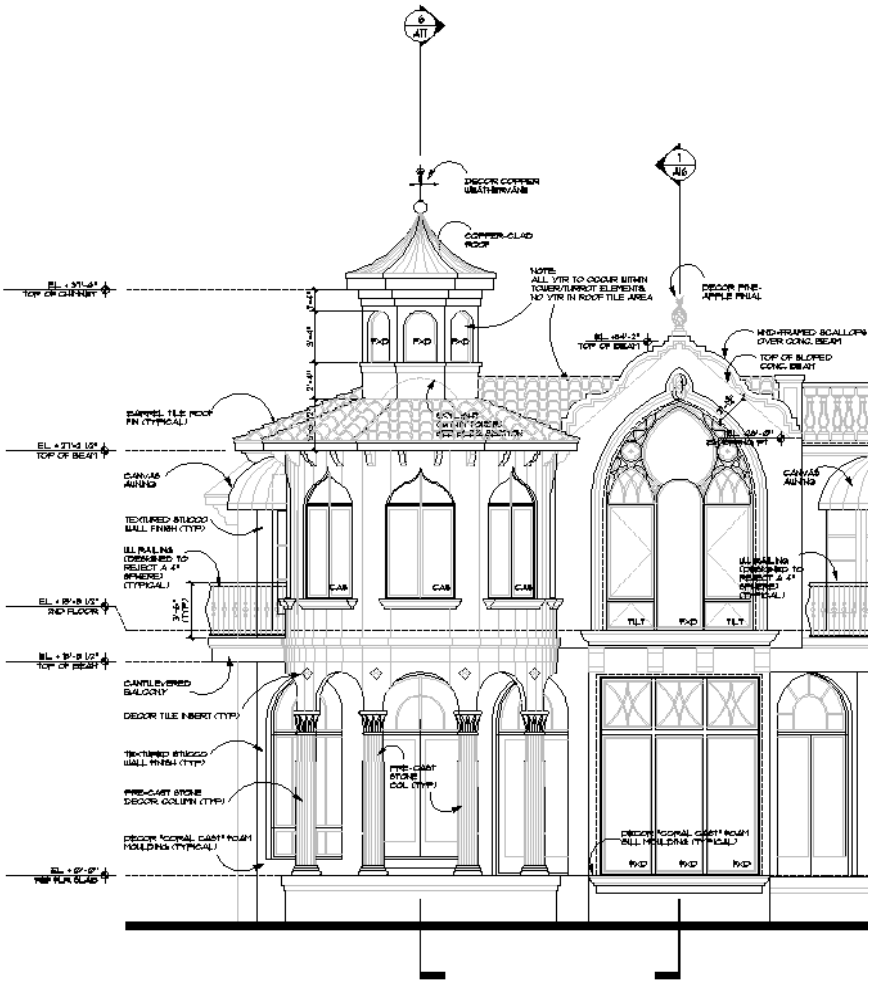

CAD STANDARDS MANUAL

Prepared for:
Solis Designs, Inc.

PSTool STD
Version 3.0

Last printed on :
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CAD STANDARDS MANUAL *Version 3.0*

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License Agreement

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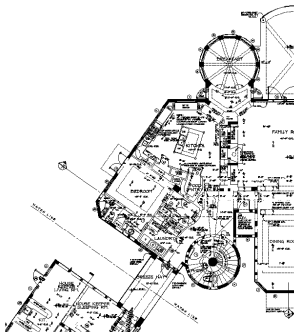
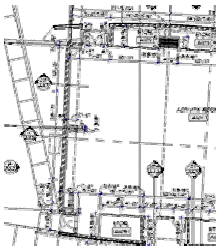




GENERAL REQUIREMENTS

INTRODUCTION

This manual is presented to provide standards for a CAD system and is envisioned as a starting point from which to build and continuously improve the means of rapidly exploiting CAD-related technology. It is *Solis Designs, Inc.'s* intent that these standards should be used as an outline for producing a standard set of CAD generated designs and documents.

These standards are intended to be neither static nor all-inclusive and thus will be updated and will be constantly evolving to meet growing technologies. Comments, suggestions, etc. are an important part for the evolution of this document and are strongly encourage so that subsequent updates to this manual will reflect both the input and needs of the CAD user.

All CAD users are expect to use these standards at all times for all computer-generated documents. These standards establish the following objectives:

- Free the operator and project manager from repeatedly determining the conventions and procedures to be used on each project.
- Create uniform design, presentation and construction information and establish a clear and precise method of communication.
- Create a uniform CAD station configuration to limit the time and involvement in maintaining the CAD stations.
- Provide groundwork for new CAD users to become productive as soon as possible and to improve efficiency in the development of construction documents.

This CAD Standards manual is developed only as a guideline for how CAD files will be created at *Solis Designs, Inc.*. Again it is only a guide to maintain a consistent format among all users (both in-house and outside consultants).

USER RESPONSIBILITY

Adherence to the standards and procedures contained in this manual is essential in preserving a consistent character among all drawings issued by *Solis Designs, Inc.* and in increasing the efficient use of project time and management. This uniformity allows information to be correctly keyed, added and displayed at any phase in the project by any CAD user (experienced or novice). It also allows for a singular format to improve the archiving and plotting procedures.

Modifications of the standards and procedures in this manual are expected and are definitely welcomed. From time to time it may be necessary for users to request changes to these standards. It is expected that end users submit the required temporary modifications to the CAD Manager and not to make arbitrary changes without prior approval. Requests for deviation shall document (1) why the current procedure or standard is inapplicable or ineffective; (2) what the proposed deviation or change should be; and (3) how it would improve the CAD standards, procedures and overall productivity levels.

The most efficient use of AutoCAD is not necessarily in the initial creation of a drawing file, but in the ability to reuse, manipulate and represent the same drawing in several different ways. The true meaning of CAD productivity is embodied in not having to do the old job over again, rather in simply doing the old job faster and more efficiently.

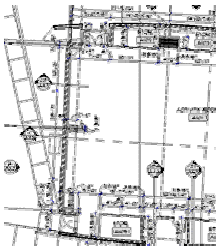
An example would be the reuse and modification of "Prototype Drawings" (also known as symbols). This can yield a very efficient use of project time and economics. On a broad scale this can be very productive, however, the reuse process must not end here. Each user must continually examine the reusability of any information in a current file. The massing of information in differing libraries will take time and effort on the part of all users but is imperative for improving the CAD productivity of all involved.

Another example would be the adoption of a drawing philosophy where drawing entities are not duplicated anywhere. This idea is based on the computer's ability to process 100's of lines of code in seconds and AutoCAD's layer management features. These two coupled together allow for very fast manipulation of layers and layer properties in order to shift layer states with minimal effort on the user's part. The "Draw it Once" philosophy allows us to expand our view of the drawing model from a static image that is used as a backdrop, to an image that would allow us to artfully manage it's representation into several forms at the click of a key.

An efficient, productive CAD environment will allow the user to concentrate on the creation of the design and not on the assemblage of it.

SUMMARY

Drawings produced by the guidance of these standards should demonstrate a professional and quality appearance. The technical competence and aesthetic judgment of *Solis Designs, Inc.* should be appropriately demonstrated at every level, to the point that a client should never find cause to question. Construction drawings should demonstrate at least as much finesse as the design they illustrate. There is no better way to express to the client our ideas and designs; therefore a successful set of Construction Documents is one that leaves the client smiling. This is the ultimate sign of a job well done.



DRAWING SETUP

Description

In order to maintain a consistent file archiving system it is imperative that a directory structure, file name conventions and file types be defined. It is also important that all persons creating CAD files follow the standard formats established.

Templates have been predefined for all drawing requirements. These drawing files (*.DWT in R14) are located in the TEMPLATE folder of *PSTool STD* directory structure. They are accessible through AutoCAD's File ➔ New menu. These templates set the dimension variables, system variables, text styles and units for the appropriate use. These settings need not be modified by the end user, and should help in making consistent drawings. Refer to **Appendix A - Drawing Templates** for template types.

Directory Structure

Program Files

AutoCAD program files
The *Solis Designs, Inc.* standards are based on AutoCAD's R14 application. The location of program files, for in-house systems, is the "C:\PROGRAM FILE\AUTOCAD R14" directories, as created by the AutoCAD installation program. No customization is to reside in this directory structure as this will prevent files from being overwritten in case AutoCAD needs to be reinstalled, or the next update is applied.

Solis Designs, Inc.'s Program Files
All customization, data files, menu files, standards, templates, custom programming and routines developed specifically for use with this standards will reside in the following directory structure and will be included in the path:

EX: 🗀 **PROGRAM FILES**
- 🗀 ***PSTool STD***
  - 🗀 Config (configuration files)
  - 🗀 Fonts (custom font files)
  - 🗀 Symbols (symbols, blocks, slides)
  - 🗀 Support (support files such as menus, PGP files)
  - 🗀 Templates (*Solis Designs, Inc.'s* templates)

User Program Files
All additional user's custom programs, partial menus and modifications must be self-contained as a subdirectory under *Solis Designs, Inc.'s* program file structure. No user customizations should interfere with or nullify any of *Solis Designs, Inc.*'s standards.

Project Files

Directory Structure

All files for a particular project need to be in the project's subdirectory under the main MY DOCUMENTS directory structure. The reason for this tree structure is so that a consistent location is established on all in-house computer systems. This will make it easier for anyone

to find a project's directory on any in-house computer system and will ultimately facilitate file archiving and backup procedures.

EX: 🗀 **MY DOCUMENTS**
- 🗀 98_2500 Project_name
  - 🗀 Sub_Directory (as required)
- 🗀 98_2501 Project_name
- 🗀 98_2502 Project_name
- 🗀 98_2503 Project_name

..continue numbering sequence as required.

Additional Files

This directory structure can have further subdirectories under each project directory to further refine its contents. An example of this can be an additional documents subdirectory to maintain communiqués with client, builder, etc.; also a subdirectory can be created to maintain alternate plans.

EX: 🗀 **MY DOCUMENTS**
- 🗀 98_2500 Project_name
  - 🗀 Documents
- 🗀 98_2501 Project_name
- 🗀 98_2502 Project_name
  - 🗀 Documents
  - 🗀 Flipped
- 🗀 98_2503 Project_name

Directory Modification Rights

User's Systems

On the user's system, each user maintains and updates their directory structure. The user can create, modify or delete directory structures as required for each project.

Storage Server

The server is the archival drive and user modifications are not allowed there. For archiving purposes the subdirectory structure on the file storage server is different than on the user's systems. On the server side any and all modifications need to be handled by the System Administrator only.

Any outside consultant bringing in project drawing files for archiving purposes must submit the files on disk. The System Administrator will create the required directory structure on the storage drive.

File Type Structure

Files are to be created and named as listed below. For the purpose of these standards, drawing files will be separated into three categories**, BASE FILES, SHEET FILES** and **SUPPORT FILES**. They are called as such to represent their intended purposes and are defined as follows:

BASE FILES

Base files are *.dwg files that are intended for drawing and entity creation, that relates to the actual building. This file is Model space only and all entities will be drawn full size (where 1”=1”).

Base files are not intended for plotting purposes therefore no scale factors are applied to this file. These files will be used as Xrefs (External References) in the sheet files, therefore keep xreferencing of BASE on BASE to a minimum. This will help prevent "unresolved circular reference" errors from occurring.

SHEET FILES

Sheet files are *.dwg files that are composite files used for the purpose of representing a specific ‘sheet’ of the construction document set. They are composed of an Xref’d representation of the model, title block borders, schedules / general notes, etc. All items that represent a plotted sheet. This file is composed of model space/paper space entities and may have several viewports to represent model space. See **Tutorial - Lesson 1** to learn how to create a composite SHEET file.

Sheet files are the only files that will be plotted as part of a Construction Document’s set. As such, it will have scale factors applied to the different viewports used. Keep one "sheet" per SHEET file to facilitate plotting automation. Do not put extraneous entities outside of the border's boundaries as this will throw off the file's ‘plotting extents’ feature.

SUPPORT FILES

Support files are files such as title block files, additional xref files from outside consultants that can be used as base files but are not intended to be modified by this office.

File name format

This standard specifies the file-naming format for a project’s drawing types. All users must adhere to these standards as it will affect how other users will use the files.

BASE FILES File names are Windows-compliant LFN (long file name) format divided into three sections as follows:

	TYPE_DESCRIP_JOBNO	What does it mean?
EX:	*BASE_PLAN_2500.dwg*	: Base file, plan entities, job no
	BASE_1FLR_2500.dwg	: Base file, 1st floor entities, job no
	BASE_ELEV_2500.dwg	: Base file, Elev/section , job no

Note: Keep BASE file names as short as possible by using abbreviations.

SHEET FILES File names are Windows-compliant LFN (long file name) format divided into three or four sections as follows:

SHTNO_DESCRIP_JOBNO	What does it mean?

EX:
01_SITE_PLAN_2500.dwg : Sheet #01, site plan sheet, job no
02_FND_PLAN_2500.dwg : Sheet #02, foundation plan sheet, job no
10_FR_ELEV_2500.dwg : Sheet #10, Front elevation sheet, job no
S20_STR_DTLS_2500.dwg : Sheet #20 of structural subset of const. docs, structural details, job no

SUPPORT FILES File names are Windows-compliant LFN (long file name) format divided into two or three (optional) sections as follows:

TYPE_DESC_JOBNO What does it mean?

EX:
TITLE_2500.dwg : Title file for project, job no
X_LS_2500.dwg : Xref'd, Landscape plan, job no
X_MS_2500.dwg : Xref'd, Mech systems, job no

File sequence :

All drawing files for a specific project will reside in the project's sub-directory (see Directory Structure for a description). The list of files will be a group of base drawing files, sheet files and additional support files required to complete the project. The following is a list of files that may exist in a project's sub-directory.

Typical single story project
A basic file structure to be used on the majority of *Solis Designs, Inc.'s* projects.

SHEET FILES

01_site_*(xxxx)*	(SHEET 01 – site plan)
02_fnd_*(xxxx)*	(SHEET 02 – foundation plan)
03_floor_*(xxxx)*	(SHEET 03 – floor plan)
04_fr_elev_*(xxxx)*	(SHEET 04 – front/rear elevations)
05_sd_elev_*(xxxx)*	(SHEET 05 – side elevations, add elev)
06_bldg_sect_*(xxxx)*	(SHEET 06 – building sections)
07_tie_beam_*(xxxx)*	(SHEET 07 – tie beam plan)
08_strap_*(xxxx)*	(SHEET 08 – strapping plan)
09_elect_*(xxxx)*	(SHEET 09 – electrical plan)

.. continue numbering sequence for as many sheets required in construction document set.

sh#_arch_det_*(xxxx)* (additonal detail sheets)

BASE FILES

BASE_1_*(xxxx)*	(main floor)
BASE_2_*(xxxx)*	(second floor)

..continuous numbering in sequence for additional floors.

BASE_ELV1_*(xxxx)* (elevation/sections)

..continuous numbering for additional elev/section files.

SUPPORT FILES
TITLE_*(xxxx)* (title block)
X_LS_(-) (landscape base plan from outside consultants)

Typical two story project
Use this file structure if the second floor requires additional SHEET files.

SHEET FILES
01_SITE_*(xxxx)*
02_FND_*(xxxx)*
03_COL_2_*(xxxx)*
04_FL00R_1_*(xxxx)*
05_FLOOR_2_*(xxxx)*
06_FR_ELEV_*(xxxx)*
07_SD_ELEV_*(xxxx)*
08_BLDG_SECT_*(xxxx)*
09_TIE_BEAM_1_*(xxxx)*
10_TIE_BEAM_2_*(xxxx)*
11_STRAP_1_*(xxxx)*
12_STRAP_2_*(xxxx)*
13_ELECT_1_*(xxxx)*
14_ELECT_2_*(xxxx)*

.. continuous numbering for additional sheets.

SH#_ARCH_DET_*(xxxx)*
SH#_STRAP_DET_*(xxxx)*

BASE FILES
BASE_1_*(xxxx)*(FIRST FLOOR PLAN)
BASE_2_*(xxxx)*(SECOND FLOOR PLAN)
BASE_3_*(xxxx)*(ELEVATION/SECTIONS)

SUPPORT FILES
TITLE_*(xxxx)*(TITLE BLOCK)

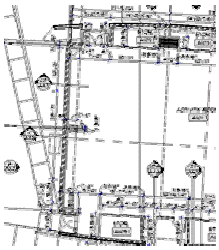
*** WHERE (xxxx) = Solis Designs, Inc.'s job number*

Additional project types
Keep in mind that the file structures listed above represent standard situations for most of *Solis Designs, Inc.*'s project types. On larger projects it may be necessary to separate the elevations and building sections into different base files; or you may need to represent a Grotto plan that is squeezed under the main floor. You may also need to represent different modes of constructions that may required additional sheets (plank flooring systems come to mind) These situations need to be addressed on a project to project basis prior to starting the project.

Multidiscipline Prefix
There is also a need to represent sheet files for multidiscipline situations (i.e. Structural, Electrical and Mechanical). These are sheet files in addition to architectural sheets. For this

type of projects the sheet file name needs to be prefixed with a discipline specific letter (i.e. A for architectural, S for structural, E for electrical, M for mechanical, etc.). Use the multidiscipline prefix only when construction documents are extensive and are multidiscipline. If only producing architectural documents, then the prefix is redundant.

EX: ***01_SITE_PLAN_2500.dwg*** would become ***A01_SITE_PLAN_2500.dwg***
02_SLAB_PLAN_2500.dwg would become ***S02_SLAB_PLAN_2500.dwg***



Conventions

Layering Standards

The following is a guideline for how layers should be named and what properties each layer should have in order to plot drawings consistently.

The standard plot configuration (see

Plotter Configuration Table on Appendix B - Factors and Settings) uses each color setting to define pen lineweights so therefore it is important that color setting be followed closely.

Each layer is defined with specific color and linetypes. Colors work in conjunction with plotter settings and take on specific properties when plotted.

Floor Plans

All layers relating to each floor plan are contained within a single BASE drawing file, one per floor of the building. This means that the electrical plan, floor plan, foundation plan, etc. are all in the same drawing, just on different layers. And that by turning on and off different combination of layers, you get a different 'SHEET' or Layer State. In order to display layers for one specific Layer State, you do not need to manipulate layers manually. All layer states are controlled and displayed using the 'SHEET' menu option – then select the appropriate sheet you would like to display and the program does the rest. This level of intricacy means that some layers are considered common throughout different 'SHEETS' while others are specific only to individual 'SHEETS'.

The following is a guideline for how layers should be named and what properties each layer should have in order to plot drawings consistently. The standard plot configuration uses each layer's color setting in conjunction with predefine pen lineweights, so therefore it is important that color setting be followed closely.

Layer names for floor plans are broken up into three sections in the following format **AAA_BBCCCCCC** where **AAA_** is the major group designation (3 characters); **BB** is the minor group designation (2 characters) and **CCCCCC** is the name (no. of characters varies). This scheme allows for general categories of layers that will be grouped together in the layer dialog. It provides greater flexibility in naming and grouping layers for manipulation by custom programming and ultimately gives the end user a layer listing that is easier to manage.

Major Modifier	Description
COM	Common – use for items that are common throughout different 'sheets'
ELC	Electrical plan specific grouping
FLR	Floor plan specific grouping
FND	Foundation plan specific grouping
HID	Construction/guideline layers – Intended to be hidden.
ROF	Roof /Tie Bm plan specific grouping
STE	Site plan specific grouping
STP	Strapping plan specific grouping

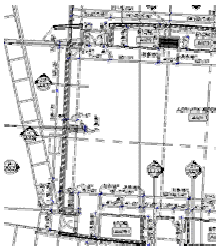
Secondary Modifier	Description
AR	Architectural elements
CO	Callouts, annotations, text
EE	Electrical elements
HS	Hardsurface elements
HT	Hatch patterns
LS	Landscaping elements
MP	Mechanical / Plumbing elements
MS	Miscellaneous elements
ST	Structural elements

Refer to the Appendix C - Layering Matrix for a complete listing of layer names.

Elevations / Sections

Elevations and section BASE files do not require “autolayering” as do floor plans. For this reason there are few layers to contend with.

Drawing Conventions



Plotting Standards

Plotting Procedures

Outside consultants: When sending files requested for plotting a set of drawings, it is required that you e-mail or bring a disk/Zip disk with both *.dwg files and *.plt files. Plot files are required for plotting out drawings.

Plotter Configurations

Plotting configurations are predefined for the printers and plotters in use. Please refer to **Plotter Configuration Table** in Appendix B - Factors and Settings for configuration settings and for pen settings.

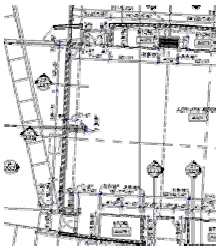
Pen Lineweight Intensity

Pen Settings are defined to produce a 'hand-drafted' effect. By this, I am referring to using lineweight intensities to signify different levels of importance for different elements of a building. By using lineweight, this standard defines levels of importance to different elements of a drawing file. For example: The lines representing the outer edge of block walls are intended to read darker than interior partitions. On the same token, dimension lines are intended to read as the lightest elements and are therefore defined with the finest line weight. Plotter pen settings are intended to go hand-in-hand with layer color definitions. Please refer to **Appendix C - Layering Matrix** for specific layer properties.

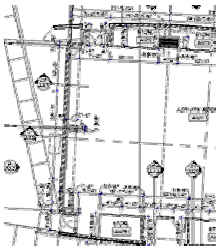
The chart below gives a brief outline of lineweight grouping and how layer colors and lineweights are organized within this grouping. The intended output is organized into six basic Lineweight Intensity Groups. Within these groups there are many different pen colors and many different layers. To view a complete listing of layers and their properties please refer to the **Layering Standards** section in **Appendix B - Factors and Settings**.

Lineweight Intensity	Color name/ number	Items
Heaviest	8,9	Roof outlines, Property lines
Heavy	1,3,32	Building Perimeter, Slab edge & recess
Medium	2,6	Interior Partitions
Light	4,7	Text, notes, tags and labels, misc. notation
Lightest	5	Dimension and decorative elements
Shading	250 - 255	Faint Backgrounds, Shading effects

It is the intent to have consistent output and all plotted drawings should follow this set of guidelines. Please use this charts only as a brief outline of lineweight grouping.
Pen settings are predetermined in the plotter configuration and, once configured, do not need to modified by the end user (see the **Pen Settings Table** for plotter pen settings).



Symbols Library



Appendix

Appendix A - Drawing Templates

All BASE, SHEET and TITLE drawing files have predefined template files. These *.dwt files already have the proper variable settings, text styles, dimension styles, viewports, etc. associated for the specific use. They are developed to make file creation easier and consistent among all users. Use them as follows:

BASE TEMPLATE FILES

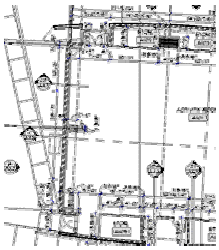
BASE FLOOR.DWT	- floor plan base drawing(any floor)
BASE ELEVATION.DWT	- elevation/section base drawing

SHEET TEMPLATE FILES

SITE PLAN.DWT	- site plan sheet
FOUNDATION.DWT	- foundation plan sheet
GRADE BEAM & PILE.DWT	- grade beam & pile plan sheet
COLUMN PLAN.DWT	- column plan sheet
FLOOR PLAN.DWT	- floor plan sheet
ELEVATION.DWT	- building elevation sheet (any elev.)
BUILDING SECTION.DWT	- building sections sheet
ELECTRICAL PLAN.DWT	- electrical plan sheet
TIE BEAM PLAN.DWT	- tie beam sheet
STRAPPING.DWT	- strapping plan sheet
ARCH_DTL_D_1.DWT	- 1st architectural detail sheet (d size)
ARCH_DTL_D_2.DWT	- 2nd architectural detail sheet (d size)
ARCH_DTL_D_3.DWT	- 3rd architectural detail sheet (d size)
ARCH_DTL_E_1.DWT	- 1st architectural detail sheet (e size)
ARCH_DTL_E_2.DWT	- 2nd architectural detail sheet (e size)
ARCH_DTL_F_1.DWT	- 1st architectural detail sheet (f size)
ARCH_DTL_F_2.DWT	- 2nd architectural detail sheet (f size)
ARCH_DTL_G_1.DWT	- 1st architectural detail sheet (g size)
STRU_DTL_D_1.DWT	- 1st strapping detail sheet (d size)
STRU_DTL_D_2.DWT	- 2nd strapping detail sheet (d size)
STRU_DTL_E_1.DWT	- 1st strapping detail sheet (e size)
STRU_DTL_E_2.DWT	- 2nd strapping detail sheet (e size)
STRU_DTL_F_1.DWT	- 1st strapping detail sheet (f size)

SUPPORT TEMPLATE FILES

ACAD.DWT	- blank drawing (*PSTool STD*)
ACAD_ORG.DWT	- blank drawing (as shipped from AutoDesk)
TITLE D.DWT	- title block (d size)
TITLE E.DWT	- title block (e size)
TITLE F.DWT	- title block (f size)



Appendix B - Factors and Settings

Zoom Factors

All AutoCAD BASE drawings are to be drawn at full scale (1 to 1) in model space. All title block templates are drawn at a scale of (1 to 1). No scale factor is to be applied to BASE drawing files nor to Title Block files. Zoom factors apply to SHEET files and are applied from paper space through a floating viewport to represent xref'd drawings.

The zoom factors listed below are used to set the scale factor for that specific viewport.

DRAWING SCALE		ZOOM FACTOR
1=3"	SCALE DRAWING	1/4XP
1=1 1/2"	SCALE DRAWING	1/8XP
1=1"	SCALE DRAWING	1/12XP
3/4"	SCALE DRAWING	1/16XP
1/2"	SCALE DRAWING	1/24XP
3/8"	SCALE DRAWING	1/32XP
1/4"	SCALE DRAWING	1/48XP
3/16"	SCALE DRAWING	1/64XP
1/8"	SCALE DRAWING	1/96XP
3/32"	SCALE DRAWING	1/128XP
1/16"	SCALE DRAWING	1/192XP
1"-10'	SCALE DRAWING	1/120XP
1"-20'	SCALE DRAWING	1/240XP
1"-30'	SCALE DRAWING	1/360XP
1"-40'	SCALE DRAWING	1/480XP
1"-50'	SCALE DRAWING	1/600XP
1"-60'	SCALE DRAWING	1/720XP

There can be as many viewports as there are different scale in a sheet file. AutoCAD R14 has a maximum default of 48 Viewports.

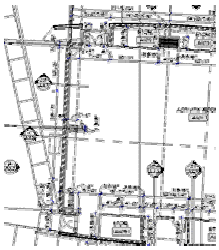
Plotter Configuration Table

There are several plotter configurations for each of the output devices. They are as follows:

- ~~**BJ230 (mono):**~~ this plotter configuration is intended to print output at 11'X17". It does not have pen settings defined and will print with a single uniform line weight. This configuration is intended for draft plots, check sheets, etc.
- ~~**BJ230 (Bold):**~~ this plotter configuration is intended to print output at 11'X17". It does have pen settings defined and will print with line weight as defined in the chart at right. This configuration is intended for visualizing how portions of a drawing will be plotted prior to sending full drawing to plotter.
- **HP600 D:** This plotter configuration is intended to print 24"X36" drawings with full pen line weight definitions. This configuration is rotated (set using HPCONFIG) and prints on a 36" wide paper roll by 24" long. This configuration is not user-modifiable.
- **HP600 E:** This plotter configuration is intended to print 30"X42" drawings with full pen line weight definitions. This configuration is not rotated and prints on a 30" wide paper roll by 42" long. This configuration is not user-modifiable.
- **HP600 F:** This plotter configuration is intended to print 48"X36" drawings with full pen line weight definitions. This configuration is not rotated and prints on a 36" wide paper roll by 48" long. This configuration is not user-modifiable.
- **HP600 (Mono):** This plotter configuration is intended to be a generic, user-modifiable configuration. It 's purpose is to allow for additional user defined pen settings, paper sizes and for the purpose of plotting, to the HP600 plotter, drawing files that do not conform to the *Solis Designs, Inc.*'s standards.

Pen Settings Table

Color	Pen Width	Additional Settings	Lineweight Intensity
1 (Red)	0.014		Heavy
2 (Yellow)	0.010		Medium
3 (Green)	0.020		Heavy
4 (Cyan)	0.010		Light
5 (Blue)	0.007		Lightest
6 (magenta)	0.010		Medium
7 (White)	0.010		Medium
8 (Drk Gray)	0.028		Heaviest
9 (Lt Gray)	0.035		Heaviest
10	0.010		
11	0.010		
12	0.010		
13	0.010		
14	0.010		
15	0.010		
30	0.010		
32	0.024		Heavy
40	0.010		
41 ... 249	0.010		
250	0.010		
251	0.010	Shaded 10% (HPCONFIG)	Shading
252	0.010	Shaded 20% (HPCONFIG)	Shading
253	0.010	Shaded 30% (HPCONFIG)	Shading
254	0.010	Shaded 40% (HPCONFIG)	Shading
255	0.010	Shaded 50% (HPCONFIG)	Shading



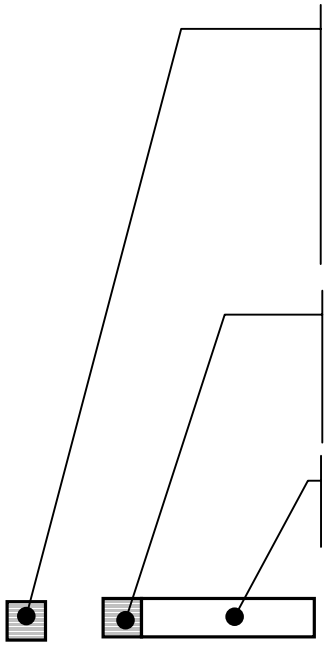
Appendix C - Layering Matrix

As specified in the Layering Standards section of this manual there are different layering conventions for Floor Plan-type BASE files and for Elevation BASE files.

Floor Plan Layers:

Layer names are composed of three separate categories. These names are defined to automate the layer manipulation process and to visually group together common layers together

The layering convention is as follows:



Major Modifier: (3 characters long)
Sheet Name Grouping (**COM**-common, **ELC**-electrical, **FND**-foundation plan, **FLR**-floor plan, **HID**-hidden / construction layers, **ROF**-roof plan, **STE**-site plan, **STP**-strapping plan, **SLB**-slab plan, **COL**-column plan, **DEM**-demolition plan, **PIL**-piling plan, **MCH**-mechanical plan)

Secondary Modifier: (2 characters long)
Layer Grouping (**AR**-architectural, **MP**-mech/plumbing, **ST**-structural, **CO**-callouts, **HT**-hatching, **HD**-hidden, **IN**-interior, **MS**-misc.)

Layer Description:
Descriptive name of layer's purpose

Following this layer naming convention will assure that the drawing file will be properly layered.

These layering conventions along with the “Lyr_State” menu (& it’s paperspace equivalent “Sheet” submenu) are designed to be flexible. Even if a new layer, not defined within the standard Template file, is added it can be “autolayered” correctly - as long as the new layer name follows these suggested guidelines.

The following matrix not only outlines the name, color and linetype for each layer, but also outlines what entities belong on each layer. This matrix denotes only the layers that are contained within the standard template file. Again, this allows flexibility for the end-user to add layers to this scheme & not lose “aoutolayering’ capabilities.

COMPOSITE MATRIX

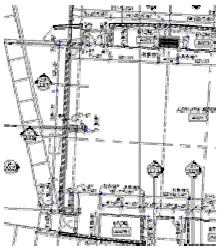
Layer Name	Color Settings	Linetype Settings	Preliminary Plan	Site Plan	Foundation Plan	Floor Plan	TB \ Roof Plan	Strapping Plan	Electrical Plan	Mechanical Plan	Area calc sheet	Remarks
ARC_COAREA		Continuous									■	Building/paving area calcs / annotation
ARC_COSCHEDULE		Continuous	■			■					■	Area calculation schedule lines
ARC_COSCHTEXT		Continuous	■			■					■	Area calculation schedule Text
ARC_COSITEAREA		Continuous									■	Site plan area calculations / annotation
COM_ARCABDN		Hidden	■			■	■		■	■		Lower Casework
COM_ARCABUP		Continuous	■			■	■		■	■		Upper Casework
COM_ARCENTER	254	Center2	■		■	■	■				■	Center lines, major axis
COM_ARCLGDN		Hidden2	■			■	■		■	■		Dropped soffits / headers not affecting trusses
COM_ARCLGUP		Hidden	■			■	■	■	■	■		Tray ceilings affecting trusses
COM_ARDECOR		Continuous	■			■			■	■		Architectural decorative elements, railings
COM_ARDOOR		Continuous	■			■	■		■	■		Interior/exterior doors on building
COM_ARFRAMING		Continuous	■			■	■		■	■		Interior partitions / framing
COM_ARSECTIONMARK		Center			■	■	■	■				Sections marks & tags
COM_ARSTAIRDN		Continuous	■			■	■		■	■		Lower portion of staircase
COM_ARSTAIRUP		Hidden2	■			■	■		■	■		Upper portions of staircase (hIdden)
COM_ARWINDOW		Continuous	■			■	■		■	■		glazing / windows
COM_COBRNG		Continuous			■	■	■	■			■	Bearing wall tags & annotation
COM_COCLGUP		Continuous	■			■	■					Ceiling / tray / clg heights annotation
COM_COCOLTS	7	Continuous			■	■	■	■				Structural annotation for ts columns
COM_CODIM	5	Continuous			■	■						Overall, wall break/opening dimensions
COM_COELECT		Continuous	■			■			■			Elect equip, appl, CVAC, HVAC annotation
COM_COEQUIP		Continuous	■		■	■			■	■		Outside equipment annotation
COM_COFIXTURE		Continuous	■		■	■			■			Plumbing fixture annotation
COM_COROOMNAME		Continuous	■	■		■			■		■	Room name annotation
COM_COROOMSIZE		Continuous	■									Room size annotation
COM_COSLAB		Continuous	■		■	■						Slab steps / slab elevation annotation
COM_HTBRNG		Continuous			■	■	■	■	■	■		Bearing wall hatching
COM_HTCLGUP		Continuous				■	■		■	■		Ceiling / truss articulation hatching
COM_HTCMU		Continuous				■			■	■		Block wall hatching
COM_HTCOL		Continuous			■	■	■		■	■		Column / filled cell hatching

COM_MPELECT		Continuous	■			■	■		■	■		Interior equip (appl, wh, dryer, cvac. AHU)
COM_MPEQUIP		Continuous	■	■		■			■	■		Exterior equip (A/C, pool equip, meter, any equipment outside of bldg line)
COM_MPFIXTURE		Continuous	■		■	■	■		■	■		Plumbing fixtures within building
COM_STCMU		Continuous	■	■	■	■	■	■	■		■	Inside face of cmu walls
COM_STCOLCONC		Continuous			■	■	■		■			Structural concrete columns
COM_STCOLTS		Continuous			■	■	■	■	■			Structural steel columns
COM_STHEADER		Hidden	■			■	■	■	■			Line of beams/headers @ door, exterior openings, archways)
COM_STSLABEDGE		Continuous	■	■	■	■	■	■	■	■	■	Footprint of bldg. / slab edge
COM_STSLABHIDDEN		Hidden2	■		■	■	■		■	■		Slab edges that are hidden (under counters, under other cant slabs)
COM_STSLABRECESS		Continuous	■		■	■	■		■	■		Slab recess / openings / stepdowns
ELC_CONOTES		Continuous							■			Electrical Plan tags, dims & annotation
ELC_EECIRCUIT	1	Center2							■			Circuit lines
ELC_EEEQUIP		continuous							■			Switched, outlets, equipment
ELC_EELIGHT		continuous							■			fixtures, lights, ceiling fans, hi hats, etc
ELC_HTSTD		Continuous							■			Electrical plan hatching
FLR_ARCENTER	252	Center				■						Minor centerlines – plan-specific
FLR_CODIM	6	Continuous				■						Floor plan-specific dimensions (interior partitions, misc framing, etc)
FLR_CONOTES		Continuous				■						Floor plan standard annotation (door, soffit, standard text, misc labels & tags)
FLR_HTFRAMING		Continuous				■						Interior partition hatching
FLR_HTSOFFIT		Continuous				■						Soffit / pot shelf hatching
FLR_HTSTD		Continuous				■						Floor plan hatching (tiled seats, flr textures)
FND_ARCENTER	252	Center				■						Minor centerlines – plan-specific
FND_CODIM	4	Continuous			■							Foundation/slab plan-specific dimensions (column locations, slab stepdowns,etc)
FND_CONOTES		Continuous			■							Foundation plan tags & annotation
FND_CORISER		Continuous			■							Foundation plan riser tags & annotation
FND_HTSTD		Continuous			■							Foundation plan hatching (footings, pads)
FND_MPRISER	3	Continuous			■							Flat plumbing / piping layout
FND_STFOOTER	1	Hidden2			■							Inside edge of footing pads / grade beams
HID_ARCONST		Center										Construction lines (hidden)
HID_ARROOF		Center2										Roof plan construction lines
HID_EECENTER	254	Center2										electrical plan construction lines
PRE_INFURNITURE		Continuous	■									Int / ext furnishings, exercise equip
PRE_MSVEHICLE	254	Continuous	■									Cars, boats, golf carts
PWR_EEEQUIP		Continuous			■				■	■		Exhaust fans and venting equipment
PWR_EEOUTLET		Continuous			■				■	■		Floor outlets recessed into slab
ROF_AREDGE		Continuous	■	■		■	■	■	■	■	■	Roof edge lines

ROF_ARHIDDEN		Hidden2		■			■	■				Roof lines of concealed edges
ROF_ARPROFILE		Continuous					■					Roof truss profiles
ROF_ARRIDGE		Continuous		■			■	■				Roof ridge lines
ROF_CODIM	5	Continuous						■				Roof plan-specific dimensions
ROF_COGIRDER		Continuous					■	■				Girder truss / ledger tags & annotation
ROF_CONOTES		Continuous					■					Roof plan tags & annotation
ROF_HTSTD		Continuous					■					Roof plan hatching (beams, truss profiles)
ROF_STBEAM		Continuous					■	■	■			Structural beams / steel 'I' beams
ROF_STGIRDER		Center2					■	■	■			Girder trusses / ledgers
SLB_STREINFDN					■		■					Lower steel of slab reinforcing
SLB_STREINFUP					■		■					Upper steel of slab reinforcing
STE_ARDECOR		Continuous	■	■								Site decorative elements
STE_ARDOOR		Continuous	■	■		■			■			Site doors / gates / fencing / railing
STE_ARPROPERTY	3	Center	■	■								Site property lines
STE_ARSETBACK	4	Hidden	■	■								Site setback / easment lines
STE_CODIM	5	Continuous		■								Site plan-specific dimension
STE_COLABEL		Continuous		■								Site plan-specific labels
STE_CONOTES		Continuous		■								Site plan-specific tags & annotation
STE_HSPAVING		Continuous	■	■								Site hardsurface elements / paving / docks
STE_HSPOOL		Continuous	■	■	■	■						Site Pool / spa
STE_HSWALL		Continuous	■	■	■	■			■			Site walls / steps / conc pads
STE_HTSTD		Continuous		■								Site plan hatching (textures, shading)
STE_HSDOCK		Continuous		■								Site boat docks
STE_LSTREE		Continuous	■	■								Site landscaping (trees, shrubs, planting)
STE_MPFIXTURE	5	Continuous	■	■	■							Site plumbing fixtures
STP_CODIM	5	Continuous						■				Strapping plan-specific dimensions
STP_CONOTES		Continuous						■				Strapping Plan tags & annotation
STP_HTSTD		Continuous						■				Strapping plan hatching
STP_STTRUSS		Center						■				Individual trusses / framing

Elevation Layers:

LAYER NAME	COLOR	LINETYPE	REMARKS
CENTER_5	5	Center	Center Line elements
CO_DIM	5	Continuous	Dimension strings
CO_TARGETS	2	Continuous	Elevation Targets
CO_WIND_LOADS	2	Continuous	Wind pressure tags & notations
CO_NOTES	2	Continuous	All call-out & notation
DEFPOINTS	7	Continuous	Entities that will not plot
DETAIL_1	1	Continuous	Entities that relate to color #1 - Lineweight properties
DETAIL_2	2	Continuous	Entities that relate to color #2 - Lineweight properties
DETAIL_3	3	Continuous	Entities that relate to color #3 - Lineweight properties
DETAIL_4	4	Continuous	Entities that relate to color #4 - Lineweight properties
DETAIL_5	5	Continuous	Entities that relate to color #5 - Lineweight properties
DETAIL_6	6	Continuous	Entities that relate to color #6 - Lineweight properties
DETAIL_8	8	Continuous	Entities that relate to color #8 - Lineweight properties
DETAIL_9	9	Continuous	Entities that relate to color #9 - Lineweight properties
DETAIL_HATCH	254	Continuous	Hatch patterns
HATCH_ROOF	253	Continuous	Roof hathc patterns
HIDDEN_4	4	Hidden	Lines that need to be represented as hidden line – relates to color #4 – Lineweight properties
HIDDEN_2	2	Hidden	Lines that need to be represented as hidden line – relates to color #4 – Lineweight properties
REVISION	254	Continuous	Revision clouds & notations
SHADING	254	Continuous	Misc shading (lines that simulate circular objects)



Appendix D - Tutorials:

The best way to have a user conform to a specific CAD Standards is to provide them with all the information required to do the job efficiently. A big part of this is proper training in the procedures adopted by the *PSTool STD*. For this reason, this manual includes the following tutorials. These tutorials are not a 'how-to-AutoCAD" style tutorials. The language used assumes that the user is familiar with AutoCAD and with the MS Windows environment. They are intended to be more like a refresher course for those familiar with the steps or as a guide for those just new to the *PSTool STD.*

Several shortcuts are used throughout to symbolize the menu bar and toolbar options. Ex: **(INSERT ➔ External Reference ➔ Attach)** = Insert menu on menu bar, external reference menu item, then attach button).

Tutorial - Lesson 1

How to create a title drawing file :

Select the appropriate title (title*.dwt) template **(FILE ➔New ➔Use a Template)** from the dialog box, verify selection in description area, and then open. Once opened you will be working with a new, unnamed drawing. Save drawing **(FILE ➔Save As)** with an appropriate title name and save it in the project's directory. This file is ready to work in Model Space. The sheet titleblock is a block with attribute definitions, do not explode. Edit the attribute **(Modify➔ Object ➔ Attribute➔ Single...).** Select the 'drawn by' & the 'project info' blocks and type in the appropriate information for the titleblock. Once edited save the drawing file.

Tutorial - Lesson 2

How to setup xrefs within a sheet file :

Prerequisite files:

- Base drawing file (layout of building) Tip: save file with the layers state (on, off, freeze, thaw, etc.) the way you want it prior to xref'ing the base file.
- Title file (title block for the proper sheet size)

Create New Sheet File:
Select the appropriate SHEET template **(FILE ➔New ➔Use a Template)** from the dialog box, verify selection in description area. Once verified, save drawing with an appropriate sheet name and save it in the project's directory. This file is ready to work in Model Space.

Attach a Base Drawing File:
Before starting, make sure that you are starting on layer "0"
With the sheet file still open, insert an externally referenced (xref'd) BASE file **(INSERT ➔ External Reference ➔ Attach).**

In the file dialog box select the appropriate BASE drawing file to be xref'd. ACAD will request a shortened name for this xref. In the Substitute Block Name dialog box, type in "XBASE_#" (where # is a single character to represent the base file name - Ex: XBASE_1 for 1st floor base, XBASE_E for elevation base file) - select ok.

In the next box, uncheck the "Include Path" option – select ok. Insert the xref in a location that will not conflict or overlap with items already in this sheet.

Attaching a Title Block File:
The base files you just inserted are placed in Model Space. For the title block we need to be in Paper Space.

On the status bar, double click the TILE button at the bottom of the screen (it is grayed out signifying that you are in Paper Space).

Insert an externally referenced (xref'd) title file **(INSERT ➔ External Reference ➔ Attach ➔Browse...).** In the file dialog box select the project's title block drawing file to be xref'd. ACAD will request a shortened name for this xref. In the Substitute Block Name dialog box, type in "XTITLE" - select ok. In the next box, uncheck the "Include Path" and all "Specify on Screen" option boxes – select ok.

Once the Title block is inserted you are now ready to view the Base drawing through a viewport.

Working with Viewports in Paper Space:
Since you started with a standard template you have the appropriate viewports setup with the correct scale factor for that particular sheet.

The viewports already in the sheet are at a zoom factor for a 1/4" scale drawing (except for the site plan). They are sized for a (D) size sheet, adjust as needed. After the title block selection has been made you may need to resize the viewport and move the 'sheet number' block. If the sheet will be plotted at another scale, you need to reset the zoom factor as well.

Modify Sheet Number Blocks (w/ attributes):
All sheet files are defaulted to accept a (D - 24"X36") size title block. If your project requires an (E - 30"X42") size sheet, then select the sheet number block and move it 6" to the right. If your project requires an (F – 36"X48") size sheet then move it 12" to the right. The sheet number is a block with attribute definitions, do not explode. Edit the attribute (Modify➔ Object ➔ Attribute➔ Single...). Select the sheet number. Type the appropriate number where this sheet is located within the drawing set.

Modify Layer Status as Appropriate to the sheet file:
After a BASE file has been xref'd into a sheet (in preparation for plotting) you will need to set layer status.

Tip: All layers of the xref'd file will have the name of the xref in front of the layer name.

Freeze all layers that do not apply to the sheet that you are setting up. Any layers that do not directly apply to the sheet but are left on for reference should be changed to the color defined for a BACKGROUND SHADING EFFECT (see Layering/Plotting Standards). This color setting will plot as a thin line and will appear as a shaded background of the sheet you are producing.

Tutorial –Lesson 3

Dimensioning Standards

Dimensioning a plan is something that everybody has a preference or a style that they prefer. This tutorial is to show how to dimension but more as an illustration of how we prefer to have dimensions drawn consistently throughout all projects. This is specified to maintain a consistent format for dimensioning. This example shows dimensions for a Foundation Plan.

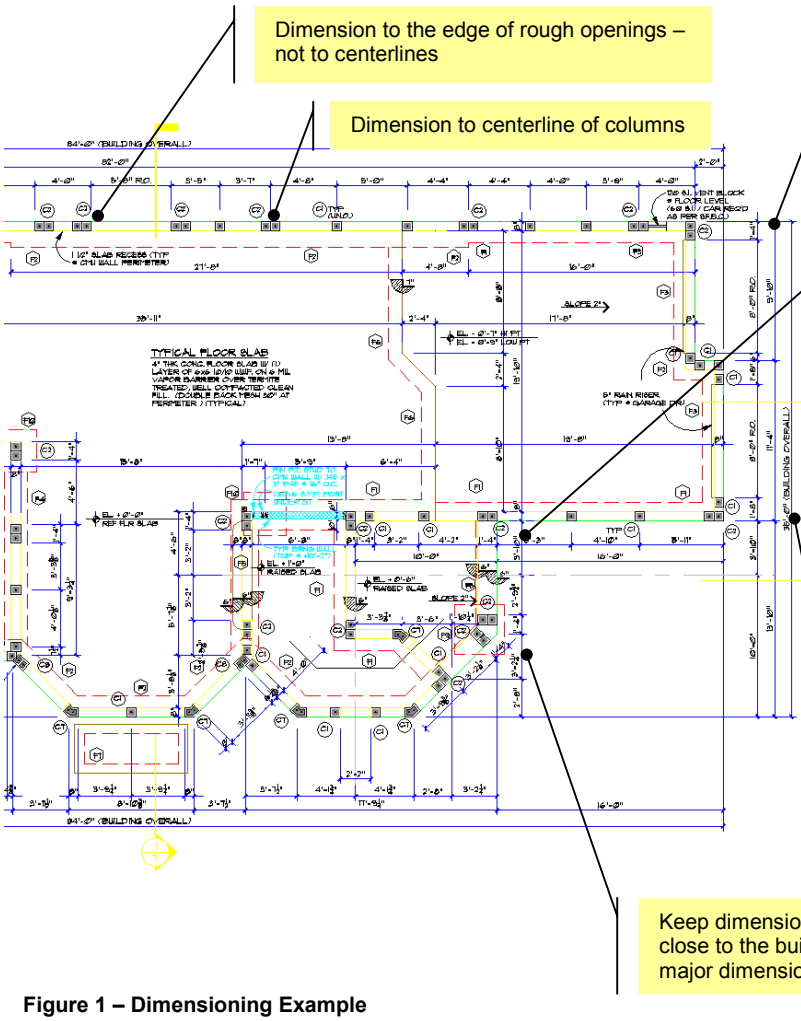


Figure 1 – Dimensioning Example

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