USING QGIS

**Basic Notes**



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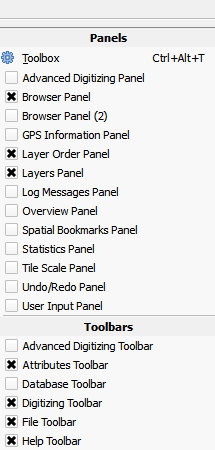
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**MANIPULATING IMAGES ON THE MAP CANVAS**

**Viewing Panels (like the layer control) and Toolbars**

Right-click on open grey area at upper part of the screen, then select the panel or toolbar to display or close

Or/ View > Panels or View > Toolbars

**Map Viewing Tools**

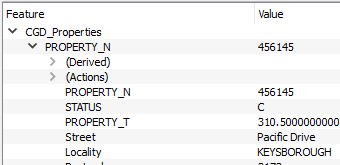
 moves map about

 Zoom in & out, or change scale below 

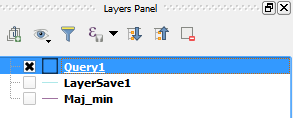
Selecting an area with the  tool expands that area to fill screen

 Zoom to selection and to layer

 Zooms to view the full, uppermost layer in Layers Panel

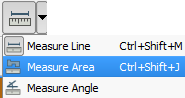
 Allows you to toggle through previous or subsequent zooms

 Click then select an area point, to view the fields and corresponding values in its Attribute Table



**Viewing Attribute Table**

 Brings up the attribute table for the layer selected in the Layers Panel (right)

**Measuring**

Click on measuring icon to measure distance, angle or area.

To measure a line, select ‘measure line’, left-click with mouse on map where you want to commence the measurement, drag mouse, then right-click to end selection of the line.

To measure an area, left-click on map to mark the start point, drag mouse around while holding down left button, left-clicking at each point, then right-click to conclude.

**Co-ordinates, Scale and Magnification**

These are shown at the bottom of the screen.



Co-ordinates represent the position of the mouse pointer over the map. The co-ordinates can be copied.

Type in co-ordinates, scale or rotation, and the map will change to reflect those values

Co-ordinates illustrated here are in degrees.

The sequence of co-ordinates is: X/longitude/easting , Y/latitude/northing

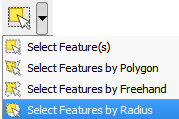
Co-ordinates can be toggled with Extents, which are the latitude, longitude of the lower-left and upper-right of the screen, respectively

**SELECTION *–*** *through the map or its attribute table – the result is the same*

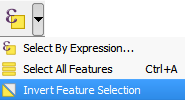
**First, in Layer Frame, activate the layer that you want to select features from**

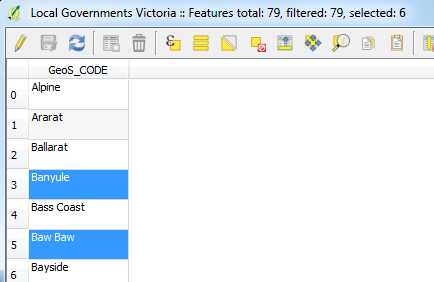
**1. Clicking**

**Selection Tools**

 Allows you to choose to select:

* individual features (hold down Control to select more than one area *or to unselect a single area*),
* by polygon (Right-click to close the polygon),
* by freehand (allows you to carefully select an area within an area),
* and by radius (R-click on map then R-click again to mark centre and start selection

 Allows you to select all features of a layer, invert selection or use expression

**Selection within Attribute Table**

Activate layer in the Layer Panel, click on Attribute Table button , then manually select records or use selection buttons to select by expression (see above), invert selection etc. The map will show the selected areas.

*Selecting or Filtering Data in Form View*

Toggle Attribute Table to Form View (at lower right) 

Click filter  icon

Type criteria into relevant fields, as the basis for seleting or filtering records

(For more, see section ‘Attribute Tables’)

**2. Expressions for selecting / labelling: select subset of a field without changing it.**

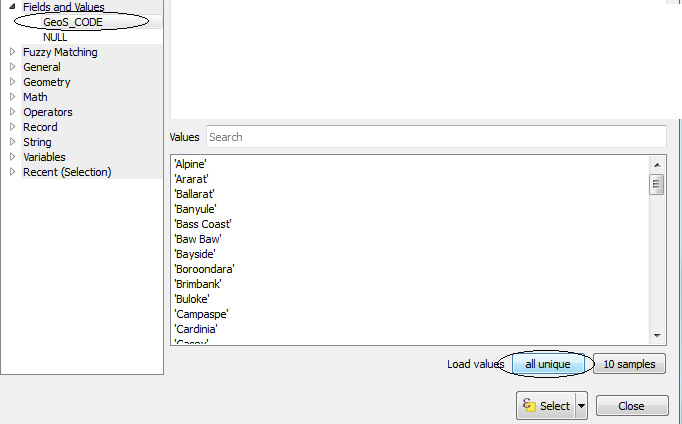
**Calculations, used to create new fields in the Attribute Table, actually do something to the field**

**Select by Expression** – can be performed from map view or Attribute Table

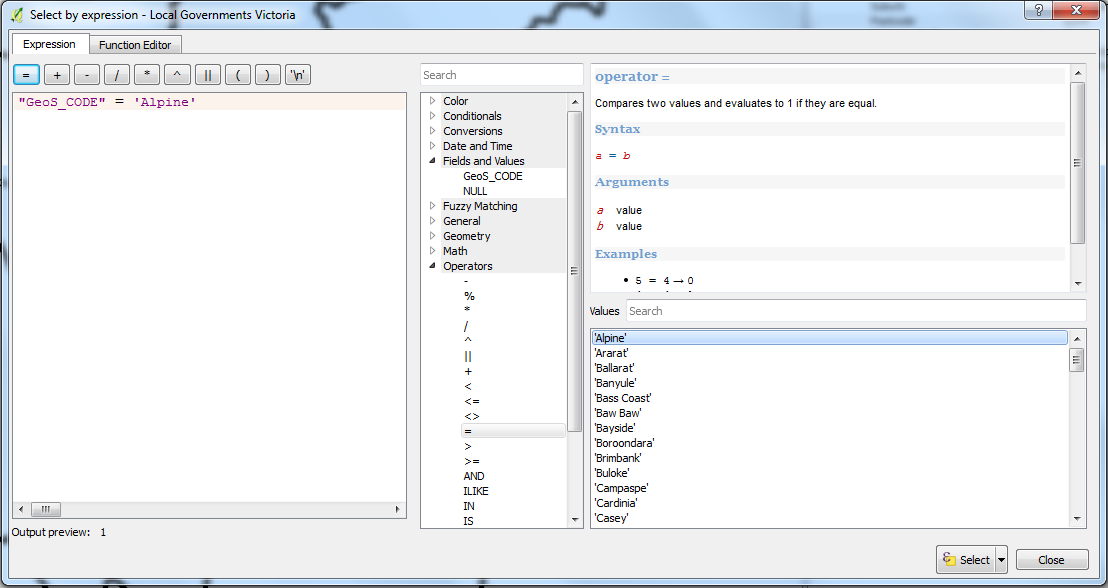
This allows an expression to be formed using:

*Operators*: expressions, such as =, >, <, Like, %, And, Or, Not, In, Toreal, Toint, Tostring

*Fields and Values*: Fields from the layer activated in the Layers Panel

*Values of specific features within a particular field in that layer*: to obtain the values within a field, open ‘Fields and values’ > select field > click on ‘All unique’ button at lower right. This shows the unique values in that field, and allows you to select one of them for inclusion in your expression

**If you cannot find the window for viewing the values in a field, click on the far edge of the window, hold mouse button down and pull to the left to reveal the window**



For example, to select the feature ‘Alpine’, from the Local Governments layer, the expression at right specifies that in the field ‘GeoS\_CODE’ (which contains LGA names) the value must be ‘Alpine’

‘=’ specifies a precise value, ‘LIKE’ coupled with ‘%’ is less specific, ‘IN’ selects multiple values:

"Municipality" = 'Maribrynong' ⇨ selects Maribyrnong

“Municipality” != ‘Moreland’ ⇨ selects everything except Moreland

"Municipality" like '%ong' ⇨ selects G. Dandenong, Geelong, Maribyrnong

"Municipality" like '%and%' ⇨ selects Moreland and G Dandenong

“Municipality” IN ('Alpine', 'Cardinia', 'Casey') - does not work with % operator though

**Field names are case sensitive, so type names or fragments of names into expressions carefully**

‘OR’ ‘AND’ adds statements together

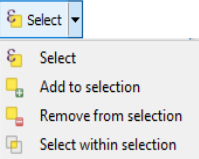
"Municipality" = 'Alpine' OR "Municipality" LIKE '%ong' ⇨ ‘Alpine, Geelong, Maribyrnong…etc

"Municipality" = 'Alpine' AND “School\_Name” LIKE '%Secondary'

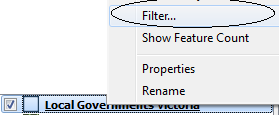
‘NOT’ reverses the effect of ‘LIKE’, ‘IN’ – but not ‘=’

"Municipality" NOT LIKE '%ong' ⇨ all municipalities *except* Geelong, Dandenong etc

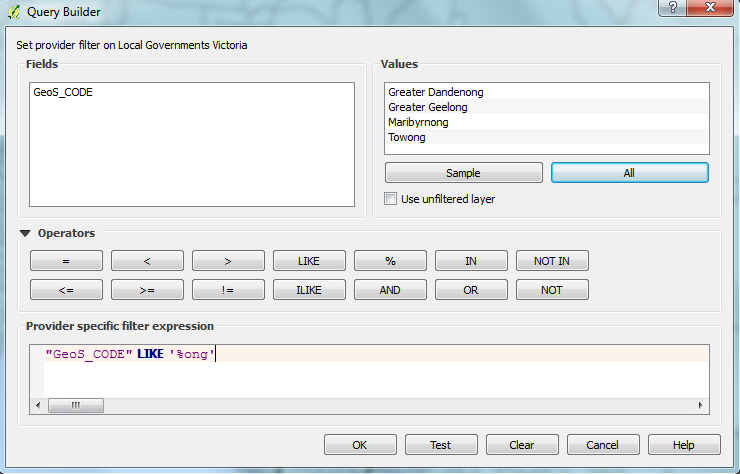
"Municipality" NOT IN ('Alpine', 'Cardinia') ⇨ all municipalities *except* Alpine and Cardinia



Click ‘Select’ at lower right-hand margin of window and choose from options – including adding to or selecting within an existing selection.

**Filter** – **similar to selecting by expression**, except that you have retained all records in your layer, but only filtered them to show a selection.

Right-click layer in Layer Panel > Filter



In window which appears, double click on the field required for the expression, then add operators using rules outlined above.

If you select ‘All’ beneath the upper-right window, it will show all the values in the field, for you to select from. Double-click on one to add to expression

Click ‘Test’ to see if your expression works

OK.

As with selections, you can ‘Save As’ and create a new layer based on the features you have filtered for.

The filtered features will show up in the Attribute Table as well – but they cannot be edited.

Once finished: Select layer in Layers Panel > Filter > Filter window appears >

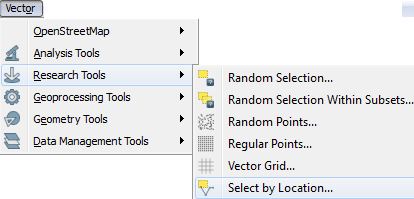
**3. Boundaries**

**Boundary Select**

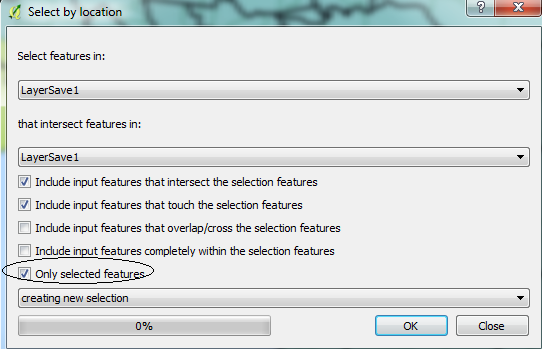
Selecting items (within ‘lower’ layer) encompassed by, or overlapping, the selected boundary of another layer (the ‘upper’ layer).

Eg: Suburbs within Greater Dandenong – selected from a Local Government layer

Activate the upper layer (Local Government, in this case) – which you want to use to select items from ‘lower’ layer (suburbs in this instance) that fall within one of its polygons

Select a single local government – eg: ‘Greater Dandenong’ –the boundary we will select within

Vector > Research tools > Select by location



In dialogue box , under ‘Select features in’ choose the ‘lower’ layer – the suburbs layer – as it is suburbs that you want to select

Under ‘That intersect features in’, select the ‘upper’ layer – that the suburbs would fall within – in this case, local government layer

Check boxes below to describe the overlap you want e.g.: touching, within feature etc.

You can also use this selection as a new selection or add/remove from an existing selection

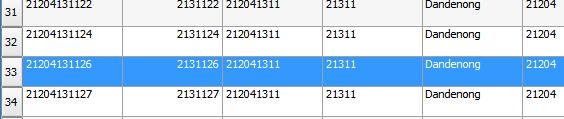
**Check ‘Only selected features’ to ensure that selection only occurs within the selected part of the ‘upper’layer**

OK then Close

**Selections show up in Attribute Table**

Incidentally, you can click on ‘Open Attribute Table’ to view the attributes

- the selected features (rows) will be shaded

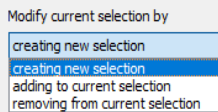


**Save Selection as a New Layer**

To save the selected suburbs as a layer: Activate suburbs layer in Layers Panel > right click > Save as > in dialogue box check ‘save only selected features’ and give the new layer a name and location.

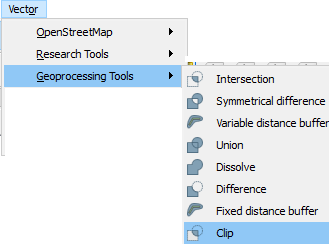
**Unselect**

 Unselects all selected objects on the map

**CLIPPING A LAYER** (to limit its extent to that of another layer)

**Similar to boundary select > save selection**

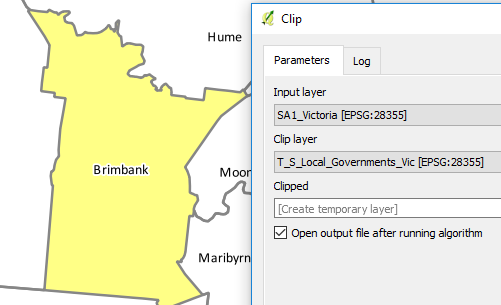
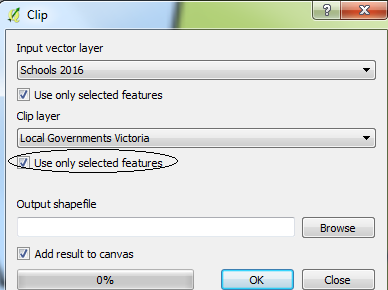
**Eg:** to clip a Suburbs layer to include only those which fall within Brimbank

****

Install both layers in the Layers Frame

Select part of the clip layer (Local Governments, here) to form the boundary of the clip

Vector > Geoprocessing Tools > Clip

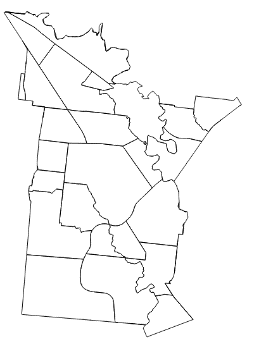
**Select:**

‘Input vector layer’ – the one being clipped

‘Clip layer’ – the one to whose extent the input layer is clipped

Check ‘Use only selected features’ from the clip layer

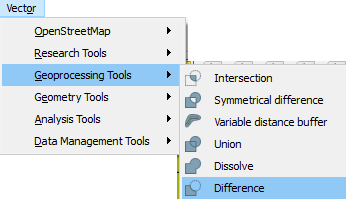
Select location & name of the resulting layer

****The result is a selection of suburbs from the Suburbs Layer, that matches the extent of a single municipality in a layer ‘Local Governments’

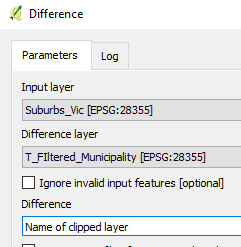
**If you clip a layer – such as SA1 areas – you can then map characteristics of that part of the layer which has been clipped, such as SA1 ares within a municipality**

**Clipping to remove that part of an area which is encompassed by another layer**

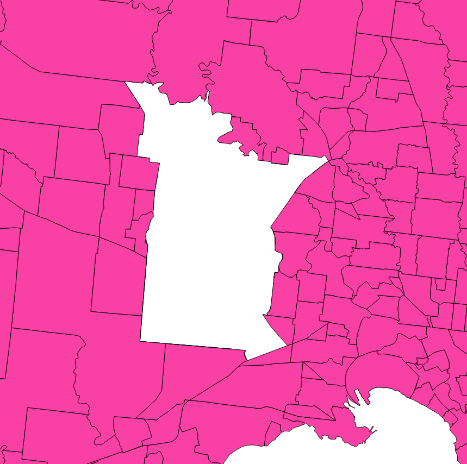
Eg: to clip a Suburbs layer to remove suburbs which fall within Brimbank

****

Vector > Geoprocessing Tools > Difference



Select ‘Input layer’ – to be clipped, and ‘Difference layer’ whose extent will determine which features of the input layer are to be removed

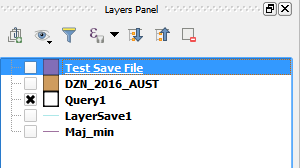


The resulting ‘difference’ layer, shows a gap where suburbs that fell within the area of a single municipality, have been removed

So you can select features of a map to create another by:

* Selecting > Save as
* Filtering on the Map Canvas >Save as
* Clipping
* Select > Control\_C > Paste into an editable Shapefile layer of compatible type (points/polygons) – this does not retain the attributes of the file being copied though

**LAYER CONTROL**

****

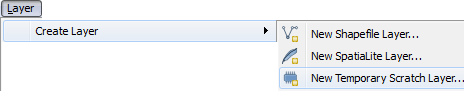
**Layers Panel**

Situated at lower left of screen

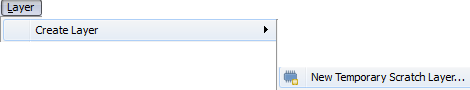
To close, click cross at upper right-hand side of the Panel

If you add a layer (Layer > Add Layer > Add Vector Layer) it will appear in the Layers Panel

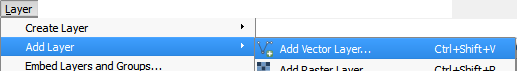
* Select and drag a layer to raise or lower it.
* Click on box next to layer to hide or show a layer on the map
* Double-click on the layer name to bring up the Layer Properties window to change its appearance

**Create a Layer**

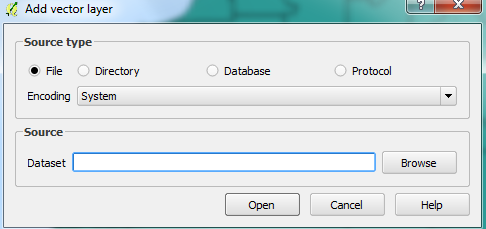
Scratch Layer – for drawing only, and with no Attributes, but *can* be saved

(whereas a new Shapefile layer has to *be* saved)

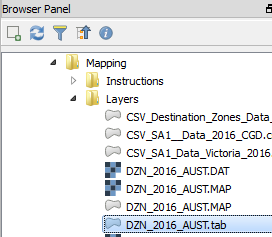
New Shapefile layers – include dots, lines and polygons (see later section)

**Add Layer**

Layer > Add layer > Vector Layer



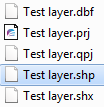
Then select the layer required from your files.



**OR/**

Double-click on a file in the Browser Panel

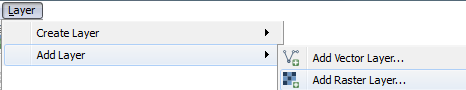
To open an old Mapinfo table, select the version called ‘MapInfo Table’ with suffix ‘.tab’



To open a file created by CGIS, select the one with the suffix ‘.shp’

Aerial Layer

Located at T:/GIS/Photo/Photo Dec 2017/Mosaic/greater-dandenong\_2017dec11-air\_vis\_10cm\_mga55.ecw

To open: Layers > Add Vector Layer > Add Rasta Layer

**Duplicate Layer**

Select layer in Layer Panel > Layer > Duplicate layer

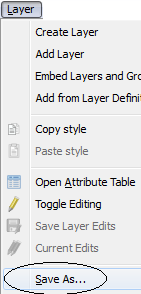
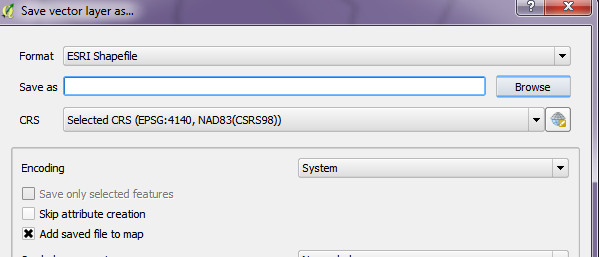
**Remove Layer**

Layer > Remove Layer

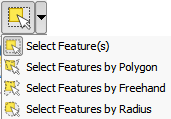
**Save a Layer**

Select layer in Layers Panel

Layer > Save as > then give a name (no spaces) and select a location for the new file

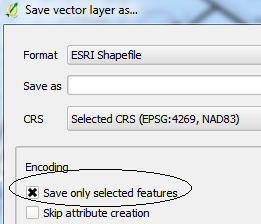


You may also decide whether or not to add the saved file to the map

****

**Creating and Saving a Subset of a Layer**

Activate the layer in Layers Panel, then select a part of the layer



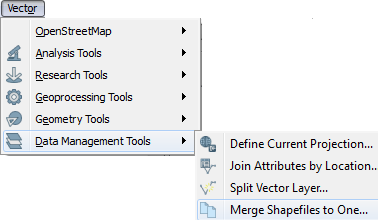
Layer > Save As.

Tick ‘Save only selected features’

Type name and select location for the new layer file

You may also tick ‘Add saved file to map’ to add the new layer to

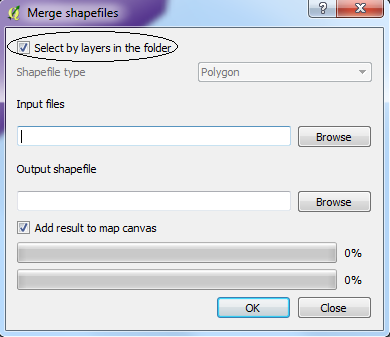
your map layers in the Layers Panel.



**Merging Layers**

Vector > Data Management Tools > Merge Shapefiles to One

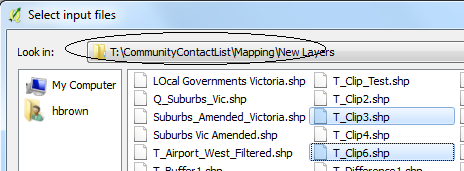
The layers must have same geometry type: point, line or polygon

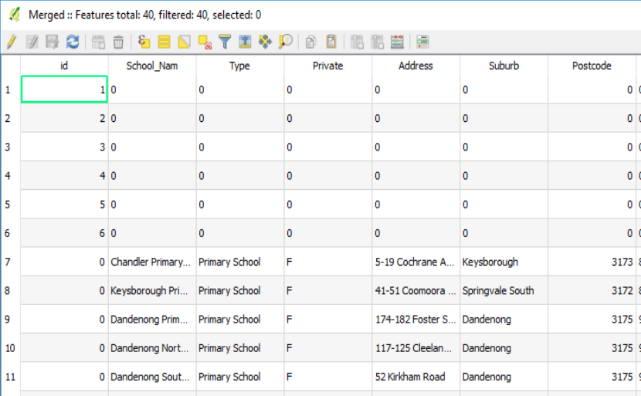


Check ‘Select by layers in the folder’ **(Layer panel)**

Select layers to merge (input files) as well as a

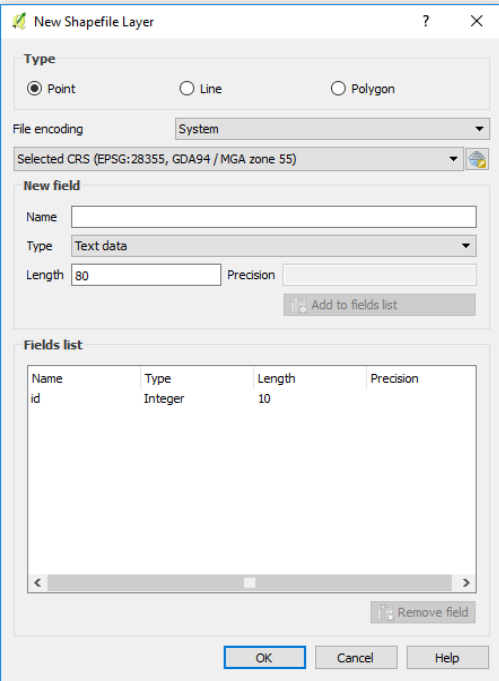
name and location for the new, merged, file





The resulting file now contains fields and values from the two separate files, as the Attribute Table at right illustrates

In this instance, the field ‘id’ from a group of dots is combined with attributes from a file of local schools.

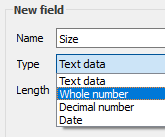
**CREATING A LAYER OF POINTS**

Layer > Create Layer > New Shapefile Layer

In window, select ‘Point’

In ‘Fields List’, a single attribute (or field) called ‘id” appears

You may add or remove fields, giving each a name, length and type (below)



You may remove any field too, including the default ‘id’field created by the computer

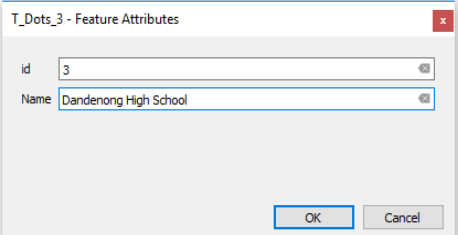
OK > select name and file location for this new layer - which we will call the ‘dot layer’

The ‘dot layer’ will appear in the Layers Frame

Open another layer to serve as a point of reference for placing the dots in the ‘dot layer’

Activate the ‘dot layer’ > click ‘Edit’ button  > Click ‘Add feature’ ****

Click mouse in location where you wish to place a dot



In window which appears, type information into the fields you added when you created the ‘dot layer’

When you’re finished, change appearance in Layer Properties window, if necessary.

When done, Layer > Save as, or untick edit button , and you will be prompted to save

**Adding further Dots Later**

At any time, you can open the layer, then:

* Click ‘Edit’ **,** click add new features **** along with the attributes of each.
* Open the Attribute Table for this layer, make it editable and add or amend its attributes

**Editing Attributes of each Dot**

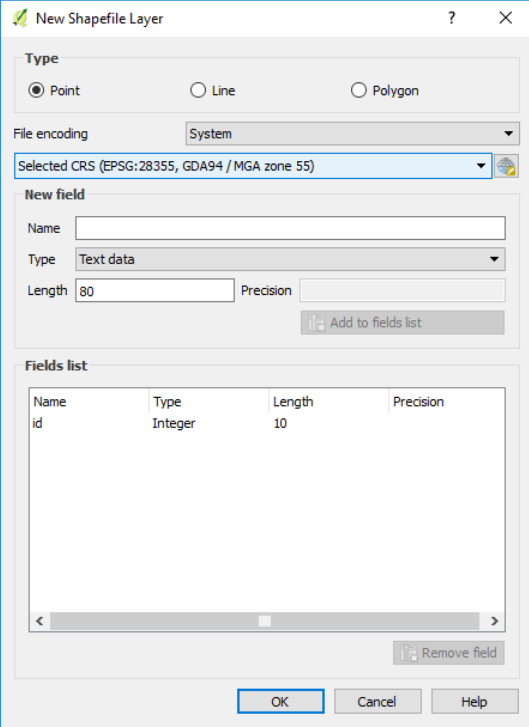
Activate dot layer in Layers Panel > Open Attribute Table >make editable > amend data in shaded row (representing a selected dot) or in other rows

**CREATING A LAYER OF POLYGONS, CIRCLES OR LINES**

Eg: for highlighting a study area or area within a certain radius

**Creating Layer**

Layer > Create layer > New Shapefile layer 



Select ‘Polygon’ or ‘Line’

Give this new ‘polygon layer’ a name and location

In window, add new attributes, or remove default ‘id’, if required – as per previous page > OK

**Drawing Your Shapes**

Click edit button  to start adding circles, lines, polygons

*Polygon or Line*: Click Add Feature button ****and draw a polygon onto the map layer, then right-click to finish

*Move the drawing*: Click ‘Move feature’ button **,** select feature and move it

****

*Adjust drawing*: Select ‘Check Node Tool’, **** > select node (it’ll turn blue) **:**

* Then hold left mouse down and drag the node to a new position or/
* Click ‘Delete’ to remove

*Add new node*: double-click on perimeter of the polygon or line to create a new node

**Changing Appearance of Dots, Lines or Polygons**

Activate and double-click layer in Layers Frame > change colour, outline etc. in Layer Properties window

**Deleting Dots, Lines or Polygons**

Make layer editable  > Select object > Delete

**Copying and Pasting Dots, Lines or Polygons into a New Layer**

Select some dots/polygons from current active layer > Control\_C

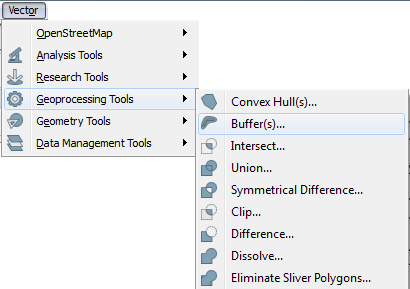
Now, to paste the items: *In existing layer*: make editable  > Control\_V

*Into new layer*: Edit > Paste features as > New vector layer

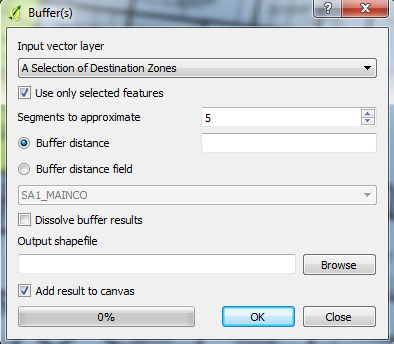
**CREATING BUFFER LAYERS FOR POINTS OR POLYGONS**

Activate layer to be buffered

Select polygon/s or dot/s to be buffered – unless you want the buffer may be added to all of them

****

Vector > Geoprocessing Tools > Buffer



Select layer for buffer

Note ‘Use only selected features’ is ticked

Add buffer distance (which is in meters)

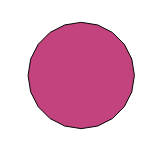
Click ‘Browse’ to give a name and location to this new layer

With this buffer superimposed, objects in a layer within the buffer area could later be selected, and characterised as features (towns, houses etc) that lie within x meters (whatever the buffer radius was) of the area that was buffered.

**Drawing a Circular Buffer** – as a substitute for a circle of exact radius around a point of interest

Layer > Create Layer > New shapefile layer > check ‘Points’ as type > Save

Place a point on this new layer, with a map visible beneath, to guide its placement

Activate the new layer in the Layers Frame, select the point, then create a buffer around the point, giving the buffer distance as the radius of the area you wish to highlight.

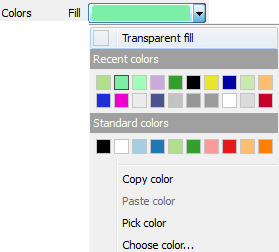
Once the new buffer layer is done and saved, change its appearance to remove fill from the buffered area

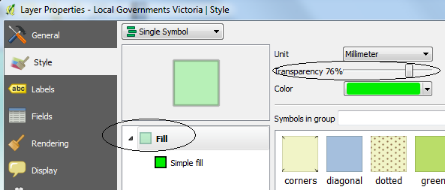
Open the buffer layer above the map layer where you wanted to highlight an area around the point of interest.

**LAYER PROPERTIES**

Double-click on layer in the Layers Panel or/ select layer > R-click > Properties

A dialogue window appears, allowing you to:

****

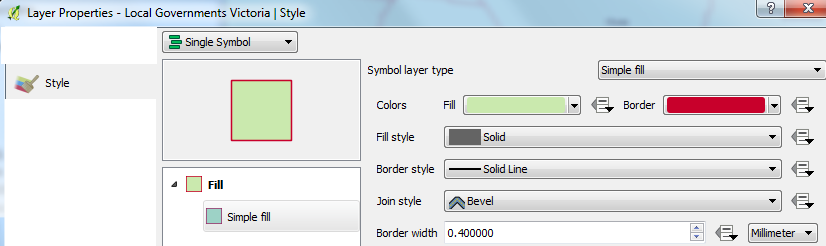


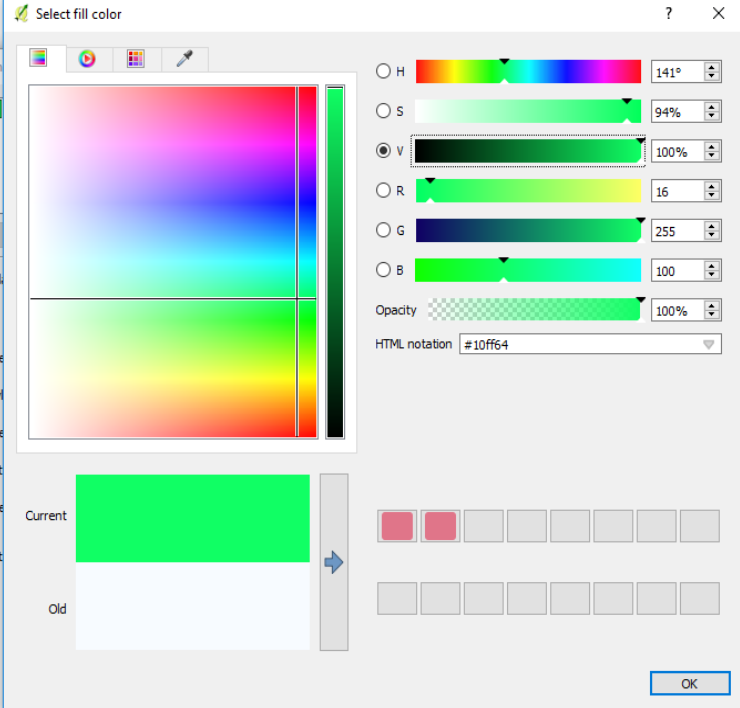
**Set fill, border and point style** Change

transparency

of fill

Area includes fill, fill style (solid, brush – nothing, patterns), border style, width and colour



For transparent layer: Colours > transparent fill **or/** Fill Style > no brush

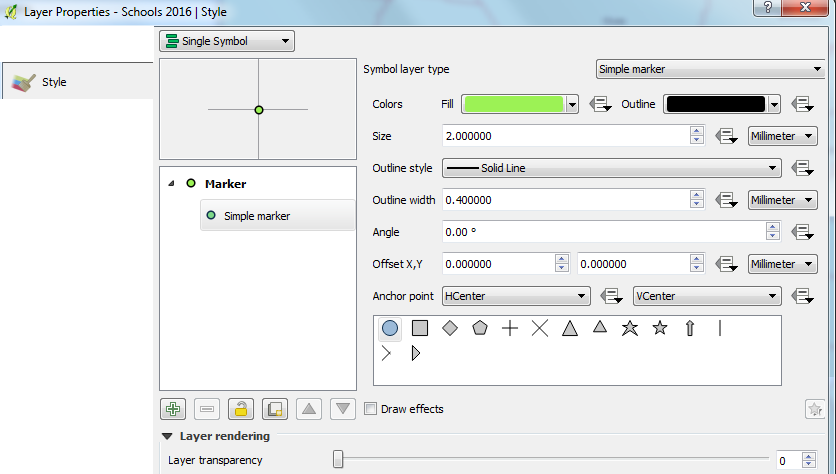
**For adjustment of colour of fill or outline**

Slider ‘V’ – brightness/darkness

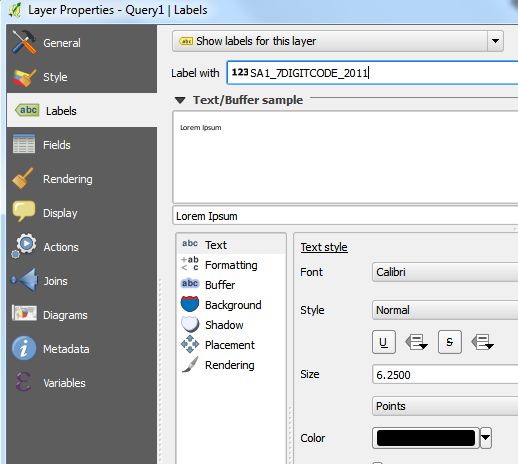
Vertical bar – colour saturation

Horizontal bar – colour selection

Points – include colour, outline colour, style, width, shape **(scroll down to view selection of shapes)**

****

Adjust transparency of whole layer

**Set label style** – including:

**Text tab:**

Whether to show labels for the layer,

Label with: What field to use for the labels

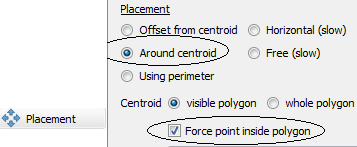
Text Style: font, style, size, colour, transparency

**Buffer tab**:

Addition of a buffer area highlights text against dark backgrounds . Size 0.5 is satisfactory.



**Placement tab**:

*For polygons:* Placement tab > ‘Around centroid’/‘Offset from centroid‘

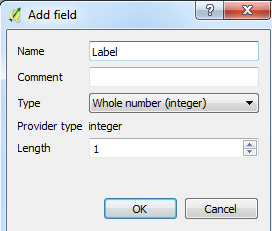
Force point inside polygon - to set labels neatly near the centre of polygons.

*For points:* Choose from ‘Offset from point’ & ‘Around point’



**Labelling Selected Features by Expression**

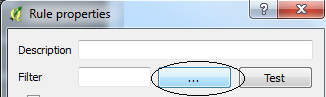
❶ Select features of layer > Save as > check ‘Save only selected features’ > Add labels to this new layer

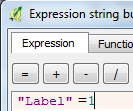
Place this new, labelled layer, above the layer from which it was derived **OR/**

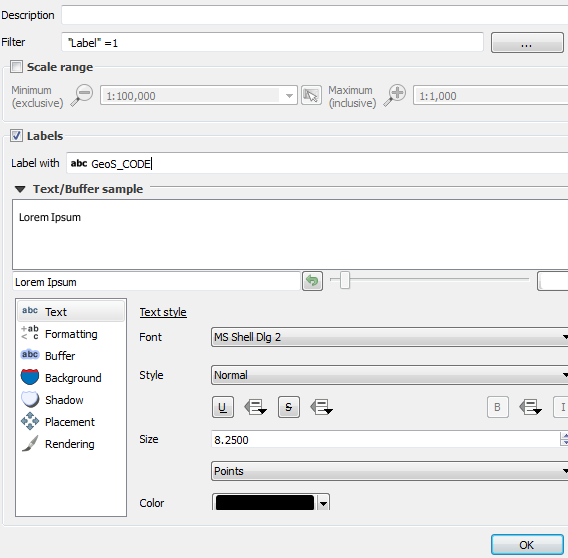
❷ Activate map layer > Open Attribute Table > make editable  > create new field 

Name new field as ‘Label’ and set as ‘Whole number (integer)’

Assign the value ‘1’ to features that you wish to label

In Layer Properties window, ‘Label’ tab:

* Select ‘Rule-based labelling’
* Click on the  symbol at lower window
* In window which appears, click  button, next to ‘Filter’
* In expression builder window, create expression “Label” = 1

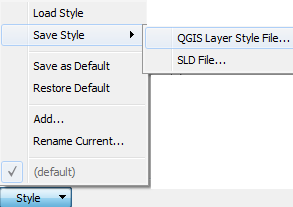


Select field labelling and other characteristics of the labels, as above > OK

Return to Layer Properties window > Apply > OK

❸ Select ‘Rule-based labelling’ > Create expression such as: “Municipality” In (‘Ararat’, ‘Buloke’, ‘Casey’ etc)

Choose field for labels & label characteristics

****

**Saving and Applying Styles**

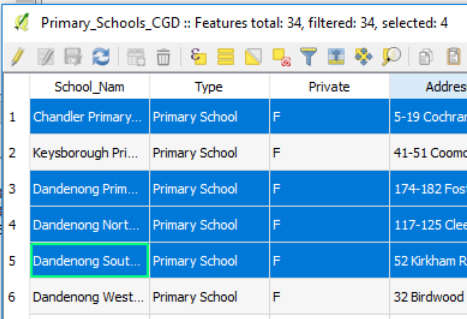
*Save a Style*

Style > Save Style > QGIS Layer Style File > set its name & location

*Apply a Style*

Style > Load Style > Locate style file of type ‘QGIS Layer Settings’ in folder where it was stored > Double-click on the file – you will be returned to ‘Properties window’ > Apply > OK

But, loaded style must be of the same geometry type (dots/polygons) as the shapefile you are formatting.

**ATTRIBUTE TABLES** (browsers)

**Opening an Attribute Table**

Or/ Click on  at top of screen

**Selecting Rows (or features) from the Table**

Click on far left of the table, to select a row

Hold own Control to select unconnected rows

Hold down Shift to select a continuous group of rows

**Selecting Using Buttons**

 - Select all fields Invert selection Moves selected rows to the top of the table

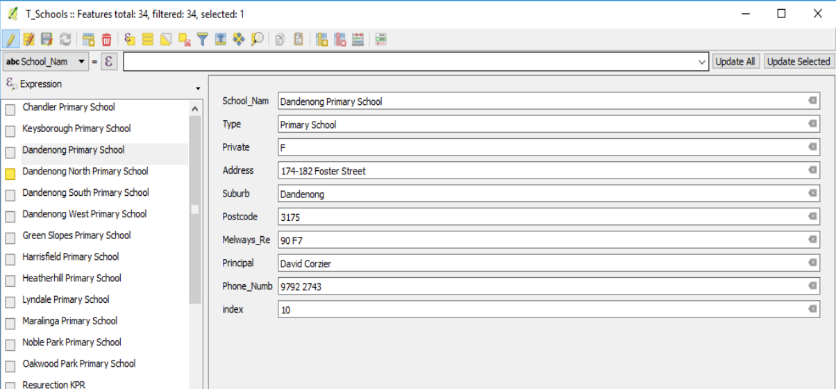


 - Deselect all Selection of rows by creating an expression

When you select a row in the Attribute Table, the corresponding feature on the map is selected. Inversely, if you select item/s in a map, the corresponding row of the Attribute Table is highlighted.

Just as you can select features of a map, then save them as another map layer, you can select rows of a map layer in its Attribute Table, then save them as another map layer.

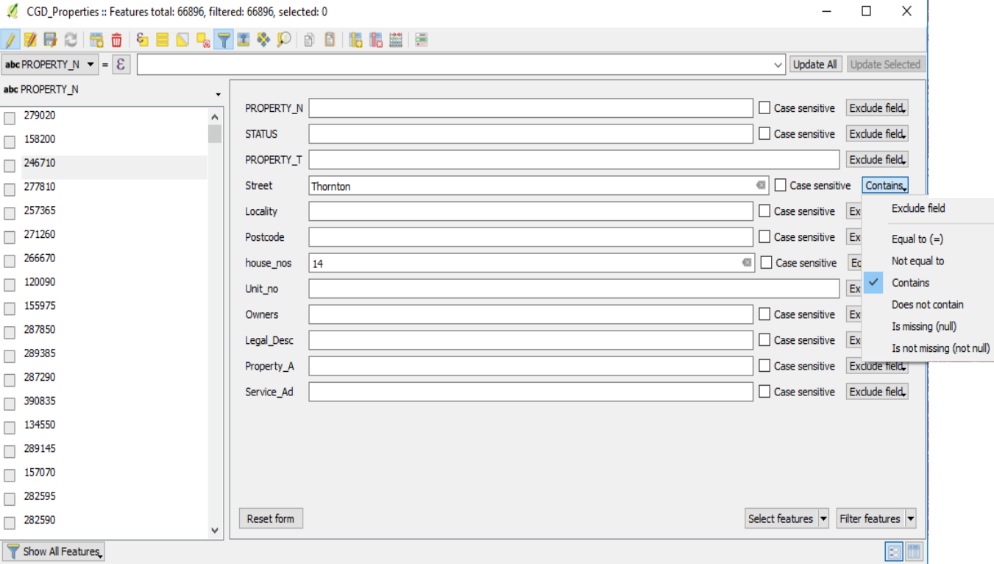
**Editing Data in Form View**

In Attribute Table > make editable  > toggle buttons in lower right corner  > then toggle filter button  to reach Form View edit (vs. Form View filter)

Select a feature at left, then complete or edit its fields in the form at right.

**Filtering/Selecting Data in Form View**

Toggle Attribute Table to Form View (at lower right) 

Toggle filter  icon to reach Form View filter/select (vs. Form View edit, above)

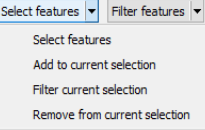
Type criteria into relevant fields, as the basis for filtering/selecting records

Each row **adds** a criterion to the selection, like ‘AND’ in an expression.

At right of each field, choose whether to filter for values in that field which are equal, not equal, contain or do not contain that value. For real & integer variables, =, >, <, ‘between’ are offered as options.



At lower right of window, choose to select or filter for these attributes



**Or**/ To filter for selected features, chose  at lower left of window.

To view selected features on map, goto Map Canvas > click  button to centre map on the selection

**Creating a Dot Layer to Depict a Selection of Addresses**

Three steps: Select a single address with Attribute Table Form View filter or Select by expression

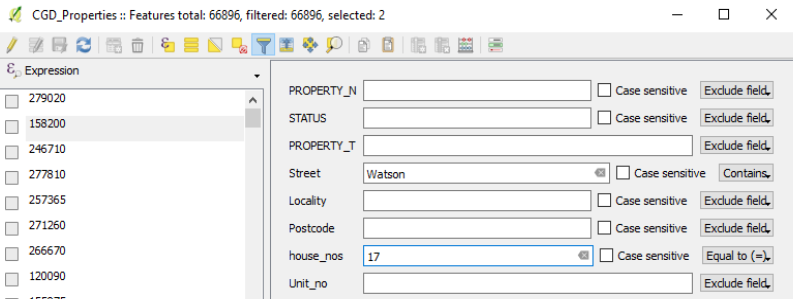
‘Zoom to selected features’ , in Map Canvas

Attach dot to the selected location

❶ Activate PropertyNo Layer > open Attribute Table > make table editable

Put Attribute Table in Form View filter – as described above

Type in street name and number in relevant fields [**try to be precise, even with streets**, so that you can select the option ‘equals’, rather than ‘Contains’ – which often selects a number of features (rows), making it hard for the computer to zoom in on a specific feature]





Click at lower right edge of window

Minimise Attribute Table

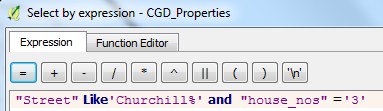
Return to Map Canvas > click ‘Zoom to selected features’ button  to view selected feature

**Make sure property layer is active**

Activate dot layer > place dot on selected property > type attributes into fields

When finished, click ‘Unselect all’  button and **re-activate property layer**, to repeat the process.

❷ In Map Canvas, Activate PropertyNo Layer > click ‘Select by expression’ button 



Type in an expression which selects the street name and street number. **Street names etc. are case-sensitive in Expression builder**

Sometimes an expression such as:

"Street" like 'Wattle%' and "house\_nos**" like '2%'** and "Unit\_no" **like '7%'**

Works better than an expression which is more specific, such as:

"Street" like 'Wattle%' and "house\_nos" **= 2** and "Unit\_no" **=7**

Then click  ‘button at lower right of Expression Builder window **(Don’t close Expression Buider)**

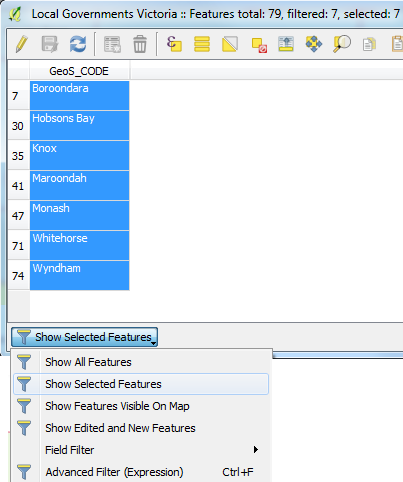
****

Click ‘Zoom to selected features’  button

Activate your editable dot layer and place dot on the highlighted yellow property.



When finished, click ‘Unselect all’ ,, **activate property layer** and return to Expression Builder, to repeat the process.

**Filtering Data in an Attribute Table**

**[Doesn’t affect map. It’s only about viewing data in the table]**

At lower left-hand edge of the Attribute Table is a filter icon

Clicking on the filter icon allows you to choose whether to view all rows or ‘features’ in a layer, just selected or visible rows, or use an expression to select rows.

The filtered rows can be copied and pasted into Excel

Closing the Attribute Table restores the full list.

**Sorting data in an Attribute Table**

Open the Attribute Table

Click on the field you need to sort by  and the data rows will be sorted in ascending or descending order of that variable

**Editing an Attribute Table – beware: changes you make here are permanent**

Select a layer in Layers Panel > open Attribute Table

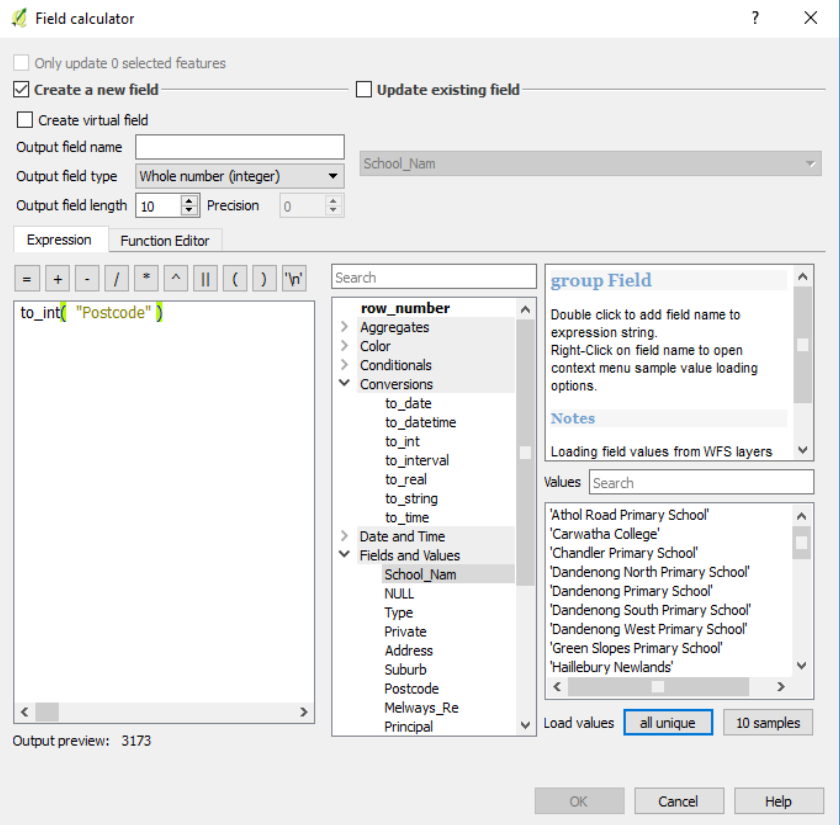
Click on the pencil icon at left  to make the table editable – as with making maps editable

*Alter the data*: double-click on a cell to edit its contents

*Add a field*: Click on the 'Add new field' icon at far right  to add a new field. Name it, select its data type & add data – **one row at a time**

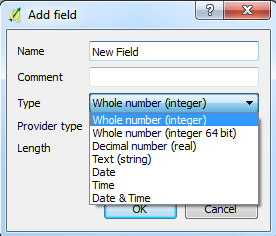
*Calculate a new field*: Unlike expressions, these actually do something to a field

Click on the ‘Calculate field’ button **** then….

\* Name the field and create an expression based on values of the fields and operators

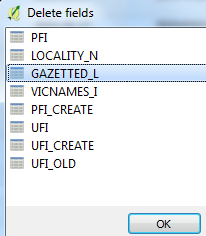
Eg: to\_real(“Field”), “Field” \* 100 etc

\* Select ‘Output field type: whole number, decimal number, text etc.)



\* Select ‘Output field length’ and ‘Precision’ – number of digits after the decimal point



**

For more complicated expressions:

CASE

WHEN "cat" > 100 THEN 2

WHEN "cat" > 10 THEN 1

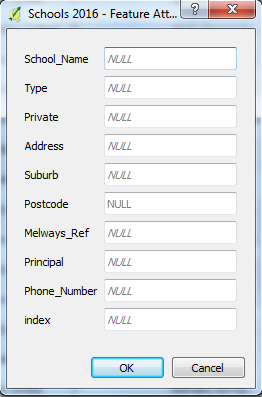
ELSE 0

END

*Delete a field*: click  then select field

*Or replace numbers with words, eg: ‘High’, ‘Low’*

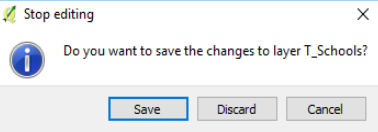
**Fields have quotation marks “, & categories a single ‘**

*Add a row of data (a feature):* click ‘add feature’ icon  & fill in values for each field of the new row

(illustration, left)

*Delete a row of data*: select row at left, then click on ‘delete feature’ icon 

When finished, click on pencil  to conclude editing, then indicate whether to save or discard changes.



**Pasting Data from an Attribute Table into Excel**

Activate a layer in the Layers Panel > open Attribute Table > select rows > Control\_C > paste into Excel

**Or/** Select part of a layer in Map Canvas or Att Table > filter for selected features > copy > paste into Excel

**Pasting Selected SA1 Areas into Excel – for a profile**

Select SA1 areas on the Map Canvas > in Attribute Table, filter for selected features (rows) > copy > paste into Excel and select values in the 7-digit SA1 column

**JOINING EXCEL DATA TO A MAP LAYER – to make it mappable**

Save the Excel data file as a CSV file (Excel file should have field names <10 characters)

**Assign Properties to Fields your CSV File – to ensure it can be mapped**

Open notepad, and specify the field types in the CSV file, in one line, each in quotation marks and separated by commas *e.g.: For a CSVT notepad file to accompany a CSV file with fields: 7-digit code, Population, Per cent Vietnamese -“String”, "Integer", "Real”*

You can specify width & precision of each column e.g.: "Integer(6)","Real(5.5)","String(22)"

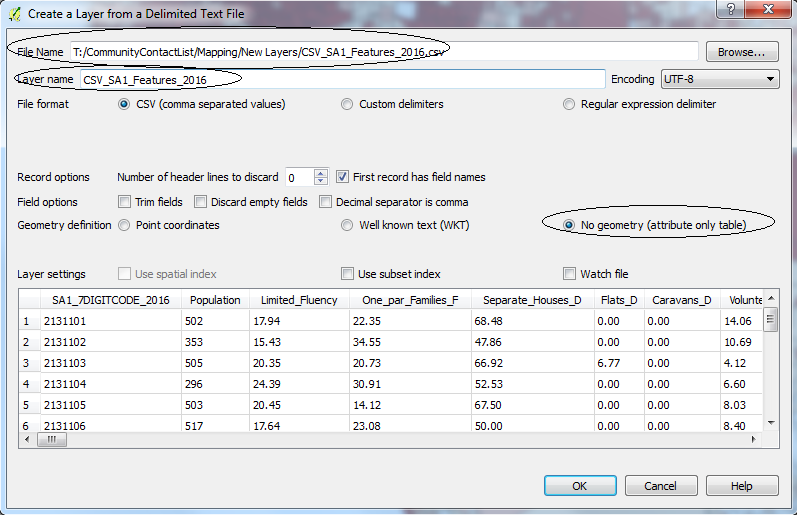
Save this with same name as the CSV file, and in the same folder, but with the suffix .CSVT

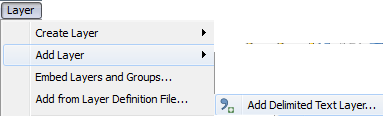
ie: Change file name suffix from .txt to .csvt

When you merge the CSV file with a map file, in QGIS, the field characteristics of the data from the CSV file will be as you specified in this CSVT file, enabling fields with numbers to be treated as numbers.

**To retain these instructions about** **file type,** **CSV file must be imported into QGIS via: Layers > Add layer >Add Delimited Text file layer**

**Import the CSV File into QGIS** (the CSVT file, with its instructions, will come too)

Layers >Add layer > Add delimited text layer

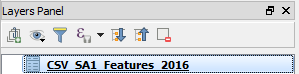


In the window which opens, browse to select the CSV data file

Change layer name if you wish

For ‘File format’, check ‘CSV’ (default)

For Geometry Definition, select ‘No geometry (attribute only file)’

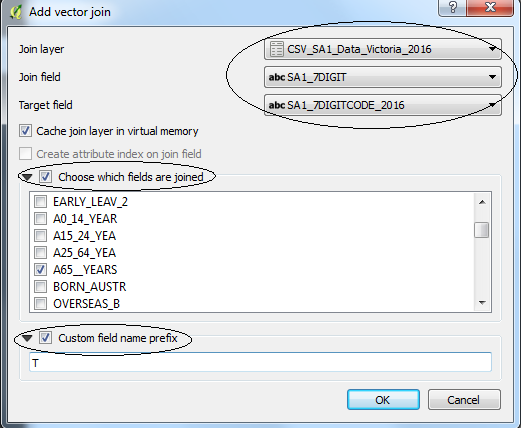
The file will now appear in the Layers Panel, with an icon

Double-click on the map layer you wish to connect the data table to.



In the Layer Properties window, select ‘Joins’

**If a layer appears at the top of the window, select it and click  to remove it (You can’t join fields from a CSV layer which already has fields joined to the map layer)**

Click on the **** button at the lower left-hand side of the window

In the window, select the:

* Join layer (the data table you have saved as CSV and opened as a ‘No geometry’ file)
* Join field (the field in the join (CSV) layer that you want to link to the map layer)
* Target field (the field in the selected map layer to be matched to the join field in the CSV file)

**Target & join fields should be the same case – eg for suburbs**

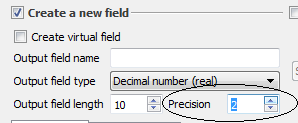
* Choose which fields from the join layer (CSV) will be joined to the target field (a map layer) - optional
* Choose a customised field name prefix (this will be appended to the original CSV field names in your map file –

**Keep it short or blank, otherwise the full name of file will be used**)

**Converting Values in the Combined Map and CSV Layer to Numbers** – for mapping attributes (If the step above has not been taken)

When a CSV file is connected to a map layer, its values in some fields may not be recognised as numbers and may therefore be impossible to map as ‘Graduated’ data – that is, as ranges of values, each assigned a different colour

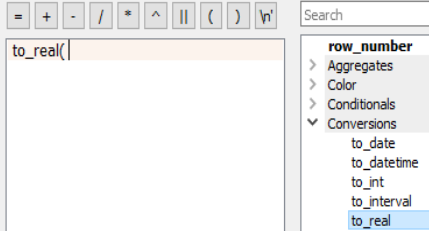
Activate layer in Layers Panel > Open Attribute Table > click  to make editable

Click ‘Calculate attribute field’  button

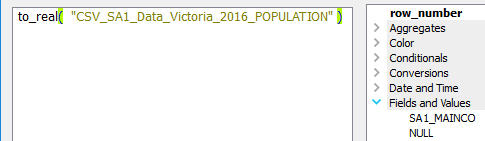
Type new field name

Select field type - ‘Whole number’ or ‘Decimal number

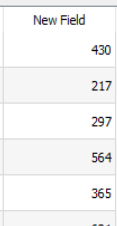
For decimals, under ‘Precision’ sets the required number of values after the decimal point



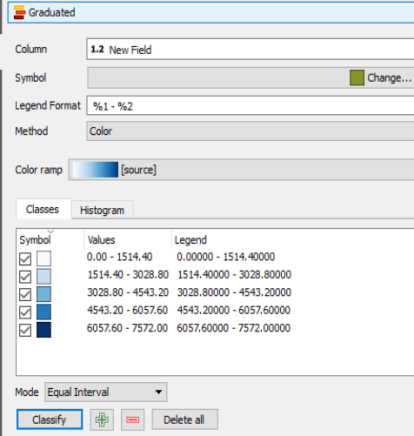
Under ‘Conversions’ select the operation ‘to\_real’ or ‘to\_int’



Under ‘Fields and Values’ select the field to be converted to numbers > OK



…and now the new field will appear in the Attribute Table.



This new field may now be mapped as a ‘Graduated’ field’.

**Joined Fields are Temporary, Unless the Map Layer is Saved under another Name**

To preserve the map layer with joined fields added to it: Layer > Save as

Otherwise, layers added through joining fields are temporary and will disappear when you either:

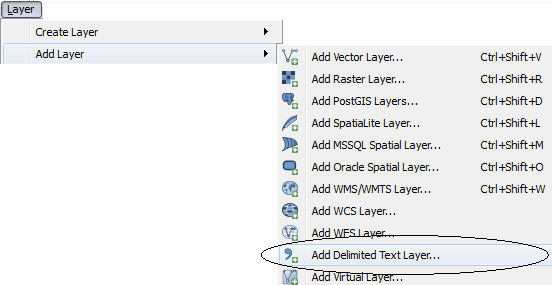
* Close the CSV layer which provided the fields
* Remove the join, shown here  in the Join Field window, by selecting it and clicking the delete  button

**IMPORTING TABLE OF DATA WITH LAT & LONG CO-ORDINATES**

Open QGIS

Click on comma symbol  (create layer from comma-delimited text file)

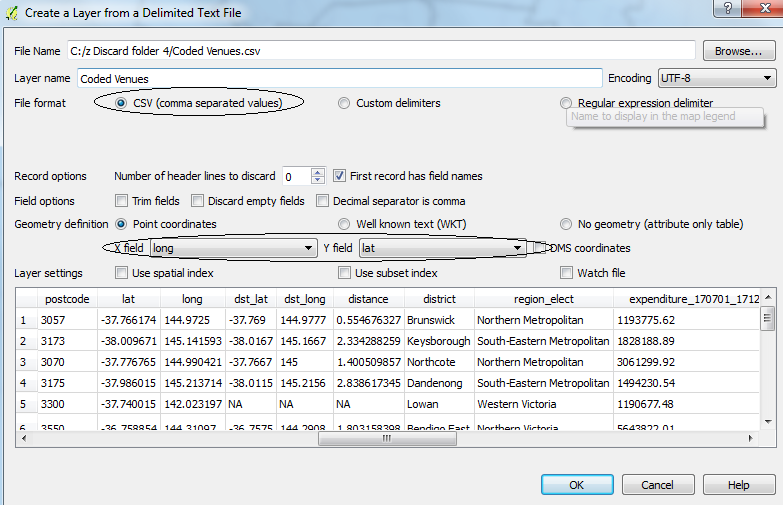
Or/



Browse to locate required CSV file

In dialogue box which opens:

* File format: click ‘CSV
* For x field: choose ‘Long’
* For y field: choose ‘Lat’



OK

**MAPPING ATTRIBUTE FIELDS**

**Mapping Points** – that is, giving them colours, based upon their values

Double-click on the layer > click on ‘Style’ tab in the ‘Layer Properties’ window

Then select:

\*‘Categorized’ (If you want dots coloured differently for each nominal category)

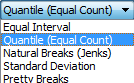
\*‘Graduated’ (If you want dots coloured by numerical ranges)

Click ‘Column’ to select the field which forms the basis for colouring the dots

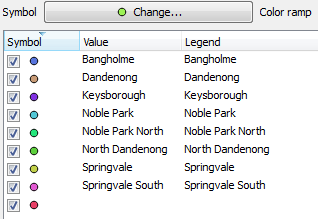
In ‘Colour Ramp’ select a colour scheme, if you wish



If ‘Categorised’: just click the ‘Classify’ button at the lower part of the window



If ‘Graduated’: first select whether ‘Quintile’, ‘Equal interval’,’ Natural break’



The dot colours and values within your chosen field that each represents, will appear in the window

⯏ To hide particular categories in the map, uncheck the box at left  or delete: click  or



⯏ To change appearance of a *single* dot, double click on it in the Layer Properties panel and make adjustments in the window (right)

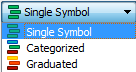
⯏ To change appearance of *all* dots, click  to adjust their shape/size/outline



Set layer transparency level, at lower part of screen

Once complete, click ‘Apply’ and ‘OK’

Save the map, if required

*To revert to a single symbol for dots on the layer*: Double-click layer in Layers Panel > select ‘Single symbol’

**Mapping Shapes -** as for instance, SA1 areas by characteristics of its population

**Once file is ready, save it first, as you cannot ‘Save as’ after you have prepared a map**

Double-click layer in Layer Frame > select ‘Style’ tab in Layer Properties window

Select ‘Graduated’ at top of window

Column: select the field whose values you wish to map

Symbol: Click  & ensure that ‘Simple fill’ ⇨ fill style ‘Solid’ **(and not ‘no brush’)**

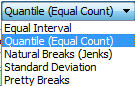


Colour ramp: select the palette

(Use ramps of similar colours: Blues, Greens, Greys, OrRd, Purples, Reds, YlGn, YlGnBu)

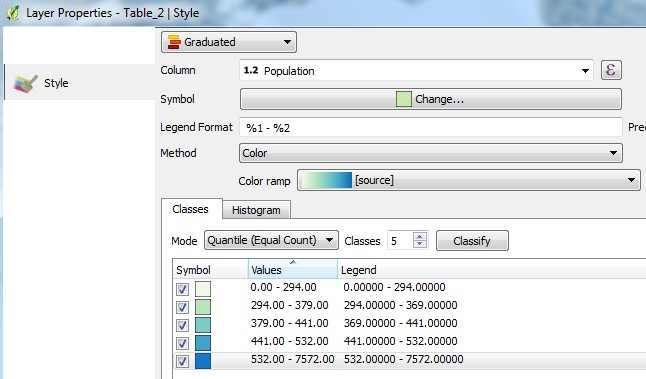


Number of classes: select number of categories for your data to be grouped by



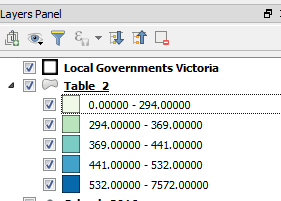
Mode: select method for grouping data: Equal interval, Quantile or

‘Natural breaks’ (where zeros account for more than a fifth of the values - otherwise 2-3 quintiles may be zeros), then click ‘Classify’ [[1]](#footnote-1)

The symbols (colours) and value ranges will appear in lower window (click ‘Classify, if necessary)

Double click on values if you wish to alter the ranges – which will alter adjacent ranges as the system seeks to include all possible values within the range of the field

Click on ‘Precision’ ****next to ‘Legend Format’ to adjust no of decimal places in legend

Adjust Layer transparency in lower part of window

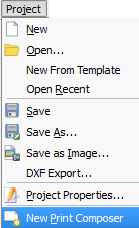
****Apply > OK

Now the colours for each value range will be shown with that layer in the Layers Panel

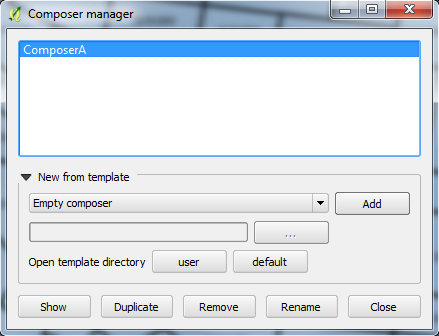
To change or replace the map, activate and open the layer and repeat the process described above.

**Removing a Map**

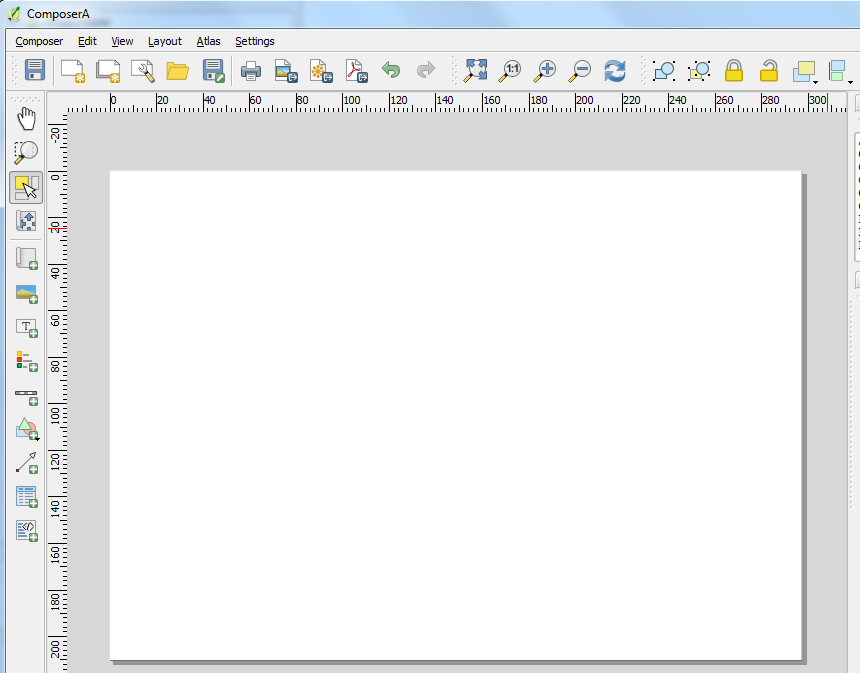
Select ‘Style’ tab in Layer Properties window > ‘ and choose shape & colour

**PRINT COMPOSER**

New composer: Project > New Print Composer



Existing composer: Project > Composer Manager > select composer required from dialogue box > click ‘Show’



Either way, the Composer window opens:

**Resizing Print Composer**

Click on magnifier icons  to change size of composition area on the screen.

Click on  for a good fit for your map or on  at lower edge of screen for a precise adjustment

**Adding a Map**

To add the map: click on icon  then draw a rectangle in the Composer and an image of the current map appears



**Moving the Map/other Features**

To move the map frame or any other map feature, click on .

Then click inside the map, hold the left mouse key down and move it around.

To expand the map, click on edge of the map, hold left key down and drag.

**Moving Contents of Map**

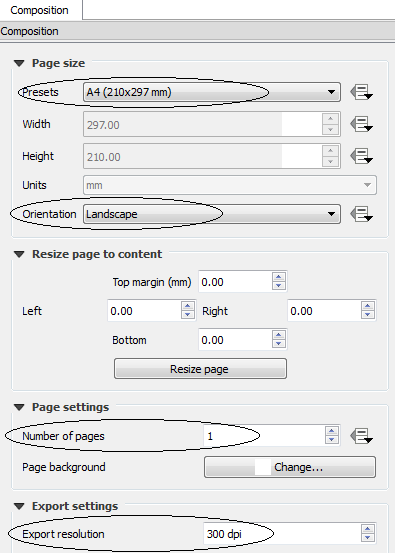
Click on  to move the contents of the map without moving or altering its frame

**Adjusting Size of Map**

Click ‘Set canvas to map extent’ in Map ‘Item Properties’ window, to adjust map to its size in Canvas



**Adjusting Content of the Map** – updates Composer to match changes in Map Canvas – not size**.**

**Map window characteristics**

Get picture right on Map Canvas first

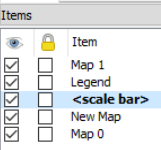
*Composition:* this window applies to the overall composition window, and specifies the page size, orientation, number of pages and export resolution (lower image)

For ‘portrait’ layout set the ‘Composition’ window to portrait, create map as usual. The map in Map Canvas will be presented in its full lateral extent in Composer, though its vertical extent in the Composer will be greater than on the Map Canvas

**Frames**

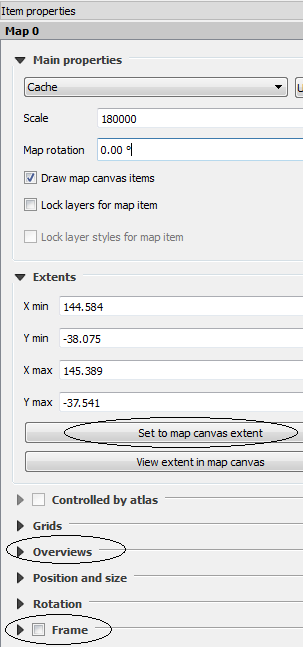
*Selection*: Click ‘Select/Move’ button and select frame of any object in the Composition window

*Deletion*: Click same button, select frame > press ‘Delete

*Item Properties Windows*: When you select a frame around an object in the Composer, a panel with the tab ‘Item properties’ appears to the right of the screen presenting options for adjusting its appearance and characteristics.

*Items Window*: Shows the objects in the Composer.

Unchecking item at left hides it

****

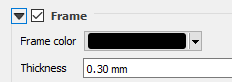
**Main Map**

For the map itself, ‘Item properties’ window is at left.

 ‘Set map to canvas extent’ adjusts map to its size and position in the Map Canvas

By contrast, refresh adjusts map to reflect its contents in the Map Canvas – but not size

Overviews: See information about inset maps



Place a frame around the selected map/object

**Adding other items Map**

Picture

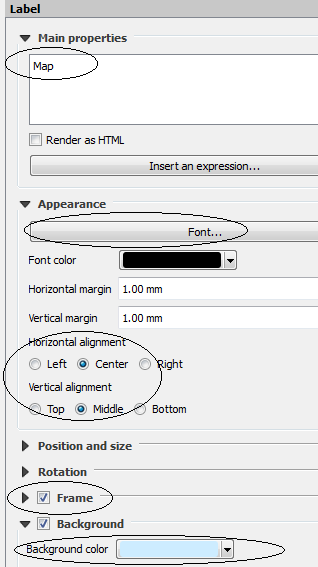
Text

Click on buttons Legend

on the left-hand side of the screen Scalebar

**Text**

Click on  icon, then use left-hand mouse button to draw a text box on the composer.



When the text box is selected, its ‘Item properties’ frame appears at right.

Type the text into the area under the heading ‘Main Properties’.

Click on ‘Font’ to adjust the font type, size, colour and alignment.

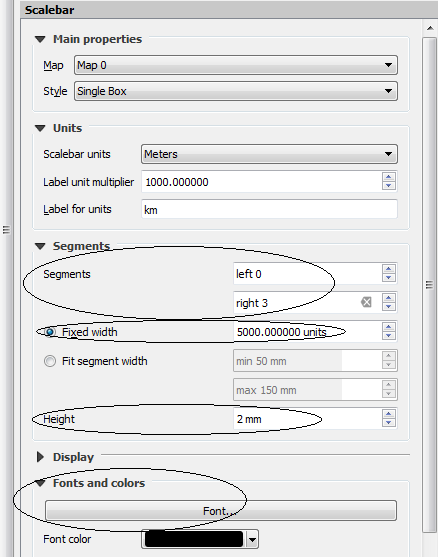
Adjust horizontal and vertical alignment

Place a frame around the title

Give a background to the title, if required

**Scalebar**

Click on scalebar icon  at left, then draw on screen to get a scalebar.

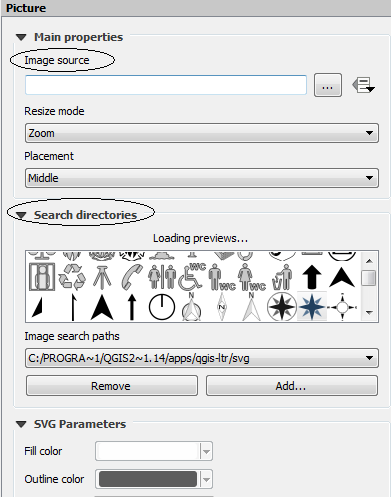
As with selection of box for image, when you select the scalebar, the panel on the left allows you to adjust features such as:

* Choose segments to the left of zero

(usually none) and to the right

* Select number of meters per segment to create a suitable size for the scalebar
* Height (that is, the thickness) of bar
* Font size and colour

**Images and North Arrows**

To add an image, click ‘add image’ button  at left, then draw a frame on the map for placing the image.

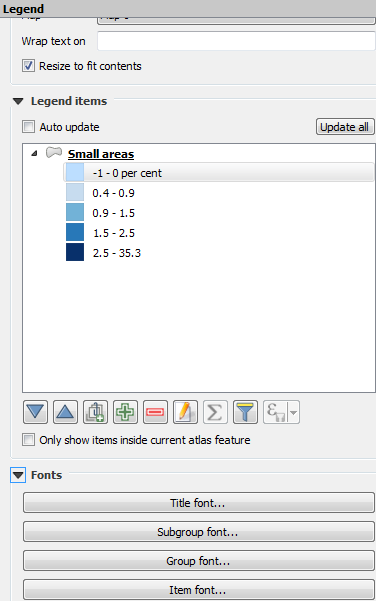
Picture Properties window appears at right, with options for adjusting your image

Click on ‘Search directories’ to locate mapping images, such as a north arrow

Otherwise, click on button next to ‘Image source’ to locate some other image in your directory.

**Legend**

Click on the legend icon  at left, then draw a box in the Composer and a legend will appear.

****When the legend box is selected, a window will appear at right (as usual) with options for adjusting the legend

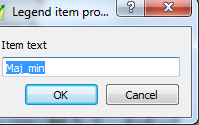
**To make changes, unclick the ‘Auto update’ button**

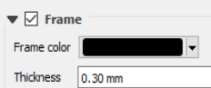
You can:

‘- add or remove layers **or map categories that are visible in Map Canvas**

‘- move legend items up/down 

- change the title (ie: ‘Legend’) adjust font of title, subgroup (ie: name of variable) or item (ie: usually the numbers)

- double-click on any legend item to view a window and change its name



‘- add a frame & perhaps a background

Adjustment of precision of legend ranges in Layer Properties in Map Canvas, will be reflected in Composer

If you click  or check ‘Auto update’ at the top of the legend panel, it will obliterate changes made to the legend and revert to its original format and content.

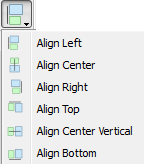
**Adjusting Positions and Placement of Map and other Images in Composer**

Two or more images – such as the map, scale bar, north arrow or picture – may be grouped, locked, moved in front of, or behind, each other, or aligned.

*Grouping*: select items while holding Shift key, then click on group or ungroup icons 

*Locking images*: select image/s then click buttons

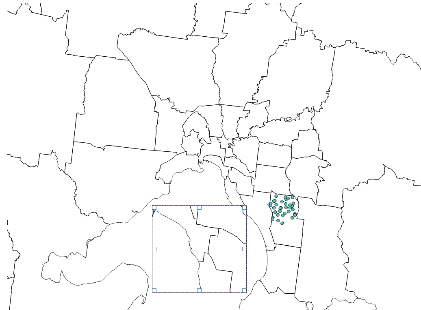
*Moving items in front or behind*: Select item then click  which gives options

*Alignment*: Shift-select items and click  which gives options

*Moving items up, down left, right* Select item, hold Control and

tap up and down keys

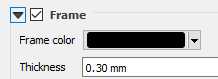
*Adjusting background*: for legend, toolbar, title, check ‘Background’ in Item Properties window, and choose a colour, or leave it unchecked for no background

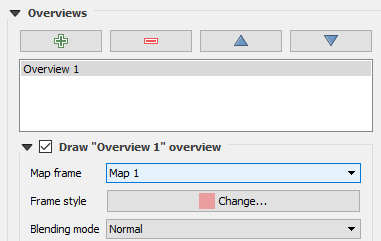
**Adding an Inset Map**

*Creating Inset Map*

In Map Canvas, zoom into area that you want as your inset

In Composer, click ‘Add map’ icon and draw frame for the inset map. The inset map will now appear. With the insert map frame still selected, click ‘Set map to canvas extent’ if it helps

Select inset map (or select ‘Map 1’ in the items list window) then check ‘Frame’ and choose a colour/thickness for a frame around the inset map



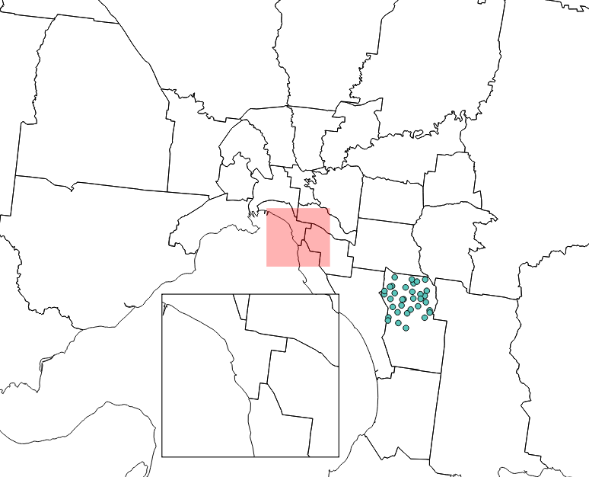
*Adding Overview*

‘\* Select main map (‘Map 0’ in items list window)

‘\* In ‘Items properties’ window > Overviews > click green cross.

‘\* Then for ‘Map frame’ select ‘Map 1' - This instructs that overview should correspond with the inset map – which is Map 1’

\* In ‘Frame style’ click ‘Change’ to alter colour of the overview





\* To remove overview,

uncheck ‘Map1’ in Items window

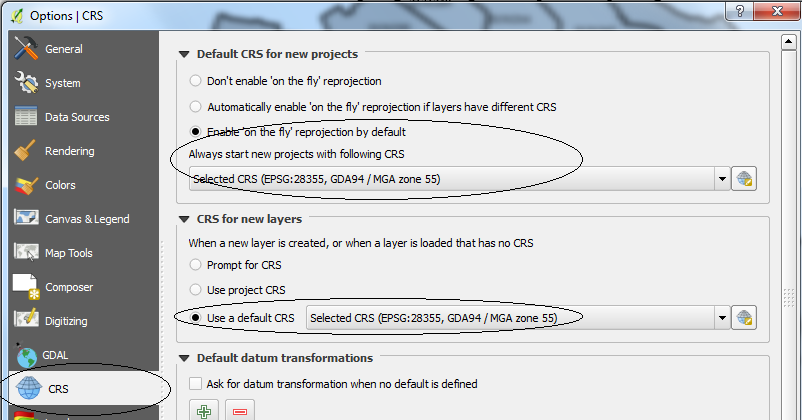
**Exporting the Composer Map**

Click on buttons at the top of the screen: - to export the image within the Composer as ‘Image’ as JPEG (and other image file types), SVG and PDF files, respectively.

Clicking on either of these buttons will first update the map in the Print Composer to reflect any changes in the content of the Map Canvas, then create an image of the resulting Print Composer.

**So once you create a map you like, don’t change the Map Canvas!**

**SETTING PARAMETERS**

**Setting Default Parameters**

***Projections***

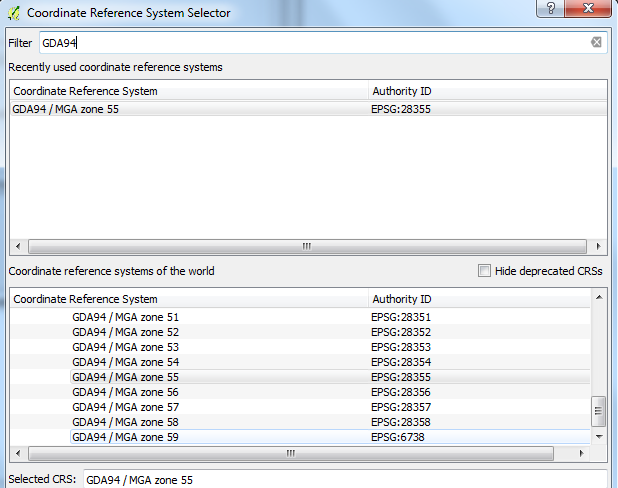
Settings > Options > CRS Tab

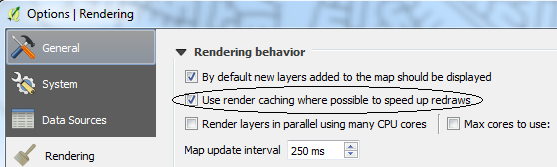
Check ‘Enable ‘on the fly’ re-projection – it’s usually the default

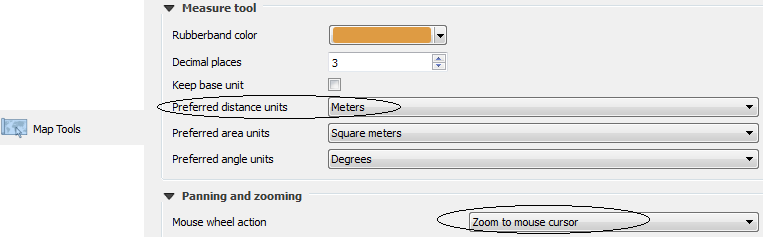
Select projection types for new projects (above) and for new layers (below)

Set projections at GDA94 / MGA zone 55 as the ‘Default CRS for new projects’ (uppermost, above) and as ‘CRS for new layers’ (below)

To select from the long list of options, click on the  icon to the right, then type in GDA94 in the filter section of the window, to filter for projections with these letters and numbers.



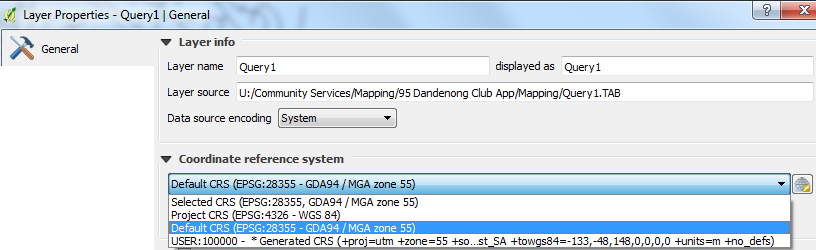
***Rendering***

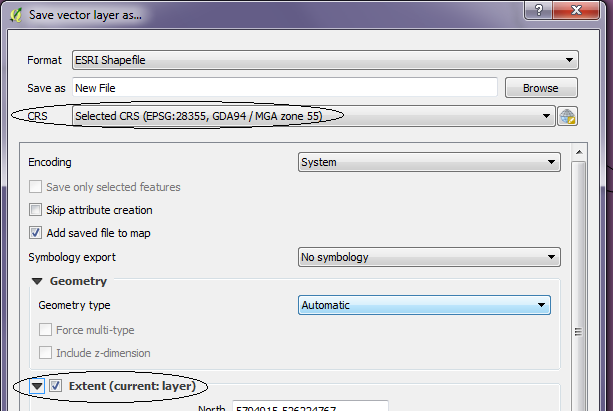
***Map Tools***

**Setting Layer Projection**

Double click on layer > in Layer Properties window > General tab > Co-ordinate Reference System

**Default CRS (EPSG:28355 – GDA94 / MGA zone 55)**



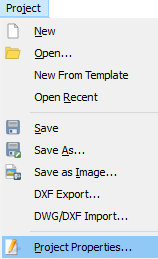


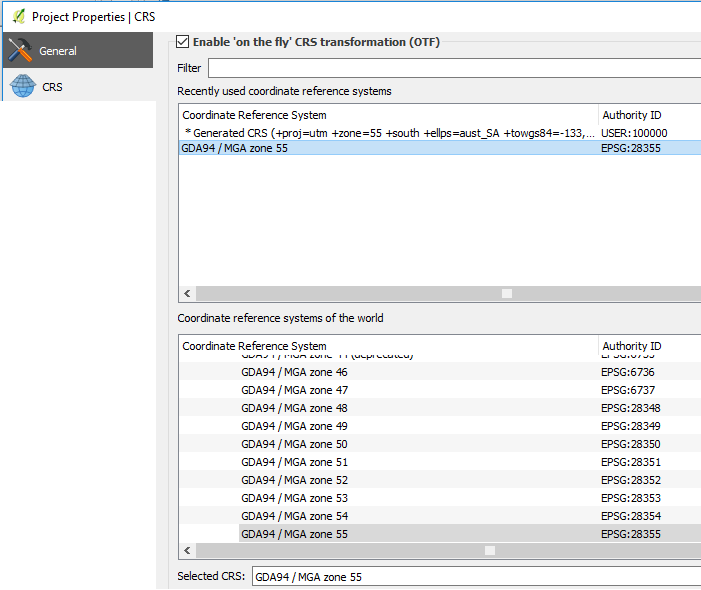
**Save As for Layer Projections**

In window where you give the name and location of the new file, check its CRS is set at the default and check ‘Extent (current layer)

**Setting Project Projection**

Project > Project Properties >



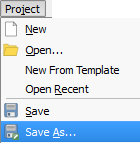


Select ‘CRS’ tab and choose projection

**PROJECTS**

**Creating Projects**

Project > New  Then open layers etc. to commence the new project

**Saving Projects**

Project > Save

Project > Save As >



Select location and name for the project

**(leave no spaces in project name)**

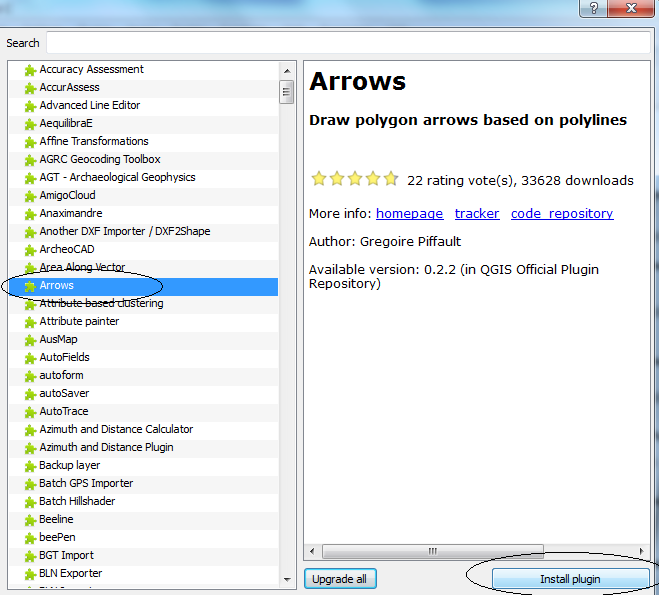
**Opening Projects**

To open a project: Project > Open > then select the project from the file where it is stored

Only QGIS Project files will appear in your search.

**INSTALLING PLUGINS & REMOVING QGIS**

Plugins > Manage and Install Plugins 



Select from the list of plugins > Install plugin

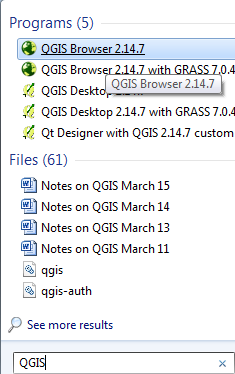
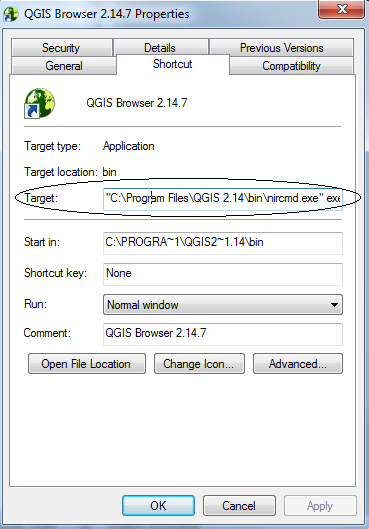
Useful plugins *may* include:

* Open layers
* Freehand drawing

**Removing QGIS** – e.g. from Home

Left-click  icon > type QGIS in box

Right-click on QGIS when it appears in the programs list



View ‘Target:’ which gives its location

Practise Exercises

**Select** By button / by form

By expression / filter by expression

By boundary / clip by boundary

**Create layers** Polygons Adjust format

Move

Create and remove nodes

Dots Adjust format

Map by category – making some disappear

Label and format labels

Create labels field & label by rule using labels field

Create a buffer zone

**Label by Rule**  Using an expression eg: Geocode In (‘Cardinia’, ‘Casey’ etc)

**Connecting addresses to map** Look up addresses in PropertyNo layer, use expression to locate them, pin dots to them

**Attribute Table (SA1 areas**)Review add/delete feature, delete/add field, calculate field

Calculate a decimal field using ‘to-real’ function

Calculate a field using Case….End

*Still on SA1 areas*Add a field using the CSV file

Map areas by a field

**Map Composer** Create a map of the SA1 or SA2 areas map, above

1. For guidance in selecting ranges, use the “Percentile Calculator”. If a high proportion of values in a field are zeros, you may have to use the deciles as a guide to create a single lower range to encompass the zero values, with positive values for the other ranges. [↑](#footnote-ref-1)