

Advanced Wall Topics

More on walls? Really? It seems as though all we do is walls. Well, that's because buildings are composed mainly of walls. As you may have noticed, the exterior walls are compound wall structures with reveals and parapet caps. In the west wing, you have a staircase that is completely unsupported. It would be nice to add a wall to make those stairs less spongy. Given that the west wing is a high-end architectural woodwork area, that wall could use some trims that can be added right to the wall's profile. Also, you haven't touched on a curtain wall of any kind.

- ▶ **Creating compound walls**
- ▶ **Adding wall sweeps**
- ▶ **Creating stacked walls**
- ▶ **Creating curtain walls**
- ▶ **Adding a wall to a massing object**

Creating Compound Walls

The first item to tackle is how to develop a wall with different materials. The exterior walls you've been using in this model are a prime example of compound walls. The bottom 3' (900 mm) of the wall consists of concrete block, and the rest of the wall is brick. When you cut a section through the wall, you can see that the wall has an airspace as well as a metal stud-wall backup.

Usually, these chapters start with a claim that "the following procedure is so easy . . . a child could do it" (or something of that nature). The development of compound walls isn't the easiest thing you'll tackle in the Autodesk® Revit® Architecture software. This procedure is somewhat touchy, and doing it well takes practice. In this section, you'll create an interior wall with a wood finish on the bottom along with different wood material on the top. You'll also extrude a chair rail along the wall.



NOTE Metric users should not type in *mm* or other metric abbreviations when entering amounts suggested in the exercises. Revit will not accept such abbreviations. Simply enter the number provided within the parentheses.

To get started, open the model you've been using to follow along. If you missed the previous chapter, go to the book's web page at www.sybex.com/go/revit2017ner. From there, you can browse to the Chapter BC1 folder and find the `NER-BC1.rvt` file.

The objective of this procedure is to create a compound wall from a basic wall. Follow these steps:

1. Open the Level 1 West dependent floor plan view.
2. On the Architecture tab, click the Wall button.
3. In the Type Selector in the Properties dialog box, choose Basic Wall : Generic – 6" (152 mm).
4. In the Properties dialog box, click the Edit Type button.
5. Click Duplicate.
6. Call the new wall West Stairwell support wall, and click OK.
7. Click the Edit button in the Structure row.
8. Click into the Material cell for the Structure row, as shown in Figure BC1.1.
9. Click the [...] button.
10. In the Material Browser, select Metal – Stud Layer, and click OK.
11. Change the thickness to 5 1/2" (140 mm) (see Figure BC1.1).
12. At the bottom of the Edit Assembly dialog box, click the Preview button (see Figure BC1.2).
13. With the preview open, change View to Section: Modify Type Attributes.

Adding a preview to the Edit Assembly dialog box is not only a nice feature; it's also absolutely necessary to continue with the editing of the wall. As you'll soon see, you won't have access to certain buttons without the preview being displayed in a sectional view.



It doesn't seem as though you've done much, but you've set the stage to start building your wall. It's time now to focus back on the Layers field.

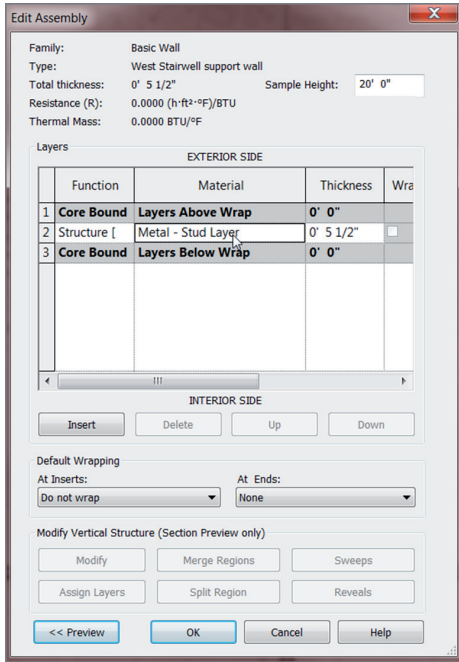


FIGURE BC 1.1: Changing the structure to a 5 1/2" (140 mm) metal stud

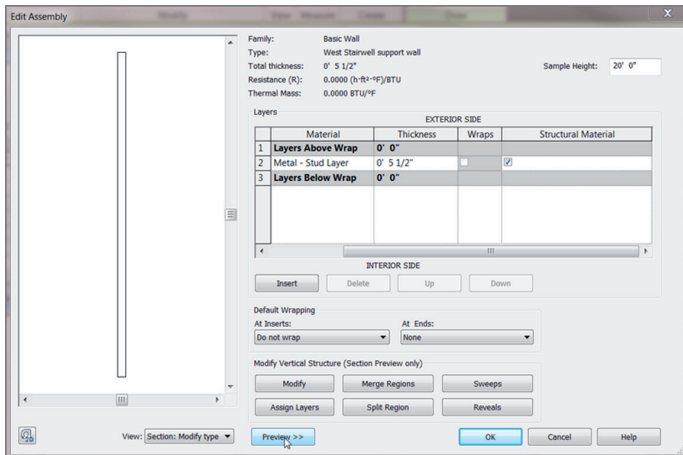


FIGURE BC 1.2: Changing the view to a section

Adding Layers to the Compound Wall

If you're an Autodesk® AutoCAD® veteran, the term *layer* takes on a different meaning. In Revit, the term *layer*, as it pertains to a wall assembly, represents a material layer that is assigned an actual thickness as well as its own material.

As you can see in Figure BC1.3, Revit understands the difference between interior and exterior. For the following procedure, you'll add materials to both the exterior and interior portions of the wall.

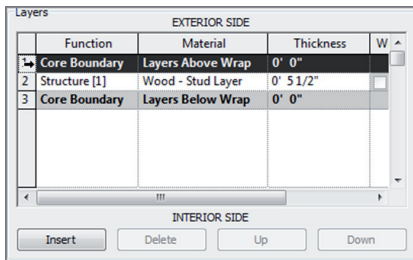


FIGURE BC 1.3 : Clicking row 1 to highlight the entire row

1. In the Layers area, click the 1, as shown in Figure BC1.3. (It's the row that holds the Layers Above Wrap field.)



TIP Note that to highlight an entire row in the Layers area, you must click right on the actual number. A small black arrow will appear, indicating that you can click that spot to highlight the entire row.

2. Click the Insert button. Revit creates a new layer above the one you select. The new layer is always set to Function: Structure [1], Material: <By Category>, and Thickness: 0.
3. Change Function to Finish 1 [4].
4. Click into the Material cell, and click the [...] button.
5. Select Gypsum Wall Board.
6. Click OK in the Material Browser.
7. Change Thickness to 5/8" (13 mm).
8. Click row 4 (Layers Below Wrap).

9. Click the Insert button.
10. Click the Down button, as shown in Figure BC1.4. It's located below the Layers area all the way to the right. Your new layer becomes 5.

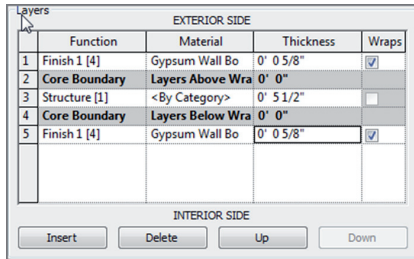


FIGURE BC1.4: Adding a 5/8" gypsum layer to the interior side of the wall

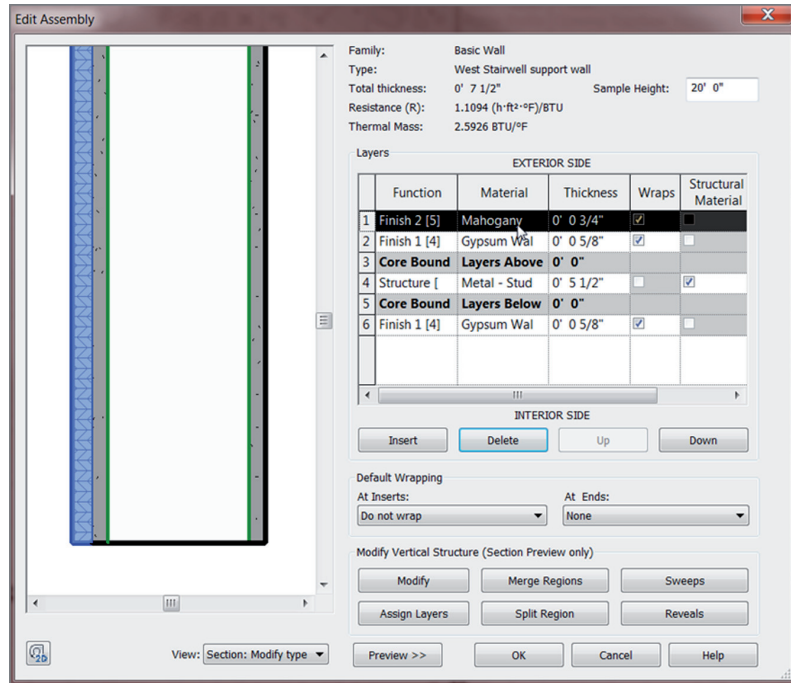
11. Change Function to Finish 1 [4].
12. Click into the Material cell, and click the [...] button.
13. Find and select Gypsum Wall Board.
14. Click OK in the Material Browser.
15. Change Thickness to 5/8" (13 mm). Your Layers field should resemble Figure BC1.4.

Now that the wall is wrapped with one layer of 5/8" (13 mm) gypsum on each side, let's start placing the veneered plywood layers on the exterior of the wall.

In the next procedure, you'll add a 3/4" (19 mm) plywood layer to the exterior of the wall. Follow these steps:

1. Click 1 Finish 1 [4] (the top layer).
2. Click Insert.
3. Change Function to Finish 2 [5].
4. Change Material to Mahogany (it's the mahogany material that has Plywood for the cut pattern). Click OK.
5. Change the Thickness to 3/4" (19 mm). Your wall's layers should resemble Figure BC1.5.

The preview instantly adds the changes to the wall. This interaction will be of great benefit down the road.



In the preview, you can hold down the wheel button on your mouse and pan around. You can also spin the wheel in and out to zoom in and out of the preview.

FIGURE BC 1.5: Adding the 3/4" (19 mm) mahogany veneered plywood material

6. At the bottom of the dialog box, click the OK button.
7. Click Apply.



WARNING By clicking OK and then Apply, you're basically saving your work. In the Edit Assembly dialog box, there is no Save or Apply button as you create the wall. Also, never press Esc—doing so will cancel every change you've made and will almost certainly result in costly repairs to your computer as you rain blows upon it.

Next, let's go back in and split the wall materials in two. It would be nice if you could have cherry at the top and mahogany at the bottom. Revit gives you the ability to do this.

Adding New Materials by Splitting a Region

If you want more than one material along the face of a wall, you can use the Split Region command in the Edit Assembly dialog box. The objective of the

following procedure is to add a new material and then apply it to the top half of the plywood face:

1. Click the Edit button in the Structure row.
2. Click Layer 1 (the top layer).
3. Click Insert.
4. Change Function to Finish 2 [5].
5. For Material, select Cherry, and click OK. (Don't give it a thickness. The next procedure takes care of that.)
6. Click the Split Region button, as shown in Figure BC1.6.

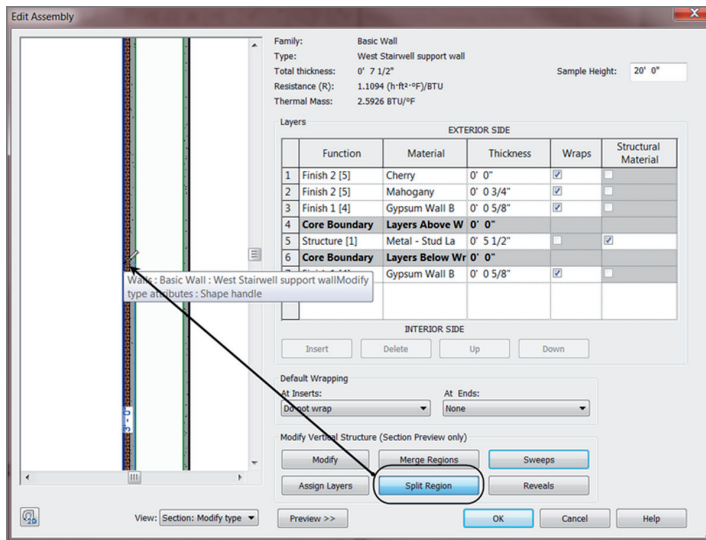


FIGURE BC1.6: Cutting the plywood at a specific height

7. Move your cursor up the plywood face. The cursor turns into a knife. You also see a short, horizontal line within the plywood; this indicates where the region will be cut.



NOTE Splitting the correct region can be extremely difficult even if you've done this procedure many times. Make sure you zoom into the area, take a deep breath, and try again if you're getting frustrated.

- When you see 3'-0" (900 mm) in the temporary dimension, pick the point as shown in Figure BC1.6. *Do not press Esc when you're finished!* If you place the split in the wrong place, click the Modify button and then select the split line you just created. You can then click the dimension field to edit the location. There is also a direction arrow that specifies whether the split is set from the bottom up (what you just did) or from the bottom down.

You've split the plywood. The only thing left to do is to apply a new material to the upper region. You can accomplish this by using the Assign Layers button.

Assigning Material to Different Layers

The Assign Layers command lets you choose where you would like to assign a layer. This is useful in the context of this dialog box because you aren't stuck without the ability to move the layers around the wall as necessary. Of course, when you split the wall layer as you just did, notice that the thicknesses of the two wood layers are set to 0 and Variable. Revit needs you to assign an alternate layer at this point.

Next, you'll assign the cherry layer to the upper portion of the plywood. Follow these steps:

- Pick the Layer 1 row (Cherry), as shown in Figure BC1.7.

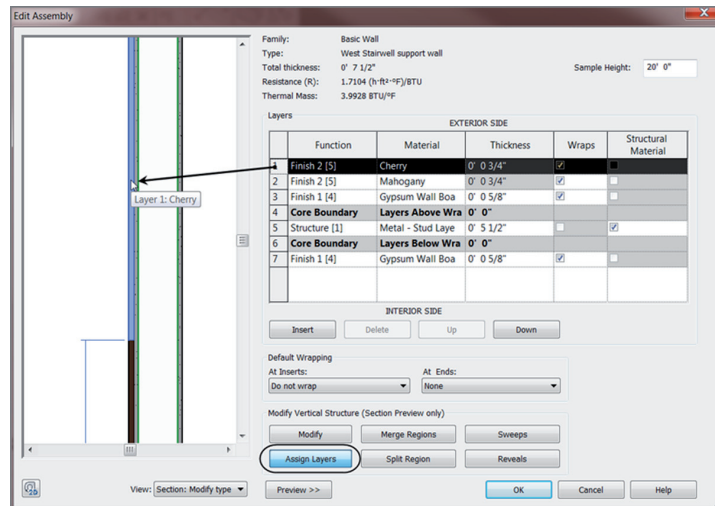


FIGURE BC 1.7: Assigning the cherry layer to the upper portion of the wall

- Click the Assign Layers button (see Figure BC1.7).

3. Move your cursor over the upper region of the plywood layer, and pick. Cherry is assigned to the upper portion of the wall, and the thicknesses are set to 3/4" (19 mm) (again, see Figure BC1.7).
4. At the bottom of the dialog box, click OK.
5. Click Apply.
6. Click the Edit button in the Structure row to get back to the Edit Assembly dialog box.
7. Pan to the top of the wall in the display, as shown in Figure BC1.8.

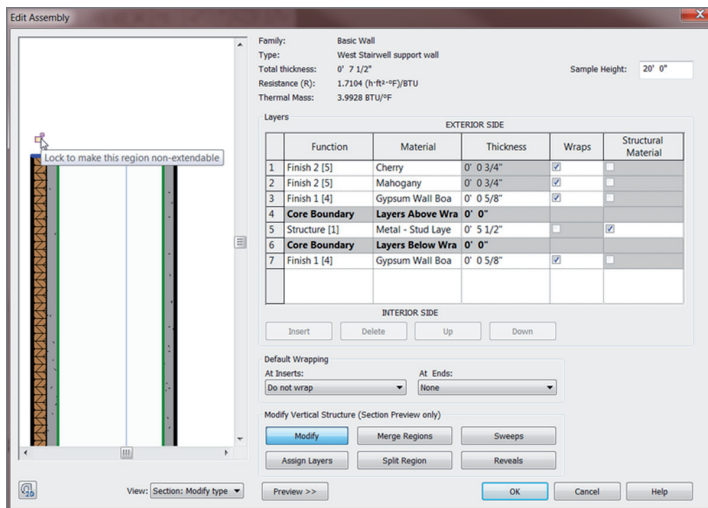


FIGURE BC 1.8: Unlocking the plywood to enable independent movement after the wall is placed into the model

8. Click the Modify button.
9. Hover your cursor over the top of the 3/4" (19 mm) plywood.
10. When the top of the plywood becomes highlighted, pick the line.
11. Unlock the blue padlock.
12. Click OK.
13. Click OK one more time to get back to the model.
14. Click the Modify button on the Architecture tab, or press Esc.
15. Save the model.

By unlocking the layer, you can move that layer up or down depending on what you need. Another good example of the usefulness of this functionality is when you need to slide a brick ledge down past a foundation.

Some people find splitting the regions in the Edit Assembly easy, whereas others consider it more difficult. I found the procedure difficult at first. If you're like me, this technique will require practice until you've done a few more walls. Don't worry—it gets easier as time passes.

Adding an automatic sweep along this wall would be nice. Come to think of it, a wood base and a chair rail would finish this wall perfectly.

Adding Wall Sweeps

The concept of adding a wall sweep is as close to actual construction as you can come without setting up a chop saw. That is because when you want to add a specific profile to sweep along a wall, you need to go outside the model, find (or create) the profile, and then bring it into the model. This process is similar to ordering trim and installing it.

In the following procedure, you'll load a base and a chair rail trim into the model. You'll then include these items in the wall on which you've been working. Follow these steps:

1. On the Insert tab, click the Load Family button.
2. Go to the Profiles directory, and then go to Finish Carpentry.
3. Load the files Base 1.rfa and Casing Profile-2.rfa. (Use Ctrl to select both files.)
4. On the Manage tab, click the Materials button.
5. Right-click the material Cherry.
6. Click the Duplicate choice.
7. Call the new material Cherry - Solid.
8. Double-click the new material to open the Material Editor.
9. Change the cut pattern to Wood 1.
10. Select the material Mahogany.
11. Click the Duplicate button.
12. Change the name to Mahogany Solid.
13. In the Material Editor, change the cut pattern to Wood 1.

14. Click Done, and then click OK.
15. On the Architecture tab, click the Wall button.
16. Make sure the current wall is West Stairwell Support Wall.
17. In the Properties dialog box, click Edit Type.
18. Click the Edit button in the Structure row.
19. Click the Sweeps button, as shown in Figure BC1.9.

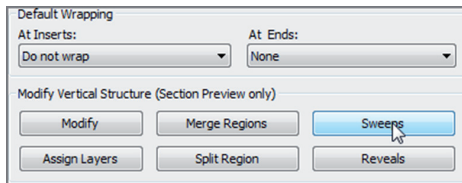


FIGURE BC1.9: Adding a sweep to the wall

20. In the Wall Sweeps dialog box, click the Add button, as shown in Figure BC1.10.

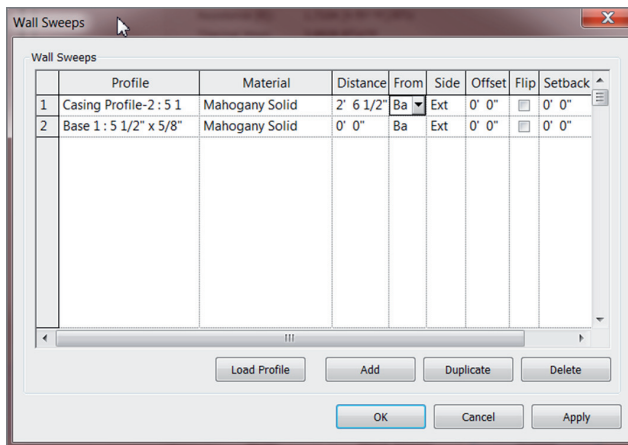


FIGURE BC1.10: Configuring the two sweeps

21. For Profile, use Base 1 : 5 1/2" × 5/8" (140 mm × 16 mm).
22. For Material, use Mahogany Solid. Click OK.
23. Click the Add button again.

24. The new Profile is Casing Profile-2 : 5 1/2" × 13/16" (140 mm × 21 mm).
25. Set Material to Mahogany Solid.
26. Set Distance 2'-6 1/2" (775 mm) from the base (see Figure BC1.10).
27. Click OK, and zoom in on the wall where the sweeps are located so that you can confirm they're placed as expected.
28. Click OK again.
29. Click OK one more time to get back to the model.
30. In the Properties panel, make sure Base Offset is set to 0'-0".
31. In the Options bar, set Height to Unconnected with a height of 10'-0" (3000 mm).
32. Set Location Line to Finish Face: Exterior, and make sure the Chain option is on.
33. Set Offset to -1" (-25 mm).
34. Draw the wall by snapping to the inside of the stringers, as shown in Figure BC1.11. You want to go in a clockwise direction, so start with the northern part of the staircase, marked 1 in Figure BC1.11.

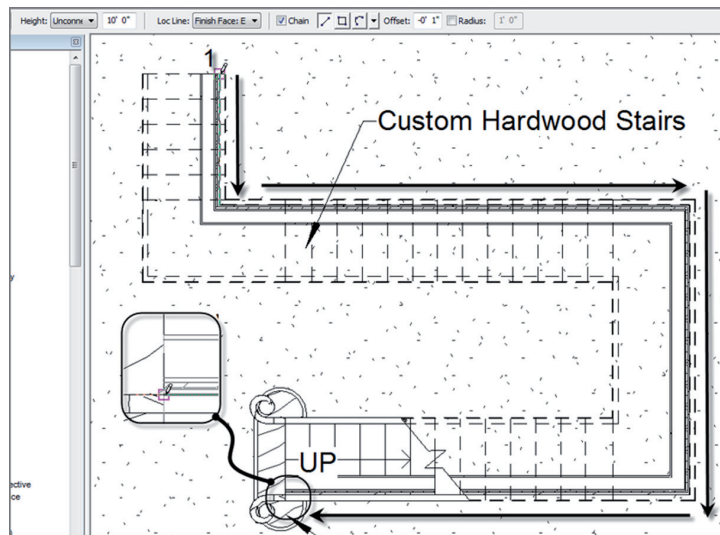


FIGURE BC1.11: Placing the wall clockwise in the model

35. On the Geometry panel on the Modify | Place Wall tab, click the Wall Joins button.
36. Using the Wall Joins tool, go to each wall corner and make the join Mitered.



TIP If you receive a warning stating that a sweep can't be added, ignore it. This warning is sometimes generated when there is a sweep on the face of a wall.

The wall has been added to the model. Because you're placing it underneath a staircase, there will be issues with the wall's profile. This brings us to the next section of this chapter, which guides you through modifying a wall's shape after it has been placed into the model.

Modifying a Wall's Profile in Place

Although we touched on modifying a wall profile in Chapter 2, "Creating a Model," in this section we'll take this technique to the next level. You can make a wall conform to any odd geometric shape you want if you follow a few simple rules and procedures.

Let's edit the profile of the new walls to conform to the profile of the stairs. Follow these steps:

1. On the View tab, click the Elevation button.
2. Place an interior elevation, as shown in Figure BC1.12.

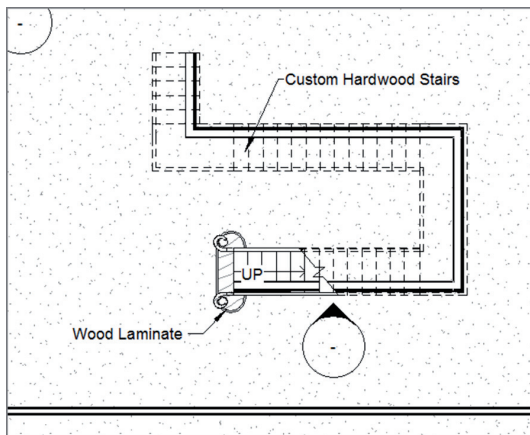


FIGURE BC1.12: Placing an interior elevation

3. Open the elevation.
4. Select the wall, as shown in Figure BC1.13.

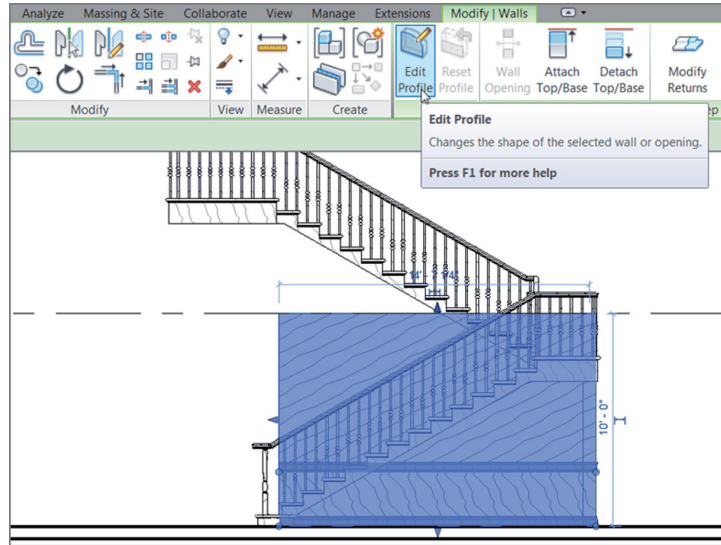


FIGURE BC 1.13: Selecting the wall to be modified and clicking the Edit Profile button

5. On the Mode tab, click Edit Profile (see Figure BC1.13).
6. On the Draw panel, click the Pick Lines icon.
7. Pick the underside of the stairs. Follow the profile exactly.
8. Delete the existing top magenta line and the existing left magenta line by selecting them and pressing the Delete key. All you should have left is the profile shown in Figure BC1.14.
9. Use the Trim/Extend Single Element command to clean up all the corners. Revit won't allow you to continue if you don't.
10. Click Finish Edit Mode. Your wall is trimmed to the underside of the stairs.



NOTE If your wall doesn't look right, select it again, and click Edit Profile. Keep working on the wall until you're satisfied.

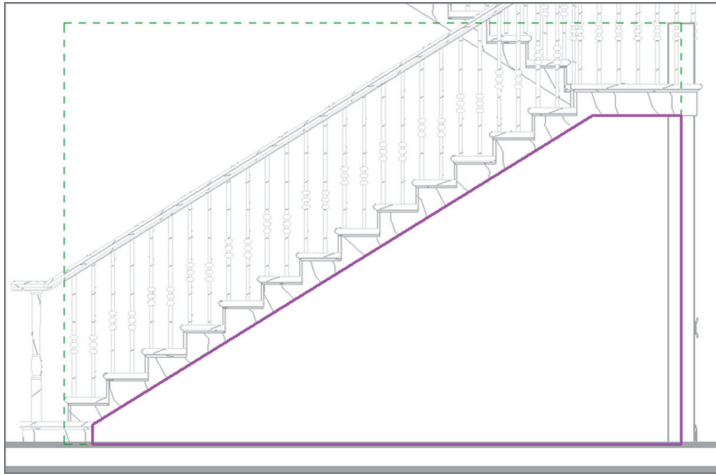


FIGURE BC1.14: Cleaning up the lines so that they form a continuous loop

11. Repeat the procedure for each wall under the stairs. Remember to add elevations for each. Your finished walls should look like Figure BC1.15.



FIGURE BC1.15: The finished walls should follow the profile of the stairs.

Now that you can create a compound wall and modify it to fit in an odd place, it's time to learn how to add some sweeps manually.

Manually Adding Host Sweeps

The problem with the wall scenario that you created in the previous procedure is that you have only horizontal wall sweeps. Suppose you need some vertical wall sweeps? This is where host sweeps come into play.

A host sweep is exactly like the sweeps you just added to the wall's properties, but by adding a host sweep, you can add sweeps manually. Next, you'll configure and add a host sweep to the model:

1. Go to the elevation shown in Figure BC1.16 (the first one you placed, looking at the stairs).

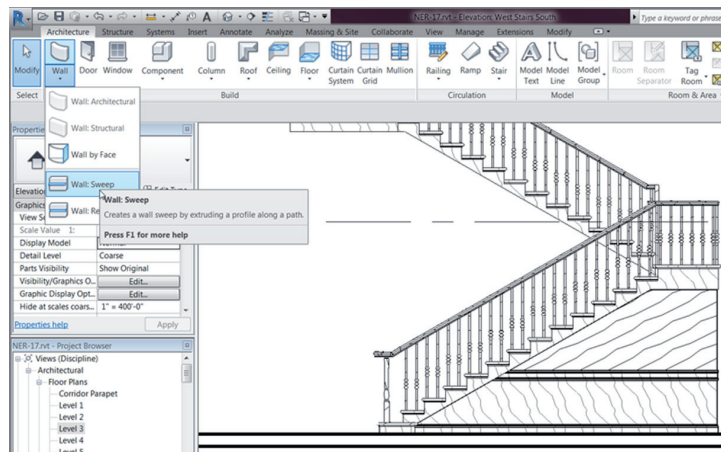


FIGURE BC1.16: Choosing the Wall Sweep command

2. On the Architecture tab, click the down arrow on the Wall button, and select Wall Sweep (see Figure BC1.16).
3. In the Properties dialog box, click Edit Type.
4. Click Duplicate.
5. Call the new sweep Chair Rail Sweep. Click OK.

6. For the profile, choose Casing Profile-2 : 5 1/2" × 13/16" (140 mm × 21 mm) from the list.
7. For Material, choose Mahogany Solid.
8. Click OK.
9. On the Modify | Place Wall Sweep tab, click Vertical on the Placement panel (see Figure BC1.17).

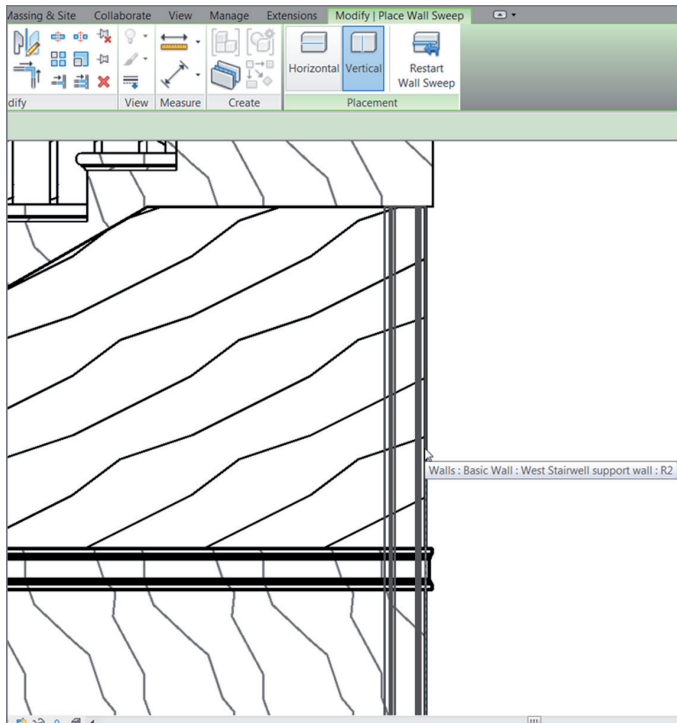


FIGURE BC1.17: Adding the profile to the wall

10. Make sure your Chair Rail Sweep is current in the Type Selector menu.
11. Place a vertical rail in the right corner, as shown in Figure BC1.18.

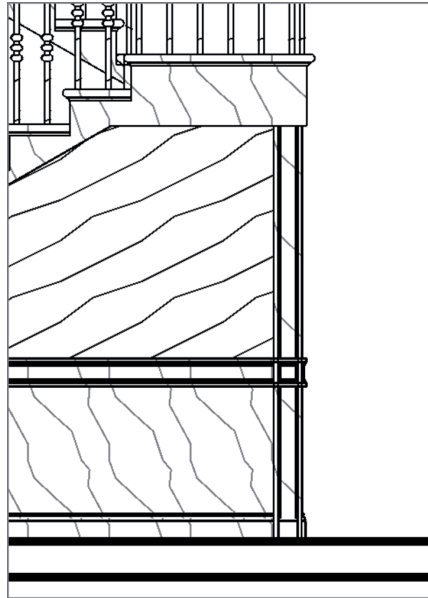


FIGURE BC1.18: Placing the sweep on the corner



NOTE If you're having trouble placing the sweep on the corner, you need to go to the plan and select **Edit Wall Joins** from the **Tools** toolbar. Pick the corner of the walls, and select **Mitered** from the **Options** bar. If you need further assistance with this procedure, go back to Chapter 2 and read up on creating mitered wall joins.

12. After the trim is placed, press Esc.
13. Select the vertical trim. Notice the grips on the top and the bottom. Pick the bottom grip, and drag it up to meet the top chair rail, as shown in Figure BC1.19.
14. Add another sweep about 3' (900 mm) to the left of the first sweep.
15. When the sweep is in, select it. A temporary dimension appears. Change the dimension to 3'-0" (900 mm).
16. Drag the bottom up.
17. Repeat the procedure so that your elevation looks like Figure BC1.20.
18. Add vertical rails at around 3'-0" (900 mm) to the other walls, as well. Your walls should look like Figure BC1.21.

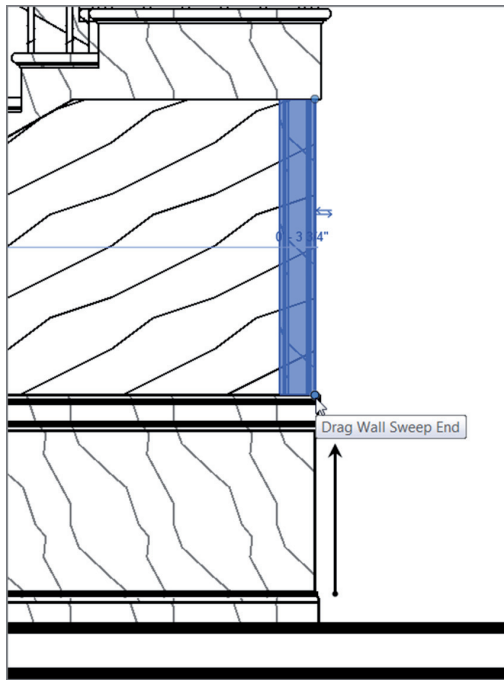


FIGURE BC1.19: Dragging the sweep up to the chair rail

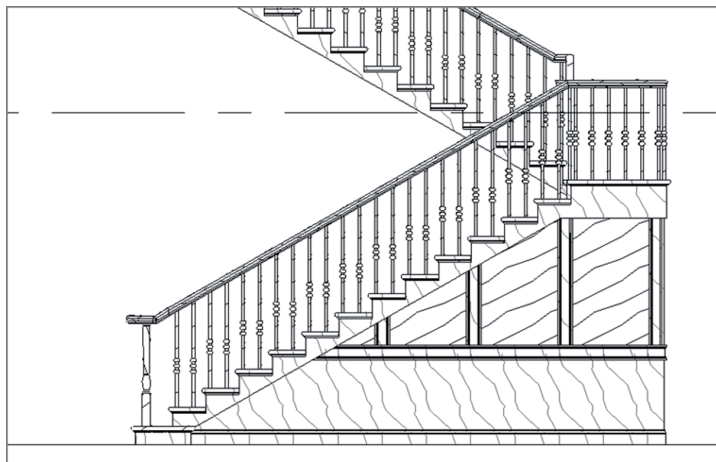


FIGURE BC1.20: The finished south wall of the stairs

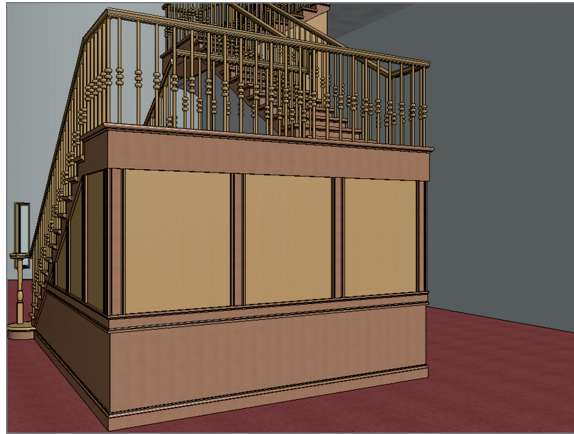


FIGURE BC1.21: The final walls with the sweeps added

You can now make modifications to a simple wall in any direction. You have experience adding sweeps to the wall's composition, and you can add sweeps freehand when you need to do so.

One other type of wall that we should cover before we get to curtain walls is a stacked wall. When you need a compound wall, the outside face must always be in alignment. When you run into this situation, you have to construct an entirely new wall.

Creating Stacked Walls

A *stacked wall*, simply put, is a wall created by stacking two premade walls together. You can't have a stacked wall without at least two basic walls that you can join. The good thing about stacked walls is that you can stack as many as you like. I recommend that you use some restraint, though—these walls can use up memory if you get too carried away.


OPEN THIS DOOR ONLY IN CASE OF EMERGENCY!

Although it's true that a stacked wall is basically the only good way to create a wall system with an offset face, stacked walls are notoriously bad in terms of hosting items and joining to other walls. In addition, one of the biggest drawbacks of a stacked wall is that it doesn't appear in a wall schedule—only the separate parts that form the wall will show up.

The objective of the following procedure is to join three basic walls together to create one stacked wall. The result will create an alcove for architectural case-work. Follow these steps:

1. Go to Level 1 West, and, on the Architecture tab, click the Wall button.
2. In the Type Selector menu in the Properties dialog box, select Basic Wall : Interior 6 1/8" (156 mm) Partition (2Hr).
3. Click Edit Type.
4. Click Duplicate.
5. Call the wall 18" (450 mm) Soffit Wall, and click OK.
6. Change Wrapping At Inserts and Wrapping At Ends to Interior.
7. Click the Edit button in the Structure row.
8. In the Layers area, click 3 Core Boundary (Layers Above Wrap), and click Insert.
9. Set Function to Structure [1].
10. Set Material to Air Barrier – Air Infiltration Barrier.
11. Set Thickness to 8 1/4" (210 mm).
12. Click Insert (to insert another layer above).
13. Set Function to Structure [1].
14. Set Material to Metal – Stud Layer.
15. Set Thickness to 3 5/8" (92 mm) (see Figure BC1.22).
16. Click OK twice.
17. To the left of the Ribbon, click the Modify button (doing so clears the Wall command).

Let's begin building the stacked wall. Because you have two walls with which to work, you can specify them in the Edit Assembly dialog box for the stacked wall.



A good way to establish the overall thickness is to look at the top of the Edit Assembly dialog box. There you can see the Total Thickness value.

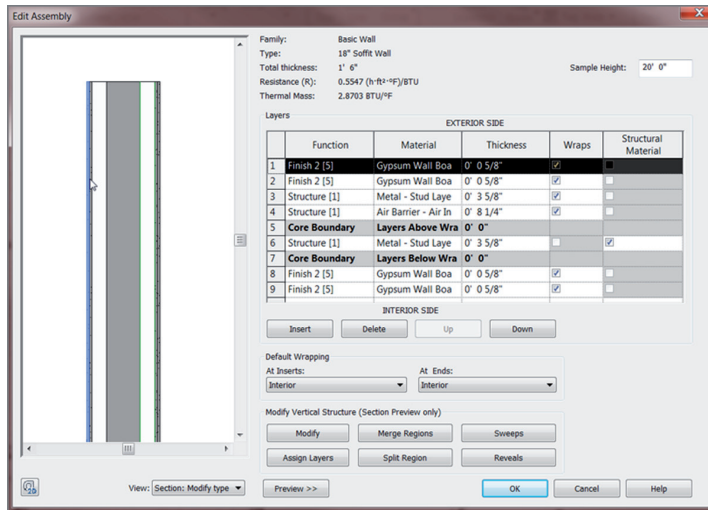


FIGURE BC 1.22: The wall layers

The next procedure joins the 18" (450 mm) soffit wall with the 6 1/8" (156 mm) partition wall:

1. On the Architecture tab, click the Wall button if it isn't already running.
2. Scroll down the Type Selector until you arrive at Stacked Wall: Exterior – Brick Over CMU w Metal Stud, and select it.
3. Click Edit Type.
4. Click Duplicate.
5. Call the new wall Recessed Wall, and click OK.
6. Click Edit in the Structure row.
7. For Offset, select Finish Face: Interior.
8. In the Types area, change Wall 1 to 18" (450 mm) Soffit Wall.
9. Change Wall 2 to Interior – 6 1/8" (156 mm) Partition (2-Hr).
10. Change Height to 5'–6" (1650 mm).
11. Insert a wall below the Interior - 6 1/8" (156 mm) Partition (2-Hr) wall.
12. Change the third wall to 18" (450 mm) Soffit Wall.
13. Change the height to 3'–0" (900 mm).

- At the top of the dialog box, change Sample Height to 10'-0" (3000 mm) (see Figure BC1.23).

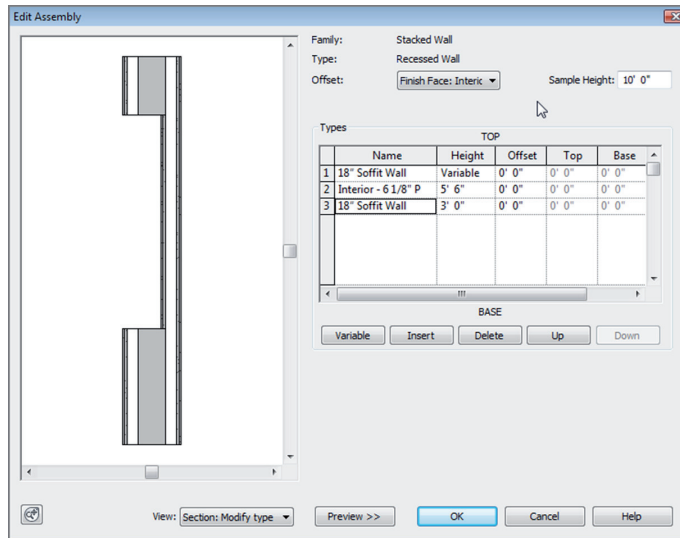


FIGURE BC1.23: Creating the stacked wall

- Click the Preview button.
- Click OK twice.
- Draw the wall in the west wing, as shown in Figure BC1.24. (If you want, you can create an elevation or cut a section through the wall.)

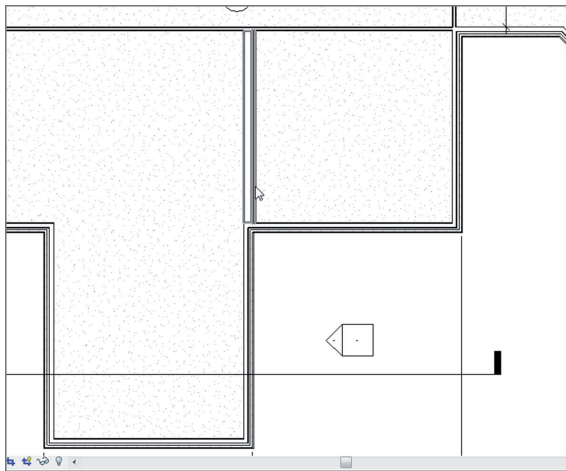


FIGURE BC1.24: Adding the new stacked wall to the model

With the concept of stacked walls behind us, we can move into the crazy world of curtain walls. Although curtain walls are complex in nature, Revit handles them quite well.

Creating Curtain Walls

The topic of curtain walls brings us away from the conventional mind-set of walls. Curtain walls are placed into the model the same way as conventional walls, but curtain walls have many more restrictions and Element Properties that you should examine before you go throwing one into your model.

With that said, curtain walls also provide the most dramatic effect on your building. As this section will explain in detail, a curtain wall is not only composed of glass and aluminum extrusions but can also be constructed from building materials such as brick, CMU, and wood. You can also predefine the materials and the spacing, or you can create them grid by grid, depending on your situation.

The first part of this section will focus on adding a predefined curtain system to the model.

Adding a Predefined Curtain Wall

The quickest way to model a curtain wall is to use one that has already been created for you. The out-of-the-box curtain walls that are provided with Revit have enough instance and type parameters available to make the curtain wall conform to your needs for each situation.

In the next procedure, you'll add a predefined curtain-wall system to the radial east entry wall. Follow these steps:

1. In the Project Browser, open the Level 1 East plan view.
2. Zoom in on the east entry.
3. On the Architecture tab, click the Wall button.
4. In the Type Selector, select Curtain Wall: Storefront.
5. Click Edit Type.
6. Click Duplicate.
7. Call the new curtain wall East Entry, and click OK.
8. You can configure many parameters. Verify that Automatically Embed is selected. For Vertical Grid Pattern, change Spacing to 4'-0" (1200 mm).

9. Select Adjust For Mullion Size.
10. For Horizontal Grid Pattern, change Layout to Maximum Spacing, and change the spacing to 4'-0" (1200 mm). Also select Adjust For Mullion Size.
11. Click OK.
12. In the Instance Properties dialog box, change Base Offset to 3'-7" (1075 mm).
13. Set Top Constraint to Up To Level: Roof.
14. Set Top Offset to -1'-0" (that's minus 1'-0") (-300 mm).
15. On the Draw panel, click the Pick Lines icon.
16. Pick the radial entry wall, as shown in Figure BC1.25. Make sure you're picking the wall centerline.
17. Go to a 3D view. Your curtain wall should resemble Figure BC1.26.

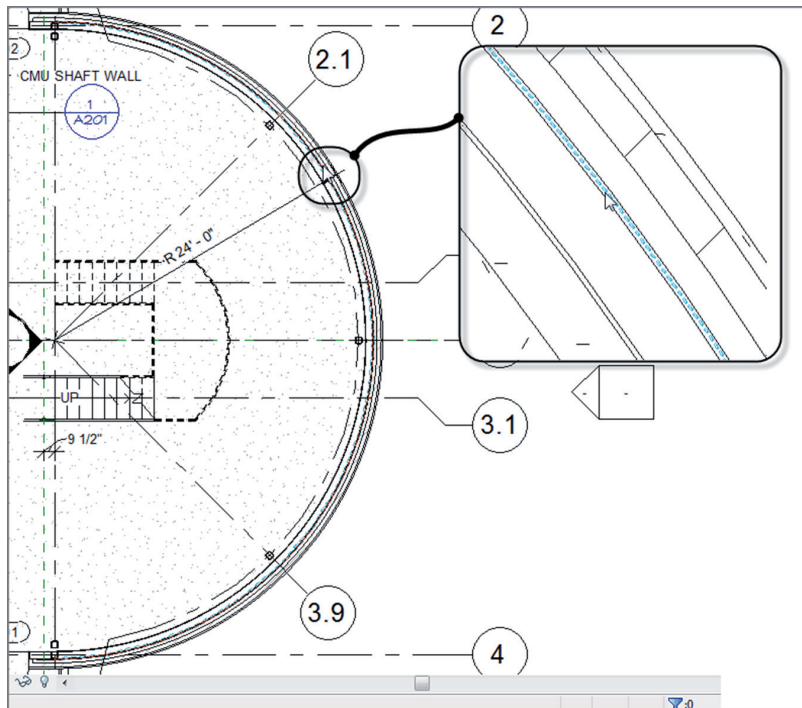


FIGURE BC1.25: Picking the radial entry wall to add the curtain wall

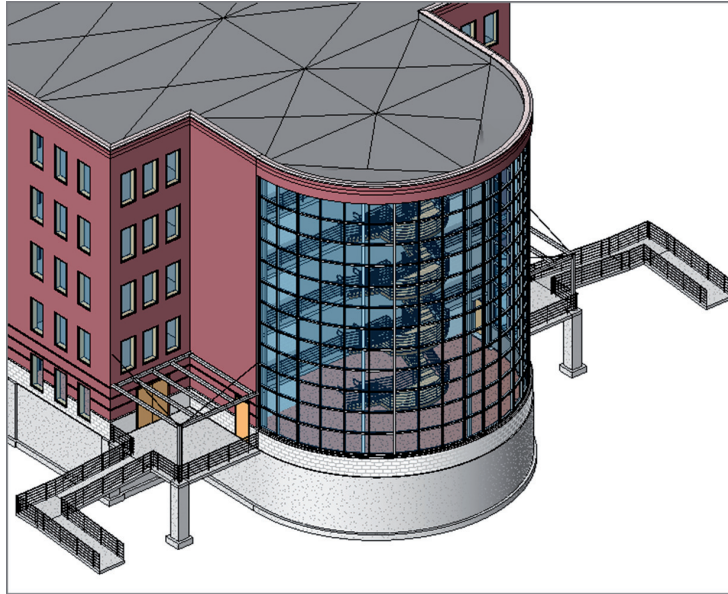
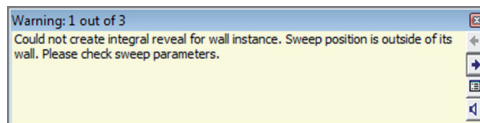


FIGURE BC1.26: The curtain wall in 3D

REVIT CAN BE TOUCHY

You may receive a warning that says, “Could not create integral reveal for wall instance. Sweep position is outside of its wall. Please check sweep parameters.” If you do, click the red X in the upper-right corner of the warning to dismiss it (as shown here):



The ability to create an automatic curtain wall such as the radial one in the west entryway is quite an advantage when it comes to modeling a curtain system quickly. However, you won't always be presented with a perfectly square, vertical shape. This is where creating a blank curtain wall comes in handy. You can then add grids and mullions at spaces that are at odd intervals.

Adding a Blank Curtain Wall

A blank curtain wall is nothing but a giant chunk of glass. By adding a blank curtain wall, you tell Revit, “Don’t bother spacing the panels—I’ll do it myself.”

Let’s create a blank curtain wall and add it to the model. You’ll then go to an elevation and edit the profile of the panel. Follow these steps:

1. In the Project Browser, open the Level 1 West view.
2. On the Work Plane panel of the Architecture tab, click Ref Plane, and then click Pick Lines on the Draw panel.
3. Offset a reference plane 2’-0” (600 mm) from the face of brick, as shown in Figure BC1.27.

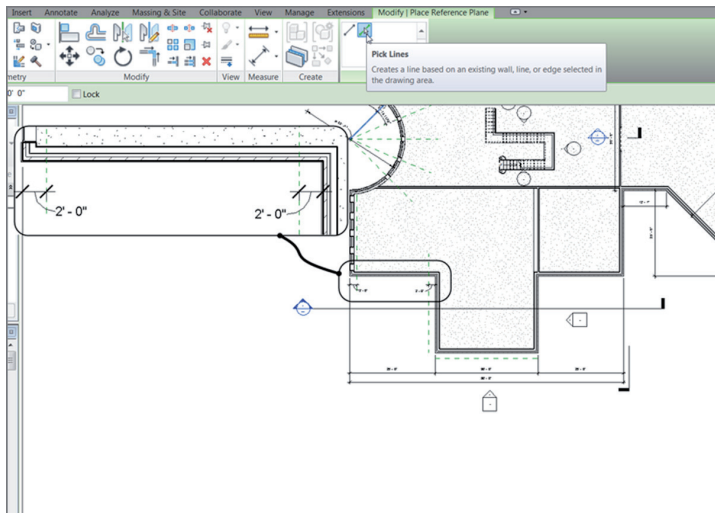


FIGURE BC 1.27: Offsetting two reference planes 2’-0” (600 mm) from the face of brick

4. On the Architecture tab, click the Wall button.
5. In the Type Selector, pick Curtain Wall: Curtain Wall 1 from the list.
6. Click Edit Type.
7. Click Duplicate.
8. Call the new curtain system South West Entry, and click OK.
9. Select the Automatically Embed check box.

10. Click OK.
11. For Base Offset, change the value to 0'-0".
12. For Top Constraint, set the value to Up To Level: Level 5.
13. For Top Offset, change the value to 0'-0".
14. Draw the wall at the centerline of the wall between each reference plane, as shown in Figure BC1.28. Note that if you draw from left to right, the exterior face of the new wall will be to the inside.

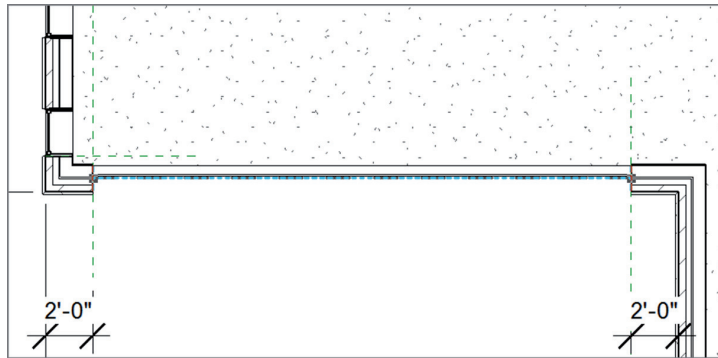


FIGURE BC1.28: Drawing the curtain wall at the centerline of the wall between the two reference planes

15. In the Project Browser, open South Entry Elevation.
16. In the South Entry Elevation, change Visual Style to Shaded (so that you can see the glass wall better).

Now that you've drawn the wall and are looking at the elevation, you can begin to alter the profile and add some curtain grids of your own. To edit the curtain profile, follow these steps:

1. Select the curtain wall.
2. On the Modify | Walls tab, click Edit Profile.
3. On the Draw panel, click Pick Lines.
4. Using the Options bar, offset the roof down 2'-0" (600 mm), and trim the edges of the curtain wall to the offset line.
5. Delete the horizontal magenta line that is now floating.
6. Click Finish Edit Mode. Your curtain wall's profile should resemble Figure BC1.29.

To select the curtain wall, you have to hover your pointer over an edge. When the curtain wall's perimeter becomes highlighted, select it.

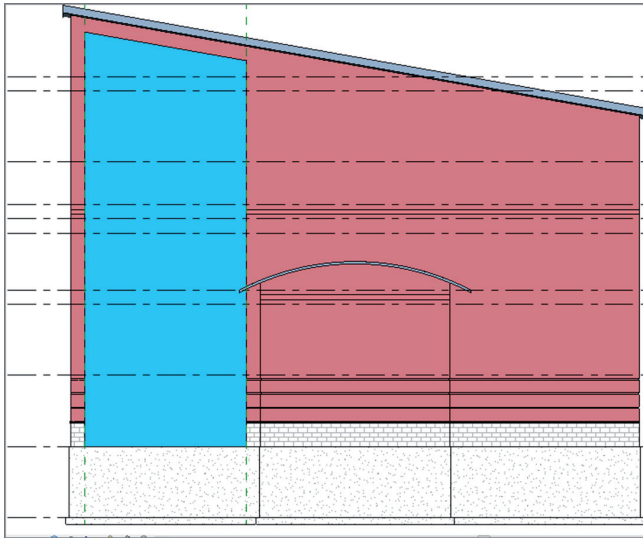


FIGURE BC1.29: The complete curtain-wall profile

With the shape of the curtain wall finished, let's create some divisions along the vertical and horizontal plane of the wall. In Revit, these are called *curtain grids*.

Creating Curtain Grids

Because all you have is a single pane of glass, you need to dice it up. In this situation, you can begin dividing the glass panel by using the Curtain Grid command. When you've finished, you can add mullions, doors, and even materials to the panels.

Begin by adding curtain grids to the glass panel:

1. On the Build panel of the Architecture tab, click the Curtain Grid button, as shown in Figure BC1.30.

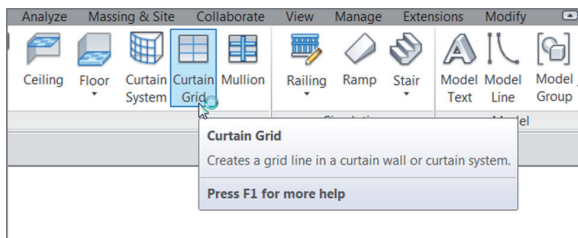


FIGURE BC1.30: Click the Curtain Grid button on the Build panel of the Architecture tab.

2. On the Modify | Place Curtain Grid tab, click the All Segments button, as shown in Figure BC1.31.

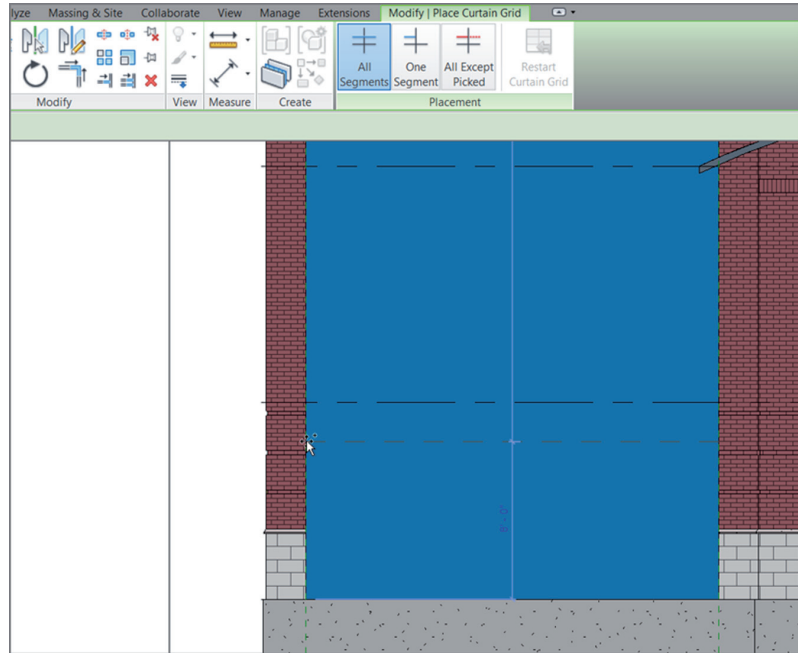


FIGURE BC 1.31: Picking a point 8'-0" (2400 mm) up from the base of the wall

3. Move your cursor up the left side of the curtain wall, and pick a horizontal point that is 8'-0" (2400 mm) up from the base of the wall (see Figure BC1.31).
4. Press Esc twice, or click Modify.
5. Select the horizontal grid.
6. Click the Copy button on the Modify panel.
7. Copy the grid up 4'-0" (1200 mm).
8. Copy the 4' grid up 2'-0" (600 mm).
9. Repeat this pattern until you've reached the top of the wall (see Figure BC1.32).

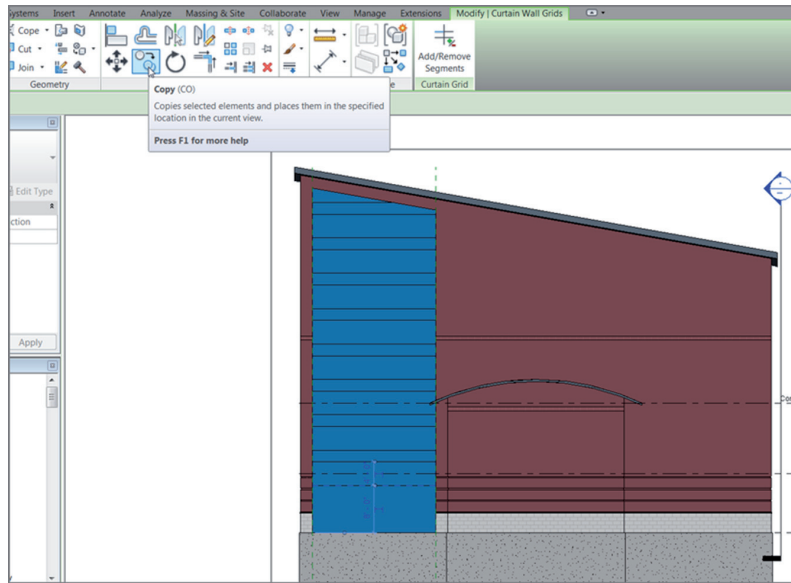


FIGURE BC1.32: Copying the grids to form the custom curtain wall

10. Click the Curtain Grid button.
11. Slide your cursor along the base of the panel (the grid is extended in a vertical direction).
12. On the Placement panel, click the One Segment button.
13. Pick the midpoint of the panel. (You should have segmented only the bottom panel.)
14. Click Modify.
15. Select the vertical grid.
16. On the Modify toolbar, click the Move icon.
17. Move the grid to the left 3'-0" (900 mm).
18. Copy the grid to the right 6'-0" (1600 mm). Your wall should now look like Figure BC1.33.

With the panel broken up, you can begin adding materials. One material you may not think of is an actual door! Yes, in Revit curtain walls, you add a door to a curtain panel as a material.

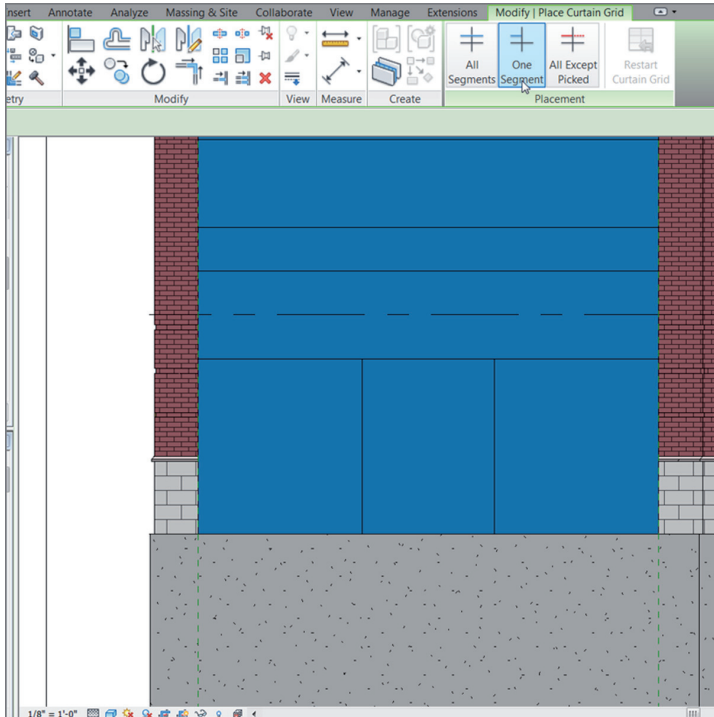


FIGURE BC1.33: Chopping up the panel

Adding Materials

In addition to doors, you can add to a curtain wall any material that is present in the model. You can even add separate wall systems.

In this procedure, you'll add a door to the curtain system. Then you'll add brick belts that fill the 2'-0" (600 mm) sections. Follow these steps:

1. On the Insert tab, click the Load Family button.
2. Browse to Doors, and open the Curtain Wall-Store Front-DbL.rfa file.
3. Zoom into the 6' × 8' (1800 mm × 2400 mm) panel.
4. Hover your cursor at the top of the panel.
5. Press the Tab key twice. When the panel is highlighted, pick it (see Figure BC1.34).

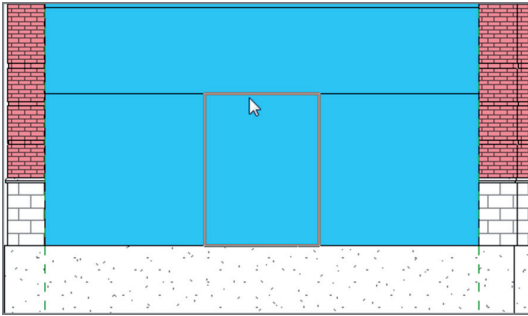
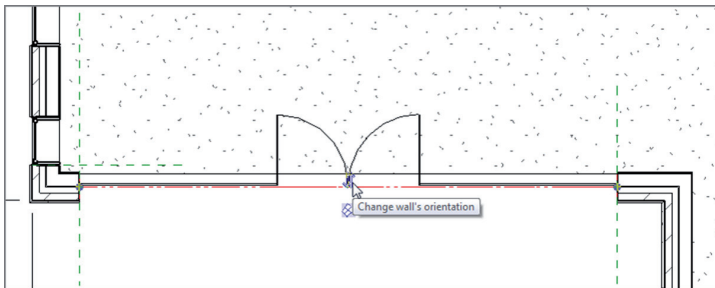


FIGURE BC1.34: Selecting the 6' × 8' (1800 mm × 2400 mm) panel

6. In the Type Selector, pick Curtain Wall-Store Front-Dbl: Store Front Double Door. A door appears in the panel.
7. Select the 2'-0" (600 mm) panel above the door.
8. In the Type Selector, pick Basic Wall: Generic – 12" (300 mm) Masonry.
9. Press Esc.
10. Fill the rest of the 2'-0" (600 mm) bands with the same Generic – 12" (300 mm) Masonry.

HEY, THIS IS GRAY!

If the wall shows up backward (appears gray), then you need to flip the curtain wall physically. To do so, go to the Level 1 West plan, and select the curtain wall. Then click the little double arrow in the middle of the wall, as shown in this graphic. Doing so flips the direction of the entire curtain wall.



With the panels in place, you can start filling in the mullions. This brings us to the next step: adding mullions to the grid.

Adding Mullions to the Grid

The next logical step is to create the mullions that will be attached to the grid you just added. Because you have a few areas where there shouldn't be mullions, the job becomes more tedious.

The next example could go one of two ways. One technique adds mullions *piece by piece*, and the other procedure lets you add mullions all at once and then delete the mullions you don't need. This procedure takes the latter approach; you'll add the mullions all at once and then remove the superfluous mullions:

1. On the Build panel of the Architecture tab, click the Mullion button, as shown in Figure BC1.35.

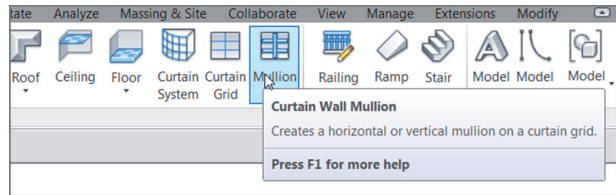


FIGURE BC 1.35: Click the Mullion button on the Architecture tab.

2. In the Properties dialog box, choose Rectangular Mullion: 2.5" × 5" (64 mm × 127 mm) Rectangular.
3. On the Placement panel, click All Grid Lines.
4. Pick the grid above the door, as shown in Figure BC1.36.

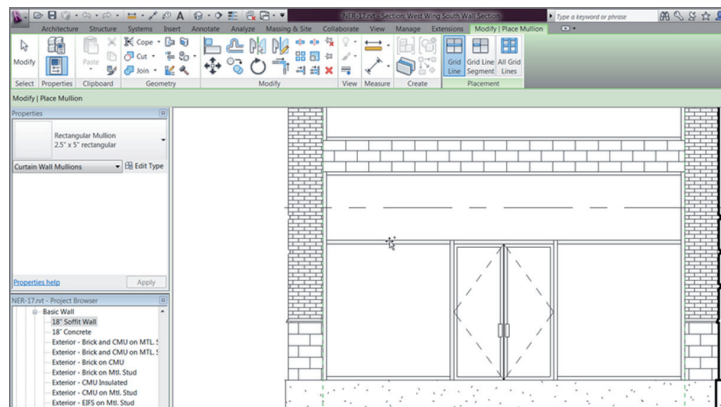


FIGURE BC 1.36: Place the 2.5" × 5" (64 mm × 127 mm) rectangular mullion above the door.

5. Pick anywhere on the grid. The mullions are added to the entire system.
6. Press Esc.

With the mullions added, you've actually gone too far! An aluminum extrusion separates the CMU from the adjacent brick. You also need to delete the mullion that appears under the door. Let's remove these pieces of mullion:

1. Zoom into an area where the CMU meets the brick, as shown in Figure BC1.37.

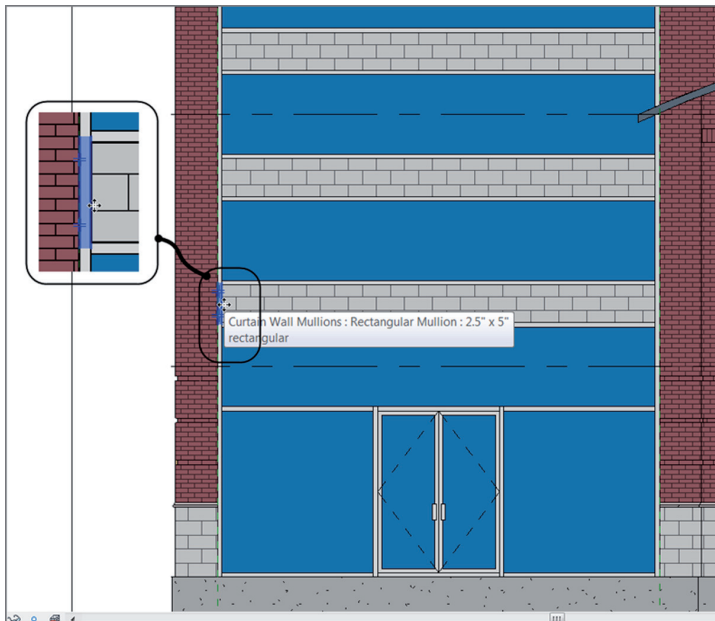


FIGURE BC1.37: Selecting the mullion

2. Select the small mullion piece that lies between the brick and the CMU. (You'll have to press the Tab key several times to accomplish this.)
3. You can either modify the join (as shown in Figure BC1.37) or press the Delete key and remove the mullion. In this case, delete the mullion. Repeat the procedure for other similar areas.

What have you accomplished? You've embedded a predefined curtain wall into a radial profile, and you've added a curtain system to a giant glass panel by hand. The only thing left to do is to apply a curtain wall to a sloping surface.

Adding a Wall to a Massing Object

Everything you've done up to this point has been within a perfectly plumb application. Not everything in architecture is perfectly plumb, however. Suppose you needed a wall that sloped in or out at an angle. Well, gentle readers, let's get into the world of massing.

Now that you're finally using 3D for the first time in the book, you need to think in those terms. You have to deal with two dimensions and then let Revit project the third. You first need to provide geometry in plan. Second, you provide geometry in elevation. When you have the plan and elevation geometry, you can blend the two together, creating the third dimension. Once this mass is created, you simply apply a wall system to the face of the mass. Let's get started:

1. Open the Level 1 West view.
2. Zoom in on the area shown in Figure BC1.38.

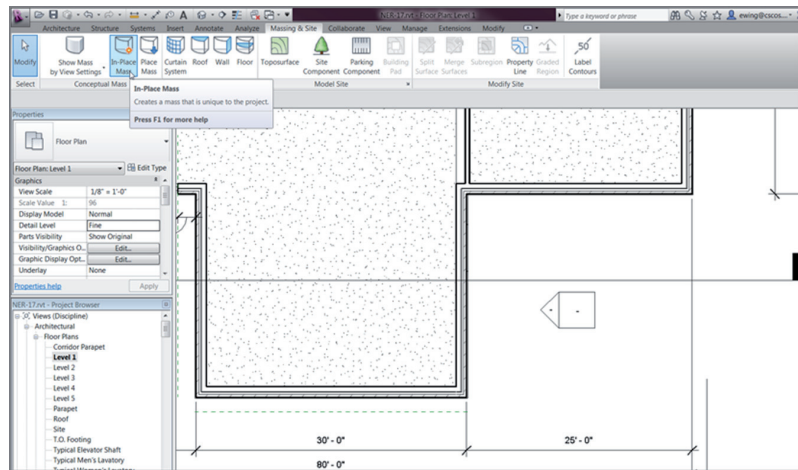


FIGURE BC1.38: Massing up your model

3. On the Massing & Site tab, click the In-Place Mass button (see Figure BC1.38). Revit may throw a warning stating that it's turning on the mass visibility. This is good, so click Close.

4. Call the new mass West Wing Atrium, and click OK.
5. On the Draw panel, click the Reference Line button, as shown in Figure BC1.39.

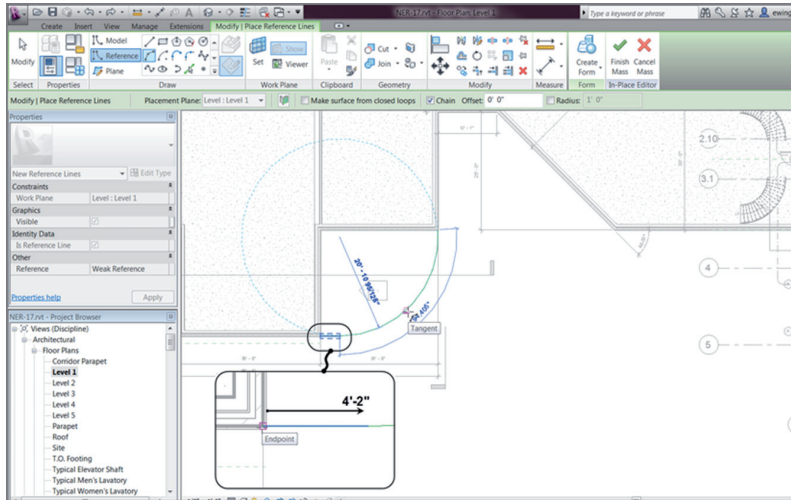


FIGURE BC1.39: Creating the plan geometry

6. Make sure the Draw On Work Plane button is active.
7. Draw a straight line from the corner of the building as shown, moving to the right 4'-2" (1250 mm). Be sure to pick the face of the brick as the start.
8. With the Reference command still running, click the Start – End – Radius Arc button.
9. Pick the corner of the building.
10. Move your cursor to the right until the arc snaps to the tangency, and then pick the third point (see Figure BC1.39).
11. Click Modify. Your plan should look like Figure BC1.40.

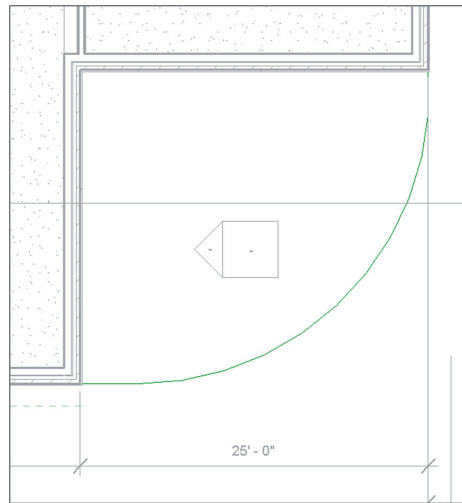


FIGURE BC 1.40: A simple line and an arc

Let's take a breather. You've satisfied the first criteria of creating a mass element by creating a simple line and arc. This line and arc will be the guide for your vertical geometry to ride along—that is, the path. It's time to move on to the second dimension: the vertical dimension. Follow these steps:

1. Open the section called West Corridor Section. You can double-click the section in plan, or you can open it from the Project Browser.
2. In the Draw panel, click the Reference Plane button, as shown in Figure BC1.41.

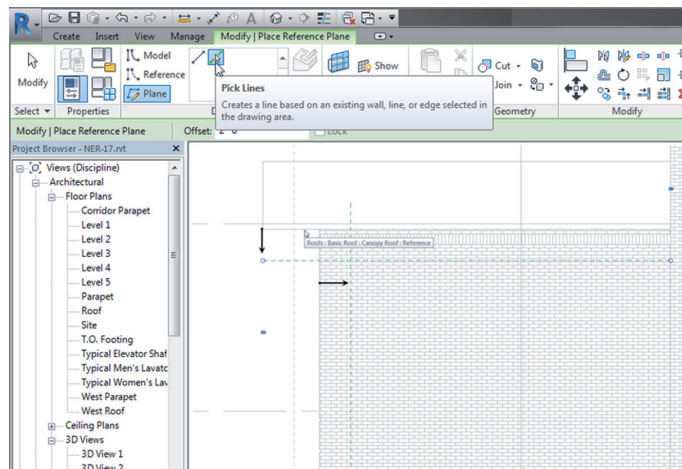


FIGURE BC 1.41: Creating some guides

3. Use Pick Lines, and offset the front face of the wall to the right 2'-0" (600 mm).
4. With the same command still running, offset another reference plane down 2'-0" (600 mm) from the bottom of the roof beyond (see Figure BC1.41).

Now let's draw the actual shape:

1. In the Draw panel, click the Model line button (see Figure BC1.42).

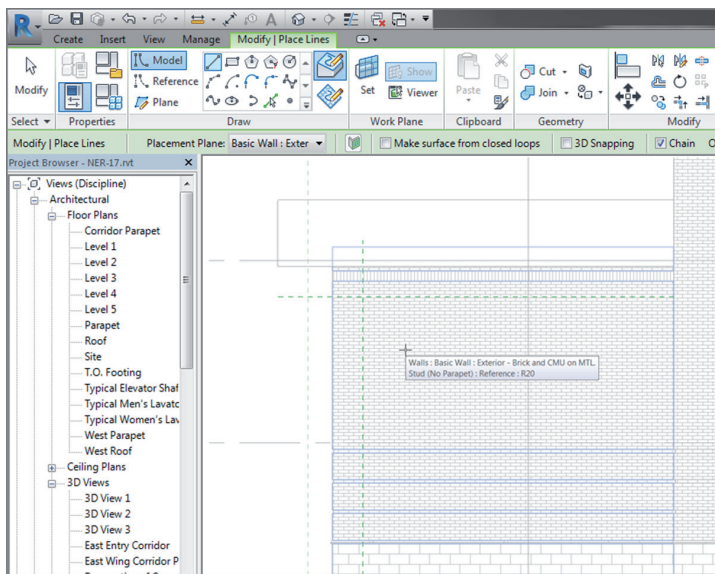


FIGURE BC1.42: Setting the vertical work plane

2. In the Work Plane dialog box, select Pick A Plane, click OK, and select the wall.
3. On the Options bar, be sure that Make Surface From Closed Loops is unchecked and that the Chain button is selected.
4. Verify that Draw Line is the draw option. Draw a line from point 1 to point 2, as shown in Figure BC1.43. (This line is from the bottom of the CMU wall to the bottom of the concrete ledge.)
5. Draw a line from point 2 to point 3 (see Figure BC1.43).
6. Draw a line from point 3 to point 4 (see Figure BC1.43).

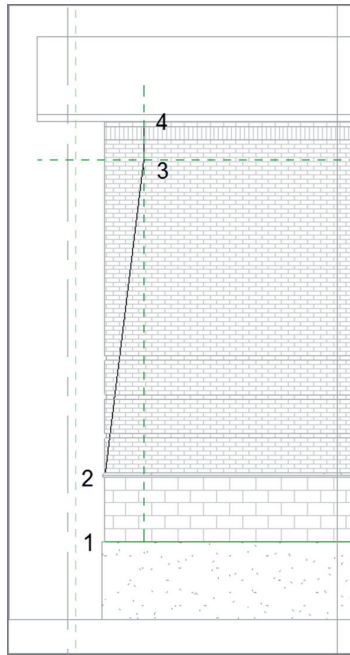


FIGURE BC1.43: Drawing the face of the shape

7. Press Esc once (and only once).
8. Click the Pick Lines button.
9. Set Offset to 6" (150 mm).
10. Hover over the angled line.
11. Press the Tab key. When the three lines are highlighted, pick the wall. You may have to zoom in a little to tell Revit that you need to make a screen selection.
12. Offset the three lines to the right, as shown in Figure BC1.44.
13. Change Offset to 0 on the Options bar.
14. Change the Pick Lines option to Draw Lines.
15. Draw a line at the top and the bottom, closing the loop. See Figure BC1.45. Pick Modify.

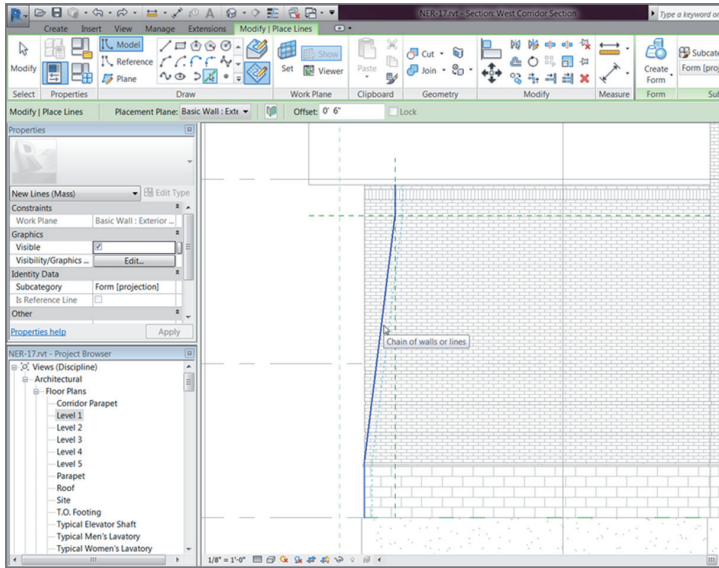


FIGURE BC1.44: Creating the thickness

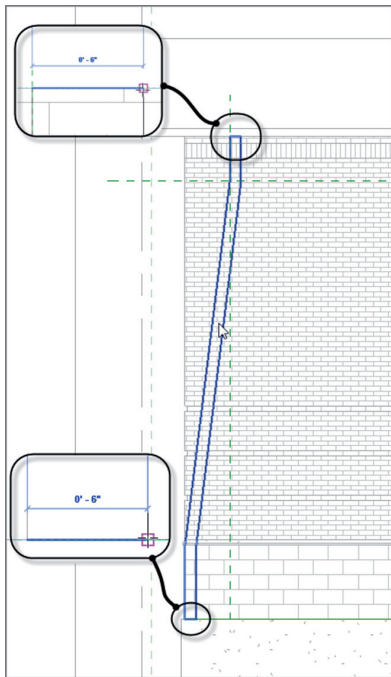


FIGURE BC1.45: Closing the loop

Nice! Two out of the three requirements for 3D are completed: horizontal (plan) and vertical (elevation). The only thing left to do is tell Revit to blend the two together.

1. Go to the default 3D view.
2. Zoom in on the area in which you're working.
3. Hover your cursor over one of the lines of the shape you just drew.
4. Press the Tab key. Revit selects the entire perimeter of the shape.
5. With the vertical shape selected, hold the Ctrl key and pick the reference arc you drew.
6. Click the Create Form button, as shown in Figure BC1.46.

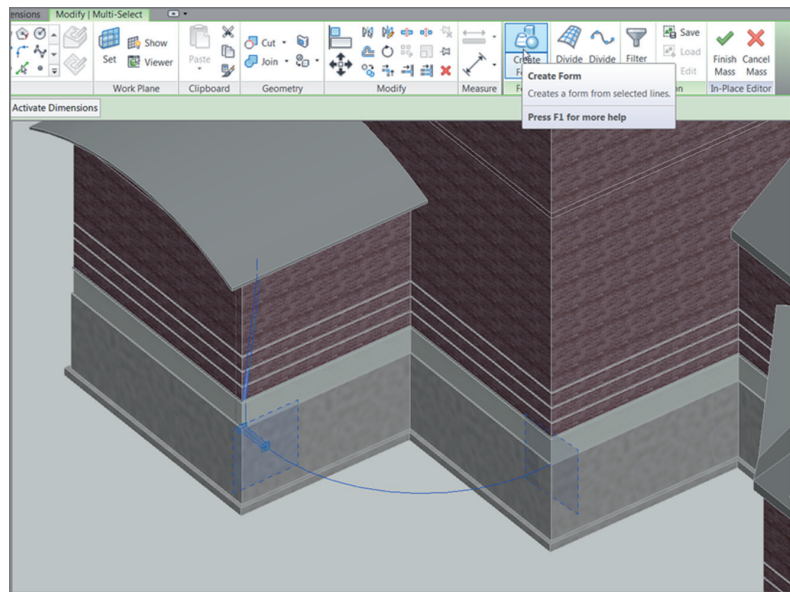


FIGURE BC1.46: Selecting the objects and creating the form

7. When the form is placed, click the Finish Mass button. You should be looking at what is shown in Figure BC1.47.

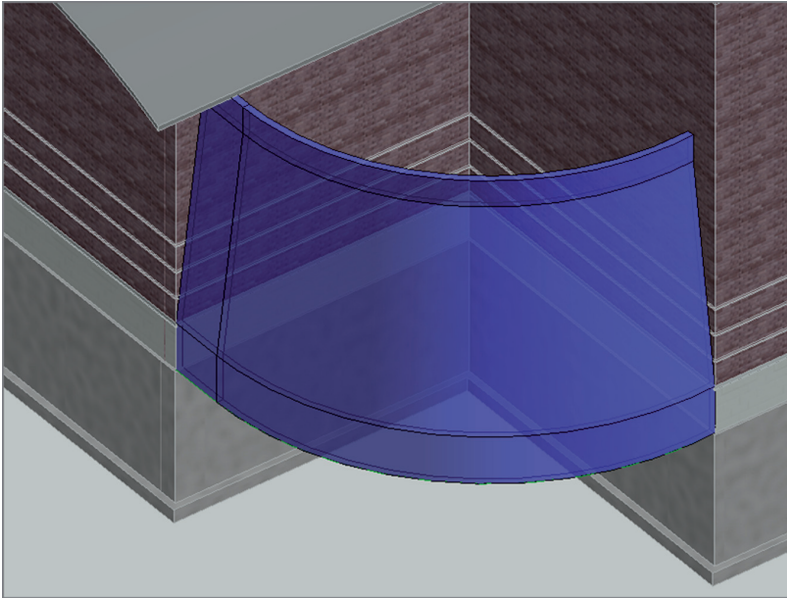


FIGURE BC1.47: The finished mass

Now it gets fun! You'll begin adding walls to the shape. In Revit Architecture, there are three ways to add walls to a model: draw them in, pick lines to add them, or pick faces. You have some pretty sweet faces eager to host some walls, so let's dig in. Follow these steps:

1. On the Architecture tab, click the Curtain System by Face button, as shown in Figure BC1.48.

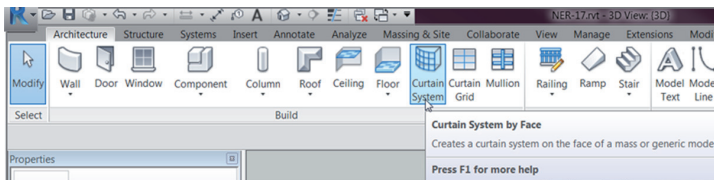


FIGURE BC1.48: Curtain System by Face

2. Click Edit Type.

3. Click Duplicate, and call the new system Atrium Curtain System.
4. For Curtain Panel, select System Panel : Glazed.
5. Set Join Condition to Border And Grid 1 Continuous.
6. Layout for Grid 1 pattern is Maximum Spacing, and Spacing is 2'-0" (600 mm).
7. Select Adjust For Mullion Size.
8. Repeat the settings for the Grid 2 pattern.
9. For the Grid 1 and Grid 2 mullions, select Circular Mullion : 2.5" (50 mm Radius) Circular for Interior Type as well as the Border 1 and 2 types, as shown in Figure BC1.49.

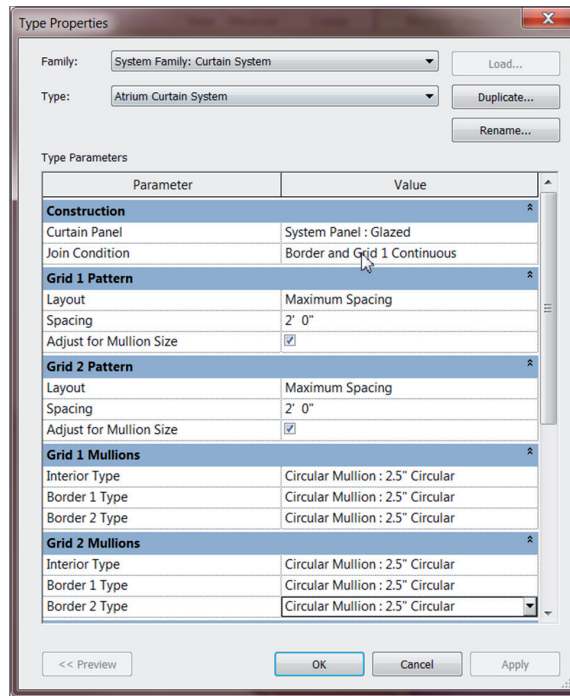


FIGURE BC1.49: Configuring the curtain system

10. Click OK.
11. Pick the two sloping faces of the mass, as shown in Figure BC1.50.

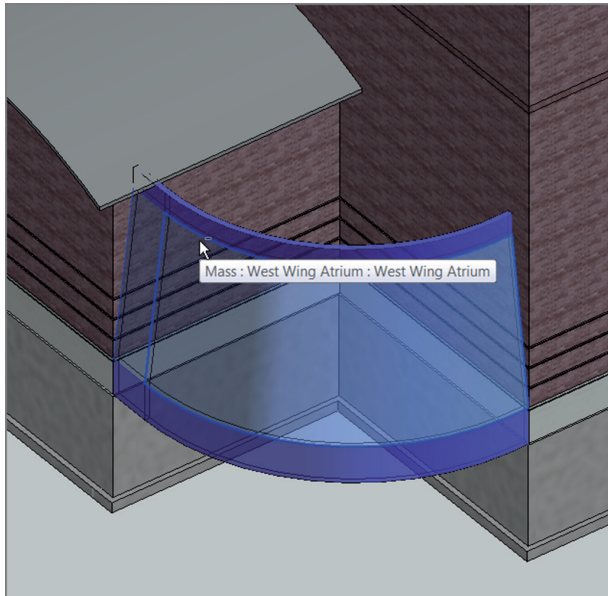


FIGURE BC1.50: Selecting the faces to host the curtain system

12. Click the Create System button, and you have it! (See Figure BC1.51.)

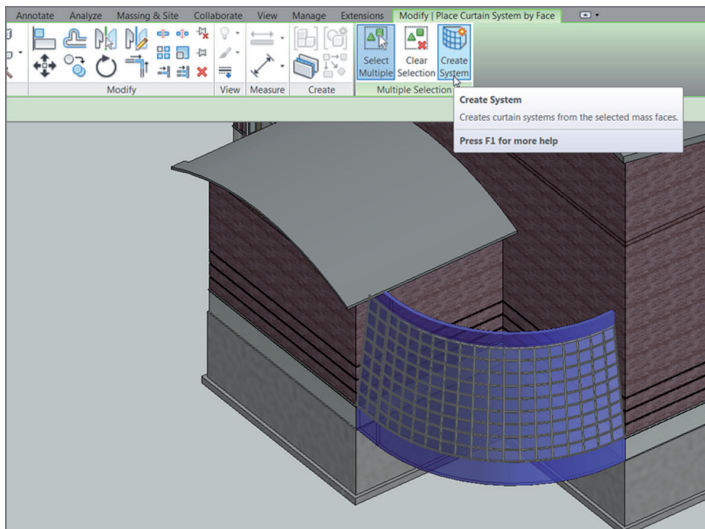


FIGURE BC1.51: The curtain wall in all its glory

Let's add some CMU and brick walls to the top and bottom:

1. Change Visual Style to Shaded.
2. On the Architecture tab, click the Wall button.
3. In the Type Selector in the Properties dialog box, select Basic Wall Generic 12" (300 mm) Masonry.
4. On the Draw panel, click the Pick Faces button, as shown in Figure BC1.52.

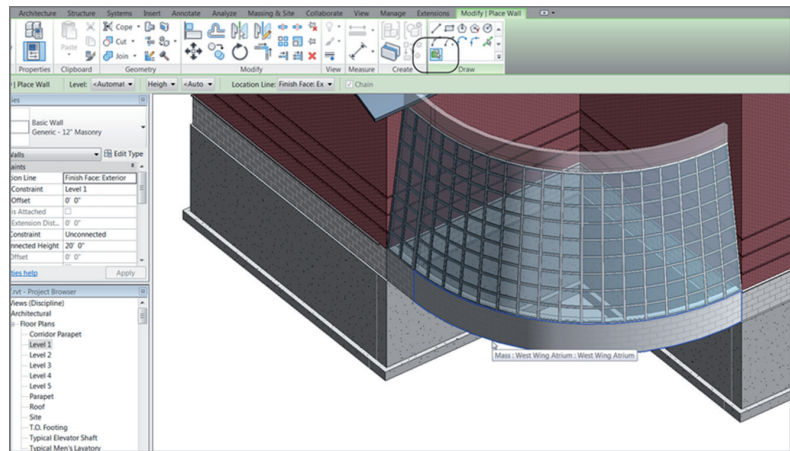


FIGURE BC1.52: Adding something on which to bear

5. On the Options bar, select Finish Face Exterior for Location Line.
6. Pick the bottom faces of the mass (see Figure BC1.52).
7. In the Type Selector, select Generic 4" Brick (Generic 102 Brick), and select the top faces.

Your wall system should look like Figure BC1.53.

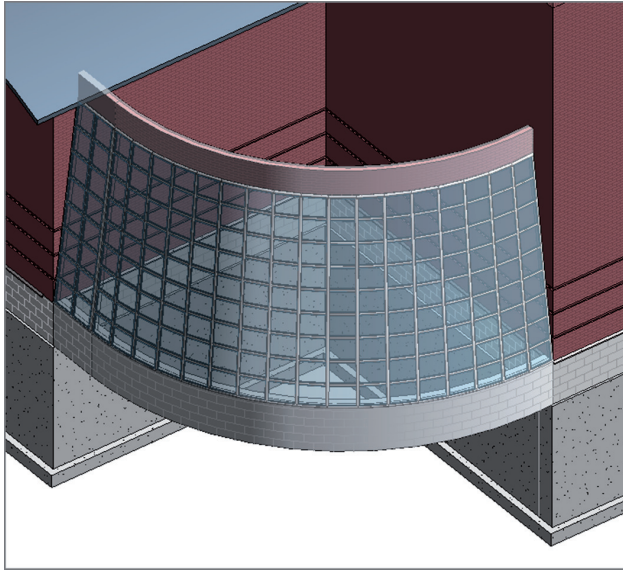


FIGURE BC1.53: The completed system

I think you'd better add a roof, just to close out the exercise. Although it's superfluous to this example, it will bother you if you don't. Follow these steps:

1. Go to Floor Plan: Corridor Parapet.
2. Set Visual Style to Wireframe in the View Control bar.
3. On the Architecture tab, click the Roof button.
4. In the Type Selector, set the roof to Basic Roof: Canopy Roof.
5. Set Base Offset From Level to $-4\text{-}1/2''$ (-112 mm).
6. Make sure the Defines Slope button is deselected on the Options bar.
7. Make sure the Pick Walls option is selected on the Draw panel.
8. Set the overhang to $1'\text{-}0''$ (300 mm), and pick the walls of the atrium.
9. Set Offset to 0 , and pick the walls of the building.
10. Clean up any overlapping corners. Your sketch should look like Figure BC1.54.

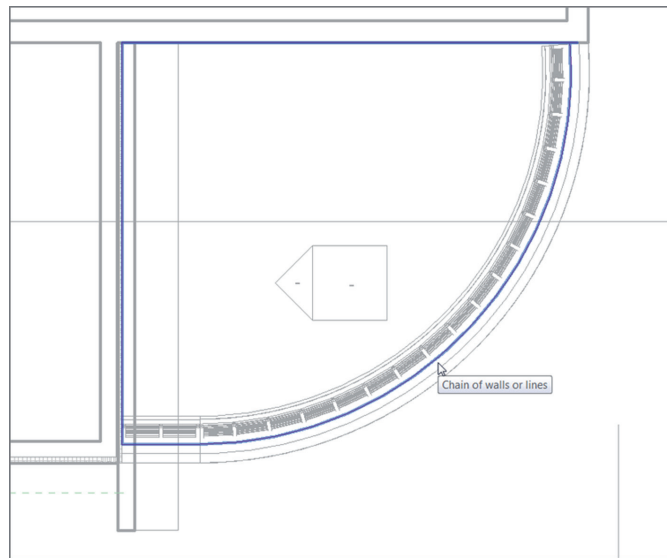


FIGURE BC1.54: The roof footprint

11. Click Finish Edit Mode.
12. Go to the default 3D view.
13. Select the Massing & Site tab.
14. Click Show Mass By View Settings. Your new atrium should look like Figure BC1.55.

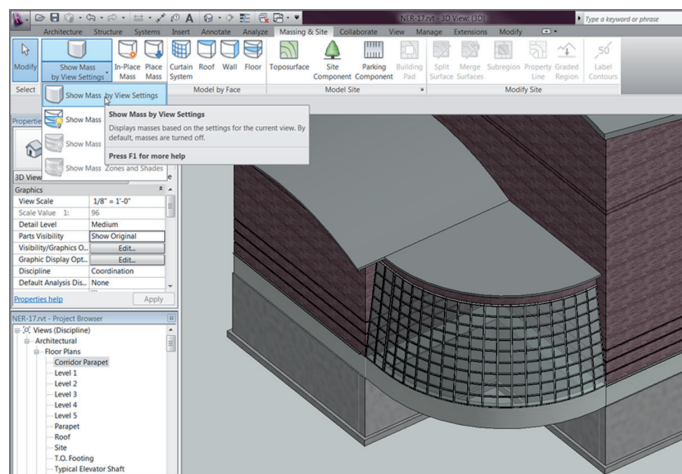


FIGURE BC1.55: The new funky atrium

As you can see, you're just at the doorway of massing. Literally. There is no way to get into the little portico you just created. In the next bonus chapter, I'll discuss creating families, and you'll delve much deeper into the massing that makes up the components built in Revit Architecture 2017.

Are You Experienced?

Now you can...

- ✓ create custom compound walls by using the Edit Assembly dialog box
- ✓ create stacked walls by joining compound walls together
- ✓ create sweeps in a wall's profile and freeform sweeps
- ✓ create curtain walls by using a predefined wall system and from a blank panel
- ✓ create vertically angled walls by applying a curtain system to a massing object