CONSTRUCTION INDUSTRY COUNCIL
建造業議會

BIM

CIC BIM Exchange Information Requirements (EIR) Template

(BIM Specifications)

(in line with ISO 19650)
December 2020

Disclaimer

"Whilst reasonable efforts have been made to ensure the accuracy of the information contained in this publication (Reference Materials), the CIC nevertheless encourages readers to seek appropriate independent advice from their professional advisers where possible. Readers should not treat or rely on this publication (Reference Materials) as a substitute for such professional advice.

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Document Revision Tracking

Issue Date	Notes
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December 2020	First Publication

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Preface

The Construction Industry Council (CIC) is committed to seeking continuous improvement in all aspects of the construction industry in Hong Kong. To achieve this aim, the CIC forms Committees, Task Forces and other forums to review specific areas of work with the intention of producing Alerts, Reference Materials, Guidelines and Codes of Conduct to assist participants in the industry to strive for excellence.

The CIC appreciates that some improvements and practices can be implemented immediately whilst others may take more time for implementation. It is for this reason that four separate categories of publication have been adopted, the purposes of which are as follows:

Alerts	The Alerts are reminders in the form of brief leaflets produced quickly to draw the immediate attention of relevant stakeholders to the need to follow some good practices or to implement some preventive measures in relation to the construction industry.
Reference Materials	The Reference Materials are standards or methodologies generally adopted and regarded by the industry as good practices. The CIC recommends the adoption of the Reference Materials by industry stakeholders where appropriate.
Guidelines	The Guidelines provide information and guidance on particular topics relevant to the construction industry. The CIC expects all industry stakeholders to adopt the recommendations set out in the Guidelines where applicable.
Codes of Conduct	The Codes of Conduct set out the principles that all relevant industry participants should follow. Under the Construction Industry Council (Cap 587), the CIC is tasked to formulate codes of conduct and enforce such codes. The CIC may take necessary actions to ensure compliance with the codes.

If you have read this publication, we encourage you to share your feedback with us. Please take a moment to fill out the Feedback Form attached to this publication in order that we can further enhance it for the benefit of all concerned. With our joint efforts, we believe our construction industry will develop further and will continue to prosper for years to come.

Foreword

I am glad to see the release of **Construction Industry Council (CIC) BIM Exchange Information Requirements (EIR) Template** (BIM Specifications). This CIC BIM EIR Template shall be read in conjunction with the CIC BIM Standards General Version 2 – December 2020, which contains major enhancements to align with ISO 19650's Information Management principles, workflows and requirements, also providing Hong Kong Local Annex of ISO 19650-2:2018.

In 2014, the CIC published a report named "Roadmap for the Strategic Implementation of Building Information Modelling (BIM) in Hong Kong's Construction Industry" with an aim to establishing a blueprint for the promotion and adoption of BIM in Hong Kong's Construction Industry. The BIM Roadmap suggested 17 initiatives in nine areas with three imminent actions. Establishment of a local BIM standards is one of the imminent actions aiming to set out a common platform and language for Hong Kong's BIM practitioners. The CIC's BIM Standards will be implemented in stages. The first Standards, renamed as CIC BIM Standards – General was published in September 2015.

Since then, BIM practitioners have gained more practical project experience, and there has been much wider adoption of BIM in various areas of the Architecture, Engineering, Construction, Owner and Operator (AECOO) industry in Hong Kong. With the release of the Technical Circular (Works) Nos. 7/2017, 18/2018 & 9/2019 by the Development Bureau (DEVB) of The Government of the Hong Kong Special Administrative Region (HKSAR), capital works projects with project estimates more than $30 Million are mandated to use BIM from 1st January 2018 onwards. All along the CIC has been continuing to develop and establish the CIC BIM Standards for specific BIM usages and disciplines, and to conduct consultations with relevant stakeholders, as an established practice.

With the establishment of the Task Force on BIM Standards under the Committee on BIM on 21 November 2017, the CIC would identify and align the common practices as well as set up new standards and guidelines to facilitate better implementation and adoption of BIM in project execution. The full suite of CIC BIM standards have been published covering the following specific BIM usages or disciplines separately:

(i) CIC BIM Standards – General (August 2019); and (*Version 2* - December 2020)*;*
(ii) CIC BIM Standards for Architecture and Structural Engineering (*Version 2* – December 2020)*;*
(iii) CIC BIM Standards for Underground Utilities (August 2019)*;*
(iv) CIC BIM Standards for Mechanical, Electrical and Plumbing (August 2019)*;*
(v) CIC BIM Standards for Preparation of Statutory Plan Submissions (December 2020)*;*
(vi) CIC Production of BIM Objects Guide – General Requirements (August 2019)*; and*
(vii) CIC BIM Dictionary (December 2020)*.*

In response to demands from the industry, a Task Force on BIM Specifications and Agreement under the ambit of Committee on BIM was established on 23 October 2019. The Task Force is co-chaired by Committee on BIM and Committee on Construction Business Development. The CIC has been developing:

- CIC BIM Exchange Information Requirements (EIR) Template (BIM Specifications);
- CIC Special Conditions of Contract for BIM for incorporating into existing construction contracts and consultancy agreements for implementing BIM in construction projects; and

- CIC BIM Services Agreements for procuring BIM services under different contractual relationships.

Therefore, two Task Groups were formulated under the Task Force, named Task Group 1 (BIM Specifications) and Task Group 2 (BIM Special Conditions of Contract & Services Agreement). The development of this CIC BIM EIR Template is led by Task Group 1.

The objective of this CIC BIM EIR Template is to provide BIM requirements for contractual deliverables to facilitate prompt adoption of BIM by the construction industry in Hong Kong.

The target users are primarily small and medium enterprises (SME) Appointing Parties / Employers / Clients / Owners (hereafter referred to as 'Appointing Parties') or their agents in the private sector who plan to use BIM for their projects. The document will help them to prepare the project specific EIR.

Feedback on the CIC BIM EIR Template from practitioners subsequent to the issuance of this publication will be considered in future revisions.

On behalf of the CIC, I would like to thank everyone who has contributed to producing this CIC BIM EIR Template, in particular to the members of the Task Force on BIM Specifications and Agreement.

Ar. Ada FUNG, BBS
Chairperson
Committee on Building Information Modelling
Construction Industry Council
December 2020

Purpose

The purpose of this document is to provide users with a standard Exchange Information Requirements (EIR) Template as set out by ISO 19650-1, which is required for service agreements or contracts following CIC BIM Standards and methodology depending on the type, scope and other Appointing Parties' requirements for those projects. Users are advised to go through the Exchange Information Requirements Template and customise them for their specific project application. This Exchange Information Requirements Template should be used in conjunction with the CIC BIM Standards – General (Version 2 – December 2020). Draft version is available on CIC BIM portal.

Who Should Use This Document

The target users are primarily small and medium enterprises (SME) in the private sector - Appointing Parties or their agents who plan to use BIM for their projects. The document is a template for, and will help them to prepare the project specific EIR.

How To Use This Document

The CIC provides this Exchange Information Requirements Template for the industry as a reference material. When preparing a contract where BIM is adopted, in particular project specific EIR, users may refer to the CIC Exchange Information Requirements Template for BIM adoption as a part of project requirements.

Notations used in the document:

- **Text in square brackets [ ]** should be edited by the user based on the project specific requirements before releasing to the project.
- **Text separate by /** is used when there are more than one option to specify.
- **Items with "*"** mean delete as appropriate.
- **Text in brackets ( )** is an abbreviation, clarification or indication of specific version of the terms mentioned.
- **Text in brackets ( ) and in italics** is a Guidance note provided as further explanation of the relevant portion of this EIR Template. Guidance notes should be removed from the resulting project specific EIR.
- **Selection box** ☐ (empty) indicates an item which may be included in the project specific EIR. Users should decide on this item based of the requirements of their project.
- **Selection box** ☑ (selected) indicates an item required for the EIR of any project, which is intended to use BIM in compliance with CIC BIM Standards – General.

In the project specific EIR users should make a reference to the specific CIC BIM Standard [version Month Year] *(User to specify the version, for example December 2020)* which is going to be used for the project.

The Fig.1 below indicates the position of the CIC Exchange Information Requirements Template for BIM and BIM Execution Plan (BEP).

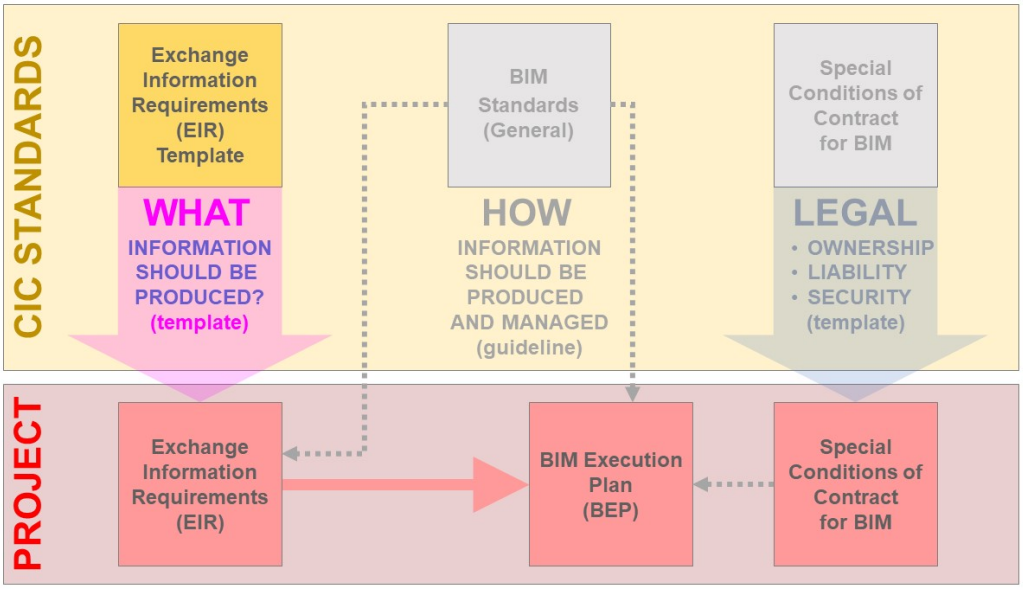

Fig.1 Relationship between CIC Exchange Information Requirements Template and CIC BIM Standards and other contractual documents.

The Fig.2 below illustrates how Appointing Parties can prepare the project specific EIR by selecting the contents from the Exchange Information Requirements Template. The selection is subject to Appointing Party's considerations that may relate to the project background, nature, complexity, budget and constraints, etc.

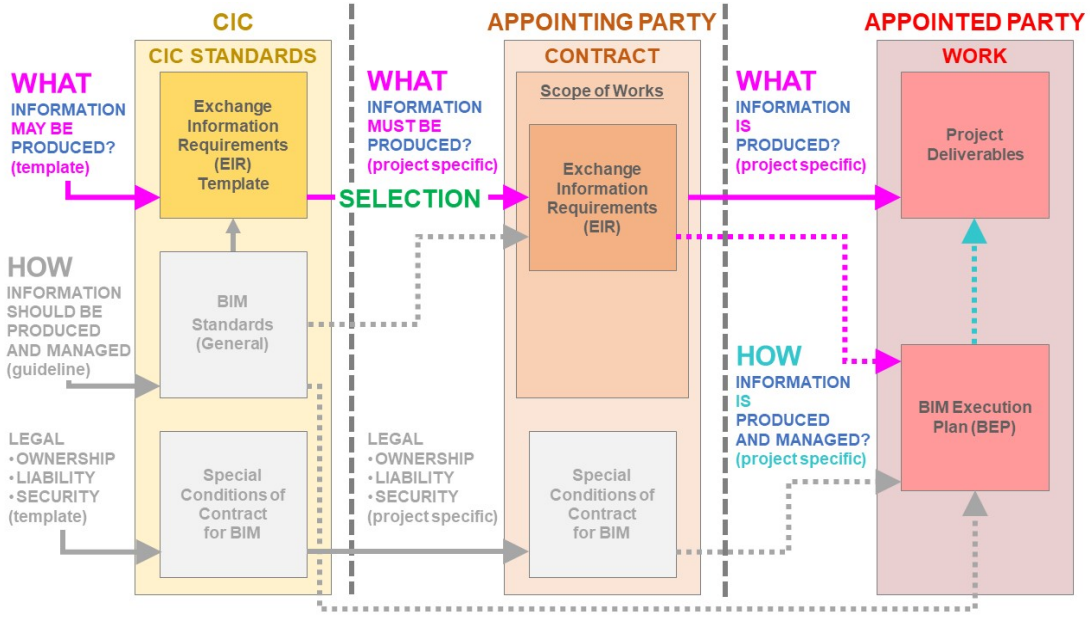

Fig.2 Process of the selection of contents from the Exchange Information Requirements Template for the preparation of project specific EIR.

Note that there are specific terminologies and abbreviations used in this document, please refer to the separate document "CIC BIM Dictionary" for the definitions and descriptions.

Users may refer to this Exchange Information Requirements Template and adjust or amend the contents to satisfy their purposes and needs. This Exchange Information Requirements Template is firstly developed for design-tender-build projects to guide Appointing Parties on how to engage consultant & contractor separately in BIM adoption. It may need to be further adjusted by the user for any other type of procurement methods such as design-and-build.

It is recommended that this Exchange Information Requirements Template is adopted in connection to (but not solely) the Special Conditions of Contract for BIM, which is a separate document to be available from the CIC.

The clauses in the Exchange Information Requirements Template are generic and project-neutral. Two project-specific examples are provided in the Sample(s) project specific EIR for BIM – as detailed in **Appendix 1** and **Appendix 2**. The table below shows the typical differences between the contents of the Exchange Information Requirements Template and the sample(s) project specific EIR for BIM.

Contents in CIC Exchange Information Requirements Template	**Contents in sample(s) project specific EIR for BIM**
1. BIM Personnel	
a) List of roles and qualification of BIM personnel b) Qualifications of BIM Personnel	a) The composition of BIM personnel (organisation chart and required numbers of the BIM roles)
2. Common Data Environment (CDE)	
a) Brand-neutral requirements b) Approach and Implementation Plan	a) Specific technologies, tools, applications and file formats
3. BIM Contractual Documents	
a) Pre-Appointment BEP Content (Tender stage) b) BEP Content c) Security Management Plan	a) Sample of Pre-Appointment BEP Content (Tender stage) b) Sample of BEP Content c) Sample of Security Management Plan
4. BIM Uses	
a) Description and list of deliverables of BIM uses	a) Selected BIM uses b) Quantity, frequency; and file format of deliverables
5. Quality Assurance	
a) Quality Assurance Plan	a) Sample of Quality Assurance Plan. Specific technologies, tools, applications and procedures for sample projects
6. Handover of Project Deliverables	
a) Description and list of deliverables	a) Selected Deliverables

Contents in CIC Exchange Information Requirements Template	Contents in sample(s) project specific EIR for BIM
7. BIM Models Management	
a) Discipline BIM models b) Federated model c) LOIN requirements	a) Selected Deliverables
8. BIM Objects	
a) Possible deliverables	a) Selected Deliverables
9. Trainings	
a) Training types, purpose, and outcome-based requirements	a) Training details, quantity of training courses and personnel to be trained
10. Hardware & Software Requirements	
a) Brand neutral requirements on compatibility and interoperability	a) Specific technologies, tools, applications and file formats
11. BIM Standards & Guidelines	
a) List of BIM Standards and Guidelines	a) BIM Standards and Guidelines selected for a specific project.

Sample Project EIR for BIM

1. If an owner / developer executes the contract with a consultant or contractor, then the Appointing Party is the Employer under the terms of the contract.
2. If a consultant sublets the work to sub-consultants, then the Appointing Party is the consultant.
3. If a contractor sublets the work to sub-contractors, then the Appointing Party is the contractor.

Appointed Party shall submit all deliverables as stated in the Clauses of this Sample Project EIR to achieve the objective to the satisfaction of the Appointing Party.

Appointed Party shall adopt BIM during the development of project planning and design stages. Appointed Party shall ensure the BIM models with accurate building information, drawings and submit to the Appointing Party for approval.

Appointed Party shall cooperate and work closely with other project parties and the Appointing Party and its's representatives to ensure that the works and deliverables are in full compliance with the specified requirements of BIM and that the deliverables are submitted on time, high quality and within budget. Appointed Party is required to resolve any discipline-based and interdisciplinary conflicts in the BIM models and ensure the BIM models are accurate and verified.

Appointed Party shall deliver BIM models according to CIC BIM Standards and Guidelines as stipulated in Clause 11of this Sample Project EIR. The BIM models shall be fully coordinated and data-rich that contain both graphical and non-graphical information through a single source of information approach providing the backbone for digital project delivery and benefit the subsequent project stages including construction stage and Operation & Maintenance stage.

The selected deliverables to specific projects are the items as stated in the Sample Project EIR while the full list of deliverables for selection shall refer to the CIC BIM Exchange Information Requirements Template.

1. BIM Personnel

(Guidance Note: The following roles should be defined, agreed and maintained for each stage of a project. On smaller projects, one person may have multiple roles and responsibilities.)

1.1 Roles and Responsibilities of BIM Personnel

There are commonly two key roles in projects adopting BIM namely BIM Manager and BIM Coordinator. BIM Manager(s) and BIM Coordinator(s) shall carry out the responsibility and authority as described in the Section 3 of the CIC BIM Standards - General.

1.2 Qualifications of BIM Personnel

Following are the qualification requirements of BIM Manager(s) and BIM Coordinator(s).

Role	Qualification
BIM Manager	1. A valid CIC Certified BIM Manager (CCBM) or satisfies requirements 2 and 3; 2. Shall either have corporate membership of an appropriate professional institution or shall have a minimum of five years relevant post-qualification experience plus university degree or equivalent in an appropriate architectural, engineering, surveying, building or construction-related discipline; and 3. Shall have a minimum of three years of practical experience in management of BIM projects.
Discipline-specific BIM Coordinators : Architectural / Structural / MEP	1. A valid CIC Certified BIM Coordinator (CCBC) or satisfies requirements 2, 3 and 4; 2. A diploma (or equivalent qualification) in the Qualifications Framework (QF) Level 4 or above in architecture, engineering, surveying, building or construction; 3. Shall have a minimum of three years related construction project experience; and 4. Shall have a minimum of one year practical experience in BIM projects; and completed at least one (1) Construction Innovation and Technology Fund (CITF) pre-approved BIM training course or possess at least one (1) BIM software certificate.

2. Common Data Environment (CDE)

(Guidance Note: A CDE should be implemented in a project for the collaborative working using BIM among the project team. The standard requirements of CDE shall refer to the Section 4 in the CIC BIM Standards – General.)

2.1 CDE Implementation

2.1.1 CDE implementation methodology shall be stated in the BIM Execution Plan. Its functional and process requirements and handover procedure shall refer to the relevant section of CIC BIM Standards – General.

2.1.2 A CDE shall be implemented within [one (1) month] by the Appointed Party (Consultant / Contractor) upon the approval of the Appointing Party, and be utilised throughout the project stages specified by the Appointing Party.

2.1.3 Individual login accounts with appropriate permissions for each person using the CDE shall be provided to the involved project parties i.e. Appointing Party and Appointed Parties (Consultant(s) and Contractor(s)).

(User may add additional CDE deliverables if appropriate)

3. BIM Contractual Documents

The document details will cover the information management process in stages of:

☐ a. Planning and Design

☐ b. Construction

☐ c. Operations and Maintenance (O&M)

Guidance Note: This clause identifies the documents required for the tender process and contract of a BIM driven project.

For the required contents and deliverables shall refer to the Section 3 in the CIC BIM Standards - General.

☑ Pre-Appointment BEP Content (Tender stage)

- ☑ 3.1.1 Project information (Project particulars);
- ☑ 3.1.2 Proposed Information Management Functions (commonly known as Roles);
- ☑ 3.1.3 BIM goals, Uses & Deliverables;
- ☑ 3.1.4 Proposed organisation structure and Delivery Team composition;

☑ 3.1.5 Proposed names and resumes of individuals to undertake information management functions;

☑ 3.1.6 Delivery Team Capability and Capacity Assessment;

☑ 3.1.7 Proposed Information Delivery Strategy;

☑ 3.1.8 Proposed EIR Strategy;

☑ 3.1.9 Proposed Project Information Standards (formerly / commonly known as standards on BIM Procedures);

☑ 3.1.10 LOD Responsibility Matrix;

☑ 3.1.11 Proposed Federation Strategy;

☑ 3.1.12 Proposed Project information production methods and procedures;

☑ 3.1.13 Goals for collaborative production;

☑ 3.1.14 Proposed Delivery Team Risk Register;

☑ 3.1.15 Proposed Mobilisation plan; and

☑ 3.1.16 Proposed Schedule of software (including versions), Hardware, CDE and IT infrastructure.

☑ BEP Content

☑ 3.2.1 Project information (Project particulars);

☑ 3.2.2 Project information functions (formerly / commonly known as Roles and Contacts);

☑ 3.2.3 Information delivery strategy;

☑3.2.4 BIM goals, uses & deliverables;

☑3.2.5 Information Management Assignment Matrix;

☑3.2.6 Project Information Standards (formerly / commonly known as standards on BIM Procedures);

☑3.2.7 Project Information Production Methods and Procedures (formerly / commonly known as BIM Procedures);

☑3.2.8 Federation Strategy (formerly / commonly known as Model Division);

☑3.2.9 Security Strategy to fulfilling the Security Information Requirements (SIR)

☑3.2.10 High and Detail Level Responsibility Matrix (formerly / commonly known as BIM Organisation Chart); with defined roles, responsibilities and authority;

☑3.2.11 BIM Team Resources, Competency and Training;

☑3.2.12 Delivery Team Risk Register;

☑3.2.13 Mobilisation Plan (formerly / commonly known as standards on resources planning / work planning);

☑3.2.14 Master Information Delivery Plan (MIDP);

☑3.2.15 Task Information Delivery Plans (TIDP);

☑3.2.16 BIM Deliverable Schedule (Programme);

☑3.2.17 Spatial Coordination Process (formerly / commonly known as BIM Coordination and Clash Detection);

☑3.2.18 Software, Hardware, CDE, hardware and IT Infrastructure; and

☑3.2.19 Quality assurance – BIM auditing

☐ Security Management Plan

4 BIM Uses

(Guidance Note: Users should select appropriate BIM Uses from the list below. The standards of each BIM Use should refer to the Section 3 in the CIC BIM Standards - General.)

☐ 4.1 Design Authoring

☐ Planning and Design Stages ☐Construction Stage

1	☐Each design discipline shall carry out its own design in BIM models with Geometries and alphanumerical Information as per Level of Information Need at particular project stage.
2	☐Each discipline shall audit its own discipline model before Information Exchange with other disciplines.
3	☐All models produced shall comply with specified BIM Standards and BIM Execution Plan.

☐ 4.2 Design Review

☐ Planning and Design Stages ☐Construction Stage

A process set up among design team members to produce comments, design reviews and feedback, etc. embedded in BIM models or carried out in the Issue Managements process on the CDE.

At the design stage, design review shall be coordinated among concerned stakeholders such as design consultants, Appointing Party, relevant Government departments to provide their feedbacks to validate multiple design aspects by reviewing the models.

The deliverables of design review shall include the following:

1	☐a. Procedure of design review; ☐b. Design review report; ☐c. Procedure of issue management / tracking and reporting using BIM; ☐d. Methodology of linking Requests for Information (RFIs) to BIM and producing log sheets of RFI; and ☐e. *(other deliverables)*
2	Design reviews shall be carried out by the Appointed Party using: *(Select appropriate items from the list below)* ☐a. Rendered still shots; ☐b. Animations; ☐c. Interactive flythrough and walkthrough visualisation; ☐d. Real-time high definition rendering (photo realistic), user interactions and simulations; and ☐e. Virtual mock-ups.
3	☐Digital issue management process shall be implemented during design review.

☐ 4.3 Drawing Generation (Drawing Production)

☐ (a) Master Layout Plan / Development Plan

1	☐Produce Master Layout Plan.
2	☐Produce Development Plan.
3	☐ Produce Preliminary area schedules embedded in BIM models and produced in drawings.

☐ (b) Statutory Submission

1	Produce Statutory plan submission (generated from BIM models) *(Select appropriate items from the list below)* ☐a. General Building Plan; ☐b. Superstructure Plan; ☐c. Foundation Plan; ☐d. Excavation and Lateral Support (ELS) Plan;

	☐e. Site Formation Plan; ☐f. Ground Investigation Plan; ☐g. Demolition Plan (included Hoarding); ☐h. Drainage Plan; ☐i. Curtain Wall Plan; ☐j. Application for Water Supply; ☐k. Drainage Connection; ☐l. Fire Service Inspection; ☐m. License for Generator; ☐n. Building Energy Efficiency Ordinance; ☐o. License for Fresh Water in Evaporative Cooling Towers; ☐p. Lift & Escalator Inspection; ☐q. Electrical Installation Drawing; ☐r. Transformer Room / LV Switch Room Inspection; and ☐s. Gas Installation.
2	The Appointed Party shall demonstrate using BIM that the following items are compliant with the statutory requirements of Planning Department, Buildings Department and Lands Department: *(Select appropriate items from the list below)* ☐a. Fundamental checking in accordance with the provisions of Buildings Ordinance and allied regulations, and relevant Practice Notes for Authorized Persons, Registered Structural Engineers and Registered Geotechnical Engineers or relevant Joint Practice Notes issued by the Authorities; ☐b. Checking of planning requirements under the Town Planning Ordinance stipulated in outline zoning plans and / or planning approval conditions; ☐c. Checking of development / planning restrictions, including but not limited to gross floor area, building heights, no. of storeys, absolute height of building, etc.; ☐d. Checking of means of escape and means of access; ☐e. Checking of sanitary fitment provision; ☐f. Checking of fire compartment and fire resisting construction; ☐g. Checking of building bulk and separation; and ☐h. Checking of the material settings and descriptions according to the specifications.

☐ (c) Tender Drawings and Working Drawings

1	Produce tender drawings and working drawings including amendments and design change instructions: *(Select appropriate items from the list below)* ☐a. General layout plans; ☐b. Schedules; List of schedules; ☐c. Blow up sections / elevations; ☐d. Details and schedule of drawings; and ☐e. MEP Design drawings and Equipment schedules.

☐ (d) Construction and Shop Drawings

1	☐ a. Produce Combined Services Drawings (CSD); ☐ b. Produce Combined Builder's Work Drawings (CBWD); ☐ c. Produce Individual Services Drawings (ISD); ☐ d. Produce Shop Drawings (generated from BIM models); ☐ e. Produce Fabrication Drawings (Verified on Site); and ☐ f. Produce As-Built Drawings (Verified on Site).

☐ (e) Sales and Lease Plans

1	Produce Plans required in Sales Brochure: *(Select appropriate items from the list below)* ☐a. Floor plans of residential properties; ☐b. Floor plans of commercial properties; ☐c. Floor plans of parking spaces; ☐d. Cross-section; ☐e. Elevations; and ☐f. *(other deliverables)*
2	Produce Schedules: *(Select appropriate items from the list below)* ☐a. Saleable areas; ☐b. Areas of other specified items not included in the Saleable Areas; ☐c. Fittings, finishes and appliances schedules; and ☐d. *(other deliverables)*

☐ (f) Operations and Maintenance Stage

1	Produce Plans required in Sales Brochure: *(Select appropriate items from the list below)* ☐a. Floor plans of residential properties; ☐b. Floor plans of commercial properties; ☐c. Floor plans of parking spaces; ☐d. Cross-section; ☐e. Elevations; and ☐f. *(other deliverables)*
2	Produce Schedules (generated from BIM models): *(Select appropriate items from the list below)* ☐a. Saleable areas; ☐b. Areas of other specified items not included in the Saleable Areas; ☐c. Fittings, finishes and appliances schedules; and ☐d. *(other deliverables)*

☐ 4.4 Existing Conditions Modelling

☐ Planning and Design Stages ☐Construction Stage

☐ (a) Planning and Design Stages

1	Produce geo-referenced existing conditions 3D models including all man-made features and objects, developed by land surveyor from: *(Select appropriate items from the list below)* ☐a. LiDAR; ☐b. Laser scanning; ☐c. Photogrammetry; ☐d. Conventional survey method; ☐e. Record drawings; and ☐f. Digital map products available from Lands Department. The required formats of the existing conditions 3D models are as follows: *(Select appropriate items from the list below)* ☐a. 3D point cloud model of existing site / building; ☐b. Surface / mesh model of existing geometric elements; and ☐c. BIM models including data regarding existing building components.
2	Provide supplementary records, accurately linked to existing conditions model as established above (1): *(Select appropriate items from the list below)* ☐a. Photographic records; ☐b. Panoramic 360; ☐c. Videos; ☐d. 3D Videos; and ☐e. other records.
3	☐Provide records of intensity / colour information indicating specific parameters on a per point basis at each scan position where the instrumentation allows.

☐ 4.5 Sustainability Evaluation

☐ Planning and Design Stages ☐Construction Stage ☐ O&M Stage

1	Provide BIM models for Sustainability evaluation status and report based on the following: *(Select appropriate items from the list below)* ☐a. Energy use simulations; ☐b. Sun shading analysis; ☐c. Noise analysis; ☐d. Air ventilation analysis; and ☐e. Others *(please specify)*
2	Sustainability Evaluation is required for obtaining the following BEAM Plus certification: ☐a. Platinum; ☐b. Gold; ☐c. Silver; and ☐d. Bronze.

☐ 4.6 Site Analysis

☐ Planning and Design Stages

1	Produce a site analysis report covering the following: *(Select appropriate items from the list below)* ☐a. Master planning; ☐b. Visual analysis; ☐c. Vantage point / ridgeline / sightline analysis; ☐d. Site context analysis; ☐e. Terrain analysis; ☐f. Heritage impact; ☐g. Traffic impact; ☐h. Tree preservation analysis; ☐i. Sun and shadow studies; ☐j. Daylight analysis; ☐k. Solar envelope analysis; ☐l. Air ventilation analysis; and ☐m. Others *(please specify)*

☐ 4.7 Space Programming

☐ Planning and Design Stages

1	☐Verify compliance with approved client's Space Programme.
2	☐Diagrams showing functional analysis between spaces.

☐ 4.8 Cost Estimation

(a) Quantity take-off and cost estimating

☐Use classification system such as Omniclass for building objects.

☐Planning and Design Stages

1	Provide Quantities generated from BIM models for: *(Select appropriate items from the list below)* ☐a. Cost budgeting; ☐b. Project cost control; and ☐c. Cost evaluation on design options, and the following stages.

☐Tendering Stage

1	☐a. Provide materials to facilitate Quantity Take Off (QTO) process and the preparation of Bills of Quantity (BoQ).

(b) Cash flow forecasting and control

☐Construction Stage

1	Provide 5D models / extracted quantities for project cost control such as: *(Select appropriate items from the list below)*

	☐a. Cost evaluation on design options; ☐b. Cost evaluation on variation of works; ☐c. Cash flow forecast; ☐d. Spending analysis; ☐e. Facilitate procurement of materials and works; ☐f. Interim payment; and ☐g. Others *(Please specify)*

☐ 4.9 Spatial Coordination (formerly 3D Coordination)

☐ Planning and Design Stages ☐Construction Stage

The 3D coordination process shall include but not be limited to the checks for spatial and headroom requirements, clashes, working spaces for building operations and maintenance activities, installation and replacement of equipment and machines.

1	Provide clash reports to include the following: *(Select appropriate items from the list below)* ☐a. Specification of clash analysis process and assumptions on element tolerances, areas and elements; ☐b. Design conflicts, clashes and design errors identified, categorised, prioritised; and ☐c. Resolution result summary.

☐ 4.10 Engineering Analysis

☐ Planning and Design Stages ☐Construction Stage

(Under every tick box below, please provide purpose and detailed specification of deliverables if any.)

☐ (a) Structural Analysis

1	☐a. Produce Structural Analysis reports based on architectural design; ☐b. Provide structural design BIM models; and ☐c. *(other deliverables)*

☐ (b) Ventilation Analysis

1	☐a. Produce Computational Fluid Dynamic (CFD) models; ☐b. Produce Air Ventilation Assessment (AVA) reports; ☐c. Produce ventilation analysis studies / reports; and ☐d. *(other deliverables)*

☐ (c) Lighting Analysis

1	☐a. Produce Lighting analysis results / reports; ☐b. Produce Renderings; and ☐c. *(other deliverables)*

☐ (d) Energy Analysis

1	☐a. Produce Energy assessments on building design; ☐b. Produce Energy analysis results / reports; and ☐c. *(other deliverables)*

☐ (e) Fire Engineering

1	☐a. Produce Fire Engineering Studies (FES) report; ☐b. Compare between Deem-to-Comply provisions and the Performance Requirements; and ☐c. *(other deliverables)*

☐ (f) Civil Engineering

1	☐a. Produce Civil Engineering design BIM models; ☐b. Produce Civil Engineering analysis results / reports *(please specify); and* ☐c. *(other deliverables)*

☐ (g) Other Engineering Analyses

1	☐a. Produce Engineering Analysis results / reports of specific system *(please specify)*; ☐b. Produce predicted performance of the specific system; ☐c. Compare between predicted performance and actual performance data of the specific system; and ☐d. *(other deliverables)*

☐ 4.11 Facility Energy Analysis

☐ Planning and Design Stages ☐Construction Stage

(Under every tick box below, please provide purpose and detailed specification of deliverables if any.)

1	☐a. Produce Energy models; ☐b. Produce Energy Analysis results / reports; ☐c. Produce predicted energy use with variation based upon design alternatives; and ☐d. *(other deliverables)*

☐ 4.12 Building Code Checking and Validation

☐ Planning and Design Stages ☐Construction Stage

1	☐ Specify methodology and software tools for automatic Code checking of the above requirements.
2	☐ Submit Code Validation Reports using the methodology and software tools specified above for the following milestone Deliverables: *(Specify the list of milestone Deliverables for which Code Validation Reports are required)*

3	☐ For every Code Validation Report indicating code incompliances prepare amendment submissions and repeat the automatic Code validation process.

☐ 4.13 Phase Planning (4D Modelling)

☐ Planning and Design Stages ☐Construction Stage

1	Provide the methodology of the Phase Planning (4D Modelling) to be adopted in the project, including the following: ☐a. Assumptions; ☐b. Time interval; and ☐c. Construction method statement (including site logistics, site layout plan, equipment catalogue and zoning plan, etc.).
2	☐Provide 4D models for Phase Planning (4D Modelling).
3	☐Link project programme to 4D models and use it to control the construction sequence to the required granularity.
4	Provide videos of the 4D simulations as follows: ☐a. 4D walkthrough; ☐b. Flythrough simulation; and ☐c. Animation videos from the model; No longer than [2] minutes each; [30] frames per second; [1080P] resolution; and In the file format viewable in a specified standalone free viewer. ☐a. In Planning and Design Stages, minimum [2] video(s); ☐b. In Tendering Stage, minimum [1] video(s); and ☐c. In Construction Stage, minimum [2] video(s)
5	Prepare videos to reflect Planned progress against Actual progress every [*number*] week(s).

☐ 4.14 Digital Fabrication

☐ Planning and Design Stages ☐Construction Stage

1	☐a. Prepare fabrication models from BIM models for prefabricated, MiC and DfMA units / elements; ☐b. Produce 3D-printed prototyping elements (elements to be specified by the Appointing Party); ☐c. Produce fabrication drawings from fabrication models; ☐d. Populate ID tags using a specified identification technology, [QR / RFID / others]. As parameters of Physical fabricated elements (exact elements to be specified by the Appointing Party) in BIM models; ☐e. Link BIM models to the tagged fabricated elements; and ☐f. *(other deliverables)*

☐ 4.15 Site Utilisation Planning

Construction Stage

1	☐Produce 3D site utilisation models and generate 2D site utilisation plans from them.
2	☐Provide visualisation of the Temporary Works and the movement of construction equipment to optimise the construction site planning, logistics and safety.
3	☐Maintain continuous monitoring of the site utilisation during construction and optimise it using predictive planning based on 4D simulations produced as needed.

☐ 4.16 3D Control and Planning

Construction Stage

3D Control and Planning shall be adopted at the construction stage to link BIM models with HK1980 Grid System. Control points shall be directly generated from BIM models with the adoption of machinery with Global Positioning System (GPS) capabilities and digital layout equipment together with corresponding software to align with BIM models.

1	☐a. Set out control points in BIM models; ☐b. Set out the above control points on site and carry out physical layout based on those points and BIM models; and ☐c. Verify aligned digital information produced from surveying equipment with BIM models based on the specified tolerances.

☐ 4.17 3D Construction Coordination

Construction Stage

1	☐a. Produce construction stage BIM models to from the design stage federated BIM models for all the relevant Disciplines; ☐b. Build or obtain construction BIM objects from suppliers and manufacturers with actual dimensions, sizes, operation spaces, connections other spatial constraints; ☐c. Organise and chair BIM coordination meetings to report and resolve the coordination issues before construction of the project; ☐d. Perform construction coordination by comparing BIM models and digitally scanned building and system layout arrangement on site. Submit coordination report identifying discrepancies; and ☐e. Organise and chair BIM coordination meetings to resolve or validate coordination issues identified on site.

☐ 4.18 Construction System Design

Construction Stage

1	☐a. Produce detailed BIM models of construction system including temporary works for coordination, cost estimation and procurement; and ☐b. Produce drawings for fabrication of elements of construction systems.

☐ 4.19 Construction Quality Management

Construction Stage

1	☐a. Provide digital system (e.g. DWSS) to track and record of construction issues, site defects and rectification; ☐b. Provide methodology for integrating this system with the BIM applications used for the project; and ☐c. Provide methodology for integrating this system with the CDE used for the project.

☐ 4.20 As-Built Modelling for As-Built Information Model (ABIM) and Asset Information Model (AIM)

☐ Construction Stage ☐O&M Stage

1	☐Produce As-Built BIM models.
2	☐Produce As-Built 2D drawings generated from As-Built BIM Models.
3	Verify the site condition against the As-Built BIM models using ☐Inspection; or ☐Photogrammetry; ☐Laser scanning; Produce reports indicating any discrepancies using specified comparison software.
4	☐Include Asset Information in the As-Built BIM model as specified in the AIR
5	Link textual information / documentations to As-Built BIM as listed below: *(Select appropriate items from the list below)* ☐a. Testing and Commissioning reports; ☐b. Operation and Maintenance manuals; ☐c. Relevant statutory certificates, approval documents and forms (e.g. Buildings Department, Planning Department, Lands Department, Water Supplies Department, Fire Services Department, Electrical and Mechanical Services Department, etc.; and ☐d. Other textual information subject to agreement of AM and Facilities Upkeep at later stage.
6	☐ Provide a library of all the As-Built BIM models, BIM objects, drawings and documentations.
7	☐ Produce AIMs based on As-Built BIM models

☐ 4.21 Maintenance Scheduling

☐ Construction Stage ☐O&M Stage

Maintenance Scheduling adopted at the design and construction stages involves collecting and providing maintenance attributes for facility structures, fabrics and equipment in the As-Built BIM models as considered appropriate. Record models shall be provided for tracking maintenance history.

1	Provide the following maintenance schedules / attributes linked to the As-Built BIM models: *(Select appropriate items from the list below)* ☐a. Maintenance cost; ☐b. Expected lifetime; ☐c. Mean time between failure; ☐d. Warranty start/end day; ☐e. Maintenance parties; and ☐f. *(other deliverables)*
2	☐ Manage maintenance tracking history in the AIM.

☐ 4.22 Project Systems Analysis

☐ Construction Stage (As-Built) ☐O&M Stage

1	☐Provide methodology for using AIMs for the following project systems analyses: *(Specify systems to be analysed)*
2	☐Connect AIMs and building systems analysis software to sensors and other building control systems to support the above methodology for the following project systems: *(Specify systems to be analysed)*
3	☐ Produce analysis results / reports against designed parameters for the following project systems: *(Specify systems to be analysed)*

☐ 4.23 Space Management and Tracking

☐ Construction Stage (As-Built) ☐O&M Stage

1	☐Integrate AIMs with space management software.
2	Produce space management reports / data for: ☐a. Existing use of space; and ☐b. Applying transition planning for renovations and refurbishment projects.

☐ 4.24 Asset Management

☐ Construction Stage (As-Built) ☐O&M Stage

1	☐a. Manage AIMs with appropriate asset information as required by the Appointing Party; ☐b. Produce the following asset management reports: *(Specify the list of asset management reports required)* ☐c. Update the AIM whenever necessary based on the data collected from site.

☐ 4.25 Sales and Marketing

☐ Construction Stage ☐O&M Stage

☐ (a) Design and Construction Professionals

1	☐a. Produce 3D walkthrough of BIM models with materials and finishes; ☐b. Generate images from BIM models for the preparation of Sales Brochures; and ☐c. Produce Leasing Plans.

☐ (b) Sales and Marketing Professionals

1	☐a. Produce presentation quality 3D walkthrough from BIM models showing materials and specific equipment to be installed; ☐b. Produce presentation quality videos from BIM models; ☐c. Produce presentation quality renderings from BIM models for the preparation of Sales Brochures; ☐d. Provide Visualisation of designs in immersive environment such as Virtual Reality, Augmented Reality and Mixed Reality; and ☐e. Provide Point of Sale configurators of building elements for indoor navigation.

☐ 4.26 Heritage Information Modelling (HIM)

1	☐a. Produce Historic Study of the Heritage Asset include defining the Character Defined Elements; ☐b. Perform Laser scanning Survey; ☐c. Perform Photogrammetry Survey; ☐d. Tagging Character Defined Elements; ☐QR Code ☐Near field communication (NFC) tags ☐RFID ☐Use of Augment Reality techniques to present the Character Defined Elements ☐Others ☐e. Build up 3D BIM Models across different historic stages or era; and ☐f. Apply 4D timeline factor to 3D model indicating the progressive historical change to suit for the purpose.
2	☐Connect historical material to BIM Model to display the historic materials.

☐ 4.27 Other BIM Uses

To be specified by the Appointing Party, if any.

5. Quality Assurance

(Guidance Note: This Clause elaborates on the documents submission upon quality control to ensure appropriate checks on information, data accuracy, models and documents.)

5.1 Quality Assurance Plan

Quality Assurance Plan shall be included as part of the project information production methods and procedures in the BIM Execution Plan, outlining the quality assurance for the BIM process, BIM compliance and asset attributes checking. Quality Assurance Plan for BIM shall be established to ensure appropriate quality control on information and data accuracy.

The quality control Deliverables or Chapters to be included in the Quality Assurance Plan shall include the following contents:

- ☐ a. Model compliance checking procedure and report according to the BIM Standards, methods and procedures as stated in the BIM Execution Plan;
- ☐b. BIM audit reports;
- ☐c. Clash analysis procedure and clash analysis reports;
- ☐d. Asset Information Requirement (AIM) validation procedure and report;
- ☐e. As-built verification such as LiDAR/laser scanning point cloud model; and
- ☐f. *(other deliverables)*

5.2 Design validation

Design validation shall be performed among concerned stakeholders such as design consultants, Appointing Party, relevant Government departments to provide their feedbacks to validate multiple design aspects by reviewing the models. The deliverables shall include the following:

- ☐a. Design validation procedure; and
- ☐b. Design validation report.

5.3 Compliance Check of Project Deliverables

Compliance check of the deliverables shall be done before every submission by:

- ☐a. The BIM personnel of the appointed party working on the project;
- ☐b. Other BIM personnel of the appointed party independent from the project team; and
- ☐c. External BIM Auditor (refer to CIC BIM Standards – General for its role and responsibility).

Irrespective of the checking parties selected above, the deliverables shall include the following:

- ☐a. Deliverables compliance checklist;
- ☐b. BIM audit report; and
- ☐c. *(other deliverables)*

6. Handover of Project Deliverables

Upon completion of the [Planning and Design Stages / the project], all deliverables according to project specific EIR for BIM shall be transferred and handed over to the

Appointing Party, including the following items and any other items as required in the Contract:

1. Schedule / List of deliverables
2. Transmittal
3. Deliverables including BIM stored in a medium agreed with the Appointing Party

7. BIM Models Management

(Guidance Note: This Clause specifies Disciplines for which BIM models need to be produced general requirements of Level of Information Need for information in those models to populate the responsibility matrix (Refer Clause 3 BIM Document: 3.5 High-level Responsibility Matrix) across Design, Construction and As-built stages.)

The BIM models shall be built and developed for the following disciplines:

☐a. Architecture
☐b. Structure
☐c. MEP
☐d. Other disciplines as required by the Appointing Party

7.1 Federated Model

Model federation strategy shall be defined in the BIM Execution Plan and models federated according to this strategy shall be used as discussion media during the regularly scheduled design coordination / project progress meetings. To facilitate and manage the project's federated models the Appointed Party shall submit the following documents:

☐a. Model federation strategy and standards
☐b. Project zoning strategy and standards
☐c. Technical requirements for the individual models to be federated (e.g. maximum. file size).

7.2 Level of Information Need

The Level of Information Need to be adopted shall refer to the latest CIC BIM Standards – General and Appointing Party's standards shall be appended to the EIR.
Based on the project brief and Exchange Information Requirements (this document) the Level of Information Need produced by the Appointed Party shall take into account that the **Purpose** of why information is needed.

8. BIM Objects

(Guidance Note: All BIM objects / model elements created shall comply with the CIC's Production of BIM Object Guide – General Requirements.)

8.1 Deliverables

The following deliverables shall be submitted upon the completion of design stage and construction stage respectively for the approval of the Appointing Party:

☐ 1. Library of BIM objects used in the BIM models organised and categorised according to the following classification system:

- ☐a. US OmniClass
- ☐b. China Guobiao (GB) Standard
- ☐c. Master Format
- ☐d. UK Uniclass
- ☐d. *(specify other classification system)*

☐2. BIM objects sheets for all/selected* BIM objects used in the BIM models prepared according to the standard template provided by the Appointed Party and approved by the Appointing Party.

9. Training

(Guidance Note: This Clause focuses on the training courses requirement across a project lifecycle under purposed project specific EIR for BIM uses.)

9.1 Training Objectives

Unless all project participants are fully conversant with BIM, the training courses aim to enable the project participants to create, view, use and manipulate the BIM models and the deliverables according to project specific EIR for BIM in a systematic and effective manner and enable the project participants to deliver the required BIM Uses.

9.2 Training Preparation and Deliverables

☐a. A detailed BIM training plan shall be developed and provided by the Consultant / Contractor* for the approval of the Appointing Party.

☐b. BIM training curricula with details of each training course shall be developed and provided by the Consultant / Contractor* for the approval of the Appointing Party.

☐c. A Training venue shall be provided by the Consultant / Contractor* for the approval of the Appointing Party before the training. Each attendee shall be provided with a workstation with necessary BIM authoring software and tools and licenses for efficient hands-on exercise during the training.

☐d. A Training Log sheet for the BIM training course shall be submitted to the Appointing Party for record after completion of the training courses. The training log shall list out the course information, include but not be limited to a description of the training course, date, duration, venue and attendee's name and position. The list of contents of the training log shall be commented and agreed by the Appointing Party. The training log shall be reviewed and updated.

☐ e. [A video recording of the training course shall be provided by the Consultant / Contractor* for the approval of the Appointing Party]

☐f. *(Other deliverables)*

9.3 Project Training Requirement

☐ a. In the early design stage, within [3 months] from commencement of the consultancy agreement, project training course curricula and materials shall be provided to the project team including the Appointing Party's staff and the design consultants to demonstrate the information retrieval from the selected BIM authoring software, tools and CDE and the implementation of BIM standards, workflow and processes such as design coordination, and to use BIM viewer software to review and mark comments on BIM models.

☐b. BIM auditing items and methodology in compliance with the CIC BIM Standard – General.

☐c. In the early construction stage, within [3 months] from commencement of the construction contract, project training course shall be provided to the project team including the Contractor to deliver the similar contents as stipulated in point a. above.

☐d. Upon completion of [Planning and Design Stages / the project] and handing over of the final As-Built BIM models and deliverables, training courses that cover information retrieval from the selected BIM authoring software, tools and CDE shall be provided to the Appointing Party.

☐ e. Training assessments shall be made and collected for revising the training materials and for preparing the next training classes.

☐f. *(Other deliverables)*

9.4 Personnel Training Requirement

1. The Consultant / Contractor is required to nominate his staff or sub-consultant / sub-contractor's staff to attend, within [6] months from the commencement of the Assignment / Contract, suitable BIM skill training courses under the pre-approved list of the Construction Innovation and Technology Fund (CITF) managed by the CIC and ensure their successful completion of the attended training courses. The required numbers of personnel to attend and complete suitable BIM skill training courses under the pre-approved list of the CITF (https://www.citf.cic.hk/) are:

    - [4] staff members of the Consultant / Contractor
    - [4] staff members of the engaged sub-consultant(s) / sub-contractor(s)

2. In case there are sub-contractor(s) / sub-consultant(s) in the Assignment / Contract, an appropriate number of staff member from the sub-consultant(s) / subcontractor(s) shall attend the BIM training courses.

3. In case the nominated staff members fail to complete the BIM training course, the Consultant / Contractor / Sub-consultant / Sub-contractor shall arrange additional BIM training courses to its staff members to fulfil the contract requirements at their own cost.

10. Hardware and Software Requirements

(Guidance Note: This Clause specifies hardware and software requirements and file formats needed for interoperability. Consideration upon cost and reliability by the Appointing Party shall be undertaken in the BIM Execution Plan.)

10.1 Hardware and Software Requirements

1. The hardware and software to be used shall enable the project participants to deliver the required BIM Uses in a productive and efficient manner. The specification and functional performance of the hardware shall refer to the requirements of the software to be adopted in the project.

2. All deliverables according to the project specific EIR for BIM shall comply with the software versions approved by the Appointing Party during the contract period and at the time of delivery. The Consultant(s) and Contractor(s) shall indicate the cost in their tender submissions if any upgrade of the software is needed during the contract period. The software with specific versions necessary for the production of different deliverables according to project specific EIR shall be indicated in the BIM Execution Plan.

10.2 File Format and Interoperability

1. The BIM authoring software for the project shall support open format (include import and export).

2. BIM models shall be submitted in

   ☐ a. editable format native of the BIM authoring application used for the project
   ☐ b. open format: Industry Foundation Classes (.IFC)

10.3 Deliverables

The Deliverables shall include but not be limited to the following:

1. A list of software, their purpose (refer to specific BIM Uses), version and file format.

	BIM Use / Deliverable	BIM Software	Version	File Format
1.	Design Authoring	[]	[]	Model (Native): [] Model (Read-only): [] Model (open format): [IFC] Object: []
2.	Design Reviews	[e.g. same as Design Authoring]	[e.g. same as Design Authoring]	[e.g. same as Design Authoring]
3.	Drawing Generation (Drawing Production)	[e.g. same as Design Authoring]	[e.g. same as Design Authoring]	Drawing (Model) (Native): [] Drawing (Read-only): [e.g. PDF]
4.	Existing Conditions Modelling	[]	[]	Point cloud: []
5.	Sustainability Evaluation	[]	[]	[]
6.	Site analysis	[]	[]	GIS model: []
7.	Space Programming	[]	[]	[]
8.	Cost Estimation/ 5D Modelling	[]	[]	5D Model: [] Document: []
9.	Spatial Coordination	[e.g. same as Design Authoring]	[e.g. same as Design Authoring]	[e.g. same as Design Authoring]
10.	Engineering Analysis	[]	[]	[]
11.	Facility Energy Analysis	[]	[]	[]
12.	Building Code Checking and Validation	[]	[]	[]
13.	Phase Planning (4D Modelling)	[]	[]	Model (Native): [] Model (Read-only): [] Video: []
14.	Digital Fabrication	[e.g. same as Design Authoring]	[e.g. same as Design Authoring]	[e.g. same as Design Authoring]
15.	Site Utilisation Planning	[]	[]	[]
16.	3D Control and Planning	[]	[]	[]
17.	3D Construction Coordination	[e.g. same as Design Authoring]	[e.g. same as Design Authoring]	[e.g. same as Design Authoring]

	BIM Use / Deliverable	BIM Software	Version	File Format
18.	Construction System Design	[]	[]	[]
19.	Construction Quality Management	[]	[]	[]
20.	As-Built Modelling for As-Built Information Model (ABIM) and Asset Information Model (AIM)	[]	[]	Model (Native): [] Model (Read-only): [] Model (open format): [IFC] Object: []
21.	Maintenance Scheduling	[]	[]	[]
22.	Project Systems Analysis	[]	[]	[]
23.	Space Management and Tracking	[]	[]	[]
24.	Asset Management	[]	[]	[]
25.	Sales and Marketing	[]	[]	[]
26.	Heritage Information Modelling (HIM)	[]	[]	Model (Native): [] Model (Read-only): [] Model (open format): [IFC] Object: []
27.	Other BIM Uses	[]	[]	[]

or equivalent, the Consultant shall demonstrate the compatibility between alternative software and the above-required software.

2. Free compatible standalone BIM viewers for viewing the deliverables according to project specific EIR for BIM.

BIM Use / Deliverable	BIM Viewer	Version
To be specified by Appointed Party	[]	[]

3. A list of hardware (computers and accessories) to be deployed in the project that shall be procured by the Appointed Party for the Appointing Party.

Hardware	Description	Quantity	Ownership of the Hardware
e.g. Personal Computer	[]	[]	Employer

(Guidance Note: Appointing Party shall specify if any hardware that shall be procured by the Appointed Party for the Appointed Party. Guideline for BIM modelling computer may refer to the Publication Resources on the CIC BIM Portal:

https://www.bim.cic.hk/en/resources/publications)

(Guidance Note: CIC promotes product/software neutral, it is inadequate to indicate any specific software names / brands in the tables above.)

11. BIM Standards and Guidelines

(Guidance Note: The BIM Standards and Guidelines listed below shall be selected and referred from the project specific EIR by the Appointing Party to fit the specific project needs. BIM Standards and Guidelines issued by the CIC are recommended as mandatory.)

1. Building Information Modelling Standards - General, August 2019, by the CIC;
2. Building Information Modelling Standards - General, version 2 - December 2020, by the CIC;
3. Production of BIM Object Guide – General Requirements, August 2019, by the CIC;
4. Building Information Modelling Standards for Mechanical, Electrical and Plumbing, August 2019, by the CIC;
5. Building Information Modelling Standards for Underground Utilities, August 2019, by the CIC;
6. Guidelines for Using Building Information Modelling in General Building Plans Submission, 2019, by Buildings Department of the HKSARG;
7. Technical Circulars (Works) on Adoption of Building Information Modelling, by Development Bureau of the HKSARG;
8. Building Information Modelling for Asset Management (BIM-AM) Standards and Guidelines, version 2.0, 2019, by the Electrical and Mechanical Services Department;
9. ISO 19650-1:2018: Organization and digitization of information about buildings and civil engineering works, including building information modelling (BIM) -- Information management using building information modelling -- Part 1: Concepts and principles, edition 1, December 2018, by the International Organization for Standardization;
10. ISO 19650-2:2018: Organization and digitization of information about buildings and civil engineering works, including building information modelling -- Information management using building information modelling -- Part 2: Delivery phase of the assets, edition 1, December 2018, by the International Organization for Standardization;
11. ISO 19650-3:2020: Organization and digitization of information about buildings and civil engineering works, including building information modelling (BIM) — Information management using building information modelling — Part 3: Operational phase of the assets, edition 1, July 2020, by the International Organization for Standardization;
12. ISO 19650-5:2020: Organization and digitization of information about buildings and civil engineering works, including building information modelling (BIM) — Information management using building information modelling — Part 5:

Security-minded approach to information management, edition 1, June 2020, by the International Organization for Standardization;

13. CIC BIM Standards for Preparation of Statutory Plan Submissions such as Superstructure Plan;
14. Common Spatial Data Infrastructure requirements, Open Geospatial Consortium Standards CityGML and specifications, or the like published / released from the Works Departments of the HKSARG from time to time;
15. Building Information Modelling (BIM) Guide for Building Services Installation (Version 1.1) issued by Building Services Branch, Architectural Services Department; and
16. BIM Guide for Facilities Upkeep (version 1.2) issued by Property Services Branch, Architectural Services Department;

12. References

- DevB Construction Specification Template for BIM (v1.9.1)
- DevB Consultancy Brief Template for BIM (v1.9.1)

13. Acknowledgement

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- Drainage Services Department
- Electrical and Mechanical Services Department
- Greater Bay Area Institute of Urban Architecture
- Highways Department
- Hong Kong Alliance of Built Asset & Environment Information Management Associations
- Hong Kong Construction Sub-contractors Association
- Hong Kong General Building Contractors Association
- Hong Kong Housing Authority
- Hong Kong Housing Society
- Hong Kong Institute of Acoustics
- Hospital Authority
- Lands Department
- MTR Corporation Limited
- Planning Department
- Real Estate Developers Association of Hong Kong
- The Association of Consulting Engineers of Hong Kong
- The Association of Consultant Quantity Surveyors
- The Hong Kong Construction Association
- The Hong Kong Federation of Electrical and Mechanical Contractors Limited
- The Hong Kong Institute of Architects
- The Hong Kong Institution of Engineers

- The Hong Kong Institute of Planners
- The Hong Kong Institute of Surveyors
- The Hong Kong Institute of Building Information Modelling
- The Hong Kong Institute of Utility Specialists
- The Hong Kong Registered Contractors Association
- The Hong Kong University of Science and Technology
- Urban Renewal Authority
- Water Supplies Department

The CIC thanks all stakeholders who have participated in the Stakeholders Engagement Consultation and offered opinions.

14. Member List of the Task Force on BIM Specifications and Agreement

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Ir Rocky POON (Co-Chairperson)	Chairperson of Committee on Construction Business Development
Sr Stephen LAI (Former Co-Chairperson)	
Mr. Marcin KLOCEK Chairperson of Task Group 1 (BIM Specifications)	MTR Corporation Limited
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Appendix 1 CIC BIM Sample Project EIR for Planning & Design Stages

Appendix 2 CIC BIM Sample Project EIR for Construction Stage

CONSTRUCTION INDUSTRY COUNCIL
建造業議會

BIM

Appendix 1

CIC BIM
Sample Project EIR for Planning & Design Stages

(in line with ISO 19650)
December 2020

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Document Revision Tracking

Issue Date	Notes
December 2020	First Publication

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Introduction

Building Information Modelling (BIM) is a process of generating and managing building information during the planning, design, construction, operation and maintenance stages of a building or an asset throughout its life cycle.

The Exchange Information Requirements (EIR) set out the managerial, commercial and technical aspects of information delivery. (Ref: Section 2.5 of BIM Standards – General (Version 2, December 2020).

As stipulated in the CIC BIM Exchange Information Requirements, the clauses in the BIM Exchange Information Requirements are developed to be generic and project-neutral. The more detailed and project-specific requirements are provided in the sample(s) of Project Exchange Information Requirements (EIR) for BIM adoption as part of project requirements.

This sample of Project EIR is for reference only. Users may make reference to this sample, as they customise the Standard EIR Template for their specific project application, adjust or amend the contents to satisfy their purposes and needs. Assumptions for project particulars given below serve to illustrate the type and scope of project nature and complexity.

Project Particulars for Project X

Project Stages: Planning and Design
Building Type: New development of residential / office / commercial building
Scale and Complexity: Single tower; <10,000m2 GFA
Project Duration: Approx.18 – 36 months
Project Estimate: >$30M
Appointing Party: Company ABC
Appointed Party: XYZ Architectural Design Consultant

Exchange Information Requirement (EIR) for BIM Adoption

Appointed Party shall adopt BIM for the planning and design of Project X, ensure all deliverables are in full compliance with the Clauses of this EIR to achieve the objective to the satisfaction of the Appointing Party.

Appointed Party shall cooperate and work closely with other project parties and the Appointing Party and its's representatives to ensure that the works and deliverables are in full compliance with the specified requirements of BIM and that the deliverables are submitted on time, high quality and within budget. Appointed Party is required to resolve any discipline-based and interdisciplinary conflicts in the BIM models and ensure the BIM models are accurate and verified.

The deliverables shall include the following items while technical requirements shall refer to the CIC BIM Exchange Information Requirements Template.

1. BIM Personnel

1.1 Roles and responsibilities of BIM personnel

There are commonly two key roles in a project with BIM adoption namely BIM Manager and BIM Coordinator. BIM Manager(s) and BIM Coordinator(s) shall carry out the responsibility and authority as described in the Section 3 of the CIC BIM Standards - General.

1.2 Qualifications of BIM Personnel

Following are the qualification requirements of BIM Manager(s) and BIM Coordinator(s).

Role	Qualification
BIM Manager	1. A valid CIC Certified BIM Manager (CCBM) or satisfy the requirements 2 and 3; 2. Shall either have corporate membership of an appropriate professional institution or shall have a minimum of five years relevant post-qualification experience plus university degree or equivalent in an appropriate architectural, engineering, surveying, building or construction-related discipline; and 3. Shall have a minimum of three years of practical experience in management of BIM projects.
Discipline-specific BIM Coordinators : Architectural	1. A valid CIC Certified BIM Coordinator (CCBC) or satisfy the requirements 2, 3 and 4; 2. A diploma (or equivalent) in Qualifications Framework (QF) Level 4 or above qualification in architecture, engineering, surveying, building or construction; 3. Shall have a minimum of three years related construction project experience; and 4. Shall have a minimum of one year practical experience in BIM projects; and completed at least one (1) CITF pre-approved BIM training course or possess at least one (1) BIM software certificate.

2. Common Data Environment (CDE)

2.1 CDE Implementation

2.1.1 CDE implementation methodology shall be stated in the BIM Execution Plan. Its functional and process requirements and handover procedure shall refer to the relevant section of CIC BIM Standards – General.

2.1.2 A CDE shall be implemented within one month by the Appointed Party upon the approval of the Appointing Party, and be utilised throughout the project stages specified by the Appointing Party.

2.1.3 Individual login accounts with appropriate permissions for each person using the CDE shall be provided to the involved project parties i.e. Appointing Party and Appointed Parties (Consultant(s) and Contractor(s)).

3. BIM Contractual Documents

The document details will cover the information management process in stages of Planning and Design Stages.

For the required contents and deliverables shall refer to the Section 3 in the CIC BIM Standards - General.

Pre-Appointment BEP Content (Tender stage)

3.1.1 Project information (Project particulars);

3.1.2 Proposed Information Management Functions (commonly known as Roles);

3.1.3 BIM goals, Uses & Deliverables;

3.1.4 Proposed organisation structure and Delivery Team composition;

3.1.5 Proposed names and resumes of individuals to undertake information management functions;

3.1.6 Delivery Team Capability and Capacity Assessment;

3.1.7 Proposed Information Delivery Strategy;

3.1.8 Proposed EIR Strategy;

3.1.9 Proposed Project Information Standards (formerly / commonly known as standards on BIM Procedures);

3.1.10 LOD Responsibility Matrix;

3.1.11 Proposed Federation Strategy;

3.1.12 Proposed Project information production methods and procedures;

3.1.13 Goals for collaborative production;

3.1.14 Proposed Mobilisation plan; and

3.1.15 Proposed Schedule of software (including versions), Hardware, CDE and IT infrastructure.

BEP Content

3.2.1 Project information (Project particulars);

3.2.2 Project information functions (formerly / commonly known as Roles and Contacts);

3.2.3 Information delivery strategy;

3.2.4 BIM goals, uses & deliverables;

3.2.5 Information Management Assignment Matrix;

3.2.6 Project Information Standards (formerly / commonly known as standards on BIM Procedures);

3.2.7 Project Information Production Methods and Procedures (formerly / commonly known as BIM Procedures);

3.2.8 Federation Strategy (formerly / commonly known as Model Division);

3.2.9 Security Strategy to fulfilling the SIR

3.2.10 High and Detail Level Responsibility Matrix (formerly / commonly known as BIM Organisation Chart); with defined roles, responsibilities and authority;

3.2.11 BIM Team Resources, Competency and Training;

3.2.12 Mobilisation Plan (formerly / commonly known as standards on resources planning / work planning);

3.2.13 Master Information Delivery Plan (MIDP);

3.2.14 BIM Deliverable Schedule (Programme);

3.2.15 Spatial Coordination Process (formerly / commonly known as BIM Coordination and Clash Detection);

3.2.16 Software, Hardware, CDE, hardware and IT Infrastructure; and

3.2.17 Quality assurance – BIM auditing

4. Deliverables

(Guidance Note: Appointing Parties shall consider carefully when making reference of this sample of Project EIR for BIM, and adjust or amend the contents to satisfy their purposes and needs. For BIM Uses, there are BIM Uses relatively new to the industry (include all BIM Uses in Planning Stage, BIM Uses 'Sustainability Evaluation' and 'Digital Fabrication' in Design Stage. Appointing Parties shall take into account criteria including but not limited to the capability of project team, project timeframe, resources and budgets for the adoption of the relatively new BIM Uses mentioned above.)

4.1 Design Authoring

1	Each design discipline shall carry out its own design in BIM models with Geometries and alphanumerical Information as per Level of Information Need at particular project stage.
2	Each discipline shall audit its own discipline model before Information Exchange with other disciplines.
3	All models produced shall comply with specified BIM Standards and BIM Execution Plan.

4.2 Design Review

1	a. Procedure of design review; b. Design review report; c. Procedure of issue management / tracking and reporting using BIM; and d. Methodology of linking Requests for Information (RFIs) to BIM and producing log sheets of RFI.
2	Design reviews shall be carried out by the Appointed Party using: a. Rendered still shots; b. Animations; and c. Interactive flythrough and walkthrough visualization.
3	Digital issue management process shall be implemented during design review.

4.3 Drawing Generation (Drawing Production)

(a) Statutory Submission

1	Produce Statutory plan submission (generated from BIM models0 a. General Building Plan; b. Superstructure Plan; c. Foundation Plan; d. Excavation and Lateral Support (ELS) Plan; e. Ground Investigation Plan; f. Demolition Plan (included Hoarding); and g. Drainage Plan.
2	The Appointed Party shall demonstrate using BIM that the following items are compliant with the statutory requirements of Planning Department, Buildings Department and Lands Department a. Fundamental checking in accordance with the provisions of Buildings Ordinance and allied regulations, and relevant Practice Notes for Authorized Persons, Registered Structural Engineers and Registered Geotechnical Engineers or relevant Joint Practice Notes issued by the Authorities; b. Checking of planning requirements under the Town Planning Ordinance stipulated in outline zoning plans and / or planning approval conditions; c. Checking of development / planning restrictions, including but not limited to gross floor area, building heights, no. of storeys, absolute height of building, etc.; d. Checking of means of escape and means of access; e. Checking of sanitary fitment provision; f. Checking of fire compartment and fire resisting construction;

	g. Checking of building bulk and separation; and h. Checking of the material settings and descriptions according to the specifications.

(c) Tender drawings and working drawings

1	Produce tender drawings and working drawings including amendments and design change instructions: a. General layout plans; b. Schedules; List of schedules c. Blow up sections / elevations; d. Details and schedule of drawings; and e. MEP Design drawings and Equipment schedules.

4.4 Spatial Coordination

The 3D coordination process shall include but not be limited to the checks for spatial and headroom requirements, clashes, working spaces for building operations and maintenance activities, installation and replacement of equipment and machines.

1	Provide clash reports to include the following: a. Specification of clash analysis process and assumptions on element tolerances, areas and elements; b. Design conflicts, clashes and design errors identified, categorised, prioritised; c. Resolution result summary.

5. Quality Assurance

(Guidance Note: This Clause elaborates on the documents submission upon quality control to ensure appropriate checks on information, data accuracy, models and documents.)

5.1 Quality Assurance Plan

Quality Assurance plan shall be included as part of the project information production methods and procedures in the BIM Execution Plan, outlining the quality assurance for the BIM process, BIM compliance and asset attributes checking. Quality Assurance Plan for BIM shall be established to ensure appropriate quality control on information and data accuracy.

The quality control Deliverables or Chapters to be included in the Quality Assurance Plan shall include the following contents:

a. Model compliance checking procedure and report according to the BIM Standards, methods and procedures which are stated in the BIM Execution Plan;
b. Clash analysis procedure and clash analysis reports; and
c. Asset Information Model (AIM) validation procedure and report;

5.2 Design validation

Design validation shall be performed among concerned stakeholders such as design consultants, Appointing Party, relevant Government departments to provide their

feedbacks to validate multiple design aspects by reviewing the models. The deliverables shall include the following:

a. Design validation procedure; and
b. Design validation report.

5.3 Compliance check of project Deliverables

Compliance check of the Deliverables shall be done before every submission by:

a. The BIM personnel of the appointed party working on the project; and
b. Other BIM personnel of the appointed party independent from the project team.

Irrespective of the checking parties selected above, the deliverables shall include the following:

a. Procedure of model compliance checking; and
b. Model compliance checking report.

6. Handover of Project Deliverables

Upon completion of the Planning and Design Stages, all deliverables according to project specific EIR for BIM shall be transferred and handed over to the Appointing Party, it shall include the following items and any other items as required in the Contract:

1. Schedule / List of deliverables
2. Transmittal
3. Deliverables including BIM stored in a medium agreed with the Appointing Party

7. BIM Models Management

The BIM models shall be built and developed for the following disciplines:

a. Architecture

7.1 Federated Model

Model federation strategy shall be defined in the BIM Execution Plan and models federated according to this strategy shall be used as discussion media during the regularly scheduled design coordination / project progress meetings. To facilitate and manage the project's federated models the Appointed Party shall submit the following documents:

a. Model federation strategy and standards;
b. Project zoning strategy and standards; and
c. Technical requirements for the individual models to be federated: Maximum file size for each native file is restricted to 500MB.

7.2 Level of Information Need

The Level of Information Need to be adopted shall refer to the latest CIC BIM Standards – General and Appointing Party's standards shall be appended to the EIR.
Based on the project brief and Exchange Information Requirements (this document) the Level of Information Need produced by the Appointed Party shall take into account that the **Purpose** of why information is needed.

8. BIM Objects

8.1 Deliverables

The following deliverables shall be submitted upon the completion of design stage and construction stage respectively for the approval of the Appointing Party:

1. Library of BIM objects used in the BIM models organised and categorised according to the US OmniClass classification system.

2. BIM objects sheets for all BIM objects used in the BIM models prepared according to the standard template provided by the Appointed Party and approved by the Appointing Party.

9. Training

9.1 Training Objectives

Unless all project participants are fully conversant with BIM, the training courses aim to enable the project participants to create, view, use and manipulate the BIM models and the deliverables according to project specific EIR for BIM in a systematic and effective manner and enable the project participants to deliver the required BIM Uses.

9.2 Training Preparation and Deliverables

a. A detailed BIM training plan shall be developed and provided by the Consultant for the approval of the Appointing Party.

b. BIM training curriculums with details of each training course shall be developed and provided by the Consultant for the approval of the Appointing Party.

c. Training venue shall be provided by the Consultant for the approval of the Appointing Party before the training. Each attendee shall be provided with a workstation with necessary BIM authoring software and tools and licenses for efficient hands-on exercise during the training.

d. Training Log sheet for the BIM training course shall be submitted to the Appointing Party for record after completion of the training courses. The training log shall list out the course information, including but not be limited to, description of the training course, date, duration, venue and attendee's name and position. The list of contents of the training log shall be commented and agreed by the Appointing Party. The training log shall be reviewed and updated.

e. Video recording of the training course shall be provided by the Consultant for the approval of the Appointing Party

9.3 Project Training Requirement

a. In the early design stage, within three months from the commencement of the consultancy agreement, project training course curriculum and materials shall be provided to the project team including the Appointing Party's staff and the design consultants to demonstrate the information retrieval from the selected BIM

authoring software, tools and CDE and the implementation of BIM standards, workflow and processes such as design coordination.

b. BIM auditing items and methodology in compliance with the CIC BIM Standard – General.

c. In the early construction stage, within three months from the commencement of the construction contract, project training course shall be provided to the project team including the Contractor to deliver the similar contents as stipulated in point 1 above.

d. Upon the completion of Planning and Design Stages and handing over of the final BIM deliverables, training courses that cover information retrieval from the selected BIM authoring software, tools and CDE shall be provided to the Appointing Party.

e. Training assessments shall be made and collected for revising the training materials and for the preparation of the next training classes.

9.4 Personnel Training Requirement

1. The Consultant is required to nominate his staff or sub-consultant's staff to attend, within six months from the commencement of the Assignment / Contract, suitable BIM skill training courses under the pre-approved list of the Construction Innovation and Technology Fund (CITF) managed by the CIC and ensure their successful completion of the attended training courses. The required numbers of personnel to attend and complete suitable BIM skill training courses under the pre-approved list of the CITF (https://www.citf.cic.hk/) are:

    - Four staff members of the Consultant / Contractor
    - Four staff members of the engaged sub-consultant(s) / sub-contractor(s)

2. In case there are sub-consultant(s) in the Assignment / Contract, an appropriate number of staff member from the sub-consultant(s) shall attend the BIM training courses.

3. In case the nominated staff members fail to complete the BIM training course, the Consultant / Sub-consultant shall arrange additional BIM training courses to its staff members to fulfil the contract requirements at their own cost.

10. Hardware and Software Requirement

10.1 Hardware and Software requirements

1. The hardware and software to be used shall enable the project participants to deliver the required BIM Uses in a productive and efficient manner. The specification and functional performance of the hardware shall refer to the requirements of the software to be adopted in the project.

2. All deliverables according to project specific EIR for BIM shall comply with the software versions approved by the Appointing Party during the contract period and at the time of delivery. The Consultant(s) and Contractor(s) shall indicate the cost in their tender submissions if any upgrade of the software is needed during the contract period. The software with specific versions necessary for the production of different deliverables according to project specific EIR shall be indicated in the BIM Execution Plan.

10.2 File Format and Interoperability

1. The BIM authoring software for the project shall support open format (include import and export).

2. BIM models shall be submitted in

   a. editable format native of the BIM authoring application used for the project
   b. open format: Industry Foundation Classes (.IFC)

10.3 Deliverables

The Deliverables shall include but not be limited to the following:

1. A list of software, their purpose (refer to specific BIM Uses), version and file format.

	BIM Use / Deliverable	**BIM Software**	**Version**	**File Format**
4.1	Design Authoring	[]	[]	Model (Native): [] Model (Read-only): [] Model (open format): [IFC] Object: []
4.2	Design Reviews	[same as Design Authoring]	[same as Design Authoring]	[same as Design Authoring]
4.3	Drawing Generation (Drawing Production)	[same as Design Authoring]	[same as Design Authoring]	Drawing (Model) (Native): [] Drawing (Read-only): [PDF]
4.4	Spatial Coordination	[same as Design Authoring]	[same as Design Authoring]	[same as Design Authoring]

   or equivalent, the Consultant shall demonstrate the compatibility between alternative software and the above-required software.

2. Free compatible standalone BIM viewers for viewing the deliverables according to project specific EIR for BIM.

BIM Use / Deliverable	BIM Viewer	Version
To be specified by Appointed Party	[]	[]

3. A list of hardware (computers and accessories) to be deployed in the project that shall be procured by the Appointed Party for the Appointing Party.

Hardware	Description	Quantity	Ownership of the Hardware
Personal Computer	[]	[]	Appointing Party

(Guidance Note: Appointing Party shall specify if any hardware that shall be procured by the Appointed Party for the Appointed Party. Guideline for BIM modelling computer may refer to the Publication Resources on the CIC BIM Portal: https://www.bim.cic.hk/en/resources/publications)

(Guidance Note: CIC promotes product/software neutral, it is inadequate to indicate any specific software names / brands in the tables above.)

11. BIM Standards and Guidelines

The mandatory BIM Standards and Guidelines to be adopted in the project shall include the following:

1. Building Information Modelling Standards - General, version 2 - December 2020, by the CIC;
2. Production of BIM Object Guide – General Requirements, August 2019, by the CIC;
3. Building Information Modelling Standards for Mechanical, Electrical and Plumbing, August 2019, by the CIC;
4. Building Information Modelling Standards for Underground Utilities, August 2019, by the CIC;
5. Guidelines for Using Building Information Modelling in General Building Plans Submission, 2019, by Buildings Department of the HKSARG;
6. ISO 19650-1:2018: Organization and digitization of information about buildings and civil engineering works, including building information modelling (BIM) -- Information management using building information modelling -- Part 1: Concepts and principles, edition 1, December 2018, by the International Organization for Standardization;
7. ISO 19650-2:2018: Organization and digitization of information about buildings and civil engineering works, including building information modelling -- Information management using building information modelling -- Part 2: Delivery phase of the assets, edition 1, December 2018, by the International Organization for Standardization; and
8. CIC BIM Standards for Preparation of Statutory Plan Submissions such as Superstructure Plan.

CONSTRUCTION INDUSTRY COUNCIL
建造業議會

BIM

Appendix 2

CIC BIM
Sample Project EIR for Construction Stage

(in line with ISO 19650)
December 2020

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2	Design reviews shall be carried out by the Appointed Party using: *(Select appropriate items from the list below)* a. Rendered still shots; b. Animations; c. Interactive flythrough and walkthrough visualisation; d. Real-time high definition rendering (photo realistic), user interactions and simulations; and e. Virtual mock-ups.
3	Digital issue management process shall be implemented during design review.

4.3 Drawing Generation (Drawing Production)

(a) Statutory Submission

1	Produce Statutory plan submission (generated from BIM models) a. Curtain Wall Plan; b. Application for Water Supply; c. Drainage Connection; d. Fire Service Inspection; e. License for Generator; f. Building Energy Efficiency Ordinance; g. License for Fresh Water in Evaporative Cooling Towers; h. Lift & Escalator Inspection; i. Electrical Installation Drawing; j. Transformer Room / LV Switch Room Inspection; and k. Gas Installation.

(b) Construction and Shop drawings

1	a. Produce Combined Services Drawings (CSD); b. Produce Combined Builder's Work Drawings (CBWD); c. Produce Individual Services Drawings (ISD); d. Produce Shop Drawings (generated from BIM models); e. Produce Fabrication Drawings (Verified on Site); and f. Produce As-Built Drawings (Verified on Site).

4.4.17 3D Construction Coordination

1	a. Produce construction stage BIM models to from the design stage federated BIM models for all the relevant Disciplines; b. Build or obtain construction BIM objects from suppliers and manufacturers with actual dimensions, sizes, operation spaces, connections other spatial constraints; c. Organise and chair BIM coordination meetings to report and resolve the coordination issues before construction of the project; d. Perform construction coordination by comparing BIM models and digitally scanned building and system layout arrangement on site. Submit coordination report identifying discrepancies; and e. Organise and chair BIM coordination meetings to resolve or validate coordination issues identified on site.

4.5 As-Built Modelling for As-Built Information Model (ABIM) and Asset Information Model (AIM)

1	Produce As-Built BIM models.
2	Produce As-Built 2D drawings generated from As-Built BIM Models.
3	Verify the site condition against the As-Built BIM models using Inspection; or Photogrammetry; Laser scanning; Produce reports indicating any discrepancies using specified comparing software.
4	Include Asset Information in the As-Built BIM model as specified in the AIR
5	Link textual information / documentations to As-Built BIM as listed below: a. Testing and Commissioning reports; b. Operation and Maintenance manuals; c. Relevant statutory certificates, approval documents and forms (Buildings Department, Planning Department, Lands Department, Water Supplies Department, Fire Services Department, Electrical and Mechanical Services Department); and d. Other textual information subject to agreement of AM and Facilities Upkeep at later stage.
6	Provide a library of all the As-Built BIM models, BIM objects, drawings and documentations.
7	Produce AIMs based on As-Built BIM models

5. Quality Assurance

(Guidance Note: This Clause elaborates on the documents submission upon quality control to ensure appropriate checks on information, data accuracy, models and documents.)

5.1 Quality Assurance Plan

Quality Assurance plan shall be included as part of the project information production methods and procedures in the BIM Execution Plan, outlining the quality assurance for

the BIM process, BIM compliance and asset attributes checking. Quality Assurance Plan for BIM shall be established to ensure appropriate quality control on information and data accuracy.

The quality control Deliverables or Chapters to be included in the Quality Assurance Plan shall include the following contents:

a. Model compliance checking procedure and report according to the BIM Standards, methods and procedures which are stated in the BIM Execution Plan;
b. BIM audit reports;
c. Clash analysis procedure and clash analysis reports;
d. Asset Information Requirement (AIM) validation procedure and report; and
e. As-Built verification such as LiDAR/laser scanning point cloud model.

5.2 Design validation

Design validation shall be performed among concerned stakeholders such as design consultants, Appointing Party, relevant Government departments to provide their feedbacks to validate multiple design aspects by reviewing the models. The deliverables shall include the following:

a. Design validation procedure; and
b. Design validation report

5.3 Compliance check of project Deliverables

Compliance check of the Deliverables shall be done before every submission by:

a. The BIM personnel of the appointed party working on the project;
b. Other BIM personnel of the appointed party independent from the project team; and
c. External BIM Auditor (refer to CIC BIM Standards – General for its role and responsibility).

Irrespective of the checking parties selected above, the deliverables shall include the following:

a. Procedure of model compliance checking; and
b. Model compliance checking report.

6. Handover of Project Deliverables

Upon completion of the Construction Stage, all deliverables according to project specific EIR for BIM shall be transferred and handed over to the Appointing Party, it shall include the following items and any other items as required in the Contract:

1. Schedule / List of deliverables
2. Transmittal
3. Deliverables including BIM stored in a medium agreed with the Appointing Party

7. BIM Models Management

The BIM models shall be built and developed for the following disciplines:

a. Architecture
b. Structure
c. MEP
d. Other disciplines as required by the Appointing Party

7.1 Federated Model

Model federation strategy shall be defined in the BIM Execution Plan and models federated according to this strategy shall be used as discussion media during the regularly scheduled design coordination / project progress meetings. To facilitate and manage the project's federated models the Appointed Party shall submit the following documents:

a. Model federation strategy and standards
b. Project zoning strategy and standards
c. Technical requirements for the individual models to be federated: Maximum file size for each native file is restricted to 500MB.

7.2 Level of Information Need

The Level of Information Need to be adopted shall refer to the latest CIC BIM Standards – General and Appointing Party's standards shall be appended to the EIR.
Based on the project brief and Exchange Information Requirements (this document) the Level of Information Need produced by the Appointed Party shall take into account that the **Purpose** of why information is needed.

8. BIM Objects

8.1 Deliverables

The following deliverables shall be submitted upon the completion of design stage and construction stage respectively for the approval of the Appointing Party:

1. Library of BIM objects used in the BIM models organised and categorised according to the US OmniClass classification system.

2. BIM objects sheets for all BIM objects used in the BIM models prepared according to the standard template provided by the Appointed Party and approved by the Appointing Party.

9. Training

9.1 Training Objectives

Unless all project participants are fully conversant with BIM, the training courses aim to enable the project participants to create, view, use and manipulate the BIM models and the deliverables according to project specific EIR for BIM in a systematic and effective manner and enable the project participants to deliver the required BIM Uses.

9.2 Training Preparation and Deliverables

a. A detailed BIM training plan shall be developed and provided by the Consultant for the approval of the Appointing Party.

b. BIM training curriculums with details of each training course shall be developed and provided by the Consultant for the approval of the Appointing Party.

c. Training venue shall be provided by the Consultant for the approval of the Appointing Party before the training. Each attendee shall be provided with a workstation with necessary BIM authoring software and tools and licenses for efficient hands-on exercise during the training.

d. Training Log sheet for the BIM training course shall be submitted to the Appointing Party for record after completion of the training courses. The training log shall list out the course information, including but not be limited to, description of the training course, date, duration, venue and attendee's name and position. The list of contents of the training log shall be commented and agreed by the Appointing Party. The training log shall be reviewed and updated.

e. Video recording of the training course shall be provided by the Consultant for the approval of the Appointing Party

9.3 Project Training Requirement

a. In the early design stage, within three months from the commencement of the consultancy agreement, project training course curriculum and materials shall be provided to the project team including the Appointing Party's staff and the design consultants to demonstrate the information retrieval from the selected BIM authoring software, tools and CDE and the implementation of BIM standards, workflow and processes such as design coordination.

b. BIM auditing items and methodology in compliance with the CIC BIM Standard – General.

c. In the early construction stage, within three months from the commencement of the construction contract, project training course shall be provided to the project team including the Contractor to deliver the similar contents as stipulated in point 1 above.

d. Upon the completion of the project and handing over of the final As-Built BIM models and deliverables, training courses that cover information retrieval from the selected BIM authoring software, tools and CDE shall be provided to the Appointing Party.

e. Training assessments shall be made and collected for revising the training materials and for the preparation of the next training classes.

9.4 Personnel Training Requirement

1. The Consultant is required to nominate his staff or sub-contractor's staff to attend, within six months from the commencement of the Assignment / Contract, suitable BIM skill training courses under the pre-approved list of the Construction Innovation and Technology Fund (CITF) managed by the CIC and ensure their successful completion of the attended training courses. The required numbers of personnel to attend and complete suitable BIM skill

training courses under the pre-approved list of the CITF (https://www.citf.cic.hk/) are:

- Four staff members of the Consultant / Contractor
- Four staff members of the engaged sub-consultant(s) / sub-contractor(s)

2. In case there are sub-consultant(s) in the Assignment / Contract, an appropriate number of staff member from the sub-consultant(s) / subcontractor(s) shall attend the BIM training courses.

3. In case the nominated staff members fail to complete the BIM training course, the Consultant / Contractor / Sub-consultant / Sub-contractor shall arrange additional BIM training courses to its staff members to fulfil the contract requirements at their own cost.

10. Hardware and Software Requirement

10.1 Hardware and Software requirements

1. The hardware and software to be used shall enable the project participants to deliver the required BIM Uses in a productive and efficient manner. The specification and functional performance of the hardware shall refer to the requirements of the software to be adopted in the project.

2. All deliverables according to project specific EIR for BIM shall comply with the software versions approved by the Appointing Party during the contract period and at the time of delivery. The Consultant(s) and Contractor(s) shall indicate the cost in their tender submissions if any upgrade of the software is needed during the contract period. The software with specific versions necessary for the production of different deliverables according to project specific EIR shall be indicated in the BIM Execution Plan.

10.2 File Format and Interoperability

1. The BIM authoring software for the project shall support open format (include import and export).

2. BIM models shall be submitted in

   a. editable format native of the BIM authoring application used for the project
   b. open format: Industry Foundation Classes (.IFC)

10.3 Deliverables

The Deliverables shall include but not be limited to the following:

1. A list of software, their purpose (refer to specific BIM Uses), version and file format.

	BIM Use / Deliverable	BIM Software	Version	File Format
4.1	Design Authoring	[]	[]	Model (Native): [] Model (Read-only): [] Model (open format): [IFC] Object: []
4.2	Design Reviews	same as Design Authoring]	same as Design Authoring]	[same as Design Authoring]
4.3	Drawing Generation (Drawing Production)	[same as Design Authoring]	[same as Design Authoring]	Drawing (Model) (Native): [] Drawing (Read-only): [PDF]
4.4	3D Construction Coordination	[same as Design Authoring]	[same as Design Authoring]	[same as Design Authoring]
4.5	As-Built Modelling and Asset Information Model	[]	[]	Model (Native): [] Model (Read-only): [] Model (open format): [IFC] Object: []

or equivalent, the Contractor shall demonstrate the compatibility between alternative software and the above-required software.

2. Free compatible standalone BIM viewers for viewing the deliverables according to project specific EIR for BIM.

BIM Use / Deliverable	BIM Viewer	Version
To be specified by Appointed Party	[]	[]

3. A list of hardware (computers and accessories) to be deployed in the project that shall be procured by the Appointed Party for the Appointing Party.

Hardware	Description	Quantity	Ownership of the Hardware
Personal Computer	[]	[]	Appointing Party

(Guidance Note: Appointing Party shall specify if any hardware that shall be procured by the Appointed Party for the Appointed Party. Guideline for BIM modelling computer may refer to the Publication Resources on the CIC BIM Portal: https://www.bim.cic.hk/en/resources/publications)

(Guidance Note: CIC promotes product/software neutral, it is inadequate to indicate any specific software names / brands in the tables above.)

11. BIM Standards and Guidelines

The mandatory BIM Standards and Guidelines to be adopted in the project shall include the following:

1. Building Information Modelling Standards - General, version 2 - December 2020, by the CIC;
2. Production of BIM Object Guide – General Requirements, August 2019, by the CIC;
3. Building Information Modelling Standards for Mechanical, Electrical and Plumbing, August 2019, by the CIC;
4. Building Information Modelling Standards for Underground Utilities, August 2019, by the CIC;
5. Guidelines for Using Building Information Modelling in General Building Plans Submission, 2019, by Buildings Department of the HKSARG;
6. ISO 19650-1:2018: Organization and digitization of information about buildings and civil engineering works, including building information modelling (BIM) -- Information management using building information modelling -- Part 1: Concepts and principles, edition 1, December 2018, by the International Organization for Standardization;
7. ISO 19650-2:2018: Organization and digitization of information about buildings and civil engineering works, including building information modelling -- Information management using building information modelling -- Part 2: Delivery phase of the assets, edition 1, December 2018, by the International Organization for Standardization; and
8. CIC BIM Standards for Preparation of Statutory Plan Submissions such as Superstructure Plan.

CONSTRUCTION INDUSTRY COUNCIL
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CIC BIM Exchange Information Requirements

To improve future editions of this publication, we would be grateful to have your comments.

(Please put a "✓" in the appropriate box.)

1. As a whole, I feel that the publication is:	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
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Comprehensive	❑	❑	❑	❑	❑
Useful	❑	❑	❑	❑	❑
Practical	❑	❑	❑	❑	❑
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