

CAD Standards Manual

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SECTION 1 - INTRODUCTION

This document is intended to outline the Santa Clarita Valley Water Agency's (SCV Water) procedures to create a standard format for all Projects as applicable. The CAD (Computer Aided Drafting) Standards Manual will address topics such as tools, techniques, standards, and procedures, which will aid the user in the efficient production of Plans. The standards set forth herein are to be used on all SCVWA projects.

The CAD Standards Manual and the associated electronic files are to be used in the generation of electronic plans. The AutoCAD drawings shall be set up in a consistent manner to allow for easy editing, reviewing, and plotting of drawings.

A PDF version of this manual can be found at the following SCVWA website:

[CAD Standards Manual – \(Placeholder for website link, Dolores to provide\)](#)

SECTION 2 - FOLDER STRUCTURE (INTERNAL USE ONLY)

Overview

At as-built survey and record drawing completion save your project files into the project folders located at the following link:

[CAD to GIS Data Conversion](#)

SECTION 3 - FILE NAMING

Job Number Anatomy

SCVWA Projects are assigned a unique job number by Finance and initiated by the Project Manager. Typically, Design and Inspection SOW's will use the same job number.

Projects Naming Convention

The CAD drawing name will be based on the following formula:

Sheet # + Job# + Drawing Number + Drawing Description

If needed, use a suffix to distinguish similar file types within the same folder.

Example Sheet File Names:

S01_Job#_G_TTL.dwg

S02_Job#_C1_SITE.dwg

S03_Job#_C2_DTL.dwg

Drawing Number

The drawing number contains 2 characters. The first character shall describe in more detail the type of sheet as below. The Plant Plan Sheets shall be ordered as follows:

<u>Designation</u>	<u>Description</u>
G	Title Sheet & General Notes <i>- includes Abbreviations, Symbology, Construction Notes Master List</i>
A	Architectural
C	Civil Sheets (Civil Plan, Sections, Details) <i>- includes Demolition, Pipeline, Grading, Utility Piping, Tank Access Road, Site Plan, Erosion Control Plan</i>
M	Mechanical Sheets (Mechanical Plan, Sections, Details) <i>- includes Booster Pump Stations, Treatment Facilities, Turnouts, PRV's, Wells</i>
S	Structural (Structural Plan, Sections and Details) <i>- includes Tanks, Vaults, Water Basins</i>
E	Electrical Sheets (Electrical Plan, Details, Single Line Diagrams, etc...)
I	Instrumentation Sheets (P&ID, Details, etc...)
L	Landscaping
TC	Traffic Control

The second character will be the corresponding sheet number for each designation. This number will be reflected in the title block under "DRAWING NO.:" and will be denoted as T-1, C-1, C-2, M-1, M-2, etc...

Drawing Description

This section shall describe in more detail the contents of the sheet.

Xref Naming Convention

External reference (Xref) files will be saved in the **Xref** folder. The SCVWA Standard Border **must be referenced** into the project plans (overlaid). The project base map can be referenced into the project plans at the discretion of the Project Engineer and is dependent on the complexity of the project. Base maps contain right-of-way information, utility lines, topographic information and the proposed design. Refer to **SECTION 5 - EXTERNAL REFERENCE FILES** of this manual for additional information on external reference files. The Xref file names are to begin with an "X" to identify that it is a reference file. To maintain overall simplicity and functionality, the Xref CAD drawing files are to be named using the following convention:

Formula: X + Prefix + File Type

Prefix

<u>Name</u>	<u>Description</u>
EX	Existing
PR	Proposed

File Type

<u>Name</u>	<u>Description</u>
Border	Border
Base	Base Map
Topo	Topographic Data

Example Xref File Names:

X-TTLBLK.dwg (This will always be the border name)

X-EX-Base.dwg

X-PR-Base.dwg

X-EX-Topo.dwg

X-PR-Topo.dwg

SECTION 4 - DRAWING SETUP

Template

The SCVWA Standard Drawing Template is located in:

[SCVWA CAD Standards Manual/AutoCAD Template](#)

ALWAYS BEGIN A NEW DRAWING FILE WITH THE SCVWA TEMPLATE FILE

The SCVWA Template stores attributes, layers and styles. **Never begin** by using outside consultants drawing files. Begin with the template drawing file and copy any consultant information into the SCVWA Template.

Do not start a new project by either copying old project files or by employing the "save as" command. This can and will populate a new project with errors or problems. Always begin a new drawing file with the SCVWA Template.

Drawing Setup

Each sheet for a Project will be a separate drawing named as outlined in **SECTION 3 - FILE NAMING**.

Border

The SCVWA Standard Border shall be used on **all** projects. The border AutoCAD file will be copied into the **Xref** subfolder to begin the project. All borders shall be set up as follows:

- Xref to paper space at 1:1 at 0,0,0 insertion point.
- Do not scale border by a drawing factor.
- The border size for Projects is 22" x 34".

Examples of the SCVWA Standard Border. The names and location of the standard borders are:

- **X-TTLBLK**
- **X-PLBLK**

Location for SCVWA Consultants & Internal Staff

[SCVWA CAD Standards Manual/Title & Plan Block \(for SCVWA Consultants and Internal Use Only\)](#)

Location for Developer Designer

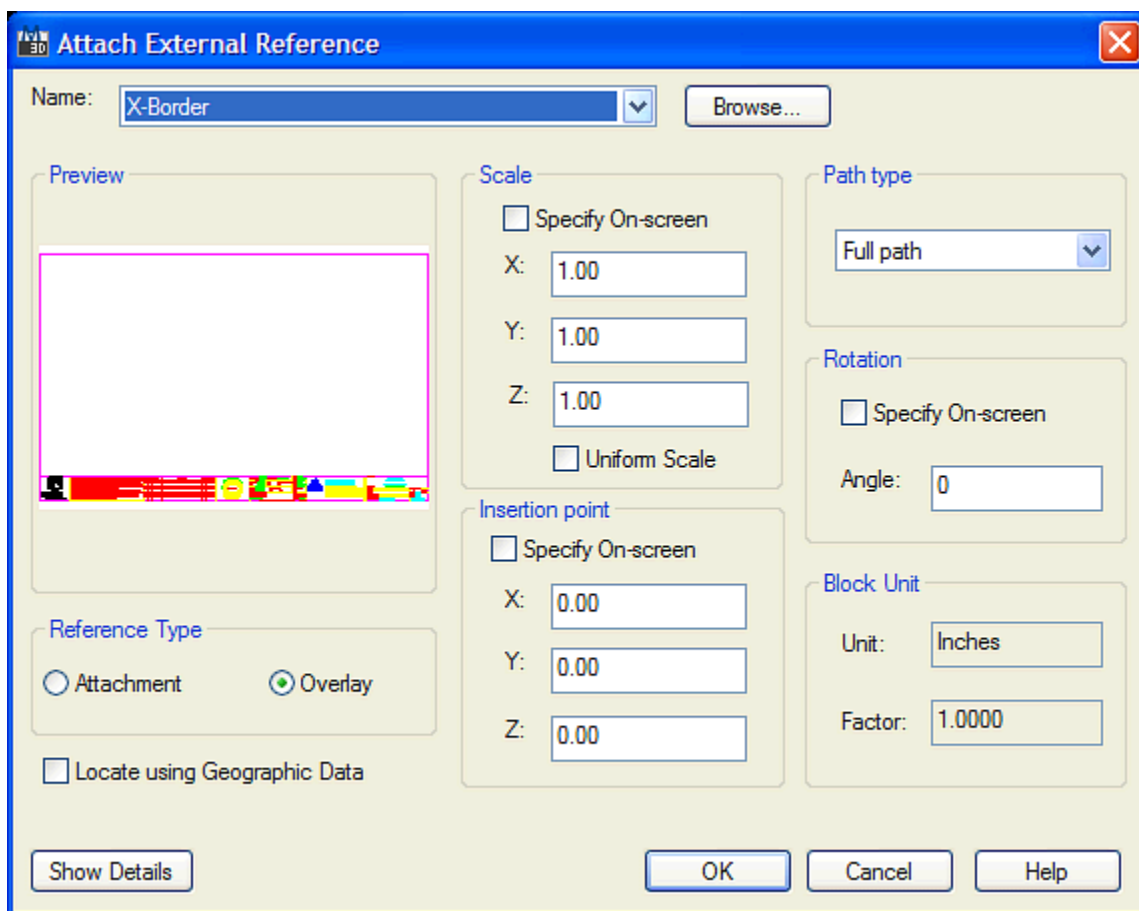
[SCVWA CAD Standards Manual/Title Block \(for Developer Designer Use Only\)](#)

SCVWA Standard Border Outline - Example

SECTION 5 - EXTERNAL REFERENCE FILES

General Guidelines

1. All sheet files are to have the SCVWA Standard Border x-referenced into **Paper Space** at 1:1 scale with the Origin at 0,0,0. **No Exceptions!** (Includes Title Sheets, Plan Sheets, Index Sheets, Exhibits, etc..).
2. Xrefs are to be attached using the **Overlay** option instead of the Attachment option. **Nested Xrefs are not allowed!**



3. All Xrefs are to be attached on its own layer. The layer name must be the same as the filename that is being attached.

- For example, the file X-TTLBLK.dwg is to be assigned to a layer called X-TTLBLK.

Attaching a file to its own layer allows the user to easily turn off the reference file by freezing the layer and lock that Xref by locking the layer. Once locked, it is impossible to accidentally move or delete that Xref.

- Most necessary layers are embedded in the SCVWA Template Drawing. Just select the corresponding layer to make active and attach. Additional layers can be created as necessary as outlined in **SECTION 6 - LAYERS & LINETYPES**.
4. Except for the border, all CAD Xrefs are to be attached in **Model Space**.
 5. All *Viewports* are to be created on a layer called VP. Once the viewport limits are set, LOCK the viewport by selecting the viewport and clicking the lock icon from the bottom ribbon in AutoCAD.
 6. Do not force elements to another color or linetype in a file to be referenced (any Xref file). This is because *Visretain* does not work on elements forced to another color or linetype except for dimensioning.
 7. Unload a reference file instead of detaching it when a file needs to be temporarily "turned off". This will maintain the visretain settings of the layers, colors and linetypes. Reload to turn on the Xref again.
 8. **Never** Xref a file that does not path from the **CAD** folder.

SECTION 6 - LAYERS & LINETYPES

General Layer Guidelines

SCVWA layer names are found in the SCVWA Template Drawing. The layer names are based on minimizing the length and description of layers. Most of the layers you'll need will be found in the SCVWA Template Drawing. If it is necessary to create additional layers, follow the guidelines shown below:

1. **Do not** create layers by color i.e. Red, White, Green.
2. **Do not** create layers by number; the only number layer should be **0**.
3. **Do not** create multiple layers for the same entities i.e. ROW and RW for right-of-way.
4. **Do not** combine different asset types into one layer. (i.e. Water Service Laterals on "PR-Water-Service" layer and Proposed Water Main on "PR-Water" layer.)
5. Layer names should be easily understood as to what data should reside on it.
6. Delete all unused layers that will not be used in your file by using the Purge command.

General Linetype Guidelines

The majority of the standard linetypes for SCVWA are directly from the default AutoCAD line type file ACAD.lin. Some of the linetypes in the SCVWA Template Drawing are **custom** linetypes for utilities generally used in SCVWA's project plans. If you need a linetype that is not located in the SCVWA Template Drawing, contact **Jimmy Moreno or Raymond Chan** to create the linetype.

Ltscale (Linetype Scale)

Since SCVWA always utilizes 1:1 paper space for all plan sheets, the LTSCALE should be 1 when plotting. When plotting from model space, the LTSCALE should be equal to the plot scale to properly display the linetypes.

For very tight spaces, the linetype scale of individual lines can be forced as needed. The following example illustrates the standard linetypes developed by SCVWA.

SCVWA Standard Layers & Linetypes

SECTION 7 - FONTS

SCVWA will only use 2 text fonts: ARIAL and ROMANS. The following are general guidelines for the use of fonts in paper space and model space.

General Guidelines

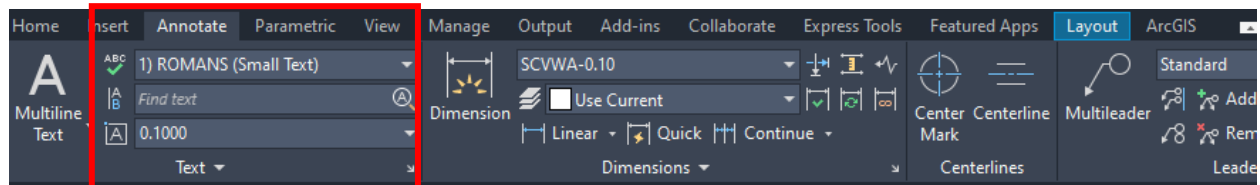
Callouts can be in model space or paper space, as long as it is consistent.

The following are general guidelines for the use of the two fonts:

1. Use Arial font for titles, street names, match lines & any place where a bold font is needed.
2. Use Romans font for general callouts and notes.

When plotted in 1:1 in paper space all text must:

1. Have a plotted size of 0.1 for normal size Romans text.
2. General Arial font should have a plotted size of 0.15.
3. Large Arial font for Main Street Names text should have a plotted size of 0.20.



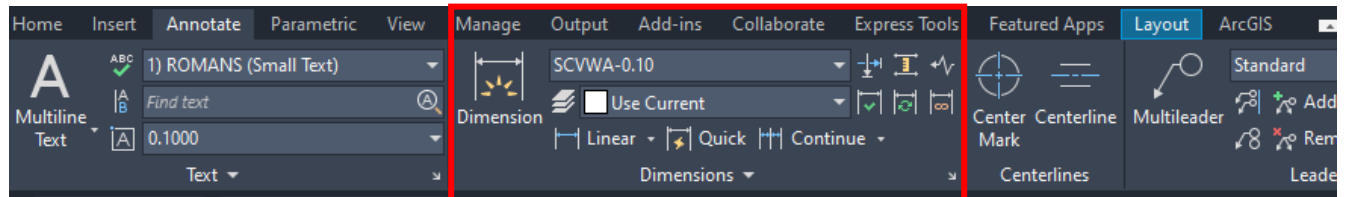
Text Styles - Example

SECTION 8 - DIMENSION STYLES

General Guidelines

SCVWA Standard Dimension styles are embedded in the SCVWA Template Drawing (as long as you begin a project with a SCVWA Template). They can also be inserted directly through the AutoCAD Design Center.

1. All dimensions are to be placed on the **TEXT-MS** or **TEXT-PS** layer. Do not create a separate layer for dimensions.
2. **Do not edit an existing dimension style.** All dimensions already placed with that style will change if edited. If you need a dimension type that is not located in the SCVWA Template Drawing, contact **Jimmy Moreno or Raymond Chan** to create the dimension type.
3. Do not explode a dimension. With the Explode command, dimensions will explode to layer zero and will no longer be associative.
4. These dimension styles are based on the scale of the drawing (SCVWA-0.10 is 1-1 dimension style) and can be accessed through the AutoCAD Annotate Tab under the Dimension Panel.



SECTION 9 - COLOR

The color of an object determines how thick it will plot, it is very important that the proper color is used to maintain uniformity from plot to plot and project to project. For a detailed list of color/pen settings, see **SECTION 11 - PLOTTING**.

General Guidelines

1. Colors 1 thru 6 represent the solid or black pens from thinnest (color 1) to thickest (color 6). Color 7 is thinner than Color 1.
2. Colors 250 through 255 represent the screened or grey pens from thickest (color 250) to thinnest (color 255).
3. Color 8 is used for existing utilities.
4. Please see SCVWA Pen Weights document for Standard Colors. Any deviation from the standard colors must be approved by **Jimmy Moreno or Raymond Chan** prior to their use.

Note: Deviations from the standard colors may require the creation of a special plotting pen table. See **SECTION 11 - PLOTTING** for details.

SCVWA Pen Weights - Example

SECTION 10 - BLOCKS

SCVWA Standard Blocks

SCVWA has standardized blocks routinely used during preparation of project plans. If a SCVWA Standard Block is available it must be used – **no exceptions**.

For additional assistance with blocks, contact **Jimmy Moreno or Raymond Chan**.

Blocks that are intended to be placed on a specific layer or on a variety of layers and **not** intended to be exploded, should be **created** on layer 0. Blocks created on layer zero will take on the linetype and color of the layer that it was placed on. This is beneficial because only one block need be created rather than a separate block for each possible layer use. Also, if a block is placed on an improper layer, the color may be different than what the user expected thus reminding the user that the block was placed on the wrong layer.

A block should be created so that its base scale is 1:1. This should simplify block placement by eliminating the need for a user to determine the original scale factor. For example, if a block was created for a 40 scale drawing but the user did not know the original scale, the user must first determine its original scale usually by trial and error. Then, if the user wants to place that block into a 1:1 file, the user would have to calculate the scale factor as 1/40. But, if a block created at a 1:1 scale is to be placed into a 40 scale drawing, a 20 scale drawing and into 1:1 paper space the scales would be 40, 20, and 1 respectively. Having the same BASE scale for all blocks simplifies their placement.

SECTION 11 - PLOTTING

Plot Drivers

There are many devices available for plotting/printing at SCVWA. The list below briefly outlines the purpose for each named device.

<u>Plot Device</u>	<u>Description</u>
<u>Digital</u>	
DWF ePlot	Use to create .DWF File
DWF eView	Use to create .DWF File
DWG To PDF	Use to create .PDF File
Publish to Web JPG	Use to create .JPG File
Publish to Web PNG	Use to create .PNG File
<u>Half Size (11"x17")</u>	
RIO-Print\Summit-ENG-Lobby Canon C5255	Black & White / Color Printing
RIO-Print\Summit-ENG-Room Canon C9270	Black & White / Color Printing
<u>Full Size (22"x34")</u>	
RIO-print\Summit-Plotter Oce ColorWave 50	Black & White / Color Printing
RIO-Print\Summit-CS-Plotter HP Pagemwide XL 5100	Black & White / Color Printing

SECTION 12 - CONSTRUCTION NOTES

General Guidelines

A Construction Note Master List (Master List) has been developed for use in the preparation of **Project Plans**. The Master List is comprised of standard construction notes that provide the flexibility to include the standard sizes of Ductile Iron (D.I.) Pipe, PVC Pipe, "main size" fittings and facilities commonly used in SCVWA Projects.

Note: Each Plan Sheet will list only the construction notes located on that particular sheet. Therefore, in the majority of cases, the Construction Notes will differ sheet by sheet.

Construction Notes Master List - Example