

A Quick Spin on Project Navigator in AutoCAD® Architecture 2010

Reid M. Addis – Microsol Resources Corporation

AB114-3L If you've never used Project Navigator, then you've never experienced the power of streamlining your design process. In this session, we'll create a small project, and then explore what Project Navigator can do and how you can use it to save time and effort. We'll cover project setup in the Project Browser, create construct and element files, create view files and sheet files, and then link it all together.

Key Topics:

- Project setup in Project Browser
- Create construct and element files
- Create view files
- Create sheet files
- Linking it all together

About the Speaker:

Reid is a registered architect with more than 30 years of experience in the industry. He has worked for a variety of architectural firms and had his own CAD consulting business for over 12 years. He is currently an applications specialist concentrating on Revit and AutoCAD Architecture for Microsol Resources Corporation, an Autodesk Premier Solutions Provider.

raddis@microsolresources.com

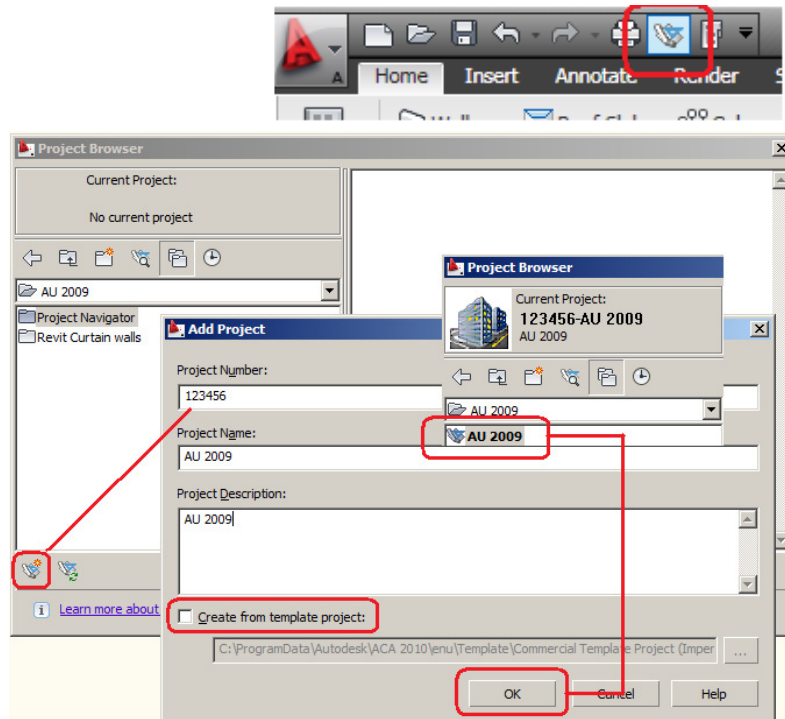
The premise behind Project Navigator is to provide a way for you to keep all of your AutoCAD files not only organized, but actually “communicating” with each other. The “buzz-acronym” for Architectural software is “BIM” or Building Information Model. Autodesk has two of these programs: Revit Architecture 2010 and **AutoCAD Architecture 2010**. Both programs use a “Project Navigator/Browser” interface to organize your project files. Revit has a slight organizational advantage because everything is stored in a single file, while AutoCAD Architecture 2010 (ACA-2010) uses the AutoCAD “External Reference” file concept to “distribute” the data amongst many files. That is why *ACA-2010* and *Project Navigator* are called a “Distributed Building Information Model.”

This distribution occurs amongst four types of files: **Elements; Constructs** (a tough name); **Views**, and **Sheets**. In order to better grasp how these all work, I’ve created the plans for a small two story office building. I’ll start by creating a new project, then import the *Element* and *Construct* files. I’ll then create some View files with *Named Modelspace Views* and some Detail Callouts. Finally I’ll create some *Sheet* files, linking the Layout viewports to the View files.

Off we go!

Everything starts with Project Browser, so I'll start there too. From the **Quick Access Toolbar**, select **Project Browser...**

There are several buttons across the top left side of the Project Browser. The one you will probably use the most is the "sundial/clock" *Project History* button, which allows you to switch projects. I'll switch to the ... \AU 2009 folder by picking the *double folder* icon to the left of the sundial, then use the drop down arrow in the section just

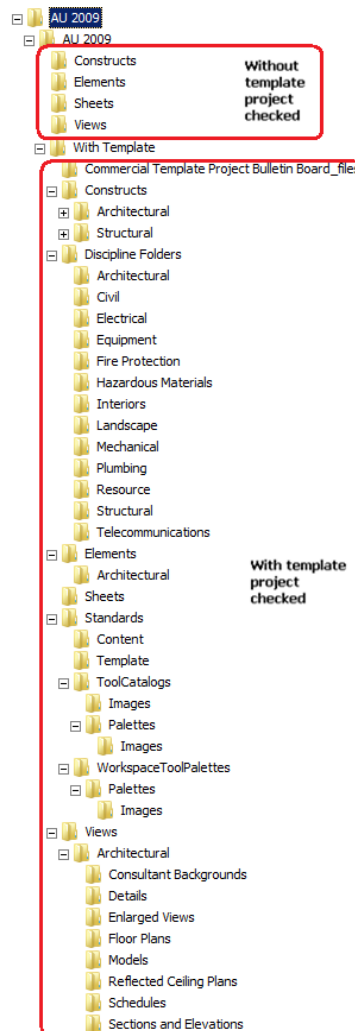
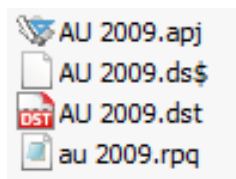


below.

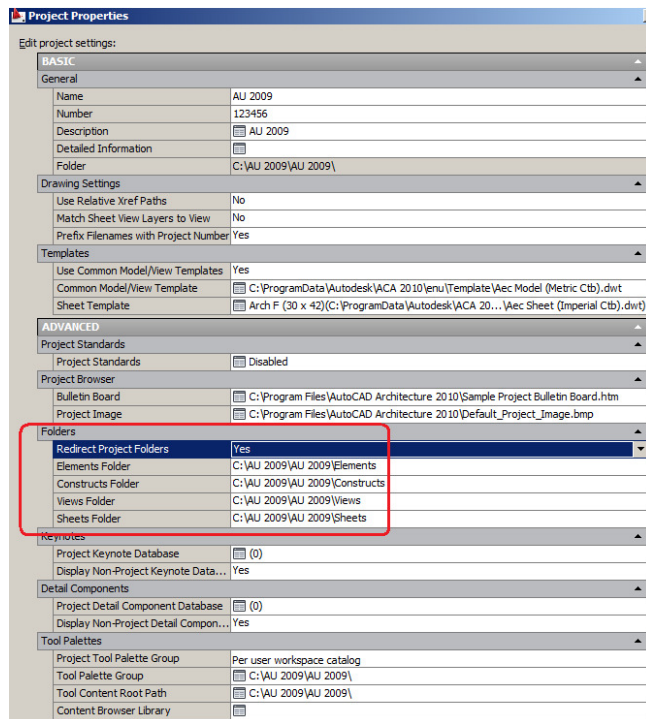
At the bottom left I'll pick the **New Project** button to bring up the **Add Project** dialog box, Using **123456** for the Project Number, **AU 2009** for the Project Name, and **AU 2009** for the Project Description. I'll also uncheck the "Create from template project" toggle. This is useful if you have set up company standards for the Project Browser icon that appears in the top left corner as well as an HTML page that appears on the right side. This option also creates additional folders and files that establish project related standards, such as tool palettes.

After creating this Project, **five new folders** are created. In this release you can choose where they will be located. I'm using the defaults. The top folder is named the same as the Project Name. Under this are the four folders for the different types of *Project Navigator* drawing files: **Elements;** **Constructs;** **Views;** and **Sheets** (not in this order).

In addition, three (really four though one is a backup) files are created in the top project folder: an **APJ** (Autodesk Project) file, a **DST** (Drawing Sheet) file, and an **RPQ** (Repath Queue) file. This latter file can be opened with the Sheet Set Manager program too. Let's look at some of our Project properties.

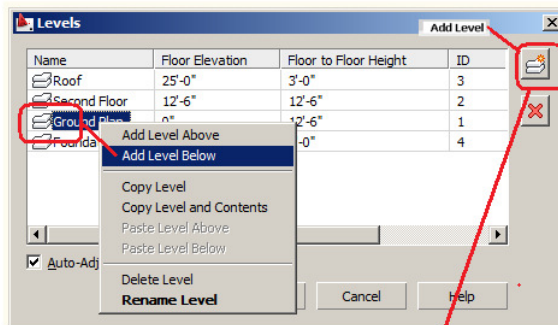


In the Modify Project dialog box, I'll set the **Prefix Filenames with Project Number** option to Yes. This will automatically add the Project number to your DWG files without you having to do it. I'll set **Use Relative Xref Paths** to NO. When set to yes, uploading to Buzzsaw is easier. I've also set the Common *Model/ViewTemplate* files to the *Aec Model (imperial Ctb).dwt* file. The *Sheet Template* and *Layout* is now set here instead of on the Sheets tab of Project Navigator. Setting the *Match Sheet View Layers to View* to Yes keeps *View* and *Sheet* files synchronized.

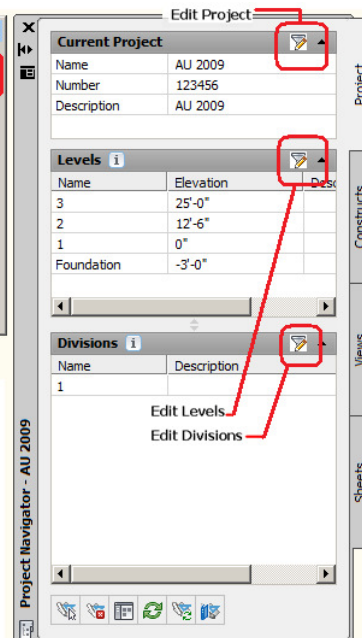


In the *General* section is the **Detailed Information** option.

In this dialog box you may add items that may be used in **fields** in things like titleblocks. Select the Close button in the lower right corner to bring up the **Project Navigator** palette. This palette has **four tabs** along the side: **Project; Constructs (and Elements); Views; and Sheets.**



Name	Floor Elevation	Floor to Floor Height	ID
Roof	25'-0"	3'-0"	3
Second Floor	12'-6"	12'-6"	2
Ground Floor	0"	12'-6"	1
Foundation	-3'-0"	3'-0"	0



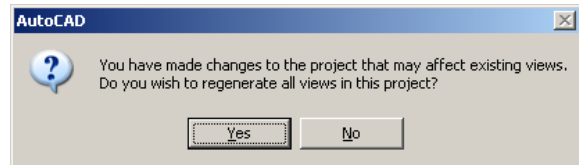
I'll start with the **Project** tab.

In the upper section is the **Edit Project** button (same as in the Project Browser dialog box). Below are two sections: **Levels and Divisions.**

Levels represent each floor or *vertical* separation in your building. **Divisions** represent *horizontal* separations in your building. Each of these represent that you will be drawing in different dwg files.

I'll create three additional levels, and rename the lowest level *Foundation*, the 1st level *Ground Floor*, the 2nd level *Second Floor*, and the 3rd level *Roof*. Notice when you right click on the *Level Name*, in the *right click options box* options for **Add Level Above** as well as **Add Level Below**. I'll keep the Floor to Floor Height at 10'-0" for the Second Floor, changing the Roof to 3'-0". Notice the Auto Adjust Elevation check box. This will adjust all project levels if a change is made to one of them. I need to change the Floor to Floor Heights to 12'-6" for the Ground and Second Levels. A warning box appears. I'll pick Yes.

The drawing files in your project will be associated with these levels. If you create a Section or Elevation of your building by Xrefing all the levels in your building into one **View** file, Project Navigator places them at the Level Height that they are associated with. Okay, enough Project Setup.



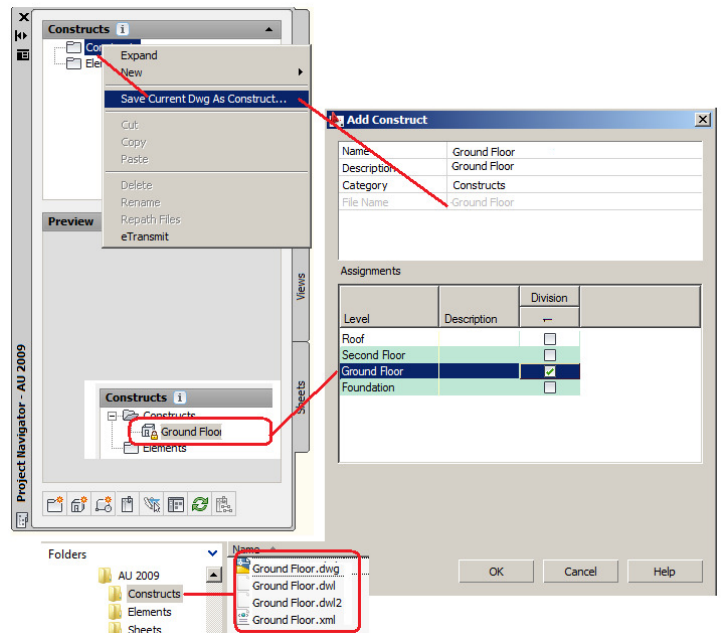
Let's get to the meat of the Drawing files.

Elements and Constructs

Project Navigator is designed so that **Element** files are externally referenced into **Construct** files. **Constructs** in turn are externally referenced into **View** files, which then are externally referenced into **Sheet** files. This seems to cause a great deal of confusion for new users of Project Navigator, so let's go through a brief description of these file types as we begin to use them. I'll begin by switching to the Constructs tab in Project Navigator.

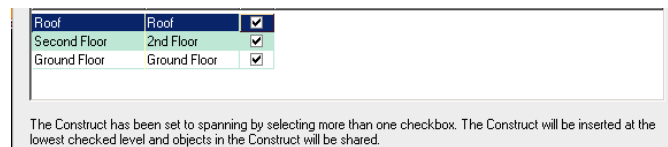


The Constructs tab actually displays the two folders **Elements** and **Constructs**. On the **Project** tab I just created three levels: one at an elevation of 0'; one at 12'-6"; and a third at 25'-0". A **Construct** DWG file is a *Level and Division* specific portion of your building that will be used in *multiple View* files. The building objects in these files exist in one and only one point in space. For example, walls for the second floor that exist there and nowhere else would go in a *Second Floor Construct* file, which in turn is associated with the Second Floor Level of your project. This file will later be externally referenced (xrefed) into several *View* files such as a Dimensioned Floor Plan; a Reflected Ceiling Plan; a Furniture Plan; etc. Objects that exist in a unique Level and Division in your Project but are **not** used in *multiple View* files will be placed directly in those View files, such as furniture.



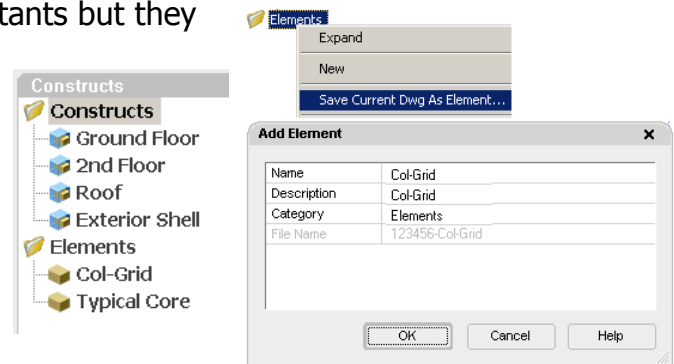
An **Element file** contains objects that will be used in more than one *Construct*, *View*, or *Sheet* file that do **not** exist in a unique spatial location. Examples of this might be a typical building column grid, a bathroom-elevator core, or a titleblock. Unlike Constructs that are associated with Levels when they are created, Elements are not associated with specific Levels in your Project. Let's create some Constructs and Elements from existing files.

Starting with the **2010-2-Ground Floor.dwg** file open, I'll right click on the word **Construct** and choose **Save Current Dwg As Construct...** from the pop up menu. This brings up the Add Construct dialog box. This is where you give the file a name and description. Notice the file name has the Project Number as a prefix, which I set to Yes in the Project Browser setup. I'll select the *Ground Floor* Level to associate with this file. I'll save and close this file. When you create a **View** file, you will specify which Level of the Project it is a View of. Project Navigator then automatically xrefs all the appropriate *Constructs* into the new *View* file.



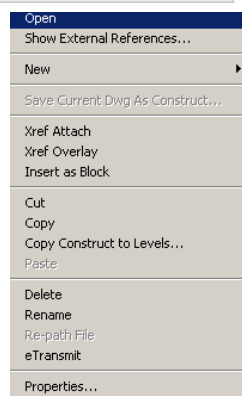
This process of creating a *Construct* from an existing drawing **copies** it from its current location to the *Constructs* project folder. It also creates two temporary files: a text log (dwl); an xml (dwl2) file for the *Whohas.arx* routine; and a permanent **XML** file. **Do Not delete** these XML files. They create the linkages among all your Project files. They are not needed when you send these files to consultants but they are critical to the functioning of Project Navigator!

I'll repeat this process for the *Exterior Shell*, *Foundation*, *2nd Floor Plan*, and *Roof*, closing each file when finished. For the *Exterior Shell* file, I'll check all three levels as it is a *Spanning Construct* (the exterior walls are continuous full building height). The *Constructs* section will look like the diagram to the right. Let's create some *Elements*.



For this Project, I've pre-created two *Element* files: a Column Grid; and a Typical Building Core. Using the same method for creating the *Element* files that I used for the *Constructs*, I open each file, right clicking on the word **Element** in the *Constructs* tab, and choosing **Save Current Dwg as Element...** Notice in the **Add Element** dialog box there are no Levels or Divisions with which to associate Element files. We now have four *Construct* and two *Element* files.

You may create new **Categories** under the *Constructs* or *Elements* sections. This in turn will create **new folders** on your hard drive. Keep in mind that once you've added files to Project Navigator, you should from here on out **always open** them through the **Project Navigator palette** and never from the Open command or Windows Explorer.



By opening them through Project Navigator, you insure that the proper data is written to the Project APJ file as well as the drawing XML files.

Opening the **Ground Floor Construct** from the Project Navigator Constructs tab, notice the **Drawing Task Bar** that has been blank up until now has some relevant information for you. On the left your current *Project* is listed, while in the middle the current **type** of file as well as its name is listed. By opening them through Project Navigator, you insure that the proper data is written to the Project APJ file as well as the drawing XML files.

Opening the **Ground Floor Construct** from the Project Navigator Constructs tab, notice the **Drawing Task Bar** that has been blank up until now has some relevant information for you. On the left your current *Project* is listed, while in the middle the current **type** of file as well as its name is listed.

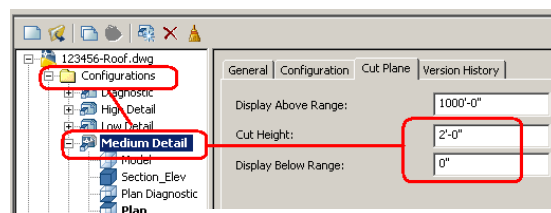


Now for the really fun part! Drag and Drop Xrefing! From the **Elements** section of the *Constructs* tab, I'll drag and drop onto my open drawing the **Col-Grid** and the **Typical Core** file, and finally from *Constructs* section, **Exterior Shell**. That's it! They are xrefed in. *Element* files from Project Navigator use the **Attach** method, while *Constructs* from Project Navigator use **Overlay**. The reason is that when you create a *View* file, you will tell **Project Navigator** which *Level* to find associated drawings from. Project Navigator then xrefs all these files into the new *View* file. By using *Overlay* in the *Construct* file, Project Navigator avoids creating nested xrefs of *Constructs*. I'll save and close this file repeating the same process for the 2nd floor plan, **freezing the revolving door layer**. I'll close this

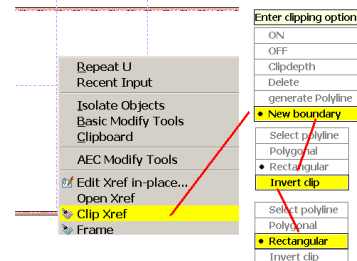
Reference Name	Status	Size	Type
123456-Ground Floor	Opened	211 KB	Current
123456-Col-Grid	Loaded	115 KB	Attach
123456-Exterior Shell	Loaded	367 KB	Overlay
123456-Typical Core	Loaded	311 KB	Attach

file and open the *Roof.dwg* file

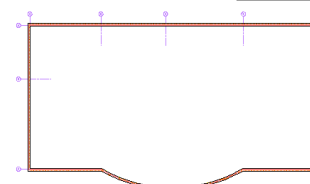
I'll drag and drop the column grid and Exterior Shell onto the Roof drawing freezing the **123456-Col-Grid | S-Cols**, and the **123456-Exterior Shell | A-Door** layers. Walls in the *Roof* file are not displaying correctly. In *Display Manager*, picking the **Cut Plane** tab, I'll set the *Cut Height* to **2'-0"**, and the *Display below Range* to **0"**.



For some extra fun, I'll **XCLIP** *Col-Grid* xref using the *Invert Clip* option, The Roof plan will now look correct.



I'll save and close the files.



Okay, let's review Reid's Rules for Project Navigator so far.

1. If drawing entities exist in a specific point in space **AND** will be used in more than one View file, create them as Constructs (the walls, doors and windows will be used in the Dimensioned Floor Plan, Furniture Plan, Finish Plan, Reflected Ceiling Plan, etc. View files so they are Constructs).
2. If drawing entities will be used in more than one View or Sheet file but **DO NOT** exist in a specific point in space, create them as Elements (buildings cores, column grids, and title blocks are excellent candidates for Element files).

There are many more objects we could add to these Construct files such as *AEC Polygons* or *Space* objects for attaching Room *Property Sets* to, but we'll save that for another time. At this point, most offices will go right to the **Sheet** or Plot files. They will xref in the Constructs (Model) files, and start adding the annotation (text, dimensions, and other symbology) to these (Sheet) files.

Let's think about this for a minute. Here you are in the early stages of your Construction Document (or Design Development) phase of your project. You know you want to plot the plans at $\frac{1}{4}''=1'-0''$ scale. You know you want $\frac{1}{2}''$ scale plans of the stair and core area. You know you want $\frac{1}{4}''$ scale Elevations and Sections of the building. You may even know which rooms you want $\frac{1}{2}''$ scale Interior Elevations of.

So, at this point, you know **what you want to plot**. The problem is you don't yet know **where you want to plot them**. Here are three more of Reid's Rules for Project Navigator

1. **What** you want to plot goes into **View** files.
2. If what you want to plot exists in a specific point in space, such as the 2nd floor furniture, but **IS NOT USED** in more than one file, put it in a View file.
3. **Where** you plot from is your **Sheet** file.

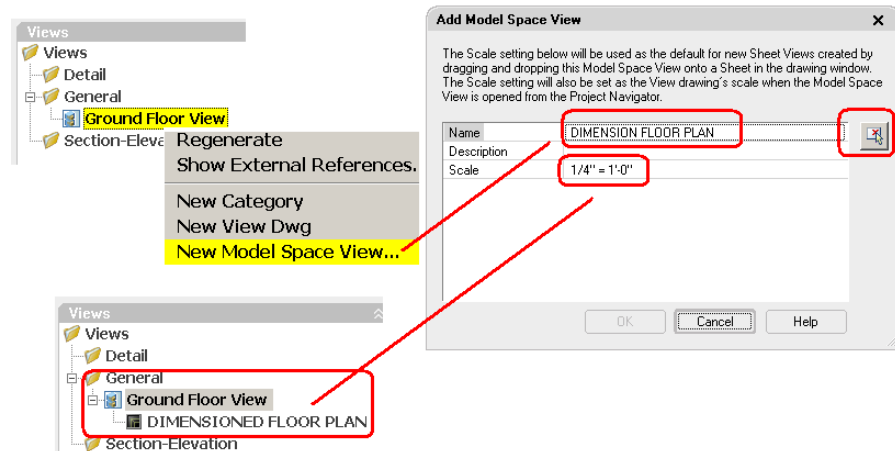
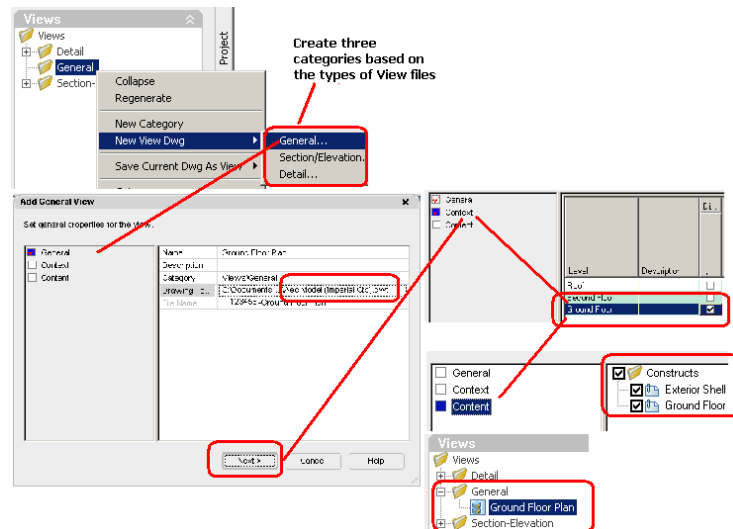
So far, here's the sequence: Elements are xrefed dragged and dropped into Constructs. The next step is to create a View file that will find **all level specific Constructs**.

On the **Views tab** I'll right click on the word **Views**. Going down to the **New View Dwg** option, you will notice three different types of **View** files: **General**, which I use for plan type drawings; **Section/Elevation**, which I use for both exterior and interior types of these drawings; and **Detail**, which I use for enlarged plan or section detail drawings, say at $1\frac{1}{2}''=1'-0''$ plot scale or larger.

At this point, I go up to the **New Category** menu option and create three categories that mimic the names of these View file types. I could go further and add additional categories under each of these. For example, under General you could have Dimensioned Plans, Furniture Plans, and Reflected Ceiling Plans. Each Category in turn creates another folder on your hard drive. Let's create a **Ground Floor View** file.

Right clicking on the General category and choosing **New View Dwg->General...** from the pop-up menu causes the **Add General View** dialog box to appear. I'll call the file *Ground Floor View*. Note how the project number is prefixed to this. The Context portion of the dialog box is where you link this file to a specific level(s). This in turn allows Project Navigator to locate all required *Dwg* files that are also linked to this Level. Picking the *Ground Floor* check box and *Next* I get to the *Content* portion of the box. We only have two Constructs in this project associated with the Ground Floor Level. In reality, you will have more than this. You may choose to uncheck certain Constructs. For example, if you have a *Reflected Ceiling Plan Construct* for the Ground Floor, but are creating a *Dimensioned Floor Plan*, you will want to uncheck it. I'll pick *Finish* at the bottom of the box. The View drawing is created but **not** opened, so I'll double left click on it, changing the Annotative Scale to $\frac{1}{4}''=1'-0''$, then right clicking on the *Ground Floor View* file name and picking **New Model Space View...** In the Add Model Space View dialog box, I'll call it *DIMENSIONED FLOOR PLAN*.

What did I just do? Well, I just decided **What to Plot**. I have created a *Named Modelspace View* with layer settings, scale, and a boundary area. This in effect has defined **what** I want to see in a *Layout tab* in a *Sheet* file. The boundary created will become the Paperspace Viewport (which may be adjusted later).



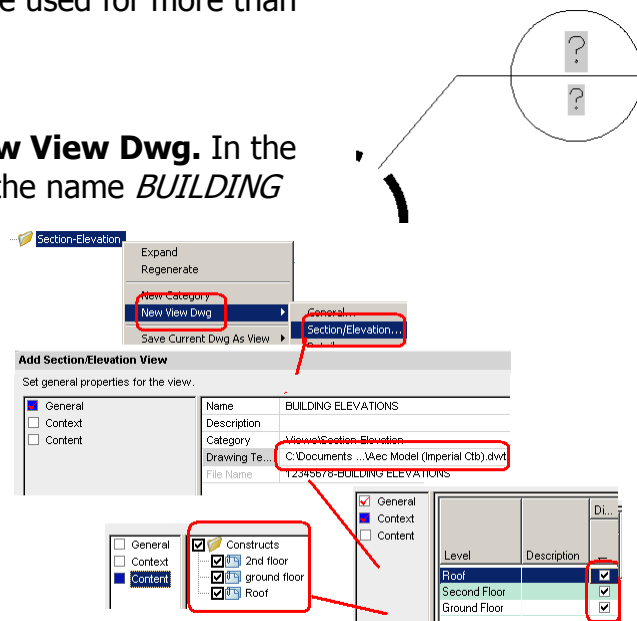
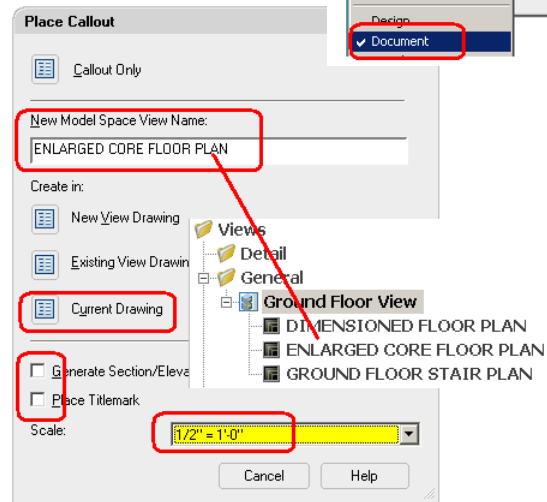
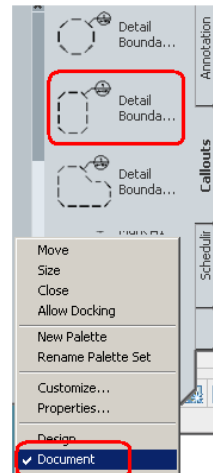
I'll add a few enlarged Plan Details to this file. On the **Callouts** tab of the **Tool Palette**, I'll use the second tool down, picking two corner points to define the boundary around the *Typical Core Area*, picking two more points to define the leader to the tag. In the **Place Callout** dialog box appears, I'll use *ENLARGED CORE FLOOR PLAN* for the View name, **uncheck** *Generate Section/Elevation* and *Place Titlemark*, and set the scale to 1/2"=1'-0". The View may be created in one of three different files. I'll create it in this file, picking the button to the left of *Current Drawing*. After the *Place Callout* dialog box closes, I'll pick two points to define my your future *Sheet File Layout tab Viewport* around the core area. This is another **What you Want to Plot** view. I'll repeat this process to create an enlarged plan view of the stair calling it *GROUND FLOOR STAIR PLAN*.

I now have three *Named Model Space Views* in this file. How do I know where these views are? Here's an ACA-20100 Secret revealed! Type in **showmodelspaceviews** (or **aecshowmodelspaceviews**). A temporary box and view Title appears around each Named View. (This command is a good candidate for a shortcut macro. I use SMV). As soon as you do anything involving your view, the names and borders disappear.

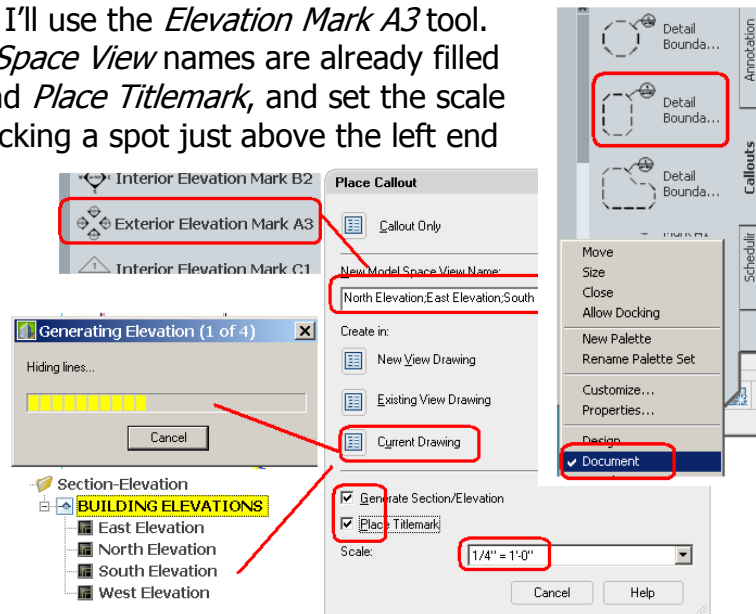
Look at the Callout bubbles. They have question marks for the *View* and *Sheet* number. This will be resolved when these Views are dropped onto *Sheet* files. We now have a basic understanding of *General View* files. They may be used for more than plan layouts, but that's how I use them.

Let's create an *Elevations* and *Section View* file next.

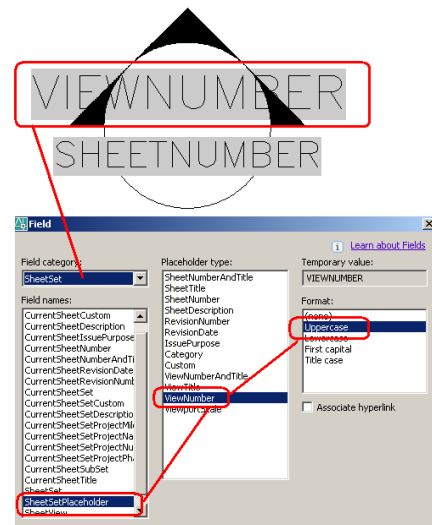
Using the **Section-Elevation** category I'll choose **New View Dwg.** In the **Add Section/Elevation View** dialog box, I'll give it the name *BUILDING ELEVATIONS*. In the Context section, I'll check all three levels, then pick Next. Finally, in the Content section, I'll accept all checked files, check the **Open in drawing editor** option in the lower left corner and pick Finish.



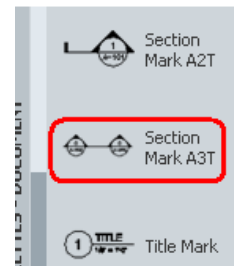
I'll generate the **Building Elevations**. With my Annotative Scale set to $\frac{1}{4}''=1'-0''$, freezing the **123456-Col-Grid | S-Cols** layers, I'll use the *Elevation Mark A3* tool. In the **Place Callout** dialog box, notice *Model Space View* names are already filled in. I'll check both *Generate Section/Elevation* and *Place Titlemark*, and set the scale to $\frac{1}{4}''=1'-0''$. I'll use *Current Drawing* button, picking a spot just above the left end of the plan for the first elevation, then a point to the right to specify the *space between elevations* (not including the actual elevation). All four elevations are created and labeled. Again notice that the elevation symbols have question marks. I won't be using these but will add them instead as *Callouts Only* to the *Ground Floor Plan View* file. Note that this View file has four *Named Model Space Views*, or again **What you want to plot**. This drawing is where you'd add notes, dimensions, etc. Everything besides what is in the *Constructs* and *Elements* that you want to plot goes in the **View** file, sometimes including the **Title** for the Sheet file *Layout viewport*.



In the **Ground Floor View** file, setting *Annotation Scale* to $\frac{1}{4}''=1'-0''$, I'll the four Elevation Mark A2 symbols as *Callout Only*. Again note that the values in these symbols are **Fields**. By double clicking on the word *VIEWNUMBER*, then right clicking on it in the Enhanced Attribute Editor dialog box in the Value area at the bottom and picking Edit Field... brings up the **Field** dialog box. This field is linked to the *SheetSet* category, *SheetSetPlaceholder* field name, *ViewNumber* placeholder type, and *Uppercase* format (so no matter how you type in a letter it will convert to upper case). We will soon discover how this all works when I create **Sheet** files.



Still in this Ground Floor Plan View file, I'll add some *Section* lines as **Callouts Only** using the **Section Mark A3T** tool, then reopen the *Building Elevations View* file and create the actual sections.

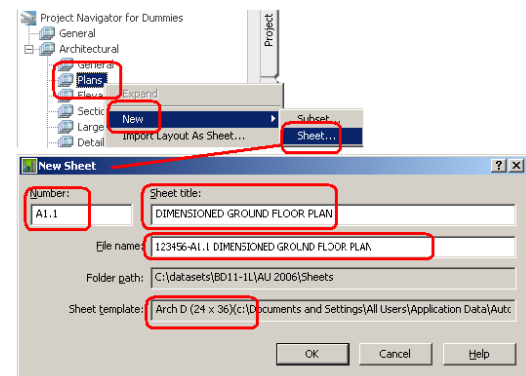


I'll rename the **BUILDING ELEVATIONS** View file, adding "+ SECTIONS" then open it. I'll repeat the process for creating the Section Views, only this time dragging the rectangular boundary just far enough to get the next wall behind my section cut line. In the *Place Callout* dialog box I'll set the scale to 1/4"=1'-0", check both *Generate Section/Elevation* and *Place Titlemark*, and select the button to the left of *Current Drawing*. For the left to right section *Named Model Space View*, I'll call it **LOGINTUDINAL SECTION** and **CROSS SECTION** for the top to bottom one, placing them well under the Elevations.



Time to move on to *Sheet* files.

Now that we have **WHAT** we want to plot, we have to create the **Sheet** files, which are the **WHERE** we want to plot files. These files will usually contain nothing more than Layout tab Viewports created from *View file Named Model Space Views*, and the project title block.

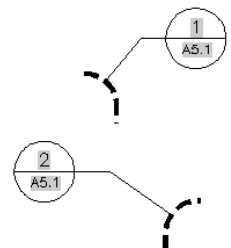


On the **Sheets** tab of Project Navigator I'll create a new file in the *Architectural->Plans* section, calling it **A1.1, DIMENSIONED GROUND FLOOR PLAN**. Notice how the Project Number is being prefixed to the sheet name and the Sheet Template is the Arch 24x26 specified in the Project properties. Notice in this sheet file the *Title Block* that portions such as the *Sheet Title* and *Sheet Mtext* have already been filled in with the correct information. This is because they have *Fields* that pull this information from the *Sheet Set* file.

Back on the *Views* tab in Project Navigator, under *General->Ground Floor Plan*, I'll **drag and drop** the **DIMENSIONED FLOOR PLAN Named View** in this sheet file. This creates the same scaled view from the *View* file in your *Sheet* file. All necessary external reference files have been attached, and the Viewport has been sized and scaled to match the 1/4"=1'-0" scale used to create the original *Named Model Space View*. The Viewport will be created on the layer for the Layer Key **VIEWPORT** in your current *Layer Key Style*, in this case **G-Anno-Nplt**. I usually change this to the *Defpoints* layer in my *Layer Key Style*.

Layer Key	Description	Layer Settings
VEHICLES	Vehicles	C Site Wheel
VIEWPORT	Sheet View ...	G-Anno-Nplt
WALL	Walls	A-wall

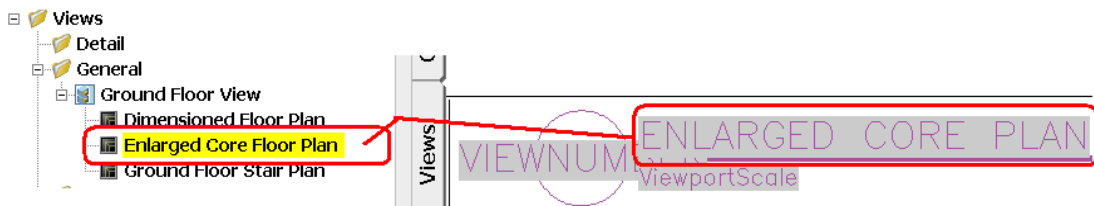
I'll create a *Large Scale Views* called **A5.1, ENLARGED PLANS**. Opening this file, from the *Views* tab, from the *Ground Floor View* file I'll drag and drop the **Enlarged Core Floor Plan Named Model Space View** onto the layout and position it to the right, repeating the process for the **Ground Floor Stair Plan View**. After saving the file, notice the **Enlarged Plan Tags** in **A1.1 DIMENSIONED GROUND FLOOR PLAN** now have the correct *Detail* and *Sheet* number information.



Next, from the *Callouts tool palette*, I'll place a *Title Mark* with the View Number bubble for each viewport. Picking this tool and moving the cursor into the layout, notice how the viewport highlights. Picking a spot in the lower left of the **Enlarged Core Floor Plan** viewport (within the viewport boundary), notice at this point the View Title will already be filled in with **ENLARGED CORE FLOOR PLAN**. The rest of the fields are still not linked.

The next step in linking this tag to the project is to select it, then pick a *non-grip point* on it and drag and

drop it on to the *ModelSpace View name* under the View file it originates from. What happens is that all of the fields correctly link to show View number, Viewport Scale, and Sheet Number, if you use that tag.



WOW! We made it (I hope!).

So, hopefully Project Navigator is not so scary now (or maybe it's even scarier). Here are the basic steps once again:

1. Set up the Project in **Project Browser**
2. In the **Project** tab, create your **Levels** and **Divisions**
3. Create your **Construct** and **Element** files in the **Constructs** tab. Remember, you drag and drop Elements and/or Constructs into Construct files. Element files are also dropped into Sheet files.
4. Create **View** files by specifying the associated **Level** and **Division**. In many cases, you may not specify any level, such as Detail files.
5. Add **ALL** of your **Annotation** to the **View** files. View files are where you create **What you want to Plot**. Create **Named Model Space Views** to the appropriate scale in these files.
6. In the **Sheets** tab, create your **Sheet** files. Sheet files are **Where you Plot** your *Named Model Space Views* from the *View* files. Simply drag and drop *Named Views* onto *Layout* tabs. Add *Title Marks*, dragging and dropping them back onto the ModelSpace Views created under the View file names in Project Navigator.