Revit Architecture 2012 Basics:

from the Ground Up

Elise Moss

Lesson 2
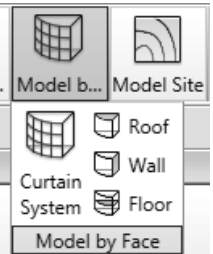# Mass Elements

Mass Elements are used to give you a conceptual idea of the space and shape of a building without having to take the time to put in a lot of detail. It allows you to create alternative designs quickly and easily and get approval before you put in a lot of effort.

Massing Tools
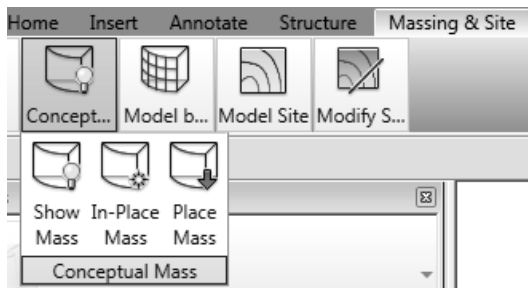
In-Place Mass	Creates a solid shape.
Show Mass	Controls the visibility of mass objects.
Place Mass	Inserts a mass group into the active project.
Model b... Model Site — Curtain System, Roof, Wall, Floor — Model by Face	Model by Face: Converts a face into a Roof, Curtain Wall System, Wall, or Floor.

When creating a conceptual mass to be used in a project, follow these steps:

1. Create a sketch of the desired shape(s).
2. Create levels to control the height of the shapes.
3. Create reference planes to control the width and depth of the shapes.
4. Draw a sketch of the profile of the shape.
5. Use the Massing tools to create the shape.

Adding a Level

Drawing Name: default.rte [metric default.rte]
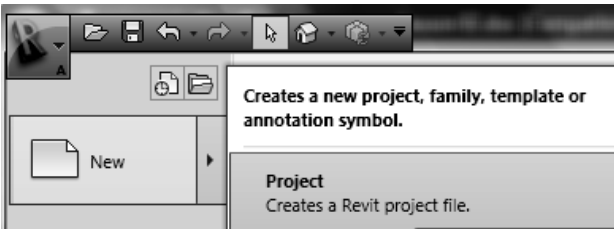Estimated Time: 5 minutes

This exercise reinforces the following skills:

❑   Switching Elevation Views
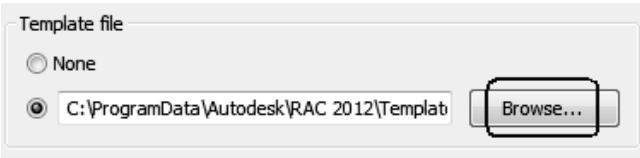❑   Basics
❑   Add a Level

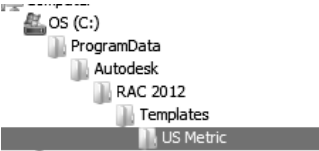*This tutorial uses metric or Imperial units. Metric units will be designated in brackets.*

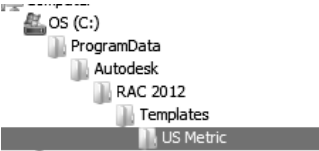Revit uses a level to define another floor or story in a building.

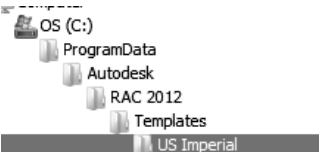1.   Go to **New→Project**.

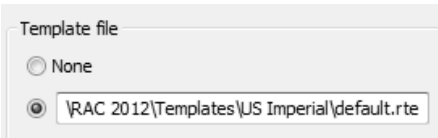2.   Under the Template file: select **Browse**.

3.   Locate the *Metric Templates* folder under *ProgramData/Autodesk/RAC2012*.

      Locate the *Imperial Templates* folder under *ProgramData/Autodesk/RAC2012*.

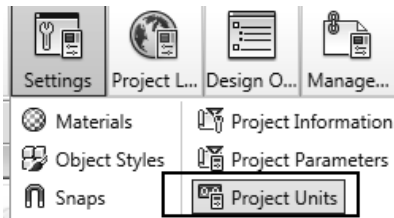4.   Select the *default.rte [DefaultMetric.rte]* template.

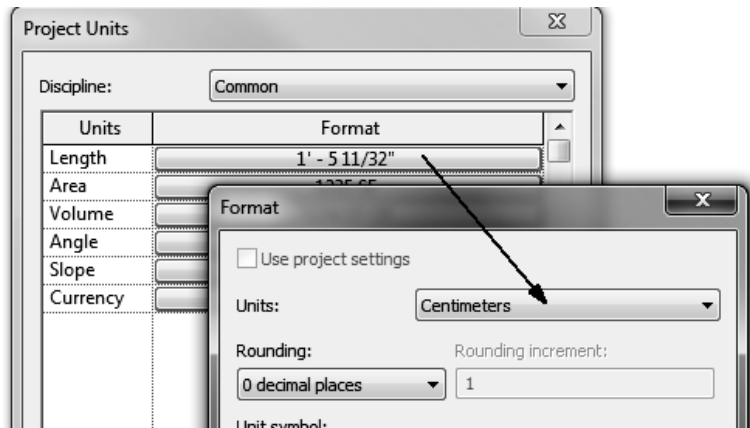*Brackets indicate metric is selected as an alternative.*

Press **OK**.

If you accidentally picked Metric when you wanted Imperial or vice versa, you can change the units at any time. Revit will automatically switch any dimensions over to the active units.

To change Project Units, go to the Manage Ribbon.

Select **Settings→Project Units**.

Left click the Length button, then select the desired units from the drop-down list.

5. Double click **East** under Elevations.

This activates the East view orientation.

6. Select the **Home** ribbon.

7. Select the **Level** tool under Datum. (This adds a floor elevation.)

8. Move your mouse to set an elevation of **12′** [**3650 mm**].
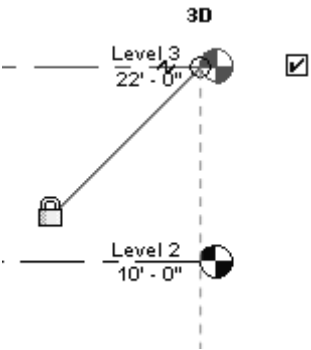   Pick to start the elevation line.

9. In the Options bar located on the lower left of the screen, enable **Make Plan View**.

This should be enabled if you want Revit to automatically create a floor plan view of this level. If you forget to check this box, you can create the floor plan view later using the **View** Ribbon.

TIP: Double click on the blue elevation symbol to automatically switch to the floor plan view for that elevation.

10.

Pick to place the end point to position the level indicator above the other indicators.

11. Basically, you place a new level by picking two points at the desired height.

Right click and select **Cancel** twice to exit the Level command.

Revit is always looking for references even among annotations, you will notice that your level tags snap and lock together so when you move one to the right or left, all those in line with it will follow.

The jogged line allows the user to create a jog if desired.

If you need to adjust the position of the tag, just click on the line, 3 blue grips will appear. These can be clicked and dragged as needed. You can also right click on a level tag and select 'Hide annotation in view' and the tag and level line will disappear in that view only.

Hide Annotation in View is only enabled if an object is selected first.

12. Save the file as a project as *ex2-1.rvt.*

Exercise 2-2
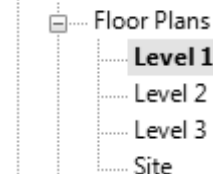# Adding Mass Elements

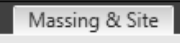Drawing Name: ex2-1.rvt
Estimated Time: 10 minutes

This exercise reinforces the following skills:
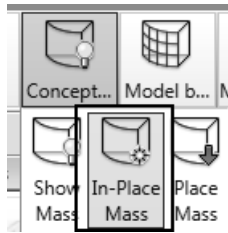
❑   Switching Elevation Views
❑   Add Mass

1.   ⬚   Open or continue working in the file *ex2-1.rvt*.

2.   ⊟ ⬚ Views (all)   Activate the **Level 1** view.
     ⊟ Floor Plans
        Level 1
        Level 2
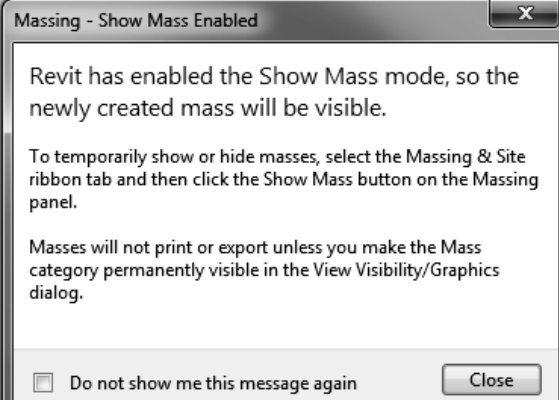   Level 3
        Site

3.   Massing & Site   Select the **Site & Massing** ribbon.

4.   Select the **In-Place Mass** tool.

     *Revit uses three different family categories. **System families** are families which are defined inside the project, such as floors, walls, and ceilings. **Model families** are external files which can be loaded into the project, such as doors, windows, and furniture. The third family category consists of **in-place masses**, which are families created on-the-fly.*

5.   **Massing - Show Mass Enabled**

     Revit has enabled the Show Mass mode, so the newly created mass will be visible.

     To temporarily show or hide masses, select the Massing & Site ribbon tab and then click the Show Mass button on the Massing panel.

     Masses will not print or export unless you make the Mass category permanently visible in the View Visibility/Graphics dialog.

     ☐ Do not show me this message again   Close

     Masses, by default, are invisible. However, in order to create and edit masses you need to see what you are doing. Revit brings up a dialog to let you know that the software is switching the visibility of masses to ON, so you can work.
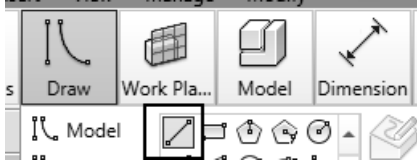
     Press **Close**.

*If you don't want to bugged by this dialog, enable the **Don't show me this message again** option.*

6. Enter **Mass 1** in the Name field.
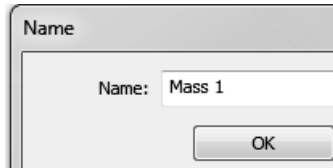
Press **OK**.

7. *Next, we create the boundary sketch to define our mass.*

Select the **Line** tool located under the Draw panel.

8. Enable **Chain** in the Options bar located on the bottom of the screen.
This allows you to draw lines without always having to pick the start point.

9. Create the shape shown.
The left figure shows the units in Imperial units (feet and inches).
The right figure shows the units in millimeters.
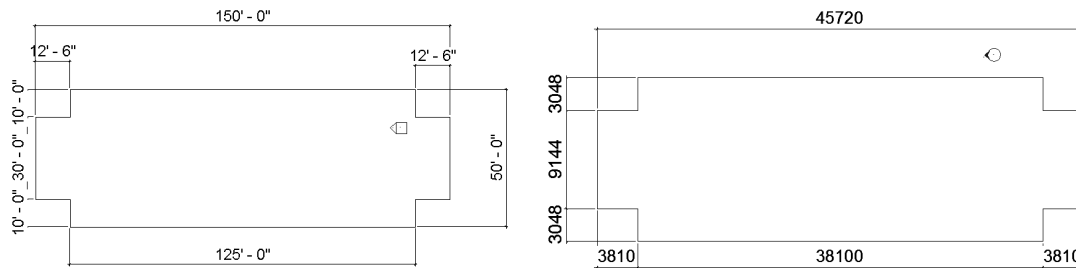
You can draw using listening dimensions or enter the dimension values as you draw.

10. Switch to a 3D view.
Activate the **View** ribbon and select **3D View**.

You can also switch to a 3D view from the Quick Access toolbar by selecting the house icon.

11. Window around the entire sketch so it is highlighted.

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

You must select the sketch to create the form.

If the sketch has any gaps, overlapping lines, or self-intersecting lines, you will get an error. Exit the command and inspect the sketch to make sure it is a cleanly closed polygon.

13.
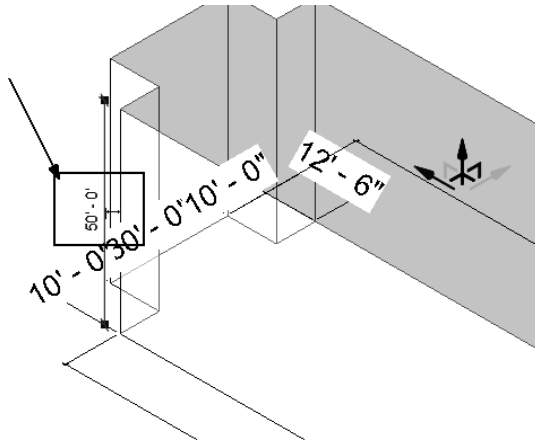
An extrusion distance is displayed.
This can be edited, if desired.

14.

Select the green check box to **Finish Mass**.
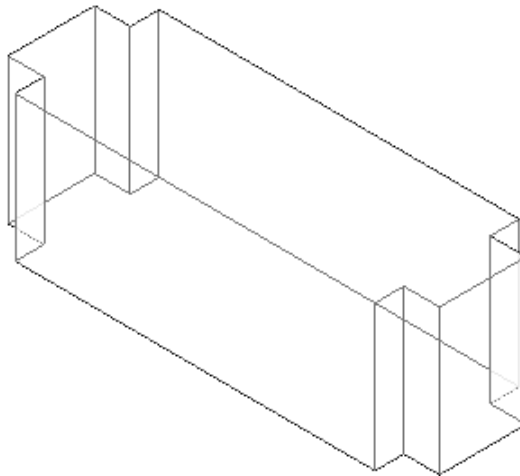
The Mass is created.

15. Save the file as *ex2-2.rvt*.

TIP: Object tracking will only work if the sketch objects are active and available in the current sketch. You can use **Pick** to copy entities into the current sketch.

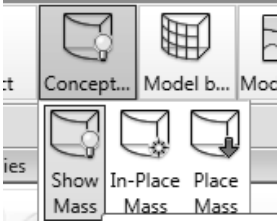*Exercise 2-3*
Modifying Mass Elements

Drawing Name: ex2-2.rvt
Estimated Time: 30 minutes

This exercise reinforces the following skills:

- ❑ Show Mass
- ❑ Align
- ❑ Modify Mass
- ❑ Mirror
- ❑ Create Form
- ❑ Save View
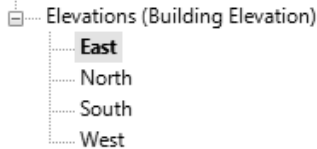
A short video of this exercise is available on my website to help users with this exercise. Access at *www.mossdesigns.com/documents/ex3-3-revit.avi*.

1. Open *ex2-2.rvt*.

2. If you don't see the mass, **Show Mass** on the Massing & Site ribbon to turn mass visibility ON.
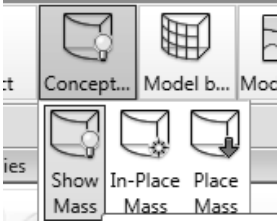
   Some students may experience this issue if they close the file and then re-open it for a later class.

3. Activate the **East** Elevation.
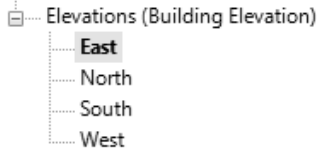
4. We see that top of the building does not align with Level 3.
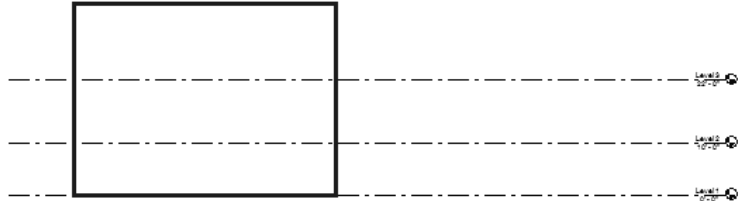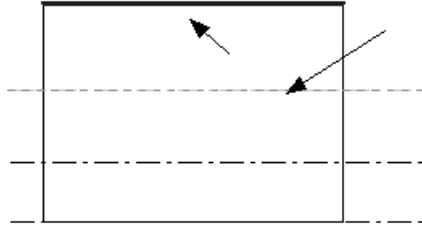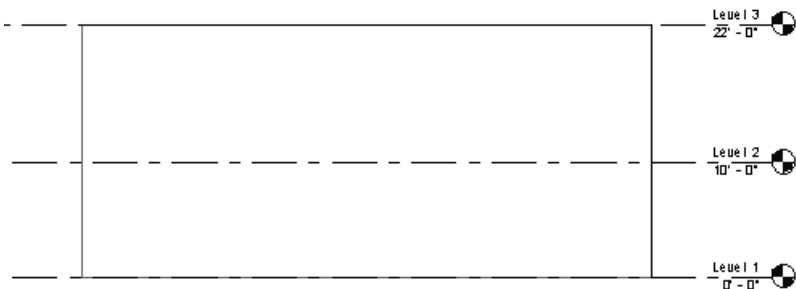
   To adjust the horizontal position of the level lines, simply select the line and use the grip to extend or shorten it.
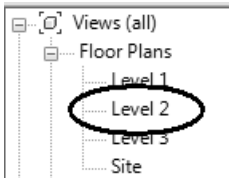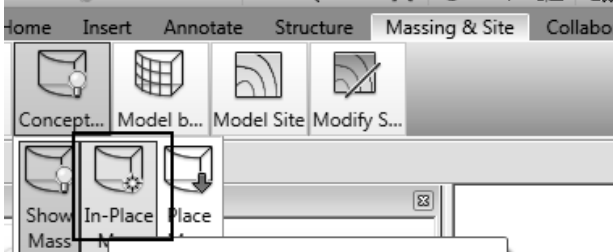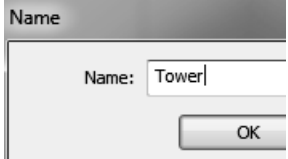
5. Select the **Modify** Ribbon.
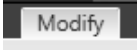
6. Select the **Align** tool.

When using Align, the first element selected acts as the source, the second element selected shifts position to align with the first element.
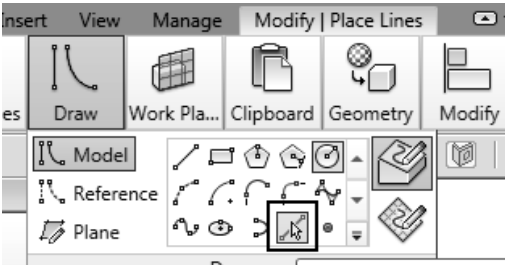
7. Select the top level line (Level 3) then select the top of the extrusion.

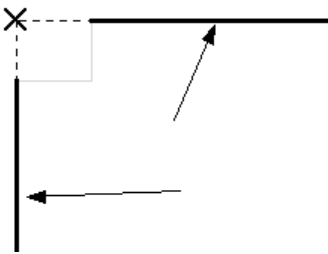Right click and select **Cancel** twice to exit the Align command.

8. Level 3
22'-0"

Level 2
10'-0"

Level 1
0'-0"

The top of the extrusion now aligns to level 3.

9. Views (all)
Floor Plans
Level 1
Level 2
Level 3
Site

Activate **Level 2** under Floor Plans.

10. Home Insert Annotate Structure Massing & Site Collabo

Concept... Model b... Model Site Modify S...

Show In-Place Place
Mass
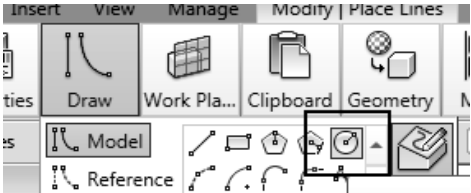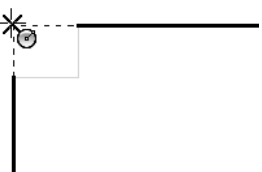
Select **In-Place Mass** from the Massing & Site ribbon.

11. Name

Name: Tower

OK
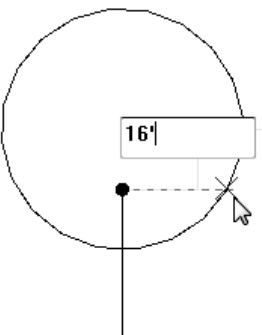
Name the new mass **Tower**.

Press **OK**.

12. nsert View Manage Modify | Place Lines

es Draw Work Pla... Clipboard Geometry Modify

Model
Reference
Plane

Draw

You can use object tracking to locate the intersection between the two corners.

To activate object tracking, enable the **Pick Lines** tool located under Draw. Then select the two lines you want to align with.

13. Select the two lines indicated to be used for object tracking to locate the center of the circle.
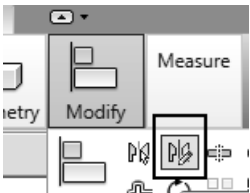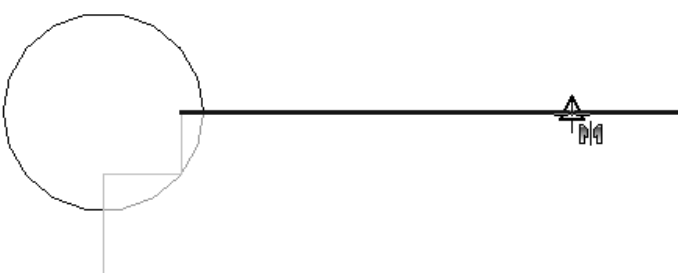
14. Select the **Circle** tool under Draw.

15. When you see the large X and the tooltip says Intersection, you will have located the intersection.

Pick to locate the center of the circle at the intersection.

16. Enter a radius of **16′-0″** [**4880**].

16'

When you used the Pick Line tool, you copied those lines into the current sketch. Once the lines were part of the current sketch, they could be used for object tracking.

17. Select the circle sketch so it is highlighted.

18. Select the **Draw Mirror Axis** tool under the **Mirror** tool.

19. Locate the midpoint of the small horizontal line and pick.

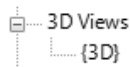20. Bring your mouse down in the Vertical direction and pick for the second point of the mirror axis.
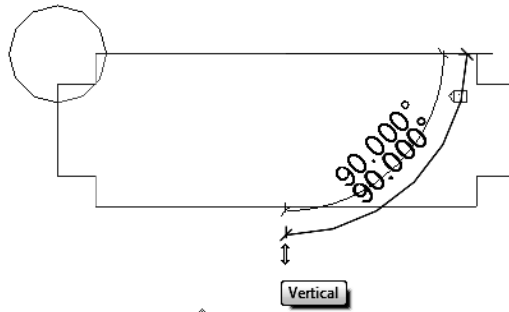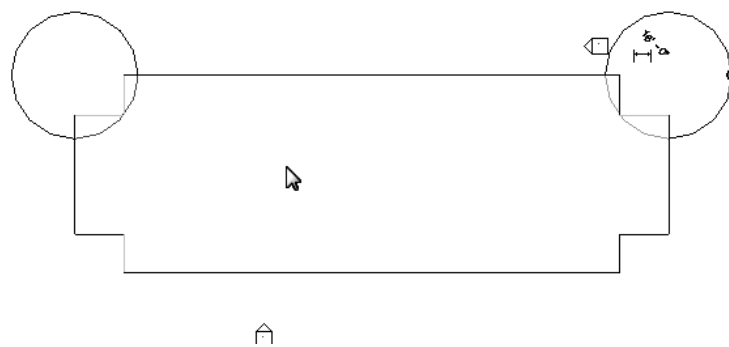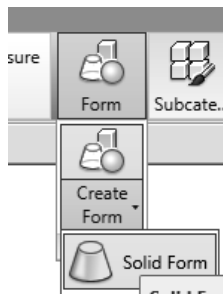
21. The circle sketch is mirrored.

Left click to release the selection.

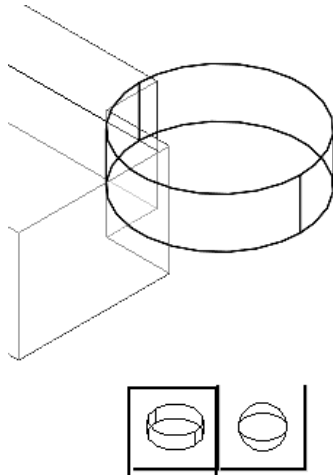22. ⊟── 3D Views   Switch to a 3D view using the Project Browser.
     └── {3D}
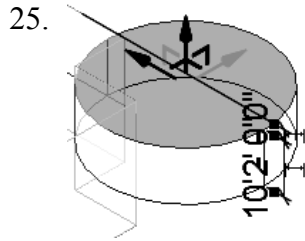
23. Select **one** of the circles so it is highlighted.

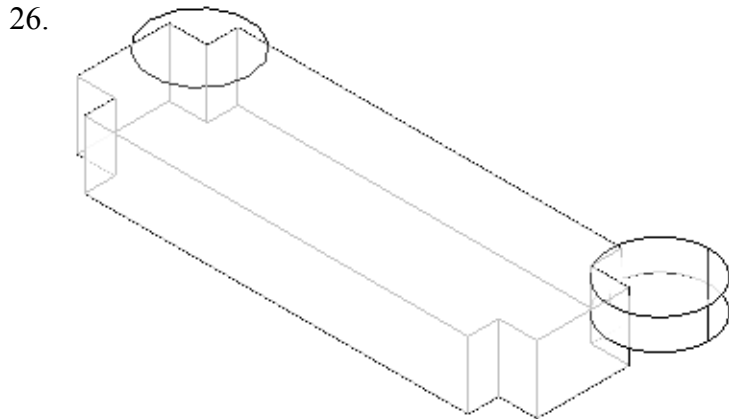Select **Form→Create Form→Solid Form**.

24. A small toolbar will appear with two options for extruding the circle.
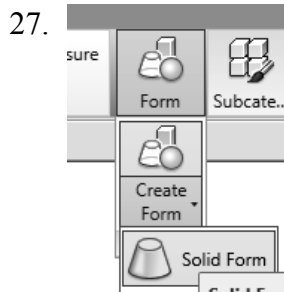
Select the option that looks like a cylinder.

25.

A preview of the extrusion will appear with the temporary dimension. You can edit the temporary dimension to modify the height of the extrusion.

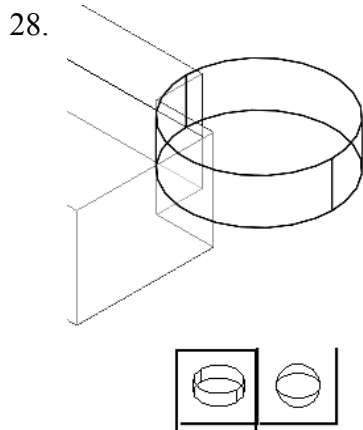Press ENTER or left click to accept the default height.

26.

If you press ENTER more than once, additional cylinders will be placed.
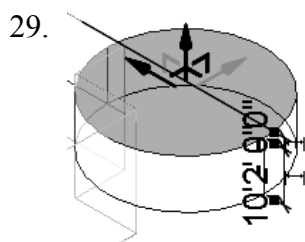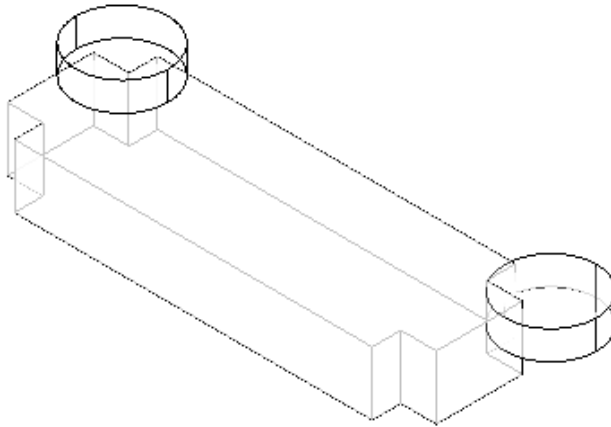
The circle is extruded.

27.

Select the remaining circle so it is highlighted.

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

28.

A small toolbar will appear with two options for extruding the circle.

Select the option that looks like a cylinder.

29.

A preview of the extrusion will appear with the temporary dimension. You can edit the temporary dimension to modify the height of the extrusion.
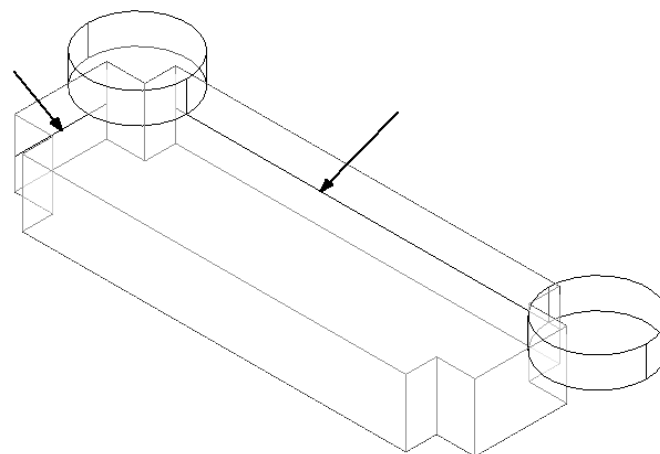
Press ENTER or left click to accept the default height.

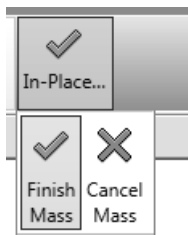30. Both circles are now extruded.

31. Select the two lines used to locate the circle sketch.

Right click and select **Delete** from the shortcut menu to delete the lines.

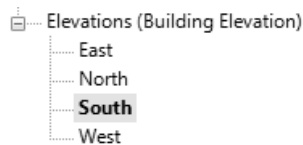*You can also press the Delete key on the keyboard or use the Delete tool on the Modify panel.*
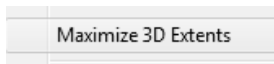
32. Select **Finish Mass**.

If you do not delete the lines before you finish the mass, you will get an error message.
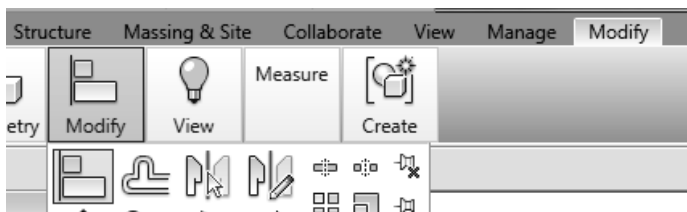
33. Elevations (Building Elevation)
    East
    North
    South
    West

Activate the **South** Elevation.

34. Select each level line.

Maximize 3D Extents

Right click and select **Maximize 3D Extents**.
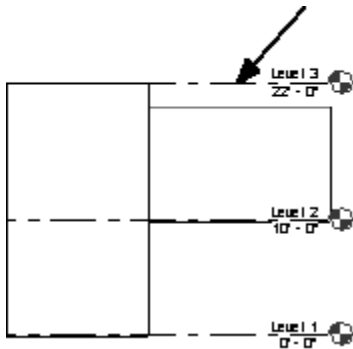This will extend each level line so it covers the entire model.
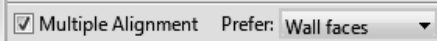
35. Structure   Massing & Site   Collaborate   View   Manage   Modify

Activate the Modify ribbon.

Select the **Align** tool from the Modify Panel.

36. ☑ Multiple Alignment   Prefer: Wall faces   ▾   On the Options bar, enable **Multiple Alignment**.

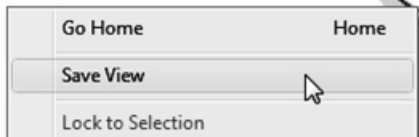37. Select the Level 3 line as the source object.

38. Select the top of the two towers as the edges to be shifted.
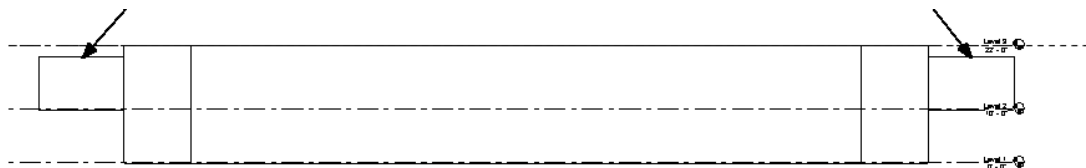
39. ⊟ 3D Views   Switch to a 3D view using the Project Browser.
    └── {3D}

40. Use the ViewCube located in the upper right of the screen to orbit the model.

41. To save the new orientation, right click on the ViewCube and select **Save View**.

    Go Home   Home
    Save View
    Lock to Selection

42. Name: 3D Ortho   Enter **3D Ortho** for the name of the view.

    OK   Press **OK**.

43. ⊟ 3D Views   The **Saved** view is now listed in the Project browser under 3D Views.
    ├── 3D Ortho
    └── {3D}

44. Save the file as *ex2-3.rvt.*

> ➢ Pick on a mass element to activate the element's grips. You can use the grips to change the element's shape, size, and location.
> ➢ You can only use the **View→Orient** menu to activate 3D views when you are already in 3D view mode.

Exercise 2-4
Create Wall by Face
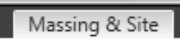
Drawing Name: ex2-3.rvt
Estimated Time: 15 minutes

This exercise reinforces the following skills:

- ❑ Wall by Face
- ❑ Trim
- ❑ Show Mass

You can add doors and windows to your conceptual model to make it easier to visualize.

1.   Open *ex2-3.rvt*.

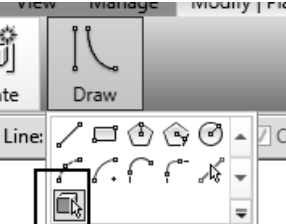2.   Activate the **3D Ortho** view under 3D Views.

3.   Activate the **Massing & Site** ribbon.
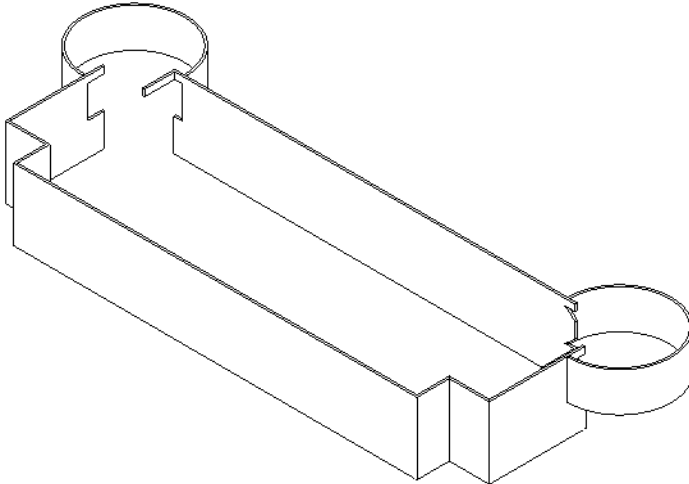
4.   Select **Model by Face→Wall**.

5.   Note the wall type currently enabled in the Properties pane. A different wall type can be selected from the drop-down list available using the small down arrow.

   Imperial:
   Set the Default Wall Type to:
   Basic Wall: Generic- 8″.

   Metric:
   Set the Default Wall Type to:
   Basic Wall: Generic- 200 mm.

6.   Enable **Pick Faces** from the Draw Panel on the ribbon.
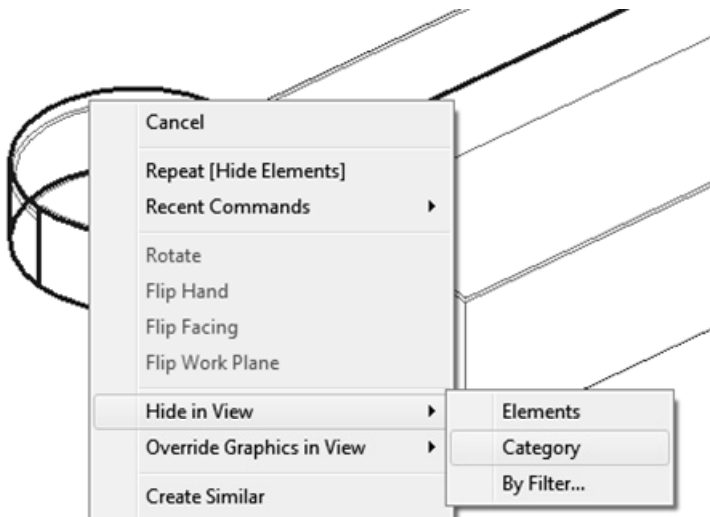
7.

Select each wall and
cylinder.

The cylinder will be halved
by the walls, so you will
have to select each half.

You will have to do some
cleanup work on the corners
where the towers are.

*Some students will accidentally pick the same face more than once. You will see an
error message that you have overlapping/duplicate walls. Simply delete the extra
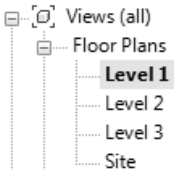walls.*

8.

Select any visible mass.
Right click and select
**Hide in View→
Category**.

Cancel	
Repeat [Hide Elements]	
Recent Commands	▶
Rotate	
Flip Hand	
Flip Facing	
Flip Work Plane	
Hide in View	▶
Override Graphics in View	▶
Create Similar	

Elements
Category
By Filter...

*This will turn off the
visibility of masses.*

9.

Views (all)
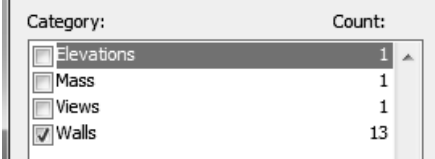 Floor Plans
    Level 1
    Level 2
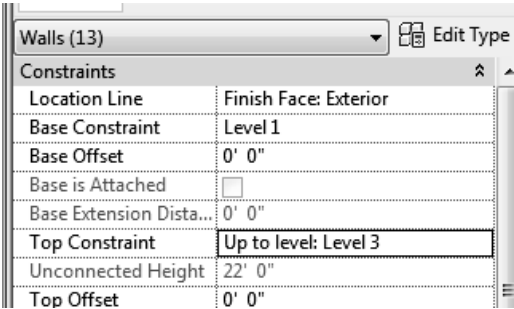   Level 3
    Site
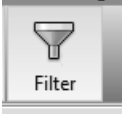
Activate **Level 1** floor plan.

10.

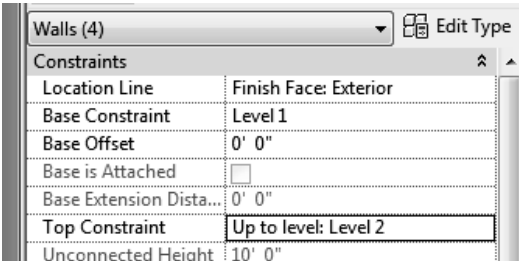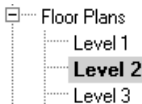Window around all the
walls to select.

11. Select the **Filter** tool from the ribbon.

12.

Category:	Count:
☐ Elevations	1
☐ Mass	1
☐ Views	1
☑ Walls	13
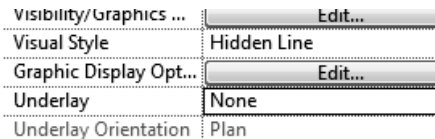
Uncheck all the boxes EXCEPT walls.
Press **OK**.

There are some duplicate walls in this selection.

13.

Walls (13)	▼ 🔡 Edit Type
Constraints	☆
Location Line	Finish Face: Exterior
Base Constraint	Level 1
Base Offset	0' 0"
Base is Attached	☐
Base Extension Dista...	0' 0"
Top Constraint	Up to level: Level 3
Unconnected Height	22' 0"
Top Offset	0' 0"

In the Properties pane:

Set the Top Constraint to **up to Level 3**.

Right click and select Cancel to release the selection or left click in the display window to release the selection.

14. Hold down the Ctrl Key.
Select the four walls indicated.

15.

Walls (4)	▼ 🔡 Edit Type
Constraints	☆
Location Line	Finish Face: Exterior
Base Constraint	Level 1
Base Offset	0' 0"
Base is Attached	☐
Base Extension Dista...	0' 0"
Top Constraint	Up to level: Level 2
Unconnected Height	10' 0"

In the Properties pane:

Set the Top Constraint to **up to Level 2**.

Right click and select Cancel to release the selection or left click in the display window to release the selection.

16.
```
Floor Plans
    Level 1
    Level 2
    Level 3
```
Activate **Level 2** under Floor Plans.

17.

Visibility/Graphics ...	Edit...
Visual Style	Hidden Line
Graphic Display Opt...	Edit...
Underlay	None
Underlay Orientation	Plan

In the Properties Pane:

Set the Underlay to **None**.

This will turn off the visibility of all entities located below Level 2.
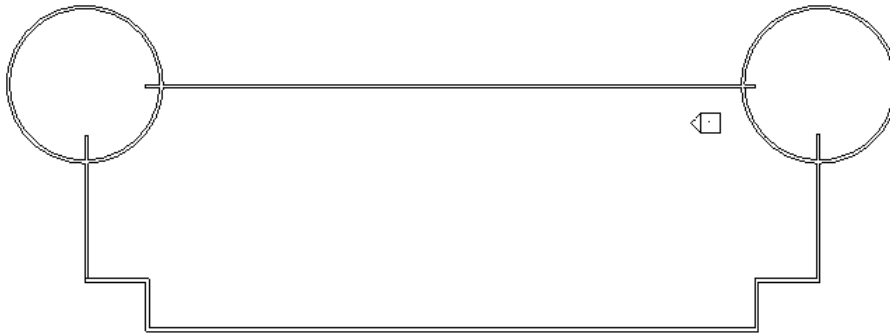
Each view has its own settings. We turned off the visibility of masses on Level 1, but we also need to turn off the visibility of masses on the Level 2 view.
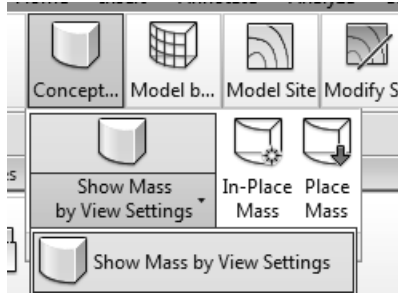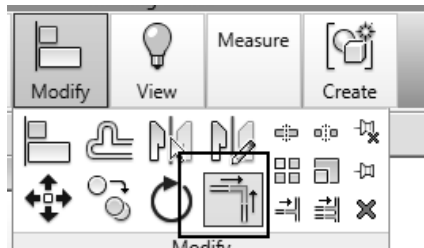
18. On the ribbon: Toggle the **Show Mass by View Settings** tool to turn the visibility of masses OFF.

19. The view should look like this with the visibility of masses turned off.
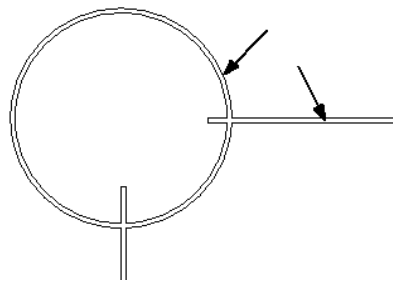

20. Activate the Modify ribbon.

Select the **Trim** tool from the Modify ribbon to clean up where the tower joins with the walls.
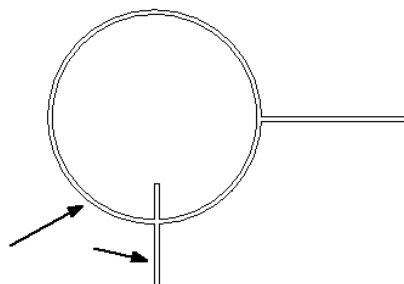
21. When you select to trim, be sure to select the section you want to keep.

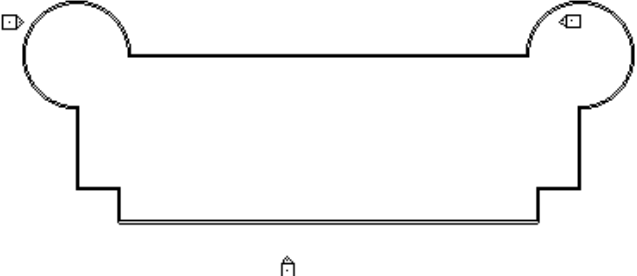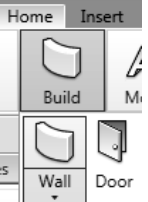22. Select the arc and wall indicated.

23. Select the arc and wall indicated.

Select the first line or wall to trim/extend. (Click on the part you want to keep)

Note that you have some instructions in the lower left of the screen to assist you.
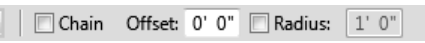
24. Trim the walls as shown on Level 2.

25. Floor Plans
    Level 1
    Level 2
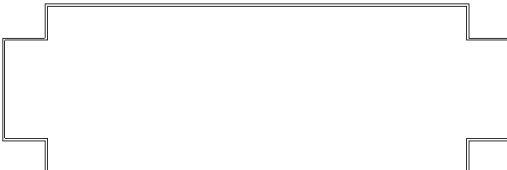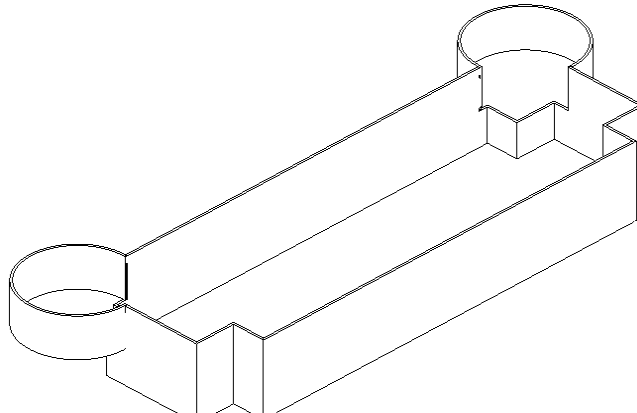
    Activate Level 1.

26. On Level 1, you should only see the walls with no towers.

    There are some small gaps where the towers overlap.

27. Home | Insert

    Build

    Wall | Door

    Activate the Home ribbon.

    Select the **Wall** tool on the Build Pane.

28. Modify | Place Wall | Height: Level 2 ▾ | 20' 0" |

    On the Options bar:
    Set the Height to **Level 2**.

29. ☐ Chain Offset: 0' 0" ☐ Radius: 1' 0"

    Disable **Chain**.

30. Close the gaps and trim as needed.

31. Switch to a 3D view and orbit your model.

    Check to make sure the walls and towers are adjusted to the correct levels.

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

Exercise 2-5
Adding Doors and Windows
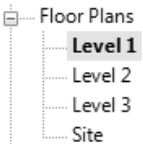
Drawing Name: ex2-4.rvt
Estimated Time: 30 minutes

This exercise reinforces the following skills:

- ❑ Basics
- ❑ Door
- ❑ Load from Library
- ❑ Window
- ❑ Array
- ❑ Mirror
- ❑ Shading
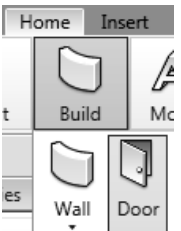
You can add doors and windows to your conceptual model to make it easier to visualize.
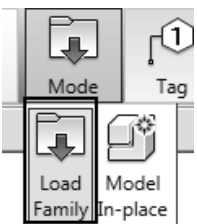
1.   Open *ex2-4.rvt*.

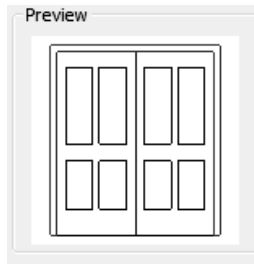2.   Activate **Level 1** under Floor Plans.

3.   Level 1 should appear like this.

4.   Activate **Home ribbon**.

5.   Select the **Door** tool under the Build panel.

6.   Select **Load Family** under the Mode panel.

Doors are model families.

7.

Browse to the **Doors** folder under the Imperial or Metric library – use Imperial if you are using Imperial units or use Metric if you are using Metric units.

As you highlight each file in the folder, you can see a preview of the family.

Note that the files are in alphabetical order.

8.

For Imperial Units:
Locate the *Double-:Panel2.rfa* file.

For Metric Units:
Locate the *M_Double-Panel 2.rfa* file.

Press **Open**.

9.
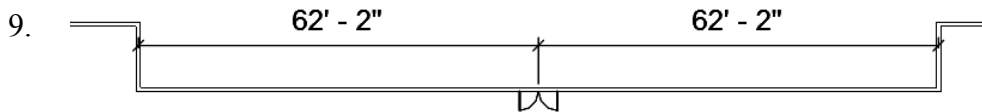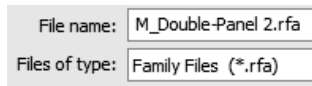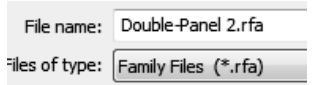
Place the door so it is centered on the wall as shown.
Doors are wall-hosted. So, you will only see a door preview when you place your cursor over a wall.

10.

If you press the space bar before you pick to place, you can control the orientation of the door.

After you have placed the door, you can flip the door by picking on it then pick on the vertical or horizontal arrows.
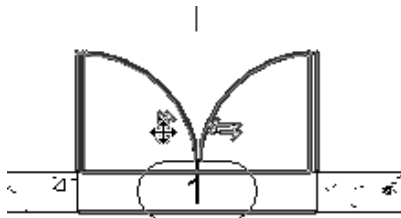
11.

Pick the **Window** tool from the Build panel.
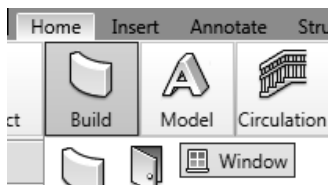
Windows are model families.

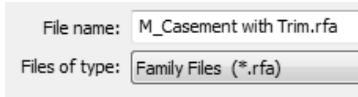12. Select **Load Family** from the Mode panel.
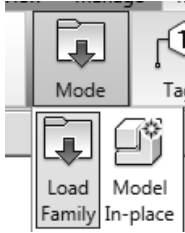
13. Browse to the **Windows** folder under the Imperial or Metric library – use Imperial if you are using Imperial units or use Metric if you are using Metric units.

14.

For Imperial Units:
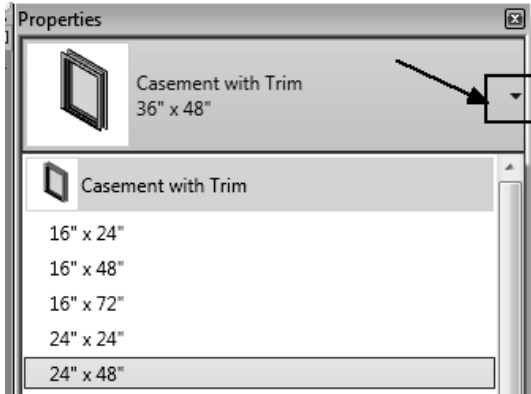Located the *Casement with Trim.rfa* file.
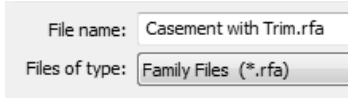
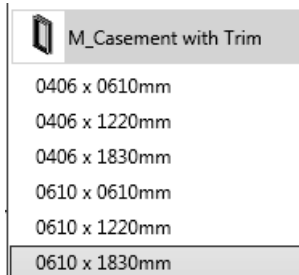For Metric Units:
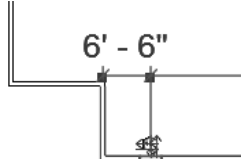Locate the *M_Casement with Trim.rfa* file.

Press **Open**.

15.

For Imperial Units:

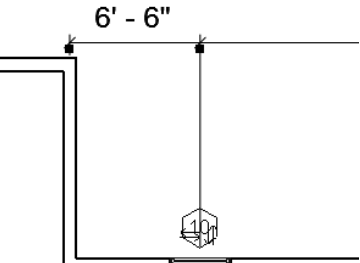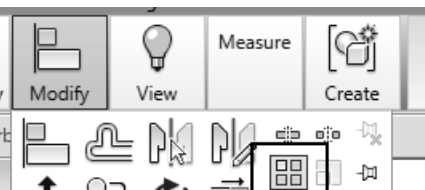From the drop-down list, select the 24″ x 48″ size for the Casement with Trim window.

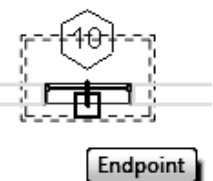*Access the list of available sizes using the small down arrow indicated.*
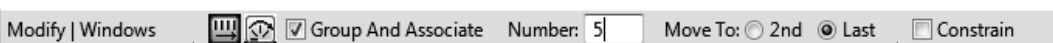

For Metric Units:

From the drop-down list, select the 0610 x 1830 mm size for the M_Casement with Trim window.

16. Place the window **6′-6″** [**3000 mm**] from the inner left wall.

Right click and select **Cancel** to exit the command.

17. Pick the window so it highlights.

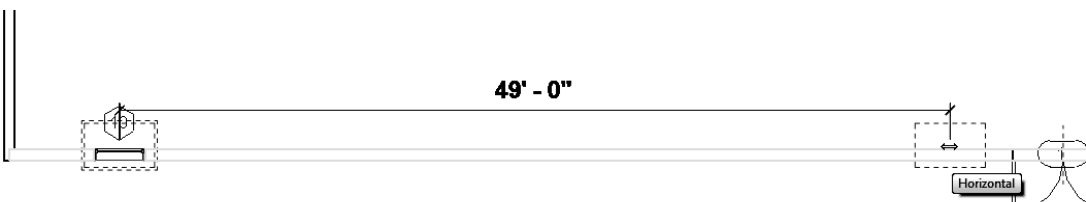18. Select the **Array** tool under the Modify panel.

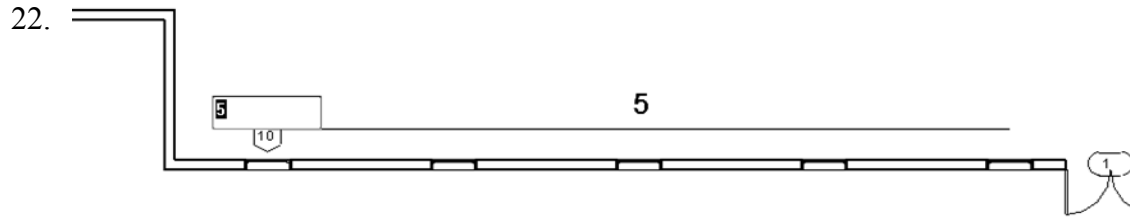19. Select the midpoint of the window as the basepoint for the array.

20.

Enable Group and Associate. This assigns the windows placed to a group and allows you to edit the array.

Set the array quantity to **5** on the options bar located on the bottom of the screen. Enable **Last**.
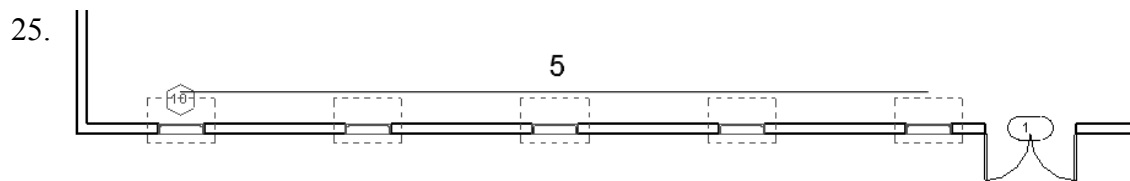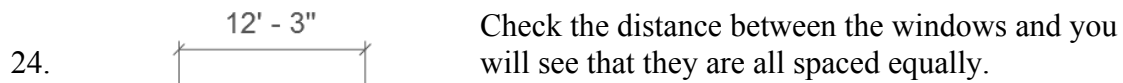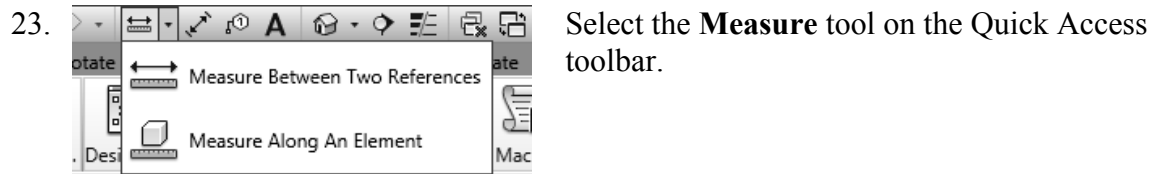
Array has two options. One option allows you to place elements at a set distance apart. The second option allows you to fill a distance with equally spaced elements. We will fill a specified distance with five elements equally spaced.

21.

Pick a point **49′-0″** [**14,935.20**] from the first selected point to the right.
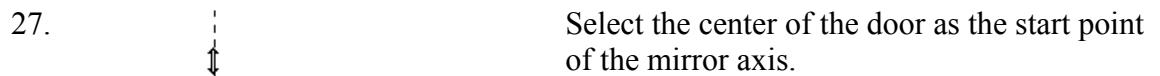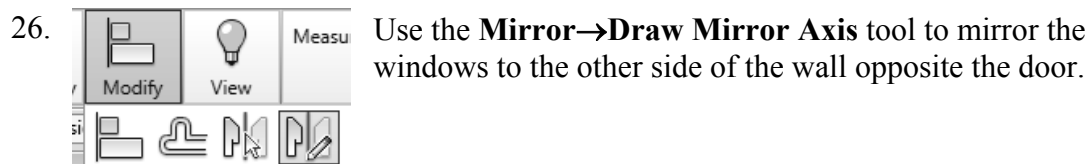
22.

You will see a preview of how the windows will fill the space.

Press **ENTER** to accept.

23.

Select the **Measure** tool on the Quick Access toolbar.

24.

Check the distance between the windows and you will see that they are all spaced equally.

25.

Window around the entire array to select all the windows.

The array count will display.

26.

Use the **Mirror→Draw Mirror Axis** tool to mirror the windows to the other side of the wall opposite the door.
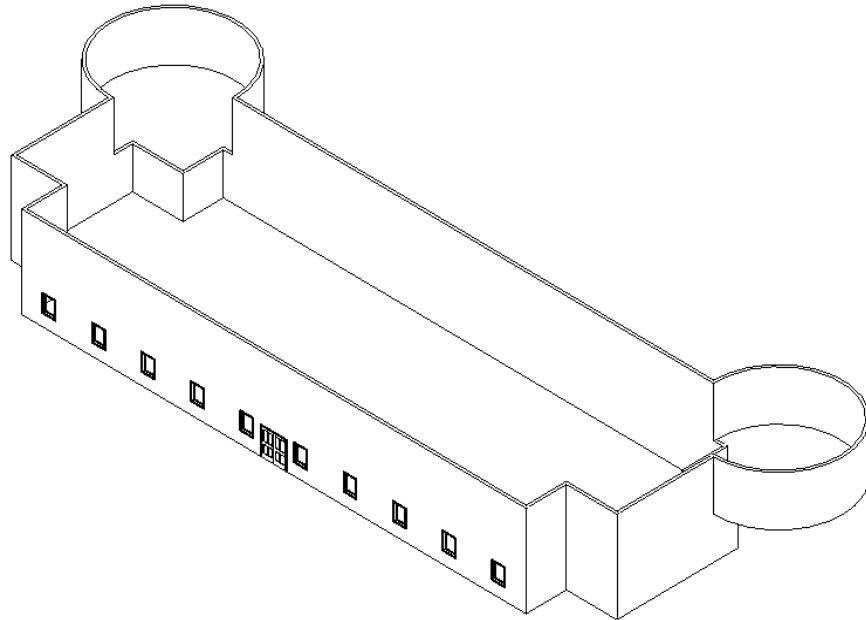
27.

Select the center of the door as the start point of the mirror axis.

Move the cursor upwards at a 90 degree angle and pick a point above the door.

28. Left pick anywhere in the graphics window to complete the command.
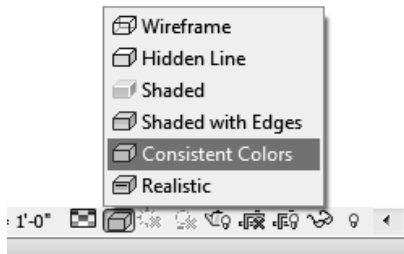
    You will get an error message and the windows will not array properly if you do not have the angle set to 90 degrees or your walls are different lengths.

29. 3D Views
       3D Ortho 2
       {3D}
          Switch to a **3D** View.

30. Wireframe
    Hidden Line
    Shaded
    Shaded with Edges
    Consistent Colors
    Realistic

    Set the Model Graphics Style to **Consistent Colors**.

    We have created a conceptual model to show a client.

31. Save the file as *ex2-5.rvt.*

Exercise 2-6
Creating a Conceptual Mass

Drawing Name: New Conceptual Mass
Estimated Time: 60 minutes

This exercise reinforces the following skills:
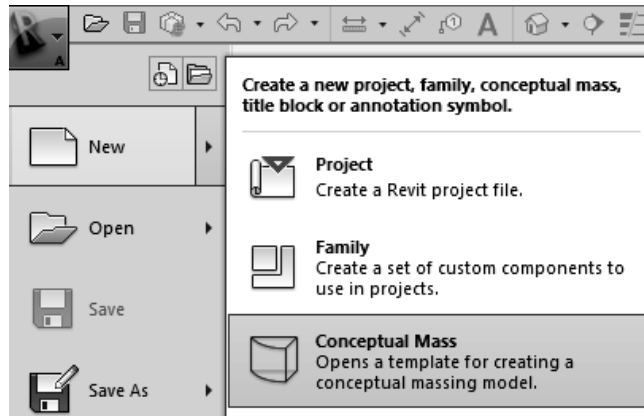
- ❑ Masses
- ❑ Levels
- ❑ Load from Library
- ❑ Aligned Dimension
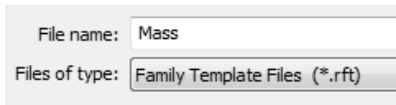- ❑ Flip Orientation

1. Close any open files.

2. On the Recent Files pane:

    Select **New Conceptual Mass**.
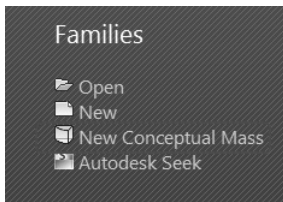
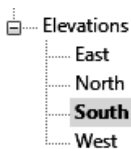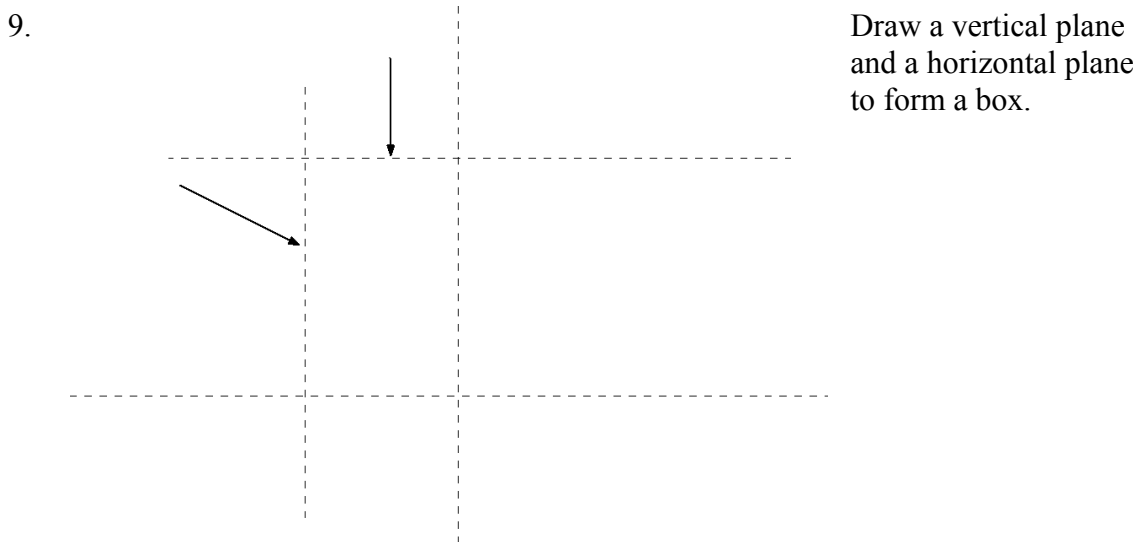   If the Recent Files pane is not available, use the Application Menu and go to **New→Conceptual Mass**.
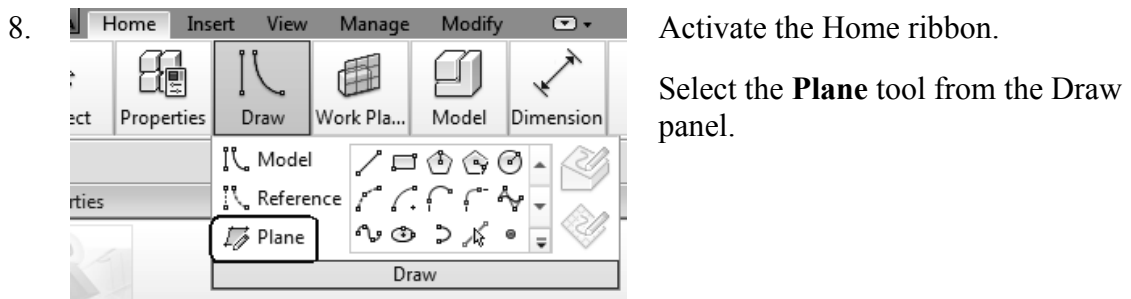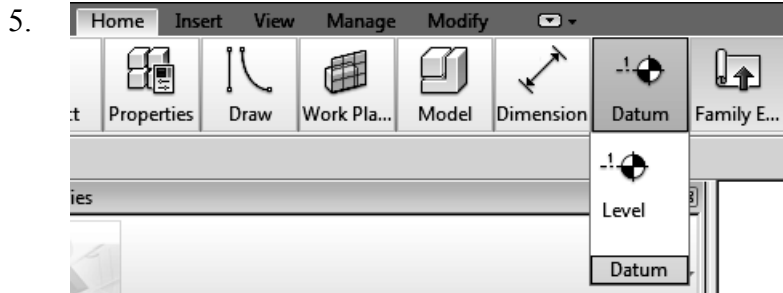
3. Select the **Mass** template.

    Press **Open**.

4. Activate the **South Elevation**.

5.

On the Home ribbon, select the **Level** tool.

6.

Place a Level 2 at **50′ 0″**.

7.

Activate the **Level 1** floor plan.

8.

Activate the Home ribbon.

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

9.

Draw a vertical plane and a horizontal plane to form a box.
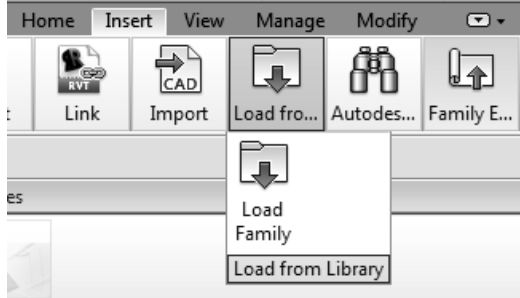
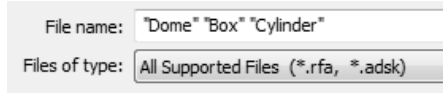|		
10.	100' - 0" 60' - 0"	Use the ALIGNED DIMENSION tool to add dimensions to the reference planes. Set the horizontal dimension to 100′ 0″ overall. Set the vertical dimension to 60′ 0″ overall.
11.	Home Insert View Manage Modify Link Import Load fro... Autodes... Family E... Load Family Load from Library	Activate the Insert ribbon. Select Load from **Library→Load Family**.
12.	OS (C:) ProgramData Autodesk RAC 2012 Libraries US Imperial Mass	Browse to the **Mass** folder.
13.	File name: "Dome" "Box" "Cylinder" Files of type: All Supported Files (*.rfa, *.adsk)	Hold down the CTRL Key and select the *Dome*, *Box*, and *Cylinder* files. Press **Open**.
14.	Model Dimen: Component Model	Activate the Home ribbon. Select the **Component** tool on the Model panel.
15.	Properties Cylinder Box Box Cylinder Cylinder Dome Dome	Select the **Box** component using the Type Selector.
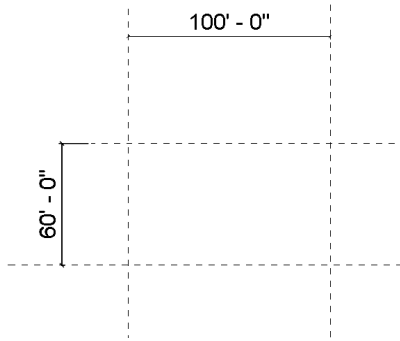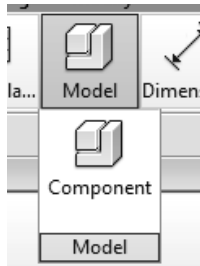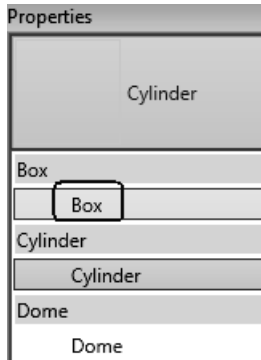
16. Select **Place on Work Plane** on the Placement panel.

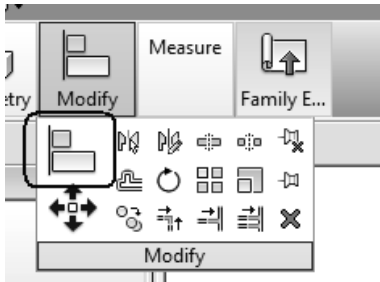17. Set the Placement Plane to **Level 1**.
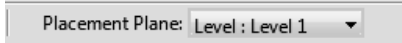
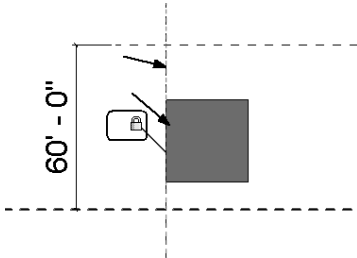18. Place the box in the view.
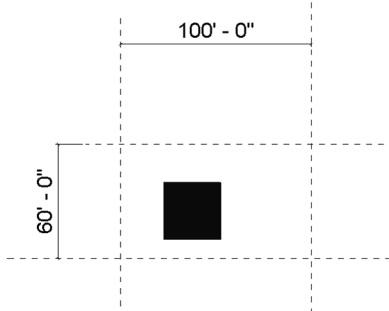
Right click and select **Cancel** twice to escape the command.

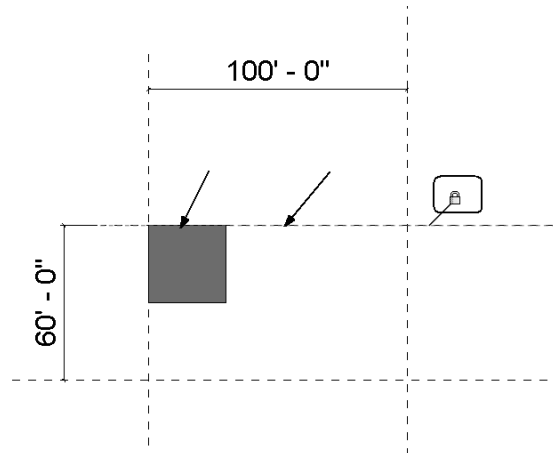19. Select the **ALIGN** tool from the Modify panel.

20. Select the reference plane on the left.

Select the left side of the box.

Left click on the lock to fix the alignment.
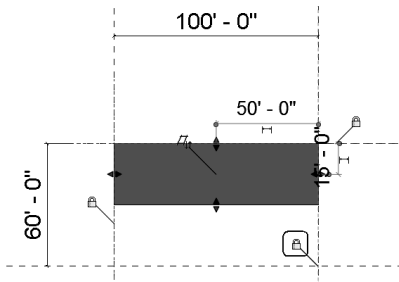
21. Select the reference plane on the top.

Select the top side of the box.

Left click on the lock to fix the alignment.

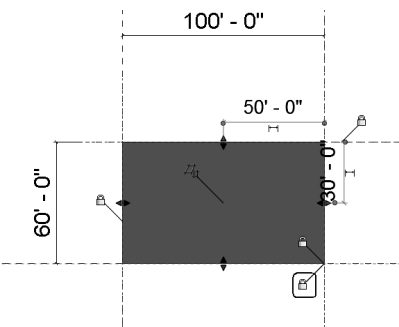Right click and select Cancel to exit the ALIGN command.

22. Left click on the box to select it.

Use the right grip to drag the right side of the box to the right reference plane.

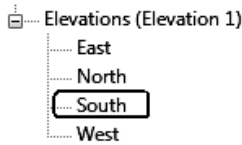Left click on the lock to fix the alignment.

23. Use the bottom grip to drag the bottom side of the box to the right reference plane.

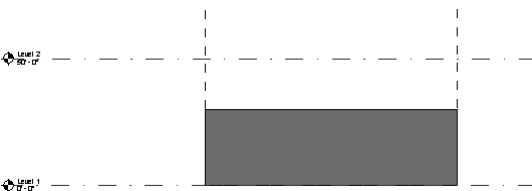Left click on the lock to fix the alignment.

Left click in the window to release the selection.

24. Elevations (Elevation 1)
    East
    North
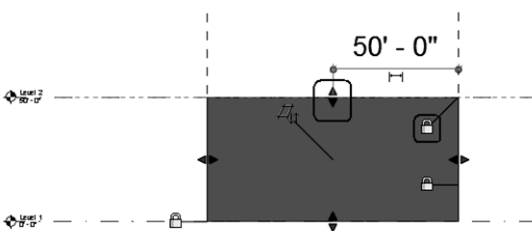   South
    West

Activate the South Elevation.

25. The box height is not aligned to Level 2.

Select the box.

26. Use the top grip to drag the top of the box even with Level 2.
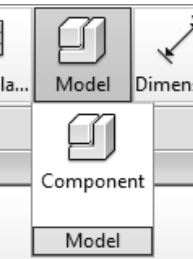Left click on the lock to fix the alignment.

Left click in the window to release the selection.

27. Floor Plans
    Level 1
    Level 2

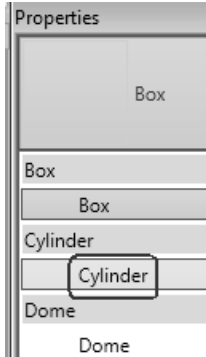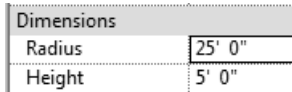Activate the **Level 2** floor plan.

28. Activate the Home ribbon.

Select the **Component** tool on the Model panel.

29. Select the **Cylinder** component using the Type Selector.

30. In the Properties Pane:

Set the Radius to **25′ 0″**.
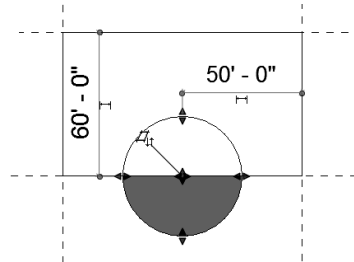Set the Height to **5′ 0″**.

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

32. Set the Placement Plane to **Level 2**.

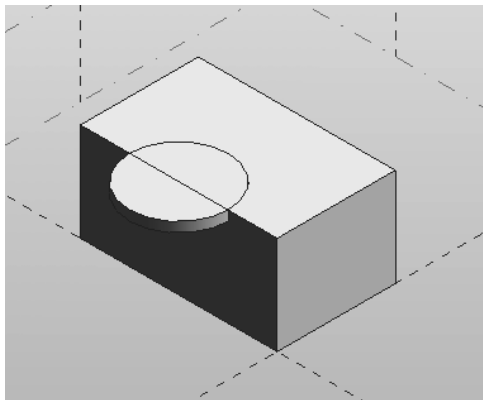33. Place a cylinder at the midpoint of the bottom edge of the box.

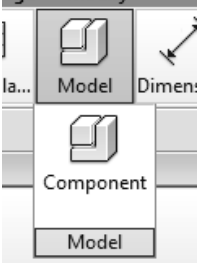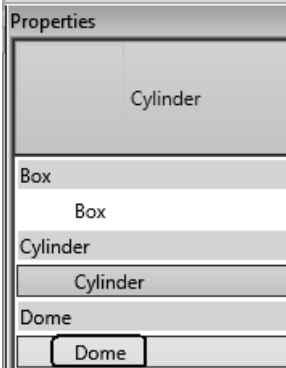Right click and select **Cancel** twice to escape the command.
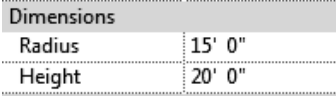
34. Switch to a 3D View.

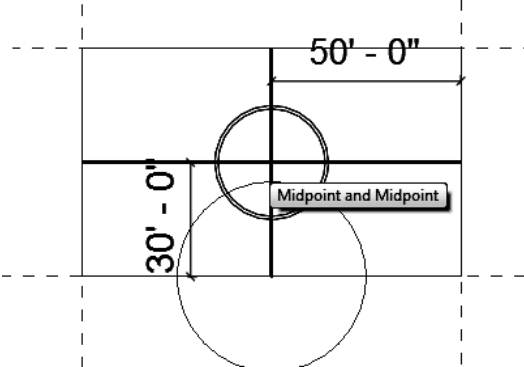35. You should see the box as well as the cylinder.

36. Activate **Level 2**.

37. Activate the Home ribbon.

    Select the **Component** tool on the Model panel.

38. Select the **Dome** component using the Type Selector.

39. In the Properties Pane:

    Set the Radius to **15′ 0″**.
    Set the Height to **20′ 0″**.

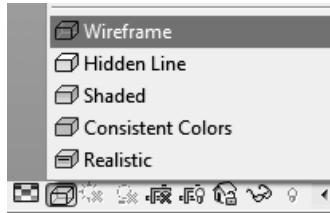40. Select **Place on Work Plane** on the Placement panel.

41. Set the Placement Plane to **Level 2**.

42. Place the dome so it is centered on the box.

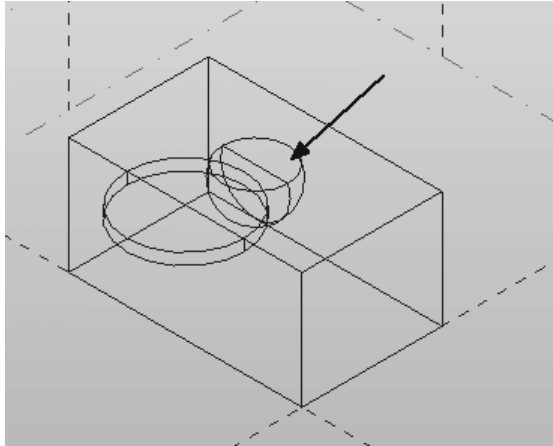   Right click and select Cancel twice to exit the command.

43. Level 5   Switch to a 3D View.
    3D Views
        3D View 1
        {3D}

44.
    Wireframe
    Hidden Line
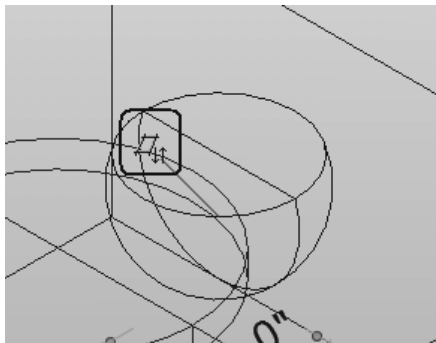   Shaded
    Consistent Colors
    Realistic

    Switch to a **Wireframe** display.

45.

The dome is upside down.

Select the dome.

46.

Left click on the orientation arrows to flip the dome.
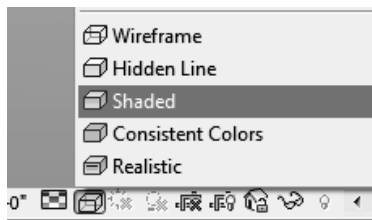
47. In the Properties pane:

    Dimensions
    Radius   30' 0"
    Height   15' 0"

    Change the Radius to **30′ 0″**.
    Change the Height to **15′ 0″**.
    Press **Apply**.

48.
    Wireframe
    Hidden Line
    Shaded
    Consistent Colors
    Realistic

    Change the display back to **Shaded**.

49. Save as *ex2-6.rfa*.

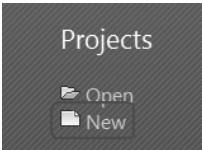## *Using a Conceptual Mass in a Project*

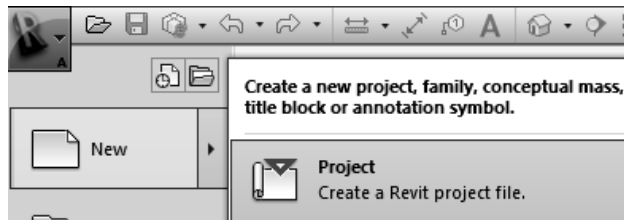Drawing Name: New
Estimated Time: 20 minutes

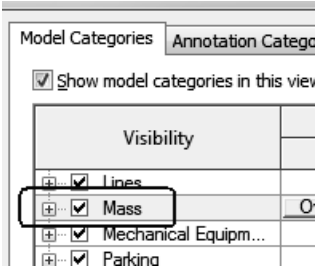This exercise reinforces the following skills:

- ❑ Masses
- ❑ Load from Library
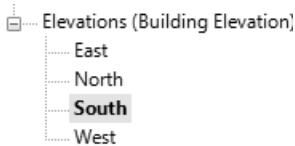- ❑ Visibility/Graphics

1. Close any open files.

2. On the Recent Files pane:

   Select **New Project**

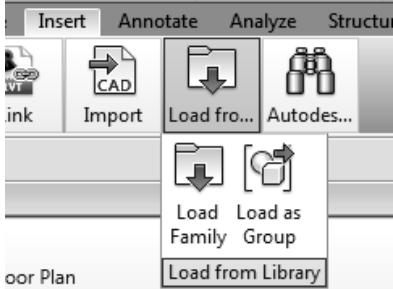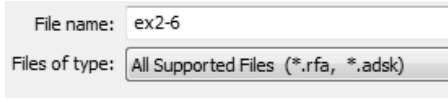   If the Recent Files pane is not available, use the Application Menu and go to **New→Project**.

   Create a new project, family, conceptual mass, title block or annotation symbol.

   New

   Project
   Create a Revit project file.

3. Type **VV** to launch the Visibility/Graphics dialog.

   Enable **Mass** visibility on the Model Categories tab.

   Press **OK**.
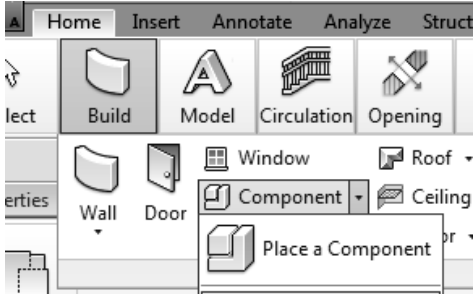
   Model Categories   Annotation Catego
   ☑ Show model categories in this view
   Visibility
   ☐ ☑ Lines
   ☐ ☑ Mass
   ☐ ☑ Mechanical Equipm...
   ☐ ☑ Parking

4. Switch to a South Elevation.

   Elevations (Building Elevation)
   East
   North
   South
   West

5. Set Level 2 to **50′ 0″**.

6. Activate Level 1.

   Floor Plans
   Level 1
   Level 2
   Site

7. Activate the **Insert** Ribbon.

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

8. File name: ex2-6

Files of type: All Supported Files (*.rfa, *.adsk)

Locate *ex2-6.rfa*.

Press **Open**.

9. Activate the Home ribbon.

Select **Component →Place a Component** from the Build panel.

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

11. Placement Plane: Level : Level 1

Set the Placement Plane to **Level 1**.

12. Click to place the mass in the view.

Right click and select Cancel to exit the command.

13.   Switch to a 3D view.

14.   Type **VV** to launch the Visibility/Graphics dialog.

Enable **Mass** visibility on the Model Categories tab.
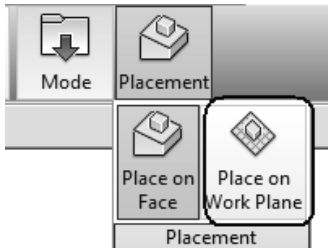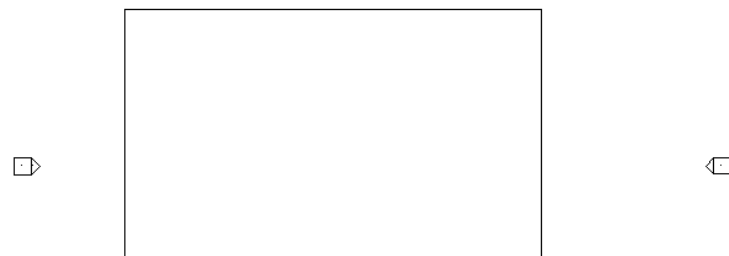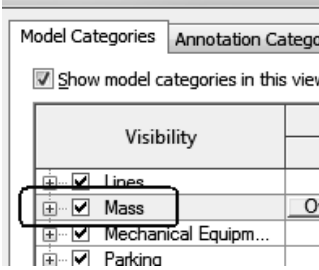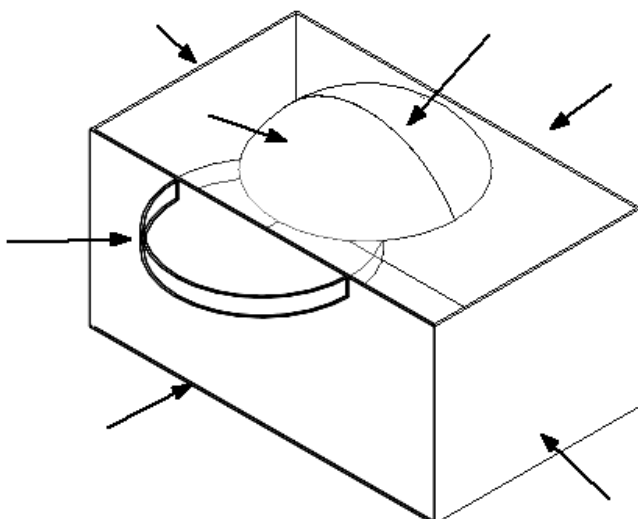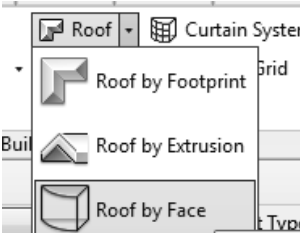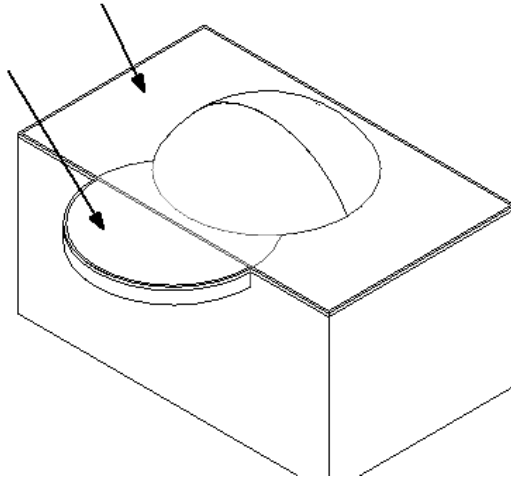
Press **OK**.

15.   Select the **Wall by Face** tool from the Home ribbon.

16.   Select the four sides of the box, the outside arc of the cylinder and the two sides of the dome to place walls.
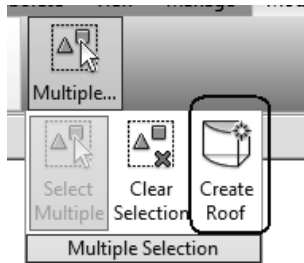
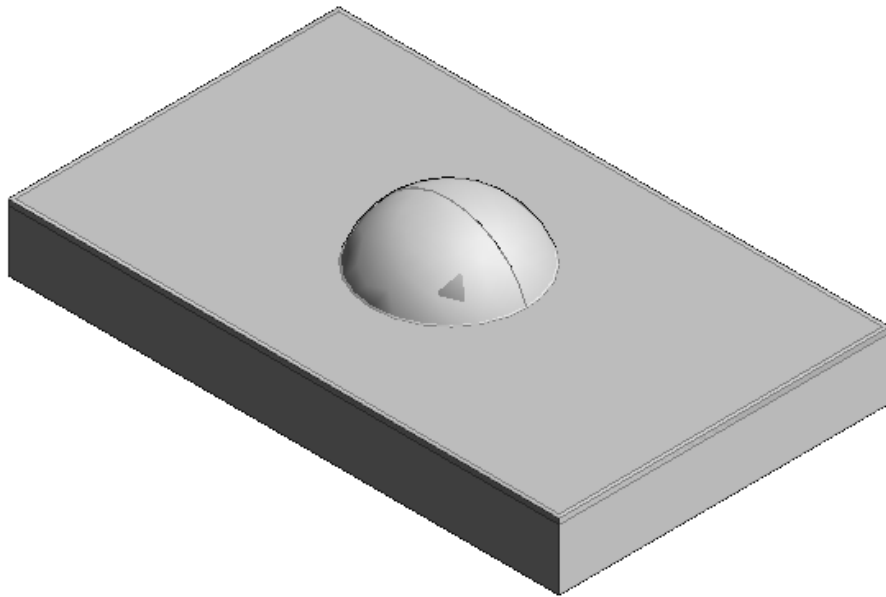17.   Select the **Roof by Face** tool on the Build panel.

18. Select the top face of the box and the top half of the cylinder.
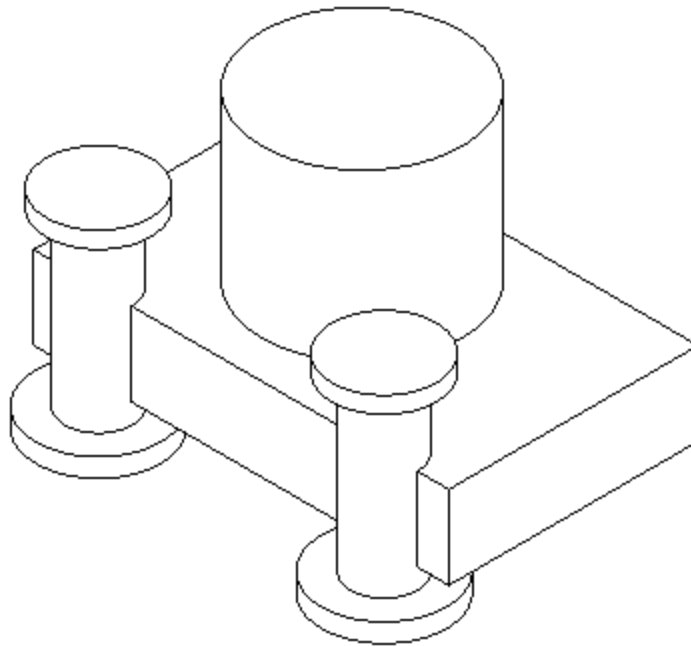
19. Select **Create Roof**.

20. The roof is placed.
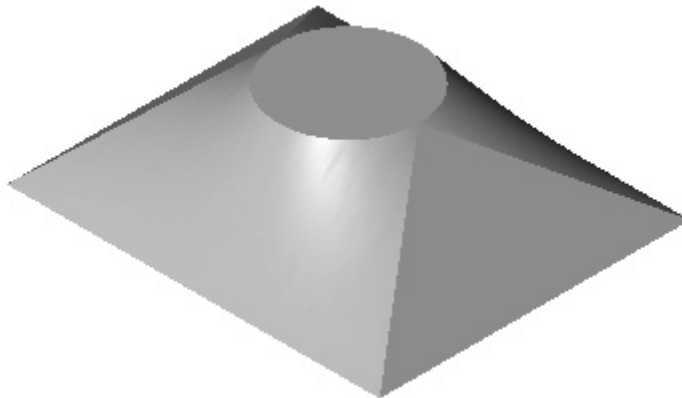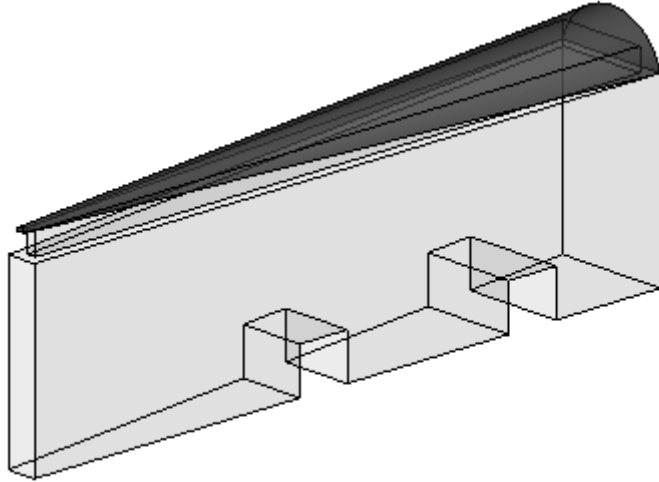

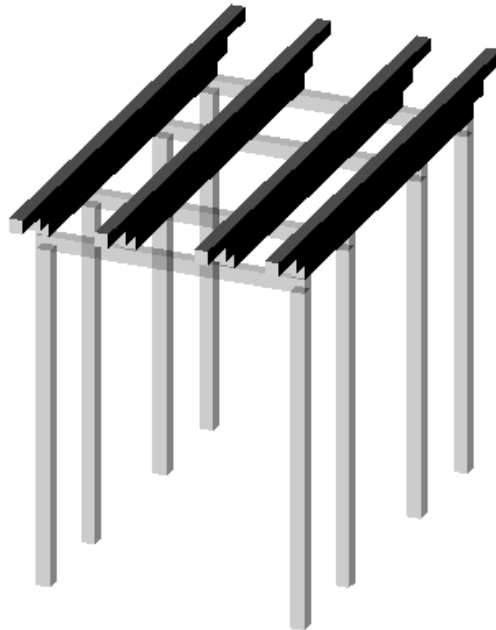21. Save as *ex2-7.rvt.*

Notes:

Additional Projects

1) Create a conceptual mass family like the one shown.

2) Make the shape shown using a Blend. The base is a rectangle and the top is a circle located at the center of the rectangle.

3) Make a conceptual mass family as shown.
   Use Solid Void to create the two openings.

4) Design a pergola using 4″ x 4″ posts and beams.

Lesson 2 Quiz

True or False

1. Masses can be created inside Projects or as a Conceptual Mass file.
2. Forms are always created by drawing a sketch, selecting the sketch, and clicking ⛁ Create Form.
3. In order to see masses, Show Mass must be enabled.
4. Masses are level-based.
5. You can modify the dimensions of conceptual masses.

Multiple Choice [Select the Best Answer]

6. Faces on masses can be converted to the following:

    A. Walls
    B. Ceilings
    C. Floors
    D. Doors
    E. A, B, and C, but NOT D

7. You can adjust the distance a mass is extruded by:

    A. Editing the temporary dimension that appears before a solid form is created
    B. Use the ALIGN tool.
    C. Use the 3D drag tool
    D. Using the Properties pane located on the left of the screen.
    E. All of the above

8. To insert a conceptual mass family in the project:

    A. Use the INSERT tool.
    B. Use the PLACE COMPONENT tool.
    C. Use the BLOCK tool.
    D. Use the MASS tool.

9. Masses are hosted by:

    A. Projects
    B. Work Planes
    C. Families
    D. Files

10.   Mass Visibility can be controlled using:

A. The SHOW MASS tool.
B. Display Settings
C. Object Settings
D. View Properties

11. Each mass is defined by _____.

A. A single profile sketch
B. Multiple profile sketches
C. Properties
D. Materials

12. Revit comes with many pre-made mass shapes. Select the mass shape NOT available in the Revit mass library:

A. BOX
B.   ARC
C. CONE
D. TRIANGLE