

**BUILDINGS DEPARTMENT**

**THE GOVERNMENT OF THE HONG KONG  
SPECIAL ADMINISTRATIVE REGION**

**TENDER FOR**

**PROVISION OF SERVICES FOR  
IMPLEMENTATION OF TOOLS TO  
FACILITATE AUTOMATED CHECKING ON  
GENERAL BUILDING PLAN SUBMISSION IN  
BUILDING INFORMATION MODELLING FORMAT**

**Tender Reference: 27/BD/2023**

**PART 3A  
SERVICE SPECIFICATIONS**

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## 1. Introduction

- 1.1 Tenderers are invited to bid for the provision of the services specified in this Service Specifications for developing Building Information Modelling (BIM) automated checking tools and standard templates for two native BIM software, i.e. Autodesk Revit (Revit) and Graphisoft ArchiCAD (ArchiCAD) for general building plan (GBP) submission to facilitate the demonstration of compliance with the safety and health standards under the Buildings Ordinance (BO) (hereafter called “**the Project**”).
- 1.2 All requirements in this Service Specifications are mandatory requirements unless otherwise specified. Tenderers shall propose, include and incorporate in their proposals ALL mandatory items and services unless otherwise specified, and shall be wholly responsible for all items and services offered. The Government reserves the right to accept all or any part of the proposed items or services from Tenderers.
- 1.3 Tenderers shall propose and provide a complete and total solution for the successful implementation of the Project. Tenderers shall propose the automated checking tools and standard templates with applicable algorithm, architecture, functionality and user interface, complying with the requirements as specified in this Service Specifications.
- 1.4 It is the responsibility of the Contractor to identify, study, analyse, ascertain, review, clarify and confirm user requirements as well as the technical solution with the Government.
- 1.5 The Contractor shall be the prime contractor and supplier for all products and services offered, and shall be fully responsible for the overall project management and coordination of the design, development, delivery, installation, documentation, acceptance testing, system support, maintenance, training and provision of other related services for the delivery of the services specified in Clause 4 of this Service Specifications.
- 1.6 The Contractor shall be the single point of contact and responsible for coordinating with its sub-contractors, other contractors of the Government and Government project teams for the implementation, system support and maintenance of the automated checking tools and standard templates.

## 2. Background

### 2.1 Preparation of GBP for Buildings Department Submission

- 2.1.1 Atop the architectural design drawings, GBP submission often involves large amount of calculations, schedules and diagrams to demonstrate compliance with the standards on development density, safety, health and environment under the BO and allied regulations.
- 2.1.2 Digital transformation of the GBP preparation and checking processes could greatly save the manual effort in handling and verifying the accuracy of the information or data involved and thus enhance the efficiency and quality. In this connection, the Buildings Department (BD) considers it is essential to codify the relevant checking logics and develop automated checking tools using BIM platform and technology to facilitate GBP preparation and checking.

### 2.2 Adopting BIM for Preparation of Statutory Plans for Submission to BD

- 2.2.1 By PNAP ADM-19 subsequently promulgated in September 2019, BD accepts the use of BIM software including Revit and ArchiCAD for calculating floor areas of buildings in the preparation of GBP. At the same time, the Guidelines for using BIM in GBP Submission 2019 (BD BIM Guidelines) was published to provide general guidelines to facilitate AP and BIM practitioners to adopt BIM technology in the preparation of GBP, and recommend good practices for the enhancement of BIM submission standard on GBP.
- 2.2.2 Practice Note for Authorized Persons, Registered Structural Engineers and Registered Geotechnical Engineers (PNAP) ADV-34 promulgated in September 2016 encourages Authorized Persons (AP), Registered Structural Engineers and Registered Geotechnical Engineers to consider adopting BIM in their private building projects under the BO. The practice note provides general guidelines on BIM submissions for building proposals as supplementary information to facilitate plan processing by BD.
- 2.2.3 To facilitate checking of different floor areas in the digital GBP prepared in BIM format, BD and Lands Department have jointly commissioned a BIM consultant to develop a common area calculation methodology and automated plug-in checking tools and software templates of 2 native BIM software (i.e. Revit and ArchiCAD) to streamline the extraction and checking of gross floor area (GFA), site coverage (SC), usable floor area (UFA) and usable floor space (UFS) against requirements under the BO and lease conditions. The automated checking plug-in tools and software templates (hereafter called the “**Area Tools**” and “**Templates**” respectively) are expected to be completed by Q1 2024. They have the following essential elements / functions:

<b>Area Tools (Revit &amp; ArchiCAD)</b>	<ul style="list-style-type: none"> <li>• Automated extraction and computation of BIM data for GFA, SC, UFA and UFS calculations</li> <li>• Built-in processing logics for automated checking of 38 items of GFA concession</li> <li>• Compilation of storey schedule, flat/room schedule and carpark schedule</li> <li>• Compilation of sanitary fitment schedule</li> <li>• Checking results and schedules presented in Excel format</li> </ul>
<b>Revit Template</b>	<ul style="list-style-type: none"> <li>• Pre-defined parameters for systemic input of BIM data for extraction by the Area Tools</li> <li>• Built-in schedules with same format as those generated by the Area Tools</li> <li>• Automatic plan colouring according to BD's colour coding system</li> </ul>
<b>ArchiCAD Template</b>	<ul style="list-style-type: none"> <li>• Pre-defined parameters for systemic input of BIM data for extraction by the Area Tools</li> </ul>

- 2.2.4 As to encourage wider and fuller use of BIM in the preparation of GBP, BD would like to develop additional plug-in tools for automated checking of compliance with the requirements stipulated in the Code of Practice for Fire Safety in Buildings 2011 (June 2023 Edition) (FS Code) on the provisions of means of escape (MOE), means of access (MOA) and fire resisting construction (FRC) and to enhance the functionality of the Templates mentioned in Clause 2.2.3 above.

### 3. Objectives

- 3.1. To develop automated checking plug-in tools in latest version of two native BIM software (i.e. Revit and ArchiCAD) with built-in processing logics for automatic identification, extraction and computation of BIM data for checking and demonstrating compliance with the requirements stipulated in the FS Code on the provisions of MOE, MOA and FRC (hereafter called the “**Checking Tools**”).
- 3.2. To enhance the functionality of the Templates mentioned in Clause 2.2.3 above by creating and incorporating additional pre-defined parameters, families, library components, objects and elements to enable systemic input of BIM data for identification, extraction, computation and reporting by the Checking Tools (hereafter called the “**Enhanced Templates**”).

## 4. Service Requirements

### 4.1 Introduction

- 4.1.1 The Contractor shall provide the implementation services according to the requirements specified in this Service Specifications covering the development of methodologies for deriving the Checking Tools and required schedules in Revit and ArchiCAD; development of the Checking Tools; preparation of the Enhanced Templates; preparation of user operation and installation instructions; updating of the BD BIM Guidelines and data / parameters / attributes of sample BIM models provided by BD; user acceptance test (UAT) and training; provision of source codes, so as to ensure the smooth implementation of the Project.
- 4.1.2 The Contractor shall provide project management service as specified in Clause 5 of this Service Specifications so as to ensure the smooth implementation of the Project. The Contractor shall closely coordinate and communicate with the Project Steering Committee (PSC) and the Project Assurance Team (PAT) formed by BD, relevant government departments and institutions who will steer, supervise and monitor the development of the Checking Tools and Enhanced Templates from the project inception until completion of the contract.

### 4.2 Task 1 – Development of Methodologies

- 4.2.1 The Contractor shall design and develop the methodologies for deriving the Checking Tools and required schedules in Revit and ArchiCAD (hereafter called “**the Methodologies**”). The Checking Tools shall be able to check the items in column (A) in Table 4.1 for a building proposal submitted in BIM format to demonstrate compliance with the requirements as specified in column (B) of the table, and to report the extracted raw data and checking results in the form of schedules in Excel format compatible to that generated by the Area Tools mentioned in Clause 2.2.3 above. The Contractor shall propose the most efficient and viable approach for acceptance of the Government Representative (GR), which shall include but not limited to the following:
- (a) Parameter setting for data input;
  - (b) Methodology to compute the requirements under the FS Code such as numbers and width of required staircase/escape route taking into account of various factors including but not limited to use classification, UFA/UFS and occupancy in actual counting;
  - (c) Methodology to define, count and retrieve information of actual provision (including but not limited to developing families and library components/objects) and compare such with the requirements under the FS Code;
  - (d) Standard schedules for compliance checking and presentation in calculation sheets of digital GBP submission in BIM format;
  - (e) Methodology to generate maximum distance in floor plans of a BIM model for the purpose of demonstrating compliance with items (3),

- (4) and (8) in Table 4.1 and presentation in digital GBP submission in BIM format;
- (f) Methodology to define and generate the length of street frontage and major façade for determining compliance with item (9) in Table 4.1 and presentation in calculation sheets of digital GBP submission in BIM format; and
- (g) Methodology to allow data and checking results that appear in the standard schedules in Excel format as mentioned in this Clause 4.2.1 to be imported by batch as the schedules of the GBP submission in Revit format through free Revit plug-in such as DiRoots, including but not limited to defining the name and scope of the standard Excel schedules.

**Table 4.1 – Scope of Compliance Checking**

(A) Items to be checked	(B) Corresponding requirements under the FS Code
<b>MOE</b>	
(1) MOE table on number and width of exit doors and exit routes required and provided against occupant capacity of each room / fire compartment / storey	Clauses B4.1, B7.1 & B8.1 and Tables B1, B2 & B5
(2) Discharge value table on discharge value of required staircases against total occupant capacity served by the required staircases	Subsection B12 and Tables B3 & B4
(3) Dead-end travel distance and travel distance	Clauses B11.2, B11.3(a) & B11.7
(4) Minimum and maximum separations between 2 required staircases; and maximum separations between 2 discharge points	Clause B10.2(b) & B11.3(b)
<b>FRC</b>	
(5) Compartment area and volume checking	Clauses C4.1, C4.3, C7.1, C13.1, C14.1 & Table C1
(6) FRC Table on fire resistance rating (FRR) required taking into account of the results of item (5) above.	
<b>MOA</b>	
(7) Required and provided number of fireman’s lifts / firefighting & rescue stairway (FRS) against building type	Clause D3.1 and Table D1
(8) Maximum distance from lobby of fireman’s lift / FRS	Clauses D8.4 and D15.6

(A) Items to be checked	(B) Corresponding requirements under the FS Code
(9) Provision of emergency vehicular access (EVA) (calculation of percentage of major façade served by EVA only)	Clauses D22.2, D22.3, D23.2 and D23.3

**Note 1:** Built-in parameters in relation to UFA/UFS calculations in the Templates mentioned in Clause 2.2.3 above shall be utilised in developing the processing logics.

4.2.2 The Methodologies shall be able to identify, retrieve, compute and distinguish the required data / information from individual components / items / objects from the BIM models with Level of Development (LOD) in line with the BD BIM Guidelines or Level of Information Need (LOIN) as defined under Construction Industry Council (CIC) BIM Standards General Version 2.1 - 2021 for performing the required compliance checking.

4.2.3 The Methodologies shall fully utilise the standardised parameters, families, library components, objects and elements developed in the Area Tools and Templates whenever practicable and shall include proposal for development of additional parameters, families, library components, objects and elements that are necessary and sufficient for data input, extraction and computation for compliance checking by the Checking Tools on the provisions of MOE, MOA and FRC for the scope specified in Table 4.1 above.

4.2.4 The Methodologies shall be developed to cater for multiple towers developments under separate / linked BIM models.

4.2.5 The Methodologies shall be compatible with the BIM software as specified in Clause 4.5.3 below for both Revit and ArchiCAD.

4.2.6 In developing the Methodologies, the Contractor shall:

- (a) Study all prevailing and relevant provisions on the requirements on MOE, MOA and FRC under the FS Code, PNAPs and Notes of Meetings provided by the GR;
- (b) Study the prevailing BIM standards, guidelines, templates and BIM-related documents issued by the Development Bureau (DevB), Hong Kong Housing Authority (HKHA), Construction Industry Council (CIC), BD and relevant government departments to ensure that the Checking Tools, Enhanced Templates and standards being developed for 3D modelling under this Contract are compatible / in line with common local practices and the standards and guidelines issued by these parties;
- (c) Study the Area Tools and the Templates mentioned in Clause 2.2.3 above; and
- (d) Study and make reference to the format of relevant schedules / tables / calculation sheets in a typical GBP submission to derive the format



of the Excel schedules required in Clause 4.2.8(c) below.

- 4.2.7 The Contractor shall deliver comprehensive documentation for describing the Methodologies for the GR's acceptance.
- 4.2.8 The Contractor shall deliver the following documentations for the GR's acceptance:
- (a) An outline of the Methodologies required to be formulated under Clause 4.2 with diagrammatic illustration showing how the checking results would be presented in the calculation sheets and/or floor plan of the native BIM file;
  - (b) A full list of additional parameters, families, library components, objects and elements to be developed for data input, extraction and computation for compliance checking by the Checking Tools; and
  - (c) The proposed format of Excel schedules to be generated by the Checking Tools. The format shall be compatible with that generated by the Area Tools mentioned in Clause 2.2.3 above.

#### 4.3 Task 2 - Development of the Checking Tools

- 4.3.1 The Contractor shall design, develop, program, package and deliver the Checking Tools in the form of executable plug-in or add-on in two versions including the associated parameters, families, library components, objects, elements and schedules accepted under Clause 4.2.8, which shall be separately compatible with the following native BIM software:
- (a) Revit 2024 or later version; and
  - (b) ArchiCAD 26, or later version,
- 4.3.2 The two versions of the Checking Tools as specified in Clause 4.3.1 above shall be delivered with identical functionalities, similar user interface and user experience design, unless there is any technical restriction or otherwise specified.
- 4.3.3 The Checking Tools shall be compatible with the digital GBP submission in file format of the native BIM software programs specified in Clause 4.3.1 above.
- 4.3.4 The Checking Tools shall fulfil the following functional requirement:
- (a) To visualise the data / essential information of digital GBP submission in BIM format and demonstrate compliance of the relevant numerical, dimensional and area requirements for the items specified in Table 4.1 above in the 3D viewing environment;
  - (b) To define, measure and count the use, area and volume of different types of space and rooms, the length of street frontage and major façade, the required and provided numbers and width of required staircase and escape route and the travel distance within the building and/or distance between different key components/objects such as required staircase/fireman's lift in a building after inputting the

relevant object components in the 3D model for subsequent data extraction, calculation and schedule preparation;

- (c) To conduct automated mathematical calculations by making use of the extracted data and/or BIM data in the native files in line with the BD BIM Guidelines and generation of relevant tables, diagrams and schedules for demonstrating compliance with the requirements listed in Table 4.1 above; and
- (d) To allow data and checking results that appear in the standard schedules in Excel format as mentioned in Clause 4.2.1 above to be imported by batch as the schedules of the GBP submission in Revit format through free Revit plug-in such as DiRoots.

4.3.5 The Checking Tools shall be developed using the native functions, Application Programming Interfaces (API) and/or Software Development Kits (SDKs) of the BIM software program specified in Clause 4.3.1 above. If external components including but not limited to library, module or software program are required for implementing the compulsory functions, the Contractor shall package and deliver the components properly as a part of the Checking Tools. The Government shall be capable of copying and re-distributing the external components of the Checking Tools together with the Checking Tools to the third parties without any restriction or additional cost and without the need to inform or obtain prior consent of the Contractor.

4.3.6 The Checking Tools shall perform all required computations with the geometries or internal parameters of the BIM objects in the BIM data file directly. The Checking Tools shall be capable of preventing manual interference, modification or alteration of the calculation results. The accuracy of the computations shall be independently checked against with other commercially available software within an acceptable tolerance as suggested by the Contractor and agreed by the GR.

4.3.7 The Checking Tools shall display and present the checking results in the format accepted under Clause 4.2.8 above with the name and scope of each and every standard Excel schedules defined in accordance with the methodology required under Clause 4.2.1(g) above.

4.3.8 The Checking Tools shall facilitate the functions in automatic or semi-automatic manner. The functions shall be executed by one-click operation or minimal steps in case user options are available.

4.3.9 The labels, descriptions, instructions and other textual contents on the user interface of the Checking Tools shall be presented in English.

#### 4.4 Task 3 - Preparation of Enhanced Templates

4.4.1 The Contractor shall develop and deliver the Enhanced Templates of Revit and ArchiCAD by incorporating into the corresponding Templates the additional parameters, families, library components, objects and elements in accordance with the lists accepted under Clause 4.2.8 above.

- 4.4.2 The Enhanced Templates for Revit and ArchiCAD shall remain fully compatible with the corresponding Area Tools mentioned in Clause 2.2.3 above. All existing settings, parameters, families, library components, objects, elements and schedules in the Templates shall be maintained and not be altered unless with the GR's permission.

#### 4.5 Task 4 - Preparation of User Operation Instructions and Installation Instructions

- 4.5.1 The Contractor shall install and configure the Checking Tools in BD's network or individual laptop computers so that maximum 150 sets of assigned workstations in different BD's offices at various locations / laptop computers for working from home can use the Checking Tools. The corresponding hardware configurations and BIM software are listed below.

- 4.5.2 Hardware configurations:

<b>CPU</b>	Intel Core i7-9700K processor or better
<b>GPU</b>	NVIDIA Quadro P4000 with 8 GB GDDR5 or better
<b>System Memory</b>	At least 64 GB DDR4-2666 non-ECC SDRAM
<b>Storage</b>	At least 512 GB SATA Solid State Drive
<b>Display Monitor</b>	27 inches LCD (Resolution: 3840 x 2160 @ 60 Hz or better)
<b>Operating System</b>	Microsoft Windows 10 Enterprise 64-bit

- 4.5.3 BIM software:

<b>Revit</b>	Autodesk Revit 2024 or later version
<b>ArchiCAD</b>	Graphisoft ArchiCAD 26 or later version

- 4.5.4 The Contractor shall prepare and deliver a set of illustrated user operation instructions to describe the functions of the Checking Tools and to provide step-by-step guidelines for making use of the functions of the Checking Tools and associated settings and features in the Enhanced Templates for the end-users.

- 4.5.5 The Contractor shall provide installation instructions to describe the procedures for the installation and configuration of the Checking Tools.

#### 4.6 Task 5 - Provision of Source Codes

- 4.6.1 The Contractor shall deliver the source codes of the Checking Tools and, if any, the dependent libraries and modules in their native editable format to the Government at no cost.
- 4.6.2 The Government or any other person employed or engaged by the Government shall be capable of copying and modifying the source codes

and re-distributing the modified copies of the Checking Tools to the third parties without the need to inform or obtain prior consent of the Contractor.

- 4.6.3 The Contractor shall deliver to the Government the source codes, the executable copy of the Checking Tools and, if any, the necessary installation files, all contained in optical disc (CD-ROM or DVD-ROM) or other digital storage media as agreed by the GR.

4.7 Task 6 - Support Service on UAT

- 4.7.1 The Contractor shall work with BD's staff in conducting the UAT for verifying the fulfilment of the requirements as stipulated in this Service Specifications, and provide all necessary assistance.
- 4.7.2 The Contractor shall deliver a UAT Plan for describing the basic UAT items and proposing the UAT procedures to examine the functionality and integrity of the Checking Tools.
- 4.7.3 As a part of the UAT, BD's staff may apply the Checking Tools on digital GBP submission in BIM format of real cases for examining the functions of the Checking Tools. The Contractor shall work with BD's staff in operating the Checking Tools and performing analysis on the UAT results.
- 4.7.4 The Contractor shall at his own cost revise, modify and enhance the 3D models and templates of the sample cases provided by BD up to the required minimum standards and specification or prepare and provide some sample cases of different types of development for the UAT, if necessary, so that the UAT can be widely performed and carried out for different scenarios.
- 4.7.5 The Contractor shall compile and deliver a UAT report to conclude the testing results for acceptance by the GR.

4.8 Task 7 - Preparation of Enhanced BD BIM Guidelines

- 4.8.1 The Contractor shall revise, update and enhance the BD BIM Guidelines on data specification and requirements for regulating the preparation of digital GBP submission in BIM format.
- 4.8.2 BD will arrange to circulate the revised and enhanced BD BIM Guidelines to the relevant parties for consultation. The Contractor shall explain the contents of the revised and enhanced BD BIM Guidelines to the relevant stakeholders and shall be responsible to address and resolve all comments received.

4.9 Task 8 - Stakeholders Consultation

- 4.9.1 The Contractor shall arrange and hold at least two (2) public consultation sessions to collect feedbacks, comments and opinions from the stakeholders in the industry. The representative(s) of the Contractor shall explain the contents and functions of the Checking Tools and Enhanced Templates and respond to the enquiries from the participants in the public consultation

sessions.

4.9.2 The Contractor shall propose the form, date, time and venue of the public consultation sessions for acceptance by the GR.

4.9.3 The Contractor shall submit a report summarising and consolidating the feedbacks, comments and opinions received from the participants and other relevant information to the GR within 1 week after each public consultation sessions.

#### 4.10 Task 9 - Provision of Training Services

4.10.1 The Contractor shall arrange at least three (3) whole-day training sessions, each with a course size of about 120 for BD's staff to cover, but not limited to the following contents:

- (a) Briefing on the methodologies for checking MOE, MOA and FRC;
- (b) Briefing on the Enhanced Templates and enhancement of the BD BIM Guidelines;
- (c) Operation of the functionalities of the Checking Tools;
- (d) Live demonstration of the Checking Tools;
- (e) Q&A sessions; and
- (f) Any other related topics.

4.10.2 The Contractor shall prepare and submit a draft training plan for the training sessions within one (1) week after the completion of UAT for acceptance by the GR. The draft training plan shall include the proposed form, contents, tutor(s), venue, date and time, required equipment and resources, and other necessary information for the arrangement of the training sessions.

4.10.3 The Contractor shall conduct the training sessions in accordance with the finalised training plan as accepted by the GR.

4.10.4 All training shall be conducted during Monday to Friday (excluding Public Holiday) from 09:00 to 17:00. The training date and time shall be arranged by the Contractor and agreed by the GR after the completion of UAT.

4.10.5 The training shall be held in a location and venue in Hong Kong as agreed or arranged by the GR. Venue will be arranged by BD. All travelling costs to different venue for training shall be at Contractor's own cost.

4.10.6 All training material shall have a document/media index and be provided in suitable formats, such as Revit and ArchiCAD Data file, MP4 for Video, Microsoft PowerPoint file for presentation slides and Microsoft Word file for document.

4.10.7 The event of training course will be recorded as video by BD and the copyright ownership of the video shall vest with BD.

4.10.8 The Contractor shall bring his own computer(s) with sufficient CPU and

GPU power for demonstration of the Checking Tools.

- 4.10.9 The Contractor shall attend and assist BD's staff to deliver briefing sessions to various parties including but not limited to APSEC discussion forums, professional institutions and Real Estate Developers Association of Hong Kong for introduction of the Checking Tools, Enhanced Templates and enhanced BD BIM Guidelines, if necessary.

4.11 Task 10: Nursing Period Services

- 4.11.1 The Contractor shall provide knowledge transfer and follow up actions on quality assurance on the project deliverables within the 3-month Nursing Period after the Checking Tools and Enhanced Templates are rolled-out.
- 4.11.2 The Contractor shall deliver the finalised version of the project documentations including but not limited to the deliverables as required in Clause 8 of this Service Specifications. The Contractor shall modify and revise the project documentations upon receiving comments of the GR during the Nursing Period.
- 4.11.3 The Contractor shall conduct a project evaluation review to examine whether the project has achieved its stated objectives and has delivered the expected products and submit a Project Evaluation Report for approval of BD after the review.

4.12 Task 11: On-site Support Services (Optional Services)

- 4.12.1 Subject to prior written instruction from the GR, the Contractor may be required to provide the on-site support services as optional services to serve BD's staff on need basis during the Nursing Period as referred to in Clause 4.11.
- 4.12.2 Each on-site support session shall be not more than eight (8) hours in total and the Contractor shall provide services including but not limited to prompt responses/solutions to address problems encountered, consultation services on the Checking Tools, the Enhanced Templates and all delivered documentations, etc.
- 4.12.3 The Contractor shall arrange BIM Managers of both software (i.e. Revit and ArchiCAD) of the Project Team or other representatives as agreed by the GR in advance to conduct the on-site support service at BD's office. All travelling costs to BD's office for on-site support session shall be at the Contractor's own cost.
- 4.12.4 All on-site support service shall be conducted during Monday to Friday (excluding Public Holidays) from 09:00 to 17:00. The date and time for each on-site support session shall be scheduled with and agreed by the GR at least five (5) working days in advance.

## 5. Staffing and Project Management Requirements

## 5.1 Composition of Project Team

5.1.1 The Contractor shall form an individual project team for providing the services specified in this Service Specifications. The proposed project team shall comprise the following Key Personnel:

- (a) At least one Project Director as the Team Leader;
- (b) At least one AP registered under section 3(1) of the BO as BIM Consultant;
- (c) At least one BIM Manager for Revit and one BIM Manager for ArchiCAD as the Team Members; and
- (d) At least one BIM Programmer for Revit and one BIM Programmer for ArchiCAD as the Team Members.

5.1.2 The Contractor shall deploy competent project team members and necessary manpower to deliver the Project.

5.1.3 The Project Director, BIM Managers and BIM Programmers shall be employed on a full-time basis at the time of tender submission and throughout the contract period. The AP may also take up the role of Project Director of the team provided that he or she can satisfy the respective qualification and experience requirements of the Project Director. The curriculum vitae of the Project Director, the AP, the BIM Managers and the BIM Programmers shall be provided together with Schedule C (Basic Information) upon the submission of tender.

5.1.4 The Contractor shall certify the full-time employment of the Project Director, BIM Managers and BIM Programmers in Schedule C (Basic Information).

5.1.5 The BIM Managers and BIM Programmers shall speak fluent Cantonese for effective communication with the GR and staff of BD.

## 5.2 Qualification and Experience of Key Personnel

5.2.1 The years of experience should be counted as at the Tender Closing Date.

5.2.2 The qualification and experience requirements of the Key Personnel are as follow:

Key Personnel	Qualification and Experience Requirements
Project Director	<ul style="list-style-type: none"> <li>(a) Shall have at least <b><u>eight (8) years</u></b> of working experience in BIM modelling or BIM-based building plan production, IT system management or software development, and</li> <li>(b) Shall have at least <b><u>two (2)</u></b> project reference of an implementation project on BIM consultancy, BIM modelling or BIM-based building plan production.</li> </ul>

Key Personnel	Qualification and Experience Requirements
AP as BIM Consultant	<p>(a) Authorized Person registered under section 3(1) of the BO;</p> <p>(b) Shall have at least <b><u>five (5) years</u></b> of post-registration practicing experience in building construction fields including at least <b><u>three (3) years</u></b> of working experience in submission of general building plans to BD.</p> <p>(c) Shall have at least <b><u>one (1)</u></b> project reference on BIM-based building plan production.</p>
BIM Manager for Revit	<p>(a) Shall be a Professional Member of the Hong Kong Institute of Building Information Modelling (HKIBIM) or possess equivalent professional qualification;</p> <p>(b) Shall have at least <b><u>five (5) years</u></b> of working experience in using BIM software in the building industry, including at least <b><u>three (3) years</u></b> of working experience in using Revit as the major BIM software environment;</p> <p>(c) Shall have at least <b><u>one (1)</u></b> project reference on implementation project on BIM modelling or BIM-based building plan production, or equivalent, by using Revit as the major BIM software environment.</p>
BIM Manager for ArchiCAD	<p>(a) Shall be a Professional Member of the Hong Kong Institute of Building Information Modelling (HKIBIM) or possess equivalent professional qualification;</p> <p>(b) Shall have at least <b><u>five (5) years</u></b> of working experience in using BIM software in the building industry, including at least <b><u>three (3) years</u></b> of working experience in using ArchiCAD as the major BIM software environment;</p> <p>(c) Shall have at least <b><u>one (1)</u></b> project reference of an implementation project on BIM modelling or BIM-based building plan production, or equivalent, by using ArchiCAD as the major BIM software environment.</p>
BIM Programmer for Revit	<p>(a) Shall have at least <b><u>two (2) years</u></b> of working experience in the BIM industry in building construction field, IT system management or software development; and</p> <p>(b) Shall have at least <b><u>one (1)</u></b> project reference of developing computer system or an implementation project on BIM programming, or equivalent, by using Revit as the major BIM software environment.</p>
BIM Programmer for ArchiCAD	<p>(a) Shall have at least <b><u>two (2) years</u></b> of working experience in the BIM industry in building construction field, IT system management or software development; and</p> <p>(b) Shall have at least <b><u>one (1)</u></b> project reference of developing computer system or an implementation project on BIM programming, or equivalent, by using ArchiCAD as the major BIM software environment.</p>



- 5.2.3 Tenderers shall submit documentary proof, project details and certificates for the qualification, certification, experience and quoted project reference of the employed Key Personnel upon submission of tender.
- 5.2.4 Only full-time involvements in related job positions will be accepted as relevant experience of the Key Personnel. The following shall not count as relevant experience:
- (a) Time spent on full-time undergraduate or full-time postgraduate programs;
  - (b) Time spent on sandwich training in full-time undergraduate or full-time Postgraduate programs.
- 5.2.5 The Contractor shall inform the Government in writing at least 1 month in advance for any change of Key Personnel of the project team and submit the curriculum vitae, documentary proof and certificates of the qualification and experience of the Key Personnel in replacement for approval by the Government. In any event, the substituted staff should have qualification and experience not inferior to those proposed in Schedule C (Basic Information).
- 5.2.6 The Contractor shall, within one (1) week after the commencement of the Contract provide the GR as part of the Project Initiation Document specified in Clause 8 an organisation chart and up-dated details of the Key Personnel including their full names, mobile phone numbers, curriculum vitae and qualifications.
- 5.2.7 If the Contractor's proposal for a change of Key Personnel is not accepted by the GR, the Contractor shall either adhere to his original staffing proposal or submit another proposal to the GR for consideration.
- 5.2.8 The Government reserves the right to require replacement or to reject any replacement of Key Personnel proposed by the Contractor. The Contractor's Key Personnel shall not be replaced without the prior approval of the GR.

### 5.3 Responsibilities of Key Personnel

#### 5.3.1 Project Director

The Project Director shall be responsible for the project management of the Project which shall include the following:

- (a) Be responsible for the total project management and act as a single contact point to the Government regarding all related activities of the Project, including but not limited to the requirements in this Service Specifications and the Implementation Plan accepted by the Government;
- (b) Collect all related information of the existing configurations and environment, analyses and give advices on solution to any possible crisis and problem arisen foresee from implementation;

- (c) Resolve conflicts and crisis during the entire life cycle of the Project;
- (d) Provide solutions for all technical issues raised during the entire life cycle of the Project and act as an overall technical leader and work proactively with Government staff to come up with the solutions;
- (e) Oversee and monitor the progress of various activities during the life cycle of the Project to ensure that these activities are completed according to the Implementation Plan and meeting the requirements of the Project;
- (f) Plan and schedule meetings at appropriate time points during the life cycle of the Project, to prepare meeting agenda, to chair and to take notes for all the meetings with various parties;
- (g) Report progress, follow up all outstanding issues with all related parties, suggest solutions and resolve difficulties throughout the Project;
- (h) Liaise closely with and report regularly to the PSC and the PAT formed under this Contract from the project inception until completion of the contract;
- (i) Attend personally all PSC and PAT meetings and all progress and working meetings held by the GR for the development of the Checking Tools and Enhanced Templates; and
- (j) Perform any other activities, which are necessary for the complete implementation of the Project.

#### 5.3.2 AP (as BIM Consultant)

The BIM Consultant shall be responsible for the consultancy of BIM-based GBP preparation and submission process in the Project. The duties of the BIM Consultant shall include the following:

- (a) Advise on the interpretation of legislative requirements on provisions of MOE, MOA and FRC as well as the BIM-based GBP preparation and submission process for the efficient implementation of the Project in coordination with the Project Manager;
- (b) Provide recommendations and solutions for project tasks including but not limited to the design, development and preparation of the methodologies, the BD BIM Guidelines, the Checking Tools, the Enhanced Templates and the UAT as stipulated in this Service Specifications and the Implementation Plan accepted by the Government;
- (c) Facilitate the project deliverables including but not limited to the methodologies being in compliance with the BIM data standards and specifications from the major stakeholders in Hong Kong;
- (d) Explain the contents of the BD BIM Guidelines to relevant stakeholders (e.g. APSEC members) during the public consultation session specified in Clause 4.9 above, address and resolve all comments received;
- (e) Collect all related information of the existing configurations and

environment, analyses and give advices on solution to any possible crisis and problem arisen foresee from implementation of the Project;

- (f) Resolve conflicts and crisis during the entire life cycle of the Project;
- (g) Provide solutions for all technical issues raised during the entire life cycle of the Project and act as a technical leader and work proactively with Government staff to come up with the solutions;
- (h) Plan, schedule and conduct the Optional On-site Support Services as stated in Clause 4.12 above as agreed by BD;
- (i) Upon request by the GR, attend personally the PSC and PAT meetings and progress and working meetings held by the GR for the development of the Checking Tools and Enhanced Templates; and
- (j) Perform any other activities, which are necessary for the complete implementation of the Project.

### 5.3.3 BIM Manager

The BIM Manager shall be responsible for the implementation of the Project. The duties of the BIM Manager shall include the following:

- (a) Be responsible for implementation of project tasks assigned by the BIM Project Director;
- (b) Implement project tasks including but not limited to the design, development and preparation of the methodologies, the Checking Tools, the BD BIM Guidelines, the Enhanced Templates, the UAT and other documentations as stipulated in this Service Specifications and the Implementation Plan accepted by the Government;
- (c) Communicate with technical support people from manufacturers or vendors of the commercial BIM software to solve any problematic technical issues;
- (d) Liaison, monitor and check the assigned work of third parties if the Contractor has assigned any work to the third parties;
- (e) Communicate with the Government staff to fix any related problems;
- (f) Work with PAT members and BD's staff to conduct UAT;
- (g) Plan, schedule and arrange training for skill transfer to internal project teams and BD's staff;
- (h) Prepare documentation including but not limited to documents stated in Clause 8 of this Service Specifications;
- (i) Plan, schedule and conduct the Optional On-site Support Services as stated in Clause 4.12 above as agreed by the GR;
- (j) Upon request by the GR, attend personally the PAT meetings and progress and working meetings held by the GR for the development of the Checking Tools and Enhanced Templates; and
- (k) Perform any other activities, which are necessary for the complete implementation of the project.

#### 5.3.4 BIM Programmer

The BIM Programmer shall be responsible for the implementation of this project. The duties of the BIM Programmer shall include the followings:

- (a) Be responsible for implementation of project tasks assigned by the BIM Project Director and BIM Managers;
- (b) Implement project tasks including but not limited to the design and development of the methodologies, the Checking Tools, Enhanced Templates, the UAT and related documentations as stipulated in this Service Specifications and the Implementation Plan accepted by the Government;
- (c) Communicate with technical support people from manufacturers or vendors of the commercial BIM software to solve any problematic technical issues;
- (d) Communicate with the Government staff to fix any related problems;
- (e) Implement any remedial action including but not limited to the bug-fixing and reconfiguration of the BIM software and the Checking Tools of any vulnerability, malfunction and operational error suggested by the Contractor Project Team, the Government staff or the third-party;
- (f) Prepare documentation including but not limited to documents stated in Clause 8 of this Service Specifications;
- (g) Conduct the Optional On-site Support Services as stated in Clause 4.12 above as agreed by the GR;
- (h) Upon request by the GR, attend personally the PAT meetings and progress and working meetings held by the GR for the development of the Checking Tools and Enhanced Templates; and
- (i) Perform any other activities, which are necessary for the complete implementation of the Project.

## **6. Maintenance Services (Optional Services)**

### **6.1 General Maintenance Requirements**

- 6.1.1 The Maintenance Services under this clause are optional services under the Contract. If the optional services are required, the GR will issue a written instruction to the Contractor at least 7 days before the date of completion of the Nursing Period under the Contract. The Maintenance Services under this clause shall commence from the date of completion of the Nursing Period for a notional period of twelve (12) months. The Contractor shall provide routine maintenance services in the Maintenance Period for ensuring the proper functioning of the Checking Tools in accordance with Clause 4 of this Service Specifications. The routine maintenance services shall cover, but not limited to, the following contents:
- (a) Correct defects leading to software malfunction;
  - (b) Conduct problem diagnosis, testing and bug-fixing;
  - (c) Modify system / software configurations, if necessary;
  - (d) Deploy security hot-fixes and patches; and
  - (e) Deploy necessary software update, if necessary.
- 6.1.2 The Contractor shall provide maintenance services for the project deliverables as specified in Clause 8 of this Service Specifications.
- 6.1.3 The Contractor shall, from the commencement date of maintenance services as specified in Clause 6.1.1 above, maintain the deployed Checking Tools in its full and proper working order and shall provide and continue to provide the maintenance services throughout the Maintenance Period.
- 6.1.4 The Contractor shall provide a single point of contact by telephone (hot-line facilities) and be responsive within 2 working days to the Government for the remedial maintenance calls, and for monitoring the progress of the maintenance calls throughout the Maintenance Period.
- 6.1.5 The Contractor may be required to carry out minor refinement / enhancement of the Checking Tools and/or Enhanced Templates as agreed by the Contractor and the GR during the Maintenance Period. If the enhancement / refinement of the Checking Tools and/or Enhanced Templates is extensive in nature such as substantial change in the interpretation of requirements on provisions of MOE / MOA / FRC, the GR may agree with the Contractor to carry out the required upgrade / enhancement on the man-day basis as specified in Clause 7 of this Service Specifications.

## **6.2 Maintenance for BIM Software Program Upgrade**

- 6.2.1 Within the Maintenance Period, the Contractor shall maintain the Checking Tools and Enhanced Templates to be functional as specified in Clause 4 of this Service Specifications, in the next three (3) versions, in maximum, of the BIM software (i.e. Revit and ArchiCAD) after the version stated in Clause 4.3.1. The version changes shall be considered based on the major version or build number of the software.
- 6.2.2 The Contractor shall perform diagnosis and testing for evaluating the functionalities of the Checking Tools and Enhanced Templates on the new version of the BIM software.
- 6.2.3 The Contractor shall modify and re-configure the Checking Tools and Enhanced Templates, if necessary, to ensure its proper functionality on every new version of the BIM software.
- 6.2.4 The Contractor shall provide an updated version of the Checking Tools and Enhanced Templates within a period of one (1) month or as agreed with the GR after the official release of the new version of BIM software.
- 6.3 Payment of the Maintenance Services as referred to in this clause will be payable every six (6) months within the Maintenance Period.
- 6.4 The duration of the Maintenance Period is tentatively 12 months and it may be subject to changes at the GR's discretion. The GR shall give at least one month's prior written notice to the Contractor to notify the changes.

## **7. Ad-hoc Request on Enhancement (Additional Services)**

- 7.1 During the Contract Period and/or the Maintenance Period as referred to in Clause 6, the Contractor may be required to provide enhancement services as additional services for the Checking Tools and Enhanced Templates due to changes in the Methodologies specified in Clause 4.2 above or any new requirements, upon the written instruction of the GR.
- 7.2 After receiving the request, the Contractor shall estimate resource requirements including hardware and software, proposed manpower, proposed price (in terms of man-hours for the proposed staff category) and submit an implementation plan with detailed programme, for the consideration and approval by the GR.
- 7.3 If the proposal mentioned in Clause 7.2 is approval by the GR as the additional services for the enhancement, the Contractor shall implement the enhancement according to the implementation plan accepted by the GR. The Contractor shall not proceed the additional services without prior approval from the GR.

## **8. Programme and Deliverables**

### **8.1 Project Programme**

- 8.1.1 The Contractor shall implement and complete all activities of each Phase of the Project to the satisfaction of the GR within fourteen (14) months counting from the commencement of the Contract, with a Nursing Period of three (3) months included.
- 8.1.2 The Contractor shall prepare and submit an Implementation Plan of the Project with reference to the Project Implementation Plan in Table 8.1 below. The Implementation Plan shall show the starting date, completion date and duration (in a weekly scale) for each project activity and deliverable, the resources required, all key dates and any other dates or important events.
- 8.1.3 The Implementation Plan shall be submitted as part of the Project Initiation Document specified in Table 8.1 to the GR for endorsement within one (1) week after the commencement of the Contract.
- 8.1.4 The Contractor shall deliver the project deliverables including but not limited to the documentation and software products in accordance with the Implementation Plan endorsed by the GR.
- 8.1.5 Subject to prior written instruction from the GR, the Contractor may be required to proceed with the Maintenance Services (optional services) in accordance with Clause 6 for a period of 12 months (tentatively) subsequent to the completion of the Nursing Period of the Contract.

**Table 8.1 Project Implementation Plan**

Stage	Major Project Activities	Schedule	Deliverables
<b>Project Initiation</b>			
1	Project Initiation	Within 1 week after Commencement Date of Contract	<ul style="list-style-type: none"> <li>Project Initiation Document comprising the organisation chart and updated details of the Key Personnel referred to in Clause 5.2.6 and the Implementation Plan referred to in Clause 8.1</li> </ul>
2	Provision of Methodologies	Within 2 months after Project Initiation	<ul style="list-style-type: none"> <li>Documentation for the Methodologies referred to in Clause 4.2.8(a)</li> <li>List of additional parameters, families, library components, objects and elements referred to in Clause 4.2.8(b)</li> <li>Format of Excel schedules to be generated by the Checking Tool referred to in Clause 4.2.8(c)</li> </ul>
<b>Implementation Phase</b>			
3	Provision of the Checking Tools	Within 5 months after Project Initiation	<ul style="list-style-type: none"> <li>The Checking Tools referred to in Clause 4.3 (pre-UAT version)</li> <li>User operation instruction referred to in Clause 4.5.4</li> <li>Installation instruction referred to in Clause 4.5.5</li> </ul>
4	Provision of Enhanced Templates	Within 7 months after Project Initiation	<ul style="list-style-type: none"> <li>Enhanced Templates referred to in Clause 4.4 (1<sup>st</sup> Draft)</li> <li>Enhanced BD BIM Guidelines referred to in Clause 4.8 (1<sup>st</sup> draft)</li> </ul>
5	Consultation	Within 8 months after Project Initiation	<ul style="list-style-type: none"> <li>Documentations for consultation referred to in Clause 4.9</li> <li>Enhanced BD BIM Guidelines referred to in Clause 4.8 (2<sup>nd</sup> draft)</li> </ul>



Stage	Major Project Activities	Schedule	Deliverables
<b>Testing Phase</b>			
6	UAT	Within 9 months after Project Initiation	<ul style="list-style-type: none"> <li>The Checking Tools referred to in Clause 4.3 (UAT version)</li> <li>Enhanced Templates referred to in Clause 4.4 (2<sup>nd</sup> Draft)</li> <li>UAT plan referred to in Clause 4.7.2</li> </ul>
7	Completion of UAT	Within 10 months after Project Initiation	<ul style="list-style-type: none"> <li>UAT report referred to in Clause 4.7.5</li> </ul>
<b>Project Closing Phase</b>			
8	Provision of all required documents & deliverables (Final)	Within 10 months after Project Initiation	<ul style="list-style-type: none"> <li>Documentations referred to in Clause 4.2.8 (Final)</li> <li>Enhanced BD BIM Guidelines referred to in Clause 4.8.1 (Final)</li> <li>The Checking Tools referred to in Clause 4.3 (Final)</li> <li>Enhanced Templates referred to in Clause 4.4 (Final)</li> <li>User Operation Instruction referred to in Clause 4.5.4 (Final)</li> <li>Installation Instruction referred to in Clause 4.5.5 (Final)</li> </ul>
9	3-day Training	Within 10 months after Project Initiation	<ul style="list-style-type: none"> <li>Training Plan referred to in Clause 4.10.2</li> <li>Training sessions referred to in Clause 4.10.1</li> <li>Training materials referred to in Clause 4.10.6</li> </ul>
10	Project roll-out	Within 11 months after Project Initiation	<ul style="list-style-type: none"> <li>Source codes referred to in Clause 4.6</li> </ul>

Stage	Major Project Activities	Schedule	Deliverables
<b>Nursing Phase</b>			
11	Nursing Period	3 months starting from date of Project roll-out	<ul style="list-style-type: none"> <li>• Latest updates on the deliverables identified in the Nursing Period referred to in Clause 4.11, if applicable</li> <li>• On-site Support Services referred to in Clause 4.12, if instructed by the GR</li> </ul>
12	Project Completion	After completion of all project tasks and deliverables from Stages 1 to 11 and within 14 months after Project Initiation	<ul style="list-style-type: none"> <li>• Project Evaluation Report referred to in Clause 4.11.3</li> </ul>
<b>Maintenance Phase</b>			
13	Maintenance Services (Optional)	12 months starting from Date of Completion of Nursing Period	<ul style="list-style-type: none"> <li>• Optional Maintenance Services as referred to in Clause 6.</li> </ul>

## 8.2 Delivery Requirements

- 8.2.1 All documentations to be delivered shall be submitted in both digital form and hardcopy. The documentations in digital form shall be delivered in both Microsoft Word format and PDF, unless otherwise specified.
- 8.2.2 All documentations to be delivered shall be submitted in A4 size and accompanying drawings of convenient sizes, but not exceeding A3 size format unless otherwise approved in writing by the GR.
- 8.2.3 All deliverables in digital form should be stored and submitted in the optical disc (CD-ROM or DVD-ROM) or other digital storage media as agreed by the GR, with clearly labelled protective cases.
- 8.2.4 The Contractor shall make revisions or supplements to all deliverables as may be required by the Government and arrange the revised deliverables for issue to the PSC and/or PAT members at least five (5) working days in advance of the arranged meetings and at the cost of the Contractor without reimbursement.

- End -