

Lesson 13

SITE and RENDERING:

In this chapter you will take a look at Revit's photo-realistic rendering abilities as well as the basic site development tools. Rather than reinventing the wheel, Autodesk makes several high-end rendering programs like *Autodesk 3DS Max*, *Autodesk Maya* and *Autodesk Render*, which work with Revit models in various ways; the integration options improve with each new release.

Exercise 13-1:

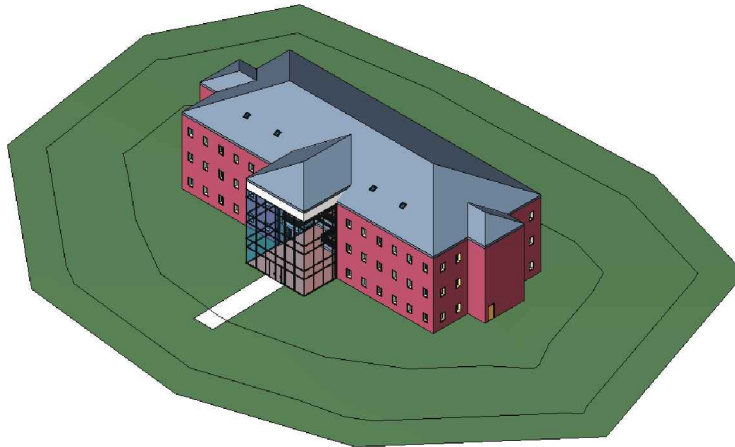
Site tools

This lesson will give the reader a quick overview of the site tools available in Revit. The site tools are not intended to be an advanced site development package. Autodesk has other programs much more capable of developing complex sites such as AutoCAD Civil 3D 2017. These programs are used by professional Civil Engineers and Surveyors. The contours generated from these advanced civil CAD programs can be used to generate a topography object in Revit.

In this lesson you will create a topography object from scratch – you will also add a sidewalk.

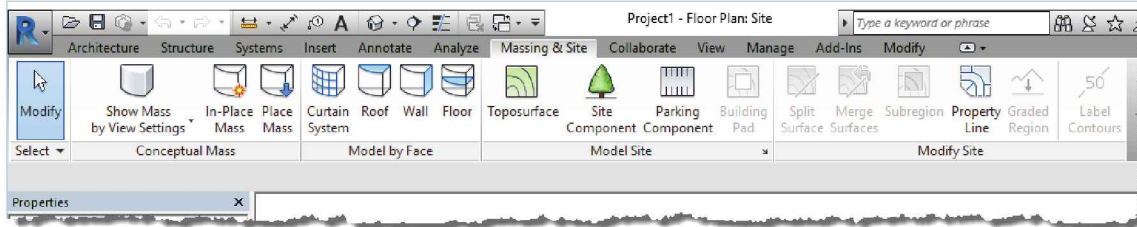
Once the topography object (the topography object, or element, is a 3D mass that represents part *or* all of the site) is created the grade line will automatically show up in building and wall sections, exterior elevations and site plans. The sections even have the earth pattern filled in below the grade line.

As with other Revit elements you can select the object after it is created and set various properties for it, such as surface material, Phase, Etc. One can also return to Sketch mode to refine or correct the surface – this is done in the same way most other Sketched objects are edited – by selecting the item and clicking *Edit* on the *Options Bar*.



Overview of Site tools located on the Ribbon:

Below is a brief description of what the site tools are used for. After this short review you will try a few of these tools on your office project.



Toposurface: Creates a 3D surface by picking points (specifying the elevation of each point picked) or by using linework, within a linked AutoCAD drawing, that were created at the proper levels.

Subregion: Allows an area to be defined within a previously drawn *Toposurface* – the result is an area within the *Toposurface* that can have a different material than the *Toposurface* itself. The *Subregion* is still part of the *Toposurface* and will move with it when relocated. If a *Subregion* is selected and deleted the original surface/properties for that area are revealed.

Split Surface: This tool is similar to the *Subregion* tool in every way except that the result is separate surfaces that can intentionally, or accidentally, be moved apart from each other. If a split surface is selected and deleted it results in a subtraction or a void relative to the original *Toposurface*.

Merge Surfaces: After a surface has been split into one or more separate surfaces you can merge them back together. Only two surfaces can be merged together at a time. The two surfaces to be merged must share a common edge or overlap.

Graded Region: This tool is used to edit the grade of a *Toposurface* that represents the existing site conditions and the designer wants to use Revit to design the new site conditions. This tool is generally only meant to be used once; when used it will copy the existing site conditions to a new phase and set the existing site to be demolished in the new construction phase. The newly copied site object can then be modified for the new site conditions.

Property Line: Creates property lines (in plan views only).

Building Pad: Used to define a portion of site to be subtracted when created below grade (and added when created above grade). An example of how this might be used is to create a *Pad* that coincides with a basement floor slab, which would remove the ground in section above the basement floor slab (otherwise the basement would be filled with the earth fill pattern). Several pads can be imposed on the same *Toposurface* element.

Parking Component: These are parking stall layouts that can be copied around to quickly layout parking lots. Several types can be loaded which specify both size and angle.

Site Component: Items like benches, dumpsters, etc. that are placed directly on the *Toposurface* at the correct elevation at the point picked.

Label Contours: Adds an elevation label to the selected contours.

FYT: Contours are automatically created based on the *Toposurface*.

Site Settings:

The *Site Settings* dialog controls a few key project wide settings related to the site – below is a brief description of these settings.

The **Site Settings** dialog is accessed from the *arrow* link in the lower-right corner of the *Model Site* panel. You should note that various tools under the Settings menu affect the entire project, not just the current view.

Contour Line Display: This controls if the contours are displayed when the *Toposurface* is visible (via the check box) and at what interval. If the *Interval* is set to 1'-0" you will see contour lines that follow the ground's surface and each line represents a vertical change of 1'-0" from the adjacent contour line (the contour lines alone do not tell you what direction the surface slopes in a plan view – this is where contour labels are important). The *Passing Through Elevation* setting allows control over where the contour intervals start from. This is useful because architects usually base the first floor of the building on elevation 0'-0" (or 100'-0") and the surveyors and Civil Engineers will use the distance above sea level (e.g. 1009.2'). So this feature allows the contours to be reconciled between the two systems. The Additional Contours section allows for more "contour" detail to be added within a particular area (vertically) – on a very large site you might want 1'-0" contours only at the building and 10'-0" contours everywhere else. However, this only works if the building is in a distinctive set of vertical elevations. If the site is relatively level or an adjacent area shares the same set of contours you will have undesirable results.

Site Settings

Contour Line Display

☒ At Intervals of: 10' 0" Passing Through Elevation: 0' 0"

Additional Contours:

	Start	Stop	Increment	Range Type	Subcategory
1	0' 0"	1000' 0' 1' 0"		Multiple Values	Secondary Contours

Insert Delete

Section Graphics

Section cut material: Earth Elevation of poche base: -10' 0"

Property Data

Angle Display: Degrees from N/S Units: Degrees minutes seconds

OK Cancel Apply Help

Section Graphics: This area controls how the earth appears when it is shown in section (e.g. exterior elevations, building sections, wall sections, etc.). Here is where the pattern is selected that appears in section (the pattern is selected from the project "materials" similar to the process for selecting the pattern to be displayed within a wall when viewed in section).

Elevation of poche base: Controls the depth of the pattern in section views relative to the grade line.

Property Data: This section controls how angles and lengths are displayed for information describing property lines.

Creating topography in Revit

1. Open file 12-3.rvt and *Save-As* **13-1.rvt**.
2. Switch to the **Site** plan view.
 - a. Adjust the category visibility so your view matches Figure 13-1.1. Also, set the *Detail Level* to *Fine*. Hide elevation and section tags.

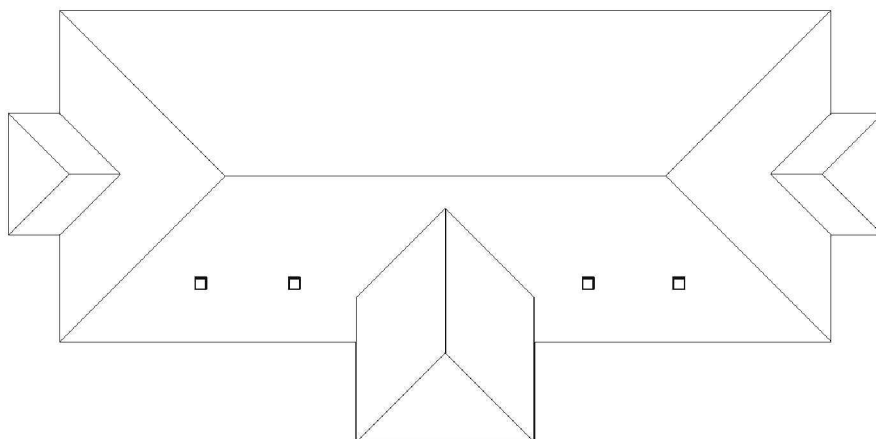


Figure 13-1.1 Site plan view

Here you will basically see what appears to be a roof plan view of your project (Figure 13-1.1). This view has the visibility set such that you see the project from above and the various “site” categories turned on so they are automatically visible once they are created. Next you will take a quick look at the *View Range* for this view so you understand how things are set up.

3. Make sure nothing is selected and a command is not active by clicking the **Modify** tool. This will ensure you have access to the *View Properties* via the *Properties Palette*.
4. In the *Properties Palette*, scroll down and select **Edit** next to *View Range*.

Here you can see the site is being viewed from 200' above the first floor level, so your building/roof would have to be “cut” like a floor plan. The *View Depth* could be a problem here: on a steep site, the entire site will be seen if part of it passes through the specified *View Range*. However, items completely below the *View Range* will not be visible.

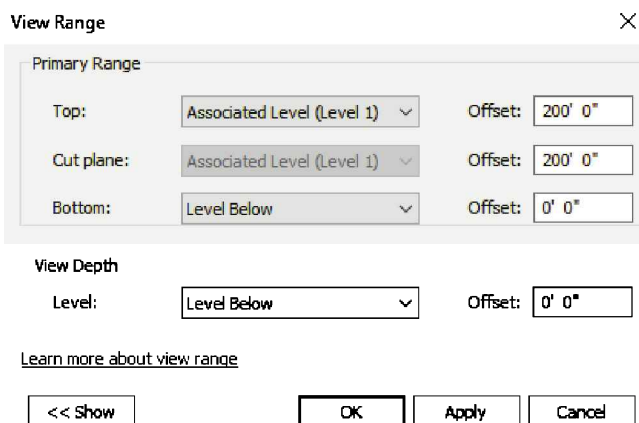


Figure 13-1.2 Site Plan view range settings

5. In the *View Depth* section, set the *Level* to **Unlimited**.

This change will ensure everything shows up on a steeper site.

6. Click **OK**.

You are now ready to create the site object. The element in Revit which represents the site is called *Toposurface*.

TIP: Structural engineers can use the toposurface tool to model ledge rock, which would aid in determining how deep foundations need to be.

7. Select **Massing & Site → Model Site → Toposurface** from the *Ribbon*.



Toposurface

By default the *Place Point* tool is selected on the *Ribbon*; you are now in sketch mode. This tool allows you to specify points within the view at various elevations – Revit will generate a 3D surface based on those points, so the more points you provide the more accurate the surface. Notice on the *Options Bar* (Figure 13-1.3) that you can enter an elevation for each point as you click to place them on the screen.



Figure 13-1.3 Options bar for Toposurface tool

What elevation should I enter on the Options Bar?

The elevation you enter for each point should relate to the level datums set up in your project – for example, look at your South exterior elevation (Figure 13-1.4). Recall that the first floor is set to 0'-0".

As you can see in the South elevation, the only place you would want to add points at an elevation of 0'-0" would be at the doors. Everywhere else should be at about -4" so the grade does not rise higher than the top of the foundation wall and come into contact with the brick, and possibly block the weeps and brick vents.

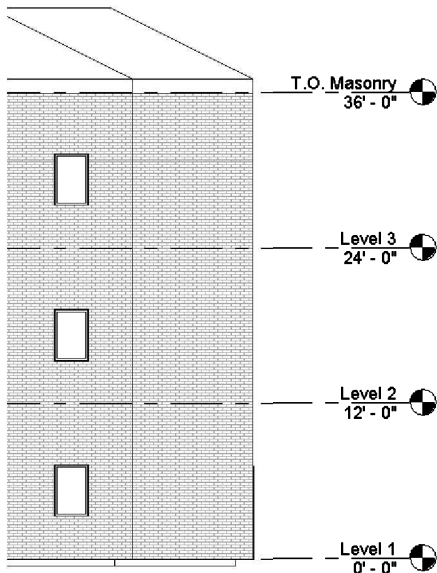


Figure 13-1.4 Partial South Elevation

8. With the *Elevation* set to **0'-0"** pick the six points shown in Figure 13-1.5; these points are at the exterior door locations.

TIP: You can switch to the Level 1 Floor Plan view while in the Toposurface tool; just click the Place Point tool again on the Ribbon.

9. Change the **Elevation** to **-0'-4"** (don't forget the minus sign) on the *Option Bar* and then pick all the inside and outside corners along the perimeter of the building which have not yet been selected.

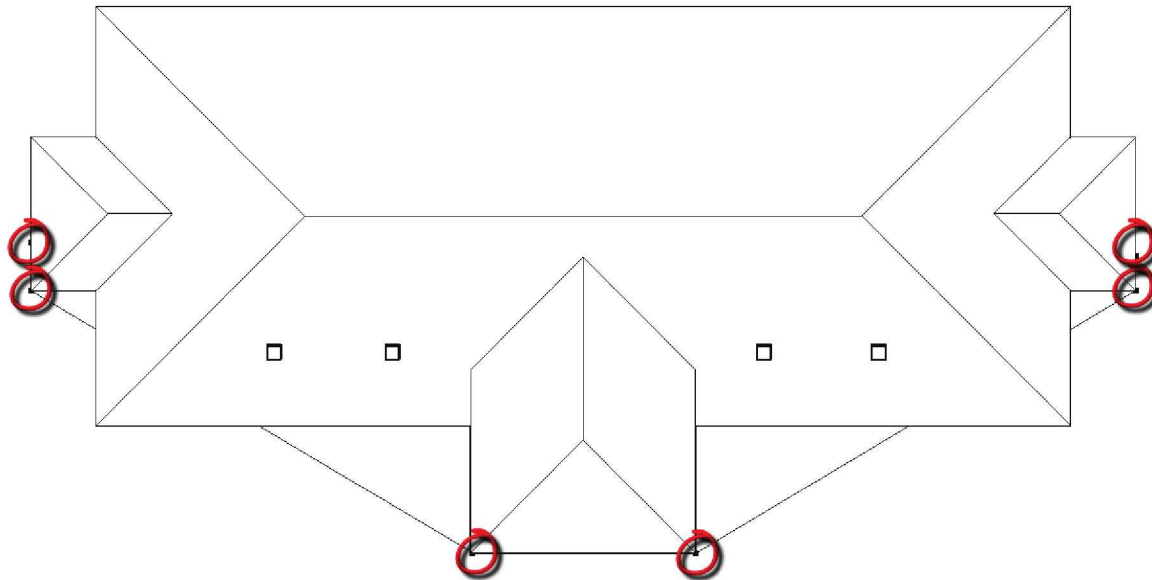
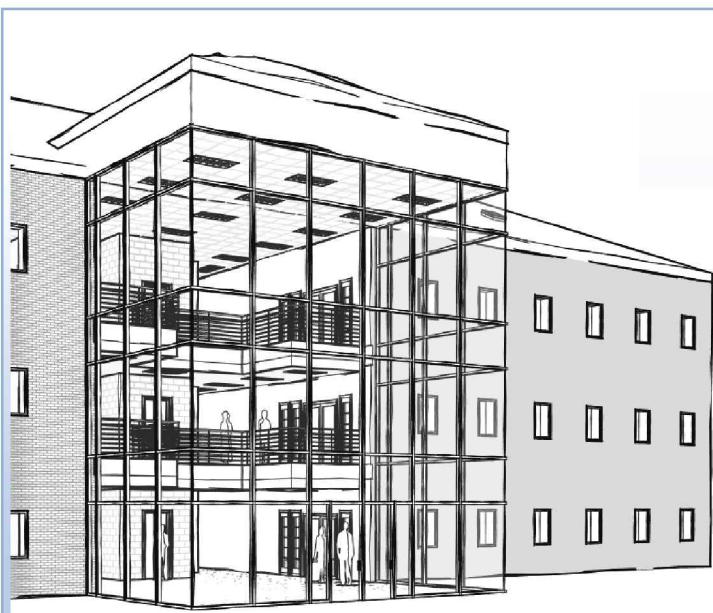


Figure 13-1.5 Site plan view – 6 points to be selected (elevation -0'-0")

10. Set the **Elevation** to **-2'-6"** and point to the ten points shown in Figure 13-1.6 which define the extents of the *Toposurface*.

FYT: The elevations selected will generally provide a positive slope away from the building – this will be visible in elevations and sections.



Sketchy Lines

Within a view's Graphic Display Options you can turn on Sketchy Lines and adjust the sliders for two related settings: *Jitter* and *Extensions*. The first determines how wavy the lines are and the latter controls how far the lines cross at corners.

This option is set per view. You will also want to turn on "smooth lines" for this view.

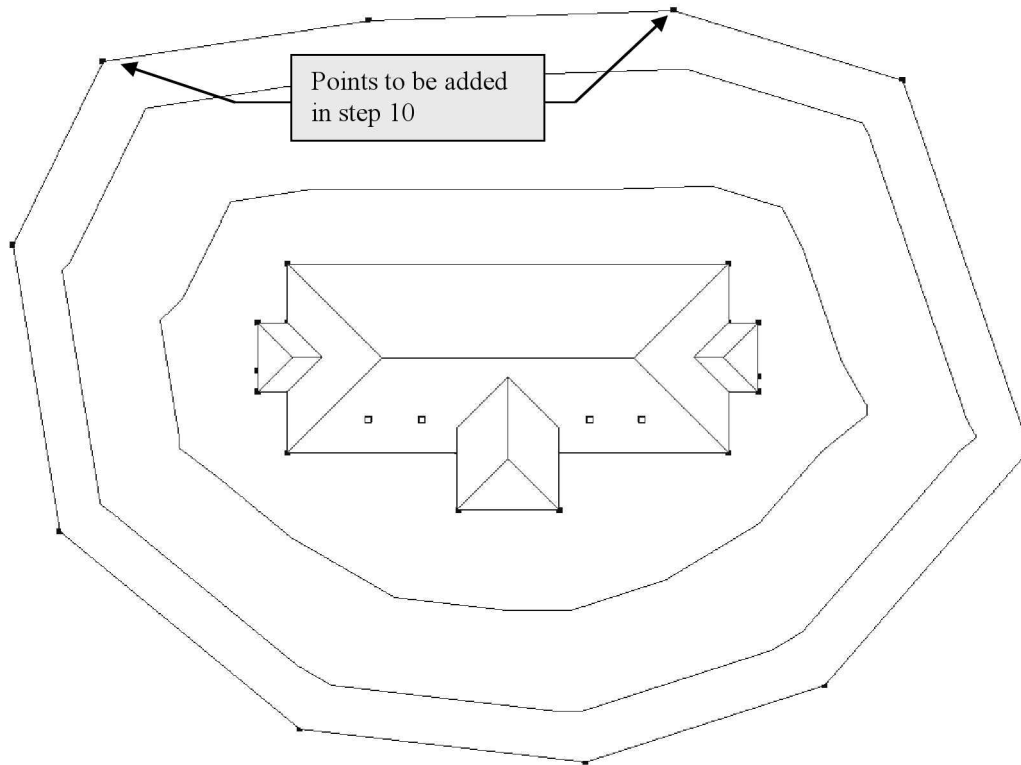


Figure 13-1.6 Site plan view – 10 points to be selected (elev – 2'-6")

11. Select the **green check mark** on the *Ribbon* to finish the *Toposurface*.

Revit has now created the *Toposurface* based on the points you specified. Again, the more points you add the more refined and accurate the surface will be.

Ideally you would use the *Toposurface* tool to create a surface from a surveyor's points file or contour lines drawn in an AutoCAD file – Revit can automatically generate surfaces from these sources, rather than you picking points. This process is beyond the scope of this tutorial.

12. Switch to the **3D view** to see your new ground surface (Figure 13-1.7).

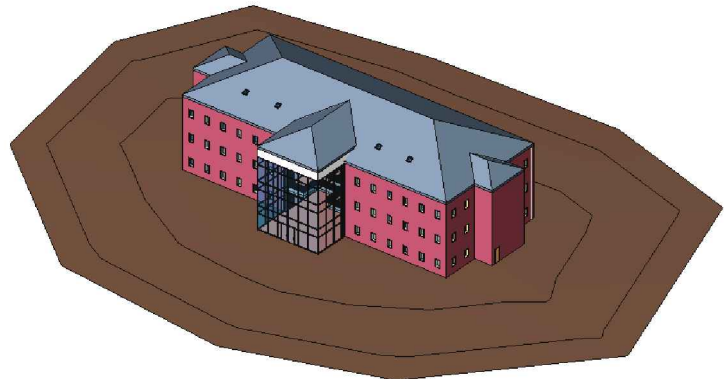


Figure 13-1.7 Toposurface seen in 3D view

The toposurface is automatically added in sections and elevations (Figure 13-1.8). It may need to be turned off in other views.

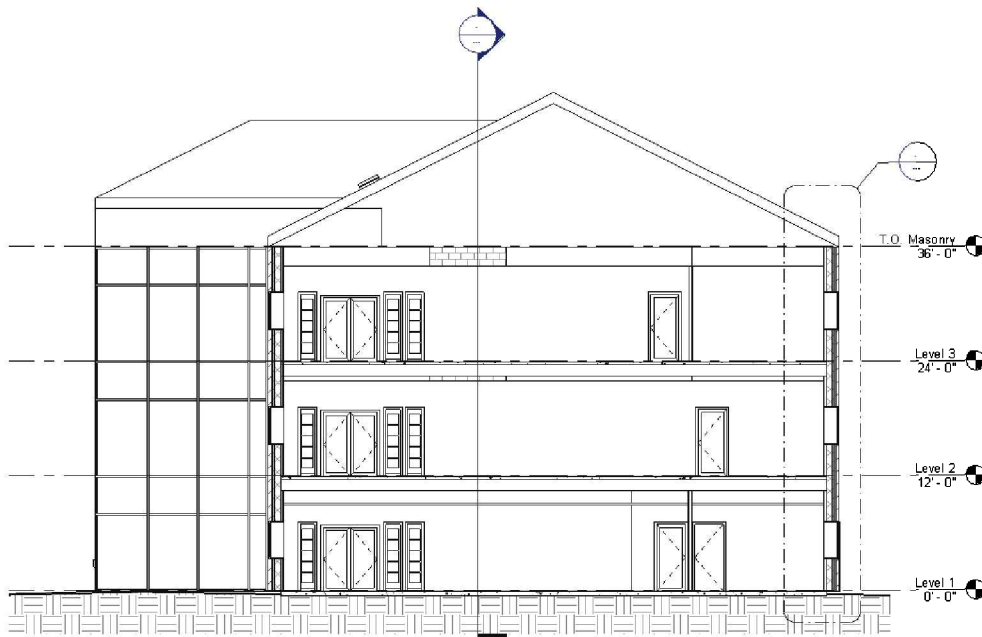


Figure 13-1.8 Section with ground pattern added

If your building has a basement or space partially below grade you will need to add a **Building Pad** to “stamp” out an area of the *Toposurface*. To add one you select the tool, draw an outline in a plan view and then specify the depth, or height, of the pad. The *Toposurface* then removes, or adds, ground below the *Building Pad*. If you have a stepped basement you will need multiple Building Pads. Their edges can align but they cannot overlap.

Next you will quickly create a sidewalk to wrap up this lesson.

You can use the *Subregion* tool or the *Split Surface* tool to create the driveway and sidewalks. The *Subregion* tool defines an area that is still part of the main site object – the *Split Surface* tool literally breaks the *Toposurface* into separate elements. Splitting a surface can create problems when trying to move or edit the site so you will use the *Subregion* tool.

13. Switch back to the **Site** plan view.
14. Select **Massing & Site → Modify Site → Subregion** tool and sketch the lines for the sidewalk (Figure 13-1.9).
15. Click the **green check mark** on the *Ribbon* to finish the *Subregion*.

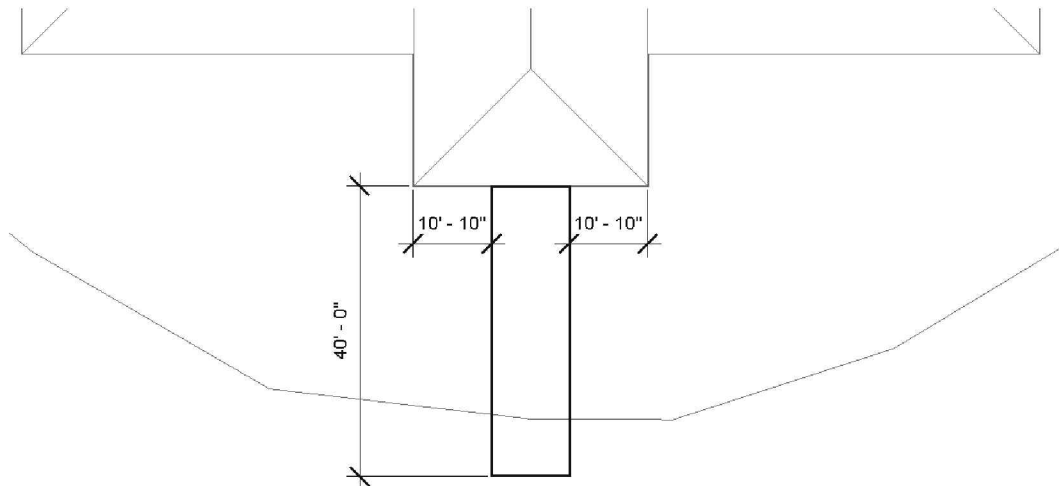


Figure 13-1.9 Partial site plan – closed sketch lines for subregion

16. Switch to 3D view to see your sidewalk (Figure 13-1.10). Notice the 2D lines sketched in the site plan view have been projected down onto the surface of the 3D site object!

Notice that the shade and render material is still the same as the main ground surface. You will learn how to change this in a moment.

When you select the *Toposurface* and click *Edit Surface* on the *Ribbon* you can select existing points and edit their elevation to refine the surface.

17. In the 3D view, select the sidewalk *Subregion*.
18. In the *Properties Palette*, set the *Material* to **Concrete – Cast-in-place concrete**.
19. Set the main site element's *Material* to **Site – Grass**.
20. Make sure the *Visual Style* for your 3D view is set to **Shaded** so you can see the “shaded” version of the materials.

TIP: Set via View Control bar.

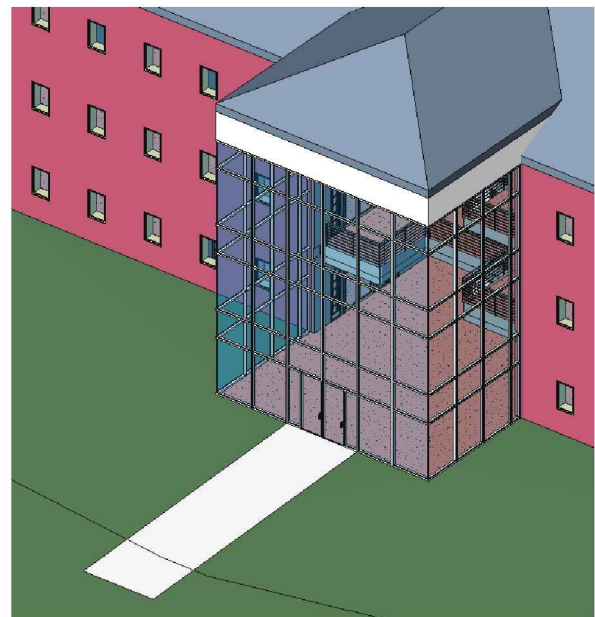


Figure 13-1.10 3D view with sidewalk added

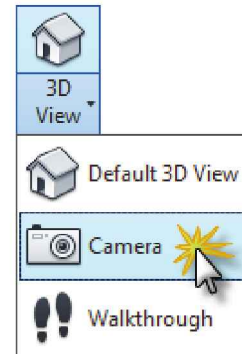
That concludes this overview of the site tools provided within Revit. You now have everything modeled in your project so you can start to develop rendered images of your project for presentations.

Exercise 13-2: Creating an Exterior Rendering

The first thing you will do to prepare a rendering is set up a view. You will use the *Camera* tool to do this. This becomes a saved view that can be opened at any time from the *Project Browser*. A *Camera* view differs from the default 3D view in that it is a perspective view.

Creating a Camera View:

1. Open file 13-1.rvt and *Save-As* to **13-2.rvt**.
2. Open the **Level 1** view and **Zoom to Fit**, so you can see the entire plan.
3. Select **View** → **Create** → **3D Views** → **Camera**.
4. Click the mouse in the lower right corner of the screen to indicate the camera eye location.



NOTE: Before you click, Revit tells you it wants the eye location first on the Status Bar.

5. Next click near the atrium curtain wall; see Figure 13-2.1.

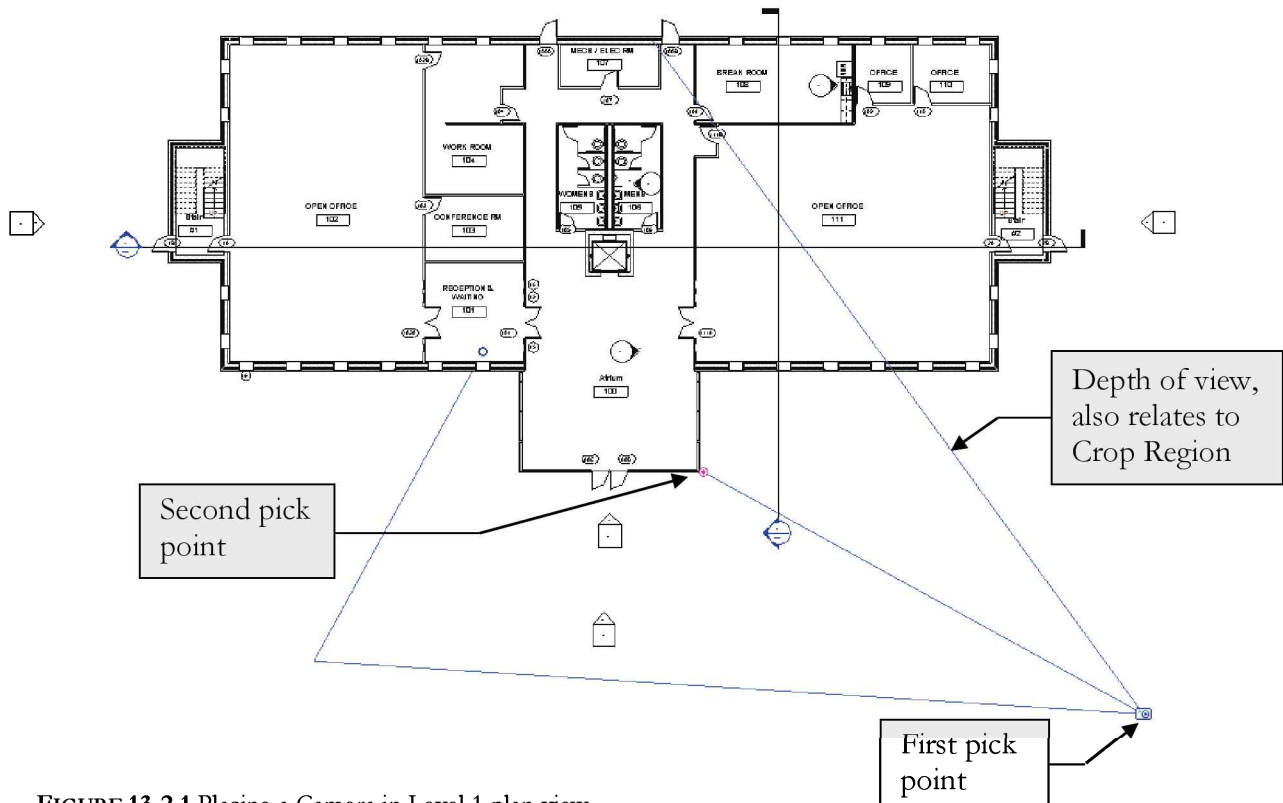


FIGURE 13-2.1 Placing a Camera in Level 1 plan view

Revit will automatically open a view window for the new camera. Take a minute to look at the view and make a mental note of what you see and don't see in the view (Figure 13-2.2).

6. Switch back to the **Level 1** plan view.
7. Adjust the camera, using its grips, to look similar to Figure 13-2.3.

TIP: If the camera is not visible in plan view, right click on the 3D view name in the Project Browser (3D View 1) and select Show Camera.

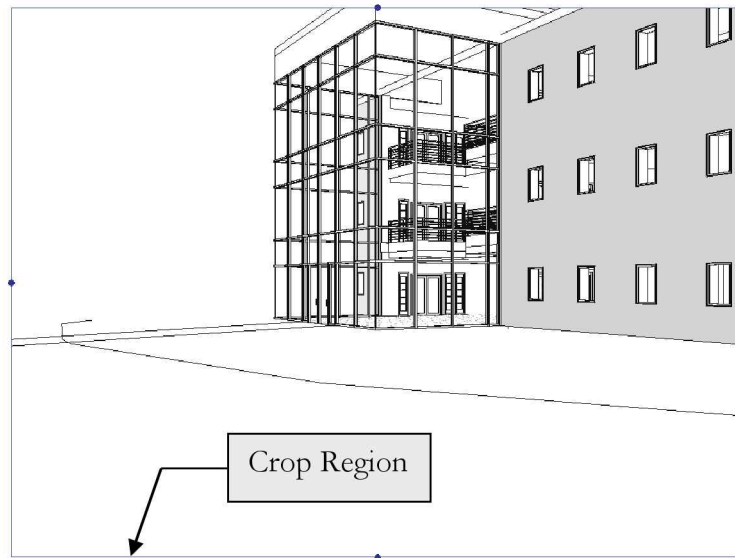


FIGURE 13-2.2 Initial Camera view

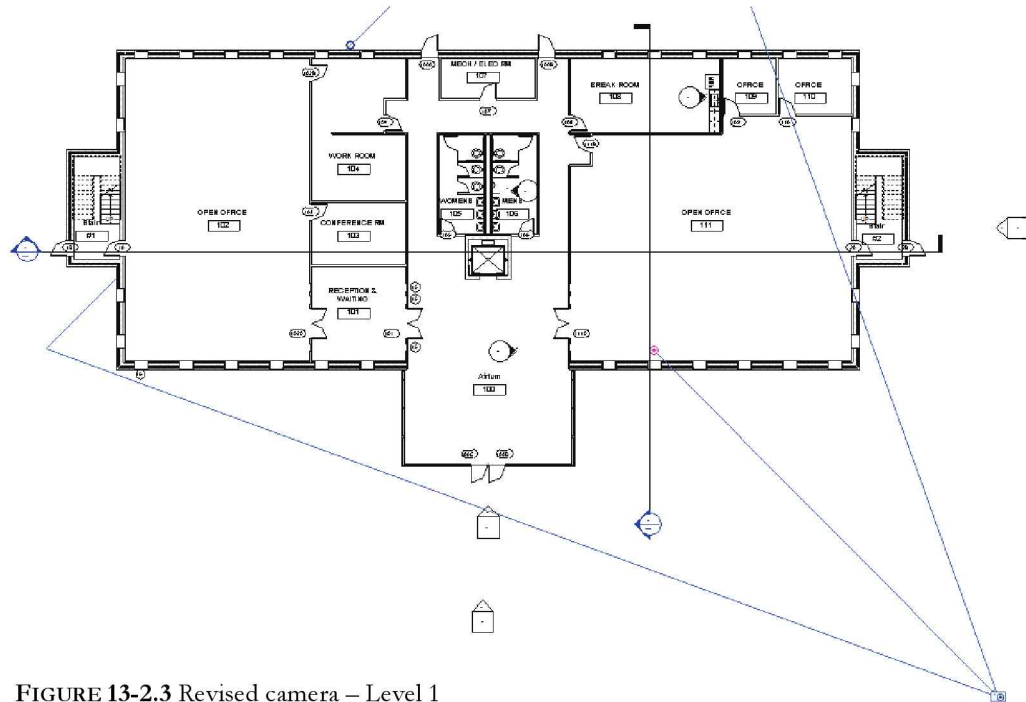


FIGURE 13-2.3 Revised camera – Level 1

8. Now switch to *3D View 1* and adjust the **Crop Region** to look similar to **Figure 13-2.4**. Also, uncheck **Far Clip Active** in the *Properties Palette*.

This will be the view we render later in this exercise.

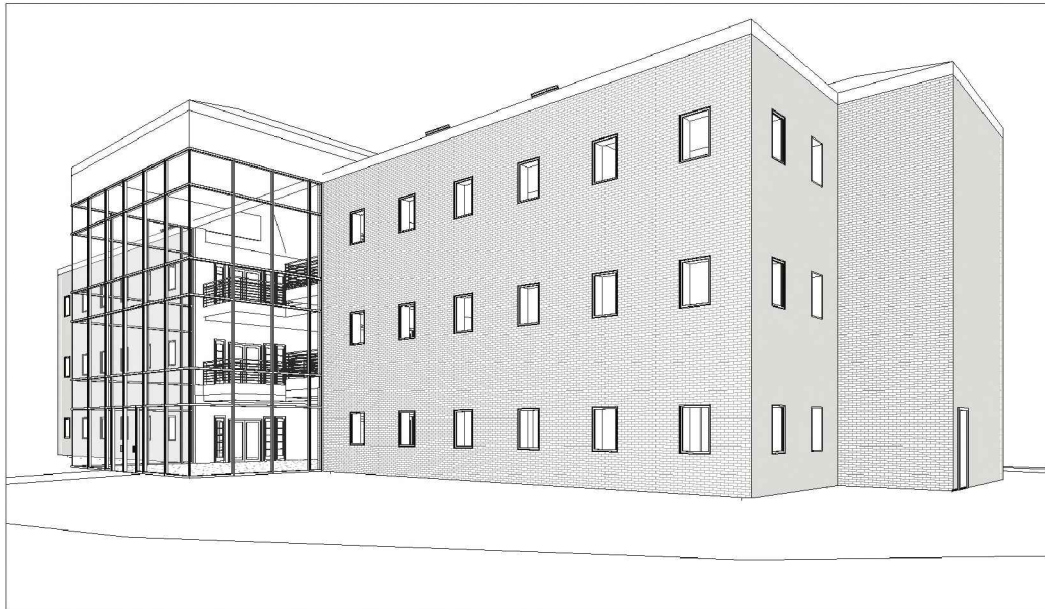


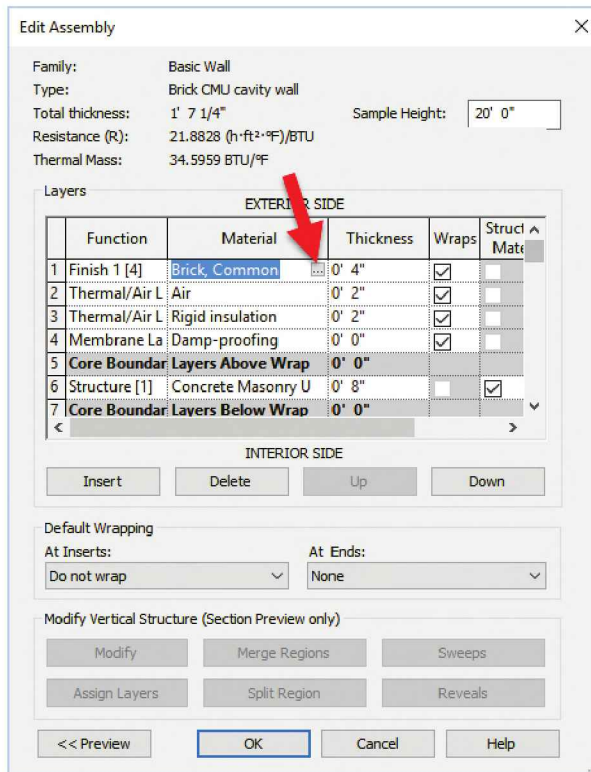
FIGURE 13-2.4 Revised camera – 3D View 1

Assigning Materials to Objects:

Materials are scanned images or computer generated representations of the materials your building will be made of.

Typically materials are added while the project is being modeled. For example, when you create a material (using the *Materials* command on the *Manage* tab), you can assign a material at that time. Of course, you can go back and add or change it later. Next you will change the material assigned for the exterior brick wall.

9. Switch to **Level 1** plan view.
10. Select an exterior wall somewhere in plan view.
11. Click **Edit Type** in the *Properties Palette* and then click **Edit structure**.
12. Notice the material selected for the exterior finish is **Brick, Common**; click in that cell (Figure 13-2.5).



- Click the “...” icon to the right of the label **Brick, Common**.

Now you will take a look at the definition of the material *Brick, Common*.

You are now in the *Materials* dialog. You should notice that a material is already selected on the left. Next you will select a different brick material.

- Click on the **Replace Asset** icon (Step 1 in Figure 13-2.7).

You can browse through the list and select any material in the list to be assigned to the *Brick, Common* material in Revit. The material does not have to be brick but would be confusing if something else were assigned to the *Brick, Common* material.

FIGURE 13-2.5 Exterior wall assembly

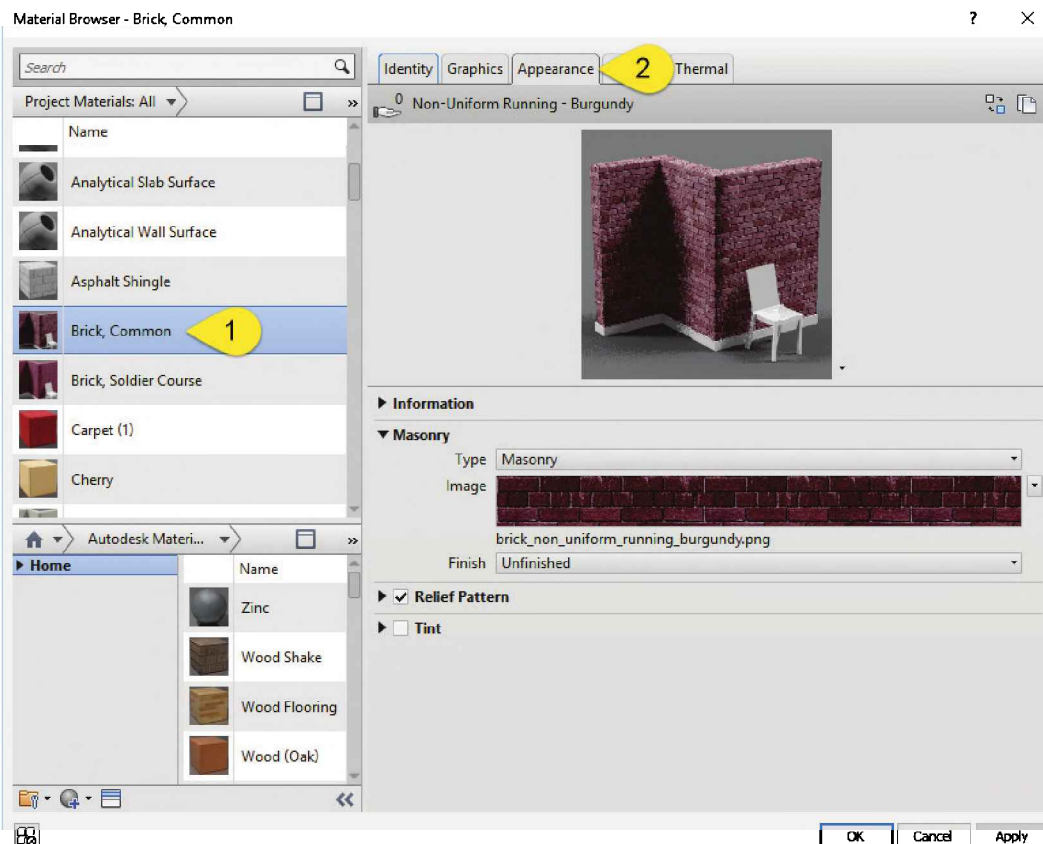


FIGURE 13-2.6 Materials dialog

15. Scroll down in the *Masonry* section and double-click **Non-uniform Running - Red**, and then click the red **X** to close the *Asset Browser* (Figure 13-2.7).

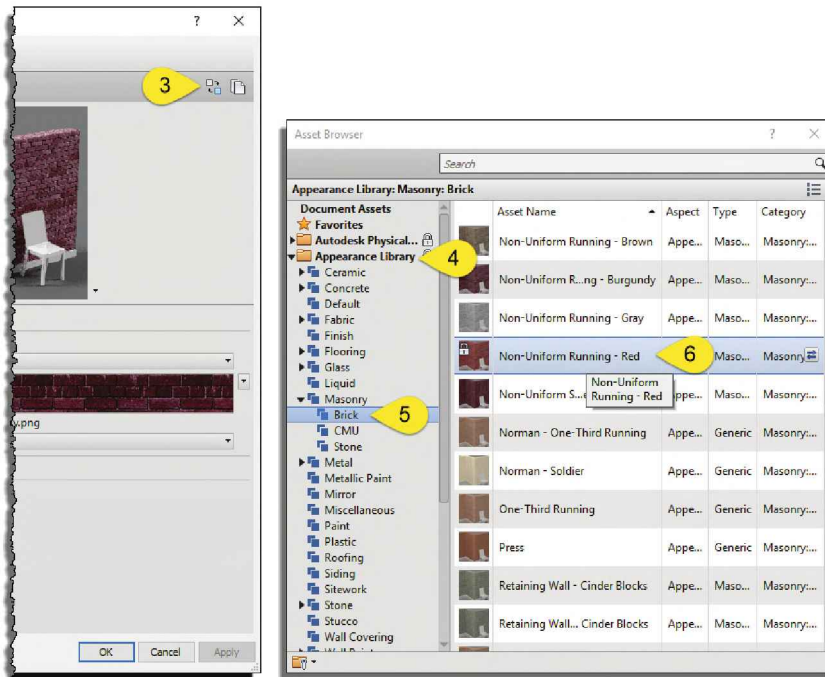


FIGURE 13-2.7 Revit's Asset Library

Notice the material listed is now updated.

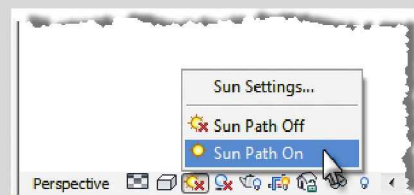
16. Click **OK** to close *all open* dialog boxes.

Now, when you render any element (wall, ceiling, etc.) that has the material *Non-uniform Running - Red* associated with it, will have a red brick appearance.

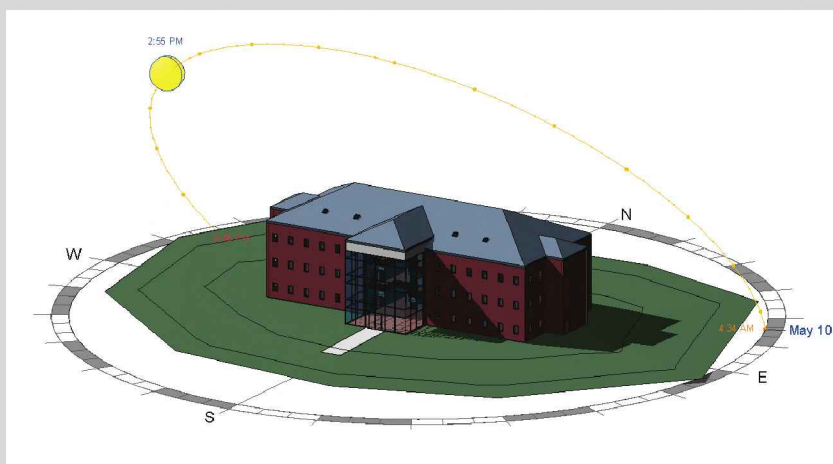
If you need more than one brick color, you assign that material to another wall type.

Sun Path

It is possible to turn on a feature called *Sun Path*. This shows the path of the sun over a day and a year. This is accessed from the *View Control Bar* while in a 3D view.



Once on, you can click and drag the sun along its daily or yearly path!



Project Location:

Next you will specify the project location on the earth. This will make the daylight accurate in your renderings.

17. Select **Manage** → **Project Location** → **Location** from the *Ribbon*.



Location

18. In the *Project Address* field enter **Minneapolis, MN**.

- You may enter your location if you wish.
- It is also possible to enter the actual street address.

19. Press **Enter**.

You should now see an internet based map as shown below, including latitude and longitude.

Location Weather and Site ×

Location Weather Site

Define Location by:

Internet Mapping Service ▼

Project Address:

Minneapolis, MN 1 Search

☐ Use Daylight Saving time

OK
Cancel
Help

FIGURE 13-2.8 Location Weather and Site dialog

20. Click **OK** to save the location settings.

Sun Settings:

Next you will define the sun and shadow settings. You will explore the various options available.

21. Select **Manage** → **Settings** → **Additional Settings** → **Sun Settings** from the *Ribbon*.  Sun Settings

22. Make the following changes (Figure 13-2.9).

- Solar Study*: **Still**.
- Uncheck *Ground Plane* at Level.
- Select **Summer Solstice** on the left.
- Change the year to the current year.

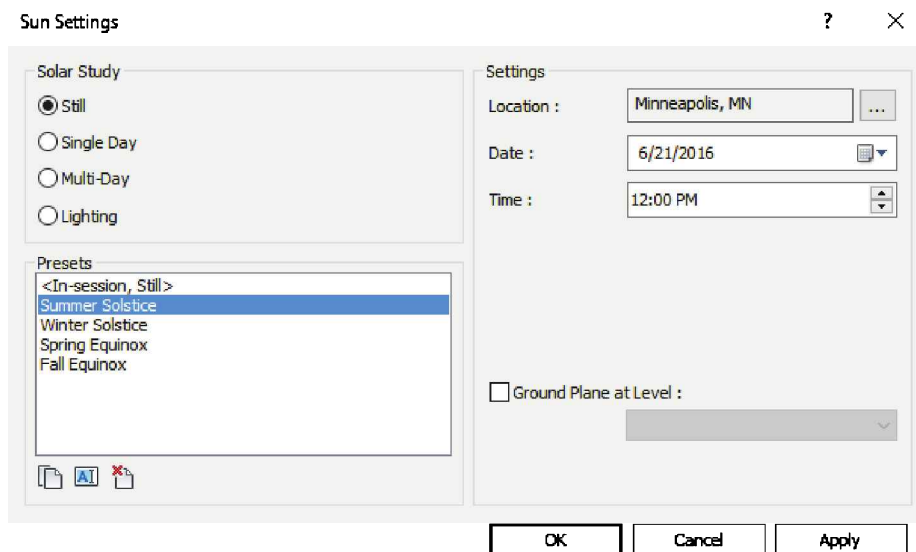


FIGURE 13-2.9 Sun Settings dialog

23. Click **OK** to close the dialog.

Setting Up the Environment:

You have limited options for setting up the building's environment. If you need more control than what is provided directly in Revit you will need to use another program like Autodesk 3DS Max 2017 which is designed to work with Revit and can create extremely high quality renderings and animations; it even has day lighting functionality that helps to validate LEED® (Leadership in Environmental and Energy Design) requirements. You can adjust the lighting and the background.

24. Switch to your camera view **3D View 1** and then select the **Show Rendering Dialog** icon on the *View Control Bar*; it looks like a teapot (Figure 13-2.10).

FYT: This icon is only visible when you are in a 3D view, the same as the Navigation Wheel and ViewCube.

The *Rendering* dialog box is now open (Figure 13-2.11). This dialog box allows you to control the environmental settings you are about to explore and actually create the rendering (which you will do soon!).



FIGURE 13-2.10 Render dialog icon

25. In the *Lighting* section, click the down-arrow next to *Scheme* to see the options. Select **Exterior: Sun and Artificial** when finished (Figure 13-2.12).

The lighting options are very simple choices: is your rendering an interior or exterior rendering and is the light source Sun or Artificial – or both? You may have artificial lights (i.e., light fixtures like the ones you placed in the office) but still only desire a rendering solely based on the light provided by the sun.

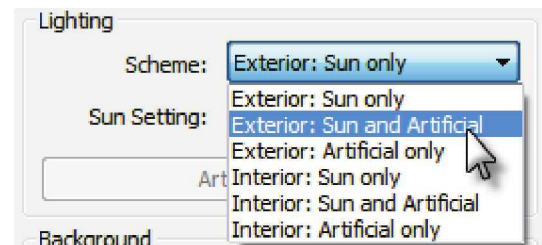


FIGURE 13-2.12 Lighting options

26. In the *Lighting* section, set the *Sun* set to **Summer Solstice**. (This relates to the settings in Figure 13-2.9.)

FYT: In the Sun Settings dialog box, Revit lets you set up various “scenes” which control time of day. Two examples would be:

- *Daytime, summer*
- *Nighttime, window*

Looking back at Figure 13-2.9, you would click *Duplicate* and provide a name. This name would then be available from the *Sun* drop-down list in the *Render* dialog box.

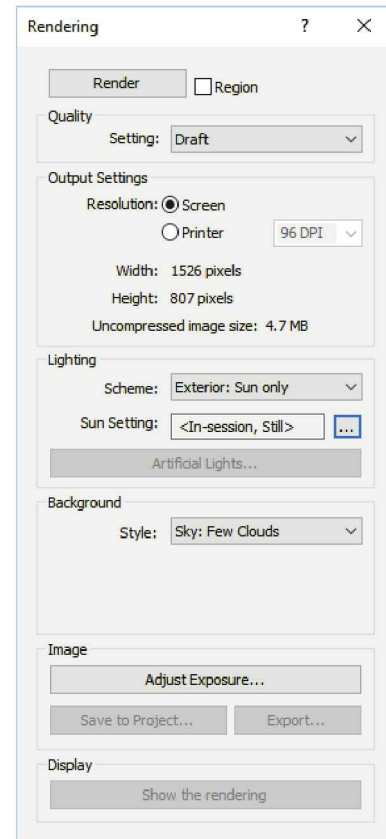


FIGURE 13-2.11 Rendering dialog

27. Click on the **Artificial Lighting** button (Figure 13-2.13).

You will now see a dialog similar to the one shown to the right (Figure 13-2.13).

You will see several 2x4 light fixtures. The light fixtures relate to the fixtures you inserted in the reflected ceiling plans. It is very convenient that you can place lights in the ceiling plan and have them ready to render whenever you need to (i.e., render and cast light into the scene!). Here you can group lights together so you can control which ones are on (e.g., exterior and interior lights).

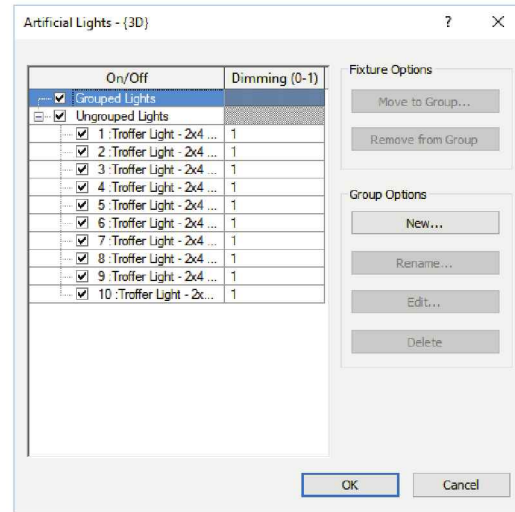


FIGURE 13-2.13 Scene Lighting dialog

28. Click **Cancel** to close the *Artificial Lighting* dialog.
29. Click the down-arrow next to *Style* in the *Background* area (Figure 13-2.14).
30. Select **Sky** (should be the default).

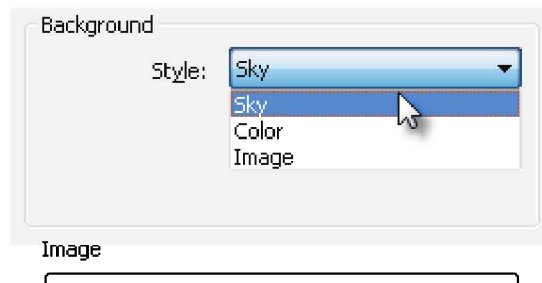


FIGURE 13-2.14 Background style

Notice that for the background, one option is Image. This allows you to specify a photograph of the site or one similar. It can prove difficult getting the perspective just right but the end results can look as if you took a picture of the completed building.

31. Close the *Renderings* dialog by clicking the “X” in the upper right; all your render settings will be saved for this view.

Next you will place a few trees into your rendering. You will adjust their exact location so they are near the edge of the framed rendering so as not to cover too much of the building.

32. Switch to **Site** plan view and select **Architecture → Build → Component → Place a Component** from the *Ribbon*. (Close the *Render* dialog if it is still open.)

33. Pick RPC Tree – Deciduous: Largetooth Aspen 25' from the *Type Selector* on the *Ribbon*.

FYT: If the tree is not listed in the Type Selector, click Load Family and load the deciduous tree family from the Plantings folder.

34. Place three trees as shown in **Figure 13-2.15**. (You will make one smaller in a moment.)

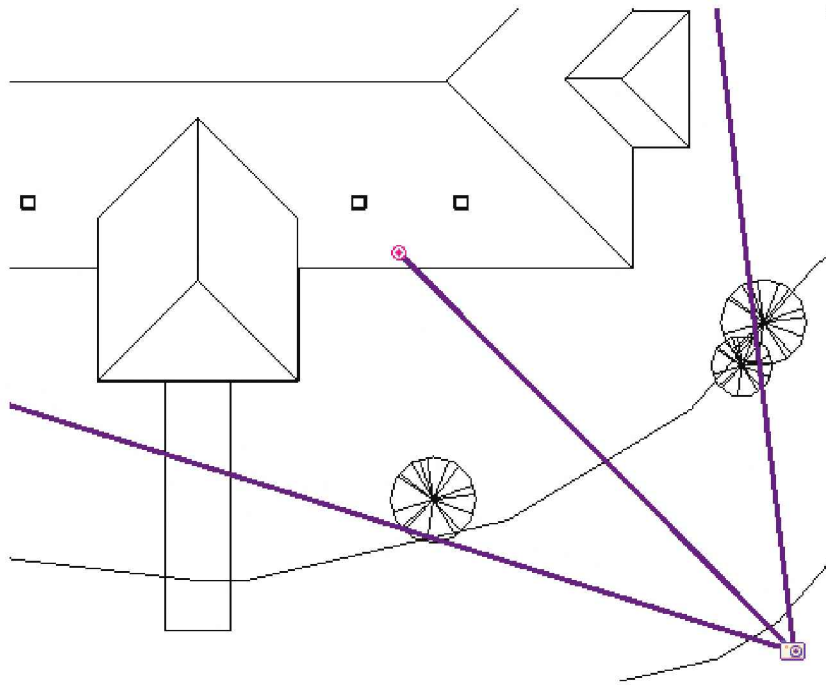


FIGURE 13-2.15 Level 1 with trees added

35. Adjust the trees in plan view, reviewing the effects in the 3D View 1 view, so your 3D view is similar to Figure 13-2.16.
36. In the Level 1 plan view, select the tree that is shown smaller in **Figure 13-2.14**.
37. Select **Edit Type** on the *Properties Palette*. Click **Duplicate** and enter the name RPC Tree – Deciduous: Largetooth Aspen 18'.



Images courtesy of LHB (www.LHBcorp.com)

38. Change the *Height* to **18'** (from 25') and then click **OK** to close the open dialog box.

The previous three steps allow you to have a little more variety in the trees being placed. Otherwise, they would all be the same height, which is not very natural.

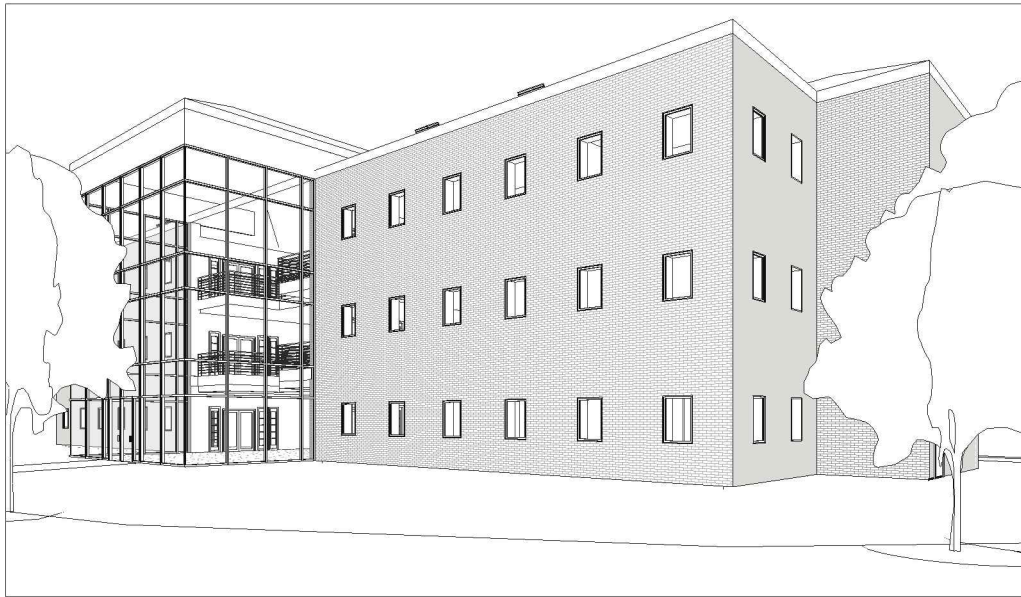


FIGURE 13-2.16 3D View 1 – with trees

39. Open the **3D View 1** camera view.
40. Open the **Rendering** dialog again.
41. Make sure the *Quality* is set to **Draft**.

FYT: The time to process the rendering increases significantly as the quality level is raised.

42. Click **Render** from the *Rendering* dialog box.

You will see a progress bar while Revit is processing the rendering (Figure 13-2.17).

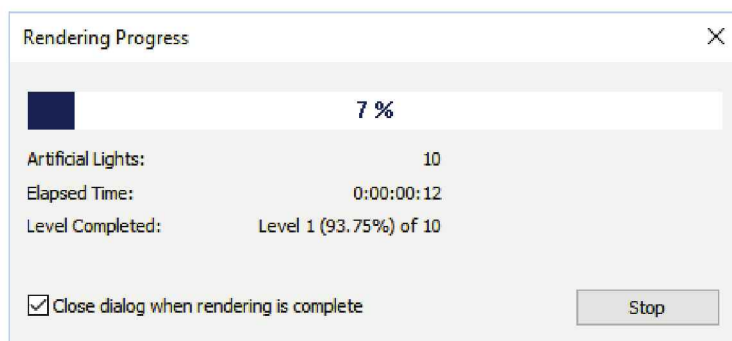


FIGURE 13-2.17 Rendering progress

After a few minutes, depending on the speed of your computer, you should have a rendered image similar to Figure 13-2.18 below. You can increase the quality of the image by adjusting the quality setting in the *Render* dialog. However, these higher settings require substantially more time to generate the rendering. The last step before saving the Revit project file is to save the rendered image to a file.

FYT: Each time you make changes to the model, you will have to re-render the view to get an updated image. Depending on exactly how your view was set up, you may be able to see light from one of the light fixtures in the office off the Atrium. Also, notice the railing through the curtain wall; Revit has the glass in the windows set to be transparent!

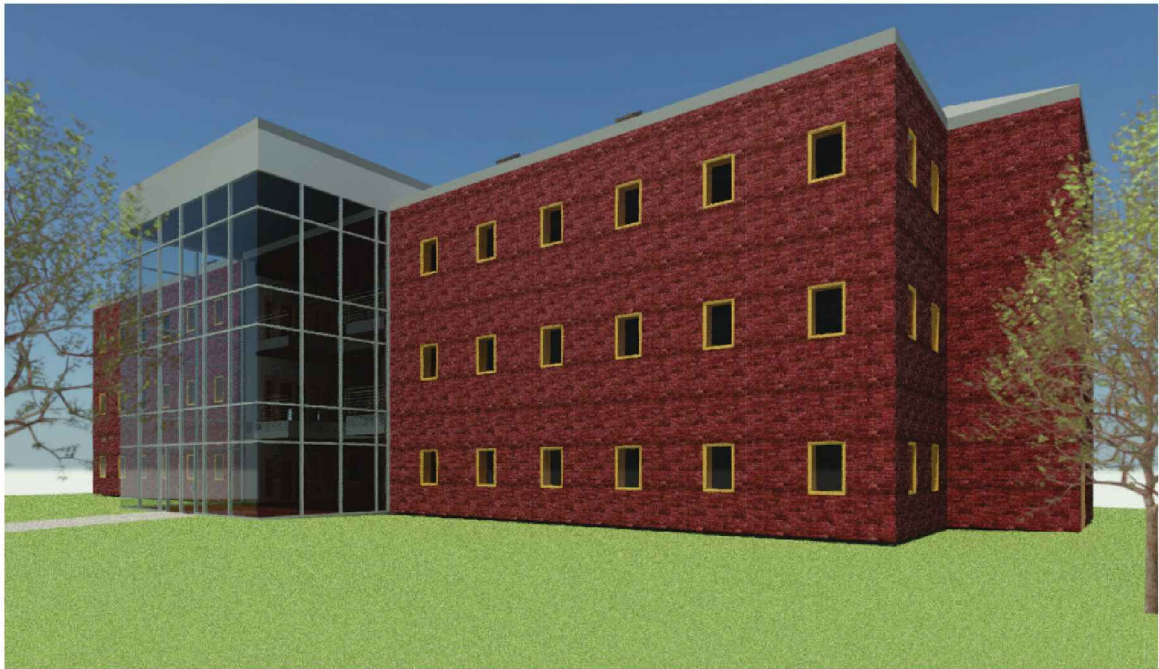


FIGURE 13-2.18 Rendered view

43. From the *Rendering* dialog select **Export**.

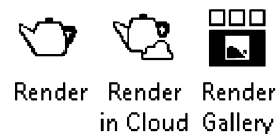
FYT: The “Save to Project” button saves the image within the Revit Project for placement on Sheets. This is convenient, but it makes the project size larger, so you should delete old ones!

44. Select a *location* and provide a *file name*.

45. Set the *Save As* type to **JPEG**.

46. Click **Save**.

47. If you are a student or work for a company who has Autodesk Subscription, try using the **Render in Cloud** tool on the *View* tab. Adjust the settings to the maximum resolution to see how fast it will render. Click the **Render Gallery** button to see the results! **Note:** You must log into *Autodesk 360* first.



The image file you just saved can now be inserted into MS Word or Adobe Photoshop for editing. Try rendering again with the quality and printer DPI increased, e.g., Medium and 300dpi.

Exercise 13-2:

Rendering an Isometric in Section

This exercise will introduce you to a view tool called *Section Box*. This tool is not necessarily related to renderings, but the two tools together can produce some interesting results. The Section Box works in any 3D, even camera views. This can be used throughout the design process to better visualize your model.

Setting up the 3D View:

1. Open file ex13-2.rvt and **Save As ex13-3.rvt**.
2. Switch to the *Default 3D* view via the 3D icon on the *QAT* (not the *3D View 1* from Exercise 13-2).
3. Make sure nothing is selected so the *Properties Palette* is showing the **View Properties**.
4. Activate the **Section Box** parameter and then click **OK**.

You should see a box appear around your building, similar to Figure 13-3.1. When selected, you can adjust the size of the box with its grips. Anything outside the box is not visible. This is a great way to study a particular area of your building while in an isometric view. You will experiment with this feature next.

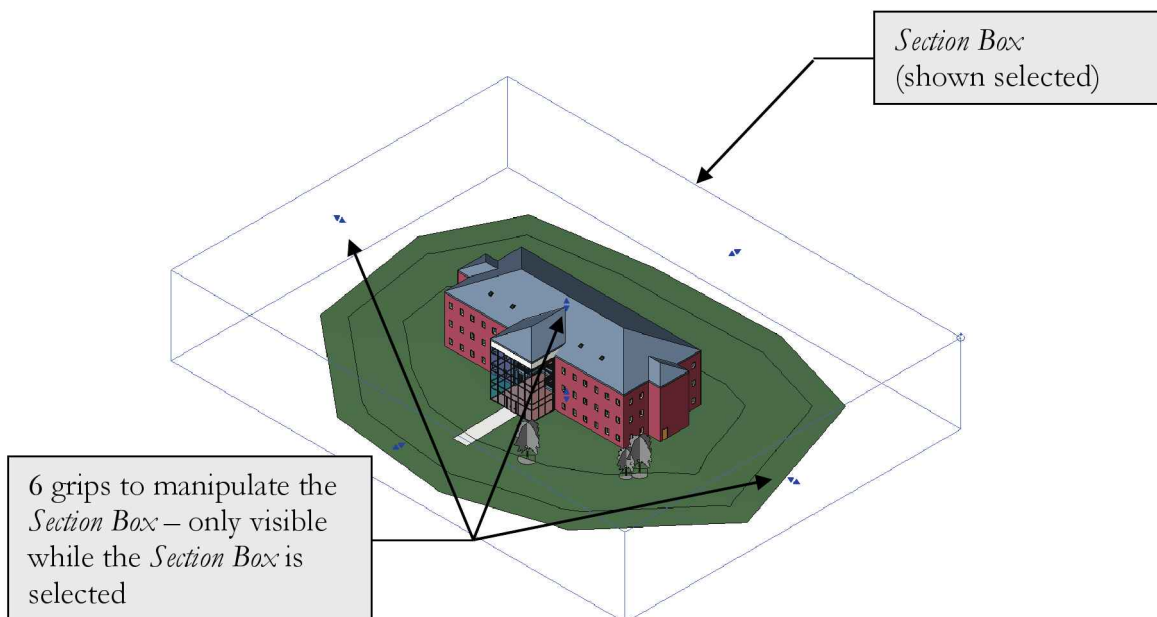


FIGURE 13-3.1 3D view with Section Box activated

5. To practice using the **Section Box**, drag the grips around until your view looks similar to **Figure 13-3.2**.

*TIP: This will require the **VienCube** tool as well.*

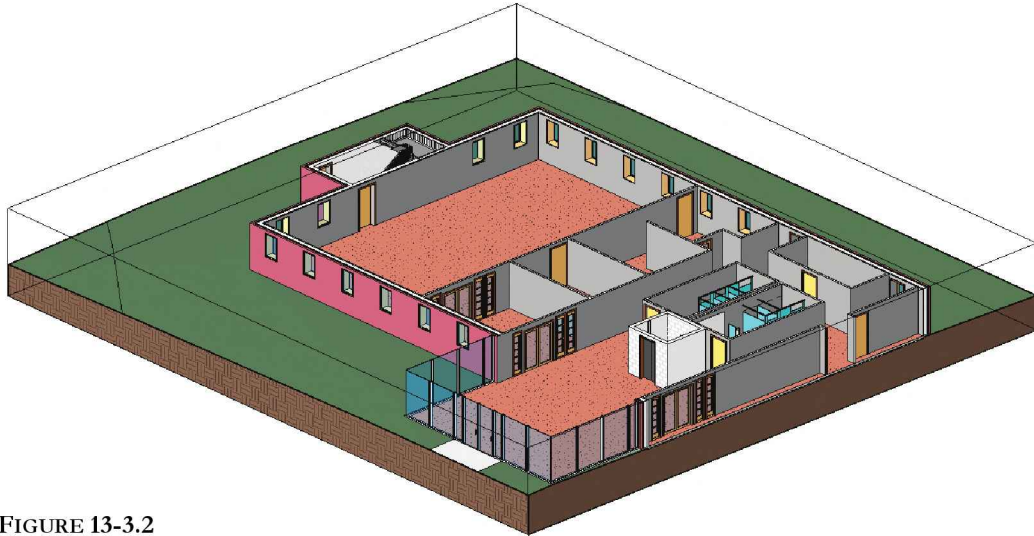


FIGURE 13-3.2
3D view with adjusted Section Box

This creates a very interesting view of the Level 1 – West Wing. What client would have trouble understanding this drawing? Notice the ground in section as well.

6. Now re-adjust the **Section Box** to look similar to **Figure 13-3.3**. Notice toilet room is visible.

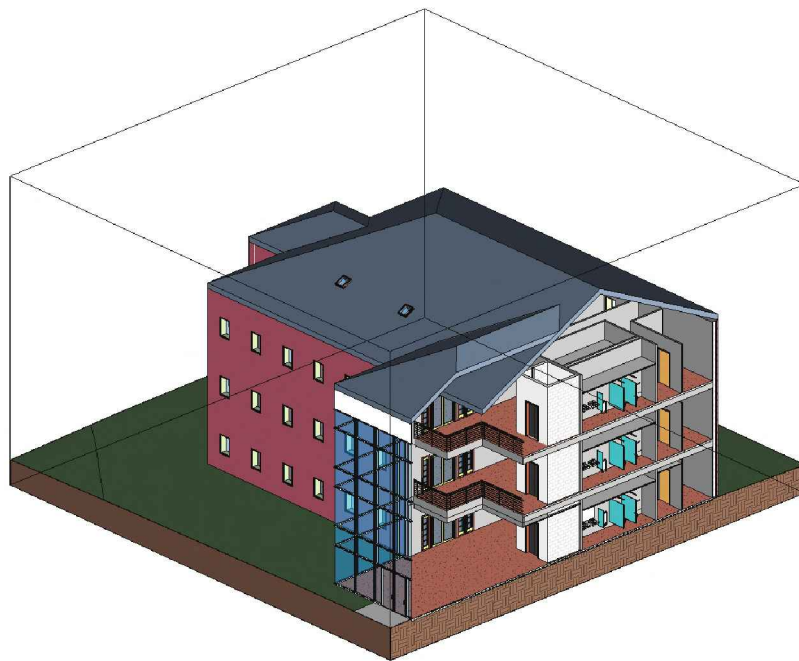


FIGURE 13-3.3
3D view

7. From the *Manage* tab, select *Additional Settings\Sun Settings* and change the following *Sun* settings (Figure 13-3.4):
 - a. Click **Duplicate** (name: 28 February 8am)
(*Must select something other than <In-session> first*)
 - b. *Date:* **2/28/2016**
 - c. *Time:* **8:00am**

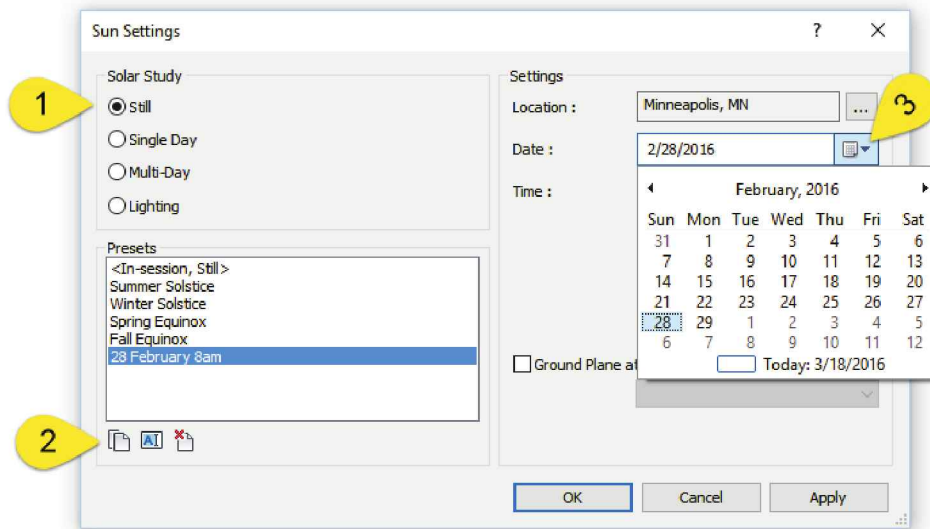
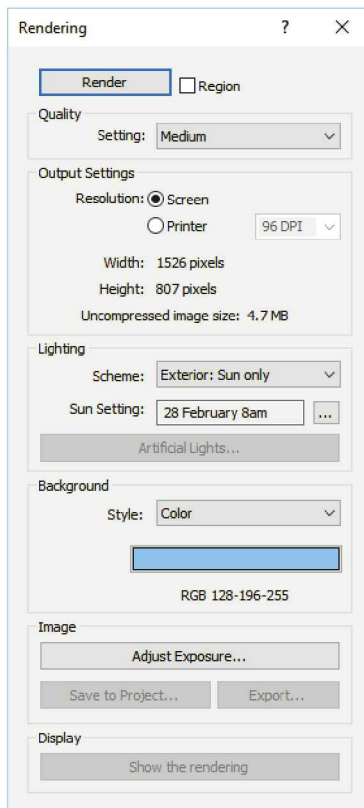


FIGURE 13-3.4 Modified Sun settings



8. Select the **Render** icon, set the *Quality* to **Medium**, select the *Scheme* **Exterior: Sun only**, and then set *Sun* to **23 February 8am**.
9. Set the *Background Style* to **Color**. Leave the default color as is.
10. Select the **Region** option and then adjust the “render region crop” that appears to indicate the area to be rendered.

TIP: This tool is nice for checking a material before rendering the entire building, which takes longer.

11. Click **Render** to generate a rendered image.

The image will take a few minutes to render (again, depending on the speed of your computer). When finished it should look similar to **Figure 13-3.5**. The image looks much better on the screen or printed in color.

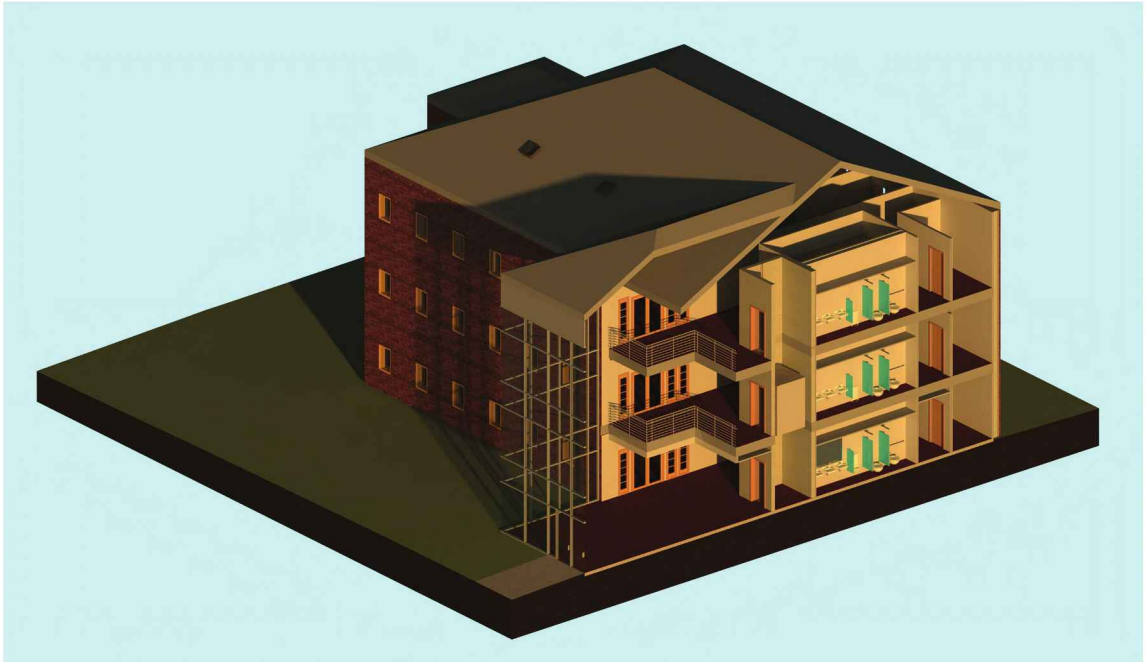


FIGURE 13-3.5 Rendered isometric view

Adjusting an Element's Material:

As previously mentioned, most elements already have a material assigned to them. This is great because it allows you to quickly render your project to get some preliminary images. However, they usually need to be adjusted. You will do this next.

12. Switch to **Level 1** plan view and zoom in on the toilet rooms.
13. Select one of the toilet partitions.
14. Click the **Edit Type** button in the *Properties Palette*.

Notice the toilet partition material is set to *Toilet Partition*. This value is a material; you will change this next (Figure 13-3.6).

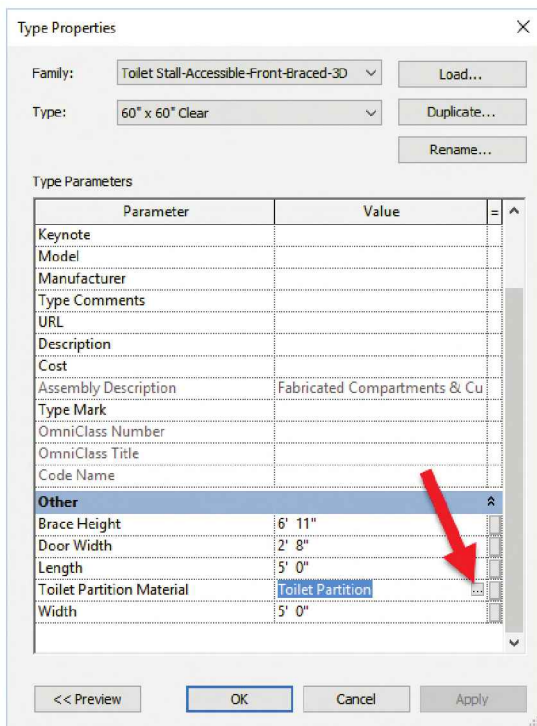


FIGURE 13-3.6 Toilet Partition properties

15. **Click** on the Toilet Partition value (which will cause a “...” icon to display to the right); click the icon.

You are now in the *Materials* dialog box where you can create and edit *Materials*.

16. Select **Toilet Partition** (if not already selected on the left).
17. Change the *Render Appearance* to *Stone - Granite, Polished - Black* (Figure 13-3.7).

TIP: Try using the search box near the top, and type “Granite.”

18. Close the open dialog boxes.

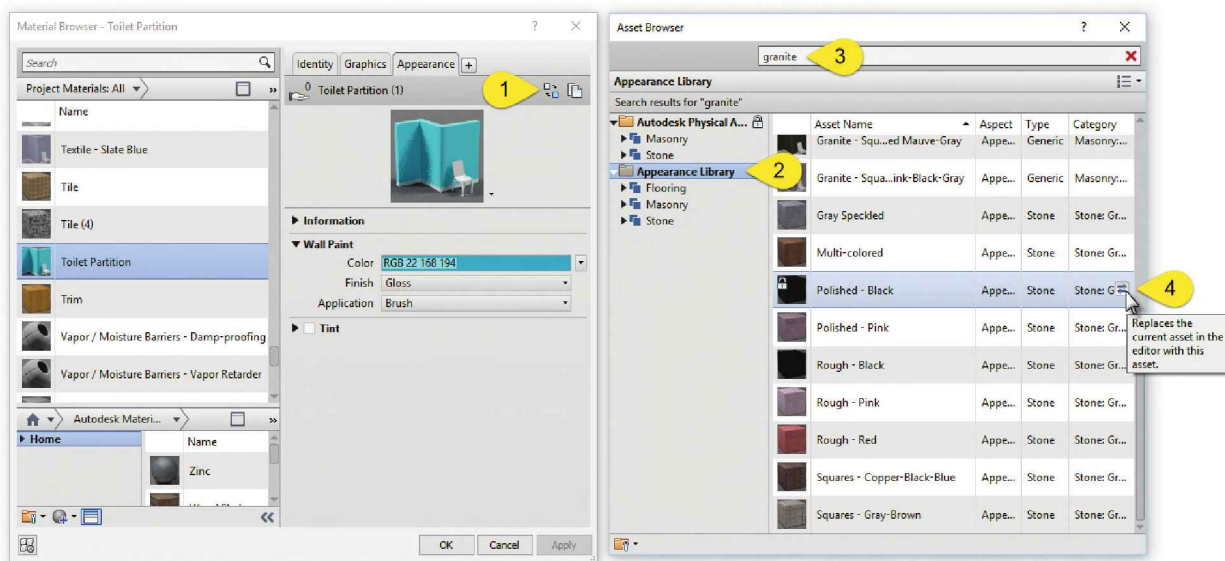


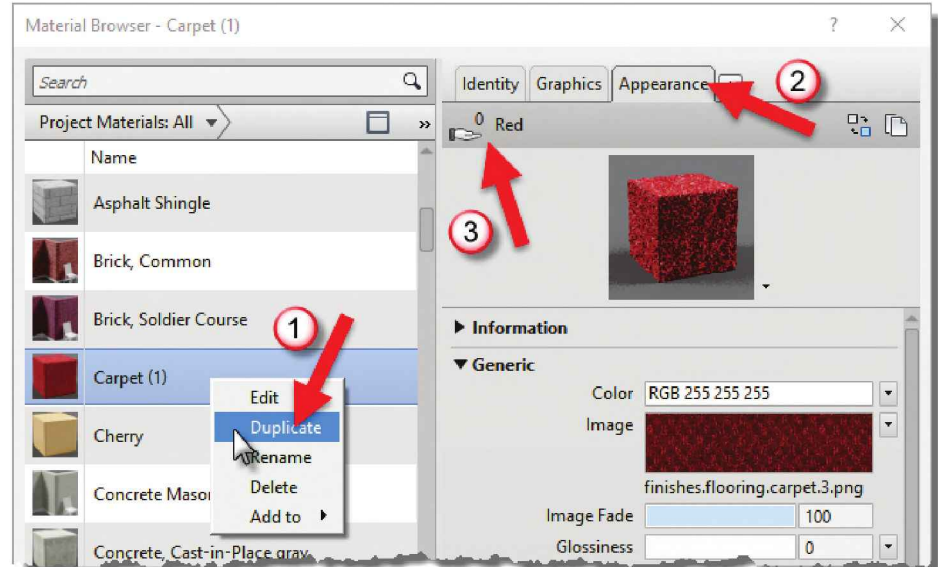
FIGURE 13-3.7 Material selection

19. You can now re-render the 3D view and see the results.
20. **Save** your project as ex **13-3.rvt**.

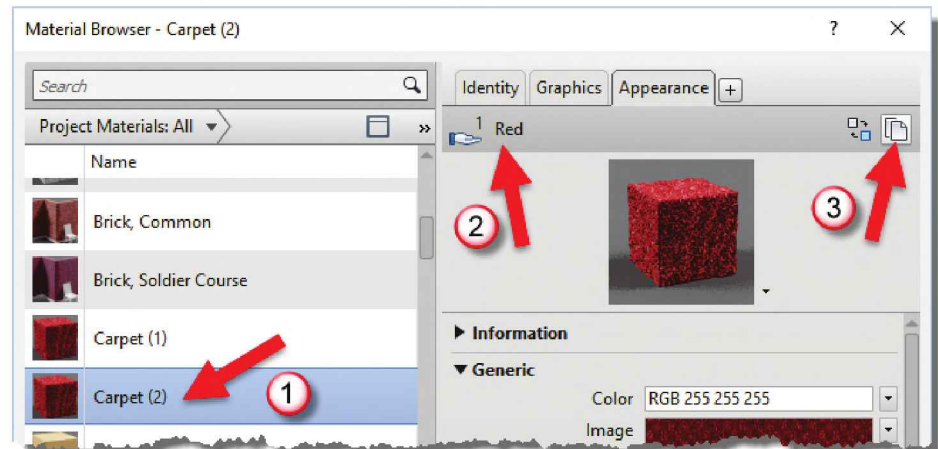
Duplicating a Material:

It is important to know how to properly duplicate a *Material* in your model so you do not unintentionally affect another *Material*. The information on this page is mainly for reference and does not need to be done in your model.

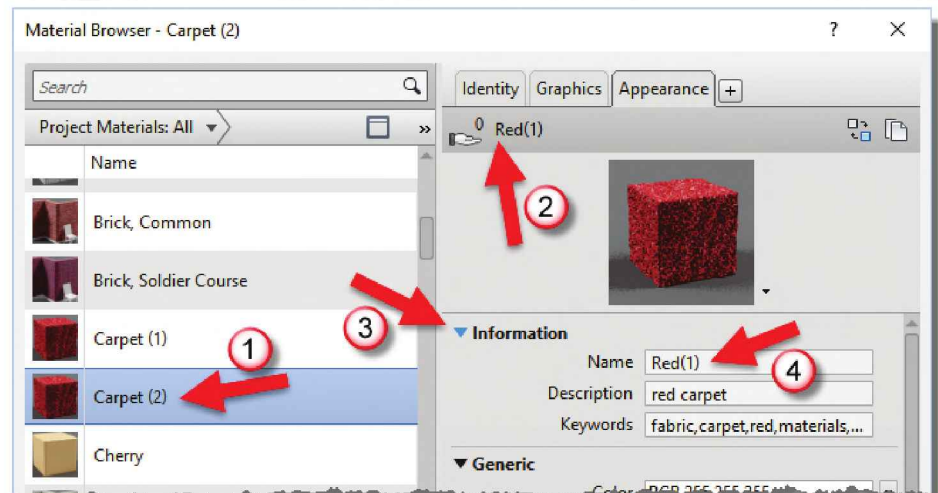
If you **Duplicate** a *Material* in your model, the **Appearance Asset** will be associated to the new *Material* AND the *Material* you copied it from! For example, in the first image (the right), we will right-click on Carpet (1) and duplicate it. Before we duplicate it, notice the *Appearance Asset* named “RED” is not shared (arrow #3).



Once you have duplicated a *Material*, notice the two carpet materials, in this example (second image), now indicate they both share the same *Appearance Asset*. Changing one will affect the other. Click the **Duplicate this asset** icon in the upper right (arrow #3).



Once the *Appearance Asset* has been duplicated (third image), you can expand the information section and rename the asset. You can now make changes to this material without affecting other materials.



Exercise 13-4:

Creating an Interior Rendering

Creating an interior rendering is very similar to an exterior rendering. This exercise will walk through the steps involved in creating a high quality interior rendering.

Setting up the Camera View:

1. Open ex13-3.rvt and **Save As** ex13-4.rvt.
2. Open **Level 2** view.
3. From the *QAT*, select **3D View → Camera**.
4. Place the *Camera* as shown in **Figure 13-4.1**.

Revit uses default heights for the camera and the target. These heights are based on the current level's floor elevation. These reference points can be edited via the camera properties.

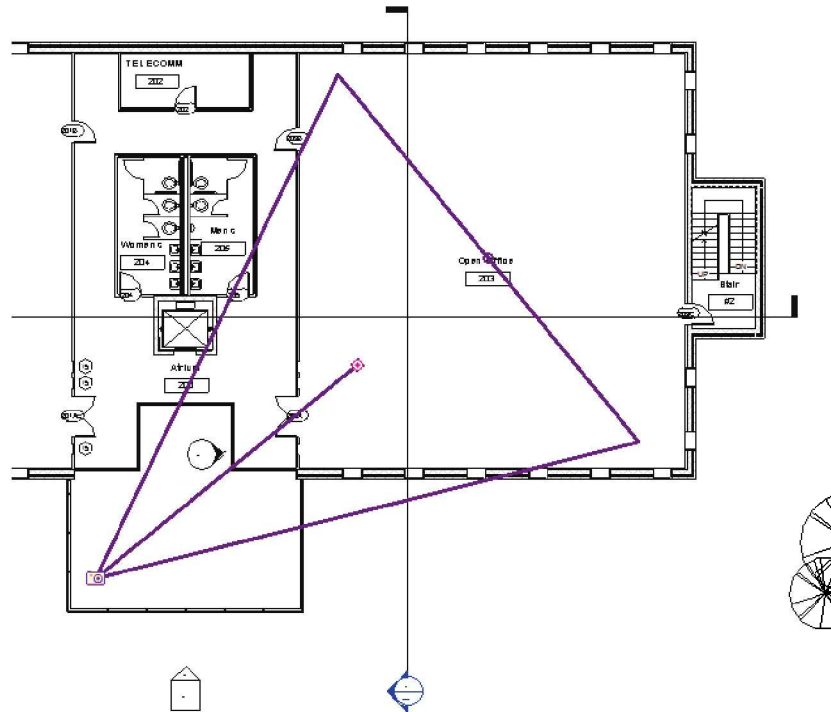


FIGURE 13-4.1 Camera placed – Level 2 view

Revit will automatically open the newly generated camera view. Your view should look similar to **Figure 13-4.2**.

FYT: Make sure you created the camera on Level 2 and picked the points in the correct order.

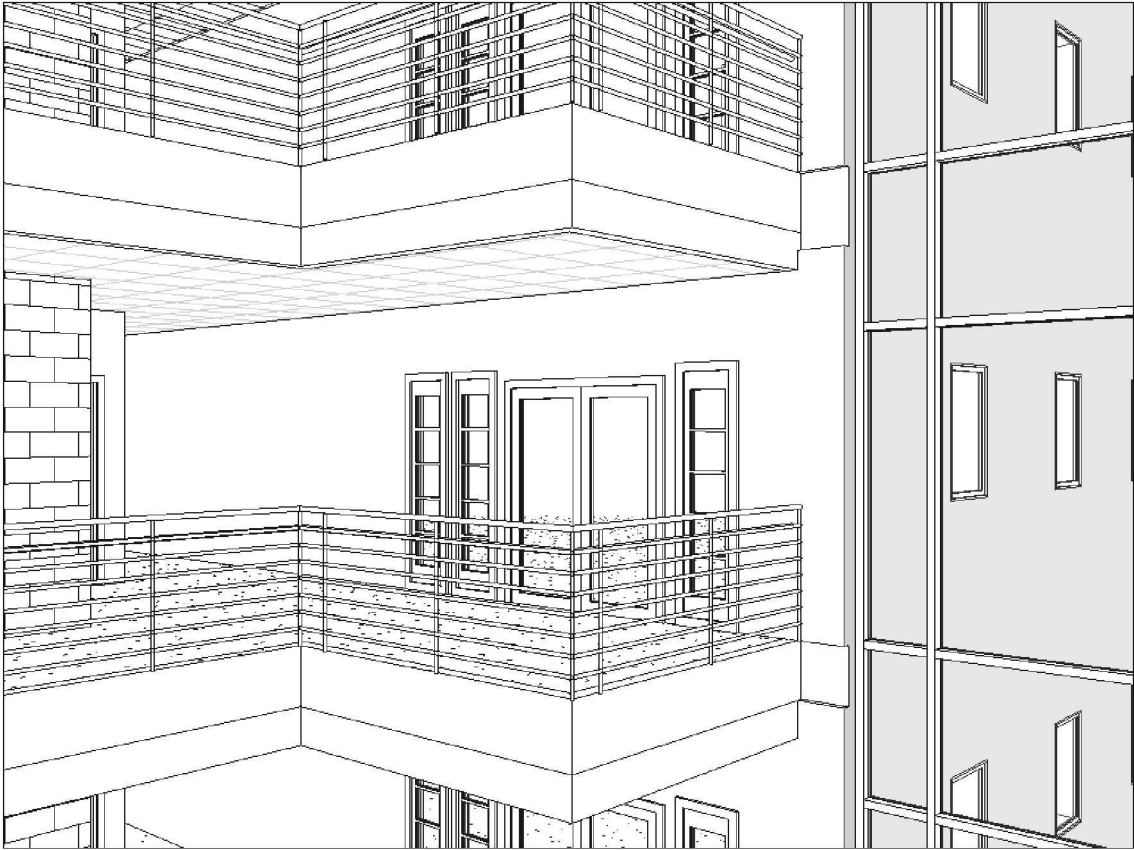


FIGURE 13-4.2 Material selector

5. Using the **Crop Region** rectangle, modify the view to look like **Figure 13-4.3**.

***TIP:** You will have to switch to plan view to adjust the camera's depth of view to see the trees.*

***REMEMBER:** If the camera does not show in plan view, right-click on the camera view label in the project browser and select Show Camera. If you did not add a ceiling to the third floor lobby previously, you should do that now.*

***FYT:** A ceiling was added at the second and third levels in this image to "clean" things up for the rendering.*

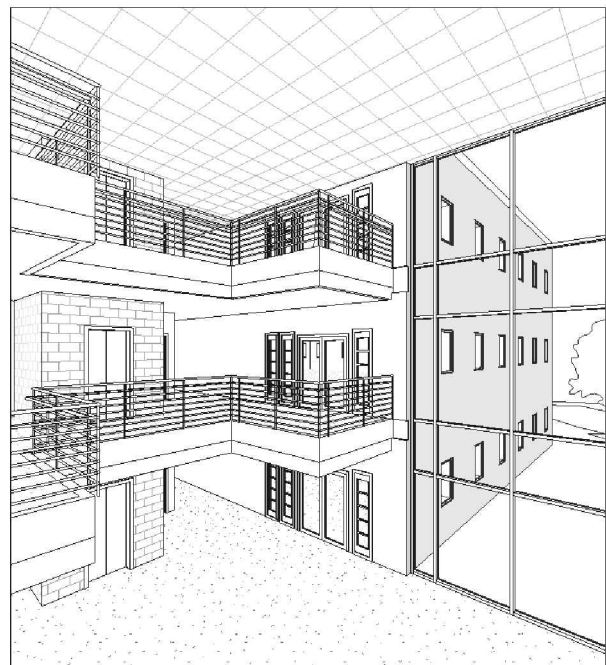


FIGURE 13-4.3 Modified interior camera

- Switch back to **Level 2** to see the revised *Camera* view settings; if you cannot see the camera, right-click on the camera view name in the *Project Browser* and select **Show Camera** from the pop-up menu that appears.

Notice the field of view triangle is wider based on the changes to the Crop Region (Figure 13-4.4).

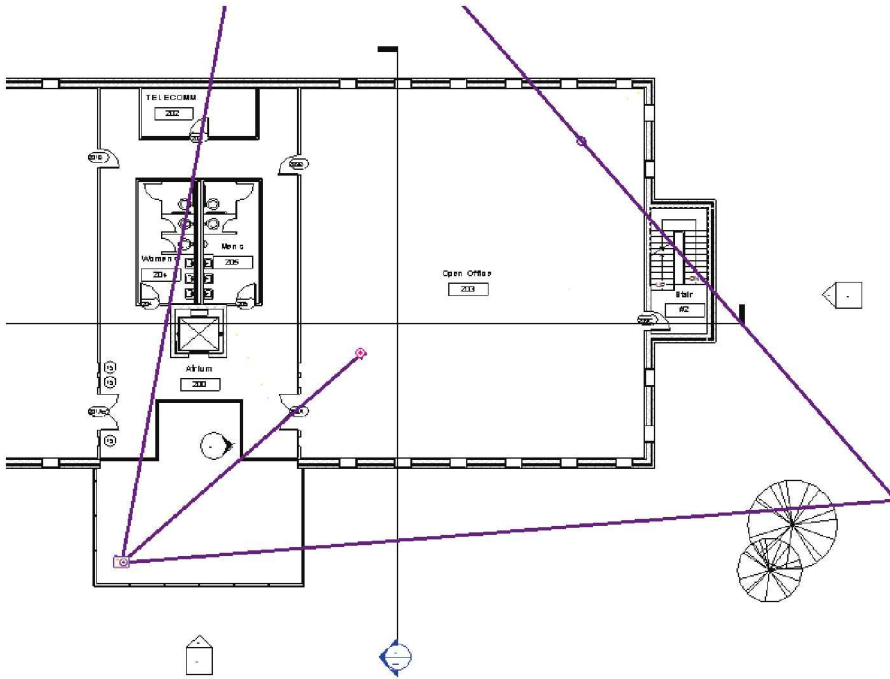


FIGURE 13-4.4 Modified camera – Level 2

- Select the *Camera* in the level 2 plan view.
- Change the **Eye Elevation** to **5'-6"** (Figure 13-4.5).
- Click **Apply**.

Your interior camera view should now look similar to **Figure 13-4.6**. This would be a person standing on Level 1 looking up. The vertical lines are distorted due to the wide field of view (crop region). This is similar to what a camera with a 10-15mm lens would get in the finished building.

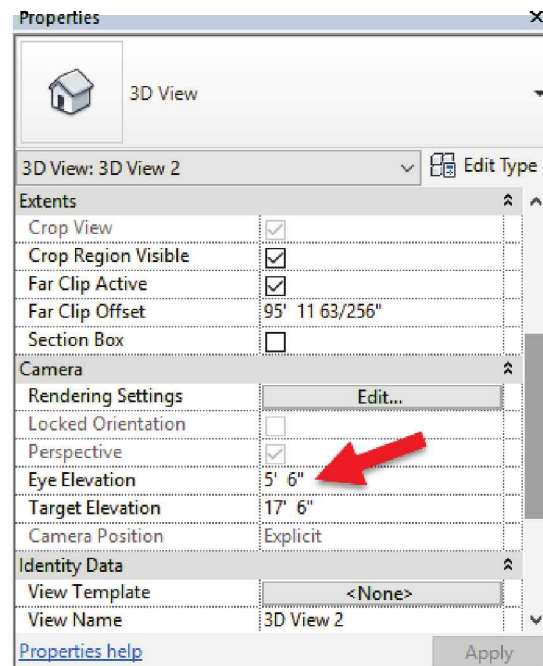


FIGURE 13-4.5 Camera properties

Creating the rendering:

Next you will render the view.

10. Select **Show Render Dialog** from the *View Control Bar*.
11. Set the *Scheme* to **Interior: Sun only**.
12. Set the *Sun Setting* to **Lighting: Sunlight from Top Right**.
13. Click **Render** to begin the rendering process.

This will take several minutes depending on the speed of your computer. When finished, the view should look similar to Figure 13-4.7.

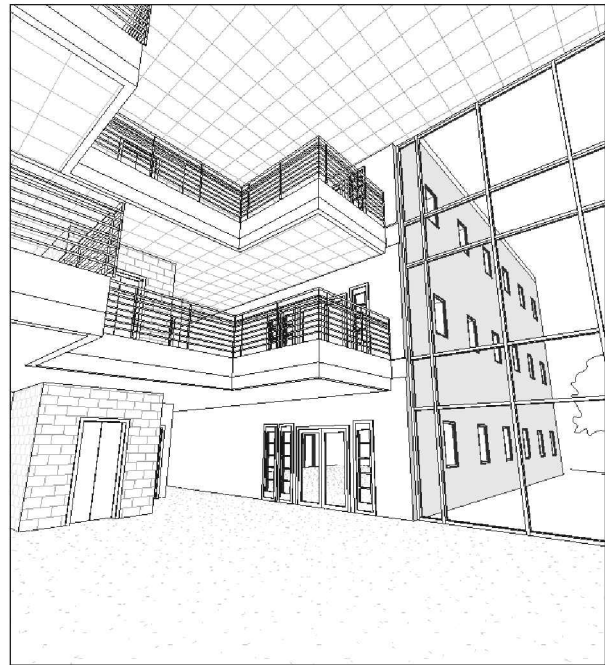


FIGURE 13-4.6 Interior camera view

14. Click **Export** from the *Rendering* dialog box to save the image to a file on your hard drive. Name the file **Atrium.jpg** (jpeg file format).

You can now open the *Atrium.jpg* file in Adobe Photoshop or insert into MS Word to manipulate or print.

To toggle back to the normal hidden view, click **Show the Model** from the *Rendering* dialog box.

There are many things you can do to make the rendering look even better. You can add interior light fixtures and props (e.g., pictures on the wall, items on the countertop, and lawn furniture). Once you add interior lights, you can adjust the Sun setting to nighttime and then render a night scene.

TIP: Setting the output to Printer rather than Screen allows you to generate a higher resolution image. Thus, between the Quality setting and the output setting you can create an extremely high quality rendering, but it might take hours, if not days, to process!

Revit also gives you the ability to set a material to be self-illuminating. This will allow you to make a button on the dishwasher look like it is lit up or, if applied to the glass on the range door, like the light in the oven is on! You can also set a lamp shade to glow when a light source has been defined under it so it looks more realistic.

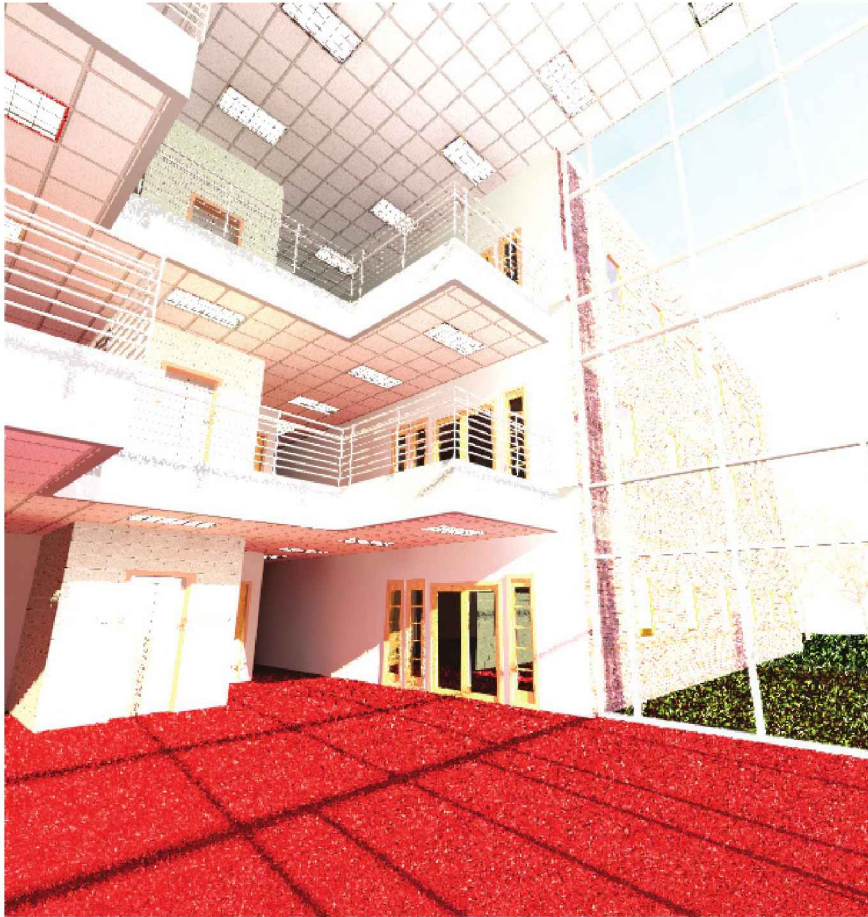


FIGURE 13-4.7 Rendered view (draft quality)

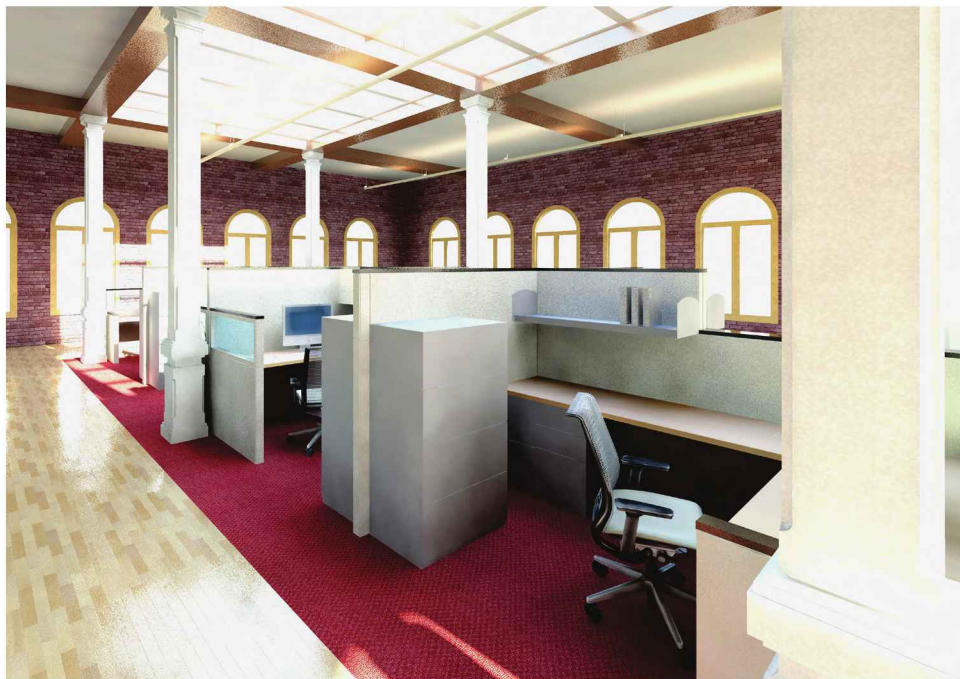
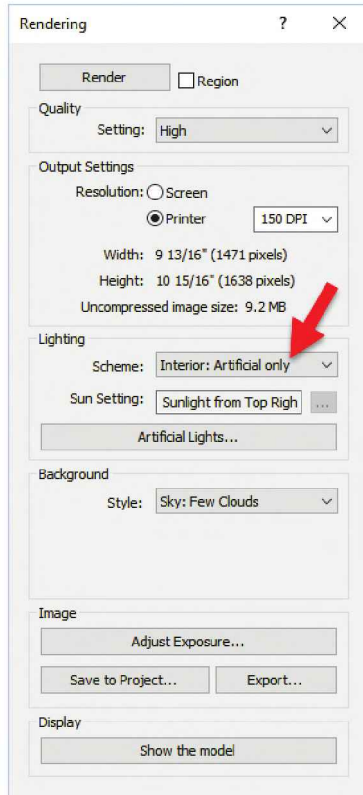


Image courtesy of LHB (www.LHBcorp.com)

Rendering a Night Scene:

One more variation we will look at is rendering the interior atrium view at nighttime. This involves adjusting the sun settings so the Sun is not considered and making sure you have the correct number of light fixtures to light the space being rendered.



15. Add Ceilings and light fixtures to Levels 2 and 3 per steps covered in previous chapters.
16. Open the *Rendering* dialog box.
17. Make the adjustments shown in the image to the left. Make sure Scheme is set to **Interior: Artificial Only**.
18. While in the camera view for the Atrium, click on the **Render** button.

When the rendering is completed you will have a night view of your interior atrium. This clearly shows the effect the 2x4 light fixtures have on the rendering, as they are the primary light source for this rendering. Your image should look similar to **Figure 13-4.8**.

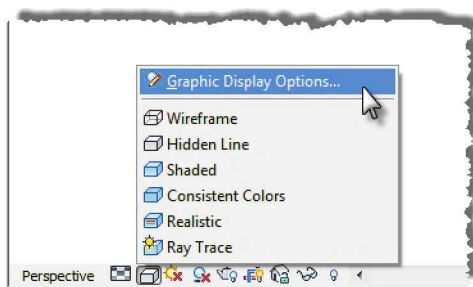
You can also try this (especially if you have placed light fixtures for the entire building) on your exterior camera view. Nighttime renderings can be very dramatic.

The image to the right is a pool created and rendered in Revit. The rendering is only using artificial lights and the “water” material is distorting the pool light and the striping on the bottom of the pool.





FIGURE 13-4.8 Rendered nighttime view



TIP: Setting the Visual Style to realistic can produce nice results without doing a rendering. Clicking the Graphic Display Options, see image to the left, allows you to turn on a feature called Show Ambient Shadows and/or Cast Shadows. Both of these settings help to produce a more realistic look without doing a rendering. This can make the view slow but not other views.

You will learn how to add people in the next lesson!

Notice you can see reflections in the curtain wall glass. Revit accurately renders reflective surfaces like glass and shiny or polished metal (like the elevator doors). This creates a more realistic rendering.

19. **Save** your project as **13-4.rvt**.

Exercise 13-4:**Adding People to Rendering**

Revit provides a few RPC (Rich Photorealistic Content) people to add to your renderings. These are files from a popular company that provides 3D photo content for use in renderings (<http://www.archvision.com>). You can buy this content in groupings (like college students) or per item. In addition to people, they offer items like cars, plants, trees, office equipment, etc.

Loading Content into Current Project

1. Open ex13-4.rvt and **Save As 13-5.rvt**.
2. Switch to **Level 2** view.
3. Select **Component** → **Place a Component**.
4. Click the **Load Family** button on the *Ribbon*.
5. Browse to the **Entourage** folder and select both the **RPC Male** and **RPC Female** files (using the *Ctrl* key to select both at once) and click **Open**.
6. Place one **Male** and one **Female** as shown in **Figure 13-5.1**.

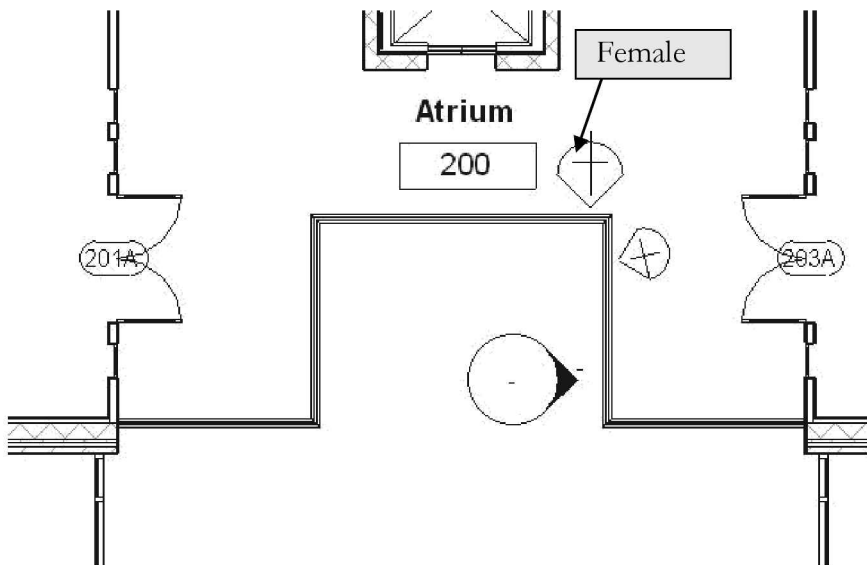


FIGURE 13-5.1 Level 2 – RPC people added

The line in the circle (Figure 13-5.1) represents the direction a person is looking. You simply rotate the object to make adjustments.

7. Switch to **Level 1** view.
8. Place a few of the other people available (similar to Fig. 13-5.3).

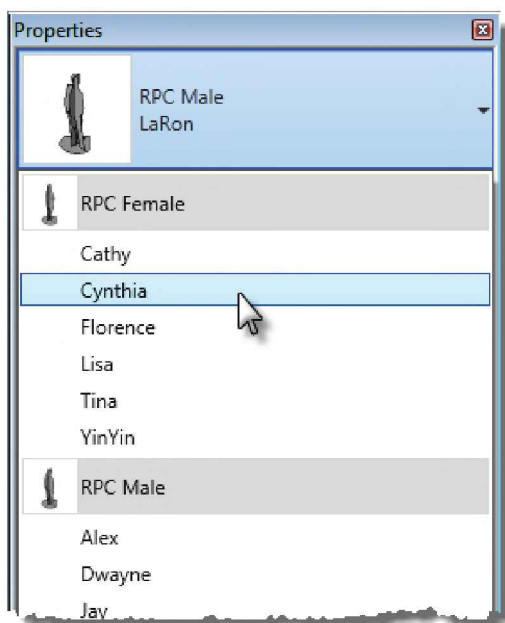


FIGURE 13-5.2 Element Type Selector

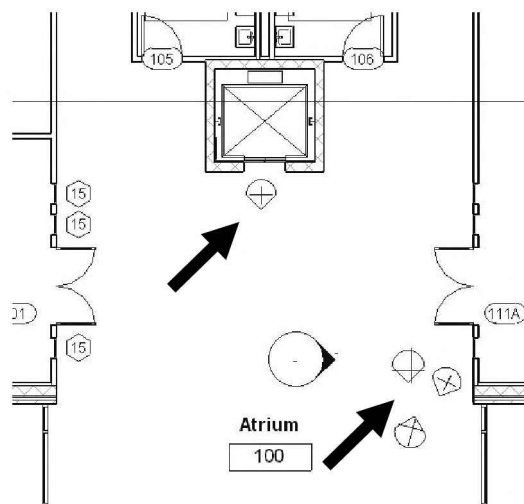


FIGURE 13-5.3 Level 1 – people added

9. Switch to your interior atrium camera view.
10. Render the Atrium view with the daytime settings previously used.

Your rendering should now have people in it and look similar to **Figure 13-5.4**.

Adding people and other “props” gives your model a sense of scale and makes it look a little more realistic. After all, architecture is for people. These objects can be viewed from any angle. Try a new camera view from a different angle to see how the people adjust to match the view and perspective, maybe from the third floor looking down to Level 1.



FIGURE 13-5.4 Interior Atrium view with people added; rendered view

11. Save your project as **ex13-5.rvt**.

Revit also has several settings which can make your camera view look more realistic without doing a rendering. The image to the right is an example. It has the *Visual Style* set to **Realistic** (notice even the RPC people are visible), which creates a nice bright image. The view also has **Ambient Shadows** and **Photographic Exposure** enabled in the view's *Graphic Display Options* dialog. Another option is to set the *Visual Style* to **Ray Trace**.



FIGURE 13-5.5
Interior Atrium view with people added;
Revit camera view set to Realistic

The image below shows all the transportation content available through Archvision. When using their subscription option, you have access to all of their content (including people, trees and more). Using the Archvision Dashboard program, you simply drag and drop content into Revit. Students should contact Archvision about special student options. These elements work in Realistic views, renderings and A360 Cloud renderings.

RPC Automobiles



rpc

ARCHVISION
archvision.com

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. Creating a camera adds a view to the *Project Browser* list. (T/F)
2. Materials are defined in Revit's *Materials* dialog box. (T/F)
3. After inserting a light fixture, you need to adjust several settings before rendering and getting light from the fixture. (T/F)
4. You cannot create a nighttime rendering as the sun is always on. (T/F)
5. Use the _____ tool to remove a large portion of the model in 3D.

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. You cannot "point" the people in a specific direction. (T/F)
2. You cannot get accurate lighting based on day/month/location. (T/F)
3. Adding *Families* to your project does not make the project file bigger. (T/F)
4. Creating photo-realistic renderings can take a significant amount of time for your computer to process. (T/F)
5. The RPC people can only be viewed from one angle. (T/F)
6. The RPC components do not cast shadows. (T/F)
7. Adjust the _____ to make more of a perspective view visible.
8. You use the _____ tool to load and insert RPC people.
9. You can adjust the *Eye Elevation* parameter of the camera via the camera's _____.
10. What is the file size of (completed) Exercise 13-5? _____ MB

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