

Roadmap on Adoption of Building Information Modelling (BIM) for Building Plan Preparation and Submission



Development Bureau

The Government of the
Hong Kong Special Administrative Region
of the People's Republic of China

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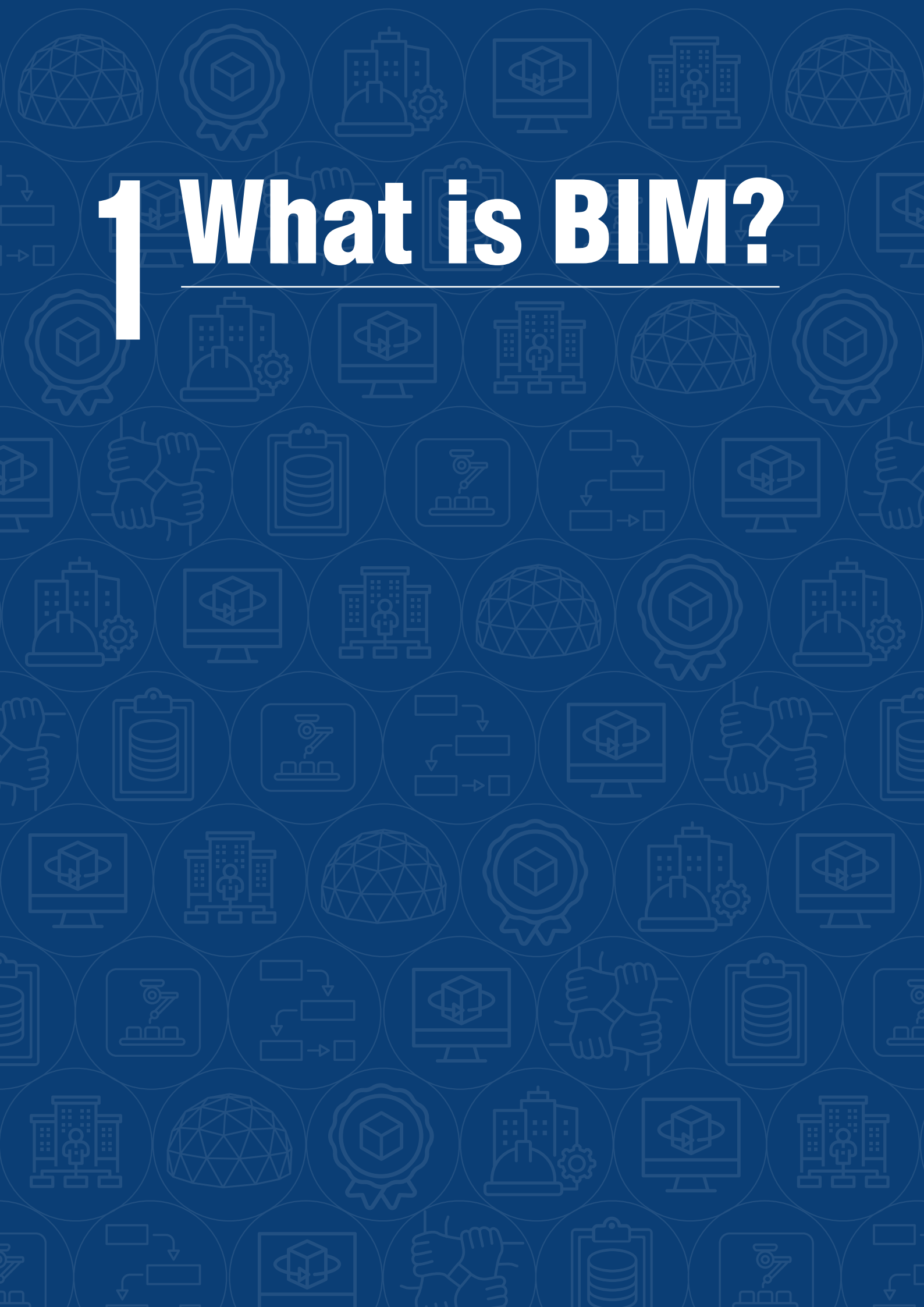
Preface

To enhance the productivity of the construction industry, the Government is committed to promoting the adoption of Building Information Modelling (BIM) in Hong Kong. Our efforts date back to 2013, where a proposal to adopt an incremental strategy in using BIM in public works projects was endorsed by the Government. Over the years, various policies and measures have been rolled out to support the use of BIM in development projects, predominantly regarding public works projects.

With experience gained so far, we now consider it opportune to formulate a roadmap for the private sector to adopt BIM in their development projects. In the 2023 Policy Address, the Chief Executive announced that the Government will promulgate within this year a roadmap on the industry's use of BIM in preparing building plans for submission to departments for approval.

This tentative roadmap is drafted to provide a basis for consultation with stakeholders in the next two months. It outlines key milestones for adoption of BIM by the private sector through a step-by-step approach, with the ultimate goal of achieving full use of BIM throughout the preparation and approval process of all building plans submitted under the Buildings Ordinance (BO). The roadmap will be finalised taking into account stakeholders' views collected in the two-month consultation period from 29 December 2023 to 29 February 2024.

1 What is BIM?



1. What is BIM?

BIM is the process of generating and managing building data during the design and construction stage as well as the asset life cycle. Typically, the process uses building modelling software to create a three-dimensional (3D) model of a building, including its physical and functional characteristics. The process produces the BIM database, which encompasses building geometry, spatial relationships, geographic information, as well as quantities and properties of building elements. It can facilitate project management, better construction process control, cross-disciplinary collaboration, communication with external stakeholders, decision support and risk management.



3D rendering of Kwu Tung North Multi-welfare Services Complex using BIM software.

2 Why BIM?

2.1 Enhance design efficiency

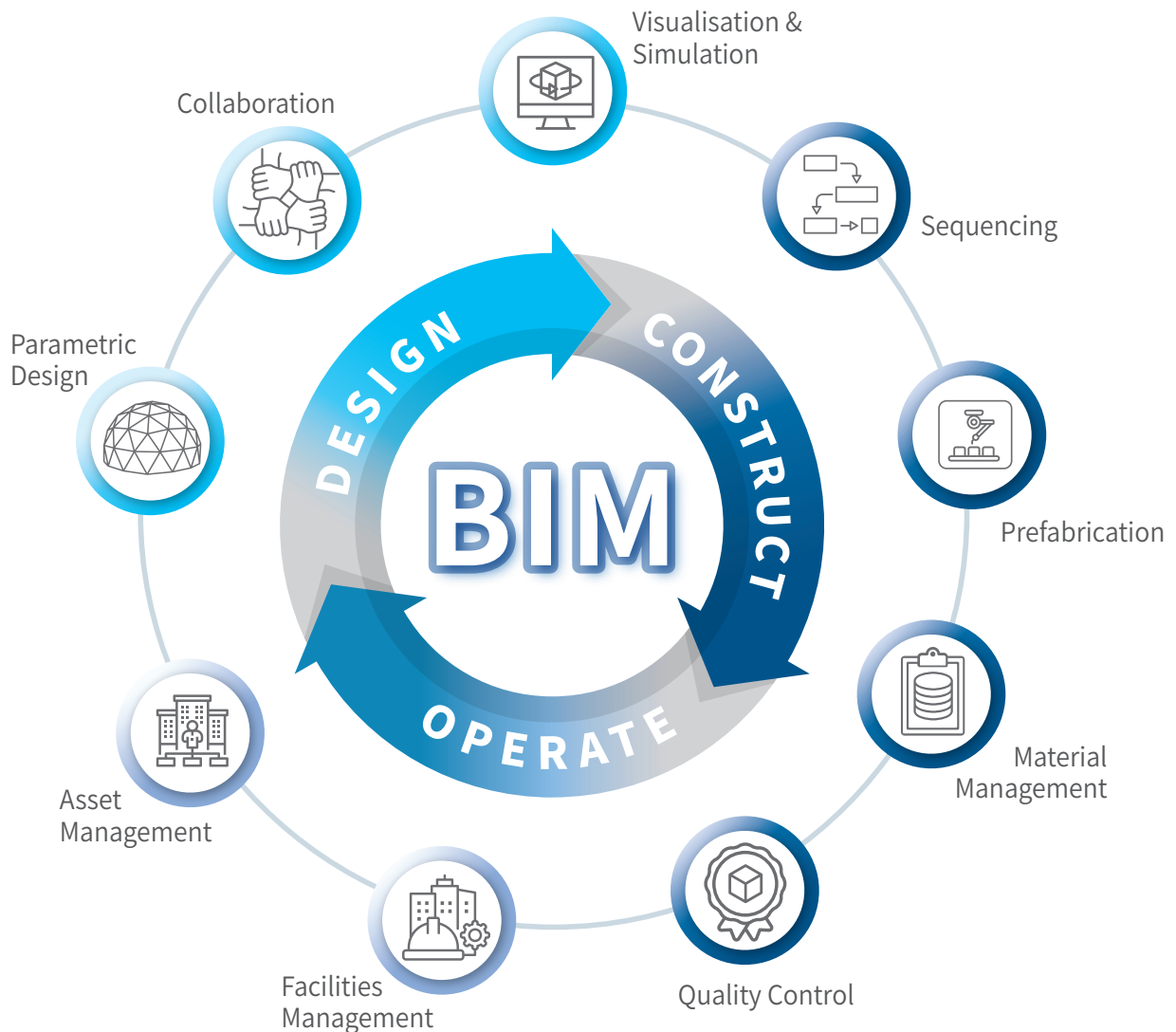
2.2 Speed up construction

2.3 Facilitate facilities management and asset management

2.4 Facilitate macro data analysis

2. Why BIM?

The BIM technology has many benefits throughout the whole project life cycle, from investigation, feasibility, planning, design and construction stages. Moreover, the BIM technology has vast potential to be integrated with other advance construction technologies for optimising operation and maintenance, thereby facilitating effective facilities management (FM) and asset management (AM)¹. The BIM models also contain rich information of built assets which can contribute to smart city planning through integration of BIM and Geographic Information System (GIS).

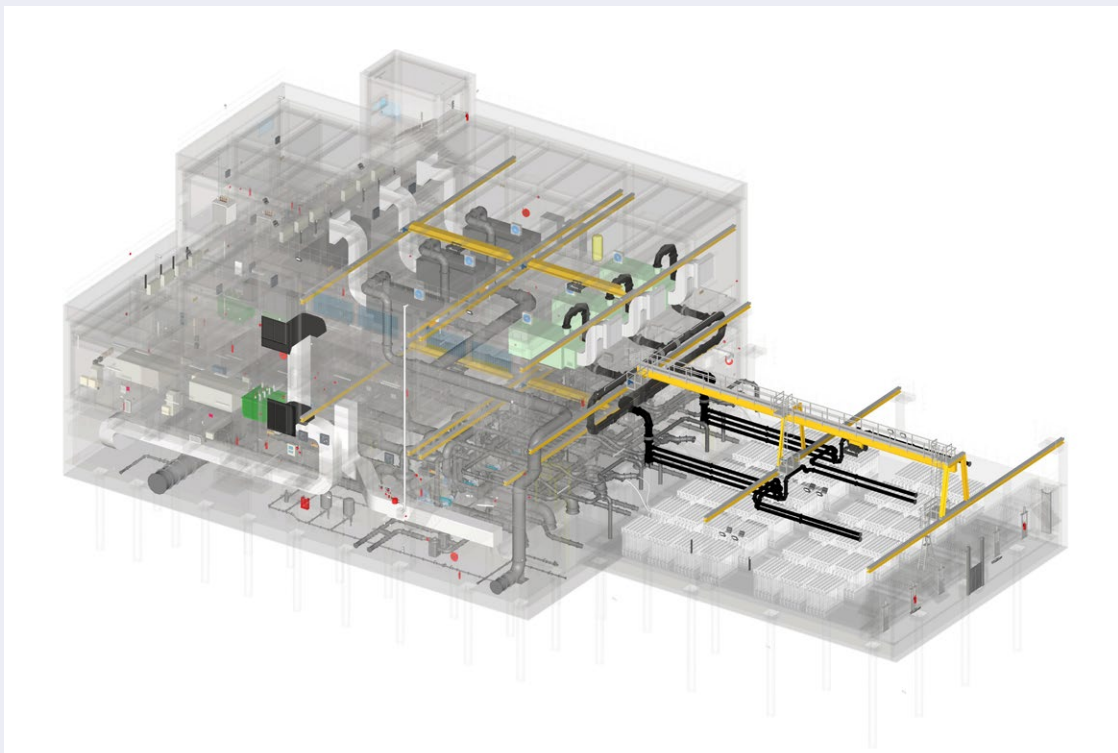


Application of BIM throughout the project life cycle.

¹ FM focuses on the day-to-day operations and maintenance of a building, while AM refers to the strategic and long-term planning of asset utilisation, an example being the disposal of asset at the end of the building life cycle.

2.1 Enhance design efficiency

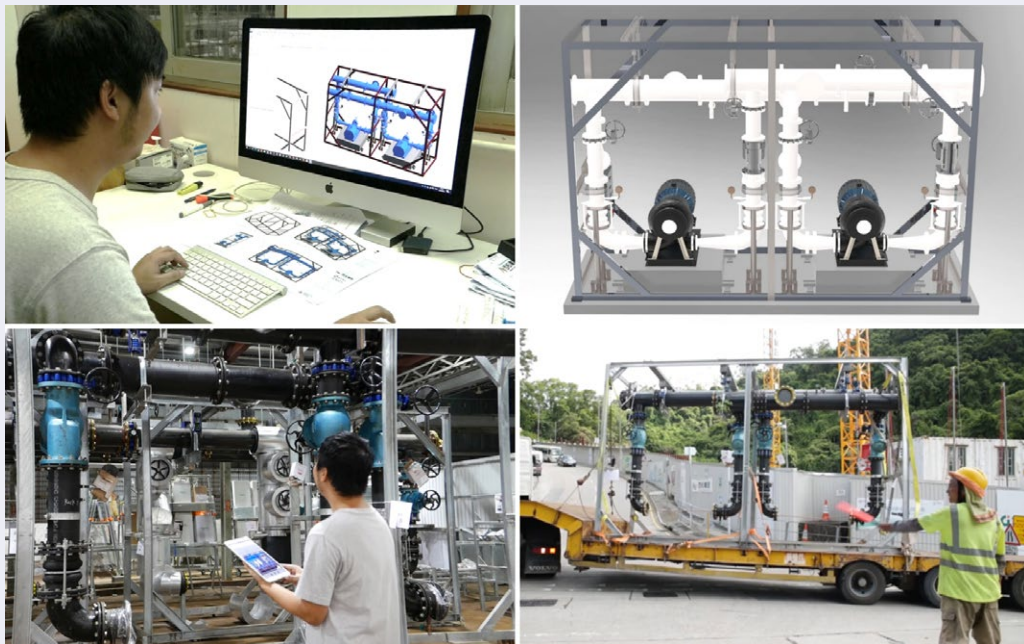
- ◆ **Enhance collaboration:** the BIM technology is a new generation of work method which supports a collaborative platform allowing multiple stakeholders to work on a single, shared model; facilitates better communication, coordination and integration of design elements, thus reducing errors and conflicts by ensuring that there is a "single source of truth".
- ◆ **Parametric design, visualisation and simulation:** BIM enables parametric modelling, where design elements are interconnected and linked to data parameters; allows quick design iterations, modifications and automatic updating, thus saving time and effort. BIM also helps optimise design decisions, identify potential issues, avoid clashes and improve overall efficiency. With integration of technologies such as augmented reality and virtual reality, users can visualise how the design fits within the real environment.



BIM helps visualise in detail the internal complex building structure and the electrical and mechanical (E&M) components of the facility, thereby facilitating estimation of construction materials required and minimising the possibility of clashes. Pictured is a BIM model of the Shek Wu Hui Sewage Treatment Works Membrane Facilities Building.

2.2 Speed up construction

- ◆ **Construction sequencing:** BIM enables the creation of four-dimensional (4D) models, which incorporate the element of time into the 3D models. Contractors can plan and optimise construction activities, identify potential bottlenecks or clashes in advance, and streamline the construction sequence accordingly.
- ◆ **Prefabrication and off-site construction:** through the use of highly detailed and coordinated 3D models, BIM can create various prefabricated elements with accuracy and quality, thereby ensuring parts and pieces will fit together as intended once installed on-site. BIM therefore facilitates the use of prefabrication and off-site construction methods, reduces on-site construction time and enhances efficiency.
- ◆ **Material management:** BIM models contain detailed information about building components, quantities, and specifications, thereby facilitating procurement and logistics, and minimising delays and wastage.
- ◆ **Monitoring and quality control:** by tracking the construction process against the BIM model, deviations can be identified early, allowing prompt corrective actions and minimising programme disruptions.

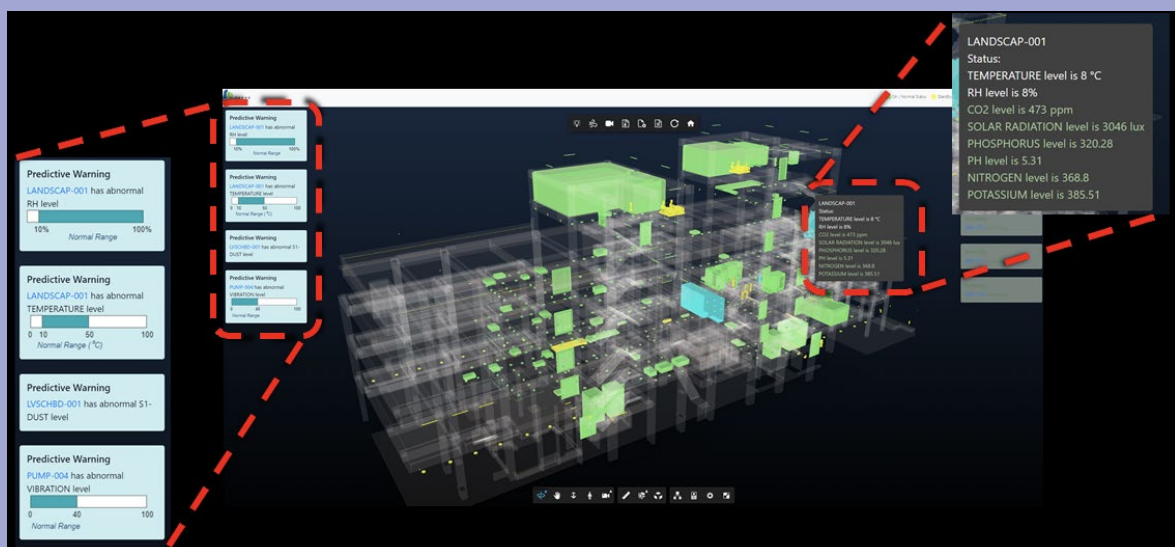


BIM helps material management, monitoring and quality control.

2.3 Facilitate facilities management and asset management

BIM facilitates facility managers to plan and maintain building facilities such as space management, energy analysis and sustainability, emergency planning and safety, renovation and retrofitting, etc. With Internet of Things (IoT) devices and sensors embedded within a building's systems and assets, real-time data (such as energy consumption and various building performance parameters) can be collected for better monitoring, analysis, and optimisation of building operations and maintenance. Accurate and up-to-date asset information also facilitates realisation of value for assets.

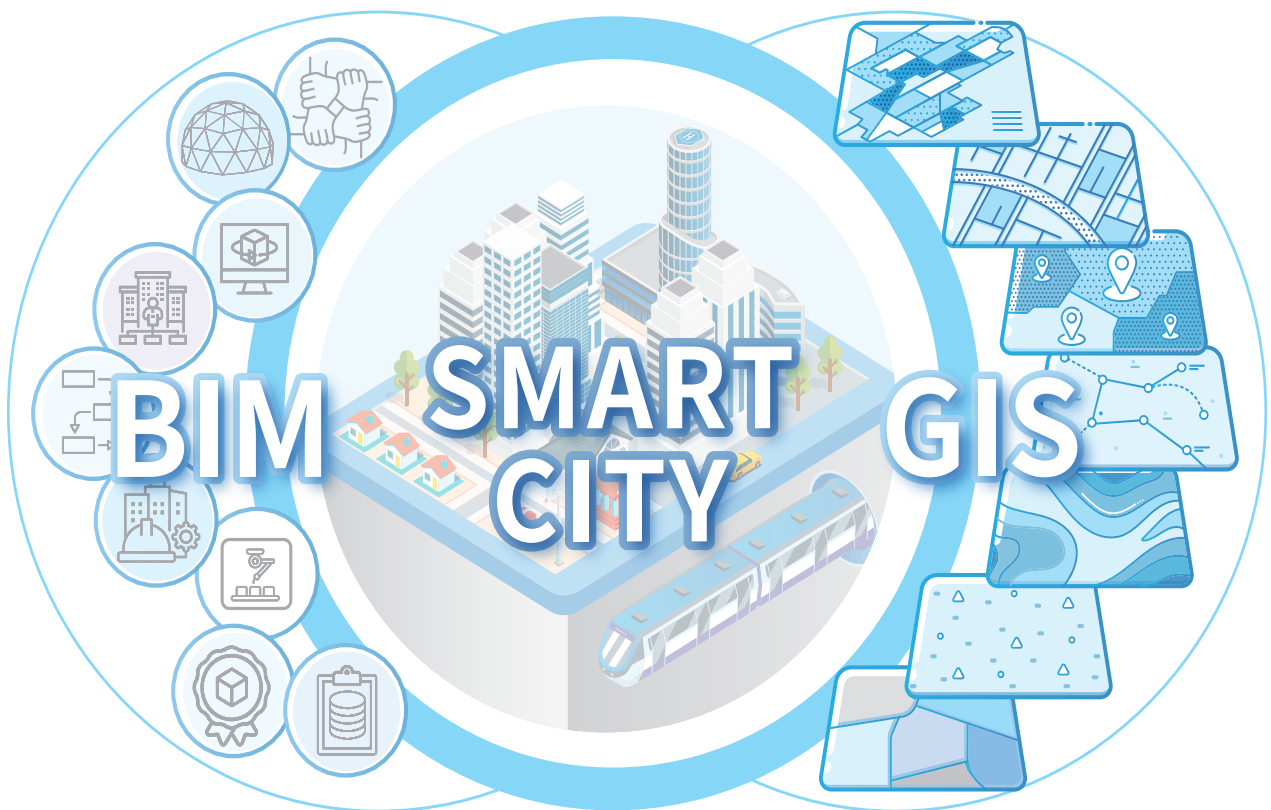
618 Shanghai Street is the Urban Renewal Authority (URA)'s first project in using BIM to enhance design coordination, prevent crash in construction, and enhance operational efficiency in FM. Employing BIM at different building stages will generate continuous data for integration with the building management system. For example, the integration of BIM-FM system and IoT technology enables real-time monitoring of the facility's operation, such as fire-rated doors, air quality and hygiene in toilets, real-time alert notifications, power consumption of building systems, etc.



Integration of BIM with building management system.

2.4 Facilitate macro data analysis

By integrating BIM with GIS, the geospatial context (e.g. building outlook) of buildings and infrastructure can be better represented. The integration of various spatial data on a common digital platform can support better understanding of the general building environment as well as the impact of a building on the surrounding environment, which in turn enables the building to be designed, constructed and managed more efficiently and sustainably, supporting smart city planning.



The integrated application of BIM and GIS.

3 Current Landscape in Hong Kong

- 3.1 Public sector's leading role
- 3.2 Facilitation for the private sector
- 3.3 Support from the Construction Industry Council

3. Current Landscape in Hong Kong

3.1 Public sector's leading role

As in many other jurisdictions, we started our journey in promoting the use of BIM technology with public works projects acting as pioneers.

3.1.1 Public works projects

In 2013, public works projects were selected for trial with a view to obtaining more information and gathering experience on the BIM performance. With a view to enhancing the design, construction, project management and AM and improving the overall productivity of the construction industry through adoption of BIM, starting from 2018 onwards, consultants and contractors are required to use BIM technology when undertaking public works projects of \$30 million or above. The Government regularly reviews and updates the policy to enhance the implementation requirements for BIM adoption, extend the scope of mandatory BIM application and enhance the quality of BIM uses.

3.1.2 Asset management

Aside from construction, BIM is also used by the Government and public bodies in other areas such as AM of venues and buildings, including government offices, non-governmental organisation venues, hospitals, etc. The Electrical and Mechanical Services Department (EMSD) has developed and adopted the BIM-AM system since 2014 to facilitate the management of E&M facilities in buildings. The adoption of BIM-AM system for managing E&M assets could improve operational efficiency and service reliability in government venues as well as promote smart building development in Hong Kong. EMSD has also published standards and guidelines to promote the adoption of BIM-AM to the trade.



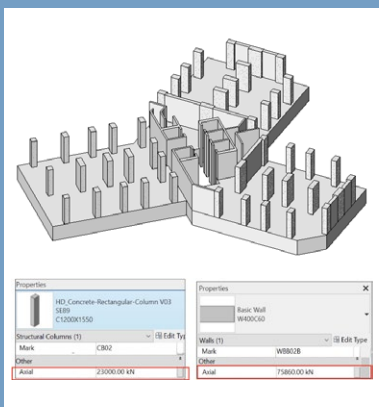
Gesture synchronisation to see through ceiling and locate target equipment.

The Hong Kong Housing Authority (HA), which is responsible for the construction of public housing, has been implementing BIM for an extensive period and continues to expand the breadth and depth of various applications with the objective of improving the quality and efficiency of their work covering the full project life cycle.

BIM has become an integral part of public housing developments, assisting in many facets including planning, design, building control, costing, documentation, construction planning, maintenance and management. With the advancement of new technologies, HA is venturing into new realms, including generative design, reality capture, smart project and site management and much more.

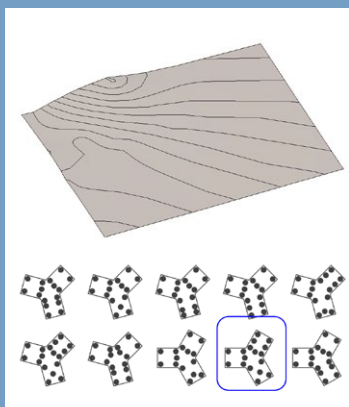
HA has received numerous BIM awards over the years, including awards for project applications, and is widely recognised as an industry influencer for its outstanding achievements in BIM.

Wall, column embedded with imposed loading on the pile cap.



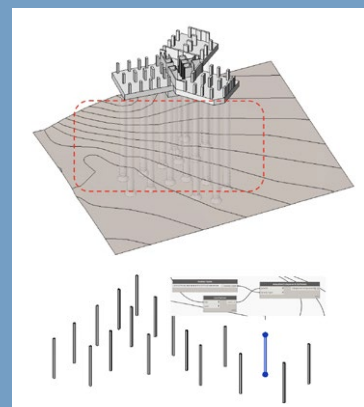
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Input of rockhead contour in BIM model and generating design options.



=

Generate the foundation BIM models for the selected design.



HA's self-developed BIM-enabled Systematic Approach to Foundation Design, which makes use of generative design to optimise foundation design, received an "Industry Influencer Award" in November 2023.

3.1.3 Smart city planning

The Government also drives the use of BIM beyond individual projects to smart city planning through integration of BIM and GIS. The Lands Department (LandsD) maintains a BIM data repository – the Government BIM Data Repository (GBDR) – for storing territory-wide BIM data from public works projects. As a centralised data sharing platform, the GBDR collects and stores the design and as-built BIM models in native formats and converts the collected BIM data into open formats, enabling effective and interoperable BIM data sharing across government bureaux and departments. The GBDR supports effective BIM data discovery, retrieval and analysis, e.g. spatial search of BIM data availability, and integrated BIM and GIS data on temporal or site analysis, etc. As the policy bureau driving the use of BIM for public works projects, the Development Bureau (DEVB) is developing in phases the integrated capital works platform, through which BIM data will be drawn from the GBDR for conducting analysis of public works projects information for continuous monitoring and review of performance. More works departments will start interfacing with GBDR and explore the use of BIM data in various aspects, e.g. site analysis and feasibility studies.

The GBDR will be expanded in the coming years for collecting and storing BIM data from projects entrusted to organisations outside the Government (e.g. Hong Kong Housing Society (HKHS), URA, MTR Corporation Limited (MTRCL), Hong Kong Airport Authority, subvented projects, etc.). It is our goal to include BIM data from private projects in the GBDR in the future.

Through the GBDR, BIM data is translated into a source of built assets information on the Common Spatial Data Infrastructure (CSDI) Portal². Dovetailed with the GBDR, the CSDI Portal not only allows BIM data sharing among government bureaux and departments, but also enables the integration of BIM-GIS data which helps the development and updating of the 3D Digital Map managed by the LandsD, which is a fundamental component of Digital Hong Kong. BIM data contributes to the 3D Digital Map in terms of building outlook and interior structures, which enables visualisation, indoor building applications and city modelling. The CSDI Portal and 3D Digital Map are available for public use for free and have the potential of enhancing government services and developing applications with smart technology. Scaling up of the GBDR to include BIM data sources other than public works, such as private projects as mentioned above, would be explored for more effective BIM data sharing and 3D Digital Map updating.

² The CSDI Portal (<https://portal.csdi.gov.hk/csdi-webpage/>) is a portal developed by the Government. It functions as a one-stop data supermarket, opening up and centralising multi-source spatial data, converting them into open and machine-readable formats. It is available for free use and download by the public.

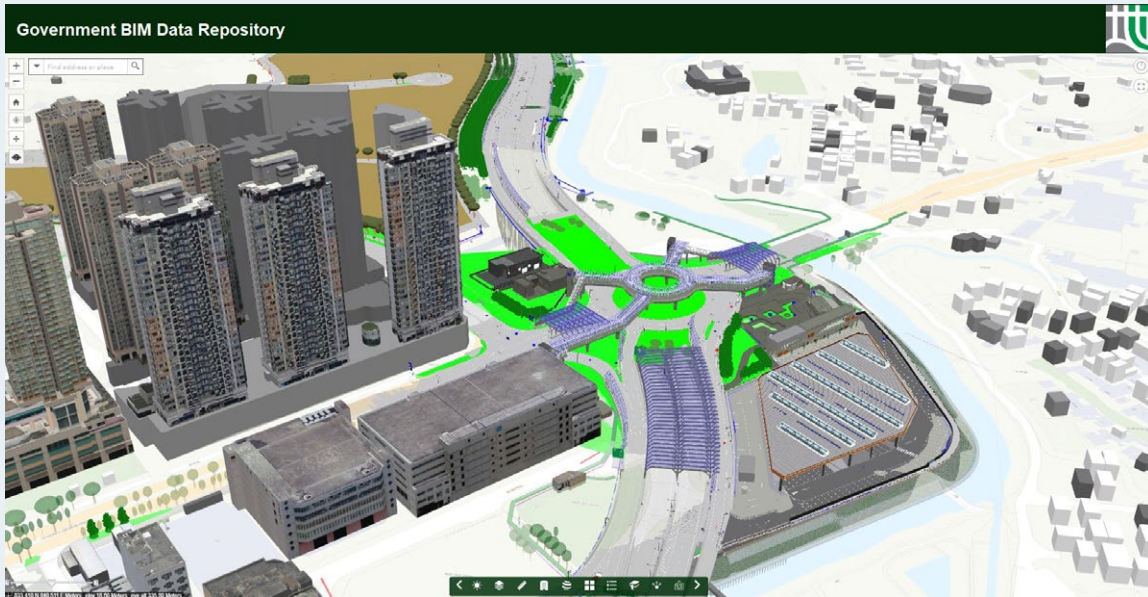


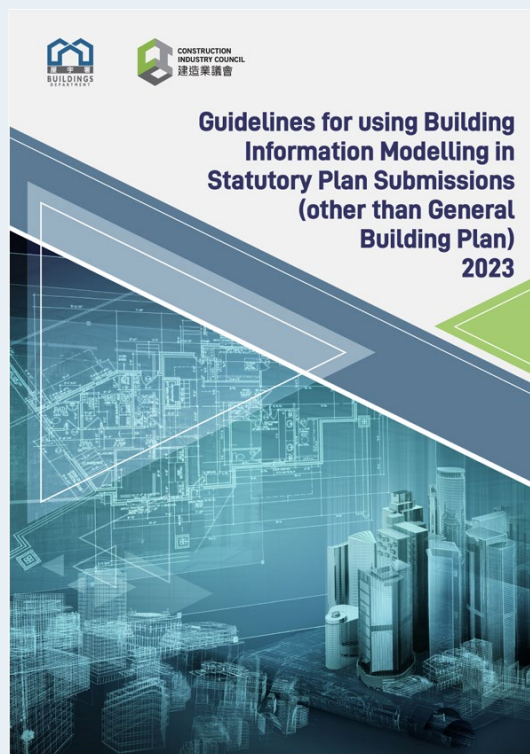
Image of 3D Digital Map from the GBDR.

3.2 Facilitation for the private sector

While the use of BIM is currently not mandatory for building plan submission, the Buildings Department (BD) accepts BIM models³ as supplementary information in the submission of building plans for BD's approval. For example, floor area information in the BIM model can be used to support calculations of gross floor area (GFA), site coverage, usable floor area and usable floor space in building plan submissions. In fact, a number of private development projects such as InnoCell (i.e. the first hybrid Modular Integrated Construction permanent building in Hong Kong), the Three-Runway System project, Asia-World Expo Phase 2 development, Site D of Wong Chuk Hang Station property development, and the University of Hong Kong's High West site development have already leveraged BIM technology to speed up design and construction.

BD has since 2019 promulgated Practice Note for Authorized Persons, Registered Structural Engineers and Registered Geotechnical Engineers (PNAP) ADV-34, "Guidelines for using BIM in General Building Plans Submission" and "Guidelines for using BIM in Statutory Plan Submissions (other than General Building Plan)" for the industry to follow in preparing plans with BIM.

³ BIM models are accepted through the Electronic Submission Hub, which is a digital platform developed by BD for receiving and processing of building plans, documents and applications submitted under the BO.



Guidelines for using BIM published by BD.

In addition, BD promulgated in September 2023 an enhanced GFA concession mechanism to encourage a more sustainable built environment. Under the enhanced mechanism, in order to be eligible for the GFA concession for green and amenity facilities (capped at 10%), the project must have achieved a specific rating at the BEAM Plus assessment⁴, or attained one or two more "specific standards", the adoption of BIM being one such specific standards. Details are set out in BD's PNAP APP-151 Appendix C4.

A list of standards and guidelines relating to BIM issued by the Government is at **Annex A**.

Meanwhile, BD is developing various automated checking tools to facilitate plan processing, automate workflows and minimise manual arithmetic checking of submissions, including the tools for automated compliance check on floor area information in building plans (area checking tool) to be released in Q1 2024.

⁴ BEAM Plus assessment offers a comprehensive set of performance criteria for a wide range of sustainability issues relating to the planning, design, construction, commissioning, management, operation and maintenance of a building. One of the pre-requisites for granting GFA concessions is the satisfactory completion of certification under BEAM Plus New Buildings Version 2.0 or above.

3.3 Support from the Construction Industry Council

3.3.1 BIM personnel

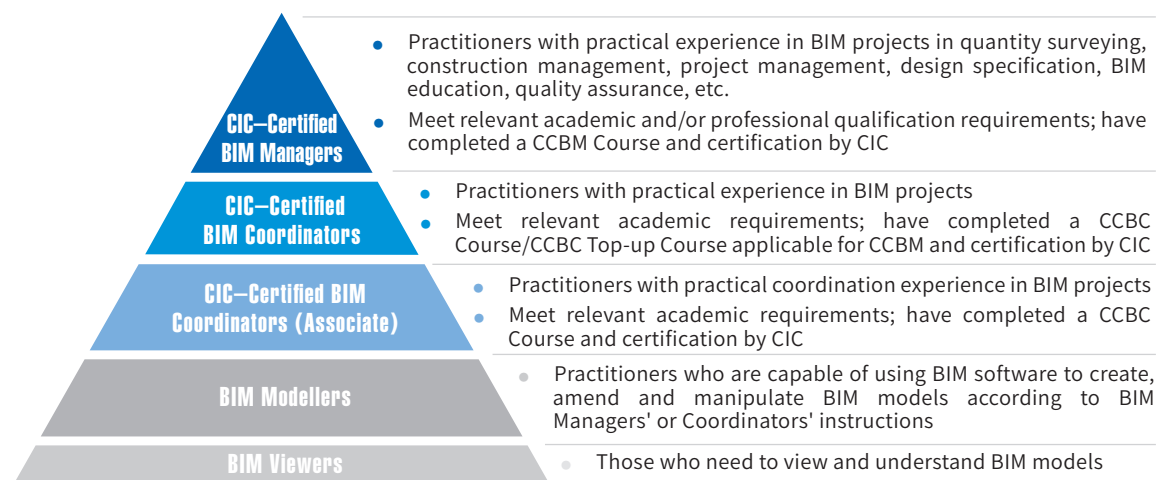
To promote skills and competency in using BIM technology, with the endorsement of the DEVB, the Construction Industry Council (CIC) has developed a certification framework for BIM personnel.

3.3.2 Training courses

Training courses on BIM are typically provided by academic institutes and private companies, and offered by the Hong Kong Institute of Construction (https://www.hkic.edu.hk/eng/programmes/skill_enhancement_bim).

For quality assurance, CIC has introduced accreditation for BIM training courses. As at mid-2023, there were about 235 courses certified by CIC for different categories of BIM personnel, including CIC-Certified BIM Manager (CCBM), CIC-Certified BIM Coordinator (CCBC), and CCBC (Associate). In addition, the CIC provides free training for BIM Viewer⁵. Further information can be found on CIC's website (https://www.bim.cic.hk/en/training/page/BIM_Training_eResources).

CIC has also signed Memoranda of Understanding with higher education institutions offering BIM related programmes in Hong Kong, including the University of Hong Kong, the Chinese University of Hong Kong, the Hong Kong University of Science and Technology and the Hong Kong Polytechnic University.



BIM personnel certification framework.

⁵ BIM Viewer refers to those who need to view and understand the BIM model. For example, senior management of an organisation, project manager, site supervisor or regulator may take up this role. Basic knowledge and skill in using PC, tablet, or mobile device effectively in a manner similar to reading two-dimensional drawings on site are required. To cope with the demand, CIC has developed a "Teaching and Learning Kit" for free BIM Viewer training.

3.3.3 Construction Innovation and Technology Fund

With total injection of \$2.2 billion since its establishment in October 2018, the Construction Innovation and Technology Fund (CITF) administered by CIC on the Government's behalf encourages wider adoption of innovative construction methods and new technologies in the construction industry with a view to promoting productivity, uplifting built quality, improving site safety and enhancing environmental performance. BIM is one of the technologies supported, and CITF funding may finance BIM training (such as BIM Viewer collaborative training or BIM project-based coaching) and BIM experiential use and project adoption.

With recent lifting of the funding cap, CITF funding is generally given in the form of cash rebate of 70%, up to a cap of \$6 million per applicant for BIM and other advance construction technology uses. As at 31 October 2023, the CITF has granted \$145.6 million for BIM-related applications. For details, please refer to the application guide on CITF's website (<https://www.citf.cic.hk/>).

3.3.4 Awareness seminars and workshops

CIC regularly convenes on their own or jointly with other organisations BIM awareness seminars and workshops for BIM practitioners, from the basics of "What is BIM" to advance BIM skills such as reality modelling. Seminars and workshops covering interfacing between BIM and other technologies/concepts, e.g. Digital Twin, Smart Site Safety System, are also available. For details, please refer to CIC's Event Calendar (<https://www.bim.cic.hk/en/events/list>).

3.3.5 Other resources

Other resources supporting BIM adoption include the CIC BIM Software-Specific User Guides for Preparation of Statutory Plan Submissions and the BIM object library which contains standardised BIM objects primarily from public works projects completed. For details, please refer to Resources under CIC's website (<https://www.bim.cic.hk/en/resources>).

4 Guiding Principles for Wider Adoption of BIM

- 4.1 Alignment within building plans processing departments**
- 4.2 Public sector to take lead**
- 4.3 Incremental and practical approach**
- 4.4 Cultivate a BIM culture**
- 4.5 Supporting and incentivising adoption of BIM**

4. Guiding Principles for Wider Adoption of BIM

Overseas experience reveals that the adoption of BIM has been an incremental, phased process. In Singapore, since acceptance of electronic submission through the CORENET platform in early 2000s and introduction of BIM in 2010, they mandated e-submission of BIM-generated plans in Native BIM format (see paragraph 5.2 below) in 2018. It takes a further five years to develop their CORENET X, which would be rolled out progressively from end 2023 for accepting plan submissions in openBIM (see paragraph 5.2 below) standards.

Similarly, in Finland, the preparation for applying for building permits through BIM was a lengthy one dating back to the early 2000s. Development of supporting technologies such as object-oriented product modelling, 4D modelling, automated cost estimating and scheduling, life-cycle cost analysis, as well as cultivation of mindset change were necessary to support the electronic building permit processing system introduced in 2015.

In the light of overseas experience, we consider it necessary to allow for a step-by-step transformation in Hong Kong for developing technological standards and tools, upgrading software and hardware, training BIM personnel, cultivating a BIM culture, and promoting change of work practice. In contemplating how to promote the wider adoption of BIM in preparation and submission of building plans, we are guided by the following principles.

4.1 Alignment within building plans processing departments

BD has established a centralised processing system (CPS) to refer building plans to relevant departments for processing. We will encourage the development and adoption of a single BIM model throughout the whole plan submission process so as to ensure coherent data processing. The BIM model should be able to accommodate design of different disciplines and information to be incorporated later on, such as engineering, planning, surveying, so as to ensure seamless data integration on a shared data platform and to facilitate macro data analysis upon design completion.

To achieve this, the Government will coordinate between different bureaux and departments to draw up policies and measures to align across different disciplines. As a start, the LandsD and BD have devised common methodologies for floor area

calculations with respect to the requirements in the BO as well as relevant lease conditions for general building plans (GBPs) submissions in BIM format, which includes common standards and specifications to be adopted by building professionals so that LandsD and BD can compute, define and verify area information in the same file.

4.2 Public sector to take lead

The public sector will continue to take lead as pioneer, to accumulate experience in using BIM, and to contribute to the continuous development of BIM technology.

As announced in the 2023 Policy Address, HKHS, URA and MTRCL (of which the Government is the largest shareholder) will be invited to submit plans with BIM model for their residential projects starting from Q2 2024. Their private sector consultants/contractors will be contractually obliged to use BIM in the preparation and submission of building plans. Indeed, HKHS and URA, as statutory bodies, have already been actively employing BIM technology in various aspects of work. There are already four HKHS pilot projects (Hung Shui Kiu/ Ha Tsuen New Development Area Dedicated Rehousing Estate Project Phase IA, Hung Shui Kiu/ Ha Tsuen New Development Area Dedicated Rehousing Estate Project Phase IB, Housing Development at Kai Tak Area 1E Site 1 and Public Rental Housing Development at Ting On Street) and three URA pilot projects (Sung Hing Lane/ Kwai Heung Street Development Project, Queen's Road West/ In Ku Lane Development Scheme and Wing Kwong Street/ Sung On Street Project) with GBPs generated by BIM models and submitted to BD for approval.



URA's Queen's Road West/ In Ku Lane Development Scheme with GBPs generated by BIM models.



HKHS's Hung Shui Kiu/ Ha Tsuen New Development Area Dedicated Rehousing Estate Project Phase IA with GBPs generated by BIM models.

We also need to empower government departments, especially the CPS departments, in the process of wider adoption of BIM. In particular, we have to ensure departments are well-prepared for the cultural and mindset change in handling projects using BIM, and to equip staff with necessary skills, software and hardware for embracing this new technology.

We will continue to work hand in hand with CIC to promote the adoption of BIM technology, set BIM standards, train BIM personnel, as well as raise awareness through workshops and trainings.

4.3 Incremental and practical approach

The full adoption of BIM should be implemented in practical steps to allow for gradual transformation, bearing in mind that not all industry players are technically or financially adept at adopting BIM within a short period of time. Smaller firms, in

particular, may be concerned about the initial start-up costs or availability of local skilled BIM personnel, etc. However, it is worth bearing in mind that despite the initial investment cost, BIM can save cost in the development cycle by enhancing productivity, efficiency and expediting construction.

4.4 Cultivate a BIM culture

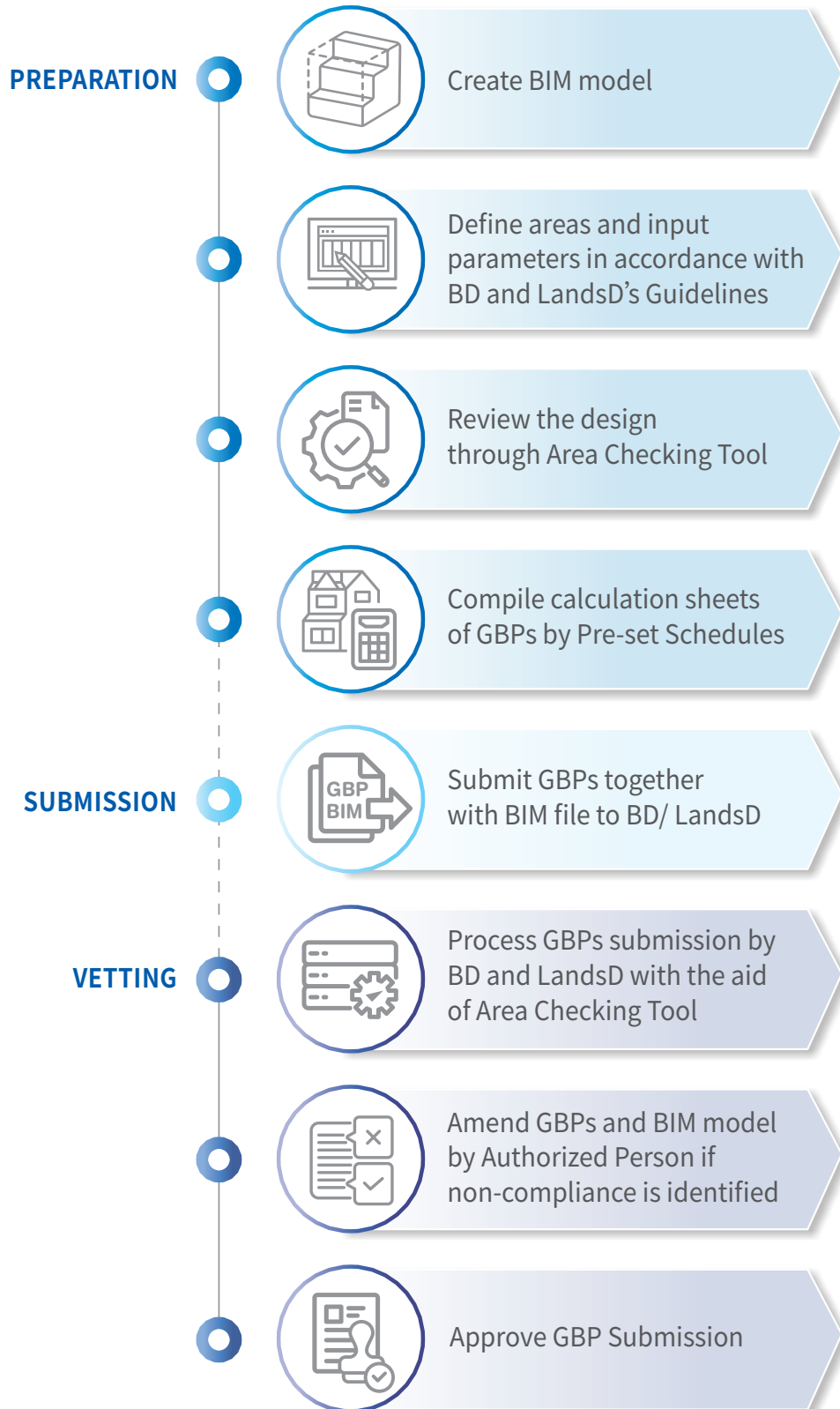
We will encourage building professionals to acquire the skills in using BIM, to change their existing practice (i.e. creating and documenting building designs with the traditional two-dimensional (2D) approach) and to cultivate a BIM culture. Measures may include stepping up efforts to promote the benefits of using BIM, providing the technical and financial support to the industry by CIC, holding workshops to assist the industry to transform into BIM practice, etc.

4.5 Supporting and incentivising adoption of BIM

To increase the industry's acceptance towards BIM, it is important for them to appreciate the benefits of BIM that can be brought to their day-to-day work. As such, BD is developing automated checking tools⁶ allowing easy and quick calculations of BIM-generated models on compliance with various statutory requirements. Apart from the floor area checking tool to be released in Q1 2024, BD plans to launch another four checking tools covering sanitary fitments, fire safety, building separation requirements, structural plan compatibility, etc. in the coming three years. Moreover, BD will kick-start a consultancy study within the first half of 2024 to study in-depth the implementation of BIM in the Mainland and overseas jurisdictions, with a view to formulating a framework for supporting the full adoption of BIM by the private sector for preparation of plans for statutory submissions and approval under the BO. The framework will include, amongst others, supporting measures (e.g. training and checking tools), technical standards or guidelines, submission and approving mechanism workflow, collaborative checking platforms, software and hardware support, as well as talent training.

⁶ The use of automated checking tools/platforms can greatly facilitate the preparation and processing of building plans. For example, the area checking tool tasked to be released in Q1 2024 has formulated a common methodology for the requirements under the BO and lease conditions through which respective data set of a single BIM model could be extracted for different automated checking paths to cater both submissions to BD and LandsD. The checking tools, which could also serve as the design review tools for the practitioners, could save ample time and manpower in verifying numerical accuracy and in updating and rechecking when amendments to the design are required. It would not only enhance quality and certainty of the submissions, but also help the industry to develop a "do it right at the start" culture instead of making numerous subsequent rectifications which would increase time and waste resources due to abortive work.

BIM Area Checking Tool Workflow



5 Towards Full Adoption of BIM

- 5.1 Policy and legislation**
- 5.2 Infrastructure and standards**
- 5.3 Technology: software and hardware**
- 5.4 Other supporting measures (ongoing)**
- 5.5 Invitation of views**

5. Towards Full Adoption of BIM

The Government is committed to driving the wider adoption of BIM, with the ultimate goal of mandating BIM for preparation and submission of building plans for departments' approval. Subject to stakeholders' feedback, our tentative target is to **mandate submission of BIM model and BIM-generated building plans for approval by departments by 2029**. Between now and 2029, we propose implementing measures in four areas, viz. policy and legislation, infrastructure and standards, technology and supporting measures, to create an enabling environment and get the industry ready for wider adoption of BIM. A tentative roadmap depicting specific measures according to the four areas is set out in the ensuing paragraphs. A graphical illustration is at **Annex B**.

5.1 Policy and legislation

We will continue with the existing approach of the public sector taking the lead in adopting BIM and gradually rolling out the technology to private sector. We will in due course put in place the legislative framework for mandating BIM in preparation and submission of building plans. The following milestones are proposed –

I The public sector to adopt BIM more widely (from Q2 2024 onwards) —

- Mandate HKHS, URA and MTRCL to submit BIM models and BIM-generated building plans⁷ for their residential projects in relation to –
 - ◆ GBPs and superstructure (framing) plans by Q2 2024; and
 - ◆ other types of building plans (e.g. foundation, excavation and lateral support, ground investigation, drainage and site formation⁸) by Q2 2025.
- With the experience from projects undertaken by the Government, HKHS, URA and MTRCL, consider expanding the arrangement to other statutory and subvented bodies from 2026 onwards, e.g. University Grants Committee-funded institutions.

⁷ For the avoidance of doubt, BD will continue to grant approval for (BIM-generated) 2D building plans as per existing practice, rather than approving the BIM model which may contain information not relevant to seeking statutory approval for building plans (e.g. E&M services or information for FM/AM stages).

⁸ Exclude alteration and addition plans, demolition and hoarding plans.

II Adoption of BIM for large-scale private residential projects (from 2026 onwards) —

- We will consider introducing a new condition under the lease of land sale sites, land grant and land exchange cases and amending relevant practice notes requiring residential developments with 1 000 residential units or above to adopt BIM submission for at least GBPs and superstructure (framing) plans from 2026 onwards.

III Explore further application of BIM data (from 2027 onwards) —

- With the growing number of projects adopting BIM, we will consider how to better integrate BIM data with GIS and the CSDI Portal to facilitate city planning and policy formulation. Possibilities may include wind flow assessment in 3D map using GIS tools which assists in design evaluation by considering surrounding building shapes and layout; or storing building information (e.g. building materials and statutory orders from BD) to facilitate the tracking of aging and dilapidated buildings.
- Expansion of the GBDR to support the storage and sharing of private projects' BIM models as one of the spatial dataset under the initiative of CSDI.

IV Corresponding legislative amendments will be made to enable mandatory e-submission of building plans (BIM and non-BIM generated) and BIM models for submission to BD for approval (before 2029) .

V Full adoption of BIM in private sector (from 2029 onwards) —

- Mandatory adoption of BIM in preparing and submitting BIM model and BIM-generated buildings plans for residential and other types of developments of different scales from 2029 onwards.

5.2 Infrastructure and standards

Currently, different bureaux and departments in the Government have developed various standards and guidelines for the use of BIM. We will align the government-wide standards and practices before the mandatory adoption of BIM. We will also look into the adoption of openBIM, which serves as an open and common infrastructure for information exchange. The following milestones are proposed –

I Consultancy study (2024-2025) —

- BD will commission a consultancy study to support the formulation of a technical framework for the full adoption of BIM by the private sector for preparation of plans for statutory submissions and approval under the BO, including subsequent development of supporting measures as mentioned in paragraph 4.5 above. Stakeholders (e.g. CIC, professional bodies, Real Estate Developers Association of Hong Kong, etc.) will be consulted in parallel.

Based on the consultancy findings and stakeholders feedback, we will continuously develop BIM standards and guidelines.

II openBIM (ongoing) —

- Native BIM and openBIM are two different approaches in the field of BIM. Native BIM refers to the use of BIM software that is specifically designed to work with the BIM file format. Native BIM software provides optimised functionality and seamless integration with the BIM data structure, allowing efficient modelling, analysis, and information management.

On the other hand, openBIM technology is an increasing trend in overseas jurisdictions. It emphasises interoperability and collaboration by promoting the use of open standards, facilitating seamless data exchange between different software applications and project stakeholders. It allows enhanced coordination and communication throughout the entire life cycle of a construction project.

In addition, the purpose-driven data extraction function of openBIM technology has the advantage of exporting native BIM model data into a standardised format (i.e. "industry foundation classes", or "ifc") of a much smaller file size containing only the necessary information for statutory submissions.

We will explore, in the context of BD's consultancy study, the adoption of openBIM standards and checking platform as part of the development of supporting infrastructure. Building professionals and BIM experts are welcomed to share with us your insights regarding the adoption of openBIM.

5.3 Technology: software and hardware

Software and hardware infrastructure should be in place to support the adoption of BIM in the private sector. To this end, we propose the following milestones –

I Enhancement of Electronic Submission Hub (ESH)(in two stages by mid-2027 and 2029) —

- BD will plan for enhancement of its ESH⁹, including expanding its capacity, to prepare for accepting mandatory e-submissions of –
 - ◆ building plans (BIM or non-BIM generated) by mid-2027; and
 - ◆ BIM models and BIM-generated plans by 2029.

II Development and rolling out of automated compliance checking tools (ongoing) —

- Automated compliance checking tools will be developed and rolled out by phases in the coming years to assist the industry in preparing and submitting plans. Items in the pipeline include –
 - ◆ checking tools for sanitary fitments, fire safety requirements, structural plan compatibility, drainage plan, natural lighting and ventilation, structural submission, etc.; and
 - ◆ building separation requirements assessment tool, etc.

⁹ ESH is being implemented in three stages. Stages 1 and 2 of ESH were launched in June 2022 and March 2023 respectively accepting plan submissions covering hoarding, covered walkway and gantries, demolition works, drainage works, excavation and lateral support works, ground investigation works, foundation works, site formation works and all structural works (excluding alteration and addition works). Stage 3 of ESH will be fully launched in the second quarter of 2025. All types of plans including GBPs and alteration and addition plans, as well as related applications under the BO, will be accepted.

5.4 Other supporting measures (ongoing)

I CIC will be tasked to widely promote to the industry its manpower training programmes and financial support (via CITF) for adopting BIM, and encourage the industry to make use of the training and financial support to get prepared for the migration towards full adoption of BIM.

II Government will collaborate with CIC to strengthen publicity and organise more educational workshops/seminars and engagement activities for the industry to help building professionals understand the BIM requirements of the Government.

5.5 Invitation of views

The Government welcomes your views on the tentative roadmap. In particular, stakeholders are invited to comment on the following —

- (a) whether it is reasonable to mandate full adoption of BIM by the private sector by 2029 having regard to where we are now, relevant experience of other places and the measures proposed in paragraphs 5.1-5.4, etc.;
- (b) whether the measures in paragraphs 5.1-5.4 are effective in nurturing a favourable environment and enhancing industry readiness for full adoption of BIM, and whether any other measures are required;
- (c) whether it is an effective strategy to require the public sector to take the lead in adopting BIM and then expand the usage to the private sector for large scale residential developments first by 2026 before adoption for all types of developments by 2029? Any other interim steps needed (e.g. commercial developments or other scales of residential developments between 2026 and 2029) to smoothen the transition towards full BIM adoption;

- (d) whether Hong Kong should follow the practices of other places in adopting the openBIM standards;
- (e) how best we can integrate BIM data with other technologies such as GIS and CSDI Portal to improve city planning and policy formulation; and
- (f) what more supporting measures in terms of manpower training, financial support, etc. should be adopted to incentivise the industry to embrace the BIM technology.

DEVB will organise consultation sessions to collect stakeholders' views during the two-month consultation period from 29 December 2023 to 29 February 2024. Members of the public can also send in their views through the following webpage at https://www.devb.gov.hk/en/issues_in_focus/building_information_modelling/consultation/index.html or to the following email address at bimroadmap@devb.gov.hk.

Annex A

List of Standards and Guidelines issued by the Government relating to BIM

- ◆ DEVB's Technical Circular (Works) No. 2/2021 on Adoption of Building Information Modelling for Capital Works Projects in Hong Kong
<https://www.devb.gov.hk/filemanager/technicalcirculars/en/upload/387/1/C-2021-02-02.pdf>
- ◆ DEVB's Building Information Modelling Harmonisation Guidelines for Works Departments (v2.0)
[https://www.devb.gov.hk/filemanager/en/content_1287/DEVB%20BIM%20Harmonisation%20Guidelines%20for%20WDs%20\(v2\).pdf](https://www.devb.gov.hk/filemanager/en/content_1287/DEVB%20BIM%20Harmonisation%20Guidelines%20for%20WDs%20(v2).pdf)
- ◆ BD's Practice Note for Authorized Persons, Registered Structural Engineers and Registered Geotechnical Engineers ADV-34 on Building Information Modelling
<https://www.bd.gov.hk/doc/en/resources/codes-and-references/practice-notes-and-circular-letters/pnap/ADV/ADV034.pdf>
- ◆ BD's Practice Note for Authorized Persons, Registered Structural Engineers and Registered Geotechnical Engineers ADM-19 on Building Approval Process
<https://www.bd.gov.hk/doc/en/resources/codes-and-references/practice-notes-and-circular-letters/pnap/ADM/ADM019.pdf>
- ◆ BD's Practice Note for Authorized Persons, Registered Structural Engineers and Registered Geotechnical Engineers APP-151 on Building Design to Foster a Quality and Sustainable Built Environment
<https://www.bd.gov.hk/doc/en/resources/codes-and-references/practice-notes-and-circular-letters/pnap/APP/APP151.pdf>
- ◆ BD's Guidelines for using Building Information Modelling in General Building Plans Submission
https://www.bd.gov.hk/en/resources/codes-and-references/building-information-modelling/index_statutory_submissions.html

- ◆ BD's Guidelines for using Building Information Modelling in Statutory Plan Submissions (other than General Building Plan)
https://www.bd.gov.hk/en/resources/codes-and-references/building-information-modelling/index_statutory_submissions.html

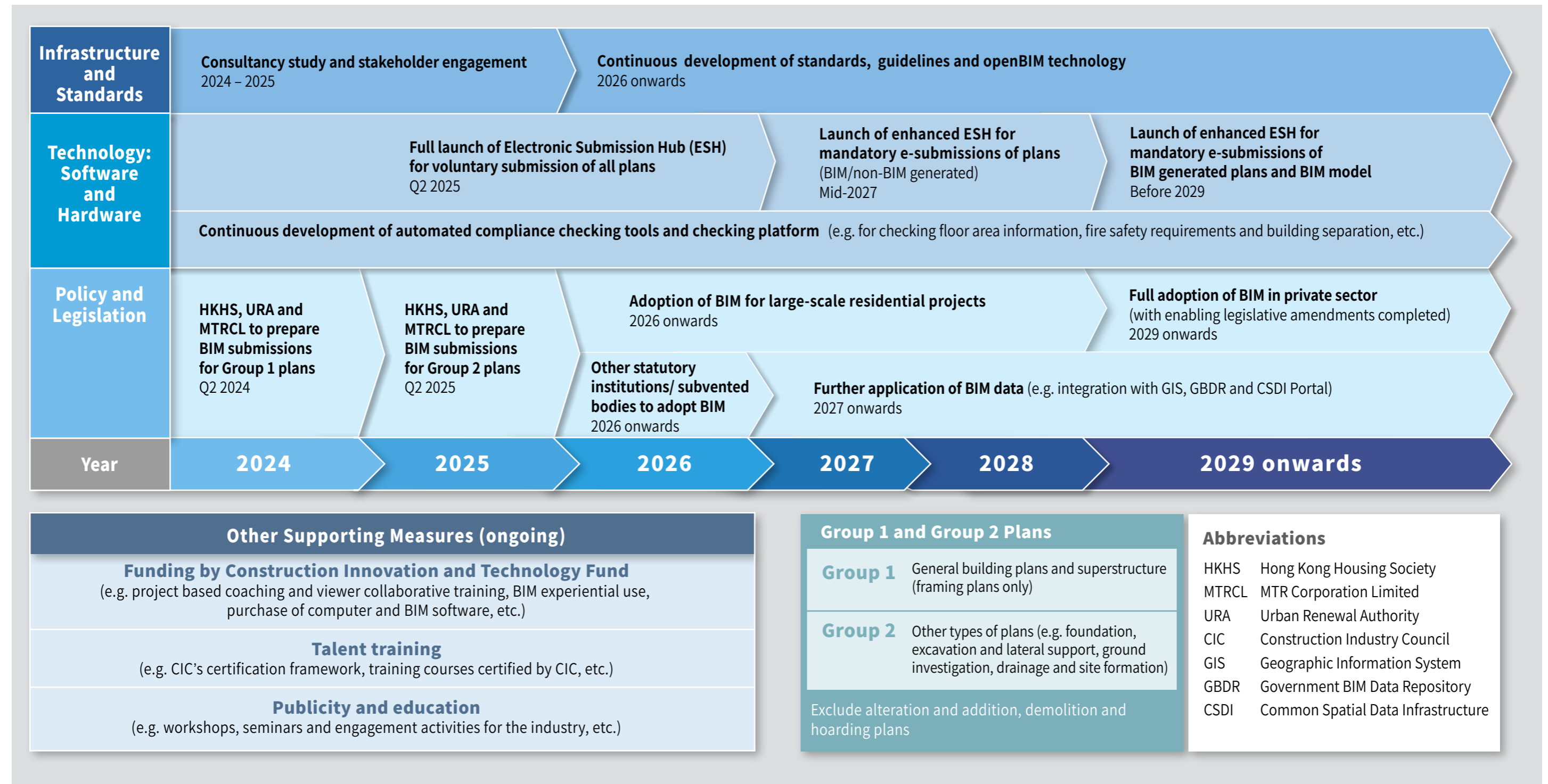
- ◆ EMSD's Building Information Modelling for Asset Management
 - Standards and Guidelines (v3.0)
 - Guidelines for the Handover of E&M Installation to EMSD (v1.0)
 - Acceptance and Upkeeping Guidelines for EMSD (v1.0)https://www.emsd.gov.hk/en/engineering_services/project_management_consultancy/highlights_of_work/bim_am/index.html

- ◆ LandsD's Building Information Modelling and Geographic Information System Data Integration Guidelines
<https://www.landsd.gov.hk/doc/en/bim/BIM%20and%20GIS%20Data%20Integration%20Guidelines.pdf>

- ◆ HA's Building Information Modelling Standards and Guidelines (v3.0)
<https://www.housingauthority.gov.hk/en/business-partnerships/resources/building-information-modelling/>

Annex B

Roadmap on Adoption of Building Information Modelling (BIM) for Building Plan Preparation and Submission.





Development Bureau

The Government of the
Hong Kong Special Administrative Region
of the People's Republic of China