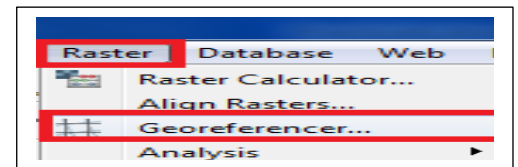
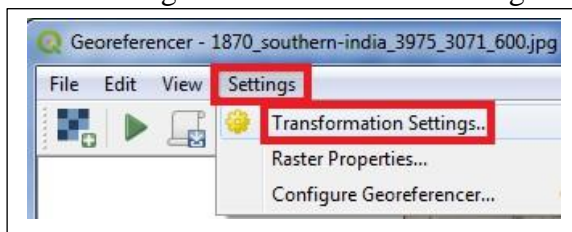


PRACTICAL - 7

➤ Georeferencing

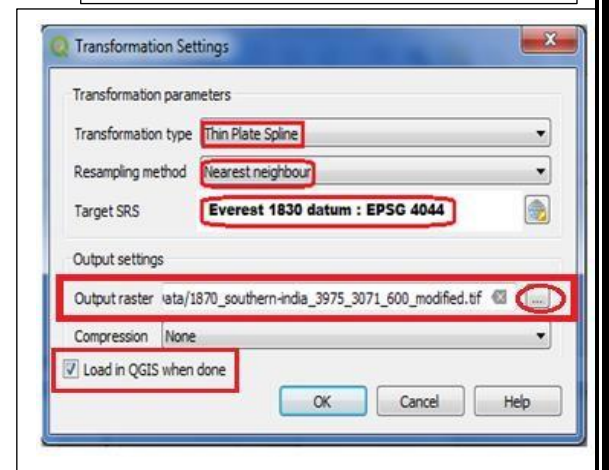
A. Georeferencing Topo Sheets and Scanned Maps

- Start a new project
- Go to Layers → Add Layer → Add vector Layer
- Select GIS_Worksho \Manual\Prac06\IND_adm0.shp
- Zoom in to Mumbai region in the layer.
- Go to Plugins → Manage and Install Plugins
- Ensure that Georeferencer GDAL is checked, if not install Georeferencer GDAL plugin.
- Go to Raster → Georeferencer
- A new Georeferencer window will open
- File → Open Raster
- Select file “1870_southern-india_3975_3071_600.jpg” from project data folder
- Go to Settings → Transformation Settings



- In the Transformation Settings window.

- Select Transformation type → Thin Plate Spline
- Re-sampling Method → Nearest Neighbour
- Target TRS → Everest 1830 datum: EPSG 4044
- Select Output Raster Name and Location
- Check the Load in QGIS When Done Option
 - Press “OK”.
 - In Georeferencer window Go to Edit → Add Points



Enter Map Coordinates

Enter X and Y coordinates (DMS (dd mm ss.ss), DD (dd.dd) or projected coordinates (mmmm.mmm)) which correspond with the selected point on the image. Alternatively, click the button with icon of a pencil and then click a corresponding point on map canvas of QGIS to fill in coordinates of that point.

X / East Y / North

click on raster to add control points and select "From Map Canvas" Button

OK **From map canvas** Cancel

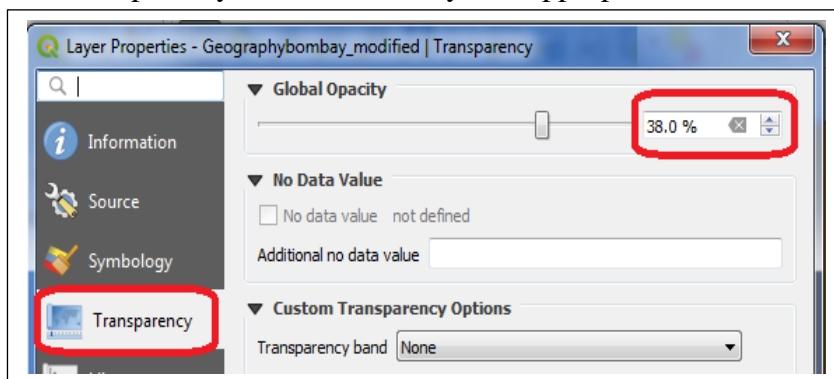
GCP table

Visible	ID	Source X	Source Y	Dest. X	Dest. Y	dX (pixels)	dY (pixels)	Residual (pixels)
<input checked="" type="checkbox"/>	0	313.914	-1438.08	72.7915	18.9415	4.93856e-10	5.25915e-10	7.21443e-10
<input checked="" type="checkbox"/>	1	925.421	-1482.13	72.8413	18.9178	5.16366e-10	5.32054e-10	7.41428e-10
<input checked="" type="checkbox"/>	2	490.111	-880.985	72.8177	19.0436	4.92491e-10	5.23755e-10	7.18935e-10
<input checked="" type="checkbox"/>	3	938.377	-844.709	72.8835	19.009	5.30804e-10	5.23301e-10	7.45383e-10

- Select the set of control points.
- Go to, Setting → transformation settings.
- Press “RUN”
- In Georeferencing window go to →File →Start Georeferencing

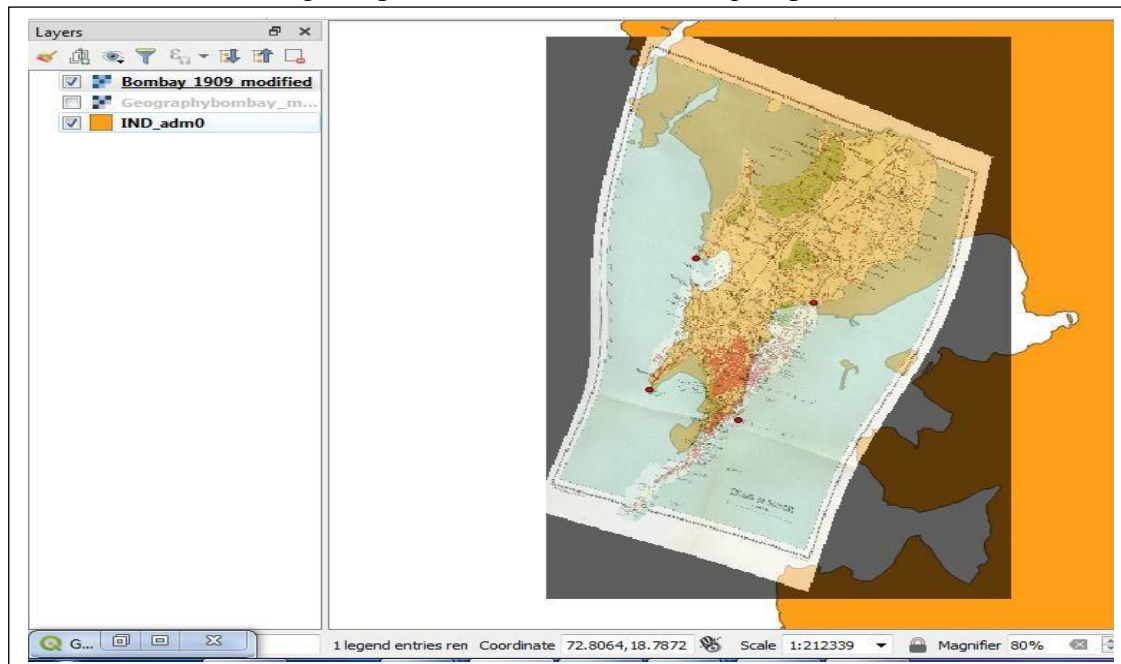


- The progress indicator will appear
- The canvas area will now have the scanned map of Mumbai referenced with control points.
- Select the newly added layer in Layer Panel Right click and go to property.
- Set Transparency level of raster layer to appropriate level.



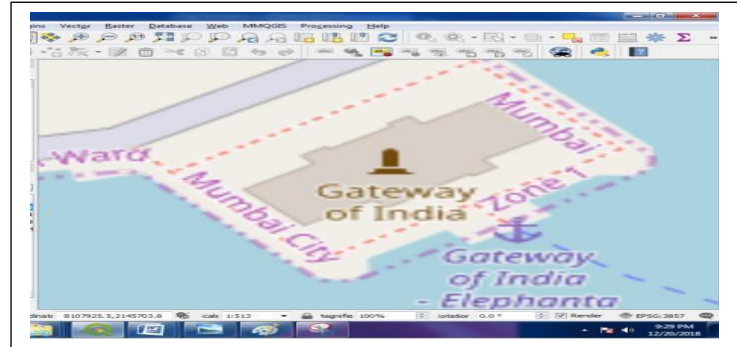
Output:

- The Scanned Image map coincides with the existing map.

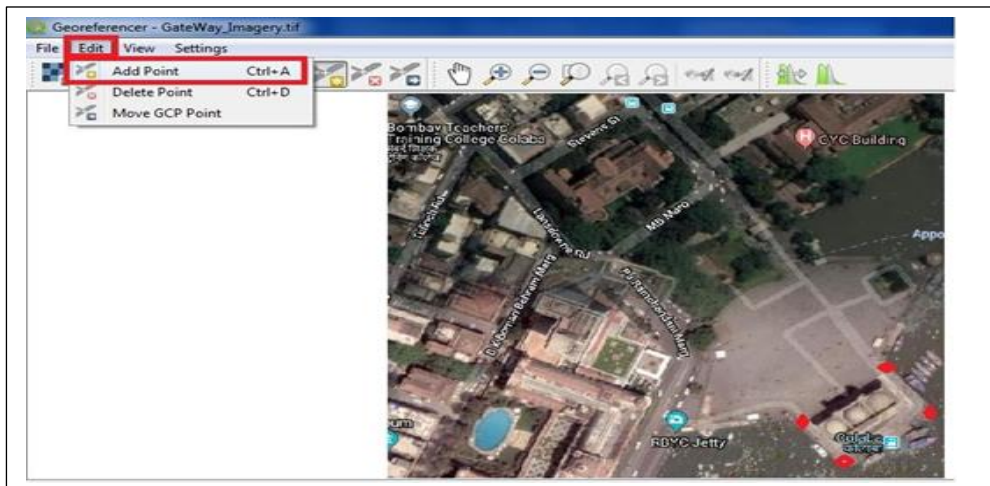


B. Georeferencing Aerial Imagery

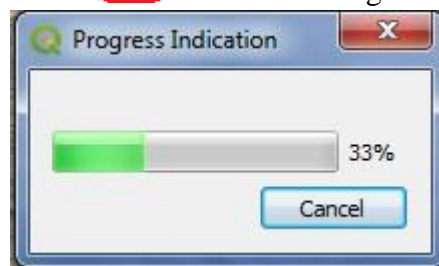
1. Install plugin OpenStreetMap
2. Go to Web Menu → OpenLayerPlugin □ OpenStreetMap □ OpenStreetMap
3. Go to Project → Properties □ Set CRS to EPSG 3857
4. Go to View → Panels → select OSM Place search
5. The Gateway of India, Mumbai is located at 18.92°N 72.83°E
6. Search Gateway of India in OSM Search Panel
7. Zoom in to appropriate level.
8. The map will appear like this
9. Go to Raster → Georefrencer



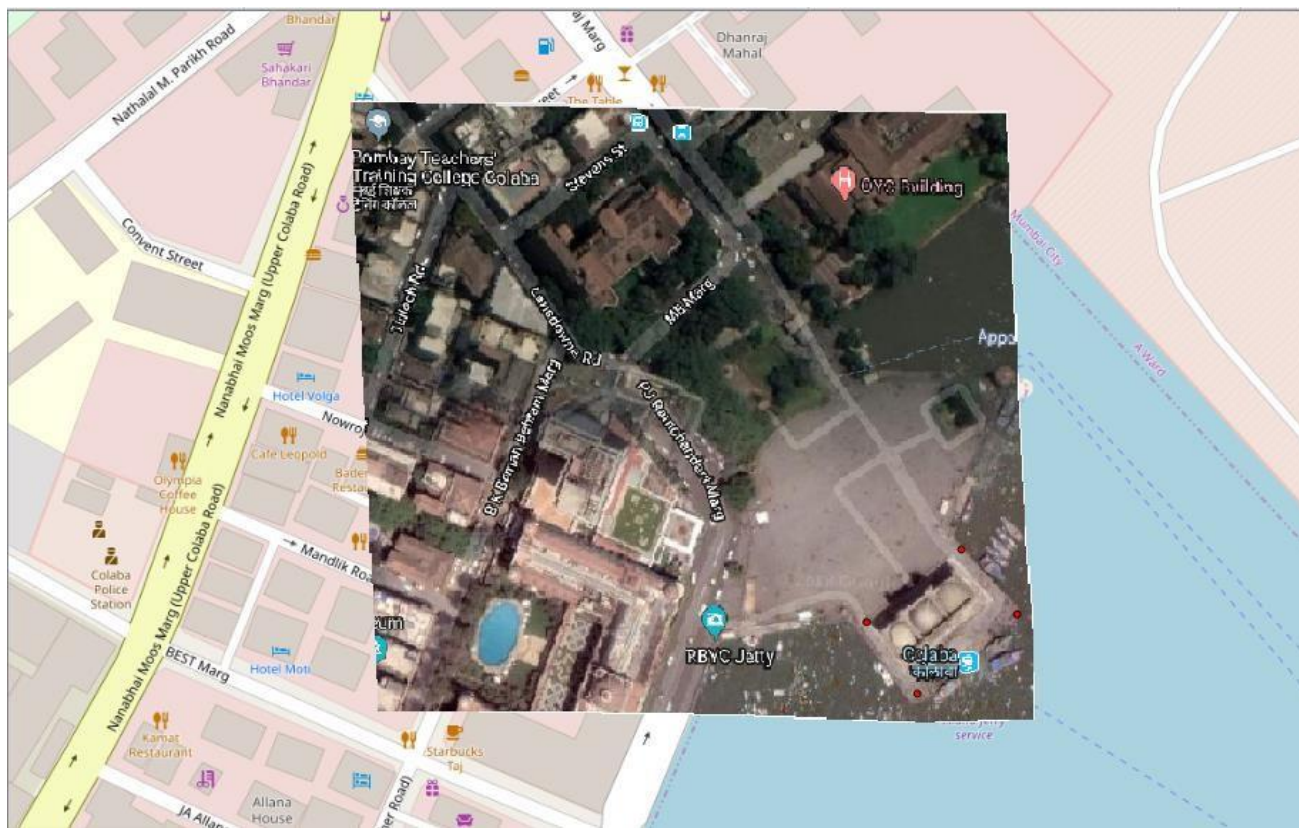
10. A new Georefrencer window will open
 11. File → Open Raster
 12. Select file “Gateway_Imagery.tif” from project data folder
 13. Go to Edit → Add Point
 14. Select control points from map (Indicated in red color).
- Go to Setting → Transformation Setting



- Go to File → Start Georeferencing or Press the  button in Georeferencing Window.
- The progress indicator will appear



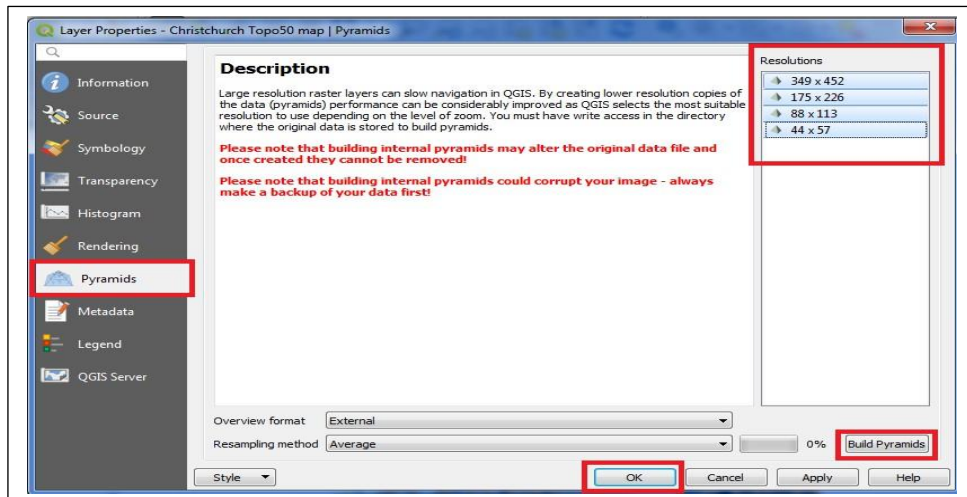
Observe that the aerial image of the Gateway of India is georeferenced on OSM in the map canvas



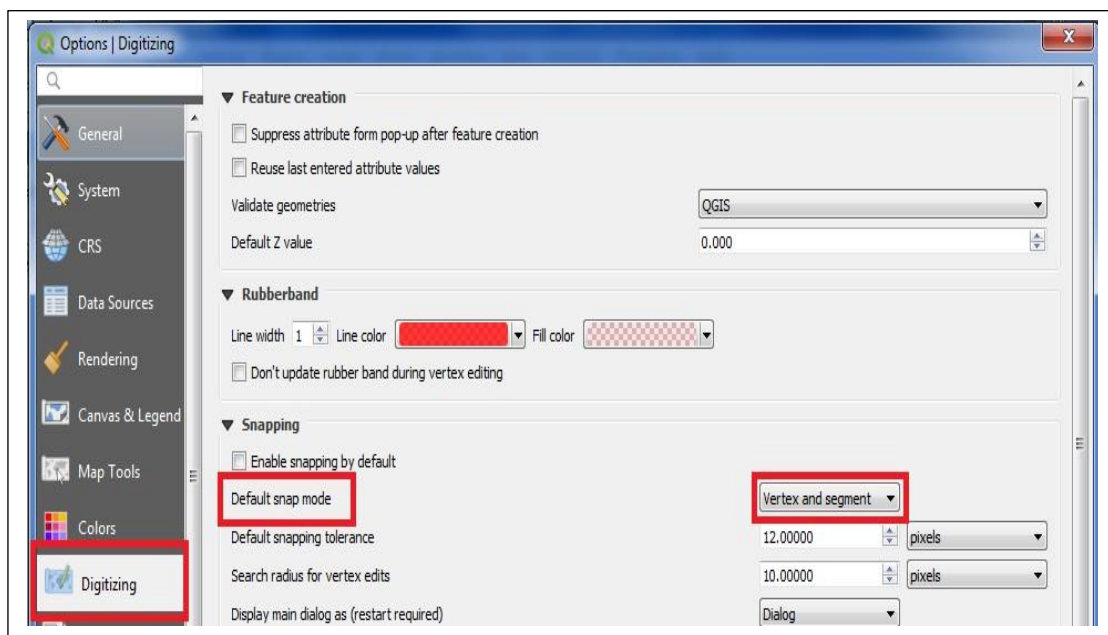
C. Digitizing Map Data

Spatialite is an open database format similar to ESRI's geodatabase format. Spatialite database is contained within a single file on your hard drive and can contain different types of spatial (point, line, polygon) as well as non-spatial layers. This makes it much easier to move it around instead of a bunch of shapefiles.

- Go to Layer ▶ Add Raster → Select “Christchurch Topo50 map.tif” from project Folder.
- QGIS offers a simple solution to make raster load much faster by using **Image Pyramids**.
- Right-click the Christchurch Topo50 map.tif layer and select Properties.
- Choose the Pyramids tab. Hold the Ctrl key and select all the resolutions offered in the Resolutions panel.

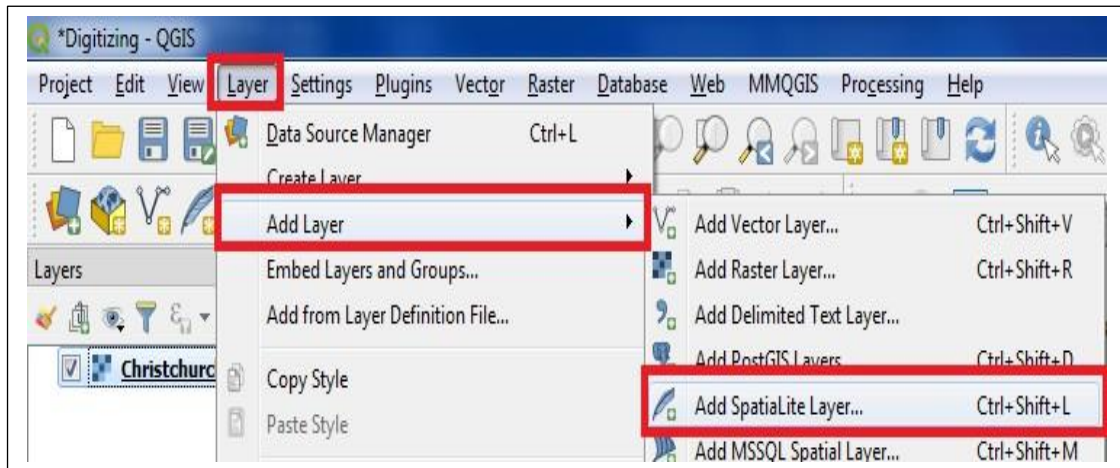


- click Build pyramids. Then click OK.
- Go to Settings → Options ... Select the Digitizing tab in the Options dialog.
- Set the Default snap mode to vertex and segment.

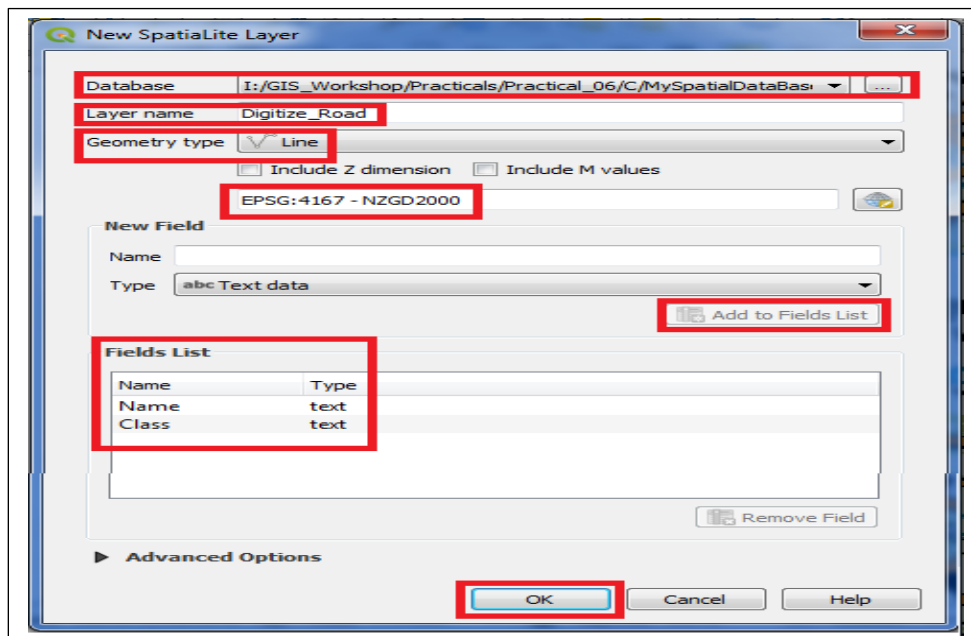


Press OK.

- Go to Layer → Add Layer → Add Spatialite Layer.




- Select the name and location for Spatial database eg:
 “GIS_Workshop\Practicals\Practical_06\C\MySpatialDataBase.sqlite”.
- Name the Layer as “Digitized_Road”
- Set Geometry type as “Line”
- Set CRS EPSG:4167 – NZGD2000

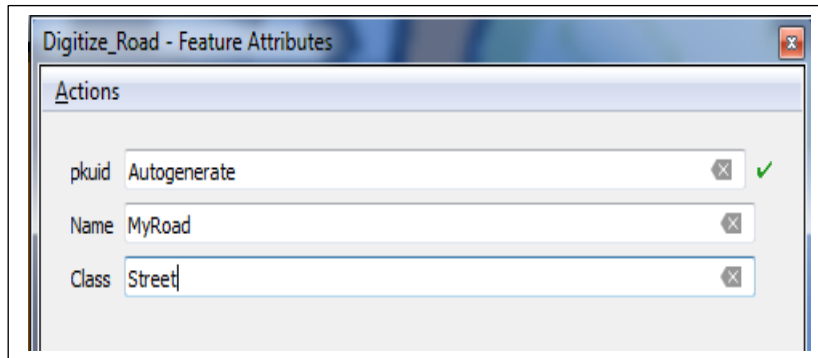


- Add “Name” and “Class” fields using “Add to Fields List”.

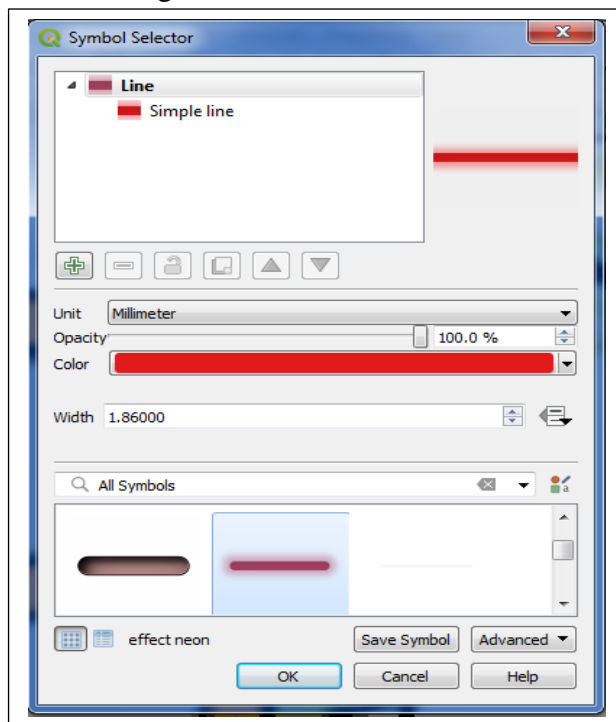


- Once the layer is loaded, click the Toggle Editing button to put the layer in editing mode.

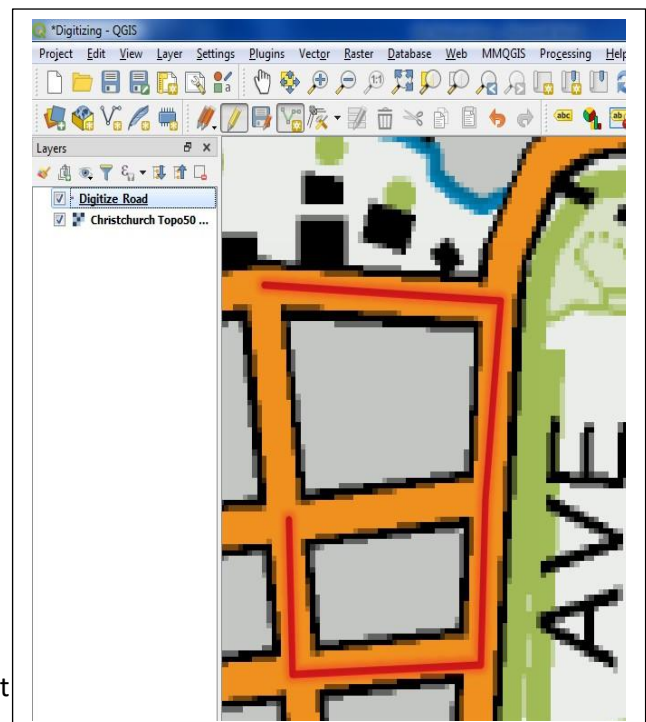
- Click the  Add Line Feature (Ctrl+.) button. Click on the map canvas to add a new vertex. Add new vertices along the road feature. Once you have digitized a road segment, right-click to end the feature.



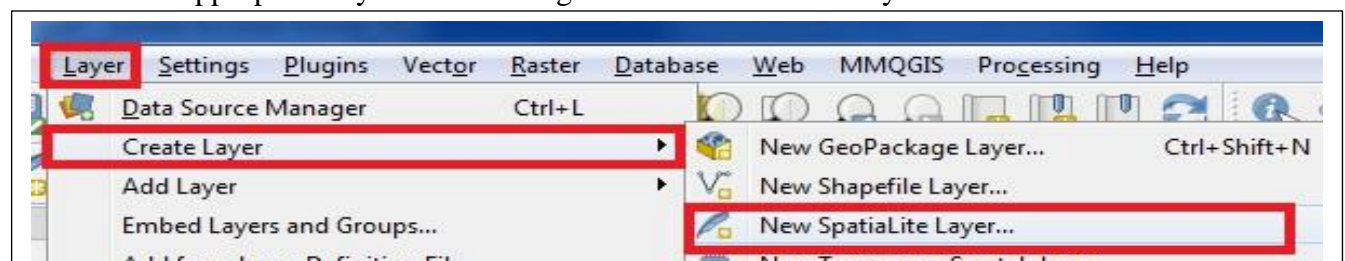
- On Layer Panel Right Click on Digitize_Road, Select the Style tab in the Layer Properties dialog.



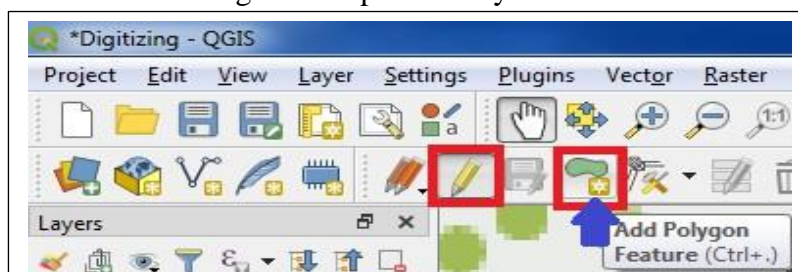
Result





- Select appropriate style to see the digitized road feature clearly.



- After creating a new Spatialite layer



- Select Digitized_Garden layer in Layer Panel and click on Toggle Editing  button and then Add Polygon Feature  button on Tool bar.
- Add two gardens to the region by adding polygon.
- The Layer will appear on map canvas



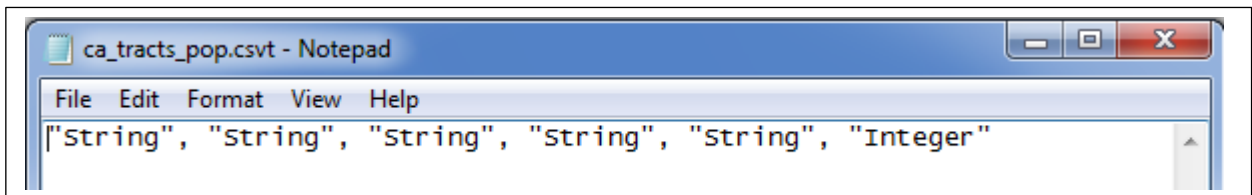
- Using the above procedure a point feature can also be digitized.
- The digitizing task is now complete. You can play with the styling and labeling options in layer properties to create a nice looking map from the data you created.

PRACTICAL - 8

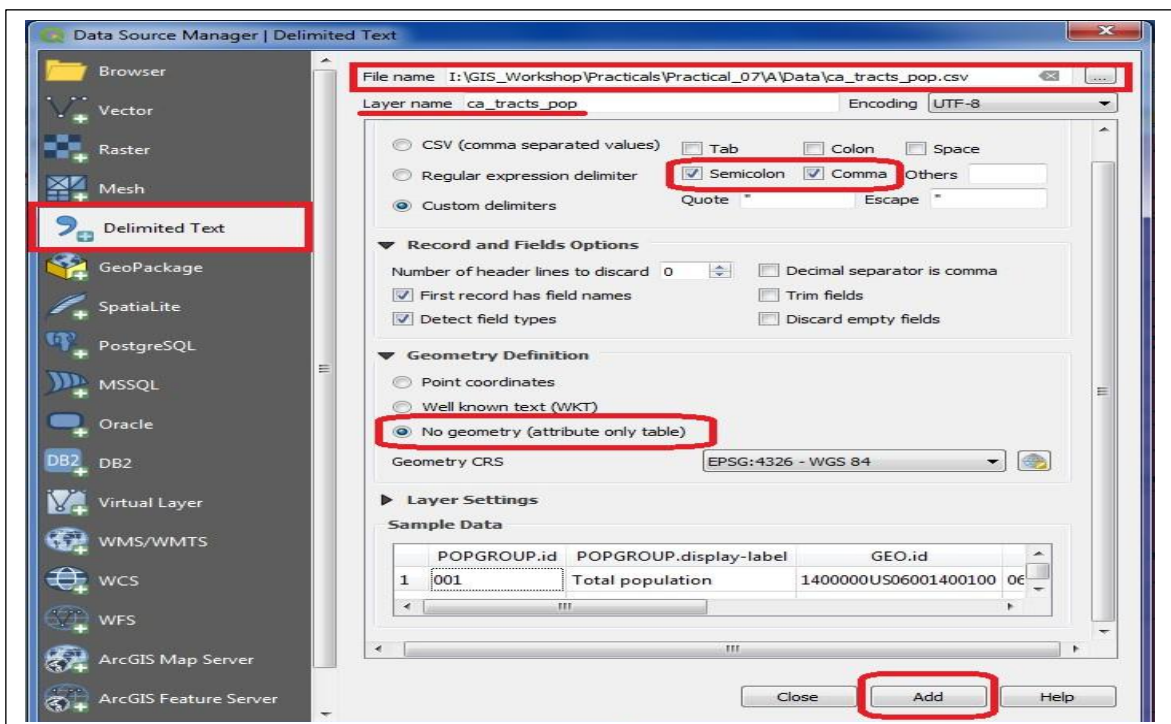
Managing Data Tables and Spatial data Sets:

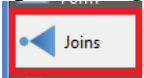

A] Table joins

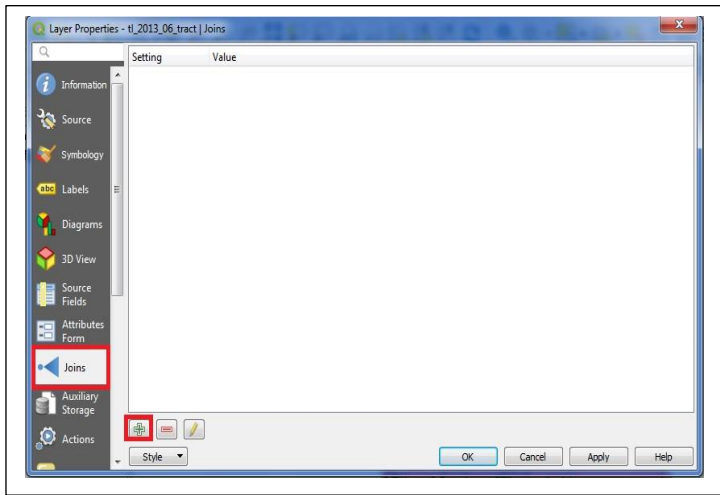
- Start a new project
- Go to Layer → Add Layer → Add new Vector Layer
“I:\GIS_Workshop\Practicals\Practical_07\A\Data\tl_2013_06_tract.zip”
- We could import this csv file without any further action and it would be imported. But, the default type of each column would be a *String* (text). That is ok except for the *D001* field which contains numbers for the population. Having those imported as text would not allow us to run any mathematical operations on this column. To tell QGIS to import the field as a number, we need to create a *sidecar* file with a *.csvt* extension.



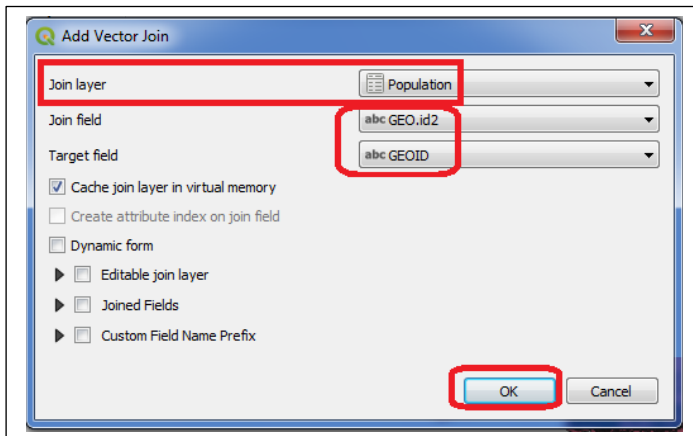
- This file will have only 1 row specifying data types for each column. Save this file as ca_tracts_pop.csvt in the same directory as the original .csv file.
- Go to Layer → Add Layer → Add Delimited Text Layer
And add I:\GIS_Workshop\Practicals\Practical_07\A\Data\ca_tacts_pop.csv”



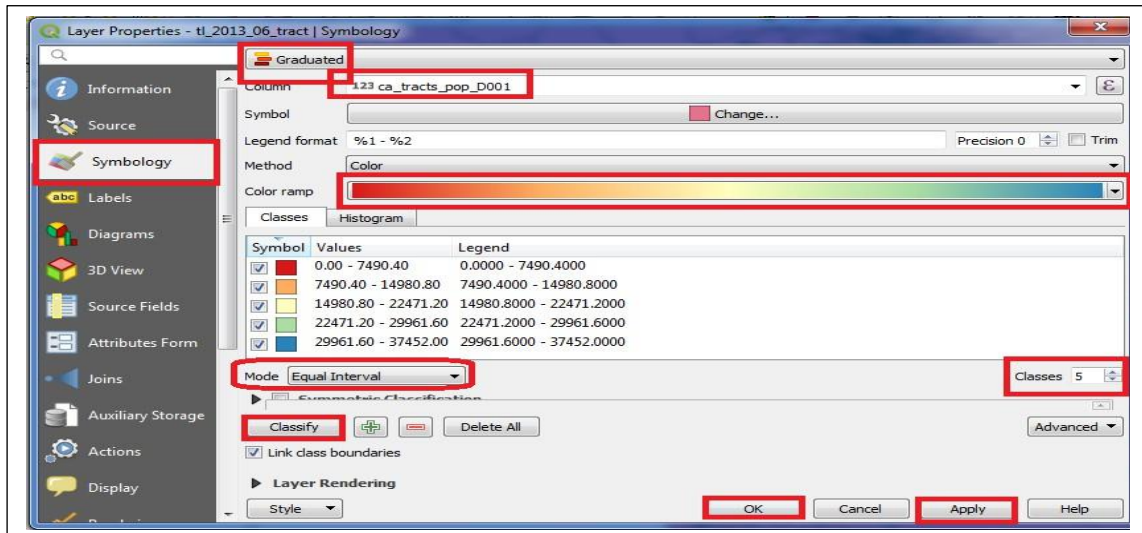
- In the layer panel, Right click on “tl_2013_06_tract”, layer and select Properties
- Select the  option in Properties, and click on  button to add new table join.



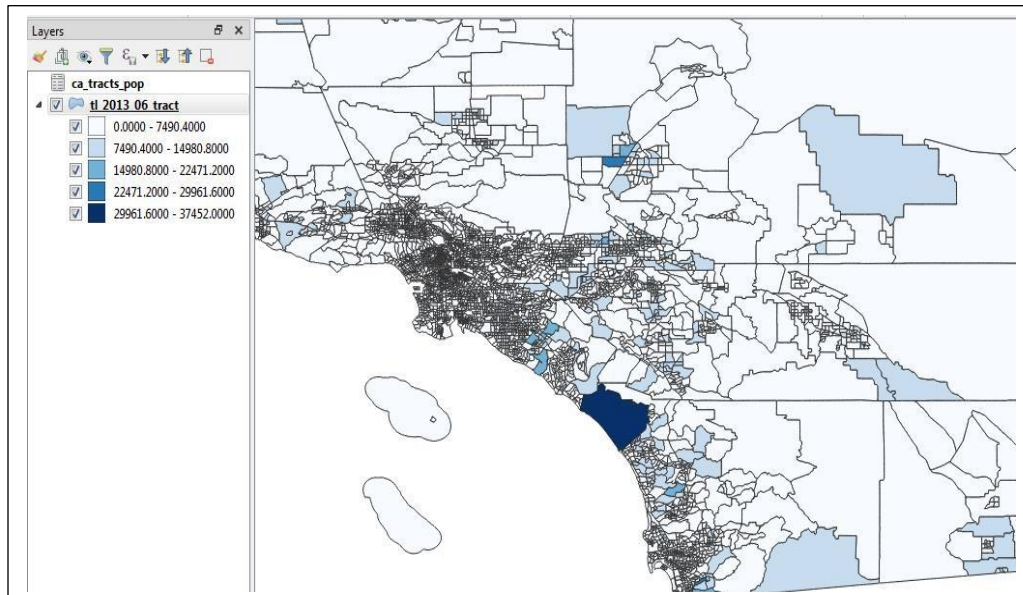
- In the Add Vector Join window set the following properties and click OK.



- After performing join
- For more clear output, select “tl_2013_06_tact” from Layer Panel, right click and select properties. Go to Symbology and set the following properties.



- A detailed and accurate population map of California can be seen as the result. Same technique can be used to create maps based on variety of census data.



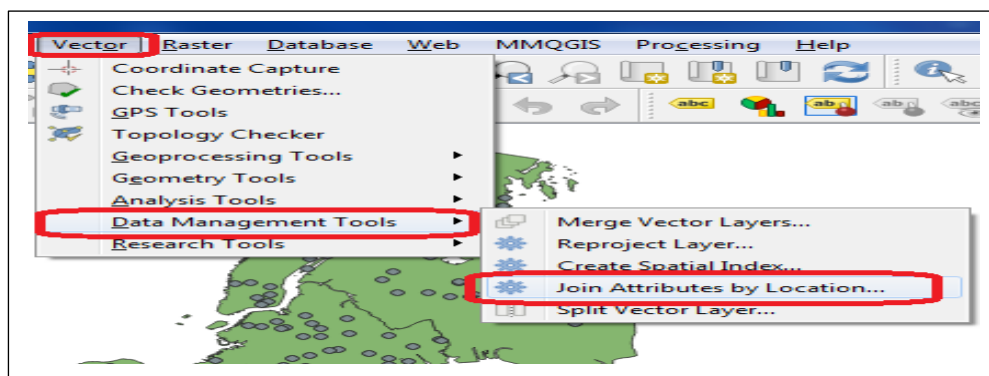
B) Spatial Joins

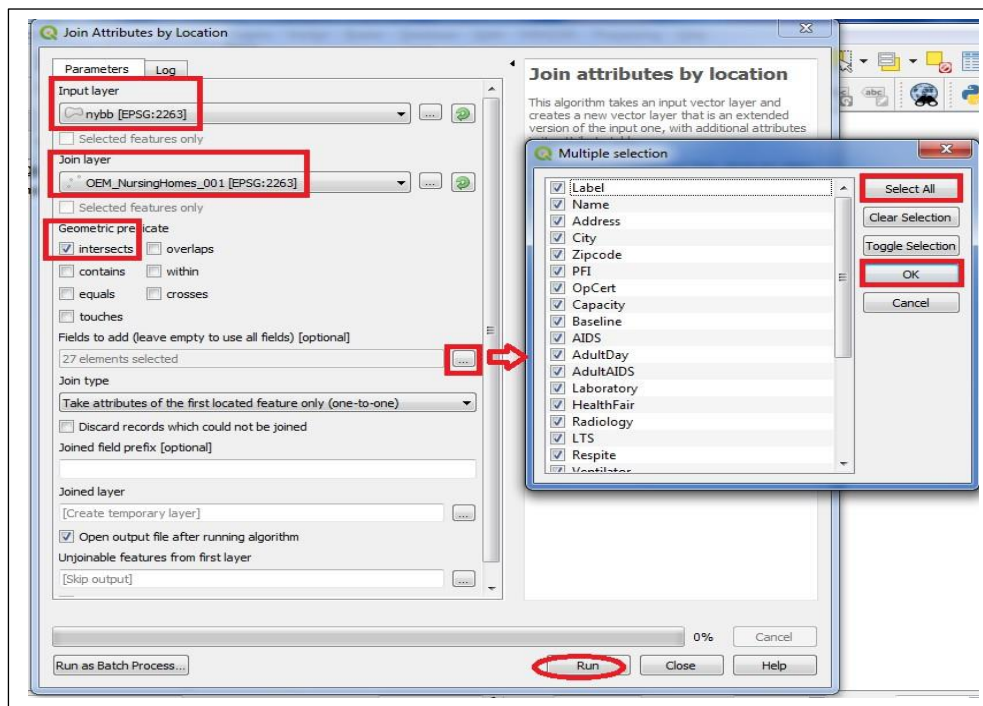
- Go to Layer → Add Layer → Add Vector Layer → Select
 “I:\GIS_Workshop\Practicals\Practical_07\B\Data\nybb_12c\nybb_13c_av\nybb.shp” and
 “I:\GIS_Workshop\Practicals\Practical_07\B\Data\OEM_NursingHomes_001\OEM_NursingHomes_001.shp”, from data folder.
- Go to attribute table and observe the data.
- Table before performing Join

OEM_NursingHomes_001 :: Features Total: 177, Filtered: 177, Selected: 0

	Address	City	Zipcode	PFI	OpCert	Capacity
1	66 VAN CORTL...	BRONX	10463	1217.000000000000	7000307.000000...	264
2	2505 GRAND AVE	BRONX	10468	1244.000000000000	7000337.000000...	46
3	2401 LACONIA ...	BRONX	10469	1245.000000000000	7000338.000000...	200
4	3200 BAYCHES...	BRONX	10475	1242.000000000000	7000356.000000...	236
5	700 WHITE PLA...	BRONX	10473	856.000000000000	7000361.000000...	240
6	3400 CANNON ...	BRONX	10463	1234.000000000000	7000374.000000...	400
7	612 ALLERTON ...	BRONX	10467	1218.000000000000	7000308.000000...	520
8	666 KAPPOCK S...	BRONX	10463	1233.000000000000	7000385.000000...	200
9	3518 BAINBRID...	BRONX	10467	1227.000000000000	7000319.000000...	200
10	801 CO-OP CIT...	BRONX	10475	1260.000000000000	7000389.000000...	480
11	2266 CROSEY ...	BROOKLYN	11214	1364.000000000000	7001303.000000...	271
12	2865 BRIGHTO...	BROOKLYN	11235	1399.000000000000	7001342.000000...	320


- Go to Vector → Data Management Tools → Join Attributes by Location

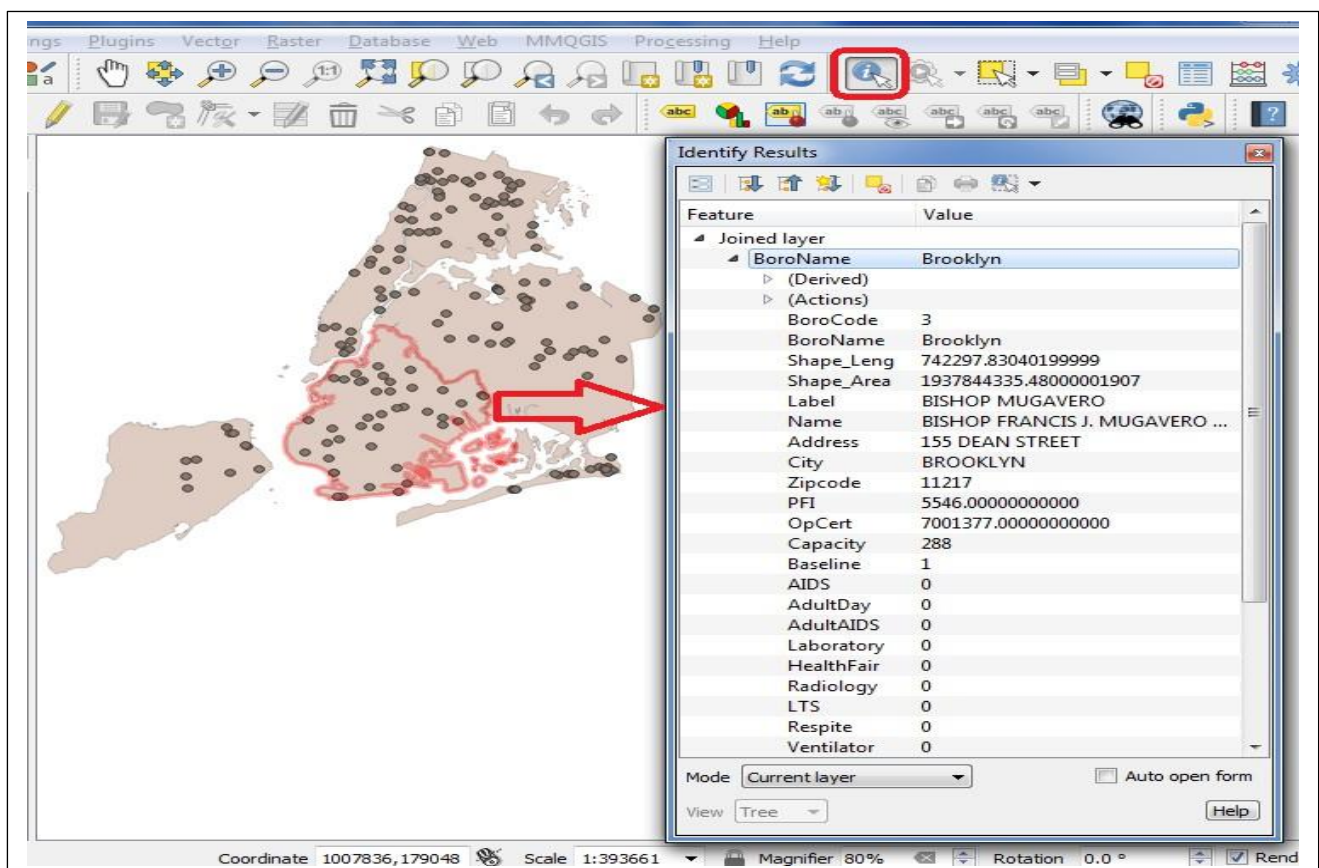




- Attribute table after join

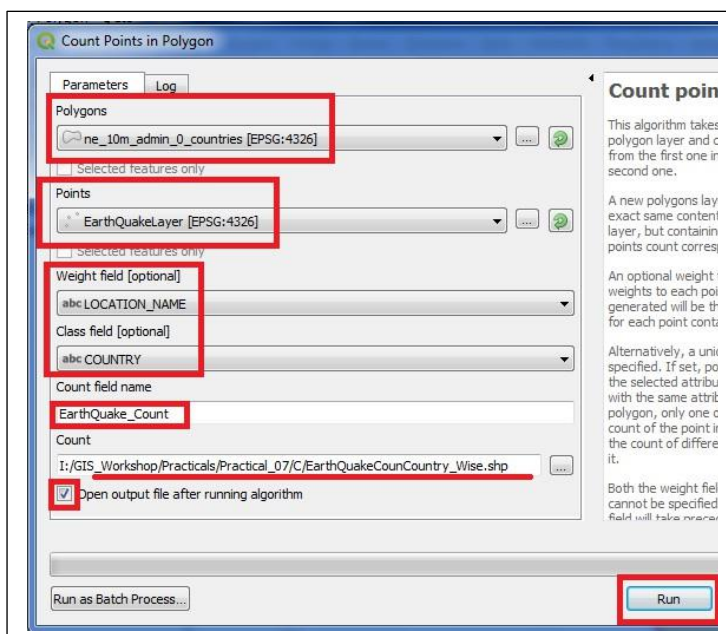
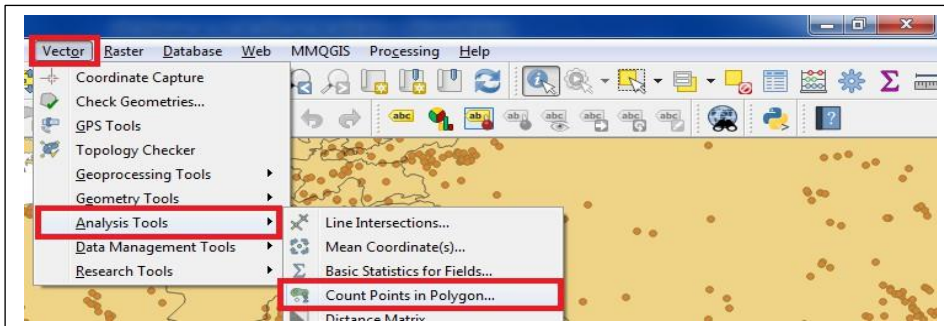
City	Zipcode	PFI	OpCert	Capacity
ASTORIA	11102	6384.000000000000	7003405.000000...	280
BROOKLYN	11217	5546.000000000000	7001377.000000...	288
BRONX	10472	1251.000000000000	7000381.000000...	200
STATEN ISLAND	10304	1755.000000000000	7004310.000000...	300
NEW YORK	10003	4807.000000000000	7002351.000000...	28

- Use the Identify Feature  Button to select a region to view join data on map Layer.
- Output

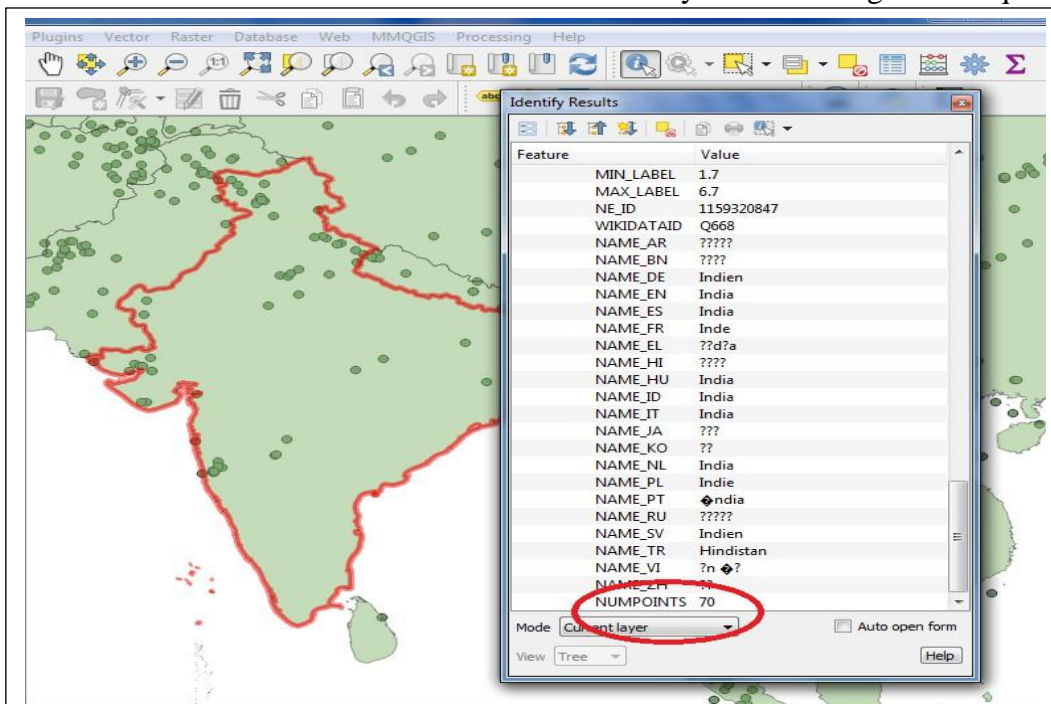


C] Points in polygon analysis

- Go to Layer → Add Layer → Add Delimited Text Layer
Select “EarthQuakeDatabase.txt”
- Go to Layer → Add Layer → Add Delimited Text Layer
“I:\GIS_Workshop\Practicals\Practical_07\C\Data\ne_10m_admin_0_countries.zip”



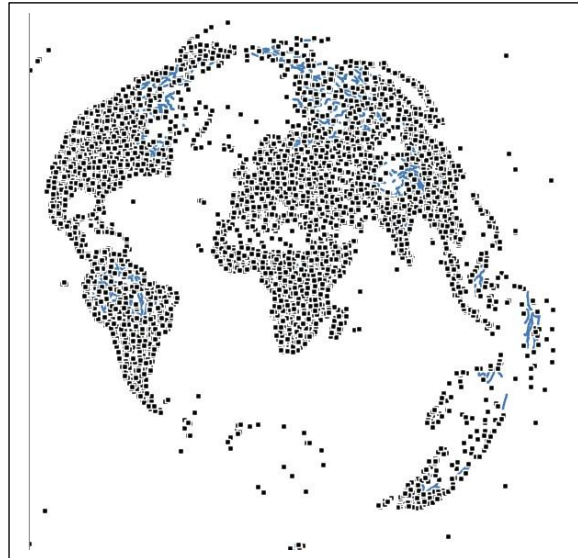
- Use the select Feature button to check country wise counting of Earthquakes.



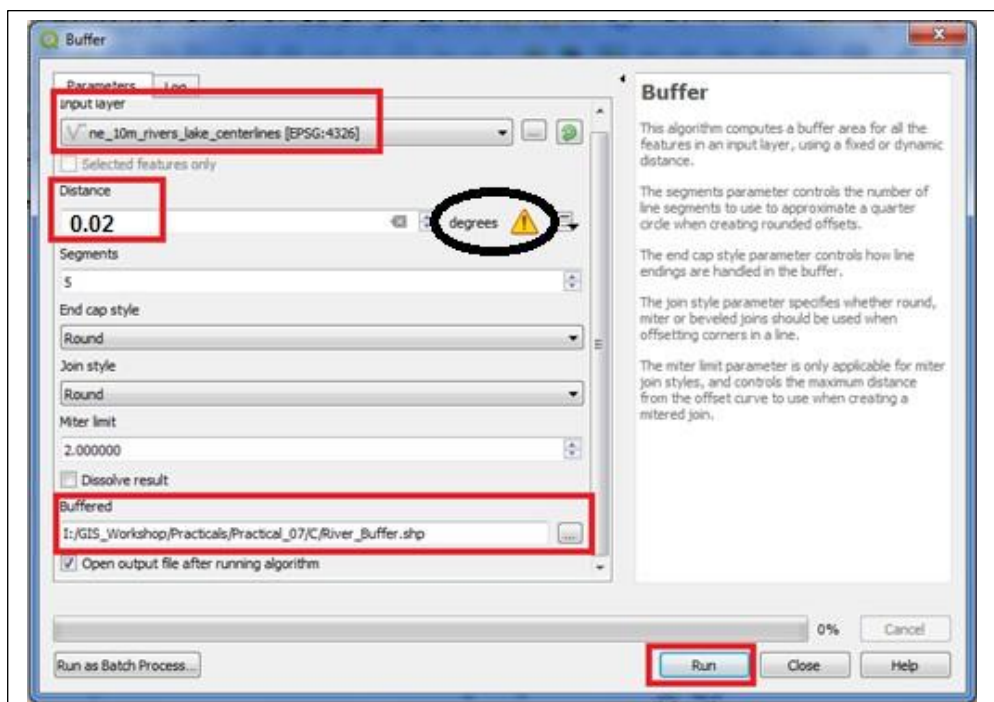
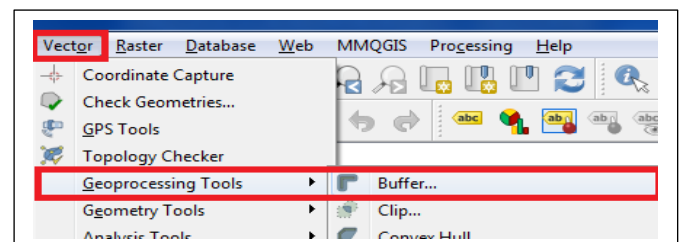
NUMPOINTS	
	0
64	
53	
13	
	0
9	
0	
10	
5	
	57
0	
12	
4	
0	
2	
5	
	8
152	
0	

D] Performing spatial queries

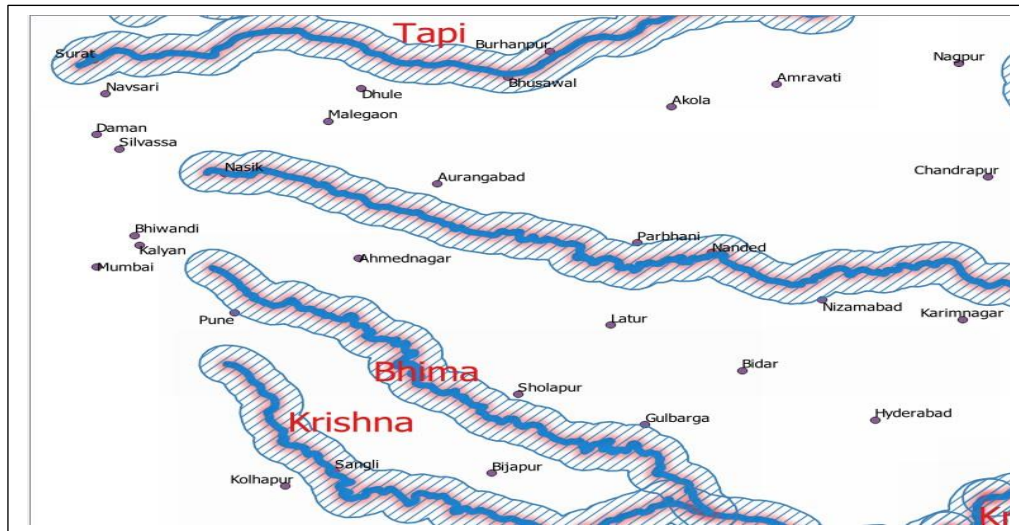
- Go to Layer → Add Layer → Add Vector Layer and load
“\GIS_Workshop\Practicals\Practical_07\D\Data\ne_10m_populated_places_simple\ne_10m_populated_places_simple.shp” and
“I:\GIS_Workshop\Practicals\Practical_07\D\Data\ne_10m_rivers_lake_centerlines\ne_10m_rivers_lake_centerlines.shp” from project data folder.
- Open project Properties → Set CRS “World_Azimuthal_Equidistant EPSG 54032” . The map will be re-projected as



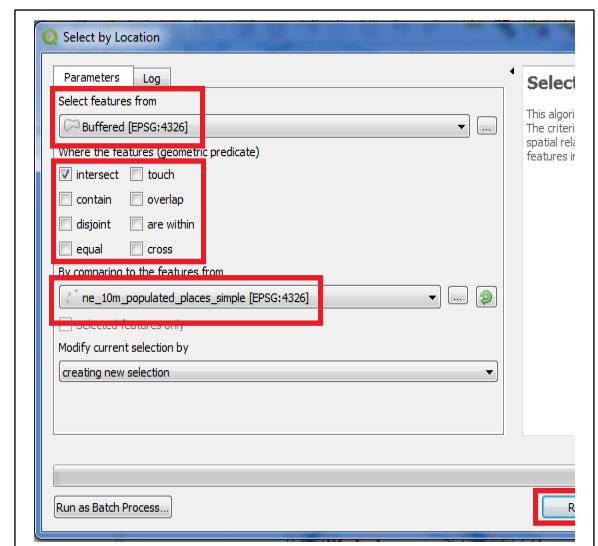
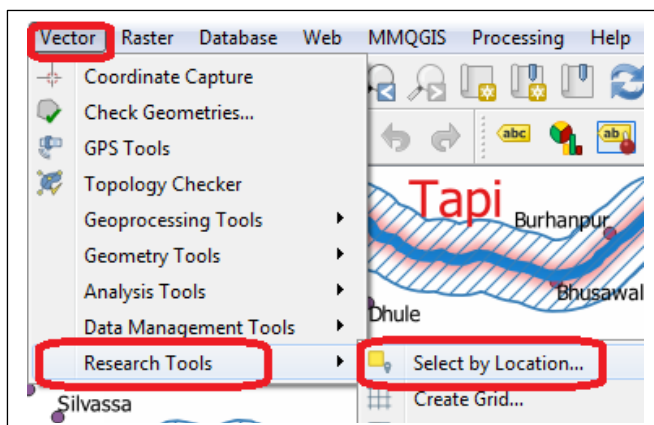
- Go to Vector □ Geoprocessing Tool □ Buffer
- Repeat the step to create River Buffer



- Create a buffer for River



- Go to Vector ☐ Research Tool ☐ Select By Location



This will highlight only those rivers containing

