AutoCAD Standards
University of California, Santa Cruz
Physical Planning & Construction

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PP&C AutoCAD Standards

1.   General Requirements:

The principal consultant shall maintain a complete set of Computer Aided Design (CAD) drawing files throughout the project. The complete set of CAD drawings for all applicable disciplines will be submitted in the same AutoCAD format and shall be identical to their hardcopy submittals. Consultants are solely responsible for (1) the production and appearance of their hard copy submittals, and (2) the preparation of electronic files that replicate the hard copy submittals when plotted. Exceptions for small projects must be approved by PP&C Records office.

1.1.   Format:
All CAD drawings must be in DWG file format saved as AutoCAD 2000, or current release used by PP&C. AutoCAD files must not be in a newer version than currently being used by PP&C. CAD graphic files copied to neutral file exchange formats such as drawing exchange format (.dxf) and initial graphics exchange specification (.iges) will not be accepted. By request, PP&C will furnish a template file which conforms to the standards described herein.

1.2.   Ownership:
All CAD files created in furtherance of a contract or authorization issued by UCSC Physical Planning and Construction are the sole property of PP&C. PP&C reserves the right to require signed written acknowledgement of ownership.

2.   Required Data:

2.1.   Area Tabulation:
All plan-view files shall contain a separate layer for area calculations (e.g. "A-FLOR-AREA"). On this layer, closed polylines shall be used to tabulate the gross square footage (GSF), by floor, of all spaces affected by the project in question. In the case of new construction, include the outside GSF for the entire building.

2.2.   Drawing Files:
2.2.1. For each hardcopy sheet in the plan set, one corresponding CAD "sheet file" is required. Sheet files shall have layouts, created in paper space, that are identical to the final hardcopies, and are ready to plot. Layout tabs shall be named to reflect the specific drawing sheet name or number within the project plan set.
2.2.2. All design work shall be created in model space.
2.2.3. In addition to sheet files and any supporting files, one separate "master" file shall be provided with both the complete Bid Set and final (As Built) submittals for each floor (or area) affected by the project in question. These files will be used by PP&C staff to incorporate project work into permanent record files for campus reference. Master files shall contain no Xrefs, no layout space, and no project-specific annotation. All disciplines affected by the project, however, shall be

represented in these files. (E.g. plumbing, electrical alterations, architectural design, etc.).

External References:

2.2.4. Use of external reference files (Xrefs) should be minimized wherever possible.

2.2.5. Xrefs, when necessary, shall be attached, not overlaid.

2.2.6. Insertion point is to be at 0,0 unless otherwise impractical.

2.2.7. Do not bind the external reference files (Xrefs) to the individual drawings.

2.2.8. Xrefs shall be located in the same directory as the dependent files, so PP&C does not have to "re-path" Xrefs.

2.3. Submittal Data:

2.3.1. Include all files, both graphic and non-graphic, required for accessing and using the project submittal drawings (e.g., raster files, plot style tables, text styles (*.shx), etc.).

2.3.2. Submitted CAD drawings shall be purged of all un-referenced line types, blocks, layers, shapes and text styles.

3.   Drawing Formats and Graphics:

3.1. Blocks:

3.1.1. Blocks shall be created on Layer 0.

3.1.2. Nested blocks shall never be used.

3.1.3. Blocks shall not be mirrored, or inserted with unequal x, y and z scale factors. Insertion point to be at 0,0 unless otherwise impractical.

3.2. Color:

The color of all drawing elements should be set to BYLAYER; colors shall not be set by object.

3.3. Dimensioning:

3.3.1. All dimensions shall be fully associated.

3.3.2. Manual input of dimension text or otherwise over riding the actual dimension is not acceptable.

3.4. Fill and Hatch Patterns:

3.4.1. Limit excessive use of hatch patterns to avoid unnecessarily large files.

3.4.2. Solid hatches shall be with the SOLID command. Using dense hatch patterns to create solid fill shall not be permitted in the drawing set.

3.5. Graphics:

Continuous linear elements such as contour lines, or curb lines, shall be constructed with continuous polylines.

3.6. Linetype:

3.6.1. Linetype & lineweight shall be BYLAYER.

3.6.2. Linetypes shown as broken lines (e.g. dashed, hidden, divided, etc.) shall be created with the LINETYPE feature and NOT by individual line elements.

3.7. Raster Graphics:

3.7.1. Raster files shall not be used to represent major drawing elements.

3.7.2. Raster files may be used for the incorporation of existing condition photos or similar applications.

3.7.3. Any raster file included in a drawing shall be "attached" and placed on its own layer.

3.7.4. Acceptable raster formats: TIFF, JPEG and BMP.

3.8. Text Styles:

3.8.1. Use standard fonts and text settings wherever possible (only standard AutoCAD or standard Windows True Type fonts may be used). Template files provided by PP&C shall contain examples of preferred text styles for typical text uses (e.g. Notes, Title, etc.).

3.8.2. The minimum plotted text size shall be 3/32".

4. <u>Drawing Setup:</u>

4.1. Coordinate System:

Use the California State Plane Coordinate System (NAD84).

4.2. File Naming:

4.2.1. All drawing file names shall begin with a serial number specifying the order of the sheets, the word "File" and the UCSC project number (e.g. "001 File 2736").

4.2.2. Where applicable, drawing names shall be identical to the hard copy drawing sheet number. Example: If the first sheet of the set is Sheet Number A1.01, the CAD drawing name would be "001 File 2736 A1.01.dwg".

4.2.3. Names of Xrefs and supporting files shall contain some descriptive information about the nature of the file (serial numbers shall not be used when naming support files). Xref file names shall include the letter 'x' after the file number, and before the descriptive information (e.g. File 2736xgrid.dwg).

4.2.4. Names of blocks shall contain descriptive information about the nature of the block.

4.3. Layers:

Do not place entities on layer 0. Place all drawing elements on their corresponding layer.

4.4. Layer Names:

4.4.1. PP&C uses the U.S. National CAD Standard, AIA Format, as the basis for layer names. Refer to the "PP&C CAD Layering Guidelines" list for a complete directory of standard layer names (a complete list is also contained in the template file (proto.dwg), provided by request by PP&C). This format provides guidelines for creating names for unique

layers. Layer names that do not conform to these guidelines are not acceptable.

4.4.2. The naming structure shall be consistent across all disciplines and common elements should be named identically in all disciplines.

4.5. Plot Styles and Pen Assignments:

4.5.1. CAD files shall be constructed using the "named plot styles" method (STB files), and not the "color-dependent plot styles" method (CTB files).

4.5.2. Unless otherwise approved by PP&C, all files shall use the "PP&C Monochrome.stb" plot style table (provided by PP&C). If this plot style table is modified, provide "Read Me" text explaining changes.

4.5.3. All layers shall have a plot style setting of "By Plot Style". Screened layers shall use pre-defined plot styles, as contained in the "PP&C Monochrome.stb" plot style table.

4.6. Scale:

4.6.1. A graphic scale must appear on all appropriate layouts (so that printed and scanned drawings are scalable).

4.6.2. All model space drawings shall be drawn full scale (1:1).

4.7. Standard Sheet Sizes:

4.7.1. Required sheet size for hard copies is specific to each project and is under the discretion of PP&C.

4.7.2. All hardcopies and electronic sheets in the As-Built drawing set shall be the same size.

4.7.3. Unless otherwise approved by PP&C, all sheet sizes are limited to five standard formats (other sheet sizes must be approved by PP&C):

ANSI A	8-1/2"x11"
ANSI B	11"x17"
ARCH C	18"x24"
ARCH D	24"x36"
ARCH E1 (Arch 30")	30"x42"
ARCH E	36"x48"

4.8. Units:

Drawing units shall be set to Architectural or Engineering. Decimal units are not permitted unless otherwise approved by PP&C.

5. Sheet Layout:

5.1. Drawing Changes:

All drawing revisions must be clouded and marked with a revision indicator (Delta). The numbered Delta symbol document reference (i.e. Change Order No. ____) and revision date must be placed in the revision block section of the title block.

5.2. Drawing Details:

All drawing details must be part of the full size drawing set and may not be submitted in book form.

5.3. Sheet Layout:

5.3.1. Standard templates for cover sheets and borders (*.DWG format) are available by request from PP&C.

5.3.2. A drawing index that lists all sheets for all disciplines is required on the Title Sheet or proximate thereto.

5.3.3. A Symbol and Abbreviation Legend is required on the Title Sheet or proximate thereto (legends for individual disciplines may be included).

5.3.4. North arrows are required on site plan and floor plans. If necessary both true north and reference north shall be shown on site plans.

5.3.5. Title block information must be placed along the right edge of the drawing sheet so that it is visible when sheets are rolled.

5.3.6. Title blocks must include the following information in the lower right hand corner of the sheet:
> PP&C File number
> CAD file name
> Consultant's project number
> Drawing sheet number

5.4. Typical Discipline Letters:

A	Architectural (may include Cover Sheet)
AV	Audio Visual
C	Civil
E	Electrical
FP	Fire Protection (sheets containing fire alarm and fire sprinkler data)
FA	Fire Alarm (only)
FS	Fire Sprinkler (only)
G	General Information (including Cover Sheets, if separate from architectural)
L	Landscape
M	Mechanical
P	Plumbing
S	Structural
T	Telecom