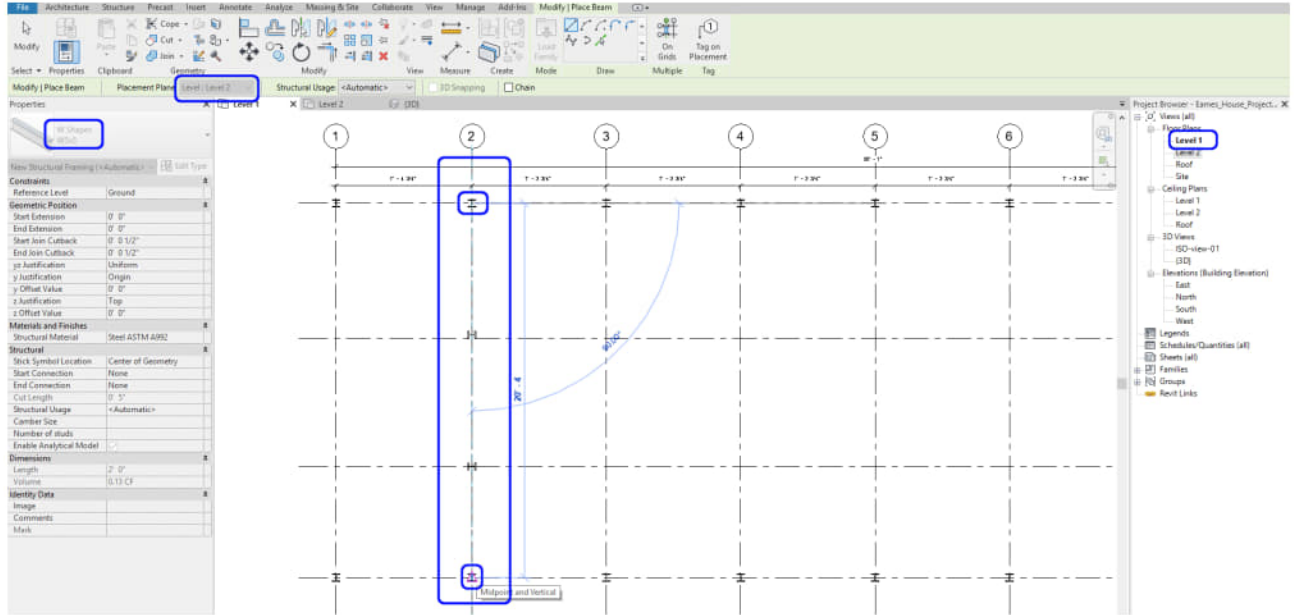
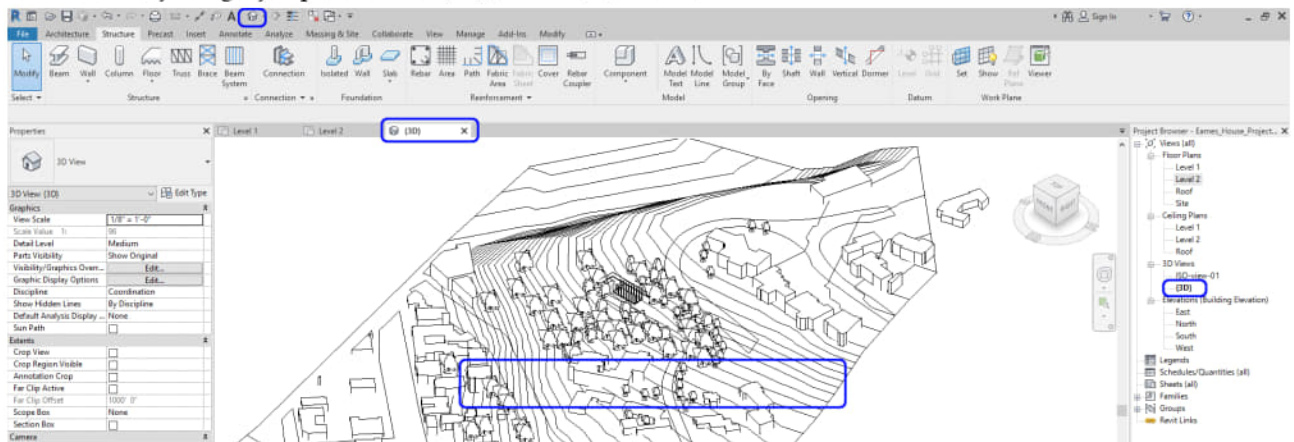


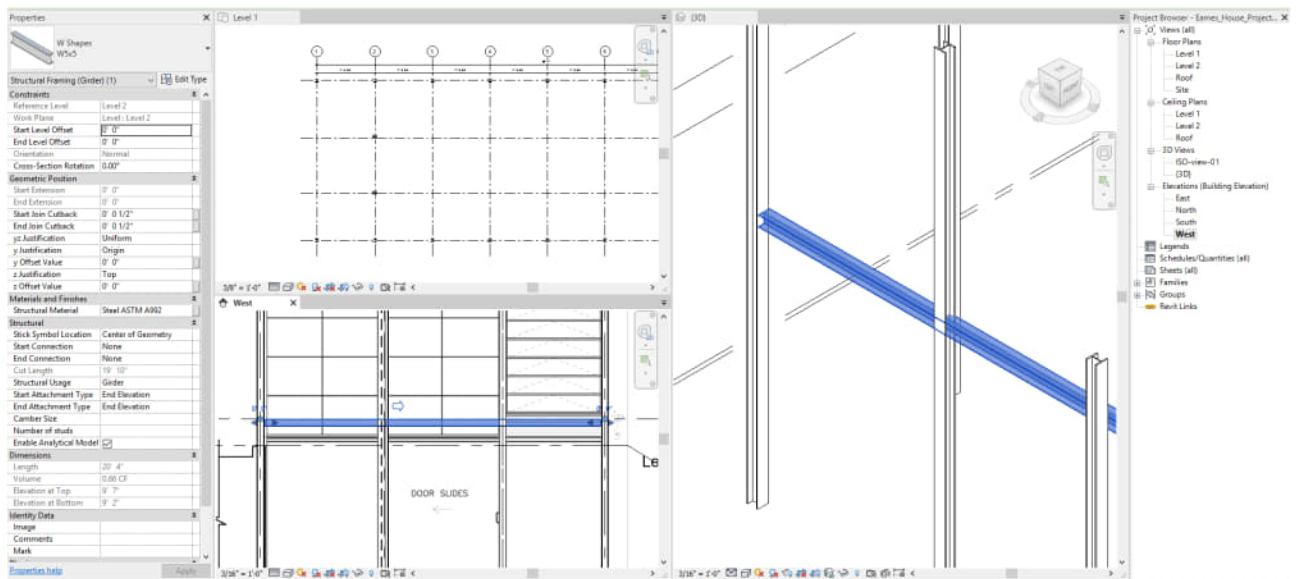
- [STEP 2] Select W Shapes-W5X5
 - If you don't have a W5x5 type. Please add one by clicking Edit Type > Duplicate > Name the type > Edit Width and Height to 5
- [STEP 3] Select [Level: Level 2] from Option Bar [Modify/Place Beam] for the West Wall of the building
- [STEP 4] Click the center of the north column of the west wall, and click the center of the south column of the west wall. You will get a warning message, but it is OK, just click X



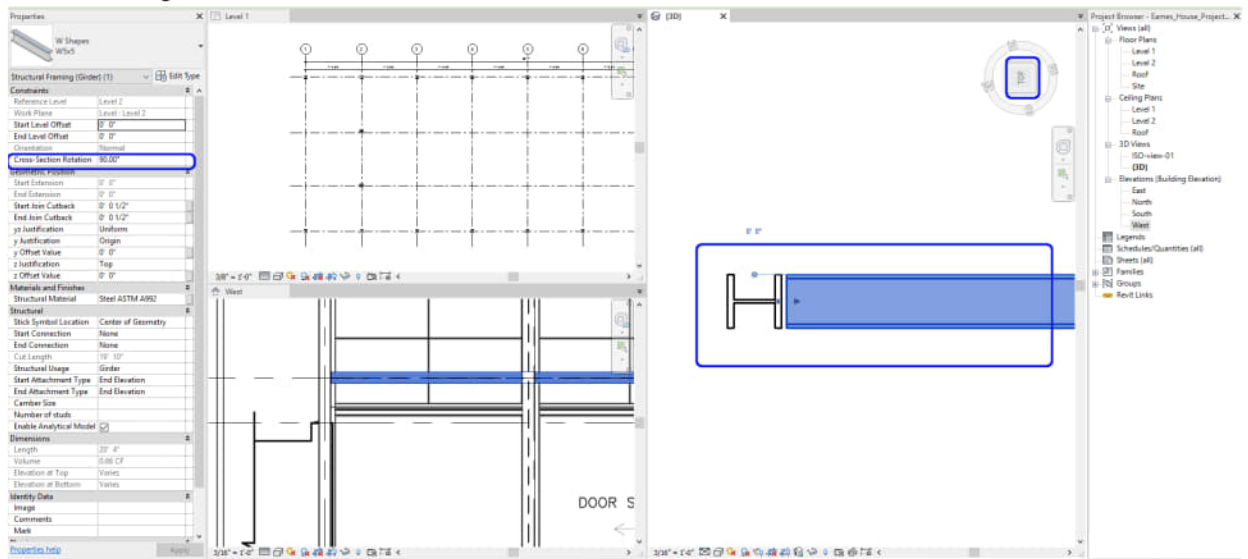
- [STEP 5] Confirm the place from the 3D view by clicking the HOUSE icon from quick access and hide site information by category. Update the 3D view scale to 3/8"=1'-0."



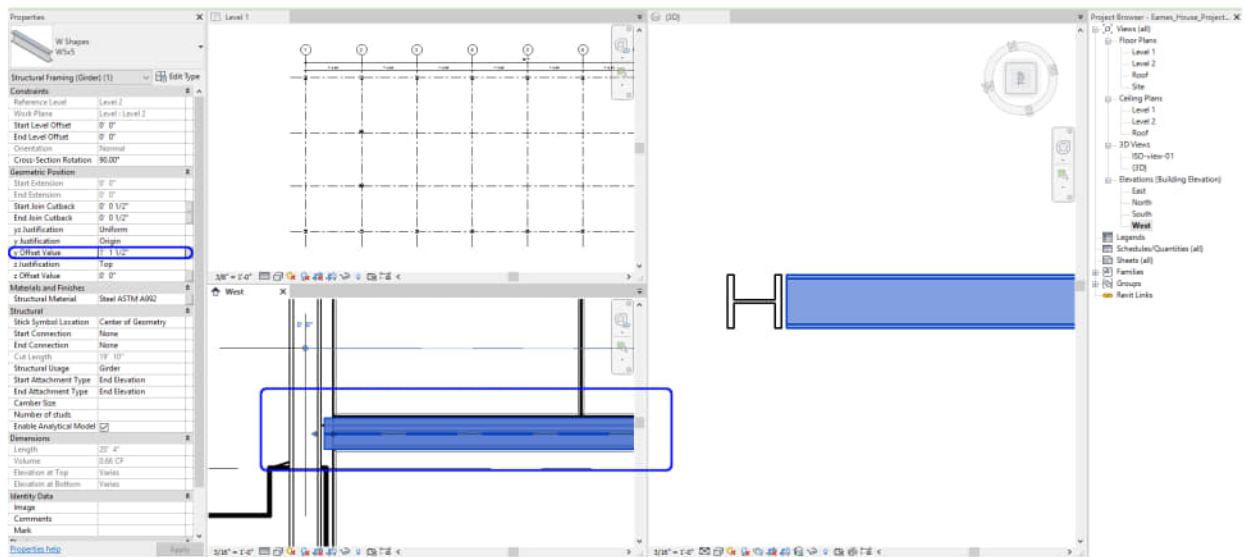
- [STEP 6] Open the 3D view, West elevation, and the floor plan together by typing [WT]



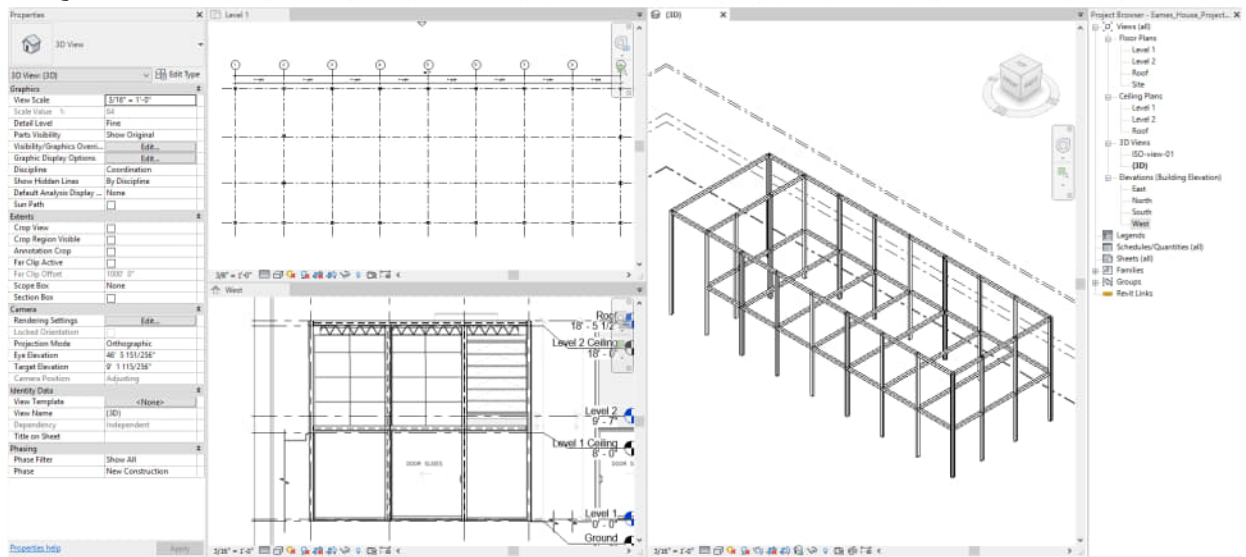
- [STEP 7] The Beam must be rotated to 90 degrees.
 - Click the Beam, and change the properties
 - Change Cross-Section Rotation to 90 degree
 - The beam location needs to be aligned from the Top view of the 3D view. Use Move (MV) command to move the Beam to be aligned.



- [STEP 8] See the West elevation and move the Beam to align with the imported image, [MOVE] command will not work.
 - Thus, update [Y OFFSET VALUE] to [1' 1 1/2"]

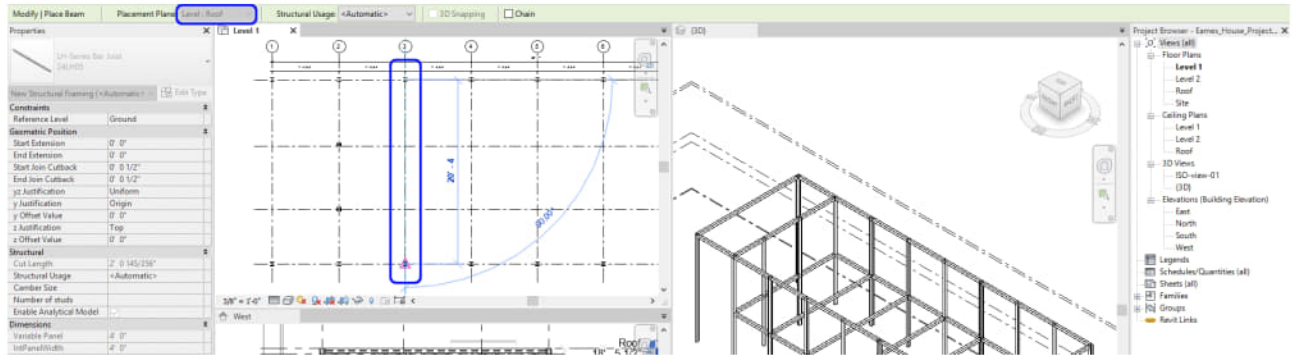


- [STEP 9] For other beams repeat step 1 through step 8. You may select all beams that you created and change the properties – Step 6 & 7. or Copy elements that have the same properties.
 - Complete beams for the second floor and the roof exterior beams, AND the second level interior beams

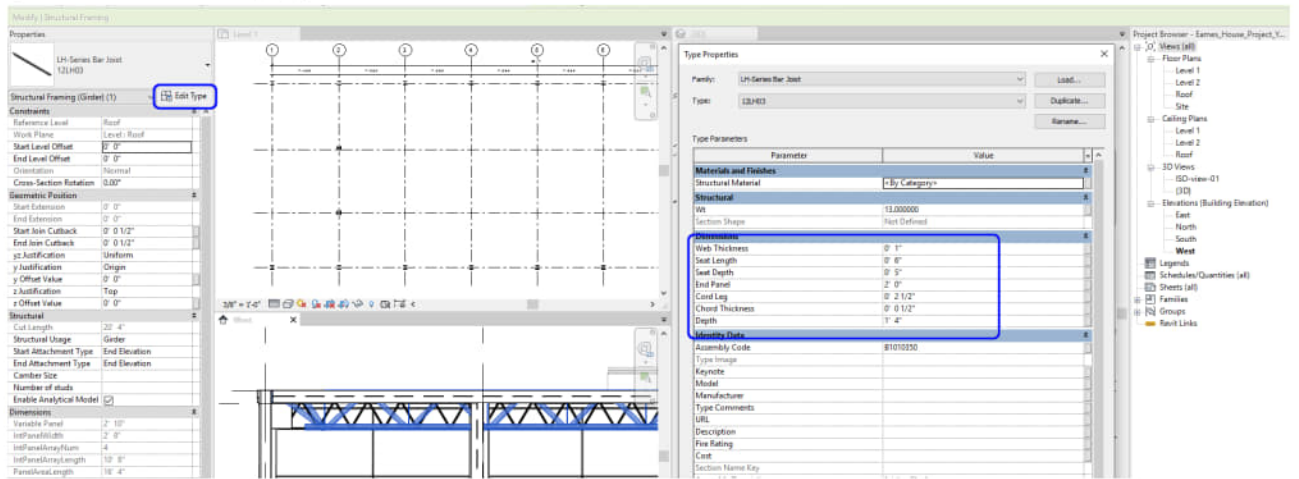


Add NEW Beams from a new family

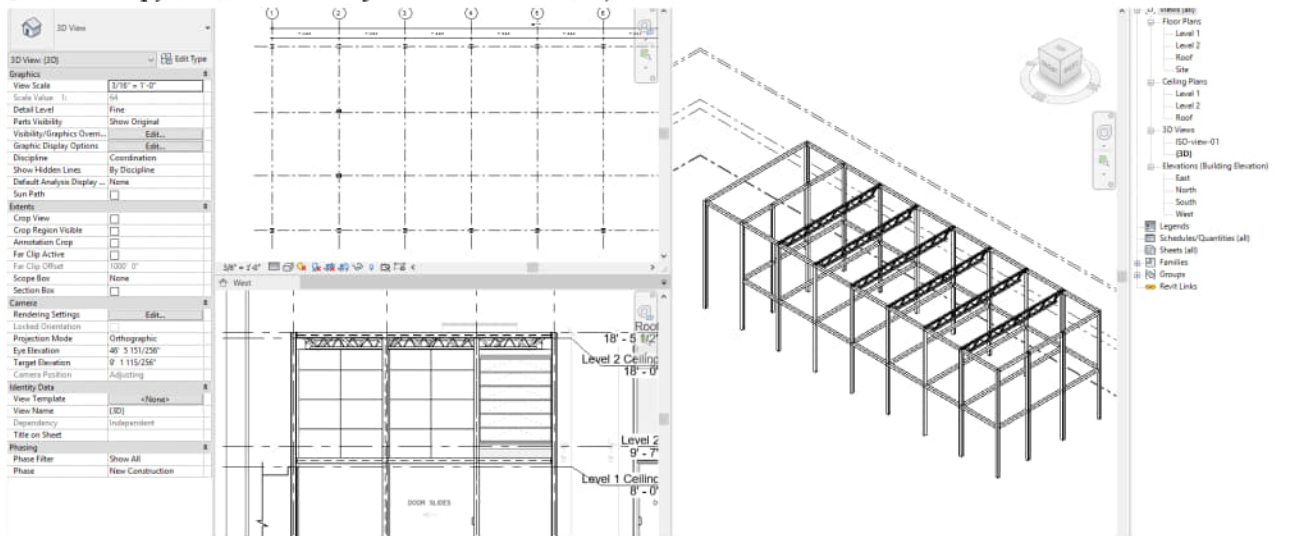
- [STEP 1] Click [Load Family] on [Insert] tab
- [STEP 2] Download [LH-Series Bar Joist.rfa] from Canvas Eames House module
- [STEP 3] Find the folder and select the file and Open
- [STEP 4] On Roof plan, Click [BEAM] on the [STRUCTURE] tab
- [STEP 5] Click North column and South column to create the Bar Joist



- [STEP 6] Edit the family type to match the imported drawing



- [STEP 7] Copy (CO) the first Bar Joist for the other Bar joists

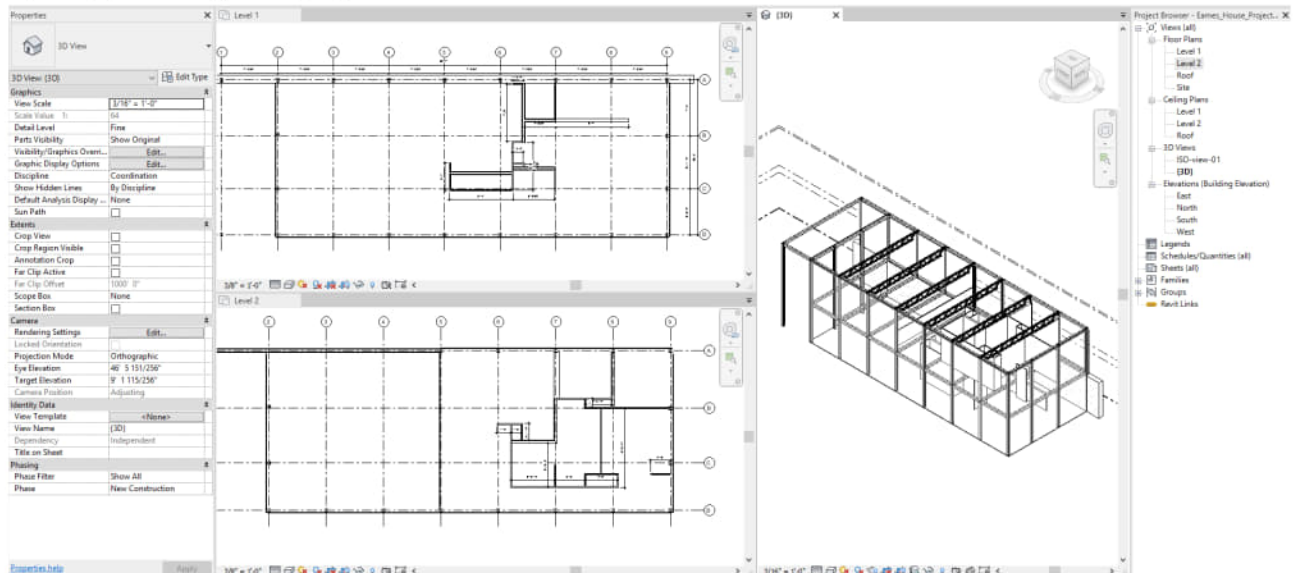


(CO 2) Create walls

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Draw WALLs with Various types based on the imported base drawing image

- [STEP 1] Select [WALL] from [ARCHITECTURE] tab, under [BUILD] panel or Type [WA]
- [STEP 2] Select a Wall family
 - If you don't have a wall type from the Properties, add by clicking Edit Type and Duplicate from a wall type.
 - For Eames House, we will use
 - Curtain Wall 1
 - Retaining -12" Concrete
 - Interior-4 7/8" Partition
 - Interior-6 1/8" Partition
 - Soffit-1/2" GWB & Metal Stud
 - But the wall details will be modified, and custom walls will be added later in this tutorial.
- [STEP 3] Confirm [BASE CONSTRAINT] and [TOP CONSTANINT]. If needed set base offset and top offset
- [STEP 4] Specify Location Line
- [STEP 5] If the wall is other than a straight line, specify a line/shape type (circle, arc, rectangle, inscribed polygon, or ellipse. And draw lines to cross-reference of the imported base drawing image
- [STEP 6] Make Dimensions [DI] for verification purposes.
- [STEP 7] Confirm with 3D view



(CO 3) Edit walls wall properties – Wall thickness, Wall details, & Finishes

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For your wall thickness, refer to Kilmer, W., & Kilmer, Rosemary. (2016). Construction drawings and details / W. Otie Kilmer and Rosemary Kilmer. (Third ed.).

For your design project, you will need to decide on your construction details.

Typical residential house wall thickness (For your reference)

- Interior Wall (without Plumbing) = 4 ½" ((1) 2"X4" wood stud, which are 3 ½" deep + (2) ½" Gypsum boards)
- Interior Wall (with Plumbing) = 6 ½" ((1) 2"X6" wood stud, which are 5 ½" deep + (2) ½" Gypsum boards)
- Exterior Wall (with Brick) = 10" ((1) 2"X6" wood stud, which are 5 ½" deep + (1) ½" Gypsum boards + (1) ½" Insulation + (1) 3 ½" Brick)
- Exterior Wall (with Stucco, wood, aluminum, or vinyl) = 7 1/2" ((1) 2"X6" wood stud, which are 5 ½" deep + (1) ½" Gypsum boards + (1) ½" Insulation + (1) 1" Stucco, wood, aluminum, or vinyl)

For the Eames house project, although this building is residential, the construction is a combination of wood base and metal base. Revit provides walls for commercial construction, which is a metal base, so, you may use the provided walls and change some walls.

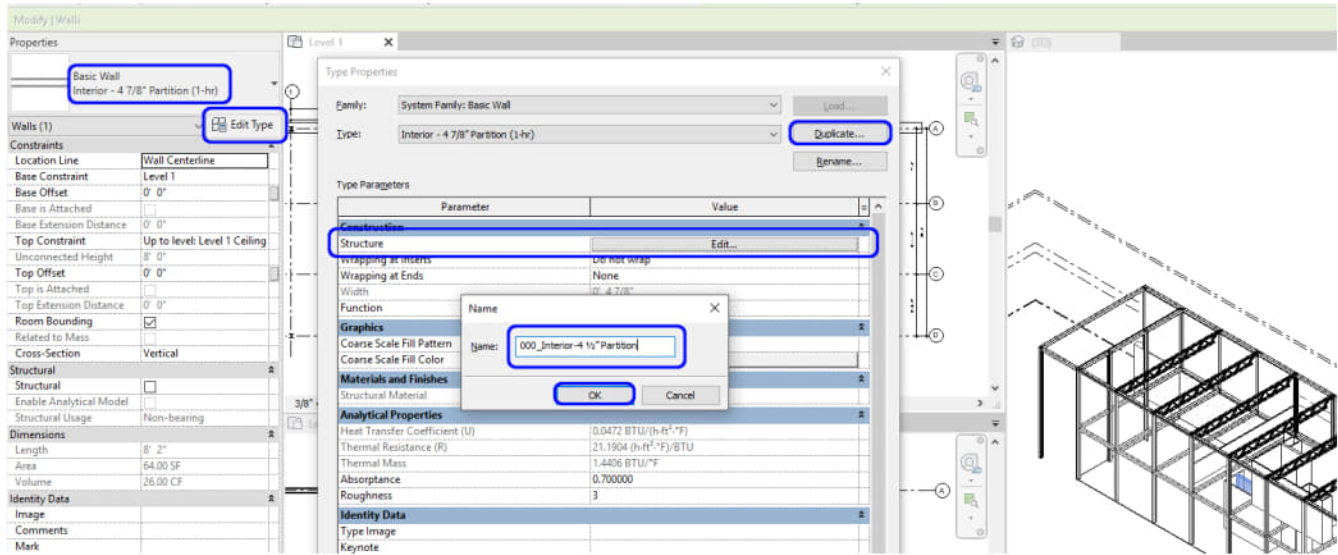
- Interior Wall = Wood stud with Gypsum BD + Paint Finish or Wood BD (3 1/8", 4 7/8", 6", 8")
- Exterior Wall = Curtain Wall with Glass, Wood, Metal panels
- Exterior Wall = Metal with Gypsum BD + Paint Finish or Wood BD
- Exterior Retain Wall = Concert

Once you click a wall, you can edit the properties (wall height-where it starts and ends & wall phase) for each wall

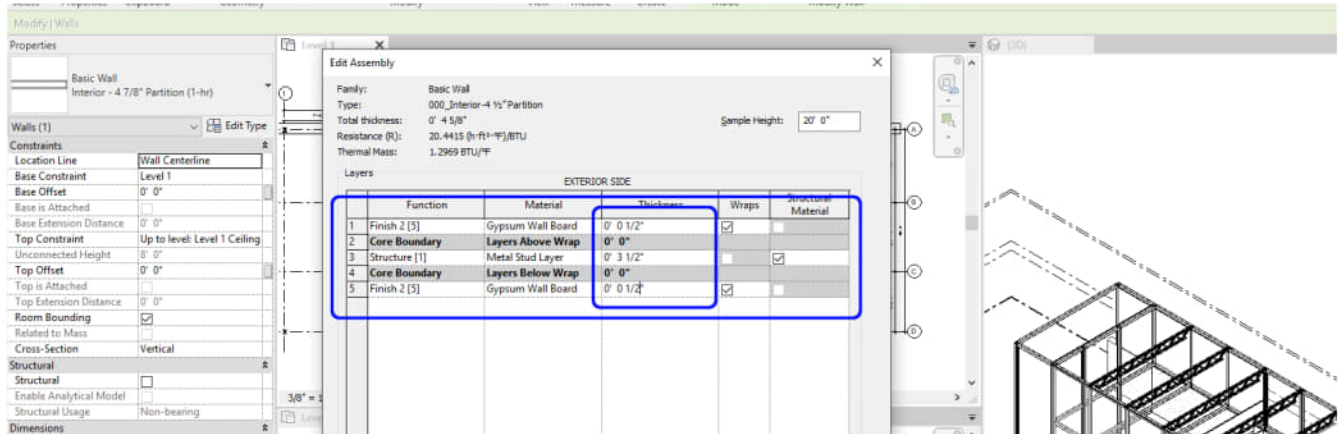
If you want to change the wall's type (wall thickness Graphic style, materials, Structure, BIM information), you can change by clicking [Edit Type]

For the future strategy, it is wise to [Duplicate] the type and edit type properties. For best practice, add "000" for the new

duplication. This will allow the types to organize in alphabetical order.

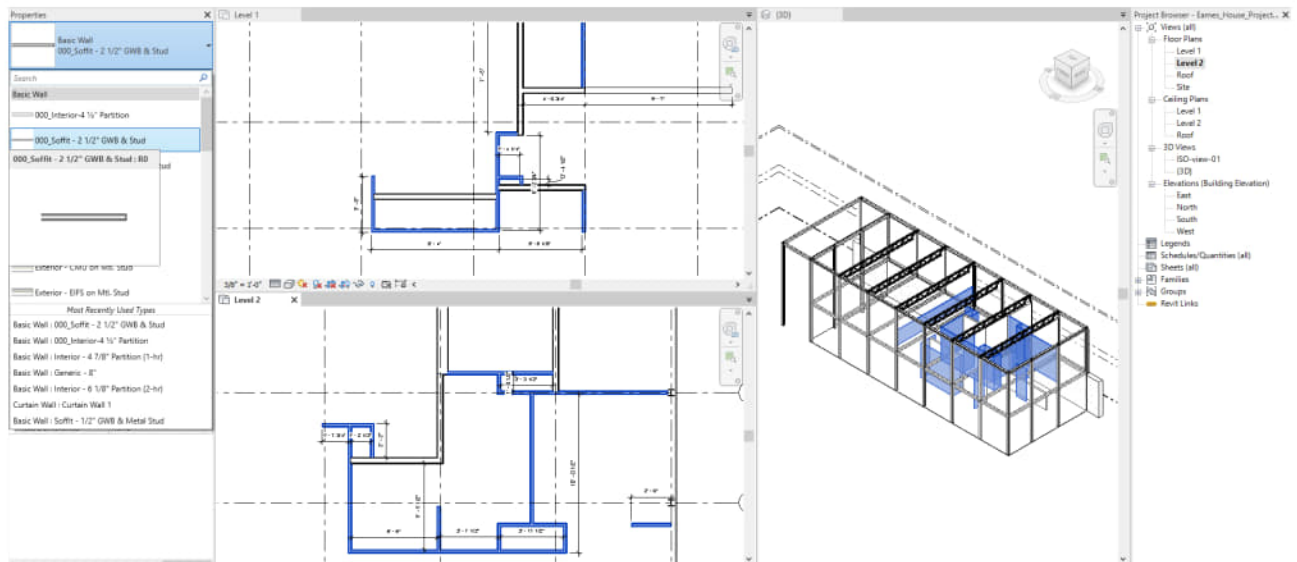


Click [EDIT] on [STRUCTURE] and change thickness and material and click [OK]



To change other walls from the Revit Metal base 4 7/8" wall to Wood base 4 1/2."

- [STEP 1] Click one of Metal base 4 7/8" wall
- [STEP 2] Mouse right click and click [Select all instances] and click [in Entire Project]
- [STEP 3] Select [000_Interior-4 1/2" Partition]

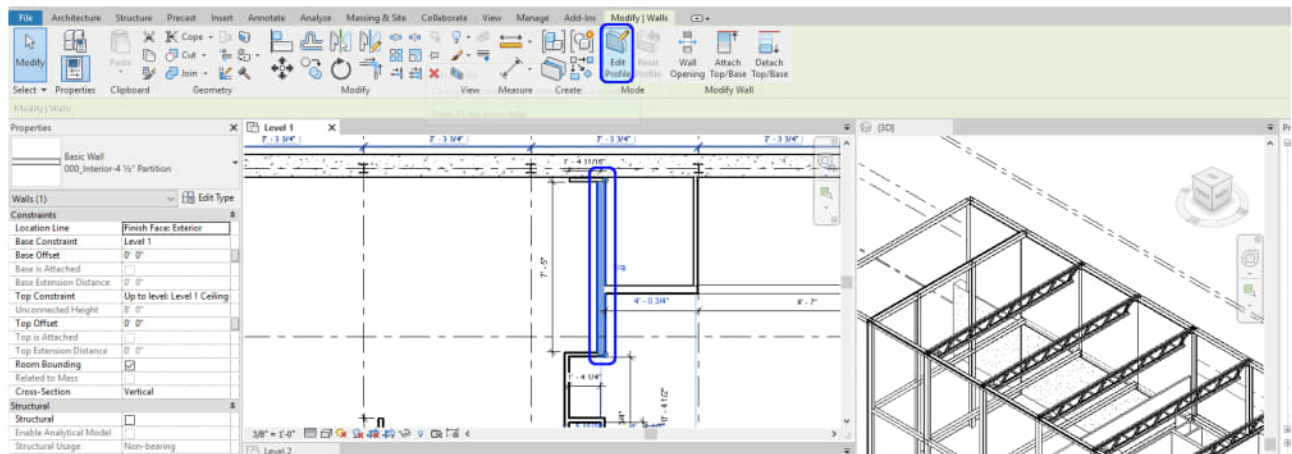


(CO 4) Edit/add wall properties – Wall opening, wall sweep

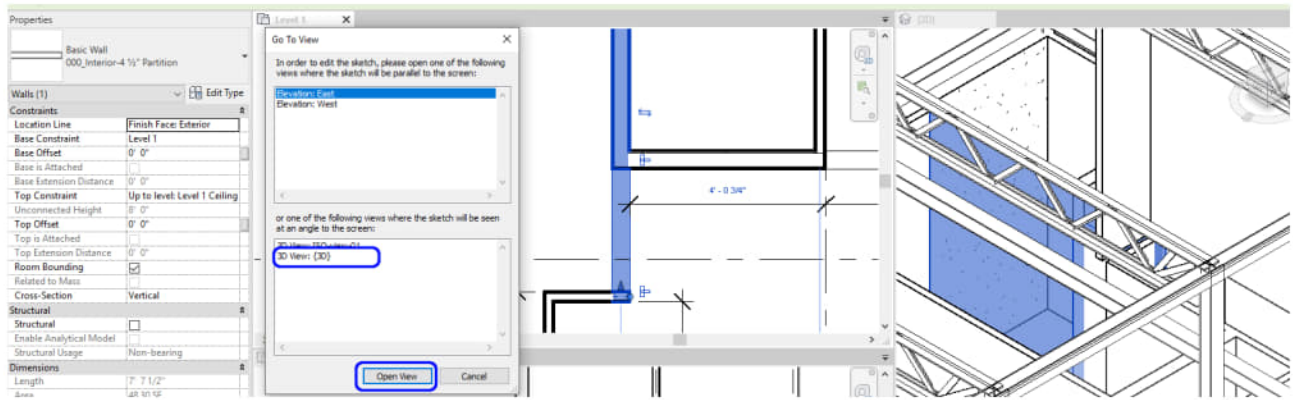
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Wall opening or wall elevation modification

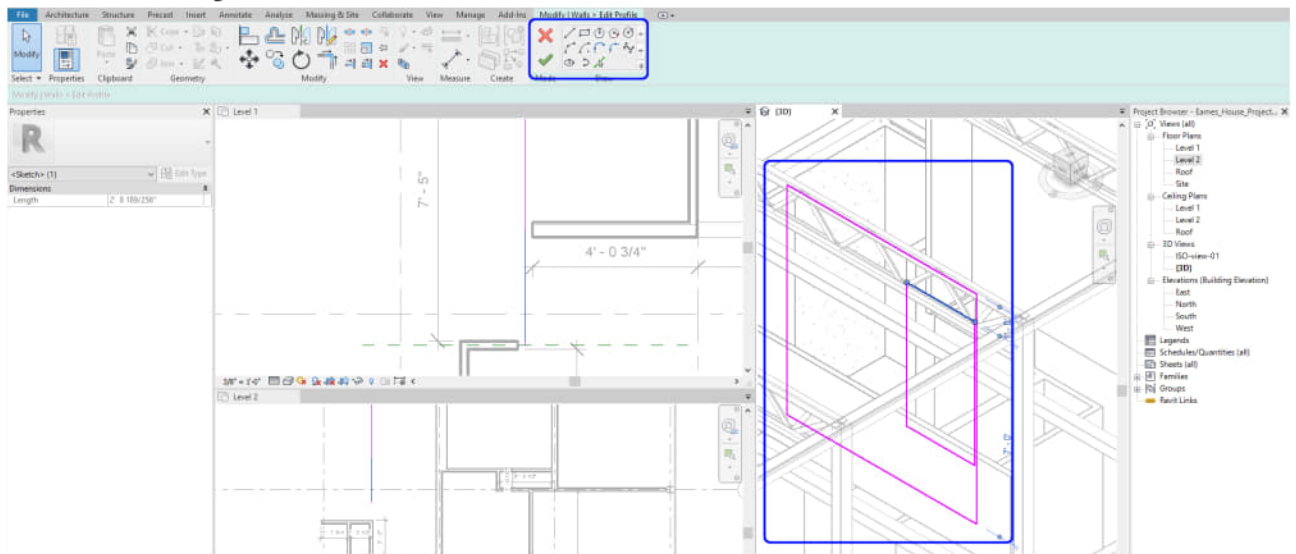
- [STEP 1] On a plan view, click the wall that you want to make wall opening
- [STEP 2] Click [Edit Profile]



- [STEP 3] Go To View window will open.
- [STEP 4] Select an appropriate view to open. I prefer the ISO view to quickly change the elements



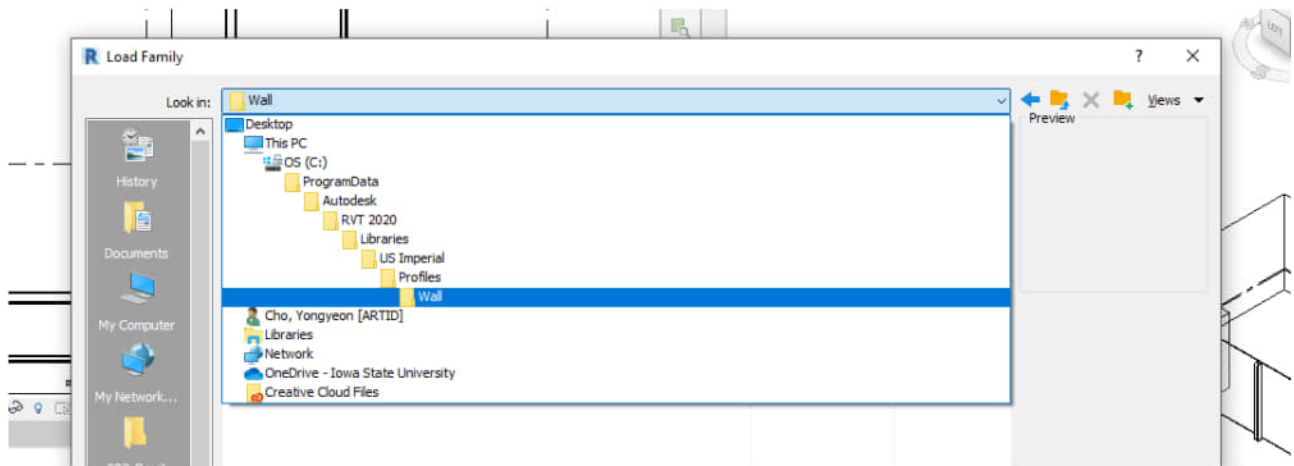
- [STEP 5] Draw the opening with dimension
- [STEP 6] Click the green checkmark to finish



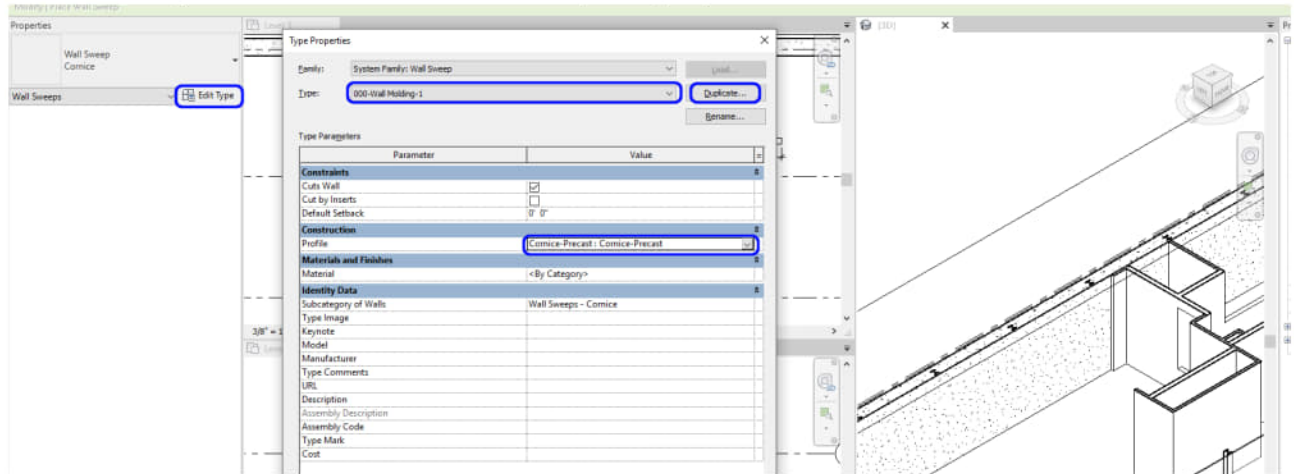
- [STEP 7] Double check in 3D view

Wall Sweep is a very useful tool to create moldings

- [STEP 1] To create a continuous molding. First, you need to load a profile by clicking [Load Family] from the [Insert] tab.
- [STEP 2] Find Profile from Revit library and open it to the file.



- [STEP 3] Click the small arrow under Wall on Architecture tab
- [STEP 4] Select Wall: Sweep on 3D view. Recommend a camera view or a 3D view with a section box
- [STEP 5] Click [Edit Type] > Duplicate the type. Don't forget to add "000" for your type.
- [STEP 6] Click profile under construction, select the profile you just loaded.



- [STEP 7] See the preview and click the appropriate location on the wall for the molding on the 3D view.
- [STEP 8] To finish the Sweep, [ESC] on Keyboard.

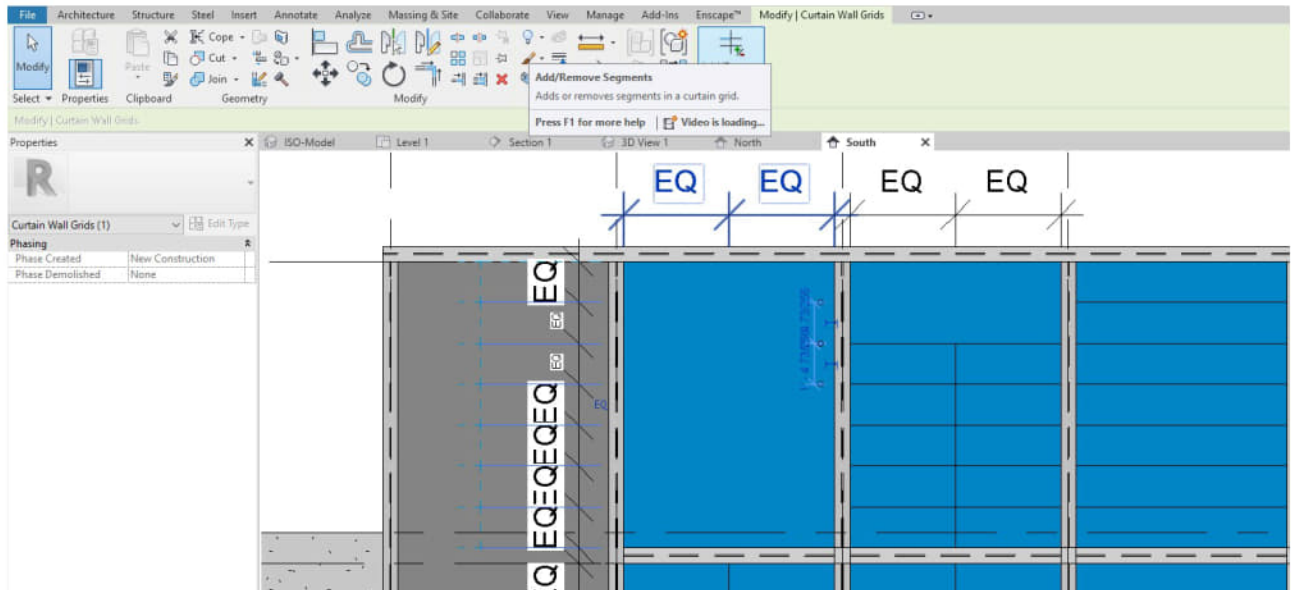
(CO 5) Add/Edit Curtainwalls, Mullions, & Panels

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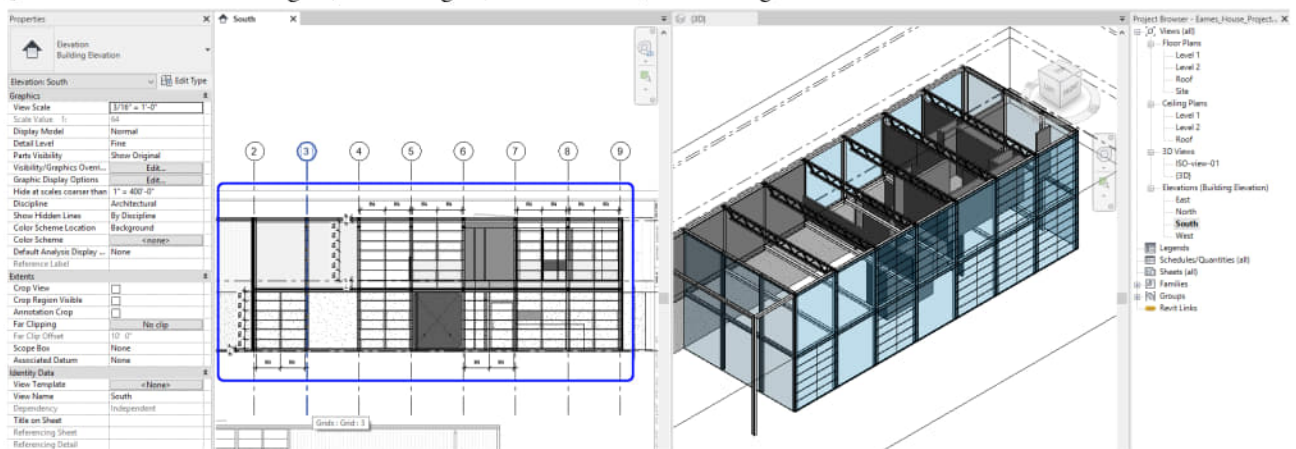
Modify curtain wall

- [STEP 1] To add curtain wall grids, open a view. It can be an elevation view. You may close the floor plans.
- [STEP 2] For the Eames house project, confirm the imported base drawing – elevations are in the correct locations.

- [STEP 3] Click [Curtain Grid] on [Architecture] tab
- [STEP 4] Select [All Segments] or [One segment]
- [STEP 5] Click grid lines and use dimensions for accurate distance based on the imported elevations



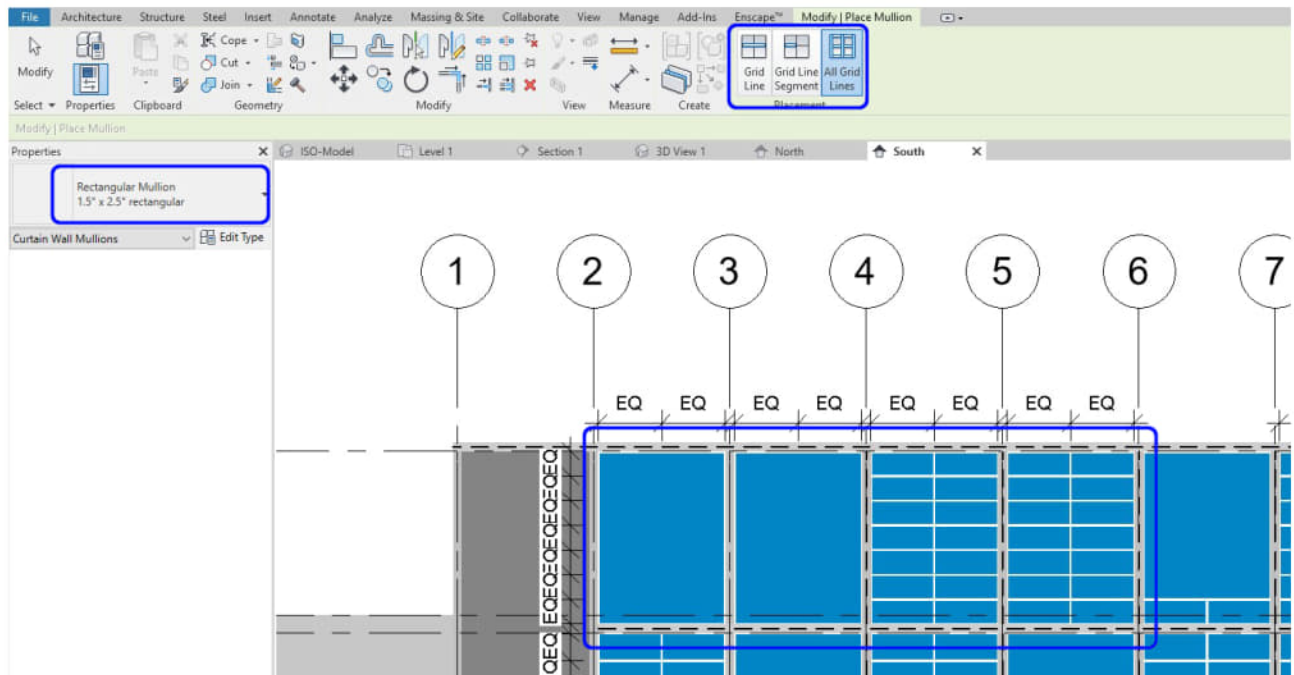
- [STEP 6] You can edit the grid, click the grid, and click add/remove segments.



- Complete for all four exterior walls

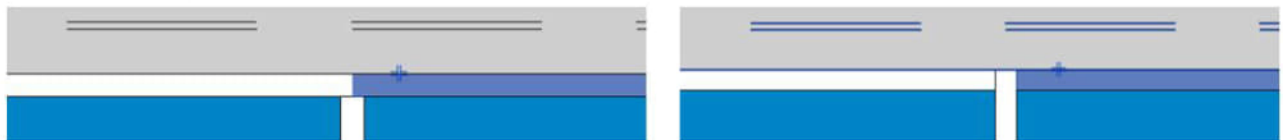
Add curtain wall mullion

- [STEP 1] On the elevation, click [MULLION] on the [ARCHITECTURE] tab
- [STEP 2] You may choose All Grid Lines, Grid Line, or Grid Line Segment
- [STEP 3] Also, you may choose a specific type of Mullion by clicking Properties, and you can edit the type as well
 - You can change material, size, profile, the width of sides, angle, & offset
- [STEP 4] Click lines to apply the mullion type that you selected



Modify Mullion

- [STEP 1] If you need to change the mullion type, you can click the mullion that you made and change the properties
- [STEP 2] If you need to change the mullion type and join order, click the Mullion you want to change and click [+] on the view to change the order



To change the panel from Glazing to Solid, door, or window

- [STEP 1] Select the panel to change by multiple [Tab] keys
- [STEP 2] Change Properties to what you need
- [STEP 3] If you need to change the properties, click [Edit type] and click [Duplicate] and change the value
- [STEP 4] If you need to add a new type, Load family first and change the Properties

Chapter 12. Understand visibility settings, add/edit floor & ceilings

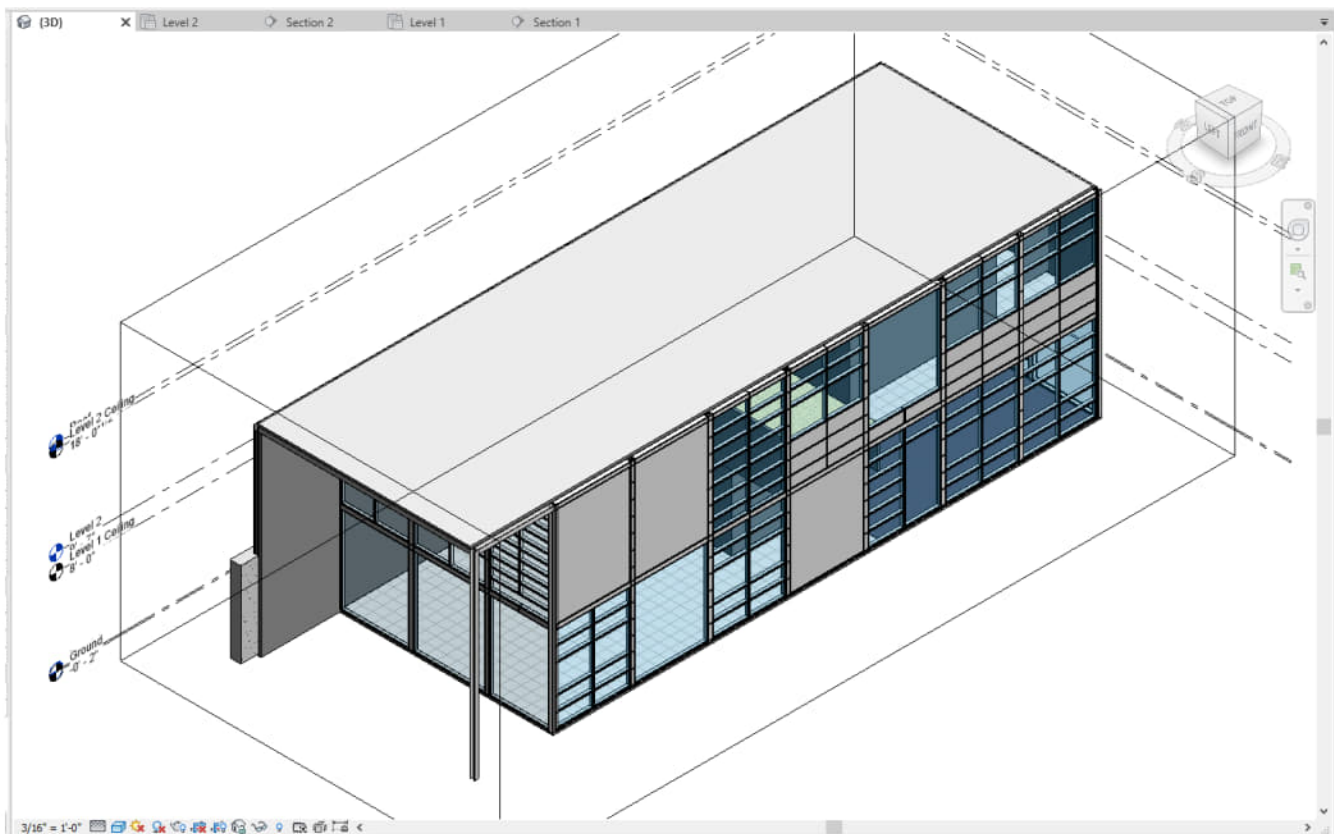
Session Objectives

Upon completing this session, students will be able to:

- (CO 1) Understand View template, visibility graphics
- (CO 2) Understand View range
- (CO 3) Add/Edit Floors & Floor Properties
- (CO 4) Add/Edit Ceilings & Ceiling Properties

Session Highlights

At the end of the session, students can create the graphics below.



(CO 1) Understand View template, visibility graphics

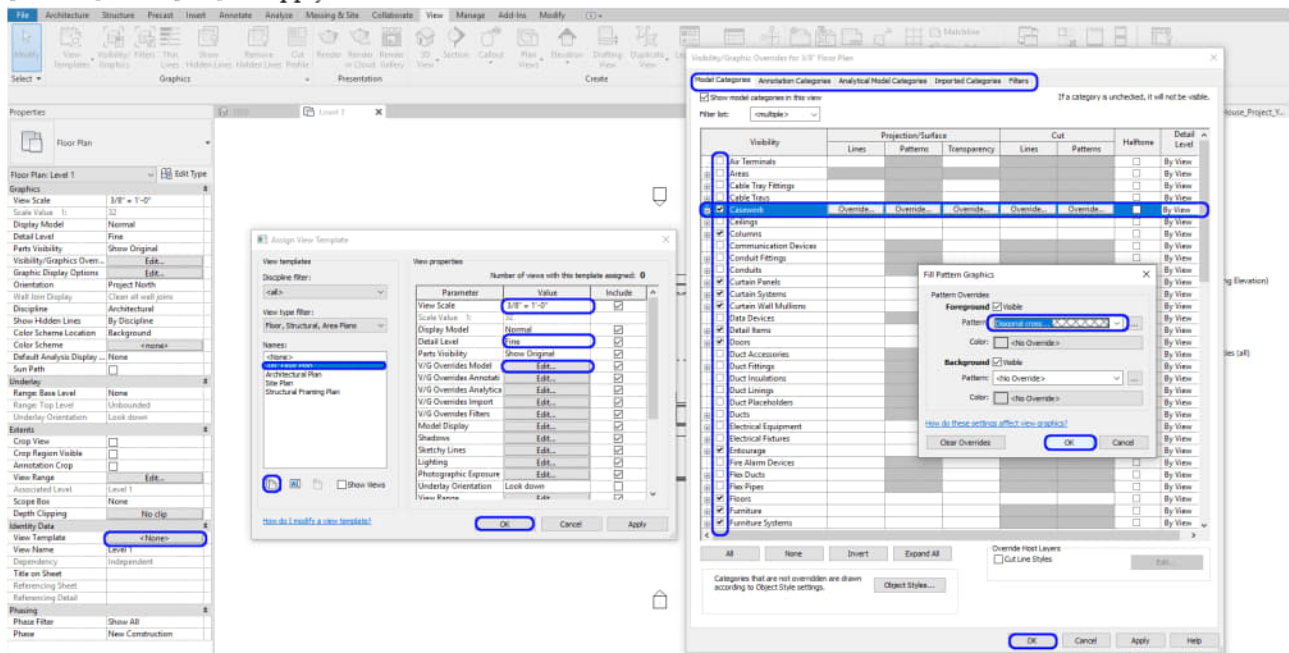
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[VIEW TEMPLATE] in Revit is a collection of view properties, such as a scale of a view, detail level, discipline, view ranges, orientations, model display, and visual settings. With using [VIEW TEMPLATE], you can apply standard settings to views.

For example, I can make a Floor plan view template to apply all my floor plans. The floor plans will have the same scale, detail level, and style of lines. And you can also set a Furniture plan template. On the floor plans, you can hide all door tags and window tags at once. View templates save much time when producing a set of construction documents.

To set a view template

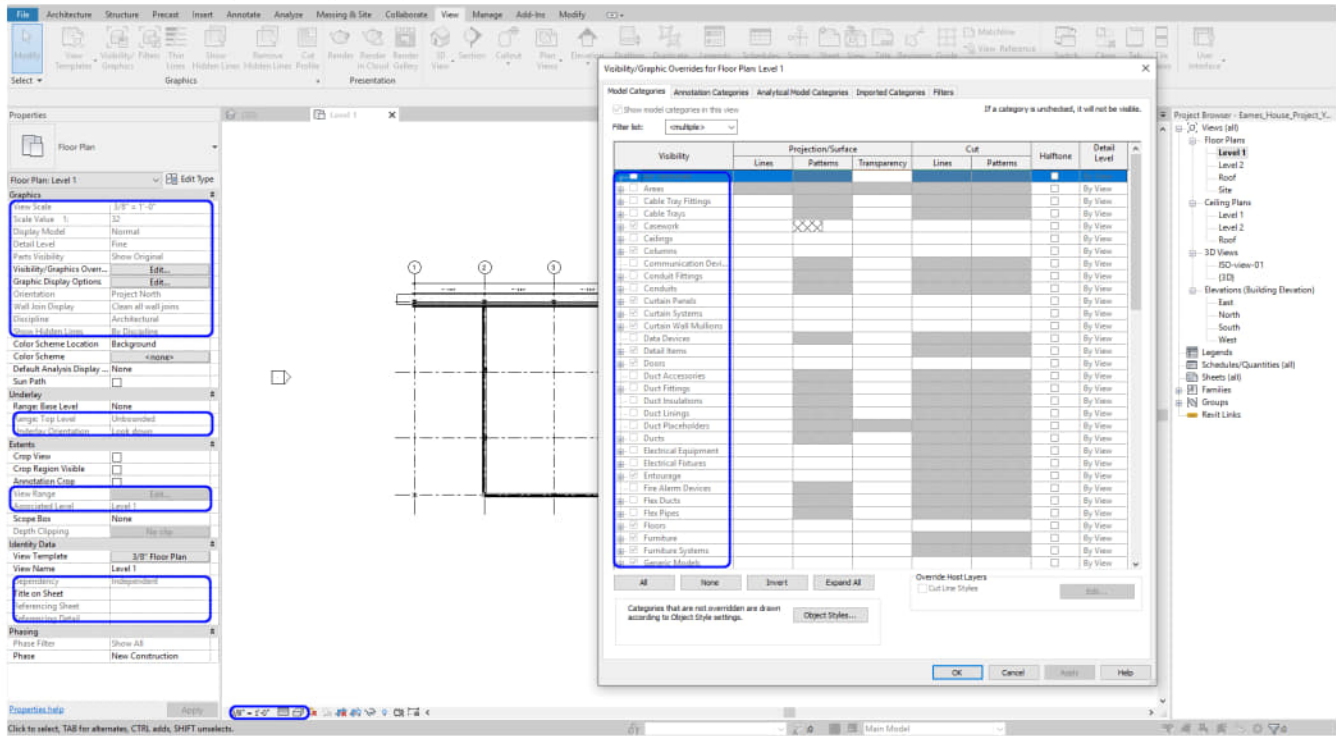
- [STEP 1] Click [VIEW TEMPLATE] from [PROPERTIES] palette, Assign view template window will open
- [STEP 2] Select [ARCHITECTURAL PLAN]
- [STEP 3] Click [DUPLICATE] icon, and Name it [3/8" Floor Plan]
- [STEP 4] Update [VIEW SCALE] to [3/8"=1'-0"]
- [STEP 5] Click [EDIT] on V/G Overrides Model, then Visibility/Graphic Overrides for 3/8" Floor Plan window will open
- [STEP 6] You can hide categories that you don't want to show in the view by unchecking the categories.
- [STEP 7] Also, you can change the graphic styles by clicking [OVERRIDE]
- [STEP 8] Click [OK]s to apply



To apply the view template to other views

- [STEP 1] Select a view or multiple views
- [STEP 2] Click [VIEW TEMPLATE] from [PROPERTIES] palette
- [STEP 3] Select the view template you made for the selected views
- [STEP 4] Click [OK] to apply

Once you apply a view template, the visibility/graphic override, view scale, display model, detail level, view range, discipline, phase filter, and more items in the view templates will be deactivated on the view. To change the setting, you have to adjust in the view template, not individually.



If you want to set the view settings individually, you must select [NONE] for the view template.

For more information, please refer to [this page](#) for the view template.

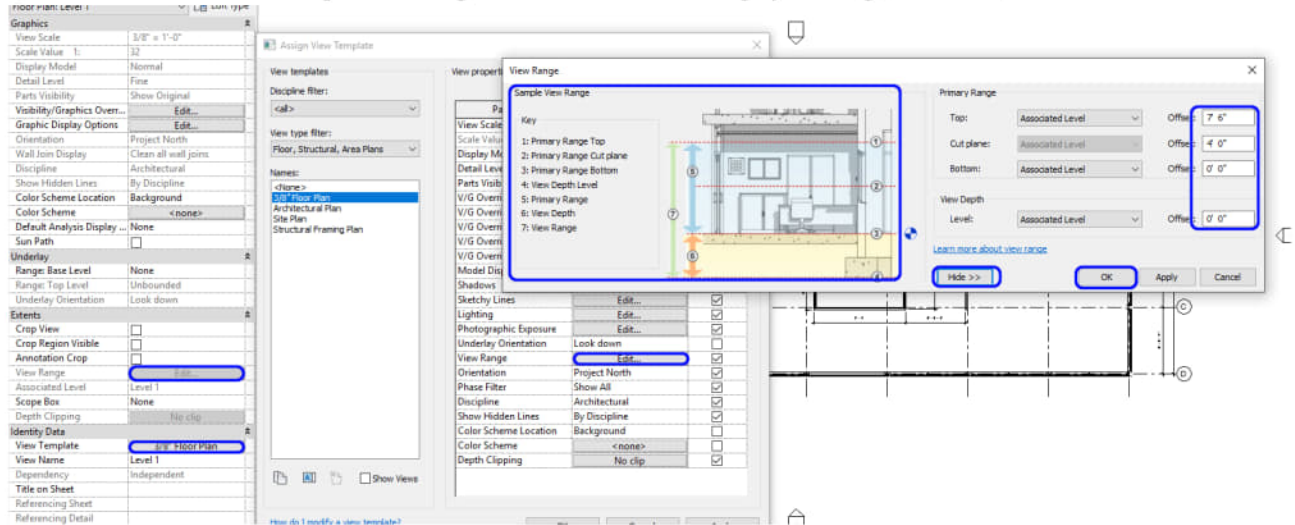
(CO 2) Understand View range

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[VIEW RANGE] is a set of horizontal planes that control the visibility and display of objects in a plan view.

To adjust view range

- [STEP 1] Click [VIEW RANGE] from [PROPERTIES] palette. If this is deactivated, check your view template and click [VIEW RANGE] from the template.
- [STEP 2] You define the ranges by adjusting the offset value
- [STEP 3] You can see the sample view range for better understanding by clicking [<< SHOW] button



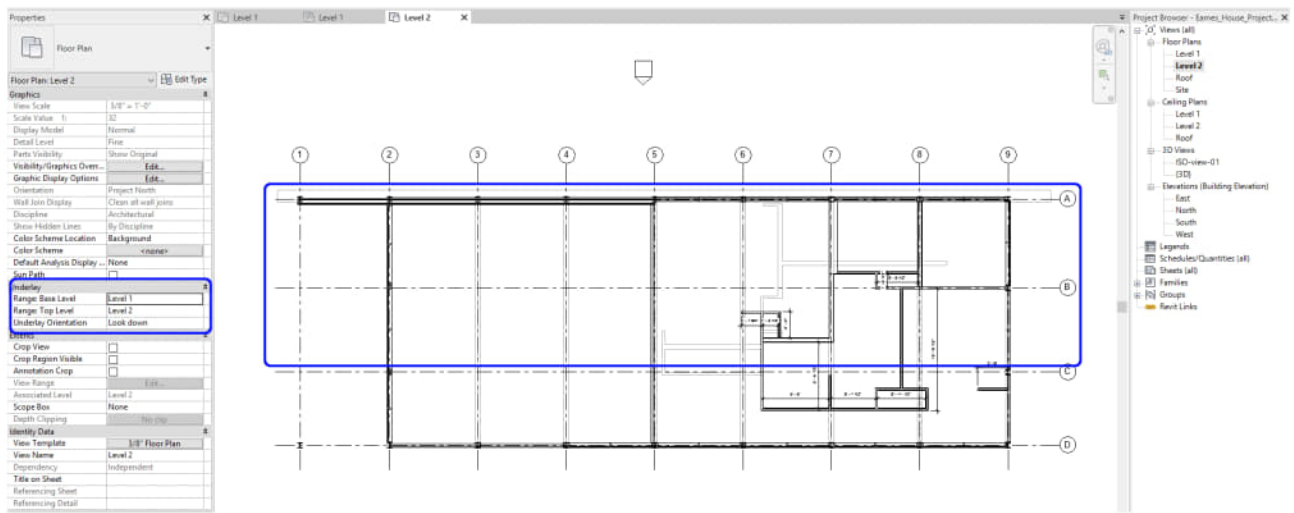
- [STEP 4] Click [OK] to apply

For more information about [VIEW RANGE], please visit [this page](#)

[UNDERLAY] is a function to understand the relationship of components at different levels for coordination and construction.

To apply [UNDERLAY]

- [STEP 1] Open the second-floor plan
- [STEP 2] Click Range: Base Level and change the level that you want to look below
- [STEP 3] Click Range: Top Level and change the level that you want to 'lookup.'
- [STEP 4] For floor plans, the Underlay Orientation should be [LOOK DOWN]
For RCPs, the Underlay Orientation should be [LOOK UP]



Once the underlay function is activated, you can see the gray lines. You are not able to click nor edit the underlay items.

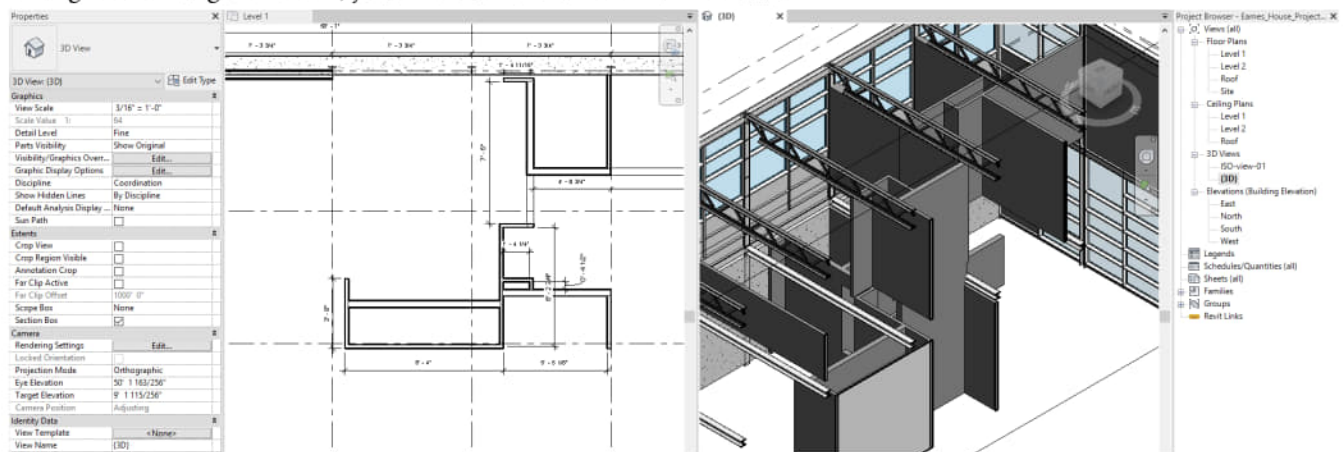
This function is only for the working process. If you don't need the underlay items, please check [NONE] on Range: Base Level to deactivate the function.

For more information about [VIEW RANGE], please visit [this page](#).

(CO 3) Add/Edit Floors & Floor Properties

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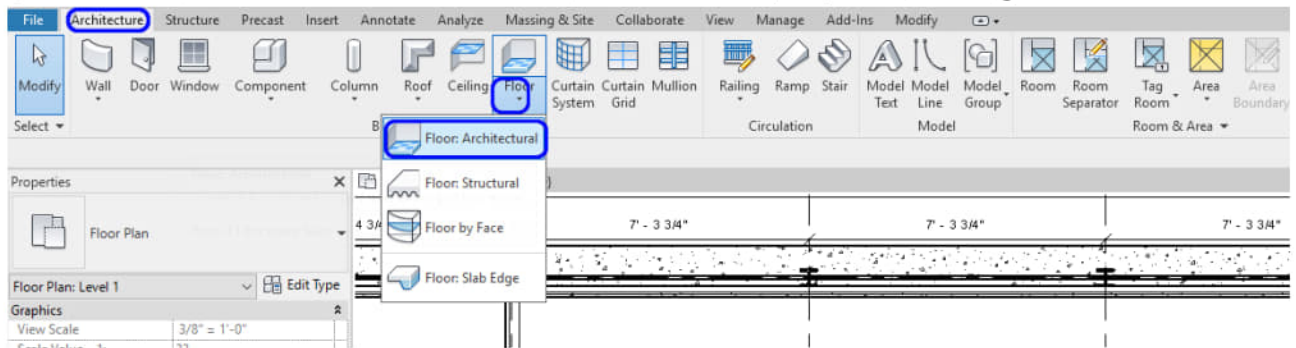
Revit is a BIM software; it needs more information to generate 3D views and Drawings. When in plan view the drawing appears complete much like it does in AutoCAD. However, when you view the Revit model in a 3D view, the floors and ceilings are missing. Therefore, you need to model these elements as well.



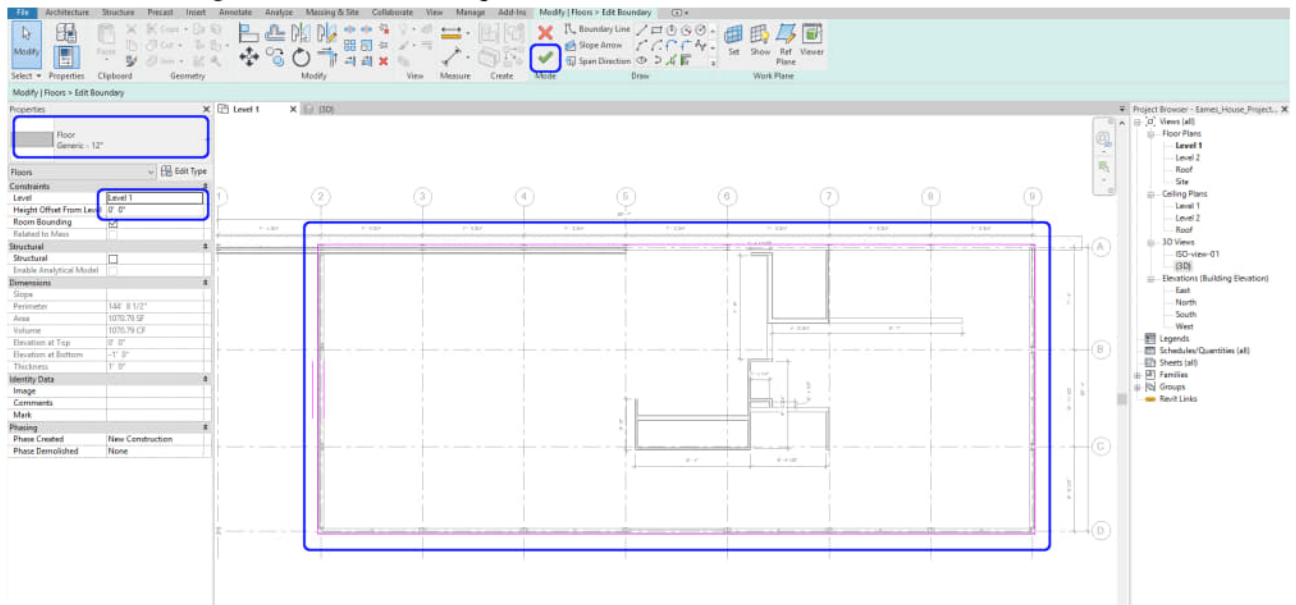
There are multiple ways to create floors. I prefer to create a slab (without finishes) and then add finishes over the top of the slab.

To Add/Edit Floors

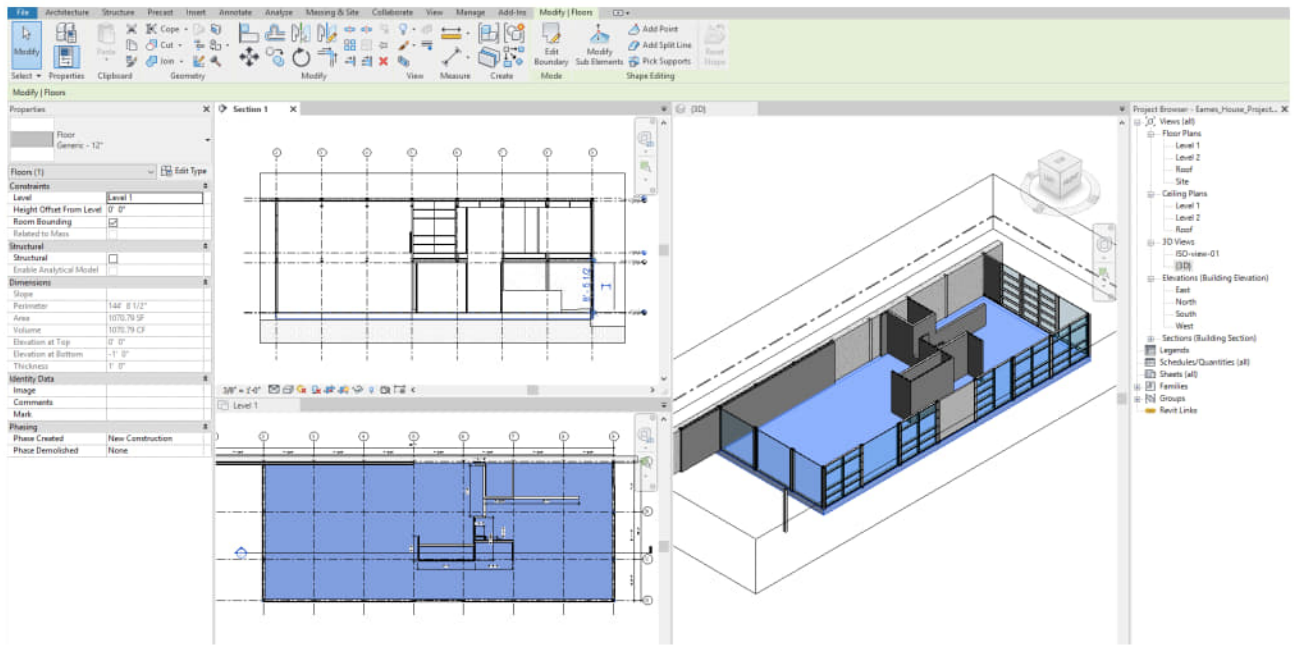
- [STEP 1] Select [FLOOR ARCHITECTURAL] from [ARCHITECTURE] tab, under [BUILD] panel



- [STEP 2] Select a Floor Type. For the First Level of Eames House, we will use [Generic – 12"], but we will modify the properties later.
- [STEP 3] Select the level where the floor is located. And specify height offset from the level if required.
- [STEP 4] Draw the boundary of the Floor plan. You can draw using straight lines or any of the other options. Make sure the boundary lines are connected and closed
- [STEP 5] Click the green checkmark to complete the sketch

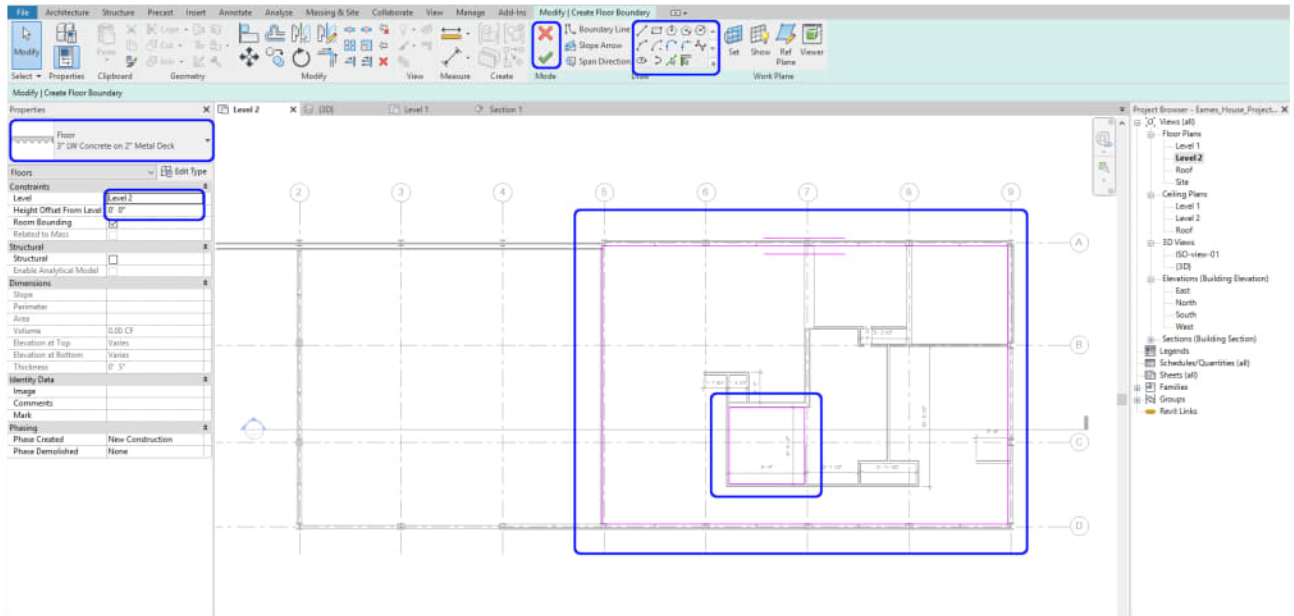


- [STEP 6] Confirm the location on a section view or a 3D view
You can click [SECTION] from the [VIEW] tab, under the [CREATE] panel. And draw a section line for verification purposes.
Make sure your building pod must be below level 1.



Add a floor for the second level

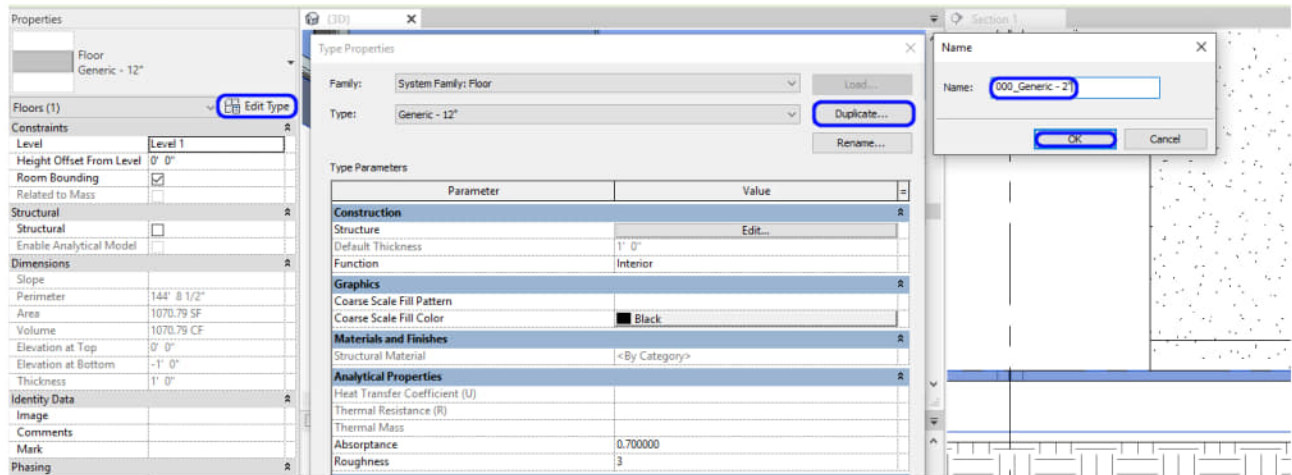
- [STEP 1] Open [LEVEL 2] floor plan
- [STEP 2] Click [FLOOR] from [ARCHITECTURE] tab, under [BUILD] panel
- [STEP 3] Change the floor type to 3" LW Concrete on 2" Metal Deck, and verify the Level 2, and the Offset
- [STEP 4] Draw continued lines for the floor. If there are floor openings, draw the openings as well. If the openings are inside the boundary of the floor, Revit will recognize as it is opening.
- [STEP 5] Click [GREEN CHECK MARK] to complete the sketches



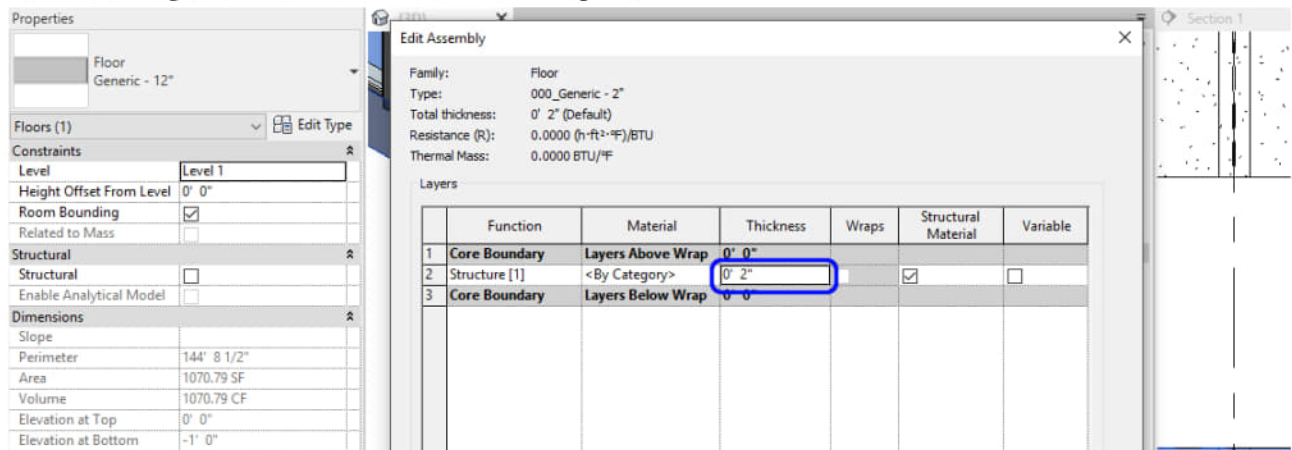
Edit Floor properties

You will change the thickness of the floor 12" to 2."

- [STEP 1] Select the first level floor from the 3D view
- [STEP 2] Click [EDIT TYPE] on [PROPERTIES] palette
- [STEP 3] Click [DUPLICATE] on [TYPE PROPERTIES]
- [STEP 4] Enter a new name. I recommend adding [000_] of the letter of the name.
For example [000_Generic - 2"]
- [STEP 5] then click [OK]



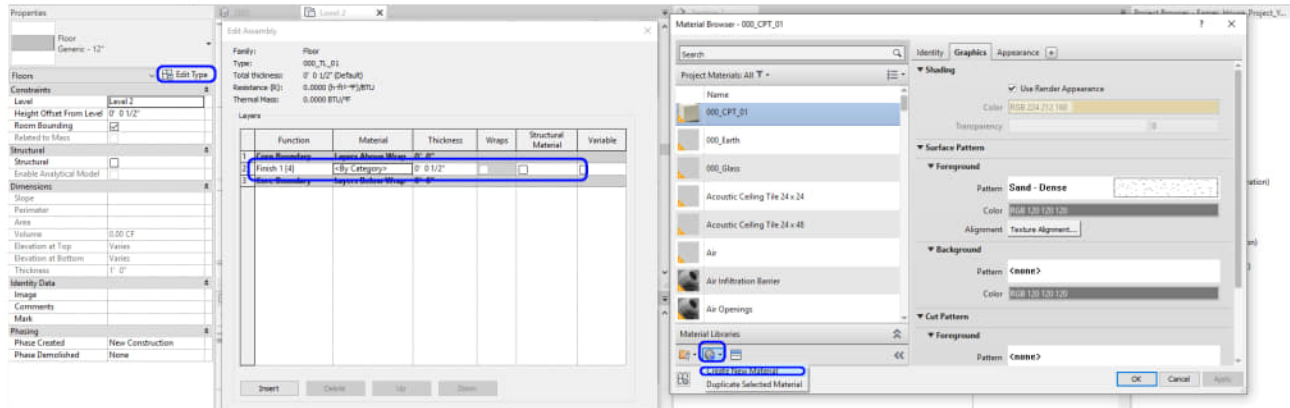
- [STEP 6] Click [EDIT] for [STRUCTURE]
- [STEP 7] Change [2"] and click [OK] and [OK] to complete



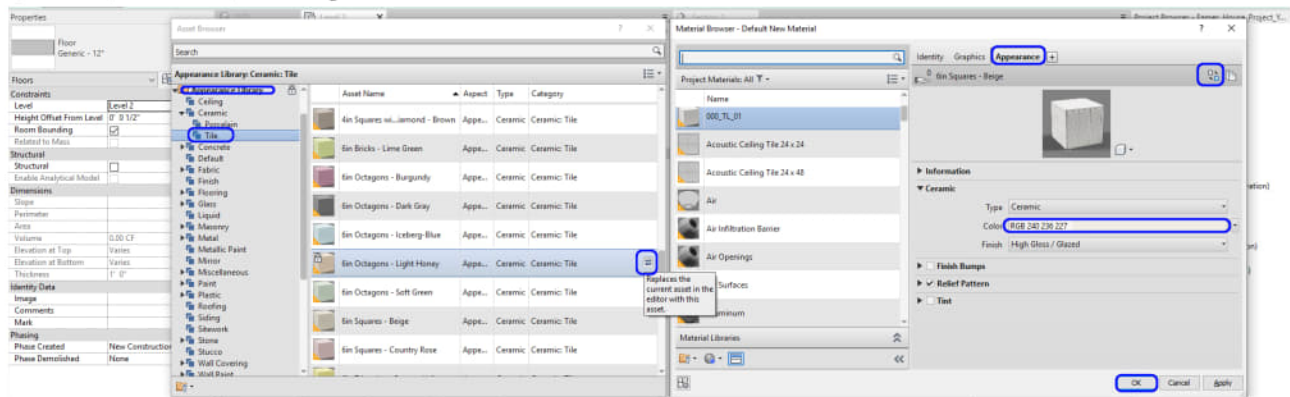
Add Floor types

- [STEP 1] Click [FLOOR] from [ARCHITECTURE] tab, under [BUILD] panel
- [STEP 2] Select [Generic - 12"]
- [STEP 3] Click [EDIT TYPE]
- [STEP 4] Click [DUPLICATE]
- [STEP 5] Rename to [000_TL_01], you will need [000_TL_02], and [000_CPT_01]

- [STEP 4] Click [EDIT] for [STRUCTURE]
- [STEP 5] Change the Function to [FINISH 1]
- [STEP 6] Change the Thickness to [1/2"]
- [STEP 7] Click <By Category>
- [STEP 8] Click [CREATE A NEW MATERIAL]
- [STEP 9] Rename the new material
- [STEP 10] Check [USE RENDER APPEARANCE]
- [STEP 11] Change the foreground pattern

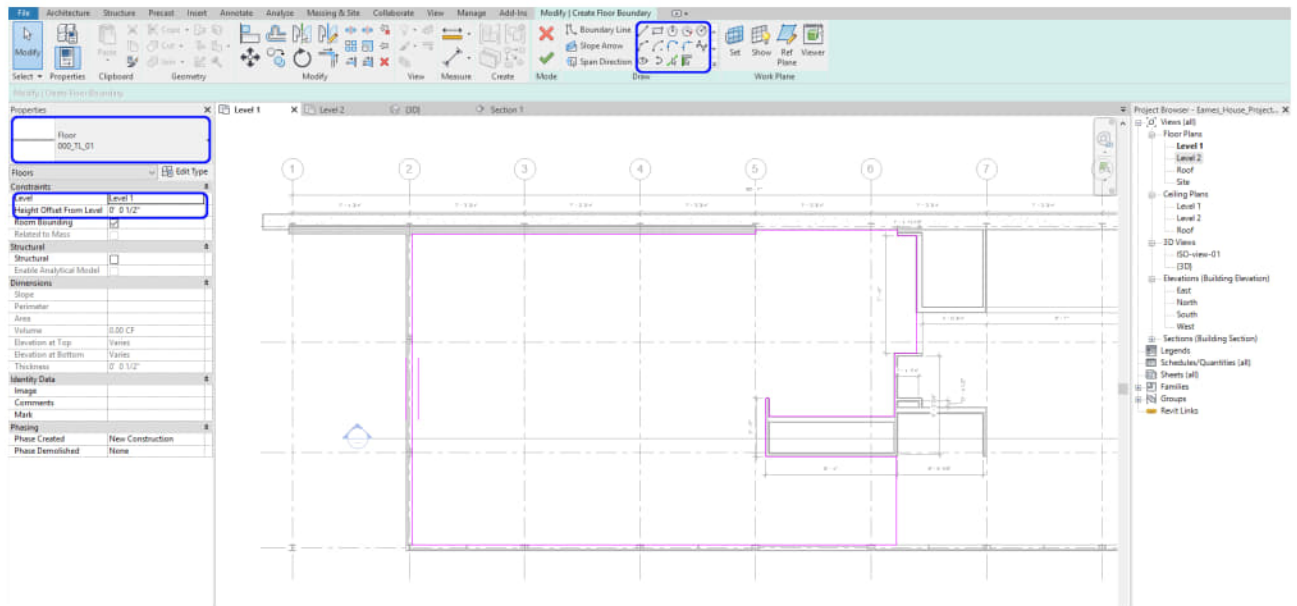


- [STEP 12] Click [APPEARANCE] tab
- [STEP 13] Click [REPLACE THIS ASSET]
- [STEP 14] Find appropriate material from [APPEARANCE LIBRARY]
- [STEP 15] Click the [REPLACE] icon, and close the [ASSET BROWSER]
- [STEP 16] If needed, change the color
- [STEP 17] Click [OK]s to complete



Add floors for finishes

- [STEP 1] Open a plan view to add the finish floor
- [STEP 2] Confirm the level on the [PROPERTIES]
- [STEP 3] Change the Height Offset From Level to [1/2"]
- [STEP 4] Draw Floor Boundary, please consider not to overlap with walls

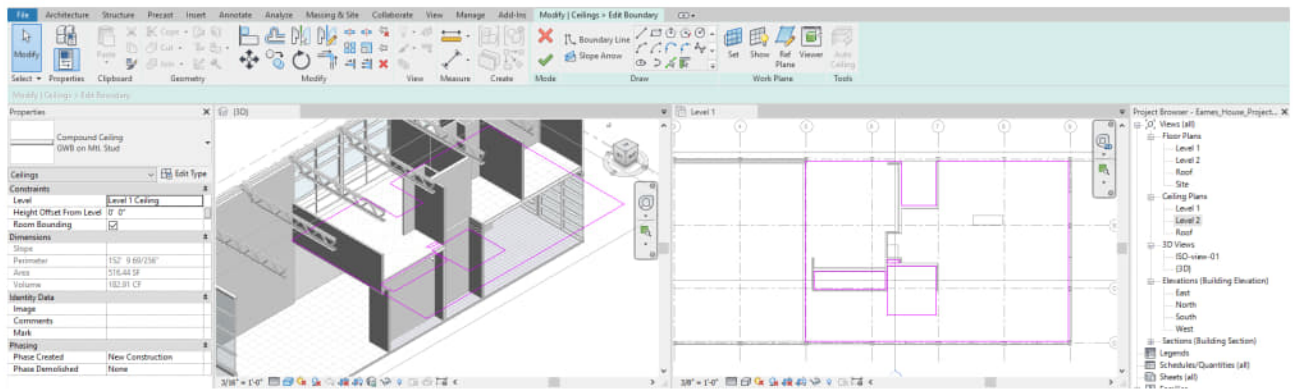


(CO 4) Add/Edit Ceilings & Ceiling Properties

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Add a ceiling

- [STEP 1] Open [LEVEL 1] ceiling plan
- [STEP 2] Click [CEILING] from [ARCHITECTURE] tab, under [BUILD] panel
- [STEP 3] Select [GWB on Mtl. Stud]
- [STEP 4] Confirm [LEVEL] is [LEVEL 1 CEILING] and [HEIGHT OFFSET FROM LEVEL] to [0'0"].
If you don't have a level for a ceiling, you can set your level to Level 1 and update the height offset from a level like 8'-0."
- [STEP 5] Draw the Ceiling boundary.
You will need to draw an independent ceiling for each room.
- [STEP 6] Click the green checkmark to complete this command.

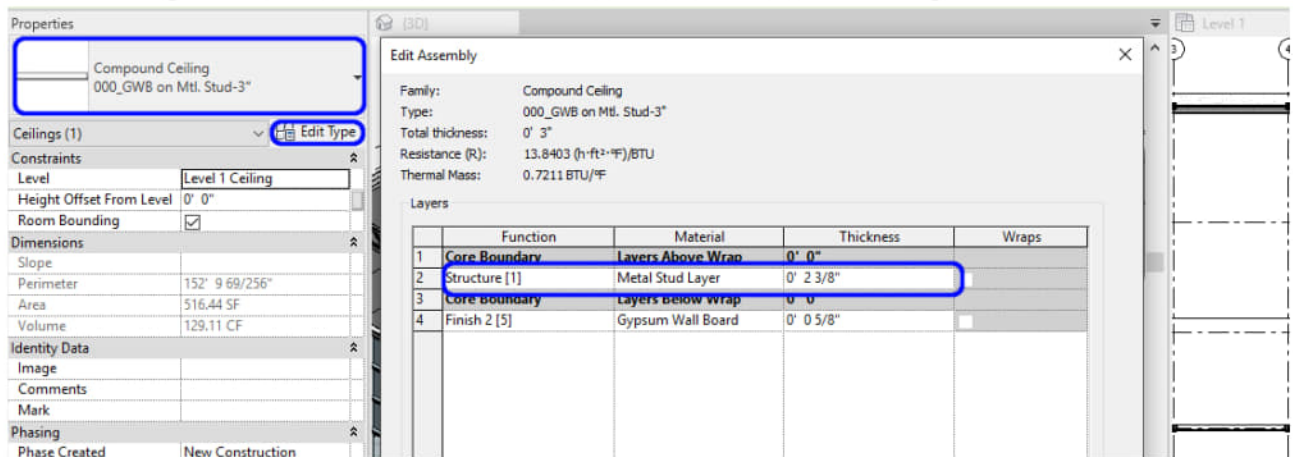


- Repeat this process to place a ceiling at level 2

Edit Ceiling properties

You will change the thickness of the ceiling 12" to 2."

- [STEP 1] Select the first level ceiling from the 3D view
- [STEP 2] Click [EDIT TYPE] on [PROPERTIES] palette
- [STEP 3] Click [DUPLICATE] on [TYPE PROPERTIES]
- [STEP 4] Enter a new name. I recommend adding [000_] of the letter of the name. For example, [000_GWB on Mtl.Stud-3"]
- [STEP 5] then click [OK]
- [STEP 6] Click [EDIT] for [STRUCTURE]
- [STEP 7] Change [2 3/8"] for [METAL STUD LAYER] and click [OK] and [OK] to complete



SAVE the file before closing the application.

Save in a different location for the backup (e.g., a cloud folder)

References

Autodesk.Help. (2020, May 13). About View Templates. Retrieved October 22, 2020, from <https://knowledge.autodesk.com/support/revit-products/learn-explore/caas/CloudHelp/cloudhelp/2018/ENU/Revit-Customize/files/GUID-C3B5FB82-3247-48F6-82F0-73011A0F8027-htm.html#:~:text=A%20view%20template%20is%20a,consistency%20across%20construction%20document%20sets>

Autodesk.Help. (2019, February 18). About the View Range. Retrieved October 22, 2020, from <https://knowledge.autodesk.com/support/revit-products/learn-explore/caas/CloudHelp/cloudhelp/2019/ENU/Revit-DocumentPresent/files/GUID-58711292-AB78-4C8F-BAA1-0855DDB518BF-htm.html>

Autodesk.Help. (2019, February 18). Create an Underlay. Retrieved October 22, 2020, from <https://knowledge.autodesk.com/support/revit-products/learn-explore/caas/CloudHelp/cloudhelp/2019/ENU/Revit-DocumentPresent/files/GUID-77184183-E245-4F3B-8486-617E9A9FB296-htm.html>

Chapter 13. Add/edit stairs, rails, & roof

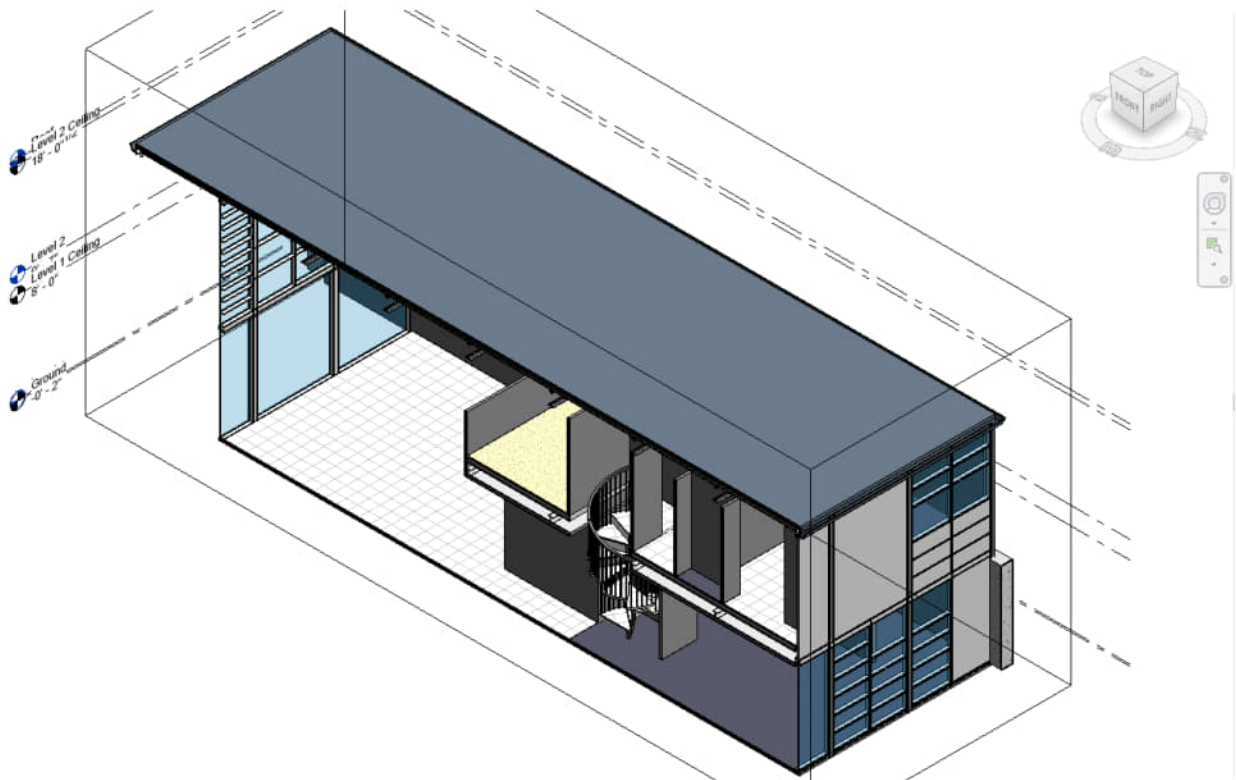
Session Objectives

Upon completing this session, students will be able to:

- (CO 1) Add/Edit Stair – three types of staircases
- (CO 2) Add/Edit Railing
- (CO 3) Add/Edit Roof

Session Highlights

At the end of the session, students can create the graphics below.



(CO 1) Add/Edit Stair – three types of staircases

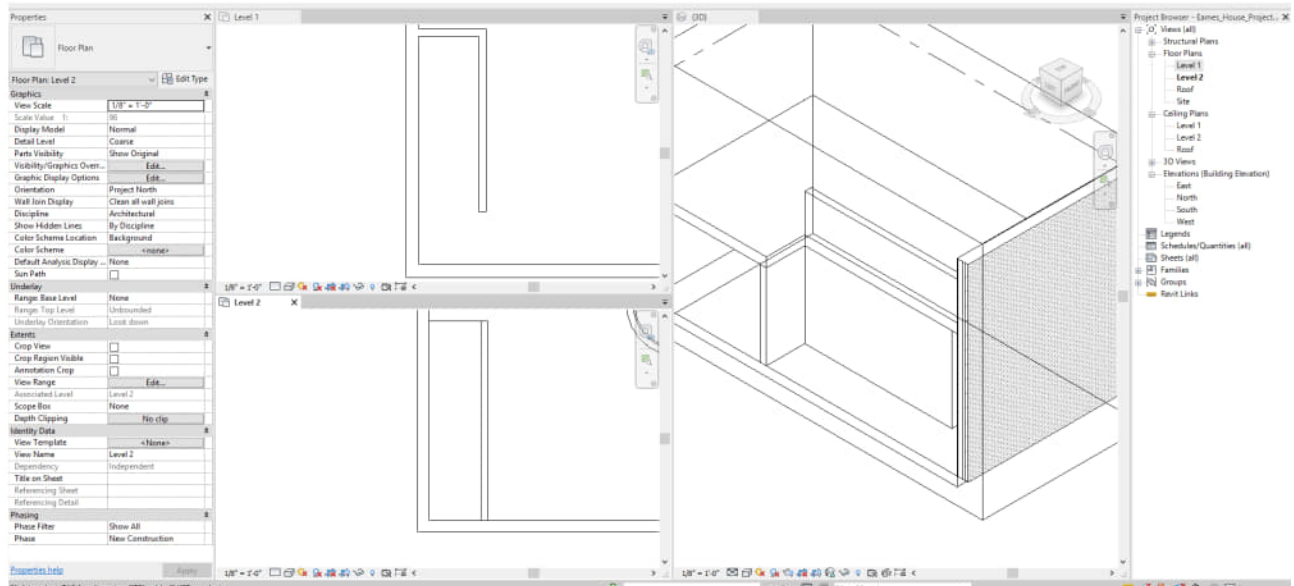
A YouTube element has been excluded from this version of the text. You can view it online here: <https://iastate.pressbooks.pub/visualgraphiccomm/?p=98>

- Revit provides various types of staircases, and it is modifiable.
- Revit stair automatically calculates the number of stair runs, automatically creating landing, supports, and even handrails.
- In this tutorial, the instructor will demonstrate four types of staircases – a straight stair, two runs (a switchback stair), a spiral, and a custom with sketch in another Revit file only for reference.
- For the Eames house, students will only need a spiral staircase.
- For more information about Revit stairs, please visit [this page](#)

To create a straight stair

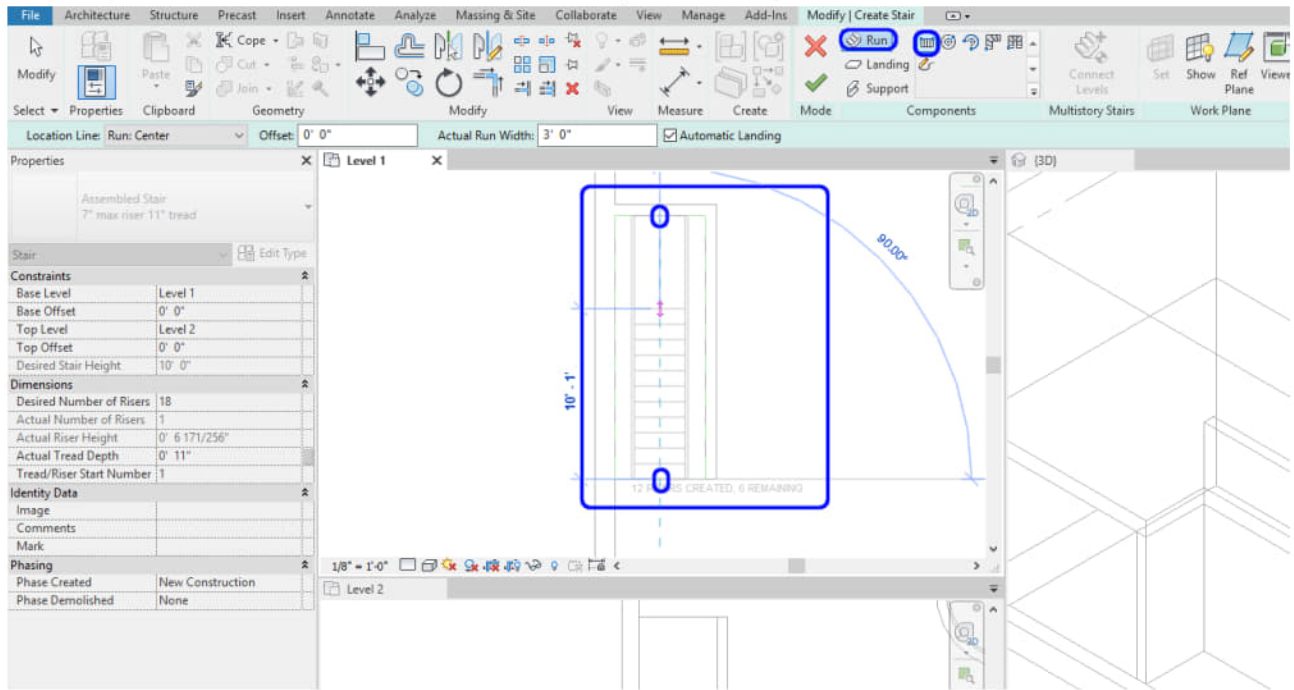
Be aware of the overall size of the staircase and create walls for the staircase before you create a staircase in Revit. If it is an open staircase, please use the reference plane for a guideline.

- [STEP 1] Open floor plan views (e.g., Level 1 floor plan view and Level 2 floor plan view) and 3D view or a section view with a perspective view to see the height and overall shape of the staircase. And view change to Window Tile view (WT)

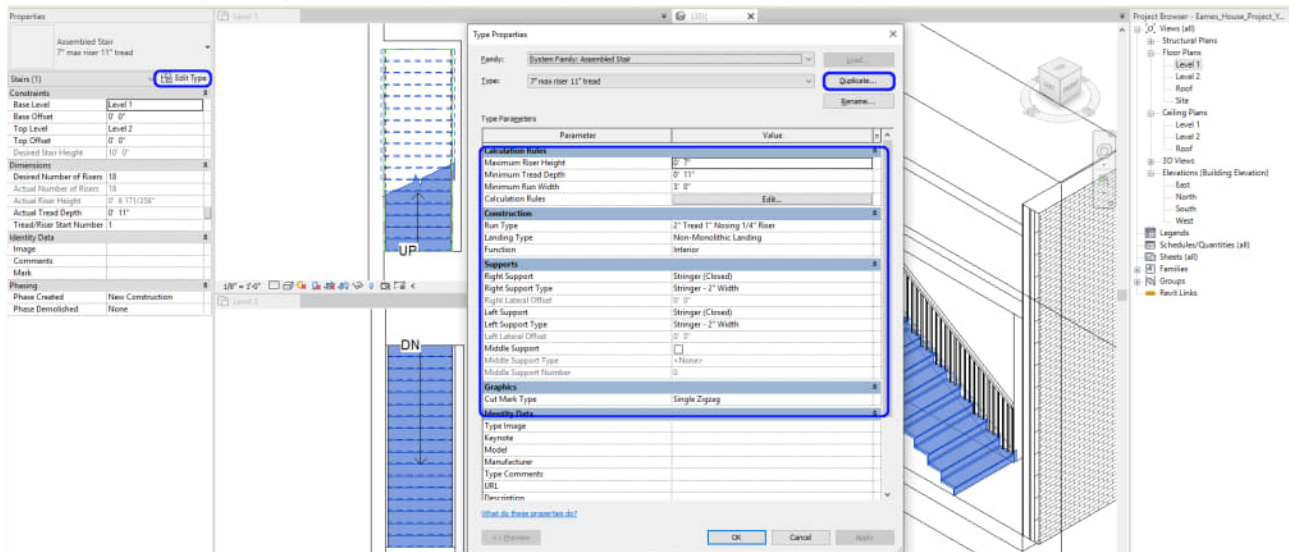


- [STEP 2] Draw Detail Line (DL) for the outlines of the staircase. You may turn on the CAD drawing that you already imported.
- [STEP 3] Click [STAIR] from [ARCHITECTURE] tab, under [BUILD] panel
- [STEP 4] Select [STRAIGHT] from [MODIFY/CREATE STAIR], under [COMPONENT] panel

- [STEP 5] Select a center point for the stair start point on a plan view, then Revit automatically calculates and shows how many stairs are needed to reach the next floor. Then, click the endpoint on the current view to finish



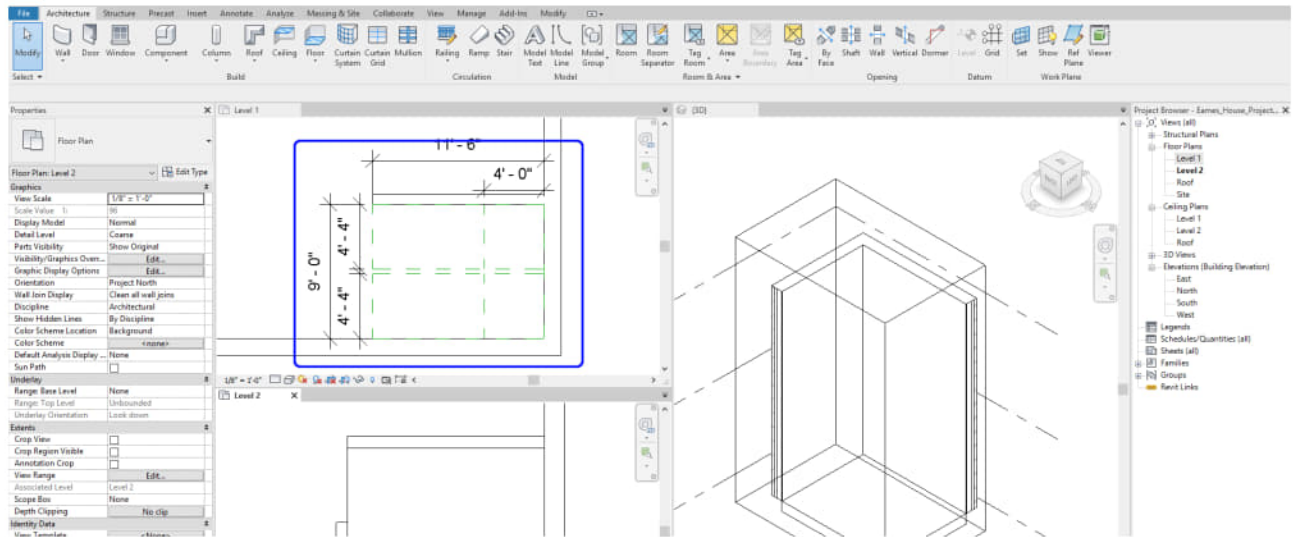
- [STEP 6] Then, the preview will show on all the views. If it looks OK, click the green checkmark to finish. If it needs changes, the types of family, click family type on [PROPERTIES] palette, and select the desired family. If you do not have a desired family for the stair, load the family first
- [STEP 7] If the stair run width need a modification, click the run, then change the width by adjusting the arrows. If the stair Riser Height or/and Tread Depth change, click [EDIT TYPE] and change the Type Properties. Do not forget, if you change the type properties, all types will change. To prevent this, please [DUPLICATE] and edit.



- [STEP 8] Click [GREEN CHECKMARK] to complete
- [STEP 9] Remove the Detail lines or the Reference Plans that you used for the stair
- [STEP 10] If you found errors on your stair, click [EDIT STAIRS] to fix the error

To create a two-runs stair (a switchback stair)

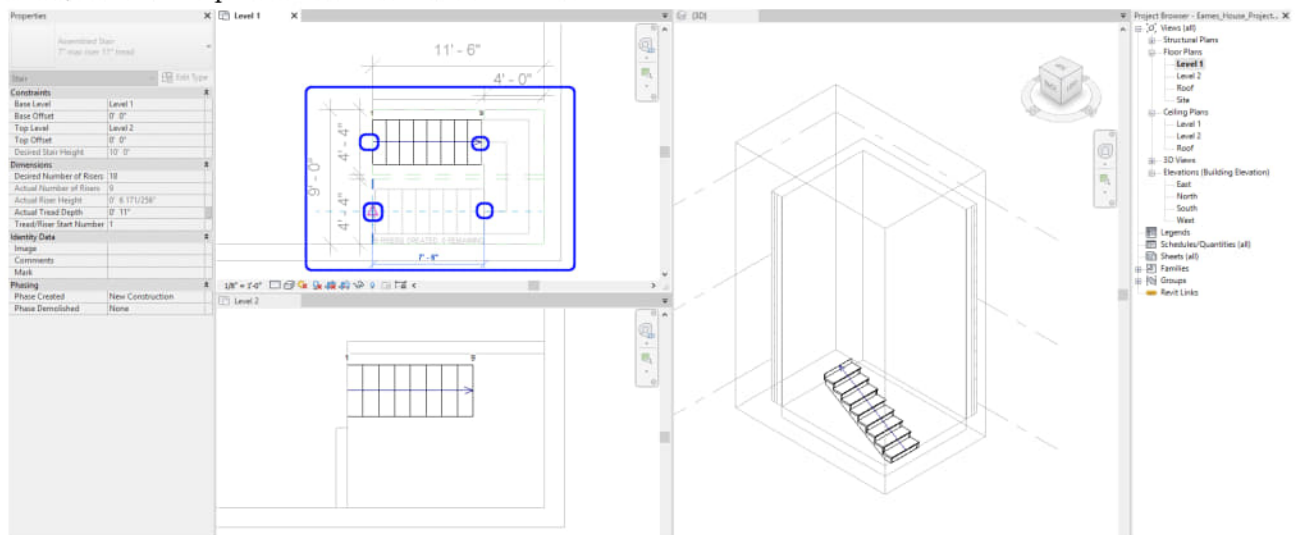
- [STEP 1] Open floor plan views (e.g., Level 1 floor plan view and Level 2 floor plan view) and 3D view or a section view with a perspective view to see the height and overall shape of the staircase. And view change to Window Tile view (WT)
- [STEP 2] Draw Detail Line (DL) for the outlines of the staircase. You may turn on the CAD drawing you already imported.



- [STEP 3] Click [STAIR] from [ARCHITECTURE] tab, under [BUILD] panel
- [STEP 4] Select [STRAIGHT] from [MODIFY/CREATE STAIR], under [COMPONENT] panel
- [STEP 5] Select a center point for the stair start point on a plan view, then Revit automatically calculates and shows how many stairs are needed to reach the next floor. Then, click the second point on the current view to create the landing start

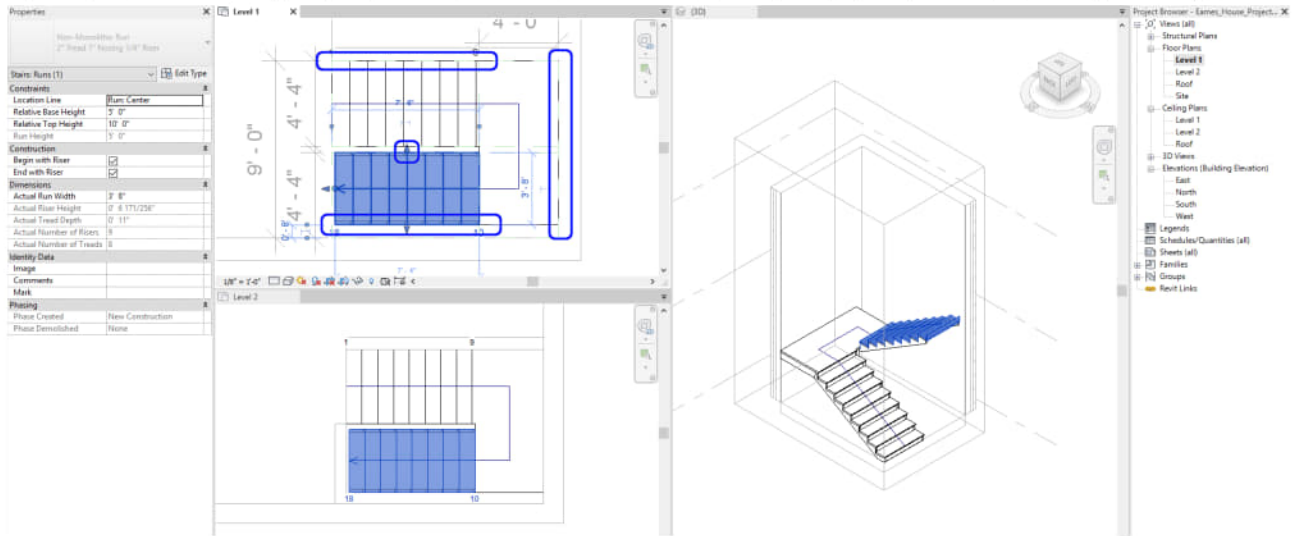
Then, click the third point on the current view to create the second stair start point

Then, click the endpoint on the current view to finish

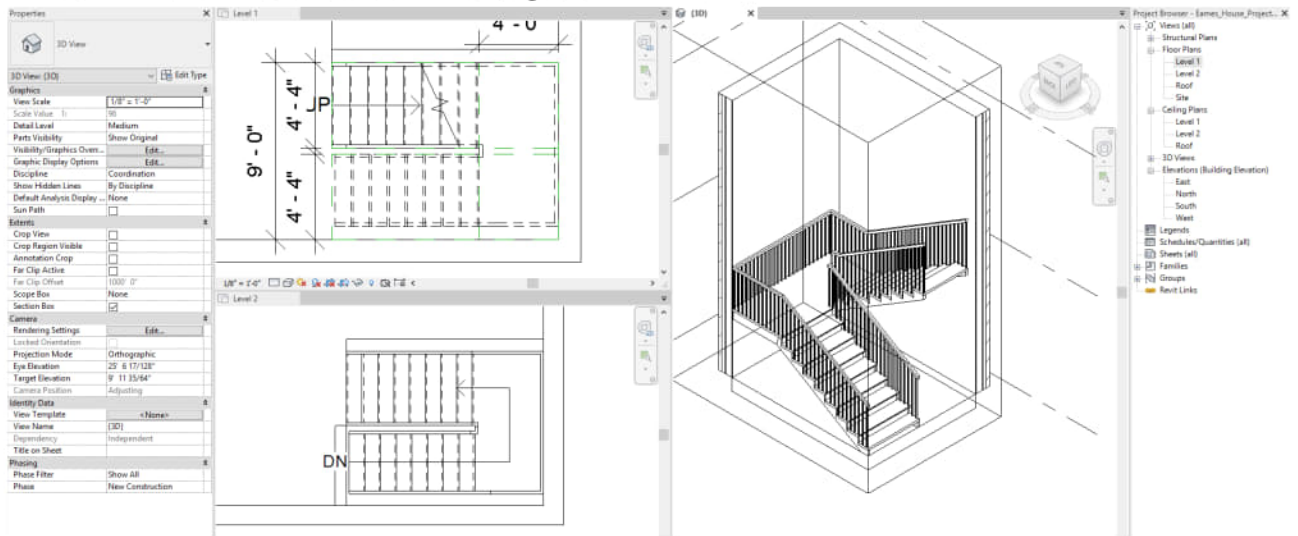


- [STEP 6] Then, the preview will show in all the views. If it looks OK, click the green checkmark to finish. If it needs changes, the types of family, click family type on [Properties] palette, and select a desire family. If you do not have a desire family for the stair, load the family first

- [STEP 7] If the stair run width needs a modification, click the run, then change the width by adjusting the arrows



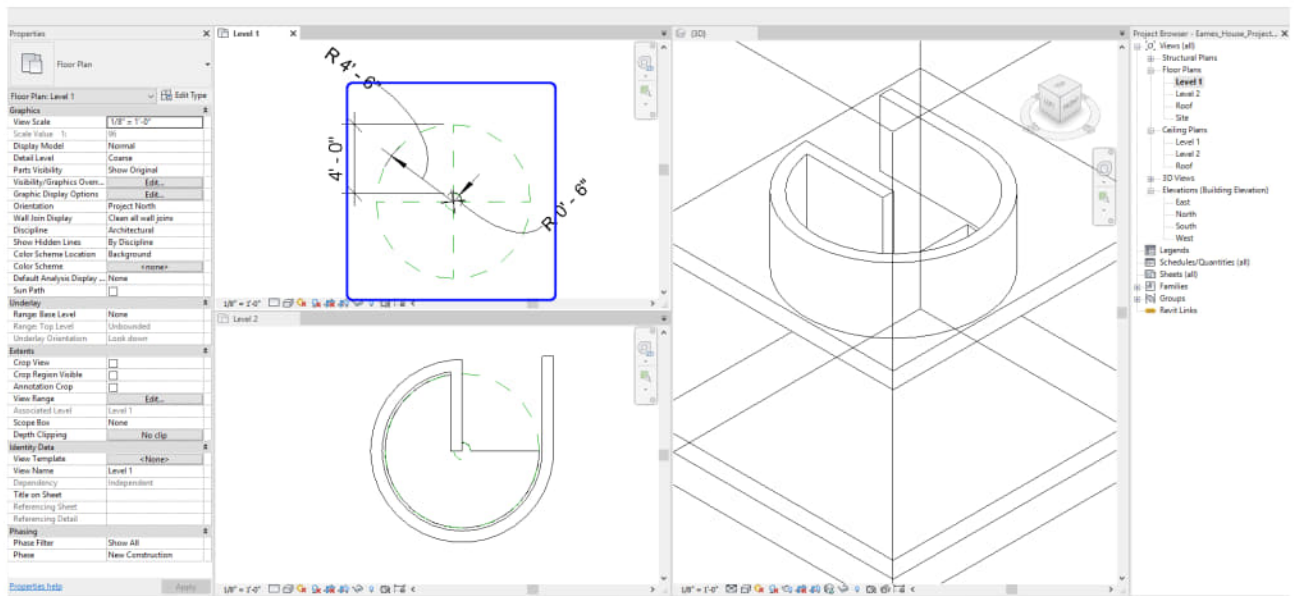
- [STEP 8] Click [GREEN CHECKMARK] to complete



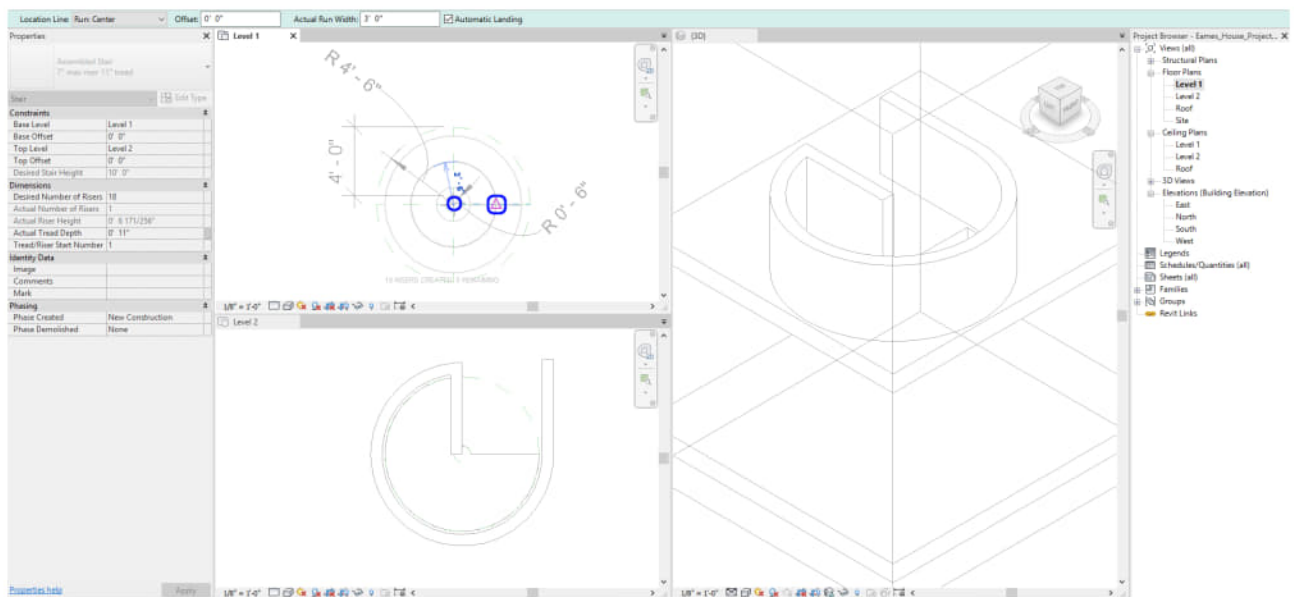
- [STEP 9] Remove the Detail lines or the Reference Plans that you used for the stair

To create a spiral stair

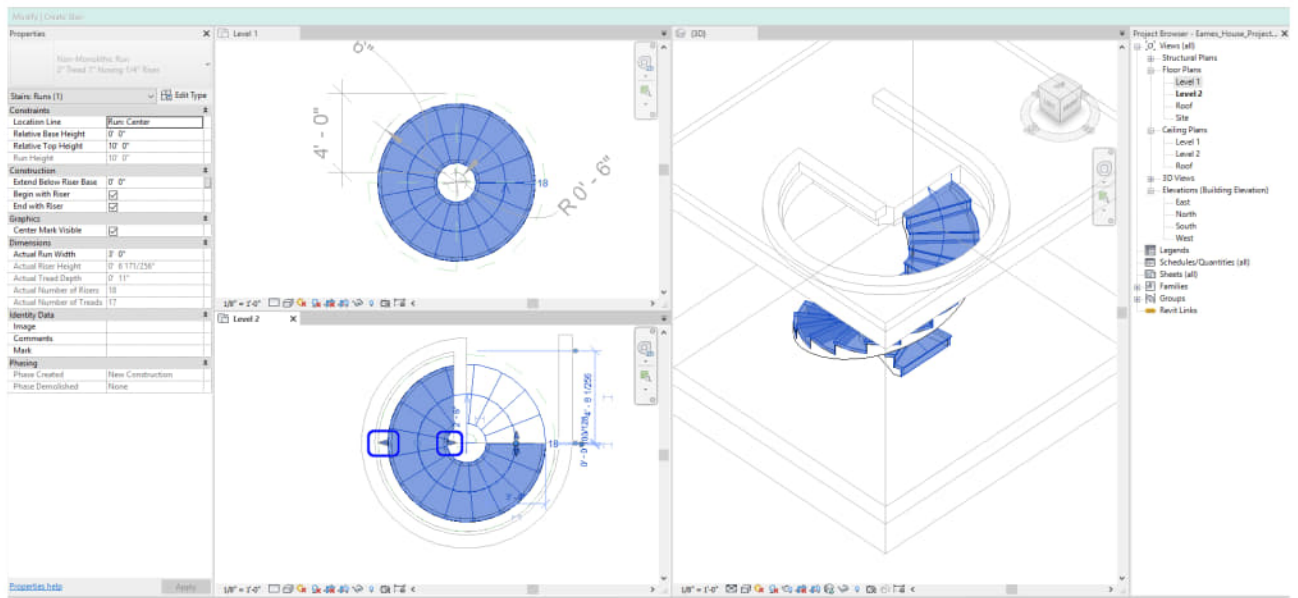
- [STEP 1] Open floor plan views (e.g., Level 1 floor plan view and Level 2 floor plan view) and 3D view or a section views with a perspective views to see the height and overall shape of the staircase. And view change to Window Tile view (WT)
- [STEP 2] Draw Detail Line (DL) for the outlines of the staircase. You may turn on the CAD drawing you already imported.



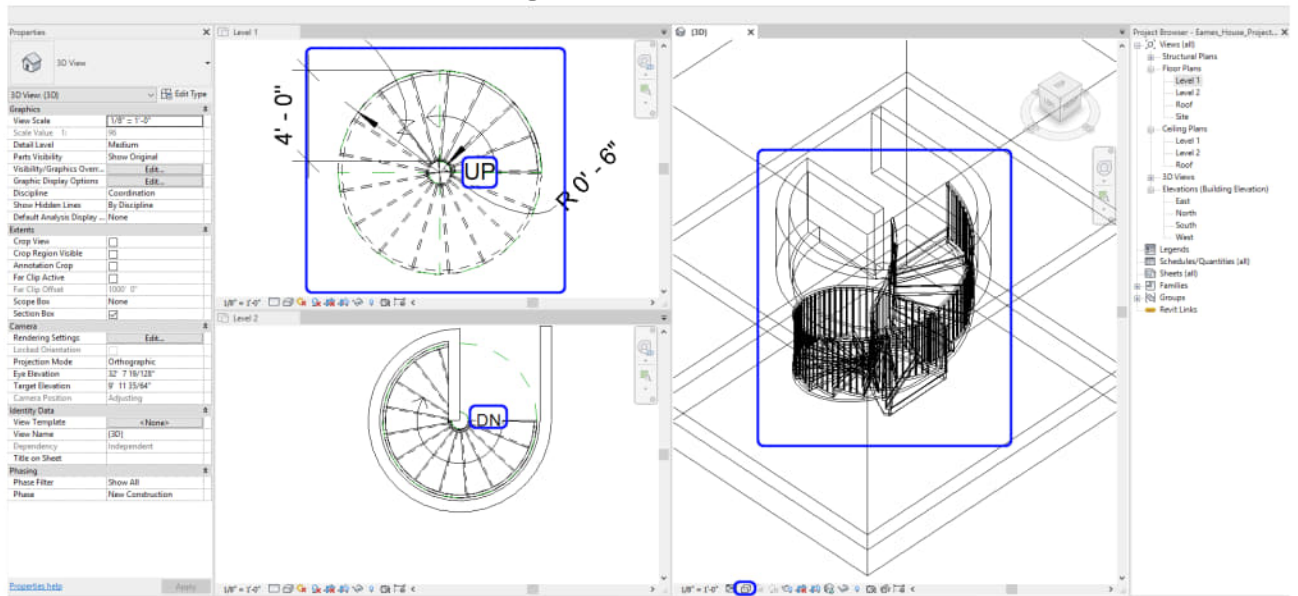
- [STEP 3] Click [STAIR] from [ARCHITECTURE] tab, under [BUILD] panel
- [STEP 4] Select [FULL STEP SPIRAL] from [MODIFY/CREATE STAIR], under [COMPONENT] panel
- [STEP 5] Select a center point of the staircase start point on a plan view, then Revit automatically calculates and shows how many stairs are needed to reach the next floor. Then, click the center point of the run start on the current view to create the staircase.



- [STEP 6] Then, the preview will show on all the views. If it looks OK, click the green checkmark to finish. If needs changes, the types of family, click family type on [PROPERTIES] palette and select a desired family. If you do not have a desired family for the stair, load the family first
- [STEP 7] If the stair run width needs a modification, click the run, then change the width by adjusting the arrows



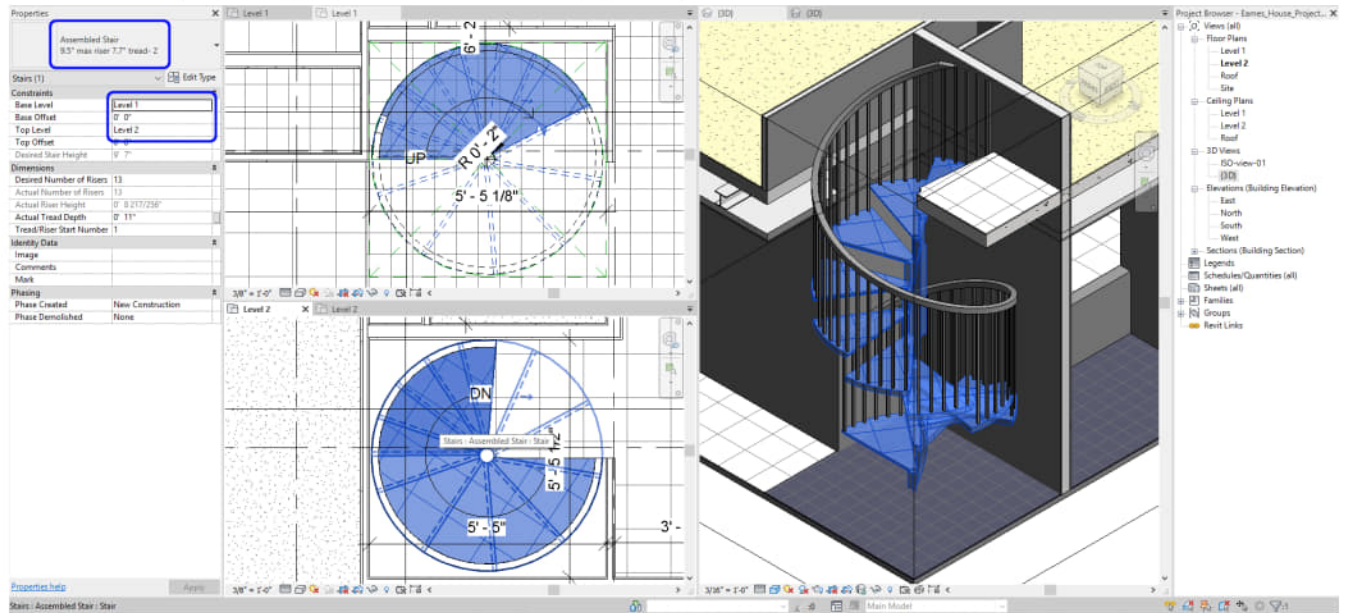
- [STEP 8] Click [GREEN CHECKMARK] to complete



- [STEP 9] Remove the Detail lines or the Reference Plans that used for the stair

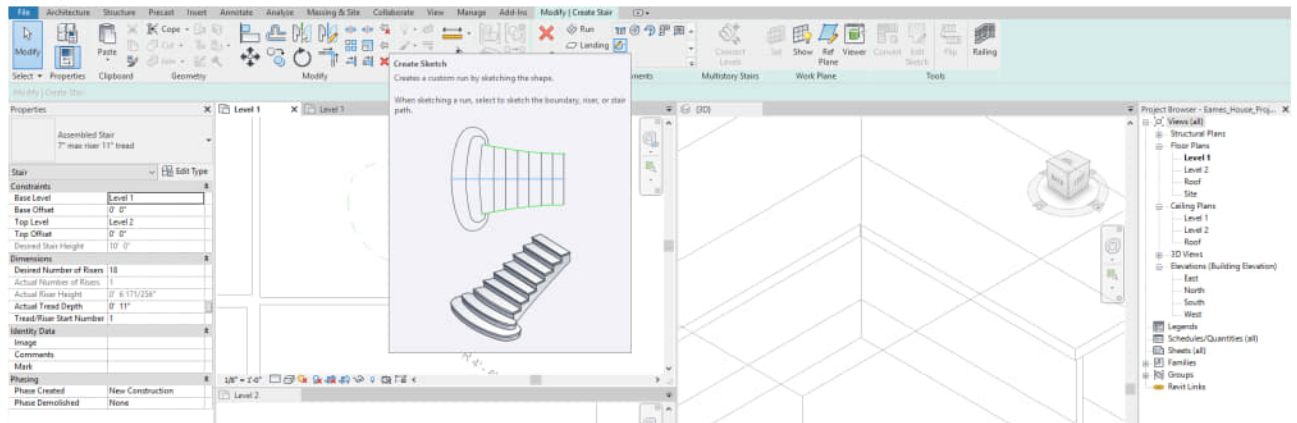
Complete the staircase for the Eames house project with [FULL STEP SPIRAL] tool. It may need some adjustment because

of the structure and shape. Please experiment for the staircase.

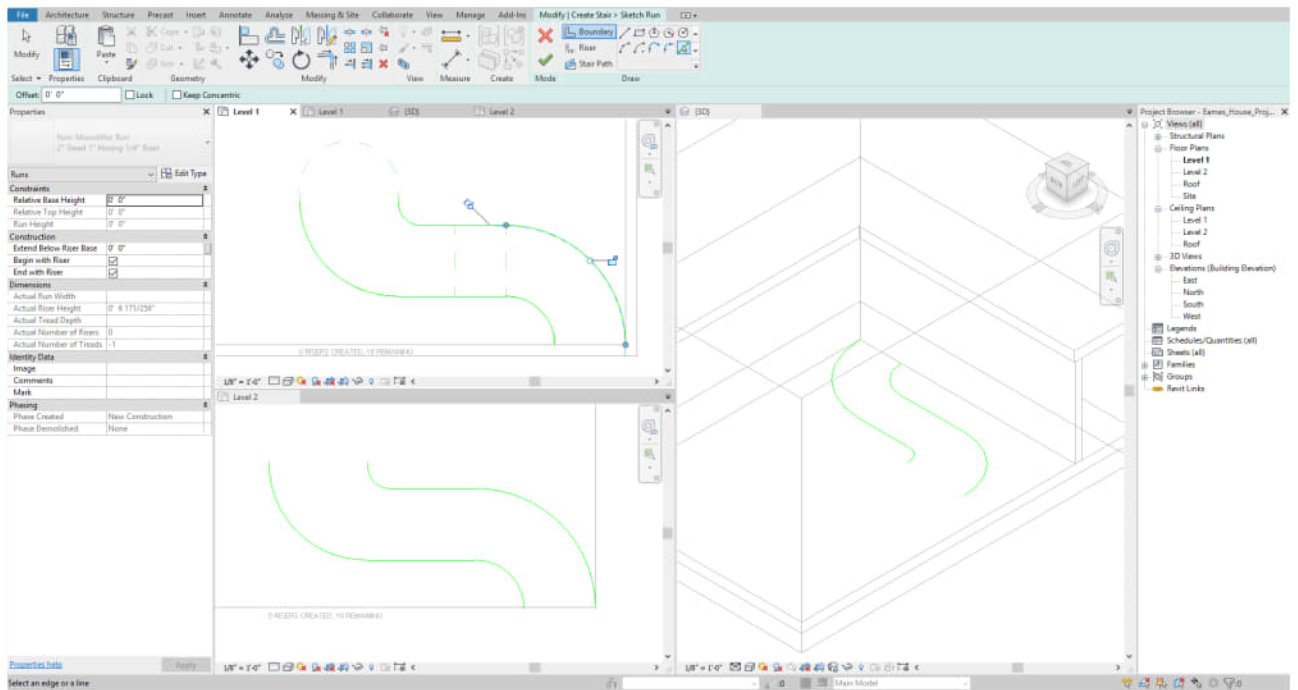


To create a custom stair

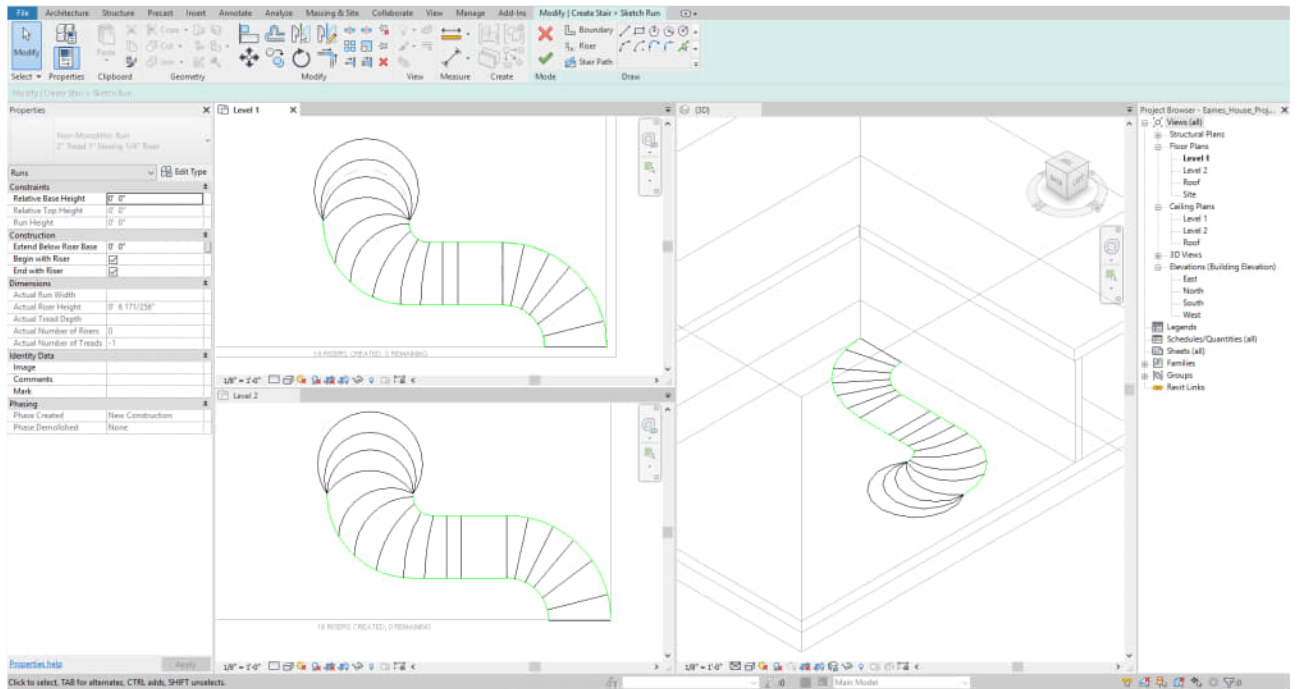
- [STEP 1] Open floor plan views (e.g., Level 1 floor plan view and Level 2 floor plan view) and 3D view or a section view with a perspective view to see the height and overall shape of the staircase. And view change to Window Tile view (WT)



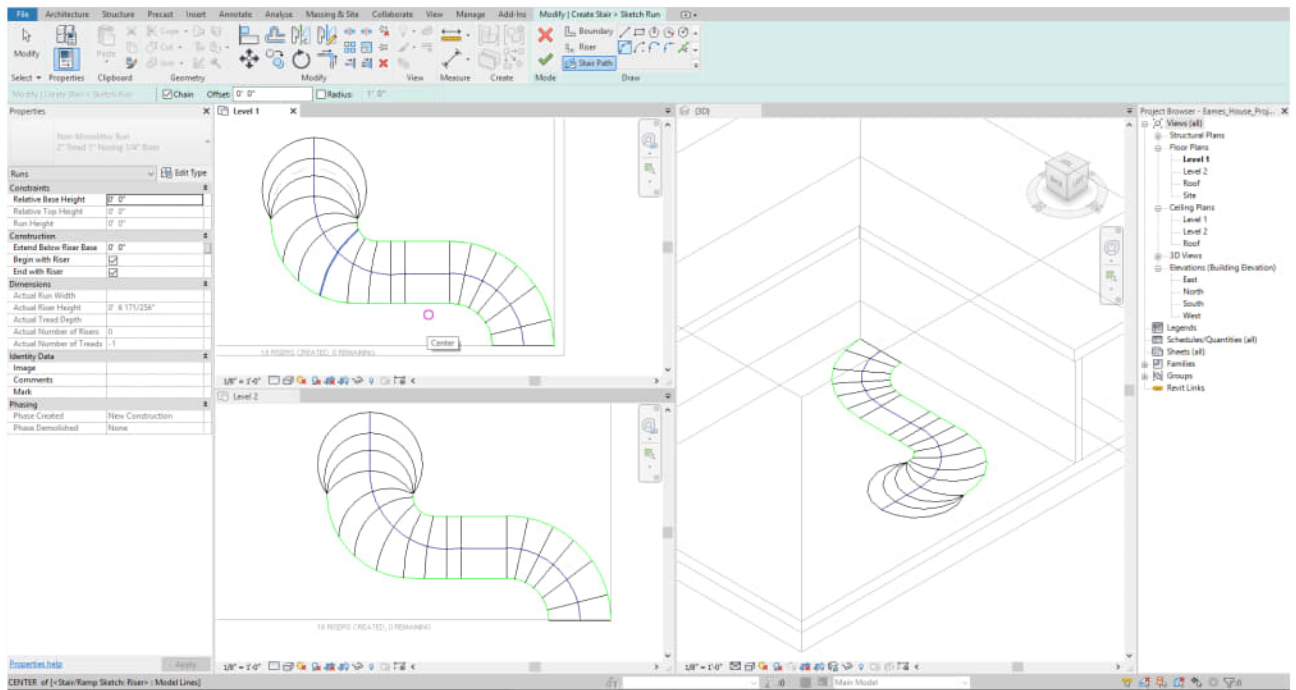
- [STEP 2] Draw [BOUNDARY]



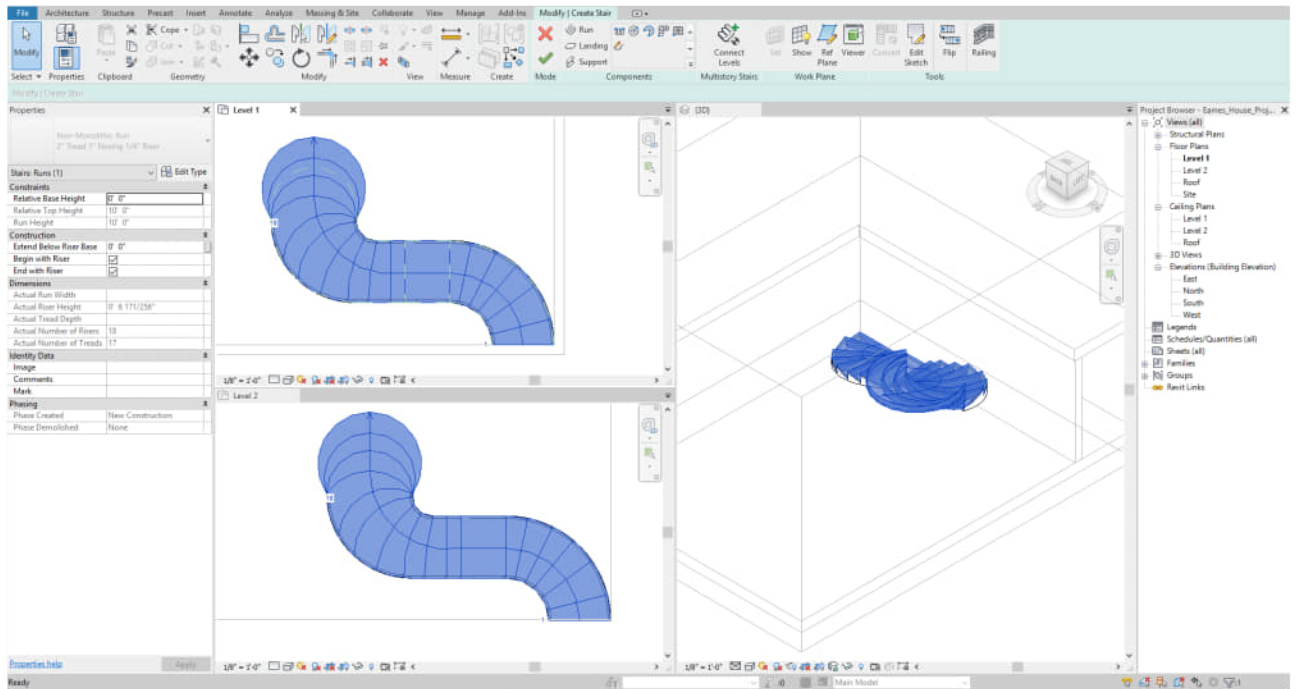
- [STEP 3] Draw [RISER]



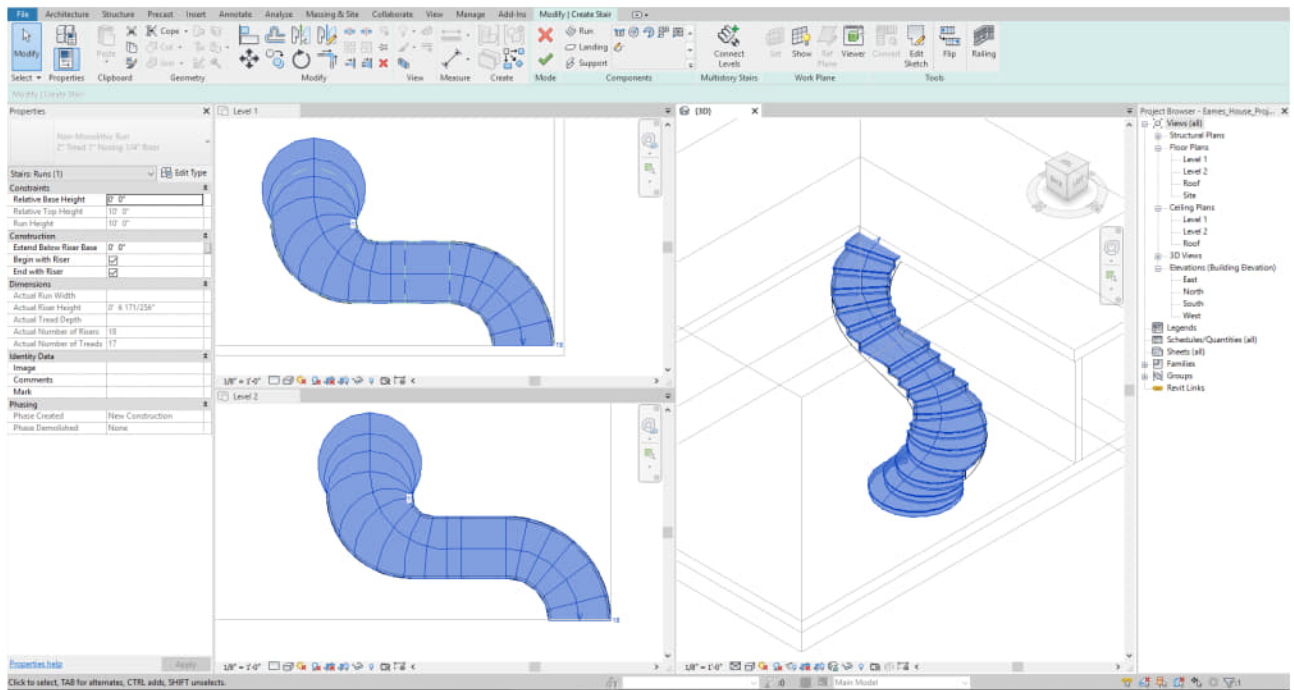
- [STEP 4] Draw [STAIR PATH]



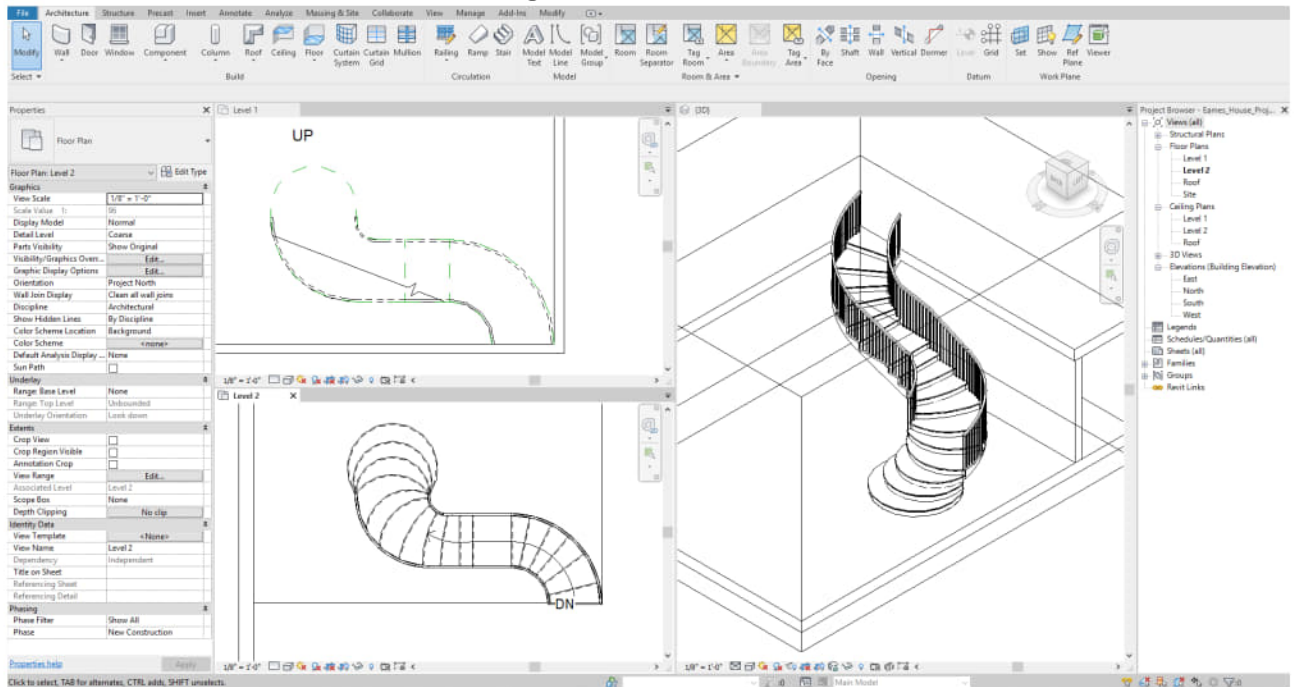
- [STEP 5] Click [GREEN CHECKMARK] to finish



- [STEP 6] If needed, click [FLIP] the direction of the staircase



- [STEP 7] Click [GREEN CHECKMARK] to complete the tool



Autodesk provides sample stairs and railings. Please download the samples by clicking [this page](#) and copy and paste that which you want to use in your project. This process will load the family files to your Revit file

(CO 2) Add/Edit Railing

A YouTube element has been excluded from this version of the text. You can view it online here: <https://iastate.pressbooks.pub/visualgraphiccomm/?p=98>

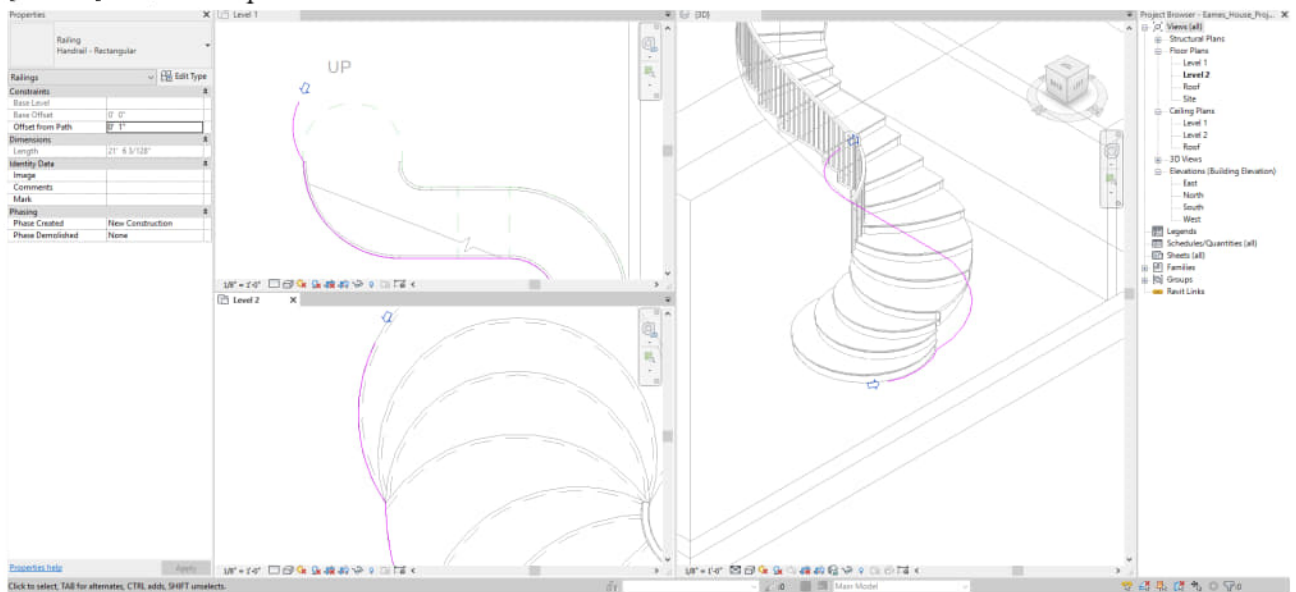
Typically, railings are automatically created when a staircase is made

For more information about Railings, please read [this page](#)

However, many times, your railings need modifications.

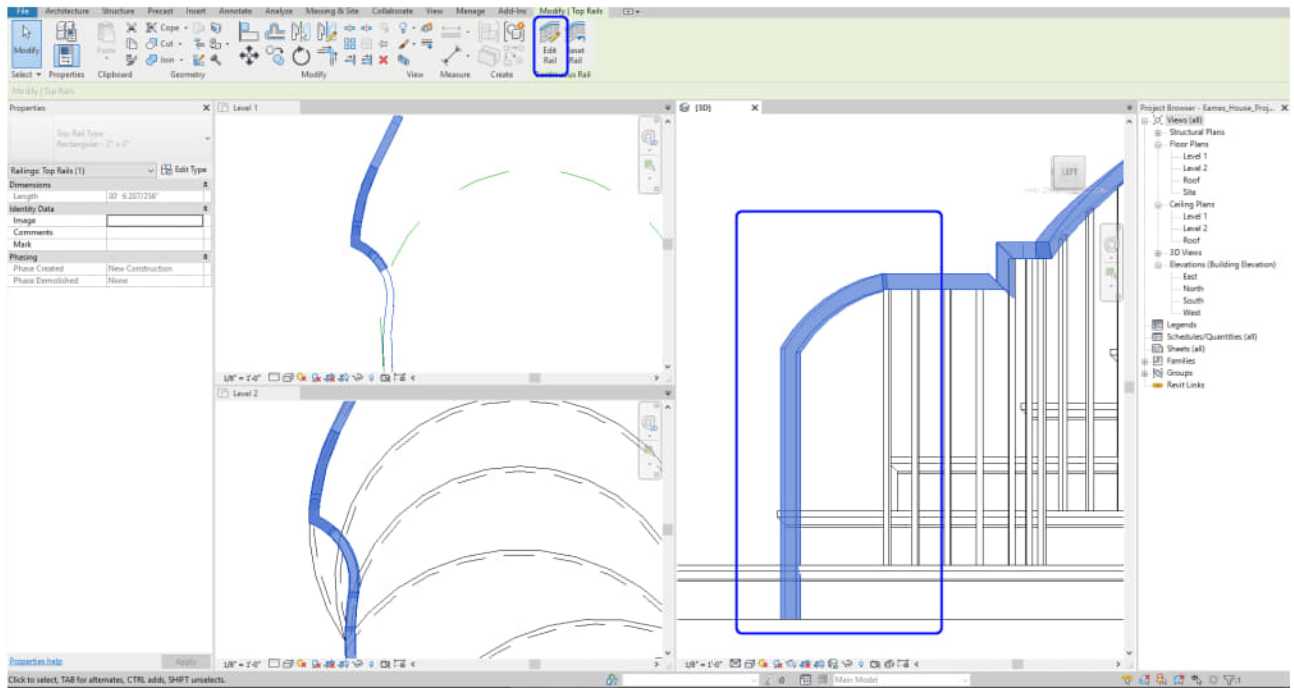
To extend your railings

- [STEP 1] click the railing
- [STEP 2] click [EDIT PATH]
- [STEP 3] edit/add the path



To edit handrail

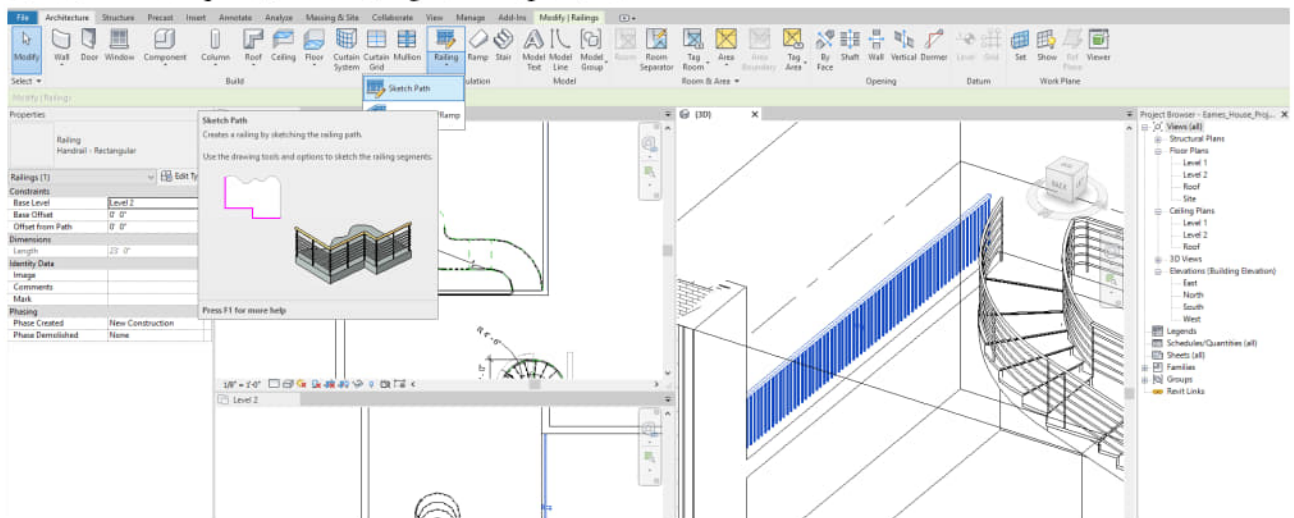
- [STEP 1] If a Handrail path needs changing, you can select handrail only by pressing the [TAB] key
- [STEP 2] click [EDIT RAIL]
- [STEP 3] click [EDIT PATH] it would be better to work in Section or a 3d view



To change the handrail type, change the family type from [PROPERTIES] palette

To create a path without a stair

- [STEP 1] Click [RAILING]
- [STEP 2] Click [SKETCH PATH]
- [STEP 3] Sketch a path with a drawing tool on a plan view



- [STEP 4] Click [GREEN CHECKMARK] to finish

(CO 3) Add/Edit Roof

A YouTube element has been excluded from this version of the text. You can view it online here: <https://iastate.pressbooks.pub/visualgraphiccomm/?p=98>

In this session, I will demonstrate the two types of roof; one is the Eames house roof – Flat roof and a typical residential roof – Hip roof

There are ten standard roof shape models in the Revit tutorial. Please watch this tutorial for your other projects
[10 Common Roof Shapes Modeled in Revit Tutorial](#)

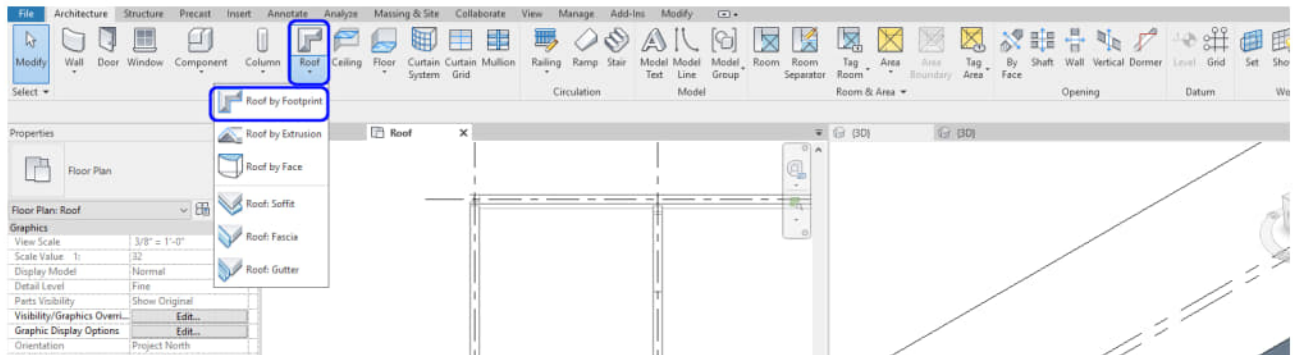
Please find Autodesk provided roof tutorials from [this link](#)

If you want to create complex roof shapes in Revit, please watch this YouTube video
[3 Complex Roof Shapes in Revit](#)

For the Eames House project, you will create two models, which are the roof on the top of the metal deck and the Edge of the roof.

Add a flat roof

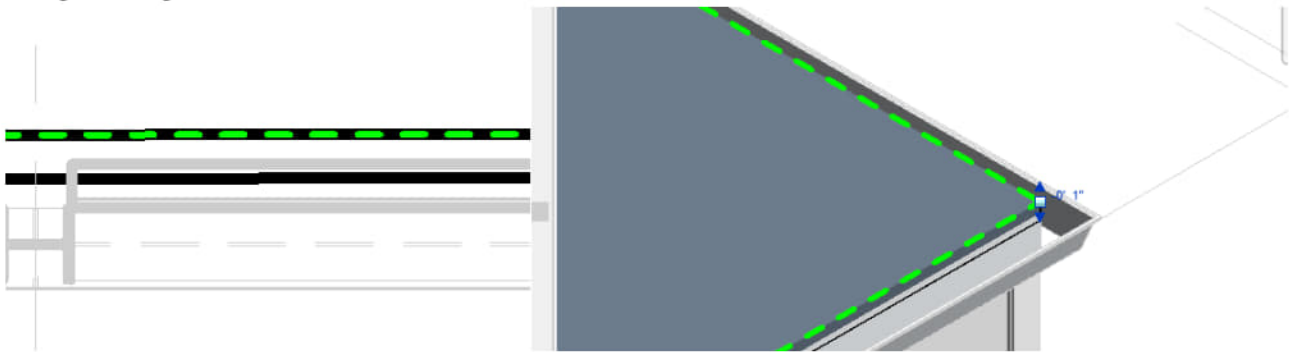
- [STEP 1] From the Project Browser, switch to the Roof plan.
- [STEP 2] In the Properties, with nothing selected, set the Underlay to level 2.
- [STEP 3] From the Architectural tab, click the small arrow on the roof] > Click [ROOF BY FOOTPRINT]



- [STEP 4] Use the Draw tool to create a boundary.
 - Make sure you check Basic Roof – Generic – 9" > Duplicate – 3."
 - Base level – Roof
 - Base offset from level – 0' 0."
 - Uncheck – Defines slope
 - Offset – 0' 0."
- [STEP 5] Once the boundary line is done, click the green checkmark
- [STEP 6] Your roof will be over the Metal deck; you can move the roof above the metal deck

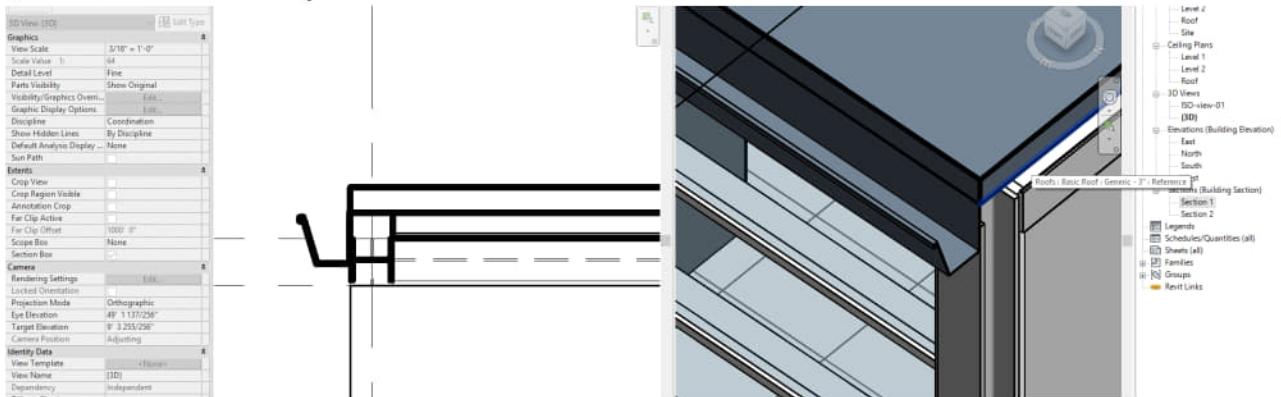


- [STEP 7] You may add a point / a line for slope for a roof drain, click [ADD POINT] and click a point on the roof and change the height.



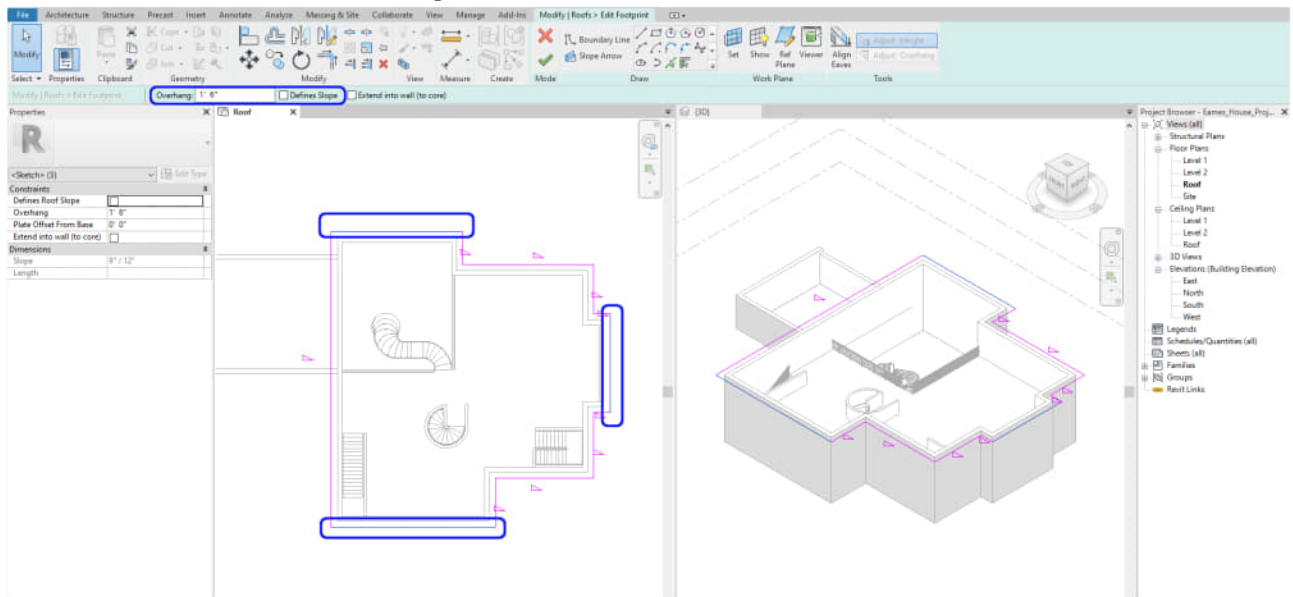
To create a gutter

- [STEP 1] From the Architectural tab, click the small arrow on the roof] > Click [ROOF: GUTTER]
- [STEP 2] Default will be Gutter – Bevel 5" x 5". We will change to 6" x 6."
- [STEP 3] Click [EDIT TYPE] > [DUPLICATE] > name change [000_Gutter – Bevel 6" x 6"] > Click [OK]
- [STEP 4] Click Gutter Profile-Bevel: 5"x5" on profile
- [STEP 5] Change to 6"x 6" > Click [OK]
- [STEP 6] From the ISO view, click the top edges of the roof
- [STEP 7] To finish, [ESC] key

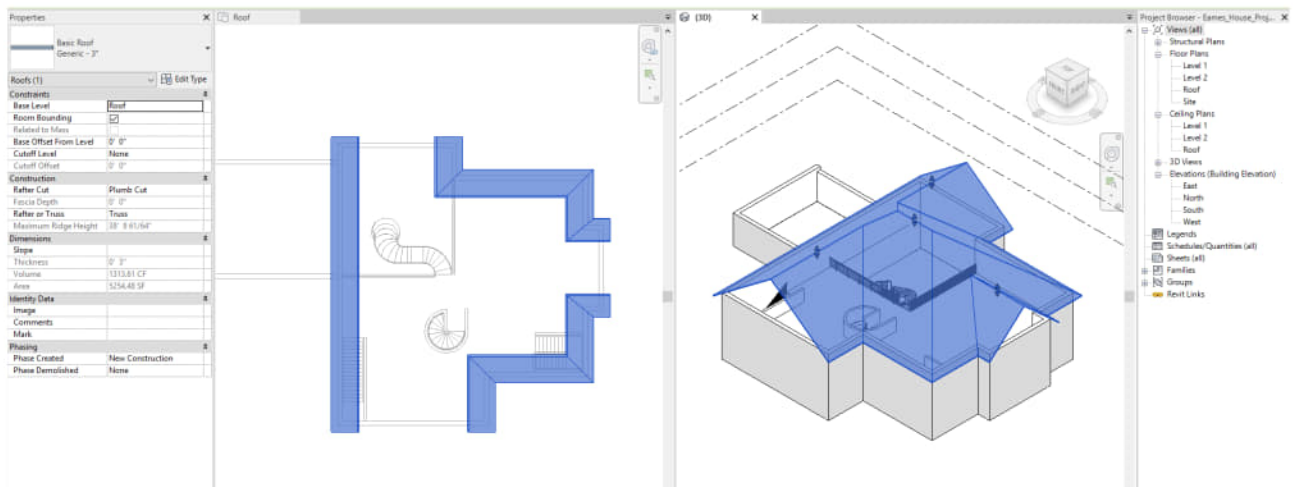


Add a hip roof (combined)

- [STEP 1] From the Project Browser, switch to the Roof plan.
- [STEP 2] In the Properties, with nothing selected, set the Underlay to level 2 or level 1.
- [STEP 3] From the Architectural tab, click the small arrow on the roof] > Click [ROOF BY FOOTPRINT]
- [STEP 4] Use the Draw tool to create a boundary.
 - Make sure you check Basic Roof – Generic – 9” > Duplicate – 3.”
 - Base level – Roof
 - Base offset from level – 0’ 0.”
 - Check – Defines slope
 - Slope – 9”/12.”
 - Offset – 1’ 6.”
- [STEP 5] Select 3 lines do not have a slope, uncheck [DEFINES SLOPE]



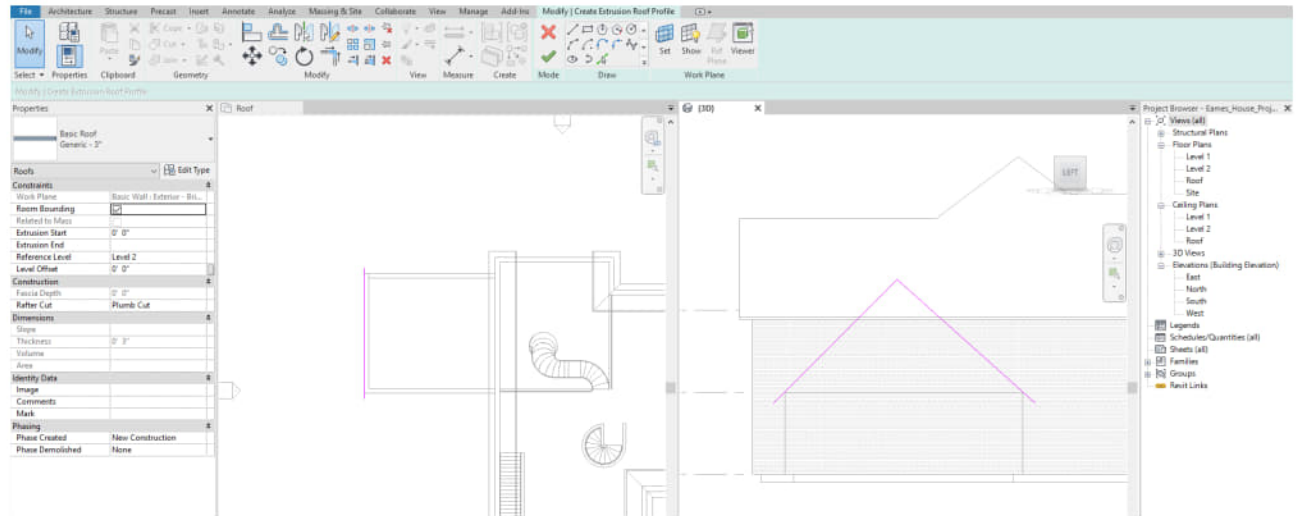
- [STEP 6] Click [GREEN CHECKMARK] when it is done



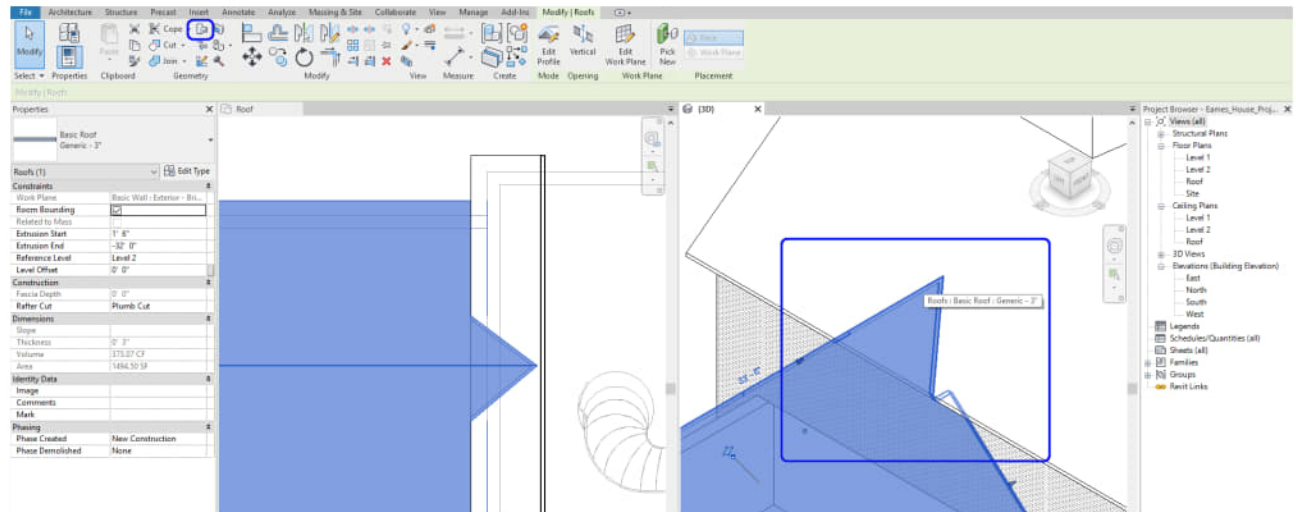
- [STEP 7] From the Architectural tab, click the small arrow on the roof > Click [ROOF BY EXTENSION]
- [STEP 8] Revit will ask you to select a work plan > Select [PICK A PLANE] > Pick a face of wall where the roof profile

will start

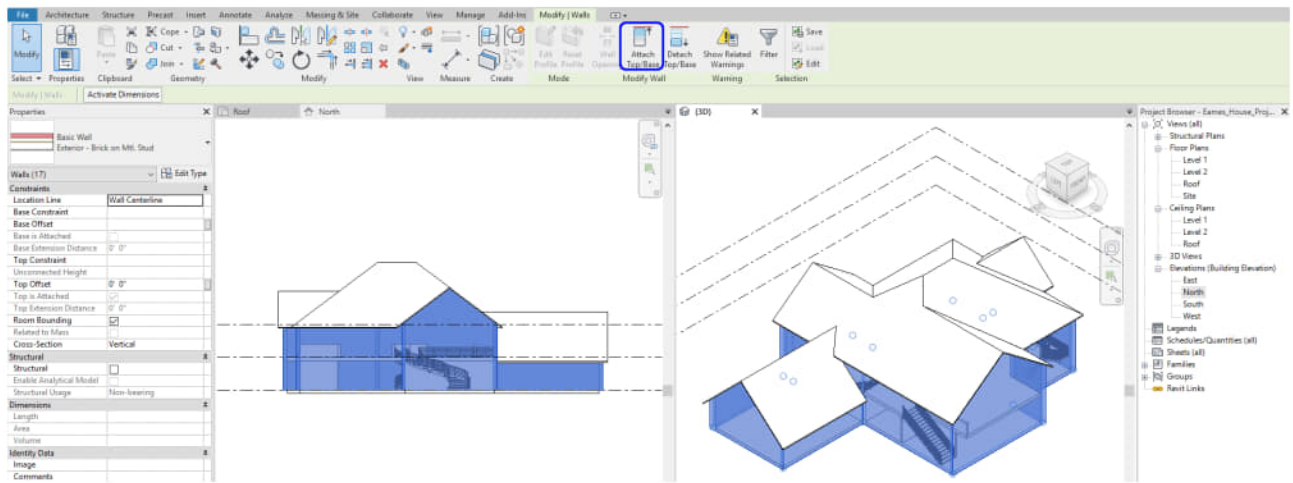
- [STEP 9] Revit will ask you to select Roof reference level and offset > Click [OK]
- [STEP 10] Draw a continued open line for the roof on a Front view



- [STEP 11] Click Green checkmark when it is done
- [STEP 12] On the plan view, you will adjust the depth of the roof
- [STEP 13] To fix the separated roof, you may use [JOIN/UNJOIN ROOF] on the Modify tab
- [STEP 14] Click the profile first and click the face where the profile will meet



- [STEP 15] To meet all wall to the Roof, Select all walls
- [STEP 16] Click [ATTACH TOP/BASE]
- [STEP 17] Click the roof, you may get a warning, but it is OK.



SAVE the file before closing the application.

Save in a different location for the backup (e.g., a cloud folder)

References

Autodesk.Help. (2020, September 10). Stairs. Retrieved October 22, 2020, from <https://knowledge.autodesk.com/support/revit-products/learn-explore/caas/CloudHelp/cloudhelp/2019/ENU/Revit-Model/files/GUID-B1B305DF-8DBE-44A7-A7C6-16B70A3B580E-htm.html>

Autodesk.Help. (2018, September 26). Revit Sample Stair and Railing Files. Retrieved October 22, 2020, from <https://knowledge.autodesk.com/support/revit-products/getting-started/caas/CloudHelp/cloudhelp/2018/ENU/Revit-GetStarted/files/GUID-899499DB-C96A-4C66-8500-0CC4E3FD62B1-htm.html>

Autodesk.Help. (2020, September 10). Railings. Retrieved October 22, 2020, from <https://knowledge.autodesk.com/support/revit-products/learn-explore/caas/CloudHelp/cloudhelp/2019/ENU/Revit-Model/files/GUID-447460EC-DAC6-481B-8F0A-1AED56D51D48-htm.html>

Balkan Architect. (2019, January 8). 10 Common Roof Shapes Modeld in Revit Tutorial. Retrieved October 22, 2020, from <https://www.youtube.com/watch?v=enrmG9CMUfE>

Autodesk.Help. (2018, September 26). Revit Roof Sample File. Retrieved October 22, 2020, from <https://knowledge.autodesk.com/support/revit-products/getting-started/caas/CloudHelp/cloudhelp/2018/ENU/Revit-GetStarted/files/GUID-785EDA82-B8DD-4BF3-A508-E7FC4860E24D-htm.html>

Balkan Architect. (2018, March 31). 3 Complex Roof Shapes in Revit. Retrieved October 22, 2020, from <https://www.youtube.com/watch?v=tTmBA4mMKK8>

Chapter 14. Add/edit windows, doors, lighting fixtures, furniture, tags, & sheets

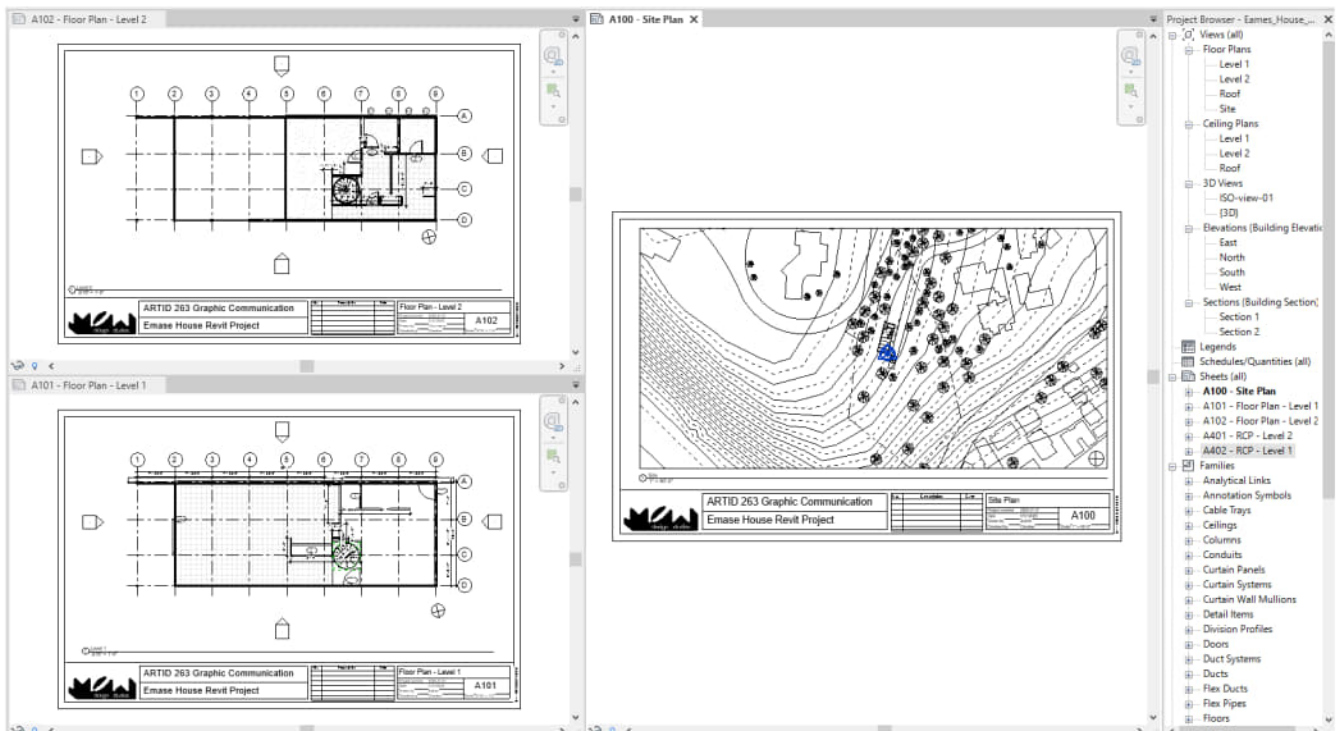
Session Objectives

Upon completing this session, students will be able to:

- (CO 1) Understand the concept of family file
- (CO 2) Add/Edit Doors and Windows
- (CO 3) Add Tags
- (CO 4) Add/Edit Lighting fixtures
- (CO 5) Add/Edit Titleblocks
- (CO 6) Insert Plan views and symbols – North arrow and graphic scale

Session Highlights

At the end of the session, students can create the graphics below.



Lecture Contents

(CO 1) Understand the concept of family file

A YouTube element has been excluded from this version of the text. You can view it online here: <https://iastate.pressbooks.pub/visualgraphiccomm/?p=100>

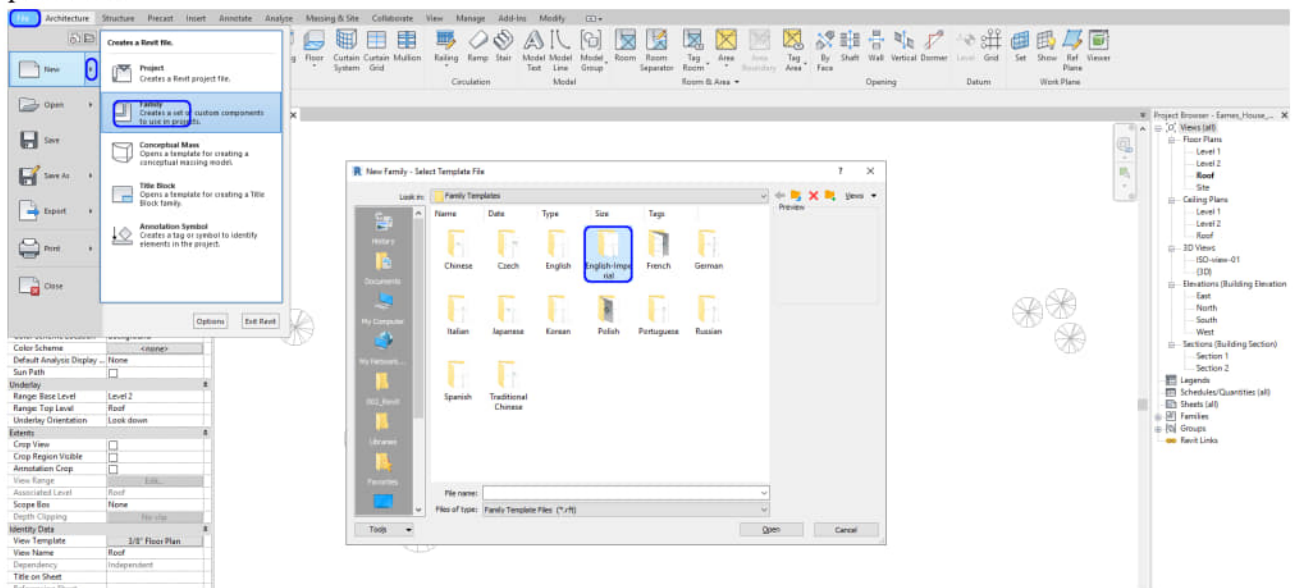
About Revit Families

- A Revit family is a group of elements with a common set of properties, called parameters, and a related graphical representation
- All of the elements that you add to your Revit projects are created with families.
- For example, the structural members, walls, roofs, windows, and doors that you use to assemble a building model, as well as the callouts, fixtures, tags, and detail components that you use to document it, are all created with families.

For more information about the Revit family, please see this page [Autodesk Knowledge – Revit Family](#)

To create a new family

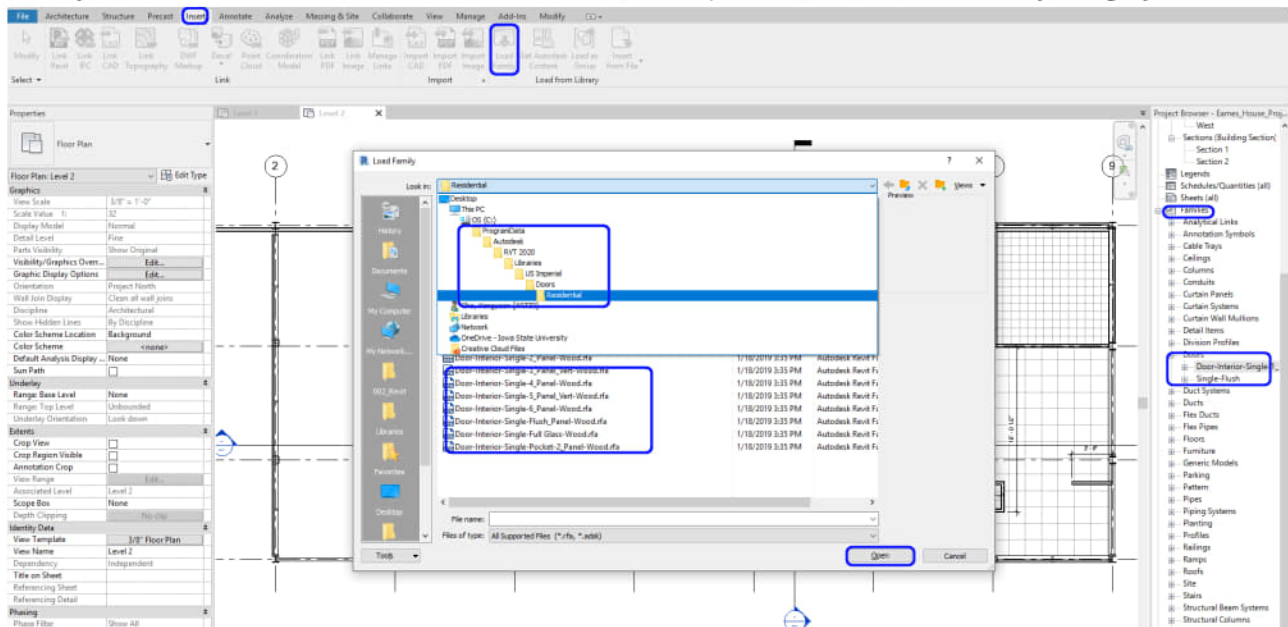
- Click [File] on the menu > Click [New] > Click [Family] > Select a template from library > create the model and parameter



- However, A beginner may elect to not create a new family due to the complexity of the process. Instead, you may want to start with a family that has similar attributes and edit accordingly.

To load Family files from the Revit library

- Click [Load Family] from [Insert] tab, under [Load from Library] panel > Find the library folder from your computer > Select a family / families to load > Click [OPEN]
- Then, you can confirm and find the loaded families from the [Project Browser] under the [Family] category



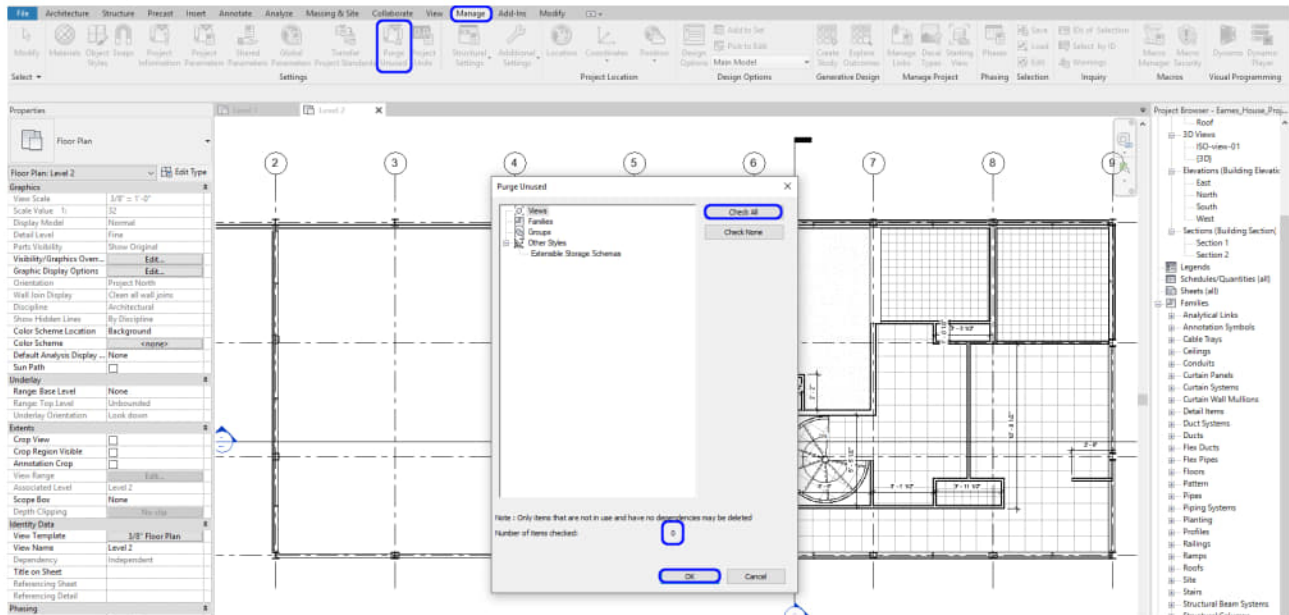
- You can load as many families as possible but you should consider file size.

Find and download Revit families from external sources (recommended websites by the instructor)

- BimObject <https://www.bimobject.com/en-us>
 - Manufacturer upload Revit Family files
 - Previously named Autodesk Seek
 - Most of the files are reliable, some advertisements added
- Revit City <https://www.revitycity.com/index.php>
 - The user shared Revit Family website
 - Many designers, practitioners, and students use this website
 - Some files may cause issues to your project
- BIM Smith <https://market.bimsmith.com/>
 - Mix of free and paid Revit Families
 - Great collection of products
- NBS National BIM Library <https://www.nationalbimlibrary.com/en/>
 - UK based the best BIM object website
 - Manufacturers website
 - Most reliable but hard to find out

Purge Revit families

- Family management is one of the keys to managing your Revit file. If you want to delete unused family files, click [Purge Unused] from the Manage tab.
- Use caution when using this function; you will lose all family and views you are not using. I recommend you make a copy or save as the original file and [Purge Unused].
- Click [Purge Unused] Number of items checked until "0".



- The file size reduced, then you have a lighter file to handle

 Eames_House_Project_Yongyeon_Cho_14.rvt		9/11/2020 11:44 AM	Autodesk Revit Pr...	13,428 KB
 Eames_House_Project_Yongyeon_Cho_14-Purged.rvt		9/11/2020 12:13 PM	Autodesk Revit Pr...	8,932 KB

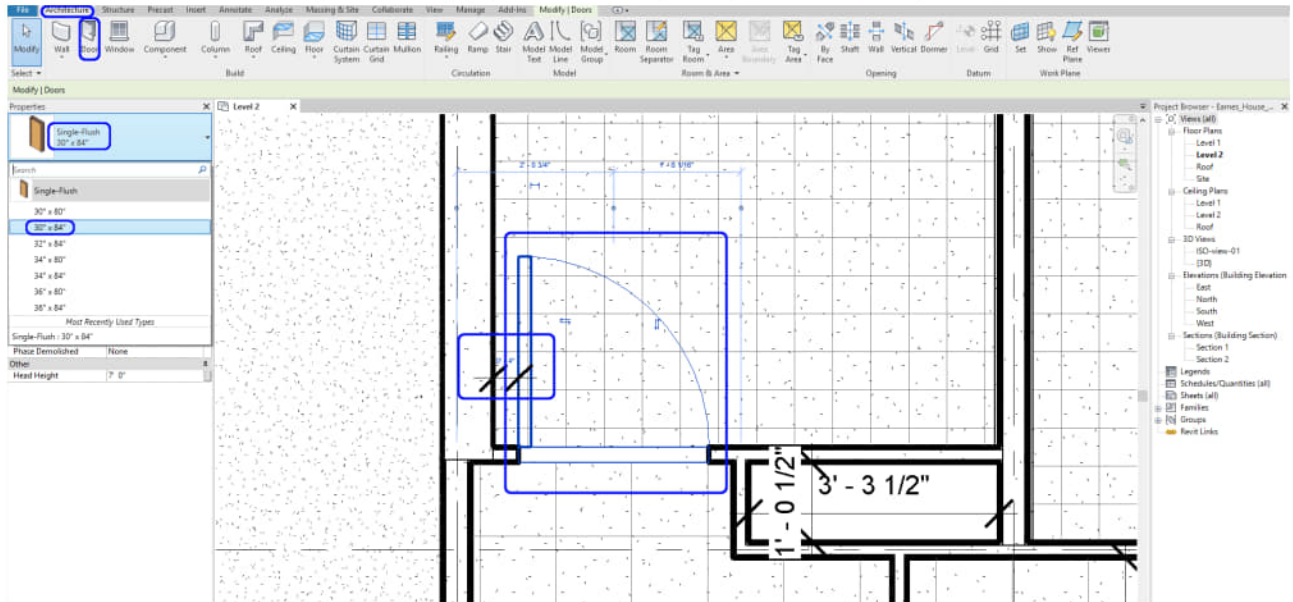
(CO 2) Add/Edit Doors and Windows

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Add a door on a Wall

- [STEP 1] Click [Door] from the [Architecture] tab, under [Built] panel or press [DR] as a shortcut
- [STEP 2] Select door type from the [Properties] palette.
 - If you need to load a new type, click the [Modify/Place Door] tab and click [Load Family], Double click [Doors] Folder, find out the family that you want from the sub-folders
 - If you cannot find the door family that you want, you may search on various websites above and load into the project file

- If you found the type you want, but you do not find the size of the door, you click [Edit Type] and Duplicate the type and change the values
- [STEP 3] Place the door near the wall. Use [Space bar] to change the direction of the door. It shows the location of the door that will be placed. Click the location that you want.
- [STEP 4] Once you placed the door, you can change the direction by clicking arrows, and you can change the exact location of the door. Typically, the distance between the wall to the door is 4.”
- [STEP 5] If you need to change the door type, click and change the type from the Properties panel



Complete to add all doors in the floor plans for the project

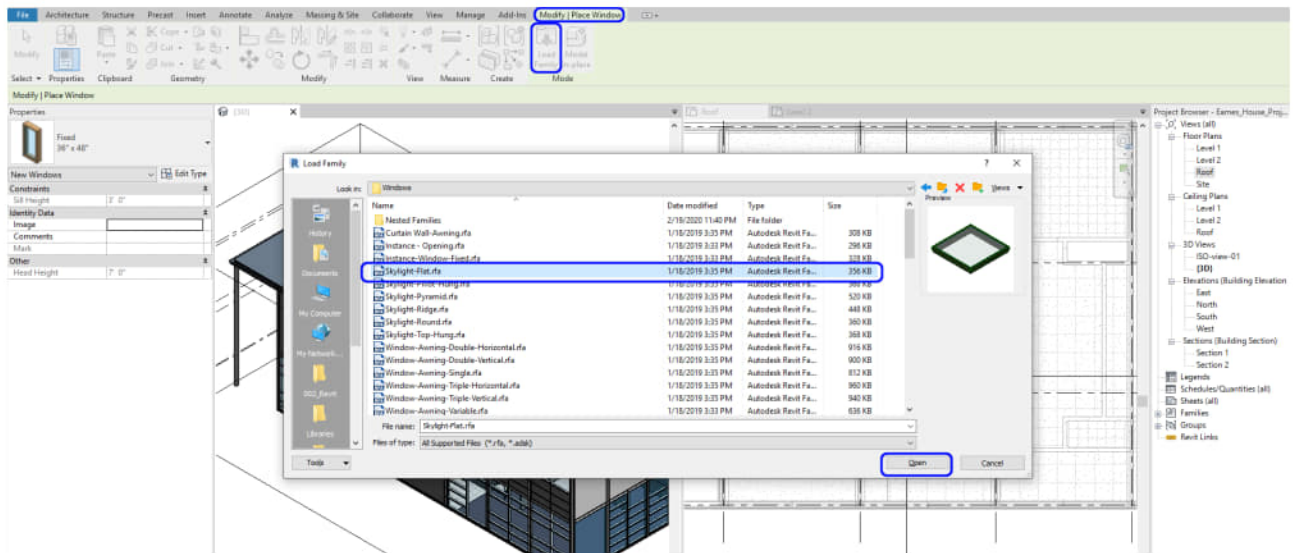
Add a window on a wall

- [STEP 1] Click [Window] from the [Architecture] tab, under [Build] panel or, press [WN] as a shortcut
- [STEP 2] Select a window type from the [Properties] palette.
- [STEP 3] Adding a window is the same sequence as adding a door.
- [STEP 4] You can modify the sill height when you add a window.

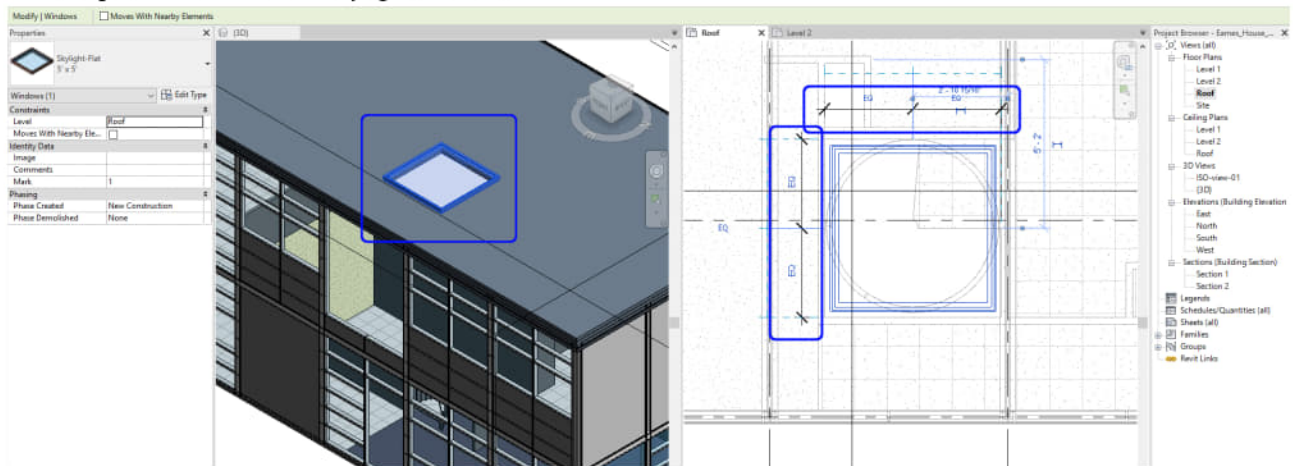
The Eames House project doesn't have a window.

Add a skylight on a roof

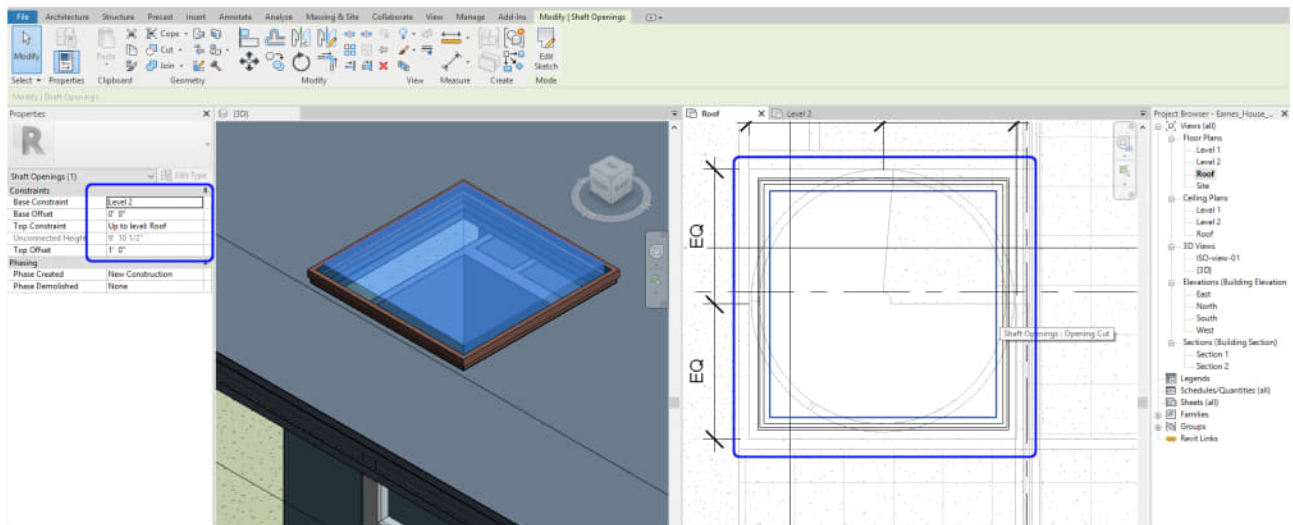
- [STEP 1] Click [Window] from the [Architecture] tab or press [WN] as a shortcut
- [STEP 2] If you do not find a skylight from the [Properties] palette, click [Load family] > find the Skylight family under the Window folder from the Revit library > click [Open]



- [STEP 3] The Skylight for Eames House is 5'X5' Flat, so the type should be made by duplicating the existing one.
- [STEP 4] Open [3D view] > click the appropriate location where the skylight is supposed to be located > open [Roof] view > update location of the skylight with dimensions



- [STEP 5] You may notice that the skylight only opens the roof, not the ceilings you may make. You must make a hole to open the ceilings. Click [Shaft] from the [Architecture] tab, under [Opening] panel > Open the plan below the roof level. For Eames house, it is Level 2 > Draw the opening. It must be a little smaller than the skylight size and click the [green checkmark]
- [STEP 6] Make sure the base constraint is Level 2, and the Top constraint is Up to Level: Roof, Top Offset 1'. Relocate the Skylight.

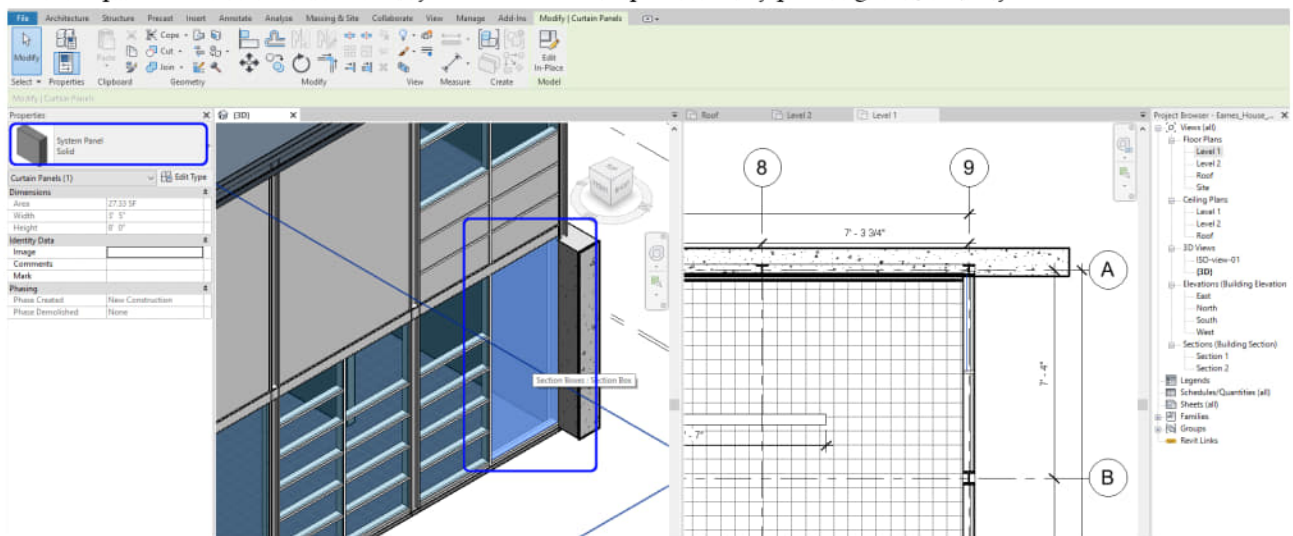


Note. If [Shaft] tool is not working, please try this

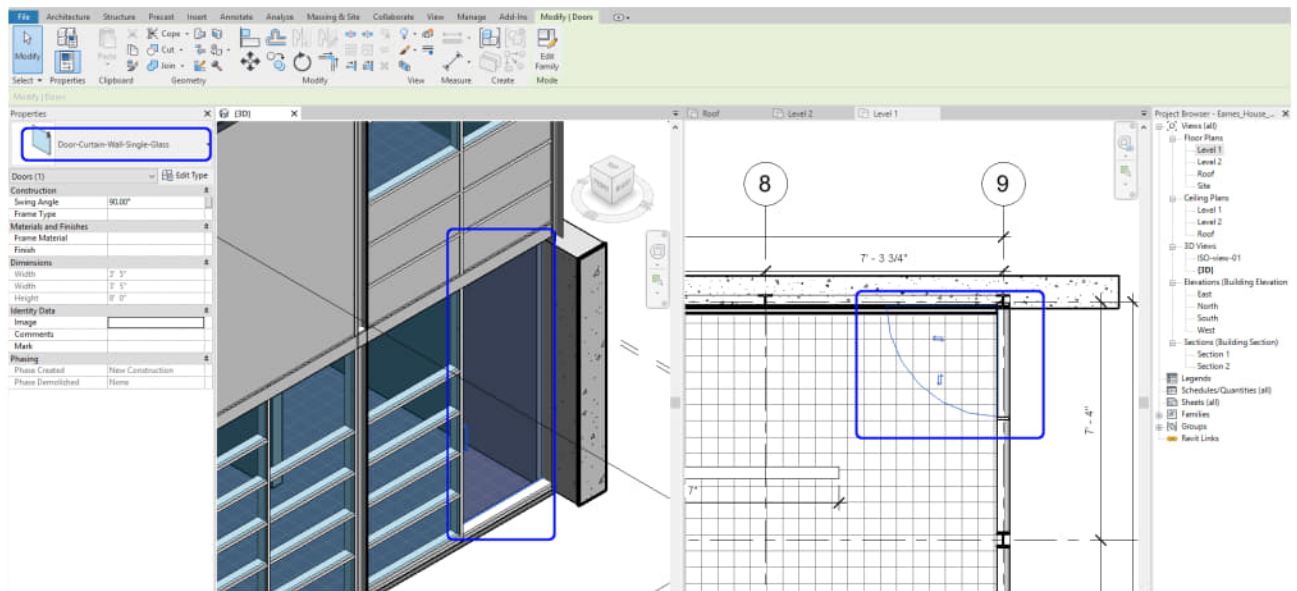
- Click [Edit In-Place] > Click [Void Forms] > Select [Void Extrusion] from [Create] tab > Draw lines > click the [Green checkmark] to finish and double-check the void penetrate

Add a door / a window on a curtain wall

- [STEP 1] Adding a curtain wall door or window is not under the Door or Window from the [Architecture] tab. To switch a panel to a door or a window, you must select the panel first by pressing the [Tab] key.



- [STEP 2] You might find the door from the [Properties] palette.
 - If the curtain wall door was not loaded, you need to load the door first and then change the properties palette.
 - To load the door family, click [Load Family] from the [Insert] tab
 - Find "Door-Curtain-Wall-Single-Glass.rfa" from the Doors folder > Open
 - Find "Curtain Wall-Awning.rfa" from the Windows folder > Open
 - Find "Sliding_Curtain_Wall_Door_12253.rfa" from Canvas and download to your project folder > Open
- [STEP 3] Change the type from the properties palette.



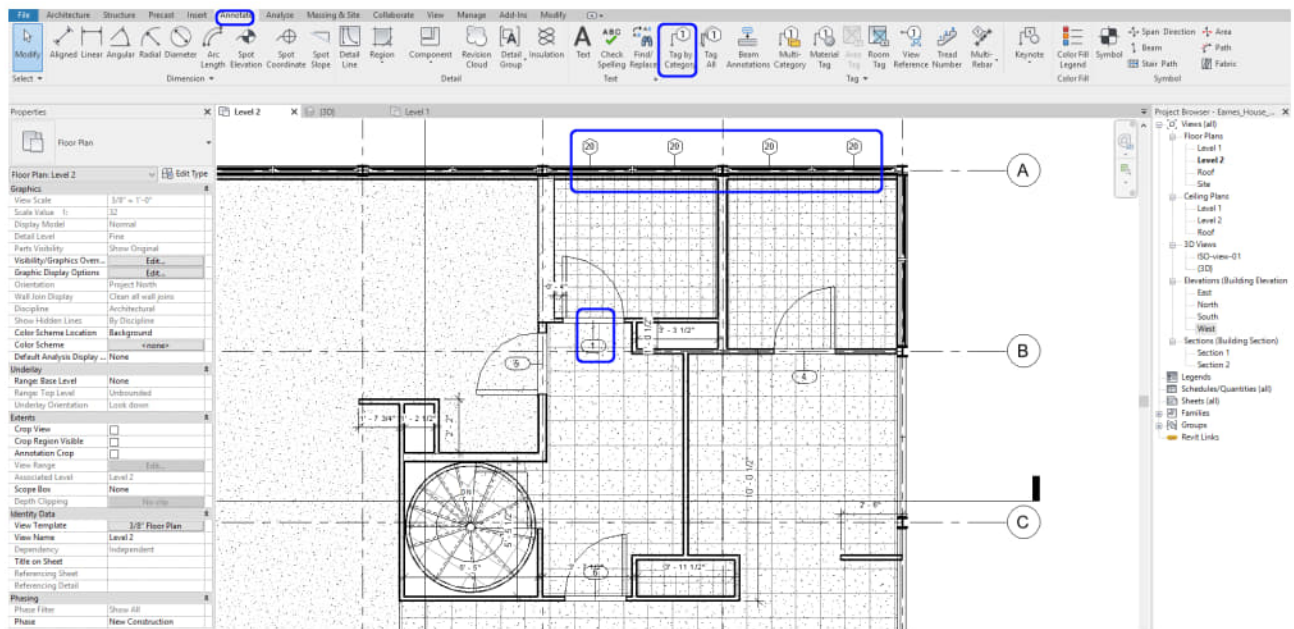
Complete to update all curtainwall doors and curtainwall windows for the project

(CO 3) Add Tags

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Add door and window tags

- [STEP 1] Click [Tag by Category] from the [Annotate] tab, under [Tag] panel or (TG) for the shortcut
- [STEP 2] The Door tag setting can be made a distance (1/4") from the door
- [STEP 3] Once you click a door, the tag will show
- [STEP 4] The number may show or may not show. If not, you can make a number
- [STEP 5] You can also tag both the curtain wall door and windows with a door and window tag.



Complete to update all tags for doors and windows for the project

(CO 4) Add/Edit Lighting fixtures

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Load Lighting Fixtures

Load Lighting families by clicking Load Family. You can find Revit lighting families from Lighting > Architectural > Internal folder from the Revit library. You can load all lighting fixtures from the folder or only selected lighting fixtures to your project.

If you want a unique lighting fixture, please download it from various websites and save it in your project folder for future use.

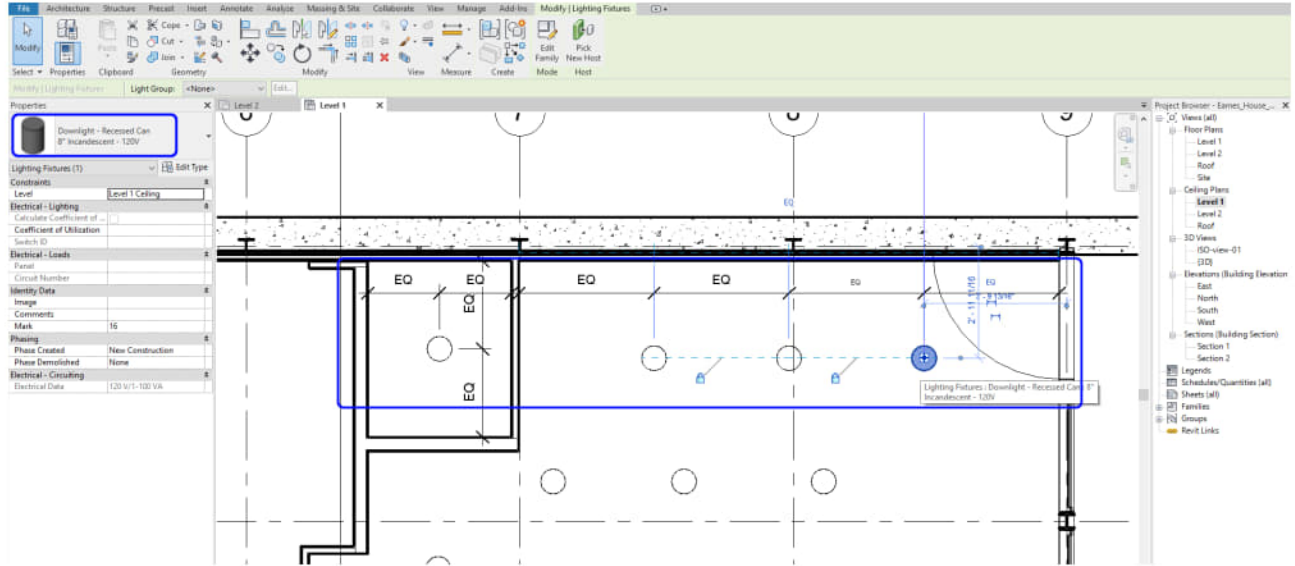
Add Lighting fixtures

- [STEP 1] Open [Level 1] Ceiling plan from the [Project Browser]
- [STEP 2] Click [Component] (CM) to place lighting fixtures from the [Architecture] tab
- [STEP 3] Select a family and a family type that you want to add on your ceiling plan. You can search the Lighting family as well
- [STEP 4] Select [Downlight – Recessed Can]
- [STEP 5] Place the lighting fixture on the Utility room ceiling. You may need to switch the placement option. Does not

need to be accurate.

- [STEP 6] Make dimensions (DM) and use Align (AL) for the accurate dimension

To see the floor plan for the positioning of the furniture, Select Level 1 for Base Level, Level 2 for Top-level, “lookup” for Underlay orientation, and then you can see the floor plan on your ceiling plan for lighting layout.



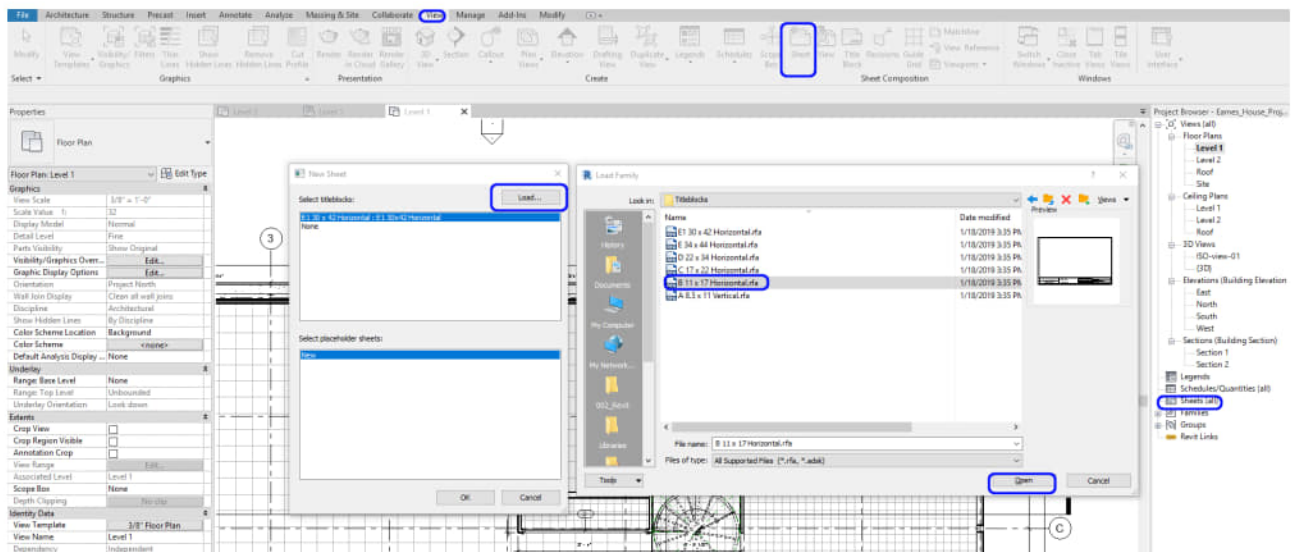
Complete lighting layout with dimensions on the ceiling plans

(CO 5) Add/Edit Titleblocks

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Create sheets

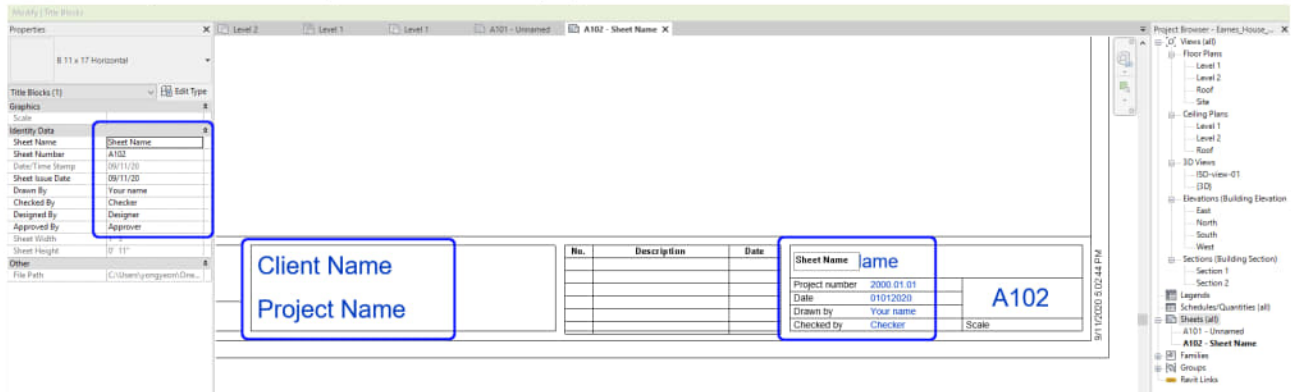
- [STEP 1] Click [Sheet] from the [view] tab, under [Sheet Composition] panel
- [STEP 2] New Sheet window will pop up to create sheets in your project. Click [Load...].
- [STEP 3] The load Family browser will pop up. Find [Titleblocks] folder > Open [B 11 x 17 Horizontal] file > click [OK] > Click [OK] to load on your project file.
- [STEP 4] You can find your A101 – Unnamed on your project browser, once you click [+] mark next to [sheet (all)]



- [STEP 5] If you need more sheets for other views, you can click sheet] from the [View] tab, or you can click the Sheets on Project Browser, and mouse right-click and select New Sheets



- [STEP 6] If you want to change the size of the sheet you already loaded, you can click the title block and change the type on the Properties palette. You can change the Titleblock format that you already loaded
- [STEP 7] On your Titleblock, you should add the project information and the sheet information.

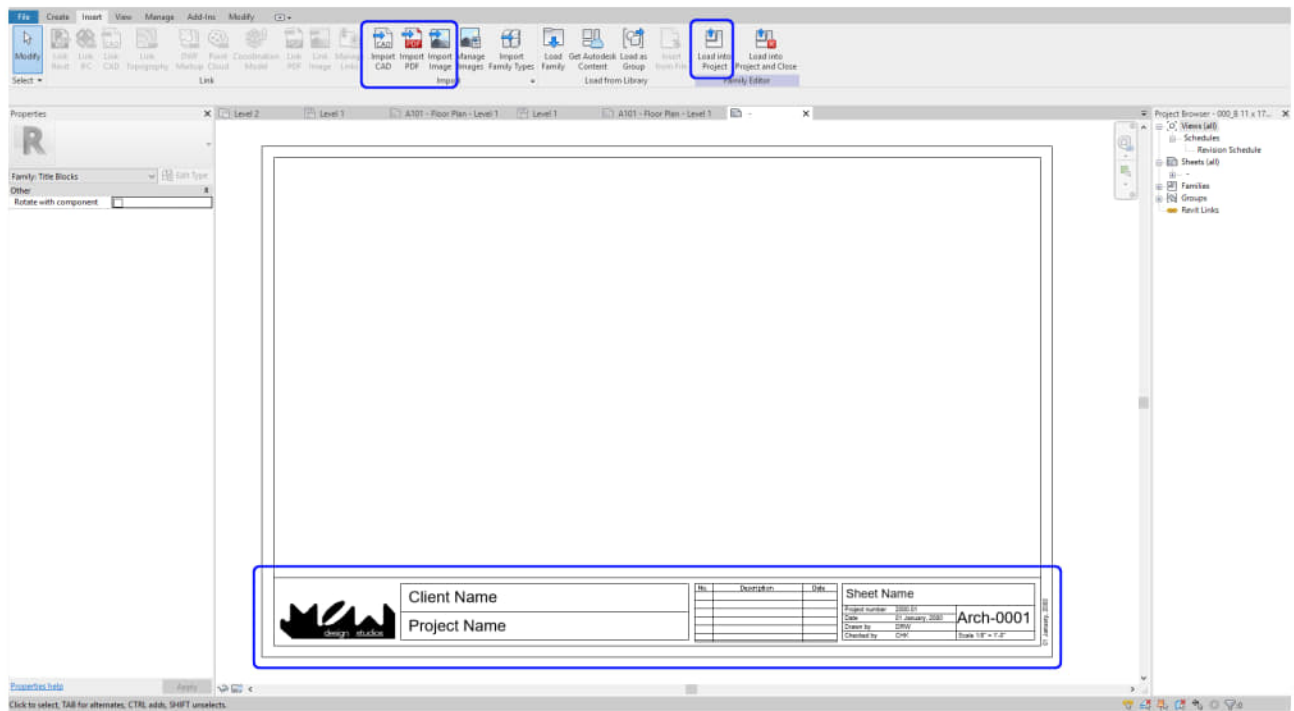


- Once you click the Titleblock, you can add more information. Do not double click. If you double click and open the family file, you are editing the family file.
- Under the Owner, we would typically designate the client's name. In this case, you can add ARTID263
- For Project Name, you can add your project name, Eames House Project
- For Unnamed, it typically designated for the Sheet name, for example, Floor Plan – Level 1, RCP – Level 2, Site Plan, or more
- For Project number, you will make your own. I typically make 20.263.01 (Year.Course number.Project number)
- The issue date will be the submission date
- The author is your name
- Checker is your instructor's name

Note. This Sheet information will not change even if you change the Titleblock type. And the Project name, Project number, Client, and Issue date will not change even if you add new sheets. But you should add Drawn by and Checked by for all sheets

Edit Titleblocks family file

- [STEP 1] Once you double click the Titleblock, the family file will open
- [STEP 2] I recommend saving this family before you start to edit to preserve the original file.
 - Do not forget to add "000" and save the file in your project family folder
- [STEP 3] You can delete anything in the document. However, I would delete the Autodesk Logo, a line below, and the website information.
- [STEP 4] You can add lines by clicking [Line] from the [Create] tab
- [STEP 5] You can move lines and text box by clicking the elements that you want to move and move (MO) command
- [STEP 6] You can edit lines and text box size as well
- [STEP 7] You can insert images or CAD files by clicking Image or Import CAD from the Insert tab
- [STEP 8] Once you complete your titleblock, you must save and click [Load into Project]
- [STEP 9] After you load the titleblock into your project, you must change the titleblock type to what you made.

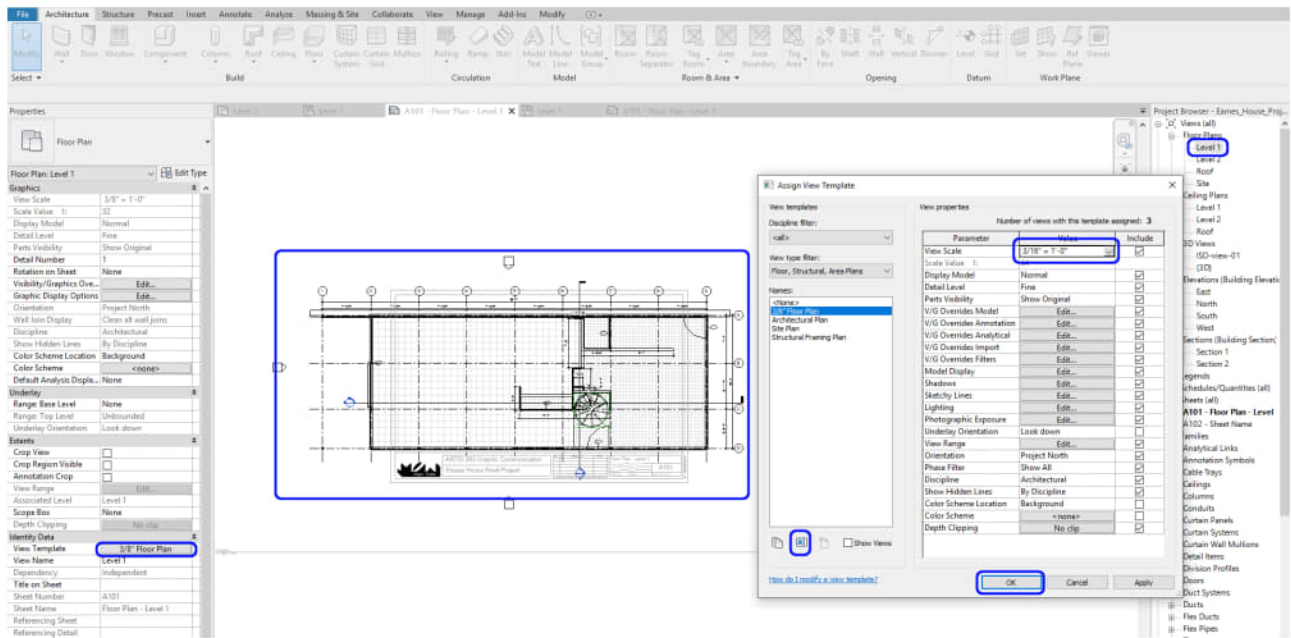


(CO 6) Insert Plan views and symbols – North arrow and graphic scale

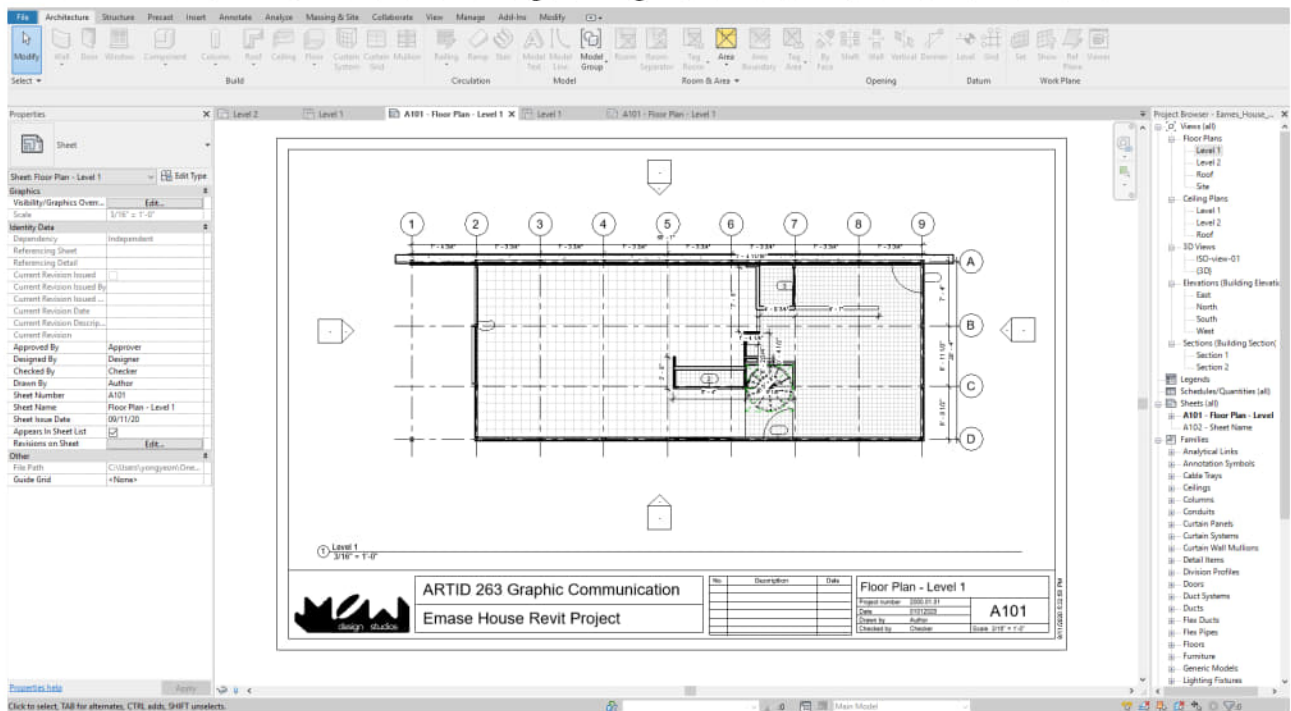
A YouTube element has been excluded from this version of the text. You can view it online here: <https://iastate.pressbooks.pub/visualgraphiccomm/?p=100>

Insert plans

- [STEP 1] Open a sheet [A101-Floor Plan-Level 1] to insert a plan
- [STEP 2] Find the view on your project browser to insert, drag and drop the view to the sheet
- [STEP 3] To fit into the Titleblock, you must change your drawing scale. You can double click and change the scale, or you can change the scale from the Properties palette



- [STEP 4] Move the view to be centered and change the length of the title bar to fit into the Titleblocks

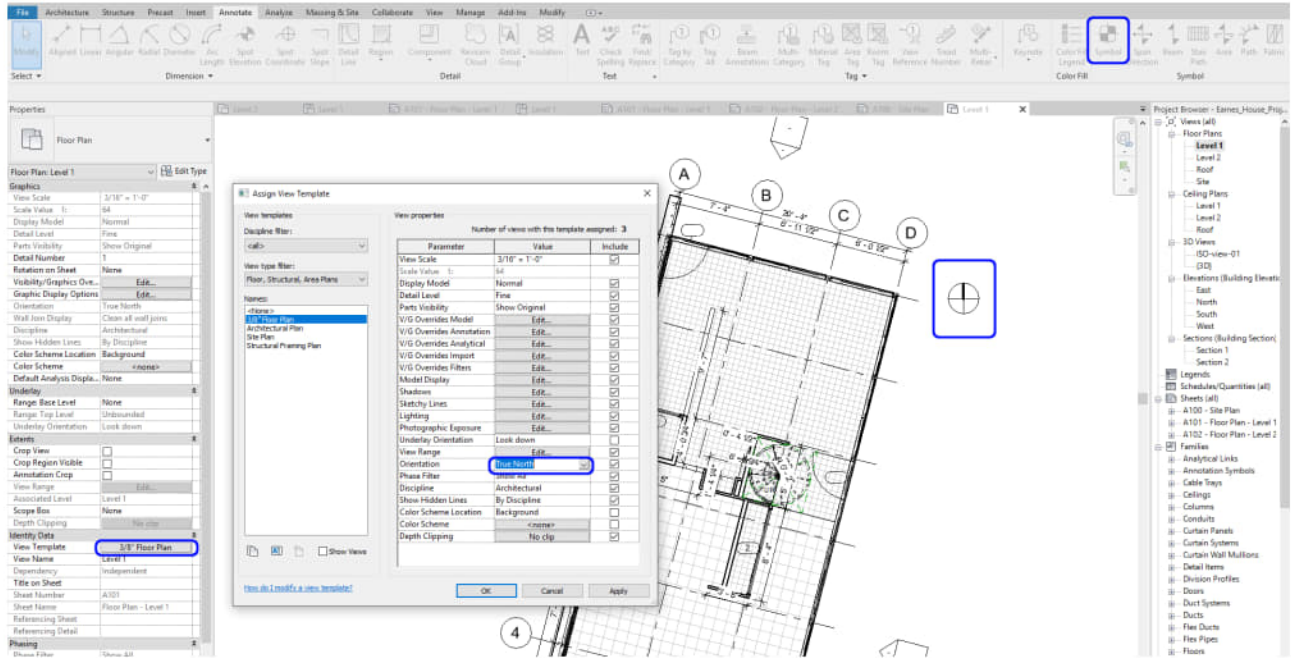


Repeat this for site plan, floor plans, and ceiling plans

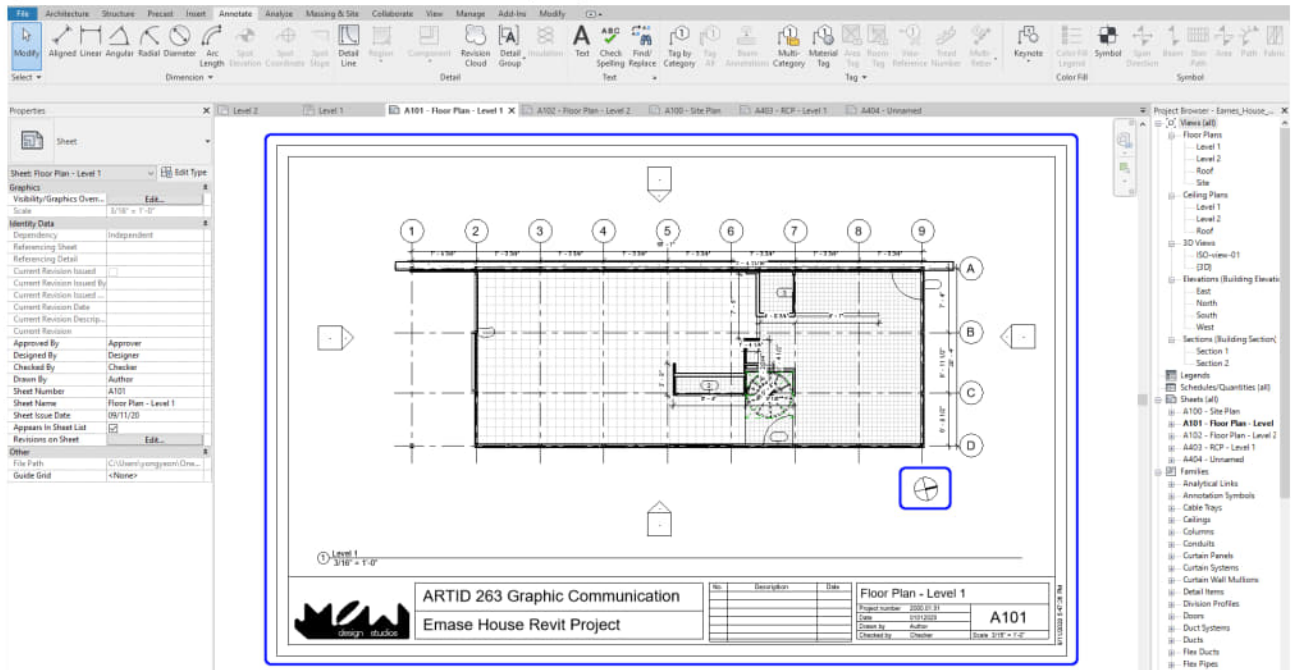
Insert north arrow

- [STEP 1] The north arrow is under Symbol from the [Annotate] tab
- [STEP 2] To add the north arrow, you will open a plan view
- [STEP 3] On the Properties palette, Orientation should be changed from Project North to True North

- [STEP 4] Click Symbol from Annotate tab
- [STEP 5] Select North Arrow 2 on the Properties palette. If you cannot find North Arrow 2, you need to load the North Arrow family from the Annotation folder
- [STEP 6] Place the North Arrow 2 on your plan view




- [STEP 7] Change Orientation again from True North to Project North
- [STEP 8] Move the north arrow to the corner of your plan



Repeat this for site plan, floor plans, and ceiling plans

SAVE the file before closing the application.

Save in a different location for the backup (e.g., a cloud folder)

 **References**

Autodesk.Help. (2018, May 16). Revit Families. Retrieved October 22, 2020, from <https://knowledge.autodesk.com/support/revit-products/learn-explore/caas/CloudHelp/cloudhelp/2016/ENU/Revit-Model/files/GUID-4EBB97AD-C7B6-4828-91EB-BC0E99B81E43-htm.html>

Chapter 15. Add/edit model-in-place components & edit family

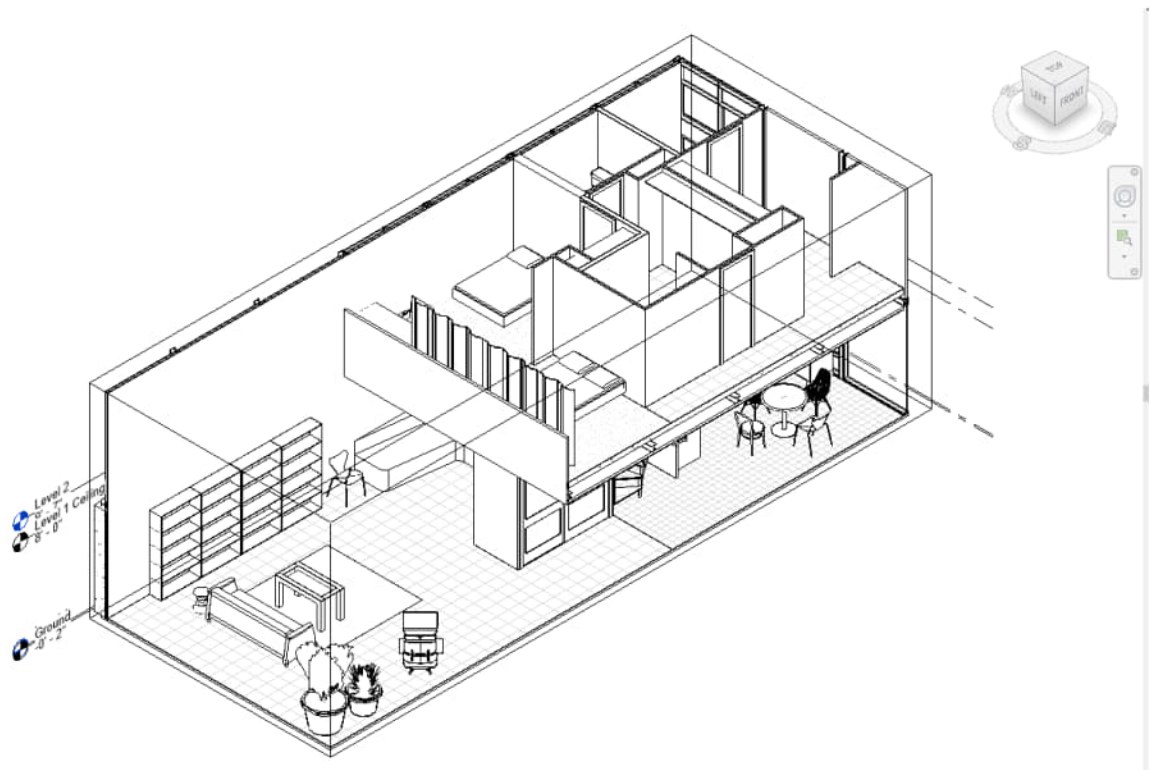
Session Objectives

Upon completing this session, students will be able to:

- (CO 1) Add/Edit Furniture families
- (CO 2) Add/Edit Model-in-place components – Custom casework
- (CO 3) Add/Edit a New Family – Furniture

Session Highlights

At the end of the session, students can create the graphics below.



(CO 1) Add/Edit Furniture families

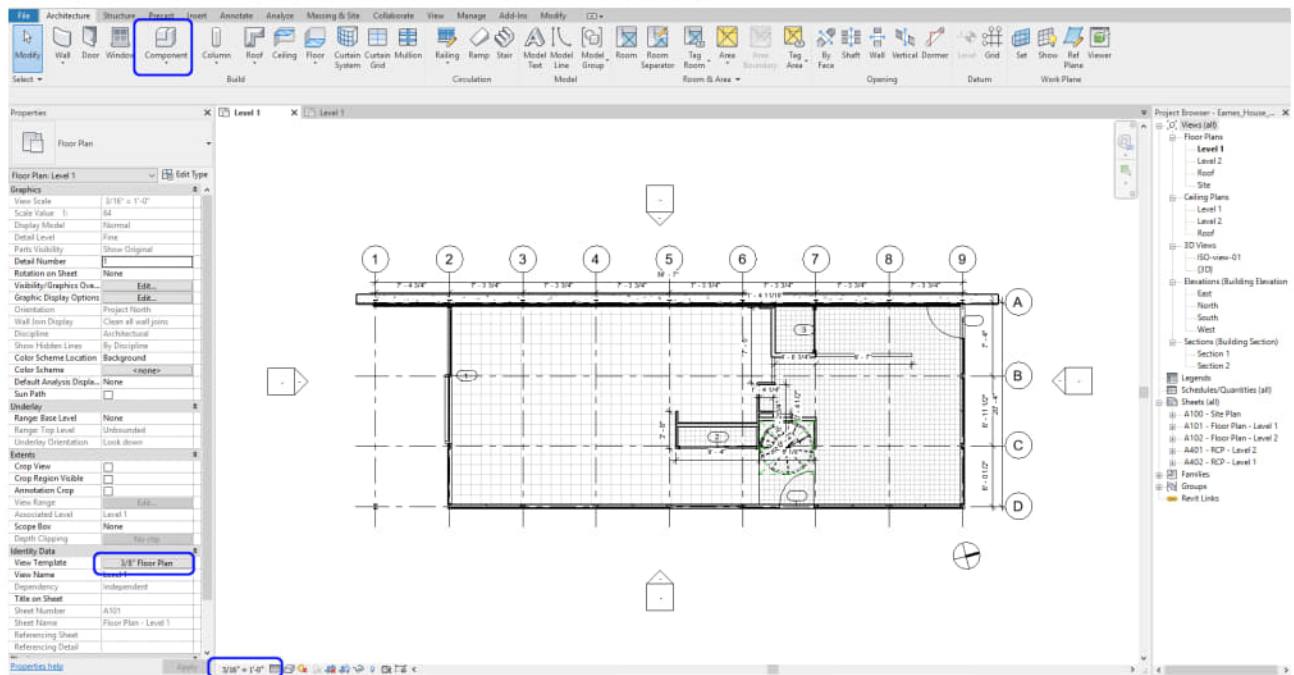
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For construction documents in Revit, furniture can be mainly categorized into two main areas. One is a product, which includes custom furniture and manufacture-made furniture, and the other is a contractor (carpenter) made built-in furniture or millwork.

- We typically use [PLACE COMPONENTS] a Revit family for custom furniture and manufacture-made furniture because it will be used multiple times. It includes millwork like Revit Countertop, Shelf, Cabinets, and so on.
- We typically use [MODEL-IN-PLACE] for contractor made built-in furniture or millwork because it will be used only once for the specific space only.

Revit Furniture [PLACE COMPONENTS]

- [STEP 1] Open a Floor Plan – Level 1 view from Project Browser
- [STEP 2] You may change the scale of the view because we changed the drawing scale to fit on an 11 in X 17 in sheet. I changed the drawing scale from 3/32" to 3/16"
- [STEP 3] Click [COMPONENTS] (CM) from [ARCHITECTURE] tab



- [STEP 4] You will find furniture (or any components—lighting fixture, plumbing, case work—sink, appliances, plants) from [Properties] palette that you want to put in the floor plan. If you do not find the furniture from the panel, you must click [LOAD FAMILY] from the [MODIFY/PLACE COMPONENT] tab and find the furniture family you want

to add from the Library folder or the websites from Session 14

- BimObject <https://www.bimobject.com/en-us>
- Revit City <https://www.revitcity.com/index.php>
- BIM Smith <https://market.bimsmith.com/>
- NBS National BIM Library <https://www.nationalbimlibrary.com/en/>
- Manufacturers' website

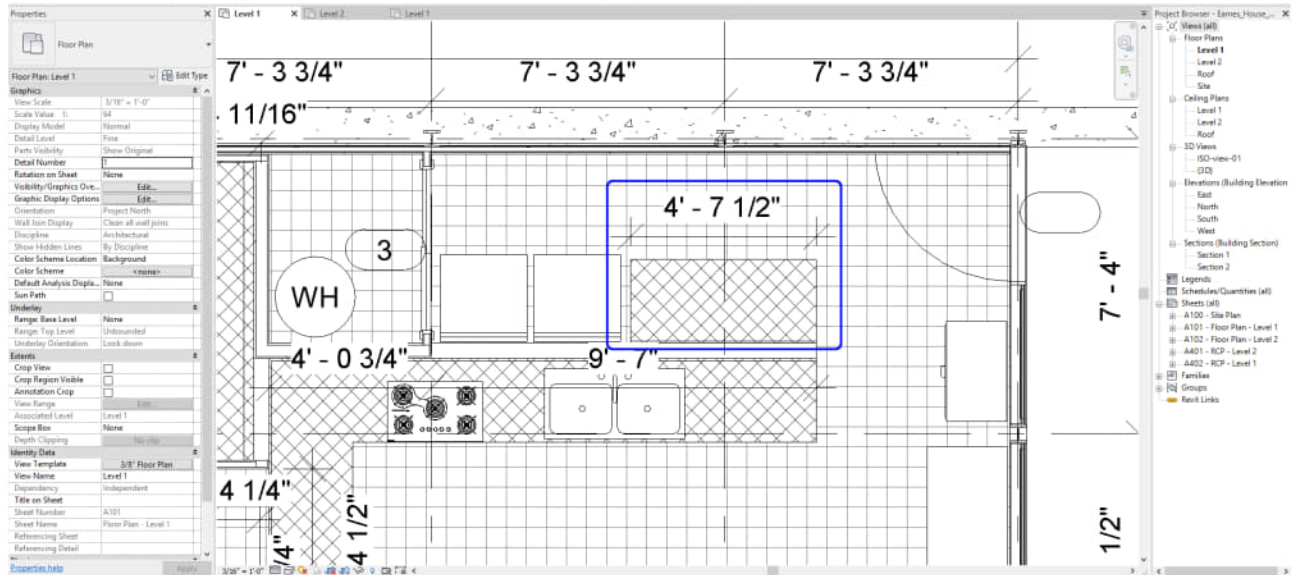
TIPS.

For your Floor plan, you do not need to find the exact furniture that you want to use. You may use the Revit furniture family for your floor plan as a placeholder. Do not waste time to add all objects (like books, decorative pieces for perspectives) that are not showing on your floor plan. For your perspective views and renderings, it would be better to find the most accurate Revit family file. If you cannot find the Revit family file, find the SketchUp file and use it for your rendering.

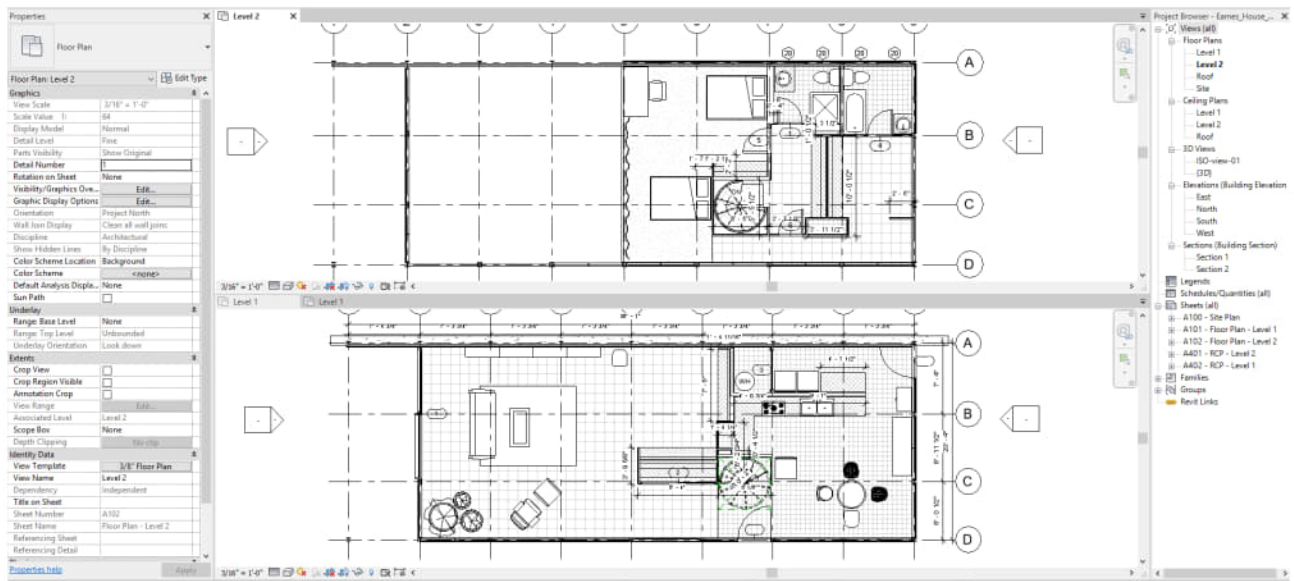
- [STEP 5] Place the furniture families on your floor plan. Make sure the Level is what you want.
- [STEP 6] Use [Space bar] on your keyboard to rotate the family.

To move/rotate/align/copy/mirror the furniture, click the furniture that you want to move/rotate and then click [MOVE] (MO), [ROTATE] (RO), [align] (AL), [COPY] (CO), or [MIRROR] (MM) from [MODIFY/FURNITURE] tab

- [STEP 7] Also, you can use [ALIGNED DIMENSION] (DI) from the [ANNOTATION] tab



- Complete all furniture placement

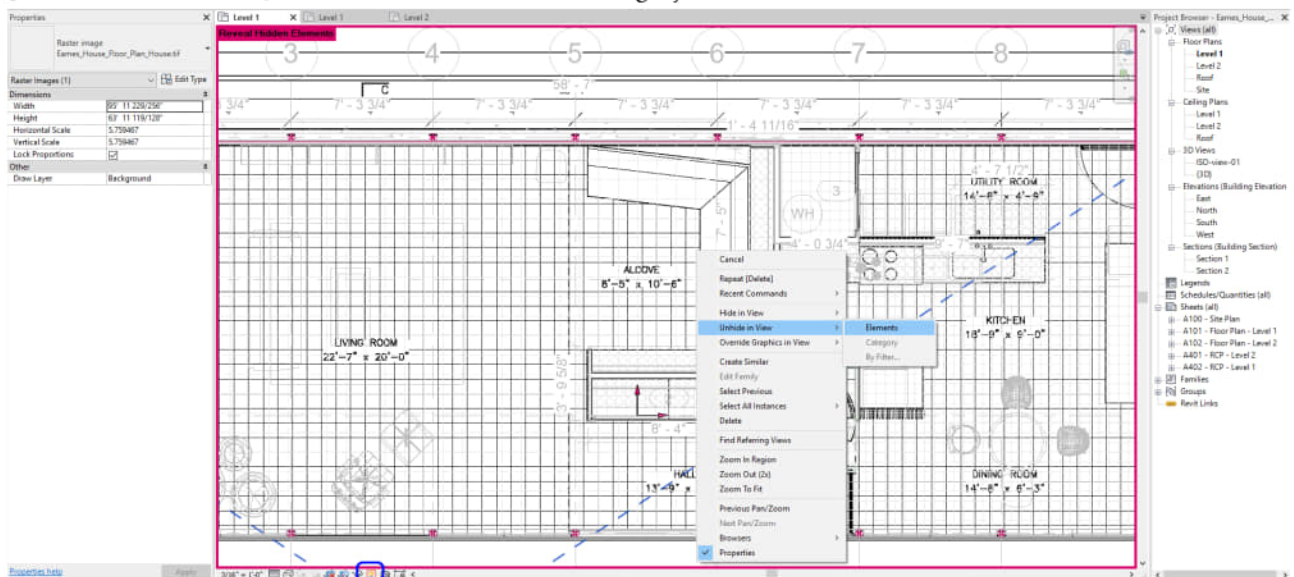


(CO 2) Add/Edit Model-in-place components – Custom casework

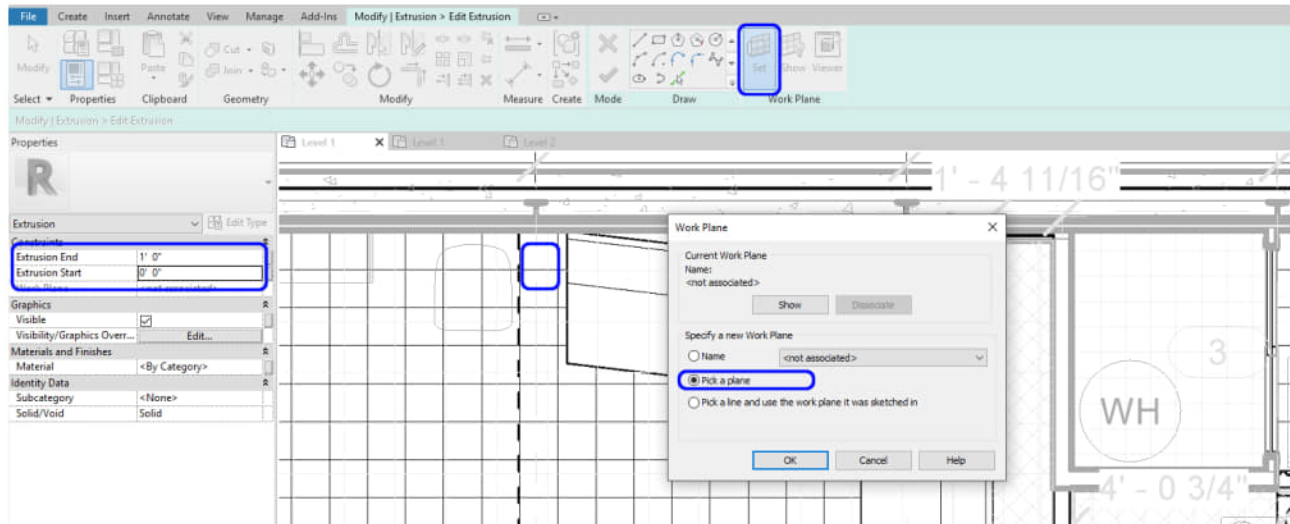
A YouTube element has been excluded from this version of the text. You can view it online here: <https://rastate.pressbooks.pub/visualgraphiccomm/?p=102>

Create Model in Place components (Alcove seating)

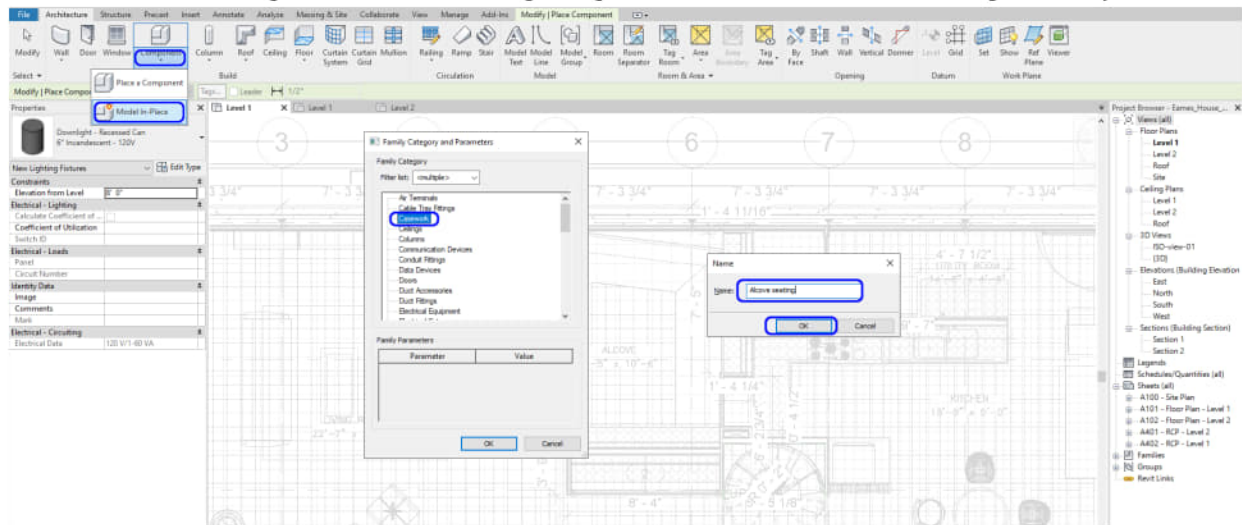
- [STEP 1] Open a Floor Plan – Level 1 view from Project Browser
- [STEP 2] You may turn on the reference CAD plan/Imported image to see the size of the Alcove setting or turn on [HIDDEN ELEMENTS] if it is hidden and unhide the category



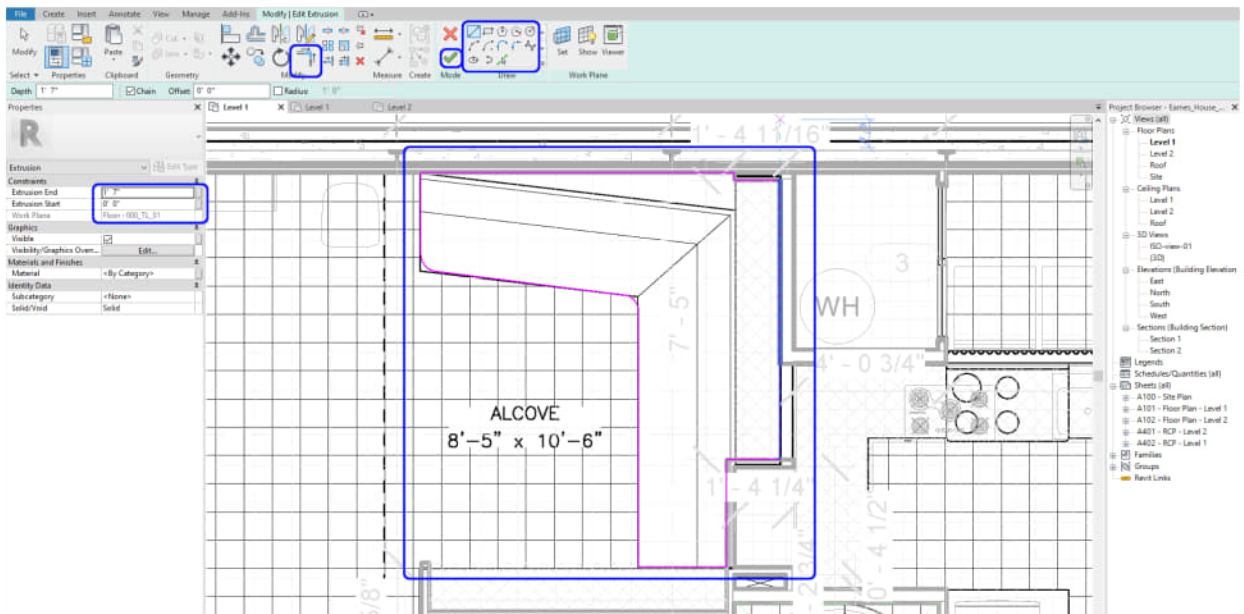
- [STEP 3] Click Component small black arrow and click [MODEL IN PLACE] from [ARCHITECTURE] tab
- [STEP 4] You will need to select the most relevant Family Category. For the Alcove Seating, [CASEWORK] is the most appropriate category. Click [OK]
- [STEP 5] make a name for the component [Alcove seating].



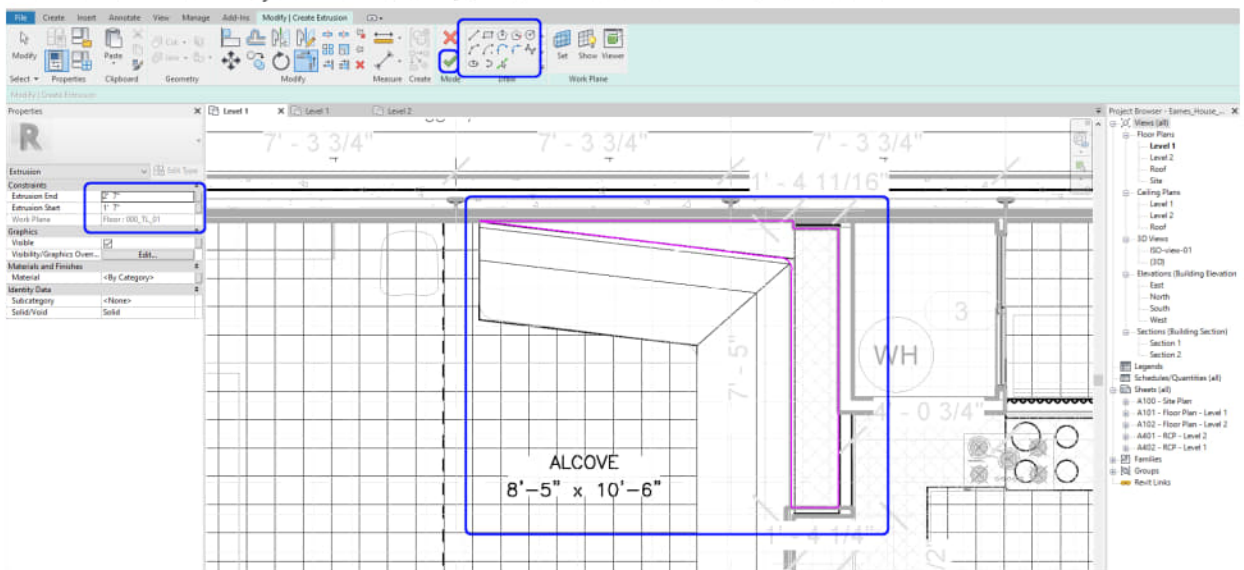
- [STEP 6] To draw lines/models, you must set/confirm the [WORK PLANE] first
 - Click [SET] from [CREATE] tab
 - You can select the work plane with the name or pick a plan. Make sure this will be the base plane that you work



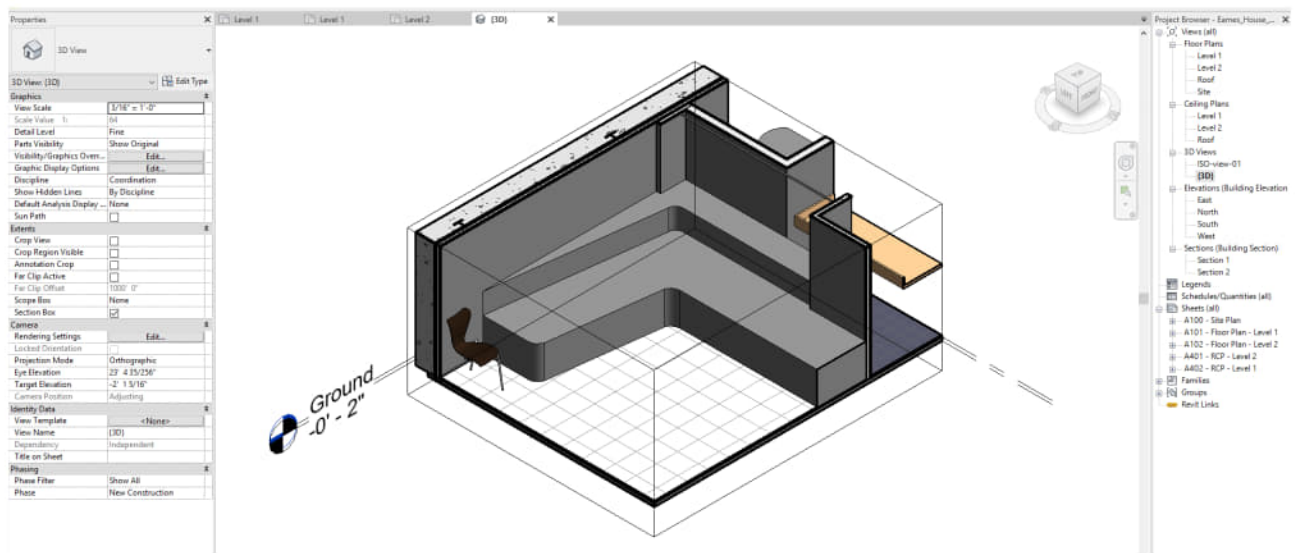
- [STEP 6] You can make models with the Forms tool
 - For the alcove seating, click [EXTRUSION] and draw lines with the [DRAW] tool
 - The line must be closed. You may use [TRIM] (TR) to make it closed
 - Double-check the Extrusion End and Extrusion Start
 - Click the [GREEN CHECKMARK] to finish the drawing



- For the upper part, you will create the upper part in the current [MODEL-IN PLACE COMPONENT]
- If you want to try other Forms, you are welcome to try and practice.
- Use the [VOID] tool and Cut tool to subtract a form from other forms (s)
- Click Extrusion > Draw lines > make sure the extrusion End and Start > Click [GREEN CHECKMARK]
- If the model is not showing, please check on your ISO view and change the [WORK PLANE]
- Once all forms created, you will click the [GREEN CHECKMARK] to Finish Model



- Complete the casework



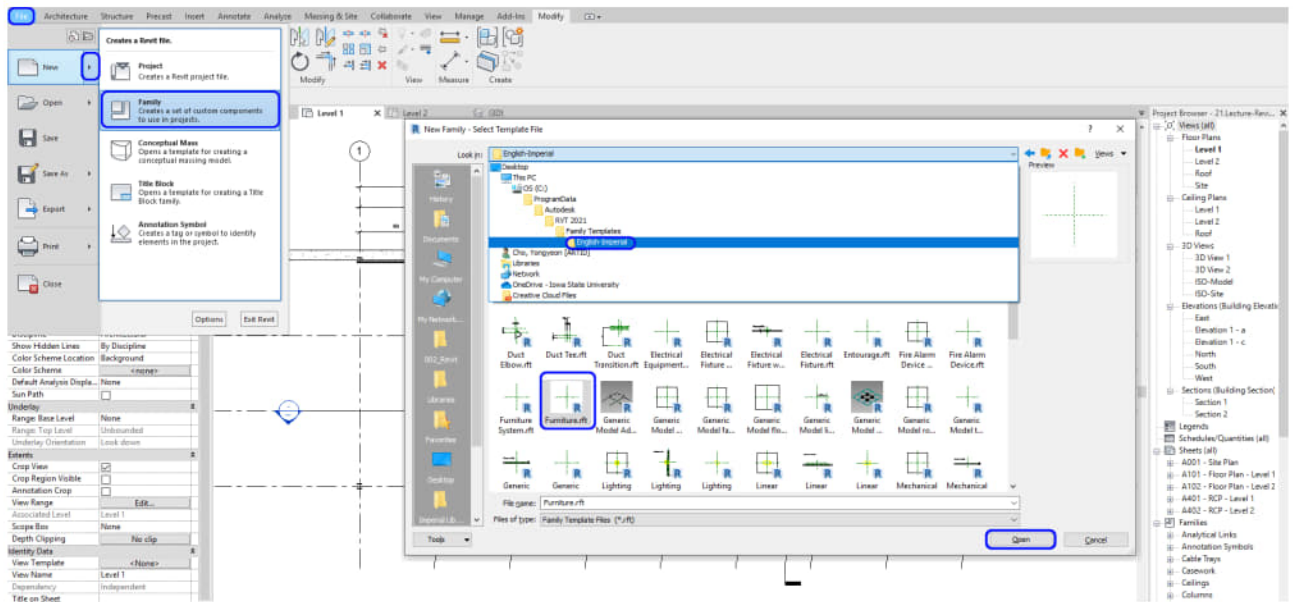
(CO 3) Add/Edit a New Family – Furniture

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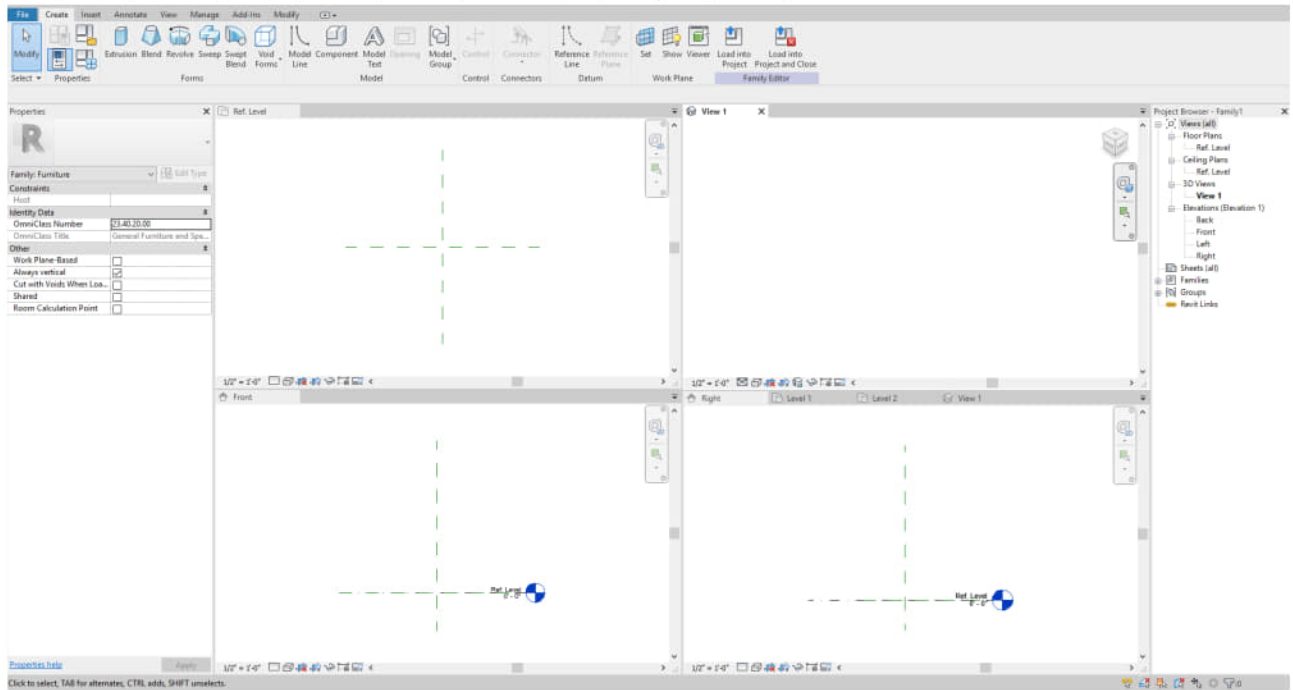
In this tutorial, I will demonstrate how to create a simple furniture family in Revit. We will use Eames Walnut Stool information from <https://www.hermanmiller.com/products/seating/stools/eames-walnut-stools/>

To create a new family file (Model it will be used multiple times)

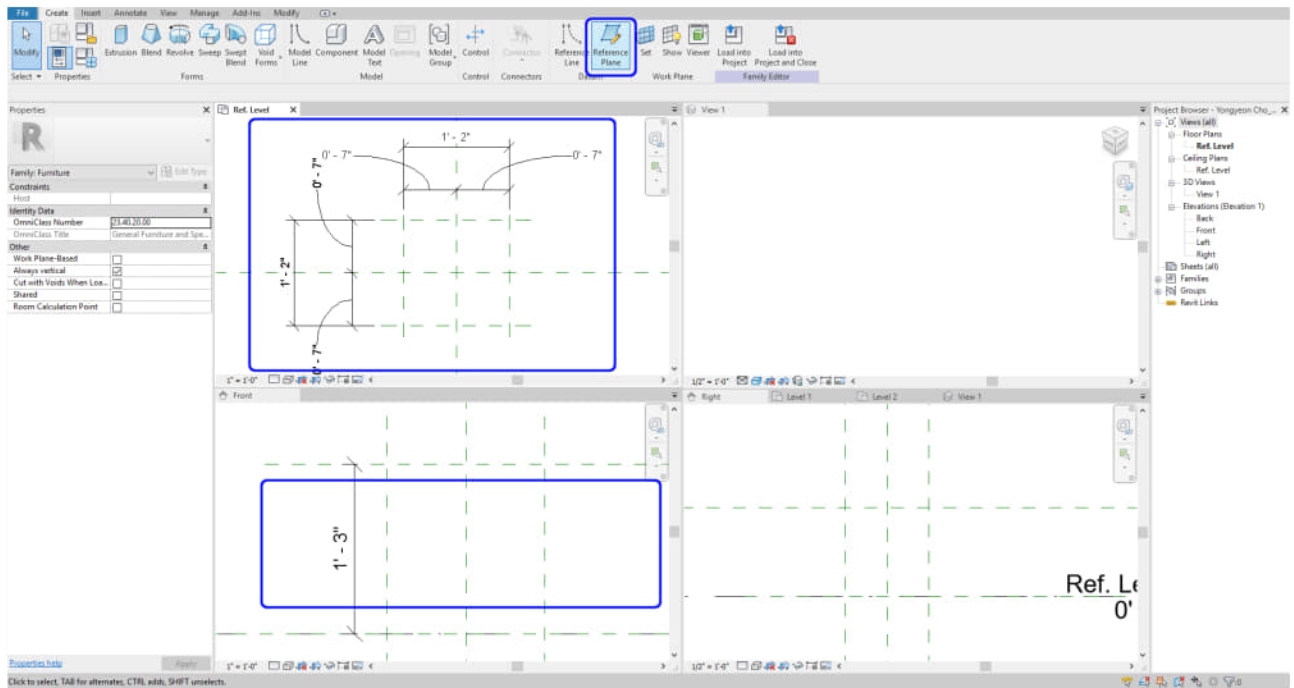
- [STEP 1] Click [FILE] > [NEW] > [FAMILY]
- [STEP 2] Find [Furniture.rft] in the Select Template File browser and Click [OPEN]



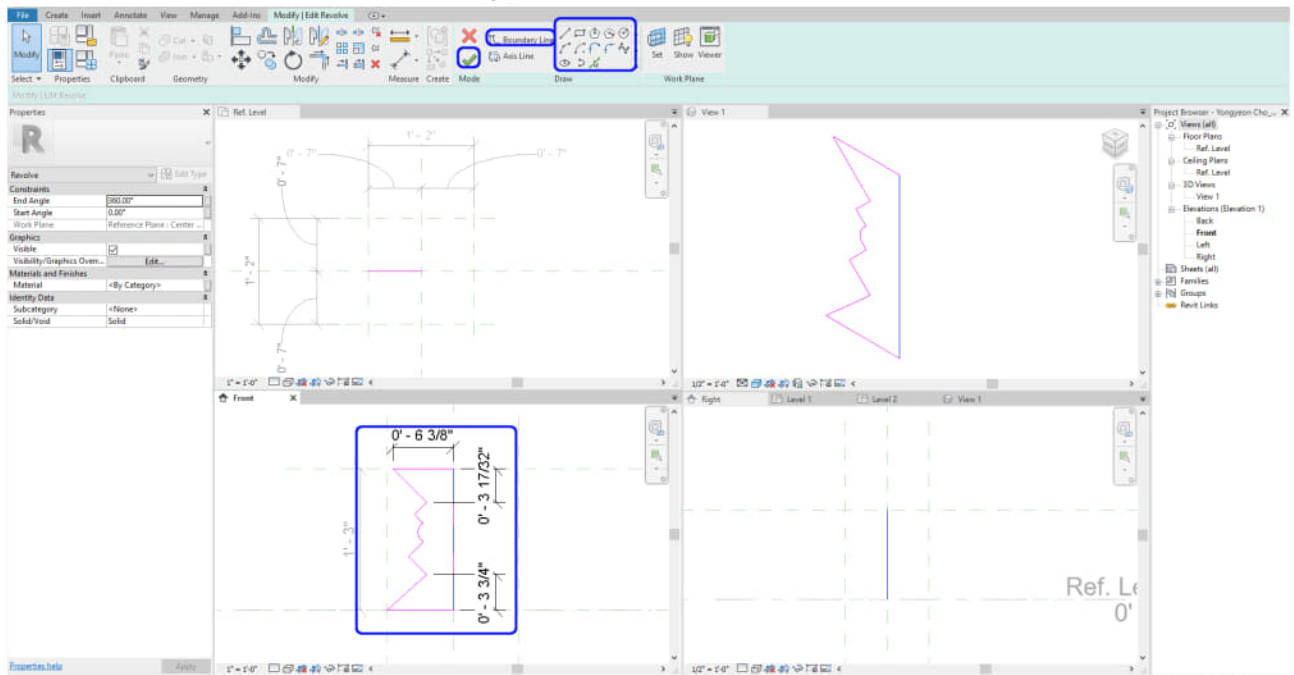
- [STEP 3] It will automatically open these four windows. Before you start, save the family file to your project folder.
- [STEP 4] I recommend you make the view tile (WT) and Zoom All (ZA) see all views. You will pick a view [REFERENCE LEVEL], or [FRONT] view depends on what you want to make.



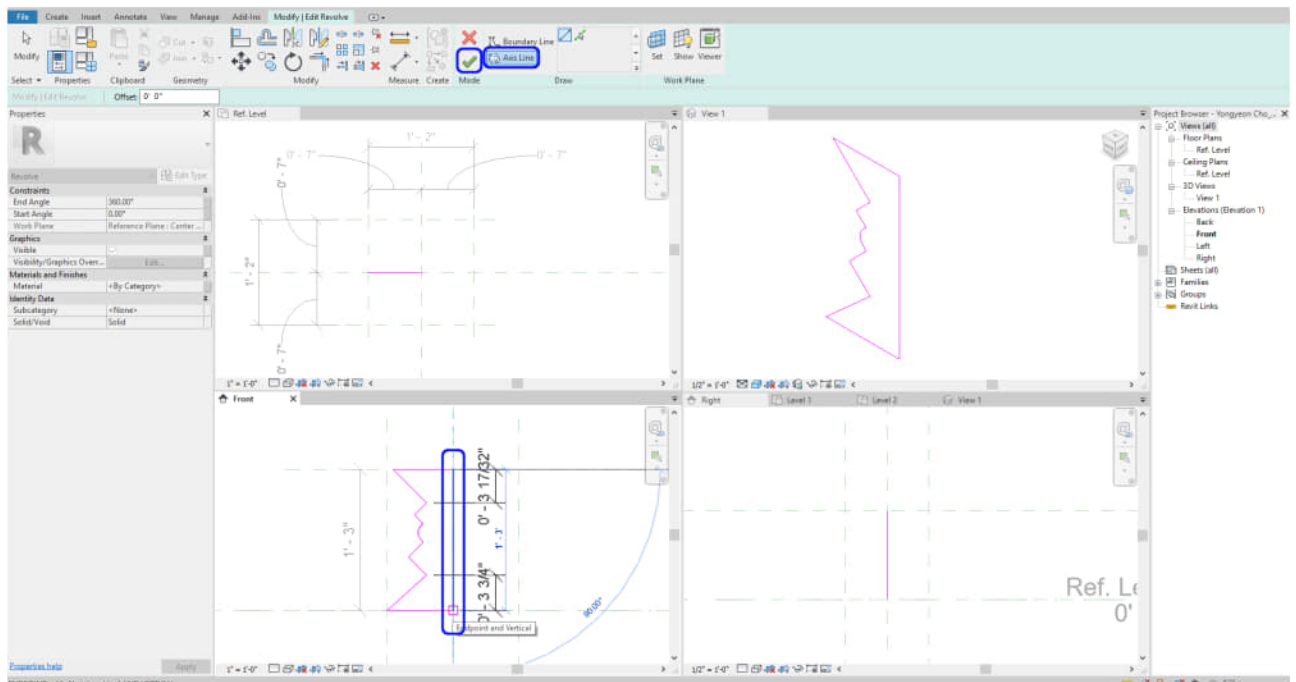
- [STEP 5] To draw the stool, you will use [REVOLVE] to draw this stool
- [STEP 6] Before you draw a revolving line, you will need [REFERENCE PLANES] to know the Height and Width. Click [REFERENCE PLANE] from the [CREATE] tab
- [STEP 7] Draw height left, and right reference plane and dimension it
Dimension information from [this page](#)



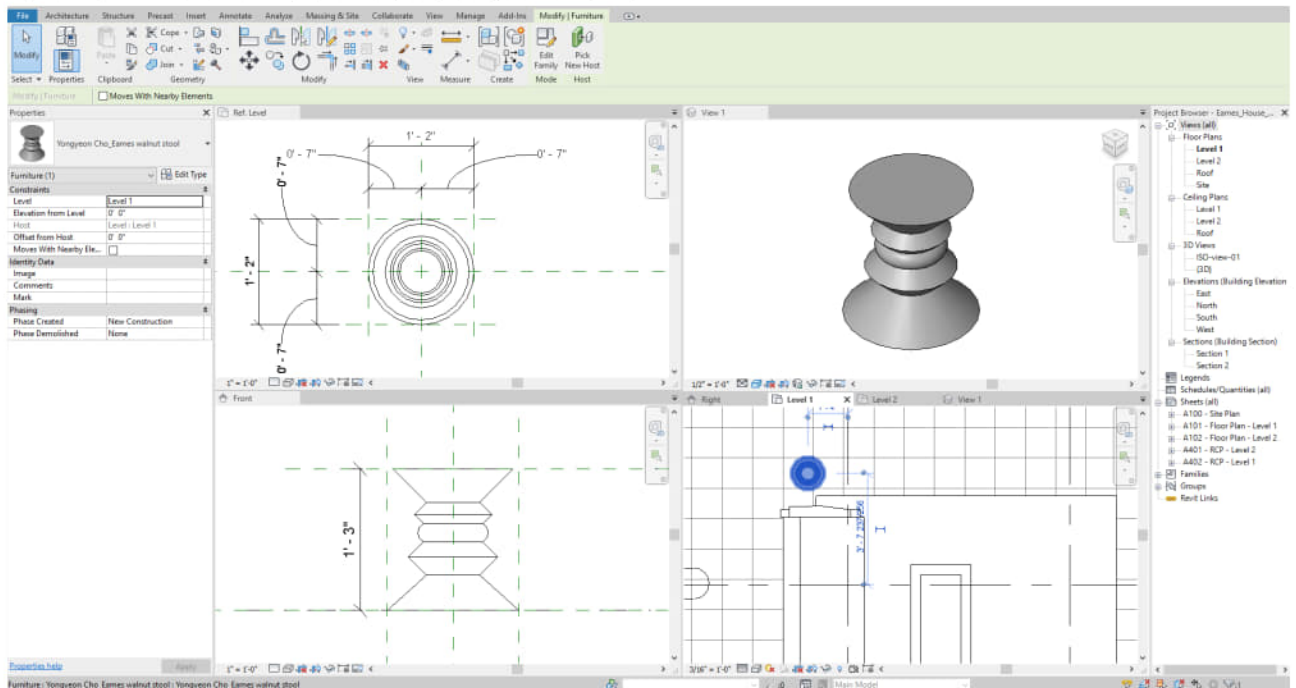
- [STEP 8] On [FRONT] view, Click [REVOLVE] from the [CREATE] tab
- [STEP 9] Draw lines for the Profile (Boundary). The lines are to be closed



- [STEP 10] Select [AXIS LINE] and pick the centerline
- [STEP 11] Click the [GREEN CHECKMARK] to finish the model



- [STEP 12] If you want to add/subtract any model, you can create it in this model
- [STEP 13] Once all your model works are done, save the family file on your project folder.
- [STEP 14] Click [LOAD INTO PROJECT] to your project.



Note. Use Sketchup Model in Revit

[Importing SketchUp Files into Revit Tutorial](#)

If you want your Sketchup file in multiple-use, you should make it as a family file.

Sketchup material will not be followed and merged as one material, but I will demonstrate some tips in the next session.

Refer to this video

[Revit Architecture | Convert SketchUp Models Into Revit\(With Materials\)](#)

SAVE the file before closing the application.

Save in a different location for the backup (e.g., a cloud folder)

References

Autodesk.Help. (2018, May 16). Revit Families. Retrieved October 22, 2020, from <https://knowledge.autodesk.com/support/revit-products/learn-explore/caas/CloudHelp/cloudhelp/2016/ENU/Revit-Model/files/GUID-4EBB97AD-C7B6-4828-91EB-BC0E99B81E43-htm.html>

Eames Walnut Stools. (n.d.). Retrieved October 23, 2020, from <https://www.hermanmiller.com/products/seating/stools/eames-walnut-stools/>

DWR. (2019, June 12). Eames Walnut Stool. Retrieved October 23, 2020, from https://www.dwr.com/bedroom-bedside-tables/eames-walnut-stool/237.html?lang=en_US

Balkan Architect. (2018, April 12). Importing SketchUp Files into Revit Tutorial. Retrieved October 23, 2020, from <https://www.youtube.com/watch?v=4VFK-KEOMZc>

M.T.H Revit Tutorials. (2018, May 4). Convert SketchUp Models Into Revit (with Materials). Retrieved October 23, 2020, from https://www.youtube.com/watch?v=k_1g3077jxI

Chapter 16. Add/edit elevation, section, detail, text, annotation, & rooms

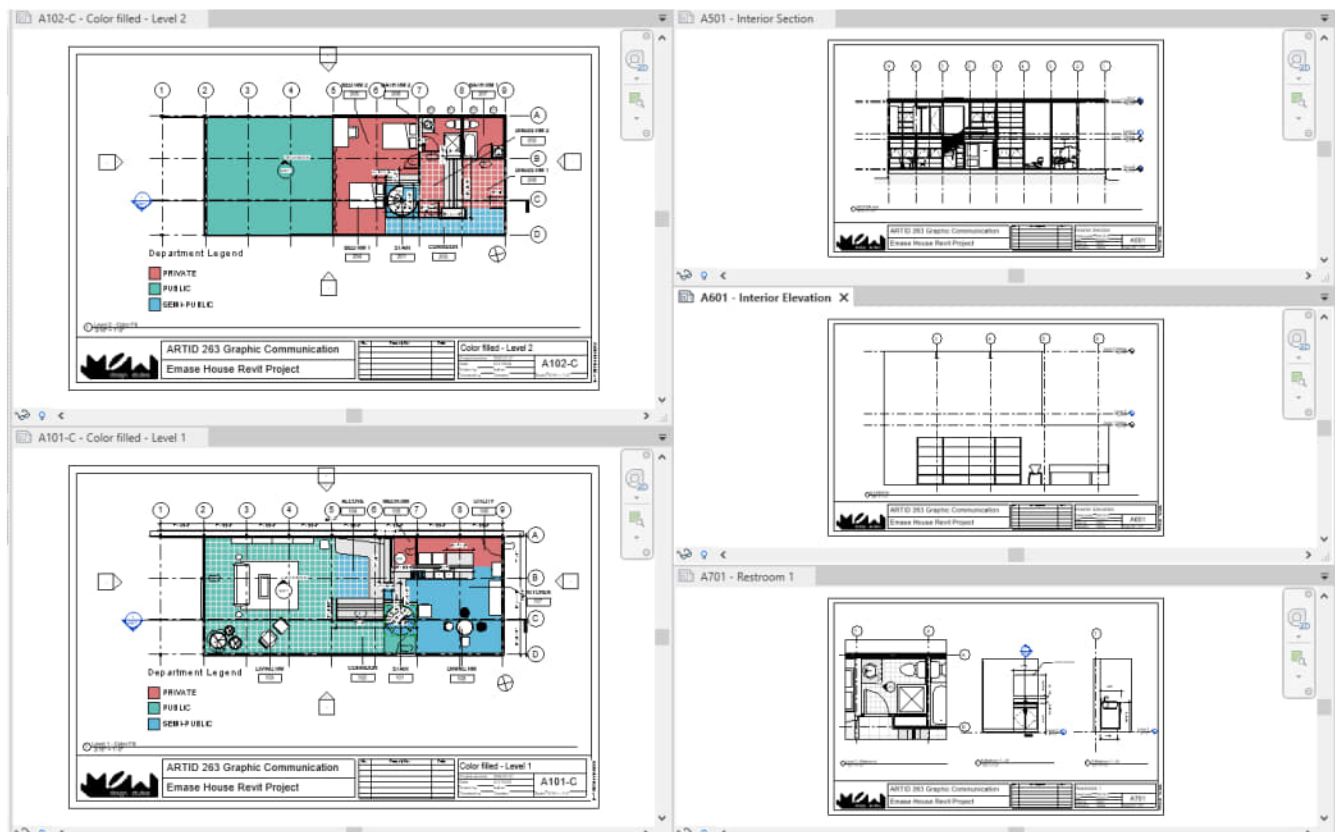
Session Objectives

Upon completing this session, students will be able to:

- (CO 1) Add/Edit Elevations & Sections – Adjust crop region
- (CO 2) Add/Edit Detail views
- (CO 3) Add Texts & Annotations
- (CO 4) Add/Edit Rooms, Room tags, Room separators
- (CO 5) Add/Edit a color fill scheme

Session Highlights

At the end of the session, students can create the graphics below.



Lecture Contents

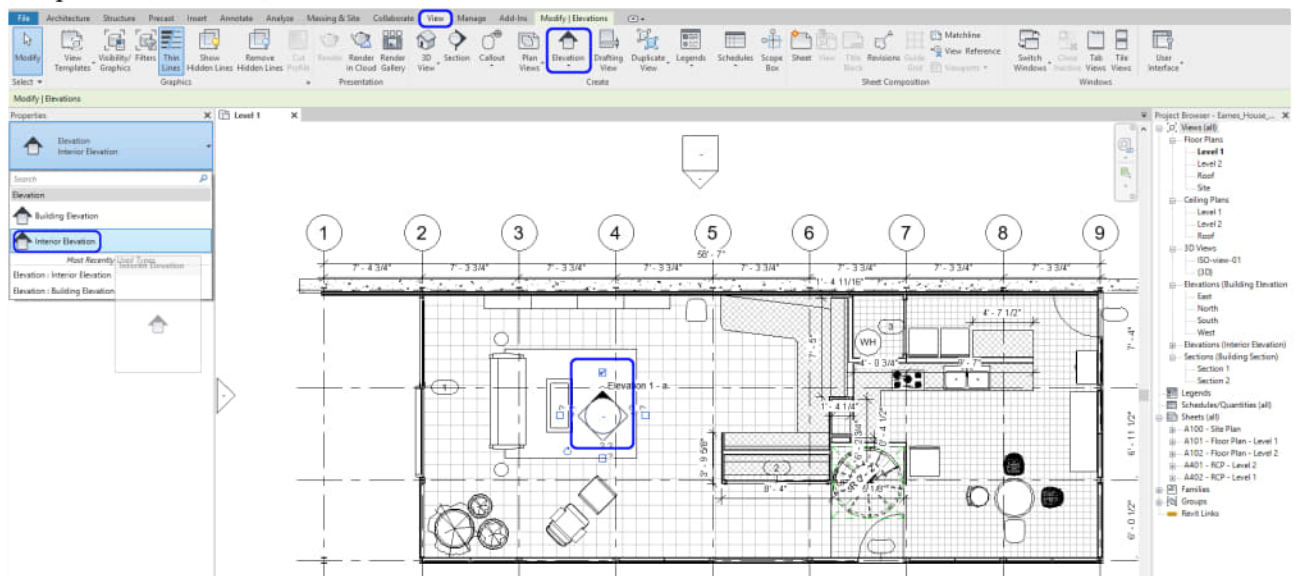
(CO 1) Add/Edit Elevations & Sections – Adjust crop region

A YouTube element has been excluded from this version of the text. You can view it online here: <https://iastate.pressbooks.pub/visualgraphiccomm/?p=104>

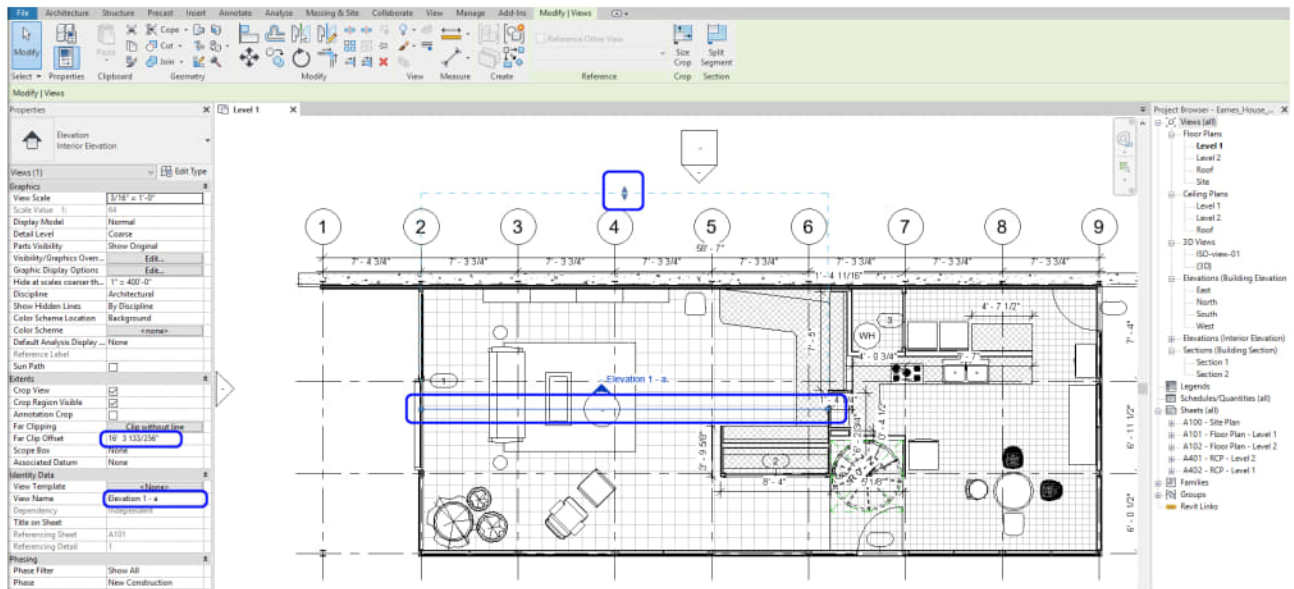
You can create sections or elevations in any floor plans.

To add an interior elevation

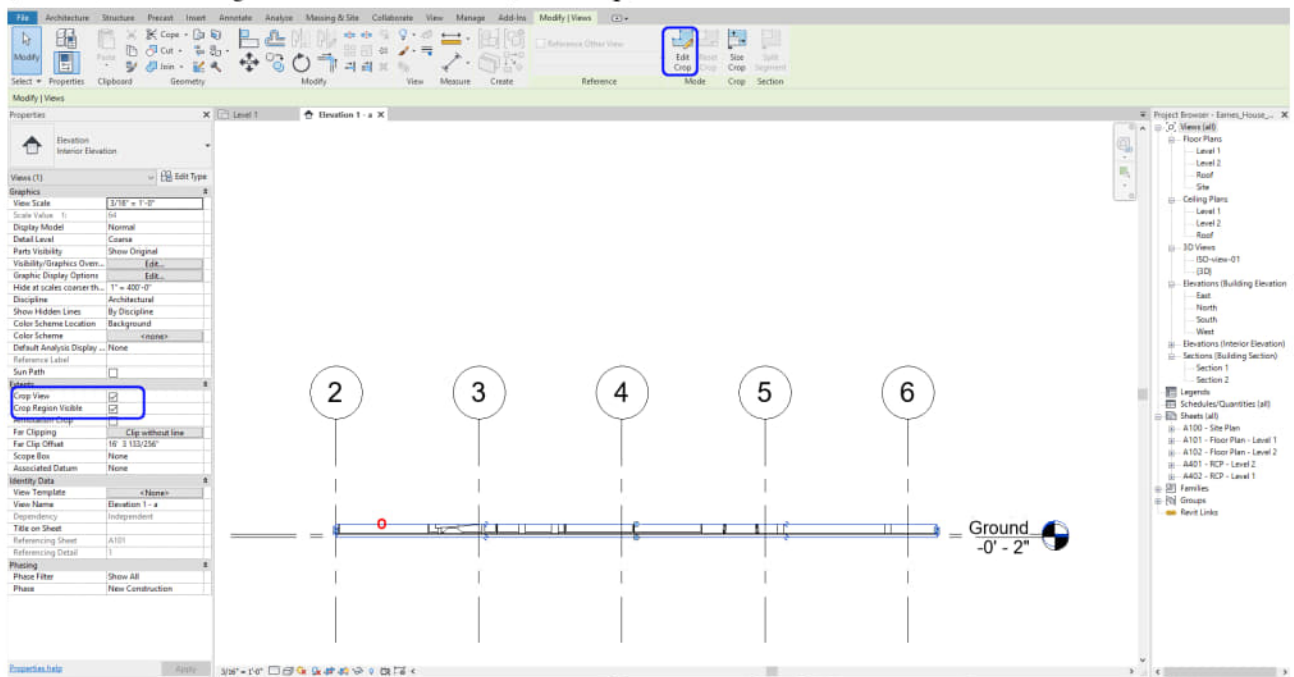
- [STEP 1] Open the project, and open [Level 1] floor plan
- [STEP 2] Click [Elevation] from [View] tab, under [Create] panel
- [STEP 3] Click the [Properties] palette > select Interior Elevation, the symbol will be updated.
- [STEP 4] Hover over your plan. You will notice the elevation marker will “snap” parallel to walls. Please select the location where you want to place your elevation and click to set it in place. Press [Esc] to complete the command
- [STEP 5] Select the elevation tag. You can create additional elevations from one elevation symbol. Press [Esc] to complete the command



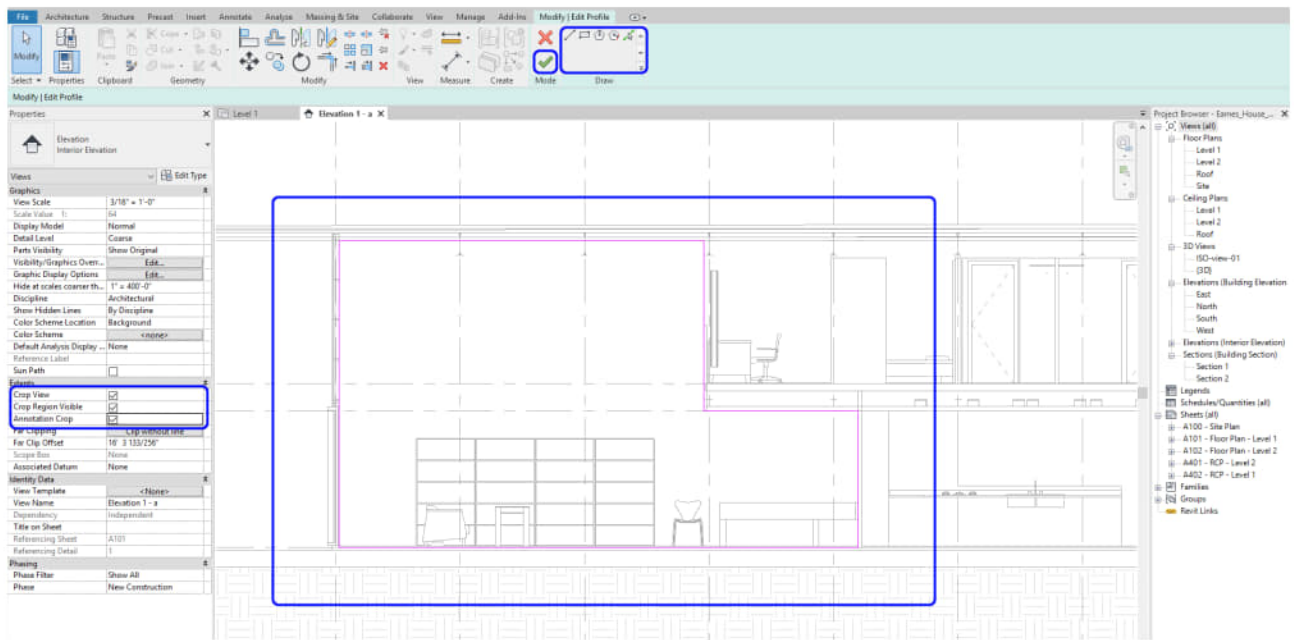
- [STEP 6] Select the elevation arrow (black filled) to adjust the crop region and view depth by moving the blue line; you can adjust where the elevation view begins. By adjusting the blue nodes on the line, you can define the crop region. Moreover, by moving the arrows, you can adjust the view depth of the elevation.



- [STEP 7] Once your elevation is defined, double click on the arrow of the elevation symbol > the newly created elevation view will be open. You may realize the current view is not what you want to present. If the view shows right, please skip [STEP 8] and [STEP 9]
- [STEP 8] Click the edge of the elevation > click [Edit Crop]

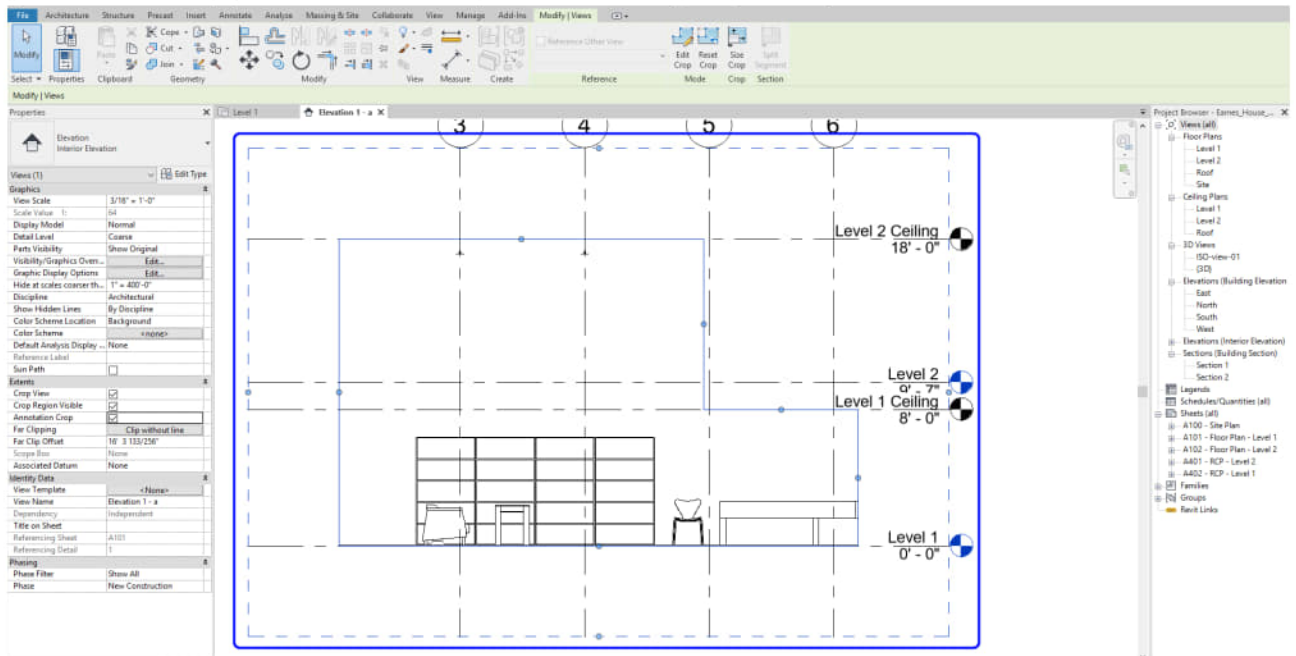


- [STEP 9] Redraw the boundary of the elevation. The boundary must be a closed-loop > Click [Green check-mark] to finish the crop boundary.

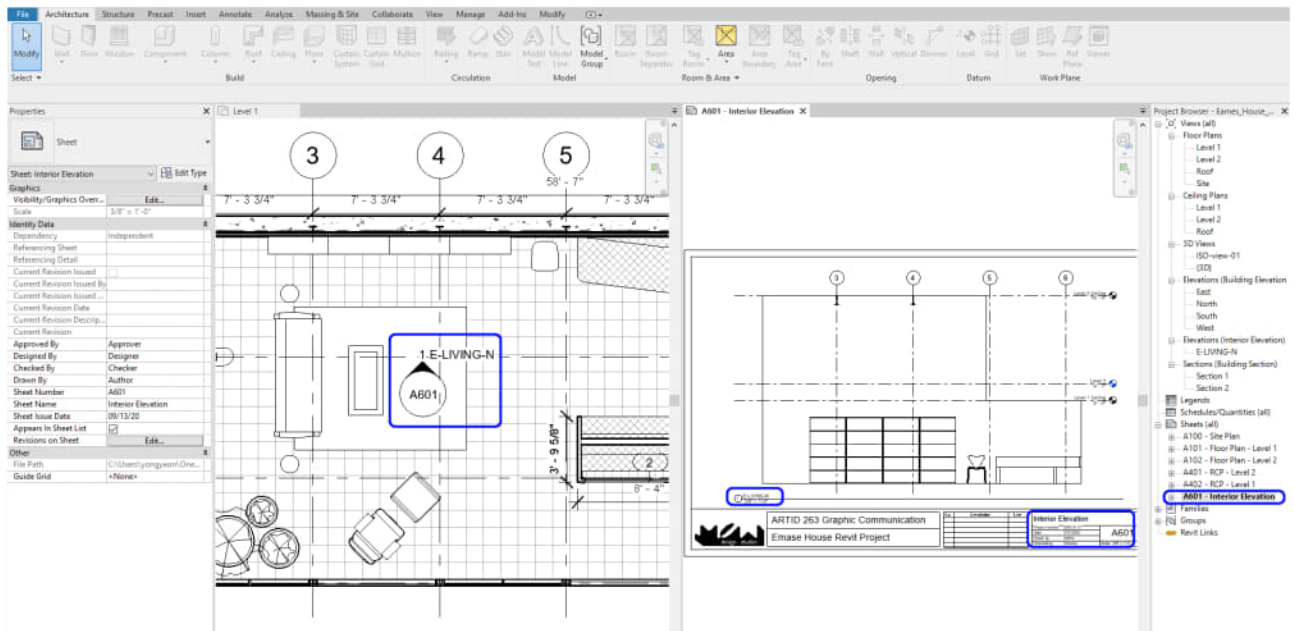


- [STEP 10] Make sure you check all three [Crop view], [Crop Region Visible], and [Annotation Crop] on [Properties] palette.

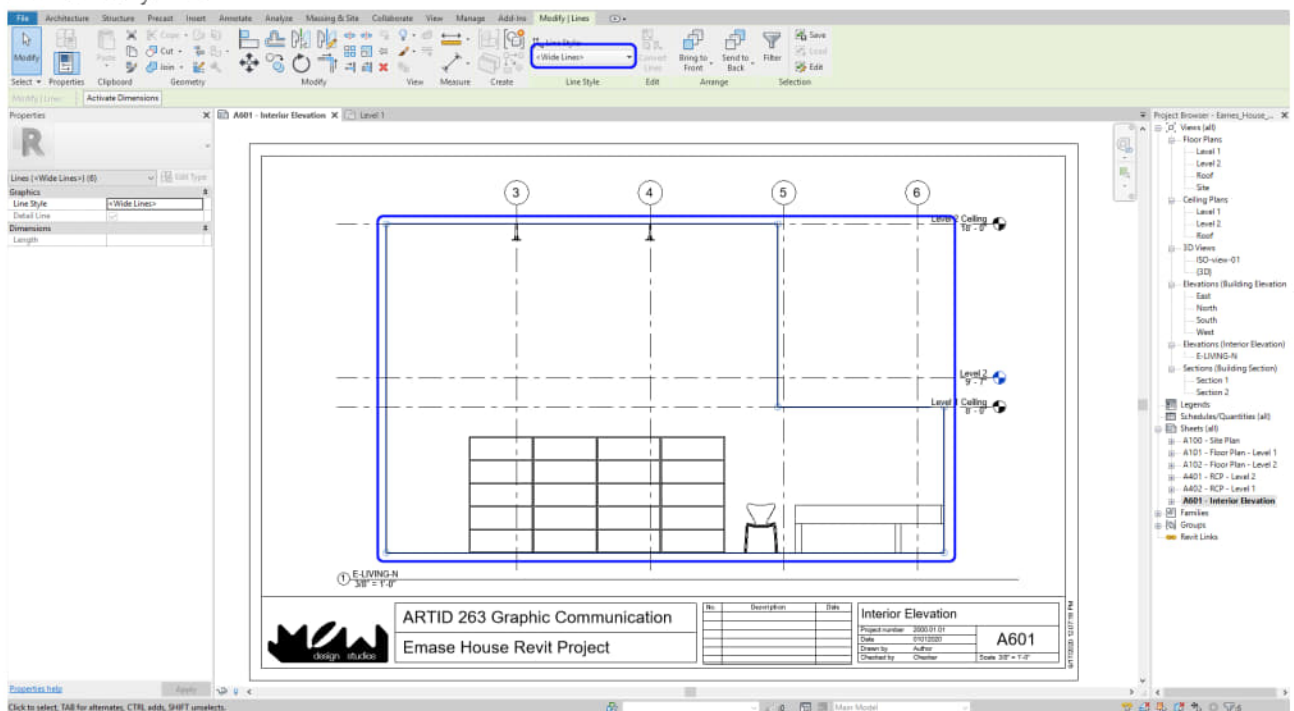
Note. The solid blue defines the visible region, and the dashed line defines where your annotations can be viewed and placed. Additionally, you can continue to adjust their view ranges by clicking on the nodes.



- [STEP 11] Add a sheet for the elevation by mouse right-clicking and clicking [New Sheet] on Sheets(all) from [Project Browser] > Select 11x17 titleblock page that you created > Rename the sheet – Sheet number [A601], Sheet name – Interior Elevation > Once the empty sheet is open > Drag the elevation view from [Project Browser] to the sheet > Rename the view title [E-LIVING-N] > Then you can see the elevation symbol name and view name updated on the floor plan

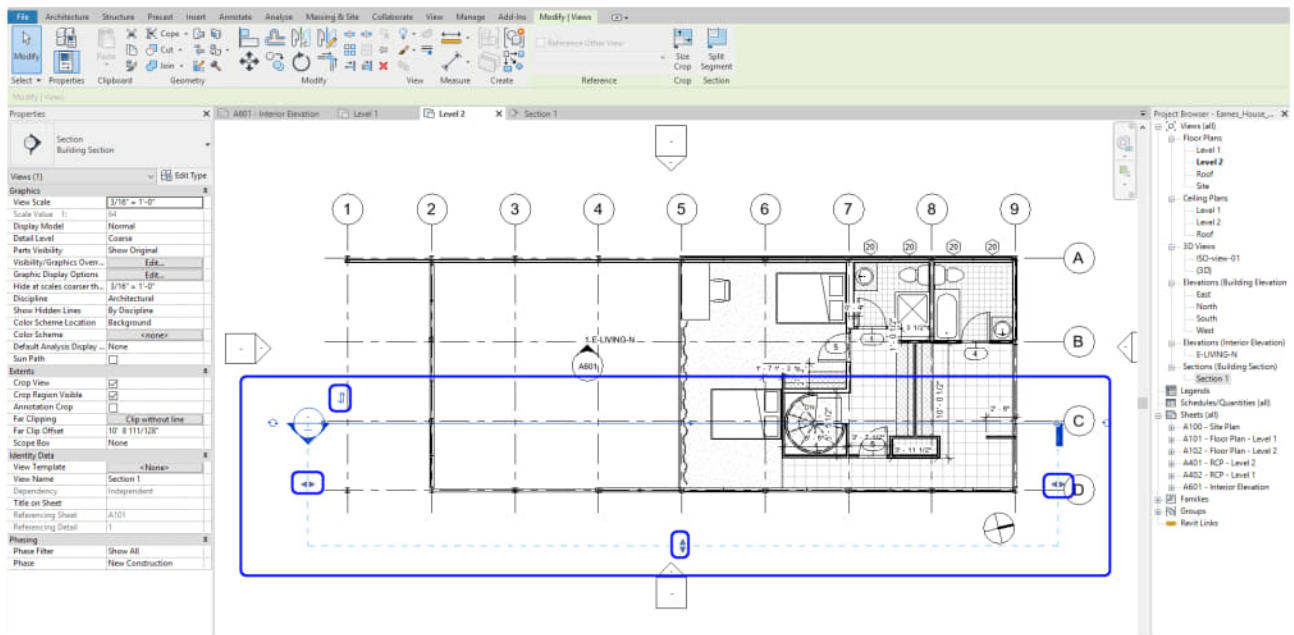


- [STEP 12] Usually, we want to show the boundary of elevation in a bold line. On your sheet, add [Detail Line] from [Annotation] tab, under [Detail] panel, or type [DL] > Select [Wide Lines] from [Modify] tab, under [Line Styles] > Trace the boundary lines

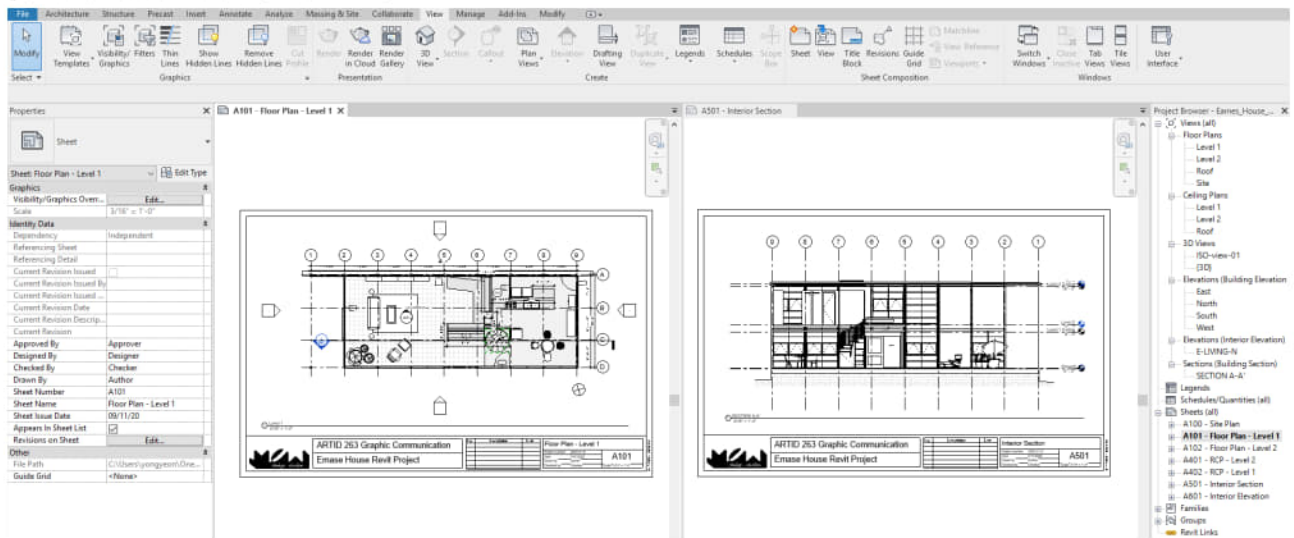


To add a section view

- [STEP 1] You will use similar steps to create section views
- [STEP 2] Click [Section] from [View] tab, under [Create] panel
- [STEP 3] Draw a section line by clicking two points, then you can change the view direction and boundary of the view



- [STEP 4] Set a sheet for the section



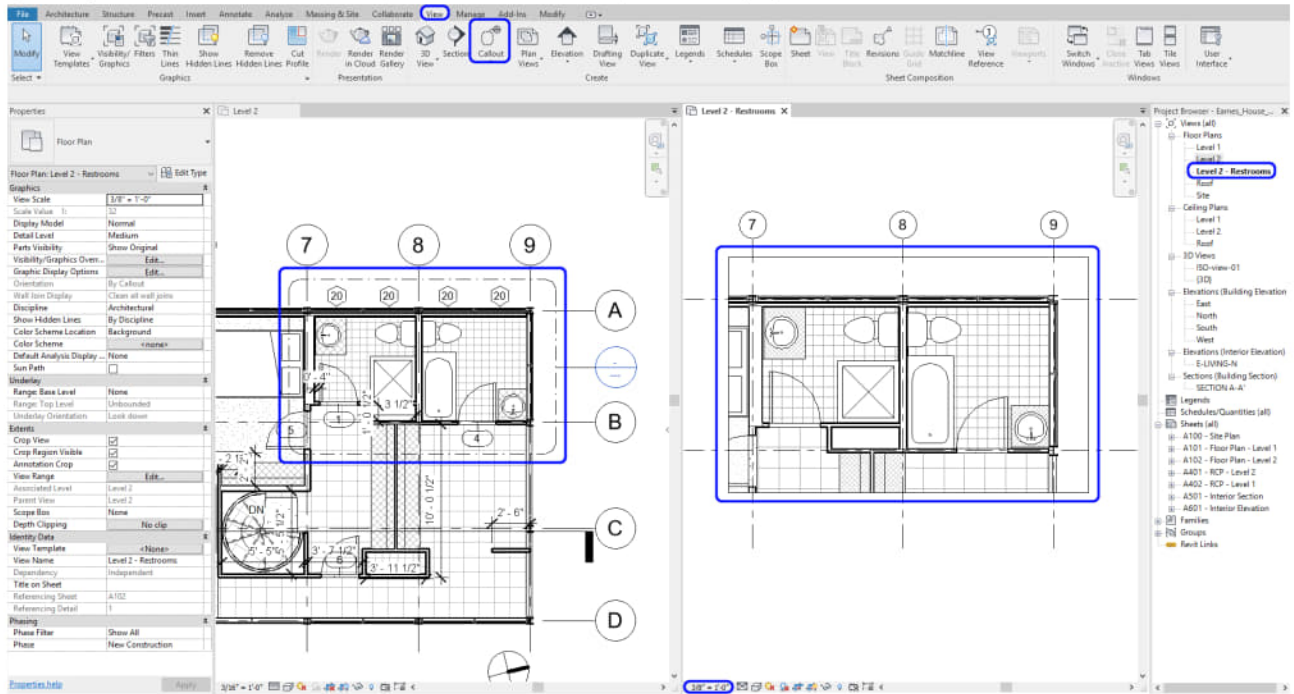
(CO 2) Add/Edit Detail views

A YouTube element has been excluded from this version of the text. You can view it online here: <https://iastate.pressbooks.pub/visualgraphiccomm/?p=104>

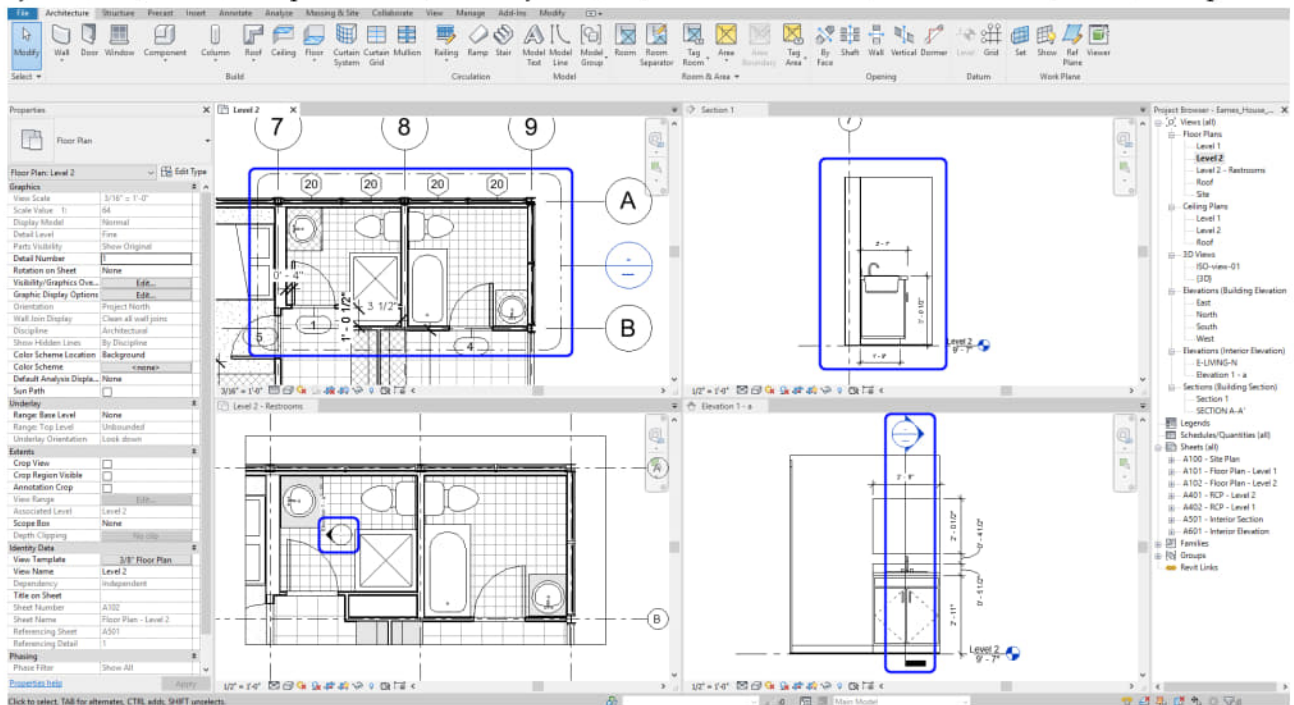
Add detailed views

- [STEP 1] Click [Callout] from [View] tab, under [Create] panel

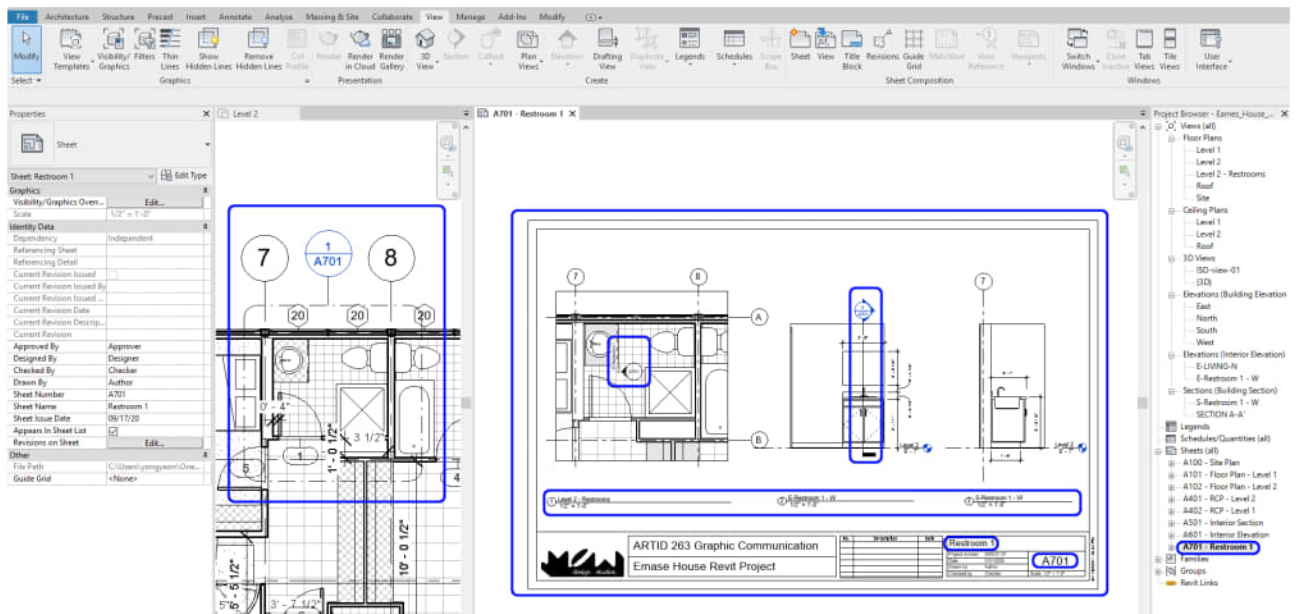
- [STEP 2] Draw the boundary of a view on your floor plan > then [Level 2-Callout] will be automatically created under [Floor plans] > Rename the view to [Level 2 – Restrooms] > If needed, update the scale



- [STEP 3] Create an elevation view and a section view on the detail view > add details > Update scales > Hide [elevation symbol] on [Level 2] floor plan > Hide [Section symbol] on [Level 2 – Restrooms] detail view and [Level 2] floor plan



- [STEP 4] Add the detail views to the sheet [A701-Restroom 1]



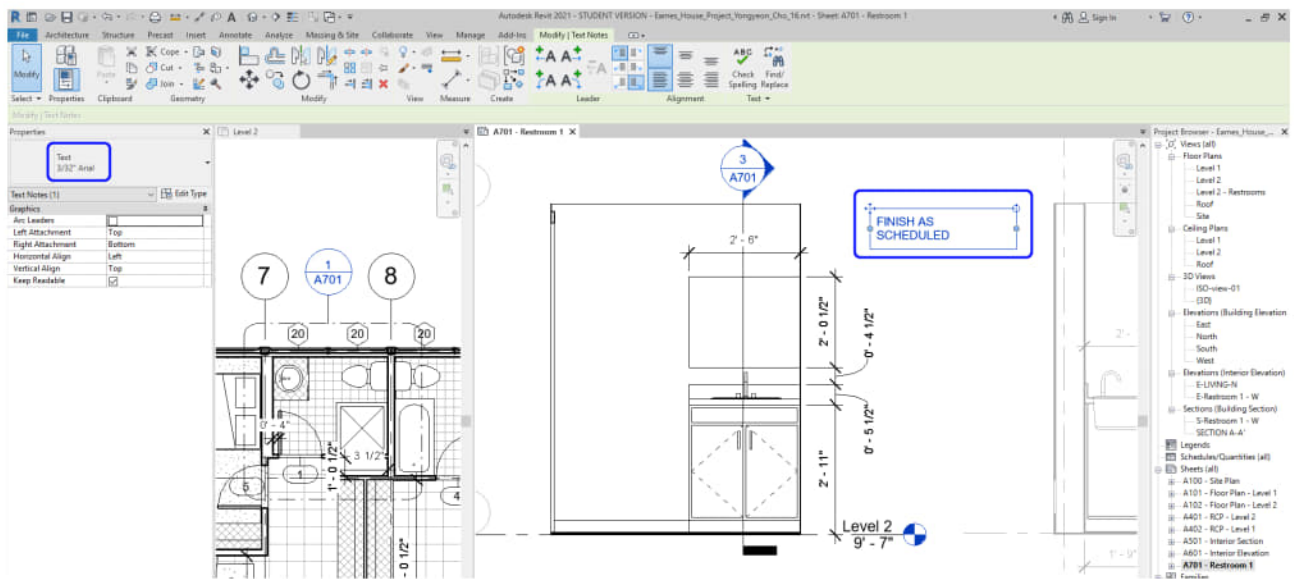
(CO 3) Add Texts & Annotations

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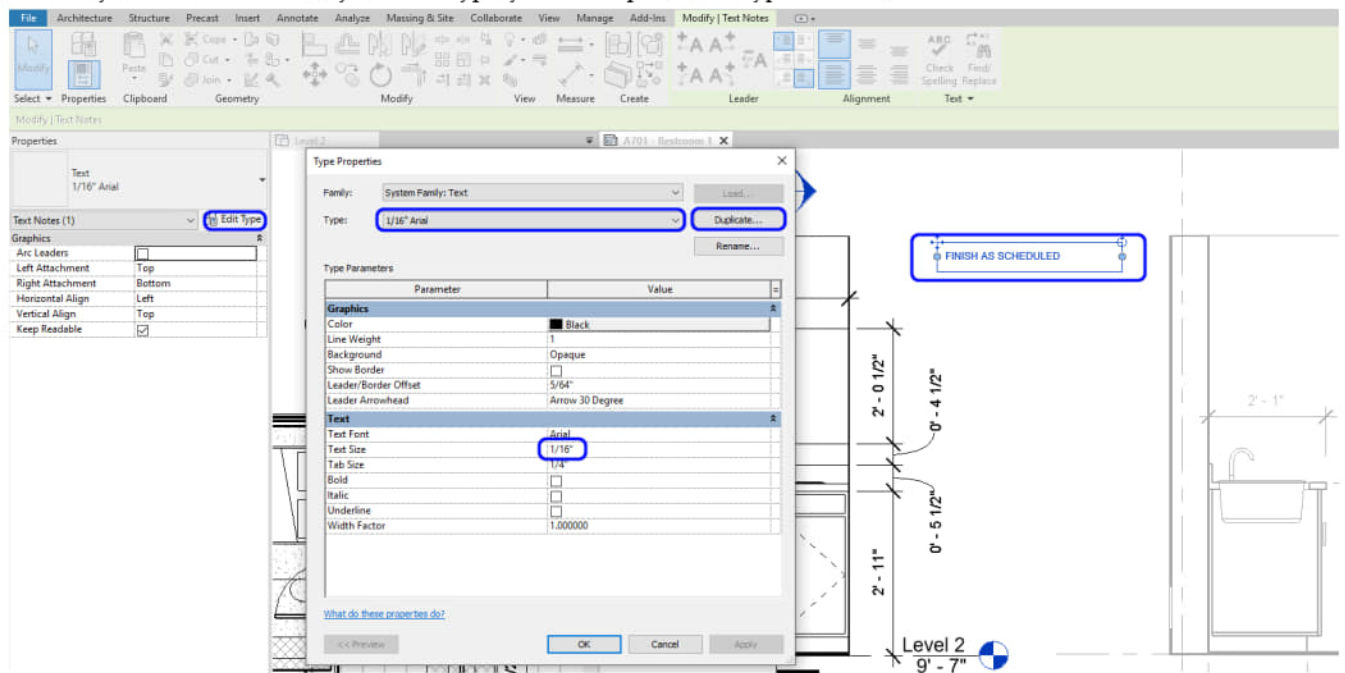
Annotation (Texts, Notes, and Dimensions) can be added to any views and sheets

In this tutorial, you will practice the [TEXT] tool to add texts and notes

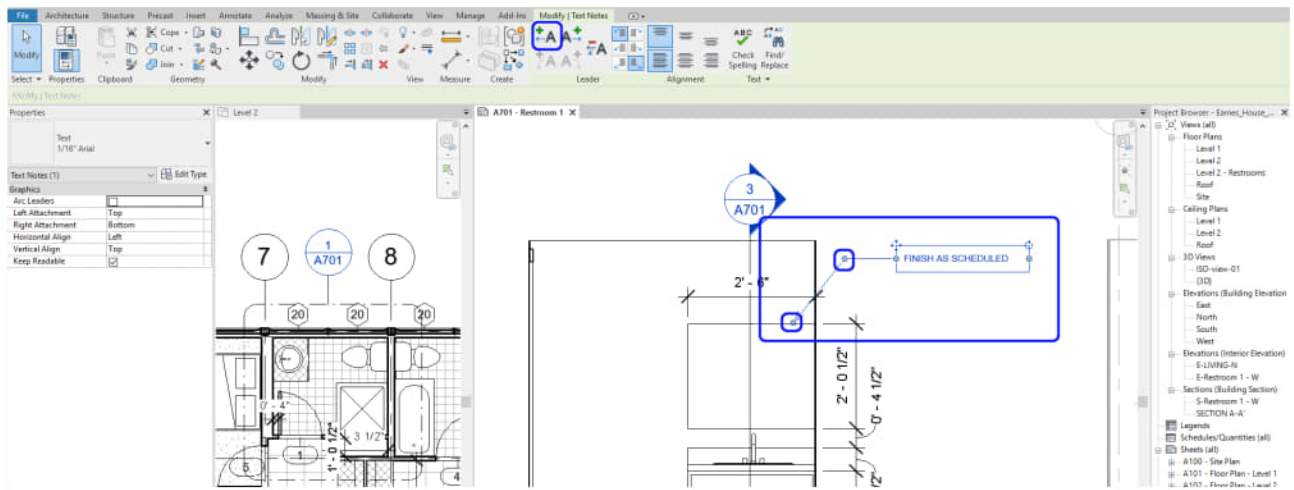
- [STEP 1] Open a [view] from [sheet] by double-clicking the view > On the view, click [Text] from [Annotate] tab, under [Text] panel > Select a text type from [Properties] panel > Drag and drop to make a text box > Add text



Note. If you need a different style of text type, you can duplicate the type and edit



- [STEP 2] Add a leader line(s) by clicking the [Leader] icon from the [Modify] tab > adjust arrow direction and the leader line



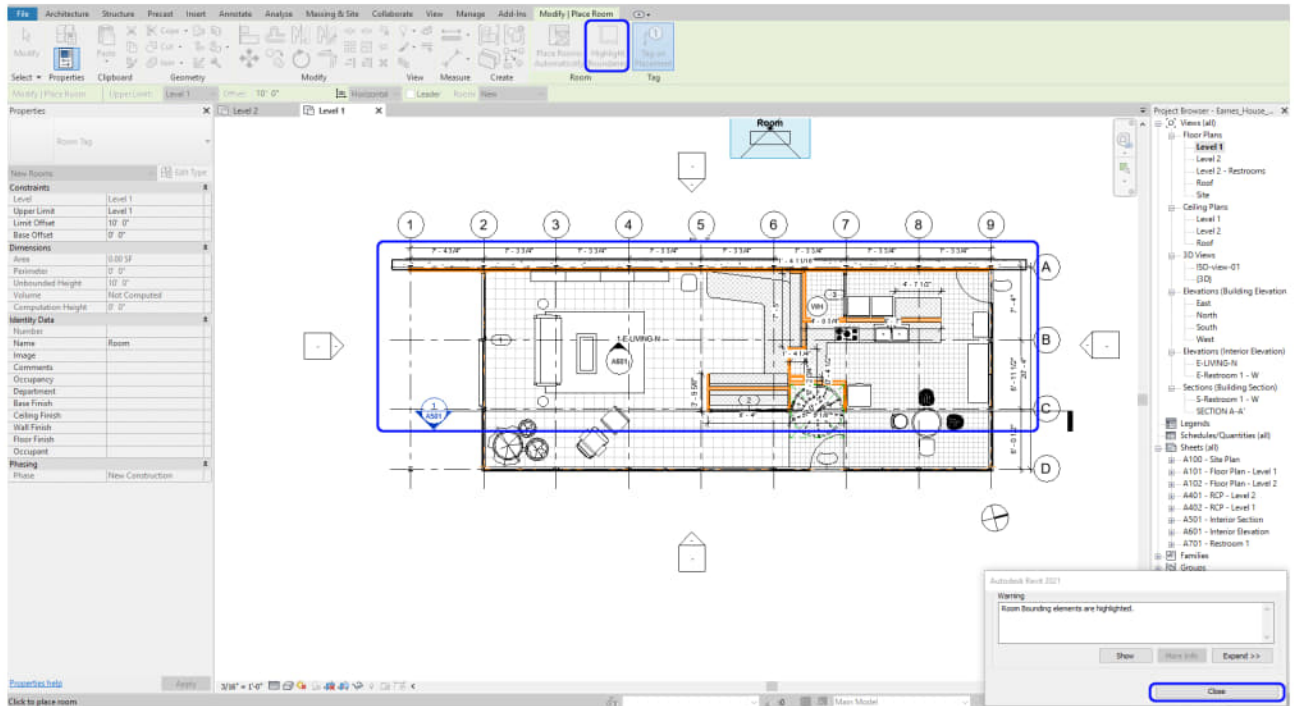
(CO 4) Add/Edit Rooms, Room tags, Room separators

A YouTube element has been excluded from this version of the text. You can view it online here: <https://iastate.pressbooks.pub/visualgraphiccomm/?p=104>

Another useful annotation tool is creating, defining, and tagging rooms in Revit. Once you have walls, Revit recognizes the walls as the boundary of the rooms. However, if you have unclear boundaries, you have to define room boundary by using [Room Separator] first

Confirm room boundaries

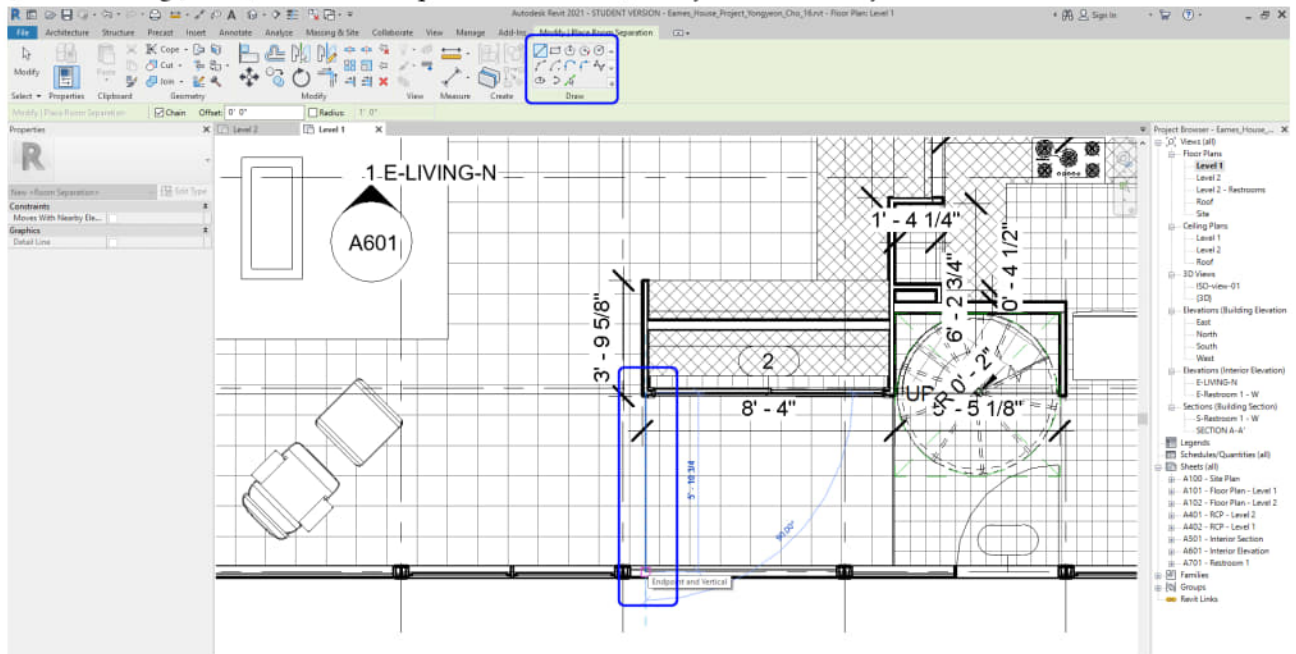
- [STEP 1] Click [Room] from [Architecture] tab, under [Room & Area] panel
- [STEP 2] Hover the mouse over the floor plan to find a closed room. You can confirm the boundaries by clicking [Highlight Boundaries]



- [STEP 3] Click [Close] to hide the highlighted boundaries

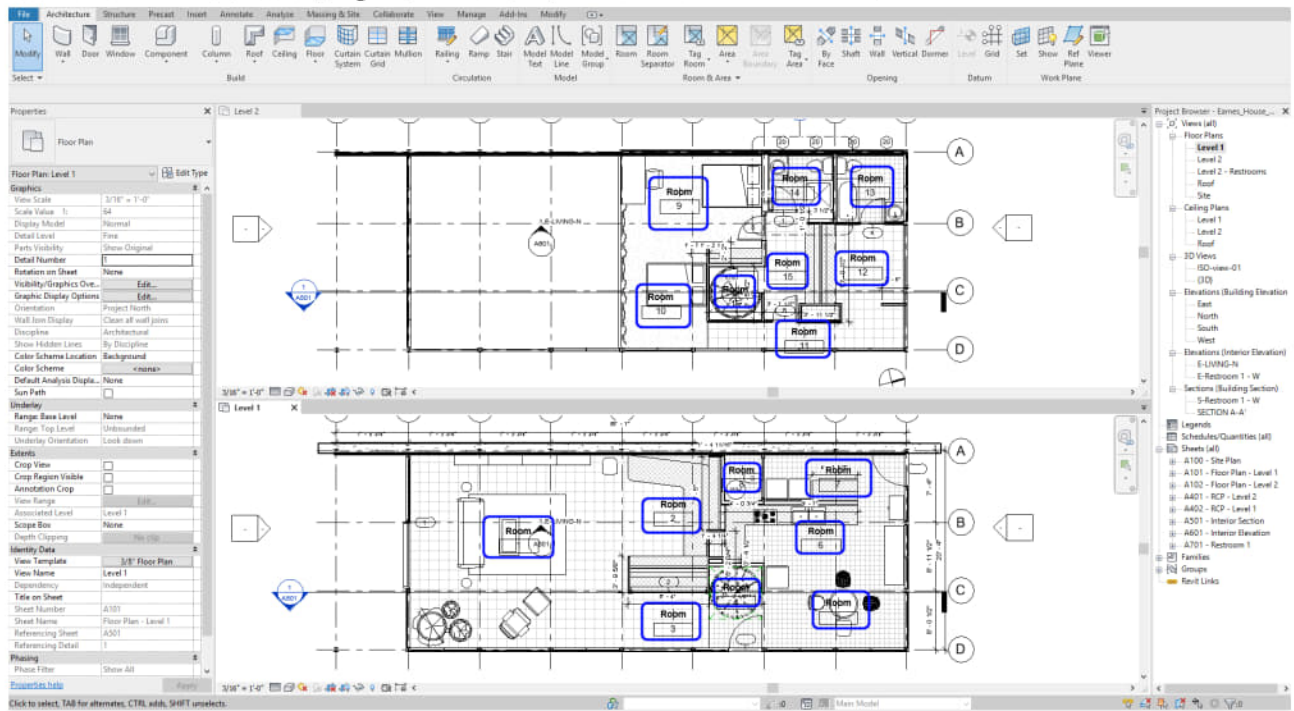
Define boundaries

- [STEP 1] To define boundaries, click [Room Separator] from [Architecture] tab, under [Room & Area] panel
- [STEP 2] Using [Draw] tool to draw separated boundaries, then you can manually define boundaries.



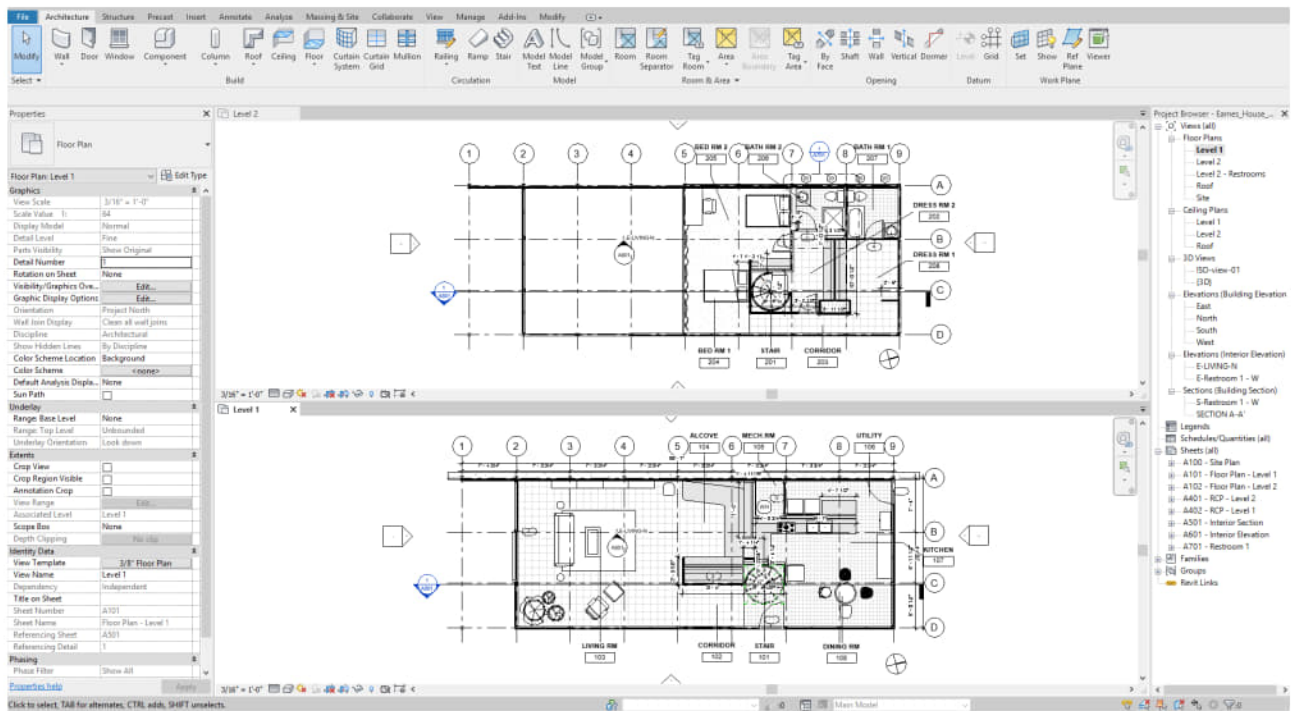
Create rooms

- [STEP 1] Click [Room] from [Architecture] tab, under [Room & Area] panel
- [STEP 2] Hover over each room and click once with the mouse to define the room boundary. You will see a tag that reads [ROOM] and a [X] showing the extent of the room. Continue for each room.



Edit tags

- [STEP 1] Click a room tag (NAME) two times, then you can edit the room name. Click a room tag (NUMBER) two times. Then you can edit the room number.
Note. If the rooms are located on the 1st floor, the number starts from 101. If the rooms are located on the 2nd floor, the number starts from 201.
- [STEP 2] Move the room tags outside of the room to avoid overlapping with model lines and the room names > Select all room tags > Check [Leader Line] box > Move the room tags to the outside of the room



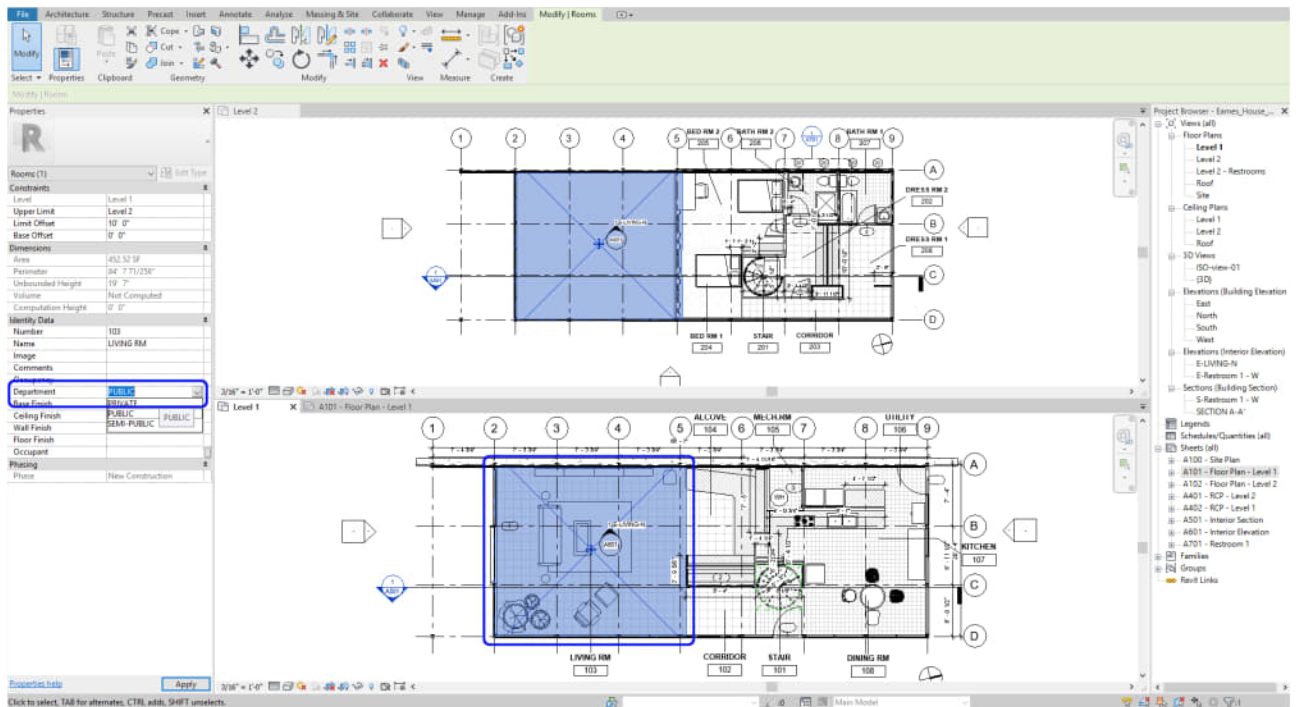
(CO 5) Add/Edit a color fill scheme

A YouTube element has been excluded from this version of the text. You can view it online here: <https://iastate.pressbooks.pub/visualgraphiccomm/?p=104>

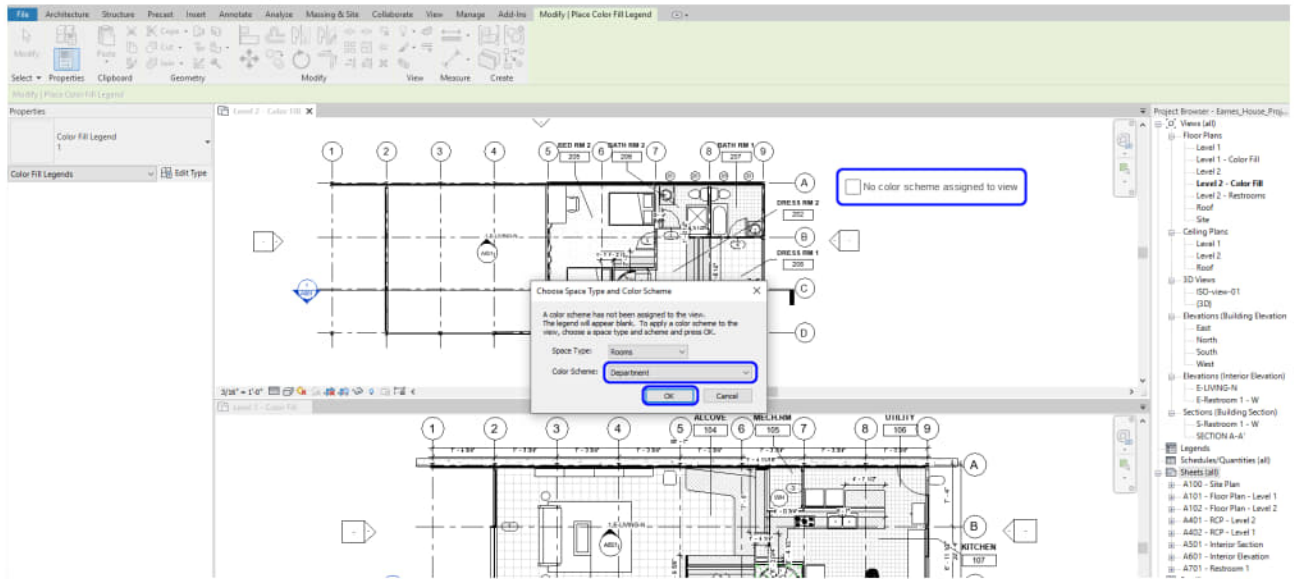
You can use the [color fill legend] to place rooms and spaces after adding rooms. Color coding plans can help the client understand the relationship between public and private, work, and rest spaces.

Add a color fill legend

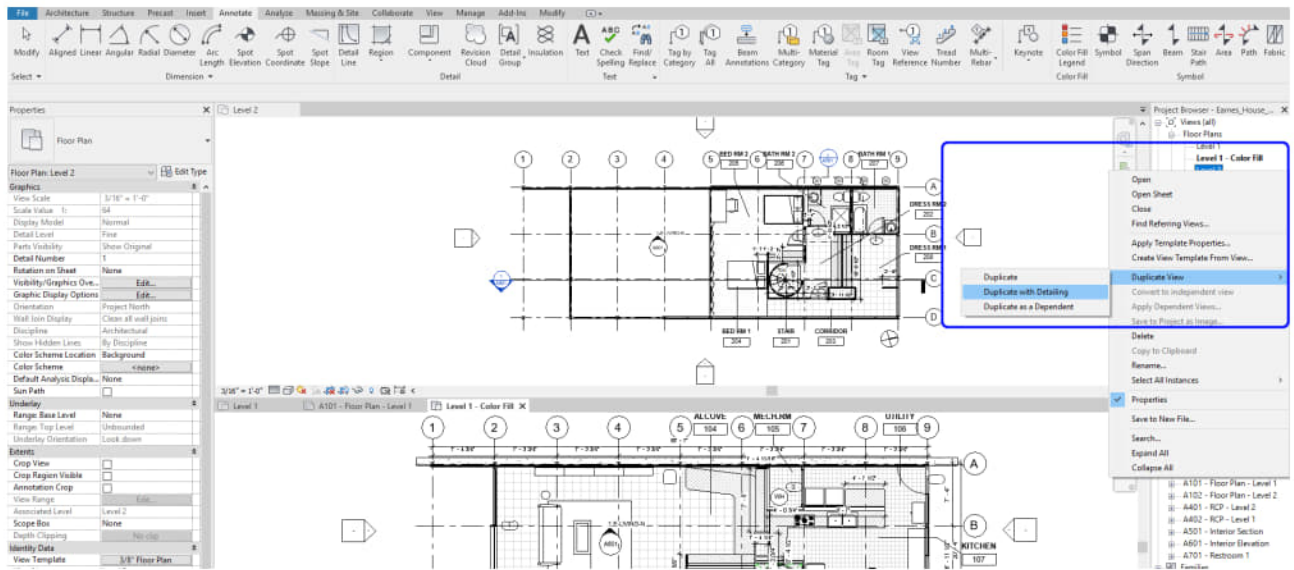
- [STEP 1] Click a [room] on a floor plan > Add [PUBLIC], [SEMI-PRIVATE], or [PRIVATE] on [Department] from [Properties] palette > If you already added one of the three options, you can select from the drop-down menu.



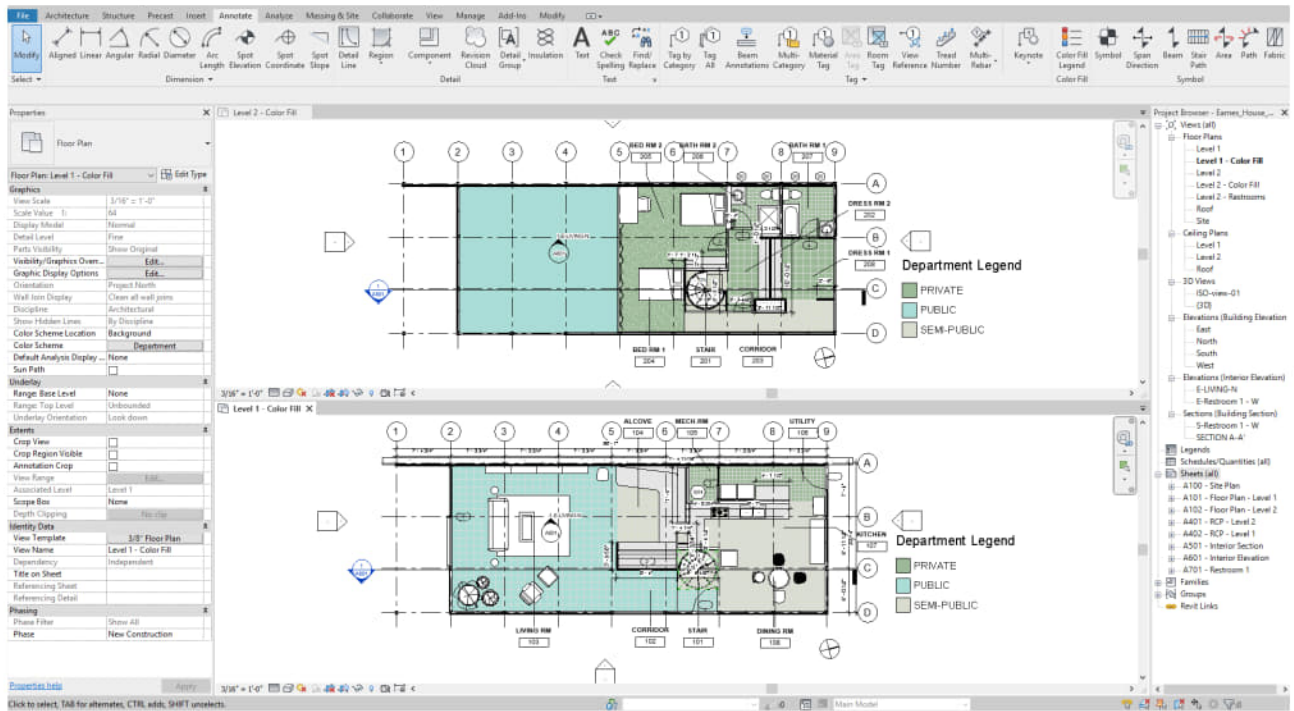
- [STEP 2] Repeat step 1 for all rooms
- [STEP 3] Duplicate floor plans for only the color-filled plans by right-clicking a view > select [Duplicate view] > select [Duplicate with Detailing] > Rename the copied views



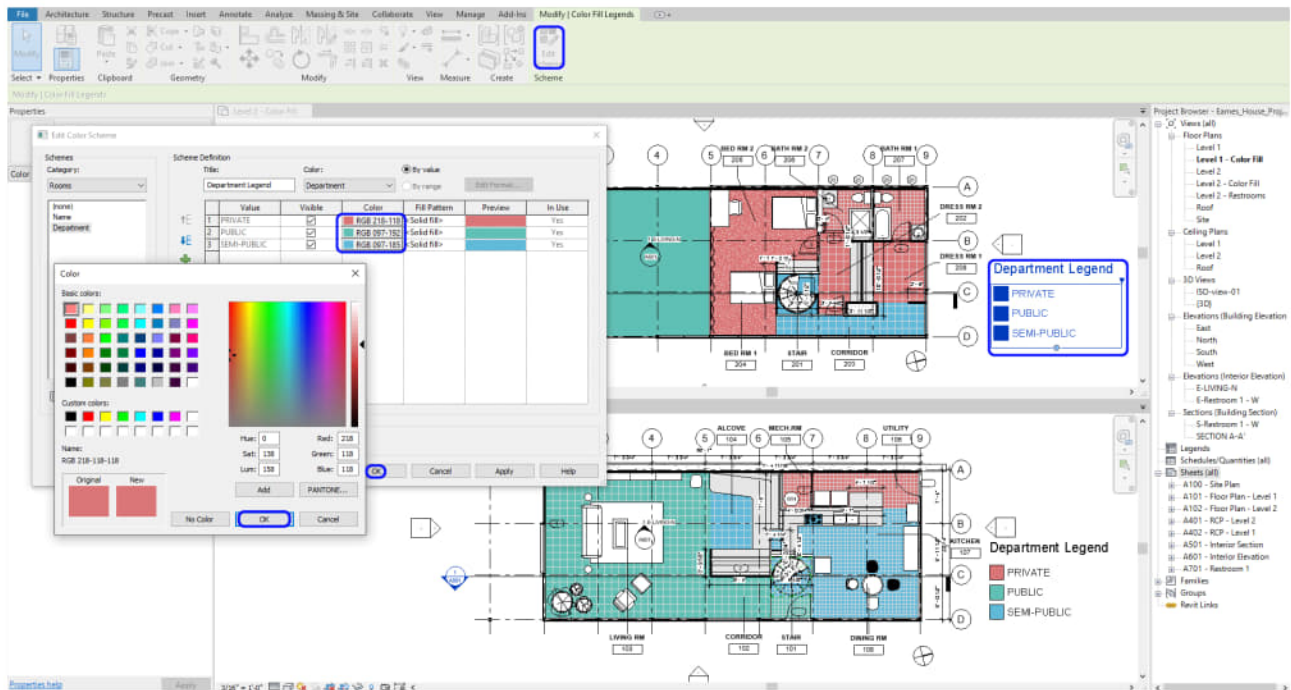
- [STEP 4] Open the duplicated views > Click [Color Fill Legend] from [Annotate] tab, under [Color Fill] panel > Click on a floor plan, then [Choose Space Type and Color Scheme] window will open > Confirm Space type: Room, Color Scheme: Department > Click [OK] then the color-filled legend and color will show.



- [STEP 5] Repeat this step 4 for another plan



- [STEP 6] To update color, Click the legend > click [Edit Scheme] > Define color> Click [OK] to finish color scheme



SAVE the file before closing the application.

Save in a different location for the backup (e.g., a cloud folder)

Chapter 17. Add/edit views, lighting, & materials

Session Objectives

Upon completing this session, students will be able to:

- (CO 1) Set perspective views
 - (CO 2) Set Isometric views
 - (CO 3) Edit Views – Graphic Display styles
 - (CO 4) Test Render
 - (CO 5) Set sun
 - (CO 6) Edit Artificial lighting
 - (CO 7) Add/Edit materials
 - (CO 8) Render material managements
-

Session Highlights

At the end of the session, students can create the graphics below.



(CO 1) Set perspective views

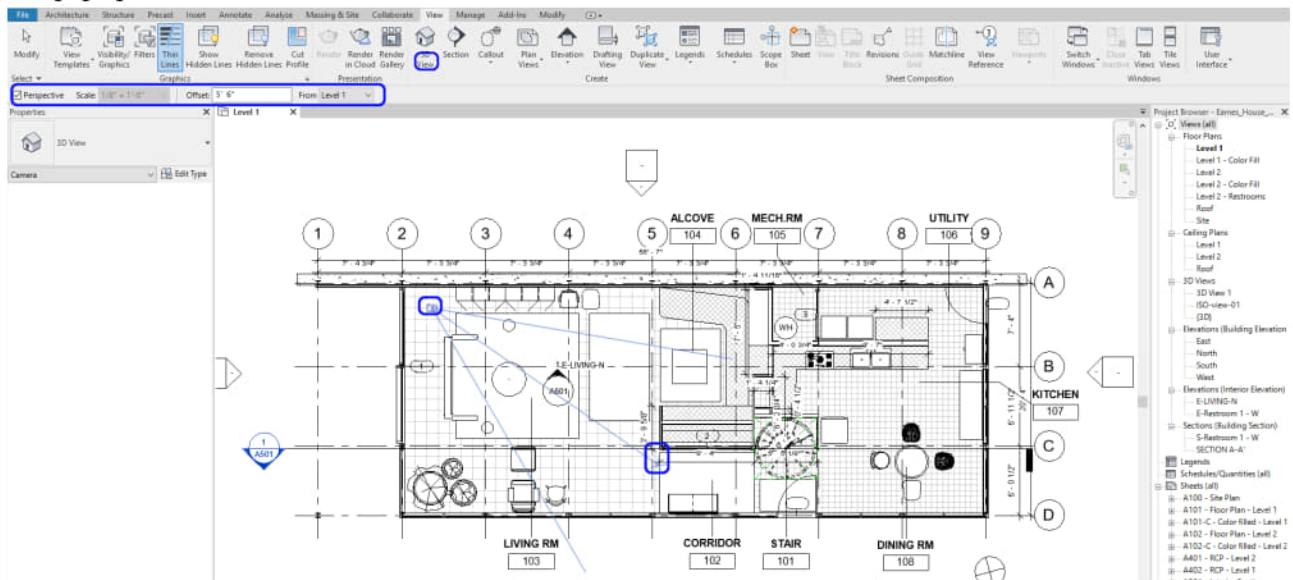
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Revit supports perspective views and isometric views.

For more information about 3D views, please read [this page](#)

To create a camera view for a perspective view

- [STEP 1] Open a floor plan [Level 1] to create a camera view
- [STEP 2] Click a drop down menu of [3D view] > [Camera view] from the [View] tab, under [Create] panel
- [STEP 3] On the floor plan, click the location of the camera position, click the target position > The perspective view will pop up the window.



To reposition the camera view

- [STEP 1] In order to adjust the view, you will open the camera view that you would like to adjust and the floor plan together. Type (WT) to see the tile view and type (ZA) to see zoom in all
- [STEP 2] Click the frame of the perspective view > you can reposition by controlling the 3D wheel on the top-right corner of the view and resize the camera view by adjusting the nodes
- [STEP 3] You can also change the camera position and the target position on your floor plan. On the Properties panel, change eye elevation & Target elevation, turn off Far Clip Active, and view the name.

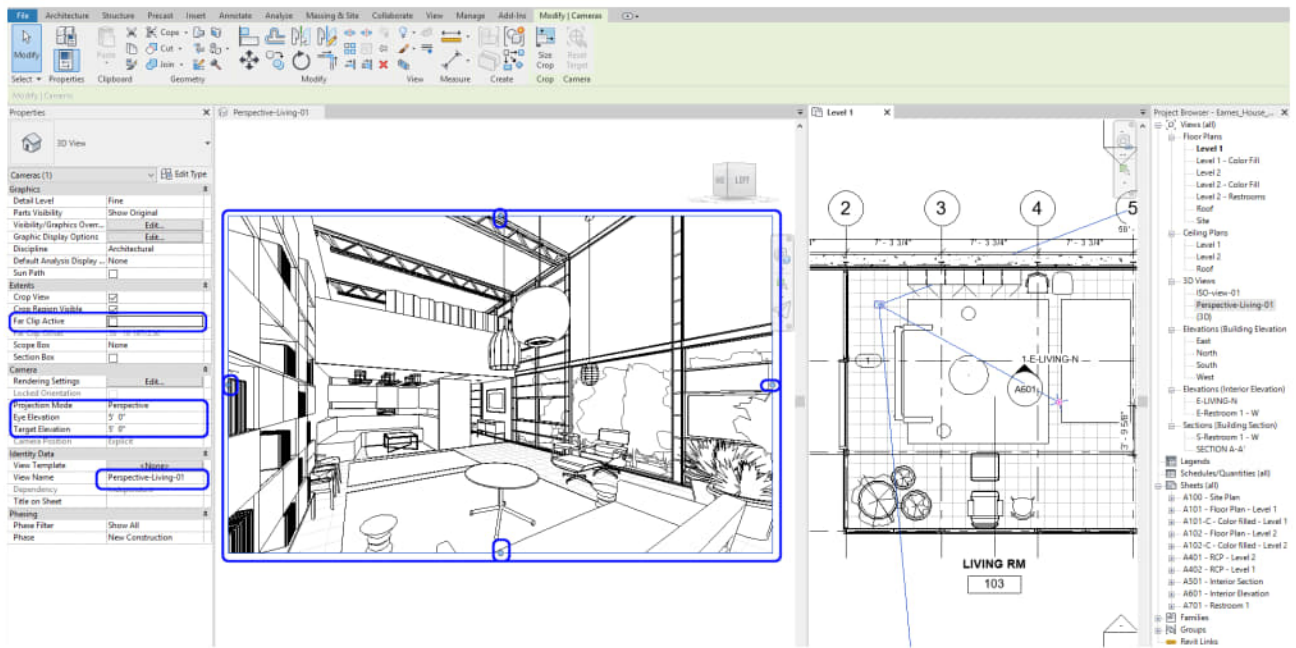
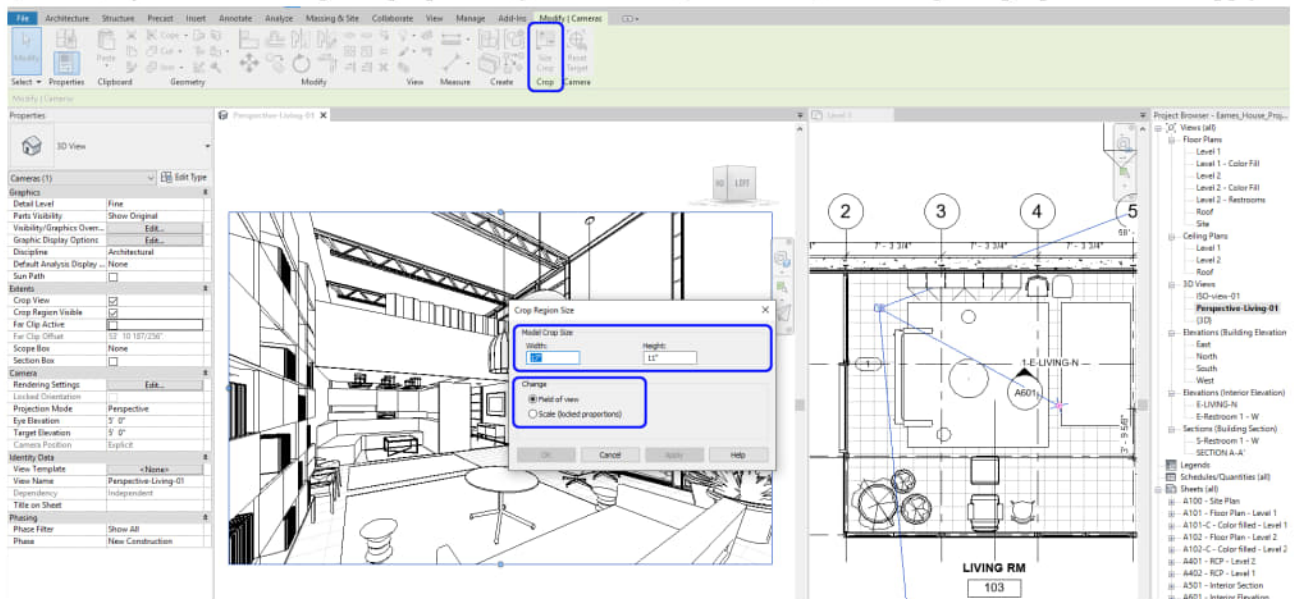


Image-print size update for the perspective view

- [STEP 1] Click the view frame
- [STEP 2] Click the [Size Crop] icon from the [Modify] tab
- [STEP 3] On Crop Region Size window, check [Scale (locked proportions)]
- [STEP 4] Change the width of what you want to make, and then the height will automatically change with the view ratio you made.
- [STEP 5] If you want to change the proportion, you check the [Field of view] and change the proportion. Click Apply.



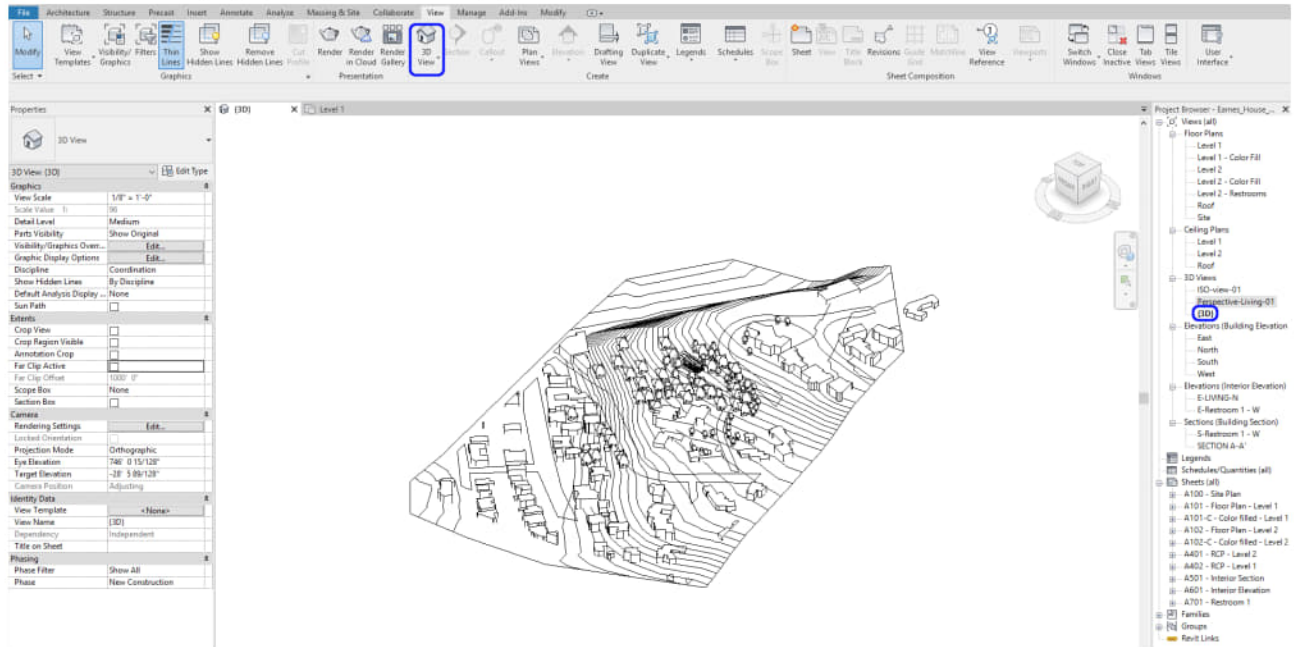
- [STEP 6] Then again, check [Scale] to change the size of the view
- [STEP 7] Click [ok] to finish

(CO 2) Set Isometric views

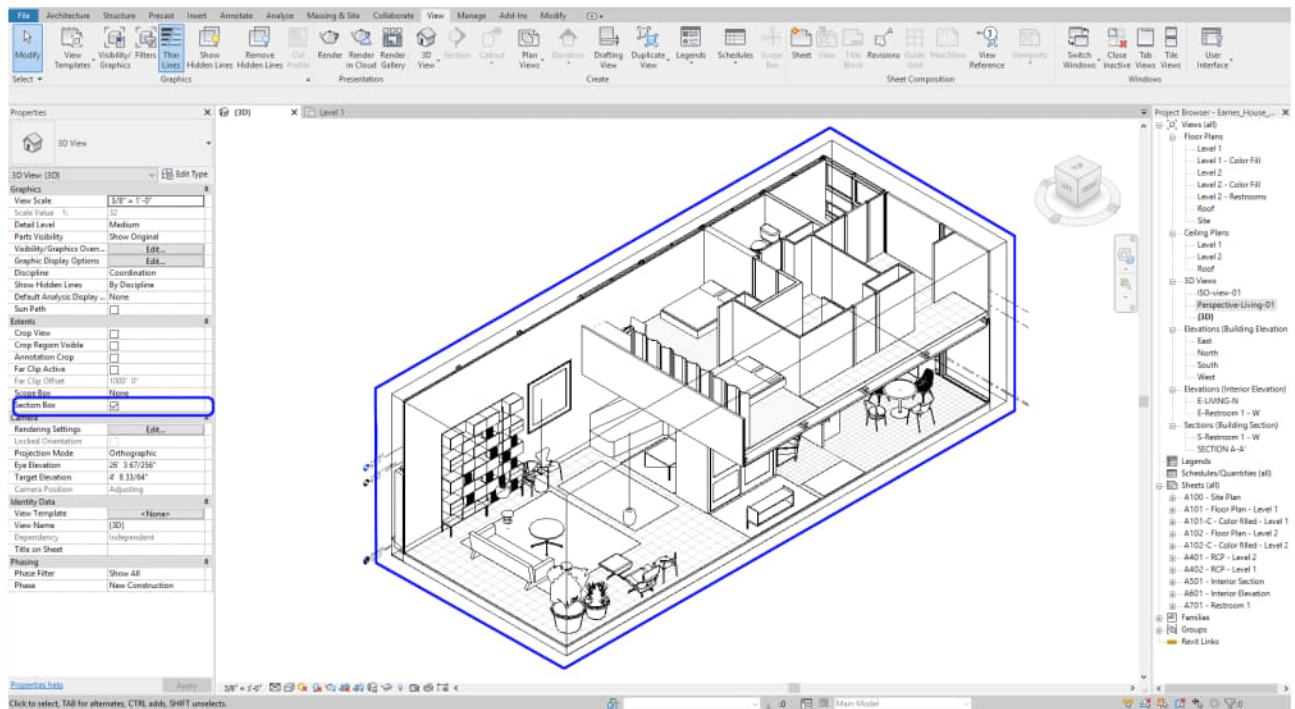
A YouTube element has been excluded from this version of the text. You can view it online here: <https://iastate.pressbooks.pub/visualgraphiccomm/?p=106>

Set Isometric view

- [STEP 1] To add an Isometric view, Click the drop-down menu of [3D view] from the [view] tab, under [Create] panel, click [Default 3D view] > The Isometric view will pop up



- [STEP 2] To edit the boundary of the view, Click the [section box] option on the [properties] palette
- [STEP 3] Click the [section box] on the view > Drag the arrows toward the model to create a dynamic slice of the model

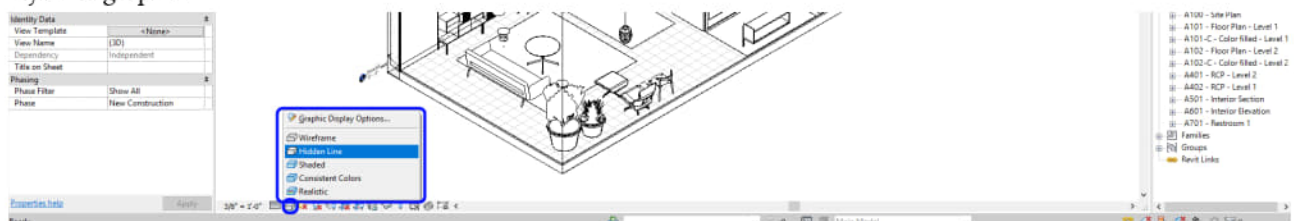


(CO 3) Edit Views – Graphic Display styles

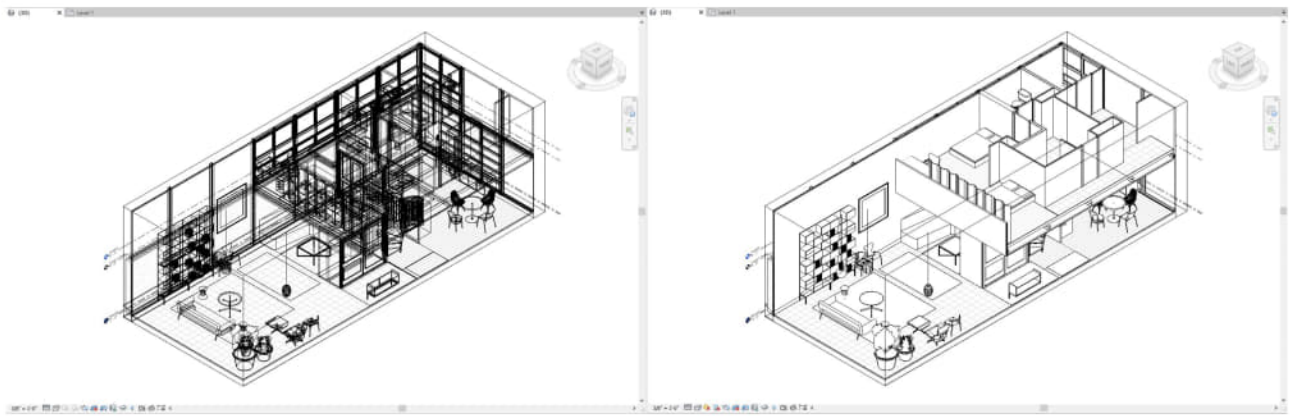
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To set the graphic display styles

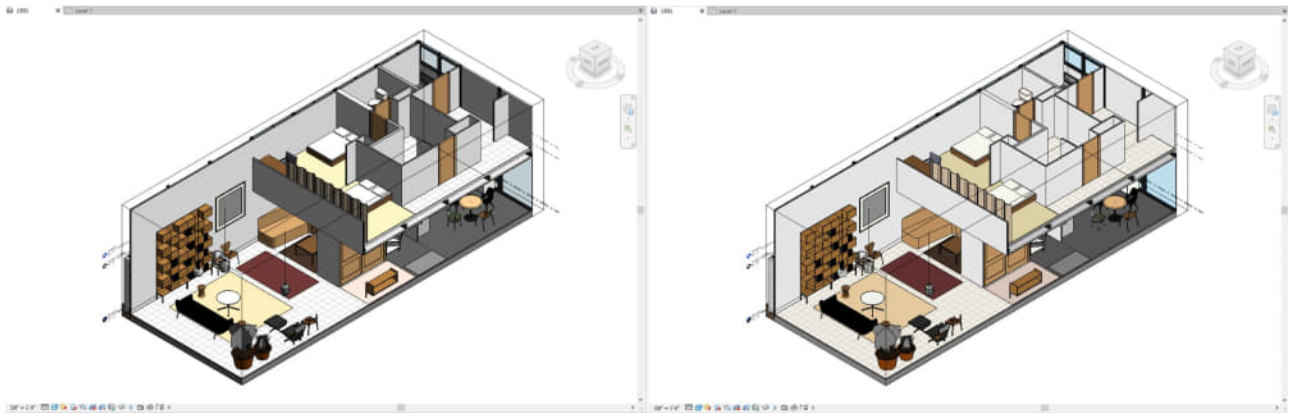
- Once you click [Graphic Display] on the [view navigation] panel, click one of the six options, then you can change the styles of graphic



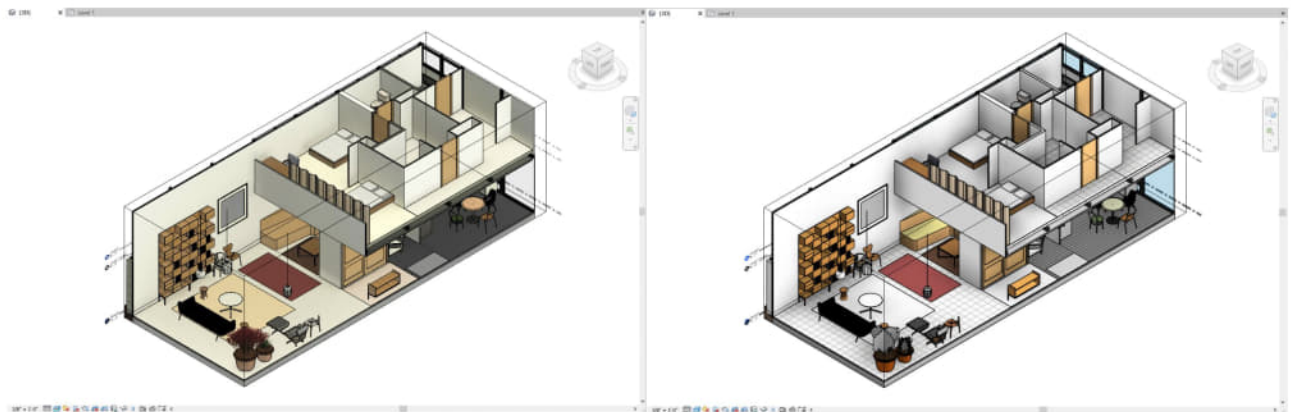
- Examples of the six graphic style preset



Wireframe & Hidden Line



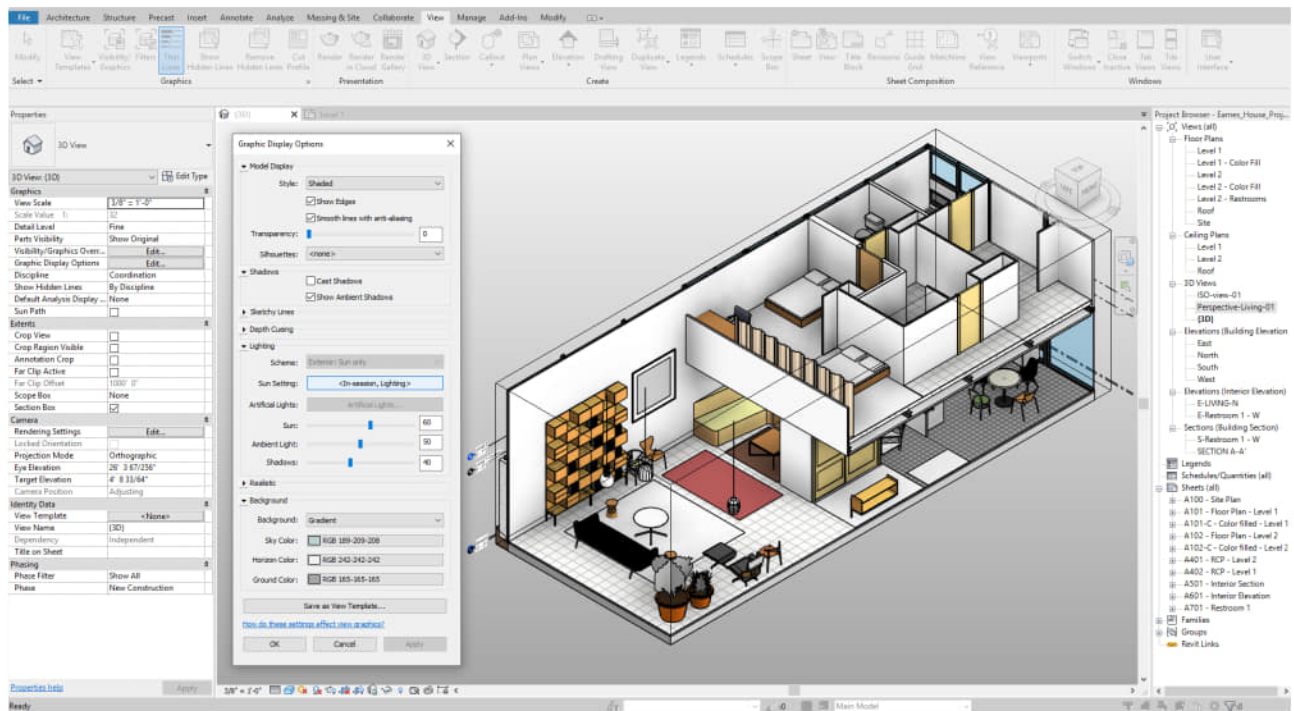
Shaded & Consistent Colors



Realistic & Custom

To modify Graphic Display Options

- [STEP 1] Click [Graphic Display] on the [view navigation] panel > click [Graphic Display Options]
- [STEP 2] Modify the properties that are appropriate for your project
For a quick presentation, I like to use these settings



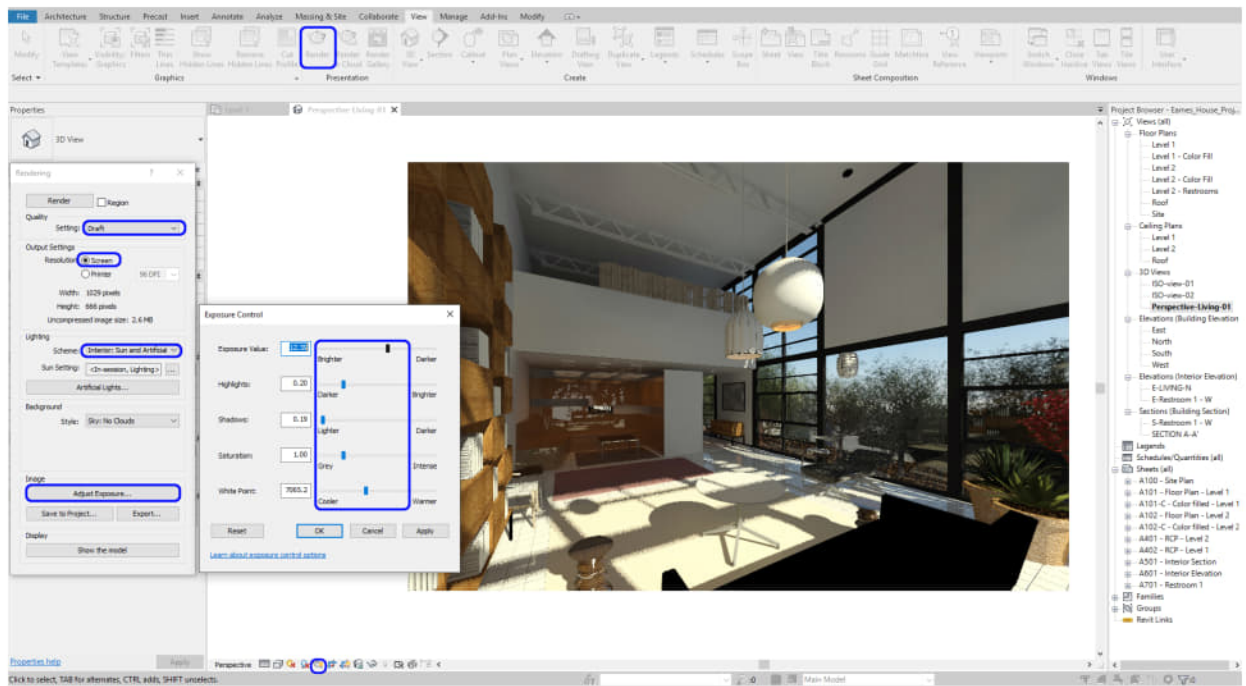
- [STEP 3] Click [Apply] to confirm what you changed, click [Ok] to set the style

(CO 4) Test Render

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To do a test render, you need to adjust the render settings

- [STEP 1] Click [Render] from the [View] tab, under [Presentation] or Click [Rendering Dialog] on the [view navigation] panel
- [STEP 2] Adjust settings
 - Confirm Setting – Draft for a test render
 - Change Lighting scheme – interior for an interior scene
 - Change Sun Setting – Sun and Artificial
 - Change Background style
 - Click [adjust Exposure] if needed



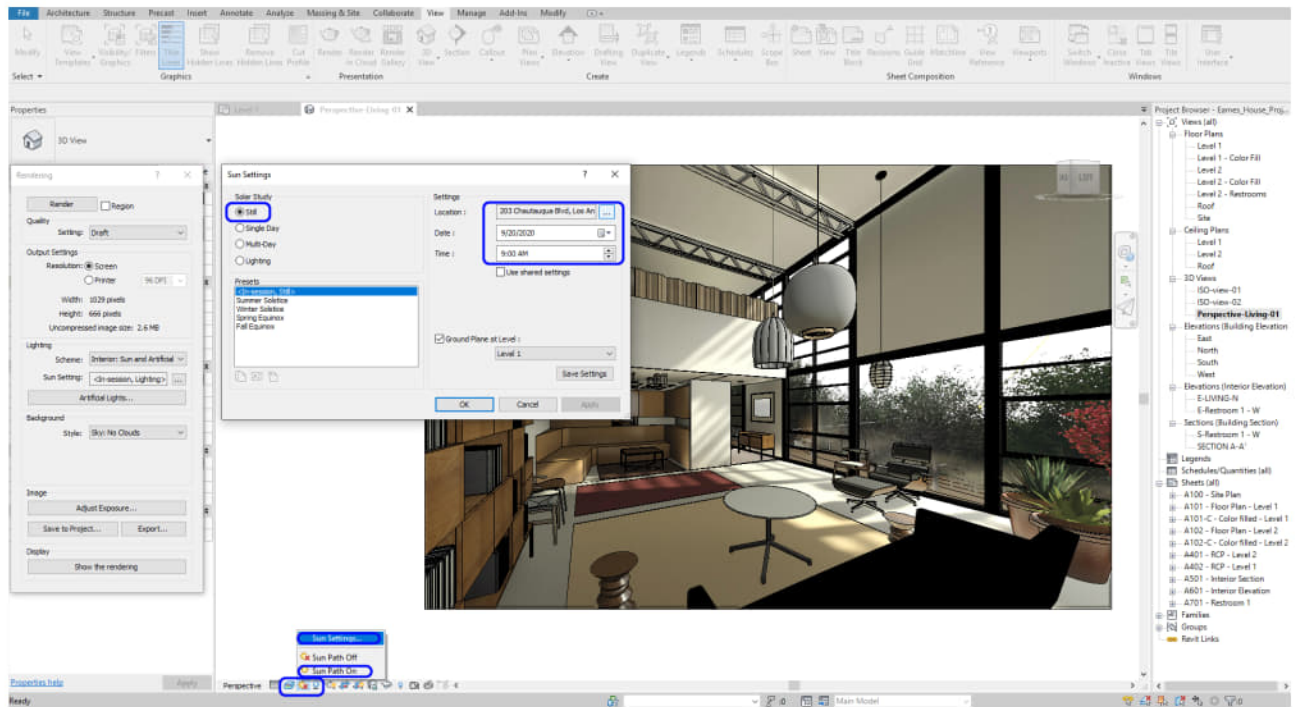
- [STEP 3] Click Render to see the result. You can stop if it shows all right, you do not need to wait until the completion.

(CO 5) Set sun

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Setting Sun

- [STEP 1] Click [Sun Path] On > Click [Shadow] On
- [STEP 2] Click Sun Settings to adjust sun direction
- [STEP 3] Select Still for a specific time
- [STEP 4] Change Display setting to Realistic or Render to see the sun direction and material

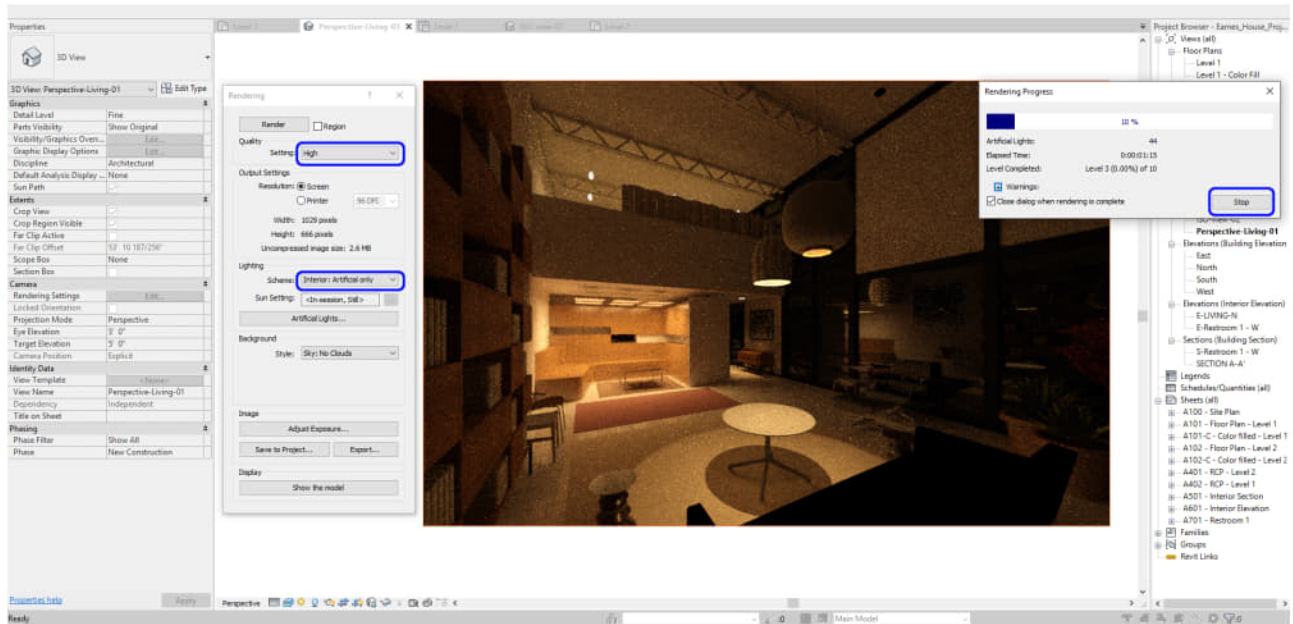


(CO 6) Edit Artificial lighting

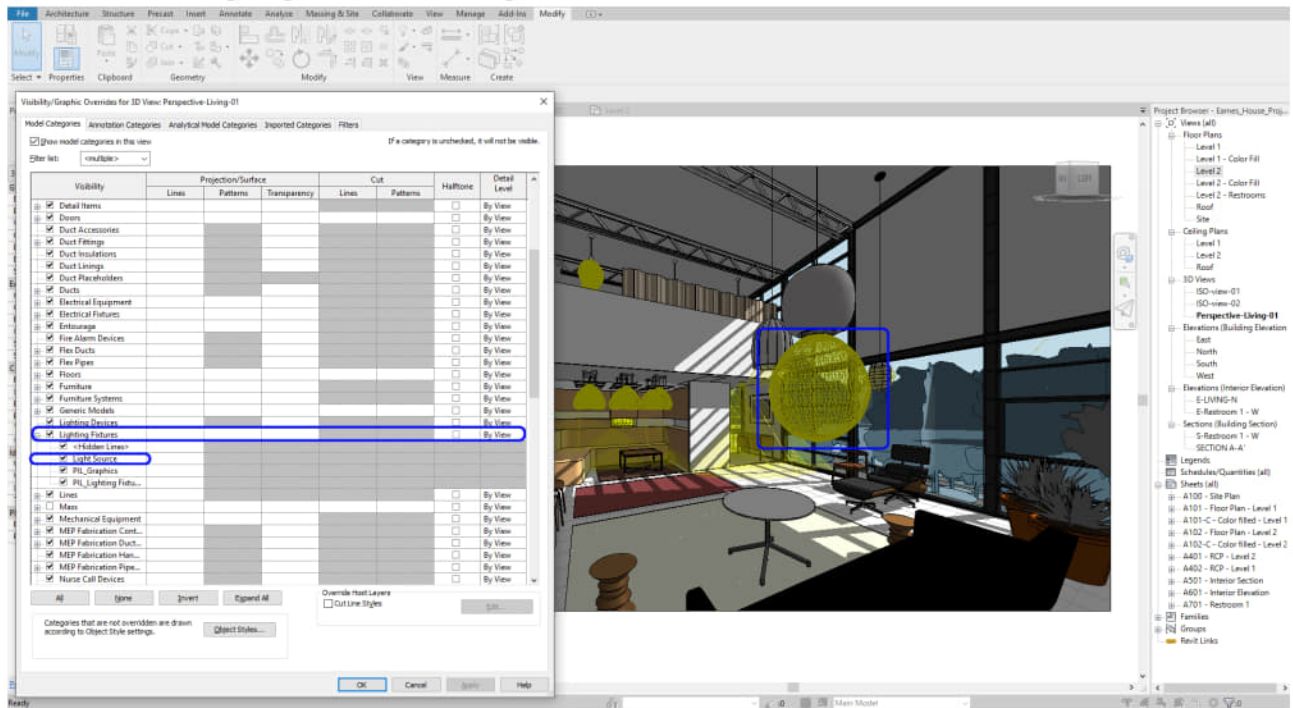
A YouTube element has been excluded from this version of the text. You can view it online here: <https://iastate.pressbooks.pub/visualgraphiccomm/?p=106>

Review the default lighting setting

- [STEP 1] To see an accurate lighting setting, change the render setting to [Interior: Artificial only] and [High] quality



- [STEP 2] Open Visibility/Graphics Overrides, or type [VV] for 3D view
- [STEP 3] Turn on Lighting Source to see the light source

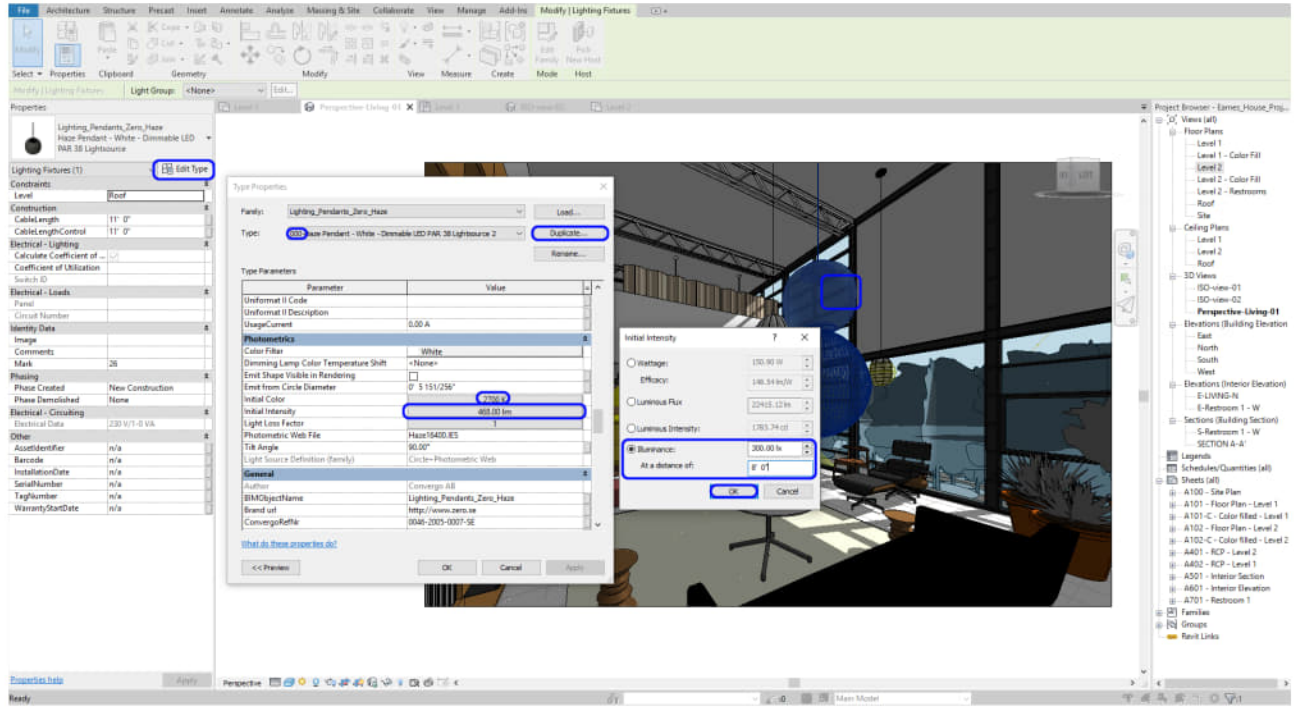


Lighting setting

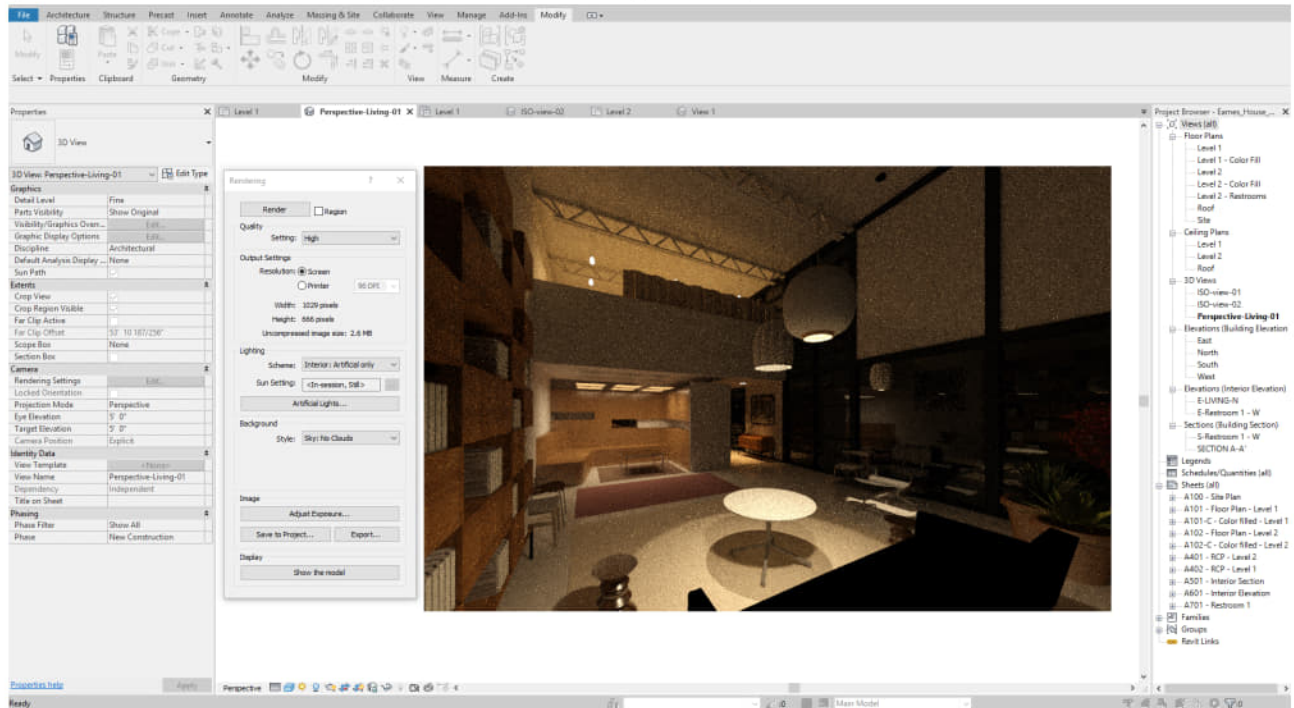
- [STEP 1] Click the lighting fixture that you want to modify
- [STEP 2] Click Edit Type > Click Duplicate and name the new type
- [STEP 3] Modify Photometrics [initial intensity] > I recommend to adjust the value of [Illuminance] and [at a distance of]

Please refer to [this page](#) for the recommended lighting level (Lux) for activities Repeat this step for all other lighting

sources



- [STEP 4] Test render to see if the light fixtures are at the right setting.



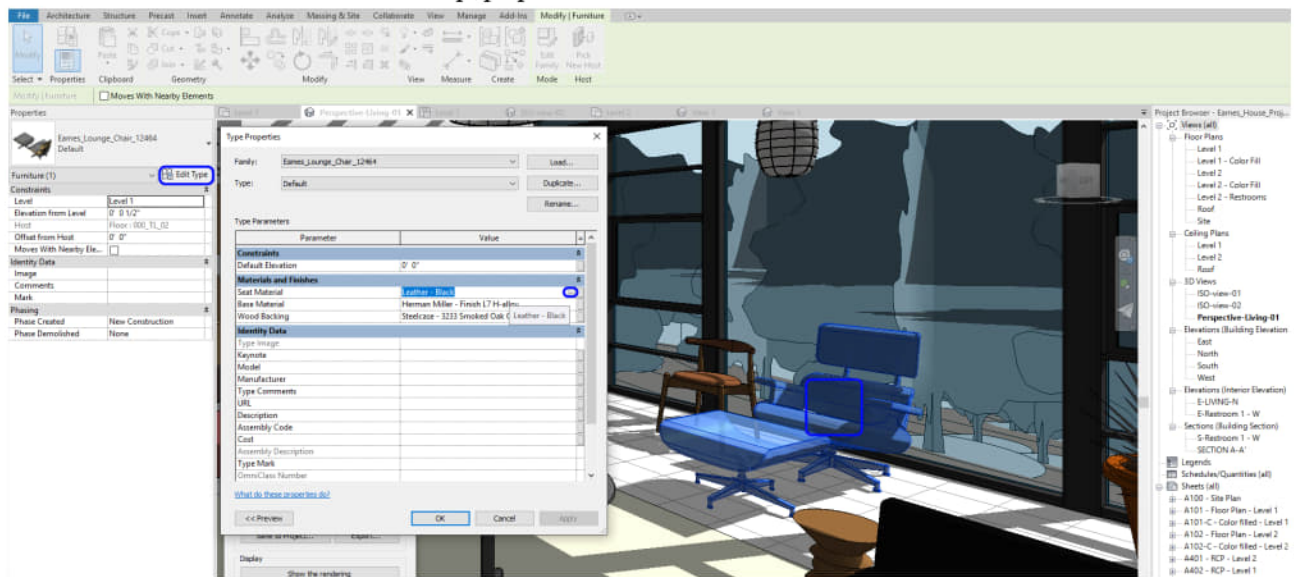
- Recessed indirect lighting
 - [Recessed Ceiling with Light in Revit * Light Tutorial *](#)

(CO 7) Add/Edit materials

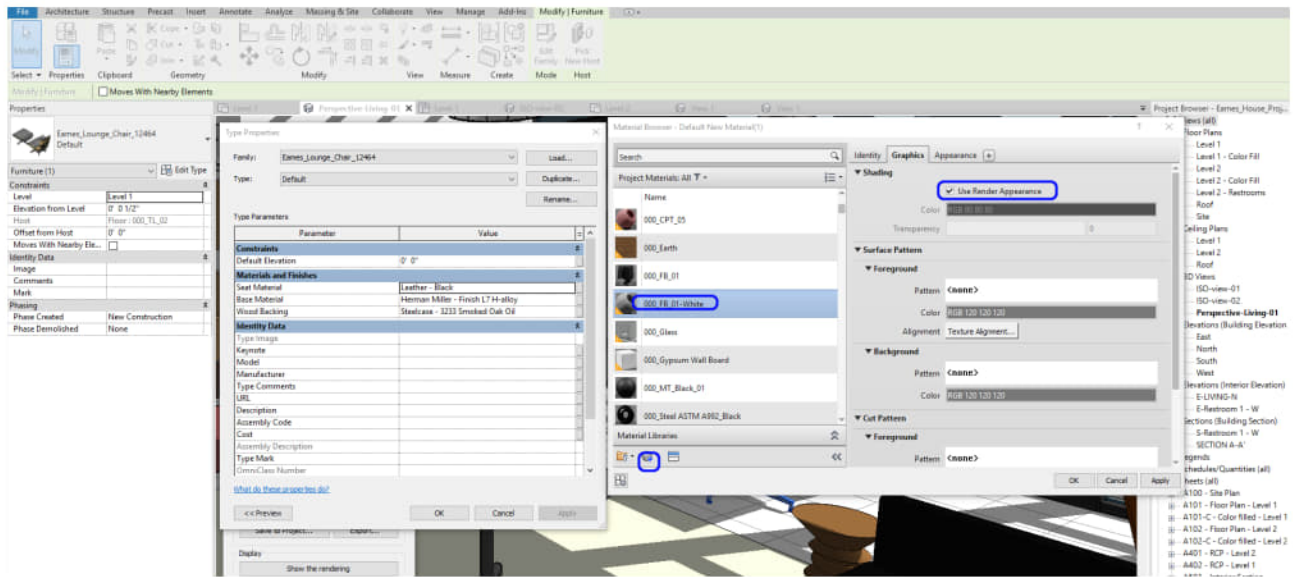
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Apply materials in Family type

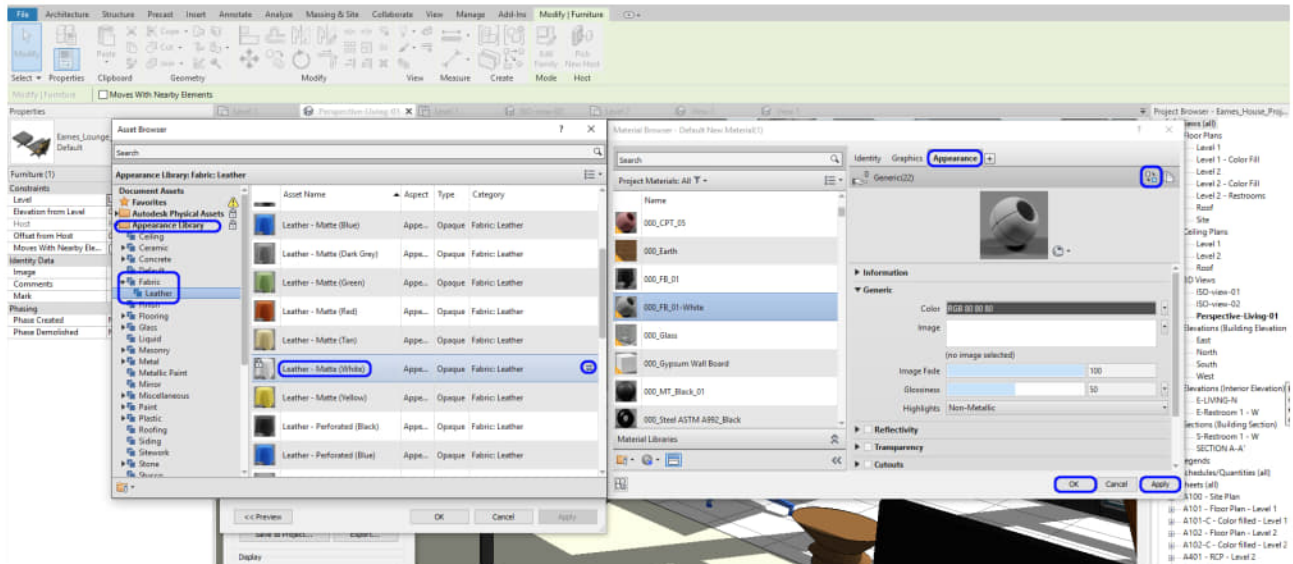
- [STEP 1] Click an object that you want to add or change materials
- [STEP 2] Click [Edit Type] to change Materials and Finishes
- [STEP 3] Duplicate if needed
- [STEP 4] Click Material Value (Not all objects have this option, but many family files do this option) to add or modify the material. Then Material Browser will pop up



- [STEP 5] If you already made a material you want to use, please select the material and click ok to finish
- [STEP 6] If you want to make a new material, click Create New Material
- [STEP 7] Mouse right-click and click to [Rename] the new material [Ex. 000-FB-01-White]



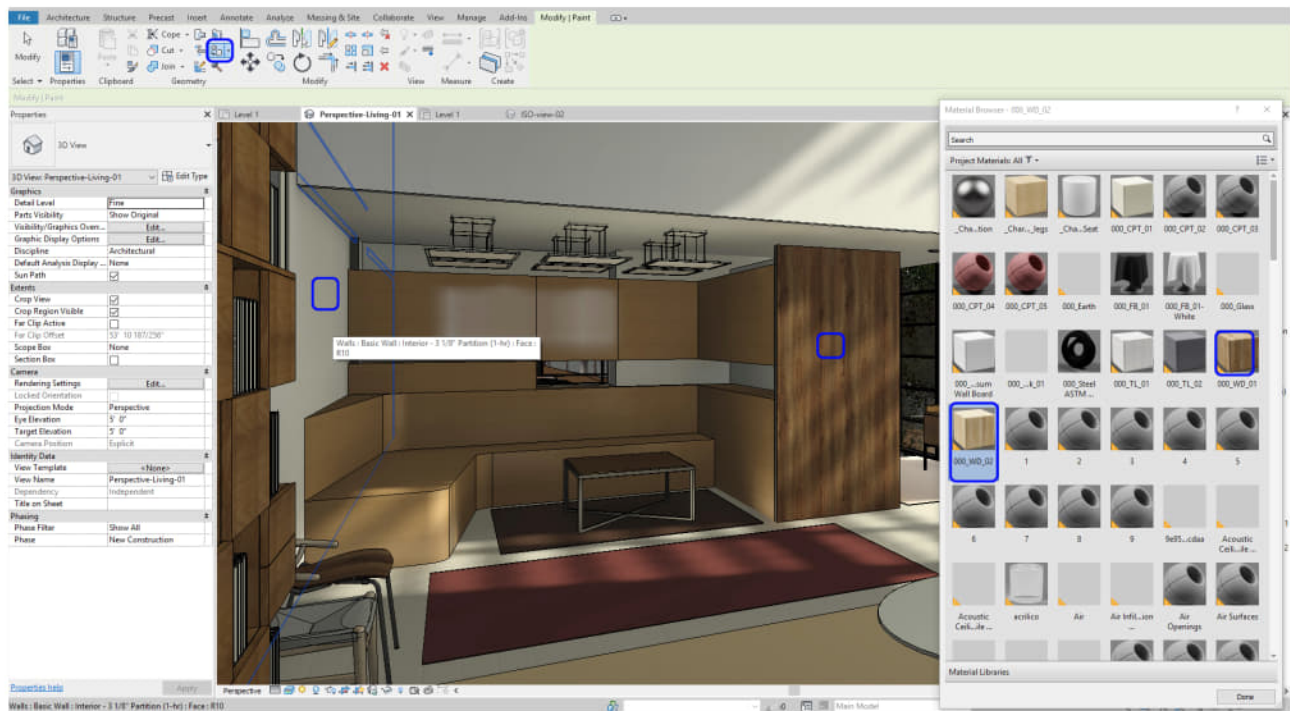
- [STEP 8] You can change Identity, Graphics, and Appearance. To add material from Revit Library, click Appearance, Click [Replace] this Asset. Asset Browser will pop up
- [STEP 9] Search a material from Appearance Library
- [STEP 10] Click a replace icon



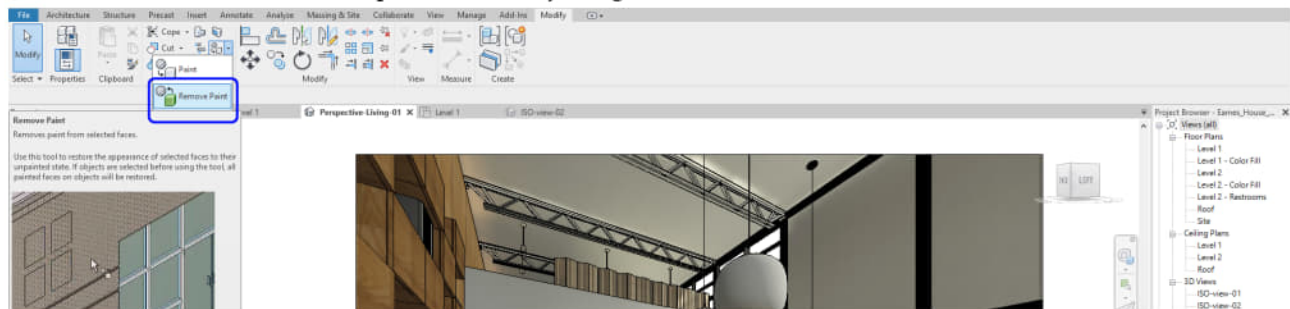
- [STEP 11] Click Information, name change if this is a unique material
- [STEP 10] Click ok to apply

Painting materials (For Walls, Floors, and Ceilings)

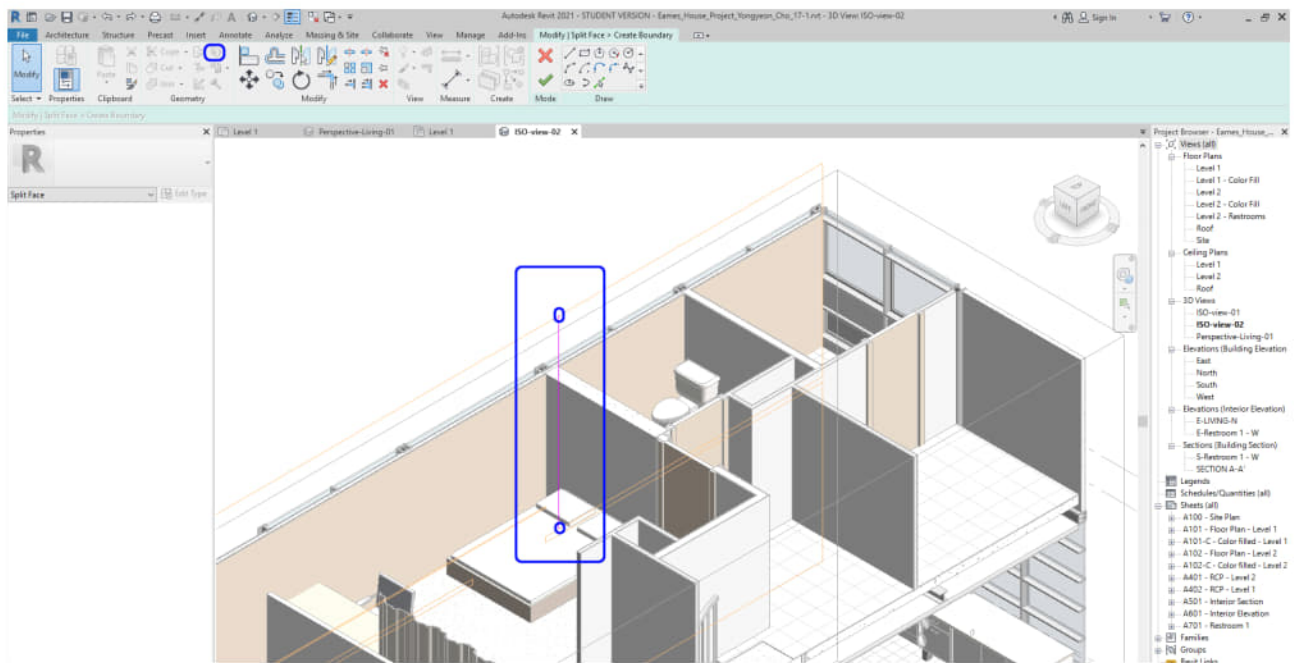
- [STEP 1] To use [Paint] tool, click [Paint] from the [Modify] tab
- [STEP 2] Click a material that you want to use from Material Browser. If you do not find the material that you want to use in the Material Browser, you must add a new material first and then apply the paint tool
- [STEP 3] Click a face that you want to change, use the Tab key to select right face



- [STEP 4] You also can remove the paint material by using the Remove Paint tool



- [STEP 5] Use [Split Face] (If the surface needs to be separated), Click [Split Face] from [Modify] tab
- [STEP 6] Click the elements (Wall, Floor, Ceiling) you want to split face. You may need to use the TAB key to select the elements
- [STEP 7] Draw a closed line to divide the surface. You may need to open an elevation view, a floor plan, or a ceiling plan to draw the lines.

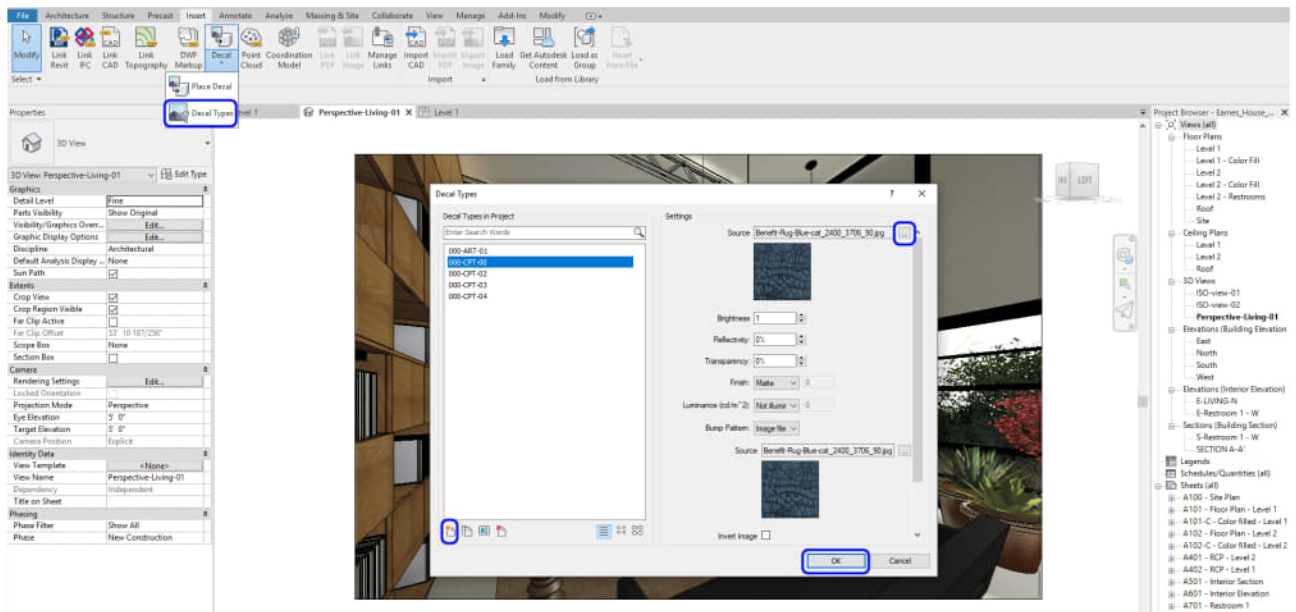


- [STEP 8] Click Green checkmark to finish
- [STEP 9] Then use the Paint tool to apply the material

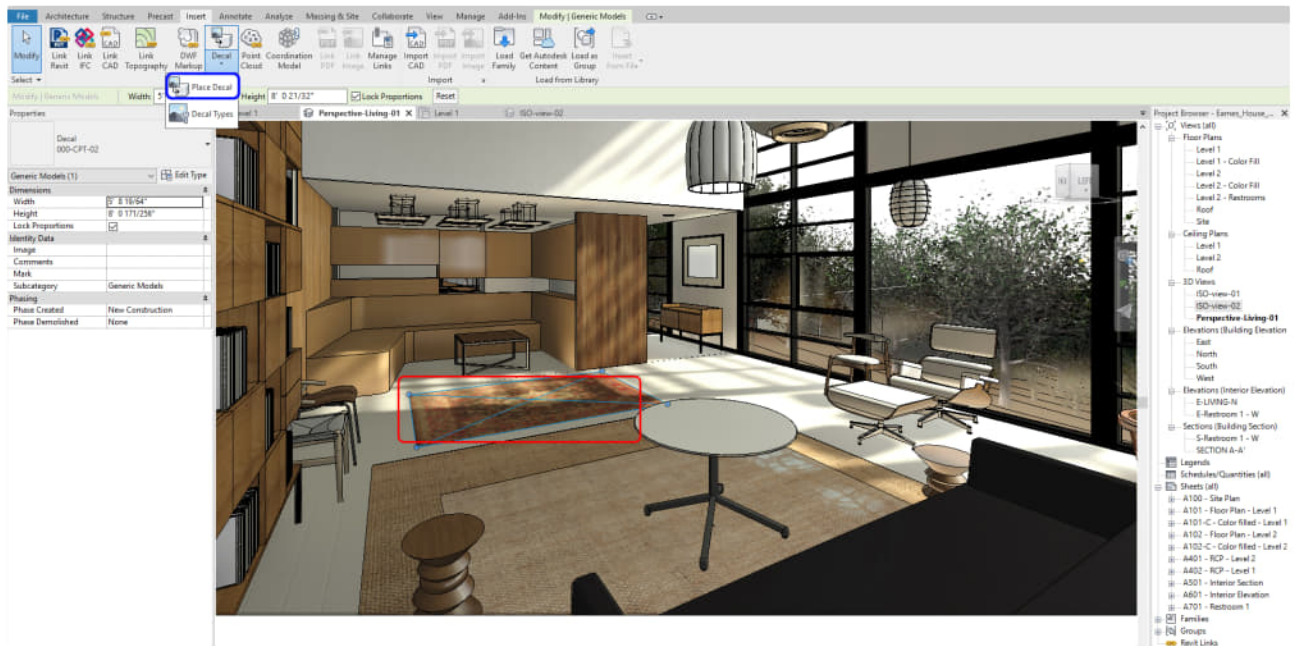


Decal (Flat Surface – Carpet or pictures)

- [STEP 1] To create Decal, click Decal Types from the Insert tab
- [STEP 2] Please create a new Decal, Name it, insert the image, and click ok



- [STEP 3] To place a Decal, Click Place Decal from the insert tab
- [STEP 4] Place on a surface
- [STEP 5] Change size and location from views

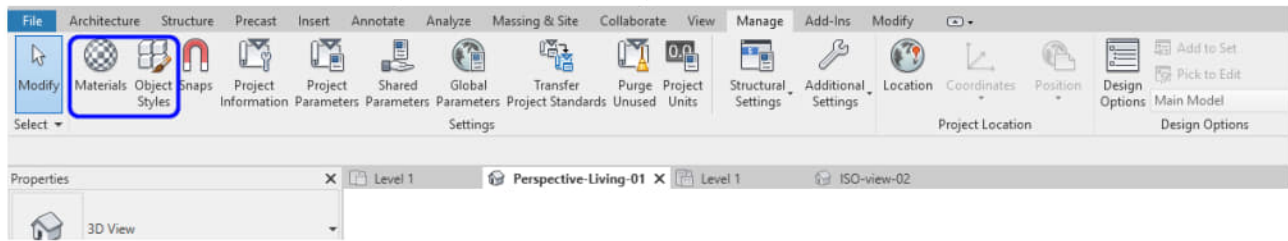


(CO 8) Render material managements

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Manage material

- [STEP 1] Click [Materials] from [Manage] tab
- [STEP 2] In this [Material Browser], you can add and modify materials



- [STEP 3] If you need to apply an imported object (CAD or Sketchup), use [Object Styles]

SAVE the file before closing the application.

Save in a different location for the backup (e.g., a cloud folder)

References

Autodesk.Help. (2019, November 17). 3D Views. Retrieved October 22, 2020, from <https://knowledge.autodesk.com/support/revit-products/learn-explore/caas/CloudHelp/cloudhelp/2020/ENU/Revit-DocumentPresent/files/GUID-B3354433-8ED8-4DA7-8078-C2514195BEB5-htm.html>

Airfal. (2014, January 15). Recommended light levels for common types of working activities. Retrieved October 23, 2020, from <https://www.airfal.com/en/industrial-lighting/recommended-light-levels-common-types-of-working-activities-2875/>

Balkan Architect. (2018, January 3). Recessed Ceiling with Light in Revit * Light Tutorial*. Retrieved October 23, 2020, from <https://www.youtube.com/watch?v=4VFK-KEOMZc>

Chapter 18. Create Revit rendering, Revit clouding rendering

Session Objectives

Upon completing this session, students will be able to:

- (CO 1) Insert other types of files – Sketchup, AutoCAD
 - (CO 2) Advanced render settings
 - (CO 3) Edit render qualities
 - (CO 4) Understand and make cloud renderings
 - (CO 5) Save Rendering outputs
-

Session Highlights

At the end of the session, students can create the graphics below.



(CO 1) Insert other types of files – Sketchup, AutoCAD

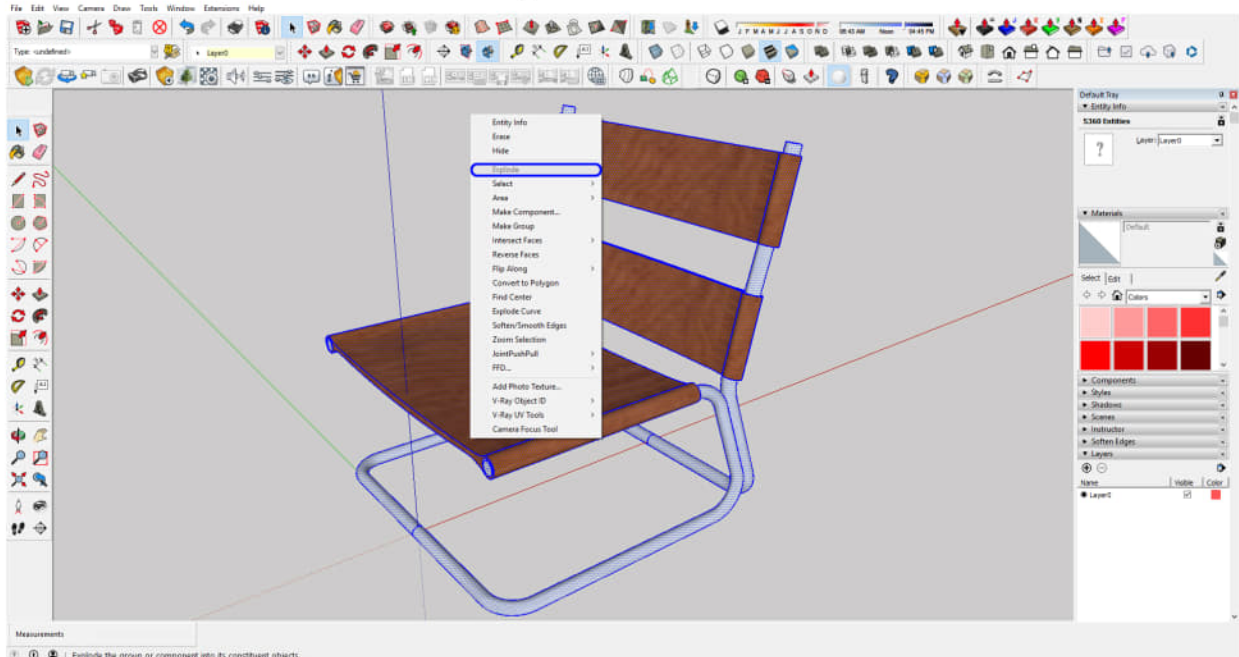
A YouTube element has been excluded from this version of the text. You can view it online here: <https://iastate.pressbooks.pub/visualgraphiccomm/?p=108>

Although many manufactures provide Revit Family and Revit also provide numerous libraries, designers always seek new models and objects for their design and renderings. Sketchup 3D Warehouse provides a great library from designers and manufacturers. I added three Video tutorials to import the Sketchup model to Revit Family for your reference. You may try.

- Sketchup Model to Revit
[Importing SketchUp Files into Revit Tutorial](#)
- Sketchup Model to Revit – Material changes
[Revit Architecture | Convert SketchUp Models Into Revit\(With Materials\)](#)
- Complex 3D max Model to Revit – Hide the complex model lines in Revit (Super advanced level)
[AMAZING REVIT 1 – FROM 3DS MAX TO REVIT WITHOUT VIEWING TRIANGLES EDGES](#)

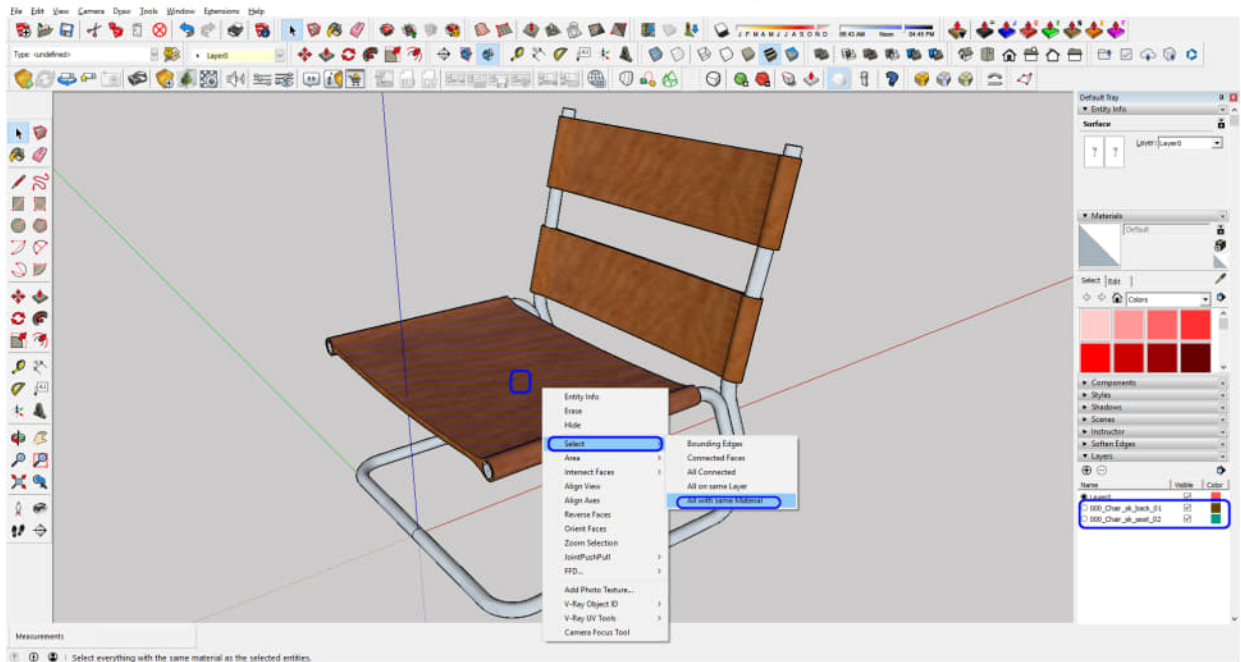
Sketchup model to Revit with updating material changes

- [STEP 1] Sketchup Model to DXF file
 - Open the Sketchup model in Sketchup, or your download the furniture model from a 3D warehouse. In this process, you may need Sketchup Pro.
 - Create layers by material. If you have 3 materials, create 3 layers with unique names (e.g. 000_Chair_sk_seat_01, 000_Chair_sk_leg_01, 000_Chair_sk_base_01)
 - The entire model until there is nothing left to explode.



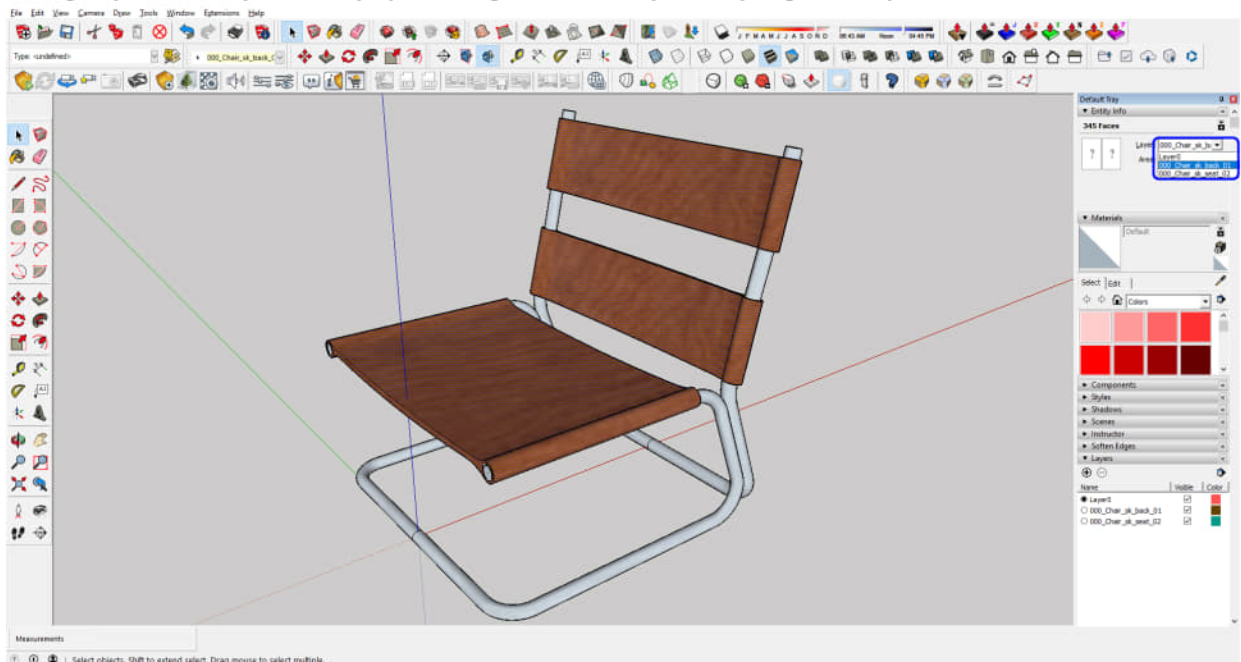
Modeling credit: Vojislav N. downloaded from 3D warehouse

- Select one material > Mouse right click and Select > All with the same material



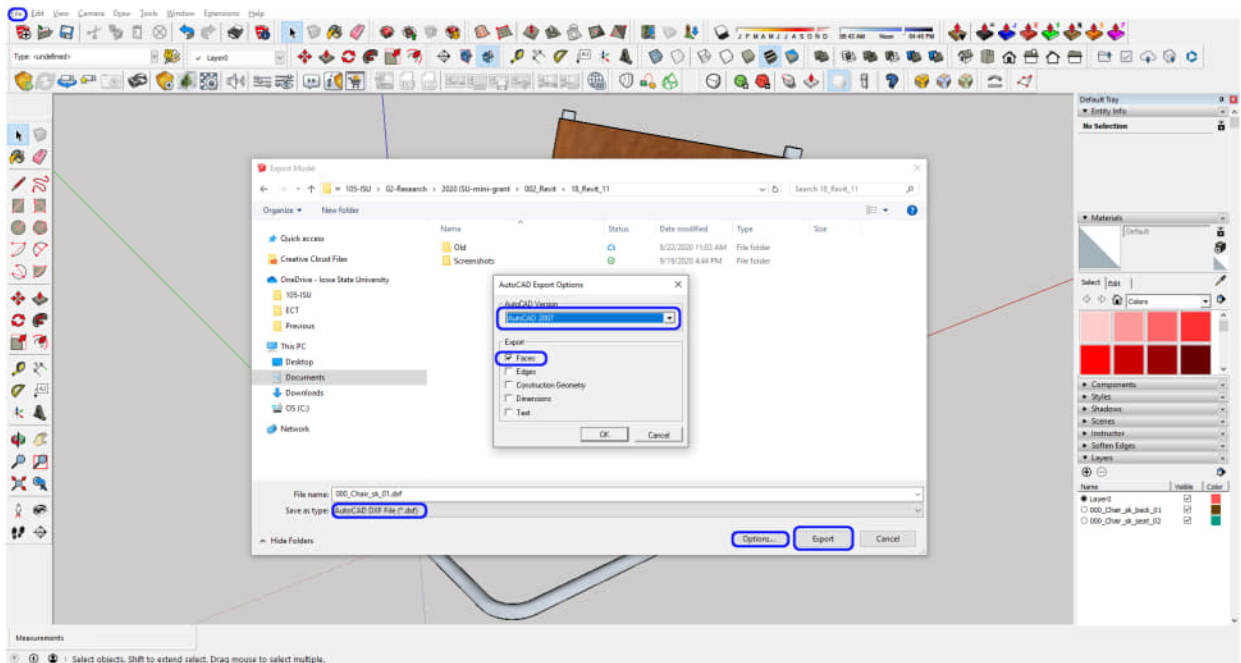
Modeling credit: Vojislav N. downloaded from 3D warehouse

- Change layer in [Entity Info] Tray by selecting the desired layer that you previously made



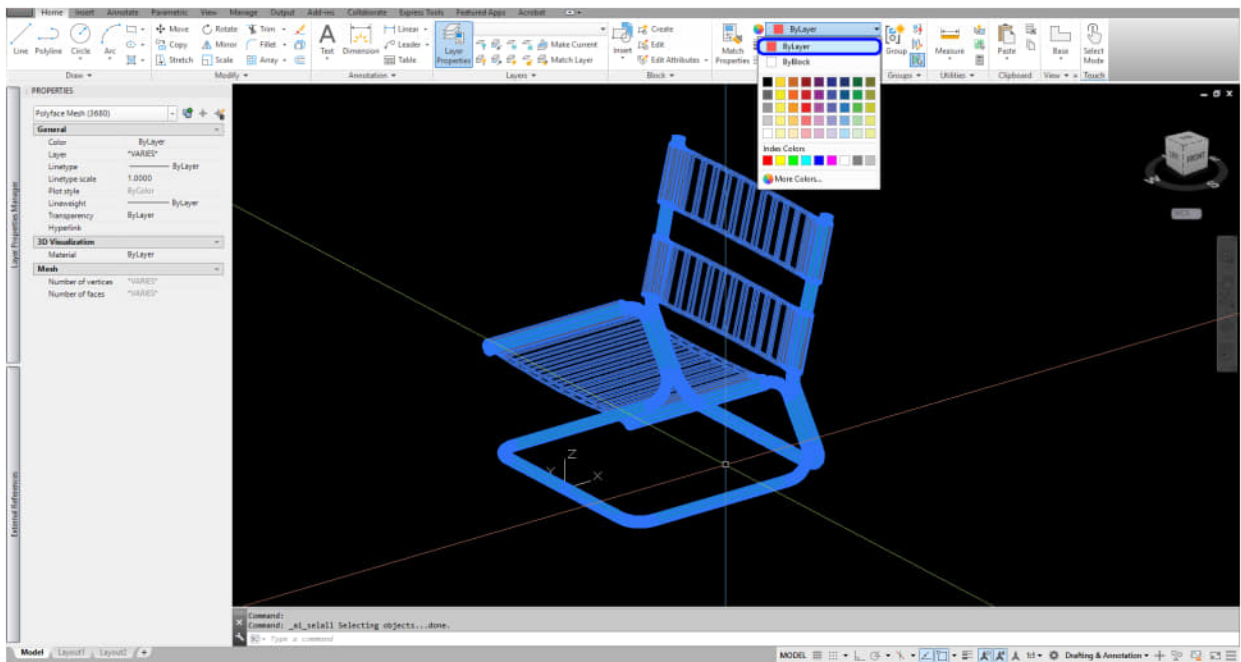
Modeling credit: Vojislav N. downloaded from 3D warehouse

- Do the same procedure (material selection and layer change) for the other materials
- Export > 3D model > Select DXF file > Click option > Select only Faces > Version 2007> OK > Export



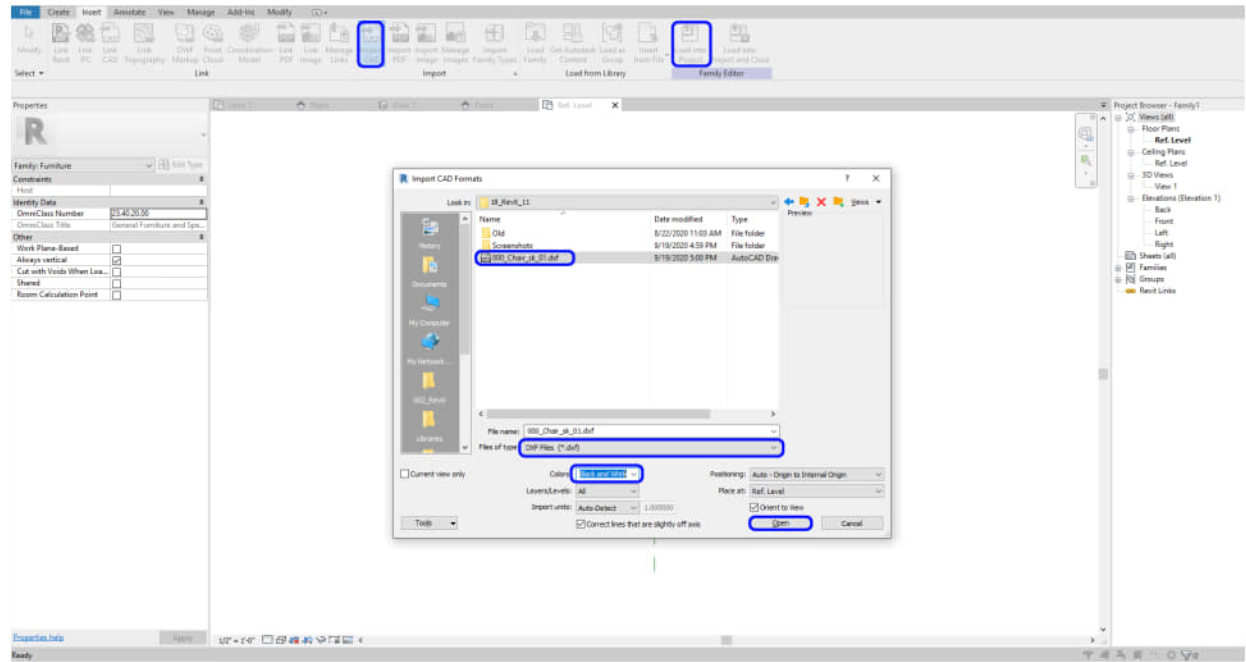
Modeling credit: Vojislav N. downloaded from 3D warehouse

- [STEP 2] DXF file Properties change
 - Open AutoCAD
 - Open the DXF file in AutoCAD. It will show in a 3D view
 - Select all lines by pressing [Ctrl+A]
 - Change Object color from [Home] tab > Color [By Layer]
 - Save the DXF file with Version 2007

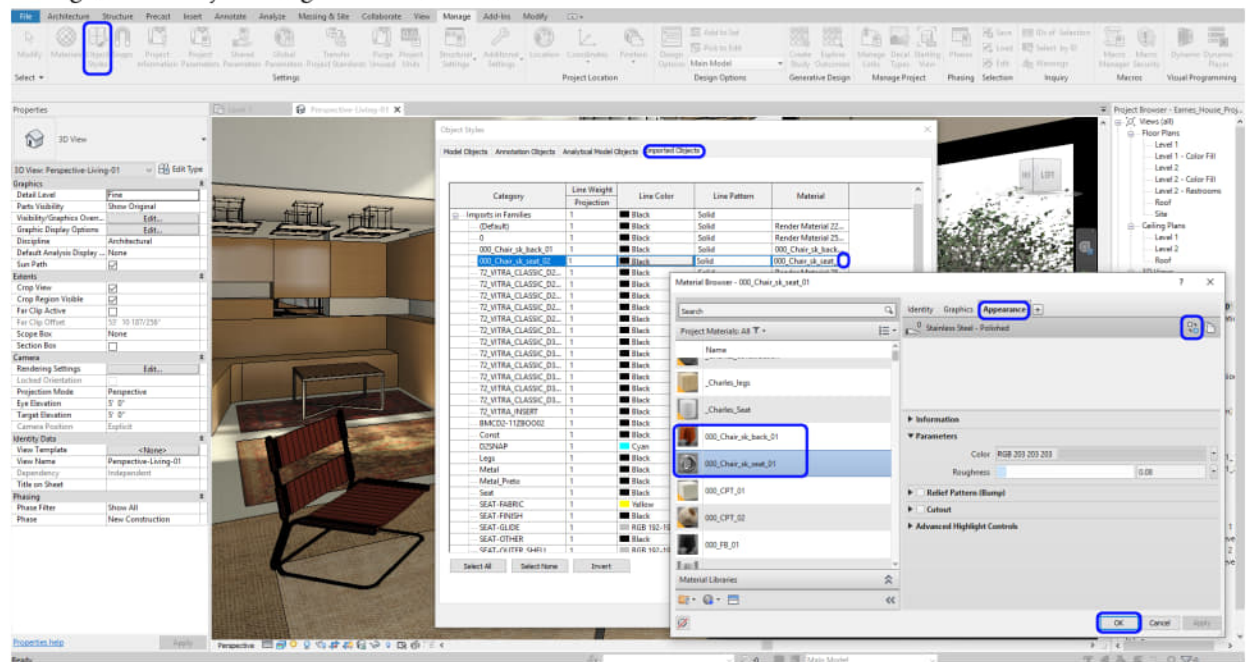


- [STEP 3] Import DWF file (Furniture) to Revit
 - File > New > Family > Select Family Template file (Furniture)
 - Insert tab > Import CAD > Change files of type to DXF > Select the file > Click [Open] > Save the family file > Load

into Project



- [STEP 4] Change materials for an imported file in the Revit project file
 - Manage tab > Object Style
 - Click Imported objects
 - Change material by clicking the material slot



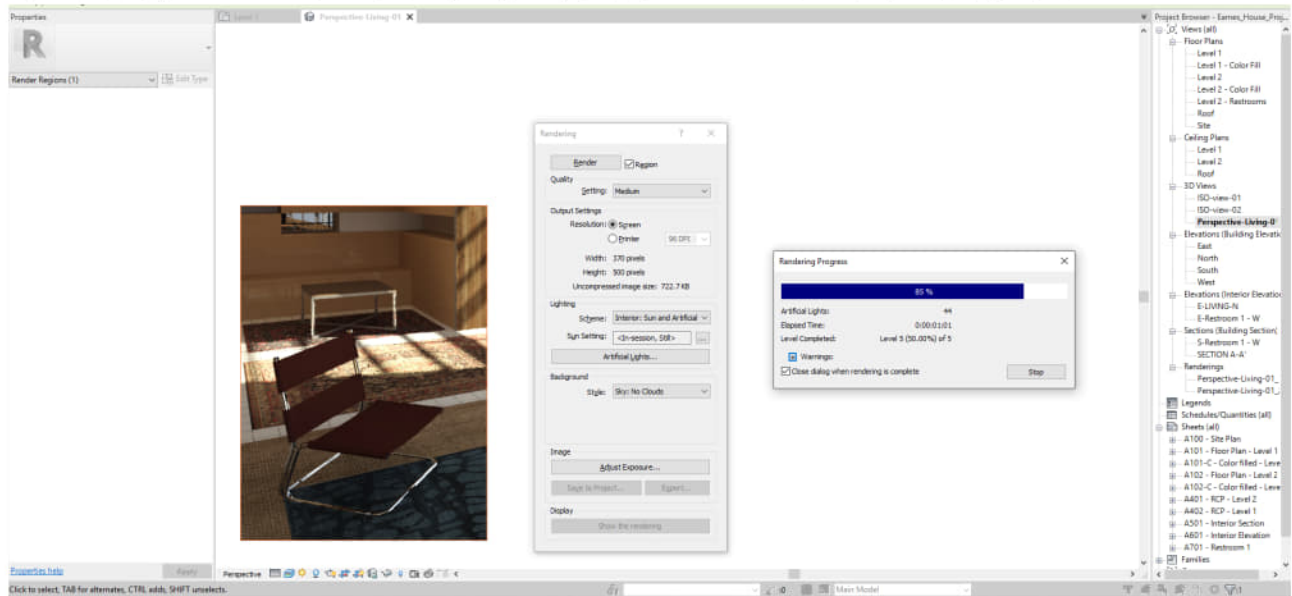
(CO 2) Advanced render settings

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Region renders

The Region render function saves time while rendering

- [STEP 1] Check Region on Render Setting
- [STEP 2] You will see RED square on the perspective view. You can adjust the box that you wish to render



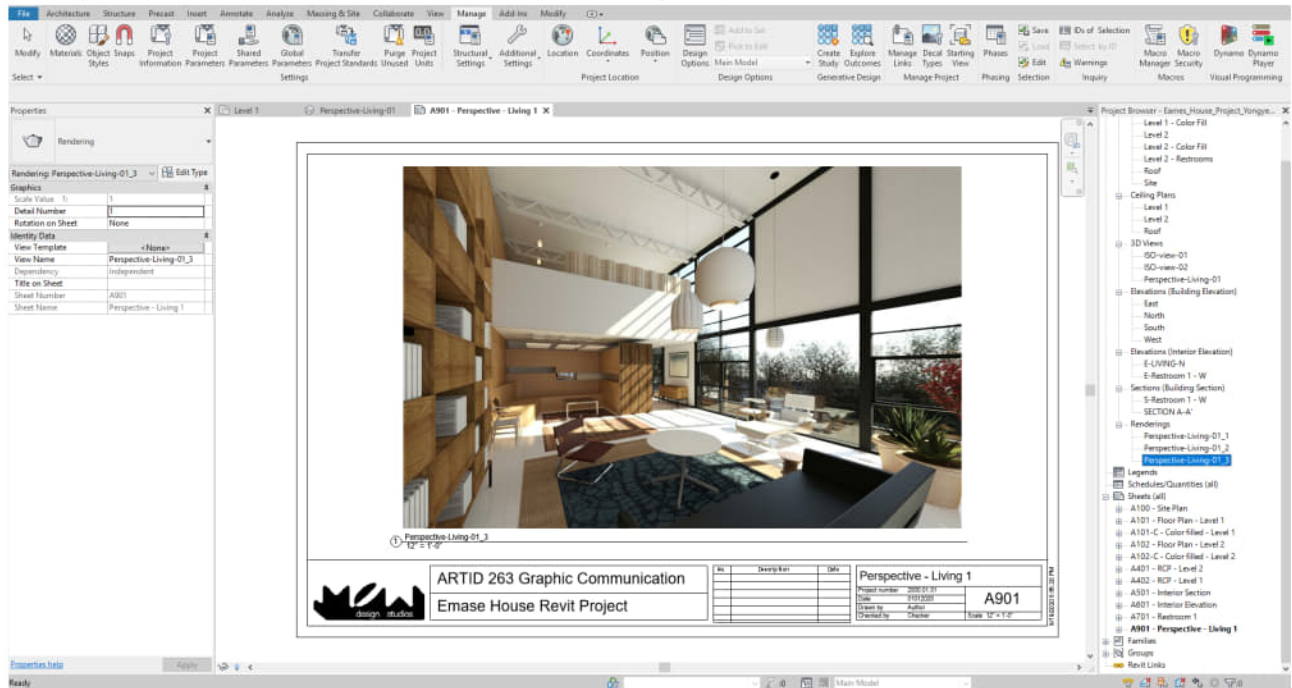
Output Settings

The default setting is Screen, which shows the entire screen size. If you need a perspective view for presentations or print, your rendering size should be a different setting

- [STEP 1] Click Print on Render Settings
- [STEP 2] Change the resolution
 - 75 DPI – Screen presentation
 - 150 DPI – Regular print size
 - 300 DPI – Fine print size
 - 600 DPI – Not used
- [STEP 3] If you need to change image size, you can adjust the width and height on Crop Region Size

Render image

- [STEP 1] After your rendering process is done, you can save the image in the Revit project file for your future use. You can find the saved rendering under the project browser by clicking [Save to Project] on the [Rendering settings] window. You can include the rendered images on the sheets with a titleblock.



- [STEP 2] You can save the rendering with different formats by clicking [Export] under the image on [Render settings]. Typically, save JPG for photoshoping.

Render Background

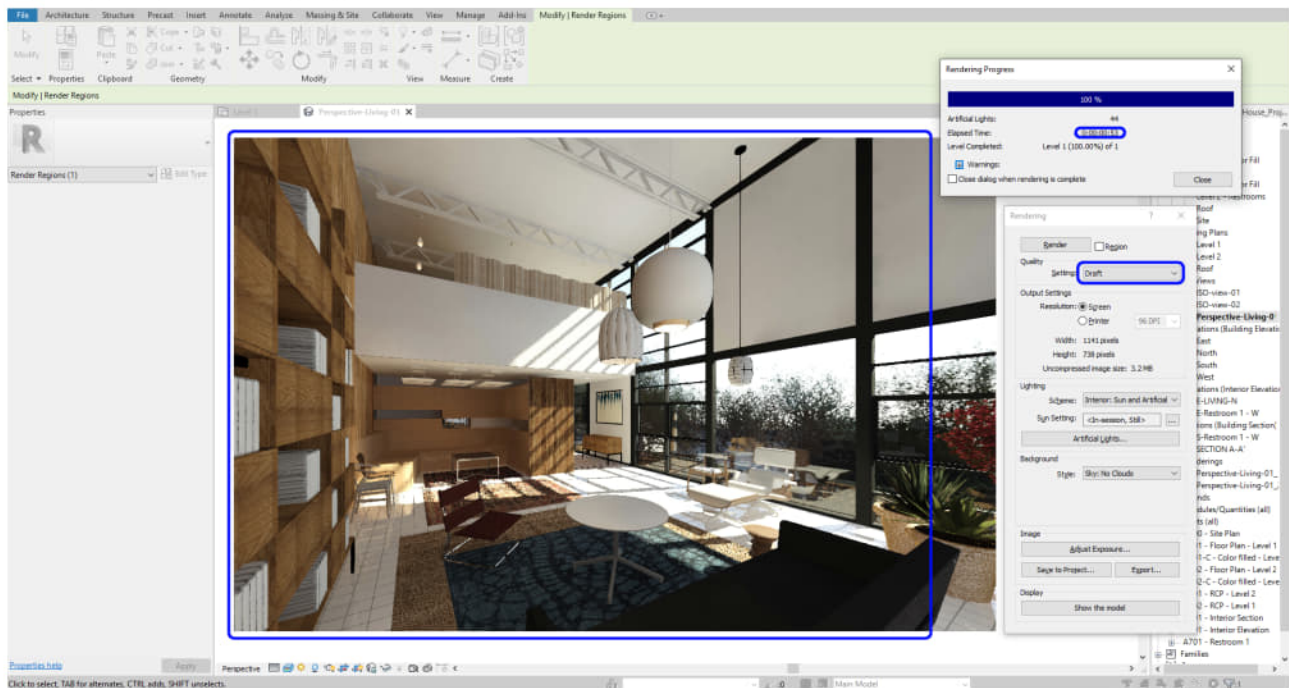
- [STEP 1] You can add a background for your render [background]
 - The default setting can be Revit Sky, which can correspond with a specific date and time.
 - You are also able to add an image as a background.
 - You can set as a Transparent image. The file type must be PNG or TIFF file to save a transparent image for the background.

(CO 3) Edit render qualities

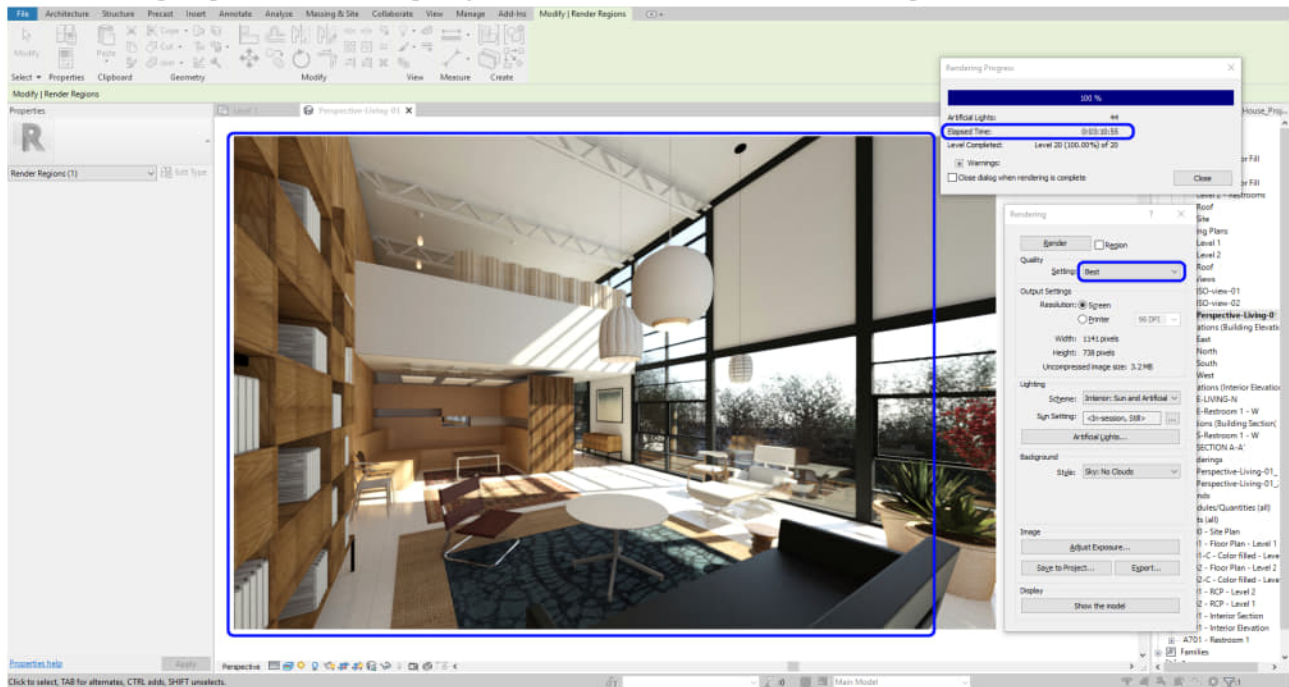
A YouTube element has been excluded from this version of the text. You can view it online here: <https://iastate.pressbooks.pub/visualgraphiccomm/?p=108>

Change the render quality

- Draft – for a test render, but not recommended, because of lighting quality, reflection, bump, and refraction on finishes
Draft-Render time 1min



- Med – is recommended for a test render. Not the best quality, but it is acceptable
- High – is recommended for a final render because of time and quality
- Best – Although it produces the best quality, it is not recommended due to rendering time. Best-Render time 2hrs



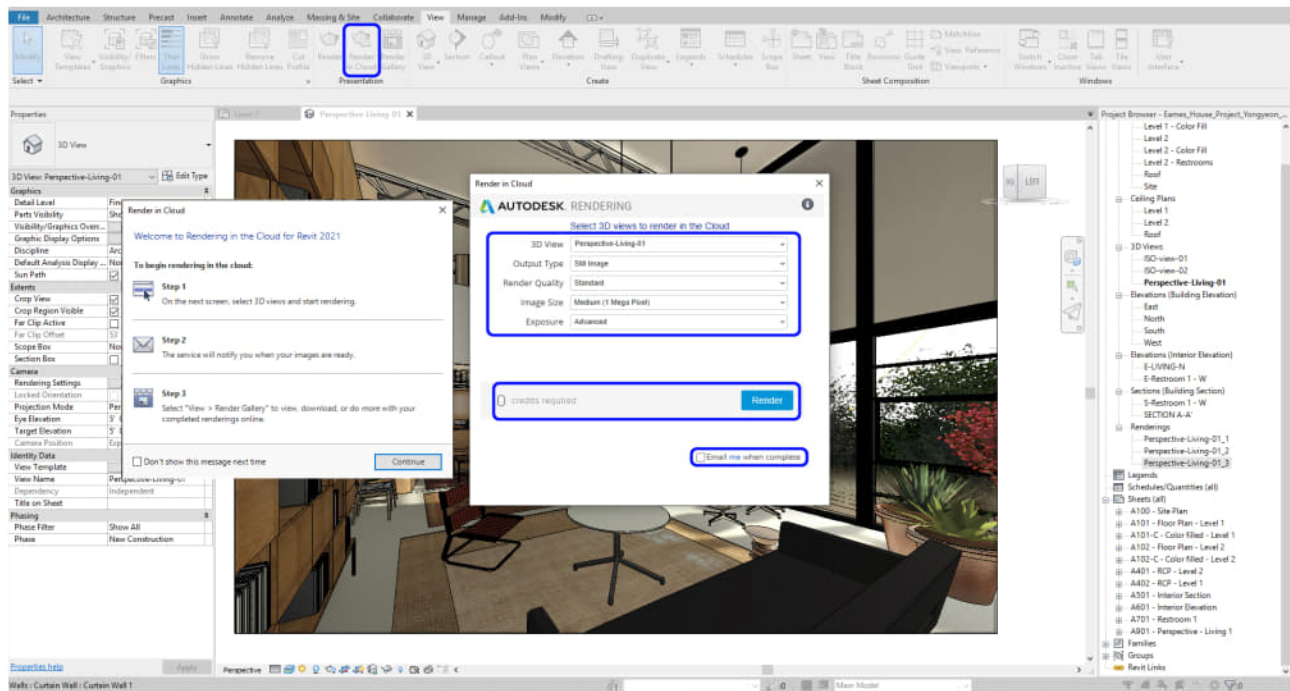
(CO 4) Understand and make Cloud Renderings

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Cloud rendering

Autodesk provides users with Cloud rendering. Design firms have great hardware to quickly render but Autodesk also provides its servers for rendering. The render quality is a bit better and faster than Revit rendering. Cloud rendering is a paid service, however, for educational purposes, it is offered for free.

- [STEP 1] Once your render settings are what you want to produce, click [Render in Cloud] from [View] tab, under [Presentation] panel
- [STEP 2] If you are a first time user of Cloud Render, you must Sign-in to an Autodesk account (email, PW, text code required)
- [STEP 3] Double-check your view name, output type (Still image), Render Quality, Image Size, Exposure
- [STEP 4] Click email when complete
- [STEP 5] Click Render

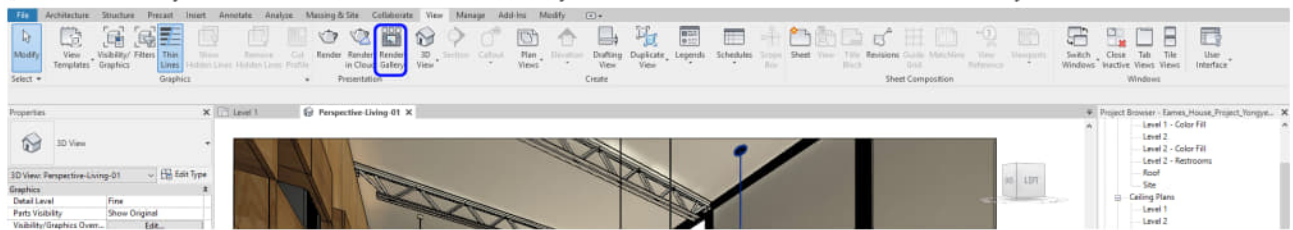


(CO 5) Save Cloud Rendering outputs

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Get rendering outputs

- [STEP 1] Check the render results
- [STEP 2] Once you received the notification email, you can check the results in Render Gallery



- [STEP 3] The Render Gallery website will open, click View Project
- [STEP 4] Click the rendered thumbnail image > Click [Post-Processing] to change expose level and color balance

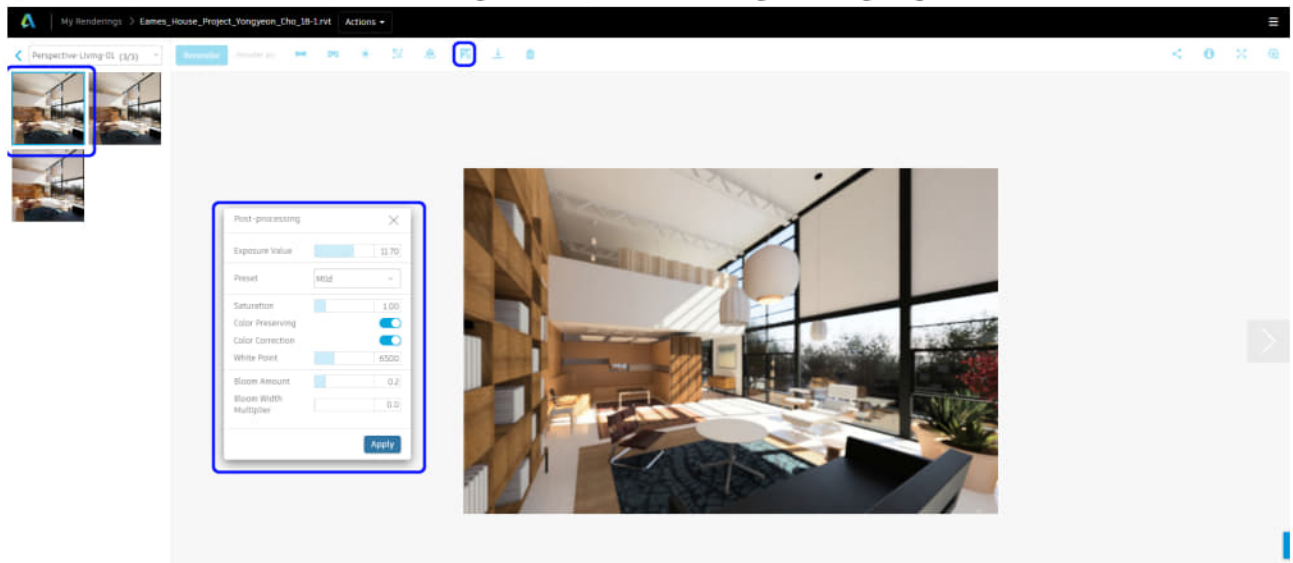


image credit: Autodesk cloud rendering

- [STEP 5] Click Download Icon > Click JPEG
- [STEP 6] If you need Transparent Background (for photoshop), click PNG

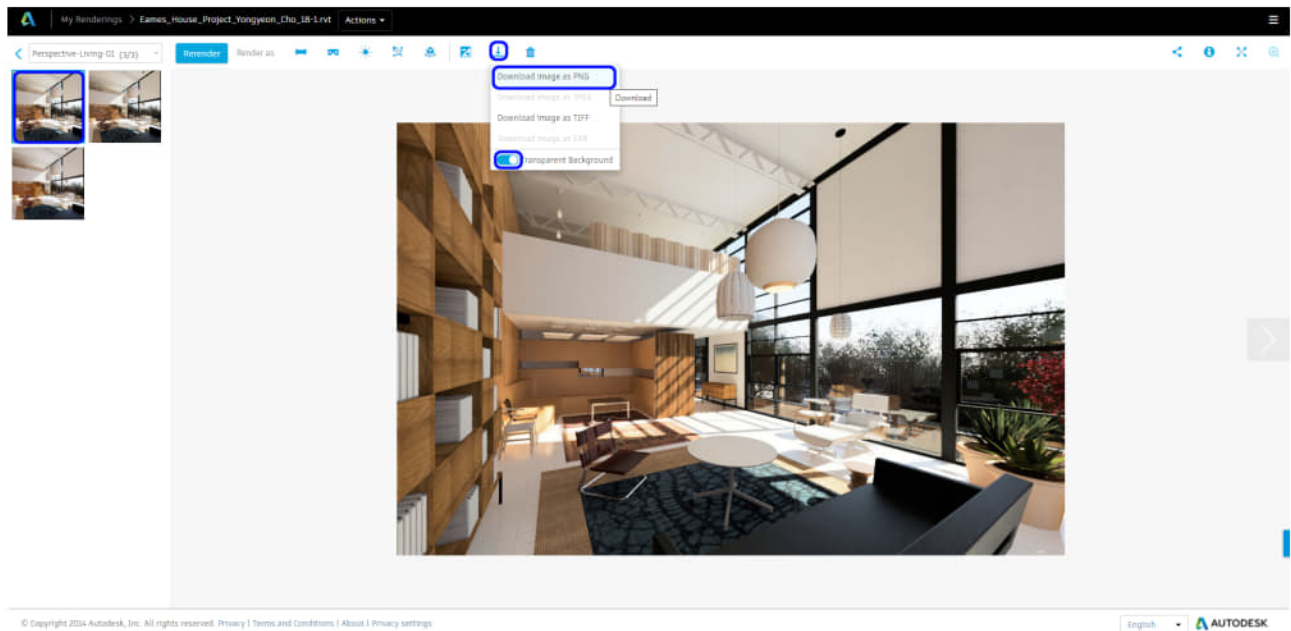


image credit: Autodesk cloud rendering

Revit rendering vs. Cloud rendering

Revit Rendering



Render time
Longer
Hardware use
Your hardware
Control – Image size
Fully controllable
Control – Lighting
Manual

Revit Cloud Rendering



Vary (shorter)
No hardware required
Few options
Automatic

SAVE the file before closing the application.

Save in a different location for the backup (e.g., a cloud folder)

References

Balkan Architect. (2018, April 12). Importing SketchUp Files into Revit Tutorial. Retrieved October 23, 2020, from <https://www.youtube.com/watch?v=4VFK-KEOMZc>

M.T.H Revit Tutorials. (2018, May 4). Convert SketchUp Models Into Revit (with Materials). Retrieved October 23, 2020, from https://www.youtube.com/watch?v=k_1g3077jxI

Pedroeron. (2011, Oct 29). From 3ds Max to Revit without viewing Triangles edges. Retrieved October 23, 2020, from <https://www.youtube.com/watch?v=ZghL7hRM-gM>

PART THREE. ENSCAPE

[Chapter 19. Introduction of Enscape](#)

- Understand what is Enscape
 - Control/navigate Enscape
 - Create views
 - Add model backgrounds
 - Add Entourages
 - Render images
-

[Chapter 20. Edit Model and Materials](#)

- Understand workflow, name of the material
 - Use 3D Grass, Water, Reflective, textures
 - Change to Architecture Maquette (*White model, Outline*) & Light mode
 - Create Orthometric views
-

[Chapter 21. Edit Lighting and Create Video](#)

- Save, and load presets
 - Set and adjust artificial lightings
 - Create a walk-through video
-

[Chapter 22. Edit Render outputs](#)

- Export enlarged jpg files (Original, ID) for print
- Create Executable file
- Create Render Panorama image

Chapter 19. Introduction to Enscape

Session Objectives

Upon completing this session, students will be able to:

- (CO 1) Understand what is Enscape
 - (CO 2) Control/navigate Enscape
 - (CO 3) Create views
 - (CO 4) Add model backgrounds
 - (CO 5) Add Entourages
 - (CO 6) Render images
-

Session Highlights

At the end of the session, students can create the graphics below.



Lecture Contents

(CO 1) Understand what Enscape is

A YouTube element has been excluded from this version of the text. You can view it online here: <https://iastate.pressbooks.pub/visualgraphiccomm/?p=110>

Enscape is a commercial real-time rendering and virtual reality “plug-in” for Revit, Sketchup, Rhino, ArchiCAD, & Vectorworks.

It is mainly used in the AEC industry and is developed and maintained by Enscape GmbH, founded in 2013 and based in Karlsruhe, Germany.

Enscape features. Information from: [Enscape website](#)

- [FEATURE 1] Real-time walk-through
CAYAS Architects was able to save 75% of their time to produce 3D visualizations by using Enscape
- [FEATURE 2] Virtual Reality
“A key add-in for Revit and Rhino workflow through to VR.” **Forster+Partners**
“Now, with Enscape, our clients are amazed with what we show them. They are able to actually experience their project before it is even built. Enscape helps us to do a better job.” **HMFH Architects**
- [FEATURE 3] Export functions
“Design is always an iterative process, but Enscape has made it a dynamic one” **Turner Fleischer**
 - Batch export
 - 360-degree panorama
 - Video exports
 - Standalones – an EXE file
- [FEATURE 4] Various visual settings
 - Clouds and backgrounds
 - Time of day change
 - White model mode
 - Light analysis mode
 - Volume fog effects
 - Depth of Field option
 - Ortho views
 - BIM information
- [FEATURE 5] Asset library – more than 1000 options

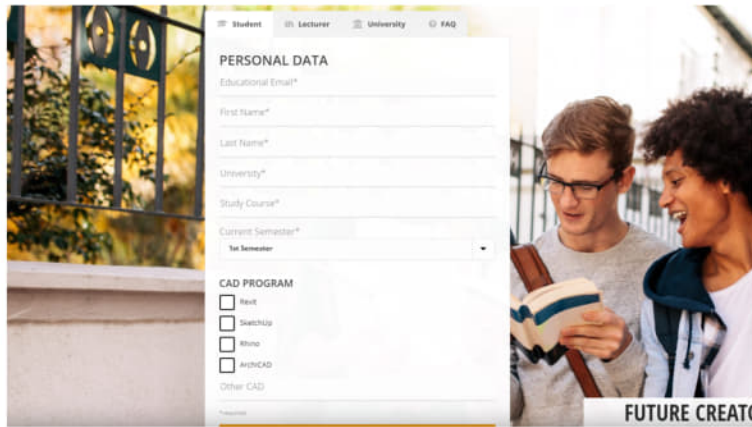
Other architectural rendering applications

- Vray
- Lumion 3D
- Twinmotion
- Corona

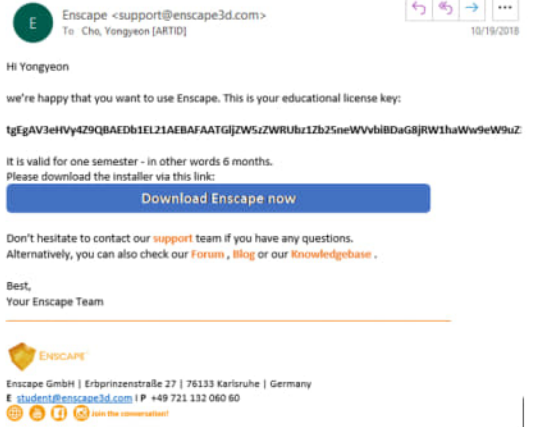
Read this article to learn more about other rendering applications in [this link](#).

Download and install Enscape

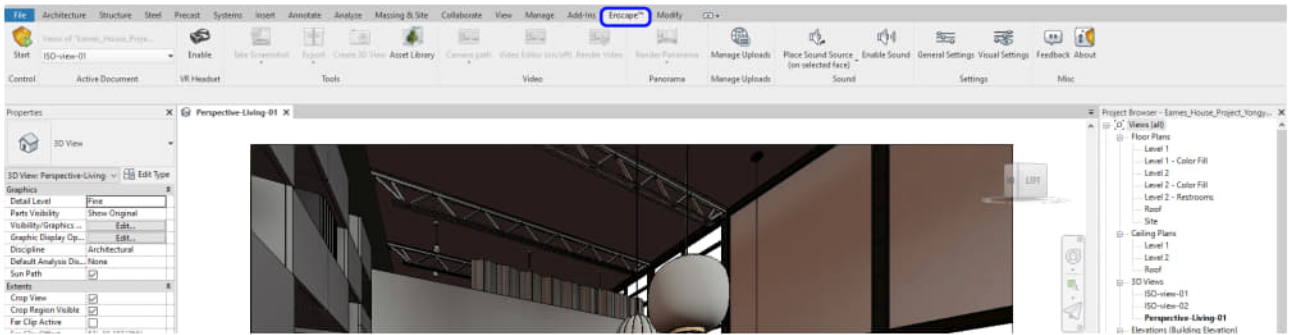
- [STEP 1] Request Enscape educational license form [the link](#)



Your Educational License



- [STEP 2] Double click the downloaded Setup file.
- [STEP 3] Enscape requires four pre-installed programs, and you must install the necessary application (all free) to run Enscape.
- [STEP 4] In an advanced setup, you can install Enscape only for Revit. If you would like to use Enscape Sketchup and Revit, you can select all (Default setting).
- [STEP 5] Once the installation process is completed, open Revit. Note. Enscape is not stand-alone software. Enscape is a plug-in application in Revit, Sketchup, and Rhino. Therefore, you must have your application open in order to use Enscape.

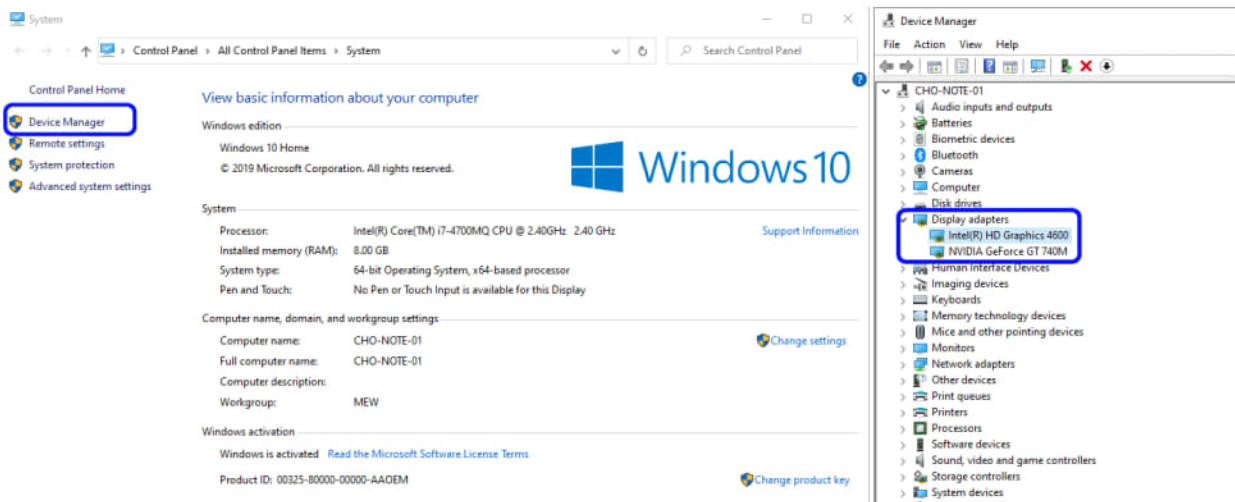


- [STEP 6] Once you click Enscape Start, Enscape will ask for the license code to activate. Please copy and paste the codes from your email and activate it.

Required Software information can be found in [this link](#).

System requirements information can be found in [this link](#)

- To check your graphic drivers (Windows)
 - Open your "This PC" on your Desktop
 - Mouse "right-click" > Click "Properties" > Click "Device Manager" on the left side of the panel > Find "Display adapters" and see the graphic drivers

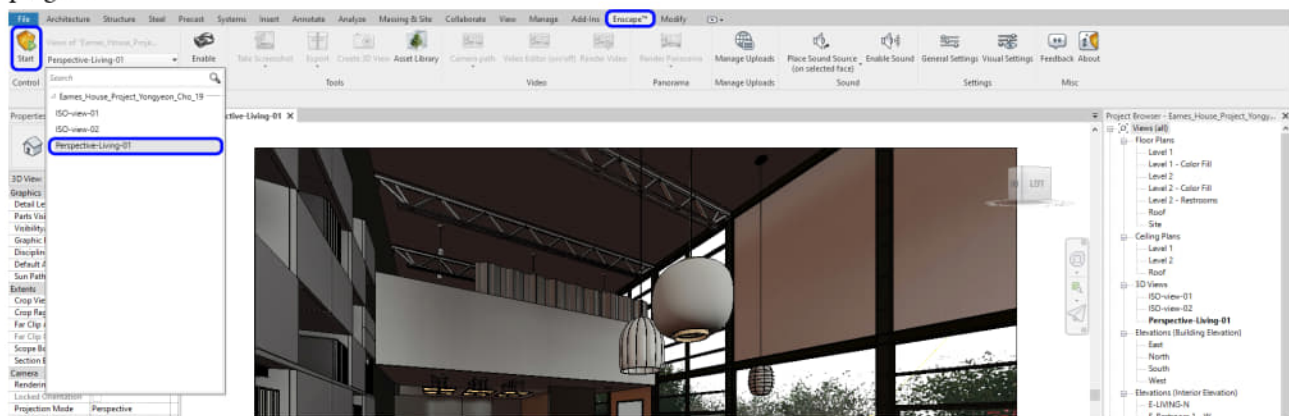


(CO 2) Control/navigate Enscape

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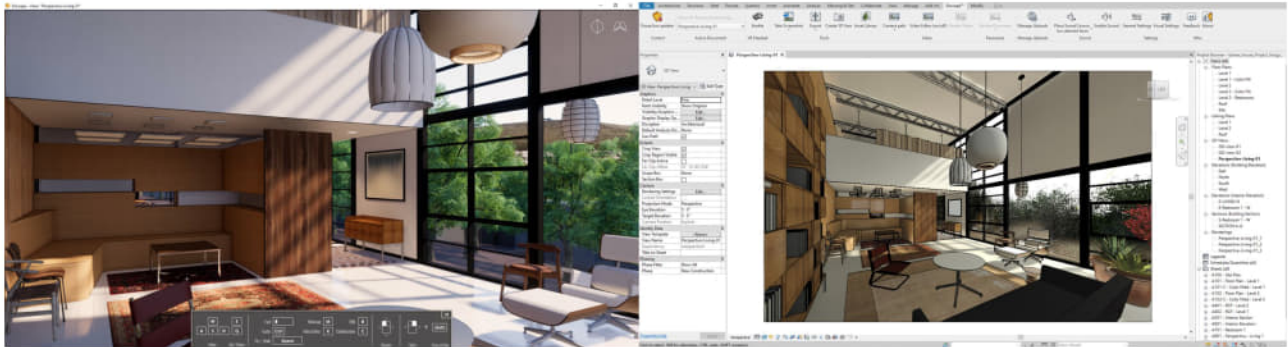
Open your project file and open a perspective that you want to make a rendered image in Enscape. **Start Enscape**

- [STEP 1] Click [Enscape] tab
- [STEP 2] Select the view that you would like to start on [Active Document] panel
- [STEP 3] Click [Start] on [Control] panel. Then it would be best if you waited a few seconds or minutes to launch the plug-in

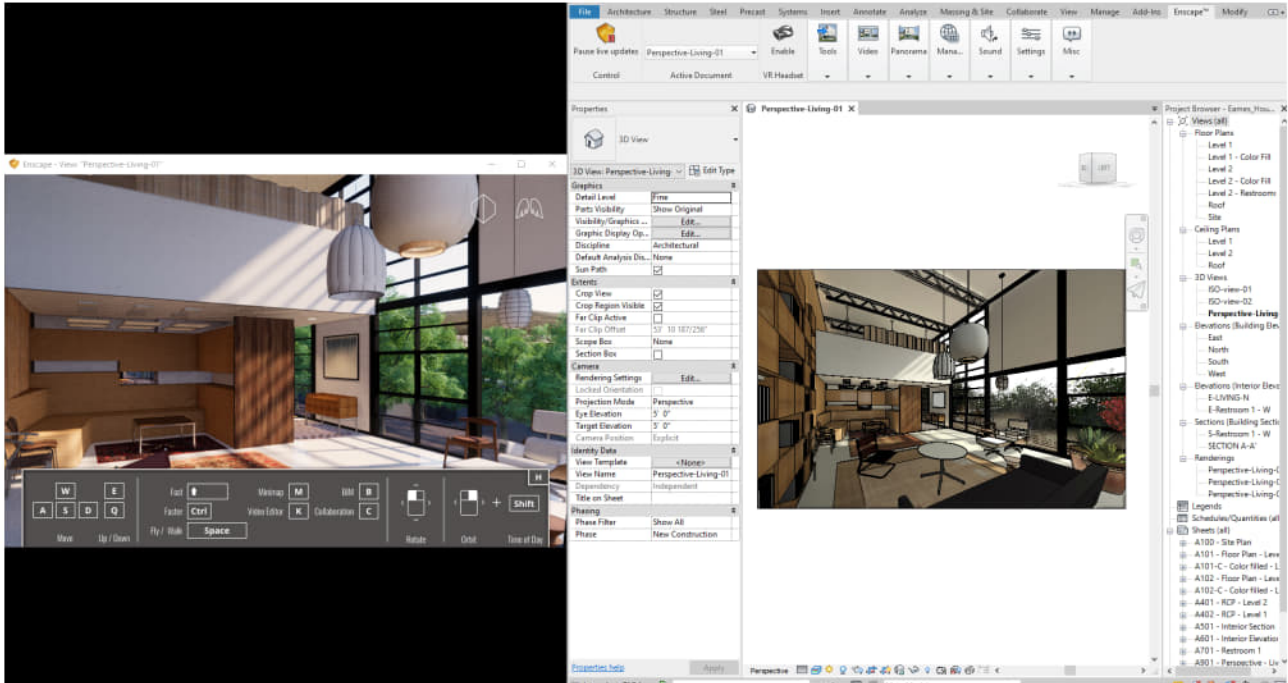


Once Enscape is open, **familiarize yourself with the navigation control**

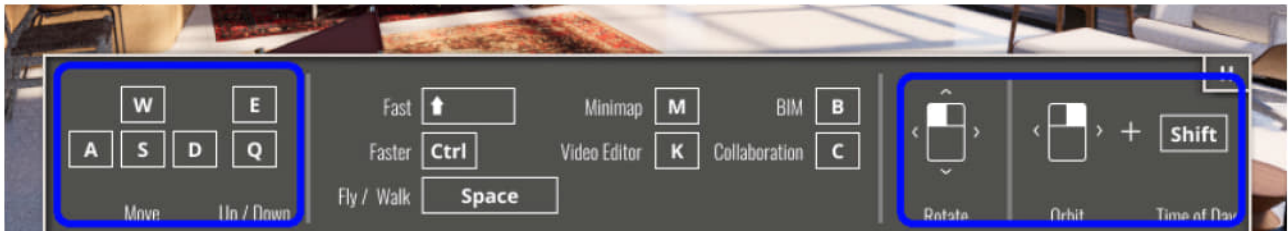
- [OPT 1] For the best practice, use dual monitors to see the Enscape real-time render on one monitor, your Revit project on the other monitor.



- [OPT 2] If you do not have two monitors, you can split your screen with two windows

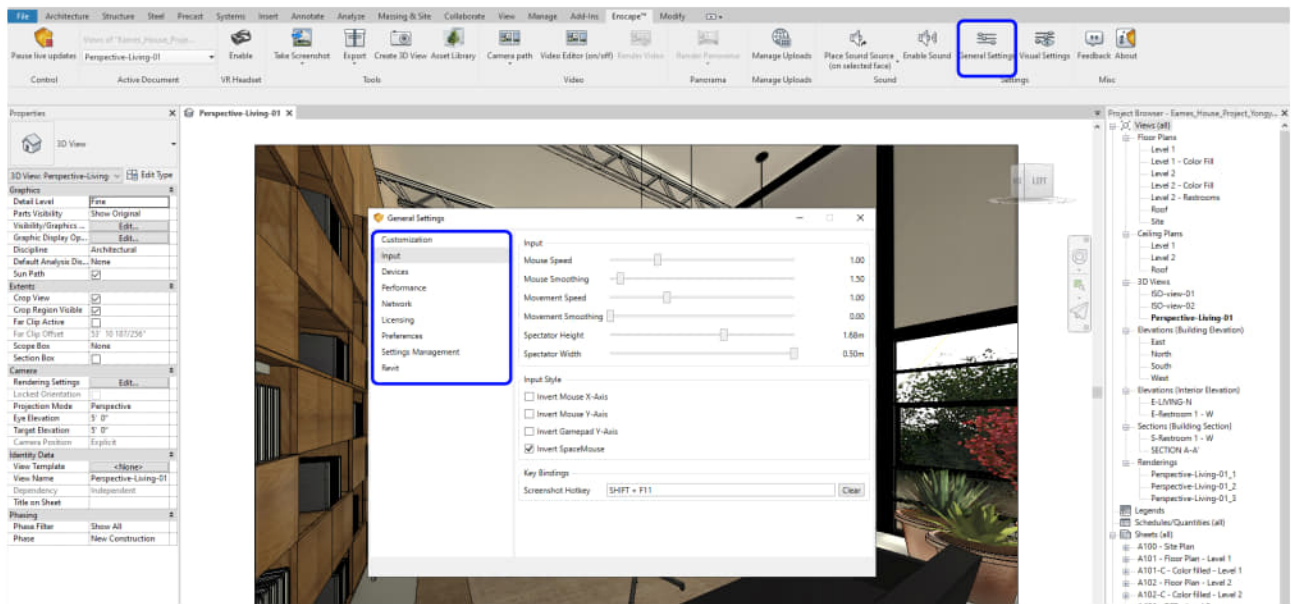


- Use both keyboard and mouse to navigate Enscape

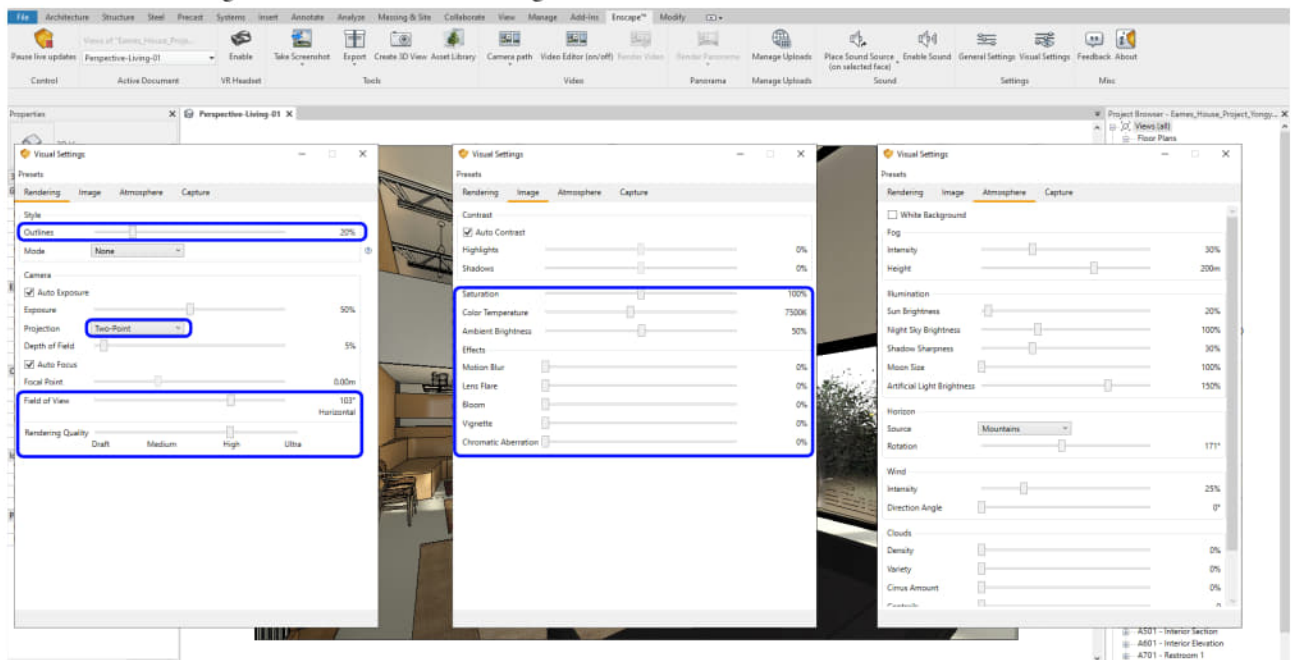


Adjust settings There are two types of settings.

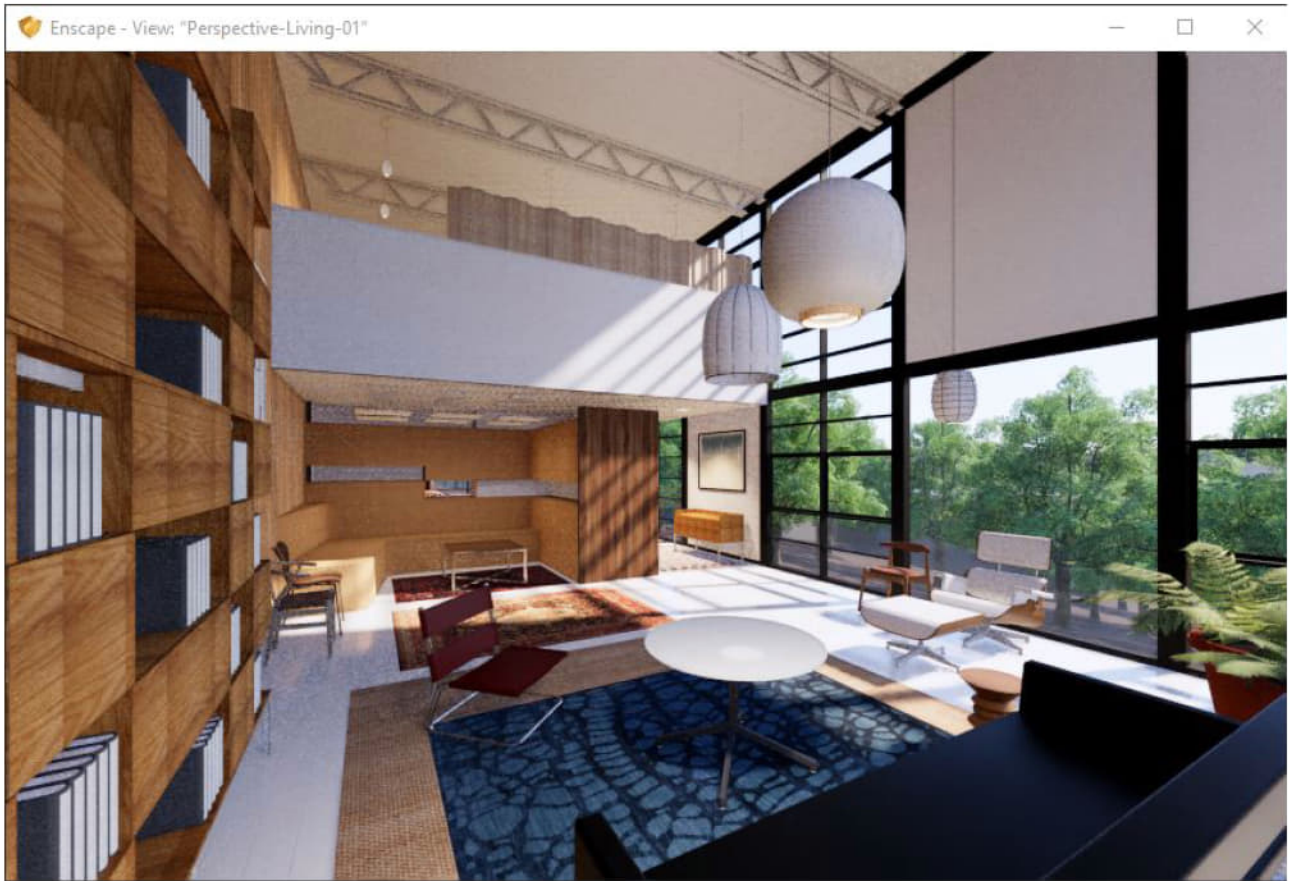
- [OPT 1] General Settings
This setting is for the file and saves locations, mouse and keyboard control, licensing, etc.



- [OPT 2] Visual Settings
This setting is to render styles, image quality, camera settings, atmosphere, background, render settings, etc.
- Below are the settings that I used in the rendering below



- the rendering preview

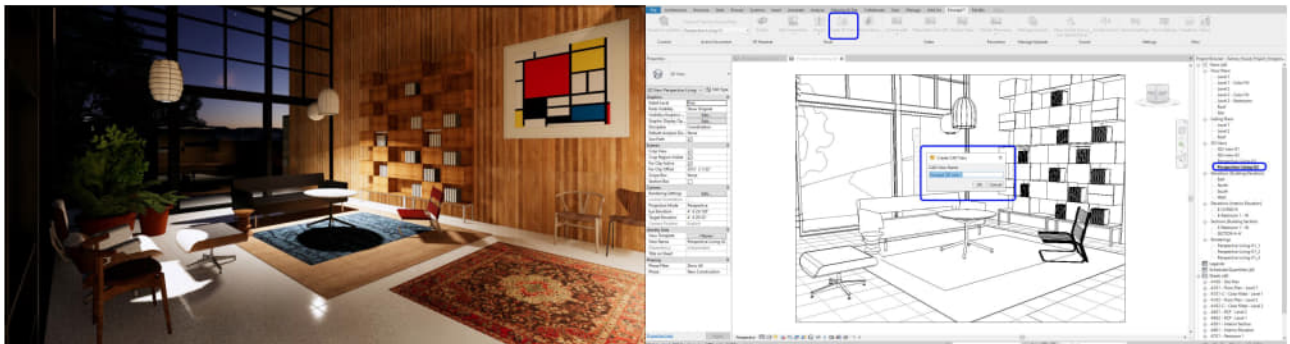


(CO 3) Create views

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If you find a view while you navigate the real-time view from Enscape, you can create/ save a view

- [STEP 1] Once you find the view, stop to navigate
- [STEP 2] Click “Create 3D view” from the tools panel
- [STEP 3] Name the view
- [STEP 4] You can find the view that you just created on the Revit Project browser



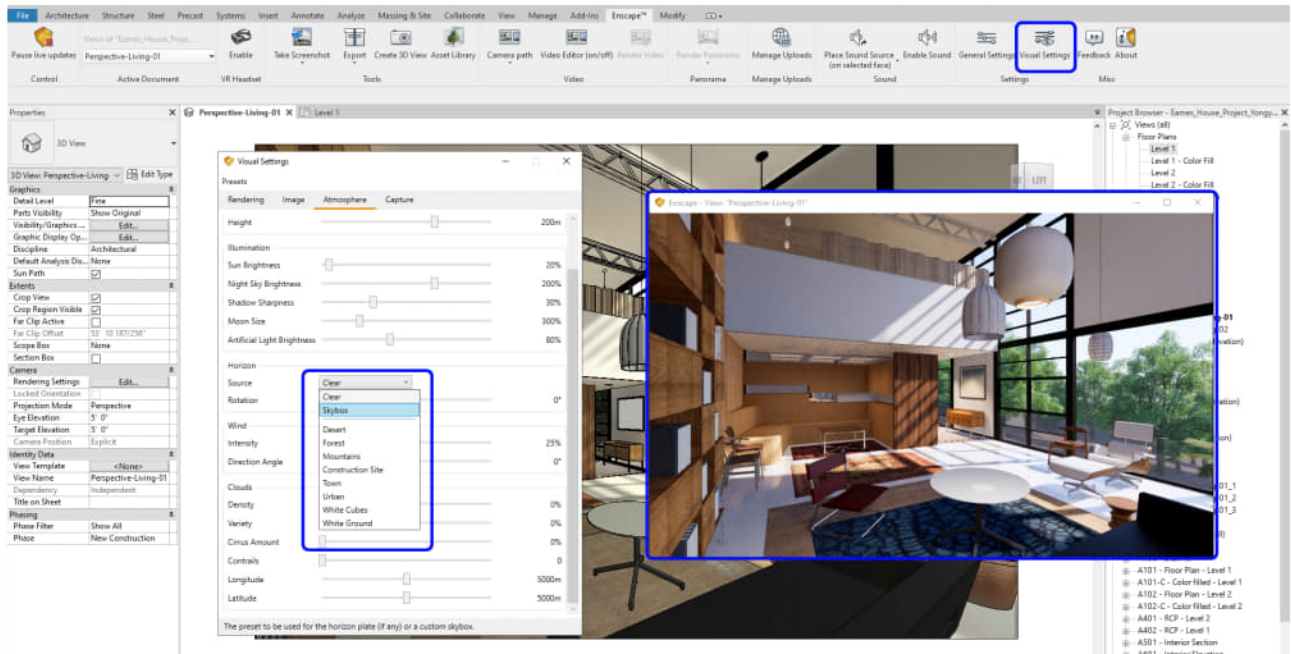
- [STEP 5] To go back your views that you created, click the view name on the [Active Document] panel

(CO 4) Add model backgrounds

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There are two options to **change the model background**

- [OPT 1] Change your Atmosphere on the visual settings to change the model backgrounds



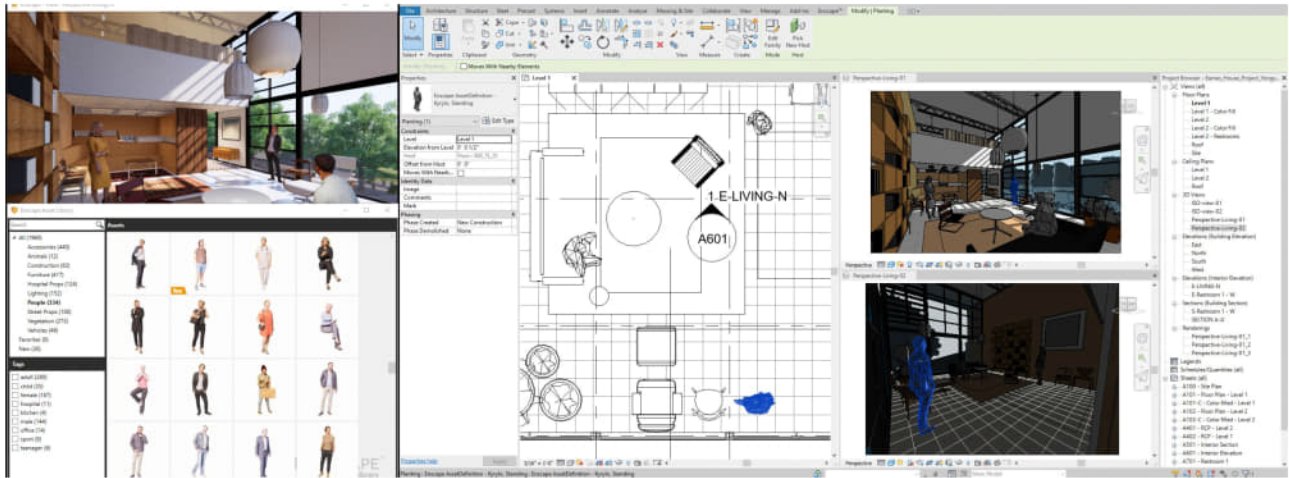
- [OPT 2] Try to use Skybox. Find free skyboxes from [this link](#)

(CO 5) Add Entourages

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Add Enscape models from **Asset Library**

- [STEP 1] Click Asset Library from the Tools panel
- [STEP 2] Search items by category or tags
- [STEP 3] Open a floor plan that you want to add the selected Enscape model to the Revit model
- [STEP 4] Select the model and place it on your floor plan. Use Move, Rotate commands to place the Enscape model. Also, confirm the positions on your perspective view.



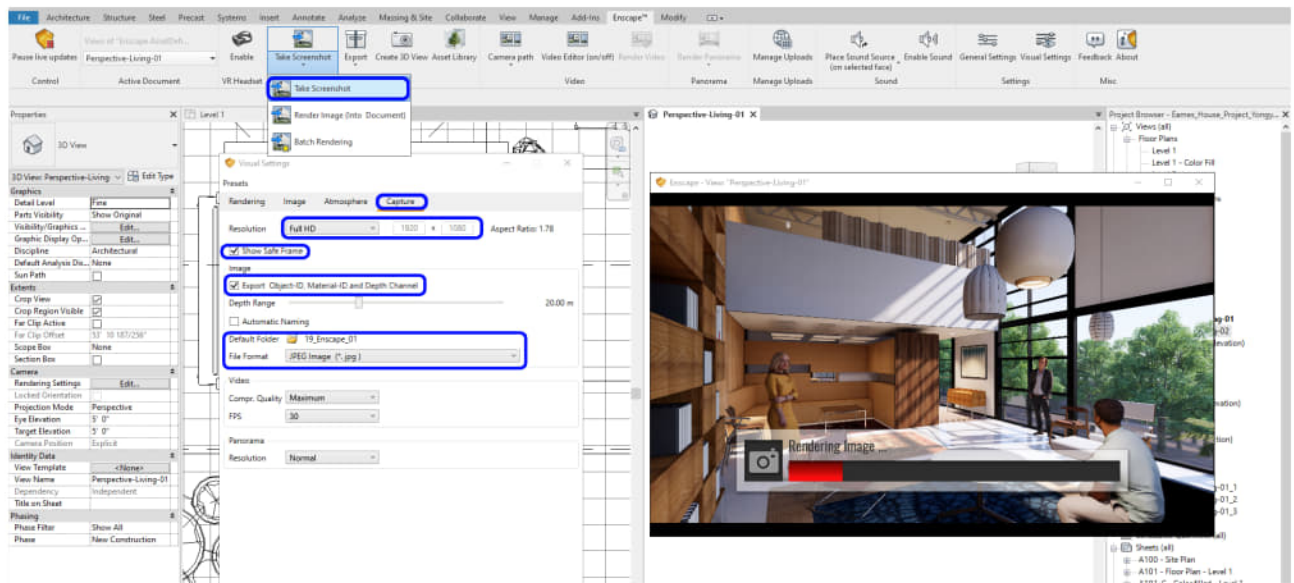
- [STEP 5] Once the placement is done, press [ESC] to go back to the library

(CO 6) Render images

A YouTube element has been excluded from this version of the text. You can view it online here: <https://iastate.pressbooks.pub/visualgraphiccomm/?p=110>

To make the final render

- [STEP 1] Click [Visual Settings] to set render size, file location, and file type.
- [STEP 2] Click [Capture] in your visual settings
- [STEP 3] Select the [Resolution] of the final rendering – Typically Full HD for PPT presentation, Ultra HD for Print version presentation. If your render size is unique, please select Custom and set the pixel size.
- [STEP 4] Check [Show Safe Frame] to see the preview on your real-time view
- [STEP 5] Check [Export Object-ID, Material-ID, and Depth Chanel], Adjust the depth for the Depth Chanel
- [STEP 6] Set a render location to save your final render image file by clicking the Folder
- [STEP 7] Select a file format, typically [JPG]
- [STEP 8] Select the view name that you want to generate a final render
- [STEP 9] Click [Render image] from [Enscape] tab, under [Tools] panel, to get the final render image outside of the file. You may click “Render image (into the document)” to use the rendered image on your Revit document. This way, you can add your final render image to your sheet



Free resources

- [Link 1](#)
- [Link 2](#)

References

- Garubba, K., & Garubba, S. (n.d.). Enscape Features. Retrieved October 22, 2020, from <https://enscape3d.com/features/>
- Kar, S. (2018, May 14). Top 9 Best Rendering Software for Architects This Year. Retrieved October 23, 2020, from <https://www.architecturelab.net/best-rendering-software-for-architects/>
- Free Enscape Student & Educational Licenses – Enscape™. (2020, June 05). Retrieved October 23, 2020, from <https://enscape3d.com/educational-license/>
- System Requirements. (2020, September 14). Retrieved October 23, 2020, from <https://enscape3d.com/community/blog/knowledgebase/system-requirements/>
- Free Sample Projects. (n.d.). Retrieved October 22, 2020, from <https://enscape3d.com/free-sample-projects/>
- Reinold, H. (n.d.). Free Resources for Architectural Projects. Retrieved October 23, 2020, from <https://blog.enscape3d.com/free-resources-for-architectural-projects>

Chapter 20. Edit model & materials

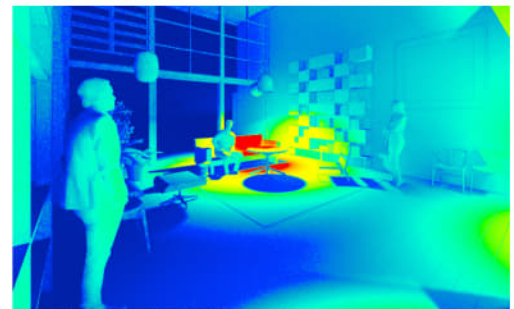
🎯 Session Objectives

Upon completing this session, students will be able to:

- (CO 1) Understand workflow, name of the material
- (CO 2) Use 3D Grass, Water, Reflective, textures
- (CO 3) Change to Architecture Maquette (White model, Outline) & Light mode
- (CO 4) Create Orthometric views

💡 Session Highlights

At the end of the session, students can create the graphics below.



Lecture Contents

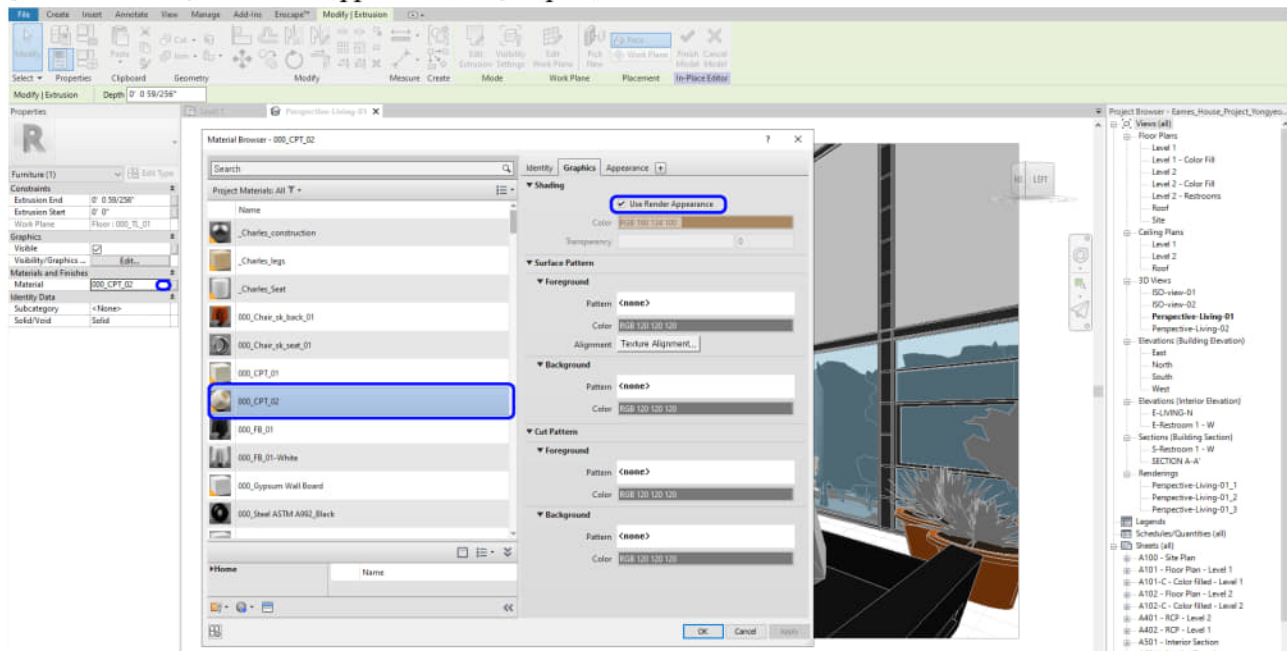
(CO 1) Understand workflow, name of the material

A YouTube element has been excluded from this version of the text. You can view it online here: <https://iastate.pressbooks.pub/visualgraphiccomm/?p=112>

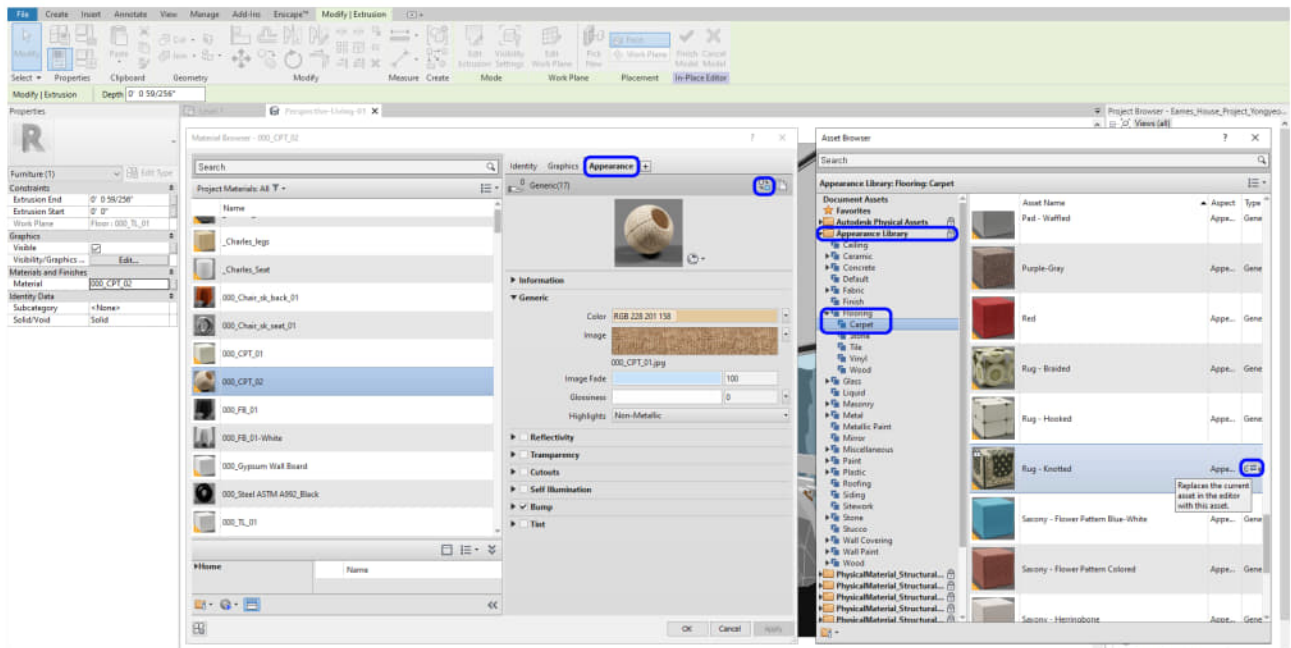
To manage your file size for faster real-time rendering in Enscape, you would be better to reduce your file size

To apply a new material

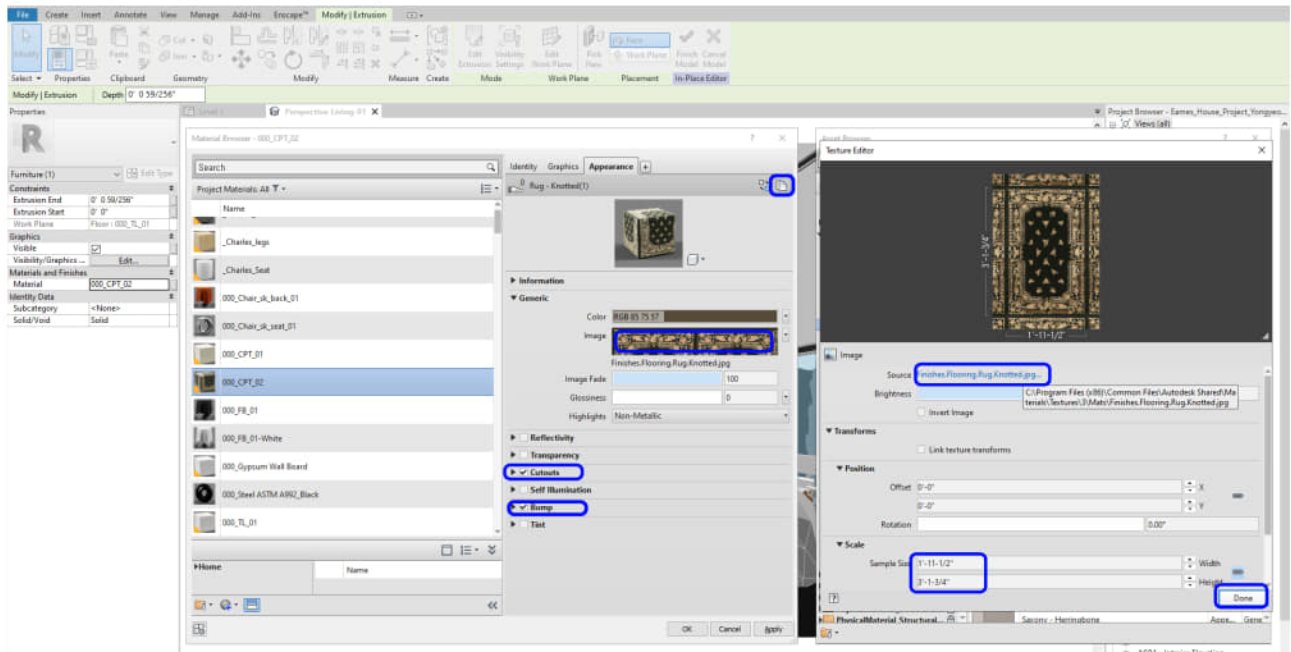
- [STEP 1] Click [Material Browser] icon on [Material and Finish] category in the [Properties] palette
- [STEP 2] Click [Create New Material] on [Material Browser]
- [STEP 3] Rename the material that you created (Example. 001_XX_01_Description)
- [STEP 4] Check [Use Render Appearance] on [Graphic] tab



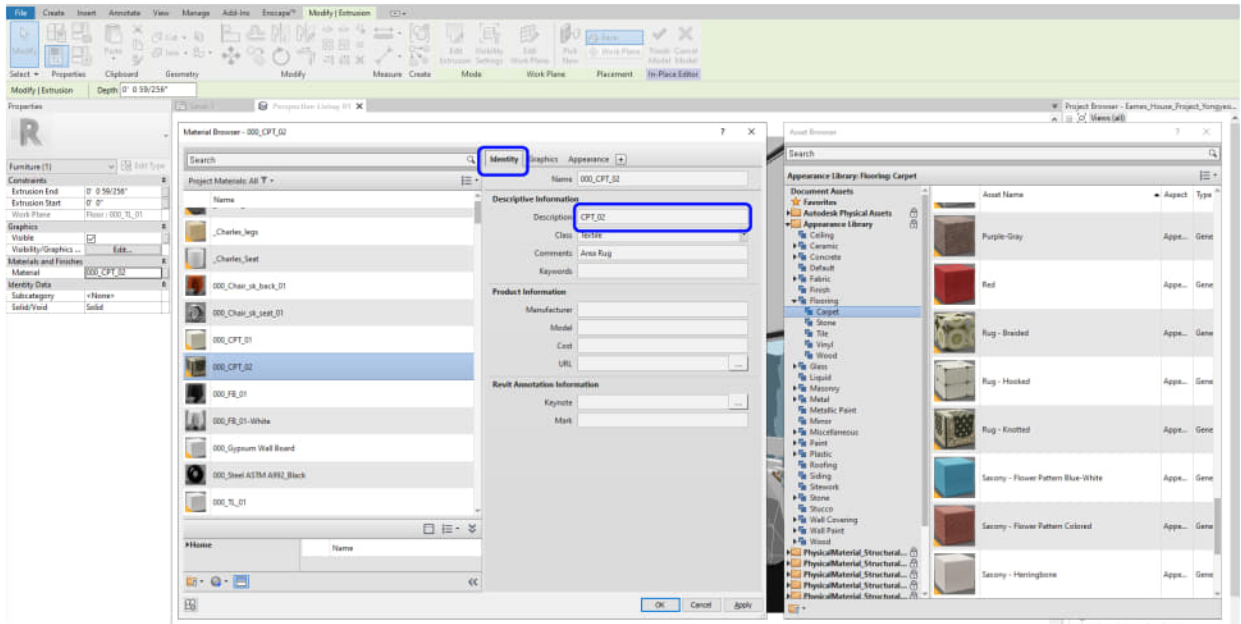
- [STEP 5] Click the [Appearance] tab on the [material browser]
- [STEP 6] Click [Replace] Icon
- [STEP 7] Click [Appearance Library]
- [STEP 8] Select a category
- [STEP 9] Click a specific material that you would like to apply, or change > click the [replace] icon



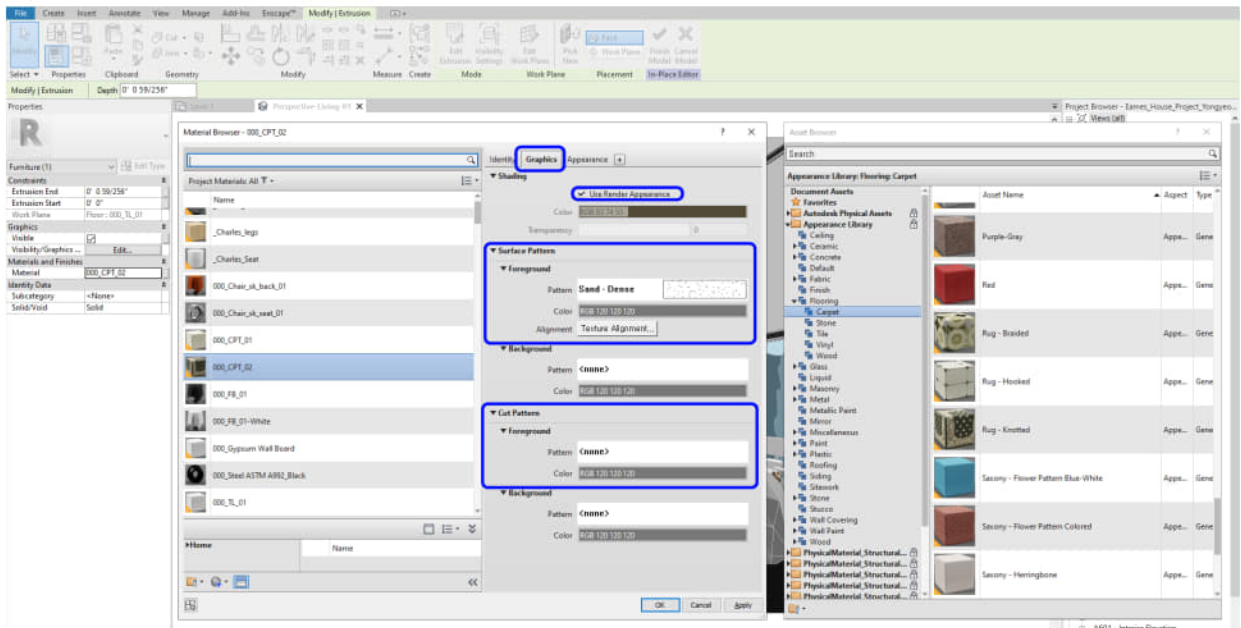
- [STEP 10] On the [Material Browser], click the Duplication icon. This process is recommended to make a unique material
- [STEP 11] If the material image needs to be changed, click the image name. If the material size, location, or rotate, click image
- [STEP 12] Change the scale, offset, or rotate > Click done



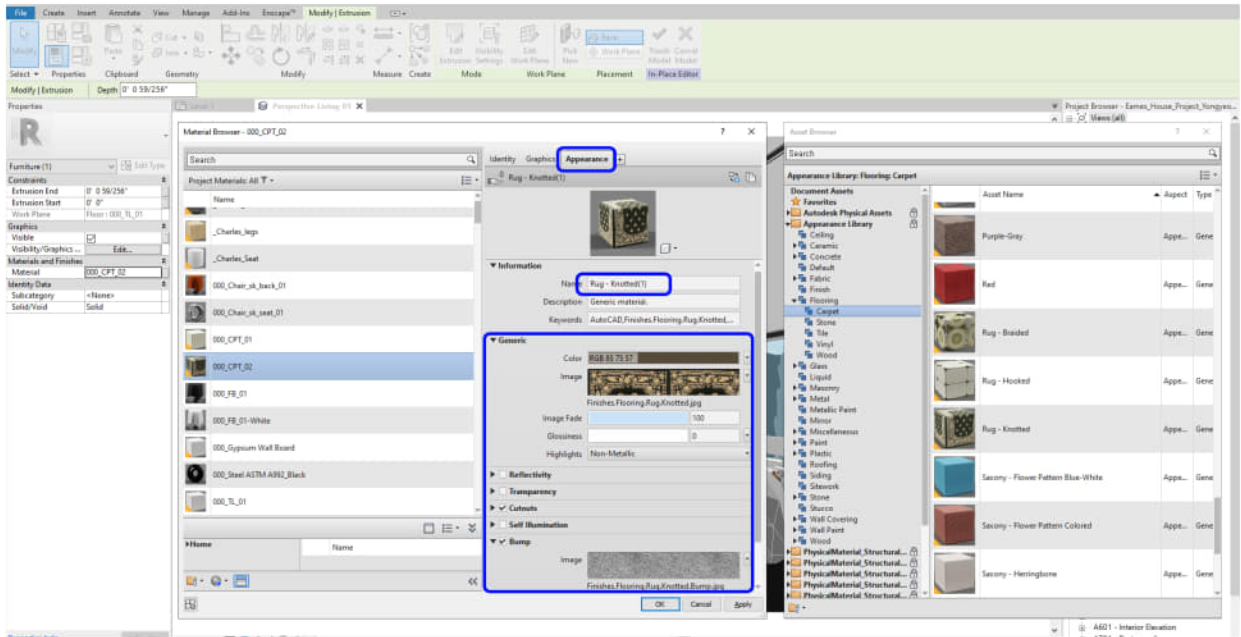
- [STEP 13] Update Information on the [Identity] tab
 - Description = Material tag information
 - Other information = Material schedule information



- [STEP 14] Update Information on the [Graphics] tab
 - Shading, Check [Use Render Appearance]
 - Update [Surface Pattern] if needed
 - Update [Cut Pattern] if needed

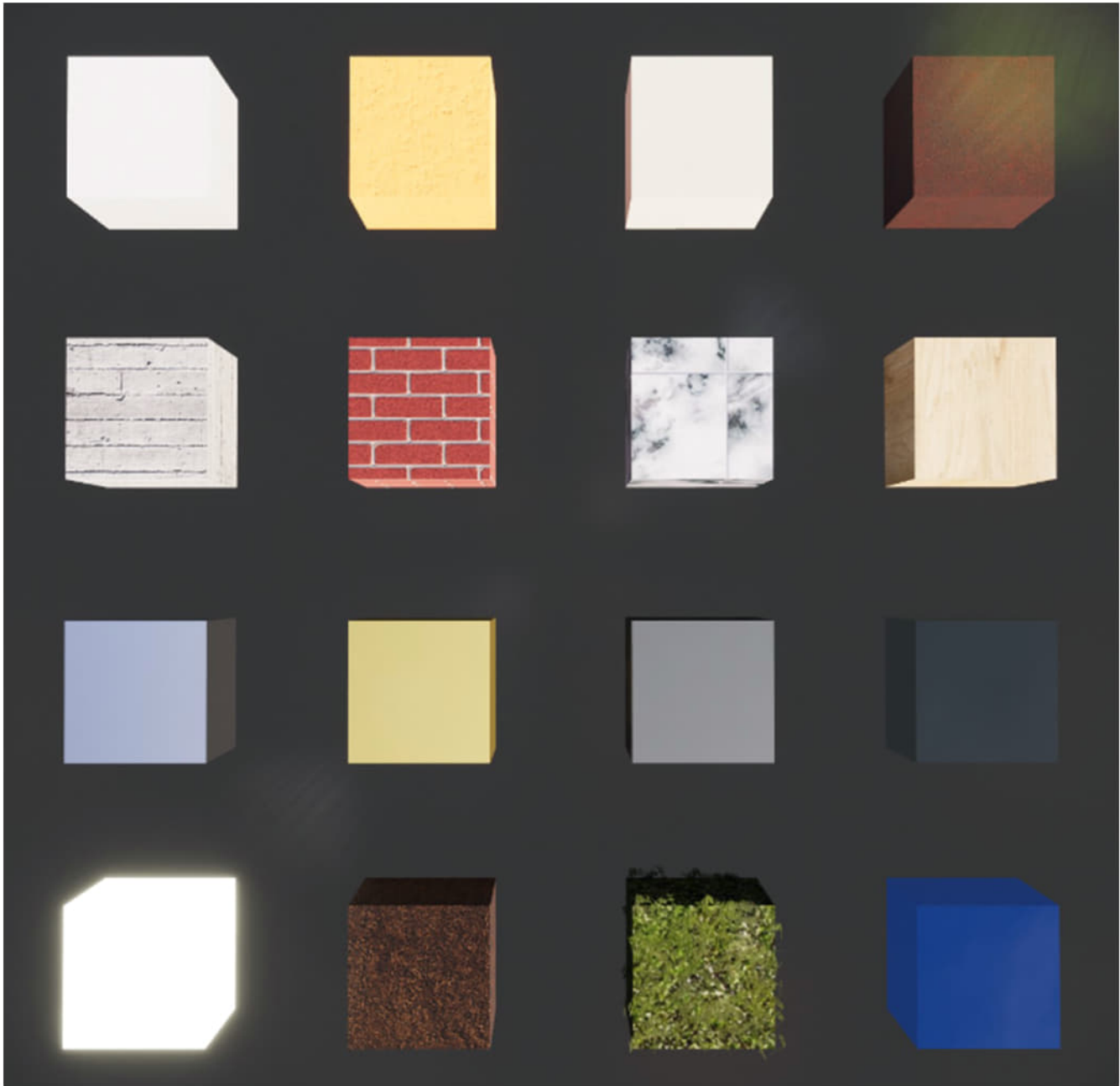


- [STEP 15] Update Information on the [Appearance] tab
 - Information name = Should be unique
 - Generic = Image or color
 - Reflectivity
 - Transparency
 - Self-illumination – Create self-illuminated material like a light source
 - Bump – Create a bumpy texture on a surface



- [STEP 16] Click [Apply] > click [ok]

For material, Enscape uses most of Revit material properties



Materials in Revit can be found at [this link](#)

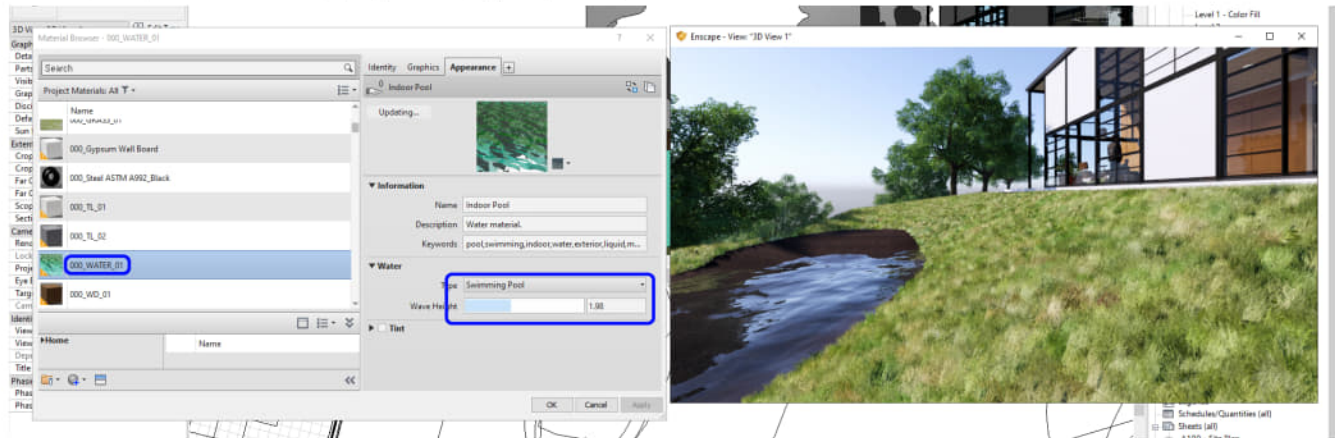
Use sample materials from [this link](#)

(CO 2) Use 3D Grass and Water

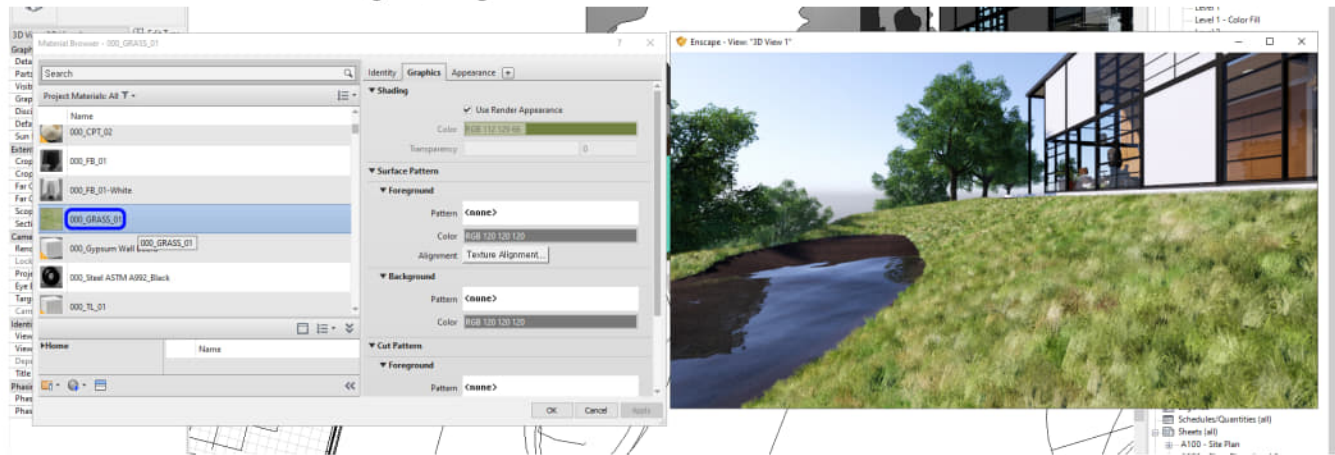
A YouTube element has been excluded from this version of the text. You can view it online here: <https://iastate.pressbooks.pub/visualgraphiccomm/?p=112>

Enscape requires a special name for **Water** and **Grass**.

The material name must include [water] for water materials.



The material name must include [grass] for grass materials.

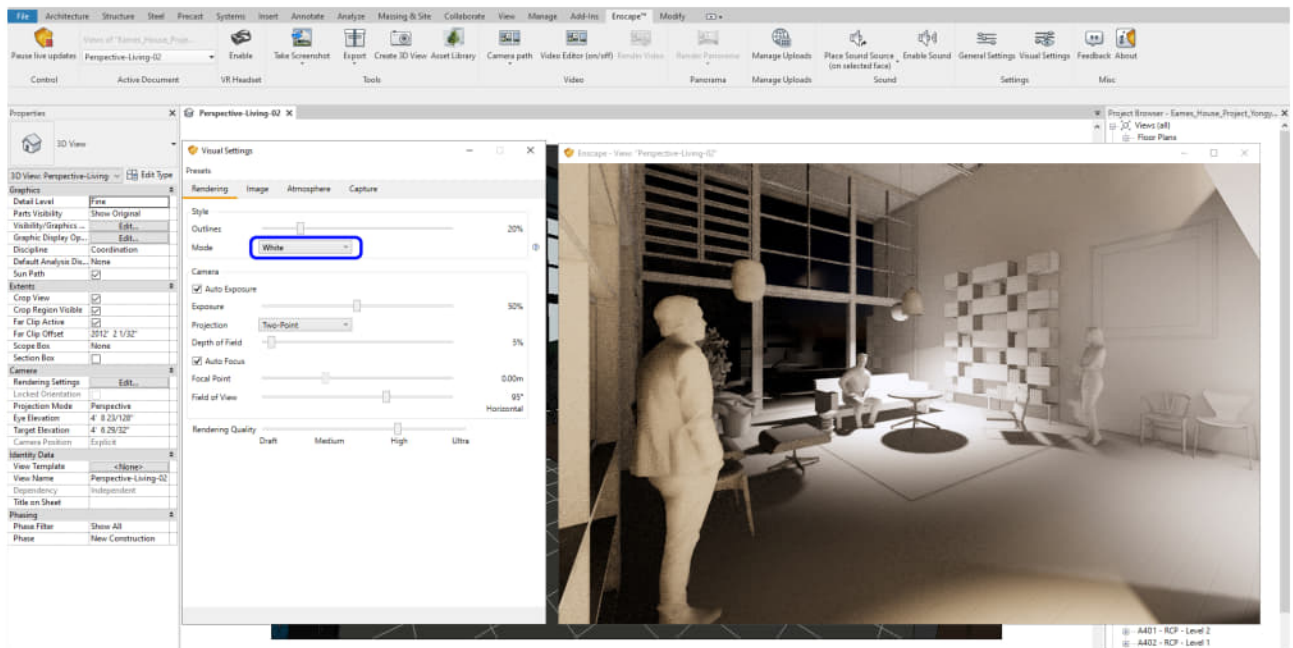


(CO 3) Change to Architecture Maquette (White model, Outline) & Light mode

A YouTube element has been excluded from this version of the text. You can view it online here: <https://iastate.pressbooks.pub/visualgraphiccomm/?p=112>

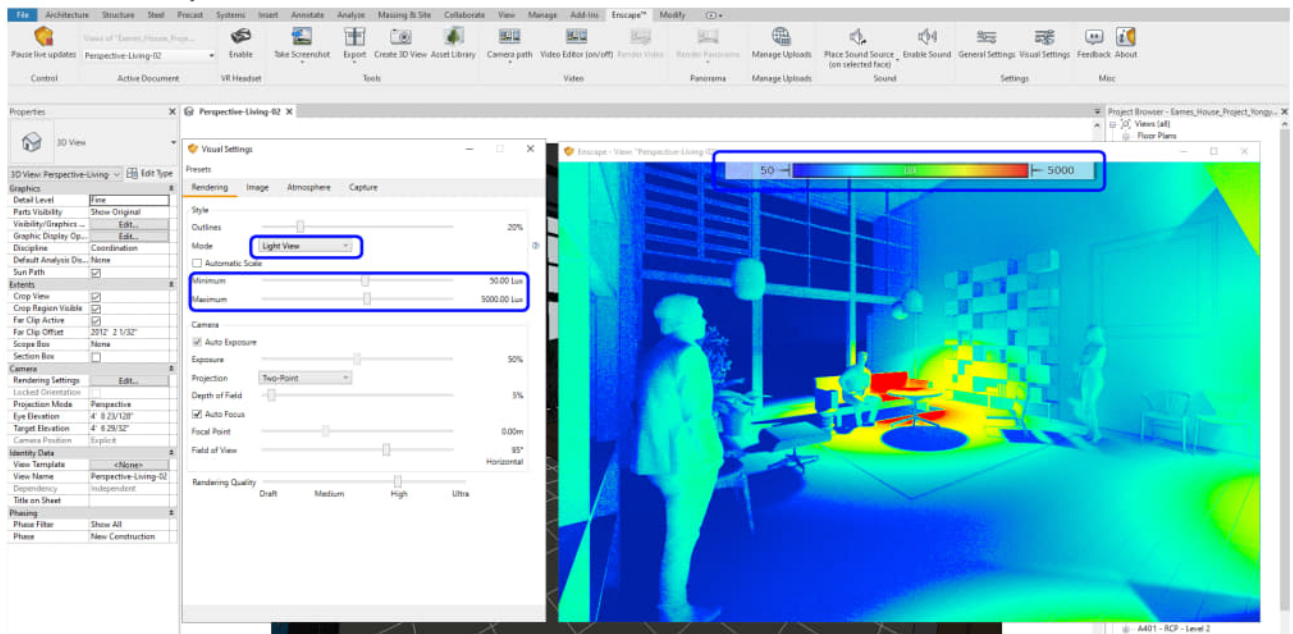
Designers use **white models** to discuss the shape or form of space.

- [STEP 1] Open [visual settings]
- [STEP 2] Change mode to [White]



The designer also uses **light mode** to show lighting intensity. You can see where hot spots are and where the areas that need more lighting.

- [STEP 1] Open [visual settings.]
- [STEP 2] Change the mode to [Light view.]
- [STEP 3] You may uncheck [Automatic Scale] for manual

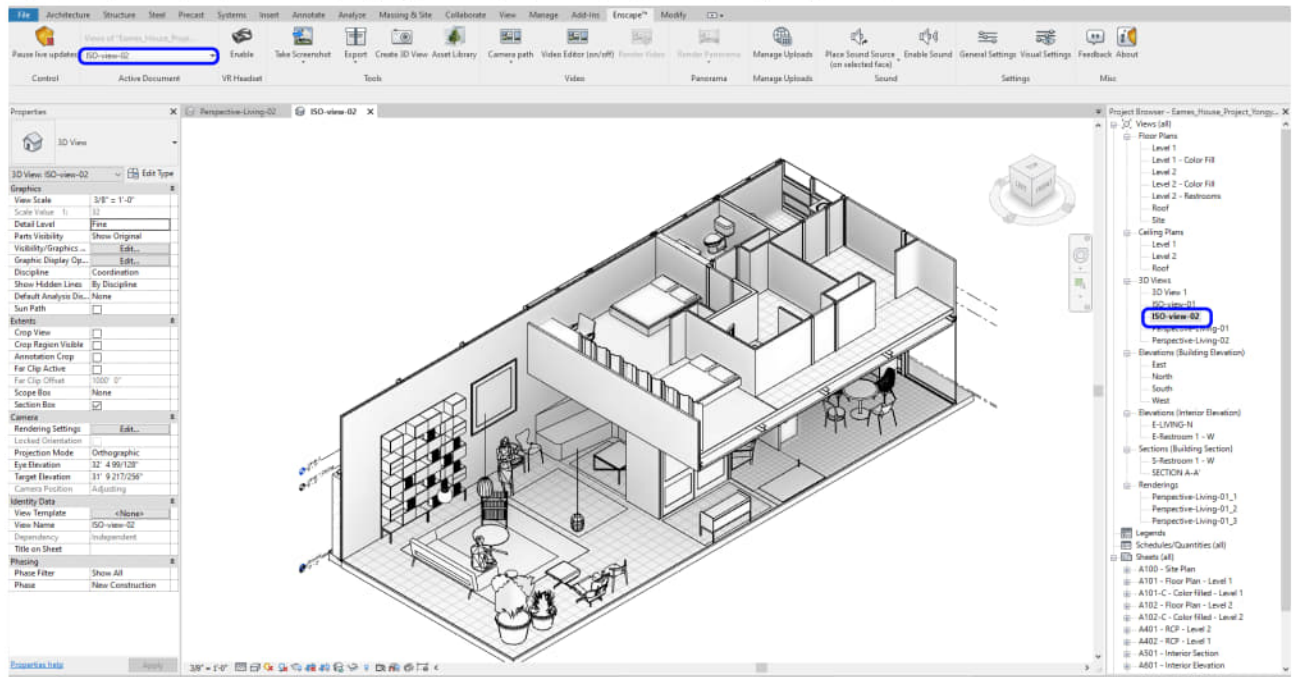


(CO 4) Create Orthometric views

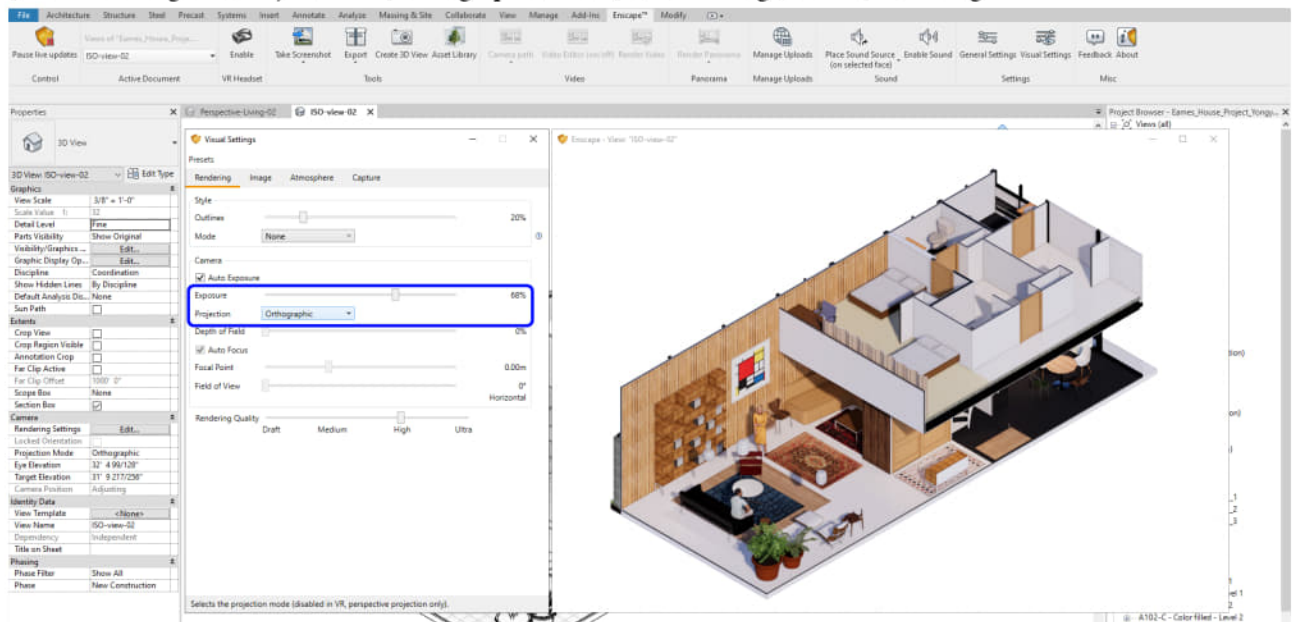
A YouTube element has been excluded from this version of the text. You can view it online here: <https://iastate.pressbooks.pub/visualgraphiccomm/?p=112>

To create an **isometric view** via Enscape, you need an isometric view on your Revit file.

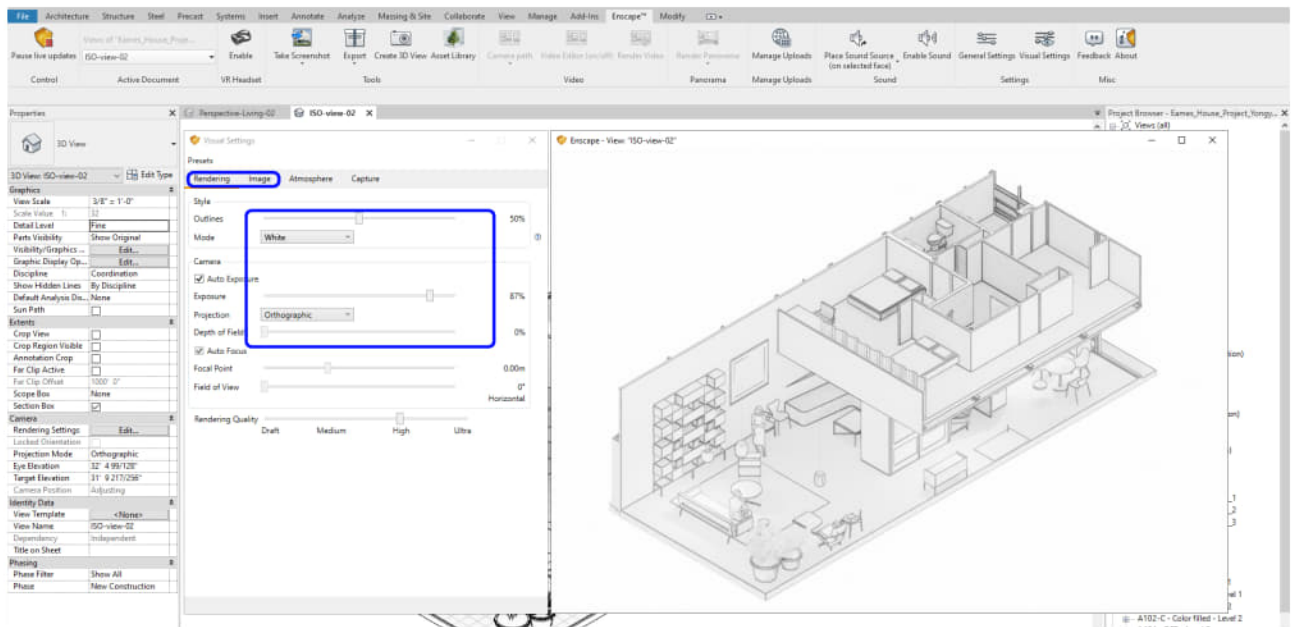
- [STEP 1] Create a Default 3D view by clicking the [3D view] from the View] tab, under [Create] panel



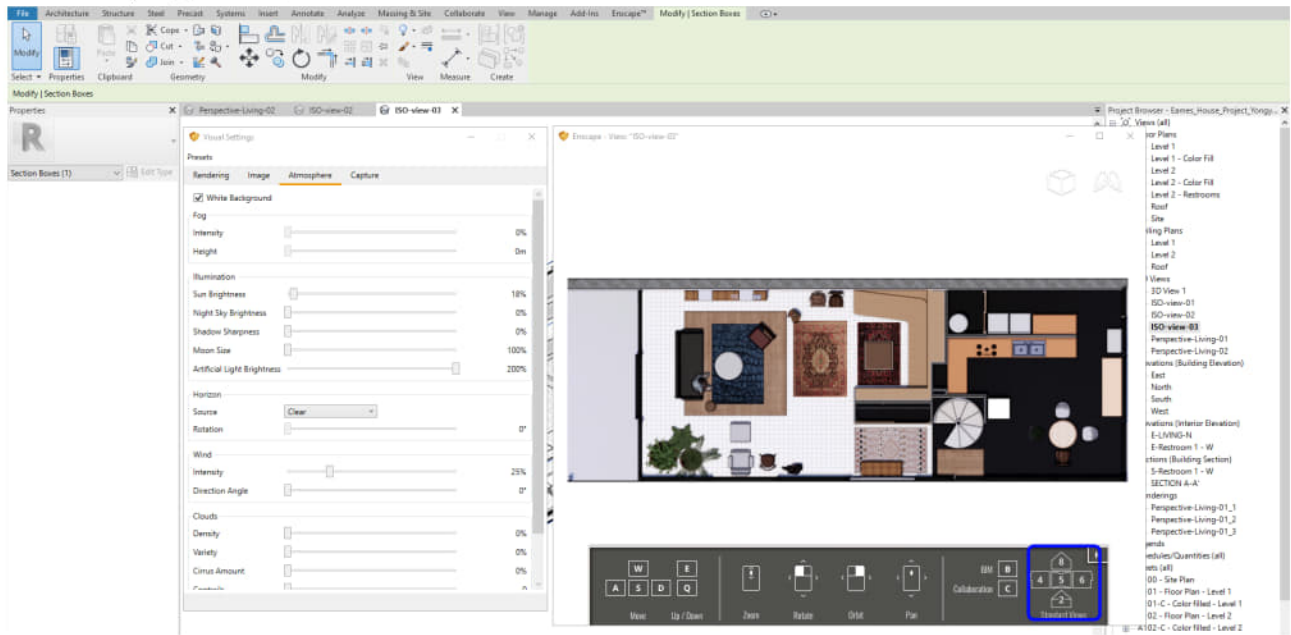
- [STEP 2] Use [section box] and hide in view by element or category to hide unnecessary items
- [STEP 3] Synchronize the view by selecting [view name]
- [STEP 4] Change the Projection to [Orthographic] from [Visual Settings] under [Rendering]



- [STEP 5] You may change the [render style mode] on your [visual settings]



- [STEP 6] You also may change views using numbers on the keyboard
For a floor plan, press [5]



References

Materials in Revit. (2020, July 16). Retrieved October 23, 2020, from <https://enscape3d.com/community/blog/knowledgebase/revit-material-parameters/>

Free Enscape Student & Educational Licenses – Enscape™. (2020, June 05). Retrieved October 23, 2020, from <https://enscape3d.com/educational-license/>

Chapter 21. Edit lighting and create a video

Session Objectives

Upon completing this session, students will be able to:

- (CO 1) Save and load presets
- (CO 2) Set and adjust artificial lightings
- (CO 3) Create a walk-through video

Session Highlights

At the end of the session, students can create the graphics below.



Lecture Contents

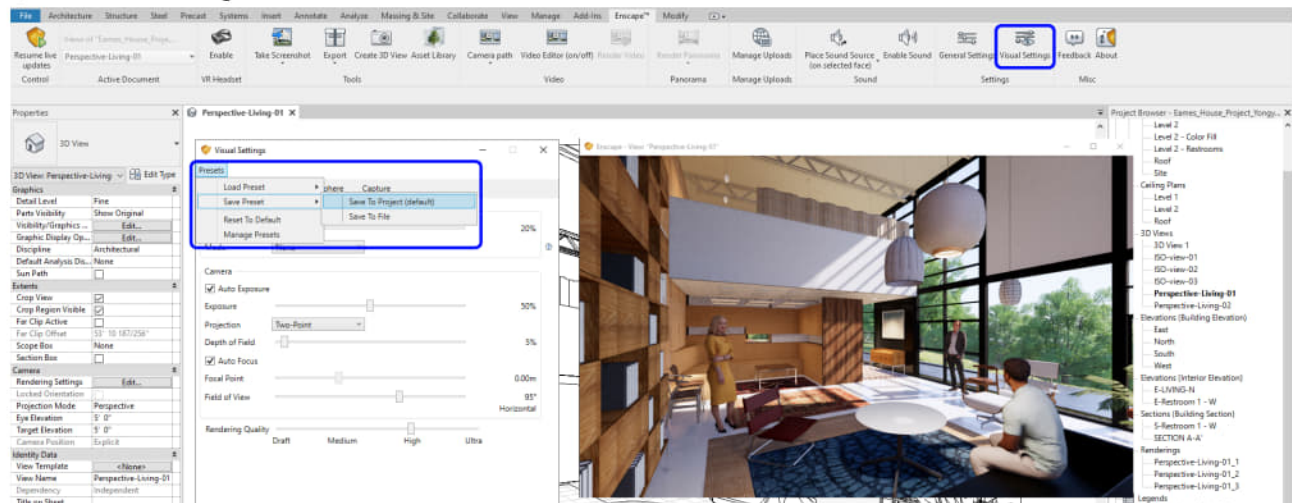
(CO 1) Save and load presets

A YouTube element has been excluded from this version of the text. You can view it online here: <https://iastate.pressbooks.pub/visualgraphiccomm/?p=114>

The saving and loading presets are very helpful if you need to render multiple images. You will save a lot of time and produce consistent image qualities.

You can save the visual setting that you modified

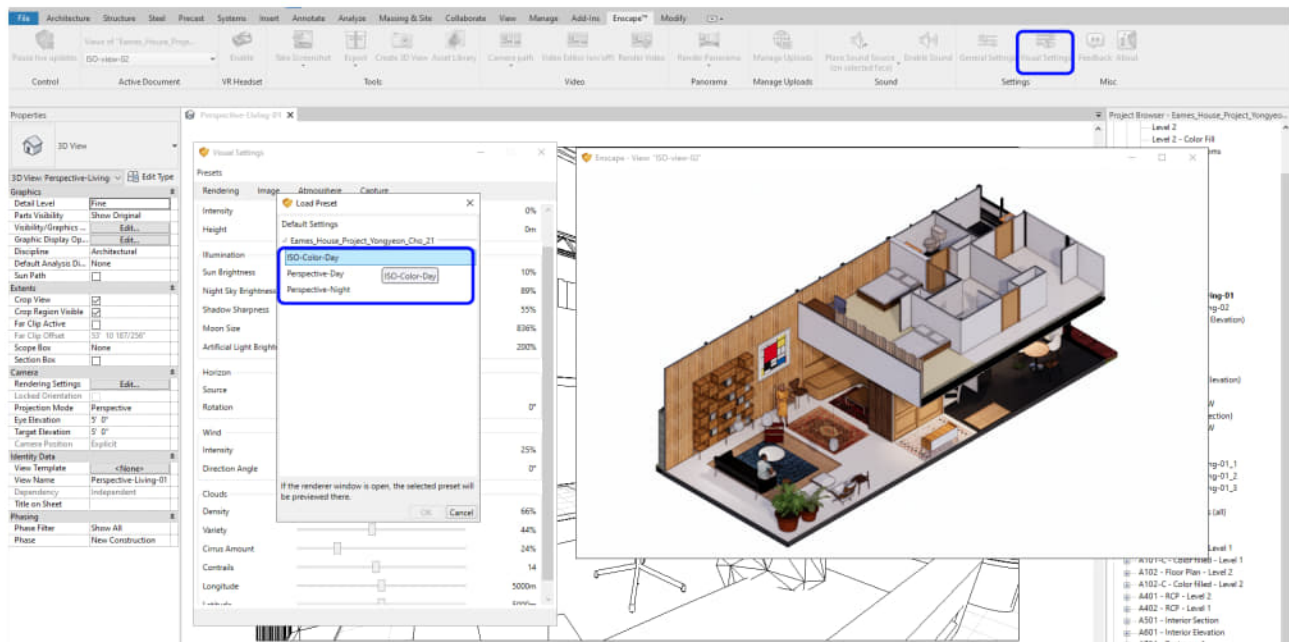
- [STEP 1] Click Presets
- [STEP 2] Click Save Preset > Save to Project or Save to File
- [STEP 3] Name the preset



- It is recommended to save three types of preset [Perspective-Day, Perspective-Night, and Isometric]

To load a preset that you already saved

- [STEP 1] Click Presets
- [STEP 2] Click load Preset > Load from Project, or you may load from the file
- [STEP 3] Select a preset that you would like to load > Click OK



(CO 2) Set and adjust artificial lightings

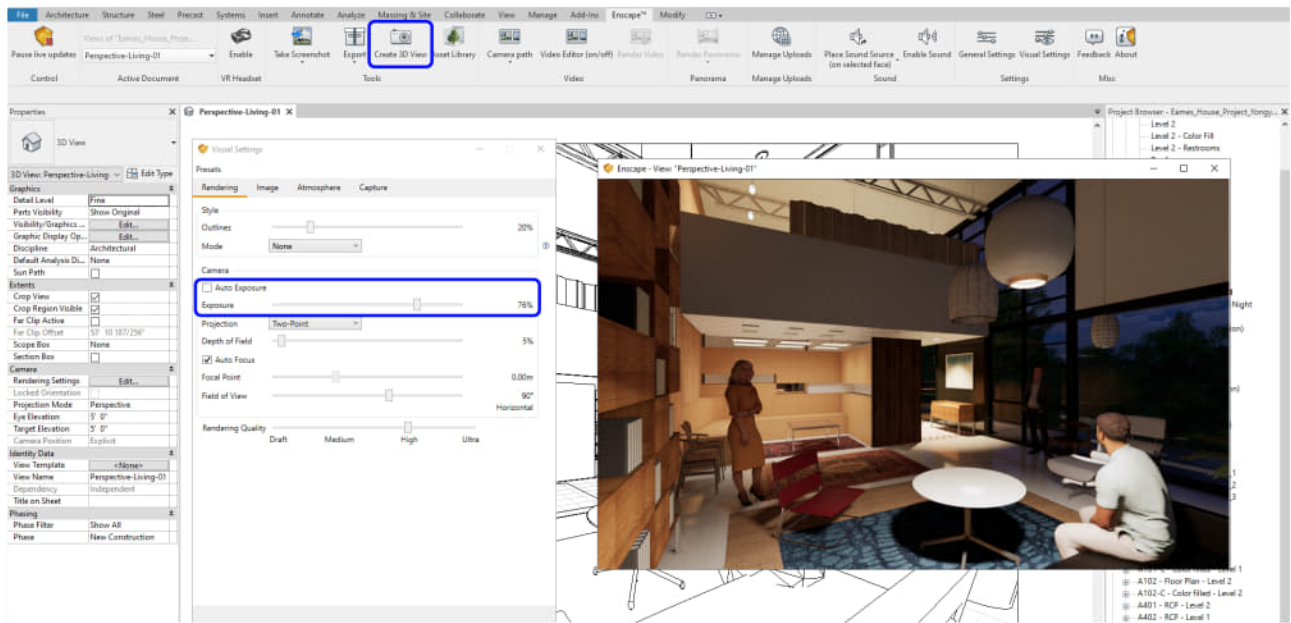
A YouTube element has been excluded from this version of the text. You can view it online here: <https://iastate.pressbooks.pub/visualgraphiccomm/?p=114>

For better artificial lighting simulation

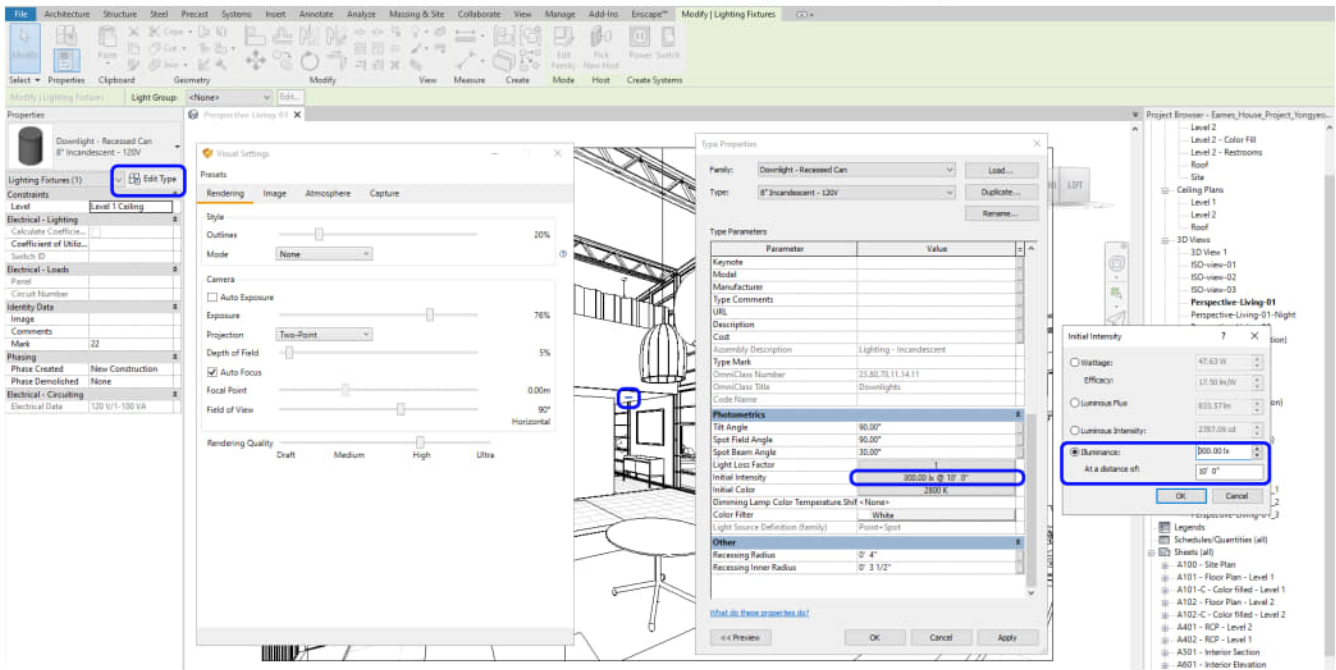
- [STEP 1] Use a night-time scene time (sunset or sunrise would work as well)
- [STEP 2] Turn off “Auto Exposure” in Enscape visual settings
 - Exposure Brightness = 60% ~ 80% (Nighttime scene)
 - Exposure Brightness = 51%~53% (Day time scene)
- [STEP 3] The render quality should be High or Ultra
- [STEP 4] Vignette effect = 0%
- [STEP 5] Artificial Light Brightness = 100% ~ 150%

Once you change the time of day, you must click “create 3D view” to save that time of day.

- [STEP 1] Click [Create 3D view] from the [Enscape] tab
- [STEP 2] Name the view

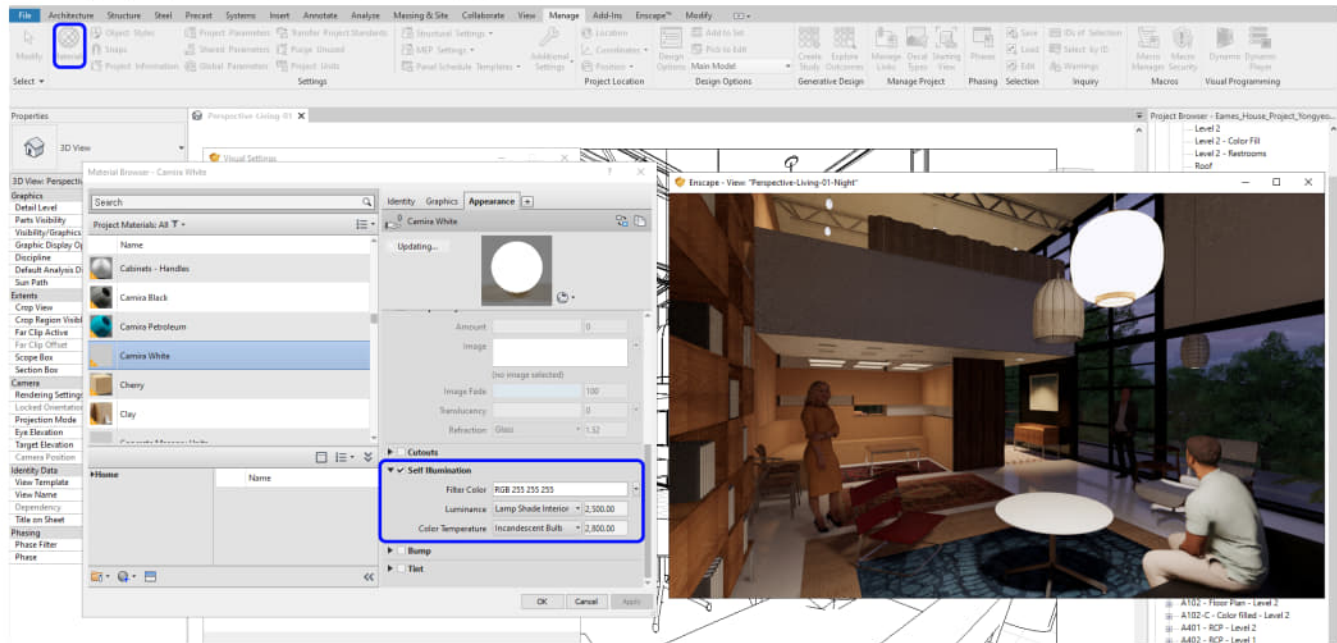


You may need to adjust the value of Illuminance on the "Initial Intensity" of lighting properties.



Find/use IES lighting from [this link](#)

Use/adjust self-illumination materials for lighting sources

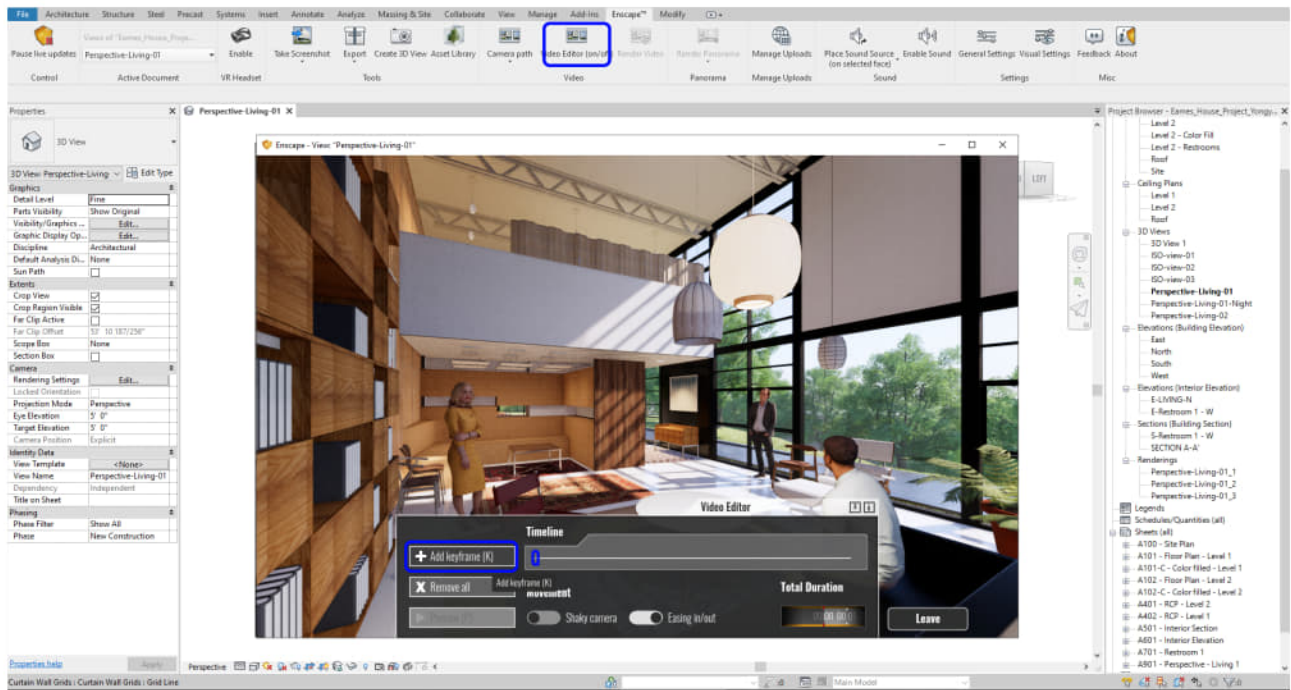


(CO 3) Create a walk-through video

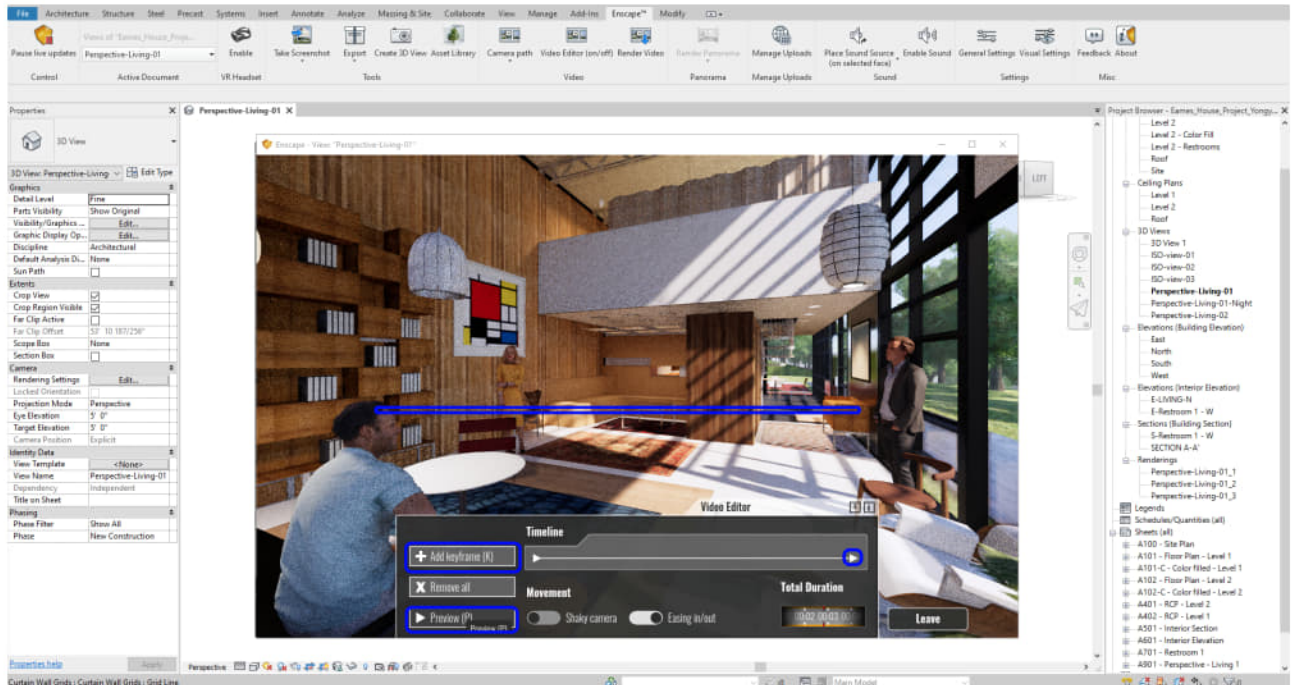
A YouTube element has been excluded from this version of the text. You can view it online here: <https://iastate.pressbooks.pub/visualgraphiccomm/?p=114>

To create a video path with scenes

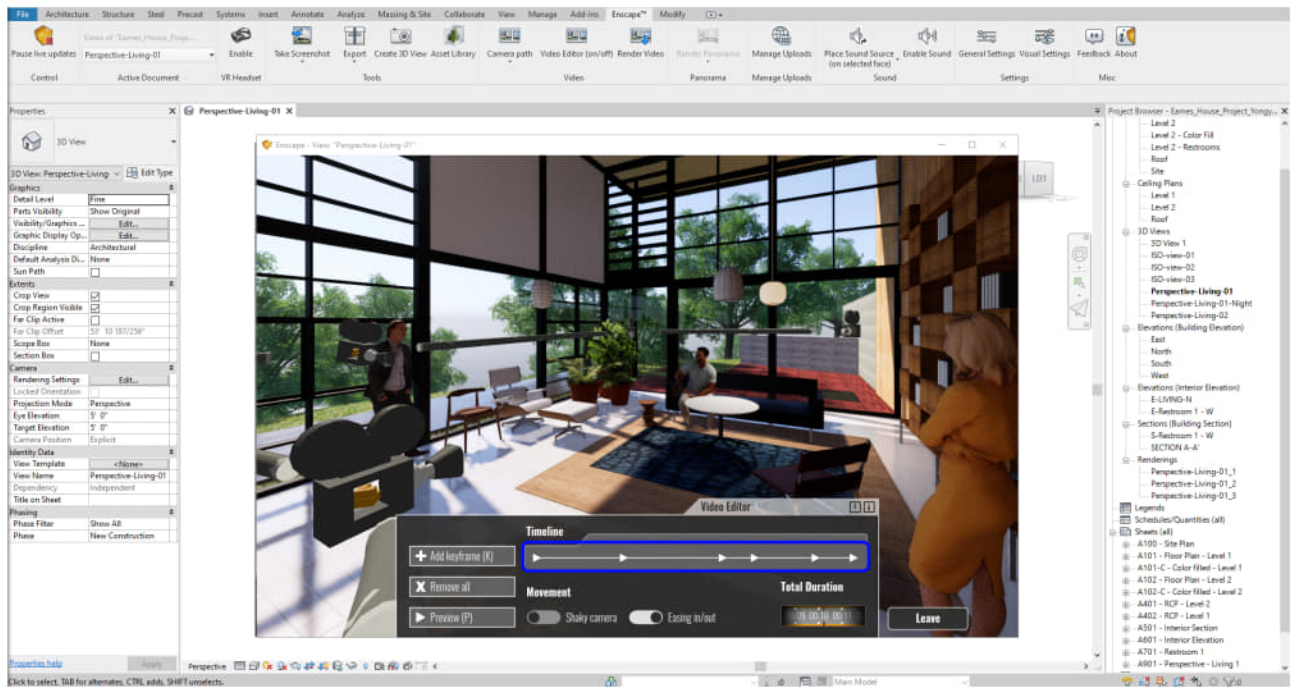
- [STEP 1] Click “Video Editor” from the Enscape tab
- [STEP 2] Click “Add keyframe” – Once you click “Add keyframe,” the setting will be saved



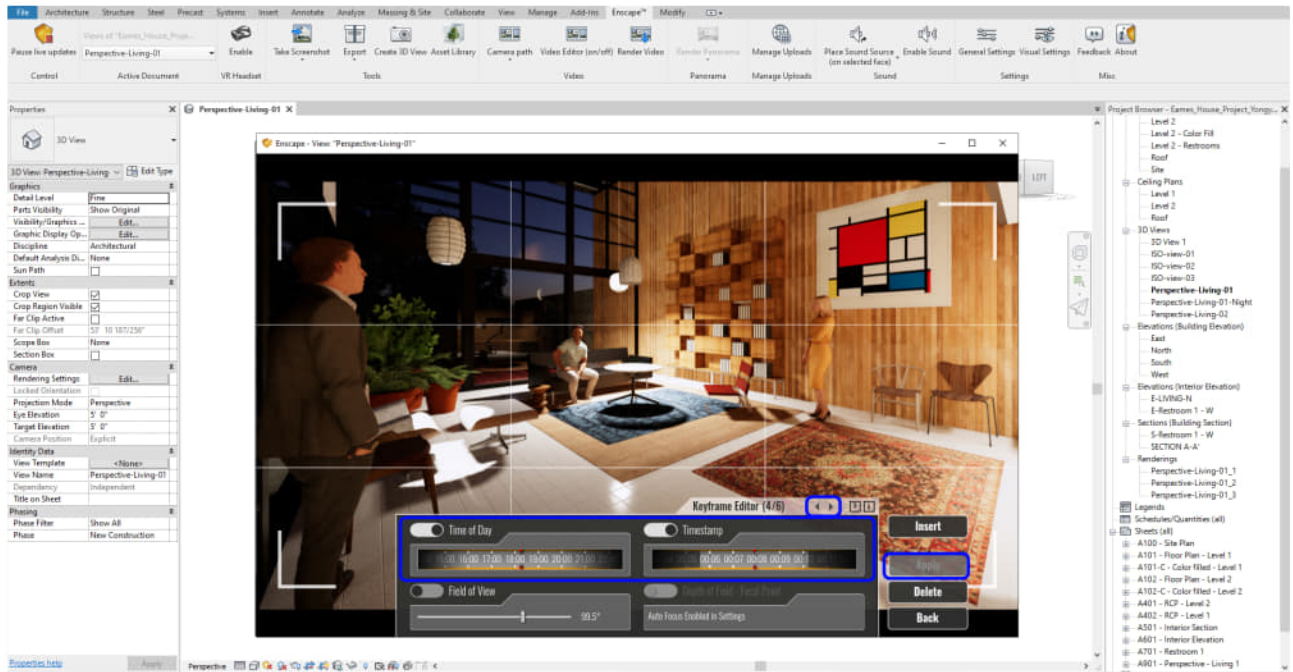
- [STEP 3] Change the scene by moving the scene
- [STEP 4] Once you think the next scene is the right position (recommend foot walk to see the scene from the same height), click “Add keyframe,” then you can see the second frame is added.
- [STEP 5] You may check the preview to see how this works.



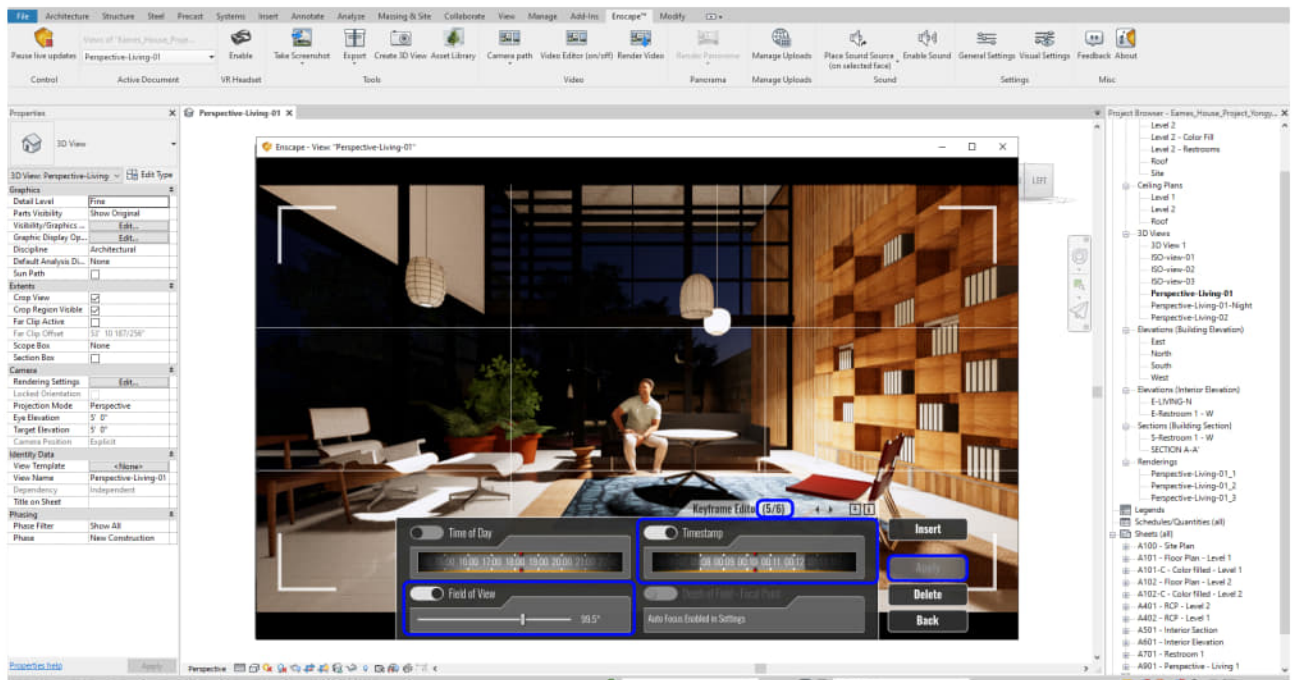
- [STEP 6] Repeat step 3 to 5 to create a complete path for a video



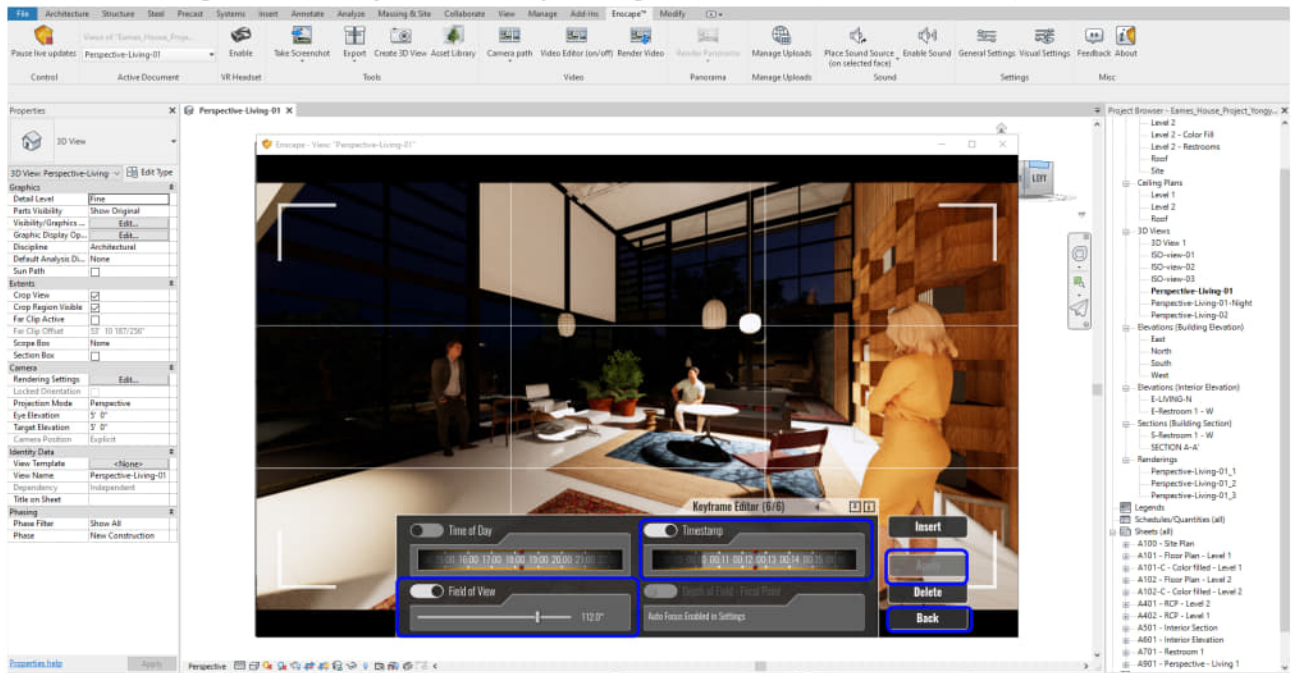
- [STEP 7] Click a [frame] and change the settings (time of the day, duration of the movement, camera field of view, and camera position) and click “Apply” to apply the changes



- [STEP 8] You can repeat other frames to change the settings

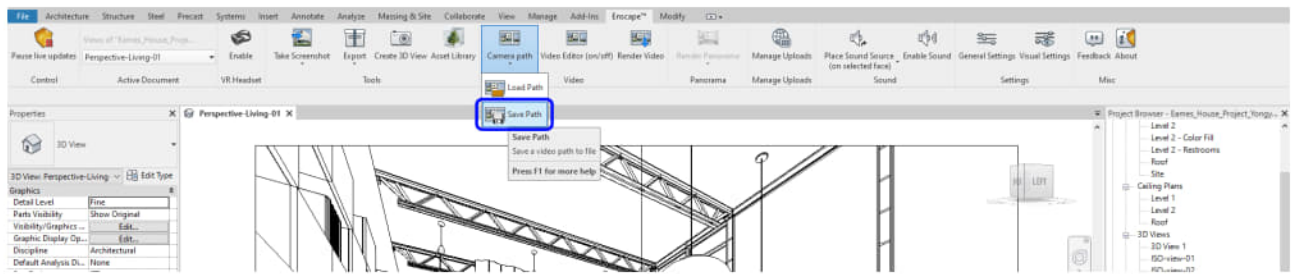


- [STEP 9] You can get out of the keyframe editor by clicking Back, Click Preview to see the results



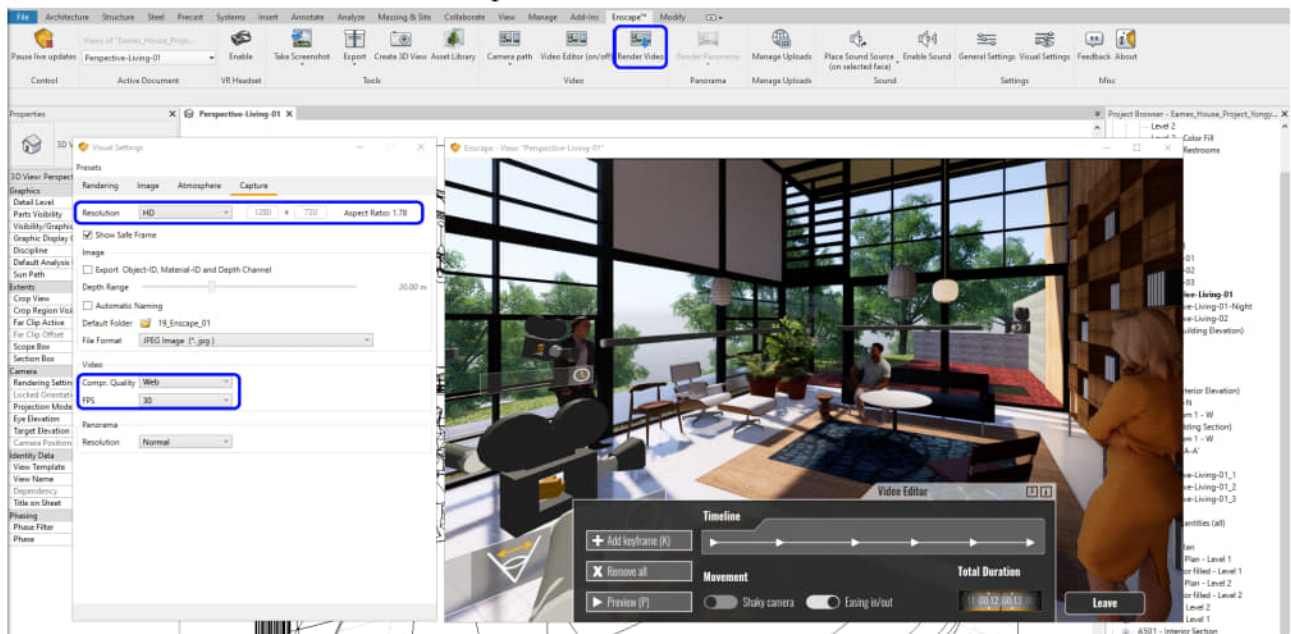
To save a video path

- [STEP 1] Click "Save Path" from the Enscape tab
- [STEP 2] Make a unique name for the path



To render the video

- [STEP 1] Load camera path by clicking “Camera Path” > “Load path” from the Enscape tab
- [STEP 2] Change video size from Visual Setting – Resolution (HD is recommended), the quality can be [Web], FPS must be [30]
- [STEP 3] Click “Render Video” to render the path



Note. To render the video, it will take a while because of the pictures that the video renders. Typically, if you render a 1-second video, Enscape renders 30 frames. If one frame takes 10 seconds to render, a total 1-second Video takes 300 seconds to render. Enscape does a great job because Revit rendering takes 5 minutes to render one frame.

References

Free Enscape Student & Educational Licenses – Enscape™. (2020, June 05). Retrieved October 23, 2020, from <https://enscape3d.com/educational-license/>

Chapter 22. Edit render outputs

🎯 Session Objectives

Upon completing this session, students will be able to:

- (CO 1) Export enlarged jpg files (Original, ID) for print
- (CO 2) Create Executable file
- (CO 3) Create Render Panorama image

💡 Session Highlights

At the end of the session, students can create the graphics below.



📄 Lecture Contents

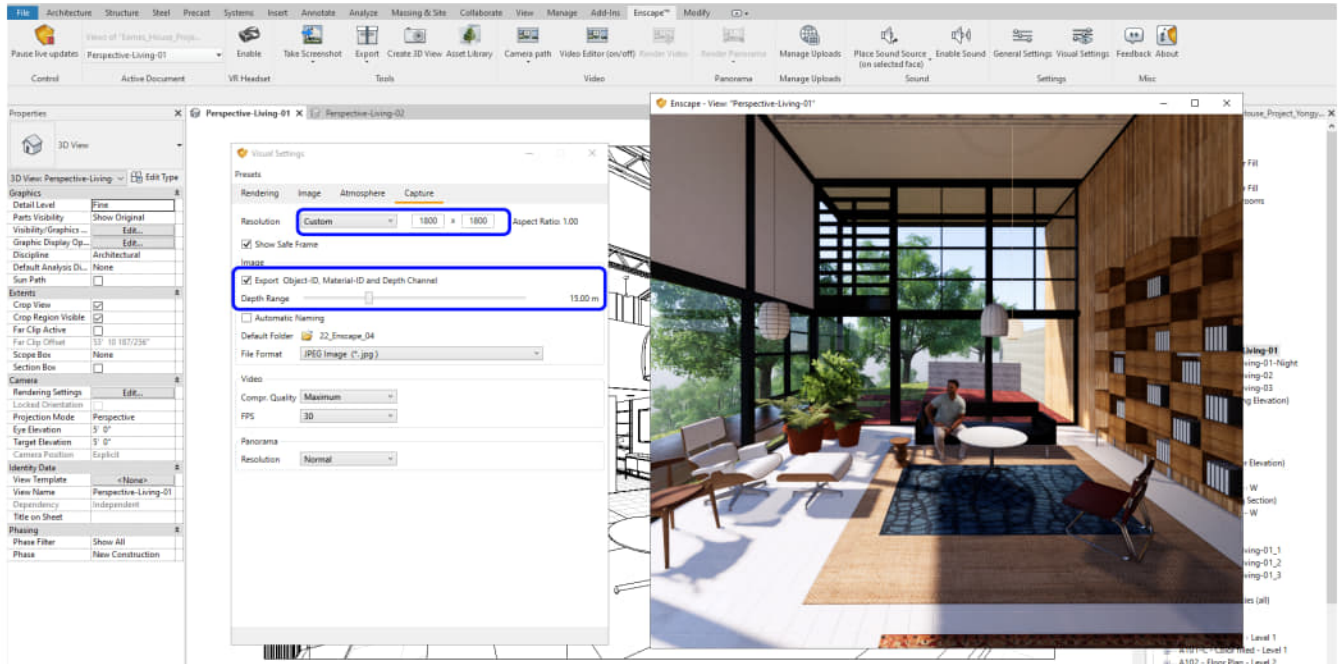
(CO 1) Export enlarged jpg files (Original, ID) for print

A YouTube element has been excluded from this version of the text. You can view it online here: <https://iastate.pressbooks.pub/visualgraphiccomm/?p=116>

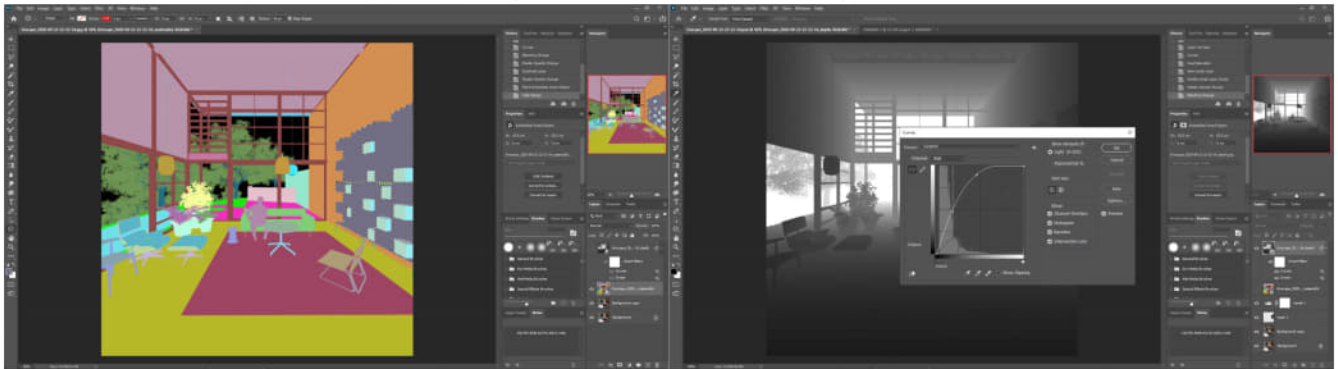
Refer to [lecture 14.1, CO 2], for the final render image process

If you need a special size of render image, change the resolution to Custom and change the values from Capture in Visual

Settings



You can use the ID images and Depth map to adjust the rendering in photoshop.



(CO 2) Create Executable file

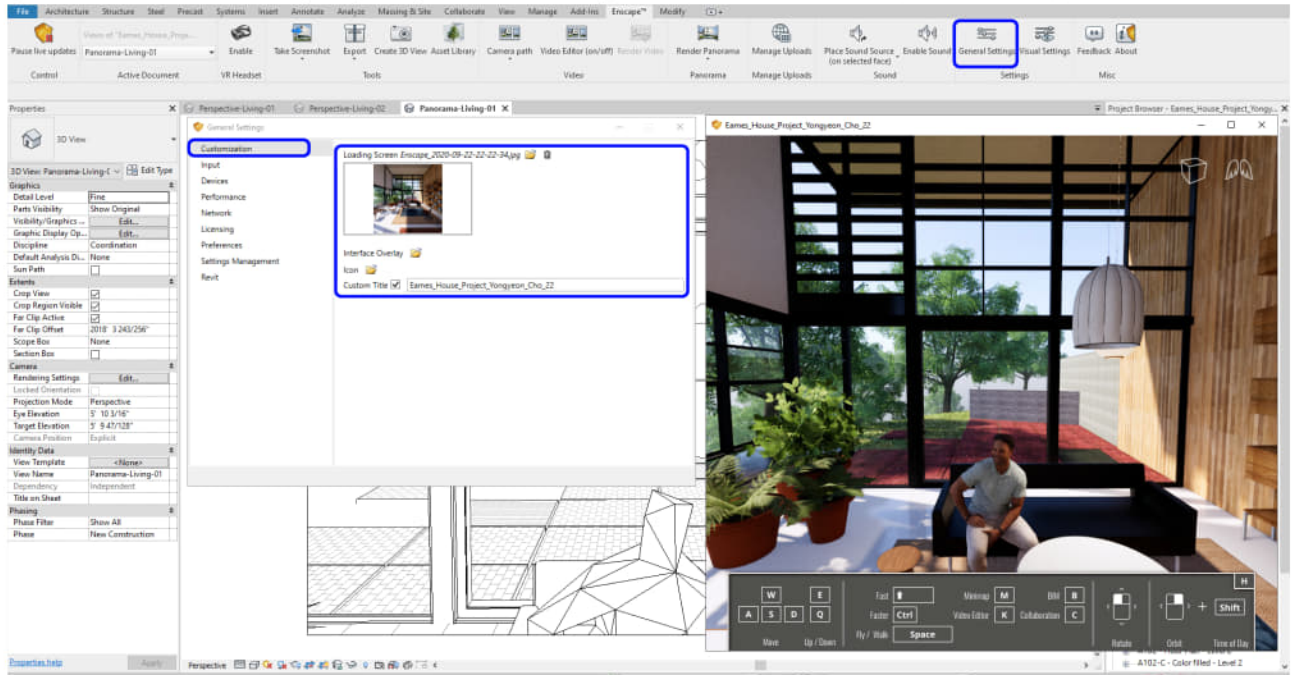
A YouTube element has been excluded from this version of the text. You can view it online here: <https://iastate.pressbooks.pub/visualgraphiccomm/?p=116>

To export the EXE file

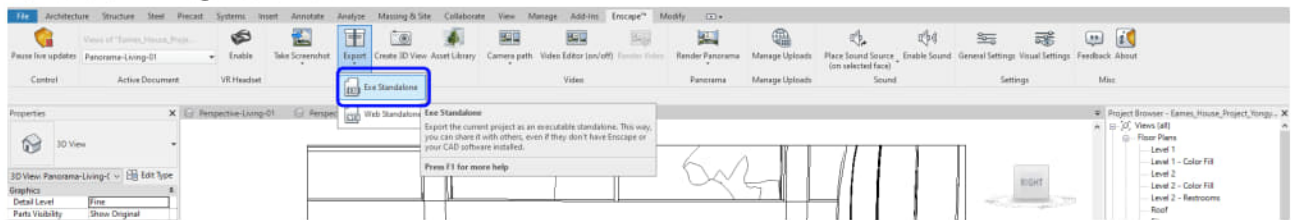
EXE file type is for a presentation, it does not require any programs like Revit, nor Enscape, material links, and lighting/render settings.

- [STEP 1] Click [Start] to launch Enscape and confirm your model is ready for export.

- [STEP 2] Select view to start
- [STEP 3] Add information (Icon, Title, Load first screen) from [Customization] on [General Settings]



- [STEP 4] Click Export > Exe Standalone



- [STEP 5] Save > Name the file name and wait until the file is created



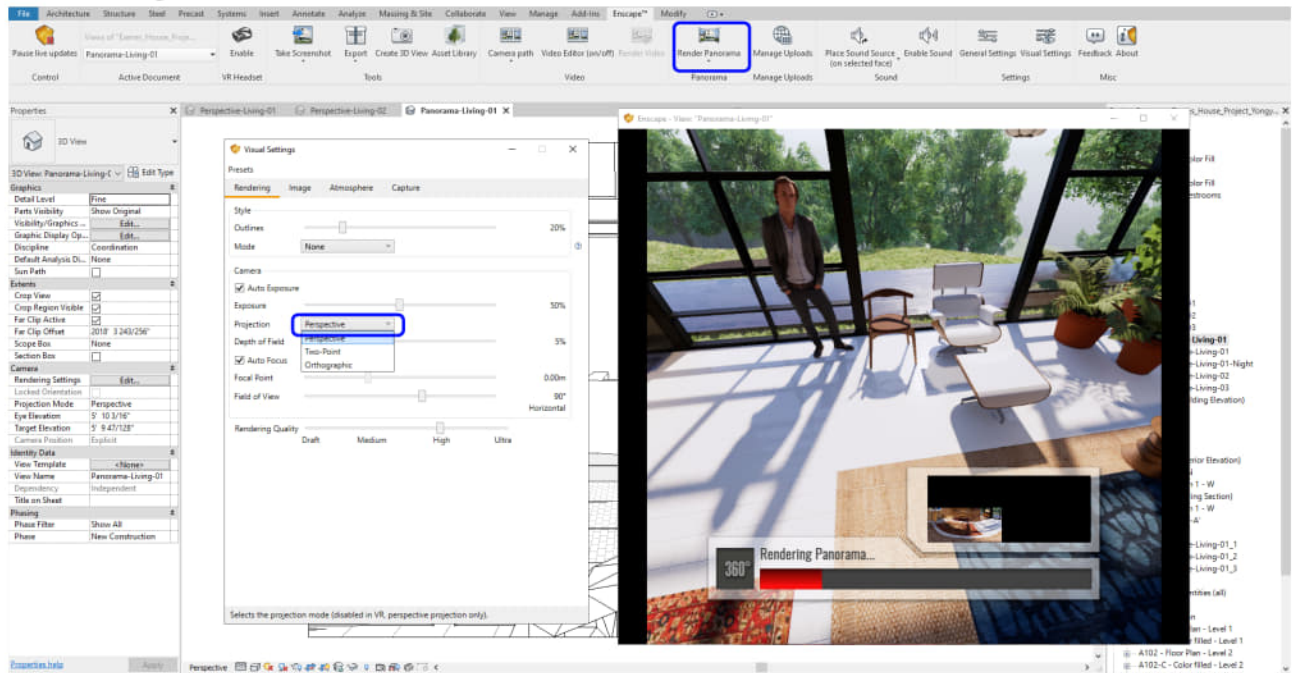
(CO 3) Create Render Panorama image

A YouTube element has been excluded from this version of the text. You can view it online here: <https://iastate.pressbooks.pub/visualgraphiccomm/?p=116>

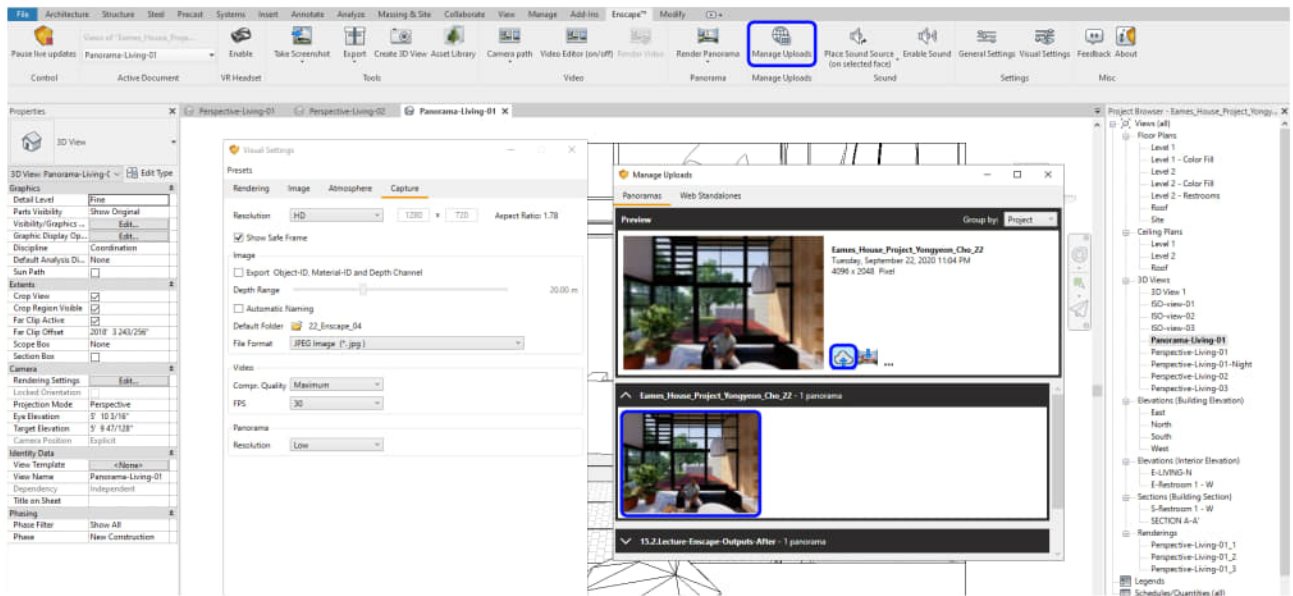
To create Render Panorama

(This option creates only one 360-degree rendering image with QR code at the same time)

- [STEP 1] Select a view to create a 360-degree rendering image (The center of a room/space)
- [STEP 2] Click Enscape Start. Confirm your Projection mode is [Perspective]
- [STEP 3] Click Render Panorama. The render takes time because this panorama needs to render 16 images (for the normal setting)

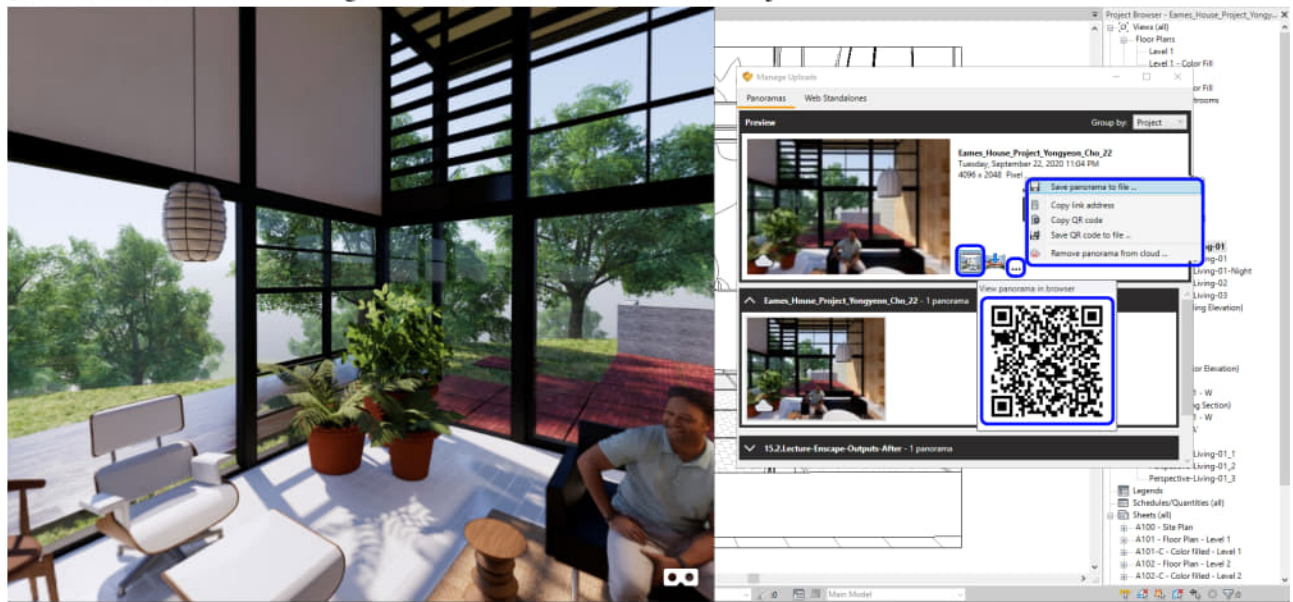


- [STEP 4] Automatically saved on [Manage Uploads], open [Manage Uploads]



[STEP 5] Click the rendered image > Upload the rendered image in ENSCAPE CLOUD

- [STEP 6] Click the file to open the web browser or use a QR code
- [STEP 7] And the rendered image file and the QR code can be saved in JPG



Tips from Enscape using Panorama view

Please read [this link](#) for using the panorama view

Please read [this link](#) for an advanced level using panorama images

References

Panorama & Cardboard. (2020, July 20). Retrieved October 23, 2020, from <https://enscape3d.com/community/blog/knowledgebase/panorama-cardboard/>

Appendix: Ancillaries

- **File package for a student** – [Download](#)
 - Base drawings
 - Source models
 - Material images

- **File package for an instructor** – **Request to the author via email**
(yongyeon@iastate.edu or choyongyeon1983@gmail.com) with documentation, they are a faculty member.
 - Base drawings
 - Source models
 - Material images
 - AutoCAD, Revit, and Enscape models

Recommended lecture schedule and to-do list for each session:

Week	Session	Contents
		<i>Introduction of AutoCAD</i>
01	01	<ul style="list-style-type: none"> • What is the application & 4 different AutoCAD • How to install the application • Understand AutoCAD interface – Ribbon, Panels, Model space, Layout tabs, Status bar, & Properties • AutoCAD setup tips – Options, Unites, Workspace • Types and structure of drawings in Auto CAD– Floor plan, RCP, Elevation, Section, & Details • Input commands and understand different selections • Understand basic drawing tools– Origin, Line, Move, Rotate, Copy • Attach image/PDF/CAD and Adjust the scale • Set the project folder, Save the file, and backups
		<i>Draw Floor Plans</i>
	02	<ul style="list-style-type: none"> • Understand Layers – Name, Line type, Thickness, & Color • Draw centerlines – Line, Ortho, & Offset • Draw exterior/interior walls, floor, millwork & openings – Polyline, Spline, Circle, Rectecgul, Object Snap, Mirror, Fillet, Trim, Extend, Array, & Match Properties
02	01	Finalize (2) Floor plans layout (1st floor & 2nd floor for the House) – Walls, Floor, Millwork, & Openings
		<i>Create Dimensions and Components</i>
	02	<ul style="list-style-type: none"> • Add/Edit dimensions (in model space)– Dim, & Dimension style • Add/Edit blocks from AutoCAD Tool Palette & Other sources – Door, Window, Column, Plumbing, Furniture & Equipment • Create custom blocks – Custom furniture
		<i>Draw Elevations and Sections</i>
03	01	<ul style="list-style-type: none"> • Draw a section • Draw an elevation from the Floor plan • Add/Edit Text & Annotation (in model space) – MText, Text style, M leader, & Multileader Style
	02	Add components (Window, Column, Plumbing, Furniture, & Equipment) in (2) Floor plans (Follow the wall layout and millwork, design your own furniture layout)
		Finalize (1) Section (House-Section A-A') and (1) Elevation (refer House-Section C-C') – with furniture, dimensions, and annotations
		<i>Draw Ceiling Plans</i>
04	01	<ul style="list-style-type: none"> • Draw Ceiling Plans from Floor plan • Add/Edit Hatch • Create Legends

Set Sheets

- 02
- **Understand the Model space and Paper spaces**
 - **Set a new layout** – *Page layout, & Plot styles*
 - **Set views in Paper spaces** – *Defpoints, Scaling*
 - **Add/Edit/Draw a titleblock**

Symbols and prints

- 05 01
- **Add/Edit symbols in Paper spaces** – *drawing title, elevation symbol and section letters, north arrow*
 - **Printing**

Add Hatches in the floor plans, sections, and ceiling plans

- 02
- Finalize (2) Ceiling plans (1st floor & 2nd floor for the House) – design your own lighting layout for the House

Create a PDF drawing set

Introduction to Revit

- 06 01
- **Purpose of using Revit** – *How & Why Interior Design uses Revit*
 - **Install Revit**
 - **Understand Project Templates** – *Default and Own*
 - **Save Revit file** – Set the project folder and backup file
 - **Open an existing project file**
 - **Keyboard shortcuts**
 - **Understand the User Interface** – *Toolbar, Properties, Drawing area, Option bar, and Project Browser*

Create a Site

- 02
- **Understand the site plan and information**
 - **Set the project location and understand building base point**
 - **Find GIS information**
 - **Add & Edit Site** – *Topo surface, roads, side works, property line, building pod, surrounding buildings, and trees*
 - **Define true north and project north**

Set Grids, Levels, Dimensions, & Building columns

- 07 01
- **Import CAD drawings**– *Floor plans, building elevations, and sections*
 - **Adjust and verify the scale**
 - **Create and modify grids and levels**
 - **Create plan views**– *Floors and ceilings*
 - **Create columns with dimensions**

- 02
- Finalize the (1) site (including terrain, roads, side works, property line, surrounding buildings, and trees)

Work on building columns

Add/Edit Beam, Walls, & Curtain Walls

- 08 01
- **Add/Edit Beam**
 - **Create walls**
 - **Edit walls wall properties** – *Wall thickness, Wall details, & Finishes*
 - **Edit/add wall properties** – *Wall opening, wall sweep*
 - **Add/Edit Curtainwalls, Mullions, & Panels**

Understand Visibility settings, Add/Edit Floor & Ceiling,

- 02
- **Understand View template, visibility graphics**
 - **Understand View range**
 - **Add/Edit Floors & Floor Properties**
 - **Add/Edit Ceilings & Ceiling Properties**

Add/Edit Stairs, Rails, & Roof

- 09 01
- **Add/Edit Stair** – three types of staircases
 - **Add/Edit Railing**
 - **Add/Edit Roof**

- 02
- Work on building beams, walls, floors, ceilings, stairs, railings, and roofs
- Finalize (2) Floor plans (1st floor & 2nd floor for the House) with dimensions

Add/Edit Windows, Doors, Lighting, Furniture, Tags, & Sheets

- 10 01
- **Understand the concept of family file**
 - **Add/Edit Doors and Windows**
 - **Add Tags**
 - **Add/Edit Lighting fixtures**
 - **Add/Edit Titleblocks**
 - **Insert Plan views and symbols** – *North arrow and graphic scale*

Add/Edit Model-in-Place Components & Edit Family

- 02
- **Add/Edit Furniture families**
 - **Add/Edit Model-in-place components** – *Custom casework*
 - **Add/Edit a New Family** – *Furniture*

Add/Edit Elevation, Section, Detail, Text, Annotation, & Rooms

- 11 01
- **Add/Edit Elevations & Sections** – *Adjust crop region*
 - **Add/Edit Detail views**
 - **Add Texts & Annotations**
 - **Add/Edit Rooms, Room tags, Room separators**
 - **Add/Edit a color fill scheme**
- Work on furniture, casework, lighting, doors, and windows
- Finalize (2) Ceiling Plans (1st floor & 2nd floor for the House) – design your own lighting layout for the House
- 02
- Finalize (2) Furniture Plans and Floor Floor Finish Plans(1st floor & 2nd floor for the House) – design your own furniture layout and finish choice for the House
- Finalize (2) Elevations (Decide your own views for the House)
- Finalize (2) Sections (House-Section A-A', House-Section C-C') – No furniture, Follow the given drawing

Add/Edit Views, Lighting, & Materials

- 12 01
- **Set perspective views**
 - **Set Isometric views**
 - **Edit Views – Graphic Display styles**
 - **Test Render**
 - **Set sun**
 - **Edit Artificial lighting**
 - **Add/Edit materials**
 - **Render material managements**

Create Revit Rendering, Revit Clouding Rendering

- 02
- **Insert other types of files** – *Sketchup, AutoCAD*
 - **Advanced render settings**
 - **Edit render qualities**
 - **Understand and make cloud renderings**
 - **Save Rendering outputs**
- Finalize (2) Perspective views (Revit rendering and Revit Cloud rendering) – (Decide your own views for the House)
- 13 01
- Finalize (1) Isometric view (Decide your own views for the House)
- Create a PDF drawing set

Introduction of Enscape

- 02
- **Understand what is Enscape**
 - **Control/navigate Enscape**
 - **Create views**
 - **Add model backgrounds**
 - **Add Entourages**
 - **Render images**

Edit Model and Materials

- 14 01
- **Understand workflow, name of the material**
 - **Use 3D Grass, Water, Reflective, textures**
 - **Change to Architecture Maquette (*White model, Outline*) & Light mode**
 - **Create Orthometric views**

Edit Lighting and Create Video

- 02
- **Save, and load presets**
 - **Set and adjust artificial lightings**
 - **Create a walk-through video**

Edit Render outputs

- 15 01
- **Export enlarged jpg files (Original, ID) for print**
 - **Create Executable file**
 - **Create Render Panorama image**

Finalize (3) Perspective views ((2) Enscape rendering + Photoshoped, (1) Lighting analysis) (Decide your own views for the House)

- 02 Finalize (1) QR code for Panorama rendering

Finalize (1) Video (30 seconds)

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