

**AEC CADD Standards – Archival Documents**

Page 1 of 7

Last Update: May 7, 2009

General:

The Instruments of Service provided under the contract are required to be delivered for all projects. **These deliverables should be received within five (5) working days of the Bid Opening.** Final payment for A/E services cannot be made until these Instruments of Service are received, reviewed, and approved. The specifications for these deliverables are described in this section.

Requirements for Electronic Deliverables:

All drawings and maps to be provided under the contract shall be accomplished and developed using computer-aided design and drafting (CAD) software and procedures conforming to the following criteria:

1. CAD drawings will be prepared using recent versions of AutoCAD or MicroStation. Contact the CAD Operations Coordinator during the DD phase to verify what versions are acceptable.
2. Elements of the digital "drawing" file which represent the work to be done (i.e. construction drawings) or natural environment (i.e. site drawings) shall be created at their "real world" size using the appropriate unit of measurement. Civil drawings need to be created in engineering units and reference control points as outlined in **02 2113 - Site Surveys**. Civil Details can be created in architectural units if desired.
3. Software other than AutoCAD or MicroStation may be used in the preparation of the digital deliverables as long as all other requirements are fulfilled without the presence of the additional software on Purdue's system. All CAD files for the project must be delivered so that they can exist solely on Purdue's network without the need to connect to external systems or networks.
4. CAD files must be organized in a clear concise manner using descriptive file names, layer (level) names, and reference file attachments.
5. The use of ".PDF", ".TIF", or any other static image format may not be substituted as electronic (CAD) file delivery.
6. Stamps and signatures should be attached to the sheet file in a separate reference (xref) and should not be a part of the border reference. When submitting electronic files at any stage of the project, detach or unload the stamp and signature files so that they are not included with the electronic deliverables.

Electronic File Naming:

The following naming standard should be followed:

1. Sheet Drawings: Project ID (last four digits)\_Sheet number.dwg (.dgn)  
Example: 1234\_A-101.dwg
2. Model Drawings: PID\_Discipline\_Plan type.dwg(.dgn)  
Example: 1234\_a-fp1.dwg (Architectural 1<sup>st</sup> floor plan)

Addendums:

When an addendum drawing is required, a new drawing file should be created for the addendum. Using an additional "layout" in drawing A-101 is not an acceptable way of creating an addendum

## **AEC CADD Standards – Archival Documents**

Page 2 of 7

drawing. Failure to comply will result in drawings being returned for correction. File naming for addendum drawings should include both the addendum number and the sheet number of the drawing represented (1234\_A101\_ad1).

### Drawing Assembly:

Paper space (sheet layout) is the preferred method for assembling projects. All models should be created in model space and assembled in paper space.

### Use of References:

CAD files containing reference files (xrefs) should be delivered with the references “bound” to the sheet drawing. Reference files that were “bound” shall also be included as separate drawings for archiving purposes. If this process is not followed, the files may be returned for correction.

Reference files shall be referenced in a manner that they are not dependent on absolute file locations.

### Layering:

Layering should be logical and consistent throughout the entire project. If the project is done in phases, the previously accepted layering structure should be used. Purdue University uses the National CAD Standard, but does not require that this standard be followed.

### Electronic File Legibility:

Extraneous graphics outside the subject area should be removed from CAD files. Graphics that do not pertain to the immediate drawing should not be in the model/sheet file. For final delivery, make sure all layers are unfrozen, on, and applicable to the design file. Layers that do not pertain to the design should be deleted. The drawing should be “purged” or “compressed” after cleaning up extraneous information in the file. Failure to comply with the above will result in the return of the files for correction.

### Directory Structure:

The following folder structure should be followed:

- PID\_project name
  - Sheet Drawings
  - Reference Drawings
  - Support (see support files)

Alternative file naming structures should be submitted for review. Submittals with unusable directory structures may be returned for correction.

### Support Files:

Support files are any files other than drawing files that are required to assure the electronic drawing will appear exactly as the hardcopy when printed. Examples are, but not limited to: plot styles (\*.ctb), linestyle files (.shx), etc. A *readme.txt* file describing the locations where each of those files needs to be included. This file should be located in the same folder as the support files. AutoCAD and MicroStation V8 will create a zip of these files automatically through a packaging utility. This is an acceptable format and the name of the zip file should be *support.zip*.

## AEC CADD Standards – Archival Documents

Page 3 of 7

Include also a *drawing\_info.txt* in the support folder. This text file should include the title block size (i.e. Arch E1 – 30 X 42), the plotting scales of the drawings, and any other specific information required to assure the file is plotted correctly. Support information should be included anytime design files are sent to Purdue.

### Fonts:

Fonts installed with the basic CAD program are the only fonts that will be acceptable for use in the design project. Failure to comply will result in the returning of the electronic files for correction.

### Requirements for Reproducible Hardcopy Deliverables:

Final drawings shall be high quality prints on reproducible media. Examples of reproducible media are vellum and Mylar. Ink delivery may be via ink jet. Chemically treated or coated media required by electrostatic or thermal processes are not acceptable. Laser printing on drafting film is not acceptable. Decals and stick-on drafting aids are not acceptable. Hand drawings, and hand written notes on drawings, are not acceptable.

### List of Final Deliverables

1. One (1) reproducible hardcopy of drawings with stamps and signatures.
2. One (1) hardcopy of specifications, unbound, with stamps and signatures.
3. Two (2) electronic copies of all **CAD** files on CD-ROM/DVD-Rom.
4. One (1) electronic copy of images in TIFF (Grp IV) or PDF reflecting the hardcopy set of drawings and specs.

The deliverables listed above should reflect the project bid documents and include any Revision or Addendum documents. **These documents should be sent to Purdue within 5 working days after a successful bid opening.** A transmittal should accompany these deliverables addressed to the attention of the Manager of Maps and Records with a carbon copy to the Project Manager.

Arrangements can be made with Printing Services for the delivery of these hardcopy documents and images.

### Purdue University's Use of AE Deliverables:

Purdue will be using the deliverables for three main purposes:

1. Long-term document archival.
2. Reference.
3. Provide architectural backgrounds for future renovation and construction and update our Geographic and Building Information System.

### Standards and Requirements for All Deliverables:

1. Expected Drawing Format:
  - A. Typically plans should be oriented so that architectural north is to the top or right of the sheet. If true north differs from architectural north, this should be indicated. The orientation should be the same from sheet to sheet. Show north arrow on all plans.

**AEC CADD Standards – Archival Documents**

Page 4 of 7

- B. The difference between existing and new work should be clear.
  - C. Provide legends, graphic scales, and north arrows on all sheets and provide key drawings where necessary.
  - D. Provide building name and project description on every sheet (see 'Title Block').
  - E. Clearly identify bid items.
  - F. Sketches and drawings, except for mechanical control drawings, should not be placed in the specifications.
2. Expected Sheet Arrangement:
- A. Title sheet and index of drawings -  
For large projects it may be necessary to provide a separate sheet for the index of drawings. Do not use the University Seal or other copyrighted items without written permission from the University's Publications Office.
  - B. Vicinity and project location plans -  
This sheet may be combined with the title and index sheet when appropriate
  - C. Existing Site Survey
  - D. Civil and Sanitary -  
Including pump stations and similar facilities
  - E. Soil Boring Logs -  
If soil boring information is available then provide copies of the information in the plans and/or specifications
  - F. Landscape and Irrigation
  - G. Architectural and Interior Design
  - H. Structural
  - I. Mechanical HVAC
  - J. Mechanical Plumbing
  - K. Electrical
  - L. Fire Protection
3. Legibility:
- Drawings, including all plans, details, symbols and lettering, must be clear and legible when reduced to half size. Particular attention should be given in the preparation of drawings to the amount of detail shown in a given space. Poor spacing, careless lettering, weak lines and crowded drawings will not be accepted. On small uncomplicated projects, one or more plans may be combined onto one sheet, but never so that the plans will be crowded. Illegible/poor quality drawings will not be accepted.

**AEC CADD Standards – Archival Documents**

4. Drawing Sizes:

Table 1

Drawing Sizes			
Size	ANSI	Arch	Misc.
A	8 ½ x 11	-----	-----
B	11 x 17	-----	-----
C	17 x 22	18 x 24	-----
D	22 x 34	24 x 36	-----
E	34 x 44	36 x 48	36 x 42
E1	-----	30 x 42	30 x 36

5. Drawing Scales:

Scales need to be appropriate to depict all aspects of the required work without clutter. Drawing scales should be noted on the drawing as appropriate.

6. Sheet Nomenclature:

Sheet numbers should adhere to the following format. Each sheet number will combine a discipline specific letter followed by a three-digit number; i.e. A101. Alternative sheet nomenclature should be reviewed and approved by both the project manager and CAD Operations Coordinator.

Table 2

Sheet Lettering System	
Letter	Discipline
A	Architectural
C	Civil
E	Electrical
F	Fire Protection
I	Interior Design
M	Mechanical
P	Plumbing
S	Structural
T	Telecommunications

**AEC CADD Standards – Archival Documents**

Page 6 of 7

Table 3

Sample Sheet Numbering System	
Number	Description
000-099	General symbols legends notes etc.
100-199	Plans (horizontal views)
200-299	Elevations (vertical views)
300-399	Sections (sectional views)
400-499	Large Scale (plans & elevations)
500-599	Details
600-699	Schedules & Diagrams
700-799	Architect Assigned
800-899	Architect Assigned
900-999	3-D Views

7. Title Block:

The following information is required on the title block.

- A. Title Description – this is the descriptive project name agreed upon between the project manager and the A&E. The title will be consistent throughout all sheet drawings.
- B. Project ID (PID) – this is a Purdue University generated number. The project manager will be able to provide this information.
- C. Sheet Number – refer to “Sheet Numbers” previously in this section for naming guidelines.
- D. File Name – refer to “File Naming – 1. Sheet Drawings” previously in this section for naming guidelines

8. Review Submittals:

Electronic copies are required at each design submittal stage in the project. The following are the typical stages in the submittal process:

- A. Schematic Design
- B. Design Development
- C. 100%
- D. Bid Documents

This is only a guideline. The project manager will dictate the frequency of submittals.

**AEC CADD Standards – Archival Documents**

Page 7 of 7

9. Delivery Methods:

The most desirable media for final project file delivery is CD-ROM/DVD-ROM. File Exchange services are an acceptable form of delivery for review drawings. Purdue's Project Manager can arrange use of this service if desired.

10. Delivery Requirements:

When exchanging digital media, an external (hard copy) label should contain, at a minimum, the following information:

- A. Project name, commission number, Project ID (Purdue).
- B. Sequence number (for multiple CD/DVD's).
- C. A brief description of the content of each CD/DVD (i.e. Mechanical, Plumbing, Civil, etc.).
- D. Drawing format (.dwg, .dgn)

A transmittal sheet should accompany all media submittals. The sheet should contain, at a minimum, the following information:

- A. Project name, commission number, Project ID (Purdue), etc.
- B. Total number of CD/DVD's being delivered.
- C. A brief description of the content of each CD/DVD (i.e. Mechanical, Plumbing, Civil, etc.).

**In the event that the file exchange services site is used to deliver project files, a transmittal, including the appropriate information described above, should also be delivered. This transmittal should be addressed to the CAD Operations Coordinator and carbon copied to the Project Manager. The transmittal can be delivered via fax or mail or email.**