USACE BIM PROJECT EXECUTION PLAN (USACE PxP)

VERSION 1.0

FOR

[PROJECT TITLE]

DEVELOPED BY

[AUTHOR COMPANY]

This template is a tool that is provided to assist in the development of a BIM project execution plan as required per contract. It was adapted from the buildingSMART alliance™ (bSa) Project "BIM Project Execution Planning" as developed by The Computer Integrated Construction (CIC) Research Group of The Pennsylvania State University. The bSa project is sponsored by The Charles Pankow Foundation (www.pankowfoundation.org), Construction Industry Institute (CII) (www.construction-institute.org), Penn State Office of Physical Plant (OPP) (www.opp.psu.edu), and The Partnership for Achieving Construction Excellence (PACE) (www.engr.psu.edu/pace). The BIM Project Execution Planning Guide can be downloaded at www.engr.psu.edu/BIM/PxP.

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TABLE OF CONTENTS

SECTION A: BIM PROJECT EXECUTION PLANNING GUIDE OVERVIEW

To successfully implement Building Information Modeling (BIM) on a project, [AUTHOR COMPANY] has developed this detailed BIM Project Execution Plan. The BIM Project Execution Plan defines uses for BIM on the project (e.g. design authoring, design reviews, 3D coordination, and record modeling), along with a detailed process for executing BIM on this project.

[INSERT ADDITIONAL INFORMATION: FOR EXAMPLE, A BIM MISSION STATEMENT. This is the location to provide additional BIM overview information up to one paragraph. Additional detailed information can be included as an attachment to this document.]

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. This can be completed, in most cases, by selecting the normal style in the template styles.

SECTION B: PROJECT INFORMATION

This section defines basic project reference information and BIM related project milestones.

1. **FACILITY OWNER:** [E.G. US ARMY, US AIR FORCE, ETC.]
2. **PROJECT NAME:** [E.G. BARRACKS]
3. **PROJECT LOCATION:** [E.G. Fort Lewis, WA]
4. **CONTRACT TYPE:** [E.G. DESIGN-BUILD]
5. **FACILITY TYPE:** [LIST ALL FACILITIES IN THE CONTRACT AND WHICH, IF ANY, ARE USACE CENTER OF STANDARDIZATION (COS) FACILITIES]
6. **BRIEF PROJECT DESCRIPTION:** [NUMBER OF FACILITIES, GENERAL SIZE, ETC]
7. **ADDITIONAL PROJECT INFORMATION:** [UNIQUE BIM PROJECT CHARACTERISTICS AND REQUIREMENTS]
8. **PROJECT NUMBERS:**

PROJECT INFORMATION	NUMBER
USACE CONTRACT NUMBER:	[E.G. W9126G-08-D-0000]
TASK ORDER:	[E.G. 0001]
USACE PROJECT NUMBER:	[E.G. PN055198]
PROJECT NUMBER(S):	[IF APPLICABLE]

SECTION C: KEY PROJECT CONTACTS

The following is a list of the lead BIM contacts for each organization on the project. Additional contacts can be included later in the document.

ROLE	ORGANIZATION	NAME	EMAIL	TIME ZONE	PHONE
Project Manager	USACE	[John Doe]			
District BIM Manager	USACE				
COS BIM Manager	USACE				
Project Manager(s)	[Company]				
BIM Manager(s)	[Company]				
Architecture Lead	[Company]				
Civil Lead	[Company]				
Electrical/Telecom Lead					
Fire Protection Lead					
Mechanical Lead					
Plumbing Lead					
Structural Lead					
Other Project Roles					

SECTION D: PROJECT GOALS / BIM OBJECTIVES

Describe how the BIM Model and Facility Data are leveraged to maximize project value (e.g. design alternatives, life-cycle analysis, scheduling, estimating, material selection, pre-fabrication opportunities, site placement, etc.) Reference www.engr.psu.edu/bim/download for BIM Goal & Use Analysis Worksheet.

1. MAJOR BIM GOALS / OBJECTIVES:

State BIM Goals / Objectives

BIM GOAL	DESCRIPTION

2. BIM USES:

The BIM Uses currently highlighted/shaded/checked(x) are required by USACE RFP Section 01 33 16, Design after Award, Attachment F. Highlight in yellow and place an X next to the additional BIM Uses as selected by the project team. See BIM Project Execution Planning Guide at www.engr.psu.edu/BIM/BIM_Uses for Use descriptions. Include additional BIM Uses as applicable in empty cells.

OPERATE	X	CONSTRUCT	X	DESIGN	X	PLAN	X
BUILDING MAINTENANCE SCHEDULING		SITE UTILIZATION PLANNING		DESIGN AUTHORING	X	PROGRAMMING	
BUILDING SYSTEM ANALYSIS		CONSTRUCTION SYSTEM DESIGN		DESIGN REVIEWS	X	SITE ANALYSIS	
ASSET MANAGEMENT		3D COORDINATION	X	3D COORDINATION	X		
SPACE MANAGEMENT / TRACKING		DIGITAL FABRICATION		STRUCTURAL ANALYSIS			
DISASTER PLANNING		3D CONTROL AND PLANNING		LIGHTING ANALYSIS			
RECORD MODELING		RECORD MODELING	X	ENERGY ANALYSIS			
				MECHANICAL ANALYSIS			
				OTHER ENG. ANALYSIS			
				LEED EVALUATION			
				CODE VALIDATION			
4D MODELING		4D MODELING		4D MODELING		4D MODELING	
COST ESTIMATION		COST ESTIMATION		COST ESTIMATION		COST ESTIMATION	
EXISTING CONDITIONS MODELING		EXISTING CONDITIONS MODELING		EXISTING CONDITIONS MODELING		EXISTING CONDITIONS MODELING	

SECTION E: ORGANIZATIONAL ROLES / STAFFING

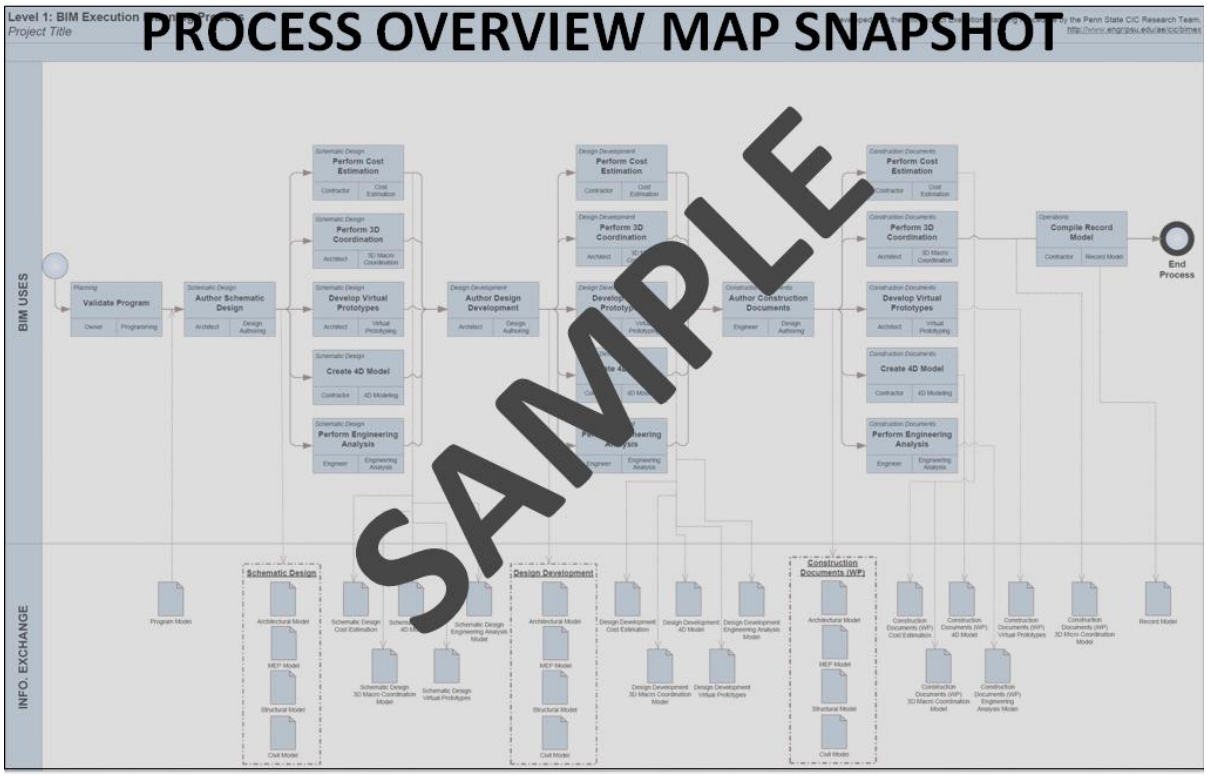
For each BIM Use selected, identify the team within the organization (or organizations) who will staff and perform that Use. Submittal of this section to USACE IS NOT REQUIRED.

BIM USE	ORGANIZATION	NUMBER OF TOTAL STAFF FOR BIM USE	LOCATION(S)	LEAD CONTACT
3D coordination	Contractor A			
	B			
	C			

SECTION F: BIM PROCESS DESIGN

Provide process maps for each BIM Use selected in section D: Project Goals/BIM Objectives. 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. The plan includes the Overview Map (Level 1) of the BIM Uses, a Detailed Map of each BIM Use (Level 2), and a description of elements on each map, as appropriate. Level 1 and 2 sample maps are available for download at www.engr.psu.edu/BIM/download. (Please note that these are sample maps and should be modified based on project specific information and requirements). Please reference Chapter Three: Designing BIM Project Execution Process in the BIM Project Execution Planning Guide found at www.engr.psu.edu/BIM/PxP

1. LEVEL ONE PROCESS OVERVIEW MAP: ATTACHMENT 1



2. LIST OF LEVEL TWO DETAILED BIM USE PROCESS MAP(S): ATTACHMENT 2

a. Existing Conditions Modeling
b. Cost Estimation
c. 4D Modeling
d. Programming
e. Site Analysis
f. Design Reviews
g. Design Authoring
h. Energy Analysis
i. Structural Analysis
j. Lighting Analysis
k. 3D Coordination
l. Site Utilization Planning
m. 3D Control and Planning
n. Record Modeling
o. Maintenance Scheduling
p. Building System Analysis
[Delete unused or add additional process maps from list]

SECTION G: BIM INFORMATION EXCHANGE WORKSHEET

Model elements by discipline, level of detail, and any specific attributes important to the project are documented using information exchange worksheet. See Chapter Four: Defining the Requirements for Information Exchanges in the BIM Project Execution Planning Guide for details on completing this template. Submittal of these worksheets to USACE IS NOT REQUIRED.

1. LIST OF INFORMATION EXCHANGE WORKSHEET(S): ATTACHMENT 3

(The following are examples. Modify for specific project. Some Information Exchanges may need to be removed, while some information exchanges may need to be added.)

a. Existing Conditions Modeling
b. Cost Estimation
c. Phase Planning
d. Programming
e. Site Analysis
f. Design Reviews
g. Design Authoring
h. Energy Analysis
i. Structural Analysis
j. Lighting Analysis
k. 3D Coordination
l. Site Utilization Planning
m. 3D Control and Planning
n. Record Modeling
o. Maintenance Scheduling
p. Building System Analysis
[Delete unused and add additional information exchange worksheets from list]

SECTION H: BIM AND FACILITY DATA REQUIREMENTS

1. MODEL OUTPUT MATRIX

In this template, the non-shaded sub-category rows may be added or modified per project requirements. Select the column that best describes the type of information that will be delivered.. SEE USACE RFP SECTION 01 33 16 DESIGN AFTER AWARD, ATTACHMENT F, SECTION 4.0 FOR REQUIREMENTS. Please note: No graphical representation without Facility Data is to be contained in the Model. Below are descriptions of the columns:

- 3D w/ facility data – 3D graphical representation with associated intelligent attribute data.
- 2D w/ facility data – 2D graphical representation with associated intelligent attribute data.
- 2D w/o facility data – 2D graphical representation without associated intelligent attribute data.
- Description/Remarks – Additional information used to explain facility data.

	MODEL ELEMENT BREAKDOWN	3D W/ FACILITY DATA	2D W/ FACILITY DATA	2D W/O FACILITY DATA	DESCRIPTION/REMARKS
4.2	**Architectural/Interior Design**				
4.2.1	**Spaces**				
	Net Square Footage and Volumes				
	Room Name and Number				
	Programmatic Information				
4.2.2	**Walls and Curtain Walls**				
	Wall Dimensions/Thickness				
	Wall Type (A1, A2, B, etc)				
	Wall Composition (CMU, Concrete)				
	Wall Rating (1 hr., 30 min.)				
	Details				
	Sections				
4.2.3	**Doors, Window and Louvers**				
	Windows, Doors and Louvers				
	Type				
	Hardware Type, Frame Mat'l, Glass Type, Door Leaf				
	Signage				
	Door Legend				
	Head, Sill, Jam Details				
4.2.4	**Roof**				
	Roof Dimensional Information				
	Type (EPDM, Standing Seam, etc)				
	Composition (Membrane, insulations, deck, joist, etc)				
4.2.5	**Floors**				
	Floor Dimensional Information				
	Rating				
	Finishes (Carpet, VCT, etc)				
	Floor Composition (Concrete, Deck, Joist, etc)				
4.2.6	**Ceilings**				
	Ceiling Plane/Dimensions				
	Layout (grids, patterns, etc)				
	Composition (ACT, GWB, Exposed)				
4.2.7	**Vertical Circulations**				
	Finished Dimensions of Openings				
	Shaft Clear Dimensions				
	Shaft Construction Materials				
4.2.8	**Architectural Specialties and Woodwork**				
	Toilet Acc. (tp holder, garbage, paper towel disp.)				
	Toilet Partition				
	Dimensions				
	Materials				
	Grab Bars				
	Dimensions				
	Cabinets and Casework				

MODEL ELEMENT BREAKDOWN		3D W/ FACILITY DATA	2D W/ FACILITY DATA	2D W/O FACILITY DATA	DESCRIPTION/REMARKS
	Dimensions				
	Materials				
	Trim (e.g. chair rail)				
	Countertops				
	Dimensions				
	Materials (Plam, Solid Surface, etc.)				
4.2.9	**Signage**				
	Type				
	Mounting Height				
	Legend				
4.2.10	**Schedules**				
	Type, materials, and Finishes generated from Model				
4.3	**Furniture**				
4.3.1	**Furniture Coordination**				
	Furniture Dimensions				
	Type				
	Electrical Needs				
	Communication Needs				
4.4	**Equipment**				
	Dimension				
4.4.1	**Schedules**				
	Type, materials, and Finishes generated from Model				
4.5	**Structural**				
4.5.1	**Foundations**				
	Dimensional Info (L,W,D, Elevation)				
	Ftg Type (e.g. F1, F2, etc)				
	Legend				
	Footing Schedule				
4.5.2	**Floor Slabs**				
	Slab Dimensional Info				
	Composition				
	Sections and Details				
4.5.3	**Structural Steel**				
	Columns				
	Dimensional Information				
	Primary/Secondary/Roof Framing Members				
	Dimensional Information				
	Sections and Details				
	Floor Systems (Decks)				
	Dimensional Information (L,W,D, Elevation)				
	Sections and Details				
4.5.4	**Cast-in-Place Concrete**				
	Footing				
4.5.5	**Expansion/Contraction Joints**				
4.5.6	**Stairs**				
	Dimensional Information				
4.5.7	**Shafts and Pits**				
	Finished Dimensions				
4.6	**Mechanical**				
4.6.1	**HVAC**				
	Equipment (AHU's, fans, VAV's, Boilers, Pumps)				
	Ductwork				

	MODEL ELEMENT BREAKDOWN	3D W/ FACILITY DATA	2D W/ FACILITY DATA	2D W/O FACILITY DATA	DESCRIPTION/REMARKS
	Registers, diffusers, grilles, etc.				
4.6.1.1	**Mechanical Piping**				
	Equipment (System specific pumps, tanks, etc.)				
	Piping >= 1.5"				
	Piping < 1.5"				
4.6.2	**Plumbing**				
	Piping >= 1.5"				
	Piping < 1.5"				
	Fixtures				
	Toilets, Urinals				
	Showers, Jan Sink, Drinking Fountains, DCVs				
	Sinks				
	Drains				
	Boiler Storage Tanks, Pumps				
4.6.3	**Equipment Clearances**				
	Dimensions				
4.6.4	**Elevator Equipment**				
	Car				
	Beam/Structure				
	Fly Wheel				
4.7	**Electrical/Telecommunications**				
4.7.1	**Interior Electrical Power and Lighting**				
	Lights				
	Receptacles				
	Panel Boards				
	Cable Tray				
	Conduit >1.5"				
	Conduit <=1.5"				
4.7.2	**Special Electrical Systems**				
	Security				
	Mass Notification				
	Public Address				
	Controls				
4.7.3	**Grounding Systems**				
	Devices				
	Wire				
	Rebar				
4.7.4	**Communications**				
	Cable Tray				
	Conduit >1.5"				
	Conduit <=1.5"				
	Controls, Connections Racks				
4.7.5	**Exterior Building Lighting**				
	Fixtures				
4.7.6	**Equipment Clearances**				
	Dimensions				
4.8	**Fire Protection**				
4.8.1	**Fire Protection System**				
	Piping				
	Fittings				
	Pumps				
	Tanks				
	Sensors				
	Panels				
4.8.2	**Fire Alarms**				
	Devices				

	MODEL ELEMENT BREAKDOWN	3D W/ FACILITY DATA	2D W/ FACILITY DATA	2D W/O FACILITY DATA	DESCRIPTION/REMARKS
4.9	**Civil**				
4.9.1	Terrain (DTM)				
	Site Conditions				
	Grading				
4.9.2	**Drainage**				
	Drain System				
4.9.3	**Storm Water and Sanitary Sewers**				
	Systems				
4.9.4	**Utilities**				
	Systems				
	Gas lines				
4.9.5	**Roads and Parking**				
	Dimensions				
	Composition				

2. VARIANCES

List variances from minimum modeling requirements as specified in contract. Note: Variances must exceed minimum contract requirements of USACE RFP 01 33 16, Design after Award, Attachment F. (i.e. using newer release of AEC CAD Standard or IFC Version.)

VARIANCE	JUSTIFICATION

SECTION I: COLLABORATION PROCEDURES

1. COLLABORATION STRATEGY:

Describe how the project team will collaborate. Include items such as communication methods, document management and transfer, and record storage, etc.

2. MEETING PROCEDURES:

The following are examples of meetings that should be considered.

MEETING TYPE	REQUIRED PER CONTRACT	PROJECT STAGE	FREQUENCY	PARTICIPANTS	LOCATION
BIM REQUIREMENTS KICK-OFF					
BIM EXECUTION PLAN DEMONSTRATION	YES			w/ USACE	
DESIGN COORDINATION					
CONSTRUCTION OVER-THE-SHOULDER PROGRESS REVIEWS	YES				
ANY OTHER BIM MEETINGS THAT OCCURS WITH MULTIPLE PARTIES					

SECTION J: QUALITY CONTROL

1. OVERALL STRATEGY FOR QUALITY CONTROL

Describe the strategy to control the quality of the model.

2. QUALITY CONTROL CHECKS

The following checks should be performed to assure quality.

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 AEC CADD Standard have been followed (fonts, dimensions, line styles, levels/layers, etc)			
MODEL INTEGRITY CHECKS	Describe the QC validation process used to ensure that the Project Facility Data set has no undefined, incorrectly defined or duplicated elements and the reporting process on non-compliant elements and corrective action plans			

SECTION K: TECHNOLOGICAL INFRASTRUCTURE NEEDS

1. SOFTWARE:

List software used to deliver BIM. Remove software that is not applicable.

BIM USE	USER	SOFTWARE	VERSION
DESIGN AUTHORING	ARCH	XYZ DESIGN APPLICATION	
DESIGN AUTHORING	STRUCTURAL	XYZ DESIGN APPLICATION	
DESIGN AUTHORING	MECHANICAL	XYZ DESIGN APPLICATION	
DESIGN AUTHORING	ELECTRICAL/TELECOM	XYZ DESIGN APPLICATION	
DESIGN AUTHORING	PLUMBING	XYZ DESIGN APPLICATION	
DESIGN AUTHORING	FIRE PROTECTION	XYZ DESIGN APPLICATION	
DESIGN AUTHORING	CIVIL	XYZ DESIGN APPLICATION	
4D MODELING		4D MODELING SOFTWARE	
COST ESTIMATION		COST ESTIMATION SOFTWARE	
EXISTING CONDITIONS MODELING		EXISTING CONDITIONS MODELING SOFTWARE	
SITE UTILIZATION PLANNING		SITE UTILIZATION PLANNING SOFTWARE	
CONSTRUCTION SYSTEM DESIGN		CONSTRUCTION SYSTEM DESIGN SOFTWARE	
DIGITAL FABRICATION		DIGITAL FABRICATION SOFTWARE	
3D CONTROL AND PLANNING		3D CONTROL AND PLANNING SOFTWARE	
3D COORDINATION		3D COORDINATION SOFTWARE	
DESIGN REVIEWS		DESIGN REVIEWS SOFTWARE	
STRUCTURAL ANALYSIS		STRUCTURAL ANALYSIS SOFTWARE	
LIGHTING ANALYSIS		LIGHTING ANALYSIS SOFTWARE	
ENERGY ANALYSIS		ENERGY ANALYSIS SOFTWARE	
LEED EVALUATION		LEED EVALUATION SOFTWARE	
CODE VALIDATION		CODE VALIDATION	
PROGRAMMING		PROGRAMMING	
SITE ANALYSIS		SITE ANALYSIS	

2. BIM AND CAD STANDARDS:

Identify items such as the BIM and CAD standards, USACE Bentley BIM Workspace version (if COS Facility), and the version of IFC, etc.

STANDARD	VERSION
USACE Bentley BIM Workspace:	
CAD Standard:	
IFC:	VERSION/MVD(s)

SECTION L: MODEL ORGANIZATION

1. **FILE NAMING STANDARD:**
   List examples of file names by discipline based on USACE BIM FILE NAMING STANDARD.
2. **MODEL STRUCTURE:**
   Describe and diagram how the Model is divided up. For example, by building, by floors, by zone, by areas, and/or discipline.
3. **MEASUREMENT AND COORDINATE SYSTEMS:**
   Describe the measurement system (Imperial or Metric) and coordinate system (geo-referenced) used.

SECTION M: PROJECT DELIVERABLES

In this section, list the BIM deliverables for the project and the format in which the information will be delivered. SEE SECTION FOUR OF USACE RFP 01 33 16 DESIGN AFTER AWARD, ATTACHMENT F FOR REQUIREMENTS

BIM SUBMITTAL ITEM	STAGE	FORMAT	NOTES
QA/QC reports – Model Standards Check Report (2.3.1)			
QA/QC reports – CAD Standards Check Report (2.3.2)			
QA/QC reports - Other Model QA/QC Reports (2.3.3)			
QA/QC reports - Visual Check Report (2.4.1)			
QA/QC reports - Interference Report (2.4.2)			
IFC file (2.4.3)			
QA/QC reports - Other Design QA/QC Reports (2.4.4)			
Visualization Model (Navigator, Navisworks, 3dPDF, Google Earth, etc) (3.1.3)			
List of all submitted files (Excel spreadsheet preferred) (3.1.3)			
Interim Design Submittal(s) (3.3.1)			
Final Design Submittal (3.4.1)			
Construction Submittals - Over-The-Shoulder Reviews (3.5)			
As-Built Submittal (3.6)			
[Other BIM Deliverables]			

SECTION N: ATTACHMENTS

1. **LEVEL 1 PROCESS OVERVIEW MAP** [FROM SECTION F]
2. **LEVEL 2 DETAILED BIM USE PROCESS MAP(S)** [FROM SECTION F]
3. **INFORMATION EXCHANGE REQUIREMENT WORKSHEET(S)** [FROM SECTION G]
4. **FILE NAMING STANDARD** [FROM SECTION L]