

Thermal Group

**Computer Aided Design
(PacifiCorp Energy)**

**| General AutoCAD/Drafting Standards
| (Specification DCAP876)**

Document Control Department

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PREFACE

For proposed of this document, PacifiCorp or PacifiCorp Energy means, the Thermal Division of Pacificorp Energy.

The intent of this document is to describe Computer Aided Design and Drafting standards as they apply to drawing documentation. These standards apply to all work whether performed internal or external to PacifiCorp Energy.

All standards in this documentation apply to the Thermal group only and should not be considered applicable to other PacifiCorp groups. Any Computer Aided Design and Drafting standards from other PacifiCorp groups should not be considered applicable to this group.

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OVERVIEW

This document is not intended to replace the standards. It is intended to give a brief overview.

If there are any conflicts in the documentation contained in this overview and the actual standards documentation, the standards documentation supersedes this overview.

AutoCAD VERSION

1. Final AutoCAD hybrid or Xref'd documents must meet current needs for EDMS compatibility.
2. Final AutoCAD documents must not be newer than current version being used by PacifiCorp Energy.

BORDERS

1. Must use PacifiCorp Energy provided borders. No exploding or editing of borders allowed.
2. Insert on Layer BDR.
3. Insert at 0,0 unless used for land based documentation in World or State Plane Coordinate Systems.
4. Layering shall be used in an intelligent manner as described herein.

DRAWING NUMBERS

1. Must be approved by Plant Site Document Control Personnel or by PacifiCorp Energy Document Control Personnel.

FONTS and TEXT STYLES

1. Simplex.shx or approved AutoCAD packaged font.
2. NO CUSTOM FONTS or SHAPE FILES.
3. Use Associative Dimensioning or Mtext for stacked fraction formatting as applicable.

REVISIONS

1. Use Revision Clouds to highlight all revisions until as-built.
2. Rev Cloud must be placed on REV Layer.
3. Rev Layer must be RED.
4. Revision triangles must be used to mark revisions.
5. All clouds and triangle markers from previous revisions must be removed.
6. Revision information must be updated in the appropriate areas of the Title Block by means of PacifiCorp Revision Block.
7. Redlines must use prescribed Color Code Key.

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DRAWING PRACTICES

1. Electrical diagrams shall not be drawn as combinations. Example: A schematic diagram shall consist purely of schematic type of imagery.
2. Cable & Conduit Schedules shall use the provided Excel file as prescribed herein.
3. Circuit Schedules shall use the provided Excel file as prescribed herein.
4. Panel Schedules shall use the provided Excel file as prescribed herein.
5. Drawing entities shall be drawn at full scale, 1:1 (1 to 1).
6. Model Space must be used for drawing geometry.
7. Paper Space must be used for the Drawing Border.
8. Paper Space Tab must be renamed.
9. Multiple Paper Space Layouts are not allowed.
10. X-Referencing shall only be used as prescribed in the standards document.
11. Hybrid drawings are allowed as indicated herein.
12. Either a color to Line Weight assignments as described herein or the PacifiCorp Energy "CTB" file must be used.
13. The Final Exit of any drawing shall be done in a manner so as to leave the file in a clean state as described in the standards.
14. SNAP settings of 1/32 or multiple there of shall be used.
15. Associative Dimensioning shall be used.
16. LTSCALE set to .25.

DRAWING INDEXES

1. Drawing indexes must use the provided Excel template and must accompany all drawing files.

CHAPTER 1 —General

1 Scope

This standard provides an introduction to the AutoCAD standards for PacifiCorp Energy's Thermal Plants. Included in this document is information on who should use these standards and how they should be applied.

2 General

The AutoCAD standards documents are contained here.

Pertinent text information, and other files used for creating and managing AutoCAD drawings are available from document control Personnel.

3 Required by Engineering Departments

Use of the standards described in this document are required of individuals in the PacifiCorp Energy Thermal Departments as well as contracted work being done in behalf of this group.

4 Acceptable AutoCAD Format

All AutoCAD files must be provided in the current PacifiCorp Energy accepted format.

1. Final AutoCAD hybrid or XREFed documents must meet current needs for EDMS compatibility.
2. Final AutoCAD documents must not be newer than current version being used by PacifiCorp Energy.

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CHAPTER 2 —Borders

1 Scope

This standard is used to standardize the border format which includes consistent drawing, and title block areas for PacifiCorp Energy drawings. Multiple drawing sizes are provided to accommodate various needs. Modifications may not be made to standard PacifiCorp Energy borders.

If agreed to by PacifiCorp Energy, any permitted consultant's logo or insignia placed inside the drawing space of the PacifiCorp's standard border shall remain as an independent block. The location of the consultant's logo or insignia on standard PacifiCorp Energy's borders shall be as specified in the AutoCAD Procedures Document.

2 General

During the creation of a new drawing or the editing of an existing drawing, the PacifiCorp Energy standard AutoCAD borders must be used. The borders contain a standard layout as well as an attributed title block. Also included are the following presets:

1. border insertion point
2. border or paper size
3. layer control
4. revision blocks
5. text styles
6. dimension styles

All borders will have a border revision date near the lower right corner of the title block just inside the border line. Each AutoCAD drafter–designer whether internal or contracted, is responsible to assure that the most current version of the PacifiCorp border or template is used.

3 Border Insertion Point

All border insertion points are located at coordinates 0,0 in the Paper Space environment. (This places the Lower Left Corner of each border at coordinates 0.5,0.5).

4 Border and Paper Size

The borders shown in Table 1 have been developed for use on all PacifiCorp Energy drawings.

1. All new drawings must utilize the *Corp-B*, *Corp-D* or *Corp-E* borders.
2. The *Corp-D* border is the preferred border, but the *Corp B* and *Corp-E* may be used to meet specific plant needs.
3. The ***Corp-B2 border must be used for Dave Johnston Plant "B" sized drawings. This border shall not be used for any other plants or locations.***

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- When updating or editing *existing non standard sized PacifiCorp Energy drawings*, other PacifiCorp standard borders may be used to meet these preexisting needs.

Table 1 lists each border file name and provides drawing size, paper size and suggested use.

Table 1 - Borders and Sizes

File Name	Size	Paper Size	Suggested Use
Corp-A.dwg	A	8-1/2" x 11"	Sketches and details. (used for portrait format)
Corp-B.dwg	B	17" x 11"	Sketch, details conductor and cable list (landscape format)
Corp-B2.dwg	B	17" x 11"	Sketch, details conductor and control wiring diagrams (landscape format) <u>(Dave Johnston Plant Only)</u>
Corp-D.dwg	D	34" x 22"	Recommended for project size and all new standards drawings (landscape format)
Corp-E.dwg	E	43" x 33"	For odd sized originals and redraws when re-drawing to D sized is problematic.
Corp-F.dwg	F	39" x 27"	For odd sized originals and redraws when re-drawing to D sized is problematic. (Not to be used for new drawings.)

5 Layer Control

The layers shown in Table 2 are provided as part of the border drawing to ensure consistency throughout disciplines and to provide a starting point for all new and existing drawings.

Table 2 - Layer Control

Layer Description	Layer Name	Color
Border	BDR	White
Dimensions	DIM	Green
Revisions	REV	Red
*Text	TEXT	varies

*Text may be a variation and on other layers as necessary.

6 Revision Block

An area to record drawing revisions and revision history has been provided within each border. Any changes made to a drawing must be recorded in this area. A revision block is provided with each border to accommodate this requirement.

7 Drawing Numbers

Assignment

PacifiCorp Document Control shall use the following procedures when assigning new drawing numbers:

When to assign new numbers

New drawing numbers shall be assigned when the need arises for new drawings to be created at new or existing PacifiCorp Energy facilities. For contract jobs, the Document Control and Design/Drafting Personnel responsible for the Plant Site will issue a list of drawing numbers for each project.

How to use new numbers

Once the user has determined how many new numbers are needed, he or she shall contact PacifiCorp Energy Plant Site Document Control personnel. The user will be given new numbers (based on current Plant numbering procedures for the specified location).

Generic Numbering convention

When plant site numbers are not available, a generic numbering convention may be assigned by PacifiCorp Energy Document Control Personnel or Plant Site Document Control Personnel. This will be structured as shown in Figure 1, and must appear in the drawing title block and the drawing file name. *This will only be used when there are no plant specific numbering requirements.* Table 3 contains some examples of drawing/document numbers for various types of files.

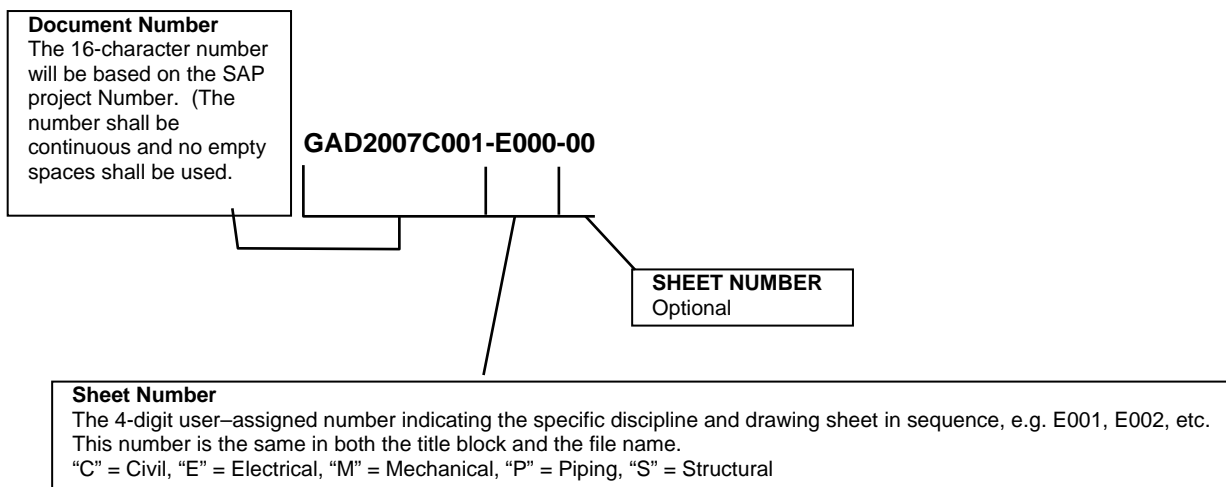
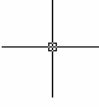


Figure 1 - Drawing Number Diagram

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Table 3 - Drawing Number Examples

DESCRIPTION	FILE NAME	TITLEBLOCK
Single sheet stand-alone drawing	GAD2007C001-E001.dwg	GAD2007C001-E001
Drawing with multiple sheets:		
Sheet 1	GAD2007C001-E001.dwg	GAD2007C001-E001
Sheet 2	GAD2007C001-E002.dwg	GAD2007C001-E002
Sheet 3	GAD2007C001-E003.dwg	GAD2007C001-E003
or		
Sheet 1	GAD2007C001-E001-01.dwg	GAD2007C001-E001-01
Raster image file for # GAD2007C001.E001 GAD2007C001.E001.tif		



: VNDR
 : VNDR#


<small>PROJ#</small>	UNIT 1 DESCRIPTION 1 DESCRIPTION 2 DESCRIPTION 3			<small>W/O No.</small>	<small>BY</small>	<small>CHK</small>	<small>APP</small>		
<small>W/D#</small>				<small>REVISION</small>	<small>FILENAME.DWG</small>	<small>W/O No.</small>	<small>BY</small>	<small>CHK</small>	<small>APP</small>
<small>DATE 01/01/01</small>				<small>REVISION</small>	<small>FILENAME.DWG</small>	<small>W/O No.</small>	<small>BY</small>	<small>CHK</small>	<small>APP</small>
<small>ENG</small> <small>DES</small>				<small>REVISION</small>	<small>FILENAME.DWG</small>	<small>W/O No.</small>	<small>BY</small>	<small>CHK</small>	<small>APP</small>
<small>DR</small> <small>CH</small>				<small>REVISION</small>	<small>FILENAME.DWG</small>	<small>W/O No.</small>	<small>BY</small>	<small>CHK</small>	<small>APP</small>
<small>APPROVAL</small>		<small>PLANT NAME</small>		<small>DATE</small>	<small>DATE</small>	<small>DATE</small>	<small>DATE</small>		
<small>REDRAWN FROM</small>				<small>No.</small>	<small>DATE</small>	<small>DATE</small>	<small>DATE</small>		
<small>RD</small> <small>REV</small>	<small>SCALE:</small> NONE	<small>PLANT DRAWING No</small>	<small>SHEET</small> 1 of 1	<small>REV.</small> 0	<small>DATE</small>	<small>DATE</small>	<small>DATE</small>		
7		8	<small>BORDER REVISED 9/06/2007 M.P.T.</small>		<small>DATE</small>	<small>DATE</small>	<small>DATE</small>		

Figure 2 – Title Block

Parent Drawing

The “parent” drawing will have its own drawing number with the appropriate file extension, (.DWG). A raster file will have the same number as the parent drawing to which it is attached, with the appropriate file extension, (.TIF). XREFs or raster files should only be used within a single facility. If there is a need to utilize raster files in other facilities, copies should be made and renamed appropriately.

8 Title Block

The title block is provided as part of the border, and has been attributed for use with the electronic drawing management system (EDMS). The attributed borders have been designed to be inserted into a new or existing drawing and are required on all PacifiCorp Energy AutoCAD files. They are not to be exploded, or modified in any way. If changes are necessary contact PacifiCorp Energy Document Control. (All changes must be approved by the PacifiCorp Energy Document Control group.)

1. When entering information into the attributed fields, leading or trailing spaces are not allowed.
2. Generic Generalized tile information is not acceptable. Drawing type and descriptions must be specific enough to allow for proper search and find in our current EDMS system.

Example 1: Current Structural Steel drawing title information might say,
“STRUCTURAL STEEL”. Appropriate and acceptable descriptions might say, “STRUCTURAL STEEL PLAN AT ELEVATION 2150’ ” or “STRUCTURAL STEEL DETAIL “A” AT COLUMN 3 TURBINE DECK”.

Example 2: Current Instrumentation Diagram title information might say,
“INSTRUMENT DIAGRAM”. Appropriate and acceptable descriptions might say, “TURBINE SUPERVISORY INSTRUMENT DIAGRAM LOOP 151 4-20mA”.

3. All electrical *One Line* and *Three Line Diagrams* must be indicated as such in the title information.
4. All drawings used as a reference, must be listed in the Reference Section of the border or in the drawing information.

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CHAPTER 3 —Font and Text Style

1 Scope

This standard specifies the fonts and fractions to be used in drawings prepared in AutoCAD.

2 General

Text on new PacifiCorp Energy drawings shall use the simplex.shx font as it is supplied by Autodesk as part of the AutoCAD package.

If, for any reason, the simplex.shx font cannot be used, the only fonts that may be substituted are the AutoCAD built-in fonts. No custom font libraries shall be used. *(The T&D PacifiCorp owned Simplex1.shx font is not allowed.)*

3 Use of Text Symbols and Fraction Codes

The Simplex.shx font contains all standard keyboard characters and many other special characters. Special characters in most cases can be created using SingleLine Text, (standard text entry). If a special character is not part of the Simplex.shx character set, another AutoCAD packaged font may be used. MultiLine Text, (Mtext), can be used to stack numbers, fractions or other text.

3.1 Special Characters

The following, Table 4, gives %% and Unicode entries for some commonly used symbols that are a part of the Simplex font library. Some of these characters are not available by using “%%” but are available through the international code (UNICODE). These start out as \u+ for the code value.

Table 4 - Codes for Special Characters.

Symbol	Code	Symbol	Code	Symbol	Code
° (Deg)	%%d or \u+00b0	±	%%p or \u+00b1	(diameter)	%%c or
ℓ	\u+214a	℄	\u+2104	Ω	\u+2126
μ (micro)	\u+00b5	<u>Underscore</u>	%%u	(Angle)	\u+2220
(Delta)	\u+0394	<u>(Subscript 2)</u>	\u+2082	(Squared)	\u+00b2
(Electrical Phase)	\u+0278				

3.2 Fractions

- | (For instruction on creating Stacked Fractions in Mtext, see “Fractions” procedures located in the AutoCAD Procedures Document.)

CHAPTER 4 —Drawing Revision

1 Scope

This standard lists the procedures to be followed when revising drawings.

2 Revision Clouds

2.1 General

All engineering groups, contractors and consultants shall use a revision cloud to identify changes on drawings.

2.2 Revision Cloud Command

When creating a revision cloud, the following standards apply.

1. Create or set the layer to REV for revision layer (color Red).
2. Select the appropriate Revision Cloud command and follow the instructions on the command line.
3. The clouds should be a continuous line whenever possible. (Multiple segments of arcs, P-lines or circles that are not continuously linked as one entity are not acceptable.)
4. When the cloud is in conflict with text associated with graphics, the line may be broken.
5. When revisions are made to large bodies of text, individual text lines shall not be clouded.
6. The loop spacing may be changed.
7. All clouds from previous revisions must be removed.

| (For instruction on using the AutoCAD Revcloud tool, see “Revision Cloud Command”, located in the AutoCAD Procedures Document.)

2.3 Revision Triangles

1. A revision Triangle with the revision number must be placed inside of each revision cloud.
2. The revision triangle should be a block with attributed text entry inside.
3. When it is not possible to properly cloud revised text, a revision triangle must be placed at the revision location.
4. Triangles from previous revisions must be removed.

3 Updating with Revisions

3.1 Update Drawing Process

Changes may be made to drawings in three ways: as *revisions* made prior to construction, as *revisions* made during construction, or as *as-builts* provided after construction. When making *revisions*, revision clouds are used to highlight changes on the drawings. In *as-builts*, revision clouds are not used.

3.2 Revisions

Changes may be introduced to drawings before the construction work is complete. The responsible engineer may provide changes to drawings during construction. These changes will be inserted on the drawings with clouds and revision numbers. Letters shall be used for changes made prior to approval for construction. After construction approval, numbers shall be used. (Examples: revisions “A” through “Z” prior to construction approval, Revisions “1” through “999” after construction approval.) This complies with nationally accepted standards.

3.3 As-Builts

The marked up drawing’s as-builts are prepared by the field after construction is complete. The revision cloud will not be removed until the marked up drawing’s as-builts are reviewed and approved by the engineer responsible for the work. At this time, the revision clouds are removed and the update is made to the master file. Additional changes may be included in the as-builts that will not have revision clouds. These changes will be added to the revision block and the changes saved to the master file.

3.4 Update of Revision History

Upon removing the revision cloud or inserting changes from the as-builts, the AutoCAD user shall update the revision area of the revision block in the standard border.

The AutoCAD user must use the revision blocks as provided.

| (For information on the Revision Block Fields, see “Update of Revision Block”, located in the AutoCAD Procedures Document.)

3.5 Redlining Drawings

The originator of any drawing changes must provide the drafter–designer with a color-coded drawing and the name of a person to contact if there are any questions. Details should include:

1. Updated information in the revision area such as revision number, description of change, work order or project number.
2. Date of change.
3. Name of individual responsible for the change.

The drafter–designer will make the changes as requested, and then return the marked up drawing along with a print of the revised drawing to the originator for review. Once approved, the drafter–designer will save the changes in the appropriate electronic filing system.

3.6 Color Code Key

When changes or corrections are being sketched on a drawing, the following color codes shall be used to assist the drafter:

1. Additions: Red
2. Deletions: Green
3. Area checked, no change made: Yellow
4. Notes to drafter must be circled and in colors other than red, black or pencil. (Preferably in Blue.)

All changes to drawings must be clearly marked with the appropriate color code to provide the drafter–designer with precise detailed information regarding the changes requested.

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CHAPTER 5 —Drawing Practices

1 Scope

This section details various drawing practices which are required to provide uniformity and ease of use for drawings.

2 Quality and Neatness

All drawings done for PacifiCorp Energy must be done neatly and accurately. They should follow good drawing practices, and clearly illustrate the necessary details for the devices represented and the work to be performed.

Some practices to abide by but not limited to, include:

1. Use appropriate pen widths to differentiate object, dimension and other lines.
2. Object lines should meet at corners.
3. In dimensioned drawings, extension lines should not touch objects.
4. All Model Space drawing content should be as close a proximity to each other as possible and at or near 0,0 in this drawing environment.
5. All Paper Space drawing content must be inside the border of this drawing environment.
6. Objects should be drawn to the actual dimension. Do not “free pick” object lines.
7. Use appropriate text justifications when placing or modifying text.
8. Draw all items on appropriate layers with color and line types set to “BYLAYER”. If a different color or line type is needed, change to or create the appropriate layer and draw the desired items.

The remaining sections in this document describe guidelines and requirements that will help maintain a professional drawing appearance.

3 Drawing Practices – Electrical

All new electrically oriented drawings done for PacifiCorp Energy must be done in a consistent manor that separates each class to their own style of drawings. (Pure single class drawings are required.) Combination drawings are unacceptable. Example: A combination of Schematic & Connection or Wiring diagram in a new drawing is unacceptable.

Some practices to abide by but not limited to, include:

1. Single-Line diagrams shall only contain pure Single Line imagery.
2. Three-Line diagrams shall only contain pure Three Line imagery.
3. Schematic diagrams shall only contain pure Schematic imagery.
4. Connection diagrams shall only contain pure Connection imagery.
5. Layout diagrams shall only contain pure Layout imagery.

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4 Cable and Conduit Schedules

All Cable and Conduit Schedules must be provided in an Excel Spreadsheet format. Use of the PacifiCorp Energy spreadsheet template, “*PcorpEnergyCableAndConduitSchedules.xls*” is recommended.

5 Circuit Schedules

All Circuit Schedules must be provided in an Excel Spreadsheet format. Use of the PacifiCorp Energy spreadsheet template, “*PcorpEnergyCircuitSchedules.xls*” is recommended.

6 Panel Schedules

All Panel Schedules must be provided in an Excel Spreadsheet format. Use of the PacifiCorp Energy spreadsheet template, “*PcorpEnergyPanelSchedules.xls*” is recommended.

7 Drawing Scale

All drawings should be made in real–world dimensions 1:1, (1 to 1).

8 Model Space

Model Space layouts shall be used in all PacifiCorp Energy drawings in the following manner. All drawing geometry including notes and legends shall be drawn in the Model Space (tab). Dimensions inside the Paper Space environment that are linked to the Model Space geometry is an exception. (The border is to be placed in Paper Space.)

1. Draw all objects at 1:1 or full scale within the Model Space environment.
2. Units set to *Inches*.
3. All borders will be inserted at coordinates 0,0 in Paper Space.
4. The Paper Space Layout (tab) must be renamed. (Example: 36x24 D).

9 Paper Space Drawings

Paper space must be used for all drawings.

1. Draw all objects at 1:1 or full scale within the Model Space area, at or near coordinates 0,0. (Items drawn to the World or State Plane Coordinates Systems are an exception.)
2. Units set to *Inches*.
3. All borders will be inserted in Paper Space at coordinates 0,0.
4. (The Paper Space Layout (tab) must be renamed from the AutoCAD default. (Example: 36x24 D) The AutoCAD default (TAB) name is not acceptable.
5. The Page Setup shall be configured at the scale of 1:1, with the Plot Area set to “EXTENTS” and “Center the Plot” selected.

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6. Multiple Paper Space layout (tabs) are NOT to be used within any single drawing file.
7. All Paper Space layout (tabs) other than the first one are to be deleted.

| (For information on setting up a Paper Space environment, see Paper Space procedures located in the AutoCAD Procedures Document.)

10 Externally Referenced Drawings

At times it may be necessary to obtain a portion of a drawing from another “parent” drawing, and to have the “child” drawing change automatically any time the parent drawing is changed. This can be done in AutoCAD using the External Referencing function (XREF). Great caution should be used with XREFs to insure that the parent drawing is only changed when appropriate.

10.1 Definition

XREFed drawings are “MASTER/BASE” drawings attached to other drawings that are modified and utilized to reduce time, repetition and errors in design. The margin for error is reduced since it is only drawn once in the BASE. Usually, these “BASE” drawings consist of entities which will appear in more than one file as a “background” or “plan.”

10.2 When to XREF

A practical application for “XREF-ing” would be whenever a general layout or a file with multiple entities will be used in more than one drawing as a “background” or “BASE.” For example, base drawing 123456-000, may consist of the following entities on related layers:

PROPERTY LINES
FENCE LINES
FOUNDATIONS
STRUCTURES
ROADS (ACCESS AND STATION)
BASELINES
CONTROL HOUSE

10.3 XREF management

The following is an XREF drawing relationships diagram (Figure 3).

The illustration below is an example XREF relationships across various drawing numbers.

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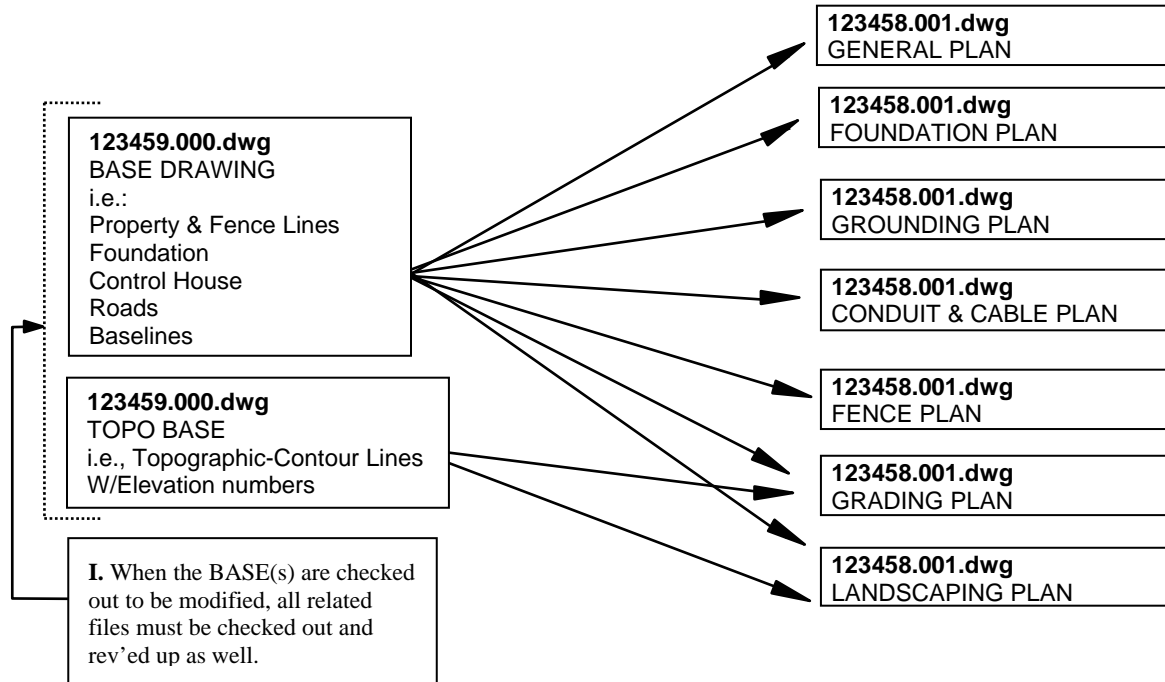


Figure 3 - XREF Drawing Relationships

External referencing is encouraged throughout the design process because it reduces drafting effort in collaboration among users and across disciplines. Upon completion of the project, or at any other time prior to checking files into EDMS, make all referenced files, (other than the “PLAN” drawings as in Figure 3 above), part of the main drawing using the XREF Manager “Bind” and “Insert” commands.

When the “BASE” or “PLAN” drawings shown above are not bound to the drawings they are referenced in, they must list all drawings they are linked to, in the “Drawing Reference Section” of the border. Wording must indicate that the “BASE” is linked to the drawing listed in the reference. EXAMPLE: In the reference part of the “BASE” the wording might say: Drawing “GAD2007C001-E001 X-REFERENCES THIS DRAWING”.

In the drawings that X-references a “BASE” the “Drawing Reference Section” must list the base drawing in its reference section of the border and indicate in its wording that the “BASE” is an X-reference. EXAMPLE: A drawing has an X-reference attached to it. In the “Reference Section” of the border it might say: Drawing “GAD2007C001-002 ATTACHED AS AN XREF”.

(See “How to X-REF” procedures located in the AutoCAD Procedures Document.)

11 Hybrid Drawings

11.1 Normal Externally Attached Raster Drawings

The purpose of Externally Attached raster images is to eliminate manual drafting and reduce drafting time when revising existing manual drawings. Raster images should only be used when it is not feasible to produce a full CAD re-draw.

Black and White Raster images should be scanned at a minimum of 300 dpi and a maximum of 400 dpi. Color images should be scanned at a minimum of 200 dpi and a maximum of 300 dpi.

Raster images should always be attached in model space at a coordinate that places the Lower Left corner of the image at or near 0,0, and on layer "RASTER", with color "WHITE". The "Retain path" option unchecked, transparency set to "ON", and the image frame turned off.

Attached raster images may be used when the revision being performed affects 30% or less of the drawing. However, the entire drawing may be redrawn in AutoCAD at the drafter/designer's discretion. It should be remembered when creating composites that the goal is to work toward a fully vectorized ".DWG" drawing. (An effort should be made when raster editing, to limit most of the edits to erasing). The drafter should, if time and budget allow, convert raster images whenever possible.

Before the raster image may be used, it must be despeckled, deskewed, cropped and otherwise prepared as necessary to assure that all portions are legible. Areas that cannot be successfully repaired by such methods shall be redrawn in AutoCAD.

Raster images may only be linked to drawings using AutoCAD. PacifiCorp Energy's preferred raster editing software is GTXRaster CAD. However, any image-editing software capable of saving the file as a stripped CCITTG4 compressed "tif" image is acceptable.

Normal Externally Attached raster images may only be referenced to one parent. If more than one parent drawing uses the raster image, and the image is not inordinately large, copies of the image file will be made, renamed and referenced to each parent.

In a drawing that has an image attached, the "Drawing Reference Section" must list the images it has attached and indicate that the image is attached. EXAMPLE: A drawing has an image attached to it. In the "Reference Section" of the border it might say: Drawing "GAD2007C001-002 RASTER ATTACHMENT".

11.2 Compound Externally Attached Raster Drawings

Compound raster drawings are created when it is desirable to provide a topological or other land base image behind the actual drawing, and there is no intent to vectorize this image in the future.

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12 Plotter Setup - Line Color to Line Width Assignment

Line color assignments are made within each AutoCAD drawing file. Each of the 16 line colors listed below must be set up with the predefined line width assignment as shown in Table 5.

These 16 color assignments agree with the colors suggested by AutoCAD. All unassigned colors shall be used with a pen width of 0.01” until defined in Table 5.

A PacifiCorp Energy CTB file is available to assist with these pen settings.

Table 5 - Line Color to Line Width Assignment

AutoCAD Color Number	Associative Color	Line Width	Suggested Line Use
1	Red	.022”	Title text, object line (large scales)
2	Yellow	.012”	Text, object lines (small scales)
3	Green	.007”	Text, extension, dimension, center line, phantom, hatching, and hidden lines
4	Cyan	.028”	Heavy object lines. Section lines. As needed
5	Blue	.012”	As needed
6	Magenta	.012”	As needed
7	White	.012”	As needed
8	Gray	.012”	Background/gray scale
9	Gray	.006”	Background/gray scale
10	Red	.018”	As needed
11	Salmon	.022”	As needed
30	Orange	.024”	As needed
230	Fuchsia	.026”	As needed
151	Lt Blue	.016”	As needed
190	Dk Blue	.013”	As needed
211	Lavender	.014”	As needed

13 Exiting a Drawing

13.1 General

When exiting a drawing the final time, use this procedure to insure that the drawing is in a clean state for other users and to reduce the drawing file size, thus saving disk space.

13.2 Exiting Procedure

1. Before exiting a drawing, the user should execute a ZOOM EXTENTS command to display all drawing entities.

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2. If there are any orphaned or unused entities outside of the border or normal drawing area, they should be erased. Repeat this process to verify all unwanted entities have been deleted from Model and Paper Space.
3. Use PURGE ALL or similar function to remove unwanted drawing entities. Then use PURGE ALL as a means of cleaning up unwanted, unreferenced data.
4. Set the current layer to “0”.
5. Save the drawing in the current PacifiCorp Energy accepted AutoCAD format.
6. The last time it is saved it must be in the space, (Model/Paper), used for plotting and viewing. (For new drawings, based on this standard, this must be Paper Space.)

14 SNAP & OSNAP Settings

SNAP & OSNAP settings should be used to ensure alignment, closure and accuracy of lines or objects created by the AutoCAD drawing program.

1. SNAP should be set to a minimum value of .03125 inches or (1/32 inch) and must be in multiples of .03125 inches.
2. The Units PRECISION field must be set to a smaller increment than 1/32 inches.
Example: 1/64, 1/128 or 1/256 inches.

15 Associative Dimensioning

15.1 General

Associative dimensioning will be used on all new and modified drawings. This will ensure that the dimensioning is consistent and dynamic throughout the drawing.

Place dimensioning on a dimension layer, color set to bylayer (color 3). If the dimensioning is done completely in Paper Space, and done properly, all dimensioning scale factors are 1:1, otherwise a dim style naming convention should be associated with the scale factor. For example, if the scale factor is 48, then the dim style used should be named 48, with the overall scale set to 48. A layer naming convention should also follow this (or a similar) logical method. (Example: DIM-48 might be used for dimensions using dim style 48).

| (See “Guidelines for Associative Dimensioning” & “Leaders” located in the AutoCAD Procedures Document.)

16 Line–Type Scale

The **LTSCALE** command sets the scale factor to be applied to all line types within the drawing. A global line–type scale factor is provided for each new drawing with a default value of 1.0. To maintain a consistent line type appearance on drawings the line–type scale (Itscale) is usually set at 0.25. The **PSLTSCALE SETVAR** should be set to 1 for all new drawings and older drawings when plotting in PaperSpace otherwise it should be set to 0.

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CHAPTER 6 —Block Usage and Development

1 Scope

The following standard is for the development of AutoCAD blocks used in PacifiCorp drawings.

| (See also “Block Usage and Development” located in the AutoCAD Procedures Document.)

1. All blocks are to be developed on layer “0”, with the color and line type attributes set to *Bylayer*, (unless specific color, line type and layering conventions are wanted for all inserts of the same block). All entities that reside in the block should be drawn using PacifiCorp standards whenever possible.
2. Dynamic blocks are new starting with AutoCAD 2006. This new capability is powerful and can limit the amount of time involved in inserting multiple views of the same symbol. One block may provide any one of many possible views for one basic symbol as a selectable option at any time in the editing process. They can also be made to utilize the ability to move, rotate, stretch . . . one or all of the entities within a block.

While Dynamic Blocks should be considered, creating the block so that it displays the desired effect can be troublesome. Great care should be taken when creating this type of block, and testing should be done to assure that the desired effect has been achieved.

2 Insertion Point

The insertion point should be on snap to allow proper alignment to any adjoining components.

3 Template Drawings

Template drawings are available. These contain the basic layers, dimstyles, and text styles intended for drawing usage.

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CHAPTER 7 —Compatibility with EDMS

1 Scope

The following standard is set up to help contractors create an index based on PacifiCorp Energy's needs.

2 Indexes

An index must accompany all new and edited drawings from anyone outside of PacifiCorp Energy's Thermal Group.

1. The index must be compatible with Excel in a format that defines each field of information into separate columns. Excel file format or "Comma Delimited" (CSV) formats are preferred. Use CSV format if it is unclear which Excel version is needed.
2. The index must contain Column Headings that clearly describe the information contained in each column.
3. The index must contain the information highlighted in the example file *PcorpEnergyDrawingIndex.xls*.
4. Leading and trailing empty spaces on a per cell basis are not acceptable.
5. All hybrid related files returned to PacifiCorp need to be supplied in a separate folder structure from non-hybrid files. Example: AutoCAD files with .TIFF, XREFed, and any other attached files all need to be saved to folders different from non-hybrid files.
6. Hybrid files need to be in a separate index or on a separate tab within an index from non-hybrid files.

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