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BIM Execution Plan Template

CPG-DGN-PLN-085

Revision 0

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Contents

Tables

References

TABLE 0-1 REFERENCES

Reference	Title
CPG-DE-PLN-084	*CADD/BIM Standards Manual*
CPG-DE-PLN-083	*BIM Implementation Plan*
Version 2.1	CIC BIM Project Execution Planning Guide

Acronyms and Abbreviations

TABLE 0-2 ACRONYMS AND ABBREVIATIONS

Acronym or Abbreviation	Definition
3D	three-dimensional
4D	four-dimensional
App	Application
BIM	Building Information Modelling
CADD	Computer-aided Drafting and Design
CIC	Computer Integrated Construction
CPG	Capital Projects Group
DB	Design and Build
FTP	File Transfer Protocol
LEED	Leadership in Energy and Environmental Design
Mech	Mechanical
QC	Quality Control
Struct	Structural
Template	*CPG BIM Execution Plan Template*

Capital Projects Group BIM Execution Plan Template Guide

The large volume of documentation required to successfully execute a Capital Projects Group (CPG) Building Information Modelling (BIM) Project can be overwhelming, and so the purpose of this *CPG BIM Execution Plan Template* (*Template*) is to provide a convenient starting point and outline of procedures for creating a BIM Execution Plan for the CPG Program.

Follow these four steps to create a CPG Program BIM Execution Plan:

1) Review the *CPG BIM Implementation Plan,* as included in the *CPG CADD/BIM Standards Manual*. This document outlines the CPG BIM requirements and methodologies for all parties potentially performing work for the Program.

2) Review Version 2.1 of the *BIM Project Execution Planning Guide* created by the Computer Integrated Construction (CIC) Research Program at The Pennsylvania State University. The CIC document describes the BIM Project Execution Plan procedure in detail and should be well understood.

   It is imperative that you understand the procedures outlined in the CIC Guide, which can be found within the CAD Information Package, as delivered with the *CPG CADD/BIM Standards*. It can also be found at: http://bim.psu.edu/Project/resources/default.aspx

3) Use this *CPG BIM Execution Plan Template* to develop a CPG BIM Project Execution Plan. As part of the *CPG BIM Project Execution Plan*, create the following documents and submit them as attachments to the *CPG BIM Execution Plan*, using templates provided by CPG:

   a. Attachment 1: BIM Goals and Use Analysis Worksheets

   b. Attachment 2: Level 1 BIM Process Overview Map

   c. Attachment 3: Level 2 Detailed BIM Use Process Map(s)

   d. Attachment 4: Information Exchange Requirement Worksheet(s)

   e. Attachment 5: Model Definition Worksheet

4) Once the *CPG BIM Execution Plan* and required attachments are completed, submit these documents to CPG for review, using the standard CPG Submittal Procedure.

CPG BIM Execution Plan

Version 1.0

For

[Project Title]

[Project Location]

[Project Number]

Developed By

[Author Company]

[This template is a tool that is provided to assist in the development of a CPG BIM Execution Plan as required per contract.

Please note: Instructions and examples to assist with the completion of this guide are currently in grey. The text can and should be modified to suit the needs of the organization filling out the template. If modified, the format of the text should be changed to match the rest of the document.]

1. BIM Execution Plan Overview

1.1.1 To successfully implement Building Information Modeling (BIM) on this CPG project, the Project Team has developed this detailed CPG BIM Execution Plan. The CPG BIM Execution Plan defines uses for BIM on the project (such as design authoring, cost estimating, and design coordination), along with a detailed design of the process for executing BIM throughout the project lifecycle.

1.1.2 [INSERT ADDITIONAL INFORMATION HERE IF APPLICABLE. FOR EXAMPLE: BIM MISSION STATEMENT]

2. Project Information

2.1.1 This section defines basic Project reference information and determined Project milestones, including:

1) Project Owner:
2) Project Name:
3) Project Location and Address:
4) Contract Type / Delivery Method:
5) Brief Project Description: [Number of Facilities, General Size, etc.]
6) Additional Project Information: [Unique BIM Project Characteristics and Requirements]
7) Project Numbers: See Table 2-1.

TABLE 2-1 PROJECT NUMBERS

Project Information	**Number**
Contract Number	
Task Order	
Project Number	

3. Key Project Contacts

3.1.1 Table 3-1 lists lead BIM contacts for each organization on the Project. Additional contacts can be included later in the document.

TABLE 3-1 KEY PROJECT CONTACTS

Role	Organization	Contact Name	Location	Email	Phone
Project Manager(s)					
BIM Project Controller(s)					
Model Manager(s)					
Other Project Roles					

4. Project Goals / BIM Uses

4.1.1 Describe how the BIM Model and Facility Data are leveraged to maximize Project value (for example, operations, asset management, design alternatives, lifecycle analysis, scheduling, estimating, material selection, prefabrication opportunities, and site placement). Reference http://www.engr.psu.edu/bim/download for more information on BIM Goal and Use Analysis Worksheets.

4.1.2 Attach the BIM Goals Worksheet as part of Attachment 1.

4.2 Major BIM Goals / Objectives: Attachment 1

4.2.1 State the major BIM goals and objectives, using the template shown in Figure 4-1.

FIGURE 4-1 BIM GOALS WORKSHEET TEMPLATE

Priority (1-3)	Goal Description	Potential BIM Uses
1- Most Important	Value added objectives	

4.3 BIM Use Analysis Worksheet: Attachment 1

4.3.1 Reference http://www.engr.psu.edu/bim/download for more information on the BIM Goal & Use Analysis Worksheets (Figure 4-2).

4.3.2 Attach the BIM Use Analysis Worksheet as part of Attachment 1.

FIGURE 4-2 – BIM USE ANALYSIS WORKSHEET TEMPLATE

BIM Use*	Value to Project	Responsible Party	Value to Resp Party	Capability Rating			Additional Resources / Competencies Required to Implement	Notes	Proceed with Use
	High / Med / Low		High / Med / Low	Scale 1-3 (1 = Low)					YES / NO / MAYBE
				Resources	Competency	Experience			
Asset Management									
Building Systems Analysis									
Record Modelling									
Cost Estimation (For Non-AFP)									
4D Modelling									
Site Utilization Planning									
Layout Control & Planning									
3D Coordination (Construction)									
Engineering Analysis									
Site Analysis									
Design Reviews									
3D Coordination (Design)									
Existing Conditions Modelling									
Design Authoring									
Programming									

4.4 BIM Uses

4.4.1 Highlight and place an X next to the additional BIM uses (Table 4-1) to be developed by the use of the BIM model as selected by the Project Team using the BIM Goal and Use Analysis Worksheet. Refer to the BIM Project Execution Planning Guide for Use descriptions. Include additional BIM uses as applicable in empty cells.

TABLE 4-1 BIM USES

X	Design	X	Construction	X	Operations [a.]
	Design Authoring		Site Utilization Planning		Building Maintenance Scheduling
	Design Reviews		Construction System Design		Building System Analysis
	3D Coordination		3D Coordination		Asset Management
	Structural Analysis		Digital Fabrication		Space Management/Tracking
	Lighting Analysis		3D Control And Planning		Disaster Planning
	Energy Analysis		Record Modelling		Record Modelling
	Mechanical Analysis				
	Other Engineering Analysis				
	Sustainability (LEED) Evaluation				
	Code Validation				
	Phase Planning (4D Modelling)		Phase Planning (4D Modelling)		Phase Planning (4D Modelling)
	Existing Conditions Modelling		Existing Conditions Modelling		Existing Conditions Modelling

Notes:

[a.] CPG staff to fill in Operations column for each Non-AFP Project.

5. Organizational Roles / Staffing

5.1.1 Determine the Project's BIM Roles and Responsibilities, and BIM Use Staffing.

5.2 BIM Roles and Responsibilities

5.2.1 Describe BIM roles, such as BIM Project Controller, Model Manager, Discipline-specific Model Element Author, and Model User, and the associated responsibilities.

5.3 BIM Use Staffing

5.3.1 For each selected BIM Use, identify the team within the organization (or organizations) who will staff and perform that Use, and estimate the personal time required. Document this information in Table 5-1.

TABLE 5-1 BIM USE STAFFING

BIM Use	Organization	Number of Total Staff for BIM Use	Estimated Worker Hours	Location(s)	Lead Contact
3D coordination	Contractor A				
	B				
	C				

6. BIM Process Design

6.1.1 Provide process maps for each BIM Use documented in Section 5.2. These process maps provide a detailed plan for execution of each BIM Use. They also define the specific Information Exchanges for each activity, building the foundation for the entire execution plan.

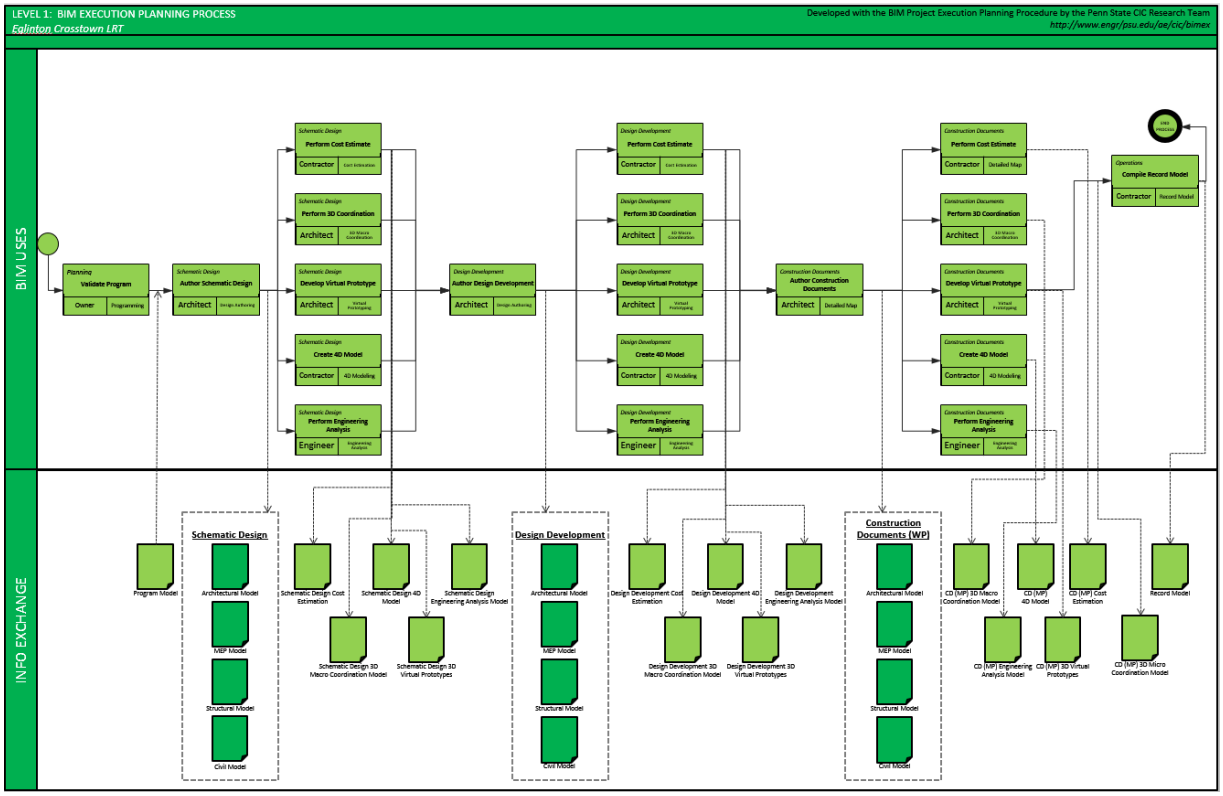
6.1.2 The plan includes the Overview Map (Level 1; Figure 6-1) of the BIM Uses, a Detailed Map of each BIM Use (Level 2; Figure 6-2), and a description of elements in each map, as appropriate.

6.1.3 Level 1 and 2 sample maps are available from CPG (these are sample maps and should be modified based on Project-specific information and requirements).

6.1.4 Please reference “Chapter Three: Designing BIM Project Execution Process” in the BIM Project Execution Planning Guide for further information for developing these to fit your Project.

1) Level One Process Overview Map: Attachment 2

FIGURE 6-1 LEVEL 1 PROCESS MAP EXAMPLE

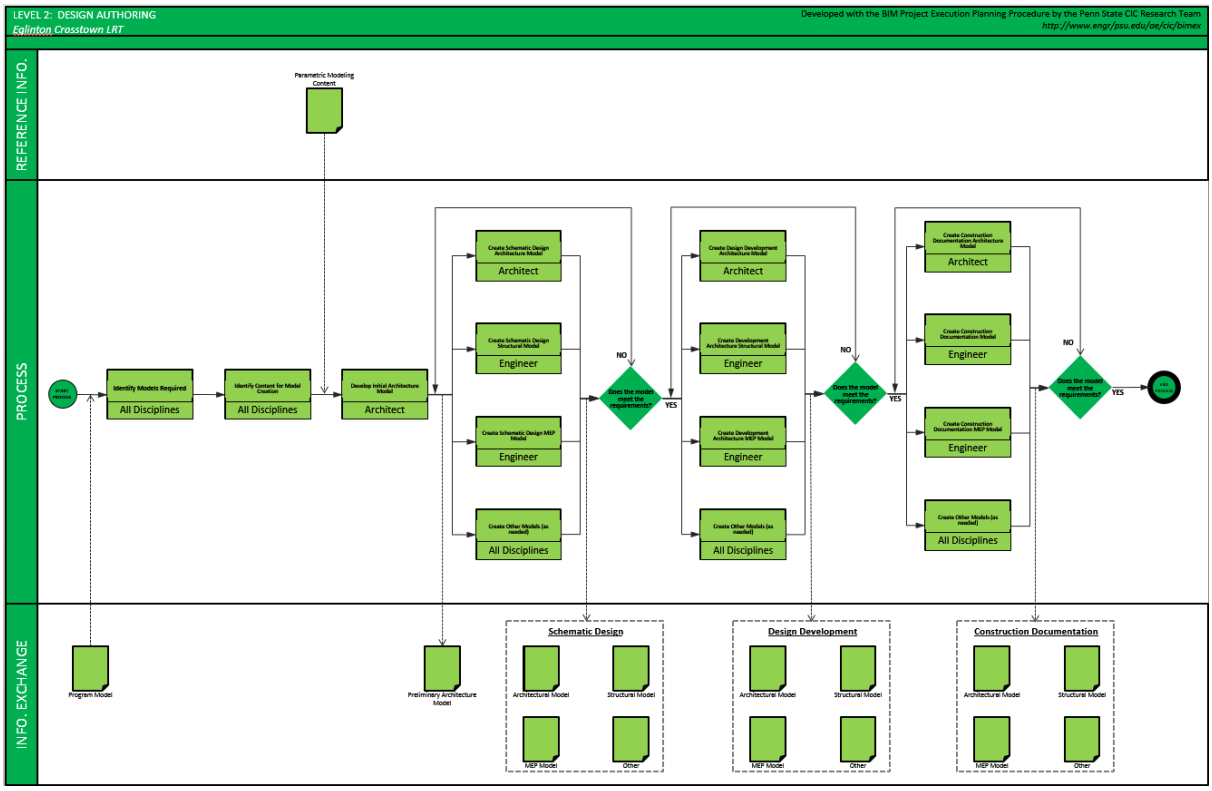


2) **List of Level Two – Detailed BIM Use Process Map(s) for Design/Build Only: Attachment 3**

a. Level two process maps only need to be submitted for design build contracts. The following are examples. Modify for your specific Project. Some Process Maps may need to be removed, while some process maps may need to be added.

i. Existing Conditions Modelling
ii. Cost Estimation
iii. Phase Planning (4D Modelling)
iv. Programming
v. Site Analysis
vi. Design Reviews
vii. Design Authoring
viii. Energy Analysis
ix. Structural Analysis
x. Lighting Analysis
xi. 3D Coordination
xii. Site Utilization Planning
xiii. 3D Control and Planning
xiv. Record Modelling
xv. Maintenance Scheduling
xvi. Building System Analysis

FIGURE 6-2 LEVEL 2 PROCESS MAP EXAMPLE



7. BIM Information Exchanges

7.1 Information Exchange Sheet

7.1.1 Using the Information Exchange sheet provided, list the Model elements by discipline, level of detail, and any specific attributes important to the Project.

7.1.2 Refer to “Chapter Four: Defining the Requirements for Information Exchanges” in the BIM Execution Planning Guide for details on completing this Attachment.

1) List of Information Exchange Worksheet(s): Attachment 4

a. The following are examples. Modify for your specific Project. Some Information Exchanges may need to be removed, while some may need to be added.

i. Existing Conditions Modelling
ii. Cost Estimation
iii. Phase Planning (4D Modelling)
iv. Programming
v. Site Analysis
vi. Design Reviews
vii. Design Authoring
viii. Energy Analysis
ix. Structural Analysis
x. Lighting Analysis
xi. 3D Coordination
xii. Site Utilization Planning
xiii. 3D Control and Planning
xiv. Record Modelling
xv. Maintenance Scheduling
xvi. Building System Analysis

FIGURE 7-1 – INFORMATION EXCHANGE TEMPLATE

BIM Use Title	Programming			Design Authoring			Existing Conditions Modeling			Cost Estimation			3D Coordination			Design Reviews			Phase Planning			Energy Analysis		
Project Stage	Planning			Design			Design			Design			Design			Design Reviews			Design			Design		
Time of Exchange (SD, DD, CD, Construction)																								
Responsible Party (Information Receiver)																								
Receiver File Format																								
Application & Version																								
Model Element Breakdown	Info	Resp Party	Notes	Info	Resp Party	Notes	Info	Resp Party	Notes	Info	Resp Party	Notes	Info	Resp Party	Notes	Info	Resp Party	Notes	Info	Resp Party	Notes	Info	Resp Party	Notes
01 SUBSTRUCTURE																								
10 Foundations																								
10 Standard Foundations																								
20 Special Foundations																								
20 Subgrade Enclosures																								
10 Walls for Subgrade Enclosures																								
40 Slabs-On-Grade																								
10 Standard Slabs-On-Grade																								
20 Structural Slabs-On-Grade																								
30 Slab Trenches																								
40 Pits and Bases																								
50 Slab-On-Grade Supplementary Components																								
60 Water and Gas Mitigation																								
10 Building Subdrainage																								
20 Off-Gassing Mitigation																								
30 Substructure Related Activities																								
10 Substructure Excavation																								
20 Construction Dewatering																								
30 Excavation Support																								
40 Soil Treatment																								
02 SHELL																								
10 Superstructure																								
10 Floor Construction																								
20 Roof Construction																								
30 Stairs																								
20 Exterior Vertical Enclosers																								
10 Exterior Walls																								
20 Exterior Windows																								
50 Exterior Doors and Grilles																								
70 Exterior Louvers and Vents																								
80 Exterior Wall Appurtenances																								
90 Exterior Wall Specialties																								
30 Exterior Horizontal Encloses																								
10 Roofing																								
20 Roof Appurtenances																								
40 Traffic Bearing Horizontal Enclosures																								
60 Horizontal Openings																								
80 Overhead Exterior Enclosures																								
03 INTERIORS																								
10 Interior Construction																								

2) Model Definition Worksheet: Attachment 5

FIGURE 7-2 MODEL DEFINITION WORKSHEET TEMPLATE

Project Stage Deliverable	10 Conception Stage			15 Project Delivery Selection Stage			20 Design Stage			25 Construction Document Stage			30 Procument Stage			40 Execution Stage			50 Utilization Stage		
Author File Format (if varies, specify in notes)																					
Application & Version																					
Model Element Breakdown	Info	Resp Party	Notes	Info	Resp Party	Notes	Info	Resp Party	Notes	Info	Resp Party	Notes	Info	Resp Party	Notes	Info	Resp Party	Notes	Info	Resp Party	Notes
01 SUBSTRUCTURE																					
10 Foundations																					
10 Standard Foundations																					
20 Special Foundations																					
20 Subgrade Enclosures																					
10 Walls for Subgrade Enclosures																					
40 Slabs-On-Grade																					
10 Standard Slabs-On-Grade																					
20 Structural Slabs-On-Grade																					
30 Slab Trenches																					
40 Pits and Bases																					
50 Slab-On-Grade Supplementary Components																					
60 Water and Gas Mitigation																					
10 Building Subdrainage																					
20 Off-Gassing Mitigation																					
30 Substructure Related Activities																					
10 Substructure Excavation																					
20 Construction Dewatering																					
30 Excavation Support																					
40 Soil Treatment																					
02 SHELL																					
10 Superstructure																					
10 Floor Construction																					
20 Roof Construction																					
30 Stairs																					
20 Exterior Vertical Enclosers																					
10 Exterior Walls																					
20 Exterior Windows																					
50 Exterior Doors and Grilles																					
70 Exterior Louvers and Vents																					
80 Exterior Wall Appurtenances																					
90 Exterior Wall Specialties																					
30 Exterior Horizontal Encloses																					
10 Roofing																					
20 Roof Appurtenances																					
40 Traffic Bearing Horizontal Enclosures																					
60 Horizontal Openings																					
80 Overhead Exterior Enclosures																					
03 INTERIORS																					
10 Interior Construction																					
10 Interior Partitions																					
20 Interior Windows																					
30 Interior Doors																					
40 Interior Grilles and Gates																					
60 Raised Floor Construction																					
70 Suspended Ceiling Construction																					
90 Interior Specialties																					

8. Collaboration Procedures

8.1 Collaboration Strategy

8.1.1 Describe how the Project Team will collaborate, including items such as communication methods, document management and transfer, and record storage.

8.2 Meeting Procedures

8.2.1 Table 8-1 lists examples of meetings that should be considered.

TABLE 8-1 POTENTIAL MEETING TYPES

Meeting Type	Project Stage	Frequency	Participants	Location
CPG Design Conference				
BIM Project Kickoff Meeting				
Requirements Kickoff Meeting with CPG				
BIM Quick Start for Architecture / Structural / Track				
Engineering (Mechanical and Plumbing)				
Engineering (Electrical, Communications, and Signals)				
BIM Quick Start for Interference Detection, Design Review, Quantification, and Constructability				
Design Reviews				
Interference Detection Reviews				

8.3 Model Delivery Schedule of Information Exchange for Submission and Approval

8.3.1 Document the information exchanges and file transfers that will occur on the project. Table 7-1 contains the type of information that should be documented.

TABLE 8-2 INFORMATION EXCHANGE AND FILE TRANSFER SAMPLE DATA

Information Exchange	File Sender	File Receiver	Frequency	Due or Start Date	Model File	Model Software	Native File Type	File Exchange Type
Design Authoring – 3D Coordination	Structural Engineer	(FTP Post) (Coordination Lead)	Weekly	[Date]	Struct	Design Application	.XYZ	.XYZ .ABC
	Mechanical	(FTP Post)	Weekly	[Date]	Mech	Design	.XYZ	.XYZ

TABLE 8-2 INFORMATION EXCHANGE AND FILE TRANSFER SAMPLE DATA

Information Exchange	File Sender	File Receiver	Frequency	Due or Start Date	Model File	Model Software	Native File Type	File Exchange Type
	Engineer	(Coordination Lead)				Application		.ABC

8.4 Interactive Workspace

8.4.1 The Project Team should consider the physical environment it will need throughout the Project lifecycle to accommodate the necessary collaboration, communication, and reviews that will improve the BIM Plan decision making process. Describe how the Project Team will be located, considering questions like “will the team be collocated?” If so, where is the location and what will be in that space? Will there be a BIM Trailer? If yes, where will it be located and what will be in the space, such as computers, projectors, tables, table configuration? Include any additional or necessary information about workspaces on the project.

8.5 Electronic Communication Procedures

8.5.1 Provide a procedure for each interface with CPG Document Control systems related to the BIM system.

9. Quality Control

9.1 Overall Strategy for Quality Control

9.1.1 Describe the strategy to control the quality of the model.

9.2 Quality Control Checks

9.2.1 Table 9-1 lists the checks that should take place, however should not be considered an exhaustive list to assure quality.

TABLE 9-1 QUALITY CONTROL CHECKS

Checks	Definition	Responsible Party	Software Program(s)	Frequency
Visual Check	Ensure there are no unintended model components and the design intent has been followed			
Interference Check	Detect problems in the model where two building components are clashing, including soft and hard			
Standards Check	Ensure that the BIM and CADD standards have been followed (including fonts, dimensions, line styles, levels, and layers)			
Model Integrity Checks	Describe the QC validation process used to verify that the Project Facility Data set has no undefined, incorrectly defined, or duplicated elements; and describe the reporting process for noncompliant elements and corrective action plans			

9.3 Model Accuracy and Tolerances

9.3.1 Models should include all appropriate dimensioning as needed for design intent, analysis, and construction (see Table 9-2). The level of detail and included model elements are provided in the Information Exchange Worksheet.

TABLE 9-2 MODEL ACCURACY

Phase	Discipline	Tolerance
Design Documents	Arch	Accurate to +/- [#] of actual size and location
Shop Drawings	Mech Contractor	Accurate to +/- [#] of actual size and location

10. Technological Infrastructure Needs

10.1 Software

10.1.1 List software used to deliver BIM in Table 10-1.

TABLE 10-1 BIM SOFTWARE LIST

BIM Use	Discipline (if applicable)	Software	Version
Design Authoring	Arch	XYZ Design Application	VER. X.X (Year)

10.2 Computers / Hardware

10.2.1 Understand hardware specification becomes valuable once information begins to be shared between several disciplines or organizations. It also becomes valuable to ensure that the downstream hardware is not less powerful than the hardware used to create the information. In order to ensure that this does not happen, choose the hardware that is in the highest demand and most appropriate for the majority of BIM Uses, and document the hardware used in Table 10-2.

TABLE 10-2 BIM HARDWARE LIST

BIM Use	Hardware	Owner of Hardware	Specifications
Design Authoring	XXX computer system	Architect x	Processor, operating system, memory storage, graphics, network card, etc.

10.3 Modelling Content and Reference Information

10.3.1 Identify items such as families, workspaces, and databases in Table 10-3.

TABLE 10-3 REFERENCE INFORMATION LIST

BIM Use	Discipline (if applicable)	Modelling Content / Reference Information	Version
Design Authoring	Architect	XYZ App Families	VER. X.X. (Year)
Estimating	Contractor	Proprietary Database	VER. X.X (Year)

11. Model Structure

11.1 File Naming Structure

11.1.1 All BIM file naming shall follow the structure outlined in the CPG CADD/BIM Standards Manual.

11.2 Model Structure

11.2.1 All models shall be structured as outlined in the CPG CADD/BIM Standards Manual.

11.3 Measurement and Coordinate Systems

11.3.1 All Models and Design shall be performed in Metric units. In addition, all Coordinate Systems as well as Georeferencing shall be as outlined in the *CPG CADD/BIM Standards Manual*.

11.4 BIM and CADD Standards

11.4.1 Identify items such as the BIM and CADD standards, content reference information, and the version of IFC, in Table 11-1.

TABLE 11-1 STANDARDS

Standard	Version	BIM Uses Applicable	Organizations Applicable
CPG CADD/BIM Standards Manual	0	Design Authoring	Architect

12. Project Deliverables

12.1.1 In this section, list the BIM deliverables agreed within the contractual obligations for the Project and the format in which the information will be delivered (Table 12-1).

TABLE 12-1 PROJECT DELIVERABLES INFORMATION

BIM Submittal Item	Stage	Approximate Due Date	Format	Notes
Design Development	10%	See Schedule	.pdf, .dgn/.dwg	
	30%			
	60%			
	Pre-100%			
	100%- Construction Documents			
Record Model	Closeout		(.xyz)	See Record Model Information Exchange to confirm that the proper information is contained in this model

13. Attachments

13.1.1 All Attachment Templates can be found as part of the CADD Information Package, as outlined in the *CPG CADD/BIM Standards Manual*.

1) BIM Goals and Use Analysis Worksheets (from Section 4)
2) Level 1 Process Overview Map (from Section 6)
3) Level 2 Detailed BIM Use Process Map(s) (from Section 6)
4) Information Exchange Requirement Worksheet(s) (from Section 7)
5) Model Definition Worksheet (from Section 7)