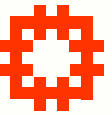


WORLDSBE Conference 2017 Hong Kong
5-7 June 2017

Integrating **BIM** for Sustainable Planning, Design, Construction and Facilities Management for Hong Kong's Public Housing Development

Mr. Lawrence K. W. CHUNG

Assistant Director of Housing (Development & Construction)
Hong Kong Housing Authority



Organisers:



International Co-owners:





Lawrence K.W. CHUNG

MSc, PGDMS, FHKIS, MRICS

Assistant Director of Housing (Development & Construction)

Hong Kong Housing Authority (HKHA)



To **lead** a multi-disciplinary team to implement various public housing developments in Hong Kong



To **oversee** the development and application of **Information Technology** to suit the diverse business practices of the Development & Construction Division of the Housing Department, including acting as **the chairman of the Division's Steering Committee on Building Information Modeling (BIM) and Geographic Information System (GIS)**



Organisers:



International Co-owners:



Sustainable Buildings and Climate Initiative
Promoting Policies and Practices for Sustainability



Global Alliance
For Buildings and
Construction

Content

Part 1 – Introduction

Part 2 – Integrating BIM for Sustainable Planning, Design, Construction and Facilities Management for Hong Kong's Public Housing Development

	BIM Applications	Project Stage
2.0	Feasibility Studies	Planning
2.1	Site Potential Studies	
2.2	Modular Flats Design	Scheme Design
2.3	Semi-Automated Foundation Design (SAFD)	
2.4	Value Management and Design Optimization	
2.5	Environmental Analysis	Detail Design
2.6	Statutory Submission	Statutory Submission
2.7	Improvement of Construction Performance	Construction
2.8	Facilities Management at Post-completion Stage	Post-completion

Part 3 – Achievements and Way Forward



Organisers:



International Co-owners:



Part 1: Introduction

Hong Kong Housing Authority (HKHA) implements one of the world's largest public housing programme

Housing Estates in Hong Kong

- Adopt **functional and cost-effective design** in the Planning, Design, Construction and Management of housing projects;
- Promote **healthy living and green environment** in the work;
- Act with **caring and partnering** culture beyond baseline performance.

2,140,000 (30%) population

14,000+ workers daily

99 listed contractors

80+ active suppliers

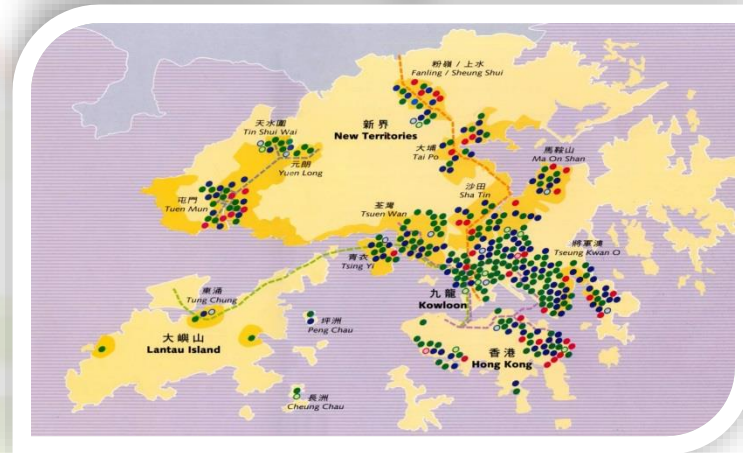
9,000+ HA staff



756,000 flats in use



280,000 new rental & subsidized sale flats from 2017/18 to 2026/27



Organisers:

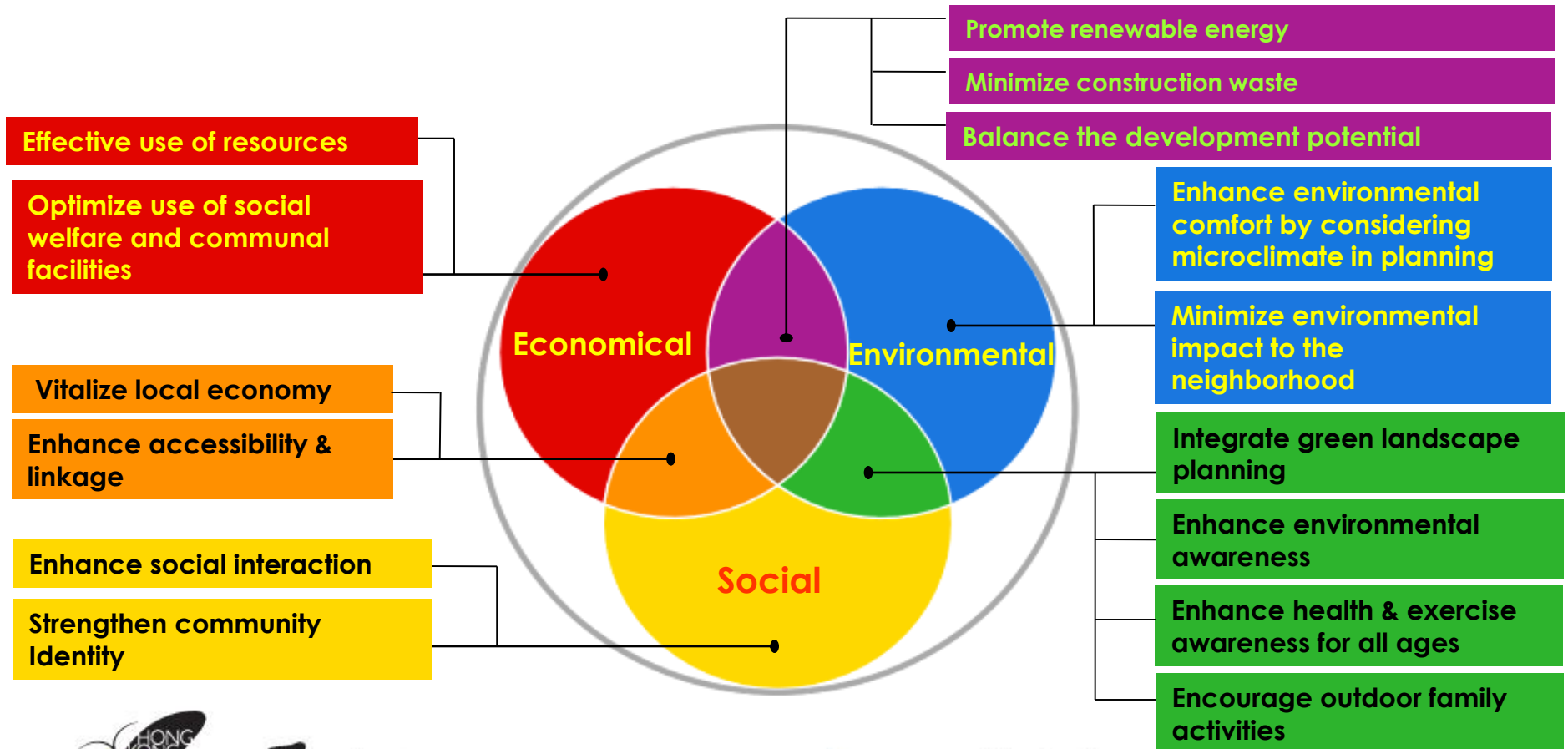


International Co-owners:



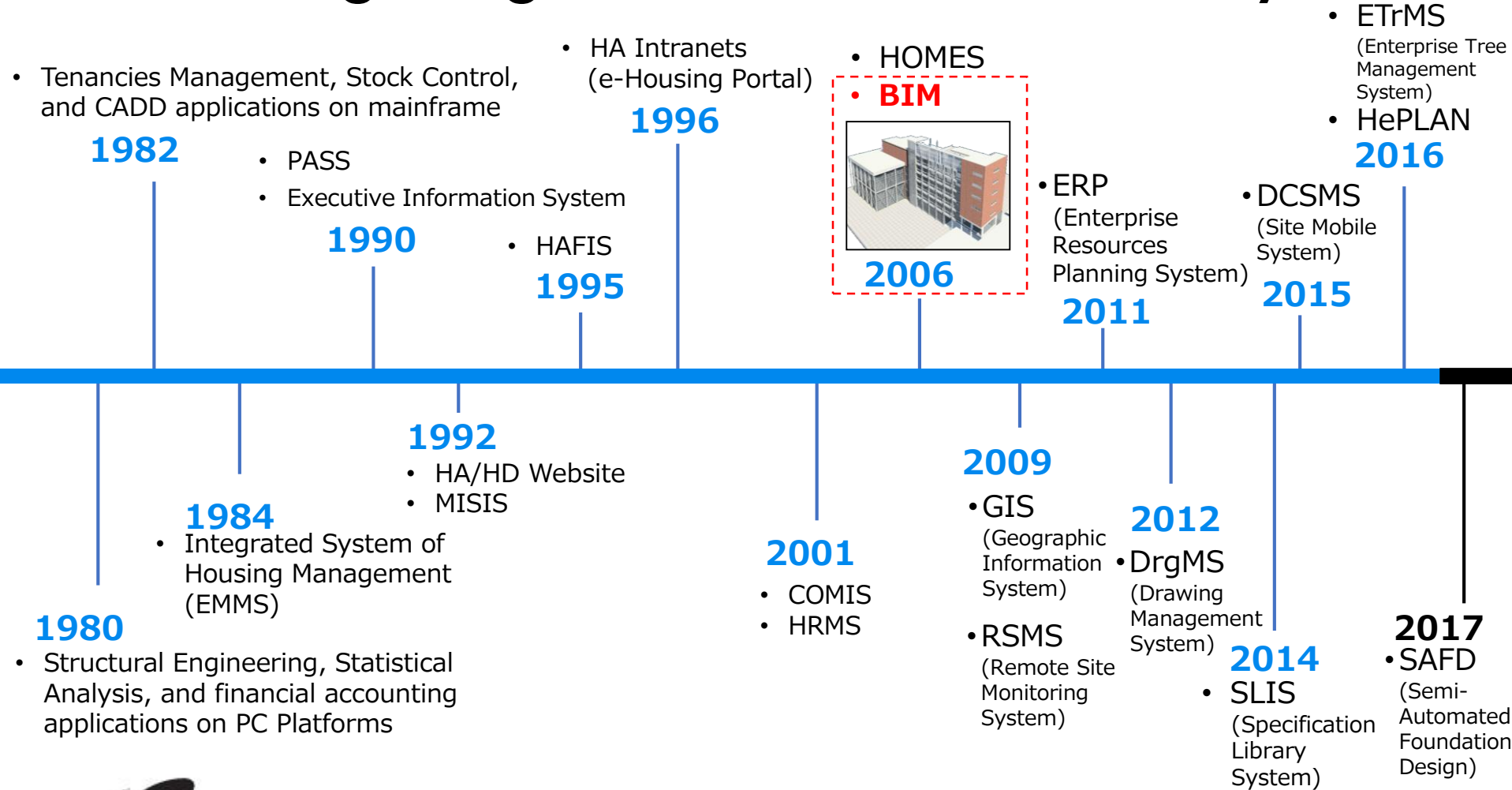
Building a Sustainable Community

To meet present social, economic and environmental needs
but NOT at the expense of future generations.



Part 1: Introduction

Integrating IT to Enhance Productivity



Part 1: Introduction

2017 Policy Address

Published on 18 Jan 2017

- Policy Address
- Policy Agenda
- Highlights
- Webcast
- Press Releases
- TV Announcements
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Technology Application and Innovation

- 130 **Building Information Modelling** technology allows construction professionals to carry out design and construction works in a virtual environment, which helps avoid changes in the construction process as far as possible, reduce risks and render clarity to project costs in various stages. **The Government will actively seek to require consultants and contractors to use this modelling technology when undertaking design of major government capital works projects from next year onwards.**
- 131 The Construction Industry Council will set up an innovation and technology application centre to provide a platform for introducing innovative technologies into the industry to enhance productivity. The centre will commence operation in the second half of this year.



Organisers:



International Co-owners:



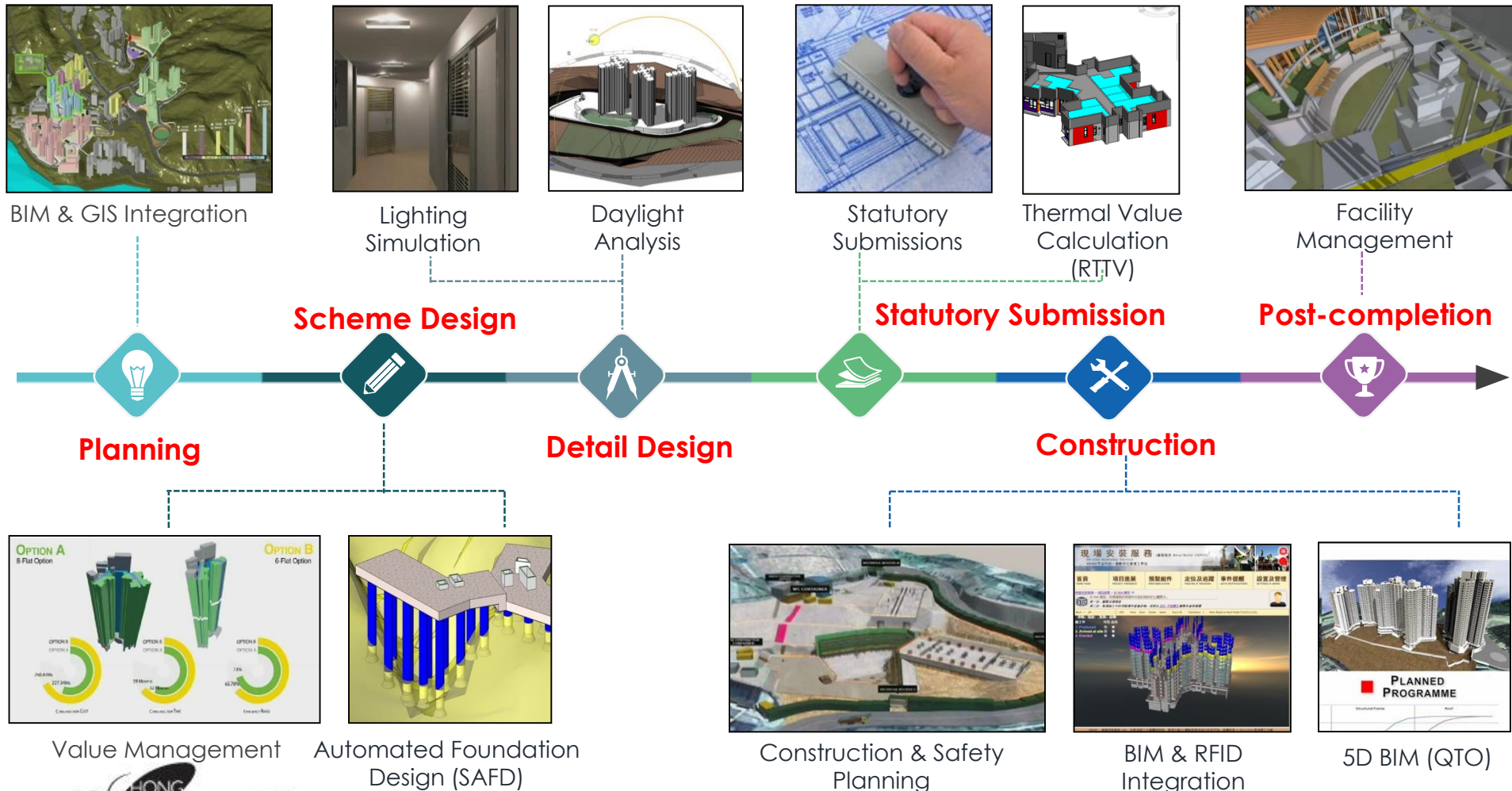
Sustainable Buildings and Climate Initiative
Promoting Policies and Practices for Sustainability



Global Alliance
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Construction

Part 2: BIM Applications

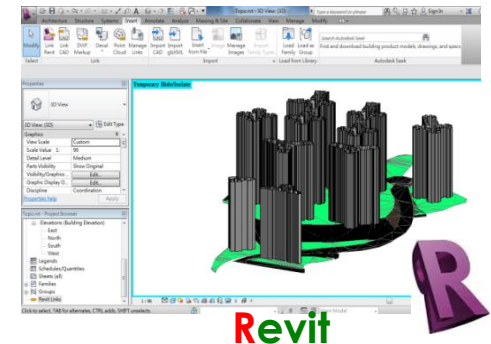
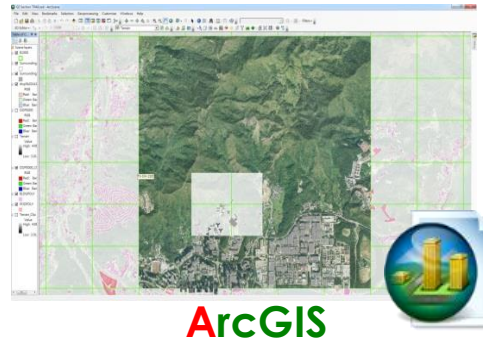
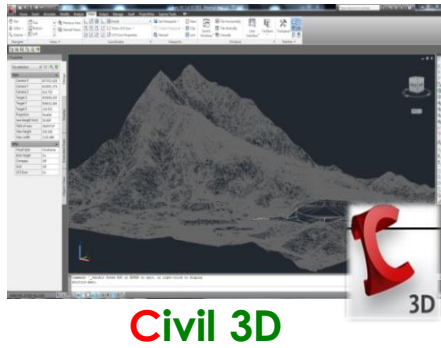
HA's BIM Applications Encompass Full Design and Construction Cycle



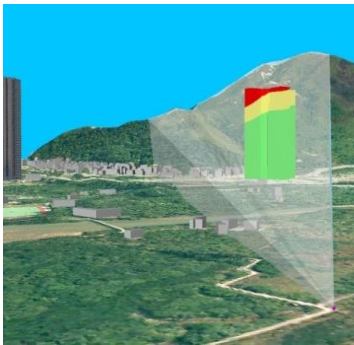
Part 2: BIM Applications – Feasibility Studies

Integrated Use of BIM and GIS

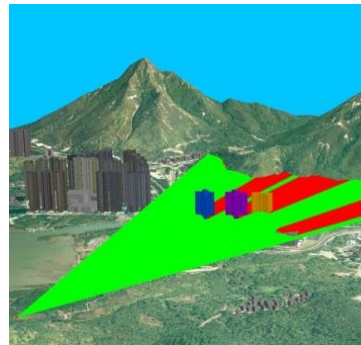
Innovation in Integrating Civil 3D, ArcScene and Revit (CAR)



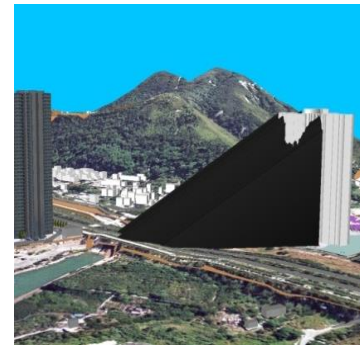
Ridge Line Analysis



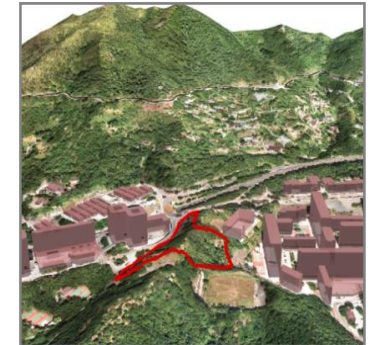
Vantage Point Analysis



Shadow Analysis



Site Appraisals



● Planning

○ Scheme Design

○ Detail Design

○ Statutory Submission

○ Construction

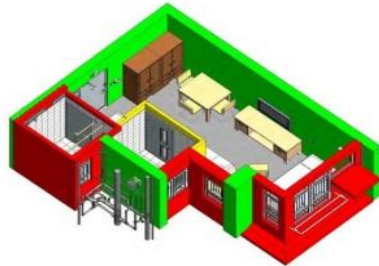
○ Post-completion

Part 2: BIM Applications – Modular Flat Design

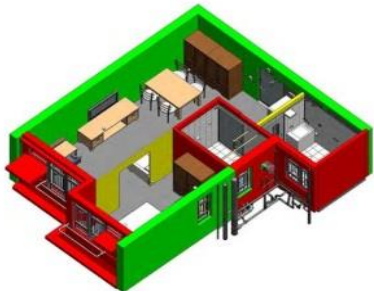
Standardized building components (building facades, bathrooms, kitchens)



1-2 Person Flat



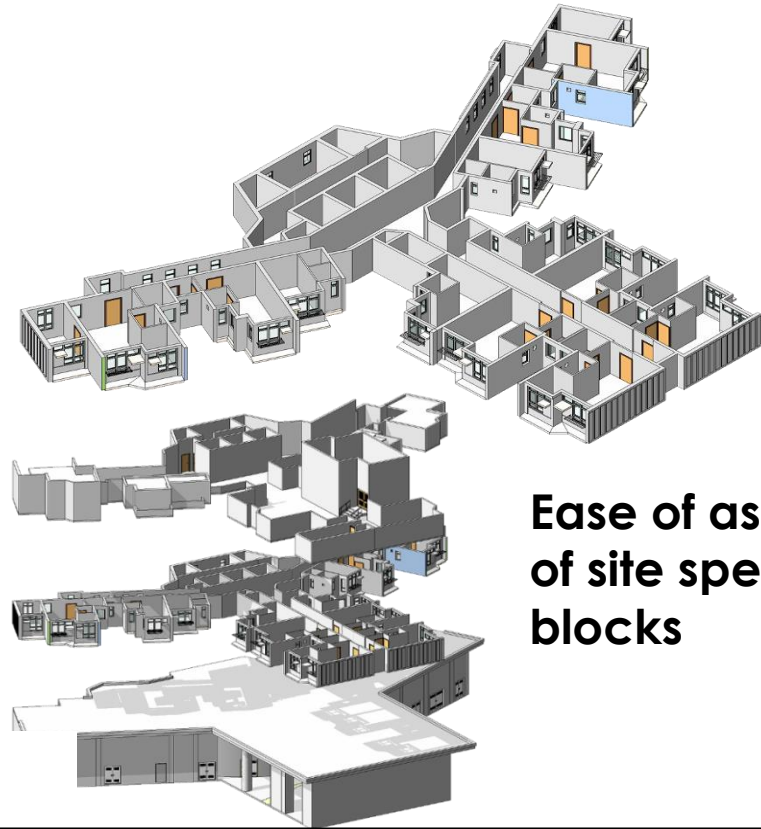
2-3 Person Flat



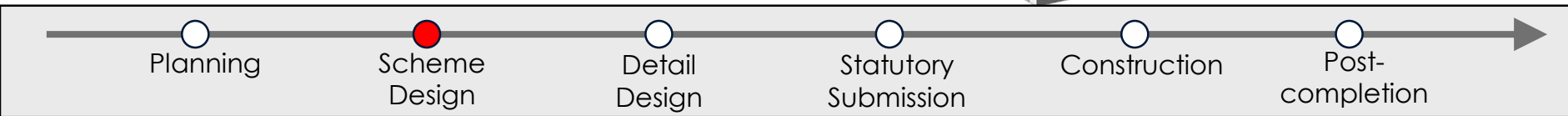
1 Bedroom Flat



2 Bedroom Flat

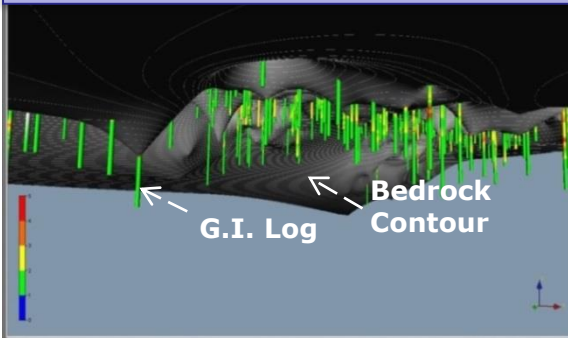


Ease of assembly
of site specific
blocks

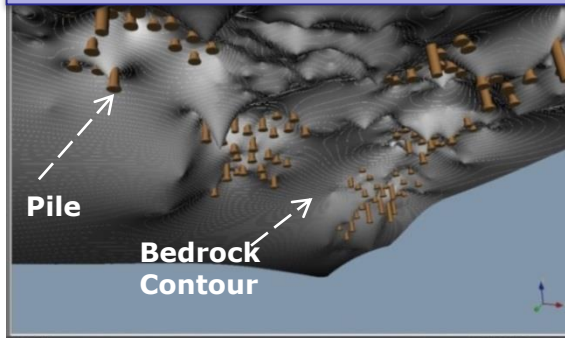


Part 2: BIM Applications – Semi-Automated Foundation Design

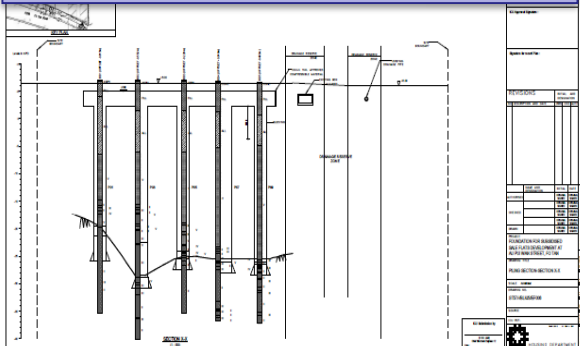
Visualization of G.I. logs and underground obstructions



Visualization of pile socket



2D drop-off for statutory submission



Visualization of problematic pile socket



Optimize Foundation Design

1. 3D Visualization;
2. 2D Drop-off for True BIM statutory submission;
3. Multi-directional exchange of BIM data;
4. Automatic update of Piling Schedule and Material Tables; and
5. Quantity Take Off.

Planning

Scheme Design

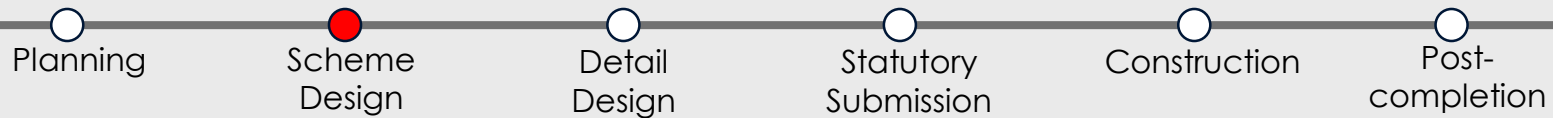
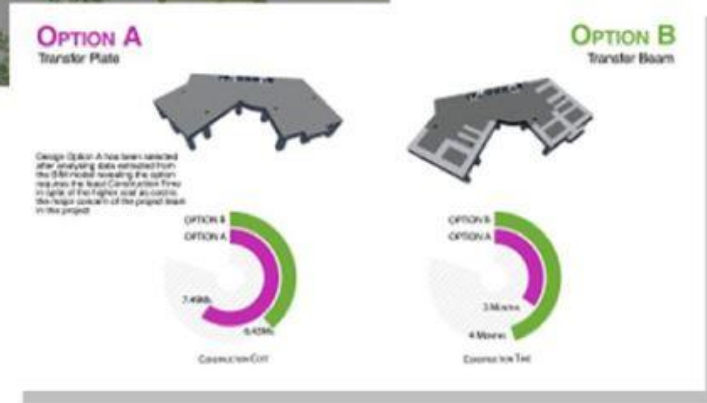
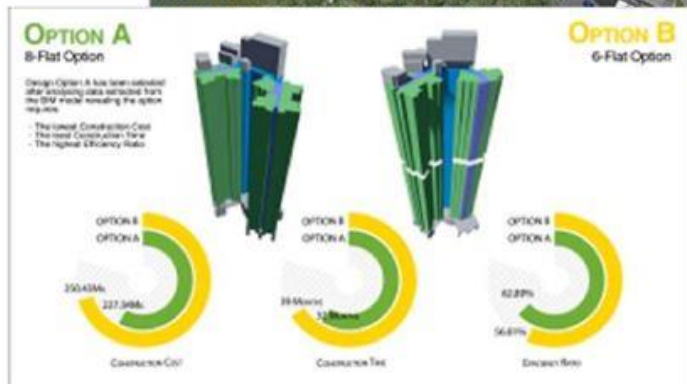
Detail Design

Statutory Submission

Construction

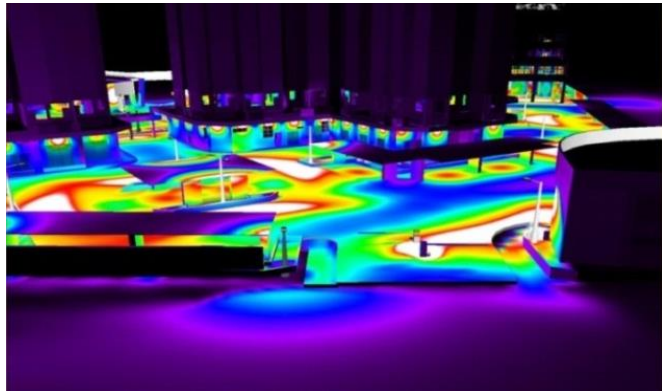
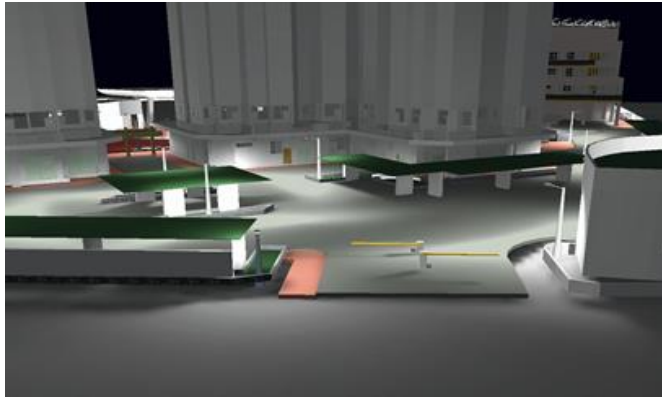
Post-completion

Part 2: BIM Applications – Value Management



Part 2: BIM Applications – Environmental Analysis

Optimize Lighting Design for Energy Saving



Development of more energy efficient lighting operation mode (Two-level lighting design)



○ Planning

○ Scheme Design

● Detail Design

○ Statutory Submission

○ Construction

○ Post-completion

Part 2: BIM Applications – Statutory Submission

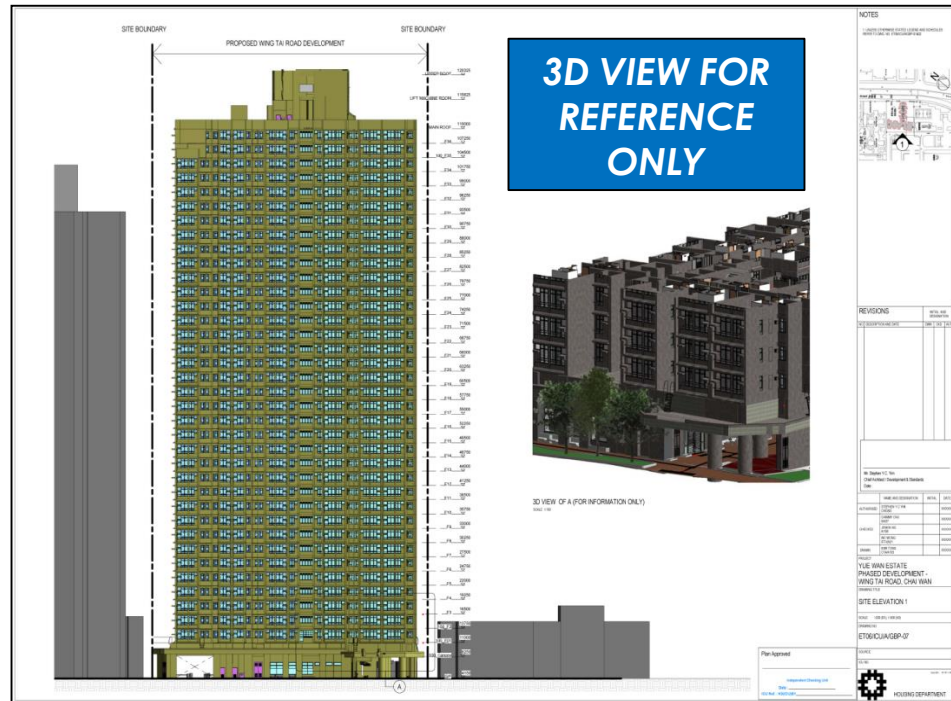
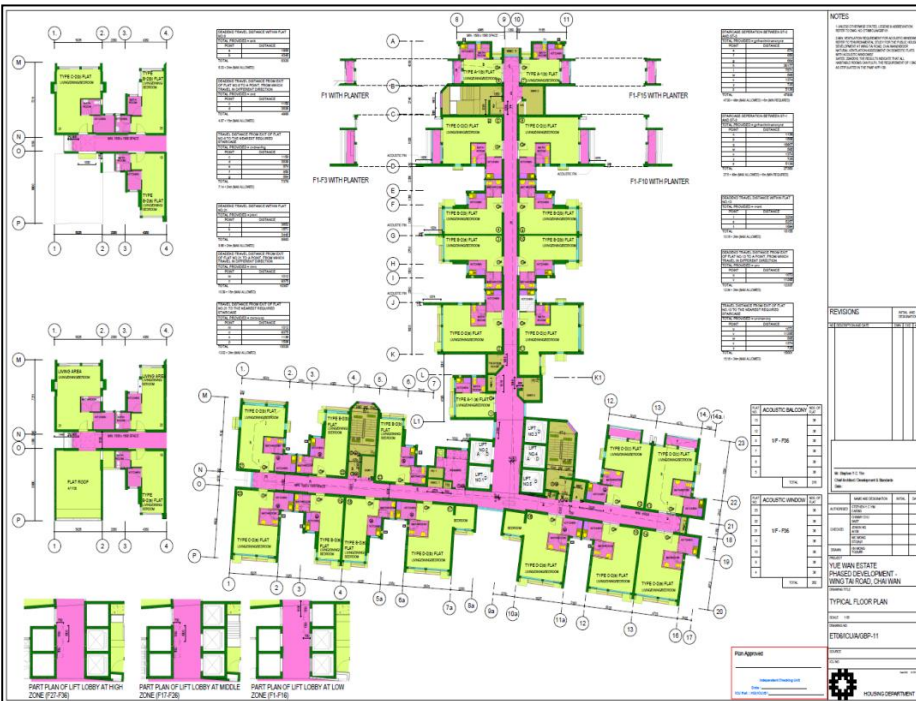
BIM (REVIT)



**2D DRAWINGS
3D .dwf Files
(For Reference)**



CHECKING



Planning

Scheme Design

Detail Design

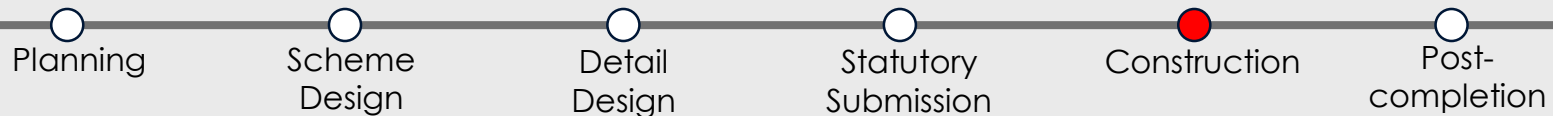
Statutory Submission

Construction

Post-completion

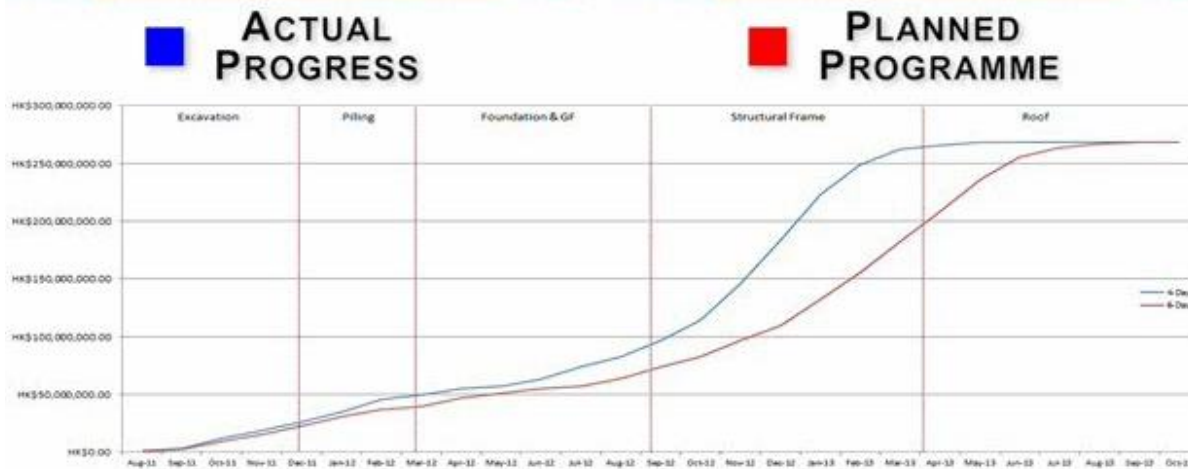
Part 2: BIM Applications – Improvement of Construction Performance

Construction planning for a long-span footbridge

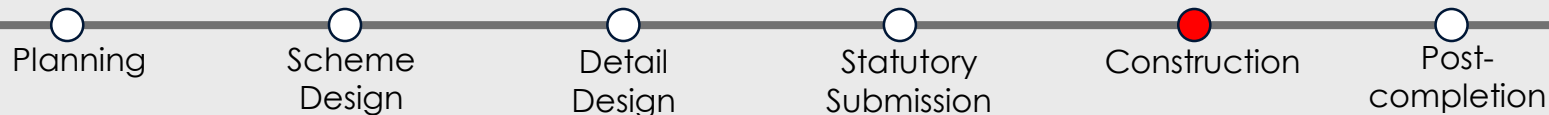


Part 2: BIM Applications – Improvement of Construction Performance

5D BIM Model for Construction Cash Flow Simulation

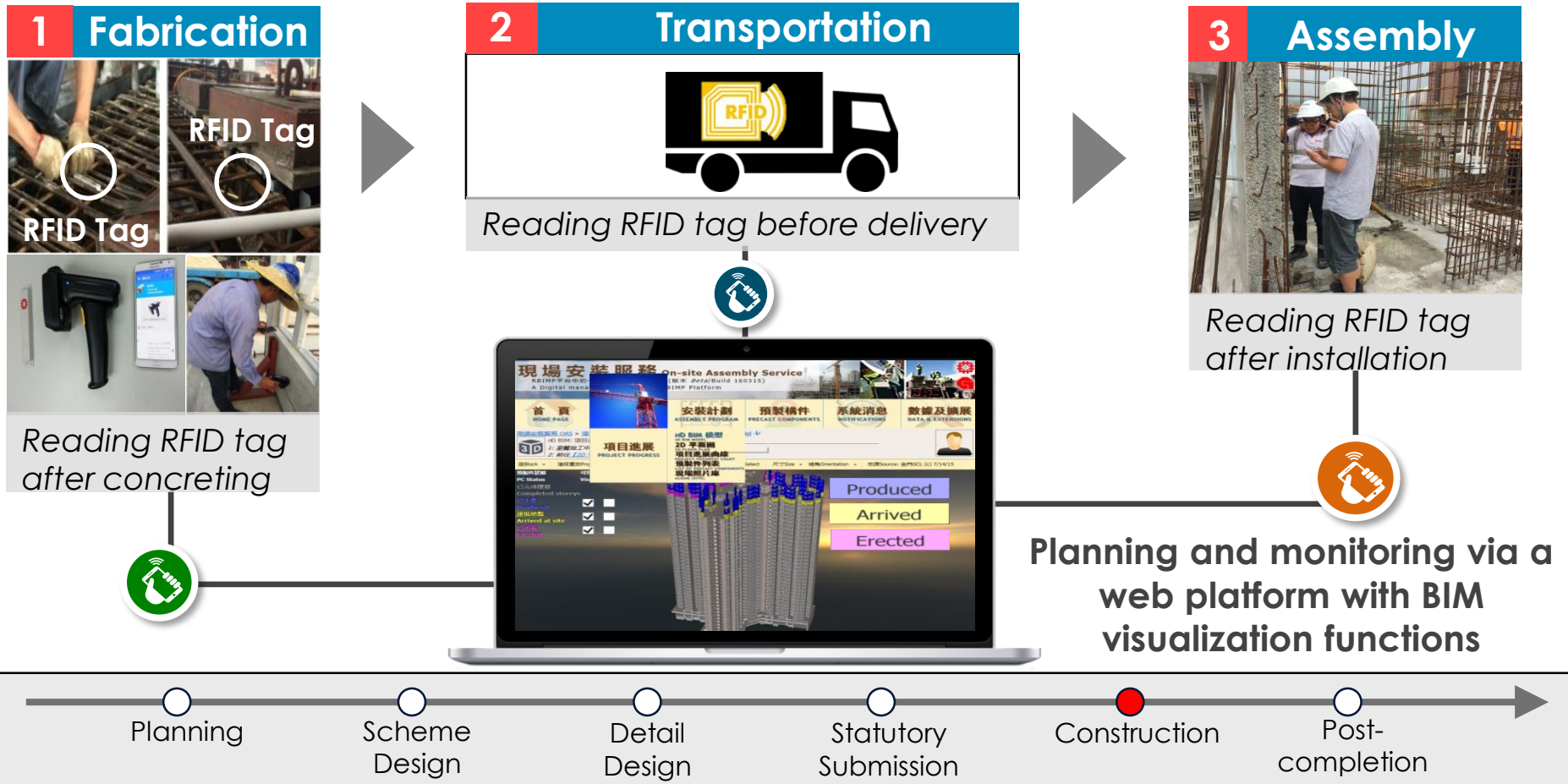


- Cash flow simulation was created by the integration of **quantities** extracted from the BIM model, construction **programme** and **cost** information.
- Reveals **actual** and **predicted** cash flow of the project.
- **Better understanding** of project cash flow.



Part 2: BIM Applications – Improvement of Construction Performance

Integrated Use of BIM and RFID for Logistic and Supply Chain Management of Precast Elements

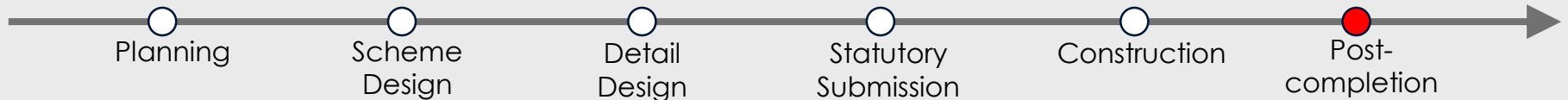
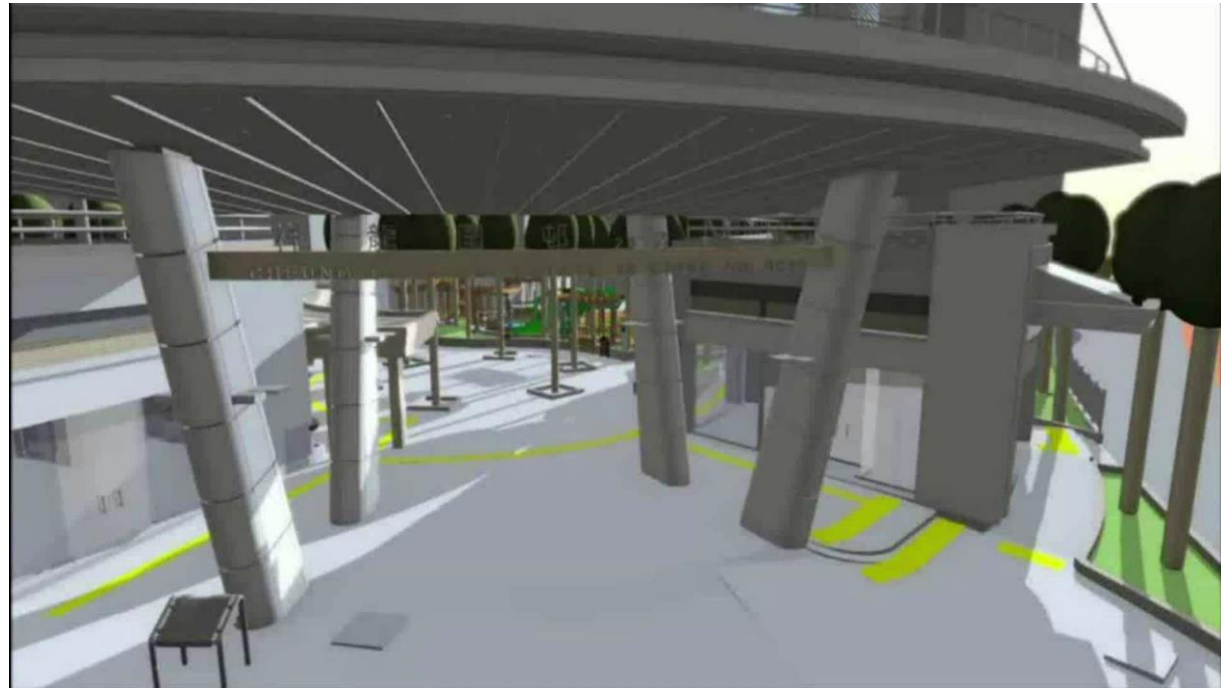


Part 2: BIM Applications – Facilities Management

Visualization of Underground Utilities

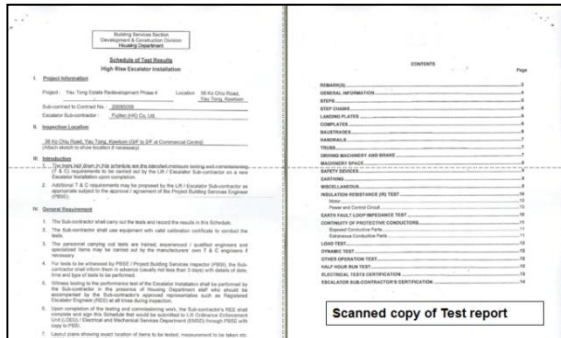
The contractor documented all the detail underground utilities and structure in the BIM model at construction stage.

This as-constructed BIM model will be handed over to the Estate Management Division to assist them in carrying out future maintenance work.

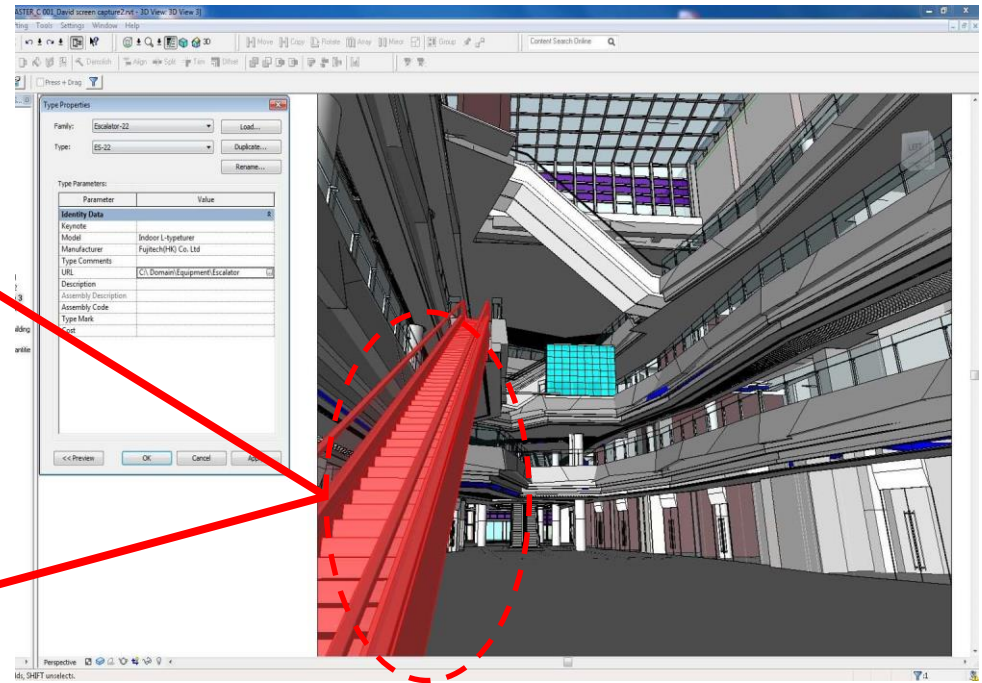


Part 2: BIM Applications – Facilities Management

Provision of a Data-Rich as-built BIM Model for Facilities Management



Scanned copy of Test Report



Hyperlink to equipment, schedules, product catalogues, test reports, certificates and O&M manual etc.



Manufacturer's Web Site

Planning

Scheme Design

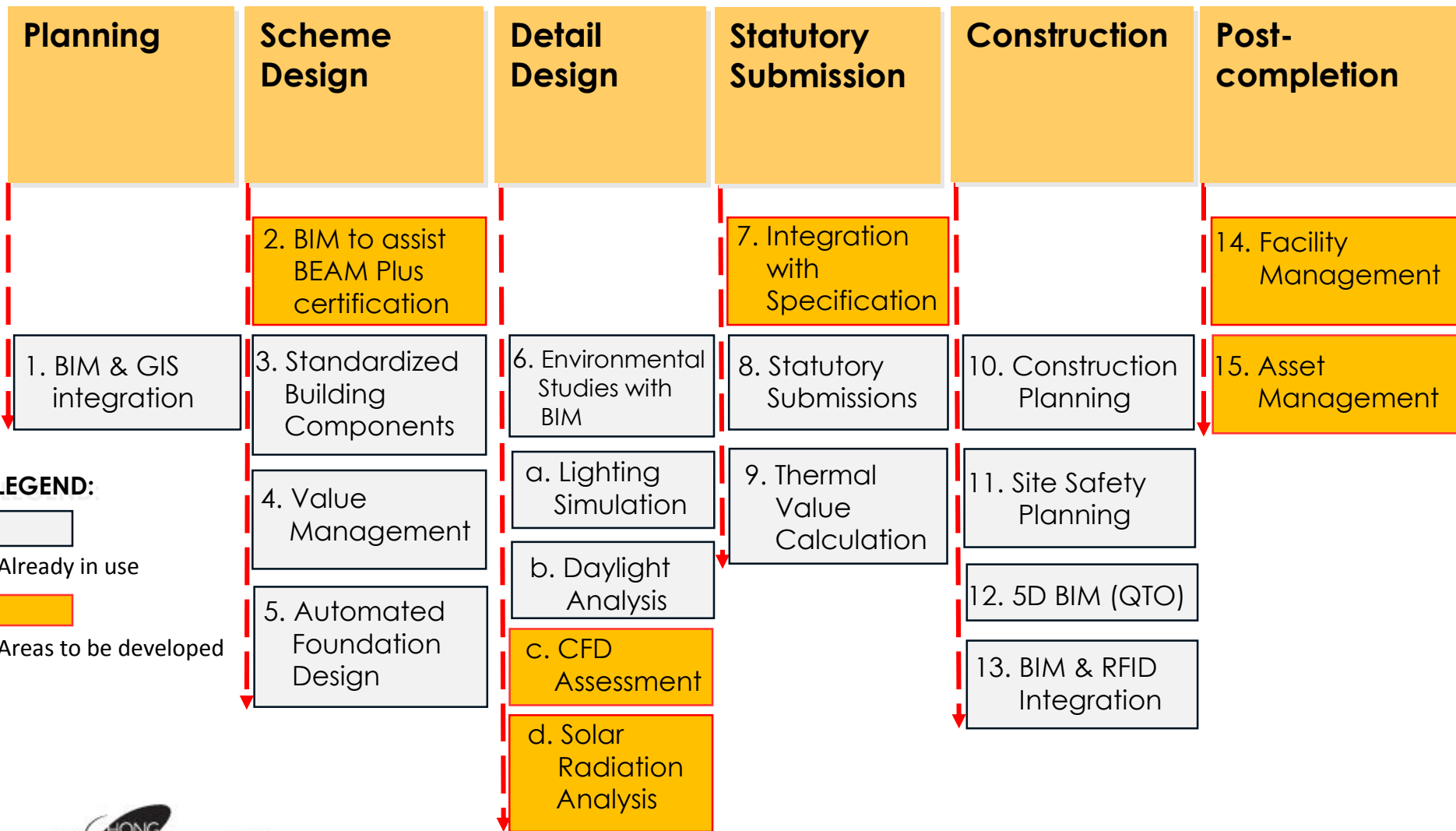
Detail Design

Statutory Submission

Construction

Post-completion

Part 3: Achievements and Way Forward – Future BIM R&D Items



LEGEND:
 Already in use
 Areas to be developed



Part 3: Achievements and Way Forward – Awards

Autodesk 2009 -2015 BIM Awards



CIC BIM Excellence Award



buildingSMART HONG KONG 2015 – 2016 International BIM Award



Organisers:



International Co-owners:



Thank you

For details of Hong Kong Housing Authority's BIM Applications, please visit –

English Version

<http://www.housingauthority.gov.hk/en/business-partnerships/resources/building-information-modelling/index.html>

Traditional Chinese Version

<http://www.housingauthority.gov.hk/tc/business-partnerships/resources/building-information-modelling/index.html>

Simplified Chinese Version

<http://www.housingauthority.gov.hk/sc/business-partnerships/resources/building-information-modelling/index.html>



Organisers:



International Co-owners:



Sustainable Buildings and Climate Initiative
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For Buildings and
Construction