BIM Requirements for Type A (Self-Built) Pavilions

GL 4-2-1 July 2021

TABLE OF CONTENTS

1. INTRODUCTION

1.1. BACKGROUND OF DEVELOPING BIM REQUIREMENTS

In order to make the Expo site a realistic model for Society 5.0, the utilization of the 3D modelling and information of architecture/plots is essential at each phase of the Expo, from the site construction and promotion prior to the opening, the operation of pavilions/facilities and the provision of services during the Expo, through the post-Expo period when the Expo legacies are utilized to help promote its vision. As means to utilize the 3D modelling and information of architecture/plots throughout the Expo phases, we have decided to implement BIM modelling for the construction of the Expo site and generate BIM data that can be used for the promotion and various services of the Expo.

1.2. OBJECTIVES OF DEVELOPING BIM REQUIREMENTS

This BIM requirements document is developed with the aim of generating shared understanding of BIM among Participants intending to build a pavilion and other facilities on their own, harmonising the level of BIM implementation for the site construction, and ensuring the level of BIM data used across the Expo site is consistent. In order to achieve these objectives, the Organiser will confirm whether Participants implement BIM appropriately and resulting BIM data satisfies the requirements. If necessary, the Organiser will demand corrective actions.

1.3. DEFINITION

(1) Organiser

"Organiser" means Japan Association for the 2025 World Exposition and those who carry out the association's operations. The Organiser has developed this BIM requirements document and will request Participants to comply with them. The Organiser will also confirm whether Participants implement BIM appropriately and resulting BIM data satisfies the requirements. If necessary, the Organiser will demand corrective actions.

(2) Participants

"Participants" means Participants that will build a pavilion and other facilities on their own and those who support the Participants' operations. Participants must comply with these BIM requirements in their Construction Project.

(3) Construction Project

"Construction Project" means overall construction works commissioned by Participants such as the design and construction of a pavilion and other facilities.

(4) Construction Phase

"Construction Phase" means a distinct stage in the project. In this BIM requirements document, the Construction Phase is divided into three distinctive stages: "General Design," "Final Design" and "Construction."

(5) BIM (Building Information Modelling)

"Building Information Modelling (BIM)" means developing building information models that combine computer-generated 3D shape information (3D models) and the architecture's attribute information such as the name and area of rooms, the specification and functionality of materials and members, finishing, etc.

(6) BIM Execution Plan

"BIM Execution Plan" means a document that sets criteria to ensure that Participants comply with these BIM requirements throughout a Construction Project and to promote the appropriate implementation of BIM.

(7) BIM Data

"BIM Data" means building information models that combine computer-generated 3D shape information (3D models) and the architecture's attribute information such as the name and area of rooms, the specification and functionality of materials and members, finishing, etc.

(8) BIM Software

"BIM Software" means software that generates BIM data in respect to design, structure, equipment, etc.

(9) Native File

"Native File" means a data file saved in the software-specific format.

(10) Object

"Object" means the computer-modelled representation of substances, objects and entities distributed within a certain space in 3D.

(11) Interference Checking

"Interference Checking" means conducting test to confirm that members of buildings such as pillars, beams, ceilings, ducts and pipes do not interfere each other.

(12) Spatial Object

"Spatial Object" means a 3D object enclosed by partitions such as floors, walls, ceilings or virtual partitions.

(13) Level of Detail (LOD)

"Level of Detail (LOD)" means the graphical details of an object that is a part of BIM data.

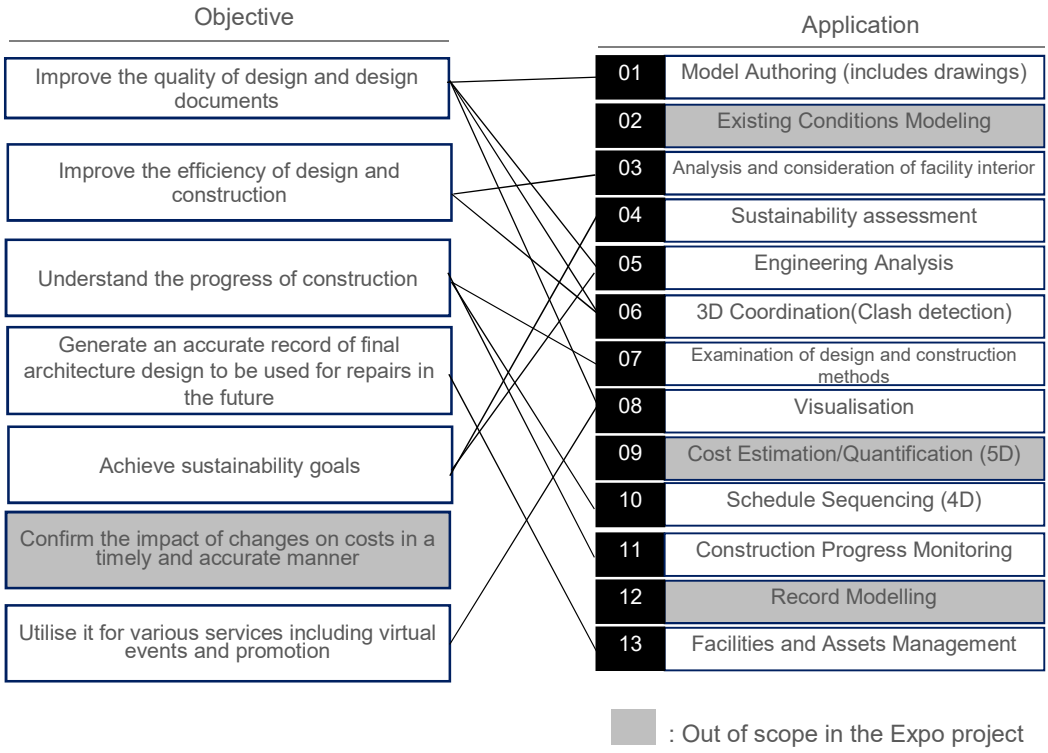
2. DETAILS OF BIM IMPLEMENTATION

This chapter elaborates on BIM implementation. Please note that what is stated in this chapter is the minimum level of BIM the Organiser demands Participants to implement and does not inhibit Participants from carrying out other types of BIM.

2.1. OBJECTIVES OF BIM IMPLEMENTATION

Table 2-1 defines the objectives of BIM implementation and application that corresponds to each objective. Participants must fully understand all of the objectives to plan how to apply BIM to achieve them.

Table 2-1



2.2. COVERAGE OF BIM IMPLEMENTATION

Participants must implement BIM for the objects below. For more information on the distinction of mandatory/voluntary requirements, please refer to the next article of this chapter and Chapter 7.

(1) Facility (Design)
(2) Facility (Structure)
(3) Facility (Equipment)
(4) Facility (Exterior)

2.3. OVERVIEW OF BIM APPLICATION

In Table 2-2, the requirement levels of each application in each Construction Phase of the Expo are defined. Participants must understand the objectives and requirement of each application. Then, they must submit a BIM Execution Plan that describes what they plan to do with BIM based on the characteristics of their Construction Project to the Organiser.

The Organiser hopes that each Participant strives to maximise the efficiency of design and construction by implementing BIM, in line with the characteristics of their architecture, even for application designated as “Recommended” or “Not required.”

Table 2-2

	Application	Construction Phase		
		General Design	Final Design	Construction
01	Model Authoring (includes drawings)	◎	◎	○
02	Existing Conditions Modeling	-	-	-
03	Analysis and consideration of facility interior	○	○	-
04	Sustainability assessment	○	○	-
05	Engineering Analysis	○	○	-
06	3D Coordination(Clash detection)	-	○	○
07	Examination of design and construction methods	○	◎	○
08	Visualisation	○	○	-
09	Cost Estimation/Quantification (5D)	-	-	-
10	Schedule Sequencing (4D)	-	-	○
11	Construction Progress Monitoring	-	-	○
12	Record Modelling	-	-	-
13	Facilities and Assets Management	-	-	○

Requirements

◎: Mandatory

Participants must implement BIM as their obligation.
Participants must monitor the status and results of BIM implementation.

○: Recommended

Participants can implement BIM at their discretion depending on the characteristics of their facilities. If a Participant deems it necessary, the Participant must describe the application in question in the BIM Execution Plan and monitor the status and results of BIM implementation.

-: Not required

Application that is not required to be implemented in this document.
However, it does not mean that Participants are prohibited from implementing it.

: Out of scope in the Expo project

2.3.1. Models Authoring (includes drawings)

The generation of models means developing and generating BIM data by using BIM software. The generation of BIM data is the first step of BIM implementation. It is important to generate BIM data in which 3D models and attribute information (properties, quantity, schedule, etc.) are integrated.

Participants must submit BIM data with a LOD (see Chapter 7) that matches with the corresponding Construction Phase to the Organiser.

If there is complete BIM data concerning the plot and surrounding areas, the Organiser will provide the relevant participant with it. If there is no such BIM data, participants must generate preliminary plot data.

2.3.2. Analysis and Consideration of Facility Interior

The analysis and consideration of facility interior means considering requirements for a space using spatial objects with single function such as a space (room) enclosed by walls, a floor and ceiling or a space with functional boundaries such as an entrance hall that has no partition. Participants must understand the relationship between spaces and required specifications by utilising generated BIM data to analyse the relevant spatial structure.

2.3.3. Sustainability Assessment

Sustainability assessment means assessing and monitoring the sustainability of buildings based on the criteria set out in the “Design Guidelines for Type A (Self-Built) Pavilions” of the Expo. Assessing the function of buildings from the sustainability perspective from the onset of designing has a positive impact on the efficiency of a Construction Project as a whole.

2.3.4. Engineering Analysis

The analysis and examination of techniques means using BIM data in environmental simulations to examine specific structure and the operation of lighting and energy systems. It aims to reduce overall lifecycle costs by optimising design and significantly improving the design and performance of facilities through their lifecycle.

2.3.5. 3D Coordination (Clash detection)

3D Coordination means identifying physical interference by overlapping the building’s 3D models using BIM software with an interference checking function. It aims to preemptively eliminate problems by detecting interference between equipment and structure and make necessary adjustments.

2.3.6. Examination of Design and Construction Methods

The examination of design and construction means evaluating various design/construction-related issues by using integrated BIM data. It enables Participants to evaluate whether their design satisfies criteria and requirements and examine various design options and alternatives in real time and with ease, allowing them to reflect their feedbacks precisely. As a result, efficient design, review and construction will be achieved.

2.3.7. Visualisation

Visualisation means generating images such as perspective drawings and animations by rendering BIM data. Aims to implement it is to make decisions on the design and construction of facilities as well as support promotion activities.

2.3.8. Schedule Sequencing (4D)

The prioritisation of schedule means examining the order of construction procedures on site and requirements such as necessary plot spaces by using a 4D model (3D model that incorporates the dimension of time). This is a communication tool that facilitates better understanding of milestones of the Construction Project and the construction plan.

2.3.9. Construction Progress Monitoring

The monitoring of the progress of the construction means visually confirming whether the progress of the construction is in line with the construction plan by using a 4D model. In general, it is done by digitising the site situation by using a drone and/or sensors to compare the data with the 4D model of the same time base. The monitoring of the progress is carried out by linking the by-period information of the 4D model and a progress management system.

2.3.10. Facilities and Assets Management

The management of facilities and assets means supporting the efficient maintenance and operation of facilities by linking a facility management system and BIM data for maintenance management with the aim to appropriately maintain the function of equipment (machinery, electricity, piping, etc.) that provide structures of buildings (walls, floors, roofs, etc.) and buildings themselves with services during the Expo period. To this end, Participants are required to generate BIM data and attribute information to support the operation and maintenance of the facilities from the completion of the construction through the end of the Expo period.

3. ORGANISATION TO IMPLEMENT BIM

This chapter elaborates on various roles for the appropriate management of BIM data.

3.1. ESTABLISHING ORGANISATION TO IMPLEMENT BIM

In Table 3-1, the roles of the Organiser and Participants are defined. Participants must assign designated roles and responsibilities to appropriate staff. Then, they must submit a BIM Execution Plan with relevant information to the Organiser.

Table 3-1

Party	Role	Responsibility
Organiser	BIM Data General Administrator	✓ Control and manage BIM data of the Expo venue as a whole ✓ Lead BIM Data Administrators
	BIM Data Administrator	✓ Manage BIM data of designated projects (from the perspective of the Organiser) ✓ Exchange BIM data with Participants and respond to enquiry into BIM data
Participants	BIM Manager	✓ Manage BIM data of designated projects (from the perspective of Participants) ✓ Exchange BIM data with the Organiser or other Participants, and respond to enquiry into BIM data ✓ Take responsibility for the BIM data submitted to the Organiser ✓ Take responsibility for developing a BIM Execution Plan

Participants can decide how to assign necessary roles and responsibilities, including whether dividing the role of a BIM Manager among multiple staff. However, in such a case, Participants must clearly define the responsibilities of each staff in the BIM Execution Plan.

BIM Managers must closely cooperate with a BIM Data Administrator in charge of their Construction Project in light of the use of BIM in the said Construction Project. In addition, if some changes are required in the BIM Execution Plan in the midst of the Construction Project, BIM Managers must contact the BIM Data Administrator in charge to submit the updated version in a timely manner to the Organiser.

4. BIM EXECUTION PLAN

This chapter elaborates on the development of a BIM Execution Plan.

4.1. PURPOSE OF BIM EXECUTION PLAN

BIM Execution Plans are to be developed to set criteria to ensure that Participants comply with the BIM requirements in this document throughout a Construction Project and to promote the appropriate implementation of BIM.

4.2. GUIDELINES FOR BIM EXECUTION PLAN

Referring to the Table 4-1, Participants must develop BIM Execution Plans for every Construction Phase that clarify the organisation, roles and responsibilities to implement BIM as well as its application. In the case that what are planned are almost the same regardless of the Project Phase, Participants can put them together in a single BIM Execution Plan. There is no format for BIM Execution Plans.

Participants must submit the BIM Execution Plans they have created to the Organiser prior to the commencement of the construction to receive approval. In addition, if there are some changes in the documents, Participants must submit the updated version to the Organiser in a timely manner.

Table 4-1

Item		What to Be Entered
Project Information	Name of Participant	Enter the formal name of the Participant. If there are supporting parties, enter their formal name in parentheses following the Participant's name.
	Name of Operations/Construction Project	Enter the formal name of operations/Construction Project in question.
	Location	Enter information that shows the location of the facility to be constructed.
	Period	Enter the period when the operations in question are conducted.
	Construction Project Summary	Enter the summary of Construction Project in question.
Organisation to Implement BIM	Organisation to Implement BIM and Responsibilities	Enter information relating to the designated BIM Manager(s), such as their name, contact and position, as well as their organisation in the case of their being supporting parties, and their specific responsibilities. Please note that if the role of the BIM Manager is divided among multiple staff, clearly describe the role of each staff and the name of the person in charge.
	Organogram	Enter the organogram to implement BIM
Software to be Used	Name of Software and Version	Enter the respective names and versions of 3D modelling tools used for design, structure and facilities.
	Version of Data Format	Enter the version of data format (IFC or RVT) used for the submission of created models.
	Intellectual Property Rights	If there is anything to be noted in relation to the intellectual property rights of the submitted data, enter it.
Details of BIM Implementation	Milestones	Enter the planned dates of commencement/completion of the construction as well as that of data submission to the Organiser.
	Objects for 3D Modelling and LOD	Enter objects for which BIM data will be generated and their LOD, including not only buildings but also other items such as roads and greenery in the plot. The LOD and data size of a simplified model for the Expo-wide consolidation
	Overview of BIM Application and Implementation	Enter the summary of BIM implementation in the project in respect to the types of BIM application that are "mandatory" or "recommended."
Others		Enter issues that have been discussed, and agreed upon, with the Organiser, if any.

5. SOFTWARE TO BE USED

This chapter elaborates on software to be used by Participants and the data format of BIM data for its submission to the Organiser. Participants must prepare and submit data in accordance with provisions set out in this chapter. Please note that it is the responsibility of Participants to convert data into the designated format for submission if necessary.

5.1. TYPE OF BIM SOFTWARE

As far as data can be converted into the designated data formats set out in the next article, Participants can freely choose the product and type of BIM software to be used for modelling in any relevant fields. However, Participants must enter information of BIM software they plan to use in their BIM Execution Plan and agree on the version of data format for submission with the Organiser.

5.2. DATA FORMAT OF BIM DATA (FOR SUBMISSION)

- BIM data (IFC file) *Two models consisting of an integrated model and a simplified model for the Expo-wide consolidation.
- Native data (Revit file) *Two models consisting of an integrated model and a simplified model for the Expo-wide consolidation.

*At the time of the development of this requirements document, expected specifications of native data is what is shown in Table 5-1.

*Participants must enter the LOD and data size of the simplified model for the Expo-wide consolidation in the BIM Execution Plan and agree upon with the BIM Data Administrator.

Table 5-1

Software	Version	Data Format
Revit	Revit2021	.rvt

5.3. INTEGRATED MODEL

Participants must also submit by-facility 3D models that integrates respective facilities' design, structure and equipment. However, this does not apply when a Participant states that it is difficult to create integrated models and the Organiser accepts it. If there are multiple facilities in a single plot, Participants must discuss with the BIM Data Administrator to determine whether the plot-wide data should be integrated or integration should be carried out on a facility-by-facility basis.

5.4. HOW TO TREAT INTELLECTUAL PROPERTY RIGHTS IN SUBMITTED DATA

The Organiser will utilise the submitted data for the site construction of the Expo, the management of facilities' life cycle, promotion activities prior to and during the Expo period, and other services. It is also expected that a successor inheriting the Organiser's rights will utilise the data with the aim of passing on the Expo legacies to the next generation.

Participants must determine how intellectual rights in the submitted data should be treated to avoid any negative impacts on the operations of the Organiser and its successor based on the assumption that the Organiser and its successor will utilise the submitted data only for the aforementioned purposes.

6. DATA SUBMISSION

This chapter elaborates on data and documents to be submitted by Participants. Participants must prepare and submit data in accordance with provisions set out in this chapter.

6.1. HOW TO SUBMIT

Participants must submit data to the BIM Data Administrator in a way designated by the Organiser.

6.2. CONTENTS OF SUBMITTED DATA

This article elaborates on data and documents submitted by Participants and then managed by the Organiser. With regard to data and documents that are not dealt with in this article, Participants must discuss with the Organiser to determine how to handle them.

6.2.1. Data and Documents to be Submitted

Data and Documents to be Submitted Before the Start of the Construction

- BIM Execution Plan (PDF data) *Please see Chapter 4.
  If there are any changes in the BIM Execution Plan during construction, submit the updated version at all times.

Data and Documents to be Submitted Upon the Completion of the Construction

- BIM data (in the IFC format) *Please see Chapter 5.
- Native data (in the Revit format) *Please see Chapter 5.
- Electronic data of design specifications defined in the “Design Guidelines for Type A (Self-Built) Pavilions.”
- Documents necessary to complement or supplement the BIM data and design specifications

6.2.2. Naming Rule of File Names

Give submitting data a name that can be uniquely identified.

The example of file names is shown below. Participants must discuss with the BIM Data Administrator for details.

Example: Design data (IFC file) in the general design plan, which was submitted on November 13, 2020, as part of the first round of submission

A26 - 1 - P1 - IFC1 - F0 - 20201113 - 01.XXX
① ② ③ ④ ⑤ ⑥ ⑦ ⑧

①Plot Number — A number that identifies the plot within the Expo venue

②Building Number — A number that identifies the building within the plot

③Phase — P1: General Design, P2: Final Design, P3: Construction

④Type of Document — A Code that identifies the type of the document
IFC*: IFC file, RVT*: Native file (Revit file), DWG: Electronic data of design specifications, BEP: BIM Execution Plan, DOC: Other types of specifications
* — 0: Integrated data, 1: Design data
Participants must discuss with the BIM Data Administrator concerning other types of files.

⑤Floor — The floor that the document in question refers to. Put a character of "F" before the number of the floor. If the data does not relate to a specific floor, for example in the case of BIM data, put the number "0."

⑥Date of Submission — The date the Participant plans to submit the document

⑦Serial Number — If submission is made several times in one day, put a number from 01 and upward

⑧Filename Extension — A data format set by each system

* If filenames share the same plot number, building number, data of submission and serial number, they are deemed as a single set of documents.

6.3. CHECKING OF SUBMITTING DATA

Participants must submit data only after they confirmed the following:

- IFC conversion errors do not occur.
- A 3D model after IFC conversion is correctly displayed on the viewer in the environment of the Participant.
- Attribute information after IFC conversion is correctly set.
- The model is consistent with the design specifications set out in the "Design Guidelines for Type A (Self-Built) Pavilions."

6.4. [REFERENCE] BIM DATA ENVIRONMENT THE ORGANISER USES

Main functions of BIM data environment the Organiser currently uses are shown below for reference.

(1) Model Viewer

A function to display BIM data. It provides the basic functions of a viewer such as rotating models, changing viewpoints, filtering and displaying a cross section.

(2) Review & Comment

A function that enables users to add review comments to BIM data. It also allows users to output comments in the BCF format.

(3) Messaging

A function that enables users to send and receive messages each other. Large-size files can be attached to the messages.

(4) Document Management

A function that can manage not only BIM data but also 2D drawings and PDF data as well as various types of document files such as Excel and Word. It enables version control and maintains historical revisions.

(5) Workflow

A workflow function that controls application/approval processes.

7. LOD OF MODELS

This chapter elaborates on the Level of Detail (LOD) of submitted BIM data and the data submission process. Participants must generate BIM data in accordance with this chapter in each Construction Phase. The Organiser will confirm whether submitted BIM data meets designated standards. If necessary, the Organiser will demand corrective actions.

7.1. DEFINITION OF LOD IN THE EXPO

Definition of LOD in the Expo is shown in Table 7-1 below. Please note that what is stated in this article is the minimum level of LOD and does not inhibit Participants from creating more detailed BIM data.

Table 7-1

LOD	LOD200	LOD300	LOD400
Input Level	Presenting the design of objects (an external form/internal space) as well as the main members, equipment, and location of the objects. The level that allows those who are involved in construction works to understand the information of the objects.	Presenting accurate design by refining the data of the external form and interior. It must show the details of necessary members and equipment such as their size, quantity and processing methods. The level that allows ordinary people who are not involved in construction works to understand the information of the objects.	This level refines LOD300 data by adding information that is required for actual construction works. It should be updated in accordance with the progress of the construction works to form an as-built drawing. *In the Expo, LOD400-level BIM data is not required.

7.2. DATA SUBMISSION AND OBJECTS TO BE PRESENTED IN EACH PHASE

The tables below show whether data submission is required and which kind of objects need to be presented in each phase. Participants must refer to this article before creating BIM data. Then, they must describe planned LOD application to their Construction Project in the BIM Execution Plan and submit it to the Organiser. Please note that the objects to be presented defined in the following tables are rough guidelines and Participants need not present all of them. Participants must discuss with the BIM Data Administrator if they have any questions.

7.2.1. Facility (Design)

Construction Phase	General Design	Final Design	Construction
LOD	LOD200	LOD300	LOD300
Data Submission	Mandatory	Mandatory	Voluntary
Objects to be Presented	•Design of external form and their size •The exterior that is important design-wise (Roofs, stairways, eaves, balconies, etc.) •Design of internal spaces and their size (Rooms, corridors, halls, etc.) •The interior that is important design-wise (Fixtures, glass, etc.) •Structures that are important design-wise (Pillars, beams, walls, etc.)	In addition to items for the general design, add the following items: •All the exteriors and their finishing •All the interiors and their finishing •Structures that are not prerequisite for design and structural strength (Dividers, partitions, etc.) •Minor components such as handrails and rainwater drain pipes •Names of manufacturers of key members, product numbers	Add information of items that were not determined at the final design phase as well as changes made during the construction to the data of the final design.

7.2.2. Facility (Structure)

Construction Phase	General Design	Final Design	Construction
LOD	LOD200	LOD300	LOD300
Data Submission	Mandatory	Mandatory	Voluntary
Objects to be Presented	Structures that are prerequisite for structural strength • Pillars, beams, slabs, foundation, bearing walls, and braces • Level difference of beams and slabs *When design data and an object are identical, Participants must conduct interference checking and integrate them before submission.	In addition to items for the general design, add the following items: • Gaps between the centre line and the reference line of pillars, beams, and walls. • Sizes and locations of the opening of sleeves for various equipment • Location of the joints and splice plates of steel frames *When design data and an object are identical, Participants must conduct interference checking and integrate them before submission.	Add information of items that were not determined at the final design phase as well as changes made during the construction to the data of the final design.

7.2.3. Facility (Equipment)

Construction Phase	General Design	Final Design	Construction
LOD	LOD200	LOD300	LOD300
Data Submission	Voluntary	Mandatory	Voluntary
Objects to be Presented	Machinery • Main pipes and ducts (external form including heat insulators, etc.) • Main machines (Machinery on the floor, sanitary equipment) Electrical equipment • Main wiring • Main machines (Lighting fittings, cubicles, generators, power supply facilities, communication apparatus, large machinery, transformers, cable racks)	In addition to items for the general design, add the following items: • Sanitary ware, all the pipes (outdoor and indoor), and all the ducts (external form including heat insulators, etc.) • All the machinery (Sanitary equipment, heavy machinery, machinery on the roof floor, racks, ducts and their accessories, pipes and their accessories, trunk lines) • All the electrical equipment (All the lighting fittings, emergency lighting and emergency exit lights, heavy equipment, equipment on the roof floor, shafts and spaces for electrical wiring) • Attribute information identifying each piece of equipment (See Chapter 8) • Names of manufacturers of key machinery, product numbers	Add information of items that were not determined at the final design phase as well as changes made during the construction to the data of the final design.

7.2.4. Facility (Exterior)

Construction Phase	General Design	Final Design	Construction
LOD	LOD200	LOD300	LOD300
Data Submission	Mandatory	Mandatory	Voluntary
Objects to be Presented	• Finishing of pavement, greenery, etc. • Outdoor signage • Outdoor lighting	In addition to items for the general design, add the following items: • All the structures within the plot	Add information of items that were not determined at the final design phase as well as changes made during the construction to the data of the final design.

8. INPUT GUIDELINES

This chapter elaborates on which kind of attribute information should be submitted as well as input rules. Participants must create BIM data in accordance with provisions set out in this chapter.

8.1. DEFINITION OF ATTRIBUTE INFORMATION TO BE INPUT

8.1.1. General Building Members

(1) General building members mean ordinary members that do not depend on specific BIM software such as pillars, beams, ceilings and walls.

(2) With regard to general building members, BIM data must be created by using corresponding building member objects in principle. Only when the BIM software used by a Participant does not have corresponding building member objects, the Participant may use different building member objects as a substitute to create BIM data with appropriate addition/change/deletion of attribute information in order to bring them into alignment with the actual building members.

(3) With regard to building member objects, BIM data must be created on a floor-by-floor basis. However, Participants must treat members that relate to multiple floors such as steel pillars appropriately by, for example, creating data on a section-by-section basis.

(4) When conducting the analysis and examination of techniques, BIM data must be created in a way that building member objects are linked each other without a break.

8.1.2. Information Necessary for Operation and Maintenance of Facilities/Site

(1) Participants must establish necessary attribute information for the operation and maintenance of their facilities and site.

(2) Table *8-1* shows attribute information to be established for Participants' reference. Input guidelines for each attribute information are provided in the next article. Please note that Participants can establish other types of attribute information at their discretion.

Table 8-1

Attribute	Explanation
Equipment Number	A number that uniquely identifies equipment in a facility. It is used as a key to associate the equipment with various information in its operation and maintenance.

Name	A name to identify the type of the equipment
Name of Manufacturer	A manufacturer of the equipment
Model Number	A model number of the equipment
Floor	The floor in which the machine is installed

(3) When trying to establish attribute information, if particular coordination is necessary in light of workload etc., Participant must discuss with the BIM Data Administrator.

8.2. INPUT GUIDELINES OF EACH ATTRIBUTE INFORMATION

Input guidelines for items that require careful attention are shown below.

8.2.1. Equipment Number

The equipment number is a number that uniquely identifies equipment in a facility. It must be established to associate the equipment with various information in its operation and maintenance. An example of numbering is shown below:

Example: The third air conditioner in the hall of a room at the northwest corner on the third floor

A26 - 1 - AC - F3 - 1 - 3
① ② ③ ④ ⑤ ⑥

①Plot Number — A number that identifies the plot within the Expo venue
②Building Number — A number that identifies the building within the plot
③Code of Machinery — A commonly used code (2-3 digits alphabet) that represents the equipment
④Floor — The floor in which the equipment is installed. Put a character of “F” before the number of the floor.
⑤Space — Identify the space in which the equipment is installed by numbering rooms and corridors on the floor clockwise from the northwest corner.
⑥Equipment — Identify the equipment by numbering all the pieces of equipment in the space clockwise from the northwest corner.

8.3. NOTE ON THE USE OF ARCHIVE LIBRARIES

With regard to building members used in construction, it is recommended that Participants should utilise objects with which the manufacturers of the members in question provided them as such objects allow Participants to improve accuracy and efficiency.

8.4. UNIT AND COORDINATE SYSTEM

(1) The measurement of drawings must be in millimetres with a unit symbol omitted. However, when using units other than millimetres, they must be SI and Participants must put the corresponding symbol in drawings.

(2) Coordinate values must be Cartesian coordinates in the rectangular plane using the world geodetic system.

(3) Participants must set the origin of the model to the coordinate value designated by the Organiser.

(4) The origin of the coordinate and direction of the same building must be identical.

8.5. LANGUAGE TO BE USED

Participants must use a language designated in the “Design Guidelines for Type A (Self-Built) Pavilions.”

9. REFERENCE

To develop this BIM requirements document, we referred to the following literature:

(1) Ministry of Land, Infrastructure, Transport and Tourism (website in Japanese)

- Development and Application of “BIM Guidelines” https://www.mlit.go.jp/report/press/eizen06_hh_000019.html
- Implementation of BIM in Building and Repairing Administered by Government Offices
  https://www.mlit.go.jp/gobuild/gobuild_tk6_000094.html
- BIM/CIM Execution Plan (Draft)
  https://www.mlit.go.jp/tec/content/001347650.pdf
- Guidelines for Construction with Contract Documents Using 3D Data as a Trial (Draft)https://www.mlit.go.jp/tec/content/001334808.pdf

(2) The Japan Institute of Architects (website in Japanese)

- BIM Guidelines
  http://www.jia.or.jp/resources/news/000/225/0000225/p7NmnPji.pdf

(3) Expo 2020 Dubai

- BIM Requirements_R2
- Self-Build-Pavilions-Guide
- Self-Build-Pavilions-Delivery-Guide

(4) Penn State College of Engineering

- BIM Uses in the BIM Project Execution Planning Guide
  https://www.bim.psu.edu/bim_uses/

(5) Singapore

- BIM Essential Guide For BIM Execution Plan

(6) AEC (UK)

- BIM Protocol Project BIM Execution Plan

Contact:

Please use the Queries function on the Participant Portal to send your enquiries about guidelines and procedures or any other questions. If you have difficulty in using the Participant Portal, please contact us via email to participant@expo2025.or.jp (or any of our other email addresses).

Japan Association for the 2025 World Exposition