
Autodesk Hong Kong
BIM
Awards
2025
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Hong Kong Institute of Utility Specialists

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HKLG HONG KONG LAW USER GROUP

iPPP 公私營合作學會
Institution of Public Private Partnerships

香港專業人士協會
The Association of Hong Kong Professionals

CIOB The Chartered Institute of Building

chartered ices

School of Architecture
THE CHINESE UNIVERSITY OF HONG KONG

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faculty of architecture 建築學院
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HKUSPACE 香港大學專業進修學院
HKU School of Professional and Continuing Education

AUTODESK

ACKNOWLEDGEMENT

Sincere thanks to all the winners – AECOM Asia Company Limited, Andrew Lee King Fun & Associates Architects Limited, Architectural Services Department, the Government of the Hong Kong Special Administrative Region, Binnies Hong Kong Limited, Build King Tung Lee Joint Venture, China Harbour Engineering Company Limited, China State Construction Engineering (Hong Kong) Limited, China State Construction Engineering (Hong Kong) Limited – Alchmex International Construction Limited Joint Venture, Chinachem Group, Civil Engineering and Development Department, the Government of the Hong Kong Special Administrative Region, CLP Power Hong Kong Limited, CRBC-QH-REC-QTEC Joint Venture, Drainage Services Department, the Government of the Hong Kong Special Administrative Region, Environmental Protection Department, the Government of the Hong Kong Special Administrative Region, Gammon Construction Limited, Hanison Construction Company Limited, Hip Hing Construction Company Limited, Hong Kong Cyberport Management Company Limited, Hong Kong Housing Authority, the Government of the Hong Kong Special Administrative Region, Hongkong Land Limited, Huadong Engineering (Shenzhen) Corporation Limited, Hysan Development Company Limited, isBIM Limited, Mott Macdonald Hong Kong Limited, P&T Architects Limited, Shenzhen Yuegang Technology Co., Limited, The University of Hong Kong, HKU Business School, Water Supplies Department, the Government of the Hong Kong Special Administrative Region, Chan Kwan Kit, Hui King Ki, Hung Kin Ho, Benson, Ngan Man Leon, Dr. Boyu Wang in providing such valuable information and pictures of their projects. Besides, we are extremely grateful for the contributions of the advisor - Dr. Calvin Kam who is profiled in this booklet.

DISCLAIMER

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- -HKUST BIM Lab, The Hong Kong University of Science and Technology

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From Vision to Reality: Leading AECO into a New Era of Innovation

In today's rapidly evolving world, industries face rising uncertainty, resource constraints, and increasing demands. The Architecture, Engineering, Construction, and Operations (AECO) sector, in particular, stands at a pivotal crossroads. Accelerating urbanization, climate imperatives, and heightened stakeholder expectations make innovation and transformation more urgent than ever. At Autodesk, we are committed to empowering professionals with tools and technologies to meet these challenges head-on. This commitment is embodied in **Autodesk Forma**—our industry cloud for AECO—which marks a significant leap forward in planning, designing, building, and operating the built environment. More than just a suite of tools, Forma is a unified, AI-native platform that enables seamless collaboration, data-driven decision-making, and sustainable outcomes across the entire project lifecycle.

Our vision is clear: to move from fragmented workflows to connected ecosystems, from static files to dynamic data, and from manual processes to intelligent automation. The **2025 Autodesk State of Design & Make Report** underscores this shift, revealing that AI skills are now a top hiring priority as organizations grapple with talent shortages and complexity. Sustainability has emerged as a key differentiator for companies seeking resilience and growth. For the second year, AI is identified as the leading enabler of sustainability in Design and Make industries, with 39% of leaders leveraging AI to enhance environmental performance. This momentum resonates locally. The HKSAR Policy Address 2025 reaffirmed the Housing Department's commitment to advanced technologies. By applying AI to analyze historical project cost data and adopting a Building Information Modeling (BIM)-enabled Systematic Approach to Foundation Design, the department sets a benchmark for cost-effective, efficient, and sustainable delivery.

Against this backdrop, the **Autodesk Hong Kong BIM Awards 2025** celebrate visionaries who embrace change and shape the future of AECO. These awards honor architects, engineers, contractors, and educators pushing boundaries through innovative use of BIM and digital technologies. Each recognized project demonstrates a unique approach to solving complex challenges—from smart infrastructure and green buildings to digital twins and AI-driven design. These success stories are more than just case studies, they are a testament to ingenuity, collaboration, and forward-thinking mindset that define Hong Kong's AECO community. They show that the future is not distant—it is being built today through data, AI, and connected workflows.

As we look ahead, the journey of transformation continues. The path forward is illuminated by the achievements of our customers, who are setting new standards and inspiring the industry to reimagine what's possible. At Autodesk, we are proud to stand alongside them, providing the tools and platforms that unlock creativity, foster collaboration, and drive meaningful impact. Together, we are entering a new era of making—one where the capacity to innovate is boundless, and the potential to shape a better, more sustainable world is within reach.

Vincent Chen
General Manager, Taiwan, Hong Kong and Macau, Autodesk

Autodesk Hong Kong BIM Awards 2025

Congratulations to all the winners!

TOP 5 BIM AWARDS

AECOM

ALKF+

China State - Alchmex Joint Venture

CHINACHEM GROUP 華懋集團

CLP 中電

渠務署 Drainage Services Department

Gammon

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Member of CTFS Group

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HKU BUSINESS SCHOOL 港大經管學院

水務署 Water Supplies Department

BIM AWARDS

AECOM

binnies

Build King

Build King – Tung Lee Joint Venture

中國港灣工程有限責任公司 CHINA HARBOUR ENGINEERING COMPANY LTD.

中國建築工程(香港)有限公司 CHINA STATE CONSTRUCTION ENGINEERING (HONG KONG) LIMITED

China State - Alchmex Joint Venture

土木工程拓展署 Civil Engineering and Development Department

CRBC-QH-REC-QTEC Joint Venture

渠務署 Drainage Services Department

Environmental Protection Department

Gammon

興勝建築有限公司 HANISON CONSTRUCTION COMPANY LIMITED

香港房屋委員會 Hong Kong Housing Authority

Hongkong Land

华东勘测设计院(深圳)有限公司

MOTT MACDONALD

P&T ARCHITECTS

YOUNG BIMER OF THE YEAR

HUNG Kin Ho, Benson

OUTSTANDING STUDENTS

HKUST BIM Lab, The Hong Kong University of Science and Technology

CHAN Kwan Kit, HUI King Ki, NGAN Man Leon, Dr. Boyu WANG

Top 5 BIM Awards



ORGANIZATION
CLP Power Hong Kong Limited
Hip Hing Construction Company Limited
Andrew Lee King Fun & Associates Architects Limited
PROJECT
Kam Tin South Substation “Smart BIM. Bold Future.”



ORGANIZATION
Drainage Services Department, the Government of the Hong Kong Special Administrative Region
AECOM Asia Company Limited
China State Construction Engineering (Hong Kong) Limited –
Alchmex International Construction Limited Joint Venture
PROJECT
Relocation of Sha Tin Sewage Treatment Works to Caverns



ORGANIZATION
Hong Kong Cyberport Management Company Limited
isBIM Limited
Gammon Construction Limited
PROJECT
Cyberport Expansion Project



ORGANIZATION
Hysan Development Company Limited
Chinachem Group
Hip Hing Construction Company Limited
PROJECT
Lee Garden Eight



ORGANIZATION
Water Supplies Department, the Government of the Hong Kong Special Administrative Region
Shenzhen Yuegang Technology Co., Limited
The University of Hong Kong, HKU Business School
PROJECT
Optimizing Water Supply Operation and Maintenance with BIM and AI Technologies

COMPANY
CLP Power Hong Kong Limited
Hip Hing Construction Company Limited
Andrew Lee King Fun & Associates Architects Limited

PROJECT
Kam Tin South Substation
"Smart BIM. Bold Future."

LOCATION
Kam Tin South, LOT NO.2324 IN D.D. 106

TYPE
Electrical Transmission Substation

SCHEDULED TIME OF COMPLETION
Feb 2027

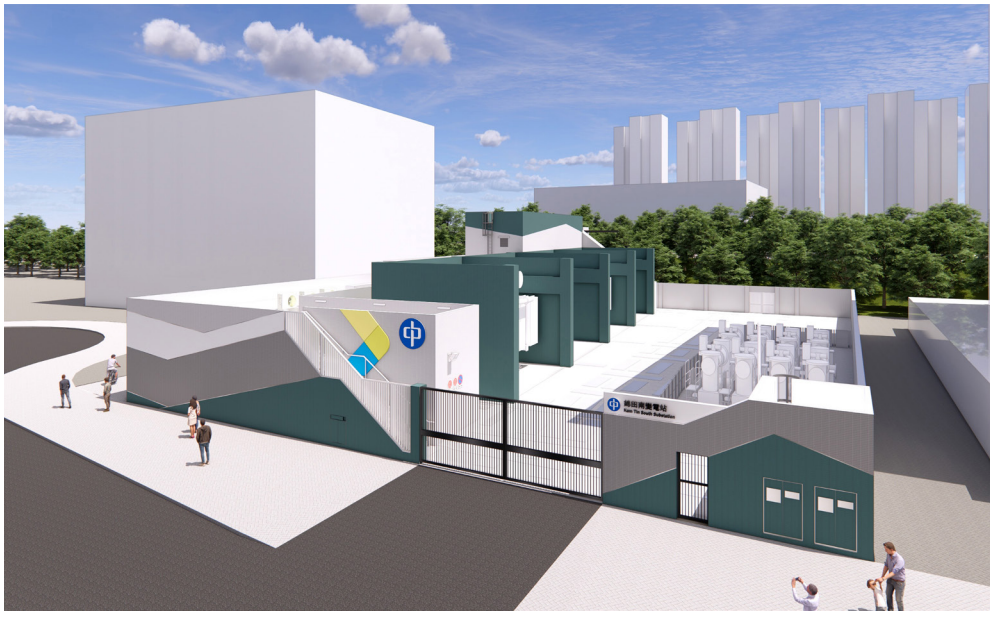
"Smart BIM. Bold Future." An Illustration of CLP Power's BIM Journey

"At CLP Power, our "BIM for Everyone" initiative unites project teams to enhance collaboration and clarity. We leverage Autodesk Construction Cloud (ACC) as our Common Data Environment (CDE) and integrate emerging technologies such as Augmented Reality (AR) and Mixed Reality (MR) to connect people, data, and decision-making.

ACC enhances coordination, communication, and compliance with international standards, transforming our vision into value through smarter designs, safer construction, operational excellence, and sustainability initiatives. We are committed to delivering innovative and impactful outcomes in electrical transmission substations, ensuring a sustainable and efficient future."

–CHUNG Sai Kit, Jackson
Manager,
Building Information Modelling,
CLP Power Hong Kong Limited

AUTODESK PRODUCTS USED
Autodesk® Civil 3D®
Autodesk Construction Cloud®
Autodesk® Dynamo
Autodesk® Navisworks®
Autodesk Platform Services
Autodesk® ReCap® Pro
Autodesk® Revit®
Autodesk® Vehicle Tracking
Data Exchange Connector



CLP Power's Kam Tin South Substation
Image Courtesy of CLP Power Hong Kong Limited and Hip Hing Construction Company Limited and Andrew Lee King Fun & Associates Architects Limited

CLP Power has been a pioneer in adopting Building Information Modelling (BIM) in electrical transmission substation projects to enhance project delivery and operational efficiency. The Kam Tin South Substation (KNS) project exemplifies our commitment to innovation, sustainability, and collaboration through BIM.

This project demonstrates the application of BIM throughout its entire lifecycle - from design and planning to construction and operations - utilising advanced technologies such as automation, data analytics, augmented reality (AR), mixed reality (MR), and cloud-based collaboration. By embracing a "BIM for Everyone" approach, CLP Power empowers all stakeholders to engage with BIM, contributing to smarter, leaner, and more impactful outcomes.

BIM Journey at CLP Power

CLP Power began its BIM journey in 2014, recognising its transformative potential across the planning, design, construction, and operation of electrical transmission substations. Over the years, BIM has evolved from a design tool into a strategic asset and is now fully integrated into all CLP Power's new transmission substation projects.

Today, BIM supports every stage of the project lifecycle - from early planning to long-term operations. CLP Power enhances usual 3D modelling and 4D construction planning by incorporating emerging technologies such as automation software, artificial intelligence (AI) chatbots, AR, and MR. These innovative technologies improve efficiency and accuracy while making BIM more accessible to all stakeholders, aligning with our commitment to achieving "BIM for Everyone."

Project Overview: Kam Tin South Substation (KNS)

The KNS is a crucial project aimed at supporting the growing electricity demand in the rapidly developing Kam Sheung Road area in the New Territories, Hong Kong. This development area encompasses new residential projects, associated facilities, and existing transport infrastructure.

CLP Power initiated the construction of KNS to ensure a reliable power supply for the expanding community. The substation was designed with mindful consideration of the natural landscape and surrounding neighbourhood. Throughout the project lifecycle, BIM technology is utilised to enhance project coordination, safety, and operational efficiency.

Design Integration with Nature

The KNS was designed with a strong emphasis on environmental sensitivity. To maintain the area's natural wind flow and green corridor, there is a height restriction for the substation building. The façade design is inspired by the surrounding hills, enabling the substation to integrate harmoniously into the nearby environment.

To optimise natural lighting and facilitate thermal comfort, a sunlight analysis was conducted. It simulated the sun's path throughout the year and assessed shading impacts from nearby structures. The results also informed temperature control strategies for rooms housing temperature-sensitive equipment.

Collaborative BIM Environment

To ensure effective collaboration and compliance with ISO 19650 standard, the project team extensively utilised the Autodesk Construction Cloud (ACC) ecosystem:

- ACC Docs served as the central repository, providing a single source of truth with version control and traceability, structured in accordance with ISO standards.
- ACC Design Collaboration facilitated the controlled sharing of design data across disciplines, streamlining workflows and enhancing teamwork.
- ACC Model Coordination created a unified space for uploading, reviewing, and identifying any potential clashes in 3D models, enabling real-time interdisciplinary coordination.
- ACC Insight delivered data-driven dashboards featuring project metrics, weather updates, and 360° site captures from various applications, transforming raw data into actionable intelligence.

By leveraging ACC, the team ensured ISO-compliant BIM practices while making BIM more controllable, accessible, and engaging for all stakeholders.

Data-Driven Decision Making

To enhance decision-making and performance tracking, the team employed the Data Exchange Connector to integrate Revit, Navisworks, and Power BI - without exporting entire models. This allowed efficient extraction and analysis of specific 3D model data, such as room geometry, equipment details, and project metrics.

Power BI transformed this data into interactive dashboards and comprehensive reports, enabling stakeholders to monitor progress and make informed decisions throughout the project lifecycle.

BIM Applications for Site Planning

BIM played a critical role in addressing site-specific challenges and enhancing planning efficiency. A key example involved mitigating traffic congestion resulting from concurrent construction activities at nearby sites.

To tackle this issue, the team conducted a swept-path analysis to simulate vehicle movements and identify potential bottlenecks along the main access route. This analysis facilitated optimised space utilisation and improved logistics planning, ensuring smoother site operations.

Enhanced MEP Coordination for Long-Term Value

Mechanical, Electrical, and Plumbing (MEP) coordination can be complex and fragmented. In this project, CLP Power successfully implemented a comprehensive BIM workflow across architecture, structure, and MEP disciplines. All teams collaborated within a shared 3D environment, establishing a single source of truth that resulted in both aesthetic and functional outcomes.

The approach of concealed conduit modelling provided valuable information for our facilities management team, facilitating more efficient planning for future maintenance work. This strategy ensures long-term value and maintainability of the systems.

Innovative Technologies for Site Monitoring

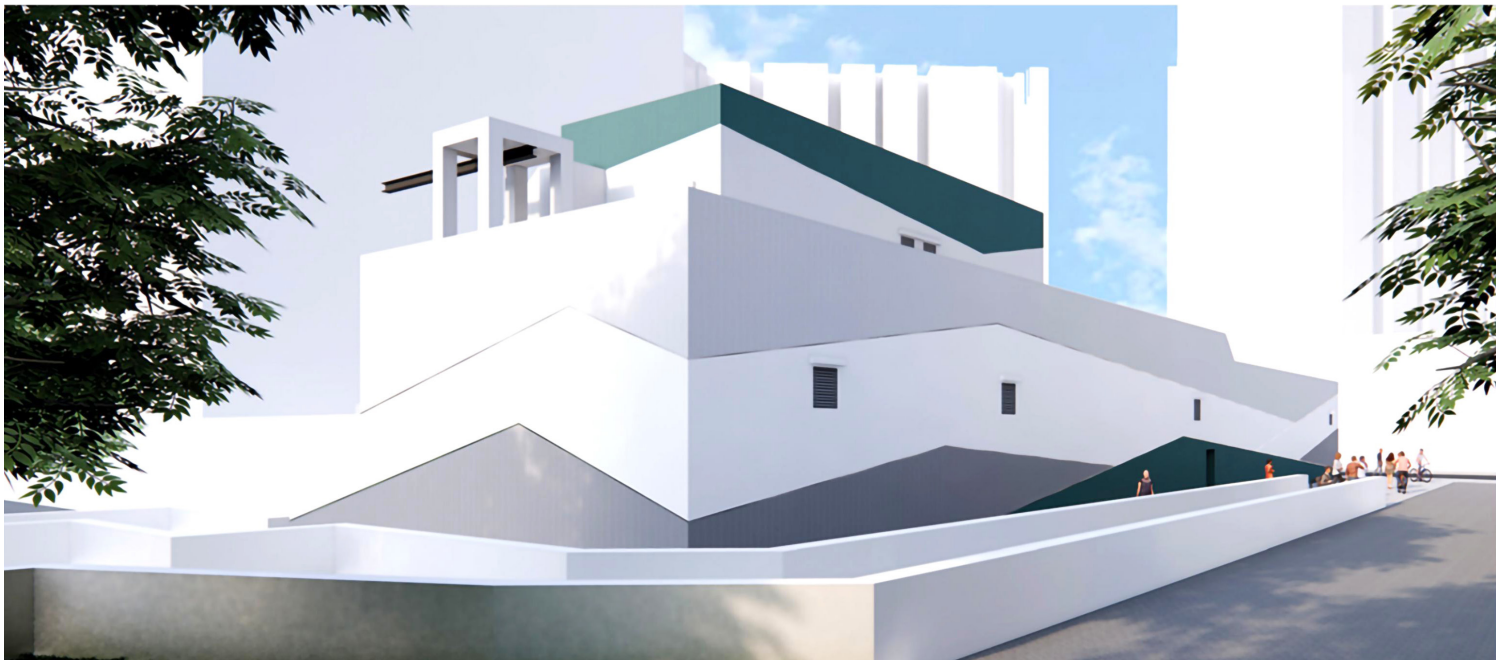
To enhance site progress tracking and facilitate real-time collaboration, CLP Power integrated AR and MR technologies with BIM. The site team member conducted weekly site walkthroughs, capturing 360° images of the construction site. These images were then uploaded to a cloud platform for processing and analysis. BIM models were regularly updated on the platform, facilitating direct comparisons between actual site progress and planned construction. This integration enabled the project team to effectively monitor progress and ensure that the substation was built according to the design.

Smart BIM, Bold Future

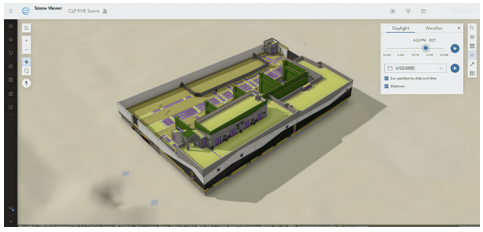
The KNS project demonstrates CLP Power's proactive approach to digital transformation through the adoption of BIM. By embracing BIM early in the project, we have realised significant benefits in design coordination, construction efficiency, stakeholder engagement, and long-term asset management.

With BIM submission becoming mandatory by private sector in Hong Kong by 2029, early adoption positions CLP Power for operational excellence. It enables us to build internal capabilities, streamline workflows, and foster a collaborative culture among the company and contractors. Now is the time to engage all project members, ensuring they are familiar with and empowered to utilise BIM effectively.

At CLP Power, we are dedicated to a "BIM for Everyone" approach. This commitment enables all project team members to contribute to the development of smarter and more sustainable solutions.



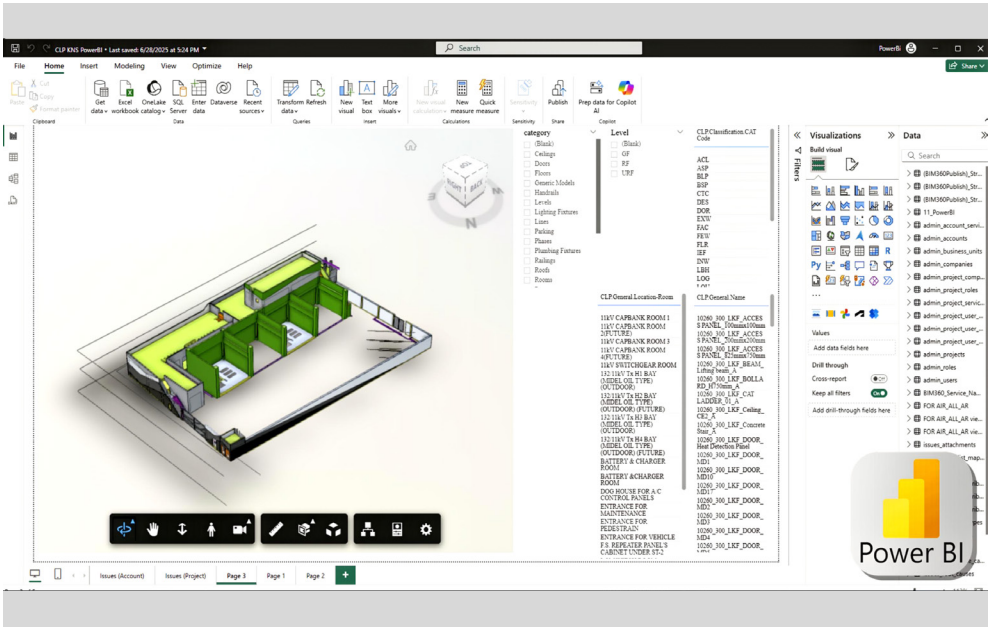
Low-rise design and mountain-patterned façade blend with nature and nearby communities
Image Courtesy of CLP Power Hong Kong Limited and Hip Hing Construction Company Limited and Andrew Lee King Fun & Associates Architects Limited



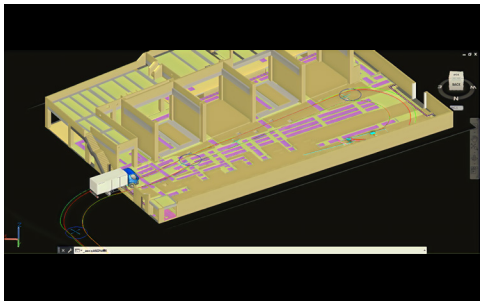
Sunlight analysis guides lighting design
Image Courtesy of CLP Power Hong Kong Limited and Hip Hing Construction Company Limited and Andrew Lee King Fun & Associates Architects Limited



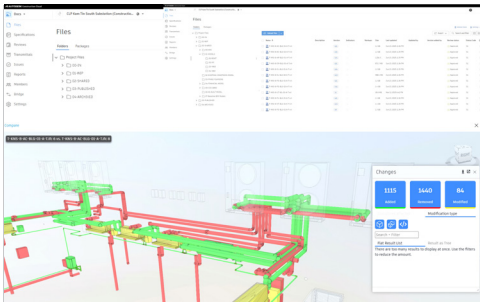
Collaborative BIM Environment - Autodesk Construction Cloud (ACC)
Image Courtesy of CLP Power Hong Kong Limited and Hip Hing Construction Company Limited and Andrew Lee King Fun & Associates Architects Limited



Data Exchange Connector for PowerBI
Image Courtesy of CLP Power Hong Kong Limited and Hip Hing Construction Company Limited and Andrew Lee King Fun & Associates Architects Limited



Swept-path analysis supports early logistic planning for site access
Image Courtesy of CLP Power Hong Kong Limited and Hip Hing Construction Company Limited and Andrew Lee King Fun & Associates Architects Limited



ACC Docs is used as single source of truth for design and file management
Image Courtesy of CLP Power Hong Kong Limited and Hip Hing Construction Company Limited and Andrew Lee King Fun & Associates Architects Limited



AR/MR is used to overlay BIM models for real-time site inspection and collaboration
Image Courtesy of CLP Power Hong Kong Limited and Hip Hing Construction Company Limited and Andrew Lee King Fun & Associates Architects Limited

COMPANY
Drainage Services Department, the Government of the Hong Kong Special Administrative Region
AECOM Asia Company Limited
China State Construction Engineering (Hong Kong) Limited – Alchmex International Construction Limited Joint Venture

PROJECT
Relocation of Sha Tin Sewage Treatment Works to Caverns

LOCATION
Nui Po Shan/A Kuk Kok Street/Mui Tsz Lam Road, Sha Tin, New Territories, Hong Kong

TYPE
Civil/Geotechnical/Structural/Infrastructure

SCHEDULED TIME OF COMPLETION
2031

Revolutionary Construction Breakthrough with AI-Integrated Generative BIM and Contractual BIM

渠務署
Drainage Services Department

AECOM

China State – Alchmex Joint Venture

"Drainage Services Department (DSD) has been actively pursuing construction digitalization through adoption of innovative tools, including BIM technology, to enhance productivity and quality. In the project "Relocation of Sha Tin Sewage Treatment Works to Caverns", we employed BIM technology throughout the project lifecycle with promising results.

Our BIM vision is to advance construction digitalization and promote enhanced design, construction and asset management. The integration of the two cutting-edge technologies, AI-Integrated Generative BIM, streamlines project collaboration for greater precision and productivity."

–LEUNG Ka Chung, Tony
Chief Engineer/Cavern Projects, Drainage Services Department, the Government of the Hong Kong Special Administrative Region

AUTODESK PRODUCTS USED
Autodesk® BIM 360® Docs
Autodesk® Civil 3D®
Autodesk Construction Cloud®
Autodesk® Docs
Autodesk® Dynamo for Revit
Autodesk® Dynamo Studio
Autodesk® Forma
Autodesk® Navisworks® Manage
Autodesk® Revit®



Caverns Location
Image Courtesy of Drainage Services Department, the Government of the Hong Kong Special Administrative Region and AECOM Asia Company Limited and China State Construction Engineering (Hong Kong) Limited – Alchmex International Construction Limited Joint Venture

BIM development of the company

Relocation of Sha Tin Sewage Treatment Works (STSTW) to Caverns is a pioneering project owned by the Drainage Services Department of the Government of the Hong Kong Special Administrative Region to initiate the local cavern development for more sustainable land use. While aiming to mitigate the long-lasting shortage of residential land, the project will also upgrade the ageing treatment facility to be more energy-efficient. The project team aims to influence the construction industry by piloting cost-effective solutions to modernize traditional workflows. To achieve this goal, extensive adoption of Building Information Modeling (BIM) is vital.

BIM Vision

The project team identifies the benefits of BIM adoption and aims to apply BIM throughout the entire project lifecycle. With reference to the ISO 19650 standard, the project team has developed a comprehensive BIM Execution Plan and implemented a structured BIM workflow since the beginning stage of the project. Thanks to the collaboration between multi-disciplinary project stakeholders, a lot of innovative and practical solutions have been created as a result to enhance the project delivery.

BIM Application – Design Phase

Generative BIM for Site Office Planning

The generative design process presented challenges: Traditional site planning in projects manual iterations for environmental constraints like sunlight and noise, often

leading to suboptimal layouts and extended feasibility studies. Autodesk Forma effectively addressed these challenges. Autodesk Forma enhanced this process by enabling the rapid analysis of site conditions, environmental impacts, and land constraints in order to generate optimal design configurations. The team generated a layout with real-time analysis in Autodesk Forma. The team also defined multiple-level goals and constraints to explore and optimize alternatives. The team used Autodesk Forma to integrate with existing conditions and generate rendered models for multidisciplinary reviews.

A generative BIM workflow using Revit Generative Design was created for the rapid exploration and optimization of site office floor plan designs. The AI-powered automation function was tailor-made to link high-level constraints and goals to corresponding layout alternatives and real-time analyses, streamlining the conceptual and feasibility study process. This function also prevented suboptimal configurations. Team members could access the cloud-based platform to obtain the latest iterations. This well-established generative BIM workflow enhanced collaboration and the decision-making process.

BIM Application – Construction Phase

Automated Parameter Input for Asset Compliance Using Dynamo

Manually inputting parameters for thousands of repetitive elements, such as manholes and pipes, is time-consuming and risks inconsistencies and errors, violating standards like ISO 19650. To address this, a visual programming solution in Dynamo was developed. The script automated the insertion of shared parameters into Revit families, validated data against project requirements, and ensured standardized consistency.

This process significantly enhanced efficiency, reduced manual effort, and ensured accuracy for downstream simulations, clash detection, and site constraint analysis. For example, the automated script inserts required parameters into families, a task that was previously only possible through manual creation. This provided a superior user interface without requiring extra settings and achieved a 90% time saving for repetitive tasks.

Rebar Modeling for Structural Elements Using Dynamo Automation

Conventional rebar modeling for concrete columns and beams is a time-consuming and complicated process. To overcome these challenges, the project team developed a Dynamo-based automation solution. This innovative approach utilized visual programming to generate rebar models for structural elements. The workflow allowed the team to modify the elements accurately and comprehensively.

Revit to Total Station Coordinate Workflow

Manually extracting coordinates for numerous survey elements increases the risk of error in large-scale cavern projects, complicating import into total stations and potentially causing construction delays. Revit to Total Station Coordinate Workflow effectively addressed this challenge. Survey coordinates were extracted directly from Revit models, exported to CSV format, and imported into total stations for precise on-site verification. This automation minimized human error in repetitive tasks and enabled instantaneous clash detection in congested zones.

Dynamo Automation for Rock Bolt and Canopy Tube Modeling

In addition to the design phase, BIM also played an important role in the construction phase. Rock bolts and canopy tubes were required for cavern stabilization work due to the large cavern span. Consequently, the project team developed the Q-system integration, an approach that automatically arranges rock bolts during the design process. This allowed for design modeling simultaneously. The fully automated modeling allowed clashes between the rock bolts to be detected automatically and instantly. This was particularly useful in congested zones and helped the team avoid rework. Therefore, the construction team could identify relevant site constraints and conduct mapping accordingly. Using Dynamo, the team developed a visual scripting solution that rapidly models rock bolts based on the mapped Q-value of the rock, the number of joints, and the nature and presence of joint water.

Point Cloud Processing with Sastrugi for As-Built Modelling

Traditional survey methods lack the precision required for accurate as-built modeling in complex cavern environments. The team utilized the Sastrugi Dynamo package to process point clouds by filtering selections and converting them into Dynamo points. The script determined the pipe centerline at the “crown level,” projected points onto a perpendicular plane, calculated the radius using best-fit geometry, and generated new pipe elements based on that radius.

Face Area Extraction for Formwork QTO

Revit cannot calculate face areas through family selection alone, which makes efficient quantity take-off for formwork challenging. However, the BIM-based tool with generative AI integration effectively addressed this challenge. The tool used visual programming enhanced by generative AI to extract surface areas from rectangular and square columns. Face Area Extraction for Formwork, enhanced with generative AI integration, streamlined repetitive tasks and improved precision.

BIM Application – Operation Phase

Streamlining Asset Management

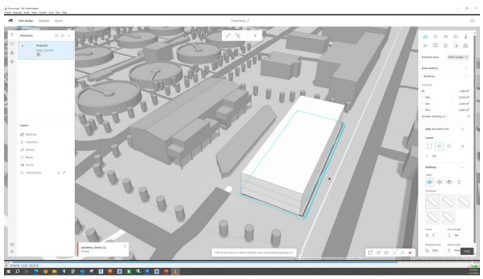
BIM application encouraged strong information exchange among stakeholders during the operational phase. Automation ensured compliance with Asset Information Requirements (AIR) and facilitated the standardisation of data across thousands of assets. This reduced the need for manual input, validated information, and enhanced the efficiency and accuracy of asset management. Autodesk BIM 360 and Autodesk Construction Cloud served as the project’s Common Data Environment (CDE), ensuring effective information management. This integrated data foundation enabled real-time monitoring, mixed reality for as-built validation, and predictive maintenance scheduling. Beyond automation, the project team developed cost-effective solutions by integrating BIM with other innovative technologies. These included using visualisation to coordinate systems during planning to proactively eliminate clashes.

Project Achievements

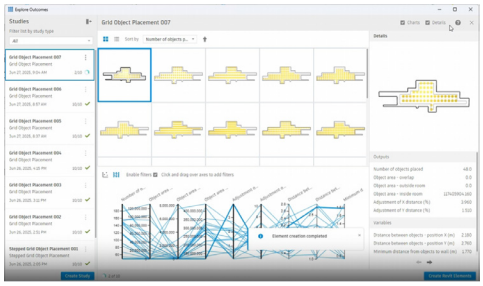
BIM is of paramount importance to our project delivery. BIM with generative AI, automation, and contractual innovations has proven to bring benefits to the entire project life cycle, from excellent safety and environmental performance to overall project administration and delivery. Our project team will continue to pioneer sustainable development by applying BIM throughout the entire project lifecycle.



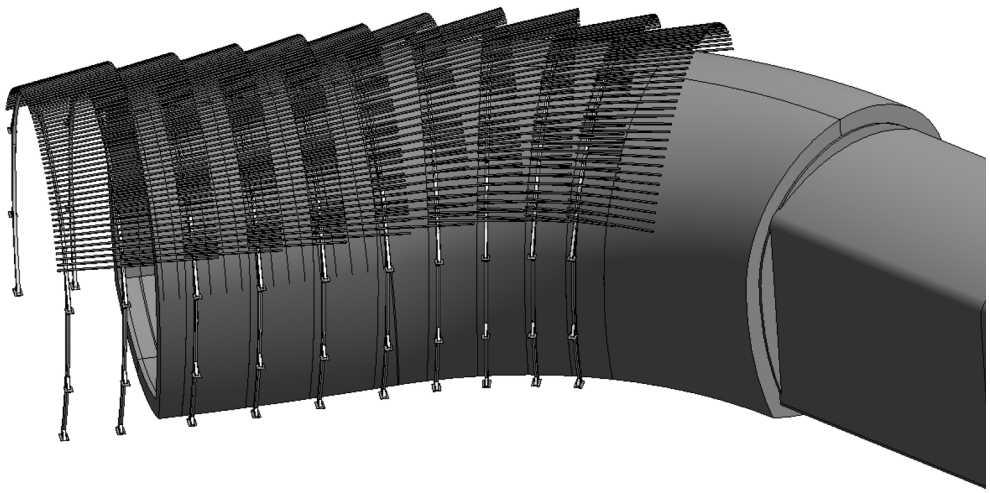
Existing Sewage Treatment Works
Image Courtesy of Drainage Services Department, the Government of the Hong Kong Special Administrative Region and AECOM Asia Company Limited and China State Construction Engineering (Hong Kong) Limited – Alchmex International Construction Limited Joint Venture



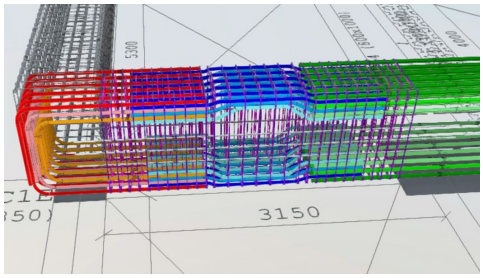
Site Office Planning
Image Courtesy of Drainage Services Department, the Government of the Hong Kong Special Administrative Region and AECOM Asia Company Limited and China State Construction Engineering (Hong Kong) Limited – Alchmex International Construction Limited Joint Venture



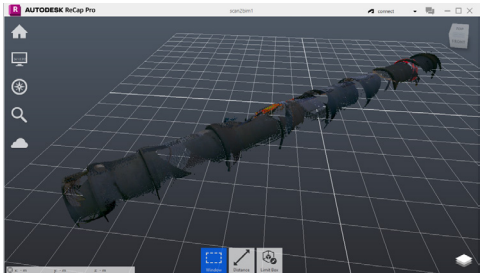
Generative Design
Image Courtesy of Drainage Services Department, the Government of the Hong Kong Special Administrative Region and AECOM Asia Company Limited and China State Construction Engineering (Hong Kong) Limited – Alchmex International Construction Limited Joint Venture



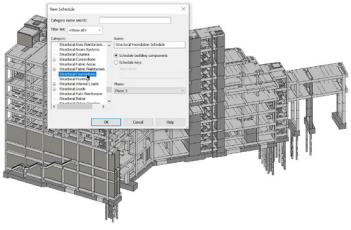
Dynamo Automation for Canopy Tubes
Image Courtesy of Drainage Services Department, the Government of the Hong Kong Special Administrative Region and AECOM Asia Company Limited and China State Construction Engineering (Hong Kong) Limited – Alchmex International Construction Limited Joint Venture



Rebar Modelling
Image Courtesy of Drainage Services Department, the Government of the Hong Kong Special Administrative Region and AECOM Asia Company Limited and China State Construction Engineering (Hong Kong) Limited – Alchmex International Construction Limited Joint Venture



Point Cloud to BIM model
Image Courtesy of Drainage Services Department, the Government of the Hong Kong Special Administrative Region and AECOM Asia Company Limited and China State Construction Engineering (Hong Kong) Limited – Alchmex International Construction Limited Joint Venture



Quantity Take-off
Image Courtesy of Drainage Services Department, the Government of the Hong Kong Special Administrative Region and AECOM Asia Company Limited and China State Construction Engineering (Hong Kong) Limited – Alchmex International Construction Limited Joint Venture

Build for a Sustainable Digital Age

COMPANY
Hong Kong Cyberport Management Company Limited
isBIM Limited
Gammon Construction Limited

PROJECT
Cyberport Expansion Project

LOCATION
Cyberport, Southern District, HK

TYPE
Commercial Building

SCHEDULED TIME OF COMPLETION
Q4 2025

"Aligning with Cyberport vision as a next-generation Digital Tech Infrastructure to support and foster the growth of digital technology, project team are keen on exploring and adopting the use of different digital solutions and technology.

By integrating BIM with IoT, cloud platforms, and digital tools. It enables seamless collaboration, smart design coordination and data-driven decision-making throughout the whole project lifecycle."

–Pierre LIN
Director,
isBIM Limited

BIM PARTNERS
Rocco Design Architects Associates Limited
WSP (Asia) Limited
AECOM Asia Company Limited
Rider Levett Bucknall Limited
Ramboll Hong Kong Limited
DSCO Group Limited
Lighting Planners Associates (HK) Limited
Shen Milsom & Wilke Limited
OZZO Technology (HK) Limited
Aurecon Hong Kong Limited

AUTODESK PRODUCTS USED
Autodesk® 3ds Max®
Autodesk® AutoCAD®
Autodesk® BIM Collaborate Pro
Autodesk® Build
Autodesk® Civil 3D®
Autodesk Construction Cloud®
Autodesk® Docs
Autodesk® Dynamo for Revit
Autodesk® Navisworks® Manage
Autodesk Platform Services
Autodesk® ReCap® Pro



Cyberport 5 – Hong Kong's New I&T Landmark
Image Courtesy of Hong Kong Cyberport Management Company Limited

Project Background

Cyberport is Hong Kong's digital tech hub and AI accelerator, with a vision to empower industry digitalisation and intelligent transformation, to promote digital economy and AI development, and to foster Hong Kong to be an international AI, innovation and technology (I&T) hub.

The Cyberport Expansion Project involves the construction of Cyberport 5 building and rejuvenating the community-beloved Waterfront Park. Cyberport 5 is a new ten-storey office building on a 1.6-hectare waterfront site located northwest of the waterfront park and adjoined the existing Cyberport Arcade. The development will provide an additional gross floor area (GFA) of 66,000 square meters, among which 36,000 square meters was office and co-working space representing approximately 30% of the current total floor area. Equipped with advanced smart office facilities, Cyberport 5 will cater to the needs of next generation digital technology enterprises and support the growth of cutting-edge technologies such as artificial intelligence, big data, blockchain, and cybersecurity, while fostering collaboration within the Greater Bay Area.

Cyberport 5 will introduce smart living experiences showcasing innovative I&T applications, as well as retail spaces for food services and convenience stores to benefit the Cyberport community and local residents. Improvements to the existing waterfront park will include rejuvenating the promenade, enhanced landscaping, and pet-friendly facilities, creating an inviting environment for all visitors.

Innovation and Technology Driven Project Delivery

At Cyberport, we are committed to fostering a smarter and more sustainable future. Our Information Strategy delivers a transformative roadmap for embedding innovation and technology throughout

Cyberport's development lifecycle. By integrating a BIM-centric approach from design through construction into operations, we've established a data-driven ecosystem that fuels operational efficiency and visionary AI applications. Centralized by a connected Common Data Environment (CDE), this strategy enables real-time collaboration, minimizes errors, and ensures seamless data continuity which turning project information into actionable intelligence that powers smart facilities, predictive analytics, and sustainable infrastructure.

Systematic Approach for BIM Success

BIM is ultimately a tool that supports daily tasks throughout the project lifecycle. Achieving success requires embedding a BIM-centric culture across the organization. In Cyberport Expansion Project, this is driven by strong project leadership and contractual rigor, underpinned by a systematic implementation approach within the project's organizational structure. Clients play a pivotal role by championing full BIM deployment as part of their corporate ethos. Mandating BIM integration in every consultancy agreement enshrines requirements from the outset of design, while extending the same obligation to construction contracts ensures seamless execution. An independent BIM consultant oversees model governance and audits deliverables, enforcing accountability and closing process gaps with industry best practices.

Consistent BIM use across consultants and contractors creates a unified digital ecosystem that streamlines automated clash detection, precise quantity take-offs, and coordinated scheduling. Planning for a seamless BIM handover with fully populated as-built models and metadata equips facility managers with a single source of truth, unlocking operational efficiencies and maximizing ROI throughout the asset's entire lifecycle.

Full BIM Design Authoring and Output Process

A systematic approach to BIM success during the design and tender stage hinges on full BIM authoring and output integration. This involves developing parametric 3D models using authoring tools like Revit, embedding data for geometry, quantities and scheduling. All disciplinary design consultants in Cyberport Expansion Project are responsible for BIM on their own disciplines, design consultants are required to author the design directly in BIM with 2D drawings created directly from BIM to maintain the single source of truth and hence a reliable federated model for coordination and other BIM uses.

The approach with an independent BIM consultant to manage, review and audit design consultants BIM input was also adopted to ensure the consistency of data input referring to BEP setup based on ISO 19650, industry standards and project specific requirements and to ensure the model quality with assistance of automation tools. BIM models are fully utilized to prepare for statutory submission and tender drawings directly. This workflow driven the use of BIM by QS on QTO, 5D and cost management with no dispute. The success in Design and Tender stage changed the culture of whole consultant team to collaborate through digital tools laying the success for BIM Implementation at construction stage in next phase.

Connected CDE Driven Construction Collaboration and Management

The full CDE driven approach on collaboration and management was adopted in construction stage starting from foundation contract to the continuous implementation at main contract. Site quality is maintained through standardized workflows, issue tracking, and coordinated updates. Models are well coordinated before construction with management and verification flow ensuring site works to follow approved construction drawings generated from BIM for a seamless transition for as-built BIM Handover. With seamless handover achieved by embedding asset data and digital twins into the CDE, BIM enable facility management team to access validated information. This approach minimizes errors, boosts productivity and ensured that every phase of the project is informed, connected, and quality-assured.

Digital Twin Development Optimizing Future Operations

The Cyberport Expansion Project advanced BIM implementation into a comprehensive digital twin development through its integrated Smart Building Platform, transcending traditional design/construction boundaries. This platform bridges the asset information model with facility management via real-time data and intelligent automation. Linked to IoT sensors, the digital twin enables dynamic monitoring of HVAC, lighting, indoor air quality, and security systems. This synergy supports predictive maintenance, energy optimization, and space utilization. These achievements earned the project WiredScore and SmartScore Platinum certifications, validating its commitment to best-in-class digital connectivity and occupant experience.

BIM Adoption to Overcome Challenges

Cyberport's commitment to digital transformation was exemplified by its pioneering use of BIM for statutory submissions, aligning with the Buildings Department's initiatives. From pre-contract to tendering stages, the project team fully leveraged BIM to streamline design coordination and enhance submission accuracy. This approach ensured 100% alignment between statutory drawings and the BIM model, significantly reducing errors and rework.

To support Cyberport's ESG commitment and initiatives such as the Journey to Zero Carbon and FinTech for ESG Conference, BIM for Engineering Analysis was strategically deployed to achieve sustainable design outcomes while ensuring occupant comfort. Through advanced modeling, we conducted solar shading and irradiance studies to optimize façade performance, air ventilation analysis considering surrounding conditions, and view studies to preserve scenic sea views at key locations like the Multi-function Hall. Functional design was seamlessly integrated, and a BIM-enabled smart platform leveraging AI analytics, Digital Twins, and IoT was adopted to enhance energy and resource management.

Through model-based clash detection with time parameters, spatial conflicts were resolved early, ensuring smooth sequencing. Safety planning was enhanced by visualizing danger zones and briefing frontline workers. BIM simulations also optimized crane usage and storage logistics, while streamlining delivery and installation workflows. This strategic use of BIM led to reduction in rework, Demonstrated outstanding milestone compliance and significantly enhanced schedule reliability. The integration of safety, logistics, and sequencing into a unified BIM environment not only mitigated risks but also maximized resource efficiency, demonstrating BIM's value as a planning and execution tool in complex construction scenarios.

Whole Lifecycle Cost Management

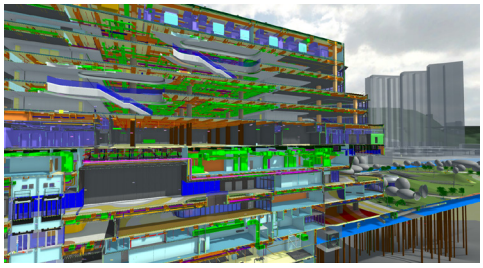
5D integration, 3D models connect cost data with schedules for real-time budget tracking, cutting overruns. A cloud-based CDE centralizes collaboration and automates compliance. Automated QTOs generate the contract sum, slashing measurement time and reducing errors. Cost visualization ensures transparency, while model comparisons accelerate change-order validation, reducing disputes and speeding approvals. The site progress itself is reflected in BIM Model for prompt interim payment assessment.

By leveraging Autodesk Construction Cloud's Cost Management module, all project cost data—estimates, budgets, commitments, invoices, and change orders—are centralized within a secure CDE. This unified platform streamlines workflows: cost plans are created, reviewed, and approved online, eliminating fragmented spreadsheets and ensuring every stakeholder accesses the latest figures.

The streamlined workflow at centralized ACC cloud accelerating the approval process. Role-based permissions govern each step, while real-time dashboards and custom reports deliver instant visibility into cost performance. Together, these capabilities enable proactive cost control, enhance collaboration across teams, and provide transparent, up-to-date insights that keep projects on budget.



Project Rendering
Image Courtesy of Hong Kong Cyberport Management Company Limited



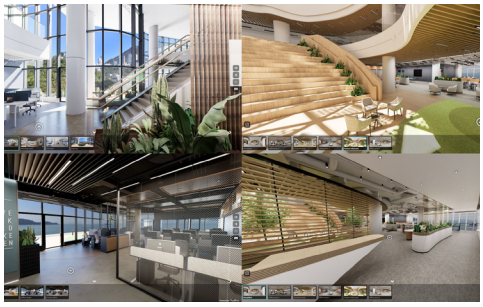
Sectional View of BIM
Image Courtesy of Hong Kong Cyberport Management Company Limited



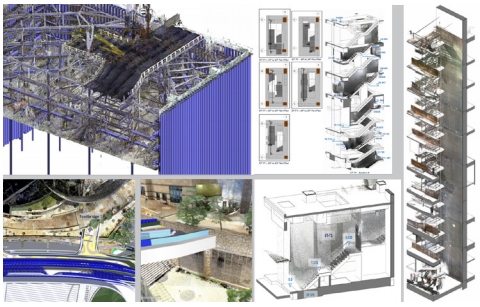
Site Image
Image Courtesy of Hong Kong Cyberport Management Company Limited



Data Services Platform (DSP)
Image Courtesy of Hong Kong Cyberport Management Company Limited



Visualization and Virtual Tour in Game Engine
Image Courtesy of Hong Kong Cyberport Management Company Limited



BIM Integration with 3D Scanning
Image Courtesy of Hong Kong Cyberport Management Company Limited



Smart Building Platform for Facility Management
Image Courtesy of Hong Kong Cyberport Management Company Limited

Lee Garden Eight: A Landmark of Sustainability and Digital Collaboration

COMPANY
Hysan Development Company Limited
Chinachem Group
Hip Hing Construction Company Limited

PROJECT
Lee Garden Eight

LOCATION
8 Caroline Hill Rd, Causeway Bay

TYPE
Commercial Building

SCHEDULED TIME OF COMPLETION
Q3 2026

"The project team has faced numerous challenges, and has used advanced technologies and softwares to effectively tackle them. Among these, BIM has proven invaluable by simplifying design coordination, minimizing construction waste, optimizing resource allocation, and mitigating risks before on-site work begins. This approach resolves potential conflicts and supports more informed decision-making."

–Dicky WOO
Deputy Project Manager,
Hip Hing Construction Company Limited

BIM PARTNERS
Foster + Partners Limited
Ronald Lu & Partners (Hong Kong) Limited
Ove Arup & Partners Hong Kong Limited
WSP (Asia) Limited
Woods Bagot Asia Limited
Inhabit Asia Limited
ATAL Building Services Engineering Limited
Jangho Group Company Limited

AUTODESK PRODUCTS USED
Autodesk® 3ds Max®
Autodesk® AutoCAD®
Autodesk® Build
Autodesk® Civil 3D®
Autodesk Construction Cloud®
Autodesk® Docs
Autodesk® Forma
Autodesk® InfraWorks
Autodesk® Navisworks®
Autodesk® ReCap® Pro
Autodesk® Revit®
Autodesk® Tandem™
Autodesk® Vehicle Tracking



Lee Garden Eight Development View
Image Courtesy of Hysan Development Company Limited and Chinachem Group

Lee Garden Eight is located at 8 Caroline Hill Road, Causeway Bay, Hong Kong. It is a high-end mixed-use commercial development project situated in one of Hong Kong's most vibrant areas and is designed to become an innovative hub for urban living, work, and social interaction. The project is jointly developed by Hysan Development Company Limited and Chinachem Group through a strategic alliance, serving as the latest expansion of the Lee Gardens Area, integrating cutting-edge architectural design with the local dynamic community.

Positioned as a new-generation urban landmark, Lee Garden Eight offers over 100,000 square feet of retail space and over 900,000 square feet of office space, catering to diverse needs such as F&B, trendy technology, and lifestyle creative industries. The project features more than 60,000 square feet of large-scale green public open spaces, creating a vibrant urban oasis that reshapes work, retail and lifestyle experiences. An integrated footbridge and covered pedestrian walkway system enhances the connectivity and pedestrian convenience throughout the entire Lee Gardens Area. By seamlessly blending indoor and outdoor environments, it encourages inspiration, exploration and discovery, relaxation, and the establishment of meaningful interpersonal connections.

Sustainability runs through the core of the project, emphasizing green and biophilic design, indoor-outdoor connectivity, and environmentally friendly building principles, setting new standards for Hong Kong's urban progress. In collaboration with the internationally renowned architectural firm Foster + Partners, the project prioritizes energy efficiency, natural lighting, and community-oriented spaces to create a more livable and environmentally responsible future. Lee Garden Eight not only continues the traditional heritage of Lee Gardens but also transforms it into a paradigm of sustainable innovation, expected to be completed in 2026.

High proportion of MEP DfMA (MiMEP) design and installation

The project faced significant challenges in implementing a high proportion of MiMEP design and installation, with over 7,400 prefabricated MEP modules delivered via MiMEP methods, covering more than 80% of the building services across three towers and podium. The primary difficulty lay in achieving factory-ready standardization while preserving flexibility for sequencing, site constraints, and interfaces in a dense urban environment, all with minimal rework and disruption.

To address this, the team adopted an early and federated design approach, coordinating MEP models within a unified environment from the outset. Multi-disciplinary reviews involving architecture, structure, façade, and building services were conducted on a fixed cadence, allowing the Design Information Model (DIM) to evolve predictably into a constructible Construction Information Model (CIM). Standardized module families were developed for elements like VAV units, valves, riser sections, and branch modules, incorporating repeatable dimensions, connection points, service clearances, and maintenance access rules to enable "swap ability" and simplify sequence planning across floors and zones. Rule-based quality gates were implemented with automated checks to validate headroom, access, fire/safety clearances, and maintainability, managed through a structured issue-tracking workflow for rapid turnaround and accountability. Once designs passed these checks, discipline leads produced Fabrication Information Models (FIM) with fully coordinated details, connection specs, lifting points, and manufacturing tags, ensuring factories received "born ready" data without manual remapping. These efforts yielded impressive outcomes: program acceleration through MiMEP adoption and clean handovers saved approximately 5% in MEP construction time compared to traditional methods; on-site MEP installation manpower was reduced by around 30%; construction waste related to MEP was cut by roughly 70%; over 10,000 clashes and issues were identified and resolved during design coordination; and quality and safety improved due to factory tolerances, consistent quality, and reduced on-site risks like work at height, hot works, and congested zones through modular assemblies and fewer in-situ fabrications.

Complex coordination with an adjacent project (Common boundary with back-to-back)

Another major hurdle was the complex coordination with an adjacent project, as Lee Garden Eight shared over 200 meters of common site boundary with a neighboring government project, featuring overlapping construction periods, interdependent basement excavation, and shared utility corridors. Geotechnical stability hinged on harmonizing excavation sequences, temporary lateral support (ELS), and structural interfaces, where late changes or misalignments could cause schedule conflicts, rework, and increased community impact. The approach involved joint phasing and interface planning, with both teams establishing a collaborative analysis to visualize and align critical sequences such as excavation stages, ELS installation and removal, utility diversions, and structural pours. High-fidelity existing conditions were captured using laser scanning—mandated by Hip Hing's policy since 2015—for basement ELS systems, with high-density scans processed and federated into the coordination environment to validate as-built conditions against design intent. Given the high-security nature of the government facility and differences in tools and versions, a "interfaces only" exchange was agreed upon, using lean, review-ready models via Autodesk Construction Cloud (ACC). Real-time coordination was maintained through regularly scheduled reviews, providing early warnings for re-sequencing to ensure area-wide geotechnical stability. Outcomes included effective stability and risk mitigation by preventing clashes between ELS and basement structures; schedule coherence through harmonized overlapping works, eliminating cascading delays and protecting sensitive assets like an Old and Valuable Tree between sites.

Traffic and logistics challenges

Traffic and logistics presented additional challenges in one of Hong Kong's busiest districts, with high traffic flow, narrow streets, and limited laydown and access points, risking congestion, delayed deliveries, safety issues for traffic marshals, and community disruption during peak hours. The team countered this with data-driven traffic management, integrating city GIS information to forecast patterns and plan strategic diversions, iterating a Traffic Management Plan based on real-world data and stakeholder feedback. Optimized access geometry was achieved through sweep path analyses to refine site gates, turning radii, and approach paths, ensuring efficient entry and exit for heavy vehicles without disruptions. As a result, peak-hour relief was realized by reducing or shifting delivery windows, lowering truck movement intensity and road occupation time; community impact was minimized by containing operations within optimal windows and aligned routes, reducing congestion and nuisance to residents and businesses.

Pedestrian footbridge connection: precision, safety, and minimal disruption

The pedestrian footbridge connection to Lee Garden Six across Leighton Road demanded millimeter-level accuracy, safety overnight installation, and minimal road closures in a dense live environment. Reality capture integrated 3D scans of the surroundings with the coordinated design model, planning control points, crane pads, rigging zones, and exclusion areas virtually. Installation simulations animated lift sequences, rotations, and placements, aligning engineers, supervisors, and safety teams on method statements, contingencies, and timings. This led to fewer unknowns, with crews briefed via visual simulations to reduce ambiguity and preserve safety; safer execution minimized surprises, time at height, and risks to public areas.

Digital assurance, automation, and team enablement

Finally, digital assurance, automation, and team enablement tackled the scale's volume of design iterations, drawing production, and repetitive tasks that risked errors and fatigue from manual workflows. Automated checks enhanced model integrity for headroom, clearances, and connections, routing issues through workflows with fix instructions. Visual programming automated repetitive tasks like E&M provision placement, reducing manual effort. Drawing production was accelerated via automation pipelines from validated models, cutting turnaround and variability. Immersive BIM Cave reviews with point cloud overlays enabled intuitive participation, speeding decisions and reducing late changes. Outcomes included faster mass drawing production with consistency; reduced coordination cycles for repetitive items, protecting schedule and quality; and faster consensus in reviews, fewer late changes, and improved stakeholder trust.

Why these solutions matter

These solutions mattered because, across MiMEP at scale, cross-project coordination, logistics, precision installations, and digitalization, the team leveraged federated coordination, reality capture, simulation, and automation to shift risks earlier in the process, where resolution is more streamlined and safer. Community impacts were minimized through targeted planning and overnight works, while geotechnical stability and interfaces were proactively managed. Collectively, these practices transformed design certainty into delivery certainty, delivering gains in time, cost, waste, safety, and stakeholder confidence.



Footbridge Connectivity to 2/F Podium
Image Courtesy of Hysan Development Company Limited and Chinachem Group



Office Tower Façade
Image Courtesy of Hysan Development Company Limited and Chinachem Group



Advanced Visulization for Integrated BIM Model
Image Courtesy of Hysan Development Company Limited and Chinachem Group



Towers 1 & 2
Image Courtesy of Hysan Development Company Limited and Chinachem Group



Covered Landscape Bridge
Image Courtesy of Hysan Development Company Limited and Chinachem Group



Towers 1 & 2 Office Drop-Off
Image Courtesy of Hysan Development Company Limited and Chinachem Group



Ground Floor “Bar Street”
Image Courtesy of Hysan Development Company Limited and Chinachem Group

COMPANY
Water Supplies Department, the Government of the Hong Kong Special Administrative Region
Shenzhen Yuegang Technology Co., Limited
The University of Hong Kong, HKU Business School

PROJECT
Optimizing Water Supply Operation and Maintenance with BIM and AI Technologies

LOCATION
Dongjiang Raw Water Trunk Transfer System

TYPE
Waterworks

SCHEDULED TIME OF COMPLETION
2026

BIM and AI-Powered Digital Twins: Optimizing Hong Kong's Water Supply System

"The integration of BIM and AI in our STTSS and AMIS systems has revolutionized water supply operations, transforming static models into dynamic digital twins that predict and prevent issues in real time. Operators now access intuitive 3D integrated dashboards for seamless decision-making, slashing energy use and downtime. This innovation not only ensures resilient supply for millions but inspires endless possibilities in smart infrastructure."

–Ir CHAN Shu To, Antonio
Chief Engineer/ New Territories East, Water Supplies Department, the Government of the Hong Kong Special Administrative Region

–Ir LEUNG Chi Chung
Chief Electrical and Mechanical Engineer/ Maintenance, Water Supplies Department, the Government of the Hong Kong Special Administrative Region

–Ir WAN Wai Yin
Senior Engineer/ Building Information Modeling, Water Supplies Department, the Government of the Hong Kong Special Administrative Region

BIM PARTNER
Summit Technology (Hong Kong) Limited

AUTODESK PRODUCTS USED
Autodesk® Navisworks®
Autodesk® ReCap® Pro
Autodesk® Revit®
Autodesk® Vault
Infowater Pro



Overall View of Tai Po WTW OSCG BIM As-built Model
Image Courtesy of Water Supplies Department, the Government of the Hong Kong Special Administrative Region and Shenzhen Yuegang Technology Co., Limited and The University of Hong Kong, HKU Business School

Introduction and Project Overview

The Water Supplies Department (WSD) is leading a major digital transformation to modernize Hong Kong's water infrastructure. At the heart of this initiative is the Dongjiang Water Supply System, which has reliably provided 70–80% of the city's water since the 1960s. In response to growing climate challenges, the project aims to enhance operational resilience, sustainability, and service continuity for over 7 million residents.

By integrating Building Information Modeling (BIM), Artificial Intelligence (AI), Geographic Information Systems (GIS), Supervisory Control and Data Acquisition (SCADA), and the Internet of Things (IoT), WSD is developing a user-friendly Digital Twin platform. This platform transforms physical infrastructure into intelligent, connected systems optimizing asset management, improving energy efficiency, and enabling data-driven decision-making across treatment works and pumping stations.

Project Scale and BIM Application

This large-scale initiative spans both above ground and underground assets. Surface infrastructure includes reservoirs, treatment works, and pumping stations, while linear assets cover water mains and tunnels. The project integrates two core systems: the Asset Management Information System (AMIS) for surface assets and the Smart Trunk Transmission System (STTSS) for trunk networks. Together, they form a unified digital ecosystem for operations and maintenance.

BIM can be applied during the operations and maintenance (O&M) phase, converting static as-built models into dynamic digital

twins. These digital twins are enhanced by real-time IoT and SCADA data, enabling continuous monitoring and predictive analytics. In STTSS, BIM supports hydraulic modeling to anticipate pressure and flow anomalies; in AMIS, it tracks asset conditions and forecasts maintenance needs.

To streamline data sharing across the asset lifecycle, the project merges BIM and GIS into a single unified platform. Lightweight BIM engines ensure fast-loading 3D models, allowing operators to make timely, informed decisions in complex water distribution environments.

BIM Implementation and Value

BIM delivers wide-ranging operational, economical, and environmental benefits. It consolidates asset data, hydraulic models, and real-time sensor feeds into a single source of truth, enabling advanced analytics and digital twin capabilities. Within STTSS, BIM facilitates hydraulic simulations for pump and valve operations, helping reduce energy consumption and improve network performance.

The Integrated System Performance Dashboard provides a state-of-the-art environment for 2D and 3D visualizations. Operators can instantly monitor key metrics such as pressure transients and flow rates. Designed with end-users in mind, the dashboard enhances situational awareness, streamlines workflows, and improves access to spatial and asset data.

AMIS supports maintenance strategy through Reliability-Centered Maintenance (RCM), combined with IoT for condition monitoring and predictive maintenance. This approach automates routine tasks and risk assessments, extends asset life, and helps prevent failures. Virtual visualizations assist with rapid emergency response, while embedded asset hierarchies ensure seamless data flow from design to decommissioning—minimizing information loss and enabling full lifecycle traceability.

By linking structured asset registers with BIM models, engineering drawings, and mobile inspection records, AMIS enables efficient condition tracking and proactive maintenance. AI-powered large language models (LLMs) further enhance BIM-AM by automating risk identification and enabling natural-language queries. This simplifies complex data interpretation and allows operators to flag potential issues such as equipment failures or inefficiencies before they escalate.

BIM also contributes to cost savings by reducing maintenance and energy expenditures. IoT-linked RCM strategies help minimize unplanned downtime, while STTSS optimizations aligned with ISO 50001 reduce operational costs. AI-enhanced lightweight engines accelerate model conversion and dashboard deployment. At Muk Wu Raw Water Pumping Station and Tai Po Water Treatment Works, BIM-AM streamlines asset registration, reduces rework, and supports real-time SCADA synchronization for proactive operations.

Innovations and Advanced Technologies

The project incorporates cutting-edge technologies to enhance functionality and user experience. Generative AI, including LLMs like DeepSeek, is embedded into STTSS to support intuitive queries—such as "Optimize pumps for peak demand" delivering real-time simulations and actionable insights. This operator-centric design democratizes complex analytics, allowing non-experts to interact with digital twins via natural language, accelerating decision-making and reducing training overhead.

Autodesk tools ensure interoperability across BIM–Asset Management workflows. Together, these technologies form a robust platform where digital twins not only replicate physical assets but also simulate "what-if" scenarios—such as climate-induced demand surges to support adaptive planning.

STTSS uses BIM as its foundation, enhanced by LLMs and genetic algorithms to optimize pump schedules and improve energy efficiency. Real-time data feeds into a 2D/3D integrated dashboard for performance monitoring and water delivery optimization. BIM and IoT also enable pipeline visualization and leak detection, reducing water loss and supporting sustainability goals.

BIM–GIS integration provides an AI-assisted workflow that links design with geospatial mapping, automates data flow, and eliminates rework. This unified view of surface and underground assets empowers WSD to monitor asset health, assess risks, and optimize operations. Realistic 3D models combine geospatial and asset data, offering a comprehensive understanding of system performance.

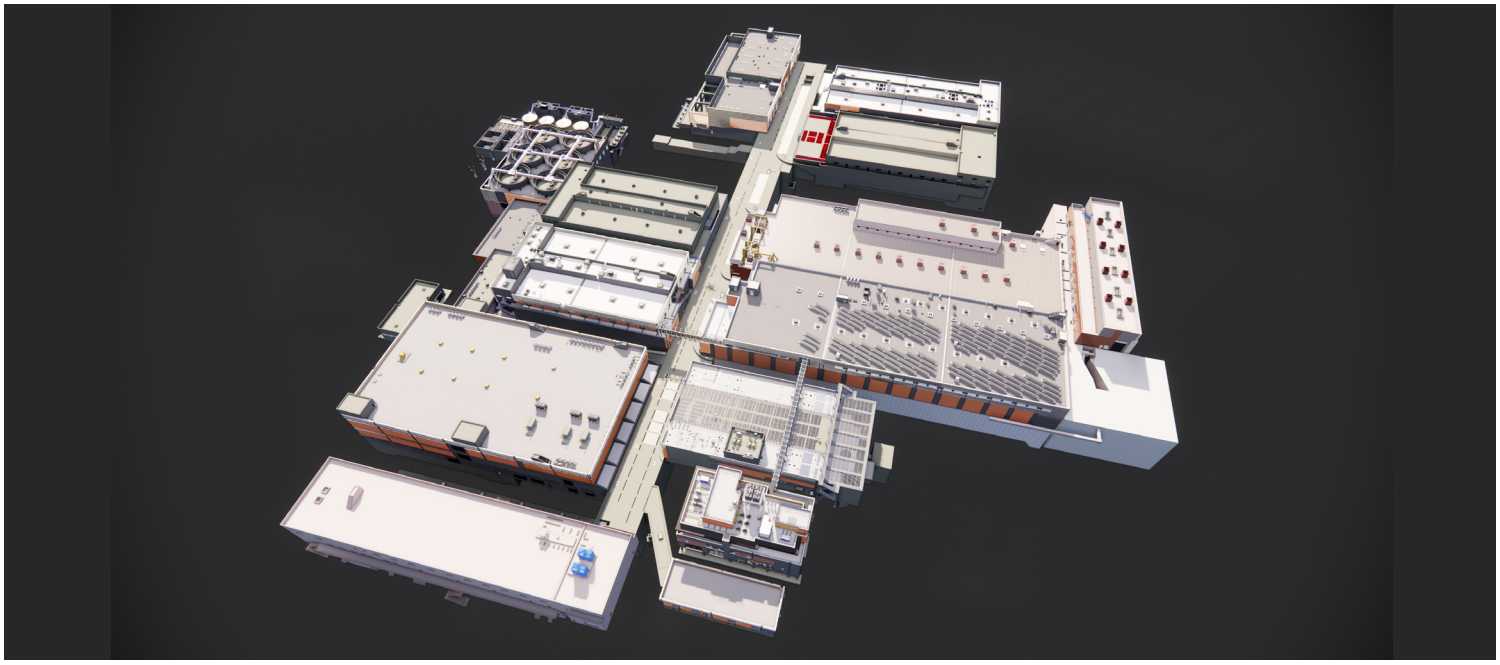
Interoperability with GIS and AI further enhances efficiency through SCADA-driven pump control and predictive maintenance analytics. The result is a reliable AI dashboard platform aligned with ISO 50001 standards, helping reduce energy use and operational costs. With BIM, WSD gains a "one-picture overview" of the entire raw water network—combining hydraulic models, dynamic 3D GIS visualization, and operational insights. Advanced features such as automated anomaly detection use LLMs to cross-reference IoT data with historical BIM records, ensuring uninterrupted service in critical infrastructure.

Recognition and Future Directions

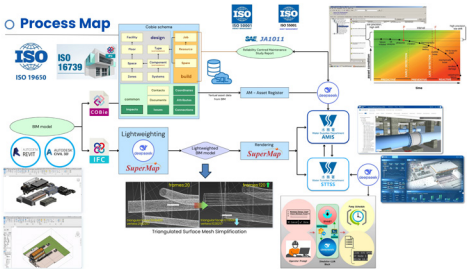
The STTSS project has received great encouragement from Minister Mr. Li Guoying during his 2025 visit. WSD has been privileged to share its BIM/GIS solutions with global experts, government leaders, and students, while using STEAM outreach to inspire future engineers and promote broader BIM adoption.

With the support of universities, consultants, and water specialists, the project has achieved remarkable outcomes: substantial energy savings valued at HK$30 million annually, a reduction of 18,000 tonnes of CO_2, and progress toward fully autonomous digital twins.

Looking ahead, WSD remains committed to innovation. Future LLM prototypes will support smarter, autonomous decision-making, including applications in reclaimed water systems. The department continues to share its learnings, such as STTSS's AI-powered semantic query pipeline tested at Muk Wu Pumping Station. This initiative marks a meaningful step toward strengthening Hong Kong's water resilience and contributing to global digital transformation.



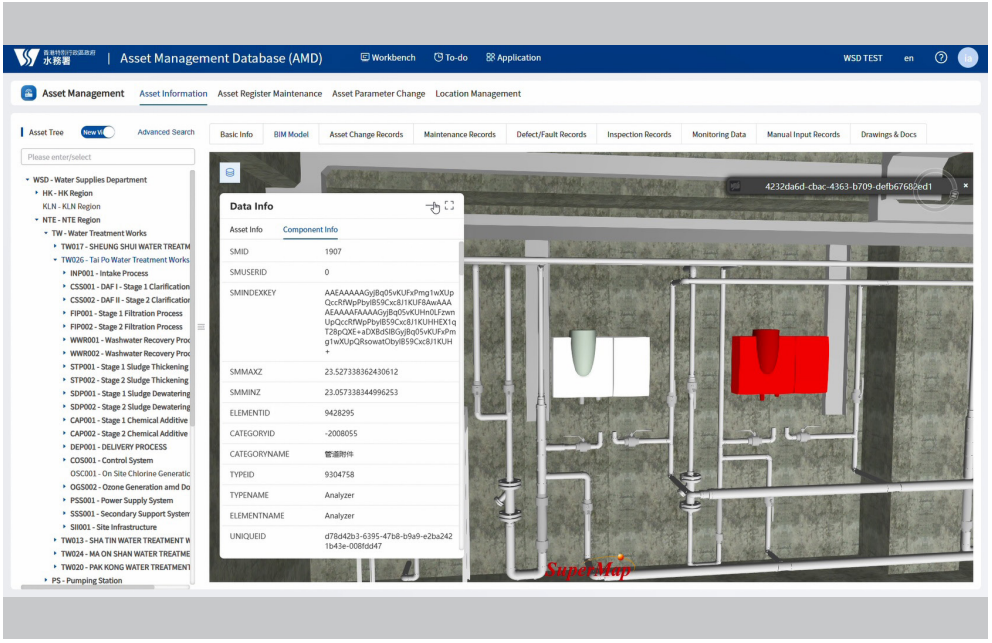
Overall View of Tai Po WTW BIM As-built Model
Image Courtesy of Water Supplies Department, the Government of the Hong Kong Special Administrative Region and Shenzhen Yuegang Technology Co., Limited and The University of Hong Kong, HKU Business School



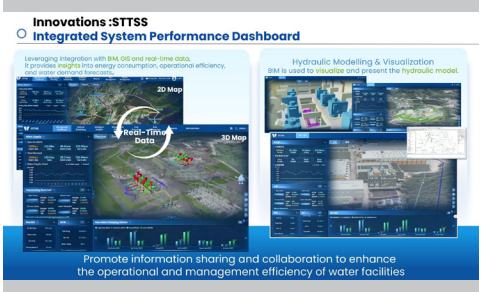
Process map for BIM integration in AMIS and STTSS
Image Courtesy of Water Supplies Department, the Government of the Hong Kong Special Administrative Region and Shenzhen Yuegang Technology Co., Limited and The University of Hong Kong, HKU Business School



Visualization of Tai Po WTW in AMIS
Image Courtesy of Water Supplies Department, the Government of the Hong Kong Special Administrative Region and Shenzhen Yuegang Technology Co., Limited and The University of Hong Kong, HKU Business School



Utilizing BIM in AMIS for Asset Management
Image Courtesy of Water Supplies Department, the Government of the Hong Kong Special Administrative Region and Shenzhen Yuegang Technology Co., Limited and The University of Hong Kong, HKU Business School



Integrated System Performance Dashboard in STTSS
Image Courtesy of Water Supplies Department, the Government of the Hong Kong Special Administrative Region and Shenzhen Yuegang Technology Co., Limited and The University of Hong Kong, HKU Business School



Visualization pump scheduling in STTSS
Image Courtesy of Water Supplies Department, the Government of the Hong Kong Special Administrative Region and Shenzhen Yuegang Technology Co., Limited and The University of Hong Kong, HKU Business School



Muk Wu RWPS lightweighted BIM model at STTSS
Image Courtesy of Water Supplies Department, the Government of the Hong Kong Special Administrative Region and Shenzhen Yuegang Technology Co., Limited and The University of Hong Kong, HKU Business School

BIM Awards



ORGANIZATION

Architectural Services Department, the Government of the Hong Kong Special Administrative Region
P&T Architects Limited
China State Construction Engineering (Hong Kong) Limited

PROJECT

Leisure and Cultural Complex at Tin Yip Road, Tin Shui Wai Phase 1 (Heritage Conservation and Resource Centre)



ORGANIZATION

Civil Engineering and Development Department, the Government of the Hong Kong Special Administrative Region
Mott Macdonald Hong Kong Limited
Build King - Tung Lee Joint Venture

PROJECT

CV/2023/17 - Site Formation and Infrastructure Works for Public Housing Development at Tsing Yi Road West, Tsing Yi



ORGANIZATION

CRBC-QH-REC-QTEC Joint Venture
Binnies Hong Kong Limited
Huadong Engineering (Shenzhen) Corporation Limited

PROJECT

The Phase 1 District Cooling System (DCS) At Kwu Tung North New Development Area (KTN NDA) Project

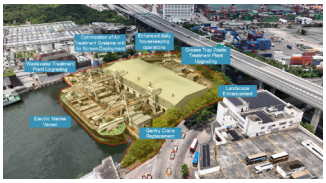


ORGANIZATION

Drainage Services Department, the Government of the Hong Kong Special Administrative Region
Binnies Hong Kong Limited
China State Construction Engineering (Hong Kong) Limited –
Alchmex International Construction Limited Joint Venture

PROJECT

DC/2022/03 Yuen Long Barrage and Nullah Improvement Schemes



ORGANIZATION

Environmental Protection Department, the Government of the Hong Kong Special Administrative Region
AECOM Asia Company Limited
China Harbour Engineering Company Limited

PROJECT

West Kowloon Transfer Station (WKTS) Second Follow-On Contract



ORGANIZATION

Hong Kong Housing Authority, the Government of the Hong Kong Special Administrative Region
Hanison Construction Company Limited

PROJECT

From Blueprint to Beyond: BIM for the Building's Full Life Cycle - Public Housing Development at Hin Fat Lane, Tuen Mun



ORGANIZATION

Hongkong Land Limited
Gammon Construction Limited

PROJECT

Tomorrow's CENTRAL: LANDMARK Atrium & Prince's Building

The BIM Museum - Unveiling Our Time Journey

COMPANY

Architectural Services Department, the Government of the Hong Kong Special Administrative Region

P&T Architects Limited

China State Construction Engineering (Hong Kong) Limited

PROJECT

Leisure and Cultural Complex at Tin Yip Road, Tin Shui Wai Phase 1 (Heritage Conservation and Resource Centre)

LOCATION

Tin Yip Road, Tin Shui Wai

TYPE

Building

SCHEDULED TIME OF COMPLETION

Q1 2027

"By integrating architectural and building technologies with heritage conservation, we not only solved complex engineering challenges but also preserved cultural assets for the next generation. BIM empowered us to turn tradition into a living legacy."

–Billy LAW
Chief Project Manager 302, Architectural Services Department, the Government of the Hong Kong Special Administrative Region

–Sian WONG
Architect (BIM Manger), P&T Architects Limited

–Becky CHAN
BIM Manager, China State Construction Engineering (Hong Kong) Limited

BIM PARTNER

Transcendence Company Limited

AUTODESK PRODUCTS USED

Autodesk® Architecture, Engineering & Construction Collection
Autodesk® AutoCAD®
Autodesk® BIM 360®
Autodesk® BIM Collaborate Pro
Autodesk® Dynamo Studio
Autodesk® Navisworks® Manage
Autodesk® Revit®



Exterior render: overall HCRC architectural massing.
Image Courtesy of Architectural Services Department, the Government of the Hong Kong Special Administrative Region and P&T Architects Limited and China State Construction Engineering (Hong Kong) Limited

Project Background

The Heritage Conservation and Resource Centre (HCRC) is Hong Kong's first purpose-built centre that combines high-standard conservation and storage with publicly visible studios and educational interaction zones. The project is located on Tin Yip Road, Tin Shui Wai, with a site area of approximately 4,924 m^2 and a construction floor area of approximately 44,980 m^2. Scheduled for completion in Q1 2027, HCRC spans from design through construction and targets museum-grade environmental performance. BIM was adopted comprehensively across architecture, structure, building services, façade, foundation, utilities, lifts, quantity surveying, and project management. Its application covers multiple building lifecycle stages: design development, coordination, digital fabrication support (CSD/CBWD), 4D construction phasing, QA/QC and compliance checking, and handover-readiness for asset management. The project team features multi-disciplinary collaboration among P&T Architects Limited, China State Construction Engineering (Hong Kong) Limited, and the Architectural Services Department, supported by a structured BIM organisation of BIM Director/Manager, Project Director, discipline BIM coordinators (AR/BS/ST), site managers, engineers, QS, and off-site BIM modellers. A role-based Common Data Environment (CDE) underpins information governance and secure sharing among designers, contractors, specialist subcontractors (MEP, lift, façade), and AM/FM stakeholders.

Value and ROI of BIM

BIM delivered clear, measurable value. Collaboration on CDE shortened coordination cycles by more than 25%, while structured clash detection and coordinated issue resolution reduced RFIs and errors by over 30%. Automated documentation–such as

CSD/CBWD generation and tagging—cut drafting effort from days to 30–75 minutes, with 514 walls, 118 slabs, and 72 beams processed in under five minutes. Model-driven QTOs for concrete and link-bridge steel improved procurement accuracy and reduced waste and carbon. 4D phasing validated sequences, crane positions, and logistics, preventing time-based clashes and resequencing. Novel simulations for heritage bus loading confirmed clearances and turning radii, avoiding late-stage redesign and site disruption. OpenBIM QA/QC with IFC and BCF increased compliance, transparency, and auditability. Collectively, these outcomes translated into reduced rework, streamlined workflows, lower operational costs, and a stronger return on investment throughout design and construction.

Innovation Highlights

The HCRC showcases several industry-leading innovations. The "BIM Museum" automation performs autonomous room searching and equipment/furniture counting, outputting reports and 3D spatial visualizations. Tasks that previously took three days now complete in three minutes, enabling research-grade documentation and curation planning. Mixed Reality (MR) was used onsite to pinpoint air-leakage weak points—such as flange, sleeve, door, and window joints—linking field observations with BIM-based CFD studies to uphold stringent airtightness targets essential for conservation. A parametric façade workflow was introduced for documentation and coordination, with BMU access simulations detecting unreachable corners before construction and informing maintainability refinements. Together, these approaches extend BIM beyond geometry into intelligent analytics, environmental performance assurance, and lifecycle planning.

BIM Goals and Rationale

The project's BIM goals were tailored to its conservation mission. First, achieve museum-grade airtightness and environmental control to safeguard artefacts and collections. Second, de-risk the complex, non-orthogonal façade's constructability and long-term maintenance through parametric modelling and BMU access verification. Third, minimize rework and RFIs via robust clash detection, analytics, and digital-fabrication-ready documentation. Fourth, provide a single source of truth for multi-trade coordination, compliance, and eventual asset handover. These goals align with the Government's policy and standards and the project's need for repeatable, auditable processes across a large, highly specialized facility.

BIM Process and Workflow

BIM governance is anchored in a CDE with a clear hierarchy (WIP, Shared, Published, Archive, As-built) and strict model naming per DEVB BIM Harmonisation Guidelines (v2.1), enabling fast identification of discipline, version, and scope without opening files. Federation spans AR, BS, ST, façade, foundation, utilities, and lift models. Clash detections were conducted with issues synchronising back to issues tracking platforms with custom attributes (level, trade, priority, target date, RFI links). Weekly dashboards are generated by exporting issue logs and auto-refreshing visualizations, providing a single source of truth for open/closed status, age, zone, and trade—accelerating closure by about 30%. 4D simulations link the BIM model to the master programme to validate sequencing, site access, and logistics, including specialty heritage bus operations. Smart site management via the C-SMART Central Management Platform (4SLS) integrates IoT, AI, and wearables, while Open3Dhk and UUIS connect open city and underground utilities data for context-aware planning. DWSS digitizes RFIs, comments, approvals, and photo records for end-to-end supervision.

Standards, KPIs, and Performance

The project adheres to a comprehensive standards stack: DEVB BIM Harmonisation Guidelines for Works Departments (v2.1); ArchSD BIM Guides for Architecture, Structure, Building Services, Cost Estimation, and Facilities Upkeep (v2.0); EMSD BIM-AM Standards and Guidelines (2022, v3.0); LandsD BIM–GIS Integration Guidelines (June 2023); and CIC BIM Standards – General (2024). Performance is tracked through KPIs including more than 25% time savings in coordination, over 30% reduction in RFIs and errors, validated airtightness via BIM-based CFD analyses, and quantified reductions in waste and carbon. OpenBIM Quality Platform with IFC-based rule checks and BCF-linked issues ensures compliance and creates a transparent audit trail across software ecosystems, supporting lifecycle management and handover readiness.

Challenges and Continuous Improvement

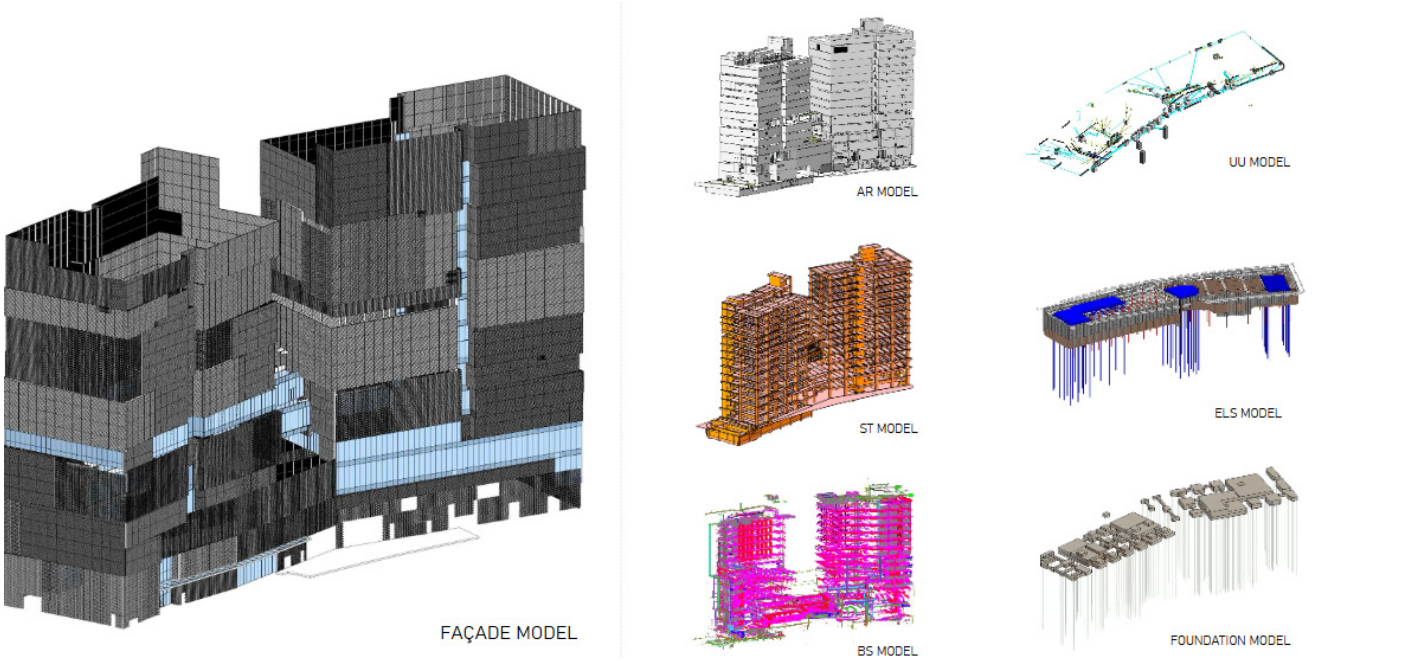
Two primary challenges shaped the BIM strategy. First, coordinating an irregular, non-vertical façade with reliable BMU access demanded parametric integration and early simulation to detect unreachable corners, leading to design refinements that improve long-term maintainability. Second, ensuring airtightness across a large inventory of specialized rooms required meticulous attention to joint types and workmanship. The team leveraged MR for onsite visualization, tied findings to CFD results, and implemented targeted detailing to reduce leakage risk. Looking forward, the project identifies pathways for improvement: more automated optimization and AI-generated design, stronger links to digital fabrication and DfMA, and continued enhancement of QA/QC rule sets to further reduce cycle time and manual effort.

From Traditional to BIM-Enhanced Practice

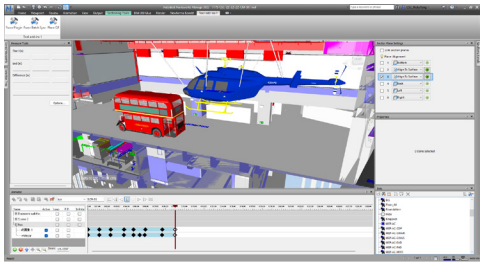
Traditional delivery relied on 2D coordination, manual counts for equipment/furniture, email-based RFI trails, and late-stage clash discovery—often causing rework and delays. The BIM-enhanced approach replaces these pain points with federated models and structured clash-to-closure workflows, API-driven documentation for CSD/CBWD and tagging, and autonomous asset analytics that produce instant Excel outputs and 3D spatial maps. 4D simulations validate sequencing and logistics in advance; MR brings field QA into the digital loop for airtightness; OpenBIM QA/QC ensures cross-platform compliance; and DWSS centralizes site supervision and approvals. The net effect is a faster, more reliable, and auditable delivery process that aligns with strict public works standards and museum-grade performance requirements.

Intelligent Workflows to Share with the Industry

HCRC offers several replicable, high-impact workflows. The Autonomous "BIM Museum" shows how multi-platform scripting can transform room-based asset discovery and reporting, cutting effort from days to minutes and elevating data fidelity for curation and O&M planning. The airtightness-by-design framework integrates BIM-based CFD with MR-enabled field verification, providing a practical playbook for archives, labs, and healthcare environments that demand stable environmental conditions. The parametric façade pipeline balances design freedom with BIM compliance and maintainability checks. OpenBIM quality control, grounded in IFC and BCF, demonstrates how to standardize QA/QC across vendors and disciplines. Finally, API-driven documentation exemplifies how targeted automation can drastically reduce drafting cycles while improving clarity for site installation. These methods, combined with 4D phasing and specialty logistics simulations, offer a robust template for complex cultural and conservation-led projects.



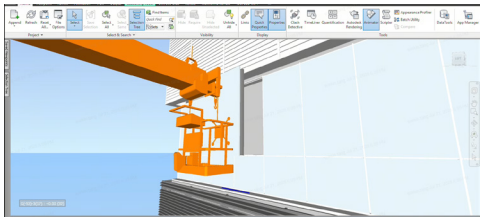
Federated AR/ST/BS model for coordination.
Image Courtesy of Architectural Services Department, the Government of the Hong Kong Special Administrative Region and P&T Architects Limited and China State Construction Engineering (Hong Kong) Limited



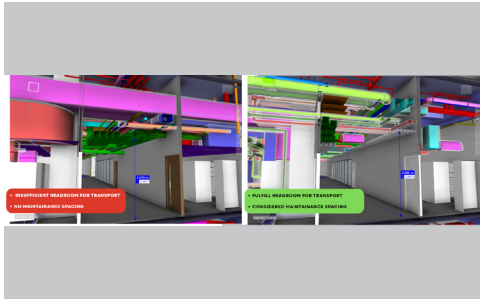
4D simulation: heritage bus logistics and clearances.
Image Courtesy of Architectural Services Department, the Government of the Hong Kong Special Administrative Region and P&T Architects Limited and China State Construction Engineering (Hong Kong) Limited



Mixed Reality airtightness review using HoloLens.
Image Courtesy of Architectural Services Department, the Government of the Hong Kong Special Administrative Region and P&T Architects Limited and China State Construction Engineering (Hong Kong) Limited



façade installation simulation for constructability.
Image Courtesy of Architectural Services Department, the Government of the Hong Kong Special Administrative Region and P&T Architects Limited and China State Construction Engineering (Hong Kong) Limited



MEP coordination: clash detection and resolution in BIM.
Image Courtesy of Architectural Services Department, the Government of the Hong Kong Special Administrative Region and P&T Architects Limited and China State Construction Engineering (Hong Kong) Limited



openBIM with Open3Dhk: site context integration.
Image Courtesy of Architectural Services Department, the Government of the Hong Kong Special Administrative Region and P&T Architects Limited and China State Construction Engineering (Hong Kong) Limited



C Smart CMP: smart site safety management platform.
Image Courtesy of Architectural Services Department, the Government of the Hong Kong Special Administrative Region and P&T Architects Limited and China State Construction Engineering (Hong Kong) Limited

COMPANY

Civil Engineering and Development Department, the Government of the Hong Kong Special Administrative Region

Mott Macdonald Hong Kong Limited

Build King - Tung Lee Joint Venture

PROJECT

CV/2023/17 - Site Formation and Infrastructure Works for Public Housing Development at Tsing Yi Road West, Tsing Yi

LOCATION

Tsing Yi Road West, Tsing Yi

TYPE

Civil

SCHEDULED TIME OF COMPLETION

01 August 2029

Infrastructure Development: Merging Technology and Collaboration for Efficient Management

CEDD 土木工程拓展署 Civil Engineering and Development Department

MOTT MACDONALD

Build King – Tung Lee Joint Venture

"Autodesk Construction Cloud and AI-driven solutions revolutionize project management by connecting data and automating workflows. Intelligent document handling, OCR data extraction, and real-time dashboards make information instantly accessible, reducing manual effort and errors. Integration with ERP systems enhances resource planning and coordination. This innovative approach transforms complexity into clarity, promotes teamwork, and sets new benchmarks for efficiency, transparency, and success, driving the construction industry forward with smarter processes and better outcomes at every stage."

–Harry LEUNG
Senior Construction Manager,
Build King Management Limited

AUTODESK PRODUCTS USED

Autodesk® 3ds Max®
Autodesk® Civil 3D®
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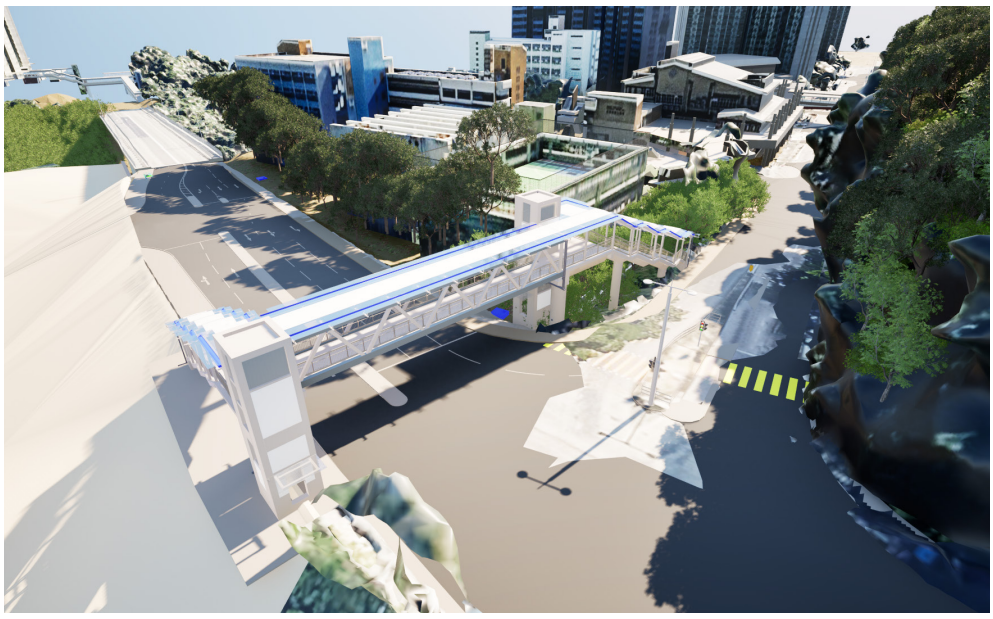
Autodesk® Navisworks® Manage
Autodesk® ReCap® Pro
Autodesk® Revit®



Site Formation and Infrastructure Works for Public Housing Development at Tsing Yi Road West, Tsing Yi. Image Courtesy of Civil Engineering and Development Department, the Government of the Hong Kong Special Administrative Region and Mott Macdonald Hong Kong Limited and Build King - Tung Lee Joint Venture

Vision for Site Formation and Infrastructure Works

The project involves site formation and infrastructure works for a public housing development at Tsing Yi Road West, Tsing Yi. Key components include forming a 3-hectare works site with retaining walls and slopes, building a footbridge with lifts over Tsing Yi Road West, constructing a signal-controlled junction for road connection, and carrying out ancillary works such as drainage, sewerage, water supply, and landscaping. The project is managed by the Civil Engineering Office / Special Duties (Works) Division of the Civil Engineering and Development Department, with Mott MacDonald Hong Kong Limited as the consultant and Build King - Tung Lee Joint Venture as the contractor. The approved project estimate is $727.1 million, and construction began in August 2024.

The Tsing Yi Road West infrastructure project demonstrates a forward-thinking approach to construction management, leveraging digital technologies to address the complexities of modern site formation. The project's adoption of Autodesk BIM and digital collaboration tools serves as a model for how technology can streamline communication, improve efficiency, and ensure quality across all stages and disciplines.

Centralized Data Hub: Foundation of Collaboration

A centralized data hub serves as the backbone of the project's information management system, enabling effective collaboration among all stakeholders. Through this unified platform, diverse teams—including project management, accounting, administration, business,

human resources, finance, estimating, procurement, safety, environmental, and operations—are brought together in a single digital environment. This centralization breaks down data silos, allowing for efficient data sharing, comprehensive analysis, and integrated decision-making at every management level. The result is a "one network, one vision" approach, where information remains consistently accessible, up-to-date, and secure for all participants.

Data Visualization and AI: From Insights to Actions

Once data is centralized, the focus shifts to transforming raw information into meaningful insights that drive action. The project leverages interactive dashboards and advanced data visualization tools to provide managers with real-time, actionable intelligence. By integrating a Universal AI Platform, users can quickly retrieve data and perform intelligent queries, enabling faster and more informed decision-making. These digital tools establish a dynamic feedback loop, ensuring that data is continuously analyzed and actively applied to enhance project performance, rather than simply being archived.

Unified Information Management: ACC Cross-Referencing

A major pain point in traditional project management is the disconnect between drawings, reference documents, and project records, leading to inefficiency and slow issue resolution. The enhanced workflow in this project uses Autodesk Construction Cloud (ACC) to cross-reference information. Every issue is linked to its full history, including schedules, drawings, BIM models, photos, SCSI, and RFI records. This unified referencing ensures that all related documents and decisions are easily traceable, supporting both internal studies and claims management.

Comprehensive Document Workflow

The document management process is both systematic and transparent, promoting efficiency and accountability throughout the project. Incoming documents are first reviewed by Project-in-charge and line managers, then tasks are automatically assigned to the relevant teams. Clerk personnel upload documents to the Autodesk Construction Cloud (ACC) and enter the necessary details. Subsequent reviews, follow-ups, and activity tracking ensure that every document is properly managed. This structured workflow, reinforced by clear activity logs and references, helps prevent information loss and maintains accountability at every step.

Document and Task Management Dashboards: Monitoring in Real Time

The document and task management dashboard provides an overview of key areas such as NCE (Notification of Compensation Event), CSF (Contractor Submission Form), and RFI (Request for Information). Managers can review task statuses (work-in-progress, pending review, closed, overdue), search reference documents, and monitor pending replies. These dashboards ensure that nothing falls through the cracks and support proactive project management.

Ongoing Enhancements: ACC API Integration

The project is actively enhancing its digital ecosystem via API integration with ACC, focusing on:

1. Excel Synchronization: File attributes are synchronized between Excel and ACC, reducing manual data entry.

2. Automatic Electronic Signatures: Streamlining approval processes.

3. Automated Document Referencing: Linking related documents automatically.

4. OCR Extraction: Using Optical Character Recognition to read and import document details directly into the CDE.

These enhancements further automate workflows, reduce manual errors, and save valuable time.

Enhancing the Common Data Environment with ACC APIs

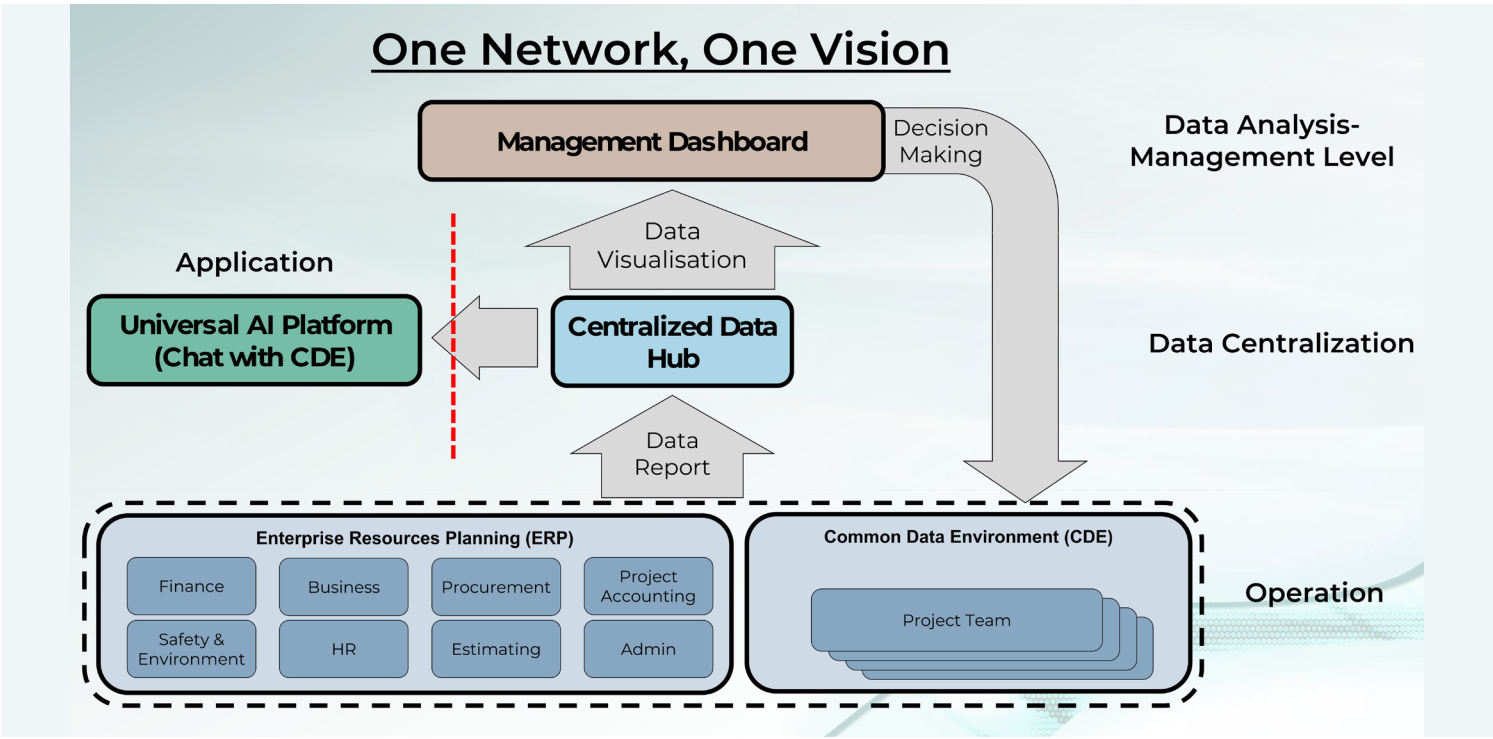
The integration of ACC APIs has brought substantial improvements to the Common Data Environment (CDE), making project workflows more efficient and reliable. By utilizing the Autodesk Construction Cloud (ACC) API, the system can now automate essential tasks such as generating cover pages, applying digital signatures, and referencing documents, all of which help reduce manual work and minimize errors. A key advancement is the integration with Enterprise Resource Planning (ERP) systems, which enables smooth data exchange between platforms and supports better resource planning and management. Alongside these features, Excel synchronization and a robust backup solution ensure that project data remains accessible and safeguarded against accidental loss. Together, these enhancements not only streamline daily operations but also enhance the overall transparency and security of project information management.

Optical Character Recognition (OCR) in Project Documentation

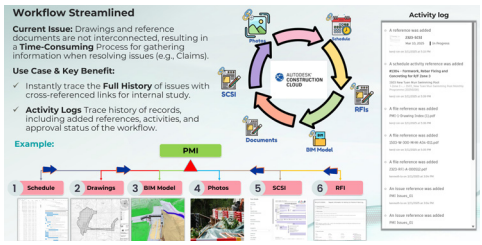
The adoption of Optical Character Recognition (OCR) technology has significantly improved the efficiency and accuracy of project documentation. By scanning and processing documents, the OCR reader captures essential details such as letter type, title, sender, date, recipient, and reference numbers. This extracted data is then automatically imported into the Common Data Environment (CDE), where it populates the relevant attributes for each document. As a result, manual data entry is greatly reduced, minimizing the risk of errors and freeing up valuable time for project teams. Overall, the integration of OCR not only streamlines the documentation process but also enhances data integrity, supporting more reliable and timely project management.

Universal AI Platform: The Future of Construction Management

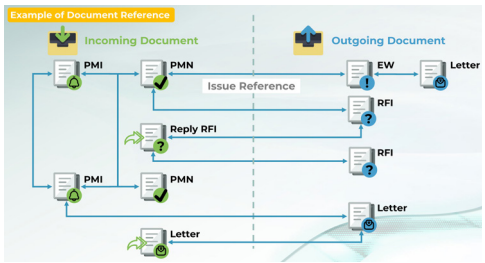
Looking forward, the Universal AI Platform will integrate AI-driven tools like safety chatbots and intelligent assistants that interact with CDE. This not only enhances user experience and accessibility but also lays the groundwork for predictive analytics, automated risk identification, and smarter workflow management. The platform's ongoing development ensures the project team stays at the forefront of digital construction practices.



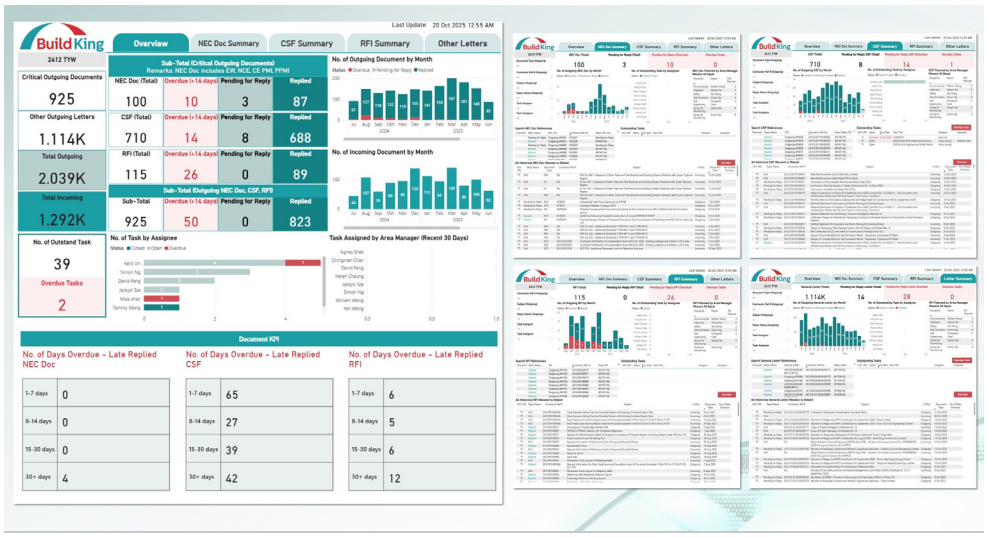
Centralizes ERP and CDE data through an AI platform, enabling unified data analysis and smarter management decisions.
Image Courtesy of Civil Engineering and Development Department, the Government of the Hong Kong Special Administrative Region and Mott Macdonald Hong Kong Limited and Build King - Tung Lee Joint Venture



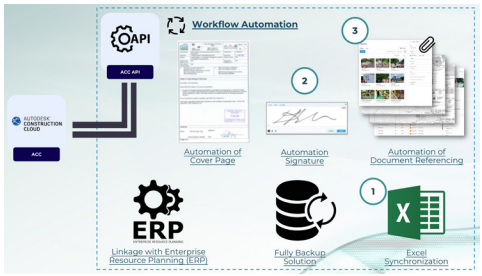
ACC cross-referencing streamlines project workflows by linking schedules, drawings, models, and documents, allowing teams to instantly trace full issue histories and view detailed activity logs.
Image Courtesy of Civil Engineering and Development Department, the Government of the Hong Kong Special Administrative Region and Mott Macdonald Hong Kong Limited and Build King - Tung Lee Joint Venture



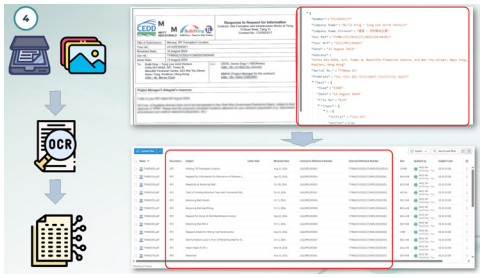
Document workflow links incoming and outgoing records for efficient tracking and issue referencing.
Image Courtesy of Civil Engineering and Development Department, the Government of the Hong Kong Special Administrative Region and Mott Macdonald Hong Kong Limited and Build King - Tung Lee Joint Venture



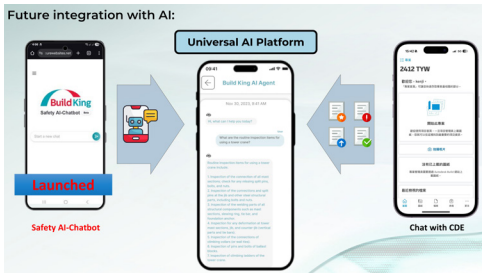
The Document and Task Management Dashboard provides real-time tracking and status summaries of all project documents.
Image Courtesy of Civil Engineering and Development Department, the Government of the Hong Kong Special Administrative Region and Mott Macdonald Hong Kong Limited and Build King - Tung Lee Joint Venture



ACC APIs automates workflows, integrates ERP, and ensures secure project data backup in the CDE. The Document Dashboard provides real-time tracking and status summaries of all project documents.
Image Courtesy of Civil Engineering and Development Department, the Government of the Hong Kong Special Administrative Region and Mott Macdonald Hong Kong Limited and Build King - Tung Lee Joint Venture



OCR automates data extraction from documents, reducing manual entry and improving accuracy.
Image Courtesy of Civil Engineering and Development Department, the Government of the Hong Kong Special Administrative Region and Mott Macdonald Hong Kong Limited and Build King - Tung Lee Joint Venture



Universal AI Platform enables smart chat and integration with project systems.
Image Courtesy of Civil Engineering and Development Department, the Government of the Hong Kong Special Administrative Region and Mott Macdonald Hong Kong Limited and Build King - Tung Lee Joint Venture

COMPANY
CRBC-QH-REC-QTEC Joint Venture
Binnies Hong Kong Limited
Huadong Engineering (Shenzhen) Corporation Limited

PROJECT
The Phase 1 District Cooling System (DCS) At Kwu Tung North New Development Area (KTN NDA) Project

LOCATION
Kwu Tung North New Development Area

TYPE
District Cooling System

SCHEDULED TIME OF COMPLETION
2026

BIM Innovations in Intelligent Construction: DfMA and Energy Optimization for District Cooling Systems

CRBC-QH-REC-QTEC Joint Venture

"We are excited to embark on the Design-Build-Operate Contract for the Phase 1 District Cooling System at Kwu Tung North New Development Area. Collaborating with the Electrical and Mechanical Services Department (EMSD), we aim to leverage innovative BIM practices to enhance project efficiency and sustainability. Our dedicated team is committed to delivering this vital infrastructure within the targeted 27-month timeline, contributing to Hong Kong's development and environmental goals."

–WANG Yanhua
Chairman and Managing Director,
China Road and Bridge Corporation

–CHAN Chi Ming, Antonio
Deputy Managing Director,
REC Engineering Company Limited

–LO Kan Ip, Eric
Director,
Binnies Hong Kong Limited

–YUE Qinghua
Chairman,
Huadong Engineering (Shenzhen) Corporation Limited

BIM PARTNER
Architectural Project Unit Limited

AUTODESK PRODUCTS USED
Autodesk® 3ds Max®
Autodesk® AutoCAD®
Autodesk® Civil 3D®
Autodesk® Construction Cloud
Autodesk® Dynamo
Autodesk® Navisworks®
Autodesk® ReCap®
Autodesk® Revit®
COBie Extension for Revit
Model Checker for Revit



Overall View of the Phase 1 District Cooling System at Kwu Tung North New Development Area
Image Courtesy of CRBC-QH-REC-QTEC Joint Venture and Binnies Hong Kong Limited and Huadong Engineering (Shenzhen) Corporation Limited

Project Overview

The Kwu Tung North Phase 1 District Cooling System (DCS) project (Design-Build-Operate (DBO) Contract No. 2915EM21A) is a landmark initiative for the Kwu Tung North New Development Area (KTN NDA), commissioned by the Electrical and Mechanical Services Department (EMSD) of the Hong Kong SAR Government. The project is delivered under a Design-Build-Operate (DBO) contract by the CRBC-QH-REC-QTEC Joint Venture (JV), with Binnies Hong Kong Limited as the lead designer and Huadong Engineering (Shenzhen) Corporation Limited providing construction BIM consultancy support.

This state-of-the-art district cooling system provides a sustainable solution which will replace installation of chillers in individual buildings, to improve energy efficiency, and enhance urban livability by minimizing noise, improving air quality and achieving carbon neutrality. Construction commenced in March 2024 with a 27-month program, featuring a chiller system using environmentally friendly refrigerants, freshwater cooling towers and an underground chilled water distribution network with efficient pumping systems.

BIM Adoption

BIM has been a cornerstone of this project, enabling innovation and collaboration across all stages.

The project demonstrates full BIM integration across the entire lifecycle, aligning with Construction Industry Council (CIC) BIM standards, EMSD BIM Asset Management (BIM-AM) framework, and client-specific requirements. Over 17 BIM uses have been implemented, including 3D design authoring, clash detection,

4D simulation, 5D cost estimation, 6D engineering analysis, and 7D asset management. A key success factor has been the seamless collaboration between the design team and the construction team, ensuring smooth BIM information flow in this fast-tracked DBO project. Advanced BIM applications, combined with AI, CFD, and intelligent construction technologies, have driven design optimization, enhanced energy efficiency and streamlined installation processes.

Common Data Environment Platform

The project leverages Autodesk Construction Cloud (ACC) as its Common Data Environment (CDE) which complies with ISO19650. The platform enables real-time multi-team collaboration on a single federated model, ensuring synchronized updates and efficient issue resolution. Robust metadata management, version control, and controlled access have significantly improved productivity and quality across all designers and construction teams.

3D Design Authoring

Using Autodesk Revit and other advanced BIM tools, the project teams produced high-quality models, coordinated drawings, enabling precise construction planning and accurate quantity take-offs. The synchronization offered by Autodesk Collaborate Pro also facilitated cross-discipline collaboration with over 50 BIM users, reducing design conflicts and accelerating approvals.

4D Simulation

The project successfully simulated critical construction sequences - including the engineering schedule, foundation design, temporary excavation works, MiC implementation, and MiMEP/DfMA installation. Through these processes, the team optimised logistic plan, refined the arrangement of mechanical systems, and resolved complex challenges, leading to significant time savings and a cost reduction.

5D Cost Estimation

Quantities generated from the BIM model are validated against the quantity surveyor's records, establishing a robust foundation for cost management. This process empowers the BIM team to deliver dynamic quantity insights that supporting accurate budgeting and efficient resource allocation.

6D Engineering Analysis

Integration of BIM with Computational Fluid Dynamics (CFD) enabled precise analysis of airflow, heat rejection, and cooling tower performance. The design BIM models were developed with various design options, which are used for CFD simulations for optimizing spatial layouts, cooling tower separation, roof arrangements, and decorative fin design, ensuring maximum thermal efficiency and compliance with environmental standards—well before physical implementation. This approach minimises trial-and-error in design, and also alterations during the construction.

7D Asset Management

The project follows EMSD's BIM-AM standard, which reflects concepts outlined in ISO 19650 for managing asset information requirement. A unique code field has been established to ensure consistency between component numbers across both the model and associated diagrams. This standardised coding system enhances traceability and supports efficient operation and maintenance. Asset codes and maintenance information are systematically recorded based on professional classifications and tailored to the operational needs of the DCS. This structured approach lays a solid foundation for the project's future operation and maintenance.

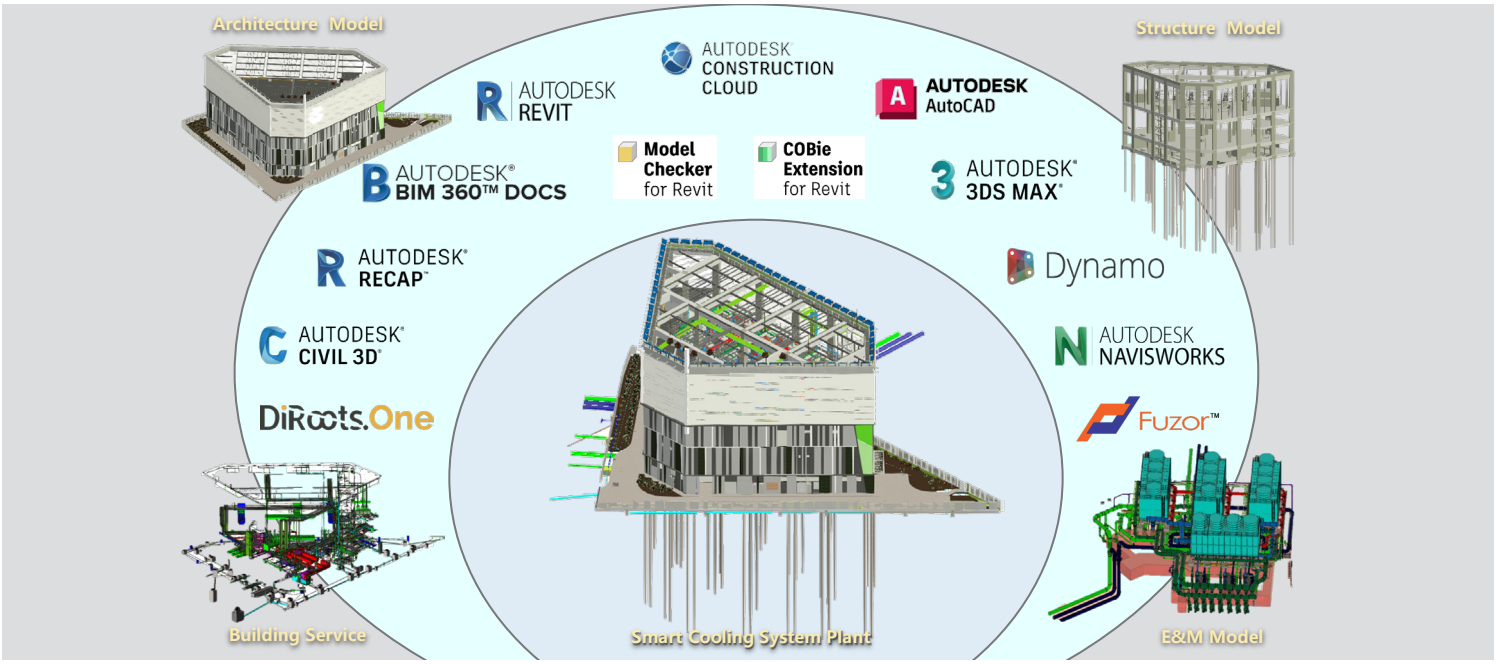
Intelligent Construction DfMA

The integration of BIM with Design for Manufacture and Assembly (DfMA), MiC and MiMEP has revolutionized the construction industry - particularly in the prefabrication of Mechanical, Electrical, and Plumbing (MEP) systems. This forward-thinking approach unfolds across four critical phases: Design, Fabrication, Transportation, and Installation. The BIM-driven prefabrication approach significantly reduced the installation time for pipework and equipment by 40%—from five months to three, saving approximately 600 man-days. Meanwhile, prefabrication elevates both quality and safety by shifting components production to controlled environments, where precision is higher and on-site risks are substantially reduced. The reduction of on-site welding achieves a 20% reduction in material waste and streamlines off-site assembly. As the industry continues to evolve, the synergy between BIM and DfMA will play a critical role in redefining construction practices and driving innovation across the built environment.

BIM + AI-Assist Energy Optimization

Integrating artificial intelligence (AI) into DCS plant control marks a transformative leap in energy optimization and operational efficiency. Traditional control methods typically depend on automated control with pre-defined logic and rules or manual control, making them inefficient under varying environmental and load conditions. In contrast, artificial intelligence leverages advanced machine learning algorithms to analyze real-time data – such as outdoor conditions, district-wise cooling demand, and equipment performance. By uncovering complex interdependencies among these variables, AI dynamically optimises chiller sequencing, water temperature settings, and variable speed drive of pumps and chillers to achieve maximum efficiency. AI systems also enhance predictive control by forecasting cooling demands and intelligently adjusting equipment operation pattern and mode, thereby reducing energy consumption while boosting energy efficiency. The BIM model and BIM-AM system provide a reliable data source for AI integration. The AI system will be integrated with the plant control system, i.e. District Cooling Instrumentation, Control and Communication System (DCICCS),to further enhance the data-driven decision making. DCS operators will receive real-time suggestions from the AI system and real-time visibility across multiple DCS sites and consumer DCS substations, enabling them to monitor performance, identify anomalies, and implement high performance strategies.

This project exemplifies how advanced BIM integration, intelligent construction, and AI-driven optimization are redefining sustainable urban infrastructure—setting a new benchmark for district cooling systems in Hong Kong and beyond.



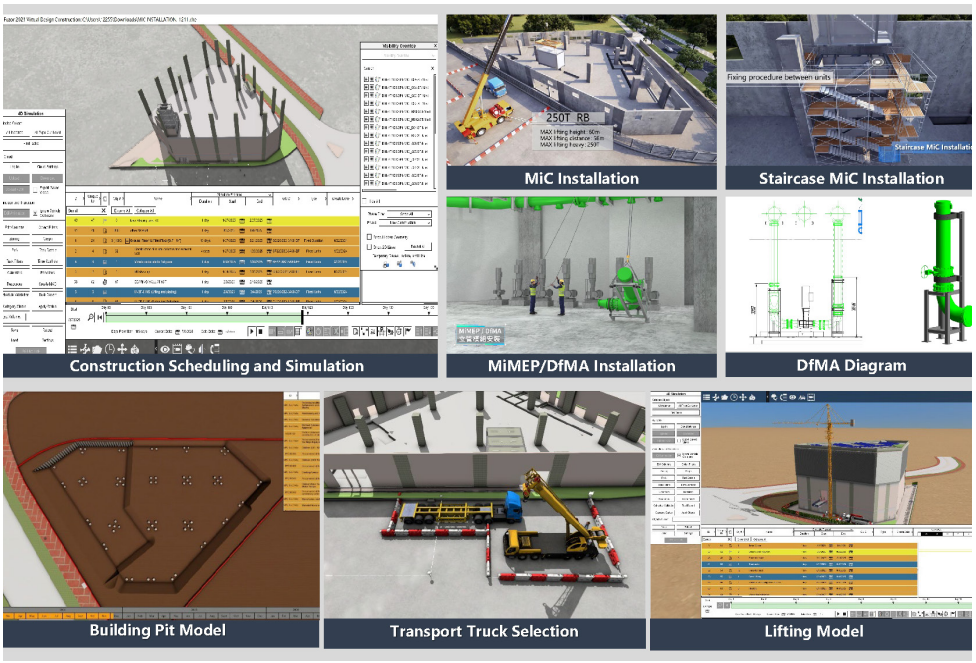
BIM Implementation Environment of the Phase 1 District Cooling System at Kwu Tung North New Development Area
Image Courtesy of CRBC-QH-REC-QTEC Joint Venture and Binnies Hong Kong Limited and Huadong Engineering (Shenzhen) Corporation Limited



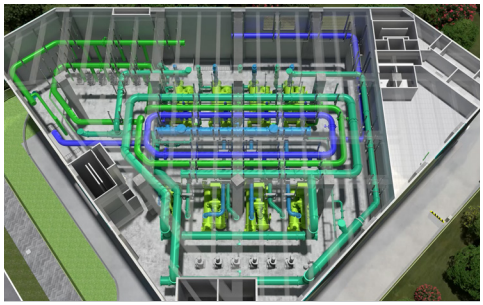
3D BIM Simulation of DCS Plant
Image Courtesy of CRBC-QH-REC-QTEC Joint Venture and Binnies Hong Kong Limited and Huadong Engineering (Shenzhen) Corporation Limited



Entrance of the Phase 1 District Cooling System at Kwu Tung North
Image Courtesy of CRBC-QH-REC-QTEC Joint Venture and Binnies Hong Kong Limited and Huadong Engineering (Shenzhen) Corporation Limited



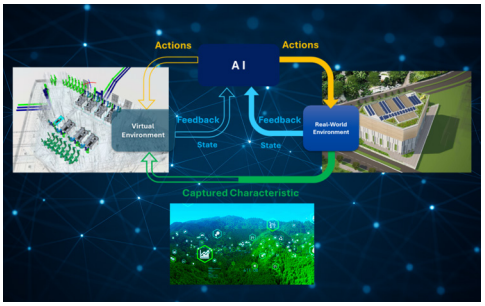
4D Phase Planning and Method Statement Simulation
Image Courtesy of CRBC-QH-REC-QTEC Joint Venture and Binnies Hong Kong Limited and Huadong Engineering (Shenzhen) Corporation Limited



Design for DfMA
Image Courtesy of CRBC-QH-REC-QTEC Joint Venture and Binnies Hong Kong Limited and Huadong Engineering (Shenzhen) Corporation Limited



Installation Simulation for DfMA
Image Courtesy of CRBC-QH-REC-QTEC Joint Venture and Binnies Hong Kong Limited and Huadong Engineering (Shenzhen) Corporation Limited



AI Workflow
Image Courtesy of CRBC-QH-REC-QTEC Joint Venture and Binnies Hong Kong Limited and Huadong Engineering (Shenzhen) Corporation Limited

COMPANY

Drainage Services Department, the Government of the Hong Kong Special Administrative Region
Binnies Hong Kong Limited
China State Construction Engineering (Hong Kong) Limited – Alchmex International Construction Limited Joint Venture

PROJECT

DC/2022/03 Yuen Long Barrage and Nullah Improvement Schemes

LOCATION

Yuen Long

TYPE

Flood Prevention

SCHEDULED TIME OF COMPLETION

March 2028

BIM-Driven, Industry-Empowered, Green-Inspired: Yuen Long Barrage and Nullah Improvement Scheme

渠務署
Drainage Services Department

China State - Alchmex Joint Venture

"We are proud to present the Yuen Long Barrage and Nullah Improvement Schemes. This project exemplifies how visionary collaboration, powered by integrated BIM and digital innovation, can redefine infrastructure delivery. By uniting multidisciplinary teams through a common data environment, we have achieved unprecedented efficiency, safety, and sustainability—setting a new benchmark for flood resilience and smart construction in Hong Kong and beyond."

–Clement WONG
Engineer,
Drainage Services Department,
the Government of the Hong Kong Special Administrative Region

–Thomas CHEUNG
Chief Resident Engineer,
Binnies Hong Kong Limited

–GU Zipeng
Project Manager,
China State Construction Engineering (Hong Kong) Limited – Alchmex International Construction Limited Joint Venture

BIM PARTNERS

ATAL Engineering Limited
AECOM Asia Company Limited
VIRCON Limited
GuangDong Lecong Steel World Electronic Commerce Co., Ltd

AUTODESK PRODUCTS USED

Autodesk® AutoCAD®
Autodesk® BIM 360® Docs
Autodesk® BIM Collaborate Pro
Autodesk® Civil 3D®
Autodesk® Dynamo Studio
Autodesk® Navisworks® Freedom
Autodesk® Navisworks® Manage
Autodesk® ReCap® Pro
Autodesk® Revit®
COBie Extension for Revit
Model Checker for Revit



Overview for Yuen Long Barrage and Nullah Improvement Schemes
Image Courtesy of Drainage Services Department, the Government of the Hong Kong Special Administrative Region and Binnies Hong Kong Limited and China State Construction Engineering (Hong Kong) Limited – Alchmex International Construction Limited Joint Venture

Project Description

The Yuen Long Barrage and Nullah Improvement Schemes represent a landmark achievement in infrastructure commissioned by the Drainage Services Department (DSD) to significantly enhance Hong Kong's flood resilience.

As one of the largest flood barrages in Asia, the project's scale encompasses a stormwater pumping station, automatic flood barriers, and a master control centre. Beyond flood protection, the project revives Yuen Long Nallah waterway, upgrades and installs new floodwalls, and constructs a dry-weather flow interception system to divert polluted urban runoff into the proper sewerage system for treatment, thereby improving the overall environment in urban areas.

Critically, Building Information Modeling (BIM) was adopted across the entire project lifecycle—from design and construction to future maintenance and operations—creating a digital legacy for asset management. A key to its success was the exceptional collaboration between multi-disciplinary stakeholders, including the client (DSD), supervising consultant (Binnies), the main contractor (China State – Alchmex JV), and all subcontractors, all seamlessly connected through a single, cloud-based Common Data Environment (CDE) on Autodesk BIM 360.

Value of BIM to the Project

Digitization was fundamental to the project's success, greatly enhancing returns and establishing a new benchmark in digital barrage engineering. By employing advanced virtual coordination, many design conflicts were resolved before construction began,

greatly reducing delays and improving coordination speed. Real-time data integration through a unified digital platform enabled highly accurate quantity tracking and significantly improved cost management. Virtual reality safety training and advanced scanning ensured safe and constructible designs prior to work starting.

Industrialization was demonstrated through the implementation of a large-scale modular excavation support system, manufactured off-site using precise digital models. This approach notably shortened the project timeline and greatly improved on-site assembly efficiency, highlighting the advantages of prefabrication in complex infrastructure delivery.

Green Transformation was integrated across all project phases, with digital tools optimizing material usage and reducing waste. Off-site fabrication minimized local disruption and environmental impact, while the facility's energy-conscious design supports broader sustainability objectives, setting a new standard for environmentally responsible urban development.

Internationalization was reflected in the adoption of globally recognized digital standards within a shared data environment. This alignment with international best practices created a transferable model for future projects, reinforcing Hong Kong's leadership in world-class engineering.

Digital Management Strategy

The BIM management strategy for the Yuen Long Barrage and Nullah Improvement Schemes was built on a seamless integration of three key technologies. Autodesk BIM 360 provided the central foundation, acting as the single source of truth where all design and construction data converged. This cloud-based Common Data Environment ensured version control, automated approval workflows, and clash detection, enabling all stakeholders—from designers to contractors—to collaborate using the most current information, which was critical for a project of this scale and complexity.

To bridge the gap between the virtual model and the physical construction site, the project leveraged the C-Smart platform. This tool integrated IoT sensors, RFID tracking, and mobile applications to translate BIM 360 data into actionable field intelligence. It enabled real-time progress monitoring, automated quality inspections, and instant issue resolution directly on-site. This closed-loop digital-physical system ensured that the precision planned in the model was accurately executed in the field, particularly within the challenging environment of the nullahs, while providing full traceability of materials and activities.

Underpinning the entire process was a foundational commitment to OpenBIM standards using Industry Foundation Classes (IFC) and COBie data formats. This vendor-neutral approach ensured seamless data exchange between multiple software platforms including Tekla, Revit, Navisworks, and the C-Smart system without proprietary barriers or data corruption. The implementation of standardized classification systems and data validation protocols-maintained information integrity across all project phases. This interoperability not only streamlined collaboration among all stakeholders but also future-proofed all digital deliverables, ensuring the data will remain accessible and valuable for the client's asset management systems throughout the infrastructure's entire operational lifecycle, while establishing a replicable benchmark for public infrastructure projects.

Advancing Project Delivery through mELS

The project's innovative use of a modular Excavation Lateral Support (mELS) system, managed through a Full Lifecycle Tracking process, fundamentally transformed a traditionally high-risk construction activity. Designed and precision-fabricated off-site directly from the BIM model, each mELS component was equipped with an RFID tag, creating a two-way binding with its digital twin in the OpenBIM model. This ensured complete traceability and transparent management throughout its journey from factory production and logistics to on-site installation. This shift from manual, on-site welding and assembly to a controlled, tracked manufacturing process significantly enhanced overall quality, consistency, and progress monitoring. The primary benefits included a major reduction in the required on-site workforce and duration for the excavation support phase, which streamlined the critical path of the project schedule. Furthermore, by moving the complex fabrication work to a factory environment, site safety was substantially improved, minimizing workers' exposure to hazardous tasks and heavy machinery operations in the excavation area.

BIM to Safety

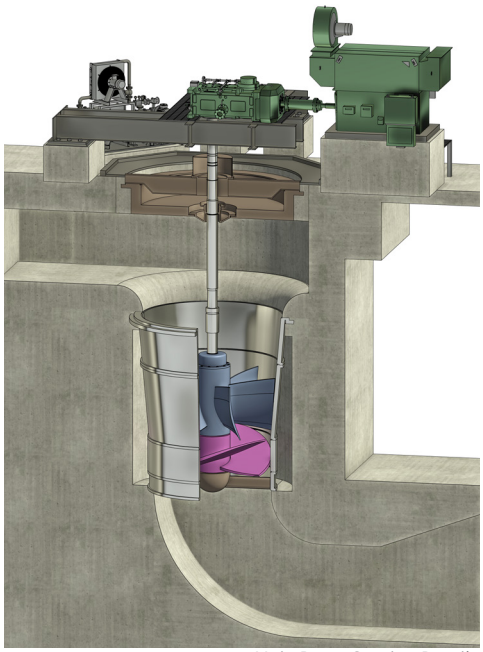
BIM technology was leveraged to proactively engineer safety into the project's planning and execution. The team utilized 4D construction sequencing to create detailed visual simulations of the construction process. This was particularly critical given the project's extreme challenges: working in a heavy rainfall and high flood risk environment, while managing multiple work fronts within a severely limited space and under tight deadlines. The 4D models allowed planners to visually identify and mitigate potential safety hazards—such as water runoff paths, equipment access during storms, and spatial conflicts between concurrent work crews—long before physical work began. This was complemented by immersive Virtual Reality (VR) safety simulations, which provided workers with realistic training in a completely safe environment, familiarizing them with the complex site logistics and emergency procedures without any risk. This proactive, data-driven approach to de-risking these formidable challenges before they could manifest on site was a fundamental contributor to the project's exemplary safety performance and its successful achievement of a zero-accident record.

Conclusion

The project's digital achievements position the Yuen Long Barrage and Nullah Improvement Schemes as a model for future smart infrastructure in Hong Kong, demonstrating how integrated data management can enhance both construction efficiency and long-term operational resilience. The implemented framework ensures that all digital assets are prepared for future integration with the Drainage Services Department's asset management systems, providing a solid foundation for the barrage's role in Hong Kong's ongoing flood protection strategy and climate resilience efforts.



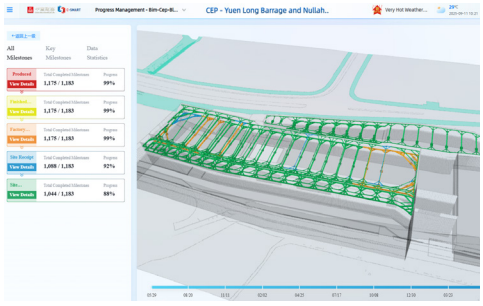
One of the Largest Stormwater Pumping Station in Asia
Image Courtesy of Drainage Services Department, the Government of the Hong Kong Special Administrative Region and Binnies Hong Kong Limited and China State Construction Engineering (Hong Kong) Limited – Alchmex International Construction Limited Joint Venture



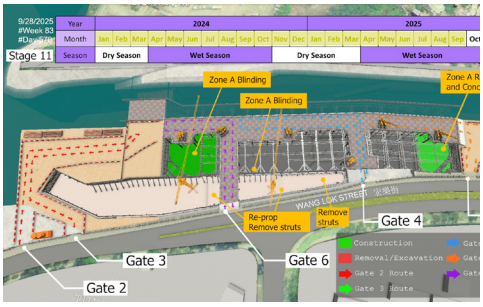
Main Pump Section Details
Image Courtesy of Drainage Services Department, the Government of the Hong Kong Special Administrative Region and Binnies Hong Kong Limited and China State Construction Engineering (Hong Kong) Limited – Alchmex International Construction Limited Joint Venture



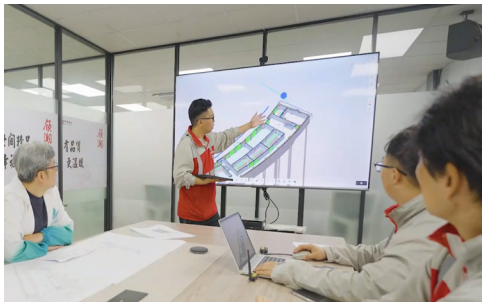
Main Pumping Station's Internal Equipment
Image Courtesy of Drainage Services Department, the Government of the Hong Kong Special Administrative Region and Binnies Hong Kong Limited and China State Construction Engineering (Hong Kong) Limited – Alchmex International Construction Limited Joint Venture



C-Smart Platform for mELS Progress Visualization with OpenBIM
Image Courtesy of Drainage Services Department, the Government of the Hong Kong Special Administrative Region and Binnies Hong Kong Limited and China State Construction Engineering (Hong Kong) Limited – Alchmex International Construction Limited Joint Venture



CMS for ELS installation of Yuen Long Barrage Pumping Station
Image Courtesy of Drainage Services Department, the Government of the Hong Kong Special Administrative Region and Binnies Hong Kong Limited and China State Construction Engineering (Hong Kong) Limited – Alchmex International Construction Limited Joint Venture



Real-Time 3D Coordination via BIM360
Image Courtesy of Drainage Services Department, the Government of the Hong Kong Special Administrative Region and Binnies Hong Kong Limited and China State Construction Engineering (Hong Kong) Limited – Alchmex International Construction Limited Joint Venture

Transforming Waste Management: 4D Simulation and Reality Capture Transform WKTS Upgrade

COMPANY
Environmental Protection Department, the Government of the Hong Kong Special Administrative Region
AECOM Asia Company Limited
China Harbour Engineering Company Limited

PROJECT
West Kowloon Transfer Station (WKTS) Second Follow-On Contract

LOCATION
West Kowlonn Reclamation Area, Kowloon District, HK

TYPE
Infrastructure

SCHEDULED TIME OF COMPLETION
2033

"It is a humbling honor to receive the 2025 Autodesk Hong Kong BIM Award for the West Kowloon Transfer Station project. This recognition reflects the diligent use of 4D simulation and Operational Reality Capture through BIM, with invaluable support from the Supervising Officer and Client, AECOM and EPD. Deep gratitude goes to the committed team and collaborators for overcoming challenges. Looking forward, there is quiet hope to continue advancing BIM innovation for the benefit of future projects."

–Kenny YU
Project Manager,
China Harbour Engineering Company Limited

BIM PARTNERS
AtkinsRealis Asia Limited
SMEC Asia Limited Hong Kong

AUTODESK PRODUCTS USED
Autodesk Construction Cloud®
Autodesk® Navisworks® Manage
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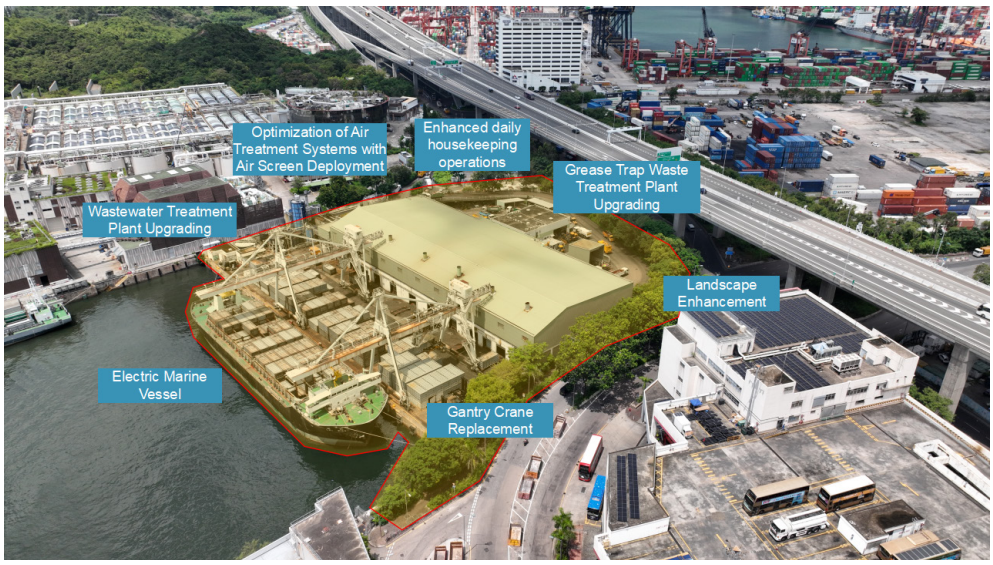


Scope of WKTS Second Follow-on Contract
Image Courtesy of Environmental Protection Department, the Government of the Hong Kong Special Administrative Region & AECOM Asia Company Limited & China Harbour Engineering Company Limited

BIM Development of the Project

The adoption of Building Information Modeling within the West Kowloon Transfer Station (WKTS) Second Follow-On Contract marks a significant evolution tailored to the project's unique demands. Initiated alongside the project's start in August 2023, BIM implementation was prompted by the need to address a 30-year-old facility's upgrade while maintaining daily operations. The process began with assessing the site's incomplete as-built data from 1997, leading to the introduction of Operational Reality Capture to establish accurate baseline models. This technology, distinct from standard 3D scanning, involved capturing real-time site conditions, which proved essential given the station's complex waste processing systems and unrecorded modifications. To further enhance this, training was provided to the operation team, enabling them to contribute directly to the capture process and ensure the models reflected practical on-site needs. This collaborative element helped bridge gaps between design intentions and operational realities, fostering a more integrated approach from the outset.

BIM development progressed through distinct phases of the building lifecycle. During the design stage, 3D modeling in Revit laid the foundation for planning upgrades to the wastewater treatment plant (WWTP), grease trap waste treatment plant (GTWTP), gantry crane replacement, and other components across the site. The construction phase saw the integration of 4D simulation using Navisworks to schedule critical tasks, such as the crane replacement, under strict operational constraints. By the operation stage, 6D asset handover via COBie ensured long-term facility management, supporting the transition to a higher daily capacity from the original level. Collaboration among multidisciplinary

stakeholders, spanning civil, structural, architectural, MEP, and processing teams, was facilitated through a Common Data Environment (CDE) hosted on Autodesk Construction Cloud (ACC), with coordination meetings held to align efforts. This phased approach, driven by the project's Phase 1 deadline and budget, quietly transformed a challenging upgrade into a model of efficiency.

The Value of BIM to the Project

BIM brought substantial value to the WKTS project, addressing its operational, financial, and innovative needs. In terms of return on investment (ROI), the technology appears to have reduced design errors through early clear detection, potentially saving costs in construction. This efficiency stemmed from the ability to identify and resolve conflicts, such as those between structural and MEP elements, before on-site work began, minimizing rework. The project duration also benefited, with 4D simulation seemingly shortening critical phases like the gantry crane replacement by optimizing schedules around tidal conditions and barge timing.

Innovation stands out as a key value, with BIM introducing novel workflows. Operational Reality Capture provided a reliable method to verify as-built conditions, reducing reliance on outdated records and enhancing design accuracy. The 4D simulation offered a dynamic view of the crane replacement process, ensuring minimal disruption to the station's daily waste handling capacity during upgrades. Additionally, micro-facility replication allowed physical models to be tested for feasibility, quietly setting a precedent for DBO projects in Hong Kong. These advancements not only met the project's goal of maintaining operations but also elevated the standard for future infrastructure upgrades, demonstrating BIM's potential to balance functionality with sustainability.

The BIM Project Management

The success of the WKTS project can be attributed to its meticulous BIM management strategy, thoughtfully designed to meet the project's foundational needs. The primary goal was to sustain daily operations while adhering to the Phase 1 deadline, a critical imperative given the station's round-the-clock waste processing obligations and the complexities inherent in a legacy facility with incomplete historical data. A secondary objective was to enhance long-term efficiency, ensuring the upgrade process established a durable framework for future operational management. These aims were driven by the necessity to navigate the dual challenges of maintaining service continuity and overcoming the limitations of outdated documentation.

The BIM process followed a structured and adaptive workflow, commencing with Operational Reality Capture to establish accurate site conditions, followed by 3D modeling in Revit for detailed design, 4D scheduling in Navisworks for construction planning, and 6D asset management via COBie for operational preparedness. The process began with comprehensive site scans to document the existing state, particularly focusing on areas like the GTWTP and jetty area. Coordination was supported by regular meetings, where multidisciplinary teams, covering civil, structural, architectural, MEP, and processing roles, aligned efforts through the Common Data Environment (CDE) on Autodesk Construction Cloud (ACC). This platform served as a hub for sharing models, tracking changes, and resolving discrepancies in real time. Change management was facilitated through iterative model updates, allowing adjustments to design plans as new site data emerged, while risk management addressed uncertainties like weather variability, tidal influences, and stakeholder differences through simulated scenarios and collaborative reviews. This framework ensured the process remained flexible, adapting to the project's evolving demands across its lifecycle.

Performance evaluation relied on Level of Development (LOD) progression from 300 to 500, tracking the increasing detail and reliability of models from conceptual design to operational handover. Clash detection within Navisworks acted as a critical metric, identifying and resolving conflicts, such as spatial overlaps between new and existing systems, during coordination sessions. The approach effectively addressed major hurdles, including aligning upgrades with live operations and compensating for outdated records through enhanced data capture. However, challenges like unpredictable weather impacts on crane replacement timing suggest potential for refinement. Further enhancements could involve integrating more sophisticated weather modeling into 4D simulations, offering a pathway for improved scheduling precision and risk mitigation in future phases.

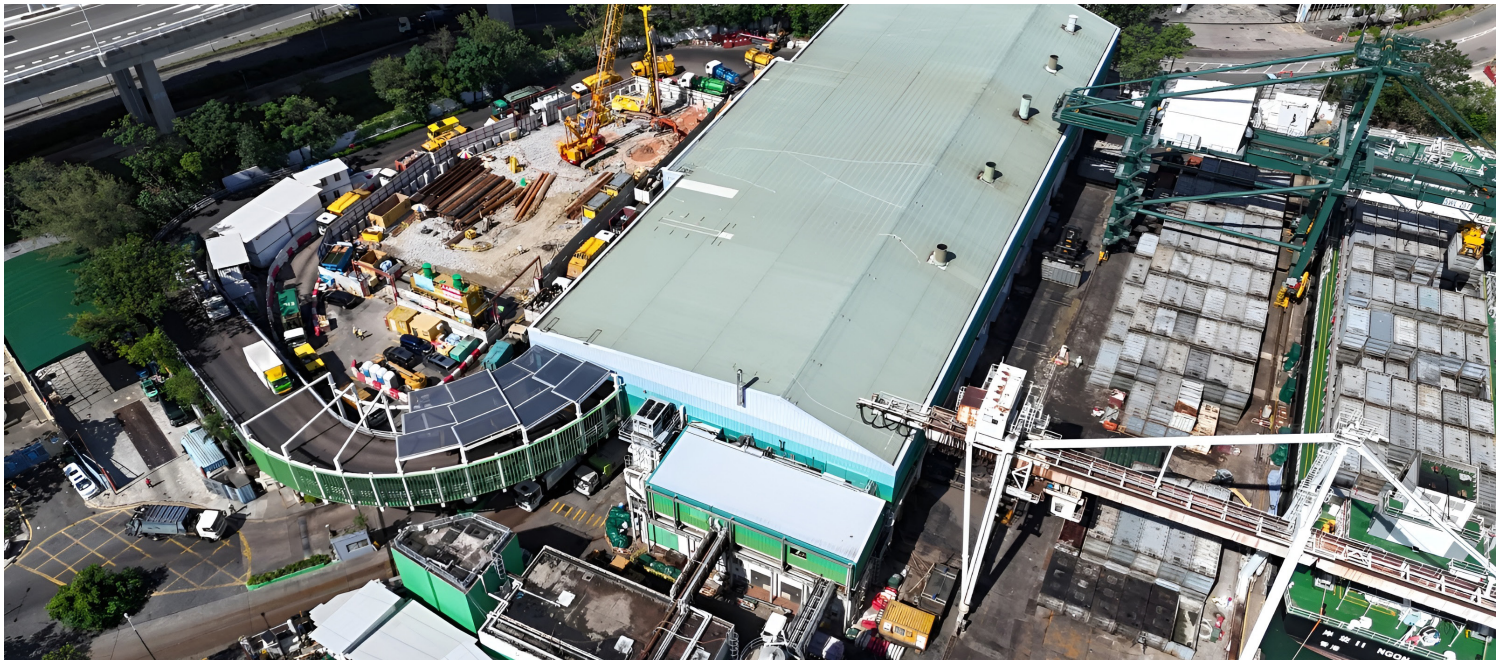
Enhancing Current Practices with BIM Technology

Traditionally, the project depended on 2D drawings and manual site inspections, which frequently resulted in delays and discrepancies due to the station's outdated records and unrecorded changes accumulated over decades. This traditional method struggled to adapt to the live operational environment, often leading to misalignment between design intentions and site conditions. For instance, during the GTWTP upgrade, manual checks failed to capture hidden piping modifications, while the crane replacement faced uncertainties due to uncharted structural supports, making planning labor-intensive and prone to errors.

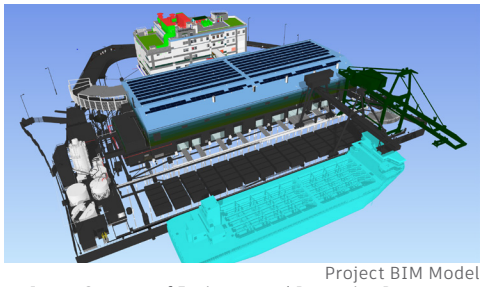
The introduction of BIM technology ushered in transformative practices that redefined this process. 3D scanning via Operational Reality Capture delivered precise as-built data, aligning designs with current site realities from the planning stage by mapping every detail, from equipment layouts to underground utilities. Real-time collaboration through the CDE enabled multidisciplinary teams to address issues swiftly, fostering a shared understanding across civil, structural, and MEP disciplines. 4D simulations provided dynamic scheduling to reduce operational disruptions, offering a virtual timeline that adjusted to tidal cycles and work-hour restrictions. For example, virtual walkthroughs of the GTWTP upgrade uncovered integration challenges, such as ductwork conflicts, early, enabling pre-construction adjustments that smoothed the workflow. This evolution enhanced reliability and efficiency, establishing a contemporary benchmark for upgrading legacy infrastructure under active use, and demonstrated how BIM could turn historical limitations into opportunities for precision.

Innovative/ Intelligent Workflow

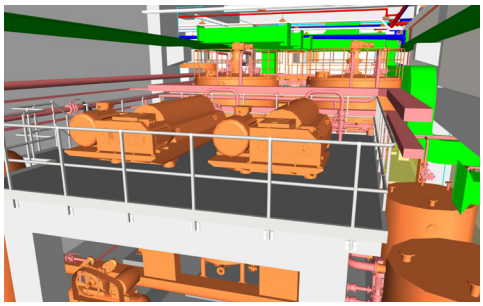
The project offers valuable insights for the industry through its innovative workflows, providing a model for tackling complex upgrades. The combined application of Operational Reality Capture, 4D simulation, and micro-facility replication delivered a robust solution for the gantry crane replacement, effectively managing constraints like barge scheduling, tidal conditions, and night-time work windows. Operational Reality Capture mapped the site's existing crane foundation and surrounding infrastructure, ensuring the new design fit seamlessly. 4D simulation sequenced the removal and installation process, visualizing barge movements and crane lifts to avoid daytime operations, while micro-facility replication tested the new crane's base assembly in a controlled setting, validating structural integrity before on-site work. This method minimized disruption to the station's waste handling capacity and holds potential to guide other infrastructure projects, especially those requiring operational continuity during construction. The understated success of these techniques highlights their relevance to Hong Kong's evolving DBO landscape, encouraging broader BIM adoption for smart, sustainable development. By sharing this approach, the project contributes to a growing knowledge base, suggesting how tailored BIM strategies can address the unique demands of live operational environments.



Overview of WKTS
Image Courtesy of Environmental Protection Department, the Government of the Hong Kong Special Administrative Region & AECOM Asia Company Limited & China Harbour Engineering Company Limited



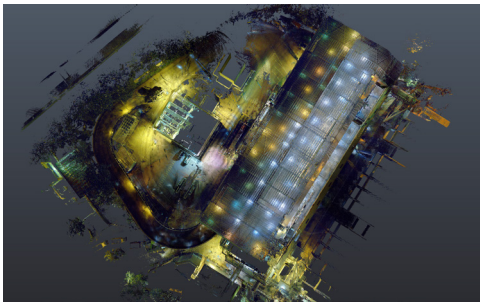
Project BIM Model
Image Courtesy of Environmental Protection Department, the Government of the Hong Kong Special Administrative Region & AECOM Asia Company Limited & China Harbour Engineering Company Limited



Clash Analysis
Image Courtesy of Environmental Protection Department, the Government of the Hong Kong Special Administrative Region & AECOM Asia Company Limited & China Harbour Engineering Company Limited



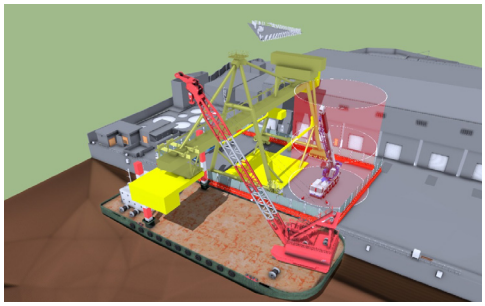
Panoramic image capturing for gantry crane dismantling and installation
Image Courtesy of Environmental Protection Department, the Government of the Hong Kong Special Administrative Region & AECOM Asia Company Limited & China Harbour Engineering Company Limited



3D Scanning by UAV and laser scanner
Image Courtesy of Environmental Protection Department, the Government of the Hong Kong Special Administrative Region & AECOM Asia Company Limited & China Harbour Engineering Company Limited



Drone shot used for progress tracking
Image Courtesy of Environmental Protection Department, the Government of the Hong Kong Special Administrative Region & AECOM Asia Company Limited & China Harbour Engineering Company Limited



4D Simulation for removal of gantry crane
Image Courtesy of Environmental Protection Department, the Government of the Hong Kong Special Administrative Region & AECOM Asia Company Limited & China Harbour Engineering Company Limited

COMPANY
Hong Kong Housing Authority, the Government of the Hong Kong Special Administrative Region
Hanison Construction Company Limited

PROJECT
From Blueprint to Beyond: BIM for the Building's Full Life Cycle - Public Housing Development at Hin Fat Lane, Tuen Mun

LOCATION
Hin Fat Lane, Tuen Mun

TYPE
Building Project

SCHEDULED TIME OF COMPLETION
Q4 2024

From Blueprint to Beyond: BIM for the Building's Full Life Cycle

香港房屋委員會
Hong Kong Housing Authority

興勝建築有限公司
HANISON CONSTRUCTION COMPANY LIMITED

"We are honored to share our project for Hin Fat Lane, "From Blueprint to Beyond: BIM for the Building's Full Life Cycle." This project showcases innovative BIM applications across the entire lifecycle of the Public Housing Development at Hin Fat Lane, Tuen Mun. Through the integration of digital solutions, we have enhanced efficiency, sustainability and maintainability, contributing to the advancement of sustainable and efficient construction practices."

–Tim LI
Chief Architect/ 3,
Hong Kong Housing Authority,
the Government of the Hong Kong Special Administrative Region

–LUN Tim Ho
Director,
Hanison Construction Company Limited

BIM PARTNERS
Wong Ouyang (Building Services) Limited
One Bite Design Studio Limited
Ove Arup & Partners Hong Kong Limited
isBIM Limited

AUTODESK PRODUCTS USED
Autodesk® AutoCAD®
Autodesk® BIM 360®
Autodesk® Dynamo Studio
Autodesk® Navisworks®
Autodesk® Navisworks® Manage
Autodesk® ReCap® Pro
Autodesk® Revit®



West Elevation
Image Courtesy of Hong Kong Housing Authority, the Government of the Hong Kong Special Administrative Region

Project Background

The Public Housing Development at Hin Fat Lane, Tuen Mun, includes a 34-storey domestic block (872 units) on a 3-storey podium with a lower ground floor housing an estate management office, covered landscape and play areas, ancillary facilities, and external works.

Hin Fat Lane has been a live testing ground for advanced Building Information Modeling, pushing the boundaries of how we plan, design, build, and manage public assets. This project stands out as one of our first to achieve full BIM integration from the earliest design sketches to project handover, covering the entire building life cycle.

BIM in Design Stage

The digital transformation journey began with the integration of BIM and Geospatial Information Systems at the design stage. This allowed for accurate visualization of the building's real-world context, assessing environmental impact, flood risks, and ecological concerns from an early stage. Visualizing data through digital models enabled early risk identification and sensitive urban integration.

BIM in Pre-Construction Stage

During pre-construction, digital tools helped us go further. For the General Building Plan submission, the project team used our self-developed BIM plug-in to automate many parts of the regulatory submission process—from calculating floor areas to ensuring travel distance in fire safety requirements. What used to take weeks now happened in days.

For the foundation design, we developed a generative design tool known as BIM-SAFD, which automatically generate optimized foundation schemes, help engineers evaluate the best pile locations, and automatically produce drawings and schedules for construction and budget planning. This drove efficiency and accuracy, supporting both our engineers and surveyors with data-driven precision.

In the tender phase, the complete BIM model allowed bidders to thoroughly assess site challenges and propose innovative methods, including 4D construction planning videos. This transparency improved buildability and site planning while reducing risks.

BIM in Construction Stage

Once construction began, BIM continued to drive our process. By linking every construction activity to a 4D BIM model—we could visualize, plan, and manage every stage more effectively. This allowed early detection and avoidance of scheduling conflicts and resource bottlenecks, reducing delays and improving overall efficiency.

To make sure everyone stayed on the same page, we used Autodesk BIM 360 as our Common Data Environment. This meant every team member accessed the most up-to-date information at all times, reducing errors and fostering real-time collaboration. Communication became seamless, with all issues and requests for information tracked and resolved quickly through a centralized platform, keeping the project steady and on schedule.

Quality on BIM modelling was paramount. To ensure compliance with our Housing Authority's BIM standard, "Autodesk Model Checker" was used and customed to our specific needs to automate BIM model checking for compliance, flagging any issues and ensuring models were properly built, guaranteeing robust digital handovers.

BIM for Post Construction Stage

But the innovation didn't stop when the building was complete. Hin Fat Lane became a pivotal pilot for establishing our in-house "Asset Information Requirements" for the BIM era—setting the data standards necessary for efficient, long-term management of our buildings. We benchmarked against international standards and tailored requirements for our housing portfolio, ensuring that essential asset data like equipment details, maintenance schedules, and warranties, were captured and embedded in our digital model for operational use.

A unified BIM-GIS portal will consolidate data from housing estates, enabling dashboards for real-time monitoring, predictive maintenance, and lifecycle cost estimations. The Asset Management System, connected to these digital model such as Hin Fat Lane model, uses big data analytics to shift from reactive to preventive upkeep—maximizing efficiency and resource planning.

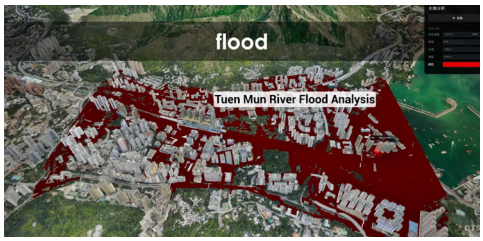
Use of smart monitoring on photovoltaic panels, EV charging facilities, and real-time IoT sensors for water and drainage, let us detect and solve issues immediately—saving time, cost, and resources. All of this is underpinned by a robust digital infrastructure that ensures the free and secure flow of BIM, GIS, and IoT data, empowering smarter, evidence-based decisions.

To ensure continual progress, we've launched an Asset Management Consultancy Study—defining our digital roadmap, aligning IT investments with long-term goals for smart facility management. We are also carrying out trials of Augmented Reality at Hin Fat Lane, allowing field technicians to access BIM and IoT data visually via tablets, streamlining inspections and guided repairs.

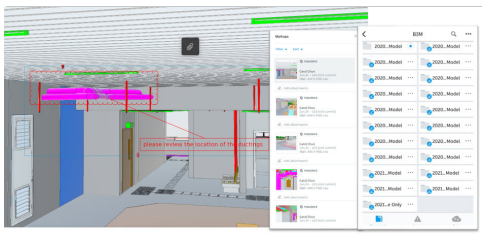
The Public Housing Development at Hin Fat Lane—a landmark project completed in 2024 showcases the Housing Authority's commitment to digital innovation and smarter building management. It represents the future of public housing—where integrated digital solutions lead to more efficient, sustainable, and resilient building management, setting a new standard for public asset development and operations.



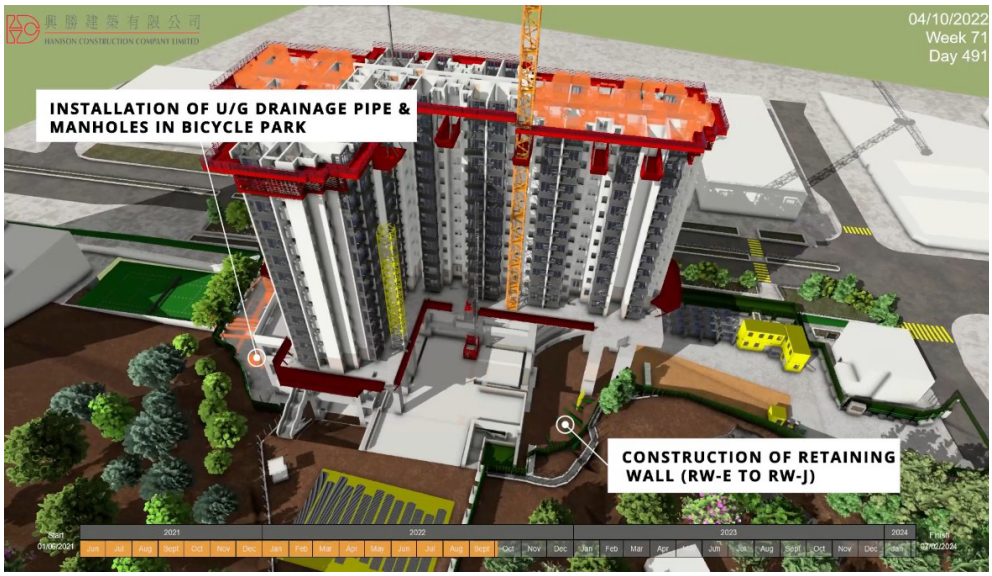
New Asset Management System for Building Maintenance and Management
Image Courtesy of Hong Kong Housing Authority, the Government of the Hong Kong Special Administrative Region



PIMAP showcase of BIM & GIS Integration
Image Courtesy of Hong Kong Housing Authority, the Government of the Hong Kong Special Administrative Region



Project team coordination through CDE Platform (BIM360)
Image Courtesy of Hong Kong Housing Authority, the Government of the Hong Kong Special Administrative Region and Hanison Construction Company Limited



4D simulation
Image Courtesy of Hong Kong Housing Authority, the Government of the Hong Kong Special Administrative Region and Hanison Construction Company Limited



Architectural Model
Image Courtesy of Hong Kong Housing Authority, the Government of the Hong Kong Special Administrative Region



Structural Model
Image Courtesy of Hong Kong Housing Authority, the Government of the Hong Kong Special Administrative Region



MEP Model
Image Courtesy of Hong Kong Housing Authority, the Government of the Hong Kong Special Administrative Region

COMPANY
Hongkong Land Limited
Gammon Construction Limited

PROJECT
Tomorrow's CENTRAL: LANDMARK Atrium & Prince's Building

LOCATION
Central, Hong Kong

TYPE
Commercial Building A&A

SCHEDULED TIME OF COMPLETION
April 2027

Shaping Tomorrow's CENTRAL: A BIM empowered modernization of LANDMARK

"Empowered by 8D BIM, we were able to develop the complex construction phasing which ensures construction and technical compliances, while enabling early communication with our office and retail tenants to minimize disruptions to their businesses.

Ultimately, this maximizes Hongkong Land's retail potential during the major alteration works to modernize LANDMARK."

–NG Mei Ling
Assistant General Manager, Projects, Hongkong Land Limited

AUTODESK PRODUCTS USED
Autodesk® AutoCAD®
Autodesk® BIM Collaborate Pro
Autodesk® Build
Autodesk Construction Cloud®
Autodesk® Data Exchanges
Autodesk® Docs
Autodesk® Dynamo
Autodesk® Navisworks®
Autodesk® Revit®
Autodesk® Validation Tool



Landmark Atrium
Image Courtesy Hongkong Land Limited and Gammon Construction Limited

Reimagining Luxury in the Heart of Hong Kong

In the vibrant core of Central, Hong Kong, a transformative journey is underway—one that redefines the boundaries of luxury, innovation, and digital construction. The "Tomorrow's CENTRAL" initiative, led by Hongkong Land in collaboration with Gammon, marks a pivotal chapter in the evolution of LANDMARK, Hong Kong's most iconic luxury retail destination. This ambitious alteration and addition (A&A) project spans the LANDMARK Atrium and Prince's Building, encompassing over 78,000 square metres of prime commercial space. It is not merely a renovation; it is a reimagination of space, experience, and sustainability, powered by cutting-edge Building Information Modelling (BIM) technologies.

A Complex Phased Renovation in a Live Environment

Undertaking a large-scale transformation within a fully operational luxury retail environment presents unique challenges. LANDMARK remains open throughout the multi-year renovation, welcoming over 50,000 patrons daily. The project is meticulously phased to ensure minimal disruption to tenants and visitors, with most construction activities scheduled during nighttime hours. This sensitive approach is essential in preserving the prestige and functionality of the space while enabling a seamless transition into its future form.

The complexity of the renovation is amplified by the need to integrate new multi-storey Maison destinations—ranging from two to eight storeys—within existing structures. These destinations will host the world's most prestigious luxury brands, including Cartier, CHANEL, Dior, Hermès, Louis Vuitton, Prada, Saint Laurent, Tiffany & Co., and Van Cleef & Arpels. The transformation will more than double the retail footprint of these anchor tenants, creating immersive environments that blend haute couture, fine dining, and experiential art.

BIM as the Backbone of Innovation

At the heart of this transformation lies BIM—a digital backbone that underpins precision, coordination, and innovation across every phase of the project. More than a 3D design tool, BIM acts as a centralized data environment, integrating architectural, structural, mechanical, electrical, and operational information into a single source of truth accessible to all stakeholders.

For "Tomorrow's CENTRAL," the reliance on BIM has been crucial in managing a complex phased renovation in a live luxury retail setting, where precision and planning are paramount. By visualizing construction sequences, optimizing material usage, and simulating operational outcomes before implementation, BIM has empowered the project team to make faster, better-informed decisions, minimize disruption to ongoing retail operations, and maintain the high standards expected of LANDMARK.

Scan-to-BIM and Concrete Scan Integration

Given the age and complexity of the buildings, accurate documentation of existing conditions was paramount. Traditional drawings were insufficient to capture the intricacies of the site. Gammon deployed laser scanning technologies to generate high-resolution point cloud models, which were then integrated into BIM platforms. This scan-to-BIM approach enabled the creation of verified existing models, ensuring millimeter-level accuracy for design and coordination.

Concrete scanning further enhanced safety and precision. By mapping embedded utilities and structural elements, the team avoided destructive testing and reduced the risk of hitting live wires or rebar during drilling. Over 1,130 openings were scanned, saving thousands of hours compared to conventional methods. These technologies not only improved efficiency but also contributed to safer and more sustainable construction practices.

Immersive Technologies: VR & AR for Design and Safety

Virtual Reality (VR) and Augmented Reality (AR) played a crucial role in stakeholder engagement and safety training. VR walkthroughs allowed clients to experience proposed designs in context, facilitating informed decisions and reducing downstream changes. AR overlays helped visualize façade modifications, bridging the gap between digital models and physical spaces.

For safety, custom VR modules simulated hazardous scenarios unique to the A&A project. Workers could train in immersive environments, gaining familiarity with site-specific risks before commencing physical work. This approach improved retention, reduced incidents, and fostered a culture of proactive risk management.

Sustainability and Digital Excellence

Hongkong Land's commitment to sustainability is deeply embedded in the project. BIM enabled precise quantity take-offs and material tracking, supporting the use of 100% low-carbon concrete, green rebar, and sustainable timber. Over 80% of construction equipment is electric, significantly reducing carbon emissions.

The project aims to achieve top-tier certifications, including BEAM Plus Interiors, LEED Commercial Interiors, and WELL. BIM dashboards, powered by Speckle and Autodesk Data Exchange, visualize carbon metrics, empowering teams to make data-driven decisions that align with environmental goals.

Autodesk Construction Cloud (ACC) for Real-Time Monitoring

Managing a phased renovation across 15 distinct sections within a live retail environment required robust project monitoring. Autodesk Construction Cloud (ACC) was adopted to centralize data, track progress, and facilitate communication between day and night shifts.

ACC Build, with its linked Schedules, Sheets, and Issues, enabled supervisors to complete nightly quality inspections and safety verifications against predefined workflows. Photographic evidence uploaded in Build captured as-built conditions, enabling seamless handovers between shifts. Each morning, program managers accessed a consolidated progress report complete with time-stamped images, status flags, and forecasted completion dates each morning, enabling proactive adjustments to logistics, manpower, and procurement.

ACC also supported document control and versioning, ensuring that all teams worked from the latest information and maintained a single source of truth. This minimized rework and enhanced coordination among consultants, contractors, and client representatives.

BIM 9D - Lean Construction for Optimal Efficiency

In combination with the adoption of BIM 2D through 8D, BIM 9D, incorporating lean construction principles, was leveraged to plan and execute works with minimal disruption, reduced waste, and optimal use of raw materials, while keeping the project on schedule and within budget.

Due to limited material storage space at the construction site, the team utilized the integrated capabilities of 4D programme simulations and material delivery modelling to synchronize site activities with manufacturing outputs. Using Autodesk Construction Cloud (ACC) schedules, deliveries were precisely timed to arrive only when needed, enabling a just-in-time construction workflow from production to installation. This sequencing minimized idle time avoided premature storage, and increased site efficiency in a live retail environment.

The lean approach was further reinforced by 5D BIM quantity take-offs, which provided accurate procurement requirements, preventing over-ordering of materials. These were paired with 6D BIM carbon emission calculations to assess the environmental impact of every procurement decision, avoiding unnecessary purchases of materials with high embodied carbon. By combining spatial planning, time scheduling, cost control, and sustainability metrics, the integrated 2D–9D BIM process delivered a tightly coordinated, resource-efficient construction programme that supported both operational excellence and environmental responsibility.

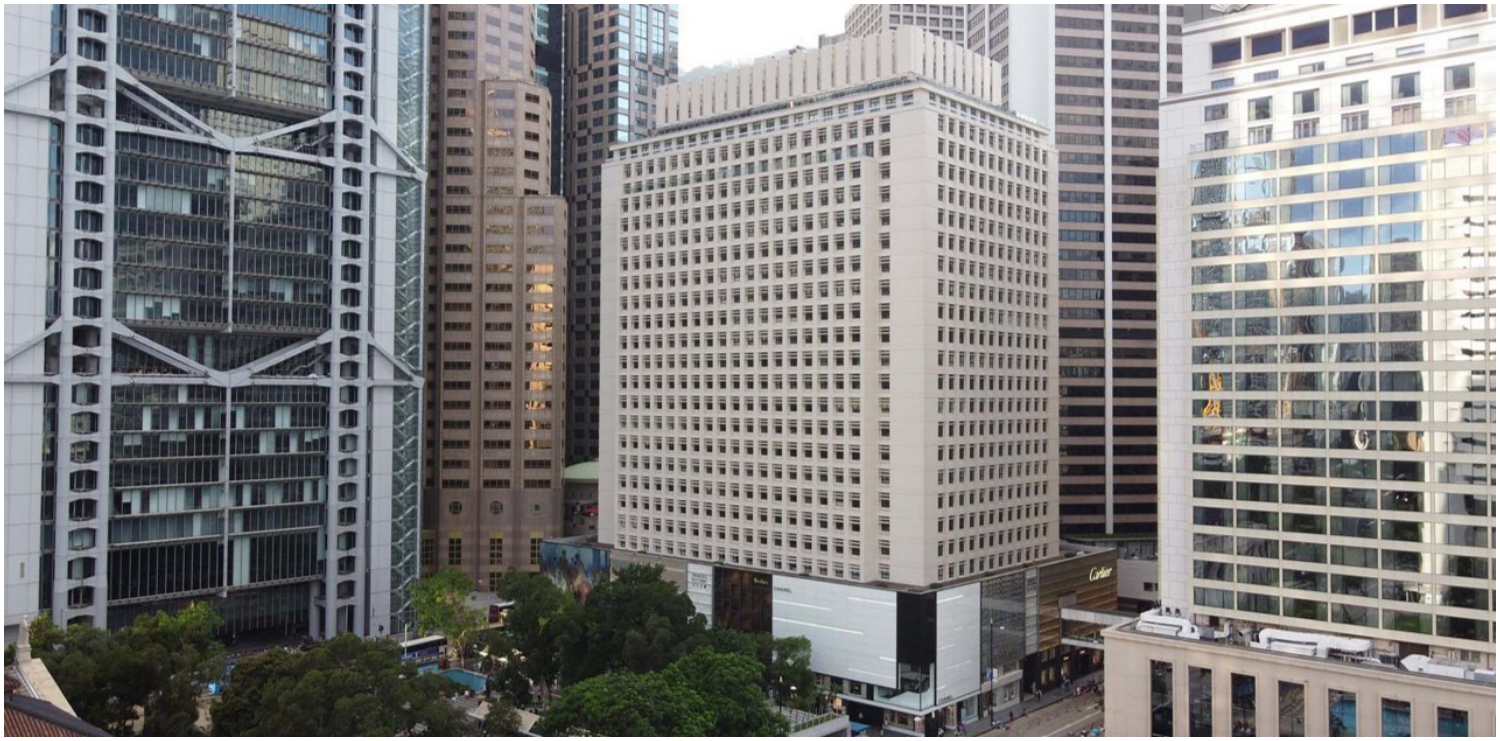
Leveraging AI-Driven OpenBIM Workflows for Innovative Modeling and Integration

The project embraced openBIM to improve interoperability and let teams use the best tool for each task in native formats. AI accelerated modelling by converting furniture reference images into detailed 3D meshes, exported to common 3D standards and converted back into Industry Foundation Classes (IFC) for coordination. This cut modelling bottlenecks while preserving data consistency across the BIM environment. By operating on native data before reintegration, the team broadened workflows and encouraged innovation. The result is greater collaboration, accuracy, and agility across the model's lifecycle—showcasing how AI and openBIM together enable flexible, data-driven decision-making in architecture, engineering, and construction.

Conclusion: Shaping the Future of Central

"Tomorrow's CENTRAL" is more than a construction project—it is a vision brought to life through innovation, collaboration, and digital transformation. By leveraging BIM and Autodesk technologies, Gammon and Hongkong Land have redefined what is possible in luxury retail renovation. The project balances heritage and modernity, elegance and efficiency, creating a destination that will captivate global audiences for years to come.

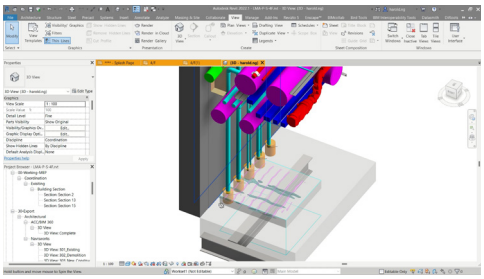
As Hong Kong continues to evolve as a global luxury hub, LANDMARK stands as a beacon of excellence, powered by the future-forward spirit of BIM. This project not only enhances the city's skyline but also elevates its reputation as a leader in sustainable, intelligent, and experiential design.



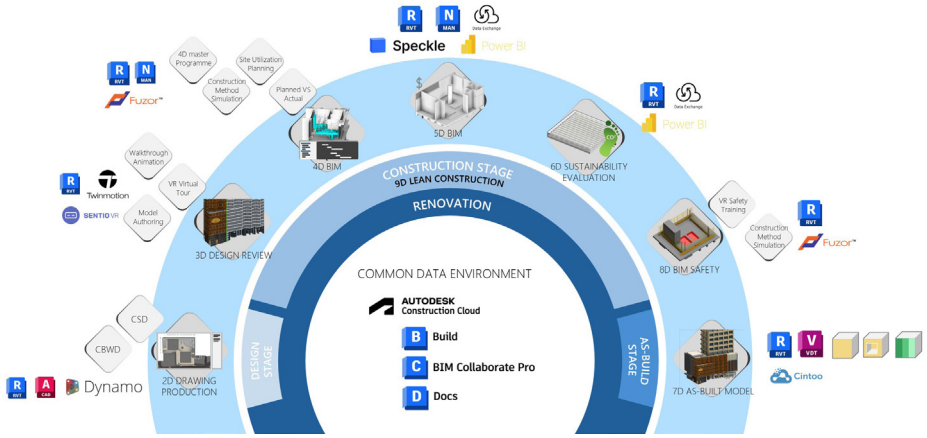
Prince's Building
Image Courtesy Hongkong Land Limited and Gammon Construction Limited



Concrete Scan
Image Courtesy Hongkong Land Limited and Gammon Construction Limited



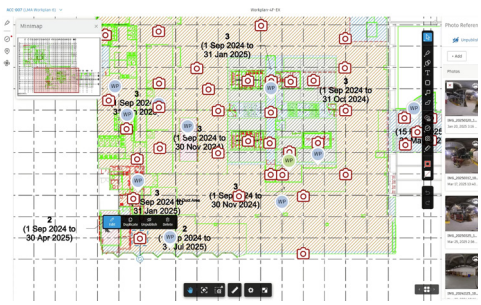
Concrete Scan record in Revit
Image Courtesy Hongkong Land Limited and Gammon Construction Limited



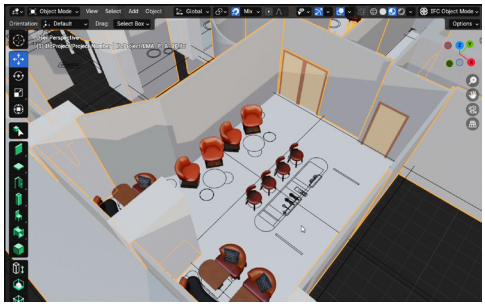
BIM Uses
Image Courtesy Hongkong Land Limited and Gammon Construction Limited



Facade Augmented Reality (AR)
Image Courtesy Hongkong Land Limited and Gammon Construction Limited



ACC Build Sheets
Image Courtesy Hongkong Land Limited and Gammon Construction Limited



AI accelerated modelling
Image Courtesy Hongkong Land Limited and Gammon Construction Limited

Advisory Panel – Introduction

We would like to express our sincere gratitude, once again, to the local organizations that have supported us and the international BIM advisors who have been instrumental in guiding us on this year's Awards. The advisory panel, comprised of esteemed leaders from local supporting organizations, has generously granted us their time to discuss and review the shortlisted projects, and provided us with valuable insights vital for future growth and success. Inspired by the sharing and experiences of the international advisors, we will continue to innovate as we stride toward a more sustainable future.



Dr. Calvin K. Kam
FAIA, PhD, CCBM, bSI Fellow
Founder and CEO,
Strategic Building Innovation · bimSCORE
StrategicGreen.AI
(Advisor)



Johnny Fu
AIA, LEED AP
Immediate Past President,
The American Institute of Architects – Hong Kong Chapter



Ryan Leong
Director,
Architects Association of Macau



Ir Francis Leung
FHKIE
President,
Hong Kong Alliance of Built Asset & Environment Information Management Associations (The Hong Kong Chapter of buildingSMART International)



Ir Henry Cheung
Council Member,
Hong Kong Information Technology Joint Council



Dr Francis Chan
Chair of External Affairs,
Hong Kong Institute of Project Management



Mike Chan
Group Admin,
Hong Kong Revit User Group



Ir Steven Lai
Vice Chairman,
Institution of Public Private Partnerships



H F Wong
Executive Vice Chairman,
The Association of Hong Kong Professionals



Kelvin Choi
Hong Kong Hub Committee Chair,
The Chartered Institute of Building (CIOB), Hong Kong



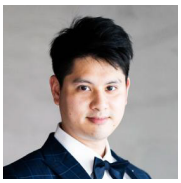
Kelvin Kuo
BIM Committee Chairman, The Chartered Institution of Civil Engineering Surveyors (Hong Kong Region)



Ar. Chan Wing Kai, Aaron
Deputy Chair, Digital Sustainability Committee,
The Hong Kong Institute of Architects



Ir Ken Mao
Board Member,
The Hong Kong Institute of Building Information Modelling



Michael Leung
Head of BIM Affairs,
The Hong Kong Institution of Engineering Surveyors



Ir Raymond Lui
Committee Member,
The Hong Kong Institution of Engineers
(IT division)



Trevor Ip
Director,
The Macau Institute of Engineers

Dr. Calvin Kam

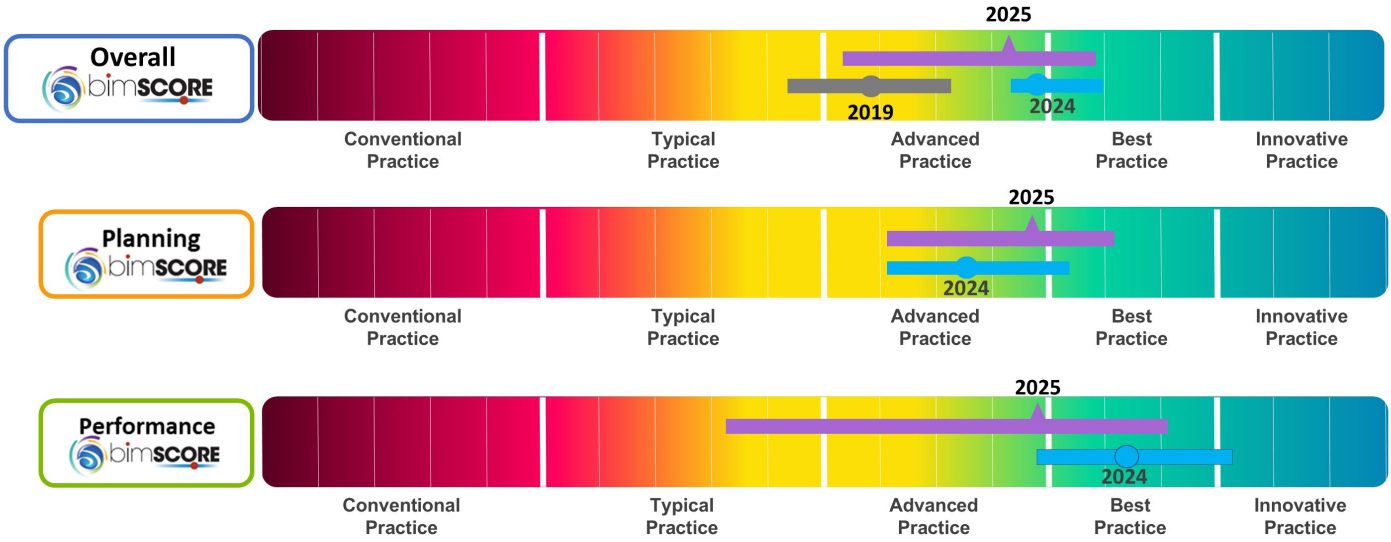
FAIA, PhD, CCBM, bSI Fellow

Overview

The 2025 Hong Kong Building Information Modelling (BIM) Awards highlighted a wide spectrum of projects applying advanced BIM and openBIM®-enabled technologies, ranging from substations and sewage facilities to digital tech hubs, mixed-use commercial developments, and water supply operations. The awardees, including returning winners such as CLP, Drainage Services Department (DSD), Gammon, and Hip Hing, demonstrated forward-looking practices, featuring advancements in openBIM workflows, dashboard integration, generative AI-driven BIM processes, automation for large-scale modelling, and BIM-enabled digital twins, among other innovations.

Our international management consulting team at Strategic Building Innovation · bimSCORE (SBI) has developed an evaluation framework for a preliminary assessment of the candidate projects. Projects were benchmarked against the global knowledge base representing hundreds of projects from over 16 countries, and categorized into five maturity tiers ranging from "Conventional" to "Innovative" Practices [as shown in the image below]. Consistent with 2024, the 2025 winners are positioned between the "Advanced" and "Best Practice" tiers in the global context.

The winning projects were further analysed in four evaluation areas: Planning, Performance, Adoption, and Technology. Data shows that this year's winning projects exhibited a wider range of scores, with a slight overall decrease in average scores compared to the previous year.



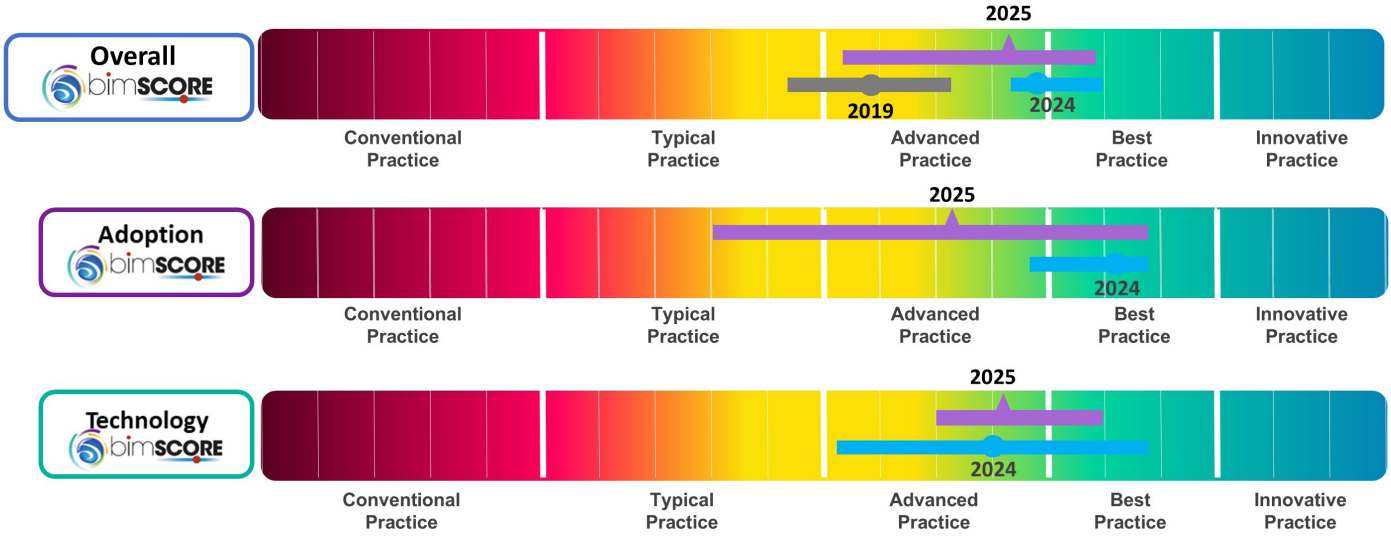
** Projects were evaluated based on the materials submitted by the applicants without interviews.

Planning and Performance

Planning for BIM implementation involves setting clear objectives with quantitative and qualitative performance targets, supporting teams to success with tools, training, and standards, and fostering collaboration among project teams. Performance monitoring is enhanced through BIM and automation for tracking project metrics to inform design and project management decisions. This year's average score of Planning Area is higher compared to the previous year. Most award-winning projects have been following ISO 19650 series for more standardized and consistent information exchange processes. Some winners set up a comprehensive set of Key Performance Indicators (KPIs), and tracked the actual achievements via quantitative measures. For example:

- CLP, Hip Hing, and Andrew Lee King Fun & Associates Architects (project: Kam Tin South Substation "Smart BIM. Bold Future.") established a comprehensive set of BIM uses and applications at an early project stage, with KPIs integrated throughout the entire process (e.g., using BIM-based quantity take-offs to achieve a 25% time saving and enhanced reliability);
- Cyberport, isBIM and Gammon (project: Cyberport Expansion) adopted a structured, BIM-driven methodology to foster efficient project delivery, supported by a BIM Deliverables Schedule defined at the project initiation stage;
- Hysan, Chinachem, and Hip Hing (project: Lee Garden Eight) achieved an impressive 70% reduction in construction waste, 30% reduction in MEP installation manpower, and 300% faster drawing production through automation.

In formal bimSCORE evaluations, Performance score records qualitative responses of stakeholders (such as user emotion) and 3rd party auditing of performance figures. In collaboration with organisations including the Hong Kong Development Bureau (DEVB), SBI formulated BIM KPIs and recommended a BIM Measurement Framework to track and report BIM adoption. Since these measures were not included in award application packages, the confidence level of the Performance scores is relatively low. Performance assessment showed variations among projects in the qualitative and 3rd party auditing aspects. * SBI encourages organisations to more proactively establish BIM-based objectives with targeted measures of success, and track these with input mechanisms that include quantitative and qualitative metrics reported by multiple stakeholders. This approach will produce performance reporting and analysis that can be used for management decisions, demonstrate progress, and drive advancement.



** Projects were evaluated based on the materials submitted by the applicants without interviews.

Adoption and Technology

Adoption of BIM is measured across the project lifecycle and with various stakeholders to gauge the degree of BIM implementation. Technology measurements consider an informed selection of BIM and related tools that support interoperable information exchanges and information-rich models. From technology perspective, this year's projects at the lower end of the performance range achieved better results than last year's. As such, the overall baseline has been raised, resulting in a more stable and consistent level of performance. Award winners demonstrated a broad spectrum of collaborative and BIM-enabled innovations from data integration, automation, and generative AI-driven workflows to digital twins, immersive technologies, and openBIM-based collaboration for design, construction, and asset management.

- DSD, AECOM, and China State - Alchmex JV (project: Relocation of Sha Tin Sewage Treatment Works To Caverns) adopted generative BIM and AI-driven workflows for modelling, data integration, task automation, digital fabrication, and IFC-based quantity take-offs via Excel VBA;
- Water Supplies Department (WSD), Shenzhen Yuegang Technology, and The University of Hong Kong (project: Optimizing Water Supply Operation and Maintenance with BIM and AI Technologies) integrated BIM and GIS, developed digital twins, and applied Large Language Models (LLMs), 4D LiDAR, and genetic algorithms to enhance planning and operational efficiency;
- Cyberport, isBIM and Gammon (project: Cyberport Expansion) applied BIM for automated statutory submissions, built a smart building platform for real-time asset management, and implemented robotics and sensor technologies for construction and environmental monitoring.

Compared to the 2024 awardees, the 2025 winners demonstrated a narrower range of technological adoption - between "Advanced Practice" and the lower end of "Best Practice" – and achieved generally better outcomes. * SBI encourages project owners to clearly define team roles and responsibilities, and strike a balance between the breadth and depth of BIM use based on project and client goals, team capabilities, and market dynamics. Emphasizing organisational processes, involving stakeholders, providing appropriate tools and training, and supporting teams to success across all project stages are all vital elements contributing to successful BIM adoption.



Dr. Calvin K. Kam
FAIA, PhD, CCBM,
bSI Fellow

Founder and CEO,
Strategic Building Innovation·
bimSCORE;
StrategicGreen.AI

Adjunct Professor
Center for Integrated Facility
Engineering, Stanford University

Dr. Calvin Kam is the Founder of Strategic Building Innovation (SBI) and bimSCORE.com – the "GPS Navigator" for any enterprise or project team charting courses for construction innovation. Dr. Kam teaches undergraduate, graduate, and professional courses and leads research as an Adjunct Professor at Stanford University's Center for Integrated Facility Engineering, where he partners with industry members in areas such as Building Information Modeling, Virtual Design, and Construction as well as Smart and Sustainable Developments. Calvin was a former National Chairman of the Center for Integrated Practice and the Technology in Architectural Practice Knowledge Community (supported by 10,000+ professionals) with the American Institute of Architects (AIA), for which he had also served on the Board Knowledge Committee.

Dr. Kam has worked with the Buildings Department, Construction Industry Council, Development Bureau, Electrical and Mechanical Services Department, English Schools Foundation, Hong Kong Housing Authority, Lands Department, Sun Hung Kai Properties, University of Chicago, and Walt Disney Imagineering, and was invited to present and facilitate at both the 2014 and 2015 APEC workshops and to author two APEC publications. In 2011, the Singapore government's Building & Construction Authority appointed Calvin as an international expert to advise its construction productivity and BIM roadmap. In 2015, Calvin was appointed an Expert Advisor to the Shanghai government's BIM advancement centre.

Calvin is honoured by elevation to the title of Fellow in both buildingSMART International and the American Institute of Architects. He is a recipient of many awards including ENR's "20 under 40" and BD+C's "40 under 40". Calvin is a Registered Architect, Professional Engineer, and LEED AP in the USA with a Ph.D. from Stanford University. Dr. Kam has presented at 100+ industry events/universities across 18 countries and regions and published several book chapters and journal publications. Calvin has also served as an Expert Advisor for the Hong Kong AIAB BIM Awards since 2008.

Memory Information Modeling: Exploring the Application of Building Information Modeling on Community-Centric Project-Based Learning



Hung Kin Ho, Benson

Making history as Hong Kong's first Chartered Infrastructure Engineer, Benson specializes in integrating Building Information Modeling (BIM), Computer Vision, and Artificial Intelligence (AI) into transportation and education. His pioneering work includes projects "Automatic BIM/GIS Data Mapping", "Infrastructure-BIM (I-BIM)" applications for light railway and road systems and "AI-driven Intelligent Traffic Junction" solutions. Actively engaged in industry leadership, Benson serves on the Construction Industry Council (CIC) BIM Assessment Panel and contributes to Chartered Institute of Logistics and Transport Hong Kong (CILTHK) committees. He also supports public service through roles on the Road Safety Campaign Committee and the Appeal Tribunal (Buildings Ordinance). His contributions have been recognized with numerous honors, including Fellowship of the Higher Education Academy (HEA), HKIBIM Awards, 2021 Greater Bay Area STEM Excellence Award. He is honored to be named "Young BIMer of the Year 2025" and remains committed to advancing BIM innovation for smarter infrastructure and societal progress.



Media coverage highlights BIM, VR preserving Choi Hung Estate's heritage. Image Courtesy of Vocational Training Council

My interest in BIM stems from its untapped potential to serve people and communities, driving purposeful industry innovation. In Hong Kong, old housing estates hold generations of collective memory, yet BIM is often seen only as an engineering tool. I aim to use BIM as a carrier of cultural heritage, preserving not just buildings, but the stories within them. As Hong Kong's first Chartered Infrastructure Engineer, I explore how BIM, combined with AI and digital twins, can be tailored to our urban fabric, serving people and heritage while meeting high technical and ethical standards. True innovation means leveraging BIM for bigger goals: decarbonization, equity, and resilience.

Needs or reasons of the innovation

The need for our innovation, Memory Information Modeling (MIM), arose from gaps in preserving heritage and BIM's limited role in cultural documentation. While digital tools like 3D scanning exist, they underutilize documenting "lived-in" spaces where community stories matter. BIM traditionally focuses on physical structures, neglecting social and emotional layers. Hong Kong's redevelopment often prioritizes physical change over culture, threatening community identity. MIM was created to bridge BIM with social heritage, capturing both physical structures and lived experiences.

The concept of the innovation

MIM integrates BIM, 3D scanning, UAV photogrammetry, and community narratives to holistically document built environments, capturing physical and socio-cultural layers.





Choi Hung BIM booth featuring OpenSpace and Trimble that cut production by 70% in 2 months drew diverse attendees.
Image Courtesy of Vocational Training Council

Challenges encountered during the process

Challenges included merging diverse data types while balancing technical accuracy and emotional authenticity, coordinating interdisciplinary teams, navigating on-site physical constraints, upholding ethical protocols with residents, and ensuring BIM model consistency.

Outcomes and sustainable development

MIM successfully expanded BIM into a framework capturing both physical and socio-emotional essence, creating a “living archive” of community memory. It offers a scalable global model, integrating technical innovation with community-centric methods to preserve cultural legacy, strengthen bonds, and ensure urban development safeguards social heritage.

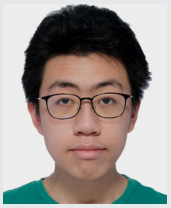
I encourage local BIM fellows to prioritize people-centric innovation, moving beyond technical models to embrace human stories and public engagement. Secondly, champion cross-disciplinary collaboration, blending BIM with AI, AR, or blockchain, and learning from social science and heritage disciplines to serve broader goals like sustainability, equity, and cultural continuity. Let BIM be a bridge between technology, people, and communities.



1964 BIM model revives Choi Hung’s water rationing queues.
Image Courtesy of Vocational Training Council



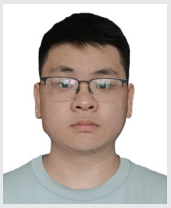
Modern 3D rendering recreates Choi Hung’s vibrant communal sports space.
Image Courtesy of Vocational Training Council



CHAN Kwan Kit



HUI King Ki



NGAN Man Leon



Dr. Boyu WANG

INSTITUTION
HKUST BIM Lab, The Hong Kong University of Science and Technology

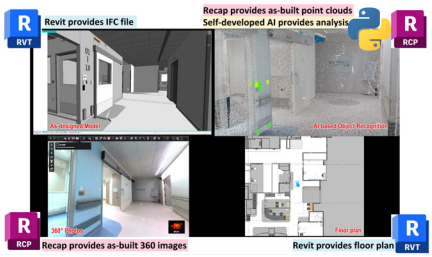
PROJECT NAME
AI-Based Scan-to-BIM for Facility Management in a Smart Sustainable Campus

PROJECT LOCATION
The Hong Kong University of Science and Technology

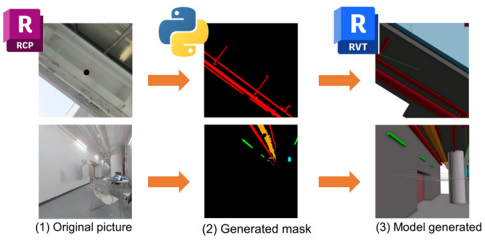
TYPE
As-Built Surveying and BIM Reconstruction

AUTODESK PRODUCTS USED
Autodesk® Dynamo
Autodesk® ReCap®
Autodesk® Revit®

AI-Based Scan-to-BIM for Facility Management in a Smart Sustainable Campus



Web-Based Integration Platform for Smart and Sustainable Campus Management
Image Courtesy of HKUST BIM Lab, The Hong Kong University of Science and Technology



Workflow Demonstration of AI-Based Scan-to-BIM
Image Courtesy of HKUST BIM Lab, The Hong Kong University of Science and Technology

Project Background

Facility management in large-scale campuses faces increasing challenges due to aging infrastructure and the lack of up-to-date building information. Traditional methods for creating Building Information Models (BIM), such as manual measurements or 2D drawings, are time-consuming, inaccurate, and unable to reflect true as-built conditions. This project aims to develop an AI-based Scan-to-BIM solution that leverages 3D scanning, computer vision, and generative modeling to automate the creation of high-precision as-built BIMs. By integrating point cloud data, 360° imagery, and AI-driven component recognition, the system enhances the efficiency, accuracy, and scalability of BIM reconstruction for smart and sustainable facility management.

Project Challenges and Solutions

Traditional BIM creation methods, reliant on manual measurements or outdated 2D drawings, are time-consuming, labor-intensive, and often inaccurate—especially for large, aging facilities. To overcome this, the project introduces an AI-based Scan-to-BIM workflow that automates as-built BIM generation using point clouds and 360° imagery.

Existing AI models also face limitations in closed-set detection, requiring large labeled datasets and struggling with unseen components. This project addresses the issue by integrating open-set, zero-shot detection using Grounding DINO and Segment Anything Model (SAM), enabling flexible object recognition via text-image prompts.

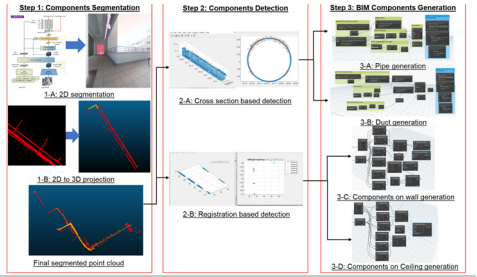
Lastly, converting AI outputs into BIM formats can be error-prone. The team resolves this by using parameter extraction and Dynamo scripting to automate BIM generation in Revit, ensuring both high accuracy and efficiency.

How does BIM help for your project?

BIM plays a central role in enabling intelligent, automated, and scalable facility management. In this project, BIM is not only the output format but also the foundation for integrating AI-driven object detection and 3D scanning data. Using Autodesk Revit and Dynamo, recognized components from point clouds are automatically converted into parametric BIM elements, ensuring consistency, accuracy, and efficiency.

BIM also serves as a single source of truth for managing and updating the as-built conditions of over 60 buildings across campus. With compatibility with Autodesk Construction Cloud, the BIM models can be easily shared among internal teams and external stakeholders, streamlining collaboration, verification, and long-term maintenance planning.

By transforming raw scan data into intelligent BIM models, this solution bridges the gap between physical environments and digital facility management systems.



NextGen AI-Based Scan-to-BIM Framework
Image Courtesy of HKUST BIM Lab, The Hong Kong University of Science and Technology



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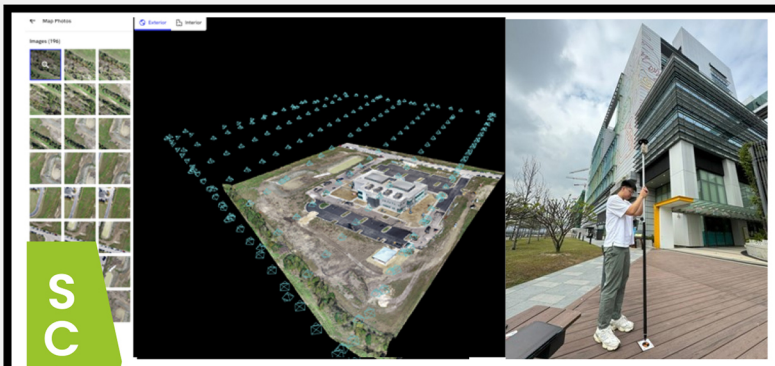

SCAN

Provide **precise distance measurements** by emitting laser beams that reflect off surfaces to **create dense point clouds.**

Data Processing

Align images and point clouds, filter out noise, and correct distortions from raw input to create **a unified digital representation.**

Data Extraction

Identify dimensions, volumes, and structural details using CAD and GIS software, preparing **essential information for practical applications.**

Progress Documentation

Create point cloud data to capture detailed information from the site, serving as **a record for regular progress checks.**

Model Creation & Visualization

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Tools that we use

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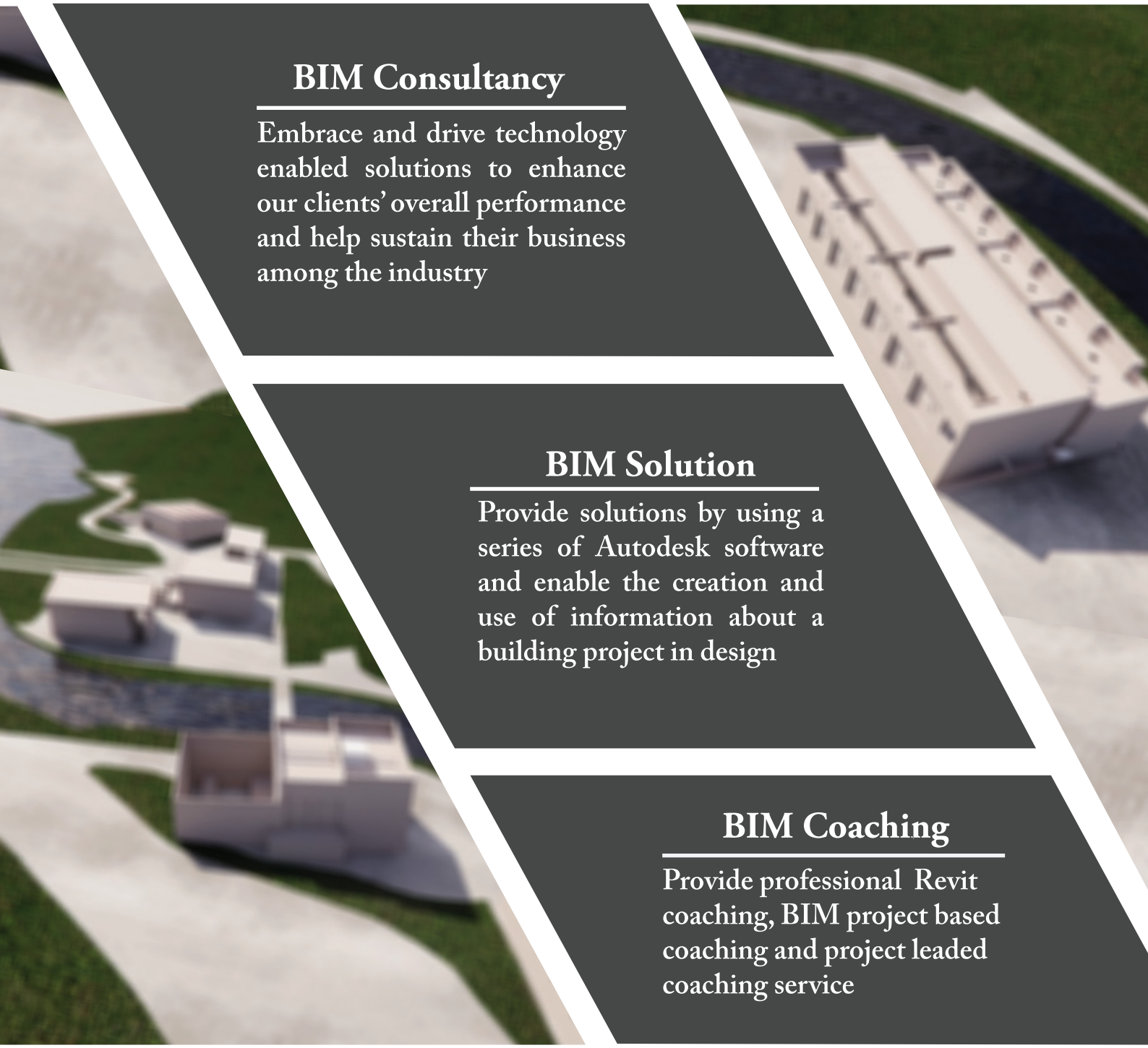

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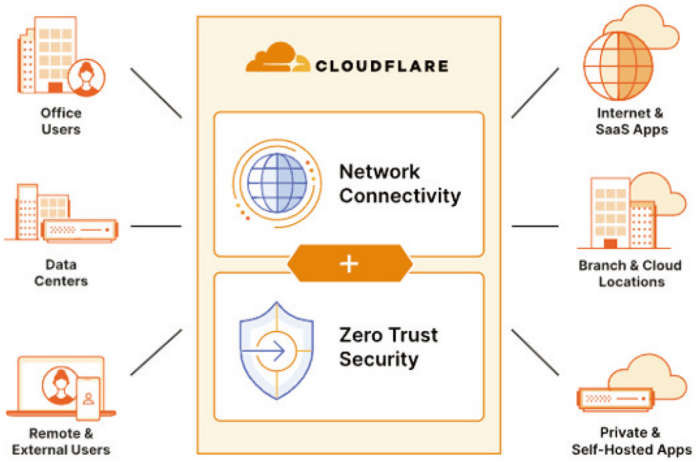

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