Annex 3
CDE User Guide

Sept 2022

機電工程署 EMSD

Content

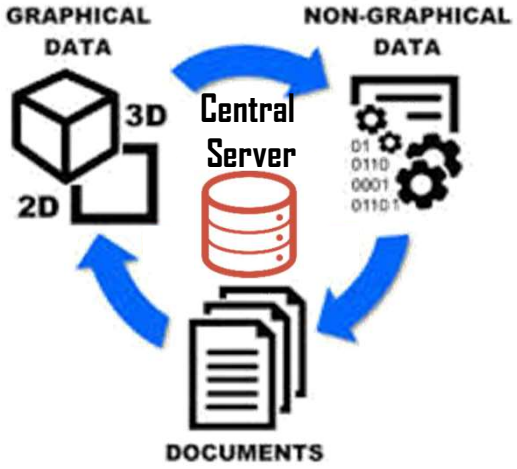
- **Part 1 : Background Introduction**
- **Part 2 : Fundamentals of CDE**
- **Part 3 : CDE Adaptions in EMSD**
- **Part 4.1 : General UI**
- **Part 4.2 : Container**
- **Part 4.3 : File Upload and Preview**
- **Part 4.4 : Model Viewer**
- **Part 5 : Enhancement in AIMP and BIM-AM**
- **Part 6 : Upcoming Features**

Fundamentals of CDE

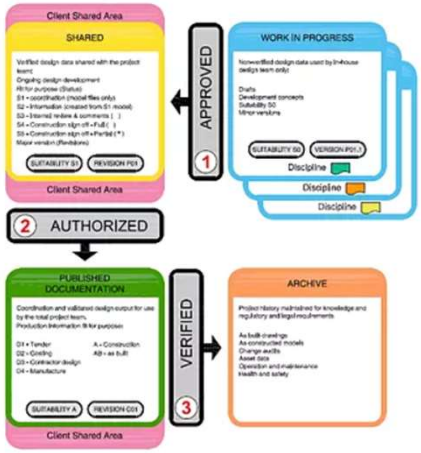
Part 2

機電工程署 EMSD

Common Data Environment (CDE)



Central Storage



Workflow Management

Working within a single environment

Common Data Environment

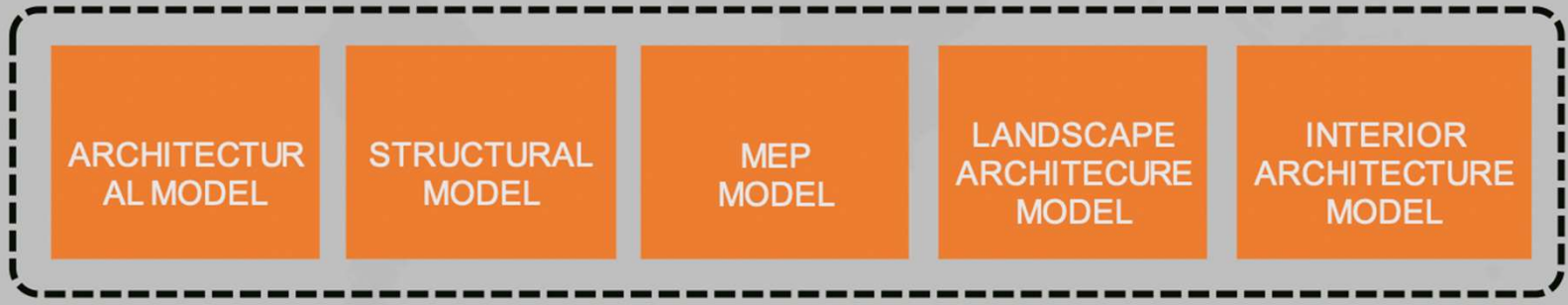
Provision of a single environment to store shared asset data and information, accessible to all individuals who are required to produce, use and maintain it

ISO 19650-1:2018

Definition of CDE

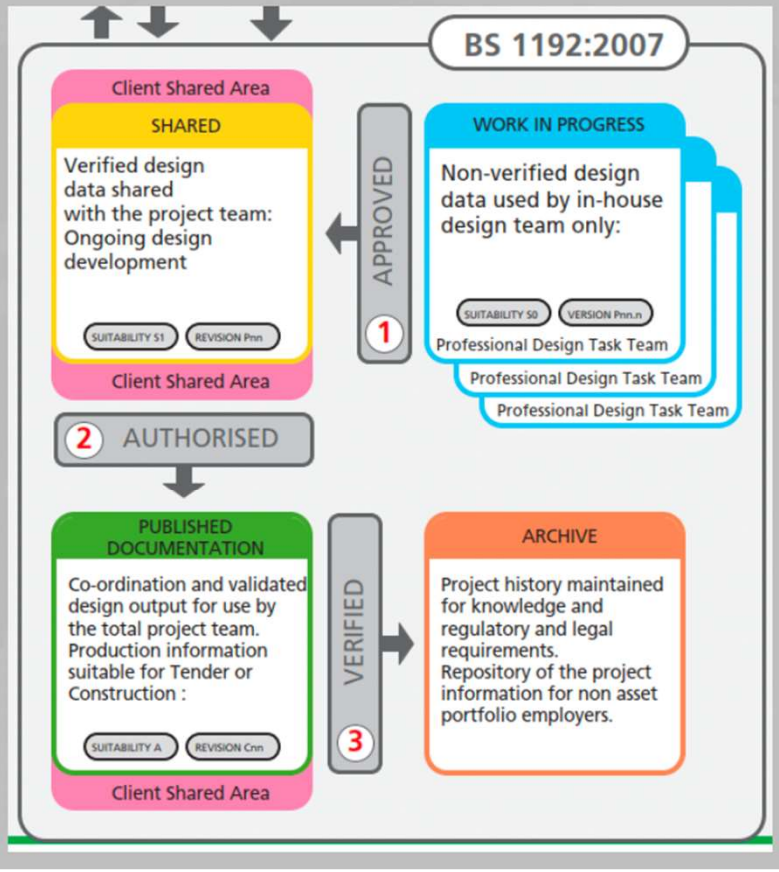
- **3.3.15**
  common data environment
  CDE
  agreed source of *information* (3.3.1) for any given project or *asset* (3.2.8), for collecting, managing and disseminating each *information container* (3.3.12) through a managed process

Note 1 to entry: **A CDE workflow** describes the processes to be used and **a CDE solution** can provide the technology to support those processes.



CDE Structure: Information Container-based Collaborative Working

- The CDE is a means of providing a collaborative environment for sharing work and can be implemented in a number of ways.
- Functional sections of CDE are:
  - ❑ Work in progress
  - ❑ Client shared area
  - ❑ Published documentation
  - ❑ Archive
- There are “gates”, or sign-off procedures, that allow data/information to pass between the sections: APPROVED, AUTORISED and VERIFIED.
- Checks for compliance with Employer's information requirements (EIR) deliverables and answers fully to Plain Language Questions (PLQ)



CIC BIM Standards – General (with Hong Kong Local Annex of ISO 19650

Figure 1 Project delivery cycle ISO 19650-1:2018(E)

Key

- **A** - Start of the delivery phase – transfer of relevant information from Asset Information Model (AIM) to Project Information Model (PIM)
- **B** - Progress development of the design intent model into the virtual construction model
- **C** - End of the delivery phase – transfer of relevant information from PIM to AIM

ISO Trend – An International Language

DRAFT INTERNATIONAL STANDARD
ISO/DIS 19650-1

ISO/TC 59/SC 13 Secretariat: SN

Voting begins on: 2017-02-17 Voting terminates on: 2017-05-11

Organization of information about construction works — Information management using building information modelling —

Part 1:
Concepts and principles

Titre manque

ICS: 91.010.0

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ISO/CEN PARALLEL PROCESSING

Reference number
ISO/DIS 19650-1:2017(E)

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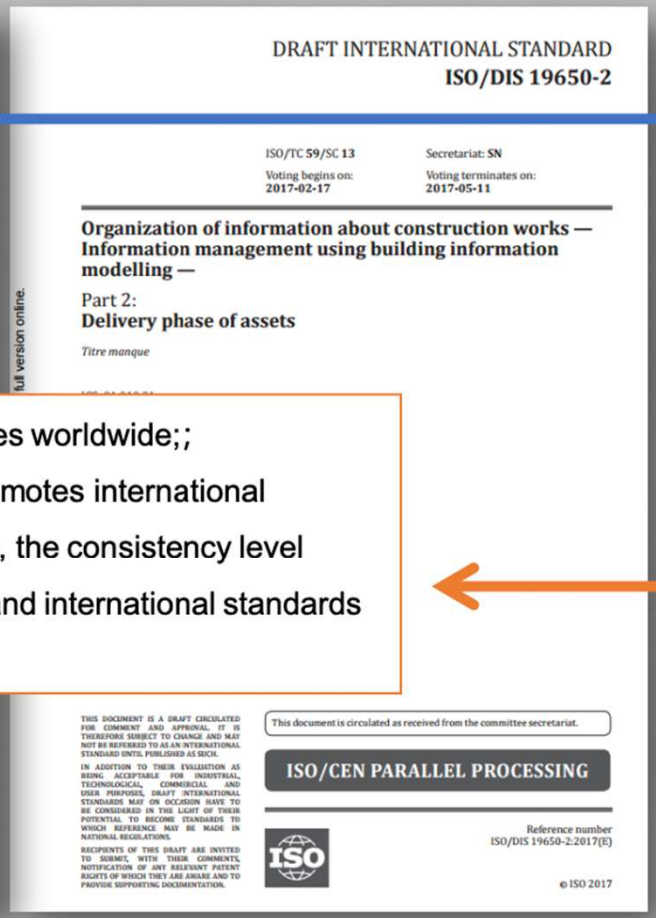
DRAFT INTERNATIONAL STANDARD
ISO/DIS 19650-2

ISO/TC 59/SC 13 Secretariat: SN

Voting begins on: 2017-02-17 Voting terminates on: 2017-05-11

Organization of information about construction works — Information management using building information modelling —

Part 2:
Delivery phase of assets

Titre manque

full version online.

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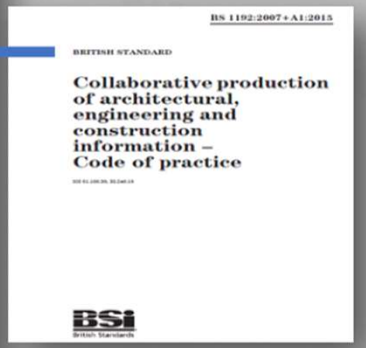
ISO/CEN PARALLEL PROCESSING

Reference number
ISO/DIS 19650-2:2017(E)

© ISO 2017

2018 Q4

- ISO has 162 member countries worldwide;;
- China actively adopts and promotes international standards. In some key areas, the consistency level between Chinese standards and international standards has reached more than 80%.


BS 1192:2007+A1:2015

BRITISH STANDARD

Collaborative production of architectural, engineering and construction information – Code of practice

BSi
British Standards

PAS 1192-2:2013

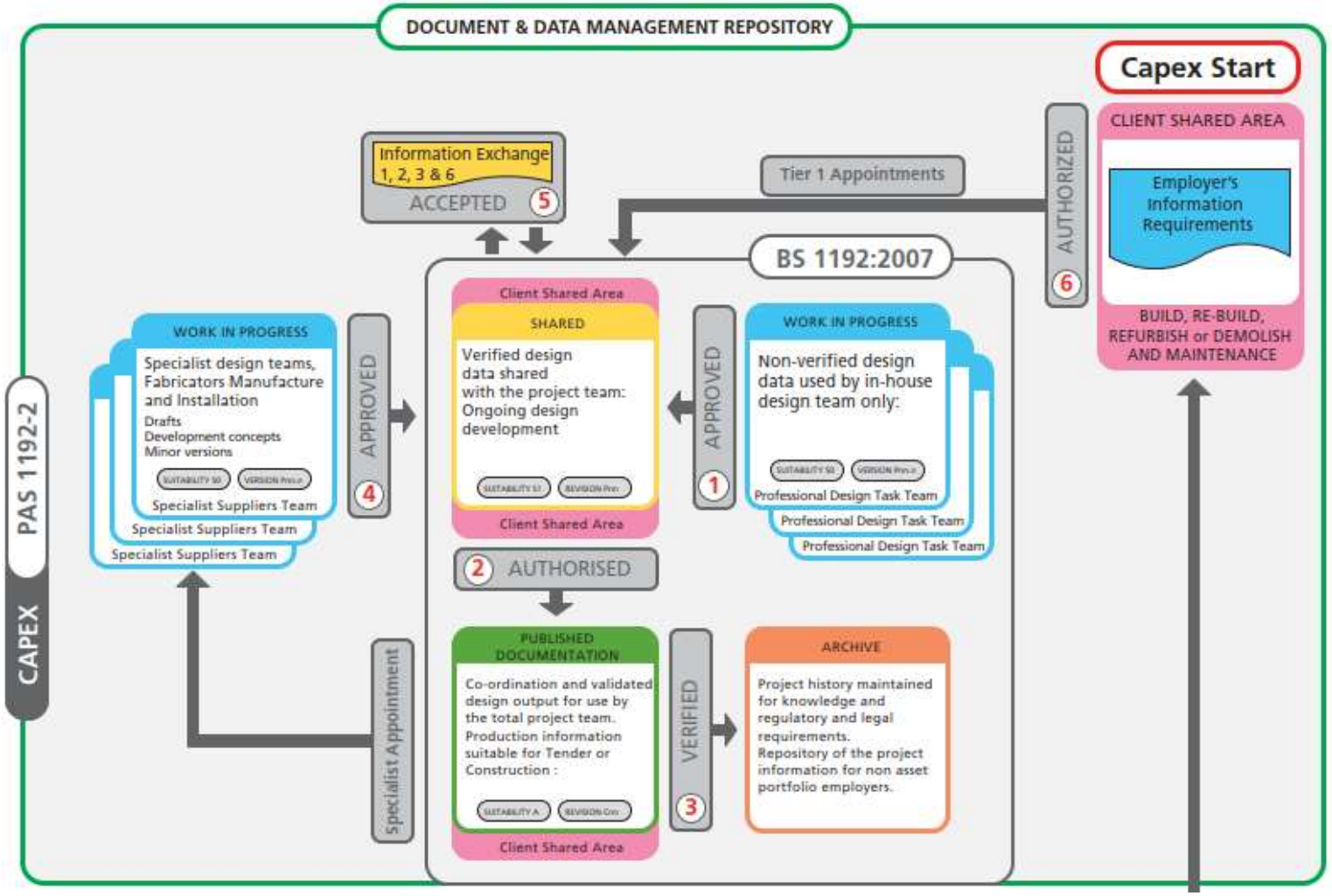
Specification for information management for the capital/delivery phase of construction projects using building information modelling

bsi.

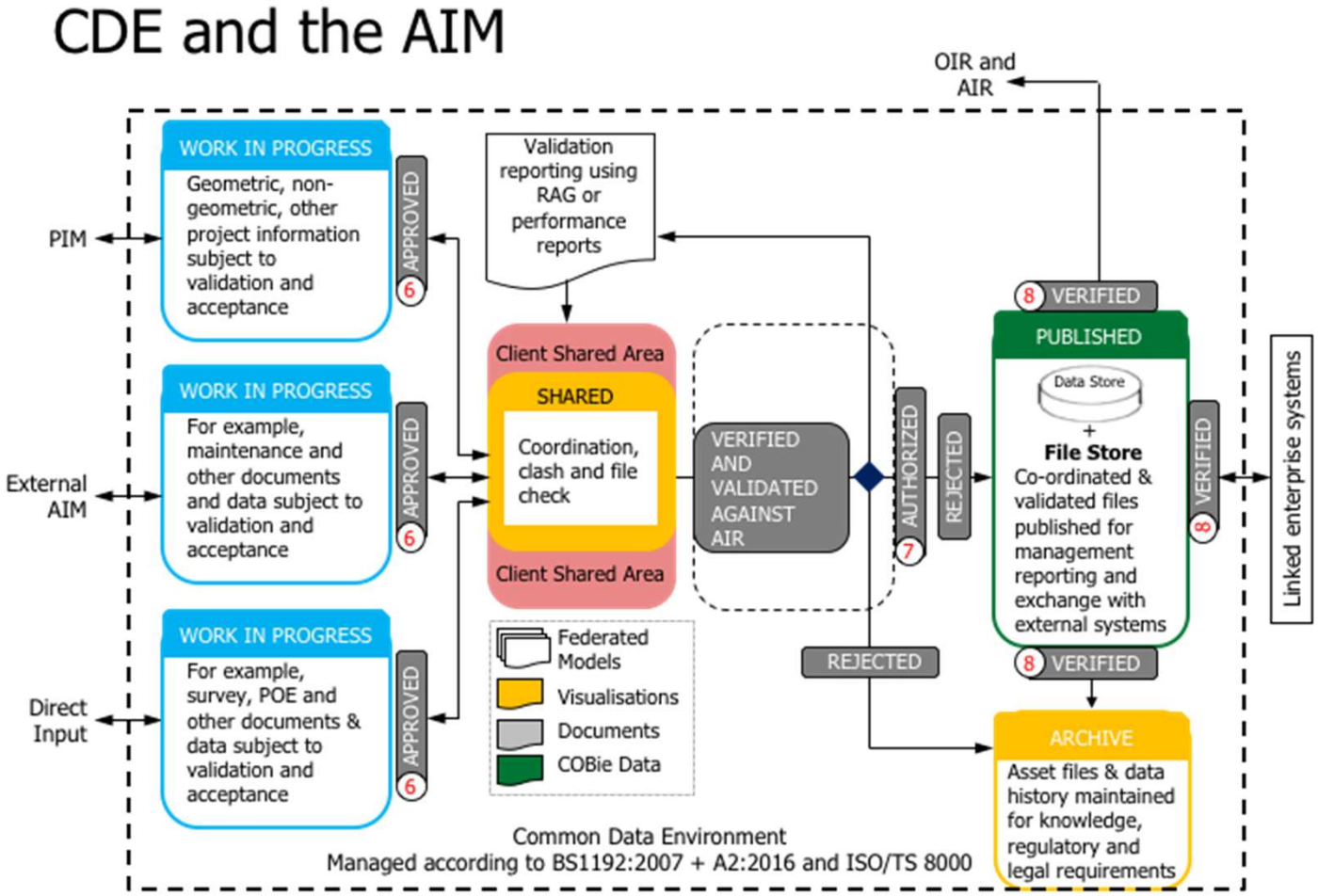
Advantages of adopting CDE

- Ownership of information remains with the originator, although it is shared and reused, only the originator shall change it;
- Shared information reduces the time and cost in producing coordinated information;
- The identification and suitability of information container can be adopted for quick searching and retrieval of large amount of information

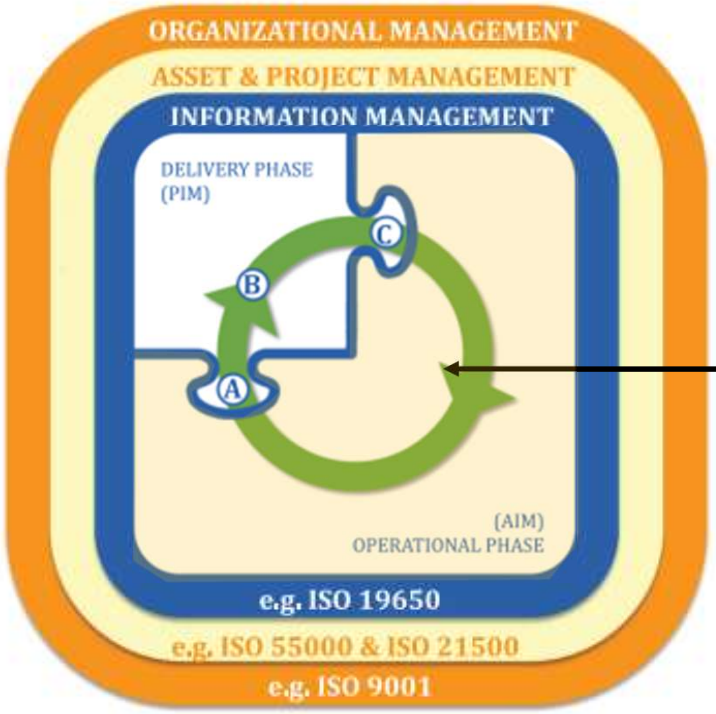
CDE


DOCUMENT & DATA MANAGEMENT REPOSITORY
Capex Start
CLIENT SHARED AREA
Employer's Information Requirements
BUILD, RE-BUILD, REFURBISH or DEMOLISH AND MAINTENANCE
AUTHORIZED
6
Tier 1 Appointments
Information Exchange 1, 2, 3 & 6
ACCEPTED
5
BS 1192:2007
PAS 1192-2
CAPEX
WORK IN PROGRESS
Specialist design teams, Fabricators Manufacture and Installation
Drafts
Development concepts
Minor versions
Specialist Suppliers Team
Specialist Suppliers Team
Specialist Suppliers Team
APPROVED
4
Client Shared Area
SHARED
Verified design data shared with the project team: Ongoing design development
Client Shared Area
APPROVED
1
WORK IN PROGRESS
Non-verified design data used by in-house design team only:
Professional Design Task Team
Professional Design Task Team
Professional Design Task Team
2 AUTHORISED
Specialist Appointment
PUBLISHED DOCUMENTATION
Co-ordination and validated design output for use by the total project team. Production information suitable for Tender or Construction :
Client Shared Area
VERIFIED
3
ARCHIVE
Project history maintained for knowledge and regulatory and legal requirements. Repository of the project information for non asset portfolio employers.

CDE


CDE and the AIM
OIR and AIR
PIM
External AIM
Direct Input
WORK IN PROGRESS
Geometric, non-geometric, other project information subject to validation and acceptance
WORK IN PROGRESS
For example, maintenance and other documents and data subject to validation and acceptance
WORK IN PROGRESS
For example, survey, POE and other documents & data subject to validation and acceptance
APPROVED
6
Validation reporting using RAG or performance reports
Client Shared Area
SHARED
Coordination, clash and file check
Client Shared Area
Federated Models
Visualisations
Documents
COBie Data
VERIFIED AND VALIDATED AGAINST AIR
AUTHORIZED
7
REJECTED
REJECTED
8 VERIFIED
PUBLISHED
Data Store
+
File Store
Co-ordinated & validated files published for management reporting and exchange with external systems
8 VERIFIED
8 VERIFIED
ARCHIVE
Asset files & data history maintained for knowledge, regulatory and legal requirements
Linked enterprise systems
Common Data Environment
Managed according to BS1192:2007 + A2:2016 and ISO/TS 8000

Information Delivery between AIM and PIM under CDE Environment



AutoCDE for EMSD
From point C to Point A

A	start of delivery phase — transfer of relevant information from AIM to PIM
B	progressive development of the design intent model into the virtual construction model
C	end of delivery phase — transfer of relevant information from PIM to AIM

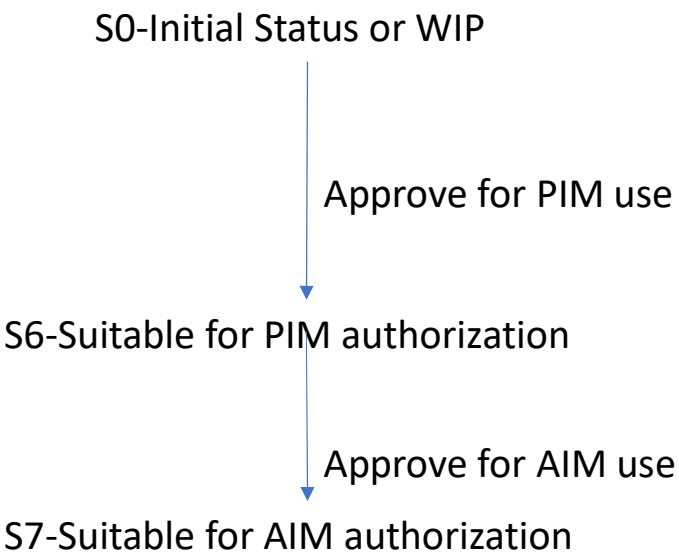
Document Approval Status in the CDE

- **Document Approval Status (Suitability):** are provided by **information originators** to define how information may be used during different phases of the CDE.
- **Status codes**: meta-data describing the suitability of the content of an *information container*

Code	Description	Revision
Work in progress (WIP)		
S0	Initial status	Preliminary revision and version
Shared (non-contractual)		
S1	Suitable for coordination	Preliminary revision
S2	Suitable for information	Preliminary revision
S3	Suitable for review and comment	Preliminary revision
S4	Suitable for stage approval	Preliminary revision
S5	Withdrawn	N/A
S6	Suitable for PIM authorization	Preliminary revision
S7	Suitable for AIM authorization	Preliminary revision
Published (contractual)		
A1, A*n*, etc.	Authorized and accepted	Contractual revision
B1, B*n*, etc.	Partial sign-off (with comments)	Preliminary revision
Published (for AIM acceptance)		
CR	As constructed record document	Contractual revision

NOTE 1 '*n*' relates to the work stages defined within BS 8536-1:2015 and BS 8536-2:2016.

NOTE 2 This list can be expanded for project-specific codes and fixed within the project information standard.



Metadata/ Information Container ID in the CDE

EMSD Information container identification (ID) (Model files):

Project Code **–** ***Originator/Author*** **–** ***System_Equipment*** **–*****Location Identifier/level_SubLocation Identifier/Block*** **–** ***Doc. Type*** **–** ***Suitability For/ Approving Party*** **–** ***EMSD Maintenance Responsibility*** **-** ***Suitability***

ISO19650-2

e.g.:

- **Project Code:** TSWH
- **Originator/Author:** EMSD
- **System:** LIFT–Lift & Escalator
- **Equipment:** ELL-Electric Lifts
- **Location Identifier/ Level:** GF-ground floor
- **Sub Location Identifier/Block:** B1 – Tower 1
- **Doc. Type:** OMD – General O&M Document
- **Suitable for / Approving Party:** APT – ArchSD Project Team
- **EMSD Maintenance Responsibility:** EM – Electrical & Mechanical
- **Suitability:** S7 – Shared for AIM Authorization and Acceptance

Adaptions in EMSD

Part 3

What will be Digitalised

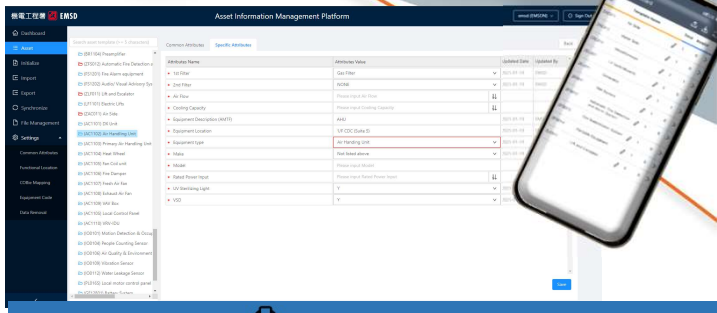
>$30M

BIM MANDATORY

New Public Works

ISO Standards

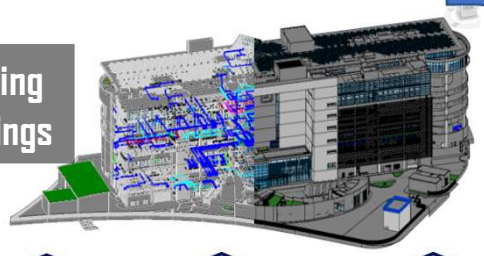
CIC Standards



AIMP

Project Handover Submission Portal

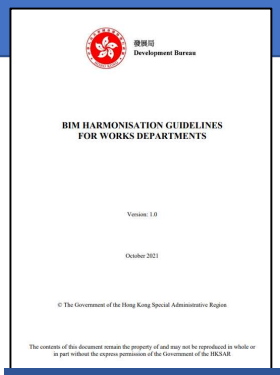
Existing Buildings



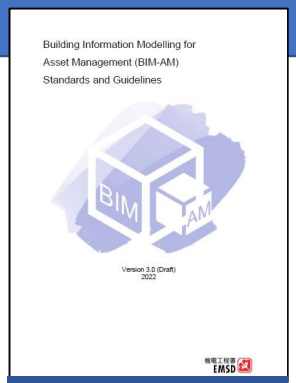
Asset Data
(incl. O&M Manual)

Operational Data
(e.g. Sensor Data / BMS)

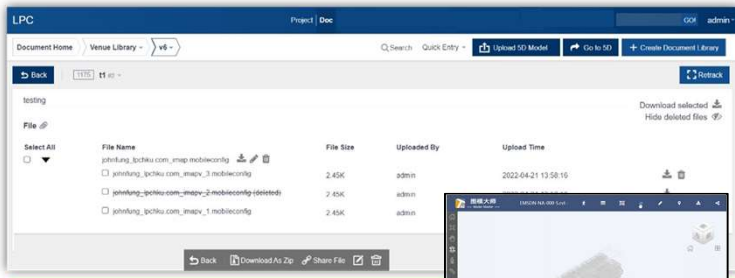
Maintenance Record
(e.g. CCeP)



DevB Guidelines



EMSD S&G



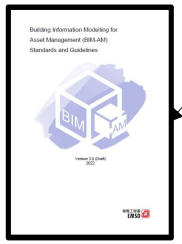
CDE

Project Submittal Review and Long-Term Storage

Note:
Training on AIMP had been conducted for 1,300+ EMSD staff and contractors; Training on CDE would commence in July 2022

機電工程署 EMSD

Document Submission Flow



Detail Workflow & Folder Structure
available in BIMAM SG3.0 and H/A Guide

做功課 → Project Drive (optional) → *交功課* → AIMP

Submission by
Client / ArchSD / Contractor

老師改功課

CDE - Project (e.g. AA&I of EMSD 6/F)

- **P0001 (AA&I #1)**
  - 10_Admin
    - BIM Execution Plan
    - BIM Standard
    - Master Information Index
  - 20_As-built
    - 21_BIM
    - 22_CAD
    - 23_Objects
    - 28_PDF
  - 30_O&M Documentation
  - 40_Statutory
  - 50_COBielite
  - 60_CCS Spreadsheet
  - 90_Others

PIM

來齊功課

Move after project accepted

CDE - Venue

- **EMSDN**
  - As-built Record — Latest Set (Upkeep by Record Office)
    - R1 Master Information Index
    - R2 Model
    - R3 Drawings (CAD&PDF)
    - R4 Statutory
  - **P0000 (New Building)** — Records of new-built
    - 10_Admin
    - 20_As-built
    - 30_O&M Documentation
    - 40_Statutory
    - 50_COBielite
    - 60_CCS Spreadsheet
    - 90_Others
  - **P0001 (AA&I #1)** — Records of A&A
    - 10_Admin
      - Master Information Index
    - 20_As-built
      - 21_BIM
      - 22_CAD
      - 23_Objects
      - 28_PDF
  - **P0002 (AA&I #2)**

AIM

機電工程署 EMSD

Typical Project Folder Structure

- EMSDN
  - 30 O&M Documents
    - 304 HVAC
      - O&M
        - HVAC-AS
          - O&M.pdf
            - (V3)O&M_final.pdf
            - ~~(V2)O&M.pdf~~
            - (V1)O&M.pdf
        - HVAC-COT
          - Model_X.pdf
            - (V1) Model_X.pdf
        - *KT-EMSDN-NA-6F-HVAC-AHU-601*
          - Model_Y.pdf
    - 399 Others
      - O&M
        - *Book Sorter (user defined folder)*
  - 90 Others
    - BMS Point List
    - *FromLPC (user defined folder)*
      - Model_Z.pdf
        - (V1) Model_Z.pdf

Venue場地 / Project項目
(a.k.a. Document Library, top level)

Folder / Sub-Folder 文件夾
(contains **sub-folder**, but **do not create document**)

Container信息集
(a.k.a. Placeholder / Information Container, contains **documents** and is the smallest unit for submission & approval, but **do not create sub-folder**

Document文檔
(contains **multiple version** of a single file)

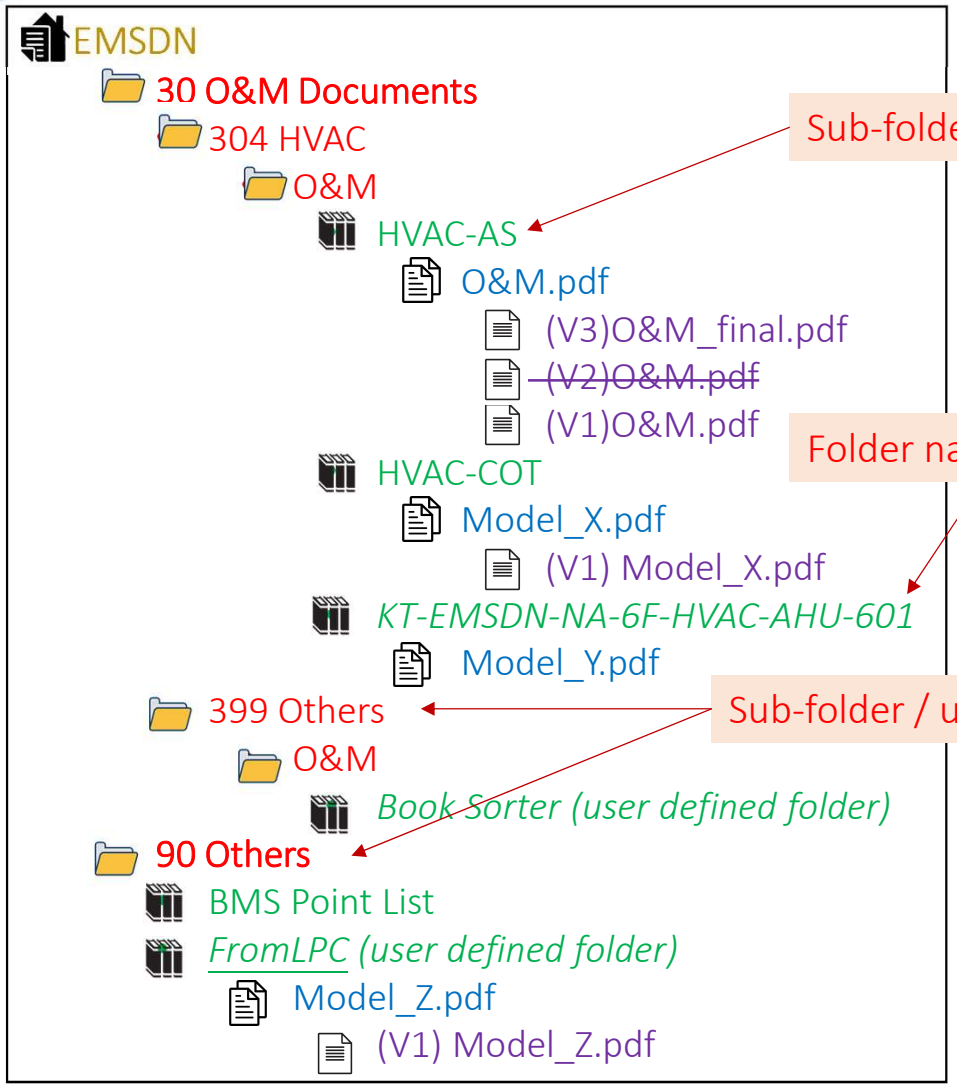
File文件
(a **particular version** / **copy** of a document)

Status of **Container** (smallest submission unit)

States	Status Code	Description
WIP	CR	Construction Record
Shared	S1	Shared for Coordination
Published	S6	Shared for PIM Stage Authorisation

工程署 EMSD

Typical Project Folder Structure: Sub-Folder



Sub-folder / user-defined folder is not allowed at typical folder level (e.g. HVAC)

Folder name with valid asset code is allowed to be created at specific level

Sub-folder / user-defined folder (one level only) is allowed at "Others" level

機電工程署 EMSD

Folder Structure - Explained

a. Not only scan to PDF → *Standardized Folder Structure, with linkage to asset / equipment automatically*
b. Not only document → *Fulfil asset information requirement specified by AMTF*

View in **AIMP** and **CDE**

- WKGO
  - 30 O&M Documentation
    - 304 HVAC
      - O&M
        - HVAC-WS *(HVAC - Water Side)* ← *System Specific Folder*
          - HVAC-COT *(Cooling Tower)* ← *Equipment-Type Specific Folder*
          - HVAC-WCC *(Water Cool Chiller)* ← *Equipment-Type Specific Folder*
            - *YTM-WKGO-S-B2F-HVAC-WCC-0001* ← *Asset Specific Folder*
            - ...
        - T&C
        - *Catalogue*
        - *Other*
    - 399 Others ← *General Folder* *(for non-AMTF equipment, no asset mapping would be performed automatically)*
    - ...

Detail list of system and equipment is available in BIMAM SG3.0

Asset-Document Mapping

a. Not only scan to PDF → *Standardized Folder Structure, with linkage to asset / equipment automatically*
b. Not only document → *Fulfil asset information requirement specified by AMTF*

View in **AIMP** and **CDE**

- WKGO
  - 30 O&M Documentation
    - 304 HVAC
      - O&M
        - HVAC-WS *(HVAC - Water Side)*
          - HVAC-COT *(Cooling Tower)*
          - HVAC-WCC *(Water Cool Chiller)*
            - *YTM-WKGO-S-B2F-HVAC-WCC-0001*
            - ...
        - T&C
        - *Catalogue*
        - *Other*
      - 399 Others (not assigned to any document)
      - ...

Shared Doc. – All HVAC-Water Side
Shared Doc. – All Cooling Tower
Shared Doc. - All Water Cool Chiller
Equipment Specific Doc.

Note: similar logic applies to photo

View in **BIM-AM**
(or other equipment based systems)

WKGO - HVAC (Water Side)

(link to document)
(link to document)

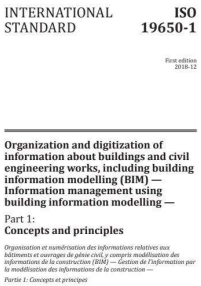
Cooling Tower #1
YTM-WKGO-S-RF-HVAC-COT-0001

(link to document)
(link to document)
(link to document)

Water Cool Chiller #1
YTM-WKGO-S-B2F-HVAC-WCC-0001

機電工程署 EMSD

File Naming Conventions - Explained


INTERNATIONAL STANDARD **ISO 19650-1**

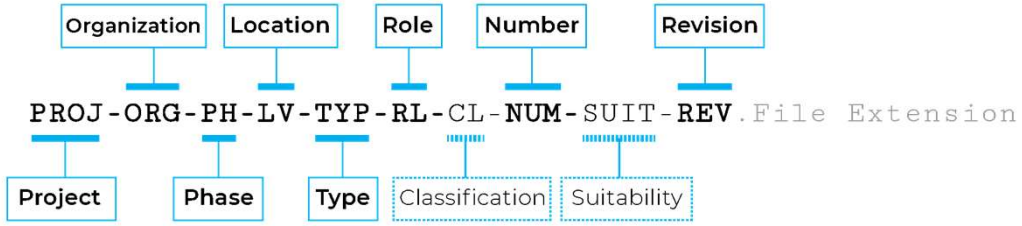
First edition 2018-12

Organization and digitization of information about buildings and civil engineering works, including building information modelling (BIM) — Information management using building information modelling —

Part 1:
Concepts and principles

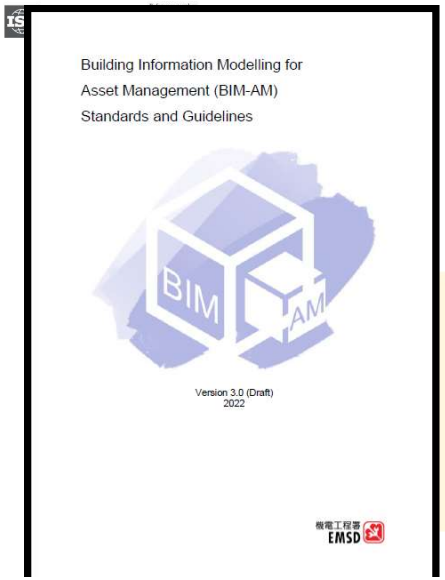
Organisation et numérisation des informations relatives aux bâtiments et ouvrages de génie civil, y compris modélisation des informations de la construction (BIM) — Gestion de l'information par la modélisation des informations de la construction —

Partie 1: Concepts et principes



ISO 19650:

- Defined Naming Structure **for ALL file types**


Building Information Modelling for Asset Management (BIM-AM) Standards and Guidelines

Version 3.0 (Draft)
2022

機電工程署 EMSD

發展局 Development Bureau

BIM HARMONISATION GUIDELINES FOR WORKS DEPARTMENTS

Version: 1.0

October 2021

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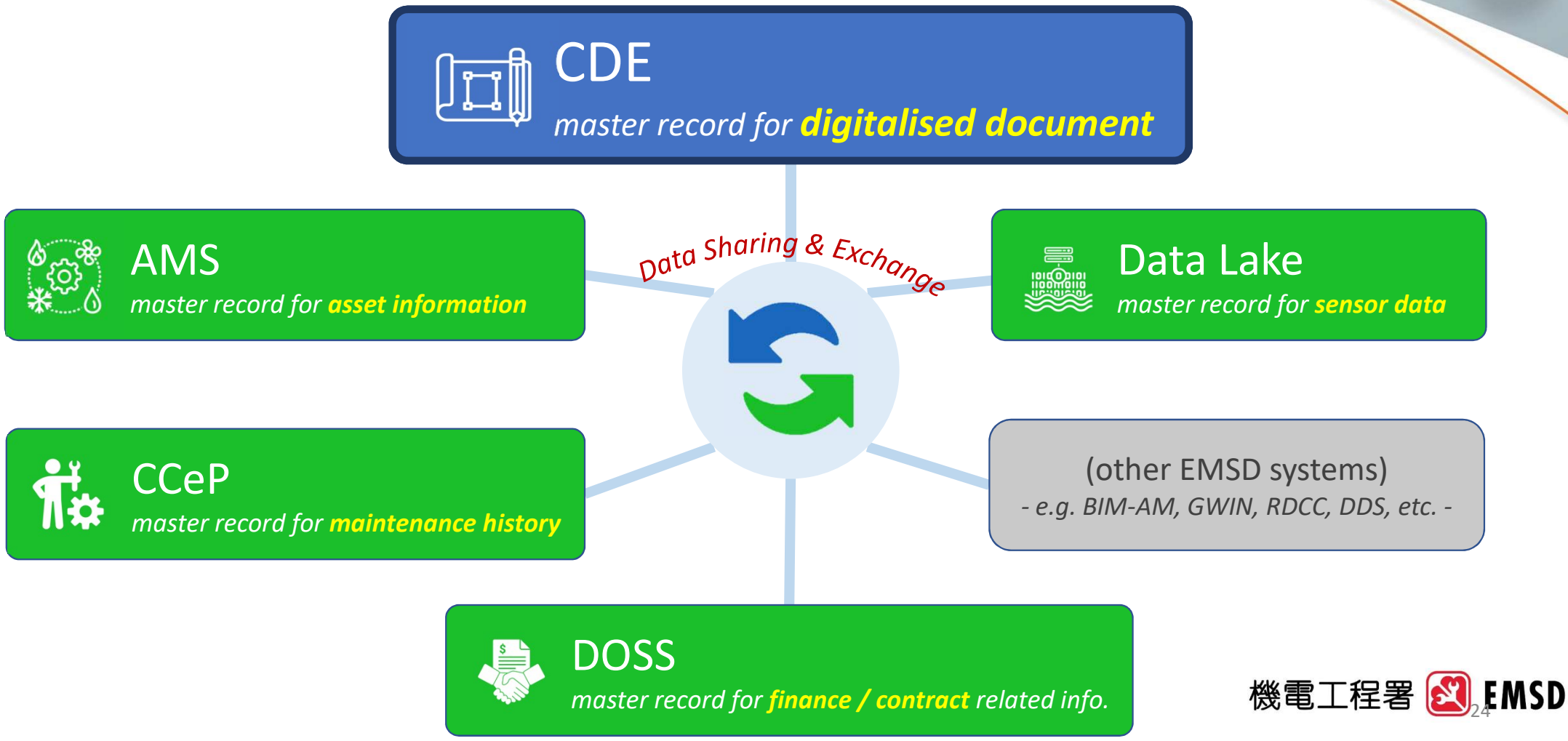
DEVB BIM Harmonisation Guidelines:

- Defined Naming Structure **for BIM files**

BIM-AM Standards and Guidelines v3.0:

- Defined Naming Structure **for BIM files and deliverables derived from the BIM model like plotted plans or exported drawings**
- Metadata for all information containers as description

Collaboration with EMSD's Corporate Systems



Phasing Plan - Function

CDE - Phase 2
Target Available by 2022

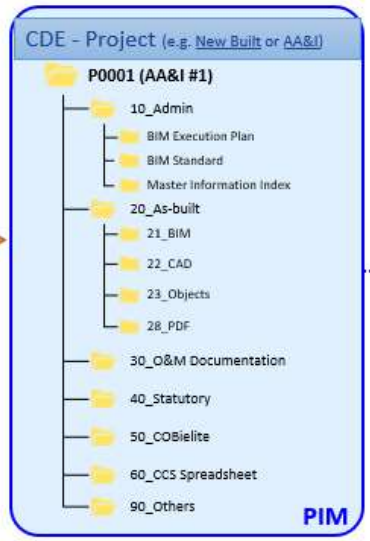
CDE - Phase 1
Data Migration In-Progress

Existing BIM-AM Project Workflow

做功課 → Project Drive (optional) → 交功課 → AIMP

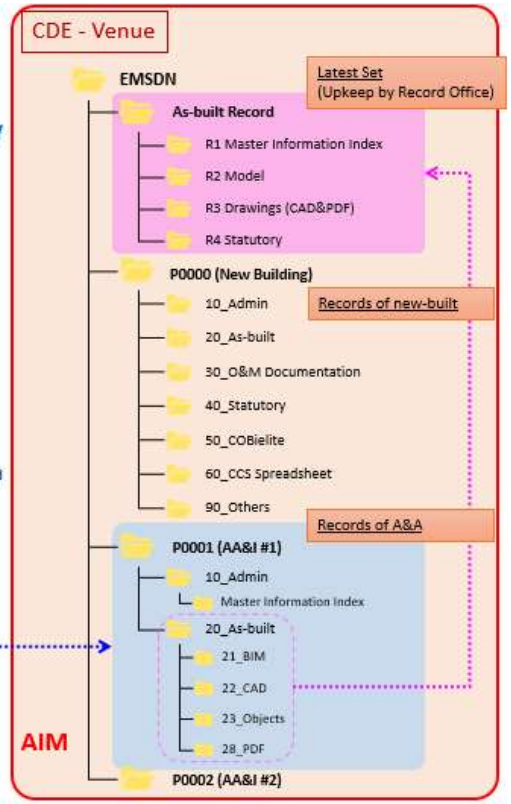
Submission by Client / ArchSD / Contractor

老師改功課



Move after project accepted

來齊功課



AIMP
(enhancement available)

BIM-AM Platform
(enhancement available)

Single Source of File Storage

AMS / DOSS
(planned)

機電工程署 EMSD

Features of EMSD's CDE

Part 4

機電工程署 EMSD

Content

- **Part 4.1 : General UI**
- **Part 4.2 : Container**
- **Part 4.3 : File Upload and Preview**
- **Part 4.4 : Model Viewer**

Part 4.1: General UI

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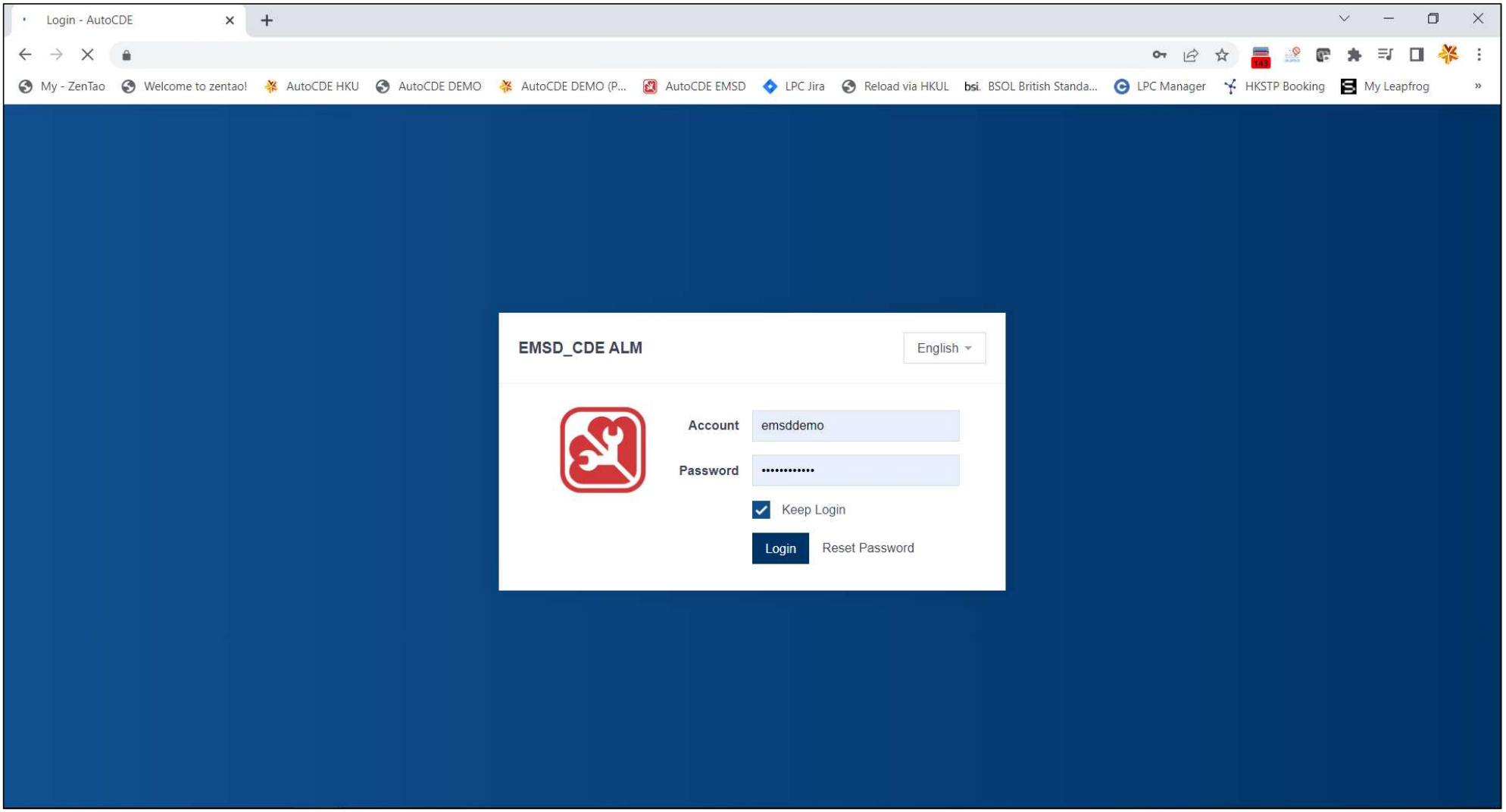
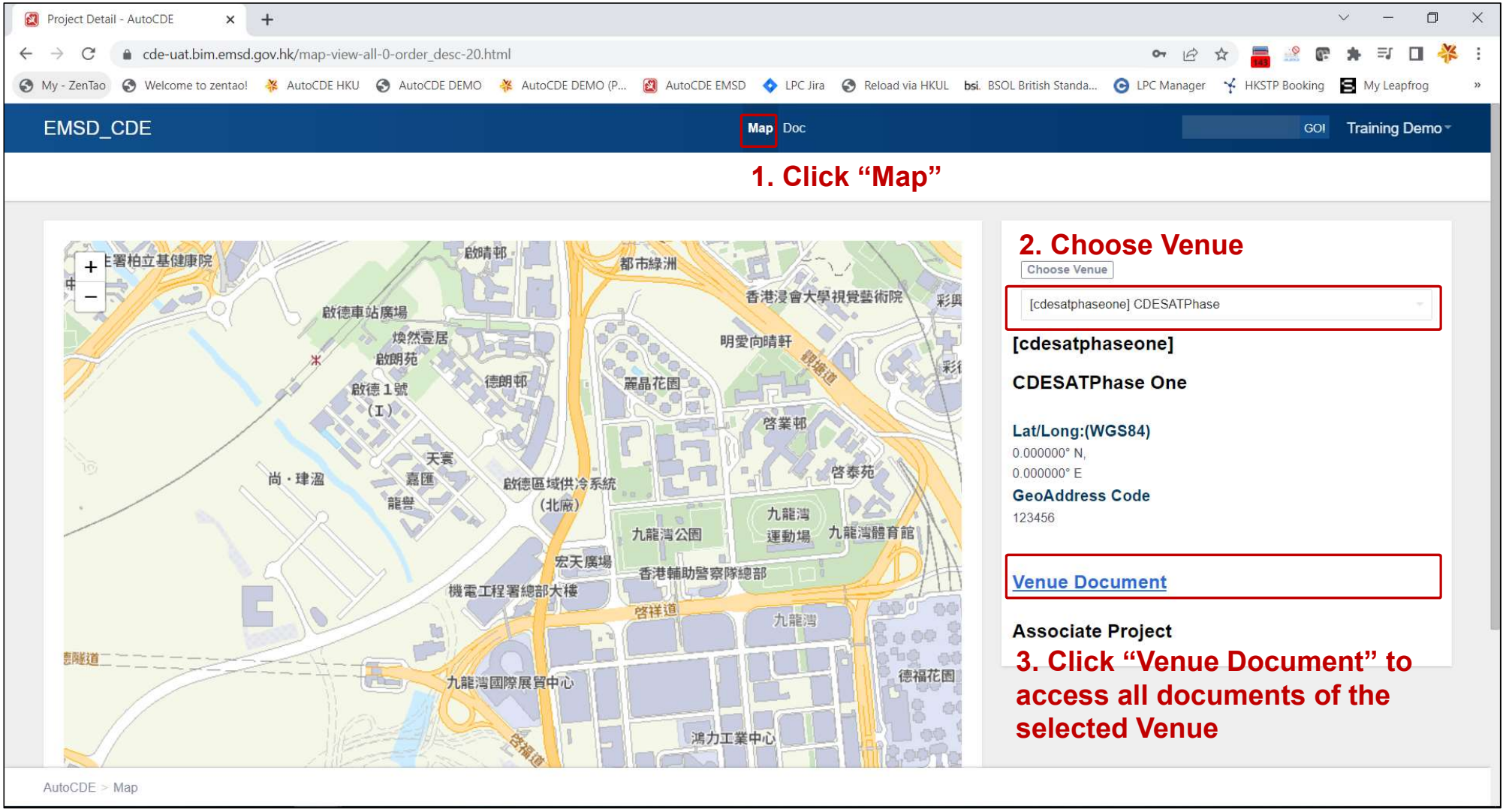
Login Page

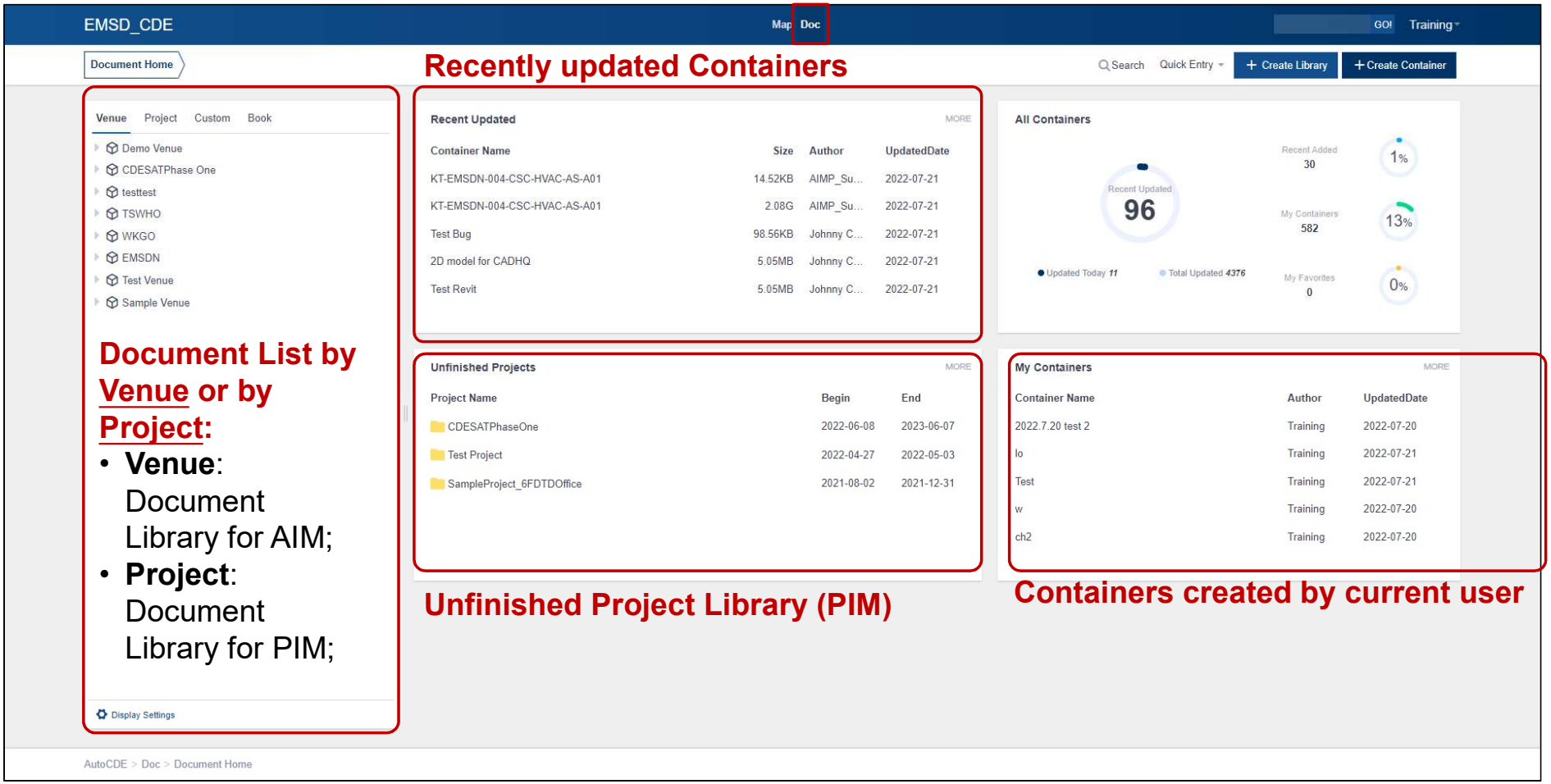

Login - AutoCDE
My - ZenTao
Welcome to zentao!
AutoCDE HKU
AutoCDE DEMO
AutoCDE DEMO (P...
AutoCDE EMSD
LPC Jira
Reload via HKUL
BSOL British Standa...
LPC Manager
HKSTP Booking
My Leapfrog
EMSD_CDE ALM
English
Account
emsddemo
Password
Keep Login
Login
Reset Password

General UI of Map Module



General UI of Doc Module

Click “Doc” to access all Containers



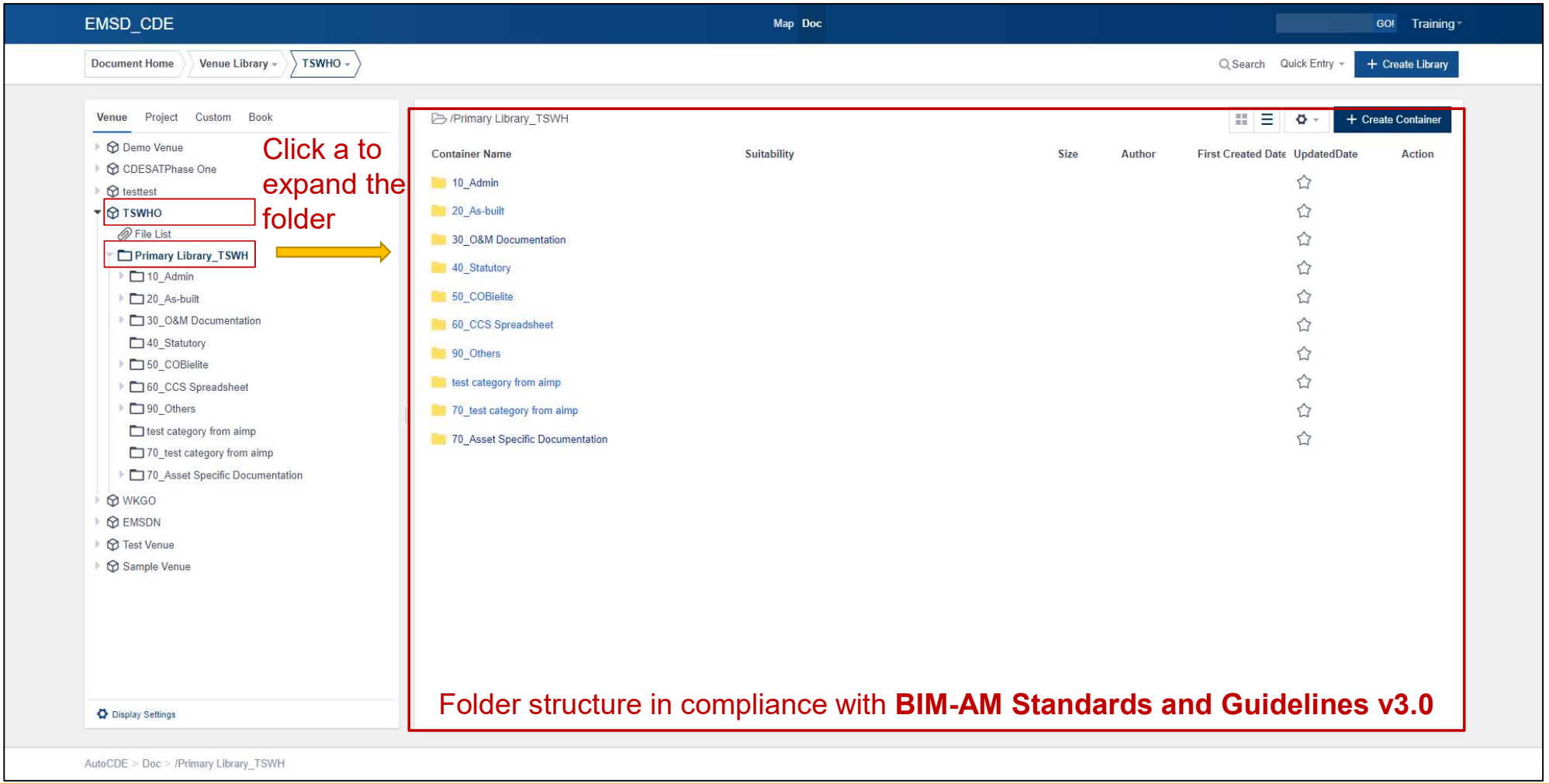
Document List by Venue or by Project:

- **Venue**: Document Library for AIM;
- **Project**: Document Library for PIM;

Unfinished Project Library (PIM)

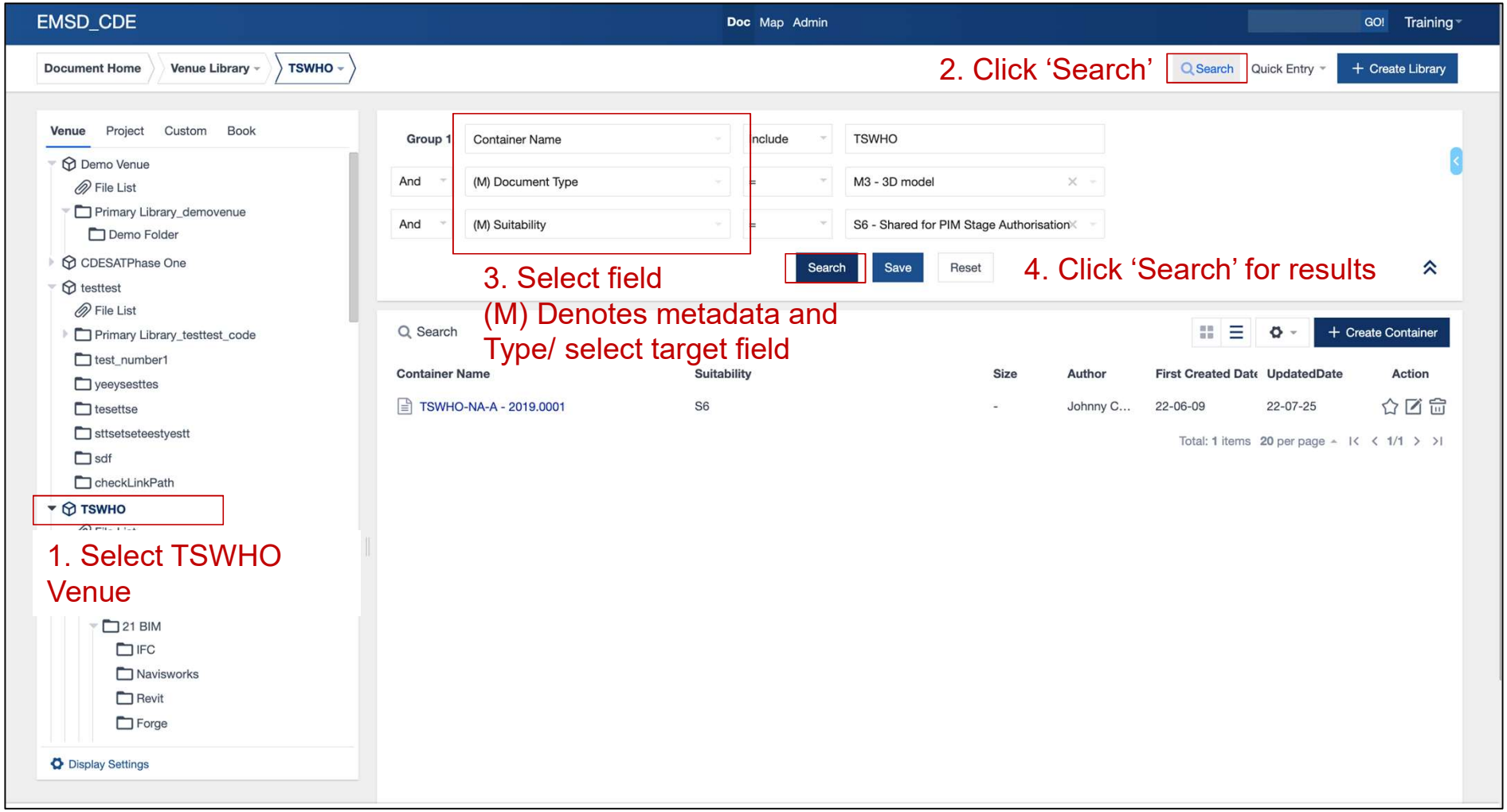
Containers created by current user

Folder Structure of AIM



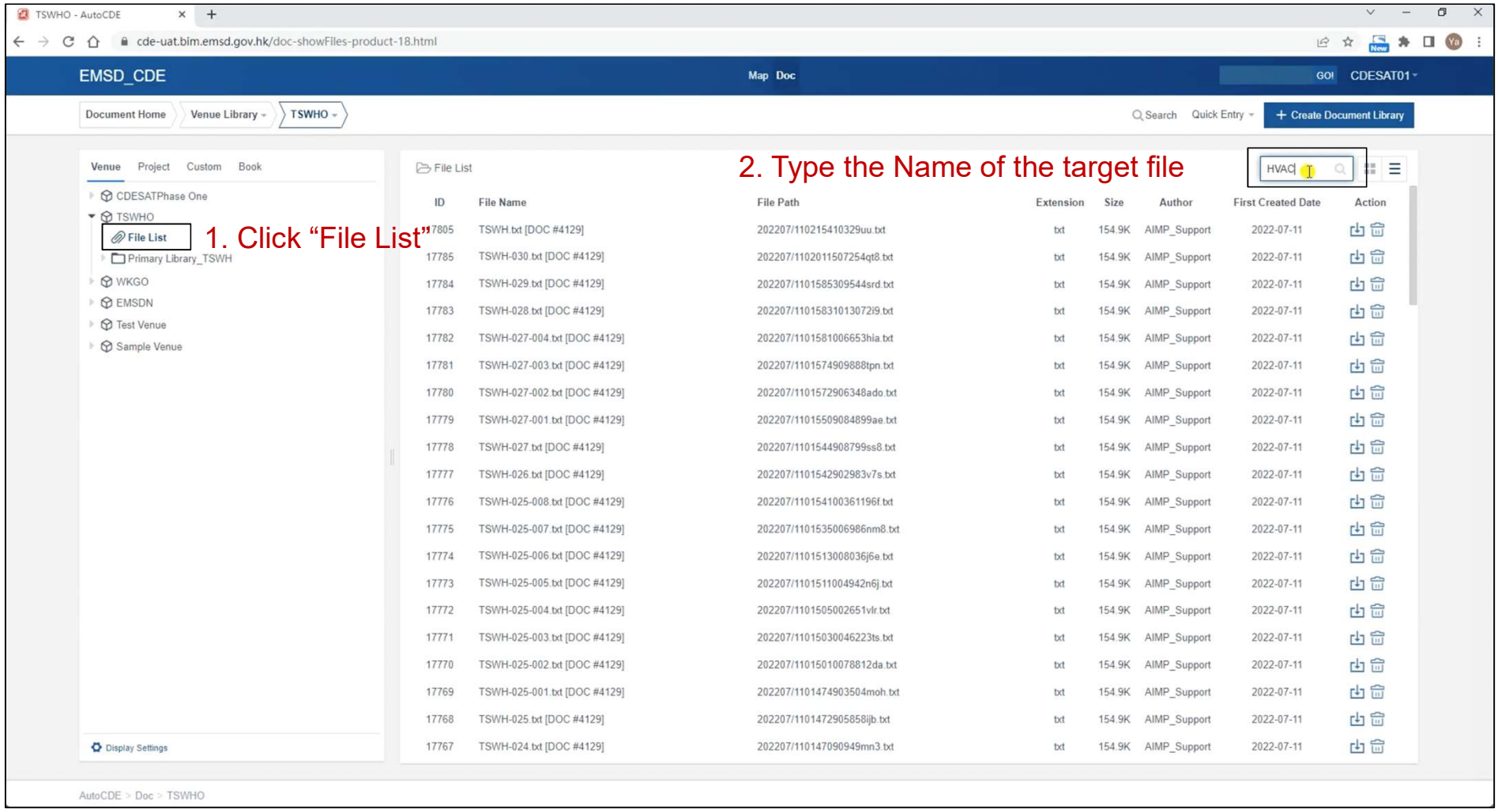
Container/ Metadata Search

Scenario: Search all the Containers in TSWHO Venue with the names contain ‘HVAC’.



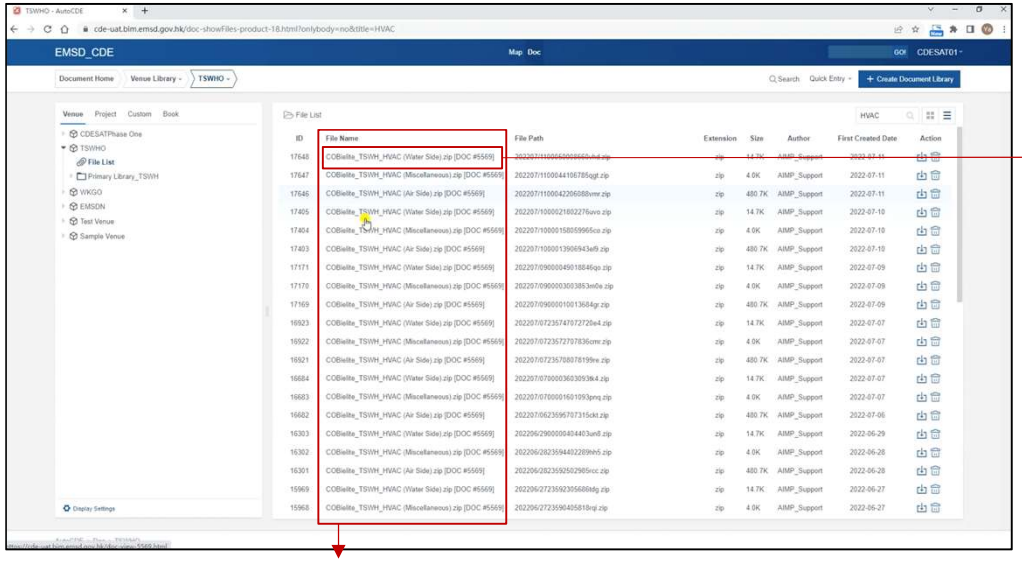
File Search by File Name

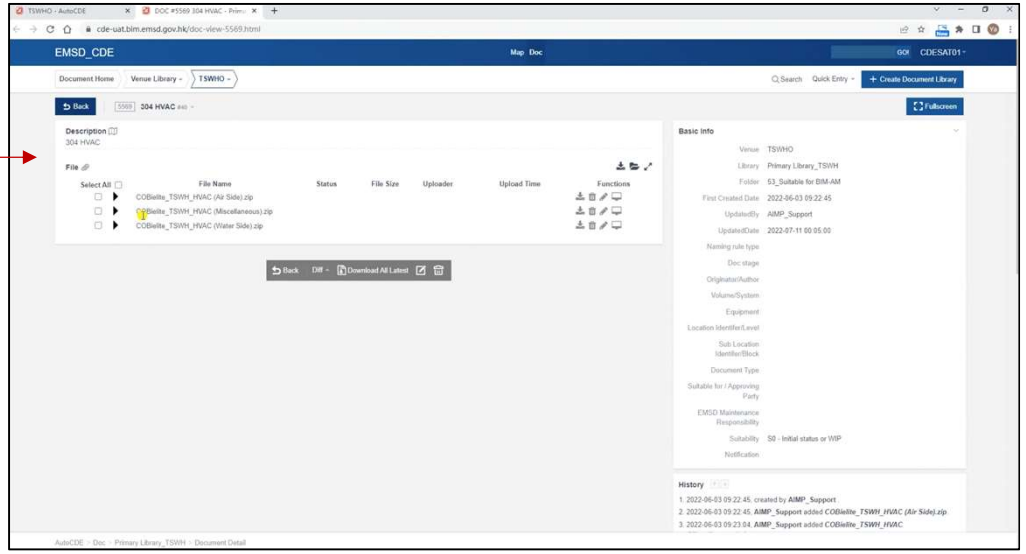
Note: In Doc, each Venue has one File List part to check all the Files uploaded in the Venue.



File Search by File Name

Click the file name of the File to navigate to
the corresponding Container





File search result

Part 4.2: Container

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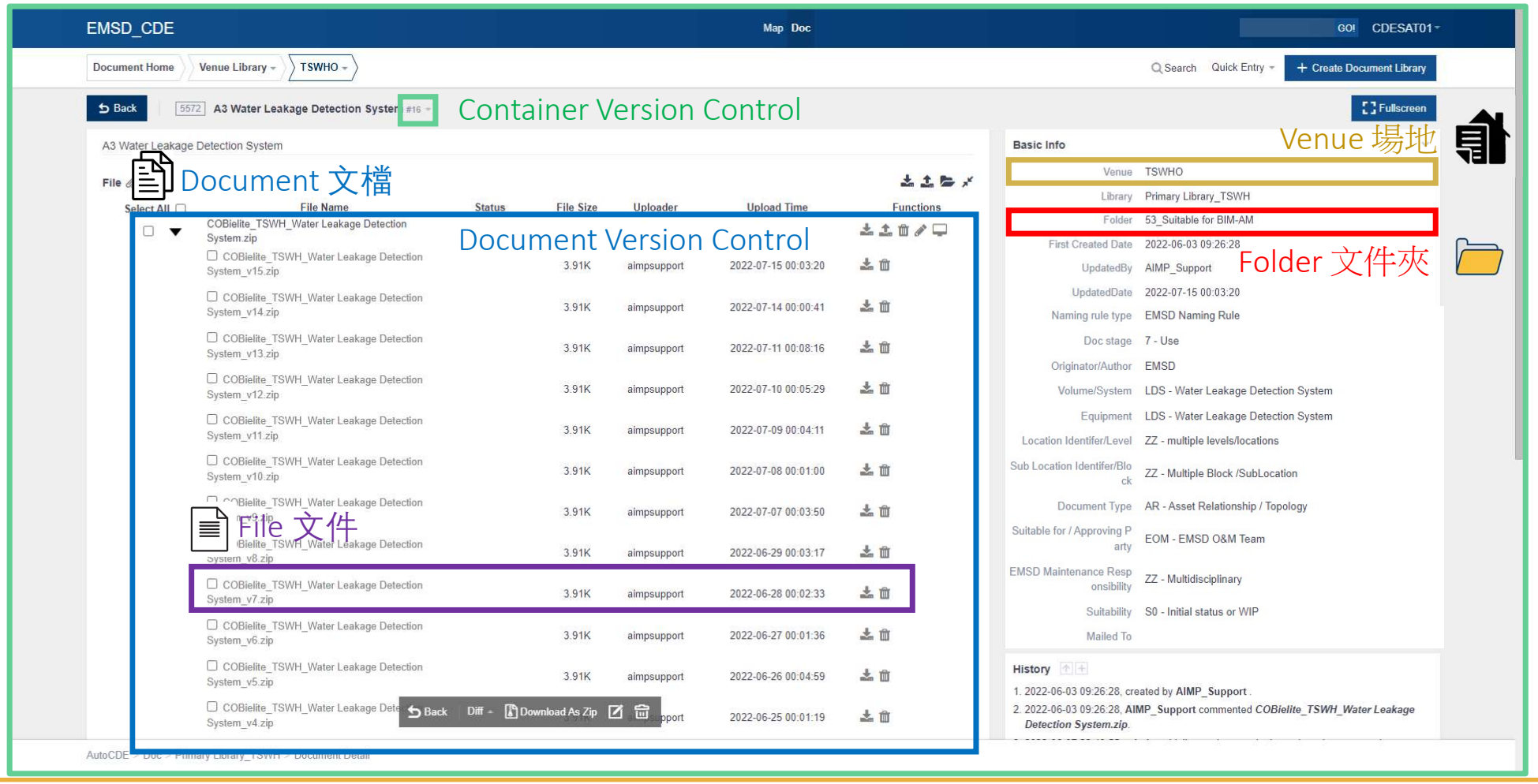
Introduction on Information Container Page

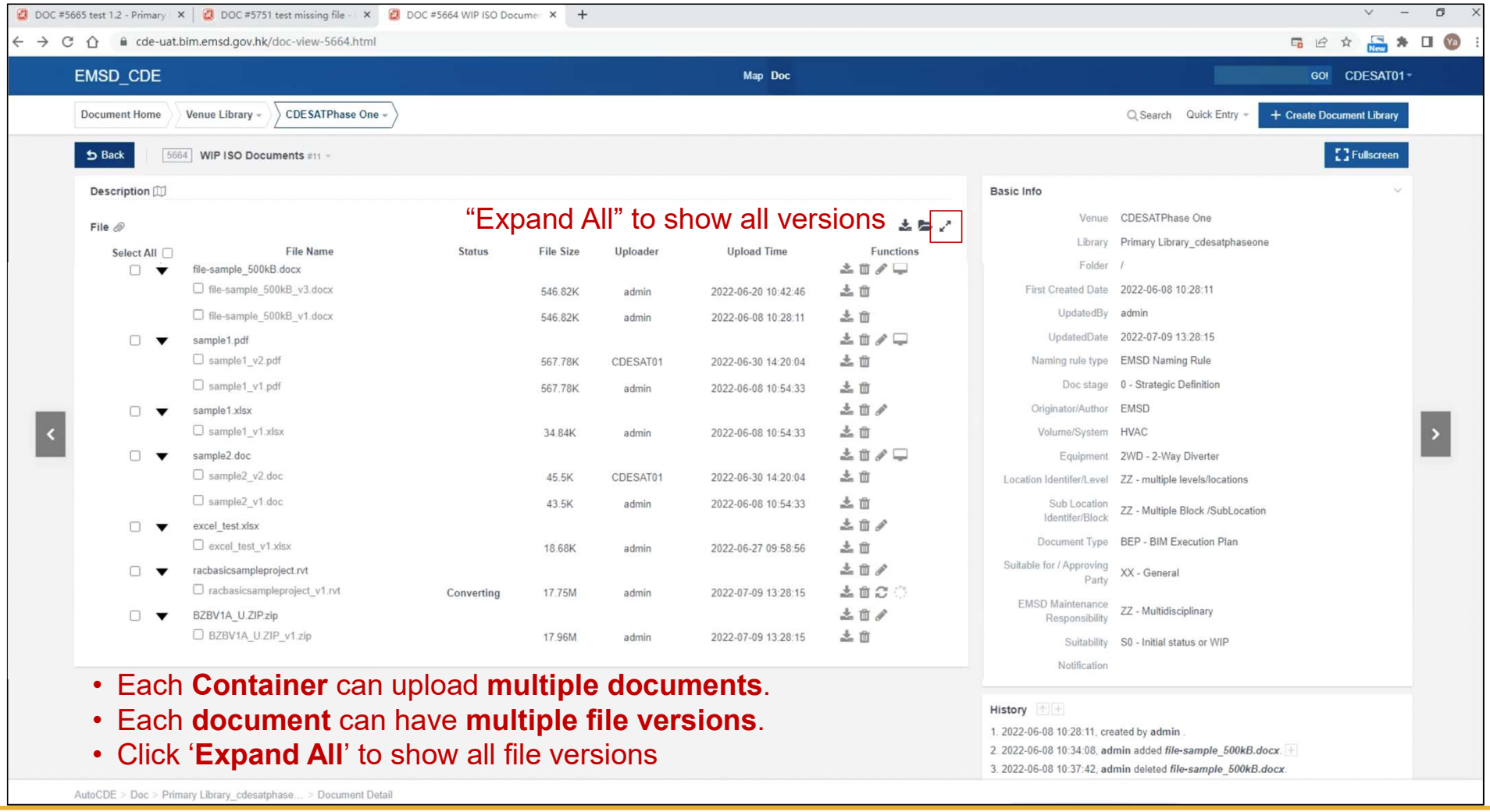
Information Container 信息集

Named persistent set of information retrievable from within a file, system or application storage hierarchy; -- ISO19650 -1



Introduction on Information Container Page

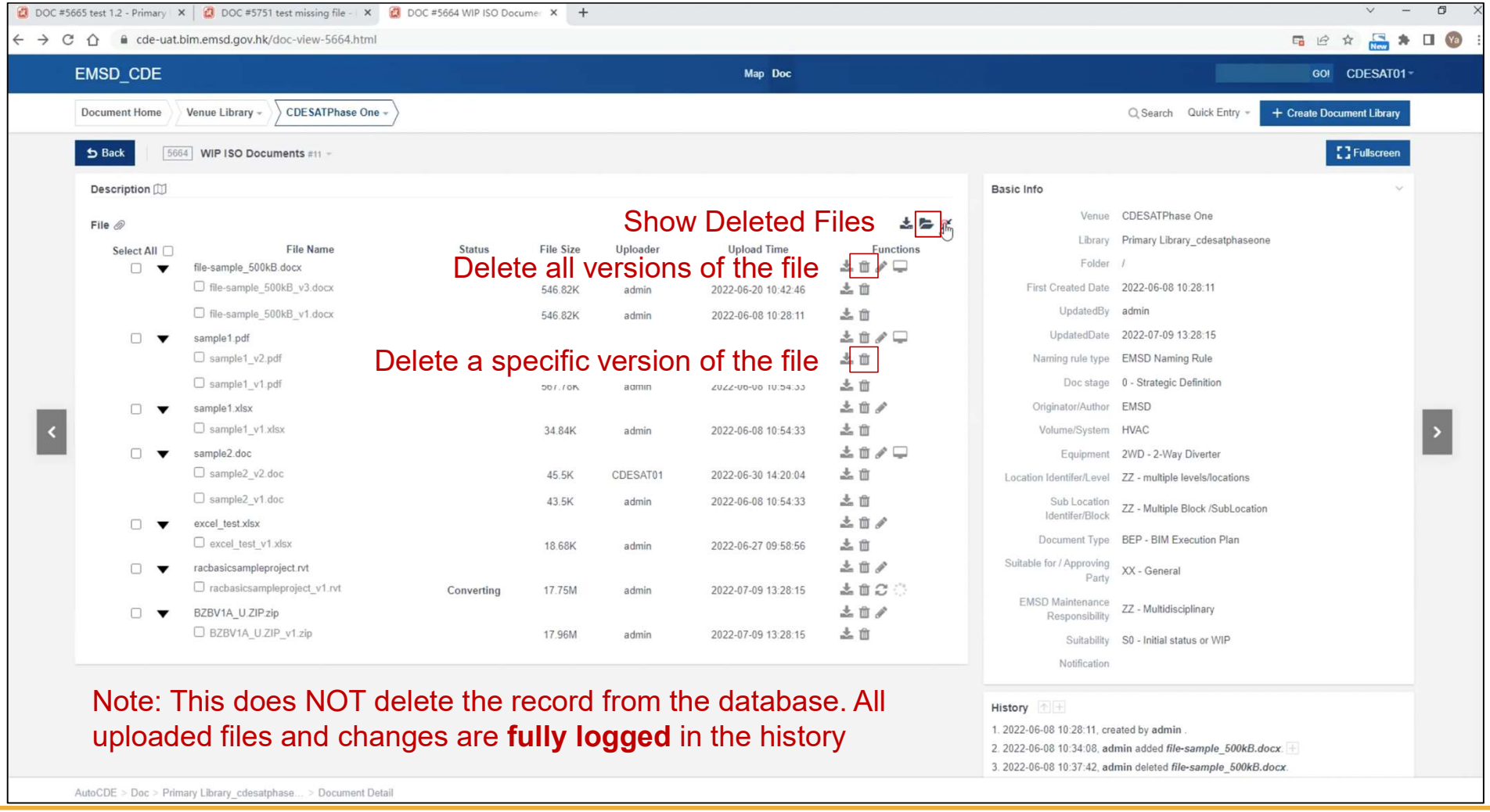
‘Expand All’ – View all file versions



- Each **Container** can upload **multiple documents**.
- Each **document** can have **multiple file versions**.
- Click ‘**Expand All**’ to show all file versions

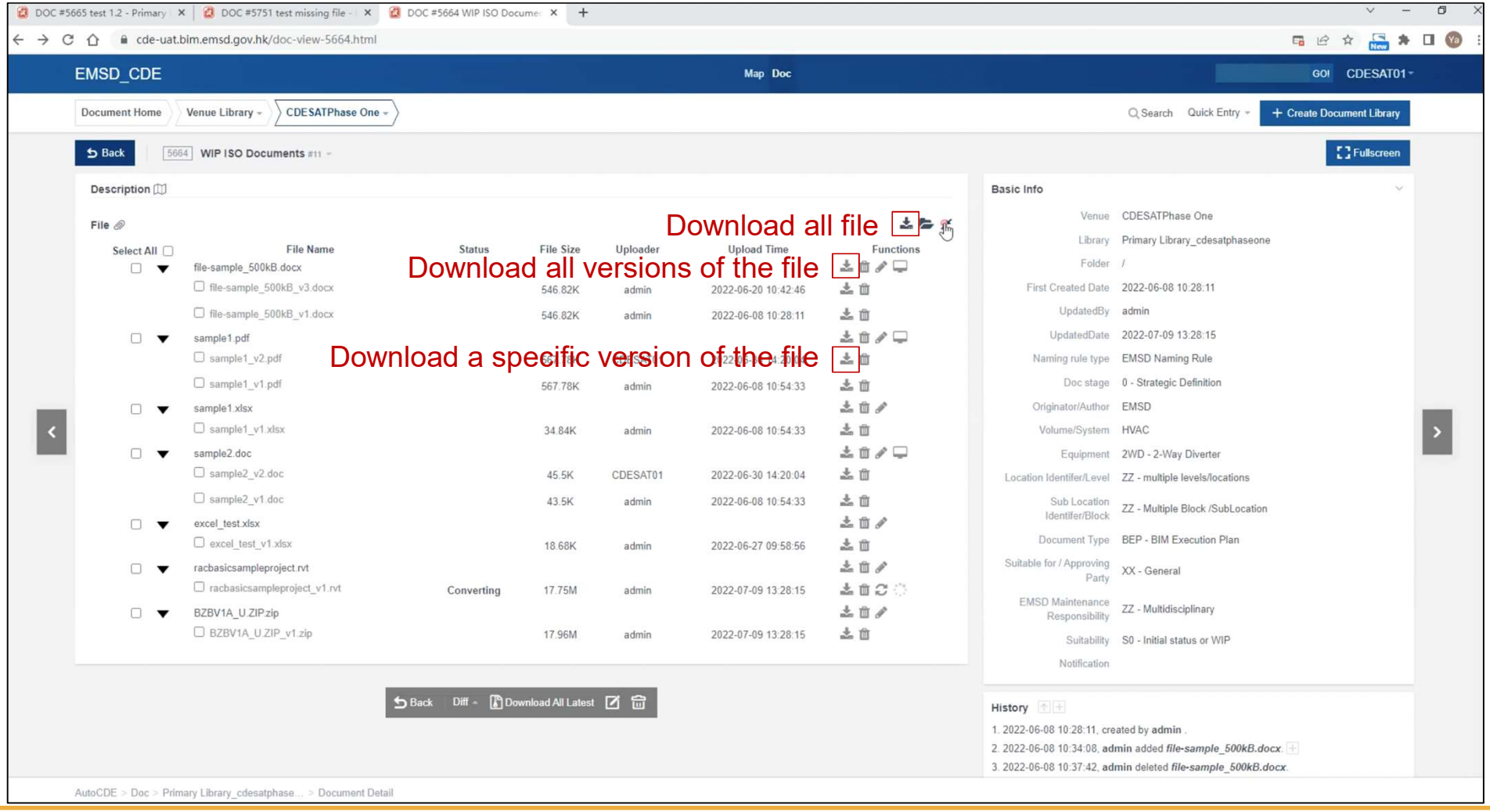
Introduction on Information Container Page

Delete files and Show Deleted Files



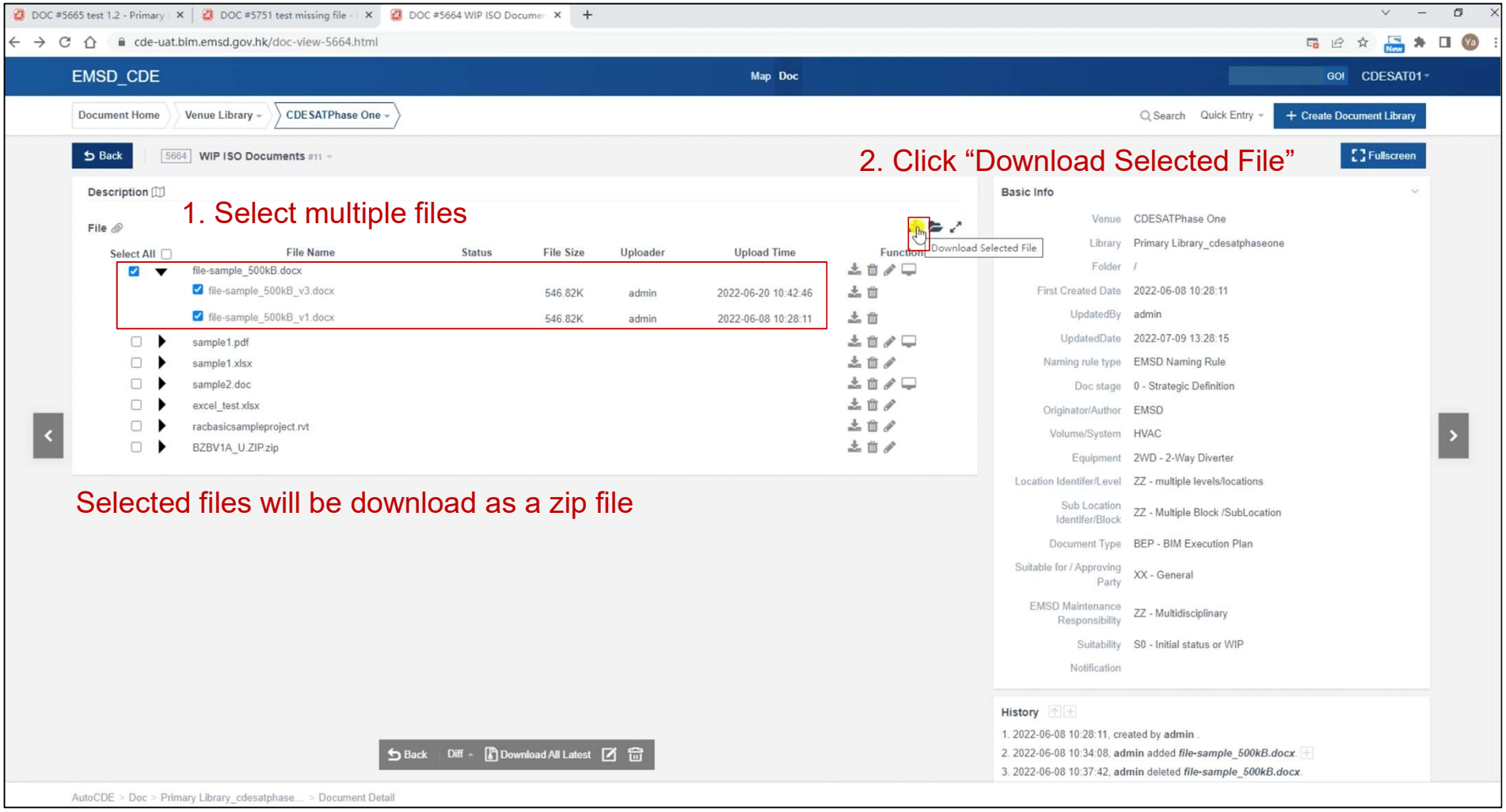
Introduction on Information Container Page

Download files



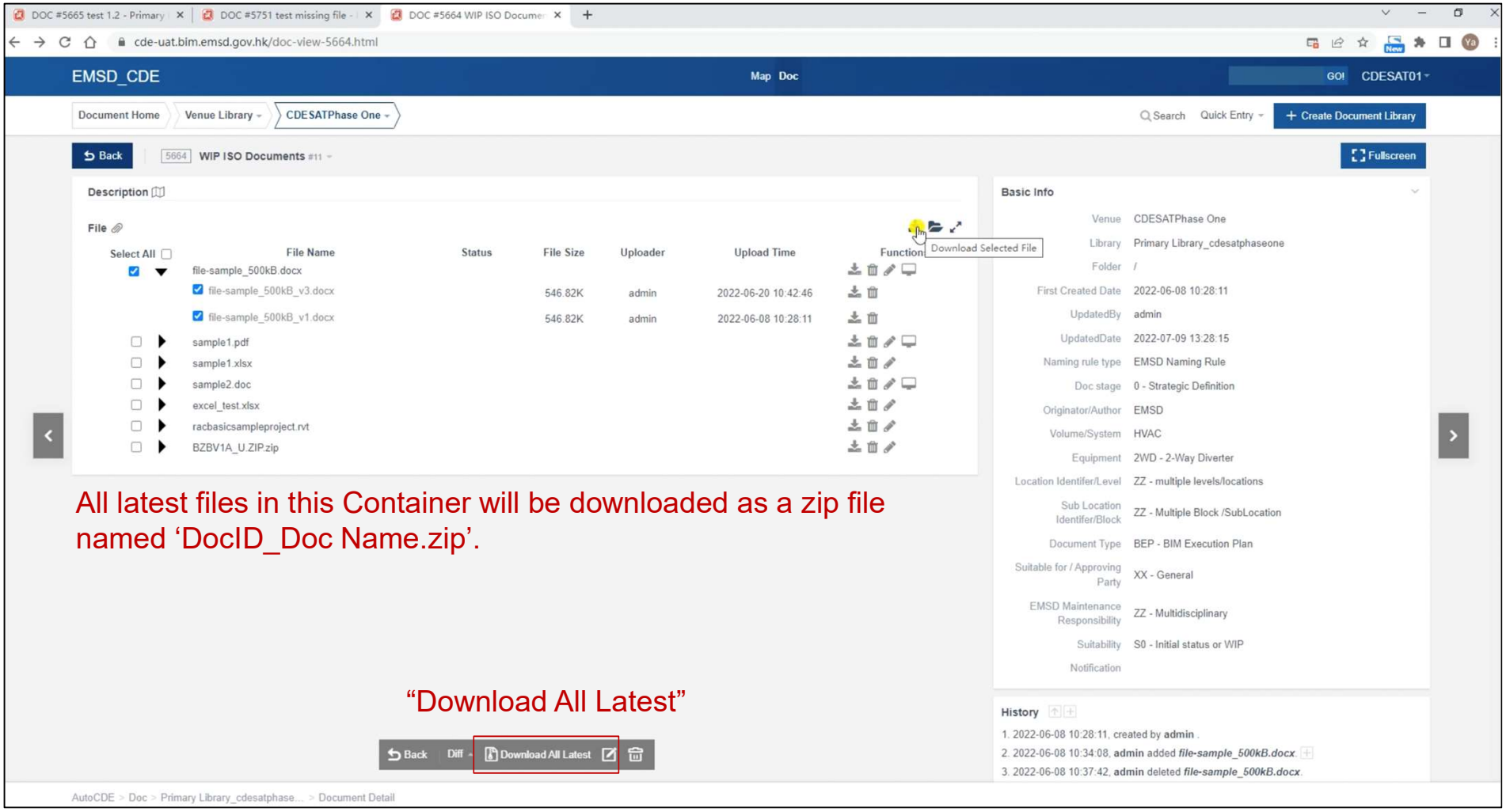
Introduction on Information Container Page

Download files in batch



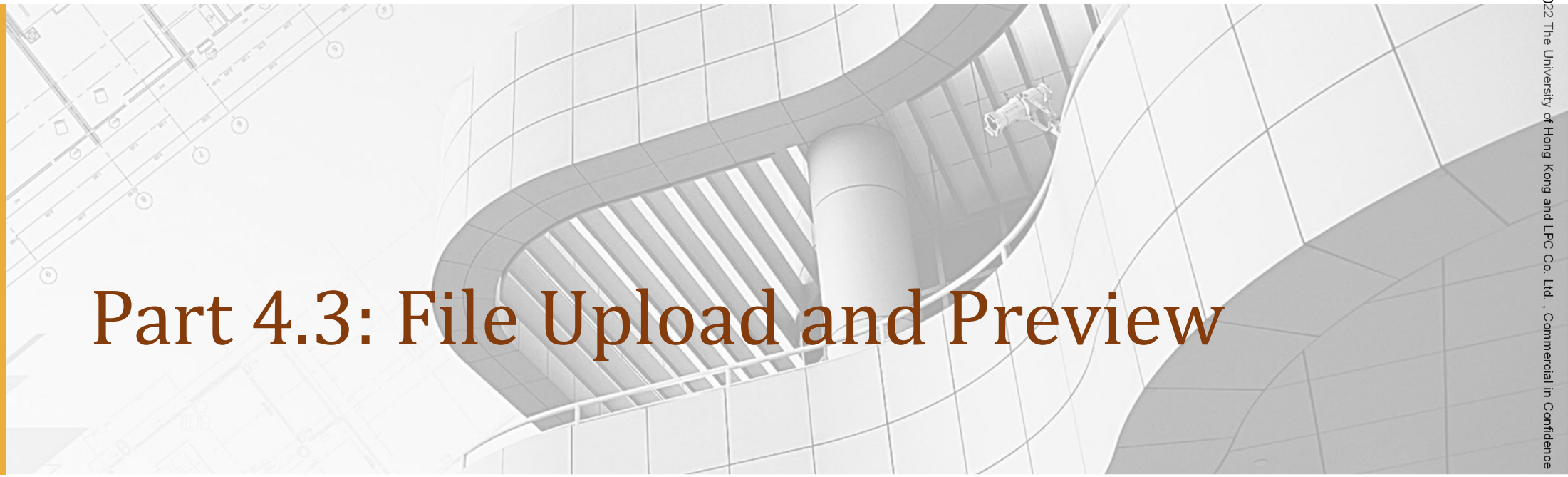
Introduction on Information Container Page

Download latest set of files



All latest files in this Container will be downloaded as a zip file named ‘DocID_Doc Name.zip’.

“Download All Latest”



Part 4.3: File Upload and Preview

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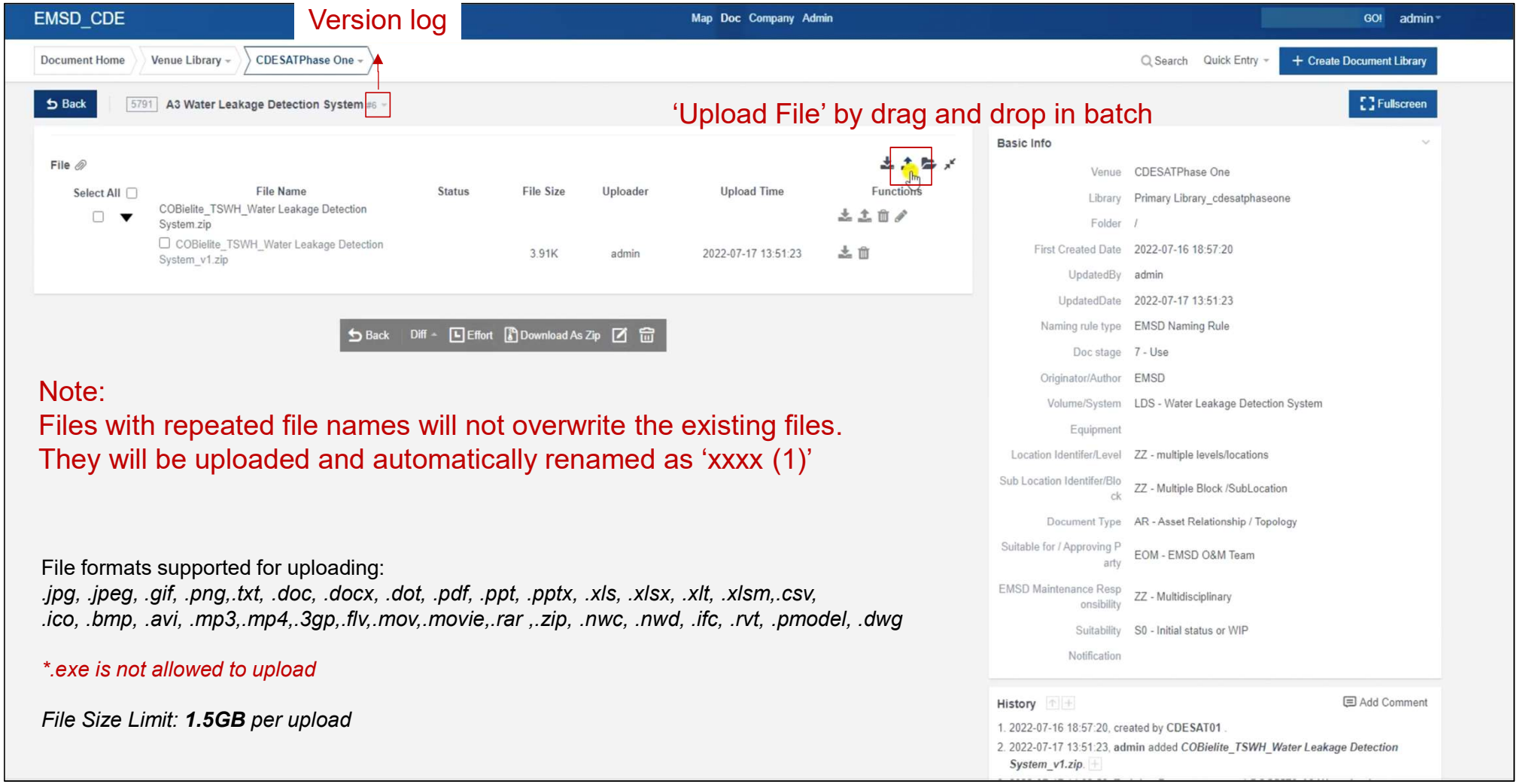
File Upload – upload new files



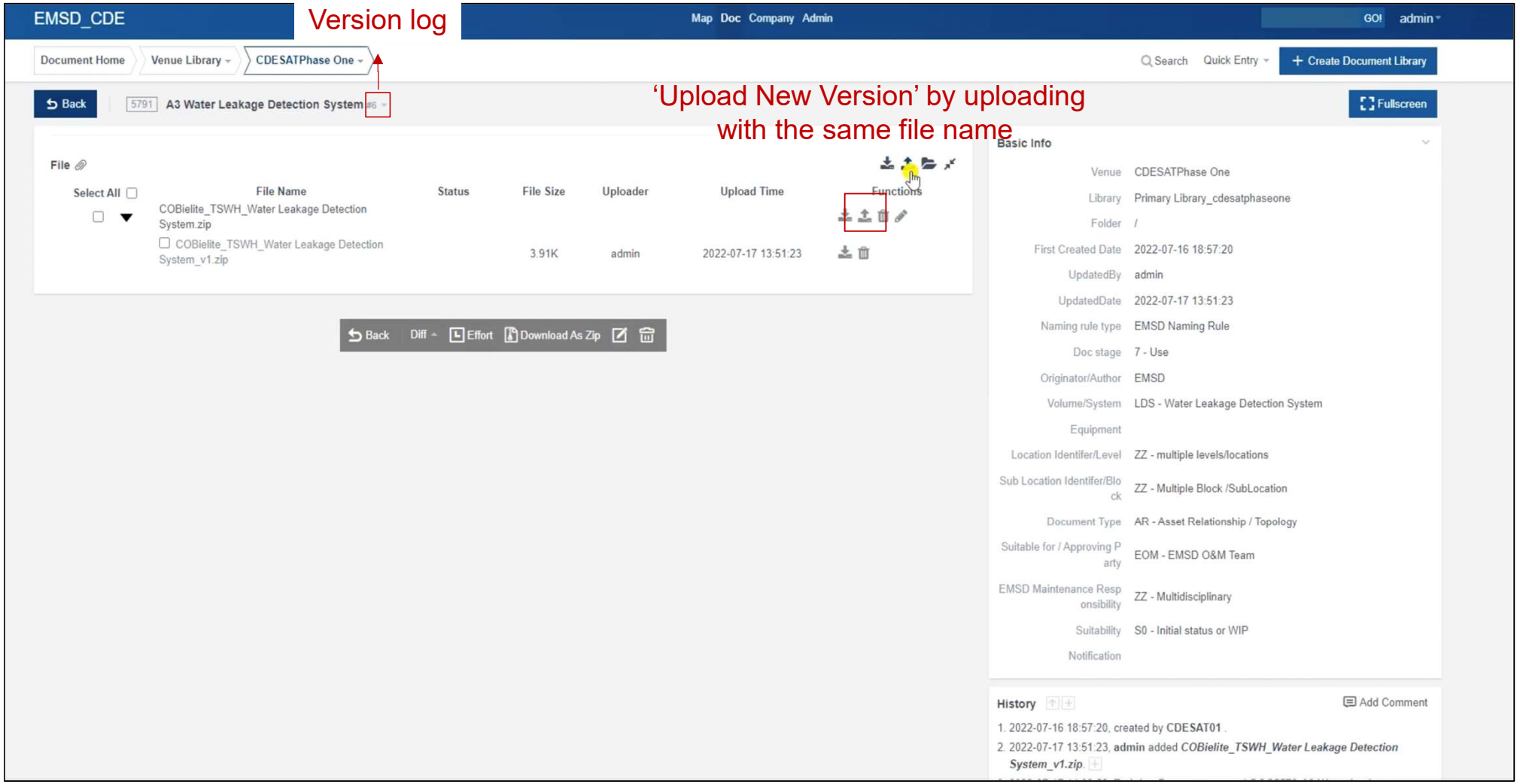
Note:
Files with repeated file names will not overwrite the existing files.
They will be uploaded and automatically renamed as 'xxxx (1)'

File formats supported for uploading:
.jpg, .jpeg, .gif, .png,.txt, .doc, .docx, .dot, .pdf, .ppt, .pptx, .xls, .xlsx, .xlt, .xlsm,.csv, .ico, .bmp, .avi, .mp3,.mp4,.3gp,.flv,.mov,.movie,.rar ,.zip, .nwc, .nwd, .ifc, .rvt, .pmodel, .dwg

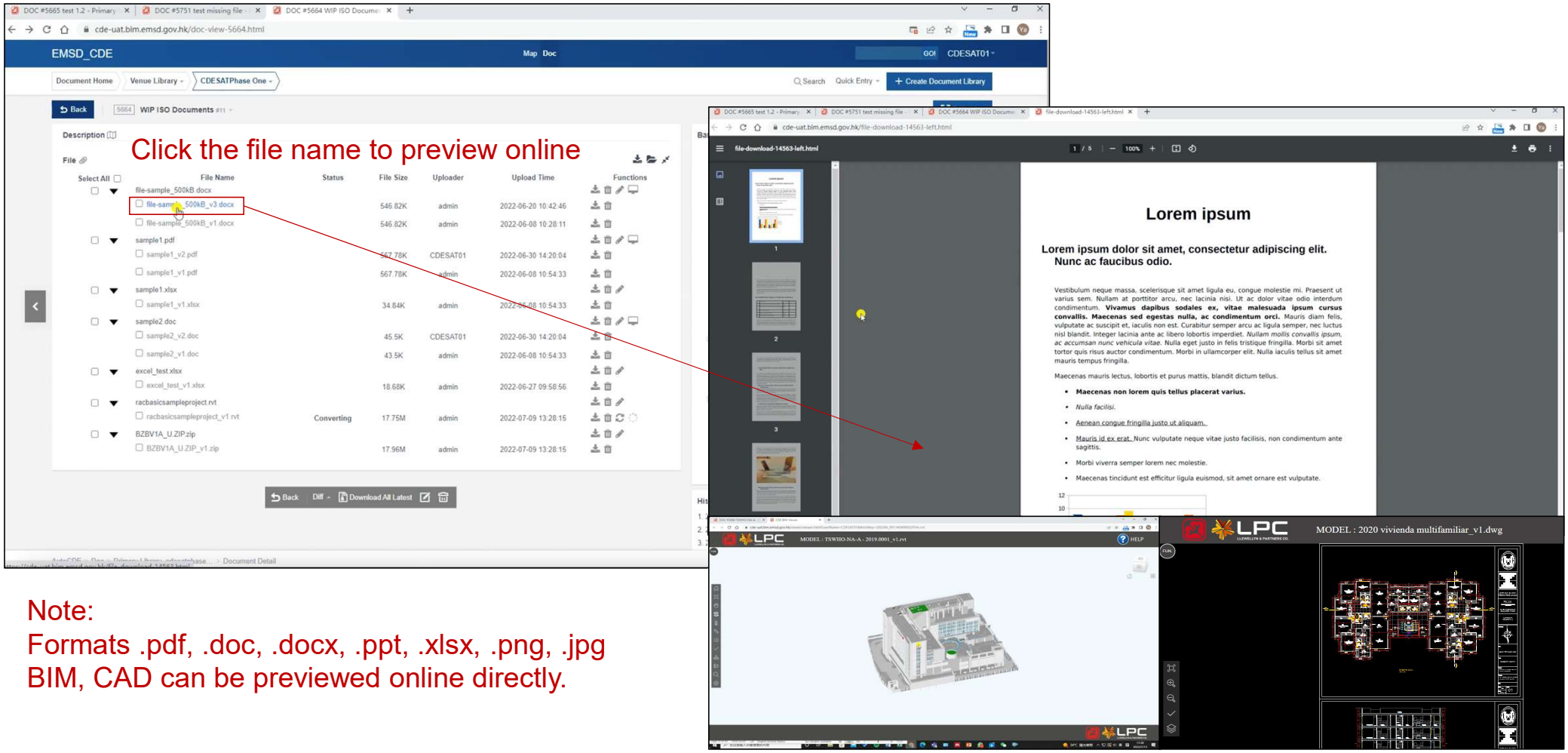
**.exe is not allowed to upload*

*File Size Limit: **1.5GB** per upload*

File Upload – upload new version



File Preview



Note:
Formats .pdf, .doc, .docx, .ppt, .xlsx, .png, .jpg
BIM, CAD can be previewed online directly.

Part 4.4: Model Viewer

a. 3D Model/ 2D Drawing Viewing;

- *Navigation;*
- *Object selection and properties checking;*
- *Objects hidden and isolated;*
- *3D measurement;*
- *Sectioning;*

b. Model linking;

c. Model Comparison;

d. Model Mark-up & viewpoint Saving;

e. Mark-up report generating;

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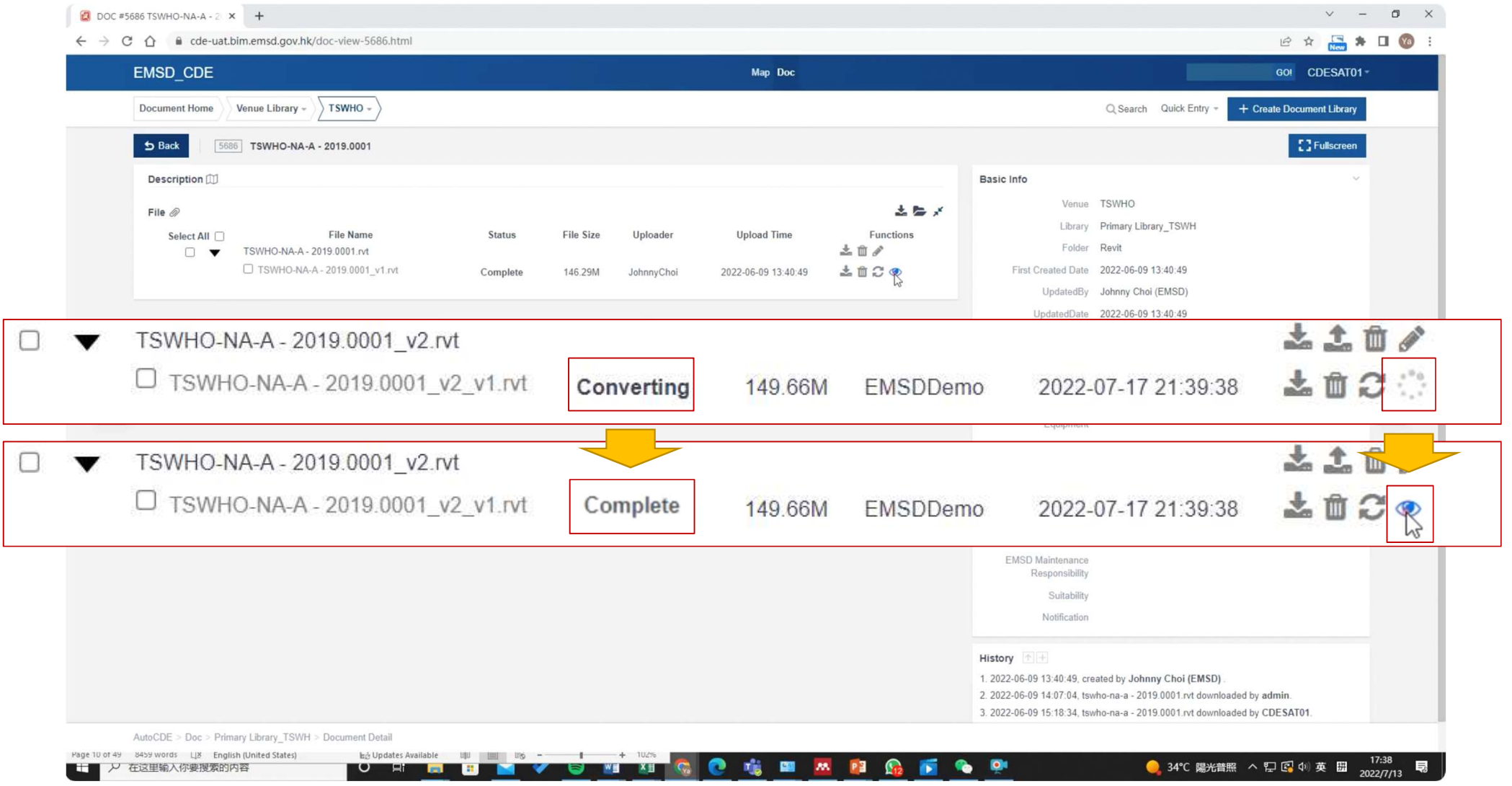
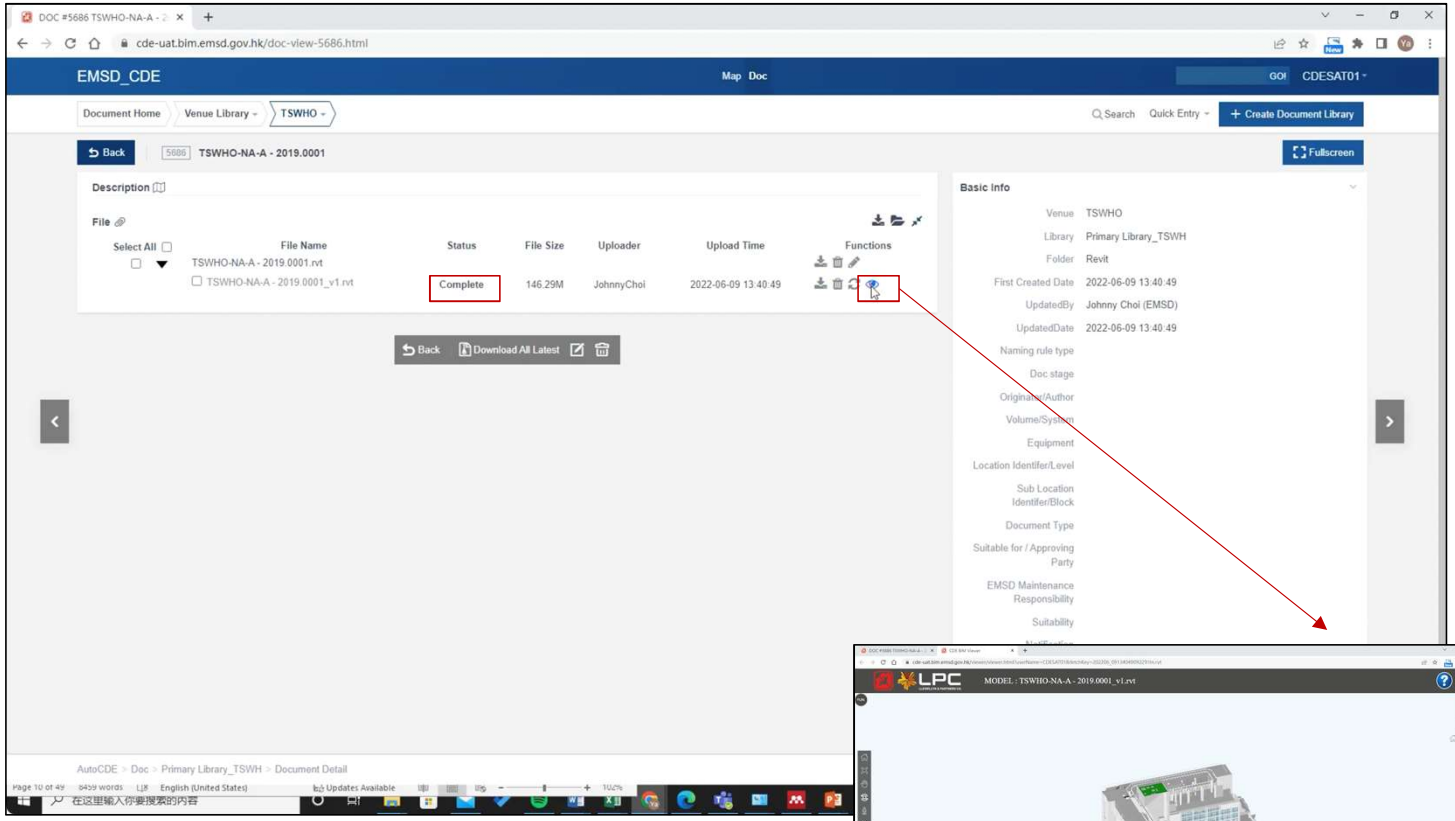
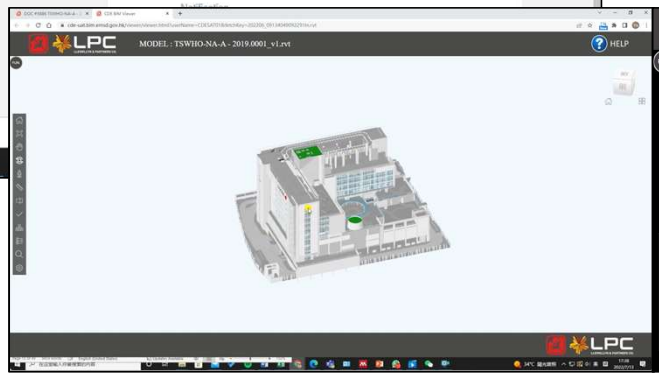
Model/ CAD Upload

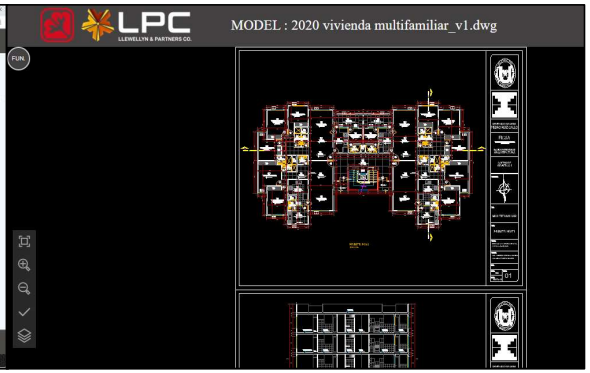
Support commonly used BIM and CAD file formats



Model/ CAD Viewing

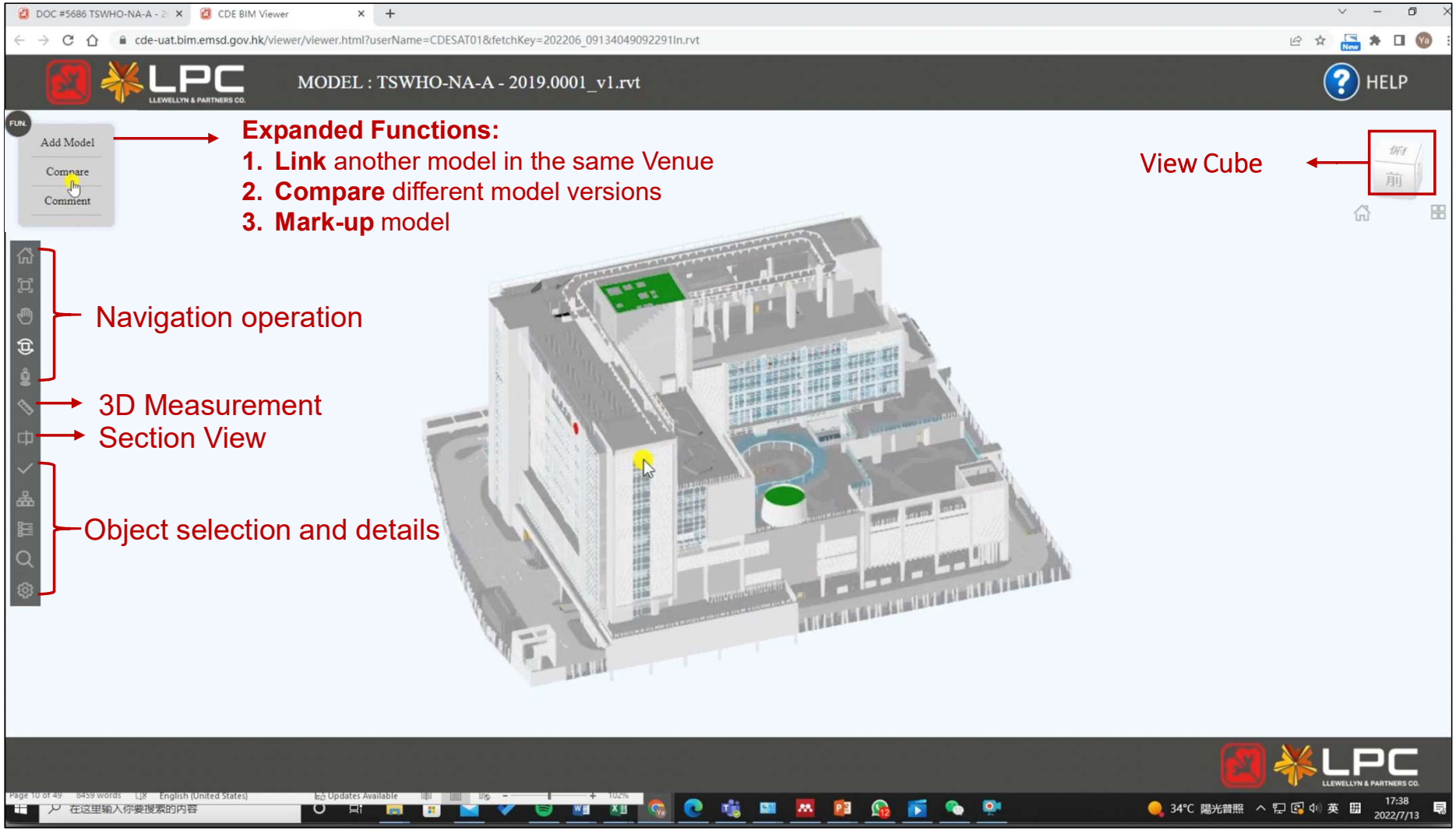






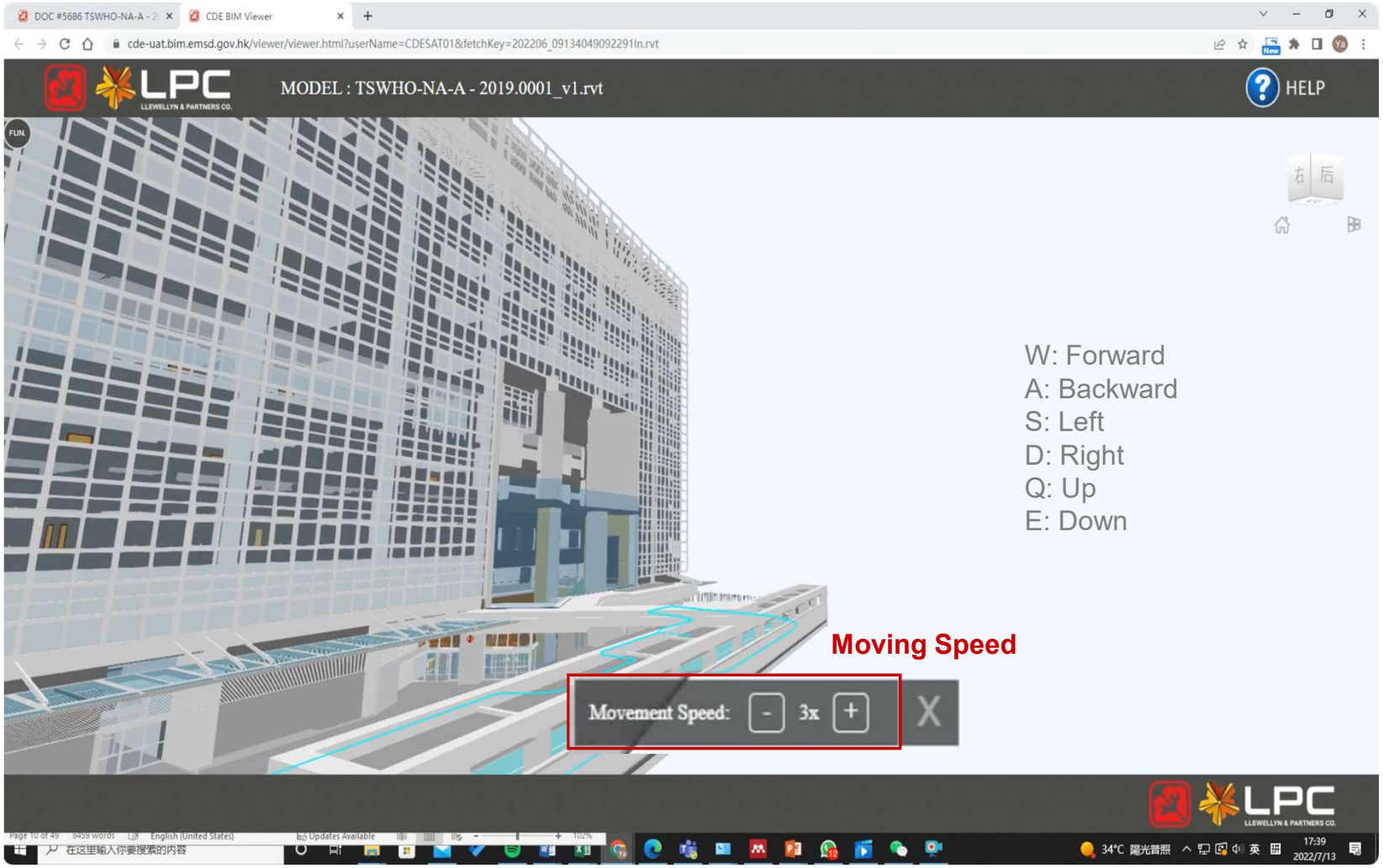
Click to open BIM/ CAD Viewer

Model Viewer Interface Introduction

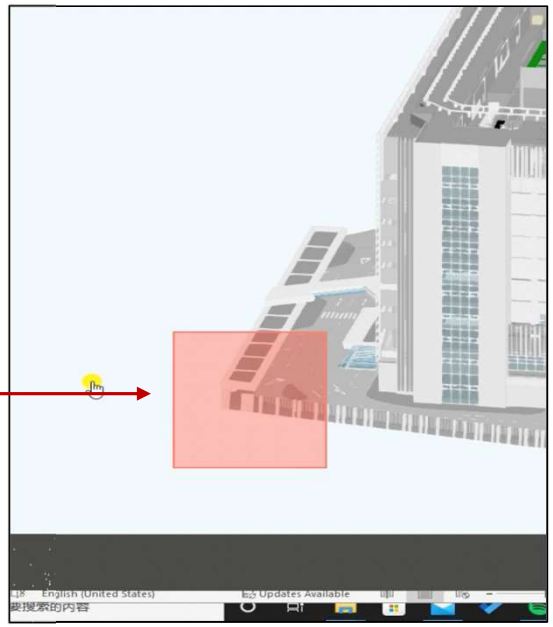


Interface Introduction – Navigation

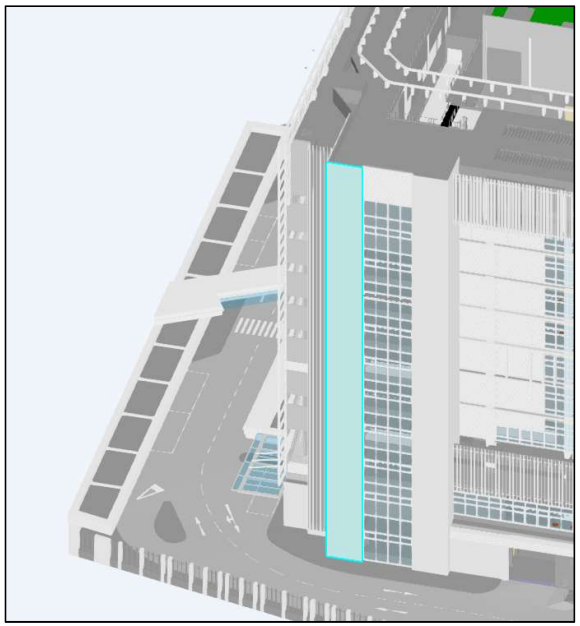
- **Pan**
- **Rotate**
- **Walkthrough:** wandering around the model using keyboard and mouse



Interface Introduction – Select BIM Object

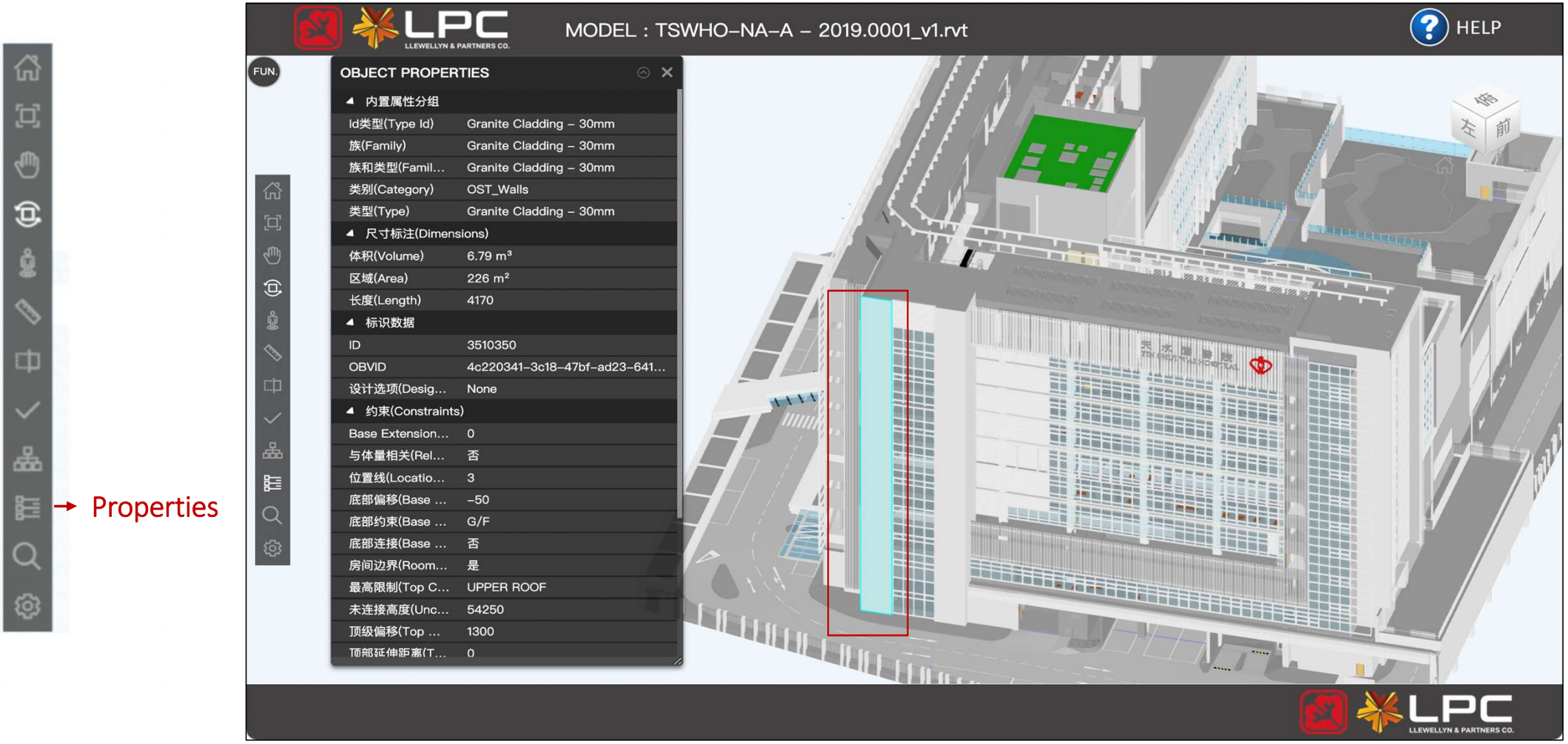


Area Selection : Drag to select multiple BIM objects by area

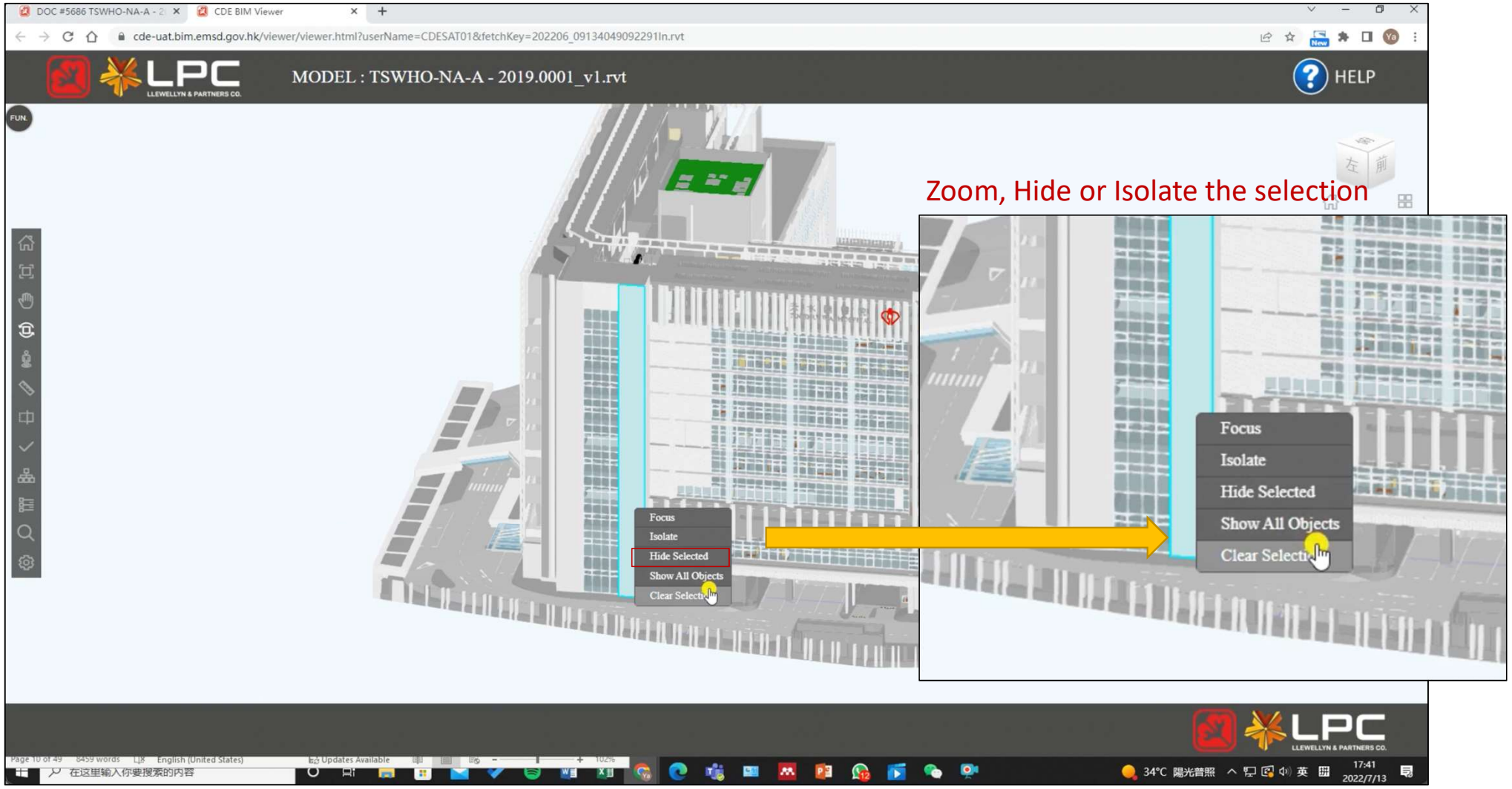


Single Selection : Click to select a single BIM object

View BIM Properties

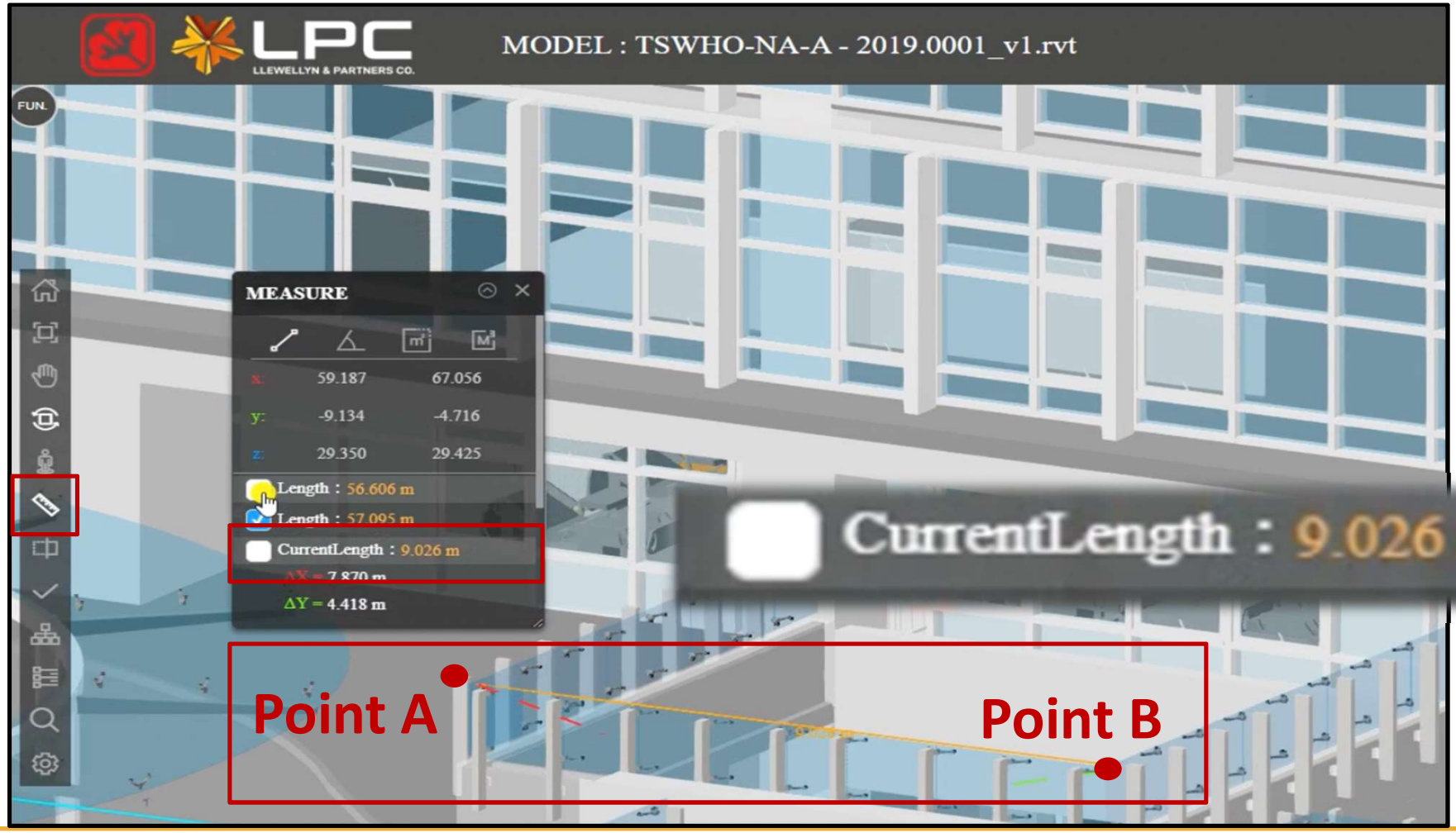


Hide certain BIM objects

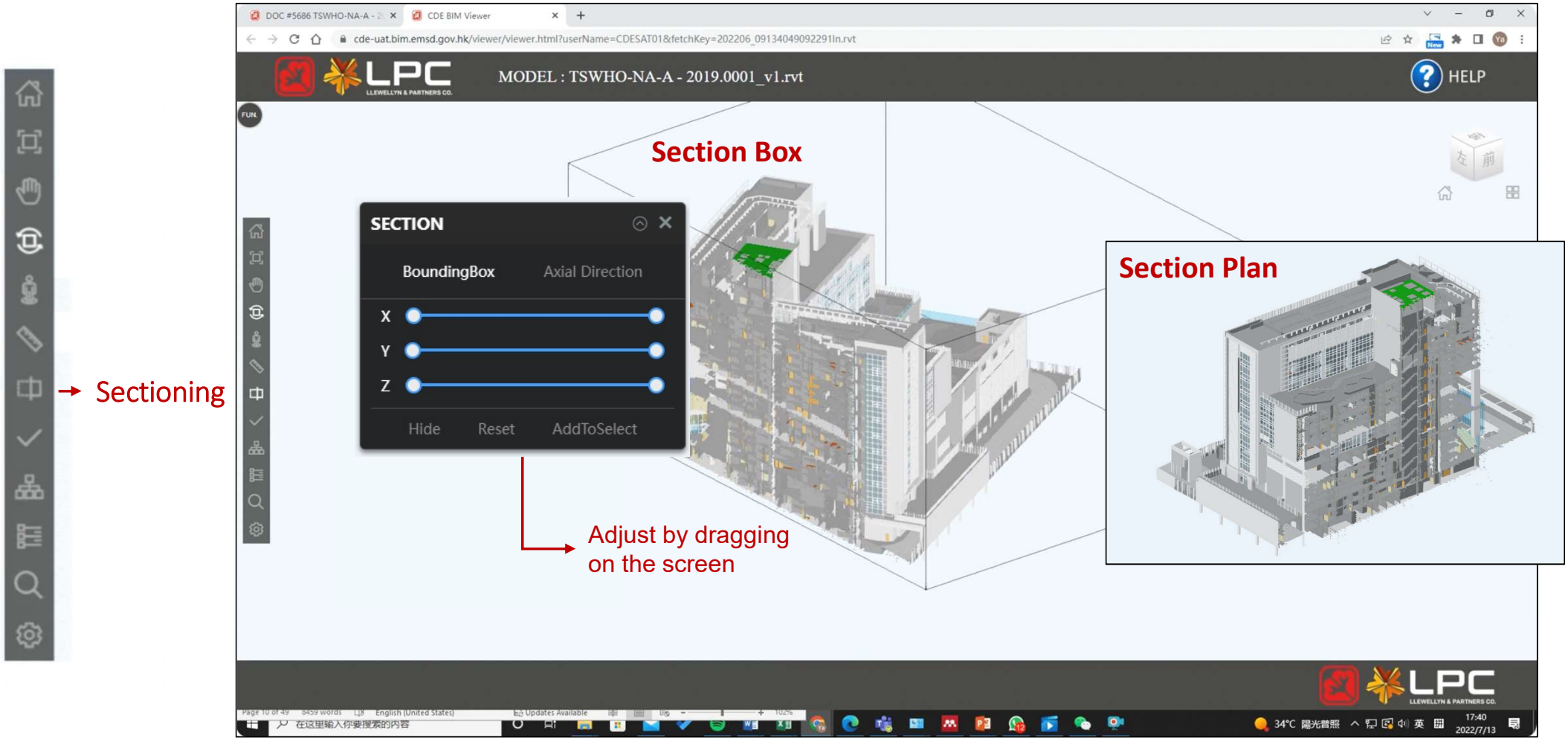


3D Measurement

Measure distance between two points

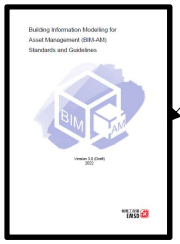


Sectioning


Sectioning
MODEL : TSWHO-NA-A - 2019.0001_v1.rvt
HELP
Section Box
SECTION
BoundingBox
Axial Direction
X
Y
Z
Hide
Reset
AddToSelect
Adjust by dragging
on the screen
Section Plan

Model Linking - Background

Model Federation Strategy:
Building → Block → Floor → System



Detail Naming & Federation Requirement available in BIMAM SG3.0

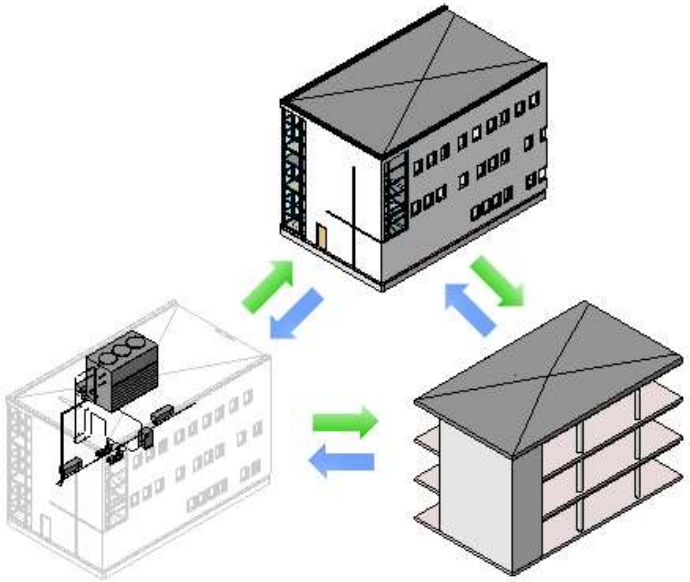
Example

WKGO-N-6F-A.rvt
WKGO-N-6F-HV.rvt
WKGO-N-5F-A.rvt
WKGO-N-5F-HV.rvt
WKGO-S-6F-A.rvt
WKGO-S-6F-HV.rvt
WKGO-S-5F-A.rvt
WKGO-S-5F-HV.rvt

Different **Systems**

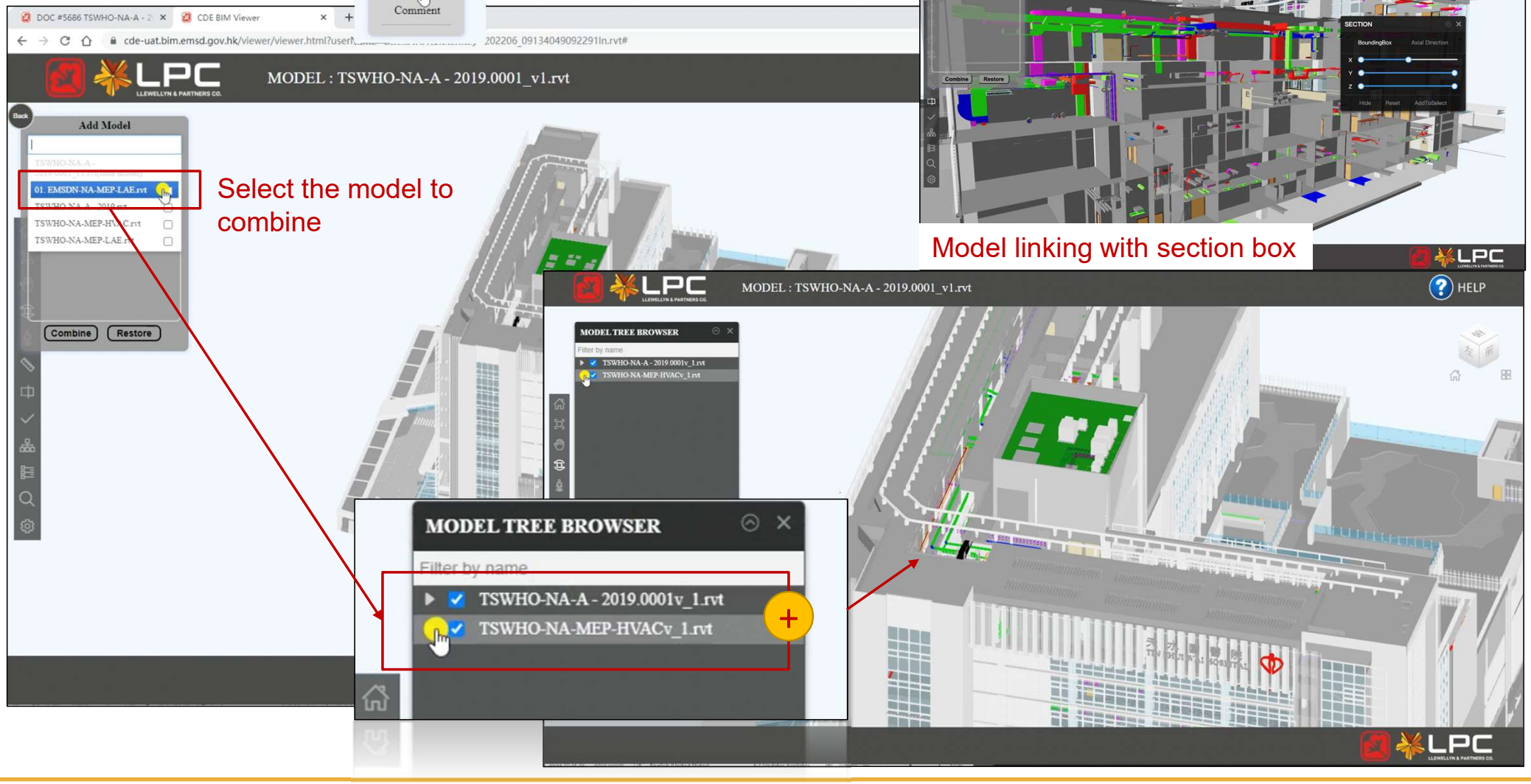
Different **Floors**

Different **Blocks**



*Overlap & Visualize **multiple files** at same time*

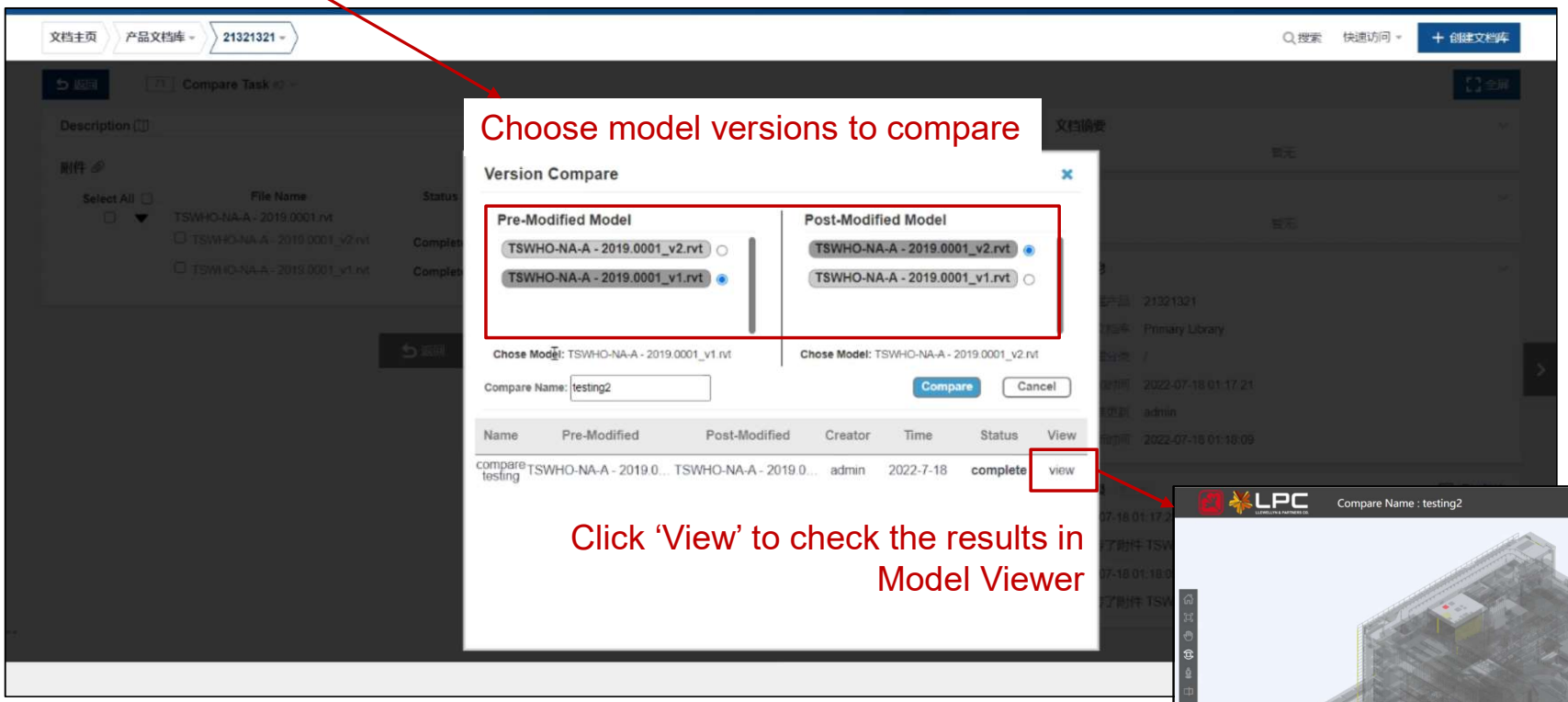
Model Linking



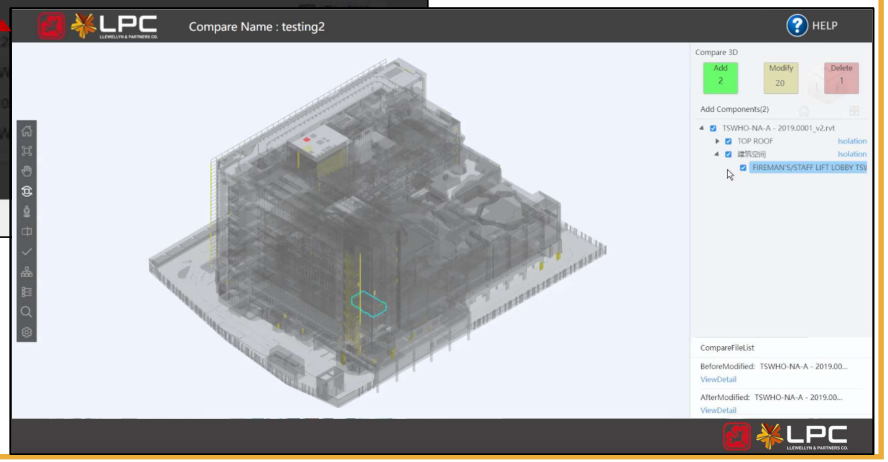
Model linking with section box

Model Comparison

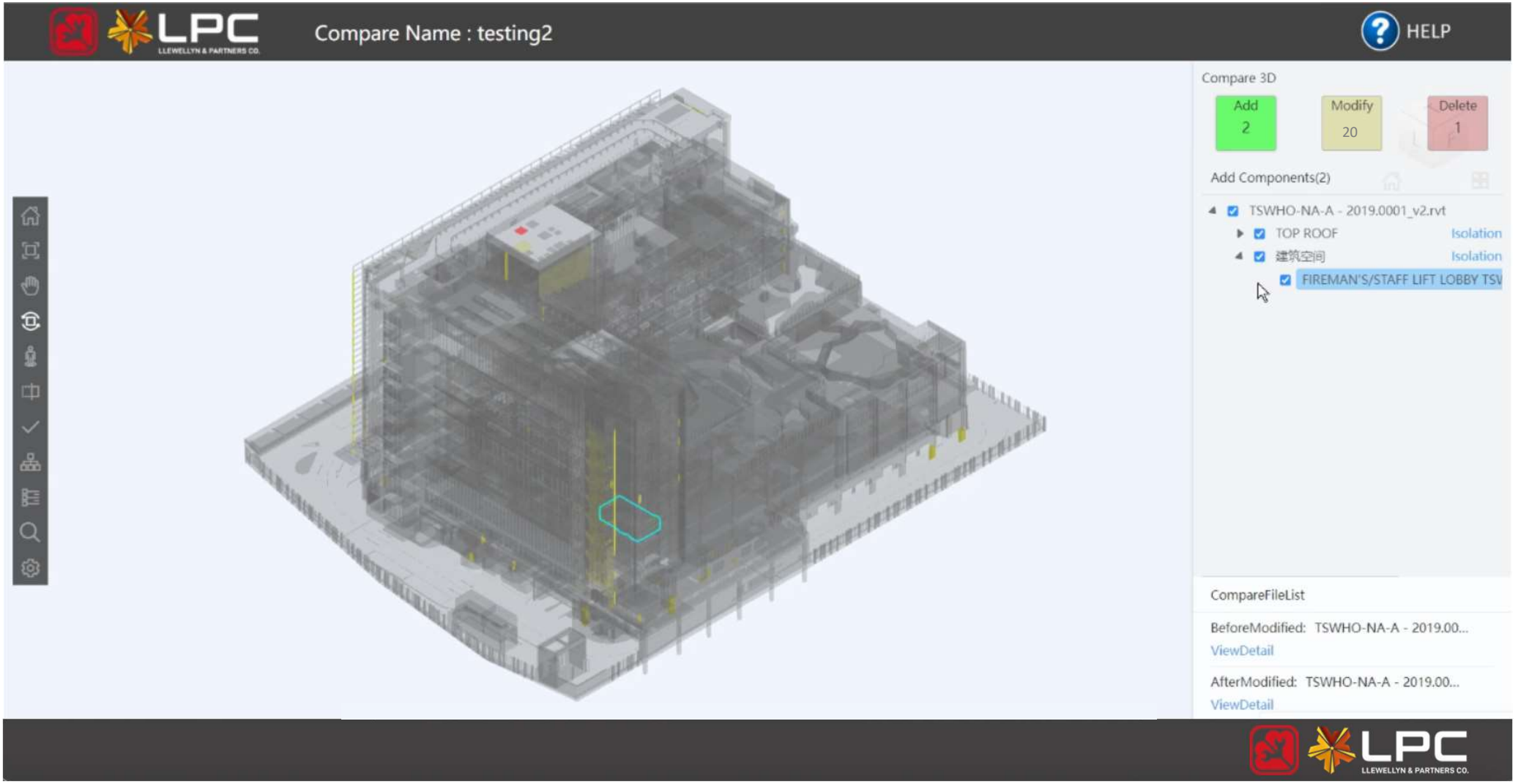
Click to start comparison



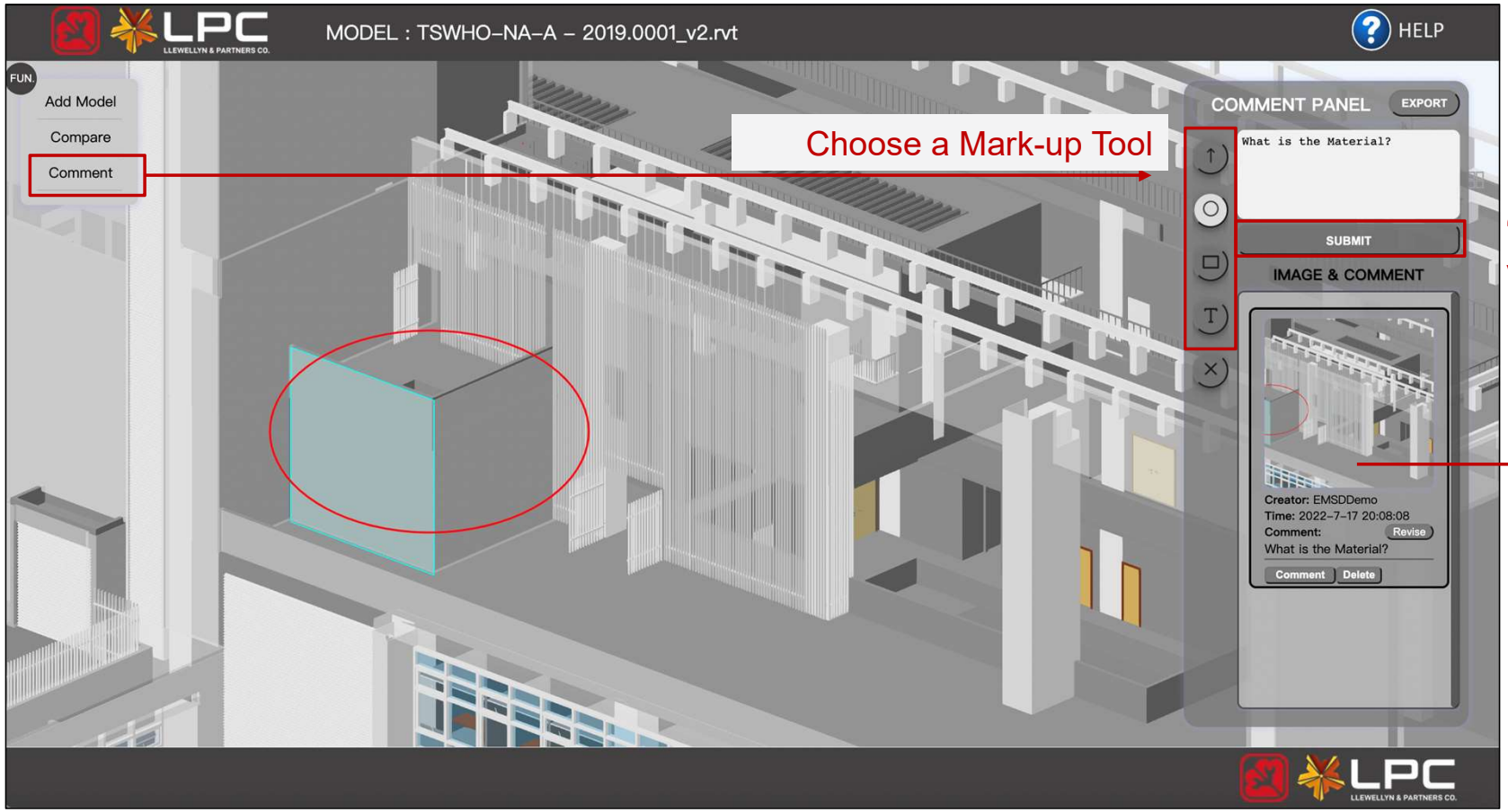
Click ‘View’ to check the results in Model Viewer



Model Comparison



Model Mark-up & Saving Viewpoint



"Submit" to save viewpoint & comment

Click on a comment to navigate the saved viewpoint

Model Mark-up & Saving Viewpoint

Export comments

Enhancement in AIMP & BIM-AM

Part 5

機電工程署 EMSD

1. Single Source of File Storage

(w/ Grouping of Functional Locations)

NEW

AIMP

BIM-AM

AIMP

Fu Shan Public Mortuary

FSPM

- O&M.pdf (10MB)
- BIM_Model.rvt (1000MB)

MOTHF-STX-013

- O&M.pdf (10MB)
- BIM_Model.rvt (1000MB)

FSPM-001

- O&M.pdf (10MB)

FSPM-002

- O&M.pdf (10MB)

x2 (Extra Copy in BIMAMs)

CDE

Fu Shan Public Mortuary

- O&M.pdf (10MB)
- BIM_Model.rvt (1000MB)

link to CDE

link to CDE

AIMP

BIM-AMs

FSPM, FSPM-001, FSPM-002, MOTHF-STX-013.....

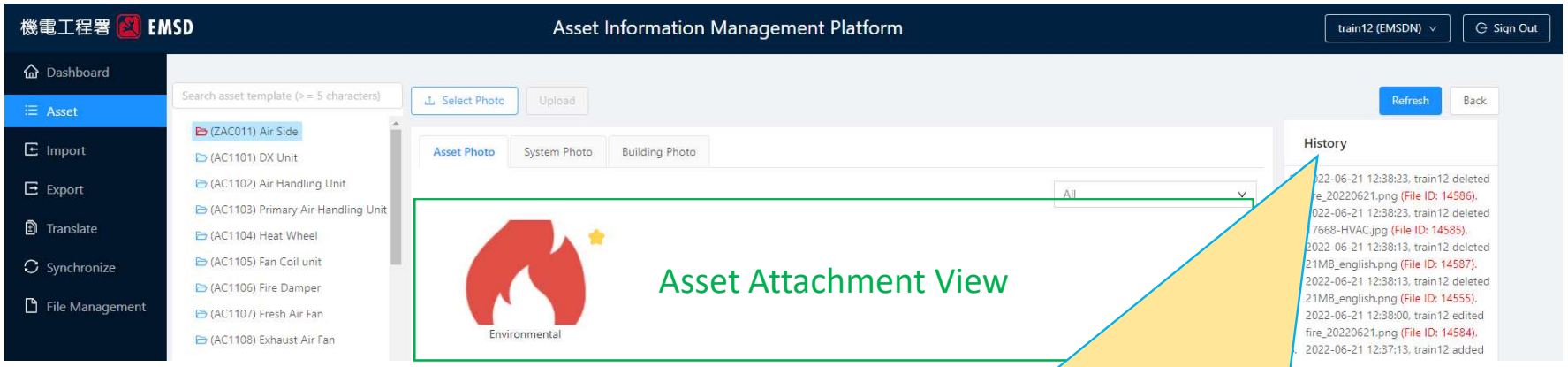
- ***Reduce Duplicate Files***
- ***Enhance Master Copy Management***

機電工程署 EMSD

2. Change History

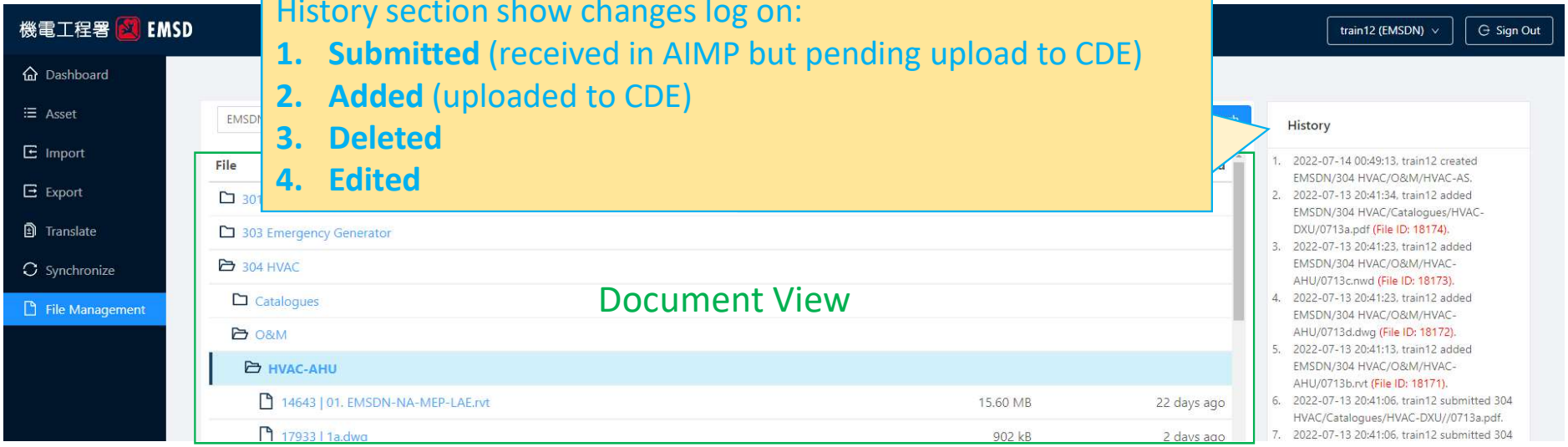
NEW

AIMP



History section show changes log on:

1. **Submitted** (received in AIMP but pending upload to CDE)
2. **Added** (uploaded to CDE)
3. **Deleted**
4. **Edited**

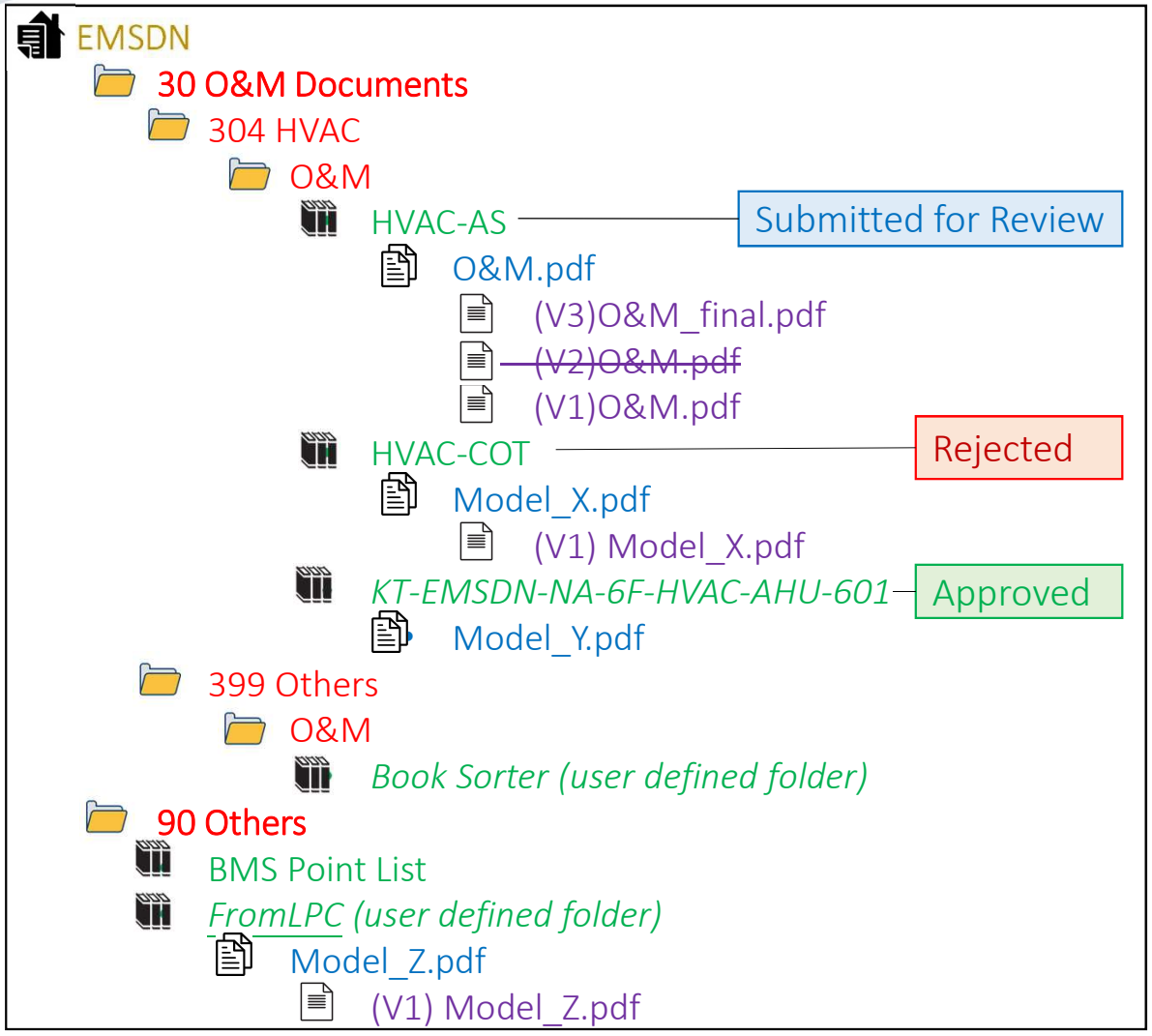


Enhanced Features

Part 6

機電工程署 EMSD

Approval Status



- One status per **container**
  (smallest approval unit)
- One approval request can include **one, multiple or all containers**
- Container **"locked"** and not allowed for editing once submitted
- Allow **cancel** approval request before the task is approved/ rejected

4 status in total

- (Not Submitted)
- Submitted for Review
- Rejected
- Approved

*Design in progress

Approval Workflow

1. *Upload Files*
2. *Create Approval Tasks & Selecting Containers*
3. *Review & Approval*
4. *Confirm and Close the Submission "Task"*

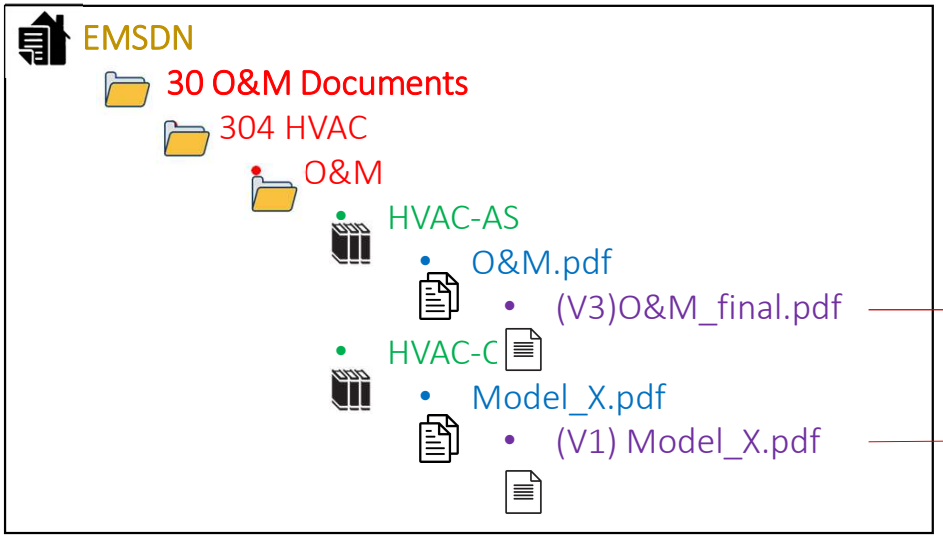
AIMP *or* CDE

AIMP *or* CDE

CDE

CDE

Approval Task (2 containers) *[Pending Review]*



Confirm

Submission Description

Reviewer's Comment

Link to Uploaded Document (latest version) Approve Reject

Link to Uploaded Document (latest version) Approve Reject

*Design in progress

End