Session 2.5

Sometimes We Make our Families Stretch, It's for Fun

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Class Description

This class will show you how to make your Revit families stretch with grip handles that are visible in 3D and controllable like never before.

About the Speaker:

John Pierson is a Design Technology Specialist at Parallax Team and a content creator at Design Tech Unraveled. At Parallax, he creates automated workflows and explores computational design solutions for the AEC industry. John is a frequent presenter at user groups and conferences.

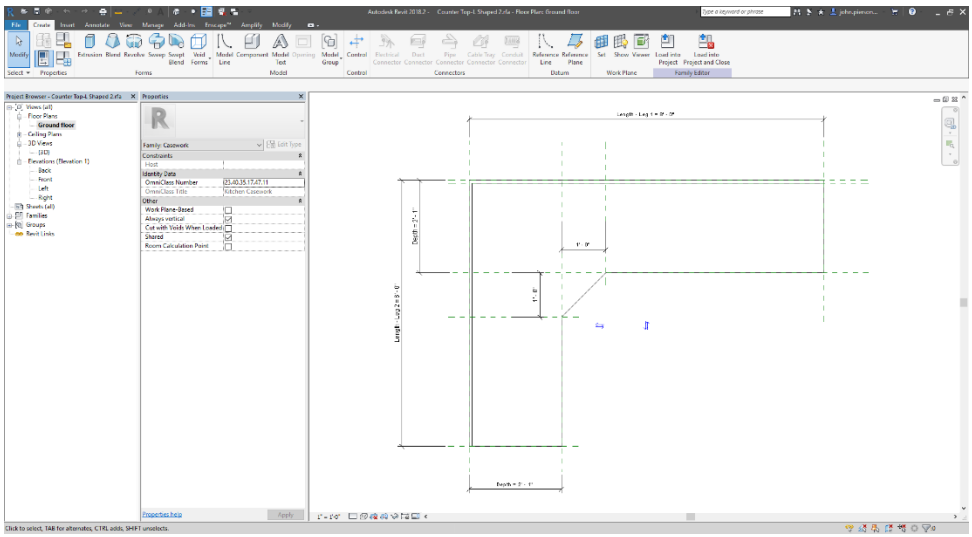
John is also an active member of the Dynamo community and currently manages the Dynamo package Rhythm, which is among the top 5 most downloaded.

Traditional Methods to Family Creation

Anyone who knows how to build Revit families is familiar with the ever-popular reference plane. These are often referred to as “the bones” of a parametric family. Reference planes allow for use to add parameters that in turn control geometry within the family.

Reference Planes

To add parameters to families, we will typically utilize reference planes. This involves drawing the reference planes in a 2d view, (plan view, elevation, etc.). within the family editor. Once we add the reference planes, we can “snap” geometry to them. After this is complete we can add dimensions and turn them into parameters. The result looks like this out of the box countertop below. (This process is not completely broken down as this is covered in other classes.)

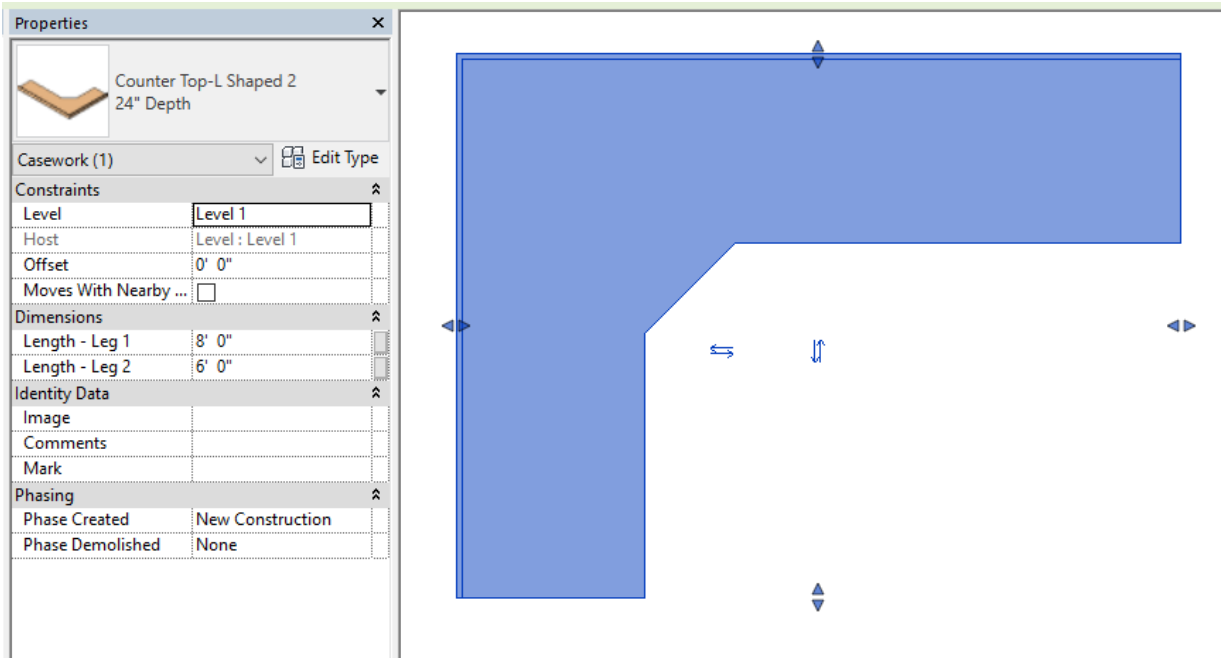


OOTB Countertop Using Traditional Methods.

Overall, reference planes are a solid tried and true method to creating families. Next, we will cover some of the opportunities surrounding this method, then we will challenge this thinking.

Control Location of Grips in the Project Environment

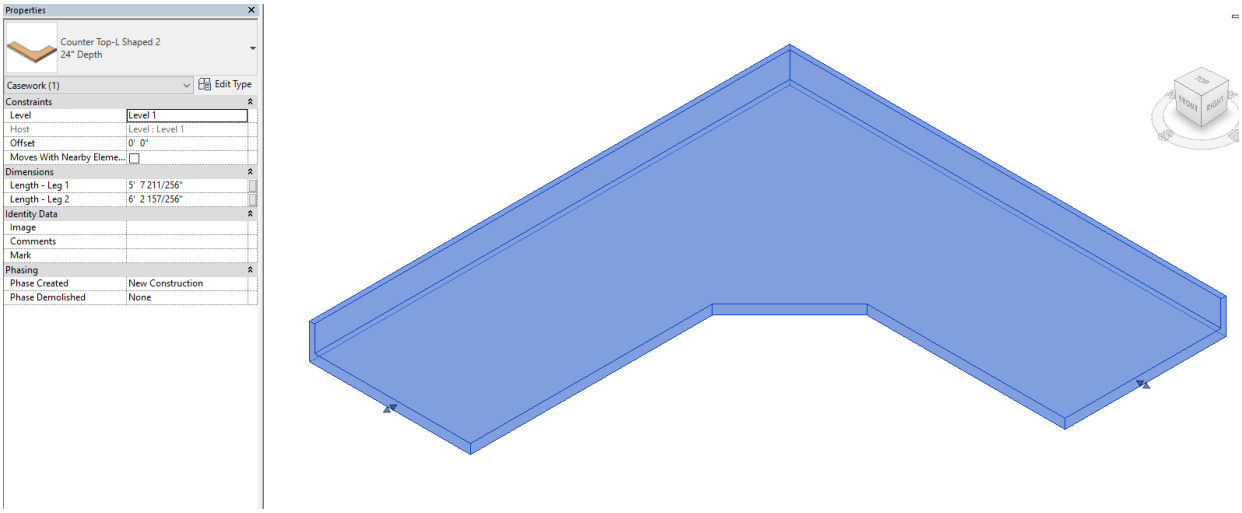
Utilizing a reference plane based grip handle method results in the inability to control the location of the resulting grips in the project environment.



OOTB Counter Top in Project Environment.

Availability in 3D Views

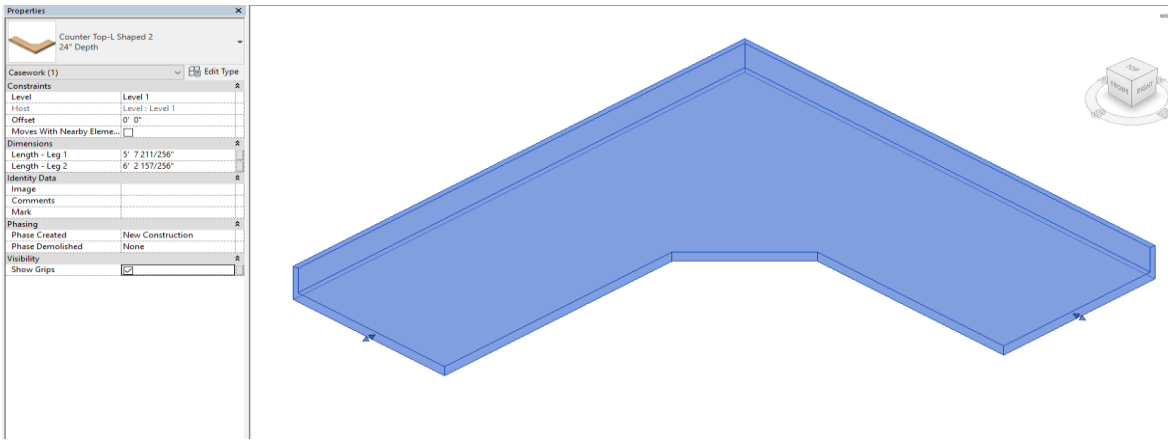
Most of us are working in 3D when we are in Revit. Why are our grip handles not available in these view for us? The reason is, we typically use reference planes which are only visible in views that are not 3D and intersect the extents of the reference plane in perpendicular views.

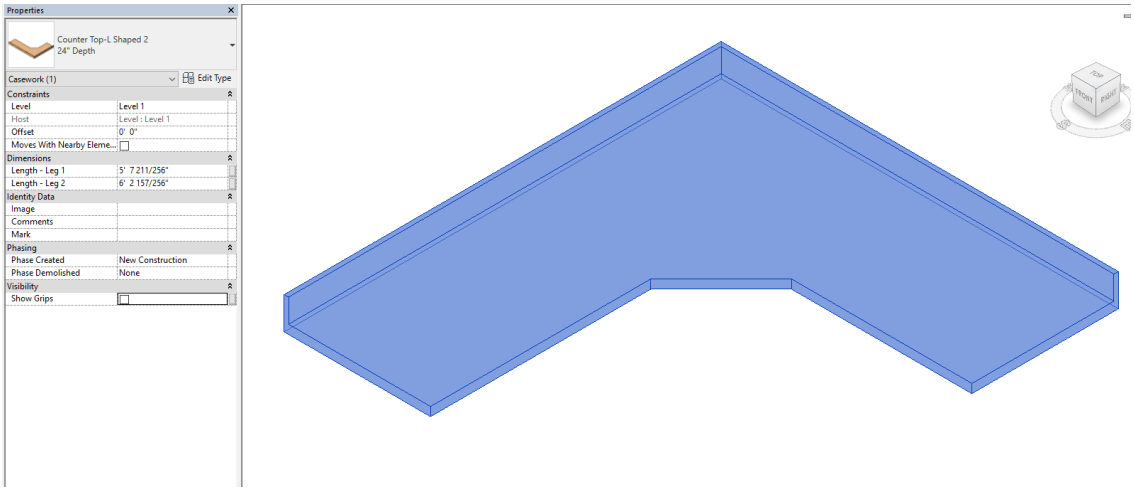


OOTB Countertop Using Revised Methods.

Control Visibility of Grips in the Project Environment

Additionally, reference plane-based grip handles are always present. Even when you don't need them. Wouldn't it be nice to turn off the grip handles when you do not need to use them?





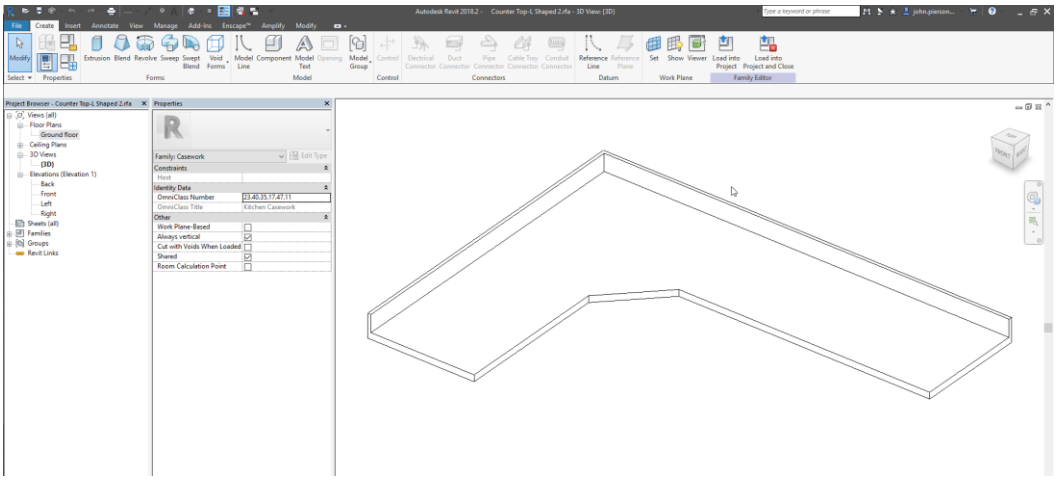
Addition of Grip Handle Visibility Parameter.

Revising the OOTB Countertop Family.

First, we start off by fixing something that is missing in the OOTB Countertop Family. We want the grip handles to be on the actual geometry that they control. Rather than centered as previously discussed.

First, Activate the Family

First, open the file named, Session 3.2__01-OOTB-Family-Begin.rvt. To activate the family, simply double click the counter top to open the family editor.

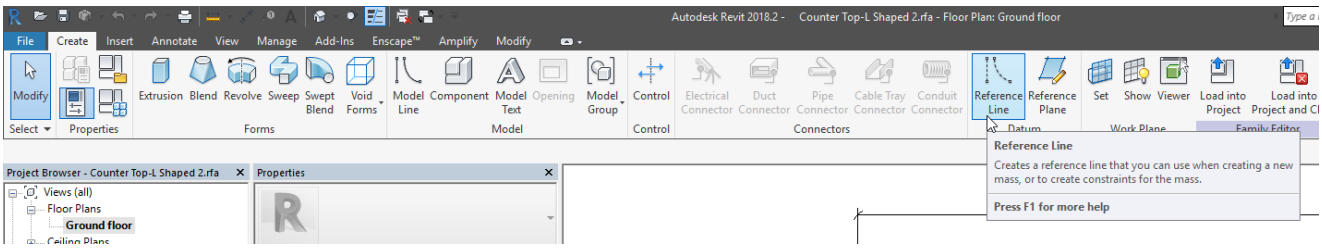


Familiarize Yourself with the Conditions

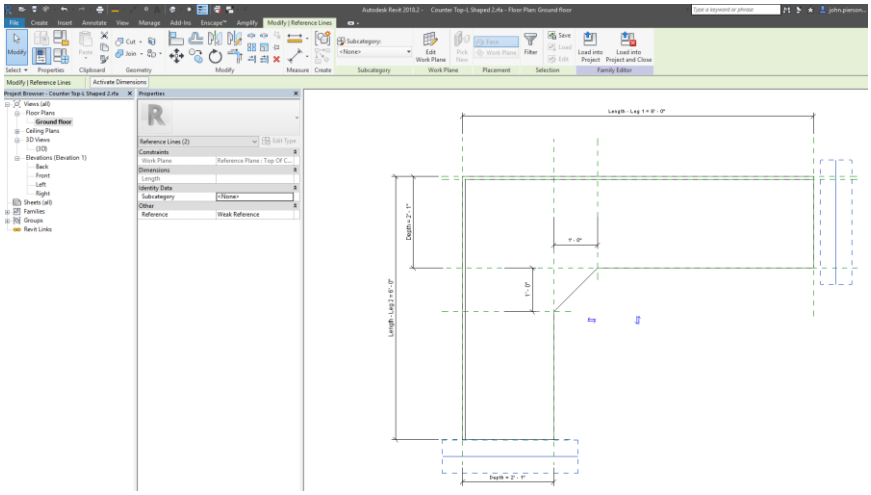
Next, we will navigate to the view, Ground Floor. Right away, we can see that this family is complete utilizing the Reference plane method. Since this is already done for us, we will leave them in place. The remaining issue is the location of the resulting grip handles, lets fix that.

Utilize Another Tool

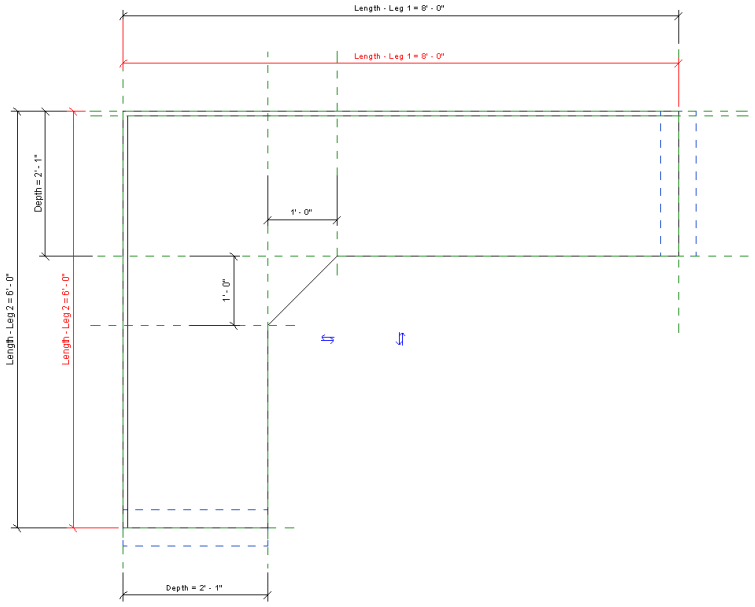
Since we are leaving the reference Planes in place for now, we can go ahead and use another tool in its place. For locatable grip handles, our first method is reference lines.



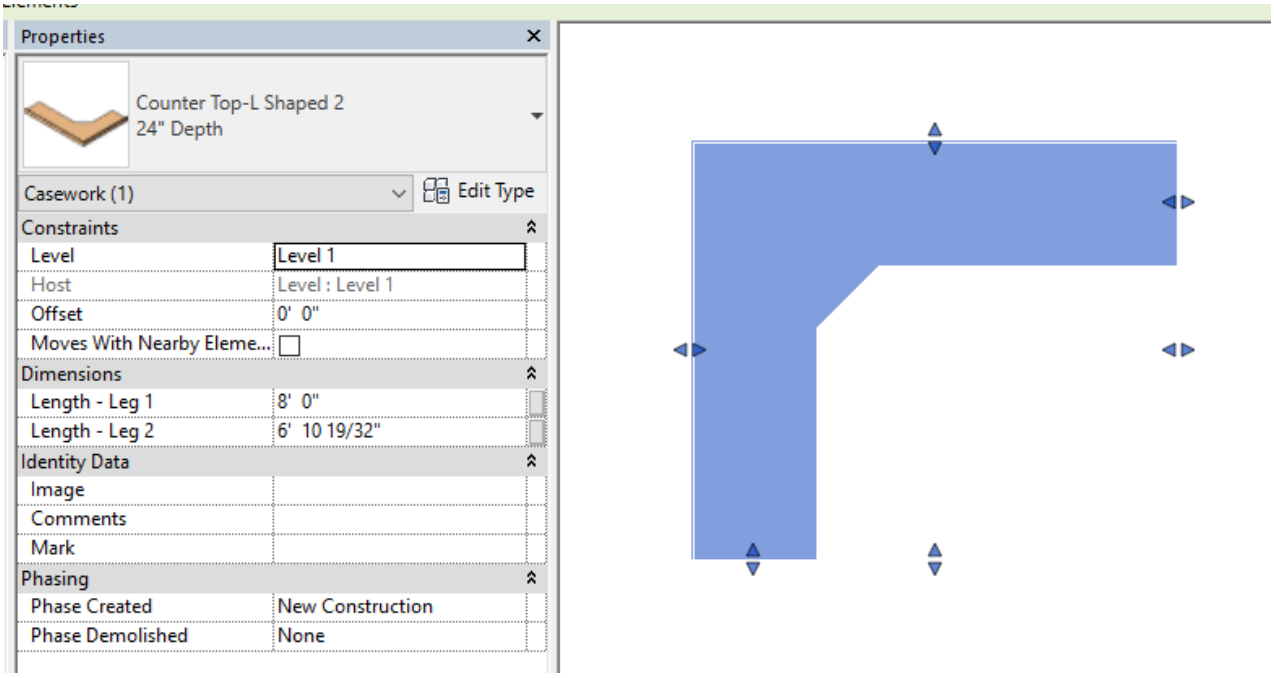
Draw a reference line just as you would any other datum element. In our case, we will draw slightly beyond the table and align it in place.



We can align the endpoints to the reference planes and draw a new dimension string to constrain them.



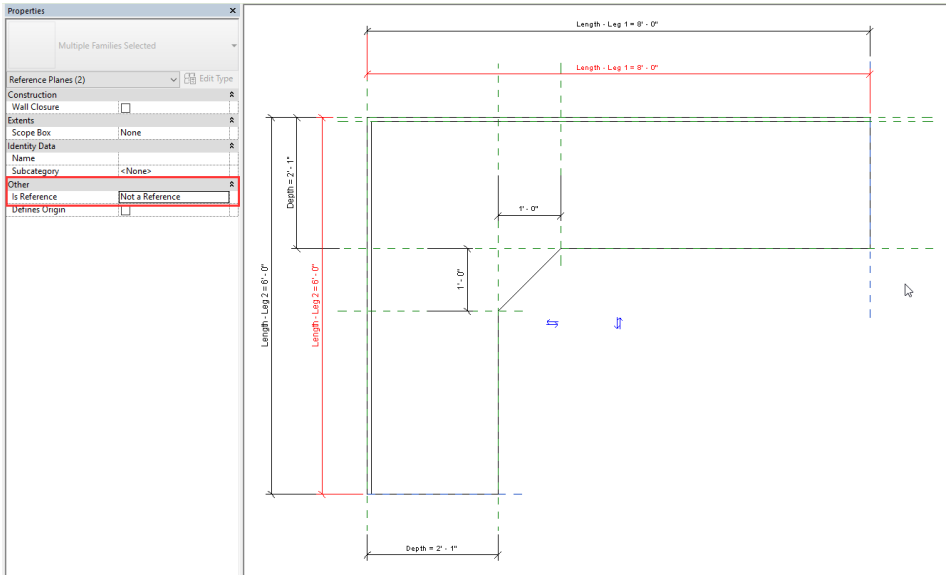
If we load this family in the project environment, we will notice that two sets of grip handles now exist! (The grips located on the corresponding geometry are our new ones.)



Old grip handles are still available in 2D

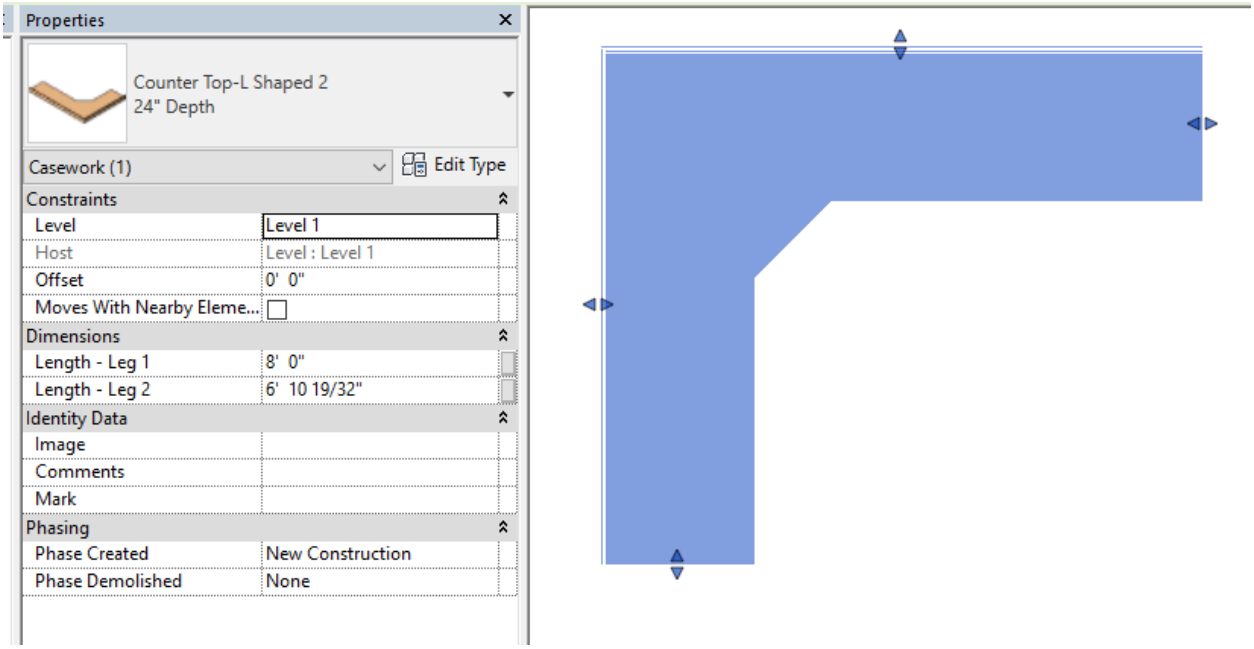
Next, lets fix those old reference plane-based ones.

Back in the family editor now, we can choose the reference planes that previously controlled the legs of the table. Here, we can change the “Is Reference” property to “Not a Reference”.

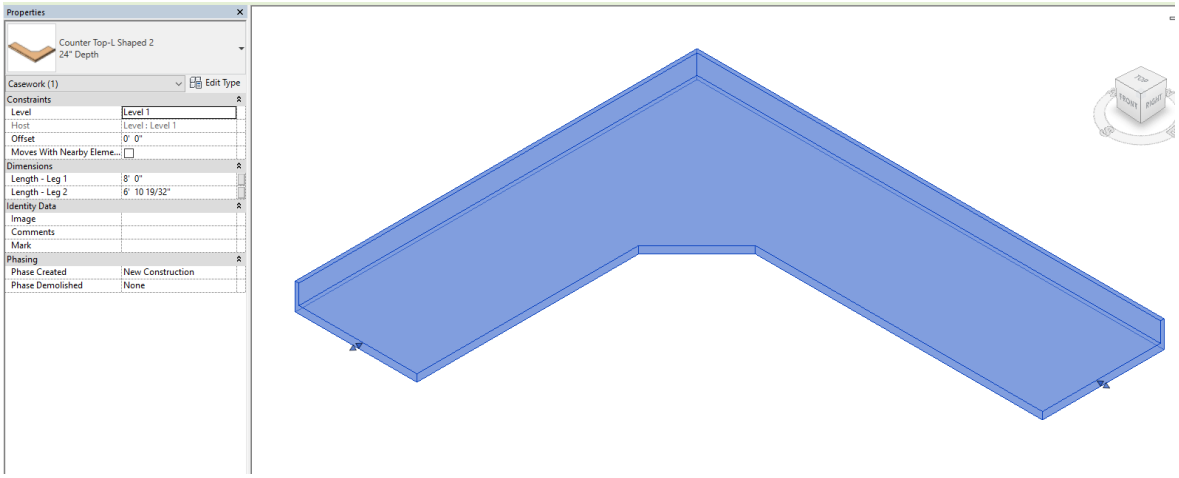


Changing Reference Plane Type

Load the family back in the project once again. Now, we can see that these old versions are now gone! Additionally, we have 3D grip handles now as well.



Old grips are now gone!



OOTB Countertop Fixed with 3D Grips in Great Locations.

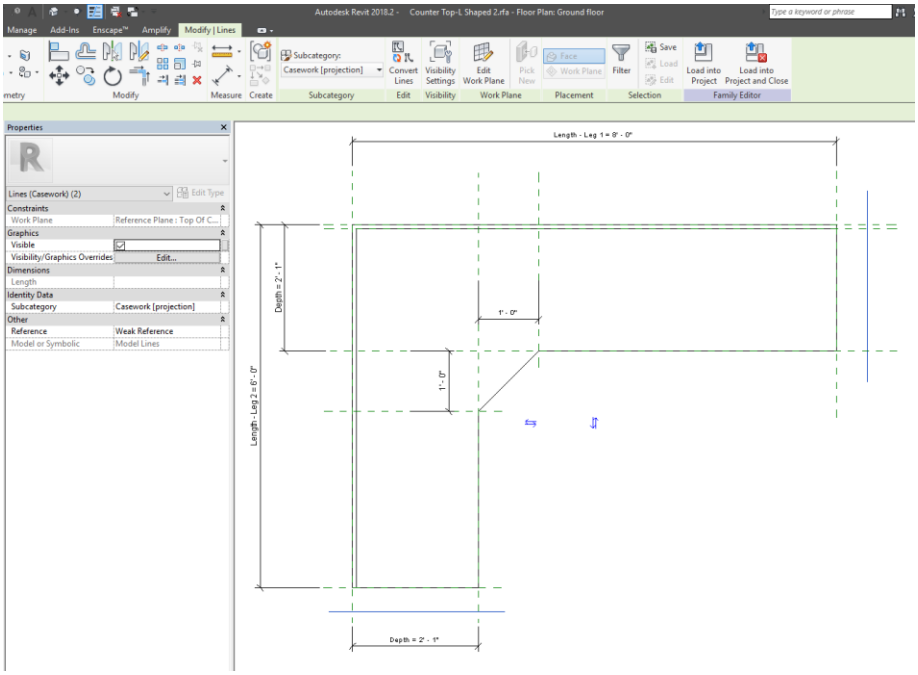
This method is great, it gave us nicely located 3d grip handles but, it can be even better! Next, we will learn how to add visibility toggles to 3d grip handles.

Visibility for Grip Handles

Using a similar thought from the previous example, we are going to give our grip handles the ability to be turned on and off with a visibility parameter.

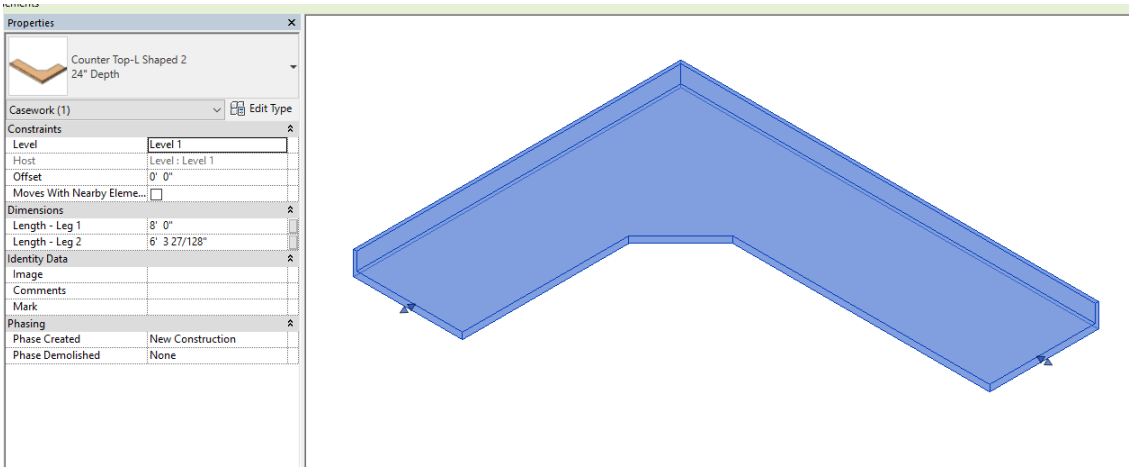
Next, we are going to remove the reference lines we previously created. This will also get rid of the dimensions that we added. This is ok, as we are going to rebuild this logic using model lines.

Like the reference lines, we are going to draw the model lines and snap them in place.



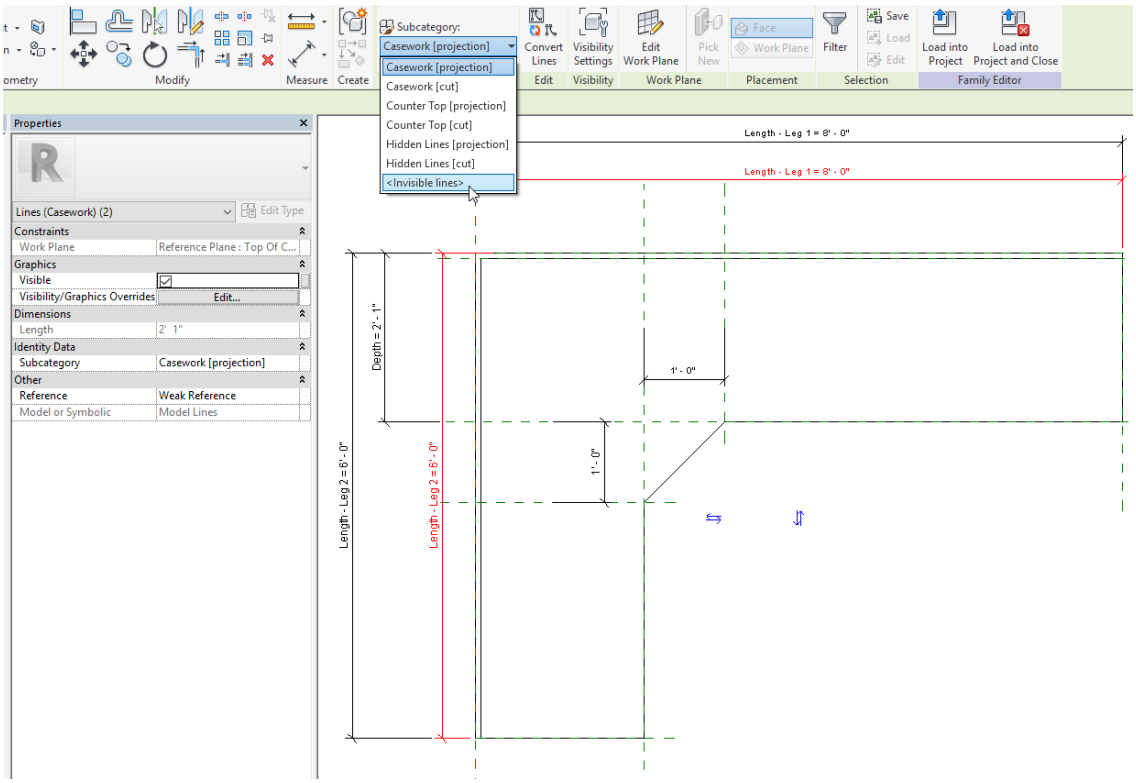
Replacing Reference Lines with Model Lines.

Now, if we load this into the project environment, we will see comparable results as before. One key difference is, we can now see the lines as well as the grip handles.



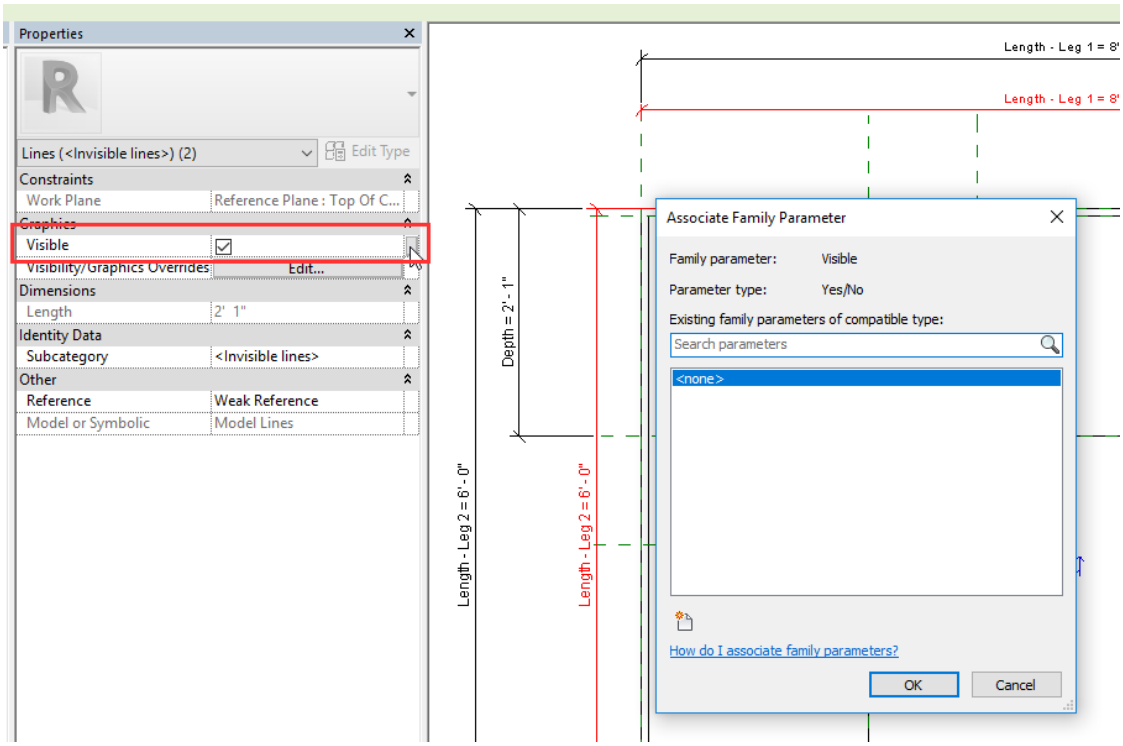
To fix this, let's go back to the family editor and use a different line style.

Within the family editor, we can choose “Invisible Lines”. This will hide the model geometry of the lines, but the grip handles will stay.

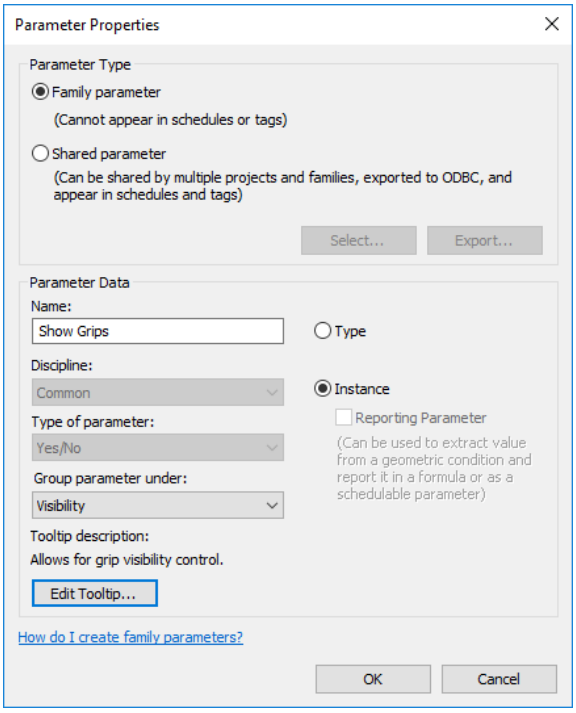


Model Lines Changed to Invisible Line Style.

While we are at it, we can go ahead and select both model lines and add a visible parameter to them. Visibility can be added after selecting both model lines and choosing the ellipsis button in the properties palette.



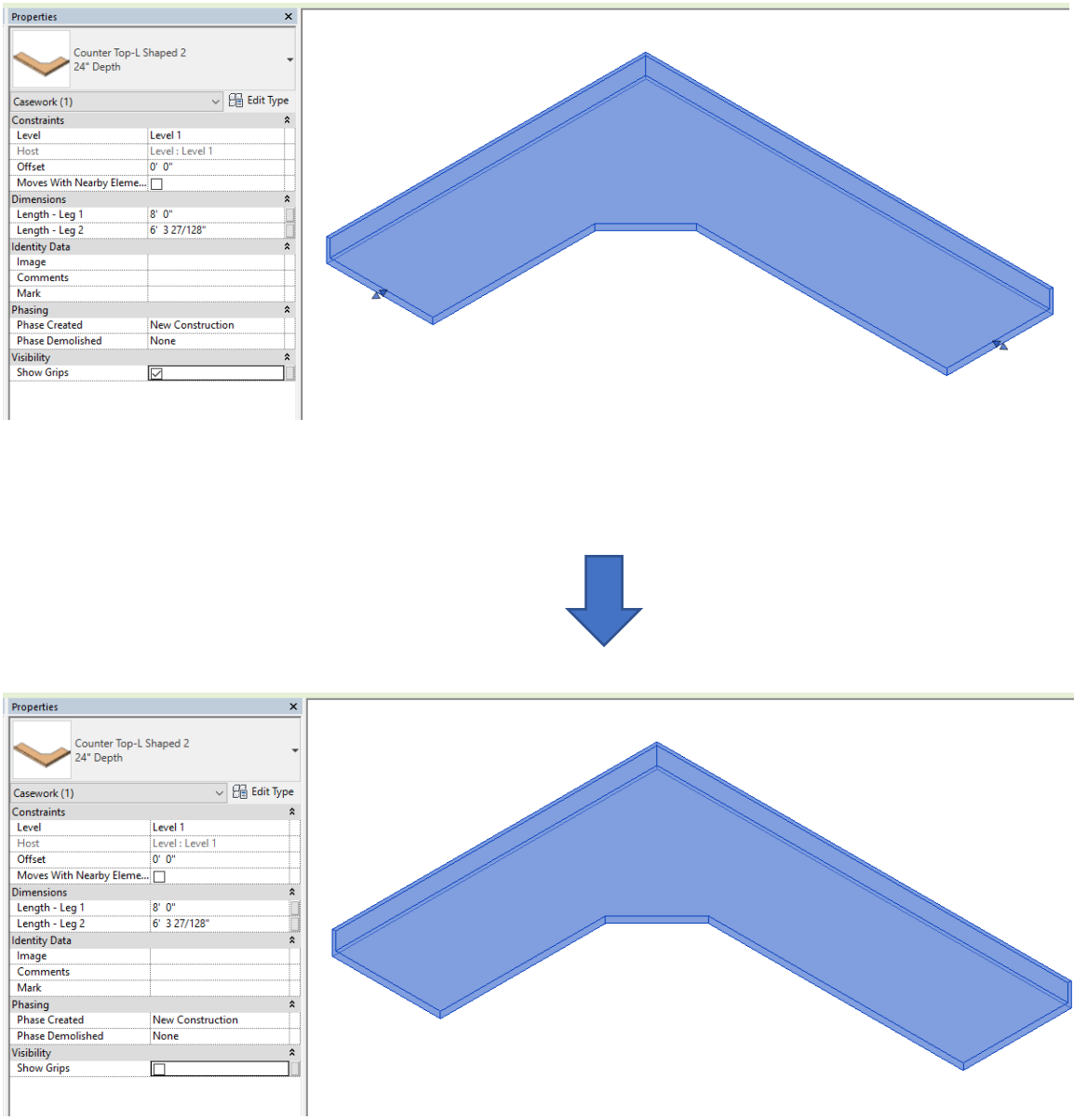
Addition of Visibility Parameter to Model Lines.



Traditionally, we name the parameter with the word “show” as a prefix. Checked means show, unchecked means do not show.

Create Visibility Parameter Dialogue.

Now, if we load this family back into the project environment, we can control the visibility of the grip handles!



Visibility for Grips.

Rotation Methods in Conjunction with 3D Grips

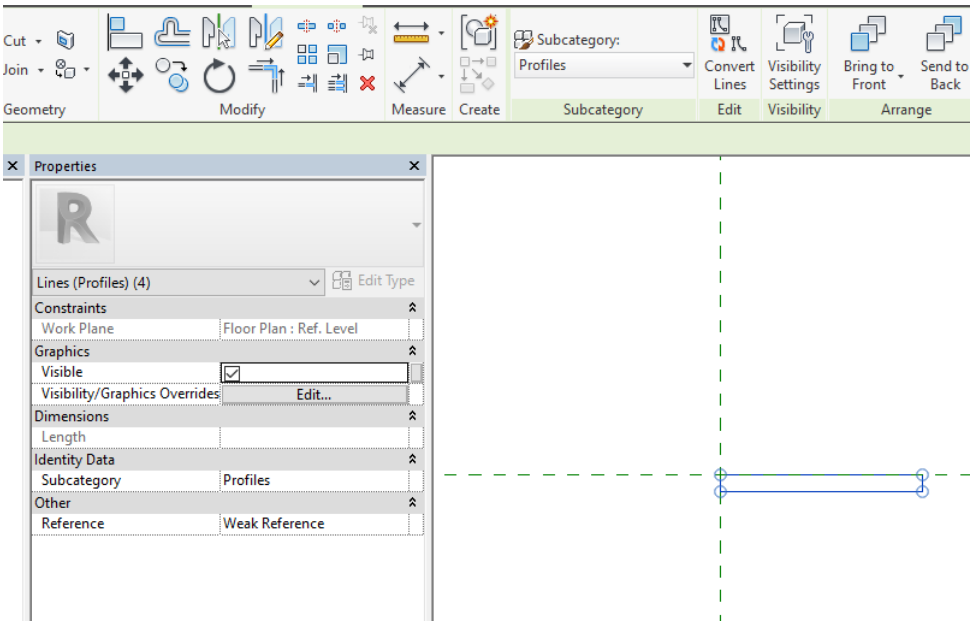
Rotating Revit families is a very love/hate relationship. In fact, there are a number of other classes to remedy this common frustration. If we add in 3D grip handles, this combination proves to be even more powerful. Next, we will make an operable door with 3d grips.

Building a Great Operable Door

First, we need to make a door family to control with our new-found methods. Go ahead and navigate to File>New>Family>Door.rft

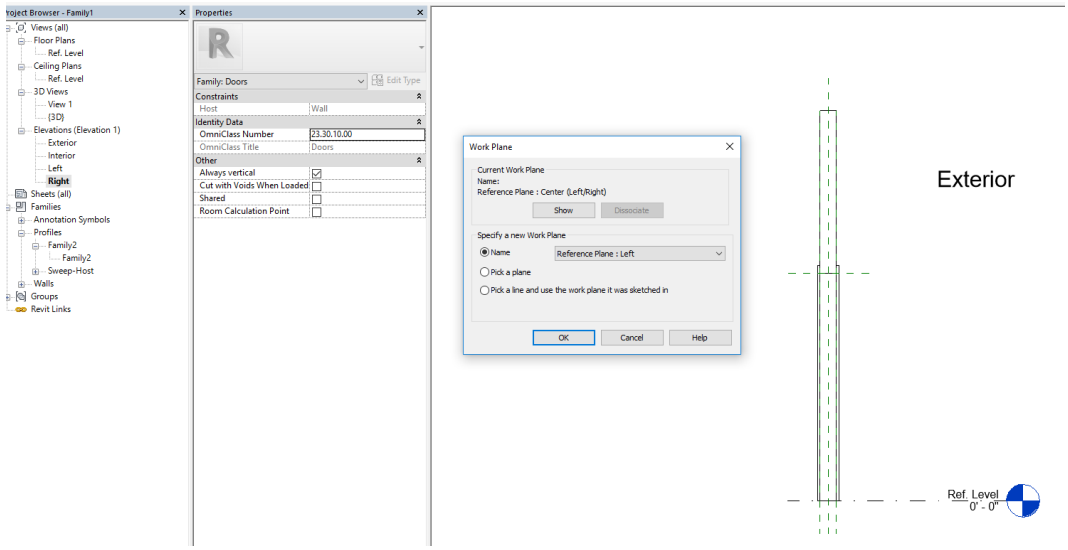
Immediately after this, we can go ahead and start a new profile family as well by navigating to File>New>Family>Profile.rft (This profile will serve as a geometry host for door components.)

In this profile family, we can draw a simple box, save as “Sweep-Host”, and load into the door family.



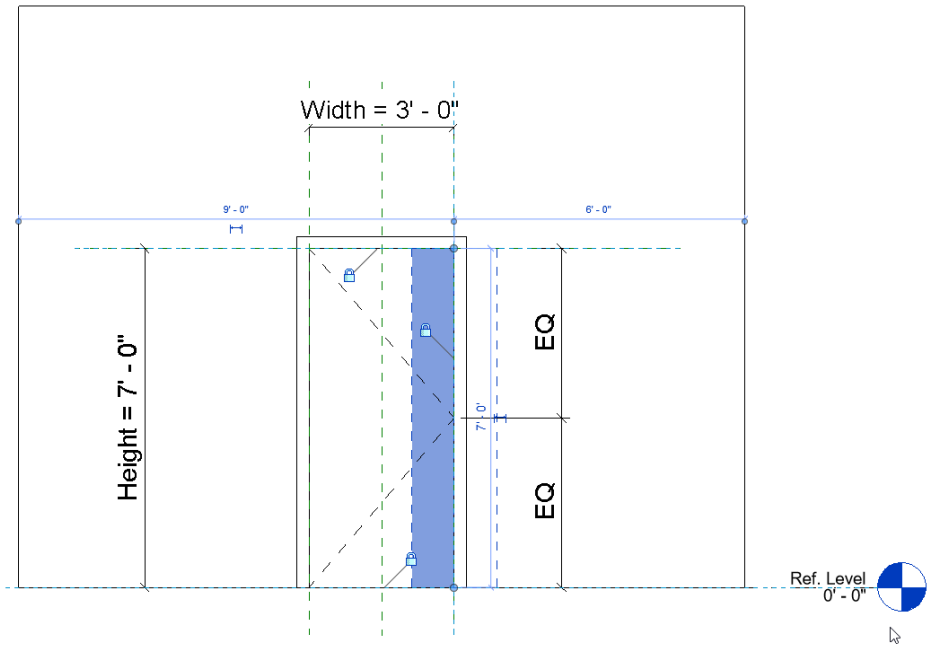
Simple “Host” Sweep Family.

To use this host sweep family, we will navigate to the exterior elevation view and set our workplane as exterior.



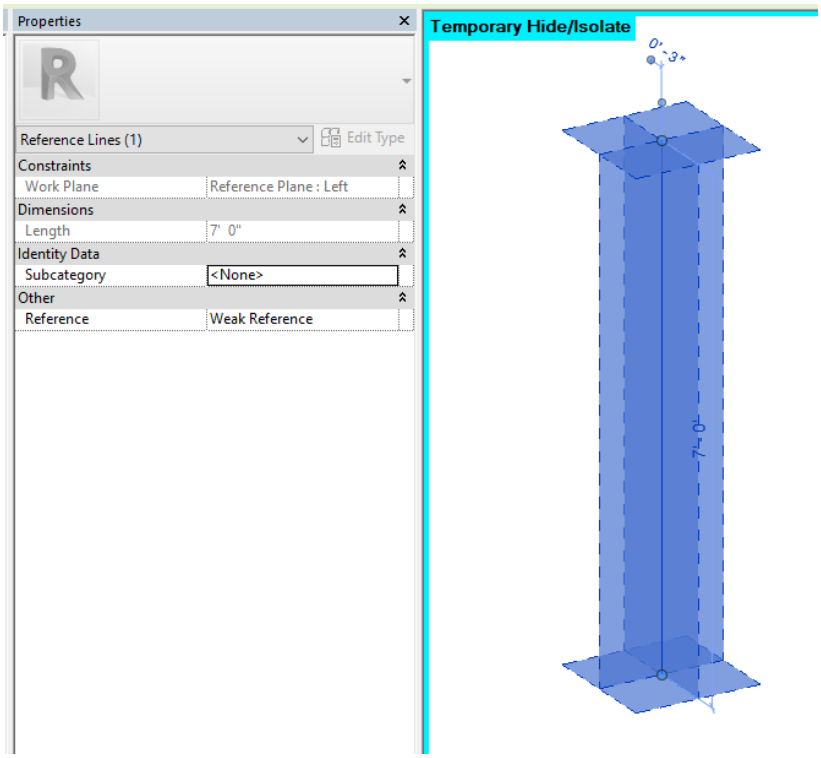
Setting Your Workplane.

Now that we have our workplane set, lets draw a reference line to host our new sweep. We will also snap this reference line to the top, bottom and right side of the door template.



Constrained Reference Line.

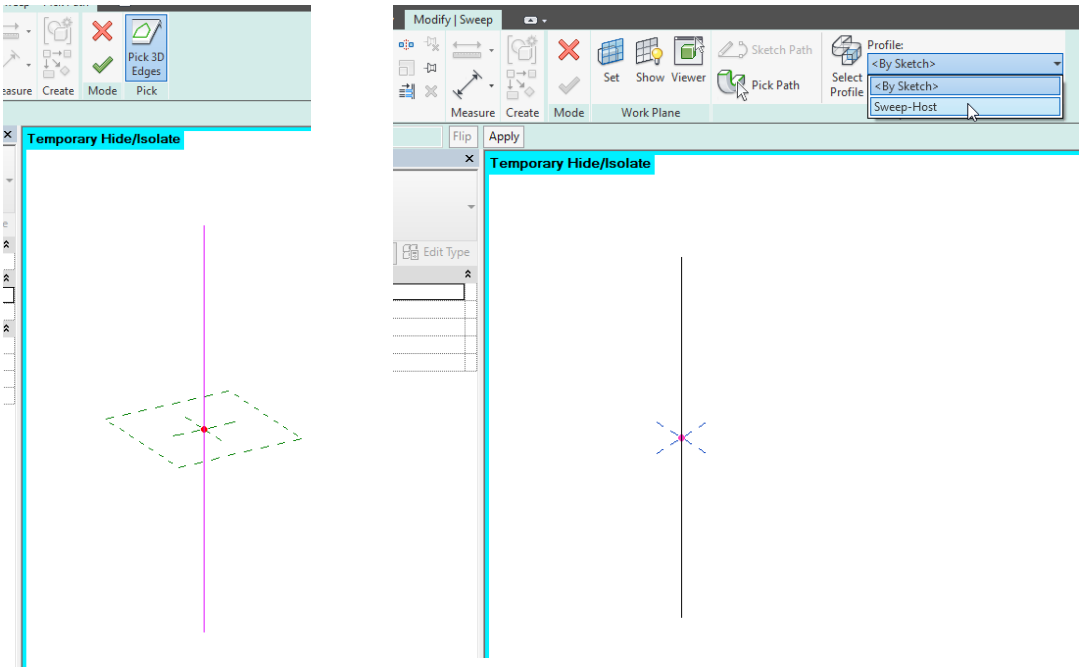
Now, we navigate to 3D and fix our view scale to create a sweep, (3” = 1’-0” seems to work well). Now, we can isolate our reference line to make life easier.

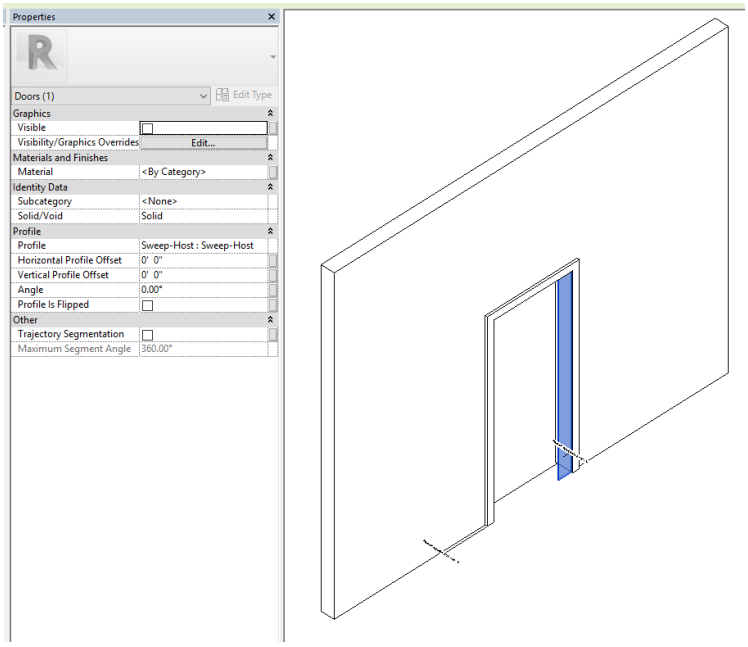


Isolated Reference Line.

Now, we can finally add the sweep by navigating to Create > Sweep. We will choose pick path and select our reference line. Then select our profile that we created previously.

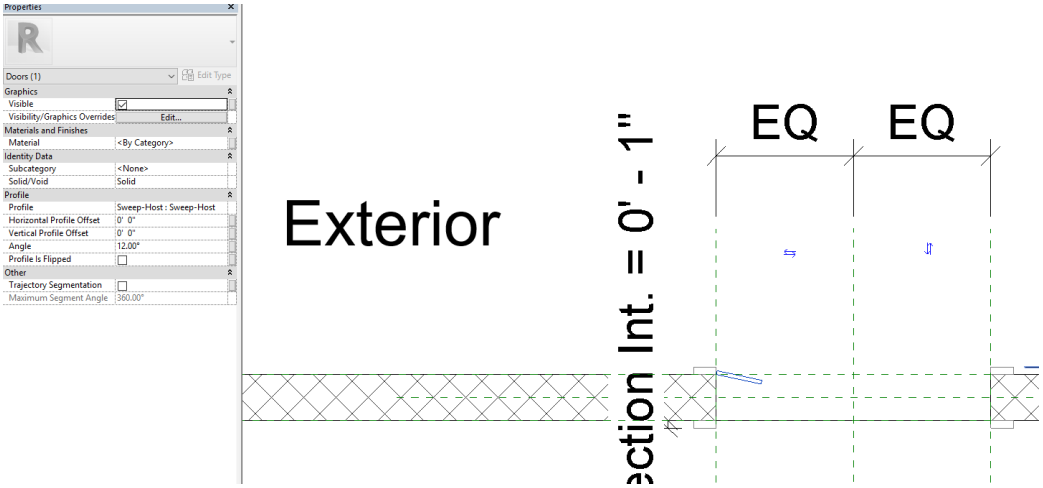
Creation of a Sweep Component.





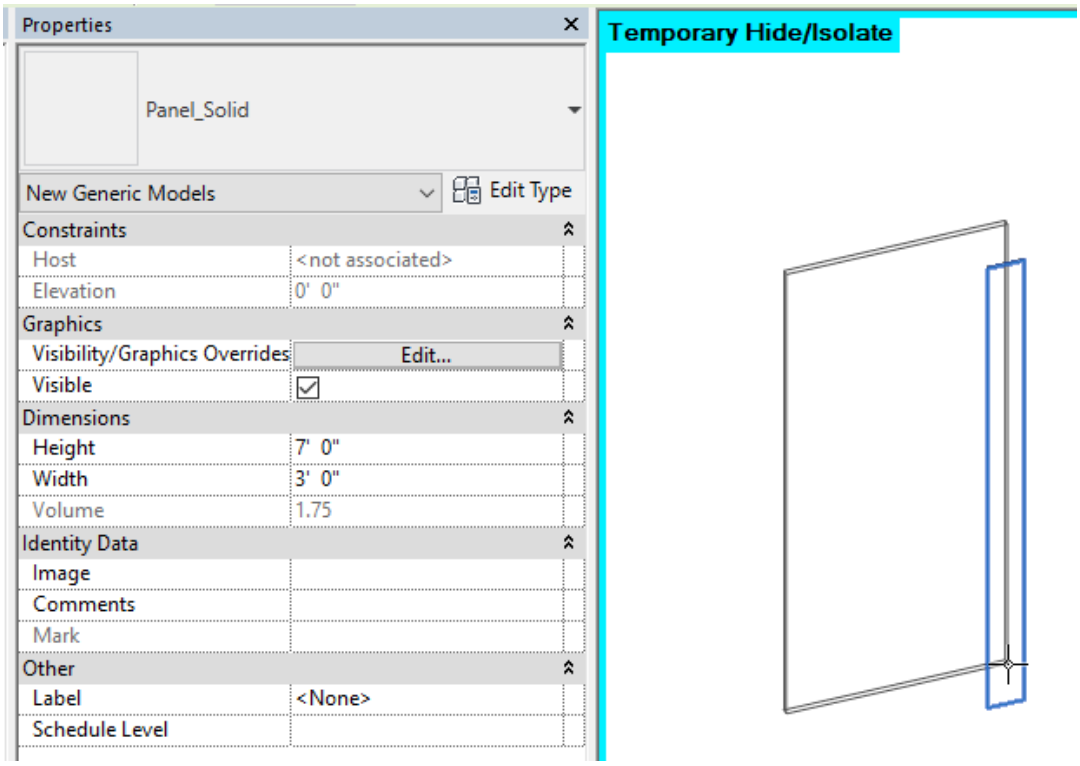
"Host" Sweep Marked as Invisible.

Now that we have our host family, we have access to an amazing hidden gem, the profile angle parameter! This awesome parameter allows for unbreakable rotations in families with minimal effort. The only downside is, in our example the angle appears to go opposite of what we want. Why is that?



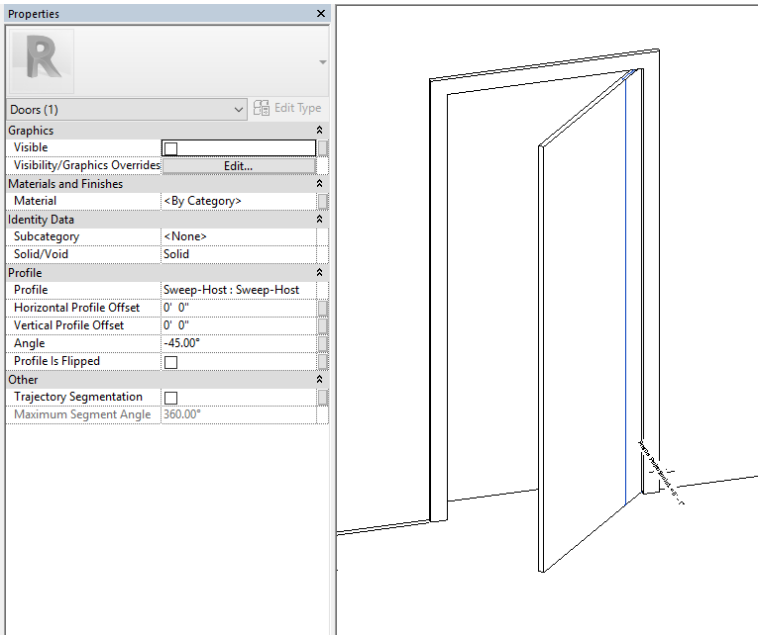
The reason for this is because the reference plane (Exterior) was originally drawn from right to left rather than left to right. Rather than rebuilding a lot of logic, we can simply fix this in our parameters later.

Now, we can go ahead and load in the provided panel family and host it to the sweep we created.



Nested Door Panel Hosting.

And we finally have a door panel that rotates in a fantastic way.



Sweep Rotation Controlling Panel.

Once we have the rotation working we can tie the panel parameters to the door family parameters.