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What is BIM ?

Building Information Modelling

BIM is an acronym for **Building Information Modelling**. The term was popularized by Jerry Laiserin as a common name for a *digital representation of the building process to facilitate exchange and interoperability of information in digital format*. According to him and others, the first implementation of BIM was under the Virtual Building concept by Graphisoft in 1987 with **ArchiCAD 3.1**

Early on the term BIM was used to distinguish the information rich architectural 3D modelling from the traditional 2D drawing. Over the last 25 years other software vendors have created BIM style solutions and to differing degrees, they all make a reliable digital representation of the building available for design decision making, high-quality construction document production, construction planning, performance predictions, and cost estimates.

Having the ability to keep information up-to-date and accessible in an integrated digital environment gives architects, engineers, builders, and owners a clear overall vision of all their projects, as well as the ability to make informed decisions faster.

The use of the term BIM has become widespread and has started to evolve. BIM still refers to Building Information Modelling, but now also includes the coordination of these highly descriptive Models within the AEC industry (Architecture, Engineering and Construction). More than ever we now see Architectural models being used as the basis for the Structural Analysis models or as the skeleton with which the MEP designers fit their Mechanical, Electrical and Plumbing components. Equally the Structural Model or the MEP model can be brought into the Architectural model and the resultant model can be checked for clashes. Furthermore these models can be used for cost analysis, environmental impact and many others.

Customers using BIM will save time and money, see fewer design errors, experience improved productivity, and have access to new business opportunities. BIM is not a technology, but it does require suitable technology to be implemented effectively.

Graphisoft has made the coordination process achievable with integrated solutions for MEP and Energy Analysis and has the ability to export of the model in IFC format which is becoming the industry standard for sharing the models data.

ArchiCAD Tutorials

GRAPHISOFT have created a simple & easy to follow Training Series that help users learn by doing; with files, documents & videos. These training modules are intended to expand your ArchiCAD knowledge in broad range of topics.

The ArchiCAD Tutorials are available to download from http://www.graphisoft.com/learning/training_materials/ and are available for both Windows and Macintosh platforms.

ArchiCAD Training Series

These Graphisoft approved training resources are made for ArchiCAD users, prospects and students with different level of knowledge and interest. These materials are compatible with ArchiCAD versions 16 and 17. The following chapters are available:

- Vol. 1 - The ArchiCAD BIM Concept
- Vol. 2 - Basic ArchiCAD
- Vol. 3 - Intermediate ArchiCAD
- Vol. 4 - Advanced ArchiCAD
- Vol. 5 - Using Teamwork

Each volume includes a step-by-step PDF manual; narrated video clips on the Graphisoft YouTube Channel and ArchiCAD project files for hands-on practice.

[Read more](#)



Once you have the ArchiCAD files, you simply open ArchiCAD's YouTube channel from within the **ArchiCAD > Help** menu, watch the related movie clip and follow the instructions, whilst you have the relevant download file open. The clips can of course be paused, rewind and replayed.

These include Mies Van Der Rohes Farnsworth House to bespoke houses and large apartment complexes to accommodate for all skill levels.

There are also a series of Interactive Training Guides available:

- **Experience BIM** - Using the Frank Lloyd Wright designed Massaro House, this provides a conceptual overview of Building Information Modelling
- **ArchiCAD Essentials** - Designing and documenting an office building from scratch, this provides in-depth insight into the functions and working methods of a BIM application
- **ArchiCAD Collaboration Part 1 (ArchiCAD Teamwork)** – a step-by-step introduction to ArchiCAD's Teamwork concept.
- **ArchiCAD Collaboration Part 2 (Collaboration Techniques)** - an overview of collaboration techniques between ArchiCAD and various other programs.
- **Advanced Modelling** – an introductory guide to advanced modelling techniques for creating complex forms and structures.

“The core of this material is the Experience BIM module which won the 2008 International Stevie Award for Best Training Technology and was a finalist in the 2008 Codie Award for Best Workforce Training Solution”, said Akos Pfemeter, Director of Marketing. “There is no other BIM learning resource in our industry that has been so highly commended.”

ArchiCAD Help

The built-in Help within ArchiCAD is much more than just linking to a printed HTML document. Whenever you hit an ArchiCAD help icon you are taken to the online interactive Help (provided you have an internet connection), where you can see the text document, as well as movie clips and any related web content.

Help Center
GRAPHISOFT

The ArchiCAD Knowledge Base

Help Center is GRAPHISOFT's ArchiCAD-integrated knowledge base. It aggregates the wealth of ArchiCAD knowledge available on the internet in a single, easy-to-search website.



Learn
from guides



Watch
tutorials



Browse
tips & tricks



Find
solution for issues

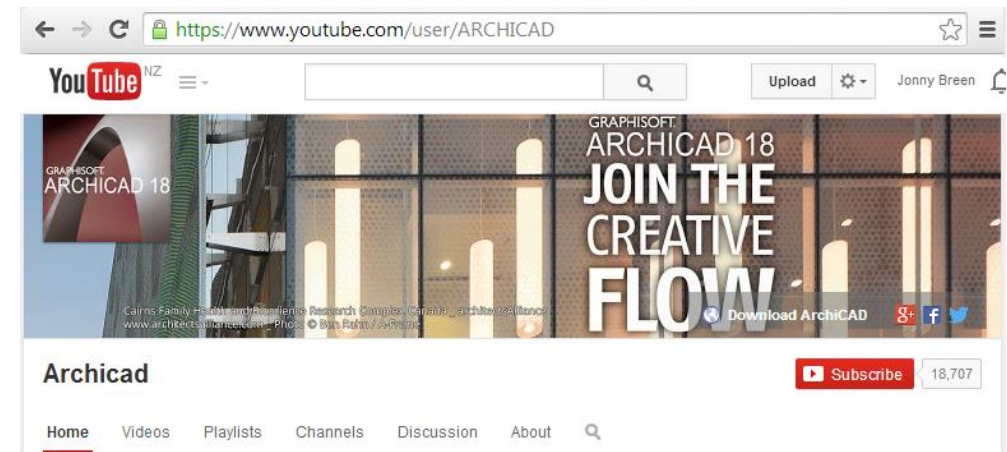


Read
technical notes

ArchiCAD YouTube Channel

GRAPHISOFT's ArchiCAD YouTube Channel is not just for your ArchiCAD Tutorial movie clips. There are hundreds of short clips on all aspect of ArchiCAD from New Features to specific modelling scenarios.

You can access it direct from ArchiCAD from the **Help > ArchiCAD YouTube Channel** menu or simply use you Internet Browser <http://www.youtube.com/user/ArchiCAD>



About this Book

This book contains all the exercises used in the 3 Day Introduction to ArchiCAD.

The exercises take you through ArchiCAD and introduce you to the concept of Virtual Building (aka Building Information Modelling.)

The exercises in the book switch between simple exercises and a project to produce some drawings for a single story bach.

ArchiCAD Files exist for each step so that you can practice any module you choose.

If you work through the book from start-to-finish you should be able to work with a single file throughout the bach building exercise.

Formatting Conventions

This book makes use of the following formatting conventions:

ArchiCAD Menus

ArchiCAD Menu commands are referenced using the full path separated with '>'

For example: **Edit > Select All** refers to the **Select All** command found under the **Edit** menu.

Menu Commands that open a dialog box end with an '...'

For Example: **File > Save As...** refers to the **Save As** Dialog in the **File** Menu.

ArchiCAD Elements

All ArchiCAD elements are referred to using capital letters.

For example: Wall, Door, Slab etc

ArchiCAD Files

All Files are provided on the Desktop of your Training Computer and can be copied to a personal USB to be used by yourself in future.

Important Notes:

This book has been written based on the **Training 19** Template File and assumes the Work Environment is set to the **Cadimage Profile 19**.

Using a different profile will mean that commands are not necessarily located in the same place / menu.

BIM Notes:

Where relevant, we will add a short note on how this relates to the bigger picture of Building Information Modelling (BIM).

Module 1 – Introduction

This module introduces you to ArchiCAD. It takes you through the basic ArchiCAD Set Up along with some important concepts including:

Interface
Navigating
Tools
Settings
Favorites

The ArchiCAD Interface

File: Finished Bach.PLN

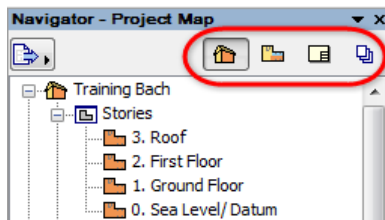
Familiarise yourself with the following Interface Elements:

- Menu
- Toolbar
- Toolbox
- Info Box
- Navigator
- Quick Options

Navigating

The Navigator allows you to access all parts of the Virtual Building. The Navigator has four modes:

- Project Map
- View Map
- Layout Book
- Publisher



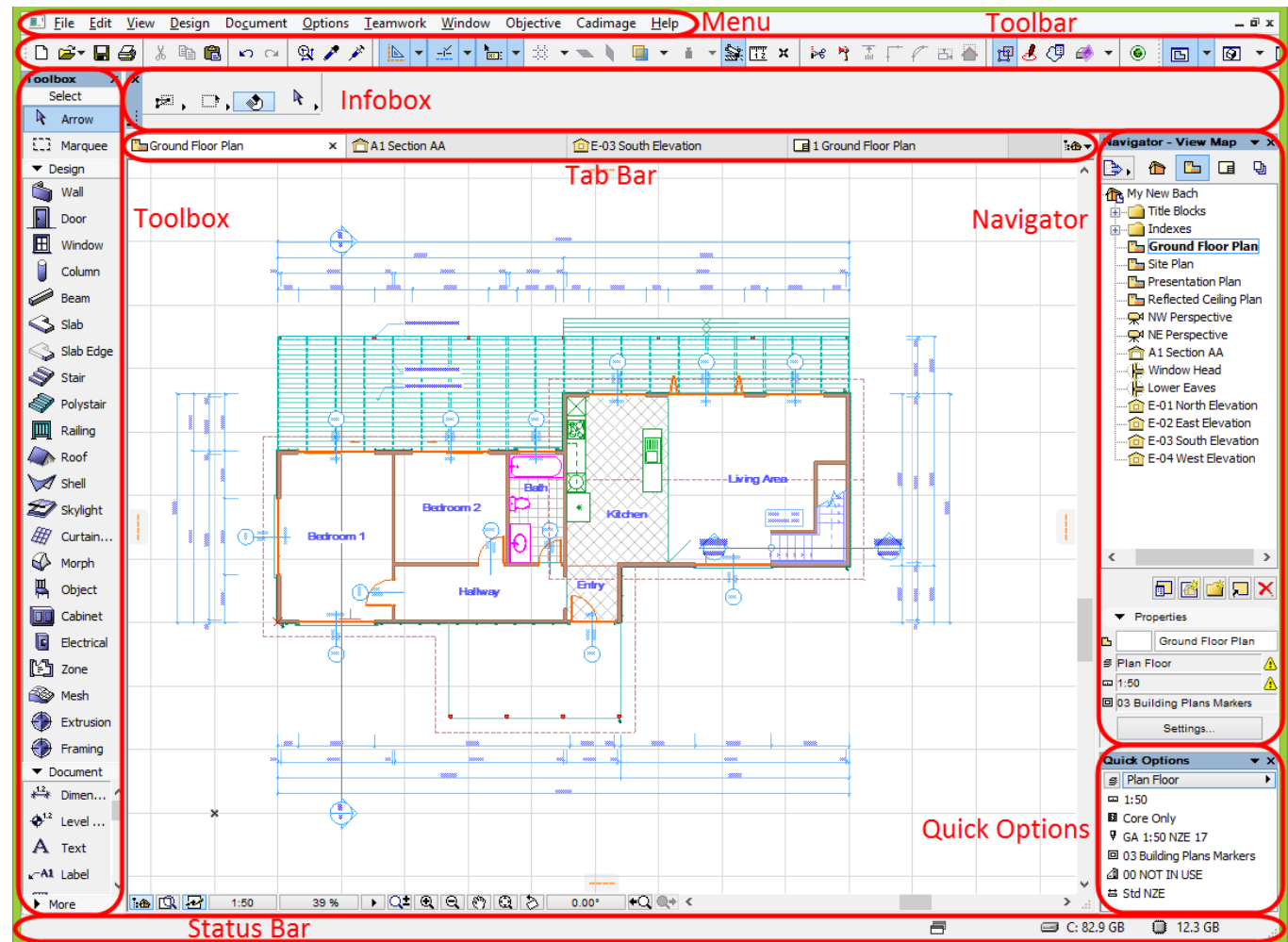
File types

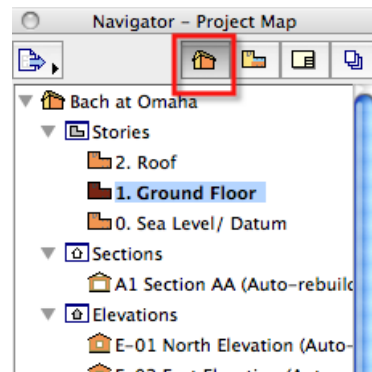
▪ .pln is the ArchiCAD file this contains all of the project information, model & drawing.

- .bpn is the backup ArchiCAD file (with the red arrow)

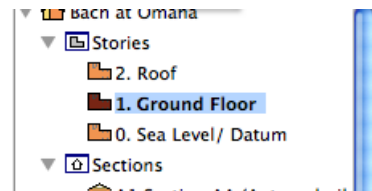
Explore the Virtual Building with the **Navigator**

- Select the **Project Map**

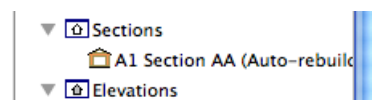




- Double Click the **Stories**



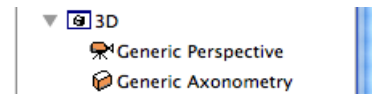
- Double Click the **Sections**



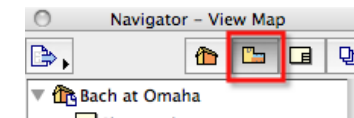
- Double Click the 4 **Elevations**



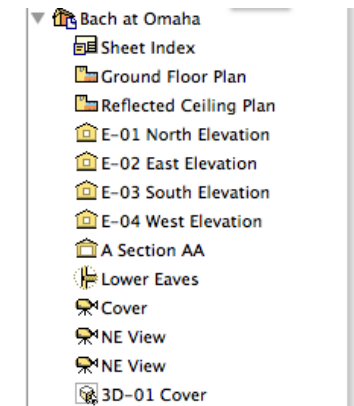
- Double Click the **3D Generic viewpoints**



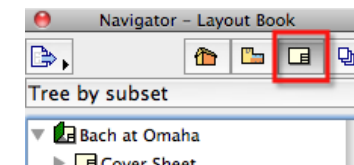
- Switch to the **View Map**



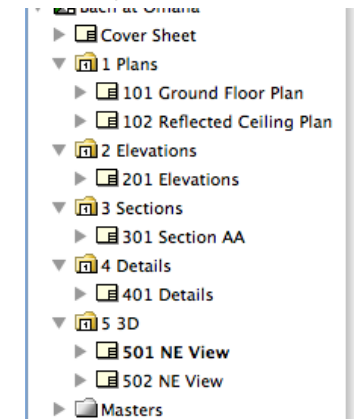
- Click through the different **Views**



- Switch to the **Layout Book**



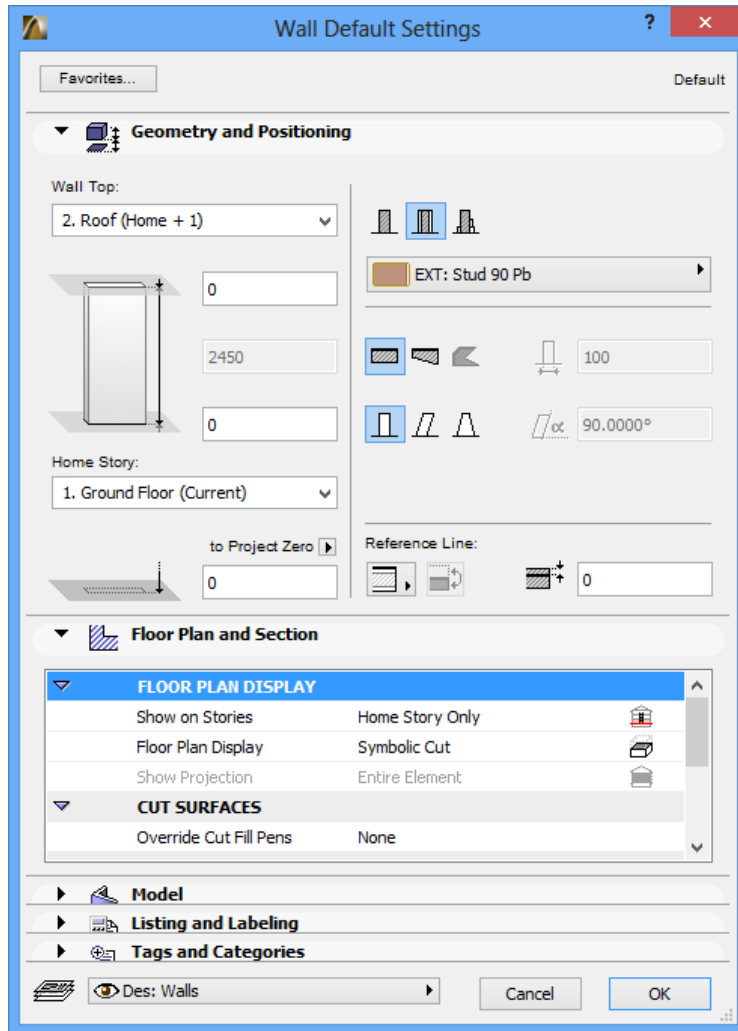
- Click through the different **Layouts**



ArchiCAD Tools, Settings & Favorites

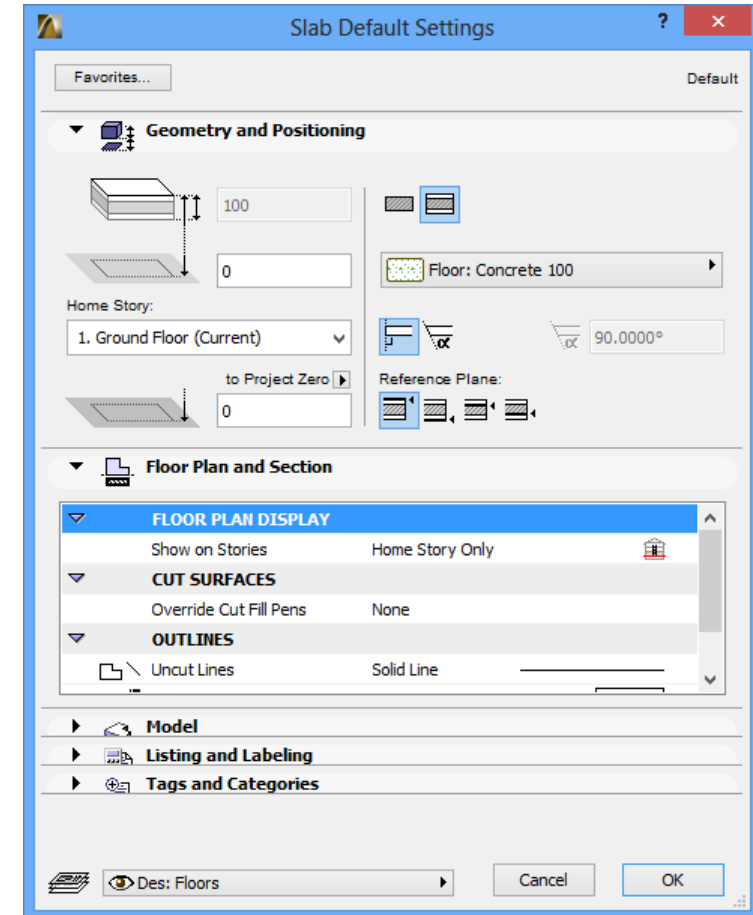
All Tools are controlled via a **Settings** Dialog

- Open the **Wall Settings** by double-clicking on the **Wall** Tool in the Tool Box
- Explore the Settings



- Click **OK**

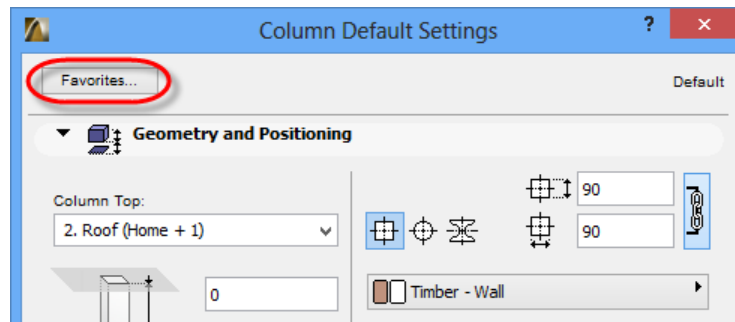
- Open the **Slab Settings** by double-clicking on the **Slab** Tool
- Explore the Settings



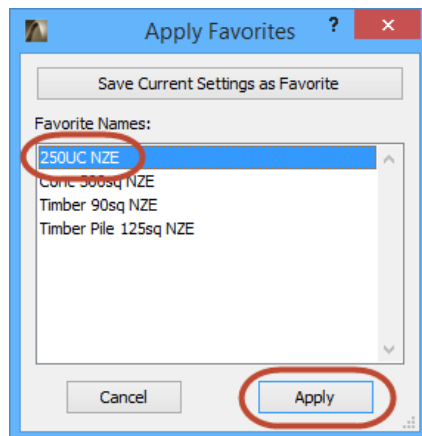
- Click **OK**

As you will see there is a large array of settings to set. Once you have configured an element (eg a Wall) and you want to remember the settings you can use Favorites

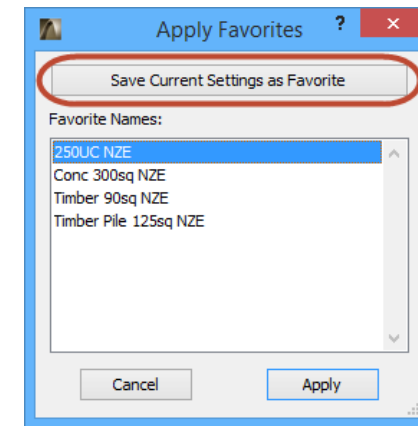
- Open the Column Default Settings (you can use **Ctrl+T** or **⌘+T** if you have the Column Tool selected)
- Click the **Favorites** button



- Select the **250UC NZE** Favorite
- Hit **Apply**. Notice the Column Settings change



- Re-open **Favorites**
- Notice this is where you **save** a Favorite as well

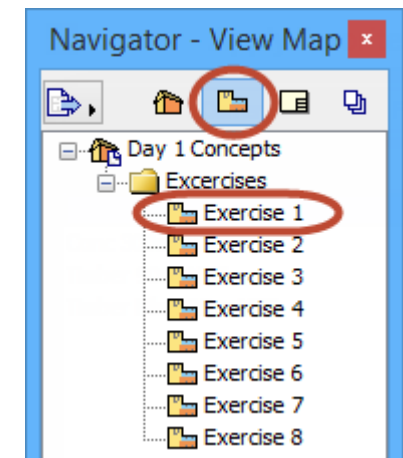


Important Concepts

In these Exercises we will look at the basic concepts of placing and manipulating objects within the BIM.

- Open the **Day 1 Concepts.PLN** file.
- File > Open > Open** then Browse for the folder on your **Desktop** called **AC19 BIM Intro**; select '**Day 1 Concepts**' file.
- In the **Navigator** set to show the **View Map**, double click on **Exercise 1**.
- Your tutor will take you through each of the exercises/stories within this view.
- If you find them too easy and have finished quickly go to the next view and complete the exercises.







- Continue down the saved views until you get to **Exercise 8**.



Exercise 1

This exercise shows you the various methods of placing a Wall and the use of **Guidelines** and the **Tracker**. It is also relevant to placing any object that has a length.

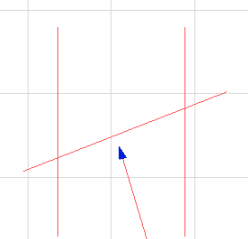
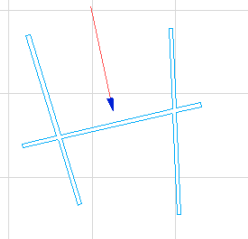
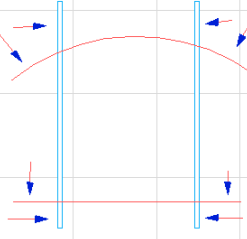
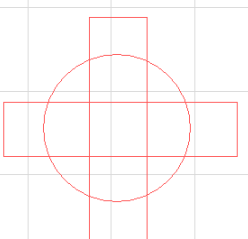
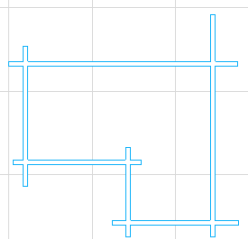
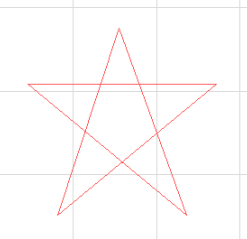
Draw a wall from hotspot 6000mm horizontally	6000mm horizontally	5000mm vertical
		
6780mm at 45degrees	2000mm and 64° from horizontal	Starting at the hotspot and ending @: X -4000 Y 3000
		

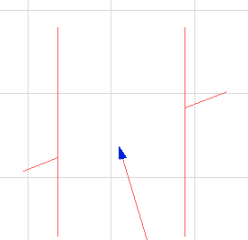
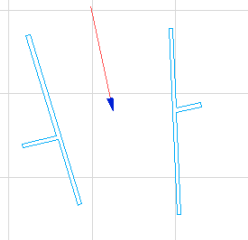
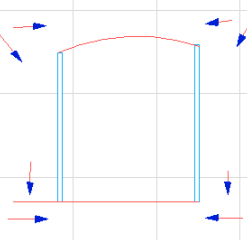
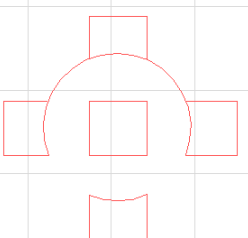
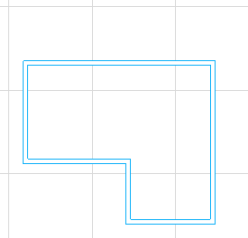
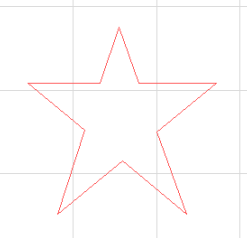
Draw a wall from hotspot 6000mm horizontally	6000mm horizontally	5000mm vertical
		
6780mm at 45degrees	2000mm and 64° from horizontal	Starting at the hotspot and ending @: X -4000 Y 3000
		

Exercise 2

This exercise shows you how to TRIM using **Ctrl** (PC) or **Command** (Mac) and the Scissors icon



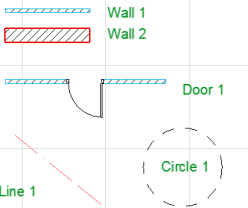

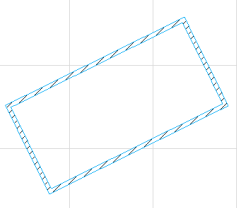

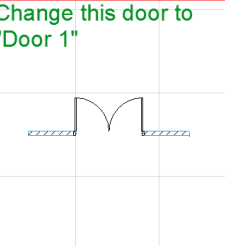
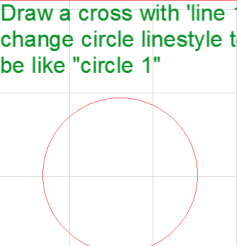
		
		

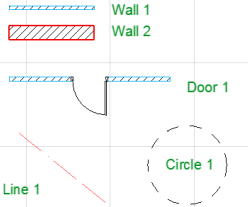

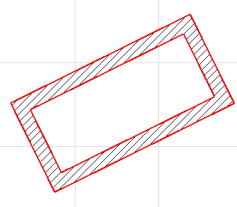

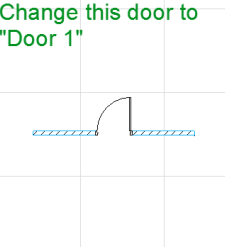
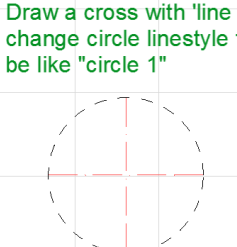
Exercise 3

This exercise shows you how to PICK UP parameters using **Alt** (PC) or **Alt/Option** (Mac) and TRANSFER parameters using **Alt+Ctrl** (PC) or **Alt/Option+Command** (Mac)

PICK UP 

TRANSFER 

<p>Palette of bits...</p> 	<p>Draw a wall like "Wall1" 4000mm horizontally.</p> 	<p>Make walls like "Wall 2"</p> 
<p>Place a "Door 1" in wall</p> 	<p>Change this door to "Door 1"</p> 	<p>Draw a cross with 'line 1' change circle linestyle to be like "circle 1"</p> 

<p>Palette of bits...</p> 	<p>Draw a wall like "Wall1" 4000mm horizontally.</p> 	<p>Make walls like "Wall 2"</p> 
<p>Place a "Door 1" in wall</p> 	<p>Change this door to "Door 1"</p> 	<p>Draw a cross with 'line 1' change circle linestyle to be like "circle 1"</p> 

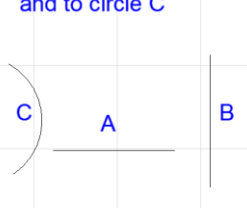
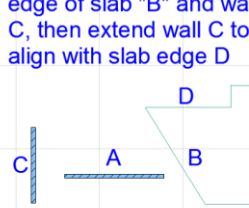
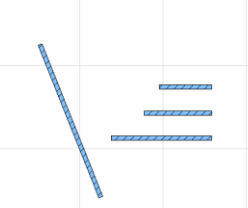
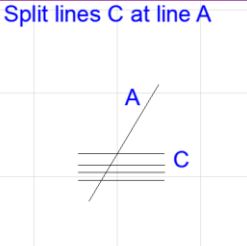
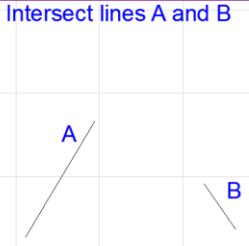
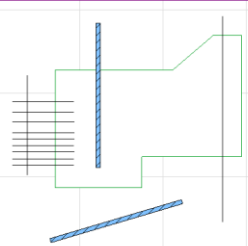
Exercise 4

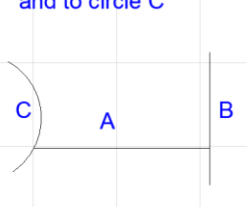
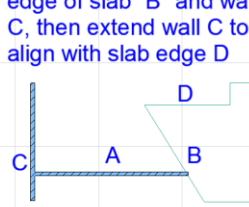
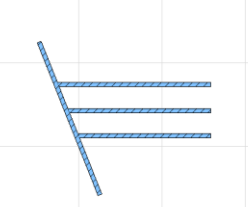
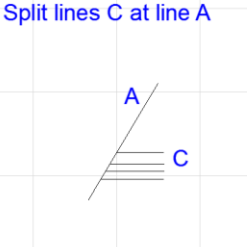
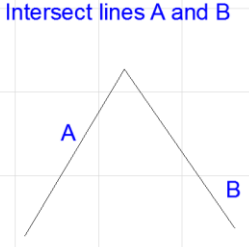
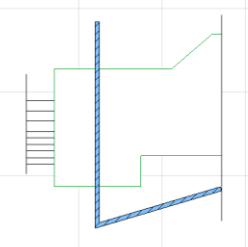
This exercise shows you how to Extend and SPLIT using **Ctrl** (PC) or **Command** (Mac). Alternatively we can use the dedicated **Split**, **Adjust** and **Intersect** Tools.

SPLIT 

ADJUST 

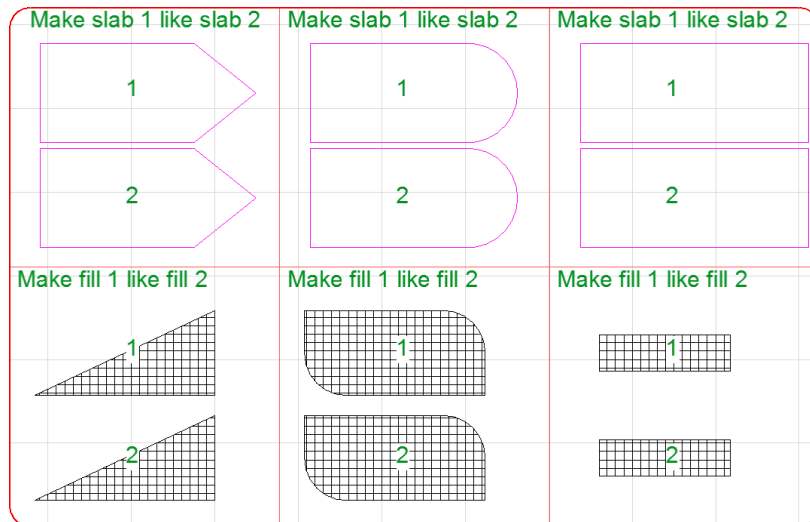
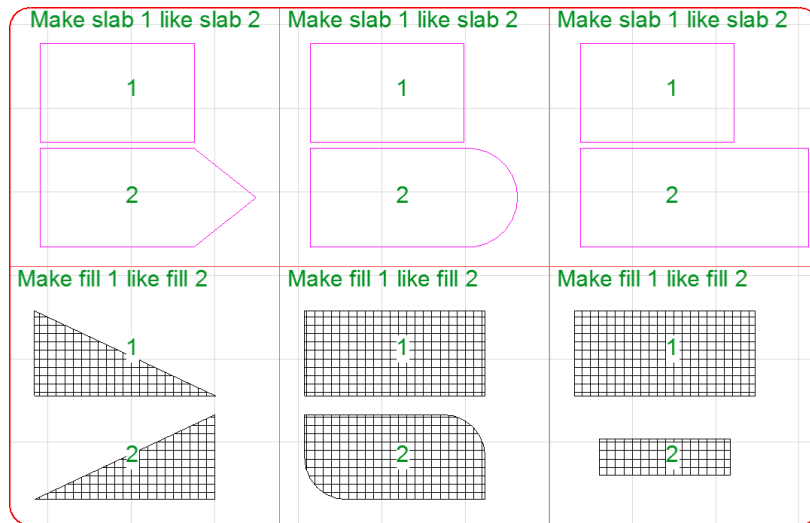
INTERSECT 

<p>Extend line A to line B and to circle C</p> 	<p>Extend wall A to meet edge of slab "B" and wall C, then extend wall C to align with slab edge D</p> 	<p>Extend walls to meet</p> 
<p>Split lines C at line A</p> 	<p>Intersect lines A and B</p> 	<p>Intersect walls</p> 

<p>Extend line A to line B and to circle C</p> 	<p>Extend wall A to meet edge of slab "B" and wall C, then extend wall C to align with slab edge D</p> 	<p>Extend walls to meet</p> 
<p>Split lines C at line A</p> 	<p>Intersect lines A and B</p> 	<p>Intersect walls</p> 

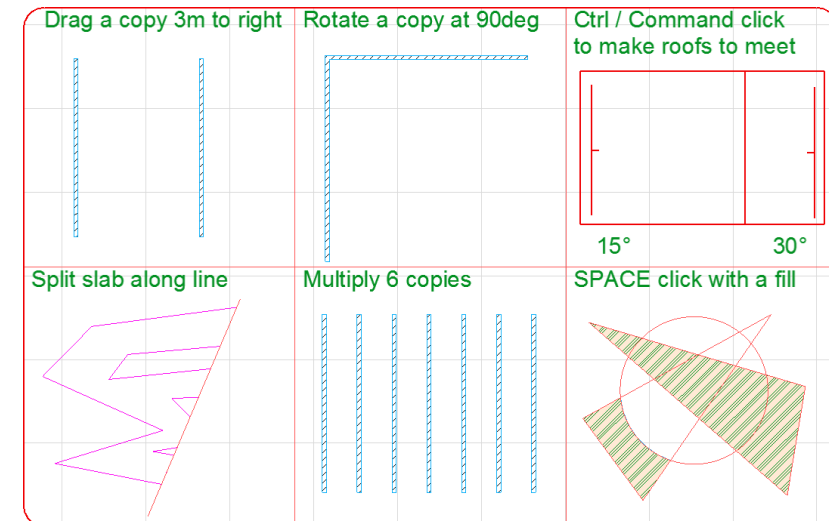
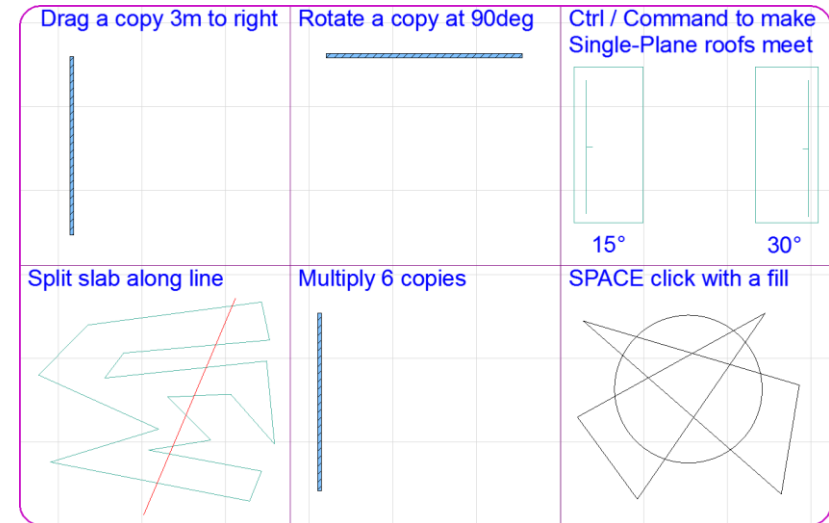
Exercise 5

This exercise shows you the differences between **Nodes** and **Edges** on Polygons shapes (Slabs, Fills, Roofs, Zones, Meshes etc)



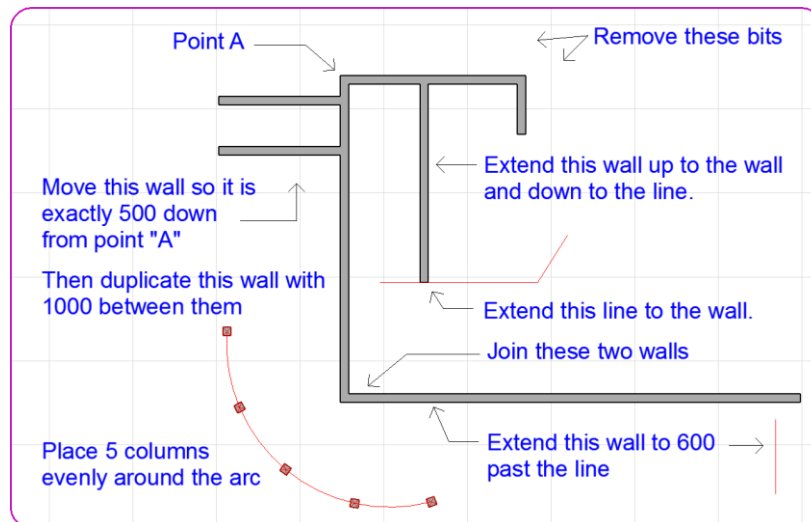
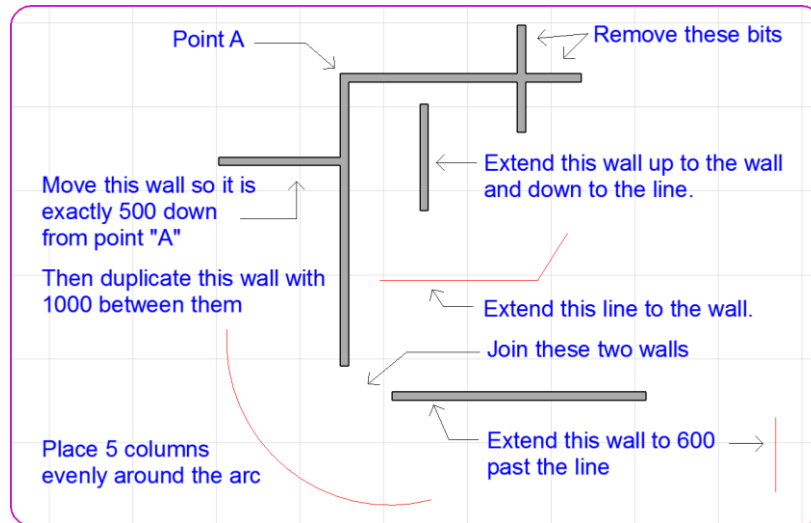
Exercise 6

This exercise shows you how to **Drag**, **Rotate**, **Split**, **Multiply**, make **Roofs** meet using Ctrl click (PC) or Command click (Mac) (and cleanly intersect in 3D) and fill areas with polygon surfaces (Fills, Slabs, Roofs etc) using the **Magic Wand**.



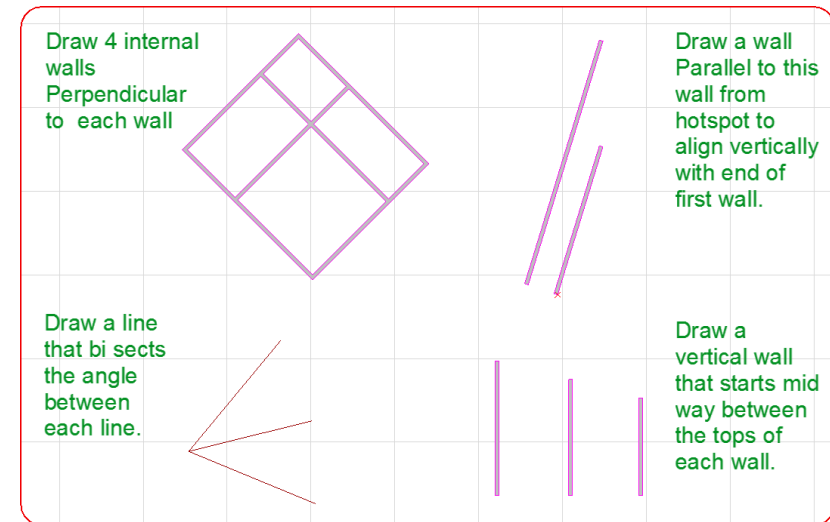
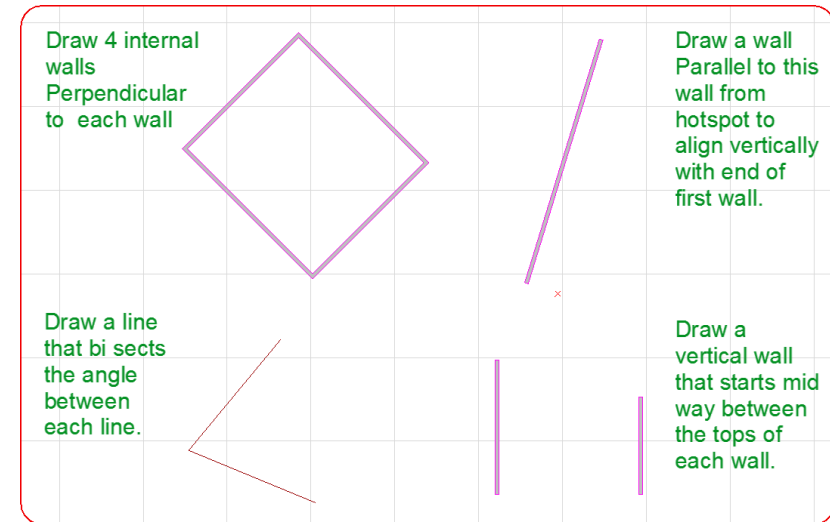
Exercise 7

This exercise applies the skills learned into practical building tasks. **Trim, Extend, Intersect, Drag, Drag a Copy** and **Multiply**.



Exercise 8

This exercise shows you some of the different ArchiCAD Cursors (Perpendicular, Parallel, Bi-sector) along with Snap Guides and Guide Lines.



ArchiCAD Intelligent Cursor

When using ArchiCAD, the intelligent cursor takes on various shapes in different locations and situations in the project.

These pages describes each icon and when it would appear.

Icon Name:



Arrow: empty area on the workspace (when Arrow Tool is active)



Crosshair: empty area on the workspace (when a Design or Documentation Tool is active)



Quick Selection using Arrow tool: appears whenever you move the cursor onto a quick-selectable item



Arrow with Heavy Checkmark: snapping to nodes on Reference Lines of walls



Arrow with Light Checkmark: snapping to nodes other than the ones on Reference Lines



Heavy Checkmark: snapping to nodes on Reference Lines of walls and reference axes of beams



Light Checkmark: snapping at any other hotspot of any element.



Arrow with Heavy Mercedes: snapping to Reference Lines



Arrow with Light Mercedes: snapping to edges other than Reference Lines



Heavy Mercedes: snapping to Reference Lines



Light Mercedes: snapping to edges other than Reference Lines



Arrow with Intersection: snapping to an intersection of edges



Intersection: snapping at an intersection of edges



Arrow with Perpendicular sign: snapping perpendicularly to an edge or arc while dragging an element



Arrow with Tangent sign: snapping tangentially to an arc while dragging an element



Cloud: indicates empty space over the horizon in perspective views

Cursors Used Only while Drafting and Editing:



White/Empty pencil: in an empty space or over any element where there is no hotspot or edge



Striped pencil: snapping to edges



Striped pencil with black top: snapping to Reference Lines and reference axes



Filled pencil: snapping to nodes on Reference Lines and reference axes



Filled pencil with white top: snapping to any other node or hotspot



Pencil point with intersection: snapping at an intersection of edges



Pencil point with perpendicular sign: snapping at a perpendicular edge



Pencil point with tangent sign: snapping at a tangential edge



Scissors: trims elements hold down the **Ctrl/Command** key while clicking on an element

- 1) **White Scissors:** indicates empty space or on node. Not positioned properly to trim
- 2) **Black Scissors:** appear on top of element edges. Click to trim the element



Magic Wand on Empty space: used for tracing the contours of existing elements for creating new elements with the active tool



Magic Wand on the identifying node: uses the active tool to trace an edge



Magic Wand on the identifying edge: uses the active tool to trace an edge



Empty Eyedropper/Syringe: empty area in the workspace when transferring element settings



Empty Eyedropper/Syringe with stripe: snapping to edges when transferring element settings



Half filled Eyedropper/Syringe: snapping to hotspots and general nodes when transferring element settings



Full Eyedropper/Syringe: snapping to nodes on Reference Lines and reference axes when transferring Element settings



Eyeball: defines the direction of

- 1) **Roof:** Once the pivot line drawn, click to indicate upward slope of roof
- 2) **Section/Elevation:** click to define the direction of section or elevation and depth of view
- 3) **Doors:** click to define hinge side and swing direction
- 4) **Windows:** Click to define exterior side
- 5) **After Splitting Elements:** Click on one side of the split to indicate which elements will remain selected



Double Eyeball: locates position of edge-placed Door/Window



Hammer: places Dimension chains, Angular Dimensions, the Elevation Dimension array, Zone Stamps and Fill areas; it also appears when closing polygons



Trident: Moves marquee area or the Clipboard contents after pasting



Plus: when dragging, rotating or mirroring a copy of an element



Double-Plus: when dragging or rotating multiple copies of an element.



Fill Handle: prompts you to draw a vector orientation after a fill is

Module 2 – Project Setup

In this module you will setup your initial project. You will learn the following principles:

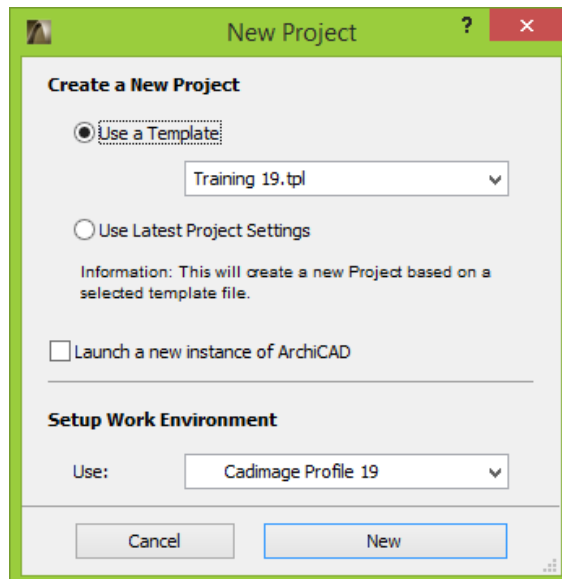
Starting a Project from a Template
Adding Project Data
Setting up Story Levels

Start new Project

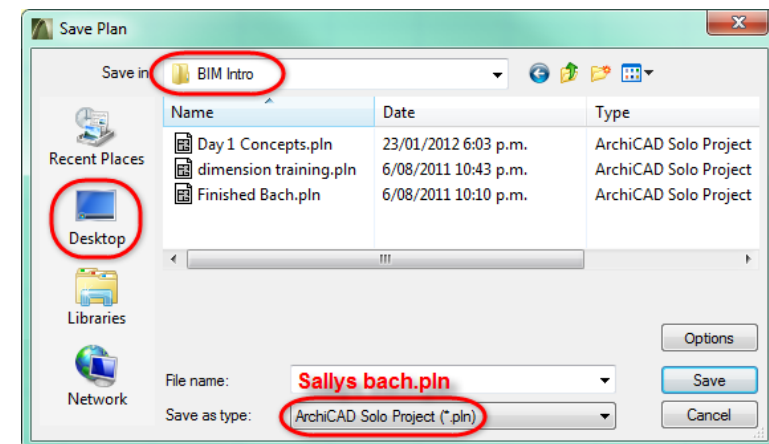
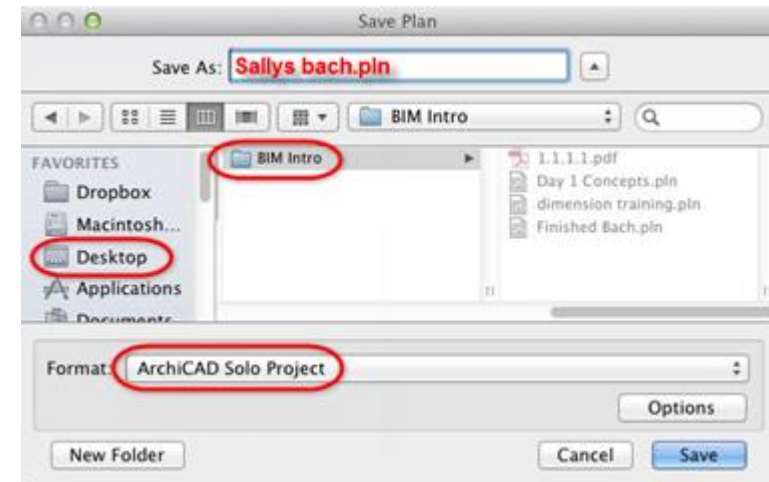
- To begin the Bach you need to start a new file using a **Template**

A template file is basically our default start point. It has the look and feel of our Documentation; Title Blocks, text, dimension and marker styles, and potentially is filled with office standard data, favourite walls, Roofs, Furniture etc. For the purposes of this Training course we have stripped out most of the Standard Template automation, in order for you to learn how to create this yourselves.

- Select **File > New...**



- Make sure you select the **Training 19.tpl** template and you have set your work environment to **Cadimage Profile 19** and click **New**
- Before going any further it is a good idea to save your file. Select **File > Save As...** and save the file as **My New Bach** (make sure the file type is set to save as a PLN)



- While working it is a good idea to get in the habit of saving frequently, you can use the **Ctrl+S / Command+S** shortcut key to save your file.

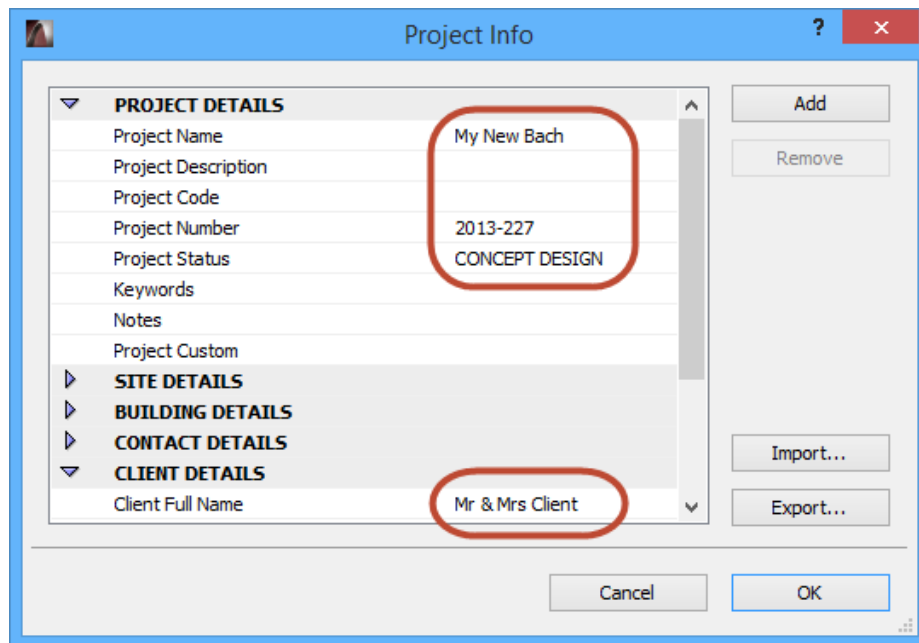
Add Project Data

Before modelling anything you can add all the information about the project into **Project Info**.

This is information like for example; Clients details, Site details, your Company details, Consultants details if applicable etc etc.

This information can be automatically used later in our Title Blocks etc.

- Go to **File > Info > Project Info**
- Within **PROJECT & SITE DETAILS** set:
 - Project Name = **My New Bach**
 - Project Number = **2013-227**
 - Project Status = **CONCEPT DESIGN**
- Within **CLIENT DETAILS** set:



- Client Name = **Mr & Mrs Client**

Hit **OK**

We'll come back to use this later in the course.

Setting up Story Levels

Story Levels are the horizontal levels that ArchiCAD uses, generally these are the building floors. But we set aside a separate level for the Site.

The Stories are labelled Story 0, Story 1, Story 2 etc.

In a standard single story residence, we would create 3 stories.

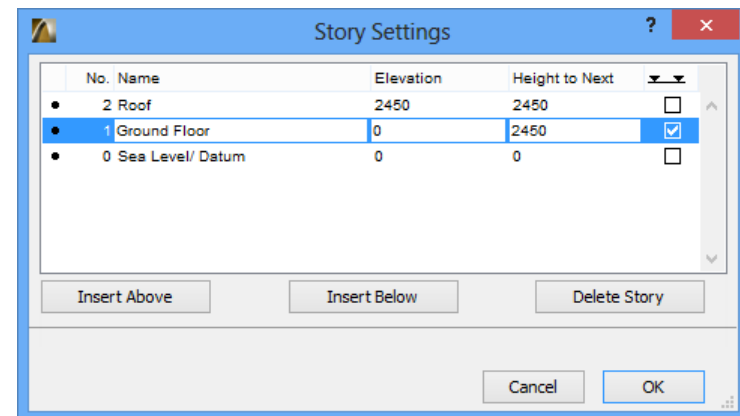
- Story 0 = Datum or Sea Level (this is where we model the Site terrain)
- Story 1 = Ground floor
- Story 2 = Roof

In a 4 level office building with 1 level of underground parking we would create:

- Story 0 = Datum
- Story 1 = Lowest modelled floor i.e. lower basement 1
- Story 2 = Ground Floor
- Story 3 = First Floor
- Story 4 = Second Floor
- Story 5 = Third Floor
- Story 6 = Roof

We are modelling a single story Bach.

- Go to **Design > Story Settings**
- By default we see 3 stories – these are fine for our purposes



Note that Sea Level & Ground Floor both have an R.L. of 0.000. This is typical as the standard scenario of residential construction is;

- Client engages Designer
- Client & Designer discuss brief & examine Site
- Designer start preliminary Concept and engages Surveyor on Clients behalf
- 1-2 weeks later Site Survey arrives
- Survey data is brought into ArchiCAD
- Building is placed correctly on Site.

With Sea Level and Ground Floor both set to 0.000 its as easy as adding the new R.L. into the **Height to Next** field and all the modelled elements move to the correct location.

We will do this after we add the terrain later in the course.

Module 3 – Bach Beginnings

In this module you will model your basic building. You will create the following elements:

Exterior Walls

Floor Slab

Interior Walls

Roof

BIM Note:

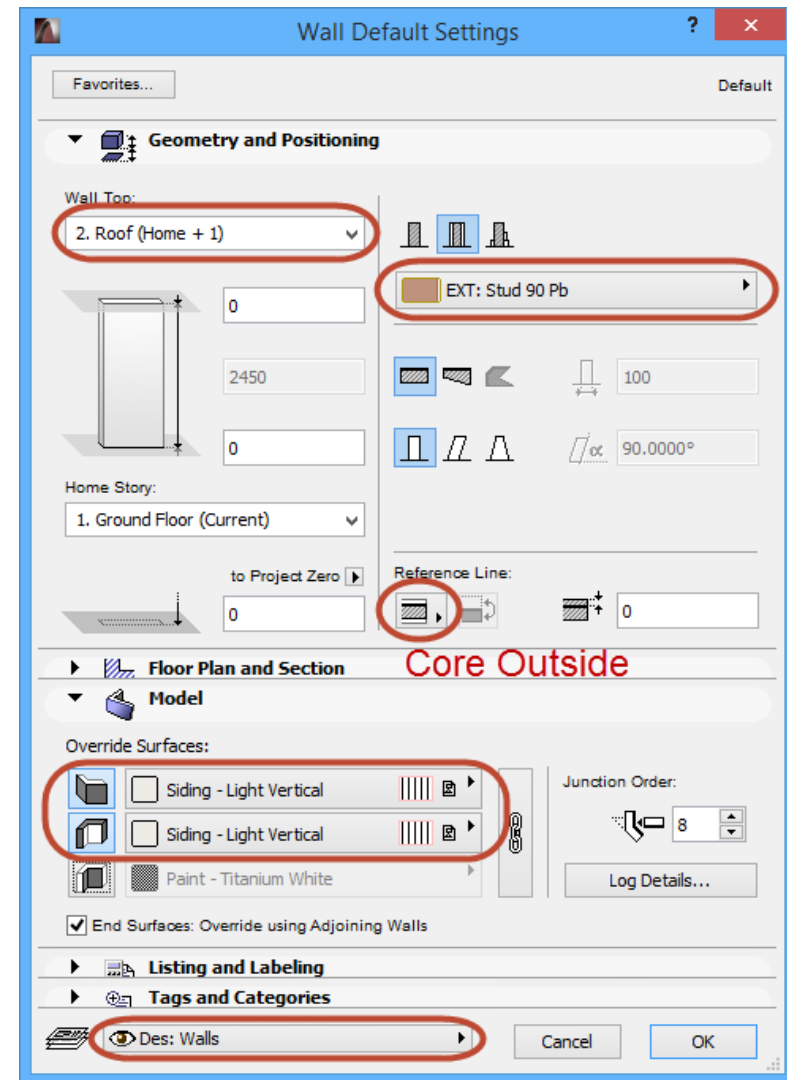
As we are modelling in 3D, we need to think about more than simply the length of our wall. What is its height and thickness, this will allow us to get Volume information later on, what is its Surface finish; paint on the interior & weatherboards on the exterior, etc.

In the early stages of the design model you could simply model the structural elements; Wall framing (excluding linings and/or claddings), Floor structure (with slab on grade don't model hardcore fill, sand blinding etc) & with Roofs just model the top chord or the rafter thickness.

With the new Priority Based Junctions, even the initial concept can be done with finishes on, and let ArchiCAD clean up all the element connections. Which we will do!

Exterior Walls

- Ensure you are currently on the **Ground Floor** Story
- Open the **Wall Settings** and set up a Wall with the following key settings:

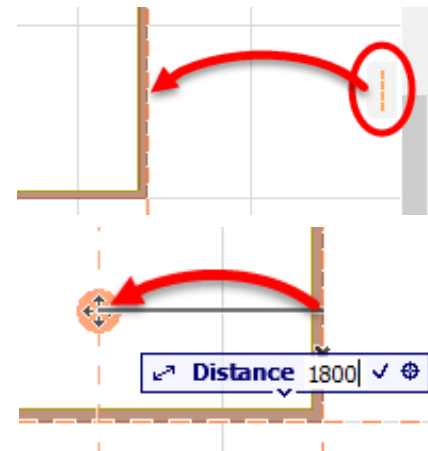
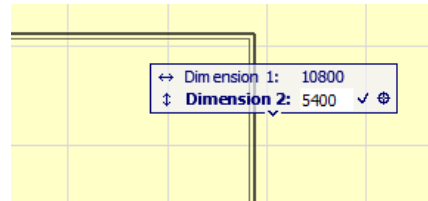


- Save a **Favorite** called **Exterior Walls 1** before you click **OK**

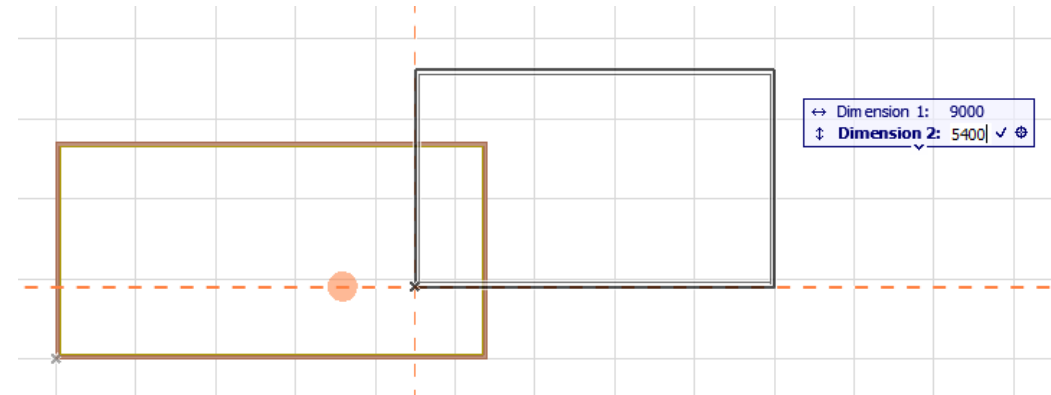
- Make sure you are set to draw a **rectangular** set of Walls & **Core Outside**



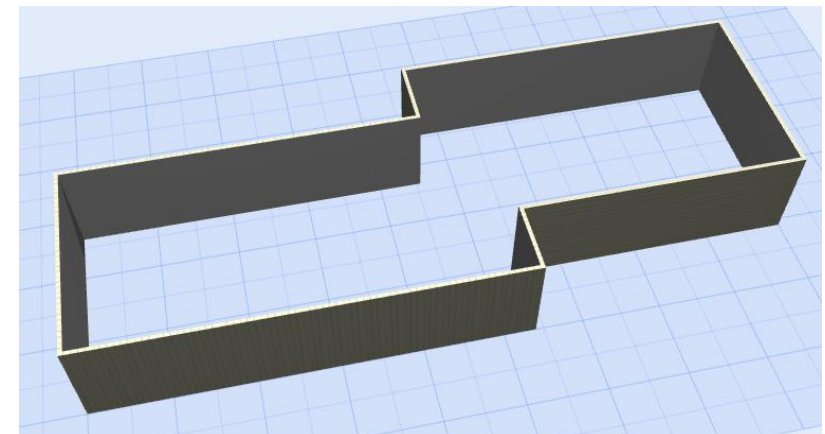
- Click the Hotspot to indicate the starting point and then draw a set of Walls that are 10800mm by 5400mm (Using the **Tracker**, Type **10800**, then **Tab**, then **5400**, then **Enter**)
- The next set of Walls overlap with the first so we need to set up some guide lines.
- The overlap of the two forms is **1800mm** so drag a guide line onto the East and South Walls.
- Use the orange dots to drag these guidelines to form the intersection.
- One Guide Line **1800mm** to the left of the top right corner
- And another Guide Line **1800mm** above the bottom right corner



- Apply the Wall Favorite **Exterior Walls 2**
- Start a new set of Walls from the intersection of the two Guide Lines and draw the Walls **9000mm** by **5400mm**



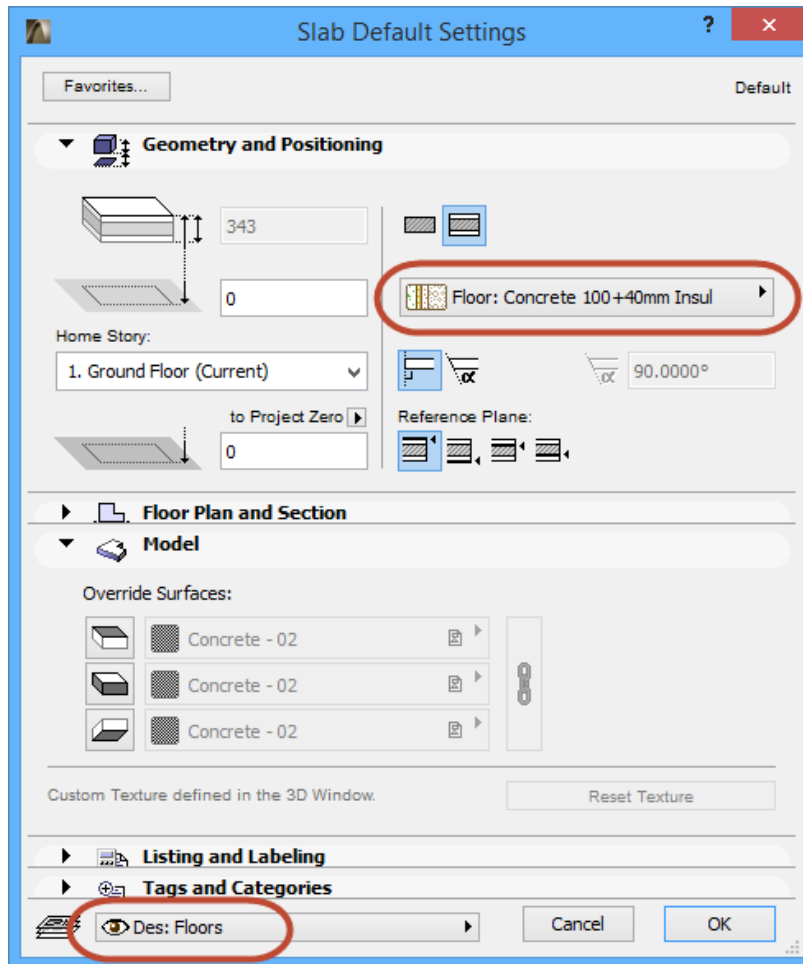
- You can now remove the guide lines by **right clicking** them and '**Erase Guide Lines**' and rub the eraser over the 2 lines. Hit **Esc** when done.
- Change to 3D to see your results (**F3** for 3D, **F2** for 2D)
- Use the **Ctrl+click** / **Command+click** to clean up the intersecting walls to end up with the following:



- Save** your file

Floor Slab

Open the **Slab Settings** and set up a Slab as follows:

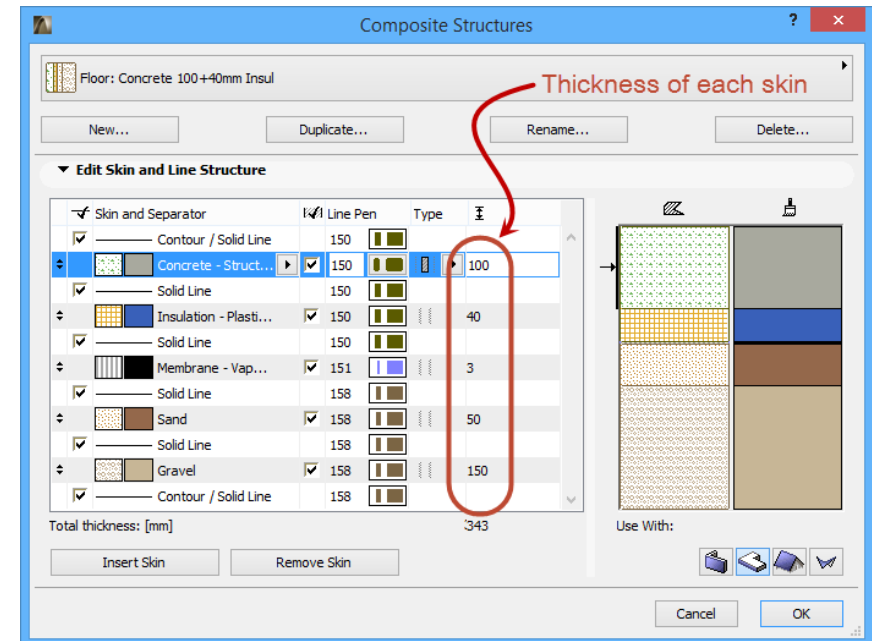


- Use the **Space+click** (magic wand) to place a Slab based on the Wall perimeter.
- Click on the bottom – outside edge of the walls once

BIM Note:

As with our walls, we can add information about the slab composition; thickness, what it is made of (Cut Fill) and what its finish is.

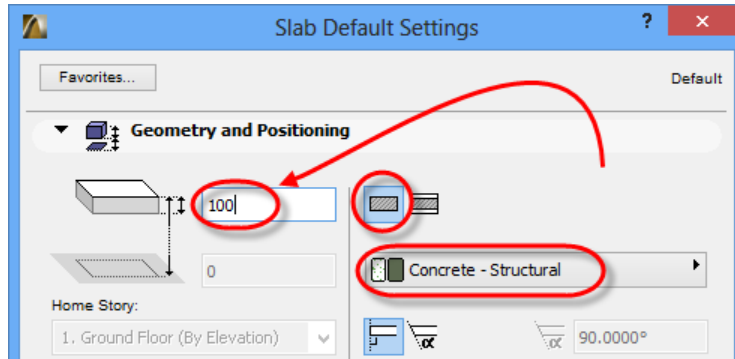
- Highlight the Slab (**Shift+Click**) then using the Right-click pop up menu, choose **Edit Selected Composite**
- In here we can see how this composite is put together
 - Building Material
 - Section pen weights
 - Skin thickness



With floors that are not concrete slabs we can either model the sheet flooring and the individual timber members (joists, blocking etc) or we can create a '**Composite**' that represents the floor that has the same total overall thickness.

If you are not sure of the floor construction, we can place a simpler floor using the Basic Structre method, and just choose a Simple Building Material.

- Re-open the **Slab** Tool in the Tools box
- Change the Structure Method to **Basic**
 - Now you can choose from your Preset **Building Materials**
 - And set your desired Floor thickness



- Click **Cancel**

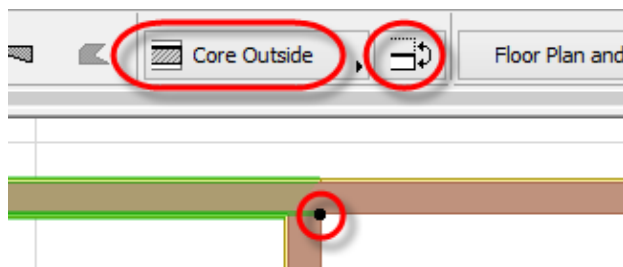
Interior Walls

- Open the **Wall Settings** and select the **INT: Stud 90 Pb NZE** Favorite
- Set the Wall Geometry Method to Single Wall

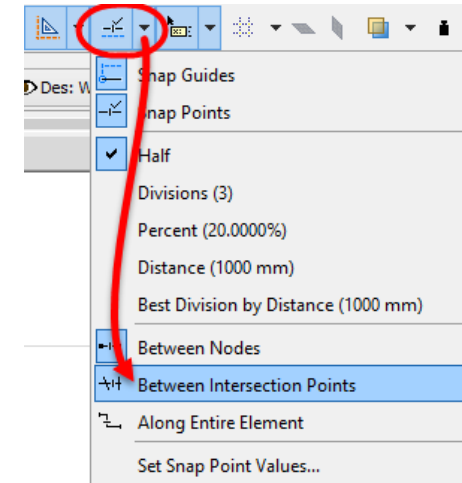


- Draw a Wall from the lower inside corner horizontally to the far left Wall

Note: Wall Reference Lines need to touch to allow the wall intersection to automatically heal. Set the Wall Construction Method to the correct position to give the desired wall location.



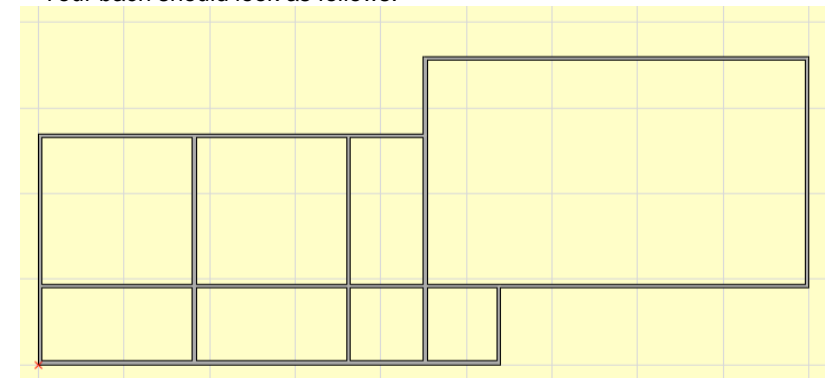
- Draw a Wall from the upper inside corner vertically to the bottom Wall
- Drag a copy of the vertical interior Wall **1800mm** to the left
- Set the **Snap Guides** to **Half** and ensure it set to **Between Intersection Points**



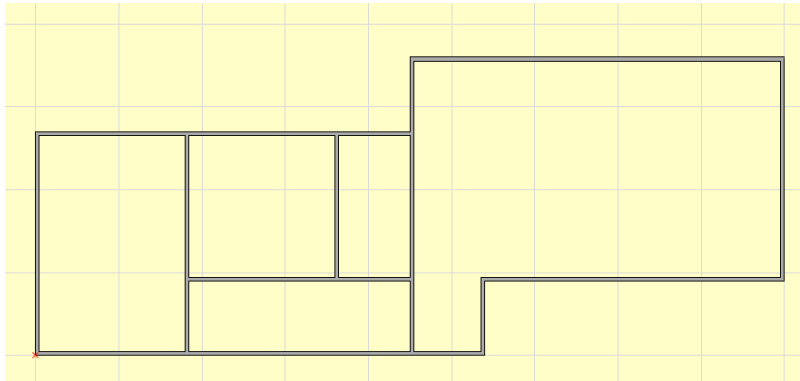
- Set the Wall Construction Method to **Core Centre** or **(Wall Centre)**



- Draw a Wall halfway between the left Wall and the previously copied Wall
- Your back should look as follows:



- Clean up the Walls using the **CTRL+click** / **Command+click** to make it look as follows:

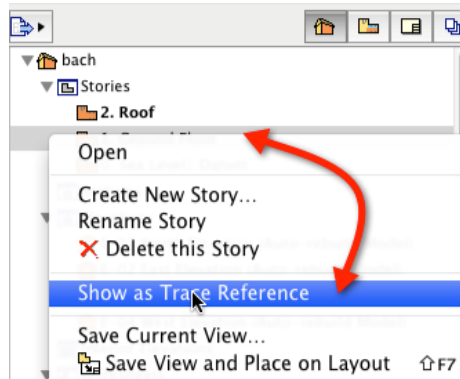


- **Save** your file

Roof (Single-Plane Roof i.e. Mono Pitch Roof)

In order to create the roof accurately we need to see the Ground Floor Walls

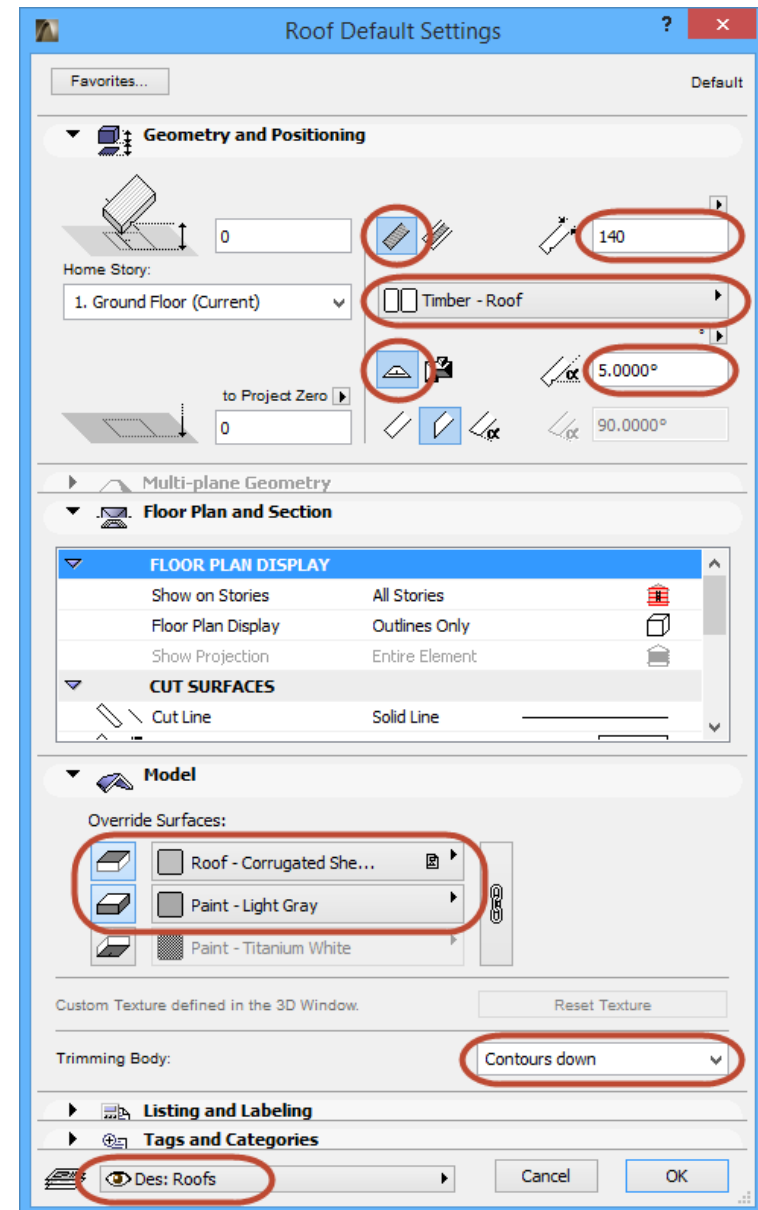
- Select **2. Roof** Story from the **Project Map**
- Use a Right mouse click over the top of **1. Ground Floor** Story and select **Show as Trace Reference**



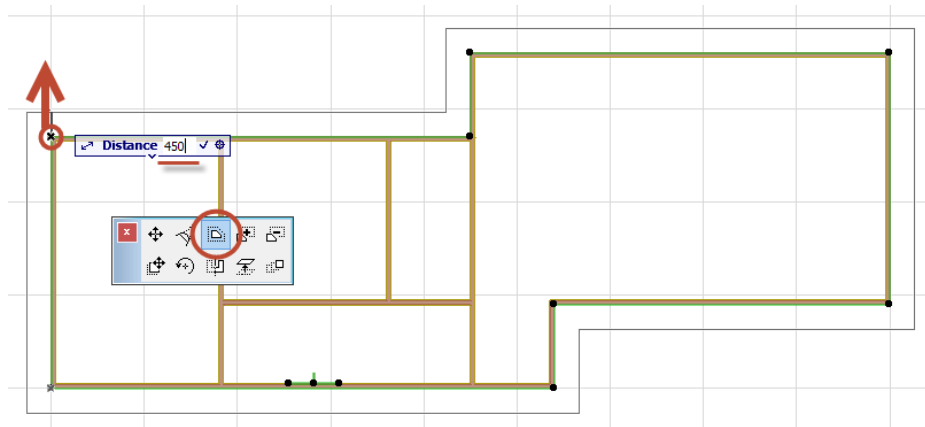
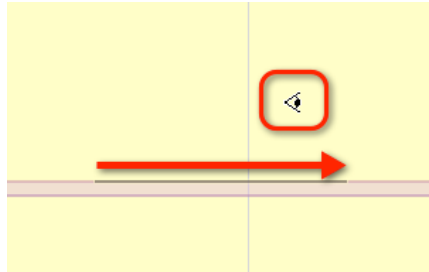
BIM Note:

*When modelling a roof treat the roof thickness as either the Top Chord of the truss, or the depth of the Rafter. (In this project the roof has 140x45 rafters)
The roof purlins, roofing material, soffit, fascia, gutter etc can be added later.*

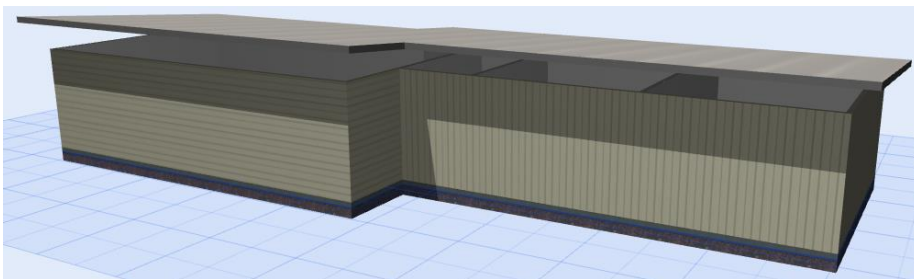
- Open the **Roof Settings** and set up a Roof as follows:
- First Choose **Single-Plane** Roof Geometry (i.e. Mono-pitched Roof)



- Draw the pitching/spring line along the inside face of lower Wall and click above the line to determine the slope direction
- Use **Space+Click** to place roof on the outside face of the wall.
- Select the **Roof**
- Using the **Pet Palette > offset all edges**, select a corner node or edge and increase the Roof size by **450mm**



Hit the **F3** key to view your model in 3D – we can connect the Walls to the Roof.

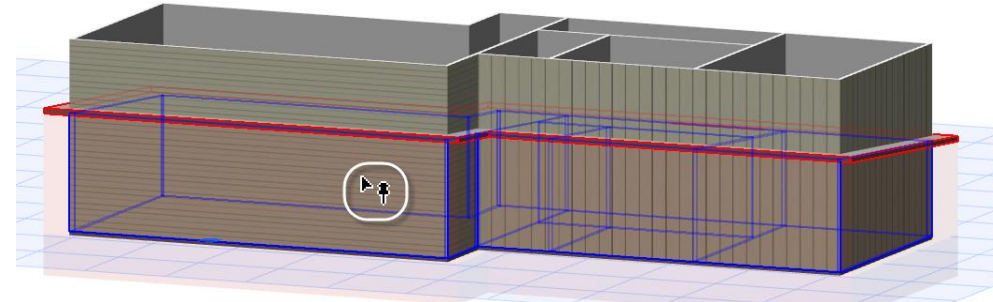


- Making sure you are on the **Wall** Tool, Select All Walls (either **Edit > Select All Walls** or **Ctrl+A/Command+A**)
- Open the **Wall Settings** and extend the Walls an extra **2000mm** High

- Use the **Design > Connect > Trim Elements to Roof/Shell...** command to trim the walls
- Click on the **Roof Plane**

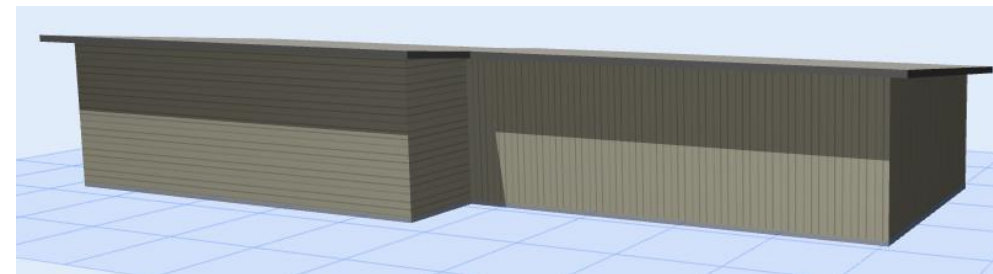


- Then select the portion of the wall you wish to keep (PIN in place)



BIM Note:

Using the Connect command allows the Roof pitch to alter and the walls will automatically continue to connect with the roof.



Module 4 – Creating Viewpoints

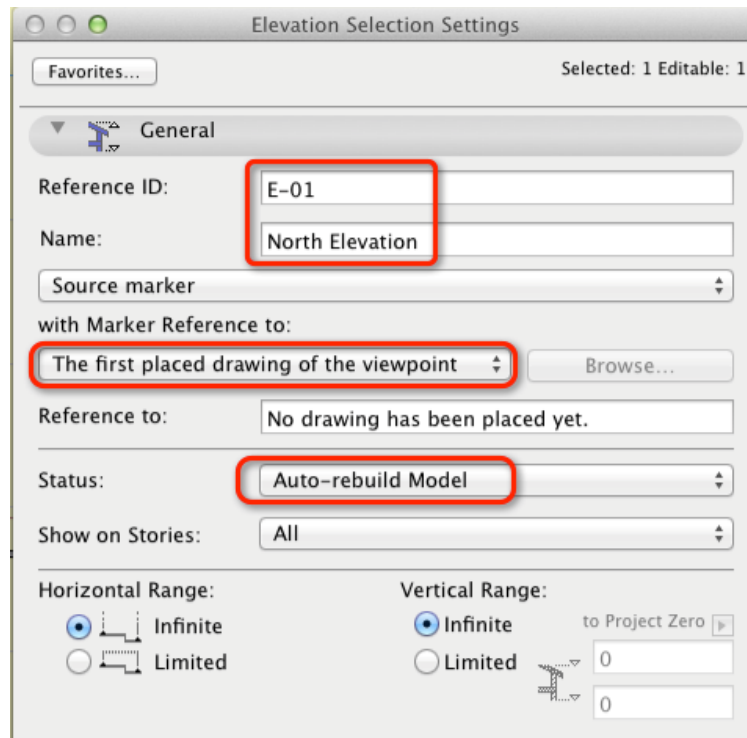
In Module 1 we learnt how to navigate a project. This module introduces you to the basic principles of creating additional views of the Virtual Building including:

Elevations

Sections

BIM Note:

This is where we see the first glimpse of the real power of the BIM. When we create our Elevations & Sections, these are simply views of our existing Model.



Elevations

The template that we started this project with had 4 elevations already placed (as is the case with the New Zealand Template). This means that the elevations have been automatically created based on the settings of those Elevation Markers.

These placed Markers are set up to produce presentation style elevations, with shading, vectorial hatching and colours based on the Materials chosen.

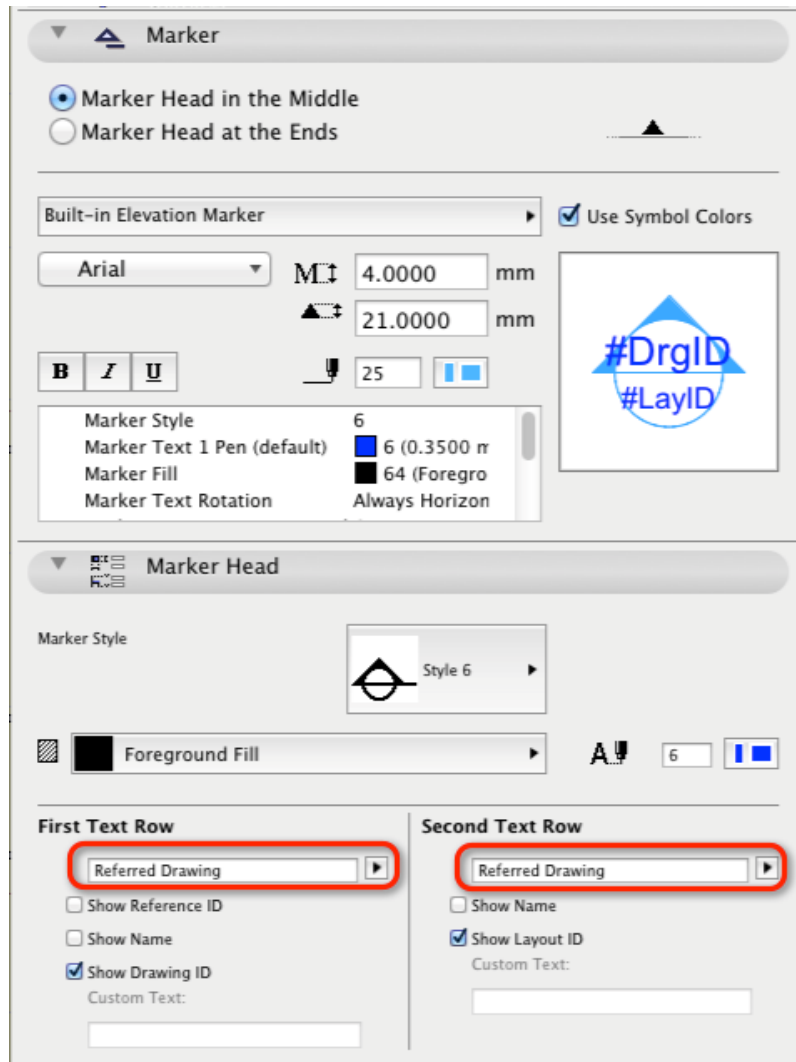
Let's examine the settings of the top (North) Elevation. Select it and open its Selection Settings (**Ctrl+T** or **Command+T**)

Alternatively you can Right Click on the North Elevation in the Project Map and choose **Elevation Settings...**

- **ID** - is the code for the elevation (this can be left blank, as we can get ArchiCAD to automatically number our views)
- **Name** - is the name of the view (North Elevation, South Elevation etc)
- **Marker Reference** - tells the Marker where to look to get the information to fill in the Marker Information.
- **NOTE:** - Almost always this needs to be set to **"The first placed drawing of the Viewpoint"**
- **Status** - relates to whether the view automatically rebuilds itself based on any changes or whether you need to tell the elevation to update (Auto or Manual)
- **Horizontal Range** - determines how 'far' the elevation 'sees'
- **Vertical Range** - can limit the elevation to a slice of the model; a floor level, or a set dimensional range.

Marker and **Marker Head** set up how the Marker looks and what information is displayed within it.

Most importantly here is that the Marker Text needs to be set to **Referred Drawing**.



Within **Model Display** we set how the Elevation looks

Uncut Elements are set to **Own Material Colours (Shaded)**

The 4 options to fill uncut surfaces are:

Nothing i.e. use no surface colours.

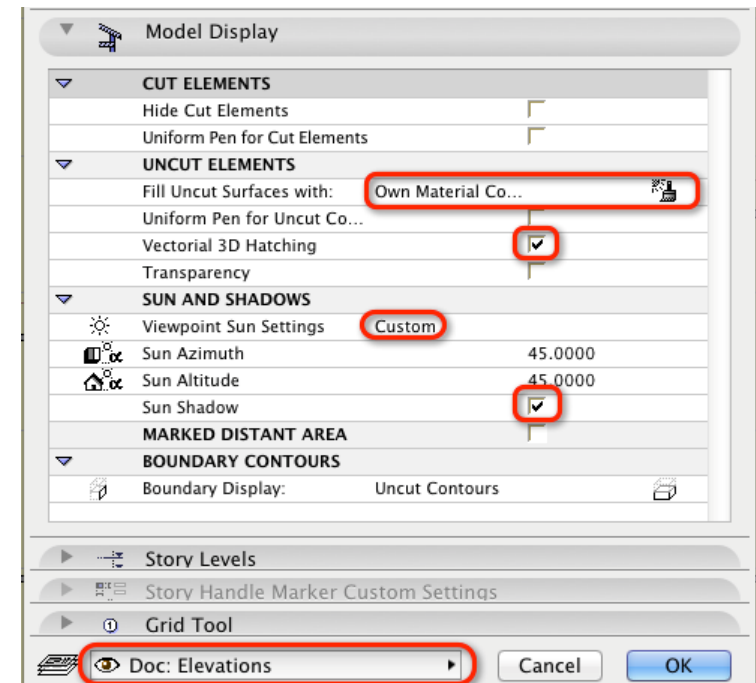
Uniform Pen Colour uses a single Pen for contour lines and no surface material.

Own Material Colors (Non Shaded) uses the surface colors of the elements, this is best option for interior elevations to show 'real' colours.

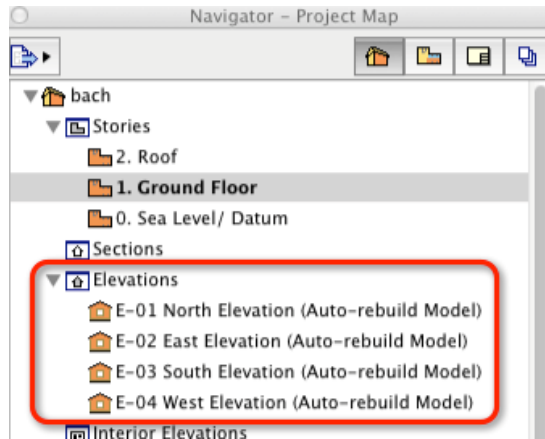
Own Material Colors (Shaded) uses the element surface colour then adds ArchiCAD shading to make the flat surfaces appear 3D.

Sun and Shadows is set to **Custom**, which means the 'Sun' will always come from the top right of the page. (Note it can also be set to use the 'real' sun based on the longitude and latitude of the project and the time of day and day of year)

And as always there is a **Layer** to place the Marker on.



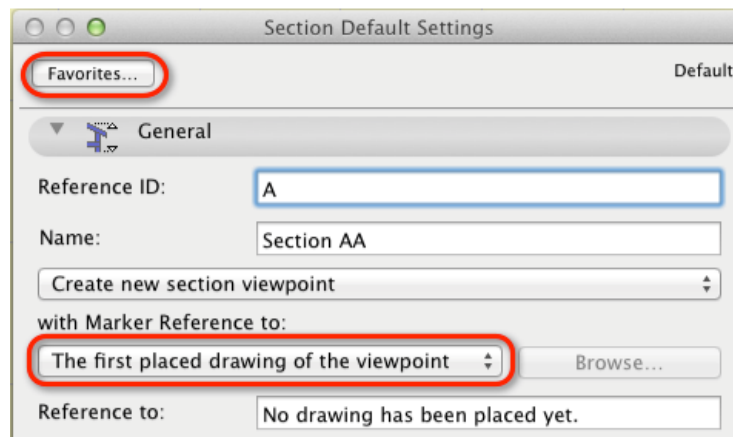
- From the **Project Map**, double click on the **Elevations** to open them.



Sections

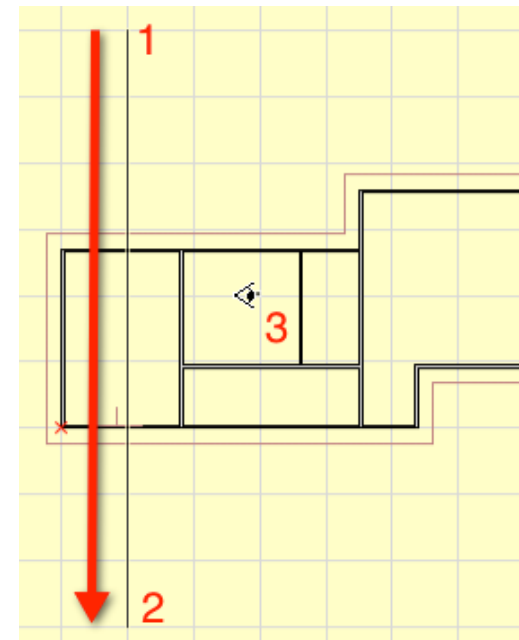
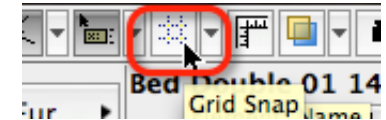
A Section is created in exactly the same way as an Elevation, however, instead of placing an elevation line 'outside' of the Building a section line 'cuts' through a part of the building.

- Open the Section Settings and select the **Section Model Pens NZE Favorite**
- Check that 'with Marker Reference to:' is set to **The First placed drawing of the viewport**.

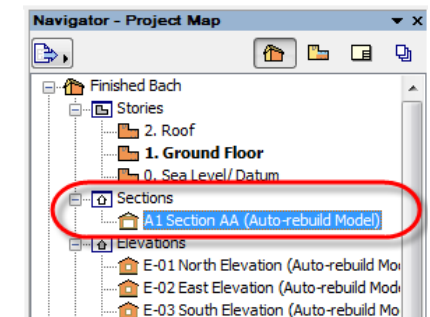


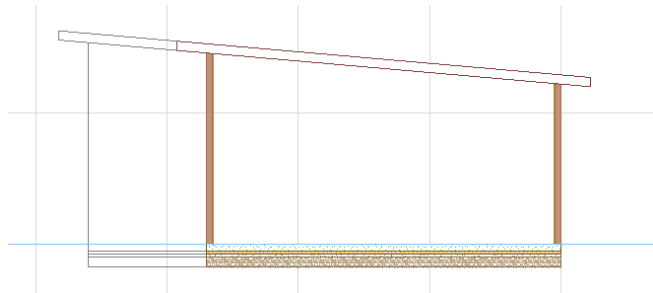
We'll draw a section through the left most room, looking right

- Start your section outside of the Bach above the western room
- Moving the cursor down the page we can draw a vertical line through the room that finishes outside the Bach
- It can be useful to turn on **Grid Snaps** to aid with accuracy of this.



- With the **Eye** cursor click a little to the right (approx 2000m or 1 Grid)
- The **Eye** is used to determine the direction of the Section or Elevation.
- The Section will have appeared in the **Project Map**
- Double click on it to view the Section

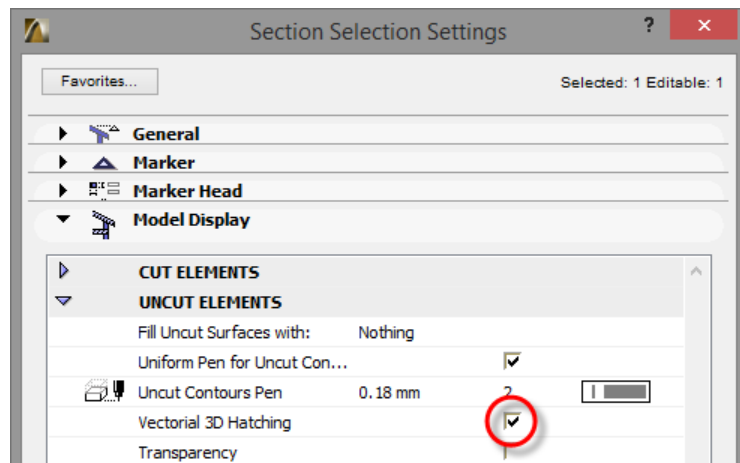




Distant Area Options

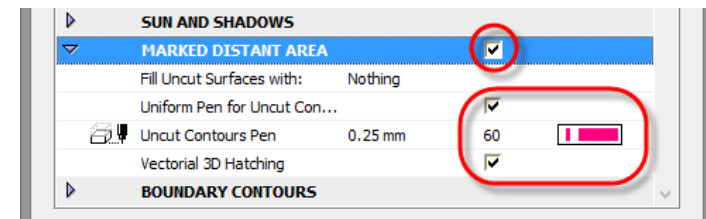
ArchiCAD provides a large array of settings within the Section and Elevation Tools to provide you with full control over the style of a Section/Elevation. We'll edit our recently created Section to show more information. To do this we'll use the Vectorial 3D Hatching and the Distant Area Option in the Section/Elevation Settings.

- Right Click in your **Section** viewpoint and choose **Section Settings...**



- Within Model Display under **UNCUT ELEMENTS** activate **Vectorial 3D Hatching**. This turns on the hatching on any 3D surfaces – Walls, Roofs etc.
- Click **OK**, to see the result – weatherboards are now visible.

- Right click and open **Section Settings...** again.



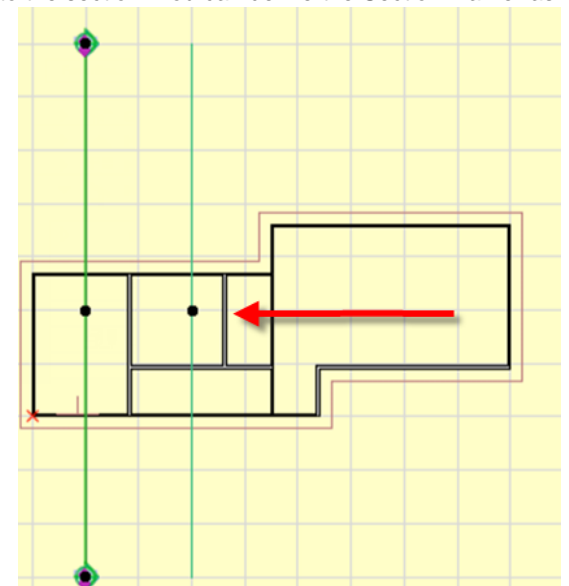
- Tick **MARKED DISTANT AREA** to turn this on.
- Once you have activated the Marked Distance area, you can set how you want your Section/Elevation surfaces to look within this 'area', using the same settings as explained earlier; lets choose **Uniform Pen** and turn on **Vectorial 3D Hatching**.
- Click **OK**.

If placed correct you should see the weatherboards to the left of the building now appear as specific adding a sense of depth to the section. You can define the Section Marker as to where the Distance Area starts.

- Go back to Plan (**F2**)

Notice a new line to the right of the **Section** line, this is our Distance Area line – elements beyond this line will use our new settings.

- Here you can change the position of the Marked Distant Area by clicking on the centre of this line and dragging it to any position you require.



Module 5 – Saving Views

In this module you will create saved views for output. You will learn the following principles:

- View Filters
- Layers & Layer Combinations
- View Scale
- Structure Display
- Pen Sets
- Model View Options
- Dimension Options
- Zoom Settings

Creating Views – View Filters

A View can be thought of as a completed drawing that is ready for output. A view uses a Viewpoint from the Project Map (e.g. Story, Section, 3D) and applies the following filters / settings:

- **Layer Combination** > What is the purpose of the View?
- **Scale** > Large or small scale (1:1 or 1:100?)
- **Structure Display** > Structural vs framed vs finish
- **Pen Set** > What is the weight and colour of the pen being used.
- **Model View Options** > Changes the display of modeled elements.
- **Renovation Filter** > Not use in this course (Existing, Demolition, New)
- **Dimension Options** > Metric or Imperial
- **Zoom Setting** > Fit in Window (unless it's a detail, then Current Zoom)

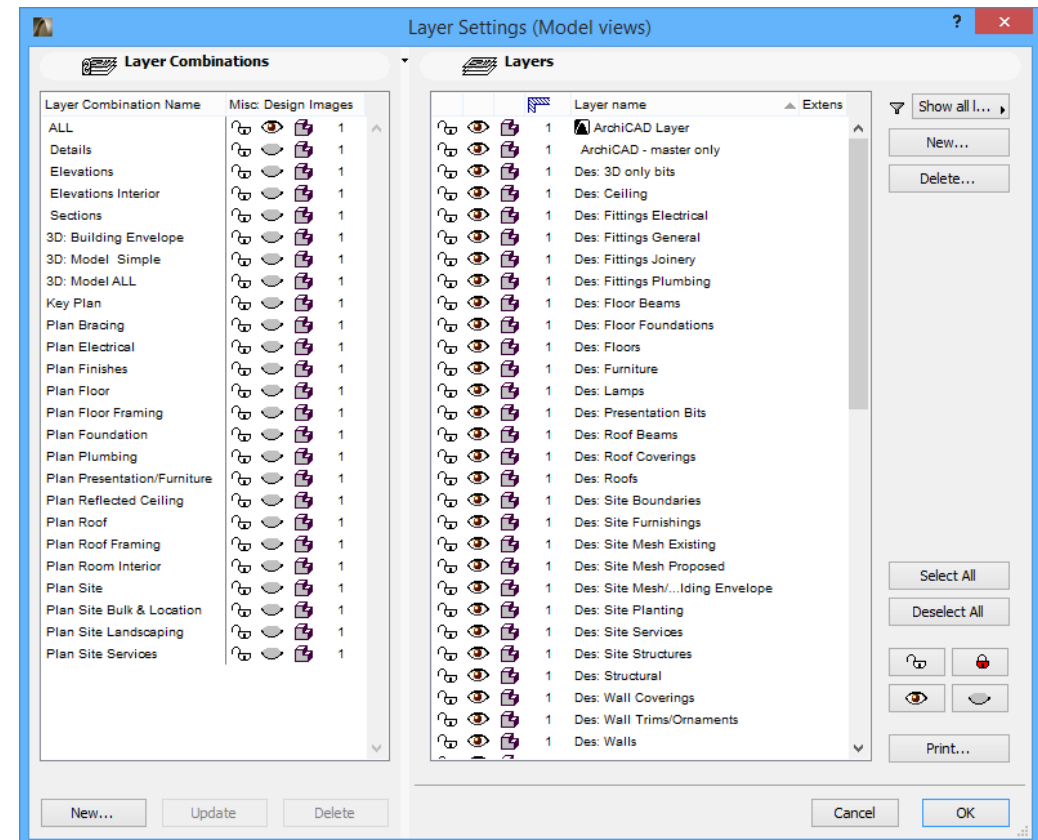
The result is that multiple Views can be created from the same Viewpoint and can display different information at different scales. For example the Ground Floor Story is the Viewpoint that is used to create the Floor Plan, the Electrical Plan, and the Furniture Plan. The different plans are produced simply by turning on and off different Layers using Layer Combinations.

Before making Views, we need to understand the various Filters.

Layers & Layer Combinations

As we have been placing elements (Walls, Slabs etc) to create our BIM model we have been placing these on specific Layers. Having elements on different layers allows us to have some items visible and other items hidden. This allows us to create different drawings with different information – for example a dimensioned floor plan and a furniture plan.

- Open the Layer Settings dialog (Use either **Document > Layers > Layer Settings (model views)...** or **Ctrl+L/Command+L**)
- You will see the dialog has all the Layers listed on the right. On the left is a series of Layer Combinations.
- If you highlight a Layer Combination on the left you can see what layers are assigned to it on the Right



Layers

Layers are divided into four groups. In addition, there is the ArchiCAD layer which is always visible.

- **Des:** (Design) These layers are for modelled (3D) elements found in the Design Menu and the Design section of the Tool Box, eg Walls, floors, furniture, choose the layer that coincides with the elements purpose.
- **Doc:** (Document) These layers are for elements under the Document menu and the Document section of the Tool Box eg dimensions, Fills, Text choose the Layer that coincides with the drawing being produced.
- **Import:** “Manually” imported elements eg contour lines, site information from another file, or aerial photos.
- **Misc:** Design Images (scanned sketches), Hidden items (design options etc) Hotlinked Modules Master Layer, and Solid Element Operators.

Layer Combinations

Layer Combinations are designed to produce particular outputs, be it a Plumbing Plan or a 3D visual. Each Layer Combination is named according to its purpose.

- Highlight a **Layer Combination** eg **Plan Plumbing** on the left and note which layers are visible on the right, highlight another eg **Plan Site** and note the difference.
- Each Layer Combination has a corresponding **Doc:** (Documentation) layer for the 2D annotation in the saved View. For instance in the **Plumbing Plan** the layer **Doc: Plumbing** is visible; this is the layer that all of the Dimensions, Text, Labels and any lines or fills that make up the annotation specific to the plumbing plan.

Scale

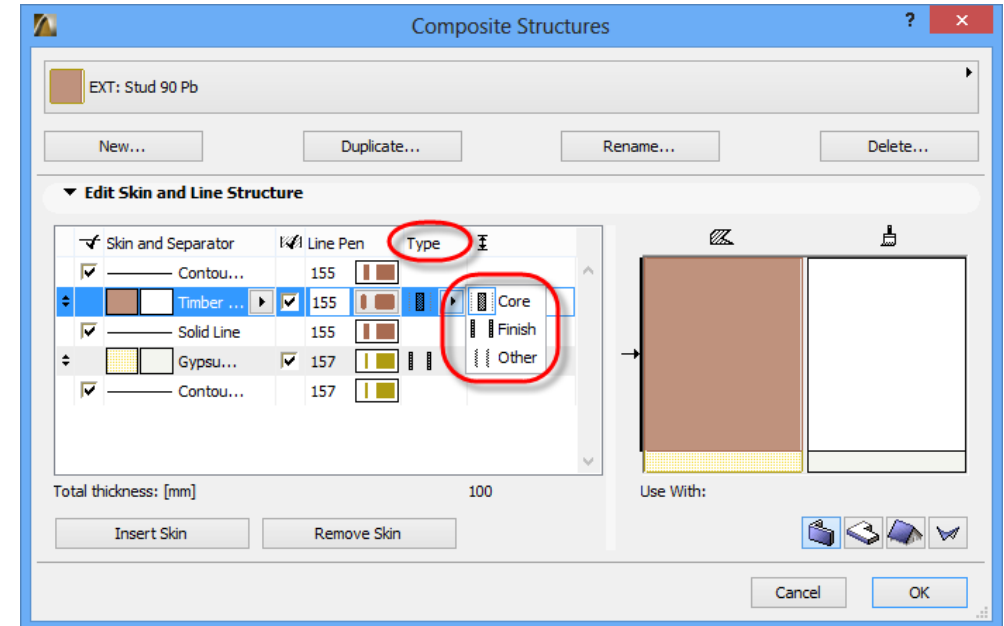
This relates to the output scale of the drawing. I.e. 1:50, 1:100 etc

Note that text is not scale dependent by default, so changing scale from 1:50 to 1:100 won't change your text height, only the modelled elements change.

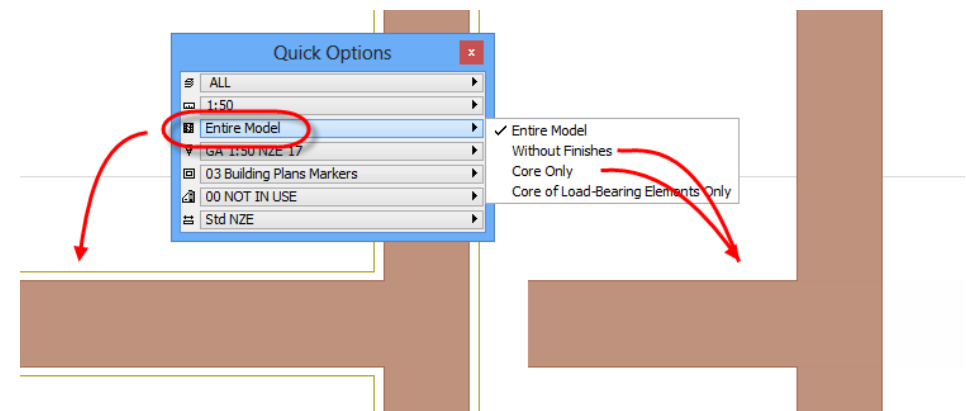
We will cover text later.

Structure Display

When using Composite Structures, for Walls, Slabs and Roof, we can set the Skins to be either: Core, Finish or Other



Then we can assign what we actually want to see using the **Structure Display Filter**.

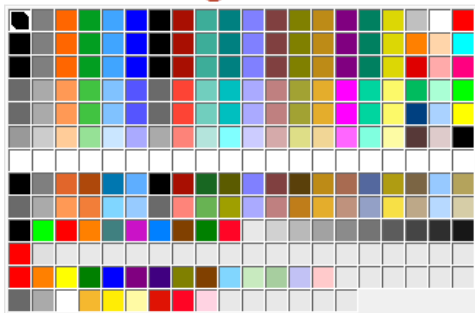


Pen Set

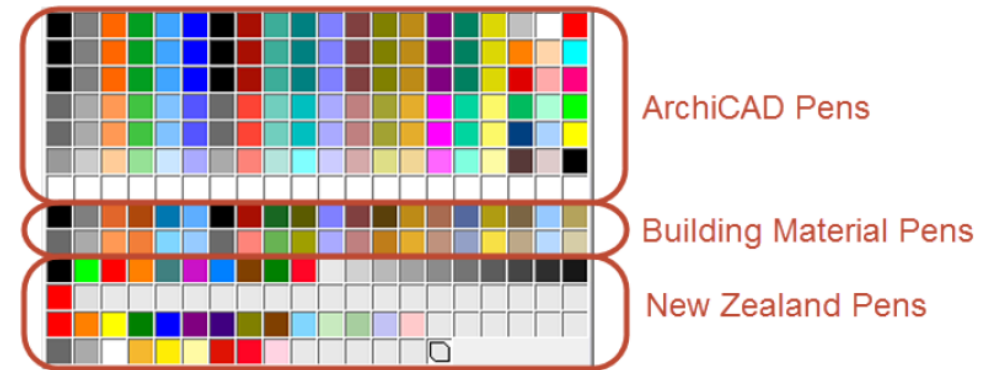
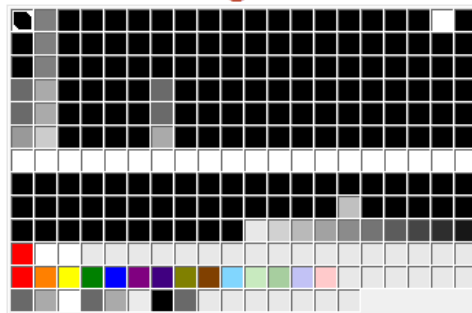
The Pen Set is what tells ArchiCAD what colour to make its Lines. We have create 4 Pen Sets based on Scale of Output, and duplicated these with Printing Pen Sets.

The **Working** Pen Set is full Colour, and the **Printing** Pen Set is mostly Black as we generally print in Black & White.

Working Pensets



Printing Pensets



- The first 140 pens are for **Modelled elements** (although this is starting to change with the new Building Elements) and are set correct for the scale of the output. These are organised in vertical columns based on elements or processes. I.e. column 1 = General, column 2 = 2D Elements, column 3 = Openings (windows and doors), column 4 = Objects . . . columns for Slabs, Beams, Stairs, Roofs etc.
- Then we have the 40 **Building Material** Pens in two horizontal rows. 141 – 180
- We then have the New Zealand pens:
- 10 **Drafting** pens – colour describes pens weight no matter what scale you print from 0.001 to 3.0mm.
- 10 **Grey Scale** pens – different shades of grey that are grey even in the Printing Pensets.
- A single red **Revisions** pen, for adding Revision Clouds and markups.
- A single '**Twink**' pen, designed to use when you want to remove a rouge line that you cannot by modelling.
- 14 **colour** pens – these are set to colour even in the Printing Pensets.
- And 9 **Renovation** Pens, 3 for each – Existing, Demolition and New .

- Go to **Document > Pen Sets > Pens & Colors** to open the Pen Sets

The default Pen Sets are:

Detailing NZE 19 - for detail work 1:1 to 1:10

GA 1:100 NZE 19 - for G.A. drawings, Floor Plans, Sections etc at 1:100

GA 1:50 NZE 19 - for G.A. drawings at 1:50 and maybe 1:25 Room Layouts and larger scale complete wall sections

Site NZE - for G.A. Site Plan drawings at 1:200 – 1:500

NOTE: Modelling Pens and Building Material Pens change pen weight with drawing scale, all other pens are fixed pen Weights.

Model View Options

The Model View Options take over from where Layers stop. A Layer is quite crude, it can only turn an entire element off or on. But if the element is quite complex, like a door, a Layer is not sufficient.

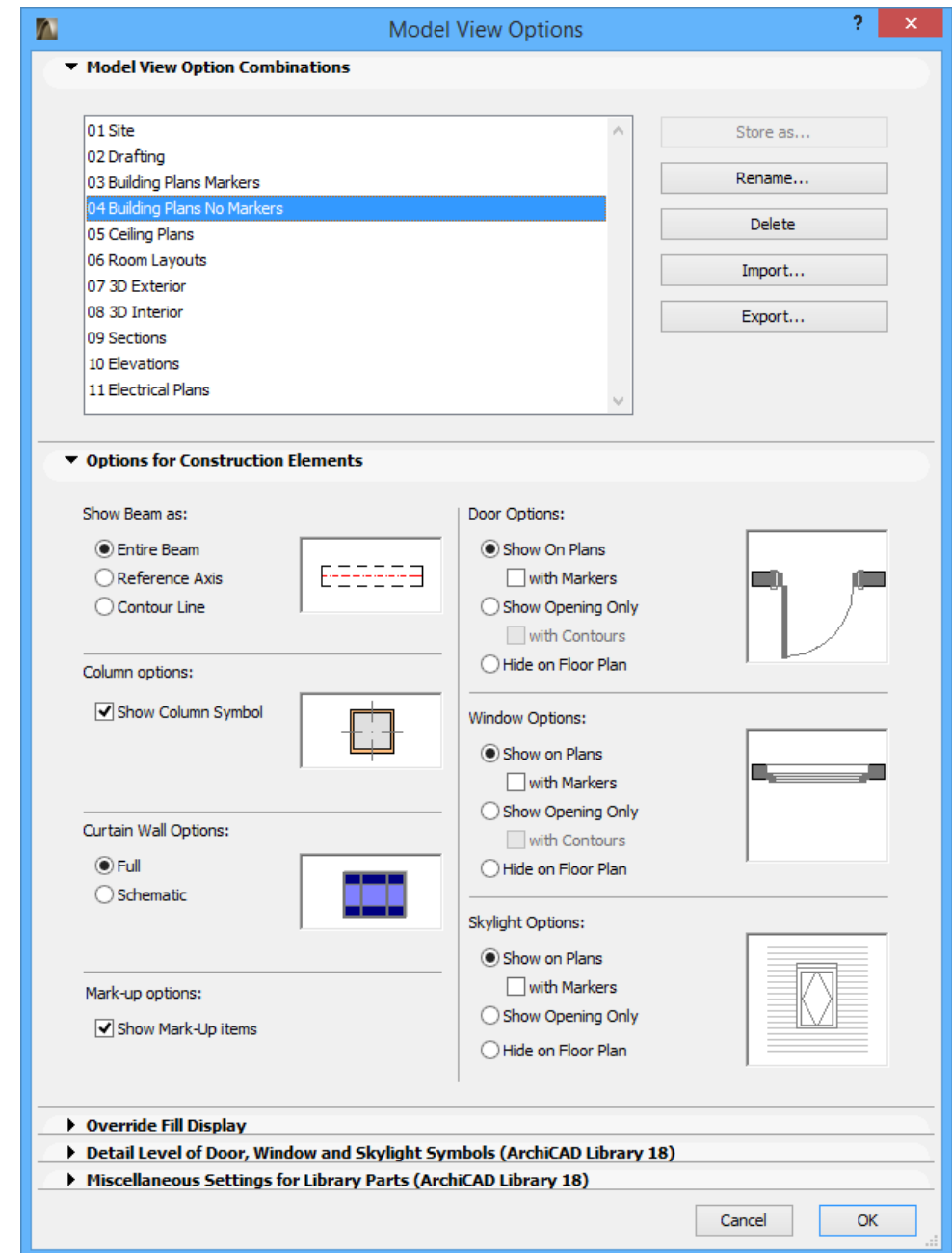
We may want to see the door hole only, or turn off the door leaf, or not see the door Number.

These things are not on their own Layers so we need another way of controlling them. Enter MVO's.

- Go to **Document > Set Model View > Model View Options**

We have 11 Model View Options, each with different settings (and different purposes):

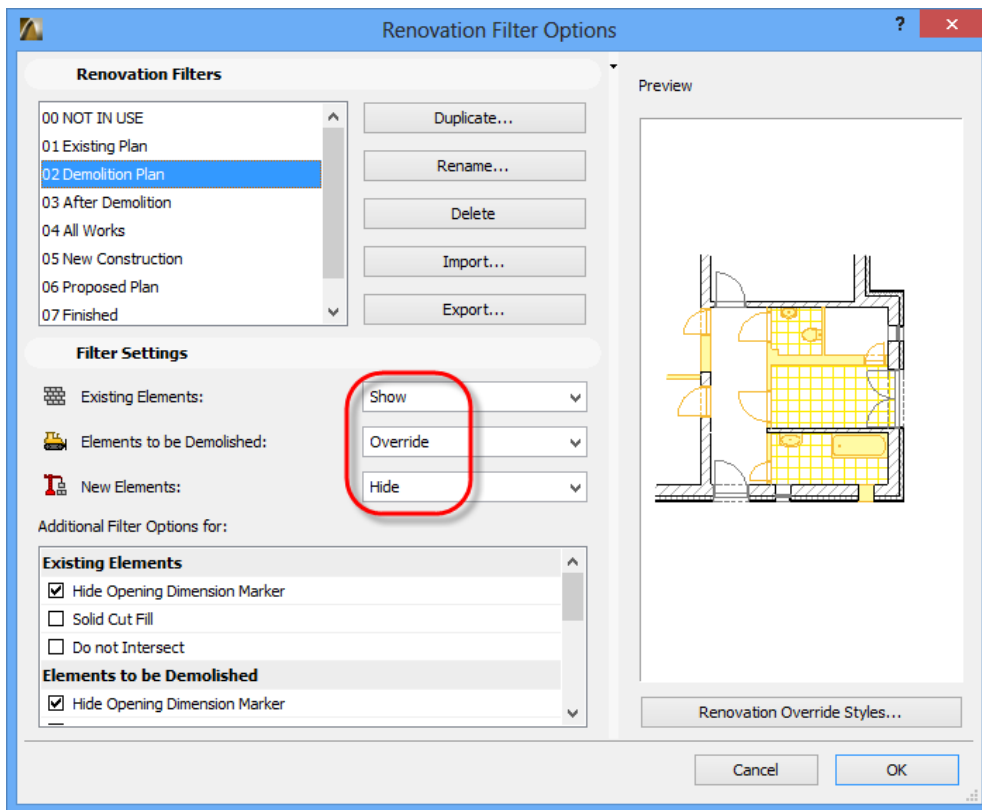
- 01 Site** – for Site Plans or larger scale drawings (1:200, 1:500)
- 02 Drafting** – designed for detail line work
- 03 Building Plans Markers** – for GA documentation with Door & Window markers ON
- 04 Building Plans No Markers** – as above but with Markers off
- 05 Ceiling Plans** – For Reflected Ceiling Plans
- 06 Room Layouts** – for mid scale detail Layouts i.e. Kitchen, Bathroom etc
- 07 3D Exterior** – for external 3D views (handles & taps set to off)
- 08 3D Interior** – for Internal 3D views (handles & taps set to on)
- 09 Sections** – for Sections
- 10 Elevations** – for Elevations
- 11 Electrical** – for Electrical setout plans.



Renovation Filter

The Renovation Filter allows you to display elements based on their Renovation Status; Existing, Demolished or New.

- Go to **Document > Renovation > Renovation Filter Options...**



We have 9 Renovation Filters by Default.

- 00 NOT IN USE** - New projects, all elements displayed no filters applied
- 01 Existing** - all existing elements displayed including those to be demolished
- 02 Demolition Plan** - displays Existing, and demolished elements with filter

- 03 After Demolition** - Shows only existing to remain
- 04 All Works** - Shows all works with New and Demolished
- 05 New Construction** - Shows Existing and New with filter applied
- 06 Proposed Plan** - New elements appear normal & Existing are white.
- 07 Finished** - New and remaining Existing elements displayed

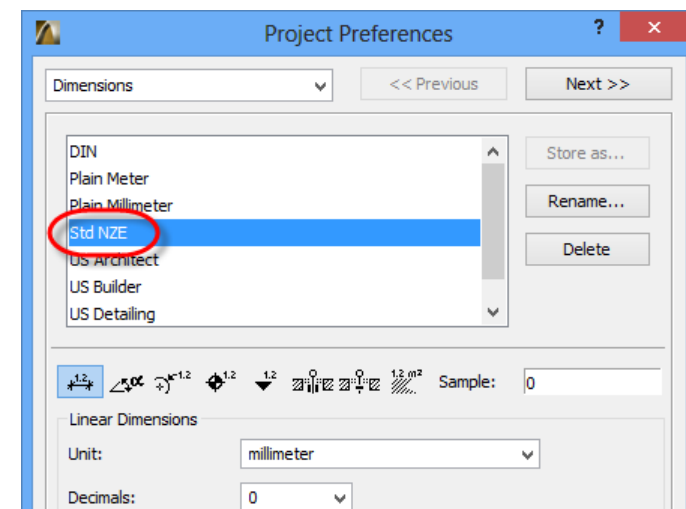
		Existing	Demolished	New
00	NOT IN USE	Show	Show	Show
01	Existing Plan	Show	Show	Hide
02	Demolition Plan	Show	Override	Hide
03	After Demolition	Show	Hide	Hide
04	All Construction	Show	Override	Override
05	New Construction	Show	Hide	Override
06	Proposed Plan	Override	Hide	Show
07	Finished Plan	Show	Hide	Show

We are not using Renovation Filters in this project so we will use **00 NOT IN USE**

Dimension Options

This is mainly for Metric vs Imperial, or Meters vs Millimeters. We have set a NZE Dimension options which is all millimetres except for Area which is meters.

- Go to **Options > Project Preferences > Dimensions**



Zoom Settings

This is for setting what the extents of your view are, generally it is set to Fit in Window, which means the drawing keeps growing as the view changes, but for Details or cropped Plan views like Kitchens or Bathroom when can choose to crop the view.

ArchiCAD NZE Template

We have created an extensive document listing all of these features and how they are set up on the disc to give you a full understanding. You can access this under **Help>ArchiCAD 19 NZE Template**

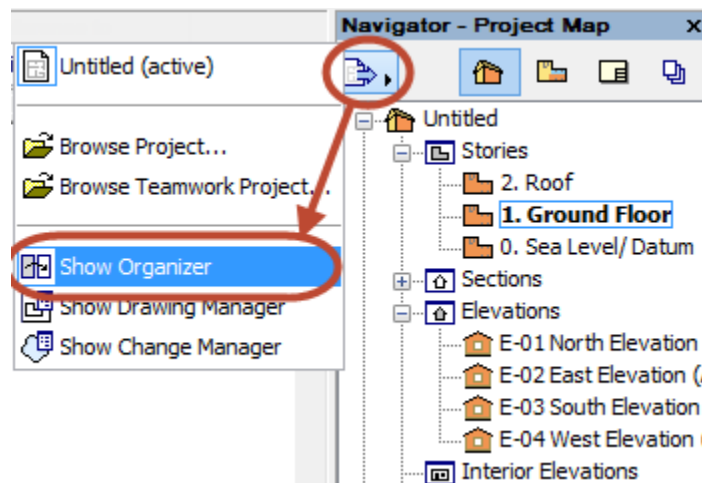
Creating Views - Organizer

We can now use these filters to make some Views.

Standard construction Floor Plan

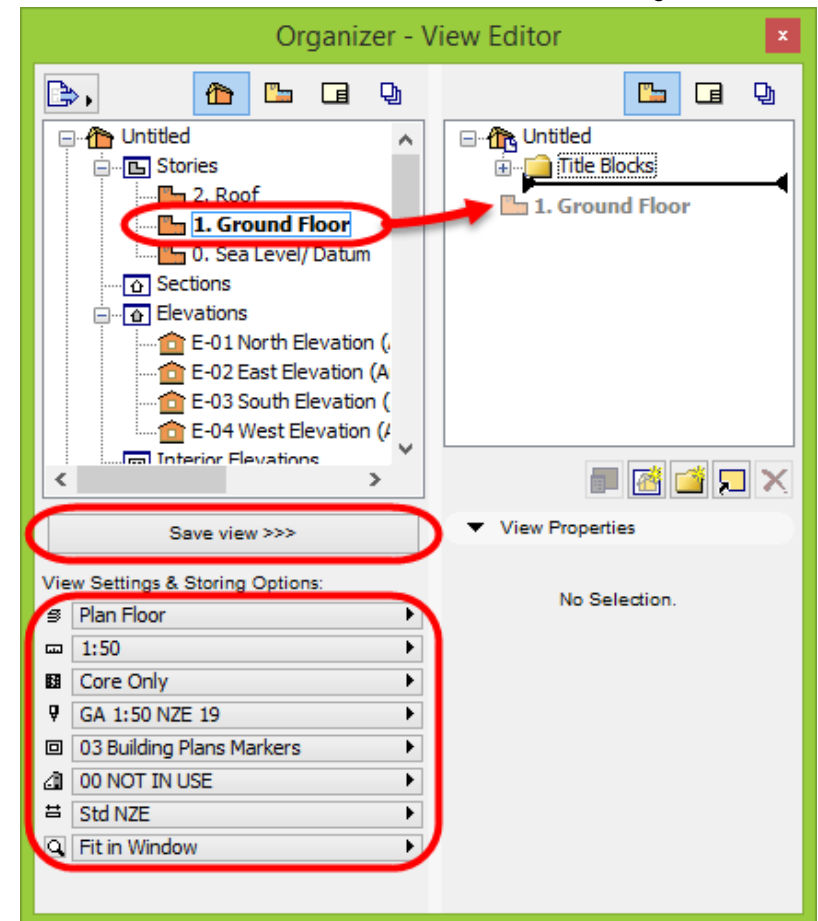
There are different ways of creating Views; we'll start by using The **Organizer**

- Open the **Organizer** Palette by clicking on the **Project Chooser** icon in the Navigator



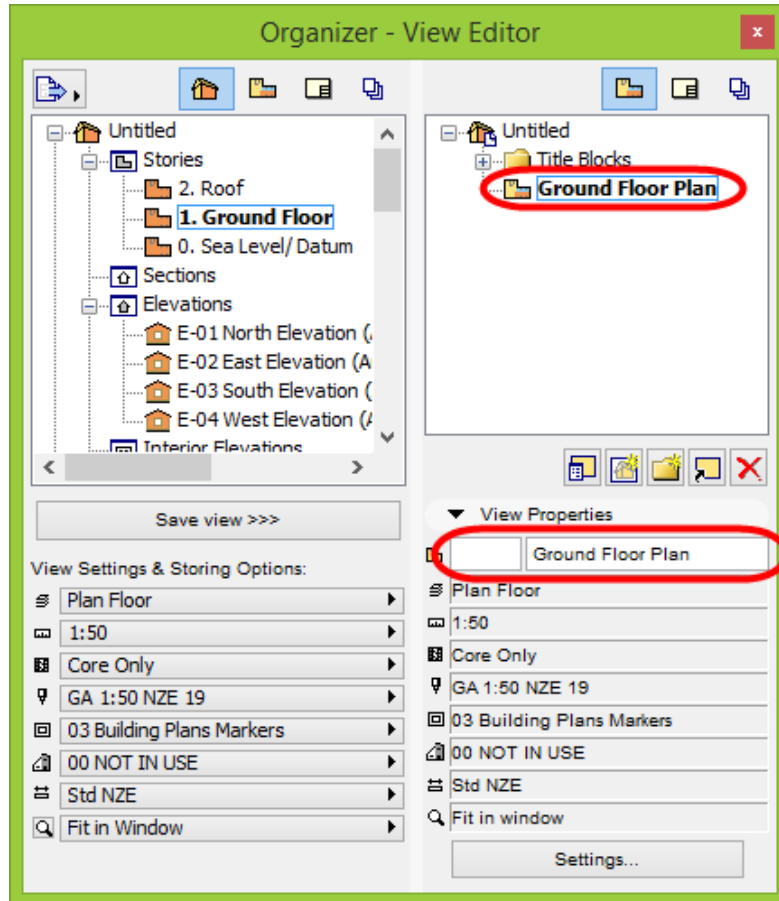
- The **Organizer** has a variety of modes. We need the **View Editor** Mode so make sure you click on the **Project Map** icon above the left part of the **Organizer** and click the **View Map** icon above the right part of the **Organizer**

- The **View Settings & Storing** Options are set at the bottom left of this palette
- To make a Construction Ground Floor Plan set the filters/settings as shown:



- Now to actually create the View, pick up the Ground Floor Story Viewpoint from the **Project Map** on the left and drag it across the **View Map** on the right. Alternatively you can hit the **Save View >>>** button.
- If you double click on the View you just created you will see a read out of the settings that the View uses and the actual View will be displayed in the current Window.

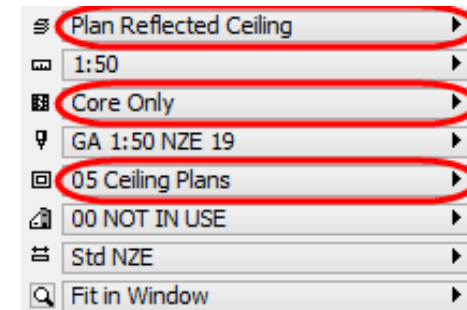
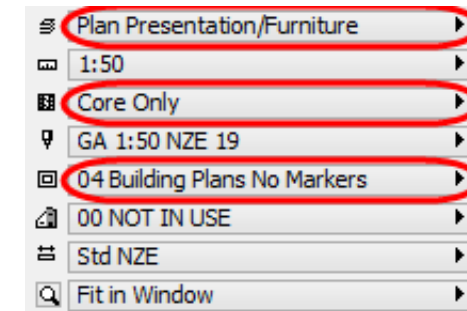
- Having selected the View you can also change the name,
- Remove the View ID and
- Change the name to **Ground Floor Plan**



Presentation/Furniture Plan

- The **Plan Floor** Layer combination is used for Construction Floor Plans.
- If however we want to create a Sketch Plan style Floor Plan displaying loose furniture and hiding some of our construction information then save a view with the following modified settings.
- Hit **Save view >>>** then rename the view **Presentation Plan**

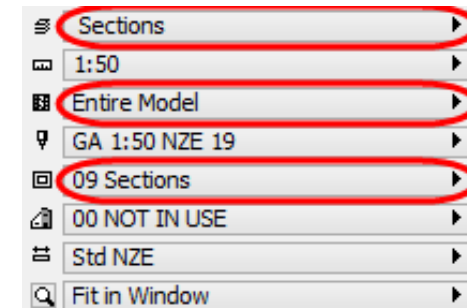
Ceiling or RCP Plan



- Set the settings as below.
- Hit **Save view >>>** then rename the view **Reflected Ceiling Plan**

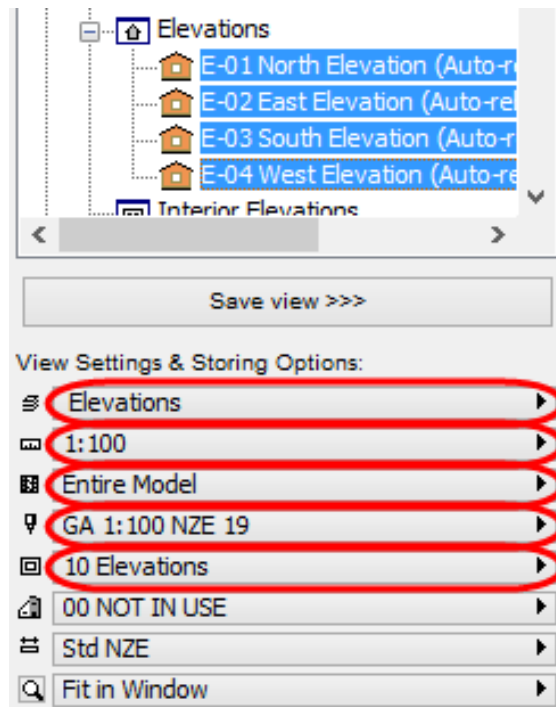
Section View

Using the same process, select the **Section**, set the settings as per below and **Save** the View.



Elevation Views

- If you need to create a **series** of Views that are essentially the same except for the Viewpoint (e.g. Elevations) you can create them in a single operation as follows:
- Set up the Settings as follows:

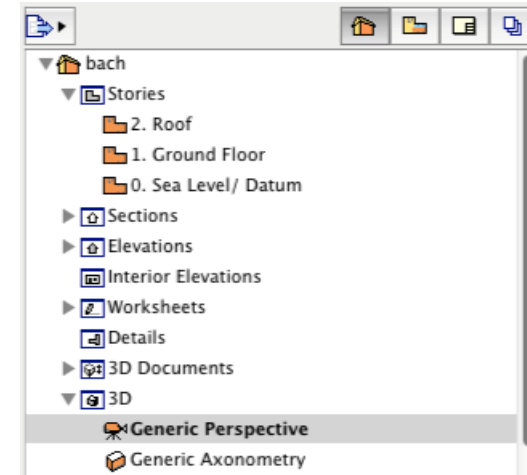


- Select all the Elevations on the left side of the **Organizer** – to do this use the Shift key to allow you to make a multiple selection
- Now use the **Save view >>>** button (you could also have dragged and dropped as above.)
- Having created your views you can now close the **Organizer**

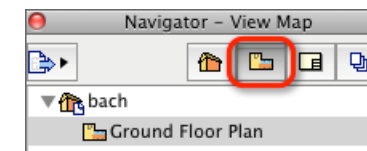
3D Views

3D view can be saved as well, but for these we need to be in the 3D window.

- Press **F3** to bring up the 3D Window
- Make sure you are in a **Perspective View**



- **Orbit** (middle mouse button and shift key) to a **North Western** point looking at the Bach
- Switch the Navigator to the View Map



- Click the **Save Current View...** button at the bottom of the **Navigator**



- Make sure the Source View says **Generic Perspective**
- Set the Layer Combination to **3D: Model All**
- Set the Scale to **1:50**
- Set the Structure Display to: **Entire Model**

- Set the Pen Set to **GA 1:50 NZE 19**
- Set Model View Options to **07 3D Exterior**
- Set the Renovation Filter to **00 NOT IN USE** (as we are not using it)
- Set to generate the 3D view generate in the **3D Window**
- Click **Create**
- Highlight the new view in the View Map, should be called Generic Perspective, and rename it to **NW Perspective**
- Orbit to a North Eastern point and create another View named **NE Perspective**

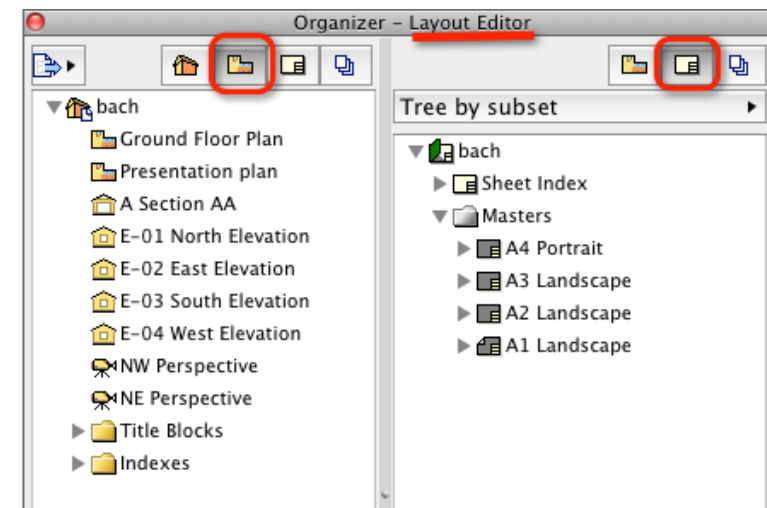
Layouts

Having created a series of Views the next step is to place the Views onto a page or Layout ready for output.

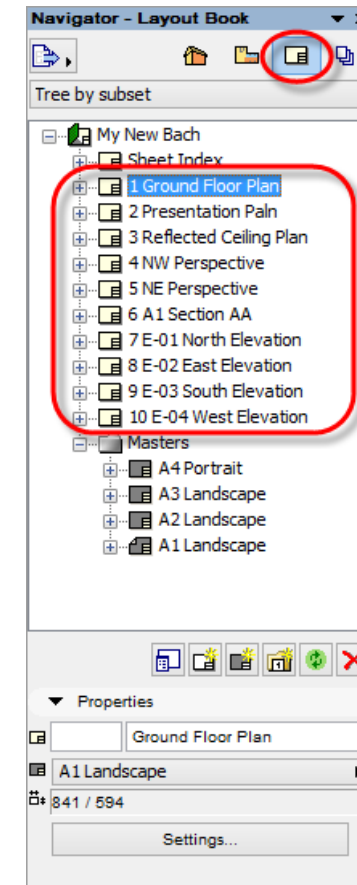
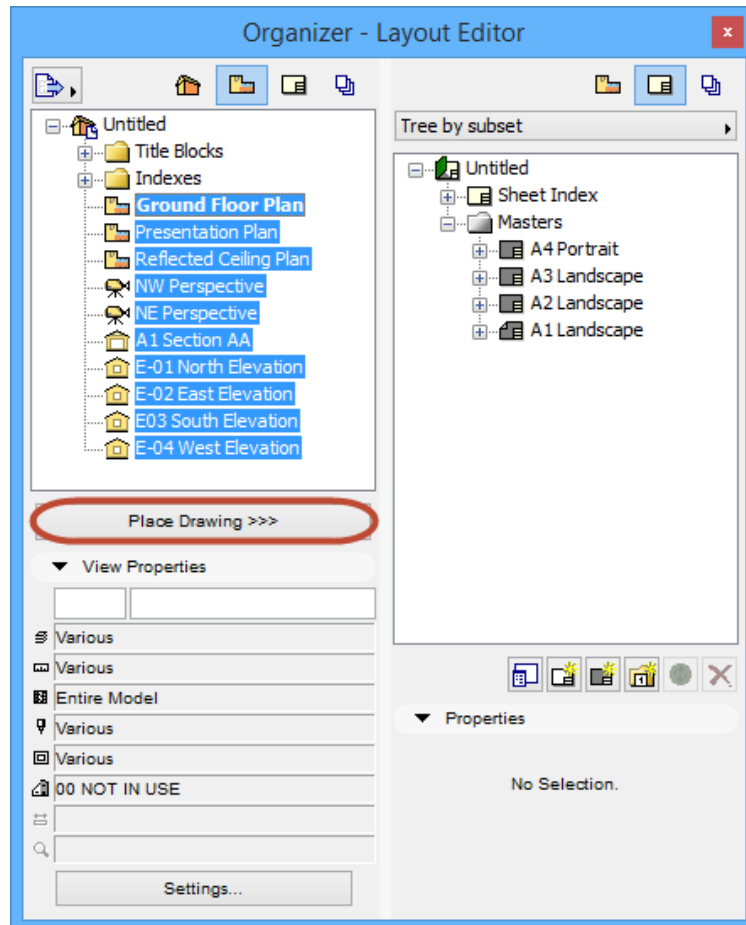
We'll cover **Layouts** and **Drawings** in more detail later but we'll have a brief look now.

To create Layouts we again use the **Organizer** this time however, it must be set up in Layout Editor Mode.

- Open the **Organizer** and switch the left side to **View Map** and the right side to **Layout Book**, the title of the **Organizer** should read **Organizer – Layout Editor**



- On the left hand side select all the Views you have created, remember to use the **Shift** key to select multiple items
- Click the **Place Drawing >>>** button



- Double click the different **Layouts** and see the Views of the different parts of the Bach

You can return to the **Layouts** at any stage and ArchiCAD will keep them up to date.

- ArchiCAD will now create a **Layout** for each **View** and then proceed to place each **View** on a **Layout**.
- This process will take a few seconds and a progress bar is displayed to show progress
- Once finished, close the **Organizer** and change the **Navigator** to **Layout Book**

Module 6 – Doors and Windows

*This module introduces you to a key component of any Building – Doors and Windows.
For this exercise we'll start to explore the Cadimage Doors + Windows.*

Bach Doors and Windows

From an ArchiCAD perspective when using standard Aluminium Joinery it is hard determine if an opening should be classified as a Door or a Window.

For all the Exterior Joinery we'll use the **Cadimage Window**.

Please note that all Doors and Windows must be placed into Walls.

BIM Note:

Windows & Doors are not just the physical opening size, information needs to be added about opening style, frame type and dimensions, additional trims, reveals, architraves, exterior finishes and material colours.

Windows/Exterior Joinery

We'll start by opening the **Window** Settings dialog.

- Double click on the **Window Tool** in the **Toolbox**
- Navigate through the Linked Libraries to find **Cadimage Library 19**
- Click to highlight the **Cadimage Window** icon
- Now we are ready to create our Windows (and Exterior Doors)

The initial dialog has three selections:

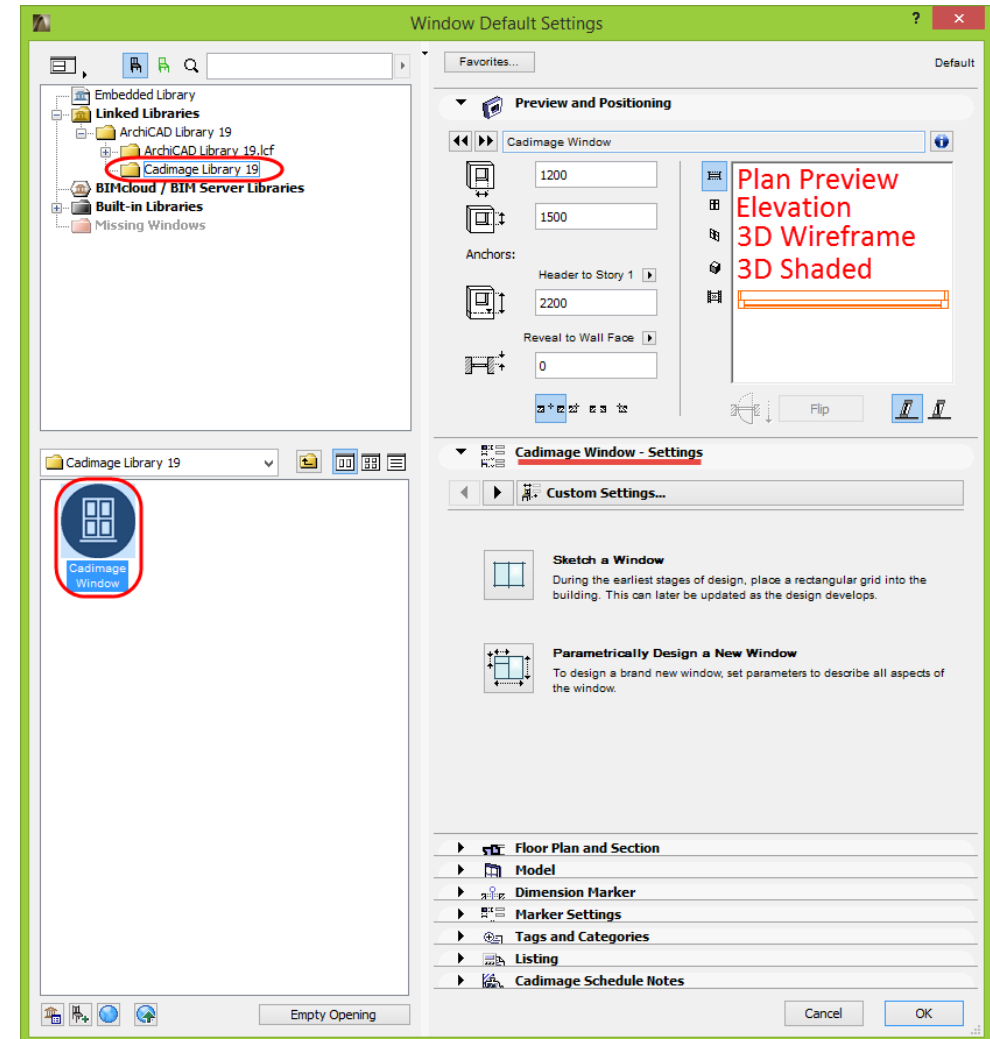
- **Sketch a Window**
Use this in the early design phase of your project to place quick windows with basic mullion configurations
- **Choose an Existing Window**
Use this method is you have already imported your Cadimage Presets Windows into your project

- **Parametrically Design a new Window**

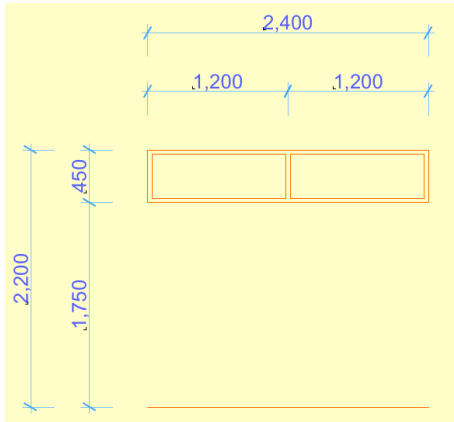
This is the full blown design everything method

We will start with the Sketch a Window Method.

- Select **Sketch a Window**



We simply want to create an opening to represent the window below

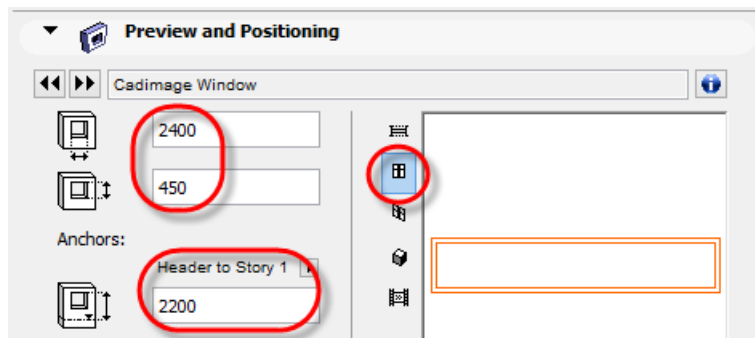


- Firstly we set the size of the window (frame)

BIM Note:

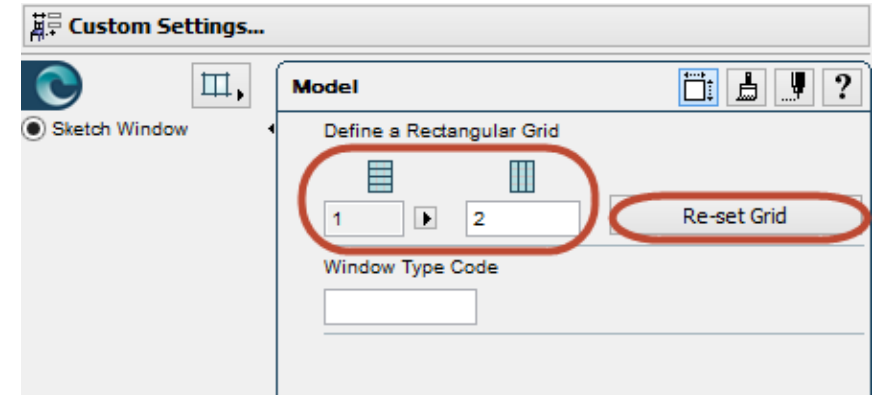
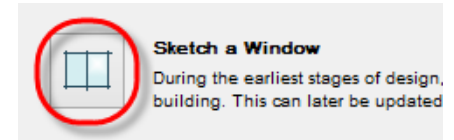
*We can use **Rough Openings** in ArchiCAD but the frame size is always the actual frame size, the **Rough Opening** can be set by using 'Shims' from within **Frame > Extensions > Shim Spaces**. **The when we dimension the opening it will dimension the Rough Opening.***

- Within **Preview and Positioning** set the width **2400**, height **450** and head height **2200**. (Header to Story 1) also set the Preview to **Elevation**.

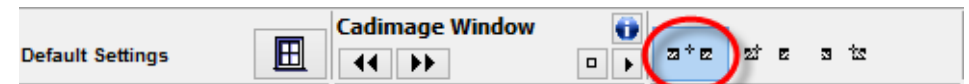


Within **Sketch Design Settings**

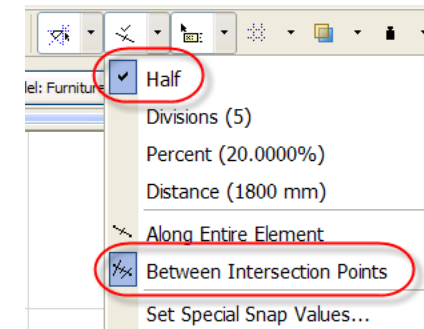
- Set the Horizontal Grid to **1**
- And the vertical Grid to **2**
- Hit the **Re-set Grid** button
- Then **OK**



To place the window, ensure the Window placement method is set to **Centre Method**

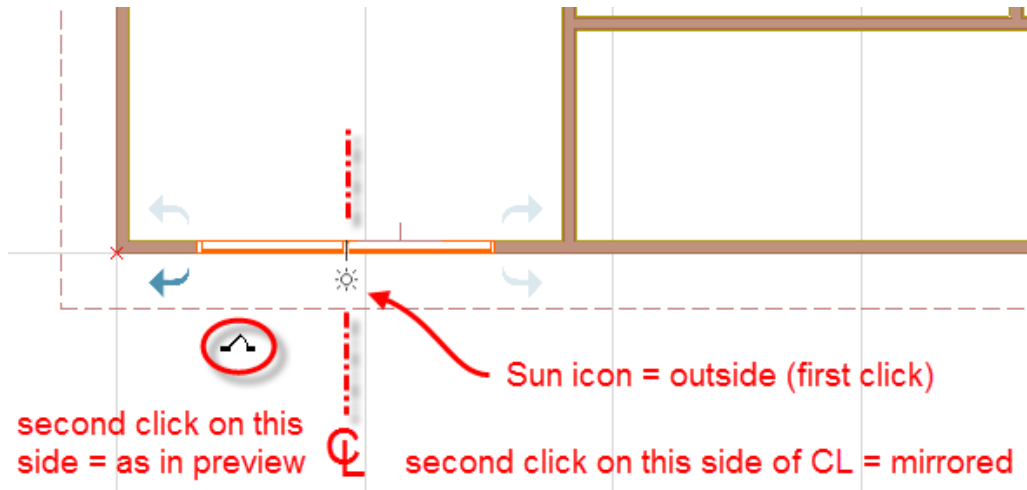


- Set the **Special Snaps** to **Half** and ensure it set to **Between Intersection Points**

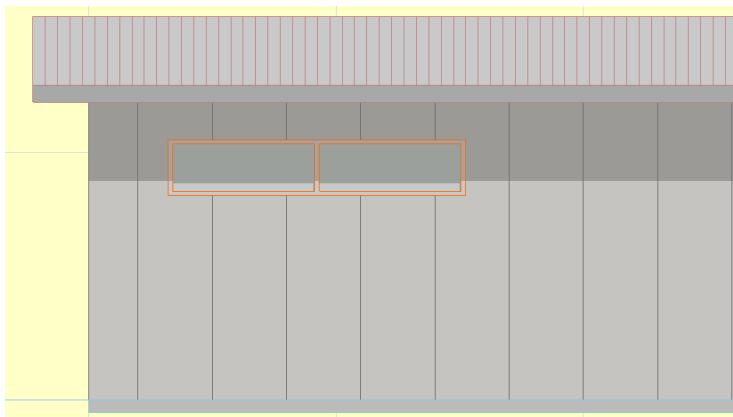


Rest your cursor over the outside edge of lower South Wall (Bedroom 1)

- Click the **Mid-point** marker
- When placing a Window the first click indicates the **Outside** (SUN), the second click is whether the window is mirrored, clicking to the outside and to the left of the centre line (looking from the outside) will place a window as it appears in the **Window Preview**, clicking to the right of the centre line will mirror the Window.



Preview your result in Elevation – Choose **South Elevation**

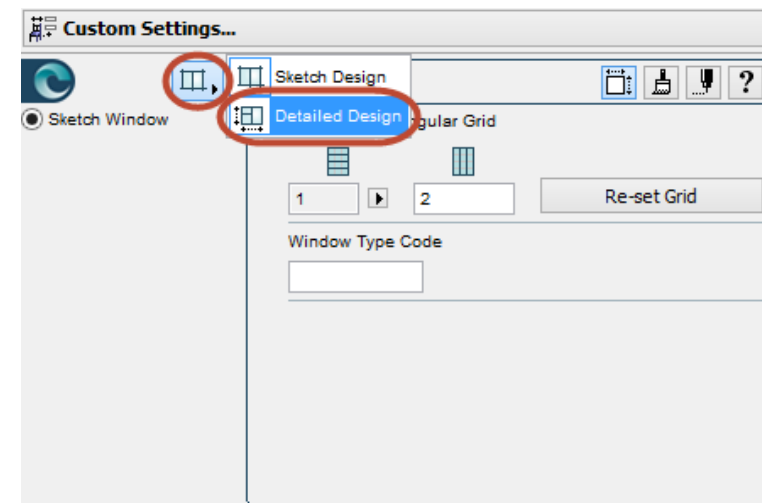


This is fine to indicate the Design intent of a framed opening in the wall.

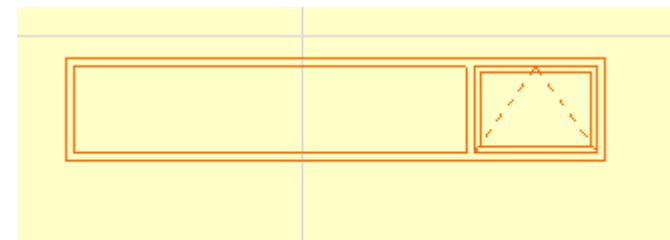
For Developed Design, and Construction Documentation, we can do better. Select the placed Window and open its Settings (**Ctrl+T** PC or **Command+T** for Mac)

- Check the **Detailed Design** button

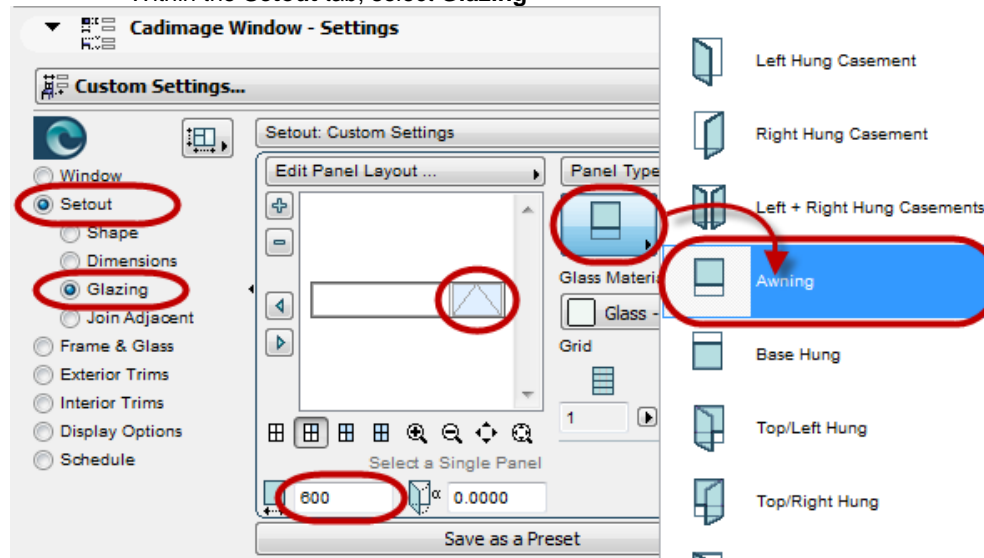
NOTE: The **Developed Design** Button also allows you the further edit the Sketch, and simply has fewer options than Detailed Design.



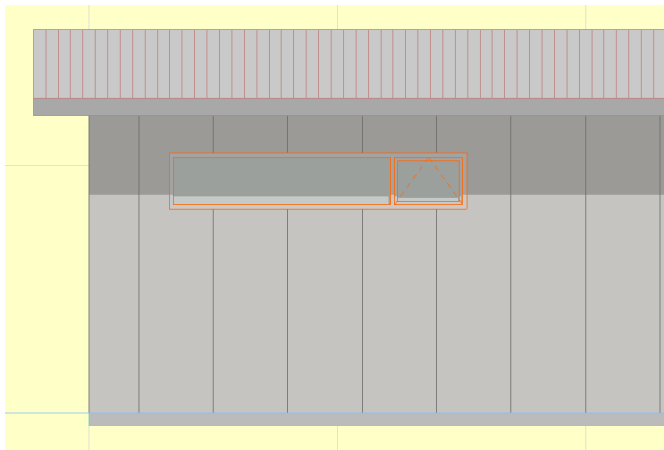
We want to further refine this opening by making the smaller sash appear as an awning window. As below



- Within the **Setout** tab, select **Glazing**



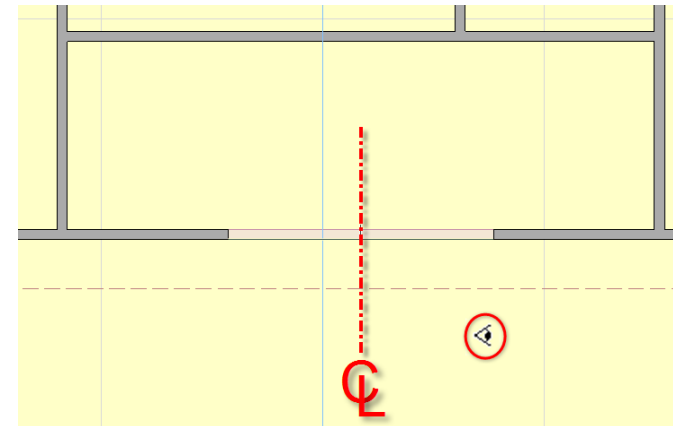
- Select the right window panel, and change its **Panel Width** to 600
- Then change its Panel Type to **Awning**
- Click **OK**, and your window will update.



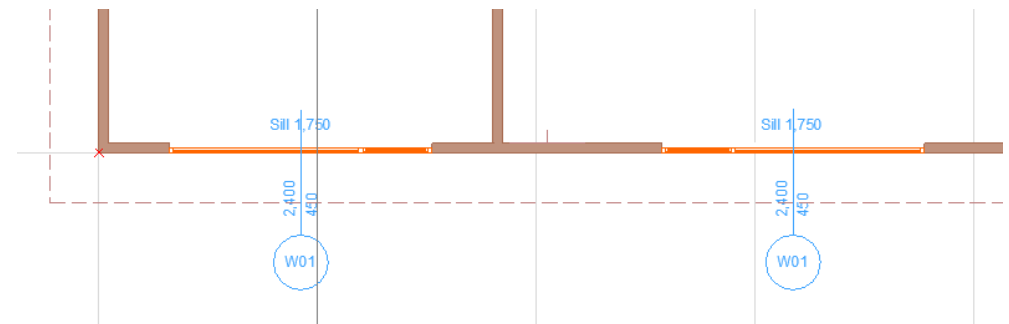
Notice the window now shows its 600mm opening sash.

Flip back to Plan view (**F2**), and place another window in the hallway, but this time mirrored.

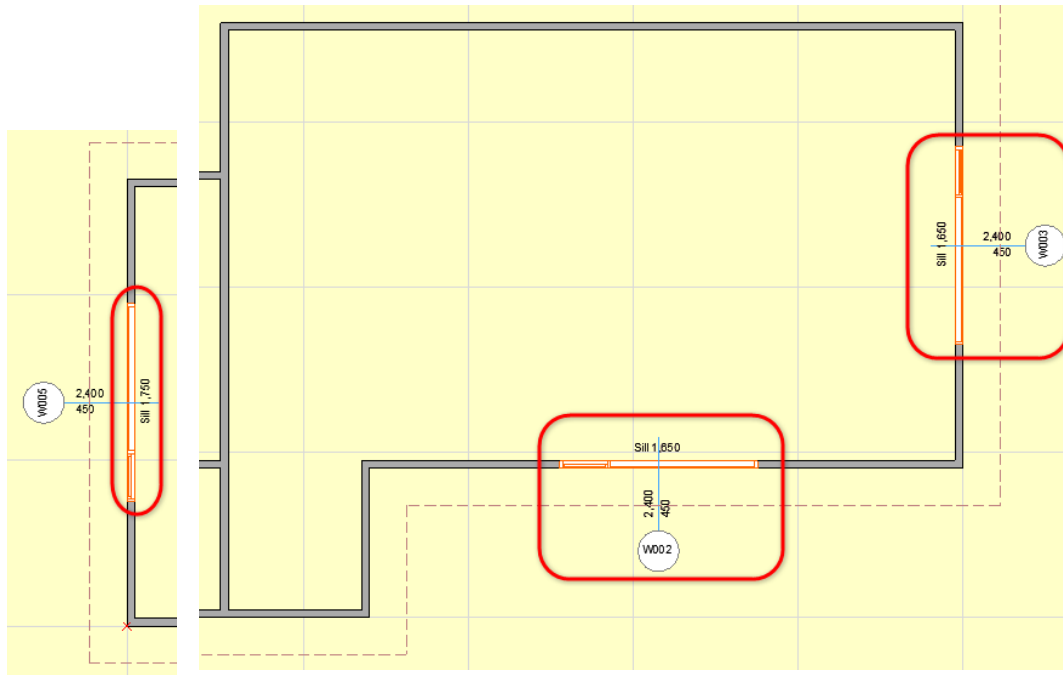
- Pick up the properties of your first placed window (Use **Alt+Click** for PC or **Option+Click** for Mac).
- Find the center mark of you hallway, and click to place the window.
- With you final click, click to the **right** of the Centre line looking at the building from the outside.



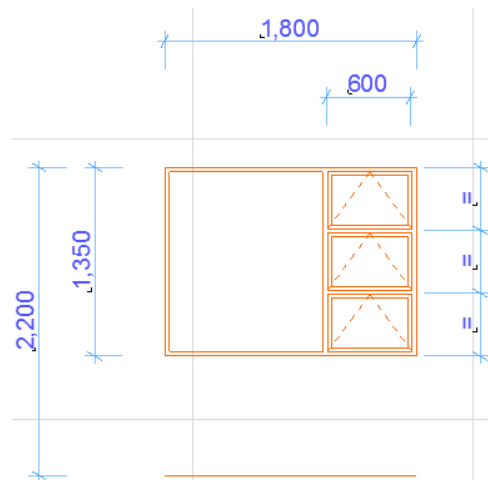
Notice the opening sash is on the left this time (i.e. it is mirrored)



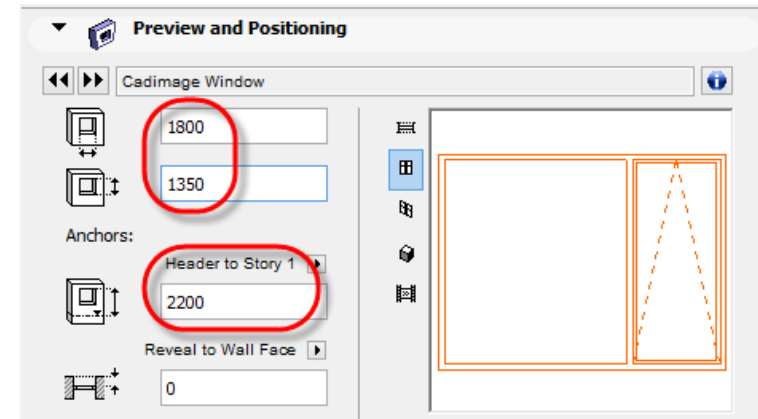
Continue to place a window in the Living room – not mirrored, another in the East wall mirrored and one in the West wall – not mirrored



Next we'll add Windows in the North Wall:

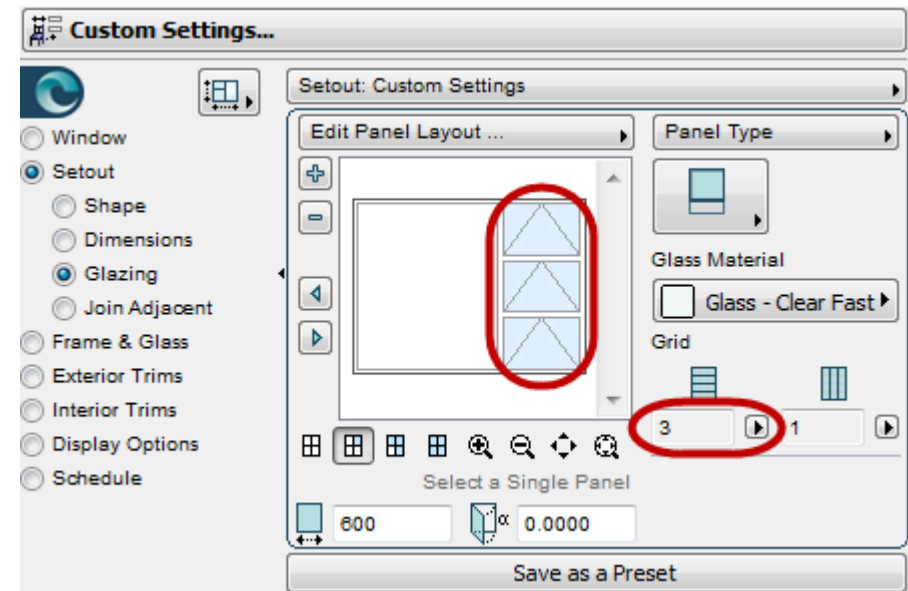


- Set the width **1800**, height **1350** and head height **2200**.

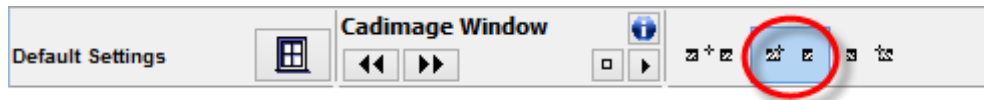


Next we want to keep the same opening sash width, but we want to add additional opening sashes.

- Use the **Setout > Glazing** highlight the right Right Panel
- Then where it says Panel Type change this to to Grid:
- Use **Divide Panel** to split the sash into 3 panels

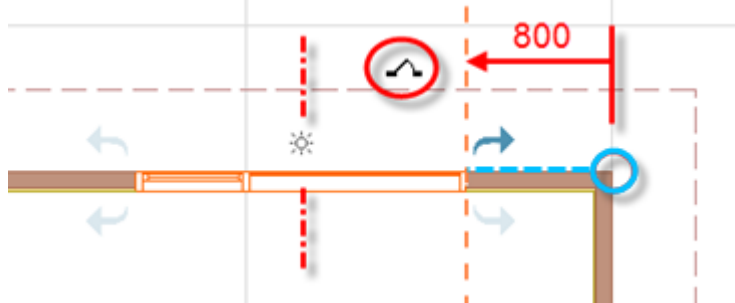


- Before placing window change the placement method to **Side 1**



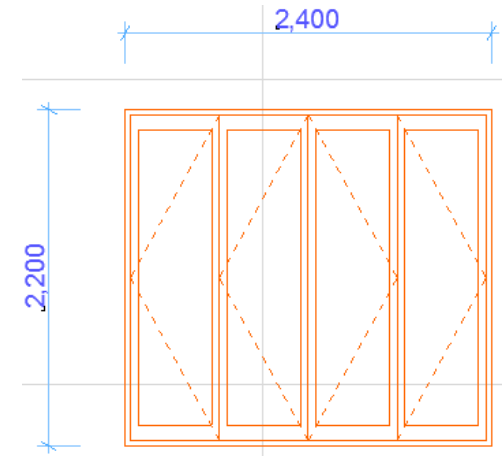
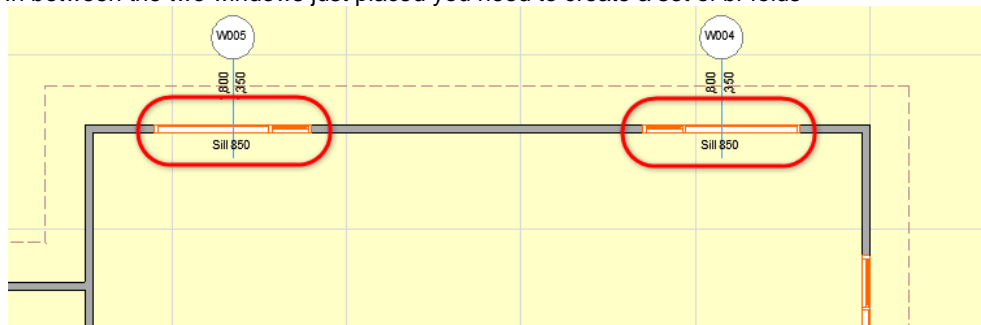
This allows the Window to be placed from its 'Right Side'. We want to place this window **800mm** in from the exterior corner of the building.

- Rest your cursor over the exterior corner – this will activate the Snap Guide
- Move your mouse to the left and type **800 -**, then **Enter**
- When you hit Enter the right side of the window is positioned
- The cursor changes to the **door swing** icon (orientation) – click to the **left** of the centre line as if you are looking at the window from the outside.

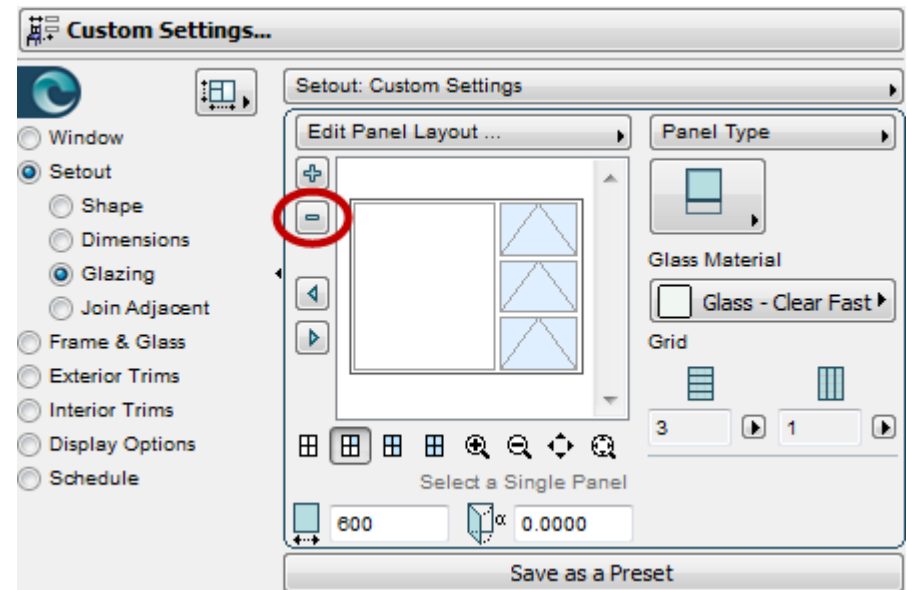


- Repeat this exercise for the Window on the left hand side of the same wall, but this time place the window mirrored.

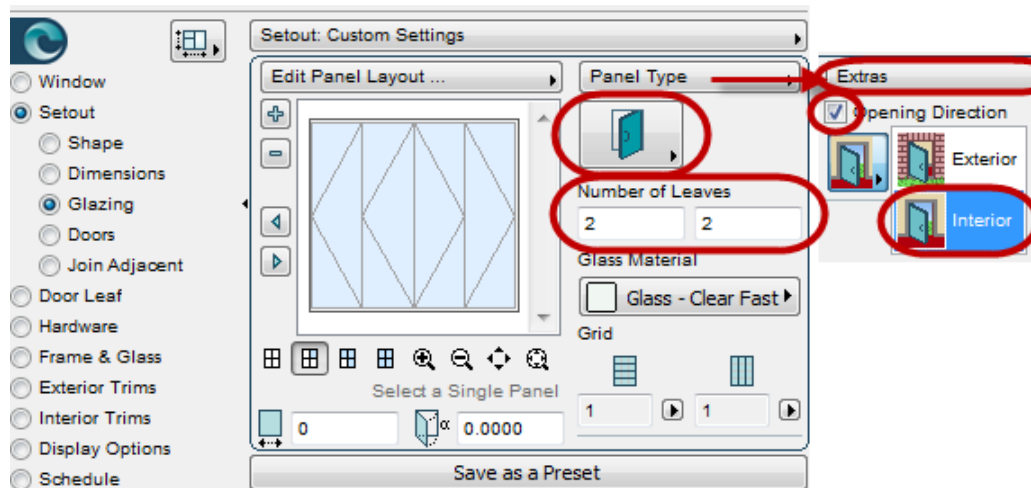
In between the two windows just placed you need to create a set of bi-folds



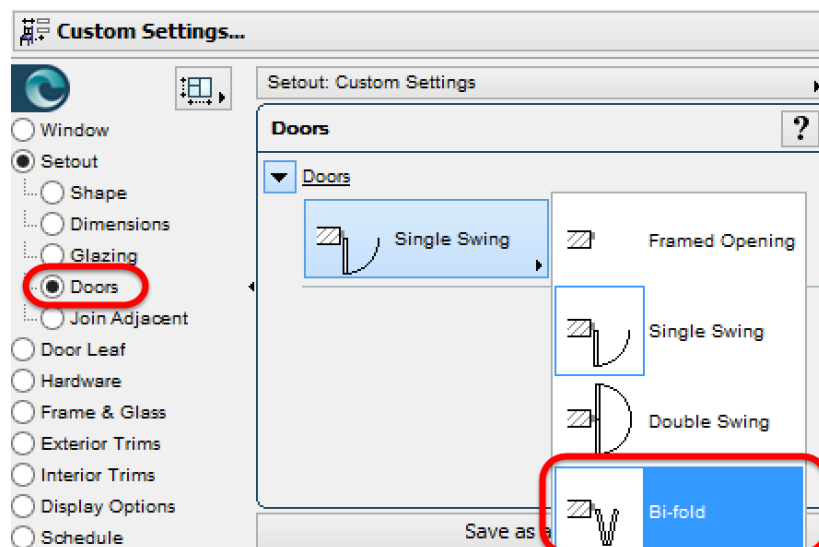
- Open the **Window** Settings
- Set the width **2400**, height **2200** and head height **2200**
- Use the **Setout > Glazing** interface to:
- Delete the Right Panel by selecting it and hitting the **←** button



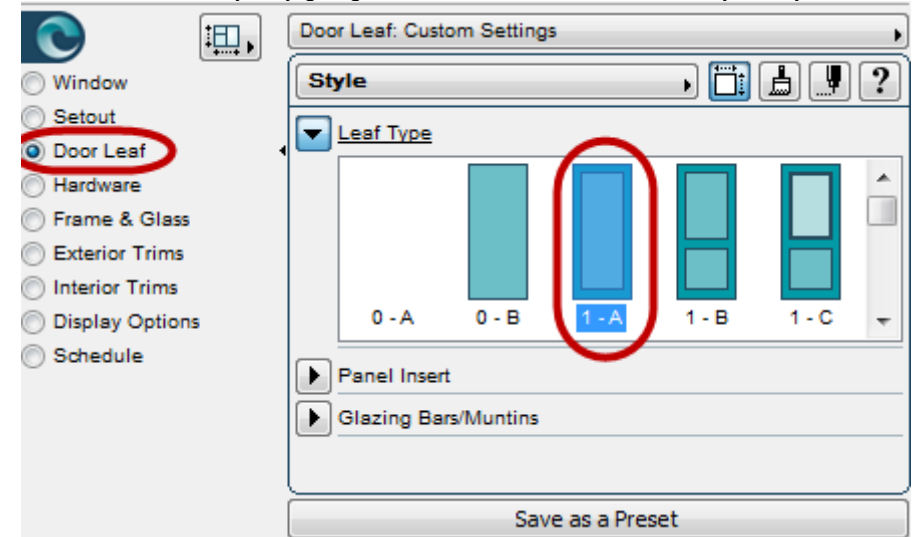
- Select the remaining Panel and change it to a **Right Hung Door** with 2 leaves on both sides



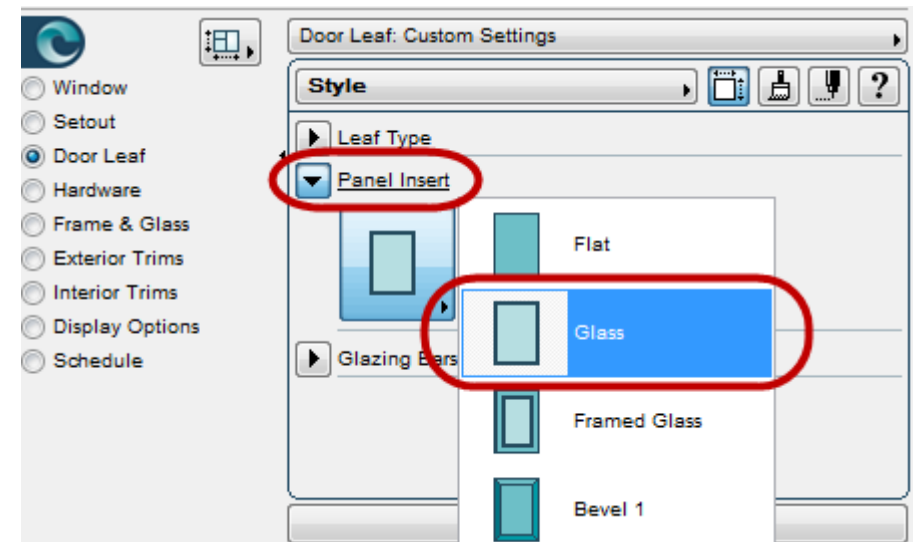
- Change to Extras & tick 'Opening Direction' set the doors to open to the **Exterior**
- Go to **Setout > Doors** and set the Door Type to **Bi-fold**



- Set the Door Style by going to **Door Leaf > Leaf** and choose your style

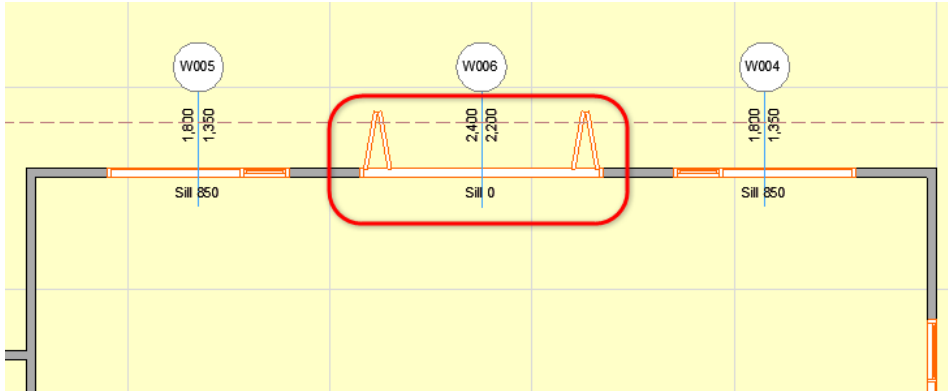


- Set the **Panel to Insert** to **Glass**

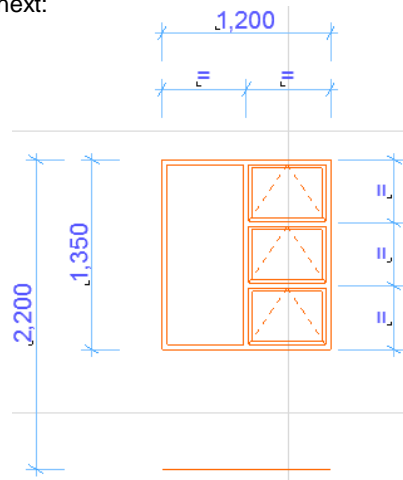


- Click **OK**

- Change the placement method back to the **Centre** and place the Window in the centre of the Wall – Remember to click to the left of the CL looking at the window from the outside.

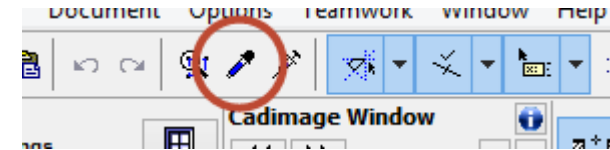


The bathroom window is next:

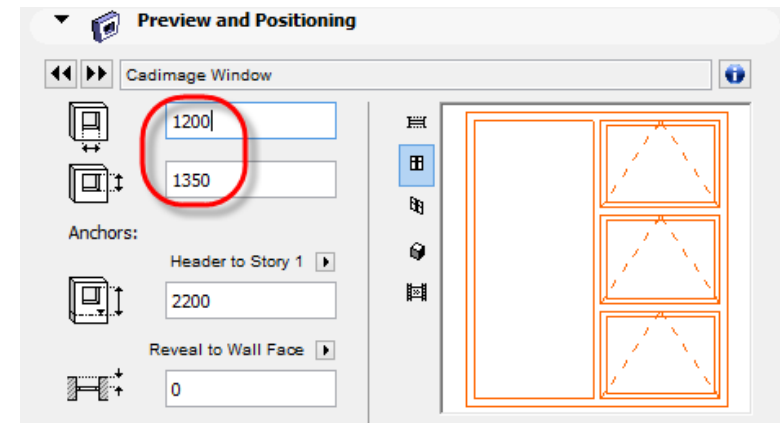


As this window is very similar to our Kitchen/ Living Windows we can use this as a start point.

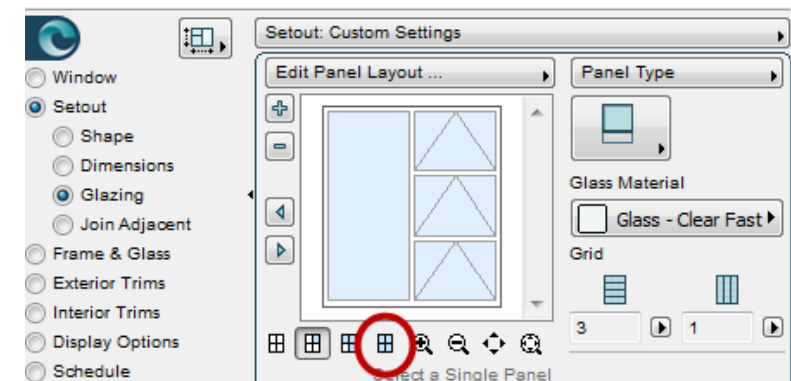
- Pick up the Properties of your placed window with the **Eyedropper** (Alternatively use **Alt+Click** for PC, **Option+Click** for Mac)



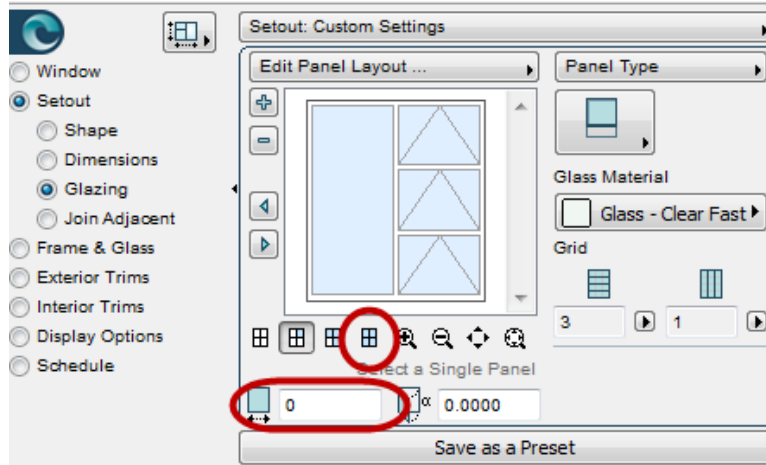
- Alt+Click** or **Option+Click** on the Kitchen window
- Open the **Window** Tool
- Within **Preview and Positioning** set the width **1200**, height **1350** and head height **2200**.



- Within the **Setout > Glazing** interface select **ALL** Panels



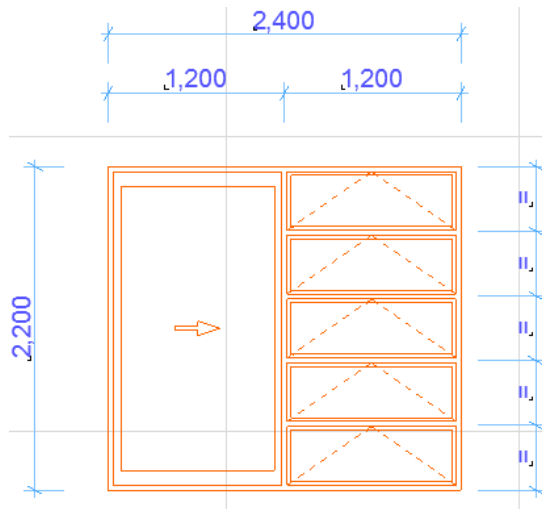
- Set the **Panel Width** to **0** (this means the panels are equal)



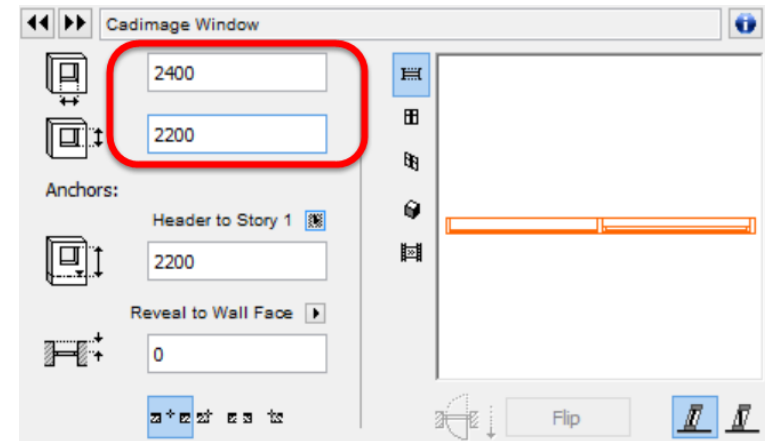
- Click **OK** and place the Window in the **centre** of the bathroom wall. Not mirrored (click to the left of the centre line looking at the window from the outside)

Now for the Bedroom sliding doors.

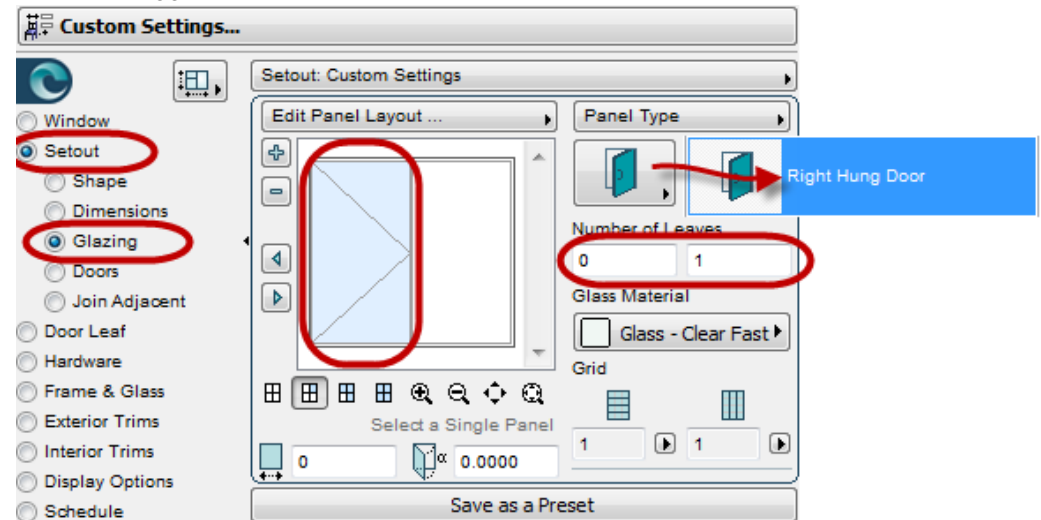
NOTE: We are still using the **Cadimage Window** Tool for this 'Door'



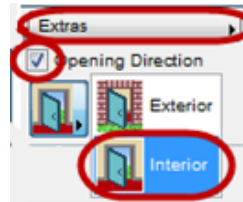
- First set the Width to **2400** and Height to **2200** within **Preview and Positioning**



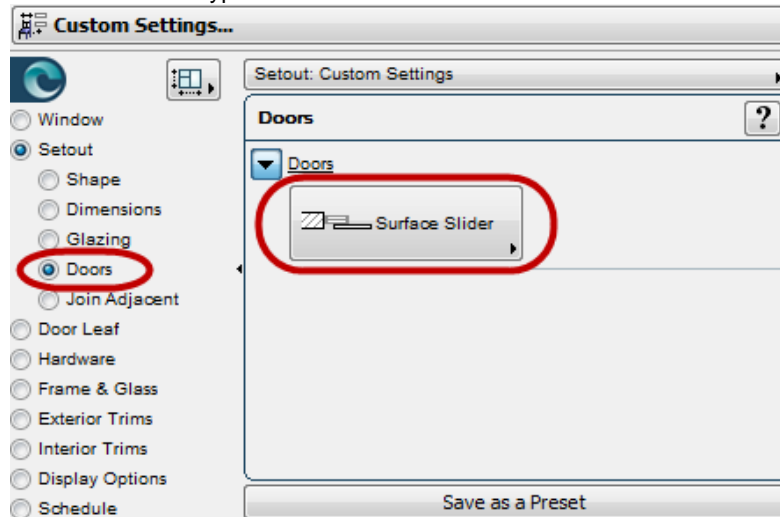
- Within the **Setout > Glazing** tab select the left panel and set it to **Right Hung Door**



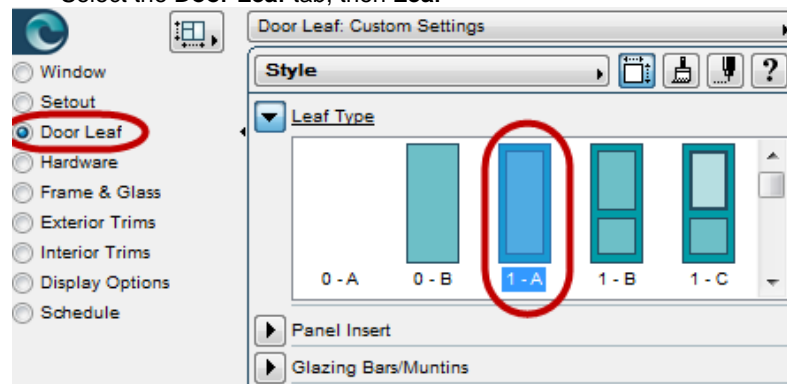
- Set the door panel to open to the **Interior**
- Click the **Panel Type** button, change it to **Extras**
- Set the the opening direction to **Interior**



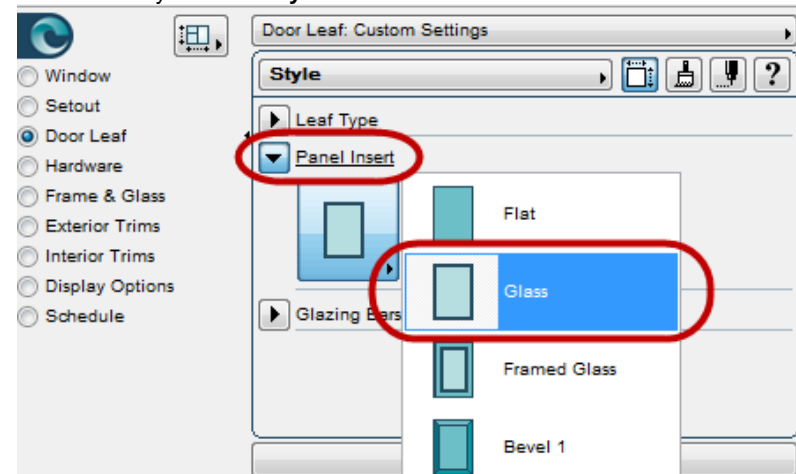
- Select the **Doors** tab
- Set the Door Type to **Surface Slide**



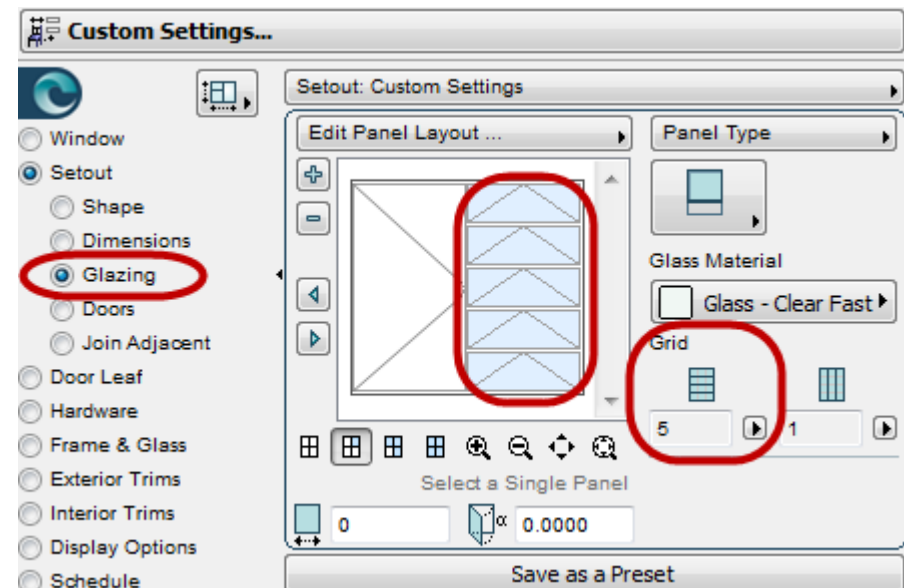
- Select the **Door Leaf** tab, then **Leaf**



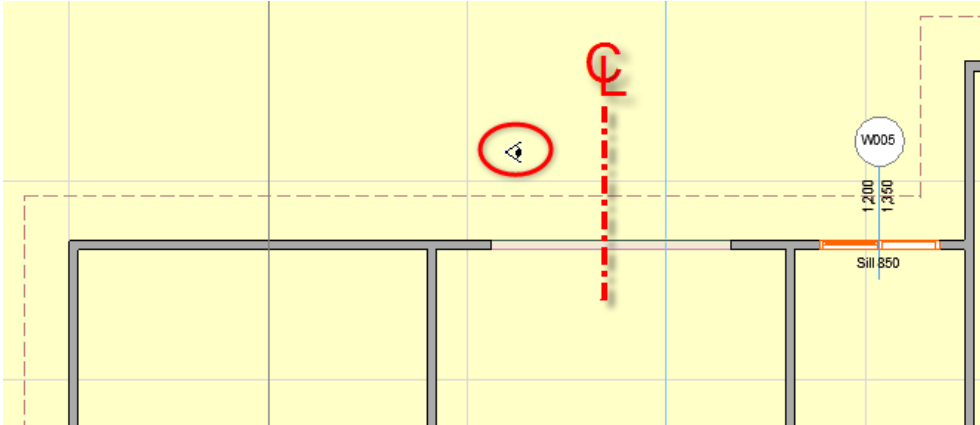
- Choose your **Leaf Style** and set the Panel to Insert to **Glass**



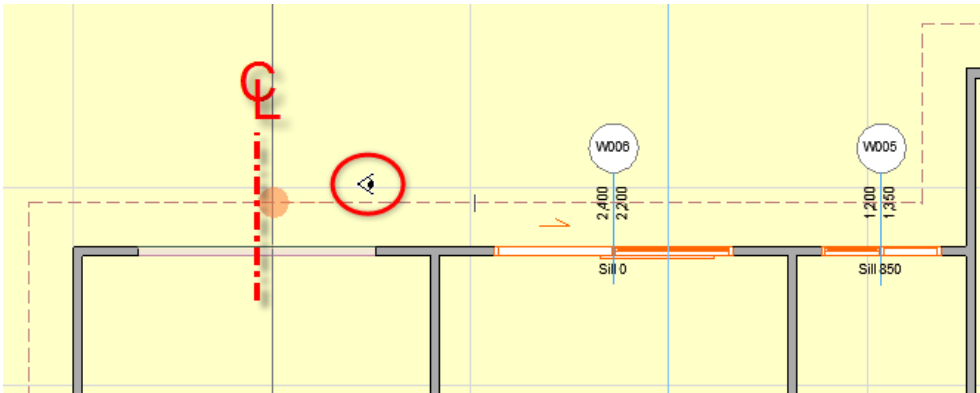
- Go back to the **Glazing** tab and highlight the right Panel (by clicking on it)
- Set the Panel Type to **Awning**
- Change Panel Type to 'Grid'
- Divide the Panel into **5 Horizontals**



- Click **OK**, and place the Door via its centre point, in the centre of the Bedroom 2.
- Place the door mirrored – make your final click to place the door on the right of the Centre line looking at the window from the outside.

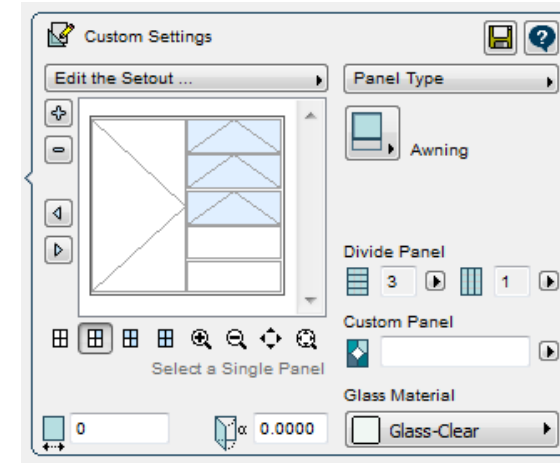


- Place an identical Door, but this time not mirrored in Bedroom 1 – make your final click to place the door on the left of the Centre line looking at the window from the outside.

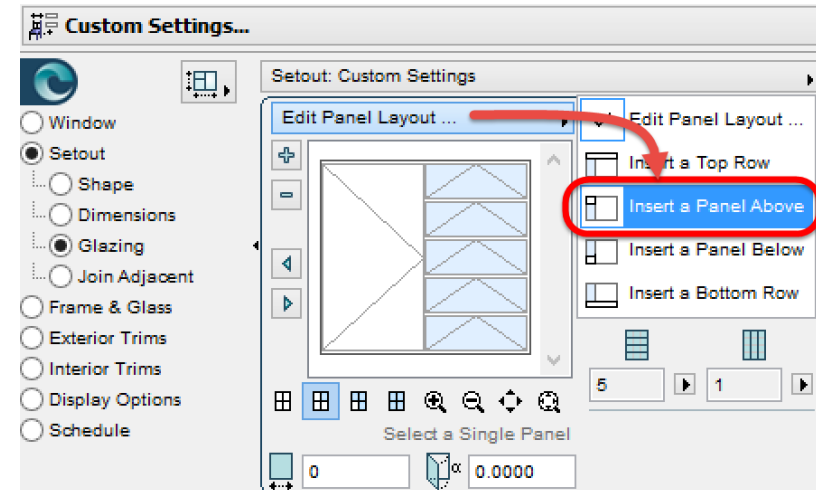


INTRODUCTION TO BIM

NOTE: Using the Divide into equal divisions means that the panels are identical, if you wanted 5 horizontal panels but the bottom 2 were fixed, you need to create 2 separate panels with the top one set to Awning and split into 3 and the bottom one set to fixed and split into 2.



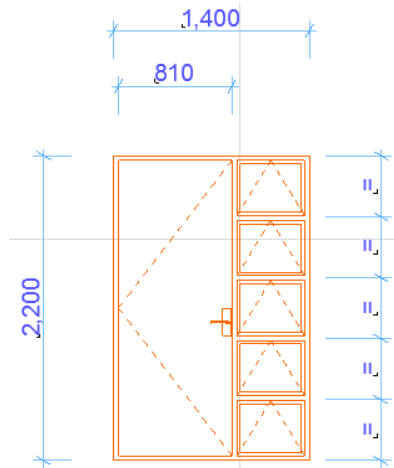
To do this you choose the 'Edit the Setout...' button to add a panel above:



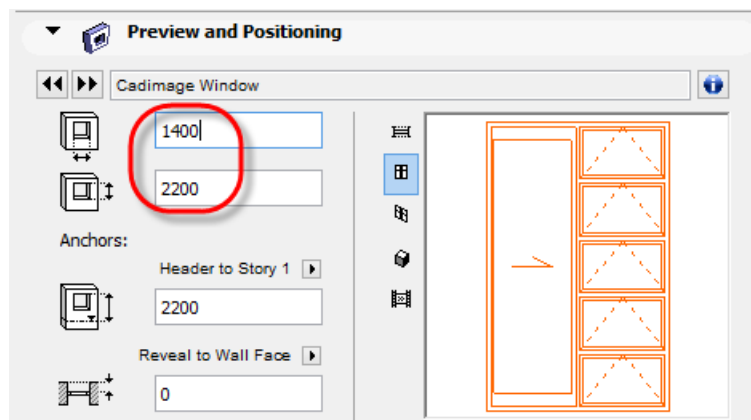
You can control the sizes of the lower and upper panels under **Setout>Dimensions**

The final item you'll place is the **Front Door**; however, you'll still use **Cadimage Windows**.

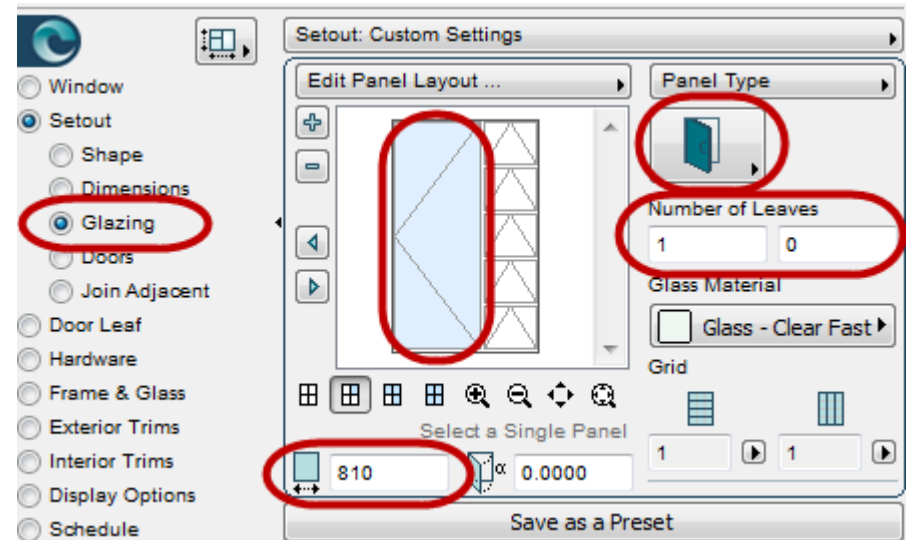
While not entirely the same we'll 'pick up' the attributes of the just placed Bedroom 1 Sliding Door and modify it as required.



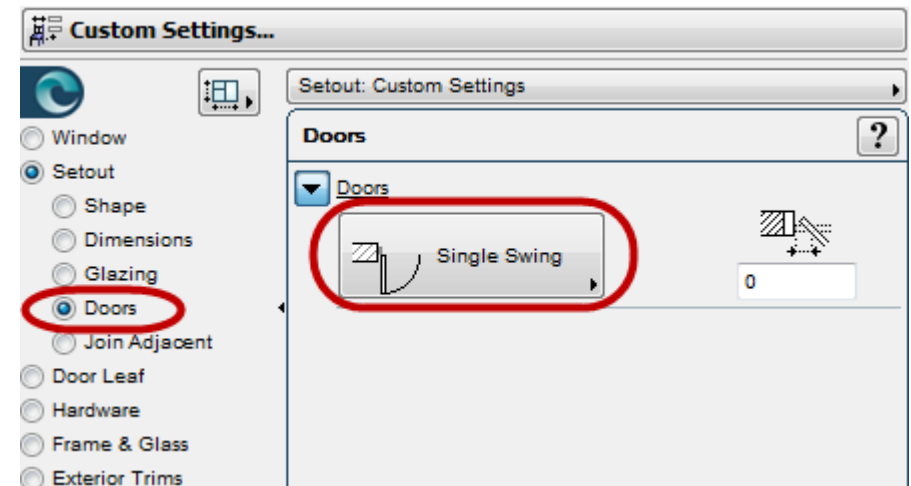
- **Alt / Option+Click** on the edge of the main Window in Bedroom 1 – before clicking make sure the Window element is highlighted
- Open the Window Settings (**Ctrl+T** or **Command +T**)
- Set the Window (Door) size as **1400 w x 2200 h** with head height **2200mm** within the **Preview and Positioning**



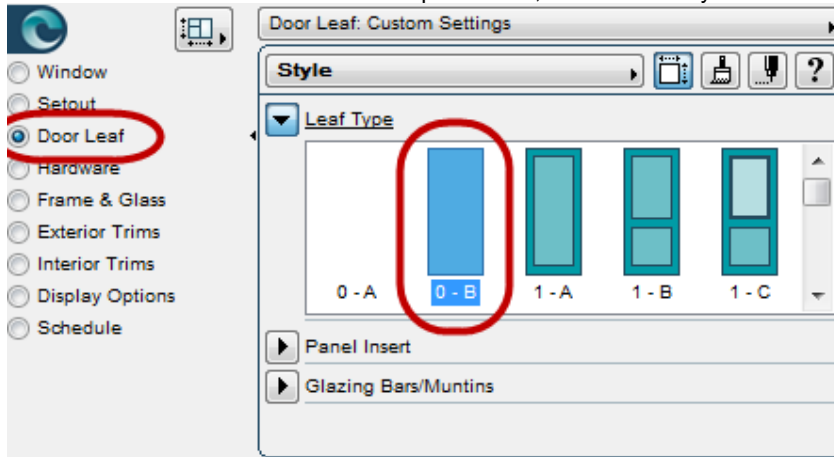
- Use the **Setout > Glazing** interface to:
- Change the Left Panel from a Right Hung Door to a **Left Hung Door** with a Panel Width of **810mm** (this is the Leaf size)



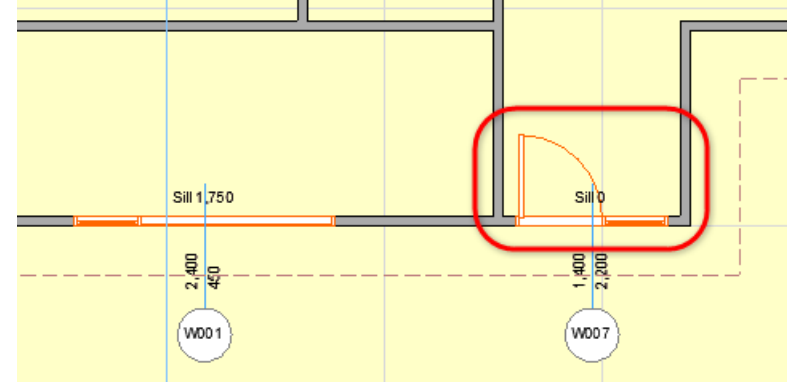
- Under **Doors** change the door type to a **Single Swing**



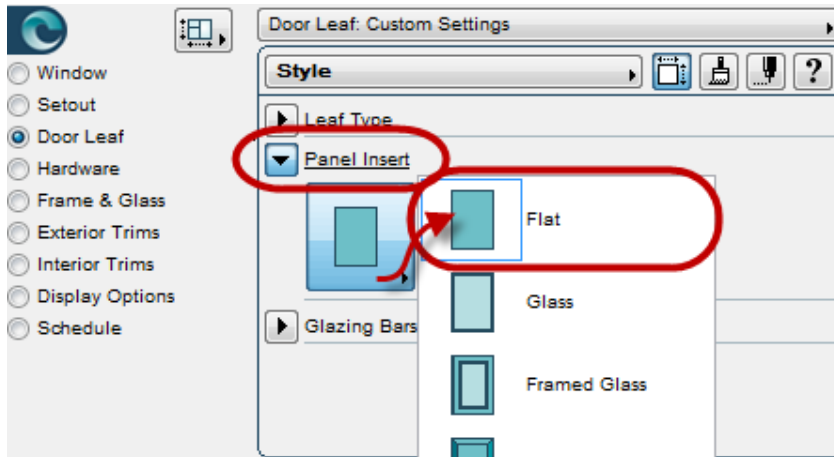
Use the **Door Leaf** interface to select a flat panel door, set the door style to 0-B



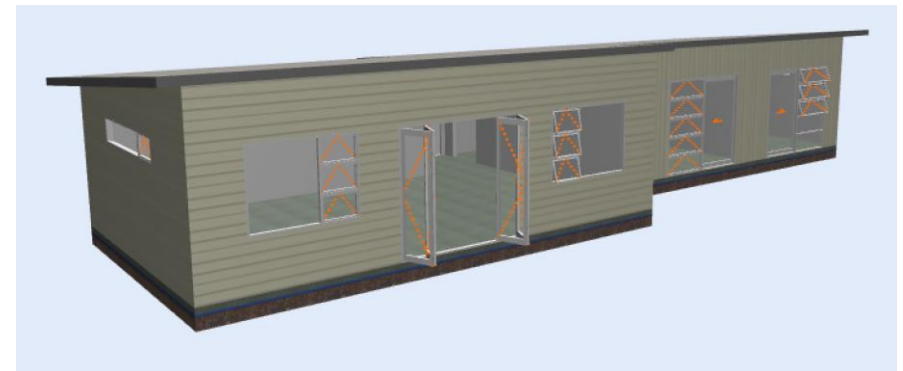
- Use the Centre placement method and place the Window midway between the exterior Wall and the Corridor Wall
- Click to have the door as it appears in the Preview Window (i.e. not mirrored)



Choose **Flat** for the **Panel to Insert**.



- Having placed the windows check out the 3D Views and the Elevation

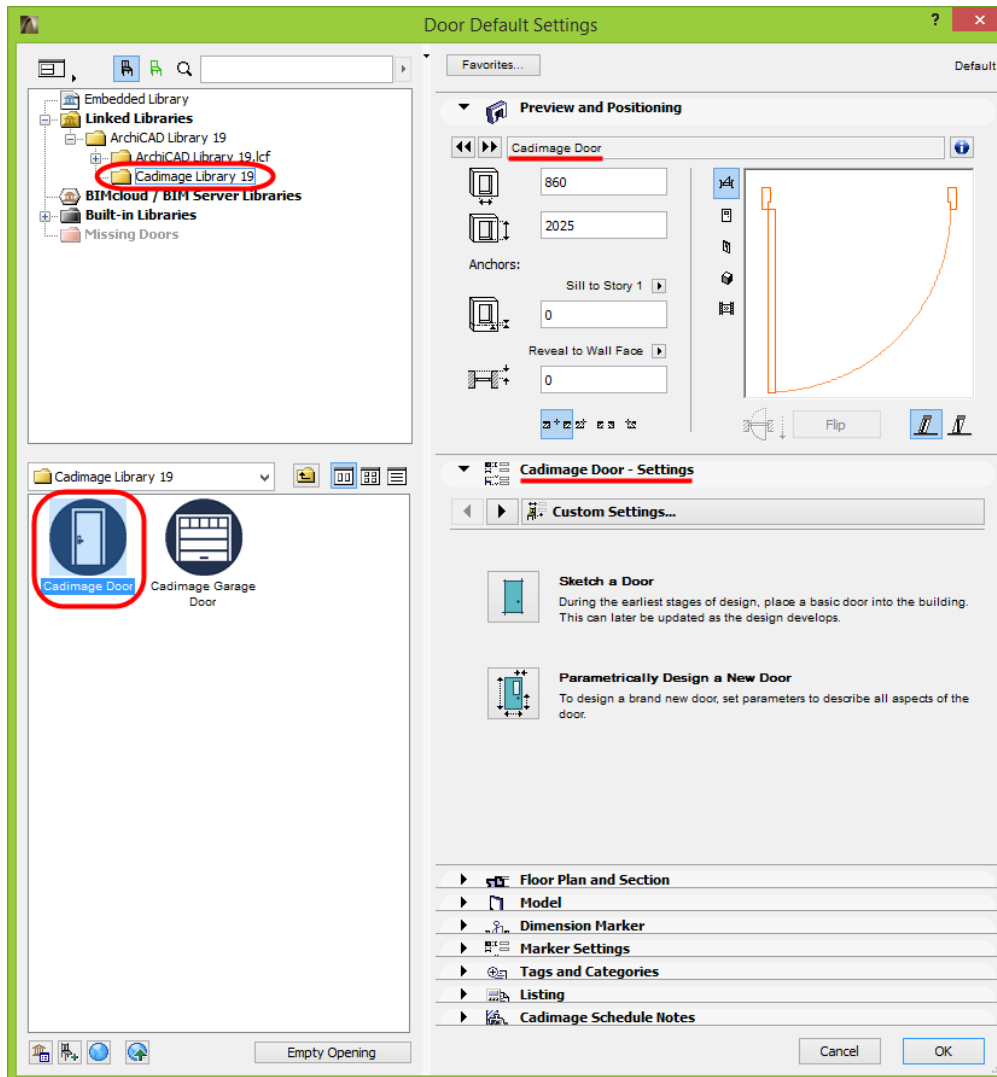


- Click **OK**

Interior Doors

- The interior doors are created using **Cadimage Door**.
- Open the Door Settings and make sure you have the **Cadimage Door** Door selected. You will see the following interface:

You have similar initial option to the Cadimage Window Tool:



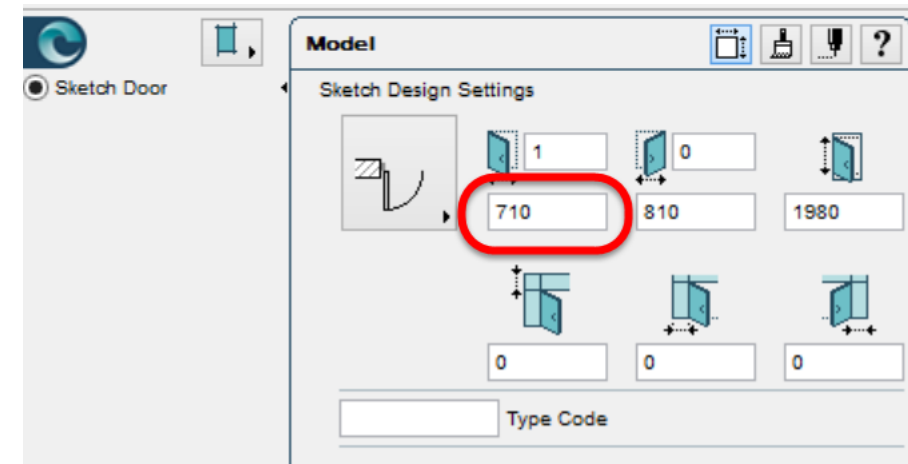
Sketch a Door – use this method to create a quick sketch design door

Choose an Existing Door – use this method if you have premade Doors

Parametrically Design a New Door – use this method to create any door from scratch.

We will just use a simple door for our Bach.

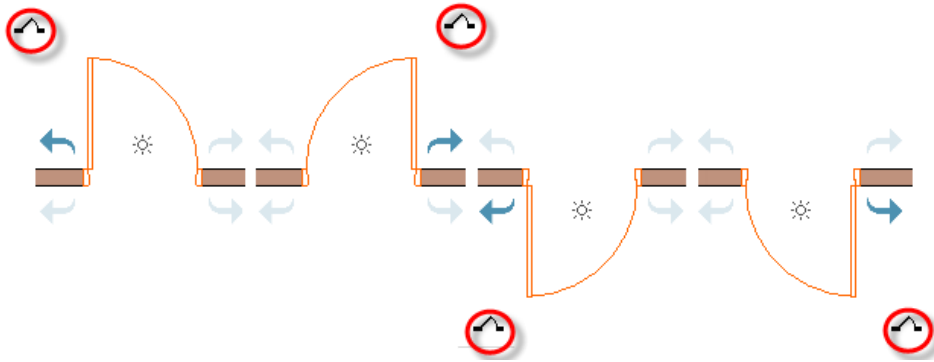
- Select the **Sketch a Door** option
- Just change the left leaf width to **710** and click **OK**:



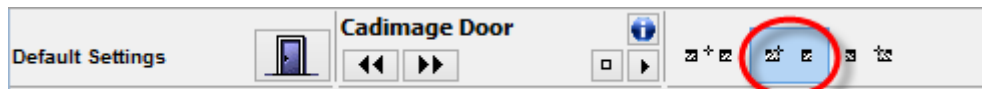
- Click **OK**

As with Windows two clicks are required to place a Door:

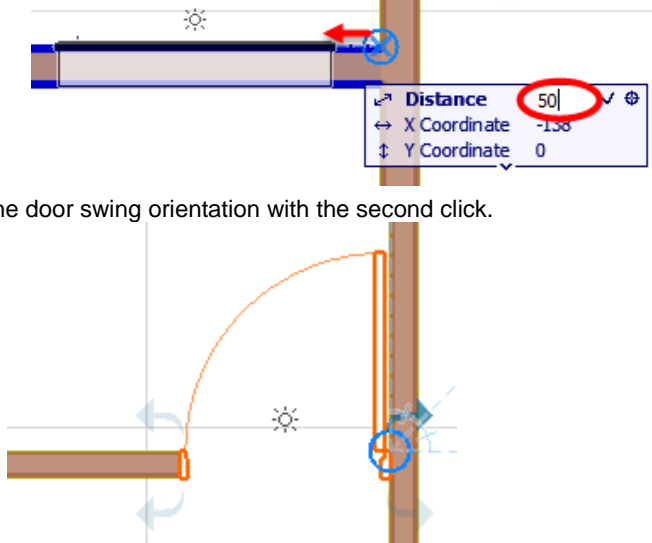
- The first indicates the insertion point, **Center**, **Side 1** or **Side 2**
- The Second click indicates in which direction the door swings (for a typical door 4 different swings are possible, make sure you click well towards the area you want the door to open to)



- Ensure the Door Placement method is set to the **Edge** (Side 1)



- The doors are all placed **50mm** from the nearest wall intersection (allowing for a 50mm stud).
- Hover your cursor at the wall intersection until the Snap Guide appears
- Move your mouse to the left and type **50** then **Enter**



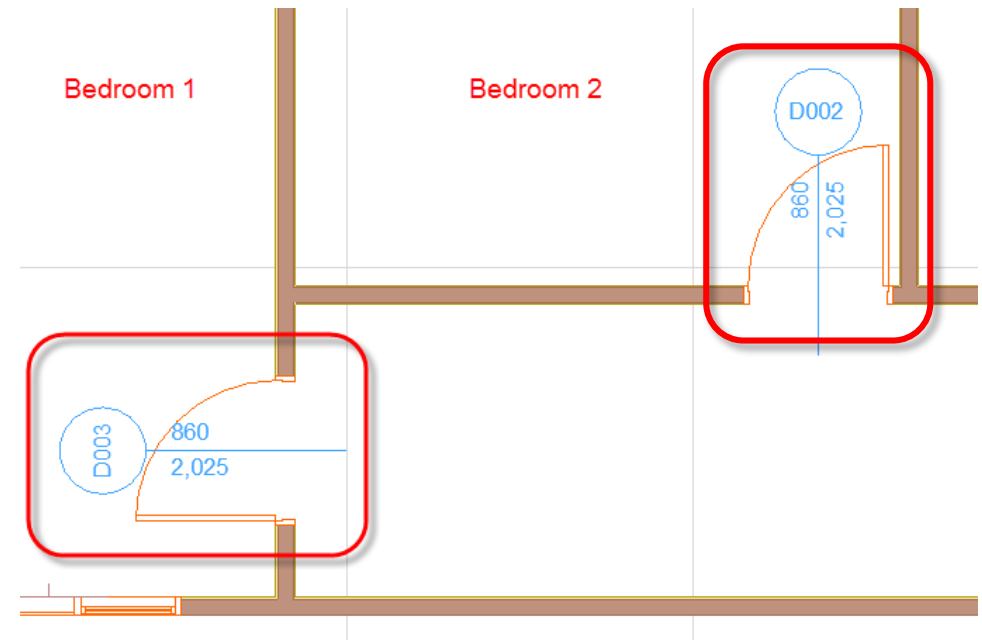
- Choose the door swing orientation with the second click.

Now place an **810** door into Bedroom 2

- Select the **Door** Tool in the Toolbox and change the width to **810**
- With the same '**Side 1**' placement, place the door 50mm from the wall junction.

Place the final door into Bedroom 1

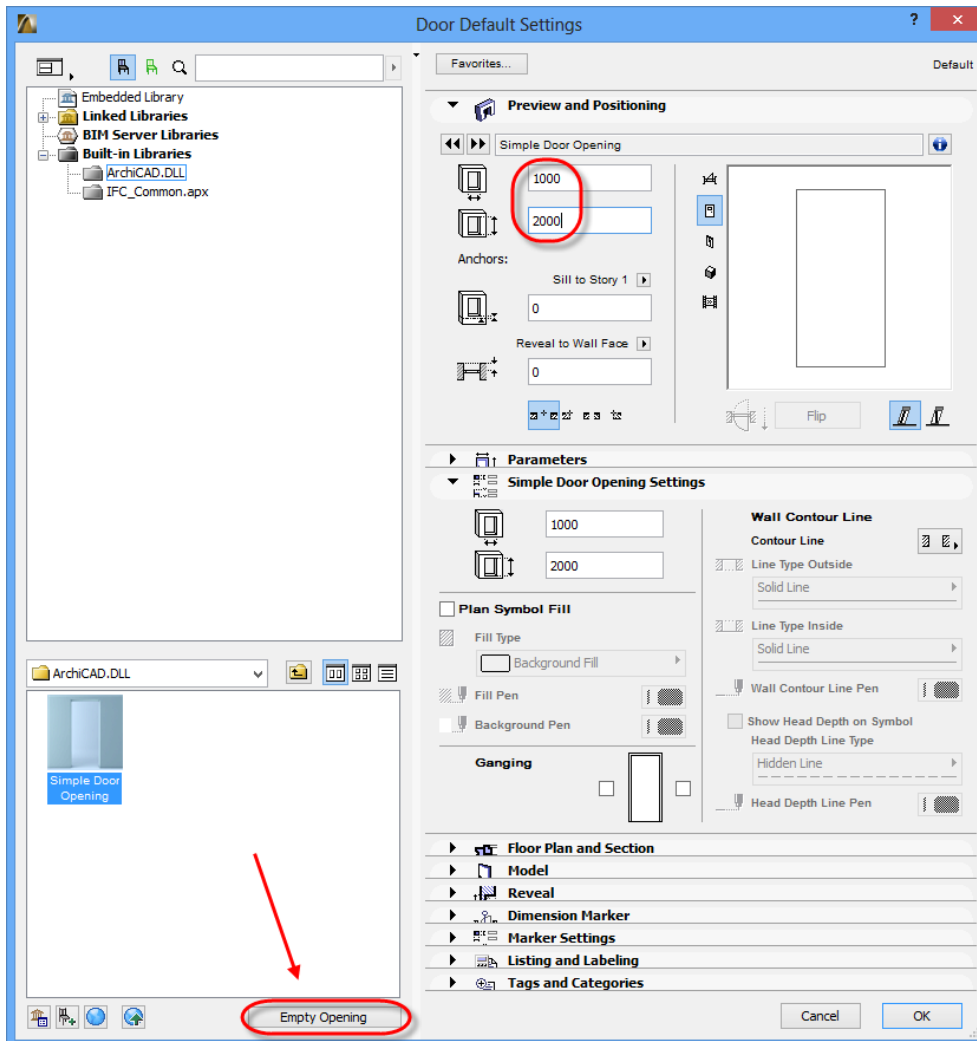
- Place this door via its centre point, and choose the mid point of the end Hallway wall.
- Make the door swing to the outside wall.



Empty Opening

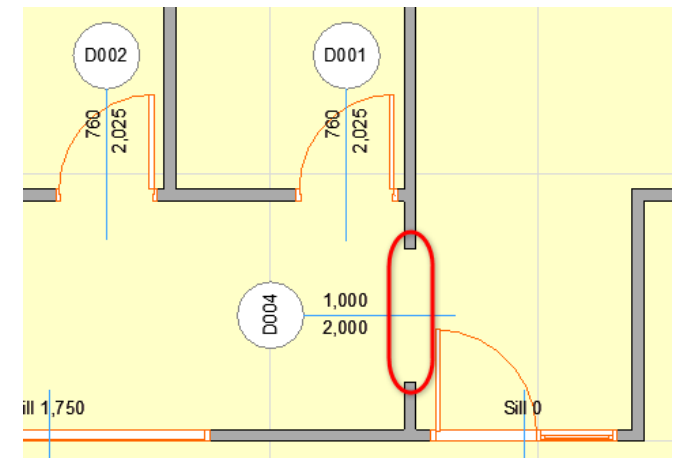
Both the Door and Window tool allow you to place empty openings. These are simply holes in the walls with no Door or Window geometry.

- Open the Door Settings and click the **Empty Opening** button

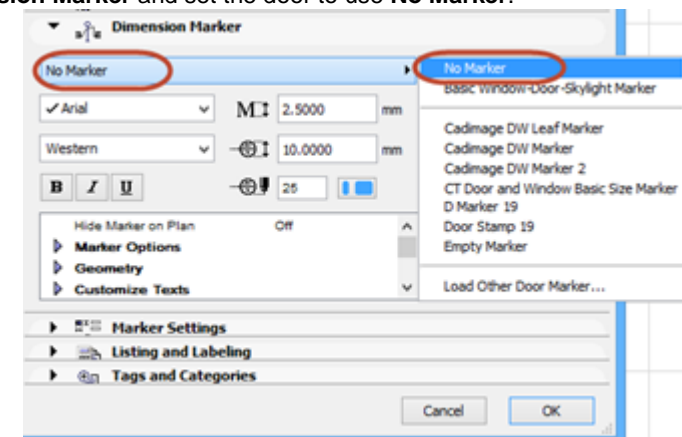


- Set the size of the opening to **1000 w x 2000 h** and ensure the Sill height is still **0** (Sill to Story 1)
- Click **OK**
- Place the empty centered in the right Hallway wall

ArchiCAD still thinks this Empty Opening is a Door and as such gives it a Door Number.



- To remove this, select the **Empty Opening** and in it's settings navigate to **Dimension Marker** and set the door to use **No Marker**.



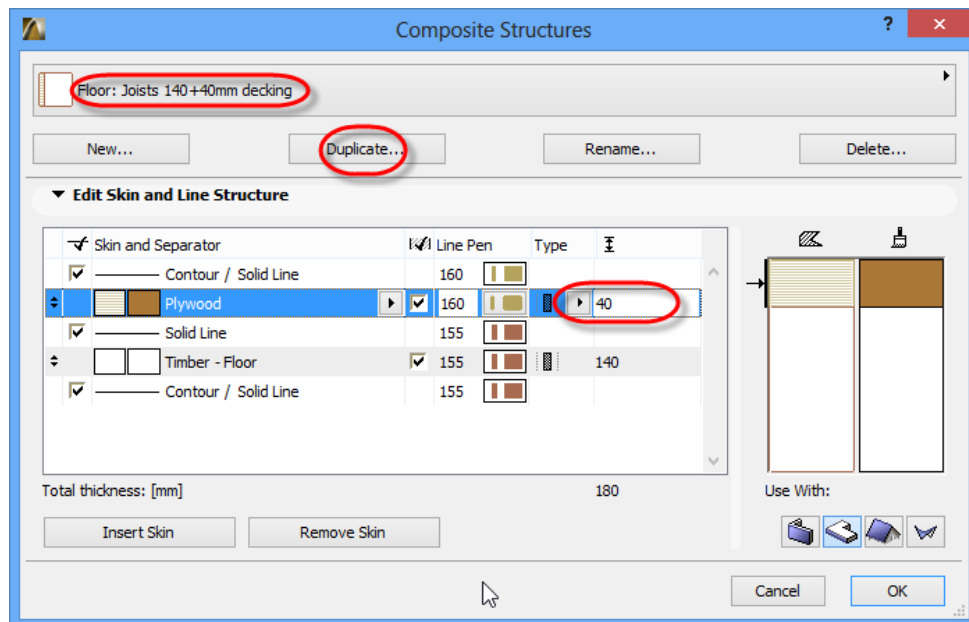
Module 7 Extras – Bach Extensions

This module involves some additions to the bach. The additions include a deck, pergola and a carport. You'll also add some furniture to the plan.

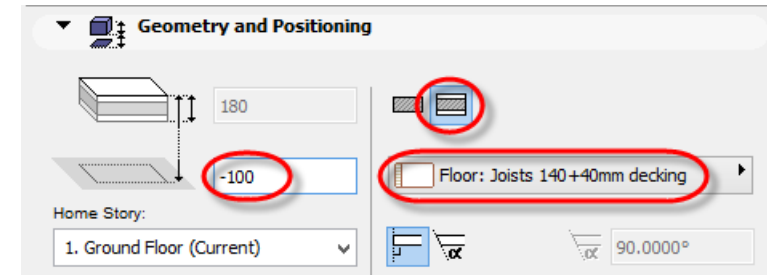
Deck

To create the deck we will use the slab tool. The deck runs along the full width of the north side of the Bach.

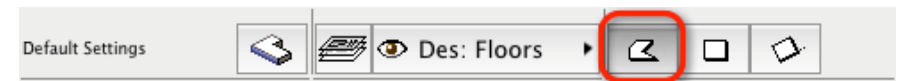
- We'll create a quick Composite to mimic our Floor structure:
 - 140 joist + 40mm decking members
- Open the Composite settings – **Options > Element Attributes > Composites**
- Choose an existing Composite that is similar to the one we want to make - **Floor: Joists 140+20mm Ply** is close.
- Select Duplicate and give our new composite a descriptive name – **Floor: Joists+40mm decking**
- Click **OK**



- Select the Slab Tool
- Choose our new Composite

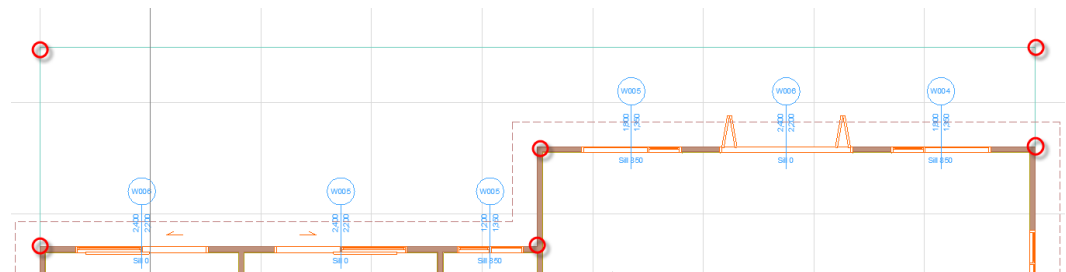


- Set the Slab to start 100mm down from the Ground Floor (-100)
- Make sure the Slab Geometry method is set to Polygon



- Click the top right corner of the Bach and draw the first edge **1800mm** to the north
- Proceed to the left until you are in line with the left hand side of the Bach (you can 'pull' a Guide Line off the left corner to ensure you are accurate)
- The remaining points of the deck are the edges of the bach; you should end up with the following

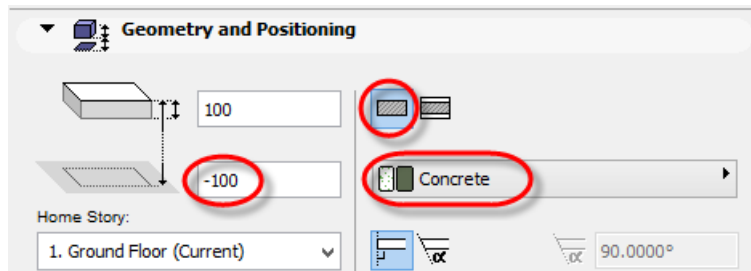
Note: If you make an error whilst creating your polygon shape; pressing **Backspace** will remove the last point.



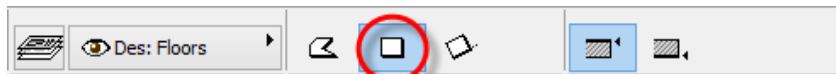
Carport

On the south side we are going to add a Slab and extend the Roof to create a carport.

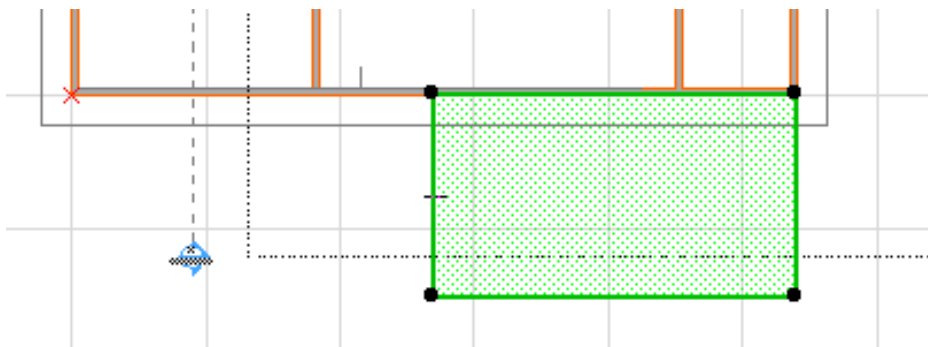
- Open the **Slab Tool** – because this slab is not a composite structure, i.e. it's just a simply non-insulated concrete slab, so we don't need to choose a composite.
- Choose **Basic** Slab type and set the Building Material to **Concrete**
- Change the slab level to -100mm



- Set the Slab Geometry method to Rectangular



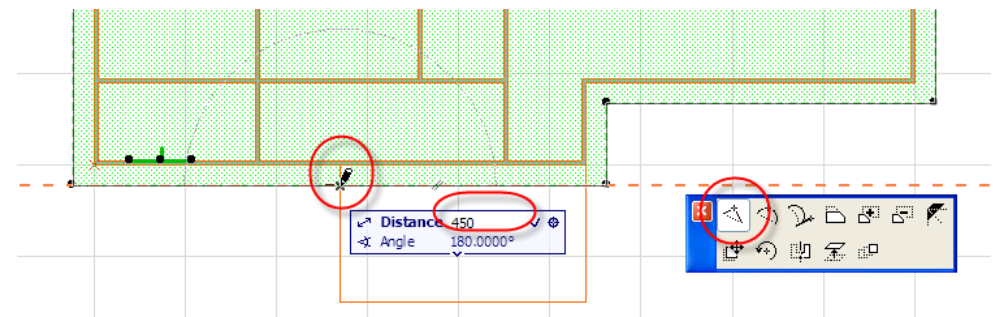
- Create a Slab **5400 x 3000mm** from the lower right corner



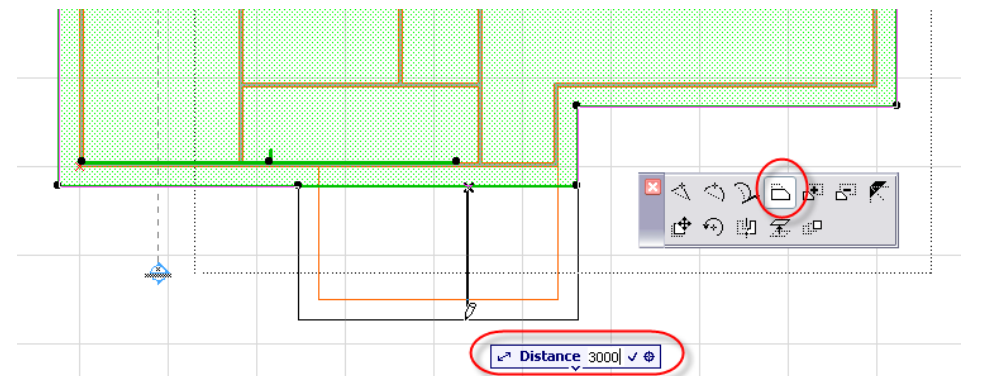
- Click on the lower right corner to start the slab, move your mouse in the general direction of the lower left corner of the finished slab. Using the **Tracker**, Type **5400**, then **Tab**, then **3000** then **Enter**

Roof Editing

- Select the **Roof Tool**
- Select the Roof
- Use the **Pet Palette** to add a node to the south edge
- This node needs to be **450mm** to the left of the new Slab edge (450mm is the roof overhang) Select the edge of the roof, highlight the intersection point between the roof and slab, move node to the left and type **450** into the Tracker, then **Enter**



- Extend the Roof edge using the Pet Palette
- The edge should be extended **3000mm** to the south



Columns

- You can use columns to form the side of the carport
Open the **Column Settings** and set up a column as follows:

Column Top – **Not Linked**

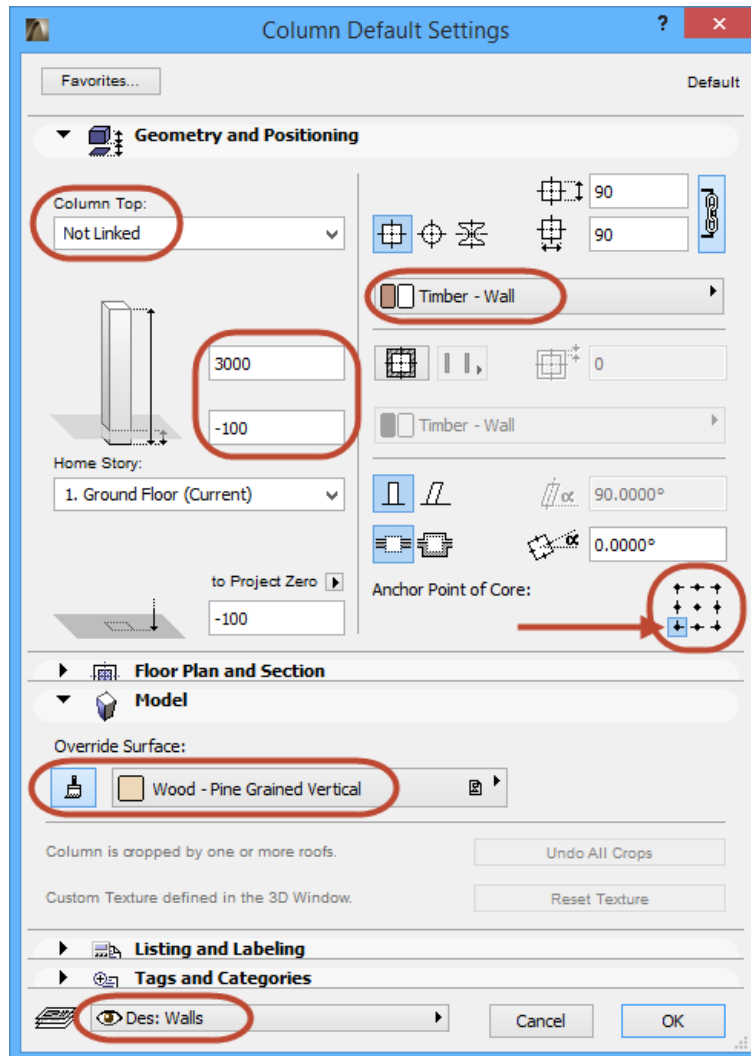
3000mm tall

Timber – Wall Building Material

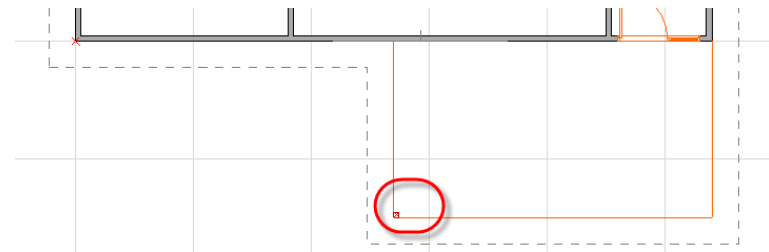
Bottom left placement point

Override surface material to **Wd-Pine Vertical**

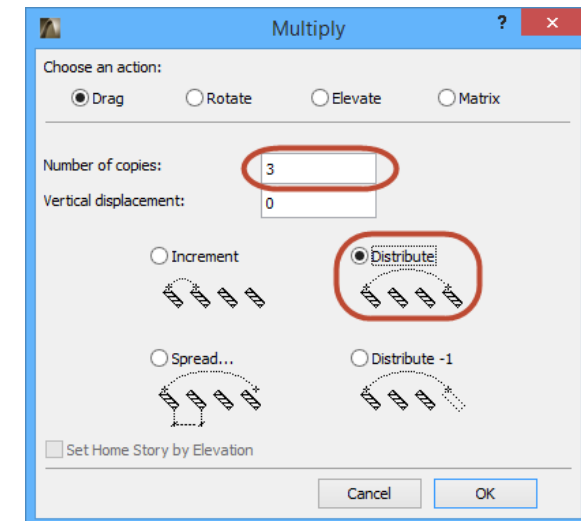
Layer = **Des: Walls**



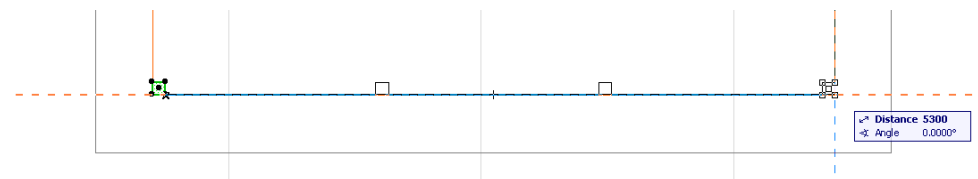
- Place the Column at the bottom left corner of the Slab



- Select the Column and use the **Multiply** command (right click menu **Move > Multiply...**) to create 3 copies that are equally spaced along the edge



- Make sure you pick up the bottom right corner of the Column when you multiply it so that you can snap this point to the bottom right corner of the Slab

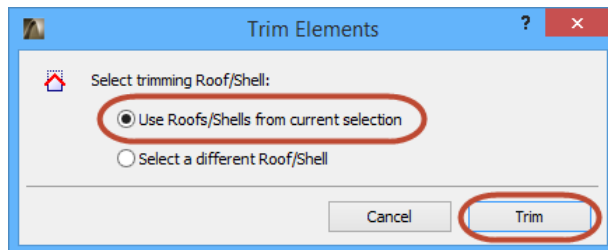


- Switch to 3D (F3)
- Select the columns. (Have the **Column** Tool selected and hit **Ctrl+A** or **Command+A** to select ALL Columns)

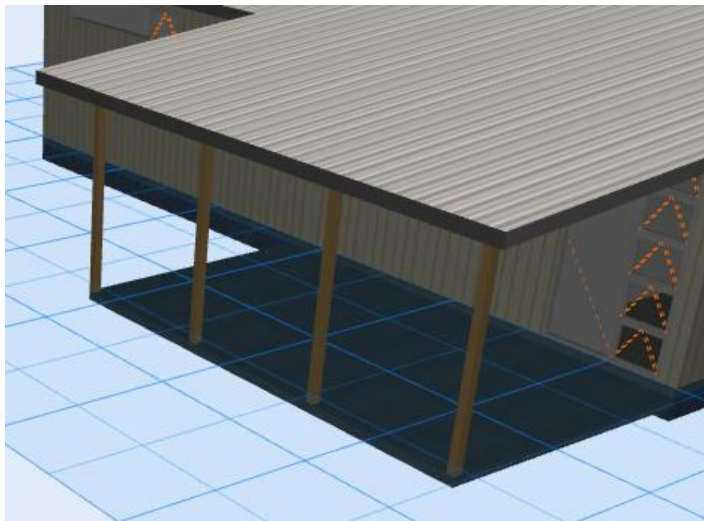


NOTE: The InfoBox will tell you how many columns you have selected. We should have 4.

- To use a different method this time also select the Roof you will be trimming to and with all 5 elements selected (4 columns & 1 roof).
- Right Click, Choose **Connect > Trim Elements to Roof/Shell**.



- Choose 'Use Roofs' and click Trim:



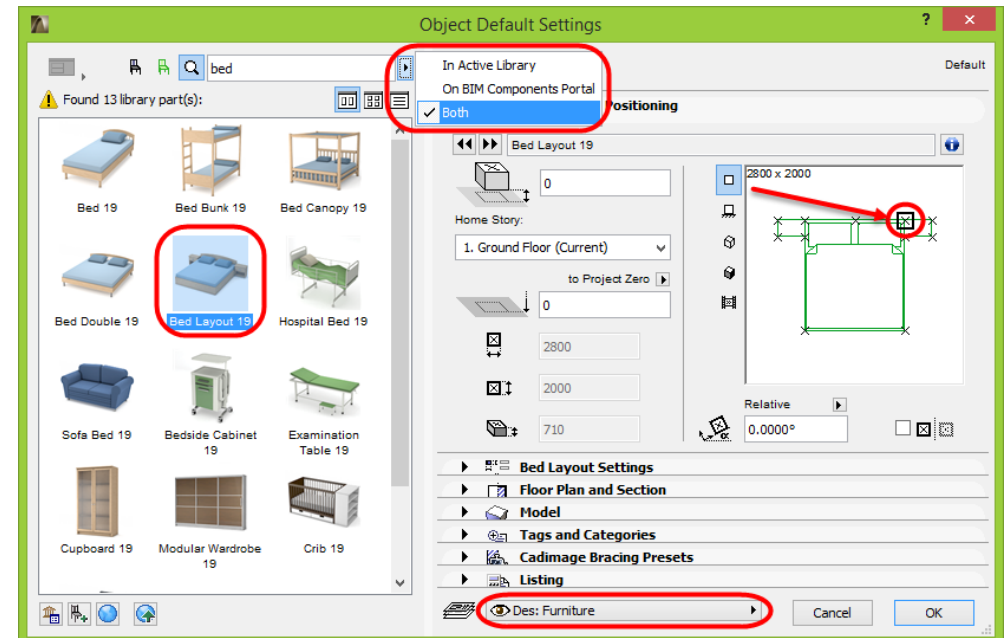
Furniture & Fittings

To help identify the function of the various rooms you can add some furniture and fittings. Furniture and Fittings are **Objects**. ArchiCAD has an extensive Library of Parametric objects that ship with ArchiCAD, in addition to this is the **BIM Components Portal**; a global resource of objects that can be dropped into your project as easily as the ones in the standard ArchiCAD Library.

When placing initial design or space holder objects – the '**Layout**' objects are great.

Beds

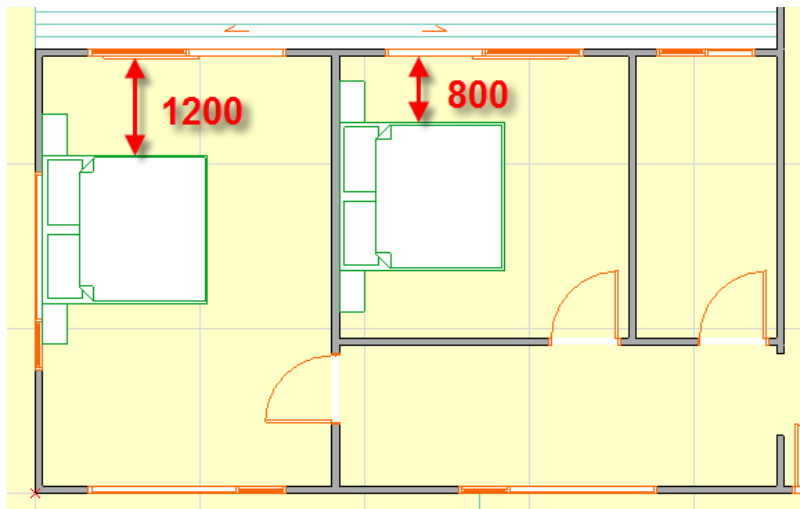
- Open the View from the View Map **Presentation Plan** (remember this is the Plan that will display loose furnishings)
- Open the **Object Settings** dialog and Type '**bed**' into the Search field at the top left. Select **Bed Layout 19**
- Make sure the following settings are correct: Height set to **0** to floor & on the **Ground Floor** and correct Layer **Des: Furniture**
- In the preview window set the **Anchor Point** in the edge of the bed



- Choose to place the object with the **Rotated Geometry Method**



- Place the first bed **1200mm** from the wall
- Highlight your mouse on the upper left corner until you get a **Snap Guide**
- Move down and Type **1200 Enter**, and you will see a preview of the Object
- Rotate the object so it is aligned with the end wall.
- Place the second bed **800mm** from the wall



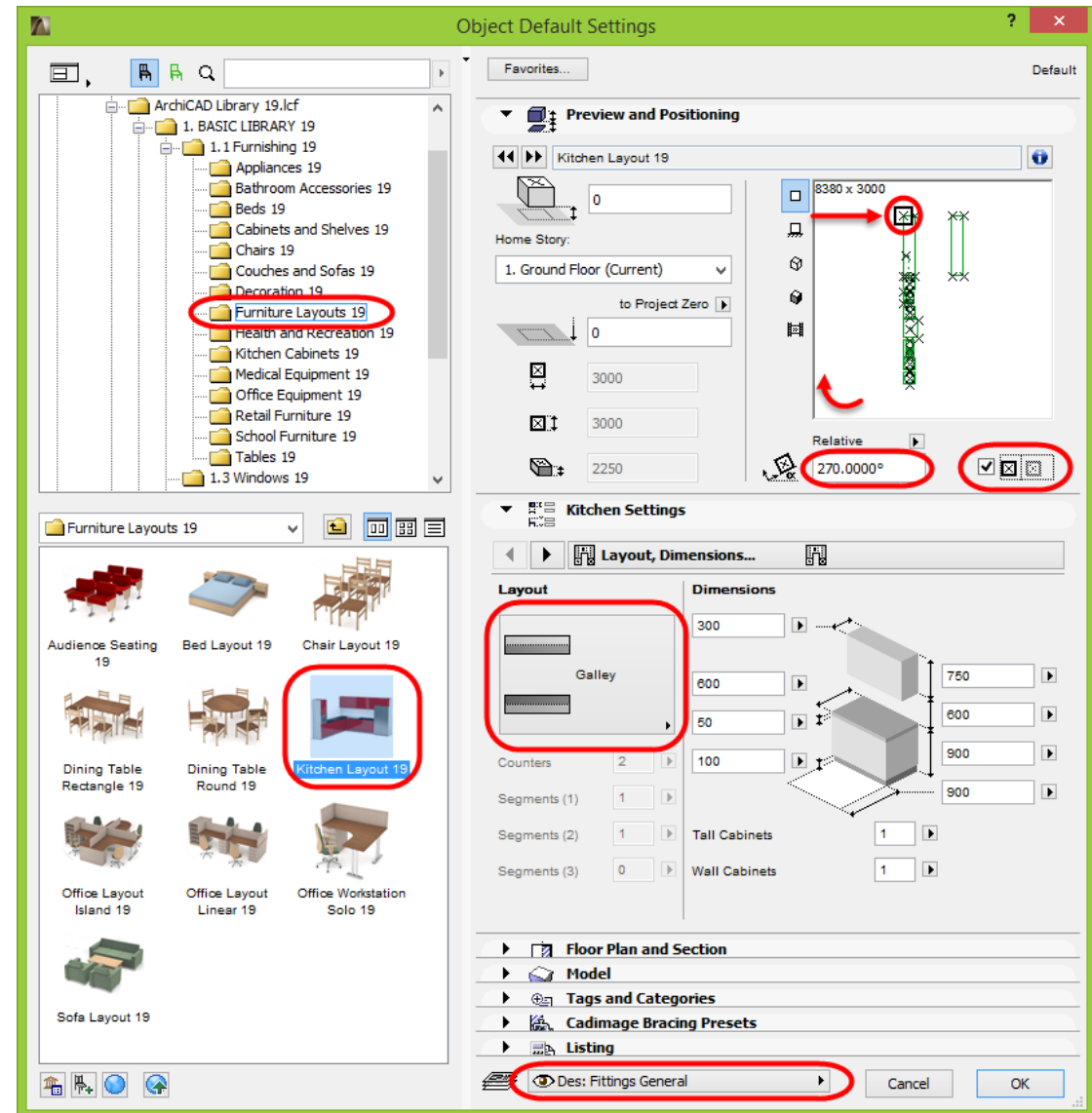
Re-open the **Object Tool**, and see the other Layout Objects – **Table Layouts**, **Sofa Layouts** etc

These Layout Objects typically contain a number of objects – Bed, bedside tables & lamps, dining table plus chairs etc. One of these grouping objects is the Kitchen Layout.

Kitchen

- Select the **Kitchen Layout 19** object
- For our design we need to **Mirror** the object and **Rotate 270°**

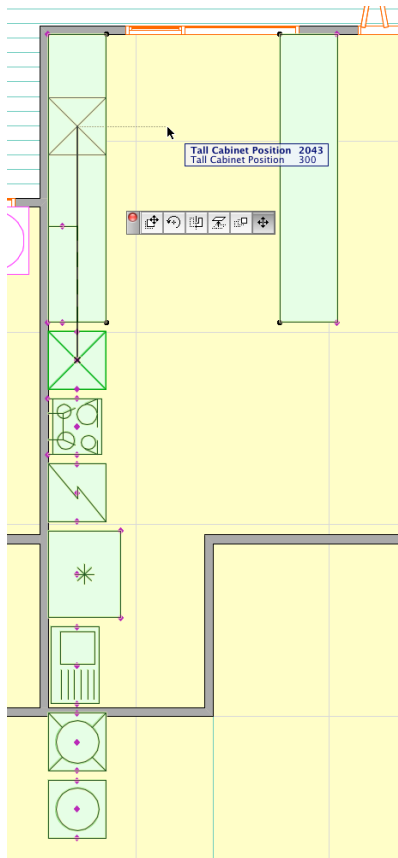
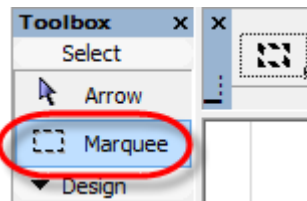
- Set the **Layer** to **Des: Fittings General**. This is the default layer for major fittings that are seen on all plans such as Kitchens and Stairs.



- Place the Kitchen Layout object in the **top left corner** of the living area
- The Kitchen Layout object contains **Benches, Wall Cabinets, Tall Cabinets** and of of the typical appliances you would expect in a Kitchen.
- Select the Layout Object and you will see each individual element has a **Pink Dynamic Hotspot**.
- The **Dynamic Hotspots** allow the stretching and arrangement of the elements they will automatically snap and jump from each set of benches.
- Arrange your Kitchen similar to the one below.

NOTE: This can be done in 2D or 3D, for 3D we can place a Marquee to limit or 3D View extents

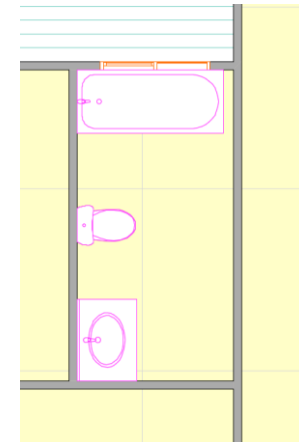
- Select the **Marquee** Tool, draw a 'box' around our Kitchen.
- Hit **F5** for PC or **F4** for Mac to view in 3D



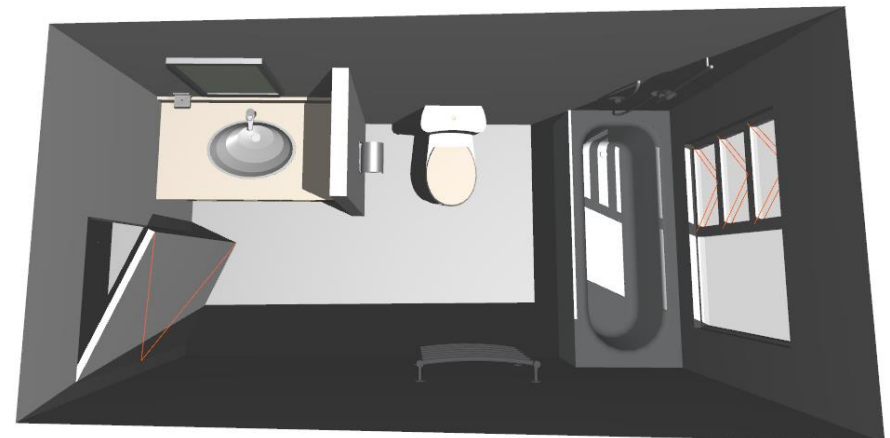
Bathroom

Because of the variant nature of bathrooms, there are no layout objects for these, so we need to use individual objects.

- Set the Layer to **Des: Fittings Plumbing**
- Search the library for various bathroom fittings and add a Bath, Basin Cabinet and WC to the bathroom
- Bathtub 19**
- Basin Cabinet**
- WC LT 19**



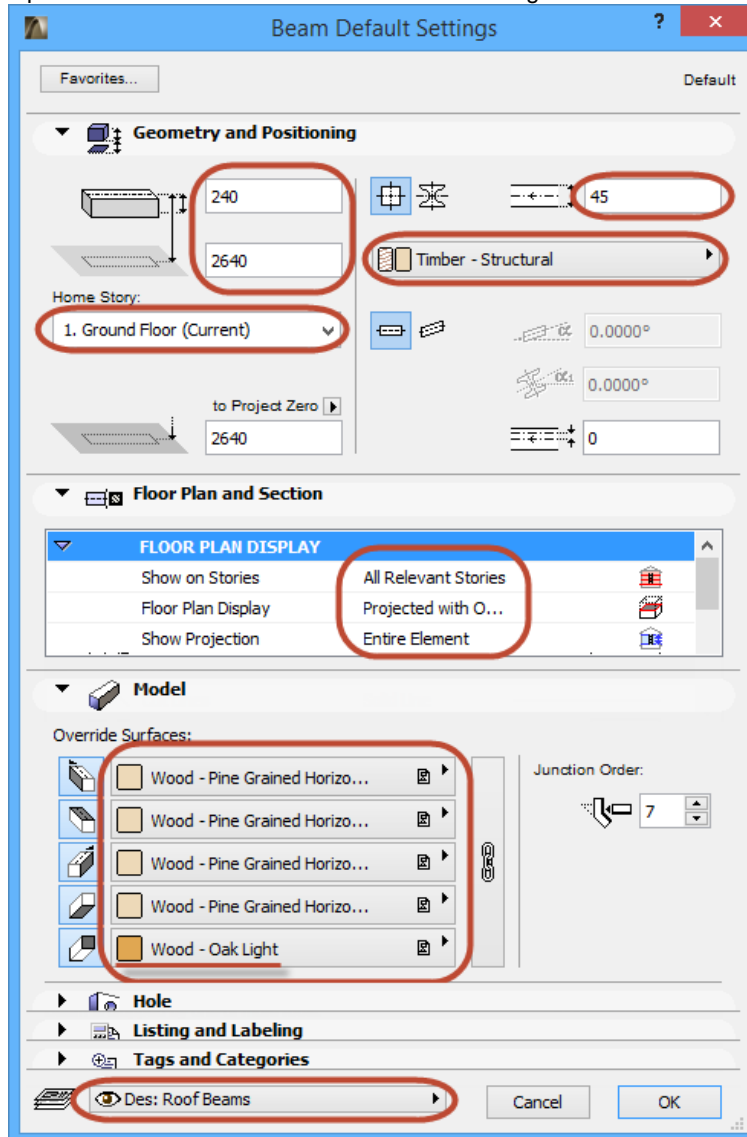
There are many more objects within the libraries



Pergola

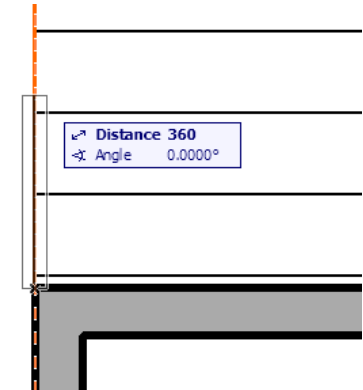
The client wants to create a pergola over the north deck.
We can use the Beam tool and Column Tool to create this.

- Open the **Beam** Tool and set the size for the Pergola Purlins like so:

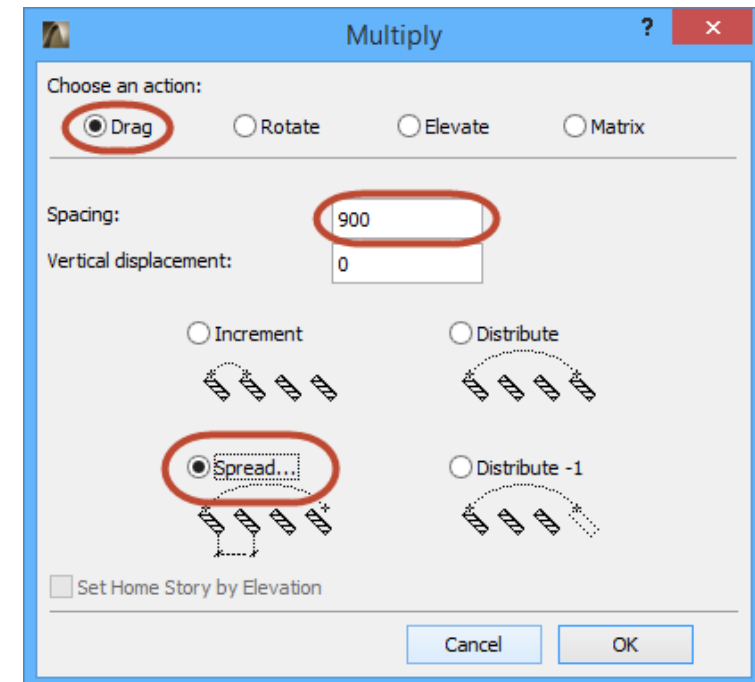


Note: Setting the End of the Timbers to a different material will mean the fills don't blend. ArchiCAD treats two like fills that are adjacent to one another as one fill. This is especially handy when using fills on walls that automatically clean up

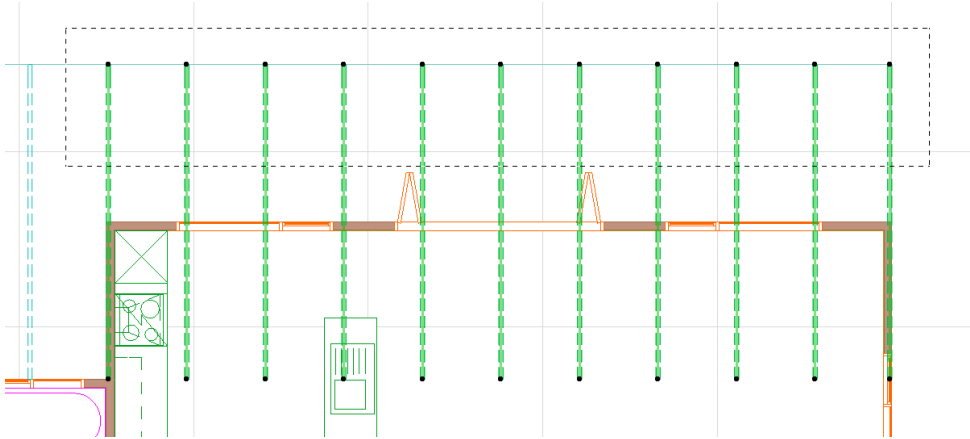
When placing beams, they are set out by their centre line, once the first beam is placed move it half its width (22.5mm) so that it is flush with the face of the wall. Or use 'With Reference to' and type **X 22.5 +** from the wall corner or you can change the Reference Line position in the settings



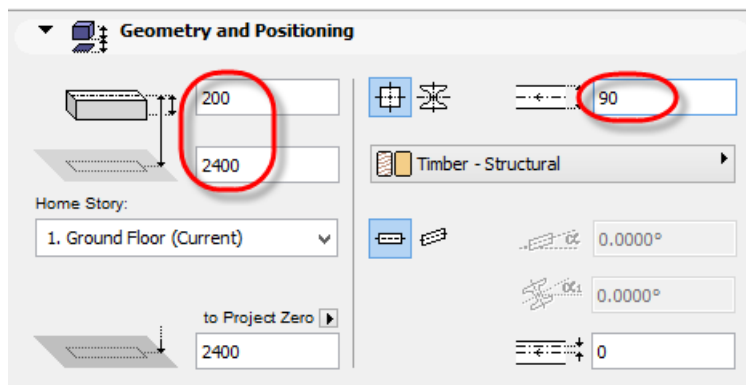
- Offset the purlins 900mm using the **Multiply** Tool from the **Pet Palette**
- The last one will fall off the end, **Select** it and **Move** it back **45mm**.



- The Rafter Beams will extend into the Living wing of our Building.
- Draw a **Marquee** around the ends of these Beams, **Select the Beam Tool** and use **Ctrl/CMD A** (Select All) to select all the Beams inside the Marquee.

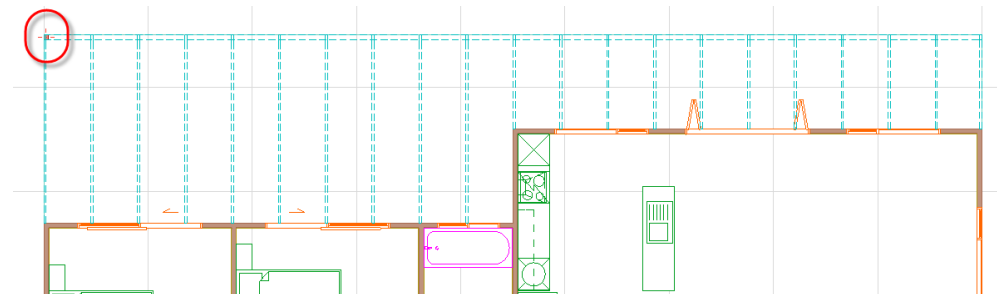
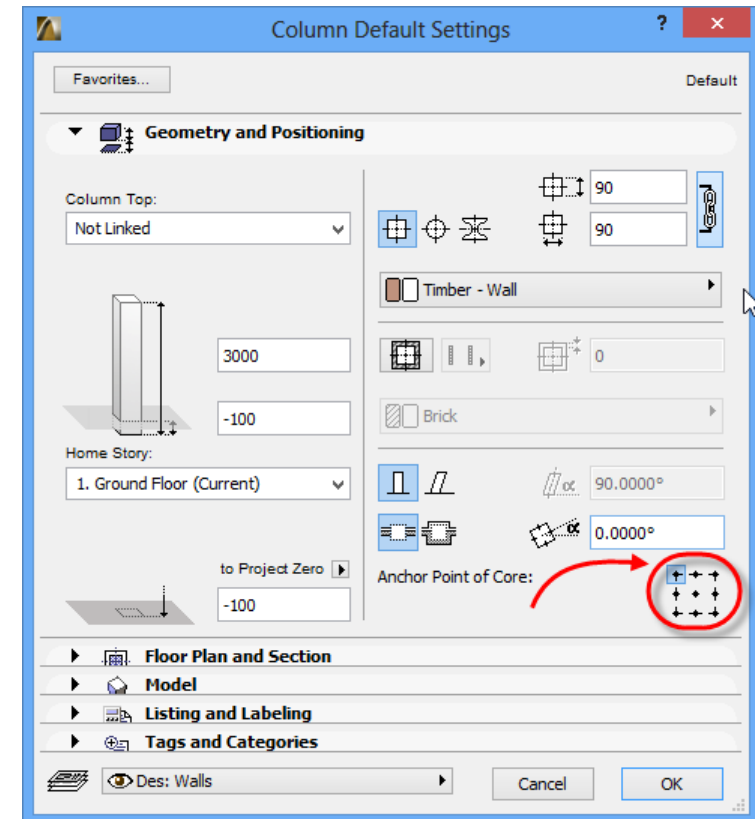


- Trim the Beams using the **Split Tool** and split along the **outside** face of the wall. (keep the bottom half of the beams selected, so you can delete them).
- Deselect the beams & reopen the **Beam Tool Settings** for the support Beams

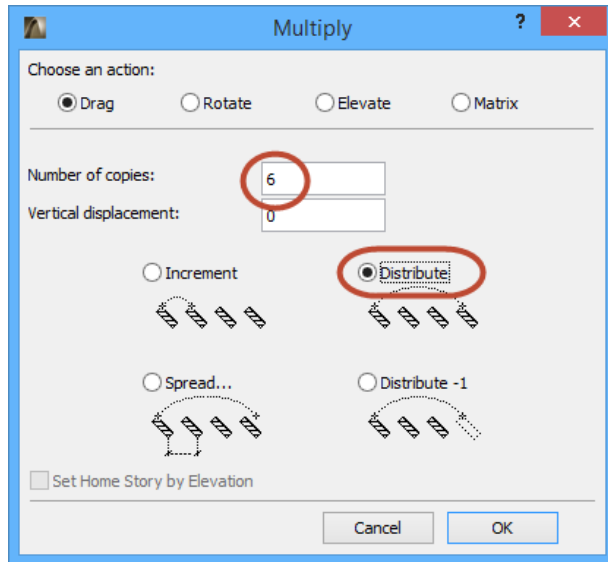


- And draw the Support Beam the length of the front edge of the Deck.

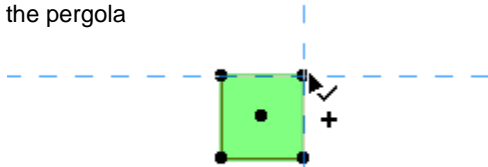
- Now open the Column tool and the settings should be as we set them for the Carport. The only change we need to make should be the **Anchor point** to place the Column at the top left.



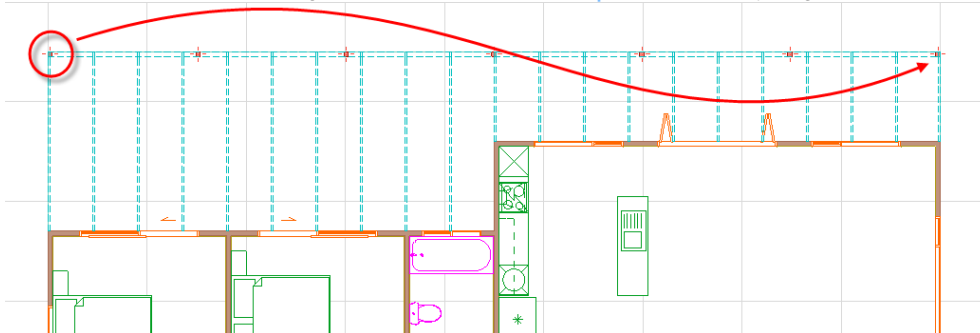
- Use **Multiply** and place 7 evenly spaced posts. The number of copies you need is **6** which equates to the existing one plus the new 6



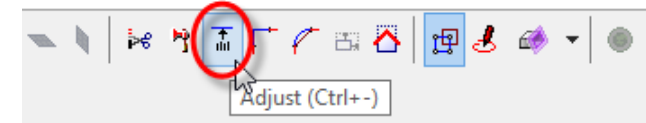
- When selecting the post to multiply use the top right corner so you can accurately locate the corner of the pergola



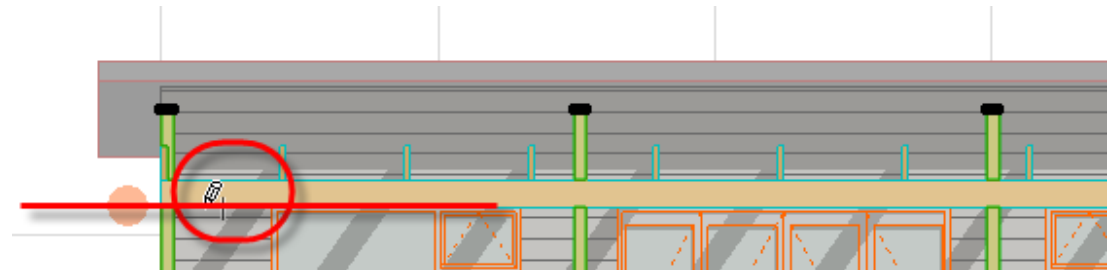
- To finish at the top right corner of the Deck. Zoom in to ensure you get it exact.



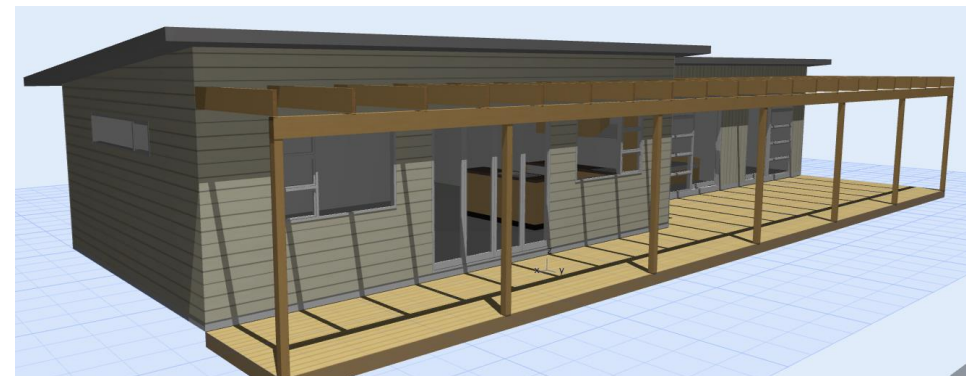
- Go to the **North Elevation**, notice the columns are too long.
- Select all the Columns, have the Column Tool selected and hit **Ctrl+A** or **Command+A**
- Select the Adjust Tool from the Top Toolbar.



- Adjust them, using the Adjust Tool by clicking the underside of the Pergola beam



- See the result in **3D**



- Save** your file

Module 8 – Site and Foundations

This module introduces you to Site and the buildings connection with the site. We will use the Cadimage Sites Tool and the Mesh tool to model & document our site and use a Complex Profile to model the Footing and Slab Thickening.

There are two distinct ways to create your Mesh:

1. From a DWG or similar supplied via a Surveyor. With this DWG you can trace around the Boundaries to form your Mesh, then use the Cadimage Tools to automatically create your Boundary objects.
2. From a C.T. (Certificate of Title) obtained from Council that have the Boundary angles and lengths. Using the Cadimage Boundary Object we can add the Boundaries then Create the Mesh from these Objects.

For the purposes of this Training course we will use Method 2.

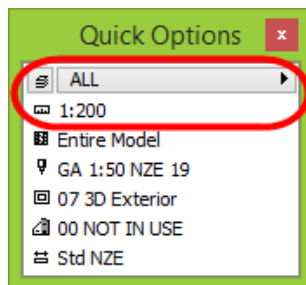
For instructions on Method 1 please see the Appendix of this Training Course.

Site Boundary & North Point

We model our Site information on the **Sea Level/Datum** Storey so we can provide accurate Levels and Dimensions relative to this in our project.

Before creating any Boundary information, we need to add a North Pointer to our Project.

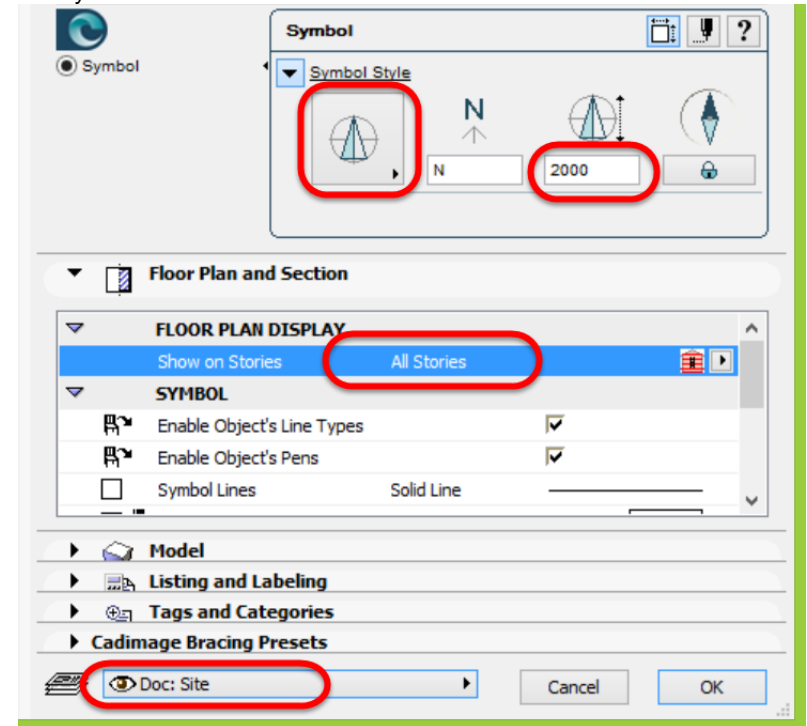
- Navigate to the **Sea Level/Datum** Storey.
- Use the **Quick Options** Palette to set the **Layer Combination** to **All** and the scale to **1:200**



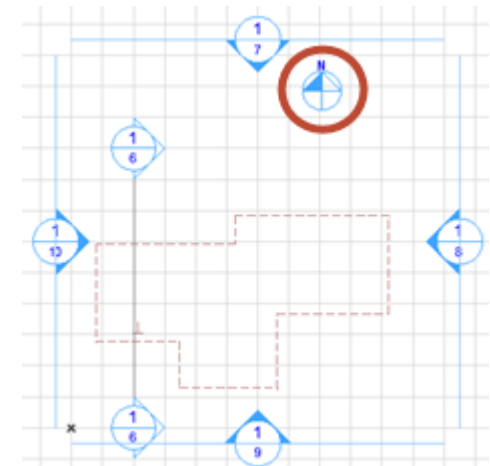
Now we can place our North Arrow

- Choose **Cadimage > Sites+Massing > Place North Arrow**
- Choose a style you prefer and adjust the size of the symbol to **2500**
- In the **Floor Plan and Section** settings set show on Stories to **All Stories**

- Set the Layer to **Doc: Site**

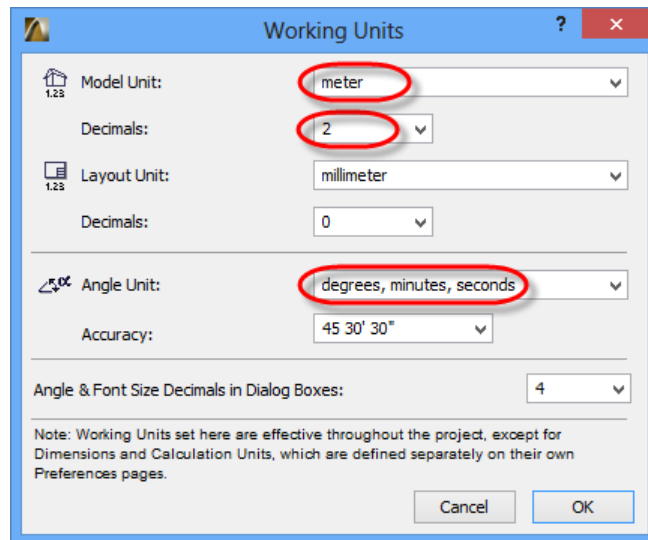


- Place the **North Arrow** in the Top Right of the building.



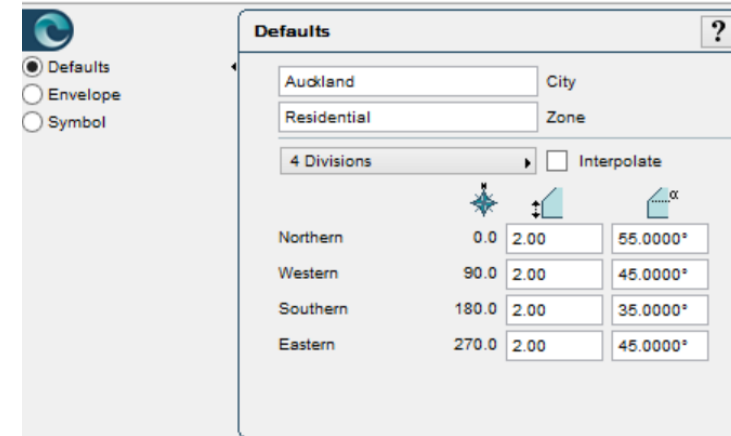
Next we will create the Boundary lines of our site. To input Boundary Lines we need to be able to input angles as degrees minutes and seconds instead of Degrees.

- Go to **Options > Project Preferences > Working Units...** These are the units of input as opposed to Dimensions which is the display of units.
- Set the **Model Units** to **meter** and **2** decimal places
- Set the **Angle Unit:** to **degrees, minutes, seconds** and click **OK**.

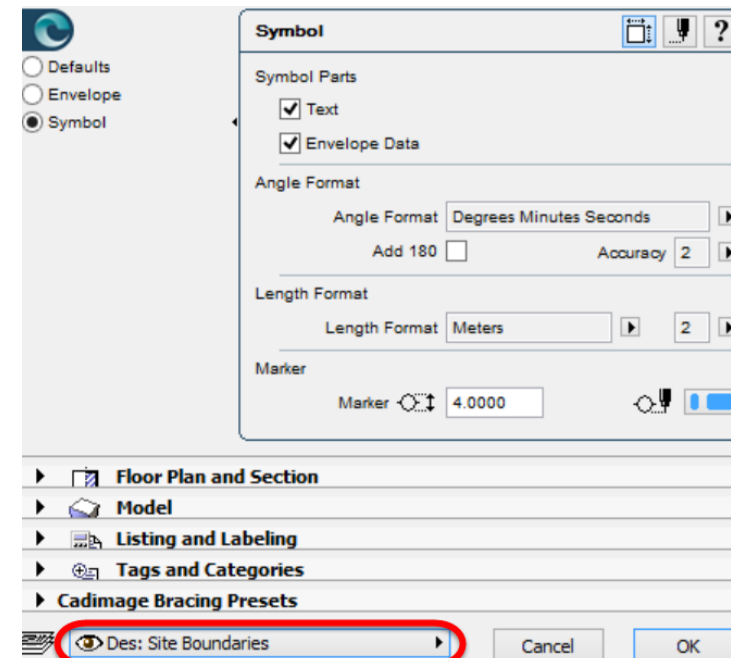


Now we will start creating our boundary lines.

- We are replicating the typical workflow of if we had received a Certificate of Title as our Site Information.
- Cadimage > Sites > Survey Boundary (Objects)**
- In the **Cadimage Boundary Settings** you can set up the HRB (Height in relation to Boundary Envelope) values for your Town Planning information. We will stick with the default which is Auckland Residential:
 - North = 2m @ 55°
 - West = 2m @ 45°
 - South = 2m @ 35°
 - East = 2m @ 45°

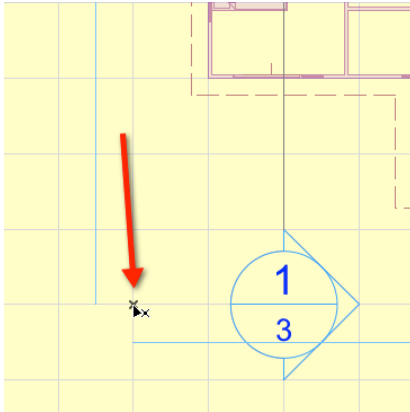


- Set the Layer to **Des: Site Boundaries**



NOTE: When adding data from a C.T., we will generally be more accurate than the Surveyor's dimensions & angles (in that they work in rounded Meters and we work in Milimeters i.e. 27.80M could be 27797mm), so it would be wise to choose a corner of the site that is NOT important, i.e. that is not a front yard or where we could be infringing on the HRB.

- Our start point is the **Project Origin** down the bottom left of our project. Click here.

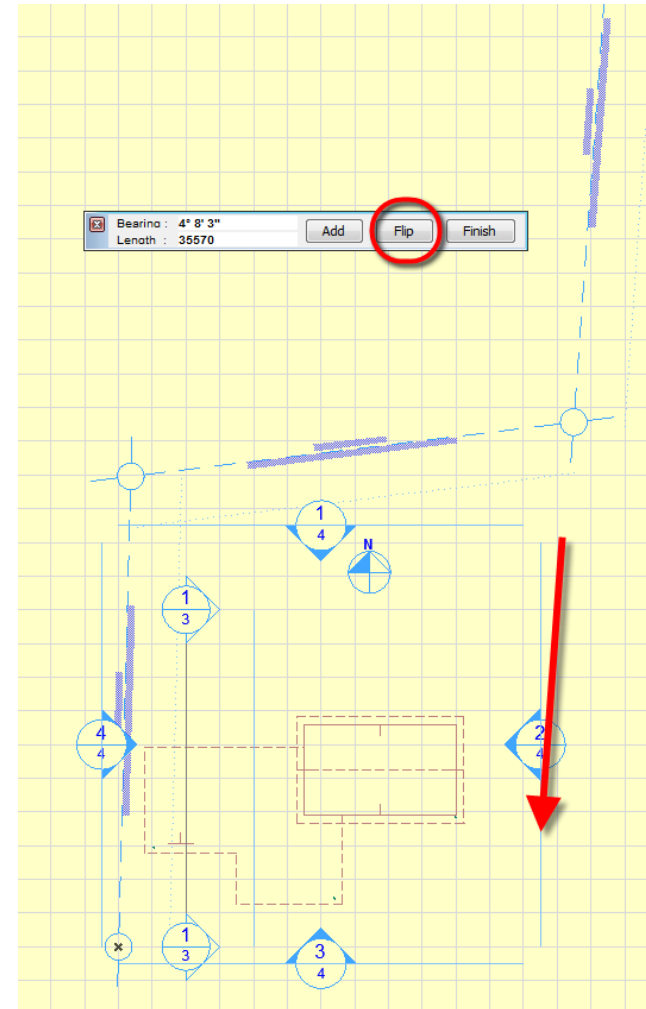


- Now you will be asked for the Bearing and Length of the Boundary Lines.
- The first Boundary is **1° 28' 49"** **27.93m**
- Add a **space** between the Degrees and Minutes and Seconds i.e. 1 <space> 28 <space> 49
- Tab to the Length field and type **27.93** and click **Add**

	Bearing : 1° 28' 49"	Add	Flip	Finish
	Length : 27.93			

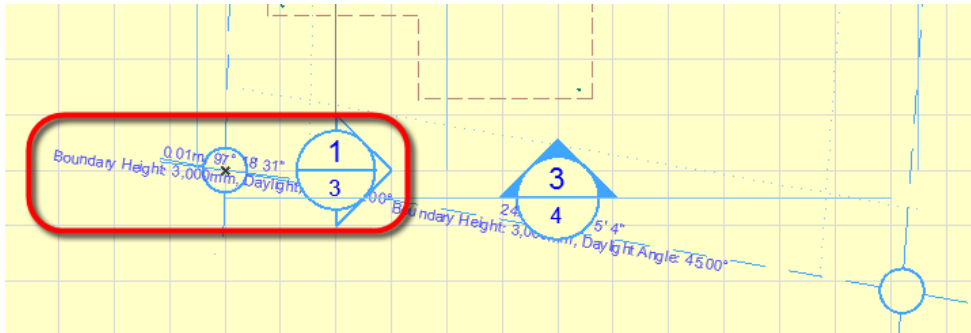
- Working in a Clockwise direction around the site.
- The second Boundary is **83° 1' 6"** **26.45m**
- The third Boundary is **4° 8' 3"** **35.57m**

NOTE how this boundary has placed 180 degrees from our intended direction; click **Flip** to flip the Boundary 180°

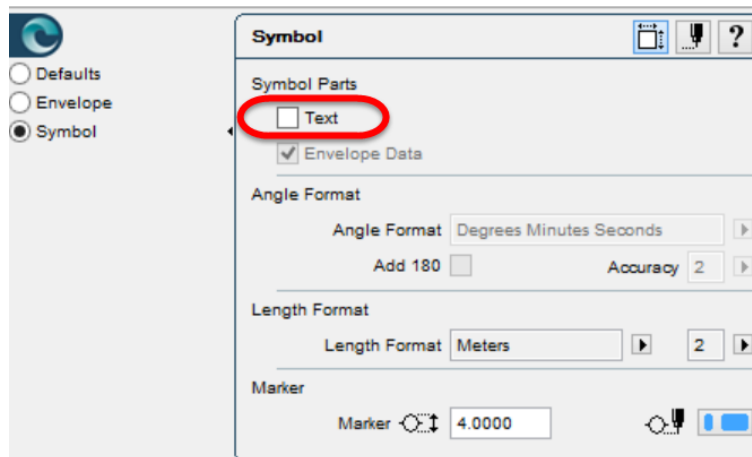


- The fourth Boundary is **100° 5' 4"** **24.78m**
- This will need to be **Flipped** also
- We rarely find that the bearings and lengths form a perfect closed shape so even though it looks as if it has closed; we have to hit the **Finish** button to add the last tiny boundary and close the shape.
- Hit **Finish**

If we zoom in on the last Boundary element placed we can see that it is 0.01m in length. This Object needs to be here so that the Boundaries closes, but we do not need to see the information. We can simply Open the Object settings and turn this info off.



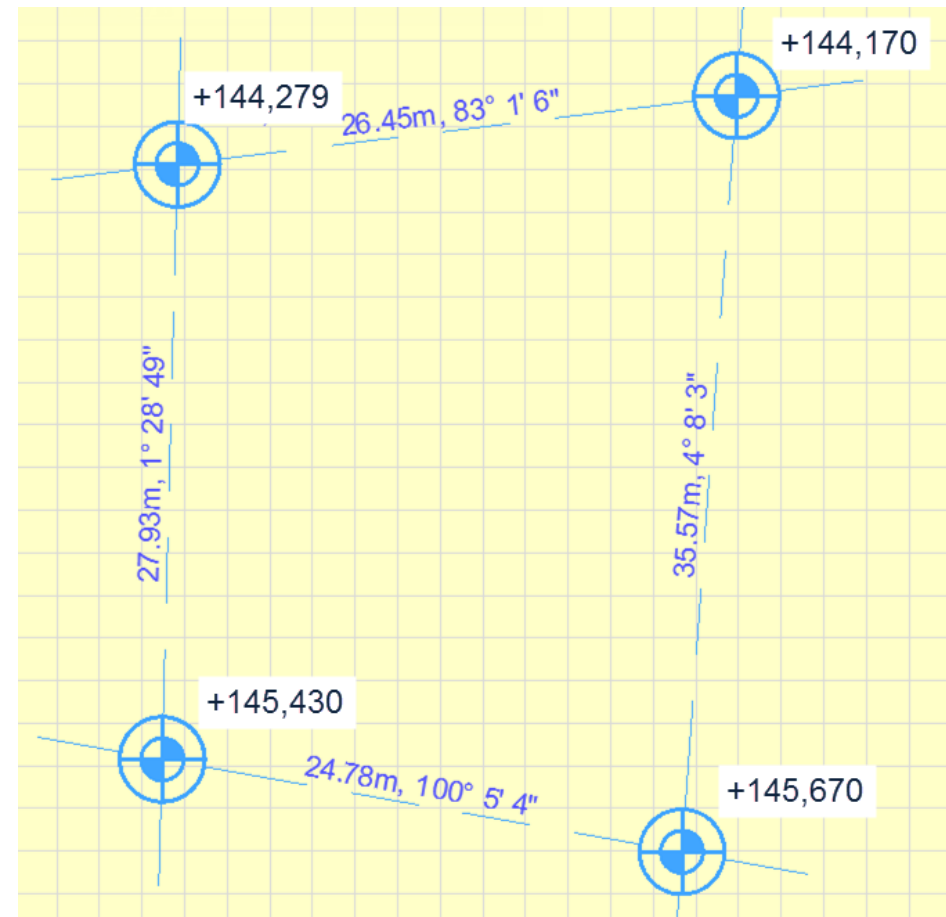
- Select the Boundary Object (Use Shift & Tab to select the correct boundary)
- Open its Settings (**Ctrl+T** or **Command+T**)
- Untick **Show Text?** under the **Symbol** settings.



Site Mesh

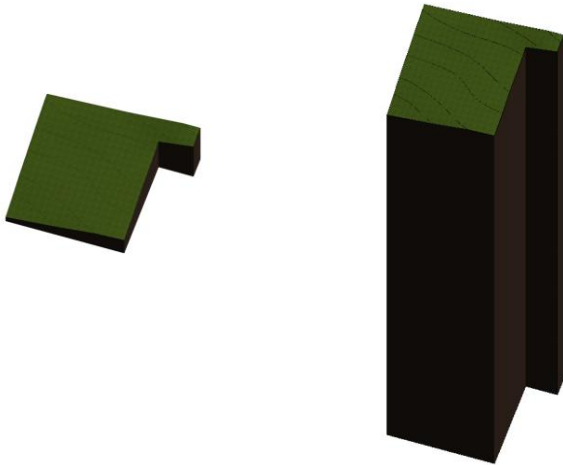
- Now we need to add our Site Mesh. Our Site is located in a lake side development so even though we are close to lake level we are far above sea level which is our survey Datum.
- We have been provided only with a spot level at each corner of the Site.

NOTE: For detailed steps on adding Contour information, refer the the Site Countours instruction sheet in the Appendix at the back of this Training Guide.

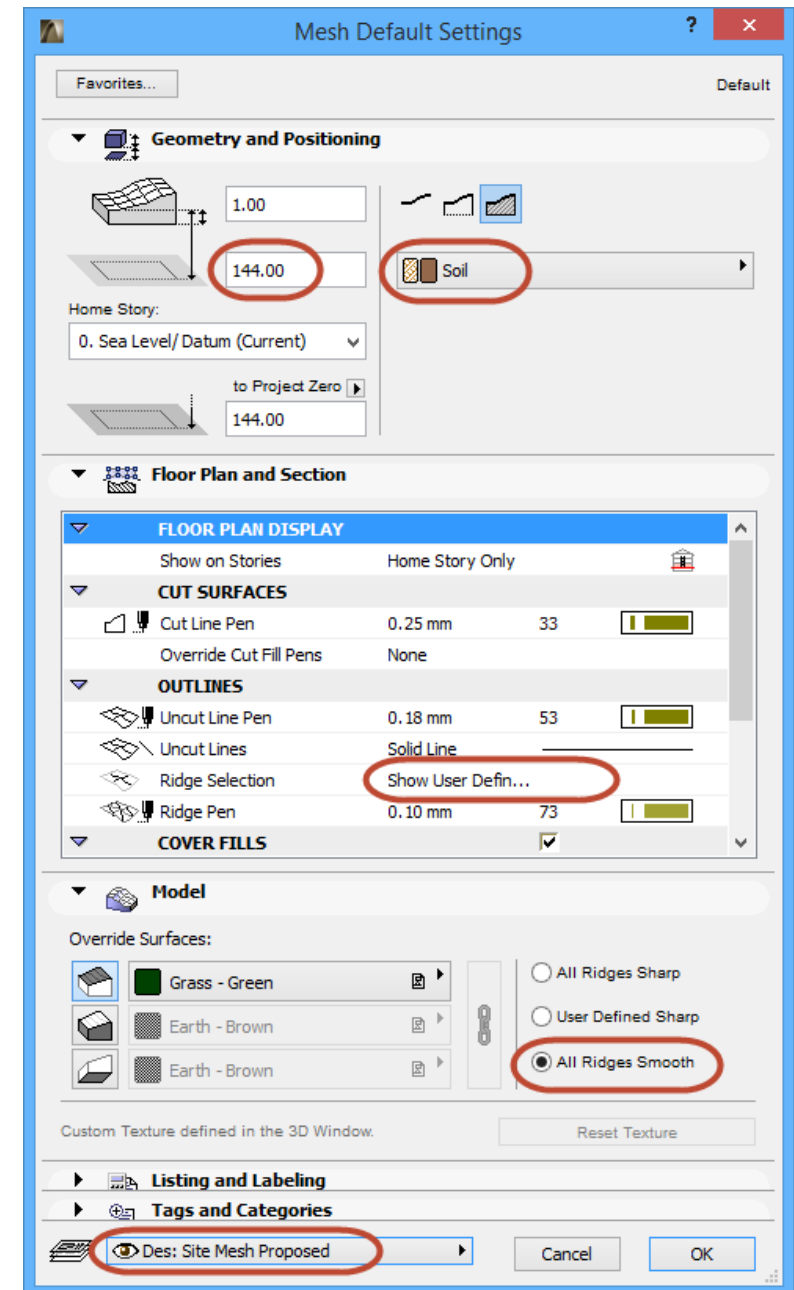


- Open the **Mesh Tool** from the **ToolBox**
- Set the **Relative Base Level** to **144 M** (make this a nice round number below your lowest site level, our lowest level is 144,170 - remember we are still set to use Metres as our Working Units)

NOTE: The main reason we do this is we are trying to avoid having a very tall telescoping Site that is 140 M high, we just want a 'Plinth' of dirt under our building.



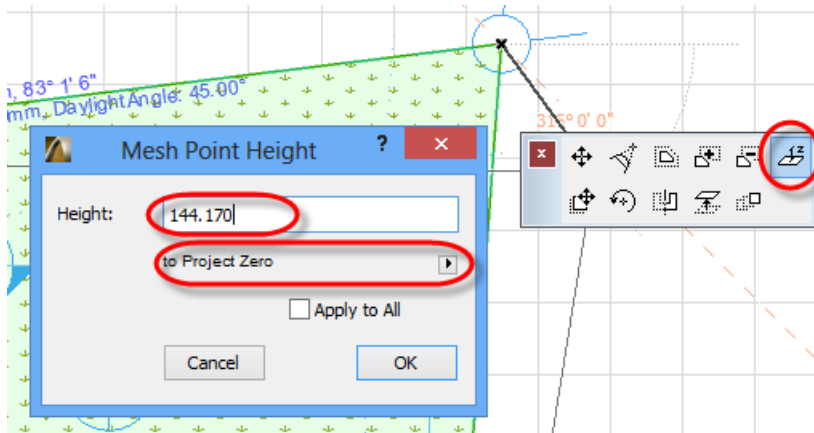
- Set **Floor Plan Display>Outlines>Ridge Selection** to **Show User defined Ridges Only**, this removes the triangulation in Plan View
- In **Model** choose **All Ridges Smooth**, this removes the triangulation in 3D view
- Layer to **Des: Site Mesh Proposed** (we are using proposed in this training course – but in Practice the first mesh should be Existing, and the modified mesh should be Proposed)
- Click **OK**



- Select the **5 Cadimage Boundary Objects** (4 main ones and the tiny one)

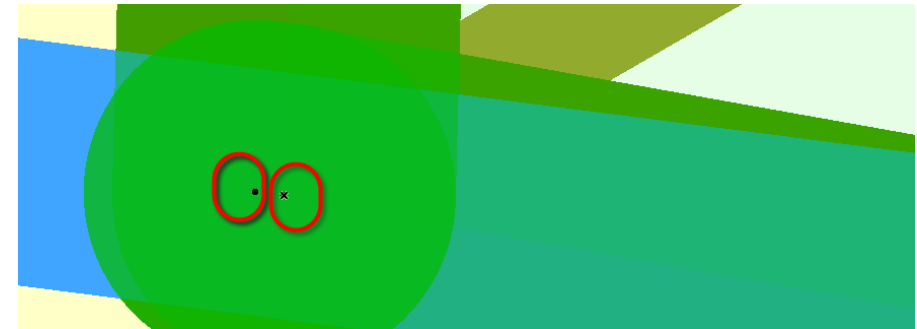


- Cadimage > Sites > Create Mesh from Boundary** to automatically create the Site Mesh based on your boundaries.
- Have a look in 3D, zoom to Extents to see a thin mesh floating 140 metres above your building.
- Now we need set the R.L. of the Mesh. Flip back to 2D and **Select the Mesh**
- In the **Info Bar** Change the Layer to **Des: Site Mesh Proposed**
- Click on the top right corner node of the Mesh.



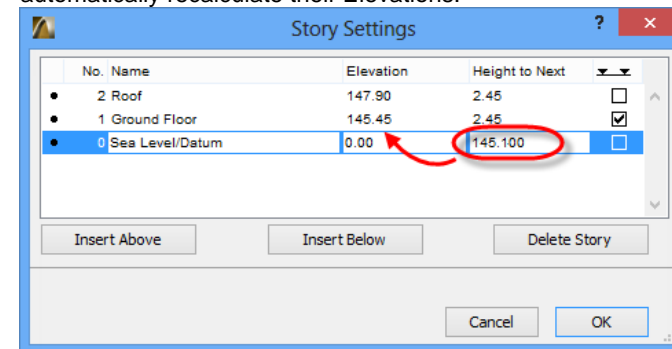
- From the Pet Palette choose **Elevate Mesh Point**
- From the new dialog set the Reference level to **Project Zero**
- Set the Height to **144.170**
- Click **OK**
- Elevate** the other three corners to their respective elevations.

NOTE: You will need to zoom in very close to pick up the two boundary points that occupy the bottom left corner of our site.



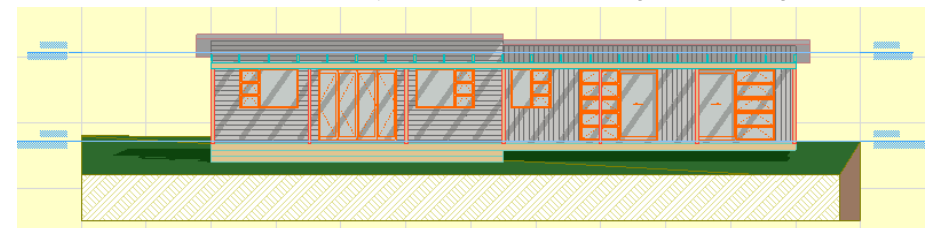
Our building now needs to be repositioned onto our Site. We can do this by defining our proposed floor level for our Ground Floor Story.

- Open **Design > Story Settings**
- Storey Levels are defined relative to each other. Our Datum is 0.Sea level and our Proposed Ground Floor Level is **145.100** Enter this in the **Height to Next** field for the **Sea Level / Datum** Story and you will see the Story's above automatically recalculate their Elevations.



- Hit **OK**

Your saved views will automatically update and the Building will be sitting on Site Mesh.

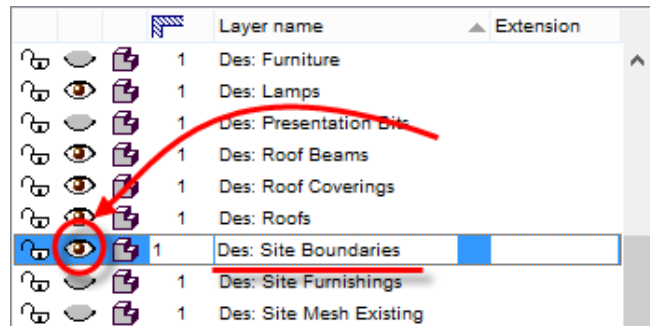


Building Envelope (HRB)

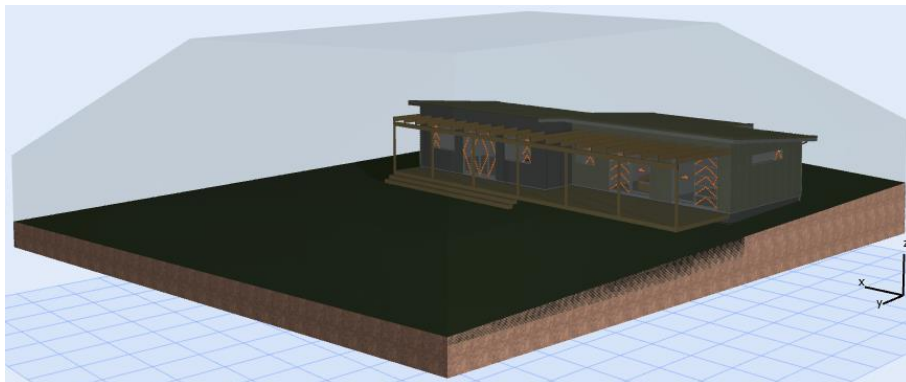
We can now place a Building Envelope over our site that reflects our HRB controls. This will allow us to better position our building so it conforms to Council requirements.

- Navigate back to our **0.Sea Level/Datum** Story
- Select the **Mesh**

NOTE: The Boundary elements need to be visible before the HRB will be able to be created. If they are not showing, open the Layers (**Ctrl+L** or **Command+L**) and turn on the boundary element layer. **Des: Site Boundaries.**

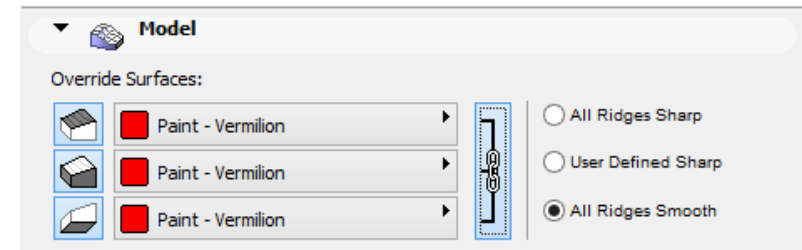


- Go to **Cadimage > Sites > Place Building Envelope**.
- Set the **Rolling Height** to **8000mm** (i.e 8.0 M)
- Flip to 3D and see your envelope as a glass box.



This is great but can be difficult to see, so we can change the glass material to solid paint.

- Select the Envelope and open its Settings (**Ctrl+T** or **Command+T**)
- Within Model, Override the Surfaces to **Paint-Vermilion**



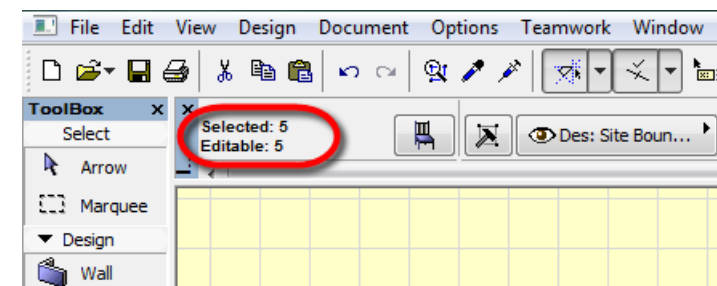
We can also get the Yard setbacks to show in 3D.

- Navigate back to our **Sea Level/Datum** Storey.
- Select the 5 Boundary Objects and open their Settings

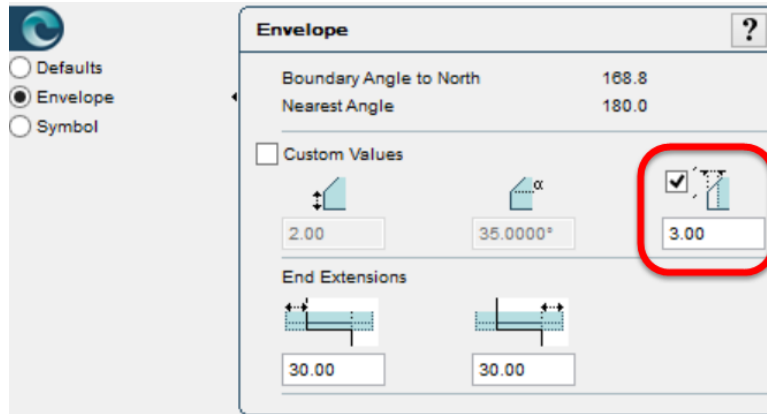
NOTE: The easiest way to do this is to place a **Marquee** around the Site,

- Select the **Object Tool** in the Toolbox
- Select all Objects with **Ctrl+A** or **Command+A**,
- Then just remove the North Point Object by Shift-clicking on it.
- You know you have done it right if in the top right of the Info Box it says

Selected: 5

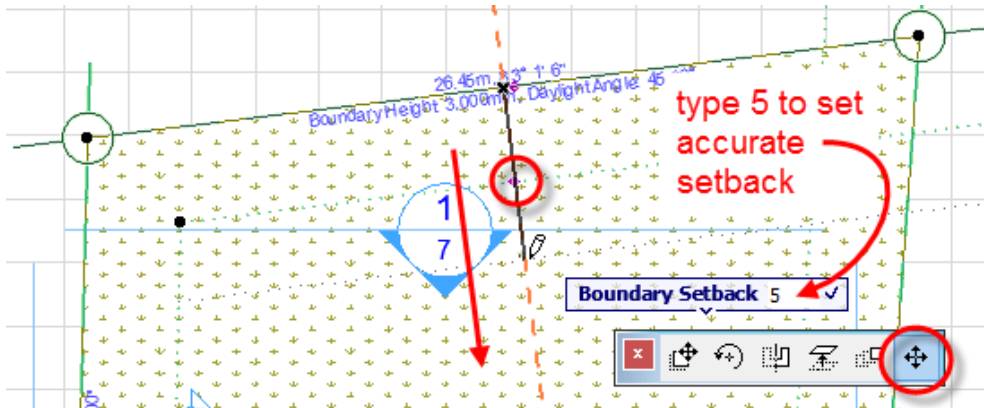


- Open their Settings with **Ctrl+T** or **Command+T**
- Within the **Envelope** tab, tick the box next to the **Apply Yard Cut in 3D** image



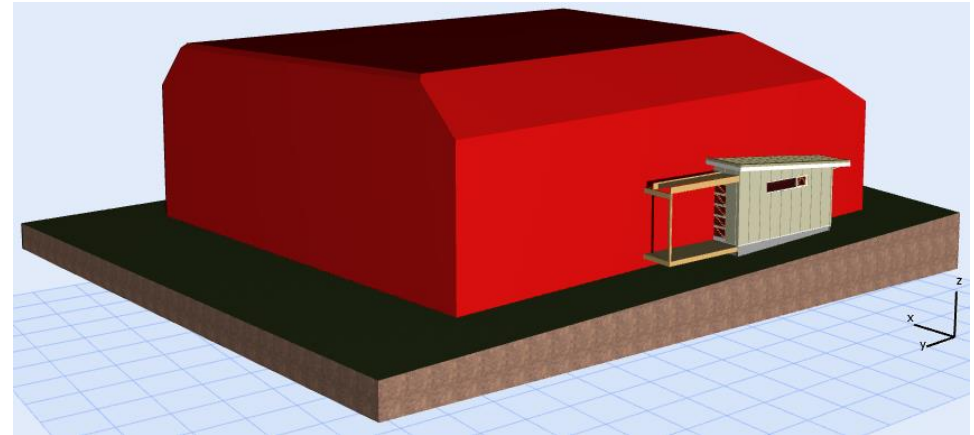
If the Yard Setbacks are not the same all round the site we can set them manually.

- Select the Northern Boundary (assuming this is our Road Boundary) Click on the Pink Editable Hotspot
- From the Pet Palette choose **Move Node**
- And set the distance to **5 M**



- Flip back to 3D and see your Building envelope is displaying the Yard setbacks.

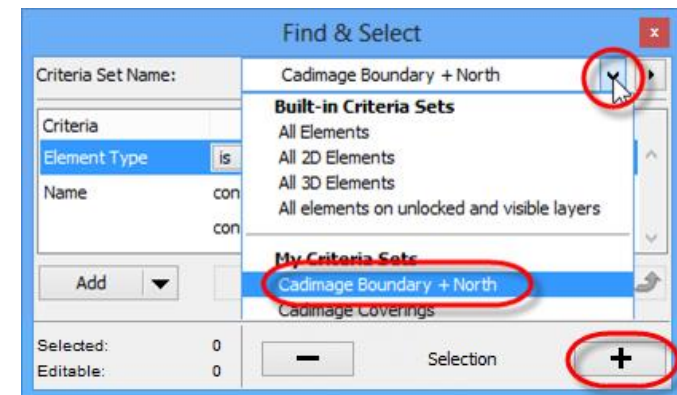
Also NOTE that we are illegally within these yard setbacks.



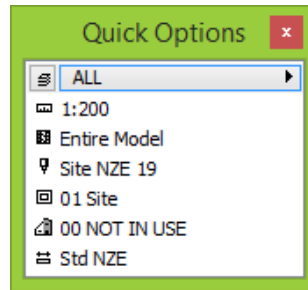
We can now use this Building Envelope to position our building.

NOTE: We are actually moving the Site in relation to the Building as opposed to moving the Building on the Site.

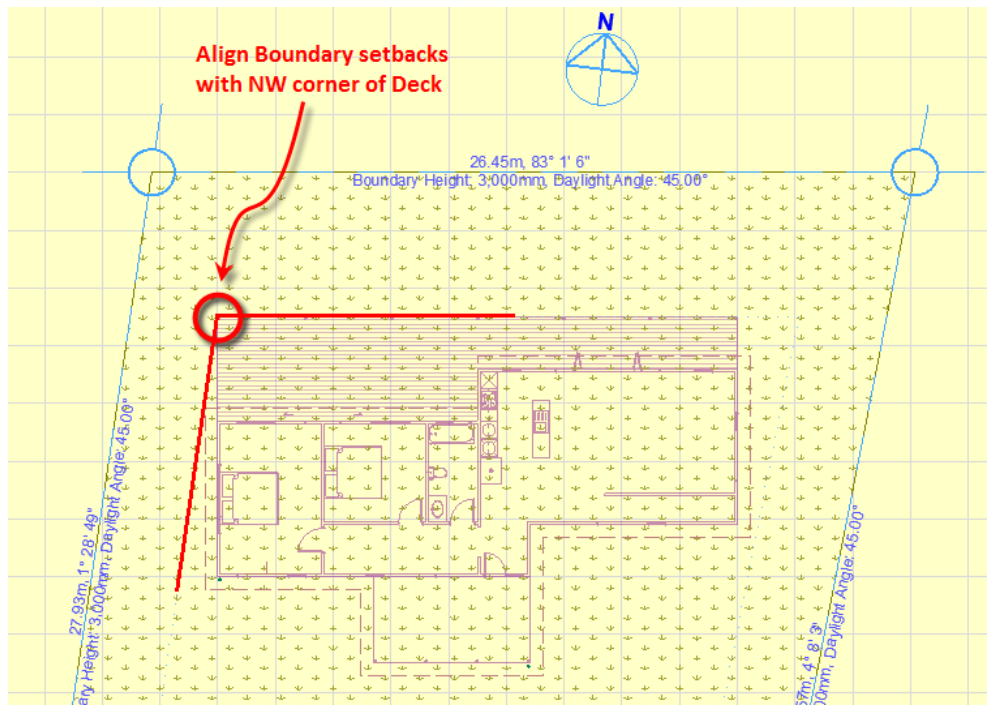
- Navigate back to our **Sea Level/Datum** Story
- Select **ALL** the Site bits & pieces; Meshes (x2), Boundary Objects and North Pt.
NOTE: The easiest way to do this is to use a Find & Select. We have saved some Criteria Sets to make this process easier.
 - Open Find & Select using **Ctrl+F** or **Command+F**
 - From the pull down select the **Cadimage Boundary + North** set.
 - Then hit the big **+** key



6 elements should be selected at the top left – if not you may not have your North point Layer ON. A quick option is to hit the **ALL** Layer Combination in the **Quick Options** palette.



- Then select the **Mesh** Tool, and hit **Ctrl+A** or **Command+A** to select All the Meshes
- Now **Drag** and/or **Rotate** these so that the Site is accurately positioned.



NOTE: You may wish to turn ON the Ground floor Plan so that you can see your Deck.

- Change to your **View Map**
- Right Click on **Ground Floor Plan**
- Choose **Show as Trace Reference**

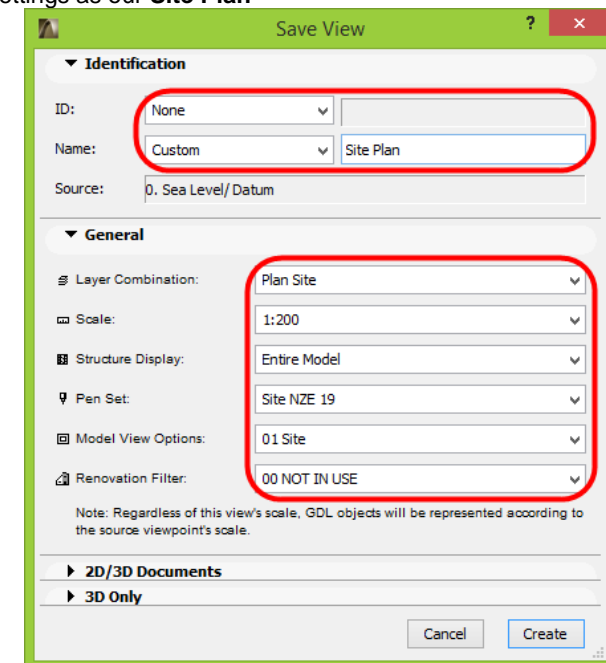
Create a Site Plan

We can now create a View of our Site Plan

NOTE: Site Plans can be created from either the Sea Level Story or the Ground Floor Story, depending on what you want to show.

We want to show the ground floor walls in relation to our site, so we will use the ground floor as our site plan source. Another option would be you just want to see your roof outline, in this case you would use Sea Level as your source.

Navigate to the **View Map > Ground Floor Plan** and Save a new View with the following settings as our **Site Plan**

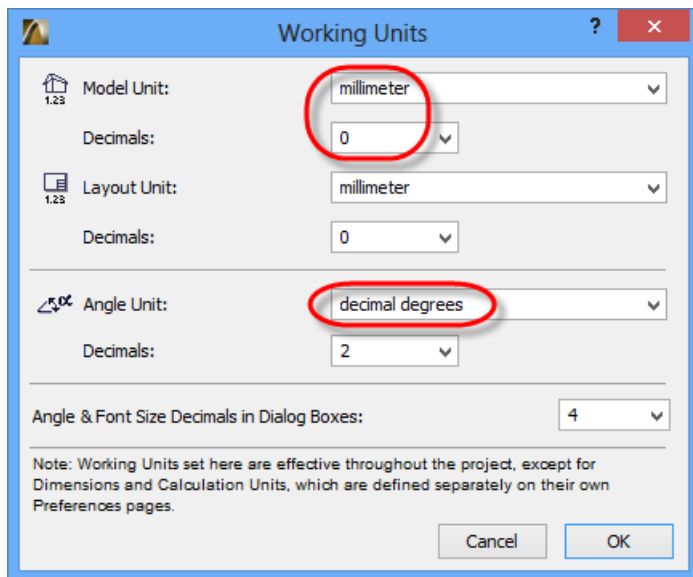


Foundations

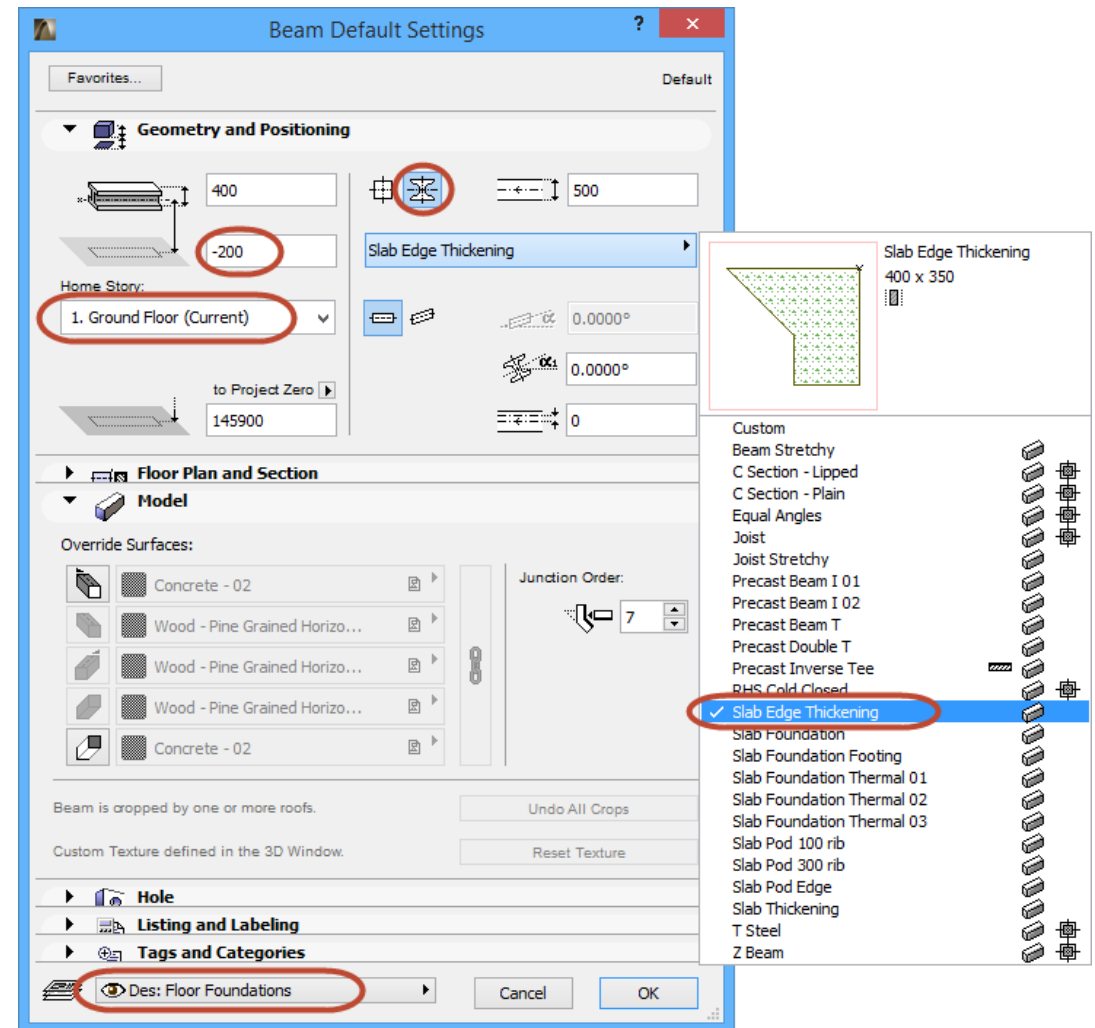
To model our Foundations we are going to use a **Beam**. Beams, Walls and Columns can be shaped in any form using **Complex Profiles**. In this instance we will use a Beam shaped like a Slab Edge Thickening.

As we have finished with our Site modelling, we should change our Working Units back to millimeters and our Degrees back to decimal.

- **Options > Project Preferences > Working Units** These are the units for input of measurement as opposed to Dimensions which is the display of units.
- Set the **Model Units** back to **millimeter** and **0** decimal places
- Set the **Angle Unit**: to **decimal degrees** and click **OK**.

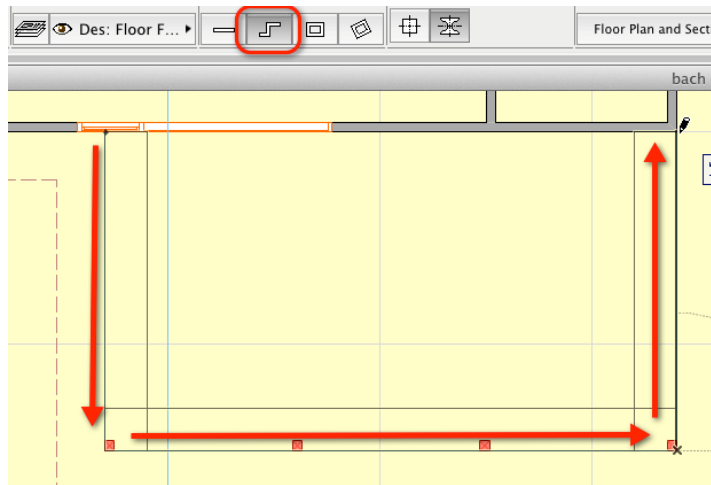


- Select the **Beam Tool** from the Tool Box and open the settings
- Choose **Complex Profile** Structure type
- From the pullout select **Slab Edge Thickening**
- Make sure the Home Story is **1. Ground Floor**



We are going to apply this Foundation to the Carport Slab. Bearing in mind that our Carport Slab is 100mm lower than our Floor level and is 100mm thick we need to set our Foundations 200mm down.

- Set the **Relative Height** to **-200**
- Set the Layer to **Des: Floor Foundations**
- Set the **Beam** to draw a **Chained** sequence of Beams.
- Snap to the corners of the Carport Slab in an **anti-clockwise** direction.



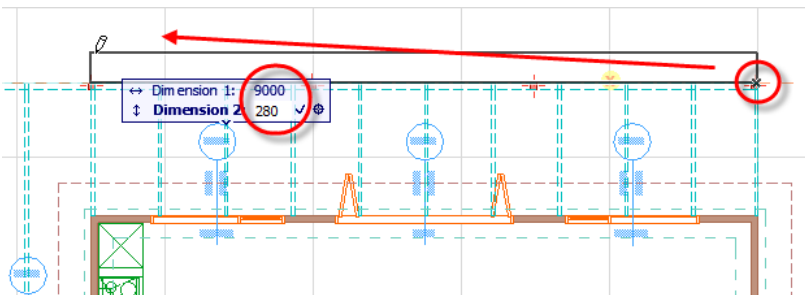
Now we'll add foundations to our main slab

- From the Complex Profile pullout, choose **Slab Foundation Footing**
- Set the Relative Height to **-100**
- Snap to the Corners of the main floor Slab, again in an anti-clockwise direction.
- Check your Section and 3D.

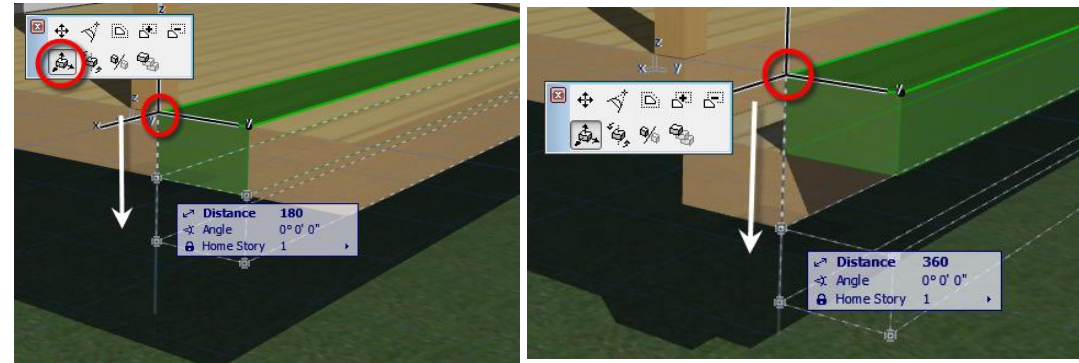
Steps

To provide some connection between the Deck and the Ground plane we will model some steps.

- Eyedrop** on the **Deck**
- Draw a rectangle **9000 x 280**, from the top right corner



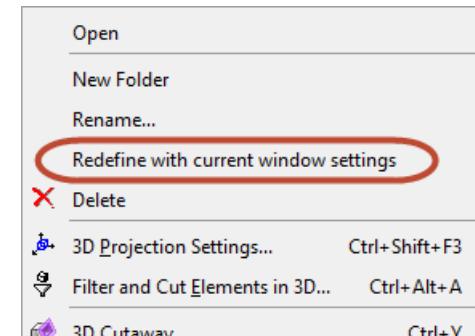
- Then drag a copy of this to form 2 Steps. – Select the new Step, Hit **Ctrl+D** then **Ctrl** (for PC) or **Command+D** then **Alt** for Mac
- View the result in **3D**, note you will need to lower the steps use the **Move** option from the **Pet Palette**



Adjust 3D Views

Our saved 3D Views are now elevated incorrectly – as we have made changes to our Storey levels.

- Double click to open one of your saved **NE/NW Perspective** views.
- You will notice that your 3D views are looking at the underside of the site navigate to a position where you can see the building again.
- Right Click on the View you need to update and choose **Modify setting with current window settings**.



Module 9 – Annotation

This module takes you through some of the 2D related elements that you need to use to produce contract documentation.

Elements include:

- Dimensions*
- Fills & Cover Fills*
- Text & Labels*

You'll also learn how to control the display of particular elements via the Model View Options.

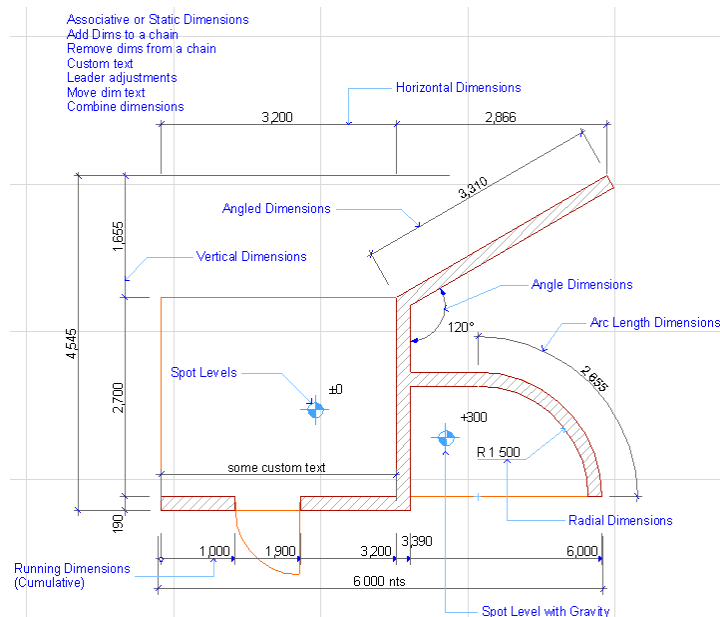
Dimensions Important Concepts

There are 4 individual Dimension Tools that create the various dimension types.

- Dimension Tool
- Level Dimension Tool
- Radial Dimension Tool
- Angle Dimension Tool

We'll use another file to examine the various Dimension Tools and their settings.

- Open the Dimensioning.PLN file.
- With the **Navigator** set to show the **View Map**, double click on **Finished Exercise** (this is our finished Dimension view)

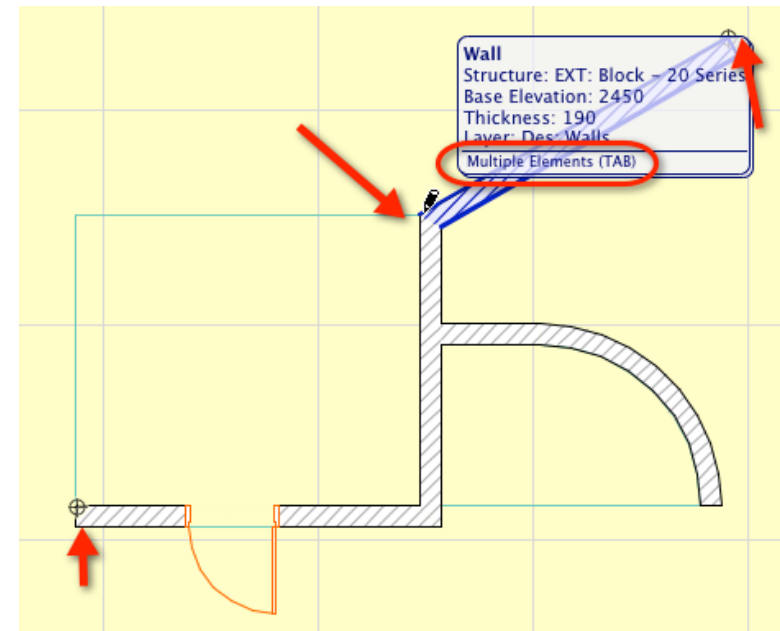


- Double click on **DIM Exercise**
- Select the **Dimension Tool** from the Toolbox

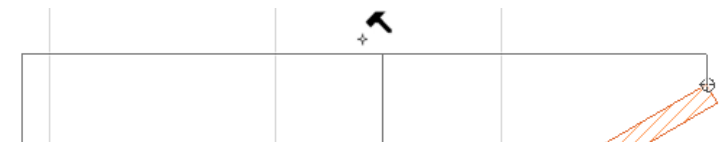


Horizontal Dimensions

- With Dimensions it is critical to ensure you dimension consistently, ie in a standard floor plan it is the Wall positions that are dimensioned. So we need to be consistent in only dimensioning wall points.
- Click to place horizontal dimensions along the top of the project.
- To ensure you dimension the correct wall points use **Tab** to cycle through the elements where there are Multiple Elements.

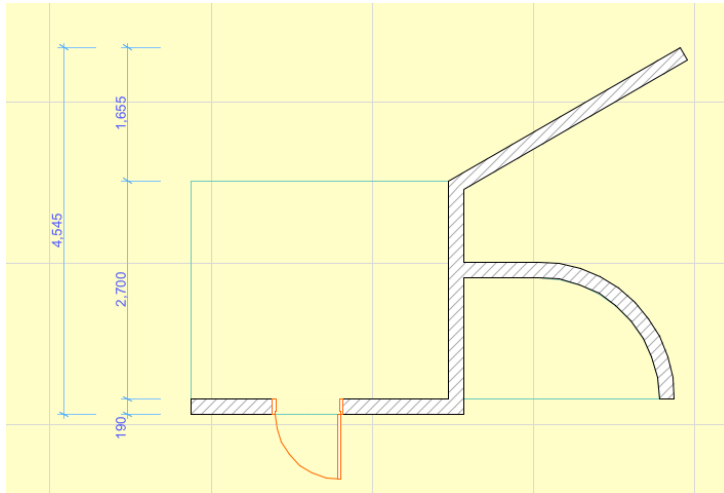


- **Double Click** to finish selecting points. (or Right Click > OK)
- Click to place your dimension String (with the hammer icon)



Vertical Dimensions

- Now use the same principle to place two Vertical Dimensions one overall and one giving the geometry and wall thickness.

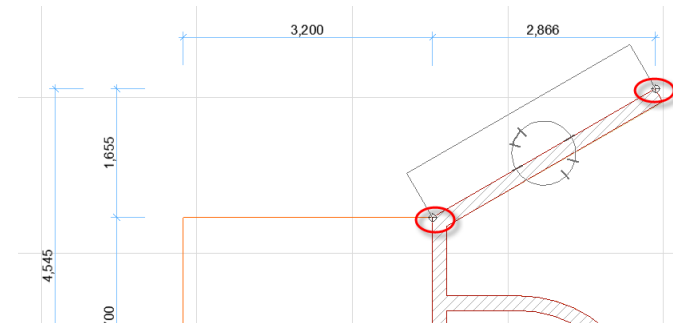


NOTE: if you rest the cursor on the side of the wall (getting the trispoke mercedes iron) it will highlight the wall and dimension the wall thickness.

- Simply clicking the corner point of the wall will dimension that point.

Aligned Dimensions

- Now place an aligned Dimension. You will need to change the Geometry method.
- Click the top corner of the Angled wall, and then click the bottom corner of the angled wall.
- Double click to finish selecting points, and place your dimension.
- Make sure the Geometry Method is set to **Any Direction**, not locked to **X-Y Only**.

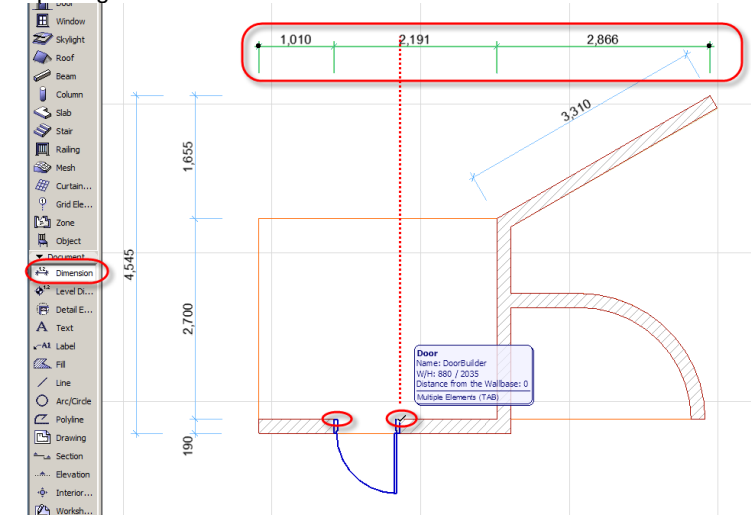


NOTE: Generally the Geometry Method will be set to X-Y Only as the majority of our projects are rectilinear and having an additional choice to place aligned each time may slow down dimension placement.

Amending placed Dimensions

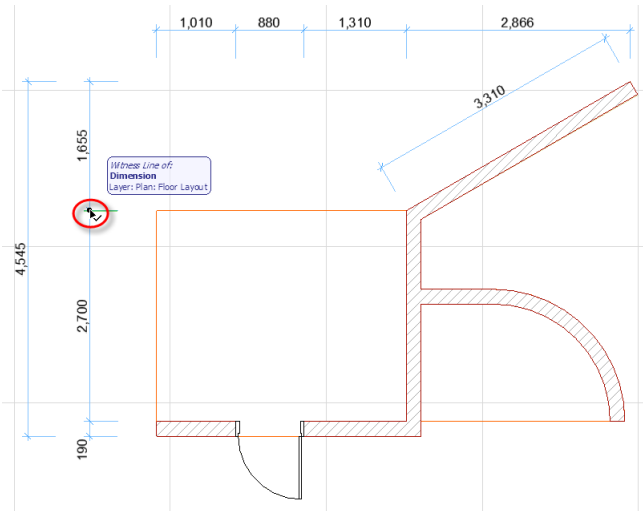
Adding extra points

- Adding extra points to a dimension string.
- Select the Horizontal Dimension string.
- Make sure the Dimension Tool is selected
- Hold down **Ctrl** (PC) or **Command** (Mac) and click either side of the door opening.



Deleting points

- Select the node at the witness line/ dimension string intersection you wish to delete
- Hit the **delete** key.



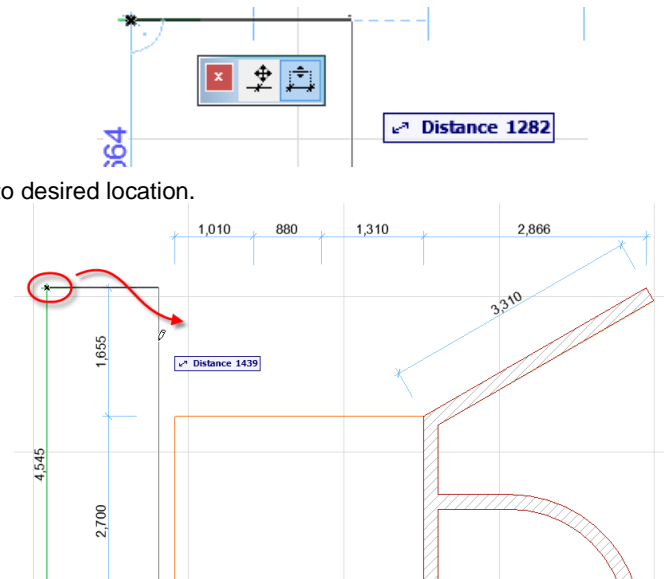
Moving points

- Select the node at the witness line/ dimension string intersection you wish to move
- Choose the first option from the Pet Palette (move node)
- Click where you want the Dimension string to now dimension

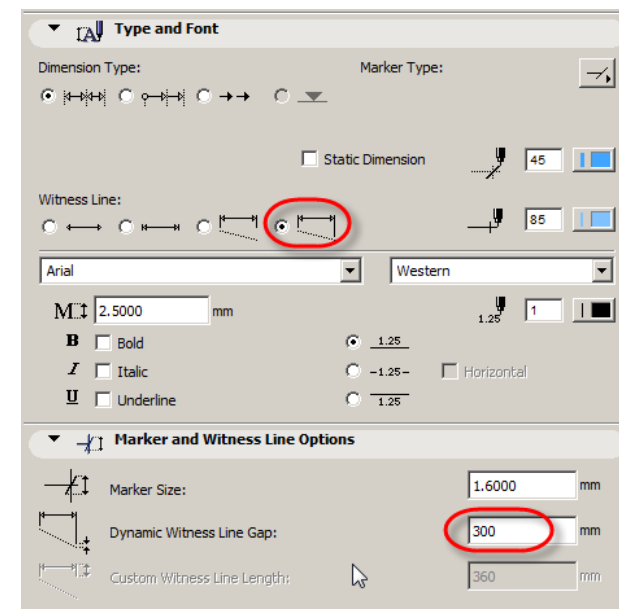
Changing the Length of a Witness Line

- Select the Dimension string
- With the Dimension tool selected in the ToolBox.
- Select the node at the witness line/ dimension string intersection
- Choose 'Edit Length of Witness line' from the pet palette:

- Stretch to desired location.

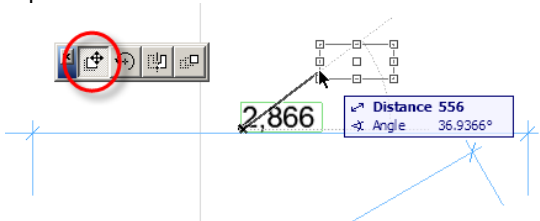


- Alternatively: You could set the Witness lines to be **Dynamic Height** in the Dimension Settings, and set the **Dynamic Witness Line Gap**.

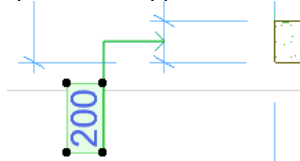


Repositioning Text

- Select the text and choose move from the Pet Palette
- Move to desired position

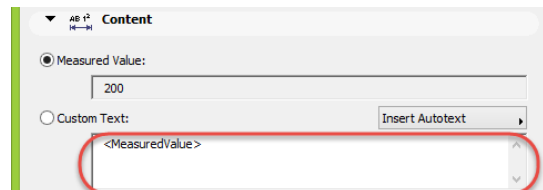


- This can be useful for Wall thickness dimensions, if you drag the dimension far enough away an automatic pointer will appear:

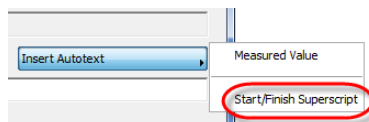


Modifying Text

- Select the text
- Open the Text Selection Settings
- Type in your new text.

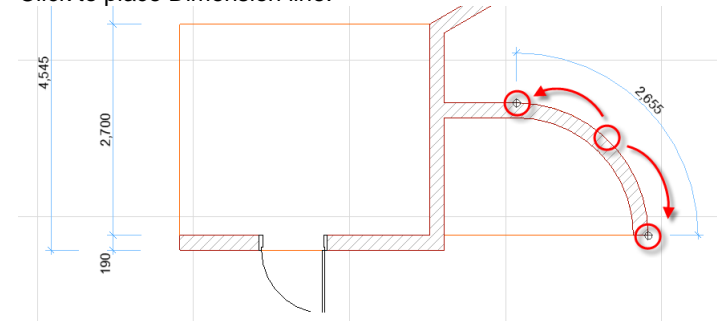


- You can also ADD superscript or standard text, either before or after the dimension.
- Select the text
- Open the Text Selection Settings
- Tick to use **Custom Text**., Your Measured Value will be added to the Custom Text line
- Type your standard text in front or behind the measured text
- Use the **Insert Autotext** button to start and finish any superscript text.



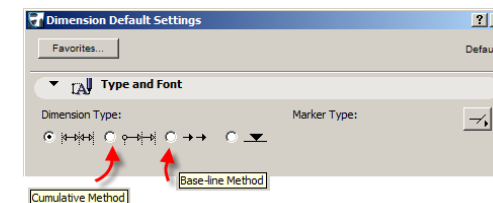
Arc Length Dimensions

- Choose the Dimension Tool from the ToolBox
- From the Geometry Method choose, **Arc length**
- Select the right side of the lower curved wall.
- Double click to finish selecting points
- Click to place Dimension line.

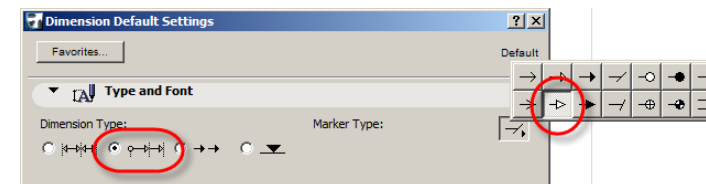
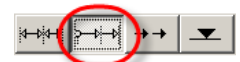


Cumulative Dimensions

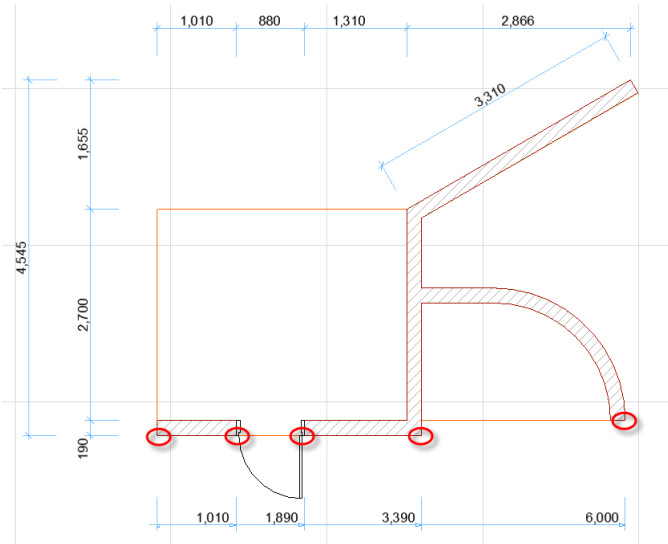
- We can create Running (Cumulative) Dimensions and Base-Line Dimensions by selecting the respective **Dimension Type** from the Dimension Default Settings.



- Or by selecting the Construction Method directly from the InfoBox
- Open the Dimension Default Settings and Choose **Cumulative Method**
- Chose a more appropriate **Marker Type** (arrow head style)

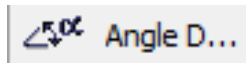


- Select points along the lower wall, from left to right.
- Double click to finish selecting points
- Click to place the Dimension String

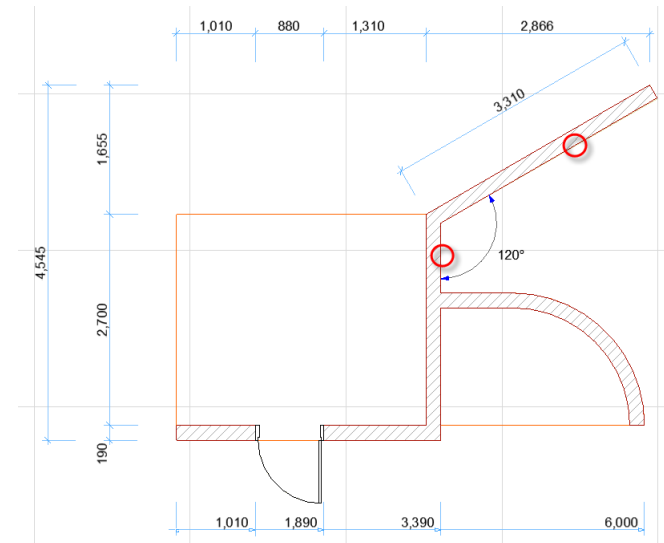


Angle Dimensions

- Choose **Angle Dimension** from the **More** section of the ToolBox.
- From the Construction Method, choose **Inner Dimension**

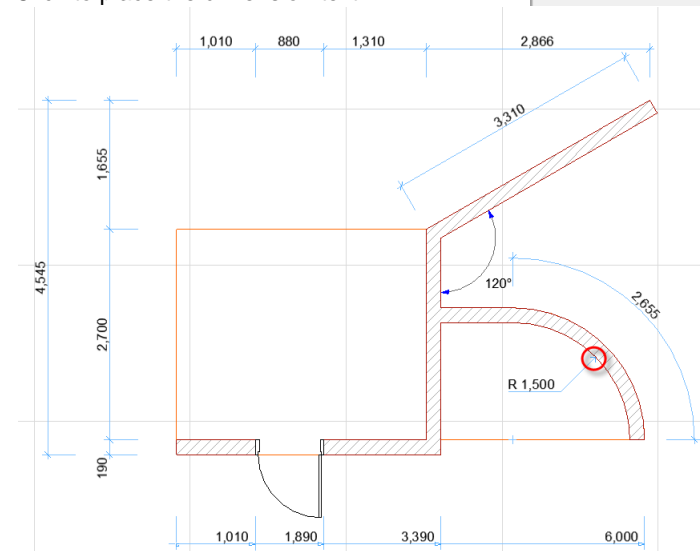


- Use the Status Bar to help you select the correct elements.
- Select the underside of the angled wall
- Select the right side of the vertical wall
- Click to place your dimension text



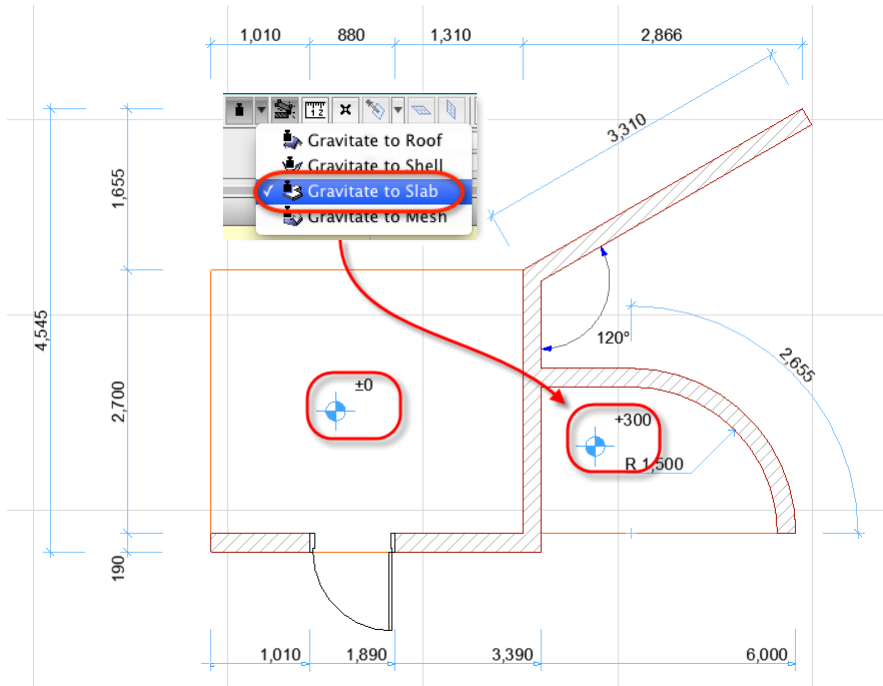
Radial Dimensions

- Choose **Radial Dimension** from the **More** section of the ToolBox.
- Select the inside face of the curved wall
- Click to place the dimension text.



Level Dimensions

- Choose **Level Dimension** from the ToolBox.
- Click on the square Slab to place a Dimension Marker
- From the ToolBar activate **Gravity** and set it to **Gravitate to Slab**
- Click on curved Slab (which is 300mm higher than the first slab)



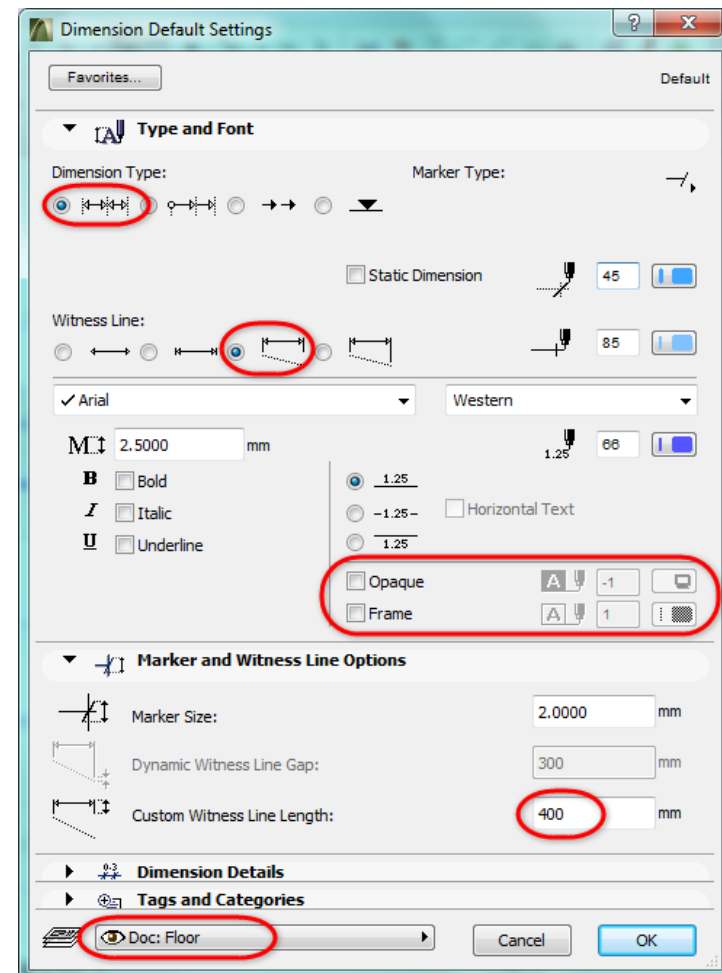
NOTE: Gravity can only be used at the time of placement, you cannot select an already placed object and use gravity on it. Gravity can also be used to place objects, Trees can Gravitate to a Mesh, Level Dimensions can Gravitate to a Roof.

Once Dimensions are placed and objects have been selected to place the dimensions, they remain associated to those objects. In the case of the level dimension, if the slab height changes the text value will alter accordingly. In the case of a wall/window dimension, if the window is moved the dimensions associated to it will update.

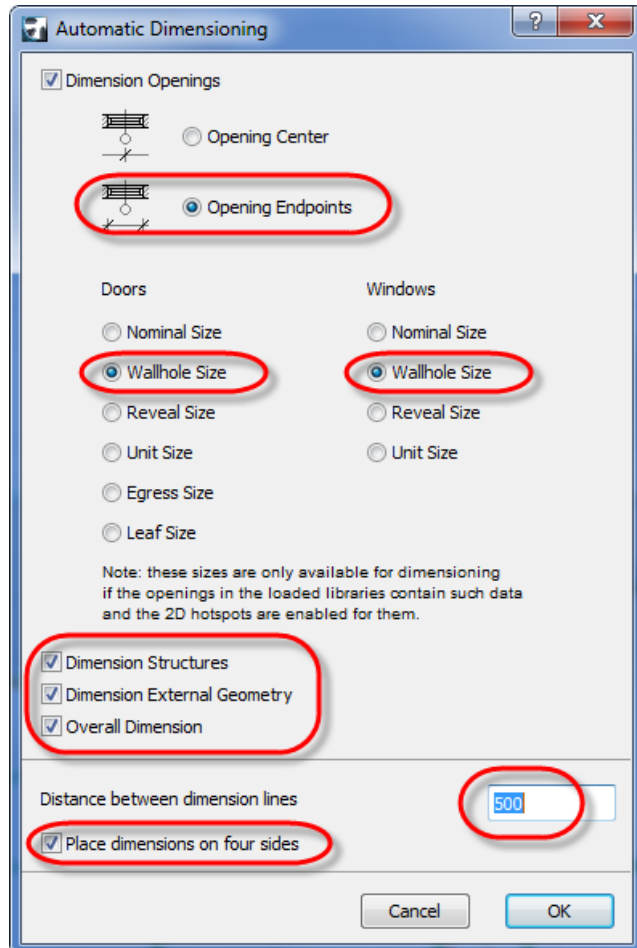
Bach Dimensions (Automatic Dimensioning)

Having completed the dimensioning exercises you can now dimension your Bach project. Instead of placing individual dimension Strings, we can use ArchiCAD's powerful Automatic Dimensioning Feature.

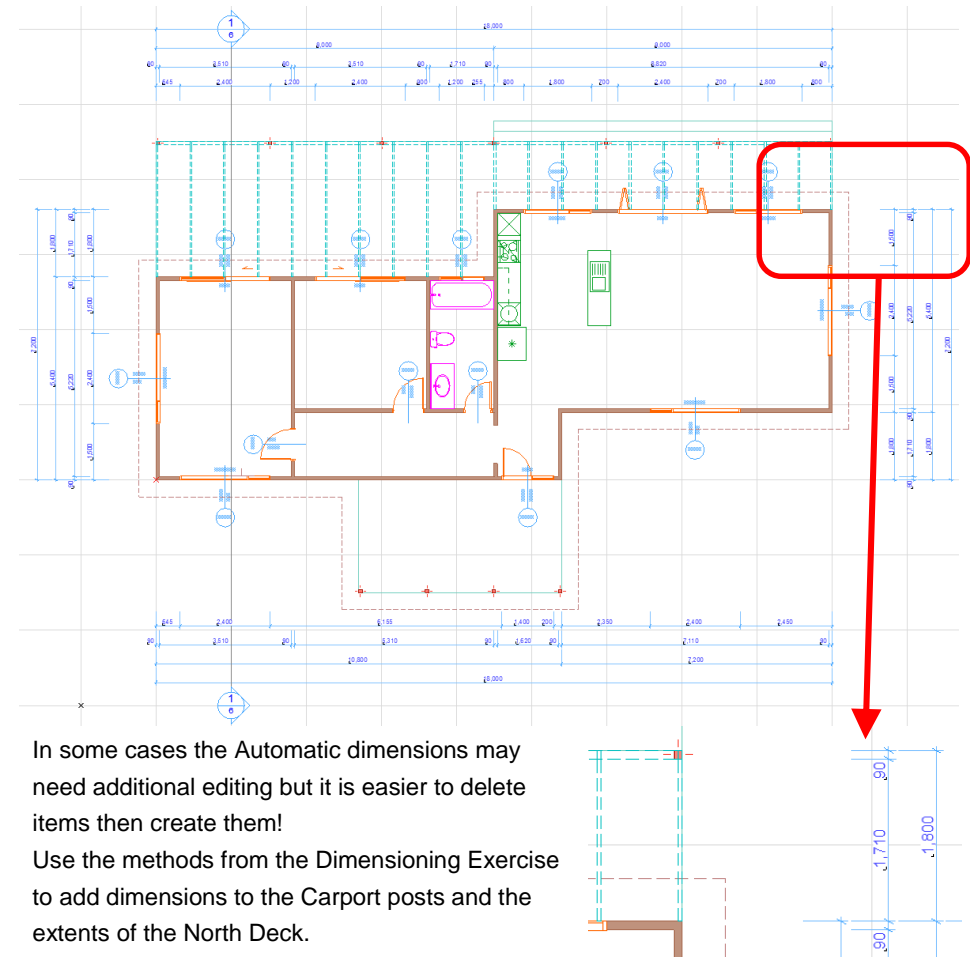
- Navigate to your Bach file.
- Navigate to the **Ground Floor Plan** – use the **View Map**
- Open the **Dimension** Tool and check the following settings



- Change to the **Wall Tool** and select all Walls (**Ctrl+A** or **Command+A**)
- Open the **Document > Document Extras > Automatic Dimensioning > Exterior Dimensions...** dialog
- Check the following Settings:

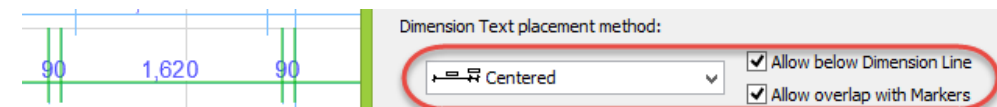


- Click **OK**
- Click the **North Wall** – this indicates the main direction of the dimensions chains
- Click a point just above the deck – this indicates the position of the first dimension chain



- In some cases the Automatic dimensions may need additional editing but it is easier to delete items then create them!
- Use the methods from the Dimensioning Exercise to add dimensions to the Carport posts and the extents of the North Deck.

We can modify the dimension strings to automatically reposition the text to a more appropriate location, for example the wall thickness dimension string. Select it and open it setting and change the **Dimension Text placement method** to **Centered**

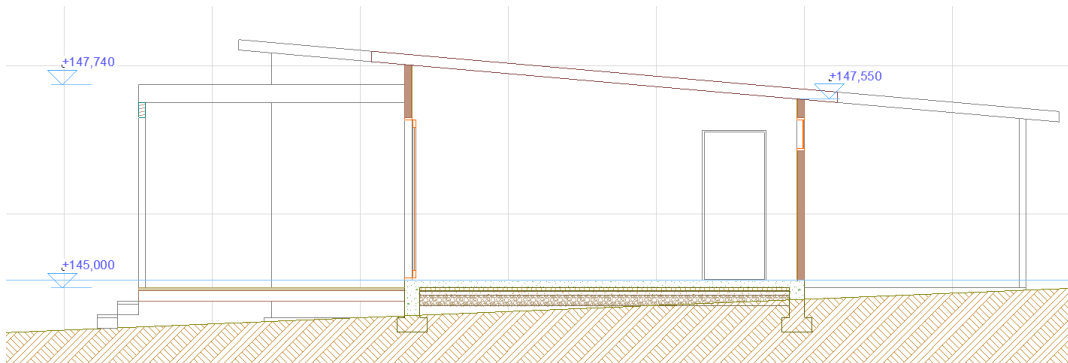


Elevation Dimensions

- We can use the Elevation dimensions in our Sections and Elevations.
- Open **A1 Section AA** from the View Map
- Select the **Dimension Tool** from the ToolBox
- In the Info Box change to **Elevation Dimension** and choose a Marker Type.



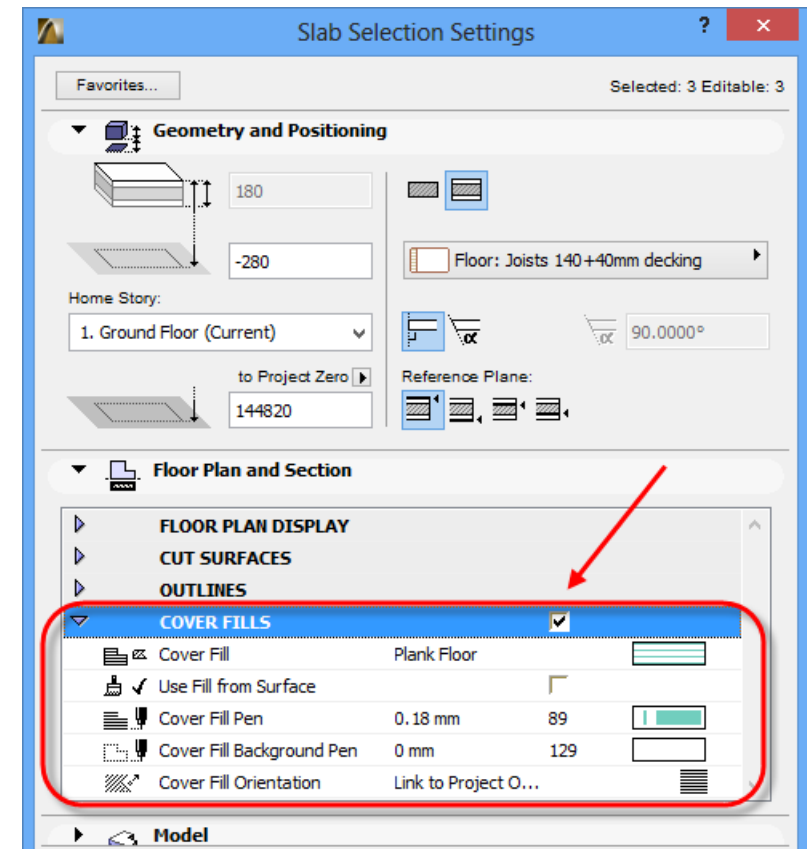
- Within Section AA we can place some Elevation Dimensions



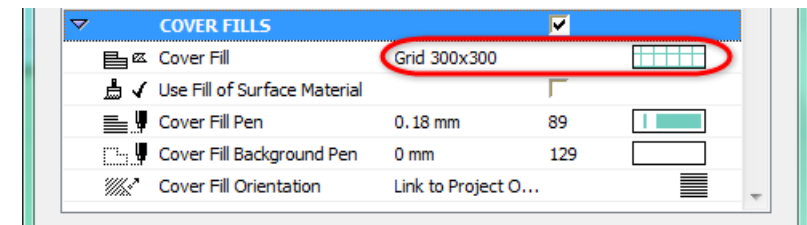
Cover Fills

Fills (or hatches) are useful to help define materiality of areas within a floor plan. We can place independent fills or we can attach fills to modelled elements – these are 'Cover Fills'

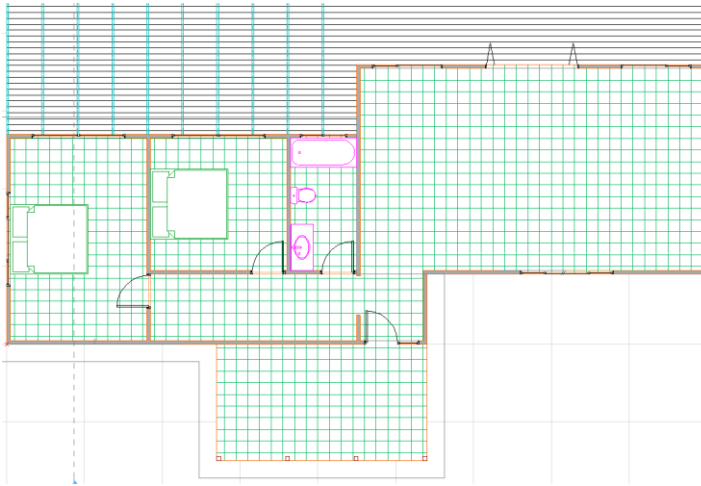
- Make sure you are on the **Presentation Plan** view
- Select the Slab that defines the deck and the two step slabs
- Open the **Slab Settings** and within Floor Plan and Section, tick ON **Cover Fills**
- Set the Fill Type to **Plank Floor**
- And set the pens accordingly
- Click **OK**



- This is great for 'single finish' slabs like decks etc
- Select the main floor Slab and apply the following **Cover Fill** Settings



- Click **OK**



As you can see the entire Slab takes on the fill. However, in this case we only want to show tiles in the Bathroom, Kitchen and Entry areas.

- Click Undo (**Ctrl+Z** or **Command+Z**) to remove the Cover Fill

Standard Fills

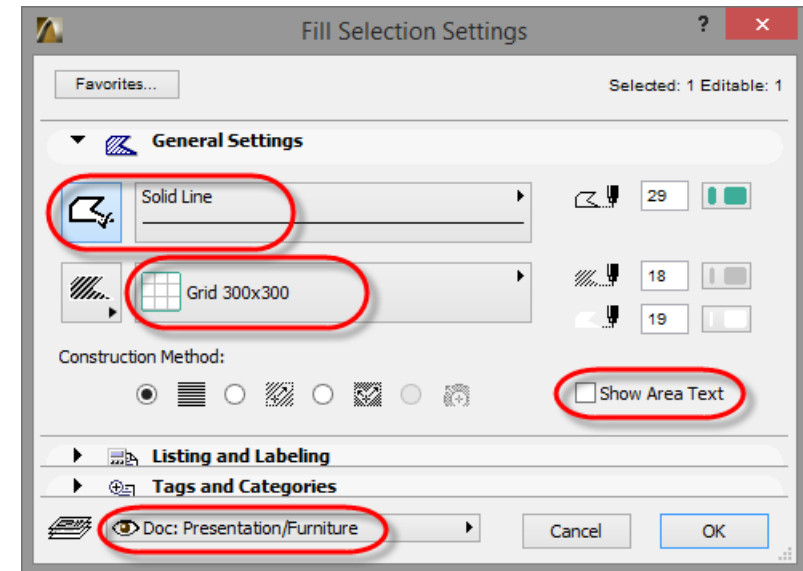
Standard 2D Fills also have their place in documentation (& presentation) and can be better suited than Cover Fills in many situations.

We'll create some Fills to represent our tiled floor areas.

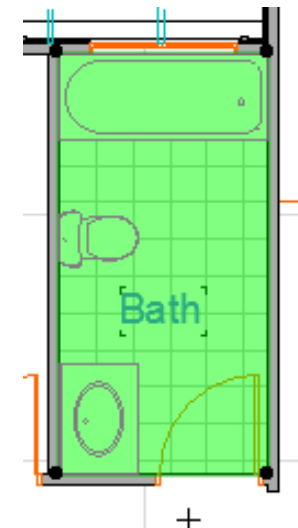
NOTE: It is also possible to use 3D Zones to identify floor finishes, we will look at this process later.

- Open the **Fill Tool** Settings and set them as follows:

NOTE: There are two main types of Fills **Vectorial** and **Symbol**. Symbol fills are much more detailed than Vectorial fills and should therefore only be used for small areas of fill – mainly in your detail work.



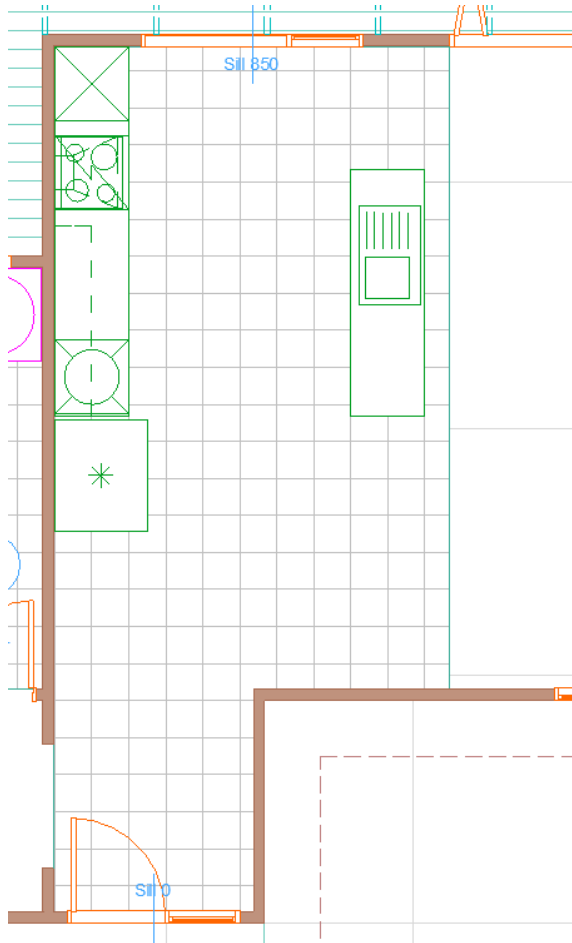
- Click **OK**
- Place a **Rectangular Fill** within the Bathroom – you can place this across the entire floor as the bathroom objects will block out the fill as they have a white background



- Place a **Polygonal Fill** in the Entry / Kitchen Area

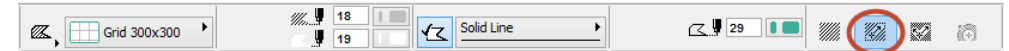


- Start at the Entry, up the Kitchen wall, along to the Bi-Fold doors, down to the South Wall, and back to the Entry start point.

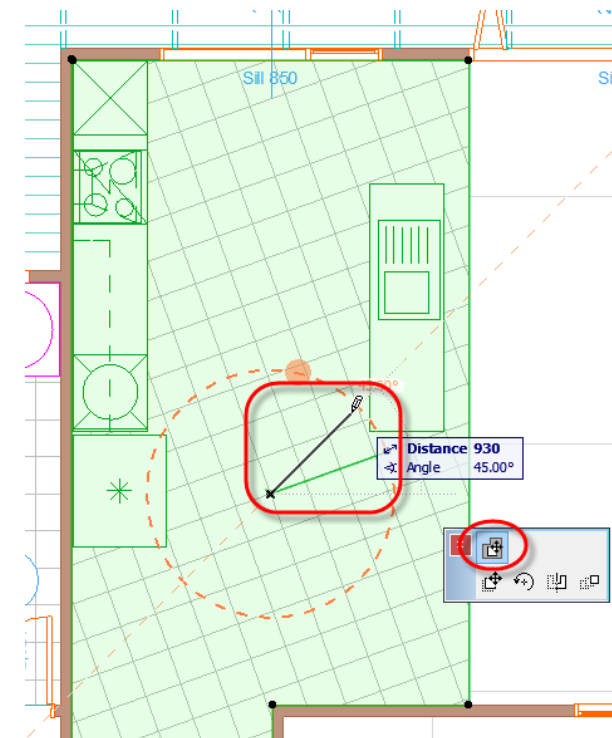


Fills allow you to change the direction and size of the Fill pattern

- Select the fill in the Kitchen
- Change the **Origin Setting** using the Info Box (you will need to scroll the **Info Box**)



- You will see a 'handle' appear – rotate the handle **45 degrees**

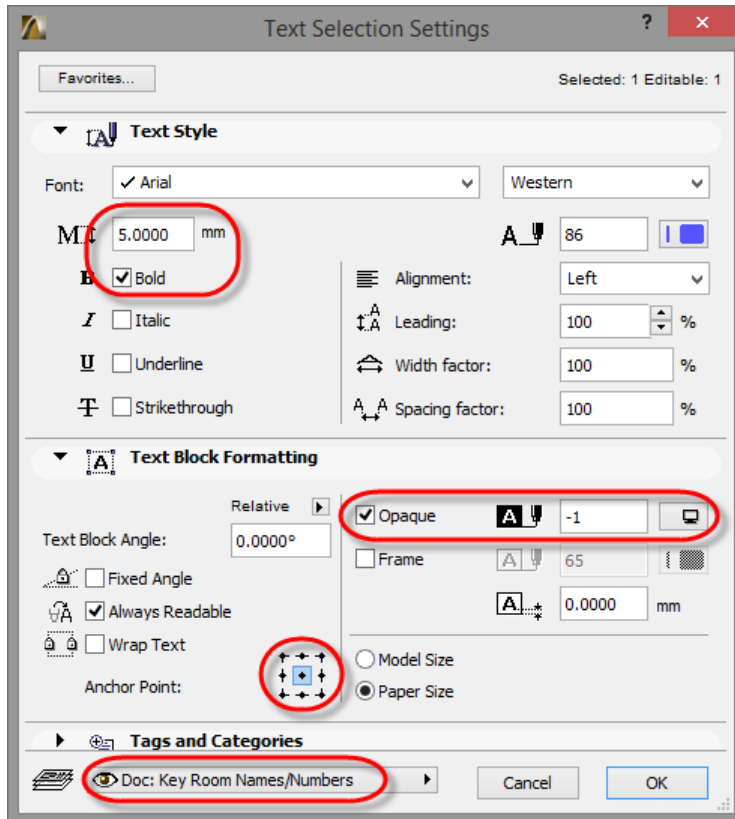


Text

For our Floor Plans we can use the Standard Text Tool to identify the various Rooms.

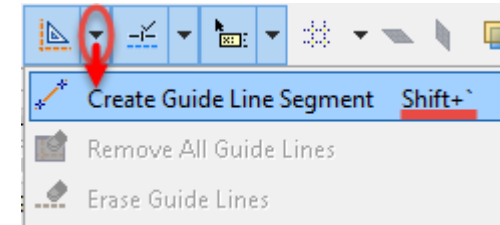
NOTE: 3D Zones can also be used to label spaces, we will look at this later.

- Open the **Text Tool** Settings and set it as follows:

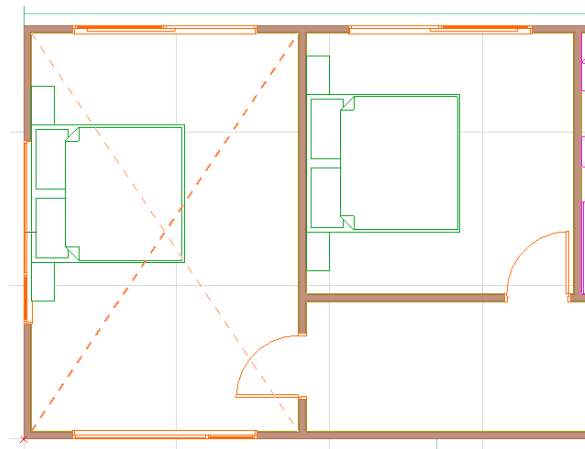


NOTE: Text is input at the real size it will output as (**Paper Size**), for example 5mm text is 5mm when printed – because of this text appears to grow and shrink when the drawing scale changes – for this reason it is important to set the anchor point for text correctly so if the drawing scale changes the text still remains in the right place. For the room names we want them to stay **centred** in the room. You can choose to place Text at **Model Size**.

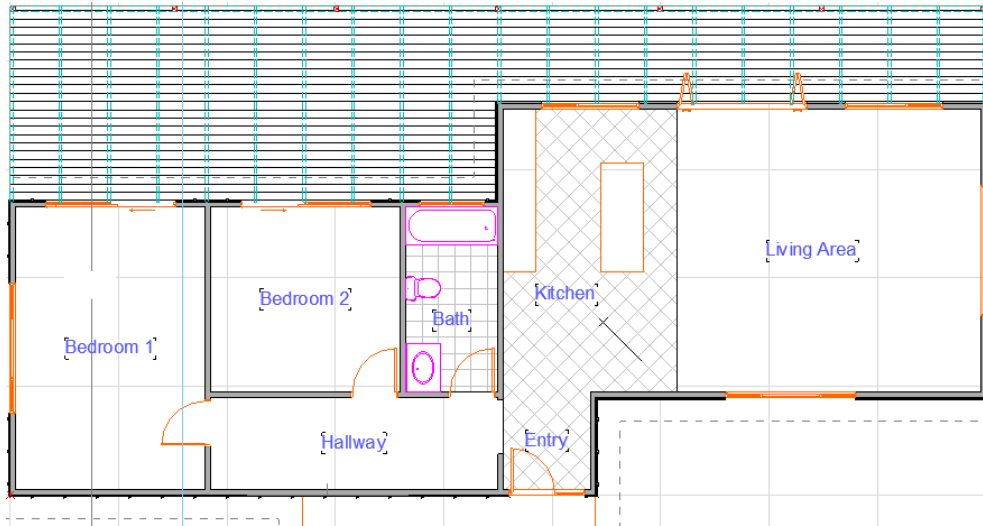
- You can use the **Create Guide Line Segment** command to place Guide Lines diagonally across the Master Bedroom



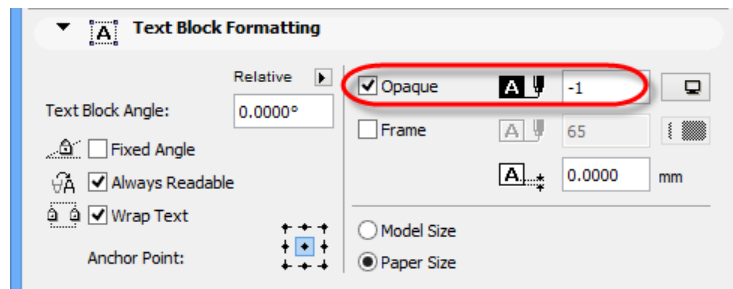
- Double click the mid-point of the Guide Line to place the text in the Centre



- Type the name: **Bedroom 1**
- Click outside of the text to complete
- Repeat for the other rooms, **Bedroom 2, Bath**
- Label the **Kitchen** and **Living Area** separately
- Label the **Entrance**
- And finally the **Hallway**



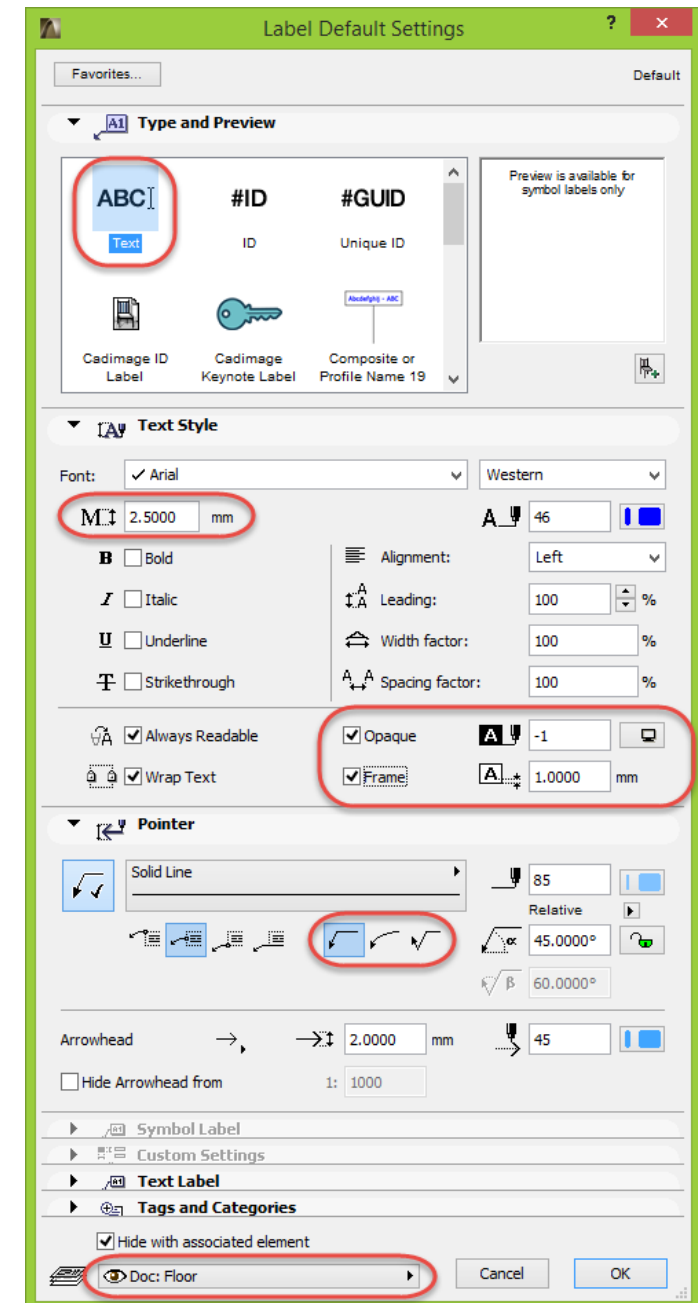
For Text placed over Fills you will notice there is an opaque background, this is because **Opaque** was ticked.



Labels

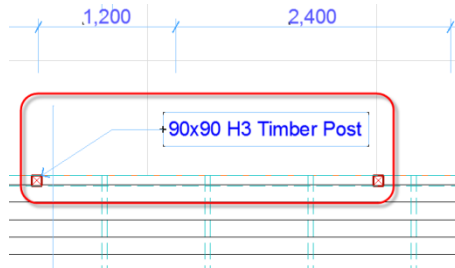
While annotating the various drawings it is important to label items and have a leader line indicating what the label refers to. You can do this with the **ArchiCAD Label Tool**.

- Open the **Label Tool Settings** and set them as follows:

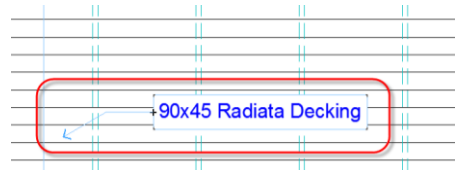


NOTE: When placing a Label (1) the first click is where the leader's arrow head will be placed, (2) the second sets the vertical offset of the leader, (3) the third indicates where the text box starts, (4) and the final click the size and shape of the text box. (The third click can be a double-click, and this will place an automatic sizing text box)

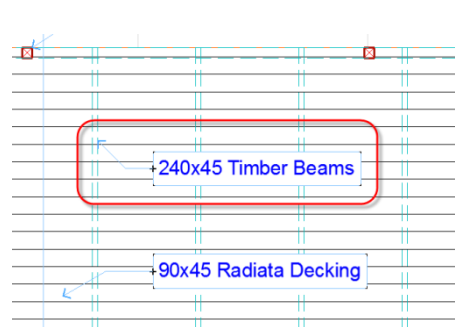
- Place a label for the Pergola Post “90x90 H3 Timber Post”



- Place a label referring to the deck “90x45 Radiata Decking”

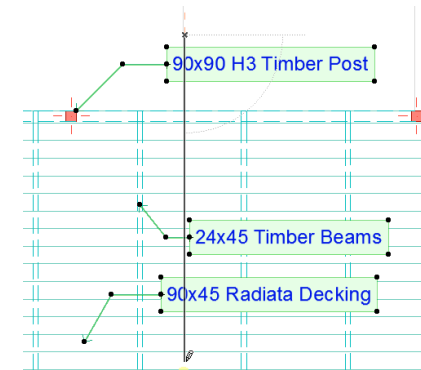


- Place a label indicating the Roof outline “240x45 Timber Beams”



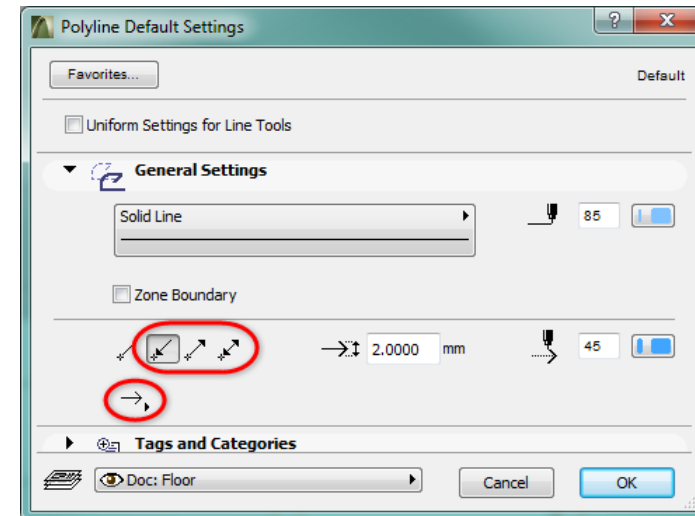
There is a nice option to align labels

- Select the 3 placed labels
- Choose the **Adjust** tool from the Toolbar
- Draw a vertical line to adjust them to.



In some cases you may wish to have multiple leader lines from the same piece of text. An alternative to ArchiCAD Labels is to use the Text Tool and the Polyline or Spline Tool with an arrowhead added.

- Select the **Polyline** Tool and open its Settings



- Choose the **Arrow at start** option
- Choose your arrow head type

NOTE: The same arrow options are available in the **Line** and **Spline** Tools.

Module 10 – Two Story Bach

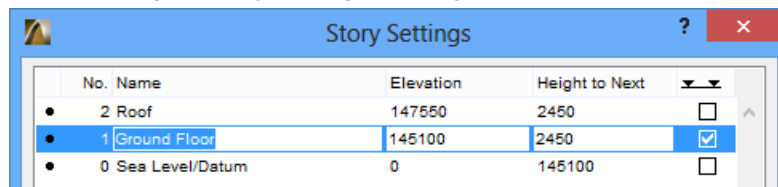
Having produced a simple one story bach the client has decided they need more space – it's time to go up.

In this module we add a top floor to our bach. This will involve the creation of some new elements along with some editing to the existing bach.

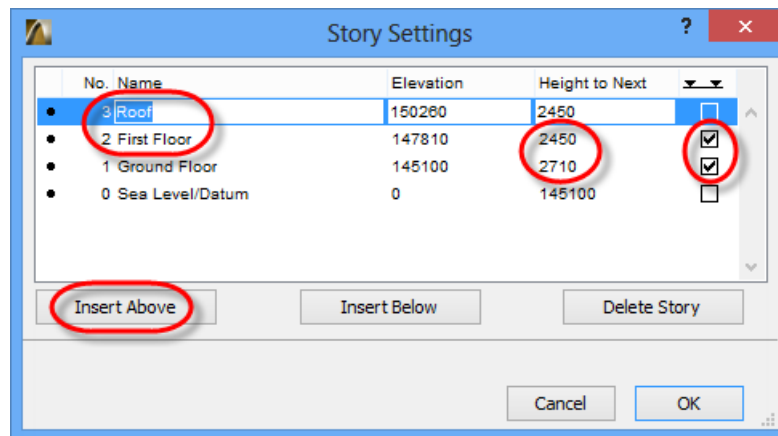
We'll also have a look at Stairs to ensure we can access the top floor

Story Settings

- Open the **Design > Story Settings...** dialog

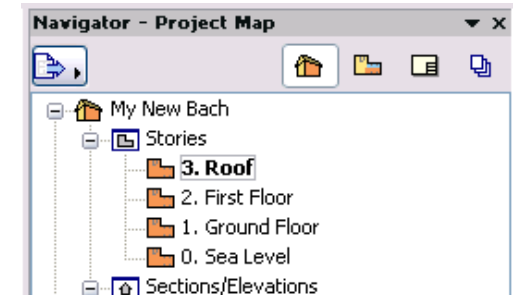


- You'll notice that the project template does not contain a First Floor



- Rename **Roof** to **First Floor** (as the lower roof will now belong to the First Floor) and add a new roof Story using **Insert Above**, label this as **Roof**
- In the **Height to Next** field for the Ground Floor change the 2450mm to **2710mm** (this allows a 2450mm Wall, 240mm Joist and 20mm Particle Board)
- In the **Height to Next** field for the First floor set this to **2450mm**

- Tick the Story level box to the right of Ground Floor and First Floor, this allows the story level markers to show in section and elevation
- Click **OK**
- The **Project Map** will now show the renamed and new Stories
- You can always see what Story you are currently on, as it is shown **Bold** in the **Navigator**



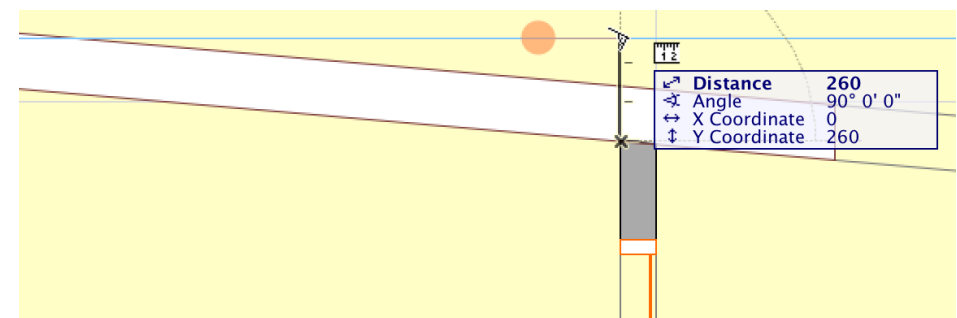
BIM Note:

The BIM environment consist of a series of Levels (called Stories) In ArchiCAD information is placed associated to a Story, if that story is moved (up or down) the information on that Story moves too. Also if the Story is deleted ALL the information on that story will be deleted too!

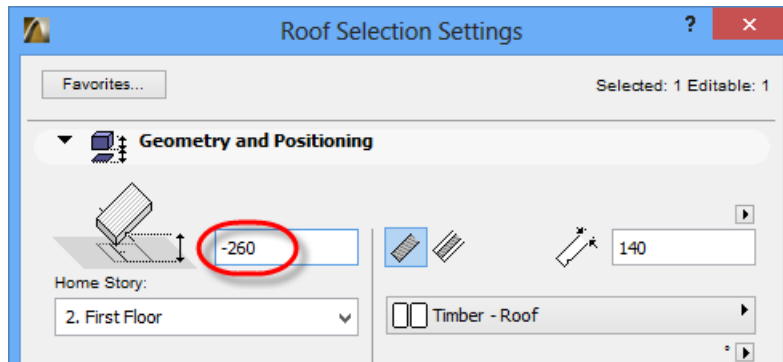
Subtly the Roof element has changed elevation – because we moved the Roof Story up 260mm, and all elements on that Story move up.

Roof Editing

Go to the **Section View** and measure the spring height, previously this was 2450...



- Select the **Roof**, open its settings and change the height to **-260mm**

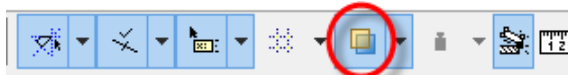


- This will set the roof back to its correct pitching height of 2450mm from the Ground Floor.

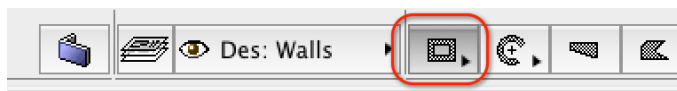
Top Story Walls

The top floor Walls are a simple rectangle of Walls placed directly over the top of the Kitchen and Living part of the bach.

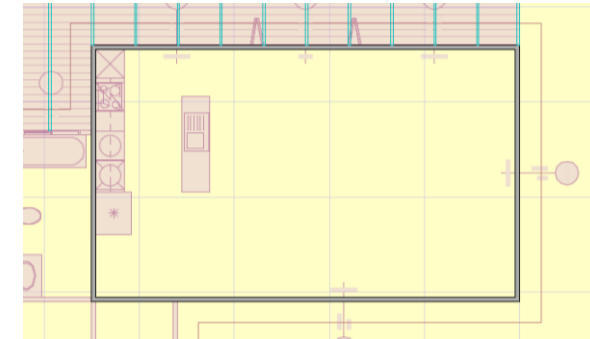
- Select the **First Floor** from the Project Map, you should still be able to see the Ground Floor walls as a Reference.
 - If not turn the **Trace reference** back on with the icon in the ToolBar.



- Use the **Eye Dropper** to 'pick up' the attributes of the Exterior Walls of the living area below (yes you can use the **Eye Dropper** on Reference elements!)
- Ensure the **Wall Geometry** method is set to **Rectangular**

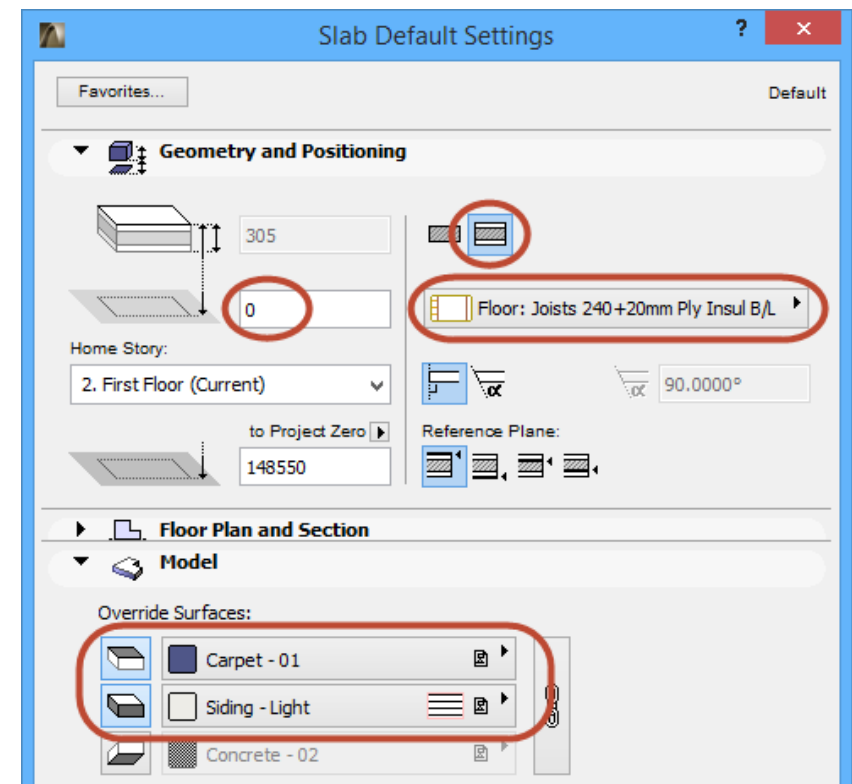


- Making sure you get the appropriate cursor symbols draw a set of Walls directly over the Ground Floor Walls (initially you will get a **Tick** cursor to indicate the exact corner point; once drawing the Walls you need to ensure you get a **Black Pencil** cursor to indicate you are directly over the Ground Floor Walls.)



Mid Floor

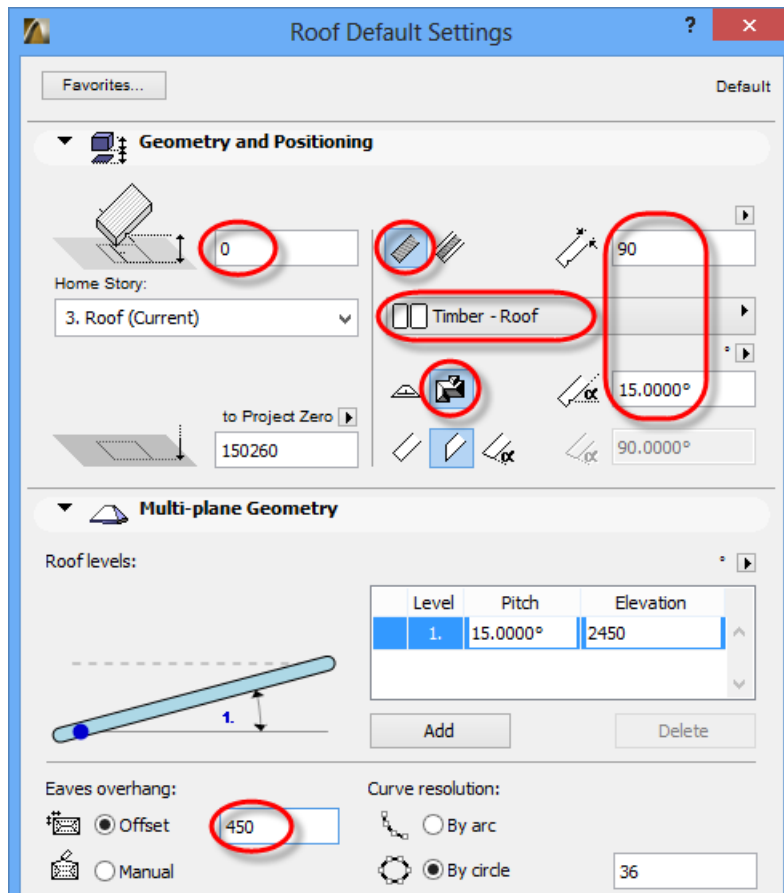
- Open the **Slab Settings**
- Set the Structure type to **Composite** and choose the composite called **Floor: Joists 240 + 20mm Ply B/L**



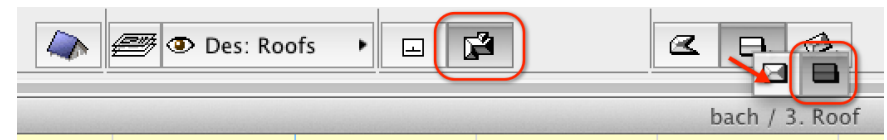
- Set the Height to Home Story to **0**
- Within the Model tab, Override the top surface with **Carpet - 01** and the edge with the same surface as the exterior walls; **Siding - Light**.
- Click **OK**
- Ensure the Slab **Geometry** method is set to **Rectangular**
- And trace the same shape as the walls you just placed.

Top Story Roof

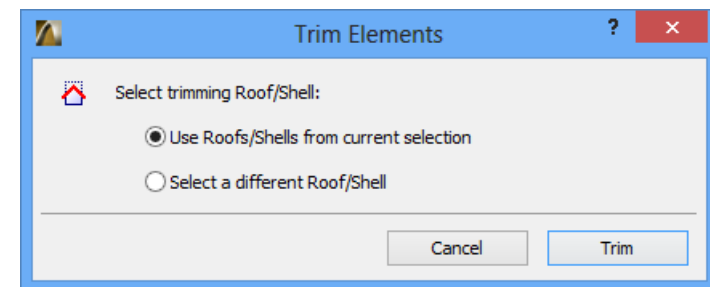
- Select the **Roof** Story from the **Project Map**



- Open the **Roof** Settings, for the top Storey we are going to construct a Gable end Roof.
- Set the Structure to **Basic** and choose the Building Material **Timber – Roof**
- Change the Geometry to **Multi-plane**.
- Change the thickness of the Roof to **90mm** and the pitch to **15°**
- In the Multi-plane Geometry settings set the **Eaves overhang Offset** to **450mm**
Layer should be **Des: Roofs**
- In the Info Bar set the **Construction Method** to **Gable**

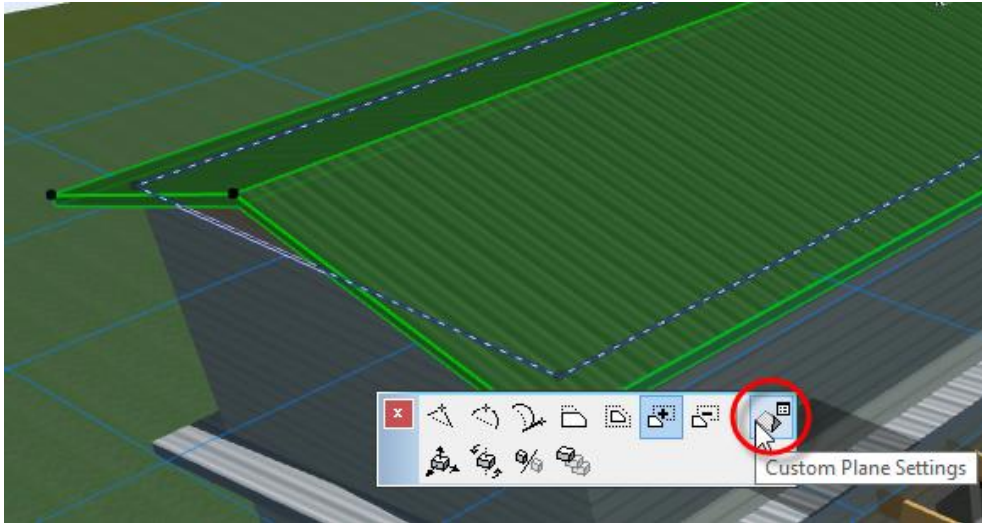


- Draw a rectangular roof snapping to the same points as your mid floor slab.
- The Multi-plane Roof will automatically extend the eaves.
- Goto 3D, select the **First Floor Walls** and the **First Floor Roof**
- Use the **Design > Connect > Trim Elements to Roof/Shell...** command to trim the walls.
- A dialog will pop up – Click **Trim**

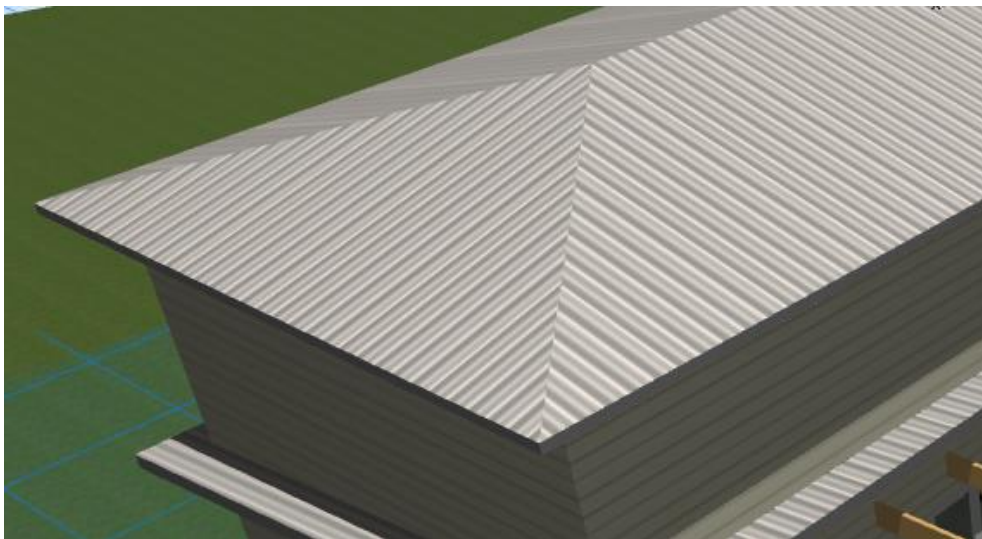


NOTE: You can easily change this roof to a Hipped roof.

- Select the Roof, click on the edge **blue** pitching line, from the Pet Palette choose **Custom Plane Settings**



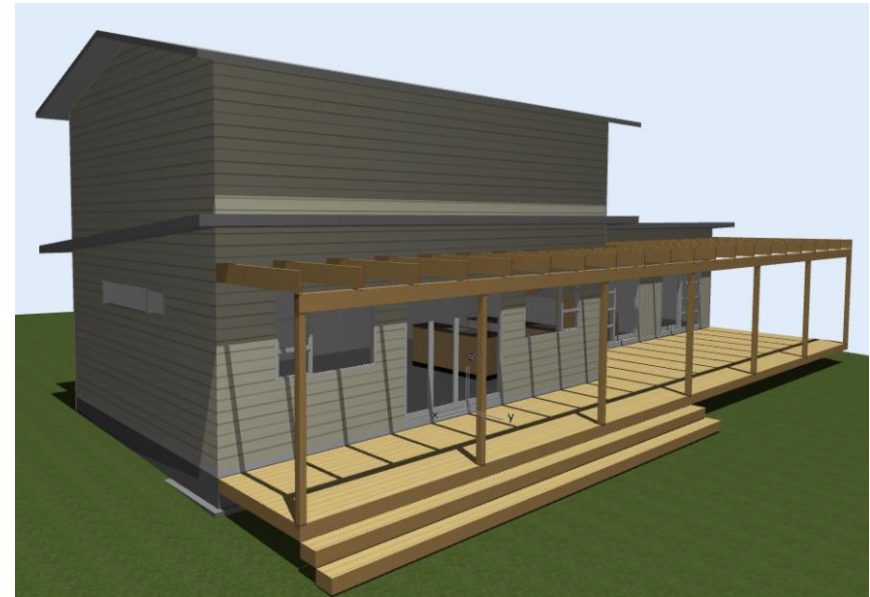
- In this new dialog change the Plane type from Gable to **Pitched**
- Click **OK**.



- Hit **Ctrl+Z** or **Command+Z** to **Undo** this.

Ground Floor Editing

If you look at the model in 3D you can see it taking shape but you may notice it isn't exactly correct! There are a few elements on the Ground Floor that need to be edited.



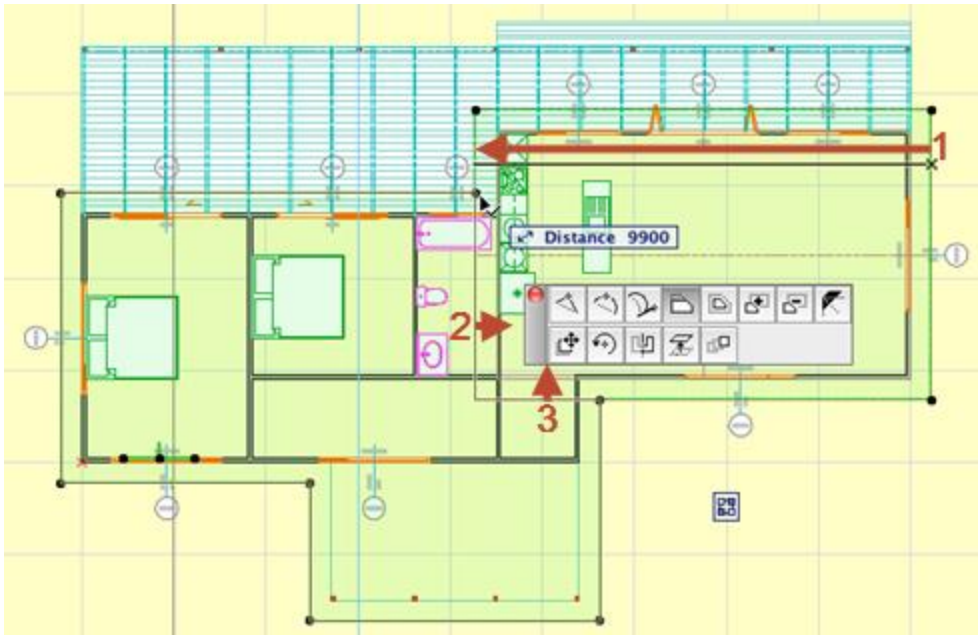
Roof Editing

With an upper floor there is no need for the lower roof to cover the entire back

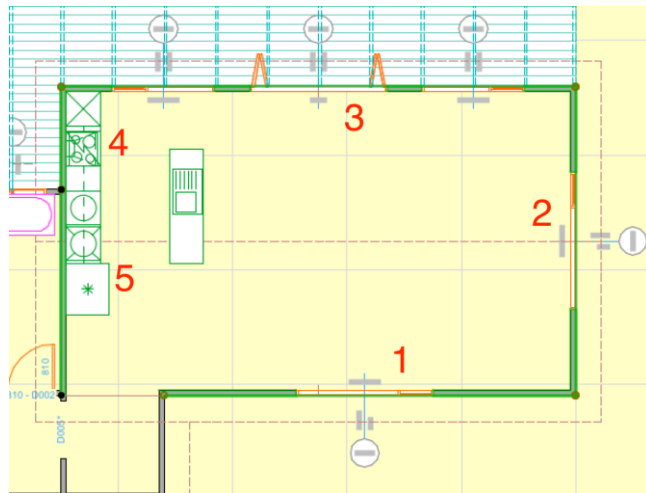
- Go to your **Ground Floor Plan** View.
- Select the Roof (remember it is best to be on the Roof Tool to make selecting Roofs easier)
- Use the **Pet Palette** to adjust the shape of the Roof so that it only covers the bedrooms, bathroom and carport, and fit nicely around the First Floor Walls.

Wall Editing

If you flip to 3D you will notice the Ground floor walls seem to have disappeared.



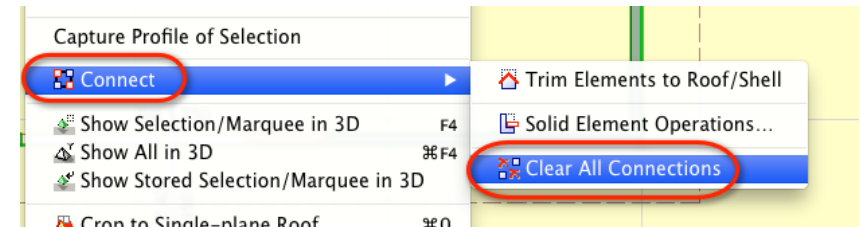
These walls are 'still' connected to the roof we just edited – and with no roof to connect to, they disappear in 3D but are still visible in 2D.



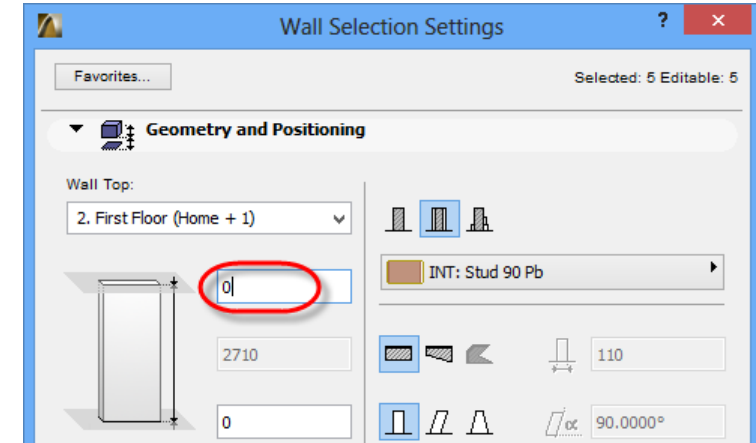
- Select the **five** Walls that sit below the upper Walls

NOTE: The top right of the Settings dialog says **Selected: 5 Editable: 5**, this means you have selected 5 walls.

- To unconnect the walls from the roof, **Right click > Connect > Clear All Connections**



- Now the walls are unconnected but very tall. They will have a 2000mm top offset.
- Open the **Wall Selection Settings**

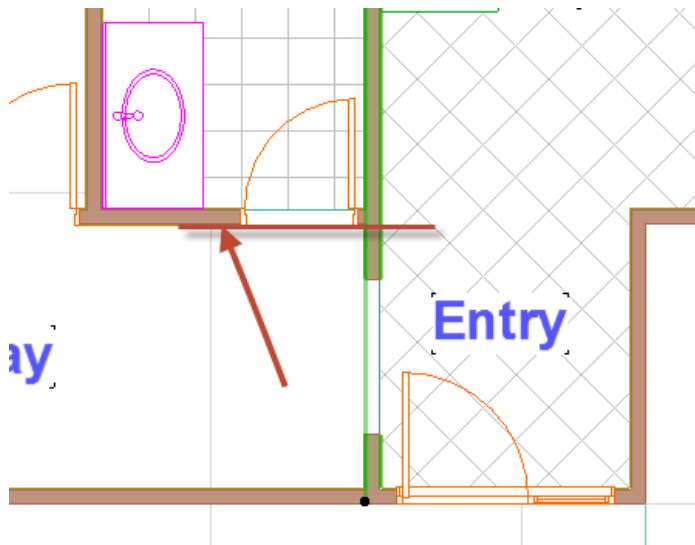


- Set the top height back to **0**
- Flip to 3D

- Note Wall 5 is poking through the lower roof.
- It needs to be **Split** at the hallway!
 - To split, select this Wall (in Plan), choose the **Split** tool in the ToolBar



- Click where you want the Split to occur.



- Flip back to 3D.
- Trim this to the Roof – select both the wall and the roof plan, Right-Click > **Connect > Trim Elements to Roof/Shell**

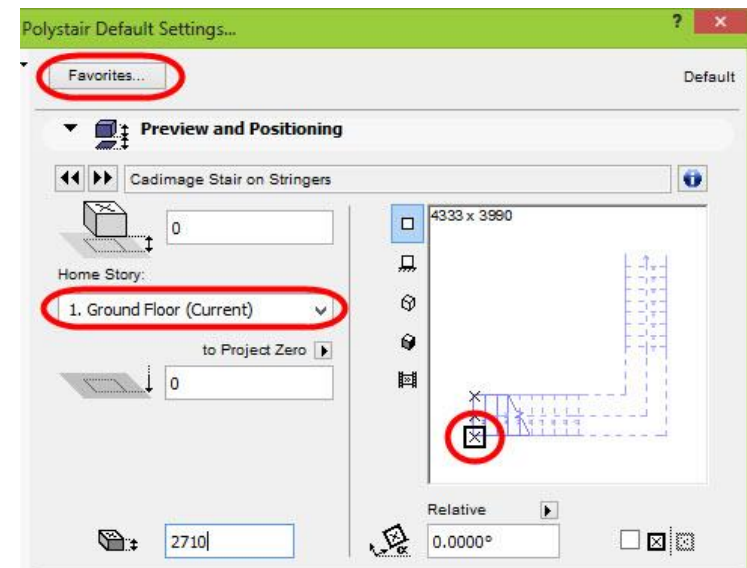
Stairs

With an upper floor it is important to be able to access it! You can add Stairs to the model using **Cadimage Stair** using the **Polystair Tool**

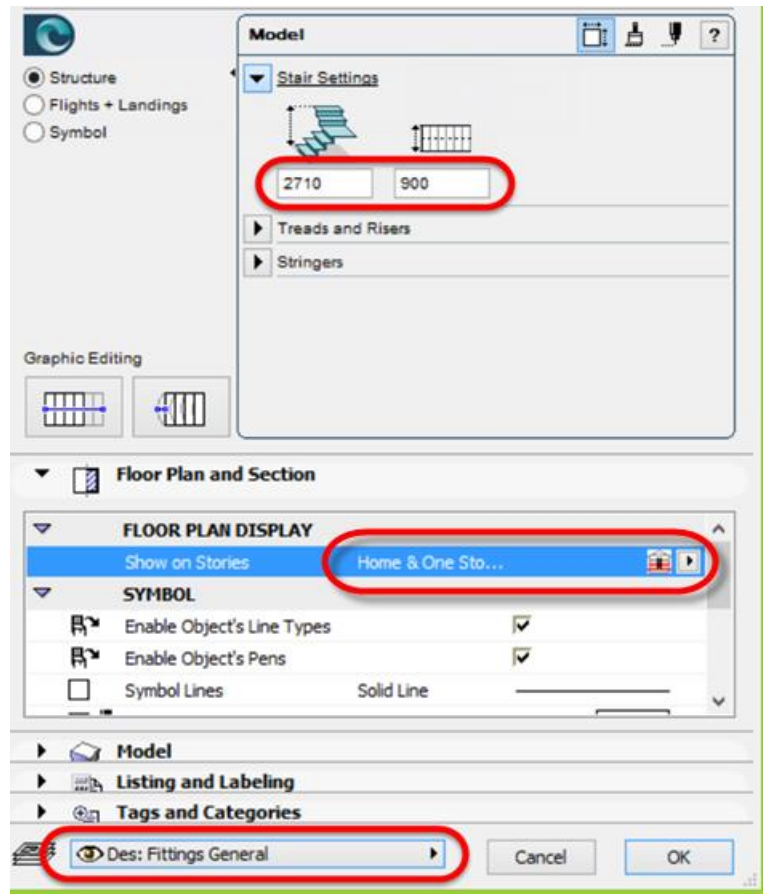
BIM Note:

Stairs are geometrically very complex, and some stairs more so than others. With Stairs, create an accurate stair with regards to treads, rise and generic style. The extra detail can come later in the 1:20 stair detail drawings.

- Open the **Polystair Tool** Settings Dialog. Select the **Cadimage Stair on Stringers**
- From **Favorites...** apply the Favorite **Timber Stair NZE**
- Set the Home Story to **1. Ground Floor**
- Set the anchor point (start point) of the stair as below:

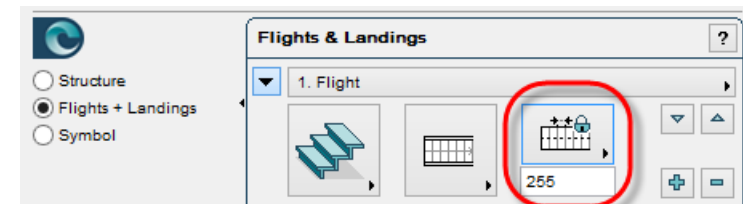


- Open the tab, **Cadimage stair on Stringer – Settings**, and in the **Structure** Tab, set the **Total Rise of the Stair** to **2710** as this is the Floor to Floor Height.
- Set the Width to **900**
- From within the **FLOOR PLAN DISPLAY** Set the Show on Stories to **Home & One Story Up**
- Set the Layer to **Des: Fittings General**

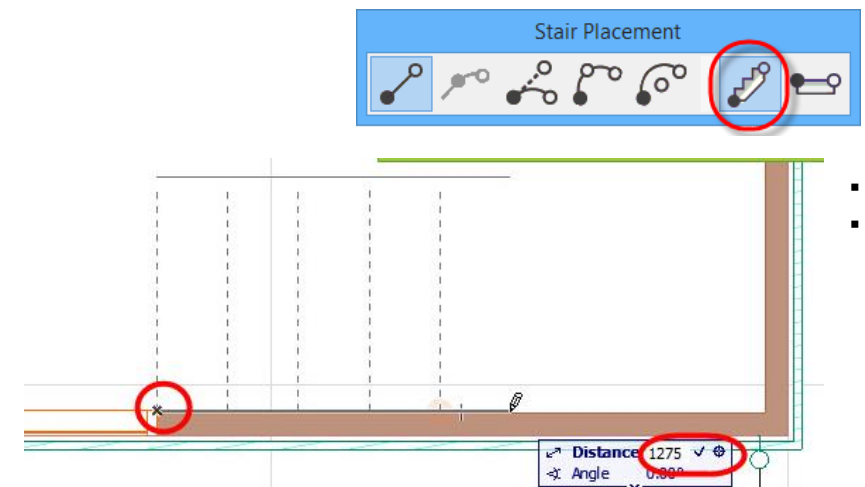


As this stair is a 'Main Private Stair' we know the min tread is 280 and the max rise is 190. We can set our stairs to have a fixed going of 255 ($255 + 25 \text{ Nosing} = 285$ to be save)

- In **Flights + Landings**, set the **1. Flight** to **255mm**
- And make sure it is locked.

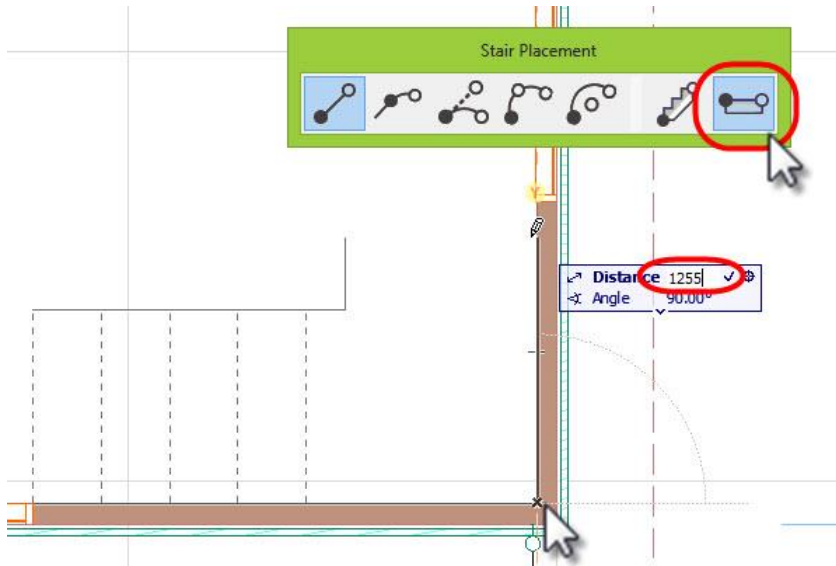


- Place the Stairs anchor point at the end of the south window and align it to the wall, draw a stair of **1275mm** long
NOTE: The Pet Palette should default to **Flight** type

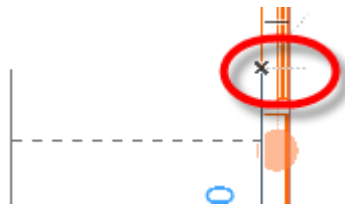


- Change the Pet Palette to **Landing** type

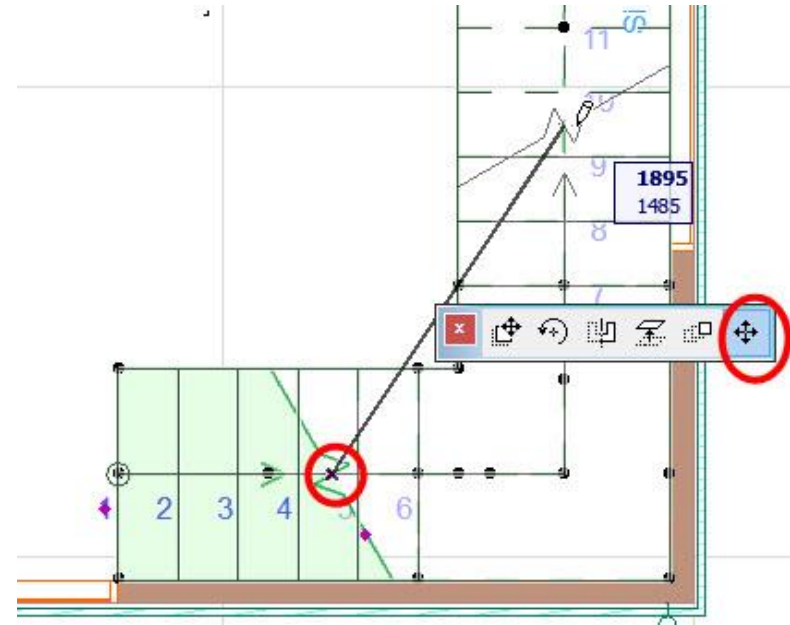
- Click into the wall corner



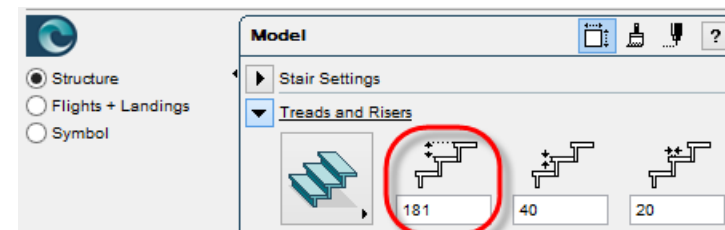
- Place the second part of the landing, **1255mm** UP from the corner.
- Change the Pet Palette back to **Flight Type**
- For the final flight click up the wall around **2000-2200** (the stair will always snap to the last 255 going)
- To Finish the Stair you need to click on the 'X' at the end of the stair.



Automatically the breakline will be displayed in the centre of the first flight, click the mid point editing node of the break line and adjust it clicking the 'move node' option in the Pet Palette.

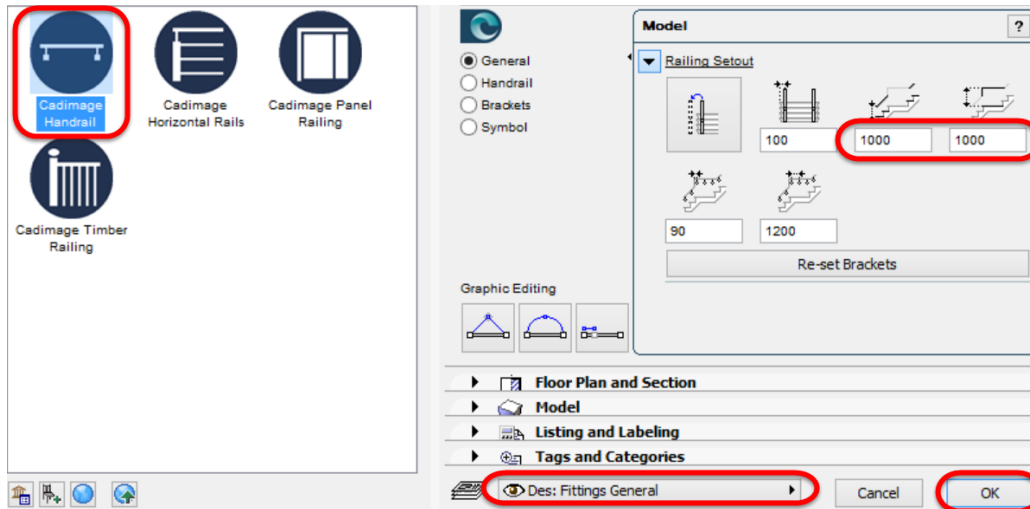


NOTE: We can check that we have the required riser height by selecting the stair and within **Structure**, we see our riser height = **181** (which is less than 190 max)

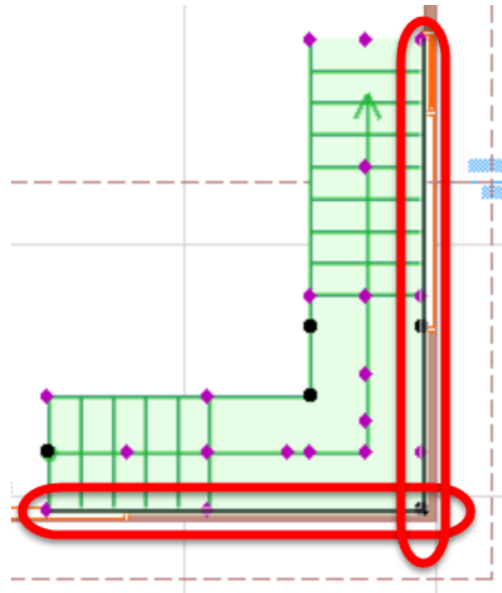


Stair Railing

- Select the Stair and go to **Cadimage > Stairs > Place Railing...**
- Select the **Favorite Handrail NZE** and check its height is **1000**
- Ensure the Layer is set to **Des: Fittings General** and click **OK**

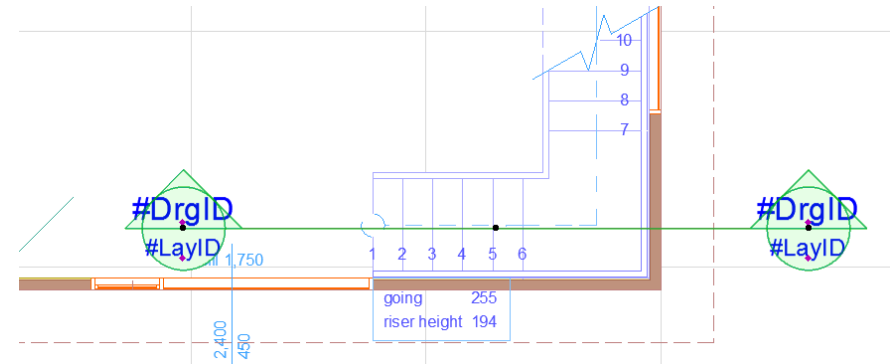


- It will zoom into the stair and you can click on the outside of the stair to place:

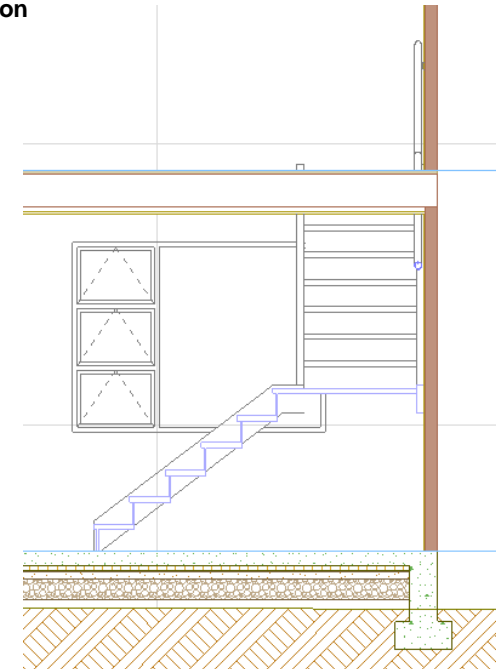


To see the resulting staircase place a Section through the Stairs

- Open the Section Settings and select the **Section Model Pens NZE Favorite**
- Start the Section line about 1000mm to the left of the stairs and about midway through the Stairs
- Draw a horizontal section line that cuts the Stairs in two and finishes about 1000mm beyond the right hand exterior Wall.



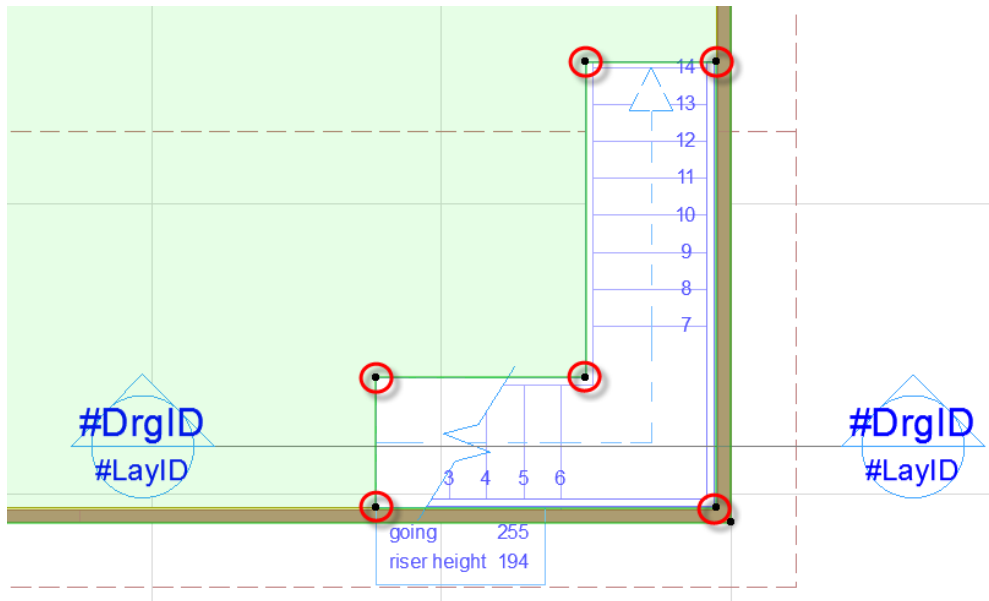
- Open the **Section**



Stair Floor opening

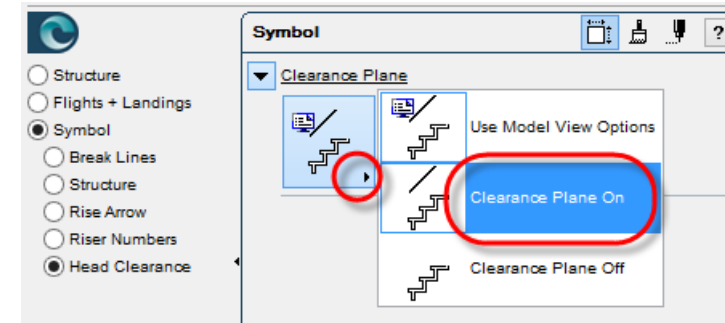
Having placed a set of stairs a hole needs to be cut in the First Floor Slab.

- Go to the **First Floor** (double click **First Floor** in the **Project Map**)
- Select the **Slab** (if you are on the Slab Tool this makes selecting Slabs easier)
- With a Slab selected; drawing a polygon within the Slab boundary tells ArchiCAD to cut a hole in the Slab if you have the Slab tool activated.
- Set the Geometry method to **Polygonal**, and trace around the Stairs (you will get Tick cursors and Black Pencil cursors to indicate you are snapping to the Stairs)

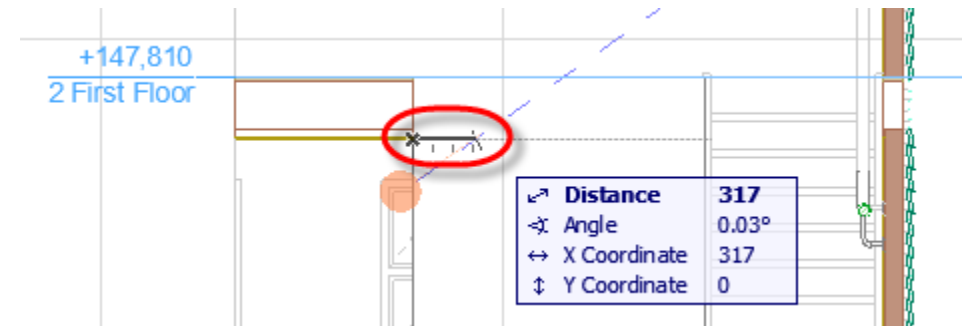


You can also re-size the opening so that it is just right for our Head plane compliance by further editing the First Floor slab. To check to clearance;

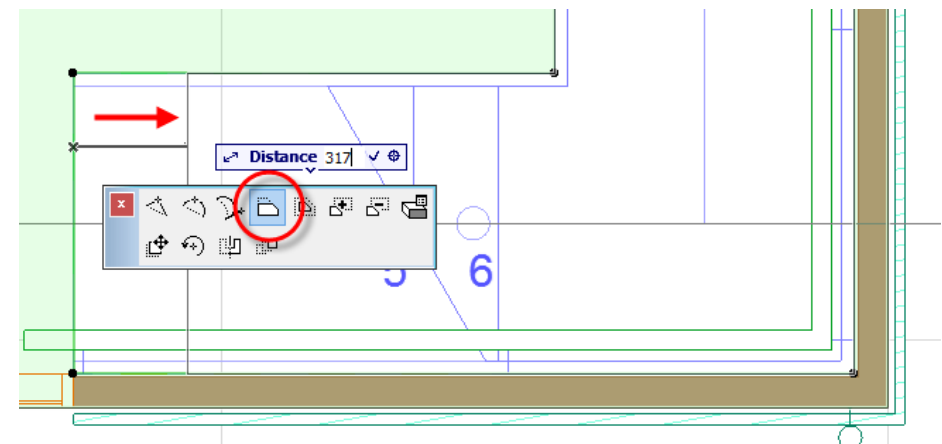
- Open your Stair Section
- Select the stair and within **Symbol > Head Clearance** you can turn ON your Head Clearance plane (this is a 3D glass plane that will show in any view)



- Measure the distance from the edge of your 'hole' to the stair height plane

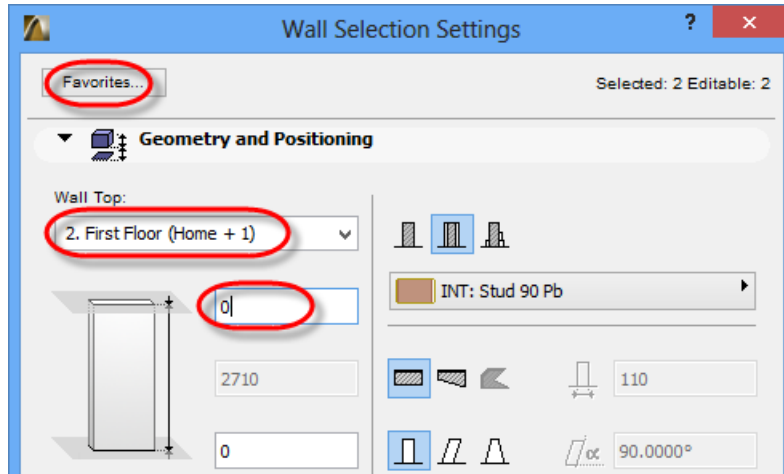


- Back in the First Floor Plan, select the Slab, and click on the 'hole' edge
- From the Pet Palette choose **'offset edge'**
- And type **317mm**

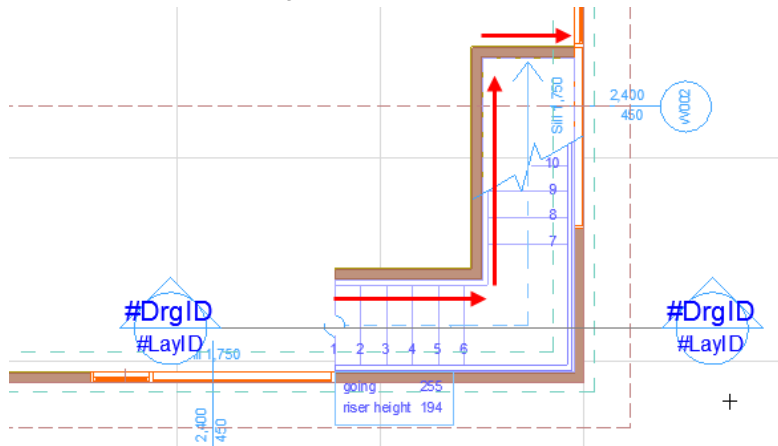


Interior Walls

- Open the **Wall Settings** and select the **INT: Stud 90 Pb NZE** Favorite
- Set the wall height to link to **Home + 1**



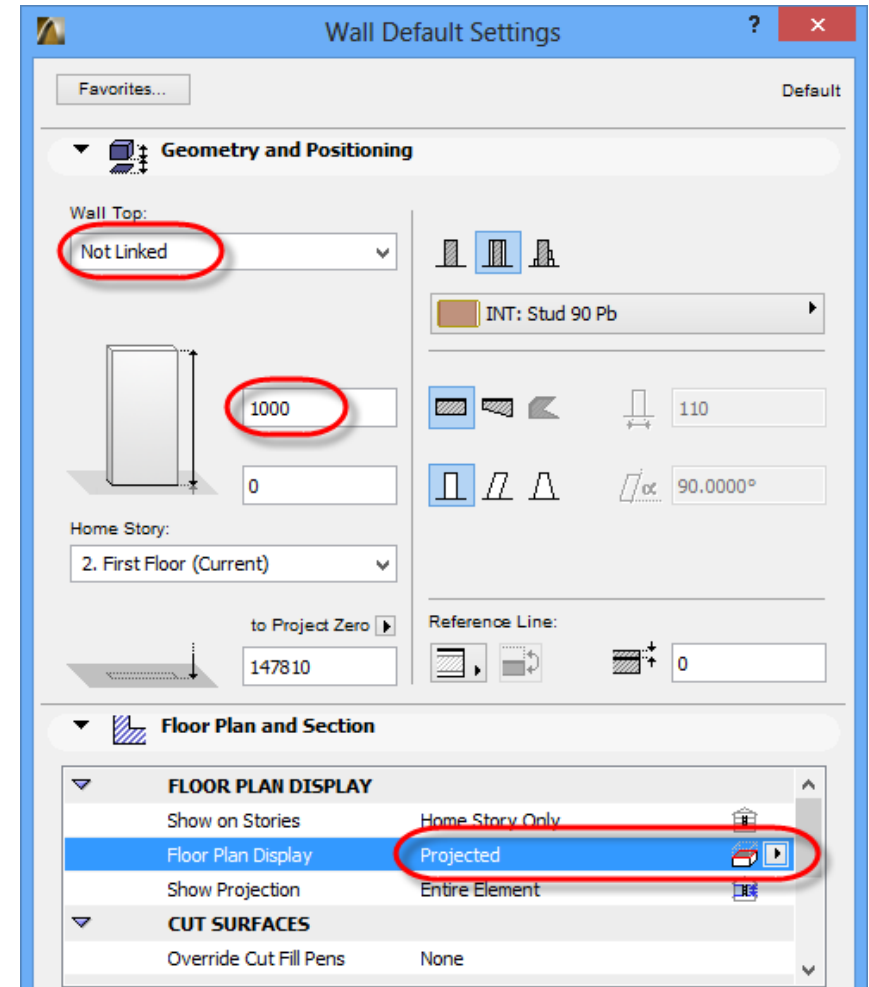
- Go down a story to the Ground Floor (use the shortcut key **Ctrl+F2**, **Ctrl+down arrow** or use the **Project Map**)
- Draw a wall that runs along side the Stairs



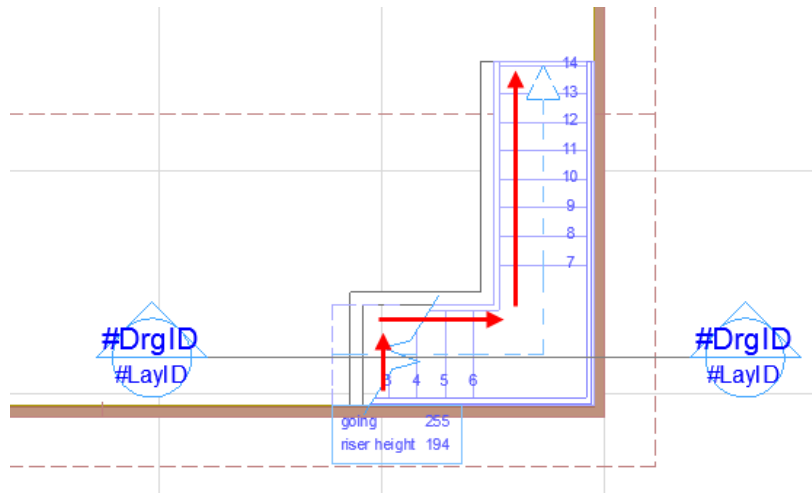
NOTE: The window we placed in the East wall now conflicts with the new wall, Select this and **delete** it.

Solid Balustrading

- Go up a story to the **First Floor**
- Open the Wall Settings and change the Wall Top linking & height to **1000mm**
- Set the **Floor Plan Display** to **Projected** (this will mean the wall will not display as being cut)



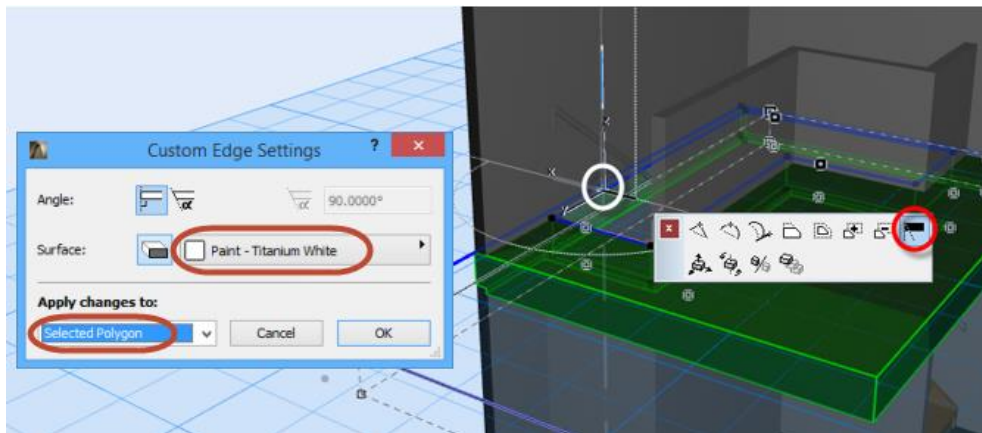
- Draw a wall along the topside of the Stairs to form a balustrade Wall



- Use a **Marquee** to just show the Stair area in 3D.

NOTE: that you can see a weatherboard pattern on the edges of the hole we cut for the stair. This is because we set the edge Override of the slab to match the wall cladding earlier. This can easily be changed.

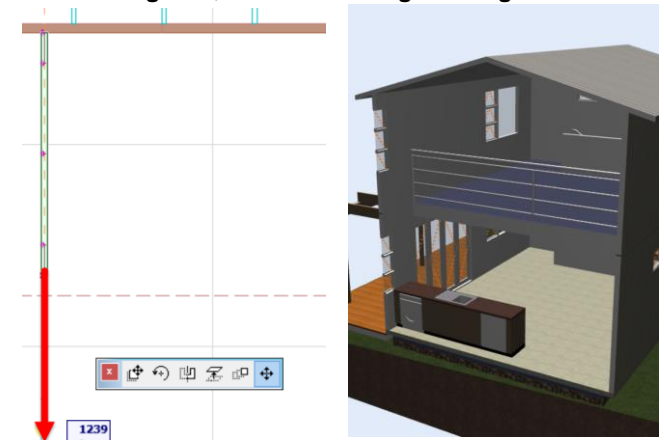
- Select the Slab, then click on the top edge of the hole.
- From the Pet Palette choose **Custom Edge Settings**
- In this dialog set the Surface to **Paint - Titanium White**, and apply to **Selected Polygon**.



Further First Floor editing

We want to pull the floor back to provide a double height space over the Kitchen.

- Back in the **First Floor Plan**, select the **Slab**
- Make sure the Trace Reference is On. Cut a hole in the Slab following the inside face of the kitchen walls up the the jamb of the Bi-Fold door below.
- Click on the edge and change to **Paint – Titanium White** (like the Stair hole)
- Place a Railing. Go to the **Railing Tool**, choose **Cadimage Railing**
- Choose the **Cadimage Horizontal Rails** and set it **Linear Graphic editing**
- Place the Handrail on the First Floor and **stretch** into position:



First Floor Windows

- Place your own Windows to the First Floor. You can 'pick up' the attributes of the Ground Floor windows or dream up your own.
- Once finished check out the 3D Views and the Elevations



Module 11 –Scheduling & Lists

This module explores ArchiCAD's ability to schedule the elements placed.

Firstly we'll look at the Cadimage Door+Window Schedule

Then the built-in Interactive Schedules, specifically a Wall Schedule.

Finally we'll look at the Zone Tool. The Zone Tool provides a large array of quantitative detail. We'll scratch the surface by looking simply at the area measurements that the Zone Tool can help with.

Creating a Door & Window Schedule

Regardless of whether you use solely Cadimage Tools Doors & Windows, ArchiCAD Doors & Windows or a combination of both, the Cadimage Door & Window Scheduling can Schedule your openings.

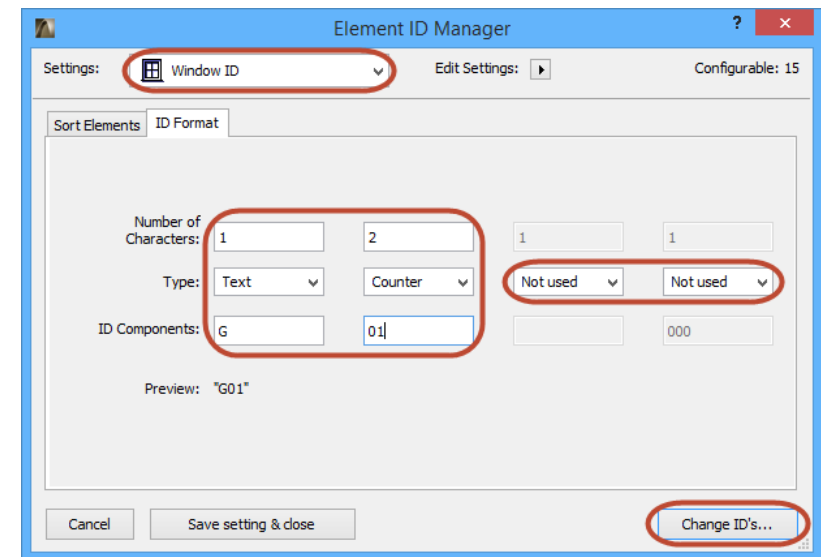
- Navigate to the **Ground Floor Plan** View

Notice that there are some duplicates window numbers which is caused by picking up the properties of windows, and they will most likely not be in the correct order.

Setting Unique ID's

The Schedule itself is very quick to create, but as with anything BIM, the information that is displayed is only as good as the information available. To this end we can turn on the Window and Door Markers and see if they are what we want to see.

- Select all the windows – Have the **Window** Tool selected and hit **Ctrl+A** for PC or **Command+A** for Mac
- Open the **Element ID Manager – Document > Schedules and Lists > Element ID Manager...**
- Choose **Window ID** in the Settings box
- Under **ID Format**, set the first two format boxes as shown, and set the second two to Not Used
- Hit **Change ID's...**
- Repeat the ID setting for the **First Floor** except set the ID Text Component to **F**. (G for Ground, F for First)
- This will now give all the selected Windows a unique ID. If you are not happy with the order of these you can manually override them.

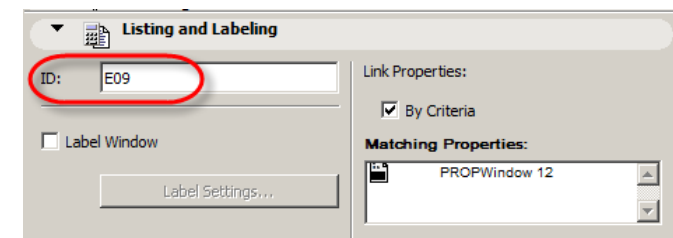


BIM Note:

As with most automated processes, the result is accurate, but may not be what we are used to. Be sure that the automated process is NOT acceptable before you break it and manually override. Ask yourself if it is really that important that all your external openings are numbered sequentially . . . what happens if you add or remove a window further down the track, do you renumber ALL your openings just so that they are in order?

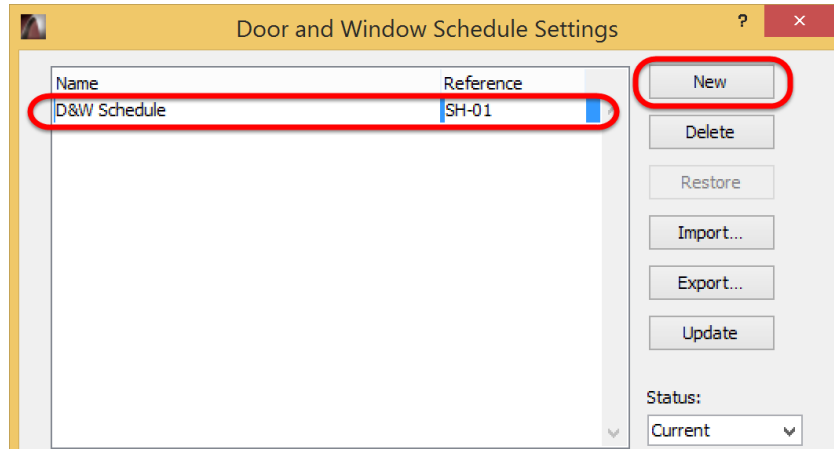
To manually adjust the Window numbers, select a Window and open its Selection Settings.

- Under **Listing and Labelling**, change the ID:

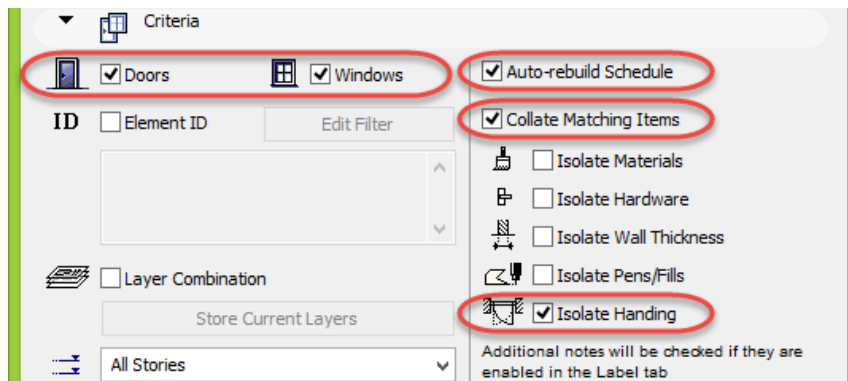


Create a Schedule

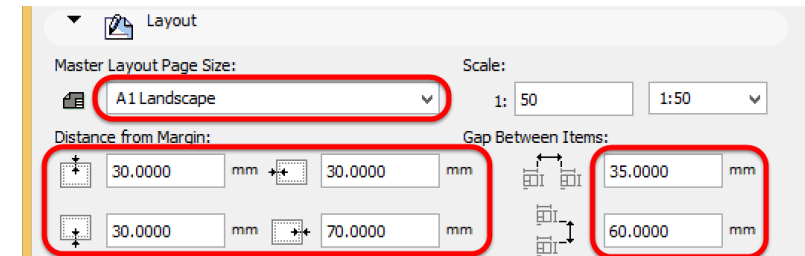
- Got to the **Cadimage** menu, **Doors+ Windows > Schedule Settings**
- Click **Create New...** ID: **SH-01** and Name: **D&W Schedule**, then **OK**



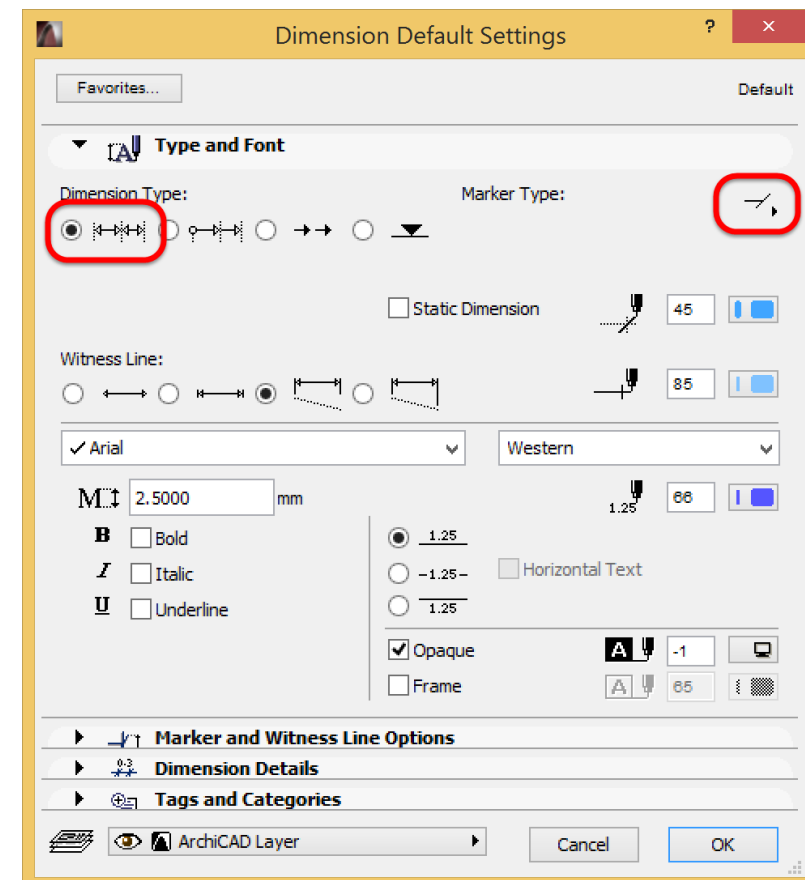
- Under **Criteria**, tick both **Doors** and **Windows** and turn ON **Collate** and tick to **Isolate Mirrored** (this will look at the Windows and Doors and group all similar items except Mirrored items)



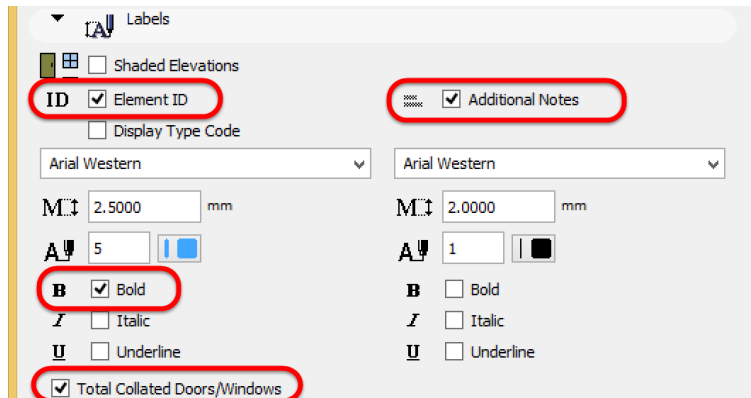
- Under **Layout** set Master Page Size to **A1** (as this will be our eventual output paper size)



- Under **Dimension** set your Dimension Style



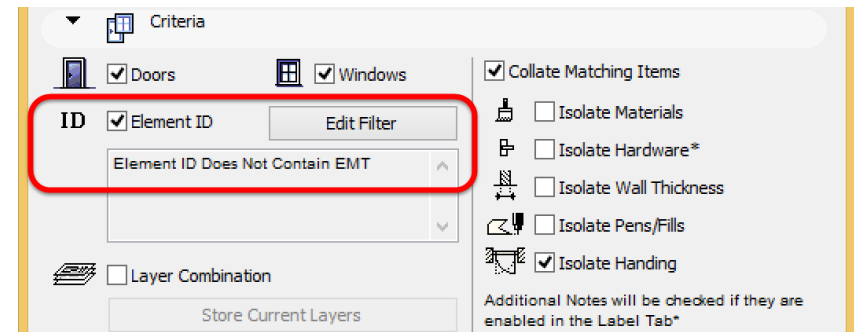
- Under **Labels** set to Show **Element ID** (Window Number) and **Additional Notes**
- Click **OK**
- Now go to the **SH-01 D&W Schedule** Worksheet in the **Project Map**.



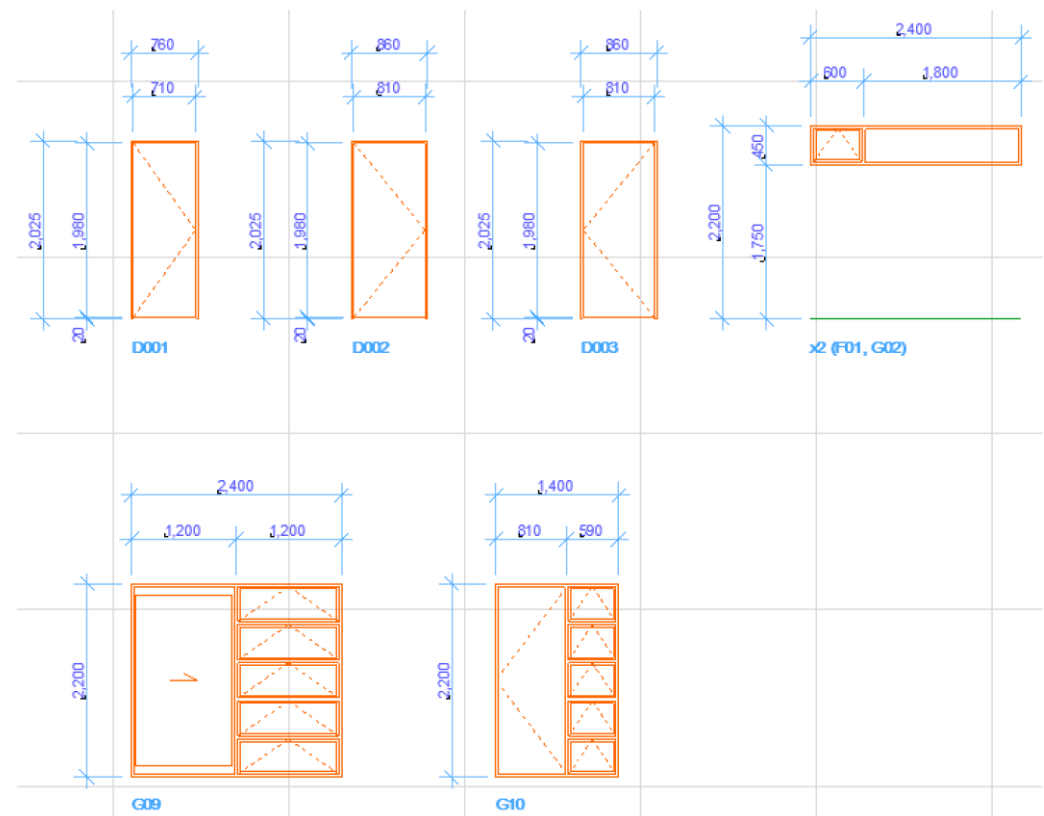
The Schedule displays the Openings in Alphanumeric order, and set out as per the Layout Tab settings.

Notice that there is a dimensioned Empty Opening. This can be removed using the **Filters** in the Schedule Settings.

- Navigate to the **Ground Floor**
- Select the an empty opening and open its **Selection Settings**
- Under **Tags and Categories** set the **ID** to **EMT01**
- Click **OK**
- Navigate back to the Schedule Worksheet
- Hit the **Settings** button in the floating Schedule Palette
- Under **Criteria** tick **Element ID**
- In the newly opened dialog **Add** a Filter > **Element ID** > **Does Not Contain** > **EMT**
- Click **OK**



- Click **Close** to close the Schedule Settings
- Back in the Schedule Worksheet, the Empty opening will disappear.



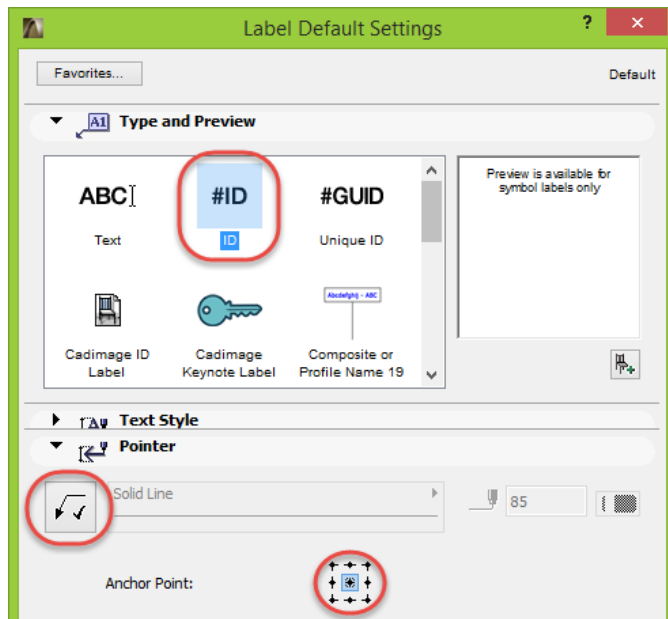
BIM Note:

*As this Schedule is a 'Result' of your BIM model, if you add new Windows, or Delete windows, all you need to do is Update your Schedule by going to **Cadimage>Doors + Windows>Update Schedule** which will refresh with this updated information.*

Window ID's in Elevation

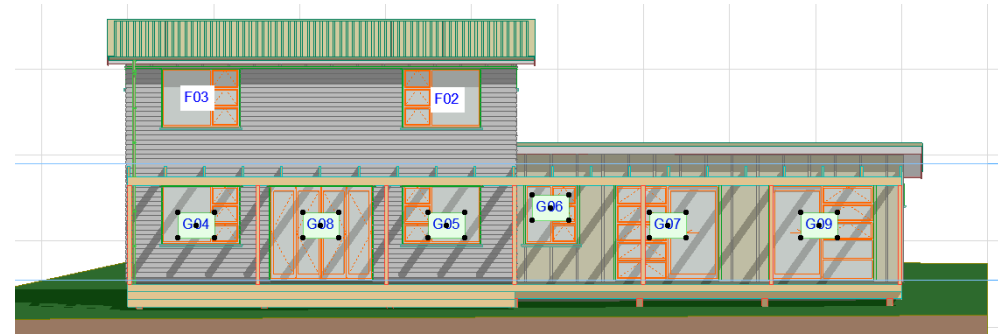
We can get our new Window ID's to Show in Elevation

- Open the **Label Tool**, select **ID Label** and turn off the Pointer
- Set the **Anchor Point** to **centre**
- Set the Layer to **Doc: Elevations**

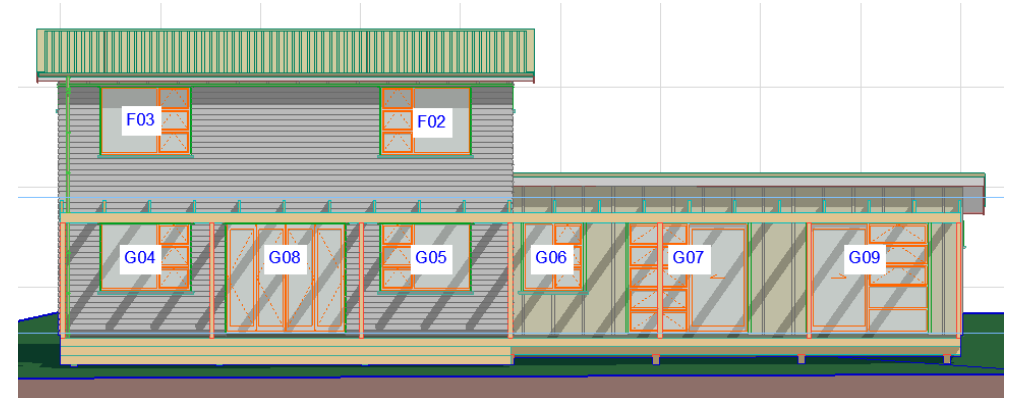


- Navigate to the **North Elevation** in the **View Map**.
- Ensure that the Window highlights as you hover your mouse over it
- Click to place the ID label in Elevation

NOTE: Be sure to set your Model View Options to a Model View that has the Window Marker ON



To get all the Labels to align select all the lower storey labels and go to **Edit>Align>Centre Horizontally**

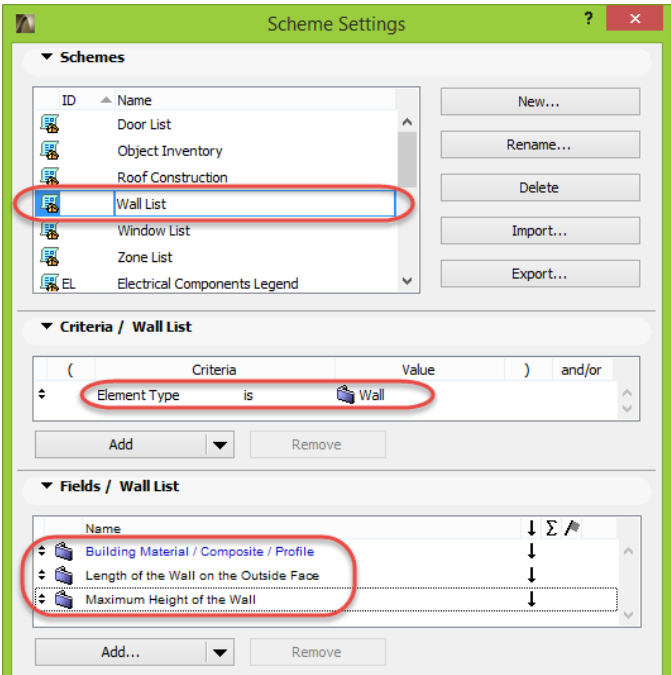


Element Lists

ArchiCAD has powerful in-built Interactive Schedule that can interrogate your BIM model and provide tabulated results.

We can make a basic wall Schedule to give us wall type, wall length and wall area.



- Within the **Project Map**, go to **Schedules > Element > Wall List**
- The List of all Walls in the Project is displayed
- Within the **Scheme Settings** (top right) we can customise the List
- As we only want *Wall Type*, *Wall Length* and *Maximum Height*, we can remove
 - **Net Volume**
 - **Thickness**
 - **Height**
 - **Maximium Height**
 - **Area of the wall** (this is the Floor Plan Area)
 - **Perimeter of the wall**
- Click **OK**



The resultant list displays the wall type, its reference side length and height.

Wall List		
Wall Type	Length of the Wall on the Outside Face	Maximum Height of the Wall
EXT: Stud 90 Pb	1,800.0	2,450.0
	1,800.0	2,598.7
	5,400.0	2,450.0
	5,400.0	2,905.8

You can select a Wall from within the Schedule and find it on the Plan or in 3D.

- Select the bottom wall in Wall Type EXT: Stud 90 (**10,800**)
- Hit the **Show on Plan Button** or 
- Select the **Show in 3D Button** 

Surface Schedules

There is a Surface Schedule where we can find out our surfaces for cladding and paint requirements. Scroll down in the **Project Map** and double click the **Finishes by Elements Surface Schedule**

Scroll down the list to see a list of the Walls:

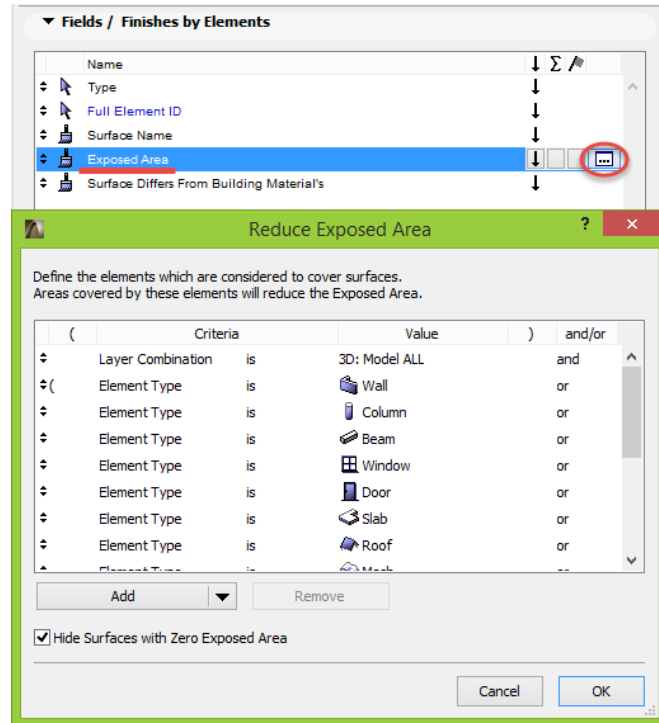
Wall				
Wall - 001	Wd Siding Light Vertical	22.65		<input checked="" type="checkbox"/>
Wall - 002	Paint-01	0.22		<input type="checkbox"/>
Wall - 002	Wd Siding Light Vertical	4.32		<input checked="" type="checkbox"/>
Wall - 003	Surf-Stucco	10.23		<input type="checkbox"/>
Wall - 003	Wd Siding Light Vertical	14.20		<input checked="" type="checkbox"/>
Wall - 004	Surf-Stucco	20.89		<input type="checkbox"/>

The checkbox on the right column shows us whether the Surface has been overridden from its default option. It is turned on for Wd Siding Light Vertical as we modified the external walls from white to board & battens.

If you select a Surface you can modify it within the Surface Interactive Schedule and this will affect the model.

This surface area can be affected by other elements that may be covering it in the model, to control what affects the surface area click **Scheme Settings** in the upper right corner.

Expand the **Fields** section and click the small icon beside **Exposed Area**:



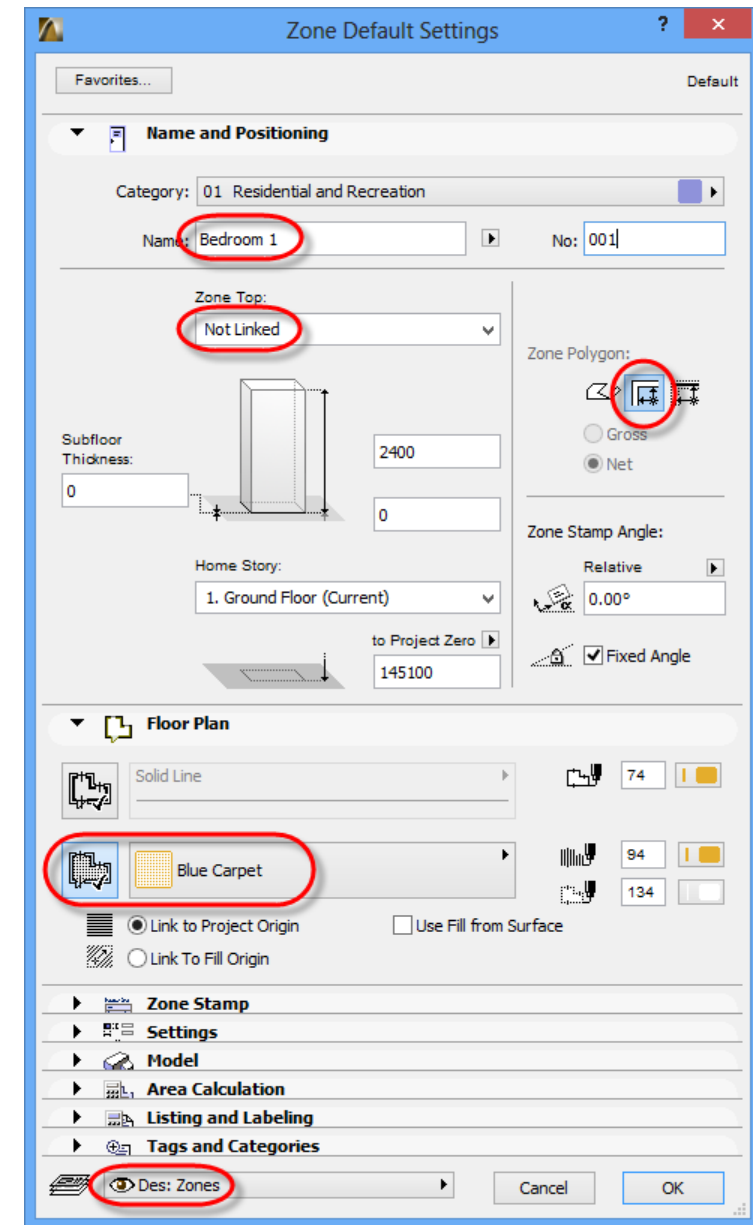
This means that the kitchen cabinetry will exclude its surface area from the internal side of the bounding walls.

Zones

The Zone Tool is a modelling tool as it allows 3D blocks to be created and viewed in 3D. These blocks can be used for space planning as they contain a huge array of quantitative data (area, volume, surface area of walls, number of openings etc)

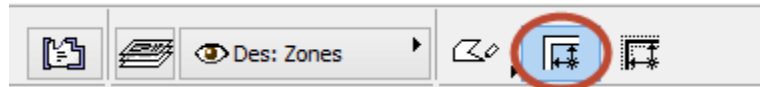
In its simplest form Zones are useful as they provide a Room Stamp to label the room and also provide simple area calculations.

- Open the **Zone** Tool
- Check the following settings are correct:



- Click **OK**

- Make sure you are on the **Presentation Plan** View
- Starting at the left hand end of the back you can add Zones to each room.
- The Zone Tool has three placement methods:



- The first allows you to draw the required shape (similar to the Slab Tool)
 - The second automatically places the Zone based on finding the Walls that define the room. In this case the zone is placed to the inside face of the Wall and therefore provides the Net Floor Area.
 - The third is again automatic, however this time it places the zone to the reference edge of the Wall and therefore is useful for Gross Floor Areas
- Make sure you select the **second** method (Inner Edge)
 - Now simply click within the left hand bedroom
 - Your cursor will change to a **Hammer**
 - Clicking again places the **Stamp** (Room Name and Area) so place this approximately in the centre of the room
 - Note you may be prompted to **Show Layer** if your not on Presentation Plan.



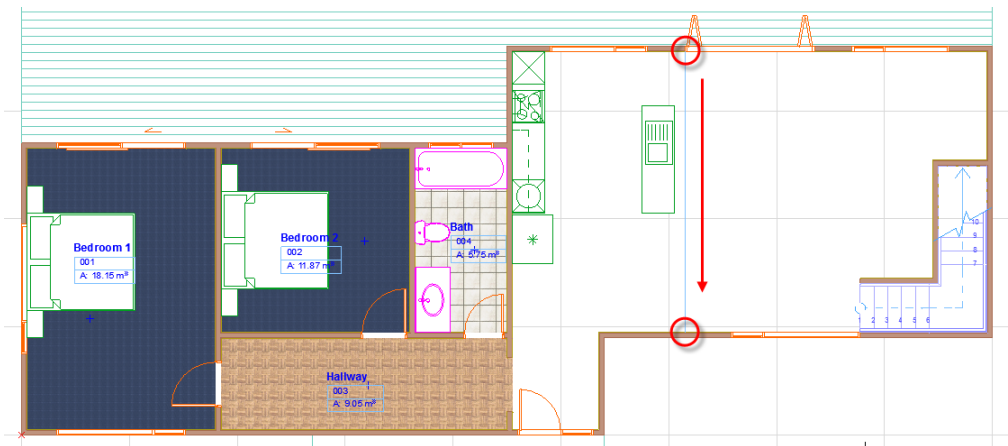
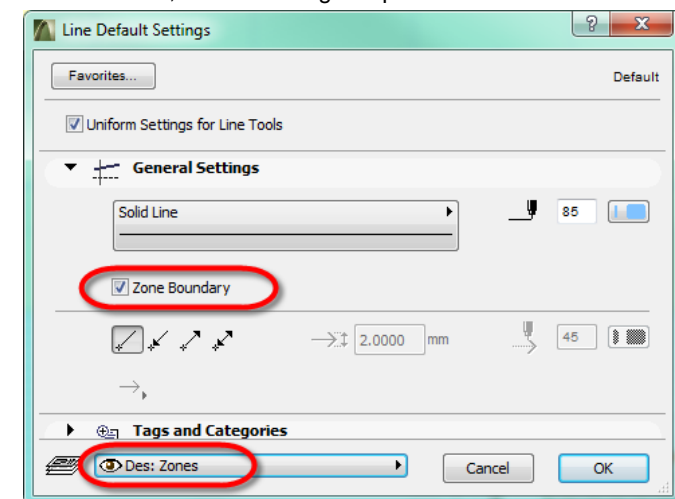
- Repeat this for all the Rooms on the Ground Floor

- The **Room Number** automatically updates but you will need to change the Name of each room before you place the Zone – to save opening the Settings Dialog you can use the **Info-Box** to change the name

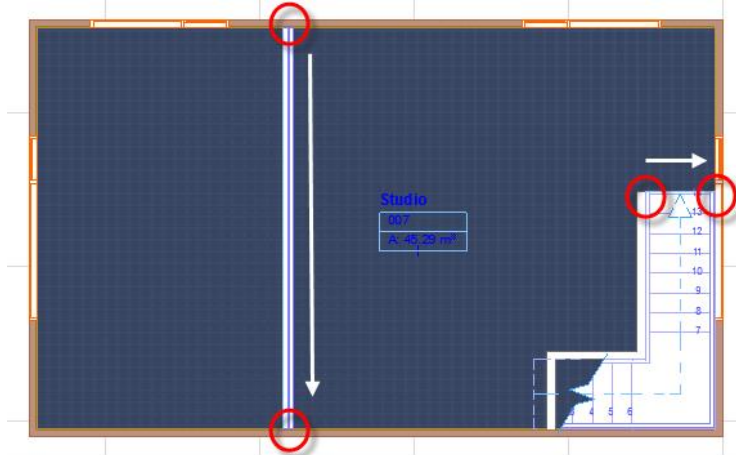


When placing a Zone that is not bounded by walls you need to add a Zone Boundary line.

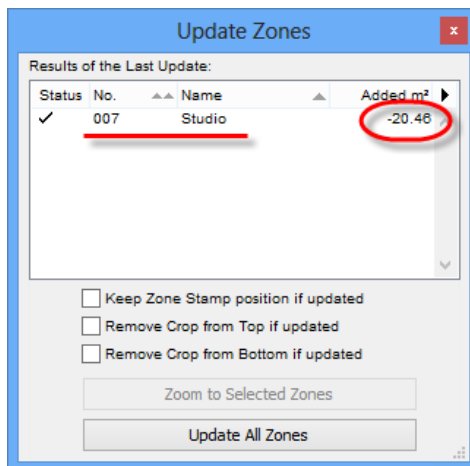
- Open the **Line** Tool, set the settings as per below:



- Draw a **Zone Boundary Line** from the edge of the Bi-Fold door to the opposite wall
- Re-open the Zone Tool, set the correct Name, Fill type etc and place a **Kitchen** Zone, then a **Living** Zone.
- Move to the First Floor and place a Zone for the **Studio**
- You will notice the Kitchen void and stairs have been included in both the Ground Floor and the First Floor – Undo the Zone Placement
- Add new **Zone Boundary** line at the top end of the Stair



- Update the Zone using **Design > Update Zones**



Zone Listing

Having placed a series of Zones we can get ArchiCAD to list the Zones along with the areas and even provide totals

- Making sure the **Navigator** is set to **Project Map**, double click the **Schedules > Element > Zone List** item
- A dialog will be displayed showing a table of data

Style: Records by Rows

☐ Show uniform items as a single entry

☒ Show headline

Settings...

Apply Format Options to: Header

Font: Arial

Encoding: Western

Font Pen: 1

Header Cell Font Style: B I U

Align Header Cell: [Left] [Center] [Right] [Justify]

Cell Border: All borders

Solid Line

Border Pen: 1

Footer Settings...

Header Options

☐ Freeze Schedule Header

Zone List		
Home Story	Zone Name	Area
1. Ground Floor		
	Bath	5.75
	Bedroom 1	18.15
	Bedroom 2	11.87
	Hallway	9.05
	Kitchen	19.52
	Living	28.62
		92.96 m²
2. First Floor		
	Studio	24.83
		24.83 m²
		117.79 m²

- The table lists the Story the Zone resides on, the name of the Zone and it's Area
- A subtotal is provided for each story and a grand total is provided at the bottom

Module 12 – More Model Detail

This module explores the ability to add more detail to the model.

We'll look at Cadimage Coverings - Roof Coverings and Wall Coverings to add more 3D information to the model. This detail helps add realism to the model but has the added benefit of adding more detail to the section drawings.

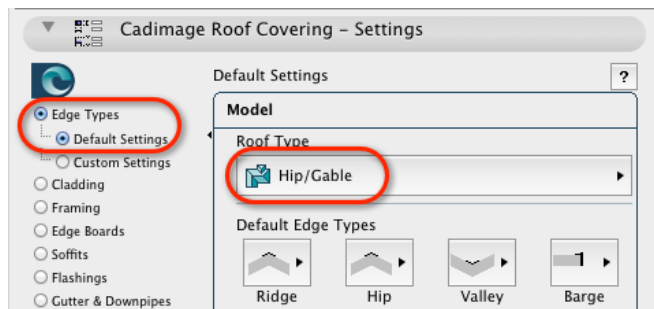
BIM Note:

Using Cadimage Coverings we really start to see the power of BIM. Based on the simple ArchiCAD geometry we can easily add the additional elements that show the true construction of the building (purlins, fascias, soffits, wall cavities and actual weatherboards). These elements not only add to the visualisation of the project but also add detail to the section views.

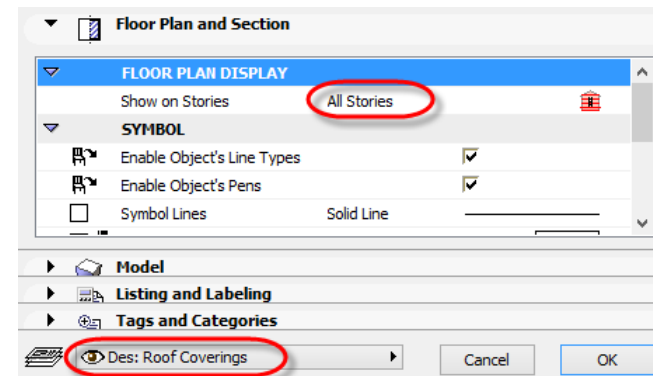
Roof Coverings

The Cadimage Roof Coverings attach a special object to a Roof to provide additional detail.

- Make sure you are on the **Roof Story**
- Select the upper **Roof**
- Select **Cadimage > Coverings > Roof Coverings...**
- Select the **Cadimage Roof Covering Object**
- Within **Preview and Positioning** make sure the Home Story is **3.Roof (Current)**
- Choose **Edge Types > Default Settings**
- We have a Gable End roof so set the **Roof Type** to **Hip/Gable**

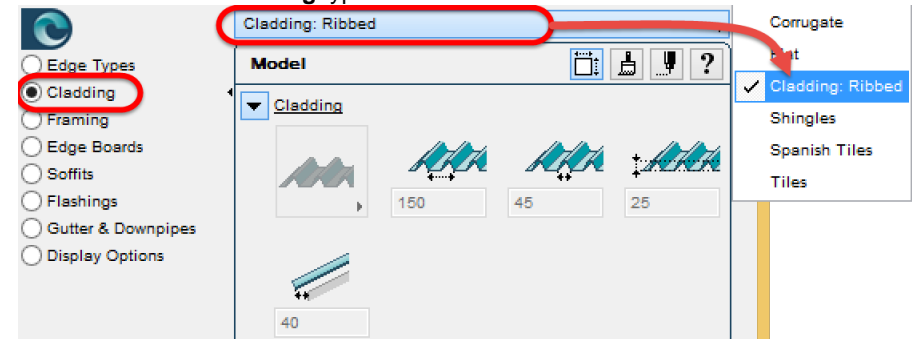


- Within **Floor Plan and Section**, set Show on Stories to **All Stories**

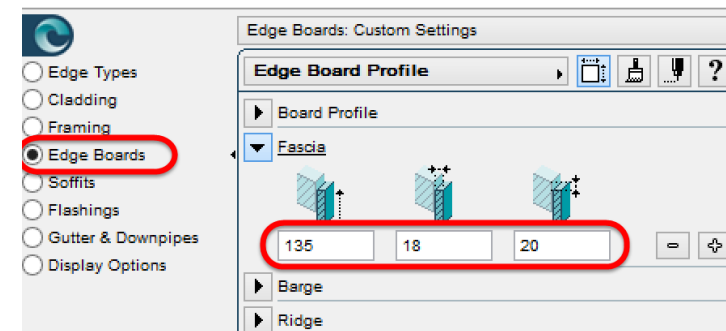


- Set the Layer to **Des: Roof Coverings**

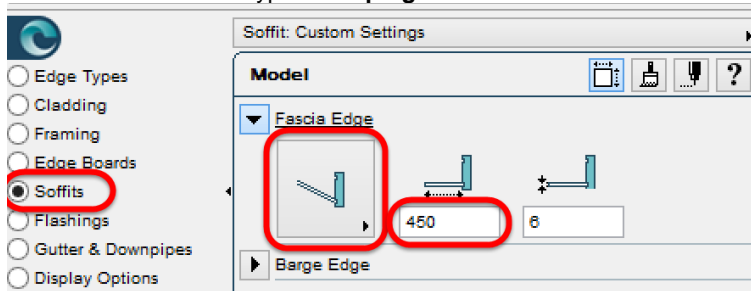
- Set the **Cladding** type to use the Preset named **Ribbed**



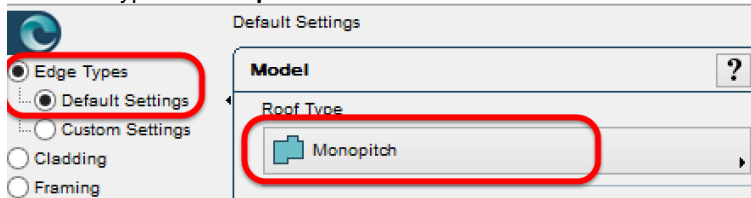
- Within **Edge Boards** set the **Fascia** as below



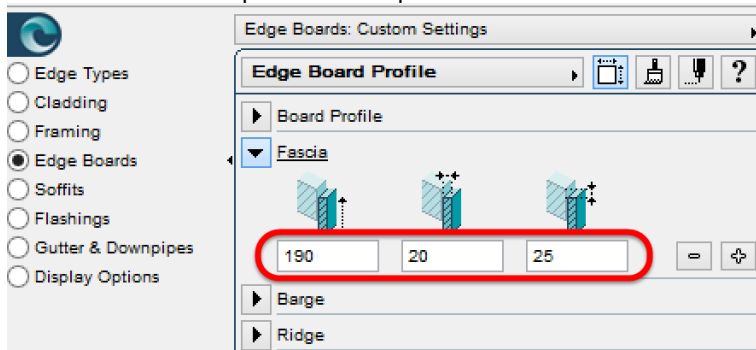
- Within **Soffits** set the Type to **Sloping** and the width to **450**



- Click **OK**
- Select the **Lower Roof** apply a similar Roof Covering, just Change the Home Story to **2. First Floor**
- the Roof Type to **Monopitch**



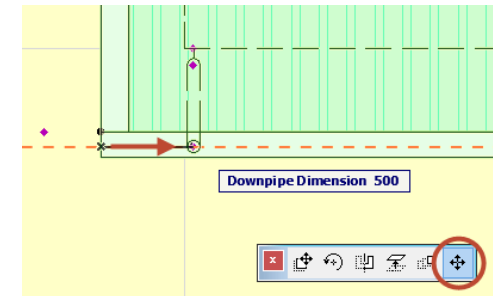
- And the Soffits to deeper for the deeper rafters – 190 x 20



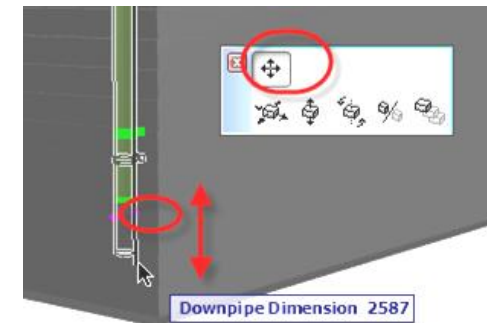
- Select the Roof Coverings and change their Display Order to Front, so that it 'covers' the pergola rafters.

Downpipes

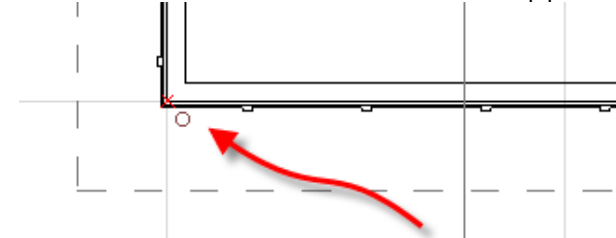
Place **downpipes** by selecting the pink downpipe hotspots at the edge of the gutters, selecting **Stretch** from the Pet Palette and dragging the downpipe into the desired location



- To adjust the downpipe length, open the 3D and select the pink hotspot at the base of the downpipe (nearest the wall) then select move node from the Pet Palette



- Notice also that the Roof now has Barges, Eaves, Fascias, Gutters and Soffits
- Navigate back to the Ground Floor and see that the downpipes are showing



Wall Coverings

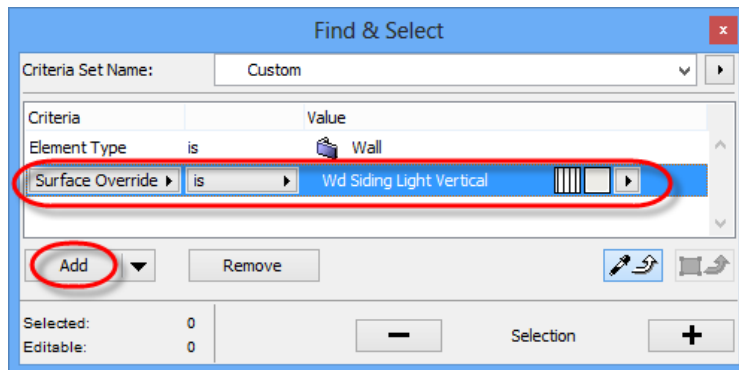
In the same way as Roof Coverings apply to Roofs, a Wall Covering Tool is available to apply sophisticated objects automatically to Walls.

The **Wall Covering** Object provides a comprehensive array of Wall Claddings that can be applied. The principle is exactly the same as the previous Coverings.

- Navigate to the **Ground Floor**
- To make the selection of the required Walls easier we'll use the **Find and Select** tool
- Open the **Edit > Find & Select ...** dialog (**Ctrl+F** PC and **Command+F** Mac)

Find & Select allows multiple criteria to be set for selection purposes

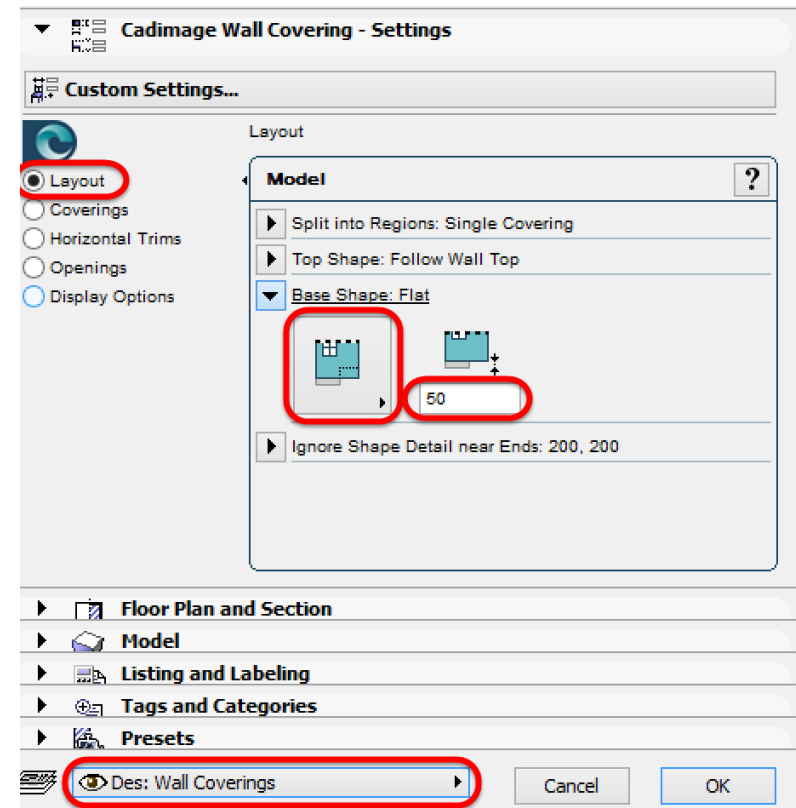
- Make the following settings or just pick up the properties of a wall.



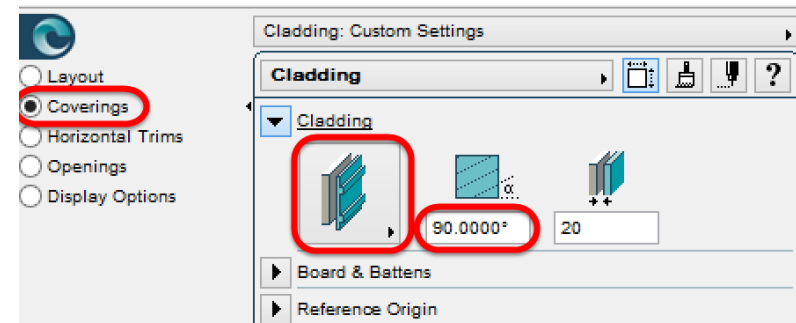
- Click the **+** button to select the four leftmost exterior walls

You don't need to close the Find & Select dialog as you'll use it again shortly – you may want to move it away to the side though

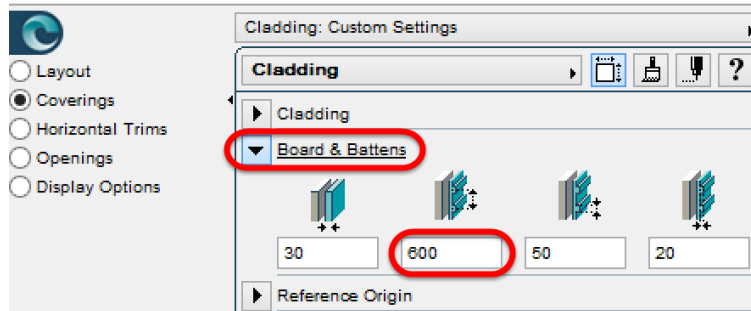
- With the walls selected go to **Cadimage > Coverings > Wall Coverings...**
- Select the **Cadimage Wall Coverings** Object
- Within the Cadimage Wall Coverings - Settings > **Covering Layout > Shape**, set the **Wall Base Shape** to **Flat** and to **Offset Down 50mm**
- Set the Layer to **Des: Wall Coverings**



- Set your **Cladding Type**
- Go to **Coverings** and choose **Board & Batten** with the following Parameters



- And since its Vertical set the spacing of Board & Battens to 600

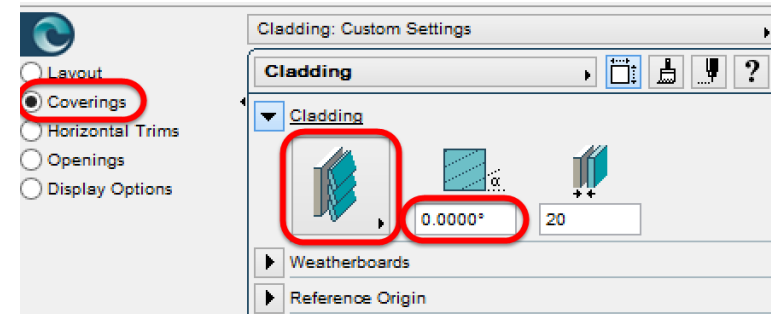
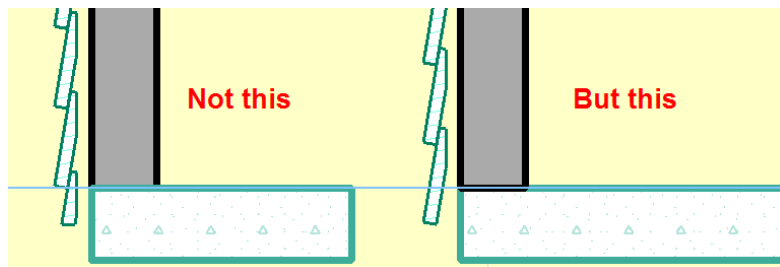


- Click **OK**
- The tool then needs you to indicate which face of the Wall to attach the **Wall Covering** Objects to – click on the **Outside**
- De-select all elements
- View the results in 3D

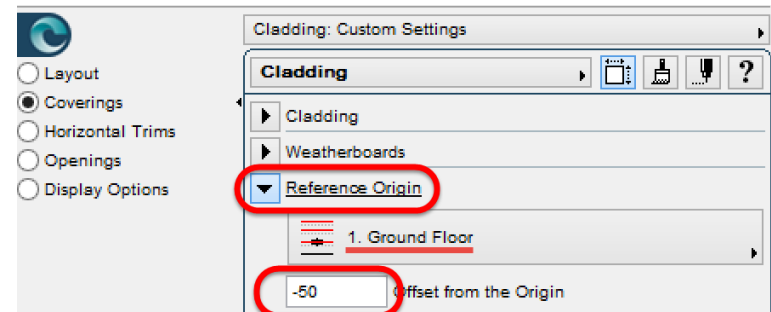
We'll now repeat the exercise for the remaining Exterior Walls

- Use **Find & Select** and pick up the properties of the other external walls.
- With the walls selected go to **Cadimage > Coverings > Wall Coverings...**
- Within **Coverings** set the following parameters for our **Horizontal Weather Boards** (or simply use the Preset named **Weatherboards**)

NOTE: We have told the cladding to start 50mm down from the base of our wall, but we have not set that we want our first full board to start 50mm down aswell. To do this:

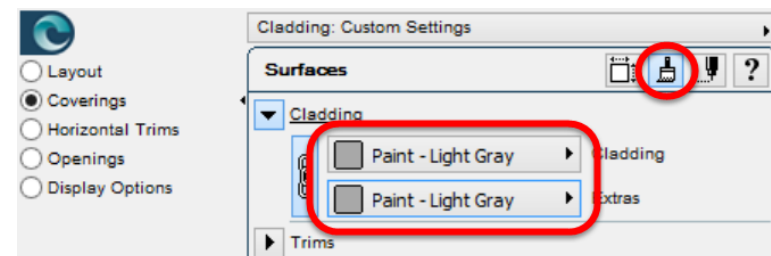


- Within the **Coverings** tab, use the Pulldown and select **Cladding Reference Origin &** set this to 50mm below **Ground Floor** (i.e. -50).



We can also change the Surface materials

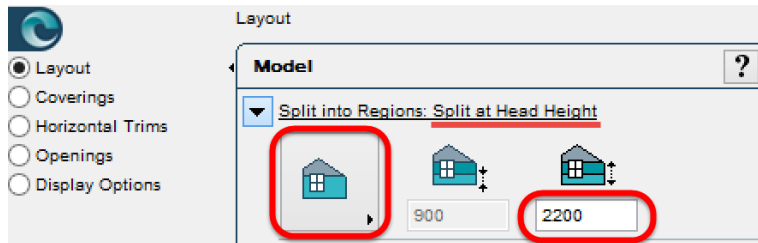
- Within **Coverings** choose the Surfaces **Paint Bruch** icon, change the Paint finish to **Paint-Light Gray**



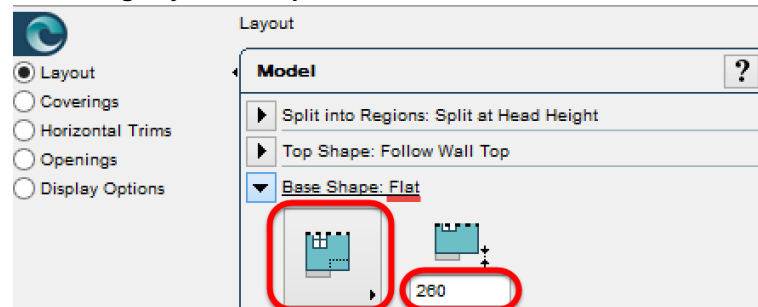
- Click **OK**, then click to place your Weatherboards.

We need to apply cladding the **First Floor** as well.

- Navigate to the first floor and Select the **Exterior Walls** & go to **Wall Covering**
- For the First Floor we are going to use two different cladding types, plus we also need to cover the First Floor Floor Structure.
- In **Covering Layout > Regions**, set the region to **Split at Head Height** and set the head height dimension to **2200**

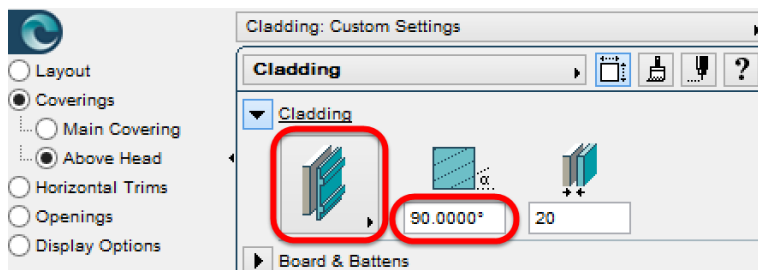


- In **Covering Layout > Shape** set the offset to the thickness of the Floor i.e. **260**

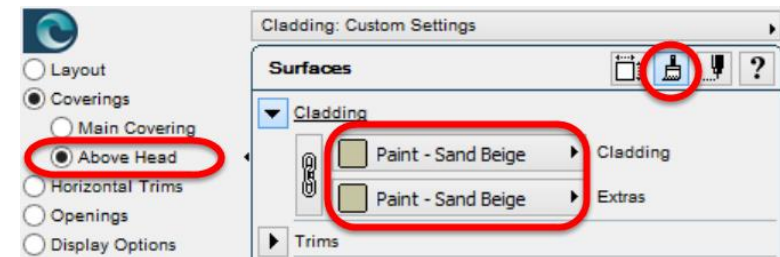


We now need to set the new cladding style (the cladding above our 2200 height)

- Navigate to the **Coverings > Above Head** and choose our **Board & Batten** Cladding Type



- Then click the Surfaces icon and change the Board + Batten to Paint Sand Beige



- Now we should have a complete model! Click OK and place the Coverings

Note that the cladding continues continuously between the two pieces of wall cladding, this is because the Cladding Reference Origin was set to 50mm down from Ground floor for both.



Wall Coverings add another level of detail to the model allowing elevations to be 100% from the Virtual Building Model.

Module 13 – Sections and Details

This module looks at how to create Sections and Details for Contract Documentation.

Two working methods are outlined for Sections, which when combined provide you with the arsenal required to create top quality sections. These methods are:

*Masking, and
Overlays*

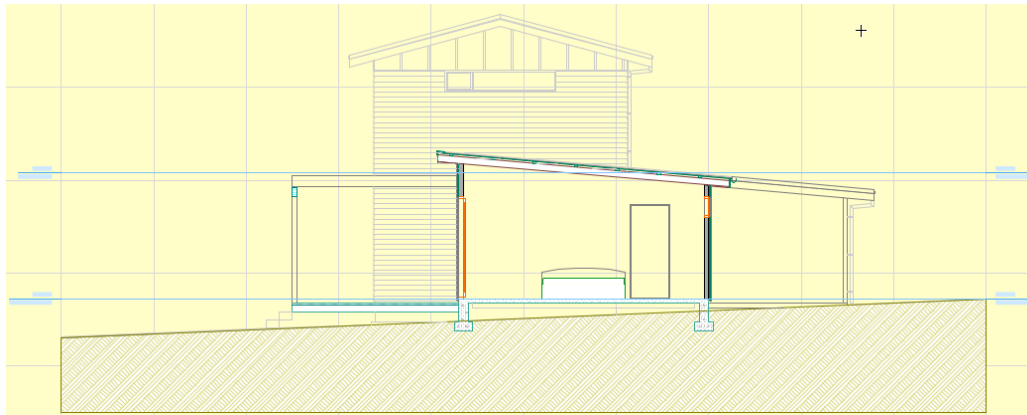
Remember the aim is to rely on the model to maximum extent possible and draft the minimum as possible.

While examining details we also show how to make use of external data to the best extent possible.

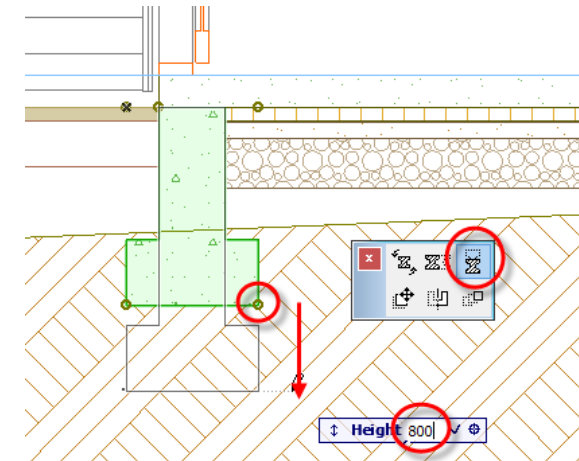
Sections

We will look at **Section AA** and experiment with a few items to show the concepts to 'spruce up' your section to working drawing level

- Use the **View Map** to open up **Section AA**



- This section is still fully modelled, so we can still make changes to the modelled elements.
- Zoom into the left foundation and stretch it down.
- Select the Beam, click on one of the bottom corners, and from the Pet Palette choose **vertical stretch**
- Move your mouse in a downward direction and type in **800**

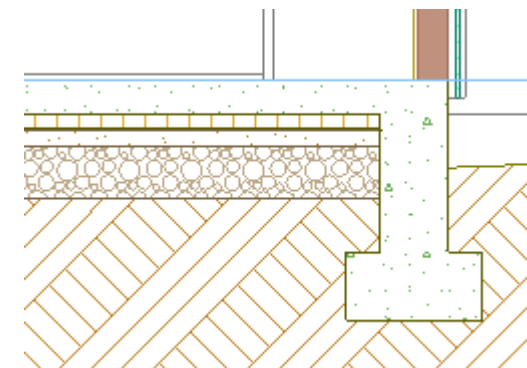


*Because of ArchiCAD's **Priority Connection** clean-up, the slab insulation, sand blinding etc, has been 'cut-away' with the foundation beam. And because the foundation beam has the same main building material, the contour line between the two has been omitted.*

You can see the Floor Slab and Foundation have cleaned up the fills have merged to display a "single pour of concrete".

We can use **Display Order** to make elements 'appear' to cut one another as well.

- Select the Earth (i.e. the cut Mesh)
- Right-click and select **Display Order > Send Backward**



Masking

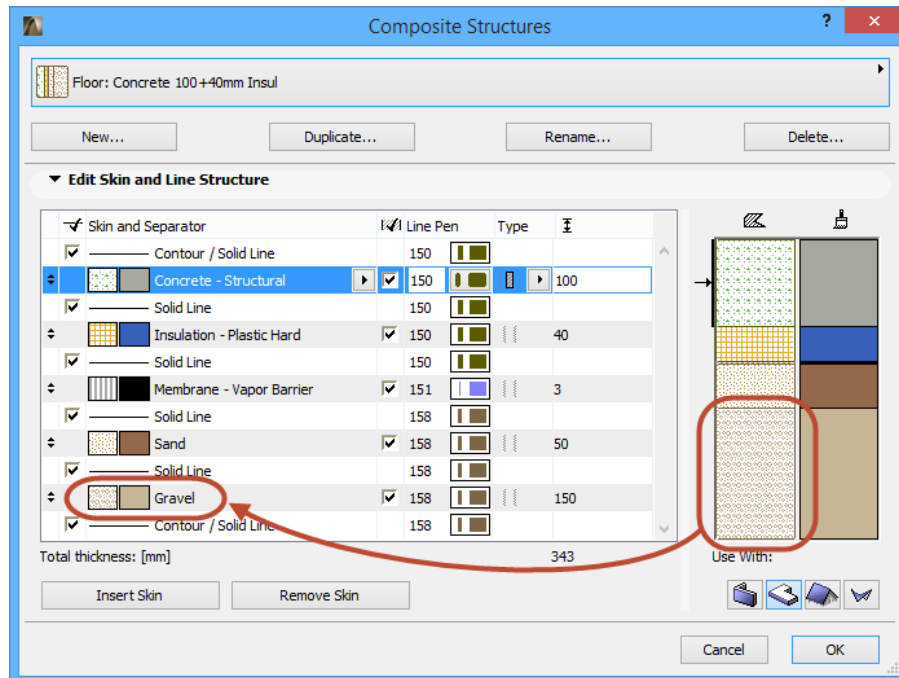
In addition to using ArchiCAD Intelligence to clean up sections, you also need a couple of further techniques – the first of these is ‘masking’.

In some cases standard Layer control (i.e. switching Layers On and Off) doesn’t provide enough flexibility.

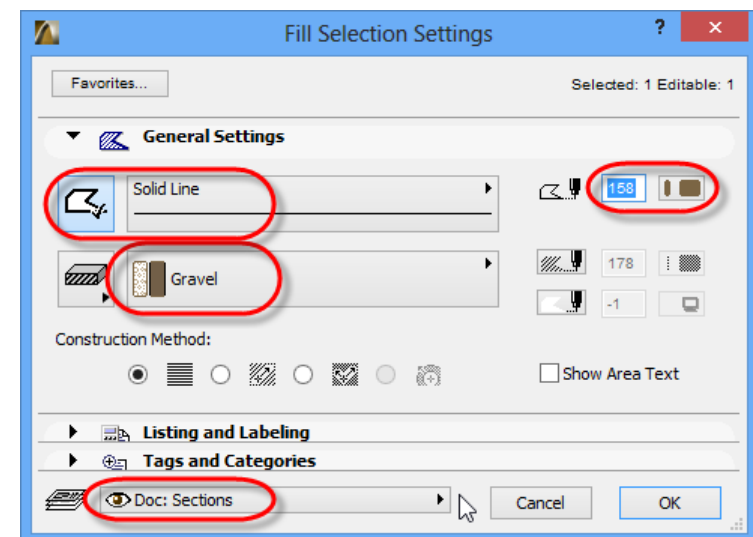
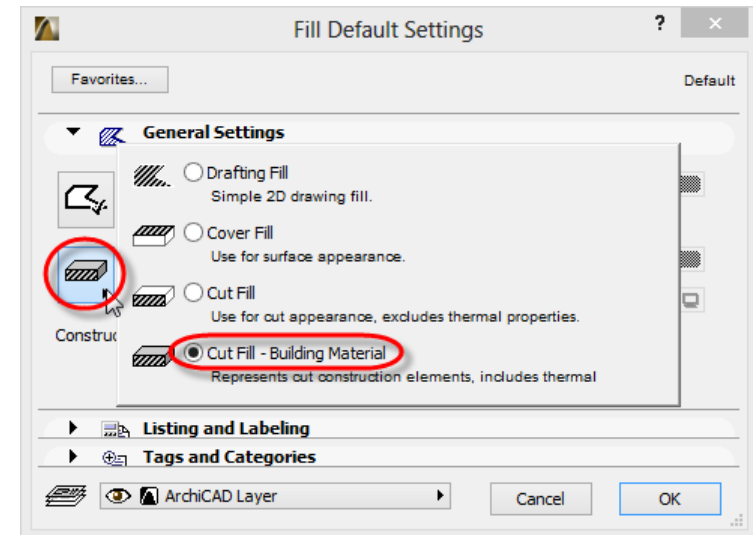
We can use 2D fills on top of our Section to add this additional detail.

The fills won’t only mask out the unwanted information, but also provide graphical information.

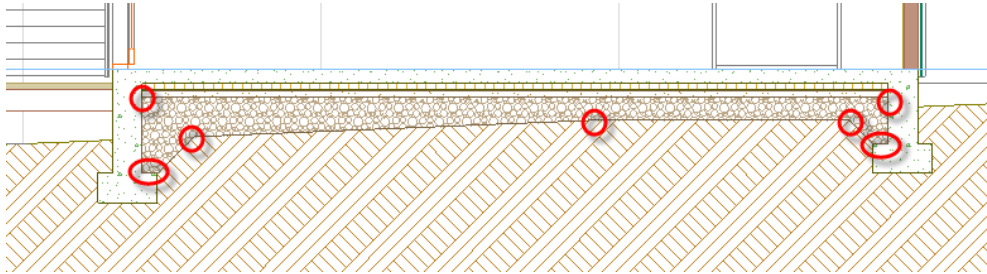
- We can add some additional backfill under our slab.
- First let’s see what fill to use, Select the Slab, right-click and choose **Edit Selected Composite...**
- Click on the backfill skin and the Building Material is displayed ‘Gravel’



- Open the Fill Tool
- Set the **Fill Settings** as follows:



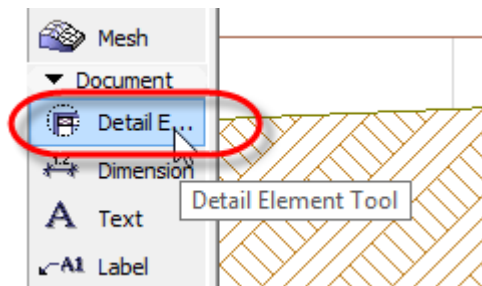
- Using the Polygonal geometry method, place your Fill under the Slab.
- Then Use **Display Order** to bring it forward



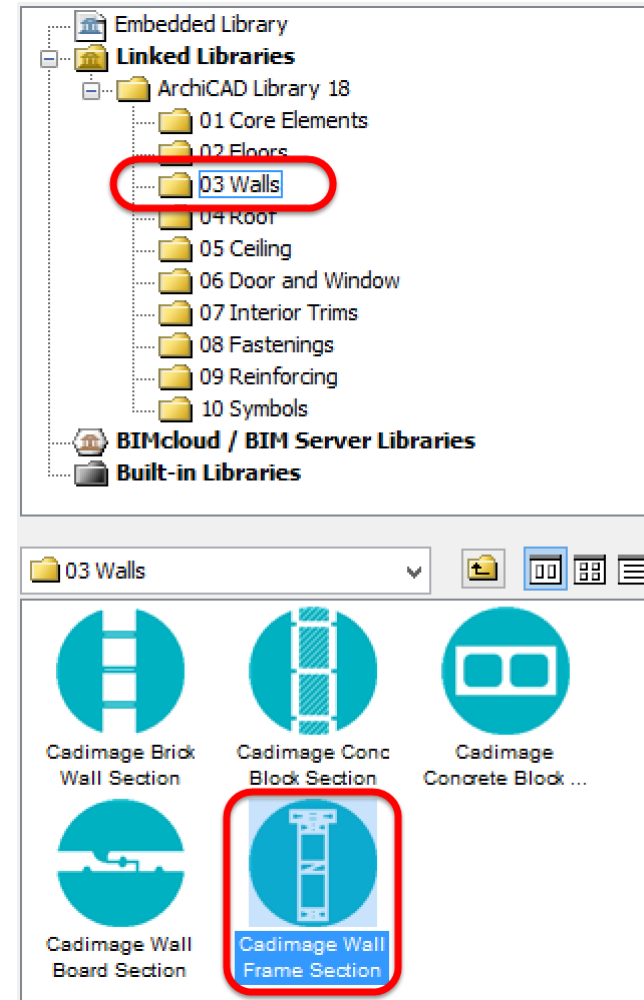
Overlays

Overlays are used to add further detail to a Section or detail that is too difficult or impractical to model (or you have certain time constraints). Where possible it is best if overlays are intelligent 2D Objects.

- The **Cadimage Detail Element** Tool provides quick access to a suite of smart overlay objects.
- Select the **Detail Element** Tool from the **Document** part of the **ToolBox**.



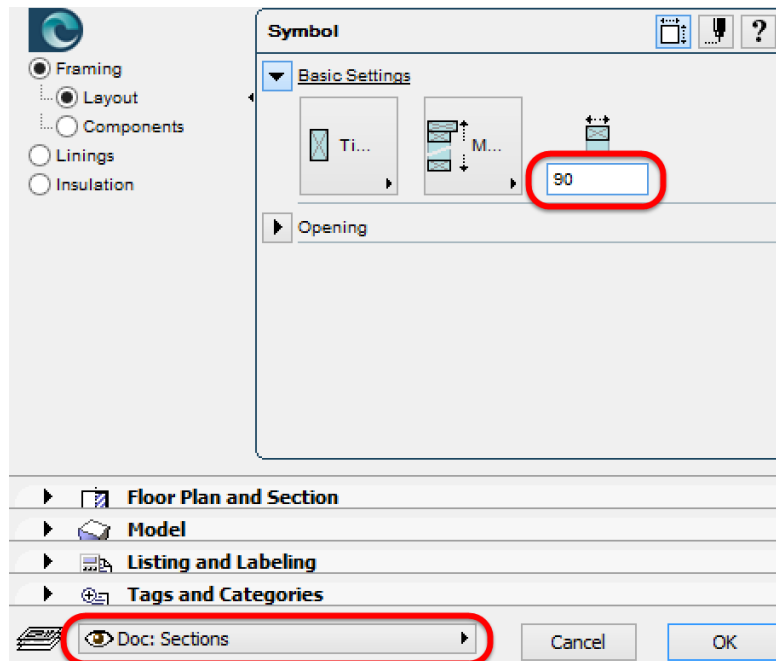
- Navigate to the **03 Walls** subfolder and select the **Cadimage Wall Frame Section** object.



- Make sure the layer is set to **Doc: Sections**
- There is also a prompt for the best placement method, in this case the best Geometry Method is **Rotated Diagonal**

NOTE: There are many settings, once your settings are chosen, you can Save them as **Presets** (or Favorites) so that you can use them again in other projects.

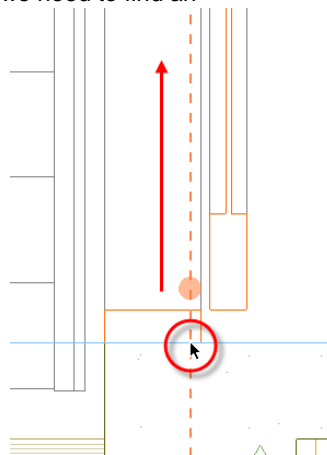
Our default settings are for 90x45 timber framing, with plaster board lining on the right and insulation within.



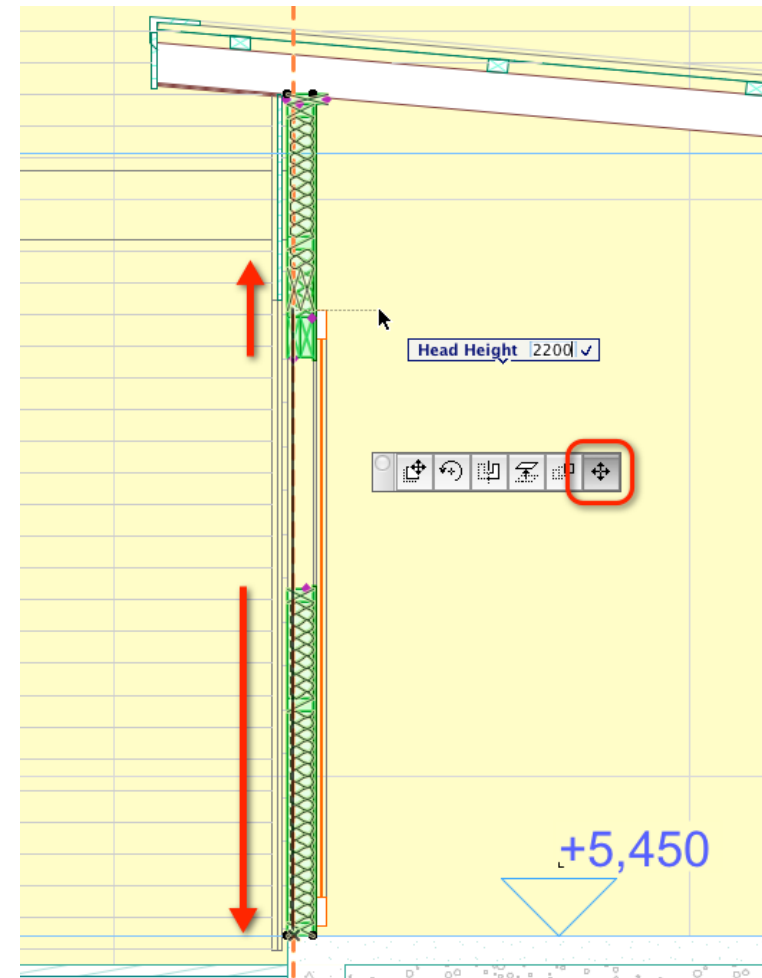
- Click **OK**, and change your **Geometry Method** to **Rotated Diagonal**.

This particular detail element places from its bottom right, so we need to find an appropriate start point. Let's start with the left wall.

- Zoom into the top of the left wall and activate a guide line at the interior framing line (click on the **orange ball**)
- Now pan to the bottom of the wall and click on the guideline/slab intersection.
- Next click is the direction – so click **vertically** up the wall.
- Next click is the height (length) so click at the **wall top**.

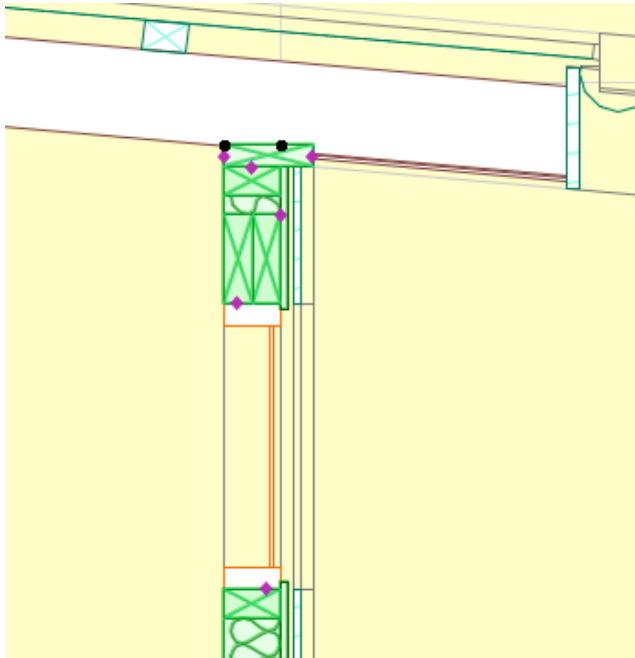


- The framing will fill in to the height of the wall. This wall has an opening in so we need to edit the overlay object to show this.
- Select the object, you will notice that some of the hotspots are purple dynamic stretchable hotspots. Select the upper hotspot, make sure you have the **stretch** option in the **pet palette** selected and stretch the hotspot up. In this case we know the window head is at **2200** so type this into the **tracker** box.



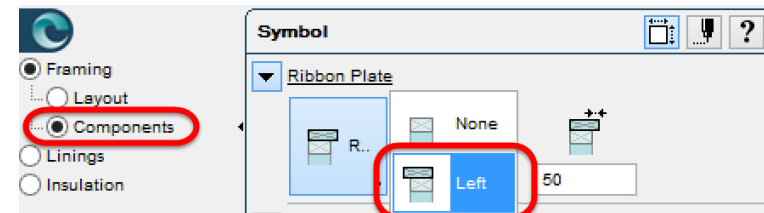
- Repeat the same exercise for the sill hotspot, in this case the opening is a door so set the sill to **0** in the **tracker** box.

- With the right hand wall, again start at the bottom **right** corner and stretch up to the top of the wall. **Tip**; you can also type **2450** into the Tracker as this was the wall height we started with.
- The ribbon plate and lining will default to the right hand side of the wall. Which is not what we want.

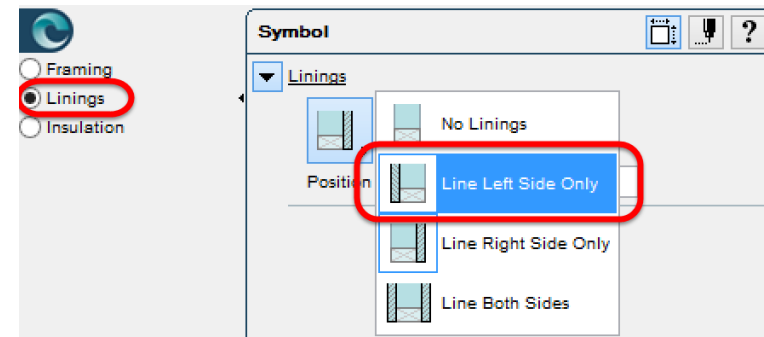


- Select the **Wall Frame** object and bring up its Settings.
- We need to change the **ribbon plate position** and **wall lining** to the left hand side.

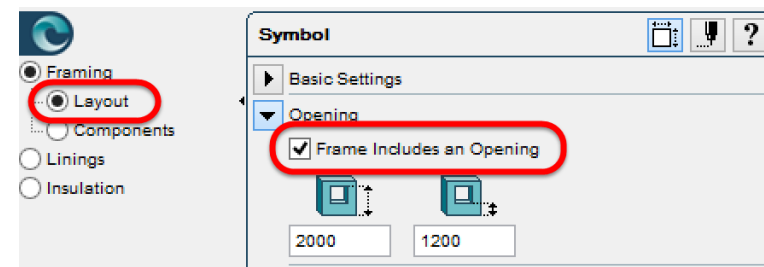
- Within **Framing > Members**, change the image on the right



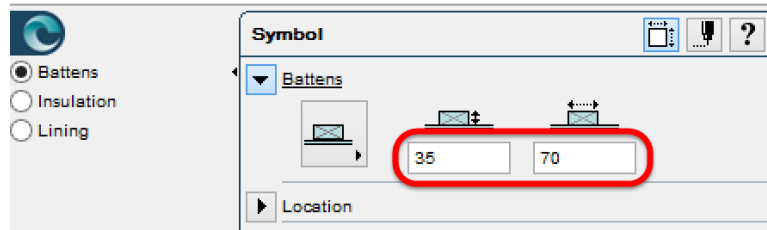
- Within Linings, change it to Line **Left Side Only**



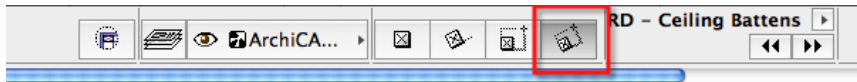
- And set the Wall Frame to have to **Opening**



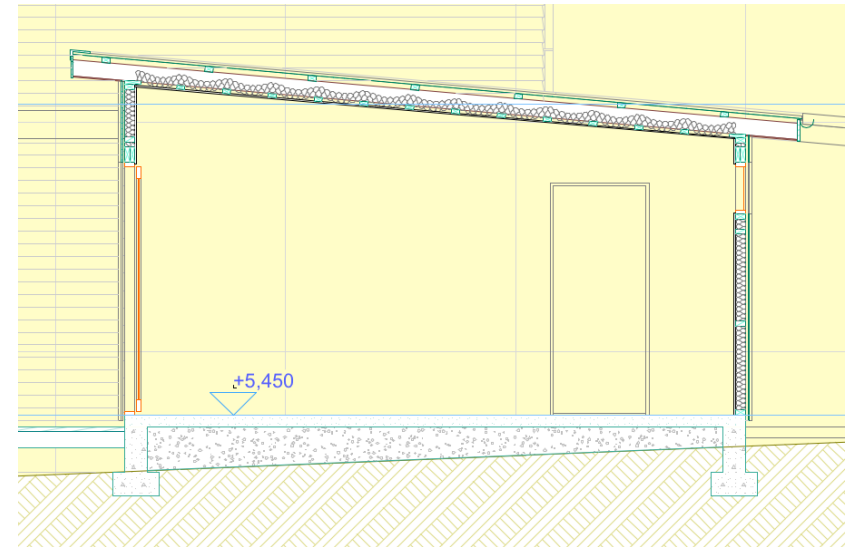
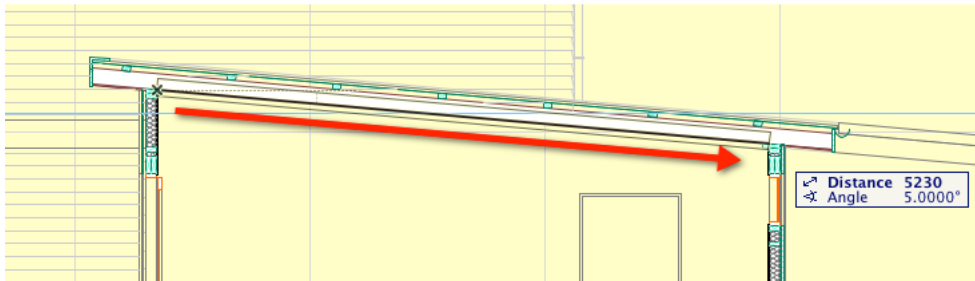
- Next open the **Detail Element Tool** again and browse to the folder **05 Ceiling** and select the **Cadimage Ceiling Battens** object.



- As our ceiling is sloping we will choose to use the **Rotated Diagonal** Geometry Method.



- Start at the inside top corner of the framing and set the angle, then stretch to the required length, ie the top of the opposite wall.



- The **Cadimage Detail Element** Library provides a huge array of Objects specifically designed for detailing up Sections as well as details as we'll see next.

BIM Note:

Using the Cadimage Coverings for 80% of the real modelled elements and Cadimage Detail Elements to represent the remainder, we can add a few Overlay Fills and label text and we have a Section ready for our Local Authority Working Drawings

Details

An essential part of all documentation are the construction details. You can either create a new detail, modify an existing detail, or import a completed detail.

BIM Note:

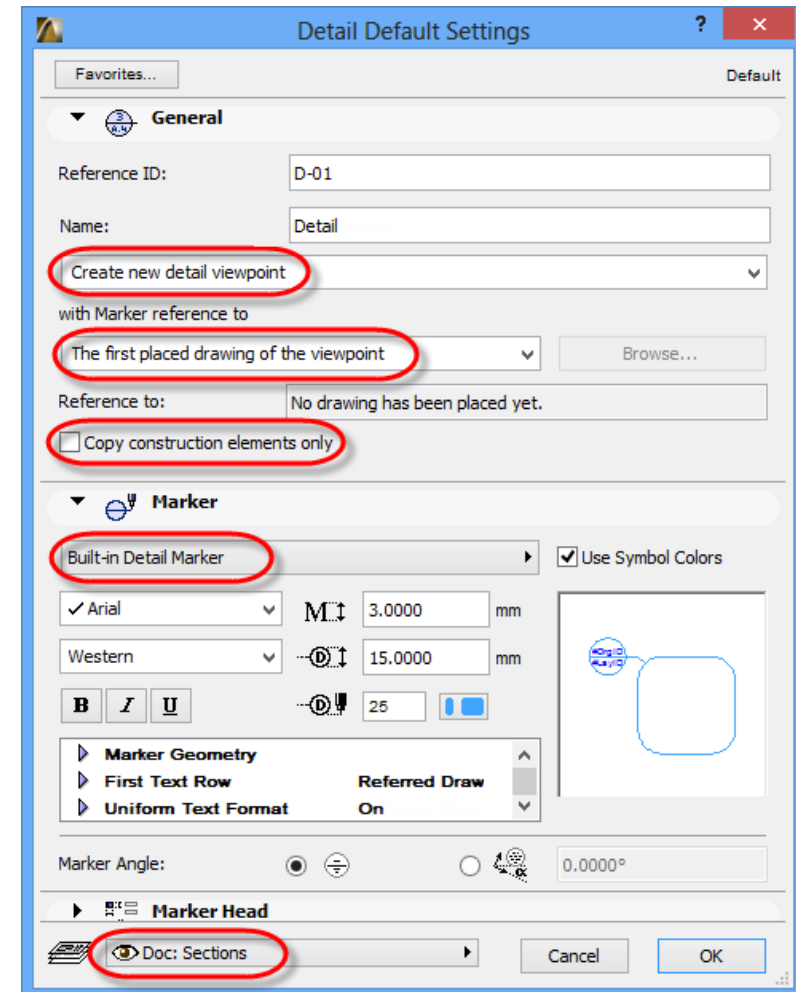
The Detail Markers perform the same function as the Section & Elevations Markers in that they take a view of the Model and allow us to add additional information. Unlike the Sections and Elevations, changes made to a Detail does not update the BIM model.

This is because typically the detail is 'exploded' so that we can show thin items like Building Paper, DPC, flashings etc. Each element is separated by a few mm. If when we moved the bottom of the wall 6mm to add the DPC between the bottom plate and the slab or moved to roof up to add the Vapour Barrier this would adversely modify our construction dimensions. This is why the detail is an abstracted view of the modelled elements with the addition of further elements.

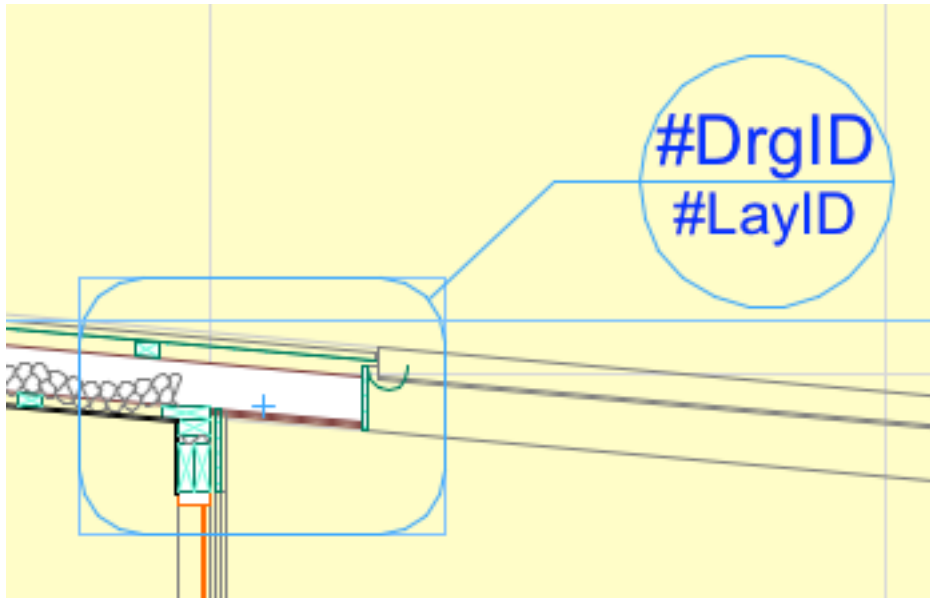
Create a New Detail

- Make sure you are still in **Section AA**
- Open the **Detail Tool** Settings dialog and review the settings:

Note: Make sure the Marker references to **The first placed drawing of the viewpoint**. This means that ArchiCAD's automatic numbering will assign the Marker to the first drawing placed on the layout. You will also notice that until this happens the Marker text will read **#DrgID** (this will be the drawing number on the Layout Sheet) and **#LayID** (this will be the number of the actual Layout Sheet).



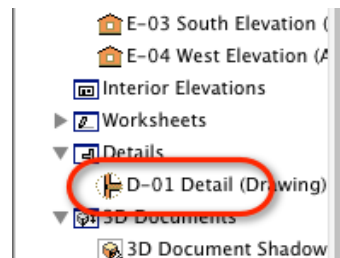
- Use the **Rectangular** Placement method:
- Draw a rectangle over the right hand Soffit area
- Click the top right corner to place the Detail Marker



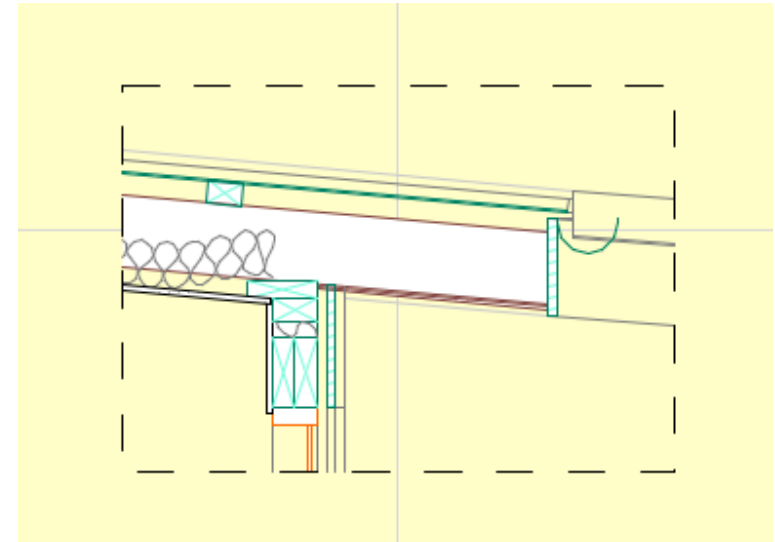
ArchiCAD Details take a snapshot of the Model Data and places it in a new window to allow further editing. Editing the Detail does not transfer back to the model – this allows details to be exploded without destroying the model.

If the model changes, the Detail can be updated with the latest model data by right clicking in the Detail and hitting **Rebuild from Source View**.

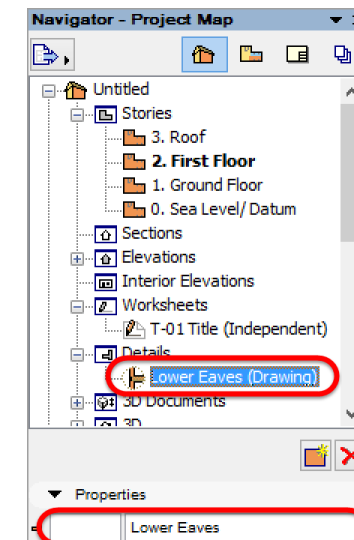
- Switch to the **Project Map**, under **Details** you'll see the new detail listed



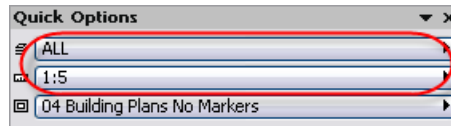
- Double Click the item to open the Detail in a new Window



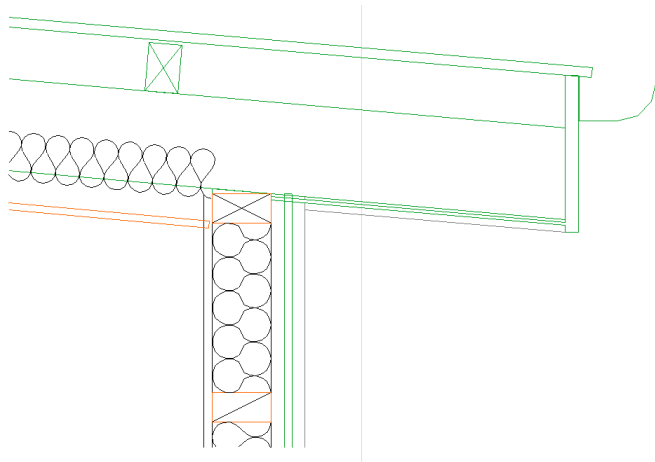
- It is a good idea at this point to rename the Detail so that it is called what it represents, in this case we will rename it to **Lower Eaves**. Remove the ID as this is not needed.



- Change the Drawing Scale to **1:5** using the **Quick Options**

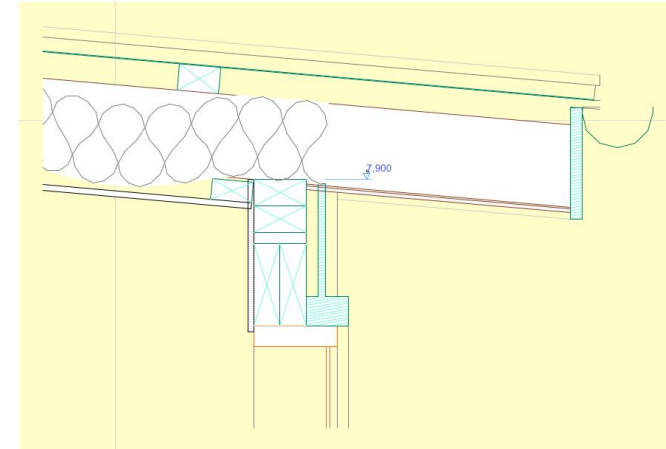
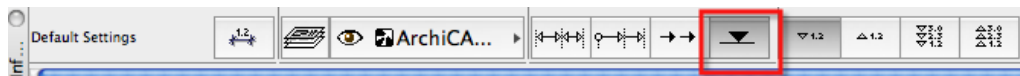


- All data has become drafting based elements (lines, fills etc)
- A good tip at this point is to **drag a copy** of the detail data to the side and use this copy of the detail drawing, this was if the model changes you can rebuild the detail window without modifying you completed detail.
- It is normally a good idea to **Select All Fills** and delete them
- And Select all the Lines and run the Line work Consolidation, **Edit > Reshape > Linework Consolidation...**
- You can also delete the dashed boundary and clean up some of the lines.



ArchiCAD Details retain important model related information

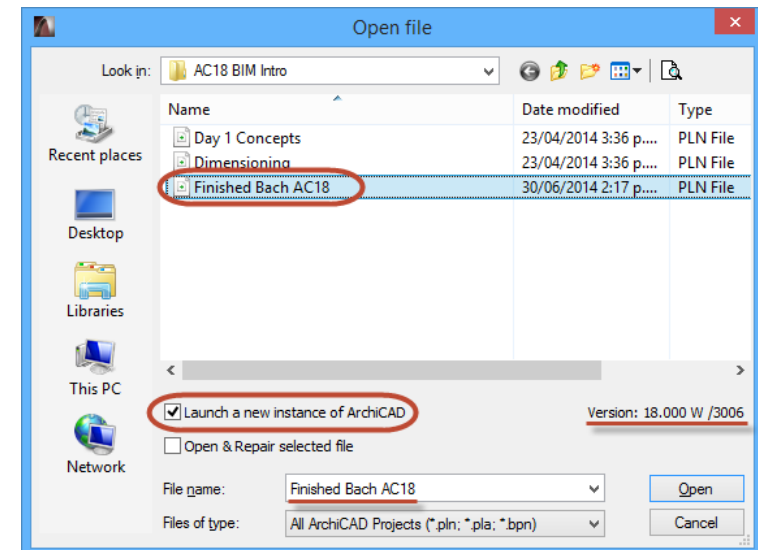
- Use the **Elevation Dimension** Tool to place a dimension to the top of the Top Plate



The concept with details is similar to the Section Overlay Technique – use the model for context and overlay a series of Intelligent 2D Objects from Cadimage Tools Rapid Details.

Modify an Existing Detail

- Alternatively you can use details that you have already created.
- Open the **Finished Bach File** – check **Launch a new instance of ArchiCAD**
- Open the Detail **Lower Eaves**



- Use the **Zoom to Extents** (or double-click the wheel on your mouse)

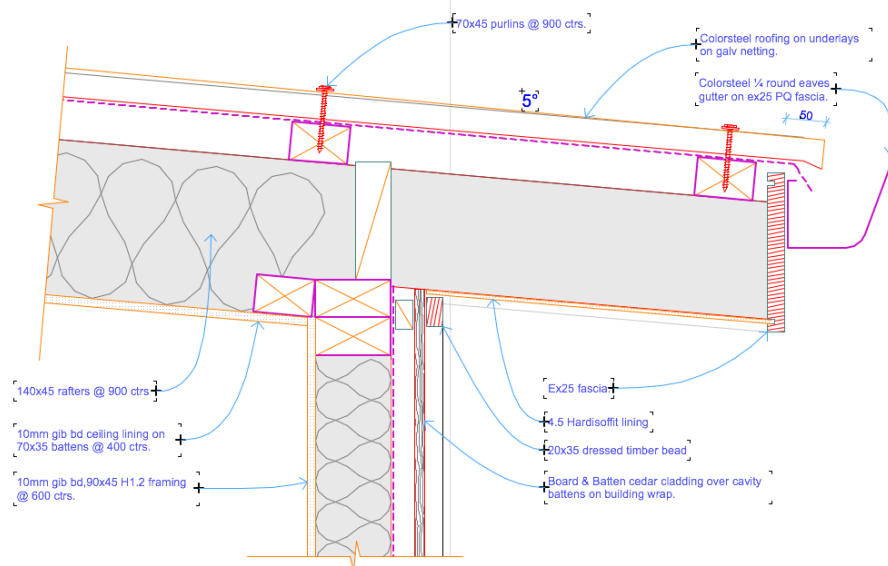


- You will notice beside the original detail (on the left) is a complete detail



NOTE: Working methods for detailing vary, sometimes it is best to redraw the detail beside the model data – this is especially applicable when you use details from previous projects

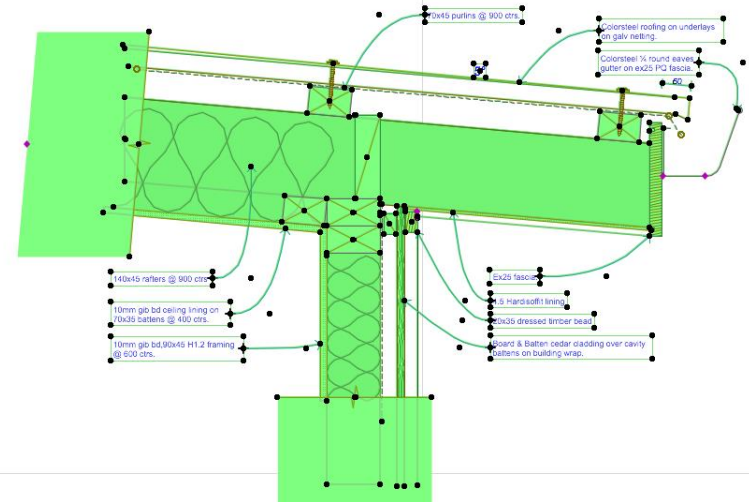
- Zoom in on the Detail on the right and look at the various objects and elements that have been used and explore their settings



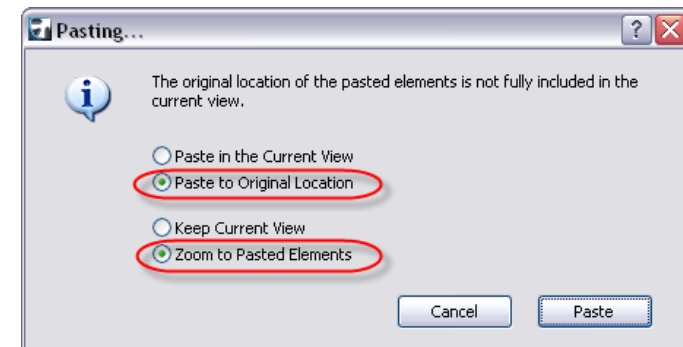
You will find two white fills beside the break lines which are Detail Elements.

As this detail is generally what we want, rather than redraw it in our current project you can simply Copy & Paste it, then modify it.

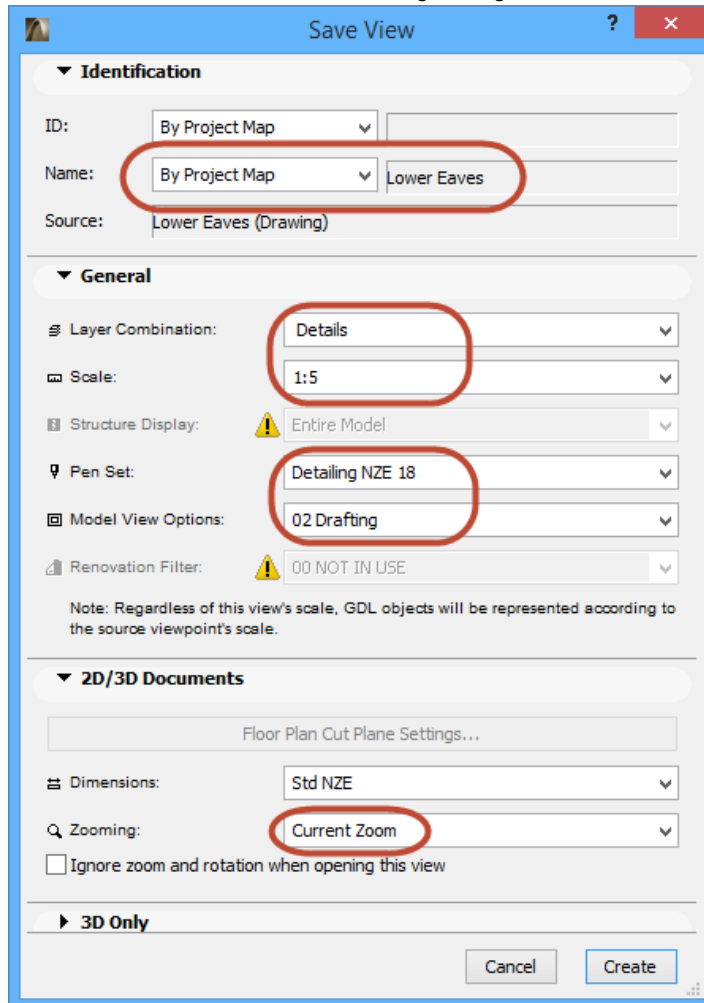
- Select the **Arrow Tool** and draw a box to select all the elements that form the detail



- Use **Ctrl+C** or **Command+C** to create a Copy on the Clipboard
- Switch back to your own Bach Project
- Make sure you are in the **Lower Eaves** Detail window
- Click **Ctrl+V** or **Command+V** to Paste the information
- You will see a dialog as follows:

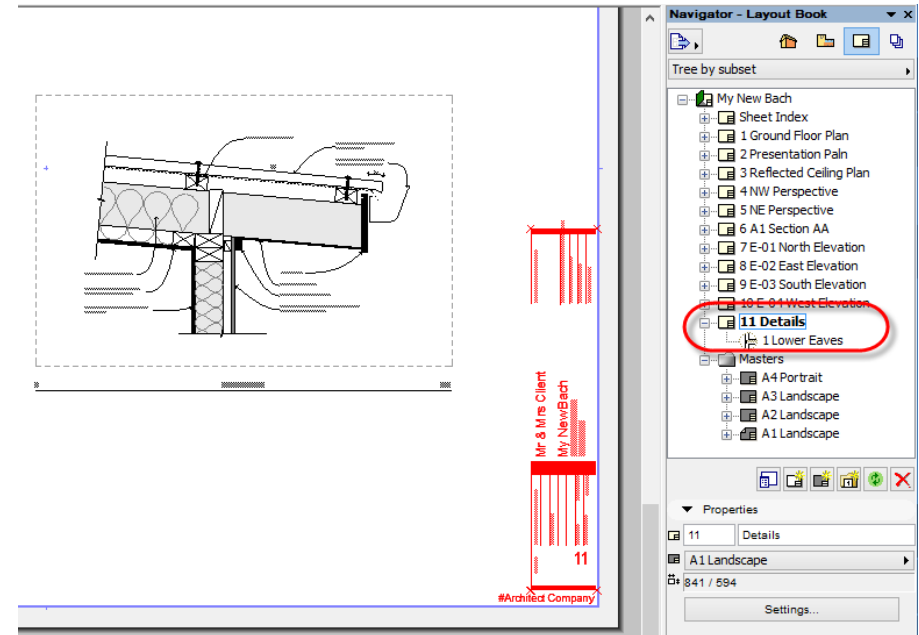


- Click **Paste**
- Do a **Zoom to Extents** and you will see the original detail from the Model and the detail just pasted
- Zoom back in on the complete detail
- Save a **View** for the Detail with the following settings:

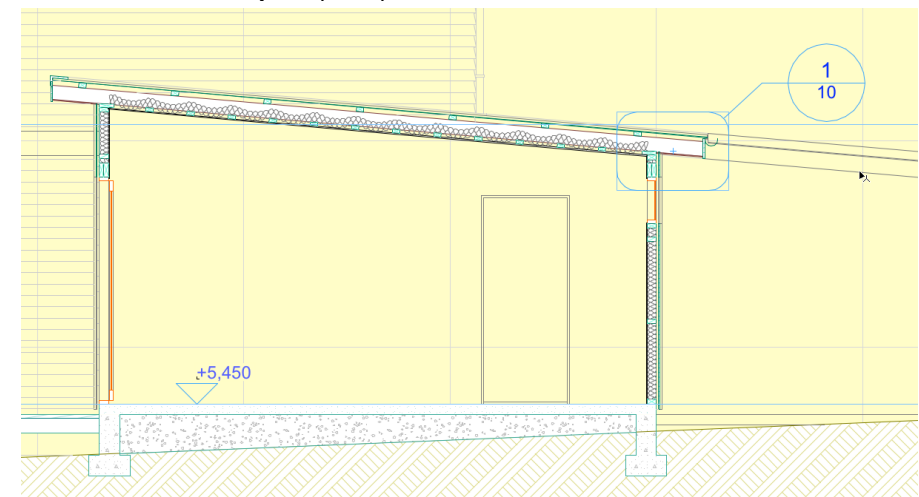


- Using **Current Zoom** means that when the View is placed on a Layout it will be cropped to the **Current Zoom** – therefore you will only see the complete detail and not the other cutting from the model

- Use the **Organizer** to create a new **Layout** & place the new cropped Detail on it

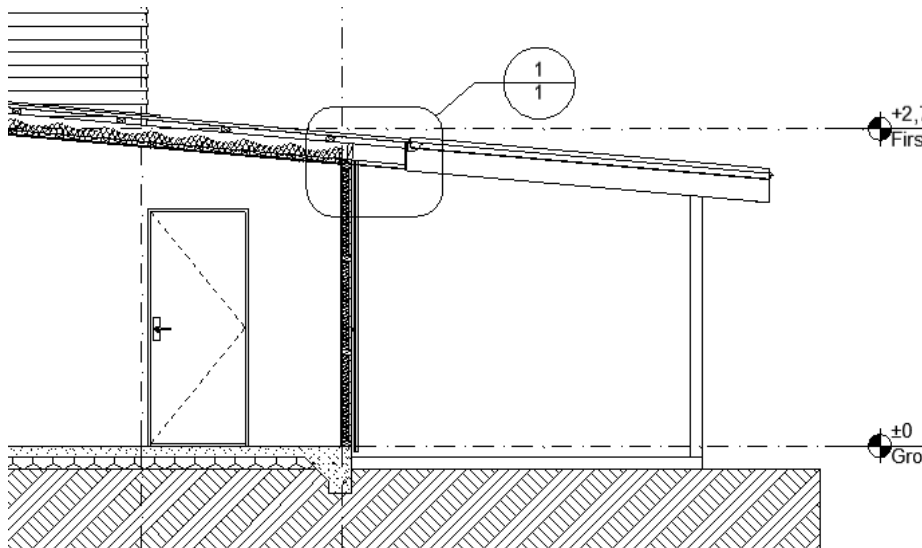


- Use the **View Map** to open up **Section AA**



- You will notice the Detail Marker now updates to show the Layout Number the Detail is placed on, and the Detail number from the Layout Sheet.

- Switch to the **Layout Book** and move the Detail Layout to the top of the list
- View the **Sections** Layout and check the Marker – it has updated and displays the correct Layout Number



- Click **Ctrl+Z** or **Command+Z** to undo the change (the Detail Layout moves back down the list)

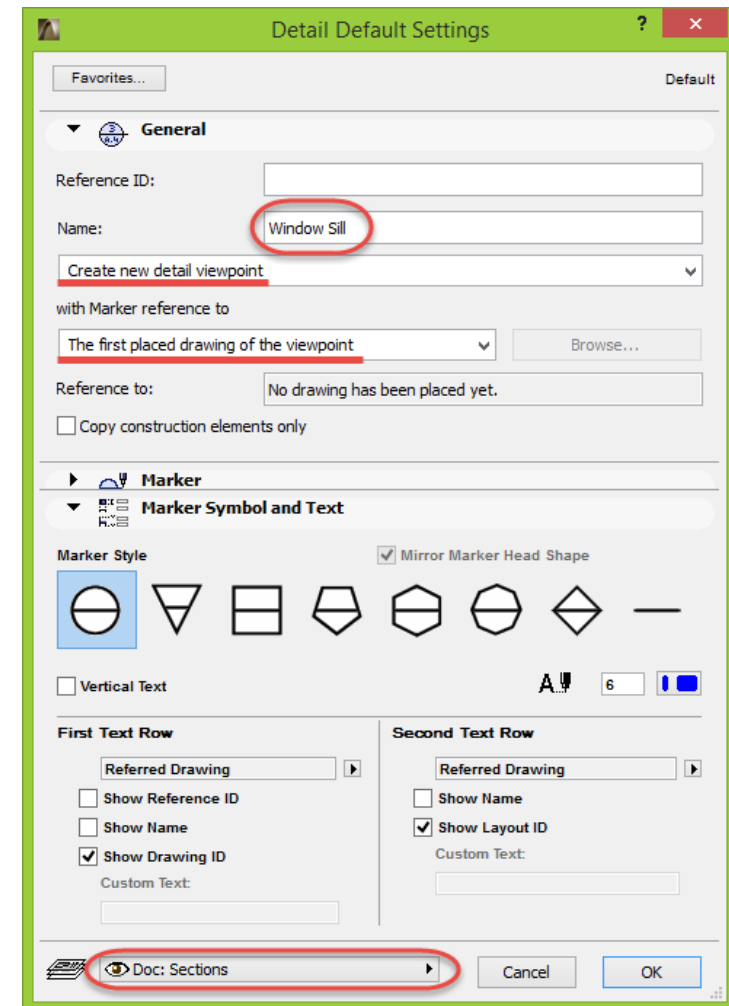
Adding Details from Others

Details may not always be created in-house. They may be sourced from Manufacturers websites, Consultants or be images from scanned details.

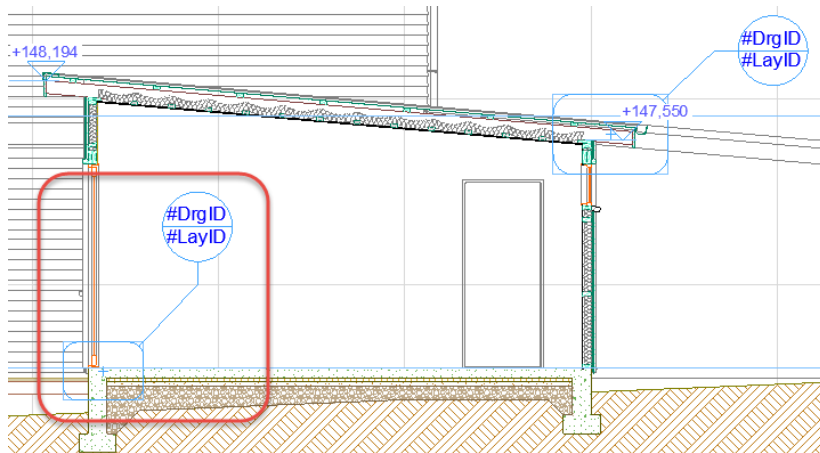
We can use the same method as described previously, but instead of dragging a detail from an existing ArchiCAD .pln file, we can paste information in PDF, DWG, DXG, DGN, JPEG and many more.

PMK Drawing (*.pmk)
 Plotter File (*.plt)
 Windows Enhanced Metafile (*.emf)
 Windows Metafile (*.wmf)
 PDF File (*.pdf)
 All Images (*.bmp; *.dib; *.rle; *.jpg; *.jpeg; *.jpe; *.jfif; *.gif; *.tif; *.tiff; *.png; *.ico; *.sgi; *.psd; *.pct; *.pict; *.png; *.tga; *.jp2; *.qtif; *.lwi)
 DWF File (*.dwf)
 DXF File (*.dxf)
 DWG File (*.dwg)
 MicroStation Design File (*.dgn)
 HPGL File (*.plt)

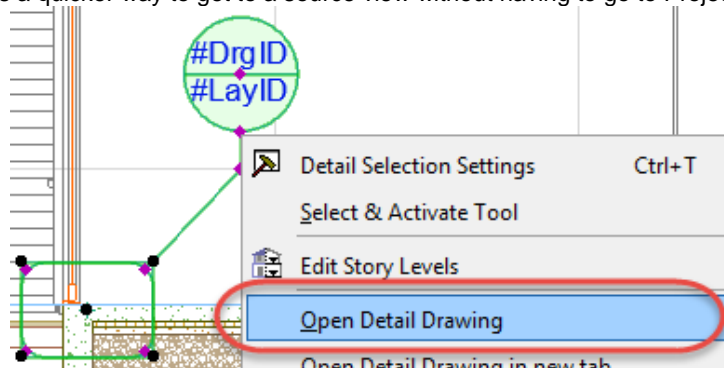
- Open **Section AA** again
- Open the **Detail Tool** and setup to create an new detail viewpoint



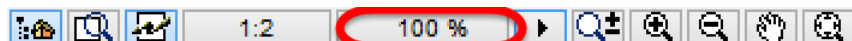
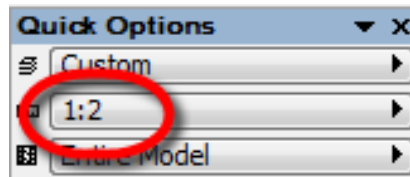
- Make sure it is set to **Create new detail viewpoint** and set the Marker to reference to **The first placed drawing of the viewpoint**.
- Create the detail around the Window Sill on the left wall of Section AA.



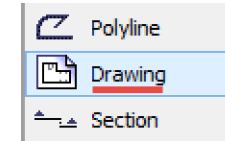
- Select the **Detail Marker** and **right click** and choose '**Open Detail Drawing**'. This is a quicker way to get to a source view without having to go to Project Map.



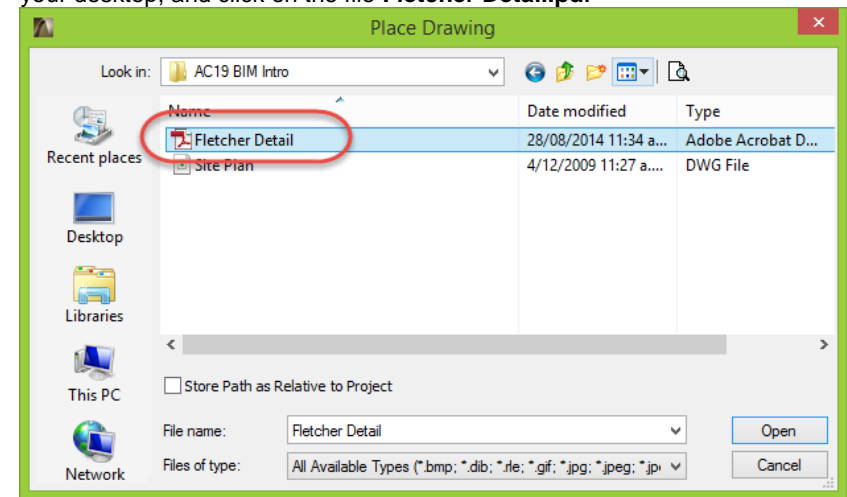
- Set the scale of the page to the same scale as the PDF (if you are unsure set the scale to 1:1) For the purposes of this training, set the scale to **1:2 & 100%**



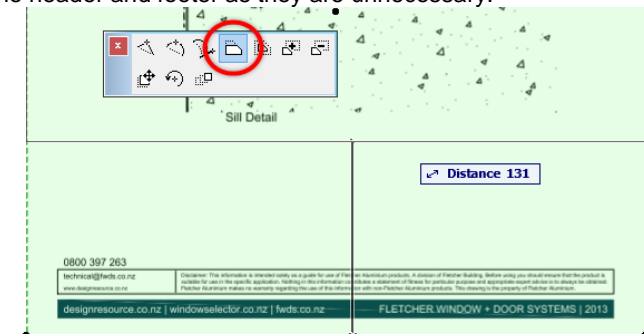
- Select the **Drawing** Tool from the ToolBox (no need to open the Tool, just select it)



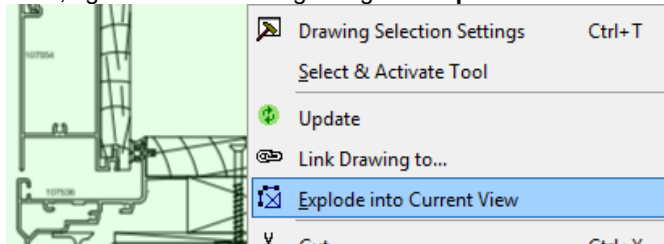
- Click somewhere to the right of the Source Detail.
- In the new dialog, Browse for your file to insert. Choose the **BIM Intro** folder on your desktop, and click on the file **Fletcher Detail.pdf**



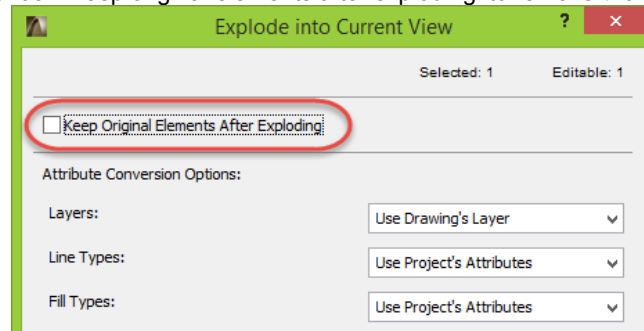
- A common problem with PDF's is that you cannot modify them, so if we wanted to to adjust something about this Detail we would have to redraw it. ARCHICAD can now **explode Vectorial PDF's** to extract their lines. First **offset the edges** to remove the header and footer as they are unnecessary:



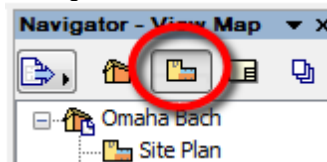
- Once trimmed; right click the Drawing and go to '**Explode into Current View**'



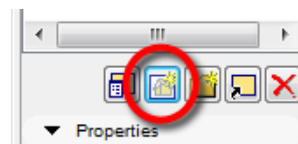
- You can control how it appears from the Layers, Lines & Pen it uses, we are going to untick 'Keep original elements after exploding' to remove the PDF:



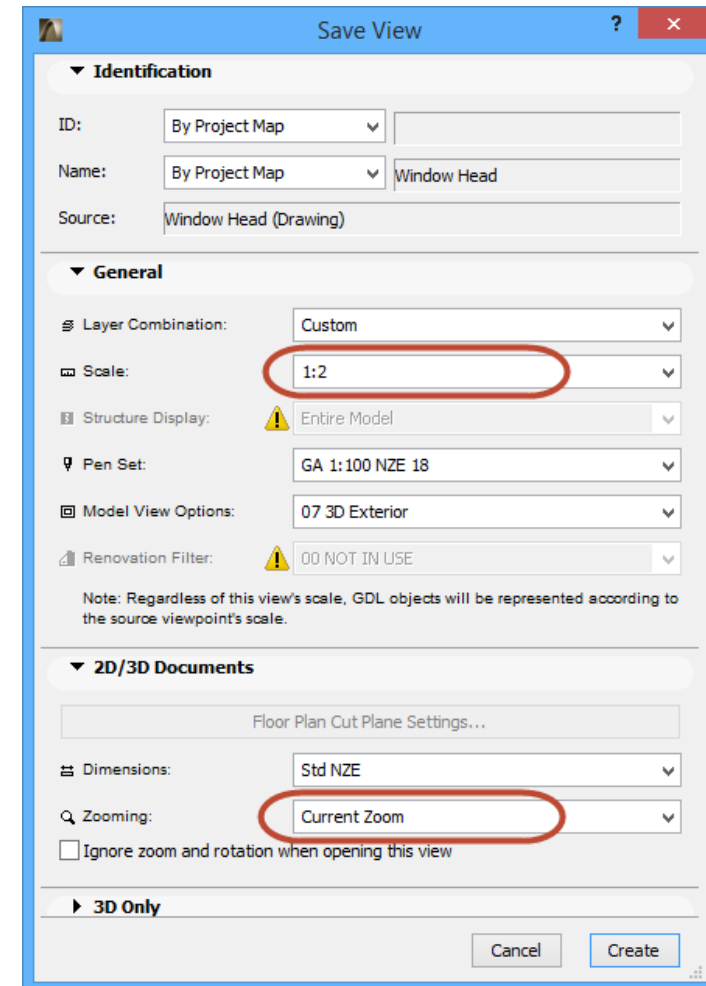
- Click OK and the Detail will now be a collection of Lines & Text you can modify.
- Zoom in** so the exploded detail is all you see, and save this as a View.
- Goto the **View Map** in the Navigator



- Choose the **Save Current View** button



- The **General** View Settings should be fine – as we are looking for a “What you see is What you get” type view.

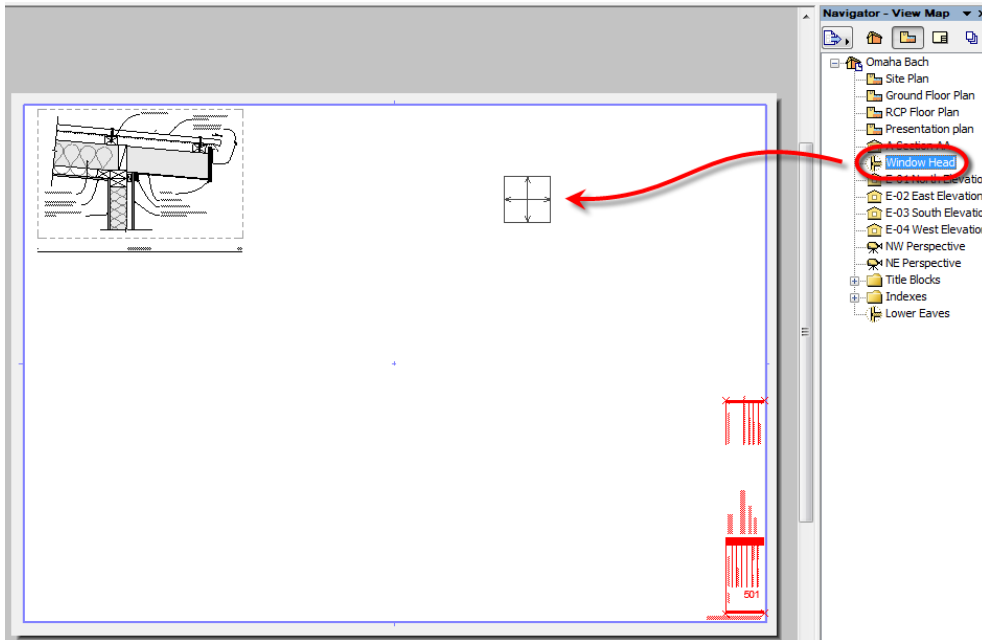


- Make sure you set the Zooming to **Current Zoom**
- Hit **Create**

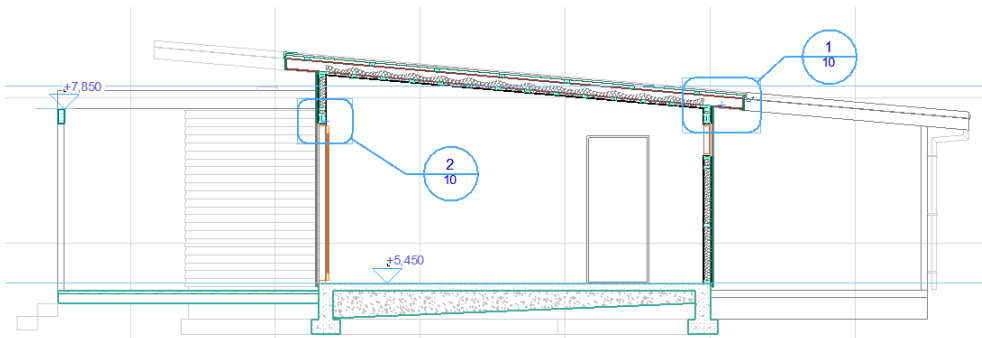
You have now made a detail in ArchiCAD that 'links' to a detail that you have not created. We can place this on the same Layout as our previous Detail.

- Open the **Layout Book** in the Navigator
- Double click on your **Detail** Layout to open it.

- Switch back to the View Map view and highlight your new Window Head detail and drag it onto your Layout.



Back in your Section View, your Details Markers will have updated themselves.



Module 14 – Drawings and Layouts

In Module 3 you created a series of Layouts for the Bach. In this Module we explore drawing and layouts further, introducing the following:

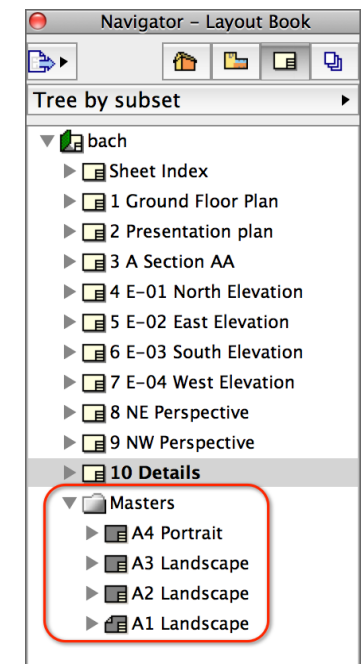
- Master Layouts
- Auto Text
- Drawings
- Titles
- Publishing

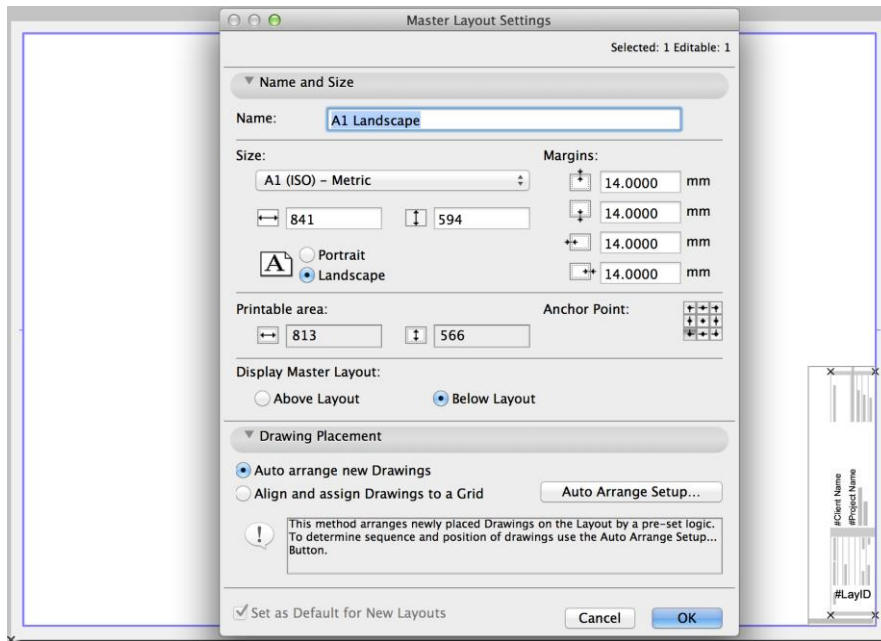
BIM Note:

At this point in BIM we are simply using the powerful publishing features of ArchiCAD to organize our model views ready for issuing to various consultants and the client. There is no more actual modelling needed.

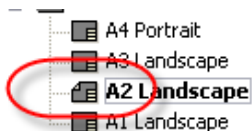
Master Layouts

- Switch the Navigator to the Layout Book
- At the bottom you will notice a series of **Master Layouts**
- Double Click the **A1 Landscape Master**
- Click the **Settings** button





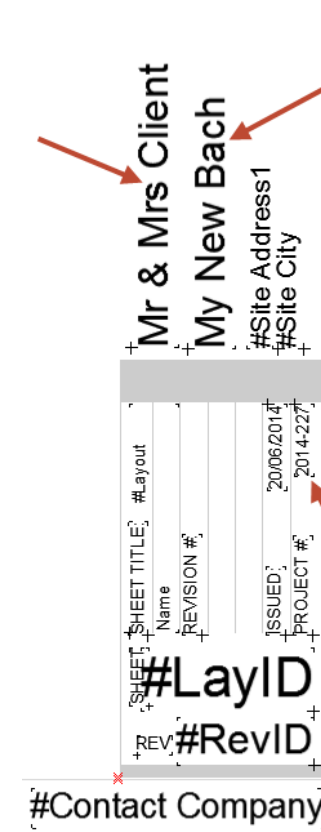
- Explore how the page has been defined
- Click **Cancel** (you don't want to keep any changes you inadvertently made!)
- You can create new Master Layouts by using the Right Click menu and selecting **New Master Layout...** - this allows you to create pages of different sizes or pages of the same size with different styled title blocks for different uses.
- Also notice that the A1 Landscape page icon has the page corner folder over



- This indicates this **Master Layout** is the **Default**– all new layouts created will use this Master by default but can be easily changed in the settings.
- If you want to change which **Master Layout** is used by **Default**, Right Click on the Master you want to use and select **Set as Default** from the menu
- Change the Default to **A3 Landscape**
- Change the Default back to **A2 Landscape**

Auto-Text

- Zoom in on the Title Block at the bottom right of the page
You will see some standard text along with some text blocks starting with #’s – the # indicates Autotext

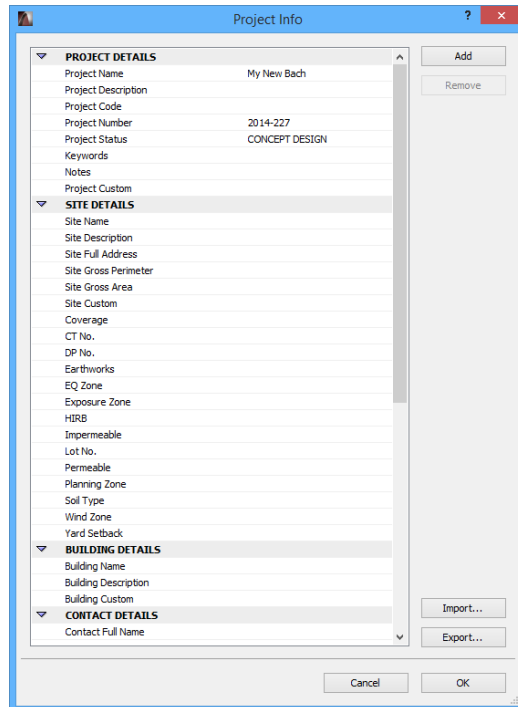


BIM Note:

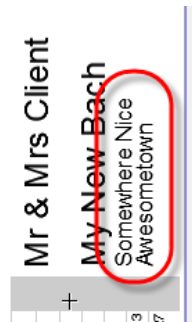
Autotext need only be edited once, then everywhere the Autotext is placed it will automatically update. Your Office template (ArchiCAD BIM Start point) will have Autotext peppered around Views and Layouts ready to be automatically filled in when the relevant info is added.

Project Specific Autotext

- Some Autotext is Project Specific for example **#ProjectName** and **#Client**
- You can see the Autotext we added on Day 1
- Open the **File > Info > Project Info...** dialog

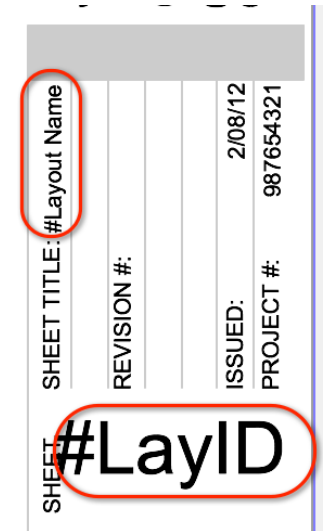


- This is where we update project related information
- Update **Site Address & Site City** fields
- Click **OK** – you will notice the Autotext is replaced with your new values

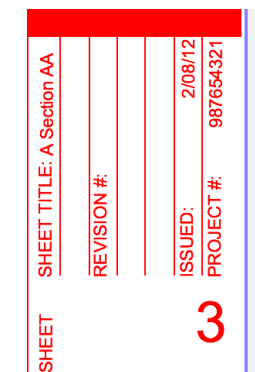


Layout and Drawing Specific Autotext

- Some Autotext is not controlled by adding into the Project Info tab.
- In the bottom of the title block you will notice there still remains some Autotext for example, **#Layout Name** and **#LayID**

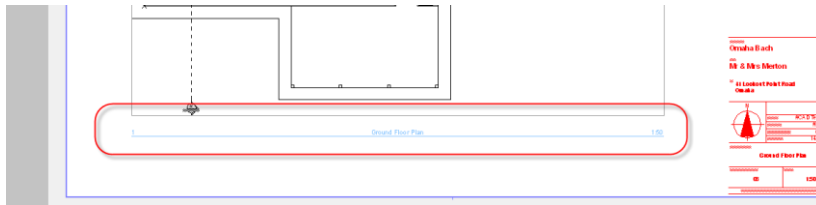


- This Autotext is layout specific so you need to be on an Layout for it to display the correct data
- Double click on a few of your Layouts and see how the data changes for each Layout
- Drawing or Revision Specific Autotext is data related to an individual Drawing or Revision status. For example a Drawing Title – we'll look at this in the next Section

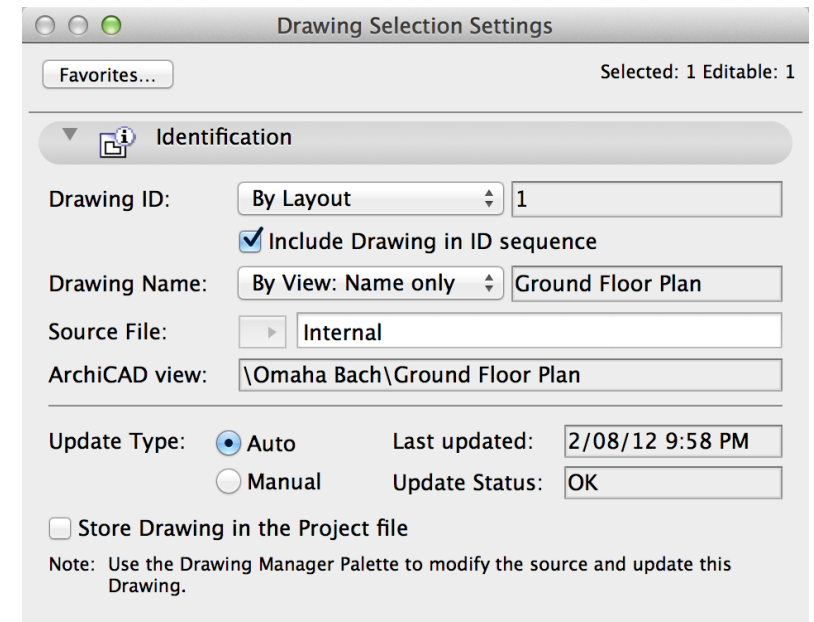
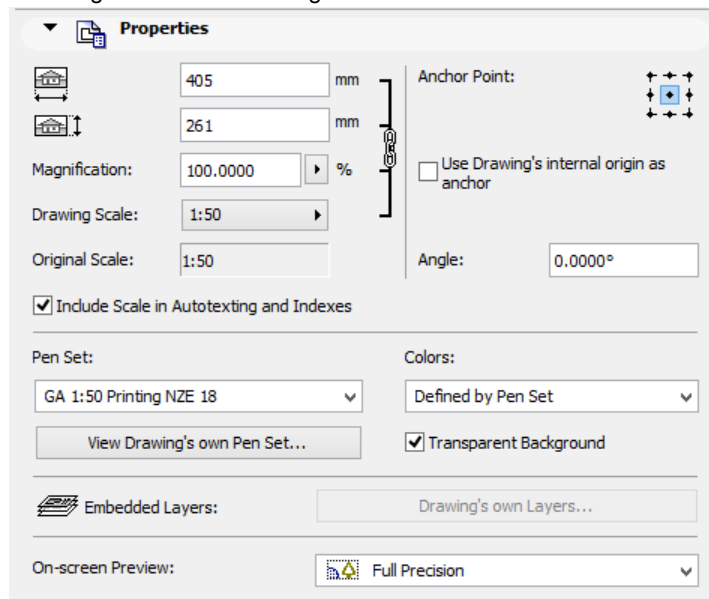


Drawings

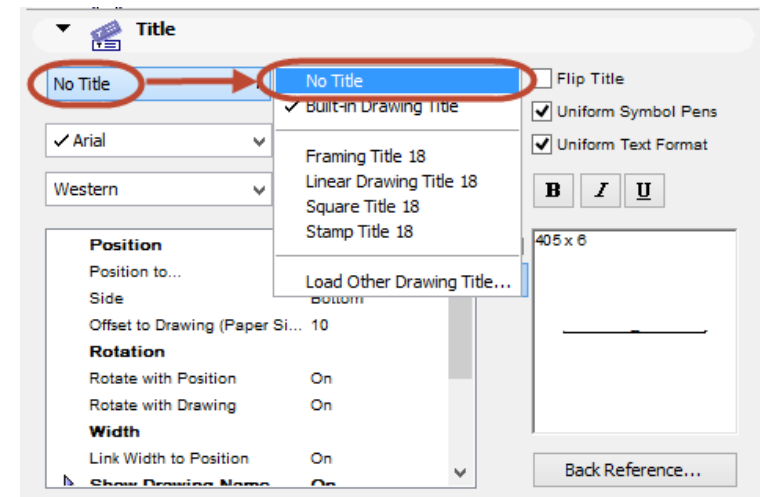
- Double-click on your **Ground Floor** Layout and make sure you can see the full Layout by using the **Fit in Window** button at the bottom of your workspace
- You will see the **Ground Floor Plan**
- Below the Plan you will see a **Drawing Title**



- The **Title** currently displays the Drawing Number (useful when there are multiple Drawings on a page) the Drawing Name and the Drawing Scale (this is all Drawing specific Autotext)
- Select the Drawing and open the Drawing Selection Settings (**Ctrl-T** for PC **Command+T** for Mac)
- Browse through the various Settings



- In the Title Tab change the Built-in Drawing Title to No Title

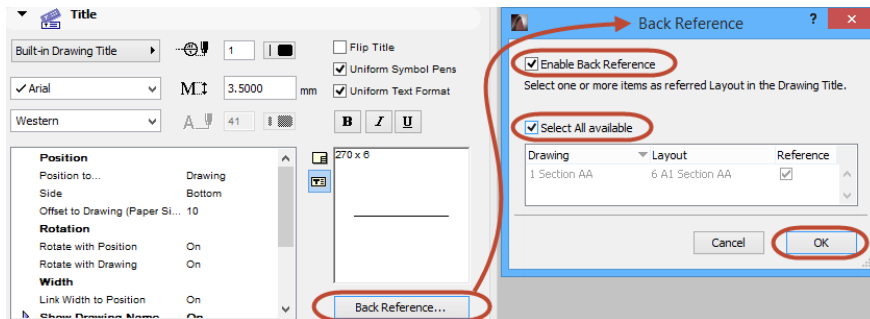


- Click **OK**
- You will notice the Drawing now has no Title

Back Referencing

This is a useful feature of the Titles when used. For a **Details** sheet you may want to show which sheet the Details have been derived from much like seeing what sheet the Detail is on in the Section Layout.

To do this within the Title settings choose **Back Reference** and enable it. Since there is only one Reference at the minute with these details we can tick 'Enable all References'

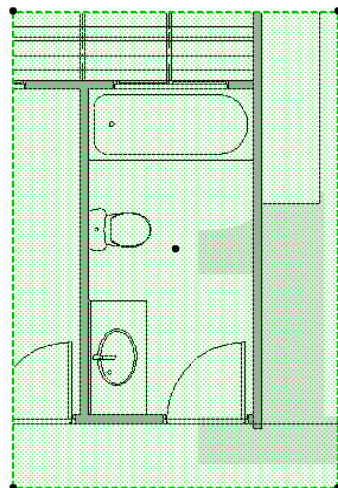


Cropping Drawings

In some instances you may want to crop a Drawing so you can only see a portion (for example if you were doing a Kitchen Plan)

The Frame / Boundary of the Drawing works in the same manner as other polygons like Roofs and Slabs

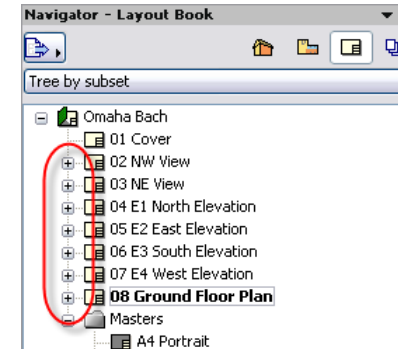
- Select the **Drawing**
- Use the **Pet Palette** to reduce the edges of the Drawing so you can only see the Kitchen
- Click within the Drawing Frame and use the **Pet Palette** to move the contents of the Drawing
- Click **Undo** as many times as required to get back to the full Floor Plan



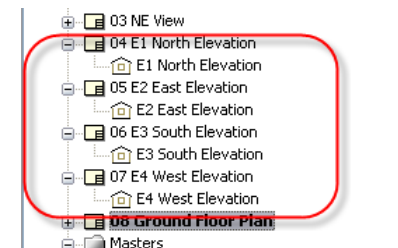
Moving Drawings from Layout to Layout

Using the Navigator you can drag Drawings from one Layout to another.

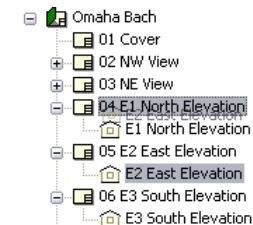
- You will notice that each Layout in the Navigator has a Plus symbol beside them



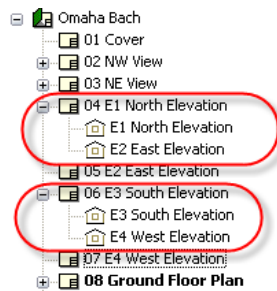
- Click the Plus Symbol to Expand the information
- You will see the Name of each Drawing placed on the Layout
- Expand the **04 Elevation** Layouts



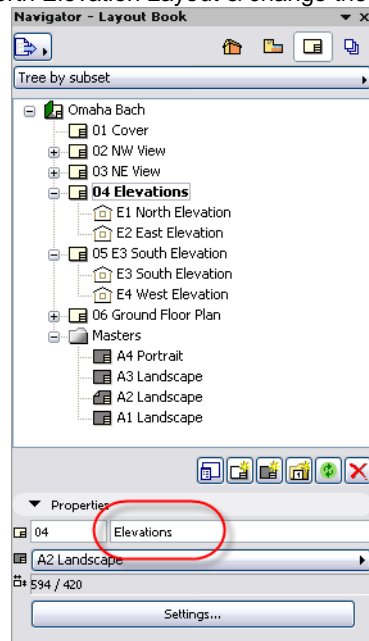
- Pick up the **East Elevation** Drawing and Drag it onto the **North Elevation** Layout



- Pick up the West Elevation Drawing and Drag it onto the South Elevation Layout



- As the East Elevation Layout and West Elevation Layout now have no Drawings you can select and **delete** them
- Double Click on the North Elevation Layout & change the Name to **Elevations**



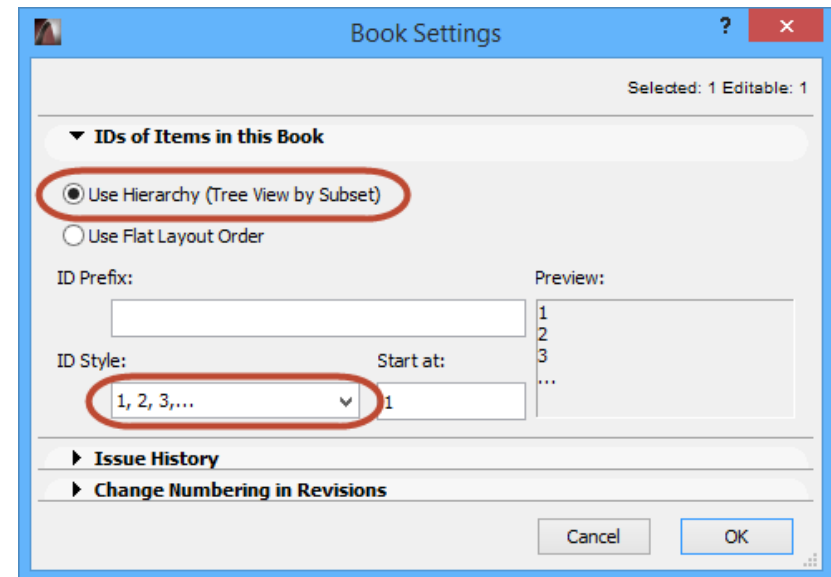
- Select the Elevations and Drag them so they can both be seen (drag one up the Layout and one down the Layout)
- Repeat the exercise for the South Elevation Layout
- You may need to right click the drawing and choose '**Update**'

Creating a Subset style Layout Book (recommended)

Setting your output documentation to use a Subset style numbering system means you can easily add new documents to your set without re-numbering the remaining sheets. This becomes invaluable if the sheets have already been issued.

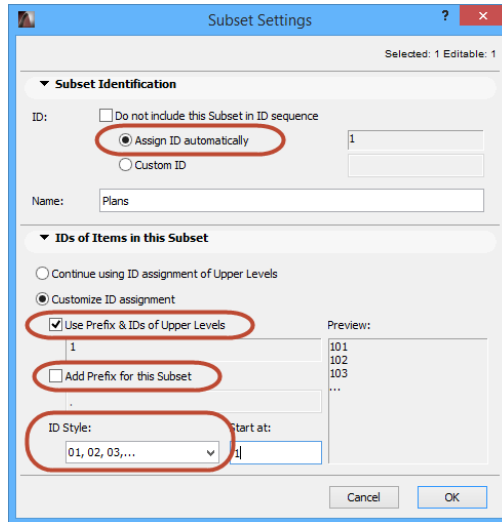
A Standard system to achieve may consist of: 100 series for Plans, 200 series for Sections, 300 series for Elevations, 400 series for Details etc.

NOTE: This is the default in the **ArchiCAD 19 Template.tpl** that shipped with the ArchiCAD 19 DVD.

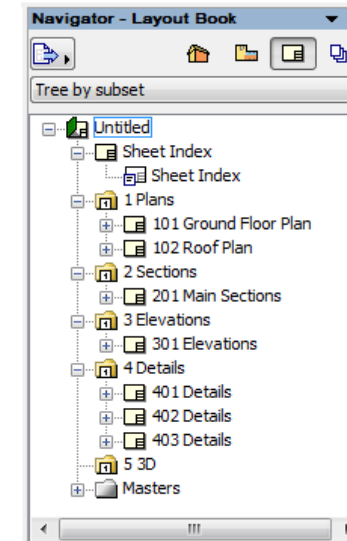
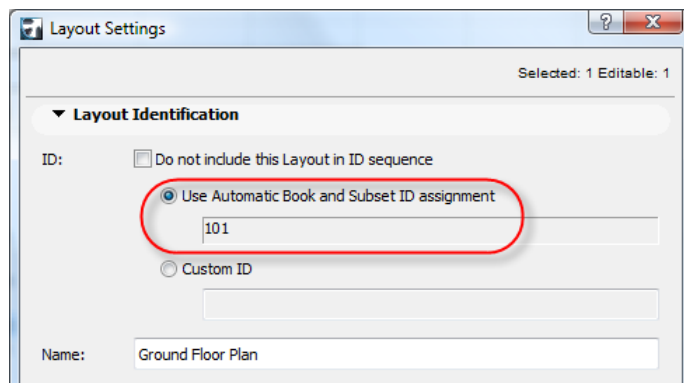


- Go to the **Navigator > Layout Book**,
- Select the **Top folder** in the tree, right-click and select **Book Settings...**
- Select **Use Hierarchy (Tree View by Subset)** and choose your ID Style
- Click **OK**.

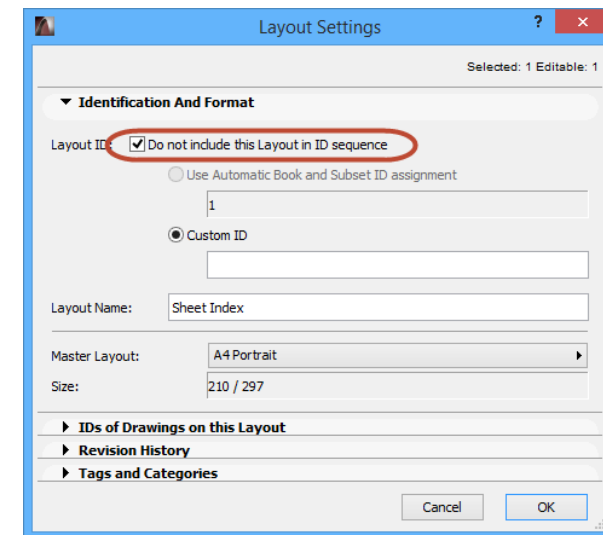
- Create your first Folder; we will first create a folder for **Plans**.
- Set to **Assign ID Automatically** and to **Use Prefix & ID of Upper Levels**.
- Then set it to **Use the ID** of pper level but uncheck **Add Prefix for this Subset**
- Then set the ID style to **01, 02, 03...** and you can see the preview to the side.



- Drag the **Ground Floor Plan** and drag it into the newly created folder. Note that it has now had its page number reassigned in accordance with the folder it is located in. Right-click, choose **Layout Settings...** in this dialog you will see why this is: **ID to Use Automatic Book and Subset ID assignment**.



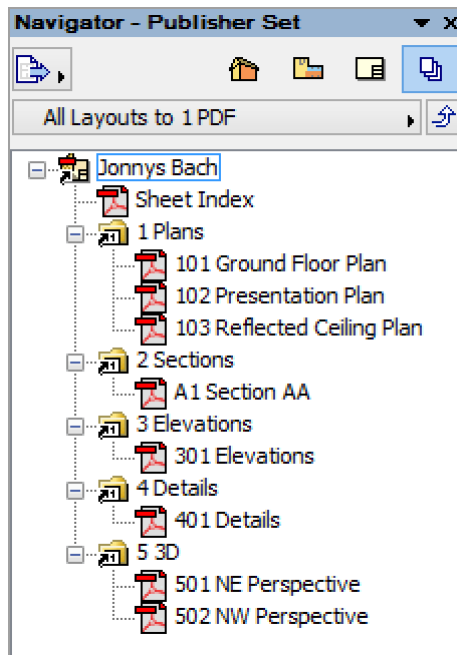
Note that the **Sheet Index** in our example has no number. This is because within the **Layout Settings** under **ID** we have ticked **Do not include this Layout in ID sequence**.



Publishing

Publishing is the fourth section of the Navigator. Publishing handles all output from the BIM model. Output could be to a printer or plotter, to PDF files and can even be used to export DXF/DWG 2D files or IFC 3D files to send to consultants

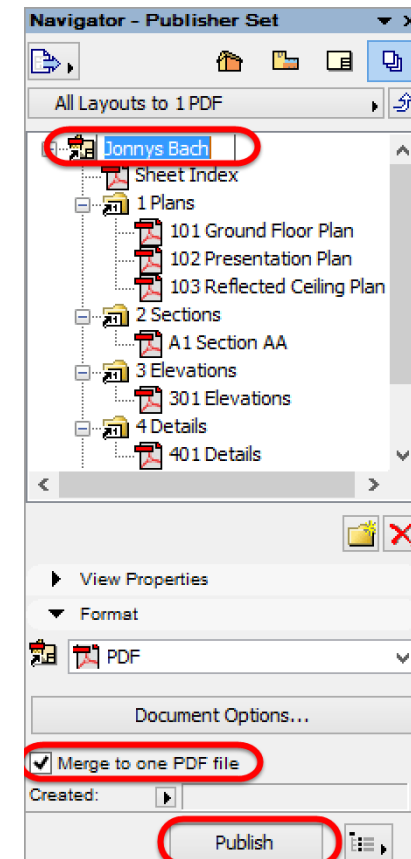
- Switch to the **Publisher** Mode in the Navigator



The Template file has been set up with several Publishing sets that publishes all the Layouts to different formats.

We are going to choose the Publisher set '**All Layouts to 1 PDF**' which will export all the Layouts to one merged PDF file with multiple pages.

- Select the **Layout Book** at the Top of the List
- Ensure the **Merge to one PDF file** is Selected
- Click **Publish**



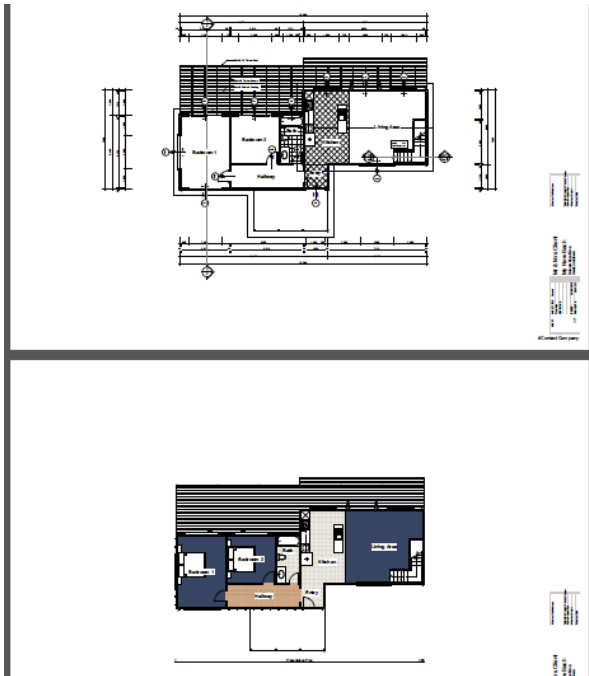
- You will be prompted to give the PDF a name – save it to the desktop
- A dialog pops up to show the Publishing progress

Publishing...

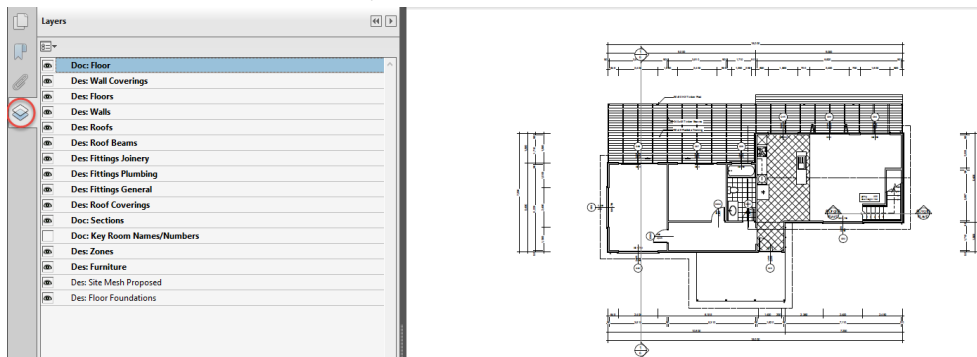
Name	Status	Size
✓ 01 Cover	Saved	40.25 KB
✓ 02 Ground Floor Plan	Saved	52.17 KB
✓ 03 First Floor Plan	Saved	45.73 KB
✓ 04 Sections	Saved	69.14 KB
✓ 04 Elevations	Saved	83.27 KB
✓ 06 Elevation	Saved	58.60 KB
✓ 07 NE View	Saved	317.90 KB
✓ 08 NW View	Saved	166.69 KB

Here you can see the progress of the publishing & the file size of each page.

Now navigate to your desktop to the AC19 BIM Intro folder and you should have your entire project saved as a PDF. Double click it to open and all your Layouts will be organized one after another in a single PDF file.



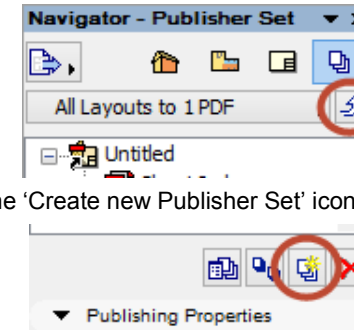
The published PDF will automatically include the Layers used to create the Layouts. In Adobe Acrobat reader click the Layers button at the left to reveal them:



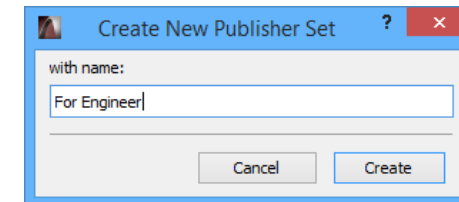
Here you can turn off Layers on the fly to show/hide information.

Extension

- If you have time **Create a New Publisher set**
- Use the up arrow to see all Publisher Sets:

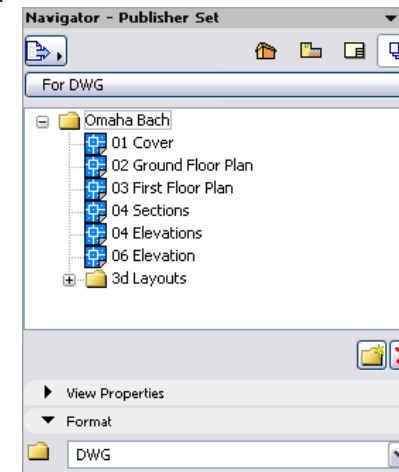


- Then choose the 'Create new Publisher Set' icon from the bottom:



- Here you can name the Publisher set as relevant

- Create a source folder – this will help set the format.
- Add the Layouts using the **Organiser**
- And set the output format to DWG



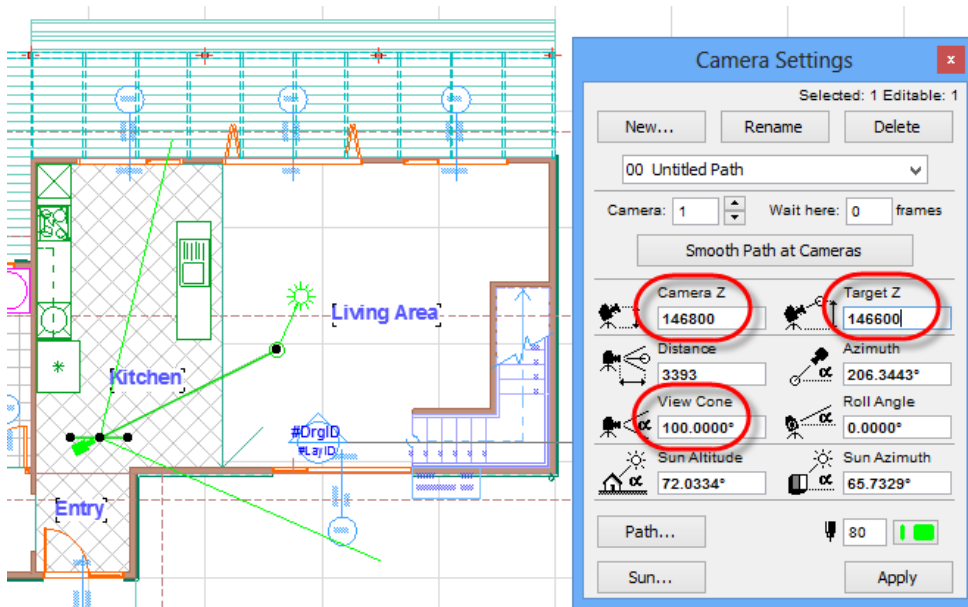
Module 15 – Sun and Shadow

This module looks at creating Shadow Diagrams and Sun Studies.

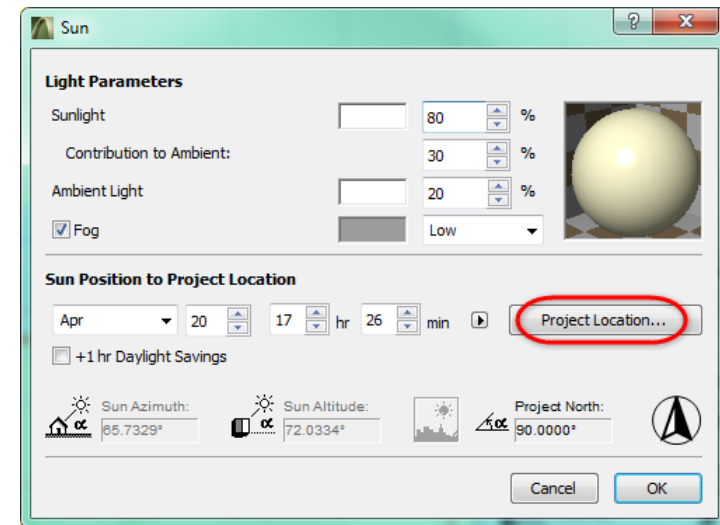
Sun Study

Often as a design tool it is good to create a study of a particular space to illustrate the sun's path over a day.

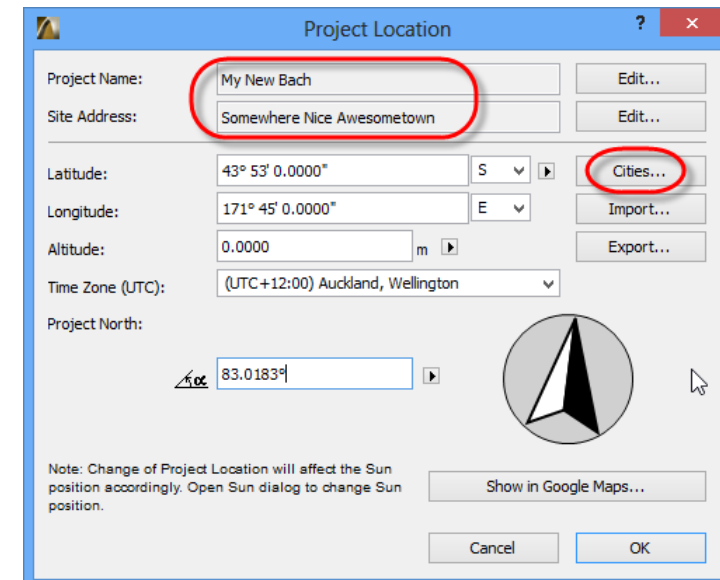
- Navigate to your **Ground Floor Plan**
- Double Click on the **Camera Tool** in the Toolbox to place a Camera in the Kitchen/Entry looking to the top-right



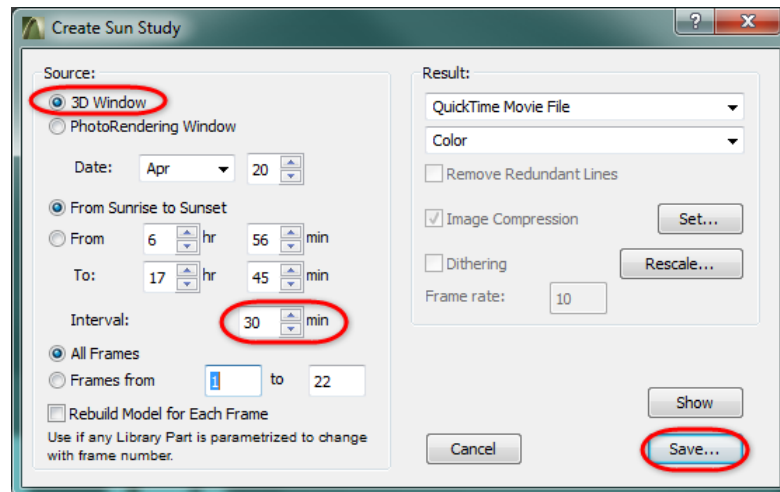
- Select the placed Camera and open its Settings.
- Change the **Camera** and **Target** heights (so that the camera is not in the ground) FFL + 1700 eye height ($145100 + 1700 = 146800$) and widen the **View Cone**.
- In the **Camera Settings** dialog you can also edit the Sun settings and check your Date, Time and Location from the **Sun...** tab
- Then select **Project Location...** to edit the location



- Hit **Cities** and select your City
- **Project Name** should come through from your Project Info.
- Hit **OK**



- Open your **Camera** View from the **Project Map**
- Go to **Document > Creative Imaging > Create Sun Study...**, choose to show in the **3D window**



Within this settings window you are able to set the **Date** and the **duration** of the Sun Study and the **interval**. (time between frames)

As per all renders you can choose a **Result:** (format) Typically this will be **QuickTime Movie**; or a series of still images (JPEG images)

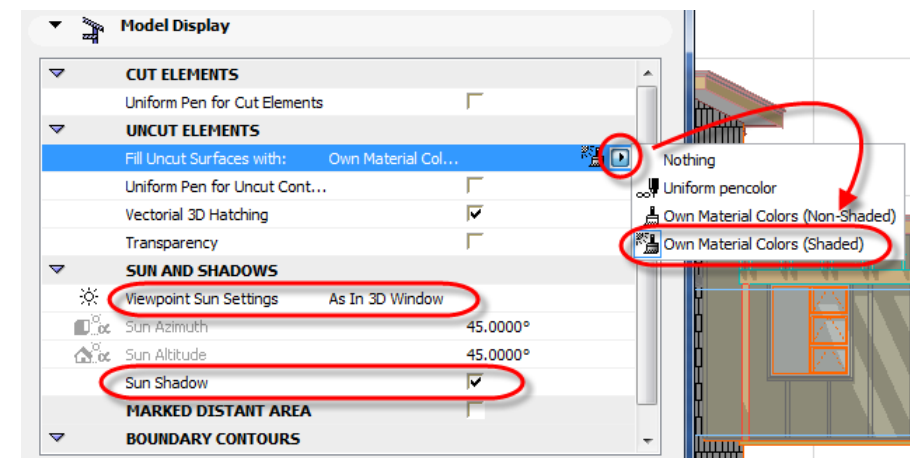
- Hit **Show** to check your Sun Study
- Make changes if necessary – Hit **Save...** (which saves a Quicktime Movie)
- Save this to the folder on your desktop.
- On **Mac** double click on this file to view your building from Sunrise to Sunset.
- On **PC** right click and choose, Open With > QuickTime Player

NOTE: As this has created a QuickTime (.mov) file, you will need QuickTime installed to view. QUICKTime is installed as part of the Mac OS, for PC users it is installed with ArchiCAD. If you are sending a file to your customer, they may have to download Quicktime.

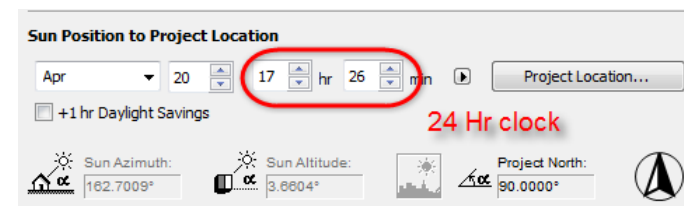
Shadows in Elevation

Sun Studies can also be used to illustrate **Façade Sun Studies**. These can be simply created in your Elevation Views.

- Open the Elevation Settings – right click on the Elevation and select **Elevation Settings...**
- Within **Model Display > Uncut Elements** note that **Fill Uncut Surfaces with:** is set to **Own Material Colors (Shaded)** this is adding colour to the elements
- Within **Sun and Shadows** the **Sun Shadows** is ticked, this is turning ON the shadows.
- **Viewpoint Sun Settings** defaults to custom, which has the sun coming from 45°, 45°, change this to **As In 3D Window** to get the sun as set up in the 3D window



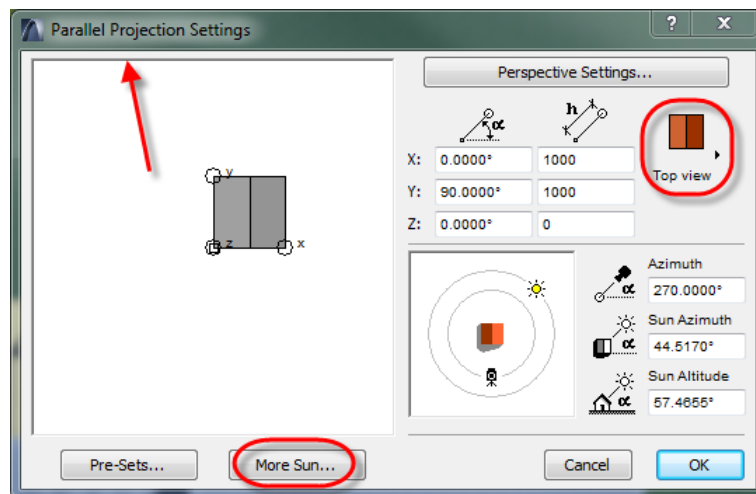
- To set the exact Sun shadows for a specific time of the day, go to **View > 3D View options > 3D Projection Settings** and hit **More Sun...**



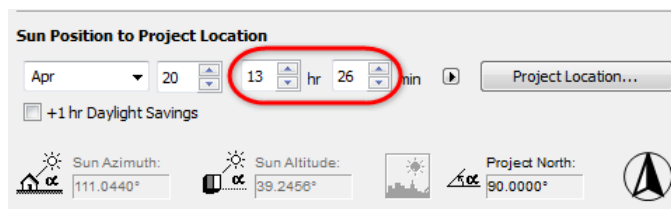
Shadows in Plan

Illustrating the shadow footprint of a building is often critical to show proposed developments and their effects on neighbouring properties.

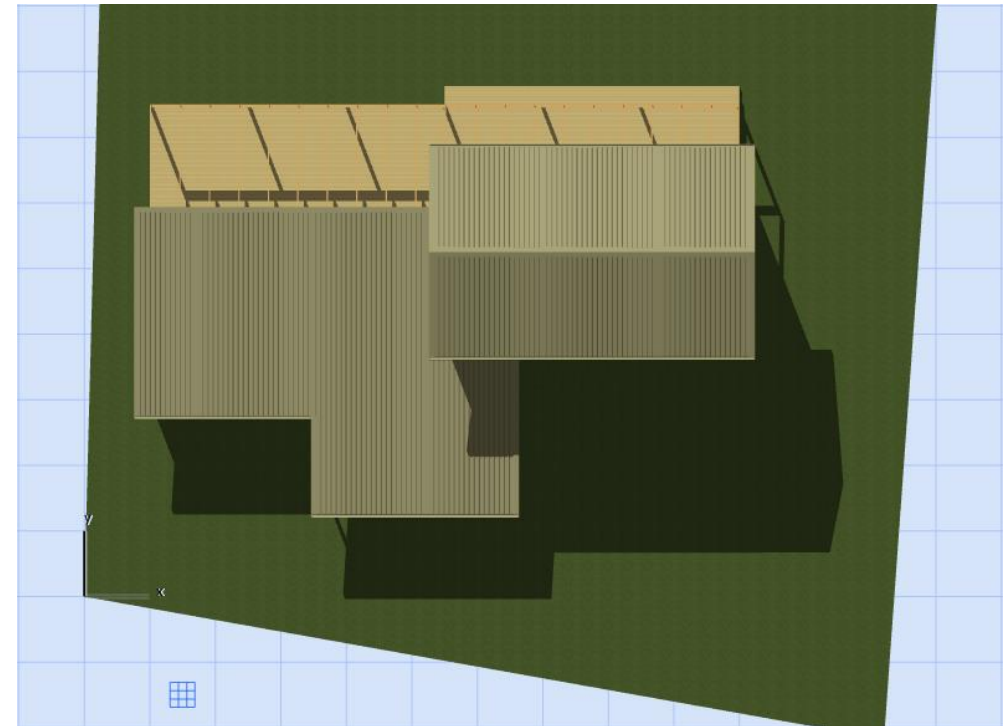
- View your model in 3D using Parallel Projection Settings-Top View.
- Right click in your 3D view, select **3D Projection Settings...**
- Choose **Top View** from the flyout on the right
- Orientate your view – generally set the X, Y & Z to multiples of **90**



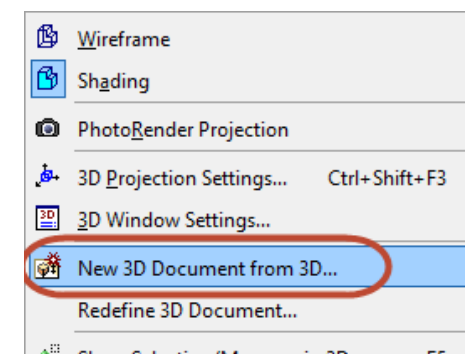
- Within **More Sun...** Set the location of your project, the Date and Time of day.



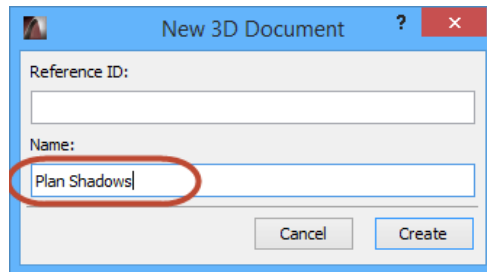
- Hit **OK**, to view the shadows



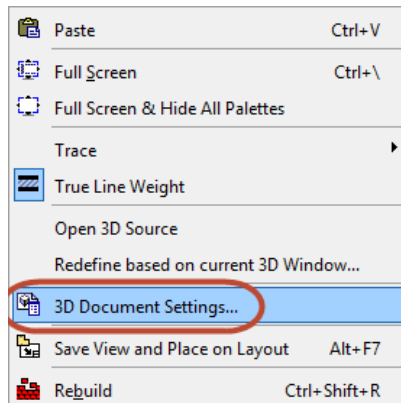
- You can also use the **3D Document** Tool to save views with Shadows Contours turned on, then add dimensions and text if needed.
- Simply **Right Click** in white space of your 3D View and choose **New 3D Document from 3D...**



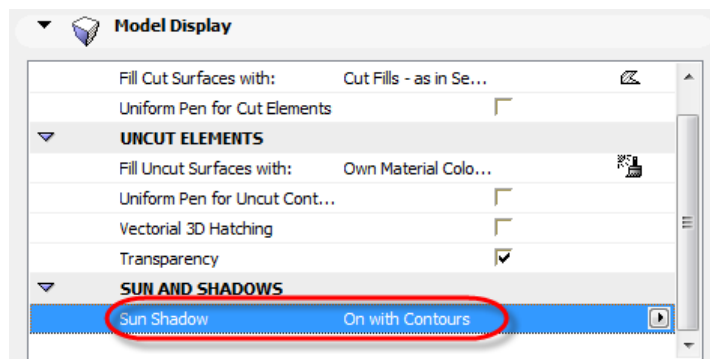
- Give the View a name: **Plan Shadows**



- Right click in white space of this new view and hit **3D Document Settings...**



- Within **SUN AND SHADOWS > Sun Shadow**, choose **On with Contours**



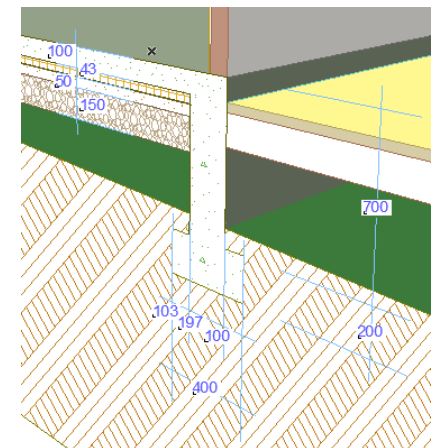
- Use the **Text** tool, and **Dimension** tool to add additional information.



- You can then save this as a View to issue in your documentation.

3D Documents are really useful for a variety of uses including:

- Sun Study
- Shadow Analysis
- 3D Details
- Axonometric setouts



Module 16 – Rendering

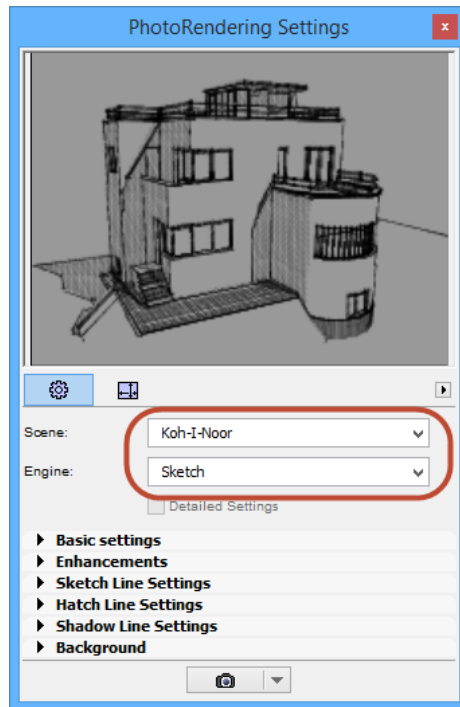
Rendering just got a lot easier & better with ArchiCAD 18, its scalability means that you do not need to adjust complex settings to produce a high quality render. However fine-tuning a render to get top quality renderings takes time, patience and experimentation.

In this module you will learn a few basics and then get on with some experimenting!

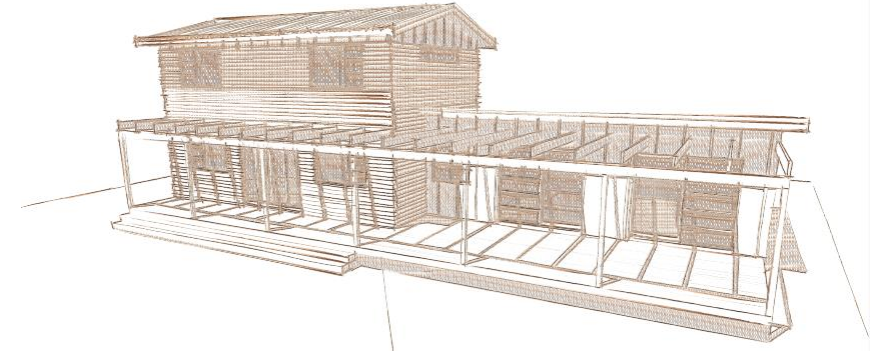
We explore both the Sketch Rendering Engine and the new CineRender Rendering Engine.

Sketch Engine

- Bring up the **NE 3D View** you saved earlier in the course.
- Open the **Document > Creative Imaging > PhotoRendering Settings** palette
- Set the following:



- Click the **Camera** icon at the bottom to Render.
- Rendering can take a while because it a complex process - shortly you should see an image



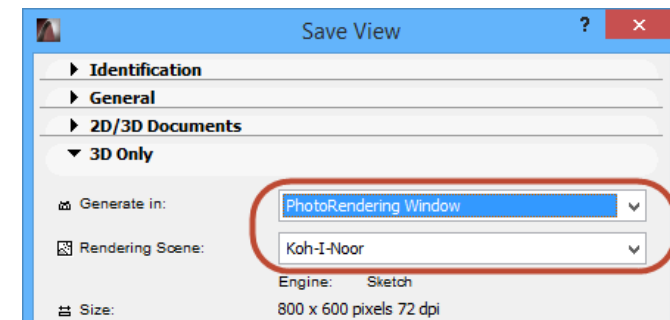
PhotoRendered Images can be Saved in a variety of industry standard image formats (for example tiff, jpeg, etc) simply hit **File > Save as...**

You can even place renderings onto you Layouts by saving a View.

- Give it a try – in the 3D view click Save Current View icon in the View Map:



- Then in the 3D window settings of the View set it to your desired Render Scene:



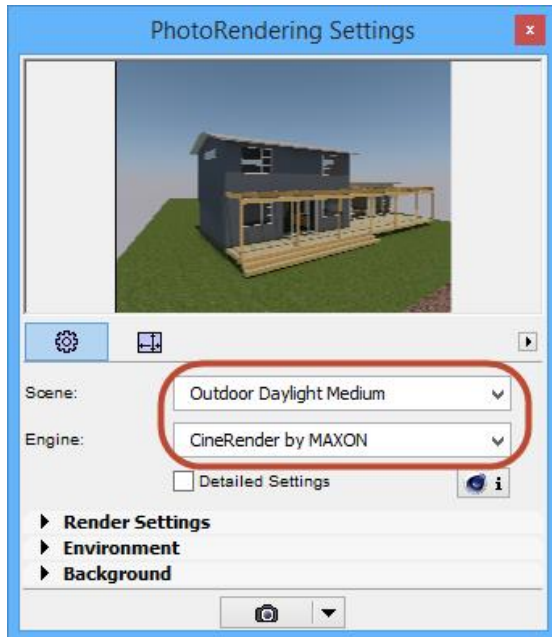
- Experiment with different 3D View points and different Sun Settings
- Try different rendering styles by adjusting the **Basic Settings** within the **PhotoRendering Settings**.
- For even more control explore: Enhancements, Sketch Line Settings, Hatch Line Settings and Shadow Line Settings.

CineRender Rendering Engine

The **CineRender** engine was introduced in ArchiCAD 18 based off the technology found inside **Cinema 4D** and is used to produce more photo-realistic renderings of the model.

Let's just see what the default Render looks like first before we get into setting it up.

You should still have the **Photorendering Settings** palette open. Change the scene to:



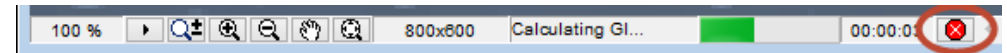
You can get a quick preview of the Render by hitting the **Refresh** icon in the Preview window of the Photorendering Settings palette:



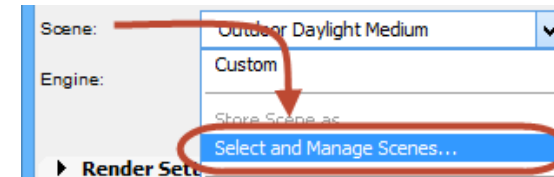
As soon as you're happy with the result click the Camera Icon to get a full Render:



This will take a minute or two to render. It renders from the centre of the image to give you an idea as soon as possible of the quality of the render. If it is not turning out well you can just click the **Stop** icon at the bottom to adjust the settings and try again:



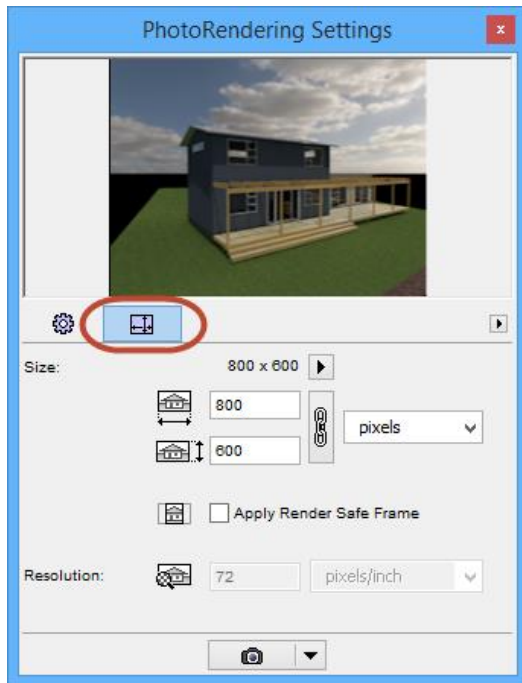
These pre-installed **Scenes** help you create a large variety of appearances of your model without ever having to adjust a settings. Click the drop-down menu at **Scene** and choose:



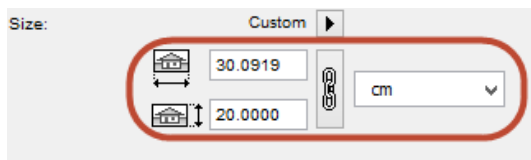
Choose another scene from the Outdoor folder and render this to see the different options available without ever having to change a setting:



OK lets get into the settings now to show how its set up. First the size of the render. Click the **Dimension** tab at the top of the Photorendering Palette:

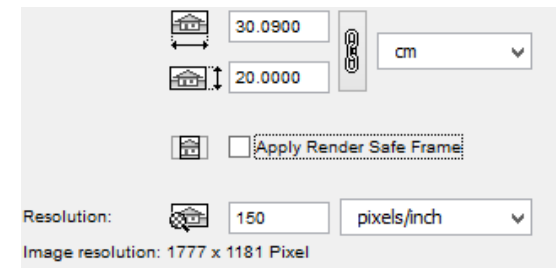


So this is the size it is rendering. Pixel size varies between computers depending on the screens resolution so this can be difficult to calculate. If you click where it says '**pixels**' and change this to '**mm**' you can set the physical size of the image:



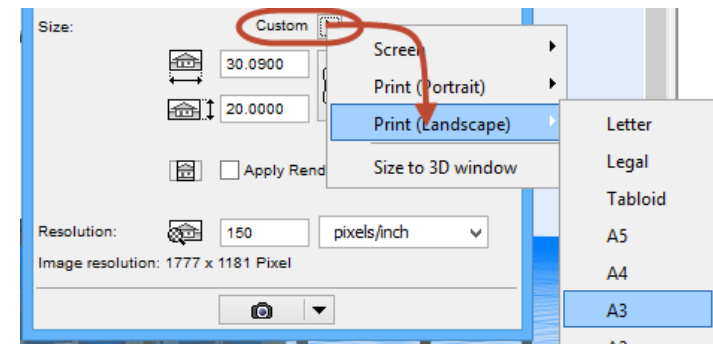
Now when you set the size of the image you can now set its **Resolution**, this is the amount of pixels in the size you've determined. It will be **72 DPI** by default as this is the resolution of most computer screens and is good to get an idea of how the Render will look.

150 DPI is really as high as you want to go for high quality presentation renders as this is the best a normal printer can print and the computer screen will now show all of the detail. By increasing the DPI the time taken to render is increased accordingly so best kept low.



With the new settings you will get a high quality Render for presentation purposes.

To help with this there is a range of default sizes available up top you can easily choose:

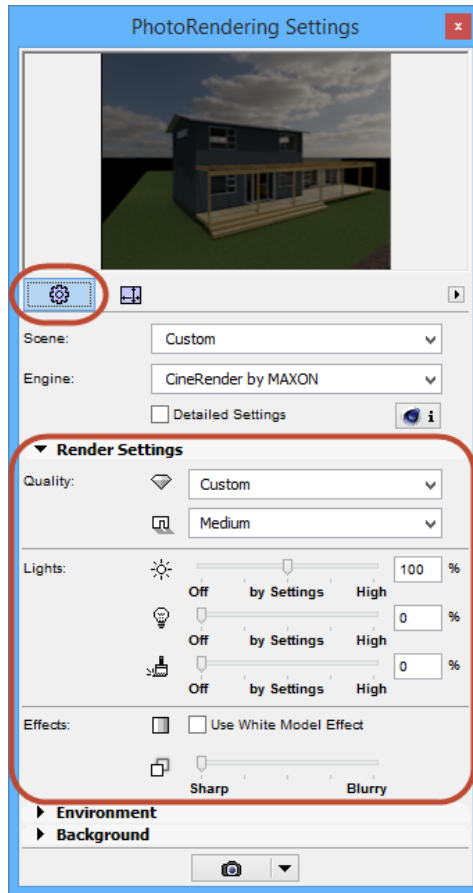


The **Apply Render Safe Frame** option ensures that what you see on the screen is exactly what is rendered by greying out any part that will not fit in the ratio of your render:



If this is turned off it will render outside your screen to fill the extra space of your ratio.

Now that we've got our size of the Render correct let's look into the actual Render settings.
Go back to the **Settings** tab Expand the **Render Settings**:



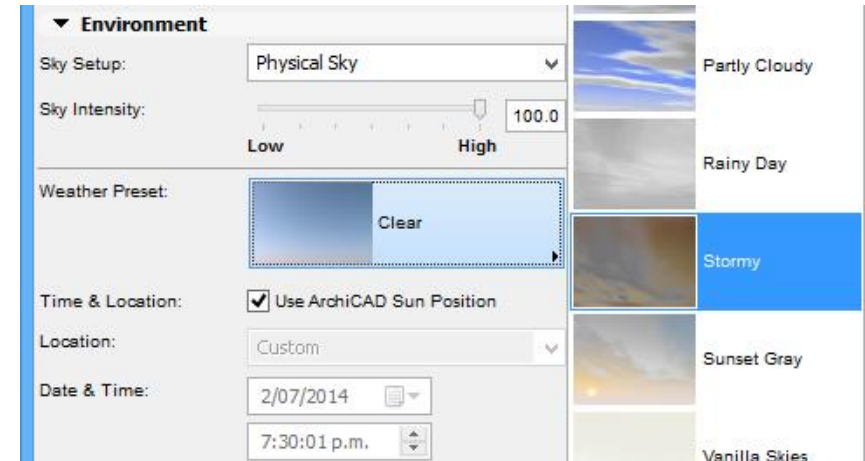
These settings will be defined by the **Scene** you chose at the top of the Settings, as soon as you change these it will change to a **Custom** scene.

Here you can control:

- **Rendering Quality**
- **Shadow Quality**
- **Light & Sun intensity**
- **Effects**
- **Depth of field**

Now within the **Environment** section of the palette can define the **Sky** & weather in your render and the position of the sun:

You can choose from a large range of **Physical** or **HDRI** skies:

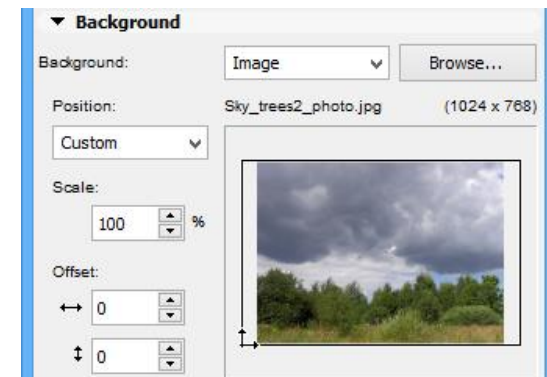


Physical Sky = models a sky to provide accurate lighting in accordance with weather

HDRI Sky = provides a HDR 360 image to provide background & lighting.

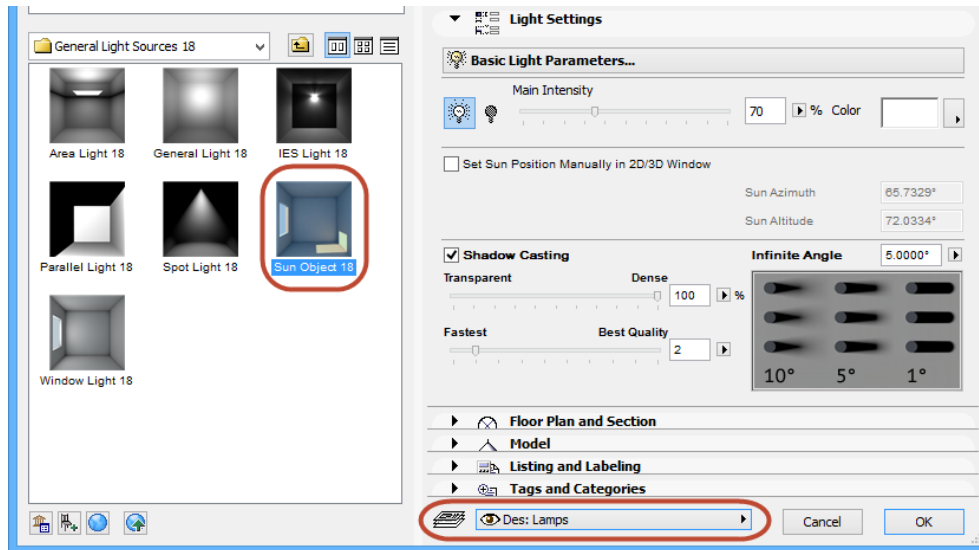
You can also change the Sun's position to give you a render at an exact time of day. It will list the time we set previously when creating a Sun Study, but you can set this to be independent as we will likely do a Sun Study in winter & a Render in summer.

If you choose to have **No Sky** you can import your own image of the context of your site under the **Background** tab of the Photorendering Settings Palette.

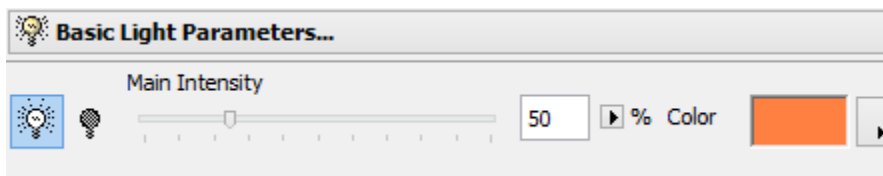


ArchiCAD 19 comes with a range of **Lamps** which are optimized for the CineRender engine, this will help provide more accurate lighting conditions which can be controlled.

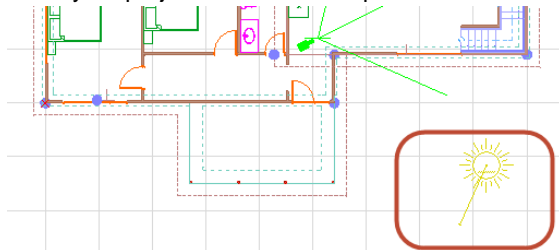
Open the **Lamp Tool** for the More Toolbox and choose **Sun Object 19**:



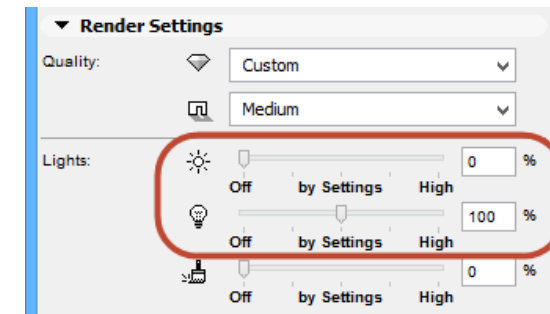
As you can see you can control the **colour** of the sun to set its warmth and the shadows it creates. Let's create a sunset which will have a warm colour but low intensity:



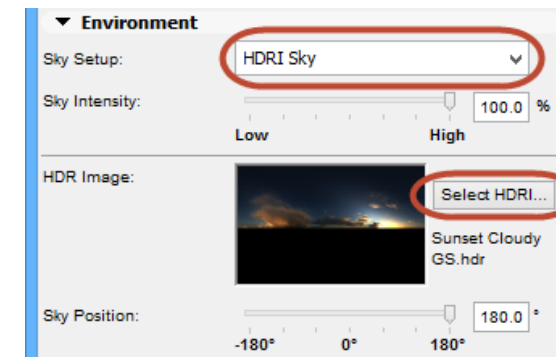
Place it off to the side of your project. ArchiCAD will put the sun in the correct position in 3D:



Now back in the Photorendering Settings palette let's turn the ArchiCAD **Sun** down and turn the **Lamp** tool up which will give us more accurate lighting effects.



We will then change the **Sky** to be something more appropriate, let's try a **HDRI** sky now which encompasses the light quality and intensity as part of the sky image as well:

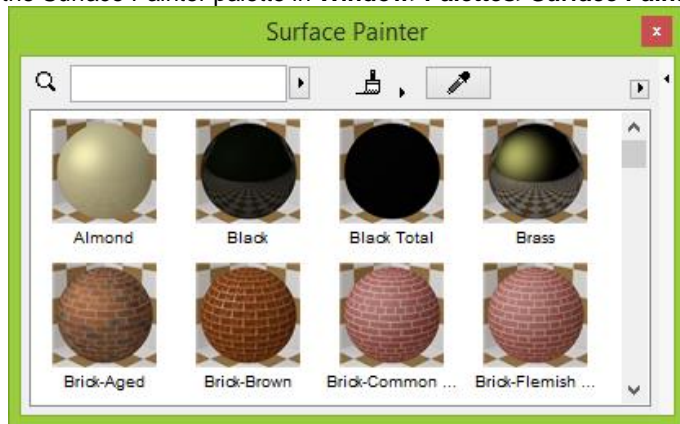


I've chose 'Sunset Cloudy GS.hrd' from **ArchiCAD Library 19>HighRes Luminance 19**

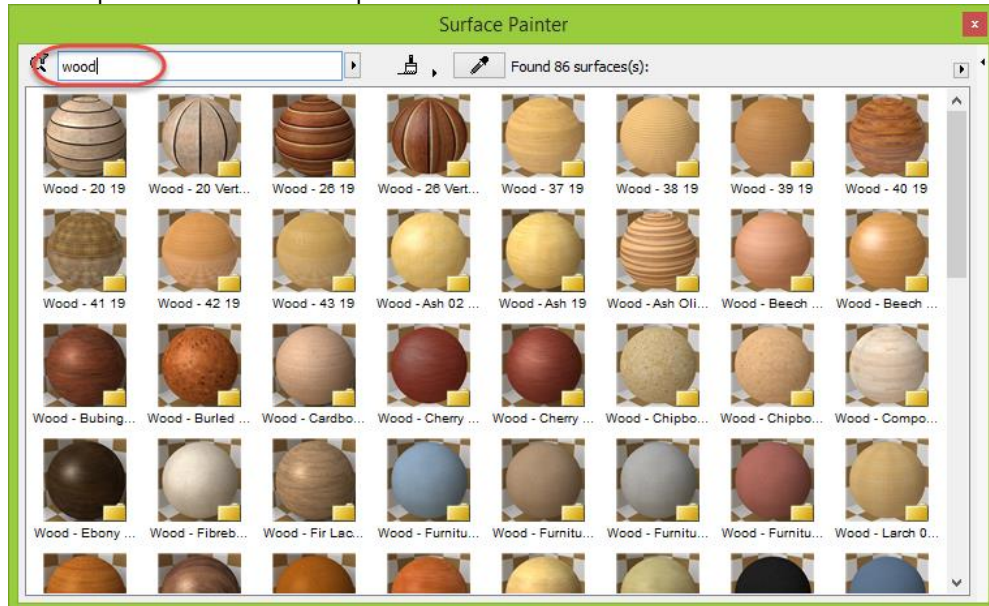
Once you've set this click the Camera icon at the bottom of the PhotoRendering palette. Now you can tweak the settings to get the effect you are looking.



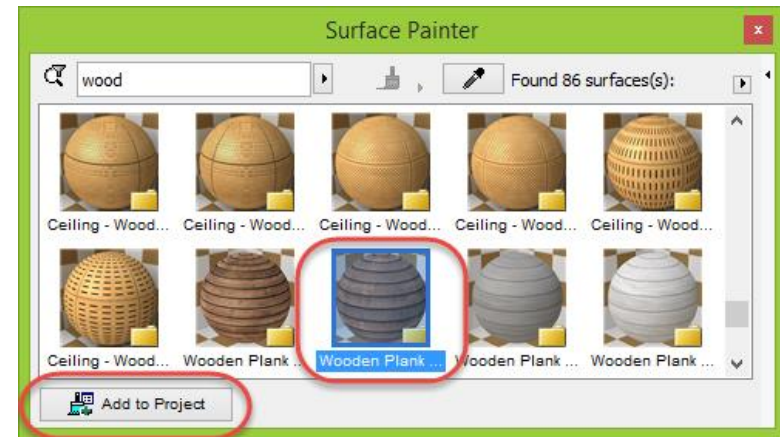
Lastly we will look into the Surface settings of the surfaces used in our render. This is all the surfaces we see when rendering. A new feature of ARCHICAD 19 will be extremely helpful for this, open the Surface Painter palette in **Window>Palettes>Surface Painter**:



Here we can see all our Surfaces in our project & catalogues. We are going to replace the Surface used on the Northern Pergola with a different decking Surface. At the top of the Surface Painter palette search for **Wood**:



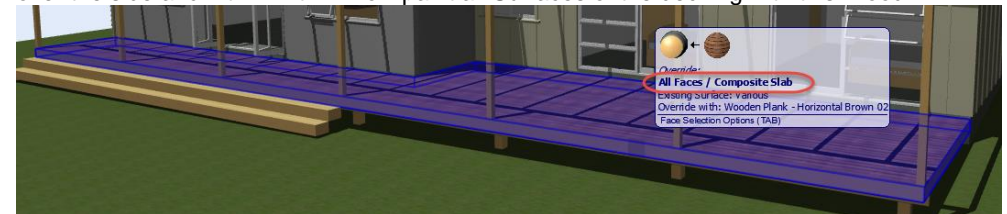
The folder icons show Surfaces that are part of the additional Surface Catalogues provided with ARCHICAD 19, If you select one you will need to click 'Add to Project' to add this Surface to your project to be able to use:



Now click the click to activate it and if you move your mouse onto your model you will be able to paint the surface of any element. Click the top of the decking:



We will want to change the side surfaces as well so rather than click every face if you hover over the side and hit TAB it will now paint all Surfaces of the decking with this Wood:

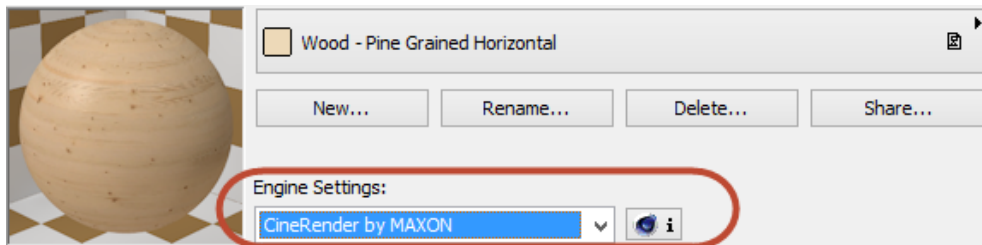


Also change the two steps using the same method.

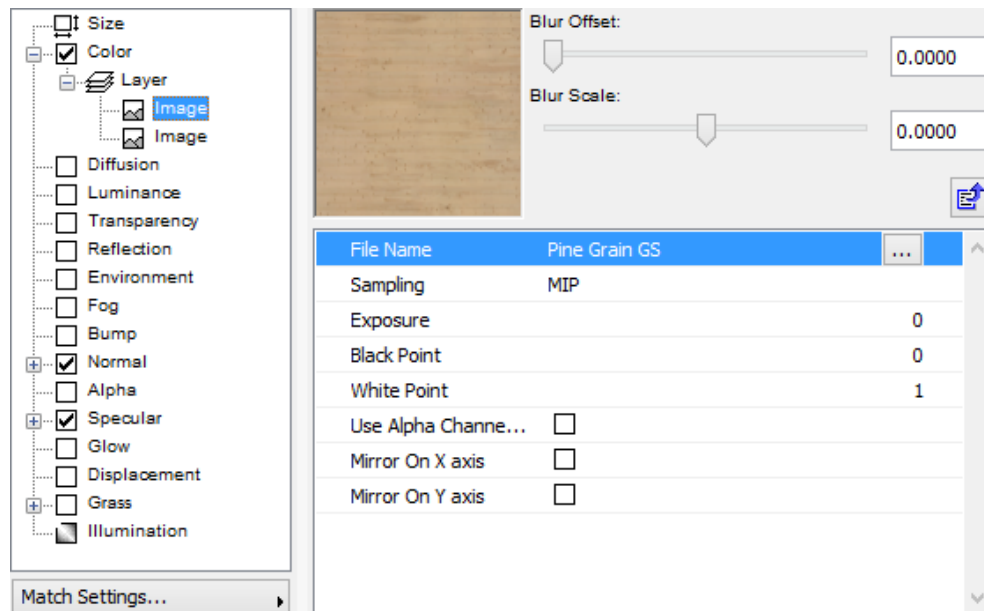


We can also easily access its Surface settings by double clicking the Surface within the Surface Painter palette.

Each Surface has its appearance set in the normal 3D window using OpenGL settings. However we are more concerned about their appearance when rendering so change the Engine Settings to **CineRender by MAXON**



Here you can see all of the different settings that define the appearance of each surface:

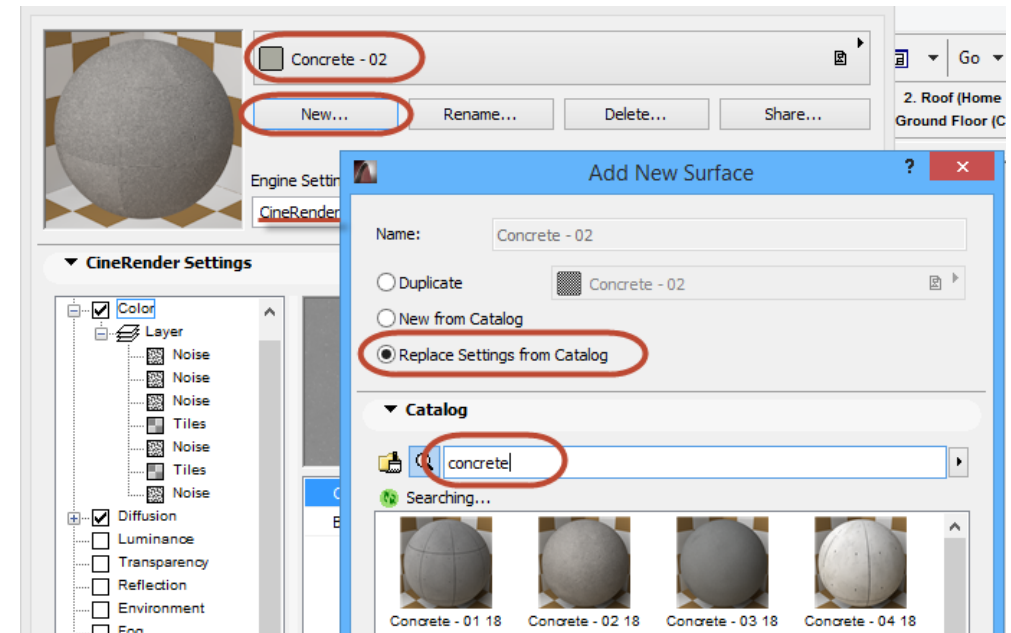


These are quite complex and go beyond the time we have in training. If you want to read more about each of the settings and what they control you can read more here:

<http://helpcenter.graphisoft.com/guides/archicad-19-int-reference-guide/user-interface-reference/dialog-boxes/surface-settings-cinerender/>

This is largely unnecessary now as ArchiCAD now comes with a large **Surface catalog** on top of the **140 Surfaces** you currently see. You can add these additional Surfaces to your project to use or replace Surfaces you are currently using with ones from the catalog.

We are going to replace the Surface settings of our foundation to look more realistic. Choose **Concrete 02** then click **'New'** and **'Replace from catalog'**



You can then just search for any surface you want and choose the most appropriate one. With over 800 Surfaces available we have everything we need right out of the box!

Once you've done that click OK and the Surface appearance of your foundations should update. Simply click the Camera icon at the bottom of the PhotoRendering palette now:



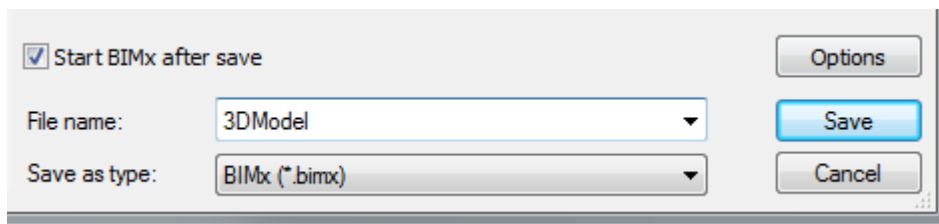
BIMx

Renders have traditionally been used to convey architectural designs in a more visual method than plans which can appeal to clients. However they can not interact with the model to see other parts.

BIMx has been a feature of ArchiCAD for several years, but for Version 17 it was included as part of the install for free! This is an extremely powerful tool at all stages of the project from helping with the sales process to the build on site.

Saving a BIMx file

To save a BIMx file it is as simple as **File > Save as while** in the 3d window and choose BIMx from the list of format types:



The checkbox for '**Start BIMx after save**' will auto-launch the program so you can preview the BIMx model before sending it out to your client.

The BIMx application

BIMx is installed automatically with every ArchiCAD installation and you will find its icon on your desktop. It will automatically launch once you save your file & open where you were looking at the model from the point you saved it:



The model will behave much like **Fly-Through** mode in ArchiCAD. The mouse is where you look and the arrow keys is where you move, much like a computer game. So to walk forward you look forward with the mouse & press the **UP** key.

Useful Shortkeys

- I** = info, you can find out the name, size & layer of any component on the model
- O** = outlines, this draws a thin black line around all edges for better clarity
- M** = measure, you can measure the distance between any 2 surfaces
- F** = fly, this works exactly like fly-through mode where you can fly through walls
- SPACE** = jump, you may need to jump onto the Pergola, you can walk up steps
- ESC** = menu, this will allow up to upload, shade & see the rest of the shortcuts

Sending it to the client

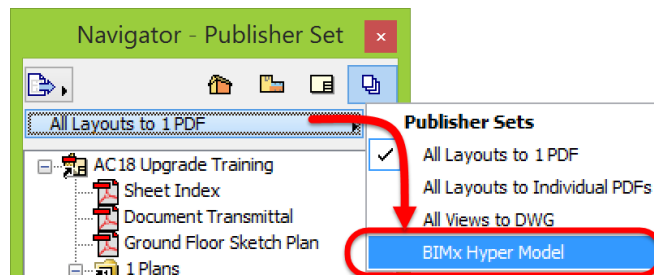
You can either use this as the medium to discuss the proposed building in a meeting keeping you in control or send them to the file, the file you just saved is around only 1MB making it easy to email. Alternatively you can create an account with Graphisoft to upload the file to cloud storage & able to send your client a link to download it from.

It can then be viewed on a PC, Mac, Ipad, Iphone, Android phone by anyone.

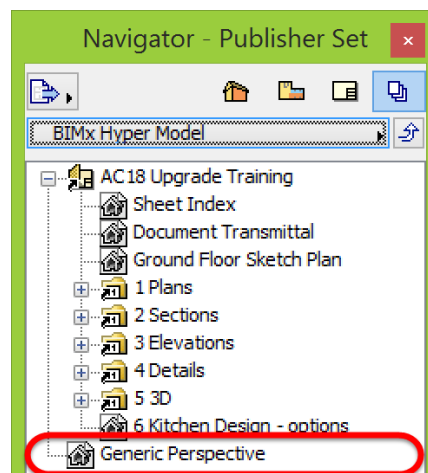
There is also a '**Hyper-Model**' function to BIMx. This not only exports the **3D model** as a BIMx file but also all of the **Layouts** associated with it so you have a full set of working drawings which can all be accessed via the 3D model or the same folders you created in your Layout Book.

BIMx Publisher Set

This is all done with the **Publisher** and to make life as easy as possible we have created a Publisher Set to do just this in the standard NZE template. **Navigate to the Publisher** and at the top where it says '**All Layouts to 1 PDF**' change this to '**BIMx Hyper Model**':



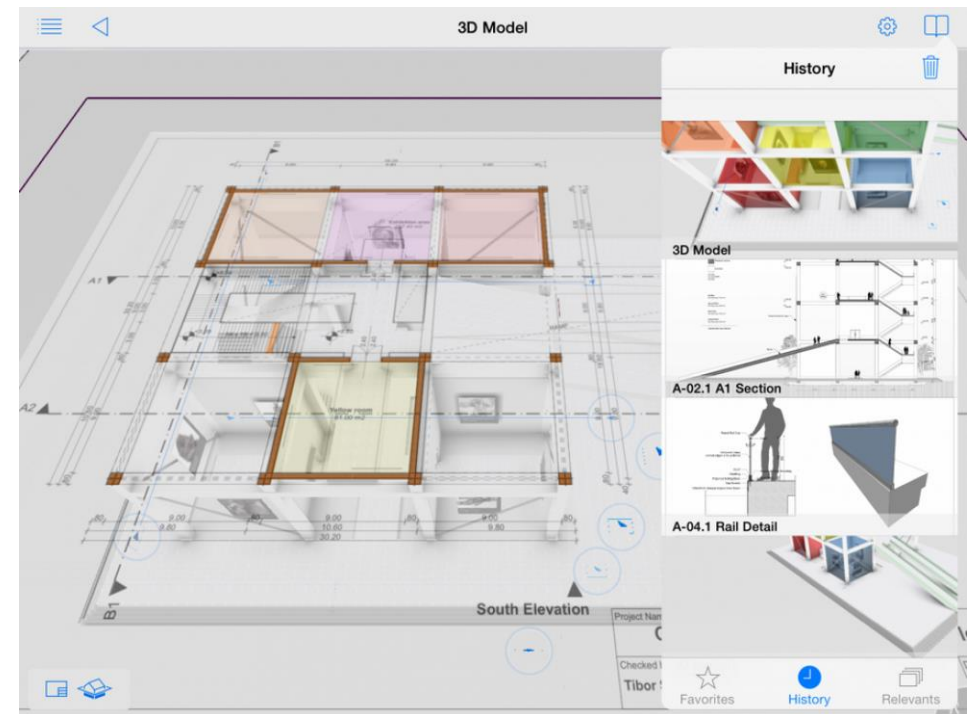
As you can see there is 1 3D view and the entire contents Layout Book including the subset folders so they are neatly organised when opening the BIMx file on another device:



The 3D view **Generic Perspective** is the 3D model that will get exported and how the model will appear when first opened, so it's best to have this View set correctly to give the client the best possible first impression when opening up and seeing their design.

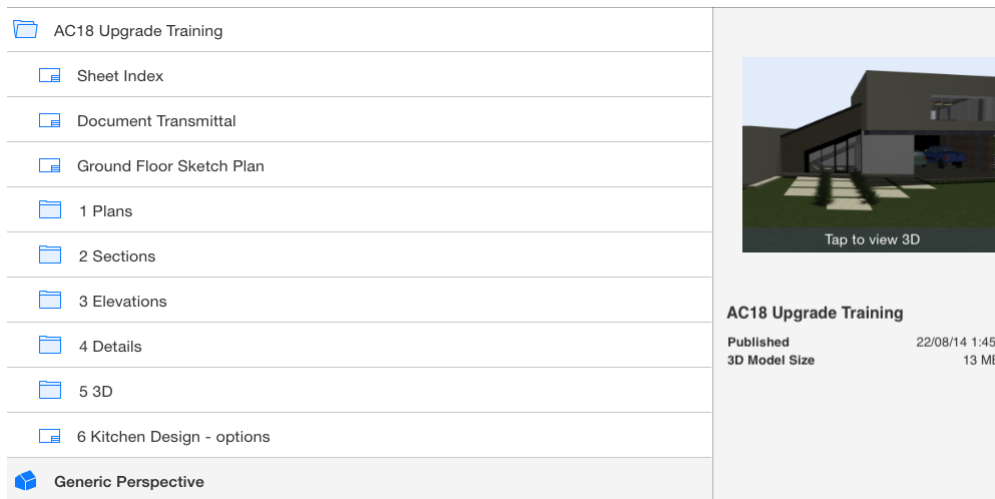
The rest is just a duplicate of the Layout Book, but you can add particular Layouts if you want rather than the whole Layout Book.

BIMx Hyper Model functionality is available on portable devices currently so you can view it on any smartphone like iPhone or Samsung but it looks a lot more impressive on an iPad or Android tablet.



If you save a BIMx Hyper Model on your computer you will still be able to view the 3D model but will not be able to access the Layouts.

When the BIMx model is downloaded and viewed on a Tablet device they will be shown the exact same format that you had set up in your Publisher Set:



Around your 3D model will be a series of **Blue Markers**, these are where your Views have been generated from and what is on your Layouts and would do exactly what you expect. The Markers you will expect to find around your 3D model are the **Plans**, **Sections** and **Elevations**. So for example if we click the Blue Icon that appears to slice our building you will get a small preview of the Layout that is linked to that Marker:

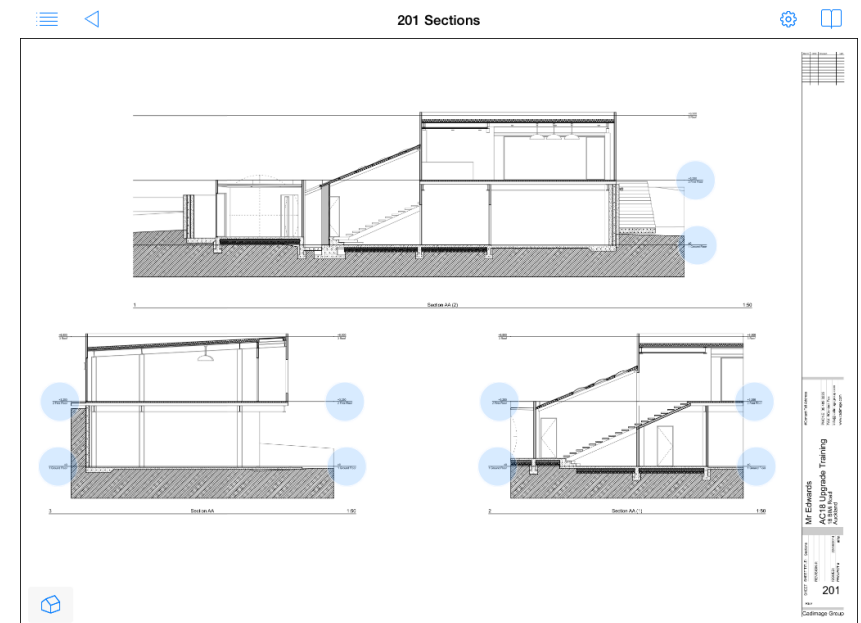


If you choose 'Show in 3D' it will show a ghost of the **Layout** in the **3D** model:



But if you click **Open** you will get a smooth transition as the model spins to an appropriate angle and peels back to reveal the **Section** & the **Layout**:

It then zooms in so you are only left with the **Layout**:



Appendix

This additional information is provided to show some alternative methods of creating ArchiCAD BIM data.

Site Modelling	pg 145
Details direct onto Layouts (Linked Markers)	pg 151
Renovation Tool	pg 154
Layer Appendix	pg 156
Pen Table	pg 158
Mac Shortcut Keys	pg 161
PC Shortcut Keys.	pg 163

Site Modelling

In this section we detail the second method of creating a Terrain Mesh in ArchiCAD.

Modelling from a Surveyor's DXF/DWG.

In the course we cover the method for Certificate of Title as it is a common workflow & suits for the time constraints of this course, however quite often you will find that you will need to engage a Surveyor and will subsequently receive a DWG from them with all the information on it. In this section we show how you can use this method. There are also several useful YouTube videos on this top you could watch also.

Importing survey information

You can import DXF/DWG info in three ways:

Merge

Use **Merge** if you want the incoming content to be fully editable. **File> File Special> Merge...**

This will bring in all the layers, line types, line styles, fills etc associated with the DWG and add them into your project. All lines are individually editable. If at some stage you finish with the DWG content and wish to remove it you can only delete it, but all the attributes remain.

This method can be great for details and such, and usually the Merge happens into a special detail template, and the purpose of the merge is to strip out all the DWG layers and clean up the detail so that it only has the ArchiCAD Attributes we want (Layers, line types, fonts etc)

Place External Drawing

Use **Place External Drawing** if you do NOT want to change the content at all. **File> External Content> Place External Drawing...** All you can do with this information is move and scale as one entity. When using this method the Default Settings of the Drawing Tool are used to place the DWG.

Attach Xref

Use **Attach Xref** if you only want to be able to turn layers on and off. **File> External Content> Attach Xref...**

Bringing the content in as an Xref means that when you **Detach** the Xref all the attributes (line types, line style, layers etc) associated with that Xref will be removed along with it.

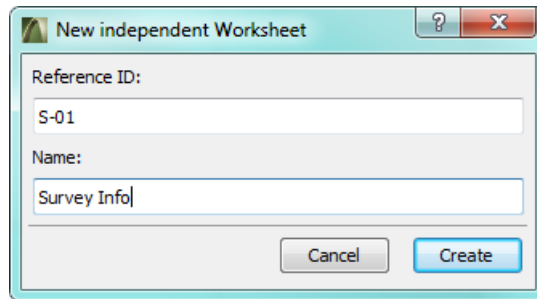
Attaching as an Xref also stores the Xref Layers in a separate part of the Layers list, and these layers can be hidden.

Xref content cannot be scaled or rotated once in the project, so you must set your scale and rotation through the Attach Xref dialog.

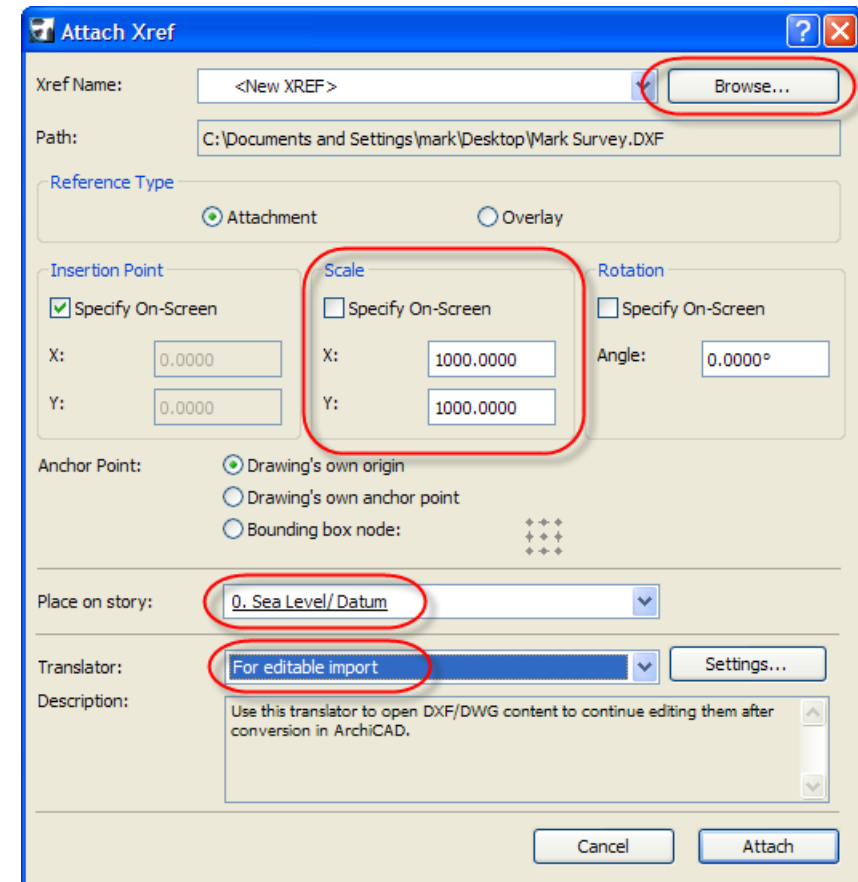
For this Workflow we will **Attach** the file as an **Xref**. Having the surveyor's file as an Xref groups the layers prefixed with the name of file in the Layer List, and cleans up all attributes associated with the Xref when it is removed.

As the surveyor's drawing is an external document we are going to store it in an *Independent Worksheet*.

- Right Click on the **Worksheet** tree in the Project Map and choose **New Independent Worksheet**.
- Give it an appropriate **Name** and **ID** and click **Create**.



- Select **File> External Content> Attach Xref**
- Browse for the Surveyor's file then click **Open**.
- When selecting a scale factor we need to know what scale the surveyor has used, typically this is 1:1 but as surveyors use meters rather than millimeters, we set the x & y scales to **1000**.
- Place on **Story 0 (Sea Level/Datum)**
- Set Translator to **For editable import**



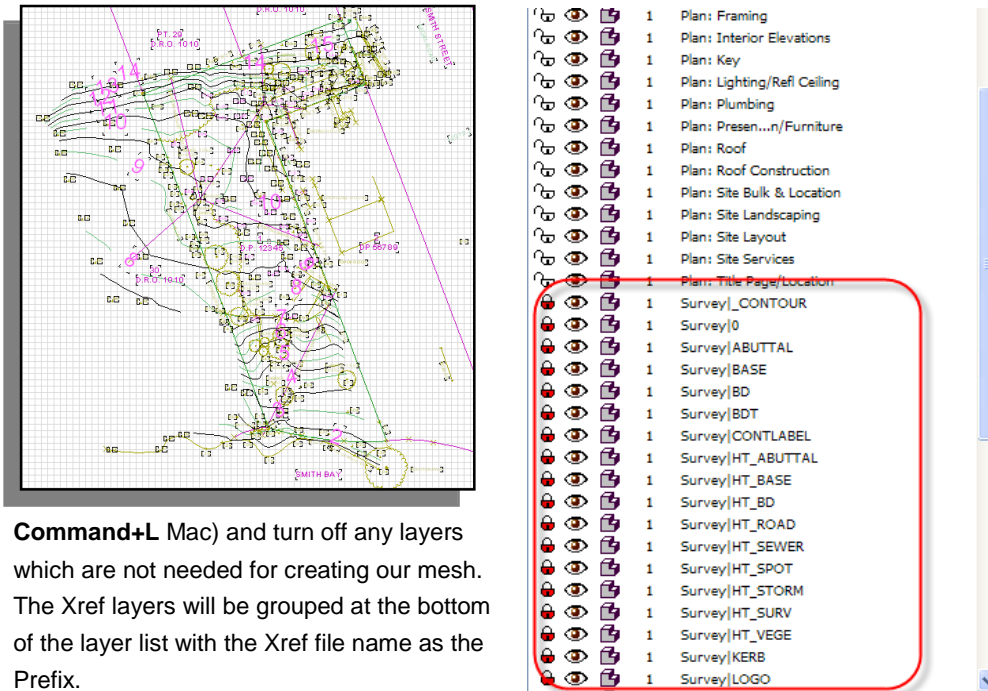
Use the **Fit in Window** to locate the survey; it maybe a long way from your project origin.

- Double-click on your mouse wheel
- Or hit the **Fit in Window** button at the bottom left of your workspace.



Once you have successfully imported your survey plan, you may find (as shown here) that there is extensive detail, text and lines making the plan very hard to work with.

To make things easier we suggest you open up the **Layer Manager (Ctrl+L PC or**



Command+L Mac) and turn off any layers which are not needed for creating our mesh. The Xref layers will be grouped at the bottom of the layer list with the Xref file name as the Prefix.

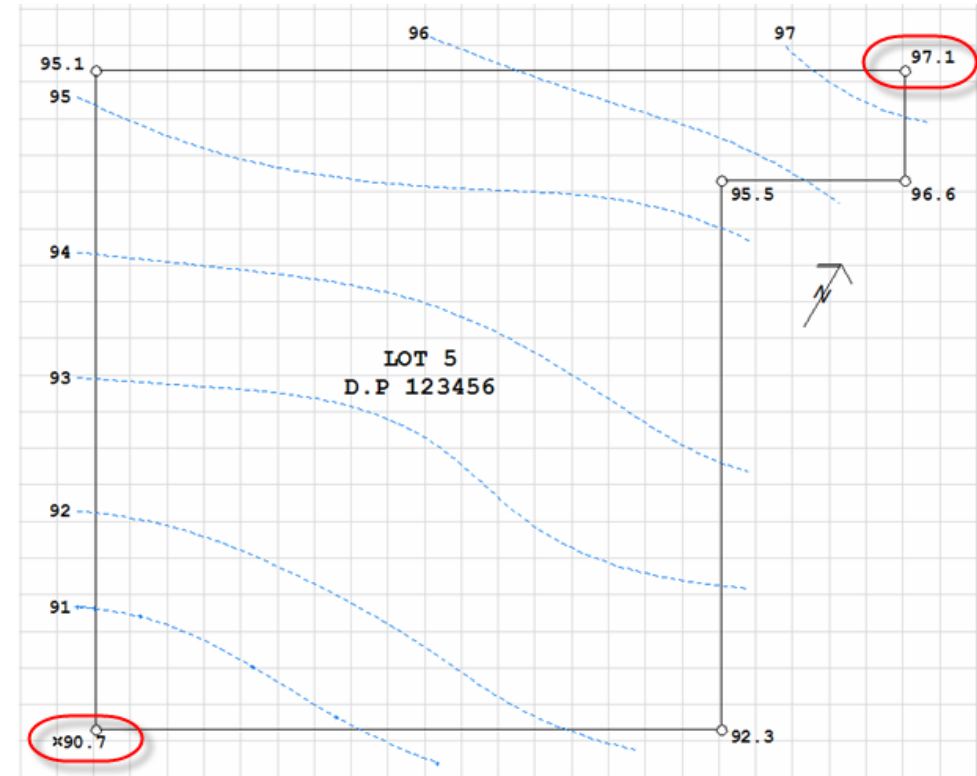
NOTE: If you are not sure of what info is on which layers, DO NOT turn any off.

Now Save a View of the Survey drawing so you don't have to remember this layer combination. You need to use a **Custom** layer combination as none of the Surveyor's Layers will appear in any of your pre-set Layer Combinations.

- Switch to the **View Map** in the Navigator
- Hit the **Save current View** Button
- The default Settings should be fine
- Click **Create**.

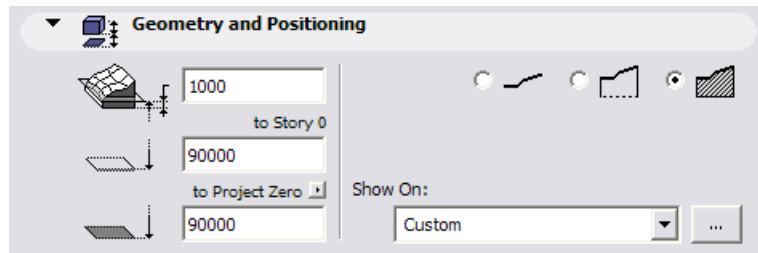
Creating you Mesh

Before you make the mesh, have a close look at your imported DXF/DWG and find the lowest level given on your site.



This particular plan has been measured relative to 'Sea Level' and has a lowest point of '90.7m above sea level.' Now we can set our Mesh start level based on this Low Point.

- Open up the **Mesh Tool** from the ToolBox
- Under **Geometry and Positioning** input your lowest site level. (Our lowest level is 90.7m so it is recommended you use the **nearest round meter** below your lowest level. In this case it would be 90m or 90000 mm).
- Enter **90000** to **Story 0**
- Click **OK**



This will elevate your mesh to or slightly below the lowest point of your site when you first model the shape. This is the first step to not creating a *Skyscraper mesh*.

- Navigate to your **Sea Level/Datum** Story in your Project Map.
- Change to your View Map and right click on your new saved Survey and choose **Show as Trace Reference**
- Set the Mesh Geometry Method to **Polygonal**

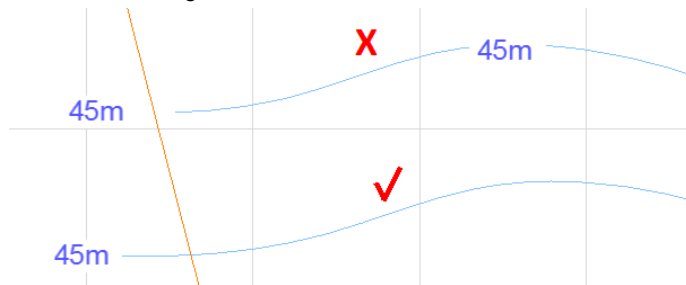


- Trace around the perimeter boundary of the site or, alternatively, you can **Magic Wand** the perimeter line of your site if the Surveyor has drawn the boundaries intersecting at the corners.

Adding Contours

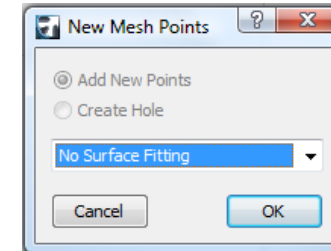
Once you have completed your shape you need to create your Mesh Contours.

NOTE: At this point you need to make sure the Contour lines drawn by your Surveyor are continuous across the site. I.e. they cannot be broken to display the contour height, also the need to cross the edge of the site.

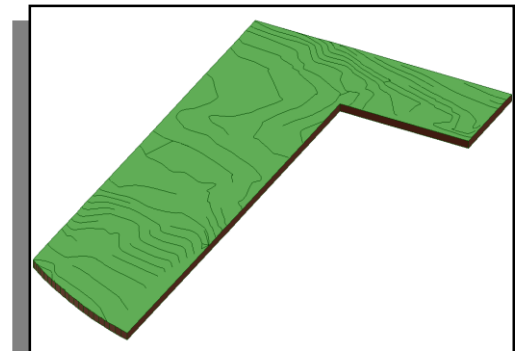
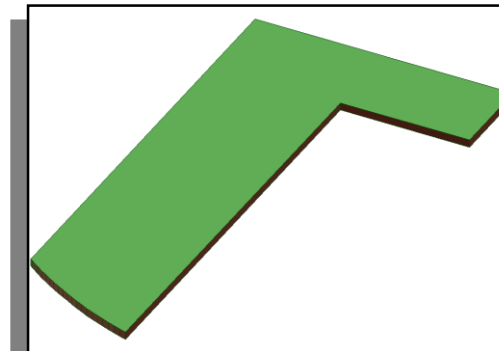


If the Contours are broken by text, or they do not extend to the edge of the Site you will need to retrace them with the **Spline Tool** (or request from the Surveyor that it is redone)

- Making sure that you are on the **Mesh Tool**
- Select the **Mesh**
- Use the **Magic Wand** (Space Bar) to trace over the Contours (or your new Splines) one-by-one.
- A dialog box will pop for each contour. Always choose **No Surface Fitting**.



TIP – It may be clearer to hide the Xref layers before Magic Wandering the splines.



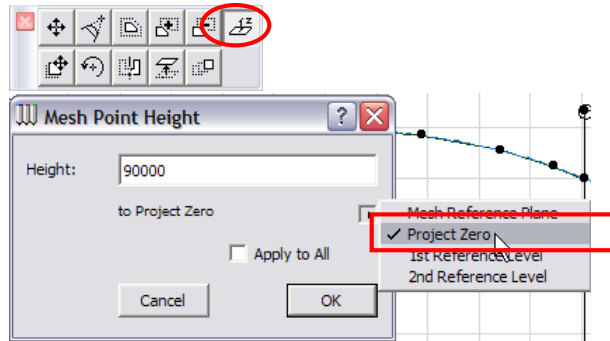
If you need to create Spot heights: with your Mesh selected, and the Mesh Tool selected in the Toolbox, set the mesh Geometry method to Polygonal and double click on the Spot location. As before, choose **No Surface Fitting** and click **OK**.

A new Spot will appear on the flat Mesh.

The next step is to give your mesh height by selecting a contour, spot height or corner node

- With the **Mesh** Selected and the **Mesh Tool** highlighted
- Click on a black height spot (this could be an individual spot, a spot that is part of a complete contour line or a corner spot) and choose **Elevate Mesh Point** from the Pet Palette.

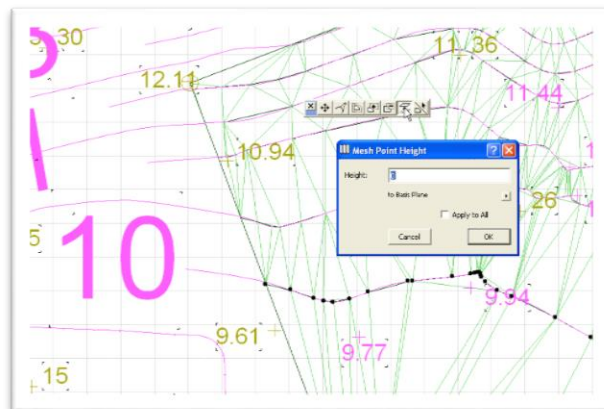
- At this point it would be a good idea to turn back on the layers containing the spot and contour level labels from your surveyor's plan.



- In the **Mesh Point Height** dialog set the height to measure from to **Project Zero** rather than the default *Mesh Reference Plane*
- Input your survey level e.g. 90000, 91000 etc, and be sure to tick **Apply to All** if you are editing a complete Contour line.

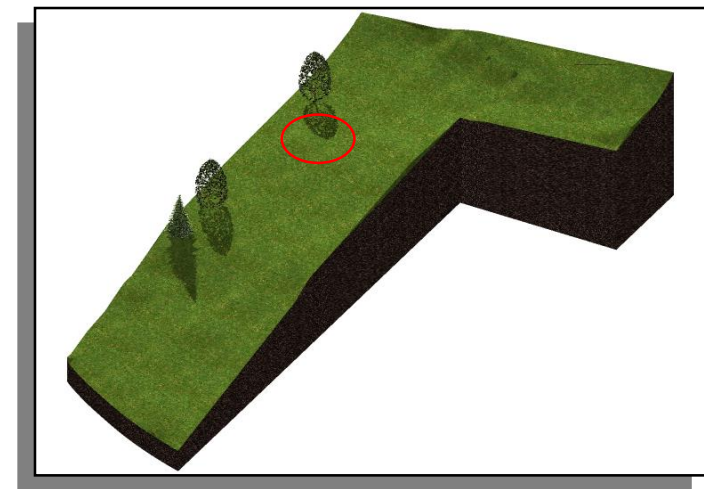
Important: You must ensure you are measuring relative to **Project Zero** because this is our datum and it allows us to put in the true survey levels. If you measure from 'mesh reference plane' the levels you put in will measure from the top surface of the mesh and you will end up with a 'Skyscraper mesh' as mentioned in page 66.

You may find in some instances end nodes that sit on the intersection point of a contour line and the boundary of a mesh may sometimes require individual heights allocated to



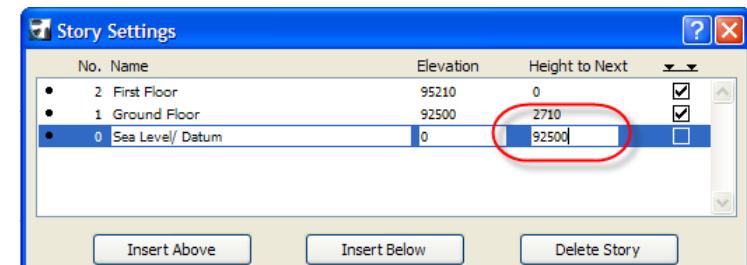
them too. It is a good idea at this point to view your mesh in your 3D window to determine which mesh points are still sitting at zero and need to be edited.

Once all mesh points and contours have been given heights you will now be left with your three dimensional site mesh.



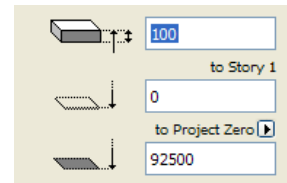
Setting up Stories

Now that your mesh is complete you can decide on the finished floor level of your building and set up your stories to match. From ArchiCAD's **Design** menu you can open up **Story Settings**.



Up until now we have been modelling our site and it has been on 'Zero Story' ArchiCAD's 'Project Zero.' Because this story has been used as our datum it should be named appropriately, in this case 'Sea Level.' Do not use this story for your Ground Floor as it will not be relative to your mesh. Put your desired Finished Floor Level height in the 'Height to Next' field of your 'Zero Story' and 'Insert Above' your Ground Floor. In this case we have set our finished floor level to be 92500 (92.5m) above sea level. By setting our finished floor level relative to sea level we are giving an accurate height corresponding to our surveyor's data.

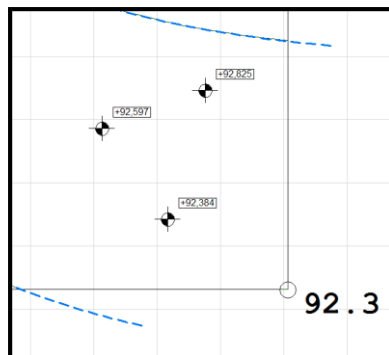
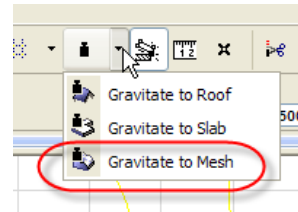
Under most of the modelling tools you will now find you can set a height relative to the story you're on or to your 'Project Zero'/'Sea Level.'



Relative Spot and Elevation Levels

Now that you have a mesh modelled relative to your Surveyor's data you can now generate your own spot levels that may be currently unknown.

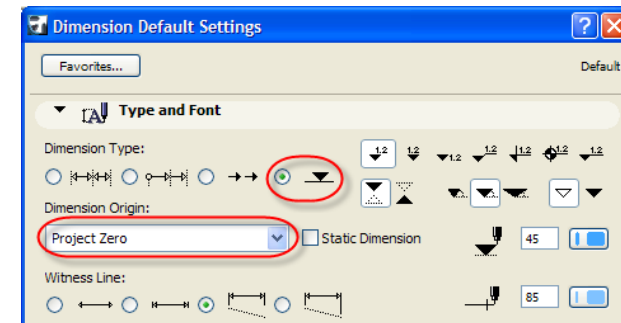
- Select the **Level Dimension Tool** from the ToolBox
- and from ArchiCAD's **Gravity** pulldown choose to **Gravitate to Mesh**.
- Now all you have to do is click on your mesh at the desired spot level locations and you will get 'relative' spot levels.



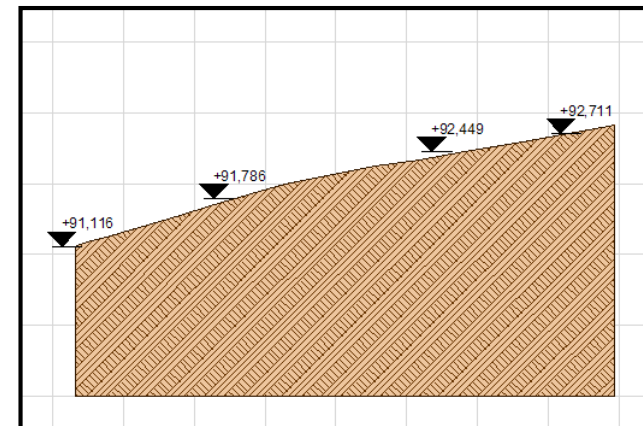
You can also place Elevation levels using the Dimension tool



- Go to a Section or Elevation window.
- Open up the **Dimension** Tool from the ToolBox.
- Set the **Dimension type** to **Elevation Dimension**.
- This will change the interface allowing you to set the **Dimension Origin**. Make sure it is set to **Project Zero** (Sea Level)



- Place the dimensions the same as you would with a standard dimension. Click on any point to dimension and then double click to finish. Now click the placement hammer to place the dimension label.



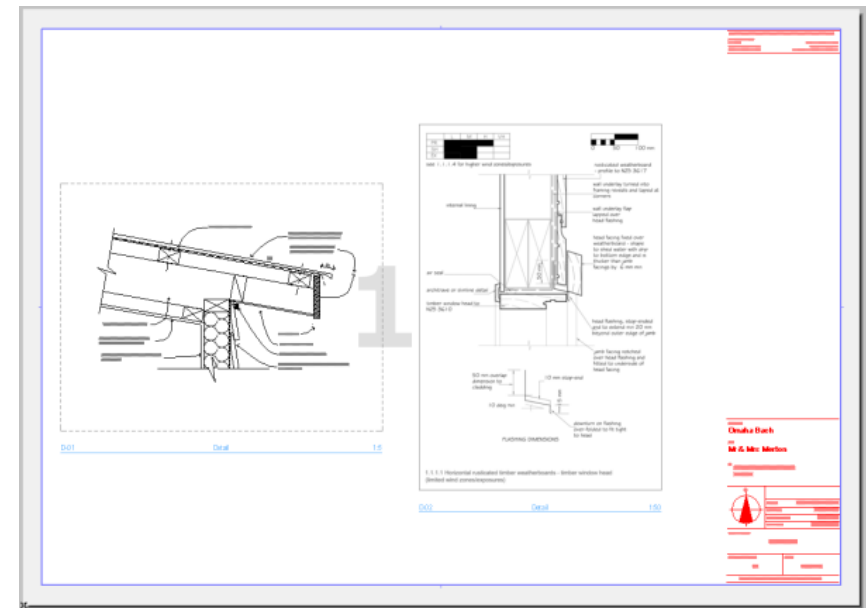
Details direct onto Layouts (Linked Markers)

Another way of getting Manufacturers or Consultants information into ArchiCAD is to place it directly onto the Layout. This process requires the use of **Linked Markers** (instead of Source Markers – which is what we have used in the main training booklet)

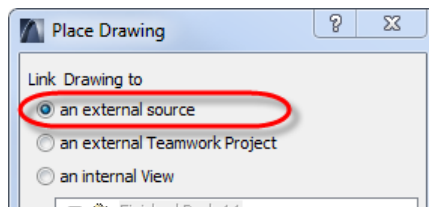
NOTE: Backreferencing will not work to Linked Markers, so for the most part the previous methods of adding details are preferred.

If you don't want to Backreference your detail information then you can use the following process.

- Open the **Layout** that you wish to place the detail.
- Click on the **Drawing Tool** from the ToolBox.

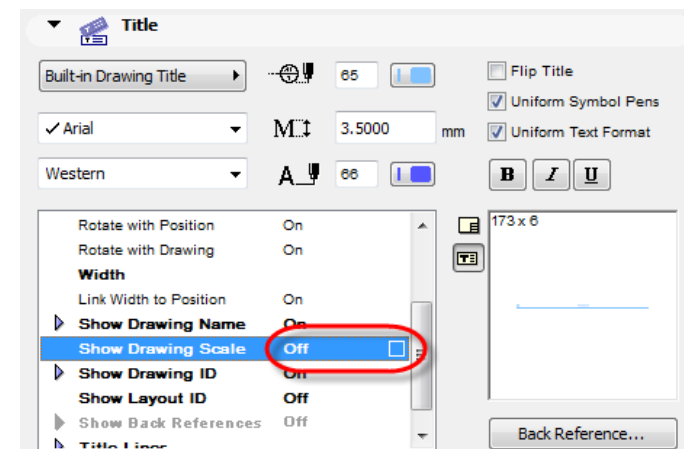


- Click on the **Layout** and you will be prompted with a File Dialog, select to link to **an external source**, and select **browse**.



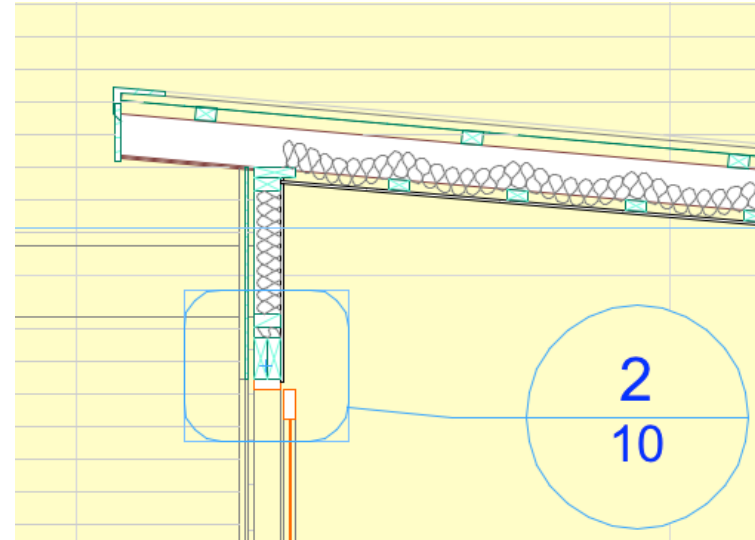
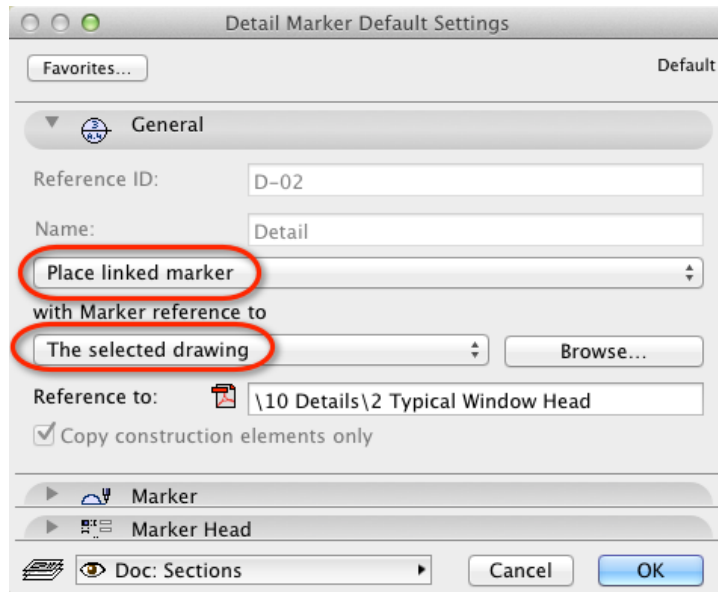
- Browse for your desired PDF
- The PDF detail will now appear on the **Layout**.

- Rename the PDF to something appropriate (**Window Head**).
- Edit the Title to not show the **Scale**

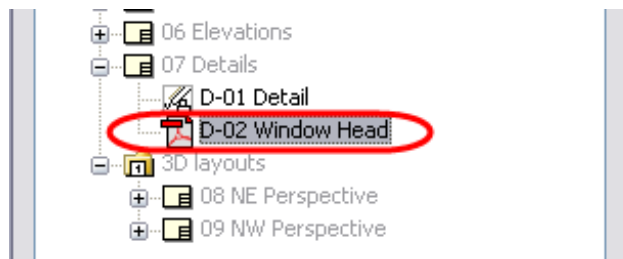


- Now we need to place a Linked Marker to the pdf detail.
- Use the **View Map** to open up your **Section**.

- Select the **Detail** tool.
- The Detail Marker Settings need to be set the **Place a linked Marker**, with the Marker referencing to **a selected drawing**.



- The dialog will prompt you to select the **Drawing**



- Place the **Detail Marker** around the window head it will automatically link to the drawing on your Layout.

Renovation Tool

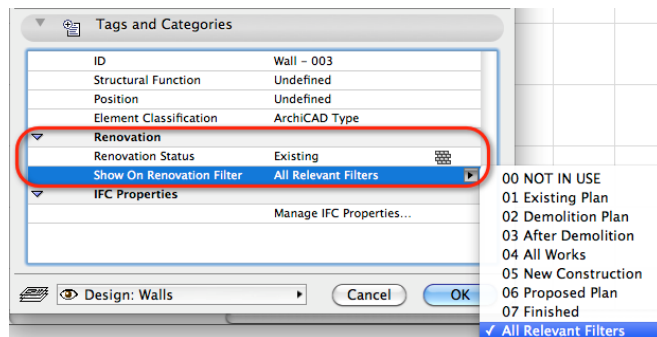
The Renovation Status was introduced to ArchiCAD in V15 to allow for efficient management of addition and alteration projects. Renovation Status is element based so no additional layers or layer combinations are required beyond the standard set of layers for a new project. There are three different Renovation Statuses; Existing, Demolished and New. Renovation Filters show, hide, or override the display of elements enabling the efficient production of documentation and communication of the project.

Renovation Status

The Renovation Status is by default set to Existing. The Renovation palette allows the default Renovation Status to be changed. *Grey Brick* for *Existing*, *Bulldozer* for *To Be Demolished*, and *Red Crane* for *New*

The third button overrides the typical display of elements this will from **All Relevant Filters** to *Pin* the Element so it only displays in the currently selected renovation filter. This is best used for annotation that is specific to the View that the Filter is used for eg demolition plan notes.

Both the **Renovation Status** and **Show On Renovation Filter** can be set in the individual element settings under **Tags and Categories** previously within Listing and Labelling.



Setting & Assigning Renovation status

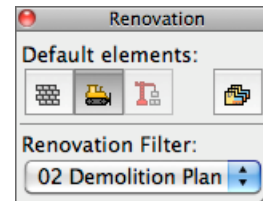
To get started with Renovation you just draw the existing conditions & then make the modifications involved in the project. From there you can assign each of those a status which allows ArchiCAD to automatically produce the documentation based on filters.

le: if we were to start demolishing items from existing house

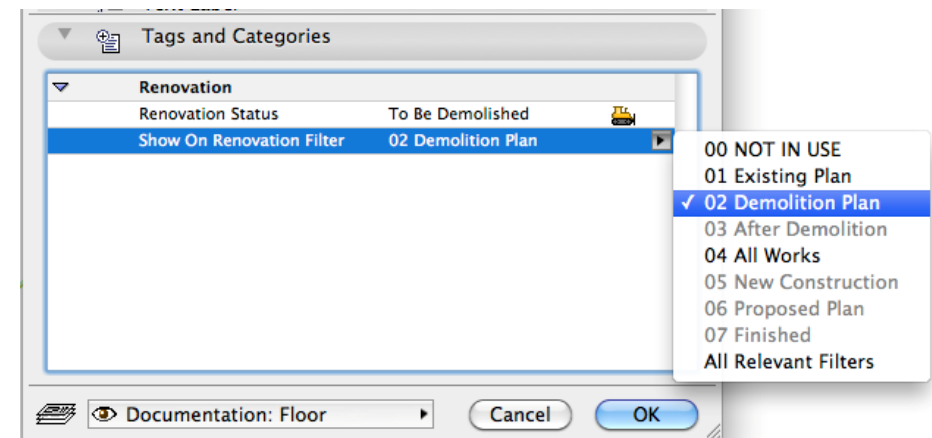
1. Open the **Renovation Palette** Window > Palettes > Renovation

2. Set the Renovation Filter to **02 Demolition Plan**

2. Select the elements that you want to demolish to allow for the new building and click the to be **To be Demolished Status** button (the Bulldozer!).

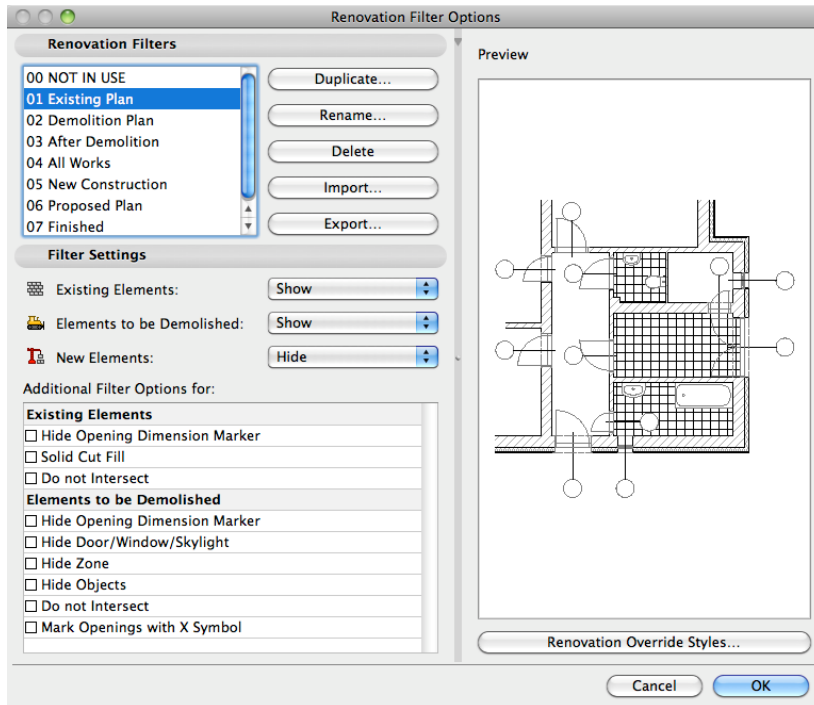


Any text or labels that you only want to appear in a certain view you can do this by opening their Selection Settings. In the **Tags and Categories** settings set their Renovation Status to **To Be Demolished** and Show On Renovation Filter to **02 Demolition Plan**



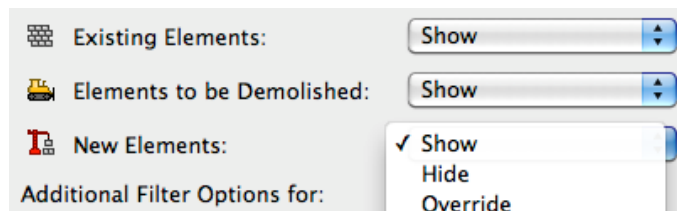
Renovation Filters

The renovation filters are defined in the menu **Document > Set Renovation Filter > Renovation Filter Options**. Renovation Filters are similar to Model View Options.



The Renovation Filters control the display of Elements based on the three Renovation Statuses; **Existing**, **Elements to be Demolished**, and **New Elements**.

For each of the 3 Renovation Statuses, there are 3 visibility options **Show**, **Hide** and **Override**.



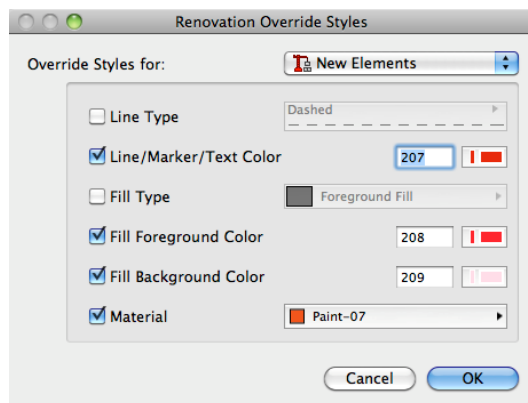
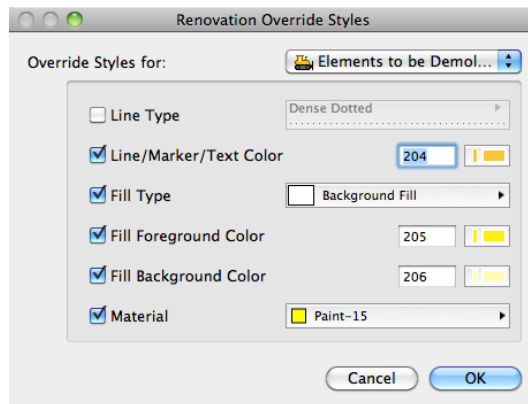
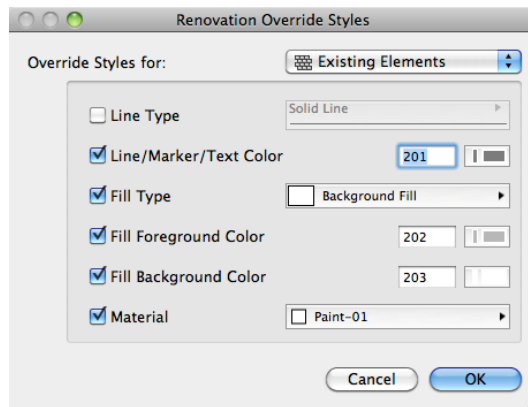
For the NZE ArchiCAD 17 Template we have provided 8 Renovation Filters

00 NOT IN USE	New projects, all elements displayed no filters applied
01 Existing	Existing Plan, all existing elements displayed including those to be demolished, no filters applied
02 Demolition Plan	Demolition Plan, displays Existing, and demolished elements with filter applied
03 After Demolition	Shows only existing to remain, used to communicate the demolition process
04 All Works	Shows all works with New and Demolished, used to communicate the renovation process by identifying Existing, Demolished and New
05 New Construction	Shows Existing and New with filter applied to New Elements used to communicate new construction
06 Proposed Plan	Proposed Plan, New elements use standard pens, Existing display with override filter.
07 Finished	New and remaining Existing elements displayed, used to for visualization / communication of the proposed finished design.

Renovation Override Styles

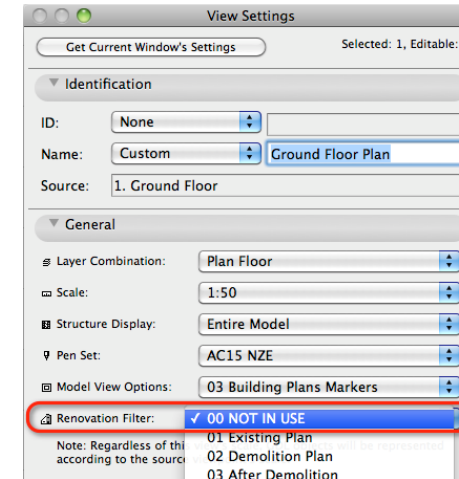
The Renovation Override Styles allow the default display options (Pens, Lines, Fills etc) to be overridden to better communicate the renovation project. These are both a visualization tool and a documentation tool allowing change to be highlighted.

Each of the Renovation Statuses has a Renovation Override Style, the predominant theme is grey for Existing, Yellow for Demolished and Red for New.



Saving Views with Renovation Status

The Renovation Status is defined in the View settings of each View, the Quick Options Palette also allows for these to be toggled between.



When you have assigned the renovation Now that we have assigned Elements in our project to the correct Renovation Status we can save Views using these Filters to produce our Documentation.

Here's an example of where certain views will come in useful:

Existing Plan use the *Filter 01 Existing Plan*

Existing Elevations use the *Filter 01 Existing Plan*

Demolition Plan use the *Filter 02 Demolition Plan*

Proposed Plan use the *Filter 06 Proposed Plan*

Proposed Elevations use the *Filter 07 Finished*

Renovation status can equally affect **3D Views** to communicate the project to the client through the construction phases, and can be saved the same way.

[illegible]

This matrix shows what Layers are visible in the Layer Combinations that are set in the *ArchiCAD16 Template.tpl* as supplied with ArchiCAD 16 in New Zealand. This Layer set is based on the sets in illustrated in the ArchiCAD Project Framework and what has been the Layer sets in the NZE version of ArchiCAD for the 6 years. This revision integrates some of the Menu and Tool Box Group names that were introduced with ArchiCAD 10, namely Design *Des:* and Document *Doc:* which were represented by Model and Plan prefixes in previous versions of this template. This template also takes into account changes in ArchiCAD and current best practice methodologies. The Template provides sufficient scope for the majority of ArchiCAD users in New Zealand, special projects and specialist practices will always require customised solutions.

Des: These Layers are for modelled (3D) elements found in the Design Menu and the Design section of the Tool Box, eg walls, floors, furniture, choose the layer that coincides with the elements purpose.

Document: These Layers are for elements under the Document menu and the Document section of the Tool Box eg dimensions, fills, text choose the layer that coincides with the drawing being produced.

Import: "Manually" imported elements eg contour lines, site information from another file, or aerial photos.

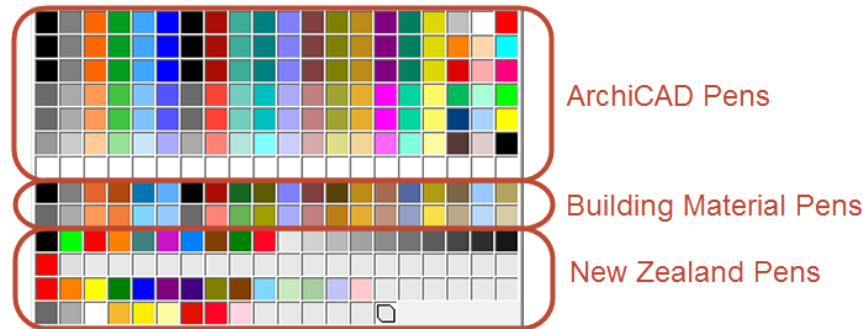
Misc: Design Images (scanned sketches), Hidden items (design options etc) Hotlinked Module Master Layer, and Solid Element Operators.

Layer Combinations

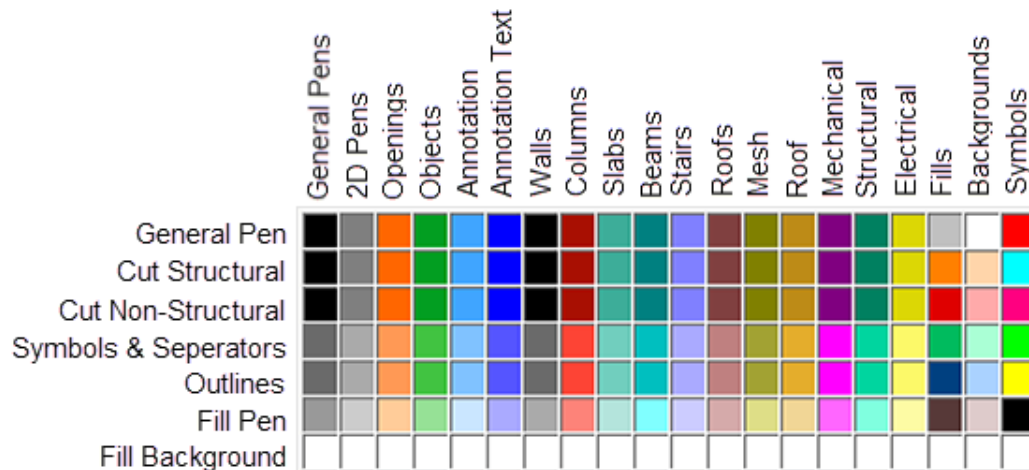
		Annotation Layer	Recommended Model View
ALL	Displays ALL Layers <i>Note if a user creates additional Layers then this Layer combination will need to be updated to show these layers it will not automatically show all layers.</i>	NA	NA
Details	Displays Layers that are necessary for the production of Detail drawings this is primarily 3d (Model / Design elements) the exceptions are Section and Elevation information and Doc: Key Room Names/Numbers	ArchiCAD layer	02 Drafting
Elevations	Displays Layers for external Elevations this primarily consists of model elements that are visible from the exterior of the building	Doc: Elevations	10 Elevations
Elevations Interior	Displays Layers for interior room Elevations – Floor, Wall, Ceiling, and interior Fittings and Joinery	Doc: Elevations Interior	09 Sections
Sections	Displays Layers for Cross Sections this primarily consists of model elements	Doc: Sections	09 Sections
3D: Building Envelope	Displays Layers that describe the exterior envelope of the building – designed to used in conjunction with the Cadimage Tools, Site + Massing Tools, Building Envelope.	NA <i>Note: if 3D Document use ArchiCAD Layer</i>	07 3D Exterior
3D: Model Simple	Displays a simple fast generating set of Layers for the 3D visualisation of the Building in 3D	NA <i>Note: if 3D Document use ArchiCAD Layer</i>	07 3D Exterior or 08 3D Interior
3D: Model ALL	Displays all Layers for the 3D visualisation of the Building	NA <i>Note: if 3D Document use ArchiCAD Layer</i>	07 3D Exterior or 08 3D Interior
Key Plan	Displays layers for the production of a Key Plan which displays the buildings external envelope and Sections, Elevations and Grids	Doc: Key	01 Site
Plan Bracing	Displays the Walls, Floors, Grids and Doc: <i>Bracing</i> which contains all bracing annotation and brace objects if using the Cadimage Tools Bracing.	Doc: Bracing	04 Building Plans No Markers or 05 Ceiling Plans
Plan Electrical	Displays the Walls, Floors, Fittings Joinery, Lamps	Doc: Electrical	04 Building Plans No Markers
Plan Finishes	Displays the Walls, Floors, Fittings, Wall trims, Zones	Doc: Finishes	04 Building Plans No Markers or 06 Room Layouts
Plan Floor	Displays the elements for a typical Construction / General Arrangement floor plan, walls roof overhangs section markers	Doc: Floor	03 Building Plans Markers
Plan Floor Framing	Displays the floor beams, floors, walls and grids	Doc: Floor Framing	04 Building Plans No Markers or 05 Ceiling Plans
Plan Foundation	Displays the Floor and Floor Foundations as well Plumbing fittings and Walls (depending on your documentation style you may want to turn these off)	Doc: Foundation	04 Building Plans No Markers or 05 Ceiling Plans
Plan Lighting/Ceiling	Displays the elements for a Lighting / Reflect Ceiling Plan plan, Walls Lamps Ceilings and Roofs. (note you may also want to turn on Roof Beams if these are exposed).	Doc: Lighting/Ceiling	05 Ceiling Plans
Plan Plumbing	Displays the Plumbing Fittings, Floors	Doc: Plumbing	04 Building Plans No Markers or 05 Ceiling Plans
Plan Presentation/Furniture	Displays all of the Fittings Layers, Furniture Lamps, Presentation Bits, Site Furnishings Walls floor and Zones, this Layer Combination is designed for Sketch Design, and Presentation Plans.	Doc: Presentation Furniture	04 Building Plans No Markers
Plan Roof	Roof Plan displays Roofs, Roof Beams, Roof Coverings	Doc: Roof	04 Building Plans No Markers
Plan Roof Framing	Displays Roofs, Roof Beams, Walls, Grids Section Markers	Doc: Roof Framing	04 Building Plans No Markers or 05 Ceiling Plans
Plan Room Interior	Designed for 1:25 / 1:20 room interior plans to complement Elevations Interior	Doc: Room Interior	06 Room Layouts
Plan Site	Displays main building elements Walls Roof Floors plumbing fittings (for drainage) and Site Services and Structures	Doc: Site	01 Site
Plan Site Bulk & Location	Displays the Primary building Envelope Walls Roof Floors & Site Boundaries	Doc: Site Bulk & Location	01 Site
Plan Site Landscaping	Displays the Primary Building Elements and all of the Site Planting, Site Structures, Site Furnishing	Doc: Site Landscaping	01 Site or 04 Building Plans No Markers if more detail required

Pens

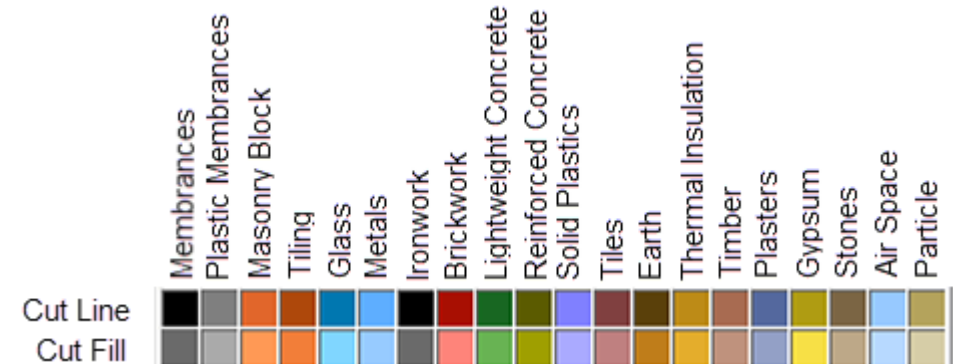
All Pen Sets are based on the ArchiCAD International Standard and are divided into 3 main sections; the **Tool pens** (1-140), the **Building Material Pens** (141-180) and the **New Zealand Pens** (181-194) which are to aid with drafting & traditional workflows.



The first 180 pens are standard ArchiCAD pens specific to the Tools, each column is a tool and each row is for a certain function. Combined they result in a very structured format which is best explained in the diagram below. Generally the first 180 pens are set correct for the scale of the output.



Then we have the new 40 **Building Material Pens** in two horizontal rows; the top row being the **outline** & the bottom row being the **fill pen**.



Then we have 4 rows of **NZE Specific Pens**:

10 **Drafting pens** – colour & description describes pen weights no matter what scale you print from 0.001 to 3.0mm.

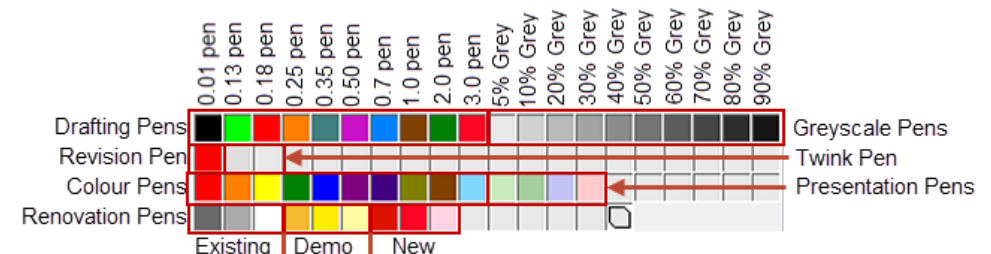
10 **Grey Scale pens** – different shades of grey (5%-90%) that are grey even in the Printing Pensets and all set to a thickness of 0.1mm.























A single red **Revisions pen**, for adding Revision Clouds using Change Tool and markups.

2 '**Twink**' pens, one thin (0.25mm) and one thick (1.0mm), designed to use when you want to remove a rouge line that you cannot by modelling.

10 **Colour pens** – these are set to colour even in the Printing Pensets & all set to 0.1mm.

And 9 **Renovation Pens**, 3 for each – Existing, Demolition and New



Shortcut Keys	Apple Computer
	Save
	option+Click
	⌘+option+Click
	⌘+Click
	Space+Click
	⇧shift +Click
	⌘T
	F2
	F3
	⌘L
	⌘F
	Esc
	Escx2
	⌘D
	⌘E
	⌘M
	option
	⌘option
	⌘U
	⌘Up
	⌘Down
	shift F2
Cut out and fix down the side of your screen	

Windows Computer	
Save	Ctrl+S
Copies Settings	Alt+Click
Inject Settings	Ctrl+Alt+Click
Trims Lines, Circles, Splines and Walls	Ctrl+Click
Magic Wand – Traces around or inside something	Space+Click
Selects Something	Shift+Click
Opens the settings of something	Ctrl+T
2D Window (Plan window)	F2
3D Window	F3
Layers Dialog	Ctrl+L
Find & Select	Ctrl+F
Cancels the operation, deselects element or removes Marquee	Esc
Takes ArchiCAD back to Arrow Tool (Default)	Escx2
Drag an element	Ctrl+D
Rotate an element	Ctrl+E
Mirror an Element	Ctrl+M
Whilst in Drag, Rotate or Mirror, hit the Ctrl key to copy the element	Ctrl
Whilst in Drag, Rotate or Mirror, hit Ctrl+Alt to copy multiple elements	Ctrl+Alt
Multiply	Ctrl+U
Up a Storey	Ctrl+Up
Down a Storey	Ctrl+Down
Toggle Trace & Reference On/Off	Alt+F2
Cut out and fix along the side of your monitor	

