Working with Images

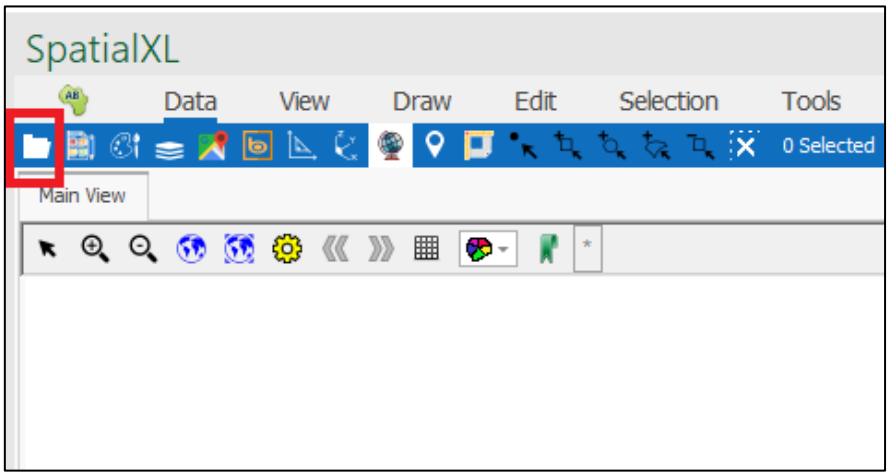
Contents

Intro

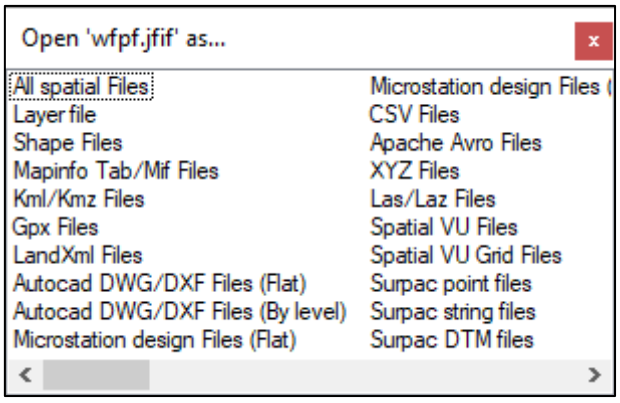
In all our spatial products you can bring in images of various kinds, many formats are supported in our software.

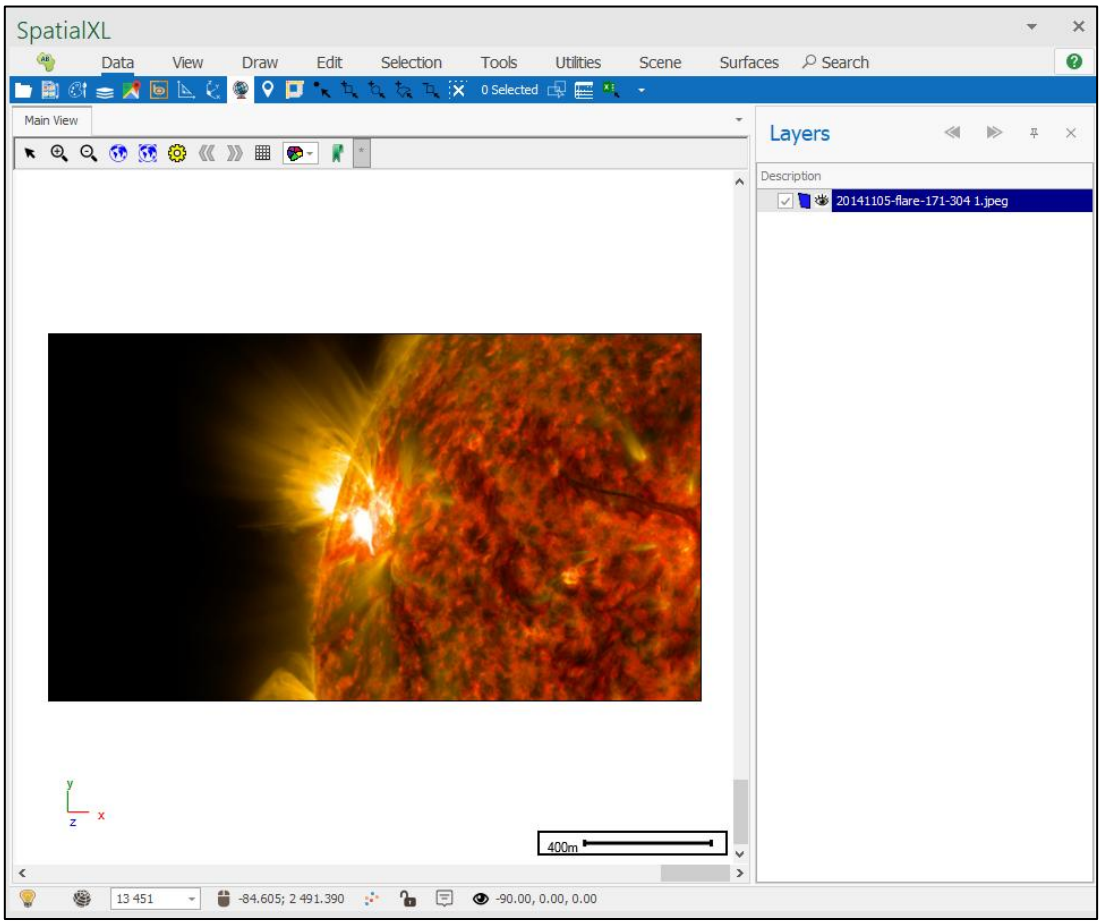
Bringing in Images

You can bring in an image by browsing to it with the **Open** button in the quick access toolbar, or just dragging it onto the scene:



Once you bring it, depending on what type of image it is, a dialogue will come up asking you to specify the type of image file it is, otherwise it will just immediately display on the screen:





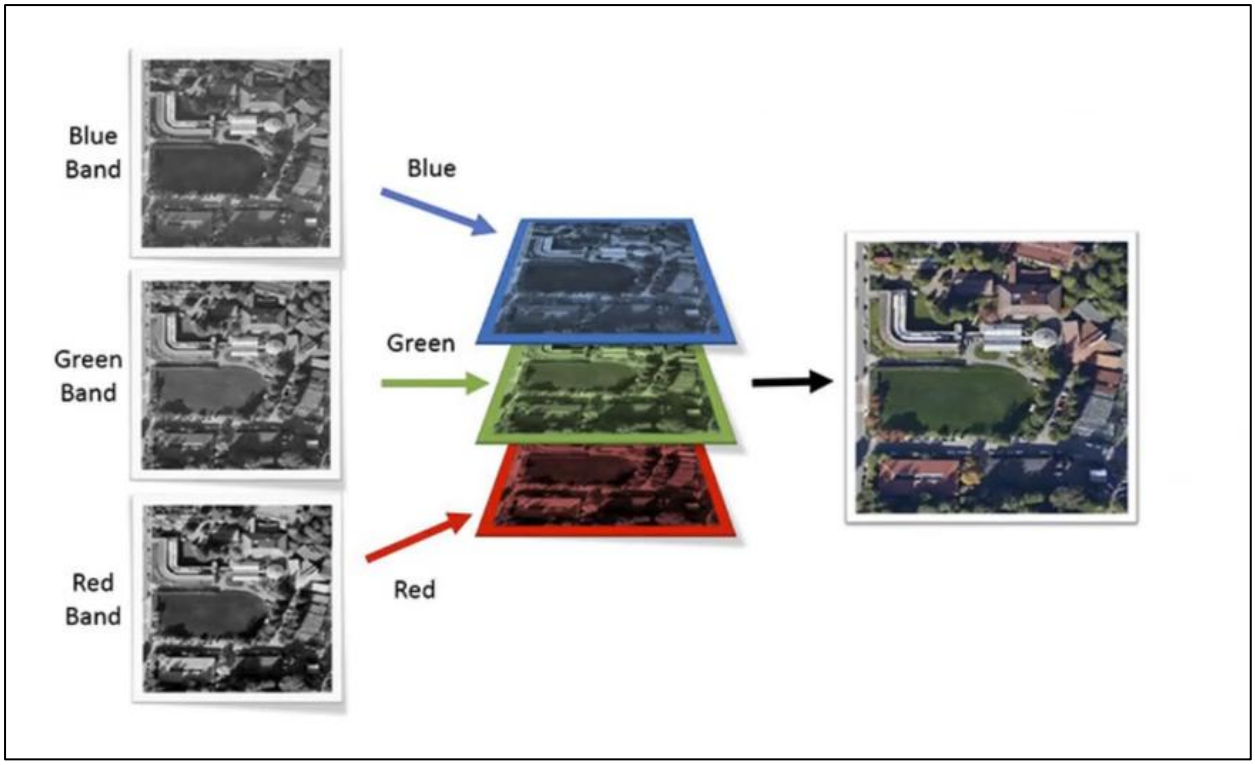
Registering an Image

To georeference an image to an exact location in space you can use the **Register Image** tool described in the *Register Image Guide*.

Colour Bands

All of the colours that humans perceive can be created by mixing the three additive primary colours: red, green and blue. Human vision is a system that is able to detect these three wavelengths or ‘bands’. Our brains combine this data detected by our eyes into a single colour image. This is also the basis of colour imaging.

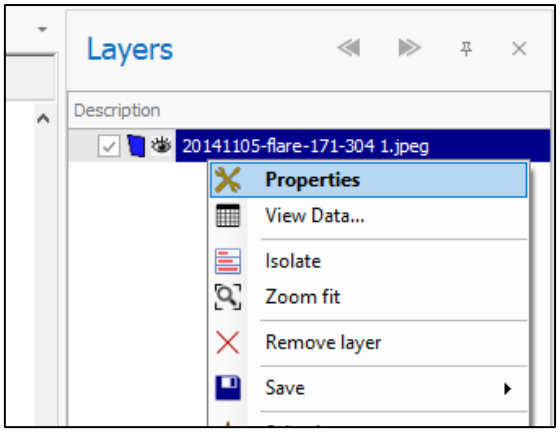
Colour images are actually made up of three values, one each for the amount of red, green and blue light that entered the camera for each pixel. This means a ‘3-band’ image is needed to display a colour image.

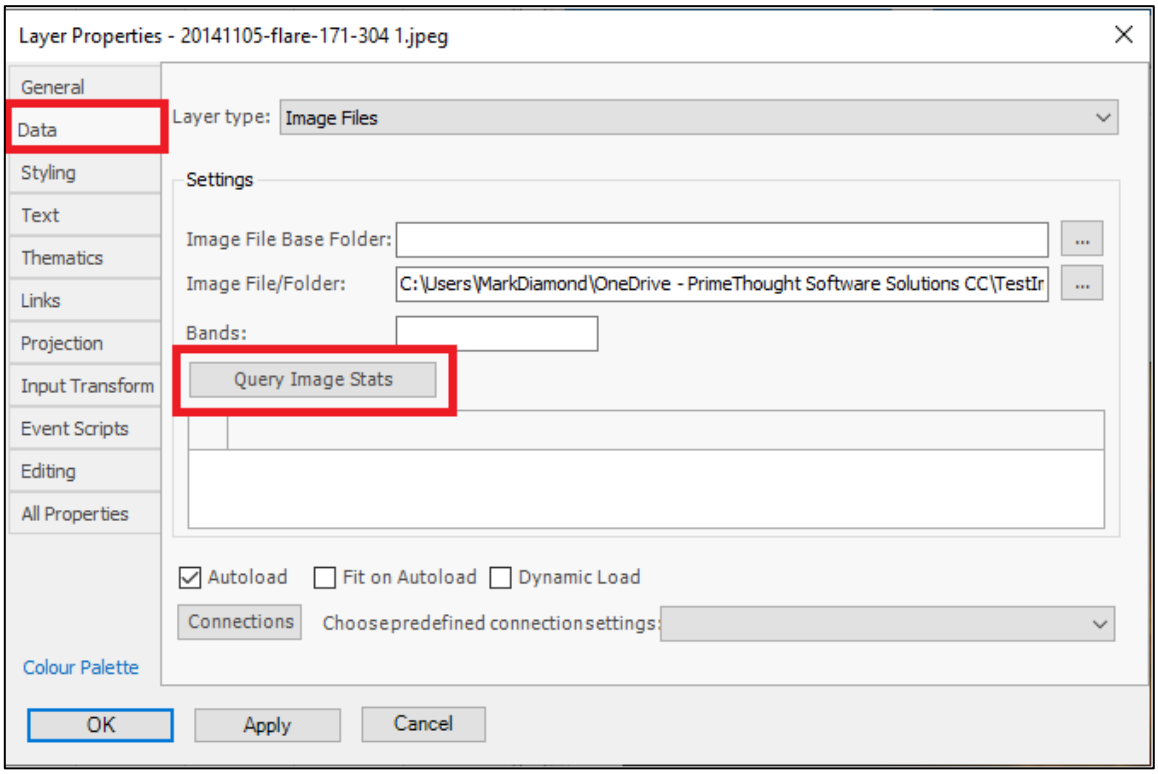


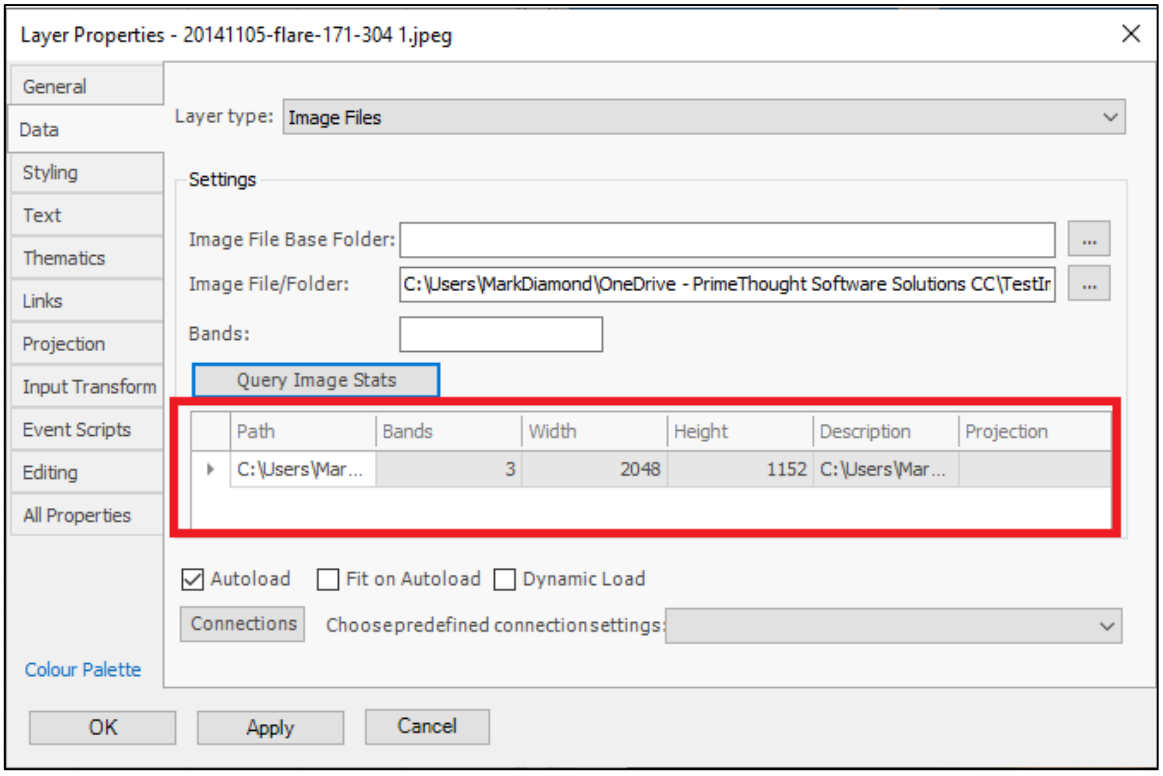
RGB (red, green, and blue) refers to a system for representing the colors to be used on a computer display. Red, green, and blue can be combined in various proportions to obtain any color in the visible spectrum. Levels of R, G, and B can each range from 0 to 100 percent of full intensity. Each level is represented by the range of decimal numbers from 0 to 255 (256 levels for each color).

Query Image Stats

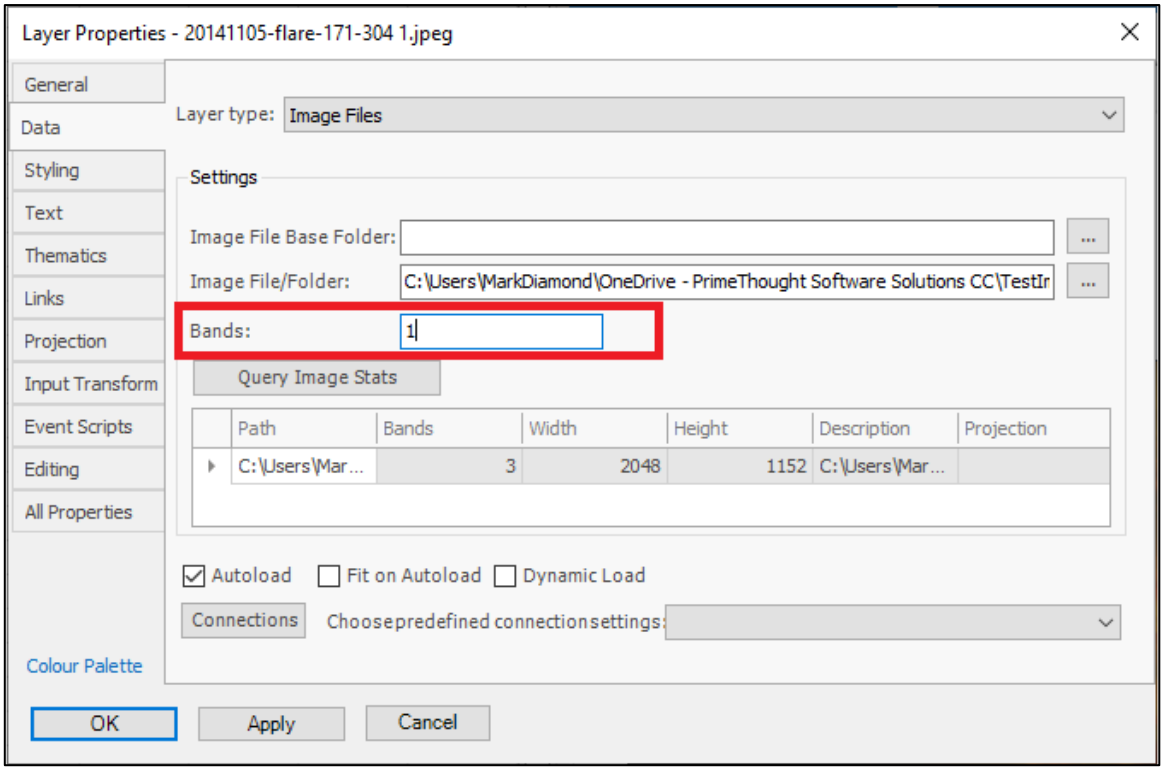
When an image has been brought in you can also query some stats relating to it that will give you the number of colour bands associated with the image, the height, width etc. This is done in the **Data** tab of the Layer Properties dialogue:


Layers
Description
20141105-flare-171-304 1.jpeg
Properties
View Data...
Isolate
Zoom fit
Remove layer
Save

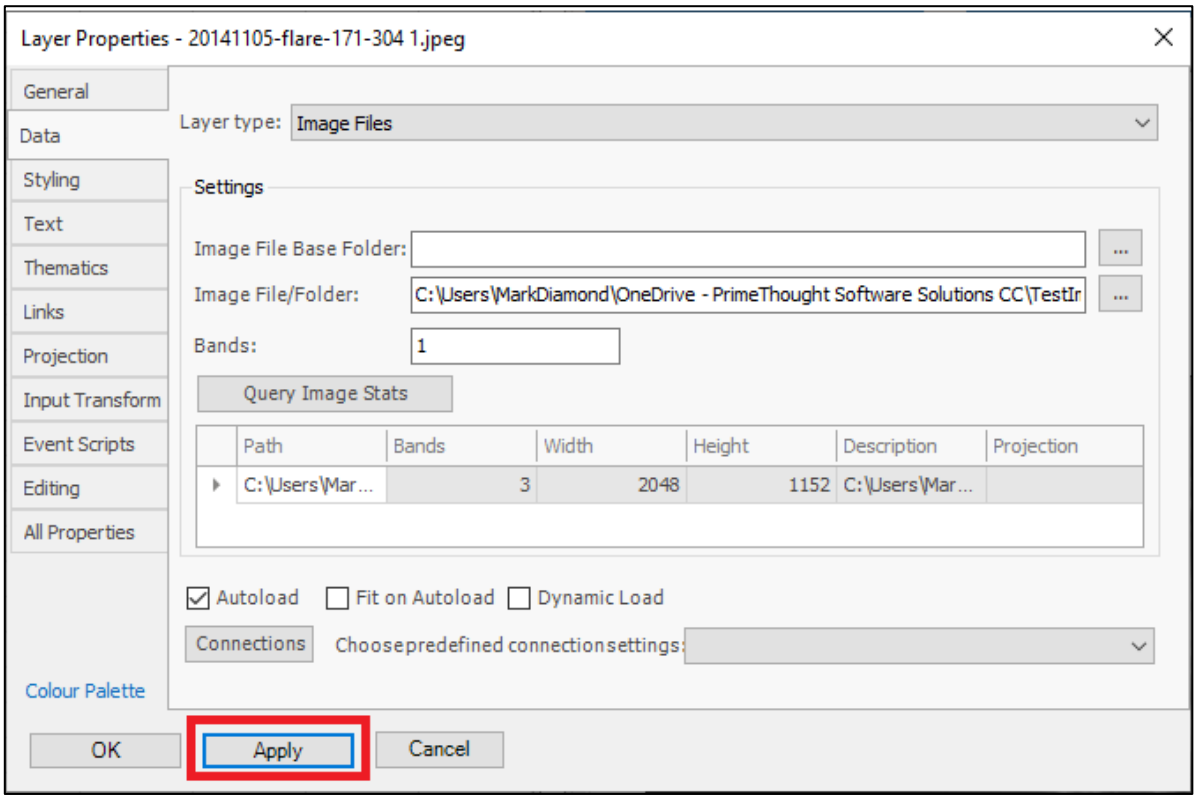

Layer Properties - 20141105-flare-171-304 1.jpeg
General
Data
Styling
Text
Thematics
Links
Projection
Input Transform
Event Scripts
Editing
All Properties
Colour Palette
Layer type: Image Files
Settings
Image File Base Folder:
Image File/Folder: C:\Users\MarkDiamond\OneDrive - PrimeThought Software Solutions CC\TestIr
Bands:
Query Image Stats
Autoload
Fit on Autoload
Dynamic Load
Connections
Choose predefined connection settings:
OK
Apply
Cancel

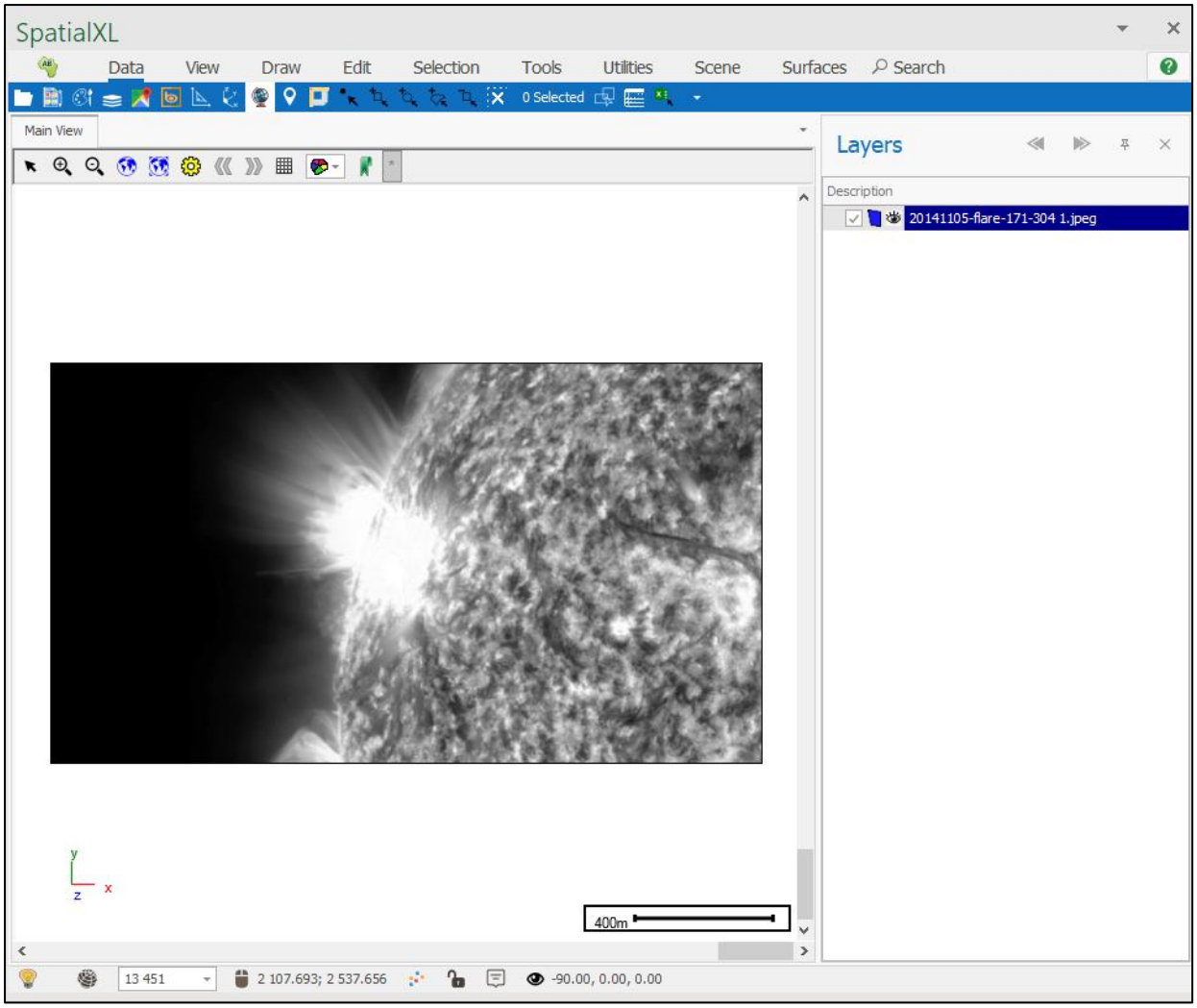


This image has 3 bands as we can see (Red, Green, Blue). An image can have more than 3 bands and often when it has 4 bands, the 4th band is a transparency, this type of band is referred to as 'Alpha'.
We can choose which bands to display, for example I will choose to only show band 1, by entering in 1 by the **Bands** field, this will give me a monochrome image (if this field is left blank it will just assume the default display of bands):

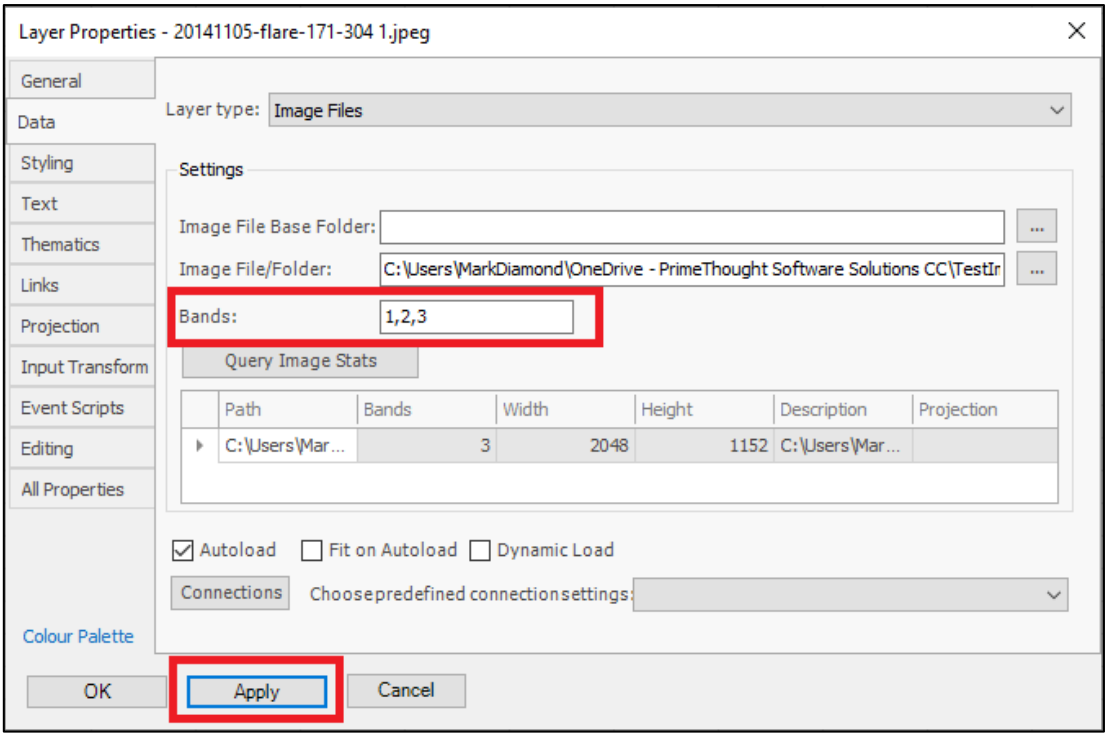


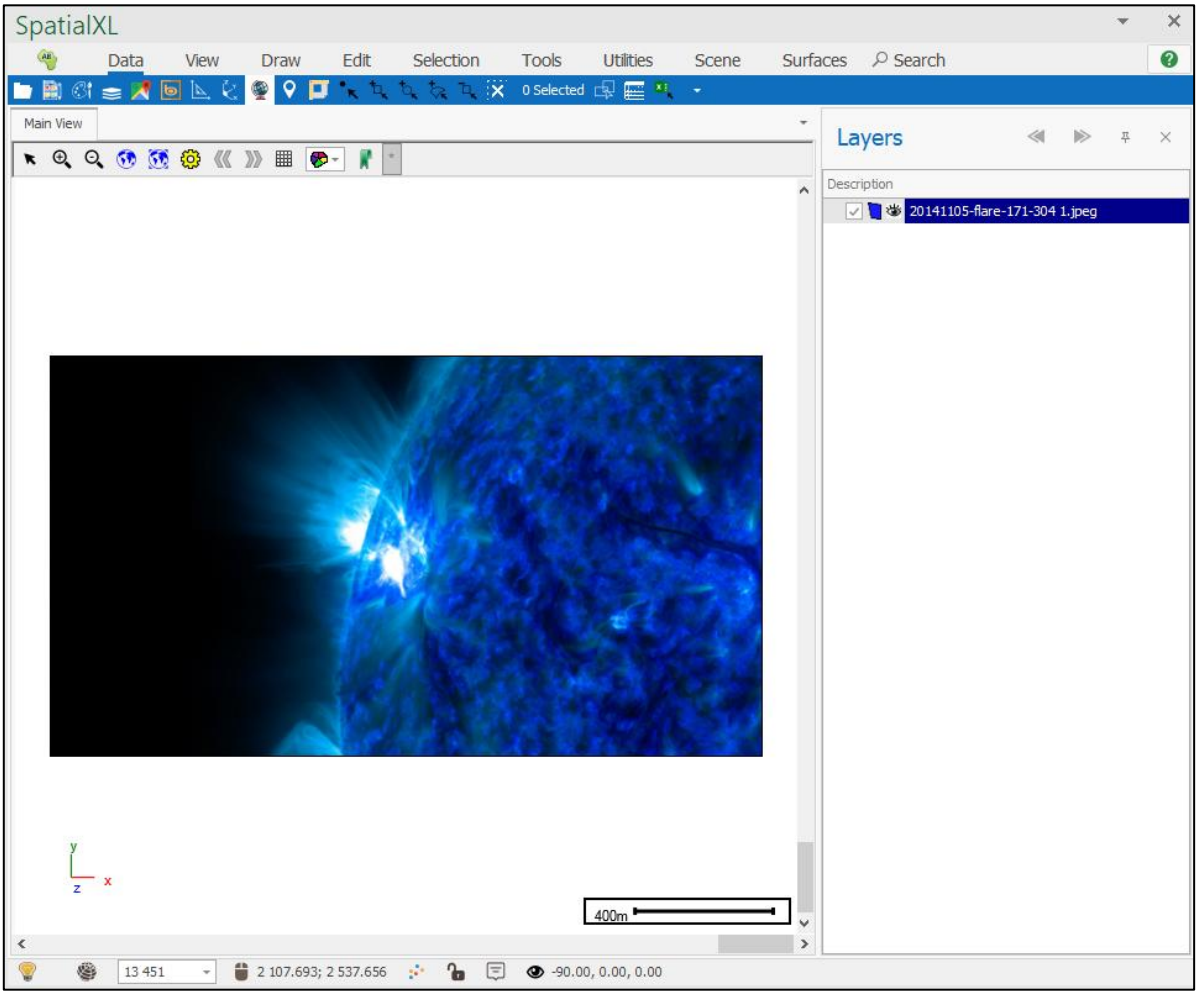
I can then press **Apply** to see what this looks like on my image:



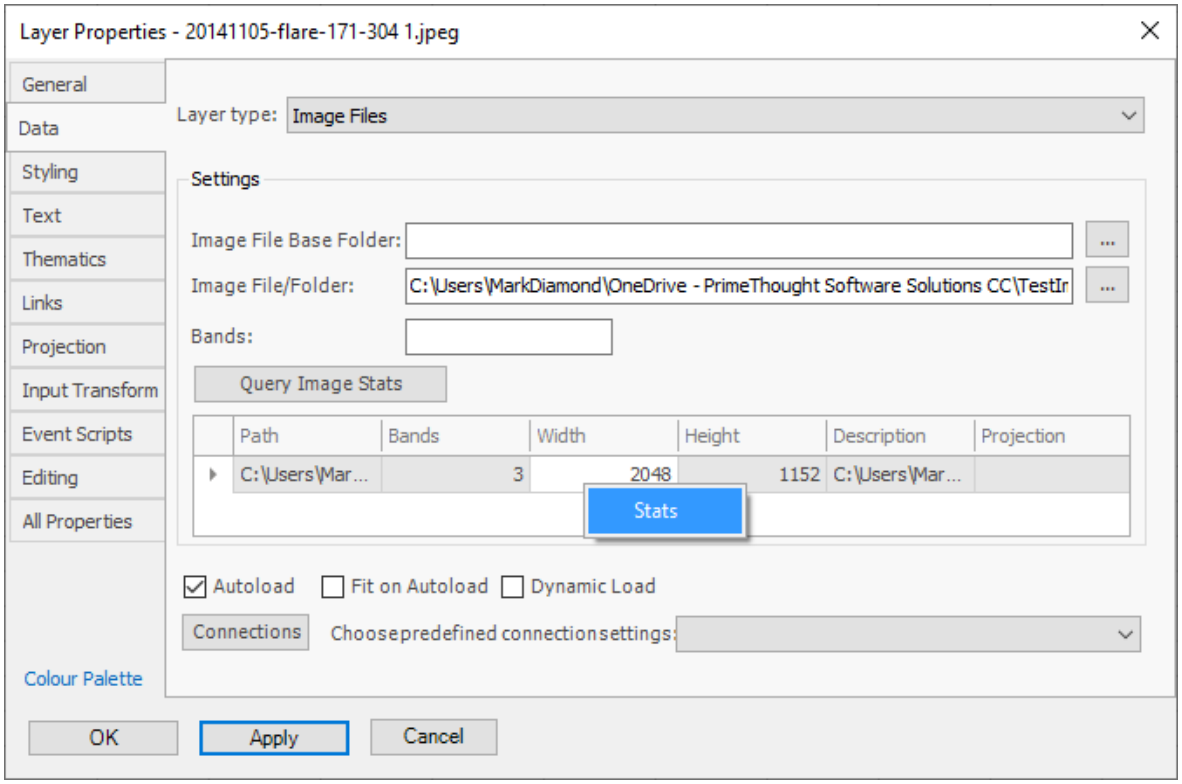


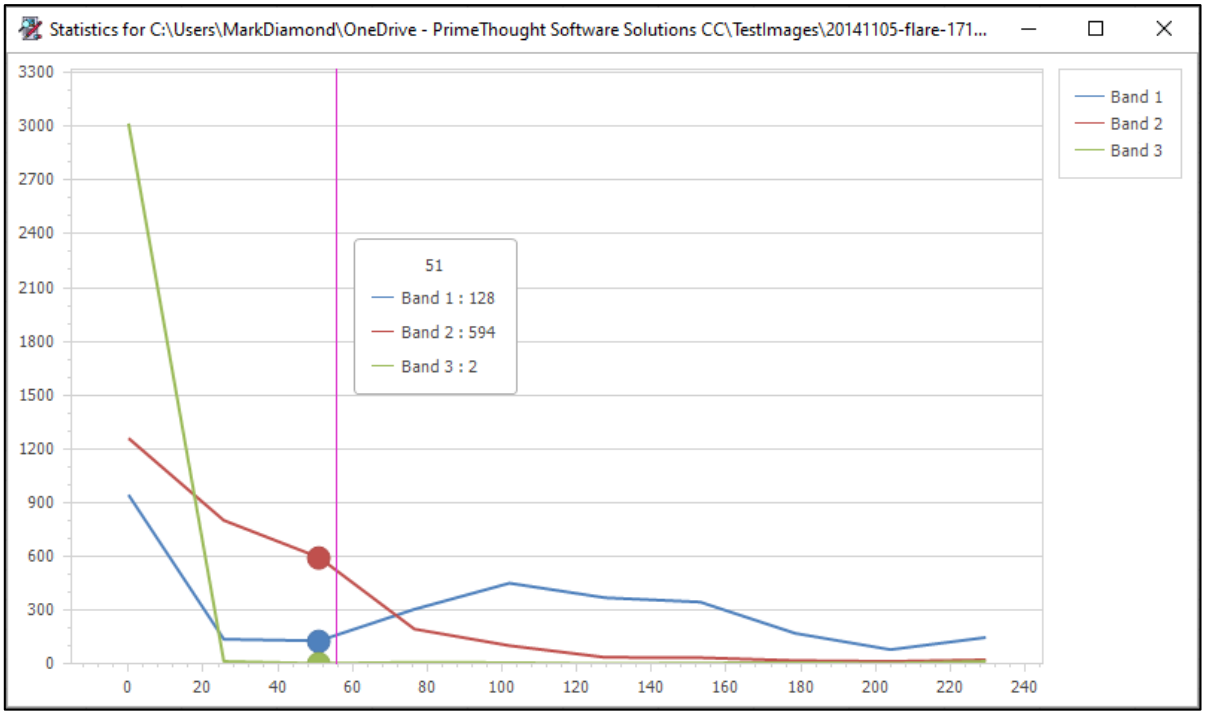
You can also choose the order of display of the bands, so for example I will put the ordering as 1,2,3 (the default display is 3,2,1), this will make my image a negative:


Layer Properties - 20141105-flare-171-304 1.jpeg
General
Data
Styling
Text
Thematics
Links
Projection
Input Transform
Event Scripts
Editing
All Properties
Colour Palette
Layer type: Image Files
Settings
Image File Base Folder:
Image File/Folder: C:\Users\MarkDiamond\OneDrive - PrimeThought Software Solutions CC\TestIr
Bands: 1,2,3
Query Image Stats
Path
Bands
Width
Height
Description
Projection
C:\Users\Mar...
3
2048
1152
C:\Users\Mar...
Autoload
Fit on Autoload
Dynamic Load
Connections
Choose predefined connection settings:
OK
Apply
Cancel


SpatialXL
Data
View
Draw
Edit
Selection
Tools
Utilities
Scene
Surfaces
Search
0 Selected
Main View
Layers
Description
20141105-flare-171-304 1.jpeg
400m
13 451
2 107.693; 2 537.656
-90.00, 0.00, 0.00

What you can also do is query some further stats about the image which will bring up a graph showing the range of the colour band values, to get this, right click on the row in the grid and click **Stats**:



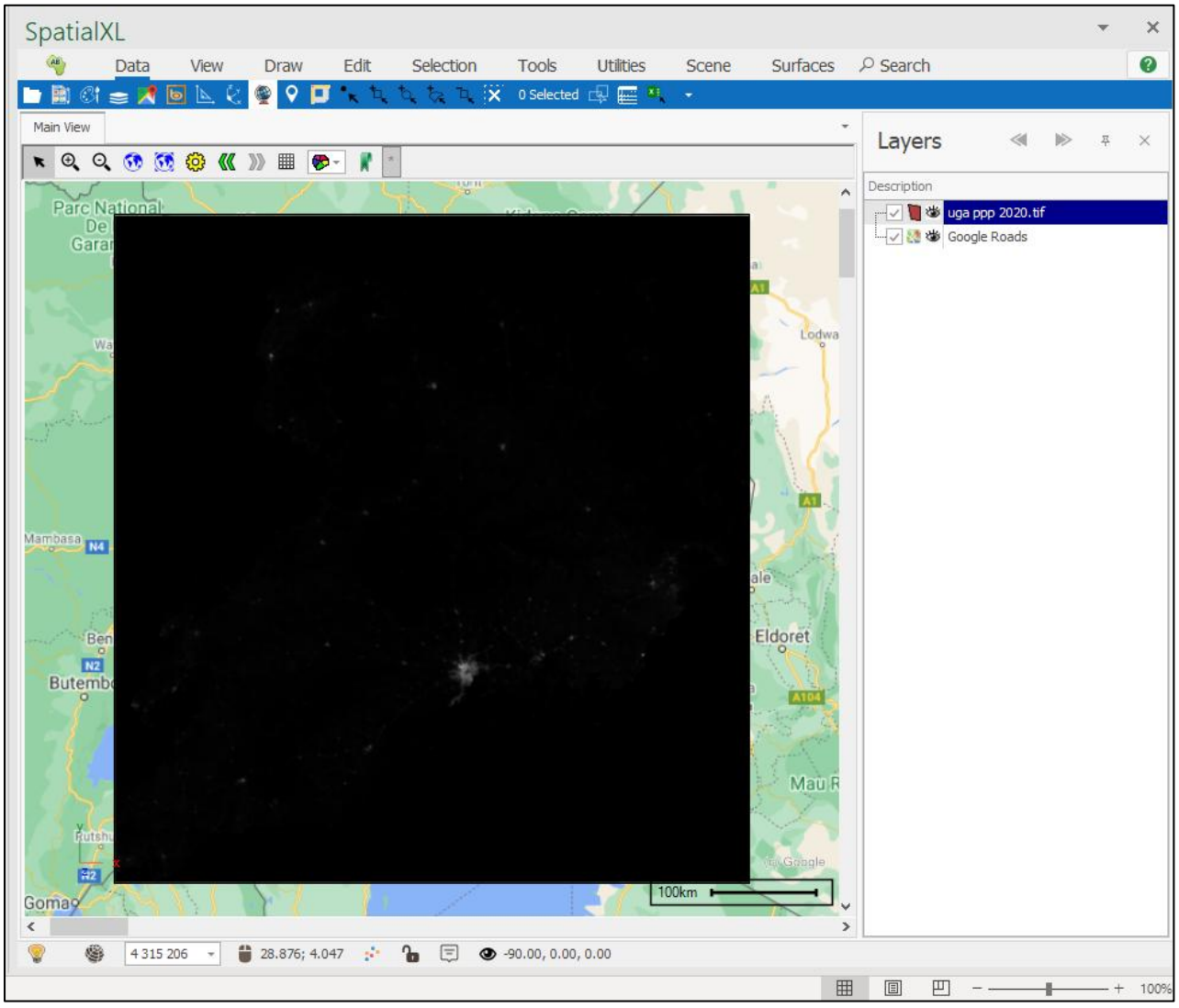


The horizontal scale is the colour value for each band, and this value is the amount of red, green and blue light in each band. The vertical scale is the number of pixels containing that colour value for each band.

Theming on Colour Bands

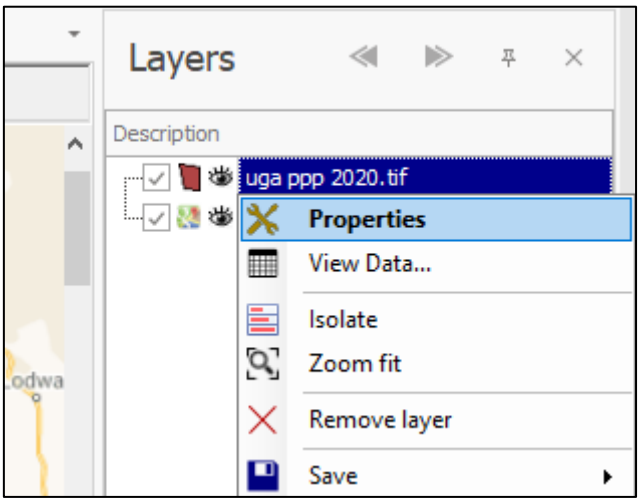
Often when working in GIS you can get some images that are only one band such as TIF images showing world population data. These images display only one band, so the colour is monochromatic, and they will have pixels with a value indicating some attribute such as the number of people in that pixel area. A pixel with the value zero will display as black and will display lighter on a greyscale towards white with higher values.
Using our tools we can display and analyse these images meaningfully.

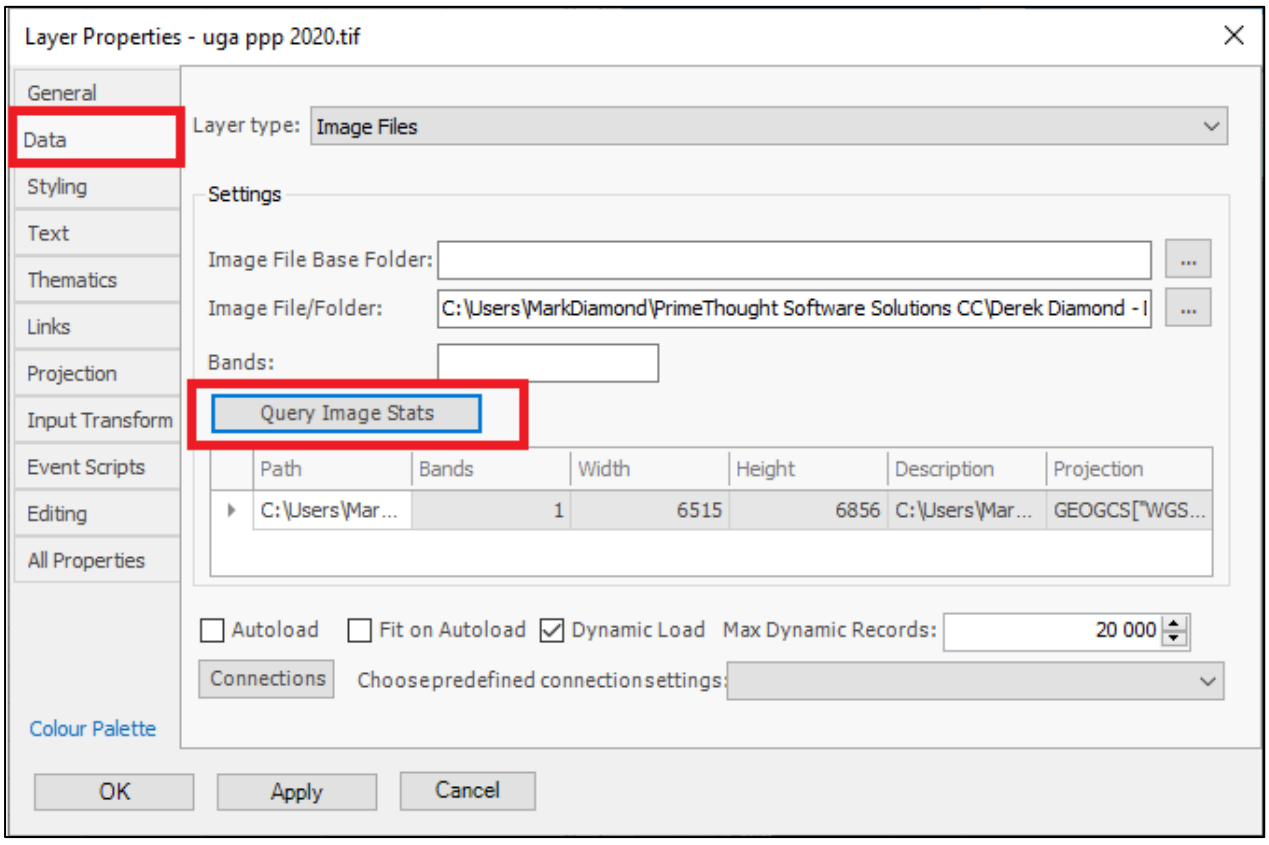
As an example here, I will bring in a TIF file I got from the WorldPop site showing population density data for Uganda, this data is shown in 100m by 100m pixels:



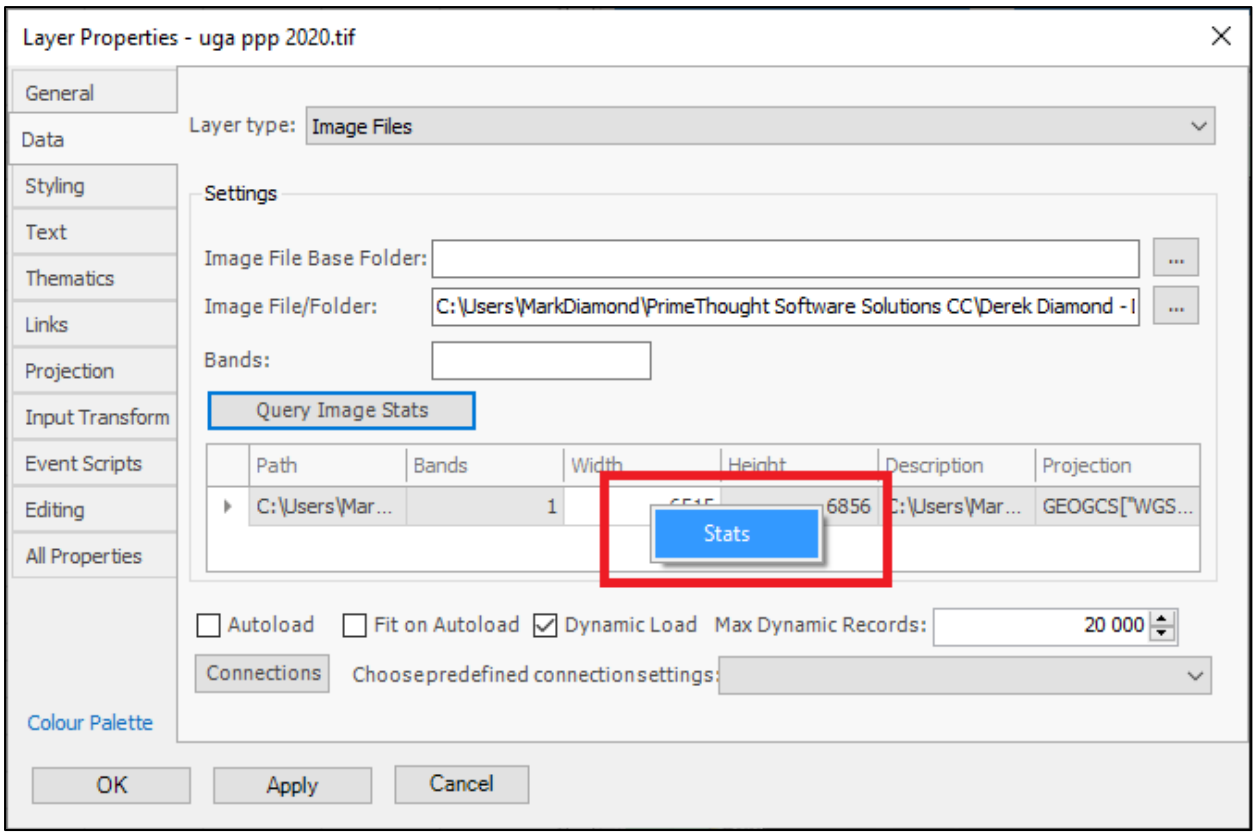
You can see as I've brought it in, that it is mainly a black square and not very useful to me. Zero values are black and so there is a lot of places where there are 0 people per 100m block.

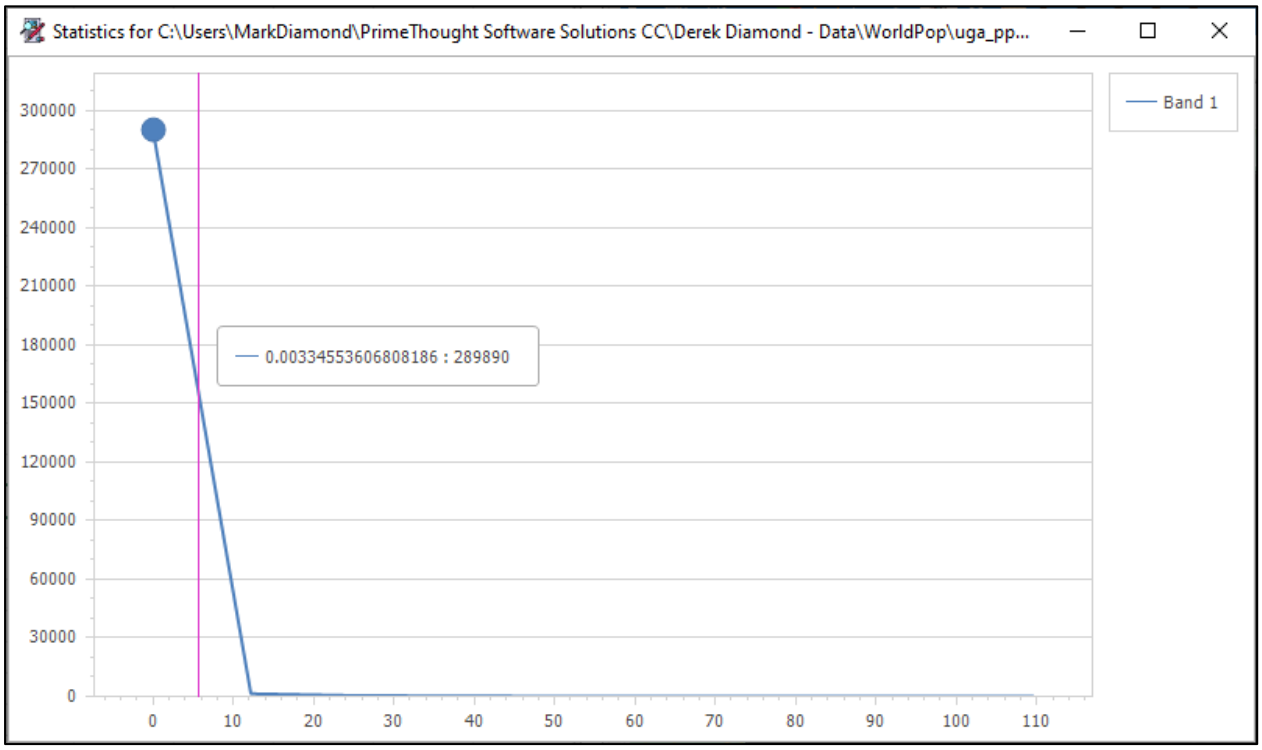
The first thing we will do is query the image stats to see how the data looks:





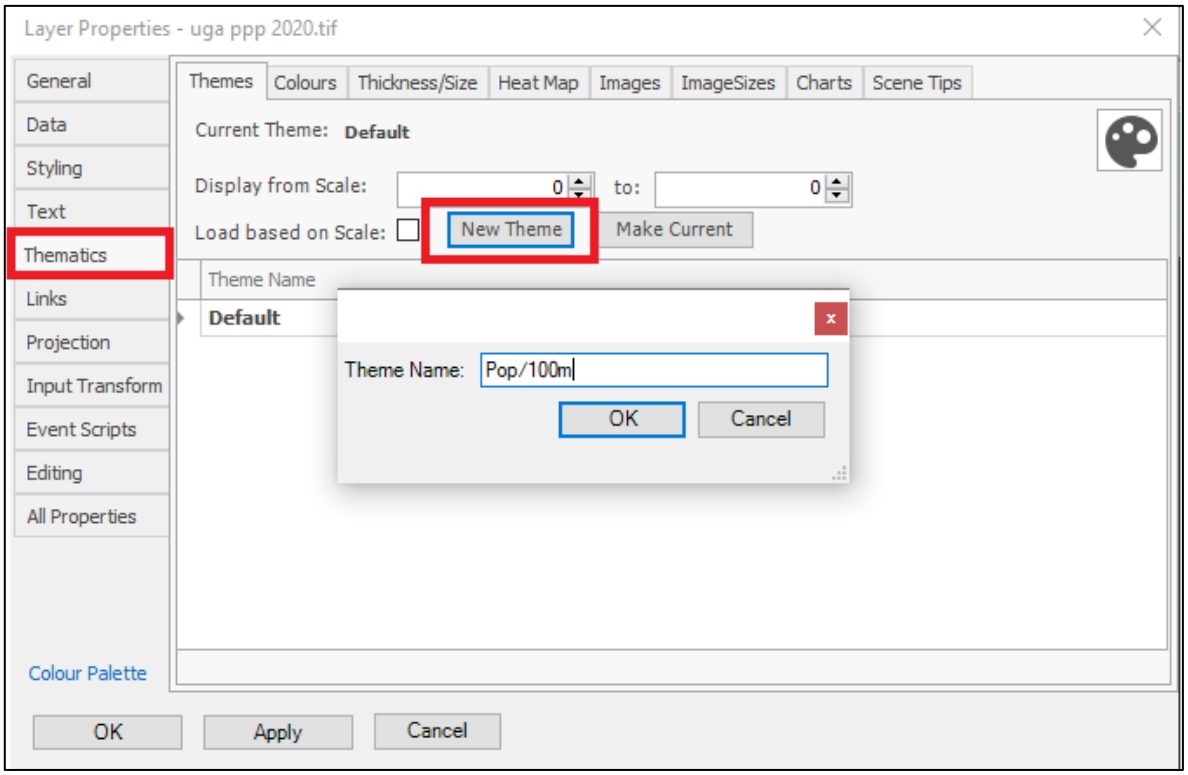
Firstly, we can see here there is just one colour band in the image, we will query further by right clicking and then going to **Stats**:

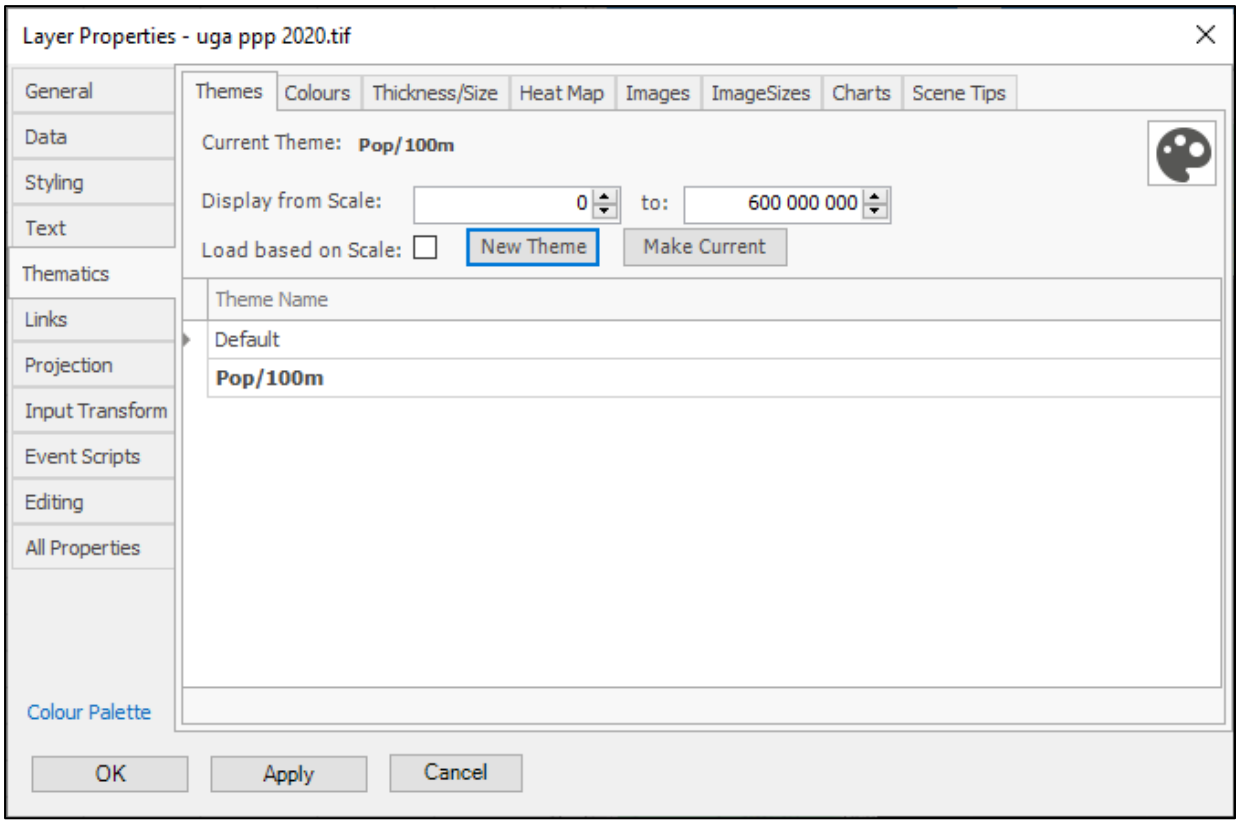




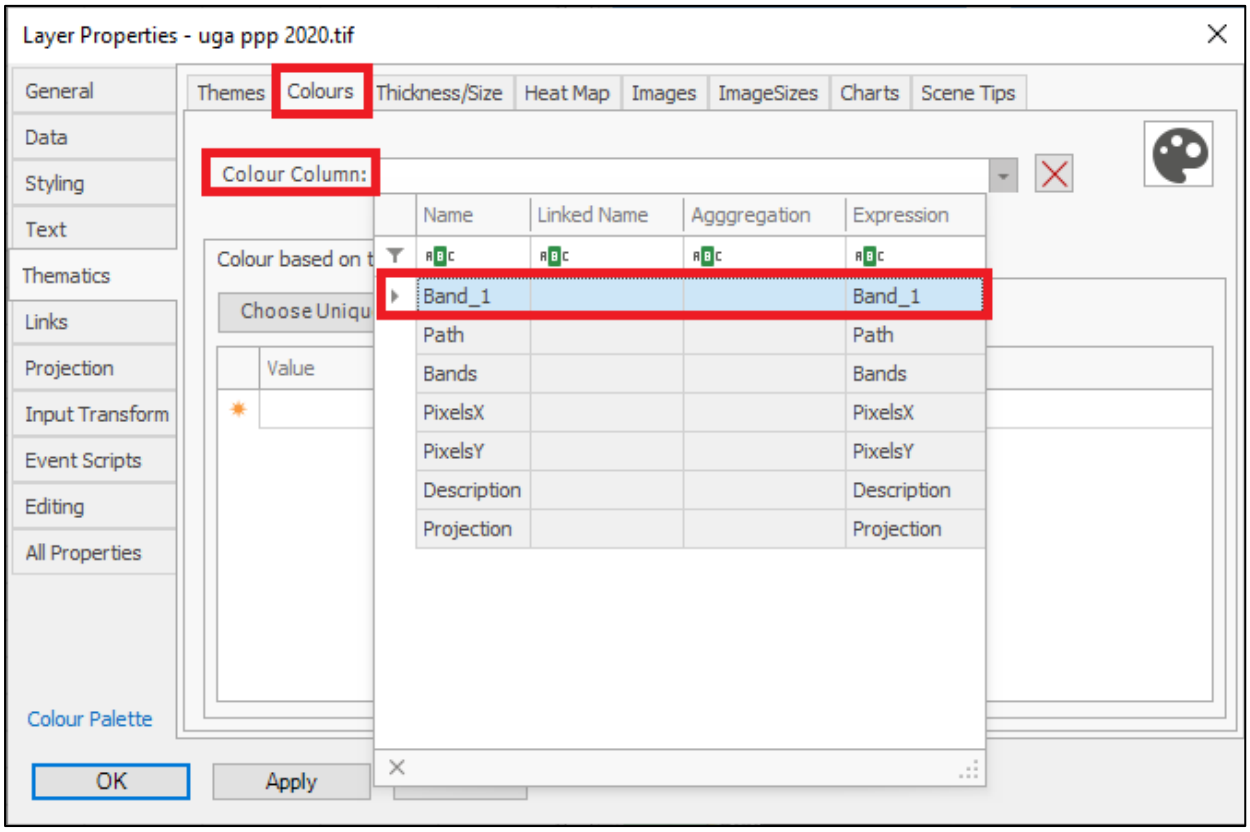
We can see from this that most of the pixels have a low value of population density, the population per 100m being shown on the horizontal scale and the number of pixels being shown on the vertical scale. This will cause the image to just show mostly as black.

In order to make this image more meaningful we can use our theming tools. Go to **Thematics** in the Layer Properties and create a new theme:

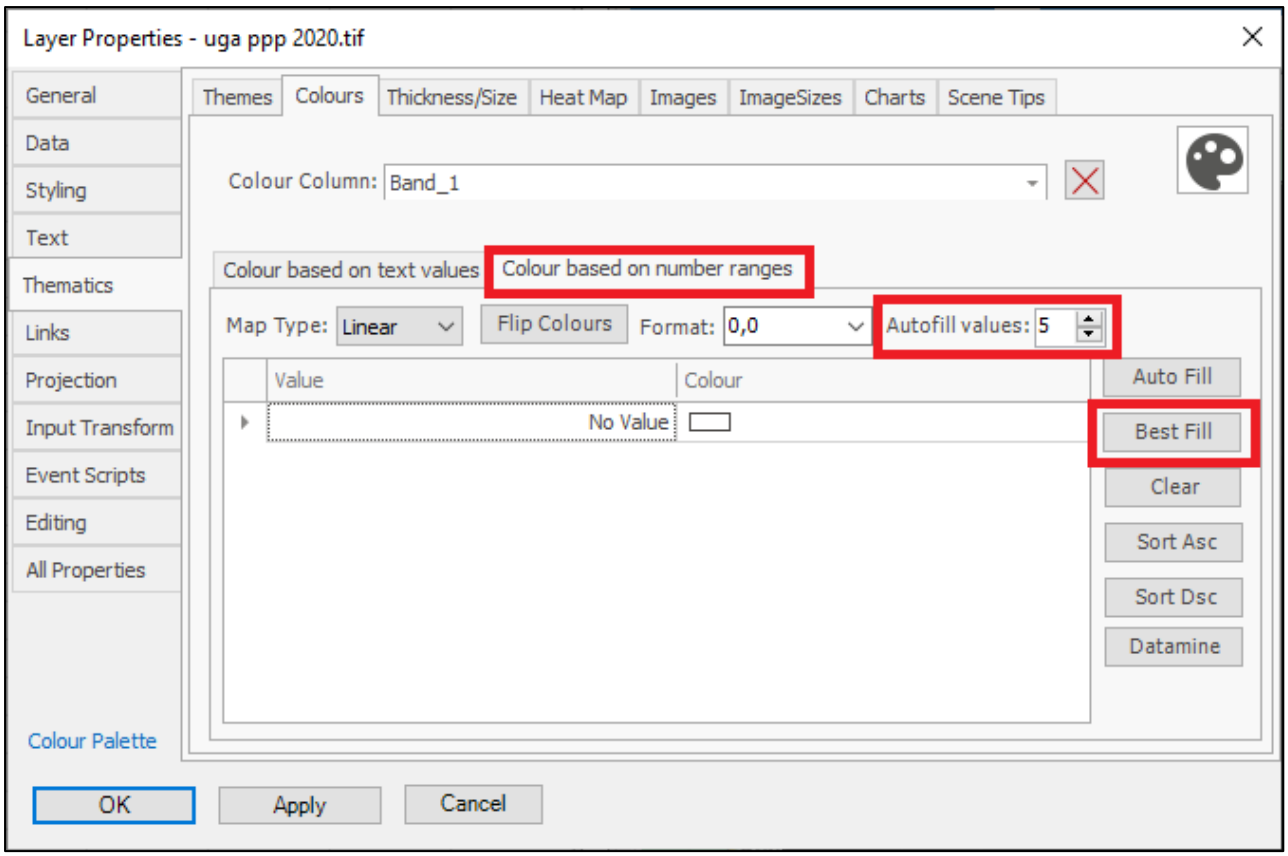


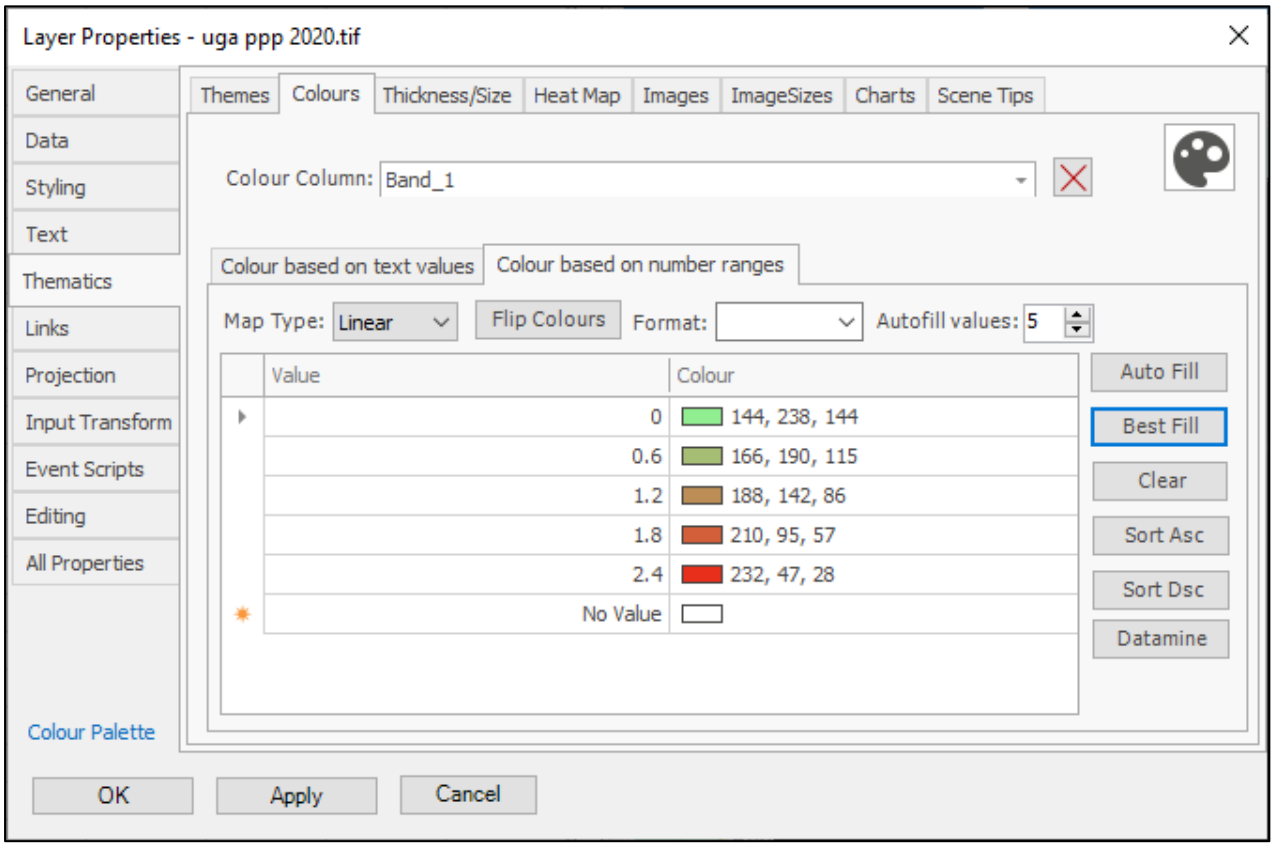


Now, go to the **Colours** tab and drop down on **Colour Column** and you will see there are a number of columns in the data you can theme on, but the one that we are interested in is **Band 1**:

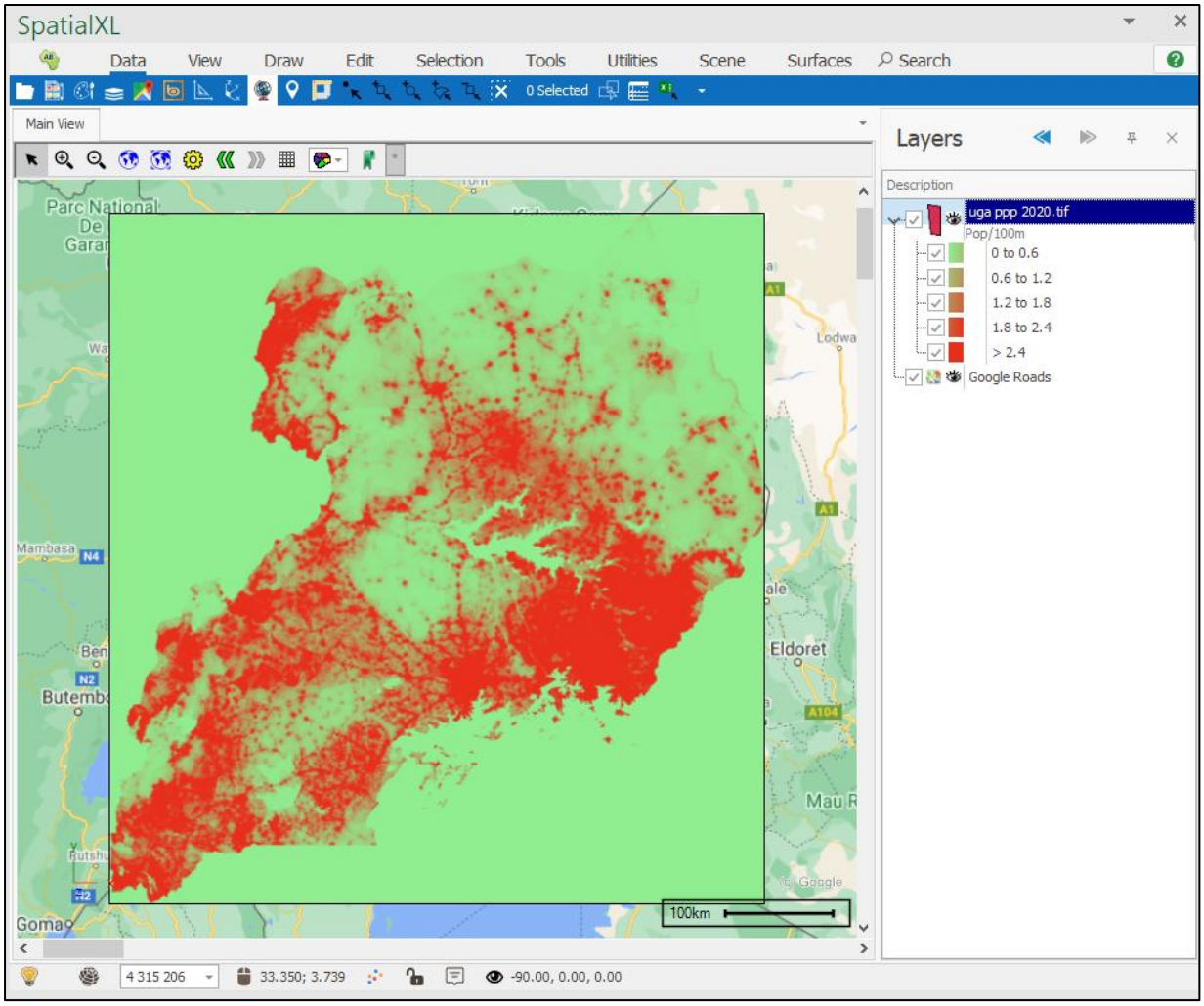


Now, go to the **Colour based on number ranges** tab since we will be colouring on a number range, then choose **Best Fill** to get the best range of values for the display of your data, if you want more values than the default 5 in the range, then change this to the desired amount in **Autofill values** and then click **Best Fill**:

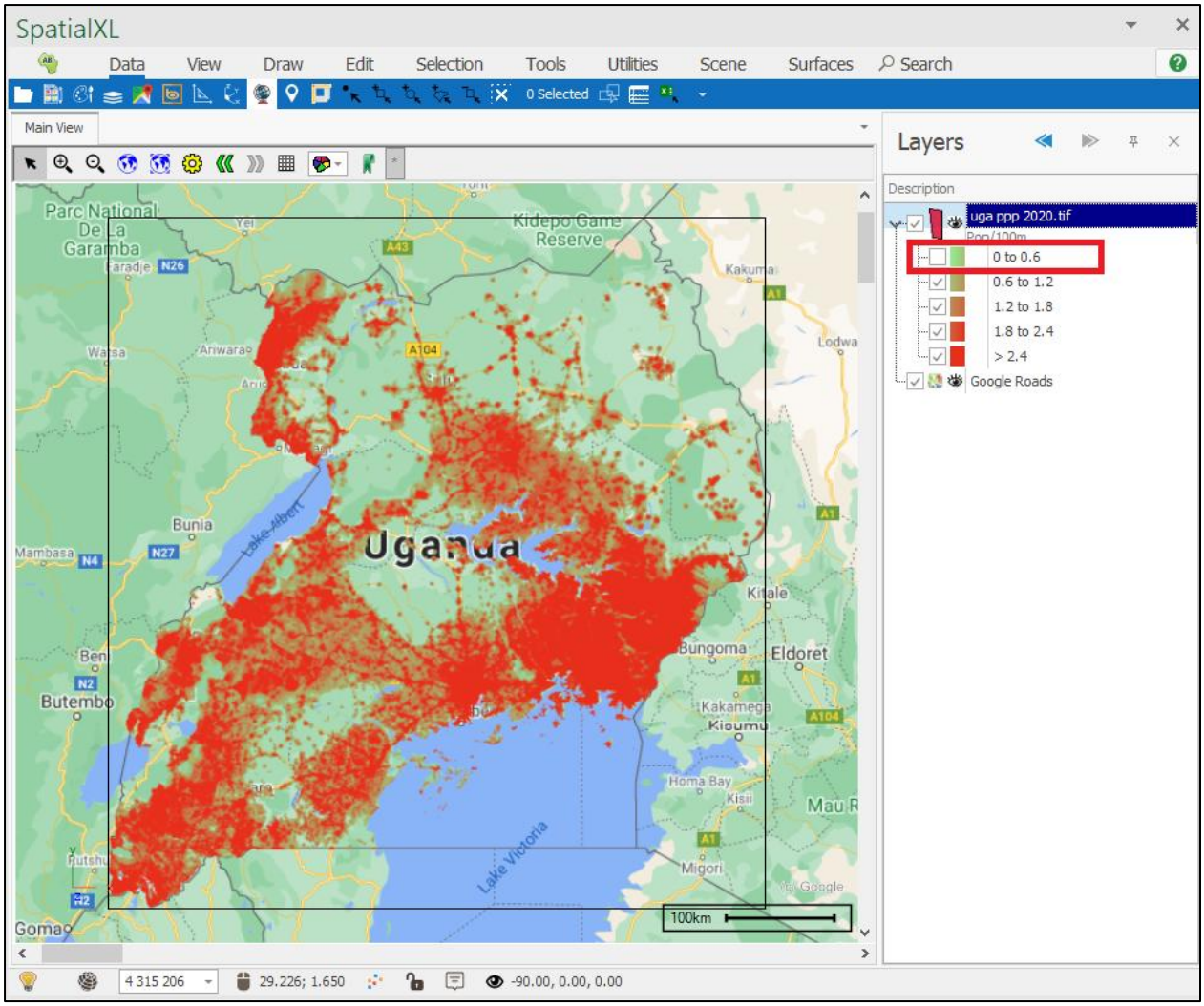




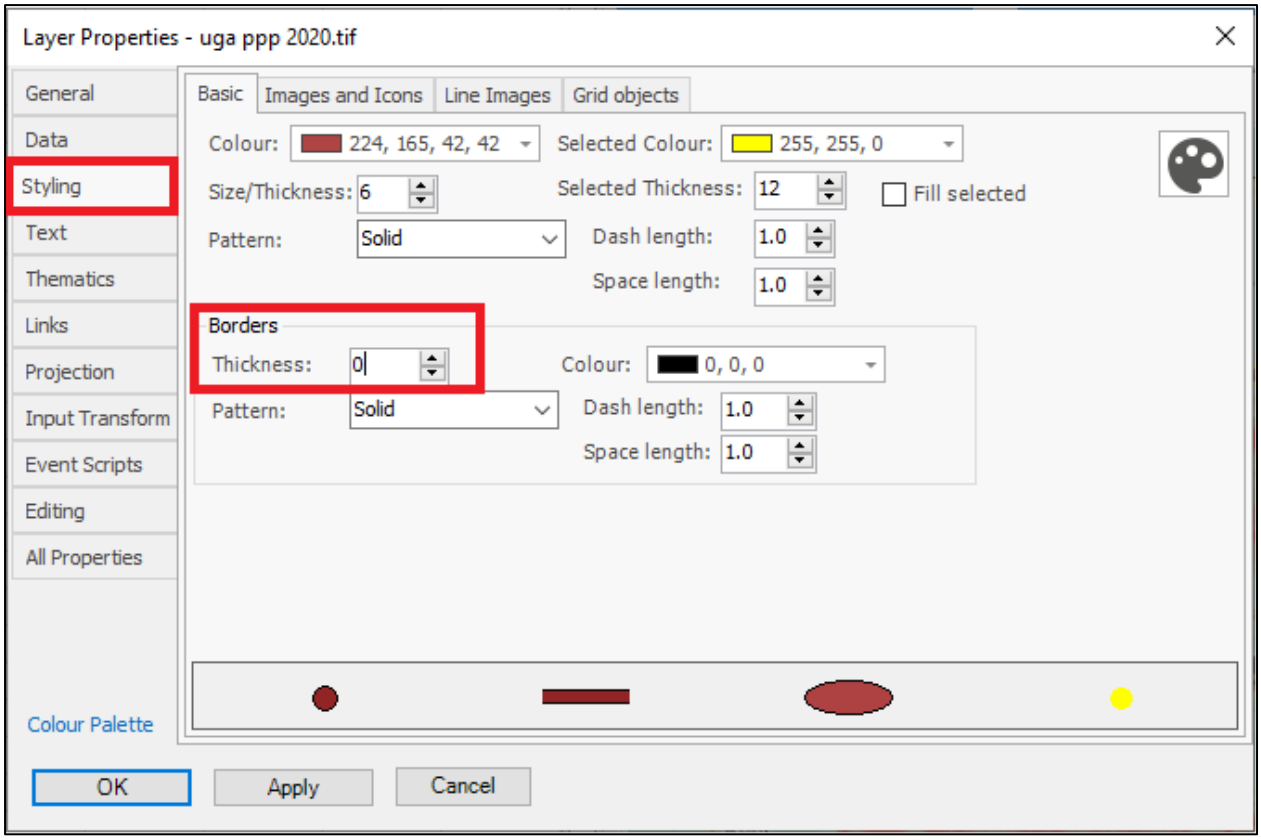
You can change the colours and numbers as desired; I am happy with this so I will leave it and click **OK**:

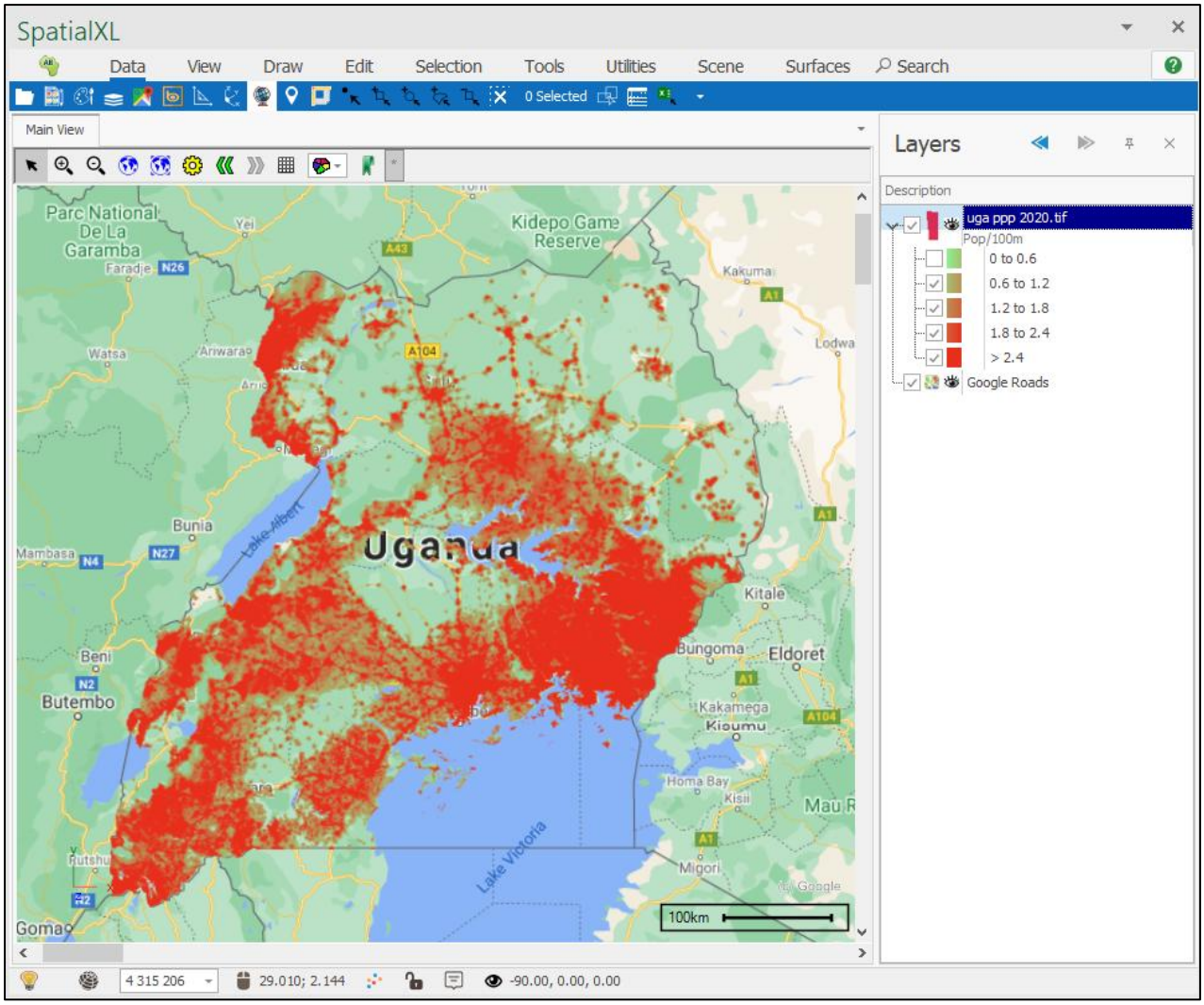


As you can see now, we have a much more meaningful picture, we can now tick off the zero values since we are not interested in them:

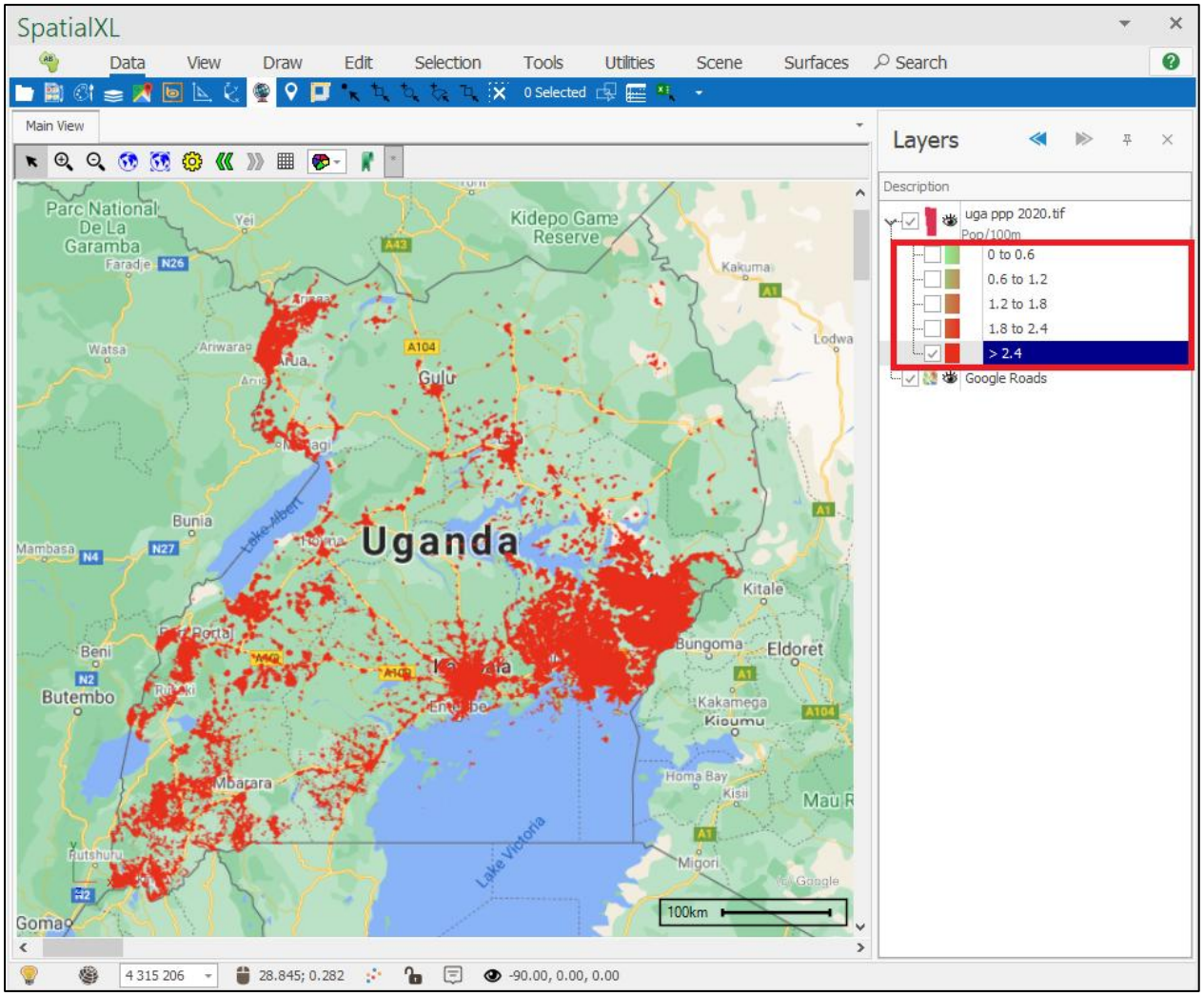


To get rid of this outlining border we can simply set our border thickness as zero in the Layer Properties:

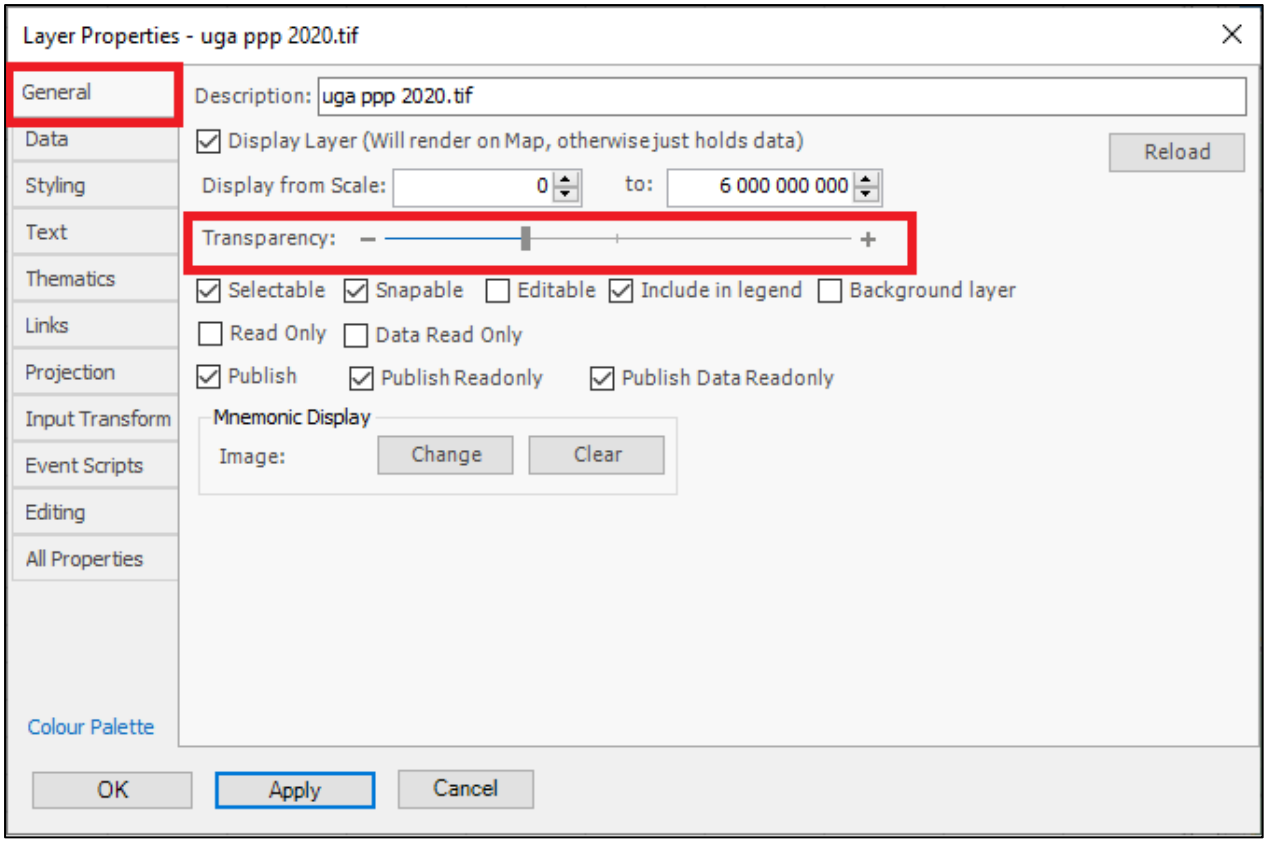

Layer Properties - uga ppp 2020.tif
General
Data
Styling
Text
Thematics
Links
Projection
Input Transform
Event Scripts
Editing
All Properties
Colour Palette
Basic
Images and Icons
Line Images
Grid objects
Colour: 224, 165, 42, 42
Selected Colour: 255, 255, 0
Size/Thickness: 6
Selected Thickness: 12
Fill selected
Pattern: Solid
Dash length: 1.0
Space length: 1.0
Borders
Thickness: 0
Colour: 0, 0, 0
Pattern: Solid
Dash length: 1.0
Space length: 1.0
OK
Apply
Cancel

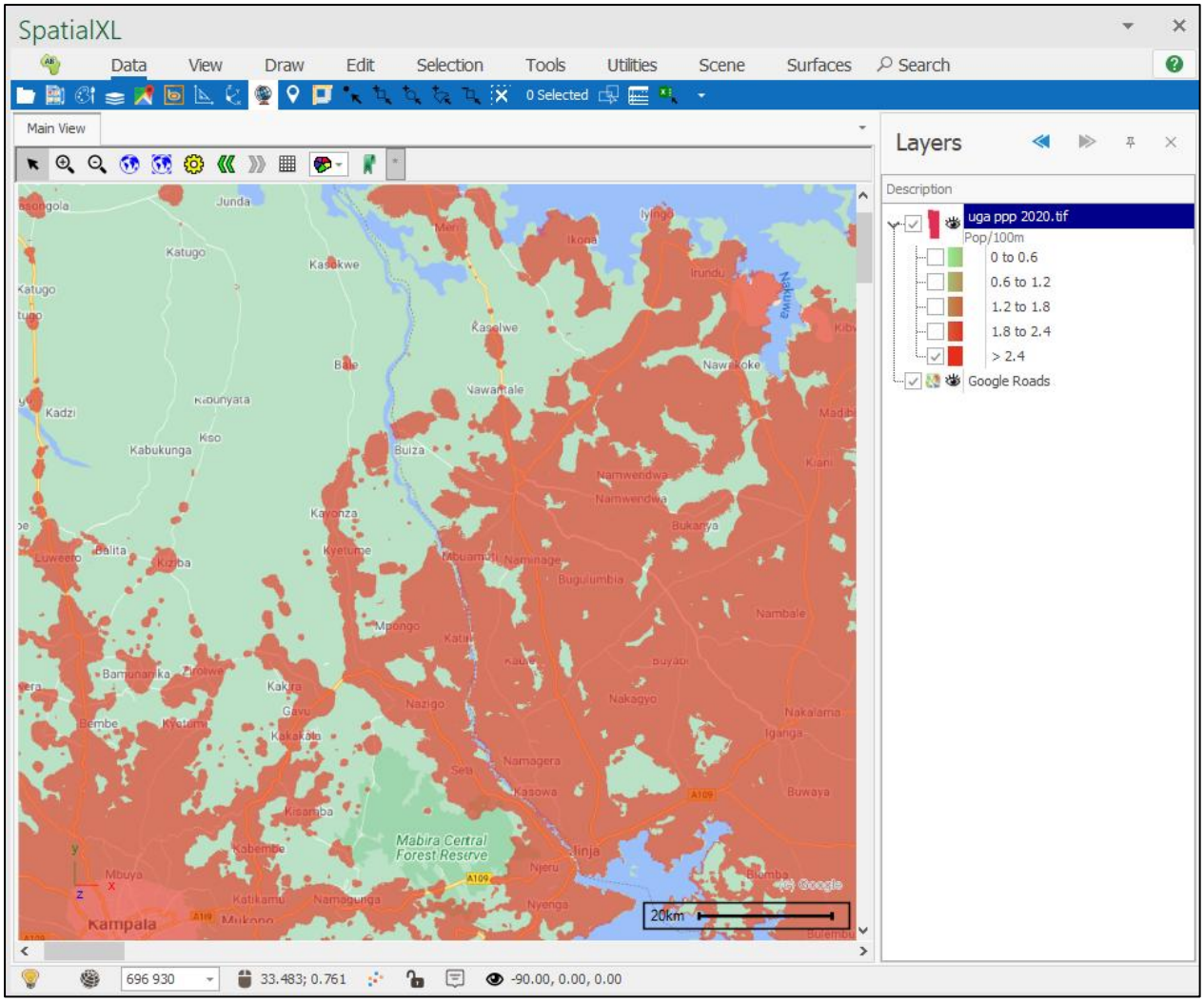


We can now analyse the data in this image nicely and tick on and off the values we do and don't want to see, for example here I ticked on only those places with a population of more than 2.4 people per 100 meters:



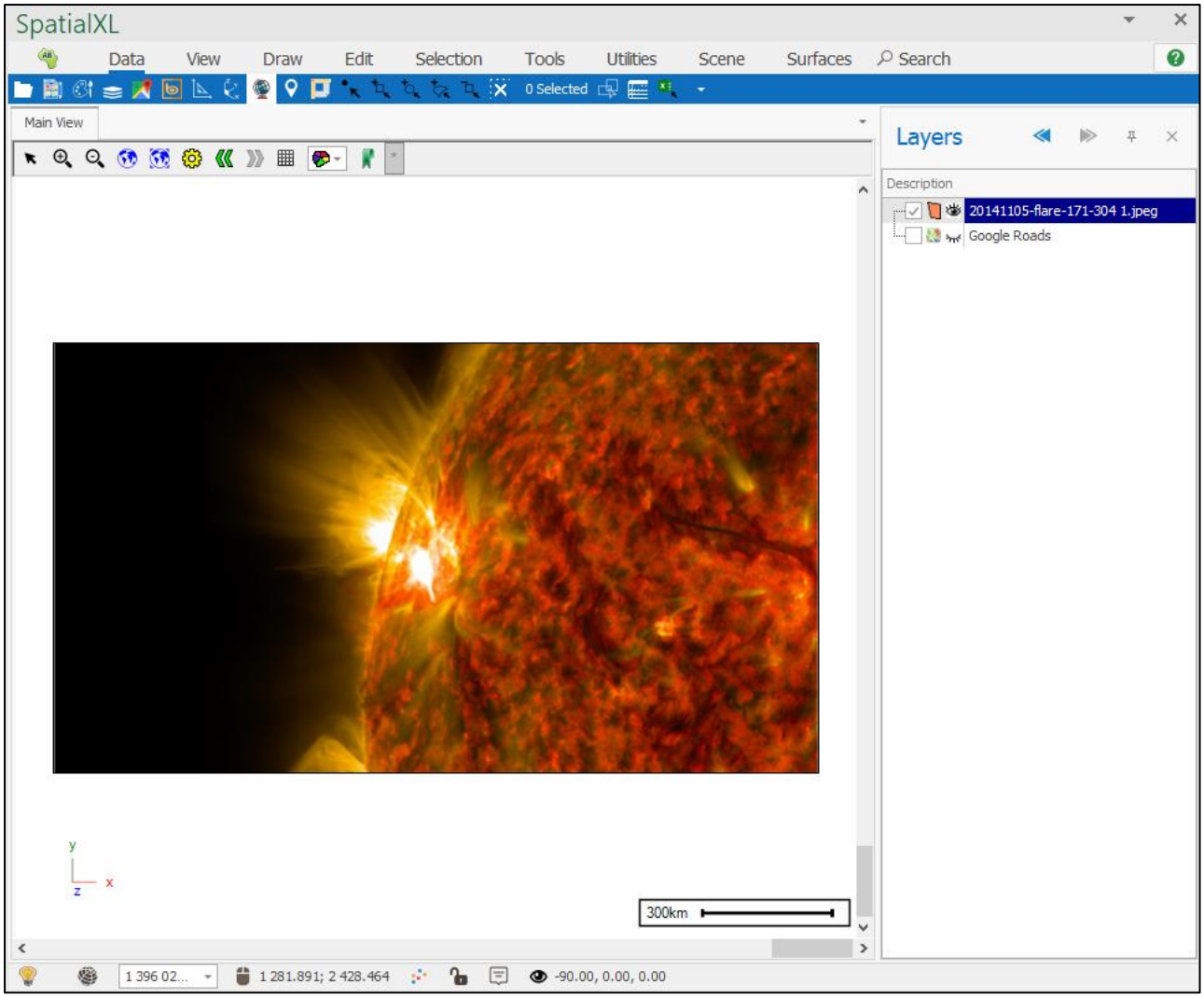
To see the underlying places on the map better we can also make the image more transparent in the Layer Properties:

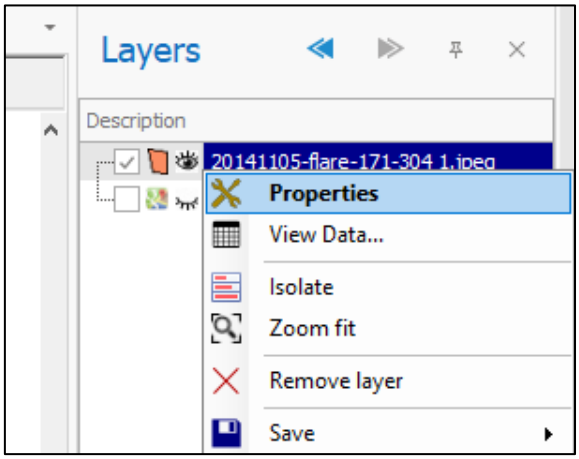

Layer Properties - uga ppp 2020.tif
General
Data
Styling
Text
Thematics
Links
Projection
Input Transform
Event Scripts
Editing
All Properties
Colour Palette
Description: uga ppp 2020.tif
Display Layer (Will render on Map, otherwise just holds data)
Reload
Display from Scale: 0
to: 6 000 000 000
Transparency:
Selectable
Snapable
Editable
Include in legend
Background layer
Read Only
Data Read Only
Publish
Publish Readonly
Publish Data Readonly
Mnemonic Display
Image:
Change
Clear
OK
Apply
Cancel

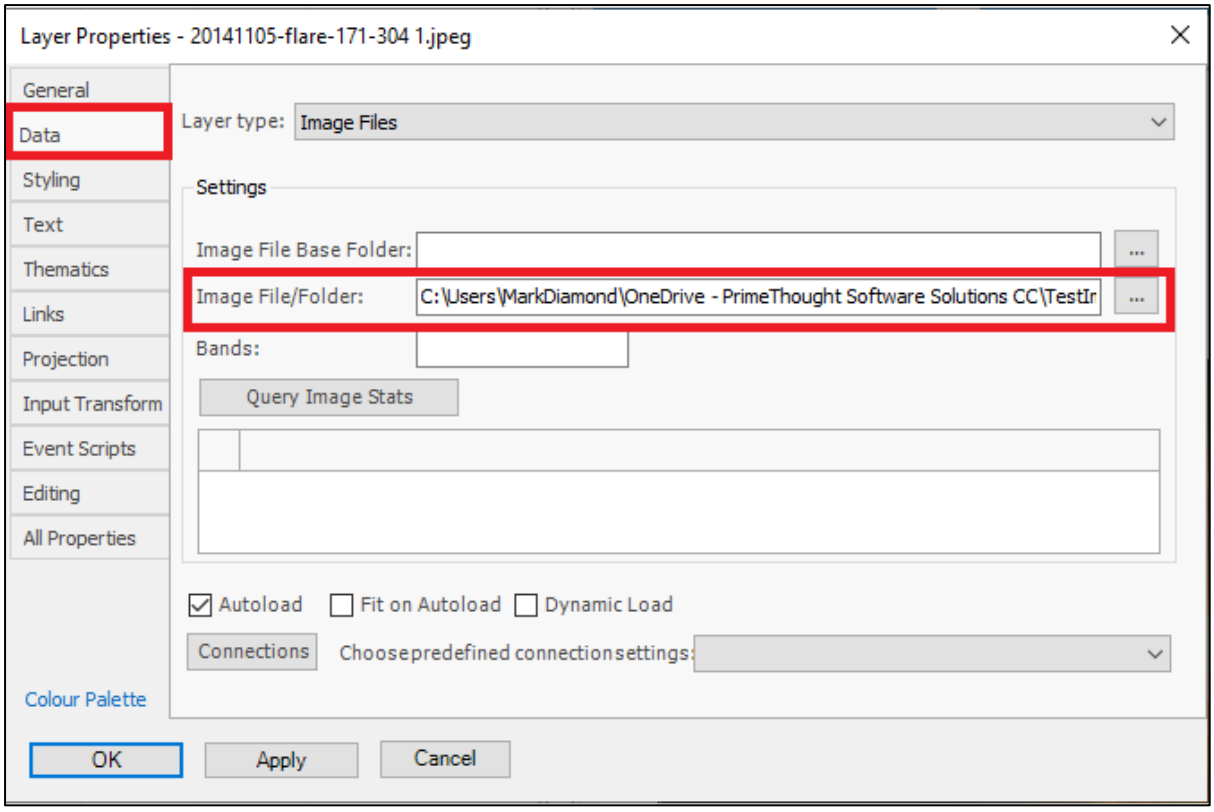


Loading Multiple Images

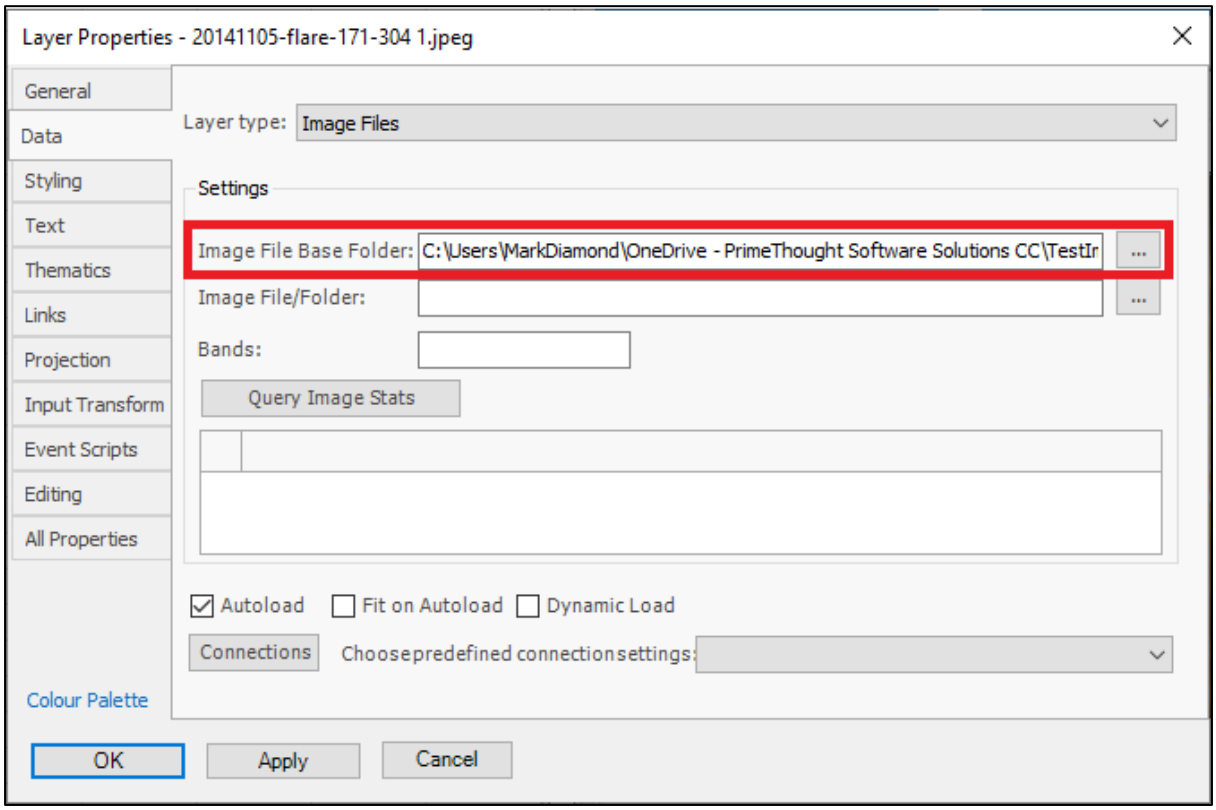
In bringing in images it is also possible to bring through multiple images at once in one layer. For example, if I go to the Layer Properties of this image I brought in, you can see the file path for the image:


SpatialXL
Data
View
Draw
Edit
Selection
Tools
Utilities
Scene
Surfaces
Search
0 Selected
Main View
Layers
Description
20141105-flare-171-304 1.jpeg
Google Roads
300km
1 396 02...
1 281.891; 2 428.464
-90.00, 0.00, 0.00

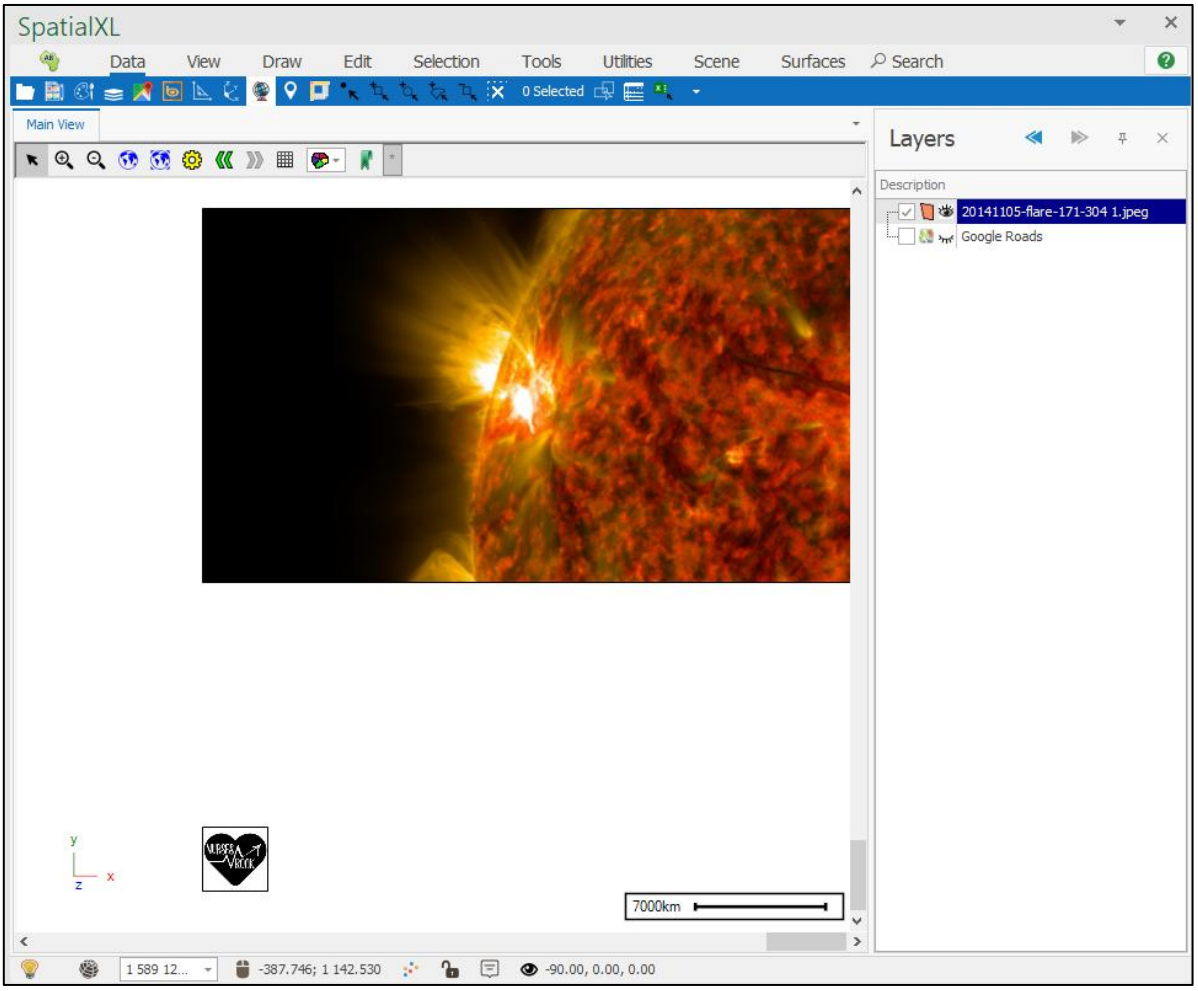

Layers
Description
20141105-flare-171-304 1.jpeg
Properties
View Data...
Isolate
Zoom fit
Remove layer
Save



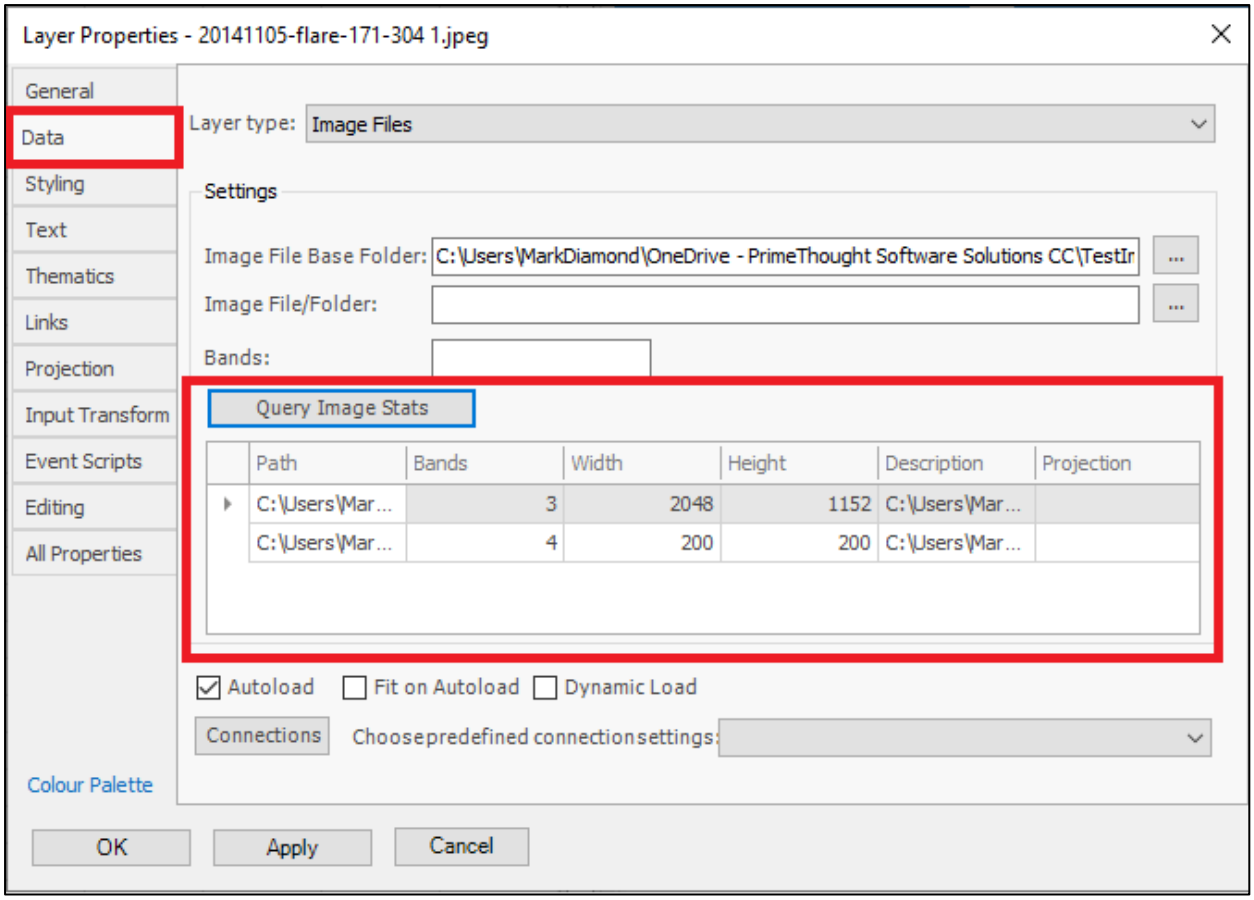
If the folder this image is in contains other images that I would also like to load, I can just put in the file path to that folder in the **Image File Base Folder** field:



I can then click OK and all the images in that file will be loaded:



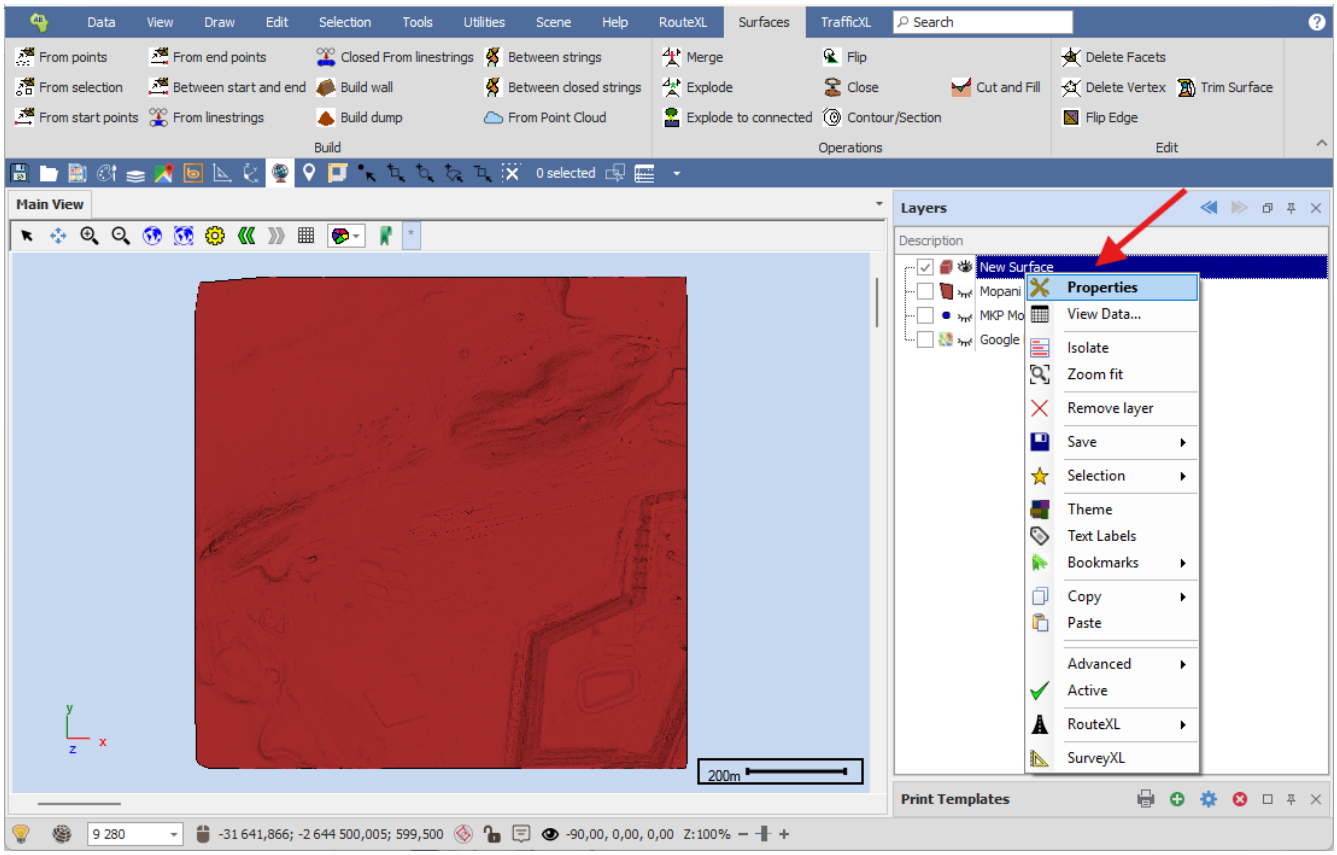
In this example the folder only had one other image and so two images are now loaded and can be seen in the scene. If I query image stats, I can also see the two images listed and their respective stats:



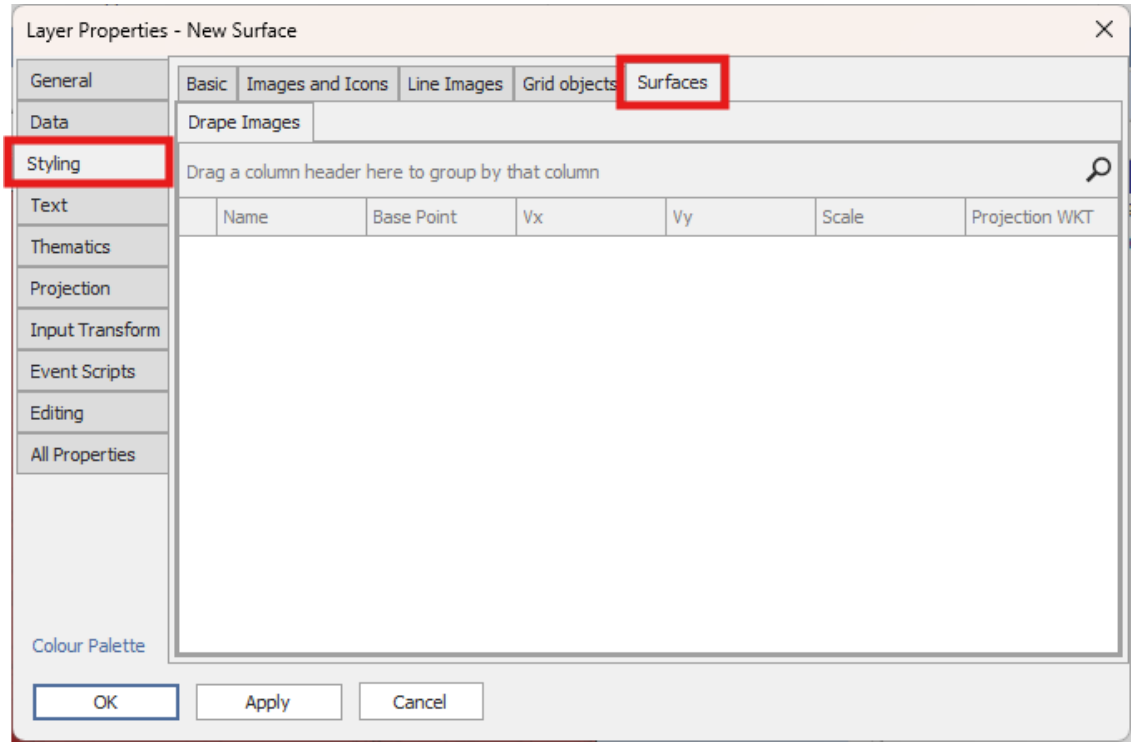
Draping Images onto Surfaces

You can drape an image file such as an ECW file onto a surface so that it shows in 3D with elevations.

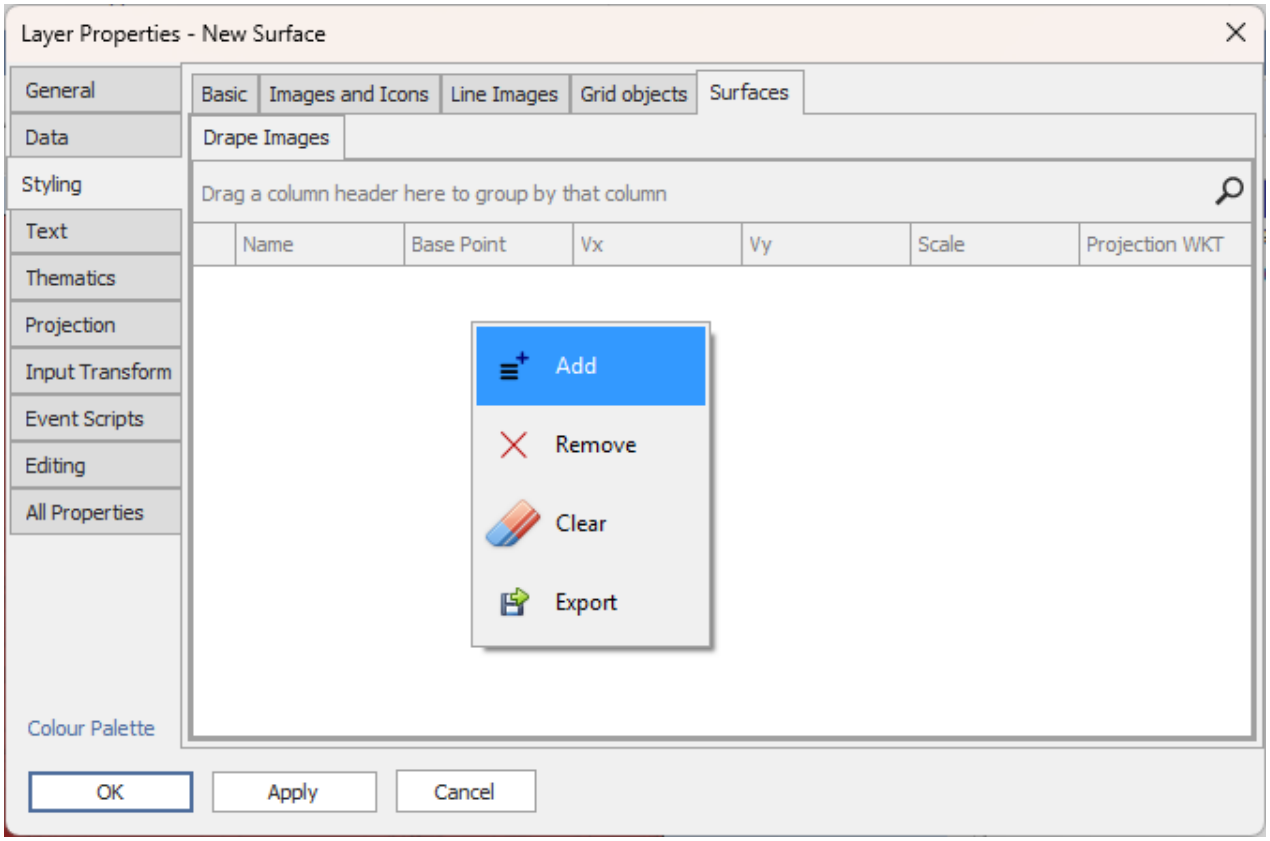
First of all, you need a surface. You then right click on that surface layer and go to Properties.



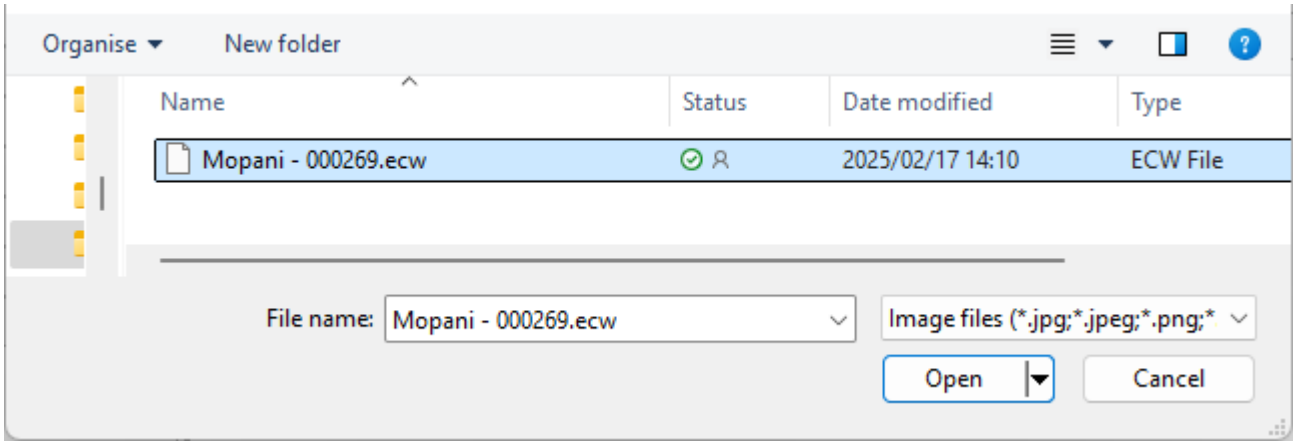
Then, go to Styling > Surfaces:



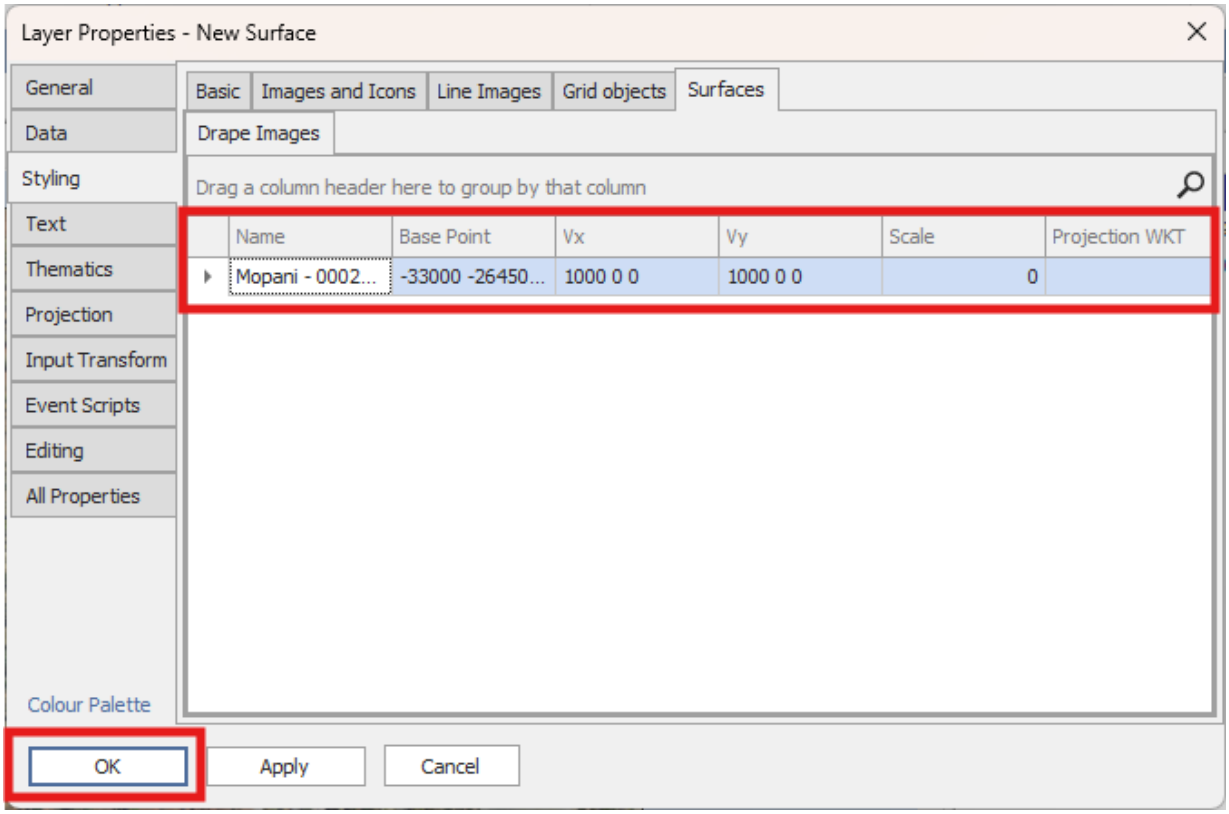
Right click in the blank area and select “Add”:



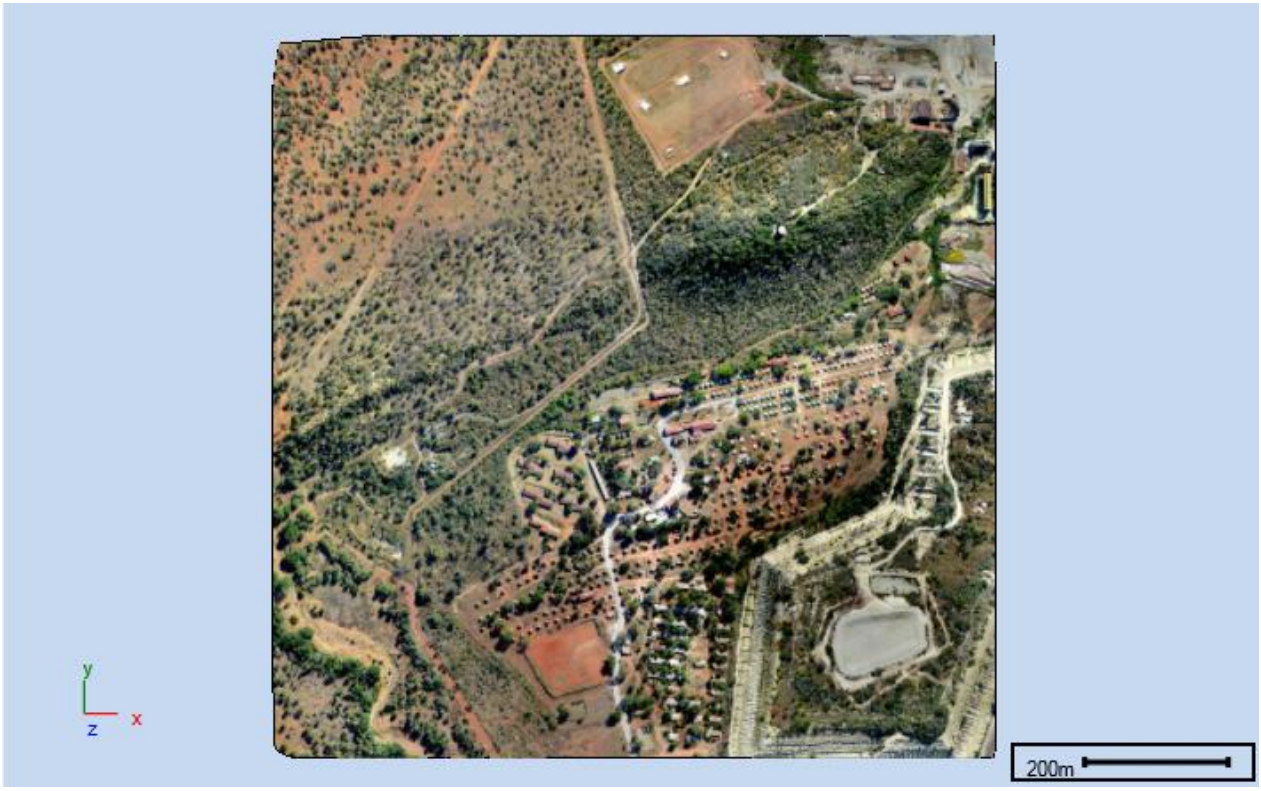
Browse to the location of the image file that you want to drape, then click {Open}:



The image will then be loaded and you can then click {OK}:

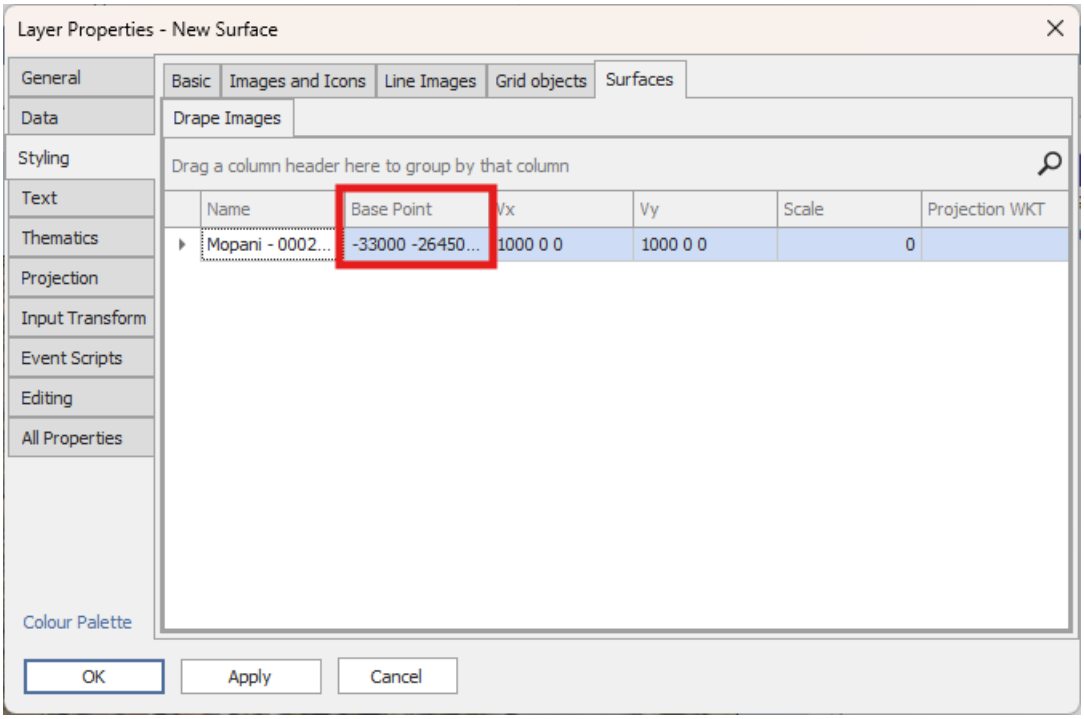


The image has now been successfully draped onto the surface:

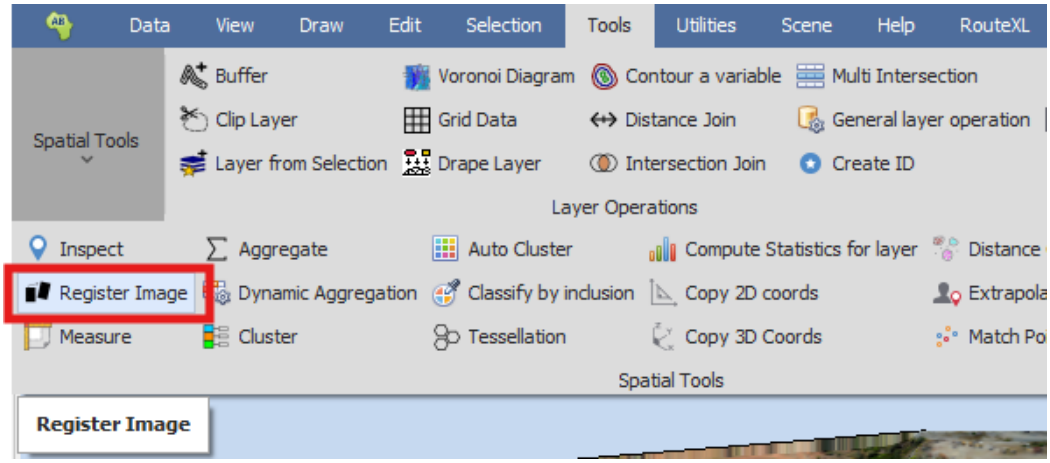


The image you are draping will need to have location data with it so it can be draped correctly, some files like ECW files already have this within them. Other file formats might have an additional file that comes with them that has the location data and as long as that additional file is in the same folder location of where you are loading the image from then it will plot correctly.

If the image file you have loaded does not have location data with it then you will see this by the fact that the “Base Point” field has all 0 values:



In the case where your image does not have location data with it you will need to first register the image using the "Register Image" tool found in the "Tools" tab of your spatial product:

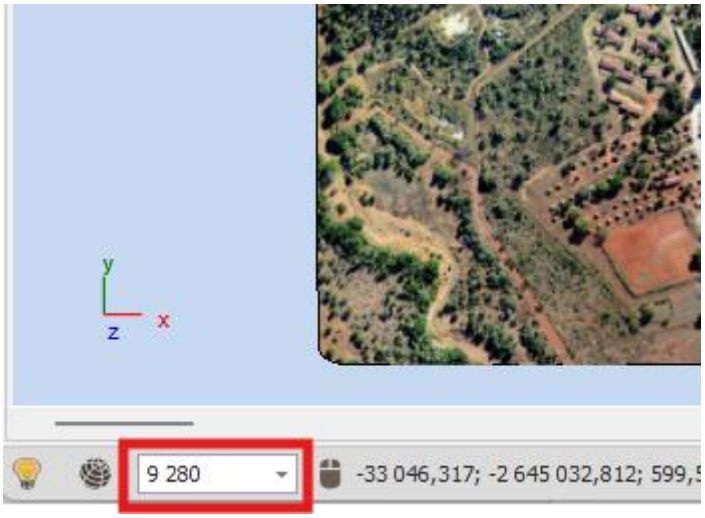


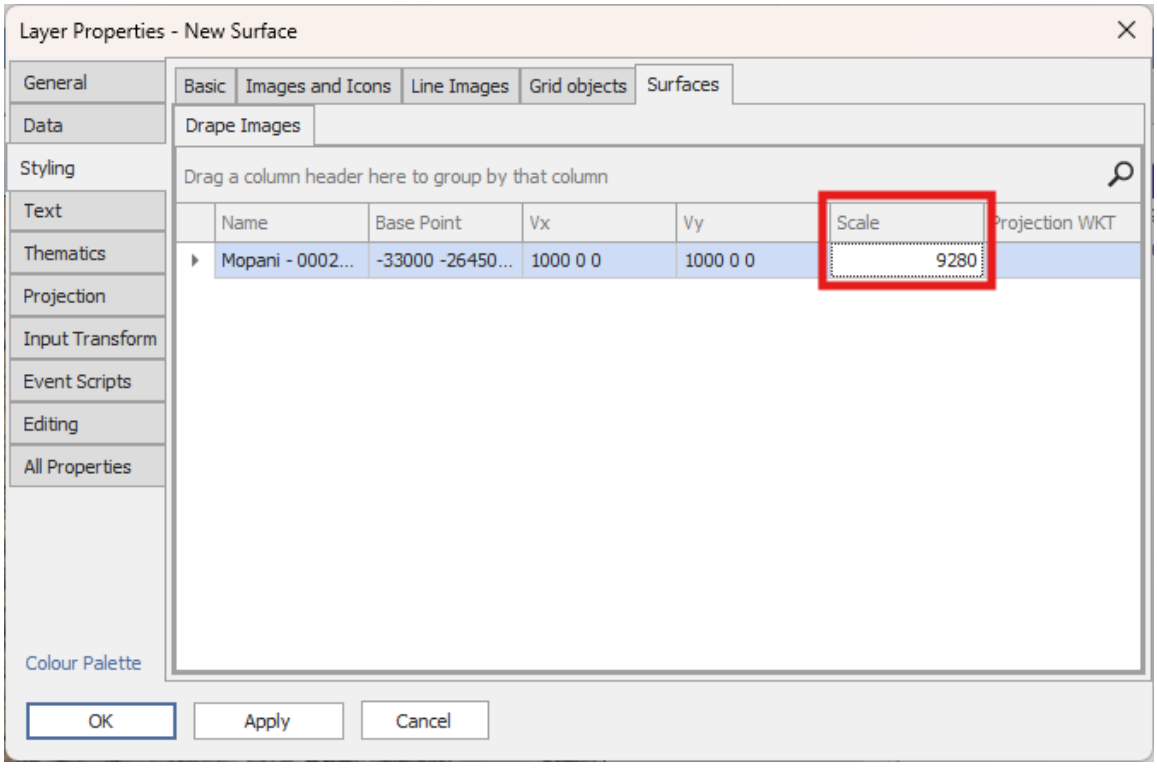
For data on how to use the Register Image too please refer to the user guide on it.

Once the image is registered, you can then load the image and do the draping as above.

Finally, you are able to also set a scale for your draped image, in the "Scale" field, so that it only loads and displays on your surface at a certain scale of the map; this is useful for if you are zoomed out far from the surface and you don't

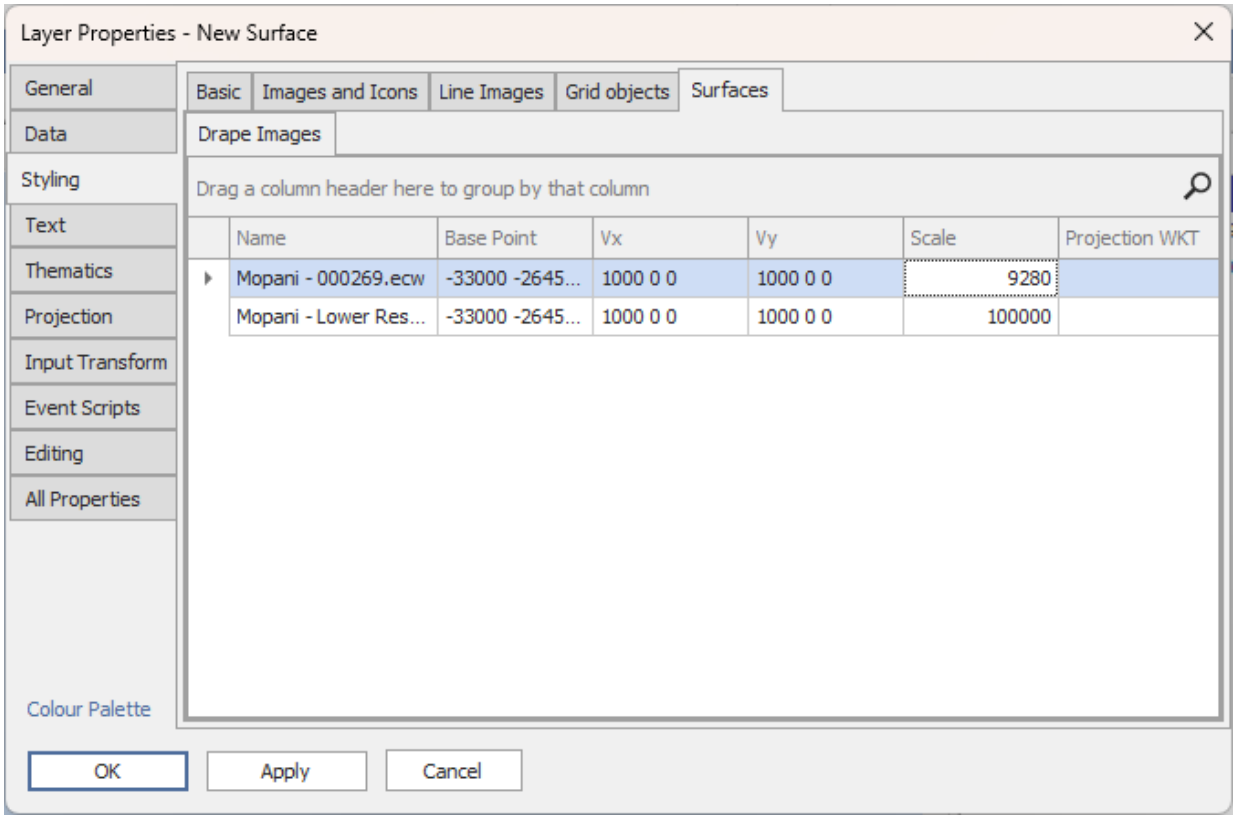
need the whole image to be loaded and displayed and it can then display only when zoomed in close enough, this will improve performance.





In this screenshot you can see I zoomed out far to a scale of 50,000 and so this has gone past the cut-off point of 9,280 that I set for my scale and so the image will not display at that scale:

What you can also do is load multiple images to drape and give each it's own scale that it will display at, for example you may choose a lower resolution image to display at a far out scale and only use the high-resolution image at a closer scale:



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