

Lesson 11

INTERIOR DESIGN:

This lesson explores the various “features,” if you will, of a floor plan, such as toilet room layouts (i.e., fixtures and partitions), cabinets and casework (e.g., reception counters and custom cabinets). Additionally, you will look at placing furniture into your project.

Exercise 11-1:

Toilet Room Layouts

Toilet room layouts involve placing water closets (toilets), toilet partitions and sinks. These rooms have many code issues related primarily to handicapped accessibility. These codes vary from state to state (and even city to city).

You will start this exercise by loading several components to be placed into your project.

1. Open ex10-5.rvt and **Save As ex11-1.rvt**.
2. Select **Load Family** from the *Insert* tab and load the following items into the current project:
 - Local Files** (*i.e., on your hard drive*)
 - a. Plumbing\Architectural\Fixtures\Water Closet**Toilet-Comercial-Wall-3D.rfa**
 - b. Plumbing Fixtures\Architectural\Fixtures\Urinals**Urinal-Wall-3D**
 - Online Files** (*i.e., Seek.autodesk.com via the Insert tab*)
 - c. **Sink-Wall-Rectangular**
 - d. **Grab Bar-3D**
 - e. **Toilet Stall-Accessible-Front-Braced-3D**
 - f. **Toilet Stall-Braced-3D**
 - g. **Urinal Screen-3D**

These files represent various families that will be used to design the toilet room. It is possible to create custom families for non-typical conditions.

Figure 11-1.1 shows an example of the various families available for Toilet Stalls on the Autodesk SEEK website.

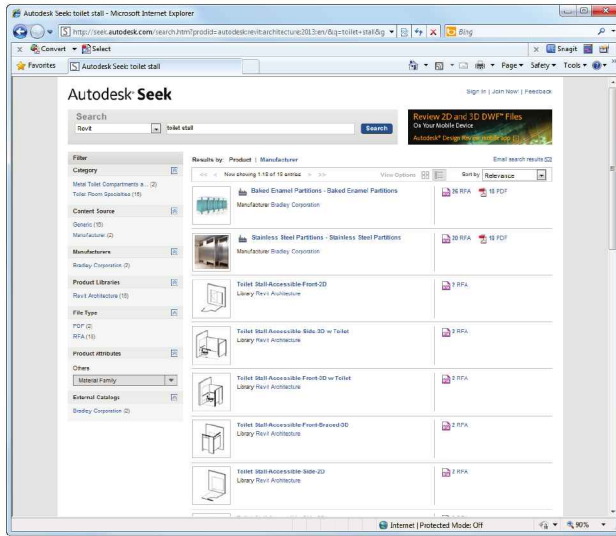


FIGURE 11-1.1 Toilet stalls online

3. Switch to **Level 1** view.

The next step will be to place the toilet stalls.

4. Using the **Component** tool, pick **Toilet Stall-Accessible-Front-Braced-3D: 60" x 60" Clear** from the *Type Selector*.

5. Zoom in to the toilet rooms (North of the elevator).
6. **Place** the toilet stall as shown and then move into place using the **Move** tool and your snaps or the *Align* tool (Figure 11-1.2).

Once you move the toilet stall North, you will have your first stall in place.

Next, you will place two standard size toilet stalls.

7. Place two toilet stalls:
Toilet Stall-Braced-3D:
36" x 60" Clear as shown in Figure 11-1.3.

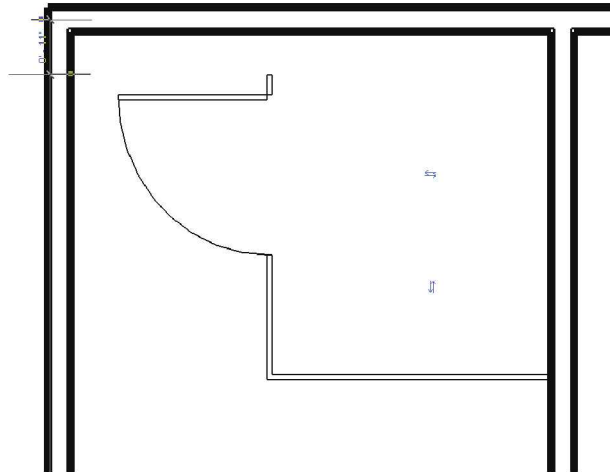


FIGURE 11-1.2 Accessible Toilet stall

As with most projects, you will need to modify the model as you develop the design. In this case we notice that toilets that are back-to-back and stacked on each floor will require a thicker wall to accommodate the fixture brackets (W.C.'s are not hung on the wall by light gauge metal studs) and larger piping. You will make this adjustment next.

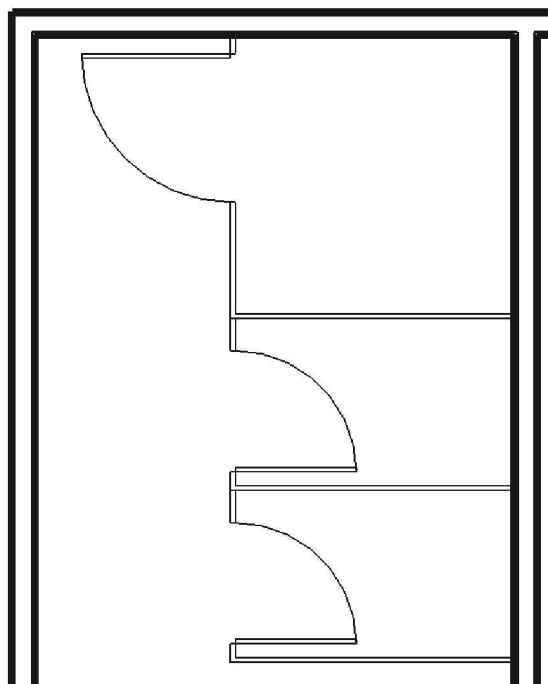


FIGURE 11-1.3 Toilet stalls placed

8. Select the middle wall and the West wall and **Move** them **6"** to the West.

9. **Move** the far East wall (of the two toilet rooms) **6"** to the east.

10. Add an additional **4 $\frac{7}{8}$ "** gyp. bd. wall as shown in **Figure 11-1.4**.

TIP: Make sure wall height and base offset are correct.

11. Modify the North wall of the elevator shaft to have furring and gyp. bd. on the toilet room side.

TIP: Use the wall type you created for the stair shafts.

12. Add the additional components as shown in **Figure 11-1.4**.

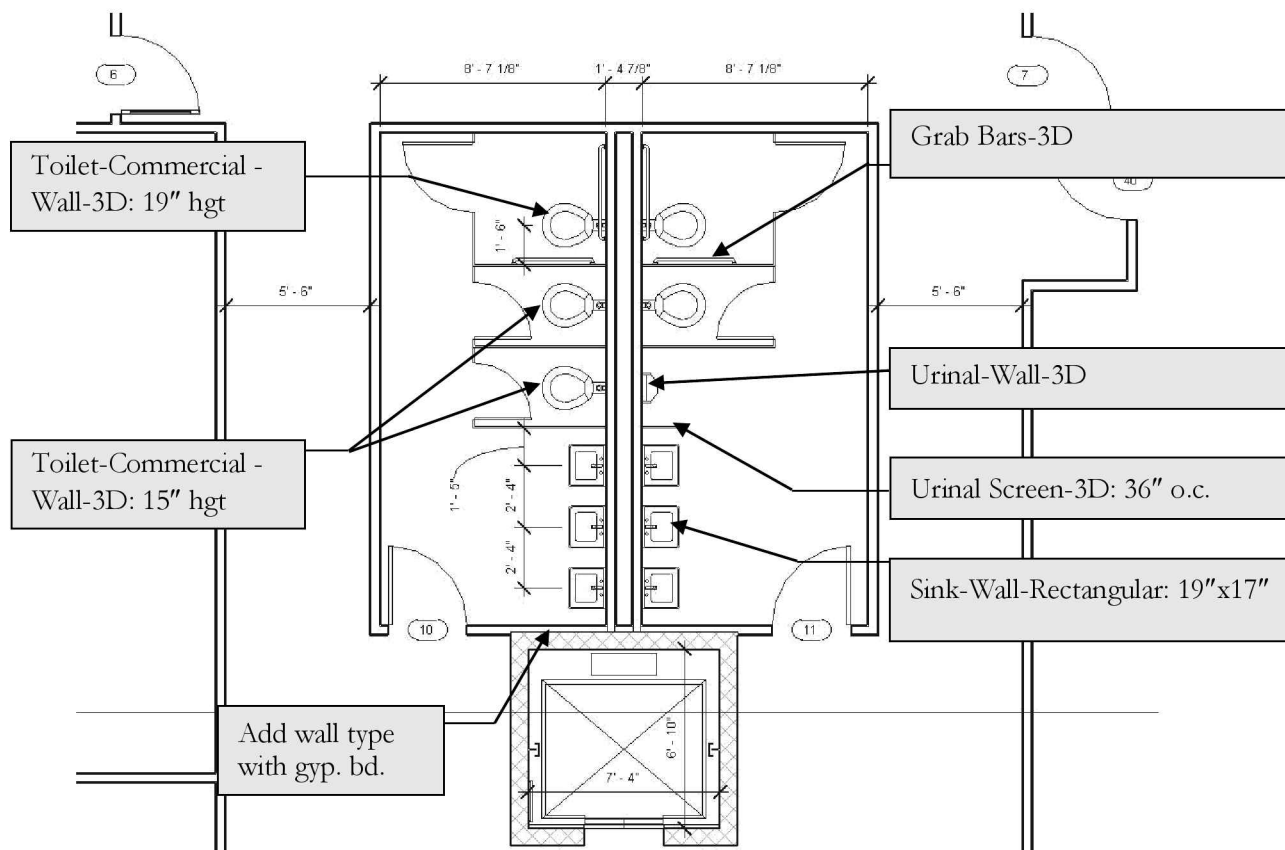


FIGURE 11-1.4 Toilet room layout

As mentioned previously, building codes vary by location. The toilets in the accessible stall area are usually mounted higher than the typical fixtures. When a room has more than one urinal, one is usually required to be mounted lower for accessibility. Another example is that Minnesota requires a separate vertical grab bar above the horizontal grab bar on the wall next to the toilet.

You will now copy the revised walls and toilet room layout to the other levels. The elevator shaft extends through each floor, so you will not have to copy that wall. Looking at the upper levels you can see the revised elevator shaft wall and the old wall layout (Figure 11-1.5). It will be easier to delete the stud walls rather than modify the existing walls.

13. Delete the walls, per **Figure 11-1.6**, for Levels 2 and 3.
14. **Copy** the walls and toilet room layout (for Level 1) to the clipboard and **Paste Aligned** to Levels 2 and 3.

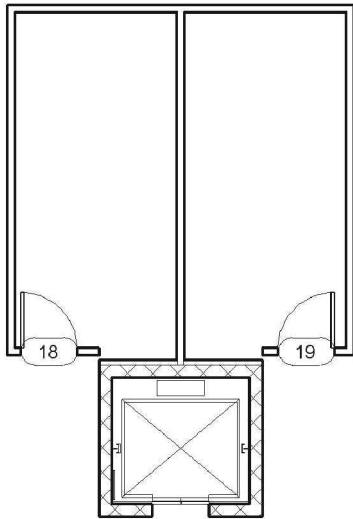


FIGURE 11-1.5 Walls on upper levels

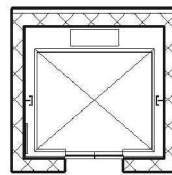


FIGURE 11-1.6 Walls deleted

Interior Elevation View:

Next, you will set up an interior elevation view for the Men's Toilet Room. You will also add a mirror above the sinks in elevation view.

15. Switch to **Level 1** and place an interior **Elevation** tag looking towards the west wall (wall with fixtures on it); see Figure 11-1.7.
16. Rename the new view to **Men's Toilet – Typical** in the *Project Browser*.
17. Switch to the new view. Adjust the *Crop Region* so the concrete slab is not visible. Your view should look like Figure 11-1.8.

You may see the building section reference as shown in Figure 11-1.8. This would not typically be shown in an interior elevation view, especially because it does not intersect the elevation view. You will remove the reference in the next step. You cannot simply delete it because that will remove it from all views and delete the section.

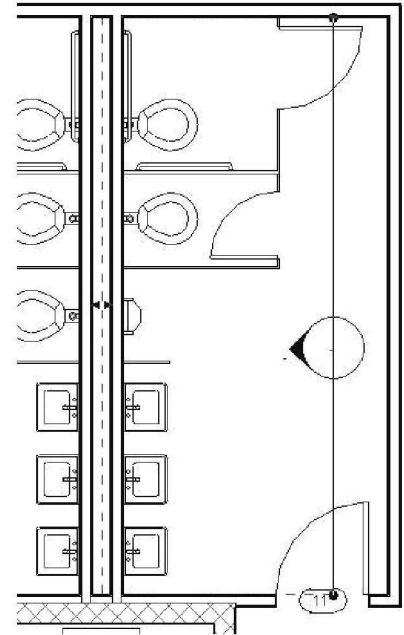


FIGURE 11-1.7 Elevation tag added

18. If you see the building section tag, click on the section reference to select it and then right-click and pick **Hide in View → Elements** from the pop-up menu (Figure 11-1.9).

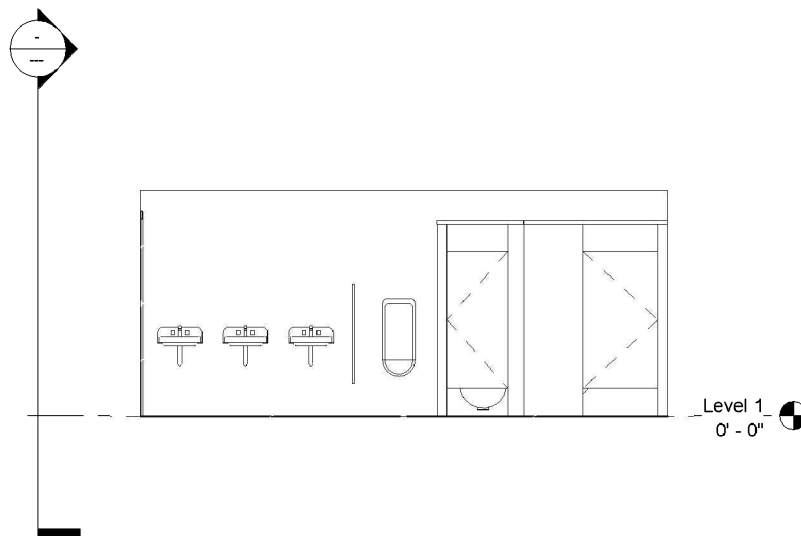


FIGURE 11-1.8 Men's Toilet – Typical view

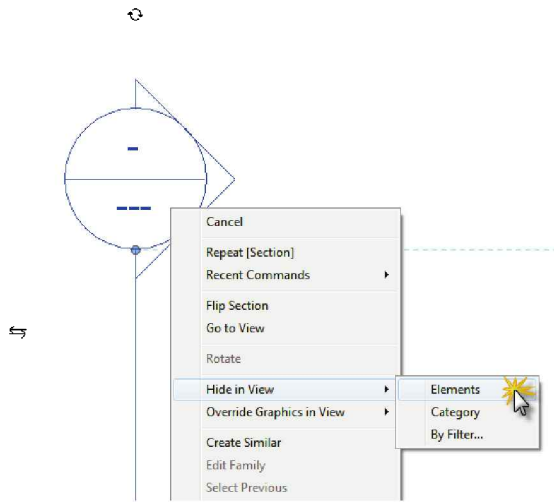


FIGURE 11-1.9 Hide annotation

19. Load component *Specialty Equipment\Toilet Room Specialties\Mirror.rfa* from the Online Revit library.
20. While in the interior elevation view, place a **72" x 48" Mirror** on the wall above the sinks. Use the *Align* tool to align the mirror with the middle sink (Figure 11-1.10).
21. Add the notes and dimensions shown in Figure 11-1.10. Adjust the heights and locations of the fixtures/components as required.

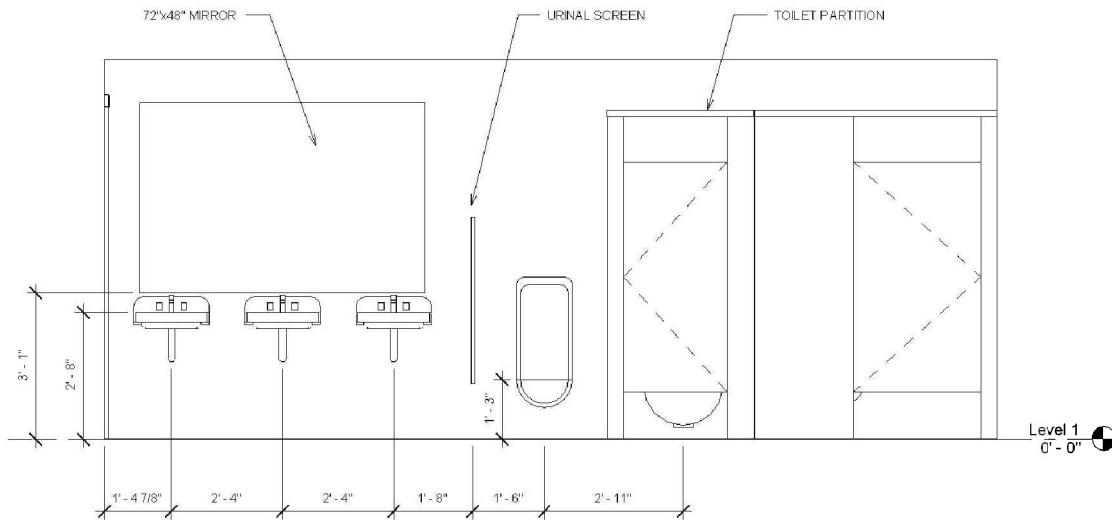


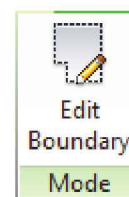
FIGURE 11-1.10 Updated interior elevation

FYT: Keep in mind that many of the symbols that come with Revit (or any program for that matter) are not necessarily drawn or reviewed by an architect. The point is that the default values, such as mounting heights, may not meet ADA, national, state or local codes. Items such as the mirror have a maximum height off the floor to the reflective surface that Revit's standard components may not comply with. However, as you apply local codes to these families, you can reuse them in the future.

Adjusting the Reflected Ceiling Plan:

Because you added a wall in the East toilet room, the definition of the room that the reflected ceiling plan uses is incorrect. You will adjust that next. You will have similar problems on Levels 2 and 3 if you added ceilings there because you deleted walls and then pasted new walls.

22. Switch to **Level 1 RCP** (Figure 11-1.11).
23. Hide the Interior Elevation tag from this view (via right-click and Hide in View).
24. Delete the ceiling in the Men's Toilet room.
25. Place a new ceiling to fit within the room.
26. Select the ceiling grid in the atrium, and then pick **Edit Boundary** to adjust the reference lines for the perimeter of the ceiling grid in the atrium area (Figure 11-1.12).



FYI: You could have used this method for Steps 24/25 as well.

27. Correct the ceilings on Levels 2 and 3.
28. **Save** your project as **ex11-1.rvt**.

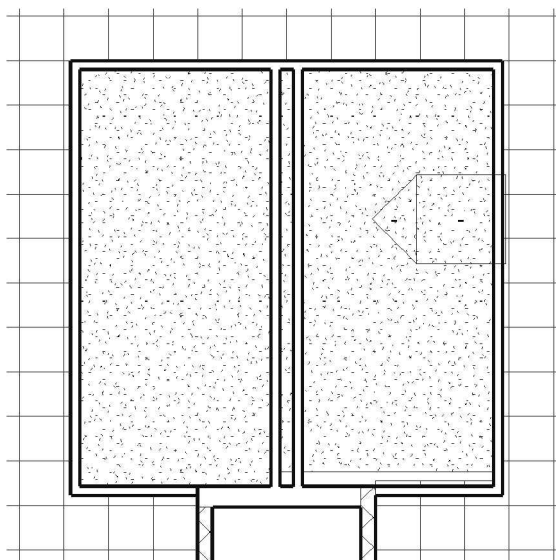


FIGURE 11-1.11 Level 1 RCP

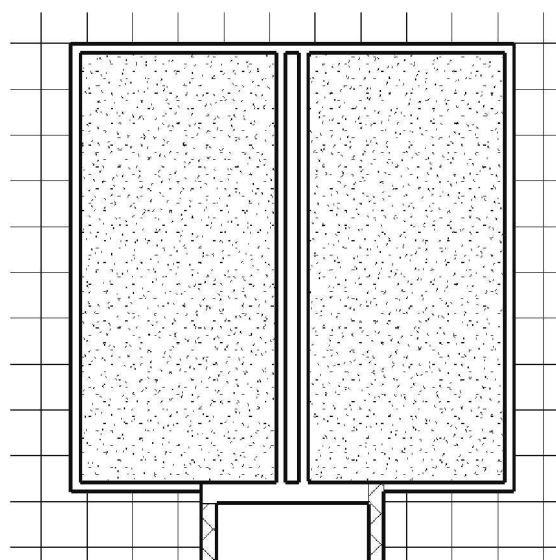


FIGURE 11-1.12 Revised Level 1 RCP

Exercise 11-2:

Cabinets

In this exercise you will look at adding cabinets and casework to your project. As usual, Revit provides several families to be placed into the project.

Placing Cabinets:

You will add base and wall cabinets in a break room on Level 1.

1. Open ex11-1.rvt and **Save As ex11-2.rvt**.
2. Switch to **Level 1** view and zoom into the area shown in **Figure 11-2.1**.

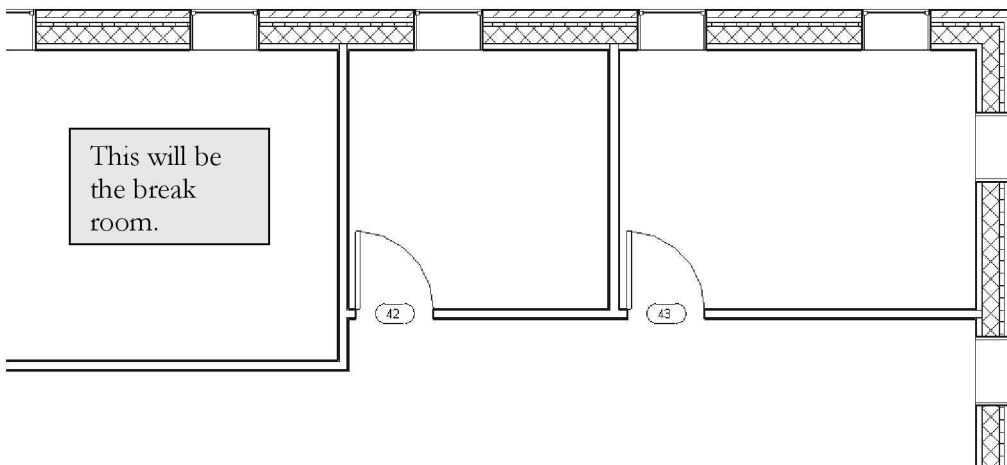
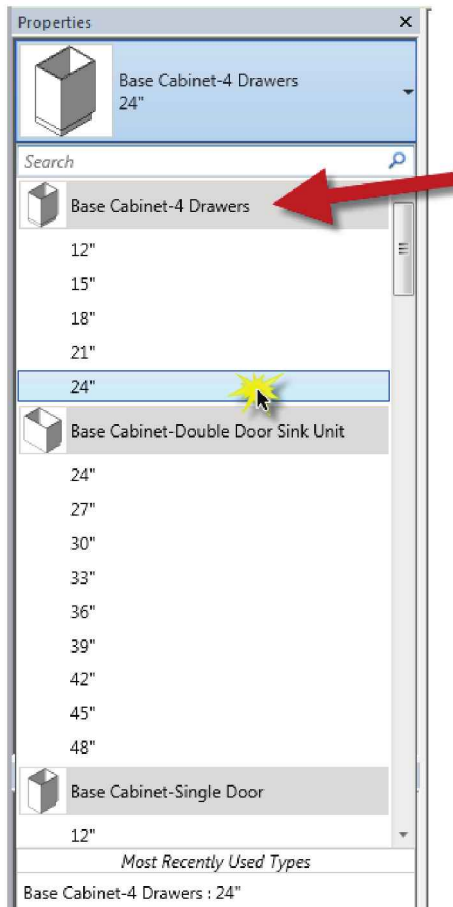


FIGURE 11-2.1 Level 1 – north-east corner

3. *Load* the following components into the project
(*all local files – folder listed after filename*):
 - a. **Counter Top w Sink Hole** (Casework\Counter Tops)
 - b. **Base Cabinet-Double Door Sink Unit** (Casework\Base Cabinets)
 - c. **Base Cabinet-Single Door** (Casework\Base Cabinets)
 - d. **Base Cabinet-4 Drawers** (Casework\Base Cabinets)
 - e. **Upper Cabinet-Double Door-Wall** (Casework\Wall Cabinets)
 - f. **Sink Kitchen-Single** (*Plumbing\Architectural\Fixtures folder*)
 - g. **Refrigerator** (*Specialty Equipment\Domestic folder*)

You are now ready to place the cabinets into your floor plan.



FYI: As with other components (i.e., doors and windows), Revit loads several types to represent the most valuable/ useful sizes available. Cabinets typically come in 3" increments with different types (i.e., single or double door unit) having maximum and minimum sizes.

4. With the *Component* tool selected, pick Base Cabinet-4 Drawers: 24" from the *Element Type Selector*.
5. Place the cabinet as shown in **Figure 11-2.2**.

TIP: The control arrows are on the front side of the cabinet; the cursor is on the back. Press the spacebar to rotate while placing (i.e., before picking).

6. Place the other two base cabinets as shown in **Figure 11-2.3**, with a 24" single door base cabinet in the middle and a 48" sink base to the north end.

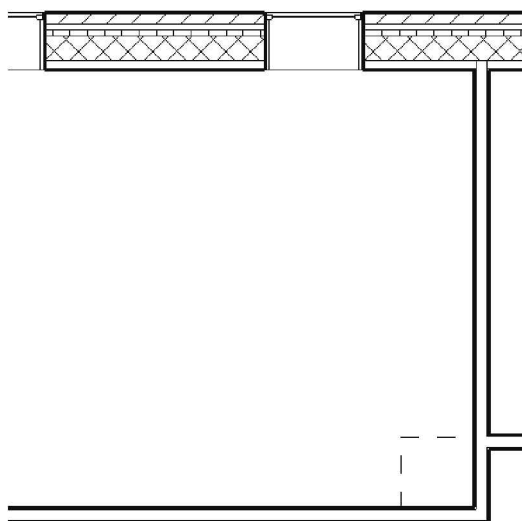


FIGURE 11-2.2 First cabinet placed

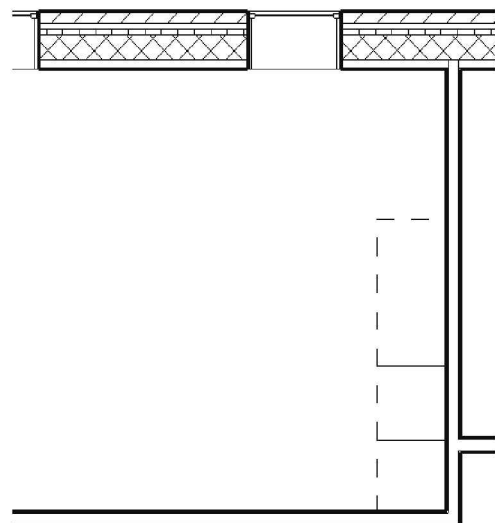


FIGURE 11-2.3 Three base cabinets placed

Add the remaining items as shown in Figure 11-2.4; be sure to use snaps. (E.g., place sink to one side, use move and snap to a mid-point of the sink bowl and then to the mid-point of the same line representing the hole in the countertop).

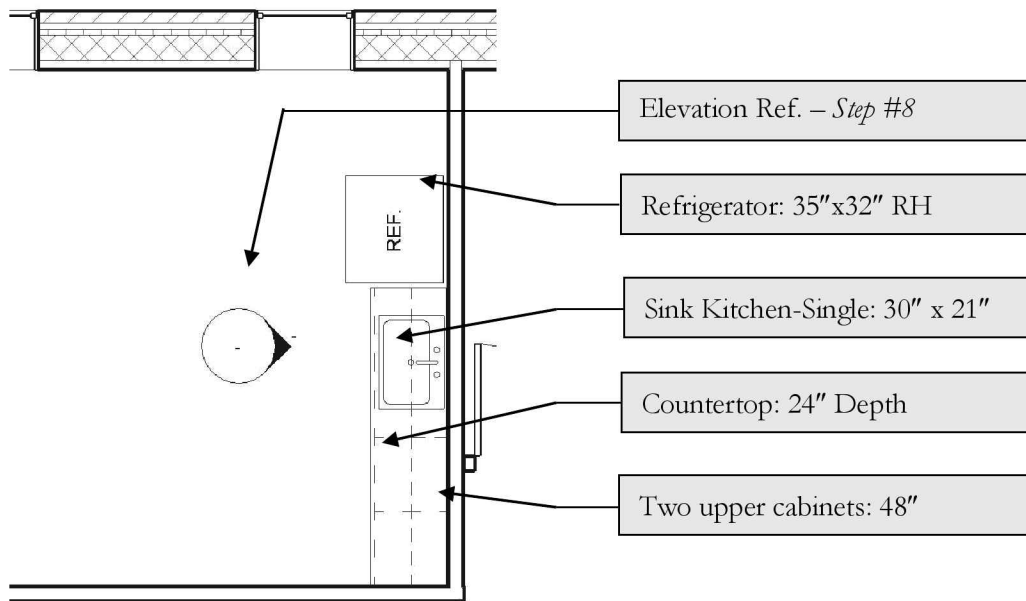


FIGURE 11-2.4 Completed plan view

7. Add an interior elevation tag to set up the interior elevation view (Figure 11-2.4).
8. Rename the new elevation view to **Break Room (east)**.
9. Switch to the new view, **Break Room (east)**.
10. Adjust the **Crop Region** so the slab on grade is not visible.
11. Your view should look like **Figure 11-2.5**.

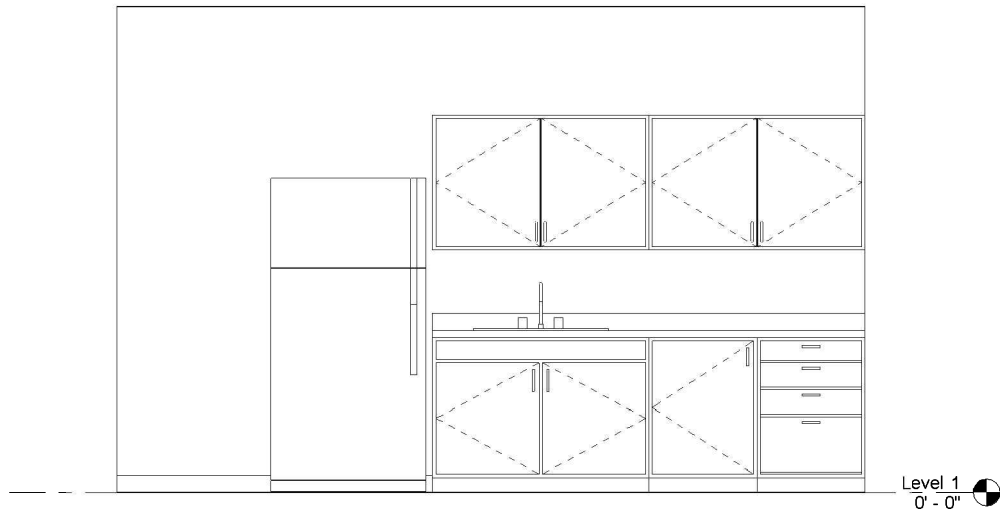


FIGURE 11-2.5 Interior elevation

You will add notes and dimensions to the elevation. You can also add 2D line work to the elevation.

12. Set the *View Scale* to $\frac{1}{2}" = 1'-0"$.

13. Add the notes and dimensions per **Figure 11-2.6**.

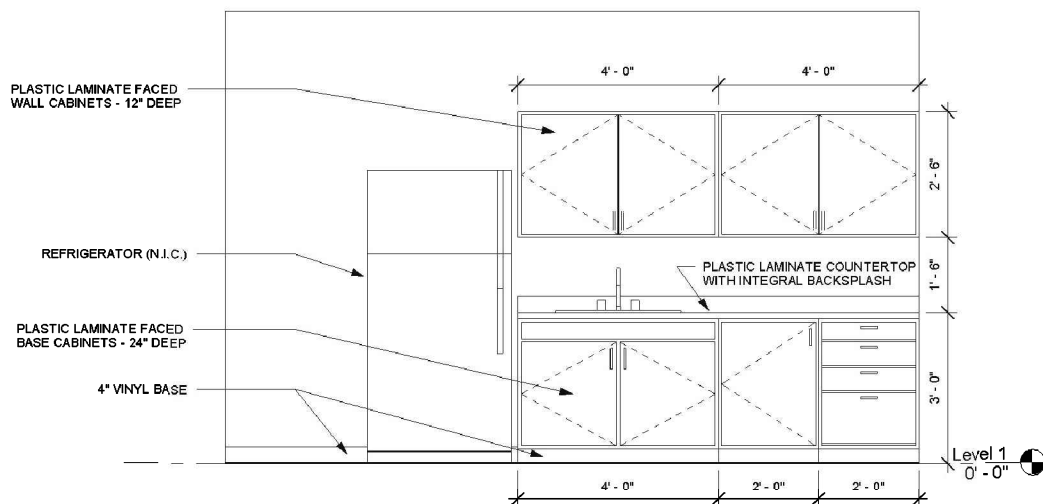


FIGURE 11-2.6 Interior elevation with annotations

14. Use the **Model Line** tool, on the *Architecture* tab, to draw the line on the wall behind the refrigerator indicating the vinyl base.

When you select the **Model Line** tool, Revit will ask you what plane you want to draw on (Figure 11-2.7). This will allow Revit to restrict all your line work to a particular plane. Otherwise you would not know exactly at what depth the lines would be drawn on.

15. Select **Pick a Plane** (Figure 11-2.7) and then pick the wall in the elevation view (use the TAB key and make sure the tool tip lists the wall before picking the plane).

TIP: If you are prompted to switch to a different view, you selected the wrong plane. Click cancel and try again.

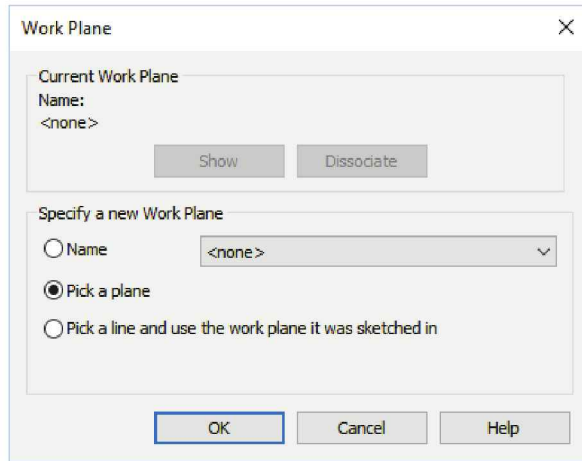


FIGURE 11-2.7 Work Plane prompt

16. Draw the line, and snap to the endpoint of the base cabinet toe kick.

FYT: The main difference between the Model Line tool on the Architecture tab and the Detail Line tool on the Annotate tab is this: any line work drawn with the Model Line tool will show up on other views which see that surface. On the other hand, any line work drawn with the Detail Line tool will only show up in the view in which they were created. So in this example, you may want to draw the lines using the Detail Line tool so the base does not show up in building and wall sections. Do not change this at this time however.

17. Select the line and in the *Type Selector*, change the *Line Style* to **Thin Lines**.
18. **Save** your project as **ex11-2.rvt**.

Exercise 11-2: Furniture

This lesson will cover the steps required to lay out office furniture. The processes are identical to those previously covered for toilets and cabinets. Various manufacturers are beginning to provide Revit content; for example, take a look at www.hayworth.com.

Loading the Necessary Families:

1. Open ex11-2.rvt and **Save As ex11-3.rvt**.
2. Select the **Component** tool and load the following items into the current project:

Local Files (i.e., on your hard drive)

- a. **Work Station Cubicle.rfa** (Furniture System)
- b. **Work Station Desktops** (Furniture System)
- c. **Sofa-Pensi** (Furniture\Seating)
- d. **Chair-Breuer** (Furniture\Seating)
- e. **Chair-Executive** (Furniture\Seating)
- f. **Chair-Task Arms** (Furniture\Seating)
- g. **Table-Round** (Furniture\Table)

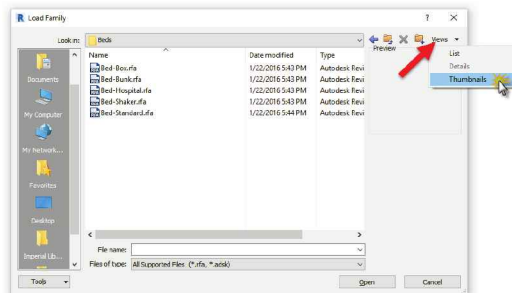
Online Files (i.e., *Seek.autodesk.com*)

- h. **Copier-Floor**

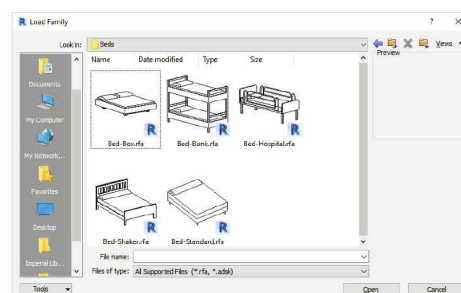
These files represent various families that will be used to design the offices.

TIP:

You can set the View mode for the Open dialog box (which is displayed when you click Load Family). One option is Thumbnail mode; this displays a small thumbnail image for each file in the current folder. This makes it easier to see the many symbols and drawings that are available for insertion. You can make the preview images larger by holding down the Ctrl key and then spinning the wheel on your mouse.



View set to List mode



View set to Thumbnail mode

Designing the Office Furniture Layout:

3. Switch to the **Level 3** view.
4. Place the furniture as shown in Figure 11-3.1.

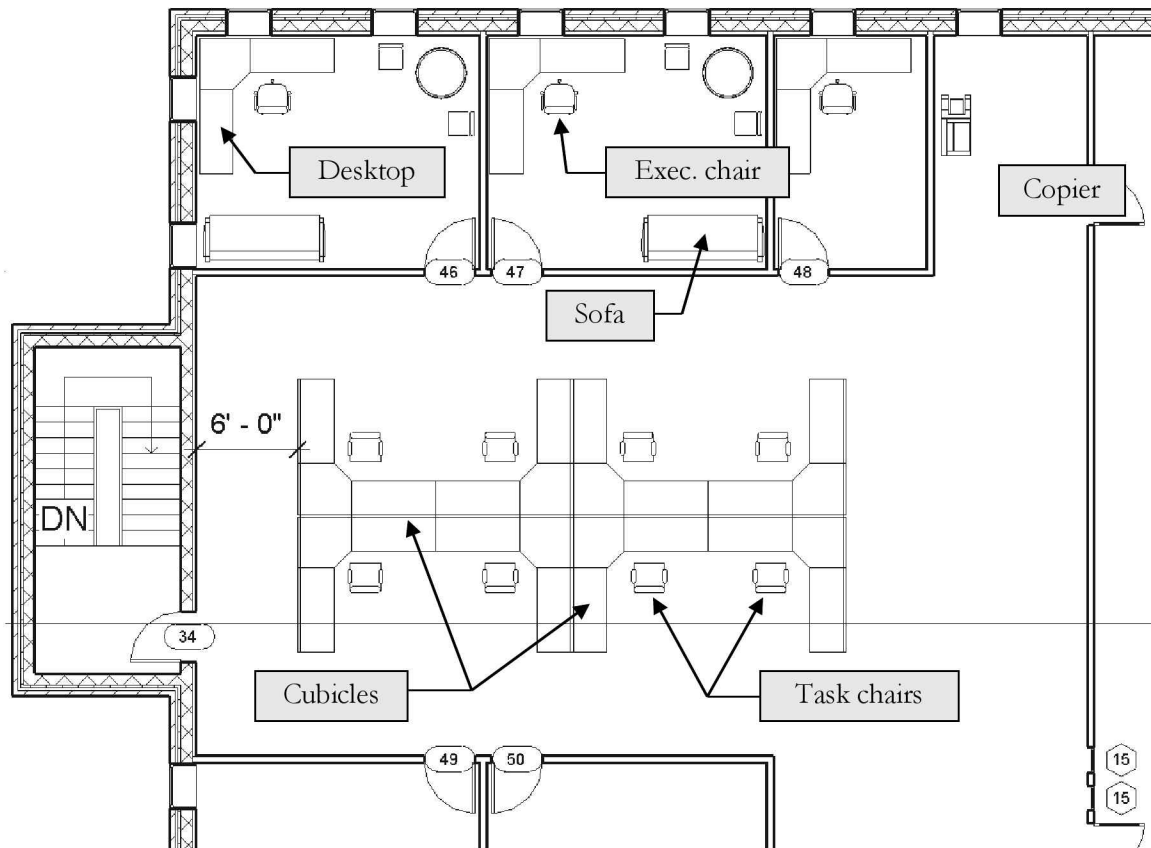


FIGURE 11-3.1 Level 3 – furniture layout

3D View of Office Layout:

Next you will look at a 3D view of your office area. This involves adjusting the visibility of the roof and skylights.

5. Switch to the *Default 3D* view.
6. Make sure nothing is selected and the *Properties Palette* is open.
7. Click **Edit** next to the *Visibility/Graphic Override* parameter.
8. Uncheck the *Roof* category and click **OK**.

The roof should not be visible now. However, you should still see the skylights floating in space. You will make those disappear next.

9. Select one of the skylights floating above the office area.
10. Click the **Temporary Hide/Isolate** from the *View Control Bar*.

You should see the menu shown in **Figure 11-3.2** show up next to the *Temporary Hide/Isolate* icon. This allows you to isolate an object (so it's the only thing on the screen) or hide it (so the object is temporarily not visible).

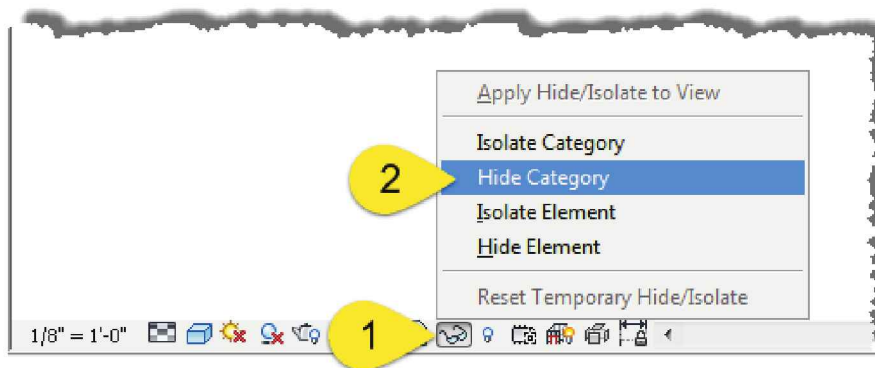


FIGURE 11-3.2 Hide/Isolate popup menu

11. Click **Hide Category** in the menu (Figure 11-3.2).

FYI: This makes all the skylights hide; you could leave it at “Hide Element” and select each skylight.

12. Adjust your 3D view to look similar to **Figure 11-3.3** by clicking and dragging your mouse on the *ViewCube*.

You will now restore the original visibility settings for the 3D view.

13. Click the *Hide/Isolate* icon and then select **Reset Temporary Hide/Isolate** from the popup up menu.

NOTE: The Temporary Hide/Isolate feature is just meant to be a temporary control of element visibility while you are working on the model. If you want permanent results, you can click the “Apply Hide/Isolate to View” option. Also, to the right of the Hide/Isolate icon is the Reveal Hidden Elements icon (the light bulb icon), which will clearly show any elements that have been previously hidden.

14. Reset the 3D view’s visibility settings so the roof is visible.

15. **Save** your project as **ex11-3.rvt**.

Notice the furniture and toilet rooms are represented in 3D.

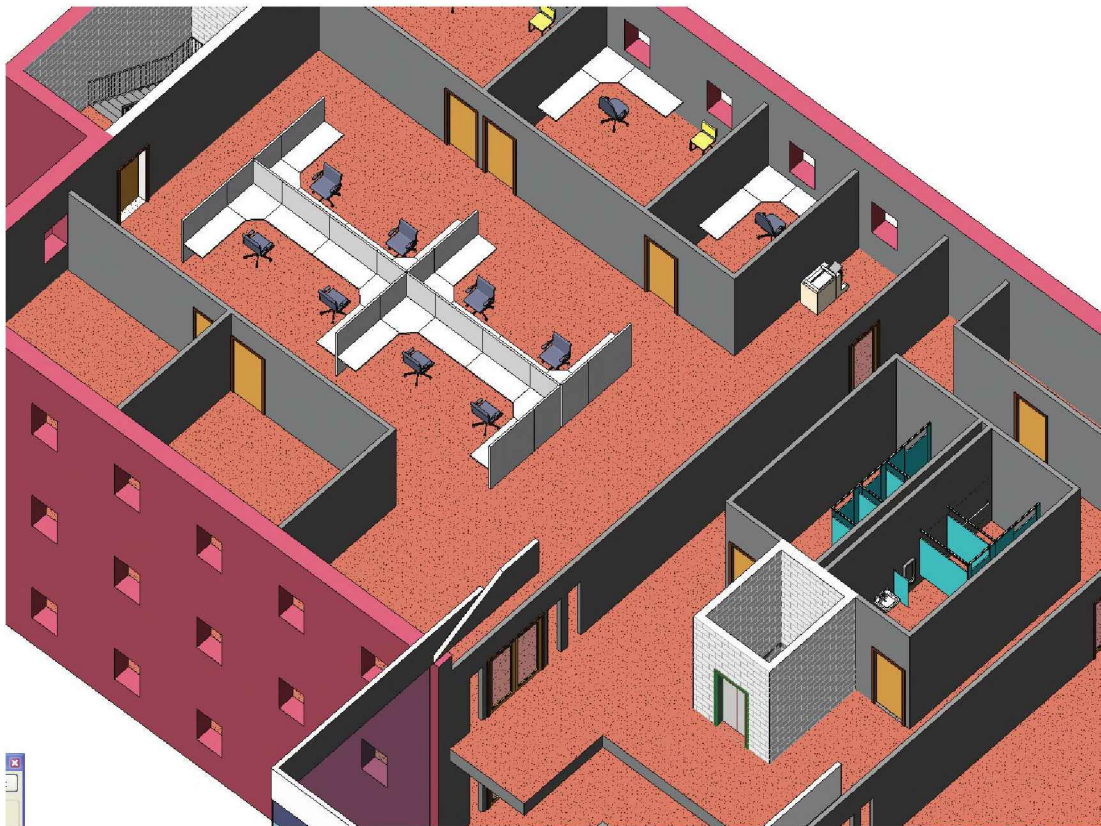


FIGURE 11-3.3 3D view with roof not visible

Online Content:

A few locations on the internet provide additional content for use in Revit. Some are free and some are not. Hopefully more product manufacturers will start providing content based on the products they make, making it easier for people to include that manufacturer's product in their project (both the virtual and real projects).

You have already spent a little time looking at Revit's online content library (Seek.autodesk.com). You should spend some more time there so you know what is generally available. This will help you to reduce duplicated effort.

The following sites also contain content that can be downloaded:

- www.revitcity.com
- Seek.autodesk.com
- revit.autodesk.com/library/html (old Revit content library)
- www.turbosquid.com/revit-market

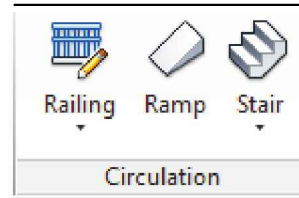
You should occasionally search the internet to see if additional content becomes available. You can do an internet search for "revit content"; make sure to include the quotation marks. The rendering content, such as that offered by www.archvision.com, will be covered in Chapter 11.

Exercise 11-4: Adding Guardrails

This lesson will cover the steps required to lay out guardrails. The steps are similar to drawing walls; you select your style and draw its path.

Adding a Guardrail to the Atrium:

1. Open ex11-3.rvt and **Save As ex11-4.rvt**.
2. Switch to **Level 2** view.
3. Select **Architecture → Circulation → Railing → Sketch Path**.
4. **Zoom** into the Atrium area (South of the elevator).



At this point you will draw a line representing the path of the guardrail. The railing is offset to one side of the line, similar to walls. However, you do not have the *Location Line* option as you do with the *Wall* tool, so you have to draw the railing in a certain direction to get the railing to be on the floor and not hovering in space just beyond the floor edge.

5. Draw a line along the edge of the floor as shown in **Figure 11-4.1**.

TIP: Select Chain from the Options Bar to draw the railing with fewer picks.

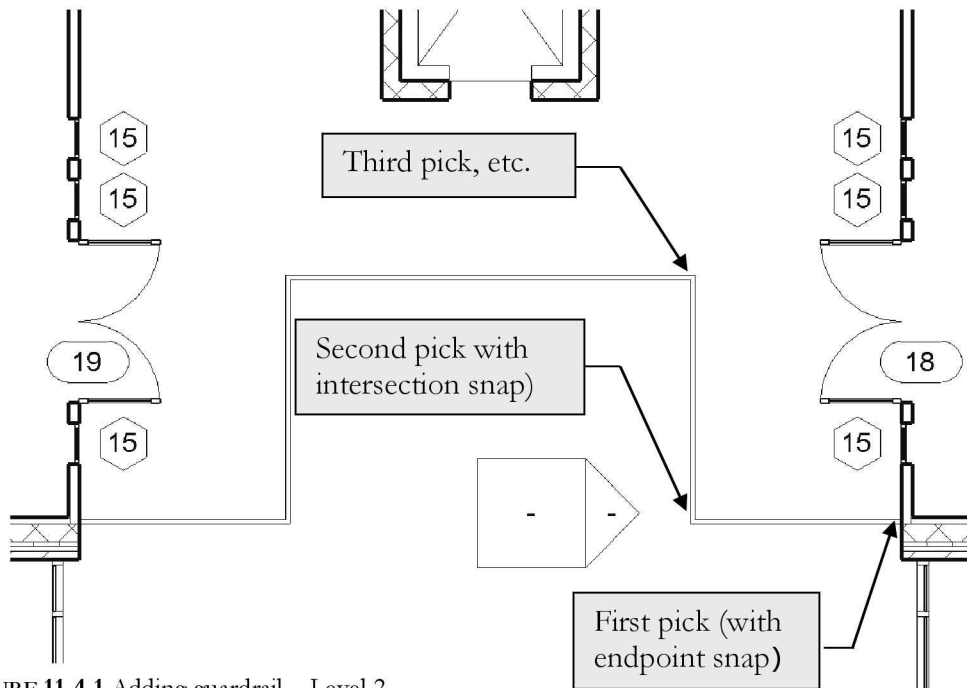


FIGURE 11-4.1 Adding guardrail – Level 2

6. Click the **green check mark** on the *Ribbon* to finish the Railing tool.

The railing has now been drawn. In the next step you will switch to a 3D view and see how to quickly change the railing style. This will also involve changing the height of the railing. Most building codes require the railing height be 42" when the drop to the adjacent surface is more than 30"; this is called a guardrail.

7. Switch to the *Default 3D* view.
8. Zoom into the railing shown on Level 2, looking at it through the curtain wall.
(Notice the railing style – Figure 11-4.2.)

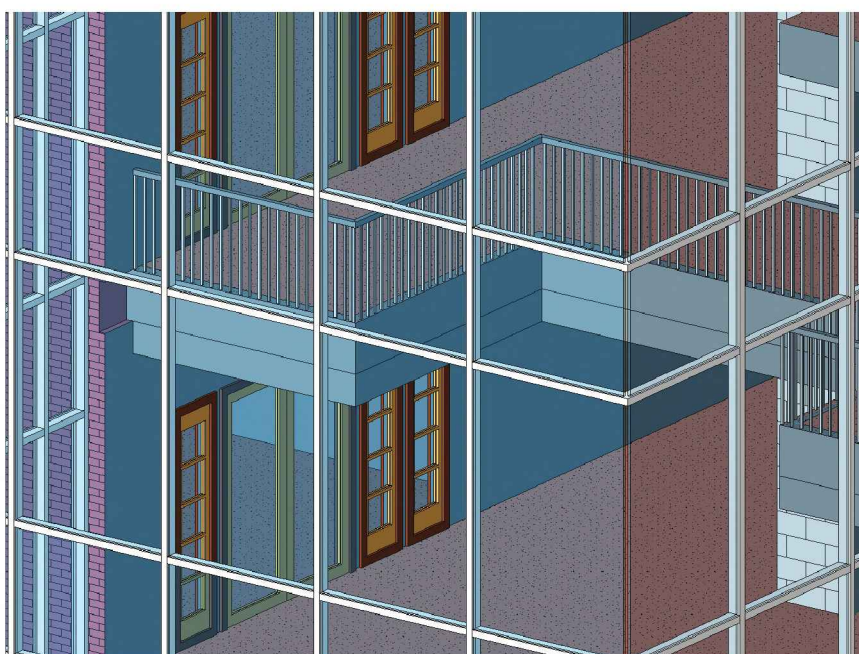


FIGURE 11-4.2 Added railing – 3D view

9. Select the railing. You may have to use the *Tab* key to cycle through the various selection options.
10. With the railing selected, select the various railing types available in the *Type Selector* on the *Ribbon*. When finished make sure **Railing: Guardrail – Pipe** is selected (Figure 11-4.3).

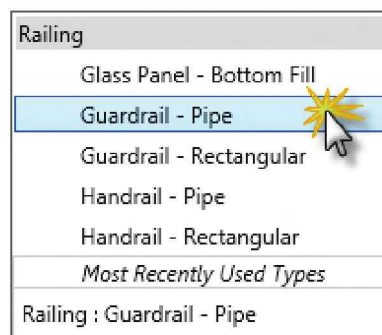


FIGURE 11-4.3 Options for selected railing

Your railing should now look like Figure 11-4.4. Notice that a handrail was added to the railing. You should also notice that the handrail is on the wrong side of the guardrail. You will adjust that next.



FIGURE 11-4.4 Railing with new style

11. Switch to the **Level 2** plan view and select the railing.
12. Click on the **Control Arrows** to flip the railing orientation. (See the *FYT* below for additional information.)
13. You can switch back to the **3D view** to see the change.
14. Finally, from the Level 2 plan view, **Copy** the railing to the clipboard and **Paste** it into the Level 3 view.
15. **Save** your project as **ex11-4.rvt**.

FYT: The last modification, using the control arrows, flipped the railing about the sketch lines, so the railing is now hanging out in space. You can fix this by selecting the railing, clicking “edit path” on the Ribbon, and then moving the sketch lines in to compensate.

Make sure to examine the railing sample file available on Autodesk Seek; search for **Railing Samples**. You can download this file (railing samples.rvt), open it, select a railing and view its properties to see how it works.

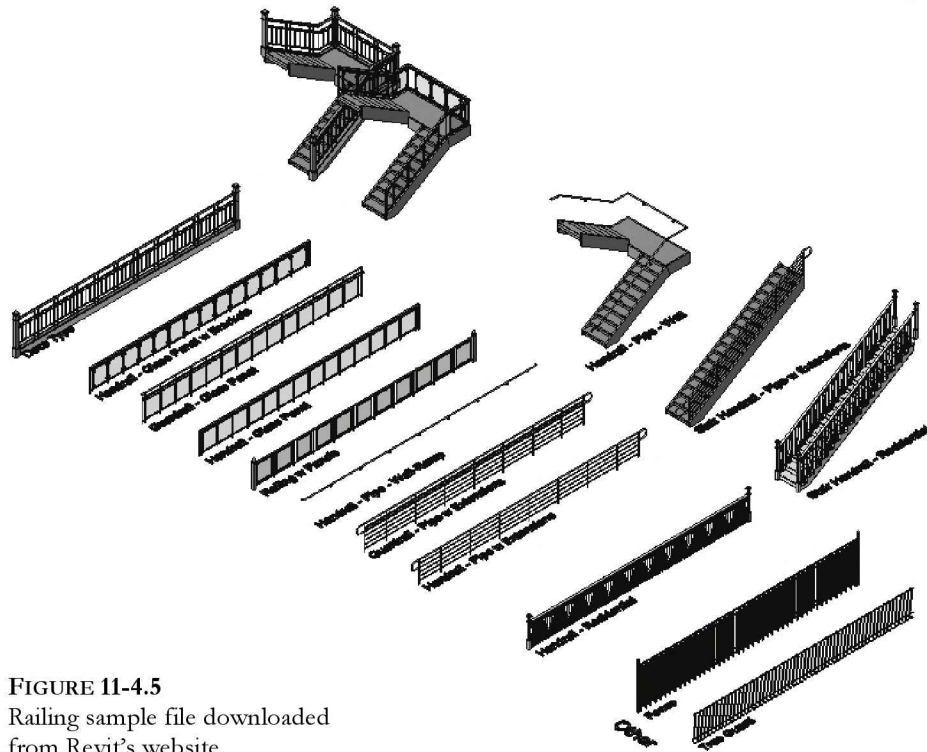


FIGURE 11-4.5
Railing sample file downloaded
from Revit's website

You can Copy/Paste a railing style from this drawing into one of your project files. Then you select your railing and pick the newly imported one from the *Type Selector*. This process was done to achieve the image below (Figure 11-4.6). Notice the glass railing with brackets.



FIGURE 11-4.6 Optional railing configuration

Self-Exam:

The following questions can be used as a way to check your knowledge of this lesson. The answers can be found at the bottom of this page.

1. The toilet room fixtures are preloaded in the template file. (T/F)
2. You do not need to be connected to the internet when loading content from the online web library. (T/F)
3. Revit content is not always in compliance with codes. (T/F)
4. You can draw 2D lines on the wall in an interior elevation view. (T/F)
5. Use the _____ tool to copy fixtures to other floors.

Review Questions:

The following questions may be assigned by your instructor as a way to assess your knowledge of this section. Your instructor has the answers to the review questions.

1. Revit provides several different styles of toilet stalls for placement. (T/F)
2. Most of the time Revit automatically updates the ceiling when walls are moved, but occasionally you have to manually make revisions. (T/F)
3. It is not possible to draw dimensions on an interior elevation view. (T/F)
4. Cabinets typically come in 6" increments. (T/F)
5. Base cabinets automatically have a countertop on them. (T/F)
6. What can you adjust so the concrete slab does not show in section?

7. How does Revit determine where to place 2D lines in an elevation view (based on the example in this lesson)?

8. What is the current size of your Revit Project? _____
9. What should you use to assure accuracy when placing furniture?

10. You use the _____ tool to make various components temporarily invisible.

SELF-EXAM ANSWERS:
1 – F, 2 – F, 3 – T, 4 – T, 5 – Copy