

ANNEXURE VIII – 7

BIM MANUAL

Annexure 7**BIM MANUAL****INDEX**

Appendix A - BIM MANUAL		Page no
1.	General	2
2.	Purpose	2
3.	Scope	2
4.	Introduction	2
5.	Standards, norms and guidelines	2
6.	Terminology	3
7.	Abbreviation	4
8.	BIM Management	5
9.	BIM Execution Plan (BEP	8
10.	Main Deliverables	10
11.	Level of Definition	12
12.	Common Data Environment (CDE)	13

Annexure - 7**GENERAL****1 Purpose**

1.1.1 This Building Information Modelling - Standards, Methods and Procedures (SMPs) describes the use of Building Information Modelling (BIM) for the work under the Contract.

1.1.2 This SMP's shall be used as a reference for the Contractor to develop specific Work Package SMPs that shall detail the specific CAD/GIS/BIM software and Electronic Content Management System (ECM) software used within the Work Package to control the specific BIM and CAD process. The outputs from this ECM system will be drawings as PDF's that will be input to the Contractors EDMS system for distribution.

1.1.3 SMPs establish the methodology for managing the production, distribution and quality of the design information generated by CAD, GIS and BIM systems, using a disciplined process for collaboration and a specified file and model naming policy.

2 Scope

1.2.1 This BIM SMP outlines the roles and responsibilities that are necessary for a successful collaborative Building Information Modelling approach.

1.2.2 The Common Data Environment (CDE) is mandated for the structure and the controlled sharing of the building information with known provenance and status in a multi-disciplinary environment.

1.2.3 The Contractor's SMPs are required to control the production and coordination of the design information within each Works Package.

3 Introduction

1.1.1 BSTP Projects are implementing BIM for the delivery of the projects to return significant time, cost and quality improvement in the way that the program will be delivered, constructed and ultimately operated.

1.1.2 The gradual development of BIM, with the support of new digital technologies, aim to improve the quality of planning, construction and operation of BSTP Rail system. BIM can be successfully implemented if effective forms of collaboration are also adopted.

1.1.3 Collaborative project execution is a central factor for success. Openness, transparency and a goal and solution-oriented approach must become the core value of all activities in the infrastructure area.

1.1.4 The BIM Manual should be implemented for all the project phases.

4 Standards, Norms and Guidelines

This manual makes use of the following technical standards

- ISO/DIS 19650-1.2 Organization of information about construction works -- Information management using building information modelling -- Part 1: Concepts and principles.
- ISO/DIS 19650-2.2 Organization of information about construction works -- Information management using building information modelling -- Part 2: Delivery phase of the assets.
- PAS 1192-2:2013 Specification for information management for the capital/delivery phase of construction projects using building information modelling.
- PAS 1192-3:2014 Specification for information management for the operational phase of assets using building information modelling.

- PAS 1192-4:2014 Collaborative production of information.
- PAS 1192-5:2015 Specification for security-minded building information modelling, digital built environments and smart asset management.

5 Terminology

Terms	Description
2D	Two-dimensional representation of an object, typically plans, sections, elevation and details.
3D	A model with objects having three-dimensional properties. Model may have varying levels of detail and development depending on the project phase.
Asset Information Model	File based federated BIM Model, set of BIM extraction (drawings, data drops) and project related documentation (reports and forms) developed during the Operation and maintenance stages.
Attribute	Data field populated with pieces of information attached to each BIM object to provide different type of information like physical/geometrical characteristics, classification codes, locations, relationships or data related to the BIM use cases. It may be called as Parameters.
Authoring Tools	BIM Software developed by different providers that enable the creation and modification of BIM Models.
Aggregated Model	A compilation of multiple models into a single manageable model. For example, an Aggregate Model may include a building model plus a site model, or several Mono-Discipline Models aggregated into a single Multi-Discipline Model. Aggregation - as a term - applies to both Integrated Models and Federated Models
BIM Execution Plan	BIM Execution Plan developed by the contractor to address the Employer's Information Requirement (EIR).
BIM Model	3D Model containing information and attribute data
Clash Rendition	Rendition of the native format model file to be used specifically for spatial coordination processes to achieve clash avoidance or to be used for clash detection.
Common Data Environment	Single source of information for any given project used to collect and manage all relevant approved project documents for multi-disciplinary teams in a managed process
Data Exchange	BIM Deliverables
Data Drop	Extraction of the data information store in the BIM Models. This data is extracted to Spreadsheets or databases.
Federated Model	A BIM Model which links (not merge) several individual discipline Models together. It does not merge the properties of individual models into single database.
Gate review	Design review carried out by Engineers to confirm the design outputs
Information Exchange	Structure collection of information at one stage of a project in a defined format
IFC	Data model neutral and open specification that is used by BIM programs and that contains a model of a building or facility including spatial elements, materials, shapes and information.
Level of Definition	It includes Level of Geometry and Level of Information

Terms	Description
Master Information Delivery Plan	Post-contract award deliverable which includes a plan listing all the information deliverables of a project including models, drawings, specification and other kind of deliverables. It identifies when project information is to be prepared, by whom and define the Level of definitions and the procedure. It will be created by collating Task Information Delivery Plan (TIDP) of all discipline of a project
Milestone	Scheduled event marking the due date of accomplishment of a specified task of objective.
Project Implementation Plan	Post-contract award deliverables which assess the capability, competence and experience of the potential contractor bidding for the project along with quality documentation.
Project Information Model	File based federated BIM (model), set of BIM extraction (Drawings, data drop) and project related documentation (report and forms) developed during the design and construction stages.
Task Information Delivery Plan	Post-Contract award deliverable, which includes a plan listing all the information deliverable of a specific discipline of a project including model, drawings, specification, and other kind of deliverables.
Virtual Design Review	Team review the digital engineering design model
Work Breakdown Structure	Multilevel framework that organizes and graphically displays elements representing work to be accomplished in logical relationships. Each descending level represents an increasingly detailed definition of a project component. Project components may be products or services. It is the structure and code that integrates and relates all project work (technical, schedule, and cost) and is used throughout the life cycle of a project to identify and track specific work scopes.
Zone	Set of spaces (locations) sharing a specific Attributes, such as activity, access, management or condition

6

Abbreviation

Abbreviation	Meaning
AIM	Asset information Model
AIR	Asset information Requirement
BEP	BIM Execution Plan
BIM	Building Information Modelling
BOQ	Bill of Quantities
CDE	Common Data Environment
COBie	Construction Operation Building Information exchange
EIR	Employer Information Requirement
GIS	Geographical Information System
IFC	Industry Foundation Class
LOD	Level of Definition
LoG	Level of Geometry
Lol	Level of Information
MEP	Mechanical Electrical Plumbing

Abbreviation	Meaning
MIDP	Master Information Delivery Plan
PIM	Project Information Model
PIP	Project Implementation Plan
QAQC	Quality Assurance & Quality Control
QC	Quality Control
TIDP	Task information Delivery Plan
VDR	Virtual Design Review
WBS	Work Break-down Structure

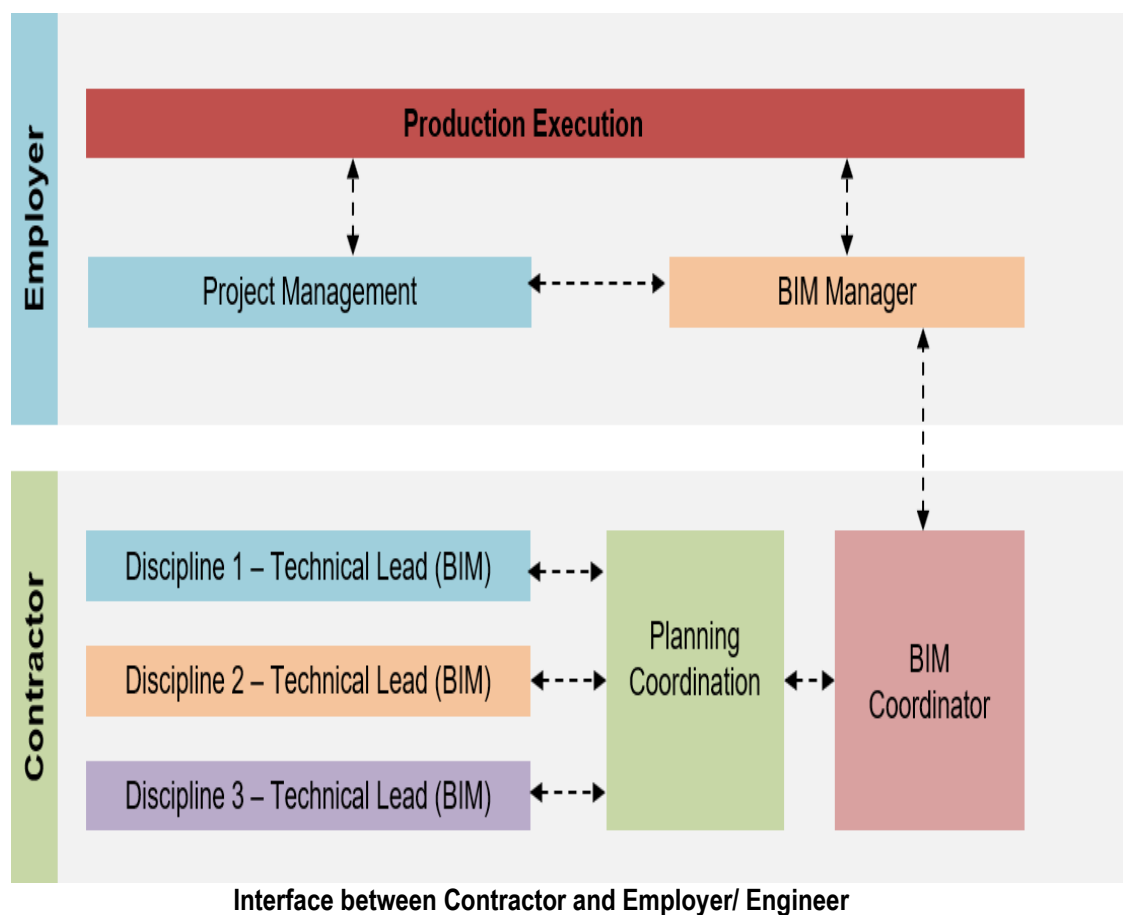
7 BIM Management

7.1.1 Employer / Engineer Team

The Employer BIM Management team has the following roles to monitor / review the BIM process for the whole project till handover. This may either be directly with the Employer or through the Engineer.

BIM Manager – Primary contact for the various BIM Coordinators within a project

BIM Coordinator– Secondary contact for the various BIM related query (on-site)



Role	Description	Tasks / responsibilities
BIM Manager	The BIM Manager leads the implementation of BIM throughout the project in compliance with Employer and leads the project as BIM Integrated team. The BIM Manager is the primary point of contact for any BIM related issues within the BIM project	Define the BIM strategy and requirements for the project, identifying and maintaining the BIM goals and priorities Review and approve the BIM Execution plan and the MIDP Lead the BIM teams, tracking and monitoring their performance Report to Employer management on any issues surrounding BIM Implementation. Ensure the project proves the tools, process and support to engage the information in a Structured, coordinated and accurate way. Hosting the BIM team Meeting. Coordinate efforts within the BIM Teams in accordance to project needs. Facilitate the adoption of collaborative ways of working
BIM Coordinator	Equivalent role to the BIM Manager but focused on local delivery aspects	Similar task of the BIM Manager but in close discussion with local implementation bodies.
Technical lead - BIM	Key person for all BIM Technical related issues within the BIM Project (for each discipline)	Ensure that Design/ Construction / Operation uses BIM. Ensure the quality and the BIM standards within the discipline. Performs a BIM Model quality verification. Participate in the BIM related meetings with local contractor / specialists. Organizes and leads the BIM kick-off meeting with the BIM Coordinator for his/ her discipline. Ensure that the 3D models are clash free Support the contractor in BIM related issues.

7.1.2 Contractor's Team

Role	Description	Tasks / responsibilities
BIM Manager	The BIM Manager leads the implementation of BIM throughout the project from the Contractor side	Leads the BIM Implementation during the project from contractor side. Produce and updates the BIM Execution Plan in collaboration with the BIM Coordinator. Produces MIDP by collating the TIDP at the start of the project. (BIM perspective). Assure the BIM deliverable. Act as a contact for any BIM related issues. Leads the Virtual Design / Construction review
BIM Coordinator	Equivalent role to the BIM Manager but focused on local delivery aspects	Similar task of the BIM Manager but in close discussion with local implementation bodies.
Technical lead – BIM (Discipline)	Technical lead – BIM (Discipline) is responsible for the interdisciplinary coordination of the BIM Model per package	Reports to the BIM Coordinator. Produce the BIM Execution plan in coordination with the BIM Coordinator / BIM Manager. Ensure that the BIM process and procedures per discipline are compliant with the project goals. Ensure that discipline models can be used to properly deliver the requested BIM uses. Support and advises on the adoption of BIM processes within the discipline. Define and updates best practice and procedure per discipline. Configure and develop Clash Detection analysis on a regular basis. Leads regular coordination meeting and track the process. Responsible for the integration and the geolocation of the models per package. Support interface Coordinator and Design Coordinators. Support the BIM Coordinator on discipline specific issues (i.e. Clash detection analysis or the Gate Review meeting). Define the TIDP (per discipline) at the start of the project (deliverable)

Role	Description	Tasks / responsibilities
BIM Engineer	BIM Engineer reports to Technical Lead – BIM (BIM perspective) and to the BIM Coordinator	Develop the BIM Models and constituent parts. Developing the content for the 3D model. Generate the 2D drawings from the 3D model. Following the standards and incorporating in the 3D/2D . Owns their model information. Generate the project output, such as drawings, the quantity (if necessary) the data drops, the visualization work and any other BIM output. Internal quality check (Self check) related to the design

8

BIM User Cases

BIM information (both graphical and non-graphical data) is initially created during the Design phases of the project. This information will be consumed later by functions based on the data that can be input into their work process. The use cases are summarized in the list below against each function. All the BIM use cases to be applied in each project shall be defined in the BIM Execution Plan.

The following table shows the mandatory (M) and optional (O) use cases.

	Design Authoring (Collaboration)	Engineering Analysis	2D Drawing	Interference Management (Clash Checks)	Interactive Design Review	Structural detailing	Quality Control	As-Built documentation	Operation & Maintenance Information (Attributes)
Mandatory (M)									
Optional (O)									
Concept Design	M	O	M	O	M	O	O	-	-
Preliminary Design	M	M	M	M	M	M	M	-	-
Detailed Design	M	M	M	M	M	M	M	-	O
Design for Approvals	M	M	M	M	-	M	O	-	-
Construction	M	O	M	M	M	M	M	-	-
As-Built	M	-	M	-	-	M	M	M	O

- Design Authoring (Collaboration)**

A BIM model of the principal elements of Civil works including Track work inside the Depots covering Architectural, Structural and MEP works shall be created in accordance with the Master Information Development Plan using discipline-based software which each designer's controls and where the required information from other teams is referenced from the Contractor CDE and the Employer CDE using Open BIM formats.

The contractor shall deploy their own CDE where their WIP (Work In Progress) design will be carried out. A Contractor CDE with a "Client Shared" area is necessary to make possible Gate Reviews for the Employer's Approval.

- Engineering Analysis**

The BIM Model produced from the core BIM authoring tools may be linked to / exported to analysis software for Structural, Mechanical, Electrical and other design analysis.

- **2D Drawings**

2D General Arrangement drawings, coordination drawings, location drawings and schedule of elements objects components and materials for all works that is modelled shall be generated from the 3D BIM Model as sheet sets (data drop) that are contained in the BIM Project model for that discipline. Typical details, assembly and component details and shop drawings may be created separately from the BIM Model depending on the Level of Definition of a stage.

- **Interference Management (Clash Detection)**

Design Collaboration between disciplines shall be supported by running clash detection in both the authoring and reviewing software to identify spatial interference between modelled elements. A Clash register will be maintained for review and action during design review (the Clash Detection Report is a deliverable). Lead Engineers shall not be permitted to approve an element unless it is confirmed as being clash free against all related model for that work.

- **BIM Quality Control and Assurance**

Quality Control and Assurance of the BIM Data (3D and information) will be done through the process of design, collaboration, checking review and audit. These processes measure how well the BIM objects fulfil their purposes and follow the processes defined to achieve those purpose

- Coordination of the BIM Data through Design / Construction Review, Clash check etc.,
- Checking the deliverable created from the BIM Model prior to Employer's approval'
- Specific Checks of the BIM Model content by any Subcontractor prior to approval (Shop Drawings generation for instance),
- Audits by the Contractor BIM Management Team

- **As-Built documentation**

The BIM Model shall be revised as work packages are completed to record the As-Built status of the works and if necessary, to adapt the positioning / shape / type of the objects to the built condition

The Contractor during the Design Stage shall develop a model that can be used / updated as a base for the As-Built models. The As-Built model documentation will also be stored and used during the Operation Stage that takes place after BIM commission (Hand-over). LOD shall be as defined in Clause 4.9.

- **Operations & Maintenance Information**

The BIM model will be used to both visualize and report the status of construction testing and the collaboration of work packages ready for Hand-over to the Client for Operation and Maintenance

9

BIM Execution Plan (BEP)

A “**BIM Execution Plan**” (BEP) is a plan prepared by the Contractor to explain how the information modelling aspects of a project will be carried out. The plan is prepared as a direct response to the Employer's Information Requirements and Technical Specifications and shall detail the project deliverables stipulated by the contract and the information exchange requirements detailed in the BIM Manual.

This plan is prepared at the beginning of the project but must be updated later for each project stage. The Contractor shall provide the BIM Execution Plan in order to explain in detail how they intend to carry along all the BIM Objectives in this project.

The BIM Execution Plan includes Specific Annexes for the different disciplines and authoring tools

describing how all the procedures shall be implemented.

The contents of the BEP shall consist of everything requested in the EIR and also the following information:

- **Management:**
 - Roles, responsibilities and authorities
 - Master Information Delivery Plan (MIDP)
- **Planning and documentation:**
 - Capability of the Contractor / Sub-contractor
 - BIM Use Cases
 - Agreed project processes for collaboration and information modelling
 - Agreed matrix of responsibilities across the Supply Chain
 - Task Information Delivery Plan (TIDP to be collated in the MIDP)
- **The standard method and procedure:**
 - File Naming Convention to be followed as per the BIM Manual Naming Convention, any change will need to be approved by the Employer.
 - Geo-location & Coordinates system.
 - Levels of definition (LOD).
 - Specific Annexes from the different disciplines and authoring tools (one per authoring tool), describing:
 - Modelling standards (including model's size and length recommendations)
 - Workflows
 - Agreed construction tolerances for all disciplines
 - Drawing sheet templates
 - Contractor CAD manual (Adaptation of the CAD Standard to its authoring tool)
- **The IT solutions**
 - Software versions
 - Exchange formats
 - Security & Extranet Access

The BEP shall include the MIDP.

The BIM Execution Plan is comprised of the main document (describing the overall information of the BEP) and a list of annexes including the TIDP, the MIDP and the different BIM Authoring tools – specific procedures and workflows.

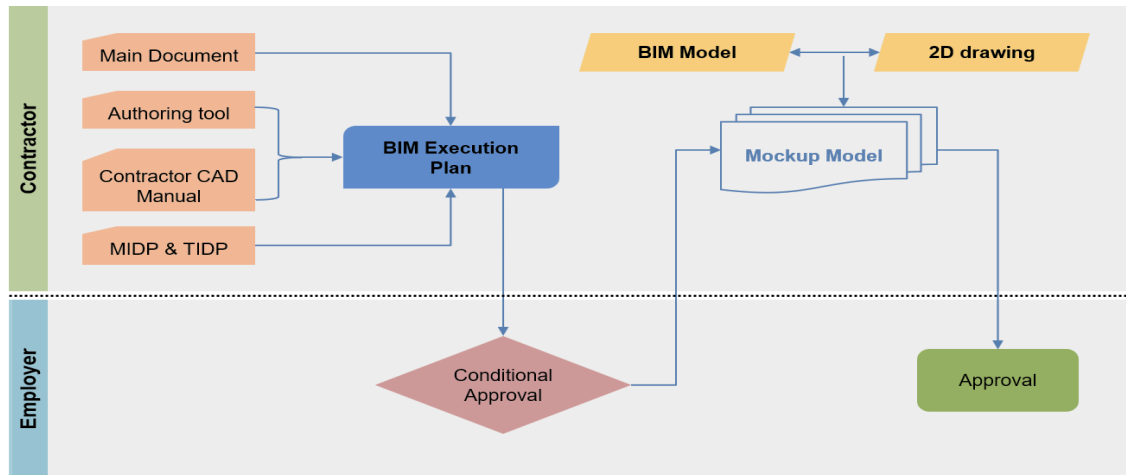
The Contractor shall provide 4 Nos. of Authoring tool licenses for the Engineer to review the deliverables throughout the entire project phases.

- **BIM Authoring tool**

The Contractor shall provide at least one annex by BIM Authoring tool and there could be more if the contractor considers it necessary; for instance, due to the existence of various disciplines developing the project with the same BIM Authoring tool.

This annex should include a small mock up model geo-located correctly. It shall be an aggregate model containing at least two BIM models from various disciplines and shall be submitted in the delivery format defined in BEP (Preferably IFC). The content of the model should have a simple 3D model to identify the proper project geo-location (Northing, Easting & Elevation).

The Engineer will review the model by linking the model to the other discipline and to export IFC with minimal loss of information.



Workflow for Mock Up Model to be fixed

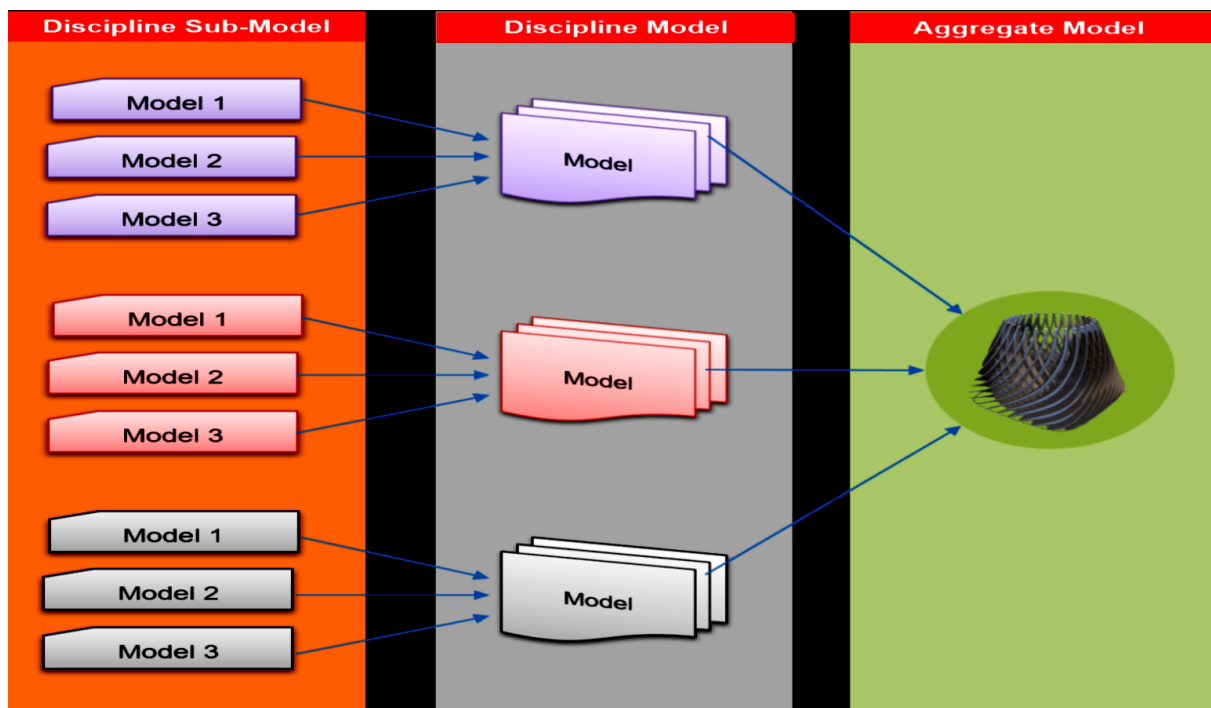
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Main Deliverables

The BIM strategy is a file-based information delivery, where the featuring files can be consumed independently but also used, viewed and referenced together, by means of the federation of the files according to the Work Breakdown Structure (WBS) and the way the Contractor structures the delivery.

The Federation of models attempts, as much as possible and depending on the CDE environments deployed by the Employer and the Contractor, to build one model but using multiple source files (federated model for instance) controlled by the Employer's CDE.

If the files are federated models, this single model is called Aggregated Model. An Aggregated model can also be generated by adding several Aggregated models.



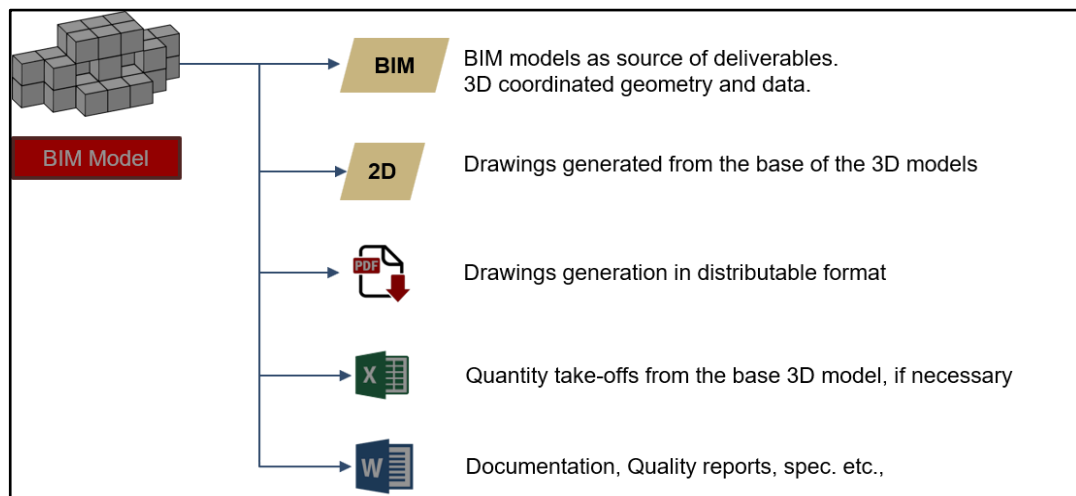
Aggregated Model

a. **3D BIM Models**

The 3D BIM Models are the core deliverables in the Project Information Model Phase (Design and Construction Stages). These models become the source any information provided in the different stages, up to the point of taking precedence in the event of discrepancies and inconsistencies between models and drawings

The Master Information Delivery Plan (MIDP) shall include the estimated list of BIM models. It will not be necessary to develop in depth the breakdown of models for each discipline/ package, but the list must include at least one model per present discipline per package/ segment and submission.

The Level of Definition, LoG (Geometry) + Lol (Information), shall be shown for each deliverable.



3D BIM Model and Data Drops

b. **2D Drawings**

2D Drawings are the preferred source of information for the transmission of information among the different stakeholders.

The MIDP will include the forecast of drawings needed for every submittal. 2D drawings shall be generated from the base of the 3D models.

c. **BIM Data drops and extraction**

The BIM Data drops are the Quantity Take-off Spreadsheet (if necessary) and the information from the BIM Model (at later stage)

d. **Master information Delivery Plan (MIDP)**

The Master Information Delivery Plan (MIDP) is a main Post-Contract award deliverable, which includes a plan listing all the information deliverables of a project including models, drawings, specifications, equipment and other kind of BIM deliverables.

It shall identify when project information is to be prepared, by whom, and defines the Levels of Definition and the procedures.

The MIDP incorporates all relevant Task Team Information Delivery Plans (TIDP), which list all the information deliverables of a discipline of a project, and an updated / detailed Responsibility Matrix. The MIDP is an independent deliverable, while the TIDPs commonly are included within the BEP. The TIDP could be also included within the MIDP documentation.

11 Level of Definition

Level of Definition is used to determine both the level of geometry detail (LOD), and level of associated information (LOI) for any given model element at project work stage. Defining LOD and LOI informs the Contractor of the degree of information reliability when using the model (LOD = LoG + LoI).

a. Level of Geometric detail (LoG)

The Level of Geometric detail (LoG) is the description of the quality of the graphical content of a container at a particular point during project delivery. It relates to how much detail is included within the model space, system of element.

Level of Geometric detail (LoG)	Definitions
LoG 200	<p>The Model Element is graphically represented within the Model as a generic system, space, object, or assembly with approximate quantities, size, shape, location, and orientation.</p> <p>The Model must be accurate enough to ensure that the design complies with the defined restrictions (clearances for administrative, legal, environmental, adjacent roads, railways, space for utilities/ electro-mechanical systems verification or transversal discipline coordination) prior to detailing. As such, the LoG 200 is defined to reach the requirements of the Master Design, by focusing on the outer geometry and allowance of the objects.</p> <p>The elements may be recognizable as the components they represent or as volumes for space allocation and reservation.</p> <p>This LoG can be used to verify regulatory requirements if those are allowance-related (clearances).</p>
LoG 300	<p>The Model Element is graphically represented within the Model as a specific system, object or assembly in terms of quantity, size, shape, location, and orientation. Objects modelled can be measured directly from the model and those non-modelled can be calculated considering measures extracted from related objects</p> <p>This LoG can be used to verify any regulatory requirements unless those are related to specific brand/model/materials etc.,</p>
LoG 400	<p>The Model Element is graphically represented within the Model as a specific system, object or assembly in terms of size, shape, location, quantity, and orientation with detailing, fabrication, assembly, and installation information.</p> <p>This LoG incorporates coordinated specialist sub-contract design models and reaches the highest level of definition geometrically speaking.</p> <p>It is important to mention that when LoG 400 is a requirement of the Design Phase, brand/model may not be stated; therefore, during the Construction Phase that Design LoG 400 would need to implement the finally chosen brand/model to the Construction LoG 400.</p>
LoG 500	<p>As per LoG 300 but with sufficient verification as to demonstrate the accuracy of the model as a constructed at Hand-over. It is focused on the graphical information needed to support the model and the LoI for the Operation & Maintenance stage.</p> <p>It is important to mention that this LoG does not necessarily need to reach the highest detail of the LoG 400.</p>

b. Level of Information (LoI)

The Level of Geometric detail (LoI) is the description of the quality of the non-graphical content of a container at any point during project delivery. It relates to the information that is included within the Models elements and that is contained in the elements Attributes.

Concept Plan	Preliminary Design	Detailed Engineering Design	Construction Drawings	As Built	Operation
					(Future)
Stage Definition (PAS 1192:2)	Stage 2 Concept / Stage 3 Definition	Stage 3 - Definition / Stage 4 – Design	Stage 4 – Design / Stage 5 – Building and commission	Stage 6 Handover	Stage 6 – Handover / Stage 7 – Operation
Level of Definition	LOD 200	LOD 300	LOD 400	LOD 500	LOD 500

12**Common Data Environment (CDE)**

A Common Data Environment (CDE) is a single source of information for any given project or asset, used to collect, manage and disseminate all relevant approved project documents and data for multi-disciplinary teams in a managed process.

The CDE is core to Building Information Modelling [BIM] and information management processes and shall act as a means of providing a collaborative environment for sharing work in a consistent, managed and lean way for all project stakeholders.

The CDE shall support container-based collaboration where information management processes are applied to all information content (model files, drawings, documents and objects etc.).

The project's CDE shall have the functionality to deliver secure, managed access to information based on a stakeholder's role in the project and the status of the information being accessed.

No information exchanges shall be permitted out of the Employer CDE environment including e-mails. This promotes a collaborative environment where all stakeholders can integrate and share appropriate content.

- **Naming Conventions within CDE**

The Project CDE shall be based on at least the following naming codification:

- Project Name / Location
- Line
- Originator Name
- Volume System / Zone
- File Type
- Discipline Code
- Floor Level
- Number
- Revision No.

- **Project Name / Location**

This will consist of a distinct common project identifier to Detailed Technical Design (three characters)

- **Line**

Line name according to the Detailed Technical Design

- **Originator Name**

Each Contractor shall be allocated a unique code.

- Discipline Code**

Each Discipline shall have the following code

Code	Description
ARC	Architecture
CTV	Closed Circuit Television
COM	Communications
CIV	Civil
ETP	Electrical Traction Power
ELV	Extra Low Voltage
ELE	Electrical Emergency Voltage
FRD	Fire Detection
FRS	Fire Suppression
MHV	Mechanical HVAC
MLF	Mechanical Lifts
MES	Mechanical Escalators
MTR	Mechanical Travellators
PUA	Public Address
PUH	Public Health
SNG	Signage
STR	Structural
SIG	Signals
TRK	Track
UTL	Utilities
GEO	Geotechnical
TUN	Tunnelling

- File Type**

The File type shall be used from the below table:

Code	Description
DRG	2D Drawing
MD2	2D Model
MD3	3D Model
MDR	Model Rendition File, e.g. PDF, Navisworks, i-model
AMF	Animation file (of a model)
VSF	Visualization File (of a model)
RPT	Report
SKE	Sketch
DAT	Data Sheet
STA	Standard

- Floor Type**

The Floor type code shall be used from the below table:

Code	Level	Description
ZZ	Multiple level	Where the file applies to multiple levels, for example a cross sectional drawing
XX	No level	For files that are not relevant to the levels, for example specifications or meeting minutes
GF	Ground floor	
0	Base level	For linear assets (for example roads) or where GF isn't applicable
1	Level one	The first level primary level above ground level
M1	Mezzanine one	Mezzanine level above level one
M2	Mezzanine two	Mezzanine level above level two
B1	Basement one	The first level below ground level
B2	Basement two	The second level below ground level

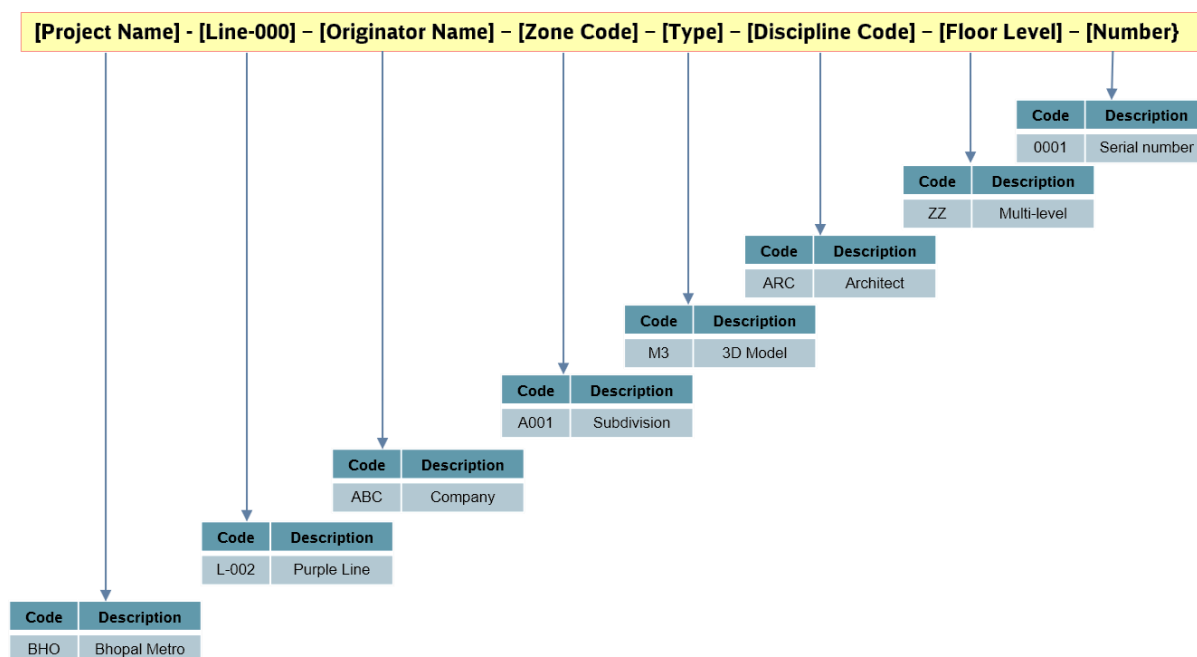
- Number**

This will consist of four numeric digits used sequentially to when a container is one of a series not distinguished by other of the fields.

- Revision No.**

The Revision number of the document (three characters) only within the CDE

The Contractor CDE Shall follow the Revision-Version concept and depending on the CDE used it could be one or two attributes. (Detailed in CDE Revision & Version Attribute).



1.12.1 Common Data Environment (CDE) Container Attributes

Containers within the Employer CDE shall have the following attributes defined:

- Suitability / Issue Purpose
- Revision
- Classification

1.12.2 Common Data Environment (CDE) Revision & Version Attributes

Each container within the Employer Common Data environment shall have an attribute indicating the container Revision on the other hand container within the Contractor shall have an additional Version number, added to the Revision on for their internal approval / validation tracking. This contractor "Revision" will be the Revision-Version number.

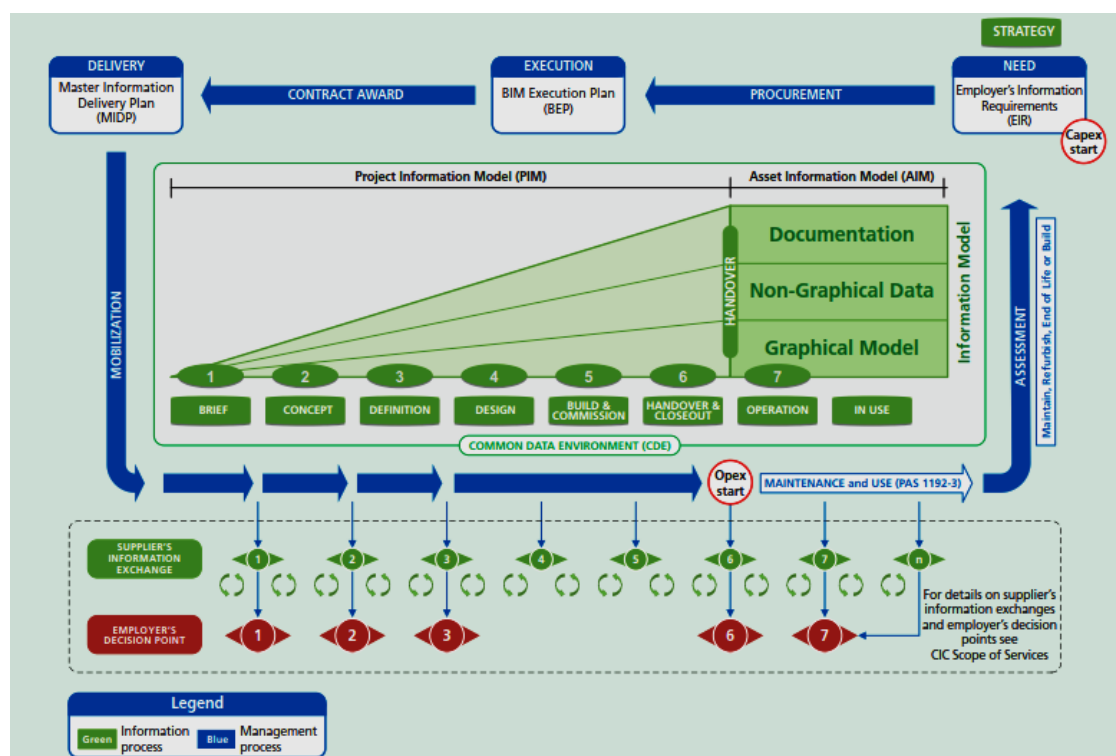
Contractor CDE shall define the attribute for the Revision-Version

[Revision]. [Version] = 0001.03

Employer CDE shall define the attribute for the Revision-Version

[Revision] = 0001

Revision-Version numbers shall be used only in the Contractor CDE, and within the Employer CDE only Revision numbers shall remain. (Version number shall be removed when submitting to the Employer CDE.

1.12.3 Common Data Environment (CDE) and the Information Life Cycle

Extracted from PAS 1192-2:2013 – Figure 2

1.12.4 Process and the Common Data Environments

Work-in-Progress (WIP):

Used to hold unapproved information. [Contractor CDE]

Shared:

Used to hold information which has been approved for sharing with other organizations/ teams to use as a reference in design/construction development.

[Contractor CDE]**Client Shared:**

Used to hold completed information, placed for Client (Employer) authorization by means of Gate Reviews. [Contractor CDE] (Employer will need to be granted with Read privileges in the Client Shared area within the Contractor CDE).

GC Shared:

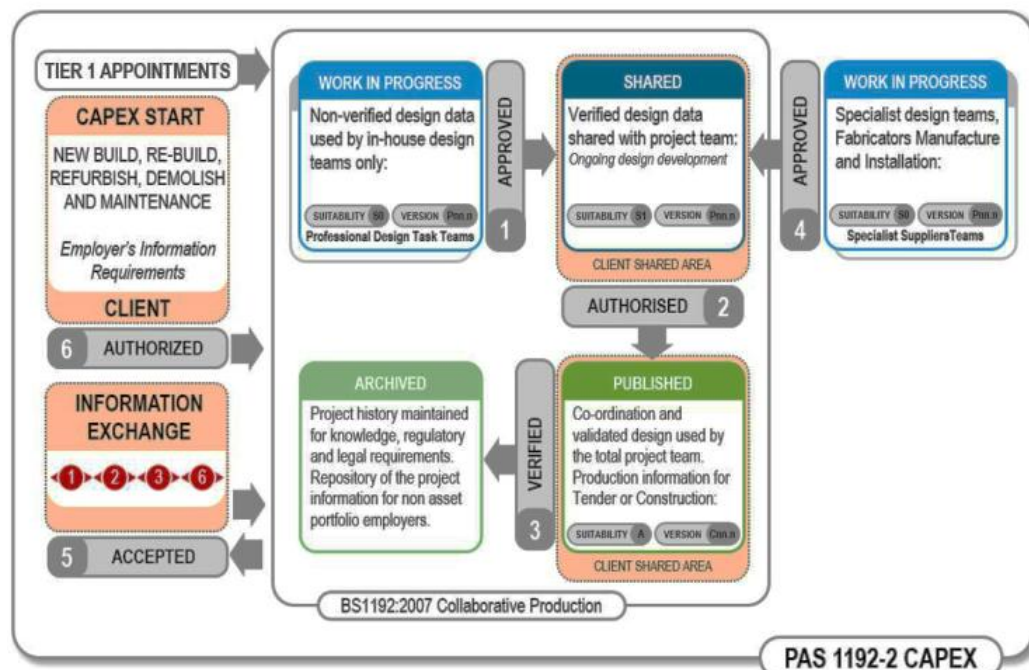
Used to release the information from the Contractor CDE to the Employer CDE, for sharing with Engineers or the local implementing bodies. [Client CDE]

Published:

Used to hold published (Approved by the Employer for a final stage) information for use by the entire project team. (both design/construction team and project team).

Archived:

Used to store all progress as each project milestone is met. In practice, the Archive area holds a record of all versions of the Published data, providing a tracking and trail in the dispute event. [Employer CDE].



CDE Model Principal phases according to the PAS 1192-2