



National BIM Standard - United States® Version 3

5 Practice Documents

5.7 BIM Planning Guide for Facility Owners, Version 2.0 – June 2013

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5.7.1 Scope – General Criteria

This Standard specifies a structured approach to effectively plan the integration of BIM within an organization. Facility owners should have a different outlook on the value of BIM for their projects. The previous guide in this series, The BIM Project Execution Planning Guide, was focused on streamlining the planning and implementation of BIM use within one capital facility or project. The value of BIM tools and processes for owners can be very much attuned to the tools and enabled processes within a given project, or it can differ with a focus on the facility operations and related data after complete. The BIM Planning Guide for Facility Owners seeks to facilitate an owner's review and planning for the proper investment in BIM in line with the specific project focal points or strategic business interests, in addition to improving the value in delivering a single facility. Three planning procedures for facility owners include:

- **Strategic planning** to assess existing organizational conditions; align BIM goals and objectives with desired bim uses and maturity level; and develop a transition plan for BIM implementation;
- **Implementation planning** to develop the detailed implementation plan within the operations of the organization; and
- **Procurement planning** to identify key issues to consider when creating BIM contract requirements.

Throughout all stages of this Guide, there are six core “BIM Planning Elements” that must be considered. The BIM Planning Elements are as follows:

- **Strategy:** defines the BIM goals and objectives; assesses change readiness; and considers management and resource support.
- **BIM uses:** identifies the methods in which bim will be implemented for gathering, generating, processing, communicating, realizing information about the owner's facilities.
- **Process:** describes the means to accomplish the BIM uses by documenting the current methods, designing new processes leveraging BIM and developing transition plans
- **Information:** documents the information needs of the organization, including the model element breakdown, level of development, and facility data.
- **Infrastructure:** determines the technology infrastructure to support BIM including computer software, hardware, networks, and physical workspaces.
- **Personnel:** establishes the roles, responsibilities, education, and training of the active participants in the BIM processes established.

A. Strategic Planning: The Strategic Planning procedure provides steps that an owner can use to plan for BIM at an organizational level. The purpose of this planning procedure is to allow you as an owner to determine your BIM goals and objectives and establish a road map to document how you will accomplish the goals and objectives. The Procedure includes:

1. **Assess** the organization's current internal and external level of BIM integration;
2. **Align** the organization's BIM goals by identifying desired levels of maturity for BIM Uses; and
3. **Advance** the BIM maturity level through the development of a defined advancement strategy.

B. Implementation Planning: After the Strategic Plan has been developed, Implementation Planning can begin. The purpose of this step is to determine and document the detailed guidelines and protocols for implementation. An Implementation Plan will include the following:

1. **Process** maps that clearly define how BIM will be integrated into the organization's practices;
2. **Information** requirements to support the implementation of BIM;
3. **Technology infrastructure** needed to support the process; and
4. **Education and training** for the personnel who will interact with BIM or resulting data.

C. Procurement Planning: Prior to the start of a facility project (new construction or renovation); an owner should develop contract requirements for BIM. These contract requirements are necessary to ensure that the owner's BIM needs are met, and the entire project team has a common understanding of the requirements. It also supports the successful implementation of BIM throughout the lifecycle of the facility. With the proper documentation in place at the beginning of the project, the team can plan an effective BIM process for both the project and your needs. Core procurement components include:

1. **Team selection criteria** to enable the procurement of qualified items;
2. **Contract requirements** to clearly define the BIM deliverables; and
3. **Standard BIM project execution plan template** to initiate the detailed BIM planning process for a project

The BIM Planning Guide for Facility Owners was developed by the Computer Integrated Construction Research Group in the Department of Architectural Engineering at The Pennsylvania State University with the generous support from The Charles Pankow Foundation, US Department of Defense Military Health System, Kaiser Permanente, US Department of Veterans Affairs, The Penn State Office of Physical Plant, and The Partnership for Achieving Construction Excellence (PACE). The Guide was created through the buildingSMART alliance® (bSa) Project "BIM for Owners."

5.7.1.1 Business case description

This guide helps organizations, particularly owner organizations, plan for the adoption and implementation of BIM. This guide presents the methodology to develop a strategic BIM Plan, a BIM implementation plan, and BIM procurement language. Because every organization is different, the guide does not provide an owner with an implementation strategy. However, the guide provides a procedure for an owner to develop a customized strategy.

1. **Problem Solved:** The problem solved in this guide is the lack of procedures for the planning of BIM within an organization - primarily facility owners.
2. **Unique Features:** Unlike most procedures, this guide is written specifically to assist facility owners. However, the procedures within the guide can be adapted to almost any organization. Most procedures focus on the implementation of BIM on a project or a facility.
3. **Use of Practice:** The procedures within the guide help organizations develop an implementable and realistic BIM strategy. The procedure helps an organization move from a BIM strategy to a tactical implementation plan. The procedure also helps an organization identify the necessary elements of the language to procure the use of BIM.

4. **Return:** The return on this procedure is realized when organization reduce the time spent on planning the implementation of BIM within an organization. However, the real return is when the organization begins to implement BIM and start realizing the benefits of BIM.

5.7.2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

- *BIM Uses*, <http://bim.psu.edu/uses>
- *BIM Project Execution Planning Guide and Templates*, <http://bim.psu.edu/Project/resources/default.aspx>
- *BIM Planning Guide for Facility Owners Templates*, Organizational BIM Assessment Profile, <http://bim.psu.edu/Owner/Resources/default.aspx>
- *BIM Planning Guide for Facility Owners Templates*, Organizational Strategic Plan Template, <http://bim.psu.edu/Owner/Resources/default.aspx>
- *BIM Planning Guide for Facility Owners Templates*, Organizational Execution Plan Template, <http://bim.psu.edu/Owner/Resources/default.aspx>
- *BIM Planning Guide for Facility Owners Templates*, Business Case Template, <http://bim.psu.edu/Owner/Resources/default.aspx>
- *BIM Planning Guide for Facility Owners Templates*, Project Procurement Documents, <http://bim.psu.edu/Owner/Resources/default.aspx>

5.7.3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

5.7.3.1

as-built model

a model representing the as-built conditions of a facility. Often times delivered as a federated model with the level of development required for construction.

5.7.3.2

Building Information Modeling (CIC Research Program)

BIM

a process focused on the development, use, and transfer of a digital information model of a building project to improve the design, construction, and operations of a project or portfolio of facilities.

5.7.3.3

Building Information Model

BIM

a digital representation of physical and functional characteristics of a facility. A BIM is a shared knowledge resource for information about a facility, forming a reliable basis for decisions during its life-cycle; which defined as existing from earliest conception to demolition. A basic premise of BIM is collaboration by different stakeholders at different phases of the life cycle of a facility to insert, extract, update, or modify information in the BIM to support and reflect the roles of that stakeholder.

5.7.3.4

BIM champion/manager

a person who is technically skilled and motivated to guide an organization to improve their processes by

pushing adoption, managing resistance to change, and ensuring implementation of a new technology or process.

5.7.3.5

BIM deliverables

information (a package of data or models in numerous formats) to be provided to another party in connection with a BIM-related service over the facility's life-cycle.

5.7.3.6

goals (BIM)

objectives used to define the potential value of BIM for a project and for project team members. BIM Goals help to define how and why BIM will be used on a project or in an organization.

5.7.3.7

process (BIM)

a generic name for the practice of performing BIM. This process can be planned or unplanned. The BIM Process may also be referred to as the BIM Execution Process or the BIM Project Execution Process. The BIM Project Execution Planning Process suggests diagramming the BIM process using process maps.

5.7.3.8

process map (BIM)

a diagram of how BIM will be applied on a project. The BIM Project Execution Plan proposes two levels of Process Maps: BIM Overview Map and Detailed BIM Use Process Maps.

5.7.3.9

BIM Project Execution Plan

BIM PxP or BIM Plan

a plan that results from the BIM Project Execution Planning Process. This document lays out how BIM will be implemented on the project as a result of the decision of the group.

5.7.3.10

BIM project execution planning procedure

a process for planning the execution of BIM on a project. It consists of four primary steps: 1) identify BIM Goals and BIM Uses, 2) design BIM Project Execution Process, 3) develop Information Exchanges, 4) define supporting infrastructure for BIM Implementation.

5.7.3.11

BIM use

a method or strategy of applying Building Information Modeling during a facility's lifecycle to achieve one or more specific objectives

5.7.3.12

Construction Operations Building information exchange

COBie

a specification that denotes how information may be captured during design and construction and provided to facility operators.

5.7.3.13

co-location

a collaboration technique where the entire project team moves into one location to develop a project.

5.7.3.14

contractor

Construction Manager (CM) Agent or At-Risk, General Contractor (GC)

5.7.3.15

detailed BIM use process maps

a comprehensive BIM Process Map that defines the various sequences to perform a specific application of BIM or BIM Uses. These maps also identify the responsible parties for each process, reference information content, and the information exchanges which will be created and shared with other processes.

5.7.3.16**fabrication model**

a BIM model with an adequate level of detail and accuracy for use in prefabrication.

5.7.3.17**federated model**

a BIM model that is the combination of BIM models (i.e. Architecture, plumbing, electrical, and HVAC). Often used for 3D coordination.

5.7.3.18**facility data**

any information for a building that has value to an owner

5.7.3.19**Information Exchange****IE**

the information passed from one party to another in the BIM process. The parties involved should agree upon and understand what information will be exchanged. These are often in the form of deliverables from a process that will be required as a resource for future processes.

5.7.3.20**Level of Development****LOD**

the degree of reliability to which a model element is developed.

5.7.3.21**objective**

specific tasks or steps that when accomplished move the organization toward their goals.

5.7.3.22**operating units**

a working group within an larger organization that has a specific mission

5.7.3.23**overview map**

a high level BIM Process Map that illustrates the relationship between BIM Uses which will be employed on the project.

5.7.3.24**project team**

every participant contracted to work on a project. This may include the owner, designer, contractor, and sub-contractor.

5.7.3.25**professional**

the designer. This may include the Architect and Engineer

5.7.3.26**record model**

a facility model illustrating as-built conditions in the Level of Development and file format specified by the owner.

5.7.3.27**reference information**

structured information resources (enterprise and external) that assist or are required to accomplish a BIM Use.

5.7.3.28**road mapping**

The process of displaying the integration of strategic changes in a business process.

5.7.3.29**subcontractor**

A contractor contracted by the CM or GC, or a Prime Contractor contracted by the owner

5.7.3.30**vision (organizational)**

a picture of what an organization is striving to become.

5.7.3.31 Symbols and abbreviated terms

For purposes of this document the following symbols and abbreviated terms apply.

2D – Two-Dimensional

3D – Three-Dimensional

AEC – Architecture Engineering Construction

AIA – American Institute of Architects

BIM – Building Information Model(ing)

BPMN – Business Process Mapping Notation

bSa – buildingSMART alliance

CAD – Computer Aided Drafting

CAFM – Computer Aided Facility Management

CIC – Computer Integrated Construction Research Program

CIFE – Center for Integrated Facilities Engineering

CM – Construction Management

CMMI – Capability Maturity Model Integrated

CMMIS – Computerized Maintenance Management Information System

CMMS – Computerized Maintenance Management Systems

COBie – Construction Operations Building Information Exchange

CPM – Critical Path Method

DB – Design-Build

DBB – Design-Bid-Build

DoD – Department of Defense

E&TM – Equipment and Technology Management

FF&E – Furniture, Fixtures, and Equipment

FLCM – Facility Life-Cycle Management

FM – Facility Management

FMS – Facility Management System

FTP – File Transportation Protocol

HBC – Healthcare BIM Consortium

HVAC – Heating Ventilation and Air Conditioning

IDEF – Integrated Definition

IFC – Industry Foundation Class

IO&T – Initial Outfitting and Transition

LOD – Level of Development

MHS – DoD Military Health System

NBIMS-US – The United States National Building Information Modeling Standards

NFS – National Facilities Services (Kaiser Permanente)

OPP – Office of Physical Plant

PACE – The Partnership for Achieving Construction Excellence

PDF – Portable Document Format

PFD – Program for Design

PSU – The Pennsylvania State University

PxP – Project Execution Plan

RAM – Random Access Memory

RFP – Request for Proposal

RFQ – Request for Qualifications

SWOT – Strength, Weakness, Opportunity, Threat

USACE – United States Army Corps of Engineers

UML – Unified Modeling Language

VA – Department of Veteran Affairs

5.7.4 [BIM Planning Guide for Facility Owners – Version 2.0, June 2013](#)

5.7.4.1 **Description of use**

This guide acts as an extension to the BIM project execution planning guide, which is sections 5.3 and 5.4 within NBIMS-US™. However rather than project, this Guide addresses organizational processes. While the procedures are written for facility owners, the concepts within the Guide can be applied to planning for the implementation of BIM within all organizations.

5.7.4.2 Process map

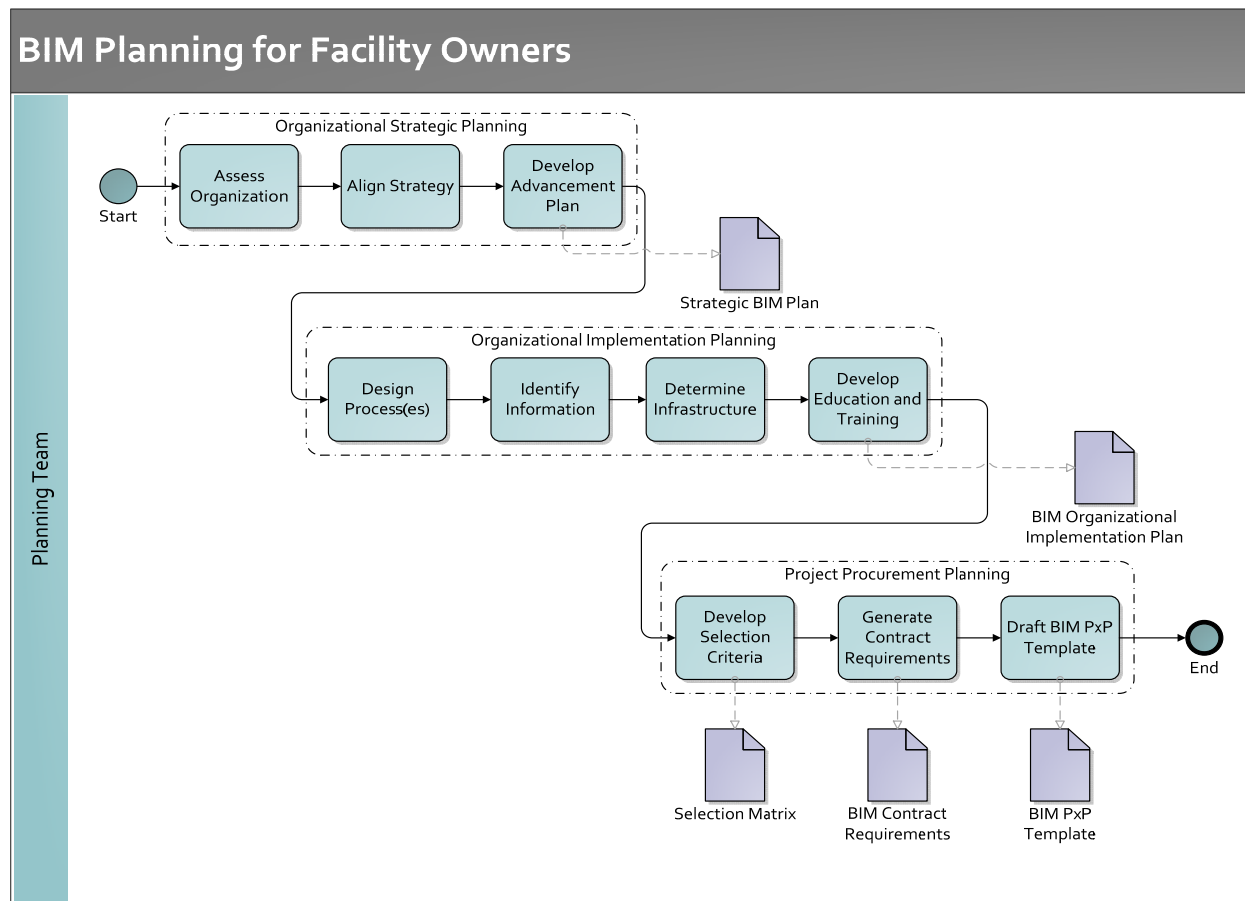


Figure 5.7-1 BIM Planning for Facility Owners Process Map

5.7.4.2.1 BPMN description

This process consists of 3 main groups of processes. There is one group for each procedure including Organizational Strategic Planning, Organizational Implementation, and Project Procurement Planning. Each procedure has three or four processes. For Organizational Strategic Planning, the process includes: assess organization, align strategy, and develop advancement plan. For Organizational Implementation Planning, the process includes design process(es), identify information, determine infrastructure, and develop education and training. For Project Procurement Planning, the process includes developing selection criteria, generate contract requirements, and draft BIM PxP template. The outputs of these processes are a strategic BIM Plan, a BIM Organizational Implementation Plan and Procurement Documents (including BIM Selection Matrix, BIM Contract Requirements, and A BIM PxP Template).

5.7.4.3 Guide for Use

This Guide has been developed for facility owner organizations, along with designers, contractors, operators, and consultants who advise owners. It is assumed that the reader has a fundamental understanding of BIM concepts.

This Guide is not intended to convince an organization to use BIM, but rather how to implement it. If the organization has determined that BIM can add value to the organization, this Guide will lead them through the steps to integrate BIM into the organization. However, if the organization is unsure about implementing BIM, it may be necessary to further research the benefits and risks of BIM to make a business case for implementing BIM.

While the Guide is written for facility owners who operate and maintain facilities, it is important to note that implementing BIM for non-owner organizations is very similar. Therefore, this Guide is an excellent resource for any organization wishing to integrate BIM into their core operational processes.

The Guide contains three primary procedures:

- The Strategic Planning procedure (Chapter 2);
- The Implementation Planning procedure (Chapter 3); and
- The Procurement Planning procedure (Chapter 4).

The Guide is written in the sequential order of the steps and procedures that are necessary to implement BIM. However, each organization will be at a different stage of BIM implementation, and it may be beneficial to focus on a specific procedure based upon the organization's current level of BIM implementation/maturity. It is suggested to first read each chapter and then target areas that provide the most value to your current level of BIM implementation.

The appendices provide additional resources for implementing the procedures documented in this Guide. Additional templates and resources are also available at the project website (<http://bim.psu.edu>). Throughout the Guide, case study examples are provided to illustrate the content discussed. Those examples were developed from case studies and input provided by the supporting organizations.

5.7.5 Demonstrated use and acceptance

The BIM Planning Guide for Facility Owners was developed through a multi-step research process including a detailed evaluation of existing owner organizations, focus group meetings with industry experts from various backgrounds, and case study research to validate the procedure. The following research steps were utilized in the development of the BIM Planning Guide for Facility Owners:

1. Review available literature, resources, and contract language;
2. Create advisory board to support project development;
3. Determine preliminary topics & procedures to be addressed;
4. Review preliminary topics & procedures with advisory board;
5. Evaluate owner organizations that have completed BIM adoption;
6. Develop planning process;
7. Revise preliminary planning process through workshop with advisory board;
8. Publish draft version of guide;
9. Validate procedures and processes through detailed case studies;

10. Revise and publish final version of guide.

5.7.5.1 Evidence of repeatability

A consensus advisory board was utilized to both assist in the development and review of the procedures in this guide. The advisory board members include:

Robert Braunagel, US Department of Defense Military Health System

Dianne Davis, AEC Infosystems

Steve Devitto, General Service Administration

Craig Dubler, Penn State Office of Physical Plant

Ed Gannon, Penn State Office of Physical Plant

Greg Gidez, Hensel Phelps

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Grace Wang, Jacobs Engineering

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