Template and Example Language for Project BIM Requirements

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1 Project BIM Requirements

Each section of this Project BIM Requirements Standard contains template and example language (*Italics*). The document is divided into three sections: Executive, Management, and Working/Technical. Owners can use this template and Example Language to create Project BIM Requirements. Owners may create general Organizational Project BIM Requirements documents that guide BIM use across the Owner's projects and use these Organizational Project BIM Requirements to develop specific Project BIM Requirements for an individual project. See Guidelines for more information. Throughout this Template and Example language brackets are used, [ ], to signify when the user should determine the appropriate term for the clause. For example, if the bracket reads [Delivery Team Member(s)] the Owner may need to specify which team member they want to direct and may replace the bracketed term with the "Architect" or the "General Contractor".

1.1 Executive

1.1.1 Deliverables

1.1.1.1 Required Deliverables

The [Delivery Team Member(s)] is required to deliver the following deliverables:

- *BIM Quality Plan*
- *Security Plan*
- *BIM Execution Plan*
- *Model Deliverable*
- *Data Deliverable*

The procedures and milestones for delivery of each required deliverable shall be specified in the BEP.

1.1.1.2 BIM Quality Plan

The BIM Quality Plan must be submitted by [X] for approval. The BIM Quality Plan shall be resubmitted for approval of any changes made, and shall be included with each major project milestone package.

1.1.1.3 Security Plan Deliverable

The Security Plan must be submitted by [X]. The Security Plan shall be resubmitted for approval of any changes made, and shall be included with each major project milestone package.

1.1.1.4 BIM Execution Plan (BEP) Deliverable

The BEP must be submitted by [X]. The BEP shall be resubmitted for approval of any changes made, and shall be included with each major project milestone package.

1.1.1.5 Model Deliverable(s)

For the [BIM Use] deliverable, the [Delivery team member(s)] shall deliver [X] using format [Y]. Model Requirements specifying the contents of the Model deliverable shall be included.

1.1.1.6 Data Deliverable(s)

The [Delivery team member(s)] shall deliver the data associated with model objects at each major deliverable milestone. The data shall be submitted using format [X].

1.1.2 Quality Management Strategy

1.1.2.1 BIM Quality Plan

The [Delivery team member(s)] is responsible for conforming to or exceeding the BIM quality plan provided by [Owner]. The [Delivery team member(s)] shall document compliance with the BIM quality plan in the BEP.

The [Delivery team member(s)] is responsible for creating and adhering to a BIM quality plan that shall be submitted to and approved by [Owner] prior to commencement of work. The [Delivery team member(s)] shall document compliance with the BIM quality plan in the BEP.

1.1.2.2 Deliverable Quality

Option 1: The [Delivery team member(s)] is responsible for compressing files with all options, purge unused objects, and auditing the model for owner requirements.

Option 2: The [Delivery team member(s)] shall ensure that the model data and structure support successful model coordination. To this end, the [Delivery team member(s)] shall:

- *remove all drawing sheet and extraneous views from the model files*
- *purge, check, and compressed each model file*
- *align file format and naming conventions to project data exchange protocols*
- *align data segregation to the methods in BIM Execution Plan*
- *update models files and verify they containing all users' local modifications*
- *detach models files from the central file*
- *remove linked reference files*
- *make associated data required to load the model file available, and*
- *visually inspect model assembly.*

1.1.2.3 Verification / Validation Requirements

The [Delivery team member(s)] shall develop and utilize checklists during the design and quality control of each submittal. The [Delivery team member(s)] shall submit completed checklists as part of the project documentation.

1.1.2.4 Collaboration and Data Sharing

For the purpose of model collaboration, a federated model may be created only by models where their quality is checked and approved. If a federated model contains documents with pending quality approval, it must be stated in the federated model's metadata.

1.1.3 Intellectual Property (IP) Rights

For this section, it is recommended that the Owner should work with their contracting officer to develop Intellectual Property Rights clauses that are most appropriate for their organization. Here are some examples:

1.1.3.1 Ownership

Owner claims ownership of all IP

The [Owner] has ownership of and rights to all model and drawing files including those generated by CAD and BIM software. This includes objects, elements, associated model data,

and Facility/Site information, developed under contract to the Owner. The Owner may use this data for any purpose. For the owner's use in constructing, operating, maintaining, renovating, and expanding the built environment asset, model elements that were developed prior to the contract, but are incorporated into the BIM deliverables, will be perpetually licensed to the Owner, without fee. For materials developed under the contract, neither the architects, engineers, nor the general contract will assert against the Owner right of copyright.

Model Author Retains Ownership

By transmitting digital deliverables, the [Delivery Team Member(s)] does not convey any ownership right in the digital deliverables or in the software used to generate them. Unless otherwise granted in a separate license, the owner's right to use, modify, or further transmit digital deliverables is specifically limited to designing, constructing, using, maintaining, altering, and adding to the built environment asset consistent with the terms of this contract, and nothing contained in this contract conveys any other right to use the digital deliverables.

Model Author Retains Ownership with License

Each [Delivery Team member(s)] warrants to the [Delivery Team member(s)] that the [author] is the copyright owner of, possesses a valid copyright license for, or is otherwise authorized by the copyright owner to use its digital deliverable, including the right to grant licenses to other [Delivery Team member(s)] to use such data or the software used to create it as needed to fulfill duties or Model Uses established in the BIM Execution Plan for the project.

1.1.3.2 Grant of License

In addition to any other copyright or other intellectual property licenses that may be granted under a Governing Contract, each Contributor grants to Owner and the other Contributors limited, non-exclusive licenses.

1.1.3.3 License Entitlements

The [author] licenses to the Owner and other Delivery Team Members the rights to reproduce, distribute, display, make derivative works of, and otherwise use any digital deliverable relating to the built environment asset to which that [author] has intellectual property rights.

1.1.3.4 License Limitations

The Copyright License will:

(a) as permitted by law remain in effect; and

(b) be limited to retention of an archival copy of the author's Project related digital deliverables after final completion of construction of the Project.

1.1.3.5 Collaboration and Data Sharing

In the case that other project team members need a document that the [Delivery team member(s)] holds the IP rights, the [Delivery team member(s)] must provide a direct reference link to the document on the project's CDE platform. The BEP shall contain a list as to who has access to which information. The authoritative source of the data is typically the best person to understand the extent to which any data can or should be shared. Should anyone leave the

project, their credentials shall be immediately removed. Data sharing needs will change over the life of a project but must be identified from day one of the project.

1.1.4 Security

1.1.4.1 Data Separation

The [Delivery team member(s)] shall establish and maintain a list of shared content and access rights. Should anyone leave the project, their credentials shall be immediately removed.

1.1.4.2 Security and Cybersecurity

The [Delivery team member(s)] shall follow the Owner's security plan and document their process for compliance in the BEP. The [Delivery team member(s)] shall create a security plan and submit for approval to the Owner and document their process for compliance in the BEP.

1.1.4.3 Data Storage Requirements

The [Delivery team member(s)] shall store all data in servers that are located within [Country]. Data shall be backed up in [enter number] locations.

1.1.4.4 Continuation of Operations and Disaster Recovery

The Security Plan shall include a continuation of operations as well as disaster recovery plans for use during design and construction as well as during operations.

1.1.4.5 Use of Security Standards

All cloud-based software used on the project must comply with [Standard, e.g. NIST SP 800-171].

1.1.4.6 Security Restrictions

The [Delivery team member(s)] shall not transfer data through use of USB Storage Devices. The [Delivery team member(s)] shall not change the format of digital documents provided for the project. [See recommendations in NIST SP 800-171 for controls.]

1.1.4.7 Confidential, Controlled Unclassified, or Sensitive Information

There is no data classified as being confidential on the project.

1.1.5 Legal Considerations

1.1.5.1 Contract Documents

Any Model Deliverable provided to the [Delivery team member(s)] shall be delivered as information only. They shall not be considered Contract Documents.

The Model Deliverable (non-editable federated Design-Intent Model) is the contract document and 2D plans are considered only extractions of the model.

*If a Model Deliverable is also a Contract Document, then the OPR shall indicate requirements for signing, sealing, and permitting contractual 3D models in accordance with local jurisdictions.

Model Deliverables shall meet the requirements of all local jurisdictions.

The model itself (non-editable federated Design-Intent Model) is the contract document and 2D plans are considered only extractions of the model.

1.1.5.2 BIM Standards

The [Delivery team member(s)] must meet the BIM standards as specified by the Owner. Once a project has been determined as an appropriate application for BIM, the project manager must ensure BIM standards are included in the contract language to the Prime(s), and the Prime(s) must include it in their contract language to their subconsultants creating contract documents using BIM workflows.

1.1.5.3 Waivers

Situations may arise where adherence to this standard is not in the best interest of the Owner. If such a situation arises, the party creating the information must request and obtain a waiver from the Owner before deviating from the BIM standard. The Owner is not opposed to waiver requests, but the request must identify the specific standard for which the waiver is requested, the reason for the waiver, the resulting impacts on the purposes Owner intends, and any alternative approaches that should be considered. The AE and the GC must update their respective BIM Execution Plans with any approved waivers.

1.1.5.4 Responsibility for Product

Each Model Author shall be responsible for the Models or the data that is developed as a result of that Model Author's access to a Model.

1.1.5.5 Indemnification Clause

After project closeout, the Owner may share data deliverables consisting of data, information, communications, drawings, texts, models, or a combination of the foregoing, created, used, or stored within the owner's document management systems with future architects, engineers, Delivery Team Member(s), consultants, service providers, or other parties (Recipient Party). The Recipient Party's use of such digital deliverables shall be at the Recipient Party's risk and without liability to the authoring party and its Delivery Team Member(s)s or consultants, the authors of or contributors to the digital deliverables, and each of their agents and employees. To the fullest extent permitted by law, the Recipient Party of any such digital deliverables shall indemnify and hold harmless the authoring party and its Delivery Team Member(s) from any and all claims, damages, losses, and expenses, including, but not limited to, attorneys' fees and costs, arising out of or resulting from such Recipient Party's use, transmission, or reliance on such digital deliverables.

1.2 Management

1.2.1 BIM Execution Plan

1.2.1.1 Purpose of Document

The BEP is a process management document which defines the process for an Owner and Delivery Team Members to develop a Project BIM Execution Plan (BEP). The BEP is a document that outlines the use cases in delivery and information handover to support further operations of a facility or asset(s); the process for information development and use; the definition and scheduling of information deliverables; and the clear definition of roles and responsibilities of the parties.

1.2.1.2 Requirement of Use and Participation

The Delivery Team shall define all BIM Uses in accordance with these requirements and document them within the BEP. The BEP shall be delivered as defined in the Deliverables section of the contract. All members of the Delivery Team shall be required to adhere to the processes defined in the BEP after it has been approved by the Owner.

1.2.1.3 Required Inclusions

The Delivery Team shall include all required elements from BEP Standard NBIMS-US v.4 when creating the project's BEPs.

1.2.1.4 BEP Accountability

Failure to deliver the BEP or adhere to processes defined within shall result in penalties which may include but is not limited to withholding of payment for design or construction.

1.2.1.5 BEP Deliverable Approval Process

Within thirty (30) days after the acceptance of the BEP, a demonstration from Delivery Team shall be given to the Owner to review the BEP for clarification, and to verify the functionality of BIM technology workflow and processes. If modifications are required, the responsible Delivery Team members shall complete the modifications and resubmit the final BEP for acceptance.

1.2.2 Roles & Responsibilities

1.2.2.1 Required Documentation

The Delivery Team shall document all Roles and Responsibilities in the BEP. For required information to be documented see BIM Execution Plan, Required Inclusions section of these requirements.

1.2.2.2 Defined Roles

The project team shall identify a BIM Manager or BIM Managers *who will oversee the Model Authors' compliance with the modeling requirements and the BIM Execution Plan. The BIM Manager(s) will also schedule and manage BIM related meetings. Project teams may also identify BIM coordinators and BIM users with specific roles and responsibilities.*

Example Responsibility Matrix

Role	***Description***	***Delivery Team (Excluding Delivery team member(s))***	***[Delivery team member(s)]***	***Owner***
BIM Manager(s)	*Review and comment on BIM Deliverables*			*X*
	Draft and deliver the BEP		*X*	
	Coordinate with all discipline designers and model element authors		*X*	

	Oversee development and publication of model configurations	*X*		
	Manage files	*X*	*X*	
	Determine the project BIM geo-reference point(s)	*X*		
	Facilitate and enforce protocols established for project data, model exchange, and model archives	*X*	*X*	
	Ensure construction documents are produced from fully coordinated design intent model	*X*		
	Manage model handover from the Design BIM Manager		*X*	
	Integrate information developed during the construction phase into the model		*X*	
	Maintain the BIM models	*X*	*X*	
	Coordinate sub-delivery team member(s) BIM use		*X*	
	Assure all sub-delivery team member(s) models are modeled per the BEP		*X*	
	Facilitate clash detection and resolution		*X*	
	Coordinate construction sequencing and scheduling activities, and assure their integration with the Construction BIM		*X*	
	Coordinate with the Design BIM team to facilitate update of the As-Built BIM		*X*	
	Work with the Design BIM Manager to coordinate model commissioning and data handover		*X*	
	Package the electronic handover transmittal		*X*	
BIM Coordinator(s)	*Coordinate discipline BIM development, standards, and data requirements, as necessary, with the Design BIM Manager*	*X*	*X*	
	Manage other BIM Users within the discipline	*X*	*X*	
	Create discipline specific BIM content	*X*		*X*
	Coordinate federation of the discipline models with the BIM Manager	*X*	*X*	
	Coordinate clash detection and resolution with the BIM Manager	*X*	*X*	*X*
	Coordinate submission and exchange of models	*X*	*X*	*X*
	Coordinate information needed by the project owner from trade and technical disciplines	*X*		
	Maintain discipline specific model archives	*X*	*X*	*X*

	Facilitate development of BEP		*X*	
	Review BIM use strategies defined in BEP		*X*	
	Monitor execution of BEP		*X*	
	Oversight of the model progression, standards, and data development	*X*	*X*	
	Coordinate BIM reviews with project owner personnel for quality assurance		*X*	
	Develop detailed models for shop drawings			*X*
	Support pre-fabrication and fabrication requirements			*X*
	Provide data required by project owner	*X*	*X*	*X*
	Manage scheduled model updates and exchanges	*X*	*X*	*X*
	Coordinate internal BIM training	*X*	*X*	*X*
BIM Users	*Model design geometry*	*X*		*X*
	Assign data to model elements	*X*	*X*	*X*
	Coordinate work with that of other disciplines	*X*	*X*	*X*
	Day to day BIM work	*X*	*X*	*X*
	Review the model for adherence to the design intent	*X*		
	Review discipline model for completeness and accuracy	*X*	*X*	*X*

1.2.3 Common Data Environment (CDE)

1.2.3.1 Requirement for Participation

All members of the Project Team shall work on and store files on the defined Project CDE. No Project Team member shall work or store files outside of the defined Project CDE.

1.2.3.2 Restrictions / Limitations

All documents shall be stored on the Owner's CDE.

1.2.3.3 Capabilities

The common data environment shall:

a. *Have unique identification for each information container*
b. *Use codified standards for each field*
c. *Define status, revision, and classification (i.e., ISO 12006-2) for each information container*

d. *Allow for the ability for information containers to transition between states*
e. *Record the name of user and date when information container revisions transition between each state*
f. *Control access at an information container level*

1.2.3.4 Document Metadata

The CDE shall manage metadata for *each information container that includes a revision code (such as IEC 82045-1) and a status code, showing the permitted use(s) of information.*

1.2.3.5 CDE Framework Documentation

If the Owner is not providing the CDE, the Delivery Team shall document all technologies and workflows used to establish the CDE for the project. The Delivery Team shall create and maintain the CDE for the life of the project. For required information to be documented see BIM Execution Plan, Required Inclusions section of these requirements.

1.2.4 Collaboration Requirements

1.2.4.1 Specification of Collaboration Requirements

Collaboration requirements may include CDE workflows and IT infrastructure/software needed for the Project Team's co-location and virtual collaboration.

1.2.4.2 Collaboration Procedures Documentation

The Delivery Team shall document all Collaboration procedures and meetings used to coordinate the Delivery Team. For required information to be documented see BIM Execution Plan, Required Inclusions section of these requirements.

1.2.4.3 Information Exchange Procedures

For the purpose of model collaboration, a federated model may be created only by BIM models where their quality is checked and approved. If a federated model contains documents with pending quality approval, it must be stated in the federated model's metadata.

1.2.4.4 Kick-Off Meeting

Design kick-off meeting – The [Lead BIM Manager] and Owner's [Project Manager] will schedule a BIM kick-off meeting after contract award. [BIM Managers] and [discipline BIM Coordinators] will attend the kick-off meeting to discuss their particular workflows and requirements for inclusion in the BEP.

Construction kick-off meeting – The [Lead BIM Manager], Owner's [Project Manager], and [Construction Manager] will schedule a kick-off meeting. [BIM Managers] and [discipline BIM Coordinators] will attend the kick-off meeting to discuss their particular workflows and requirements for inclusion in the BEP.

1.2.4.5 Team Co-location

The [Delivery team member(s)] shall provide a team collaboration site that includes a team Big Room to support collaboration meetings with space and virtual participation capability for BIM reviews.

Co-location of the [lead BIM Manager] and [discipline BIM Coordinators] should be considered to enable direct communication and coordination among project team members.

1.2.4.6 Coordination Meetings

Model coordination meetings shall occur on a regular basis throughout the design process and construction process. Coordination meetings shall involve the [Lead BIM Manager] and at least one person from each discipline who is directly involved in the project design. A live walk-through of the composite model and results in a clash report with agreement reached for each coordination issue shall be executed.

1.2.4.7 Quality Control Activities

The [Delivery Team Member(s)] are responsible for assuring their models and data submittals have been thoroughly checked and meet OPR and contract requirements for the project.

OR

The [Delivery Team Member(s)] will typically have a Quality Control (QC) process defined for the overall project. This QC plan should include how deliverables will be checked for compliance to include the BIM defined deliverables. The OPR identifies specific QC requirements and the [Delivery Team Member(s)] should be able to verbally express how those QC efforts are being performed. Additionally, the [Owner] may ask for a basic visual demonstration of those QC efforts periodically throughout the project. This is especially likely if a QC concern arises during the execution of the project.

1.2.4.8 Required Documentation

The Delivery Team shall document quality control activities to be performed by the Delivery Team. For required information to be documented see BIM Execution Plan, Required Inclusions section of these requirements.

1.2.4.9 Quality Control Report

The [Delivery team member(s)] shall prepare a Quality Control Report (QCR) to be submitted with all items referenced in the Deliverables section of these requirements. The QCR shall at a minimum include updates on the quality control activities required in this section.

1.2.4.10 Constructability Checks

The project team will perform visual constructability checks through the duration of the project to ensure model components are capable of being physically constructed. Constructability checks shall be performed at intervals determined by the Delivery Team and summarized in the QCR.

1.2.4.11 Interference Checks

The [Delivery team member(s)] shall work with the Delivery Team to perform intended interference checks between their model-based contributions to ensure collisions are appropriately managed. Interference checks shall be performed at intervals determined by the Delivery Team and summarized in the QCR.

1.2.4.12 Model Integrity Checks

The [Delivery team member(s)} shall perform model standards checks to identify missing, undefined, incorrectly defined, or underdeveloped elements. The [Delivery team member(s)} shall document non-compliant elements and create a corrective action plan with the intent of eliminating any conflicts and defects in the model(s). Any non-compliant elements that are requested to remain in the model shall be documented with a detailed justification that is reviewed and approved by the Owner.

1.2.4.13 Metadata

All files stored in the common data environment shall carry metadata that meets the requirements of ISO 19650-2:2018. At a minimum this includes: Name, Type, Description, Revision, Status, Discipline, Phase, and System.

1.2.4.14 Federated Model Checks

Delivery Team members are responsible for model quality reviews and data validation or their models prior to being incorporated into a federated model. The Delivery Team Member responsible for creating the federated model shall conduct checks to ensure the Model has no misaligned or duplicated elements. Any non-compliant models shall be fixed by the Delivery Team member that submitted before model Federation can continue.

1.2.4.15 Data Compliance Checks

[Delivery team member(s)] shall use the [a model checking software] with owner standards, documenting all compliant and noncompliant elements with the interim and final model reviews. Model files in each deliverable shall be coordinated and contain all of the required data elements defined by the Owners data standard. Asset data worksheets [e.g., COBie worksheets] shall be coordinated and contain all the required data elements defined by the Owners data standard. All compliant and noncompliant elements must be documented in the deliverable.

1.3 Working/Technical

1.3.1 BIM Uses

1.3.1.1 List of Core and Additional BIM Uses

The [Delivery team member(s)] shall contribute to the following BIM Uses on the project.

- *Capture Conditions*
- *Author Design*
- *Produce Construction Documentation*
- *Generate Fabrication Details*
- *Coordinate Design and Construction*
- *Review Design*
- *Compile Record Deliverables*

The BEP shall include these defined BIM Uses, their implementation phases, and assigned Delivery Team member. If the [Delivery team member(s)] does not wish to perform any of the

above BIM Uses it shall be documented in the BEP for approval. The project team can select additional BIM Uses. These BIM Uses should be included in the BEP.

1.3.2 Model Requirements (Finished Product)

1.3.2.1 Model Element Breakdown (MEB)

The Delivery Teams models shall include all elements listed in the Owners MEB. If no template is provided, [Delivery team member(s)] shall create a MEB and submit to the Owner as part of the BEP.

1.3.2.2 Model Progression Specification (MPS)

The desired Level of Development (LOD) shall be defined for the digital objects (BIM models). A LOD standard for all model content, or a specific LOD per model element and by discipline, trade, and/or design phase may be indicated. An industry or a customized LOD standard specification may be followed.

The desired LOD and specifications to be followed in the project shall be indicated in the BIM Execution Plan (BEP).

1.3.3 Modeling Requirements (Creation Requirements)

1.3.3.1 Owner Specific Requirements

Create all Model Elements in accordance with the [Owner's modeling requirement document such as the Model Element Templates from the BEP Module] for the project. Document any exceptions to the [Owner's modeling requirement document] in the BEP.

1.3.4 Data Requirements

1.3.4.1 File Metadata

All files stored in the common data environment shall carry metadata that meets the requirements of ISO 19650-5:2018.

1.3.4.2 Data Attribution Requirement

Models and/or associated databases must contain the necessary data to produce project documentation for construction and to enable facility lifecycle management objectives.

1.3.4.3 Data Standard Reference

All Delivery Team Members are required to create and populate values for data attributes on model objects listed in and as defined by the [Data Standard].

1.3.4.4 Inclusion in BIM Execution Plan

All Delivery Team members shall apply data attributes as defined above. If there are any deviations from the required data attributes they will be documented and submitted for approval as part of the BEP.

1.3.4.5 Existing Facilities Dataset

The Owner [shall/shall not] include a dataset of existing assets for the project. The dataset will be delivered by [Owners Representative] and will be delivered as a [Dataset Format].