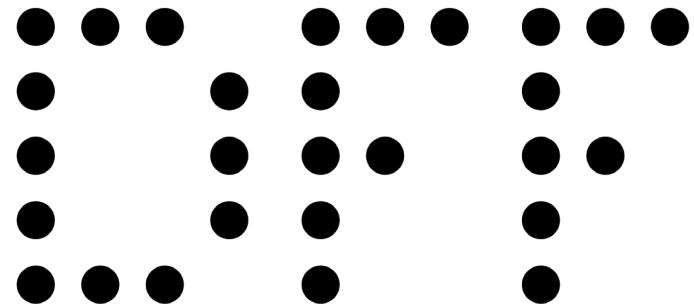


2.2

3D

rendering principles

Rendering guide for its principles



Digital Fabrication Facilities
for Architecture



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Q: Why rendering?

A:

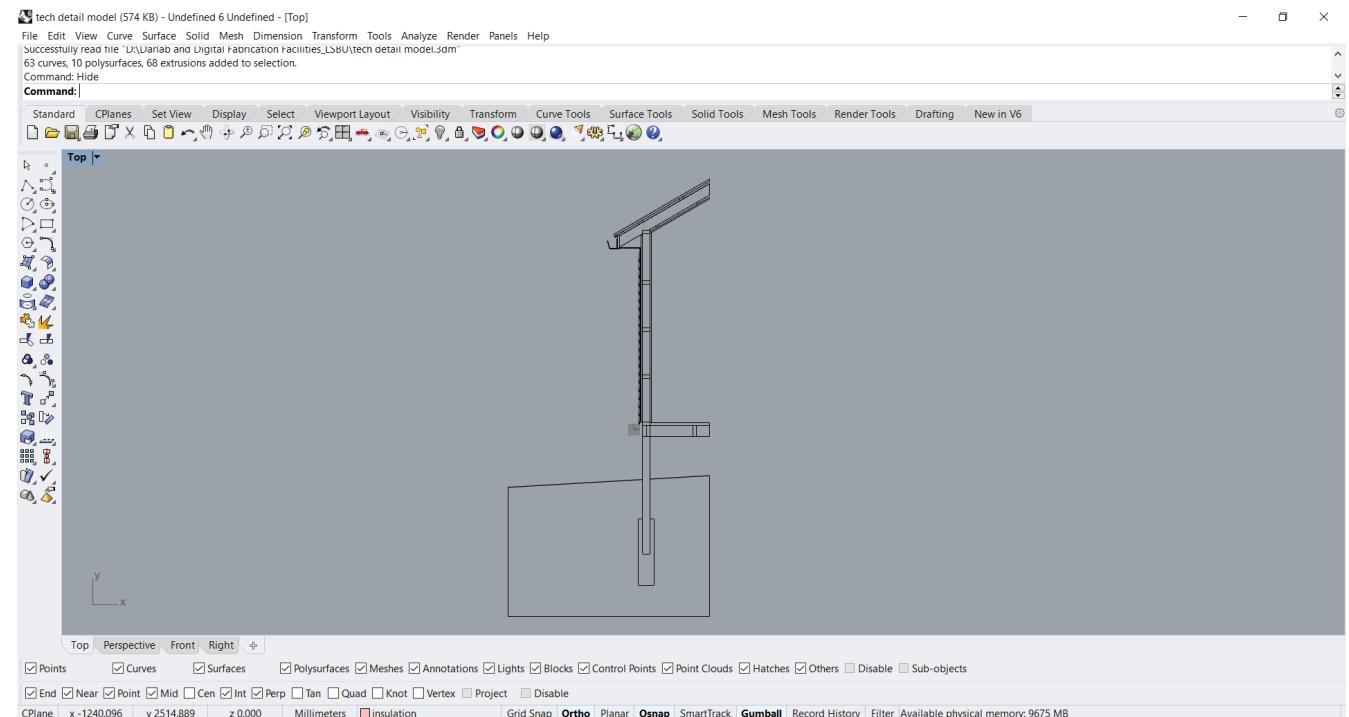
Rendering is an easy way to show 3D design for visualisation purposes. It has been used widely for product design and interior design. There are many rendering software out there and this guide uses Keyshot as an example as it is a standalone software and easy to show off the principles. You can use any rendering software you like and they usually follow the same logic.

Please note the document shows you the principle and in practice details may vary.

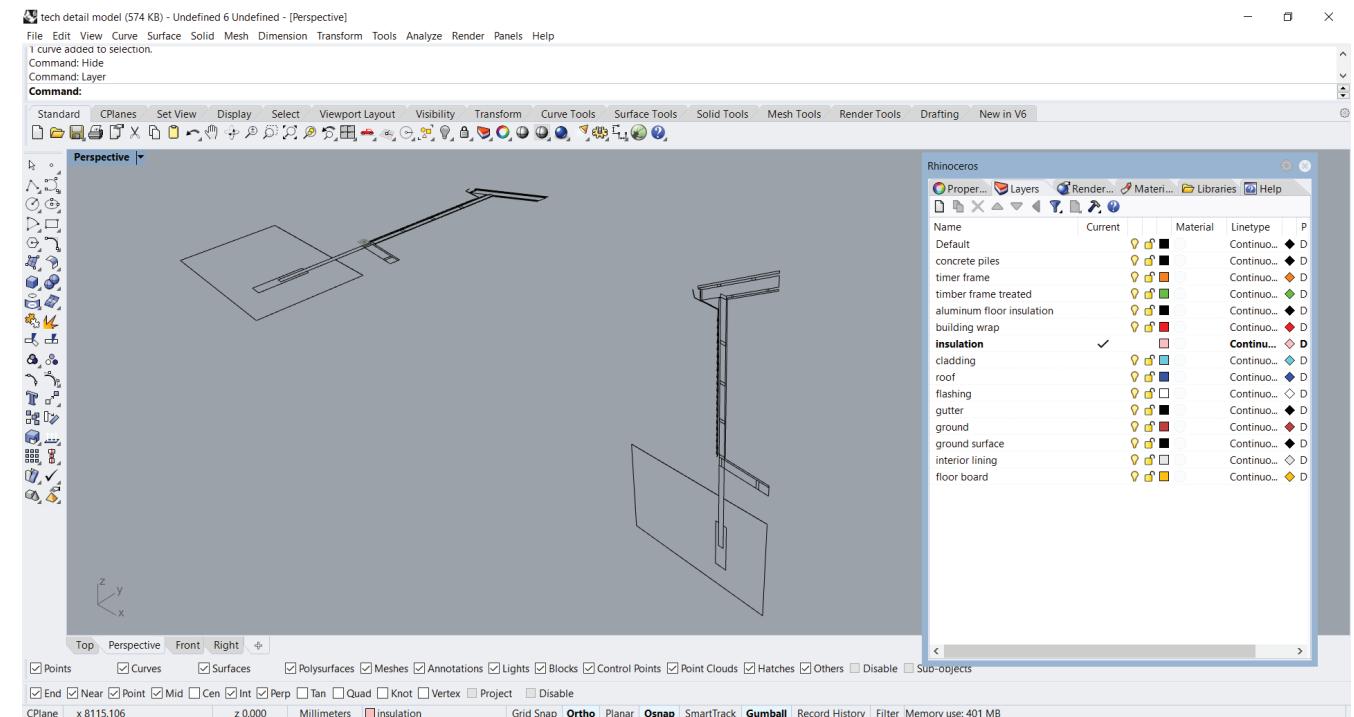
Q: What to prepare?

A:

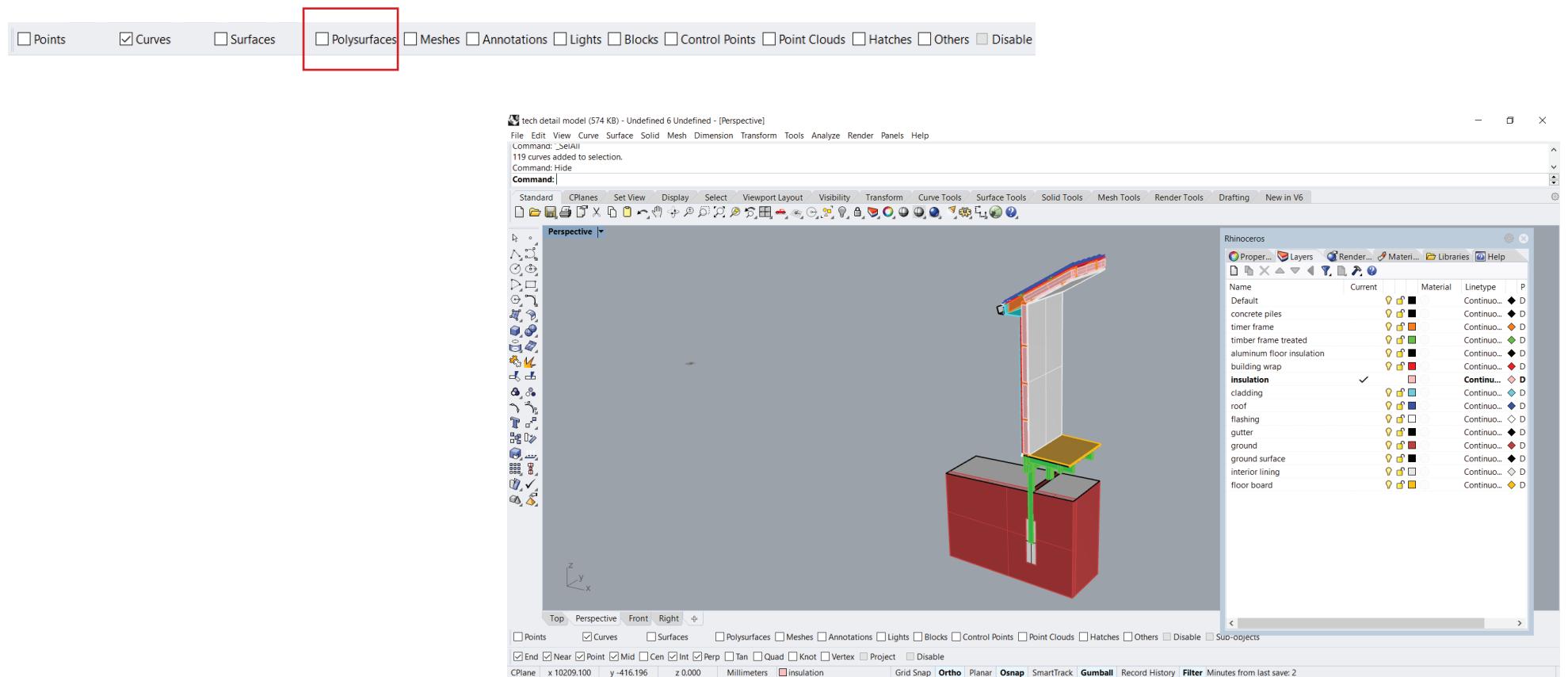
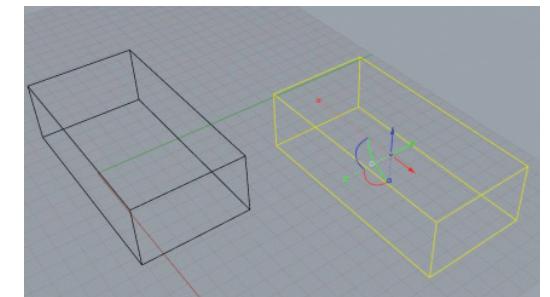
This guide will show you how to turn your 2D details into a 3D visualisation.
You will need to first produce a section with construction detail in a CAD format.
Then, You will turn it into a 3D model in Rhino. So first, open the CAD model in Rhino
on a plan top 2D view.



Prepare your CAD section for 3D modeling. Rotate the drawing to vertical position and prepare the layers. It is imperative to prepare an extensive layer which will store different model part. It is advised to arrange the model part with the same materials into the same layer. This will make the work in Keyshot much easier. Also, it is recommended to give the elements a thickness for better rendering quality.



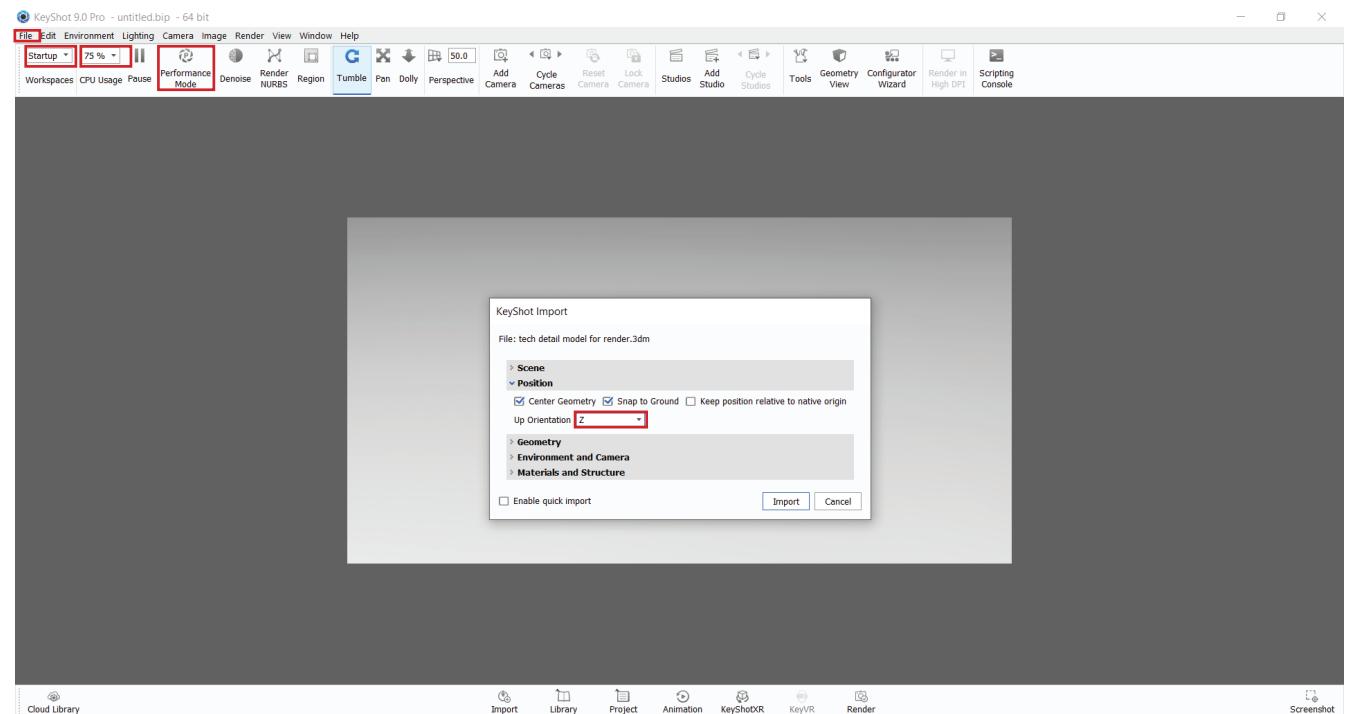
Make the 2D drawing into 3D model. The primary command to use is "extrudeCrv" and "move". Utilise gumball function to move the object. You can click on the arrow on the gumball to type in the distance you want to move. After this, your model is almost ready for Keyshot. It is recommended to export only without 2D section drawings. Use "selectionFilter" and right click the polysurface box. Then select all, this will automatically ignores all the 2D lines. Then, type in "export selected" option to export the model for Keyshot.



Q: How to set up?

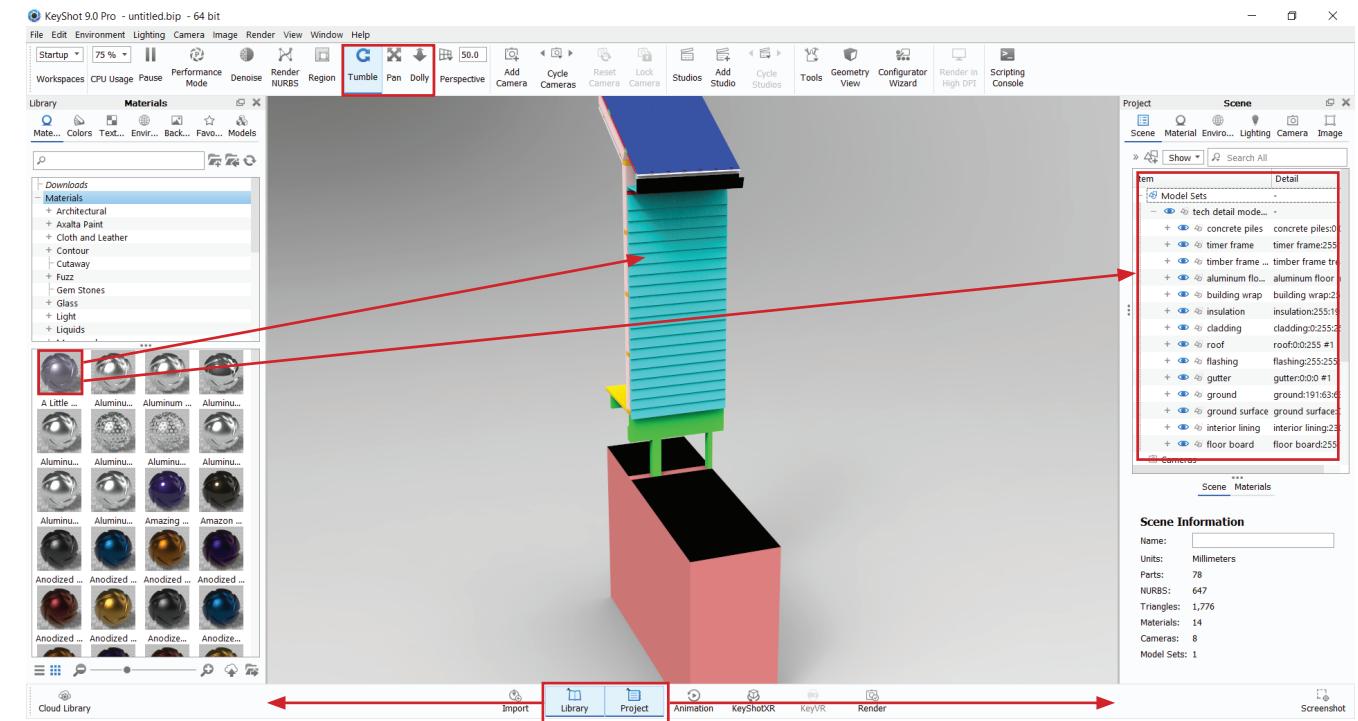
A:

Launch Keyshot, go to file to import Rhino model. You will see the options for import. make sure the Up orientation is set to Z. Change the dropdown menu to change the interface, you can have the option to have dark mode. Also in the menu it is recommended not to use 100% CPU to prevent lagging. It is recommended to activate "Performance Mode" for smooth operation. Other import option will be discussed later so for the timebeing, Do not use the options shown in this page.



Use left mouse bottom to navigate. The current navigation are shown in the top panel. By default, you can use the middle button to pan and use the scroll to zoom.

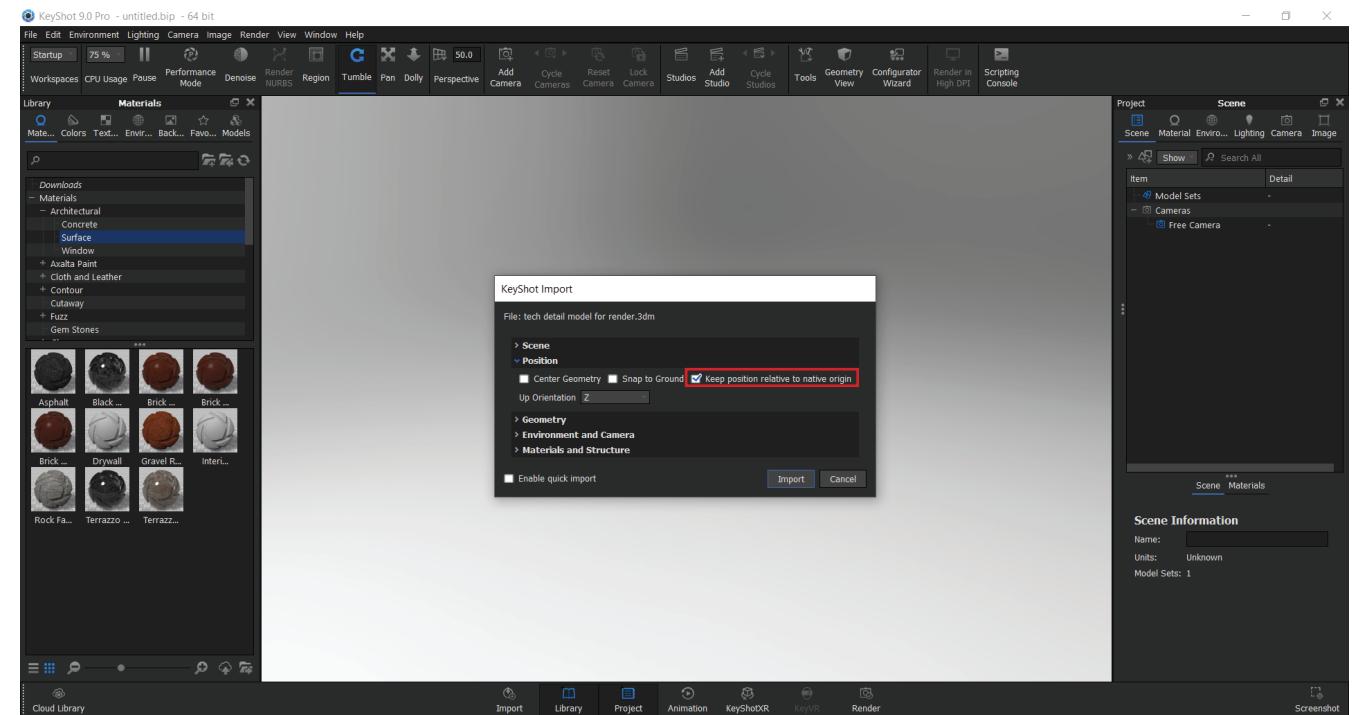
Activate the library and project panels. You can use the material and environment tab to import library resources into the model. The project panel will show the materials and environment being used in the active model set. In the model set, you can also see the layers that stores the model parts. To use the material library, simply drag and drop into either the active view or the layer panels to apply.



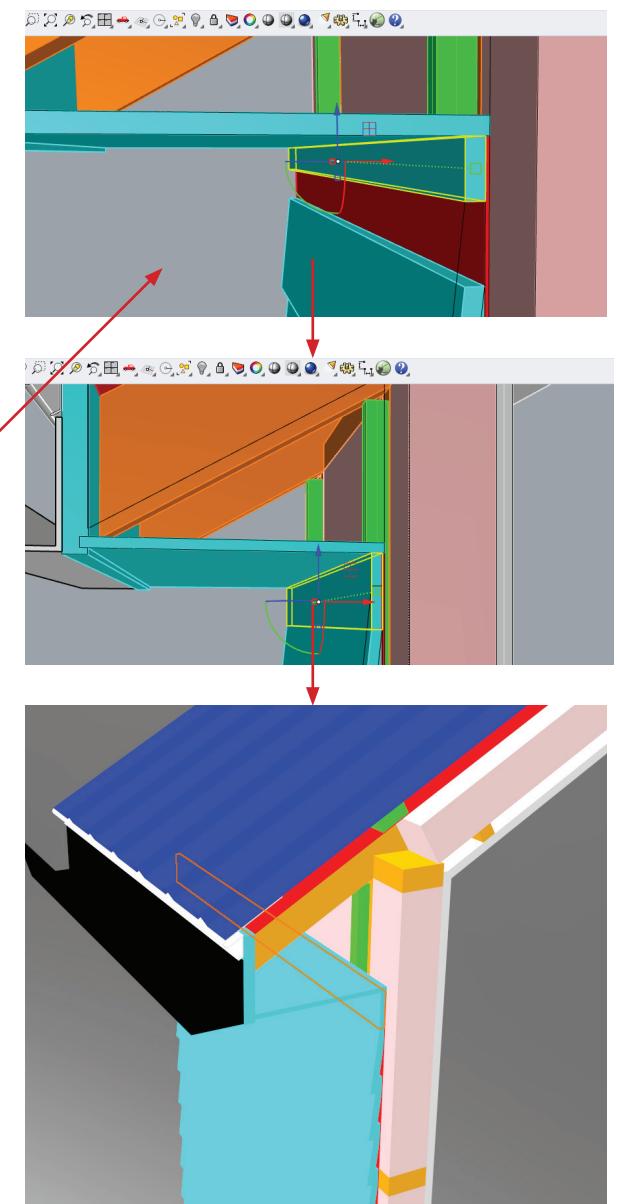
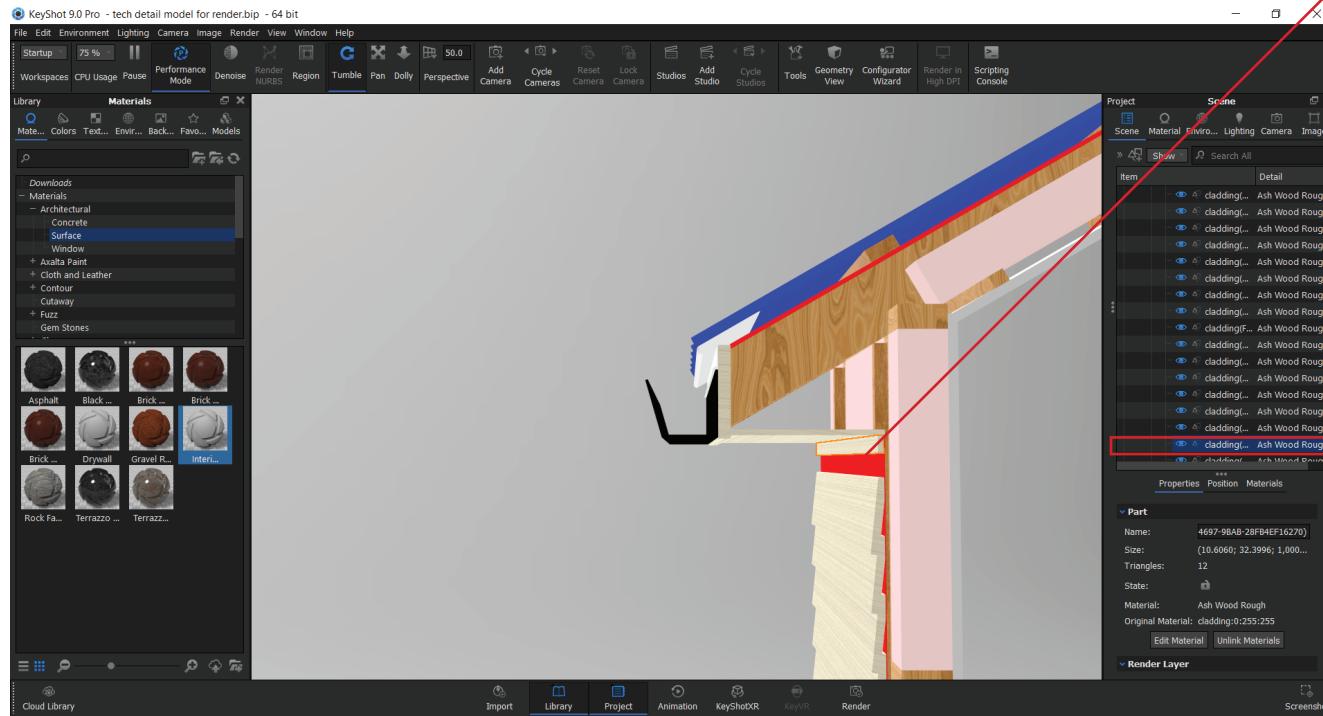
Q: How to import model?

A:

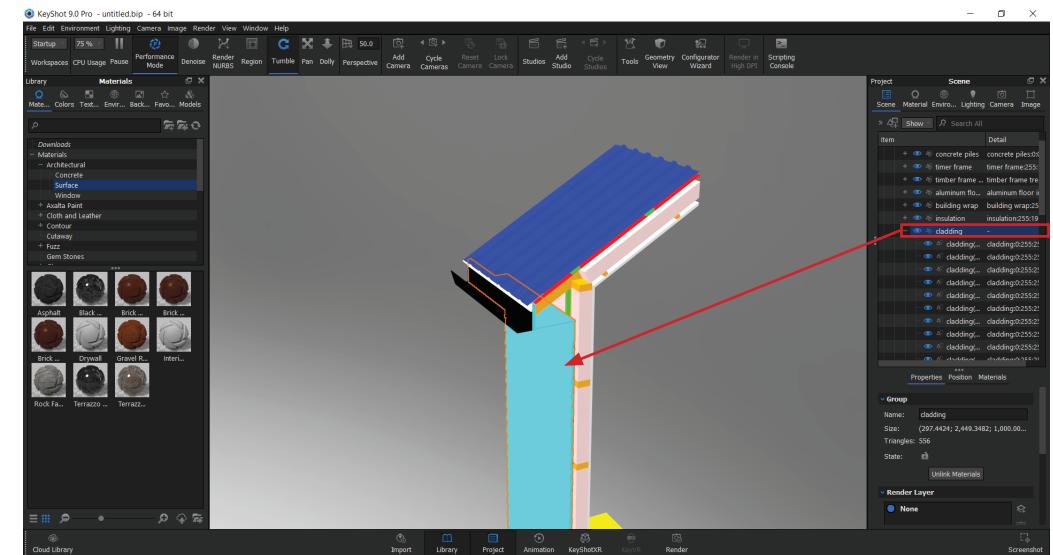
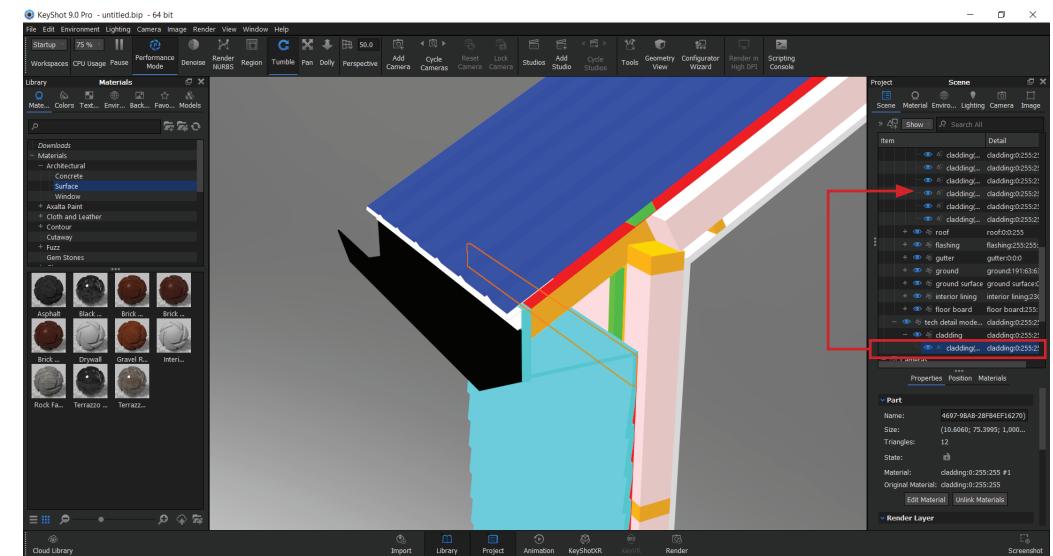
It is recommended to preserve the original 3D position while importing Rhino model into Keyshot. By doing this, it will help you retain editing ability for your keyshot model. In addition, you can also get the Keyshot plugin for Rhino to try it out yourself. While Importing the model, make sure to check "keep position relative to model origin" box.



Here is an example of utilising the editing ability for the Keyshot model. In the Keyshot model, an error has been spotted. So click on the defect piece in the 3D view space and it shows the selected model piece with an orange outline, in the project panel it will show you the piece selected automatically. So right click on it and click delete. Then go back to the Rhino model and change it. Then Use "exportSelected" command to export only the part adjusted. After that, follow the previous steps to import to Keyshot. Then, you will see that the newly adjusted piece appeared in the correct place in the model set.

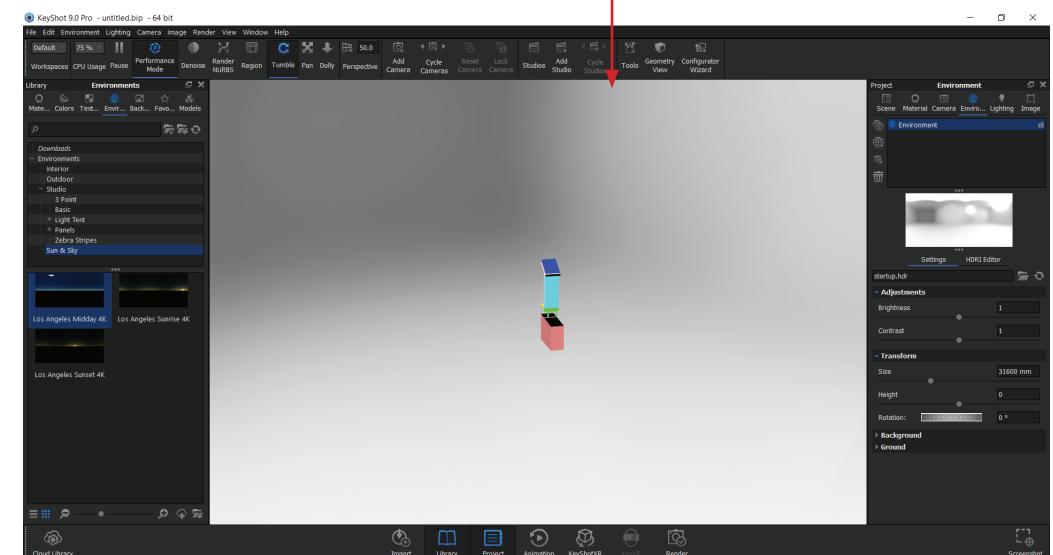
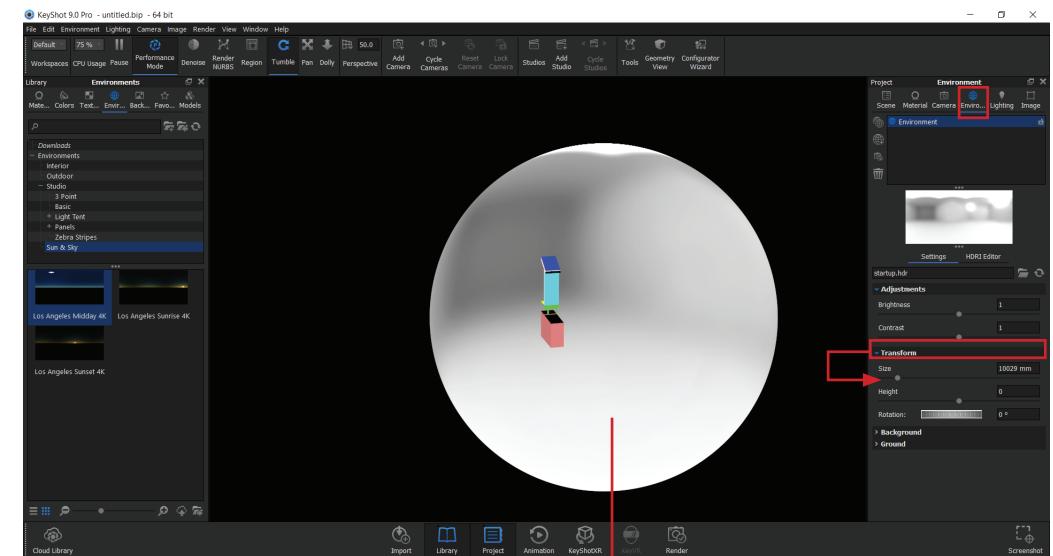


After importing the adjusted model piece, you will see in the project panel that a new layer has been created. Now you will need to merge this into the existing layer to prevent overly complicating things. Select the piece directly through the project panel and drag it into the existing layer structure. Ignore the warning window and proceed. Then once you select the layer on the model panel, you will see the orange outline of the entire region is highlighted in the 3D view.



Now we need to adjust the environment space. If you zoom out far enough, you will realise that your model is in a weird place. It happened because we chose to retain the model's original location instead of snapping it in the centre. This can be easily fixed. On the project tab, select the environment menu and you will see the options to manipulate the environment. Now go to the transform drop menu and adjust the size bar until you can no longer see the outline of the sphere.

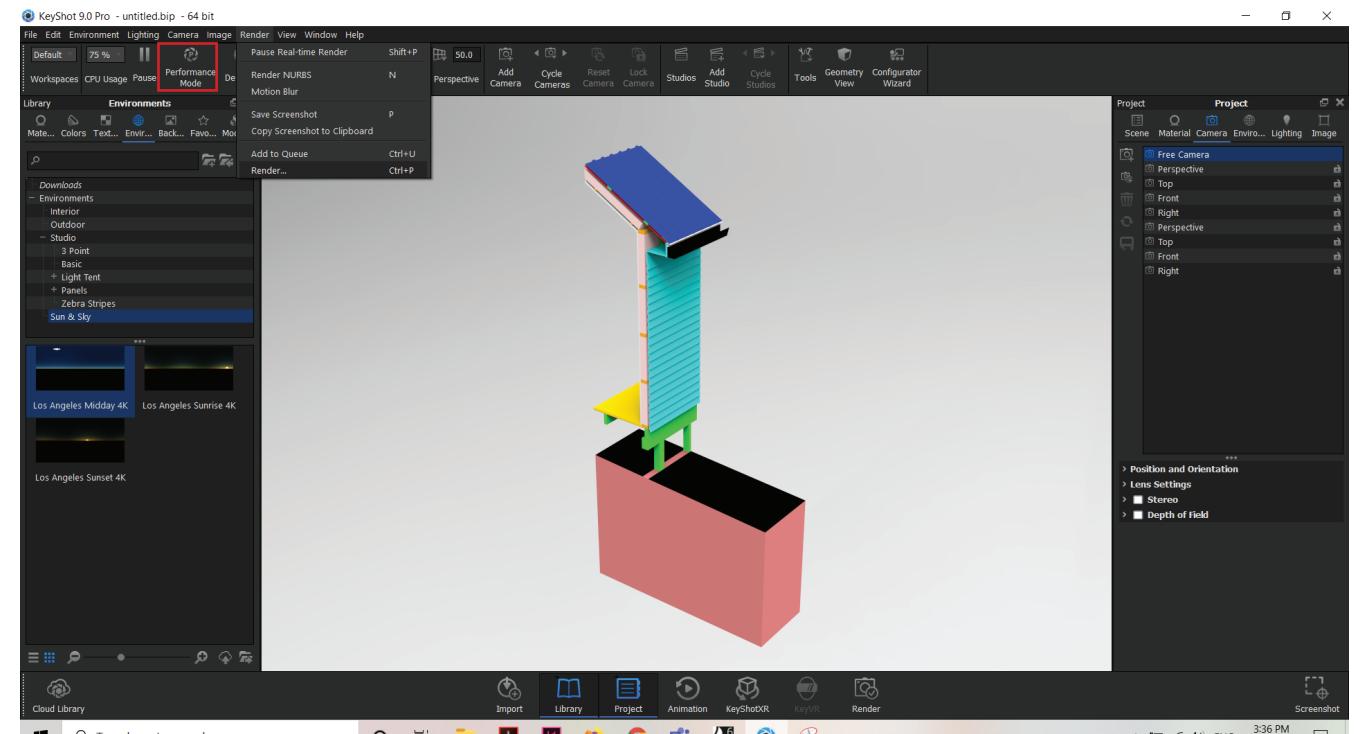
It is worth mentioning that the environment library works the same way as the material library, you just need to drag and drop to apply them to your model set. Now we are ready to dig into the render options.



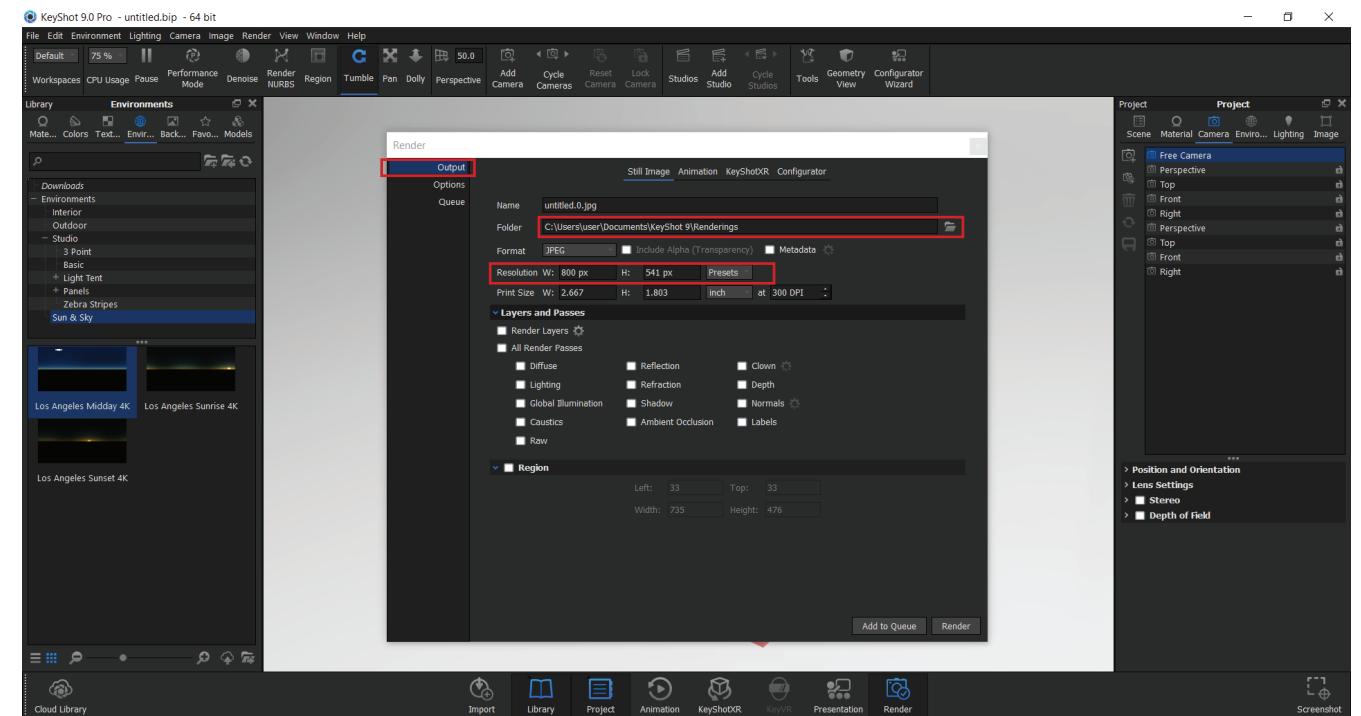
Q: How to render?

A:

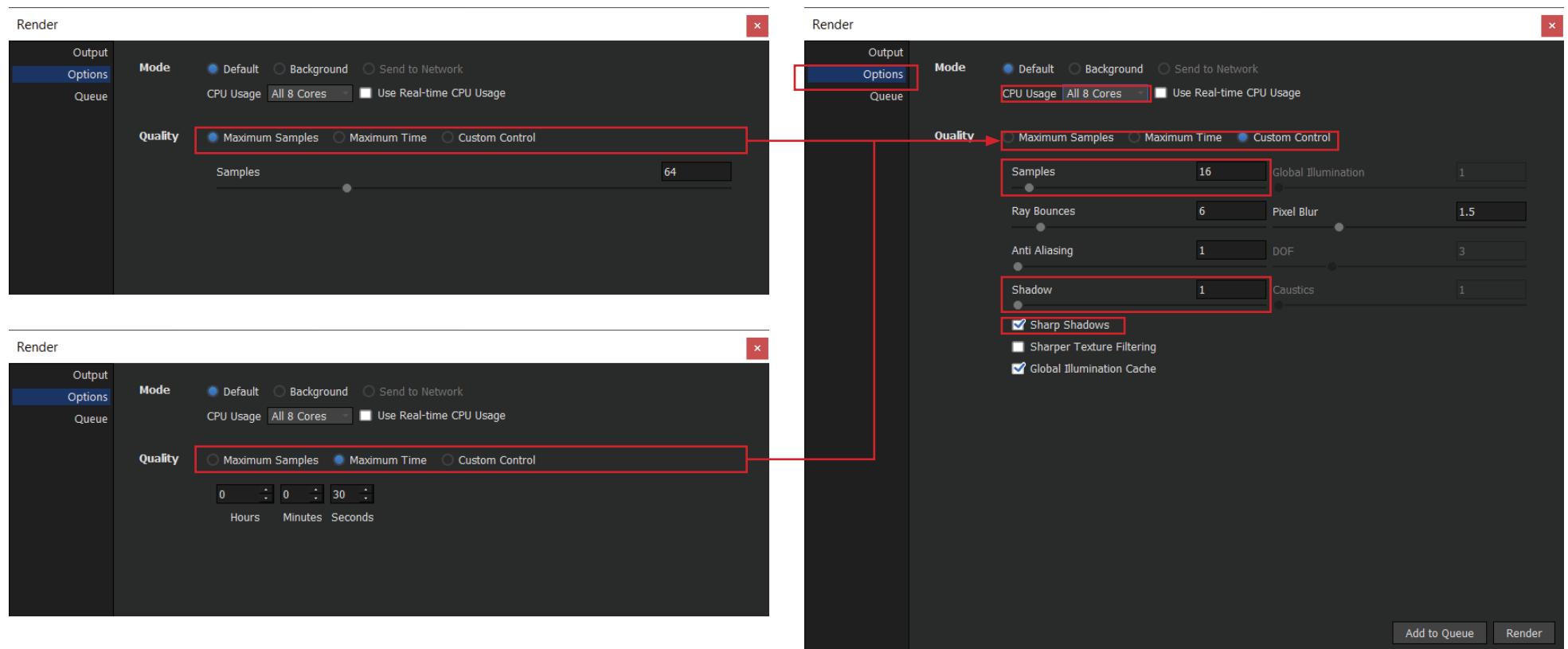
It is simple go to the render drop down menu on the top bar and click render to activate rendering options. But before you do any rendering, make sure you deactivate the "Performance Mode" option. This is really important because if you don't do that, your render will only generate a preview and the software won't tell you about it.



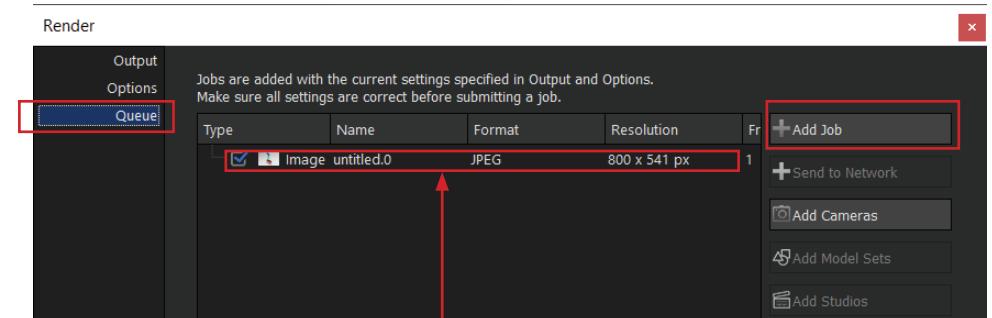
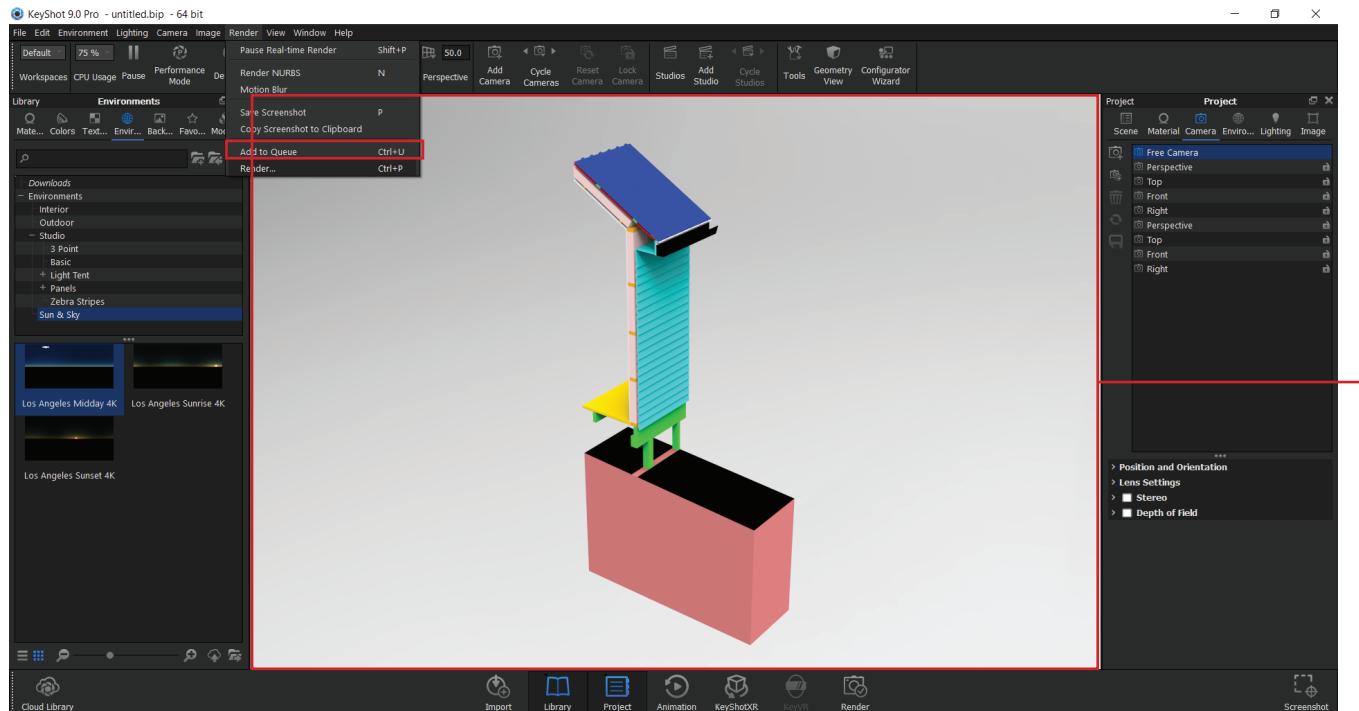
As soon as you see the rendering options, there are three tabs of options. by default, you will see the output tab. You will have the option to choose the destination folder and other options. Keyshot should create a shortcut on the desktop so you can use that to access the default location if you don't change it. The other important option is resolution, it will give you the option to change the size of the render. You can simply choose from default set up in the preset drop down menu. This will play a part in affecting the quality of the render. You can also choose to render only a specific layer/special passes by using the additional drop down menu. You can also choose to render by region that allow you to render the part you select on the screen.



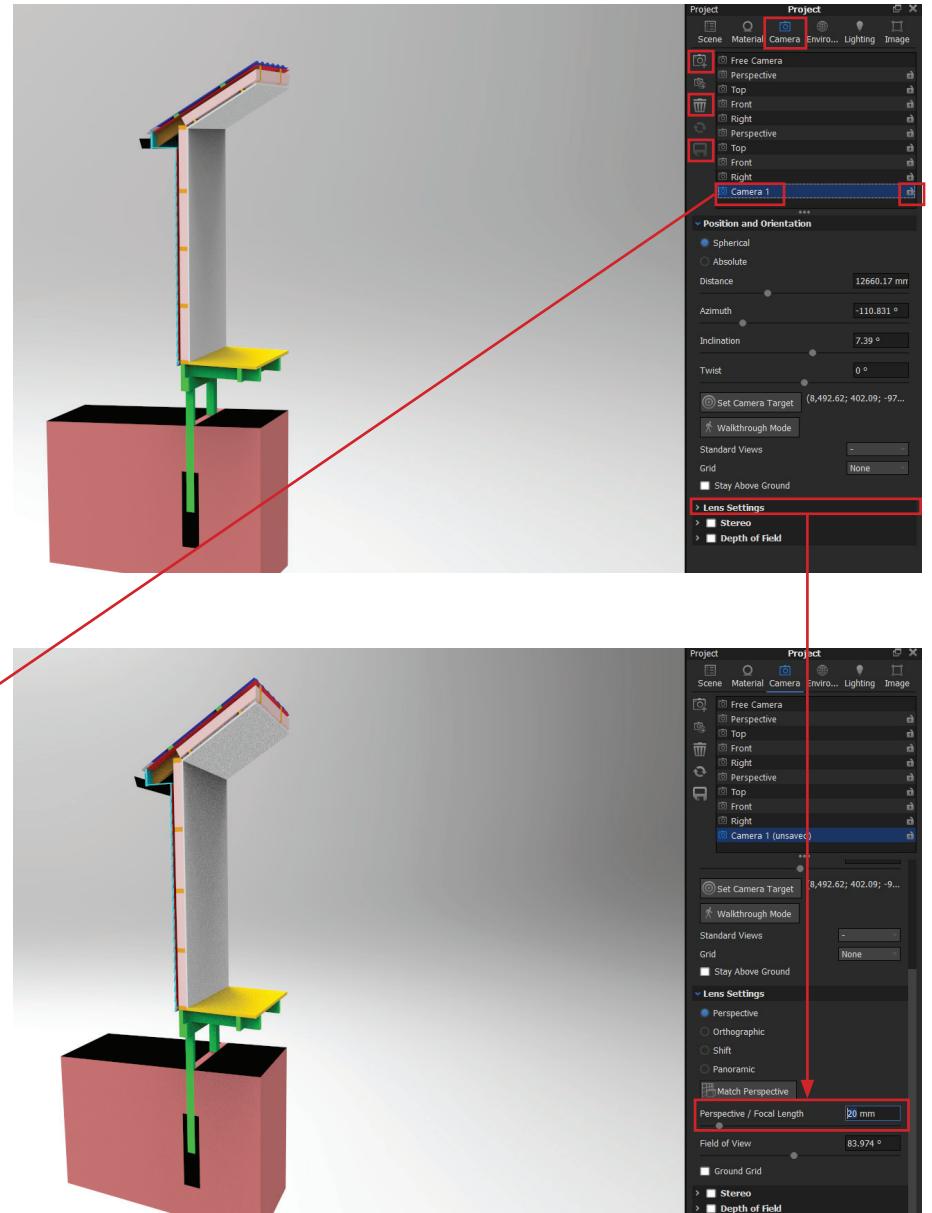
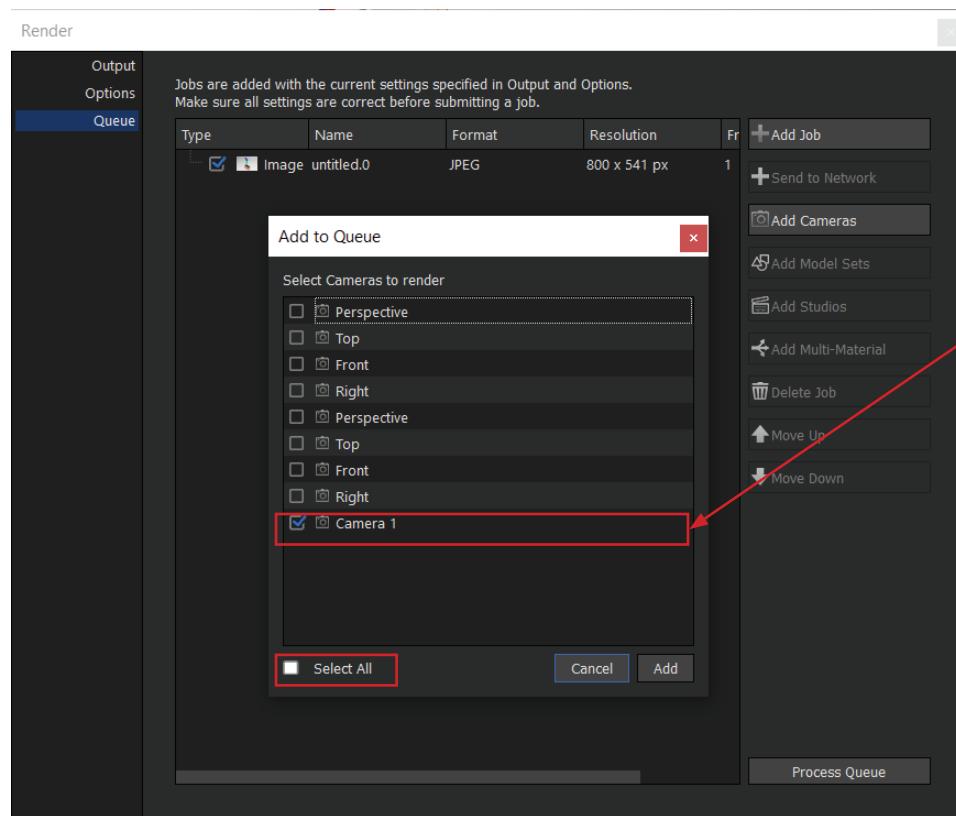
Under option tab, you will see the control for render quality and resource allocation. It is recommended not to assign all the CPU cores to allow you to use the machine when rendering is taking place. Samples will control the quality of the rendering. For maximum option and maximum time option, it will enable the computer to run indefinitely until the threshold is met. For custom control, you have the option to adjust shadow as well as samples.



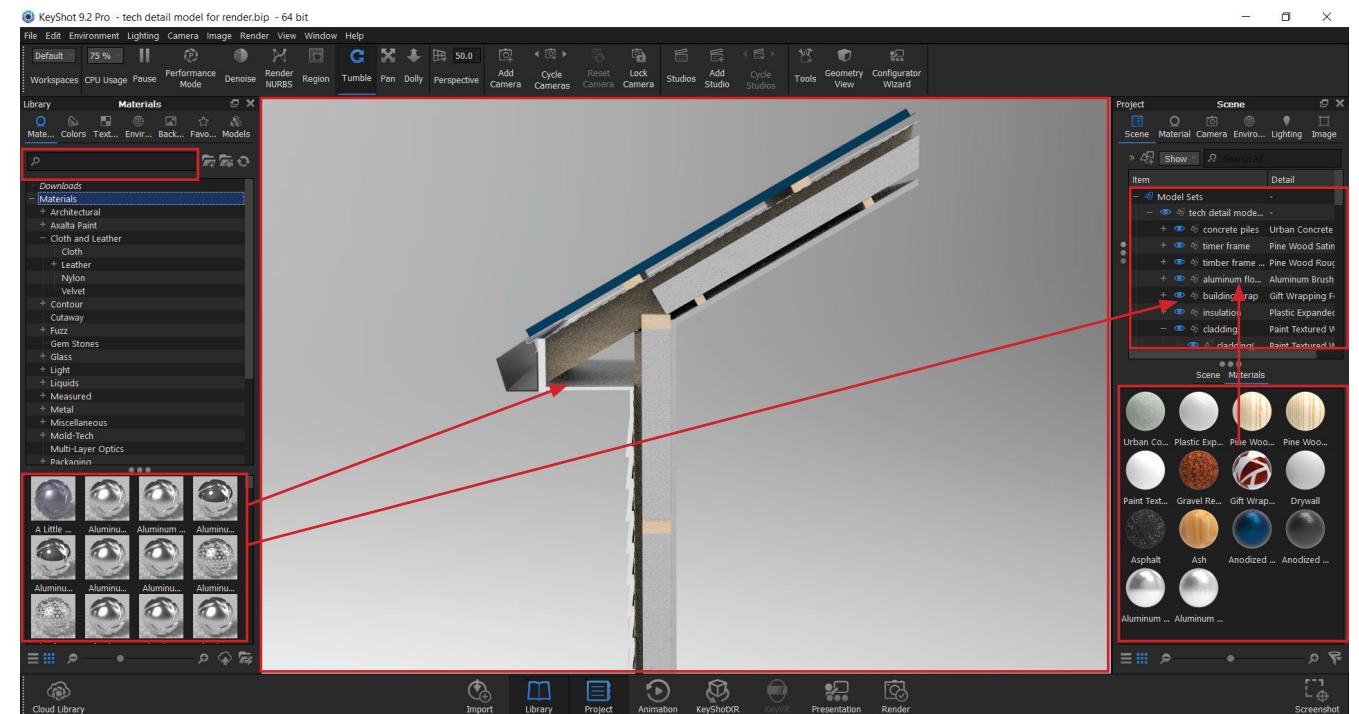
Render queue is a really important tool. It allows you to set up your job before you proceed to rendering, which will improve your productivity. It can be accessed in render drop down menu directly. There are two usable buttons when opened. Add job will put the current view on screen into the rendering queue. Add camera is a more advanced option but will require camera set up first, which will be explained later.



To set up a camera, go to the Camera menu on project panel. Click the first button on the side to add camera, you can also have the option to delete view. You also need to save the camera view before rendering. You can also lock the camera to make sure nothing changes once you've finalised a view. Change the perspective to make it more architecture. Then click "Add camera" and choose to add a job. Use the select all box to select/deselect all.



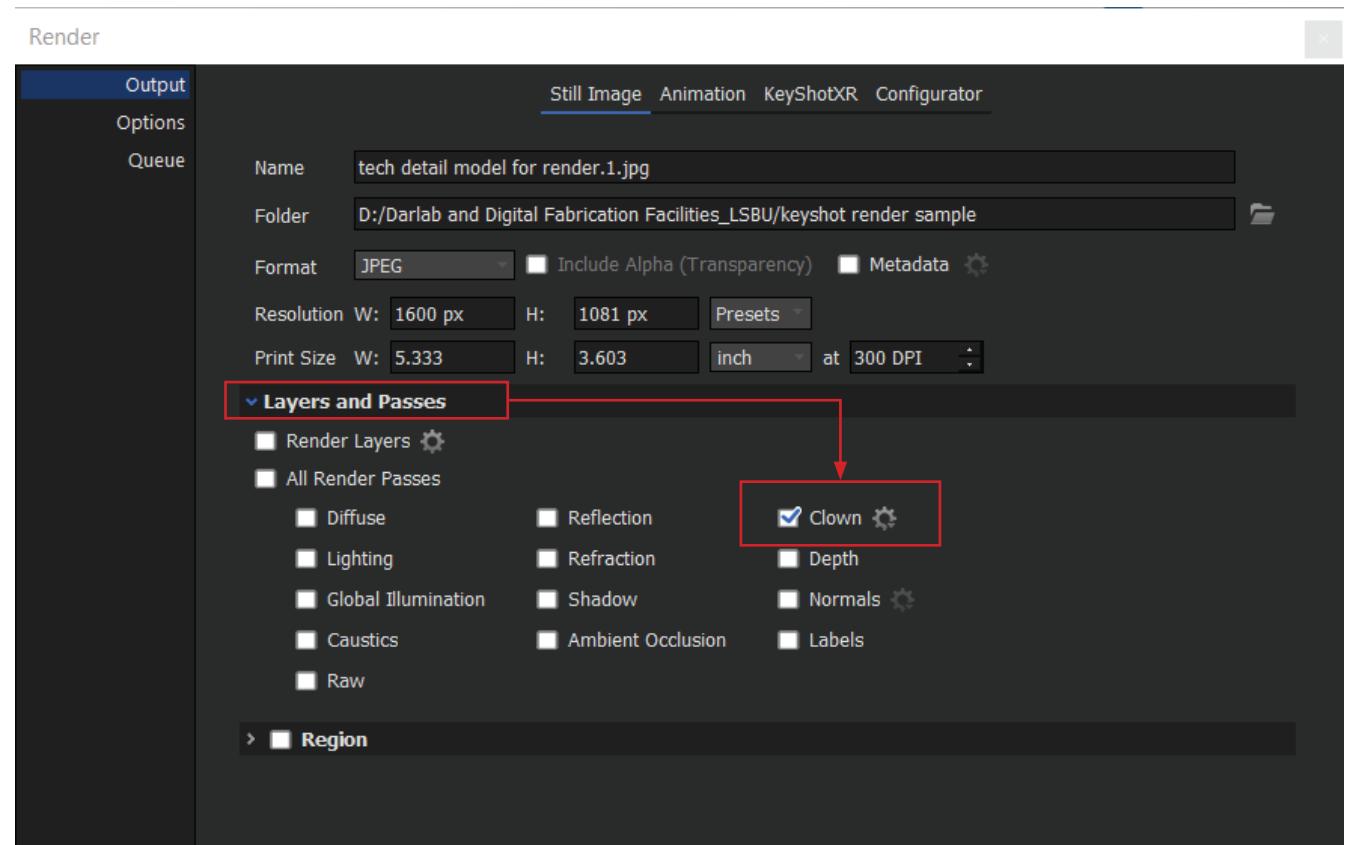
Now it is the time to assign materials. Use the search bar in the library tab to find the material you want. Or you can also navigate the catalogue manually. Then drag the desired material either to the 3D view or the layer field in the project panel to apply material. The materials used in the active model set will be displayed in the bottom half of the project panel, which is a good indicator to use. You can check this field to make sure all the parts in the model has been assigned a material. To check this simply hover on any of the materials in the project field and it should display the materials with the correct name. If it displays a name of a layer that means that the afro-mentioned layer hasn't been assigned a material.



Q: How to prepare?

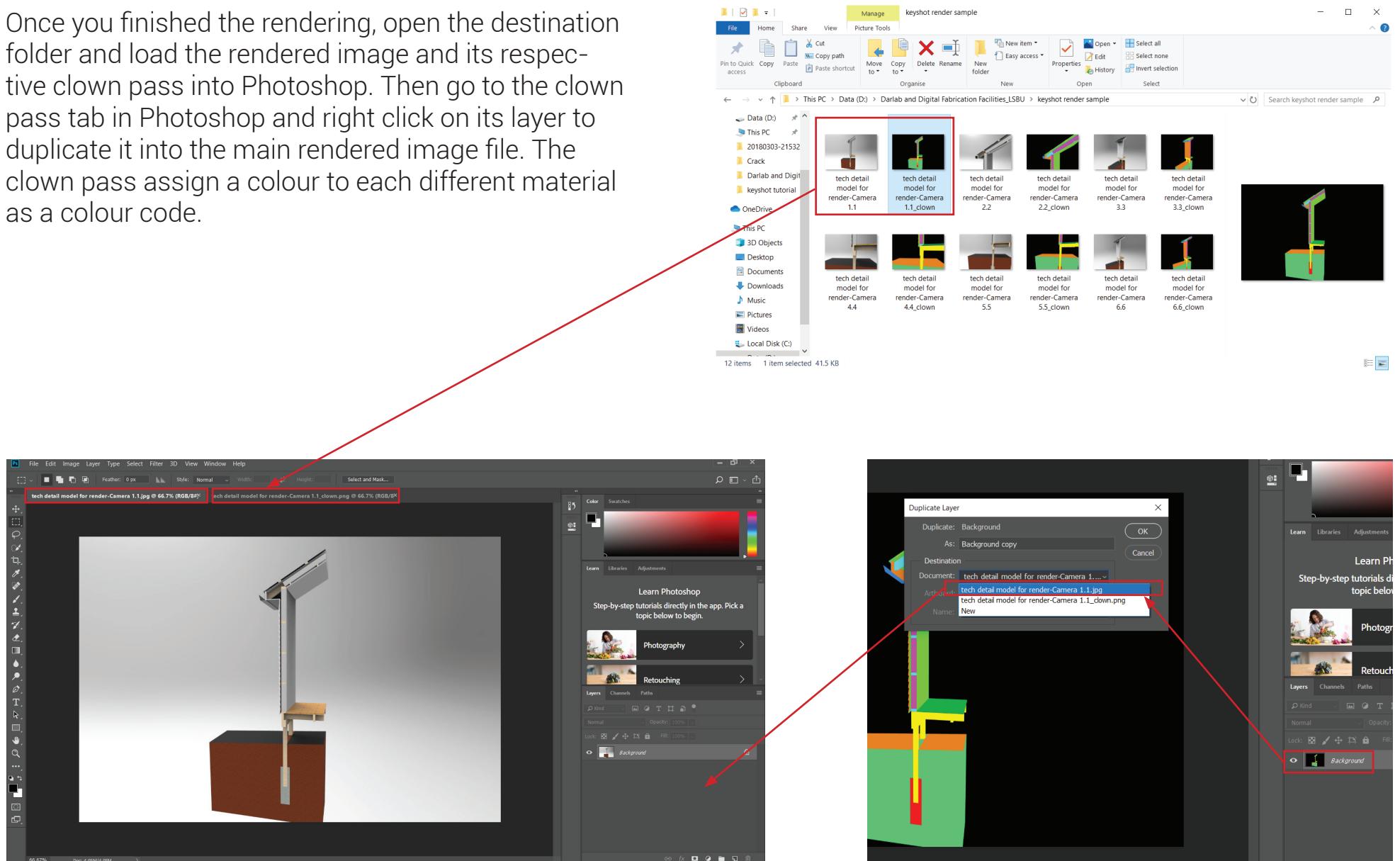
A:

Before you render anything, you have to activate the clown passes in render output option. Failure to do so will result in your post processing extremely tedious or even impossible!!!

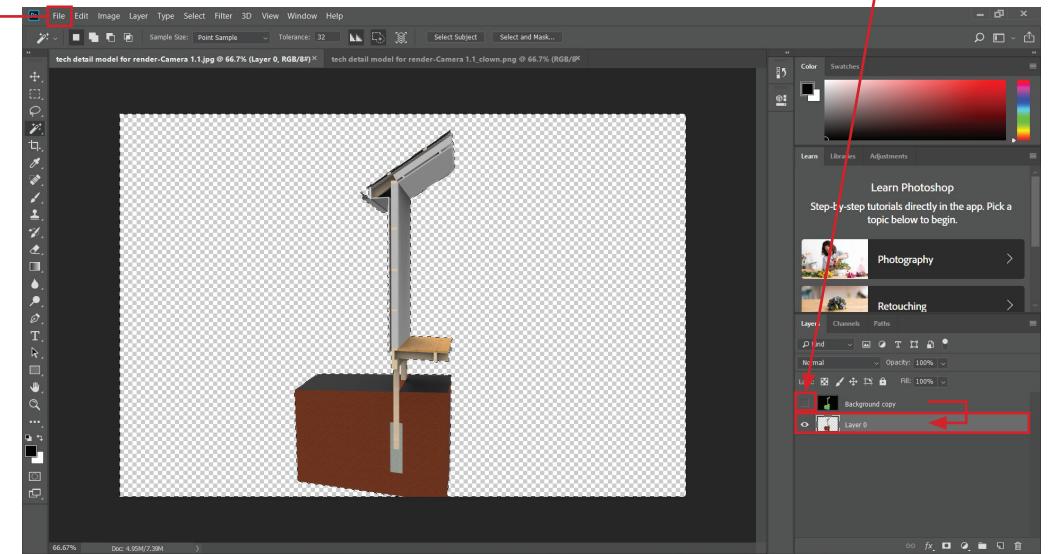
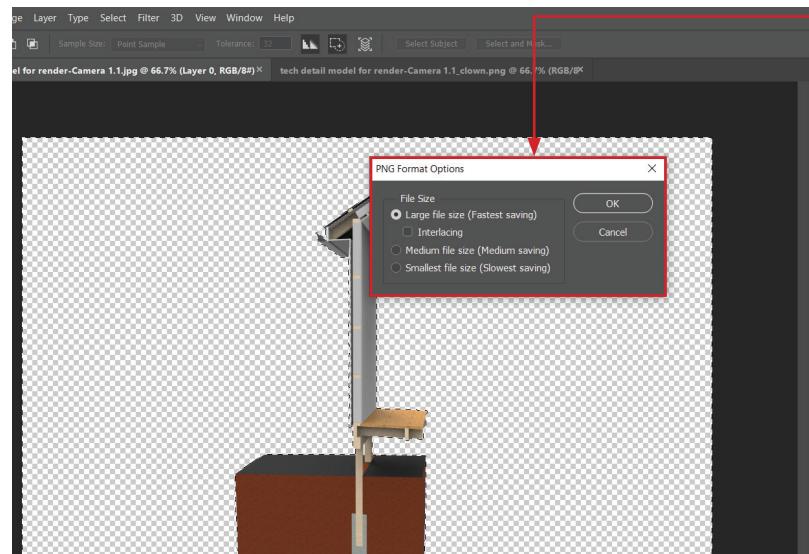
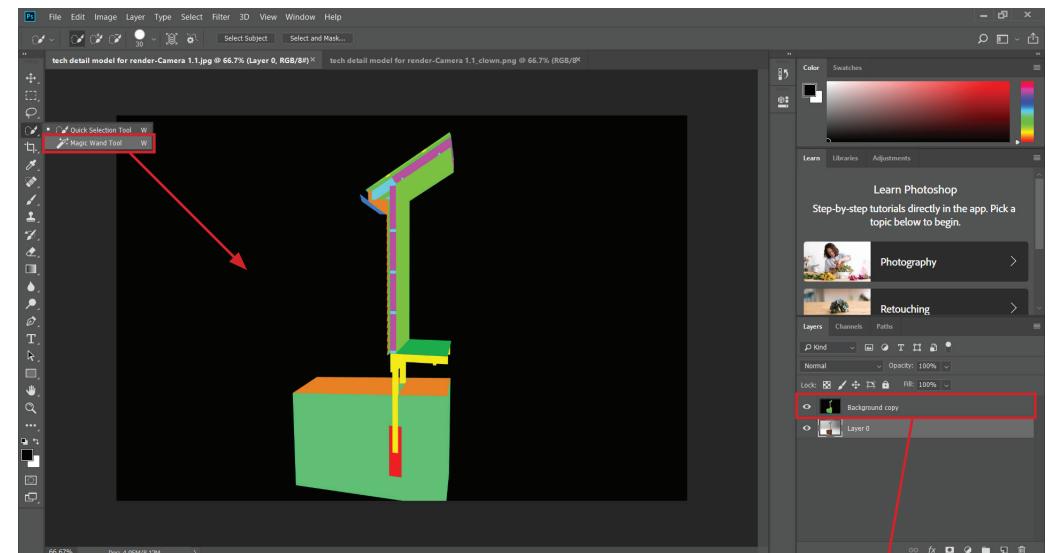


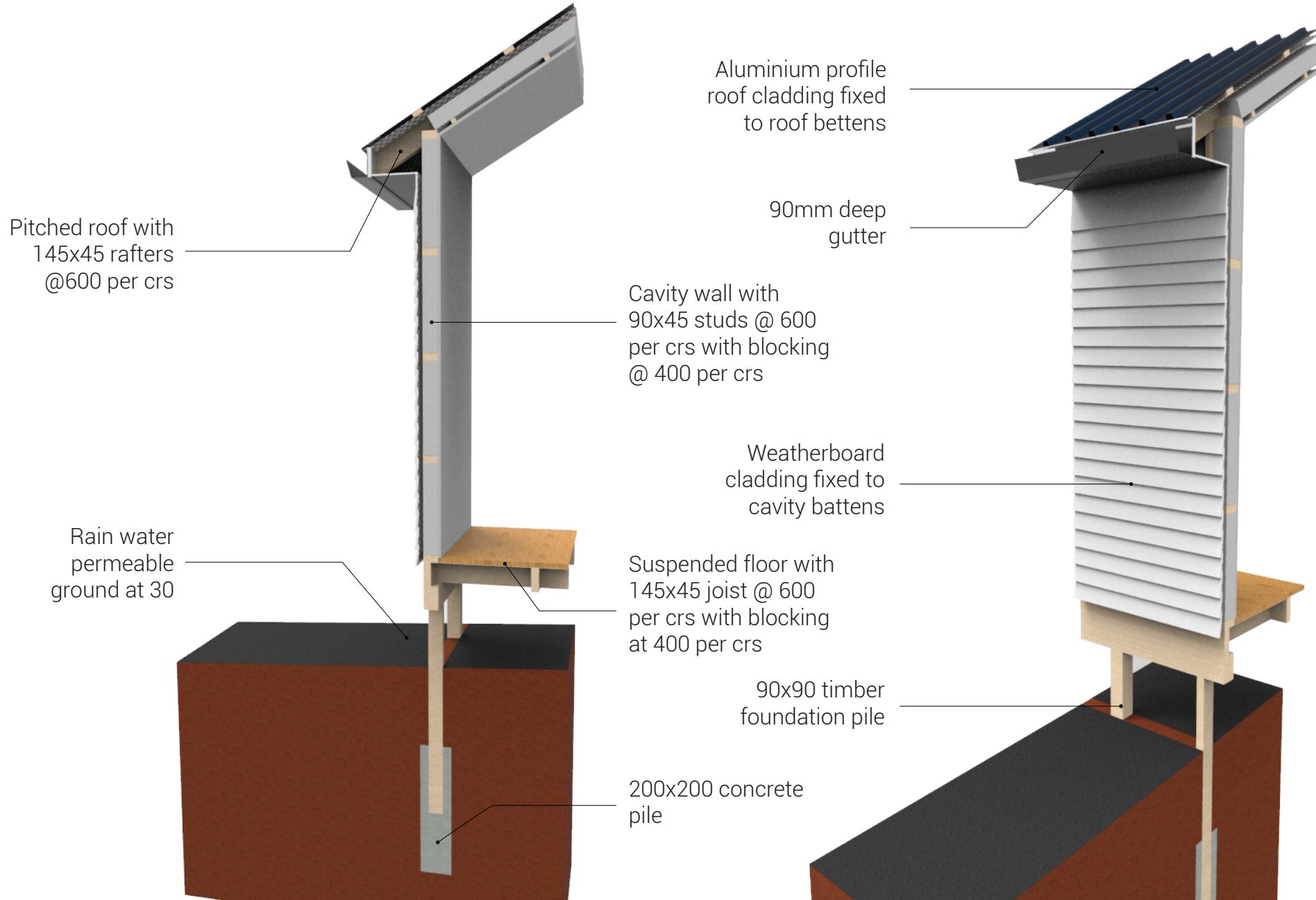
Post processing / How to prepare

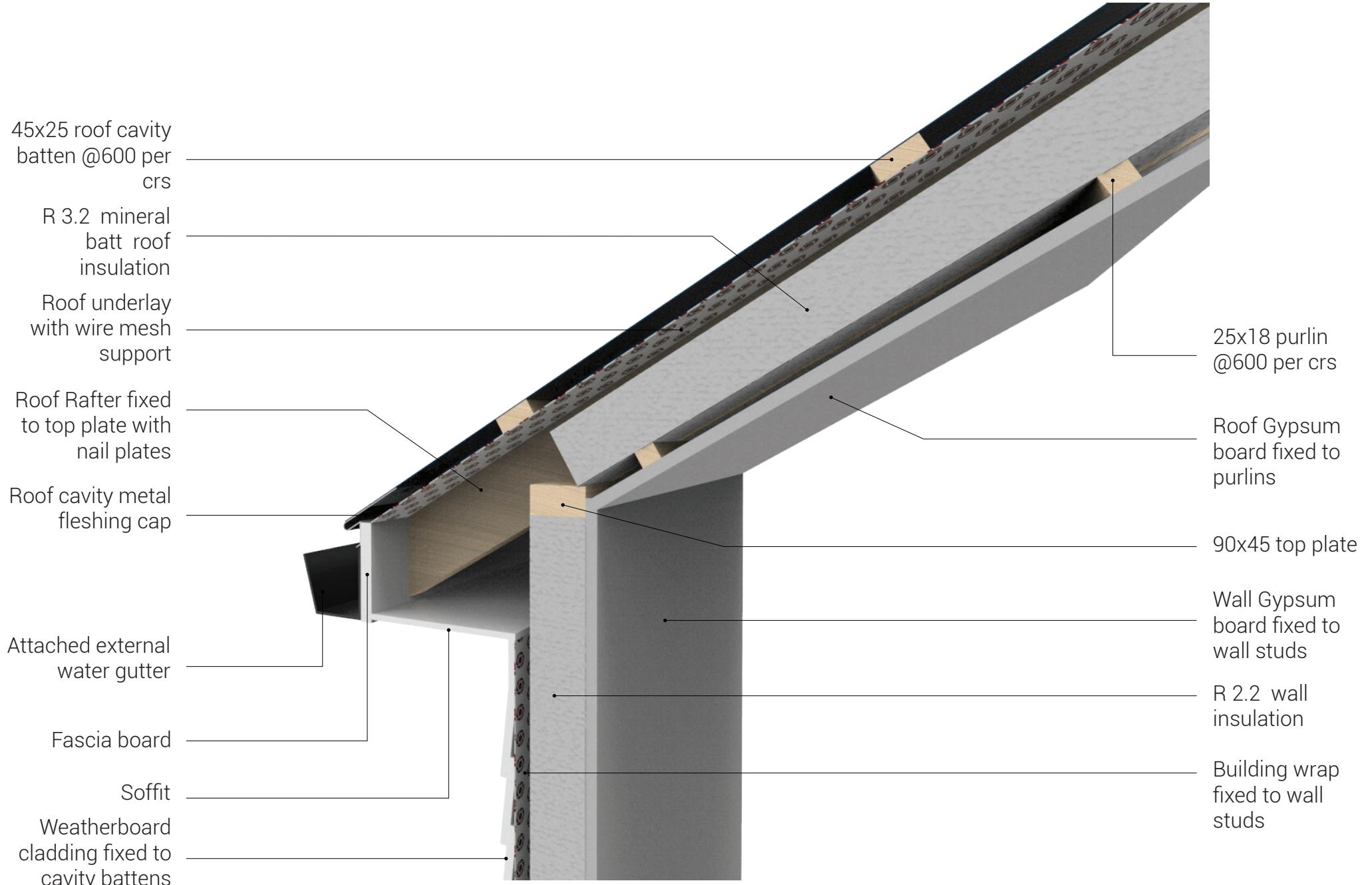
Once you finished the rendering, open the destination folder and load the rendered image and its respective clown pass into Photoshop. Then go to the clown pass tab in Photoshop and right click on its layer to duplicate it into the main rendered image file. The clown pass assign a colour to each different material as a colour code.



Now once the file is prepared, post processing can start and first let's get rid of the background. Use "magic wand" tool to select back ground, and make sure you select the clown image layer first and click on the black part in the image, which is assigned to the background part in the render layer. Then turn off the clown image layer. Now make sure you select the render image layer and press "delete". Then you can "save as" to save the file in PNG format. Now the rendered image is ready for annotation.







Post processing / Annotation

