

3D Modelling**Enhancing and Sharing your 3D model**

By this stage you have already processed your 3D model, following the steps described in our guidance notes ***3D modelling: Processing to create a 3D model***. You should now have the following files saved in your folder for that specific panel:

- **Original field photos** (JPGs)
- **3D model** (.PSZ)

Your 3D rock art model is now ready to view, to share with us, and to make publicly accessible. We recommend that you do this using the following steps:

- **Step 1.** Export your 3D model as a 3D object (an **.OBJ** file). When you do this you will automatically also create files for the material (an **.MTL** file) and the texture file (a **.JPG** file).
- **Step 2.** Upload your 3D model to the online platform **Sketchfab**
- **Step 3.** Enhance your model in **Sketchfab**
- **Step 4.** Add the link from your 3D model in **Sketchfab** to our **website**. This will make the model publicly accessible as part of the on-line record for that panel.
- **Step 5.** Upload the **.OBJ**, **.MTL** and **.JPG** files for your model to our **website**. This will enable us to use your model for research and, unlike your Sketchfab model, the files will be deposited in HES's Collections (Canmore) where they will be preserved in perpetuity

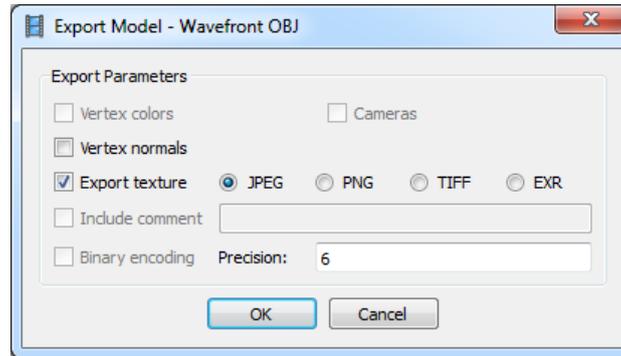
The following two steps are optional:

- **Step 6.** You may also wish to enhance or modify your **.OBJ** model to view it in different ways. The best way to do this is using free software called **Meshlab**. You can also share your **.OBJ** file with others so that they can view it in Meshlab.
- **Step 7.** You may also like to produce an interactive PDF of your model to email to people

STEP 1: Export your model as an .OBJ file

1. In Agisoft Photoscan:
Select: **File** -> **Export Model**,
Select: **.obj**.

A window will open asking you for details about your texture. Select the JPEG (or PNG for better quality) and keep the default *Precision*. Click OK.



2. Name the model with the Panel name (and number if it has one) e.g. Knock 4.
3. Save it in an appropriate folder where you can easily find it again. It is best to save the .obj in your folder with the other photogrammetry models for this panel.
4. When you export your model as an .obj, the software automatically creates an .mtl and a .jpg (or .png if you have selected that option) file at the same time. These files contain information about the texture of your model (i.e. what the surface looks like) and you may want to use them to render your models later.

Optional stage: compressing your files

5. To make your files the right size for uploading to **Sketchfab**, you can compress (shrink) and group the files into a single package which allows you to upload a larger model.

In Windows Explorer, find the folder where you have saved your .obj, .mtl and .jpg files. Here, right click on the white space in the folder to open a drop down list of options. Navigate to the 'New >' option – this will bring up an additional list of options. One of these is 'Compressed (Zipped) Folder'. Click this option.

This will create a new folder alongside your three files.

Name	Date modified	Type	Size
OldPoltalloch_23Oct18_Dec_OBJ	11/11/2018 20:21	OBJ File	81,461 KB
OldPoltalloch_23Oct18_Dec_JPG	11/11/2018 20:21	JPEG image	5,667 KB
OldPoltalloch_23Oct18_Dec_MTL	11/11/2018 20:21	MTL File	1 KB
New Compressed (zipped) Folder	09/01/2019 11:53	Compressed (zipp...	1 KB

Highlight the three files and drag them into the New Compressed (zipped) Folder. This will copy the files and compress (shrink) them into a smaller package, allowing you to upload larger files to Sketchfab.

Name	Date	Type	Size	Tags
 New Compressed (zipped) Folder	09/01/2019 11:53	Compressed (zipp...	1 KB	
 OldPoltalloch_23Oct18_Dec.JPG	11/11/2018 20:21	JPEG image	5,667 KB	
 OldPoltalloch_23Oct18_Dec_MTL	11/11/2018 20:21	MTL File	1 KB	
 OldPoltalloch_23Oct18_Dec_OBJ	11/11/2018 20:21	OBJ File	81,461 KB	

In this instance, the 81,461 Kb (81.4 Mb) .OBJ, the 1 Kb .MTL and the 5,667 Kb (5.6 Mb) .JPG would have been too large to upload to Sketchfab. However, after compression, they total 28,737 Kb (28.7 Mb) which is well within the 50 Mb upload limit to Sketchfab.

STEP 2: Upload your model to Sketchfab

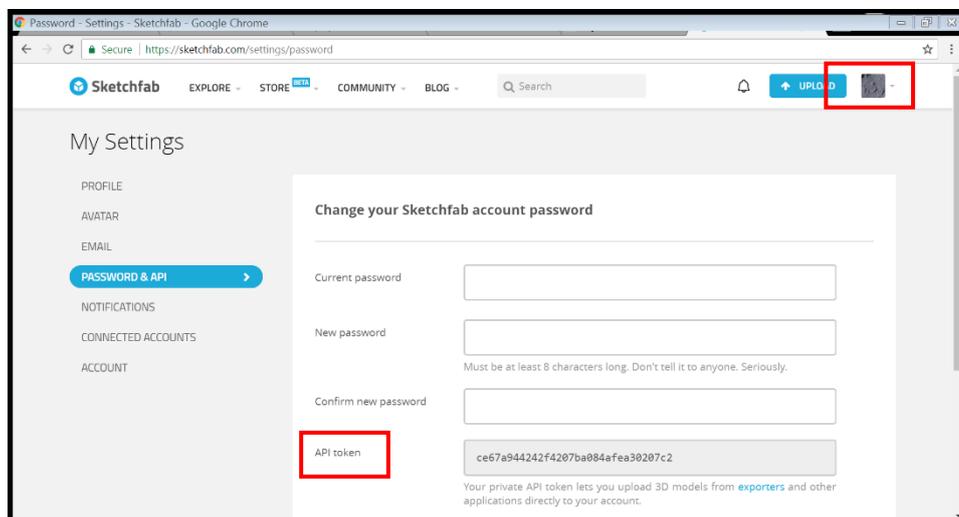
To upload your 3D model to Sketchfab, you will need to have the log in details (user name and password) for a Sketchfab account. We will help you with this.

You can upload your 3D model to Sketchfab in two ways:

Either upload your model to Sketchfab **directly from Agisoft Photoscan**
Or upload your saved 3D files **directly to Sketchfab**.

Upload your 3D model directly from Agisoft Photoscan

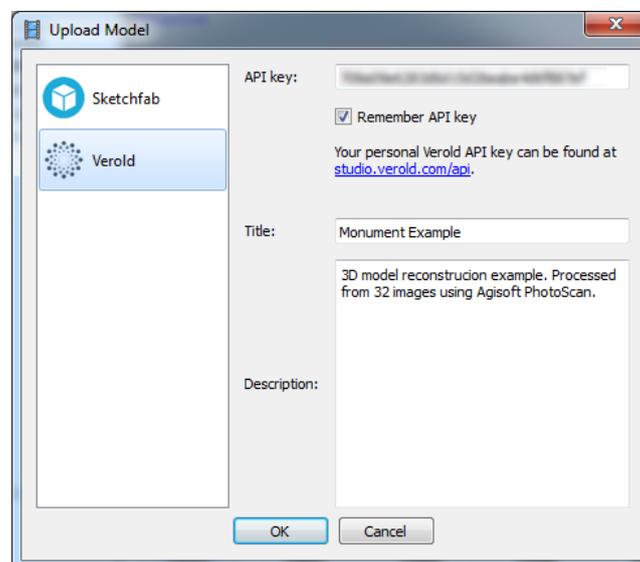
1. In Agisoft Photoscan, select *Upload Model*, which you will find in the *File Menu* in Photoscan.
2. Login to Sketchfab at www.sketchfab.com
3. The first time you upload to Sketchfab via Photoscan, you will be asked for the **API key**. You can find this by selecting *Settings* (click on the icon in the top right corner of the screen), then selecting *Password* and *API*.



4. Copy the long code next to **API token**, and paste it into the box in Agisoft Photoscan. Once you have entered the API, you do not need to do this stage again.
5. You are now ready to upload your models. If you are using a Free Sketchfab account, there is a 50Mb upload limit per model. If you have a Pro Sketchfab account, the upload limit is 250Mb per model.

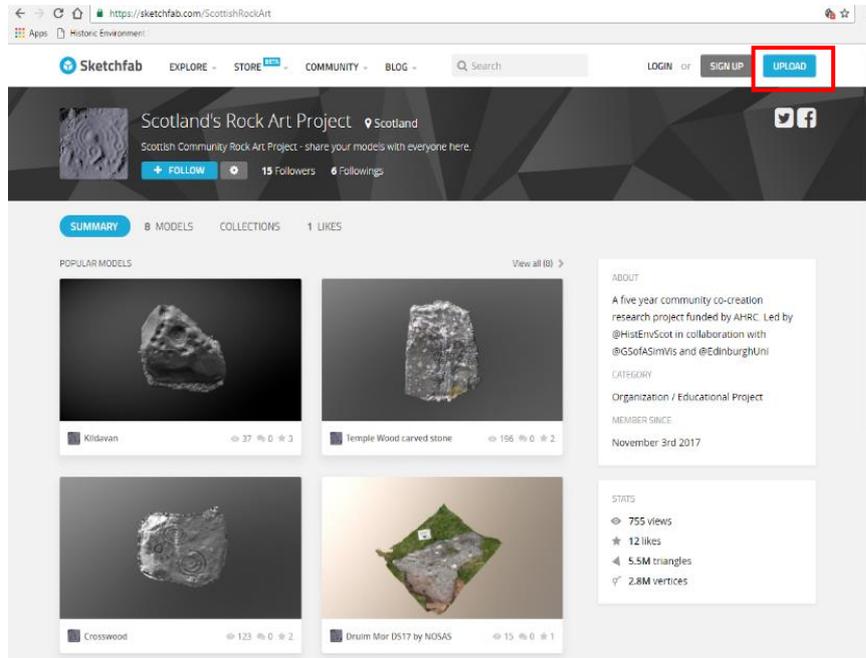
If your model is too large, you may need to first decimate it in Agisoft Photoscan (see our guidance **3D modelling: Processing to create a 3D model** to find out how to decimate it).

6. To make sure that your model is correctly orientated, you can use the *Rotate Object* tool prior to uploading your model. You can also do this after uploading your model into Sketchfab, in which case you will be able to check the change you are making directly on the model.



Upload your 3D files directly to Sketchfab

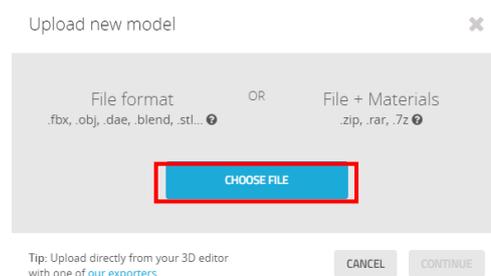
1. You may prefer to upload your model directly to Sketchfab. In this case, you will be using the .obj file that you have already saved. Log in to your Sketchfab account and find the button “Upload”, on the right hand corner of the page:



2. Choose the three 3D model files (.obj, .mtl and .jpg) for the model you wish to upload. Remember that there are restrictions on the size of model you upload. If you are using a Free Sketchfab account, there is a 50Mb upload limit per model. If you have a Pro account, the upload limit is 250Mb per model.

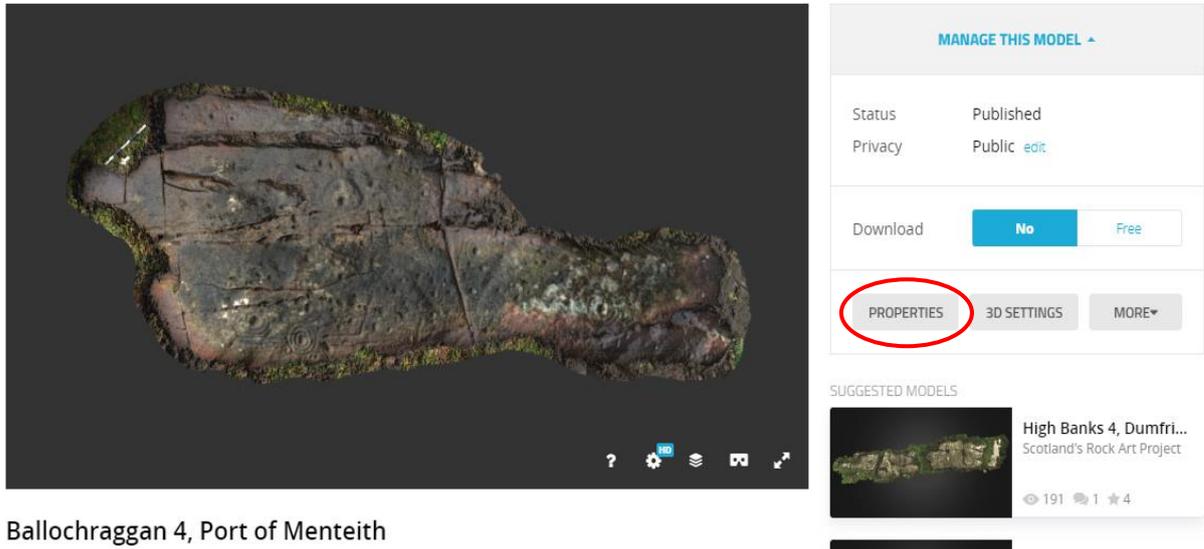
If your model is too large, you may need to decimate it in Agisoft Photoscan before doing uploading (see guidance notes on **3D modelling: Processing to create a 3D model** to find out how to decimate it).

Alternatively, if your model is up to 150 Mb in size, you can try compressing these files into a zip folder (as discussed in Step 1 part 5) before you upload to Sketchfab. This allows you to upload a higher resolution model within the 50Mb parameter.



When your model is uploading (this can take a while!), you could write a description and select relevant categories and ‘tags’ in the boxes provided (see below).

3. Make sure you update the model **properties** with relevant information. You will be taken to this page as your model is uploading, but you can edit it again later by clicking the 'Properties' button on the right hand side of your model. Completing this section makes it more likely that people will be able to find your model.

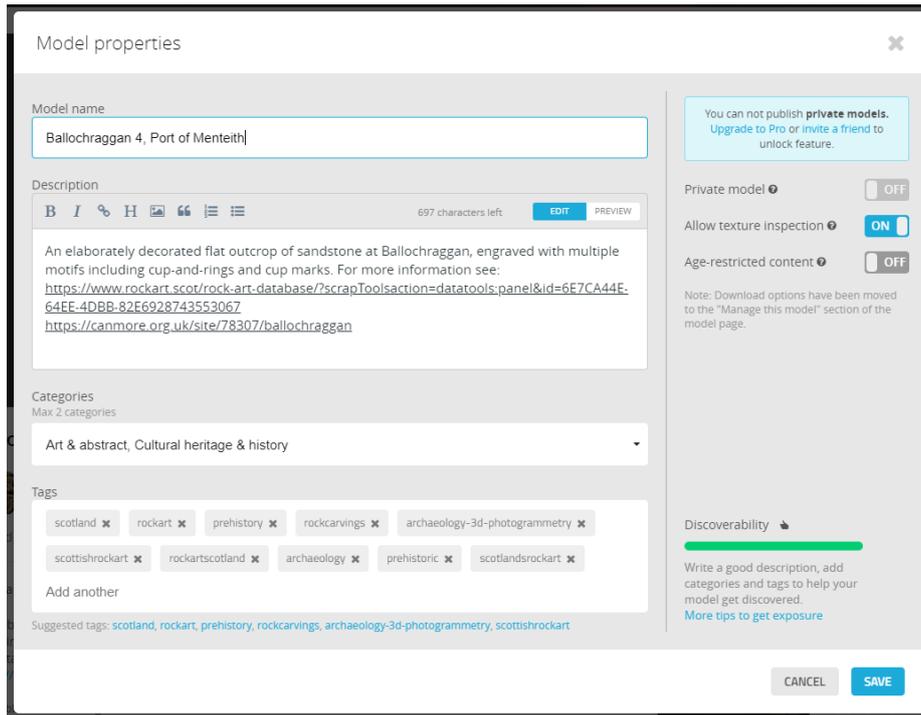


When naming your model, use the name (and number) and location of the panel for the title. In the description, give a brief outline of what the model depicts and what motifs are visible. You can also include a link here to the record for this panel on the ScRAP website (www.rockart.scot) and to the Canmore record for the site, if people want more information.

To make it easier for people who are interested in certain subjects to find your model, you can assign it specific model **Categories**. You can select up to two categories - we recommend using 'Art & Abstract' and 'Cultural heritage & history'.

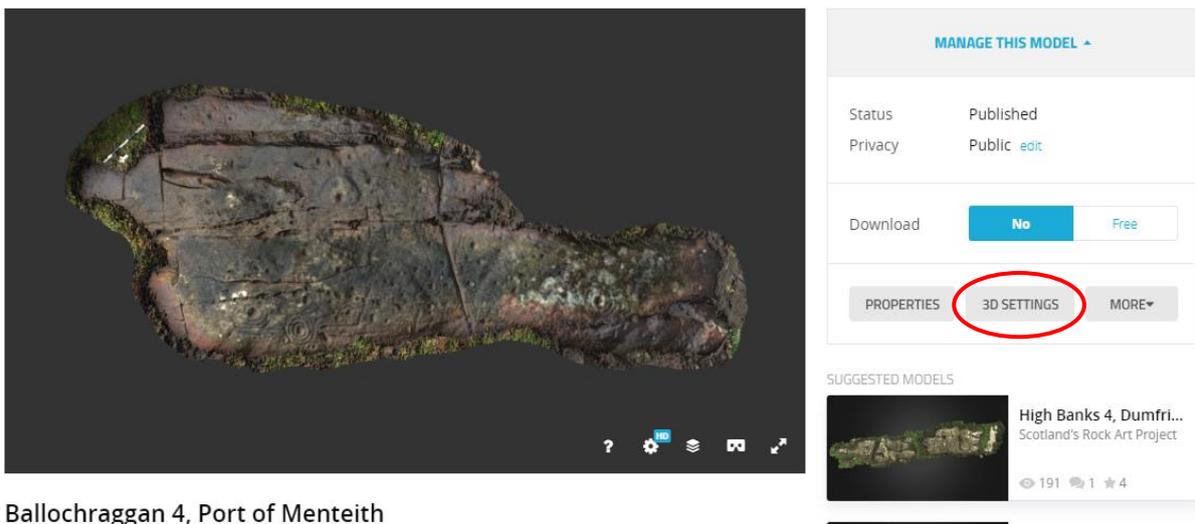
Lastly, you can assign **Tags** to your model. Tags are useful for when someone is searching in Sketchfab for a certain topic. For instance, if you assign the tag 'prehistory' to your model, when someone searches for 'prehistory' in Sketchfab, your model will be included in their results. We recommend using all or a selection of the following tags:

Scotland; rockart; prehistory; rockcarvings; archaeology-3d-photogrammetry; scottishrockart; prehistoric; rockartscotland; scotlandsrockart; archaeology



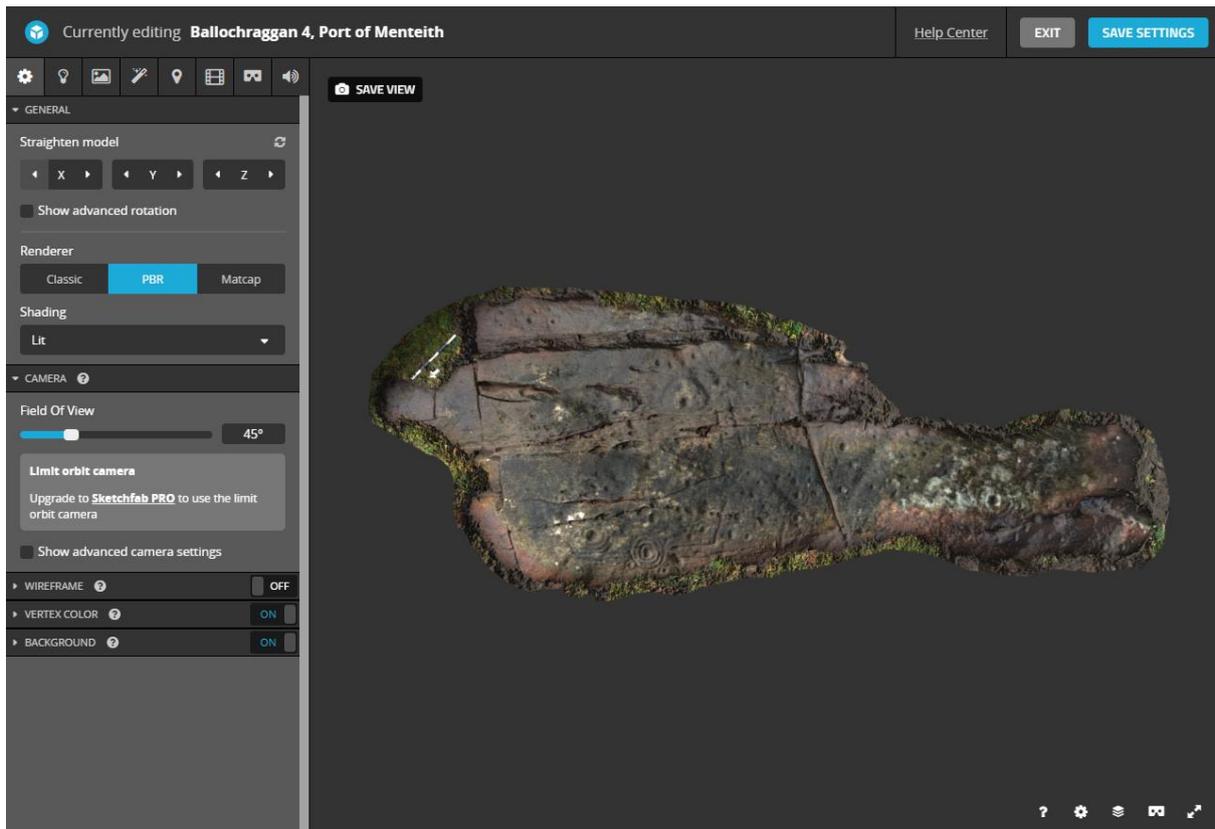
Step 3. Enhancing your model in Sketchfab

Once the model is uploaded you will be able to play around with it (technically termed 'rendering') in Sketchfab in order to enhance its features. To do this, select '**3D Settings**' on the left side of the page.



Ballochraggan 4, Port of Menteith

When you open the 3D settings, you will see a page with various options:



Along the top of the work area on the left hand side you will see a list of icons. These eight icons each represent (from left to right): **scene, lighting, materials, post processing filters, annotations, animation, virtual reality and sound.**



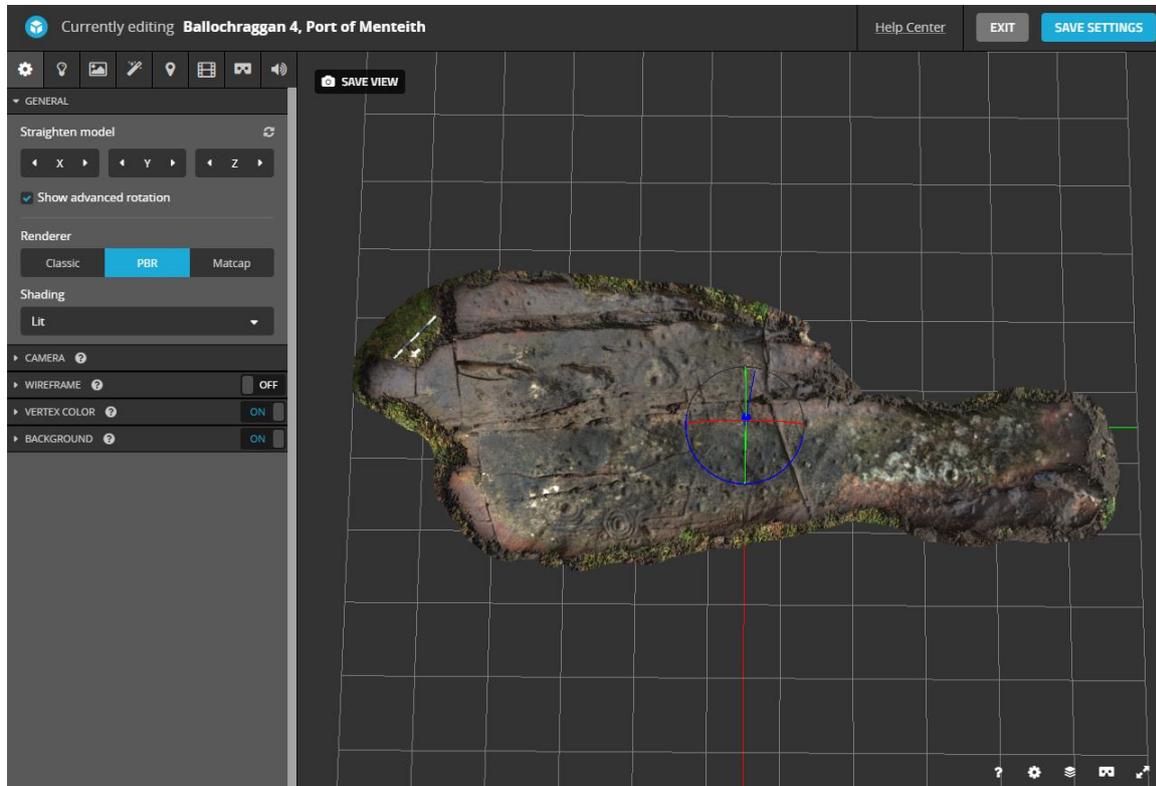
We will focus on using the first four of these tools in order. You can use the others, but they are not necessary for the purposes of this project.

Scene

There are five different zones in the 'scene' workspace. These include: **general, camera, wireframe, vertex colour** and **background**. The options to primarily focus on are 'general' and 'background'.

General: This contains tools that allow you to straighten your model and to apply different renders and different basic shading styles.

Under the 'X' 'Y' 'Z' section of 'straighten model' there is a box called 'show advanced rotation'. Selecting this will allow you to orientate your model and correctly align it with the virtual ground surface. You can use the trackball (the green, red and blue lines) to rotate the model; the blue arrow can be used to move the model up and down.



Under this are three different **Renderer** options: Classic, PBR (Physically Based Rendering), and Matcap (material Capture). **We recommend using PBR** as this method of shading and rendering most accurately represents how light interacts with surfaces. Matcap (Material Capture) is commonly used by people who use Sketchfab as a tool during 3D sculpting, as it is a quick and easy way to apply material and light reflection information to the whole model to check its shape.

Once you have selected PBR, chose the '**Lit**' option from the shading dropdown list below.

Camera: We recommend that you leave these settings as they are, with the Field of View at 45°.

Wireframe: This section allows you to turn the mesh layer on and off, so that you can see the underlying shape of the model. We recommend that you leave this turned off.

Vertex color: This looks at the base data in the .obj file and applies the vertex colour if this data has been created. We advise that you leave this on whichever settings Sketchfab has automatically applied.

Background: Selecting a suitable background can make a huge difference to your model. We recommend that you turn the background 'on' and select either one of the image options (clean dark and clean light are favourites in the ScRAP office) or selecting a plain colour between white and black which compliments your model and helps it to stand out.



Lighting

There are three different zones in the lighting area: **lights** (*for advanced users*), **ground shadows** and **environment**.

Lights: As the lights section is a little more, advanced, we tend to advise you use the Environment options until you are a little more confident with the 3D settings.

Ground Shadows: If you wish to experiment with applying ground shadows, you may do so, but this feature works better with objects such as archaeological artefacts rather than earth bound rock art.

Environment: Under this section, it is important that you select the right option from the dropdown list. Sketchfab will randomly assign you an environment, but it may cast an unusual colour over your model.

For instance: if you use 'Queen Mary Chimney', your model is cast in a purple-ish light; if you use 'Milky Way' your model is cast in a pink-ish light; if you use 'Tropical Ruins' your model will be cast in a blue light;

We recommend that you use '**Studio**' to get a more standardised light colour.

Tip for colouring:

If you are having problems with unusual colouring, the 'Environment' you have selected is most likely what is causing the issue.

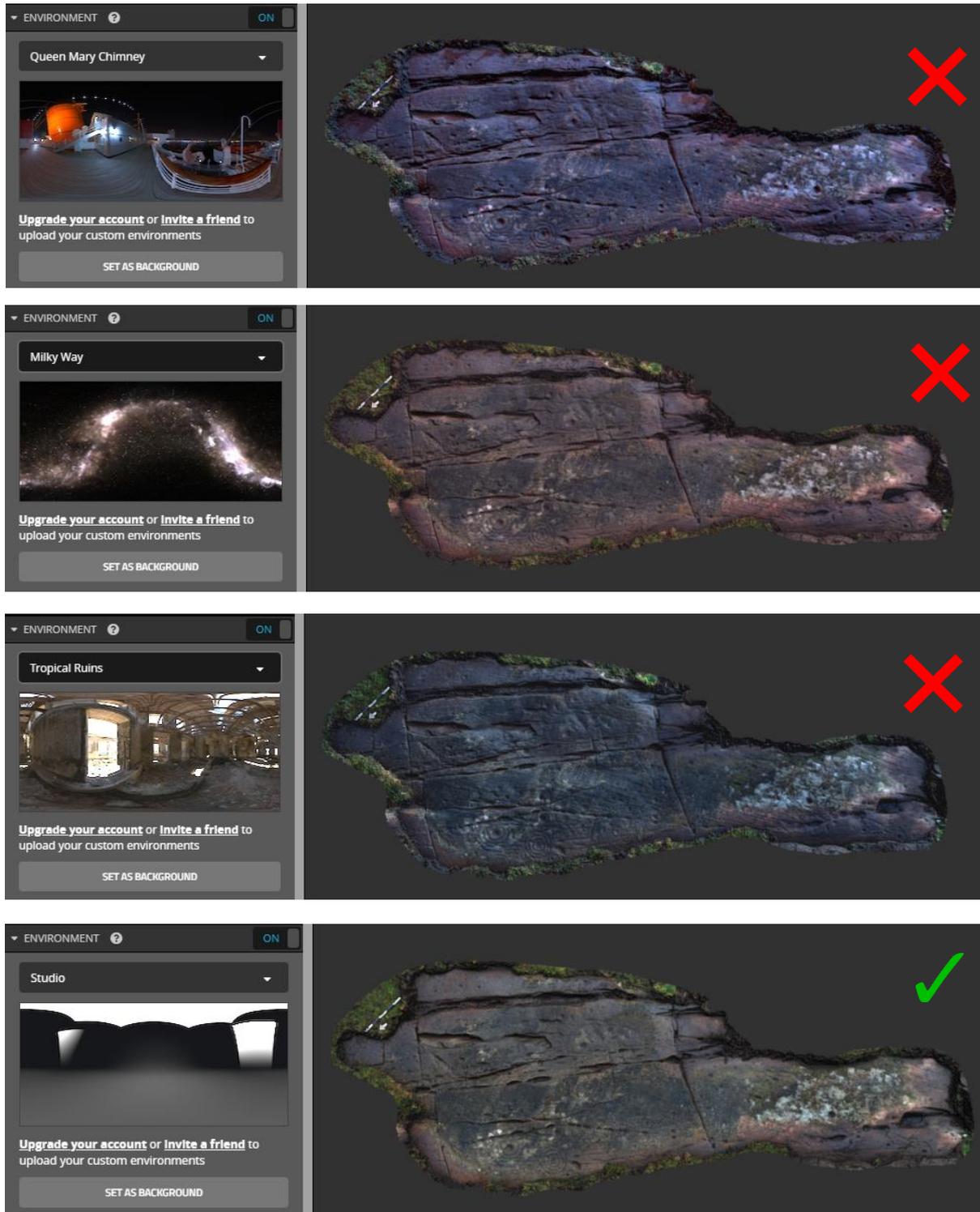
Tip for moving models in Sketchfab:



Hold down the shift key (and the left mouse button) to move the model

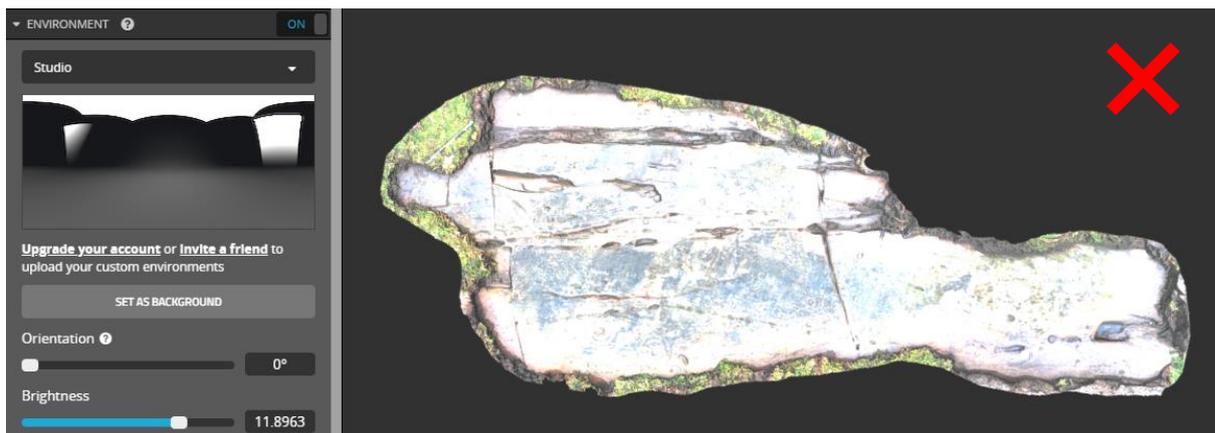
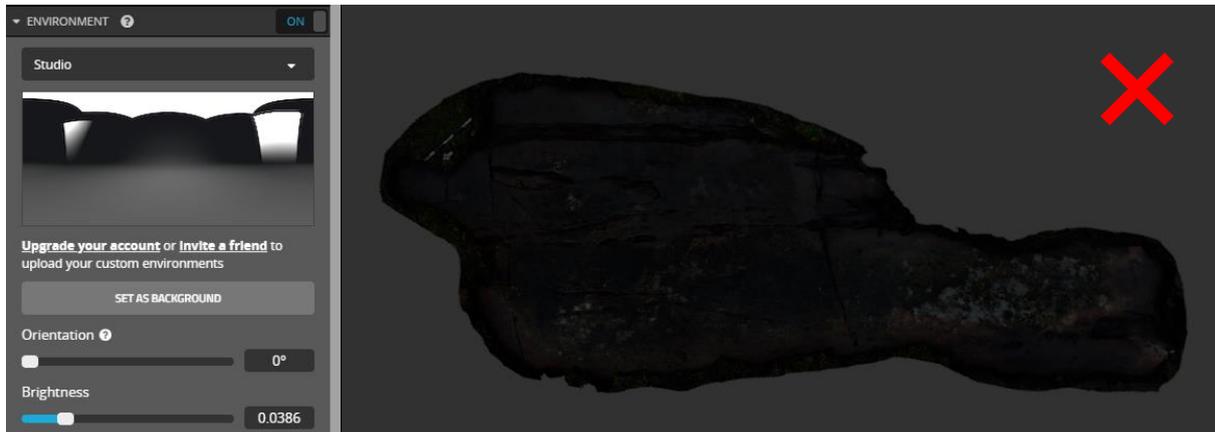


Hold down the control key (and left mouse button) to zoom in and out



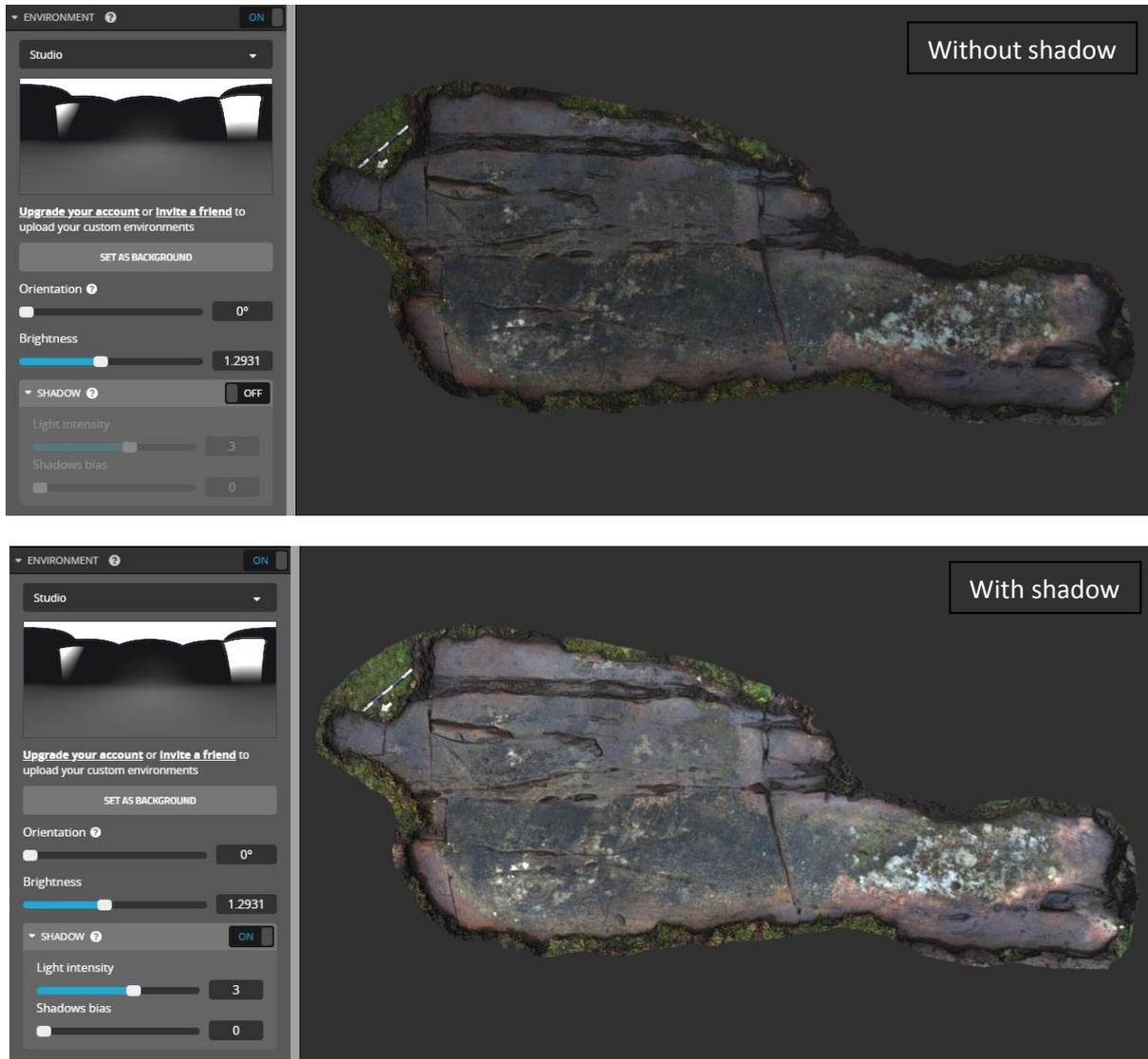
In these four different 'Environment' lightings, each casts a different colour light over the model. We advise using the 'studio' option which give the most natural lighting.

Once you have selected the 'Studio' option from the drop down list, you can manage the orientation and the brightness. If you imagine that there is a light shining down on your model from above, you can change the **position** of this light and the **direction** that it shines on the model. By sliding the tab along the orientation bar you are changing the position of the light and moving it in a 360 degree circle above your model. Chose whichever position you feel best displays the motifs.



You can also change the **brightness** of the light by sliding the tab on the brightness bar. The further it is to the left the dimmer the light will be, the further to the right, the brighter. Be careful not to move it too far in one direction as you will lose the features on your panel.

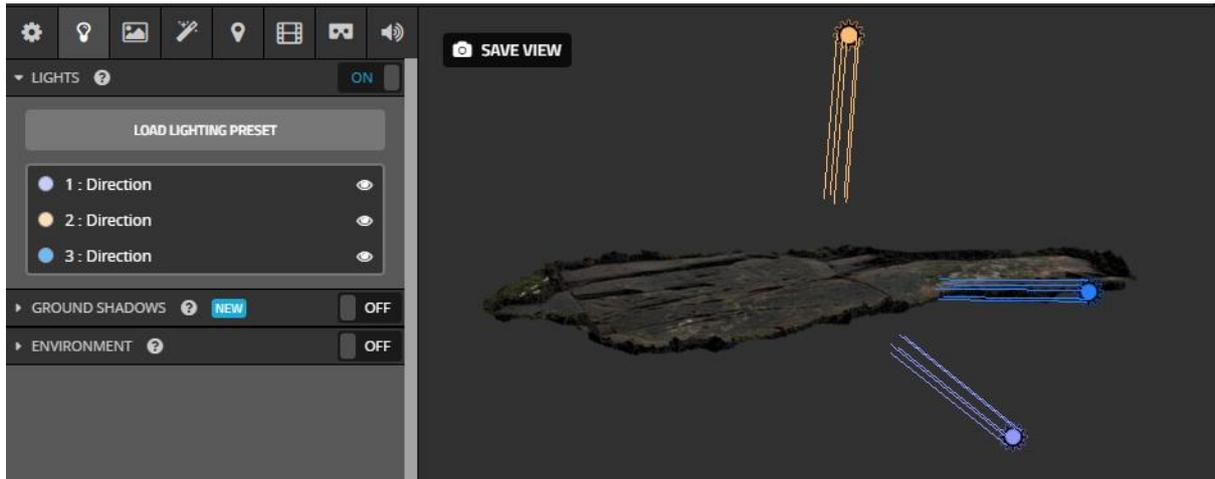
Lastly, you have the option to turn **shadows** on and off. If you turn the shadows on, be careful that it doesn't cast shadows across the motifs and hide them. You can also alter the **intensity** of the light casting the shadows, and the **bias** of the shadow (i.e how far the shadows reach).



Advanced option: Lights

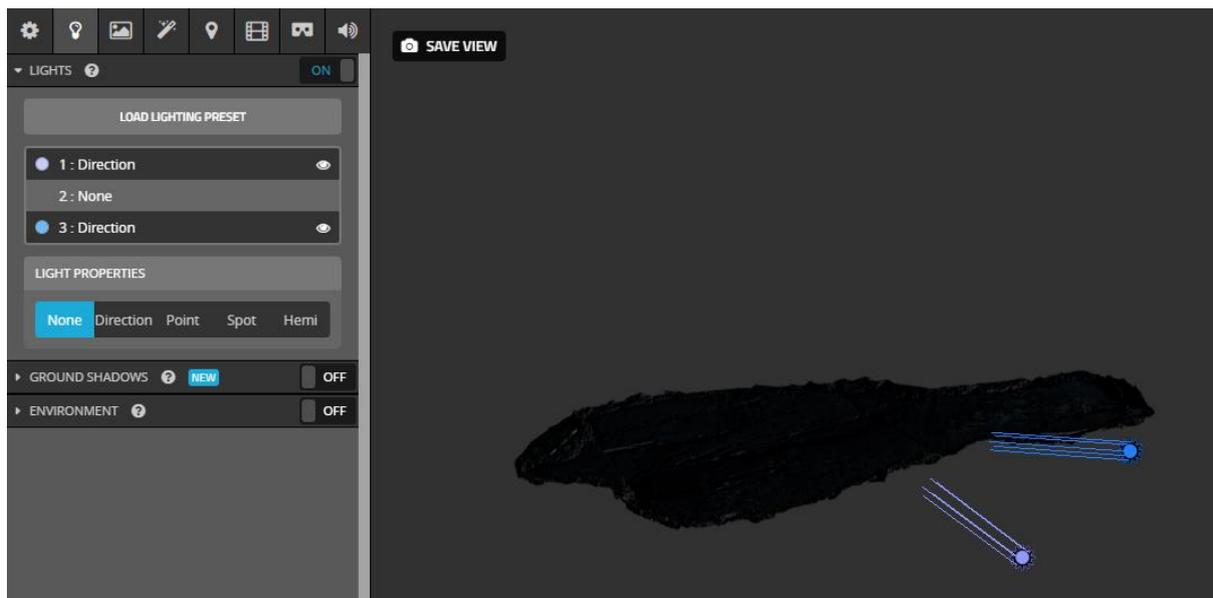
Using the 'Lights' section allows you to have more control over the lighting properties of your model. You can use this in combination with the 'Environment' settings, but ideally, if you choose this option, it is best to turn off the 'Environment'.

Start by clicking 'Load lighting Preset' – you will be presented with six different preset options. We recommend using the Three-point lighting. This will create three lights which will each shine on your model from a different direction, one from above, one from the side, one from below. The one above is usually an orange light, the one at the side is blue, and the one below is lilac.

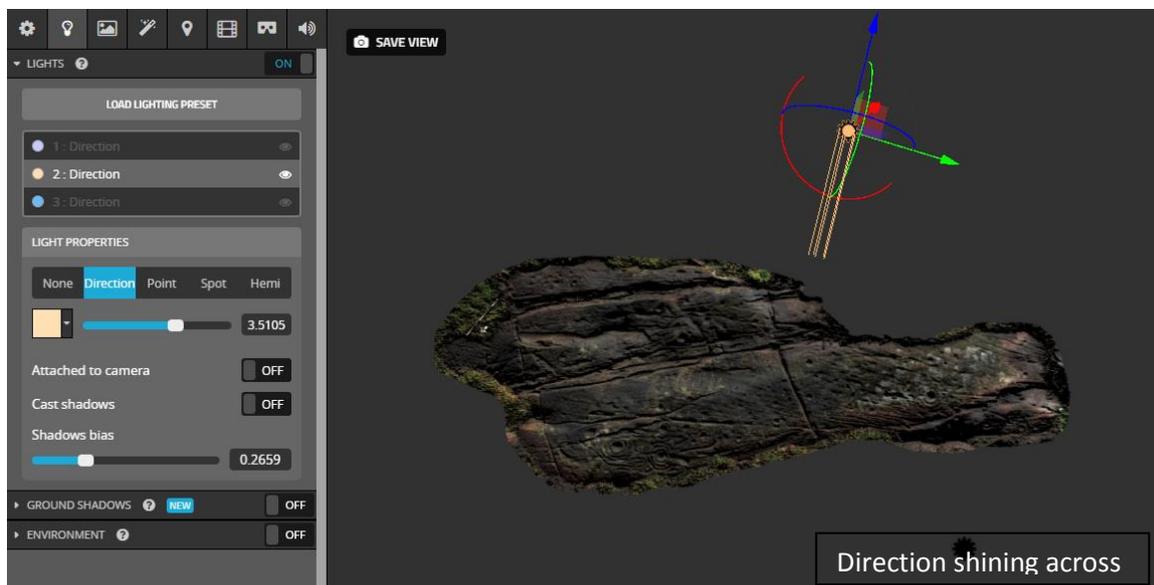
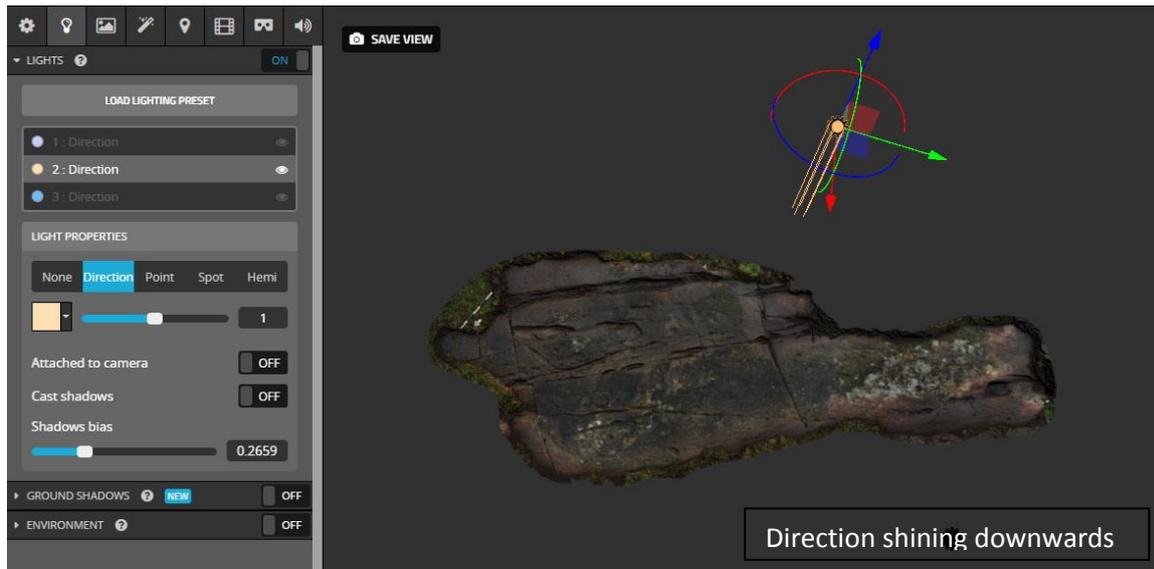


You can select these lights either by clicking on them or selecting them in the list on the right hand side. Each light has options of light properties. There are five different light types: none, direction, point, spot and hemi.

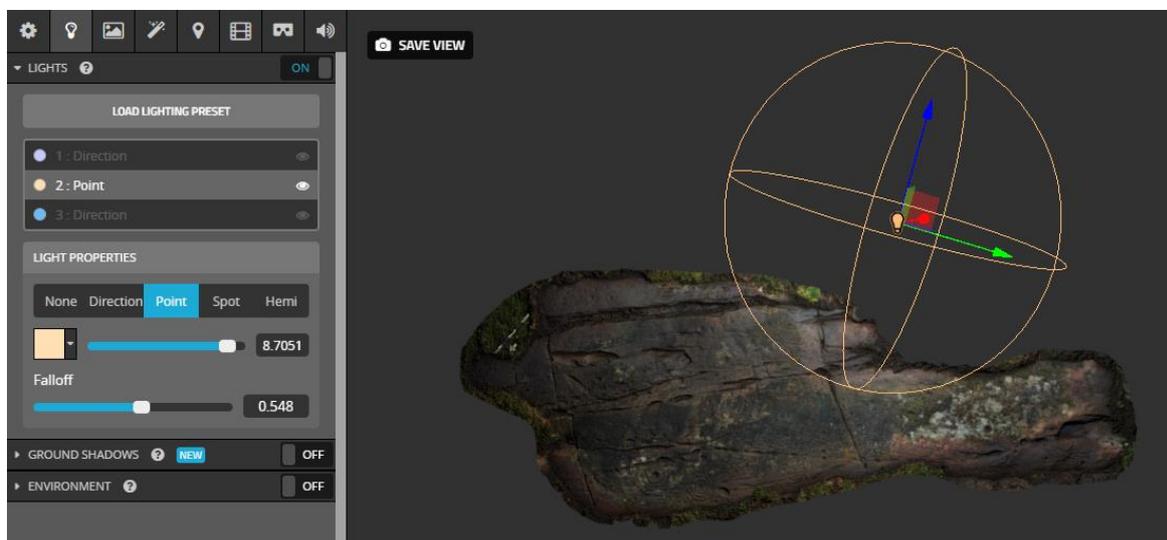
If you select **'None'** you will turn that light off.



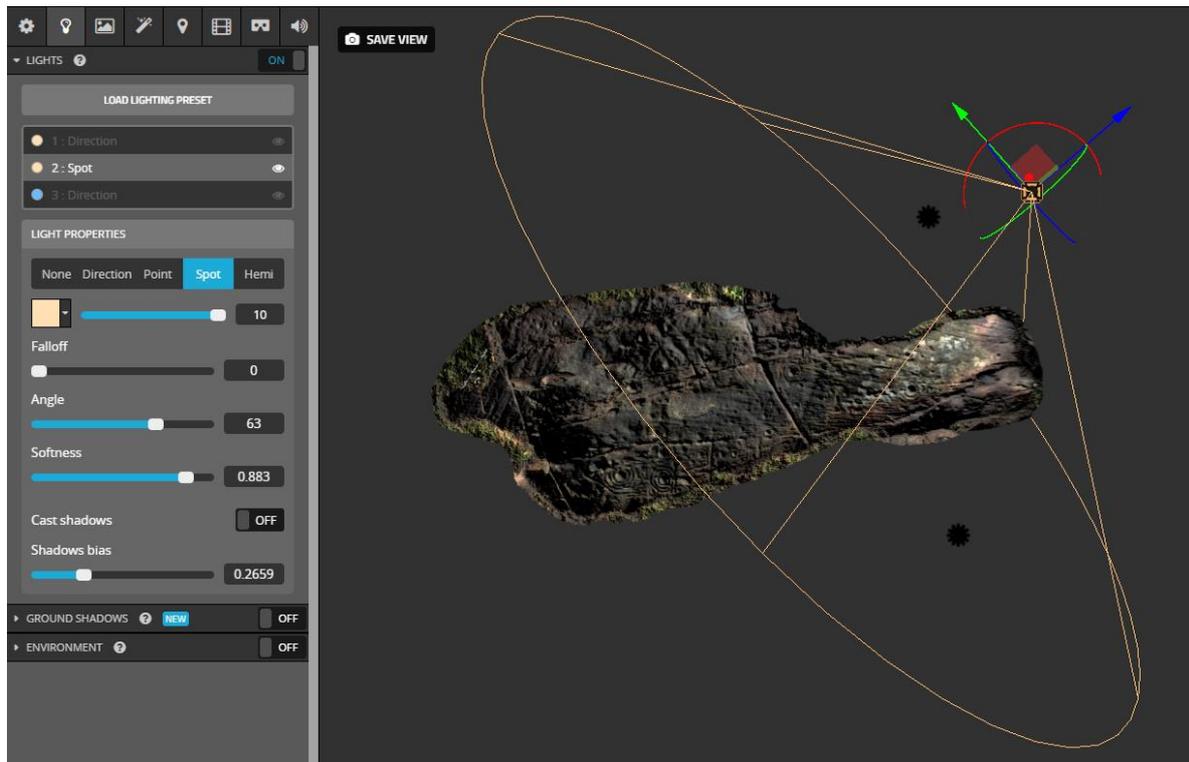
If you select **'Direction'** you create a global light. It doesn't matter where you position this light, what does matter is the angle you direct it in. This works in the same way as the orientation option in the 'environment' option discussed above, except you can change the light to shine across the surface of the rock, not just downwards on to it.



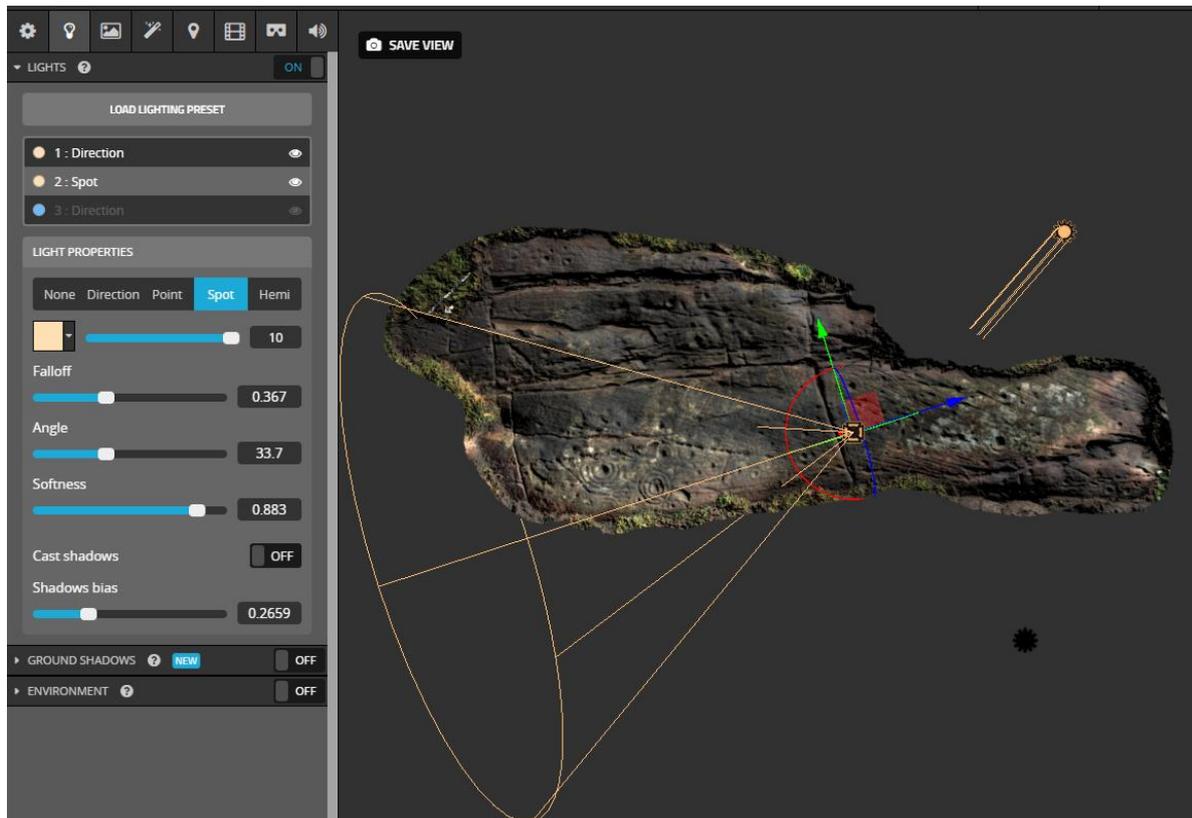
If you select 'Point' you create a light which shines out in all directions from a single point. You can move this light around your model. We do not commonly use this option, but it can be useful for some types of model.



If you select **'Spot'** you can create a spotlight which you can shine across the model, or you can use it to pick out certain important features.



Using the **'Spot'** light in combination with a **'Direction'** light of the same colour, can help you pick out and highlight a particularly significant motif (or group of motifs).



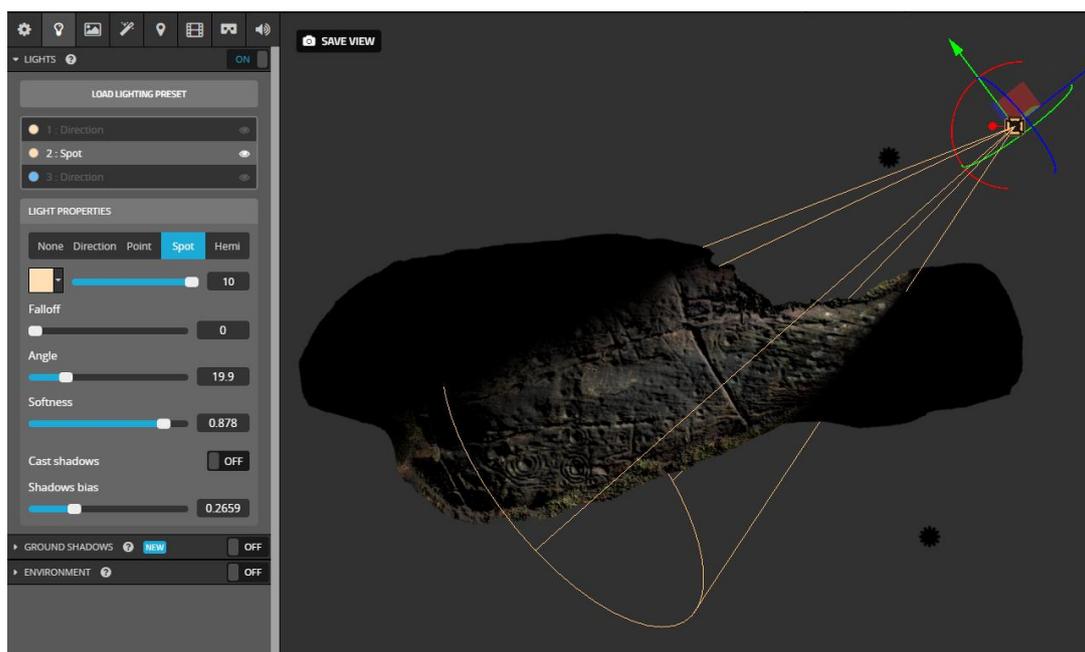
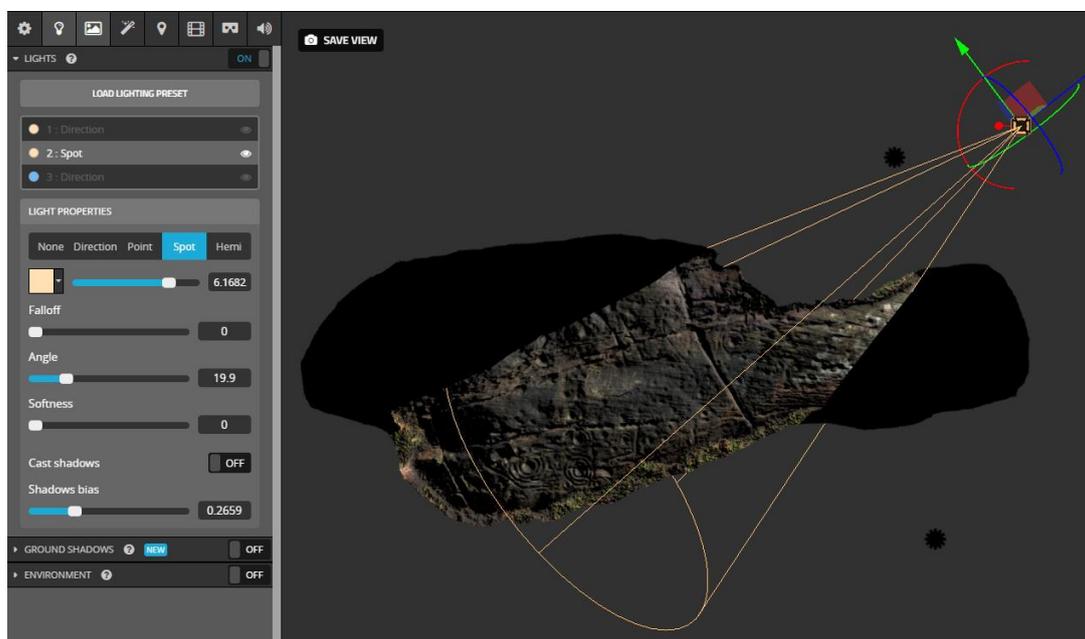
The final light option is **'hemi'** which, when using the PBR option, works the same as the **'Direction'** light, so it is best to ignore this option.

The light properties each come with different settings. You can change the **colour of the light** by clicking on the coloured box. The bar beside this can be moved from right to left to increase the brightness of the light source.

'Falloff' changes the distance that the light reaches from the original light source.

'Angle' changes how wide the light is spread. Note that the wider the angle, the less distance the light will travel across the model.

'Softness' changes the intensity between where the light meets shadow. The lower you set this (i.e. the closer to the left), the more noticeable the difference is between the light and dark, the further you move it to the right, the softer the difference is between the two.



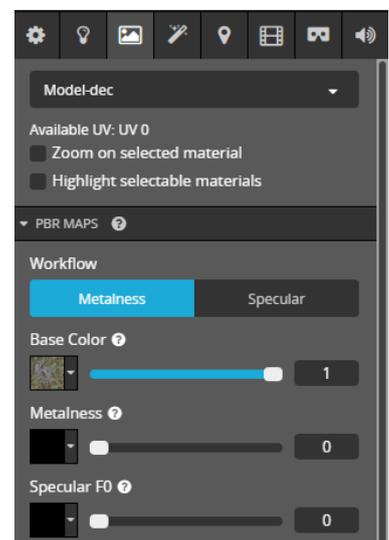
You can also chose to **cast shadows** across your model based on the light source you use. Be careful when using this; make sure you do not cast shadows which mask any of the motifs. The higher and lower you tilt your light, the more or less shadow you will cast.



Materials

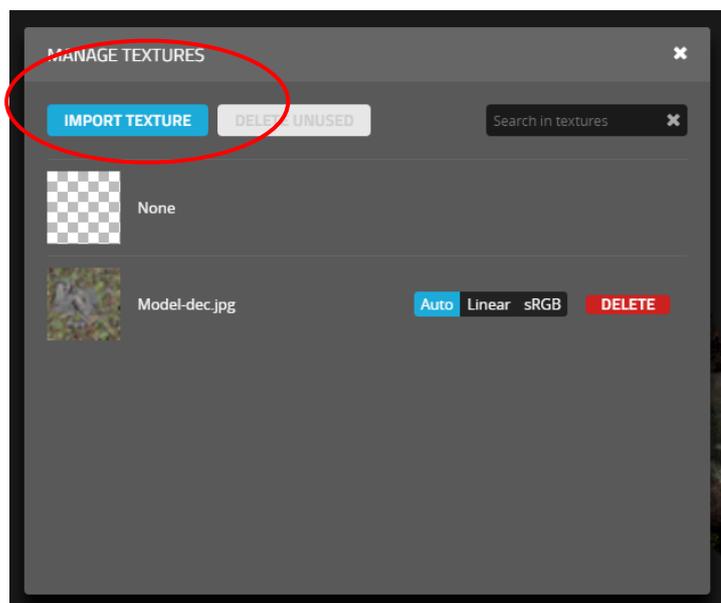
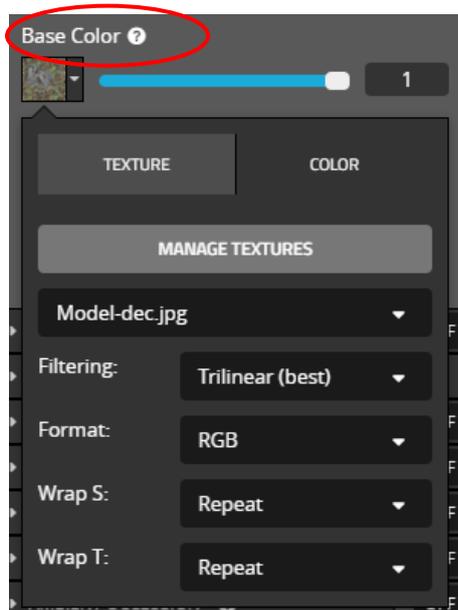
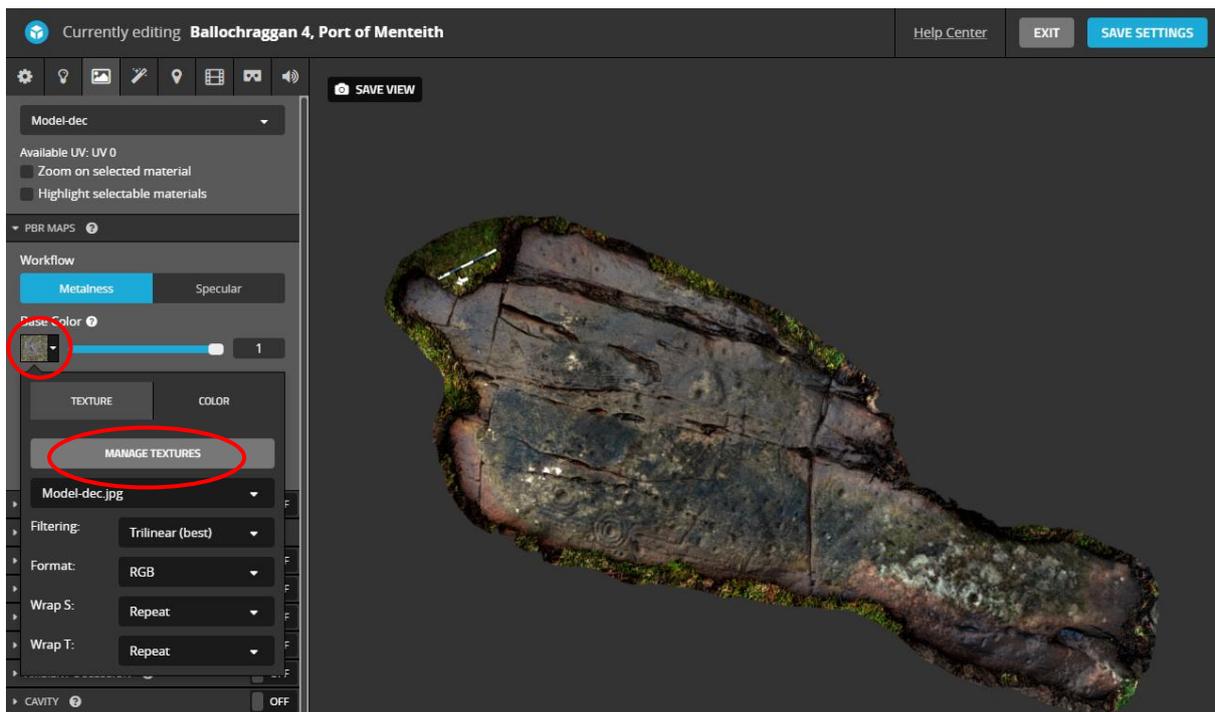
The options that you have at this stage depend on which **'Renderer'** option you chose in the **'General'** section under **'Scene'** (discussed above). These are either Classic, PBR, or Matcap (Material Capture). We recommend using PBR, and will give guidance on using this option here.

The **Materials** section contains many different options. For the most part, we advise that you leave these all turned off, except for **'PBR maps'**, which is the only section you may like to adjust. In 'PBR maps', under **'Workflow'** there are two options: Metalness or Specular. We recommend you select **'Metalness'**.



Metalness: Under this you will see three bars: **Base Colour**, **Metalness** and **Specular F0**. If you have uploaded your files correctly, at the top of the options area you will see the name of the file you uploaded as your texture file (the jpeg file discussed above). If you did not upload this file during the original upload stage, but now wish to do so, you can add it here.

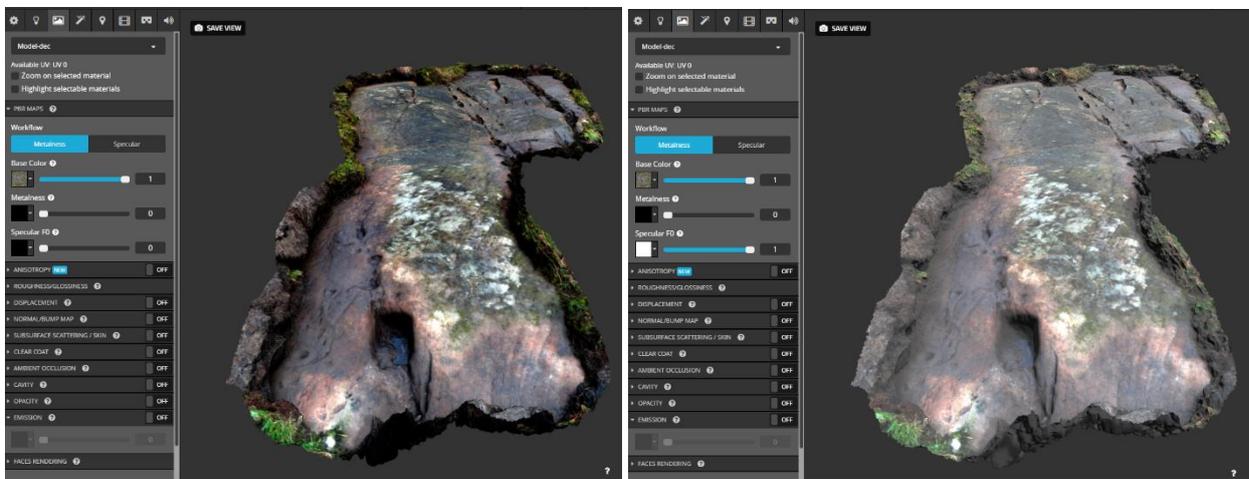
Base Colour: Click on the thumbnail icon on the left hand side of the 'Base Colour' bar. This will present a dropdown list of options. If your texture file is not listed here, click 'Manage textures'. This will open a second options box where you can select 'Import textures'. Once you have clicked this, navigate in Windows Explorer to the correct file and click 'open'. Once uploaded, select your texture file from the list.



The three bars each have different functions. Once you have your texture file uploaded under the '**Base Colour**' option, we recommend that you drag this to the top of the scale and have it on '1'.

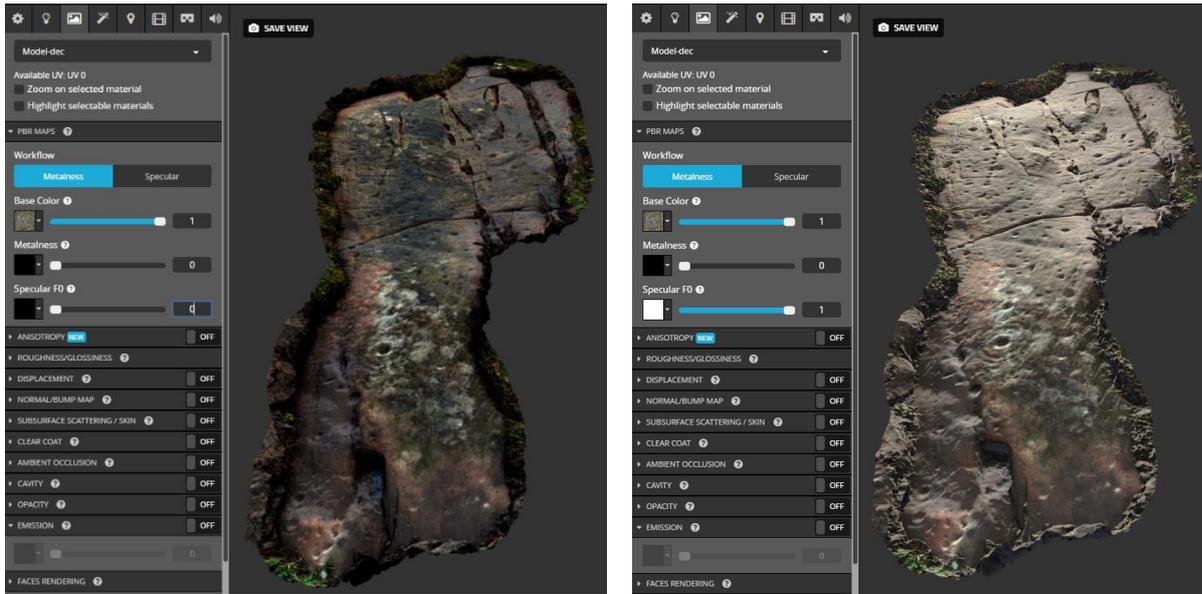
Metalness: This second option has been designed by Sketchfab to allow users who have uploaded metal objects to change how metallic the object looks. As we are not working with metal objects, we recommend that you turn this off by dragging the tab to the left of the bar at positioning it at '0'.

Specular FO: This last option allows you to increase the intensity of light reflecting off of the rock surface. This will be influenced by which lighting option you chose in the 'lighting' area. If you used the easier 'environment' option, increasing the Specular FO will make your model look lighter, but the light might look flatter.

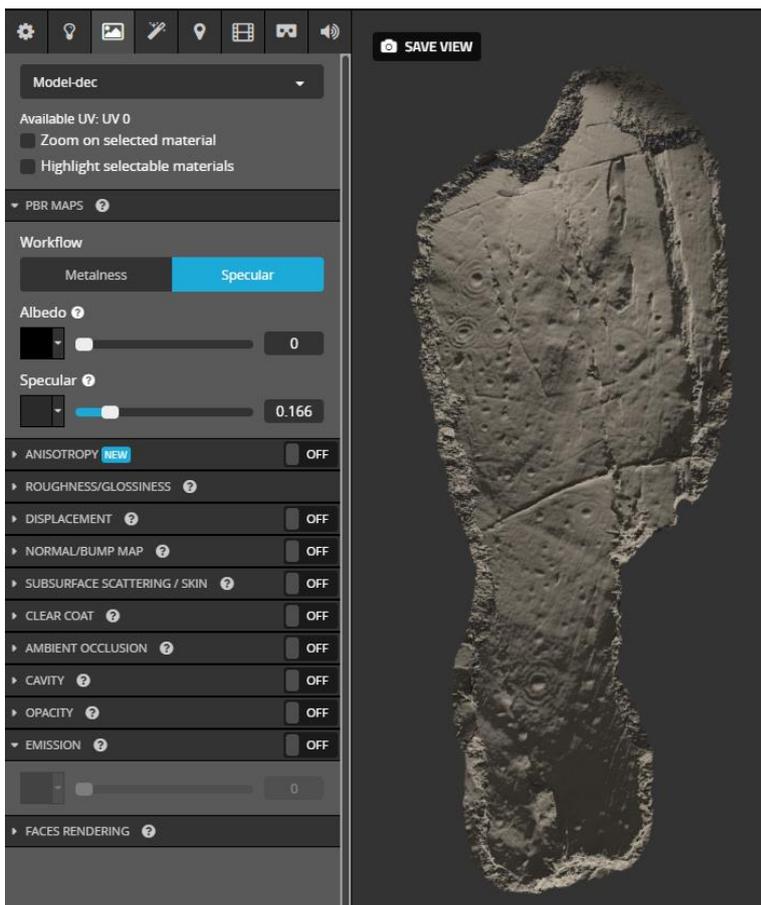


Both models have been lit using the 'environment' lighting option. The one on the left shows the model with the Specular FO on low; the one on the right shows the Specular FO option on high.

However, if you have used the 'Lighting' 'Lights' option (i.e. have lit the model yourself) you may find that the Specular FO option can really enhance your model and bring out the motifs.



Both models have been lit using the 'lights' lighting option. The one on the left shows the model with the Specular FO on low; the one on the right shows the Specular FO option on high.

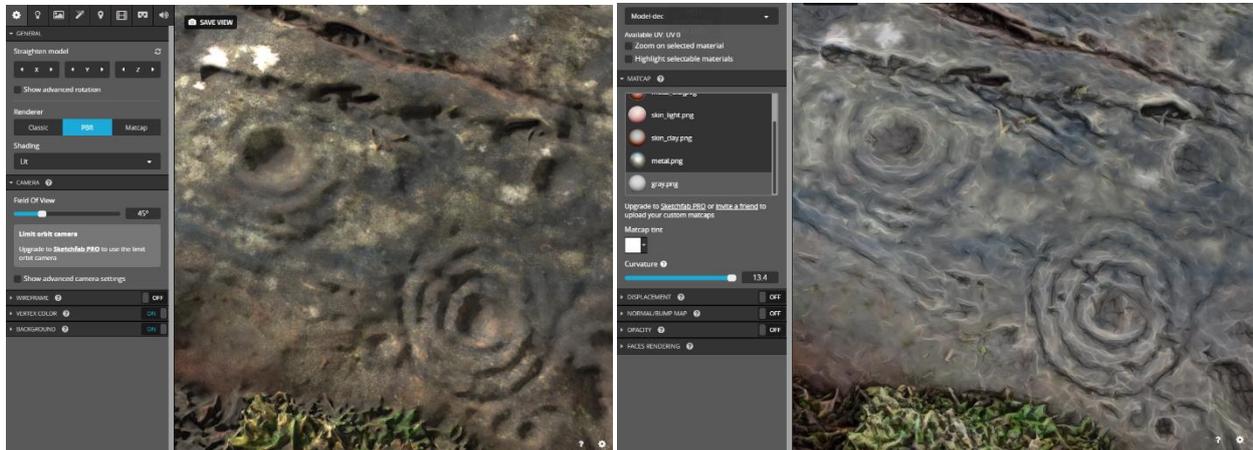


Lastly, you may find, for one reason or another, that your model looks better without the texture overlay. This can happen if you have taken your photographs on a sunny day but shadows have been cast over the surface. Or it may happen if you photographed your model in a darker lighting and the texture is very dark. In these instances, you may decide not to use the texture, and turn it off.

To do this, we recommend that instead of choosing the 'Metalness' option you instead choose the '**Specular**' option. Turn the 'Albedo' scale to '0' and use the 'Specular FO' setting to bring out the motifs.

Alternative material option: Matcap

Some people prefer to use 'Matcap' as a rendering option (on the first 'scene' option), as discussed above. Matcap can be tempting as it can, at first sight, offer promising results. However, the issue with using Matcap as a render is that you will lose a lot of detail on your model and when you zoom in, you will lose the texture of the rock surface.

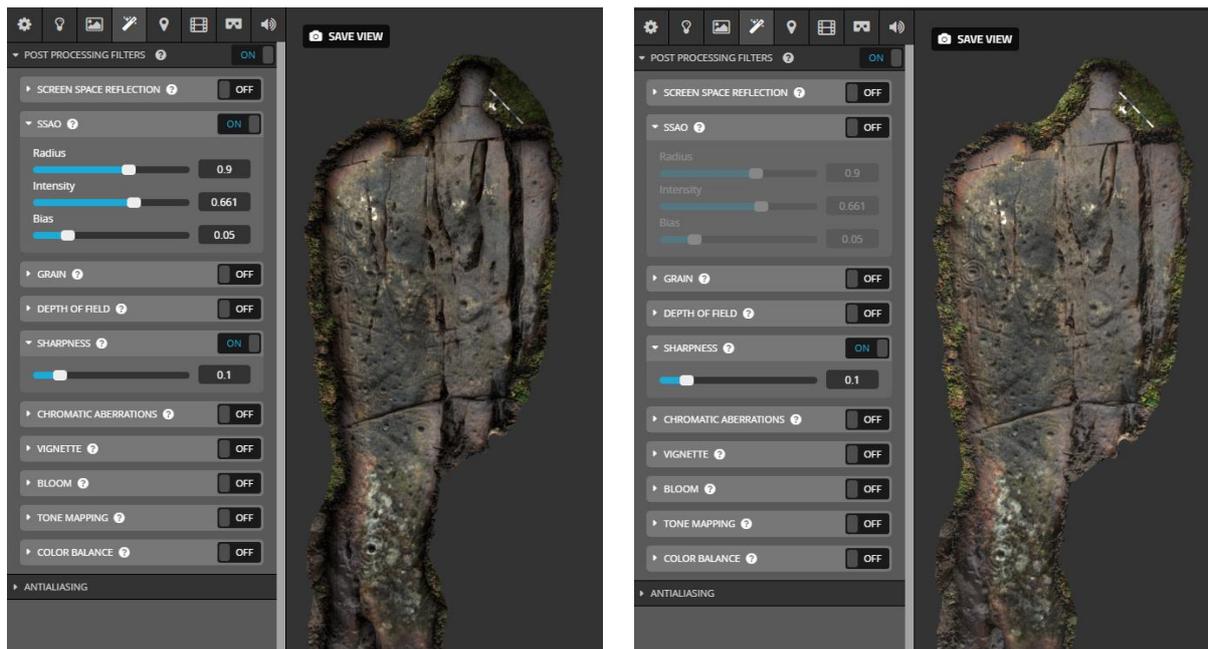


These images show the different between a close up of a PBR render model (on the left) and a Matcap render model (on the right). The PBR render shows the surface detail more accurately and in better quality.



Post Processing Filters

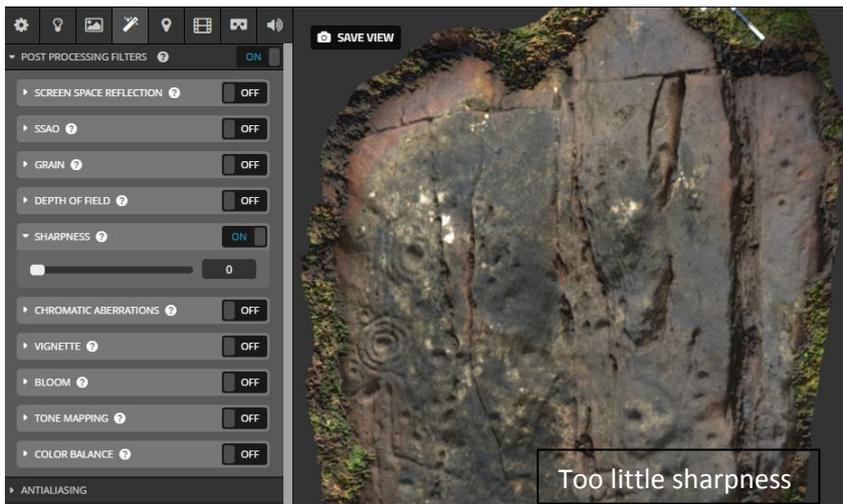
Once you are happy with your settings in the **Scene, Lighting and Material** options, you can play with the **Post Processing Filters**. We recommend that you don't do this until after you are happy with the settings in the first three options.



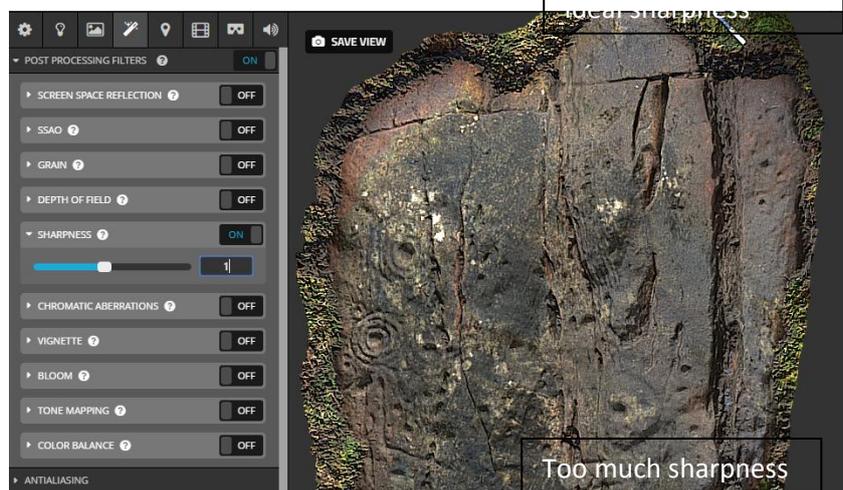
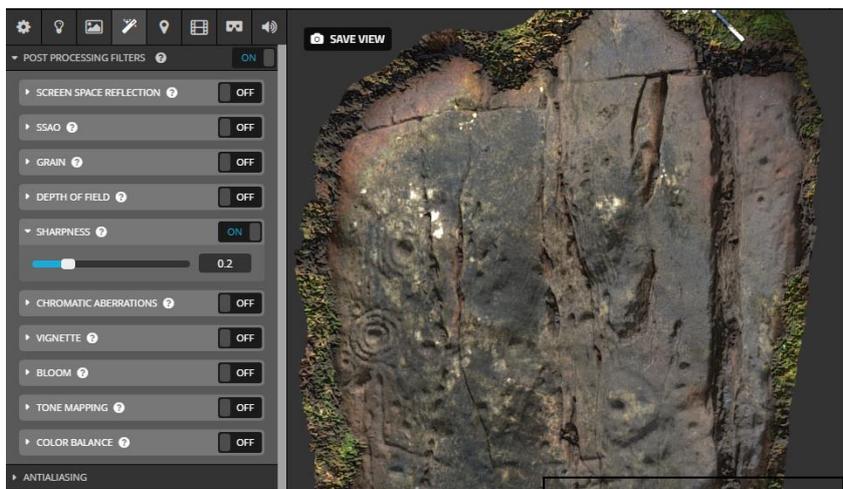
With SSAO turned on (left) and with SSAO turned off (right).

There are, again, numerous settings in the Post Processing Filters that you can experiment with, but we recommend you use them sparingly and cautiously as they can take away from the authenticity of your model. Please note, for the options that we have not covered below, we recommend that you leave them turned off.

SSAO: This can be used to strengthen and deepen the shadowed area on your model. Sometimes this can be useful for highlighting motifs; play around with the settings to see what, if any, work for your model.



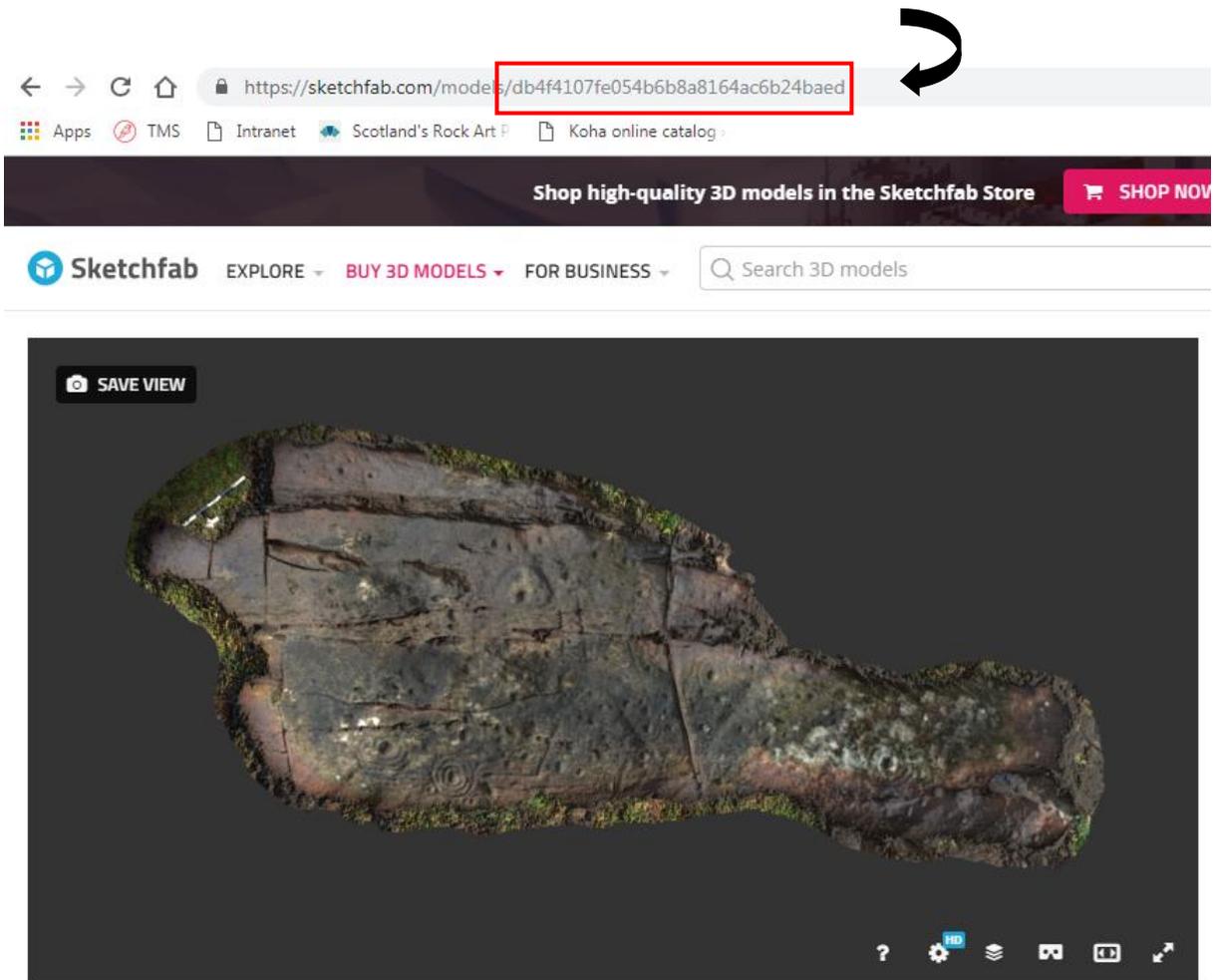
Sharpness: when used sparingly, sharpness can also be useful for enhancing the crispness of your model. We apply this setting to most models, but advise caution in using a sharpness above **0.3** as it can be too much and take away, rather than add, to the models appearance.



STEP 4: Add the link from your model in Sketchfab to our website

You are now ready to start uploading your 3D model to our website. By uploading the ID for your model in Sketchfab, you will make the model publicly accessible on our website as part of the on-line record for that panel.

1. With your model open in Sketchfab, copy the ID number from the URL link at the top of the page. You should only copy the number, not the whole URL link. In this case, the model ID number is: **db4f4107fe054b6b8a8164ac6b24baed**.



Ballochraggan 4, Port of Menteith



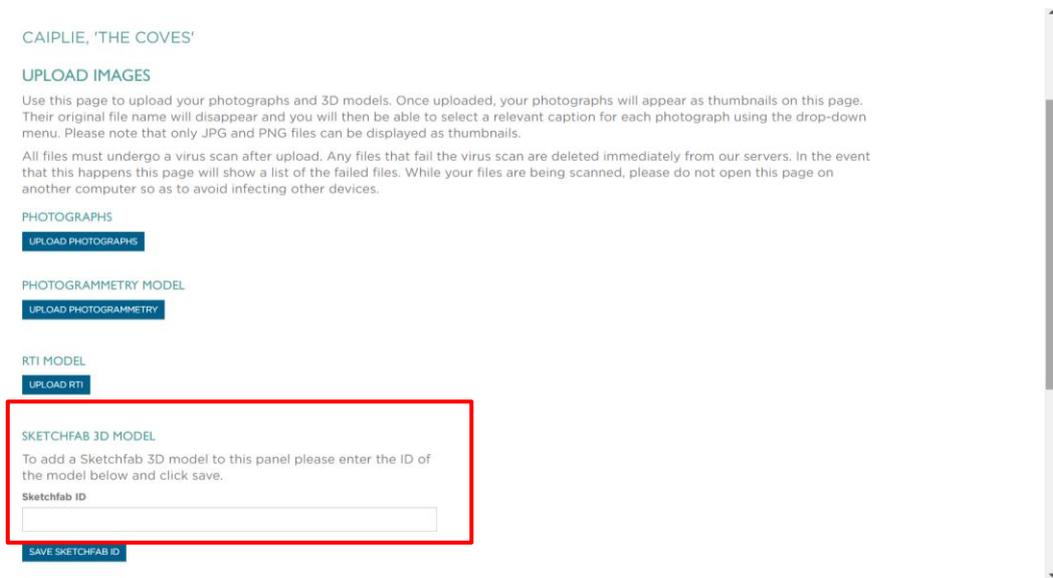
Scotland's Rock Art Project

14



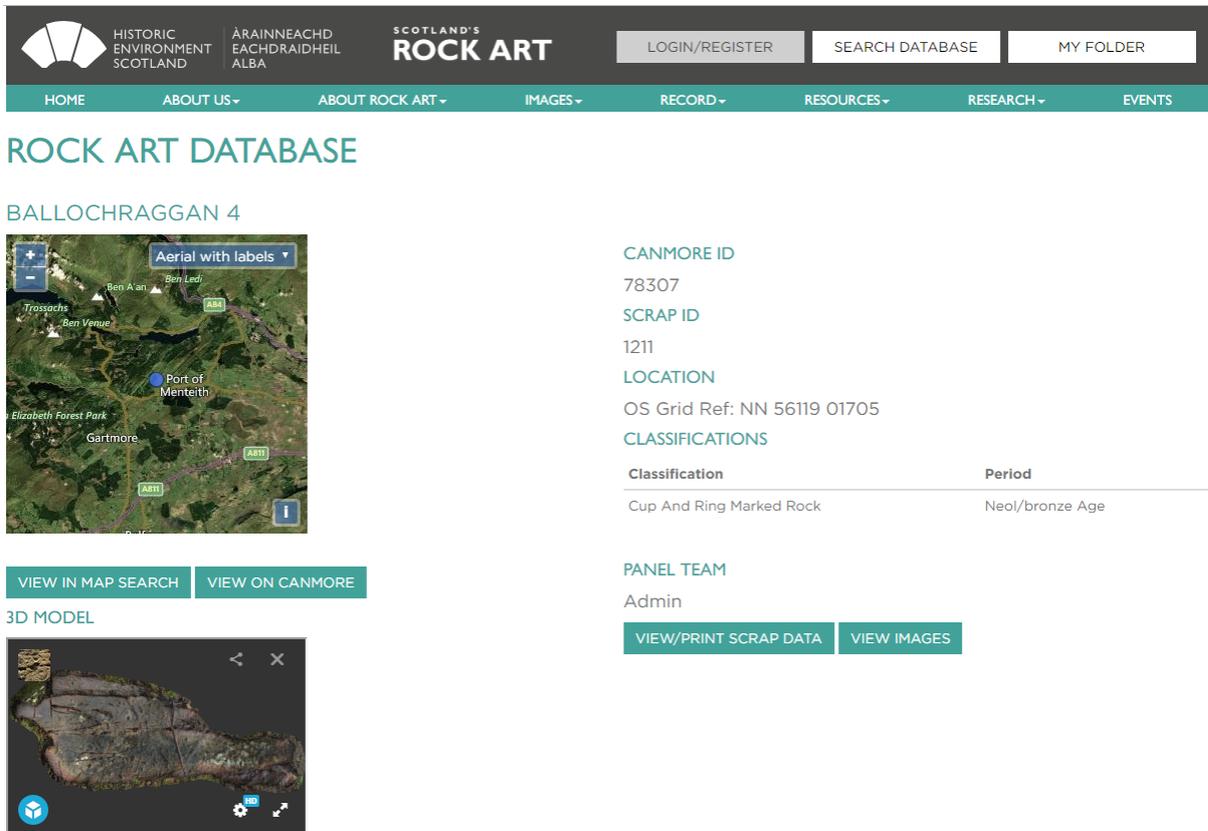
2. Next, go to our website (www.rockart.scot) and login to MyScRAP (this is your dedicated space on our website). Find the panel you are recording (see our guidance *Using MyScRAP*), select 'Edit', and go to the Upload Images page.

3. Paste the model ID number in the **Sketchfab ID** box under ‘Sketchfab 3D model’.



4. Save the Sketchfab ID.

5. Once your record for that panel has been validated, the model will be displayed on the “View Panel” page with the rest of the panel data. People will be able to enlarge the screen and rotate the model.

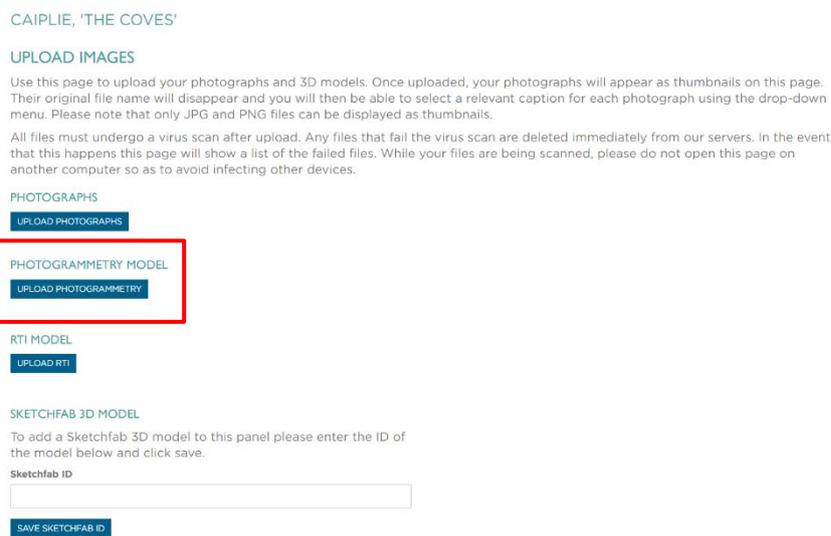


STEP 5: Upload your .OBJ file to our website.

We also recommend that you upload your model to our website so that we can use it for research during the project. The file you upload will be better quality than the version on Sketchfab, and will enable us to view the carvings in more detail.

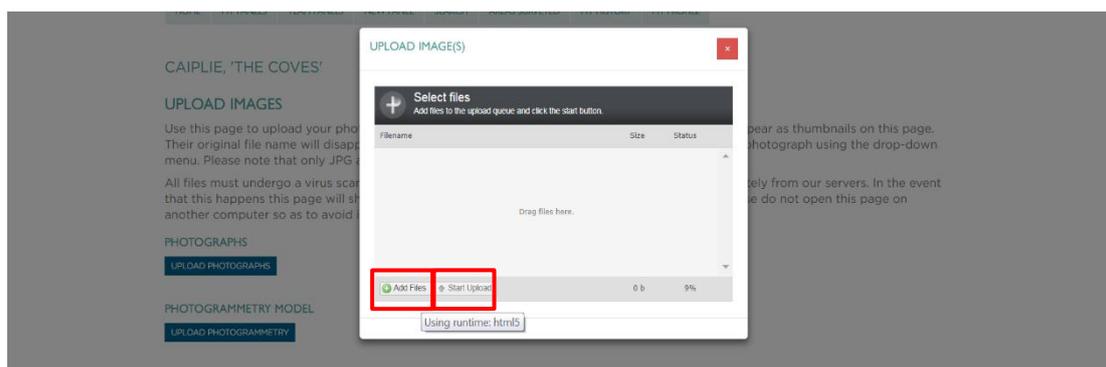
Unlike your model on Sketchfab, the file you upload to our website will be deposited in HES's Collections (Canmore) where it will be preserved in the long-term as part of the National Monuments archive.

1. You can upload your model in the 'Upload Images' page for that panel (see **Step 5** above, and our guidance *Using MyScRAP*).
2. Select '**Upload Photogrammetry**' under 'Photogrammetry Model'



3. This brings up a window where you can select "Add files", and then chose the files you want to upload for that panel.

You should upload the **.obj** file that you have already saved, as well as the **.mtl** and **.jpg** (or **.png**) files that were automatically created when you exported you model as an **.obj** file (see **Step 1**).



CAIPLIE, 'THE COVES'

UPLOAD IMAGES

Use this page to upload your photographs and 3D models. Once uploaded, your photographs will appear as thumbnails on this page. Their original file name will disappear and you will then be able to select a relevant caption for each photograph using the drop-down menu. Please note that only JPG and PNG files can be displayed as thumbnails.

All files must undergo a virus scan after upload. Any files that fail the virus scan are deleted immediately from our servers. In the event that this happens this page will show a list of the failed files. While your files are being scanned, please do not open this page on another computer so as to avoid infecting other devices.

PHOTOGRAPHS

UPLOAD PHOTOGRAPHS

PHOTOGRAMMETRY MODEL

UPLOAD PHOTOGRAMMETRY

- AWAITING VIRUS CHECK: photogrammetry_1(Little Bernera.jpg)
- AWAITING VIRUS CHECK: photogrammetry_2(Little Bernera.mtl)
- AWAITING VIRUS CHECK: photogrammetry_3(Little Bernera.obj)

4. When you have added all the files you want to upload, press “Start Upload”. The upload may take a little time, depending on the size of the files and the capacity of your computer. This is a good time to go and have a cup of tea!

Once your files have finished uploading, you will get a message saying “Awaiting virus check”. Your files are now in a queue and will be checked as soon as they get to the top of the queue.

5. You will still be able to submit your record for validation before the files have been checked, but we will only be able to validate them once the checks have been completed successfully.

Well done! You have now finished uploading your 3D models and making them publicly accessible.

Summary

When you have processed your model using the steps above, you should have created the following files, and shared them in the ways recommended in below:

3D Modelling	File Type	Upload to our website	Upload to Sketchfab	We collect from external hard drive	Minimum / Maximum size for each file
Photogrammetry field photographs	JPG			X	Recommended: 3 Mb / 10Mb
Model created in Agisoft Photoscan	PSZ			X	No limits
Exported Model	OBJ (+MTL and JPG)	X	X		10 Mb / 250 Mb for OBJ

3D modelling software

We would like all 3D models that you upload to our database to be created in **Agisoft Photoscan**. Following training, we will provide Agisoft Photoscan licences to specific people in each Community Team.

You can try out the Photoscan software by downloading a 30-day free trial version from the Agisoft website: <http://www.agisoft.com/>.

If you would like to experiment with other types of 3D modelling software, there are various options freely available on-line, including:

Regard3D: <http://www.regard3d.org/>

VisualSFM: <http://ccwu.me/vsfm/>

3DFlow: <https://www.3dflow.net/3df-zephyr-free/>

Autodesk 123DCatch: <https://autodesk-123d-catch.en.softonic.com/?ex=DSK-309.0>.

For more information, see: <https://pfalkingham.wordpress.com/2016/09/14/trying-all-the-free-photogrammetry/>

Free ways to manipulate and share your 3D model

Meshlab: <http://www.meshlab.net/>

Sketchfab: <https://sketchfab.com/>

If you are interested in being creative with your 3D model on Sketchfab, you might like to look at: <https://www.digitaltrends.com/cool-tech/sketchfab-3d-remix-challenge/>

Notes:

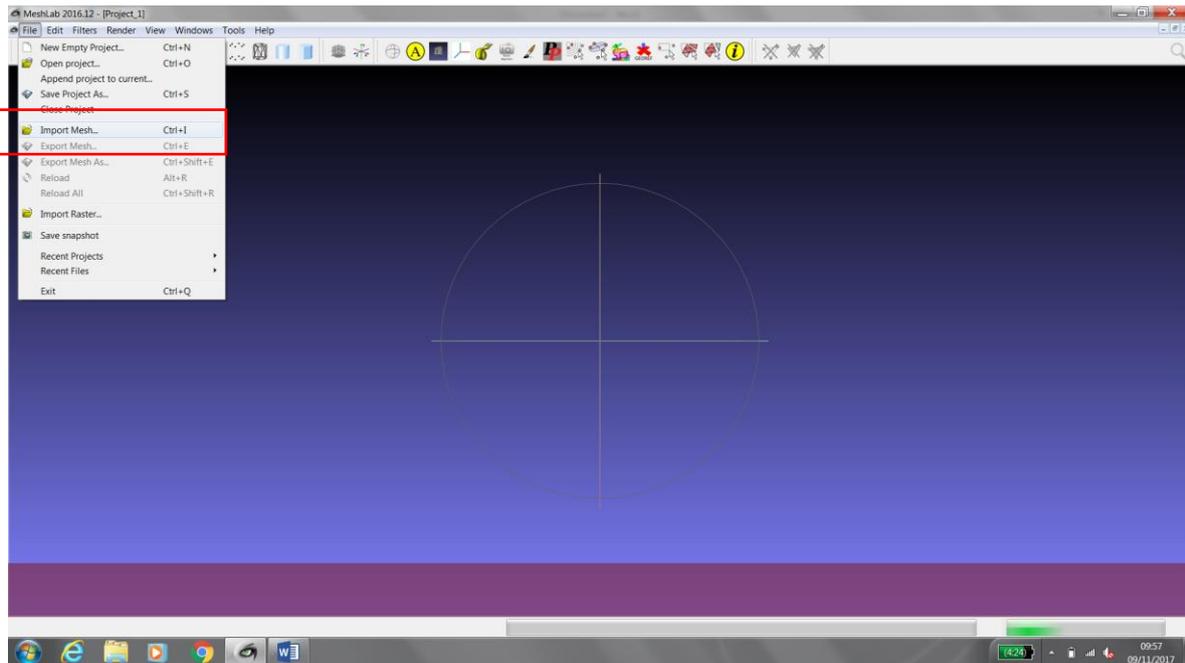
- We will provide an external hard drive for you to store your field photographs and processed models. We will regularly collect copies of these from you during the project.
- If your OBJ model is larger than 250 Mb, it will not be possible to upload it to our website or Sketchfab. We recommend that you either:
 - Decimate your model (see our guidance ***Creating a 3D Model***) and export it as a smaller OBJ file, which you can then upload to our website and Sketchfab, or;
 - Save the OBJ in your Panel folder, along with the field photographs and PSZ file, and we will collect it from you.

If you now want to continue enhancing your model in **Meshlab**, or create interactive pdfs to share by email, **Steps 6 and 7** on the following provide guidance on how to do this. Please note that these Steps are entirely optional!

STEP 6: Enhance your model using MeshLab

This step is entirely optional, but we recommend it if you want to view your model in different ways. As Meshlab is a free software, it is also a very good way to share your model with other members of your team. All you have to do is give them a copy of your .obj file of the model, and they will be able to open it and play around with it in Meshlab.

1. Download the free MeshLab software from the website <http://www.meshlab.net/> (you will need to download the most recent version)



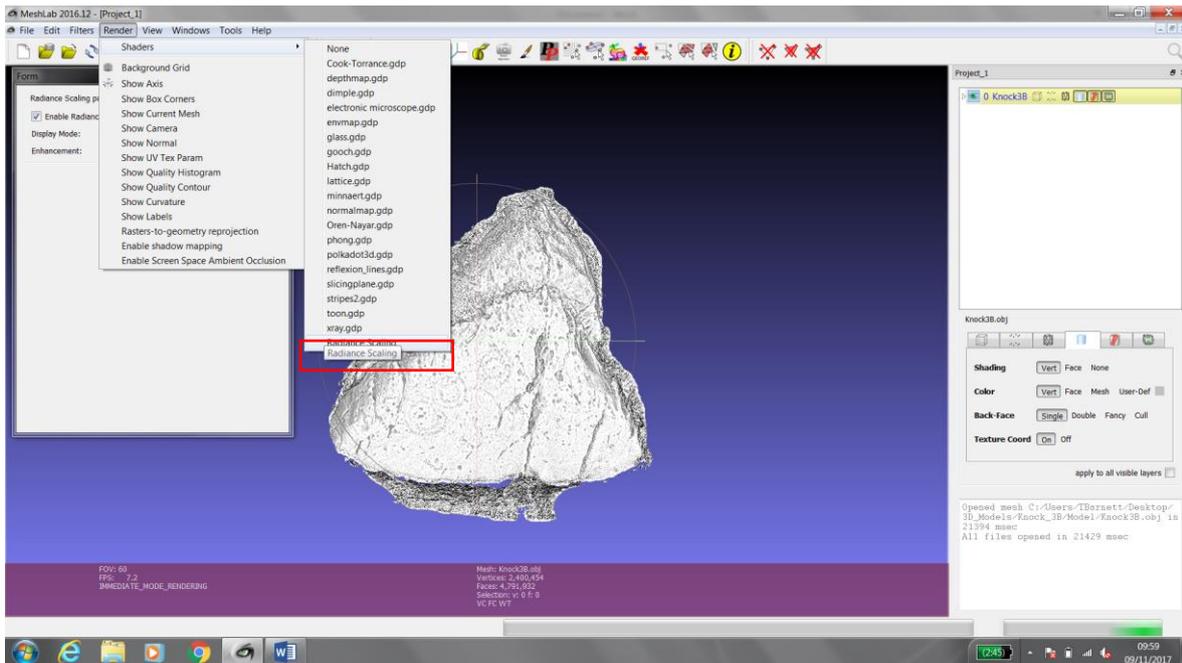
2. Import your 3D model (select the .obj file that you exported from Agisoft Photoscan) into Meshlab: **File → Import Mesh → Select Model**
3. Once the model is uploaded, you can render it by using a number of different available shaders, that will enhance the surface of our model and improve the visualisation of details and motifs:

Render → Shaders → Select the one you wish to apply to your model.

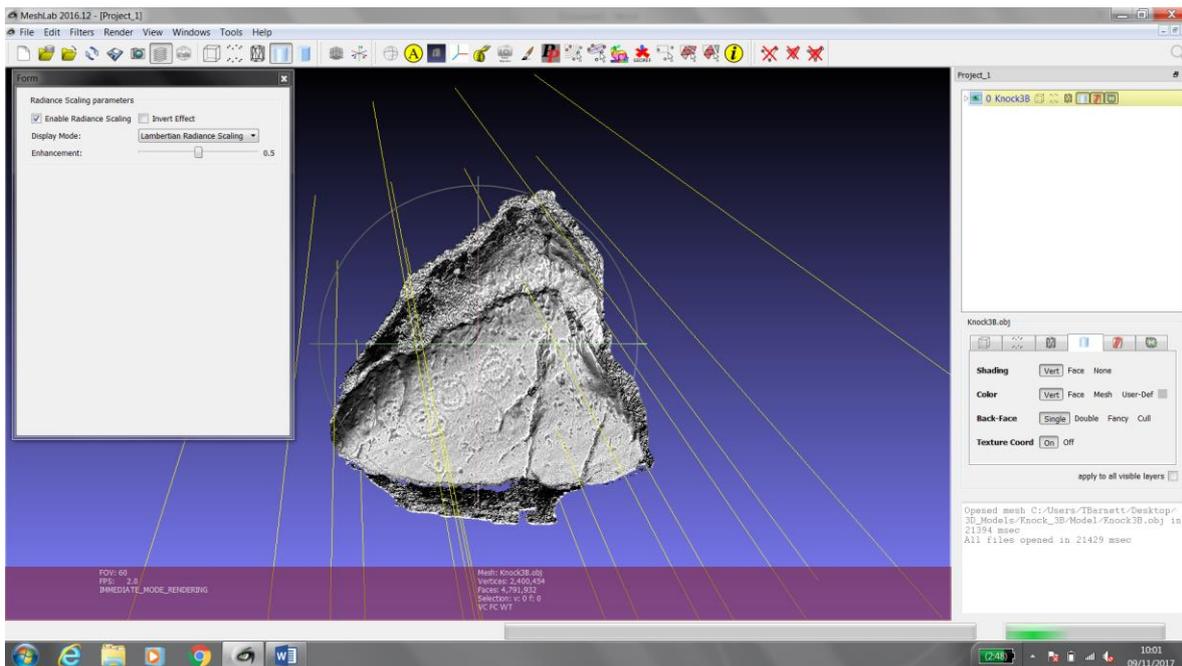
We suggest the **Radiance Scaling** rendering (last on the list), which comes with several sub-options. The one that comes by default (*Lambertian Radiance Scaling*) is the only one that allows you to manipulate the light.

The other renders are fixed but are good to highlight contrasts. You can learn more about this rendering here:

<https://www.youtube.com/watch?v=eFlff7H7Ams>



- To manipulate the light source you must press “Shift” + “Ctrl” keys at the same time and once the yellow lines appear, you move your mouse around to move the light.



You can find more on how to control lighting conditions with Meshlab here:

<https://www.youtube.com/watch?v=bO5WzFzmIM>



There are two useful shortcuts you can use when in Meshlab. Holding the left mouse button with shift allows you to zoom in and out, where holding the left mouse button and Ctrl allows you to move the model.

STEP 7: Export Model as an Interactive PDF

This is entirely optional, and is most useful if you want to send your model to people by email or embed it in a document.

1. Check if you have decimated your mesh, otherwise you will create a very large file which is then difficult to manipulate.
2. From the *File menu* in Photoscan, select *Export Model*.
3. In the Save As box, select PDF.
4. In the Export Model window, indicate your preferred parameters, or leave on the default setting. The exported textures will be stored in the same folder as the 3D-model.
5. You can then simply attach the PDF to an email in order to send it to someone.

And that's all there is to it!!