

# ACPWA

## CADD USERS' MANUAL

SECTION 13

AGENCY AND CONSULTANT CADD PROCEDURES

REVISED  
9/21/2012



Public Works Agency  
— Alameda County —

**AutoCAD Civil 3D  
Release 2012**



399 Elmhurst Street  
Hayward CA, 94544  
(510) 670-5480

## Introduction

---

The procedures in the *ACPWA CADD Users' Manual* were developed by Road Design and Flood Design Sections for use in production of Capital Improvement Project Drawings with Autodesk software. This manual is intended for use by all Agency CADD (computer-aided drafting & design) users and Agency consultants.

We hope that adhering to these procedures will produce a uniform CADD product, and meet the Agency's CADD needs.

Preparation of this manual was guided by the review and comments of staff members of the Public Works Agency and Agency consultants.

Contributors:

Jane Ringot .....	Engineering CADD Technician III
Daniel Castaneda .....	Engineering CADD Technician III
Paul Crawford .....	Engineering CADD Technician III
Edward Perez .....	Surveyor
CAD Masters, Inc.	

## TABLE OF CONTENTS

Section & Subject	Revision Date	Page
Introduction		ii
Table of Contents		iii
Table of Figures		iv
<b>Section 13. AGENCY AND CONSULTANT CADD PROCEDURES</b>		<b>95</b>
13.1 CADD Procedures-Road Design and Flood Control Design	9/21/2012	96
13.1.A Consultant Data Packages - Standard CADD Files Listing		96
13.1.B File Naming Examples		98
13.1.C Consultant - Title Sheet, Pollution Prevention, & Notes and Abbreviations		100
13.1.D Creating New Drawings		101
13.1.E Inserting Borders with Title Blocks		101
13.1.F Consultant - Dimensioning		102
13.1.G Consultant - Lettering (Text Styles and Fonts)		103
13.1.H Consultant - Pen Numbers & Line Widths		103
13.1.I Layer Naming Conventions		103
13.1.J Consultant - Hatch Patterns		107
13.1.K Consultant Submittals to ACPWA		108
<b>Section 13. AGENCY AND CONSULTANT CADD PROCEDURES (Continued)</b>		
13.2 AutoCAD Civil 3D Design Workflow	9/21/2012	109
13.2.A Directory Structure		109
13.2.B File Naming Conventions		114
13.2.C Creating Model Drawings Using Templates		116
13.2.D Creating Sheet Drawings Using Templates		119
13.2.E Working with Survey		121
13.2.F Working with Consultants		122
13.2.G Data Sharing using Data Shortcuts and Data References		124
13.2.H Create Data Shortcuts		124

## TABLE OF CONTENTS

Section & Subject	Revision Date	Page
13.2.I Create Data References		127
13.2.J Data Shortcuts Editor		128
13.2.K Design's Workflow Diagram		129
13.3 Templates	9/21/2012	130
13.3.A Consultants - Civil 3D Drawing Templates		130
13.3.B Create a Custom Template for General Sheets		131
13.3.C Create a Custom Template for Plan and Profile Sheets		133
13.4 Sheet Sets	9/21/2012	135
13.4.A Concept		135
13.4.B Fields		135
13.4.C Title Sheet, Pollution Prevention, & Notes and Abbreviations		138
13.4.D Creating a New Sheet Set		140
13.4.E Opening an Existing Sheet Set		142
13.4.F Import a Layout as a Sheet		143
13.4.G Creating a New Sheet from the Sheet Set Manager		144
13.4.H Renumbering & Renaming Sheets		145
13.4.I Publishing		146
<i>INDEX</i> .....		147

## TABLE OF FIGURES

Figure	Page
<i>Figure 12: Consultant-Hatch Patterns</i> .....	107
<i>Figure 13: Workflow Diagram (Not For Consultant Use)</i> .....	129
<i>Figure 14: Sheet Set Manager</i> .....	135

### **13. AGENCY AND CONSULTANT CADD PROCEDURES**

---

This section of the *ACPWA CADD Users' Manual* is intended for use by all Agency CADD (computer-aided drafting & design) users and Agency consultants. This section will be made available to all Agency consultants for use in production of Capital Improvement Project drawings with Autodesk Civil 3D (C3D) software by the Agency, and is included in both Road Design's and Flood Control Design's consultant data packages.

Please review and adhere to the following Alameda County Public Works Agency (ACPWA) and Consultant CADD Procedures for both Road Design and Flood Control Design Capital Improvement Projects in AutoCAD Civil 3D.

For ACPWA Survey Department procedures or data package, Agency consultants should contact the ACPWA project engineer/manager.

For the in-house ACPWA project engineer/managers, zipped consultant data packages for Road, Flood Control and Survey are located at: N:\Standards\2012C3D\2012 Consultant CAD Stds...

## 13. AGENCY AND CONSULTANT CADD PROCEDURES

### 13.1 CADD Procedures-Road Design and Flood Control Design

9/21/2012

#### 13.1.A Consultant Data Packages - Standard CADD Files Listing

Within each package the consultant will receive from the Agency via download, email, CD-ROM or FTP site the files listed below. See [Section 13.1.K](#) for submittal format and software release information.

#### *Road Design and Flood Control Design Consultant Data Packages*

Each is a separate consultant data package for AutoCAD Civil 3D Design Projects containing:

File Name (by file type)	Description
CON-ACPWA CADD Manual - Section 13.pdf	<i>ACPWA CADD Users' Manual, Section 13 AGENCY AND CONSULTANT CADD PROCEDURES</i>
seiko2050.ctb	ACPWA color dependent pen table. <b>We Do Not use layer dependent pen styles!</b>
7.4 - seiko2050 Plotting.dwg	"Seiko 2050 Standard Plotter Settings-Pen Nos. & Line Widths." <b>Please pay special attention to pens and line widths!</b>
det-lbl-e.dwg, det-ref1-e.dwg & det-ref2-e.dwg	Detail label & reference blocks. Details are labeled numerically, e.g., 1, 2 & 3.
N-Arrow-Lg.dwg & N-Arrow-Sm.dwg	Large & small north arrow blocks. Place north arrow in the top portion of the plan view, preferably the upper right side.
review-e.dwg	Review block
scale-feet.dwg	<b>Scale bar block in feet.</b> Place scale bar in the bottom portion of the plan view, preferably the lower right side. If multiple scales are used per sheet, label scale "AS SHOWN" in the title block. <b>For Profiles Only:</b> If the grid lines are to scale and labeled in correct increments no scale bars are needed, but label vertical and horizontal scales correctly on the profile title and in the title block.
sec-lbl-e.dwg, sec-ref1-e.dwg & sec-ref2-e.dwg	Section label & reference blocks. Sections are labeled alphabetically, e.g., A, B & C
std-blocks-e.dwg	Instructions for using ACPWA standard blocks
concre.pat, earth2.pat, water.pat, wood1.pat, wood3.pat and wood3.pat	AutoCAD hatch patterns definition files, see <a href="#">Section 13.1.J</a>
acad.lin	AutoCAD line type definition file with ACPWA's user defined custom line types
ACPWA Sheet Set-Flood.dst or ACPWA Sheet Set-Road.dst	ACPWA sample sheet sets for Flood or Road. Subsets (within the DST) will allow you to keep your sheets in the correct order.
_ACPWA F-Basic.dwt or _ACPWA R-Basic.dwt	<b>ACPWA Flood or Road Basic templates for Civil 3D drawings.</b> Start new C3D drawings with a basic data template when minimal C3D objects are needed (e.g., Signing & Striping, Street Lighting Landscaping and Layout Plans). Each contains Line and Curve Label, EG Surface and Alignment Styles.
_ACPWA F-Master.dwt or _ACPWA R-Master.dwt	<b>ACPWA Flood or Road Master templates for Civil 3D drawings.</b> Start new C3D model drawings with a master data template. All Styles are included, except Pipe Network Styles. Each contains components like layers, text styles, dimension styles, C3D object styles, label styles and drawing settings specifically for a Flood Control Project or Road Project. See <a href="#">Section 13.2.C</a> <i>Creating Model Drawings using Templates.</i>
_ACPWA Pipe Network.dwt	<b>Civil 3D Styles for Pipe Networks</b> for Flood Control & Road Projects (C3D data). Start new pipes drawings with this data template.

Continued on next page...

## 13. AGENCY AND CONSULTANT CADD PROCEDURES

### 13.1 CADD Procedures-Road Design & Flood Control Design (Continued) 9/21/2012

#### Road Design and Flood Control Design Consultant Data Packages (Continued)

File Name (by file type)	Description
CON-ACPWA F-Plan Production-20 Scale.dwt or CON-ACPWA R-Plan Production-20 Scale.dwt	Use C3D automated Plan Production tools to create aligned views for an alignment and profile. Contains C3D Road or Flood master template data. See Section 13.2.D topic, <a href="#">Creating New Plan and Profile Sheets</a> .
CON-ACPWA F-Sheets.dwt or CON-ACPWA R-Sheets.dwt	ACPWA template containing layouts with borders for "22x34" & "8.5x11" sheets. For creating General Sheet Drawings. See Sections <a href="#">13.2.D</a> and <a href="#">13.4.G</a> .
CON-ACPWA F-Title Pollution Notes.dwt or CON-ACPWA R-Title Pollution Notes.dwt	ACPWA template containing layouts for sheets 1, 2 & 3 of plans. Also see <a href="#">Section 13.1.C</a> <ol style="list-style-type: none"> <li>1. TITLE SHEET Layout (Includes: Conventional Symbols, Index of Sheets, Vicinity Map, Location Map, etc.)</li> <li>2. POLLUTION PREVENTION Layout</li> <li>3. NOTES AND ABBREVIATIONS Layout</li> </ol>
ACPWASHP.shx	Compiled shape file with custom shapes used in 'acad.lin' file
n-outline.shx, shadow.shx & simplex.shx	AutoCAD compiled shape files. Fonts used by ACPWA.

#### **Survey's Consultant Data Package (NEW ITEM)**

Use for topographic surveys and right of-way drawings this package contains:

File Name (by file type)	Description
_ACPWA Survey.dwt	<b>Survey Master Template for Civil 3D drawings.</b> Data Styles for Points.
ACPWA Survey-Sheets.dwt	For topographic survey or right-of-way maps only. Layout tab with Survey's border. (Not for use with Road or Flood Control Capital Improvement Plans)
acad.lin	AutoCAD line type definition file with ACPWA's user defined custom line types
N-Arrow-Lg.dwg & N-Arrow-Sm.dwg	Large & small north arrow blocks. Place north arrow in the top portion of the plan view, preferably the upper right side.
scale-feet.dwg	<b>Scale bar block in feet.</b> Place scale bar in the bottom portion of the plan view, preferably the lower right side. If multiple scales are used per sheet, label scale "AS SHOWN" in the title block. <b>For Profiles Only:</b> If the grid lines are to scale and labeled in correct increments no scale bars are needed, but label vertical and horizontal scales correctly on the profile title and in the title block.
seiko2050.ctb	ACPWA color dependent pen table. <b>We Do Not use layer dependent pen styles!</b>

For ACPWA Survey Department consultant data package, Agency consultants should contact the ACPWA project engineer/manager.

## 13. AGENCY AND CONSULTANT CADD PROCEDURES

---

### 13.1 CADD Procedures-Road Design & Flood Control Design (Continued) 9/21/2012

#### 13.1.B File Naming Examples

Refer to [Section 13.2.B](#) of the *ACPWA CADD Users' Manual* for an explanation of our file naming conventions. ACPWA store's the AutoCAD files as per the directory structure outlined in [Section 13.2.A](#) of the *ACPWA CADD Users' Manual*.

The **[description]** in the file name is usually based on the project name. Be consistent in the naming of your files and keep descriptions short (e.g., for the project titled "Improvements of Hesperian Blvd." the description can be **Hesp**). For Model drawings the [description] can be based on the name of the Civil 3D object it contains (e.g., a drawing containing an alignment named "Hesperian CL" can be called **Align&Prof-Hesperian CL.dwg**).

#### File Naming Examples

Keep file names short and descriptive, and use 30 characters or less.

File Name by Folder Category	Description
<b>Images folder– Aerial photo image drawing and all images</b>	
Image-[description].dwg	Drawing with aerial photo image files attached (xref)
<b>Model folder- Any drawing that contains Civil 3D objects</b>	
Align-[description].dwg Prof-[description].dwg Align&Prof-[description].dwg	Alignment and corresponding profile drawings (For most projects you will have one drawing with the alignments and separate files for individual profile drawings. For small projects each alignment and corresponding profiles can be stored in their own file.)
Corridor-[description].dwg	Corridor Models drawing
Ex-Surface-[description].dwg	Existing Ground Surface drawing (a.k.a. Original Ground Surface drawing)
Grading-[description].dwg	Grading Models drawing contains a finished grade surface
Parcels-[description].dwg	Parcels drawing
Pipes-[network name].dwg	Pipes Network drawing
VF-[alignment name].dwg	View Frame drawing
XSection-[Alignment Name].dwg	Cross Section drawings

Continued on next page...



## 13. AGENCY AND CONSULTANT CADD PROCEDURES

### 13.1 CADD Procedures-Road Design & Flood Control Design (Continued) 9/21/2012

#### File Naming Examples (Continued)

Keep file names short and descriptive, and use 30 characters or less.

File Name by Folder Category	Description
<b>Plan folder - All plan drawings that are not sheet drawings and model drawings</b>	
Drain-Impr-[description].dwg	Drainage Improvements (xref)
Ex-Impr-[description].dwg	Existing Planimetrics or Topography Drawing (xref)*
Ex-Utilities-[description].dwg	Existing Utilities Drawing – for utilities not shown on Survey's topo (xref)
Pr-Impr-[description].dwg	Proposed Improvements Drawing (xref)
RW-[description].dwg	Horizontal Geometry or Right-of-way Drawing (xref)*
Sign&Striping-Impr-[description].dwg	Signing & Striping Improvements (xref)
<b>Sheets folder– Drawing (DWG) files you plot from &amp; sheet set (DST) file</b>	
[description].dst	Sheet Set File (e.g., Crow Canyon Rd 2.40.dst)
Title-PP-Notes-[description].dwg	Title Sheet, Pollution Prevention, and General Notes and Abbreviations
SWPPP-[description].dwg	Conceptual Storm Water Pollution Prevention Plan
TypSection-[description].dwg	Typical Sections
Detail-[description].dwg	Miscellaneous Details
Layout-[description].dwg	Layout Plan Drawing
##-Rdwy P&P-(STA[Station Interval]).dwg ##-Rdwy Prof-(STA[Station Interval]).dwg	Roadway Improvement Plan & Profile Roadway Improvement Profile
##-Grading Pln-[description].dwg	Grading Plan
##-Drain P&P-(STA[Station Interval]).dwg ##-Drain Prof-(STA[Station Interval]).dwg	Drainage Plan & Profile Drainage Profile
Boring Log-[description].dwg	Log of Test Borings
Embk Pln-[description].dwg	Embankment Plan
Plant Pln-[description].dwg	Planting or Landscaping Plan
Street Lt-[description].dwg	Street Lighting Plan
Traf Sig-[description].dwg	Traffic Signal Plan
Traf Sig Mod-[description].dwg	Traffic Signal Modification Plan
Sign&Striping-[description].dwg	Signing & Striping Plan

- \* Existing Planimetrics (a.k.a. topography) and Horizontal Geometry (a.k.a. right-of-way) drawings are usually created by our Survey Department. If you need to make edits to our survey drawings create a copy and name it as indicated above.

## 13. AGENCY AND CONSULTANT CADD PROCEDURES

---

### 13.1 CADD Procedures-Road Design & Flood Control Design (Continued) 9/21/2012

#### 13.1.C Consultant - Title Sheet, Pollution Prevention, & Notes and Abbreviations

Consultants can create Title Sheet, Pollution Prevention, and Notes and Abbreviations sheets by starting a **NEW** drawing using template **CON-ACPWA R-Title Pollution Notes.dwt** or **CON-ACPWA F-Title Pollution Notes.dwt** included in the consultant data package. (For in-house projects see [Section 13.4.C](#) of the *ACPWA CADD Users' Manual*).

##### **Title Sheet**

In addition to the main title and signatures, the **Title Sheet** (a.k.a. sheet 1) contains the Vicinity Map, the Location Map, the Conventional Symbols Legend, the Index of Sheets, a list of Alameda County Design Guidelines, a list of Caltrans Standard Plans and a list of Construction Area Signs.

Do not copy and paste properties from Conventional Symbols Legend into your drawing. For utilities we have custom line types both with text and without text. Instead select the correct line types from 'acad.lin' and apply them to your layers.

Base maps for the Location Map are available from ACPWA for most locations. Please contact the ACPWA project engineer/manager.

##### **Pollution Prevention**

The **Pollution Prevention** sheet (a.k.a. sheet 2) will only be used for project construction disturbance of less than one acre. For project construction disturbance of more than one acre, project specific Conceptual Storm Water Pollution Prevention Plan (SWPPP) will be prepared in lieu of the Pollution Prevention sheet. Please contact the ACPWA project engineer/manager.

If the Pollution Prevention sheet is being used for this project, **SAVE** this drawing as **Title-PP-Notes-[description].dwg** in your project's *Sheets* folder.

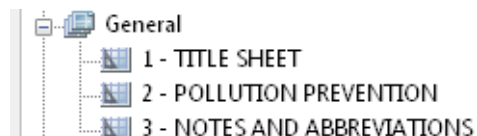
If a separate (SWPPP) is being prepared delete the "POLLUTION PREVENTION" layout tab and **SAVE** your plan as **Title-Notes-[description].dwg** in your project's *Sheets* folder.

If you prefer separate drawing files, **SAVE** your new drawing in your project's *Sheets* folder as three separate files called: **Title-[description].dwg**, **Pollution-[description].dwg** and **Notes-[description].dwg**. Delete the layout tabs you do not need from each drawing.

##### **Notes and Abbreviations**

Read and follow the instructions on the **Notes and Abbreviations** sheet. Any additional abbreviations used on the plans should be added to the Abbreviations list on the Notes and Abbreviations sheet.

Add the sheet layouts to your sheet set under the General subset. See [Section 13.4](#) of the *ACPWA CADD Users' Manual* for instructions on creating and working with sheet sets. Re-number the sheets as follows:



## 13. AGENCY AND CONSULTANT CADD PROCEDURES

---

### 13.1 CADD Procedures-Road Design & Flood Control Design (Continued) 9/21/2012

#### 13.1.D Creating New Drawings

Create all new Civil 3D (C3D) drawings using an appropriate C3D data template. Our C3D data templates begin with an underscore, e.g., **\_ACPWA F-Master.dwt**. For a complete listing and description of templates, see [Section 13.1.A](#) for Agency consultant projects (For in-house projects see Section 3.3.A of the *ACPWA CADD Users' Manual*).

C3D data templates contain C3D settings for Road Design Projects, Flood Control Design projects or Surveys, and the units are in feet. C3D points settings for topographic survey drawings are in **\_ACPWA Survey.dwt**.

For consultants who need Survey's C3D templates please request the Survey's Consultant Data Package from the ACPWA project engineer/manager.

#### 13.1.E Inserting Borders with Title Blocks

Insert a 22" x 34" border with title block by adding a new layout from a template.

In paper space, **right click** on any layout tab and select **From template...** Open the appropriated sheet template, then select the "22x34" and click **OK** to insert layout tab into your drawing.

##### Sheet Templates with Title Blocks:

- **ACPWA F-Sheets.dwt** (In-house Flood projects)
- **ACPWA R-Sheets.dwt** (In-house Road projects)
- **CON-ACPWA F-Sheets.dwt** (Consultant Flood projects)
- **CON-ACPWA R-Sheets.dwt** (Consultant Road projects)

Our standard 22" x 34" title block plots at a scale of 1"=1'. Please **Do Not** change the size of the title block.

Use the existing viewport, or use the **MVIEW** command to create new viewport(s). Zoom in to the correct paper space "xp" scale.

Consultants should revise title blocks accordingly to include their company's logo, their Engineer's stamp, and any other miscellaneous consultant information/data.

**DO NOT edit text or delete text with a grey background!** This text is a field. Edits to fields need to be made through the sheet set manager. Fields are populated by updating the properties in the sheet set manager; see [Section 13.4](#) for information on sheet sets.

## 13. AGENCY AND CONSULTANT CADD PROCEDURES

### 13.1 CADD Procedures-Road Design & Flood Control Design (Continued) 9/21/2012

#### 13.1.F Consultant - Dimensioning

Dimension Styles are predefined in the Agency's C3D data templates for the overall scales of 1, 10, 20, 30, 40, 50 and 100. Included are styles for dot blank leaders and dot leaders. C3D data templates begin with an underscore, e.g., ACPWA F-Master.dwt. For a listing and description of templates, see [Section 13.1.A](#) of the *ACPWA CADD Users' Manual*.

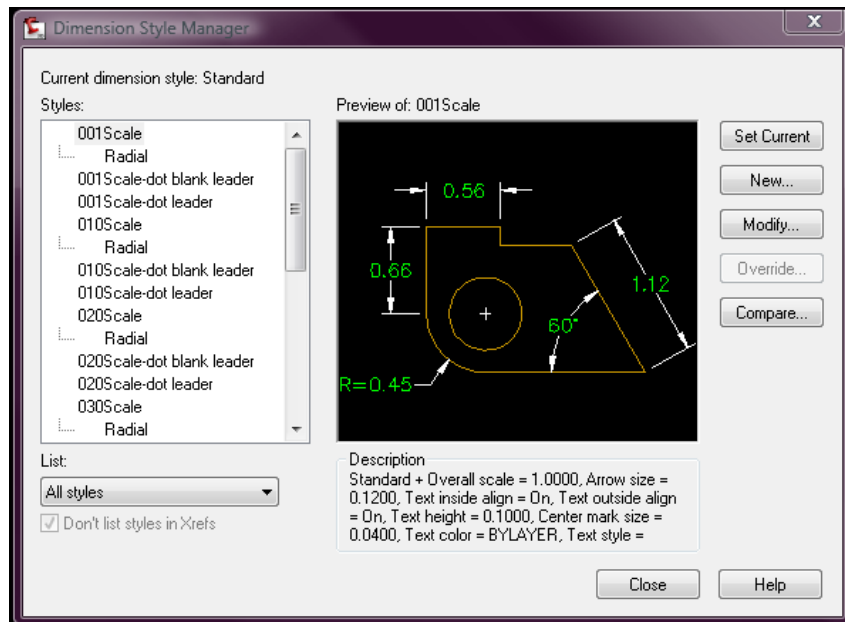
Place general dimensions on **G-DIM** layer, or create similar layers as needed as per our layer naming convention. Set new dimension layer color to (3) green.

For all leader lines, dimension lines, and extension lines the pen color of the dimension is preset to (7) white.

Dimension styles use text style Simplex0 and text height = 0.1000. The text pen color is defined by layer.

Text style for dimensioning, Simplex0 has a height of 0.0000. The dimension styles are set to the scale of the drawing or viewport so the text will scale correctly.

Add the foot symbol (e.g., 1.00') to your dimension as a suffix when you are dimensioning in feet.



**Please avoid exploding your dimensions!**

## 13. AGENCY AND CONSULTANT CADD PROCEDURES

---

### 13.1 CADD Procedures Road Design & Flood Control Design (Continued) 9/21/2012

#### 13.1.G Consultant - Lettering (Text Styles and Fonts)

Text styles are predefined in the Agency's C3D data templates. C3D data templates begin with an underscore, e.g., **\_ACPWA F-Master.dwt**. For a listing and description of templates, see [Section 13.1.A](#) of the *ACPWA CADD Users' Manual*. These templates are set at 1"=20' scale (UON), and units set to feet. Lettering standards are as follows:

- Use "simplex.shx", height = 0.10", pen color (3) green, for all notes, and general text. Predefined text style named **L100** height is 2.00 (Drawing scale multiplied by text height desired).
- Use TrueType font "Arial" in bold, height = 0.15", pen color (7) white for street names, match line text and other intermediate text. Predefined text style named **L150** height is 3.00 (Drawing scale multiplied by text height desired).
- Use TrueType font "Arial" in bold, height = 0.20", pen color (7) white, for all titles including sections, details, etc. Predefined text style named **L200** height is 4.00 (Drawing scale multiplied by text height desired).
- Predefined text style named **Simplex0** ("simplex.shx", height = 0.00") is used for predefined dimensions. Use pen color (3) green for dimension layers.

**Use uppercase (CAPS) for all text! Do not use annotative text styles.**

#### 13.1.H Consultant - Pen Numbers & Line Widths

Please pay special attention to pens and line widths! Refer to the enclosed "7.4 – seiko2050 Plotting.dwg" when creating new objects and layers.

We use a color dependent pen table, i.e., seiko2050.ctb. We do not use layer dependent pen styles!

Use the correct ACPWA pen color or equivalent color specified. Make sure that the pen color in the chart matches the desired line width in the drawing. Use pen color 33 for screened gridlines on profiles! For most Civil 3D objects styles predefined within our templates.

#### 13.1.I Layer Naming Conventions

**Creating New Layers** - Many layers are predefined in our templates with descriptions. Our layer naming convention uses a modified version of the *CAD Layer Guidelines* found in *United States National CAD Standards® (NCS) v4.0*. When naming new layers please follow our convention using NCS as a guideline, and add descriptions to layers for clarification. The NCS v4.0 can be ordered at the following website: <http://www.buildingsmartalliance.org/index.php/ncs>

Layer names should be defined with ACPWA colors and line types. Please choose the correct color and line type for each layer. Refer the conventional symbols legend found on our plan title sheet. Consultants also refer to the enclosed "7.4 – seiko2050 Plotting.dwg" file.

Note: External references should be inserted on layers named, "**xr[Xref File Name]**."

### 13. AGENCY AND CONSULTANT CADD PROCEDURES

**13.1 CADD Procedures Road Design & Flood Control Design (Continued) 9/21/2012**

**Layer Naming Hierarchy** - consists of:

[discipline designator]-[major group]-[minor group 1]-[minor group 2]-[status]  
 XX-XXXX-XXXX-XXXX-X

**LAYER DESIGNATIONS BY FOLDER/DRAWING TYPE**

[discipline designator]-[major group] XX-XXXX-XXXX-XXXX-X	Drawing Description
<b>Exhibits folder – Drawings not part of the construction plans</b>	
G-LOCMAP or G-EXHB	Location Map or Exhibits
<b>Images folder - Aerial photo image drawing</b>	
G-IMAGE	Drawing with aerial photo image files attached (xref)
<b>Model folder - Any drawing that contains Civil 3D objects</b> (Only Civil 3D objects have C as the discipline designator. See Agency's data templates for complete list of predefined layers.)	
C-ALGN & C-PROF	Alignment and Profiles drawings
C-CORR, C-ROAD-CORR...	Corridors drawing
C-SECT	Cross Section drawing
C-TINN, C-TOPO-GRAD...	Grading drawing containing a surface
C-XXXX-PCRL	Parcel drawing
C-STRM, C-SSWR, C-WATR ...	Pipes drawing (Storm Drain, Sanitary Sewer, or Water)
C-XXXX-VIEW	View Frame drawing
<b>Plan folder - All plan drawings that are not sheet drawings and model drawings</b>	
CI-STRM	Drainage Improvements (xref)
CI-TOPO, CI-XXXX...	Existing Topography (xref) *
CI-XXXX	Proposed Improvements Drawing (xref)
CT-SIGN & CT-STRP	Signing & Striping Improvements (xref)
CI-RWAY, CI-ESMT, CI-XXXX...	Right-of-way Drawing (xref) *
<b>Sheets folder - Drawing (DWG) files you plot from</b>	
G-ANNO, G-POLLUTION & G-NOTES	Title Sheet, Pollution Prevention, and Notes and Abbreviations (see templates)
G-SECT	Typical Sections
G-DETL	Miscellaneous Details
CI-LAYO	Layout Plan Drawing
CD-XXXX	Demolition Plans
CI-ROAD	Roadway Improvement Plan & Profile Roadway Improvement Profile
CP-XXXX	Paving Plan
CI-EROS	Erosion Control Plans
CG-XXXX	Grading Plan
CI-STRM	Drainage Plan & Profile

Continued next page...

\* If you are using existing topography and right-of-way drawings created by our Survey Department, the layer discipline designators used in Survey's template are C, V, VZ and VY. Please use discipline designator CI if new objects layers are created in these drawings.

### 13. AGENCY AND CONSULTANT CADD PROCEDURES

**13.1 CADD Procedures Road Design & Flood Control Design (Continued)      9/21/2012**

**LAYER DESIGNATIONS BY FOLDER/DRAWING TYPE (Continued)**

[discipline designator]-[major group] <del>XX-XXXX-XXXX-XXXX-X</del>	Description of Plans
<b><i>Sheets folder - Drawing (DWG) files you plot from (continued)</i></b>	
CI-EMBK, CI-DSLT, CI-CHNL, CI-RRAP, CI-POND & CI-WWAY (i.e. civil improvement: embankment, desilting, channel, riprap, pond & waterway)	Embankment Plan, Desilting Plan, and Channel Improvement Plan
CI-SSWR	Sanitary Sewer Plan
CU-XXXX	Utility Plan
CU-JT-[minor group 1] CU-JT-ANNO CU-JT-SECT CU-JT-COMP CU-JT-UBOX CU-JT-ELEC CU-JT-GAS CU-JT-TELE CU-JT-CATV CU-JT-STLT & CU-JT-TS	<u>Joint Trench Plan</u> - General Notes Trench Sections Trench Composite Utility Box Location Electric Schematic Gas Schematic Telephone Schematic Cable TV Schematic Street Lighting and Traffic Signal Schematic
CU-SRVC	Service Conversion Plan
CI-STAG	Staging Plan
CT-SIGN & CT-STRP	Signing and Striping Plans
CI-RWAL or CG-RWAL (i.e., Civil Improvements Retaining Wall or Civil Grading Retaining Wall)	Retaining Wall
L-XXXX LD-XXXX LG-XXXX LL-XXXX LP-XXXX LR-XXXX LS-XXXX	<u>Landscaping Plan</u> - Landscape Demolition Landscape Grading Landscape Lighting Landscape Planting Landscape Relocation Landscape Site
LI-XXXX	Irrigation Plan
CT-STLT	Street Lighting Plan
CT-TS	Traffic Signal Plan
CT-TS-MODF	Traffic Signal Modification Plan
CT-TS-SCHD	Traffic Signal Schedule

**STATUS (Phase) - XX-XXXX-XXXX-XXXX-X**

[status]	Description
D	Existing to demolish/remove
E	Existing to remain
F	Future work
M	Items to be moved
N	New work
T	Temporary work
X	Not in contract
1-9	1-9 Phase numbers

### 13. AGENCY AND CONSULTANT CADD PROCEDURES

**13.1 CADD Procedures Road Design & Flood Control Design (Continued) 9/21/2012**

**DISCIPLINE DESIGNATOR - ~~XX~~-XXXX-XXXX-XXXX-X**

<b>[discipline designator] Levels 1 &amp; 2</b>	<b>Description: i.e.</b>
A AD, AE, AF, AG, AI & AS	Architectural: Demolition, Elements, Finishes, Graphics, Interiors & Site
B	Geotechnical:
<b>C</b> <b>CD, CG, CI, CP, CS,</b> <b>CT &amp; CU</b>	<b>Civil:</b> <b>Demolition, Grading, Improvements, Paving, Site,</b> <b>Transportation (Traffic) &amp; Utilities</b>
D DA, DC, DD, DE, DG, DI, DL, DM, DO, DP, DQ, DR, DS, DV, DW, DX & DY	Process: Airs, Chemical, Demolition, Electrical, Gases, Instrumentation, Liquids, HPM Gases, Oils, Piping, Equipment, Drains/Reclaims, Site, Vacuum, Waters, Exhaust & Slurry
E ED, EI, EL, EP, ES, ET & EY	Electrical: Demolition, Instrumentation, Lighting, Power, Site, Telecommunications & Auxiliary Systems
F FA & FX	Fire Protection Fire Detection and Alarm, & Fire Suppression
<b>G</b> <b>GC, GI &amp; GR</b>	<b>General:</b> <b>Contractual, Informational &amp; Resource</b>
H HA, HC, HL, HP & HR	Hazardous Materials Asbestos, Chemical, Lead, PCB & Refrigerants
I ID, IF, IG, IJ & IN	Interiors Demolition, Furnishings, Graphics & Design
<b>L</b> <b>LD, LG, LI, LL, LP,</b> <b>LR &amp; LS</b>	<b>Landscaping:</b> <b>Demolition, Grading, Irrigation, Lighting, Planting,</b> <b>Relocation &amp; Site</b>
M MD, MH, MI, MP & MS	Mechanical: Demolition, HVAC, Instrumentation, Piping & Site
O	Operations
P or PL PD, PP, PQ & PS	Plumbing: Demolition, Piping, Equipment & Site
Q QA, QB, QC, QD, QE, QF, QH, QL, QM, QP, QR, QS, QT, QV & QY	Equipment: Athletic, Bank, Dry Cleaning, Detention, Educational, Food Service, Hospital, Laboratory, Maintenance, Parking Lot, Retail, Site, Theatrical, Video / Photographic & Security
<b>R</b> <b>RA, RC, RE, RM &amp; RS</b>	<b>Resource (Land Right-of-Way &amp; Property Boundary Maps):</b> <b>Architectural, Civil, Electrical, Mechanical &amp; Structural</b>
<b>S</b> <b>SB, SD, SF &amp; SS</b>	<b>Structural:</b> <b>Substructure, Demolition, Framing &amp; Site</b>
T TA, TC, TI, TM, TN, TT & TY	Telecommunications: Audio Visual, Clock / Program, Intercom, Monitoring, Data Networks, Telephone & Security
<b>V</b> <b>VY &amp; VZ</b>	<b>Survey / Mapping (Topographic Features):</b> <b>Points (Non-surface) &amp; Surface / Ground Points</b>
X	Other Disciplines
Z	Contractor / Shop Drawings

\* **Bolded** items are the disciplines most frequently used by ACPWA.



## 13. AGENCY AND CONSULTANT CADD PROCEDURES

### 13.1 CADD Procedures Road Design & Flood Control Design (Continued) 9/21/2012

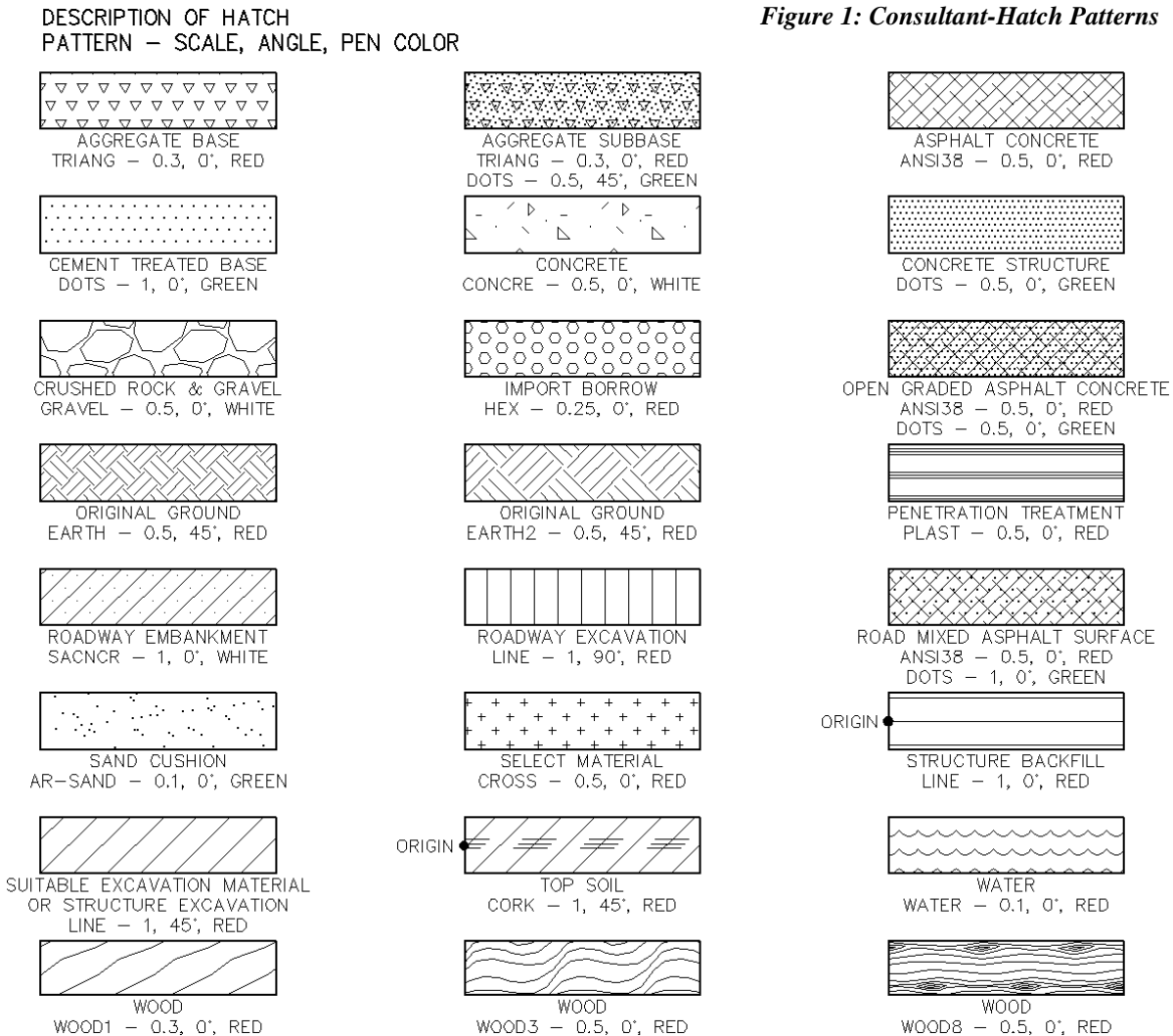
#### 13.1.J Consultant - Hatch Patterns

Agency consultants should use the 'acad.pat' that comes with AutoCAD software for most patterns in *Figure 11*. Additional patterns, PAT files, are included within the consultant data package.

Type the command **HATCH** or **H**. Ribbon commands will appear on the Hatch Creation tab. Adjust scale of the hatch to the match scale of your drawing (i.e., multiple the hatch scales below by 20 if the drawing scale is 1"=20'). Hatch patterns below were draw at 1:1 scale, and have their origin set to bottom left boundary extents unless otherwise noted.

**Hatch Origin:** If hatch patterns do not display correctly, the hatch origin may be too far from the work area for the patterns to be interpreted correctly. Select the hatch pattern, right-click and select 'Set Origin' to set a new origin closer to area being hatched. Or use the Origin button on the Hatch Creation ribbon to specify an origin closer to your work area. **SNAPBASE** command will actually move the snap base of your entire drawing closer to your work area.

**Associative Hatching:** Keep your hatch boundaries on 'no plot' layers if you don't want the boundaries to plot. Warning! Drawings can become unstable if an associative hatch boundary is erased, frozen or turned off.



*Figure 1: Consultant-Hatch Patterns*

## 13. AGENCY AND CONSULTANT CADD PROCEDURES

---

### 13.1 CADD Procedures Road Design & Flood Control Design (Continued) 9/21/2012

#### 13.1.K Consultant Submittals to ACPWA

1. Software Specification: **AutoCAD Civil 3D Release 2012**. DWG File Format: **AutoCAD 2010 Format**.  
All submittals of drawing files must be useable in AutoCAD Civil 3D 2012. AutoCAD Civil 3D objects are version specific and we are unable to downgrade newer files to our current version.
2. External References: **Overlay** all External references. Use **Relative Path**. External references should be inserted on layers named, "**xr[Xref File Name]**." Set system variable **VISRETAIN = 1**.
3. All drawings should be drawn at 1:1 scale in model space. Units are in feet.
4. All plotting data, including title block information, should be in paper space.
5. All DWG files included in the data package have units set to feet.
6. Use a layout tab for each sheet. Start with layout tab '22x34' included with **CON-ACPWA R-Sheets.dwt** or **CON-ACPWA F-Sheets.dwt**.
7. To avoid drawing performance issues please keep the number of layouts per drawing to a maximum of five.
8. Save views using simple descriptive names.
9. Give us all your working drawing files including: the drawings containing the sheets you plot from, all external references, and all C3D data drawing files that were used to create the project design. For example: sheet set drawings, externally referenced plans, all C3D data drawings with alignments, surfaces, cross sections, corridors, assemblies, etc. If you are including the cross-sections, include the vertical and horizontal scales, plotted scale, and alignment, profile and surface names.
10. When using **eTransmit** to deliver CAD files (e.g., files within a sheet set) the consultant as directed by the ACPWA project engineer/manager will either:
  - a. Place all files in one folder
  - b. Use organized folder structure
11. When using **eTransmit** be sure to manually add any C3D data files the may not be externally referenced into the sheet set.
12. Submittals to ACPWA will either be in the form of e-mail, CD-ROM or posted to FTP site as directed by the ACPWA project engineer/manager.

If you have any questions regarding our CADD procedures, please contact the project manager or one of the following lead technicians: Daniel Castaneda at 510-670-5493, Paul Crawford at 510-670-6482 or Jane Ringot at 510-670-5432.

## 13. AGENCY AND CONSULTANT CADD PROCEDURES

---

### 13.2 AutoCAD Civil 3D Design Workflow

9/21/2012

#### 13.2.A Directory Structure

##### ***Project Directory***

(The following paragraph does not apply to Agency consultants).

Design workflow begins with the project directory. All Civil 3D projects will utilize the N:\C3D ACPWA network directory. Each discipline will store their projects under their respective discipline folder. For example, Road projects will be stored in N:\C3D\Road\, Flood Control projects will be stored in N:\C3D\Flood\; and Surveys will be stored in N:\C3D\Survey\. See N:\Standards\2012C3D\Project Folder Structure for sample sub folders.

##### ***Project Directory Folders***

When a new Civil 3D 2012 Road project begins, a new folder needs to be created in the project directory entitled **RXXXXX** where X represents the job number (e.g., R32000).

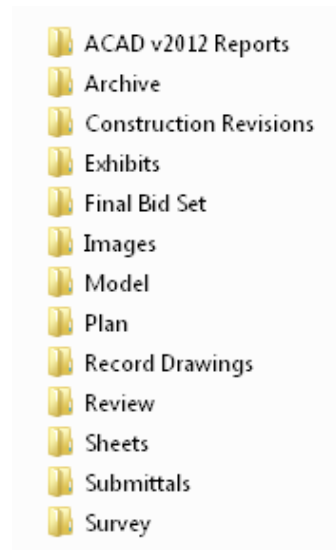
When a new Civil 3D 2012 Flood Control project begins, a new folder needs to be created in the project directory entitled **FXXXXX** where X represents the job number (e.g., F02C01).

The project directory is the folder where each project's files reside, and is also known as the working folder for your data shortcuts. See subsequent Sections [13.2.G](#), [13.2.H](#) and [13.2.I](#) on data shortcuts to learn more about the working folder.

##### ***Project Sub Folders***

After the project directory folder is created, sub folders should be created for organizing all the files that accumulate during the course of the project.

On the ACPWA network, create project sub folders by going to N:\Standards\2012C3D\Project Folder Structure and copy all folders show to the right to the new project directory folder.



Sub Folders defined in this section are created in windows prior to working on the project, except for the *Data Shortcuts* folder. The *Data Shortcuts* folder will be created automatically through Civil 3D.

Agency consultants should also follow our directory structure, but will need to create the follow project sub folders manually:

- *Archive*
- *Images*
- *Plan*
- *Survey*
- *Exhibit*
- *Model*
- *Sheets*

## 13. AGENCY AND CONSULTANT CADD PROCEDURES

---

### 13.2 AutoCAD Civil 3D Design Workflow (Continued)

9/21/2012

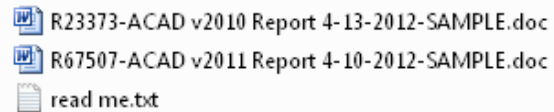
#### ***Listing and Description of Project Sub Folders are as Follows:***

##### **ACAD v2012 Reports *NEW ITEM***

(This sub folder does not apply to Agency consultants).

The *ACAD Reports* folder provides a location to document the AutoCAD files, data and links in a report format. The folder name indicates the version of software used for the plans. The read me.txt file within this folder can be used in sub folder to create notes on that folder. Sample reports are included in this sub folder.

IMPORTANT: For new or migrated Civil 3D projects you will add the AutoCAD release number to the *ACAD Reports* folder, e.g., *ACAD v2012 Reports*.



##### **Archive**

The intent for the *Archive* folder is to provide a location to back up a copy of any drawing for any reason. Since all the data for a project is located inside drawing files, it is good practice to create backup copies every so often in the event the actual design file becomes unusable. Sub folders may be created under this directory named the appropriate date of the archive. For example, to archive a grading drawing dated 3/15/12, a folder should be archived as *2012-03-15* and a copy of the grading drawing should be placed in that folder. Archived items should be read only. Compress/zip items to save disk space and avoid duplication of data shortcuts.

Do not modify the files located in the *Archive* folder. If an archived file needs to be used, first copy the file from the *Archive* folder to a workable folder (e.g. the *Model* or *Plan* folder). Then open it from this folder. Rename the file to avoid conflicts with other drawings, if necessary.

##### **Construction Revisions** (This sub folder does not apply to Agency consultants).

After the project is awarded copies of any revision made during construction can be placed in the *Construction Revisions* folder. See *Section 2.6 Revisions to Signed Plans* for construction revision procedures.

##### **Data Shortcuts**

**NEVER** create the *Data Shortcuts* folder using Windows! The *Data Shortcuts* folder is automatically created by Civil 3D when a new data shortcut folder is created from the Civil 3D Toolspace. For in-house projects, Survey should create the *Data Shortcuts* folder when sharing their original surface and any alignment data.

This folder will contain all the XML files needed to share Civil 3D information from one drawing file to another. The XML files retain the drawing path and object name of the shared objects from a Civil 3D project. There is no need to ever modify anything from this directory in Windows. See subsequent Sections [13.2.G](#), [13.2.H](#), [13.2.I](#) and [13.2.J](#) on data shortcuts to learn how to use them correctly.

**Exhibit** The *Exhibit* folder contains any exhibit drawings not part of the final contract plan set.

## 13. AGENCY AND CONSULTANT CADD PROCEDURES

### 13.2 AutoCAD Civil 3D Design Workflow (Continued)

9/21/2012

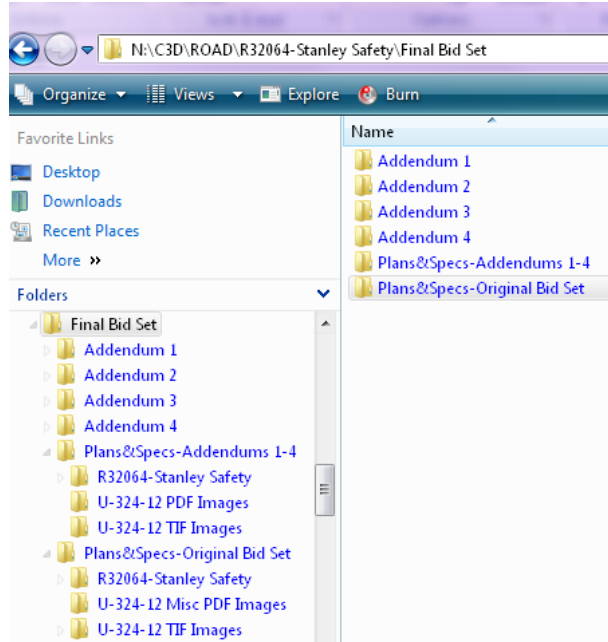
#### ***Listing and Description of Project Sub Folders (Continued)***

**Final Bid Set** (This sub folder does not apply to Agency consultants).

The *Final Bid Set* folder will contain the following types of sub directories with all final bid items.

- **Addendum #** - These folders contain the PDF & TIF images files of each addendum by number. For example: The folder named *Addendum 1* contains PDF file(s) of the addendum and single page TIF files of the plan sheets that were revised.
- **[Description]-Images** - Contains final bid set of Plans, Specifications, and Bid Proposal images in multipage PDF format; and Plans in single page TIF format.

***Project Directory*** - Archive the project when plans go out to bid and when the project is awarded. The archived project directory should have the same name as the original project directory. Copy the project directory and delete any unneeded files and folders. Or use **eTransmit** to collect all drawings in your sheet set into one folder. Add any data drawings not referenced to the sheet set and the data shortcuts folder. Do not archive your DST file, so sheet set fields cannot be inadvertently changed.



Each drawing may need its external reference and data reference paths directed to this folder. You may use the Data Shortcuts Editor to redirect the path of the data shortcuts to this folder.

Make all the files read only in the *Final Bid Set* folder. Compress/zip it to save disk space and avoid duplication of data shortcuts. The example above was a large project which had four addendums, so there is an original bid set and a final bid set with Addendums 1 thru 4 archived.

#### **Images**

The *Images* folder will contain all the images referenced into drawings in the project. As needed, copy all image files and world files to this folder.

Attach the aerial photo image files into a drawing which will only contain images. Start a new drawing from **acad.dwt** and change your units to feet. Save the drawing as **Image-[description].dwg** in the *Images* folder. The **Image-[description].dwg** can be used as an external reference to overlay into other drawings using relative path.

To request aerial photos Agency consultants should contact the ACPWA project engineer/manager.

It may be necessary to crop an image for a particular project location. The cropped version of the image file and its world file are saved to the *Images* folder. This process can be done via Raster Design. For in-house project see Section 3.2.C for more information on cropping aerial photos. Agency consultants see the Raster Design help files.

## 13. AGENCY AND CONSULTANT CADD PROCEDURES

---

### 13.2 AutoCAD Civil 3D Design Workflow (Continued)

9/21/2012

#### *Listing and Description of Project Sub Folders (Continued)*

##### Model

Any design drawings that contains Civil 3D objects (alignments, profiles, surfaces, corridors, cross-sections, pipe networks, view frames, etc.) should be saved in the *Model* folder. The Civil 3D data files that reside in this folder are referenced by other drawings so always exercise caution.

**Avoid renaming or moving these files!**

##### Plan

Drawings in the *Plan* folder are primarily external references. All drawings that are not Sheet drawings or Model drawings should be placed here. For example drainage plans, planting plans, striping plans, traffic plans, etc. can be saved here to be externally referenced into Sheet drawings or other design drawings. Wblocks created for your project are also saved here.

**Avoid renaming or moving external reference files!**

##### Record Drawings (This sub folder does not apply to Agency consultants).

The *Record Drawings* folder contains record drawing files; see Section 2.4.C for record drawing procedures.

##### Review (This sub folder does not apply to Agency consultants).

The *Review* folder is used when a project reaches a review milestone (i.e., the 50%, 70 % and 90% Review). Copy the entire project directory or use eTransmit to collect all drawings in your sheet set into one folder with an organized folder structure. Name *Review* sub folder, **## Percent Review YY-MM-DD** (e.g., a 70% review should be named, *70 Percent Review 12-08-15*). Delete any unneeded files and folders. The DST file does not need to be archived, so sheet set fields cannot be inadvertently changed.

When a project is archived to this location, external references and data shortcuts may become broken. The Data Shortcuts Editor and the External References Editor can be used to set paths to the new folder. For information on the Data Shortcuts Editor see [Section 13.2.J](#).

When the file folder has been cleaned, zip it to save disk space and avoid duplication of data shortcuts. Use the same name for the zip file, **## Percent Review YY-MM-DD.zip**. Then delete the original **## Percent Review YY-MM-DD** sub folder.

For additional information on Submitting Plans for review see Section 2.5.

##### Sheets

Sheet drawing (DWG) files are the files you plot from. This folder will contain all Sheet drawings for a project, as well as all sheet set DST file(s) and plot PLT files. PLT files are kept in a sub folder called *Plots* under the *Sheets* folder.

**Avoid renaming or moving sheet files from Windows!** The DWG files are linked to the DST file by path and file name. Use the sheet set manager to rename your sheet files as explained in [Section 13.4.H](#).

## 13. AGENCY AND CONSULTANT CADD PROCEDURES

---

### 13.2 AutoCAD Civil 3D Design Workflow (Continued)

9/21/2012

#### *Listing and Description of Project Sub Folders (Continued)*

**Submittals** (This sub folder does not apply to Agency consultants).

When files are received from a consultant, save the files in this location in sub folders with the following naming convention: ***From [consultant's name] YYYY-MM-DD***

When files are given to a consultant or contractor, save the files in this location in sub folders with the following naming convention: ***To [consultant's name] YYYY-MM-DD***

You may configure files to plot from the *Submittals* folder, but do not reference to or work on these original files. Copy the files to a workable folder (i.e., *Model*, *Plan* or *Sheets* folder) before working on them.

#### **Survey**

The *Survey* folder will be used to store any files transferred from the ACPWA Survey department. Original survey files should NOT be modified! Write protect original survey files as read only.

When a file is received, save the file in a sub folder within the *Survey* folder with the following naming convention: ***[Description] YYYY-MM-DD***

If it is necessary to modify a file for any reason, copy and rename the file to a workable folder (i.e., *Model*, *Plan* or *Sheets* folder). For example: Road Design renames the planimetrics (a.k.a. topography) as **EX-impr-[description].dwg**, and the horizontal geometry (a.k.a. right-of-way) as **ROW-[description].dwg**.

## 13. AGENCY AND CONSULTANT CADD PROCEDURES

---

### 13.2 AutoCAD Civil 3D Design Workflow (Continued)

9/21/2012

#### 13.2.B File Naming Conventions

Every file in Civil 3D (C3D) will contain different objects that will contribute to the whole project. It is important to store the files in appropriate locations and use the proper file naming conventions from the very beginning. If a file needs to be relocated or renamed, it is likely the data shortcuts and/or external references associated with the file will become broken. For this reason, this section will outline the common files that will be created throughout a C3D project and the appropriate naming convention that should be associated with those files.

**Please avoid renaming or moving files!** Exercise extreme caution if renaming or moving files is necessary.

The **[description]** in the file name is usually based on the project name. Be consistent in the naming of your files and keep descriptions short (e.g., for the project titled Improvements of Hesperian Blvd. the description can be **Hesp**). For Model drawings the **[description]** can be based on the name of the Civil 3D object it contains (e.g., a drawing containing an alignment named "Hesperian CL" can be called **Align-Hesperian CL.dwg**).

For file naming examples see [Section 13.1.B](#).

#### *Alignments and Profiles*

For most projects, you want to have one drawing with only the alignments and separate files for individual profile drawings. The files should be named **Align-[description].dwg** for alignments and **Prof-[description].dwg** for profiles. This method can avoid performances issues, and make organizing your alignments and profiles easier. When you externally reference the profile into your plan and profile sheets, it looks cleaner not having all the alignments in the same file as the profile.

For smaller projects each alignment and corresponding profiles can be stored in the same file. The file should be named **Align&Prof-[description].dwg**. For example, a drawing that contains a centerline alignment and corresponding profile information for Hesperian Blvd should be named: **Align&Prof-Hesp.dwg**. If more alignments will be created for Hesperian in other drawings then it would be a good idea to name the file with a more descriptive name such as **Align&Prof-Hesperian-CL.dwg**.

#### *Corridor Models*

A corridor model is a file that contains a corridor and all associated features used to build the corridor. The corridor model may also have surfaces in it that relate to the corridor. The corridor drawing should be named **Corridor-[description].dwg**. For example, a corridor that was built to improve Hesperian Blvd. should be named **Corridor-Hesp.dwg**.

#### *Cross Sections*

Cross sections should be stored in a separate file and should be named **XSection-[Alignment Name]**. For example, a drawing that would contain cross sections for Main Street taken along the centerline should be named **XSection-Main-CL.dwg**.



## 13. AGENCY AND CONSULTANT CADD PROCEDURES

---

### 13.2 AutoCAD Civil 3D Design Workflow (Continued)

9/21/2012

#### **Grading Models**

A grading model is a file that contains a finish ground surface and all information used to construct that surface such as feature lines, polylines, grading objects, etc. These files should be named **Grading-[description].dwg**. For example, a grading model that was constructed for a detention pond would be called **Grading-DetentionPond.dwg**. If there was more than one pond to grade for a given project then the naming should be a more descriptive; **Grading-DetentionPond-North.dwg**. Existing ground (a.k.a. original ground) surfaces can be named **EG Surface-[description].dwg**

#### **Parcels**

In general, all parcel objects can reside in one drawing, unless the site is particularly large, in which case it might make sense to separate parcels into separate files based on a logical factor like subdivisions. The naming convention for parcel files will be **Parcels-[description].dwg**. For example, a drawing that contains parcel objects for Prairie Ranch subdivision should be named **Parcels-PrairieRanch.dwg**.

#### **Pipes**

Pipe networks should be stored in a separate file entitled **Pipes-[network name].dwg**. For example, if a model was created for storm drainage pipes that run underneath Hesperian Blvd, then the drawing should be named **Pipes-StormDrain-Hesp.dwg**.

#### **Sheet Drawing - General**

The purpose of a sheet drawing file located in the *Sheets* folder is to create a layout in paper space that will be plotted as part of the project documentation, specifically the construction plans. Sheet files should reference other drawings for model components. It is appropriate to label referenced objects in the sheet drawing if the annotation is sheet specific.

Every sheet that gets created should follow a similar naming convention such as **##-[Sheet title-description]**. For example, the fifth sheet in a plot set that is used to show the proposed grading plan should be named **05-Grading Pln-Hesp.dwg**. See [Section 13.2.D](#) on creating sheet drawings with templates.

The files that are located in the *Sheets* folder can be renamed, via the sheet manager, with minimal effect on external references and data references. **DO NOT use Windows to rename sheet drawings!** If you rename your sheet drawings in Windows, the links to your sheet set will be broken. Use sheet set manager's automated tools that assist in renumbering and renaming sheets automatically, and see [Section 13.4.H](#). For additional information on the sheet sets please read [Section 13.4](#).

If your project is small and a sheet set was not created following our naming conventions, do not worry about adding sheet numbers to the beginning of the file names. But see [Section 13.1.B](#) and follow file naming examples for sheet drawings.

## 13. AGENCY AND CONSULTANT CADD PROCEDURES

---

### 13.2 AutoCAD Civil 3D Design Workflow (Continued)

9/21/2012

#### **Sheet Drawing - Plan & Profile**

Plan and profile sheets are handled differently than the general sheets because there are automated plan production tools in Civil 3D for creating plan and profile sheets. A wizard will guide any user through the process of creating plan and profile sheets; also see [Section 13.2.D](#) for creating sheet drawings using templates.

There is a field to fill out in the wizard that is related to the drawing name. Plan and profile sheets should be named **##-Drain P&P-STA [Station Interval].dwg** or **##-Rdwy P&P-STA [Station Interval].dwg**. For example, in a project where several sheets exist for drainage plan & profile sheets, one sheet may be appropriately named: **10-Drain P&P-STA 1000 thru 1500.dwg**. These files are to be located in the *Sheets* folder.

Make sure that you add your plan and profile sheets to the project's sheet set. For information on creating sheet sets read [Section 13.4](#).

Sheet drawings can be renamed via the sheet set manager with minimal effect on external references and data references. Use sheet set manager's automated tools that assist in renumbering and renaming sheets automatically, see [Section 13.4.H](#). **DO NOT use Windows to rename sheet drawings!** If you rename your sheet drawings in Windows the links to your sheet set will be broken.

### 13.2.C Creating Model Drawings Using Templates

#### **Templates**

A template or DWT file is the most crucial aspect of Civil 3D because important components like layers, text styles, dimension styles; Civil 3D object styles, label styles and drawing settings are all stored inside the drawing file.

Templates for Agency consultants are included in the consultant data package. For in-house projects the most up-to-date templates for Road Design, Flood Control Design and Survey in Civil 3D 2012 are located in N:\Standards\2012C3D\templates\templates C3D.

The templates for Road Design, Flood Control Design and Survey are described in [Section 13.1.A](#) for consultant projects, and in Section 3.3.A for in-house projects.

Every new drawing started in C3D should begin by selecting an appropriate data template. The first drawing opened when C3D is launched is **acad.dwt**, the generic AutoCAD drawing template. The first drawing opened should never be used for design work. Instead start a new drawing with an appropriate data template beginning with an underscore (i.e., **\_ACPWA...**) and begin working.

For ACPWA Survey Department procedures or data, Agency consultants should contact the ACPWA project engineer/manager.

## 13. AGENCY AND CONSULTANT CADD PROCEDURES

---

### 13.2 AutoCAD Civil 3D Design Workflow (Continued)

9/21/2012

#### **Template Changes**

(This paragraph does not apply to Agency consultants.)

Over the course of a project, certain styles or settings may need to be changed from one drawing to another. If a style is needed for a project does not exist in the current drawing, create a new style and use it as needed. If the style needs to be used for other projects, then that style can be saved to an appropriate template. Please contact the lead person(s) in charge of template settings if you have questions or comments regarding the templates, see *Section 1.1 Where to Go for Help*.

#### **Create New Model Drawings**

During a typical project, many Civil 3D objects will need to be created to complete the design and documentation process. It is recommended practice to break up the overall design into separate files with limited civil objects resident in each file. Follow the general outline below when creating drawings that contain Civil 3D objects. For proper *Model* file naming conventions, see [Section 13.2.B](#). For a listing and description of templates, see [Section 13.1.A](#) for consultant projects. For in-house projects there are a number of additional data templates for specific tasks, see Section 3.3.A for a listing and description of our templates.

#### **Alignment and Profile Drawings**

1. Start a new drawing with **\_ACPWA F-Master.dwt** or **\_ACPWA F-Master.dwt**
2. Save the drawing to the *Model* folder using the proper naming convention
3. Data reference any surfaces that will be used to create surface profiles
4. Externally reference any drawing that is needed to design the alignment
5. Create alignments and profiles as needed

For most projects you will want to have one drawing with only the alignments and separate files for individual profile drawings. This method avoids performances issues while making, organizing, or referencing your alignments and profiles much easier. For smaller projects each alignment and corresponding profiles can be stored in their own drawing file.

#### **Corridor Drawings**

1. Start a new drawing with **\_ACPWA F-Master.dwt** or **\_ACPWA R-Master.dwt**
2. Save the drawing to the *Model* folder using the proper naming convention
3. Data reference:
  - a. Existing ground surface - for daylighting the corridor
  - b. Alignment(s) - used as a baseline for the corridor or as targets for transitioning the corridor
  - c. Profile(s) - used as a baseline for the corridor or as targets for transitioning the corridor
4. Externally reference any drawings that need to be used for design purposes
5. Create an assembly or multiple assemblies as needed
6. Create corridor

## 13. AGENCY AND CONSULTANT CADD PROCEDURES

---

### ***13.2 AutoCAD Civil 3D Design Workflow (Continued)***

9/21/2012

#### **Cross Sections Drawings**

1. Start a new drawing with **\_ACPWA F-Master.dwt** or **\_ACPWA R-Master.dwt**
2. Save the drawing to the *Model* folder using the proper naming convention
3. Data reference the alignment that will be used as a baseline for the sections
4. Externally reference any drawing that contains needed surfaces or corridors
5. Create sample lines based on referenced alignment
6. Create section views

#### **Grading Drawings**

1. Start a new drawing with **\_ACPWA F-Master.dwt** or **\_ACPWA R-Master.dwt**
2. Save the drawing to the *Model* folder using the proper naming convention
3. Data reference existing ground surface for daylighting purposes
4. Externally reference any drawing that will be used as a reference for the design
5. Create feature lines, grading objects, etc. to build the finish ground surface
6. Create the finish ground surface

#### **Pipes Drawings**

1. Start a new drawing with **\_ACPWA Pipe Network.dwt**.
2. Save the drawing to the *Model* folder using the proper naming convention
3. Data reference:
  - a. Surfaces – Existing ground surface can be used to calculate rim elevations and cover information
  - b. Alignment – An alignment can be used to label station and offsets in plan view
  - c. Profile – Create profile view to show pipes in profile view.
4. Externally reference any drawings that may be used to help create the pipe network
5. Create the pipe network

#### **View Frames Drawings**

1. Start a new drawing with **\_ACPWA F-Master.dwt** or **\_ACPWA R-Master.dwt**
2. Save the drawing to the *Model* folder using the proper naming convention, e.g., **VF-[alignment name].dwg**.
3. Data reference the alignment that will be used to create the plan and profile view frames.
4. Create View Frames. In AutoCAD Civil 3D help topics see [Plan Production Tools](#) tutorials, *Tutorial: Preparing a Drawing for Plan and Profile Sheet Layout*, [Exercise 2](#) for information on creating view frames.
5. After your view frame drawing is created, see [Section 13.2.D](#) for information on creating plan & profile sheet drawings using templates

## 13. AGENCY AND CONSULTANT CADD PROCEDURES

---

### 13.2 AutoCAD Civil 3D Design Workflow (Continued)

9/21/2012

#### 13.2.D Creating Sheet Drawings Using Templates

To avoid drawing performance issues please keep the number of layout tabs per drawing to a maximum of five.

##### ***Templates for Sheet Drawings***

Templates for Agency consultants are included in the consultant data package. For in-house projects the most up-to-date templates for Road Design, Flood Control Design and Survey in Civil 3D 2012 are located in N:\Standards\2012C3D\templates\templates C3D. For consultant projects, see [Section 13.1.A](#) for a listing and description of templates. For in-house projects there are additional templates for specific tasks, see Section 3.3.A for a listing and description of templates.

**General Sheets Templates** - The templates that have preconfigured layout tabs for creating general sheets are:

- **CON-ACPWA R-Sheets.dwt** (Consultants use for Road Design general sheets)
- **CON-ACPWA F-Sheets.dwt** (Consultants use for Flood Control Design general sheets)
- **ACPWA R-Sheets.dwt** (use for Road Design general sheets)
- **ACPWA F-Sheets.dwt** (use for Flood Control Design general sheets)
- **ACPWA Survey-Sheets.dwt** (Use for Survey's general sheets. For topographic survey or right-of-way maps only. Not for use with Road or Flood Capital Improvement Plans.)

**Plan and Profile Sheets Templates** - Another type of sheet drawing that may need to be created is the plan & profile (P&P) sheet drawing. P&P sheets are unique in Civil 3D (C3D). There are automated plan and production tools available in C3D to create aligned views for alignment and profile. There are templates that can be used to create sheet drawings for plan and profile sheets:

- **CON-ACPWA R-Plan Production-20 Scale.dwt** (consultants use for Road Design P&P sheets)
- **CON-ACPWA F-Plan Production-20 Scale.dwt** (consultants use for Flood Control Design P&P sheets)
- **ACPWA R-Plan Production-20 Scale.dwt** (use for Road Design P&P sheets)
- **ACPWA F-Plan Production-20 Scale.dwt** (use for Flood Control Design P&P sheets)

Read the two subsequent topics for additional information on [Creating New General Sheets](#), and [Creating New Plan and Profile Sheets](#). The [Plan Production Tools](#) in AutoCAD Civil 3D help topics provides more information on creation of plan and profile sheets.

##### ***Creating New General Sheets***

**Method 1** - To create new sheets without using sheet set manager, follow these steps:

1. Start a new drawing with an appropriate template, e.g., **\_ACPWA F-Master.dwt** or **\_ACPWA R-Master.dwt**

## 13. AGENCY AND CONSULTANT CADD PROCEDURES

---

### 13.2 AutoCAD Civil 3D Design Workflow (Continued)

9/21/2012

#### Creating New General Sheets (Continued)

2. Right click on "Layout1" layout tab and select "From template..." Agency consultants select **CON-ACPWA R-Sheets.dwt** or **CON-ACPWA F-Sheets.dwt** provided in the consultant data package. For in-house projects select **ACPWA R-Sheets.dwt** or **ACPWA F-Sheets.dwt**.
3. Click Open. Select "22x34" and click OK
4. Right click on "Layout1" layout tab again. Select Delete and OK
5. Save the drawing to the Project's *Sheets* folder using a proper name, as per Sections [13.1.B](#) and [13.2.B](#)
6. Add your new layouts tab(s) to sheet set as needed

**Method 2** - Use the sheet set manager as described [Section 13.4.G: Creating a New Sheet from the Sheet Set Manager](#) to create new sheets from a custom template.

#### Creating New Plan and Profile Sheets

1. Before using the Civil 3D plan and production tools to create new plan and/or profile sheets:
  - a. Create a view frame drawing in your *Model* folder, see [View Frames Drawings](#) topic under Section 13.2.C
  - b. To create the plan and profile sheet drawings use **ACPWA R-Plan Production-20 Scale.dwt** or **ACPWA F-Plan Production-20 Scale.dwt** for in-house projects. Agency consultants use **CON-ACPWA R-Plan Production-20 Scale.dwt** or **CON-ACPWA F-Plan Production-20 Scale.dwt** provided in the consultant data package. Plan production templates are in 1"=20' scale. If any changes to the template are needed, create a custom template as described in [Section 13.3.C](#).
2. Open the view frame drawing you created
3. Click ribbon **Output** tab → **Plan Production** panel → **Create Sheets** and follow the wizard:
  - a. Use a plan and profile sheet drawing template configured for your project
  - b. Make sure that you add your finished plan and profile sheets to the project's sheet set
4. The profile is inserted into your drawing as a data reference. It is broken up into sections and setup for each sheet. You may prefer externally referencing the profile, and use plan production tools to only layout your sheets as follows:
  - a. Delete the data referenced profile
  - b. Externally reference the profile and any other plan drawings needed.

The [Plan Production Tools](#) in AutoCAD Civil 3D help topics provides more information on creation of plan and profile sheets.

## **13. AGENCY AND CONSULTANT CADD PROCEDURES**

---

### **13.2 AutoCAD Civil 3D Design Workflow (Continued)**

9/21/2012

#### **13.2.E Working with Survey**

##### ***File Exchange***

Survey Department may give designers three types of drawings over the course of a project:

**Horizontal Geometry Drawings** - Contain boundaries, parcels, right-of-ways, and alignments.

**Planimetrics Drawings** - The planimetrics or topography drawings containing the points and figures from the survey database with 3D information that was used to build the existing ground surface.

**Surface Drawings** - Drawing containing the existing ground surface.

(This paragraph does not apply to Agency consultants). The existing surface drawing is not necessarily given to the in-house designer. The existing surface can be in a separate drawing kept in Survey's area, N:\C3D\SURVEY\. The existing surface is linked to the Design project by Survey department via data shortcuts.

All Designers, including Agency consultants, should store the files given to them by ACPWA Survey department in the *Survey* folder located under the project directory. All drawings in *Survey* folder should be used for reference purposes only. Never modify the files in your *Survey* folder.

If a file that was received from Survey department needs to be modified for any reason, copy the file to the *Plan* or *Model* folder first and then continue to modify the file from the working directory. Try to limit the amount of information that you edit in these files, because you may have to duplicate your efforts if a more recent copy of a drawing becomes available later in the project.

##### ***Accessing Existing Ground Data***

Agency consultants will receive the existing ground data from the ACPWA project engineer or ACPWA Survey Department.

(The following five paragraphs do not apply to Agency consultants).

It is important with Civil 3D projects that the designer and the surveyor work closely on projects.

Survey should create a *Data Shortcuts* folder in the Design project directory which will contain the data for the existing ground surface. If any designer needs to use that surface, set the data shortcut working folder to the project directory by right clicking on the data shortcut heading from Toolspace and select **Set Working Folder...** Depending on the type of project, the working folder will be set to one of the following directories, where 'X' represents the job number:

**N:\C3D\FLOOD\FXXXXX or N:\C3D\ROAD\RXXXXX**

## 13. AGENCY AND CONSULTANT CADD PROCEDURES

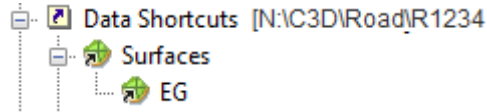
---

### 13.2 AutoCAD Civil 3D Design Workflow (Continued)

9/21/2012

#### Accessing Existing Ground Data (Continued)

After setting the working folder, the existing ground surface should be accessible beneath **Data Shortcuts** in Toolspace.



To bring the surface into another drawing, right click on the surface name from the data shortcuts section of Toolspace and select **Create Reference...** If you do not see the surface in Toolspace it either means that Survey has not created the shortcut yet or that the working folder is set to the wrong location. If **Create Reference...** is grey you might need to save the file and/or associate it to a project.

#### 13.2.F Working with Consultants

(This section is not intended for Agency consultants. It is intended for the ACPWA staff working with an Agency consultant.)

Our consultant standards are updated periodically, so please check with Jane Ringot (Road Design), Daniel Castaneda (Flood Control Design), or Survey department before you send our standards to your consultant.

Please review [Section 13: Agency and Consultant CADD Procedures](#) and see *Section 1.1 Where to Go for Help*.

When project is awarded if you have not yet received all AutoCAD drawing files from the consultant please request them. Refer to [Section 13.1.K](#) for information on submittals from Agency consultants.

Copies of all consultant drawing files submitted that pertain to a project should be stored in an appropriate sub folder beneath the project directory. When files are received from a consultant, the files should be saved in the *Submittals* folder.

Do not use or reference the original files that reside in the *Submittals* folder. However, you may configure to plot from the *Submittals* folder, as long as no other changes are made. Copies of the original files should be transferred to the workable folders (i.e., *Model*, *Sheets* or *Plan*) before working on them. The *Model* folder should be used to store any files that contain Civil 3D objects, *Sheets* folder contains the drawings you plot from, and the *Plan* folder will be used to store any other drawings that just contain AutoCAD objects.



## 13. AGENCY AND CONSULTANT CADD PROCEDURES

---

### 13.2 AutoCAD Civil 3D Design Workflow (Continued)

9/21/2012


#### **Consultants that use Civil 3D**

(This section is not intended for Agency consultants. It is intended for ACPWA staff working with an Agency consultant.)

There are a few things that everyone should be aware of when working with consultants that use Civil 3D:

1. **Civil 3D objects are version specific** and cannot be easily downgraded to an older version. If you work with a consultant that uses a newer version of Civil 3D, they should be informed that Alameda County Public Works is using AutoCAD Civil 3D release 2012.


Make sure that the consultant submits copies of the drawing files that can be used in AutoCAD Civil 3D release 2012. Entire drawings can be converted back for use in release 2012 by exporting each drawing to AutoCAD 2010 format as explained in Section 12.2.C. Civil 3D objects (surfaces, alignments, etc.) must be saved back separately by using LandXML export/import.

2. When sending drawings to consultants, make sure that all external references and data references are sent with the original drawing. **eTransmit** is a helpful command that can aid in gathering referenced files. See AutoCAD Civil 3D help topic [ETRANSMIT](#).
3. If you need to send a consultant a drawing that has data references in it and want to remove the link, use **promote** to copy the data referenced object into the drawing file you're sending. This will destroy any dynamic link, so make sure that you do this in a copied version of the file and not in the original file. Place the copies for consultants in the *Submittals* folder.
4. Avoid binding unless specifically required to do so. If you need to **bind** external references, be sure to **promote** the data references in the external references before you **bind** the external references to your drawing. Links to C3D objects, such as labels, can be lost!
5. Before binding external references, you can use  → **Export** → **AutoCAD Drawing** → as explained in Section 12.2.C. This command will downgrade any AEC objects (including Civil 3D objects) into AutoCAD equivalent objects.

#### **Parties using Software Other than Civil 3D**

(This section is not intended for Agency consultants. It is intended for ACPWA staff working with an Agency consultant.)

Parties (e.g., consultants or contractors) who use AutoCAD without Civil 3D are not going to be able to read any Civil 3D objects, so an AutoCAD equivalent drawing should be created to give to these parties.

Export each drawing to AutoCAD by using  → **Export** → **AutoCAD Drawing** as explained in Section 12.2.C. This command will downgrade any AEC objects (including Civil 3D objects) into AutoCAD equivalent objects.

## 13. AGENCY AND CONSULTANT CADD PROCEDURES

---

### 13.2 AutoCAD Civil 3D Design Workflow (Continued)

9/21/2012

#### 13.2.G Data Sharing using Data Shortcuts and Data References

There are two different ways to share data in Civil 3D (C3D), external references and data shortcuts. There are only 5 objects that can be shared with data shortcuts, all other objects can be shared with external references:

1. Surfaces
2. Alignments
3. Profiles
4. Pipes
5. View Frames

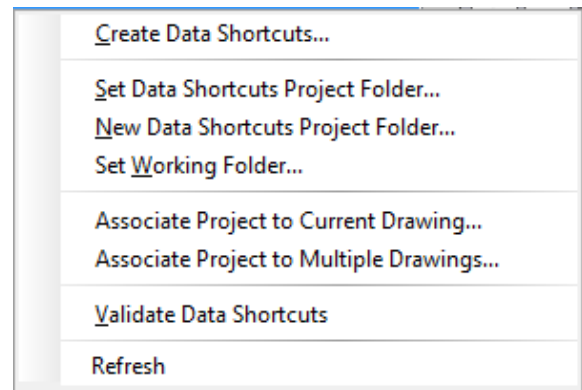
Data shortcuts can be divided into two main procedures: Creating Data Shortcuts (export) and Creating Data References (import).

#### 13.2.H Create Data Shortcuts

Creating Data Shortcuts is the process of exporting an object and its data from a drawing to make it available outside the drawing for use by other drawings. Creating Data Shortcuts only saves the path of the drawing file and the object name to the *Data Shortcuts* folder. If the object is renamed or the drawing is moved the Data Shortcut link can be broken. This concept is similar to AutoCAD external reference files.

- 1) **Data Shortcuts**: In the C3D Toolspace go to Master View in the Prospector tab, & right click on Data Shortcuts. From here you will select:

- a) **Set Working Folder...** Set to the project directory folder (e.g., **N:\C3D\FLOOD\FXXXXX** or **N:\C3D\ROAD\RXXXXX**, where 'X' represents the job number). Then you can create a **New Data Shortcuts Folder** or **Set Data Shortcuts Folder**.



- b) **New Data Shortcuts Project Folder...** This is where C3D creates the *Data Shortcuts* folder. Note that all other project sub folders were created manually.
- c) **Set Data Shortcuts Project Folder...** You must do this for each drawing you create. You will need to create a separate drawing each for surfaces, alignments, profiles and points using the appropriate template, e.g., **\_ACPWA R-Master.dwt**, or **\_ACPWA F-Master.dwt**.
- d) **Associate Project to Current Drawing...** or **Associate Project to Multiple Drawings...** In release 2012 you add project association to the drawings. When working on drawings you do not need to verify that you are in the correct working folder. The project association does it for you. **SAVE** the drawing to save project association.

## 13. AGENCY AND CONSULTANT CADD PROCEDURES

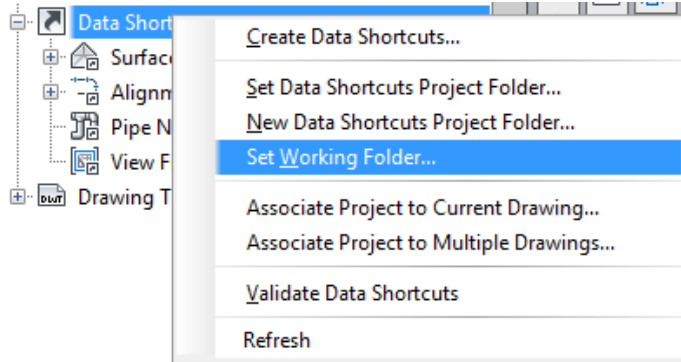
### 13.2 AutoCAD Civil 3D Design Workflow (Continued)

9/21/2012

The steps to create data shortcuts are as follows:

1. Setting the Working Folder:

- a. Right Click on **Data Shortcuts** from Prospector tab of Toolspace and choose **Set Working Folder...**



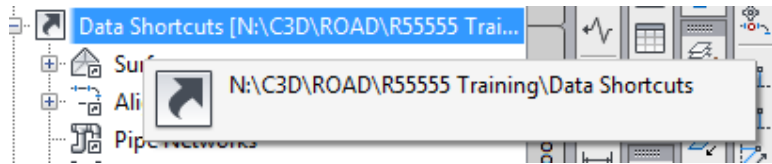
- b. If you don't see the **Data Shortcuts** option in Toolspace, make sure you are on the Prospector tab and that the upper combo-box is set to **Master View**.

- c. The working folder should always be set to the project directory folder, where project files reside (i.e., N:\C3D\FLOOD\FXXXXX or N:\C3D\ROAD\RXXXXX, where 'X' represents the job number).

2. Verify the path shown in Toolspace:

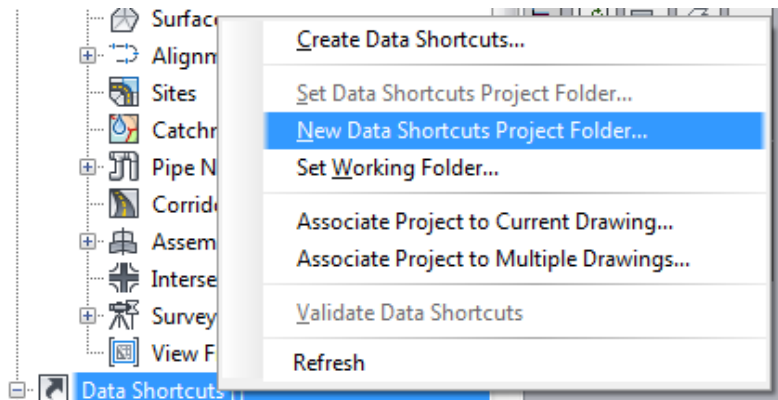
- a. Once the working folder is set, you should see a path next to the **Data Shortcuts** option in Toolspace. Hover your mouse over the path and the full path will appear in a larger window.

Make sure that path is set to the correct project and that it points to the folder entitled *Data Shortcuts*.



- b. If you **do not see a path** next to the **Data Shortcuts**, then either the working folder is not set to the correct path or the *Data Shortcuts* folder has not been created.

- c. If the working folder is correct and no path is shown, create a *Data Shortcuts* folder. Right click **Data Shortcuts** and choose **New Data Shortcuts Project Folder...** Always Name the *Data Shortcuts* folder "Data Shortcuts." Click **OK**.



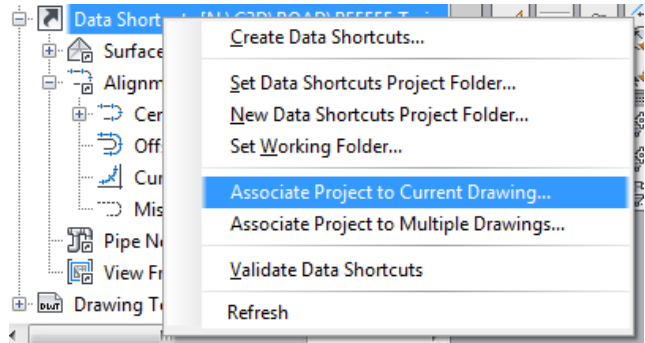
## 13. AGENCY AND CONSULTANT CADD PROCEDURES

### 13.2 AutoCAD Civil 3D Design Workflow (Continued)

9/21/2012

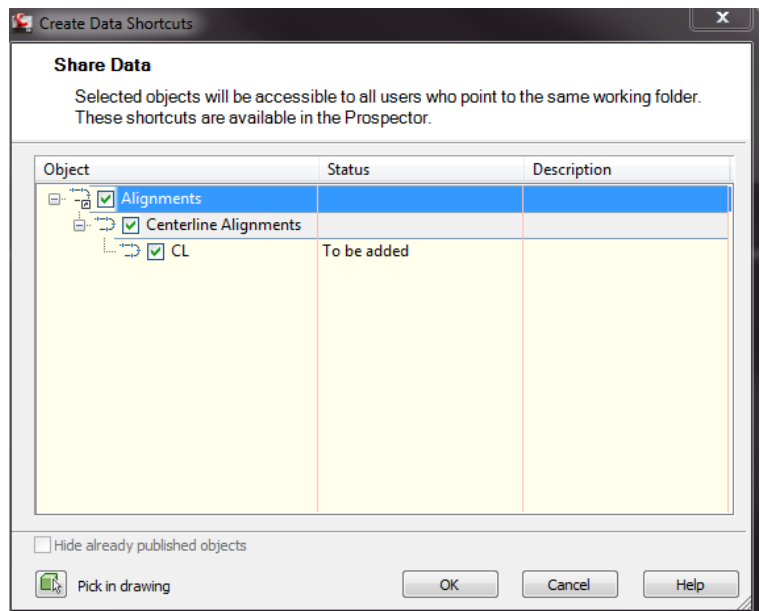
3. You are pointing to the correct *Data Shortcuts* folder. Before you can create data shortcuts you must add a project association and save your drawing(s) as follows:

- a. Right click on **Data Shortcuts** from Prospector tab of Toolspace and choose **Associate Project to Current Drawing...** Your *Data Shortcuts* folder is known as the Data Shortcuts Project Folder in Civil 3D 2012. Select Project: **Data Shortcuts**. Click **OK**.
- b. **SAVE** the drawing to save project association.

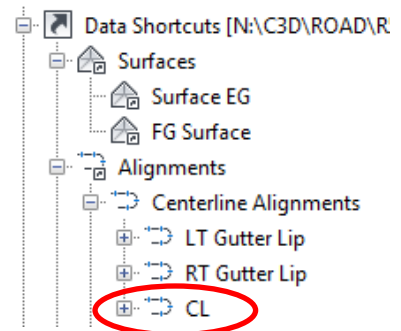


4. Create Data Shortcuts as follows:

- a. Right Click on **Data Shortcuts** and choose **Create Data Shortcuts...**
- b. A window will appear that shows all objects from the current drawing that can be shared with Data Shortcuts. Select the objects that need to be shared outside the drawing and click **OK**.



- c. Finally, verify that the shortcuts have been created by looking under **Data Shortcuts** from Prospector tab of Toolspace and making sure the objects you selected show up.



**Do not** move or rename drawings that are connected by data shortcuts. The links will be broken.

## 13. AGENCY AND CONSULTANT CADD PROCEDURES

### 13.2 AutoCAD Civil 3D Design Workflow (Continued)

9/21/2012

#### 13.2.1 Create Data References

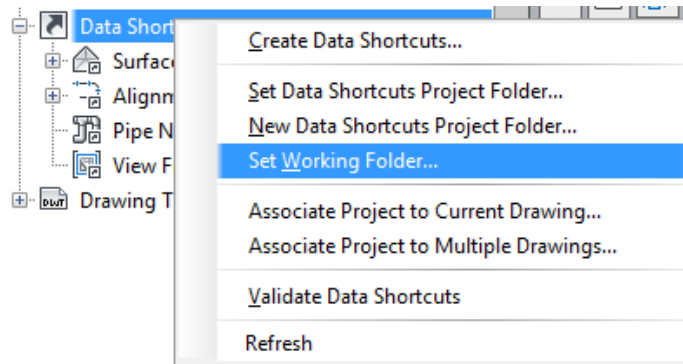
Creating Data References is the process which imports data shortcuts into a drawing. The data referencing process takes a definition already saved outside the drawing and imports it into the current drawing. This process can only be utilized if data shortcuts already exist for a project.

Examples of where data references can be used:

- Daylight to an existing ground *surface*
- Create a *corridor* along an *alignment* and *profile*
- Sample *cross sections* along an *alignment*
- Set structure rim elevations at *surface* elevation
- Change the contour interval of a *surface* in an individual sheet

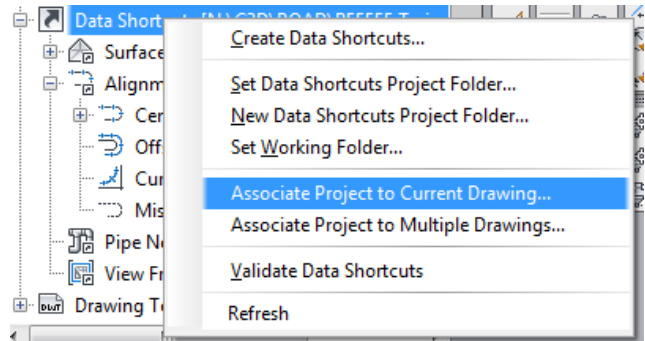
To create data references follow the steps below:

1. Set the working folder by right clicking on **Data Shortcuts** from the Prospector tab of Toolspace and choose **Set Working Folder...** The working folder will always be set to the project directory where the project files reside (i.e., **RXXXXX** or **FXXXXX** where 'X' represents the job number).



2. Before you can create data references, or data shortcuts for that matter, you must add a project association and save your drawing(s) as follows:

- a. Right Click on **Data Shortcuts** from Prospector tab of Toolspace and choose **Associate Project to Current Drawing...**
- b. Verify the Working Folder was set correctly in step 1. Your Data Shortcuts folder is also known as Civil 3D's Data Shortcuts Project Folder. Select Project: **Data Shortcuts**. Click **OK**.
- c. **SAVE** the drawing to save project association.



## 13. AGENCY AND CONSULTANT CADD PROCEDURES

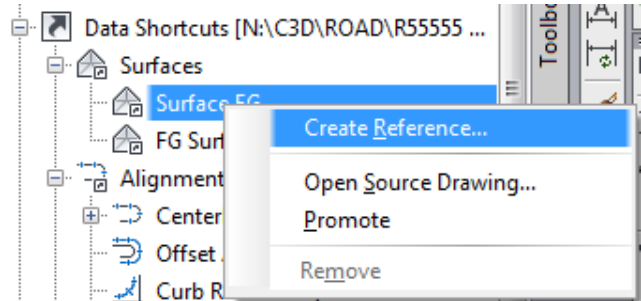
---

### 13.2 AutoCAD Civil 3D Design Workflow (Continued)

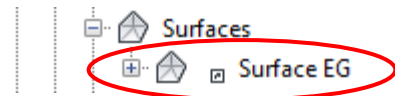
9/21/2012

3. Create Data Reference:

- a. Beneath **Data Shortcuts**, select the name of an object that you wish to bring into the current drawing, right click and select **Create Reference...** Click **OK**.



- b. If the option for **Create Reference...** is greyed out, it is usually caused by not saving the current drawing first. A drawing needs to be saved before references can be created.
- c. The object you data referenced will appear under your current drawing below Open Drawings in the Prospector tab of Toolspace. The small arrow symbol next to the object indicates the object is a data reference.



### 13.2.J Data Shortcuts Editor

The Data Shortcuts Editor is a program that runs independent of AutoCAD. To locate the Data Shortcuts Editor, click on the Windows Start button and type “data shortcuts.” Similar in concept to AutoCAD external references, if an object is renamed or a drawing is moved the Data Shortcuts become broken. If numerous data shortcuts become broken use the **Find and Replace** command in Data Shortcuts Editor to update all the paths.

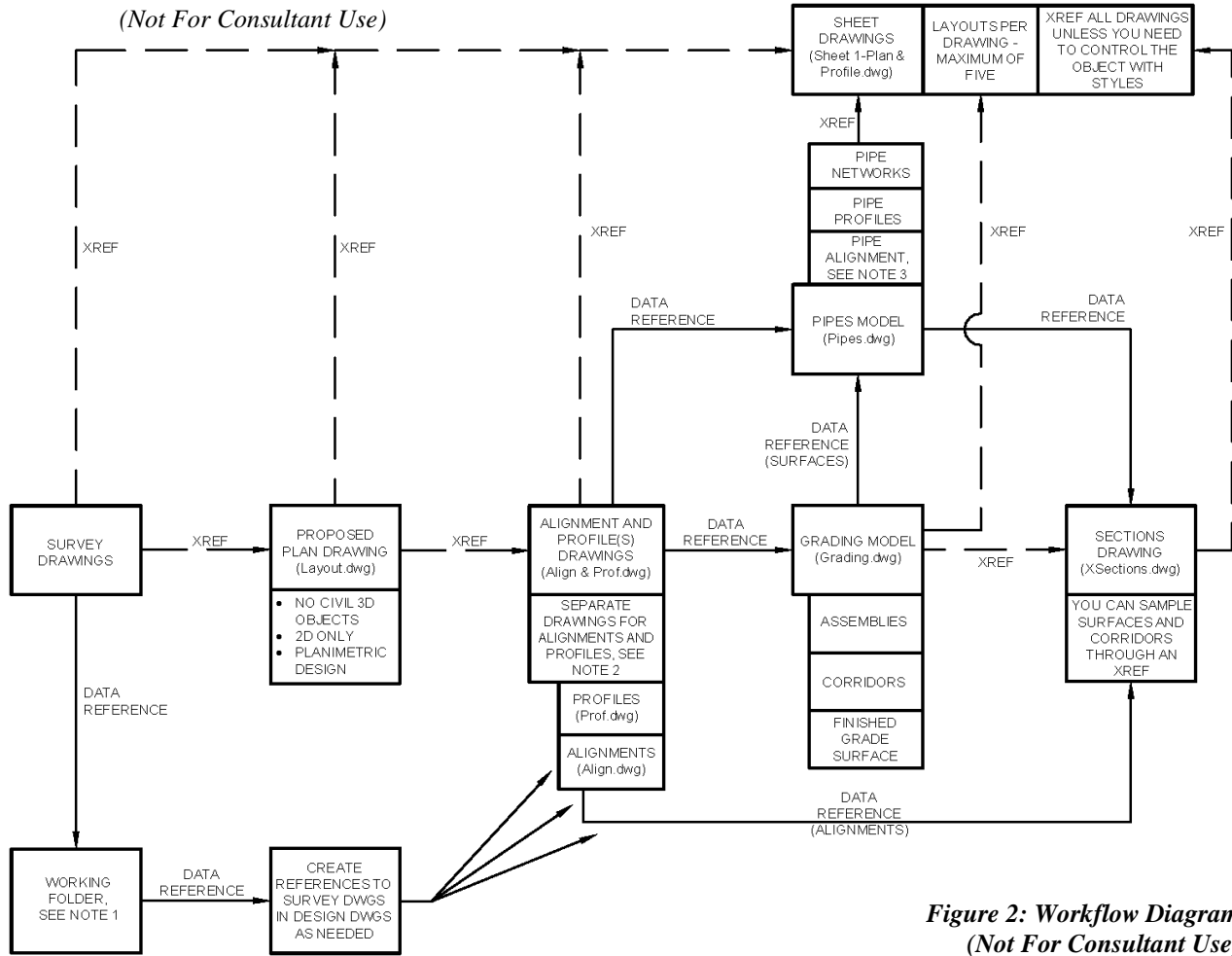
## 13. AGENCY AND CONSULTANT CADD PROCEDURES

### 13.2 AutoCAD Civil 3D Design Workflow (Continued)

9/21/2012

#### 13.2.K Design's Workflow Diagram

*(Not For Consultant Use)*



**Figure 2: Workflow Diagram**  
*(Not For Consultant Use)*

**Notes:**

1. When opening a drawing always check the working folder (a.k.a. project directory folder):  
**N:\C3D\FLOOD\FXXXXX**  
**N:\C3D\ROAD\RXXXXX**
2. For most projects, you will have one drawing with the alignments and separate files for individual profile drawings. This is cleaner when profiles are used as external references.  
 For smaller projects, each alignment and its corresponding profiles can be stored in their own file. For each major centerline, multiple profile lines and alignments may be in the same drawing (i.e., for offset alignments).
3. Alignments created from pipe networks can be stored in the pipes model drawing.
4. Drawing file names are examples, adjust as needed. Append the name of the project or specific object to the end of the DWG file name.
5. Externally reference all non-Civil 3D drawing files as needed. All external references should use overlay not attach.

## 13. AGENCY AND CONSULTANT CADD PROCEDURES

---

### 13.3 Templates

9/21/2012

#### 13.3.A Consultants - Civil 3D Drawing Templates

Templates for Agency consultants are included in the consultant data packages. See [Section 13.1.A](#) for a listing and description of templates included within the consultants data package.

Always start new Civil 3D drawings with one of our “Data” templates. Each template contains components such as layers, text styles, dimension styles, Civil 3D object styles, label styles and drawing settings specifically for that type of project (i.e. a Flood Control Project, a Road Project or a Survey).

Use command: **NEW** or in the pull down menu under **File** → **New ...** and select an appropriate ACPWA template.

For information regarding using templates to create drawings, see [Section 13.2.C](#) (for model drawings) and [Section 13.2.D](#) (for sheet drawings).





## 13. AGENCY AND CONSULTANT CADD PROCEDURES

---

### 13.3 Templates (Continued)

9/21/2012

3. **Optional:** If the drawing template needs any project specific adjustments you can customize this drawing template for your project's needs.
  - a. **SAVE** your drawing template as a DWG file in the project's *Sheets* folder (i.e., **General Sheet-20 Scale-[description].dwg**).
  - b. Open your sheet set DST file. Update your sheet set's main properties by right clicking on the sheet set's name in the sheet set manager and editing.
  - c. Temporarily add the "22x34" layout from your DWG file to your existing sheet set. Make any additional adjustments needed, **REGEN** and **SAVE**.
  - d. Remove this sheet from your project's sheet set.
4. **SAVE** the drawing as a drawing template in the project's *Sheets* folder. Name the new DWT file: **General Sheet-20 Scale-[description].dwt**.
5. You now have a custom template set to 1"=20' scale. You also have components such text, dimensions, and Civil 3D settings and label styles.
6. If you opted to created **General Sheets-20 Scale-[description].dwg** in step 3 you can now delete this temporary DWG file from the *Sheets* folder. Do not delete the DWT drawing template.

For information on creating general sheets using the custom template, see [Section 13.2.D](#). For information on creating new sheets from the sheet set manager using the custom template, see [Section 13.4.G](#).

## 13. AGENCY AND CONSULTANT CADD PROCEDURES

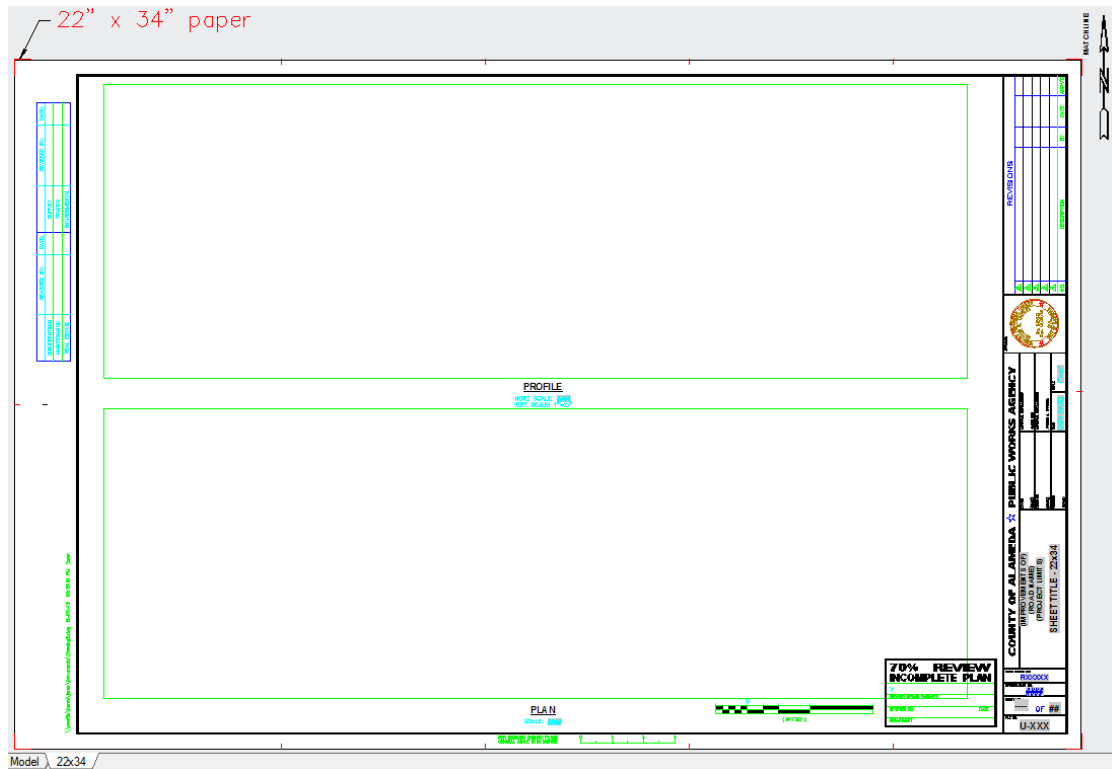
### 13.3 Templates (Continued)

9/21/2012

#### 13.3.C Create a Custom Template for Plan and Profile Sheets

Please follow these steps to create a custom template for plan and profile sheets that will utilize Civil 3D Plan Production tools.

1. Start a **NEW** drawing with **ACPWA R-Plan Production-20 Scale.dwt** or **ACPWA F-Plan Production-20 Scale.dwt** for in-house projects. (Agency consultants use **CON-ACPWA R-Plan Production-20 Scale.dwt** or **CON-ACPWA F-Plan Production-20 Scale.dwt** provided in the consultant data package). Your new drawing will look something like this:



2. You can customize your template by changing the scale of the model and editing the viewport properties.
  - a. In viewport properties change the scale of both viewports to match the model scale if needed.
  - b. Also in viewport properties change the viewport type if needed. Set a plan viewport(s) for plan only sheets. Or set a profile viewport(s) profile only sheets.
  - c. You can also adjust the size of the viewports; or set your scale bar attributes to the correct scale.

## 13. AGENCY AND CONSULTANT CADD PROCEDURES

---

### 13.3 Templates (Continued)

9/21/2012

3. **Optional:** If your layouts need any adjustments you can customize this drawing template for your project.
  - a. **SAVE** your drawing template as a DWG file in the project's *Sheets* folder (i.e., **P&P Sheet-## Scale-Template.dwg** with ## representing the scale).
  - b. Open your sheet set DST file. Update your sheet set's main properties by right clicking on the sheet set's name in the sheet set manager and editing.
  - c. Temporarily add the "22x34" layout from your DWG file to your existing sheet set. Make any additional adjustments needed, **REGEN** and **SAVE**.
  - d. Remove this sheet from your project's sheet set.
4. **SAVE** the drawing as a drawing template in the project's *Sheets* folder. Name the DWT file: **P&P Sheet-## Scale-Template.dwt**
5. If you opted to create **P&P Sheet-## Scale-Template.dwg** in step 3 you can now delete the DWG file you created temporarily. Do not delete the DWT template.

For information on creating plan and profile sheets using templates, see [Section 13.2.D](#)

## 13. AGENCY AND CONSULTANT CADD PROCEDURES

### 13.4 Sheet Sets

9/21/2012

#### 13.4.A Concept

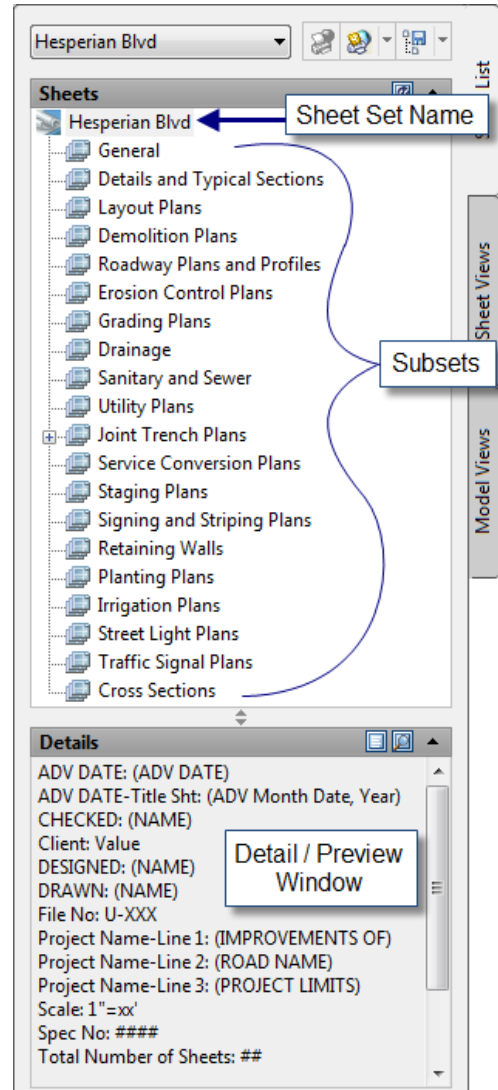
A **sheet set** is a DST file which groups many layouts from multiple drawings into one common repository. The **sheet set manager** is a palette in AutoCAD that allows you to view and manipulate all of the layouts defined as sheets within the sheet set's DST file. Using the sheet set manager; anyone can create new sheets, open and modify existing sheets, modify sheet numbers and drawing names, and publish multiple sheets. The AutoCAD sheet set manager can be used from any AutoCAD application, except for Land Desktop Companion.

**To avoid drawing performance issues please keep the number of layouts per drawing to a maximum of five.** The sheet set may contain as many layouts as needed for the project.

This section discusses the general use of the sheet set manager. For additional information on sheet sets see the [Work with Sheets in a Sheet Set](#) topic in AutoCAD Civil 3D help.

**Subsets** - allow you to categorize your sheets and keep your plans in the correct order.

**When to Use Sheet Sets** - If you have a small project (10 sheets or less) you may choose **not** to create a sheet set. But creating a sheet set is always recommended. Even on small projects the sheet set can make project management easier. The sheet set can be used to track and gather your project files and references via eTransmit.



*Figure 3: Sheet Set Manager*

#### 13.4.B Fields

Fields are pieces of text that automatically update based on the properties of an object. The sheet set manager utilizes fields to fill out title block information automatically. Fields are very useful because one piece of data can be modified in one location that ultimately changes the same information in every location within the entire project. For example, there is a Sheet Set Custom Property entitled 'File No.' If the 'File No' property is modified every sheet, that is a part of this sheet set, will have the file number in the title block automatically updated.

Fields can be identified in a drawing by a grey background:

**U-324-12**

**DO NOT edit fields in the text editor!** Edits to fields need to be made through the sheet set manager. Once a sheet is added to a sheet set, fields are populated by updating the properties in the sheet set manager.

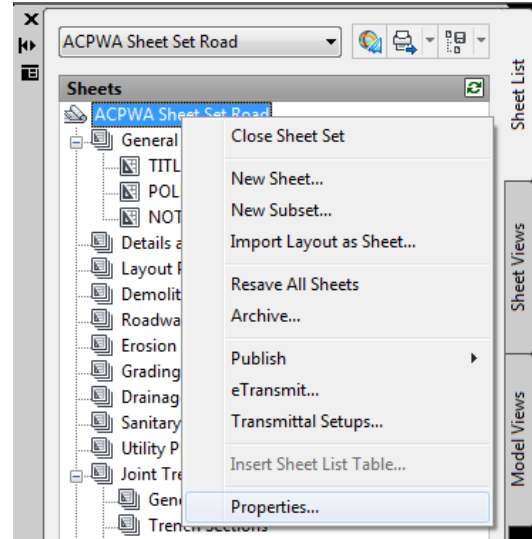
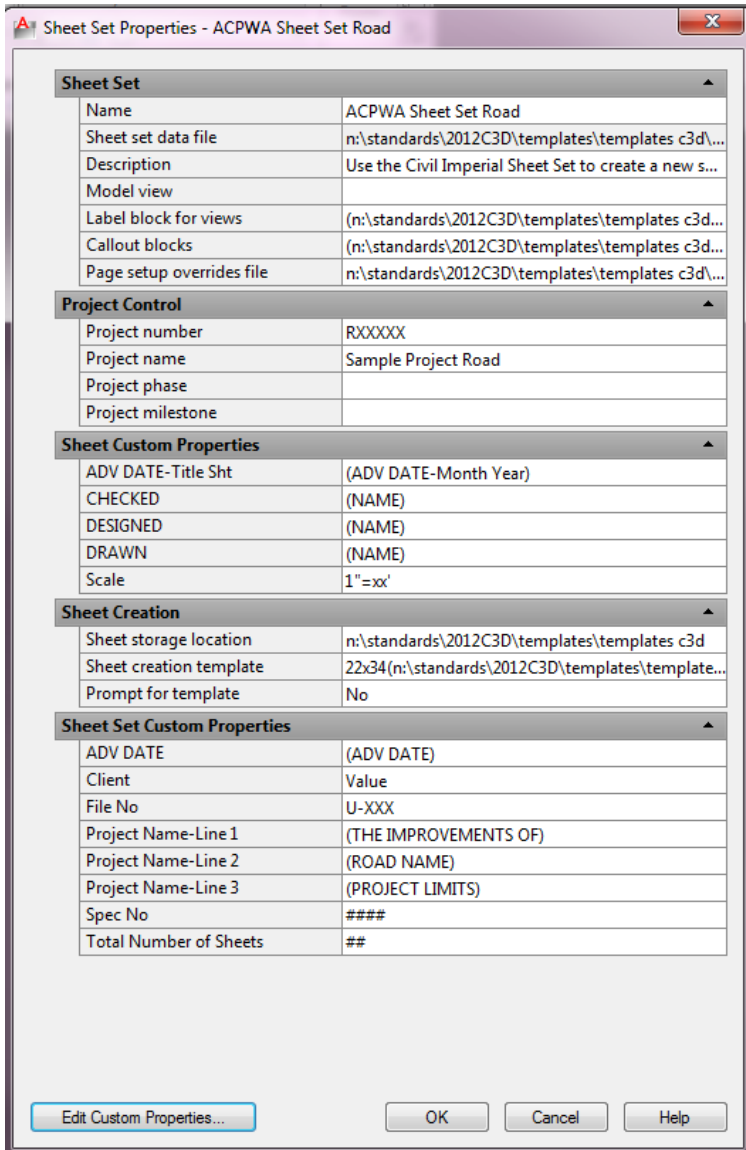
## 13. AGENCY AND CONSULTANT CADD PROCEDURES

### 13.4 Sheet Sets (Continued)

9/21/2012

Fields can be applied to a sheet set at two distinct levels: **Project Specific Fields** and **Sheet Specific Fields**.

**Project Specific Fields** - (i.e., fields located under Project Control and Sheet Set Custom Properties) are pieces of data in the title block that are unique to the project, yet the same on every sheet in the sheet set. For example, File No, Project number, Spec No, and Total Number of Sheets are a few properties that will be the same on every sheet and unique to a particular project.



In the sheet set manager right click on the sheet set name and select **Properties...** to launch the dialog box shown.

From this dialog box you can edit the properties under **Project Control** or **Sheet Set Custom Properties** as they apply to the entire sheet set, e.g.:

- Project number
- ADV DATE (Write the month and year as it should appear on every sheet, e.g., JAN 2012)
- File No
- Project Name-Line 1
- Project Name-Line 2
- Project Name-Line 3
- Spec No
- Total Number of Sheets

Each sheet will acquire the Sheet Set Properties as it is added to the sheet set. So the first thing you need to do is customize **all** the properties (including Sheet Custom Properties) for your project, before you add new sheets.

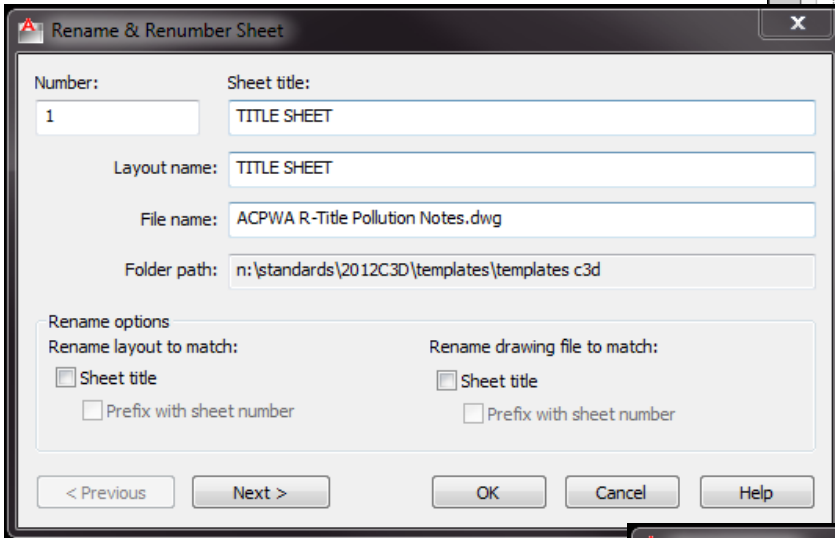
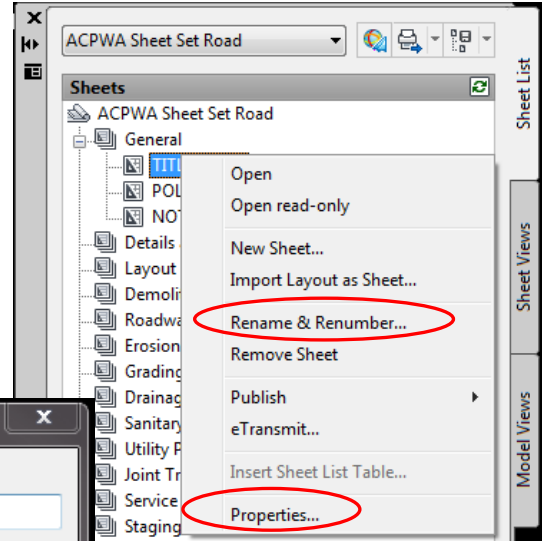
## 13. AGENCY AND CONSULTANT CADD PROCEDURES

### 13.4 Sheet Sets (Continued)

9/21/2012

**Sheet Specific Fields** - (i.e., the Sheet Custom Properties) are pieces of data that are unique to each individual sheet. Examples of sheet specific fields include; sheet number and scale information.

While in the Sheet Set Manager (DST file) right click on an individual sheet and select **Rename & Renumber...** or **Properties...** to launch one of the dialog boxes shown below.



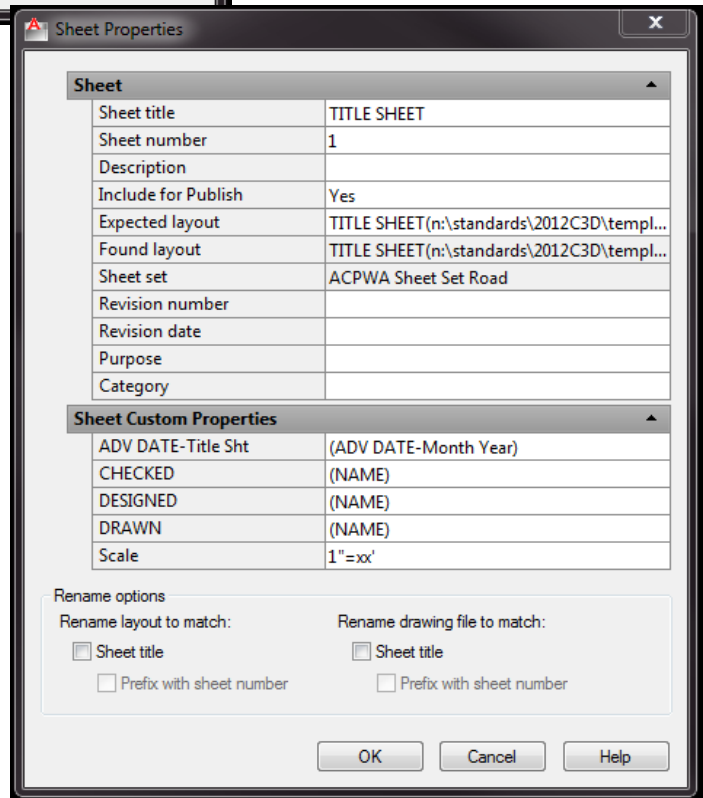
#### Rename & Renumber...

This dialog box is used to edit Number, Sheet title, Layout name and File name. For more information see [Section 13.4.H](#).

#### Properties...

This dialog box is used to edit the following Sheet Custom Properties, specific to that sheet only:

- ADV DATE-Title Sht (This field is in the main title of the title sheet only. Write out the month and year, e.g., JANUARY 2012.)
- CHECKED
- DESIGNED
- DRAWN
- Scale



## 13. AGENCY AND CONSULTANT CADD PROCEDURES

### 13.4 Sheet Sets (Continued)

9/21/2012

#### 13.4.C Title Sheet, Pollution Prevention, & Notes and Abbreviations

(This section does not apply to Agency consultants. Please see [Section 13.1.C.](#))

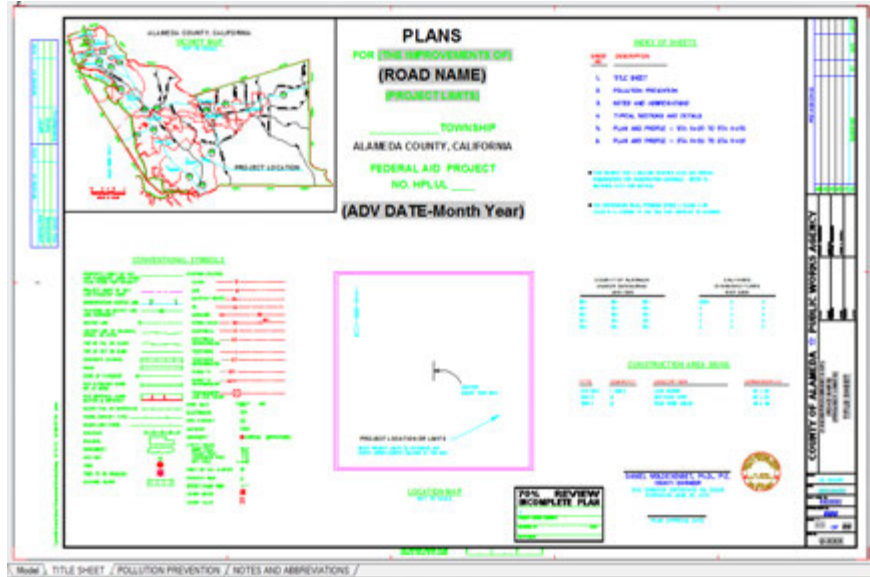
To create a new drawing from a Road or a Flood Control template, type **NEW** at the command line and select either the template called:

**ACPWA R-Title Pollution Notes.dwt or ACPWA F-Title Pollution Notes.dwt**

#### Title Sheet

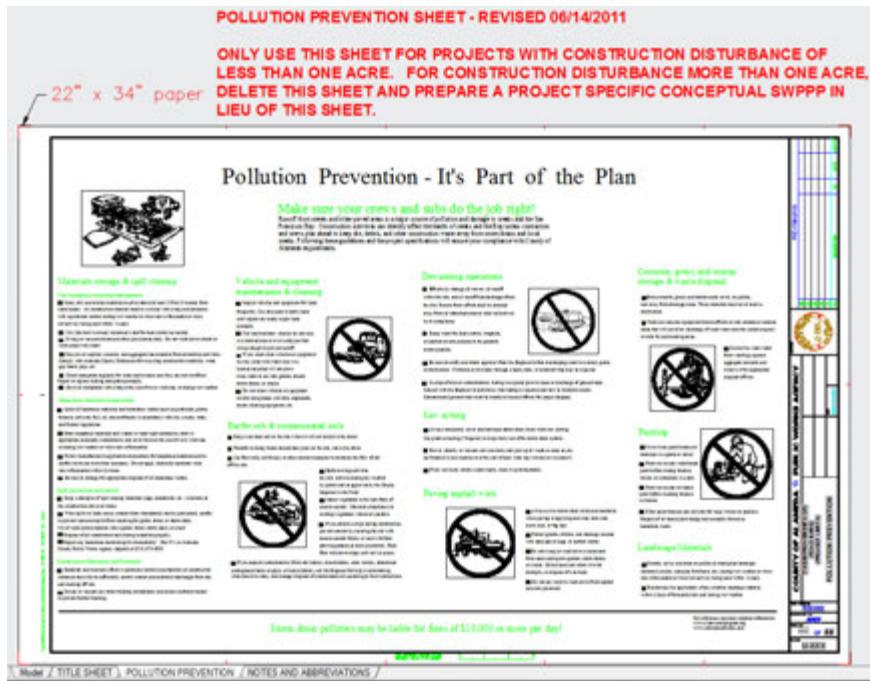
In addition to the main title and signatures the Title Sheet (a.k.a. sheet 1) contains the Vicinity Map, the Location Map, the Conventional Symbols Legend, the Index of Sheets, a list of Alameda County Design Guidelines, a list of Caltrans Standard Plans and a list of Construction Area Signs.

Do not copy and paste properties from Conventional Symbols Legend into your drawing. For utilities we have custom line types both with text and without text. Instead select the correct line types from 'acad.lin' and apply them to your layers.



#### Pollution Prevention

The Pollution Prevention sheet (a.k.a. sheet 2) will only be used for project construction disturbance of less than one acre. For project construction disturbance of more than one acre, project specific Conceptual Storm Water Pollution Prevention Plan (SWPPP) will be prepared in lieu of the Pollution Prevention sheet.





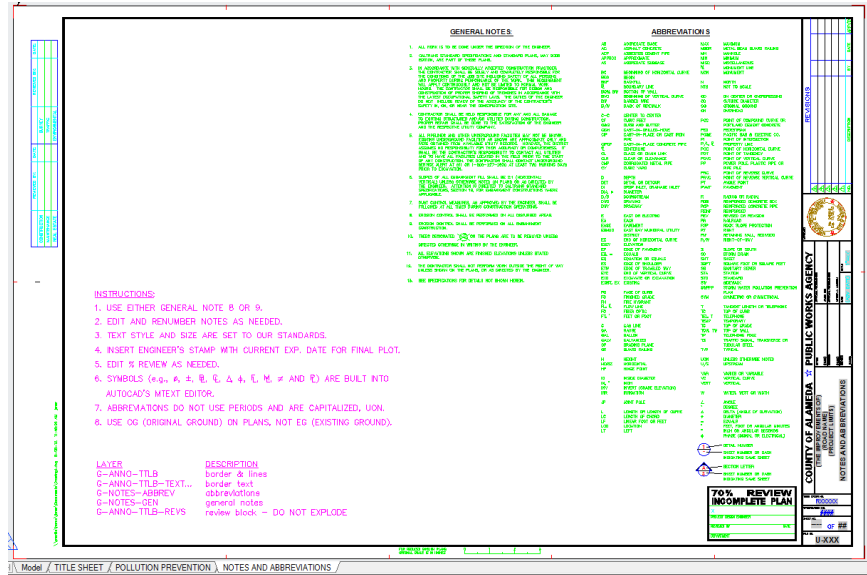
## 13. AGENCY AND CONSULTANT CADD PROCEDURES

### 13.4 Sheet Sets (Continued)

9/21/2012

#### Notes and Abbreviations

Read and follow the instructions on the Notes and Abbreviations sheet. Any additional abbreviations used on the plans should be added to the Abbreviations list on the Notes and Abbreviations sheet.



#### Saving the Drawing Files

If the Pollution Prevention sheet is being used for this project, **SAVE** this drawing as **Title-PP-Notes-[description].dwg** in your project's *Sheets* folder.

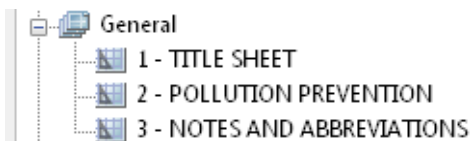
If a separate (SWPPP) is being prepared delete the "POLLUTION PREVENTION" layout tab and **SAVE** your plan as **Title-Notes-[description].dwg** in your project's *Sheets* folder.

If you prefer separate drawing files, **SAVE** your new drawing in your project's *Sheets* folder as three separate files called: **Title-[description].dwg**, **Pollution-[description].dwg** and **Notes-[description].dwg**. Delete the layout tabs you do not need from each drawing.

#### Add the Layouts to Sheet Set

After creating a new sheet set add these layouts to your sheet set under the "General" subset. Right click on the "General" subset and select **Import Layout as Sheet...**

Then browse to your drawing and import checked layout tabs you wish add to the sheet set. See [Section 13.4.H](#) and re-number the sheets as follows:




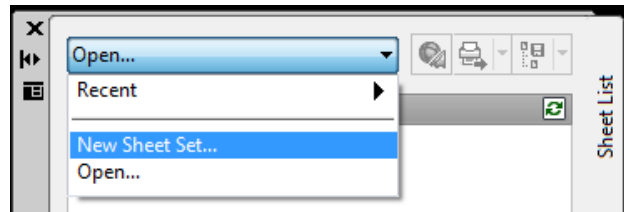
## 13. AGENCY AND CONSULTANT CADD PROCEDURES

### 13.4 Sheet Sets (Continued)

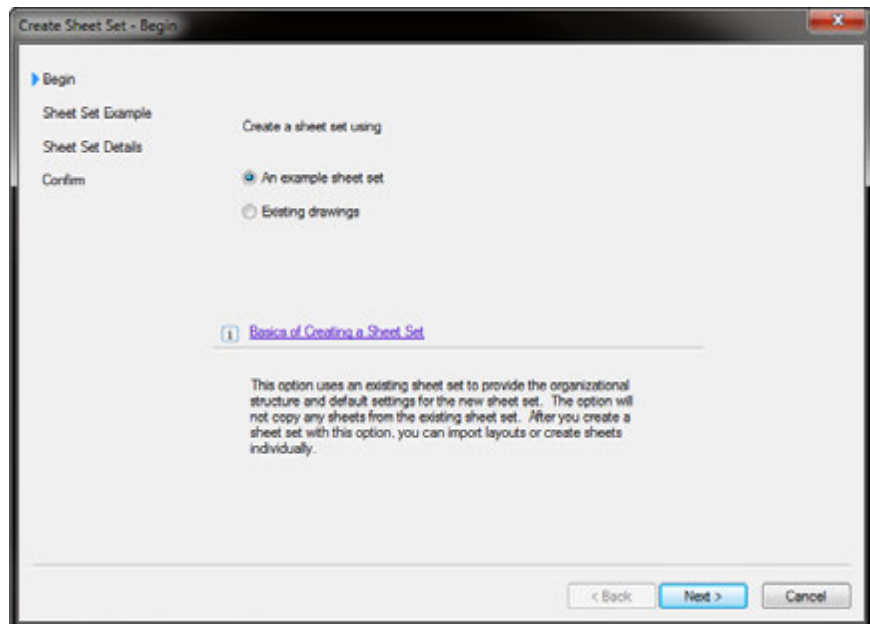
9/21/2012

#### 13.4.D Creating a New Sheet Set

1. Open the sheet set manager by typing **SSM** in the command line or select Ribbon: **View** tab → **Palettes** panel →  **Sheet Set Manager**. (For more information about [SHEETSET](#) command, see AutoCAD help).
2. From the sheet set manager, click in the list box in the upper portion of the palette and choose **New Sheet Set...**



3. On the first page of the wizard, choose the radial button for **An example sheet set**. Click **Next**.



## 13. AGENCY AND CONSULTANT CADD PROCEDURES

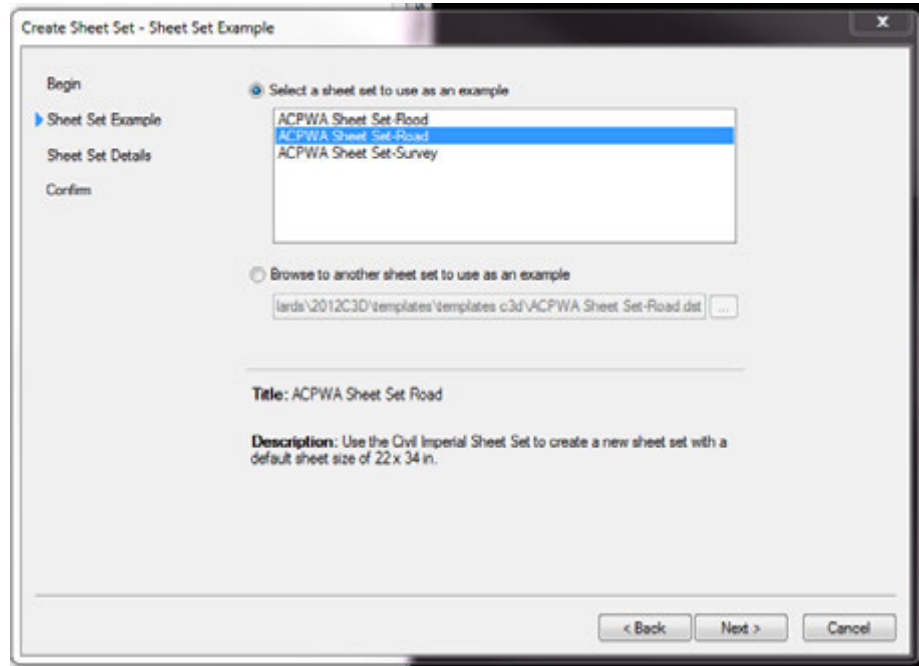
### 13.4 Sheet Sets (Continued)

9/21/2012

4. For in-house projects choose the radial button for **Select a sheet set to use as an example**, choose the appropriate template. In-house examples (DST files) are kept in N:\Standards\2012C3D\templates\templates C3D.

Agency consultants choose **Browse to another sheet set to use as an example**. Select the DST file that is provided in the consultant data package.

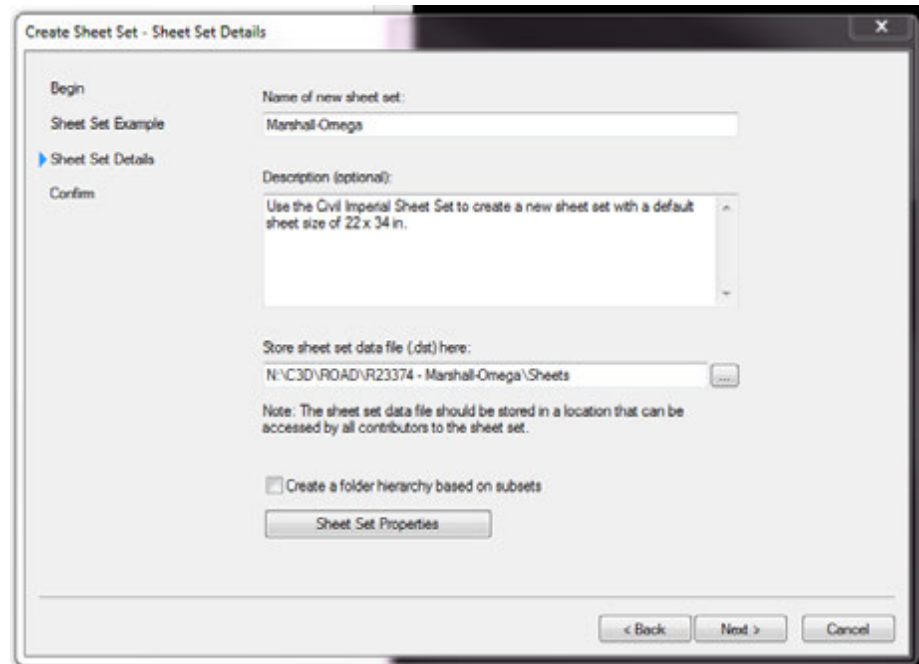
Click **Next**.



5. Name the new sheet set after the project's name.

Set **Store sheet set data file (dst) here:** to the correct path. Always keep the DST file in the *Sheets* folder within the project directory.

Click **Next**.



6. Confirm the settings and click **Next>**. Then click **Finish** to create the sheet set.


## 13. AGENCY AND CONSULTANT CADD PROCEDURES

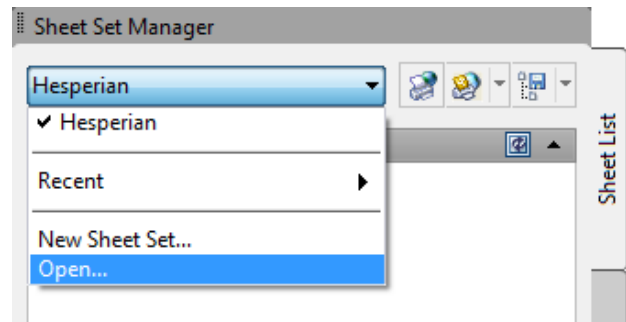
---

### 13.4 Sheet Sets (Continued)

9/21/2012

#### 13.4.E. Opening an Existing Sheet Set

1. Open the sheet set manager by typing **SSM** in the command line or select Ribbon: **View** tab → **Palettes** panel →  **Sheet Set Manager**. (For more information about [SHEETSET](#) command, see AutoCAD help).
2. From the sheet set manager, click in the list box in the upper portion of the palette and choose **Open...**



3. Browse to the *Sheets* folder underneath the appropriate project and choose the DST file located there. Click the **Open** button to open the sheet set.

## 13. AGENCY AND CONSULTANT CADD PROCEDURES

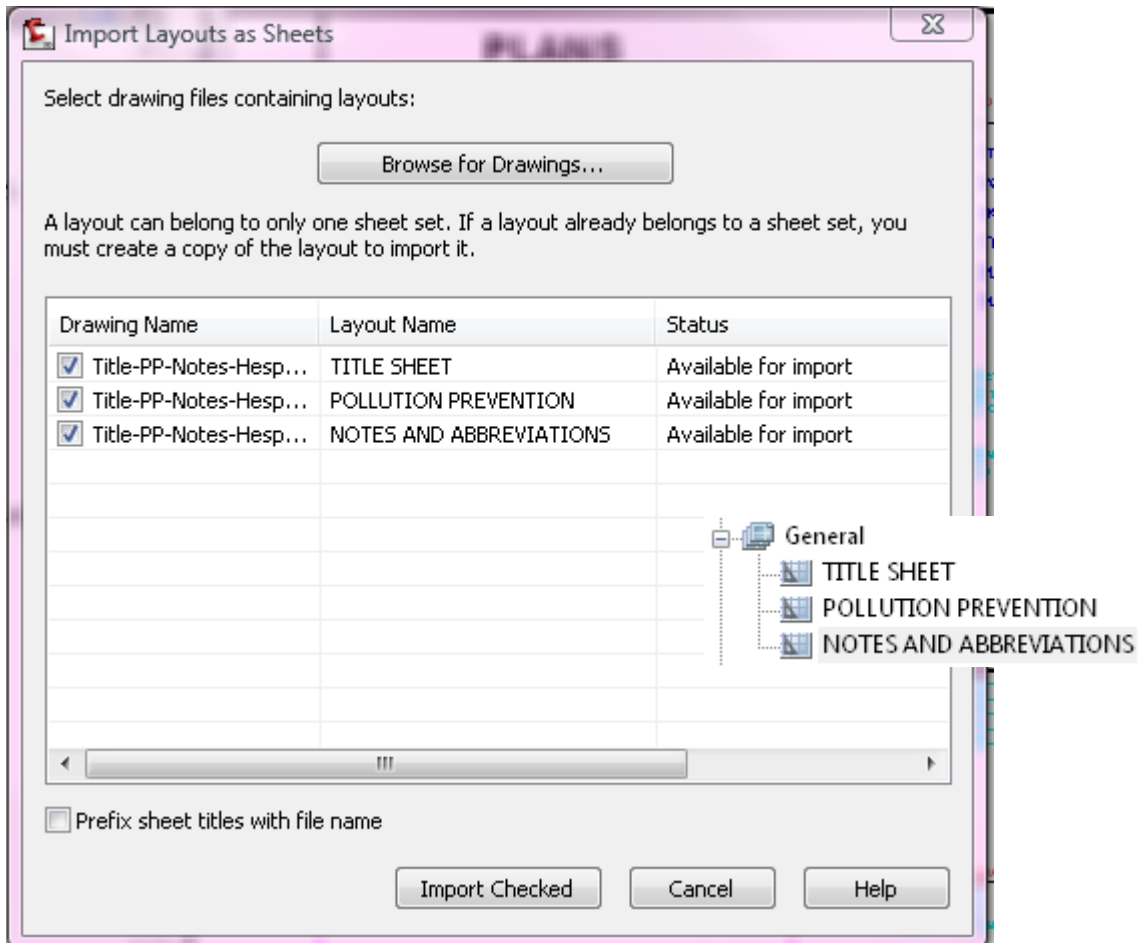
### 13.4 Sheet Sets (Continued)

9/21/2012

#### 13.4.F Import a Layout as a Sheet

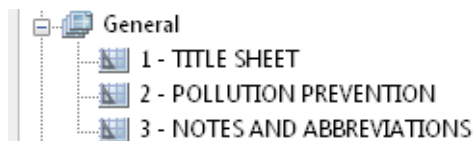
1. Make sure that you have your sheet set open.
2. From the sheet set manager, right click on a subset name that corresponds with the type of sheet that will be created and then select **Import Layout as Sheet...**

For example right click on a subset named “General.” Select **Browse for Drawings...** Open **Title-PP-Notes-[description].dwg** in your project’s *Sheets* folder. Select **Browse for drawings...** Select **Import Checked** to import the three layouts into your sheet set.



3. Right click on one of new sheets in the sheet set manager and select **Re-name & Re-number...** Renumber the first sheet. Select the next button to renumber the next sheet. See [Section 13.4.H](#) for additional information.

**Regen** to see the sheet numbers update in the layout.



## 13. AGENCY AND CONSULTANT CADD PROCEDURES

---

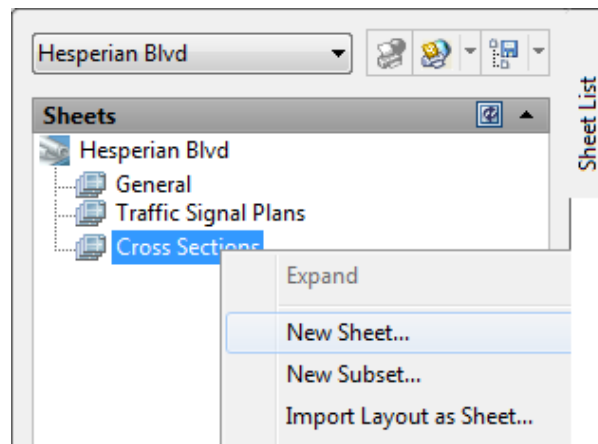
### 13.4 Sheet Sets (Continued)

9/21/2012

#### 13.4.G Creating a New Sheet from the Sheet Set Manager

For this method to work your sheet set must be pointed to a template configured correctly for your project. To create custom templates for general sheets see [Section 13.3.B](#). To create a new sheet the steps are as follows:

1. Make sure that you have the sheet set open.
2. From the sheet set manager, right click on the title of your sheet set and select **Properties...** Under “Sheet Creation” set the path of the “Sheet creation template” to the template you wish to use. Click **OK**.
3. Right click on the subset name that corresponds with the type of sheet that will be created and then select **New Sheet...** For example to create a new sheet that will show cross sections, right click on the Cross Sections subset.



4. A new sheet window will appear. Fill out the sheet number and sheet title.
5. There is an optional check box on the bottom called **open in drawing editor**. If this is checked then the drawing will be opened upon creation. If this option is not checked then the sheet will be created but it will not open until you open it manually.
6. Once the sheet drawing is open, use it as you would use any other sheet drawing. Create references, annotate etc.

**DO NOT edit text fields with grey background in the text editor!** Fields will fill in automatically when properties in the sheet set manager are updated.

**Plan and Profile Sheets** - Do not use the sheet manager to create plan and profile sheets! Templates created for plan and profile sheets are to be used with the Civil 3D plan and production tools. To create custom templates for plan and profile sheets, see [Section 13.3.C](#).

## 13. AGENCY AND CONSULTANT CADD PROCEDURES

---

### 13.4 Sheet Sets (Continued)

9/21/2012

#### 13.4.H Renumbering & Renaming Sheets

If you need to rename or renumber sheets there is a built in utility that you can use from the sheet set manager. To access the utility, right click on a sheet that you wish to renumber and choose **Rename & Renumber...** The following window will appear:

From this window you can edit the Number, Sheet title, Layout name and File name. Under 'Rename options' there are check boxes to rename the layout tab or the drawing file to match the edits that you make to the Sheet title. Once one sheet is modified, the **Next** and **Previous** buttons can be used to navigate to other sheets in the sheet set.

#### Renaming Drawing Files and Layouts

Always rename drawing files from the Rename & Renumber Sheet dialog box in the sheet set manager. This will keep link to layouts and drawing files intact. **Never rename drawing files in Windows Explorer**, the links to the sheet set will be broken.

If the 'File name' function in the dialog box is **grey**, close your Civil 3D application! This will makes sure that all drawing files linked to your sheet set are closed. Re-launch Civil 3D and a new drawing should launch with only the default template open. Do not open any of the drawings attached to your sheet set. Open your existing sheet set (DST file). Now you should be able to rename your files rename your files.

If you try to rename a layout in AutoCAD you will see a warning and you should select "Rename layout and sheet" to rename both at the same time.

## 13. AGENCY AND CONSULTANT CADD PROCEDURES

### 13.4 Sheet Sets (Continued)

9/21/2012

#### 13.4.I Publishing

Publishing is one of the most utilized features within the sheet set manager. From the sheet set manager, any combination of sheets can be plotted with one command. For more information regarding [PUBLISH](#) command, see AutoCAD help.

**Plot a sheet** - right click on the sheet name from the sheet set manager and choose a publish option.

**Plot a subset** - right click on the subset from the sheet set manager and choose a publish option.

**Plot an entire sheet set** - right click on the name of the sheet set and choose a publish option.

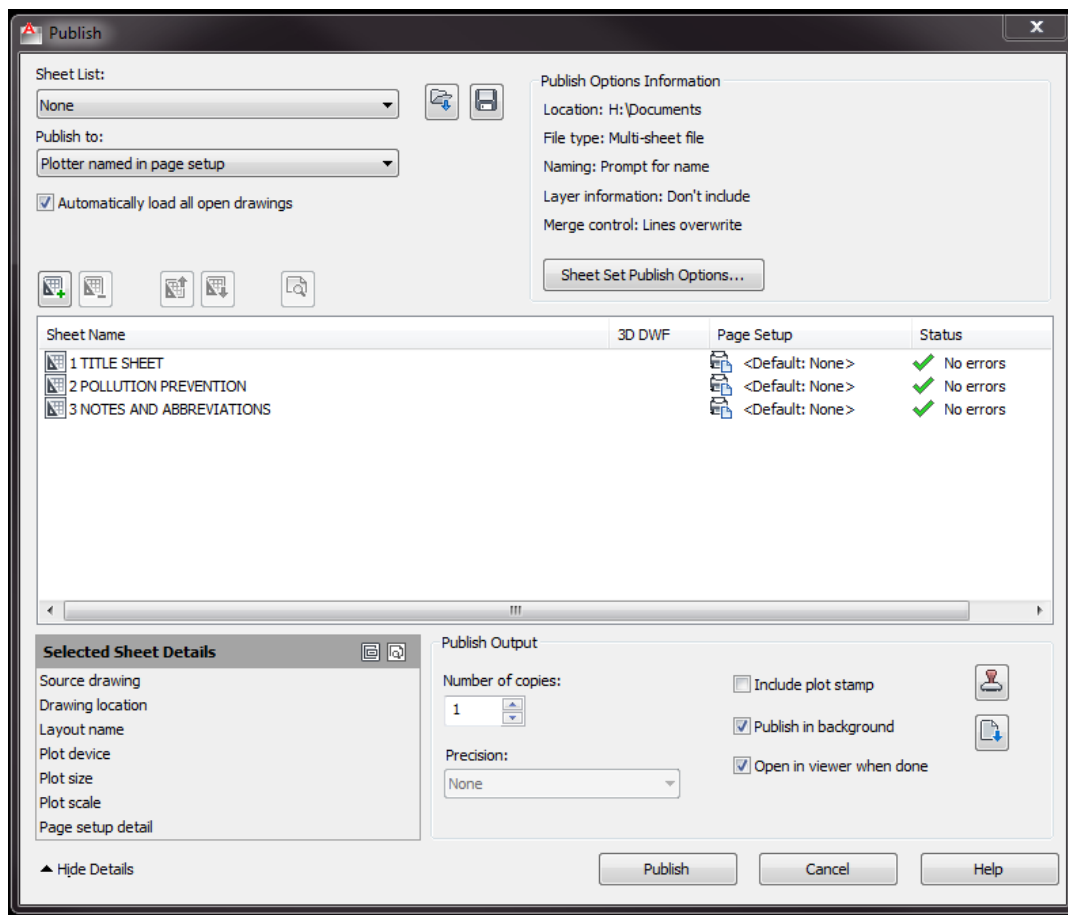
#### Publish to:

**Plotter** - plots the set to the plotter name in page setup of each sheet

**DWF or DWFx** - plots the set to a DWF or DWFx file based on publish settings

**PDF** - plots to PDF using DWG to PDF override based on publish settings

In the **Publish Dialog Box...** allows you to control a number of **Sheet Set Publish Options...**



**Warning:** Not all the publish functions work correctly with Agency printers. DWF/DWFx cannot be sent via Terriostation to the Seiko2050 plotter. AutoCAD does not publish to PLT, so final plots using PLT files need to be plotted to PLT individually.



## INDEX

---

### A

ACAD Reports folder .....	110
acad.dwt .....	116
Accessing Existing Ground Data .....	121
Alignment and Profile Drawings .....	117
Alignments and Profiles	
File Naming Convention.....	114
Archive folder.....	110

---

### C

Construction Revisions folder.....	110
Consultant Data Package	
Road Design and Flood Control Design.....	96
Consultants	
Using Civil 3D .....	123
Using Software other than Civil 3D.....	123
Corridor Drawings .....	117
Corridor Models	
File Naming Convention.....	114
Cross Sections	
Drawings.....	118
File Naming Convention.....	114

---

### D

Data References.....	127
Data Shortcuts .....	124
Data Sharing in Civil 3D.....	124
Data Shortcuts Editor.....	128
Data Shortcuts folder.....	110
Dimension Styles	
For Consultants.....	102
DST file .....	135

---

### E

eTransmit.....	108, 111, 112, 123
Exhibit folder.....	110
External References	
Bind.....	123
Data Sharing in Civil 3D.....	124

---

### F

Fields.....	135, 136
Project specific fields .....	136
Sheet specific fields .....	137
File Exchange (Working with Survey).....	121
File Naming .....	98
Conventions.....	114

Examples .....	98, 99
Final Bid Set folder .....	111

---

### G

Grading Drawings.....	118
Grading Models	
File Naming Convention.....	115

---

### H

Hatching (for consultants)	
Associative Hatching .....	107
HATCH command.....	107
Hatch Origin .....	107
Horizontal Geometry Drawings.....	121

---

### I

Images folder .....	111
---------------------	-----

---

### L

Layer	
Designations.....	104, 105
Discipline Designator .....	106
Status Designator .....	105
Layer Naming	
Conventions .....	103
For Dimensioning .....	102
Hierarchy.....	104

---

### M

Model Drawings	
Create New .....	117
Model folder.....	112

---

### N

<b>NEW ITEM</b>	
ACAD Reports folder .....	110
Survey's Consultant Data Package .....	97
Notes and Abbreviations.....	104, 139
For Consultants .....	100
Saving the Drawing File.....	139

**P**

Parcels  
 File Naming Convention.....115  
 PAT files .....107  
 Pipes  
 File Naming Convention.....115  
 Pipes Drawings.....118  
 Plan folder.....112  
 Planimetrics Drawings  
 Topography Drawings.....121  
 Pollution Prevention ..... 104, 138, 139  
 For Consultants.....100  
 Saving the Drawing File.....139  
 Project Directory.....109  
 Folders .....109  
 Sub Folders .....109  
 Promote  
 Data References.....123  
 Publishing.....146

**R**

Record Drawings folder .....112  
 Rename & Renumber.....137, 145  
 Review folder .....112

**S**

Sheet Drawings  
 Creating New General Sheets .....119  
 Creating New Plan and Profile Sheets .....119, 120  
 File Naming Convention for General Sheets.....115  
 File Naming Convention for Plan & Profile Sheets.....116  
 sheet set manager ..... 135, 140, 142, 143, 145, 146  
 Create New Sheet from the Sheet Set Manager.....144  
 Sheet Sets .....135–46  
 Opening an Existing Sheet Set .....142  
 Renaming Drawing Files and Layouts .....145  
 Sheet Custom Properties .....137  
 Sheet Set Custom Properties .....136  
 Subsets.....135

When to Use Sheet Sets..... 135  
 Sheets folder ..... 112  
 SNAPBASE command..... 107  
 SSM (Sheet Set Manager) command..... 140, 142  
 Submittals folder..... 113  
 Subsets ..... 135  
 Surface Drawings..... 121  
 Survey folder ..... 113  
 SWPPP (Storm Water Pollution Prevention Plan) .... 100, 138, 139

**T**

Template Changes ..... 117  
 Templates  
 Create a Custom Template for General Sheets..... 131  
 Create a Custom Template for Plan & Profile Sheets... 133  
 For Model Drawings..... 116  
 For Sheet Drawings ..... 119  
 Text Styles  
 For Consultants ..... 103  
 Title Sheet ..... 104, 138  
 For Consultants ..... 100  
 Saving the Drawing File..... 139  
 Topography Drawings  
 Planimetrics Drawings..... 121

**U**

Units ..... 108  
 uppercase..... 103

**V**

View Frames Drawings ..... 118

**W**

Workflow  
 Design ..... 109–29