



2024 P100 Training



This session is being recorded.

P100 A+E Training Series Ground Rules

- Attendance will be taken automatically; there is no sign-in sheet
- GSA Participants who attend 75% of the session will be provided CLPs
- If you join by phone, please email your name and the phone number you joined with so we can record your attendance.
Address email to: mark.kutchi@gsa.gov & benjamin.pisarcik@gsa.gov
- Mute microphone when not speaking
- Use Q & A to ask questions; “raise hand” for urgent questions

P100 A+E Training Series Ground Rules

- Approach each topic in a positive and constructive manner
- Slides and recordings will be made available publicly after the session on: www.gsa.gov/p100
- Slides will be added in a few days but recordings will take a few weeks.
- We are starting the meeting recording, please leave the meeting if you do not consent to being recorded.

Training

General Requirements/LCCA/ BIM



This session is being recorded.

Presenters

**Lance
Davis**

Sustainability
Architect



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Mechanical
Engineer



**Ed
Newman**

Architect, BIM
Program



01

**General
Requirements**

Getting to know
P100

02

LCCA

Appendix A.6 Life
Cycle Cost Analysis
Requirements

03

BIM

The
Building
Information
Model



01

General Requirements

Getting to know P100

Official roll out dates:

**Studies, BER,
O&M, repair and
alteration, task
orders**

July 1, 2024

**Prospectus and
all other projects**

Aug 1, 2024

- * BIL and IRA majority funded - review for applicability, but not required
- * Existing projects can utilize the new standards



P100 is mandatory!

It applies to our owned inventory regardless of funding source:

BA51	New Construction
BA54	Minor Repairs and Alterations
BA55	Major Repairs and Alterations
BA61	Operating Funds (including O&M contracts)
BA63	Energy Rebates
BA64	Historic Preservation
BA80	Reimbursable Work Authorization
External financed	ESPC

* P100 also applies to certain BA53 lease construction facilities.

* P100 is not retroactive



Repairs and Alterations

Repair - bring to working order, to fix, or improve a damaged item

Alteration - adds, removes, or replaces items

P100 is required including “in kind”!

Abandonment

Not allowed in scoped area of work.

Code may require further removal



Facility Definitions



Essential

IBC defines to remain operational after an event



Critical Action

DHS defines a slight chance of flooding is too great.
Updated floodplain management information.

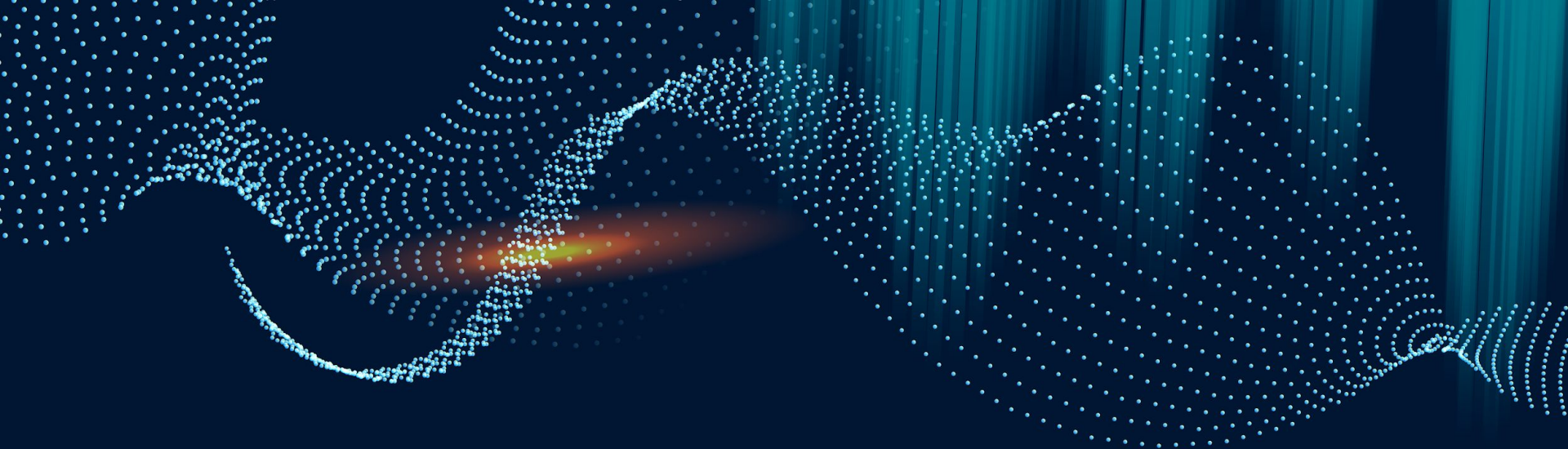


Mission Critical

Tenant defines if any operation is affected by electrical supply.
Updated Data Center information.

Child and Forced Labor





ASHRAE 90.1

Use latest approved by DOE
regardless of start date listed

Document Security Requirements

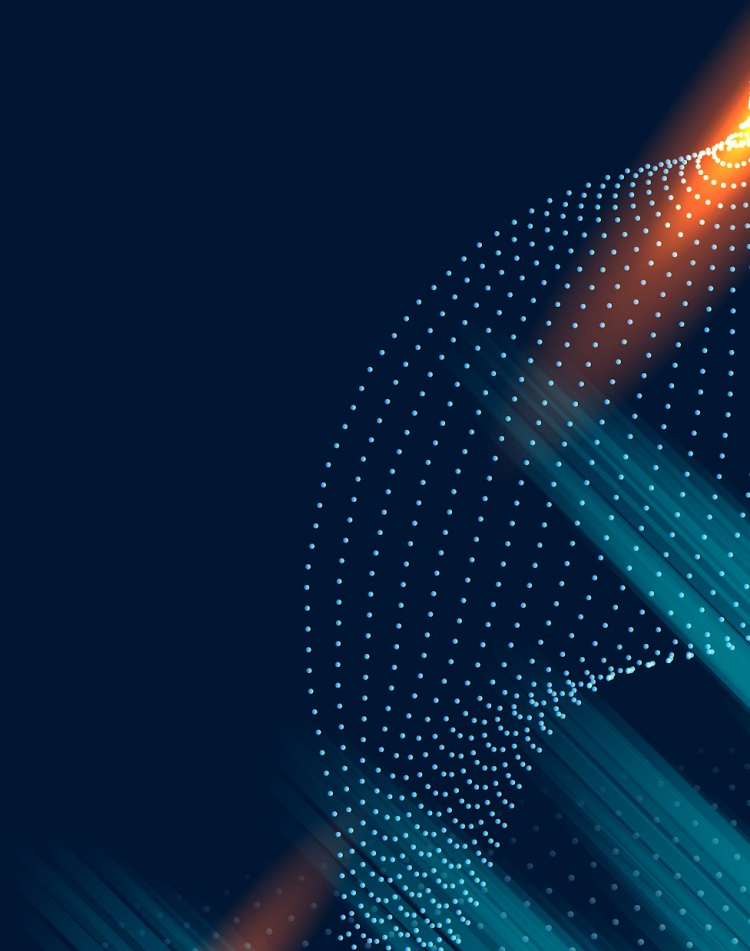
Updated CUI to latest standards including:

GSA Order PBS 3490.3 CHGE 1, Security for Sensitive
Building Information Related to Federal Buildings,
Grounds, or Property



Signed, Sealed and Licensed

- The responsible design professional must sign and seal.
- Professional must comply with seal, stamp and signature requirements from the project's state, district, or territory law.





02

LCCA

Appendix A.6 Life Cycle Cost Analysis Requirements

Appendix A.6 Life Cycle Cost Analysis Requirements

Appendix A.6 LCCA Requirements are not new

- Appendix A.6 released via memorandum on September 12, 2023
 - Identifies the LCCA documentation requirements needed to:
 - track the evaluation process
 - create a decision record
 - validate the findings
- Appendix A.6 added to the 2024 P100 update

Appendix A.6 Life Cycle Cost Analysis Requirements

Tables A.6.1, A.6.2, A.6.3 and A.6.4 identify the;

- design alternatives
- proposed systems
- baseline systems

that must be included in the LCCA for each project phase and project delivery type

Example

A.6.1.3 LCCA DESIGN ALTERNATIVES, PROPOSED SYSTEMS AND BASELINE REQUIREMENTS

Table A.6.1 Delivery Method: Design Bid Build; Design Build Bridging; Construction Manager as Constructor

Funding Code: BA51 New Construction, BA55 Major Repair and Alterations			
Project Phase ³			
Preliminary Concept	Concept Development	Final Concept	Design Development 100%
Proposed Design and Alternatives			
<ul style="list-style-type: none"> • Three distinctly different architectural design schemes • Proven life cycle cost effective building enclosure system • Lighting system for each architectural design scheme <p>One ASHRAE 90.1 Appendix G PRM for:</p> <ul style="list-style-type: none"> • Lighting control system for each architectural design scheme ^{1,2} • HVAC system for each architectural design scheme ^{1,2} • Service water-heating system for each architectural design scheme 	<ul style="list-style-type: none"> • Architectural design scheme • Three building enclosure system alternatives² • Lighting system • Three lighting control system alternatives ² • Three HVAC system alternatives ² • Service water-heating system 	<ul style="list-style-type: none"> • Architectural design scheme • Building enclosure system • Lighting system • Lighting control system • HVAC system • Service water-heating system 	<ul style="list-style-type: none"> • Architectural design scheme • Building enclosure system • Lighting system • Lighting control system • HVAC system • Service water-heating system
Baseline Systems			
<p>One ASHRAE 90.1 Appendix G PRM baseline for:</p> <ul style="list-style-type: none"> • Each architectural design scheme • Enclosure system for each architectural design scheme • Lighting system for each architectural design scheme • Lighting control system for each architectural design scheme • HVAC system for each architectural design scheme • Service water-heating system for each architectural design scheme 	<p>One ASHRAE 90.1 Appendix G PRM for:</p> <ul style="list-style-type: none"> • Baseline building • Building enclosure system • Lighting system • Lighting control system • HVAC system • Service water-heating system 	<p>One ASHRAE 90.1 Appendix G PRM for:</p> <ul style="list-style-type: none"> • Baseline building • Building enclosure system • Lighting system • Lighting control system • HVAC system • Service water-heating system 	<p>One ASHRAE 90.1 Appendix G PRM for:</p> <ul style="list-style-type: none"> • Baseline building • Building enclosure system • Lighting system • Lighting control system • HVAC system • Service water-heating system

Footnotes:

1. The proposed system must be the ASHRAE 90.1 Appendix G PRM baseline system for the Preliminary Concept phase.
2. If the project scope of work is not a new building or retrofit of the existing architectural design scheme, then provide three proposed building enclosure system alternatives, three proposed HVAC system alternatives and three proposed lighting control system alternatives in the Preliminary Concept phase instead of the Concept Development phase.
3. Update the LCCA as the design progresses for the CD 65%, CD 95%, and CD Final project phase submissions.

What you need to know!


- Statement of Work should be edited to;
 - reference P100 Appendix A.6 LCCA Requirements
 - If project scope is different from Appendix A.6 tables A.6.1, A.6.2, A.6.3 and A.6.4, then identify the;
 - design alternatives
 - proposed systems
 - baseline systemsthat must be included in the LCCA for each project phase in the SOW

Appendix A.6 Life Cycle Cost Analysis Requirements

A.6.2.1 Project Description and Scope

- General information
- Types of decisions to be made
- Constraints

A.6.2.2 Common Parameters

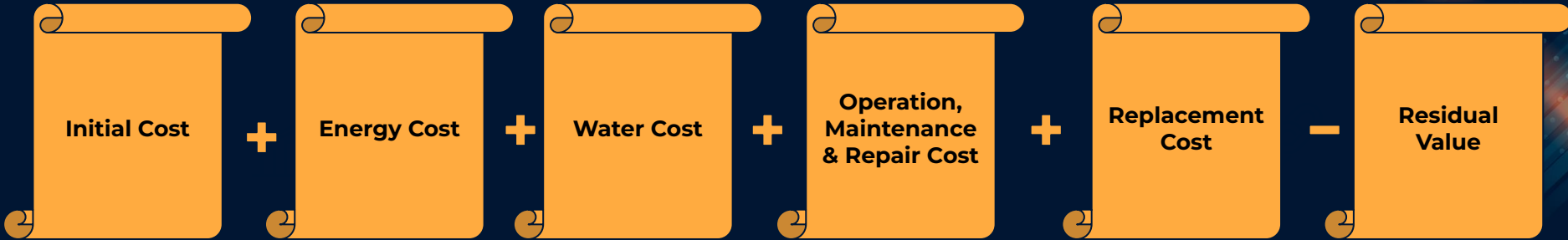
- General information
 - Study period
 - Base date
 - Discount rate
 - Inflation
 - Operational assumptions
 - Local utility energy and water cost rates/schedules
- 

Appendix A.6 Life Cycle Cost Analysis Requirements

A.6.2.3 Design Alternatives, Proposed Systems and Baseline Systems

- Narrative for each alternative, proposed system and baseline system
- Technical criteria and design features
- Rationale for including the alternatives and proposed systems in the LCCA
- Rationale for excluding alternatives and proposed systems from the LCCA
- Non-monetary considerations

How is life cycle cost determined?



All costs are converted to present values by discounting

What you need to know!

P100 Appendix A.6 identifies the LCCA documentation requirements needed to;

- track the evaluation process
- create a decision record
- validate the LCCA findings

Appendix A.6 Life Cycle Cost Analysis Requirements

A.6.2.3.1 Materials and Equipment

- Materials and equipment list must be provided for each design alternative, proposed system and baseline system
- The material and equipment list is the input for the;
 - Initial cost estimate
 - Energy modeling program inputs
 - Water use calculations
 - Operation, maintenance and repair tasks and frequency
 - Replacement cost estimate
 - Residual value estimate

Appendix A.6 Life Cycle Cost Analysis Requirements

A.6.2.4 Initial Investment Costs

- An initial investment cost estimate must be provided for each design alternative, proposed system, and baseline system based on materials and equipment list
- The initial investment cost estimate must meet the P120 PBS Cost and Schedule Management Policy Requirements

Appendix A.6 Life Cycle Cost Analysis Requirements

A.6.2.5 Energy Modeling

- Energy modeling must be provided for each design alternative, proposed system, and baseline system for each combination of interdependent design alternatives, proposed systems, and baseline systems
- The energy modeling must be completed in accordance with ASHRAE 90.1 Appendix G, Performance Rating Method energy modeling requirements
- A summary table must be provided showing the annual energy use by type and total energy use from the energy modeling calculations for each design alternative, proposed system and baseline system

Appendix A.6 Life Cycle Cost Analysis Requirements

A.6.2.6 Water Usage and Disposal Calculations

- Water usage and disposal/treatment calculations must be provided for each proposed system, design alternative, and baseline system
- A table showing the annual water usage and disposal/treatment for each proposed system, design alternative and baseline systems must be provided

What you need to know!

Most LCCA's provided for GSA projects apply simple cost per unit floor area to determine operation, maintenance and repair costs

- Applying simple cost per unit of building floor area is;
 - unreliable
 - does **not** address the factors that affect OM&R costs
 - must **not** be used as the basis to determine OM&R costs

Appendix A.6 Life Cycle Cost Analysis Requirements

A.6.2.7 Operation, Maintenance and Repair Costs

- The design alternatives, proposed systems, and baseline systems equipment and materials manufacturers OM&R manuals must be used to determine the OM&R tasks and frequency

Appendix A.6 Life Cycle Cost Analysis Requirements

A.6.2.7 Operation, Maintenance and Repair Costs

- ASHRAE Applications Handbook Chapter 38 Owning and Operating Costs, Section 3, Factors Affecting Maintenance Costs must be evaluated and documented for each OM&R task:
 - Quantity and type of equipment
 - Equipment location (height above floor/grade, above ceiling) and access (including access restrictions)
 - System run time
 - Critical systems
 - System complexity
 - Local conditions
 - Geographical location
 - Equipment age
 - Available infrastructure

Appendix A.6 Life Cycle Cost Analysis Requirements

A.6.2.7 Operation, Maintenance and Repair Costs

- Operation, maintenance and repair costs must be determined from contractor and vendor quotes provided for the OM&R list of tasks and frequency and the ASHRAE Factors Affecting Maintenance Costs
- If other accurate and reliable OM&R cost data sources, other than vendor quotes, would like to be considered for use as the OM&R cost data, then submit the OM&R cost data information to GSA for review and approval.
 - The OM&R cost data must account for the OM&R maintenance tasks and frequency and the ASHRAE factors affecting OM&R cost

Appendix A.6 Life Cycle Cost Analysis Requirements

A.6.2.8 Replacement Costs

- A replacement cost estimate must be provided for each design alternative, proposed system, and baseline system with an expected/service life less than the LCCA study period
- The replacement cost estimate must meet the P120 PBS Cost and Schedule Management Policy Requirements
- Copies of the materials and equipment manufacturers data or industry technical data identifying the expected /service life must be provided
- Tables listing the expected/service life of the materials and equipment for each proposed system, design alternative and the baseline systems must be provided

Appendix A.6 Life Cycle Cost Analysis Requirements

A.6.2.9 Residual Costs

- Tables listing the residual value, net of any disposal costs of the design alternatives, proposed systems, and baseline systems with an expected/service life longer than the LCCA study period must be provided

Appendix A.6 Life Cycle Cost Analysis Requirements

A.6.2.10 NIST Building Life Cycle Cost (BLCC) Program

- The most recent version of the NIST BLCC program must be used to perform the life cycle cost analysis calculations
- The following BLCC program reports must be provided for each design alternative, proposed system and baseline system:
 - BLCC Input Data Listing
 - Detailed LCC Analysis
 - Cash Flow Analysis
 - Summary LCC
 - Lowest LCC
 - Comparative Analysis

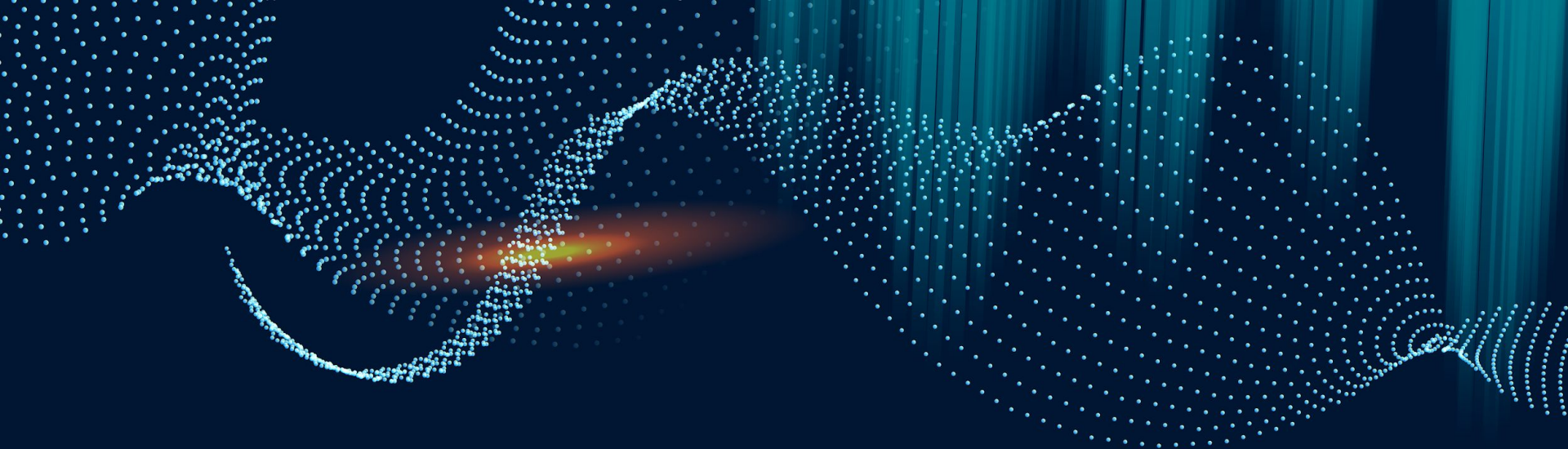
Appendix A.6 Life Cycle Cost Analysis Requirements

A.6.2.11 Interpretations

- Provide narratives and tables presenting the data for the baseline and each alternative and proposed system for the following;
 - LCCA comparisons
 - Sensitivity analysis
 - Uncertainty assessment

Recap

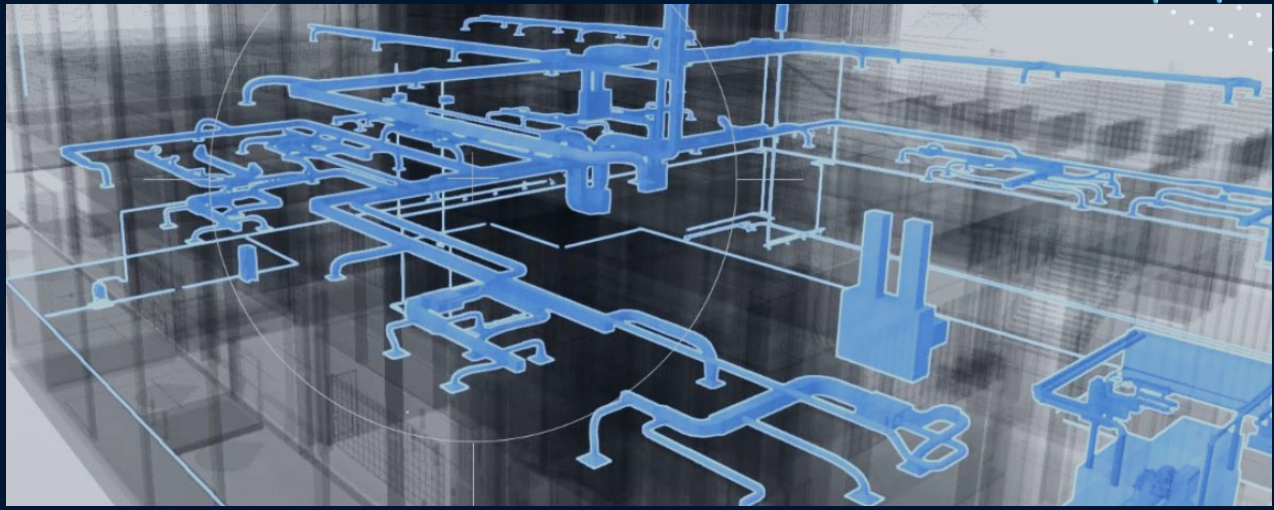
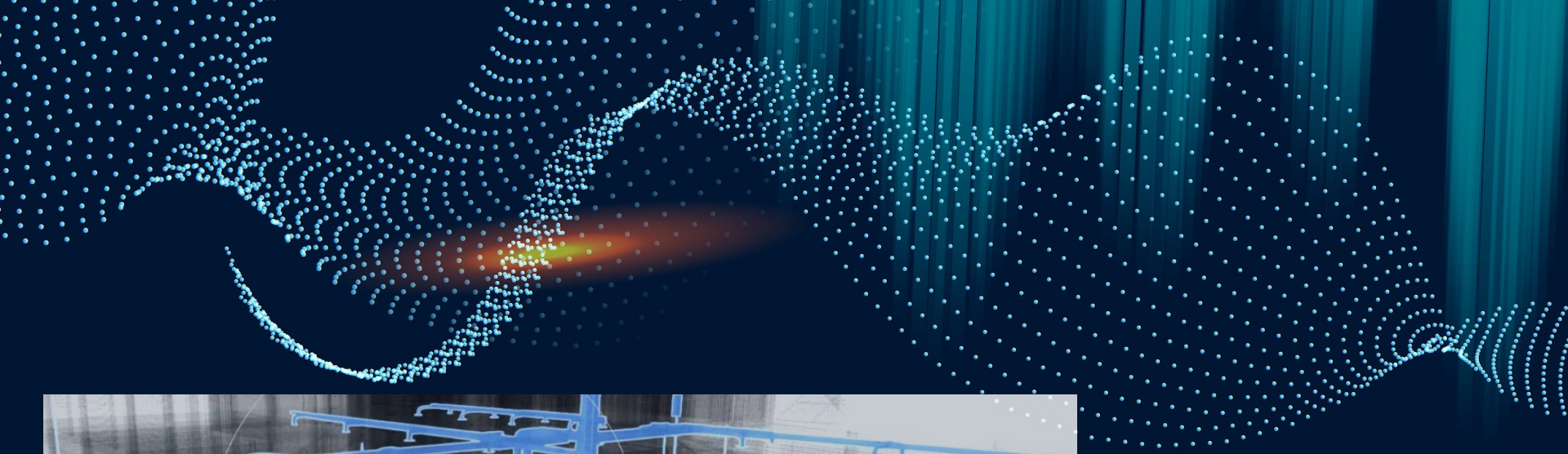
- Edit project statement of work to reference appendix A.6
- If the project scope is different from Appendix A.6 tables A.6.1, A.6.2, A.6.3 and A.6.4, then edit the statement of work to identify the design alternatives, proposed systems, and baseline systems that must be included in the LCCA in each project phase
- Documentation, Documentation, Documentation
 - Documentation requirements identified in Appendix A.6 are needed to validate LCCA results
- Operation, maintenance and repair costs must be determined from contractor and vendor quotes provided for the OM&R list of tasks and frequency and the ASHRAE Factors Affecting Maintenance Costs



03

BIM

BUILDING INFORMATION MODELING



**P-100 HAS REQUIRED
BIM
SINCE 2009**

P-100 HAS REQUIRED BIM SINCE 2009

BIM is the DESIGN model from which your
Construction Documents are derived.

**P-100 HAS REQUIRED
EQUIPMENT MODELING
- “C O B i e” -
SINCE 2015**

BIM REQUIREMENTS 2024



BIM REQUIREMENTS 2024

The BIM *requirement* for each project is **unchanged**:



BIM REQUIREMENTS 2024

The BIM *requirement* for each project is **unchanged**:

- New and major R&A require BIM MODELING



BIM REQUIREMENTS 2024

The BIM *requirement* for each project is **unchanged**:

- New and major R&A require BIM MODELING
- Construction sheets MUST BE derived from the BIM model



BIM REQUIREMENTS 2024

The BIM *requirement* for each project is **unchanged**:

- New and major R&A requires BIM MODELING
- Construction sheets MUST BE derived from the BIM model
- Equipment, Asset, and SDM information entered via the **CDX** and **COBie** standards



BIM REQUIREMENTS 2024

The BIM *requirement* for each project is **unchanged**:

- New and major R&A requires BIM MODELING
- Construction sheets MUST BE derived from the BIM model
- Equipment, Asset, and SDM information entered via the **CDX** and **COBie** standards
- P-100 SECTION 1.8.3, APPENDIX A.1.1, SUBMITTAL MATRIX



BIM REQUIREMENTS 2024

The BIM *requirement* for each project is **unchanged**:

- New and major R&A requires BIM MODELING
- Construction sheets MUST BE derived from the BIM model
- Equipment, Asset, and SDM information entered via the **CDX** and **COBie** standards
- P-100 SECTION 1.8.3, APPENDIX A.1.1, SUBMITTAL MATRIX

FACILITIES MANAGEMENT EXPECTS TO RECEIVE
EQUIPMENT INFORMATION ELECTRONICALLY



BIM - WHAT *is* NEW?



BIM - WHAT *is* NEW?

GSA BIM, CDX AND COBie STANDARD

BIM - WHAT *is* NEW?

GSA BIM, CDX AND COBie STANDARD

Now One Document

BIM - WHAT *is* NEW?

GSA BIM, CDX AND COBie STANDARD

**Now One Document
Requirements adjusted for National Use**

BIM - WHAT *is* NEW?

GSA BIM, CDX AND COBie STANDARD

BIM Standard REVISED

New Standard available
JULY 2024

**A&E, Contractor activities
and information
requirements updated**

CDX Standard REVISED

- Equipment info returns to 'COBie' format
- SDM Data stored in GSA-specific attributes

BIM - WHAT *is* NEW?

PROJECT HELP: BIM set-up SUPPORT

PM should email
BIMSUPPORT@GSA.GOV

BIM File Management

BIM files entered in
Kahua File Manager
transfer to BDR

BIM - WHAT *is* NEW?

NATIONAL BIM PROGRAM MANAGERS

**EDMUND
NEWMAN**

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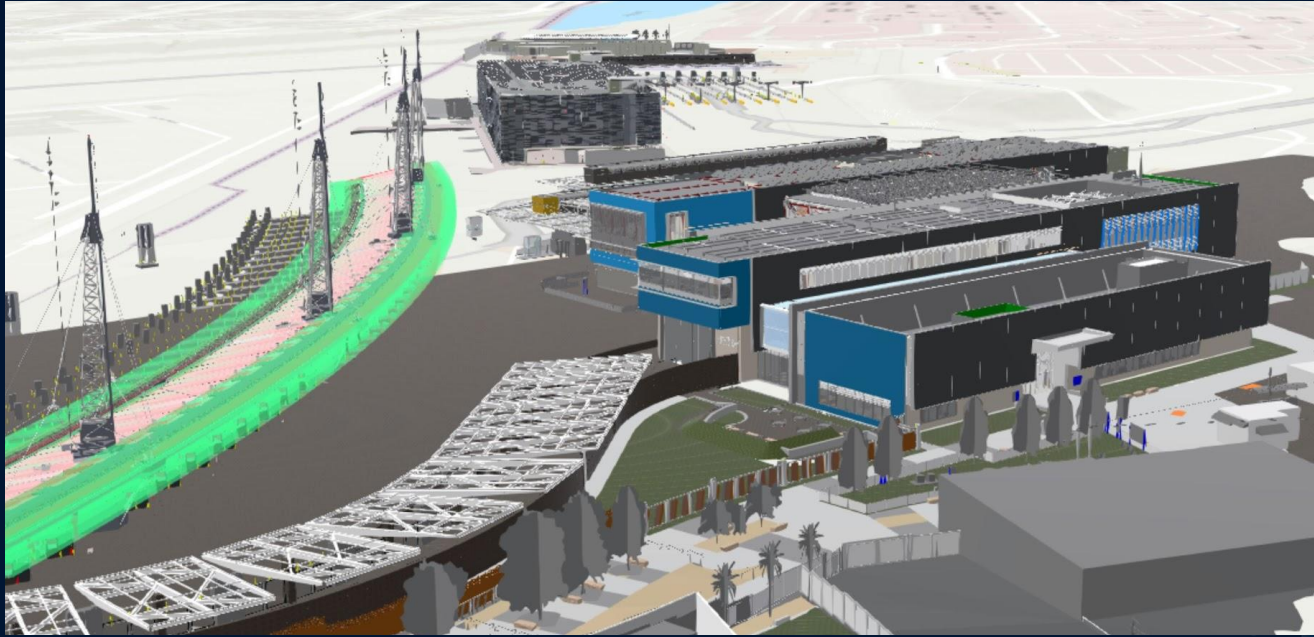
**SUZANNE
MANHIRE**

suzanne.manhire@gsa.gov



cfrBIM

BIM model checking
available in the PBS Portal



GIS

Questions

Contact speakers at:

- Lance Davis - lance.davis@gsa.gov
 - Mark Kutchi - mark.kutchi@gsa.gov
 - Edmund Newman - edmund.newman@gsa.gov
-