

Layers, selections & masks in Affinity Photo 2

This guide describes the use of layers, selections and masks when processing digital photographs using the application program Affinity Photo. Illustrations are from version 2.0 of the program running in Windows 11. Readers are assumed to be familiar with the contents of our previous guide: Affinity Photo 2 - A basic workflow.


Mac users: whenever we mention the Ctrl key you should use Cmd; when we say “right click” you should use the Control key and click.

Graham Relf 2022.11.30

1 - Layers

Opening an image

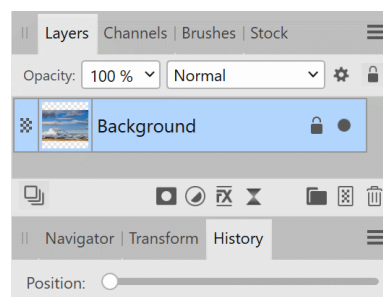
On opening an image file it is shown in the Layers panel like this:

The layer is shown in blue, meaning that it is the currently selected one we are working on. Note that it is a “Pixel” layer, as indicated by the  icon, so we can use tools that modify parts of it.

The two little icons on the right of the layer can be clicked. The lock means the image cannot be moved around relative to its window. The solid dot means the layer is visible. These become more useful when we have more than one layer.

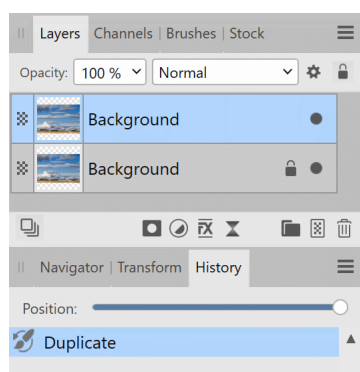
The layer is called Background but it can be renamed by clicking on that name and typing something else. This is also more useful when we have several layers.

The History panel indicates that nothing has yet been done to the image.

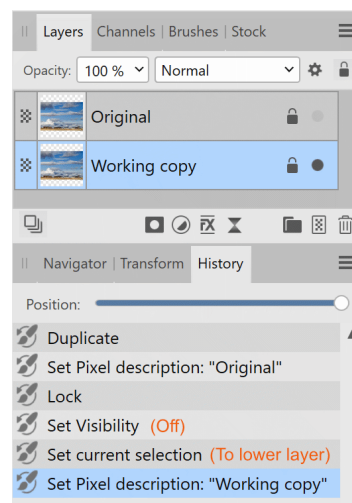


Duplicate the layer

Select Duplicate either on the Layer menu or on the context menu (right-click on the layer).



Rename the layers so the upper one is called “Original” and the bottom one is “Working copy”. Also lock the top one by clicking the padlock at top right of the whole panel. These 2 layers should remain aligned.



Then un-dot the upper layer to make it invisible.

This is often a useful thing to do. If we now process the lower working copy (make sure it is blue) we can dot the original temporarily to view it for comparison.

The reason for putting the original at the top of the layer stack is that it will not be affected by adjustment layers we are going to put above the working copy.

A very basic point

The Layers panel shows a vertical stack of layers but you need to envisage that as a stack of images behind each other on the screen in front of you. The topmost layer shown in the panel is the one nearest to you on the screen. So if that layer contains a complete image and it is dotted, so it is visible, then it blocks out all the other layers below/behind it (as long as the blending mode is Normal - see page 5).

With similar logic, if an upper layer is an adjustment layer (such as Curves) then its effect applies to all the layers under (behind) it. We will see later that it is possible to change that, so an adjustment only applies to certain layers.




Replacing sky: 2 pixel layers

The sky in the first image here is rather boring. Let's replace it with the sky in the lower image.

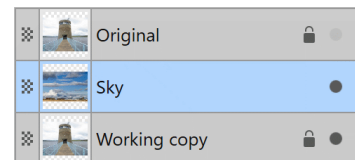
Open the first one and duplicate it as before. Select the working copy layer. There are several ways to put the second image in the same layer stack:



1. On the File menu select "Place...". This lets you select the image and drag it across our first image. It becomes an "Image" layer  above the working copy. Right click and "Rasterise..." it to be a pixel layer.


2. File/Open the second image. It has its own tab in Affinity Photo. Use Ctrl+A to select it All - an animated dashed line surrounds it. Ctrl+C to Copy it. Move to the first image's tab. Ctrl+V to paste.

After renaming the layer to "Sky" the layer stack is like this:

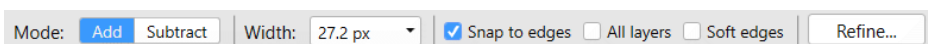


Notice that the sky layer is not locked and it is not the same size as the other image, so we will need to move it and rescale it. But not yet.

First drag the sky layer down so it is below (and therefore behind) the working copy.

Highlight the working copy layer again and from the main tool bar choose the Selection brush tool:  Wipe it across the boring sky until it is all selected, but nothing else is.

Remember that the size of the circular tool can be adjusted with [and] keys.



The context toolbar should show "Add" in blue so that if you stop dragging but start again the new selection will add to the previous one. There is also "Subtract" if you make a mistake and select some non-sky. While adding you can also select the tiny bits of sky that are showing through the tower's window.

When the whole sky is selected press the Del key to delete the sky. You will see the underlying better sky layer instead. Play with the visibility dots in the Layers panel so you fully understand what you are seeing.

Ctrl+D deselects, to get rid of the animated dashed outline.

Then we may need to move the sky around to position it better. Highlight it in the Layers panel. With both sky and working layers visible, choose the Move tool:



That enables you not only to drag the sky layer around (as long as it is not locked) but also to rescale it by dragging the corners of the blue box created by the tool.

Adjustment layers

With the working copy layer selected press Ctrl+M (or on the Layer menu select New Adjustment Layer > and then Curves...). The tone curve dialogue appears, with its graph, and the adjustment layer is attached to the working copy. It is shown in the layers panel as an extra icon, with a blue rim to indicate that it, the adjustment, is now the current layer to work on, not the pixel layer.

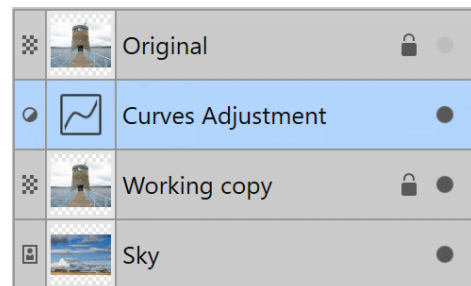
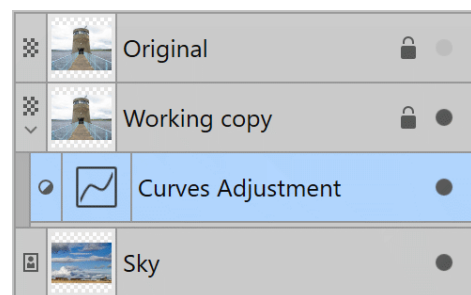
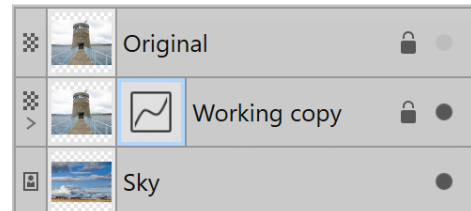
Notice the chevron, >, at the left of the working copy layer. Clicking that causes the adjustment layer to become visible. The way it is positioned means that it only affects the working copy layer, not the sky layer.

Sometimes we want an adjustment to affect all of the layers below it. That can be achieved by dragging the adjustment layer up until it sits in the required place, as in the lower diagram here. This change can be reversed by dragging back down.

Reminder: it is very easy after this to forget to highlight a pixel layer before using another tool and then to wonder why the tool seems to have no effect (though it may be affecting a mask - explained later).

Note for those used to Affinity version 1

The behaviour just described is quite different from previously. It used to be that the new adjustment first appeared as shown in the third diagram on this page, affecting all layers below it. You then had to drag the adjustment layer down carefully until it attached itself to a single layer.



Live filters

Similar to live adjustment layers there are also live filters. There are many of these. Examples include noise reduction (“denoise”) and sharpening (“unsharp mask”). The full list pops up on clicking an icon at the bottom of the layers panel (the icons are described on the next page). On selecting a filter it becomes a new layer just like the adjustments.

Adjustment or filter?

What is the difference? Adjustments work on each pixel of the image individually, adjusting its value without looking at its neighbours. A filter takes into account what is going on around each pixel. Filters therefore tend to take longer to apply but on today's fast PCs you will rarely be able to see that. As a user you really don't need to know this. Just see what is available on each list.

Select multiple layers

Holding the Shift or Ctrl key while clicking on layers in the layers panel enables several to be highlighted at once. Tools will then affect all of the selected layers.

Layer panel icons



- Select all layers
- Create a mask layer - we will come to this later
- Create an adjustment layer - a list pops up for selecting one
- Layer effects - we will not cover because it is more relevant to graphical design
- Create a live filter layer - a list pops up for selecting a filter
- Group layers - with multiple layers selected they can be treated as one. This enables you to apply an adjustment to a group of layers - not all and not just one
- Create an empty pixel layer above the current layer
- Delete current layer

Merging layers

The Layer menu has 3 options for merging layers:

- Merge down - if 1 layer is selected and there are others below
- Merge selected - if several layers have been selected
- Merge visible - if several layers are ticked to be visible

The result is a new pixel layer just above the highest one to be merged. Adjustments and filters will have been applied where necessary, so they are no longer alterable in the merged version.

Removing dust spots

The first image on the right here is a small patch of sky (cut from a photo of a hang glider). As a displayed image it looks fine. A fairly extreme curves adjustment reveals dust spots (far right) which might mar a printed version.



While the curves layer is dotted (visible) select the sky layer and use the Inpainting brush tool to correct the spots. Then either un-dot the curves or delete that layer.

The top bar of the layers panel

There are 4 control elements above the layers. These apply to whichever layer (or set of layers) is currently selected (highlighted in blue).

The first from the left is Opacity. This can be altered either by the slider as shown or by typing a number into the entry box. Some photographers use this to let a texture photo show faintly through what would otherwise be a very flat plain background.

The second element is a very long drop-down list of “Blending modes”, the beginning of which can be seen here. The scroll bar reveals many more.

The default setting is “Normal” which means that the current layer will hide those below (behind) it.

It can be worth experimenting with the various possibilities. There is a huge range of possible effects, especially if you apply the modes to adjustment layers. A whole book could be written on this subject. The Affinity Photo Workbook does include many examples. We will consider just 3 cases here.

1. If you have a pair of duplicate layers several modes give you heightened contrast. The “Multiply” mode is a fairly extreme case.

2. The mode called “Subtract” can be used to get the difference between 2 images when subjects have moved, as in the heron image on the right. The procedure involves tone curve layers too and is fully described on page 12 (abridged from https://grelf.net/how_subtract.html).

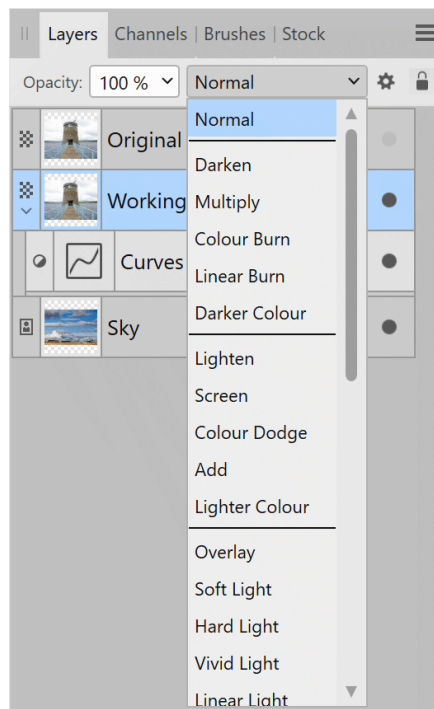
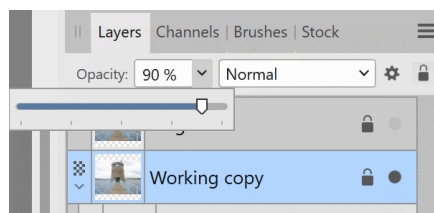
3. The “Divide” mode provides a very good way of correcting colour casts, particularly for night shots where the unwanted colour is from street lighting.

3.1 From the original photo use the eyedropper tool to pick a sample of the undesirable colour.

3.2 Add a pixel layer over the photo.

3.3 Fill the new layer with the sampled colour.

3.4 Make the blending mode of the new layer “Divide”.

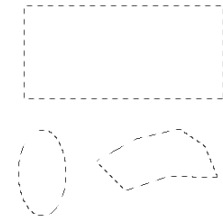


The third element in the Layers panel bar, with a cog wheel icon, leads to a dialogue for altering the range of brightnesses affected by the blending. This is going beyond the scope of these pages. The help pages of Affinity Photo offer some explanation.

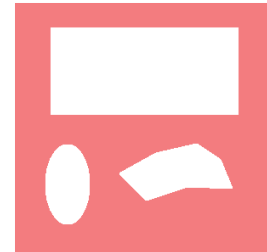
Finally, the lock icon we have already seen on page 1.

2 - Selections

A selection is an area or a set of disconnected areas which limit the action of an operation or tool to only affect pixels in those areas. The selected areas are outlined by animated black and white dashes, like this (the dashes march around the outlines):




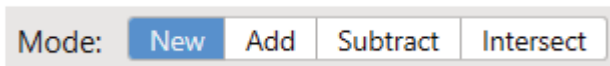
If you press key Q the selection can be viewed differently, as a transparent mask (a Quick Mask, shown here in red). We will come to masks later.



Selection tools

Several tools are available. Choose a tool and **check**

- (a) is the current layer  (Pixel),
- (b) does it contain the pixels you can select,
- (c) is the mode (shown in the context bar, below the menus) suitable?



or



Are you starting a NEW selection or ADDing to or SUBTRACTing from a selection?



Selection Brush Tool

The Brush tool can be dragged around to select an area. We used it before on a sky.



Flood Selection Tool

With the Flood tool (wand) just click on required areas. Notice the **Tolerance** setting above the image: adjust it to avoid selecting too much or too little on each click.



Marquee Selection Tool - 4 shapes:

The Marquee tool is simple. Try it on an image, using all 4 modes (as above) to see effects.



Freehand Selection Tool (under M)

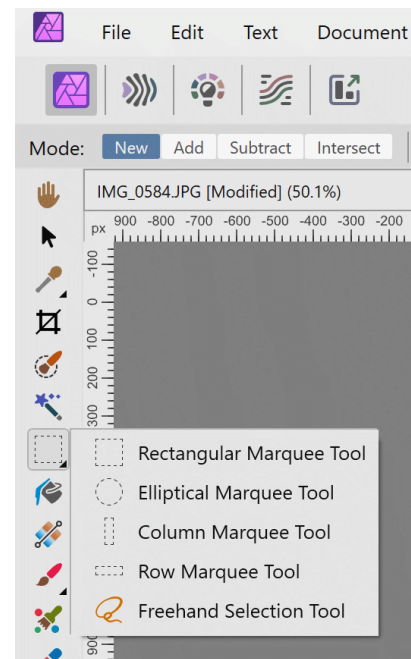
The Freehand tool (lassoe) has 3 types:



The 2nd type (polygon) is most useful. Click each vertex, (Del key to step back if you get it wrong), double-click to close the polygon.

The first type is a true freehand curve which can be tricky to do. The third type is magnetic: if there is a clearly defined contrast step (edge) in the image it will try to follow that.

Notice hints at the bottom of the screen as you use any of the tools.



Use a combination of tools

Having used one tool to get most of the selection you can use any of the others in add or subtract mode to improve it. I often start with flood or brush then use polygon to improve.

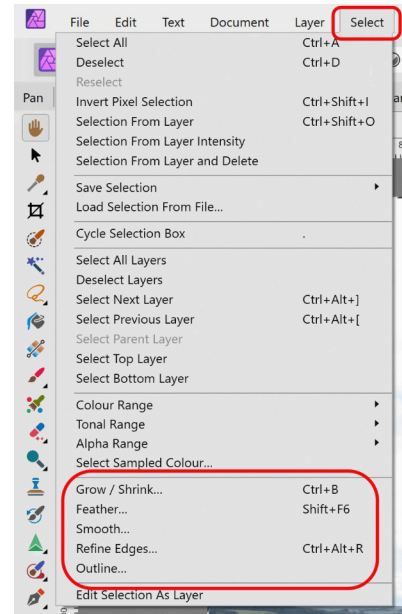
More buttons on top bar: Select all | Deselect | Invert selection.
Or use keys: Ctrl+A selects all of an image/layer.
Ctrl+D deselects. Ctrl+Shift+I inverts the selection.



Refining selections

There are several useful options available on the Select menu. All lead to relevant dialogues.

- **Grow / Shrink...** lets you select how many pixels by which to change the size of the selection.
- **Feather...** lets you set a number of pixels by which the selected area will smoothly fade into another layer if it is copied. Quite useful.
- **Smooth...** gets rid of sharp corners in the selection (this is less useful).
- **Refine edges...** we will look at in more detail below.
- **Outline...** You can select a band, of chosen width, around the edge of the selection (hardly useful for us, more for graphical effects).



Refining edges

Suppose we wanted to replace the sky in an image like this. It is quite impossible to select all the spaces between the tree branches by hand.

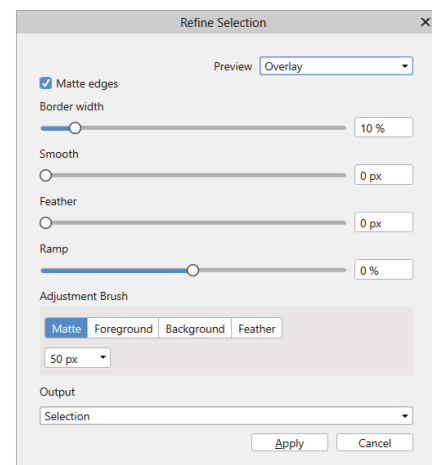


The selection procedure is as follows.

1. Use one of the selection tools already described to get most of the sky selected.
2. Invert the selection, so it covers the ground, not the sky. The sky is the background, to be discarded.
3. Select menu: Refine Edges... to get this dialogue:

The unselected part of the image (mostly sky) becomes covered in a transparent red.

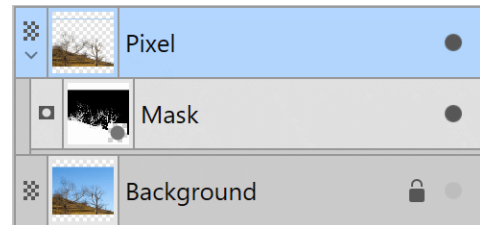
4. Brush over all of the trees (not just the unselected gaps). This may be easier if the brush is enlarged. The "50px" box at lower left reveals a slider which can be pushed up to, say, 300px.



The areas you brush go pink and when you raise the brush some processing occurs. You may need to do this a few times to cover everything.

5. To check what has happened, change the “Preview” drop-down (top right) to either “Transparent” or (perhaps better) “Black & white”.
6. When the selection seems to be complete change the “Output” drop-down to “New layer with mask”. **Apply**.

The image and layers then look like this:



And then of course we can slip a sky image in as a layer below (behind) that, as we did before.

The Refine Selection dialogue does have more capabilities, well explained here:

<https://affinity.serif.com/en-gb/tutorials/photo/desktop/video/334273469>

Copy and paste a selection

With a pixel layer highlighted in the layers panel, use menu Edit/Copy or Ctrl+C to copy the selected part of the image to the clipboard. Edit/Paste or Ctrl+V to paste it as a new pixel layer either on the current image or on a different one. The new layer only contains pixels from the selected region, the rest of the layer is transparent.

You can also create a new image containing only the copied selection by using menu “File/New From Clipboard” or Ctrl+Shift+Alt+N. If the selected area is not rectangular there will again be transparent pixels around it.

Move it

Once you have copied and pasted a selected area onto a new pixel layer the move tool (V) enables you not only to move it around but also to stretch or rotate it. Why would you want to? Let’s consider an example.

This image is part of a photo of a roof, spoiled by spotlights. We can get rid of those but it is not as simple as cloning from another part of the image because of the curve. We need to copy a part of the curved plaster and move and rotate it to fit over the lights.



First use the freehand / polygon tool to define a shape that goes along an unspoilt section, like this.

Copy the selection and paste it as a new layer.

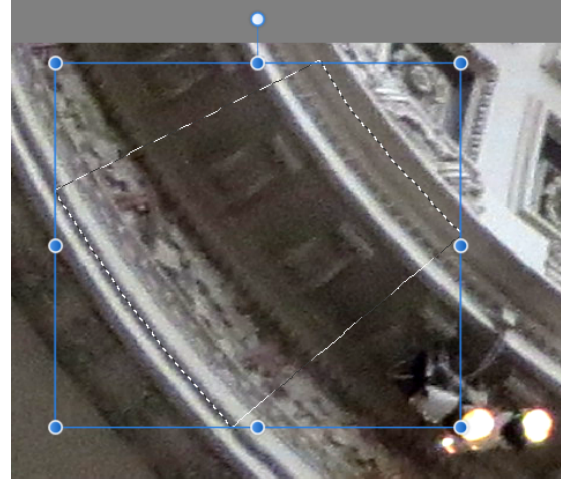
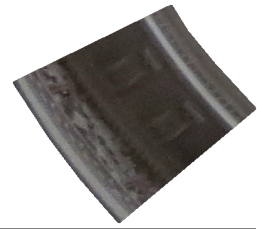
Clicked on with the move tool (V) you get a blue outline with circular handles on it:

Highlighted like this the layer can be dragged to a new position. The corner handles enable it to be scaled but keeping its proportions. The handles in the middle of the sides of the rectangle enable either the horizontal or vertical direction to be scaled, changing the proportions.

Most importantly for our purposes the handle off to the top enables the layer to be rotated.

So the cut out portion can be dragged and rotated to fit over the offending lights but keep the pattern of the plasterwork. It may be necessary to slightly change the proportions to make it fit exactly.

Here is my result:



Using the Move tool



Save a selection shape and reload it

On the Select menu: "Save Selection/To File..." presents a file saving dialogue to create a file of type .afselection. At some later time you could then use menu "Select/Load Selection From File..."

Use a selection as a guard region

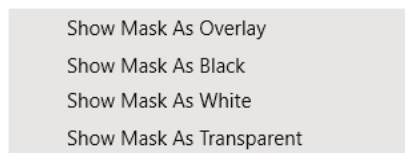
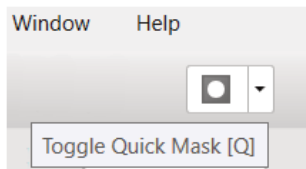
When using the clone tool it is all too easy to draw outside the target area but setting a selection ensures that the tool can only change pixels in the selected area.

Here is a greatly enlarged detail from a photo. When I took it I failed to notice a person standing there. With a polygonal selection area it was easy to use the clone tool to copy material leftwards with the grey vertical protected from being overwritten.



Areas outside the selection may be copied but only pixels inside the selection can be changed.

3 - Masks



Convert a selection to a quick mask

In the top bar beneath the menus clicking this icon (or key Q) converts a selection area to a mask. Q is for “Quick mask”.

The drop-down indicated beside the icon is a small menu of options for how the mask is to be depicted.

By default the mask as an overlay is translucent red:

In this mode you can use painting and erasing tools to adjust the selection.



Paintbrush tool (B): Paint in white to add to the selection. In black to erase parts. In grey to change the opacity (proportionate effectiveness) of the selection.



Erase brush tool (E): Always erases from the selection.

When done, Q takes you back to the normal view of the selected area(s) rather than the quick mask view.



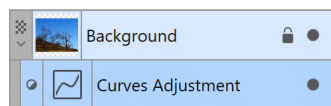
Mask layers

The quick mask was just a temporary way of changing the shape of a selection by using different tools (painting and erasing).

There is a different kind of mask which is created as a layer. We have already met one such mask when refining a selection.

We have also met masks without realising it...

Live adjustments & filters have masks

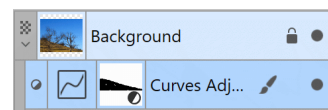


The curves adjustment layer here has a mask. Initially the adjustment applies to the whole image. But its mask can be edited like any other mask.

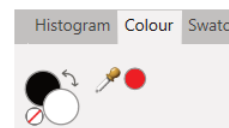
One way to make the mask visible is to Alt-click on the graph icon in the Curves layer. That will show the mask, all white. Drawing on that in black will prevent the adjustment applying to the drawn regions of the image.

Better though: select the Erase brush tool (E) and use it on the image while the Curves layer is highlighted. You will see that the tone curve no longer applies to the areas where the erasure occurred.

Suppose the tone curve has improved some areas of the image but looks quite wrong in others (grass has gone too bright green perhaps). All you need to do, having ensured the adjustment layer is highlighted, is to use the Erase brush tool (E) to remove the bad areas from the mask. When you have done that it becomes apparent in the Curves layer too, as shown here. The black portion was erased.




The mask can be inverted (Ctrl+I, or Layer menu/Invert). So if you only want to apply the adjustment to certain areas, first invert so the mask goes black then choose the paint brush tool (B) and paint in white on the areas you want the adjustment to be applied to.

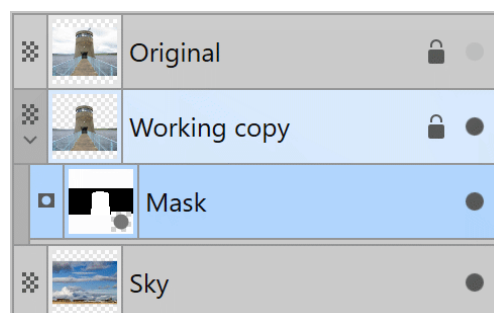


Creating new masks as layers

There is a different approach to the sky replacement we did earlier.

Recap: duplicate the reservoir image, put the better sky below (behind) it, select the bad sky in the working copy. But then...

- Invert the selection (Ctrl+Shift+I) so the ground is selected, not the sky.
- Click the new mask icon at the bottom of the layers panel.  The working copy layer was selected so the new mask is attached to that. That layer is now masked.
- Clear the selection (Ctrl+D).



The mask becomes as shown here. The black area (sky) is transparent so the better sky is

seen behind it.

The advantage of this method is that the selection shape is kept in the layer stack in a form that can still be edited again if necessary. Saved in a .afphoto file you can bring it back any time for amending.

Appendix

Subtracting one photo from another (further to page 5)

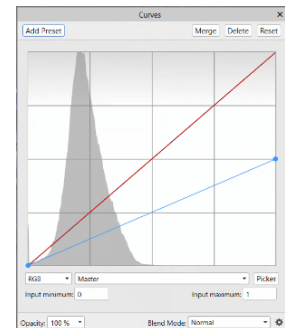
If you put each photo on a different layer one of the possible blending modes for the upper layer is Subtract. However, that by itself will not produce the desired result.

If the range of brightnesses in each image (pixel values in each colour channel) is from 0 to M (maximum) then subtracting one image from another produces a possible range from -M to +M. (think about it: $M - 0 = +M$ but the other extreme is $0 - M = -M$). Neither Affinity Photo (AP) nor Photoshop (PS) is able to display negative pixel values. Such values all become zero, shown as black. Everything that was brighter in the second, subtracted, image than it was in the first image will become black.

We need to have a Curves adjustment layer for each image. This must be a different one for each image and only affect that image, not both of them.

We need to adjust the initial straight line in each curves diagram. For the lower layer (to be subtracted from) the left end of the line has to be dragged up half-way, so the pixels go from $M/2$ to M. For the upper layer the right end of the line must be dragged down from M to $M/2$. Then subtraction will produce the range from 0 to M. Things which are unchanged between the two images will appear as mid-grey, at $M/2$ for all colour channels. Other pixels will be brighter or darker depending on whether they were brighter in the first or second image.

Shown on the right is the curve setting for the subtracted image (upper layer in the layers panel). The red line was the original. The blue line has had its right end dragged down half way. This applies to all 3 colour channels.



This technique is suitable when two photos have been taken with the same exposure settings and with the camera fixed (eg, on a tripod) but something in the scene has moved or changed in some way. Subtraction shows only things which changed. Fix the camera and use manual settings to take two photos. Automatic settings might be different

for each image, so manual is best. Fixing the camera ensures that an unchanging background will be the same in both photos (except for possible noise if a high ISO setting was used). In this example there was some breeze causing the foliage and water to move slightly, which makes an embossed effect.