

Building Information Modelling for Asset Management (BIM-AM)

Guidelines for the Handover of E&M Installation to EMSD



Version 1.0
2022 Edition

Document Revision Tracking

Document Revision	Issue Date
Version 1.0	14 th September 2022

For any enquiries regarding this document, please contact bimam-support@emsd.gov.hk.

©Copyright 2022 by the Electrical and Mechanical Services Department, all rights reserved. No part of this publication may be reproduced, distributed, or transmitted in any form or by any means, including photocopying, recording, or other electronic or mechanical methods, without the prior written permission of the publisher, except in the case of brief quotations embodied in critical reviews and certain other non-commercial uses permitted by copyright law.

Table of Content

1	INTRODUCTION.....	1
1.1	Purpose of this Document	1
1.2	Roles and Responsibilities	2
1.3	Reading the H/O Guide.....	5
1.4	Overall Handover Workflow from Design to Project Handover.....	6
2	HANDOVER PROCEDURES.....	9
2.1	Deliverables and Timeline	9
2.2	Handover Procedures	9
2.3	Preparation for Handover.....	10
2.4	Stage I – Deliverables Preparation.....	11
2.5	Stage II – Uploading Asset Data	18
2.6	Stage III – Setting Up BIM-enabled Database for Data Upkeep	27
2.7	Handover Deliverables.....	28
3	A&A HANDOVER PROCEDURES.....	29
3.1	Types of A&A Projects.....	29
3.2	Type I A&A Project.....	30
3.3	Type II & Type III A&A Projects.....	30
3.4	A&A workflow	34
4	QUALITY ASSURANCE/ QUALITY CHECK (QA/QC) PROCEDURES FOR HANDOVER DELIVERABLES	35
4.1	BIM Model Checking	35
4.2	AIMP Data Checking.....	36
4.3	On-Site Checking.....	38

List of Figures

Figure 1-1 Roles and Relationship of Different Parties under New-build Projects (e.g. ArchSD as the Project Team).....	2
Figure 1-2 Roles and Relationship of Different Parties During Operation/ A&A works (e.g. EMSD as Project Team).....	2
Figure 1-3 Overall Handover Workflow from Design to Project Handover.....	8
Figure 2-1 Overall Handover Workflow	9
Figure 2-2 Handover Deliverables- Stage I Detailed Deliverable Preparation Diagram	10
Figure 2-3 Loading Shared Parameters	15
Figure 2-4 Screen Capture of MII	16
Figure 2-5 Example of RFID/QR code list.....	17
Figure 2-6 Floor plan shows the location for assets with RFID Tags.....	17
Figure 2-7 Uploading COBieLite	25
Figure 2-8 Uploading CCS Templates into AIMP	26
Figure 2-9 Creating Assets within AIMP	26
Figure 2-10 Uploading Asset Relationship to AIMP.....	26
Figure 2-11 Uploading As-Built Documents in AIMP.....	26
Figure 2-12 Export CCS templates from AIMP	27
Figure 2-13 Export COBieLite file from AIMP	28
Figure 3-1 Workflow for Type II & III A&A Projects	30
Figure 3-2 Handover Deliverables- Stage I Detailed Deliverable Preparation Diagram (A&A).....	34
Figure 4-1 Screenshot of How the Information Can be Presented.....	35
Figure 4-2 Screenshot of ADT (Appendix B of BIM-AM SG).....	36
Figure 4-3 Checking Number of Assets within AIMP	36
Figure 4-4 Checking Topology and Documents in AIMP	37
Figure 4-5 Checking Asset Attributes in AIMP	37

List of Tables

Table 1-1 Responsible Personnel and their Duties	3
Table 2-1 Description of Asset Data Types	12
Table 2-2 Actions for Different Asset Data Types in BIM Model	12
Table 2-3 List of Type 3 E&M Assets which are NOT created in BIM Models	13
Table 3-1 Types of A&A Projects	29
Table 3-2 New-build vs A&A	32
Table 3-3 A&A Assets in BIM Models	33
Table 3-4 Actions for A&A Asset Data Inputs.....	33

List of Annexes

- Annex 1 – Enlarged Images for Figures in Handover Guide
- Annex 2 – Sample of Master Information Index
- Annex 3 – BIM-AM Deliverable Checklist

List of Abbreviation:

Abbreviation	Definition
A&A	Addition and Alternation
ACB	Air Circuit Breaker
ADT	Asset Data Templates in Appendix B of BIM-AM SG
AIM	Asset Information Model
AIMP	Asset Information Management Platform which serves as front end of departmental common data environment for files and BIM models management
AMS	Asset Management System
AMTF	Asset Management Task Force of EMSD which set up the E&M asset data requirement for operation
API	Application Programming Interface
PT	ArchSD Project Team
ARC	Agent Responsible Code
ArchSD	Architectural Services Department
BEP	BIM Execution Plan
BIM	Building Information Modelling
BIM-AM	Building Information Modelling-Asset Management
BIM-AM SG	Latest version of BIM-AM Standards and Guidelines
BMS	Building Management System
CAD	Computer-Aided Design
CCS	Corporate Computer System
CCTV	Closed-circuit Television
CDE	Common Data Environment
CIC	Construction Industry Council
COBie	Construction Operation Building Information Exchange
COBieLite	Lightweight Extensible Markup Language (XML) format of COBie data
CSWP	Computer-Aided-Drafting Standard for Works Projects
DEVB	Development Bureau
DLP	Defect Liability Period
E&M	Electrical and Mechanical
EMSD	Electrical and Mechanical Services Department
EMSTF	Electrical and Mechanical Services Trading Fund
H/O Guide	Guidelines for the Handover of E&M Installation to EMSD
iBMS	Integrated Building Management System
IoT	Internet of Things
JSON	JavaScript Object Notation
LoRA	Long Range Radio
MII	Master Information Index
O&M	Operation and Maintenance

Abbreviation	Definition
PIM	Project Information Model
PT	Project Team
QA/QC	Quality Assurance/ Quality Control
QR Code	Quick Response Code
Revit	Autodesk Revit
RFID	Radio-frequency Identification
SBU	Strategic Business Units of EMSD, i.e EMSD O&M Team
T&C	Testing and Commissioning
UHF	Ultra High Frequency
WIP	Work in Progress
XML	eXtensible Markup Language

List of Interpretations:

For common BIM terminologies, refer to CIC BIM Dictionary.

Abbreviation	Term	Definition / Description
ADT	Asset Data Templates	All templates have been included in Appendix B of BIM-AM SG. Common attributes as shown in ADT should be added as Project Parameters. Specific attributes as shown in ADT should be added as Object's Parameters.
PT	Project Team	This team is the project execution and supervision team issuing the contract or managing Contractor to deliver the contracted works and check for the compliance and quality of works in accordance with BIM-AM SG
SBU	Strategic Business Unit	Different strategic business units in EMSD under the Electrical and Mechanical Services Trading Fund (EMSTF)
-	Attribute	It is a piece of data describing a BIM object.
-	BIM Object	A building component in BIM software that can be inserted, moved and rotated into required location and orientation within models (e.g. MCB board, air diffuser, etc.).
-	Consultant / Contractor/ Trade	It includes the meaning of any appointed parties to deliver the services included in BIM-AM SG for which they have been assigned.
-	CDE for Project/ Project CDE	The CDE location allowing Contractor to upload models/ documents for EMSD review and approval.
-	CDE for Venue Operation/ Venue CDE	The CDE location for EMSD internal use and synchronise with other internal system like CCS, AMS, CCeP-JM and etc.

Abbreviation	Term	Definition / Description
-	Level 1 System/ Equipment	The E&M systems as defined in the Appendix G of BIM-AM SG.
-	Level 2 Equipment	The E&M equipment for asset management as specified in the Appendix G of BIM-AM SG.

1 Introduction

1.1 Purpose of this Document

1.1.1 The purpose of the Guidelines for the Handover of E&M Installation to EMSD (thereafter referred to as H/O Guide) is to ensure BIM-AM compliance across different project types. Consistent handover guidelines on BIM-AM are set out for Project Team (PT) and the Trade working on new construction and addition and alteration (A&A) projects. The instructions set out for:

- Overall handover process
- Software tool and access required for the process
- List of deliverables for the handover
- How to conduct quality checks on these deliverables

By following this H/O Guide, Contractor could gain an aligned understanding of EMSD's requirements on BIM-AM deliverables, and thereby be able to facilitate the handover process to EMSD before and after project completion.

This H/O Guide should be circulated to all parties involved in the creation of the handover deliverables together with EMSD BIM-AM Standards and Guidelines – latest version, published by EMSD (thereafter referred to as BIM-AM SG). This allows all parties involved to have a holistic understanding of handover requirements, which facilitates formulating model creation and information collection strategies for the project lifecycle to ease the handover process.

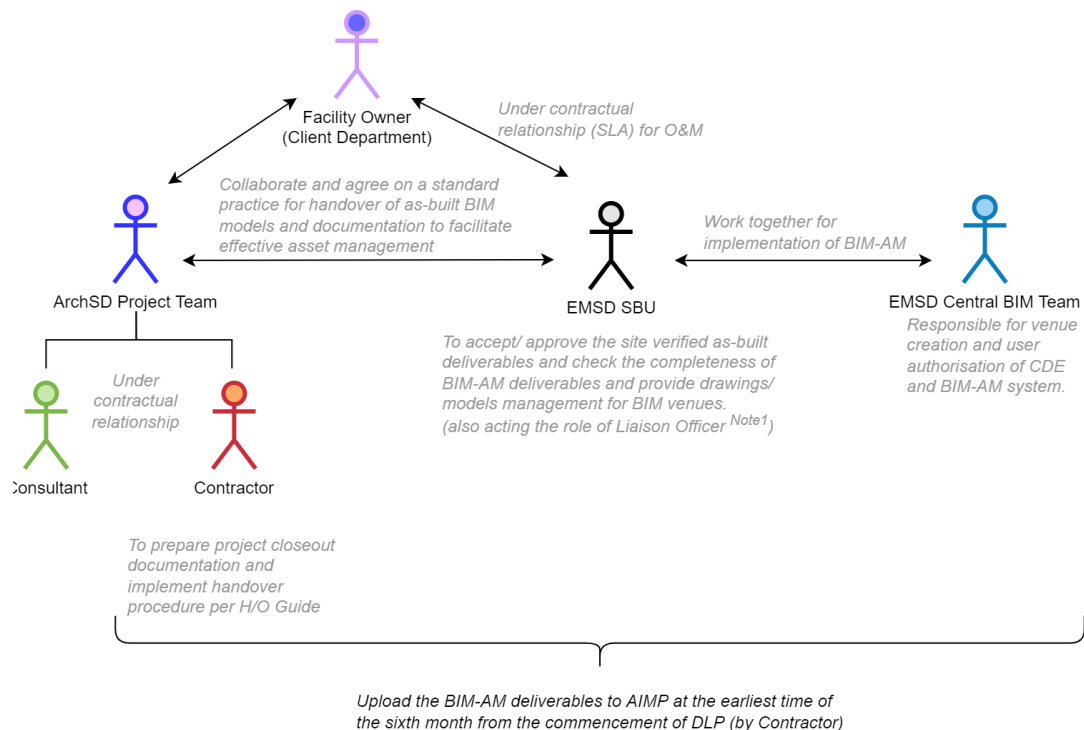
For more information and videos demonstration on BIM-AM, please visit EMSD's website at below:

https://www.emsd.gov.hk/en/engineering_services/project_management_consultancy/highlights_of_work/bim_am/

1.2 Roles and Responsibilities

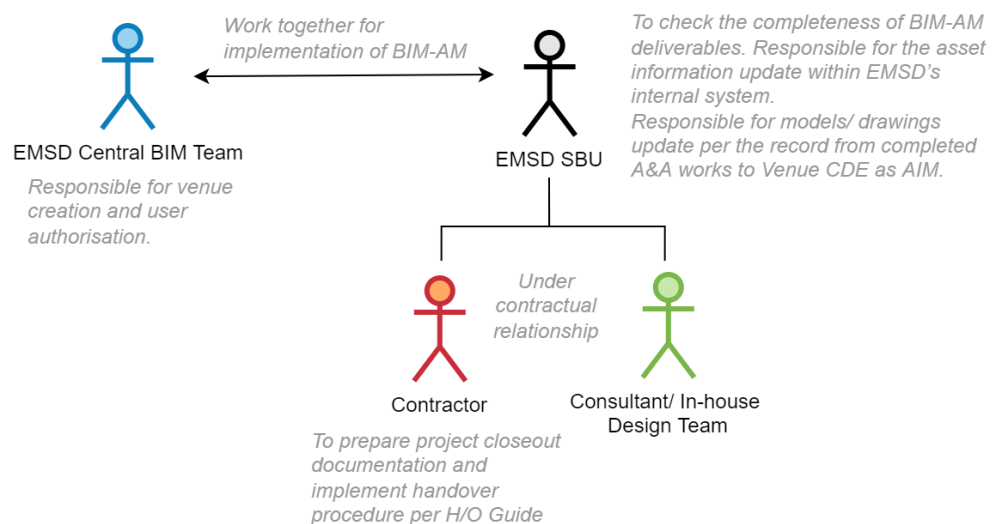
The figures below describe the overall relationship of key parties under new-build projects and during operation. The detail explanation of their roles and responsibilities are listed in Table 1-1.

Figure 1-1 Roles and Relationship of Different Parties under New-build Projects
(e.g. ArchSD as the Project Team)



Note 1: Liaison Officer is the professional staff as stated in EMSD Technical Circular for Procedures in Handling/ Taking over of New Works from the Architectural Services Department

Figure 1-2 Roles and Relationship of Different Parties During Operation/ A&A works (e.g. EMSD as Project Team)



The description and elaboration of detail roles and responsibilities are shown in the table below:

Table 1-1 Responsible Personnel and their Duties

Responsible Personnel	Duties
Project Team (PT)	• To make sure BIM-AM SG and Particular Specification for BIM-AM Implementation have been included in the contractual documents; • To perform quality assurance/ quality control (QA/QC) check of Contractor's deliverable in project level to comply with BIM-AM SG; • To oversee the overall progress of Contractor's as-built submission; • To approve and reject the as-built models, asset data, documents and BIM-AM deliverables submitted by Contractor.
Main Contractor/ Trade Contractor (Contractor)	• To prepare BIM models and BIM objects in compliance with BIM-AM SG; • To prepare Master Information Index (MII) and list out all drawings, and models. A sample of MII can be found in Annex 2 of H/O Guide; • To conduct all self QA/QC check for BIM-AM deliverables; • To ensure the quality and accuracy of the handover deliverables before submitting to PT by conducting self-quality checks in compliance to the requirements outlined in BIM-AM SG; • To complete the asset information by completing the following templates: a) Excel templates¹ for asset relationship and b) Corporate Computer System (CCS) asset templates for E&M assets which are not included in the BIM models; • To digitalise the as-built documents (including O&M manuals) and upload to Asset Information Management Platform (AIMP). • To upload as-built BIM models and as-built data to AIMP for project handover. For new-build:

¹ Excel templates of asset relationship can be downloaded from AIMP

Responsible Personnel	Duties
	• To prepare project BIM Execution Plan including MII to incorporate project specifications and EMSD's BIM-AM requirements; • To complete the federated AIM models² ; • To remove all revisions in drawings and models in as-built deliverable.
Design Consultant/ In-house Design Team (Consultant)	• To prepare the E&M system design; • To vet the Contractor's submission and witness the T&C for E&M equipment; • To verify and make sure the accuracy of the as-built models and drawings complied with all design requirement.
EMSD's Central BIM Team (BIMSD)	• To provide contractual documents/ particular specifications on BIM-AM related works to PT and EMSD SBU (for A&A project); • To define and update as-built information templates, deliverables and definition files for BIM-AM operation; • To maintain BIM-AM related systems, including user account management, user authorisation, creation of venues, system licenses and version management of BIM authorising tools; • To enhance the BIM-AM related systems as per operational needs; • To provide helpdesk technical support for implementation and operation of BIM-AM; • To check, audit and control information being shared across a project relevant to Contractor's specific task; • To monitor and manage the workflow of in & out of Asset Information Models (AIM) ; • To grant access to project participants on BIM-AM related systems to ease for asset data and models upload; • To maintain CDE for AIM models, asset data, documents and Internet of Things (IoT) data.

² Refer to Section 2 of BIM-AM SG

Responsible Personnel	Duties
EMSD Strategic Business Unit (SBU)	• To facilitate the implementation of divisional BIM for asset management initiative; • To manage the handover of the AIM models; • To input CCS/AMS related data for setting up and maintaining BIM-AM database; • To review the completeness of as-built deliverables prior to uploading to BIM-AM platform(s); • To approve / reject the BIM-AM deliverables (e.g. models and COBieLite); • To coordinate and liaise with BIMSD for the login accounts of BIM-AM related systems. • To manage and upkeep the models and drawing library (including 2D plans, schematics, control diagrams) up to date in BIM venues; • To work with BIMSD on getting access to BIM-AM systems for uploading models/ drawings to EMSD's departmental CDE; • To manage the document library (including the update of MII after completion of A&A projects) and records of O&M documents; • To create and assign building codes with reference to the functional location to be created in CCS.

1.3 Reading the H/O Guide

1.3.1 This H/O Guide shall be read in conjunction with reference to BIM-AM SG) including appendices as follows:

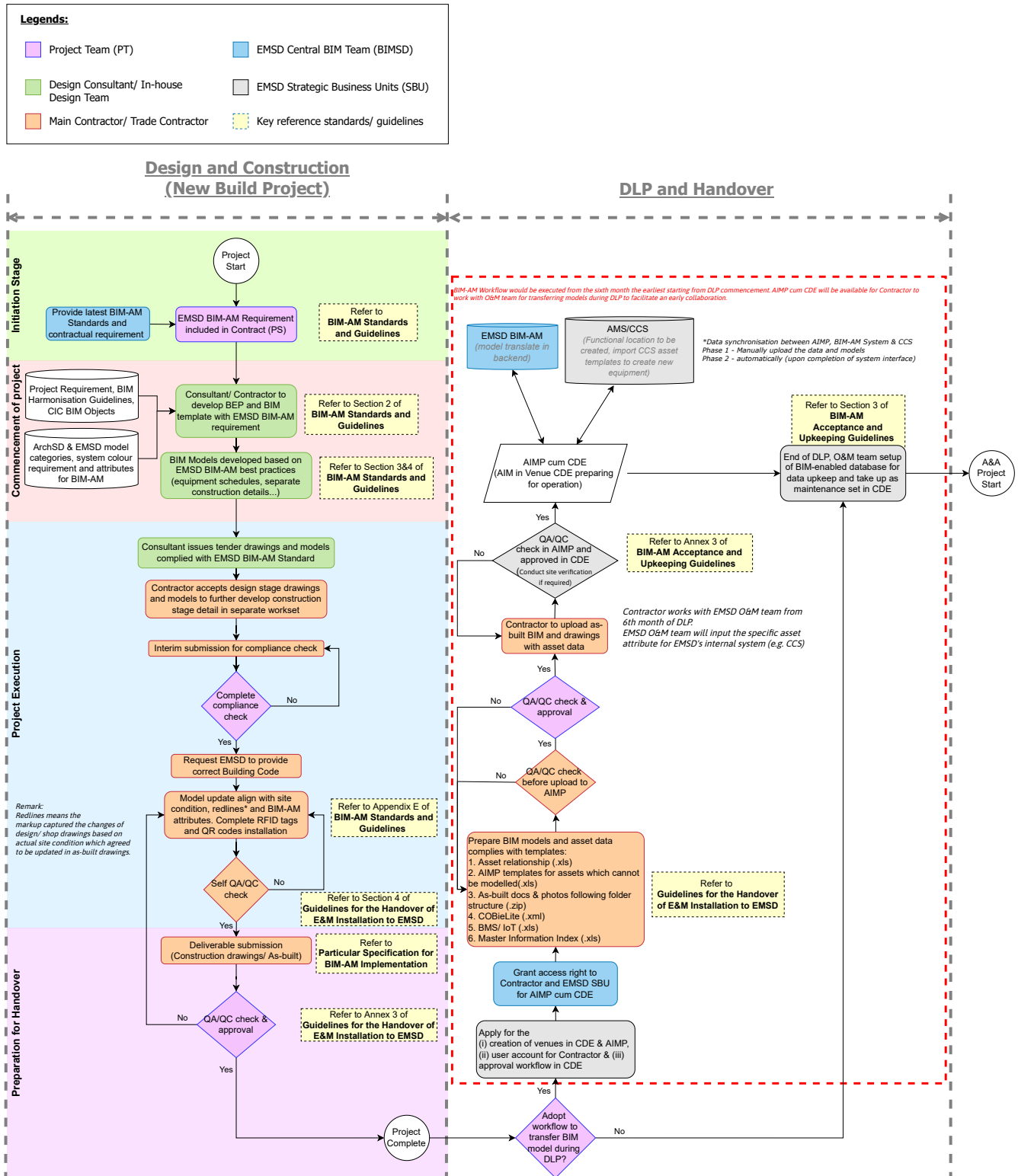
- Appendix A – Building Code (List of existing buildings in Hong Kong and their corresponding building code);
- Appendix B – Asset Information Requirement;
- Appendix C – Asset Information Management Platform (AIMP) User Guide;
- Appendix D – Shared Parameters File for EMSD BIM-AM;
- Appendix E – Best Practices for BIM Modelling;
- Appendix F – Codification for EMSD BIM Model Naming Convention;
- Appendix G – List of Equipment and Equipment Code and Provisional Requirement of RFID tags and QR codes;

- Appendix H – Templates of point definition and point mapping (for equipment status visualisation in model)
 - Appendix I – Handover Package and Folder Structure
 - Appendix Z – Particular Specification for BIM-AM Implementation (For EMSD Internal only)
- 1.3.2 Towards the end of the project and before defect liability period (DLP), PT and Contractor shall obtain the latest version of the H/O Guide from EMSD's website prior to starting handover planning.
- 1.4 Overall Handover Workflow from Design to Project Handover**
- Figure 1-3 below shows the overall workflow of project participants' involvements with corresponding reference BIM-AM SG to be used for ArchSD Project team (PT), Consultants and Contractors.
- 1.4.1 Design and Construction Stages
- Before project completion, Contractor shall comply with the contractual requirement as specified in BIM-AM SG and Particular Specification for BIM-AM Implementation to submit their BIM-AM related deliverables.
- Contractor shall enquiry EMSD via PT to obtain building codes for RFID encoding and assignment of asset codes/ zone codes. RFID tags shall be stuck for major E&M equipment inside false ceiling before the installation of false ceiling or raised floor. The provision of RFID tags shall be referred to Appendix G of the BIM-AM SG.
- 1.4.2 Late Construction Stage
- The following two handover deliverables shall be prepared and site verified with EMSD during the late construction stage:-
- Site installation of RFID Tag and QR Codes with; and
 - Completion of Asset Relationship information in pre-defined Excel templates which can be download on AIMP.
- The details of these two deliverables will be elaborated in Section 2.4.6 and 2.4.3 respectively.
- For site installation of RFID tag and QR code, the purpose of early engagement with EMSD is to minimise the work required for installation of the tags in areas where accessibility could be limited when construction is completed. For example, tagging of equipment above ceiling/ inside raised floor may require installed ceiling/ floor to be temporarily removed.
- For the asset relationship, early involvement of EMSD is recommended to align which portion of the cross-disciplinary relationship is required for the handover to EMSD in maintenance point of view.

1.4.3 Defects Liability Period (DLP) and Handover Stage

During DLP and handover stage, if agreed by PT to adopt workflow to transfer BIM models during DLP, a BIM-AM workflow would be implemented at the earliest time of the sixth month after DLP commencement. A collaborative working environment (EMSD's AIMP) would be available for the early involvement of EMSD SBU and Contractor to ensure smooth transition of Project Information Models (PIM) to Asset Information Models (AIM). Refer to Sections 1 of H/O Guide for detailed explanation of this workflow as shown in the figure below. Refer to Annex 1 for the enlarged versions of the figure below.

Figure 1-3 Overall Handover Workflow from Design to Project Handover



2 Handover Procedures

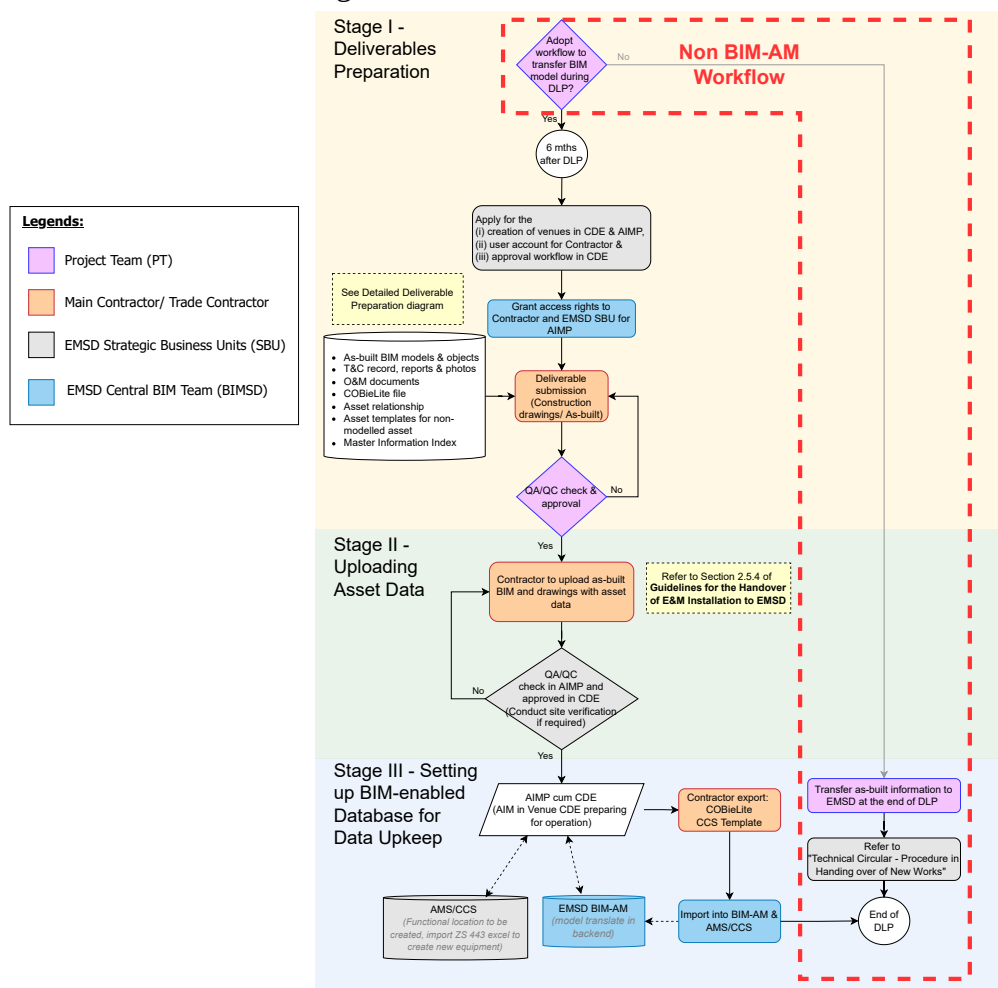
2.1 Deliverables and Timeline

If agreed by PT to adopt workflow to transfer BIM models during DLP, Contractor shall provide BIM models and associated as-built BIM-AM deliverables (e.g. COBieLite files, etc.) to EMSD at the earliest time of the sixth month after DLP commencement. The upload process shall be continuously collaborating with EMSD SBU until completed at the end of DLP. The preparation process is described in the sections below.

2.2 Handover Procedures

The overall workflow at DLP and handover stage is shown in the figures below. Refer to Annex 1 for the enlarged versions of these figures.

Figure 2-1 Overall Handover Workflow



2.2.1 Stage I – Deliverables Preparation

Initiation stage begins at the earliest time of the sixth month after DLP commencement. Contractor shall refer to Figure 2-2 to prepare the deliverables.

2.2.2 Stage II – Uploading Asset Data

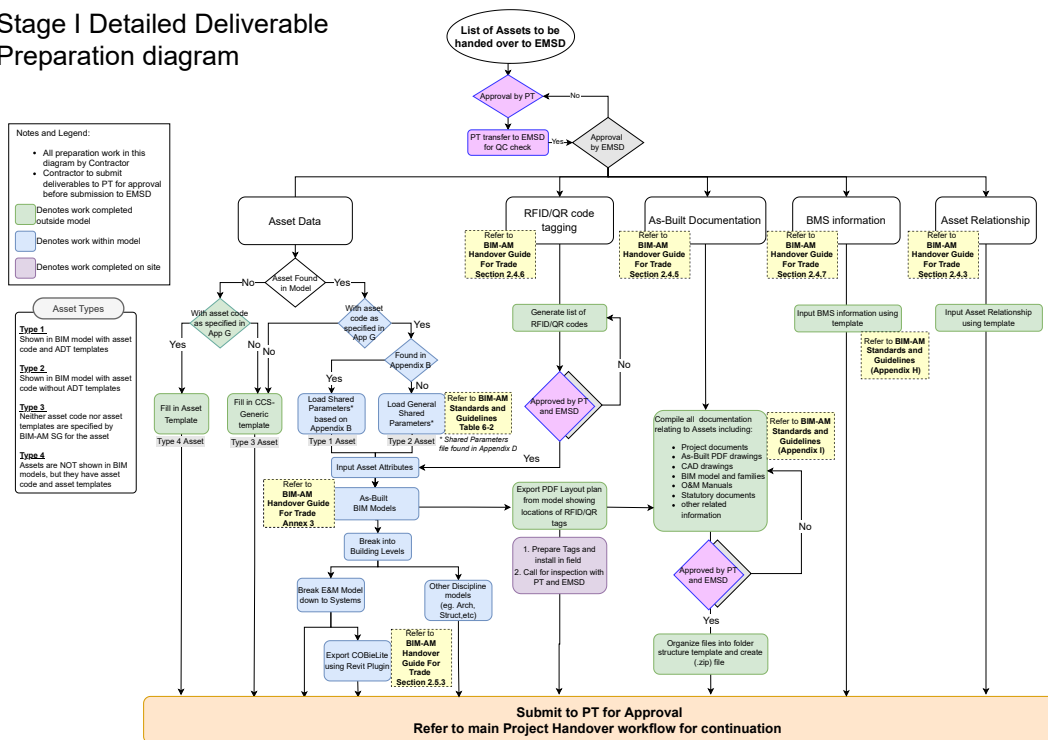
In this stage, Contractor executes the handover procedures and uploads the deliverables to AIMP. EMSD SBU shall be Contractor's main point of contact to address any questions about using the system or populating the information required. EMSD SBU shall also review and approve the deliverables in AIMP after Contractor gives notification that the uploads are completed. This stage can last up to the end of DLP.

2.2.3 Stage III – Setting Up BIM-enabled Database for Data Upkeep

In this stage, all Contractors' deliverables should be deemed acceptable prior to being turned over for operation. EMSD SBU shall review all deliverables submitted by Contractor as mentioned in BIM-AM SG and contract particular specification.

Figure 2-2 Handover Deliverables- Stage I Detailed Deliverable Preparation Diagram

Stage I Detailed Deliverable Preparation diagram



2.3 Preparation for Handover

2.3.1 Requesting Access to AIMP

To kick off the handover process, Contractor shall request the access and login details from EMSD on AIMP at the earliest time of the sixth month after DLP commencement.

Contractor shall enquiry EMSD SBU and seek for confirmation on the on the new building codes if they are not specified in the Appendix A of the BIM-AM SG. The building code will be used to generate the asset codes and incorporated into asset data mentioned in the following sections.

2.3.2 Access to Tools and Information

To facilitate the handover process, PT and Contractor shall conduct the followings when starting to prepare the handover of BIM-AM deliverables:

- To verify that the latest version of BIM-AM SG, H/O Guide and asset templates are used;
- To review the quality of as-built BIM models using BIM-AM Deliverable Checklist mentioned in Annex 3 of this Guide; and

In addition, Contractor shall coordinate with EMSD to gain access or obtain the following template/tools:

- Excel templates
 - Asset relationship template and the samples templates can be downloaded through AIMP as shown in Section 2.5.4.3 in this Guide.
 - CCS templates (liaise with EMSD SBU to obtain the latest version of templates)
 - BMS templates in Appendix H of the BIM-AM SG
- COBieLite plugin and EMSD JSON configuration file (liaise with the EMSD BIMSD to obtain the tools)
- Folder structure .zip file in Appendix I of the BIM-AM SG
- Access to AIMP system (liaise with the EMSD BIMSD to obtain the login credentials)

2.4 Stage I – Deliverables Preparation

2.4.1 As-Built Models Preparation

Contractor shall use the BIM-AM Deliverable Checklist mentioned in Annex 3 of this Guide and exported Revit schedules to verify that the BIM models meet handover requirements.

The as-built architectural, structural and E&M BIM models shall be separated based on the individual systems per floor. The system categories are shown in Table 5-4 of BIM-AM SG.

It is also important to note that each asset shall be represented by a unique BIM object (i.e. not nested within another asset).

2.4.2 Asset Data Preparation

Contractor is responsible for the assignment of asset code according to the requirement of naming convention as specified in Section 5.1 of BIM-AM SG.

Asset data types can be categorised into four main types:

Table 2-1 Description of Asset Data Types

Asset Types	Description
Type 1	Assets are shown in BIM models <u>with asset code</u> and <u>with</u> Asset Data Templates (ADTs, refer to Appendix B of BIM-AM SG)
Type 2	Assets are shown in BIM models <u>with asset code</u> , but <u>without</u> ADTs
Type 3	<u>Neither asset code nor asset templates</u> are specified by BIM-AM SG for the asset, e.g. laundry machine, book conveyor, patient monitor etc.
Type 4	Assets are <u>NOT</u> shown in BIM models, but they <u>have asset code and asset templates</u> , e.g. Level 1 HVAC System & Level 1 Plumbing and Drainage System etc. Refer to Table 2-3 of this Guide for Type 3 asset list.

2.4.2.1 Methodology of Asset Data Input for Different Data Types

The table below shows the action required for incorporating asset data.

Table 2-2 Actions for Different Asset Data Types in BIM Model

Types	Actions
Type 1	Contractor shall refer to Appendix B, D and G in BIM-AM SG for the following process. Contractor shall refer to Appendix G for the appropriate EMSD equipment type to generate asset code and create parameters in <u>models</u> based on the ADTs as shown Appendix B. Based on Appendix B, Contractor shall ensure project-level common parameters have been populated. Contractor shall also load the relevant specific parameters into the BIM object family files via shared parameters in accordance with Appendix D.

Types	Actions																
Type 2	Contractor shall create and input the following mandatory attributes (and optional attributes if applicable) in models. <table> <tr> <th>Asset Attributes Required</th><th>Mandatory (M) / Optional (O)</th></tr> <tr> <td>EMSD.Common.Asset Code</td><td>M</td></tr> <tr> <td>EMSD.Common.Zone Tag No.</td><td>M</td></tr> <tr> <td>EMSD.Common.Manufacturer</td><td>O</td></tr> <tr> <td>EMSD.Common.Model No.</td><td>O</td></tr> <tr> <td>EMSD.Common.Equipment Description</td><td>M</td></tr> <tr> <td>EMSD.Common.Documentation</td><td>M</td></tr> <tr> <td>EMSD.Common.Asset Relationship</td><td>O</td></tr> </table>	Asset Attributes Required	Mandatory (M) / Optional (O)	EMSD.Common.Asset Code	M	EMSD.Common.Zone Tag No.	M	EMSD.Common.Manufacturer	O	EMSD.Common.Model No.	O	EMSD.Common.Equipment Description	M	EMSD.Common.Documentation	M	EMSD.Common.Asset Relationship	O
Asset Attributes Required	Mandatory (M) / Optional (O)																
EMSD.Common.Asset Code	M																
EMSD.Common.Zone Tag No.	M																
EMSD.Common.Manufacturer	O																
EMSD.Common.Model No.	O																
EMSD.Common.Equipment Description	M																
EMSD.Common.Documentation	M																
EMSD.Common.Asset Relationship	O																
Type 3	For equipment which is not defined in Appendix G of BIM-AM SG (<u>non-BIM workflow</u>), Contractor shall provide assets information to EMSD SBU in order to facilitate manual asset creation AMS/CCS through CCS-Generic template. Approval from Asset Management Task Force (AMTF) for creating new asset template shall be obtained if it is necessary.																
Type 4	As this type of assets are not shown in the models, the asset data input shall be by means of uploading asset templates to AIMP. Refer to Section 2.4.4 of this Guide for details. Table 2-3 below illustrates the list of Type 3 E&M systems using the asset templates for data creation and inputting. To fulfil the requirements for asset management, Contractor shall complete the asset templates.																

Table 2-3 List of Type 3 E&M Assets which are NOT created in BIM Models

Object Type as specified in CCS asset templates	Nature of Asset/ System	Name of the E&M Asset / System
ZAC011	Level 1 System	HVAC Air Side
ZAC012	Level 1 System	HVAC Water Side
ZAC013	Level 1 System	Cold Room / Store
ZAC014	Level 1 System	HVAC Miscellaneous
ZBR011	Level 1 System	UHF TV System
ZBR012	Level 1 System	Satellite TV System
ZFP011	Level 1 System	Filtration Plant System
ZFS011	Level 1 System	Fire Services Wet System

Object Type as specified in CCS asset templates	Nature of Asset/ System	Name of the E&M Asset / System
ZFS012	Level 1 System	Automatic Fire Detection and Alarm System
ZFS013	Level 1 System	Gas Suppression System
ZFS014	Level 1 System	Portable Equipment
ZFS015	Level 1 System	Gas Detection System
ZFS016	Level 1 System	Exit Sign & Directional Sign
ZGE121	Level 1 System	Audio System
ZGE122	Level 1 System	CCTV System for non- burglar-alarm purpose
ZGE123	Level 1 System	Audio Video System
ZGE124	Level 1 System	Radio System
ZGE125	Level 1 System	Radar & Navigation System
ZGE126	Level 1 System	Microwave Link System
ZGE127	Level 1 System	Timing & Display System
ZGE128	Level 1 System	UPS System
ZSS011	Level 1 System	Boiler System
ZSY011	Level 1 System	Access Control System for the security purpose
ZSY012	Level 1 System	Burglar Alarm System
ZSY013	Level 1 System	CCTV and Intercom for the security purpose
ZSY014	Level 1 System	Smart Card System for the security purpose
ZSY015	Level 1 System	Call Alarm for the security purpose
ZSY016	Level 1 System	Videophone System for the security purpose
ZSY017	Level 1 System	Keypad Lock System for the security purpose
ZSY019	Level 1 System	Electric Lock System for the security purpose
ZSY018	Level 1 System	Drop-arm Barrier System for the security purpose
ZLI011	Level 1 System	Lighting System
CCS template-Generic	Level 1 System	Electrical Distribution System
CCS template-Generic	Level 1 System	Medical Gas System
CCS template-Generic	Level 1 System	Pneumatic Tube Transport System
CCS template-Generic	Level 1 System	Internet-of-thing Installation

Object Type as specified in CCS asset templates	Nature of Asset/ System	Name of the E&M Asset / System
CCS template-Generic	Level 1 System	High Voltage Power Supply System
CCS template-Generic	Level 1 System	Private Automatic Branch Exchange System
CCS template-Generic	Level 1 System	Automatic Refuse Collection System
CCS template-Generic	Level 1 System	Plumbing System
CCS template-Generic	Level 1 System	Drainage System
CCS template-Generic	Level 1 System	Water Leakage Detection System
CCS template-Generic	Level 1 System	Mechanical Handling & Lifting Installation

Note:

(1) Refer to Section 2.5.4.2 of this Guide for the example of creating Type 4 assets on AIMP by means of asset templates.

The figure below uses a Primary AHU as an example to illustrate how to reference the three appendices (Appendix B, D and G) to load relevant parameters into each BIM object family file. This is applicable for type 1 and 2 assets.

Figure 2-3 Loading Shared Parameters

Appendix G – List of Equipment

1 Find the EMSD System name based on equipment type
E.g. Primary AHU belongs to HVAC (Air Side)

BIM-AM No.	BIM-AM EMSD System Name	BIM-AM EMSD Equipment Type (*): Level 1 equipment type (*): Not existed in the EMSD asset templates.	BIM-AM Equipment Code
4	HVAC (Air Side)	Air Side (*)	-
4	HVAC (Air Side)	VRV-IDU	IDU
4	HVAC (Air Side)	Air Handling Unit	AHU
4	HVAC (Air Side)	Primary Air Handling Unit	PAU

Appendix B – Asset Data Template

2 Find Asset Data Template file based on System name, Find the correct Tab based on Equipment Type

3 Check the Common Parameters needed for equipment

4 Check the Equipment Specific Parameters needed for equipment

Appendix D – Shared Parameter file

5 Load relevant parameters into Family

2.4.3 Asset Relationship

Asset relationship, also known as system topologies in Appendix C of BIM-AM SG, provides information on how the assets are connected to each other. Asset

The templates can be downloaded from AIMP and details can be referred to the Section 2.5.4.3 of this Guide.

For E&M asset that cannot be modelled when relevant and suitable CCS templates are not available, Contractor shall coordinate with EMSD SBU for the asset data requirement as far as practicable.

As-built documents (e.g. O&M manuals, catalogues, certificates, etc.) should be organised into folder structure as detailed in Appendix I of BIM-AM SG. As-built documents shall be prepared in a .zip file to be uploaded into AIMP.

All columns in green colour filled heading shall be input by the Contractor. Whereas the file information with orange and light blue colour filled heading including CDE path, author and discipline etc. could be automatically generated from CDE after being uploaded to the AIMP cum CDE by the Contractor. A sample of MII in excel (.xlsx) format should be referred to Annex 2 (See the figure below for reference). The Contractor shall expand and/or modify the MII to comply with requirement for individual projects and stakeholders.

[illegible]

Section 7.2 of BIM-AM SG provides the details to the requirements of RFID tags and QR codes installation on equipment and zones respectively. Contractor shall then encode the RFID tags and assign coding based on the naming convention as specified in BIM-AM SG and submit to EMSD SBU for approval. Contractor shall

include the approved site survey report mentioned in Particular Specification for EMSD BIM-AM Implementation for EMSD SBU as record.

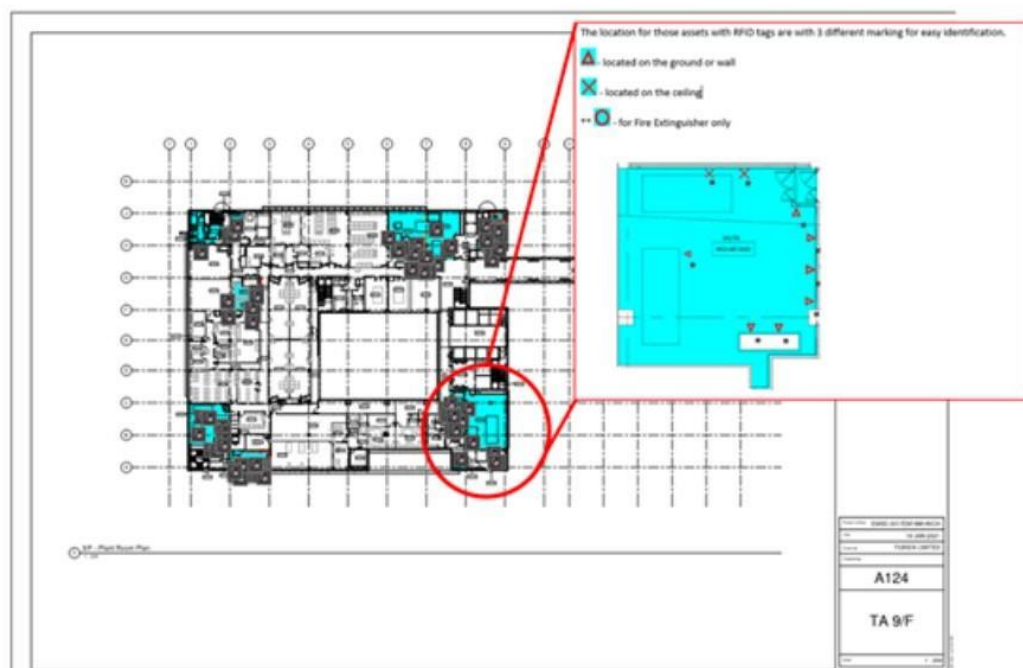
The figure below is an example of the list where Asset Code / Zone and its corresponding RFID/QR code are reflected.

Figure 2-5 Example of RFID/QR code list

Tower	Floor	Room	Asset Code	Asset Description	RFID Asset Tag Code
A	9F	AHU Room (063)	KC-HKCH-TA-009-HVAC-AHU-0006	AHU-A-903 (R)	HKCH-040000095
A	9F	AHU Room (063)	KC-HKCH-TA-009-HVAC-EAF-0002	EAF-A-907	HKCH-040000096
A	9F	AHU Room (063)	KC-HKCH-TA-009-HVAC-EAF-0001	EAF-A-908	HKCH-040000097
A	9F	AHU Room (063)	KC-HKCH-TA-009-HVAC-FD-0025	FD-A-9F-026	HKCH-040000098
A	9F	AHU Room (063)	KC-HKCH-TA-009-HVAC-FD-0002	FD-A-9F-027	HKCH-040000099
A	9F	AHU Room (063)	KC-HKCH-TA-009-HVAC-FD-0027	FD-A-9F-028	HKCH-040000100
A	9F	AHU Room (063)	KC-HKCH-TA-009-HVAC-FD-0026	FD-A-9F-029	HKCH-040000101
A	9F	AHU Room (063)	KC-HKCH-TA-009-HVAC-FD-0028	FD-A-9F-030	HKCH-040000102
A	9F	AHU Room (063)	KC-HKCH-TA-009-HVAC-FD-0029	FD-A-9F-031	HKCH-040000103
A	9F	AHU Room (063)	KC-HKCH-TA-009-FS-PFE-0006	Fire Extinguisher	HKCH-070000037

These RFID asset and zone codes shall also be inputted in the BIM models via parameter name “EMSD.Common.Asset.Tag” and “EMSD.Common.Zone.Tag”.

Figure 2-6 Floor plan shows the location for assets with RFID Tags



For more information on RFID Tag and QR Code application, please visit the website provided in Section 1.1.1.

2.4.7 Templates of the Operational Point Mapping

This deliverable is only applicable for the project with the project scope of system interface between real time monitoring system to EMSD BIM-AM Systems. The templates (.xlsx) should be referred to Appendix H of BIM-AM SG. Contractor shall use the templates for providing the following.

- Point mapping list, which shows the mapping of each operational point to dedicated asset code.
- Point type definition file, which shows the point type, unit, range and threshold etc.

2.5 Stage II – Uploading Asset Data

Upon the PT's approval to BIM models and asset data in Stage I, Contractor shall complete the following tasks.

2.5.1 Accessing to AIMP

Contractor shall use AIMP to complete the asset data and export the COBieLite file for uploading to BIM-AM systems. Contractor shall request AIMP access from BIMSD through EMSD SBU. Refer to Appendix C in BIM-AM SG for details on operating AIMP.

2.5.2 Setting Up BIM Models before Conversion

Contractor shall select the correct settings in default 3D view prior to BIM models upload and ensure that all E&M models are broken down into individual Level 1 E&M systems per floor.

Contractor shall upload all the native files of E&M BIM models and other discipline (e.g. architectural and structural) BIM models to AIMP.

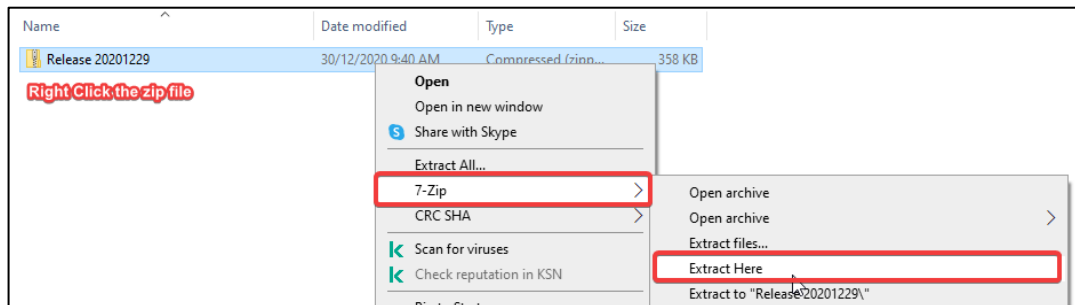
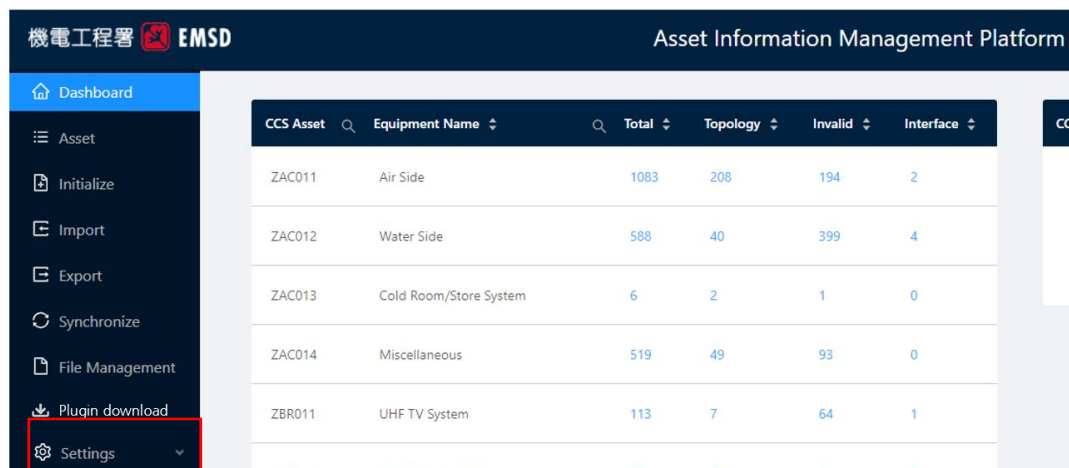
2.5.3 Plugin for Asset Data Export from BIM Models

The Contractor shall export a COBieLite in .xml format of a BIM model, by using compatible extension for BIM authorising tool or equivalent, e.g. Autodesk COBie extension for Revit³.

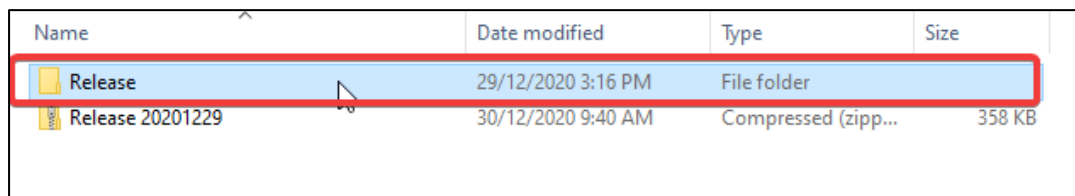
“COBeLite Exporter” is a plug-in developed by EMSD for general BIM-authorising tool. The Contractor shall make request to the BIMSD for “COBieLite exporter” installation package to ensure the data format is fully compatible to BIM-AM systems. Detail procedures of using the plugin are illustrated as follows.

³ <https://interoperability.autodesk.com/cobieextensionrevit.php>

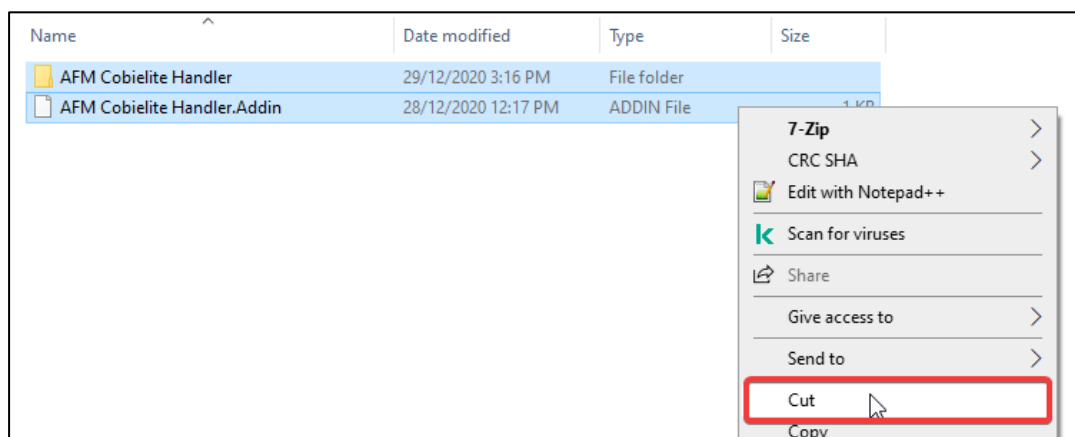
1. Step 1: Download the plugin on AIMP and install the plugin



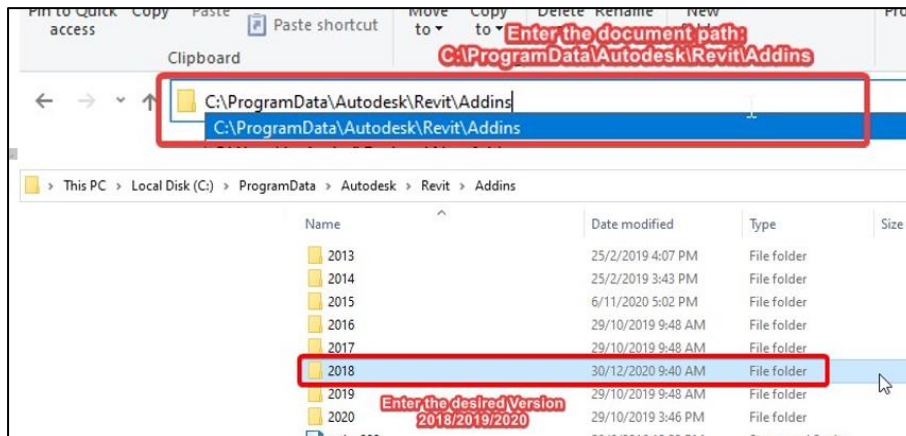
- Click “Release”



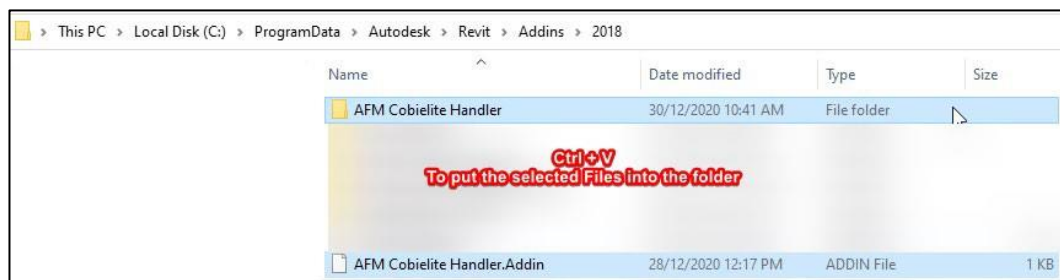
- Copy all file inside “Release” folder



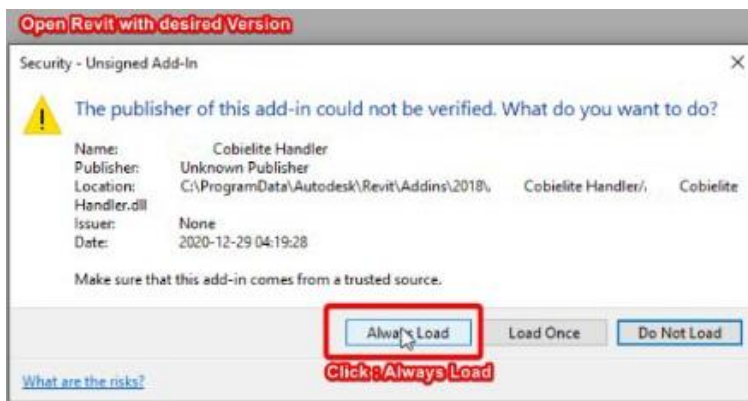
- Enter the link “C:\ProgramData\Autodesk\Revit\Addins” and choose the desired version



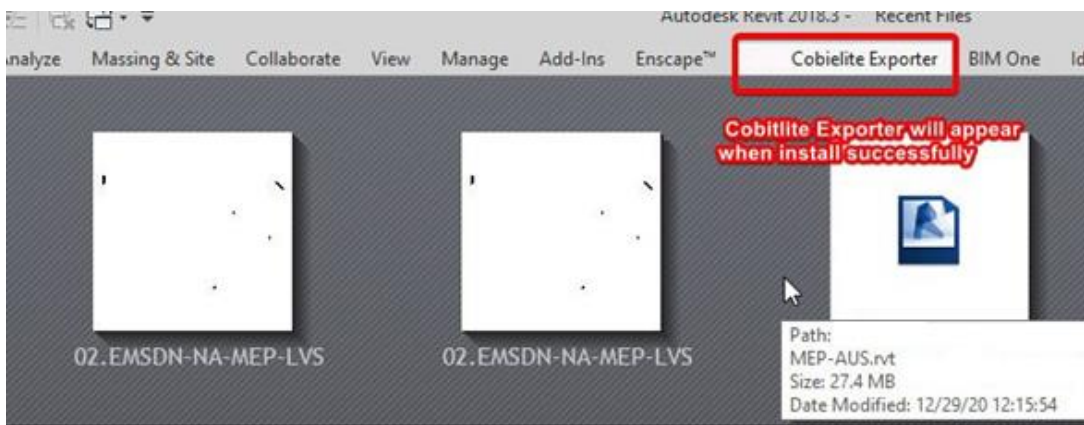
- Paste all documents from “Release” folder into the folder of desired version



- Open Revit with correct version, click “Always load” in pop-up window to install the Plugin.

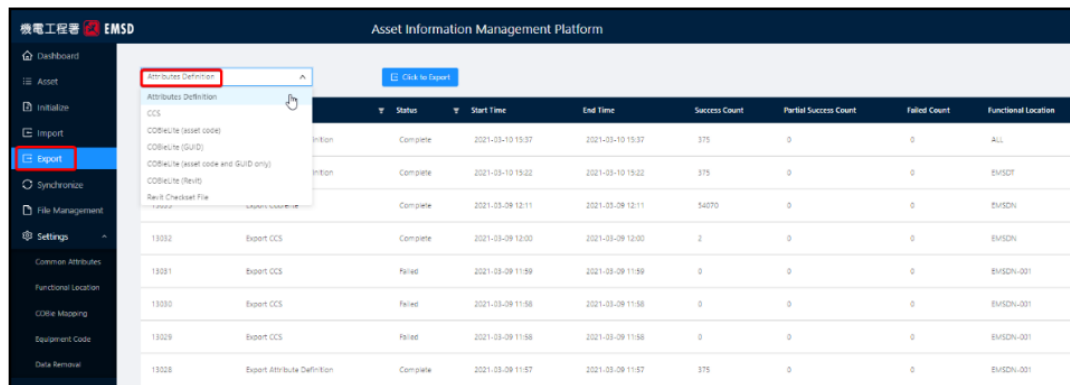


- Open Revit with correct version, click “Always Load” in pop-up window to install the plugin.

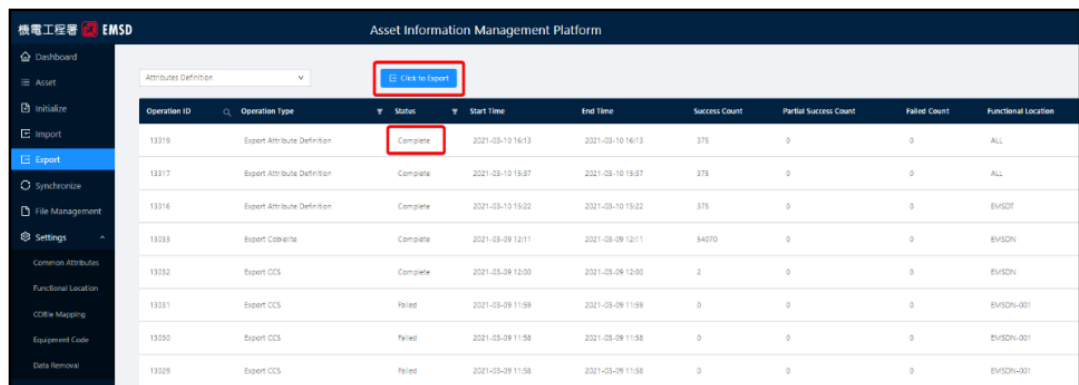


2. Step 2: Export Attribute Definition file from AIMP

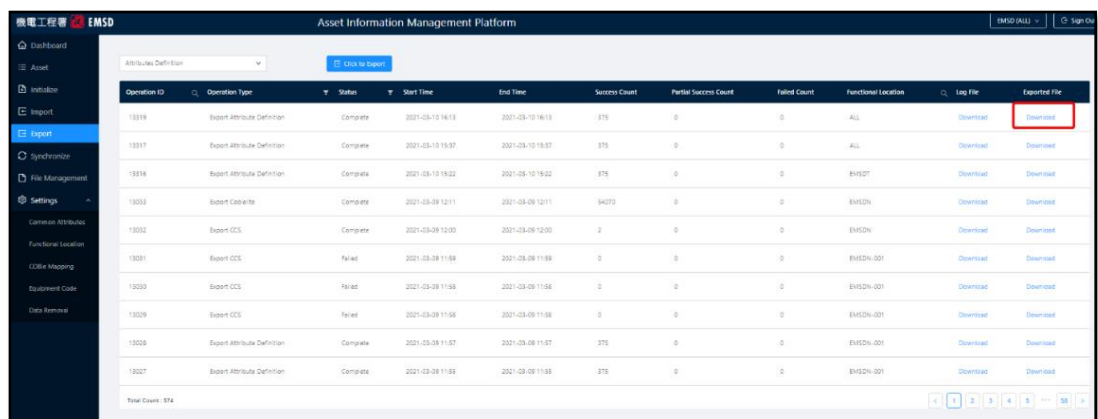
- Log in to AIMP.
- Click “Export”. Choose “Attributes Definition”.



- Click “Click to Export” to export the Attributes Definition file. Status will be changed to “Complete” if export is successful.

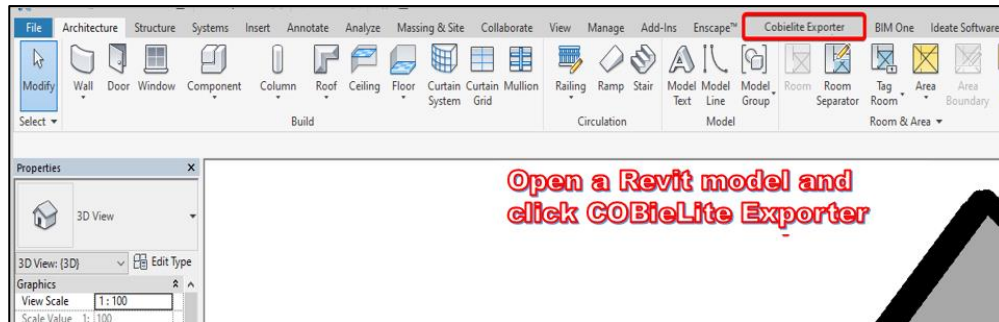


- Click “Download” under “Exported File” column.

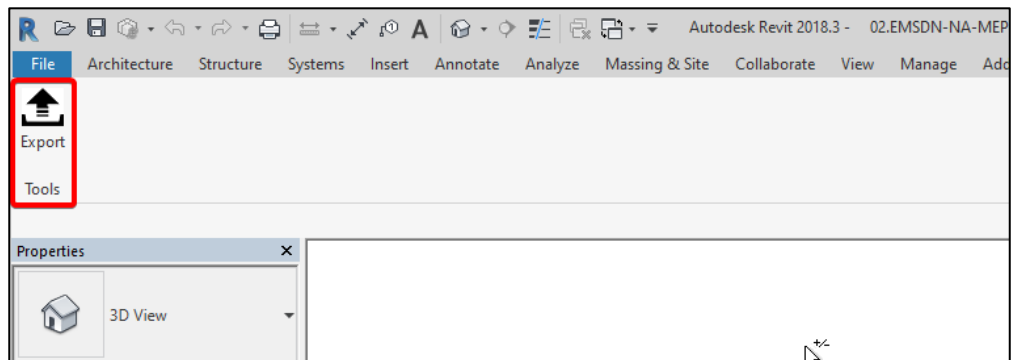


3. Step 3: Select the Attributes Definition file.

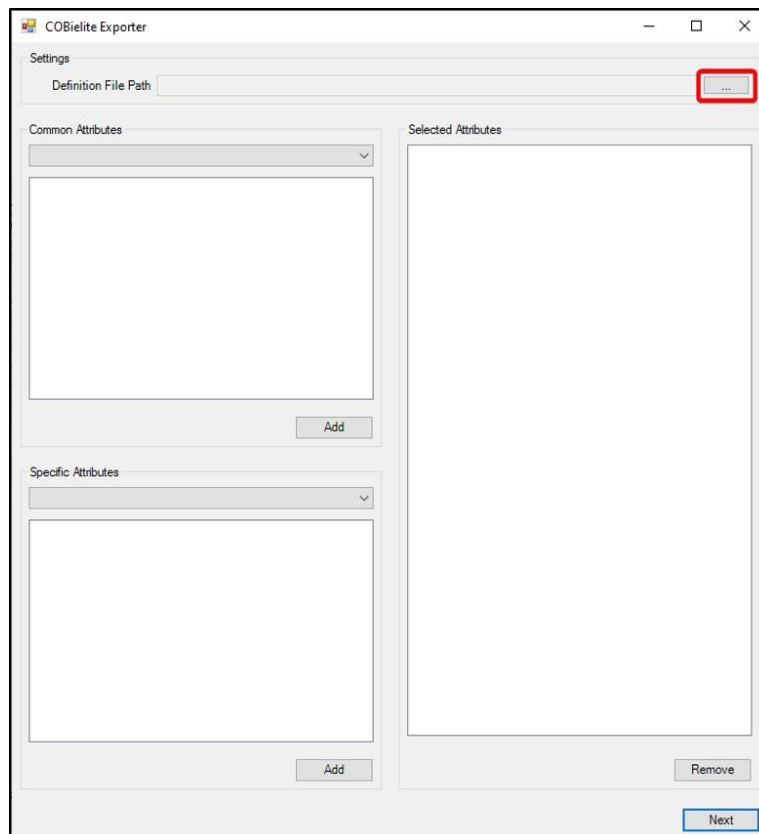
- Click “COBieLite Exporter” in toolbar.



- Click “Export” to open the plugin.

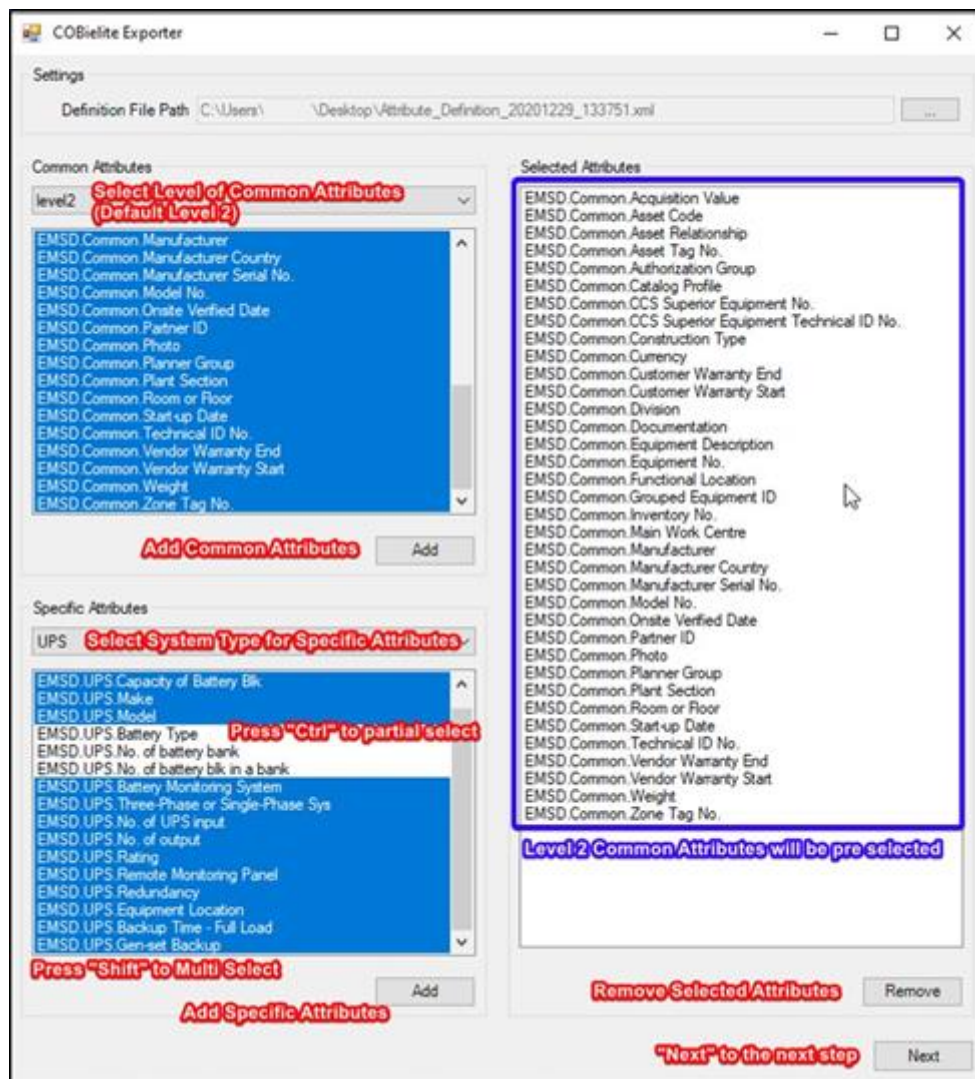


- Click “...” to import the definition file.

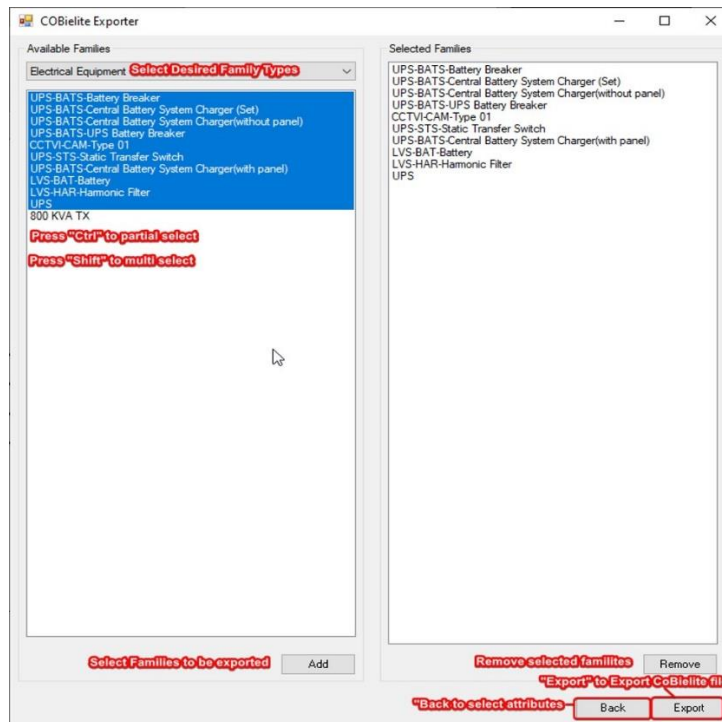


4. Step 4: Select the related attribute set

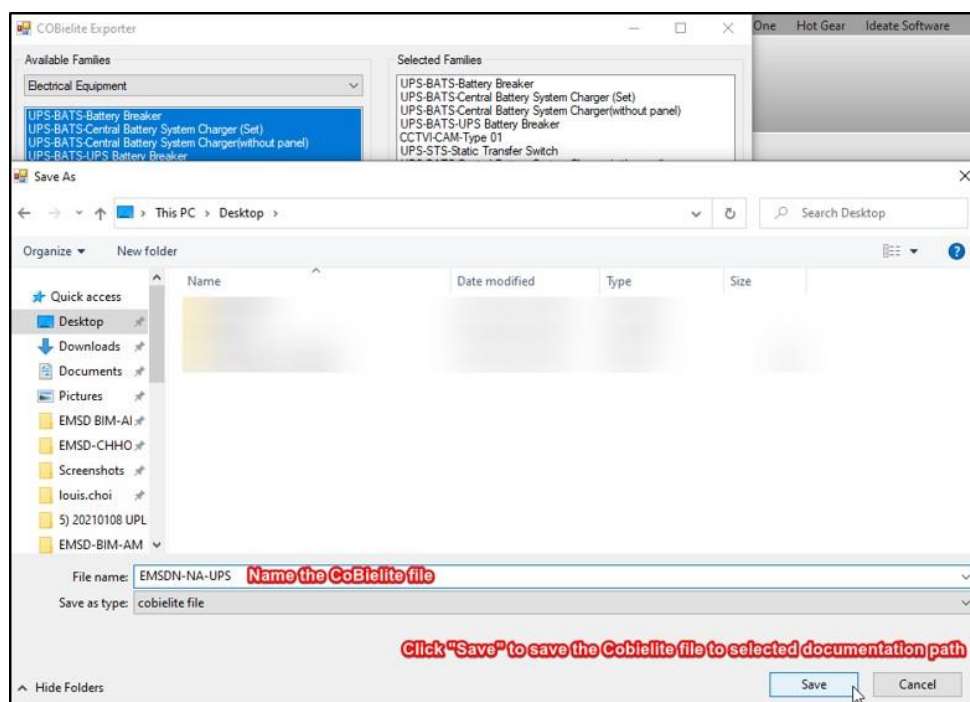
- Select desired attributes to be exported. Level 2 common attributes will be pre-selected by default. Then, click “Next” to proceed.



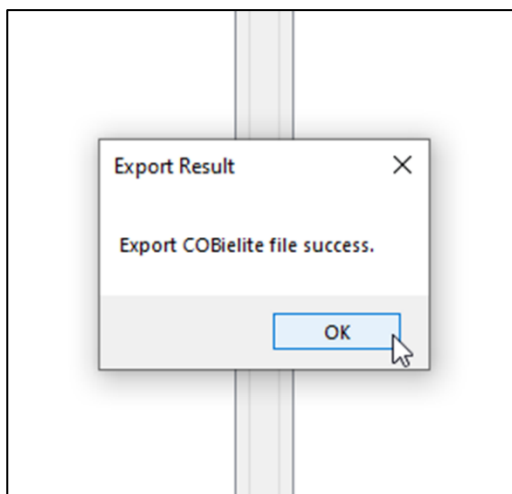
- Select desired families to be exported. Click “Export” to export COBielite file.



- Click "Save" to save the COBielite file to the selected documentation path.



- "Export COBieLite file success" will pop up when export is successful.



2.5.4 Uploading to AIMP

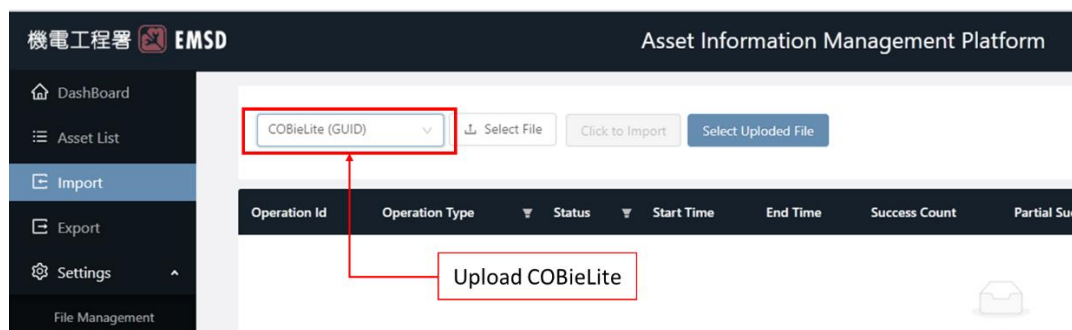
EMSD SBU shall coordinate with BIMSD to obtain a set of login name(s) and password(s) for Contractor to access AIMP.

2.5.4.1 Uploading BIM Model Data to AIMP

Contractor shall upload the COBieLite files exported from the BIM models to AIMP⁴

The figure below illustrates the user interface of uploading COBieLite files to AIMP.

Figure 2-7 Uploading COBieLite



2.5.4.2 Uploading CCS assets templates for those asset not created in BIM Models

Assets not shown in BIM models (e.g. Type 4 asset specified in Section 2.4.2 and Level 1 systems) shall be created by importing the CCS asset templates to AIMP (as shown in the figure below) or directly inputted to AIMP (as shown in Figure 2-9).

4

https://www.emsd.gov.hk/en/engineering_services/project_management_consultancy/highlights_of_work/bim_a_m/index.html

Figure 2-8 Uploading CCS Templates into AIMP

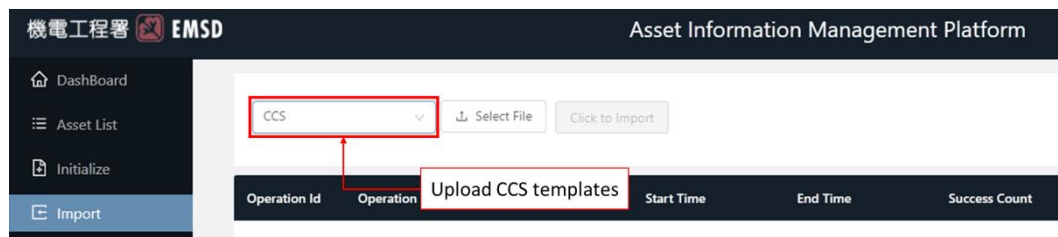
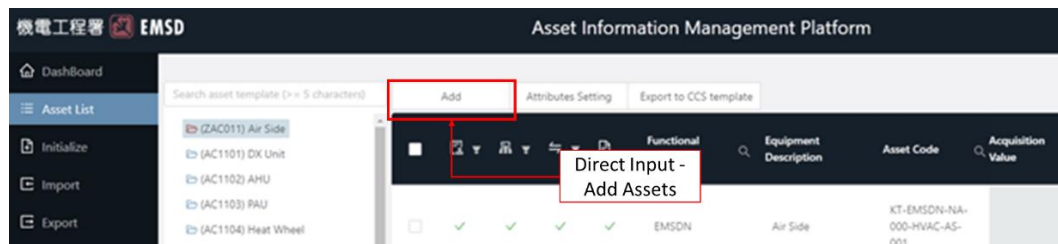


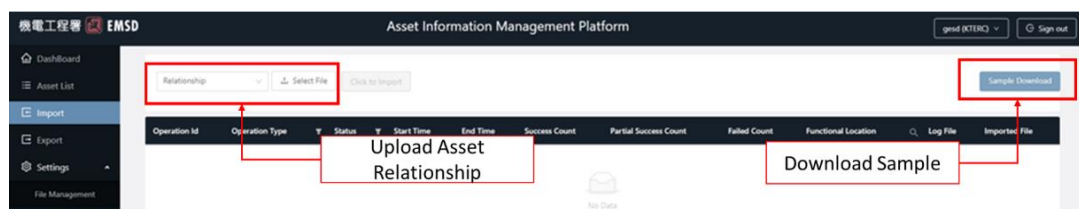
Figure 2-9 Creating Assets within AIMP



2.5.4.3 Uploading Asset Relationship to AIMP

Contractor shall upload the completed asset relationship file (in .xlsx format) as mentioned in Section 2.4.3 to AIMP.

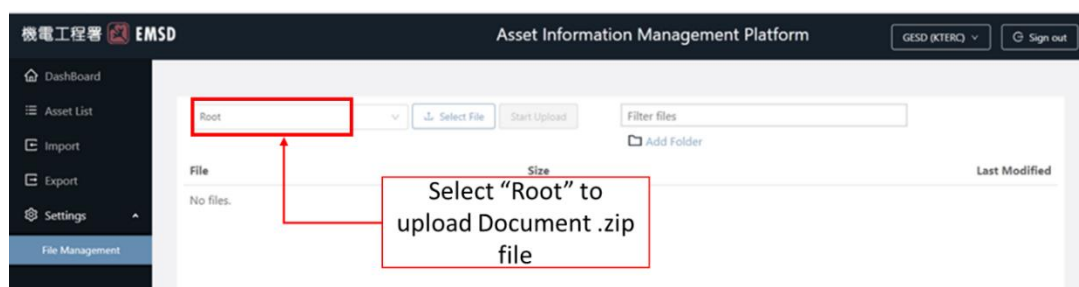
Figure 2-10 Uploading Asset Relationship to AIMP



2.5.4.4 Uploading and Associating As-Built Documentation in AIMP

Contractor shall upload .zip file of as-built documents to AIMP using the folder template mentioned in Section 2.4.5.

Figure 2-11 Uploading As-Built Documents in AIMP



2.5.5 AIMP Post Processing

Most of the information should be populated within AIMP via uploads. Contractor shall update and complete the information after uploading templates to AIMP, including:

- Asset relationships (also referred as system topologies);

- Asset to document mapping (cannot be manually added in model/ excel); and
- Creation of Level 1 System

2.5.5.1 Asset Relationships

Although asset relationships are uploaded using the Excel template and should be already captured in AIMP, Contractor shall ensure that the information is correctly captured. If there are any missing information or errors, the asset relationship can be edited within AIMP.

2.5.5.2 Asset to Document Mapping

Contractor shall assign document into folder structure as shown in Appendix I of BIM-AM SG to facilitate asset to document mapping on AIMP. Detail instructions shall be referred to Appendix C – AIMP User Guide of BIM-AM SG.

2.6 Stage III – Setting Up BIM-enabled Database for Data Upkeep

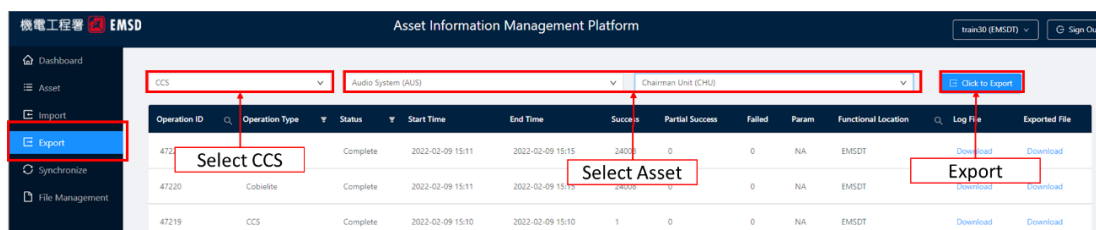
EMSD SBU shall conduct the completeness checks on handover deliverables submitted by Contractor through PT before uploading to BIM-AM.

The AIMP system is locked during the approval process. If EMSD SBU finds that there are too many deficiencies in the AIMP information, the system would be released again for Contractor to complete this information. Alternatively, if EMSD SBU is satisfied with the information completed in AIMP, Contractor will get the approval on AIMP.

2.6.1 Exporting CCS Templates

Contractor shall export the completed CCS templates from each asset category from AIMP and submit them to EMSD SBU for approval. The figure below is the user interface for the export.

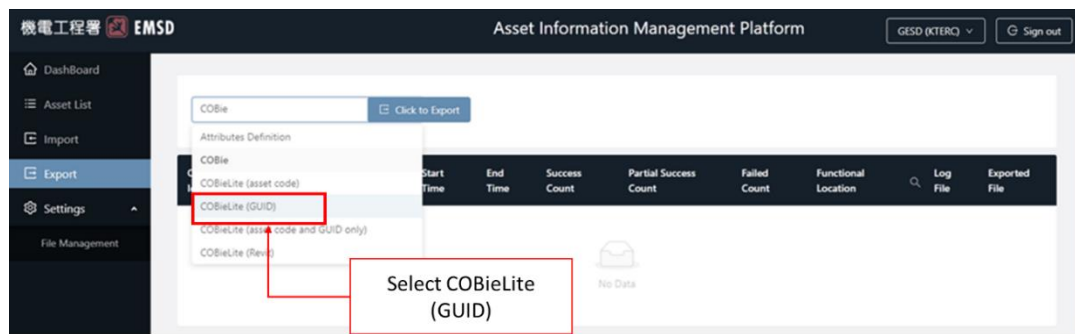
Figure 2-12 Export CCS templates from AIMP



2.6.2 Exporting COBieLite files from AIMP

Contractor shall export the COBieLite (GUID) files from AIMP and submit them to EMSD SBU for approval. The figure below is the user interface for the export.

Figure 2-13 Export COBieLite file from AIMP



2.7 Handover Deliverables

The list of deliverables and their file formats required for the handover can be summarised as follows:

2.7.1 Stage I – Deliverables Preparation

- As-built E&M BIM model (e.g. .rvt) and BIM objects (e.g. .rfa)
 - Asset schedules per equipment types as specified in Appendix G (.xlsx) should be generated in the native BIM models
- Completed Model Checklist (.pdf) (refer to BIM-AM Deliverable Checklist mentioned in Annex 3 of this Guide)
- As-built drawings, documents and photos complied with the folder structure under Section 2.4.5 (.zip) with attaching document index list from MII and list out all O&M documents.
- Asset relationship (.xlsx)
- Type 4 Asset data not in BIM models (.xlsx)
- Site installation of RFID tags and QR codes, including RFID/QR list (.xlsx) and location plan (.pdf)
 - Point definition and point mapping based on Appendix H of BIM-AM SG (.xlsx)
- Master Information Index (.xlsx)

2.7.2 Stage II – Uploading Asset Data

- Model Conversion / upload – COBieLite file (.xml)

2.7.3 Stage III – Setting Up BIM-enabled Database for Data Upkeep

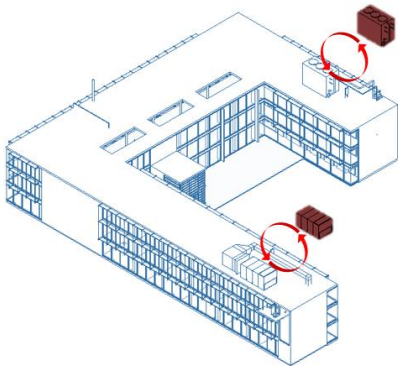
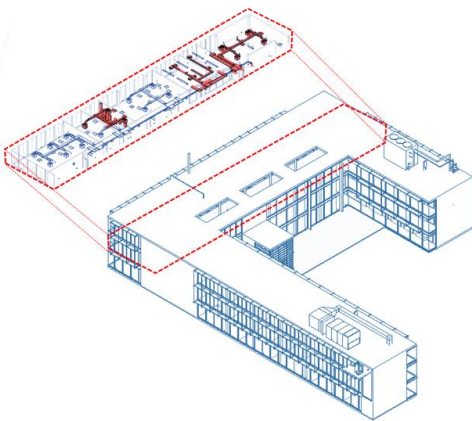
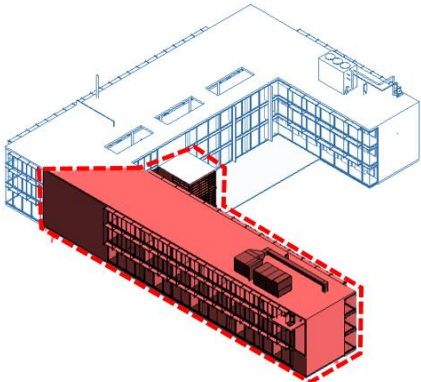
- COBieLite export from AIMP
- AIMP CCS template export from AIMP
- Completed BIM-AM Checklist (.pdf) (refer to BIM-AM Deliverable Checklist mentioned in Annex 3 of this Guide)

3 A&A Handover Procedures

3.1 Types of A&A Projects

A&A projects are categorised into three types according to the following criteria as shown in Table 3-1.

Table 3-1 Types of A&A Projects

	Type I <u>Replacement works</u> • To be conducted by EMSD SBU internally • No model deliverables
	Type II <u>Projects Engaging Contractor Only</u> • Contractor to be engaged for works contracts. • Contractor to submit as-built drawings and/or models deliverables as well as updated asset data.
	Type III <u>Projects Engaging Consultant and Contractor</u> (for large scale A&A works which involve design and construction activities. For small scale A&A works, design to be performed by EMSD in-house design team) • Consultant and Contractor to be engaged. • Contractor to submit drawings and/or models deliverables as well as updated asset data.

3.2 Type I A&A Project

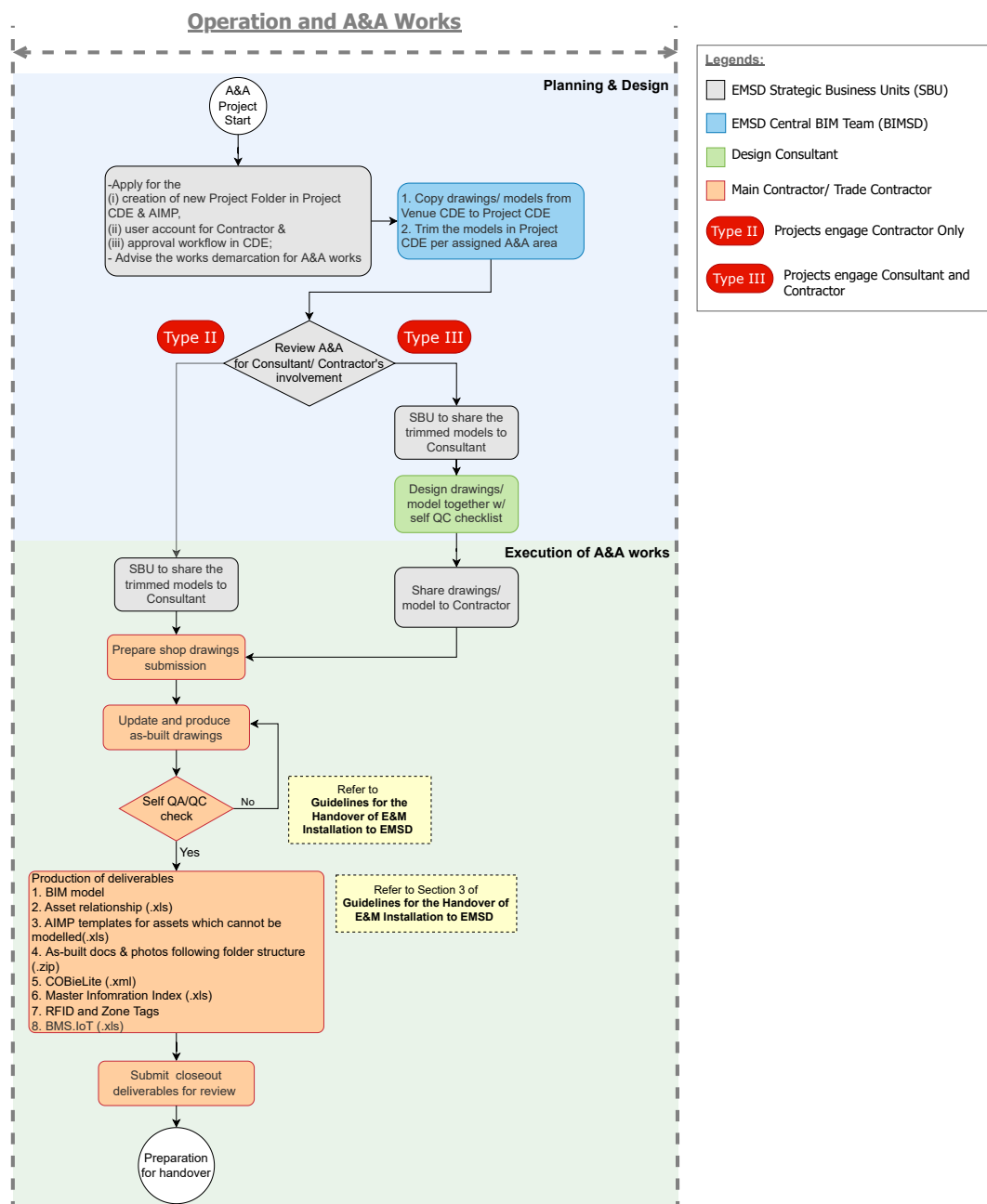
Type I A&A project applies to project that only involves in the alteration and replacement of assets. The asset information of the replaced asset shall be updated into EMSD's AMS / CCS/ BIM-AM systems.

Contractor shall coordinate with EMSD SBU to provide the information required to update asset attributes.

3.3 Type II & Type III A&A Projects

Type II and Type III A&A projects apply to projects where there are modifications to an existing building that will require models and asset data updates. The following diagram shows the workflow for these projects.

Figure 3-1 Workflow for Type II & III A&A Projects



3.3.1 Project initiation

Contractor shall request for the following information from EMSD SBU at the beginning of the project:

- Model of existing conditions (if any)
- CAD Drawings of existing conditions

Contractor shall use these existing drawings and/or models for verifying existing conditions of the venue and develop a set of updated drawings and/or models for the handover. Since these existing models are exported from EMSD's database, they are already structured according to requirements stipulated in the BIM-AM SG.

Contractor shall maintain the model configurations of the existing conditions while making A&A updates to the model. This will include:

- Model naming and breakdown structure
- Shared parameters and existing asset attributes
- Visibility/Graphics settings
- Coordinates

3.3.2 Project Handover

Similar to new-build project, Contractor will acquire access to the AIMP from BIMSD through EMSD SBU. The table below highlights the differences in deliverables between new-build project and Type II & III A&A projects.

Table 3-2 New-build vs A&A

#	New-build project	Type II & III A&A Projects
1	Provide a list of all assets	Provide a <u>list of all assets</u> , differentiating them into the below categories: • Added • Removed • Relocated or modified
2	As-built project drawings / models	Project drawings/ models indicating areas that has been added, removed or modified.
3	Complete topology for all assets	• Create topology for new asset / systems created during A&A works. • No topology information needs to be filled for replaced assets because they are part of the existing system.
4	• All asset information in BIM models need to be populated. • Full asset information shall be provided for those assets are not drawn in BIM models, but need to be created with asset code as detailed in section 2.4.2	Provide full asset information for new assets and partial asset information for modified assets details.
5	Master Information Index (MII) for list of BIM models and Drawings	Master Information Index (MII) for list of BIM models and Drawings

3.3.2.1 As-Built BIM model

Contractor shall make updates to the models provided by EMSD SBU during project initiation while making sure that model requirements mentioned in the BIM-AM SG and the H/O Guide is maintained.

These are the various types of assets and how their asset data should be reflected in the model:

Table 3-3 A&A Assets in BIM Models

Methodology of Handling different Asset in BIM Models	
New Asset	Create shared parameters and input asset data into BIM model
Existing Asset	Remove information within parameter “EMSD.Common.Asset Code”
Demolished Asset	Remove information within parameter “EMSD.Common.Asset Code”
Relocated Asset	- Contractor shall move model elements within existing models to the new location. New BIM objects for relocated asset in A&A model is prohibited to retain the same GUID between the existing and A&A models. - Remove information within parameter “EMSD.Common.Asset Code” for COBieLite export. - For the submission of as-built BIM models, the asset code and zone tag number of the relocated asset need to be inputted.

3.3.2.2 RFID and QR Code Tagging

Contractor shall create a RFID and QR code list and list out the replaced assets and the new assets.

- Replaced asset shall use the same RFID codes as the existing asset.
- New asset shall be assigned with a new RFID code. Contractor shall liaise with EMSD SBU to ensure that this code is unique and has not been used anywhere else in the existing site.

Contractor shall arrange a site inspection with EMSD SBU to verify the installation of the new tags and ensure that the existing RFID or QR tags are not affected by A&A works. If any existing RFID or QR tag is found to be obstructed or damaged by A&A works, Contractor shall provide replacement for the asset or zone.

3.3.2.3 AIMP Data Inputs

The table below illustrates the actions responding to the situations that Contractor may encounter while updating the Asset information into AIMP:

Table 3-4 Actions for A&A Asset Data Inputs

Asset Information Data	
New Assets	Contractor to input asset data into BIM models or directly update asset data to AIMP by using asset templates

Asset Information Data		
Existing Assets	Removed:	No action required
	Modified/Relocated:	Contractor to input only fields that were modified during the A&A works
	Unchanged:	No action required

3.4 A&A workflow

Other than the differences highlighted in Section 3.3.2 and 3.3.2.3, the overall workflow remains the same as new-build projects. The figure below is the A&A workflow for deliverables preparation. Refer to Annex 1 for enlarged version of this diagram.

Figure 3-2 Handover Deliverables- Stage I Detailed Deliverable Preparation Diagram (A&A)

Stage I Detailed Deliverable Preparation diagram (A&A)

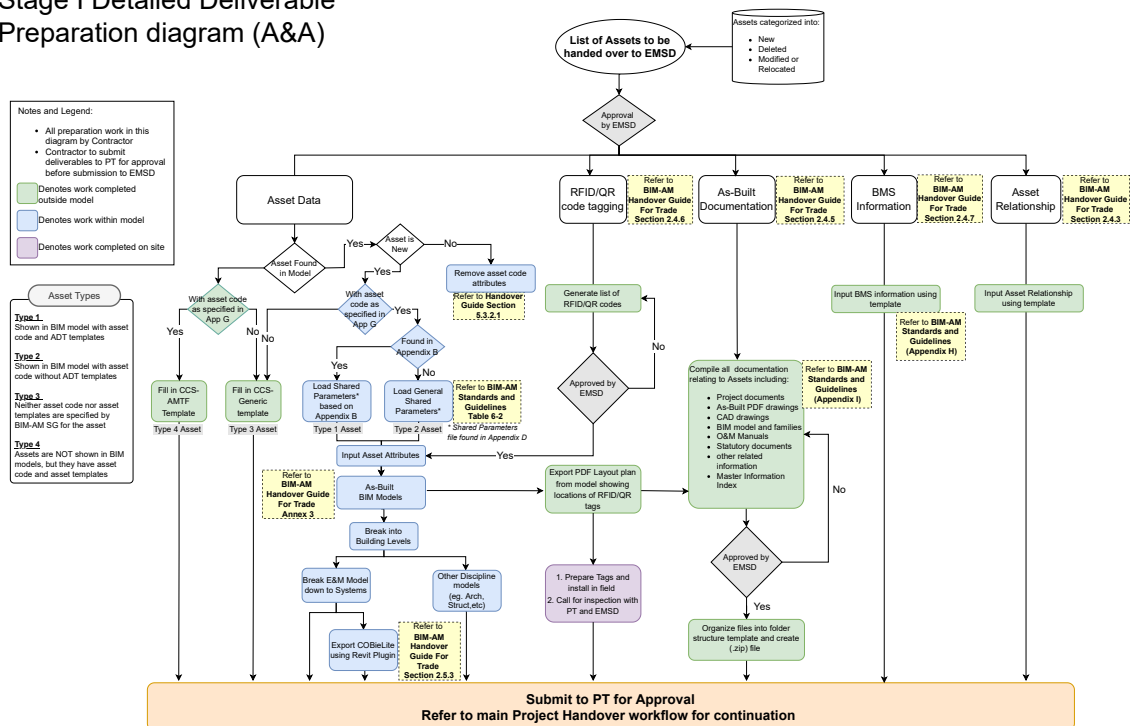


Figure 4-2 Screenshot of ADT (Appendix B of BIM-AM SG)

EMSD BIM-AM Asset Data Template (ADT)									
KDT Reference No.	EMSD								
Code (System - Equipment)	LTG-LUM								
System Type	Lighting System								
Equipment Type	Luminaire								
Equipment Level	L2								
Version	2.0								
Parameter Name	Description	Type	Group	Example	Max characters	Value	Units	M/O	EMSD Specific
GENERAL	Parameter type: Instance	Discipline: Common							
EMSD Common Asset Code	Long form Asset Code	Text	Data	KT-EMSD-AIA-001-HVAC-FCU-0001	33	KC-HVCH-TA-RF-LTG-LU-M-0024		M	N
EMSD Common Functional Location	Functional Location	Text	Data	CHB-LF	30	HVCH-LI		M	Y
EMSD Common Asset Relationship	Asset Relationship of the equipment	Text	Data	To be filled using asset information input tool	N/A	Filled by excel table		M	N
EMSD Common Grouped Equipment ID	Grouped Equipment ID of the equipment	Text	Data	To be filled using asset information input tool	N/A	Assigned by AIMP after filled asset relationship		M	N
EMSD Common Asset Tag No.	RFID Tag No. / QR Code of the equipment	Text	Data	EMSDN-0000000001	16	N/A		M	N
EMSD Common Zone Tag No.	QR Code for Zone	Text	Data		16	Filled by dym		M	N
EMSD Common Onsite Verified Date	Onsite Verified Date	Text	Data	01.12.2000	N/A	11.06.2020		M	N
EMSD Common Installation Group	Who provide on-site services to create job and notification with reference to the	Text	Data	T304	4	H300		M	Y
EMSD Common Division	Division of the equipment	Text	Data	05 PD	N/A	03 - HSD1		M	Y
EMSD Common Equipment Type	EMSD CCS/SAP	Text	Data	19570000	8	10912605		M	Y
EMSD Common Main Work Centre	Location main centre for maintaining the	Text	Data	MC14E00	8	H3000		M	Y
EMSD Common Partner ID	Short form search form of customer department	Text	Data	CSD	10	NA-HVCH		M	Y

4.1.2 BIM Model Checklist

To ensure the compliance of the BIM-AM requirement (e.g. coordinates, units, file size, etc) for BIM models, Contractor shall go through the BIM-AM Deliverable Checklist in Annex 3 of this Guide for self-checking.

After the BIM models have been gone through the checks, Contractor shall submit the BIM models, checklists, schedules and reports generated by the Revit plugin to PT to verify that the BIM models are ready to be uploaded to AIMP.

4.2 AIMP Data Checking

4.2.1 Data Completeness

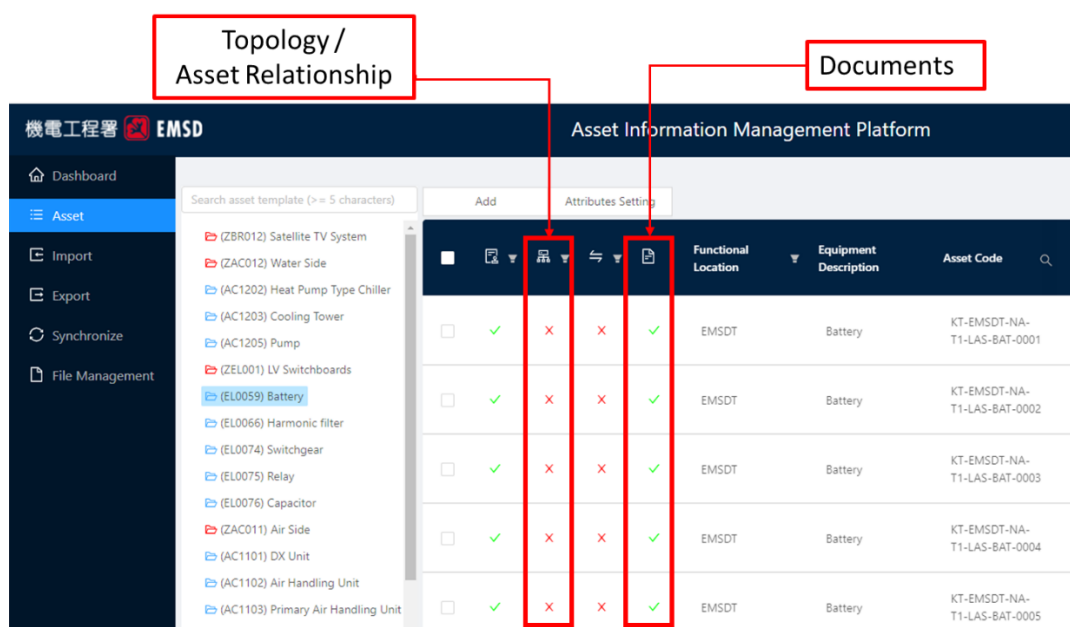
Contractor shall ensure the accuracy of the inputs into AIMP of asset information, including those using the BIM models and those using CCS templates.

Figure 4-3 Checking Number of Assets within AIMP

Asset Information Management Platform									
CCS Asset	Equipment Name	Total	Topology	Invalid	Interface	CCS Asset	Equipment Name	Total	Topology
ZACD11	Air Side	4	0	2	0	AC1101	DX Unit	15	6
ZACD12	Water Side	5	1	4	0	AC1102	Air Handling Unit	17	0
ZBR011	UHF TV System	0	0	0	0	AC1103	Primary Air Handling Unit	4	0
ZBR012	Satellite TV System	2	0	0	0	AC1104	Heat Wheel	0	0
ZEL001	LV Switchboards	1	1	0	1	AC1105	Fan Coil unit	25	1
ZEL011	Generator	1	1	1	1	AC1106	Fire Damper	5	0
ZFS016	Exit sign & Directional sign	1	0	1	0	AC1107	Heads Air Fan	0	0
Total Count : 16						AC1108	Exhaust Air Fan	0	0
						AC1109	VAV Box	4	0
						AC1105	Local Control Panel	0	0
						Total Count : 11			

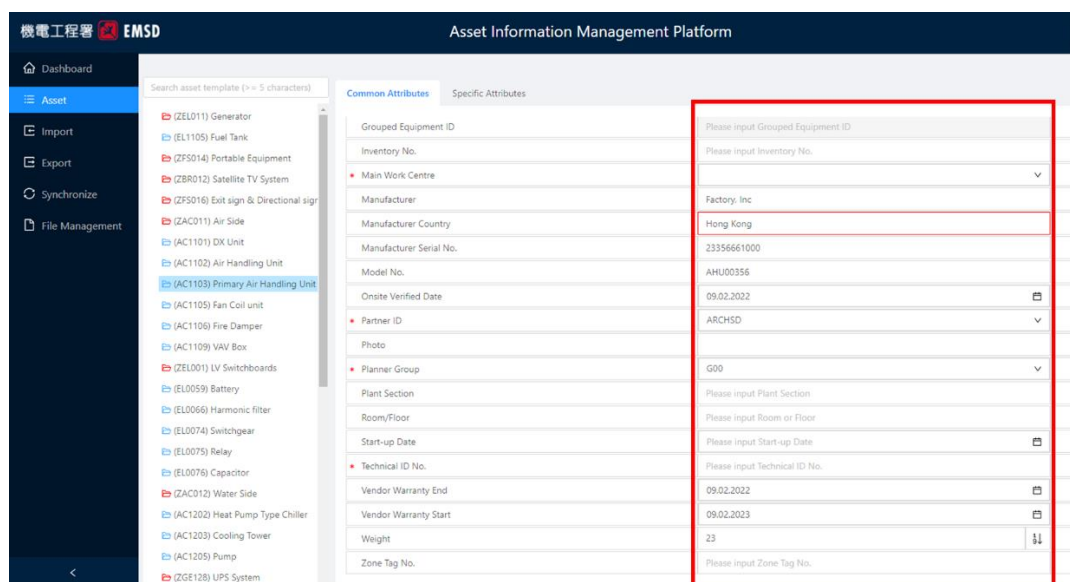
Contractor shall click into the systems to check that topology and asset documents have been successfully captured in AIMP. The user interface intuitively places a green checkmark for information captured and red cross for missing information.

Figure 4-4 Checking Topology and Documents in AIMP



Lastly, Contractor shall ensure that all mandatory information for the respective assets is captured in the system.

Figure 4-5 Checking Asset Attributes in AIMP



4.2.2 Data Integrity

Contractor shall ensure that asset relationships and asset documents are uploaded correctly into AIMP. This can be examined by conducting quality checks across a wide range of assets in AIMP.

For asset relationship, the topology diagram shall match information reflected in as-built system schematic diagrams.

For asset documents, each asset shall be mapped to the correct documents by opening the document folder.

4.3 On-Site Checking

PT shall check whether the quantity, location and size of all the equipment generally aligned with the site condition or not. Accuracy of setting-out location and spatial dimensions between the models and actual installation should be subject to ArchSD or relevant Project Team's approval based on the project specifications.

The on-site checking is mainly for the RFID Tags and QR codes and should be examined according to the installation requirements which are specified in Section 7.2 of BIM-AM SG.

Contractor shall perform full inspection on site, verifying the below:

- Tag visibility is unobstructed;
- Tag location is reflected correctly in the layout; and
- Tag is associated with the correct asset.

Upon completion of the above self-check on-site, the Contractor shall notify EMSD SBU for on-site inspection for the purpose of demonstrating the satisfactory performances of the installations. The inspection shall be conducted before the installation of false ceiling. For existing venues, inspection shall be subject to the user's permission and be performed as far as practicable.

End of the Guidelines