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# CAD and BIM Standards

## A. Standards, PDF Requirements, and Compliance Review Submittals

This document describes the University of Washington standards for A/E project drawings that must be submitted for all capital projects. This includes but is not limited to CAD and BIM drawing standards, PDF requirements, and the schedule of document submittals for Owner's compliance review. The A/E may request a compliance review at any time during the Project through the UW Project Manager. It is required that the project schedule contains milestones as identified below in the *Schedule of Submittals* section.

### CAD and BIM Compliance Submittal Review Requirements (format and content):

1. BIM models shall utilize the latest Revit UW Resource Template
  - a. Email [flrplans@uw.edu](mailto:flrplans@uw.edu) for the latest template
2. Revit model files shall be named  
<UW FACNUM>\_<Discipline>\_<Description>\_v<Version>.rvt  
CamelCase should be used for Descriptions longer than one word  
i.e. (200001-A-ShellCore-v22.rvt).
3. Everything in the BIM model must be able to be exported to AutoCAD.
4. Models must be detached from central. All work sets must be relinquished. On final export dialog box, UNCHECK the box saying "Export views on sheets and links as external references". Use eTransmit to package model and related files.
5. All CAD files are to be submitted as an AutoCAD .dwg format.
  - a. Remove all non-drawing files from drawing folder before submission, i.e.: .log, .bak, .svs, etc.
6. Custom menus or arx applications are not allowed if it creates a requirement for the drawing to be used. No menus, custom user interface (cui) files or arx applications are to be submitted.
7. Each CAD drawing should represent a single printed sheet.
8. Drawing and PDF file names must be titled <Sheet Number> <Sheet Name> i.e. (A-101 1<sup>ST</sup> FLOOR PLAN.dwg or .pdf). The title should be consistent with the Drawing Index for sheet # and name
  - a. All PDF and drawing file names and descriptions must match the index names and descriptions.
  - b. If index sheet number is listed with a period (A0.00) then the drawing file sheet number needs to be (A0.00).
  - c. If index sheet number is listed with a period (A0.00) and the drawing file sheet number is (A0-00), using a dash (-) not a period (.), then they don't match.
9. All CAD drawings shall use the following folder structure:
  - a. One folder per discipline, by discipline name (Civil, Landscape, Architecture, etc.).
10. No .zip files are allowed.
11. All AutoCAD and BIM/Revit files shall be georeferenced to real-world coordinates using State Plane Washington North (NAD 1983, State Plane Feet). This is necessary to ensure design deliverables can be directly integrated into UW Facilities' enterprise GIS, including Space Viewer.

12. All review requests to take a minimum 2-4 week, depending on workload.

### **CAD Standards Compliance Review – Schedule of Submittals:**

**All CAD drawing submittals shall be provided electronically to the UW Project Manager, for review by the UW CAD Compliance Coordinator.**

1. Test set to be provided to BIM Manager at minimum 4 weeks prior to construction set.
2. Schematic Design Phase (where applicable) – 100% Complete:
  - a. Room numbering schematic methodology is required for review. Please see [Room Numbering Standards](#) for guidance.
3. When no Schematic Design Phase, room numbering methodology shall be provided prior to design.
  - a. Representative sample of each discipline in CAD format shall be submitted for review.
  - b. The Owner will provide comments, as appropriate. Files with changes do not need to be resubmitted at this time, but should be done during Design.
4. Design Development (DD) and/or Preliminary Design Phase – 100% Complete:
  - a. Room numbering plan is required for review and approval.
  - b. Layer name format plan is required for review and approval.
  - c. The Owner will provide comments, as appropriate.
5. Construction Documents Phase – 100% Complete:
  - a. Room numbering revisions, from the reviewed DD and/or Preliminary Design Phase submittal, are required for review and comment prior to A/E submitting for a building permit. Only Owner approved room numbers are to populate the Construction Documents.
  - b. All Construction Drawings shall be submitted for CAD format review prior to permit submittals, including the separate documentation for projects with phased construction permit submittals.
6. Construction Completion Phase - Project Record Drawings:
  - a. All Record Drawings shall be submitted to [flrplans@uw.edu](mailto:flrplans@uw.edu) copying [Records@uw.edu](mailto:Records@uw.edu) for Owner's CAD check process review with the location that the documents can be downloaded from for approval prior to receiving Final Acceptance. Please see [CAD Check review abbreviated checklist](#) for your reference.
    - i. Once approval is received, record drawings and documents (Closeout Document package) should be sent to [Records@uw.edu](mailto:Records@uw.edu) for upload to UW's record filing system (Facilities Information Library (FIL)).
  - b. Provide Owner CAD files of the final Record Drawings, including a final cover sheet with a master sheet index of all drawings, clearly noting any additional drawings added from the Construction Documents.
  - c. To the maximum extent possible, record all as-built drawing conditions on the original construction drawings.
  - d. Printing of the final Record Drawings shall not occur before Owner's approval. Contractor's CAD shop drawings such as fire alarm, CAAMS, and Environmental Control Systems shall not be submitted by the A/E.

## CAD Standards:

1. Title block
  - a. All sheets are to have a title block.
  - b. Title block information is to be on the right side of the sheet.
  - c. All PDF and drawing title blocks must match content. The sheet numbers must match the file name sheet number.
  - d. Title blocks shall follow the [Title Block Template](#) and **must** contain the following information:
    - i. Record Drawing Date
    - ii. UW Project Number
    - iii. UW Facility Number (FACNUM)
    - iv. UW Project Name
    - v. Sheet Name
    - vi. Sheet Number
    - vii. A Key Plan
    - viii. List of Revisions
    - ix. Consultant Company Name
  - e. Floor and room numbering shall be according to [Room Numbering Standards](#)
2. All PDF and drawing body must match content.
3. Layering Format
  - a. All layers should be on and thawed
  - b. Layer name format shall follow [AIA layer standards](#).
  - c. For architectural layering minimum requirements please see [UW Architectural CAD Standard Layers](#)
    - i. Layers "0" and "Defpoints" are permitted but must not contain content.
    - ii. Include designated furniture and equipment layers when applicable to project scope.
4. Scale and Units
  - a. All objects are to be drawn at full scale for the assigned unit of measure.
  - b. All drawings are to have a unit of measure assigned and not set to "unitless".
  - c. GIS georeferencing standards:
    - i. Coordinate system: State Plane Washington North, NAD 83 HARN.
    - ii. Units: US Feet.
    - iii. Origin (0,0): Defined by survey data (X-Base) or approved GIS/Aerial imagery for placement
    - iv. File Setup: Design in Model Space, 1 drawing unit = 1 ft.
5. External references usage in CAD Documents
  - a. External references are not allowed for submittals. All external references are to be bound using the Bind option (instead of the insert option).
6. Area of Work
  - a. CAD drawings shall include a boundary to define the Area of Work encompassing all areas, and only those areas where work is to be performed
  - b. Each room should be outlined with a polyline. It is used to calculate the area of the room.
  - c. Room numbers should be located at the center of each room.
  - d. Wall linework should be separated at partial height walls and glazing.
  - e. Door swing should be drawn with Arc and not with polylines.

- f. Fixtures and casework shall be inserted as blocks and not individual lines.

**BIM Standards:**

1. BIM models shall be submitted in Revit.rvt format.
2. Revit model file names must start with the UW PDG Project Number. For example, 200000 Parrington Hall Room 123 HVAC Upgrade.
3. Layer name format shall follow [AIA layer standards](#).
4. Packaging for Submission
  - a. Model should include shared coordinates
  - b. Models must be detached from central.
  - c. All worksets must be relinquished.
  - d. On final export dialog box, UNCHECK the box saying "Export views on sheets and links as external references."
  - e. Use eTransmit to package model and related files.
5. All Revit files shall be georeferenced to real-world coordinates using StatePlane Washington North (NAD 1983, State Plane Feet).
6. All CAD drawings shall be exported from Revit, maintaining georeferencing to StatePlane Washington North.

**Portable Document Format (PDF) Requirements:**

1. All documents are to be created as PDF files from the original source files, unless approved otherwise in writing by Owner. Scanning is not permissible.
2. PDF files shall reside in the same folder as the CAD version of the sheet.
3. The CAD printer shall be Autodesk DWG to PDF.pc3 print configuration.
  - a. Layer information shall not be included.
4. All documents are to be created with a resolution of not less than 300 dpi. All fonts are to be embedded in the PDF.
5. When compression is used, the algorithm must be LZW, CITT Group 4, or PackBits.
6. The PDF document size must be the same as the original document size if the document were printed (e.g., a 24x36 print should have a PDF sheet size of 24x36).
7. Each document must be submitted as a single file, as follows:
  - a. A single document, such as a pre-design report, design calculations, or project manual, is one file.
  - b. A single drawing is one file.
  - c. A document larger than 11x17 inches is defined as a single document and is one file.
8. No .zip files are allowed.