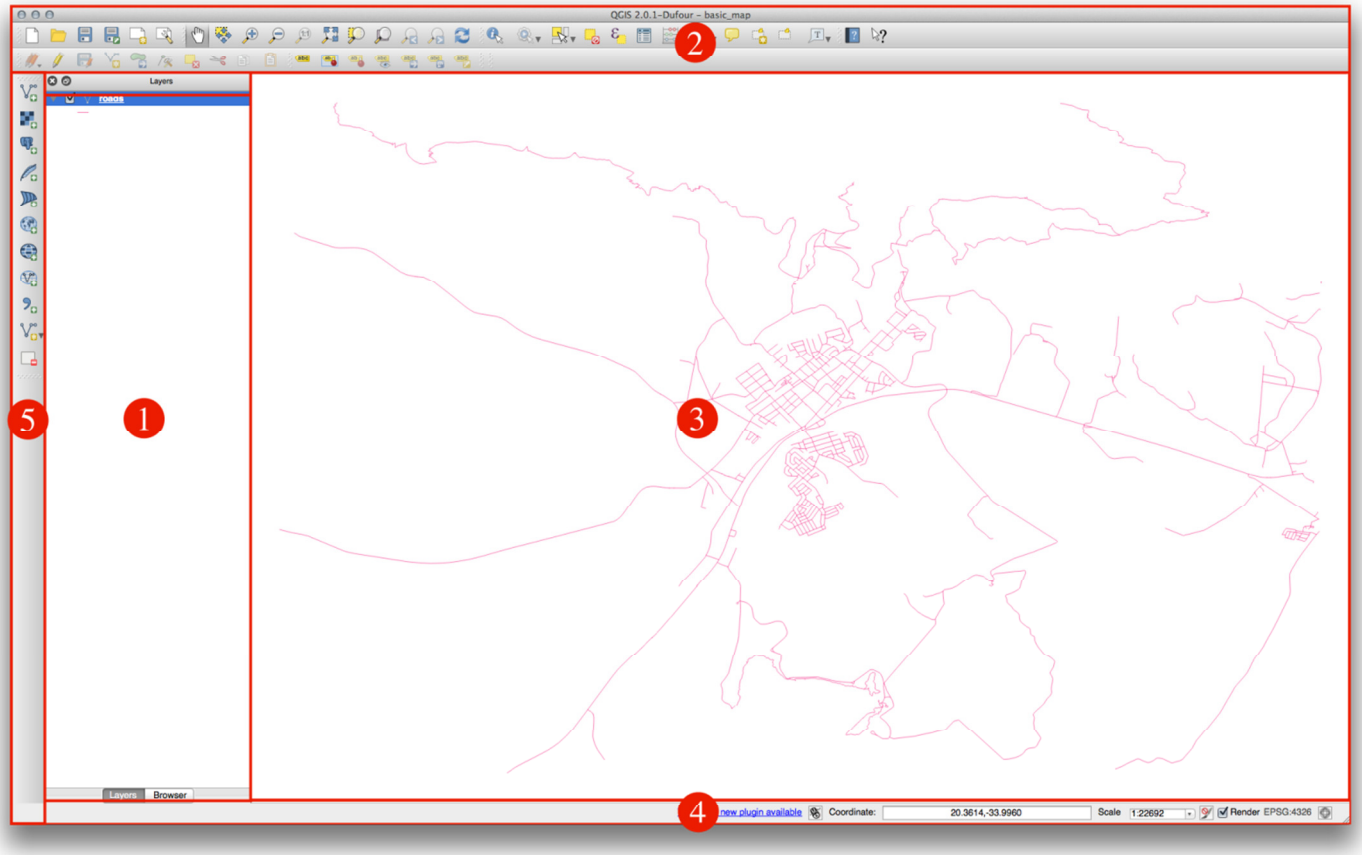
Introduction to QGIS

A Free and Open Source Geographic Information System

Companion information to Bath: Hacked Learning Night 17th August 2016



http://docs.qgis.org/2.2/en/docs/training_manual/introduction/overview.html

The elements identified in the figure above are:

1. Layers List / Browser Panel
2. Toolbars
3. Map canvas
4. Status bar
5. Side Toolbar

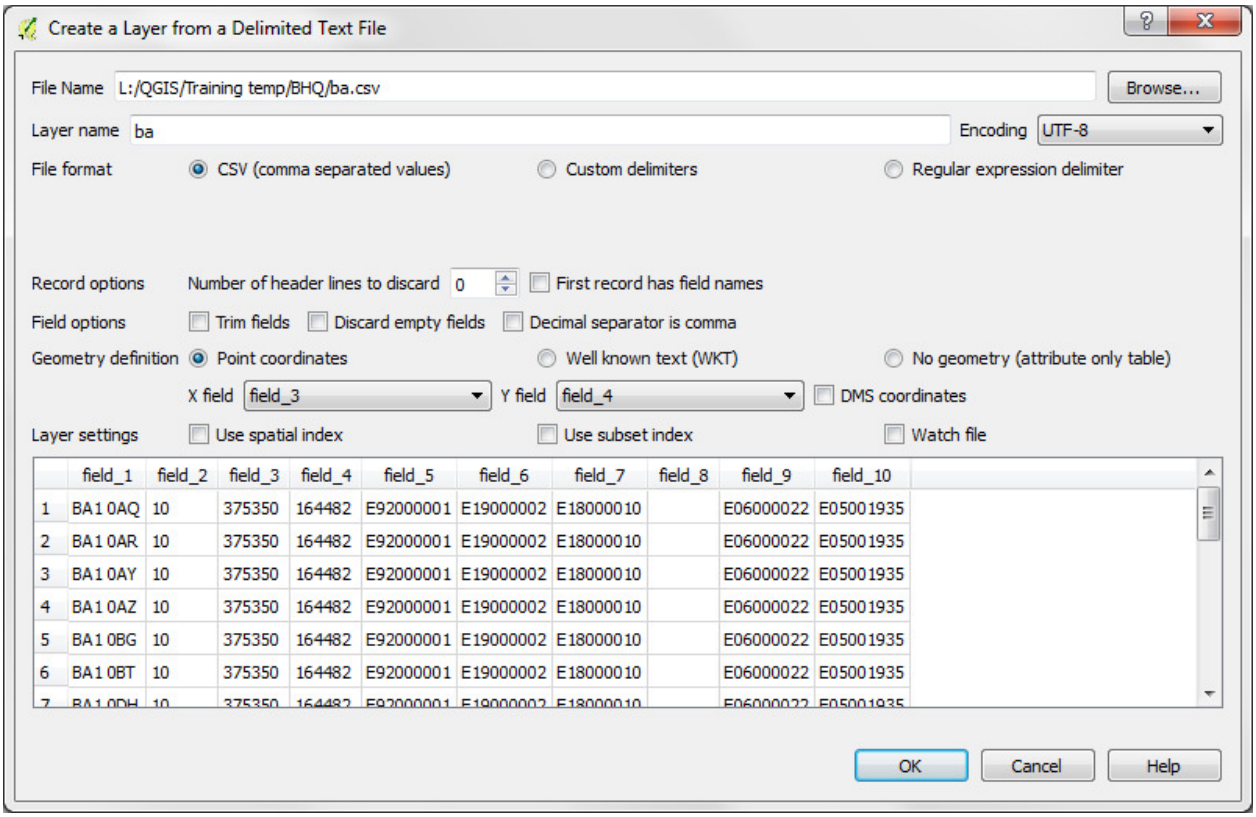
Adding New Data

Add new data to the map using the menus, manage layers toolbar or drag and drop into the map window. Some of the most common formats are indicated below.

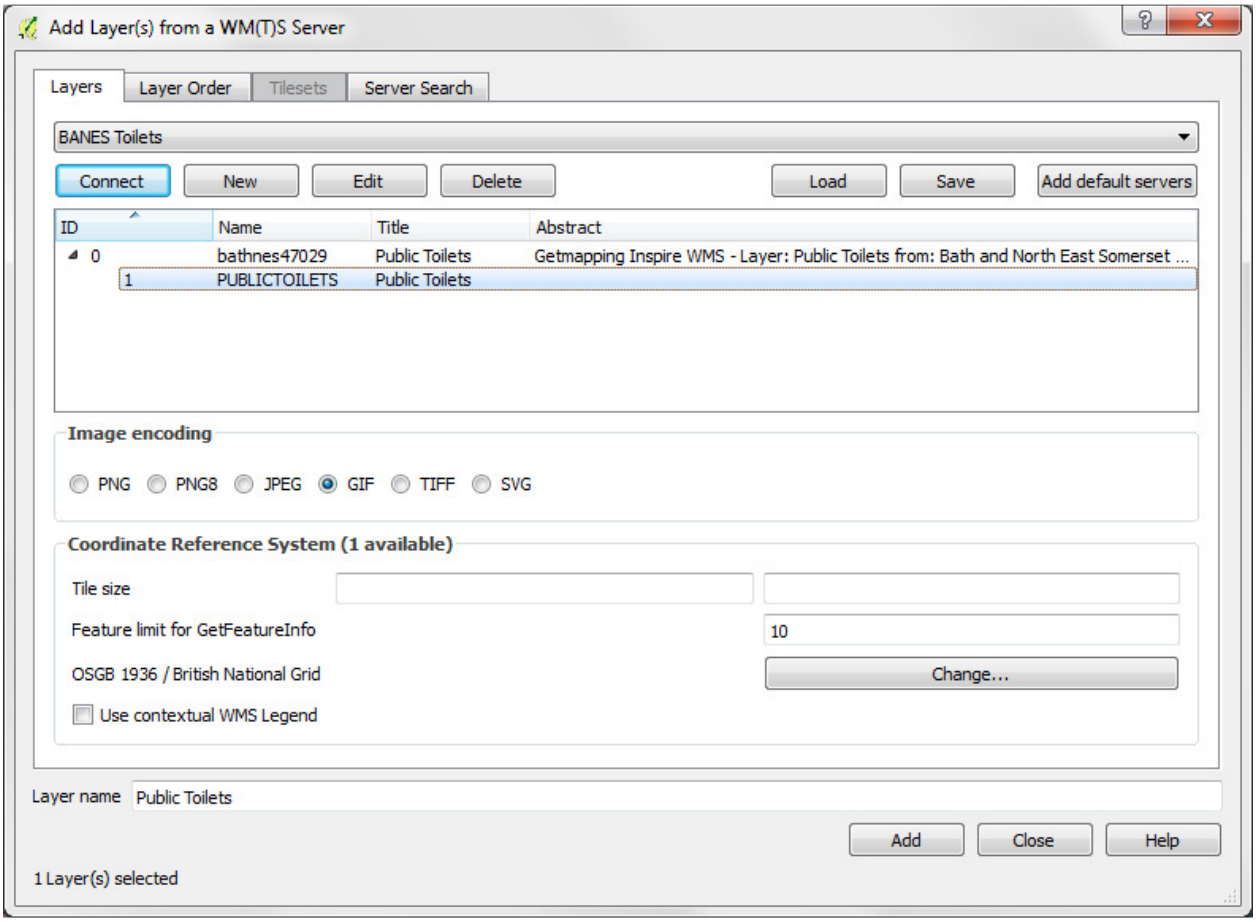
 Vector (.shp)

 Raster (.tiff .png)

 Delimited Text Layer (.csv .txt)



Web Map Service (WMS) / Web Feature Service (WFS)



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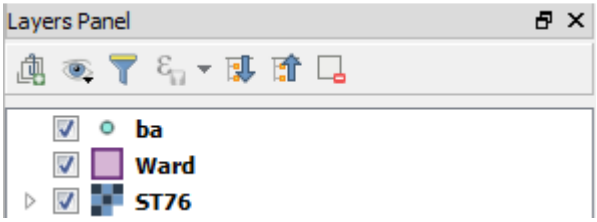
Navigation

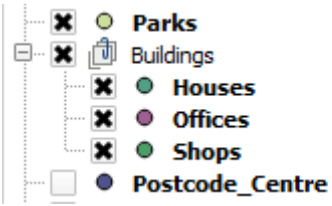
The toolbar contains the Pan (hand), Zoom (+ -), Zoom to Layer, Zoom to full extent buttons (hover the curser over each button to see a description). Select the tool you want to use. Zoom by clicking once on the map or left click hold and draw a box to zoom to a specific location. You can also scroll using the mouse wheel

The Layer List

The Layer list shows all layers available to you. Check the box to turn layers on and off. The list shows the draw order, layers at the top will be drawn on top of those listed below. You can drag the layers up and down to change draw order. The legend is also included here. You can see what type of layers you have and their styling. Below shows Point, Polygon and Raster layers

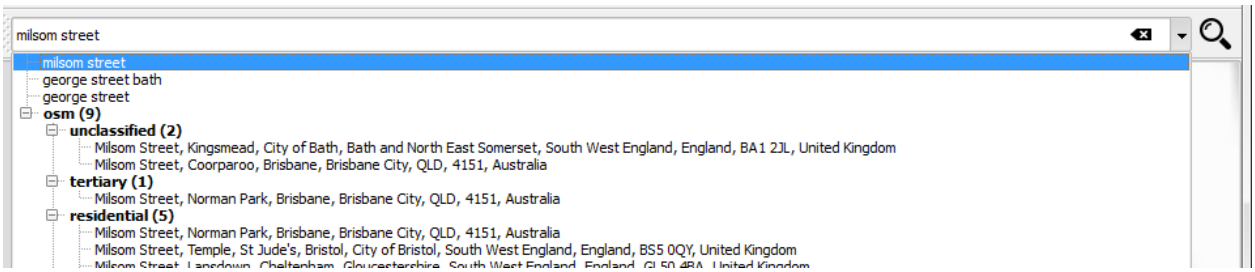


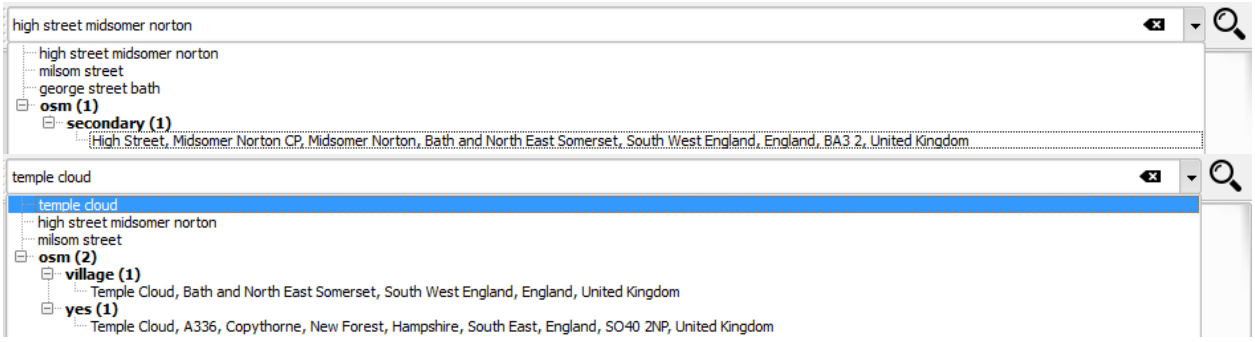
Right clicking a layer will bring up a number of options such as **Open Attribute Table** (see later), **Toggle Editing** (see later) and **Zoom to Layer**. Close a layer by right clicking or using the close layer button just above (red minus).
To group layers, select the ones you want, right click and select **Group Selected**. You can now turn the whole group on and off with one click rather than clicking many individuals. To change the group name, right click and select **Rename**. Ungroup by right clicking a layer and selecting **Move to Top-Level** or drag it out. Add a new layer to an existing group by dragging it in



Searching

Using the Quick Search Plugin, type in the name of a street or place and press enter. This is a global search (using open street map) so you may need to type in the town name after the street (e.g. High Street Midsomer Norton). From the results menu double click on the result you want and the map will zoom to the location and highlight with a yellow line.

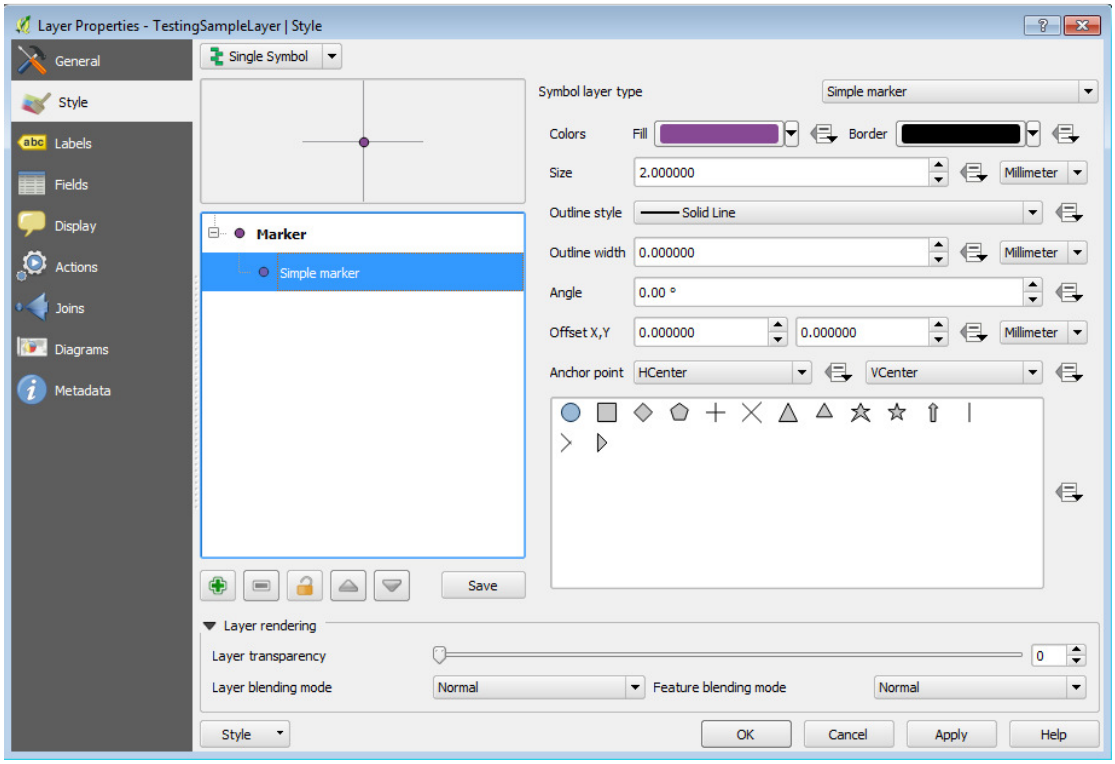




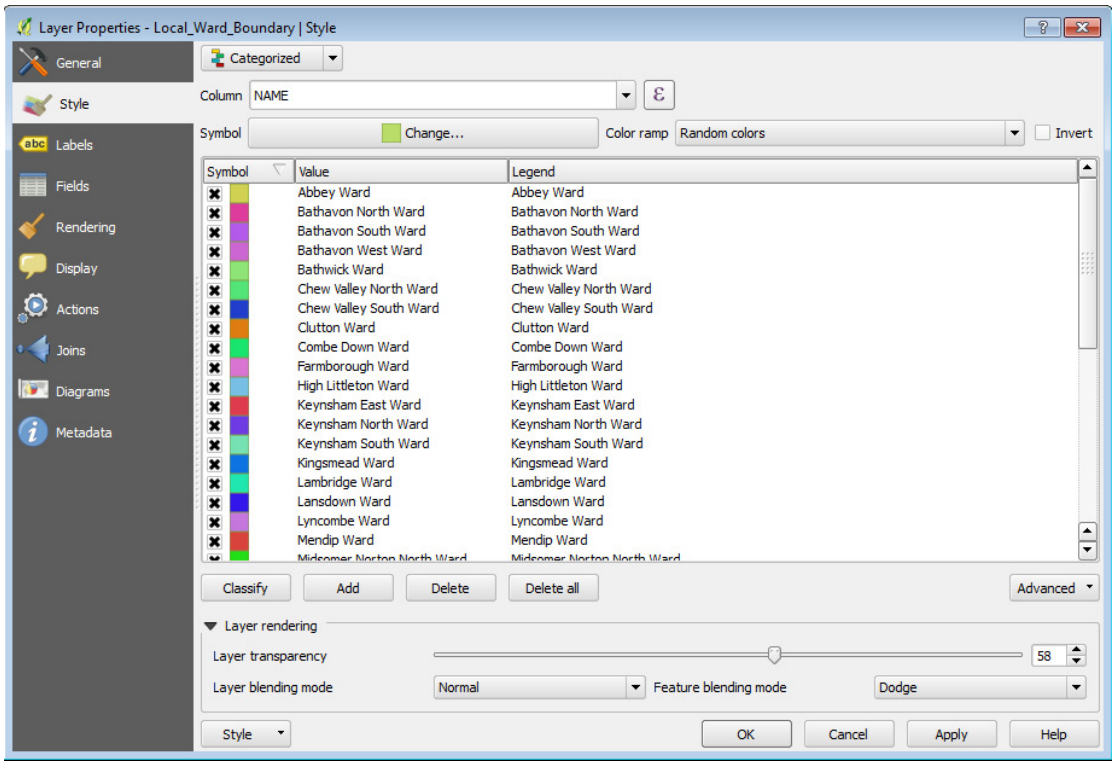
Styling

Double click on a layer to open its properties (or right click > properties). In the Styles section you can re-style the layer in a number of ways. Here are some examples:

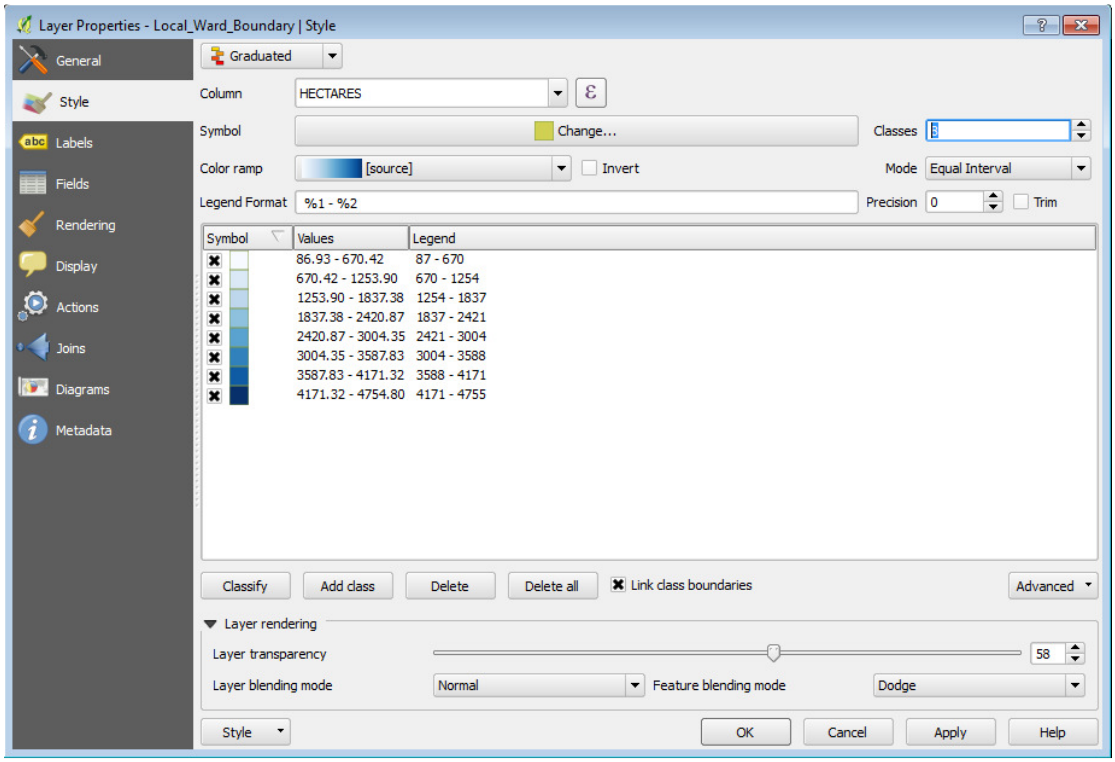
Simple Styling. Click on Simple Marker. From here you can change symbol, colour, size, outline etc.



Categorized: Style by a category held within one of the fields. Choose which field (column) to style on, select the colour/style and click classify. You can also manually make changes to each individual style. In this example the column Ward Name is chosen



Graduated: Based on a numeric value in the layer. In this example the area of each ward is taken from the hectares field.



Rule Based styling allows bespoke styles to be created depending on various criteria held in several attributes.

In the **Labels** tab you can set your label to appear from a selected field and style it using the sub menus. A white buffer (halo) will make text more visible on a map. Placement rules can be set to avoid overlap when features are close together. Show all labels will force them all on at all times.

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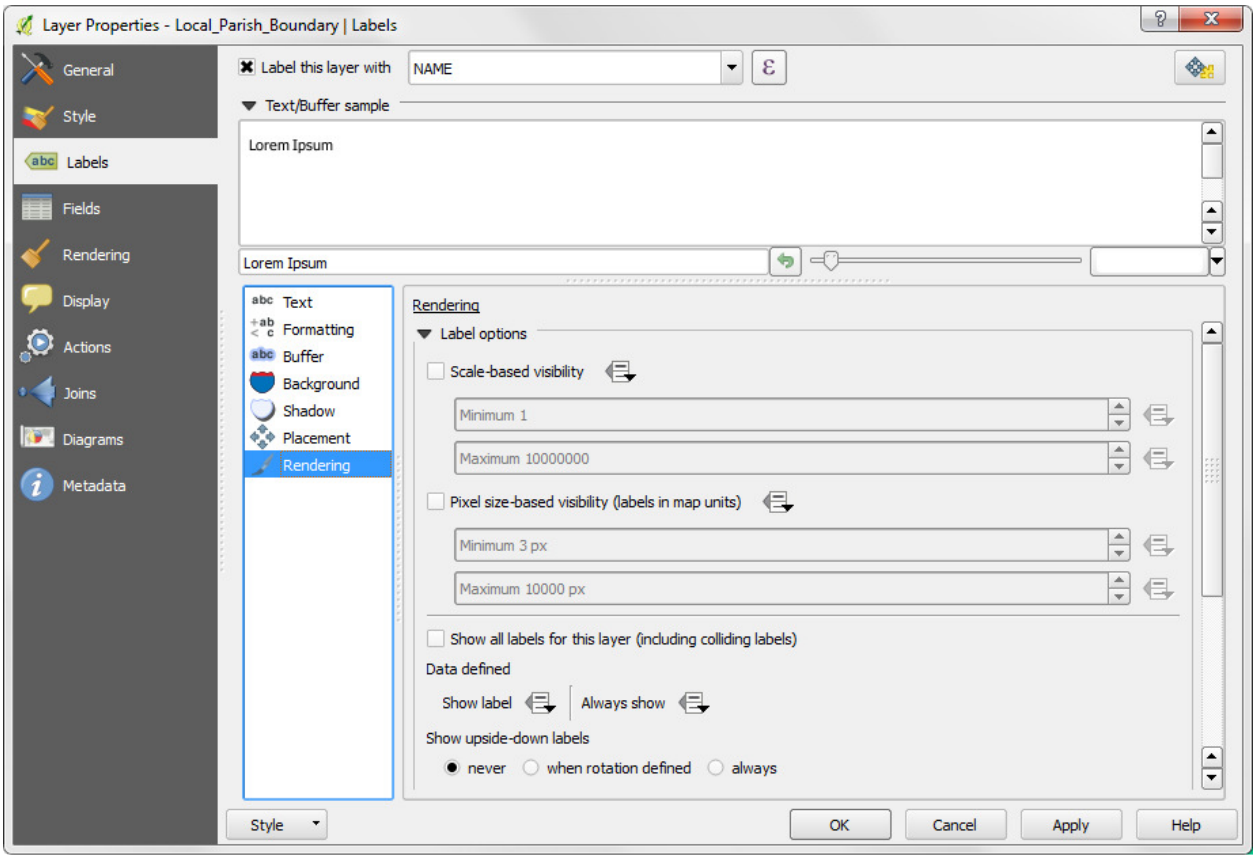
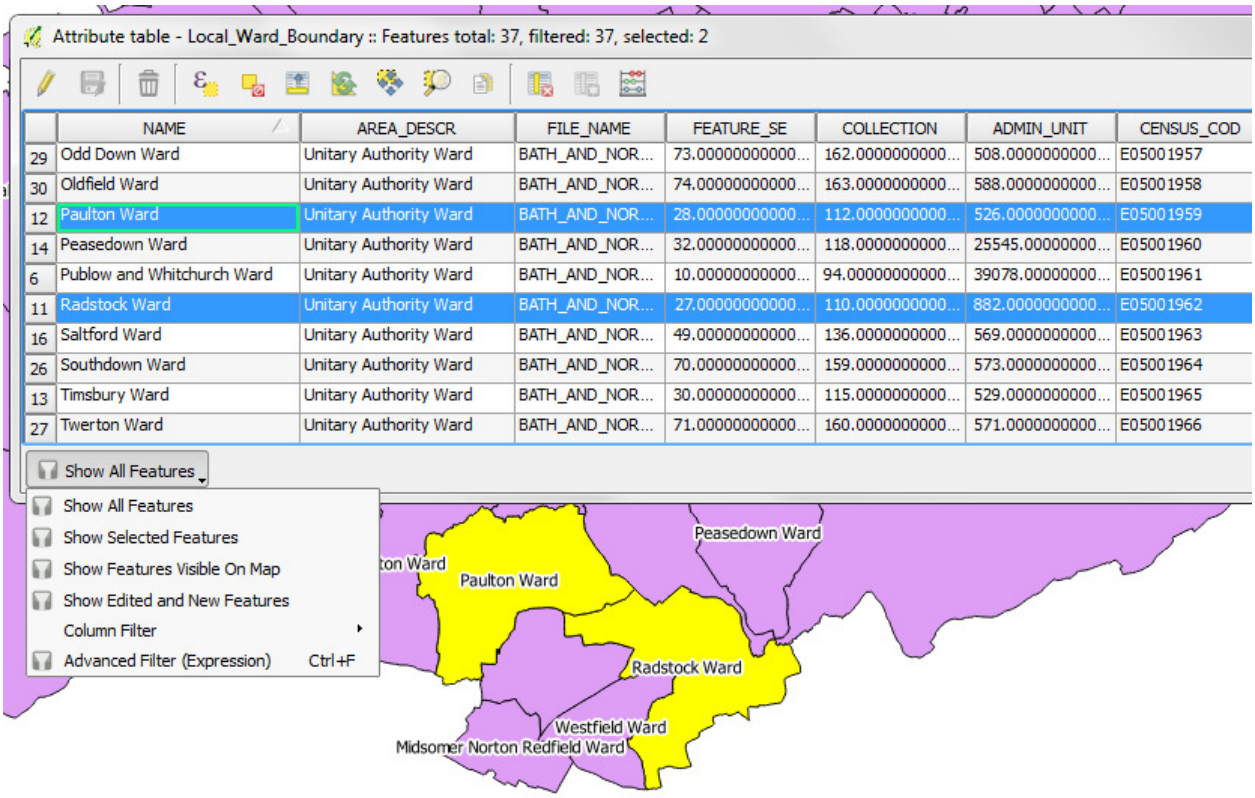


Attribute Table

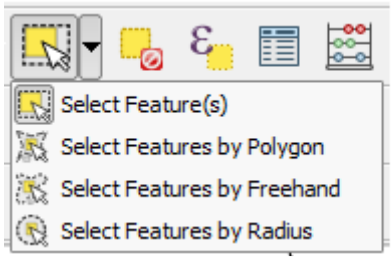
Each vector layer is a table of data, each record having a geographical representation.

- Clicking on the column heading will sort alphabetically/numerically
- Selecting one or more record in the table will select it on the map and vice-versa
- Change the view to only see those selected/visible on map/meets certain criteria (expression)
- Select based on a query (further information on select by expression in next section) or Invert Selection.
- Toggle editing to edit attribute data. The Field Calculator can be used in editing to auto generate fields with calculations or specific criteria



Selecting

Highlight the layer you want to select from in the layer list. Use the Select tools to click on the map. You can use a single click to select a feature or draw a polygon to select those features which intersect the polygon. The deselect button clears the selection. To select more than one feature (or remove from selection) hold down CTRL. Selection drawing a box will select all features intersecting it, hold CTRL to select features only completely within the box.



Select By Attribute

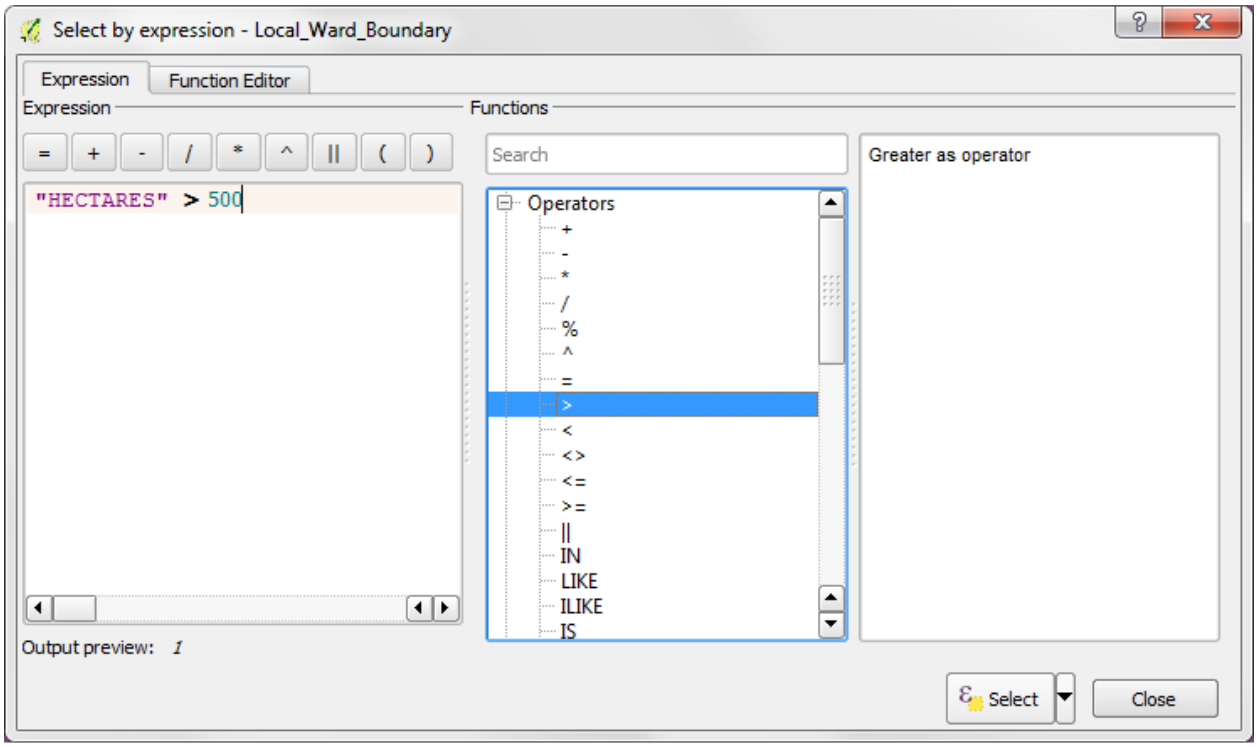
Select Features using an Expression allows you to do a query or spatial query on the layer

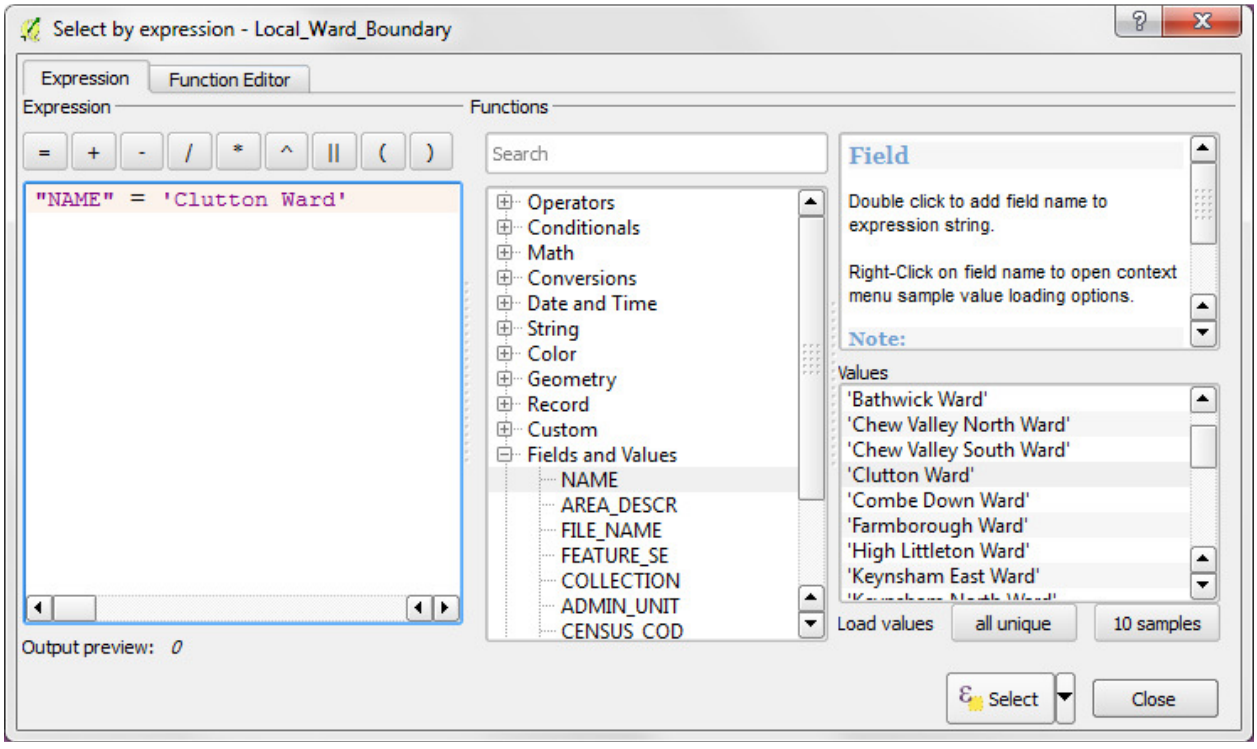
Open the **Select features using an expression** window . This tool will allow you to build simple or complex expressions to select data. You can type the expression or use the menus to build the query.

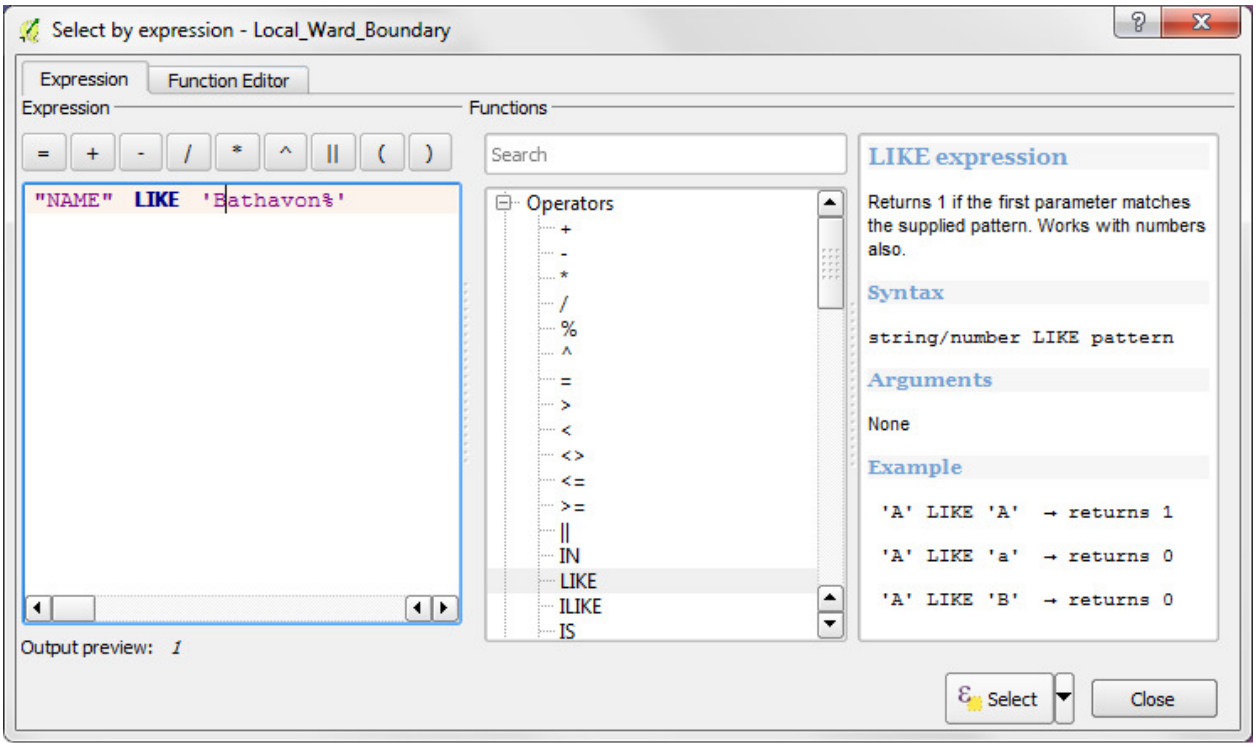
Field Names can be found in the Functions Fields and Values. The All Unique button can be used to select a unique attribute. *NB/ Do Not use this if there are hundreds of values as it may hang or crash*

Operators (equals, more than, etc) are in Functions Operators

Please note queries are case sensitive

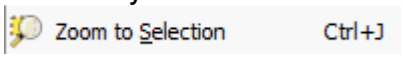

Select by expression - Local_Ward_Boundary
Expression
Function Editor
Expression
Functions
= + - / * ^ || ( )
"HECTARES" > 500
Search
Operators
+
-
*
/
%
^
=
>
<
<>
<=
>=
||
IN
LIKE
ILIKE
IS
Greater as operator
Output preview: 1
Select
Close


Select by expression - Local_Ward_Boundary
Expression
Function Editor
Expression
Functions
= + - / * ^ || ( )
"NAME" = 'Clutton Ward'
Search
Operators
Conditionals
Math
Conversions
Date and Time
String
Color
Geometry
Record
Custom
Fields and Values
NAME
AREA_DESCR
FILE_NAME
FEATURE_SE
COLLECTION
ADMIN_UNIT
CENSUS_COD
Field
Double click to add field name to expression string.
Right-Click on field name to open context menu sample value loading options.
Note:
Values
'Bathwick Ward'
'Chew Valley North Ward'
'Chew Valley South Ward'
'Clutton Ward'
'Combe Down Ward'
'Farmborough Ward'
'High Littleton Ward'
'Keynsham East Ward'
Load values
all unique
10 samples
Output preview: 0
Select
Close



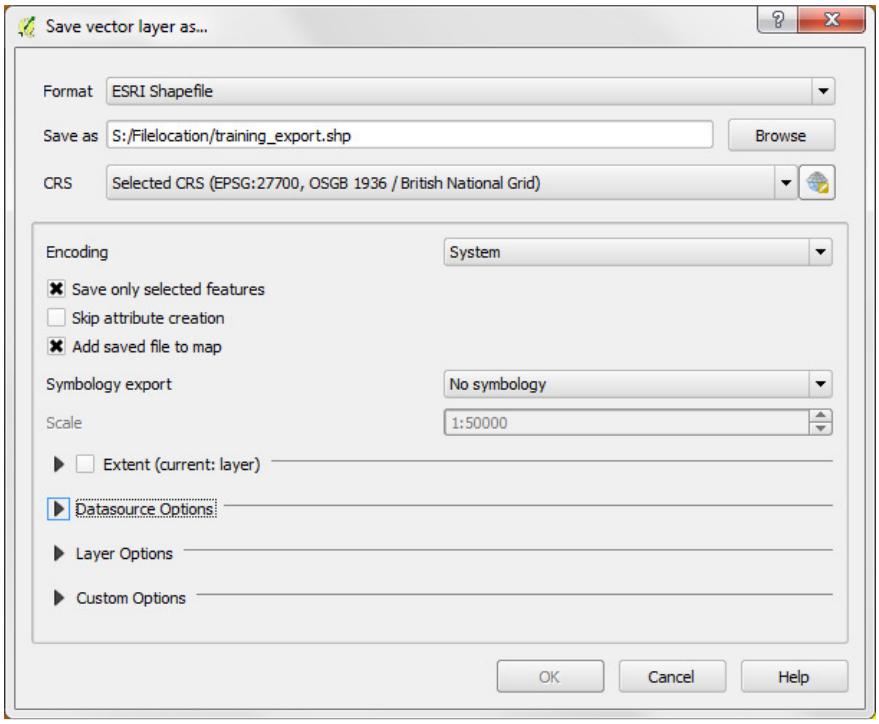
=	Equal to
>	Greater than
<	Less that
>=	Greater than or equal to
<=	Less than or equal to
<>	Different from
LIKE	Is like something
AND	When performing 2 statements which must both be fulfilled
OR	When performing 2 statements at least 1 must be fulfilled
%	Wildcard. e.g. select records containing avon would be '%avon%'

Once you have made your selection you can zoom to it

View > Zoom to Selection 

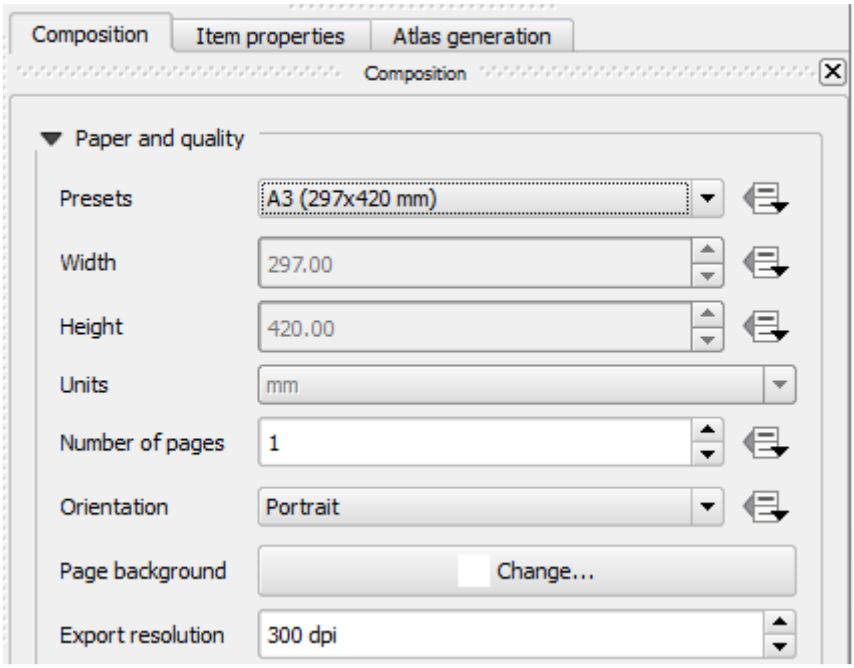
Exporting Data

To export a selection, select the layer in the layer list and go to **Layer > Save As**
Choose your export format. For use in QGIS use Shapefile, for Mapinfo, TAB file, for Autocad DXF. There is also the option to just save the table (no geography) as a CSV for excel.
Make sure the projection is correct.
Check **Save only selected features** for just the selection (or not for the whole layer)



Map Composer – making pdf/printable maps

Click the New Print Composer icon  (it will ask you to name your map – this displays in the window bar not on the map itself). This opens the Composer Window.
The paper Size and Orientation will default to A4 Landscape. If you wish to change this set your paper size and orientation in the Composition tab. Recommended export resolution is 300dpi



It is important to include any licensing/copyright information in any maps produced.

Using the Select button  click on the map and then in the Item Properties tab click the button Set to Map Canvas Extent to get your map in the frame.

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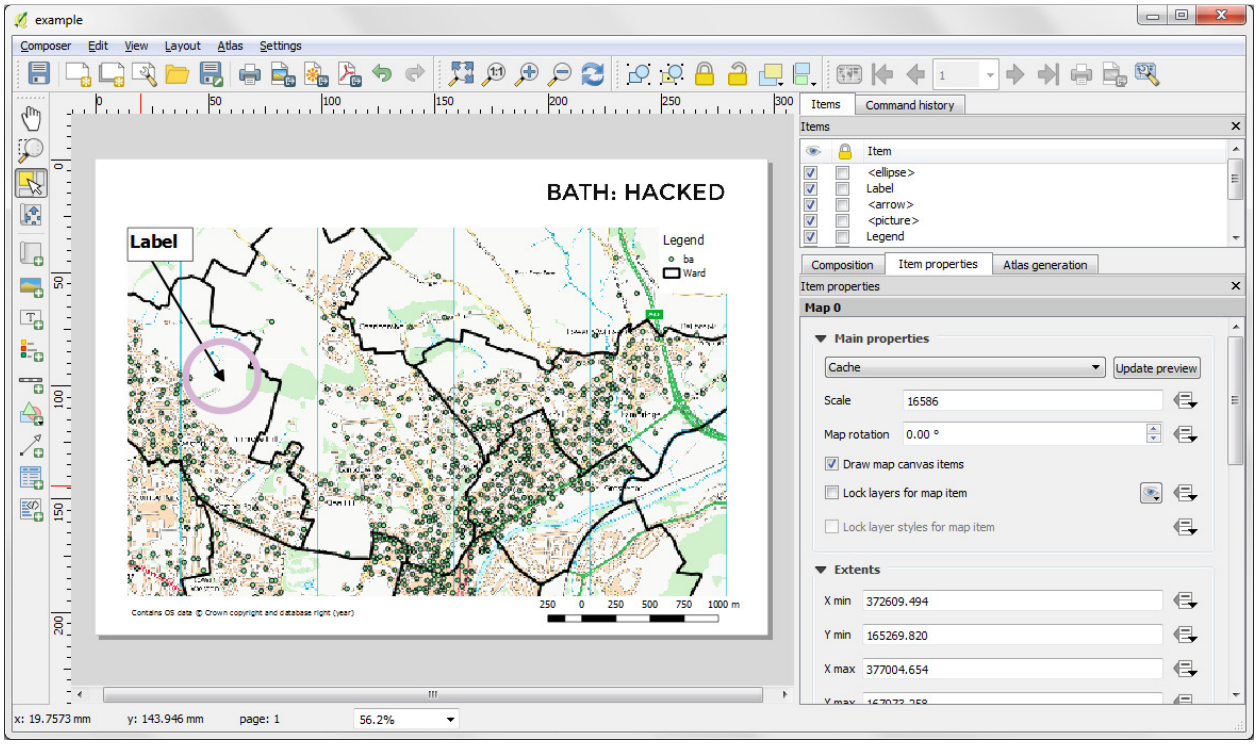
You can add other items such as a legend, scale bar, arrows, attribute tables and custom labels by using the tools in the side bar. Each map element has a range of options you can change in the Item Properties tab when you click on them

To change the position of the map use the Move Item Content button  . Use the Scale dialogue box to change the zoom level. If you move your map or change layers in the main QGIS window just press Set Map to Canvas Extent again to refresh



Print the map or save as an image or pdf 

You can make multiple composers which all save in your Project (workspace). Use the New Composer button or Duplicate Composer button 

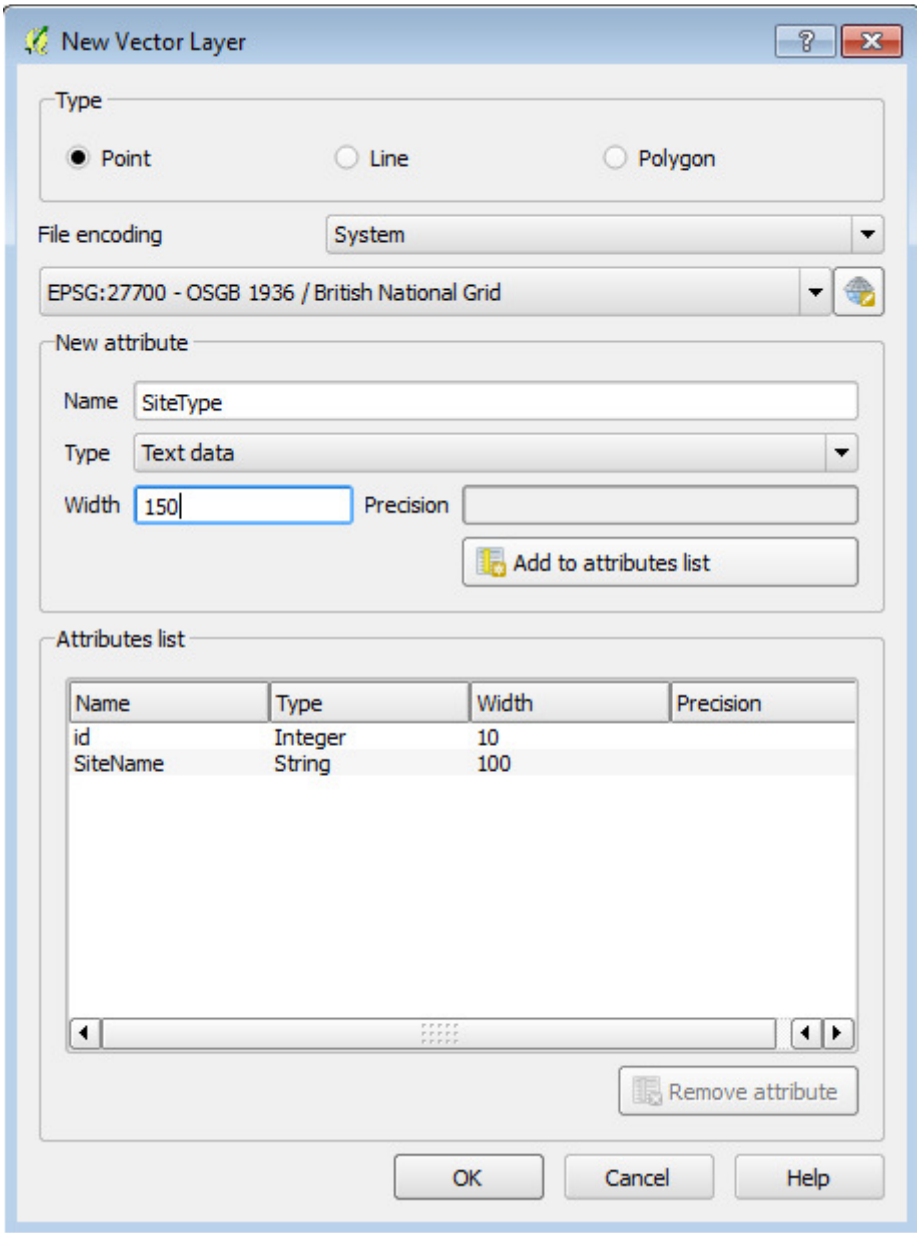
Creating New Data

Creating a new vector shapefile layer
Layer > Create Layer > Create new shapefile layer

Choose layer type – point/line/polygon. A layer can only have one type of geometry.

Set the coordinate system. **British National Grid EPSG:27700** is the coordinate reference system used for all maps in the UK. Read more about it from Ordnance Survey here and here for FAQ. The Default global CRS is **ESPG:4326 WGS84**

Define your attribute table. Here you can set what fields you want in your data. To add a new attribute, set the criteria then click **Add to attributes list**. Attribute names should not contain any spaces or punctuation.



Editing/Digitising Data

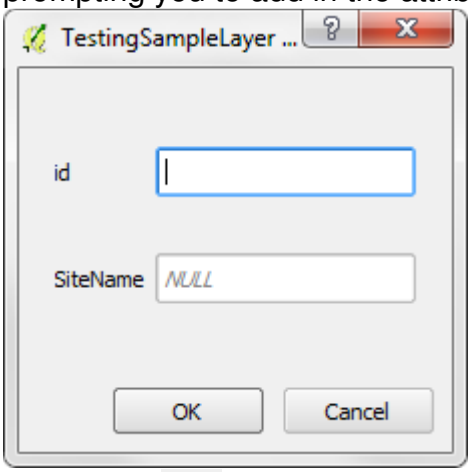
Digitising is the creation or amendment of data records in a layer. Each shape you draw is a record in the attribute table, where you can type in or import attribute information

To turn toolbars on and off right click in the toolbar area and select the check boxes

Toolbars: Digitising and Advanced Digitising

Point creation

Highlight the layer in the layer list you want to edit. Toggle editing (yellow pencil). Once you turn editing on the rest of the editing tools will become active. For the point layer you want to edit and click on the Add Feature button  . (the icon will change dependent on point/line/polygon layer). Click on the map where you want the point. A popup box will appear prompting you to add in the attributes (you can add these now or later).

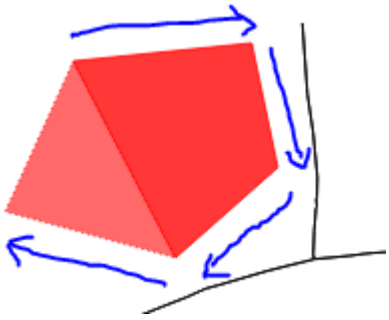


Save edits  and toggle edits off

Freehand Drawing (lines and polygons)

Freehand drawing should only be used when there is no mapped feature to copy or trace from e.g. Allotment plots or location of paths through fields

Highlight the layer in the layer list you want to edit. Toggle editing for the point layer you want to edit and click on the Add Feature button  (you will notice the icon has changed from the point to polygon editing symbol).
To draw the polygon left click once for each corner of the polygon. (once you reach your third click a dark red shape will indicate where your polygon will be and a light red shape shows the path for your next click).
To cancel your previous click press backspace to remove it.
To finish your drawing right click and the attribute popup will appear.



To cancel your drawing right click then click cancel on the attribute popup.

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 Use the Node Tool to add new nodes (double click on a line section) or move existing ones (click and drag)

Add Ring, Add Part, Split, Merge etc are all further tools for manipulation of your data.

Snapping

You can freehand draw but snap to pre-existing nodes e.g. tracing round a building in Mastermap however if you miss some nodes, particularly when the geometry is quite complex (curves) the representation will not be accurate.

To turn snapping on go to Settings > Snapping Options

Trace

The trace tool lets you trace around objects copying the exact geometry as you go. This is useful when drawing a large feature encompassing the geometry of several pre existing features.