

Chapter 3



Creating the First Project

Learning Objectives

After completing this chapter, you will be able to:

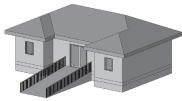
- *Understand the concept of walls.*
- *Understand the properties of walls.*
- *Use the sketching tools to create walls.*
- *Create exterior walls based on given parameters.*
- *Create interior walls based on given parameters.*

In the previous chapter, you have learned the procedure of starting and saving a new project. In this chapter, you will learn to use walls as the basic element of a building project.

CREATING A BUILDING PROJECT

In Autodesk Revit Architecture, the term project comprises not only the physical building model but also its associated documentation such as drawings, views, schedules, areas, and so on. The first step in creating a project is to create the building model. In Autodesk Revit Architecture, you can create it using the following two different methodologies:

- Method 1:** Create a building model using individual building elements such as walls, windows, doors, floors, roofs, and so on.
- Method 2:** Create a building model using the **Massing** tool and conceptualize the overall building shape and volume before working with individual elements.



Tip: You can also use a combination of the above two methods. A building model can be generated using the **Massing** tool and then it can be converted into a model with individual building elements.

The choice of methodology depends upon different project parameters such as project magnitude, building shape, building technology, current documentation stage of the project, industry parameters, and so on. The use of the **Massing** tool to create a building geometry will be described later in Chapter 10. The following few chapters describe the usage of individual building components to develop a building model.

Autodesk Revit Architecture provides you with several tools to add individual building elements such as wall, floor, roof, and so on, to create a building model. Several predefined element types have been provided for each building element in Autodesk Revit Architecture's libraries. You have the flexibility to either use the predefined element types or create your own element type to create a building model.

Sequence of Creating a Building Model

The sequence of using the building elements for creating a building model may also depend on various parameters such as the building type, building volume, building shape, and so on. For most of the building projects, the sequence given below may be adopted.

- Step 1: Start the model by creating the exterior walls of the building on Level 1 (lowest level).
- Step 2: Create the interior walls at the desired locations.
- Step 3: Add doors and windows to the exterior and interior walls at the desired location.
- Step 4: Add the floor to the building model.
- Step 5: Add the roof to the building model.

Step 6: Add the structural or architectural grid and structural elements.

Step 7: Add stand-alone components such as furniture items and plumbing fixtures.

Step 8: Add text and annotations to different spaces.

Step 9: Create dimensions for different parameters of the project.

Step 10: Create project details and documentation.

Step 11: Create rendered 3D views and walkthrough.

In Autodesk Revit Architecture, each building element is a three-dimensional parametric entity. This means on adding elements, you also add the associated information and specification about them. One of the most important elements in a building model is the wall that defines the basic spatial arrangement of the building and acts as the host for the doors and windows.

Understanding Wall Types

Autodesk Revit Architecture provides you with several predefined wall types based on their usage such as **Exterior**, **Interior**, **Retaining**, **Foundation** and **Curtain** wall.

Exterior Walls

This category constitutes the wall types that are primarily used for generating the exterior skin of the building model. It has predefined wall types such as **Brick on CMU**, **Brick on Mtl. Stud**, **CMU Insulated**, and so on.

Interior Walls

The interior walls are used as the interior partitions in a building project non-bearing character. The predefined interior walls provided in Autodesk Revit Architecture have a dry wall construction with a metal stud framing and varying thickness.

Retaining Walls

As the name suggests, the primary function of the retaining walls is to retain the earth. You can either use the retaining walls provided in the program or set the function of any wall type as retaining.

Foundation Walls

The walls that form the foundation or substrate of the main building structure belong to this category. **Foundation- 12" Concrete** has been provided as the predefined foundation wall type.

Curtain Walls

Apart from these wall types, Autodesk Revit Architecture also has predefined curtain walls or screen walls consisting of panels and mullions. You can choose the mullion spacing and the panel type from the provided options.

Autodesk Revit Architecture provides you with the flexibility of creating your own wall type. You can also change the wall function of any of these walls to modify their functional usage based on the requirement of the project.

Creating Exterior Walls

Menu Bar: Modelling > Wall
Design Bar: Basics > Wall
Shortcut Key: WA

In this section, you will learn the concept and method of creating and editing exterior walls. In Autodesk Revit Architecture, each wall type has specific predefined properties such as its use, composition, material, characteristics, finish, height, and so on. You can select the wall type based on its specific use in the project. Walls, like most other model elements, can be created in a plain view or a 3D view. To create an exterior wall, you need to invoke the **Wall** tool and then select the appropriate exterior wall type.

To invoke the **Wall** tool, choose **Modelling > Wall** from the menu bar or choose the **Wall** tool from the **Design Bar**, as shown in Figure 3-1. Click on the **Type Selector Bar** to display the drop-down list of the wall types in Autodesk Revit Architecture's library. You can choose the type of wall that you want to use by selecting the appropriate name, as shown in Figure 3-2.

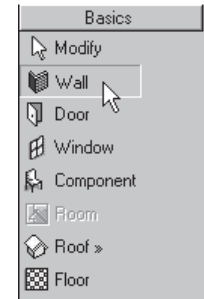


Figure 3-1 Invoking the **Wall** tool from the **Design Bar**

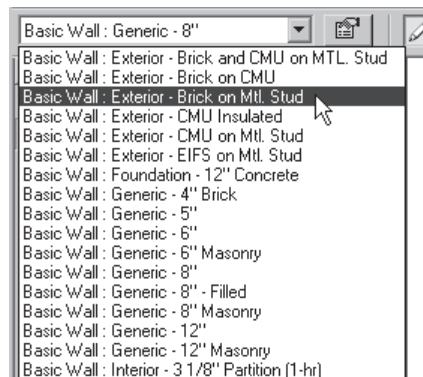


Figure 3-2 Choosing a wall type from the **Type Selector Bar**

Understanding Wall Properties

The **Element Properties** button is used to view and modify various predefined properties of the selected wall type. When you choose the **Element Properties** button, the **Element Properties** dialog box is displayed, as shown in Figure 3-3.

Element Properties

The **Element Properties** dialog box, shown in Figure 3-3, displays the properties of the selected element. The **Element Properties** dialog box contains the **Family** and **Type** drop-down lists on the top indicating the family and type of the selected wall. You can also modify the wall type from the **Type** drop-down list. The table given below it indicates the **Type Parameters**. These are the properties of the wall type, which are common to many elements in the wall family such as wall function, assembly description, width, and so on. In the **Element Properties** dialog box, you can only view these parameters but cannot edit them. The Instance Parameters can be viewed and modified in this dialog box.

Element Properties

Family: System Family: Basic Wall Load...

Type: Exterior - Brick on Mtl. Stud Edit / New...

Type Parameters: Control all elements of this type

Parameter	Value
Construction	
Structure	Edit...
Wrapping at Inserts	Do not wrap
Wrapping at Ends	None
Width	1' 1 7/8"

Instance Parameters - Control selected or to-be-created instance

Parameter	Value
Constraints	
Location Line	Wall Centerline
Base Constraint	Level 1
Base Offset	0' 0"
Base is Attached	<input type="checkbox"/>
Base Extension Distance	0' 0"
Top Constraint	Unconnected
Unconnected Height	20' 0"
Top Offset	0' 0"
Top is Attached	<input type="checkbox"/>
Top Extension Distance	0' 0"
Room Bounding	<input checked="" type="checkbox"/>
Related to Mass	<input type="checkbox"/>
Structural	
Structural Usage	Non-bearing

OK Cancel

Figure 3-3 The *Element Properties* dialog box for the *Exterior - Brick on Mtl. Stud* wall type

Exterior Wall Instance Parameters

The **Instance Parameters** table in the **Element Properties** dialog box shows various parameters and their corresponding values for the specified instance of the element. Using it, you can modify the instance parameters of a created or to-be-created element. The options in this table depend on the type and the instance of the selected element. The instance properties of the exterior walls are displayed in different categories such as **Constraints**, **Structural**, **Dimensions**, and **Identity Data**, each representing a set of properties corresponding to the title. You can use the twin arrows on the right of the title to collapse the table of properties for each title. Some of the important instance parameters are discussed next.

The **Location Line** parameter indicates the reference line used for creating the wall. In 3D, the location line refers to a plane in the wall that does not get modified, even if the wall parameters are changed. Click on the **Value** column to view the following available options.

- Wall Centerline** - Center line of the entire composite wall
- Core Centerline** - Center line of the structural core of the wall
- Finish Face: Exterior** - Exterior face of the wall as the location line
- Finish Face: Interior** - Interior face of the wall as the location line
- Core Face: Exterior** - Exterior face of the core
- Core Face: Interior** - Interior face of the core

The location line is indicated by a dashed line, which appears while sketching the wall segment. For example, on selecting the **Wall Centerline** as the location line parameter, you will notice a dashed line in the middle of the wall, as shown in Figure 3-4. When you select the **Finish Face: Interior**, it appears on the interior face of the wall, see Figure 3-5.

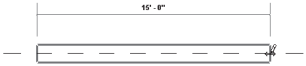


Figure 3-4 Location Line as the Wall Centerline



Note
As the design is developed, you may need to modify certain parameters of the exterior wall such as its thickness and composition, based on the final selection of the materials and their specifications. Taking this flexibility in to consideration, the location line parameter enables you to create walls.

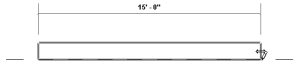


Figure 3-5 Location Line as the Finish Face: Interior



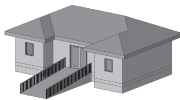
Tip: The selection for the **Location Line Parameter** should also be based on your design intent. For example, to create walls defined by the exact interior dimensions, you can select the **Finish Face: Interior** as the location line value. Once this parameter is selected, any addition or reduction of the wall thickness will be done towards its outer face.

In Autodesk Revit Architecture, you can specify the height of the walls by applying the base and the top constraints with respect to the levels defined in the project. This means that once you set the base and height of a top story and apply these constraints, all walls will be sketched with the same base and the top. To create a wall segment that is not related to these components and levels, you can type the desired height in the value column of the

Unconnected Height instance parameter: The default value for the unconnected height is 20'0".

The instance parameters for the walls and their usage are given next. The values of some of the instance parameters are available only after an instance is created. The instance parameters of the wall are given in the table below.

Instance Parameter	Description
Location Line	Line or reference plane for sketching the wall
Base Constraint	Level or reference plane of the base of the wall
Base Offset	Height of the wall from its base constraint
Base is Attached	Check box showing whether the wall is attached or not
Base Extension Distance	Distance of the base of the layers in the wall
Top Constraint	Whether the wall height is defined by specified levels or is unconnected
Unconnected Height	Explicit height of the wall
Top Offset	Distance of the top of the wall from the top constraint
Top Extension Distance	Distance of the top of the layer in the wall
Room Bounding	Whether the wall constitutes the boundary of the room
Related to Mass	Whether the wall relates to a massing geometry
Structural Usage	Shows the specific structural usage of the wall
Length	Shows the value of the length of the wall
Area	Shows the value of the surface area of the wall
Volume	Shows the value of the volume of the wall
Comments	Specific comments to describe the wall
Mark	To add a unique value or label to each wall
Phase Created	Phase in which the wall is created
Phase Demolished	Phase in which the wall was demolished



Tip: For most projects, it is easier to set the levels first and then create the walls with the **Upto Top Constraint Level**. You do not need to specify its height because you have already specified the height between the levels. You can also set some of the parameters of the wall component such as height, top constraint, and location line from the **Options Bar**.

Exterior Wall Type Parameters

To view and modify the **Type Parameters** of a wall, choose the **Edit/New** button from the **Element Properties** dialog box; the **Type Properties** dialog box will be displayed, as shown in Figure 3-6. Using this dialog box, you can modify some of the type properties of the selected wall type such as **Structure**, **Wall Function**, **Coarse Scale Fill Pattern**, and so on. The structure parameter indicates the basic composition of the wall type. Choose **Edit** in the **Value** column to view the **Edit Assembly** dialog box.

In Autodesk Revit Architecture, a wall is a composite building element and can consist of several layers. Choose the **Preview** button from the **Edit Assembly** dialog box to view the graphical representation of the layers, as shown in Figure 3-7.

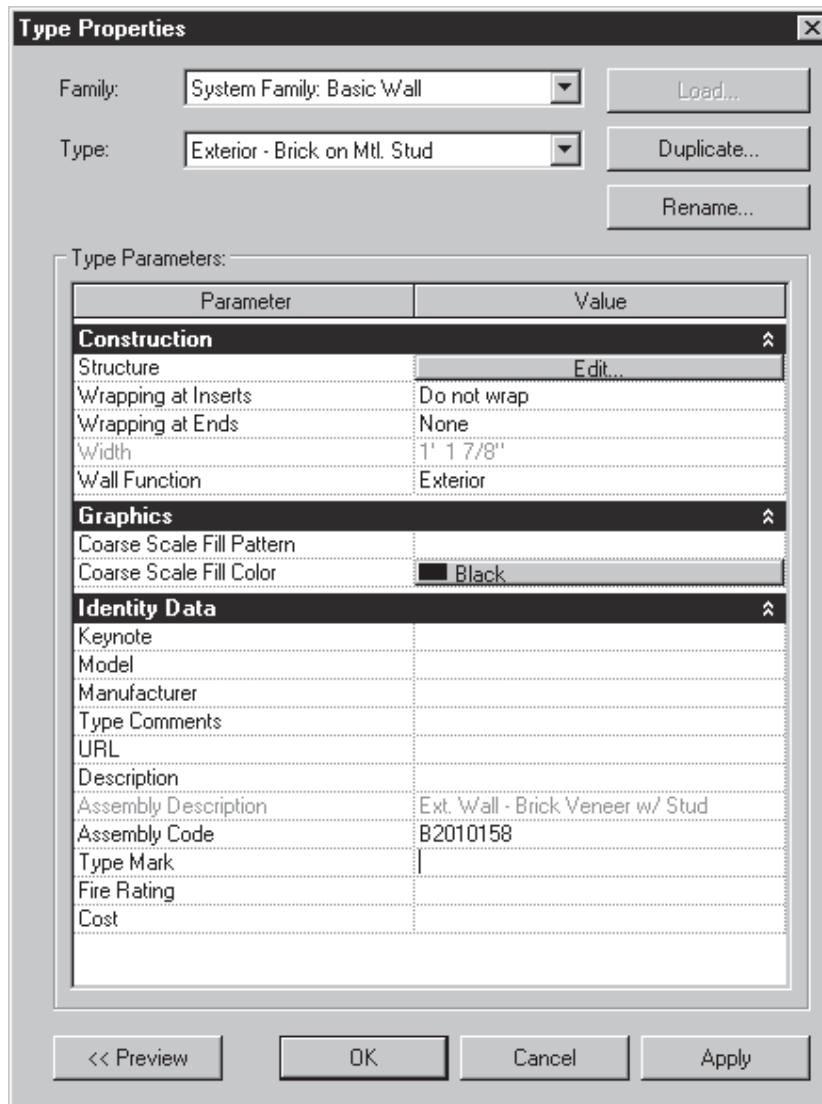


Figure 3-6 The *Type Properties* dialog box for the *Exterior- Brick on Mtl. Stud* wall type

Each layer of the composite wall is assigned a specific function and priority based on its usage. Layers available in Autodesk Revit Architecture can be broadly classified into categories given next.

Structure Layer - Priority [1]- Consists of main supporting element of the structure such as concrete, brick, wood, metal stud, and so on.

Substrate Layer - Priority [2] - Consists of material that functions as substructure, such as foundation and plywood.

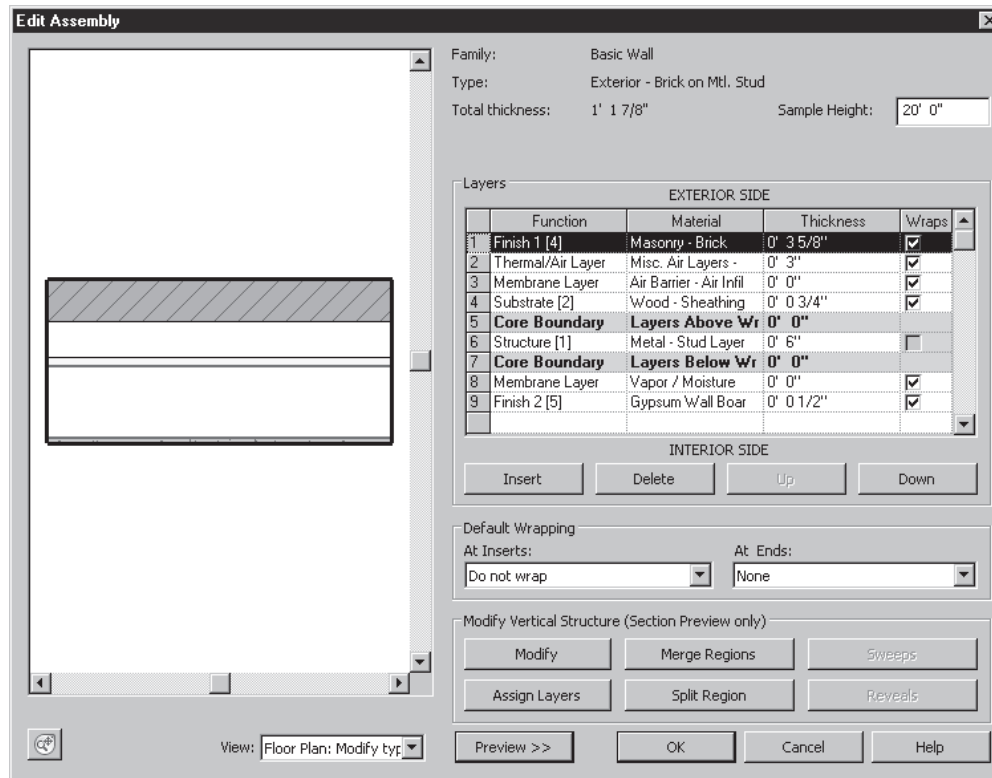


Figure 3-7 The **Edit Assembly** dialog box with the **Preview** button chosen

Thermal Layer - Priority [3] - Indicates the air cavity or the thermal insulation layer.

Membrane Layer - A zero thickness layer is primarily for the prevention against water vapor penetration.

Finish 1 - Priority [6] - Exterior finish such as metal, brick, and stone.

Finish 2 - Priority [7] - Interior finish such as paint, gypsum wall board, and so on.



Note

Priority set to the layer enables Autodesk Revit Architecture to work out the joinery of the wall segments at the corners and intersections. When joined, a higher priority layer takes precedence over a lower priority layer.

The **Layers** area in the **Edit Assembly** dialog box displays that the selected wall comprises of multiple layers, each with a specific function, material, and thickness. The layer on the top of the table represents the exterior side of the wall and the last layer represents the interior face. The **Layers** area as shown in Figure 3-7, displays the selected wall type, in this case, **Exterior- Brick on Mtl. Stud**. This wall has nine layers. The **Material** column displays the material specification where as the **Thickness** column displays the value of thickness of each layer. The total thickness of this composite wall is the sum of the thickness of all layers,

in this case 1'1 7/8", shown in the **Total thickness** parameter given, on the top of the dialog box. You can click on the **View** drop-down list and select **Section: Modify type attributes** to view the section of the wall.

Autodesk Revit Architecture enables you to add or remove layers using the **Insert** and **Delete** buttons provided below the **Layers** area. To shift the layers, choose the **Up** and **Down** buttons. You can also create your own layers. You will learn more about materials, layers, and composite walls in the later chapters.

The **Default Wrapping** area displays two options to allow wrapping of the compound walls, **At Inserts** and **At Ends**. The layers of the compound walls can wrap both at the inserts and the wall ends. Wrapping can be viewed in the plan view. You can select different options to allow wrapping from the **At Inserts** and **At Ends** drop-down lists in the **Default Wrapping** area. The Figures 3-8 to 3-11 illustrate the wrapping options.

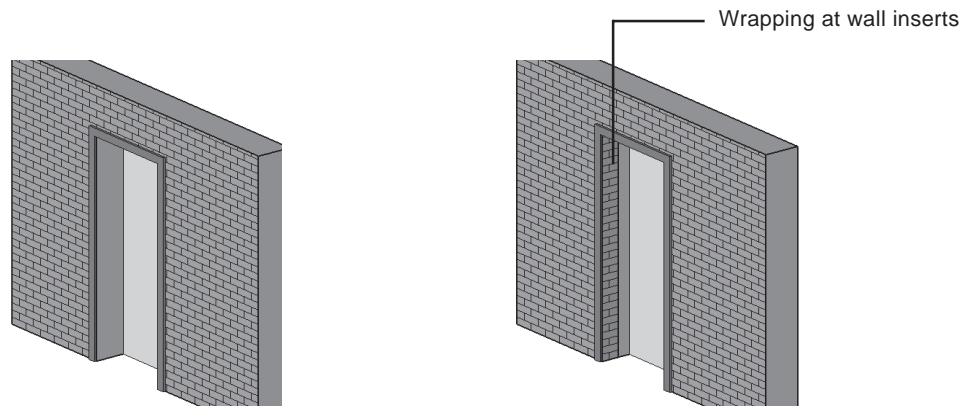


Figure 3-8 The wall created with the **Do not wrap** option selected from the **At Inserts** drop-down list in the **Default Wrapping** area

Figure 3-9 The wall created with the **Exterior** option selected from the **At Inserts** drop-down list in the **Default Wrapping** area

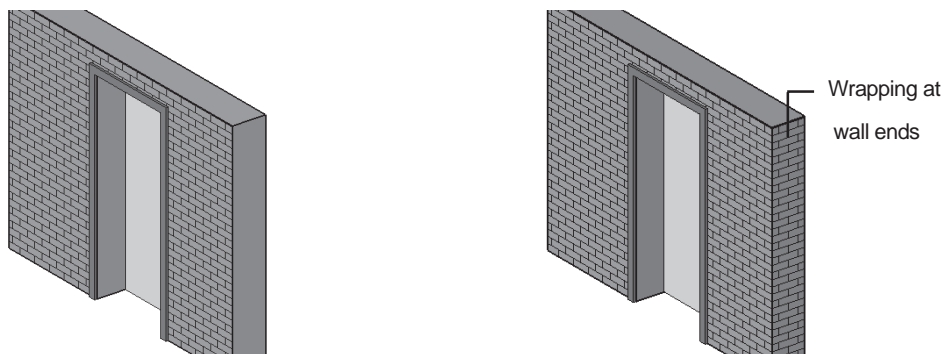


Figure 3-10 The wall created with the **None** option selected from the **At Ends** drop-down list in the **Default Wrapping** area

Figure 3-11 The wall created with the **Exterior** option selected from the **At Ends** drop-down list in the **Default Wrapping** area

Sketching Walls

The next step after selecting the wall type is to select the sketching tool. Autodesk Revit Architecture provides several sketching tools to sketch the walls of different shapes. These tools can be accessed from the **Options Bar** placed above the drawing window, as shown in Figure 3-12.

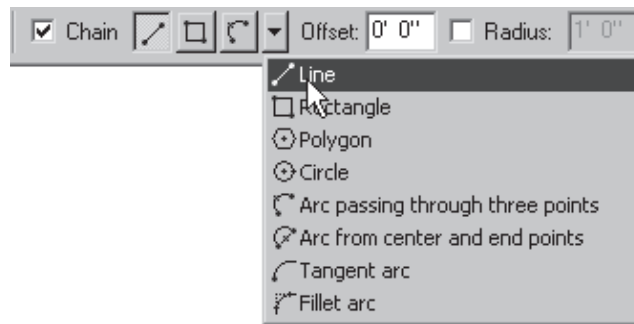


Figure 3-12 Wall sketching options available in the **Options Bar**

Using the Sketching Tools

For easy accessibility, three buttons for the **Line**, **Rectangle** and **Arc passing through three points** sketching tools are provided in the **Options Bar**. The down arrow key in the **Options Bar** can be used to display all the sketching tools, and the appropriate tool can be selected from the drop-down list. The **Line** is the default option for sketching the walls. The cursor is replaced by the sketching tool when the **Wall** tool is invoked.

Sketching Straight Wall Profiles



You can sketch the straight walls using the **Line** sketching tool by specifying the start point and the endpoint of the wall segment. To specify the location of the starting point, click in the viewing area. On moving the cursor, you will notice that a wall segment is starting from the specified point and the dimension, which changes dynamically appears on it. This dimension is called the temporary dimension or the listening dimension and it shows the length of the wall segment at any given location of the cursor, as shown in Figure 3-13. Also, notice that the cursor moves in increments by the value set in the **Dimension Snaps** option of the **Snaps** dialog box (See Chapter 2- Setting Snaps). The angle subtended by the wall on the horizontal axis is also displayed and it keeps changing dynamically as you move the cursor to modify the inclination of the wall. Also, notice that on bringing the cursor near the horizontal or vertical axis, a dashed line will appear near the wall segment. This is called the alignment line and it helps you sketch the components with respect to the already created components. You will also notice a tooltip is displayed indicating that the wall segment being sketched is horizontal, as shown in Figure 3-14.

Autodesk Revit Architecture provides you the flexibility of specifying the length of the walls in different ways. The first option is to specify the starting point of the wall, move the cursor in the desired direction and click when the angle and the temporary dimension attain the

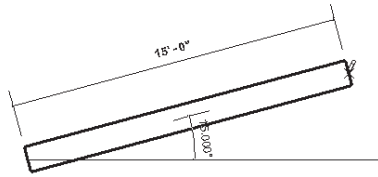


Figure 3-13 Sketching a wall using the **Line** option

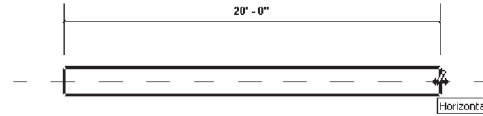


Figure 3-14 Sketching a horizontal wall

required values. The second option is to sketch the wall and then modify its length and angle to the exact value. For example, to sketch a 18'0" long horizontal wall after specifying the starting point, you can move the cursor to the right until you see a dashed horizontal line parallel to the sketched wall. Click when the temporary dimension shows 20'0" approximately. The length of the wall may not be exactly 18'0". You can now use the wall controls to modify the dimensions of the wall to its exact value.

You can invoke the **Modify** tool from the **Design Bar** and select the wall segment to view its properties and controls. The wall segment gets highlighted in red color. Three symbols in blue appear above the wall segment, as shown in Figure 3-15.

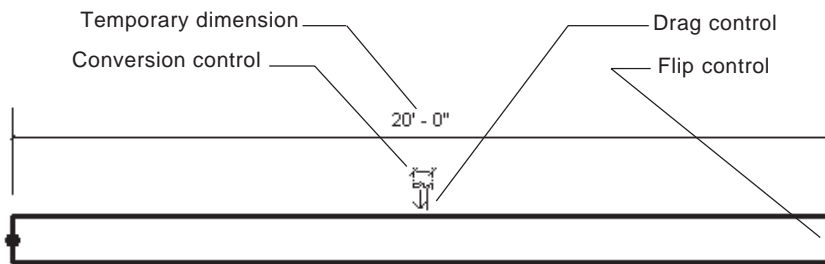


Figure 3-15 Highlighted wall displaying its controls

The exact dimension of the sketched wall is visible in the dimension text of the temporary dimension. The dimension symbol, which appears below the dimension value, is used to convert the temporary dimension into a permanent dimension. Two blue arrows, which also appear on the upper face of the wall, indicate the flip control symbol for the sketched walls. They appear on the side interpreted as the exterior face of the wall. By default, walls drawn from the left to right have the external face on the upper side and walls drawn from the top to bottom have it on the right side. You can flip the orientation of the wall by clicking on the arrows symbol. Alternatively, press the SPACEBAR to flip it. The two blue dots that appear at the two ends of the wall segments are the drag control symbols. You can use them to stretch and resize the walls. To set the wall to the exact length, click on the temporary dimension. An edit box will appear showing the current dimension of the wall segment. You can now replace it by typing the exact length, in this case **18'0"** in the edit box, as shown in Figure 3-16. The length of the wall will be modified to 18'0".

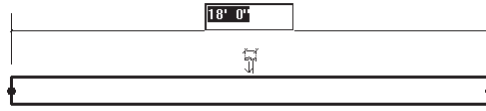


Figure 3-16 Specifying the exact length of the wall

Alternatively, you can create a straight wall by typing the dimension of the length before choosing the endpoint. As soon as you start typing the length, an edit box appears. Enter the value of the length and press ENTER to create a wall segment of the specified length.

To sketch a wall at a given angle, sketch it at any angle and then click on the angular dimension symbol. An edit box will appear, where you can enter the exact angular dimension from the horizontal axis to which the wall will be inclined.



Note

The **Project browser** shows **Level 1** in bold letters. This indicates that the wall has been sketched in that level.

Sketching Rectangular Wall Profiles



You can choose the **Rectangle** sketching tool to create a rectangular profile of the walls. Click on the screen to specify the location of a corner. As you move the cursor away from this point, a rectangular wall profile will be displayed along with the temporary dimensions between the two parallel walls. Move the cursor to the desired location and when the temporary dimension attains the desired value, click to specify the diagonally opposite corner of the profile. The rectangular wall profile will be created and the temporary dimensions will be displayed. Another method is to first sketch the profile without the exact dimensions and then modify the size of the rectangle. This can be done by clicking on the temporary dimension and entering the exact distance in the edit box, as shown in Figure 3-17. The size of the rectangle will be modified to the exact values.

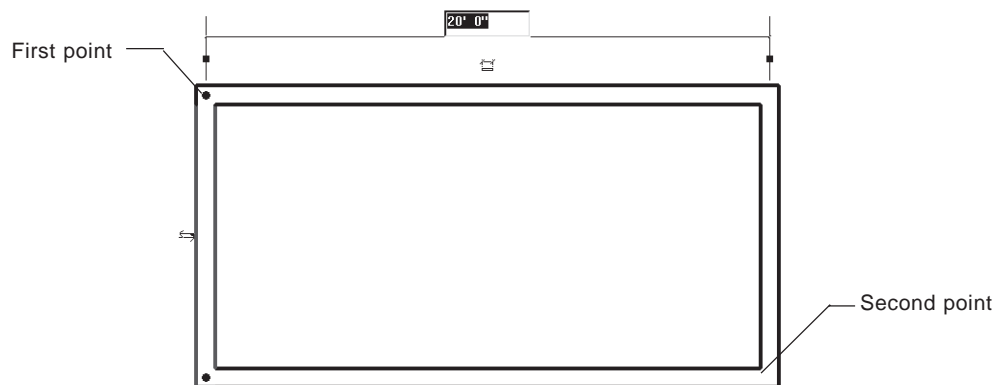
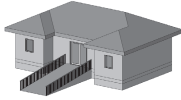


Figure 3-17 Creating and modifying a rectangular wall profile



Tip: Notice that the cursor still has the sketching tool attached to it, indicating that the wall tool is still running. To discontinue it, set the text and press the **ESC** key twice. You will return to the **Modify** mode (default mode). You can also choose any other option from the **Design Bar**, menu bar, or toolbar to discontinue the running tool and invoke the next tool. The temporary dimension disappears as you invoke another tool

Sketching Polygonal Wall Profiles



The **Polygon** sketching tool can be used to sketch a polygonal wall profile. When you choose this tool, various options are displayed in the **Options Bar**. You can specify the number of sides of the polygon in the **Sides** edit box. The polygonal profile is created by specifying the radius of the inscribed or circumscribed circle. The **Inscribe Polygon** can be selected to create the polygonal profile by specifying the radius of the inscribed circle. You can also specify the radius in the **Radius** edit box.

Sketching Circular Wall Profiles



The **Circle** sketching tool can be used to sketch a circular wall profile. Click to specify the center point of the circular wall. You will notice that a circular wall profile is extending dynamically with the specified point as the center and the other end attached to the cursor. The temporary radial dimension will also be displayed. Click when the desired value for the radius is displayed. Alternatively, before clicking on the second point, type the value for the radius of the circular profile. As you type, the value will be shown in the edit box, as shown in Figure 3-18. Press **ENTER** to complete the profile. Notice that the dimension that you entered is the distance of the center point to the location line of the profile.

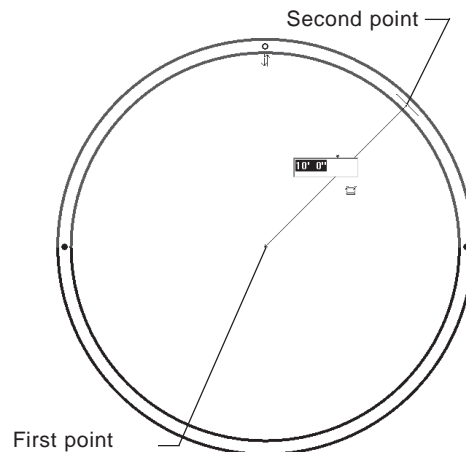
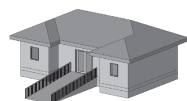


Figure 3-18 Sketching and modifying a circular wall profile



Tip: In case you want to sketch a circular profile with a specific inner radius, you can choose the **Finish Face : Interior** as the **Loc Line** parameter from the **Options Bar** and then create the profile.

Sketching Arcs Passing Through Three Points



The **Arc passing through three points** sketching tool enables you to sketch a curved wall by specifying any three points defining it. Specify the start point and endpoint of the curved wall. Notice that a curved wall with a variable radius stretches dynamically between the two specified points. Specify the location of the third point between the two specified points. The angular and radial temporary dimensions displayed can also be used to locate the third point. Click in the drawing area to specify the third point and the curved wall will be sketched. You can also modify the sketched wall to the desired curvature parameters such as radius, angle subtended, orientation, and so on. To modify the curvature, click on the parameter such as the angular dimension and enter the new value, as shown in Figure 3-19. You can also use the drag controls to increase or decrease the extent of the wall. The central blue dot can be used to stretch the wall keeping the subtended angle constant.

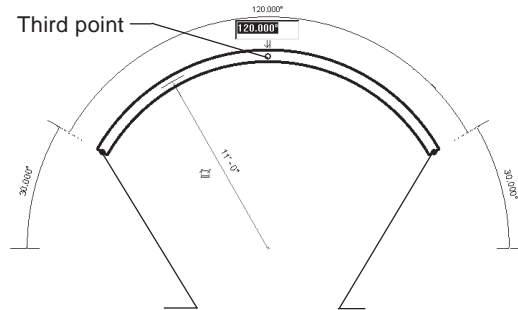


Figure 3-19 Sketching and modifying a curved wall profile

Sketching Arcs from Center and End Points



You can sketch a curved wall by specifying its center point and the two end points using the **Arc from center and end points** sketching tool. Click to specify the location of the center point and then move the cursor. Click when the desired value of the radius is displayed. You can also type the radius value and then press ENTER. The point, which you specify will be taken as the start point of the wall. Next, you will be prompted to enter the arc wall end point. The curved wall segment can be extended up to 180-degree. When the angle exceeds 180-degree, the wall will flip the side. Once the wall is sketched, you can select it and modify its parameters such as the subtended angle and the radius. You can also modify the curvature keeping the radius fixed by using the drag controls, as shown in Figure 3-20.

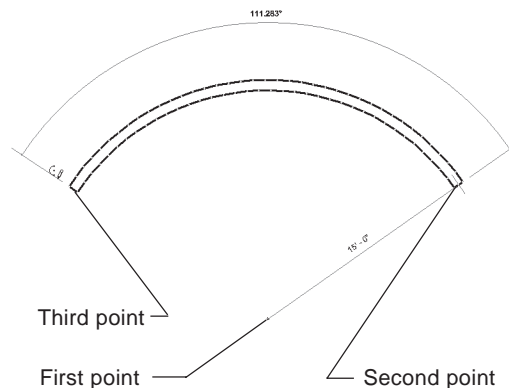


Figure 3-20 Sketching a curved wall profile using the **Arc from center and end points** sketching tool

Sketching Tangent Arcs



The **Tangent arc** sketching tool can be used to sketch a curved wall profile that starts tangentially from an existing wall. The start point of the wall can be specified as the end point of an existing wall. After selecting the start point, move the cursor to the desired distance and click to define the curved wall profile.

Sketching Fillet Arcs



Choose the **Fillet arc** sketching tool to create a curved fillet wall between the two existing walls. Click on the two walls to fillet close to the desired fillet end. A fillet wall will appear, showing its possible locations, as shown in Figure 3-21. Click to specify the location of the fillet. Once the fillet wall is sketched, you can modify its radius by clicking on it and typing its value. Notice that the walls are automatically trimmed after placing the fillet arc.

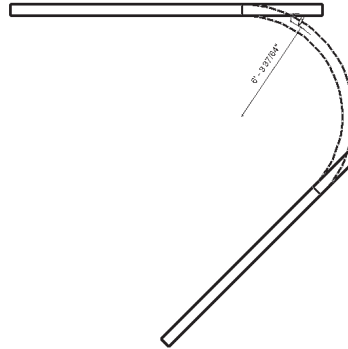


Figure 3-21 Sketching a fillet arc wall profile

Using the Chain Option

The **Chain** option is an important option that is used to create a continuous wall profile with a number of wall segments. It enables you to create a continuous wall with wall segments that are connected end to end. The end point of the previous wall becomes the start point of the next wall. To enable the **Chain** option, select the check box before or while sketching the wall profile. You can also use this option while using different sketching options.

Using the Offset Option

The **Offset** option is used to create a wall that starts at a specified offset distance from a point defined in an existing element. The offset distance value can be entered inside the edit box in the **Options Bar**. However, the shape of the resulting wall depends on the sketching tool selected. After entering the offset value and selecting the sketching option, click near the element to define the offset distance. When you move the cursor, the wall will start at the specified distance from the selected point. For example, this option can be used for creating boundary walls that are placed at a specific distance from the building profile.

Using the Radius Option

The **Radius** option can be used to specify the radius while sketching a circular, curved, or a fillet wall. You can type the value of the radius in the text box before or after selecting the desired sketching tool.



Tip: An appropriate sketching option should be selected based on the desired wall profile. You can also sketch walls using a combination of the available sketching options. In the **Options Bar**, the sketching option buttons are replaced by the latest sketching options used.

SKETCHING INTERIOR WALLS

In Autodesk Revit Architecture, interior walls form a separate family of wall types. They differ from the exterior wall types by their usage, material specifications, and non load-bearing character. Several predefined interior wall types are provided in the Autodesk Revit Architecture libraries.

To view the interior wall types, invoke the **Wall** tool from the **Basics** tab in the **Design Bar**. The **Type** drop-down list displays the different type of walls available in Autodesk Revit Architecture. The wall types that may be used as interior walls have been assigned the prefix **Interior**. Based on the project requirement, you can select the appropriate interior wall type from the drop-down list. For example, **Basic Wall: Interior- 5" Partition (2-hr)** is a type of interior wall with a 2-hour fire rating and can be selected from the **Type Selector Bar** drop-down list, as shown in Figure 3-22.

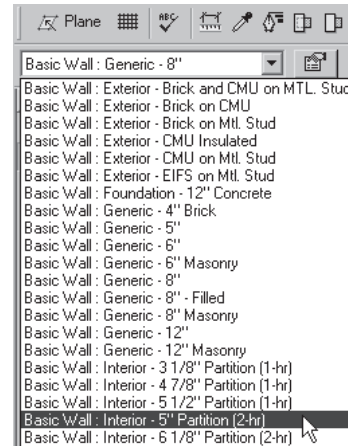


Figure 3-22 Selecting the interior wall type from the **Type Selector Bar** drop-down list

The properties of the interior wall type can be viewed by choosing the **Element Properties** button. The **Element Properties** dialog box will be displayed, as shown in Figure 3-23. It shows various instance parameters of the selected wall such as **Unconnected Height**, **Location Line**, **Structural Usage**, **Top Constraint**, and so on. You can modify these parameters either by entering the new value or selecting from the available values.

The sketching options explained earlier (for exterior walls) can also be used for sketching interior walls. When you sketch the interior walls, the top constraint of the interior walls is automatically set to the level above the current level.

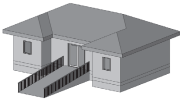


Note

The interior walls do not create a neat junction with the exterior walls as they have different composition and characteristics. Walls are the host elements for other building elements such as doors and windows. So, deleting the walls deletes all its dependent elements.

To view the basic composition of this interior wall type, choose the **Edit/New** button from the **Element Properties** dialog box. The **Type Properties** dialog box will be displayed, showing different Type parameters of the selected interior wall type.

To view the structural composition of the wall type, click on the **Edit** button for the **Structure** type parameter. The **Edit Assembly** dialog box will be displayed, showing the layers for this wall type. For example, the **Basic Wall: Interior - 5" Partition (2-hr)** comprises seven layers with different materials and thickness. You can use the **Add** and **Delete** buttons to modify the wall type. The **Preview** button shows a graphic view of the **Interior-5" Partition(2 -hr)** wall type as shown in Figure 3-24.



Tip: The location line parameter is useful for creating interior walls. You can create interior walls at a specified distance from another existing wall using the **Finish Face: Interior** option.

Element Properties

Family: System Family: Basic Wall Load...

Type: Interior - 5" Partition (2-hr) Edit / New...

Type Parameters: Control all elements of this type

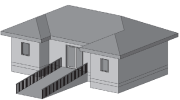
Parameter	Value
Construction	
Structure	Edit...
Wrapping at Inserts	Do not wrap
Wrapping at Ends	None
Width	0' 5"

Instance Parameters - Control selected or to-be-created instance

Parameter	Value
Constraints	
Location Line	Wall Centerline
Base Constraint	Level 1
Base Offset	0' 0"
Base is Attached	<input type="checkbox"/>
Base Extension Distance	0' 0"
Top Constraint	Up to level: Level 2
Unconnected Height	10' 0"
Top Offset	0' 0"
Top is Attached	<input type="checkbox"/>
Top Extension Distance	0' 0"
Room Bounding	<input checked="" type="checkbox"/>
Related to Mass	<input type="checkbox"/>
Structural	
Structural Usage	Non-bearing

OK Cancel

Figure 3-23 The **Element Properties** dialog box for the **Basic Wall: Interior - 5" Partition (2-hr)** wall type



Tip: Besides the **Type Selector Bar**, wall types are also listed under the **Families** head in the **Project browser**. Left-click the '+' next to the **Families** head to view the families available in Autodesk Revit Architecture. Click the '+' symbol next to the **Wall** subhead and then the one next to **Basic Wall** to display the various basic wall types. Select and right-click on any wall type to display a shortcut menu with the options that can be used for editing. For example, to select all instances of a particular wall type, use the **Select all instances** option.

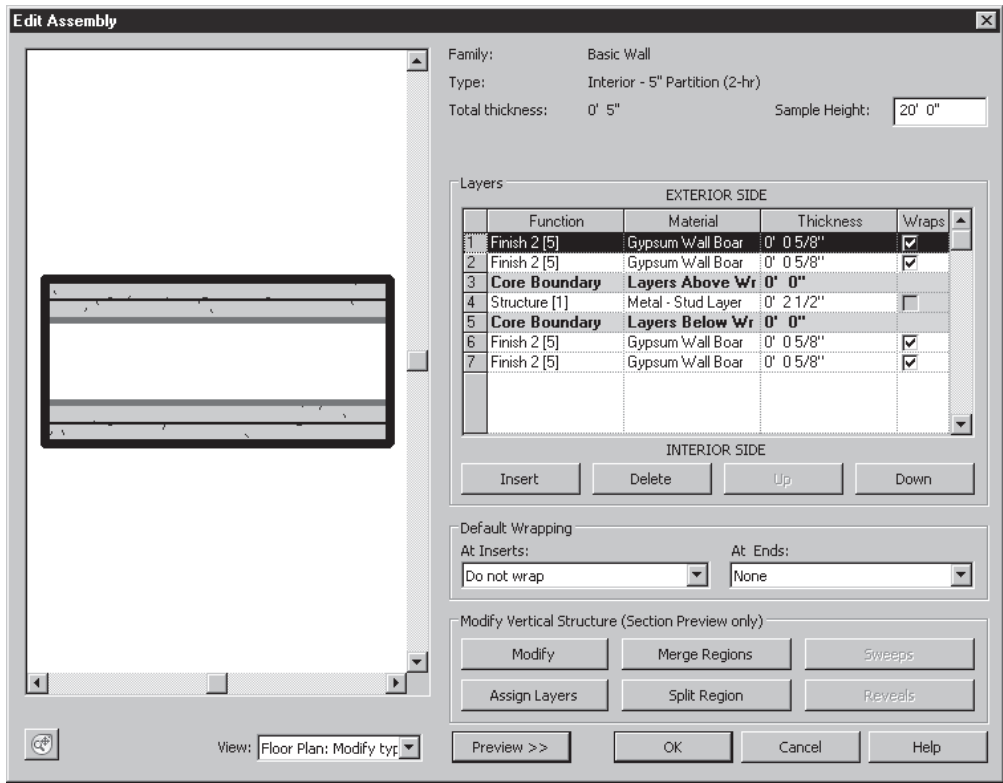


Figure 3-24 The *Edit Assembly* dialog box for the **Basic: Interior-5" Partition (2-hr)** wall type



Tip: If you create a new wall type, include “**Exterior**” or “**Interior**” in the **Wall Function** name to describe it and set its function appropriately.

The following tutorials are designed to familiarize you with the concepts of invoking the **Wall** tool, selecting the wall type, modifying its properties, using the sketching options, and sketching a wall with the given parameters.

TUTORIALS

Tutorial 1 Apartment 1

Create the exterior walls of a two-room apartment based on the sketch plan shown in Figure 3-25. The dimensions have been given for reference and are not to be created in this tutorial. The parameters to be used for creating the exterior walls are given below.

(Expected time: 30 min)

1. Project file- *Apartment 1.rvt* created in Tutorial 1 of Chapter 1.
2. Exterior wall type- **Basic Wall: Exterior - Brick on Mtl. Stud**

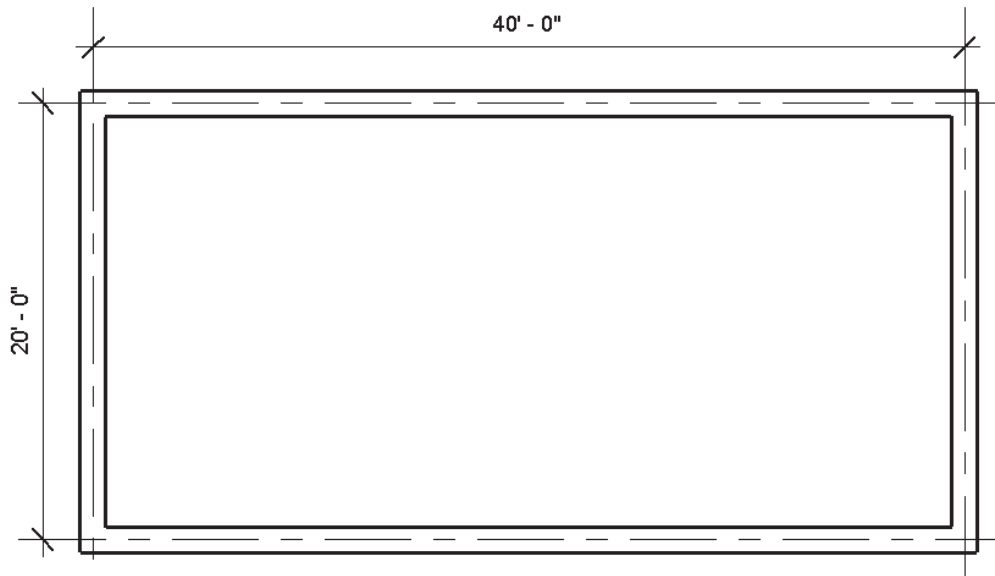


Figure 3-25 Sketch plan for creating exterior walls for the Apartment 1 project

3. Location line parameter- **Wall Centerline**; Top Constraint- **Up to Level 2**

The following steps are required to complete this tutorial:

- a. Open the *Apartment 1.rvt* file created in Tutorial 1 of Chapter 2.
- b. Invoke the **Wall** tool.
- c. Select the exterior wall type **Basic Wall: Exterior - Brick on Mtl. Stud** from the **Type Selector Bar**.
- d. Modify **Top Constraint- Up to level: Level 2** and **Location Line- Wall Centerline** as wall properties using the **Element Properties** button, refer to Figure 3-26.
- e. Choose the **Line** sketching tool.
- f. Sketch the exterior walls based on the given parameters, refer to Figures 3-26 through 3-35.

Opening an Existing Project

1. Choose **File > Open** from the menu bar and open the *Apartment 1.rvt* project file from the *My Documents/revit_2009* folder. This file was created in Tutorial 1 of Chapter 2.

Invoking the Wall Tool and Selecting the Wall Type

As mentioned earlier, to start sketching the wall, you must invoke the **Wall** tool and select the wall type to be used (**Basic Wall: Exterior - Brick on Mtl. Stud** in this case).

1. Invoke the **Wall** tool by choosing it from the **Basics** tab of the **Design Bar**. Alternatively, you can also choose **Modelling > Wall** from the menu bar or type **WA**.
2. Click on the **Type Selector Bar** to display the drop-down list of the wall types. Select the **Basic Wall: Exterior - Brick on Mtl. Stud** wall type.

Modifying Properties of the Exterior Wall

After selecting the wall type, you need to modify the properties of the wall type using the **Element Properties** dialog box. The **default.rte** template file used for this project has two predefined levels: Level 1 and Level 2.

1. Choose the **Element Properties** button located next to the **Type Selector Bar**; the **Element Properties** dialog box is displayed.
2. In the **Element Properties** dialog box, the **Location Line** parameter has **Wall Centerline** as the default value. Click on the field under the **Value** column for the **Top Constraint** instance parameter. Select **Up to Level: Level 2** from this drop-down list, as shown in Figure 3-26. Exit the dialog box by choosing the **OK** button to return to the interface screen.

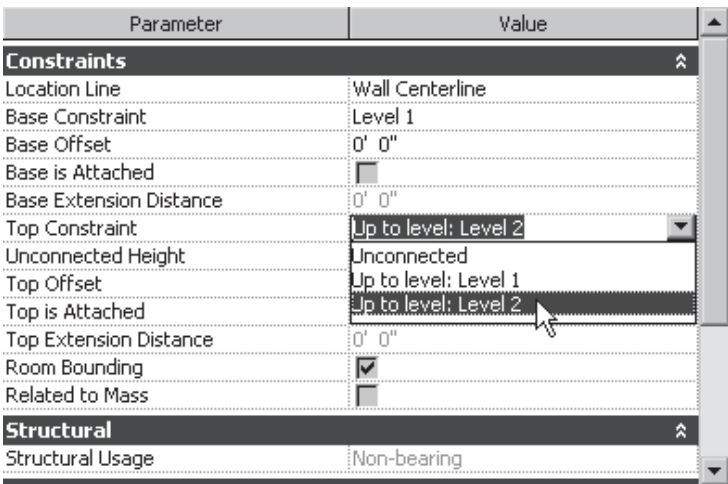


Figure 3-26 Setting the **Top Constraint** parameter using the **Element Properties** dialog box

Sketching the First Exterior Wall Segment

To sketch a wall, select the appropriate sketching tool from the **Options Bar**. The exterior walls of the given sketch of the Apartment 1 project can be created using the **Rectangle** option. You will, however, use the **Line** option to learn and understand the usage of various parameters for sketching the straight walls.

1. Notice that in the **Options Bar**, the **Line** tool is selected by default.
2. Move the cursor in the drawing window. To specify the start point of the first wall segment, click between the four inward arrow keys. Move the cursor toward the right hand side. Notice that a wall segment starts from the specified point and a temporary dimension appears, which changes dynamically as you move the cursor. This shows the length of the wall segment at any given location of the cursor.

3. Choose **View > Zoom > Zoom-in-Region** from the menu bar or type **ZR** and zoom into the area to get a closer view of the sketched wall segment, as shown in Figure 3-27 (for zooming techniques, see Chapter 1- Introduction to Autodesk Revit Architecture 2009) Notice that the cursor moves in incremental values set in the **Snap** option. The angle subtended by the wall on the horizontal axis is also visible and keeps changing dynamically as you stretch the wall with the cursor.

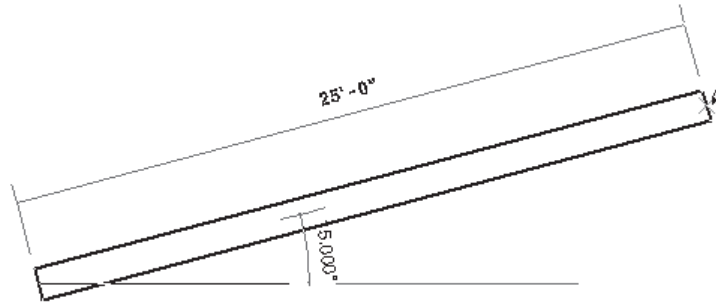


Figure 3-27 The angle and temporary dimensions are displayed on the wall being sketched

4. Move the cursor near the horizontal axis so that the dashed line appears inside the wall segment, as shown in Figure 3-28. Notice the two-sided arrow attached to the endpoint of the wall. This indicates that the wall segment being sketched is horizontal. A tooltip indicating the horizontal alignment is also displayed.

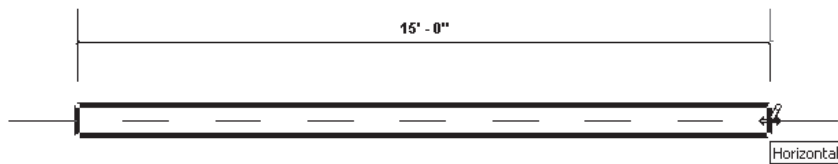


Figure 3-28 Sketching a horizontal wall segment

5. Move the cursor to the right until the temporary dimension shows the value to be more than 40'0". Click at this location as the endpoint of the wall segment. The created wall shows its temporary dimension, a dimension symbol, and a twin-arrow symbol, as shown in Figure 3-29.

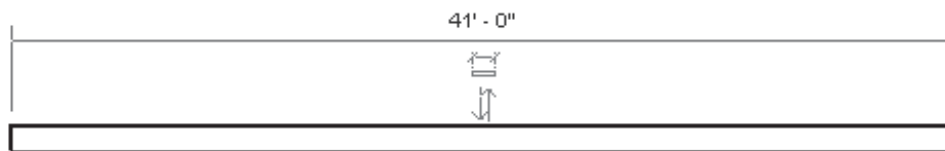


Figure 3-29 The sketched horizontal wall with its controls

**Note**

You can create a wall of exactly 40'0" length using the dimension snaps set in the **Snaps** dialog box. The only purpose of creating a wall more than the desired length in this step is to explain how to modify the length of the sketched wall to the exact value.

Modifying the Length of the Sketched Exterior Wall

You will now modify the length of the sketched wall to the actual dimension, as given in the Apartment 1 sketch.

1. Click on the temporary dimension. An edit box appears showing the current dimension of the wall segment. Enter **40'0"** in the edit box, as shown in Figure 3-30. The wall length is modified to 40'0". Notice that the cursor still in the shape of a pencil, indicates that the **Wall** tool is still active. To exit this tool, press the ESC key twice. You will return to the **Modify** tool (default mode).

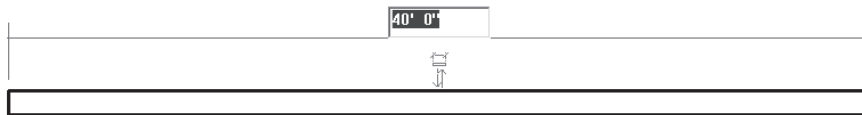
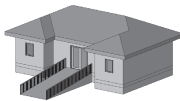


Figure 3-30 Modifying the length of a wall segment using temporary dimensions



Tip: To exit the current tool, invoke any other tool or right-click and choose **Cancel** from the shortcut menu to discontinue it.

**Note**

The **Project browser** shows **Level 1** in bold letters. This indicates that the wall is sketched in that level.

2. With the **Modify** tool active (default mode), select the wall by clicking it. The wall segment is highlighted in red color and its dimension, a dimension symbol, a twin arrow symbol and two blue dots at the endpoint of the wall are displayed in the drawing area. The dimension symbol is used to convert this temporary dimension into a permanent dimension.

**Note**

By default, the exterior face of the walls drawn from the left to right is on the upper face and for those drawn from the top to bottom on the right face. Similarly, the exterior face of the walls drawn from the right to left is on the lower face, and for those drawn from the bottom to top on the left side. Hence, you can minimize the use of the flip tool by sketching the walls in the appropriate direction.

Sketching the Second Exterior Wall Segment

The second exterior wall segment will be sketched using the endpoint object snap tool.

1. Invoke the **Wall** tool from the **Design Bar** and bring the cursor close to the right end point of the first wall segment. When the cursor shows a square box at the endpoint (indicating the **Endpoint** object snap), as shown in Figure 3-31, click to specify the start point of the second wall segment.



Figure 3-31 Starting a second exterior wall segment using the **Endpoint** object snap option

2. As you move the cursor, a dynamic wall starts with one end attached to the specified point and the other attached to the cursor. Move the cursor vertically downward so that you see a dashed vertical line inside the wall segment. Now enter **20'0"** as the value of the length; an edit box is displayed with the dimension you have entered, as shown in Figure 3-32. Press ENTER; the second wall segment is sketched to exactly 20'0" length. Notice that the intersection of the first and the second wall segment has been intuitively filled or completed.



Figure 3-32 Creating the second exterior wall segment

3. To draw the third wall segment, use the **Chain** option. Enable it by selecting the **Chain** check box from the **Options Bar**.
4. Move the cursor close to the endpoint of the second wall segment and click when the endpoint object snap is displayed. The third wall segment starts from this specified point. Move the cursor horizontally towards the left. Now, hold the SHIFT key while moving the cursor.

Notice that the cursor can now move only in the orthogonal directions i.e. horizontal and vertical directions. When the length of the wall segment is around 40'0", a vertical

dashed line originates from the start point of the first wall segment. The alignment line shows the point on the third wall segment that is in plumb with the first point. An intersection snap symbol indicated by an X appears at this point, as shown in Figure 3-33.

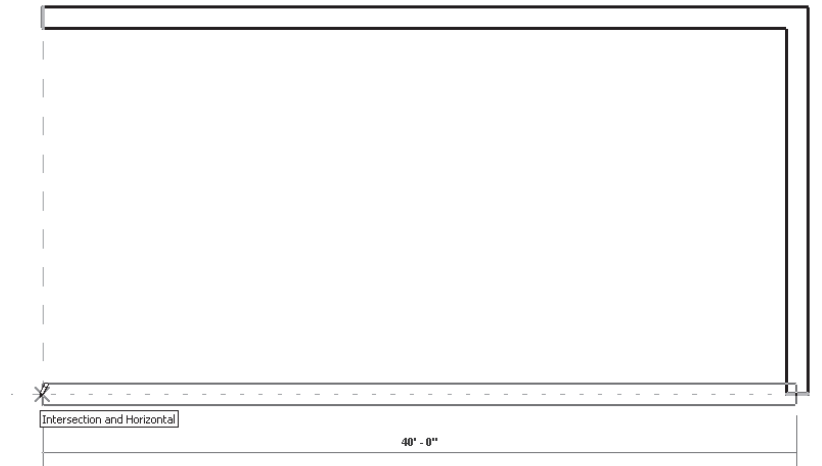


Figure 3-33 Creating the third wall segment

5. Click when the intersection snap symbol is displayed to specify the location of the endpoint of the third wall segment.
6. You have enabled the **Chain** option and so the next wall segment automatically starts from the last specified point. Hold the SHIFT key and move the cursor vertically upward. Enter **25'0"** to create a vertical wall segment, as shown in Figure 3-34. The fourth wall segment is created, as shown in Figure 3-34.

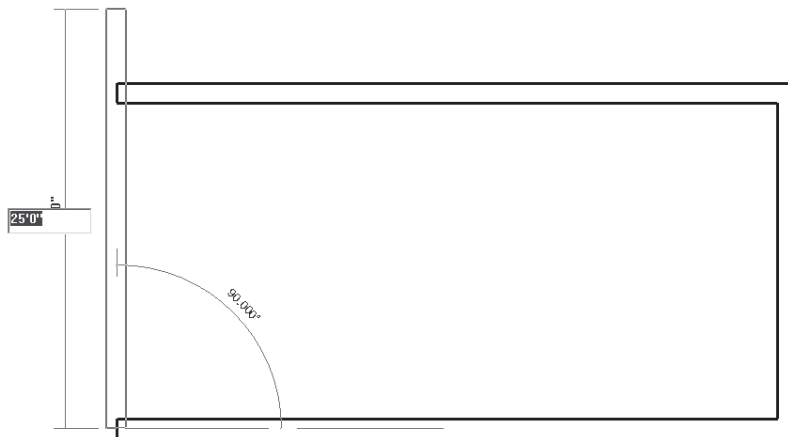


Figure 3-34 Sketching the fourth exterior wall segment

**Note**

The only purpose of creating a wall of more than the desired length in this step is to explain how to stretch the wall to the exact length.

7. Press ESC twice to exit the **Wall** tool.

Stretching the Wall Segment

You will now stretch the wall segment to reduce its length to the desired dimension by using the drag controls.

1. With **Modify** as the selected option (default), select the fourth wall segment to display its controls. The two blue dots at its two endpoints are the drag controls. Move the cursor near the upper dot. The drag control now shows a square symbol, as shown in Figure 3-35. Press and hold the left mouse button at this point and drag the cursor vertically downward and bring it close to the start point of the first wall segment. The endpoint object snap is displayed and the tooltip shows **Endpoint and Vertical**.

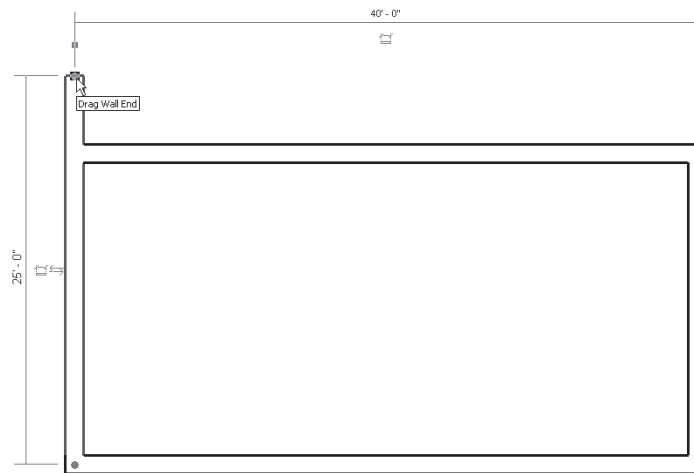


Figure 3-35 Using the drag control to modify the length of wall

2. Release the left mouse button at the intersection point to reduce the length of the fourth wall segment. The first and fourth wall segments are joined at the corner with their ends completed. The external wall profile is completed at the edge, as shown in Figure 3-36.
3. Choose **File > Save** from the menu bar to save the project and then choose **File > Close** from the menu bar to close the project.

This completes the creation of the external wall segments for the *Apartment 1* project.

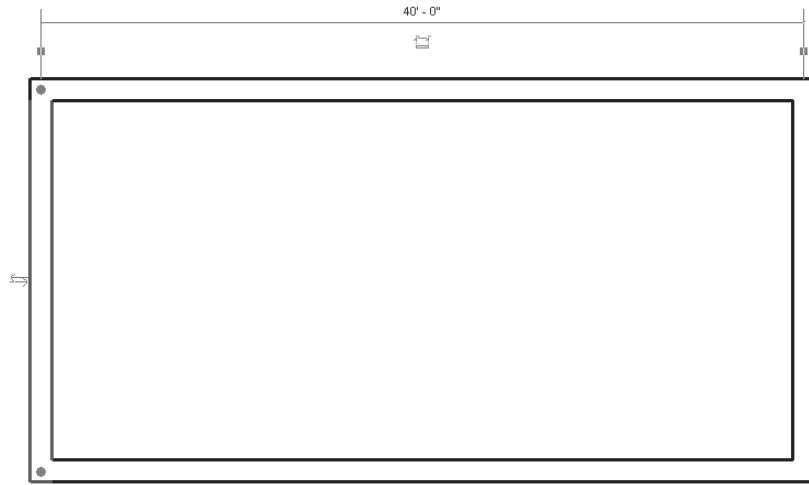


Figure 3-36 The completed exterior wall profile

Tutorial 2

Club

Create the exterior walls of the club building whose profile is shown in Figure 3-37. The given dimensions are measured from the exterior faces and are not to be created. The parameters to be used for different elements are given next. **(Expected time: 30 min)**

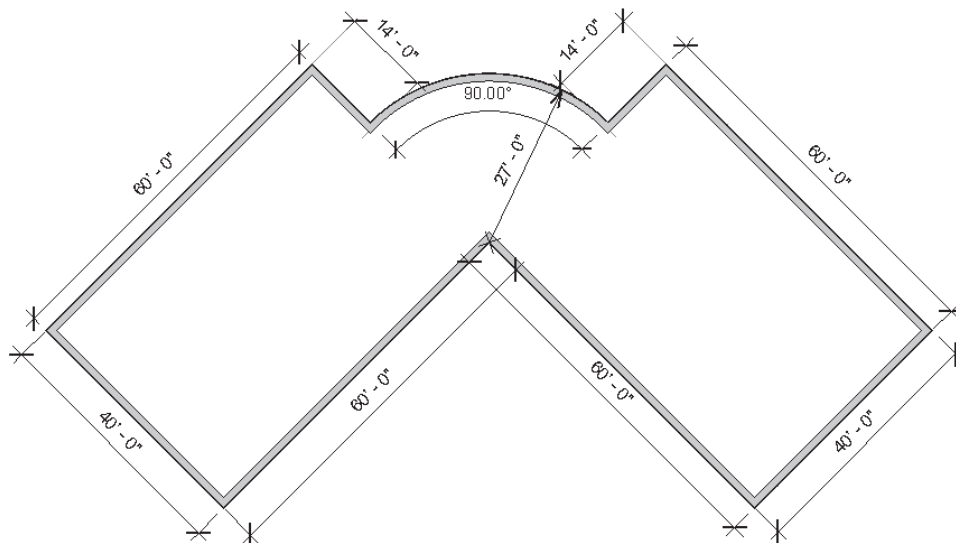


Figure 3-37 Sketch plan for the Club project

1. Project- *Club.rvt* project created in Tutorial 2 of Chapter 2.
2. Exterior wall type- **Basic Wall: Exterior - Brick and CMU on Mtl. Stud.**
3. Unconnected height of walls- **15'0"**.
4. All inclined walls are at 45-degree to the horizontal axis.

The following steps are required to complete this tutorial:

- a. Open the *Club.rvt* project file created in Tutorial 2 of Chapter 2.
- b. Invoke the **Wall** tool.
- c. Select the exterior wall type **Basic Wall: Exterior- CMU on Mtl. Stud.**
- d. Set the unconnected height to **15'0"**.
- e. Change the **Location Line** parameter to **Finish Face: Exterior**, refer to Figure 3-38.
- f. Select the **Line** sketching option and sketch the inclined wall profile using the **Chain** option, refer to Figures 3-39 through 3-45.
- g. Use the **Arc from center and end points** sketching option to create the curved wall, refer to Figures 3-46 and 3-47.

Opening the Project

1. Choose **File > Open** from the menu bar and open the *Club.rvt* project file created in Tutorial 2 of Chapter 2 using the **Open** dialog box.

Invoking the Wall Tool and Selecting the Wall Type

First, you will invoke the **Wall** tool and select the specified exterior wall type **Basic Wall: Exterior - CMU on Mtl. Stud.**, as given in the project parameters.

1. Invoke the **Wall** tool from the **Basics** tab in the **Design Bar**. Alternatively, you can choose **Modelling > Wall** menu bar or type **WA**.
2. Click on the **Type Selector Bar** to display the available drop-down menu of the wall types. Select **Basic Wall: Exterior - CMU on Mtl. Stud** from the list.

Modifying Properties of the Exterior Wall

Next, you will use the **Element Properties** dialog box to modify the unconnected height to 15'0". The dimensions given in the sketch are exterior wall face dimensions and so you will set the location line parameter to **Finish Face: Exterior**.

1. Choose the **Element Properties** button located next to the **Type Selector Bar**. The **Element Properties** dialog box is displayed. In the **Value** column for the **Unconnected height** parameter, replace the current value by entering **15'0"**.
2. Click in the **Value** column of the **Location Line** parameter and choose the **Finished Face: Exterior** option, as shown in Figure 3-38. Choose the **OK** button to close the dialog box and return to the interface screen.

Parameter	Value
Constraints	
Location Line	Finish Face: Exterior
Base Constraint	Wall Centerline
Base Offset	Core Centerline
Base is Attached	Finish Face: Exterior
Base Extension Distance	Finish Face: Interior
Top Constraint	Core Face: Exterior
Unconnected Height	Core Face: Interior
Top Offset	0' 0"
Top is Attached	<input type="checkbox"/>
Top Extension Distance	0' 0"
Room Bounding	<input checked="" type="checkbox"/>
Related to Mass	<input type="checkbox"/>
Structural	
Structural Usage	Non-bearing

Figure 3-38 Setting the location line parameter in the **Instance Properties** table of the **Element Properties** dialog box

Sketching the Inclined Exterior Walls

Start creating the exterior wall profile by sketching the inclined walls first in a sequence such that the exterior face of the wall is on the external side. You will use the **Chain** option to sketch the continuous wall profile. Once you create the first inclined wall, the other parallel and perpendicular walls can easily be created using the alignment lines and different object snaps options.

1. To create the straight wall, choose the **Line** tool from the **Options Bar**.
2. In the **Options Bar**, enable the **Chain** option by selecting its check box.
3. To start sketching the first inclined wall segment, click inside the four arrow keys in the drawing window and move the cursor upward toward the right.
4. Move the cursor to an inclination such that the angle subtended to the horizontal axis is 45 degrees.
5. Enter the value **14'0"** to specify the length of the first wall segment. The value is displayed in the edit box, as shown in Figure 3-39. This creates the first wall segment of the desired length.
6. The **Chain** option is enabled and so the second wall segment starts from the last specified point. Move the cursor downward towards the right such that the perpendicular object snap symbol appears, Enter **60'0"** as the value, see Figure 3-40. The wall perpendicular to the first inclined wall is created.

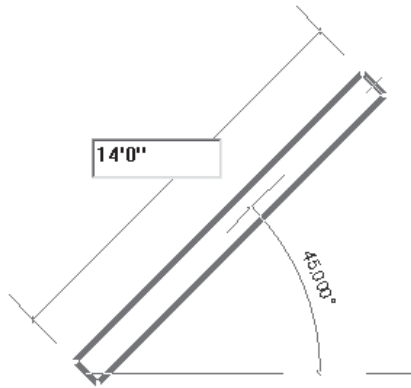


Figure 3-39 Sketching the first inclined wall segment

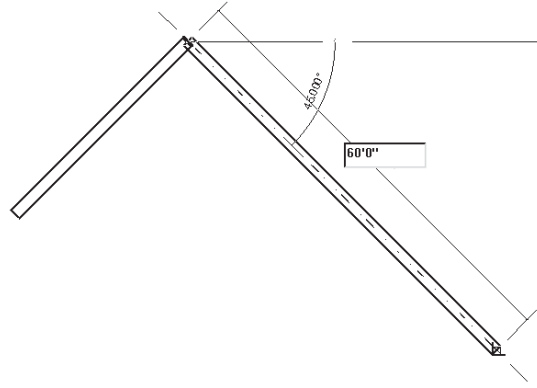


Figure 3-40 Sketching the second inclined wall segment

7. Move the cursor downward to the left until the perpendicular object snap appears. Move the cursor in that direction and click when the temporary dimension value displays 40'0", as shown in Figure 3-41. The third inclined wall is created.
8. To create the next wall, move the cursor upward to the left until the perpendicular object snap appears. When the temporary dimension value displays 60'0", click to create the inclined wall segment, as shown in Figure 3-42.

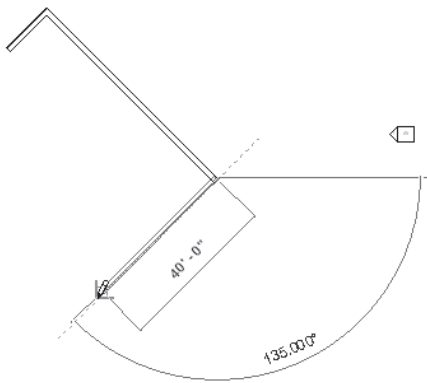


Figure 3-41 Sketching the third inclined wall segment

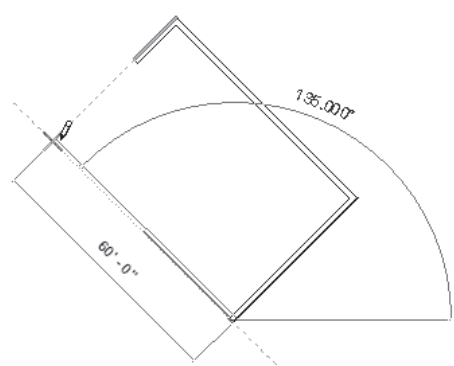


Figure 3-42 Sketching the fourth inclined wall segment

9. Similarly, create the fifth inclined wall segment of 60'0" length, as shown in Figure 3-43.
10. Next, create the connected wall segment of 40'0" length, as shown in Figure 3-44.

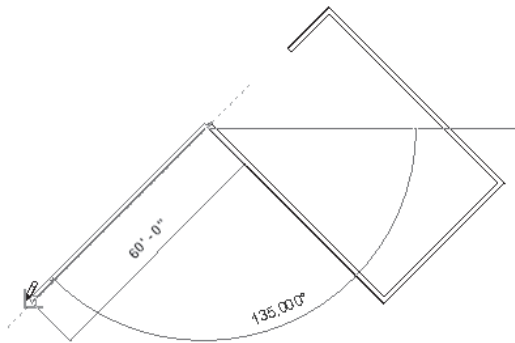


Figure 3-43 Sketching the fifth inclined wall segment

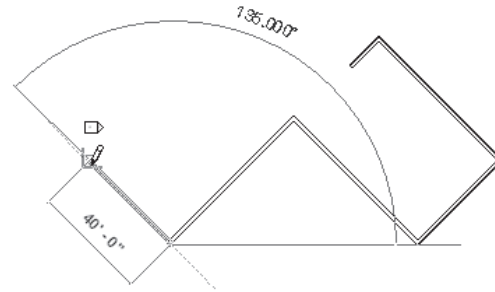


Figure 3-44 Sketching the sixth inclined wall segment

11. Similarly, create the next two wall segments of 60'-0" and 14'-0" length to complete the inclined wall exterior profile, as given in the sketch plan and shown in Figure 3-45.

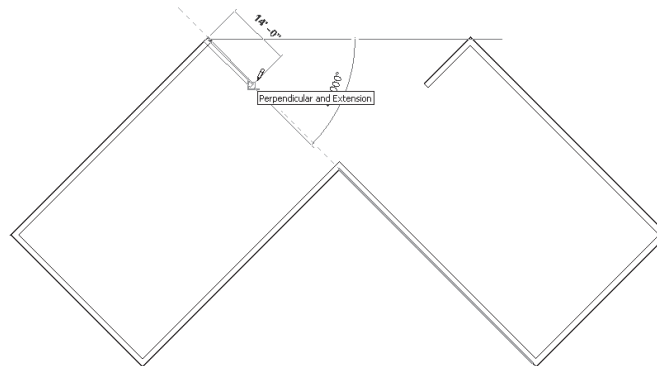


Figure 3-45 Sketching the inclined exterior walls using the **Chain** option

12. Press the ESC key to discontinue the wall at this point.

Sketching the Curved Exterior Wall

Next, you will sketch the curved exterior wall profile based on the given parameters. Use the **Arc from center and end points** tool to create the curved wall segment.

1. From the **Options Bar**, choose the **Arc from center and end points** sketching option. Move the cursor in the drawing window and click on the outer intersection of the inclined walls to specify the center of the curved wall.
2. Move the cursor near the endpoint of the last sketched inclined wall segment. When 135-degree is displayed as the angular dimension, enter the value **27'-0"** as the radius of

the curved wall, as shown in Figure 3-46. The curved wall with the specified radius is started from the specified point.

3. Move the cursor toward the right and click when the object snap for the intersection of the curved wall and the inclined wall is displayed, as shown in Figure 3-47. The completed exterior wall profile is shown in Figure 3-48.

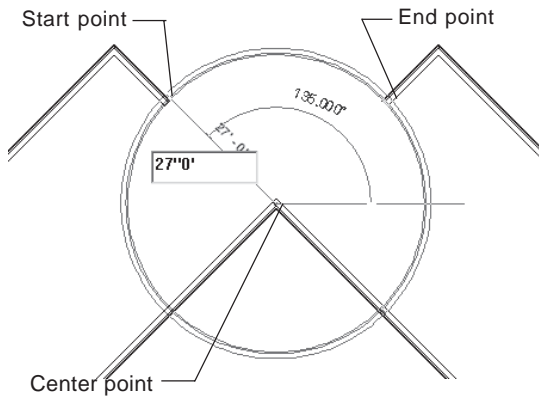


Figure 3-46 Starting the curved wall segment

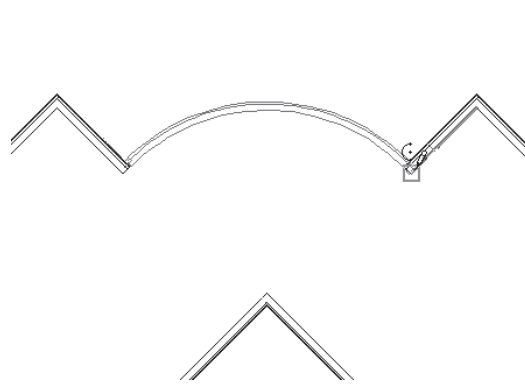


Figure 3-47 Completing the curved wall segment

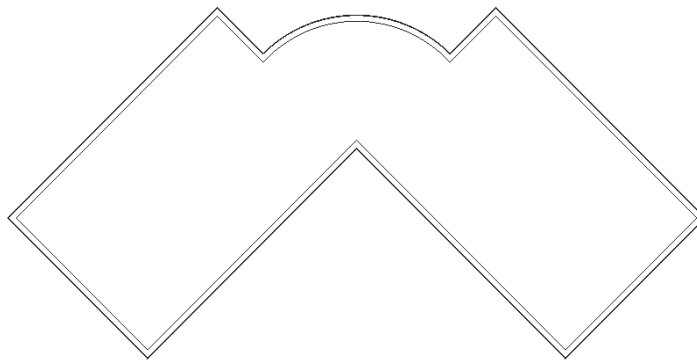


Figure 3-48 Completed layout of the exterior walls for the Club project

4. Choose **View > Shading with Edges** from the menu bar and choose the **3D** button from the **View** toolbar to view the project in 3D, as shown in Figure 3-49.
5. Under the **Floor Plans** head in the **Project browser**, double-click on **Level 1** to return to the plan view.
6. Choose **File > Save** from the menu bar to save the file and then choose **File > Close** from the menu bar to close the project file.

This completes the tutorial for creating the exterior wall profile for the Club project.

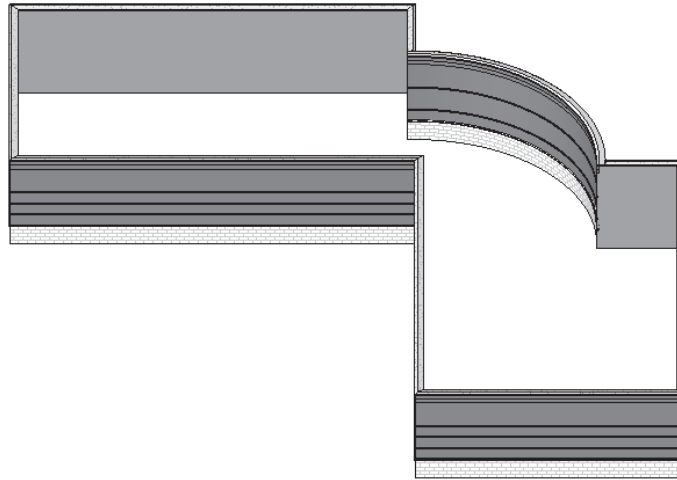


Figure 3-49 3D view of the completed exterior wall profile

Tutorial 3

Apartment 1-Interior Walls

In this tutorial, you will add interior walls to the apartment plan created in Tutorial 1 of this chapter. The interior walls to be created are the intermediate walls among various rooms, as shown in the plan sketch in Figure 3-50. The dimensions and text have been given for reference and are not to be created. The parameters to be used for different elements are given next. **(Expected time: 30 min)**

1. Project- *Apartment 1.rvt* project created in Tutorial 1 in this chapter.
2. Interior wall type- **Basic Wall: Interior - 5" Partition (2-hr)**.
3. Location line parameter- **Wall Centerline**

The following steps are required to complete this tutorial:

- a. Open the *Apartment 1.rvt* project created earlier in this chapter.
- b. Invoke the **Wall** tool and select the **Basic Wall: Interior - 5" Partition (2-hr)**, refer to Figure 3-51.
- c. Set the location line parameter as **Location Line- Wall Centerline**.
- d. Select the **Line** sketching tool to sketch the straight walls.
- e. Sketch the interior walls based on the given parameters, refer to Figures 3-52 through Figure 3-58.
- f. Edit the interior walls location to achieve clear internal distances, refer to Figures 3-59 and Figure 3-60.

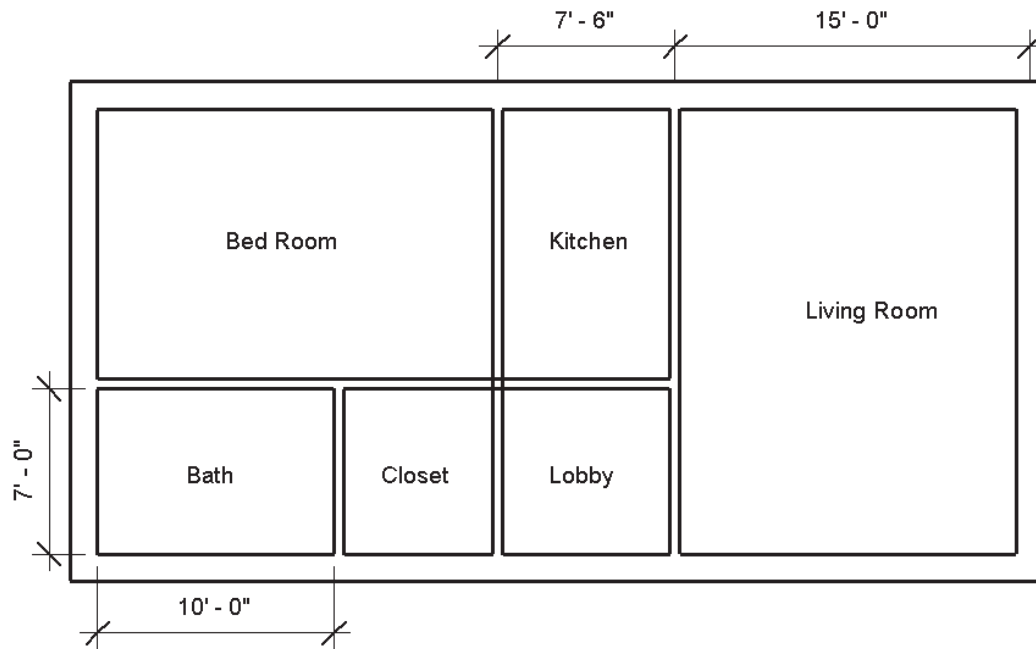


Figure 3-50 Layout of internal walls for Apartment 1 project

Opening the Existing Project and Invoking the Wall Tool

1. Choose **File > Open** from the menu bar to open the *Apartment 1.rvt* project created earlier in this chapter.
2. Invoke the **Wall** tool from the **Basics** tab in the **Design Bar**.

Selecting the Interior Wall Type

1. Click on the **Type Selector Bar** to display the types of walls available in Autodesk Revit Architecture. Select **Basic Wall: Interior - 5" Partition (2 hr)**, as shown in Figure 3-51.
2. Ensure that the **Location Line** parameter in the **Options Bar** shows **Wall centerlines**. Also, ensure that the **Chain** check box is cleared.

Sketching the First Interior Wall

After selecting the interior wall type, start sketching the interior walls. Notice that the **Line** option is selected as the default option for sketching the walls.

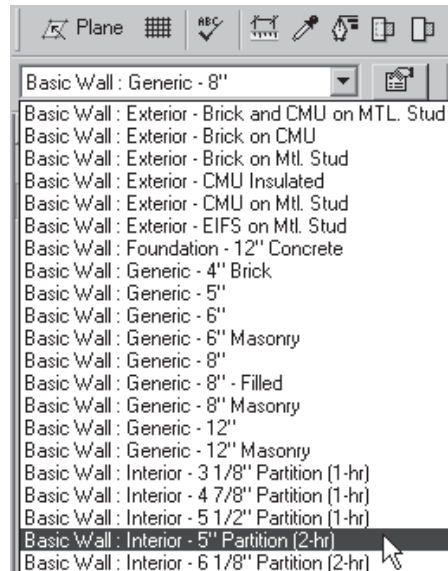


Figure 3-51 Selecting the **Basic Wall : Interior-5"Partition (2hr)** wall type

1. Move the cursor near the top right endpoint of the wall structure. You will notice that a temporary dimension appears and changes dynamically as you move the cursor. This dimension shows the distance of the cursor from the nearest wall segment.
2. Enter **15'0"** from the keyboard, as shown in Figure 3-52, to specify the starting point of the first interior wall.

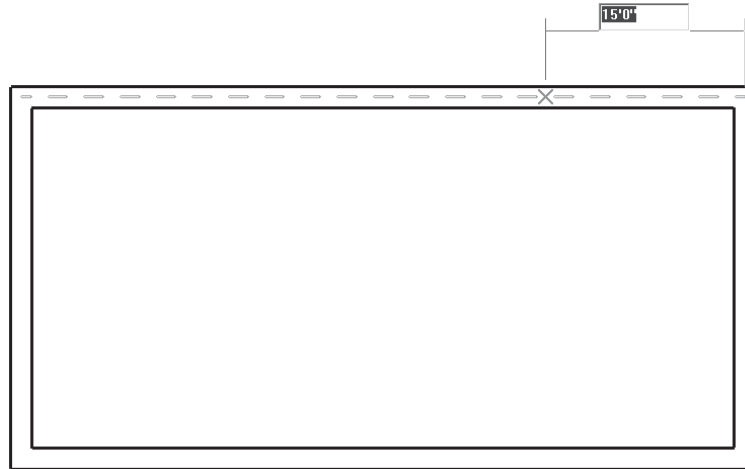


Figure 3-52 Specifying the distance for starting the first interior wall segment

3. Move the cursor vertically downward near the lower exterior wall segment. When the **Vertical and Nearest** symbol appears, as shown in Figure 3-53, click to specify the location of the endpoint of the wall segment. The first interior wall segment is sketched.

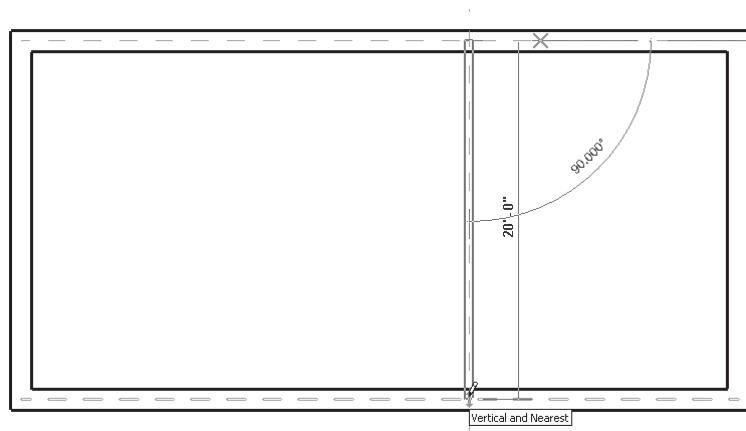


Figure 3-53 Specifying the endpoint of the first interior wall segment

Sketching Other Interior Walls

Similarly, you can sketch the other horizontal and vertical interior walls by specifying their start point and endpoint using different object snap options.

1. To sketch the second interior wall, move the cursor to the upper endpoint of the interior wall and then move the cursor horizontally toward the left. Enter **7'6"**, when the temporary dimension and the intersection object snap appears, as shown in Figure 3-54.

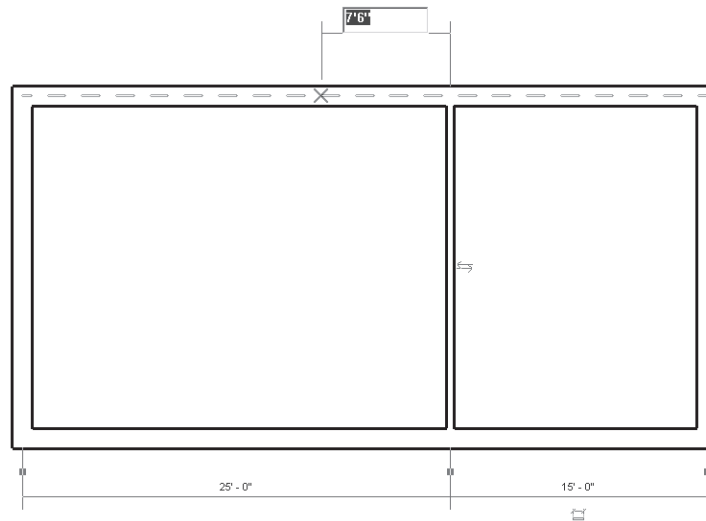


Figure 3-54 Specifying the starting point of the second interior wall

The second wall segment starts from the specified point on the upper horizontal exterior wall.

2. Press SHIFT and move the cursor downward. The cursor moves parallel to the vertical axis. Click near the lower external wall when the **Vertical and Nearest** symbol appears, as shown in Figure 3-55.

Next, you will sketch the interior walls of the bath. Since the internal dimensions have been provided for the interior walls, you will first sketch them using the wall centerlines and later move them to get the exact clearance distance of the bath walls.

3. Move the cursor to the lower left corner and then move it vertically upward. When the temporary dimension appears, enter **7'0"** to select the starting point of the third interior wall, as shown in Figure 3-56.
4. Press SHIFT and move the cursor horizontally towards the right until it reaches the first vertical interior wall. When the **Horizontal and Nearest** object snap symbol appear, click to specify the location of the endpoint of the third interior wall, as shown in Figure 3-57. The wall segment is created.

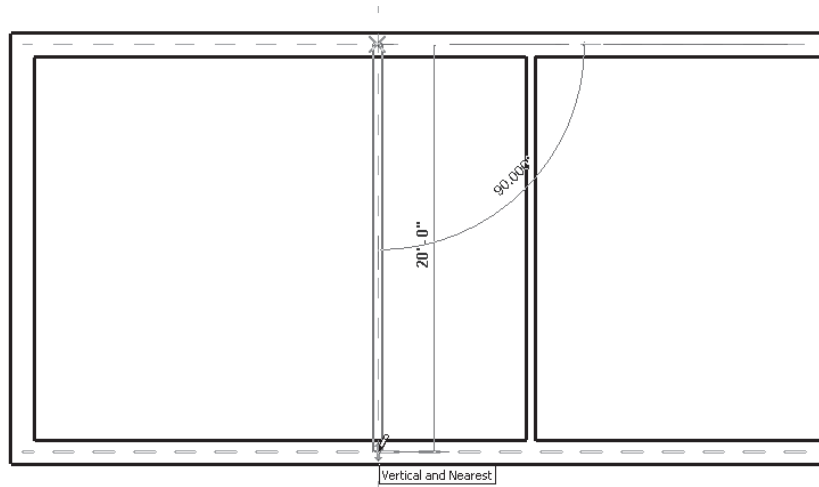


Figure 3-55 Sketching the second interior wall

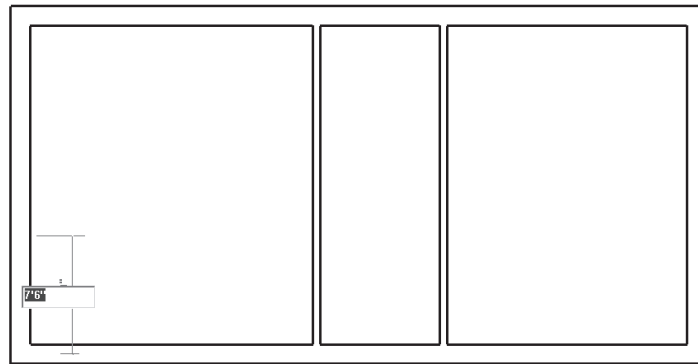


Figure 3-56 Specifying the distance for sketching the third internal wall

5. Similarly, move the cursor near the lower left corner and then move it horizontally toward the right. When the temporary dimension and the intersection object snap appears, enter the value **10'0"**, as shown in Figure 3-58.
6. Press and hold the **SHIFT** key and move the cursor vertically upward until it reaches the horizontal interior wall. Click when the perpendicular object snap appears to specify the endpoint of the wall.

Moving Walls Using Witness Lines

You will notice that the dimension of the bath walls is from the centerline of the external walls. To move the interior walls of the bath such that the internal dimensions are 7'0"X10'0" as specified in the sketch, use the witness lines and specify these dimensions.

1. Choose **Modify** from the **Design Bar** and select the last created interior wall. The selected interior wall shows the centerline distances and its controls.

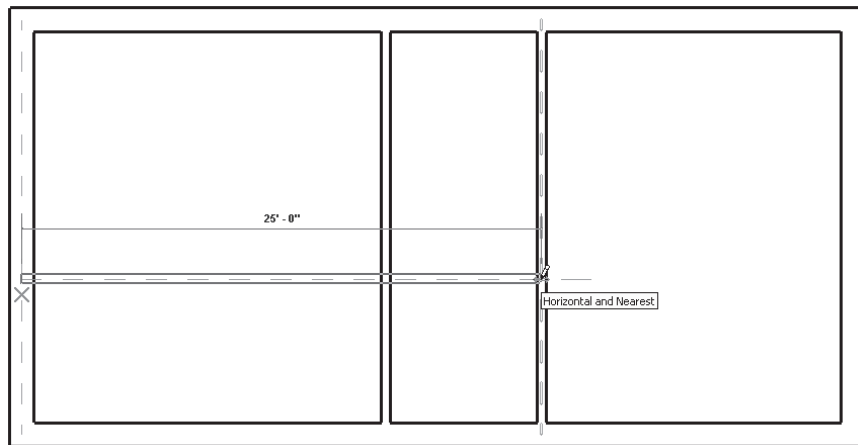


Figure 3-57 Sketching the third interior wall segment

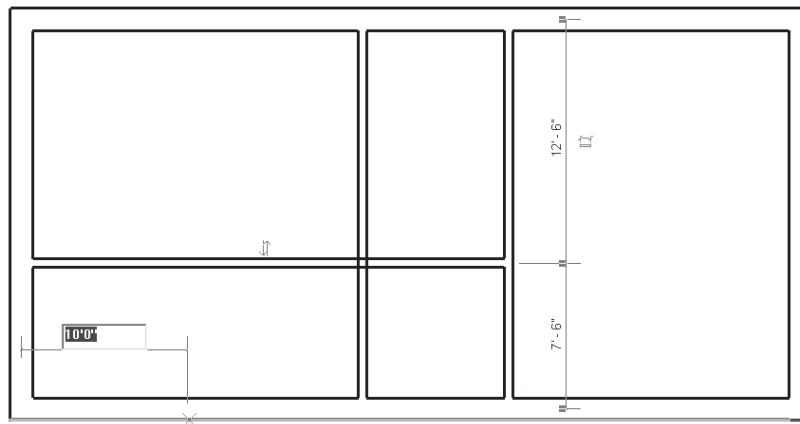


Figure 3-58 Sketching the interior walls of the bath

2. Two blue square dots define the extents of the dimension. Click on the square dot on the left. The dot and dimension witness line moves to the interior face of the exterior wall, as shown in Figure 3-59.
3. Similarly, click on the blue dot on the right twice to move it to the inner face of the third interior wall.
4. Now, click on the temporary dimension and enter the value **10'0"**. The interior wall is moved to the desired distance 10'0" from the interior face of the exterior wall, as shown in Figure 3-60.
5. Similarly, to move the horizontal interior wall of the bath, select it and move both the witness lines toward the inner face by clicking on the blue dots.

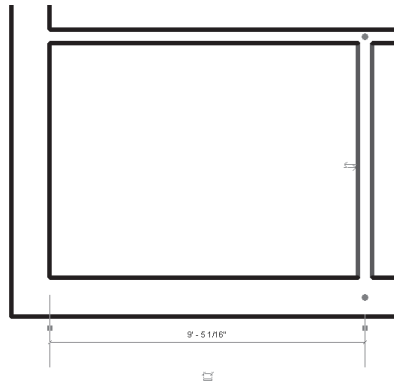


Figure 3-59 Moving the witness lines

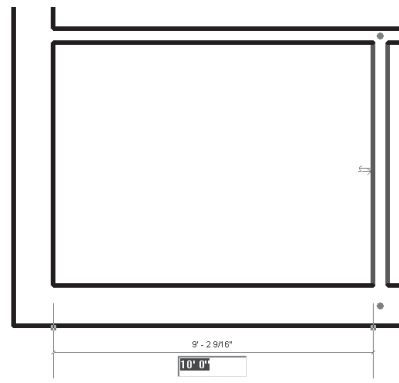


Figure 3-60 Specifying the distance

6. Click on the temporary dimension from the lower external wall and enter the value **7'0"**. The interior wall is moved to the desired location.
7. This completes the interior wall layout for the *Apartment 1* project. The model will look similar to that shown in Figure 3-61.

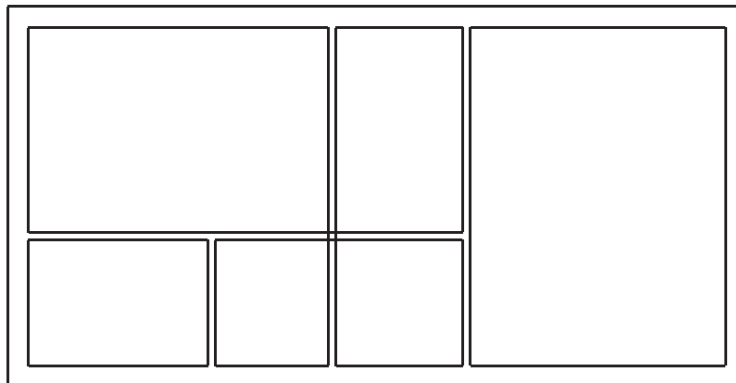


Figure 3-61 Complete building profile of the *Apartment 1* project with the exterior and interior walls

8. To view the building model in 3D, choose the **3D** button in the **View** toolbar. Choose **View > Hidden Lines** from the menu bar. The view is similar to the one shown in Figure 3-62.
9. Choose **File > Save** from the menu bar to save the file.
10. Choose **File > Close** from the menu bar to close the project file.



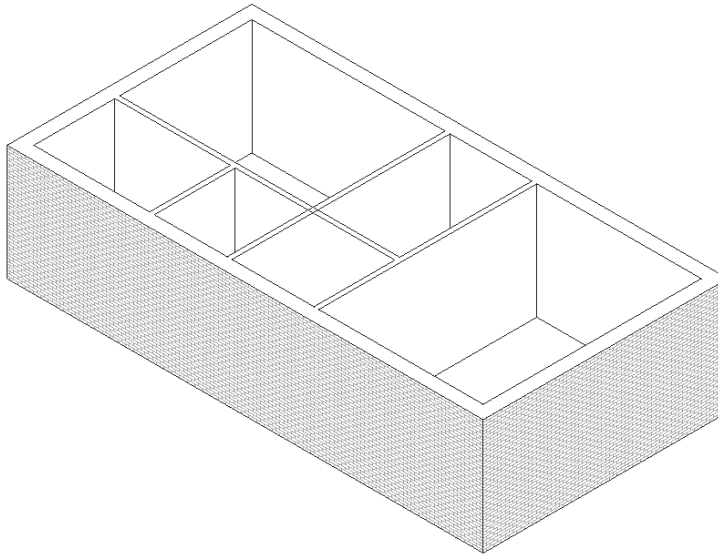


Figure 3-62 3D view of the Apartment 1 building model

Tutorial 4

Club - Interior Walls

Create the interior walls of the left portion of the club building whose exterior wall profile was created in Tutorial 2 earlier in this chapter. It will be based on the sketch plan shown in Figure 3-63. The dimensions are given for the centerlines of the walls and are displayed only for drawing purpose. You do not need to dimension or add text to the building. The parameters to be used for different elements are given below. **(Expected time: 30 min)**

1. Project- *Club.rvt* project created in Tutorial 2 of this Chapter.
2. Interior wall type- **Basic Wall: Interior - 6 1/8" Partition (2-hr)**.
3. Unconnected height of walls- **12'0"**.
4. Location Line- **Wall Centerline**.
5. Inclined walls are parallel to the external walls and perpendicular to each other.

The following steps are required to complete this tutorial:

- a. Open the *Club.rvt* project file created in Tutorial 2 of this Chapter.
- b. Invoke the **Wall** tool.
- c. Select the **Basic Wall: Interior - 6 1/8" Partition (2-hr)** wall type, refer to Figure 3-64.
- d. Set the unconnected height to **12'0"**
- e. Verify that the location line parameter is set to **Wall Centerline**.
- f. Select the **Line** sketching option to create the straight walls.
- g. Sketch the interior walls based on the given parameters, refer to Figures 3-65 through 3-71.

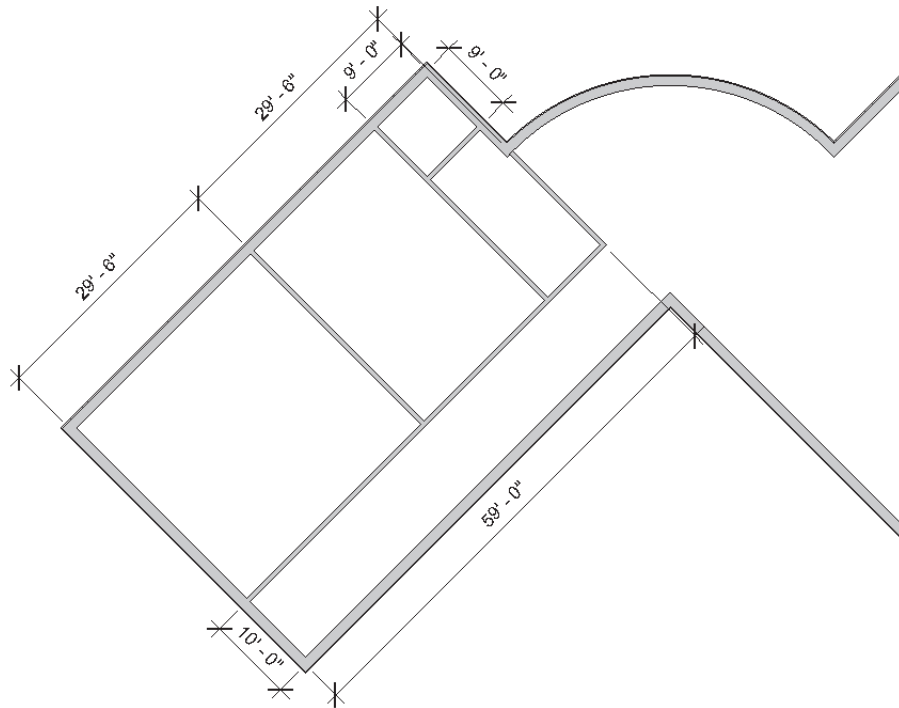


Figure 3-63 Sketch plan for creating the interior wall of the left portion of the Club project

Opening the Existing Project and Invoking the Wall Tool

1. Open the *Club.rvt* project using the **File > Open** from the menu bar.
2. Invoke the **Wall** tool from the **Design Bar**.

Choosing the Interior Wall Type

Before creating the interior walls, select the wall type using the **Type Selector Bar**.

1. Click on the **Type Selector Bar** to display the walls available in Autodesk Revit Architecture. Choose **Basic Wall: Interior - 6 1/8" Partition (2-hr)**, as shown in Figure 3-64.
2. Click on the **Element Properties** button. The **Element Properties** dialog box is displayed.

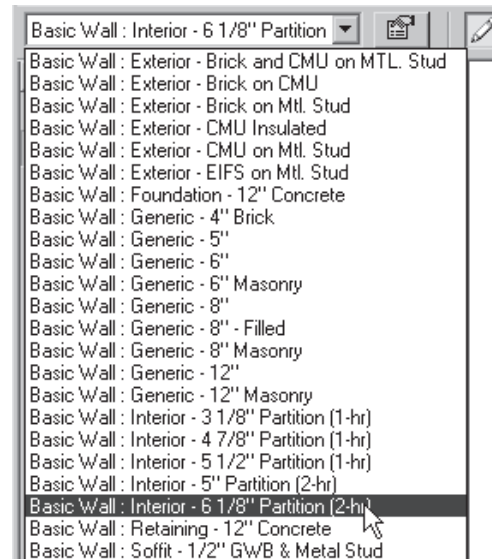


Figure 3-64 Selecting the interior wall type from the **Type Selector Bar**

3. In the **Value** column for the **Unconnected Height** parameter, replace the current value by entering the new value **12'0"**.
4. Choose the **OK** button to close the **Element Properties** dialog box.

Sketching the Interior Walls

The interior walls to be created are straight in nature. Choose the **Line** option to create them.

1. Verify that the **Location Line** parameter in the **Options Bar** is set to **Wall Centerline**.
2. Also, verify that the **Chain** option is unchecked in the **Options Bar**.
3. Move the cursor close to the lower left corner of the building profile. When the temporary dimension appears, enter the value **10'0"** to start the interior wall profile from the specified point, as shown in Figure 3-65.

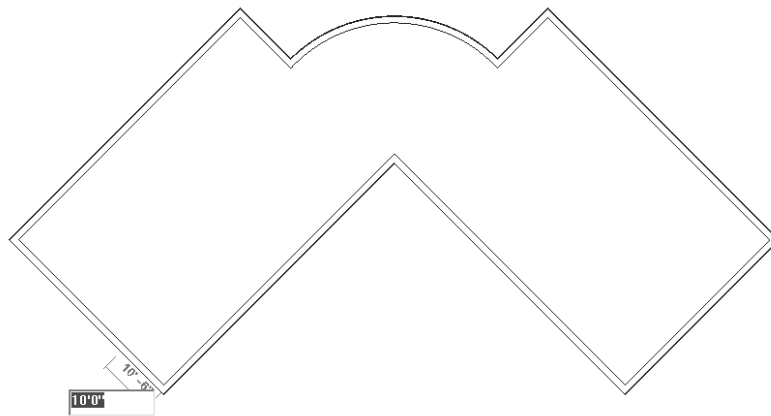


Figure 3-65 Specifying the start point of the first interior wall

4. Move the cursor 45-degree upward to the right. When a dashed line and the perpendicular object snap symbol appear, enter the value **59'0"**, as shown in Figure 3-66.
5. Start the next wall from the endpoint of the last wall by clicking on its endpoint. Moving the cursor upward towards the left until the perpendicular object snap appears, as shown in Figure 3-67. Click to specify the point on the external wall to end the interior wall.
6. Similarly, to start the next interior wall, bring the cursor close to the last created wall. When the temporary dimension appears, enter the value **10'0"** to start the wall.
7. Move the cursor upward towards the left until it reaches the exterior wall and the **Perpendicular and Nearest** object snap is displayed, as shown in Figure 3-68. Click to specify the endpoint of the wall.
8. Create the next wall by moving the cursor close to the last specified point. Next, move it

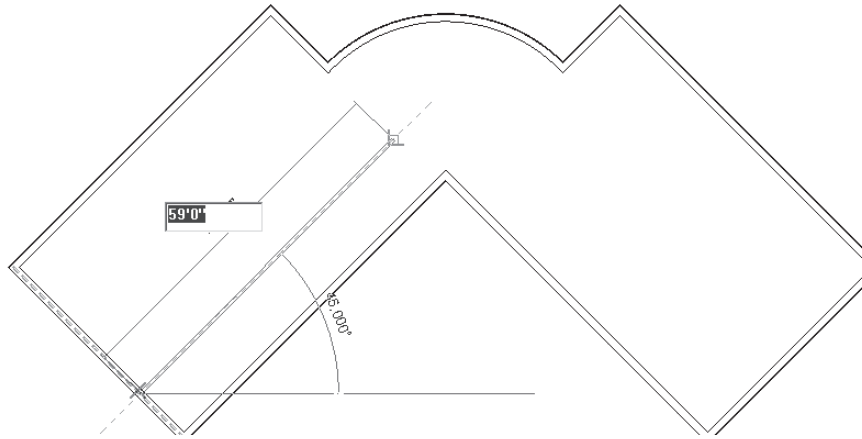


Figure 3-66 *Sketching the first interior wall of the Club project*

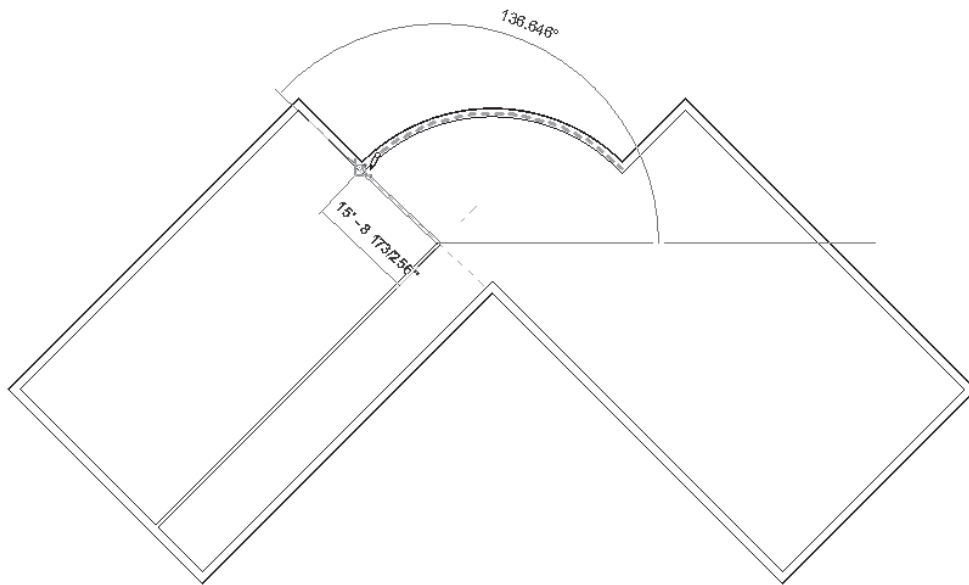


Figure 3-67 *Sketching the second interior wall*

downward towards the right. When the temporary dimension appears, enter the value **9'0"** to start the wall, as shown in Figure 3-69.

9. Move the cursor upward toward the right. Click on the exterior wall when the perpendicular object snap appears to specify the endpoint of the interior wall.
10. To create the next wall, bring the cursor close to the midpoint of the first interior wall until the midpoint object snap appears, as shown in Figure 3-70. Click in the drawing to start the wall.

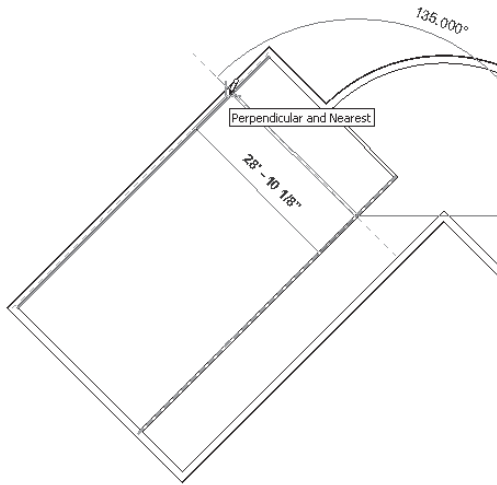


Figure 3-68 Sketching the third interior wall

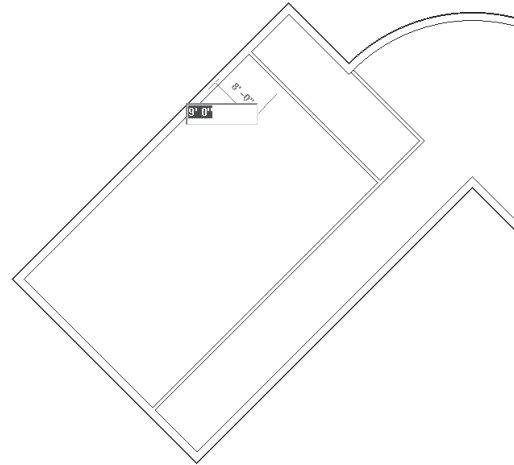


Figure 3-69 Specifying the distance of the fourth interior wall

11. Move the cursor toward the exterior wall and click when the perpendicular object snap appears, as shown in Figure 3-71, click to specify the endpoint and the wall is created. This completes the interior wall layout for the left portion of the Club project.

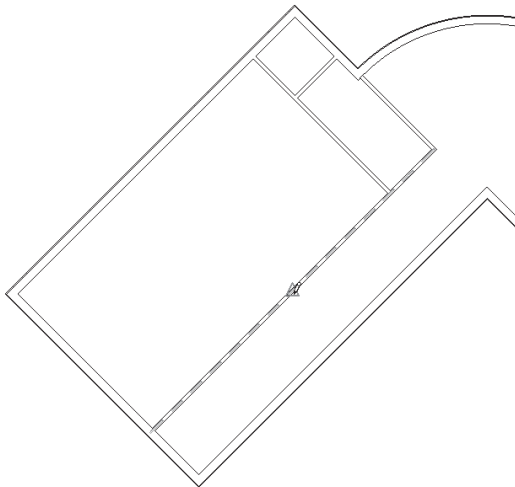


Figure 3-70 Starting the interior wall from the midpoint of the first interior wall

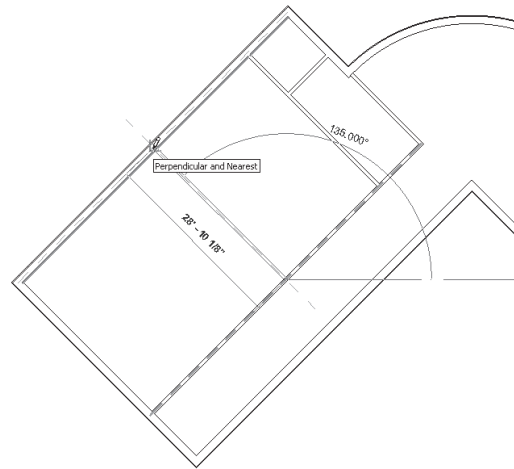


Figure 3-71 Completing the interior walls

12. Choose **File > Save** from the menu bar to save the file.
13. Choose **File > Close** from the menu bar to close the project file.

Self-Evaluation Test

Answer the following questions and then compare them to those given at the end of this chapter:

1. You can modify the instance properties of a wall type in the **Element Properties** dialog box. (T/F)
2. When you modify the instance properties of a wall, the instance properties of all the same wall types used in the project are modified. (T/F)
3. You can create a wall type of your choice by combining various layers. (T/F)
4. By default, when you sketch a wall from left to right, the lower face becomes the external face. (T/F)
5. You cannot modify the angle of an inclined wall after sketching it. (T/F)
6. The _____ dimension appears after you specify the start point of the wall and move the cursor.
7. You can use the _____ option to create a curved wall by specifying the center and the endpoints.
8. The _____ option enables you to sketch continuous wall segments that are connected end to end.
9. To create a wall starting at a specified distance from a point on an existing element, you can use the _____ tool from the **Options Bar**.
10. The required wall type can be selected from the available wall types displayed in the _____ drop-down list.

Review Questions

Answer the following questions:

1. The **Location Line** parameter is an instance property of a wall. (T/F)
2. The value of the **Wall Function** parameter in the **Type Properties** dialog box for an exterior wall is **Exterior**. (T/F)
3. You can add or delete layers of a composite wall type to create a new wall type. (T/F)
4. Once a wall is sketched, its dimension and angle cannot be modified. (T/F)

5. The **Chain** option can be enabled or disabled without exiting the wall tool. (T/F)
6. The usage of the wall can be changed by modifying the value of the **Wall Function** parameter. (T/F)
7. While using the **Wall** tool, if you invoke any other tool, the **Wall** tool is discontinued. (T/F)
8. Which of the following sketching tools can be used to create a straight wall?
- | | |
|----------------------|--|
| a) Lines | b) Circles |
| c) Fillet Arc | d) Arc from center and end points |
9. Which of the following keys can be used to constrain the cursor to move in the orthogonal direction?
- | | |
|--------|----------|
| a) TAB | b) SHIFT |
| c) ALT | d) F3 |
10. Which of the following sketching tools can be used to create a curved wall?
- | | |
|----------------------|---------------------|
| a) Polygon | b) Line |
| c) Fillet Arc | d) Rectangle |

Exercises

Exercise 1

Apartment 2

Create the exterior and interior walls of the *Apartment 2*, based on the Figure 3-72. The thick walls are the exterior walls and the thin walls are the interior walls. The dimensions and texts are not to be added. The project parameters for this exercise are given below.

(Expected time: 30 min)

1. Project File - *Apartment 2.rvt* created in Exercise 1 of Chapter 2.
2. Exterior wall type- **Basic Wall: Exterior - Brick on Mtl. Stud**
3. Interior wall type- **Basic Wall: Interior - 5" Partition (2-hr)**.
4. Height of the wall- **Top Constraint- Upto Level 2**.
5. Location line parameter for the exterior walls- **Wall Centerline**.

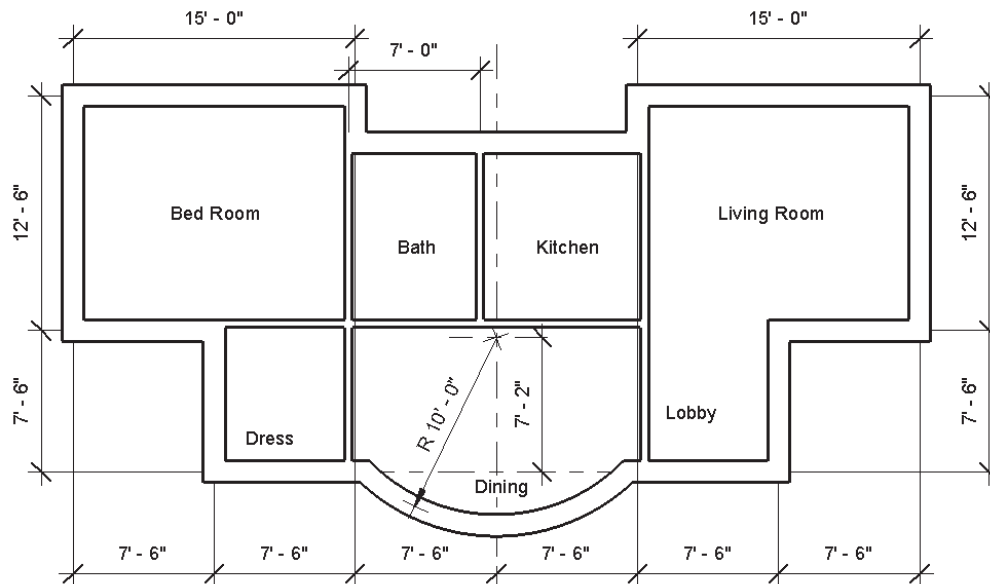


Figure 3-72 The sketch plan for creating the exterior and interior walls for the Apartment 2 project

Exercise 2**Elevator and Stair Lobby**

Create the exterior walls of the *Elevator and Stair Lobby* project, based on the Figure 3-73. Do not add dimensions or texts as they are only for reference. The project parameters for this exercise are given next. **(Expected time: 30 min)**

1. Project File - *Elevator and Stair Lobby.rvt* created in Exercise 2 of Chapter 2.
2. Exterior wall type- **Basic Wall Exterior Brick on Mtl. Stud.**
3. Height of the wall- **Top Constraint- Upto Level 2.**
4. Location line parameter- **Wall Centerline.**

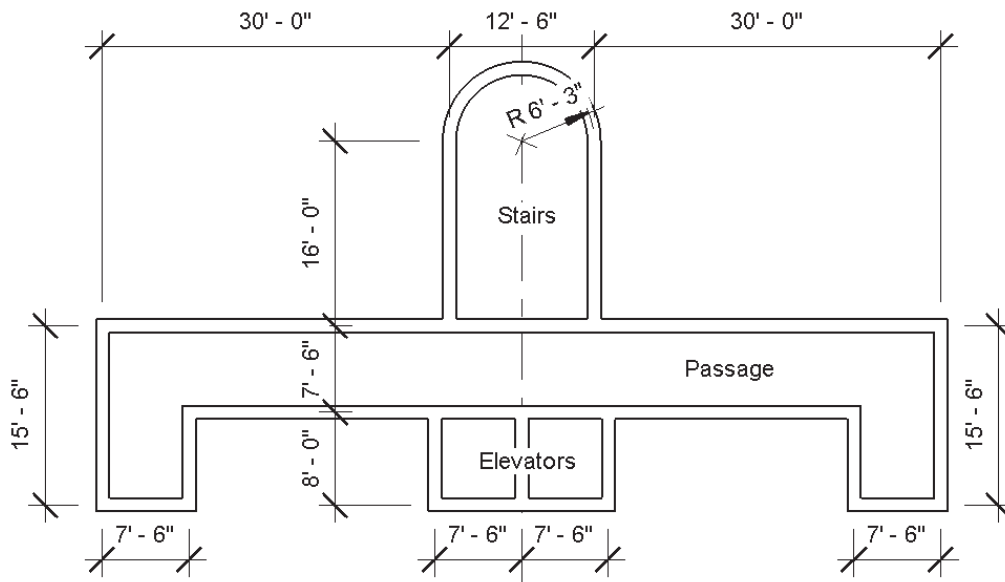


Figure 3-73 Sketch plan for creating the exterior walls for the Elevator and Stair Lobby project

Exercise 3**Club-Interior Walls**

Create the interior walls of Hall 2 of the *Club* project based on Figure 3-74. Do not dimension the sketch as these are only for reference. The project parameters for this exercise are given next. **(Expected time: 30 min)**

1. Project File - *Club.rvt* created in Tutorial 2 of this chapter.
2. Interior wall type- **Basic Wall: Interior - 6 1/8" Partition (2-hr)**.
3. Unconnected height of walls- **12'0"**.
4. Location Line- **Wall Centerline**.
5. Inclined walls are parallel to the external walls and perpendicular to each other.

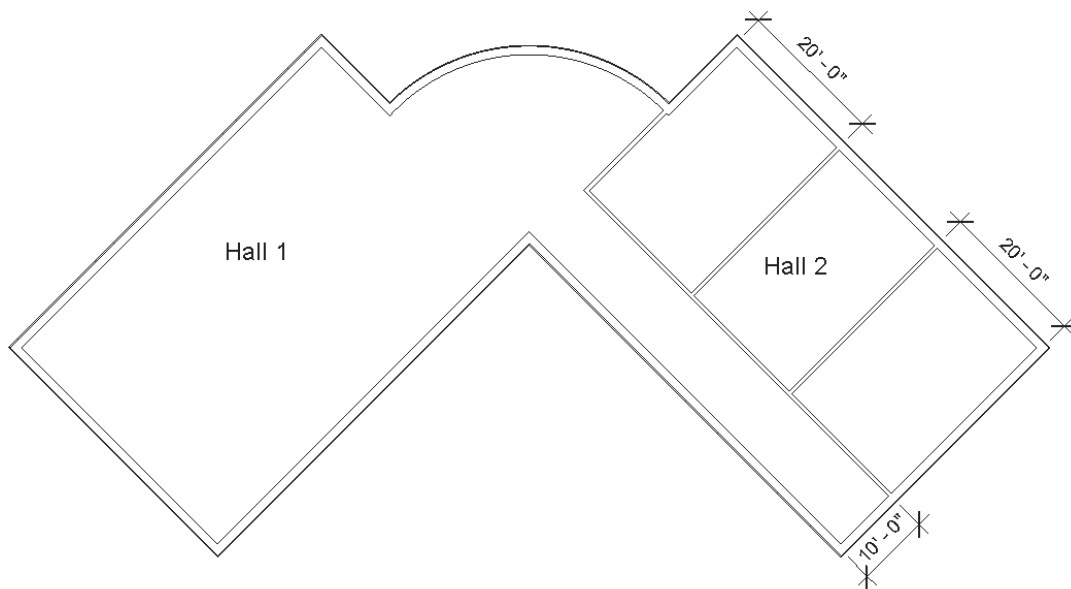


Figure 3-74 Sketch plan for sketching the interior walls of right portion for the *Club* project

Answers to Self-Evaluation Test

1. T, 2. F, 3. T, 4. F, 5. F, 6. Temporary, 7. Arc from center and end points, 8. Chain, 9. Offset, 10. Type Selector Bar