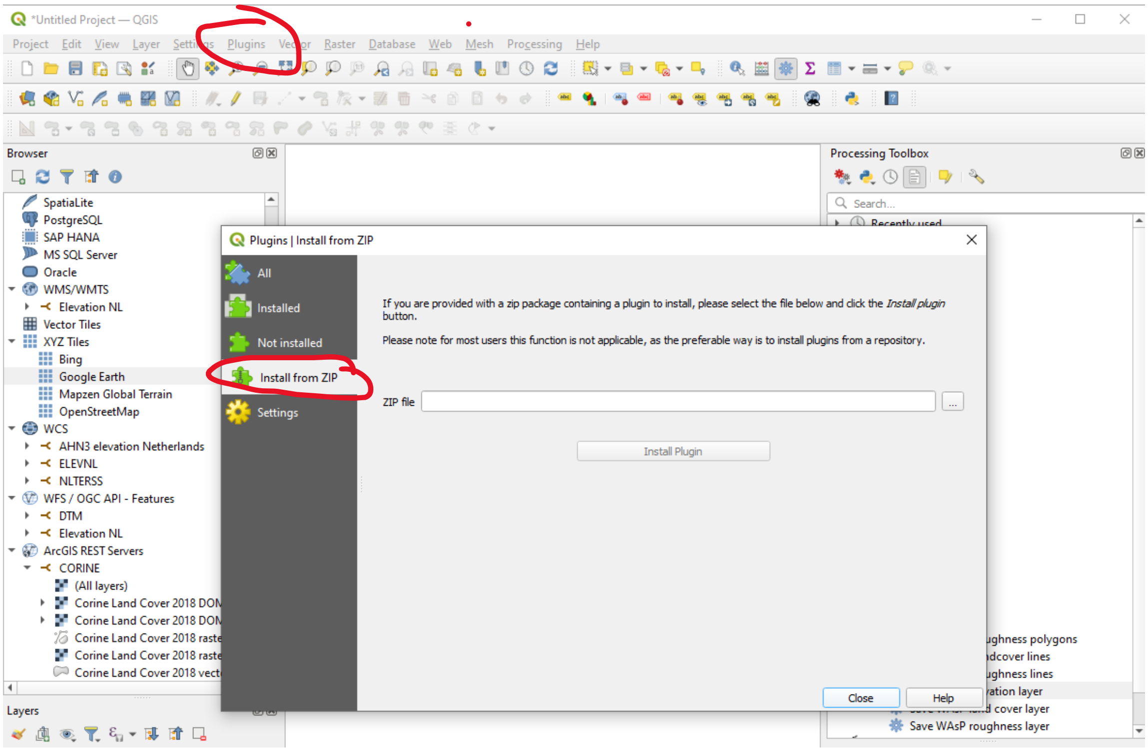
Making WAsP landcover maps in QGIS

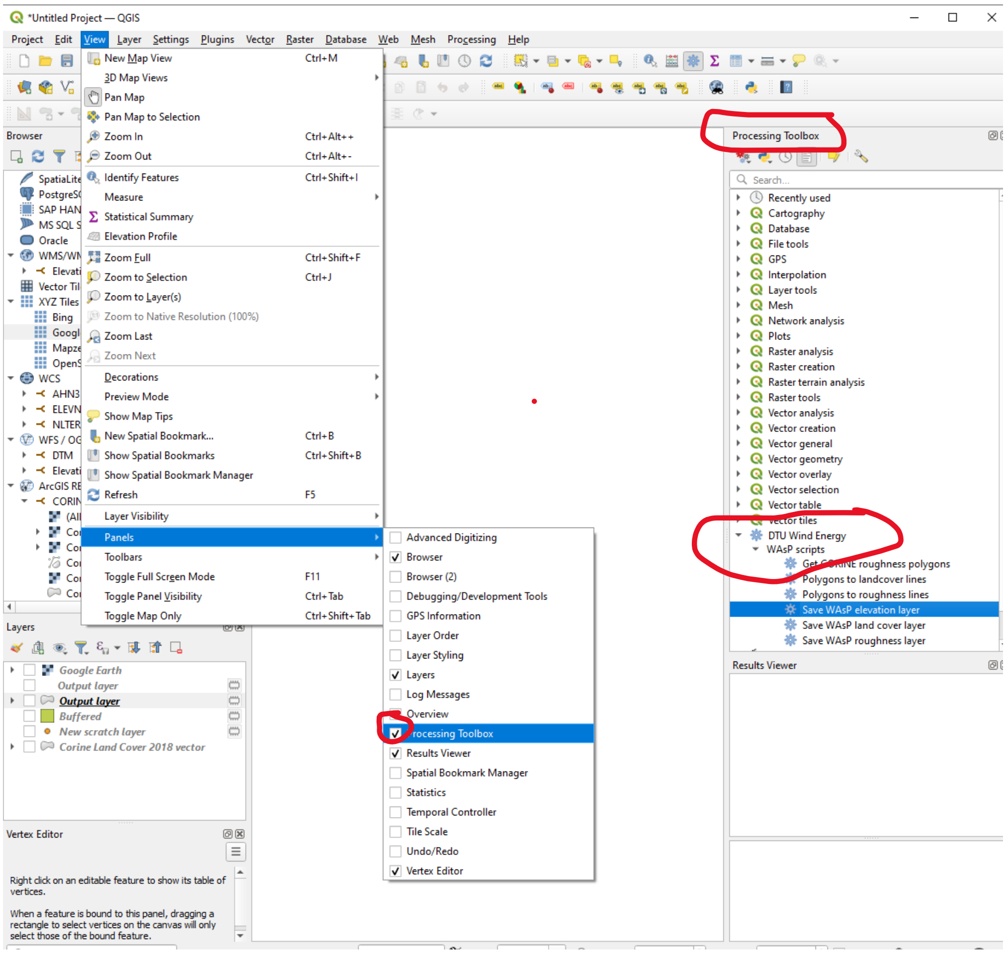
You will need to install QGIS for this exercise. Following the instructions on
https://download.qgis.org/
The following has been tested using the version 3.22 LTS and the newest version 3.28

This tutorial requires you to download the “wasp_scripts.zip” plugin available from the same directory where this word document was obtained from.

Go to *Plugins > Manage and Install plugins > Install from ZIP*, provide to zip file “wasp_scripts.zip” and click Install Plugin.



The scripts will be available under ‘DTU Wind > WAsP scripts’ in the ‘Processing toolbox’.

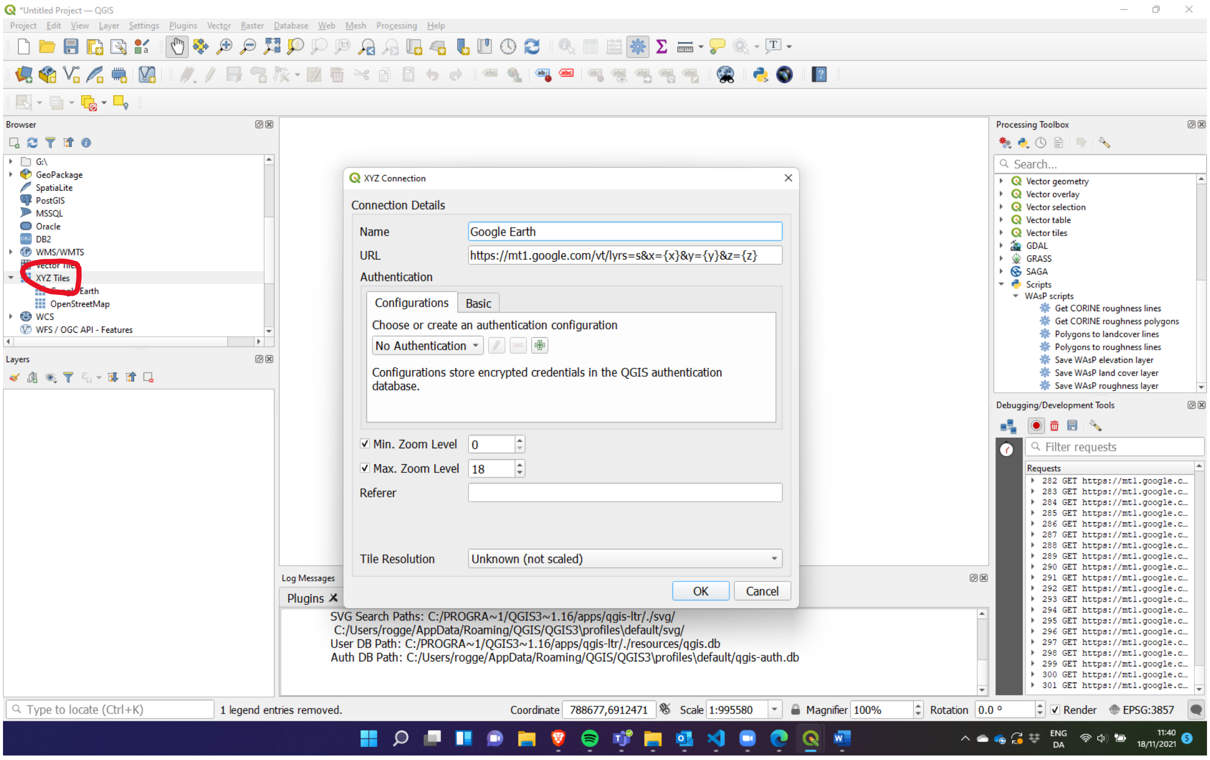


Go to the Browser and right click on XYZ tiles and press “New connection” with URL:

https://mt1.google.com/vt/lyrs=s&x={x}&y={y}&z={z}

or

http://ecn.t3.tiles.virtualearth.net/tiles/a{q}.jpeg?g=1

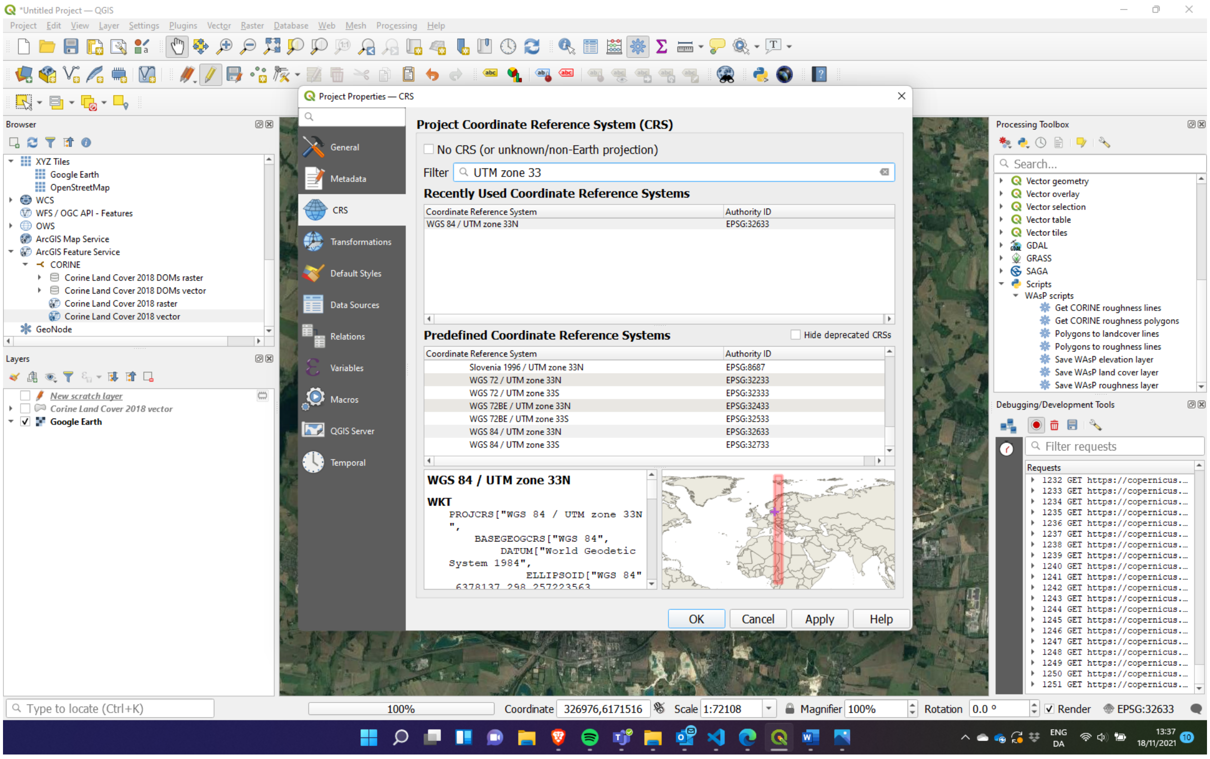


Double click on Google Earth to add the layer to the map canvas. Zoom into the area where you are interested to make a map and choose an appropriate projection with a metric projected coordinated system, such as the UTM projection.

You can find the appropriate UTM zone for your location for example here:

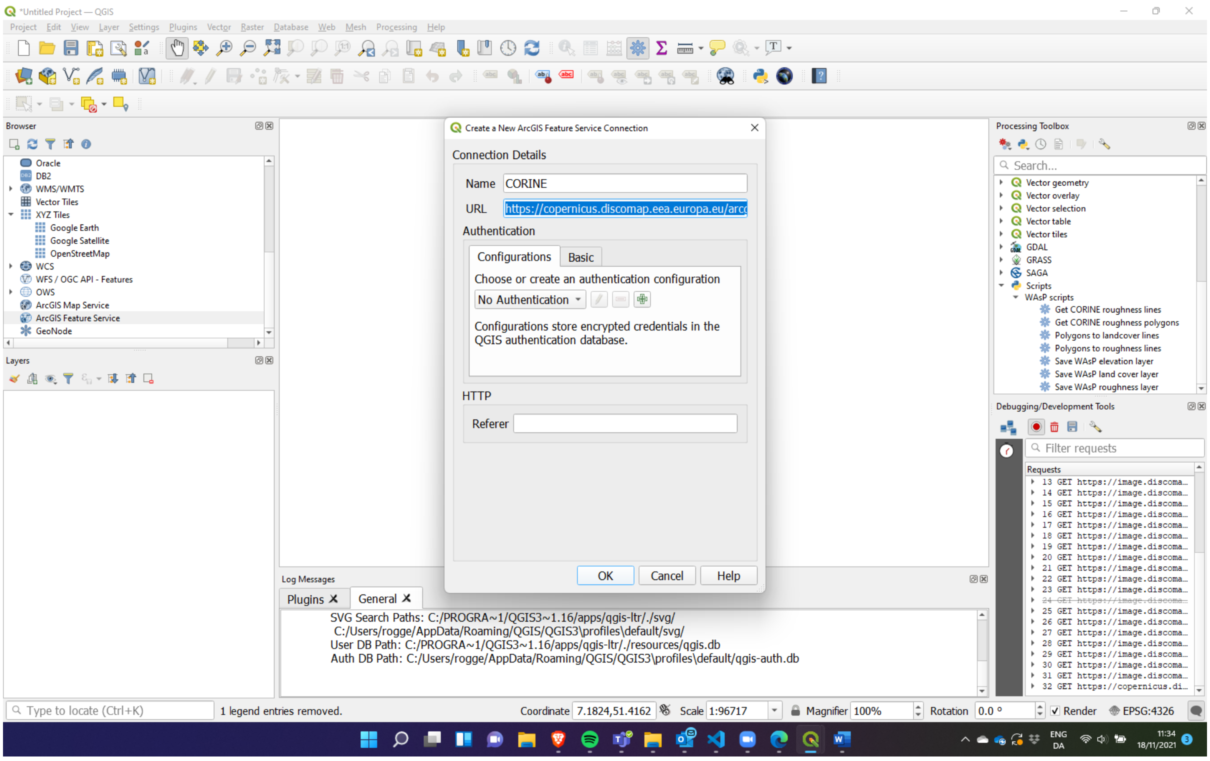
https://mangomap.com/robertyoung/maps/69585/what-utm-zone-am-i-in-

You can easily change the projection by clicking in the bottom right (where it says EPSG:3857). This opens the project and we can search for e.g "UTM zone XX", where XX is the number obtained from the image above. There is projections for the northern and southern hemisphere, which are labelled with N or S. The northern hemisphere have EPSG codes 326XX and the southern hemisphere has codes 327XX, where XX is zone number. Changing the projection in the bottom right only changes the way data are display and does not change any of your data sources in the "layers" panel. If you have a "layer" with data in geographic coordinates (latitude/longitude) you will still have to convert these layers to a metric coordinates system to use them in WAsP.

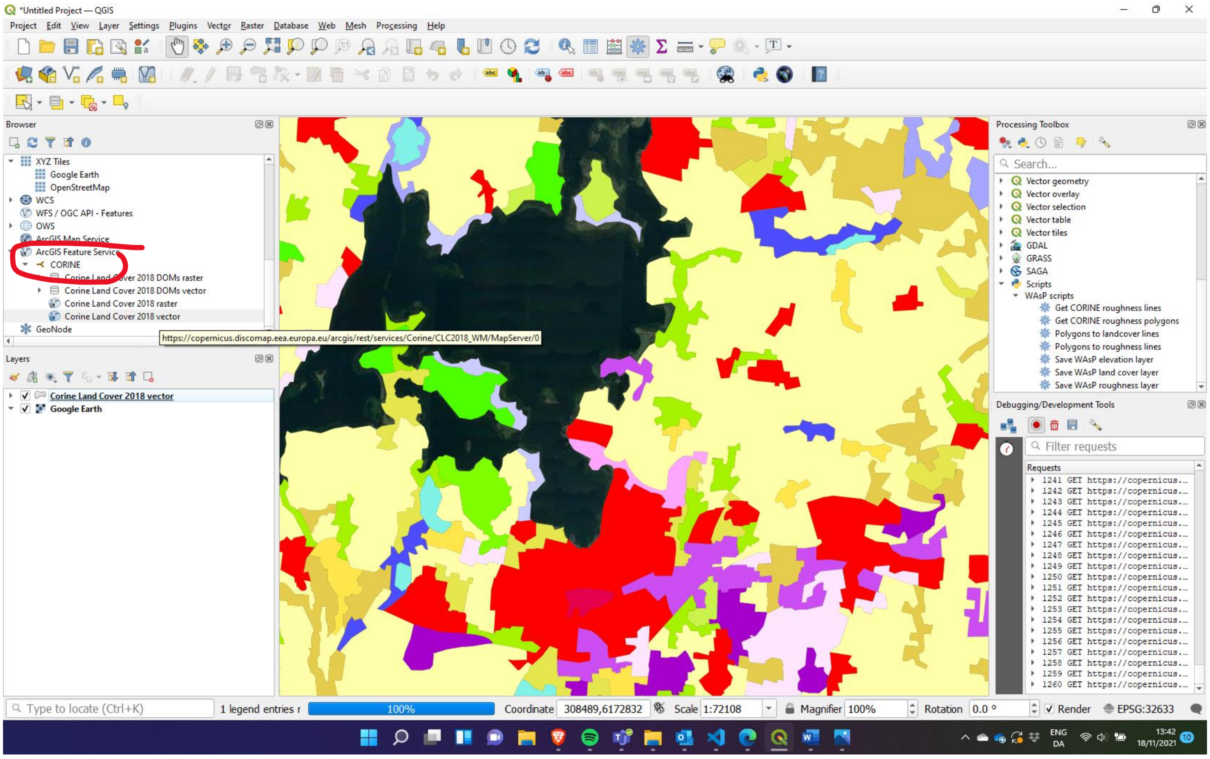


Go to the Browser and right click on ArcGIS Feature Service and click “New connection” with URL:

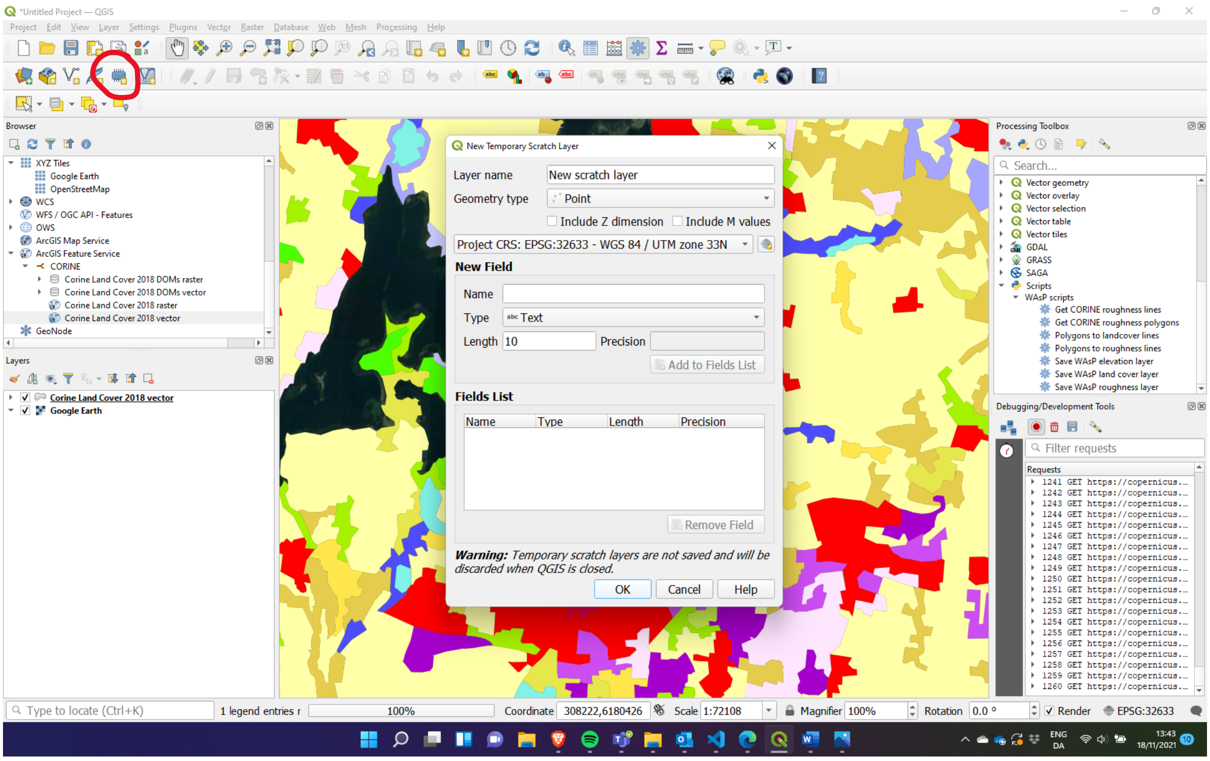
https://copernicus.discomap.eea.europa.eu/arcgis/rest/services/Corine/CLC2018_WM/MapServer



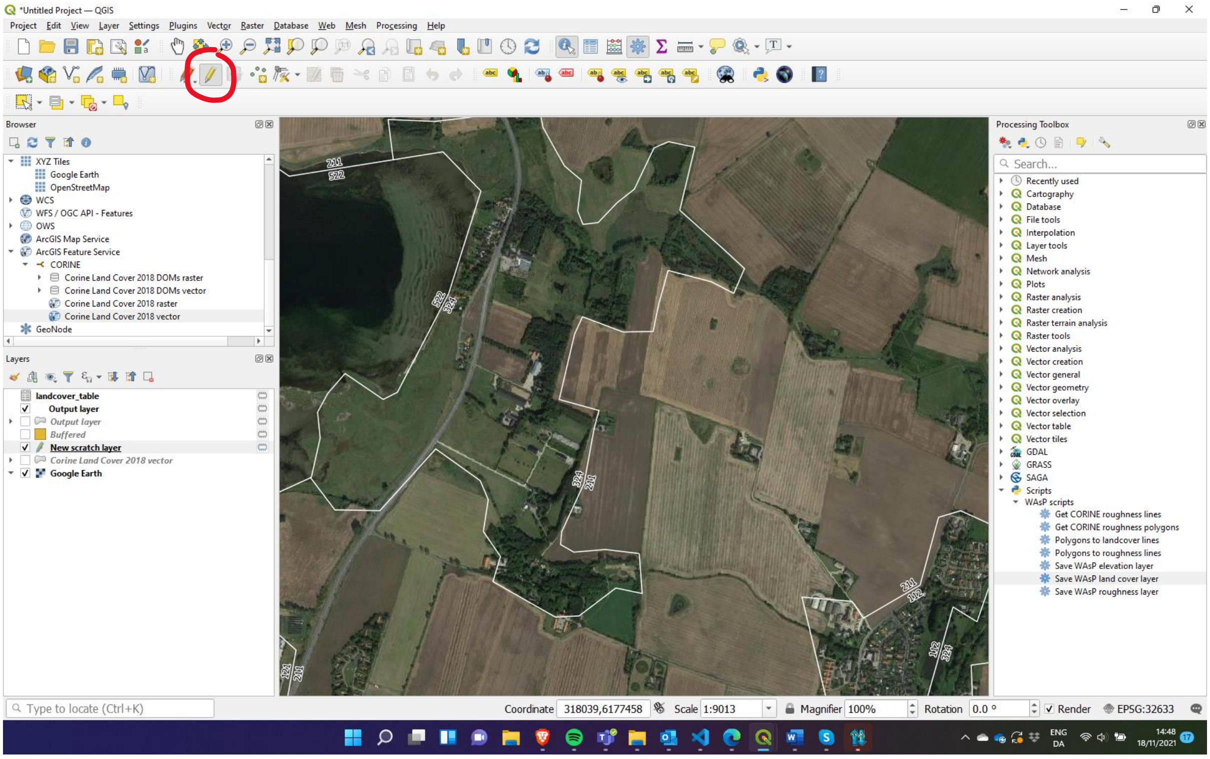
Expand the CORINE item in the ‘ArcGIS feature service’ (in newest version called ‘ArcGIS REST service’) and double click “CORINE Land Cover 2018 vector”. This will add CORINE polygons to your map. Make sure the region you have chosen is not too big, because then loading the polygons is very slow or will not work at all.



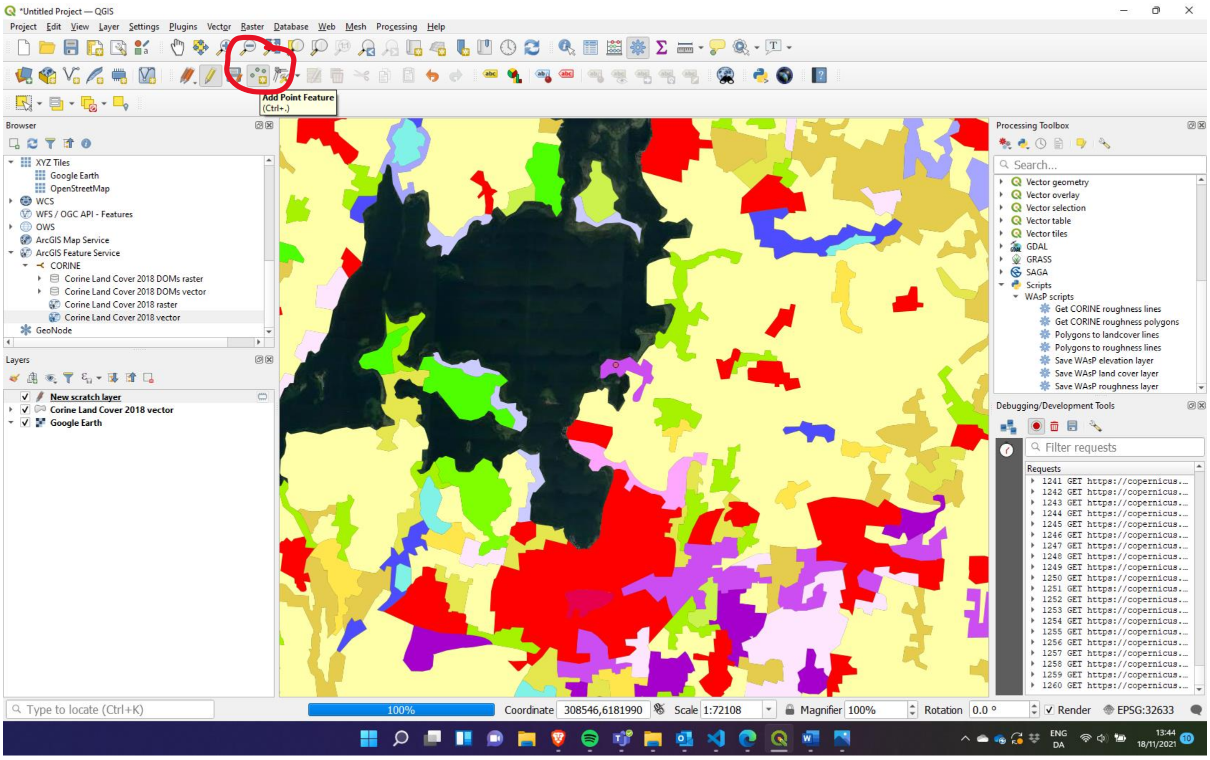
Now we must extract the features from the CORINE dataset. We will create a ‘Point’ scratch layer with the projection chosen above. As discussed above, you will have to make sure you use a metric projection that WAsP can handle.



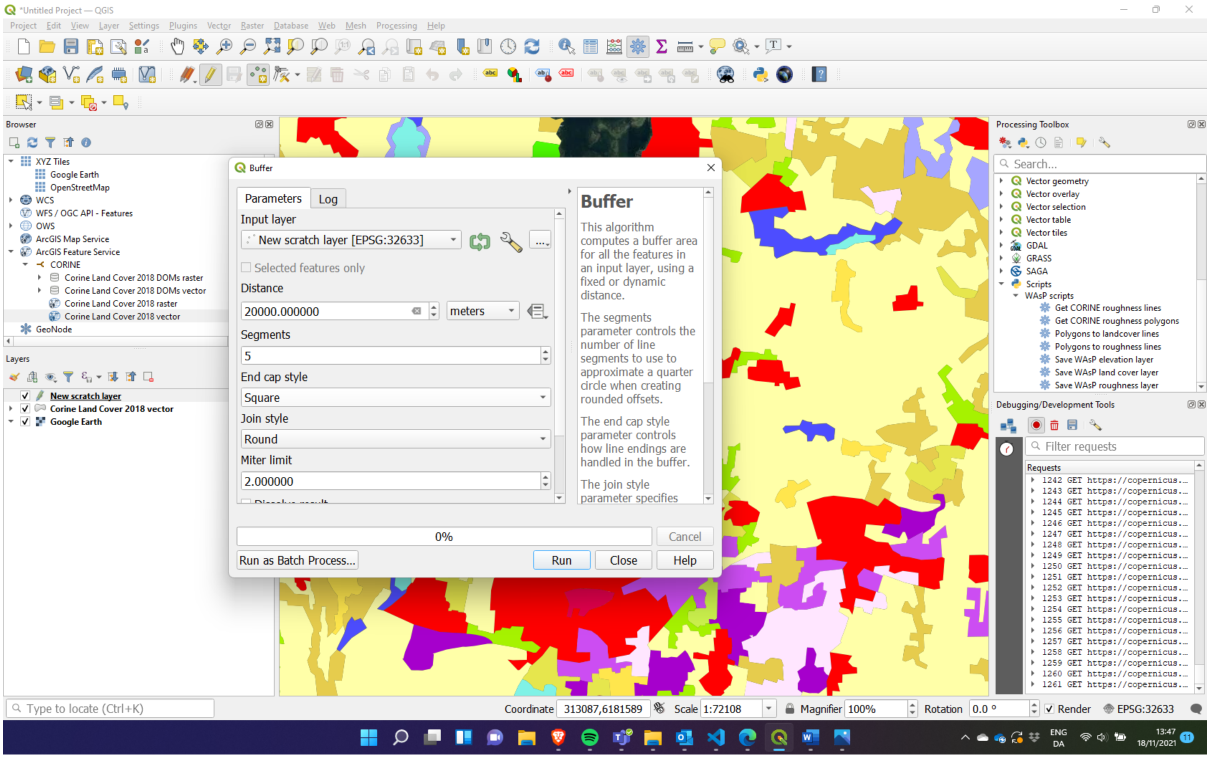
Make sure the layer is editable by clicking the pencil icon:



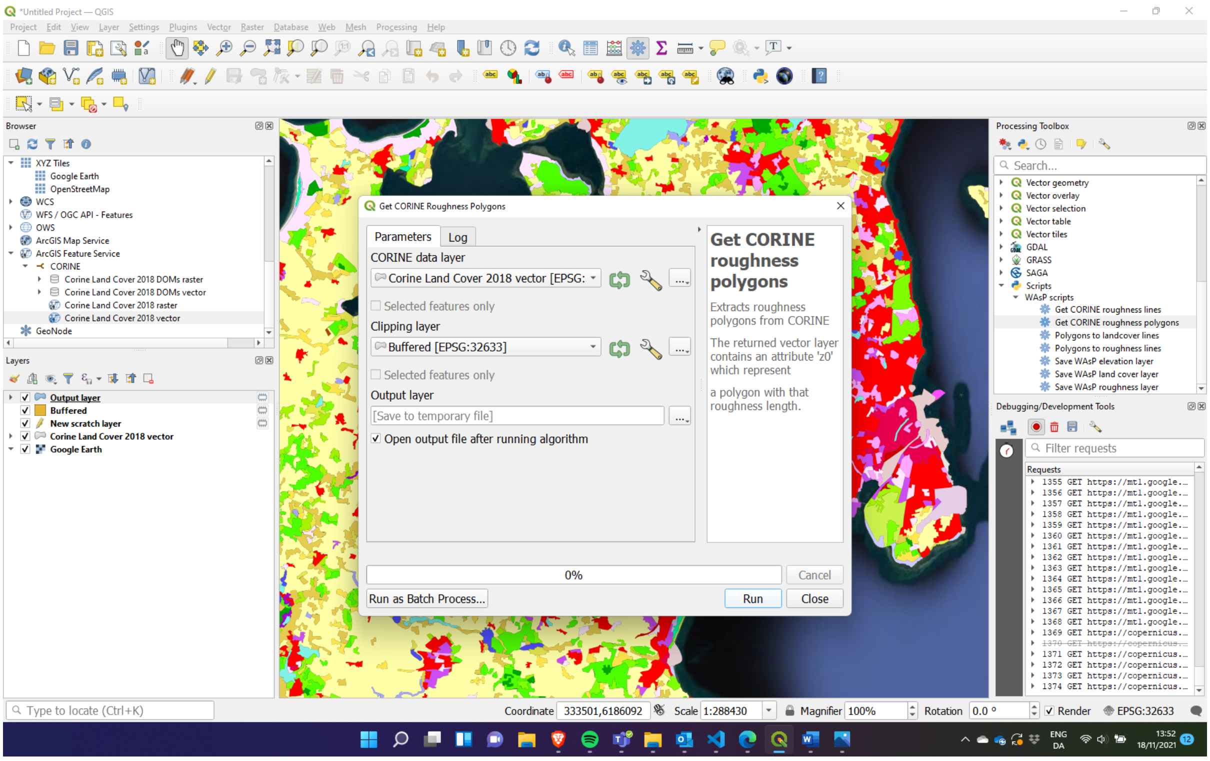
Click the add point feature and add a point where you want the center of your map to be:



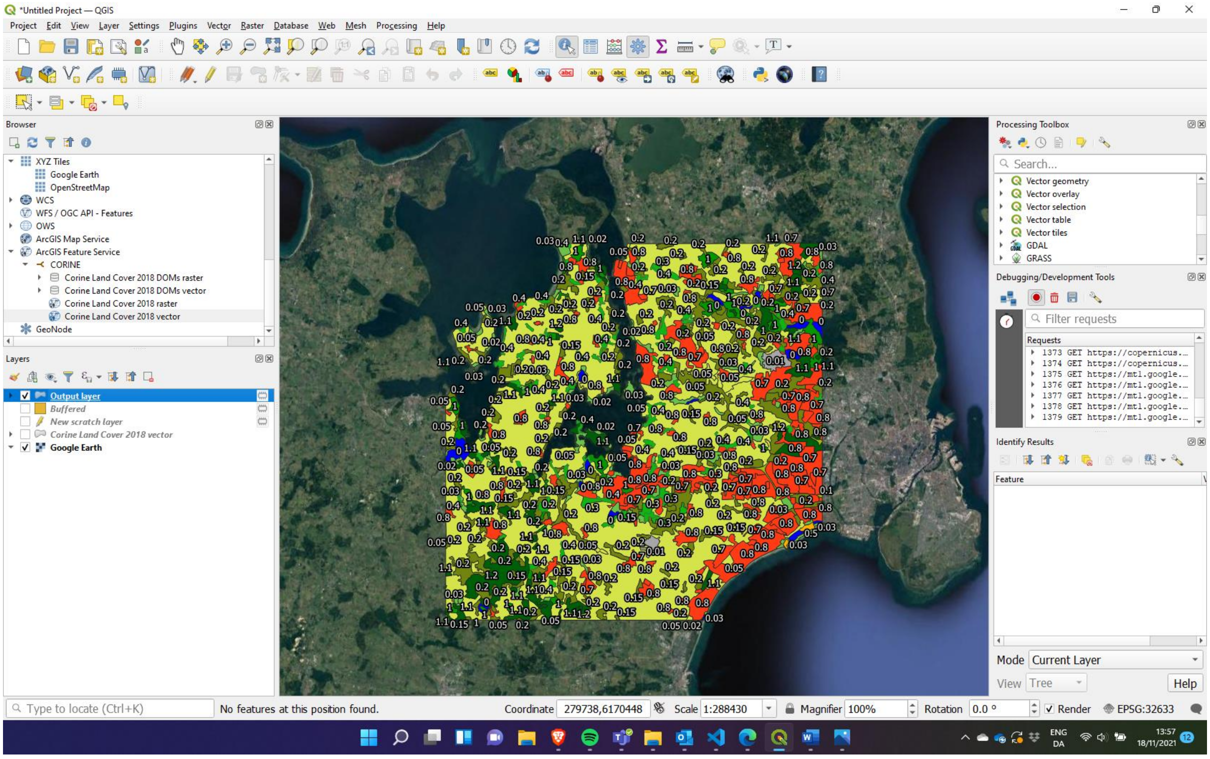
After adding the point, save the layer edits (button left next to 'add point feature'). Then go to "Vector > Geoprocessing tools > buffer". Select the scratch layer you have created and a distance which you want the map to extent to from the chosen point. Choose a 'End cap style: Square' so we get a square map and press 'Run'.



Zoom out and you will see the square you have just created. Now double click on the WAsP script ‘Get CORINE roughness polygons’ and select the CORINE data layer and the buffer layer with our square as input for the script:

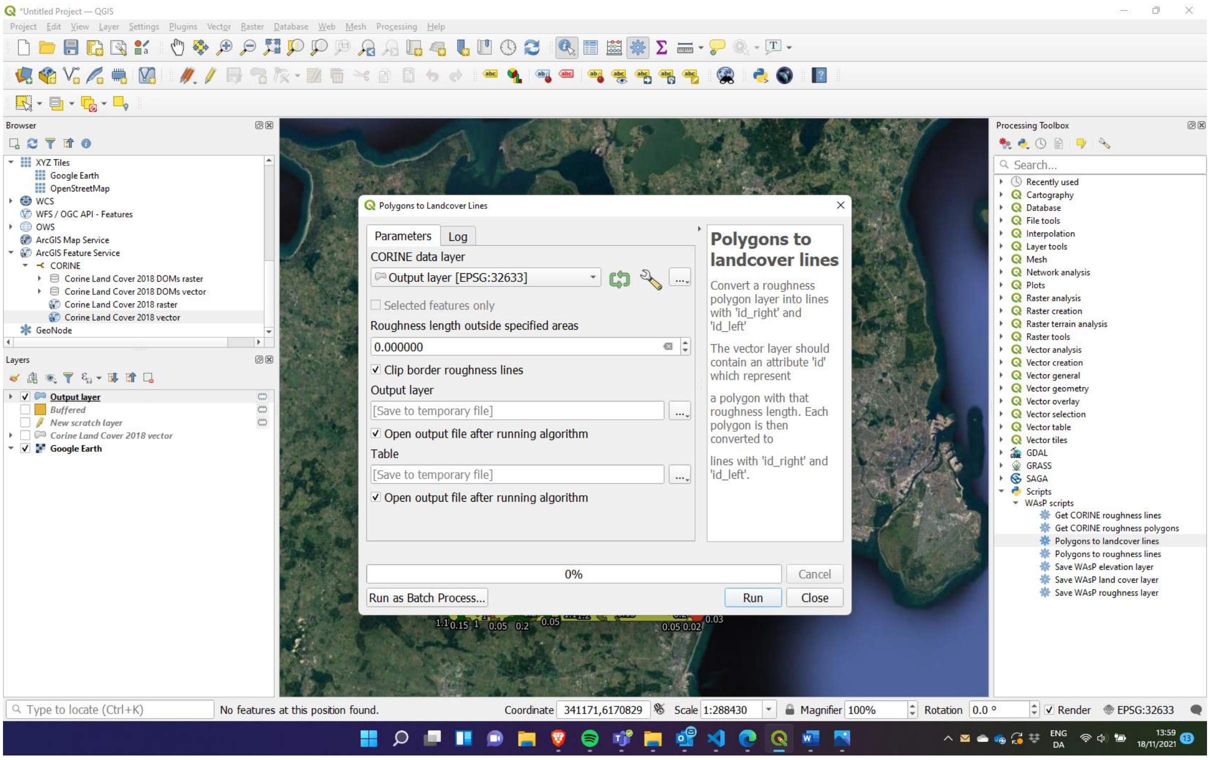


Press ‘Run’ and you will see that the layer is added to the map. You can also save the map to disk if you want to save it (generally a good idea, because QGIS does not save the whole workspace for you when exiting).



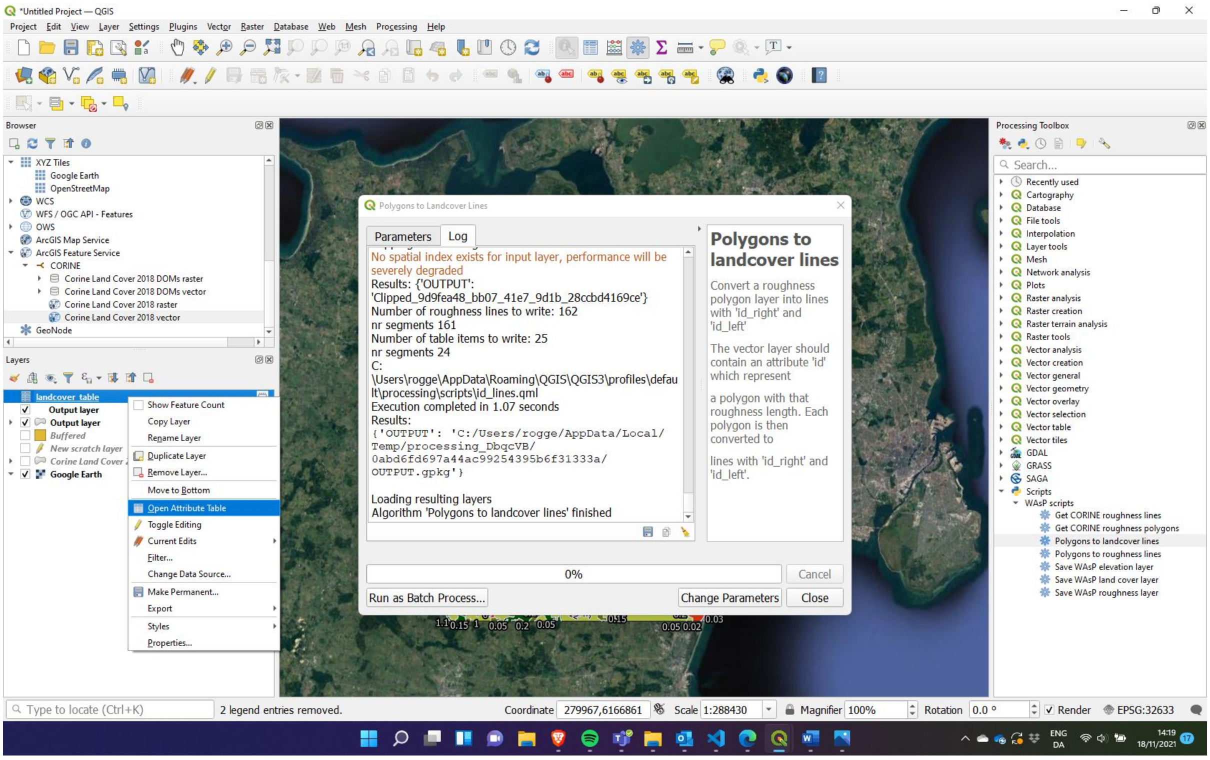
You can now uncheck the 'CORINE land cover 2018 vector' and 'Buffered' layer in our workspace to only see the extracted square with roughness polygons. Note that there is no offshore polygon because it is not present in the CORINE feature server.

Now double click on the WAsP script 'Polygons to landcover lines':

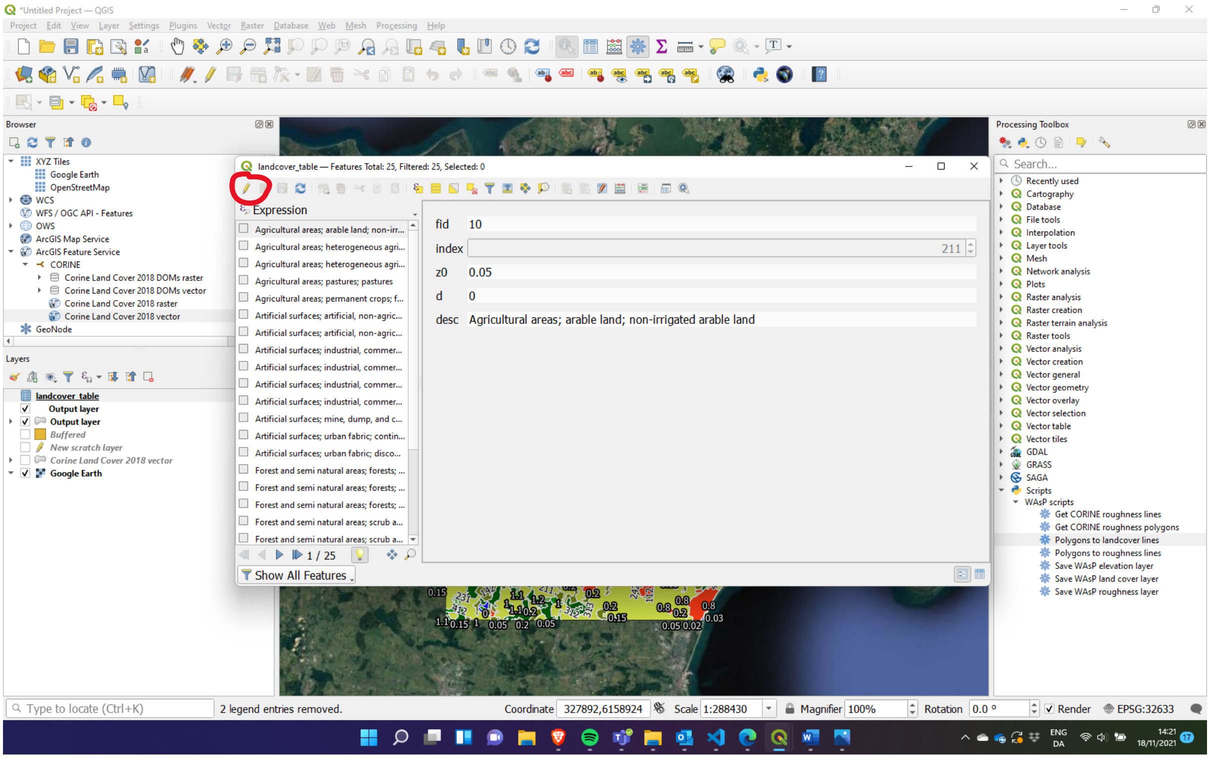


Select the 'Output layer' with extracted polygons and select 0.0 as roughness length outside the specified area, as in this case the water surface polygon is missing. To not have water around the border we select the ‘Clip border roughness lines’ (only works for square maps). Press ‘Run’ and you will see a layer with land cover lines and a table with roughness and displacement heights being created.

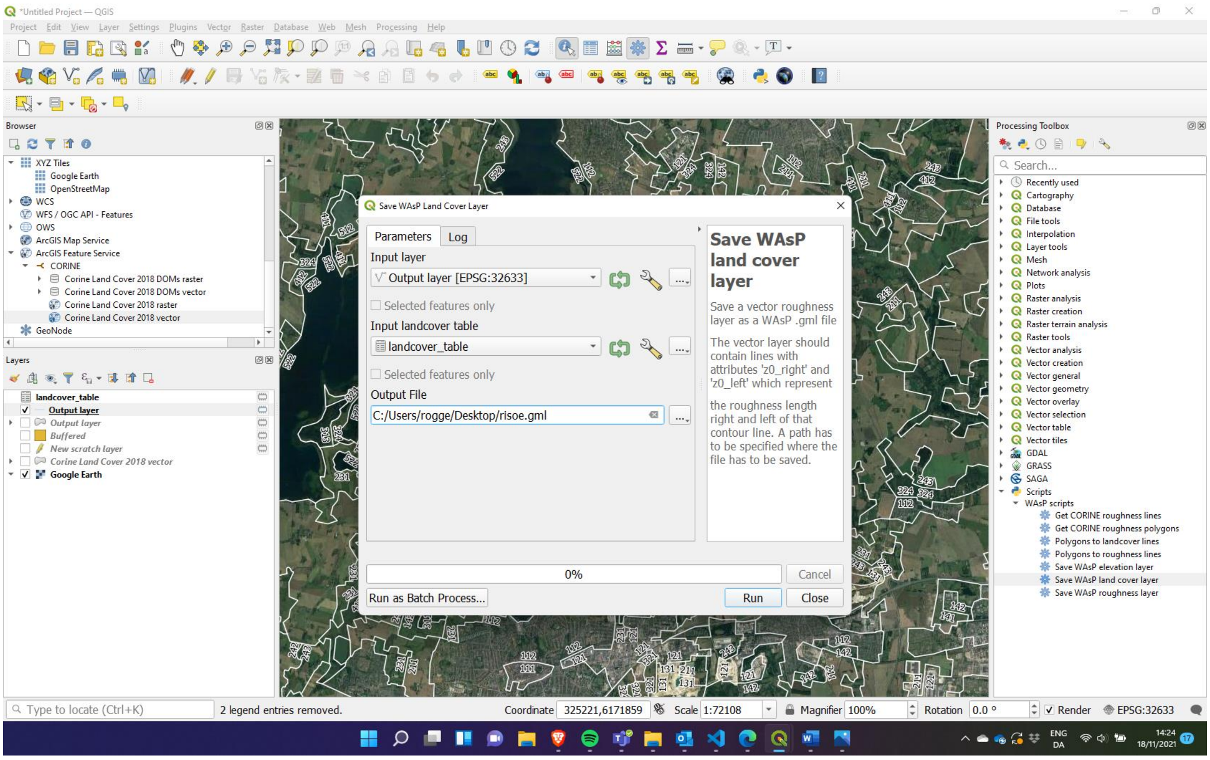
Uncheck the ‘Output layer’ with polygons and you will see the landcover lines and the ID’s corresponding to each land cover type. You can find the corresponding roughness and displacement height by right clicking on the ‘landcover_table’, click on ‘Open attribute table’ and look at the fields ‘z0’ and ‘d’.



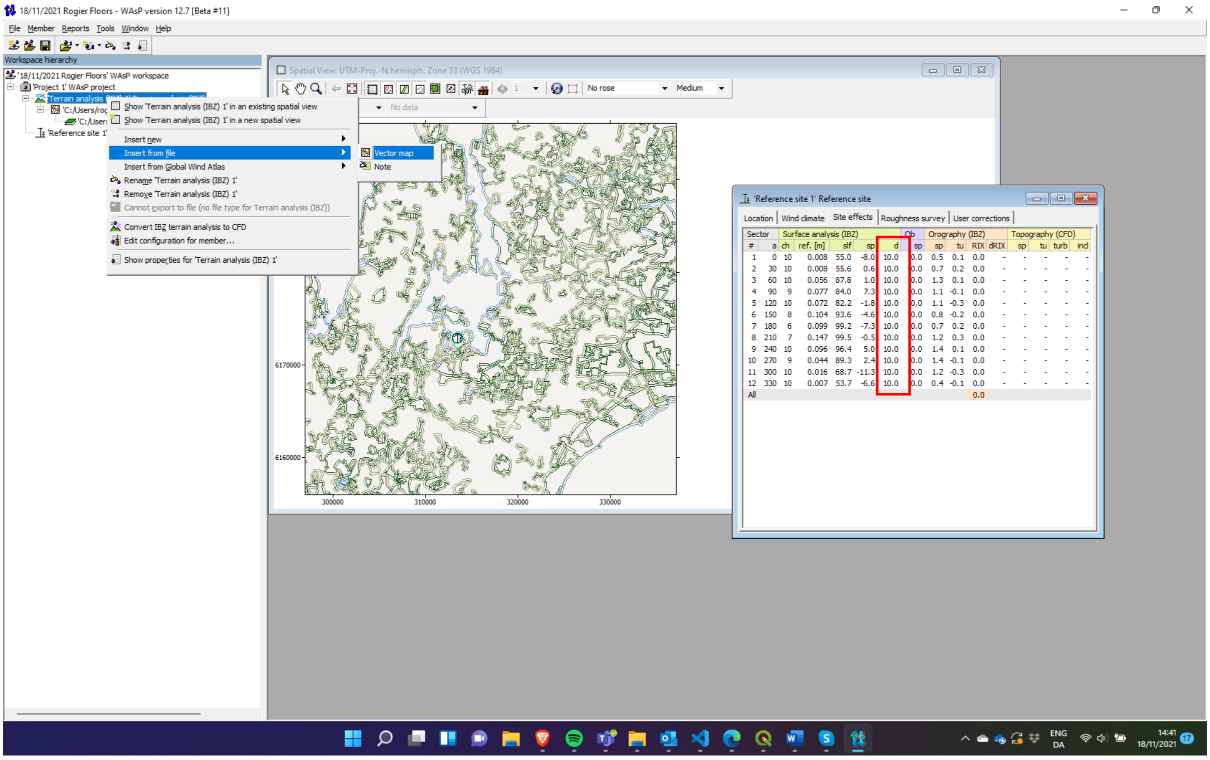
You can click on the pencil symbol to edit the values of z0 and d for each land cover type.



Once you are done, click on the WAsP script 'Save WAsP land cover layer'. It will show you the following panel, and you will have to select the layer with landcover lines and the land cover table with corresponding z0 and displacement values. Finally, you must specify a path to the output file by clicking 'save to file'. You cannot save this as a temporary layer but only to disk.



Open the file you just saved in WAsP. A reference site is inserted here into a forest with a displacement height of 10 m as example.


18/11/2021 Rogier Floors - WAsP version 12.7 [Beta #11]
File Member Reports Tools Window Help
Workspace hierarchy
'18/11/2021 Rogier Floors' WAsP workspace
'Project 1' WAsP project
Terrain analysis
'Reference site 1'
Show 'Terrain analysis (IBZ) 1' in an existing spatial view
Show 'Terrain analysis (IBZ) 1' in a new spatial view
Insert new
Insert from file
Vector map
Note
Insert from Global Wind Atlas
Rename 'Terrain analysis (IBZ) 1'
Remove 'Terrain analysis (IBZ) 1'
Cannot export to file (no file type for Terrain analysis (IBZ))
Convert IBZ terrain analysis to CFD
Edit configuration for member...
Show properties for 'Terrain analysis (IBZ) 1'
Spatial View: UTM-Proj.-N.hemisph. Zone 33 (WGS 1984)
No rose
Medium
No data
6170000
6160000
300000
310000
320000
330000
'Reference site 1' Reference site
Location
Wind climate
Site effects
Roughness survey
User corrections
Sector
Surface analysis (IBZ)
Ob
Orography (IBZ)
Topography (CFD)
a ch ref. [m] slf sp d sp sp tu RIX dRIX sp tu turb incl
1 0 10 0.008 55.0 -8.0 10.0 0.0 0.5 0.1 0.0 - - - - -
2 30 10 0.008 55.6 0.6 10.0 0.0 0.7 0.2 0.0 - - - - -
3 60 10 0.056 87.8 1.0 10.0 0.0 1.3 0.1 0.0 - - - - -
4 90 9 0.077 84.0 7.3 10.0 0.0 1.1 -0.1 0.0 - - - - -
5 120 10 0.072 82.2 -1.8 10.0 0.0 1.1 -0.3 0.0 - - - - -
6 150 8 0.104 93.6 -4.6 10.0 0.0 0.8 -0.2 0.0 - - - - -
7 180 6 0.099 99.2 -7.3 10.0 0.0 0.7 0.2 0.0 - - - - -
8 210 7 0.147 99.5 -0.5 10.0 0.0 1.2 0.3 0.0 - - - - -
9 240 10 0.096 96.4 5.0 10.0 0.0 1.4 0.1 0.0 - - - - -
10 270 9 0.044 89.3 2.4 10.0 0.0 1.4 -0.1 0.0 - - - - -
11 300 10 0.016 68.7 -11.3 10.0 0.0 1.2 -0.3 0.0 - - - - -
12 330 10 0.007 53.7 -6.6 10.0 0.0 0.4 -0.1 0.0 - - - - -
All 0.0
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DA
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18/11/2021