Illinois State University

BIM Project Execution and Standards Guide V.1.1

February 7, 2014

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SECTION A: BUILDING INFORMATION MODELING PROJECT EXECUTION PLAN OVERVIEW

To successfully implement Building Information Modeling (BIM) on a project, Illinois State University has developed this detailed BIM Execution and Standards Guide. This guide defines uses for BIM on the project (e.g. design authoring, cost estimating, and design and construction coordination), along with a detailed design of the process for executing BIM throughout the project lifecycle.

1.   Intent

These guidelines are intended to act as standards for building information model development from schematic design to project closeout. Illinois State University has adopted building information modeling as a tool for project documentation and development, as-built record documentation for Facilities Planning & Construction, Facilities Management, and the Office of Energy Management.

Illinois State University has made every attempt to provide this standard be as complete as possible. However, if there are items not covered in this guide, please contact the Office of Facilities Planning and Construction. Illinois State University assumes no responsibility for Revit models of existing buildings provided by ISU for renovations and additions.

2.   Building Information Modeling (BIM)
BIM is the process that contains all physical features of the project. Building Information Models shall be created that include all geometry, physical characteristics, and product data needed to describe the design and construction work. All drawings and schedules required for assessment, review, bidding, and construction shall be extractions from the model.

The term "model" is used in these guidelines as a digital representation of building elements and data used to design, construct, and lifecycle manage a building.

3.   Model Ownership
Illinois State University will retain ownership of all documentation throughout the building information modeling process including the Autodesk® Revit® Architecture central file, MEP, and Structure Models (.rvt files), Navisworks® files, and all other associated document types.   Models will be made available to key stakeholders to be used to visualize, coordinate, schedule, and analyze design intent and constructability throughout the project including closeout.

4.   External Model Conflict and Clash Detection
Building Information Models will be imported into external software that checks each model discipline (architectural, MEP, and structural) for hard clashes (clashes between elements) and soft clashes (clashes between elements and required clearances)

Conflict and clash detection allows the project team to verify clearances, analyze conflicts/clashes, deliver quality documentation, and coordinate between disciplines to reduce RFI and Change Order submissions.

5.   Applicability
Building Information Modeling capability will be:

Required on all new construction projects and major additions/renovations contracted by Illinois State University on or after the issue of this document.

Where applicable, it is up to the discretion of Illinois State University to allow partial building modeling for projects that do not affect more than 50% of any given structure or where project scope does not warrant full modeling. Prior to initiation of modeling, such action will require approval by Owner.

6. Lifecycle Management

Illinois State University intends to make final deliverable building information models available for integration into a Lifecycle Management solution to be used by the Facilities Planning & Construction, Facilities Management, and the Office of Energy Management. In order to meet that objective, it is important that the guidelines presented in this document be followed. If there is any question as to the intent of this document, please contact the Office of Facilities Planning and Construction at Illinois State University.

SECTION B: PROJECT INFORMATION (See Appendix B1)

1. **Project Owner:** Illinois State University

2. **Project Name:**

3. **Project Location and Address:**

4. **Contract Type / Delivery Method:**

5. **Brief Project Description:**

6. **Existing Conditions:**

7. **Additional Project Information:**

Project Information	Number
ISU FP&C Project Number:	
ISU Project Number:	
AE Project Number:	
GC Project Number:	
Autodesk Software Version	Current

8. **General Project Schedule:**

Include BIM milestones, pre-design activities, major design reviews, stakeholder reviews, and any other major events which occur during the project lifecycle. **See ISU Professional Services Agreement for official project schedule.**

PROJECT PHASE/ MILESTONE	ESTIMATED START DATE	ESTIMATED COMPLETION DATE	PROJECT STAKEHOLDERS INVOLVED
PROGRAMING			
SCHEMATIC DESIGN			
DESIGN DEVELOPMENT			
CONSTRUCTION DOCUMENTS			
CONSTRUCTION			
CLOSEOUT			
LIFECYCLE			

SECTION C: KEY PROJECT CONTACTS (See Appendix C1)

1. **Project Contacts for this Project**

Role	Organization	Contact Name	Location	E-Mail	Phone
Project Manager	AE Firm				
Project Manager	Contractor				
Project Manager	ISU				
BIM Coordinator					
Discipline Lead ARCH					
Discipline Lead MEP					
Discipline Lead Structure					
Owners Representative					
Commissioning					

SECTION D: PROJECT GOALS / BIM USES (See Appendix D1)

1. **Major BIM Goals & Objectives:**

Priority High/Med /Low	Goal Description	Project Phase
H	Provide ISU a LOD 400 model including Arch, MEP, and Structure for construction	Construction
H	Coordinate all disciplines through the design/construction process to reduce RFI's	Construction
M	Reference all building components per the Illinois State University BIM guideline	Lifecycle
H	Deliver an As-constructed model for integration into future Lifecycle management	Lifecycle
H	Improve visualization of design intent using BIM design principles	Design

2. **Mandatory Uses of BIM Model for this project: (See Appendix D2)**

X	Plan	X	Design	X	Construct	X	Operate
X	Programming	X	Design Authoring		Site Utilization Planning	X	Building Maintenance Schedule
	Site Analysis	X	Design Reviews	X	Construction System		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	X	Record Modeling		Record Modeling
			Mechanical Analysis				
			Sustainability (LEED)				
			Code Validation				
	Phase Planning (4D Modeling)		Phase Planning (4D Modeling)		Phase Planning (4D Modeling)		Phase Planning (4D Modeling)
X	Cost Estimation	X	Cost Estimating	X	Cost Estimating		Cost Estimating

Project Scope and objectives should determine the proper application of modeling and weigh all factors including time, cost, and effort vs. net benefit.

3. **Illinois State University BIM Models for Existing Buildings**

ISU will make Revit 2013 .rvt model files available for existing buildings that have been modeled. **ISU takes no responsibility for the accuracy of these models therefore each should be field verified for accuracy.**

SECTION E: BUILDING INFORMATION MODELING FILE TYPES

1. **Architectural Models – Autodesk® Revit® Architecture .rvt**

Models are Revit Architecture project files with Worksets enabled in order to create a central file. The Revit Architecture Model file (.rvt) contains all architectural features for a building including but not limited to:

- Exterior wall systems
- Interior wall systems
- Fire rated walls
- Architectural floor slabs
- Roofing systems
- Fixed and non-fixed equipment including owner provided equipment
- Reflected ceiling plans
- Vertical circulation – including elevators, stairs, escalators, and railings
- Doors and door frames
- Glazing – windows, interior glazing, curtain wall, and storefront
- Millwork and casework
- Furniture
- Finishes – Including all room paint codes, flooring codes, and other finish items
- Toilets and accessories
- Toilet Partitions
- Acoustics and sound control systems
- Specialties
- Minimum BOMA Standards

2.   Structural Model – Autodesk® Revit® Structure .rvt

Models are Revit Structure project files with Worksets enabled in order to create a central file.   The Revit Structure Model file (.rvt) contains all structural features for a building including but not limited to:

- Foundations
- Columns, beams, and joists
- Column grid
- Brace frames and shear walls
- Structural slab
- Specialties
- Misc. structural components.

3.   Mechanical, Electrical, and Plumbing Model – Autodesk® Revit® MEP .rvt

Models are Revit MEP project files with Worksets enabled in order to create a central file.   The Revit MEP Model file (.rvt) contains all mechanical, electrical, and plumbing features for a building including but not limited to:

- Rain Leader
- Overflow drain
- Drain
- Vent
- Waste water
- Domestic cold water
- Domestic hot water
- Steam
- Condensate
- Hot water
- Chilled water
- Refrigerants
- Relief valves
- Fire protection
- Gases
- Fire alarm system
- Mechanical ductwork
- Mechanical equipment
- Electrical Conduit
- Electrical lighting
- Fire/smoke dampers
- Valves and valve tags
- Plumbing equipment and fixtures
- Electrical equipment
- Electrical panels and schedules
- Metering
- DDC Controls
- Telecommunications
- Specialties
- AV Systems
- Fiber Optic Systems
- Equipment clearances for replacement, access, service space requirements, gauge reading, valve clearances, and other operational clearances and access panels.

4.   Life Safety and Fire Protection – Autodesk® Revit® MEP .rvt

Models are Revit MEP project files with Worksets enabled in order to create a central file. The Revit MEP Model file (.rvt) contains all mechanical, electrical, and plumbing features for a building including but not limited to:

- Electrical low voltage
- Security system
- Energy management system

5.   Model Phases

All model files shall include Revit phases as listed:
- Existing conditions – See Section B for further details of existing conditions
- New construction separated into planned project construction phases

6.   Design and Construction Model Coordination – Navisworks® Manage - .nwd

Models are to be Navisworks Manage .nwc files. Models will then be converted to .nwd files and made available per the project coordination schedule for design and construction professionals to perform clash detection, scheduling and visualization using Navisworks Manage.

SECTION F: BIM AUTHORING AND COLLABORATION SOFTWARE REQUIREMENTS

1. Design Team Software

Building information models shall be created that include all geometry, physical characteristics and product data needed to describe the design and construction work. All drawings, schedules, simulations, and services required for assessment, review, bidding and construction shall be extractions from this model. The Design Team shall follow the guidelines and requirements detailed in this document for BIM related services. Deliverable requirements are as specified in the Illinois State University Professional Services Agreement.

Models shall be created that include all geometry, physical characteristics and product data needed to describe the design and construction work to within 5' of building envelope. Drawings and schedules required for assessment, review, bidding and construction shall be extractions from this model. Software shall be capable of interfacing with the design teams BIM authored software. In all cases, model building and infrastructure systems to a level that allows the team to verify clearances, analyze conflicts/clashes and properly coordinate the work with all other aspects of the project. The Design Team shall follow the guidelines and requirements detailed in this document for BIM related services.

2. BIM Software Requirements

Authoring Software
The Design Team shall use parametric BIM Authoring software for Illinois State University projects. All architects, engineers, and specialty consultants are required to use the following design authoring software in its current version*:

- **Autodesk® Revit® Architecture**
- **Autodesk® Revit® MEP**
- **AutoCAD® MEP**
- **Autodesk® Revit® Structure**
- **Autodesk® Civil 3D**

Projects will remain on the same software release throughout the life of the project.

3. Coordination Software

All internal and external model coordination and conflict detection are required to use the following software in its native file format in its current version*:

• **Autodesk® Navisworks® Manage**

Design Team Coordination Requirements
AE Firms are **required** to perform internal coordination between all necessary disciplines to assure quality project document delivery for all delivery phases.

General Contractor and Construction Manager Coordination Requirements
CM/GC Firms are **required** to coordinate models between disciplines to perform clash detection in order to assure constructability and reduce RFI and change order submissions using Navisworks Manage.

4. Open Architecture for Interoperability

The Design Team is encouraged to use products based on or using open architecture for greatest interoperability between consultants and Illinois State University.

5. Project collaboration tools

The Design and Construction Team is required to use the Illinois State University designated site, https://sendto.illinoisstate.edu, for all model and document collaboration.   Models as well as 2D documentation will be available from this site for download to perform reviews, coordination, estimating, and scheduling.

SECTION G: COLLABORATION PROCEDURES

1. Collaboration Strategy:

All BIM collaboration will happen using the Illinois State University's designated site, https://sendto.illinoisstate.edu. Project team members will be required to upload information per the BIM project model and document delivery schedule.

2. BIM Coordination Meeting Procedures: (See Appendix G1)

MEETING TYPE	PROJECT STAGE	FREQUENCY	PARTICIPANTS	LOCATION
BIM Requirements Kick-Off	Programming	Once	ISU/AE/CONST	ISU
BIM Execution Plan Demonstration	Programming	Once	Responsible Party	ISU
Design Coordination	DD/SD/CD	Bi-Weekly	Responsible Party	ISU
Constructability Coordination	Construction	Bi-Weekly	Responsible Party	ISU

3. **Model & Document Delivery Schedule of Information Exchange for Review, Coordination, Submission and Approval: (See Appendix G2)**

INFORMATION EXCHNAGE	FILE SENDER	FILE RECEIVER	ONE-TIME or FREQUENCY	DUE DATE or START DATE	MODEL FILE	MODEL SOFTWARE	FILE TYPE	2D FILE TYPE
Design Intent	AE Firm	https://sendto.illinoisstate.edu	Bi-Weekly		ARCH	Revit	.NWC/ .DWF	.PDF
MEP Coordination	MEP Consultant	https://sendto.illinoisstate.edu	Bi-Weekly		MEP	Revit	.NWC/ .DWF	.PDF
MEP Coordination	MEP Consultant	https://sendto.illinoisstate.edu	Bi-Weekly		MEP	Revit	.NWC/ .DWF	.PDF
Structure Coordination	Structure Consultant	https://sendto.illinoisstate.edu	Bi-Weekly		STRUC	Revit	.NWC/ .DWF	.PDF
Coordination*	GM/GC	https://sendto.illinoisstate.edu	Bi-Weekly		CONST	Navisworks	.NWD	.PDF
Bid Distribution	Construction	https://sendto.illinoisstate.edu	Bid	Bid	CONST	Revit	.NWC	.PDF
Shop Drawings	Construction	https://sendto.illinoisstate.edu	As Required	CONST	ARCH	Revit	.RVT	.PDF
Shop Drawings	Construction	https://sendto.illinoisstate.edu	As Required	CONST	MEP	Revit	.RVT	.PDF
Shop Drawings	Construction	https://sendto.illinoisstate.edu	As Required	CONST	STRUC	Revit	.RVT	.PDF
Submittals	Construction	https://sendto.illinoisstate.edu	As Required	CONST	NA	NA	.PDF	.PDF

* In addition to the BIM model file types, documents will be issued in PDF format.

Genneral Contractors and Construction Managers are **required** to coordinate models between disciplines to perform clash detection in order to reduce RFI and change order submissions using Navisworks Manage.

SECTION H: FILE NAMING CONVENTION

1. **General**

   The purpose of this guideline is to provide guidelines and direction for standardizing electronic file information into retrievable formats. Building Information Management Systems require unique file names to function properly and allow searches to find the information the requestor desires. These guidelines/standards will be the first step in developing our Building Information Management Systems (BIM).

   This guideline should be followed by all personnel in the Facilities Planning & Construction Department and anyone providing services, documents or work for the University. Deviations from this guideline shall require approval in writing from ISU Facilities Planning & Construction Management Director.

   This document will be updated regularly as we implement our document consolidation process.

2. **File Naming Convention**

   The following are the new file naming conventions for all files on the Facilities Planning & Construction computer system. The intent of this naming convention is to give each file on our computer network a unique name that can be utilized to retrieve files and information from our computer network.

2.1 File Name Structure & Conventions

To ensure consistent naming for documents, the following file name format needs to be followed. The underscore (_) is used in the file name to separate the section fields. The file names shall consist of five or six distinct sections delineated by the following format:

Field 1_Field 2_Field 3_Field 4_Field 5_Field 6.xxxx

The following table is intended to be a matrix of standard nomenclature to use in the various fields identified.

Table 2.1

	Field 1		Field 2		Field 3		Field 4		Field 5 and/or Field 6				
	Date (yy.mm.dd)		Location		Sub-Location		Document Type		Description		Document Revision		
Directory	13.11.01	Underscore	Bldg. Abbrev. Campus Location	Underscore	Floor No. Project Name	Underscore	Admin, Form, Schedule, Scope, Meeting Minutes Bid, RFP, RFQ, Proposal, Budget, Contract Spec Section or Division Shop Drawing, RFI, Photos, O & M, Punchlist System: Structural, Architectural, Mechanical, Electrical, Plumbing, Landscape/Civil, Equipment, Utility, Survey, Telecom, Fire Alarm, Tunnel	Underscore	Sheet Title or Number File Description	Underscore	Revision # Drawing Package (i.e. 50% CD's) Change Order # RFI #	Period	File Extension

(Table title row: Field 1_Field 2_Field 3_Field 4_Field 5.xxxx)

3. QUESTIONS

Questions, comments, mistakes that are identified in the use of this process should be directed to ISU Facilities Planning and Construction, attention Interior Design/CAD Manager.

SECTION I: QUALITY CONTROL

1. **Overall Strategy for Quality Control:**

The building information modeling process is intended to improve coordination of the design/construction process. Illinois State University requires the following quality control process.

2. **Quality Control Checks:**

The following checks should be performed to assure quality. Required files/documents will be uploaded to the Illinois State University designated site, https://sendto.illinoisstate.edu per the schedule requirements.

Check	Definition	Responsible Party	Software Program (s)	Frequency
Visual Check	Review of all 3D design intent.	AE Firm	Revit Navisworks	Project Review
Visual Check	Review of all 2D design intent.	AE Firm	PDF/DWF	Project Review
Coordination	Coordinate all disciplines including Arch, MEP, and Structure to reduce construction RFI's and change orders	CM/GC	Navisworks Manage	Project Review
Standards Check	Ensure that the BIM and AEC Standards have been followed.	AE Firm	Revit	Project Review
Model Integrity Checks	External model coordination should be performed between disciplines including clash detection and visualization.	AE Firm	Navisworks Manage	Project Review

3. **Model Accuracy and Tolerances:**

Models should include all appropriate dimensioning as needed for design intent, analysis, and construction.

Phase	Discipline	Tolerance
Design Documents	Arch	Accurate to +/- 1" of actual size and Location
Shop Drawings	Mech Contractor	Accurate to +/- 1" of actual size and Location

SECTION J: TECHNOLOGY INFASTRUCTURE REQUIREMENTS

1. **Software:**

All project participants are required to have the following software in order to participate in the ISU BIM design and construction process. BIM software use is as follows:

BIM Use	Discipline (if applicable)	Software	Version
Design Authoring	Arch	Revit Architecture	Current
Design Authoring	MEP	Revit	Current
Design Authoring	Structural	Revit Structure	Current
Design Authoring	Civil	Civil	Current
Coordination	Construction	Navisworks Manage	Current

2. Computers / Hardware:

All project participants are required to have the necessary hardware in order to participate in the BIM design and construction process. Hardware required is as follows:

BIM	Hardware	Owner of Hardware	Specifications
All Phases	Responsibility of Design/Construction Firm	Design/Construction Firm	Autodesk minimum required specifications

SECTION K: MODEL STRUCTURE

1. File Naming Structure

All Revit Central files will be named using the following instructions.

File Format for Models Should be Formatted as:	
ARCHITECTURAL MODEL	yy.mm.dd_Building Abbrev_Project Name_Arch_Description_Document Revision
CIVIL MODEL	yy.mm.dd_Building Abbrev_Project Name_Civil_Description_Document Revision
MEP MODEL	yy.mm.dd_Building Abbrev_Project Name_MEP_Description_Document Revision
STRUCTURAL MODEL	yy.mm.dd_Building Abbrev_Project Name_Struc_Description_Document Revision
ENERGY MODEL	yy.mm.dd_Building Abbrev_Project Name_Energy_Description_Document Revision
CONSTRUCTION MODEL	yy.mm.dd_Building Abbrev_Project Name_Const_Description_Document Revision
COORDINATION MODEL	yy.mm.dd_Building Abbrev_Project Name_Coordination_Description_Document Revision
LIFECYCLE MODEL	yy.mm.dd_Building Abbrev_Project Name_Lifecycle_Description_Document Revision

2. Model Structure:

Model will be separated by the following disciplines for design and construction coordination by all project participants throughout the design and construction process.

- **Architectural**
- **Mechanical, Electrical, Plumbing – MEP**
- **Structure**
- **Civil**

3. Measurement and Coordinate Systems:

Imperial measurement system will be used for all modeling.

4. GIS Coordinates

All models should be created using True North coordinates vs. Project North. Firms are required to verify building true north coordinates. Illinois State University will make every effort to assist in this process.

1. **Project Deliverable Definitions for each project phase. (See Appendix L1)**

BIM Submittal Item	Stage	Approximate Due Date	Format	Notes
Complete LOD & MEA Checklist	Programming		PDF	ISU and design team will LOD and MEA Checklist
Schematic Design Model for review	Schematic Design		RVT	The current Revit Model .rvt will be uploaded to https://sendto.illinoisstate.edu at the conclusion of the SD phase
Design Development Model for review	Design Development		RVT	The current Revit Model .rvt will be uploaded to https://sendto.illinoisstate.edu at the conclusion of the DD phase.
Construction Documents for bidding	Construction Documents		PDF	2D PDF files will be issued for bidding. All 2D documents must use ISU's defined file naming format.
Coordination Model for Constructability	Construction		NWD	Navisworks Manage will be used to coordinate all disciplines to perform scheduling, clash detection, and visualization.
Record Model	Closeout		RVT	As constructed model to be delivered at project completion.
Submittal and Shop Drawings	Closeout		PDF	All submittals will be coordinated, approved, and uploaded in PDF format to https://sendto.illinoisstate.edu
Final 2D Drawings	Closeout		PDF	Final 2D drawings will be output from the Revit® model and provided in PDF in full sets.
Asset Management/Model Coordination*	Post Closeout		RVT	All approved submittals may be linked to the .rvt model for future facility and lifecycle management.
Lifecycle Management*	Post Closeout		RVT	Final model to include all attributes required for integration to the future ISU lifecycle management model.

 * To be performed by ISU.

SECTION M: DELIVERY STRATEGY & LOD – LEVEL OF DEVELOPMENT

1. **Delivery and Contracting Strategy & LOD-Level of Development**

The intent of the building information modeling process is to improve project visualization, coordination, and construction process. All models will be made available to design and construction project participants throughout the design and construction process.

2. **Team Selection Procedure**

Team members will not be selected entirely on their ability to participate in the BIM process. However those firms that do not have the capacity or capability will be required to partner with a firm that can provide the required BIM deliverable.

3. Illinois State University LOD – Level of Development

The following outlines Illinois State University's definition of Level of Development – LOD for building information model – BIM deliverables. As defined by the AIA document G202-2013.

- **LOD 100 –** The Model Element may be graphically represented in the Model with a symbol or other generic representation, but does not satisfy the requirements for LOD 200. Information related to the Model Element (i.e. cost per square foot, tonnage of HVAC, etc.) can be derived from other Model Elements.

- **LOD 200 –** The Model Element is graphically represented withing the Model as a generic system, object, or assembly with approximate quantities, size, shape, location, and orientation. Non-graphic information may also be attached to the Model Element.

- **LOD 300 –** The Model Element is graphically represented within the Model as a specific system, object or assembly in terms of quantity, shape, location, and orientation. Non-graphic information may also be attached to the Model Element.

- **LOD 400 –** The Model Element is graphically represented within the Model as a specific system, object or assembly in terms of size, shape, location, quantity, and orientation with detailing, fabrication, assembly, and installation information. Non-graphic information may also be attached to the Model Element.

- **LOD 500 –** The Model Element is a field verified representation in terms of size, shape, location, quantity, and orientation. Non-graphic information may be attached to the Model Elements.

  - All as-built record drawings and documentation at the time of turnover must be provided in Revit. Elements included in the model must be detailed in both the 2D and 3D documentation for internal ISU use. Elements must be clearly marked or tagged and visual in both the 2D and 3D documentation.

  - All record drawings must be submitted in AutoCAD DWG, as full set PDF files, and the Revit RVT file(s)

SECTION N: MEA- Model Element Author Table: (See Appendix N1)

1. The Model Element Table indicates the LOD to which each Model Element shall be developed at each identified Project milestone and the Model Element Author.
2. Identify (1) the LOD required for each Model Element at each Project milestone, (2) the Model Element Author (MEA), and (3) references to any applicable notes.
3. Insert abbreviations for each MEA identified in the table below, such as "A-Architect" or "C- Contractor.

Model Element Author (MEA)Table	Project Milestone 1			Project Milestone 2			Project Milestone 3			Project Milestone 4			Project Milestone 5			Project Milestone 6			Notes:
Model Elements:	LOD	MEA	Notes	LOD	MEA	Notes	LOD	MEA	Notes	LOD	MEA	Notes	LOD	MEA	Notes	LOD	MEA	Notes	

SECTION O: BUILDING INFORMATION MODEL REQUIREMENTS – DETAILS

The following is a summary of the items requires for BIM document information. These basic guidelines have been established to create a custom plan for each individual project. The intent is for the project team to review and adapt this list for projects of all sizes, and assure consistent outcomes regardless of the complexity of the systems. BIM information attachment for any project may include each of the following items.

In addition to the specifics listed below, it is assumed that all data provided for each system will include the date of installation, warranty duration, and installer contact information. For the sake of brevity these are considered universal requirements, and are not included in each section.

1.   CODE ANALYSIS SUMMARY
   a.   IBC- International Building Code
   b.   NFPA 101
   c.   Illinois Plumbing Code
   d.   Illinois Energy Code
   e.   Illinois Accessibility Code

2.   SPACE IDENTIFICATION - Rooms

- Room- ID number, Use, Department

- Size- Square feet, Volume, Occupant Load

- Finishes – Flooring, Base, Paint, Wall coverings, Ceiling type, Wood finishes, laminates, wall tiles and information

- Window Coverings- Manufacturer, O&M

3.   CONVEYANCE SYSTEMS

- Elevators – Package Units; Make, Model, Serial number, Parts catalog, O&M\

   o   Motors- Make, Model, Serial number, HP, Frame, Voltage

   o   Pumps- Make, Model, Serial number, HP, Curve, GPM, Voltage

   o   Controls- Drawings, Sequence of Operation, Logic Programming, Voltage

- ADA Lifts – Package Units; Make, Model, Serial number, Parts catalog, O&M

- Dock Lifts and Levelers – Package Units; Make, Model, Serial number, Parts catalog, O&M

- Escalators – Package Units; Make, Model, Serial number, Parts catalog, O&M

- Dumb Waiters and Stage Lifts- Make, Model, Serial number, Parts catalog, O&M

4.   LIFE SAFETY/ SECURITY SYSTEMS

Fire Safety Systems

- Fire Alarm- Make, Model, Serial number, Sequence of operation, O&M

- Components- Strobe, Speaker, Detectors, Horn, Pull station and other features; Cut sheet for each type.

- Fire Suppression- System riser diagram, Shut off valve locations

   • Sprinkler Heads; Cut sheet for each type

- Fire Department Connection
- Pumps- Make, Model, Serial number, GPM, Pump curve, O&M

- Backflow Preventer- Make, Model, O&M

- Tamper Prevention- Make, Model, O&M

Security Systems

- Card Access- Component information, Cut sheets or O&M where applicable, each location

- Cameras- Component information, Cut sheets or O&M where applicable, each location

- Motion Sensors- Component information, Cut sheet/O&M where applicable, each location

- Motorized openers- Component information, Cut sheet/O&M where applicable, each location, O&M, Programming and setup information

5. **OFFICE/CLASSROOM TECHNOLOGY**

Office Technology

- o Smart boards- Component information, Cut sheets or O&M where applicable, each location

- o Projectors- Component information, Cut sheets or O&M where applicable, each location

- o Screens- Component information, Cut sheets or O&M where applicable, each location

- o TV/Sound systems- Component information for receivers, speakers amplifiers, DVD, Overhead cameras, Cut sheets or O&M where applicable, each location

Classroom Technology

- o Projectors- Component information, Cut sheets or O&M where applicable, each location

- o Screens- Component information, Cut sheets or O&M where applicable, each location

- o TV/Sound systems- Component information for receivers, speakers amplifiers, DVD, Overhead cameras, Cut sheets or O&M where applicable, each location

- Multi-System Interaction- Product and System programming files and product information for all interactive carts and podiums designed to merge multiple inputs.

6. **INFORMATION TECHNOLOGY SYSTEMS**

Unknown Categories– Make, Model, Serial number, Sequence of operation, O&M

7. **AIR DISTRIBUTION SYSTEMS**

Air Handling Package – Package Air Handling Units; Make, Model, Serial number, Filter size & quantity, Sequence of operation, O&M

- Supply Fans – Make, Model, Serial number, Motor HP, Belt size and quantity, Maximum design flow for installed system, Fan curve

- Return Fans - Make, Model, Serial number, Motor HP, Belt size and quantity, Maximum design flow for installed system, Fan curve, Voltage, CFM

Exhaust Fans **-** Make, Model, Serial number, Belt Size, Bearing number, Sheave numbers, Sequence of operation, O&M

- **Motor -** Make, Model, Serial number, HP, Frame, Fan curve, Voltage, Efficiency

Outside Air Supply Systems, Heat Recovery Units – Make, Model, Serial number, O&M

- **Fans -** Make, Model, Serial number, Motor HP, Belt size and quantity, Fan curve, CFM

- **Motor -** Make, Model, Serial number, HP, Frame, Voltage

Emergency Fire System AHU Interaction –Make, Model, Serial number, Sequence of operation, Graphical system riser representation, Smoke & heat detector data

- **Smoke Purge Fan-** Make, Model, Serial number, fan curve, Belts size and quantity

- **Fire Dampers-** Make, model and motor information at each location

8. **BUILDING AUTOMATION, MONITORING, SPACE CONTROL**

- **Thermostat, Humidity and remote Sensors-** Make, Model, Serial number, Unit(s) controlled, Spaces controlled at each location, Signal amperage/voltage

- **Remote Static pressure sensors-** Make, Model, Serial number, Unit(s) controlled, Sequence of operation or space/equipment controlled, at each location, Signal amperage/voltage

- Differential Pressure Sensors- Make, Model, Serial number, Units(s) controlled, Sequence of operation or equipment controlled at each location, serial amperage/voltage

9. **HEATING FUNCTIONS**

Steam Delivery and Condensate Return

- **Meters, Gauges**

- **Relief Valves**

- **Pressure Valves**

- **Coils**- Make, Model, Serial number, Sequence of Operation, O&M, Size, materials, Capacity,   Pressure drop, Operating Pressure, Maximum design conditions including Steam Consumption, Air flow, Air inlet temperature and Air outlet temperature.

- **Pumping traps, Receivers**- Make, Model, Serial number, Sequence of Operation, O&M, Capacity

- **Spence type PRV's**- Make, Model, Serial number, Sequence of Operation, O&M, Entering pressure, Discharge pressure, Capacity

Heating Water Distribution

- **Pumps-** Make, Model, Serial number, Sequence of operation, Pump curve, O&M, Horsepower, Voltage, GPM

- **Heat Exchangers-** Make, Model, Serial number, Sequence of operation, Pump curve, O&M, Operating Pressure, Maximum design conditions including Steam Consumption, Air flow, Air inlet temperature and Air outlet temperature.

- **Fin Tubes and Radiant Panels-** Make, Model, Serial number, Sequence of operation, Pump curve, O&M, Maximum steam consumption.

Cabinet and/or Suspended Unit Heaters

- **Unit Heaters-** Make, Model, Serial number, BTU's, Sequence of operation, O&M, CFM, GPM

- **Cabinet Unit Heaters-** Make, Model, Serial number, BTUs, Sequence of operation, O&M, CFM, GPM

- **Gas fired units -** Make, Model, Serial number, Sequence of operation, O&M, CFM, BTUs

- **Remote sensors -** Make, Model, Serial number, O&M, Signal Amperage

10. **COOLING FUNCTIONS**

Chillers and Refrigeration Systems – Make, Model, Serial number, Unit(s), Spaces controlled, at each location, Steam Absorption Units, Electric Chillers, Size, Voltage, Capacity, Efficiency, etc.

- **Cooling Towers-** Condenser Motors, Fan Motors, Variable speed drives, Sumps, Drains, Condition Direct Expansion Refrigeration, Design capacity and maximum design conditions, DX Circuits, Motor Voltage and HP, Efficiency

- **Condenser Water Pumps**- Make, Model, Serial Number, Sequence of Operation, Pump Curve with Design Operation, O&M Hyperlink, HP, Voltage, GPM

- **Chilled water pumps-** Make, Model, Serial number, Sequence of Operation, Pump Curve with design operation, O&M Hyperlink, HP, Voltage, GPM, Variable Speed Drive data.

- **Split Systems and Package (Leibert type) AC Units-** Make, Model, Serial number, Capacity in BTU, O&M Hyperlink, System efficiency, Voltage, Refigerant.

  o Sensors- Make, Model, Serial number, Sequence of Operation, O&M

  o Condensation pumps - Make, Model, Serial number, O&M

11. **PLUMBING SYSTEMS**

Chilled Water Plumbing

- Meters- Make, Model, Serial number, Sequence of Operation, O&M

- Back flow Preventers- Make, Model, Serial number, Sequence of Operation, Certification, O&M

- Booster/Circulation Pumps- Make, Model, Serial number, Design Criteria, Sequence of Operation, O&M, Capacity, Operating pressures.

- Water Softeners- Make, Model, Serial number, Sequence of operation, O&M, Capacity.

- Heaters and Heat Exchangers- Make, Model, Serial number, O&M

- Pressure Relief Valves- Make, Model, Cut sheets each location, O&M, Capacity, Operating pressures.

- Expansion Tanks- Make, Model, Cut sheets, Capacity.

Fire Protection Plumbing

- Meters- Make, Model, Serial number, Sequence of Operation, O&M

- Back flow Preventers- Make, Model, Serial number, Sequence of Operation, Certification, O&M

- Booster/Circulation Pumps- Make, Model, Serial number, Design Criteria, Sequence of Operation, O&M, Capacity, Operating pressures.

- Water Softeners- Make, Model, Serial number, Sequence of operation, O&M, Capacity.

- Heaters and Heat Exchangers- Make, Model, Serial number, O&M

- Pressure Relief Valves- Make, Model, Cut sheets each location, O&M, Capacity, Operating pressures.

- Expansion Tanks- Make, Model, Cut sheets, Capacity.

Sanitary System

- Sump Pumps- Make, Model, Serial number, Sequence of operation, Pump curve, O&M

- Acid Treatment- Component information

- Manholes- Component information, Cut sheets each location

Storm System

- Roof Sumps - Component information, Cut sheets where applicable, each location

- Sump pumps- Make, Model, Serial number, Sequence of operation, Pump curve, O&M

12. **ARCHITECTURAL**

Building Envelope Systems

- Roof System- Manufacturer, Type and Material information, Green Roof Details

- Exterior Doors- Make, Model, Glass details, Revolving/Motorized details, Sealant, Hardware

- Windows- Make, Model, Reflection, Color, Grade, Sealant, Hardware

- Skylights- Make, Model, Reflection, Color, Grade, Sealant

- Access Doors and Hatches, Ladders- Make, Model

13. **BUILDING COMPRESSED GAS SYSTEMS**

Natural Gas System- Meters, Regulators/PRV's, Safeties Make, Model, Mfr. Information, Size, Capacity, Operating pressure.

Compressed Air Systems

- Air Compressors- Make, Model, Mfr. Information, Capacity, Voltage, Pressure

- Air Dryers- Make, Model, Serial number, Sequence of Operation, O&M, Capacity, Mfr. Information

- Storage tanks- Make, Model, Serial number, Mfr. Information, Size

Lab Gas Systems

- Regulator stations- Make, Model, Mfr. Information, O&M

- Monitoring and Alarm Systems- Make, Model, Serial number, Mfr. Information, O&M

- Vacuum Pumps- Make, Model, Serial number, O&M, Mfr. Information

14. **ELECTRICAL**

Electrical Distribution System

- Transformers- Make, Model, Serial number, Mfr. Information, O&M, Voltage, Size

- Switch Gear- Make, Model, Serial number, Mfr. Information, O&M

- Panels- Make, Model, Mfr. Information, O&M, Voltage, Size

- Major Equipment Service Disconnects- Make, Model, Mfr. Information

- Provide arc flash information

Emergency Electric Generation

- Service Entrance- Make, Model, Serial number, Mfr. Information, O&M

- Emergency Generators- Make, Model, Serial number, O&M, Parts list, Service History

- Transfer Switches- Make, Model, Serial number, Mfr. Information, O&M

- Emergency Lighting Components- Make, Model, Serial number, Mfr. Information, O&M Lighting

- Provide arc flash information

Systems

- Fixtures- Make, Model, Bulb type and quantity, Mfr. Information

- Controls- Make, Model, Serial number, Mfr. Information, O&M

- Occupancy Sensors- Make, Model, Serial number, Mfr. Information, O&M

- Timers- Make, Model, Serial number, Mfr. Information, O&M

- Specialty Lighting- Make, Model, Serial number, Mfr. Information, O&M