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SUPPLEMENTAL FILES ON CD

The *Unofficial* Revit 2012 Certification Exam Guide

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Schroff Development Corporation

Lesson Two

The Basics of Building a Model

This lesson addresses the following Associate and Professional level exam questions:

- Wall Properties
- Compound Walls
- Stacked Walls
- Doors and Windows
- In-Place Mass

In the Professional exam, most of the wall problems follow these steps:

- Place a wall of a specific element type. (Be able to select wall type.)
- Place a wall by setting the location line. (Understand how to use the location line setting.)
- Place a wall using different Option Settings. (Understand how to use the Options Settings when placing a wall.)
- After placing the wall, place a dimension to determine if the wall was placed correctly.
- After placing the wall, inspect the element properties to determine if the wall was placed correctly.

In the Associate exam, the user will need to be familiar with the different parameters in walls and compound walls. The user should also know which options are applied to walls and when those options are available.

Command Exercise

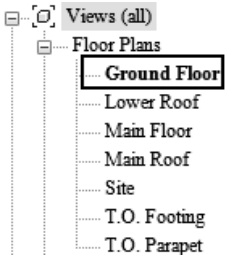
Exercise 2-1 – Wall Options

Drawing Name: **i_firestation_basic_plan.rvt**
Estimated Time to Completion: 10 Minutes

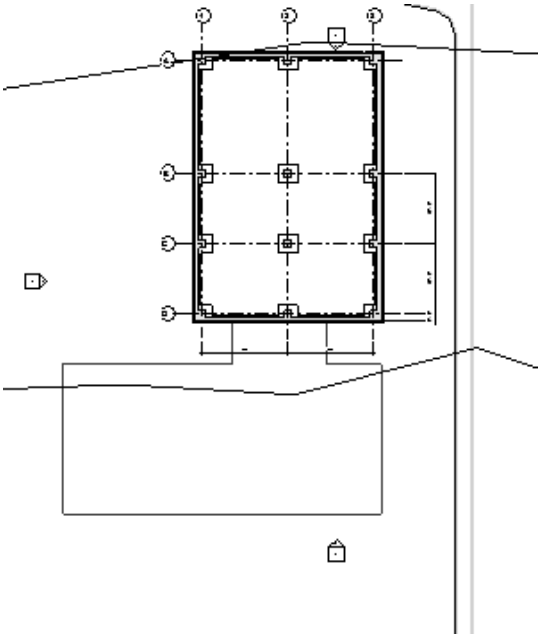
Scope

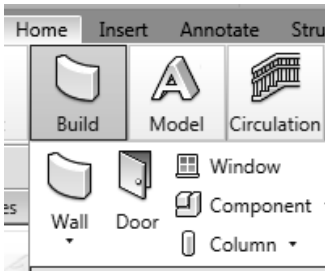
Exploring the different wall options

Solution

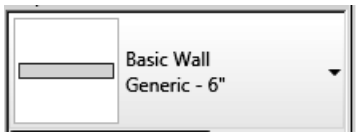
1. 

Activate the **Ground Floor** floor plan.

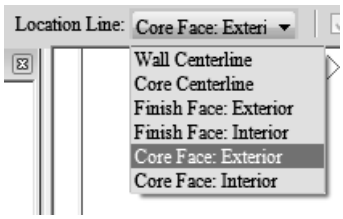
2. 
Zoom into the area where the green polygon is.

3. 

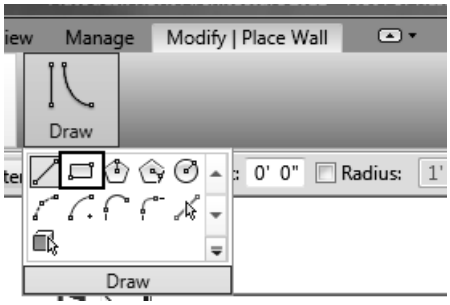
Select **Wall** from the Home ribbon.

4. 

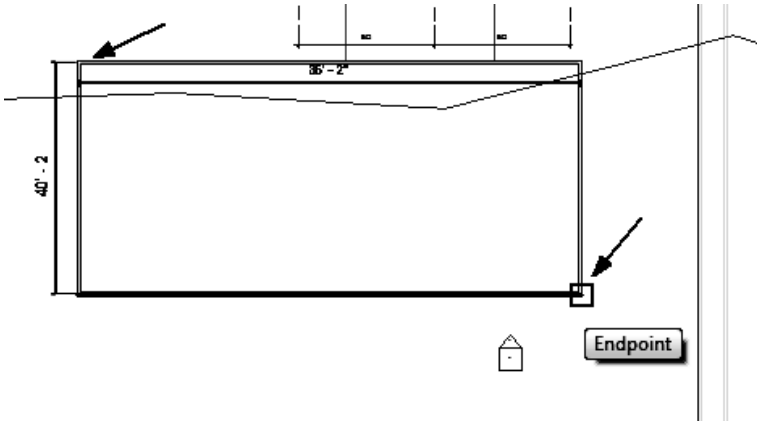
Set the Wall Type to **Generic – 6″** in the Properties pane.

5. 

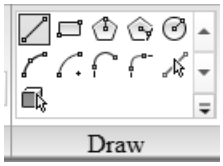
Set the Location Line to **Core Face:Exterior**.

6. 

Select the **Rectangle** tool on the Draw panel.

7. 

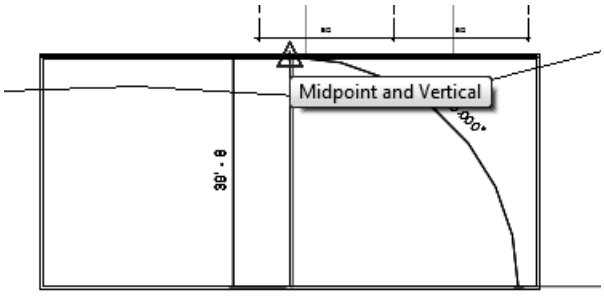
Select the two points indicated to place the rectangle.

8. 

Select the **Line** tool from the Draw panel.

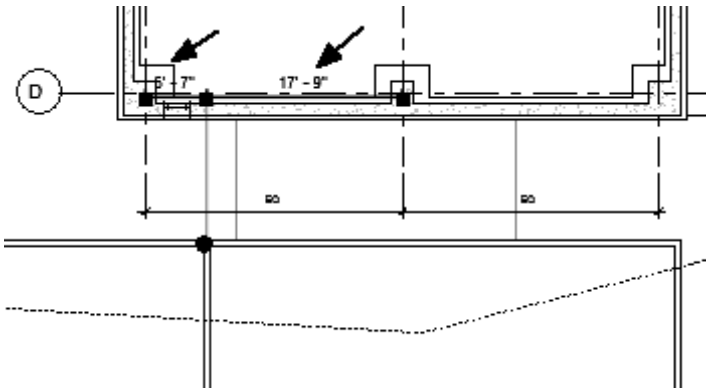
9. 

Start the line at the midpoint of the lower horizontal wall.

10. 

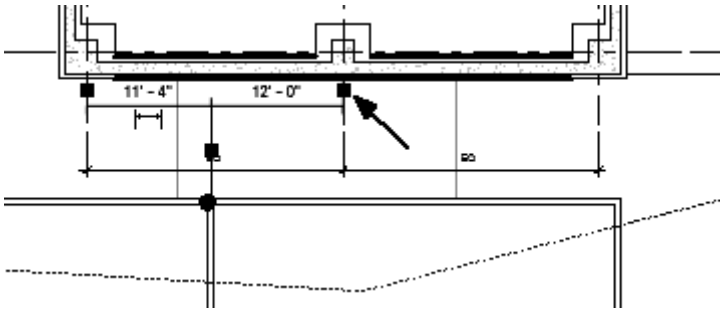
Bring the line end up to the midpoint of the upper horizontal wall.

Left click to finish placing the wall.

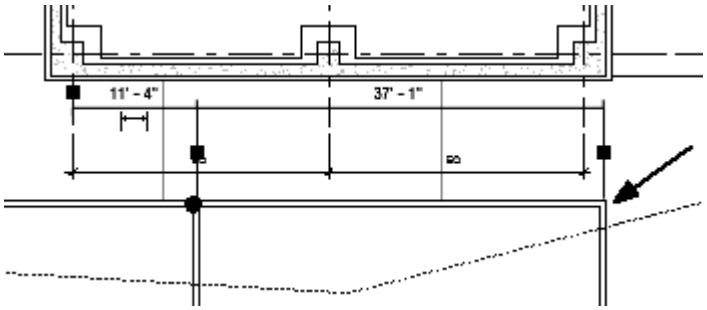
11. 

Select the vertical wall. Two temporary (listening) dimensions will appear.

Change the right dimension to **12′** [**3600 mm**].

12. 

Select the witness grip point indicated.

13. 

Move the witness line to the right vertical wall.

Note that the dimension updates.

14. Close the file without saving.

Command Exercise

Exercise 2-2 – Placing a Wall Sweep

Drawing Name: **i_walls.rvt**
Estimated Time to Completion: 20 Minutes

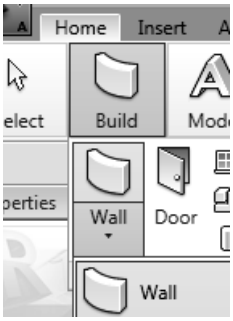
Scope

Placing a wall sweep.

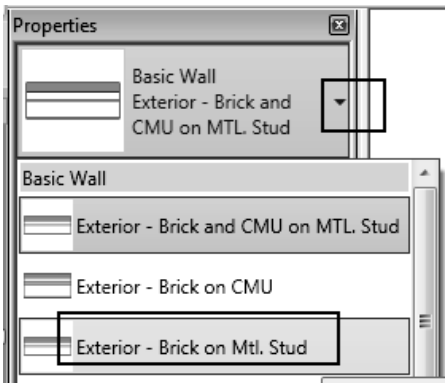
Solution

1. 

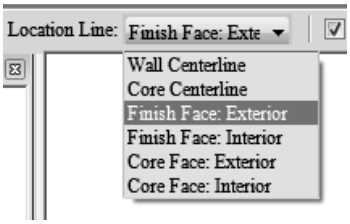
Activate **Level 1** Floor Plan.

2. 

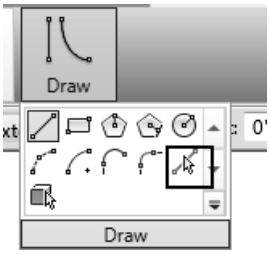
Select the **Wall** tool from the Home ribbon on the Build panel.

3. 

Set the wall type to **Exterior - Brick on Mtl. Stud** using the Type Selector on the Properties pane.

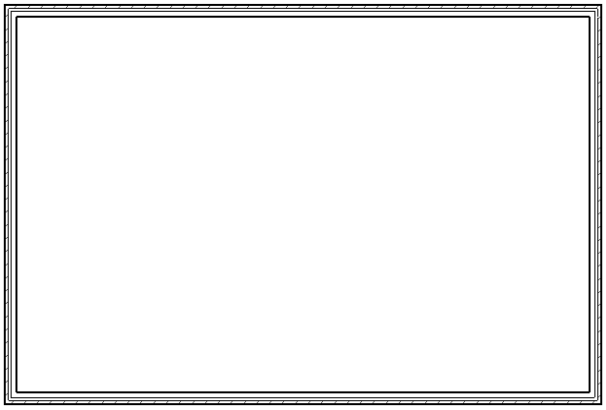
4. 

Set the Location Line to **Finish Face: Exterior**.

5. 

Select the **Pick Line** mode from the Draw panel.
Select the four green lines.

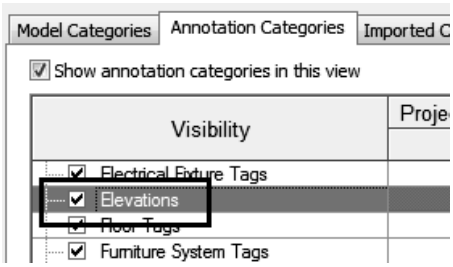
Note that when you pick the lines, the side of the line you use determines which side of the line is used for the exterior side of the wall.

6. 

The lines should be aligned to the exterior side of the walls.

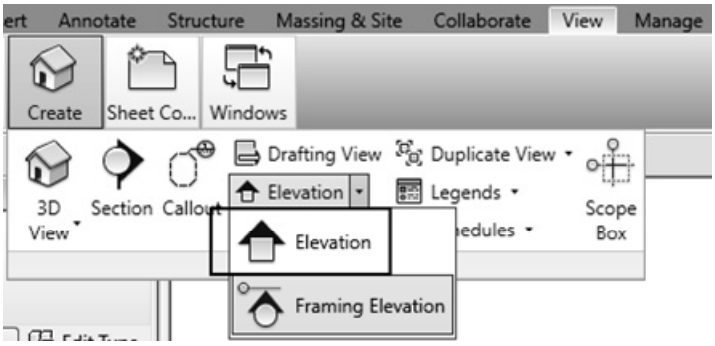
Set the Detail Level to **Medium**.

7. Type **VV** to bring up the Visibility/Graphics dialog.

8. 

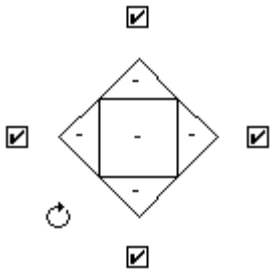
Enable the visibility of Elevations.

Press **OK**.

9. 

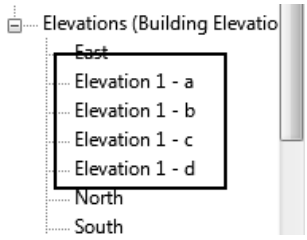
Activate the **View** ribbon.

Select the **Elevation** tool on the Create panel.

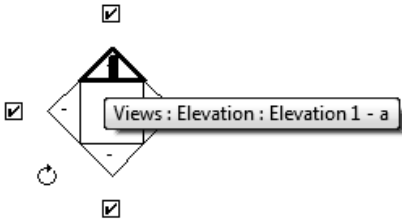
10. 

Place an elevation in the center of the room.

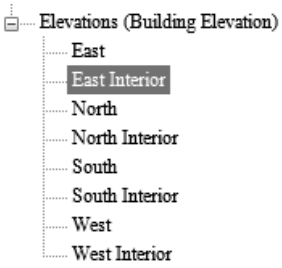
Place a check mark on each box to create an elevation for each interior wall.

11. 

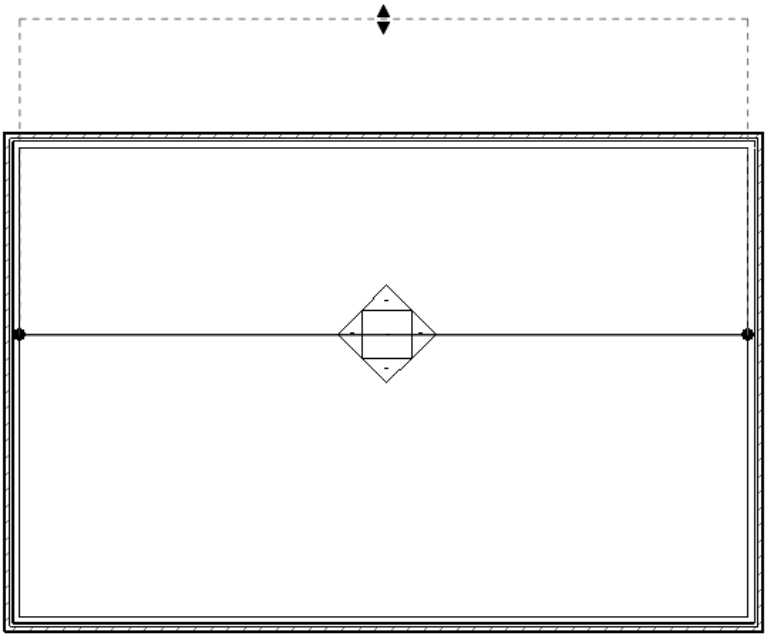
In the Project Browser, you will see that four elevation views have been created.

12. 

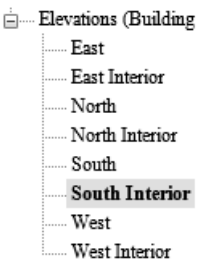
If you hover your mouse over a triangle, a tooltip will appear with the name of the linked view.

13. 

Rename the elevation views to East Interior, North Interior, South Interior and West Interior.

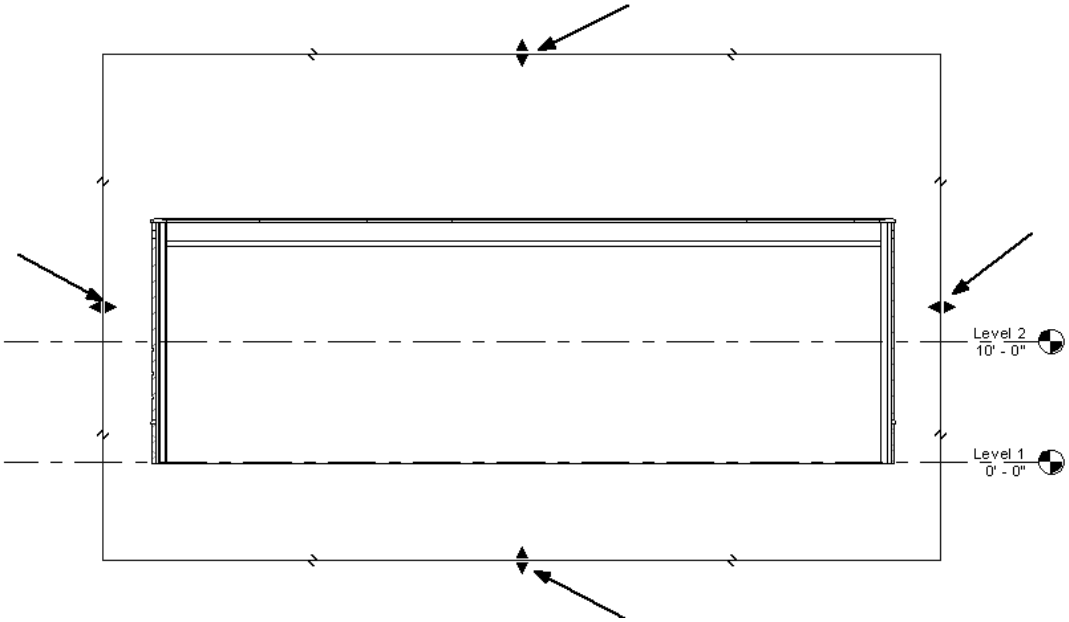
14. 

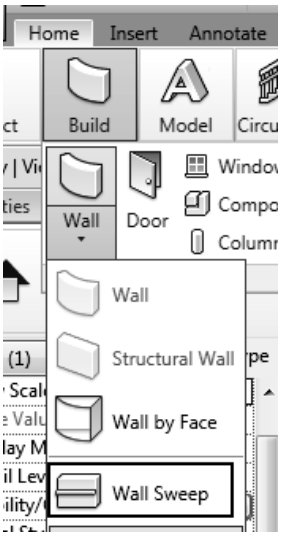
If you pick on the triangle part of the elevation, you will see the view depth (Far Clip Offset) of that elevation view.

15. 

Activate the **South Interior** View.

16. Use the grips to extend the elevation view beyond the walls.



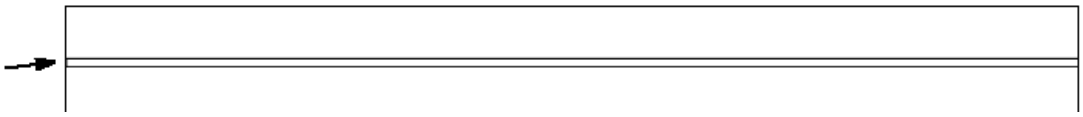
17. 

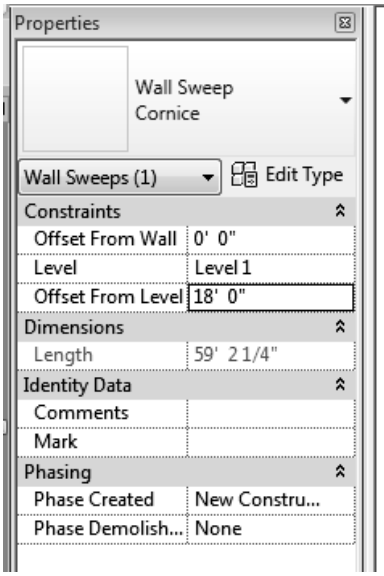
Activate the **Home** ribbon.

Select the **Wall Sweep** tool.

The Wall Sweep tool is only available in elevation, 3D or section views.

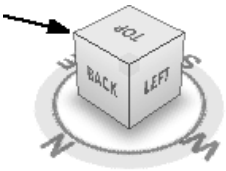
18. Place the sweep so it is toward the top of the wall.



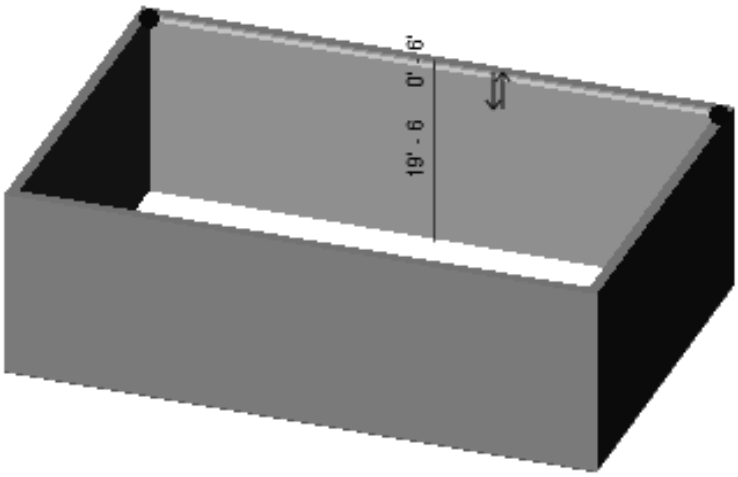
19. 

In the Properties pane, adjust the Offset from Level to **18′ 0″**.

20.  Switch to a 3D view.

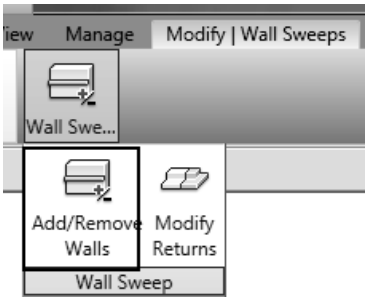
21. 

Select the top corners of the view cube to orient the view so you can see the wall sweep.

22. 

Select the wall sweep that was placed.

It will highlight when selected.

23. 

Select **Add/Remove Walls** from the ribbon.

Select the other walls.
Orbit around to inspect.

24. Save as *ex2-2.rvt*.

Command Exercise

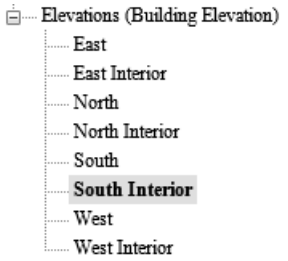
Exercise 2-3 – Create a Wall Sweep Style

Drawing Name: **ex2-2.rvt**
Estimated Time to Completion: 15 Minutes

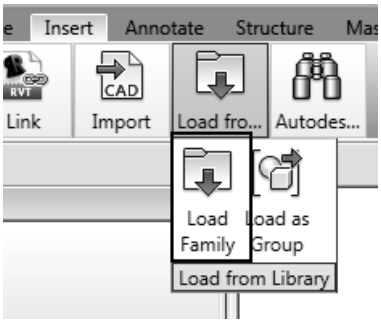
Scope

Creating a wall sweep style.
Loading a Profile.

Solution:

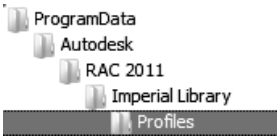
1. 

Activate the **South Interior** View.

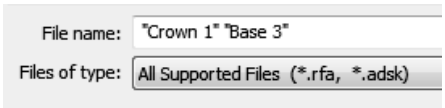
2. 

Activate the **Insert** ribbon.

Select **Load Family**.

3. 

Browse to the **Profiles** folder.

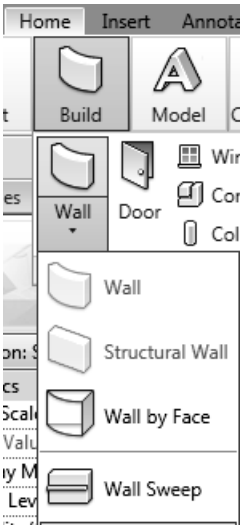
4. 

Load the following profiles:

Base-3.rfa
Crown 1.rfa

You can load more than one file at a time by holding down the CTRL key.

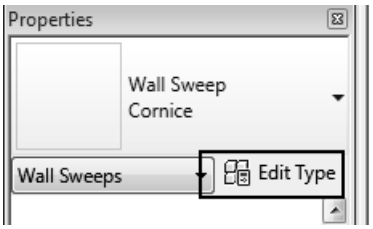
5. Press **Open**.

6. 

Activate the **Home** ribbon.

Select the **Wall Sweep** tool.

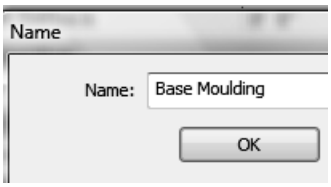
The Wall Sweep tool is only available in elevation, 3D or section views.

7. 

Select **Edit Type** from the Properties pane.

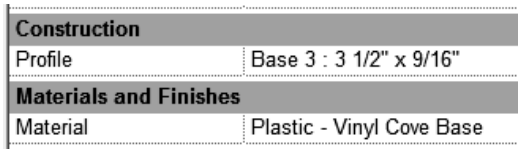
8. 

Select **Duplicate**.

9. 

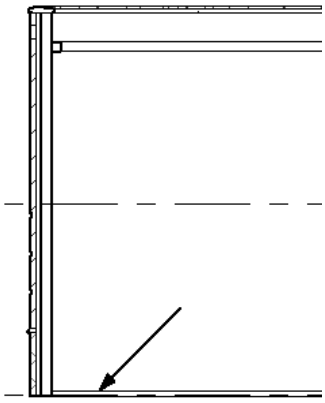
Enter **Base Moulding** in the Name field.

Press **OK**.

10. 

Set the Profile to **Base 3 : 3 1/2″ x 9/16″**.
Set the Material to **Plastic - Vinyl Cove Base**.

Press **OK** to exit the dialog.

11. 

Place the baseboard on the bottom of the wall.

12. Save as *ex2-3.rvt*.

Command Exercise

Exercise 2-4 – Create a Custom Profile

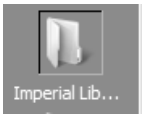
Drawing Name: **ex2-3.rvt**
Estimated Time to Completion: 20 Minutes

Scope

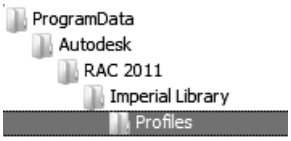
Creating a custom profile.
Using the custom profile in a wall sweep.

Solution

1.  Select **Open**.

2. 

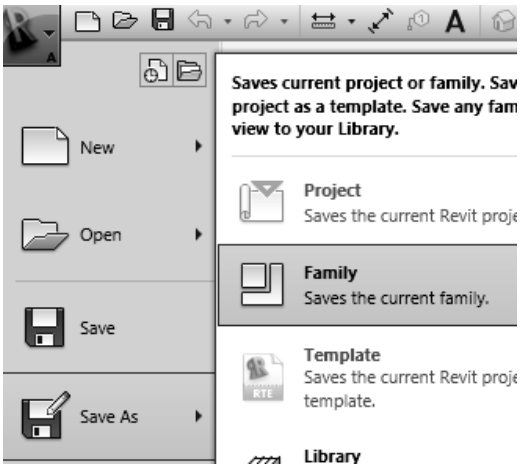
Scroll on the left pane to the **Imperial Library**.

3. 

Browse to the **Profiles** folder.

4. 

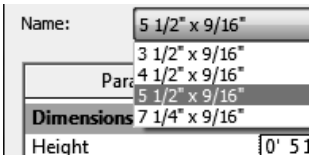
Open *Base 3.rfa*.

5. Save the file as *Base 4.rfa*.


6. 

Activate the Home ribbon.

Select the **Types** tool on the Properties pane.

7. 

Note that several sizes are available for this profile.

Use the Apply button to see how the profile changes depending on the size selected.

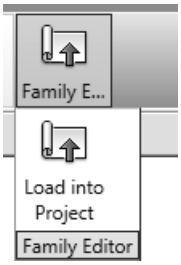
Press **OK** to close the Types dialog.

8. 
Modify the profile.

I eliminated the offset on the left and simplified the top.

Verify that the profile still flexes properly using the different types.

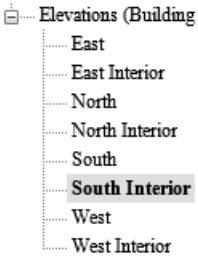
9. Save the new profile.

10. 

Activate the Modify ribbon.

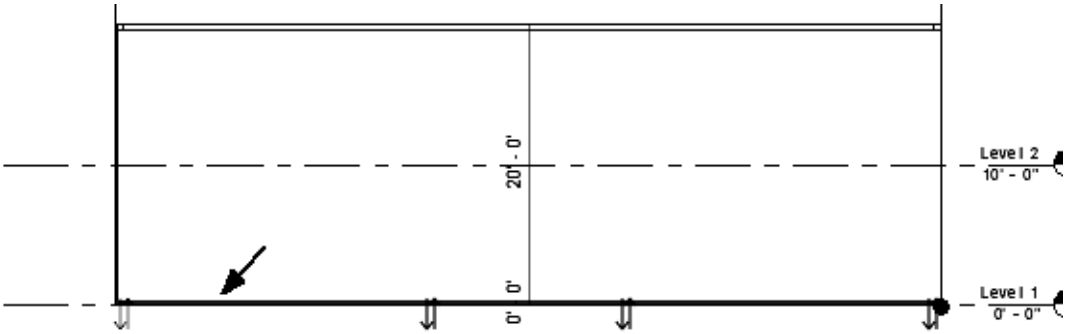
Select **Load into Project**.

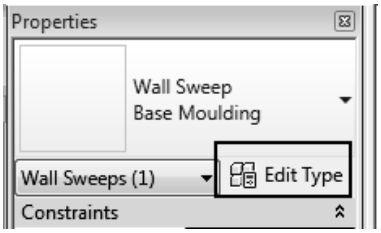
11. Close the family file.

12. 

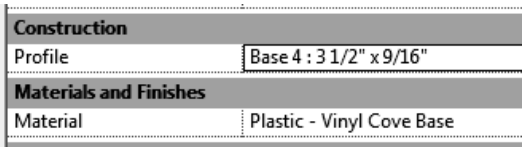
Activate the **South Interior** View.

13. Select the base wall sweep.



14. 

Select **Edit Type** from the Properties pane.

15. 

Select **Base 4: 3 1/2″ x 9/16″** for the Profile.

This is the new profile you just created and loaded into the project.

Press **OK**.

16. Save as *ex2-4.rvt*.

Command Exercise

Exercise 2-5 – Create a Compound Wall

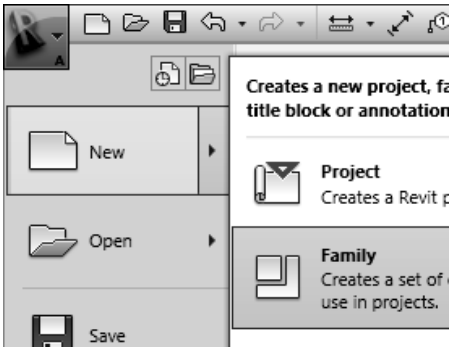
Drawing Name: **ex2-4.rvt**
Estimated Time to Completion: 40 Minutes

Scope

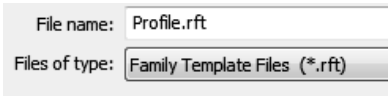
Creating a custom profile.
Using the custom profile in a Compound Wall.

Revit defines a compound wall as a wall that consists of multiple vertical layers.

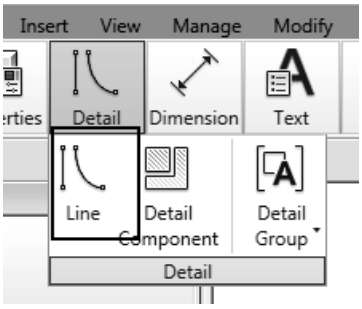
Solution

1. 

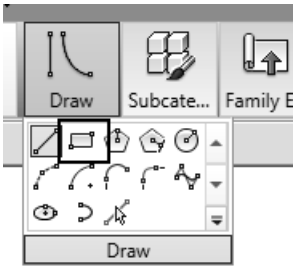
Select **New→Family**.

2. 

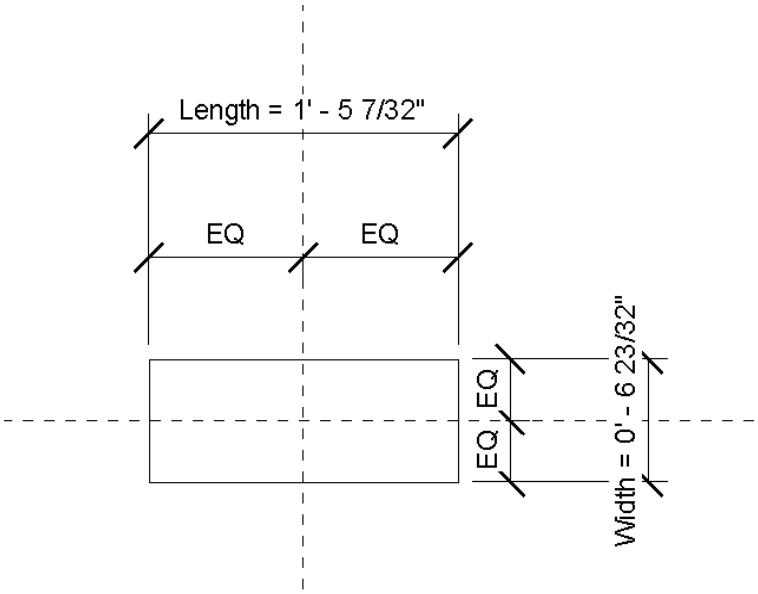
Locate the *Profile.rft* file.
Select **Open**.

3. 

Select the **Line** tool on the Detail panel.

4. 

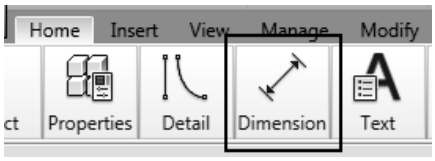
Select the **Rectangle** tool on the Draw panel.

5. 

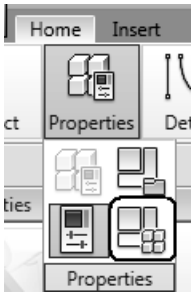
Create a rectangle centered on the reference planes.

The orientation of the rectangle is important for the stud to appear properly in the wall.

Add a length label and a width label to the dimensions.

6. 

The dimension tool is located on the Home ribbon.
To add a label, select the dimension, right click and select Edit Label.

7. 

Activate the Home ribbon.

Select the **Types** tool from the Properties panel.

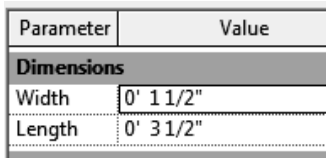
8. 

Select **New** under Family Types.

9. 

Enter **Stud - 2″ x 4″** in the Name field.

Press **OK**.

10. 

Set the Width to **1 1/2″**.
Set the Length to **3 1/2″**.

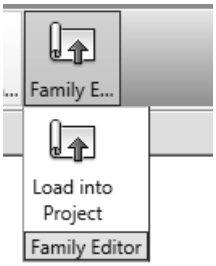
Press **Apply** to see the profile update.

11. Press **OK** to close the dialog.

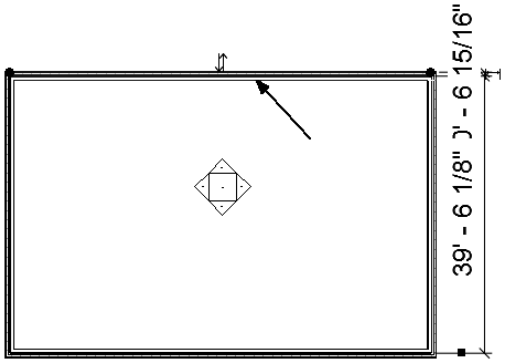
12.  Select **Save**.

13. 

Save the file as **Profile - Stud**.

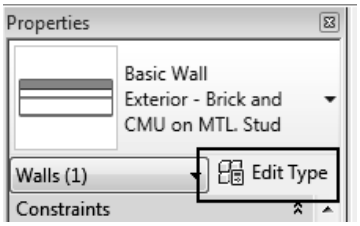
14. 

Load the file into the ex2-4.rvt project.

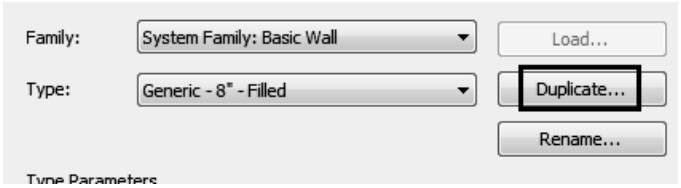
15. 

Activate **Level 1**.

Select one of the walls.

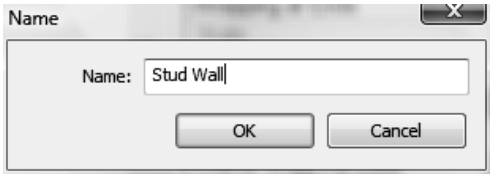
16. 

Select **Edit Type** from the Properties pane.

17. 

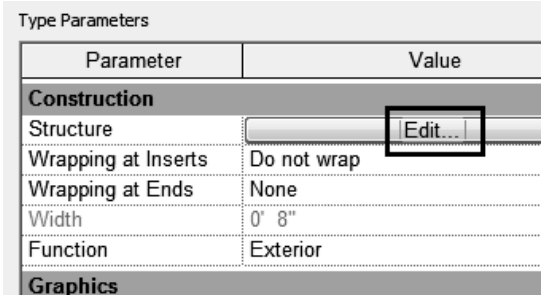
Select **Generic- 8″- Filled** under the Type list.

Select **Duplicate**.

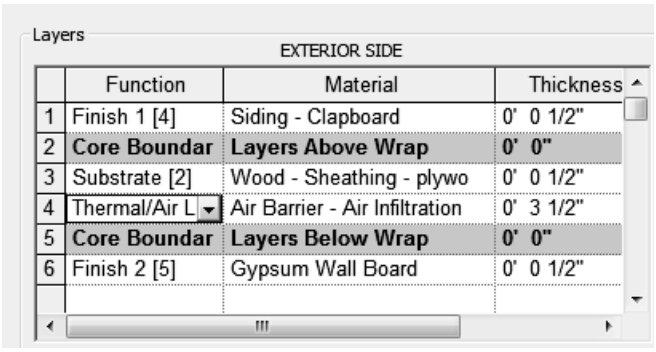
18. 

Enter **Stud Wall** in the name field.

Press **OK**.

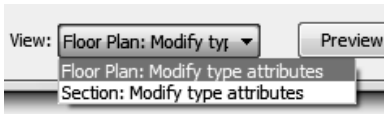
19. 

Select **Edit** next to Structure.

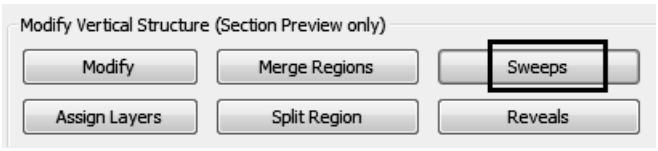
20. 

Create the following layer structure:

Layer 1: Finish 1 [4] Siding Clapboard ½″
Layer 2: Core Boundary
Layer 3: Substrate [2] Wood – Sheathing – Plywood ½″
Layer 4: Thermal/Air Layer Air Barrier- Air Infiltration 3 ½″
Layer 5: Core Boundary
Layer 6: Finish [2] (5) Gypsum Wall Board ½″

21. 

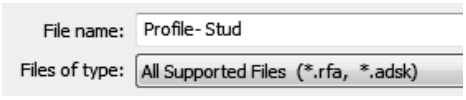
Switch the Preview window to display a section view.

22. 

Select the **Sweeps** button.

23. 

Select **Load Profile**.

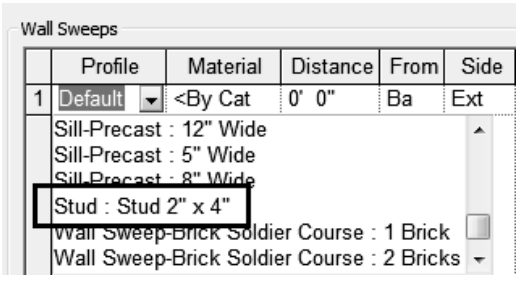
24. 

Locate the *Profile-Stud.rfa* profile you created.

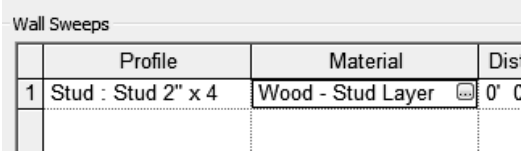
Press Open.

25. 

Select **Add**.

26. 

Locate the Stud profile that was loaded.

27. 

Set the material to **Wood-Stud Layer**.

28.  We want to locate the stud profile so it is between the gypsum board and the plywood sheath.

29. Wall Sweeps

	Material	Distance	From	Side	Offset	Flip	Setback
1	Wood - Stud Layer	-0" 0 3/4"	Top	Interior	-0" 2 1/4"	☐	0" 0"
2	Wood - Stud Layer	0" 0 3/4"	Base	Interior	-0" 2 1/4"	☐	0" 0"

To have the profile place properly:

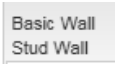
Set the first Wall Sweep at a distance of -3/4″ from the Top.
Offset it -2 ¼″ from the interior side.

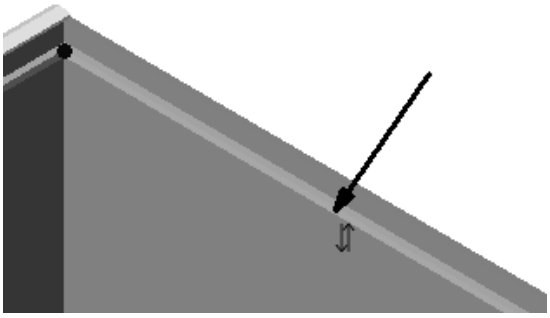
Select **Add** to add the second wall sweep.
Set the second Wall Sweep at a distance of ¾″ from the Base.
Offset it -2 ¼″ from the interior side.
Press **OK**.

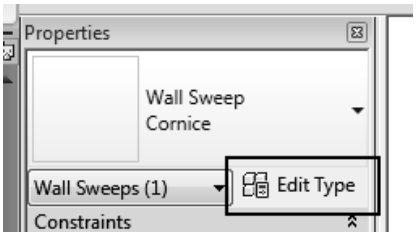
30.  Zoom into the top and bottom of the wall to verify the placement of the stud.

31. Press **OK** to close the dialog.

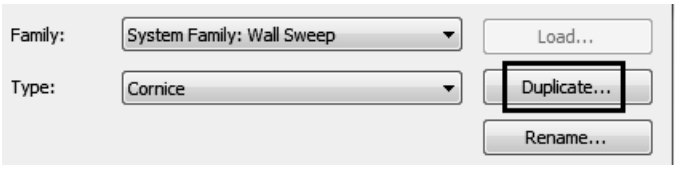
32.  Switch to a 3D view.

33. Determine which wall is the stud wall.
If you select the wall, you will see the wall type displayed in the ribbon. 

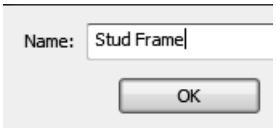
34.  Select the wall sweep that has been placed on the wall.

35. 

Select **Edit Type** from the Properties Pane.

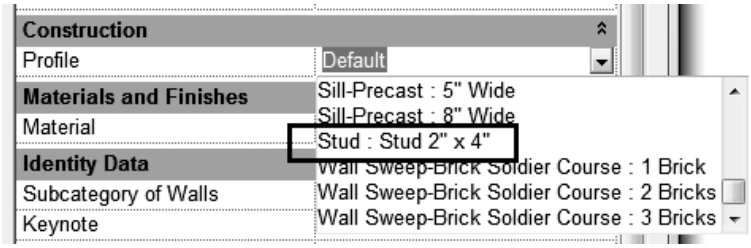
36. 

Select **Duplicate**.

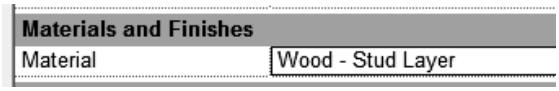
37. 

Enter **Stud Frame** in the name field.

Press **OK**.

38. 

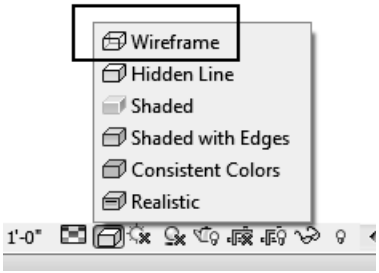
In the Profile field, select the Stud profile you created.

39. 

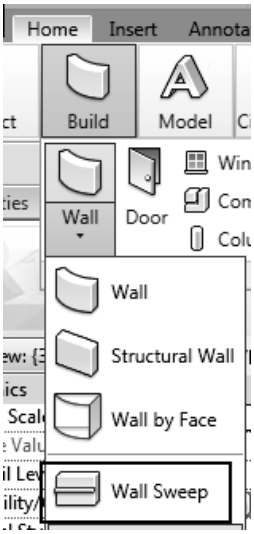
Set the material to **Wood-Stud Layer**.

40. Press **OK**.

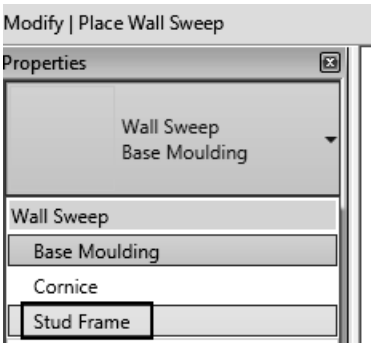
41. Release the wall sweep you have selected by left clicking anywhere in the drawing window.

42. 

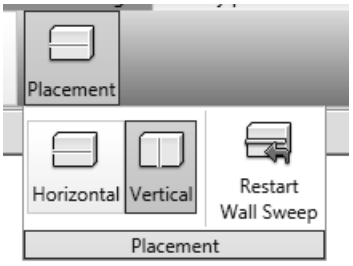
Switch to a wireframe view.

43. 

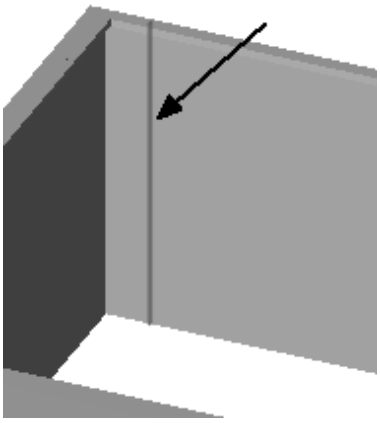
Select **Wall Sweep** from the Home ribbon.

44. 

Select **Stud Frame** from the element type drop-down list in the Properties pane.

45. 

Select **Vertical** orientation on the Placement panel.

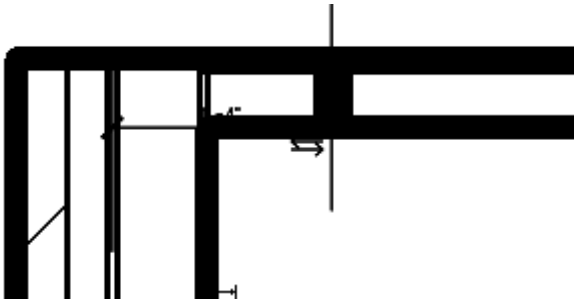
46. 

Place the stud on the wall.

Cancel out of the command.

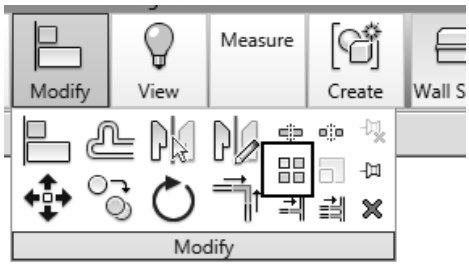
47. 

Switch to **Level 1** floor plan for a plan view.

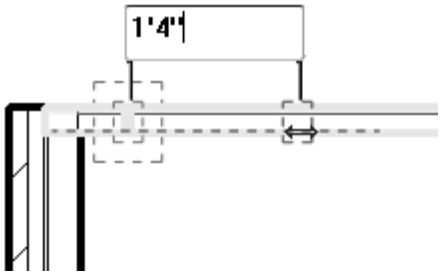
48. 

Use the **Move** tool to position the stud inside the wall.

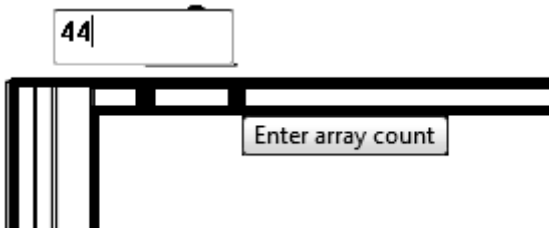
Adjust the distance so the stud is located 16″ from the wall end.

49. 

Select the wall stud.
Select the **Array** tool on the Modify panel.

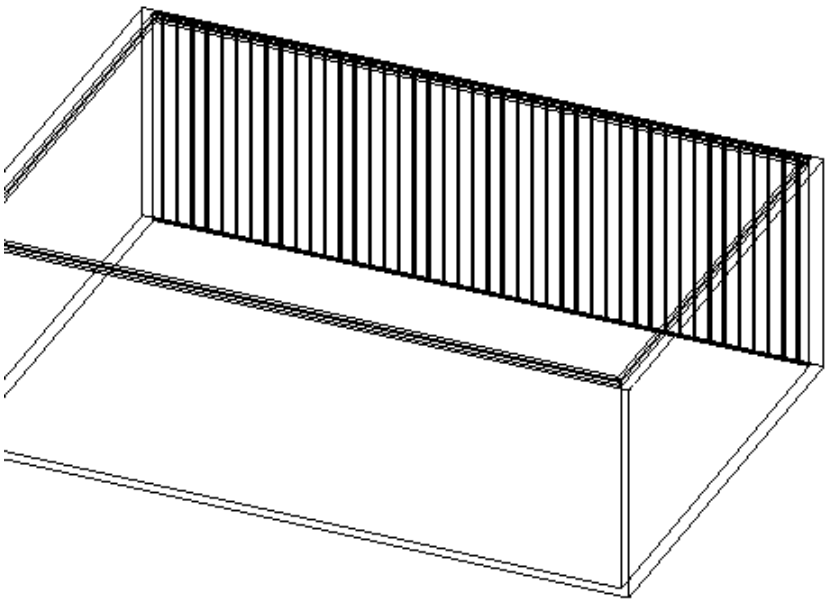
50. 

Set the center to center distance between the studs to **1′ 4″**.

51. 

Set the number of studs to **44**.

Depending on your system, it may take a few minutes to generate the array.

52. 

Switch to a 3D view.

Set it to wireframe.

You see a stud-framed wall.

53. Save as *ex2-5.rvt*.

Command Exercise

Exercise 2-6 – Stacked Walls

Drawing Name: **i_stacked_walls.rvt**
Estimated Time to Completion: 60 Minutes

Scope

Defining a stacked wall structure

Revit defines a stacked wall as a wall that has 2 or more horizontal layers, each consisting of different materials and surfaces.

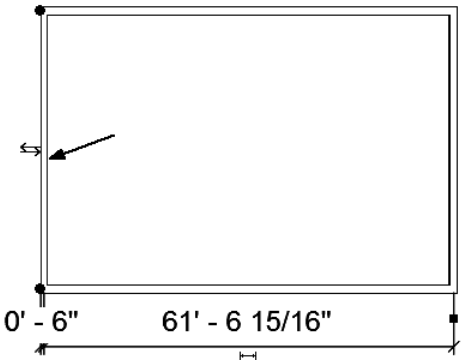
Solution

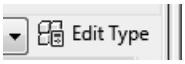
1. Open *i_stacked_walls.rvt*.

2. 

Activate **Level 1**.

3. Select the left vertical wall.



4. 

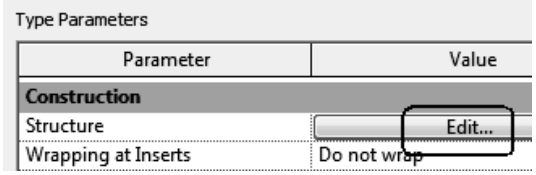
Select **Edit Type** on the Properties pane.

5. 

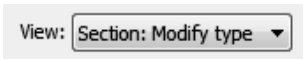
Select **Duplicate**.

6. 

Type **Exterior - Concrete Foundation**. Press **OK**.

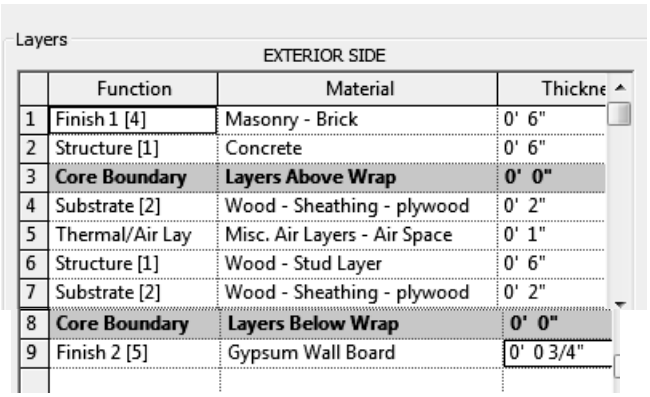
7. 

Select Edit Structure.

8. 

Switch the view to **Section: Modify Type**.

9.

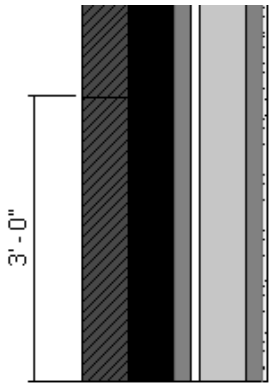


	Function	Material	Thickne
1	Finish 1 [4]	Masonry - Brick	0' 6"
2	Structure [1]	Concrete	0' 6"
3	**Core Boundary**	**Layers Above Wrap**	**0' 0"**
4	Substrate [2]	Wood - Sheathing - plywood	0' 2"
5	Thermal/Air Lay	Misc. Air Layers - Air Space	0' 1"
6	Structure [1]	Wood - Stud Layer	0' 6"
7	Substrate [2]	Wood - Sheathing - plywood	0' 2"
8	**Core Boundary**	**Layers Below Wrap**	**0' 0"**
9	Finish 2 [5]	Gypsum Wall Board	0' 0 3/4"

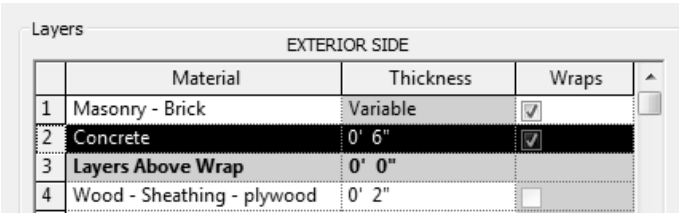
Add Layers as follows:
Layer 1: Finish 1 [4] Masonry - Brick 6″
Layer 2: Structure [1] Concrete 6″
Layer 3: Core Boundary
Layer 4: Substrate [2] Wood - Sheathing 2″
Layer 5: Thermal Air Lay - Misc Air Layers - Air Space 1″
Layer 6: Structure [1] Wood - Stud Layer 6″
Layer 7: Substrate [2] Wood - Sheathing 2″
Layer 8: Core Boundary
Layer 9: Finish 2 [5] Gypsum Wall Board 3/4″

10. 

Select **Split Region**.

11. 

Cut the Layer 1: brick layer 3′-0″ from the base.

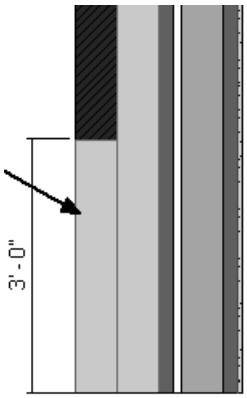
12. 

	Material	Thickness	Wraps
1	Masonry - Brick	Variable	☑
2	Concrete	0' 6"	☑
3	**Layers Above Wrap**	**0' 0"**	
4	Wood - Sheathing - plywood	0' 2"	☐

Highlight the **Layer 2: Concrete** Layer.

13. 

Pick on the **Assign Layers** button.

14. 

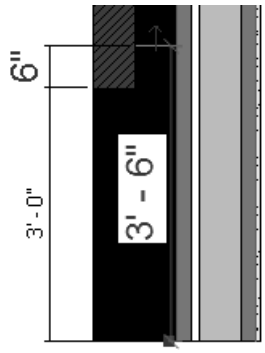
Select the lower region of the brick layer that was just split.

The upper region will now be brick and the lower region will be concrete.

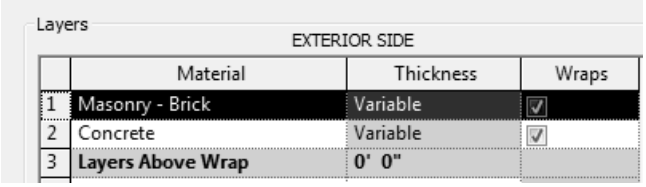
It may take some practice before you are able to do this.

15. 

Select **Split Region**.

16. 

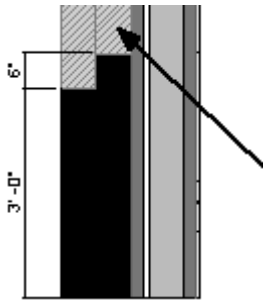
Cut the Layer 2: concrete 3′-6″ from the base.

17. 

Highlight the **Layer 1: Masonry Brick** Layer.

18. 

Pick on the **Assign Layers** button.

19. 

Highlight the Masonry brick layer.

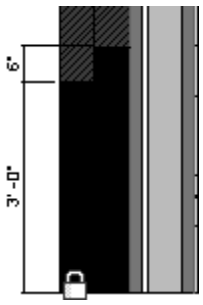
Select the upper region of layer 2.

The upper region will now be brick and the lower region will be concrete.

It may take some practice before you are able to do this.

20. 

Select **Modify**.

21. 

Select the base of the concrete Layer 1 component.

22. 

A small lock will appear.

Click on the lock to unlock it.

23. 

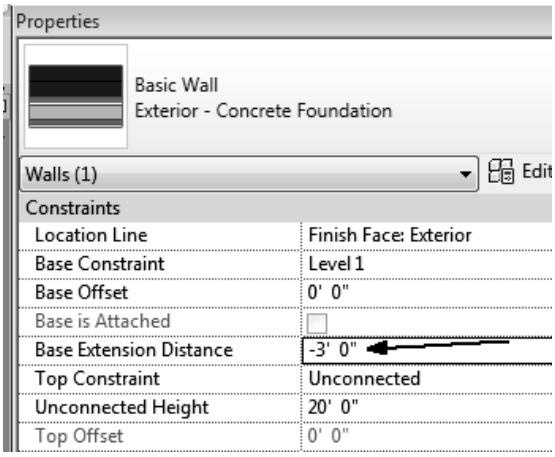
Select **Modify**.

24. 

Select the base of Layer 2: Concrete.

Click on the lock to unlock it.

25. Press **OK** to close the dialogs.

26. 

Select the wall with the Exterior - Concrete Foundation wall type.

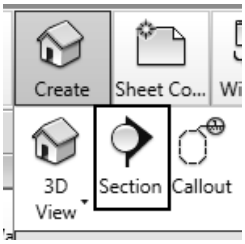
In the Properties pane:

Set the Base Extension Distance to **-3′ 0″**.

Left click in the display window to release the selection.

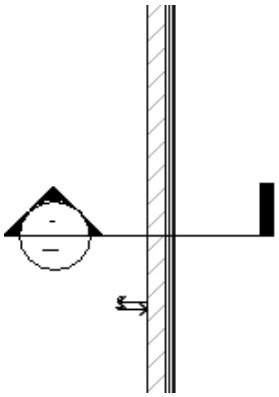
27. 

Set the display to Medium or Fine to see the wall layers.

28. 

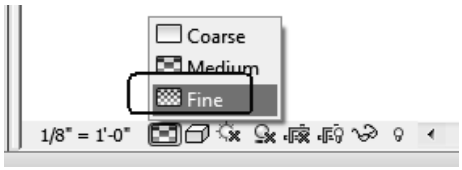
Activate the View ribbon.

Select the Section tool from the Create panel.

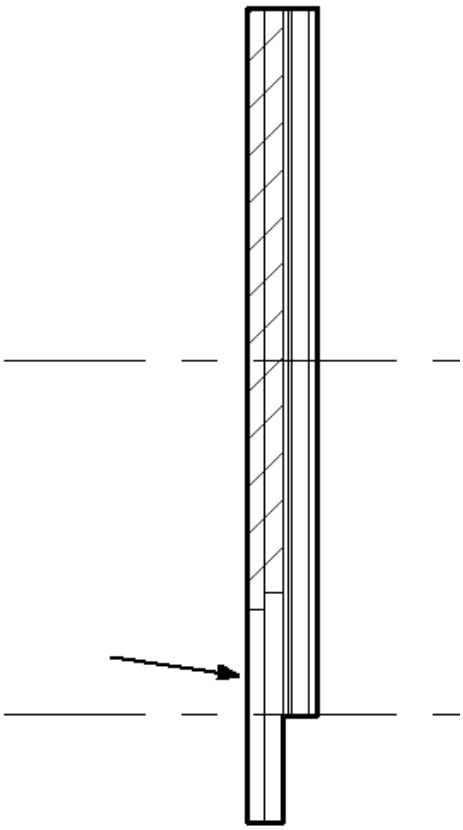
29. 

Place a small section on the wall you just defined.

Activate the section view.

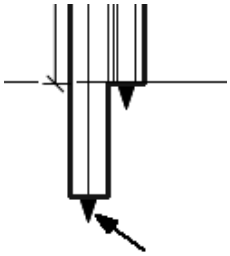
30. 

Set the display to Medium or Fine to see the wall layers.

31. 

Note the concrete section is below the base level.

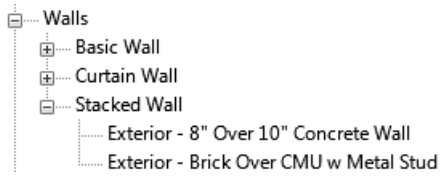
Select the wall.

32. 

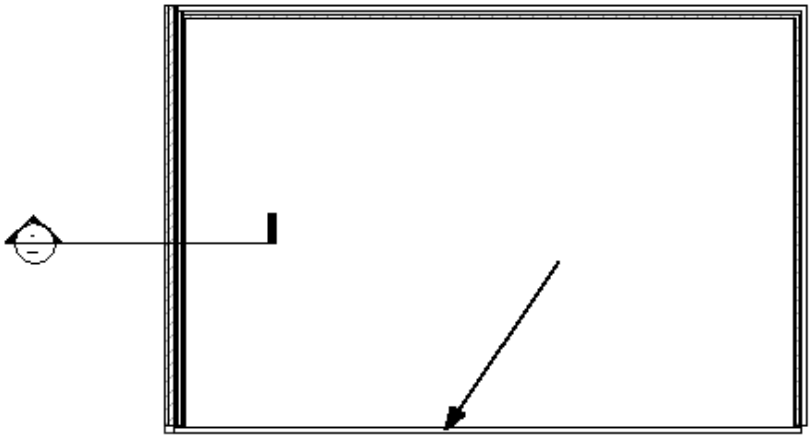
You can use the grips to adjust the base depth of the concrete section.

33. 

Activate **Level 1**.

34. 

In the Project Browser, locate the two Stacked Wall types.

35. 
Select the south wall.

36. 

Switch the wall to **Stacked Wall Exterior Brick Over CMU w Metal Stud**.
Select **Edit Type**.

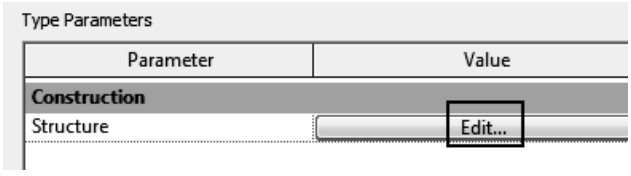
37. 

Select **Duplicate**.

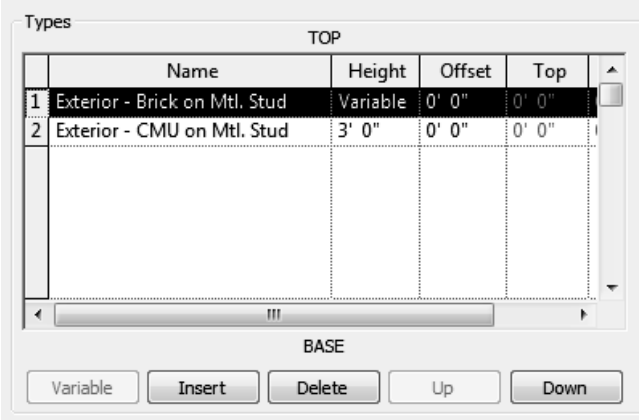
38. 

Rename **Exterior - Brick with Concrete Foundation**.

Press **OK**.

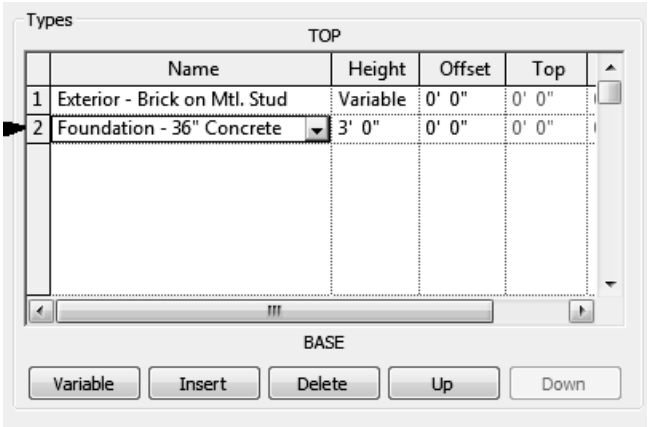
39. 

Select **Edit Structure**.

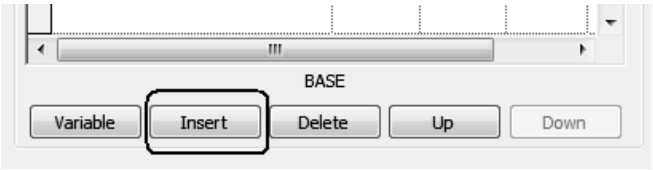
40. 

Note the stacked wall uses different layers going from Top to Base instead of Exterior to Interior.

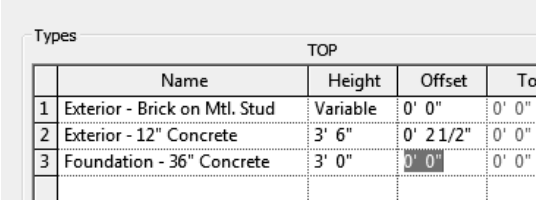
Each layer is a wall type instead of a component material.

41. 

Change Layer 2 to **Foundation - 36″ Concrete**.

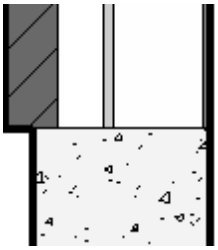
42. 

Select **Insert**.

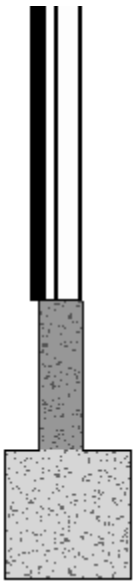
43. 

Set the new layer to:

Exterior - **12″ Concrete**.
Set the Height to **3′ 6″**.
Set the Offset to **2 1/2″**.

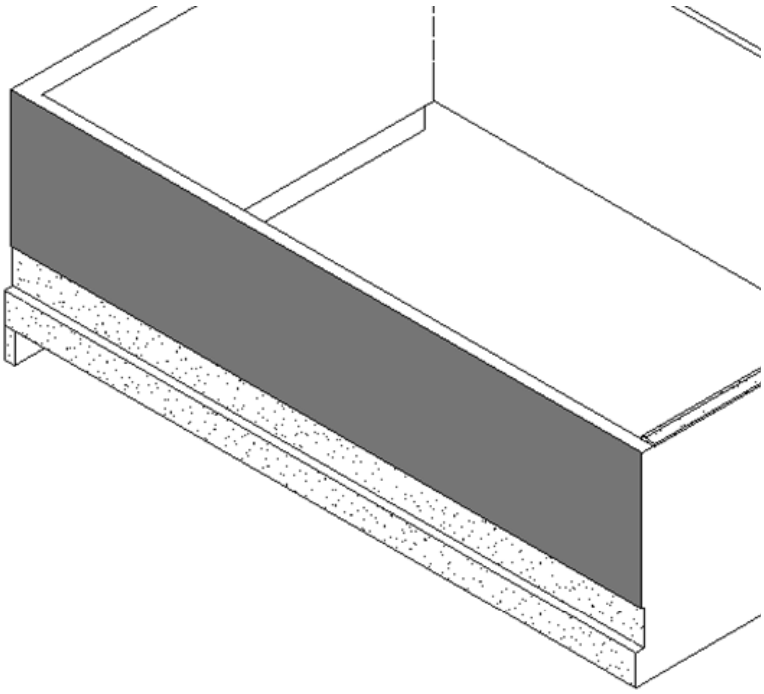
44. 

You can zoom into the preview window to check the offset value.

45. 

The height of the Top Layer is set to **Variable** so the user can set the wall height.

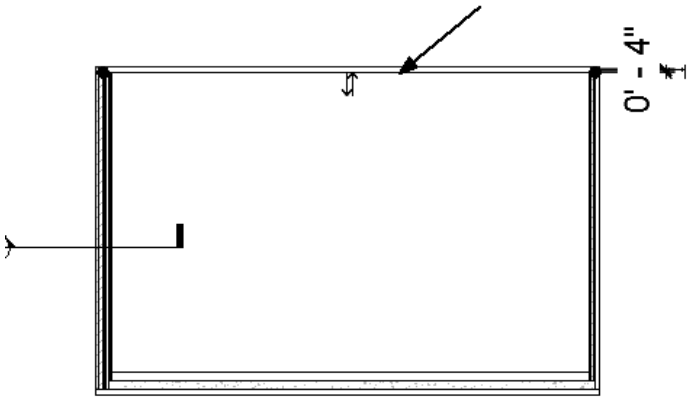
Press **OK** twice to exit the dialog.

46. 

Switch to a 3D view so you can inspect the two wall types.

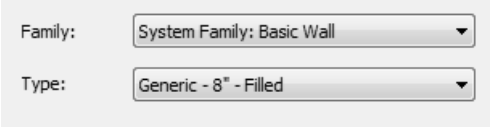
Note that when you hover the mouse over the first wall it displays as a Basic Wall.

The other wall displays as a Stacked Wall.

47. 

Select the North wall.

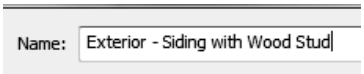
Select **Edit Type** from the Properties pane.

48. 

Set the Type to **Generic - 8″ - Filled**.

49. 

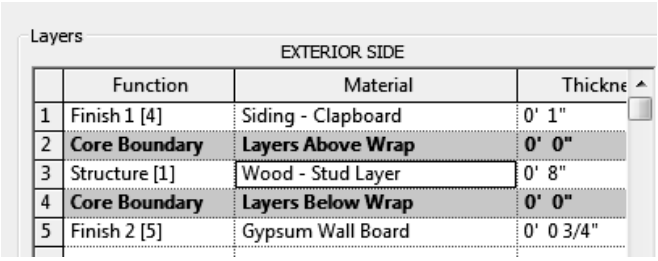
Select **Duplicate**.

50. 

Type **Exterior - Siding with Wood Stud**.
Press **OK**.

51. 

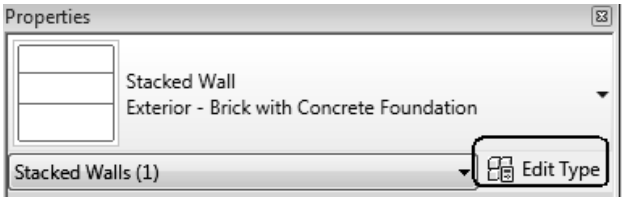
Select **Edit** Structure.

52. 

Define the wall type as follows:

Layer 1: Finish 1 [4] Siding Clapboard 1″
Layer 2: Core Boundary
Layer 3: Structure [1] Wood Stud Layer 8″
Layer 4: Core Boundary
Layer 5: Finish 2 [5] Gypsum Wall Board 3/4″

53. Press **OK** to close all dialogs.

54. 

Select the South Wall (the stacked wall).
Select **Edit Type**.

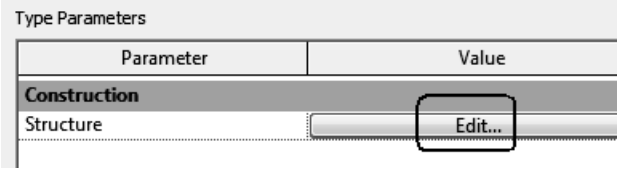
55. 

Select **Duplicate**.

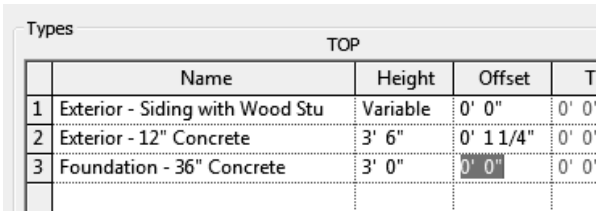
56. 

Rename **Exterior - Siding with Concrete Foundation**.

Press **OK**.

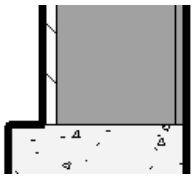
57. 

Select **Edit** Structure.

58. 

Set Layer 1 to the new wall type: **Exterior - Siding with Wood Stud**.

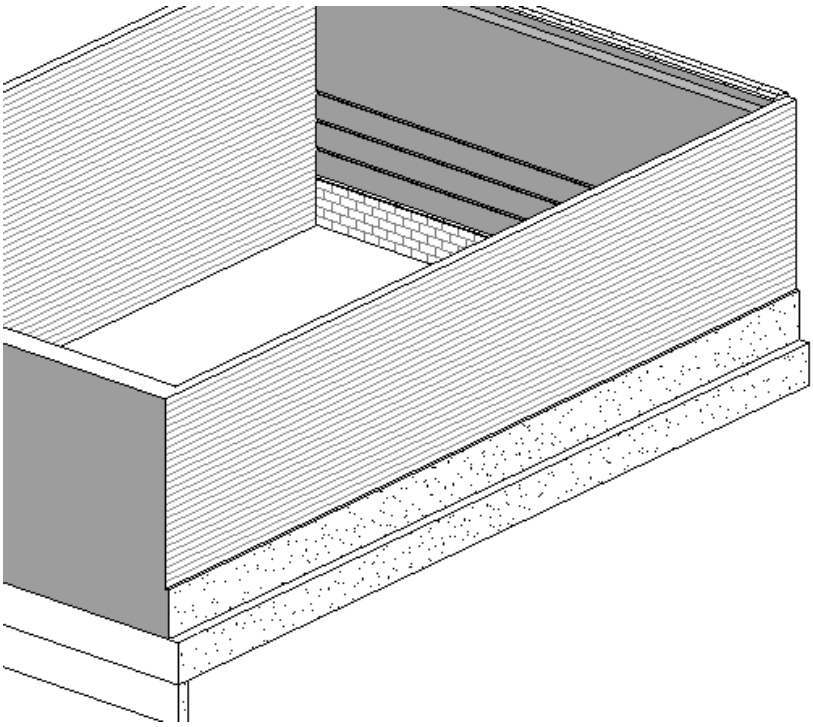
Adjust the Offset for Layer 2: Exterior - 12″ Concrete to **1 1/4″**. Press **OK** to close all dialogs.

59. 

You can zoom into the preview window to check the offset.

Press **OK** twice to close the dialogs.

60. Switch to a 3D view.



61. Close without saving.

Command Exercise

Exercise 2-7 – Chained Walls

Drawing Name: **i-walls.rvt**
Estimated Time to Completion: 10 Minutes

Scope

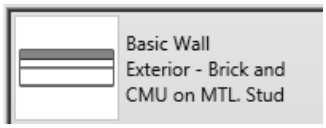
Using TAB to select walls.
Using CTRL to copy selected items.
Using SHIFT to move selected items.

Solution

1.  Open *i-walls.rvt*.

2. 

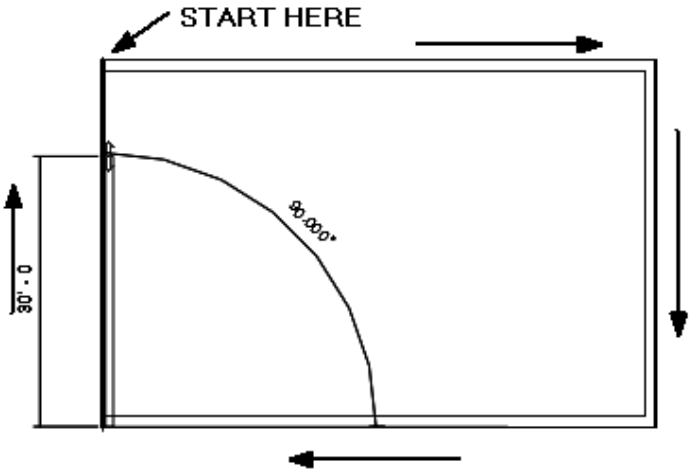
Select the **Wall** tool from the Home ribbon.

3. 

Select the **Brick and CMU on MTL. Stud** wall style on the Properties pane.

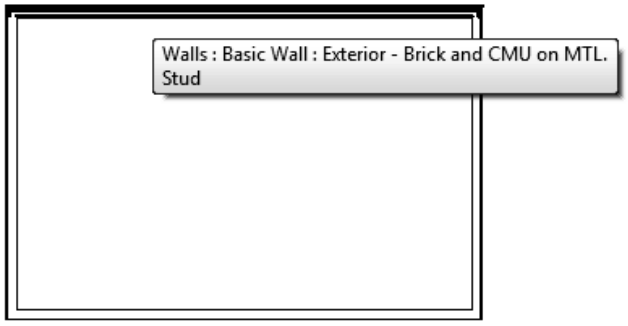
4. 

Enable **Chain**.

5. 

Select the upper left vertex of the rectangle and draw the walls to place following the direction of the arrows.

Right click to cancel or press ESC to finish placing walls.

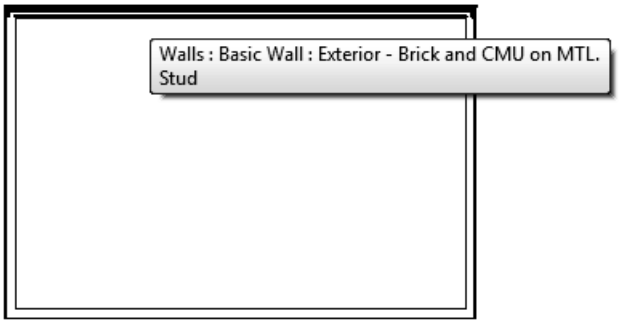
6. 

Place the mouse over one of the walls so it highlights. DO NOT SELECT.

Press the TAB key.
All the walls highlight.
Left pick to select all four walls.

7. Press the CONTROL key and hold down the left mouse to drag the walls to the right.

The CONTROL key is used to create copies of selected elements.

8. 

Place the mouse over one of the walls so it highlights. DO NOT SELECT.

Press the TAB key.
All the walls highlight.
Left pick to select all four walls.

9. Press the SHIFT key to move the selected walls.

10. Close the file without saving.

Command Exercise

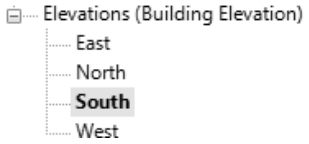
Exercise 2-8 – Dividing a Wall into Parts

Drawing Name: **wall_parts.rvt**
Estimated Time to Completion: 45 Minutes

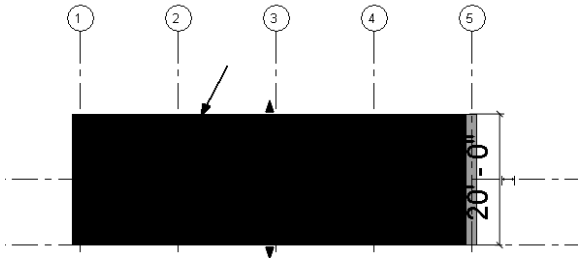
Scope

Use of parts to apply materials to a wall

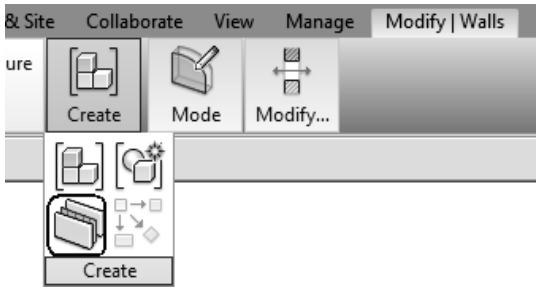
Solution

1. 

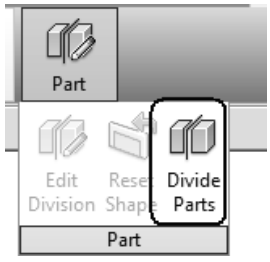
Activate the **South** elevation view.

2. 

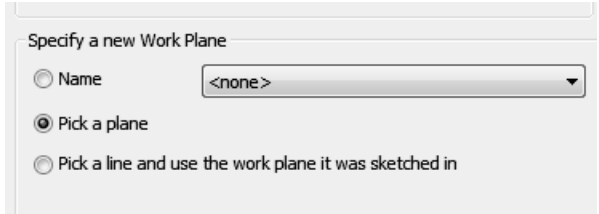
Select the wall so it highlights.

3. 

Select the **Create Parts** tool on the Create panel.

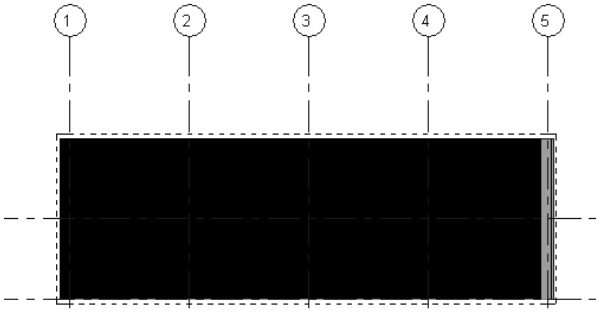
4. 

Select **Divide Parts** on the Part panel.

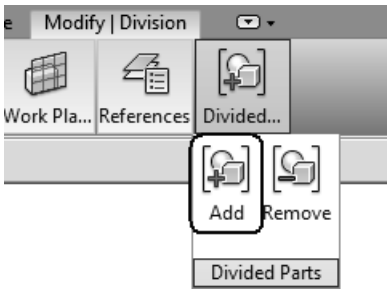
5. 

Enable **Pick a plane**.

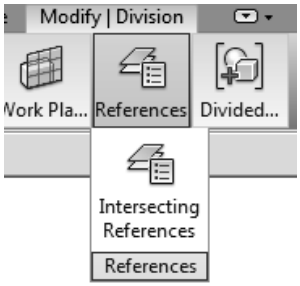
Press **OK**.

6. 

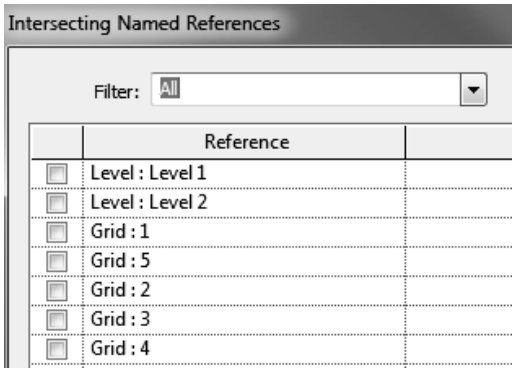
Pick the front of the wall for the workplane.

7. 

Select the **Add** tool from the Divided Parts panel.

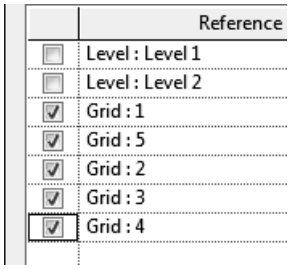
8. 

Select **Intersecting References** from the References panel.

9. 

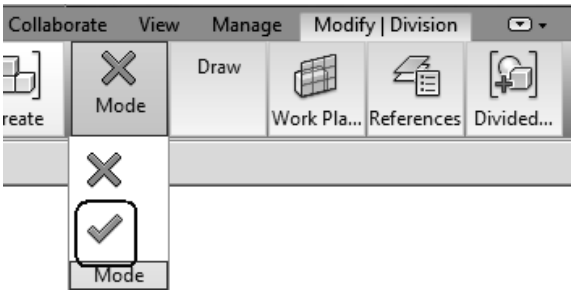
Set Filter to **All**.

This allows you to see Grids and Levels.

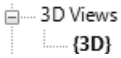
10. 

Place a check next to the **Grids**.

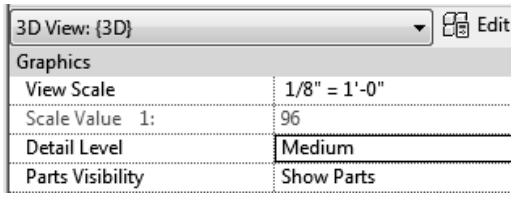
Press **OK**.

11. 

Select the **green check** on the Mode panel to finish dividing the parts.

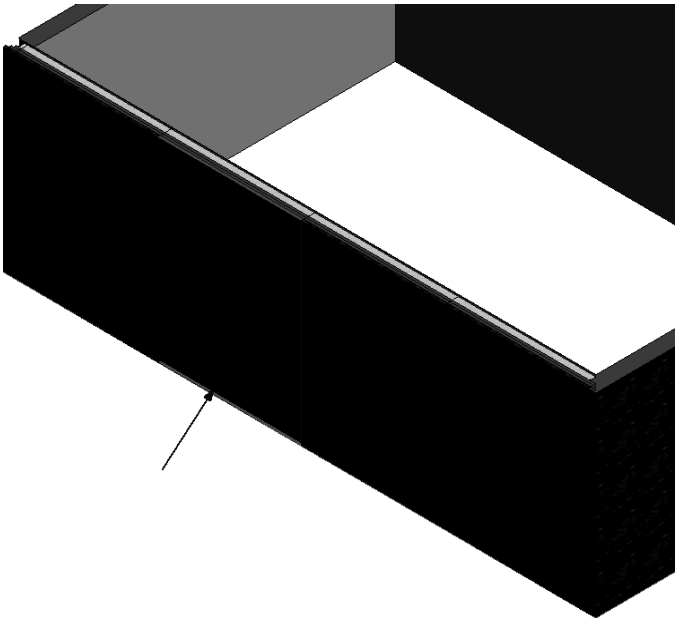
12. 

Switch to a 3D view.

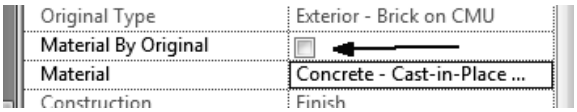
13. 

In the Properties pane:

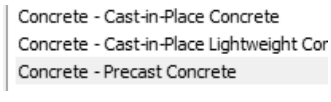
Set the Detail Level to **Medium**.
Set the Parts Visibility to **Show Parts**.

14. 
Select the second panel/part.

15. In the Properties panel:



Uncheck **Material by Original**.
Left click in the Material column to assign a material.

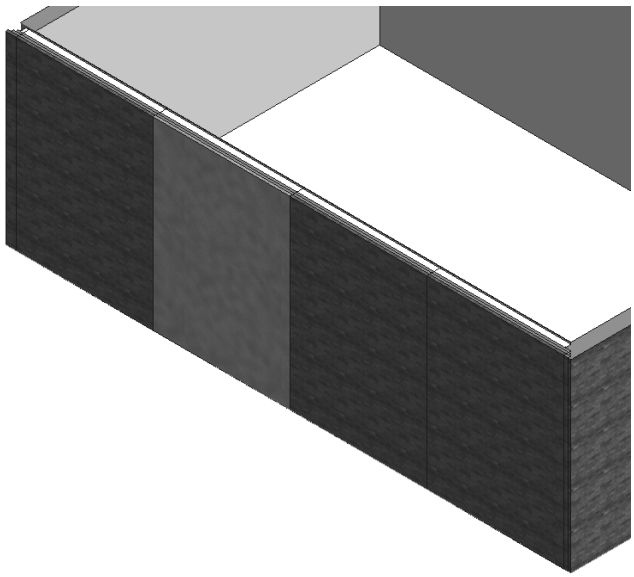
16. 

Select the **Concrete - Precast Concrete** material.

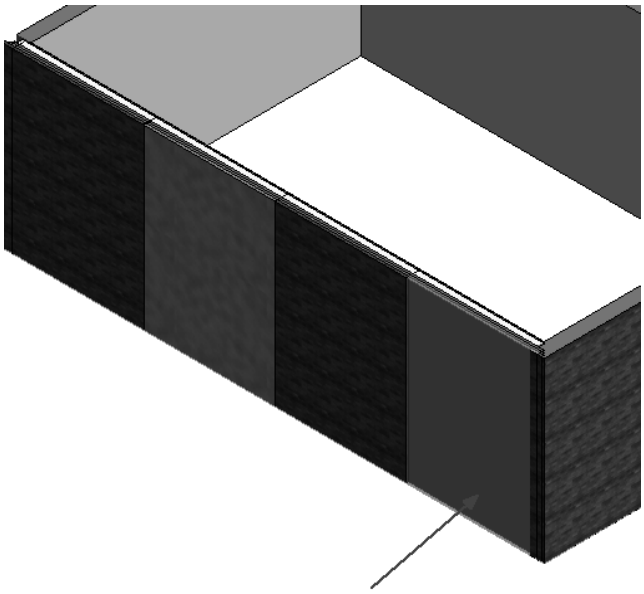
17. 

Enable **Use Render Appearance for Shading**.

Press **OK**.

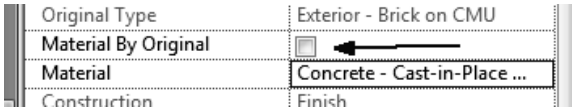
18. 

The wall changes to show the new material.

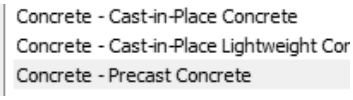
19. 

Select the fourth panel/part.

20. In the Properties panel:



Uncheck **Material by Original**. Left click in the Material column to assign a material.

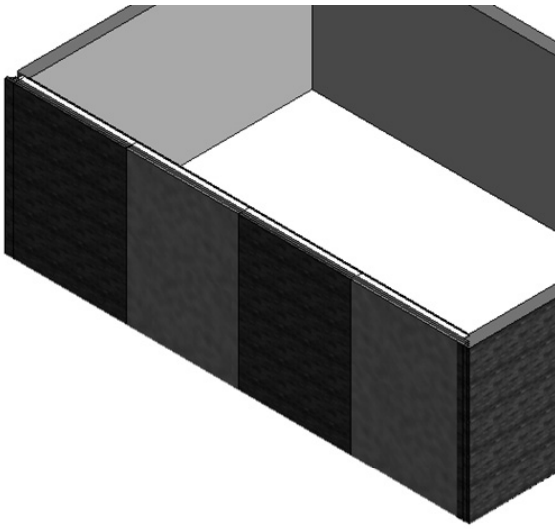
21. 

Select the **Concrete - Precast Concrete** material.

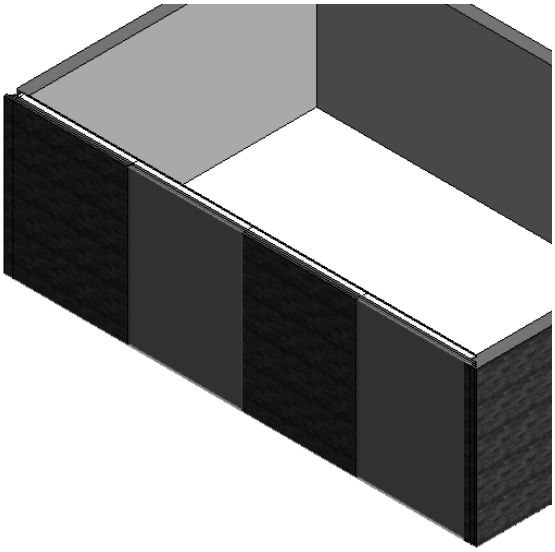
22. 

Enable **Use Render Appearance for Shading**.

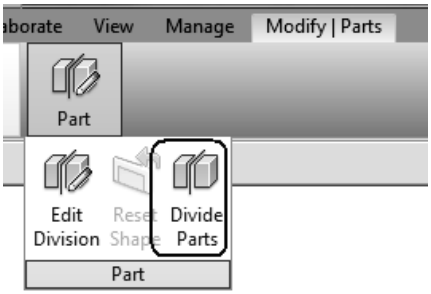
Press **OK**.

23. 

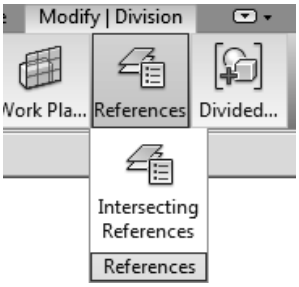
The wall changes to show the new material.

24. 

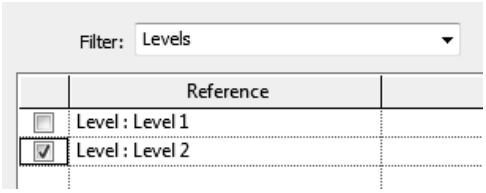
Hold down the CTRL key and select the two concrete panels.

25. 

Select the **Divide Parts** tool from the Part panel.

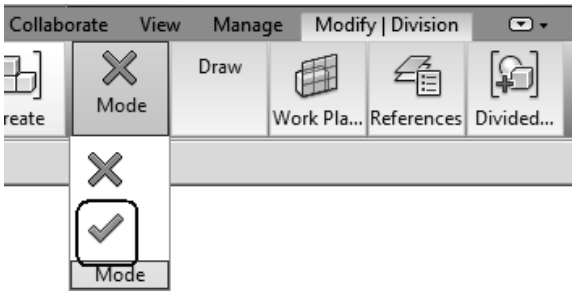
26. 

Select **Intersecting References** from the References panel.

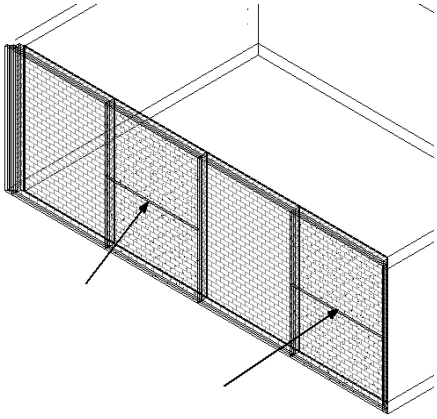
27. 

Place a check next to the **Level 2**.

Press **OK**.

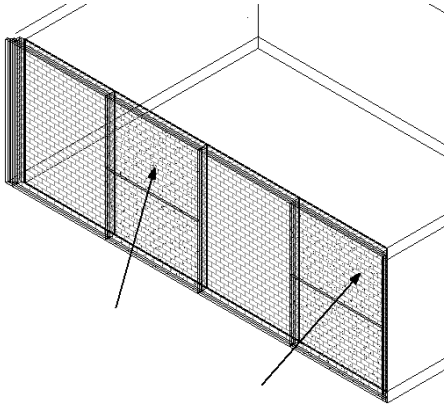
28. 

Select the **green check** on the Mode panel to finish dividing the parts.

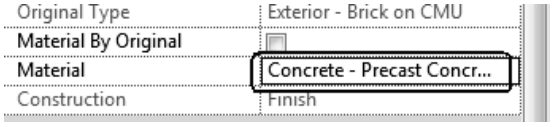
29. 

The concrete panels are now divided into two sections.

Shown in wireframe so you can see the divisions easily.

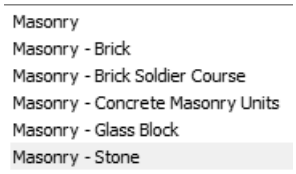
30. 

Hold down the CTRL key and select the two top sections of the concrete panels.

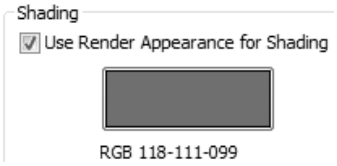
31. 

In the Properties panel:

Left click in the Material column to assign a material.

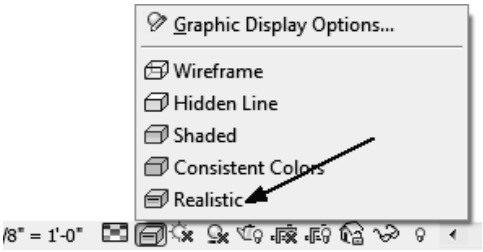
32. 

Select the **Masonry-Stone** material.

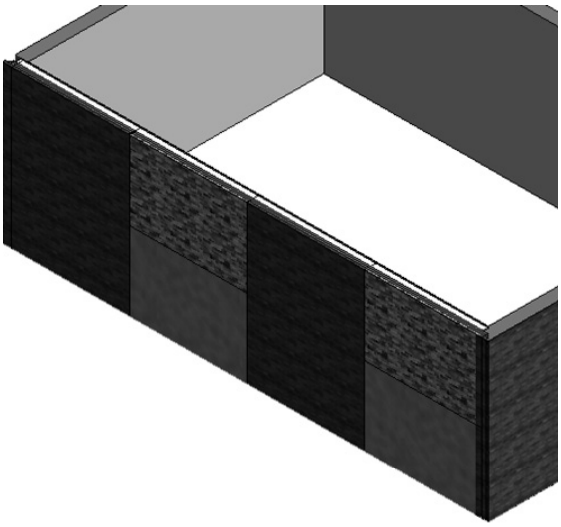
33. 

Enable **Use Render Appearance for Shading**.

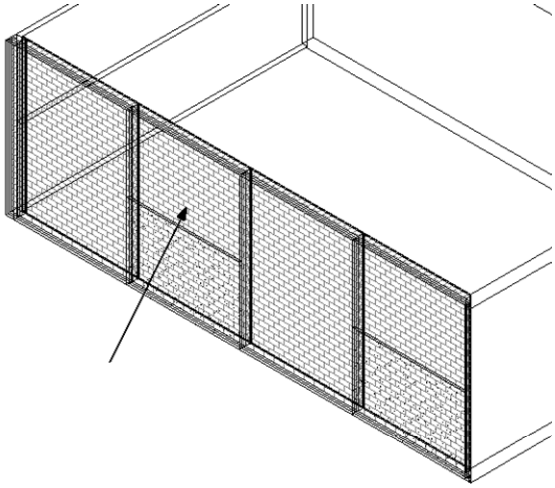
Press **OK**.

34. 

Set the display to **Realistic**.

35. 

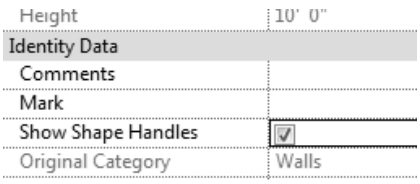
The new materials are assigned.

36. 

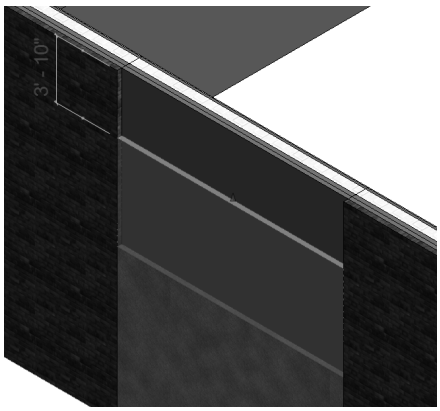
Select the top part indicated.

Note that no grips are available when a part is selected.

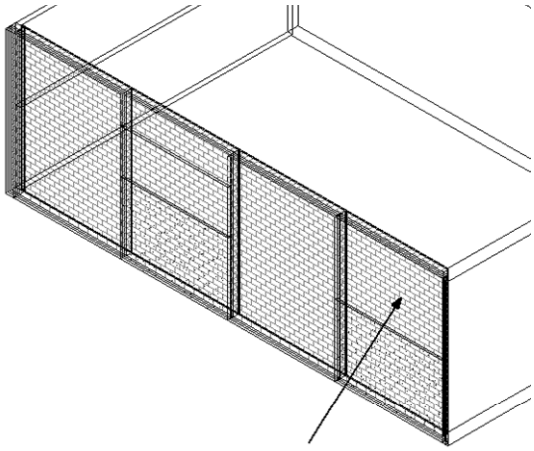
Shown in wireframe so you can see the divisions easily.

37. 

Enable **Show Shape Handles** on the Properties pane.

38. 

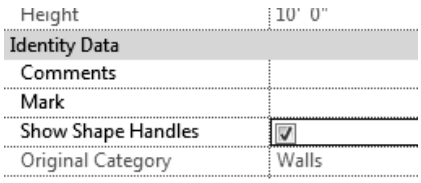
Use the top shape handle to lower the material 3′ -10″ from the top of the wall.

39. 

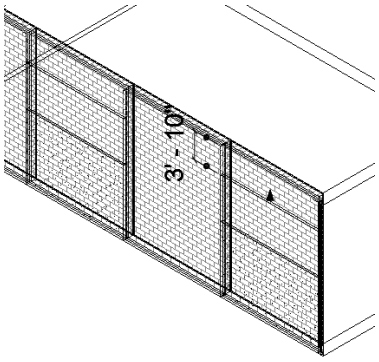
Select the top part indicated.

Note that no grips are available when a part is selected.

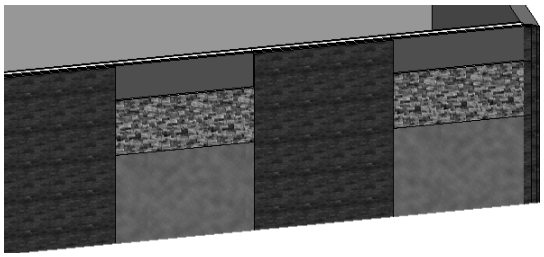
Shown in wireframe so you can see the divisions easily.

40. 

Enable **Show Shape Handles** on the Properties pane.

41. 

Use the top shape handle to lower the material 3' -10" from the top of the wall.

42. 

Switch to a **Realistic** display.

Orbit the model to inspect your new wall.

Save as *ex2-8.rvt*.

Command Exercise

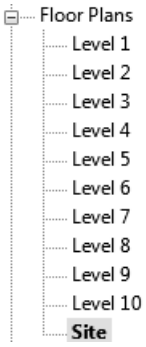
Exercise 2-9 – Creating an In-Place Mass

Drawing Name: **in_place_mass.rvt**
Estimated Time to Completion: 60 Minutes

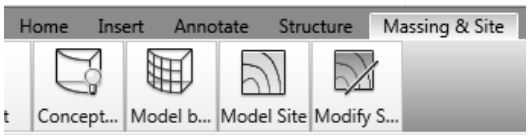
Scope

Use of in-place masses to create a conceptual model

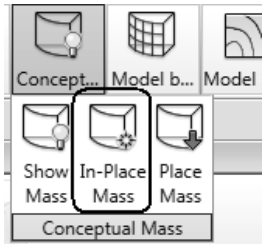
Solution

1. 

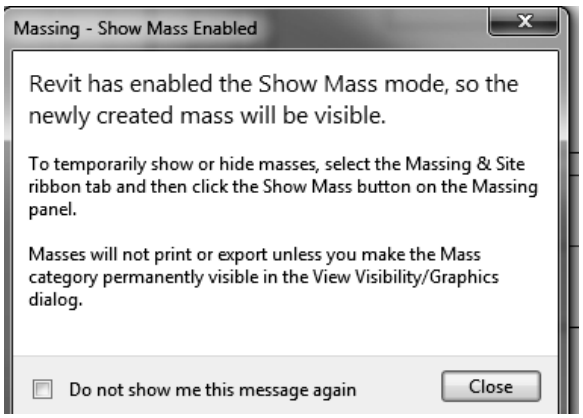
Activate the **Site** plan view.

2. 

Activate the **Massing & Site** ribbon.

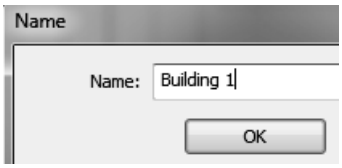
3. 

Select the **In-Place Mass** tool from the Conceptual Mass panel.

4. 

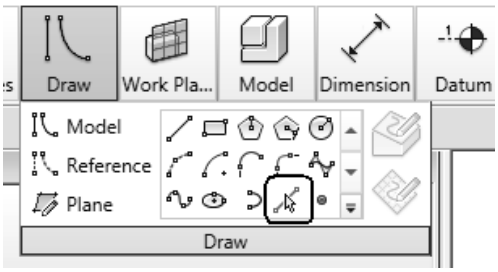
Revit displays a message indicating that visibility of masses has been turned on.

Press **Close**.

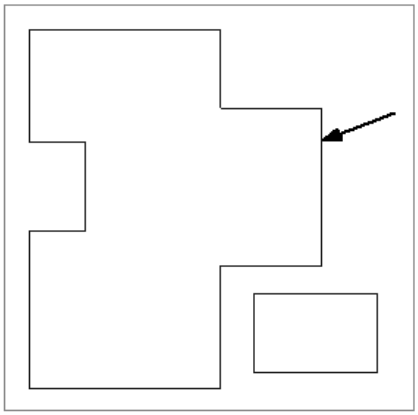
5. 

Name your first mass **Building 1**.

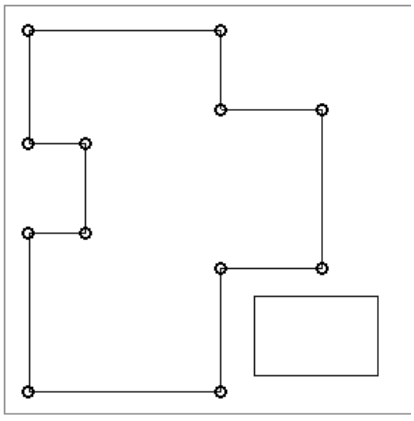
Press **OK**.

6. 

Select the **Pick Line** tool from the Draw panel.

7. 

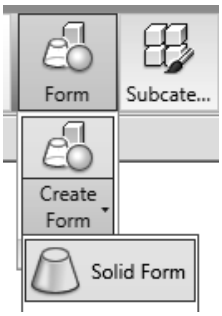
Pick the lines for the building in the upper right quadrant.

8. 

When you select the sketch, it should form a closed boundary.

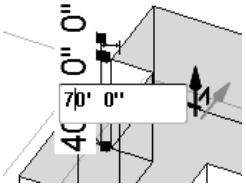
Make sure there are no overlapping lines.

9.  Switch to a **3D** view.

10. 

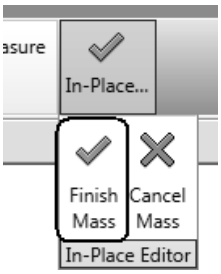
Select the sketch.

Select **Form→Create Form→Solid Form**.

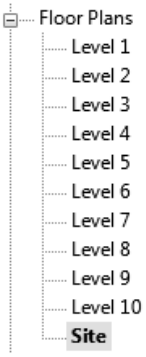
11. 

Click on the dimension.
Change it to **70′ 0″**.

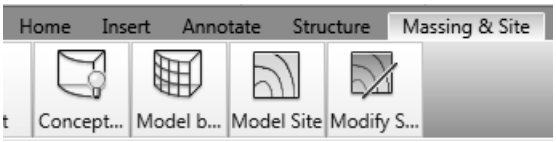
Press **ENTER**.
Left click in the display window to release the selection.

12. 

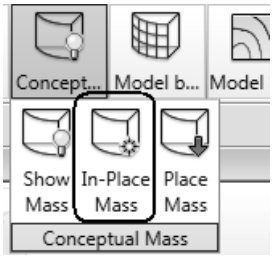
Select **Finish Mass** from the In-Place Editor panel.

13. 

Activate the **Site** plan view.

14. 

Activate the **Massing & Site** ribbon.

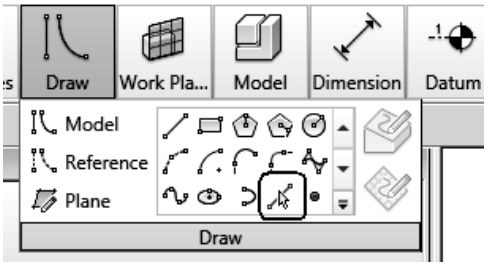
15. 

Select the **In-Place Mass** tool from the Conceptual Mass panel.

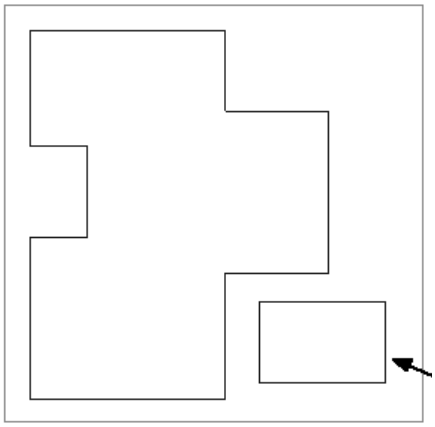
16. 

Name your mass **Building 2**.

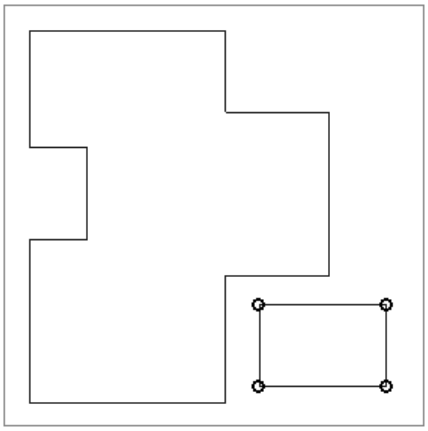
Press **OK**.

17. 

Select the **Pick Line** tool from the Draw panel.

18. 

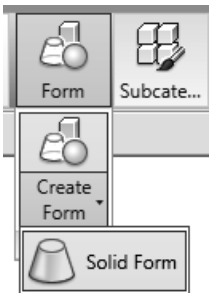
Pick the lines for the small building in the upper right quadrant.

19. 

When you select the sketch, it should form a closed boundary.

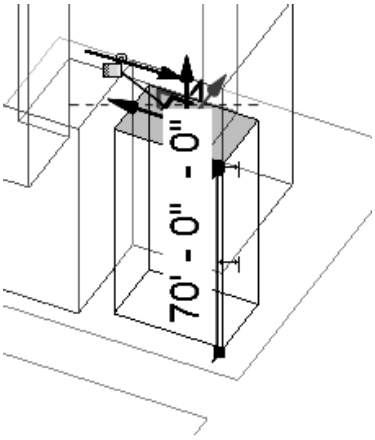
Make sure there are no overlapping lines.

20. Switch to a **3D** view.

21. 

Select the sketch.

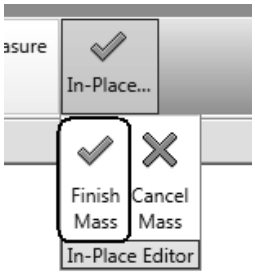
Select **Form→Create Form→Solid Form**.

22. 

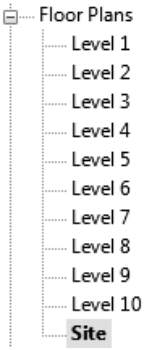
Select the blue Z-axis.

Drag the building up until the dimension displays **70′-0″**.

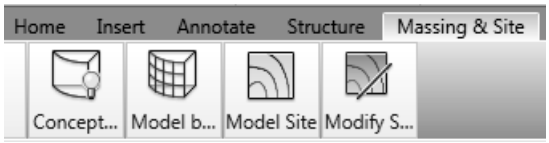
Left click in the display window to release the selection.

23. 

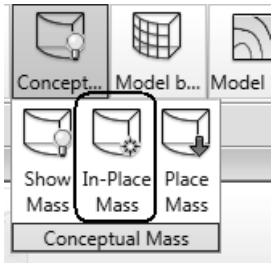
Select **Finish Mass** from the In-Place Editor panel.

24. 

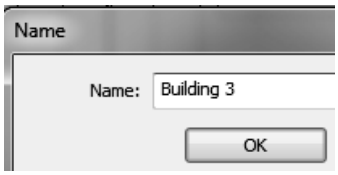
Activate the **Site** plan view.

25. 

Activate the **Massing & Site** ribbon.

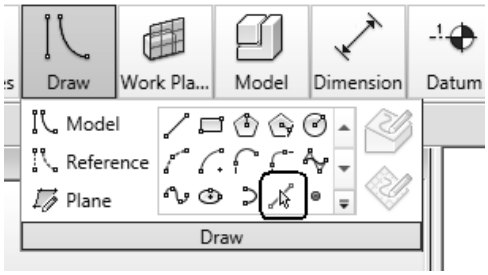
26. 

Select the **In-Place Mass** tool from the Conceptual Mass panel.

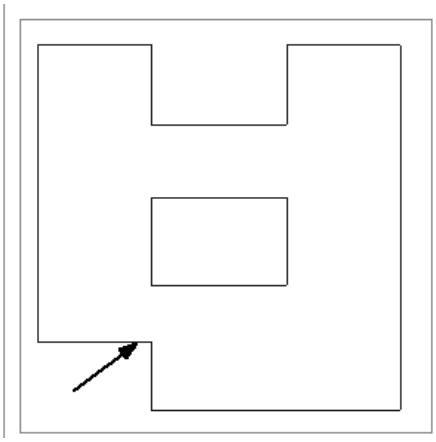
27. 

Name your mass **Building 3**.

Press **OK**.

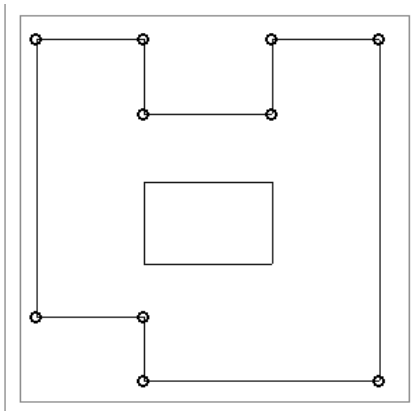
28. 

Select the **Pick Line** tool from the Draw panel.

29. 

Pick the lines for the building in the upper left quadrant.

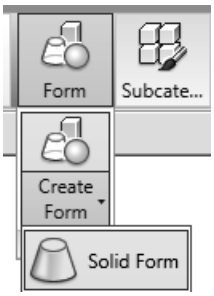
Select both the inner and outer boundaries.

30. 

When you select the sketch, it should form a closed boundary.

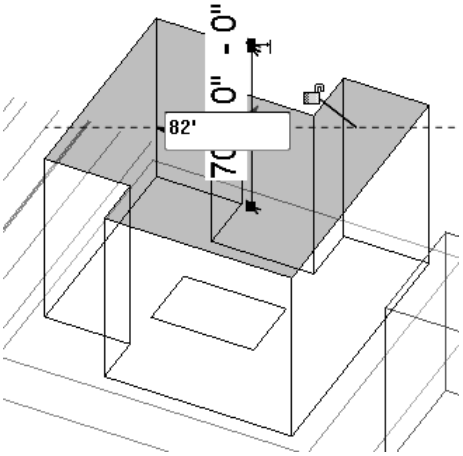
Make sure there are no overlapping lines.

31.  Switch to a **3D** view.

32. 

Select the outer sketch.

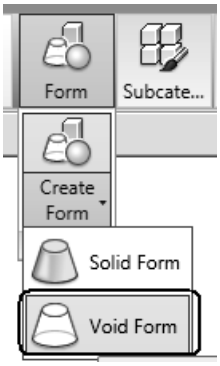
Select **Form→Create Form→Solid Form**.

33. 

Select the Blue Z-axis.

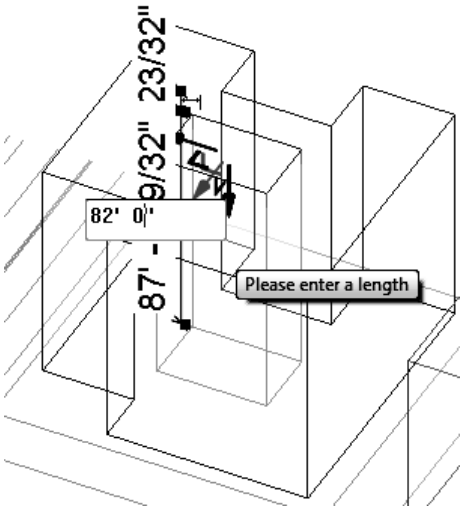
Drag the building up until the dimension displays **82′-0″**.

Left click in the display window to release the selection.

34. 

Select the inner sketch.

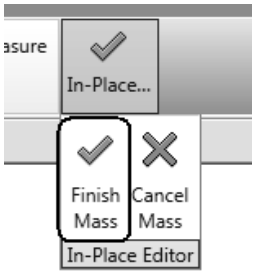
Select **Form→Create Form→Void Form**.

35. 

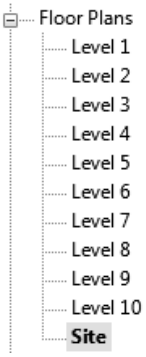
Select the blue Z-axis.

Drag the void down until the dimension displays **82′-0″**.

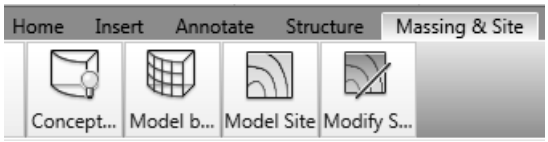
Left click in the display window to release the selection.

36. 

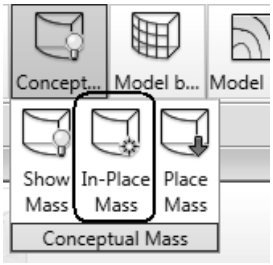
Select **Finish Mass** from the In-Place Editor panel.

37. 

Activate the **Site** plan view.

38. 

Activate the **Massing & Site** ribbon.

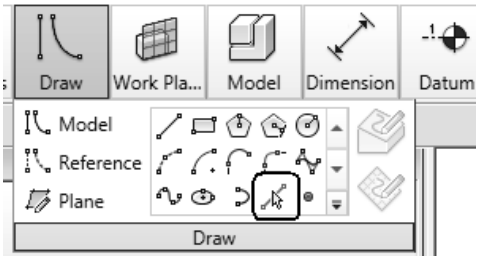
39. 

Select the **In-Place Mass** tool from the Conceptual Mass panel.

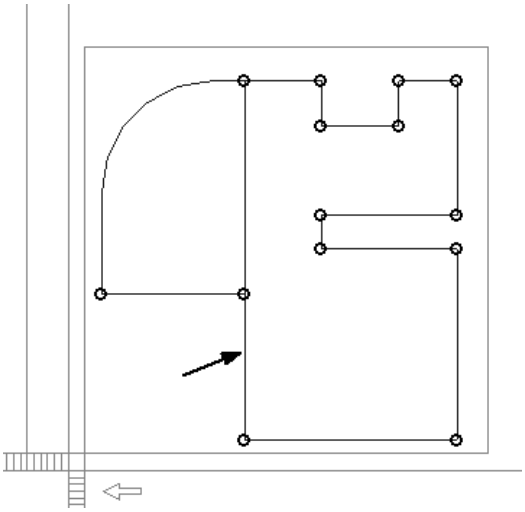
40. 

Name your mass **Building 4**.

Press **OK**.

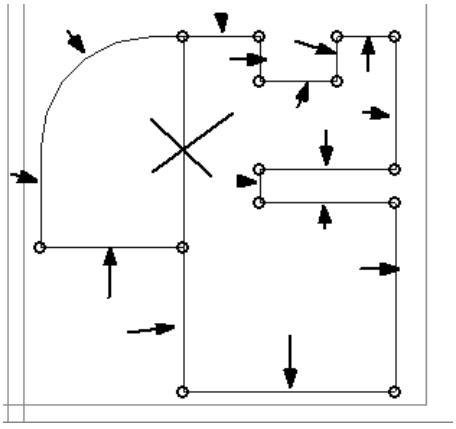
41. 

Select the **Pick Line** tool from the Draw panel.

42. 

Pick the lines for the building in the lower left quadrant.

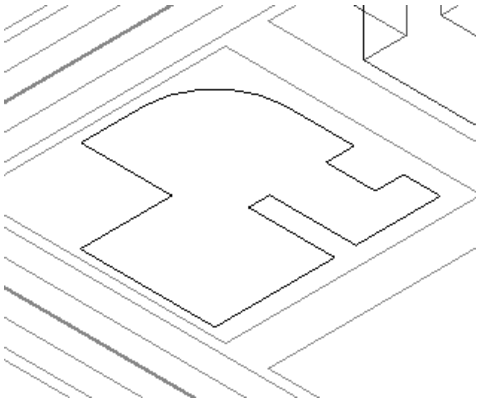
You will need to use the TRIM tool from the Modify panel to trim the lower left side of the sketch.

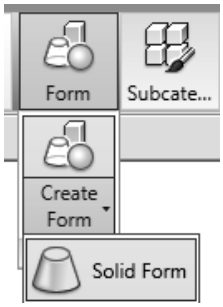
43. 

When you select the sketch, it should form a closed boundary.

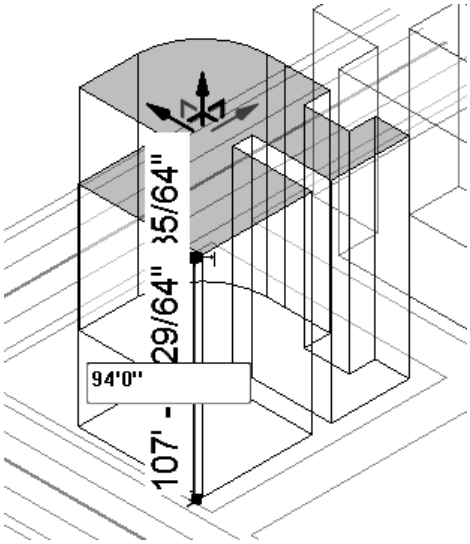
Make sure there are no overlapping lines. Arrows indicate the sketch components. I have x'd out the line which needs to be trimmed out.

44. Switch to a **3D** view.

45.  Select the sketch.

46. 

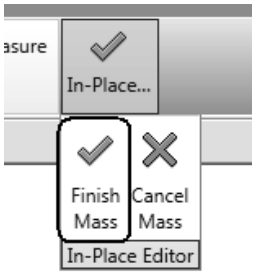
Select **Form→Create Form→Solid Form**.

47. 

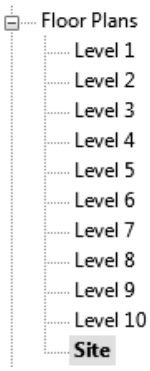
Select the Blue Z-axis.

Drag the building up until the dimension displays **94′-0″**.

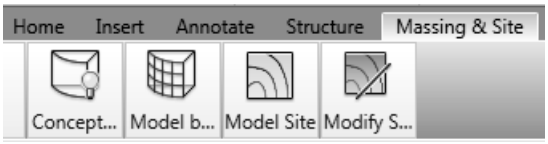
Left click in the display window to release the selection.

48. 

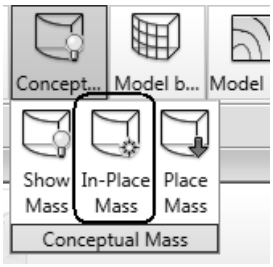
Select **Finish Mass** from the In-Place Editor panel.

49. 

Activate the **Site** plan view.

50. 

Activate the **Massing & Site** ribbon.

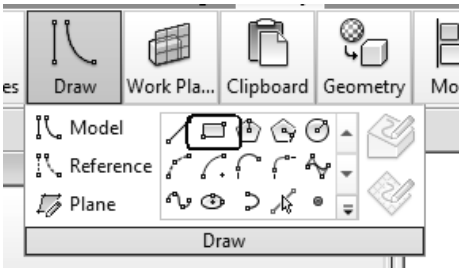
51. 

Select the **In-Place Mass** tool from the Conceptual Mass panel.

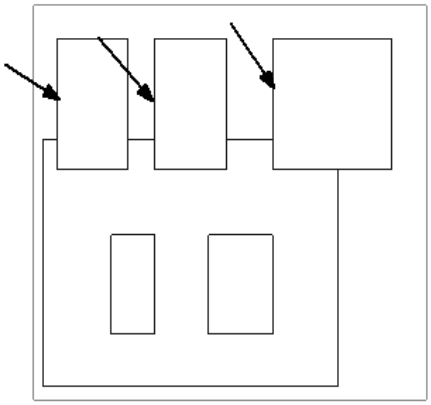
52. 

Name the mass **Towers**.

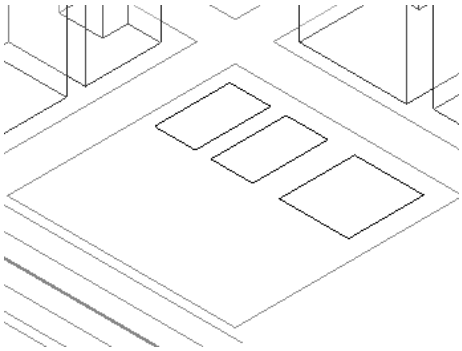
Press **OK**.

53. 

Select the **Rectangle** tool from the Draw panel.

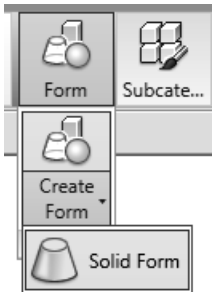
54. 
Trace over the top three rectangles in the fourth quadrant.

55. Switch to a **3D** view.

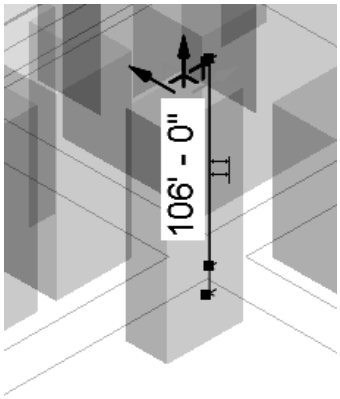
56. 

Select the left rectangle.

You can only use one closed polygon at a time for a solid form.

57. 

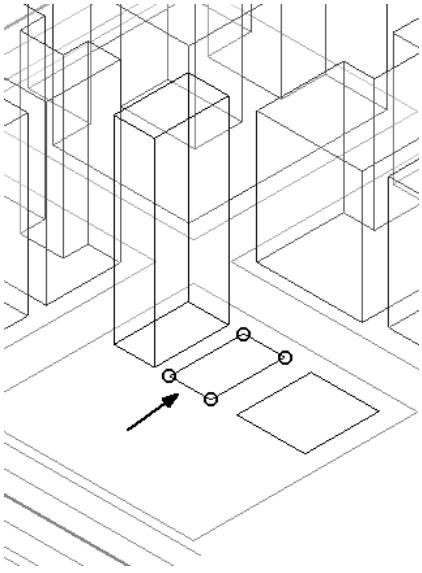
Select **Form→Create Form→Solid Form**.

58. 

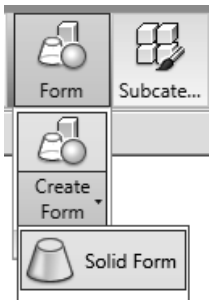
Select the Blue Z-axis.

Drag the building up until the dimension displays **106′-0″**.

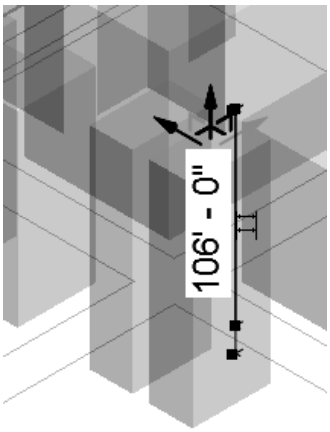
Left click in the display window to release the selection.

59. 

Select the middle rectangle.

60. 

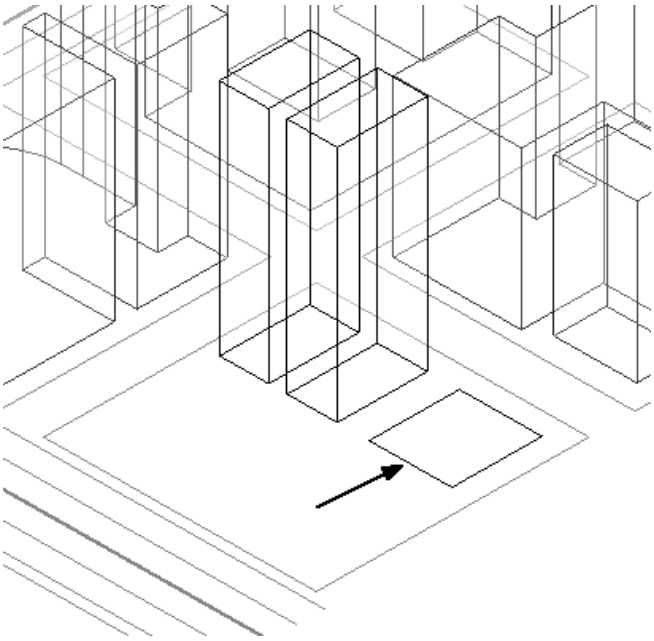
Select **Form→Create Form→Solid Form**.

61. 

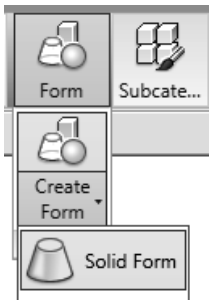
Select the Blue Z-axis.

Drag the building up until the dimension displays **106′-0″**.

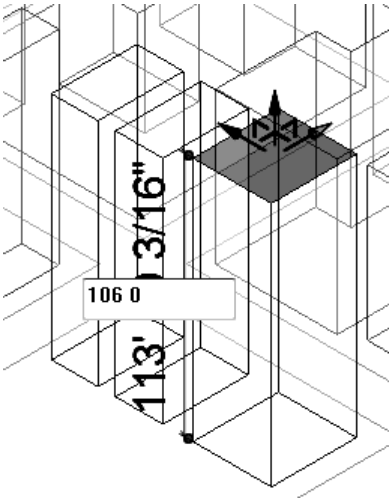
Left click in the display window to release the selection.

62. 

Select the right rectangle.

63. 

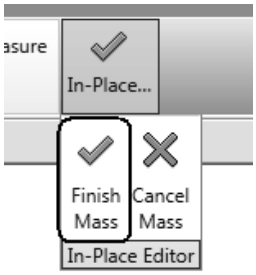
Select **Form→Create Form→Solid Form**.

64. 

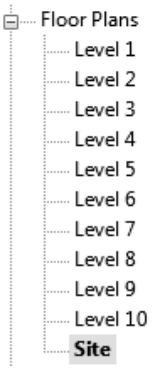
Select the blue Z-axis.

Drag the building up until the dimension displays **106′-0″**.

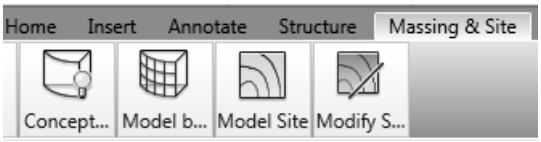
Left click in the display window to release the selection.

65. 

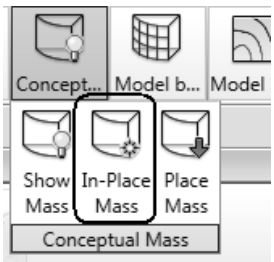
Select **Finish Mass** from the In-Place Editor panel.

66. 

Activate the **Site** plan view.

67. 

Activate the **Massing & Site** ribbon.

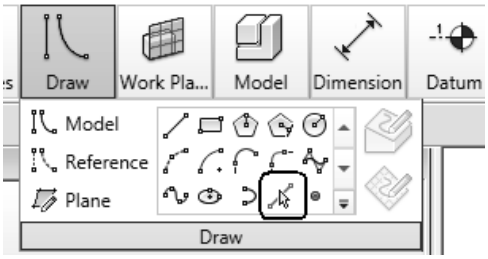
68. 

Select the **In-Place Mass** tool from the Conceptual Mass panel.

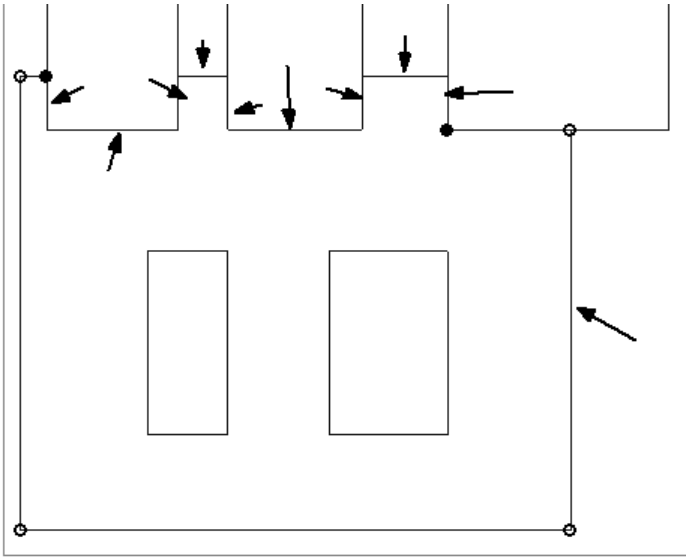
69. 

Name the mass **Building 5**.

Press **OK**.

70. 

Select the **Pick Line** tool from the Draw panel.

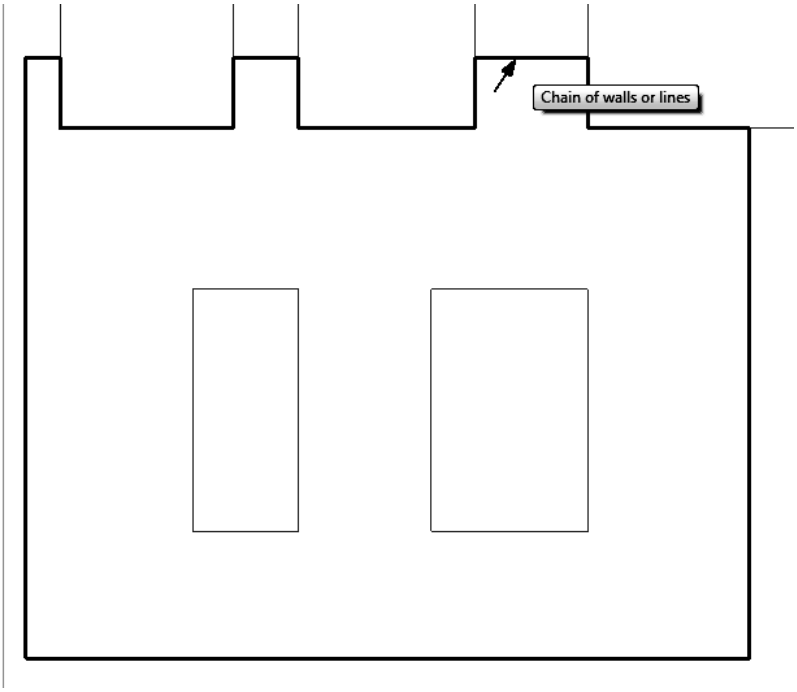
71. 

Pick the lines for the sketch in the lower right quadrant.

Use **Draw Line** to complete the sketch.

Use the **Rectangle** tool to create two sketches for the internal rectangles.

These will be voids.

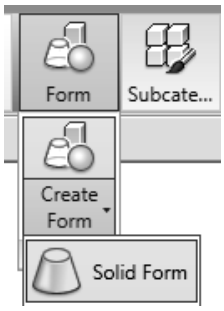
72. 

When you select one of the lines of the sketch, you should see the entire sketch highlight.

If you don't see a continuous loop, there are either missing lines or overlapping/ duplicate lines.

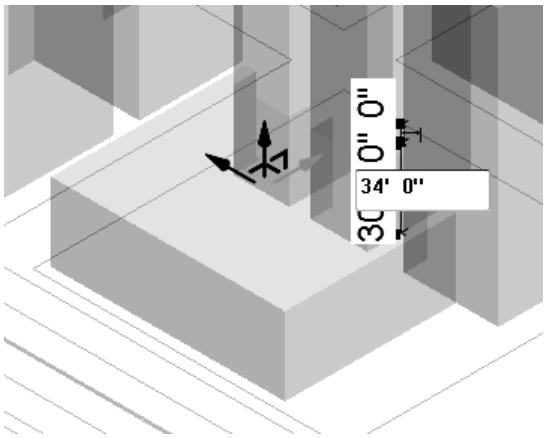
Check the sketch for overlapping lines by deleting a line, then click UNDO if it is not a duplicate.

73. Switch to a **3D** view.

74. 

Select the outside boundary sketch.

Select **Form→Create Form→Solid Form**.

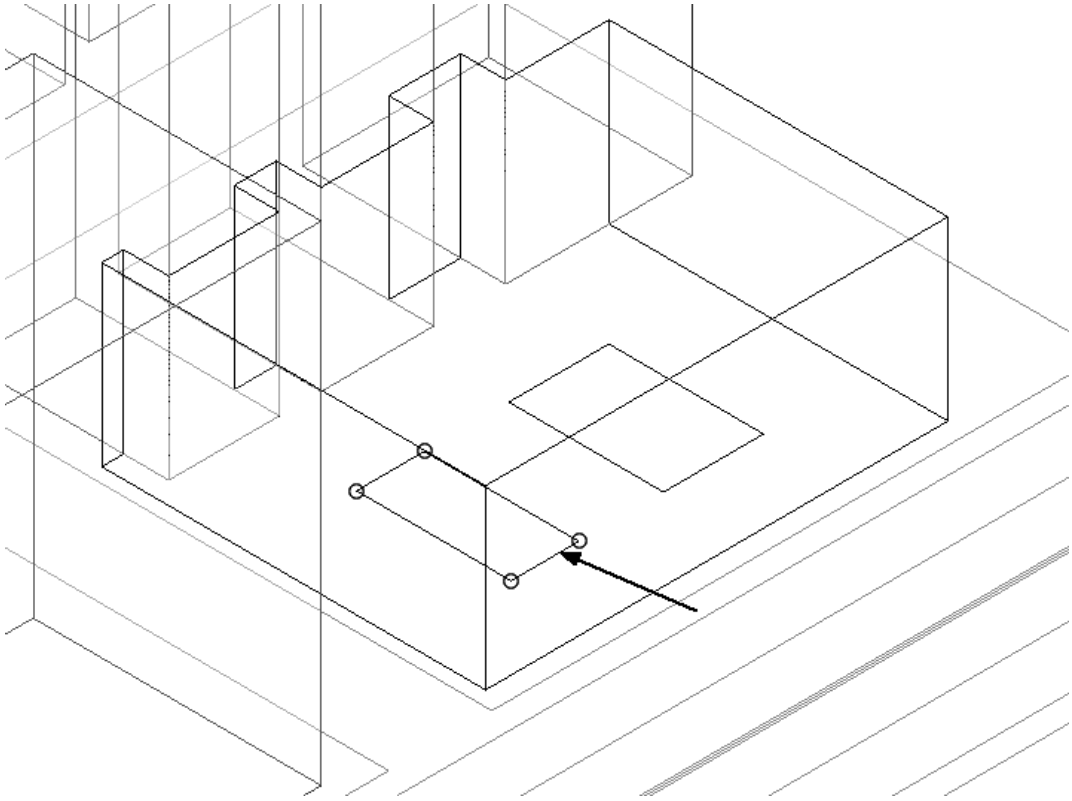
75. 

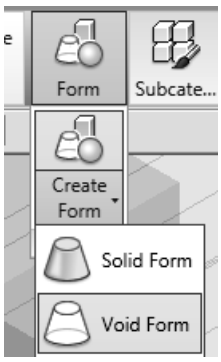
Select the Blue Z-axis.

Drag the building up until the dimension displays **34′-0″**.

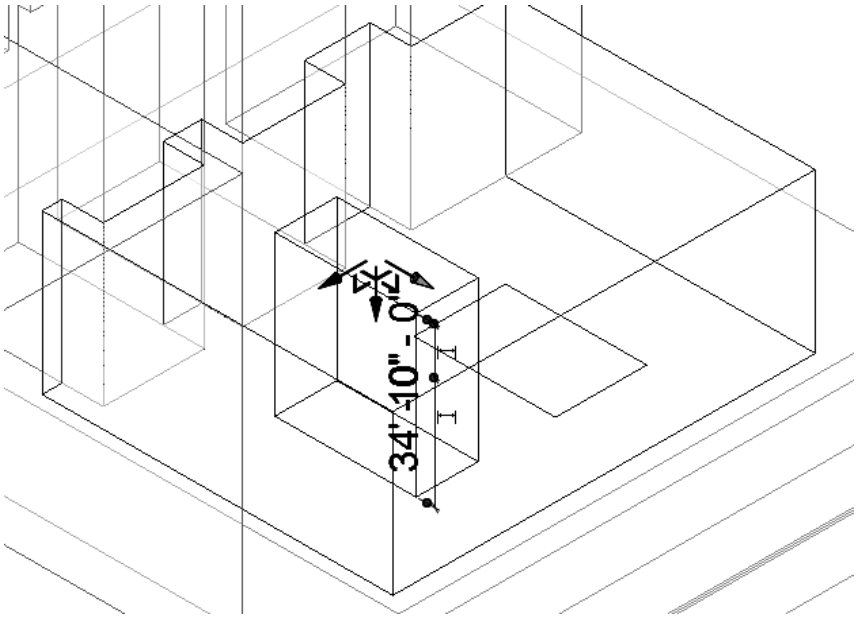
Left click in the display window to release the selection.

76. Select the left rectangle.



77. 

Select **Form→Create Form→Void Form**.

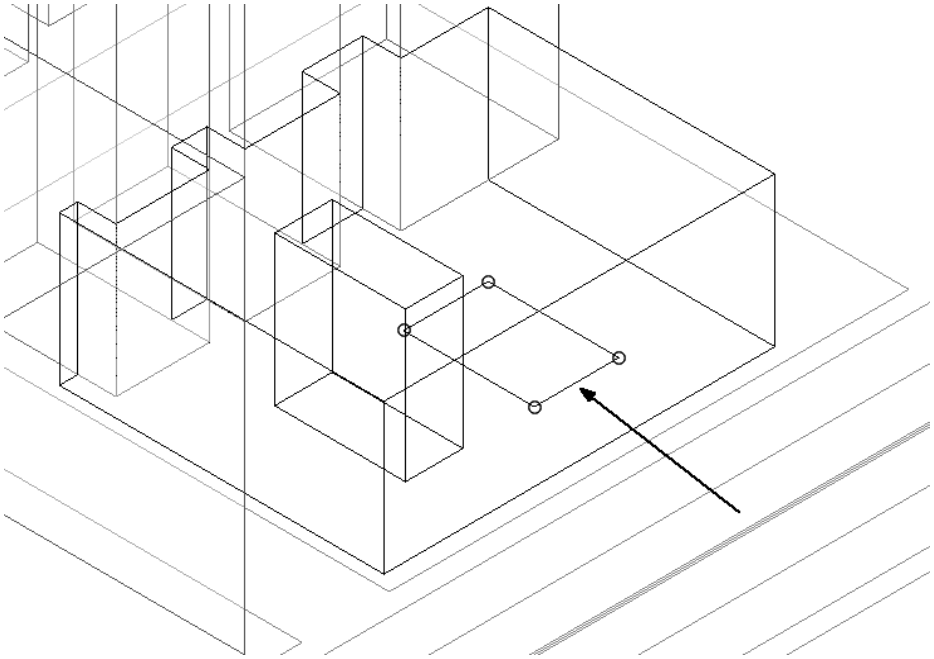
78. 

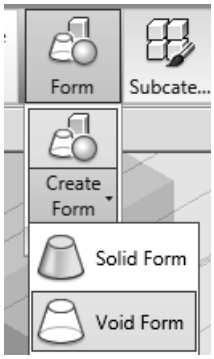
Select the blue Z-axis.

Drag the building up until the dimension displays **34′-0″**.

Left click in the display window to release the selection.

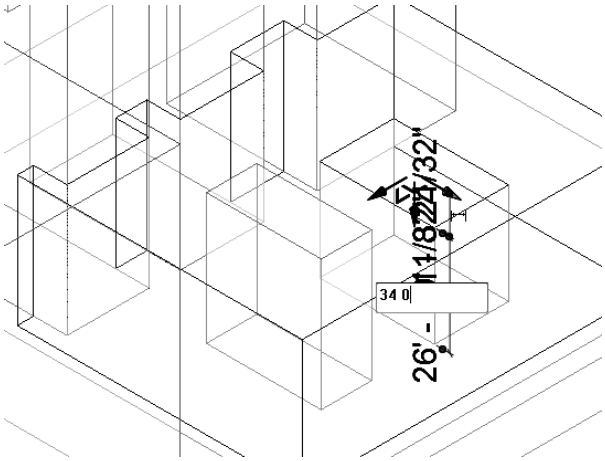
79. Select the right rectangle.



80. 

Select the sketch.

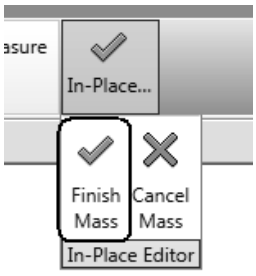
Select **Form→Create Form→Void Form**.

81. 

Select the Blue Z-axis.

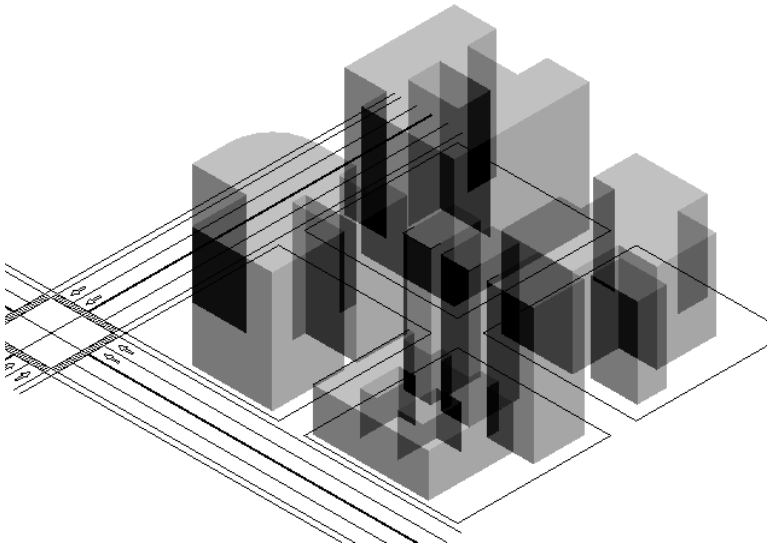
Drag the building up until the dimension displays **34′-0″**.

Left click in the display window to release the selection.

82. 

Select **Finish Mass** from the In-Place Editor panel.

83. Close without saving.



Command Exercise

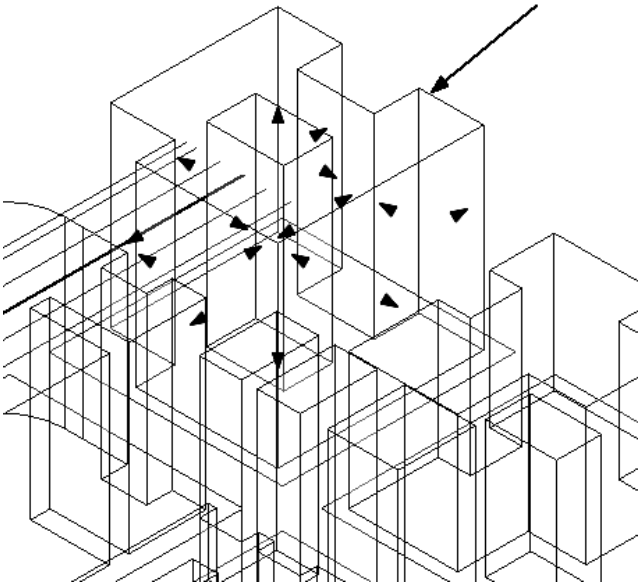
Exercise 2-10 – Editing an In-Place Mass

Drawing Name: **editing_masses.rvt**
Estimated Time to Completion: 30 Minutes

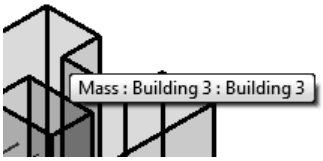
Scope

Editing in-place masses to develop a conceptual model

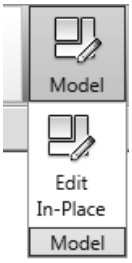
Solution

1. 

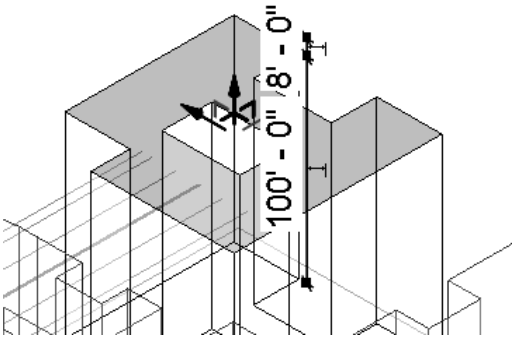
Select **Building 3** in the NW quadrant.



If you hover your mouse over a mass, it will display the mass name assigned.

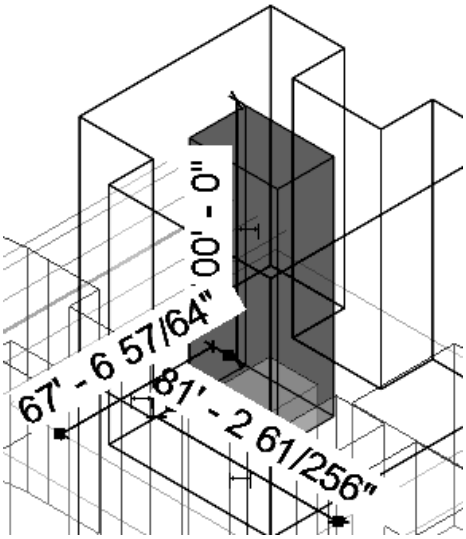
2. 

Select **Edit In-Place** from the Model panel.

3. 

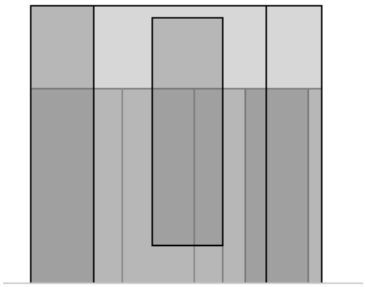
Use the **TAB** key to cycle through the selections until you have selected the top face.

Change the height of the mass to **100′-0″**.

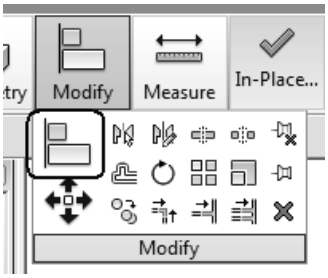
4. 

Use the **TAB** key to cycle through the selections until you have selected the void.

Change the height of the mass to **100′-0″**.

5. 

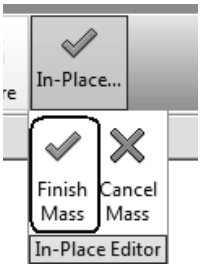
If you switch to a Left view, you can check the void to see if it really is aligned on the top and bottom.

6. 

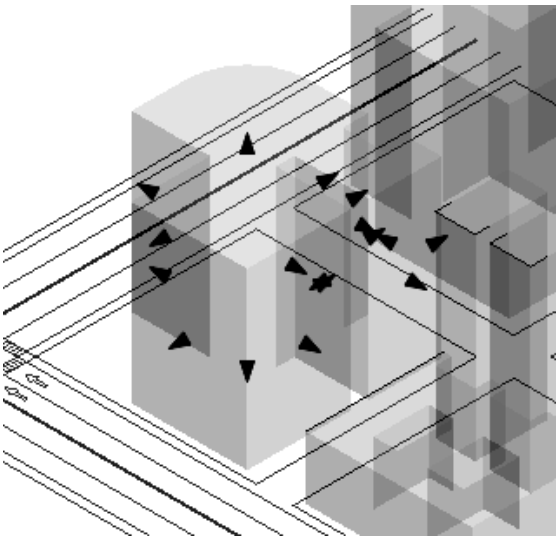
You can also use the ALIGN tool on the Modify panel to align the top of the void with the top of the solid form.

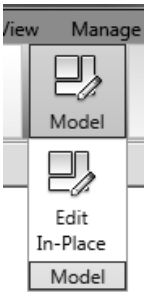
Select ALIGN. Use the TAB key to select the top of the solid form. Then, use the TAB key to select the top of the void.

Repeat for the bottom.

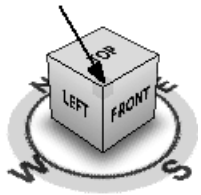
7. 

Select **Finish Mass** on the In-Place Editor panel when you are done editing the mass.

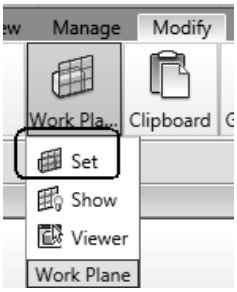
8.  Select Building 4.

9. 

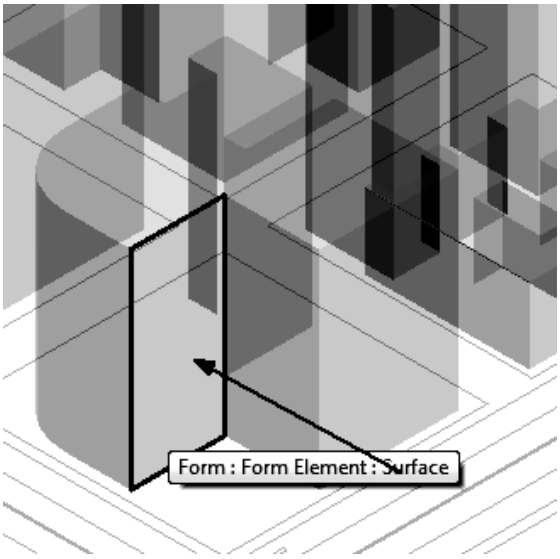
Select **Edit In-Place** from the Model panel.

10. 

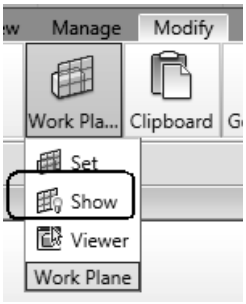
Rotate the view using the ViewCube.

11. 

Select **Set Work Plane** from the Work Plane panel.

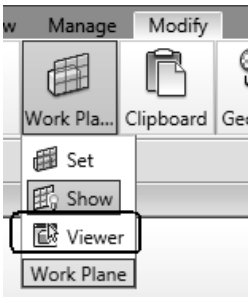
12. 

Select the face indicated.

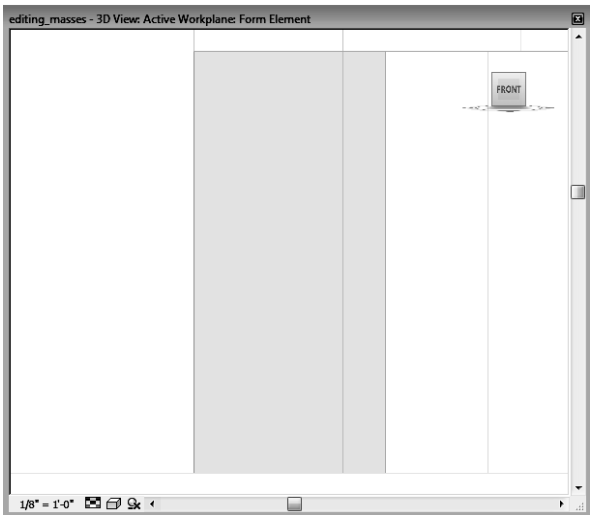
13. 

Select **Show Work Plane** from the Work Plane panel.

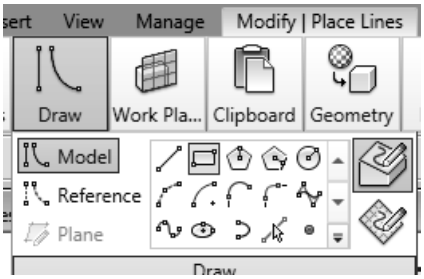
The color of the selected face will change.

14. 

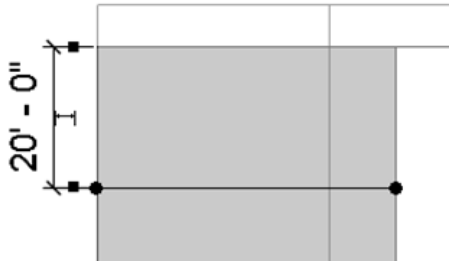
Select **Viewer** from the Work Plane panel.

15. 

A window will open with a normal (perpendicular) view to the active work plane.

16. 

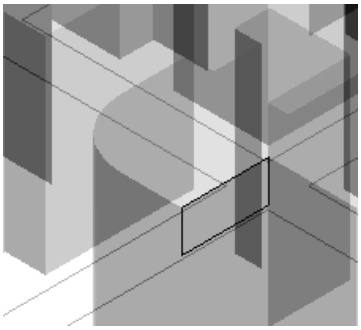
Select the **Rectangle** tool from the Draw panel.

17. 

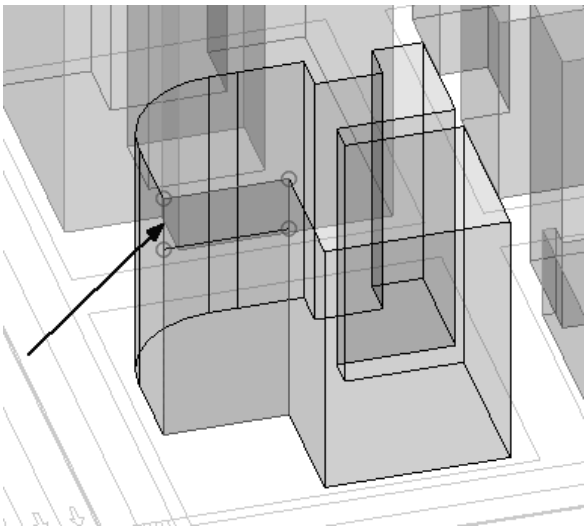
Draw a rectangle that is 20′ high using the Viewer window.

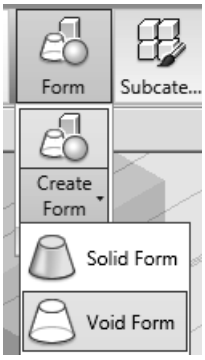
To adjust the dimension, select the bottom line and the temporary dimension will appear.

You can also use the ALIGN tool to set the sides of the rectangle collinear to the mass.

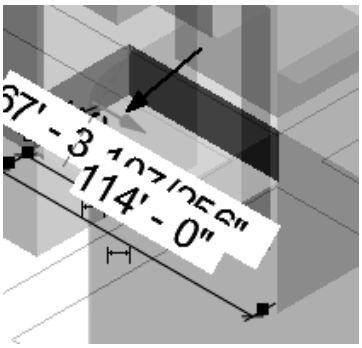
18. 
Check the placement of the rectangle in the 3D view.

Close the Viewer window.

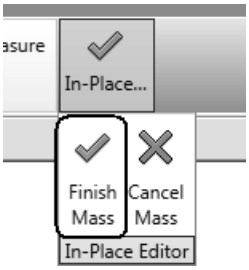
19. 
Select the sketch.

20. 

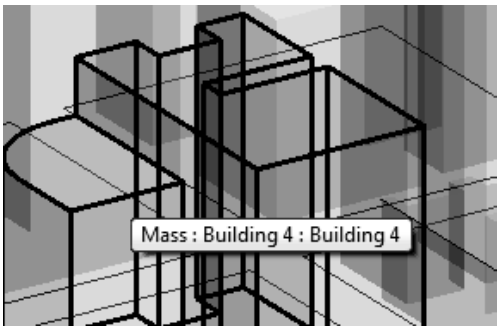
Select **Form→Create Form→Void Form**.

21. 

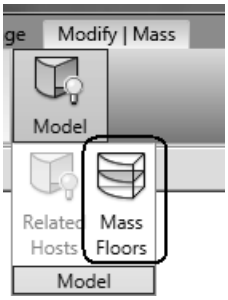
Use the green Axis to drag the void form through the existing mass.

22. 

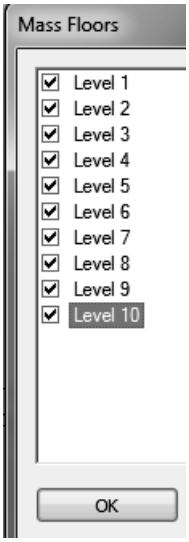
Select **Finish Mass** from the In-Place Editor panel.

23. 

Select **Building 4**. (This is the building you just modified.)

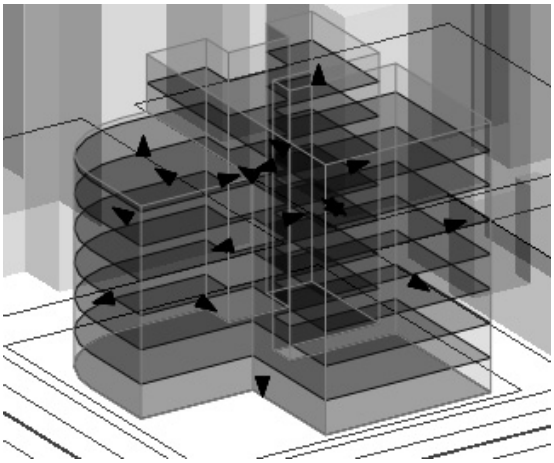
24. 

Select **Mass Floors** from the Model panel.

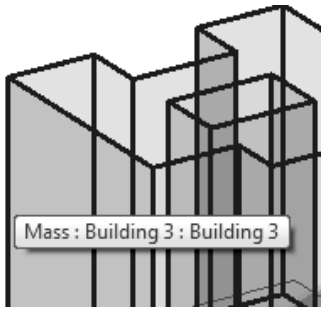
25. 

Enable all the Levels.

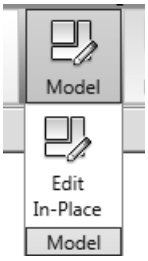
Press **OK**.

26. 

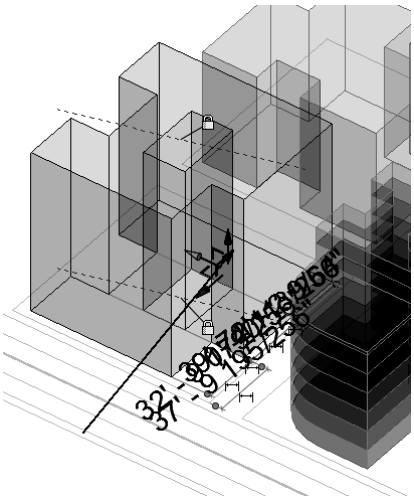
Floors are placed at each level.

27. 

Select Building 3.

28. 

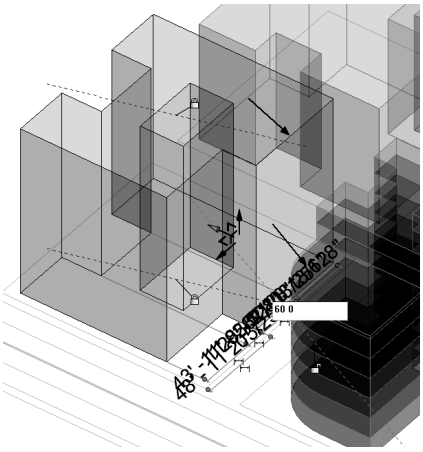
Select **Edit In-Place** from the Model panel.

29. 

Select the face indicated.

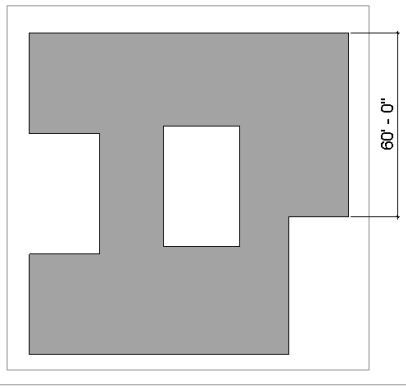
You should see the shape handle axis tool.

You can use the TAB key to cycle through the selection until the face is highlighted then left click.

30. 

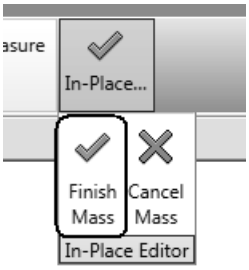
Adjust the dimension using the red axis.

It may be difficult to see the distance. You can also select the temporary dimension and set it to 60' 0". The arrows indicate the edge which is being adjusted.

31. 

To verify that the face was moved properly, switch to a Top view using the view cube.

Then use the MEASURE tool to verify the dimension.

32. 

Select **Finish Mass** from the In-Place Editor panel.

33. Save the file as *ex2-10.rvt*.

Command Exercise

Exercise 2-11 – Mass Properties

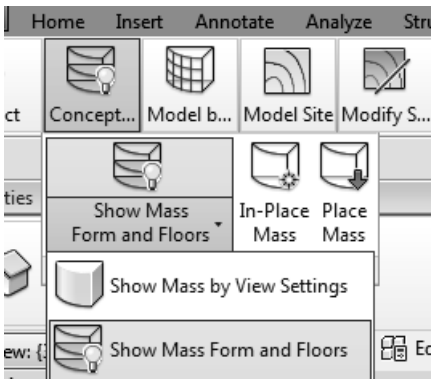
Drawing Name: **new**
Estimated Time to Completion: 15 Minutes

Scope

Modifying a conceptual mass

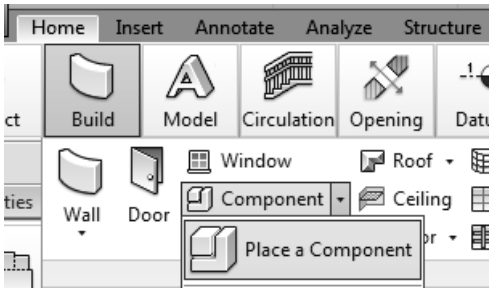
Solution

1. Start a new project using the Default template.

2. 

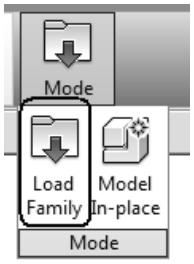
Activate the Massing & Site ribbon.

Enable **Show Mass Form and Floors** from the Conceptual Mass panel.

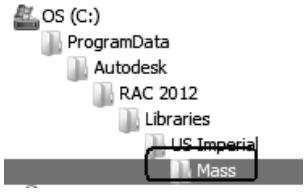
3. 

Activate the Home ribbon.

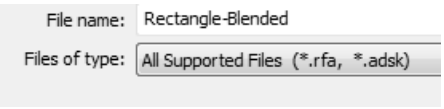
Select the **Component→Place a Component** tool on the Build panel.

4. 

Select **Load Family** from the Mode panel.

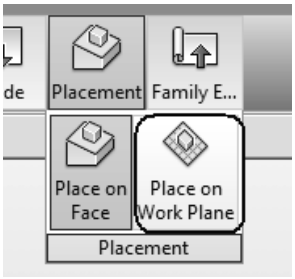
5. 

Browse to the *Mass* folder.

6. 

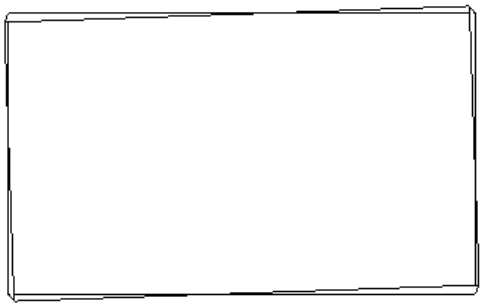
Select the *Rectangle-Blended* mass.

Press **Open**.

7. 

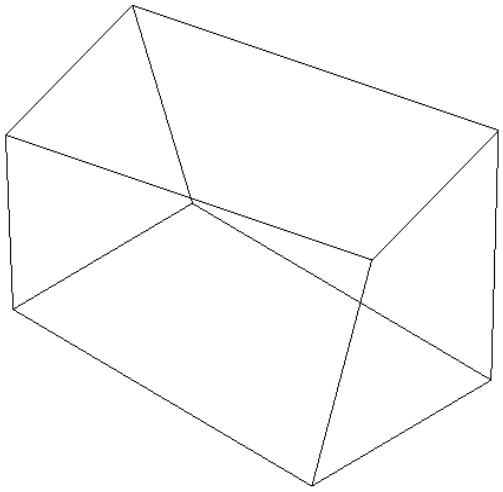
On the ribbon:

Select **Place on Work Plane** on the Placement panel.

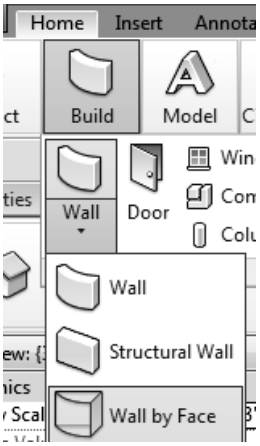
8. 

Place in the window.

Right click and select Cancel twice to exit the command.

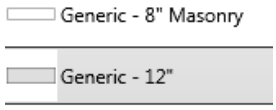
9. 

Switch to a 3D view.

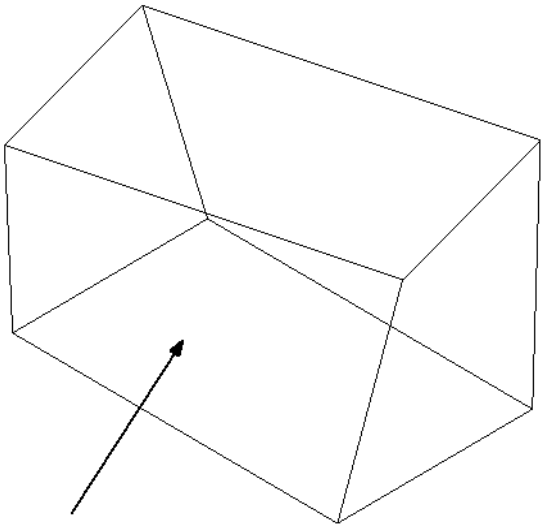
10. 

Activate the Home ribbon.

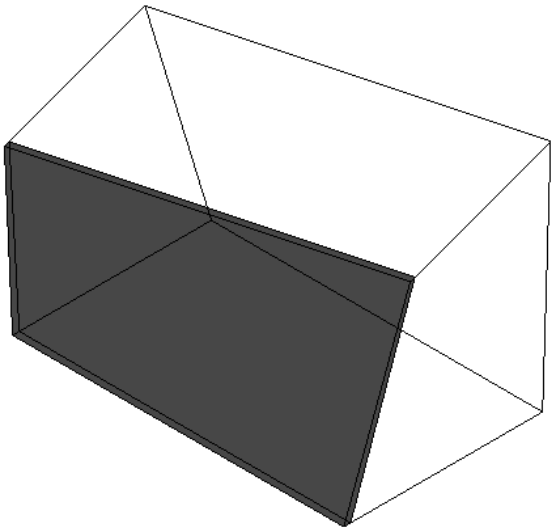
Select the **Wall→Wall by Face** tool on the Build panel.

11. 

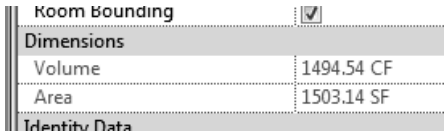
Set the wall type to **Generic - 12″** using the Type Selector.

12. 
Select the face indicated.

Left click in the window to exit the command.

13. 
Select the wall you just placed.

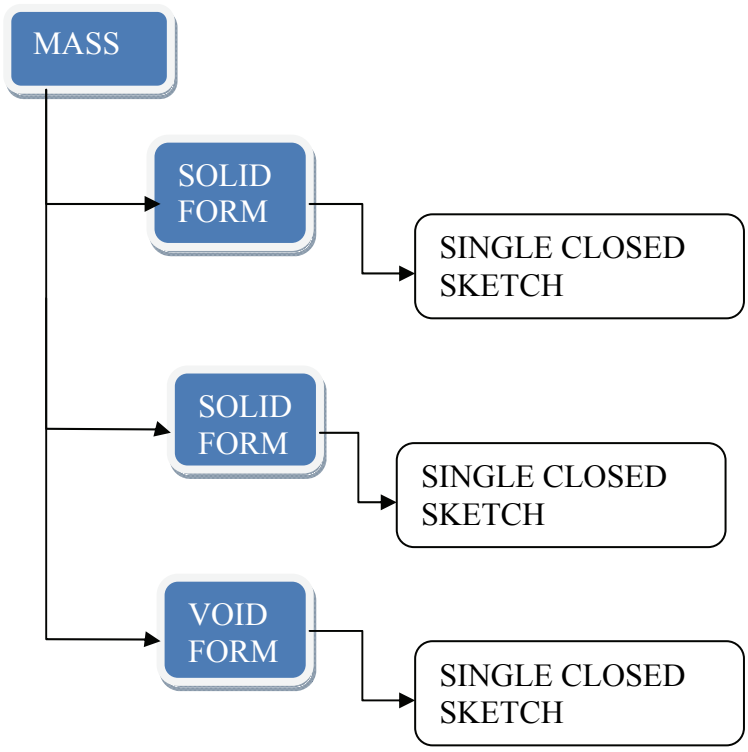
What is the area of the wall?

14. 

You should see the Volume and Area in the Properties pane.

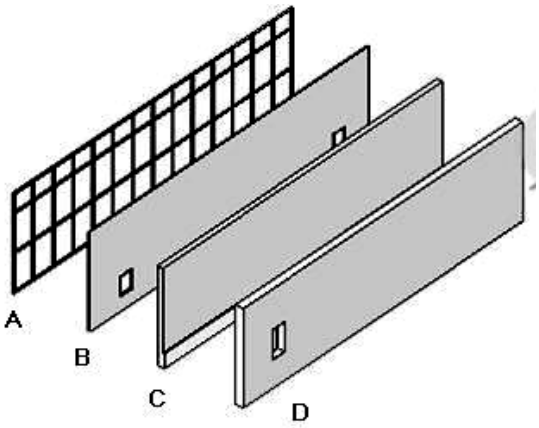
15. Close without saving.

- The default material for a mass is 5 percent transparent.
- Masses will not print unless the category is enabled in Visibility/Graphics Overrides.
- Masses are created from a single closed profile.
- Masses are a nested entity. In order to modify the profile, you have to open the mass up for editing and then open the desired form component up for editing.
- Masses can be comprised of multiple forms, a combination of voids and solids.



Practice Associate Exam

1. Which of the following can NOT be defined prior to placing a wall?
    A. Unconnected Height
    B. Base Constraint
    C. Location Line
    D. Profile
    E. Top Offset



2. Identify the stacked wall.

3. Walls are system families. Which name is NOT a wall family?
    A. BASIC
    B. COMPOUND
    C. CURTAIN
    D. COMPLICATED

4. Select the TWO which are wall type properties:
    A. COARSE FILL PATTERN
    B. LOCATION LINE
    C. TOP CONSTRAINT
    D. FUNCTION
    E. BASE CONSTRAINT

5. Select ONE item that is used when defining a compound wall:
    A. MATERIAL
    B. SWEEPS
    C. GRIDS
    D. LAYERS
    E. FILL PATTERN

6. Enabling the Chain command when placing walls does the following:
    A. Creates a daisy chain of walls.
    B. Constrains the walls together so they can be moved and copied as a set.
    C. Reduces the number of clicks required when placing walls.
    D. Places a compound wall.

7. Use this key to cycle through selections:

   A. TAB
   B. CTL
   C. SHIFT
   D. ALT

8. When working with a mass, you can use levels to define mass _____

   A. Roofs
   B. Floors
   C. Ceilings
   D. Walls

9. To create a mass that is unique in a project, use the _____ Mass tool.

   A. In-Place
   B. Component
   C. System
   D. By Face

10. Selecting a work plane:

   A. Automatically changes the relative coordinate system
   B. Changes the project location
   C. Changes the level
   D. Determines the depth of an extrusion

11. The construction of a stacked wall is defined by different wall _____.

   A. Types
   B. Layers
   C. Regions
   D. Instances

12. To change the structure of a basic wall you must modify it's:

   A. Type Parameters
   B. Instance Parameters
   C. Structural Usage
   D. Function

13. Select THREE element types than can be created using mass faces:

   A. Doors
   B. Walls
   C. Levels
   D. Floors
   E. Roofs

14. Select TWO methods used to create a conceptual design using mass families;
    A. Go to the Applications Menu and select New→Conceptual Mass.
    B. Go to the Massing & Site ribbon and select Place Mass.
    C. Go to the Applications Menu and select New→Family
    D. Go to the Massing & Site ribbon and select In-Place Mass
    E. Go to the Applications Menu and select New→Project

15. In order to place a wall or floor on a mass face, the face must be:
    A. Horizontal
    B. Vertical
    C. Either Horizontal or Vertical
    D. Curved or spherical
    E. None of the above

16. To divide a floor or wall into parts, you can use the following (select all that apply):
    A. Lines
    B. Levels
    C. Grids
    D. Circles
    E. Arcs

17. To display parts in a view:
    A. Go to the Massing & Site ribbon and select Show Mass.
    B. On the View Properties pane: set Parts Visibility to Show Parts
    C. Go to the Visibility/Graphics dialog and enable Parts.
    D. Go to Temporary Hide/Isolate and Reset

18. To assign a different material to a part, select the part and:
    A. On the Properties pane: Enable Material by Original
    B. Right click and select Assign Material
    C. On the Modify ribbon, select Paint from the Geometry Panel.
    D. On the Properties pane: Uncheck Material by Original, then assign a material in the material field.

Answers:

1) D; 2) C; 3) D; 4) A & D; 5) D; 6) C; 7) A; 8) B; 9) A; 10) A; 11) A; 12) A; 13) B, D, & E; 14) A & D; 15) E; 16) A, B, C, & D; 17) B; 18) D