

# **GIS for Urban Planning: QGIS methods**

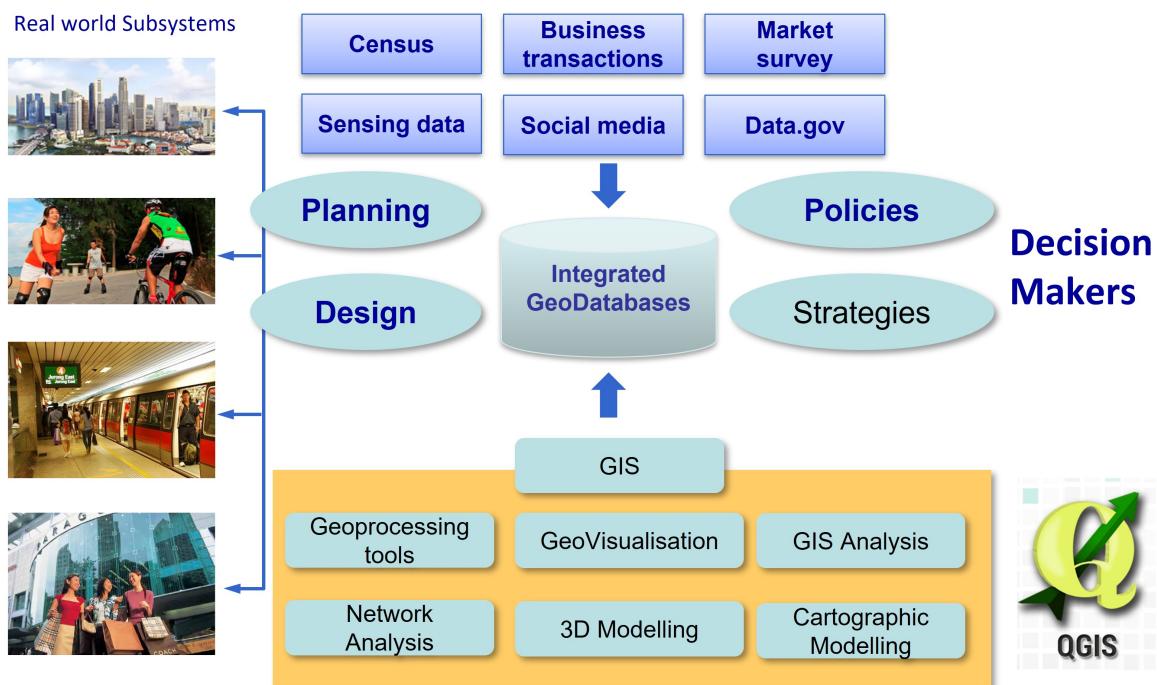
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09/11/2022

# **Table of contents**

# Welcome

This workbook consists of a collection QGIS methods specially designed to support the teaching needs of **SMT201 Geographic Information Systems for Urban Planning**. Each exercise maps closely to the topic covers in the weekly lesson. Having said that, this workbook can be useful also for others who are interested find out more about the potential used of QGIS for urban planning and management.



This workbook has two unique features. Firstly, all the exercises are developed based on **QGIS**, an open source GIS toolkit with full GIS functions including 3-D modelling, Network Analysis and image analysis. Secondly, all the use cases and data sets are from **Singapore**, one of the amazing city-state in the world with diverse culture.

## **License**

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# 1 Introduction

QGIS (formally known as Quantum GIS) is a full-features open source GIS software. It is the GIS tool used in this course.

This section provides you with step-by-step guide on how to download and install QGIS in your window-based computer (i.e. desktop or laptop).

## 1.1 Downloading QGIS installer

- Launch the web browser.
- In the address bar at the top of the window, enter <http://qgis.org/> and press **Enter**.

The website should look something like this:



- Click on **Download Now** button.

Your screen should look similar to the figure below.

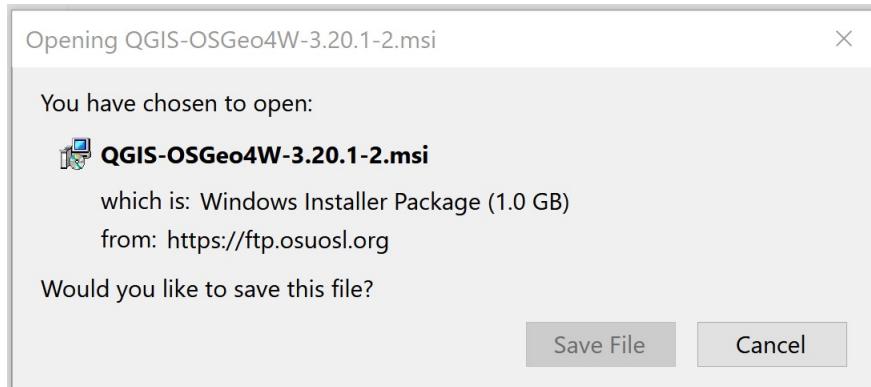
The screenshot shows the QGIS download page. At the top, there are links for 'DISCOVER QGIS', 'FOR USERS', 'GET INVOLVED', and 'DOCUMENTATION'. A language dropdown shows 'English'. Below the header, it says 'Download QGIS for your platform'. It mentions binary packages (installers) available from this page, specifically QGIS 3.26.1 'Buenos Aires' released on 15.07.2022, and QGIS 3.22.9 'Bialowieża'. It notes QGIS availability on Windows, macOS, Linux, Android, and iOS. Below this, there are tabs for 'INSTALLATION DOWNLOADS', 'ALL RELEASES', and 'SOURCES', with 'INSTALLATION DOWNLOADS' currently selected.

This is a detailed view of the 'Download for Windows' section. It starts with a heading 'QGIS in OSGeo4W (recommended for regular users):'. It features a green QGIS icon followed by the text 'OSGeo4W Network Installer'. Below this, it provides instructions: 'In the installer choose Express Install and select QGIS to install the latest release or QGIS LTR to install the long term release.' It also states that express installations have optional packages including non-free software. A note says 'To avoid those you have to use the Advanced Install and choose qgis and/or qgis-ltr in the desktop section.' At the bottom, two cautionary notes are present: one about upgrading from OSGeo4W v1 and another about 32-bit binaries no longer being produced for Windows 7 due to Python 3.9 support.

- Click on **QGIS Standalone Installer Version 3.26**

This screenshot shows the 'Standalone installers (MSI) from OSGeo4W packages (recommended for new users)' section. It highlights the 'Latest release (richest on features)': 'QGIS Standalone Installer Version 3.26'. Below the title, there is a green QGIS logo with a download arrow, the text 'sha256', and a link to the file.

After a few seconds (depend on your network speed), a pop-up window appears.



- Click on the **Save File** button.

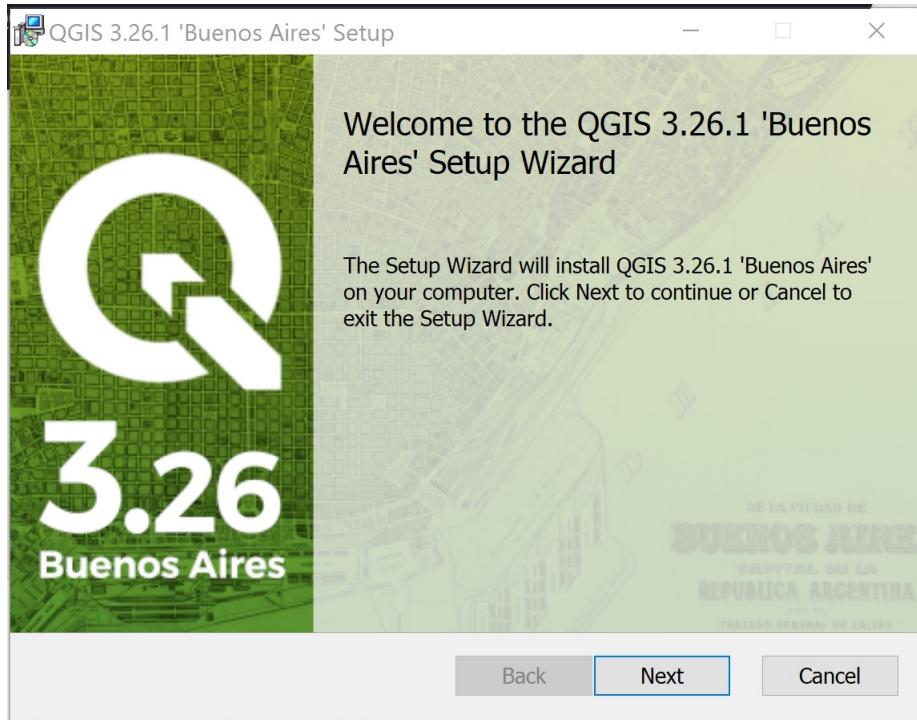
Be patient, the downloading will take a few minutes depend on the speed of your internet.

## 1.2 Installing QGIS

In this section, you will learn how to install QGIS into your computer.

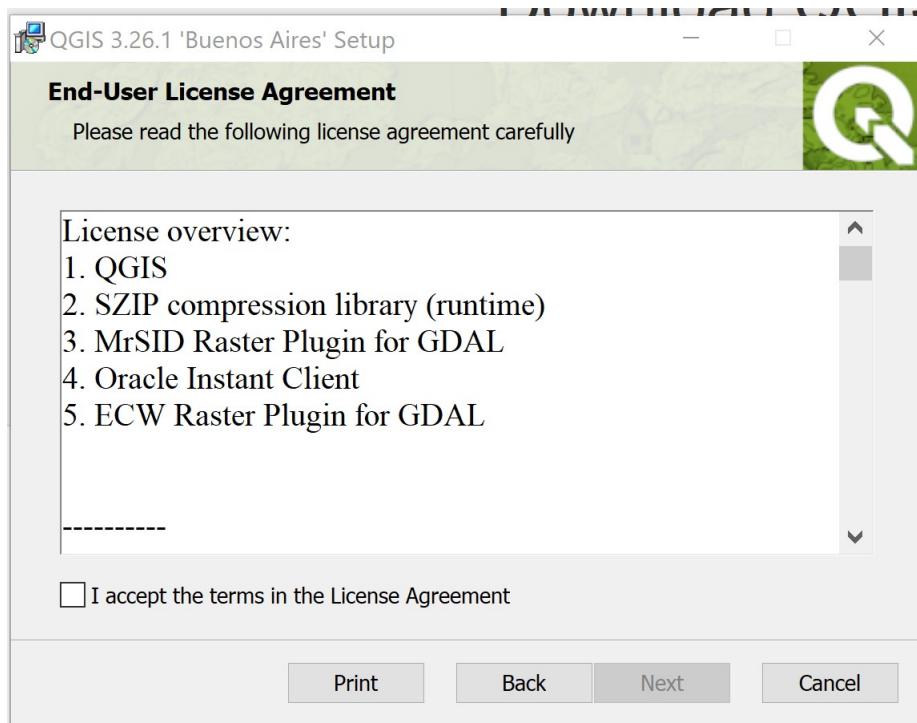
- Find the QGIS installer on your computer, right-click and select **Install** from the context menu to launch the setup.
- Click on the **Yes** button when Windows prompt you with the dialog “Do you want to allow this app to make change to your device?”

After a few second, the Setup Wizard dialog window appears.



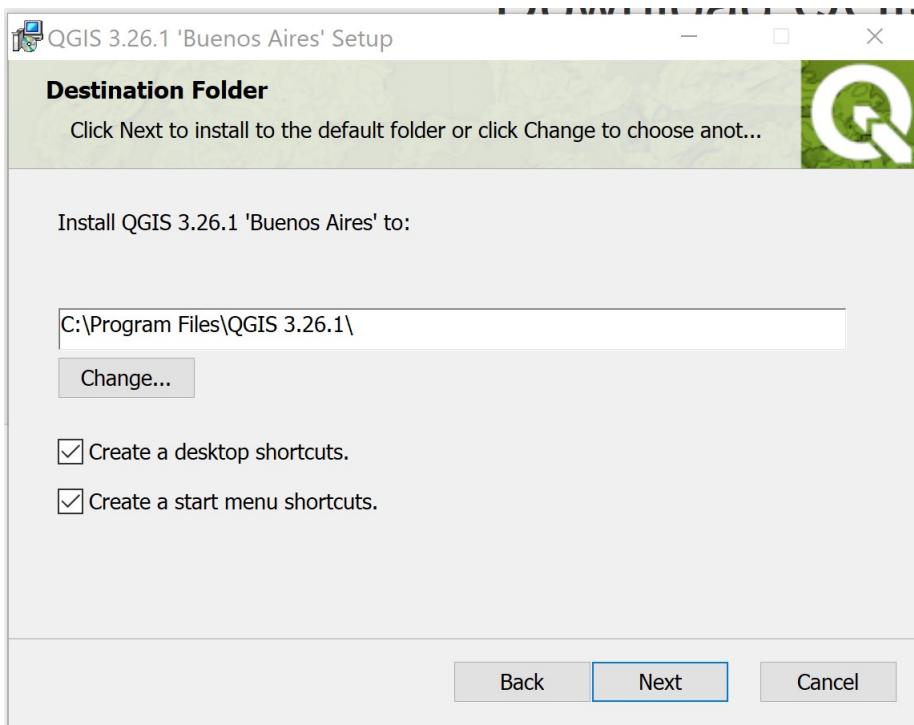
- Click on the **Next** button.

The End-User License Agreement dialog window appears.



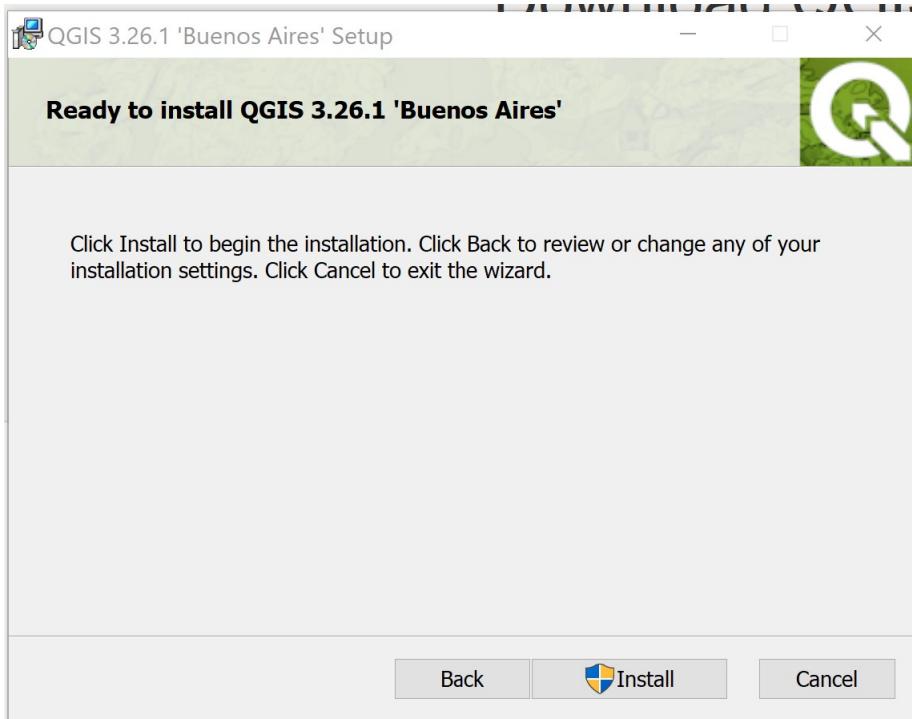
- Click on the checkbox in front of **I accept the terms in the License Agreement** button.
- Then, click on **Next** button.

The Destination Folder dialog window appears.

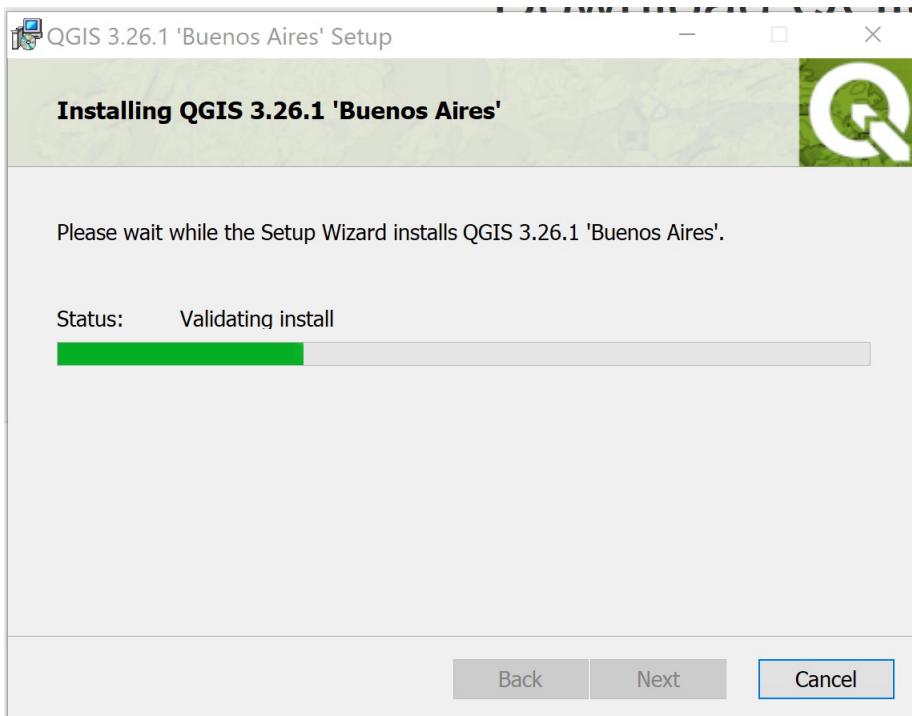


- Ensure that the Destination Folder is at `C:\Program Files\QGIS 3.26.1\`
- Keep both checkboxes selected.
- Click on the **Next** button.

The **Ready to install QGIS 3.26.1 ‘Buenos Aires’** dialog window appears.



- Click on **Install** button to start the installation process.



QGIS will begin to install. It may take a few minutes to install so be patient.

When the installation is completed, a Setup Wizard window look similar to the screenshot below appears.



- Click on **Finish** button.

Congratulations! You have installed QGIS successfully!

# 2 My First Date with QGIS

In this hands-on exercise, you will learn the basic operations of a GIS software in general and the graphic user interfaces (GUIs) of QGIS specifically.

## 2.1 Getting Started

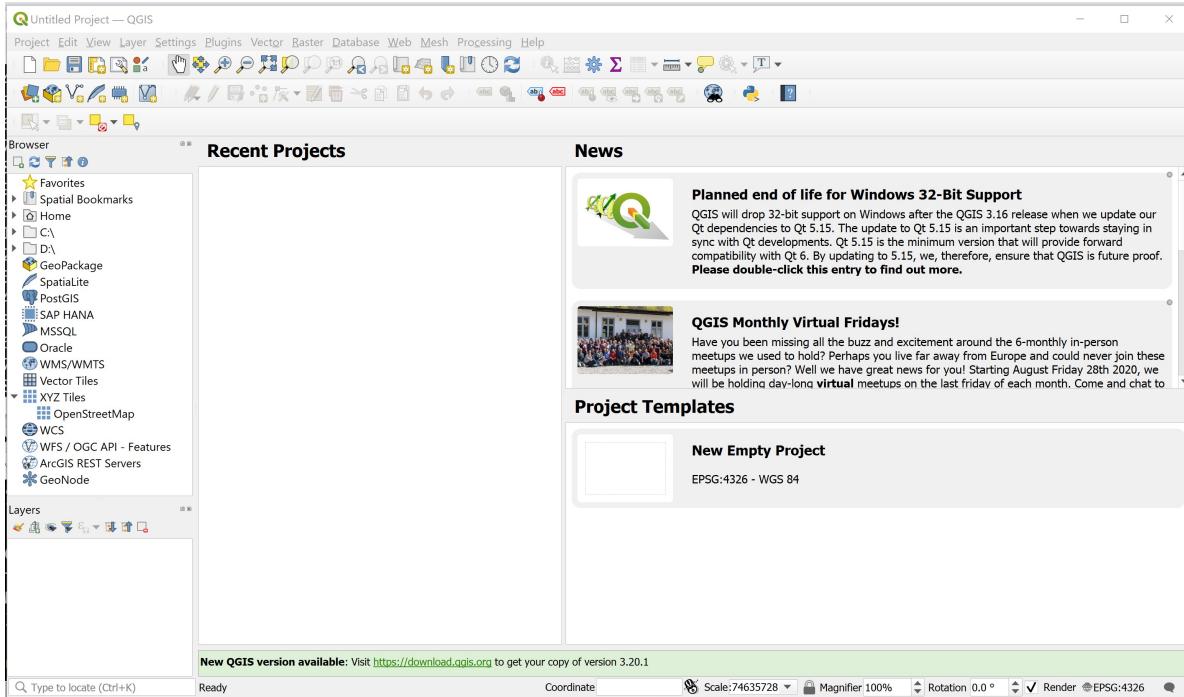
First, you will launch QGIS.

- At your window desktop, double-click on **QGIS Desktop3.26** icon.

After a few seconds, QGIS window appears.

- On the *QGIS Tips! Dialog* window, click on the **OK** button.

Your screen should look similar to the figure below.



### 2.1.1 Getting to know a GIS project file

A GIS project file provides a link between the GIS software and the geospatial datasets instead of stored data. It also contains GIS operation configurations such as symbolisation used, data classification, map projection, the paths of each data and map design. In this section, you will explore an existing QGIS's project file called Hands-on01.qgs.

- Start Window Explorer.
- Navigate to \SMT201\Hands-on\_Ex01\ sub-folder.

You will find a file called Hands-On01.qgs in the sub-folder.

- Right-click on Hands-On01.qgs.
- Select **Open** with from the context menu.
- Use the **Notepad** to open the file.

The Notepad window should look similar to the figure below.



The screenshot shows a Windows Notepad window titled "Hands-On01 - Notepad". The content of the window is the XML code of a QGIS project file. The code defines a project with a name ("Hands-On01"), version ("3.8.2-Zanzibar"), and various spatial settings like projection and coordinate system. It also lists several layers, including "Shopping", "RoadSectionLine", "Building", and "Cadastral\_Lot", each with its own unique identifier and provider settings.

```
<!DOCTYPE qgis PUBLIC 'http://mrcc.com/qgis.dtd' 'SYSTEM'>
<qgis projectname="" version="3.8.2-Zanzibar">
  <homePath path="/" />
  <title></title>
  <autotransaction active="0"/>
  <evaluateDefaultValues active="0"/>
  <trust active="0"/>
  <projectCrs>
    <spatialrefsys>
      <proj4>+proj=tmerc +lat_0=1.366666666666667 +lon_0=103.8333333333333 +k=1 +x_0=28001.642 +y_0=38744.572 +ellps=WGS84 +units=m +no_defs</proj4>
      <srsid>1372</srsid>
      <srid>3414</srid>
      <authid>EPSG:3414</authid>
      <description>SVY21 / Singapore TM</description>
      <projectionacronym>tmerc</projectionacronym>
      <ellipsoidacronym>WGS84</ellipsoidacronym>
      <geographicflag>false</geographicflag>
    </spatialrefsys>
  </projectCrs>
  <layer-tree-group>
    <customproperties/>
    <layer-tree-layer name="Shopping" id="Shopping20121007002102169" checked="Qt::Checked" providerKey="ogr" expanded="0" source=".//data/SHPFiles/Sh</layer-tree-layer>
    <layer-tree-layer name="RoadSectionLine" id="RoadSectionLine_ee86f5a0_94f3_4313_848d_2e0edd941bd3" checked="Qt::Checked" providerKey="ogr" expanded="0" source=".//data/SLAData/Ro</layer-tree-layer>
    <layer-tree-layer name="Building" id="Building20121007000852999" checked="Qt::Checked" providerKey="ogr" expanded="0" source=".//data/SLAData/Bui</layer-tree-layer>
    <layer-tree-layer name="Cadastral_Lot" id="Cadastral_Lot20121007000853155" checked="Qt::Unchecked" providerKey="ogr" expanded="0" source=".//data/SLAData/Cad</layer-tree-layer>
  </layer-tree-group>
</qgis>
```

Notice that the QGIS project file is actually in XML format.

- Close Notepad.

### 2.1.2 Open an existing project file

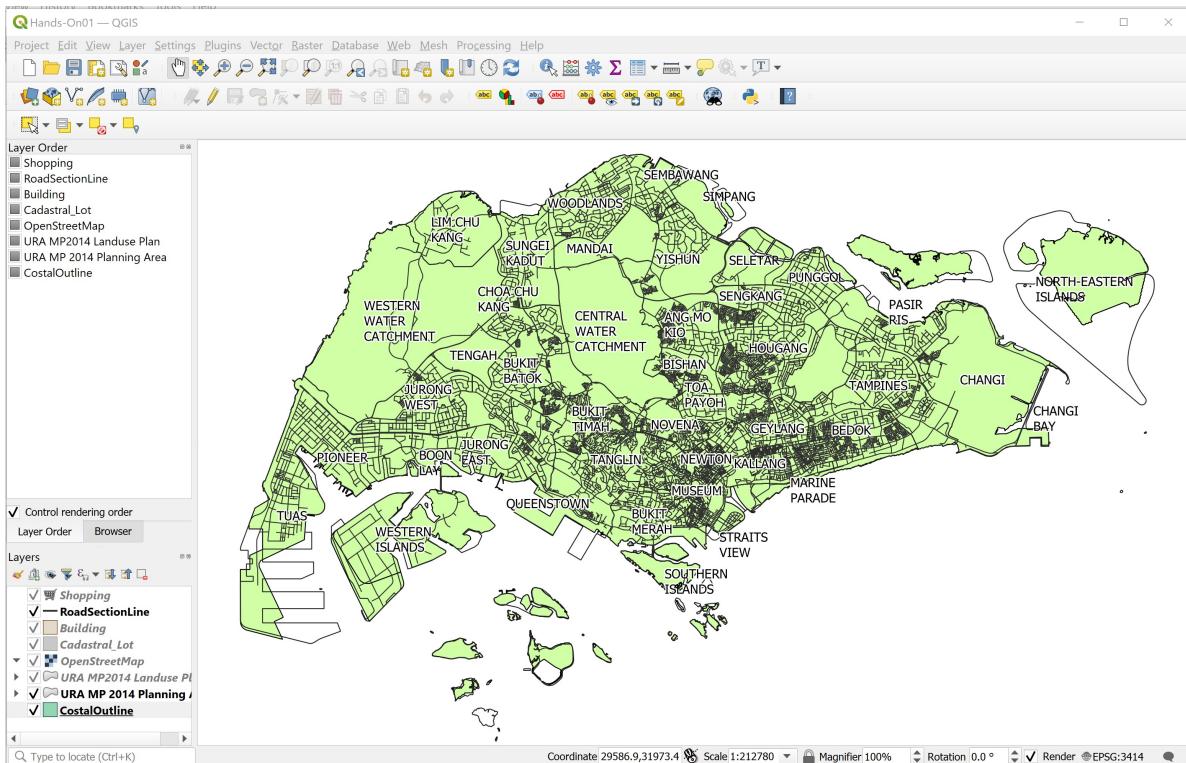
In this section, you will learn how to open an existing QGIS project file.

- From QGIS main menu, click on **Project -> Open**.

The **Choose a QGIS project file to open** dialog window appears.

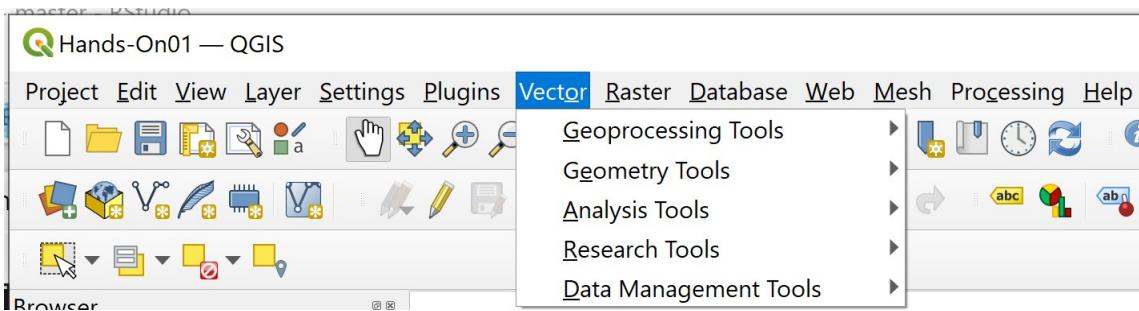
- Navigate to \SMT201\Hands-on\_Ex01\ sub-folder.
- Double-click on **Hans-On01.qgs** file.

Your screen should look similar to the figure below.

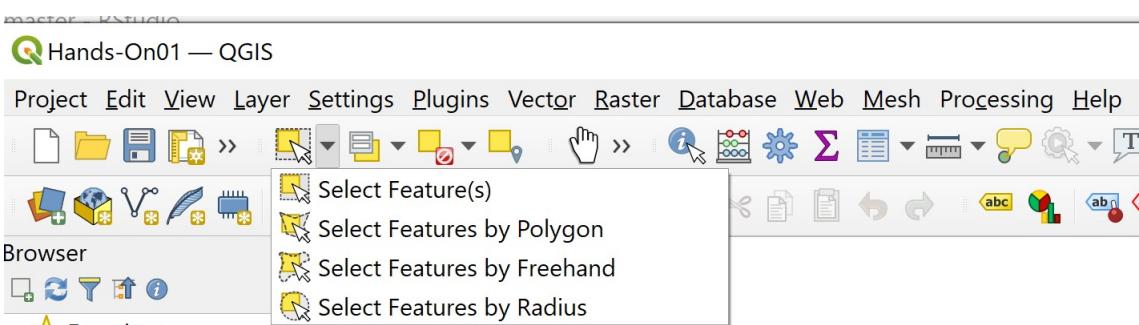


## 2.2 Exploring QGIS interfaces

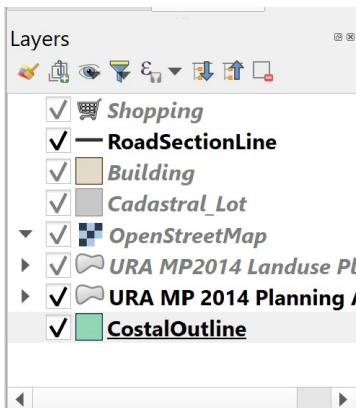
The QGIS interface comprises six major components. They are: menu bar, toolbar, map legend, browser, status bar and map view. The **Menu Bar** provides access to various features and functions of QGIS using hierarchical menu. The location of the menu and menu items is fixed, although if you activate certain plugins, they may add an additional menu to the bar.



The **Toolbar** replicates many of the features and functions in the Menu Bar, providing access to common features in a single click. The location of the toolbar is not fixed; if you hover over the edge of the toolbar and hold down the left mouse button you can drag the toolbar wherever you like.



The **Map Legend** lists data layers that are linked with the current project.



You can turn each of the data layer on and off by clicking on the checkbox in front of each data layer.

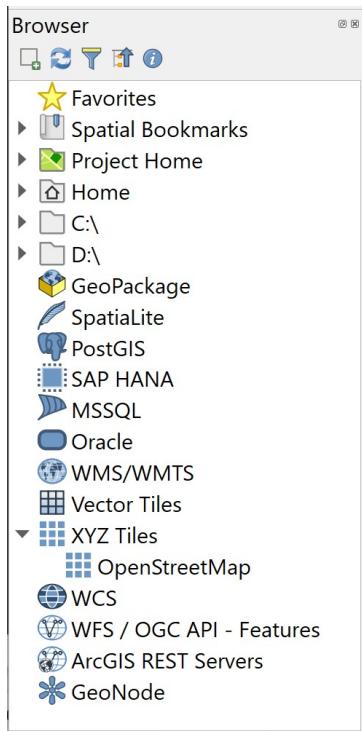
- From the Map Legend, click on the checkbox in front of CoastalOutline.

Notice that the Singapore boundary map on the Map View window disappears.

- Click on the checkbox in front of CoastalOutline again.

Notice that the Singapore boundary map on the Map View window reappears.

The **Browser**, a new feature in QGIS 2.0, allows users to see their file system and all of the GIS data files and databases. It also allows users to drag files from the file system into QGIS project.



The **Status Bar** shows the current scale of the map view, the coordinates of the current position of the cursor and the coordinate system used by the project. When a computation operation such as buffering is used, the progress meters will appear here to show the progress of the operations.



Last but not least, the **Map View** window displays all the active layers in the project.

## 2.3 Navigating the Map View

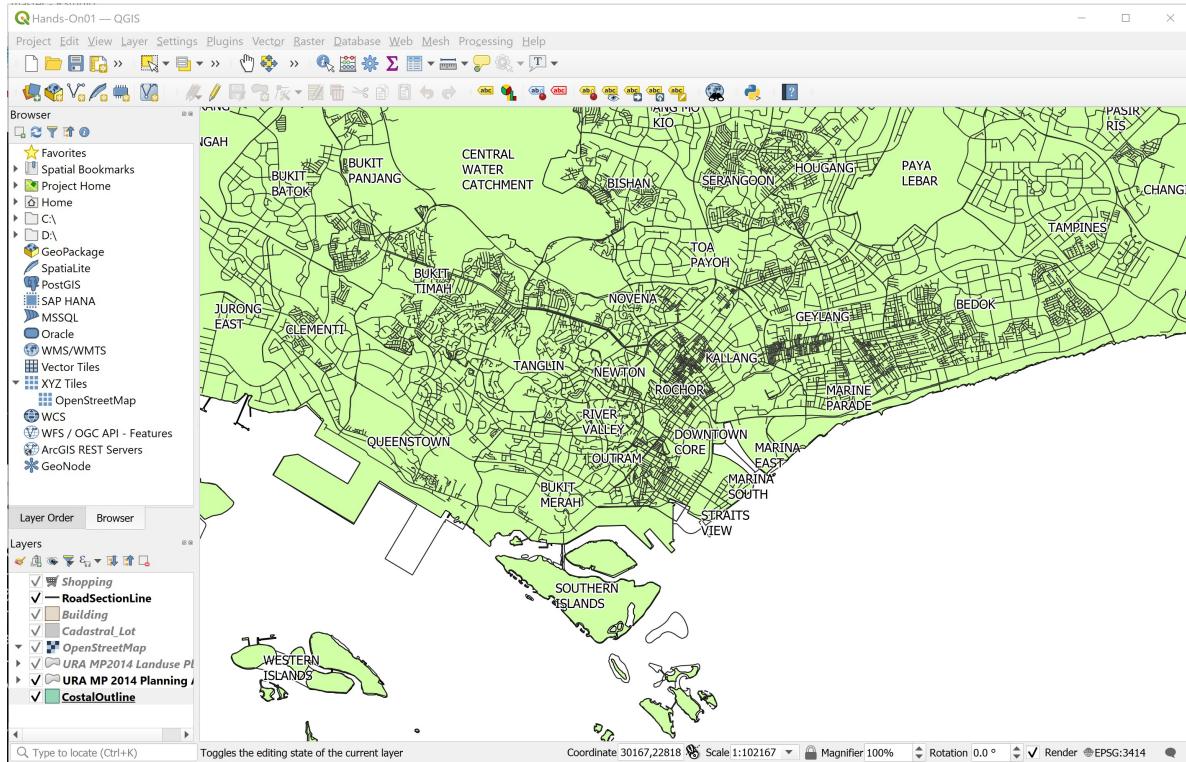
### 2.3.1 Navigating around a GIS view

In this section, you will learn how to navigate around the Map View. First, you will work with the navigation tools.



- From the **Toolbar**, click on the **Zoom In** tool.
- Hover the mouse to the centre of Singapore, click once.

Your screen should look similar to the figure below.



Notice that the map layer zooms into a new extent.

Now, you want to return to the previous extent.

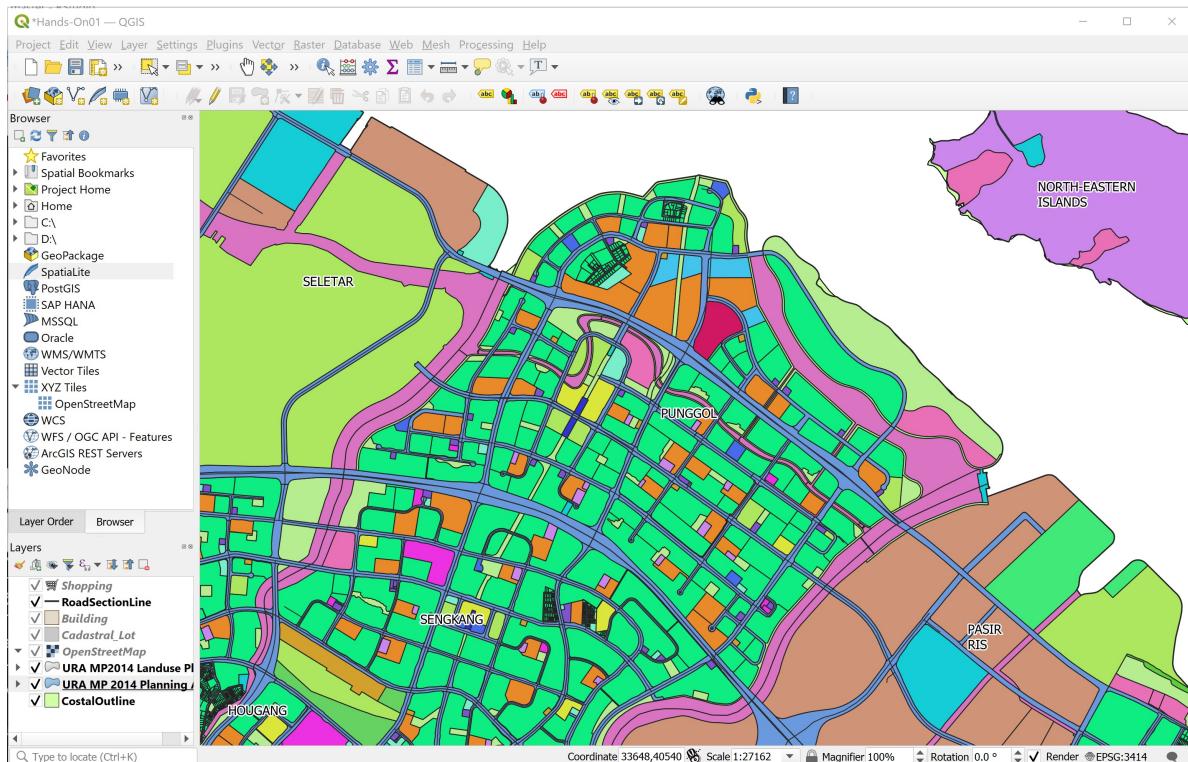
- From **Map Navigation Toolbar**, click on the **Zoom Last** tool.

Notice that the map view returns to the initial extant now.

Next, you will learn how to zoom into a specific location using the Zoom In tool. For example, we would like to zoom into the mark area as shown in the figure below.

- From **Map Navigation Toolbar**, click on the **Zoom In** tool.
- Hover the mouse over Punggol Planning Area.
- Press on the left button of the mouse, drag to form a rectangle around Puggol Planning Area.
- Release the left button.

Your screen should look similar to the figure below. Notice that the URA MP2014 Landuse Plan layer appears now.



Next, you will return to the previous extent using alternative zooming tool.

- From **Map Navigation Toolbar**, click on the **Zoom to Layer** tool.

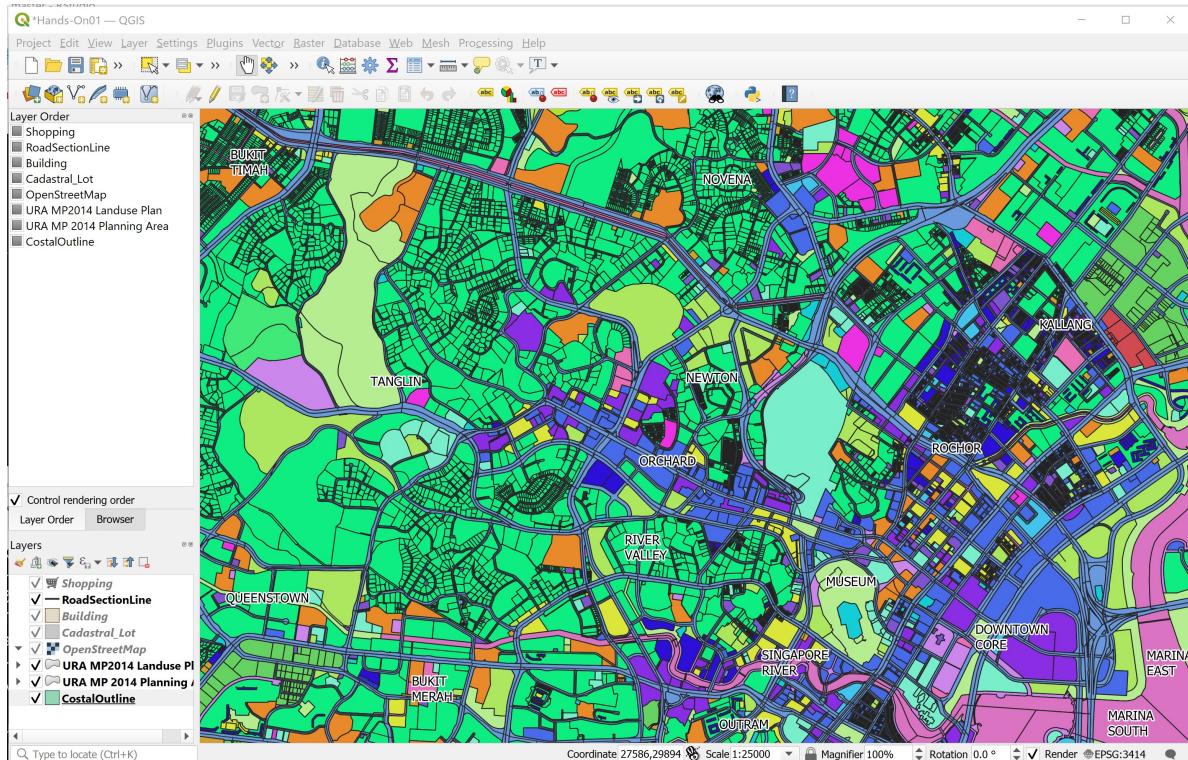
Notice that the map view returns to the previous state and *URA MP2014 Landuse Plan* layers are turned off again.

DIY: Try out the remaining navigation tools in **Map Navigation Toolbar**.

### 2.3.2 Map Navigation by changing the map scale

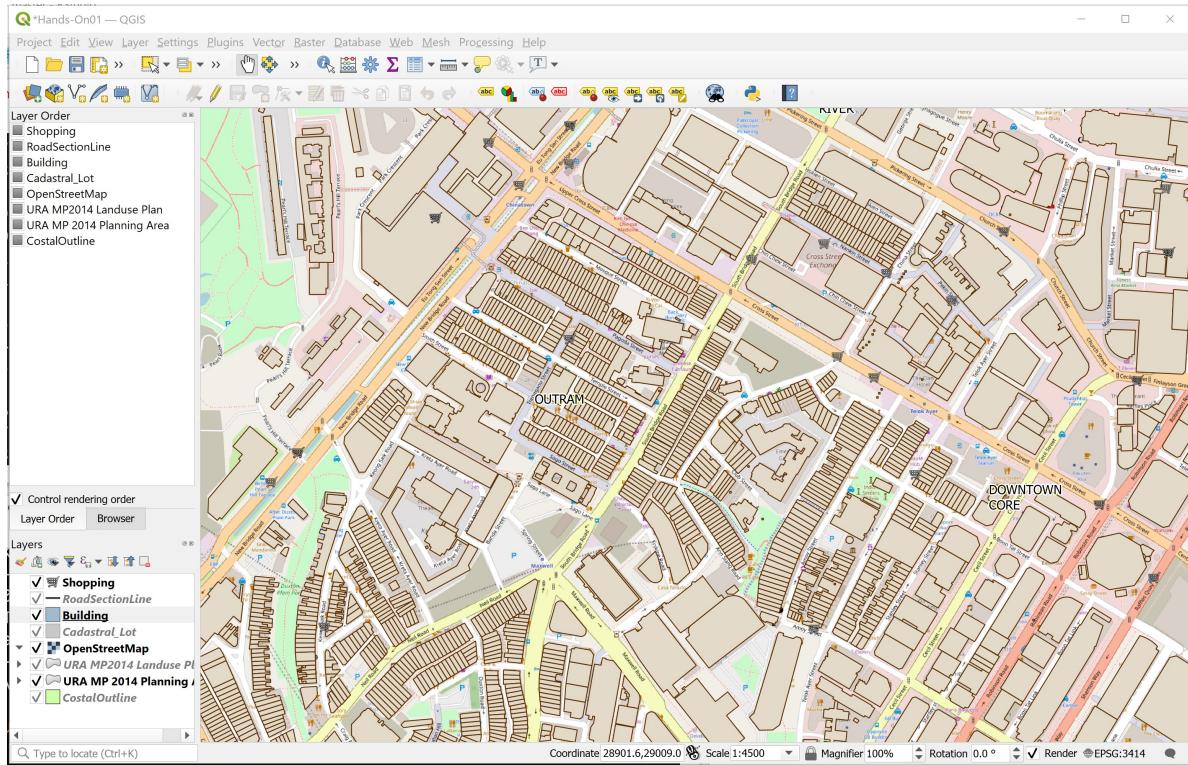
In this section, you will learn how to change the map view by changing the map scale.

- From the **Status bar** (located below Map View), click on the drop-down list of **Scale**.
- Select **1:25,000**.
- Use the **Pan tool** to move the map area so that it looks similar to the figure below.



- From the **Scale** of at the **Status bar**, click on the drop-down list again.
- Select **1:4500**.

Your screen should look similar to the figure below. Notice that more detail appears when the map scale increases.



## 2.4 Exploring GIS data

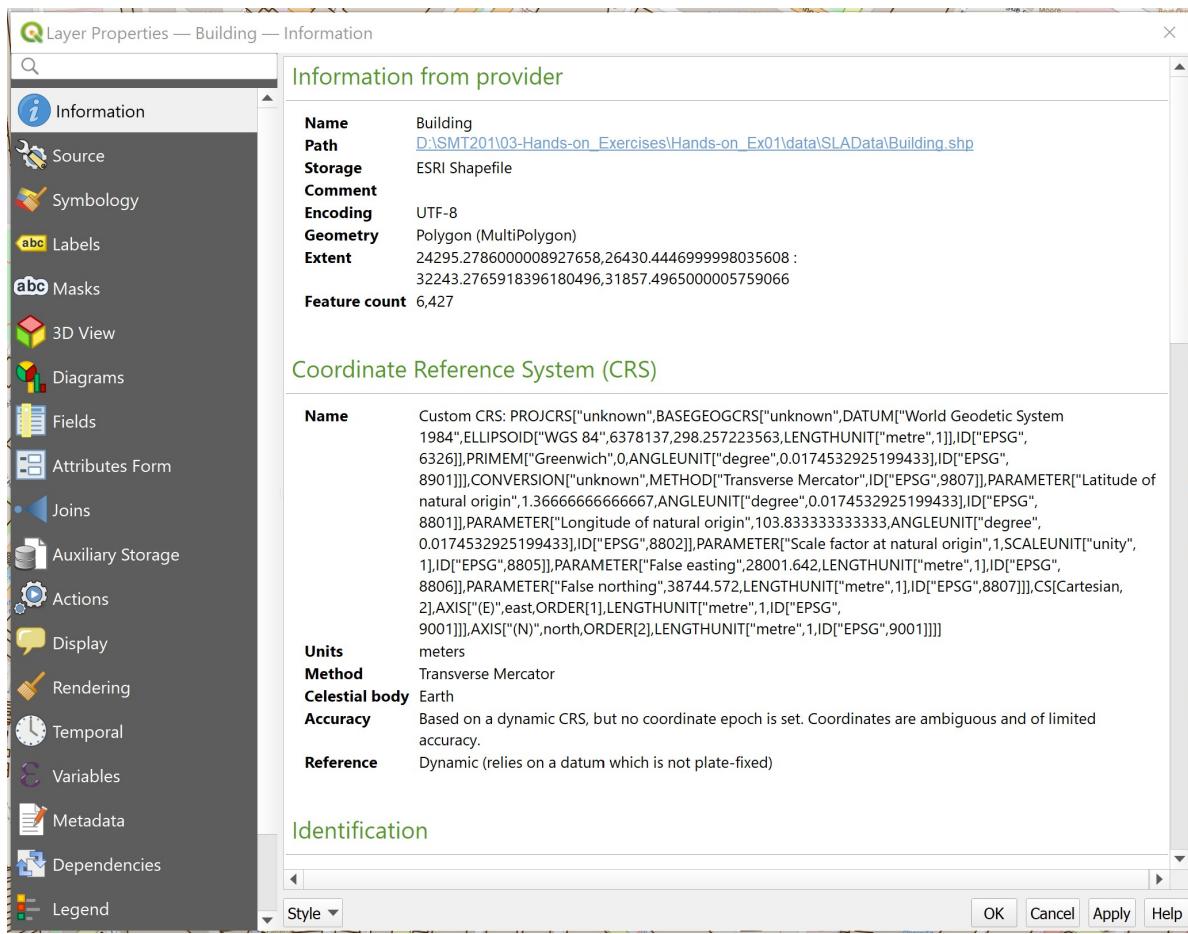
In this section, you will learn how to interact with the features that appear in the Map View and retrieve their corresponding attribute information.

### 2.4.1 Exploring GIS Layer

In this sub-section, you will learn how to explore the information of individual GIS layer.

- From the **Map Legend** window, right-click on **Building** layer.
- Select **Properties** from the context menu.

The Layer Properties of Building layer appears. It provides the full metadata of Building layer, its symbolization configuration and the data fields.



By default, QGIS will display the general information of the selected layer. You can retrieve other information or configurations of the layer by clicking on the appropriate tab.

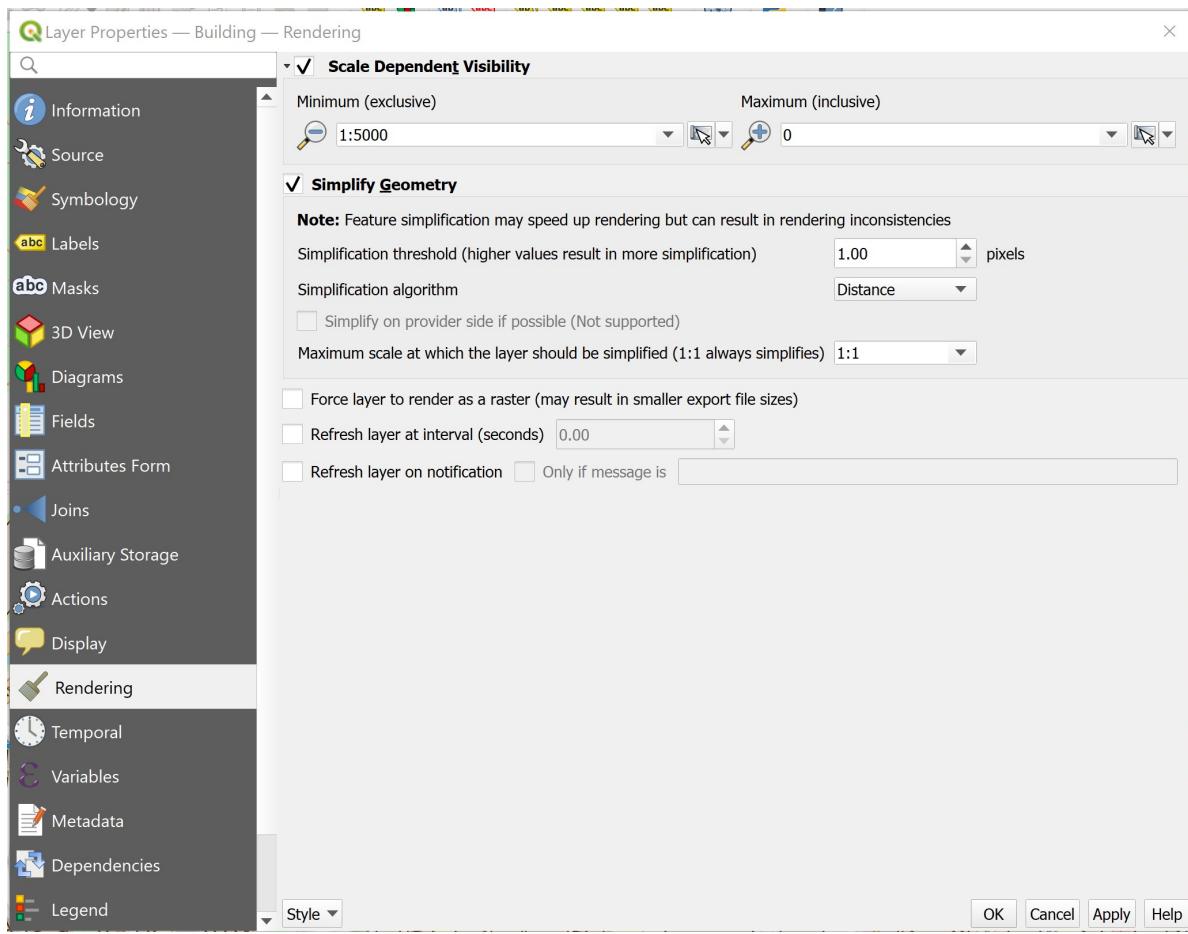
The key information available are as follows:

- Source shows the path of Building layer.
- Storage reveals the file type, i.e. ESRI Shapefile format.
- Geometry indicate the spatial object used to represent the real world feature.
- CRS shows the georeferencing information of the active layer (i.e. SVY21/Singapore TM).
- Unit is the unit measurement of the active layer.

Let us examine other tab.

- Click on **Rendering** tab.

Your screen should look similar to the figure below.

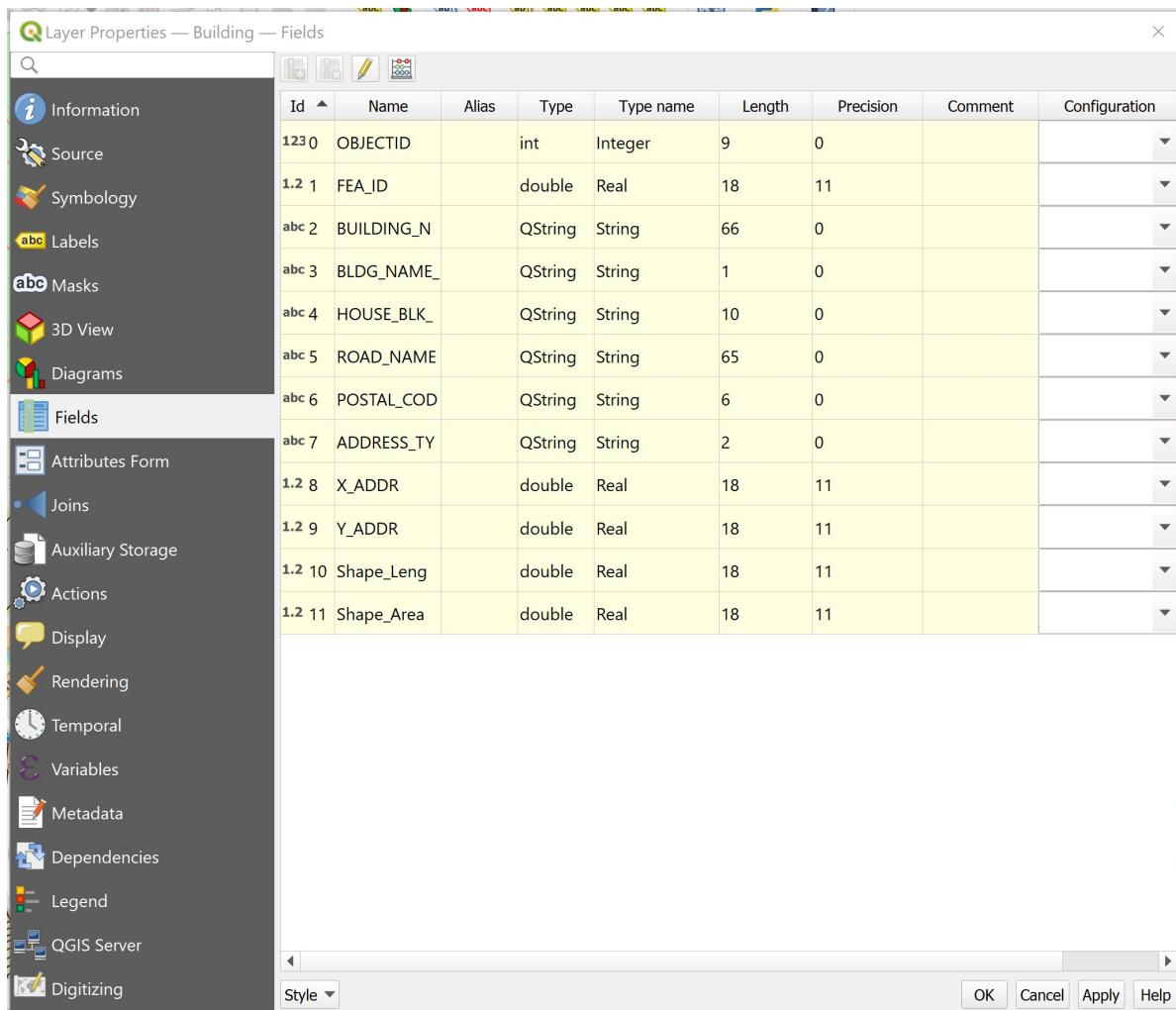


Note that the minimum map scale is 5000. That explains why the building layer only appears when the map scale of Map View is less than or equal to 1:5000.

Next, you will explore the data fields of Building layer.

- Click on the **Field** tab.

Your screen should look similar to the figure below.



Notice that there are 12 fields in the corresponding attribute table of Building layer. The Layer Properties window also shows the data type, length and precision of each field.

You will explore the other tabs in the next hands-on.

- At the **Layer Properties** window, click on the cross button located at the upper right hand corner to close the window.

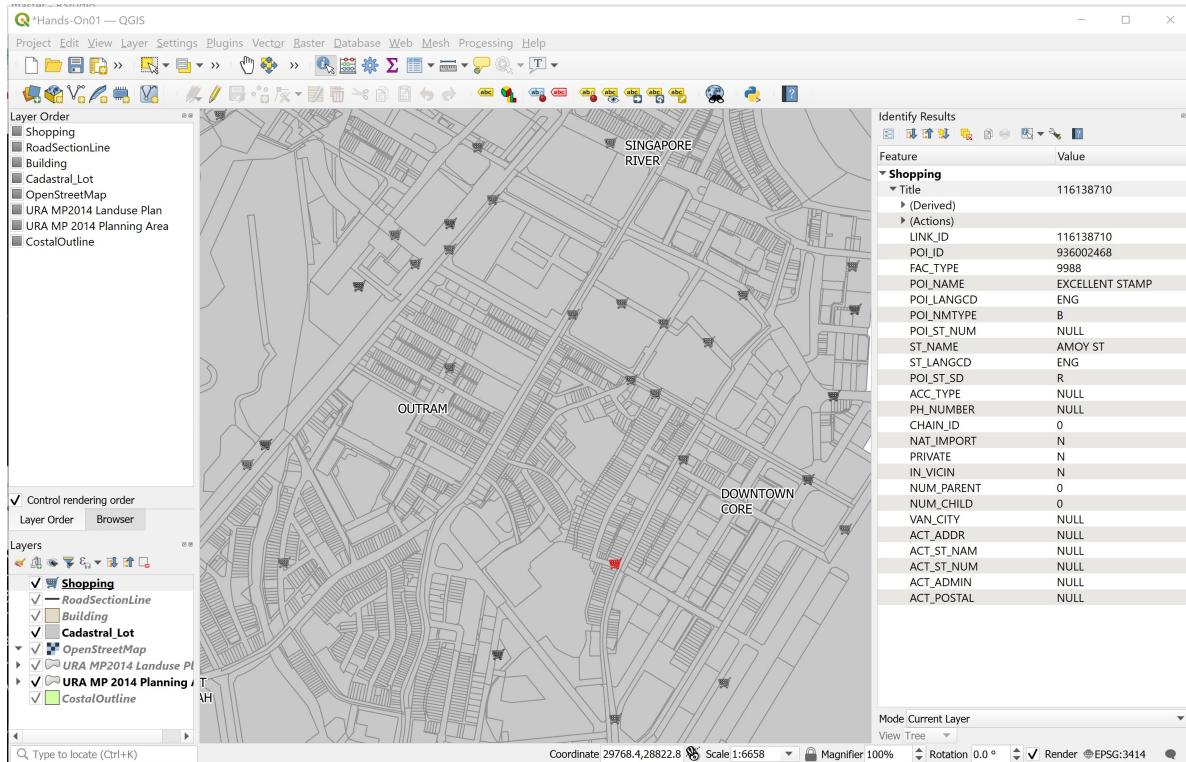
#### 2.4.2 Working with Identify Features tool

Using **Identify Features** tool to interact with a geographical feature and retrieve its corresponding attribute information is a two steps process. First, you need to make the layer of the feature active. Then, you will use the Identify Features tool to query the information.

In this section, you will learn how to query information of a selected Shopping feature (marks by a circle in the figure above).

- At the **Map Legend** window, click on **Shopping** layer to make it active.
- Click on the **Identify Features** tool.
- At the **Map View** window, hovers the mouse over the shopping feature you are interested to query (the one marked in the figure above).
- Click on an shopping feature.

Your screen should look similar to the figure below.



Notice that the selected shopping feature was highlighted (i.e. in red) and the Identify Results window appears.

**DIY:** Using the steps you had learned from this section, query a building feature, a road network feature and a URA planning area feature.

### 2.4.3 Query Attribute Table

The ability to interactively select a geographic feature and query its associated attribute information is a very powerful feature of a GIS. However, there are times that you would like to see the attributes of all the features in a GIS layer. In this section, you will learn how to use QGIS's Open Attribute Table function to display the attribute table of a GIS layer.

- At the **Map Legend** window, right-click on **Building** layer.
- Select **Open Attribute Table** from the context menu.

The **Attribute table** window appears.

OBJECTID	FEA_ID	BUILDING_N	BLDG_NAME_	HOUSE_BLK	ROAD_NAME	POSTAL_COD	ADDRESS_TY	X_ADDR	Y_ADDR	Shape_Leng	Shape_Area
1	72	96220.0000000...	KIM LIN PARK	1	53	JALAN KELAWAR	249282	R	27258.22543340...	31440.57936000...	61.46964405620
2	111	181573.0000000...	SUPREME COUR...	4	1	SUPREME COUR...	178879	S	29939.91939340...	30311.95074830...	364.01626076500
3	112	93776.0000000...	MASONIC HALL	1	23A	COLEMAN STREET	179806	S	29718.30448100...	30538.49507430...	38.94401655170
4	181	13949.0000000...	NULL	3	123	DEVONSHIRE R...	239883	S	28338.42272870...	31346.15357220...	63.62348996960
5	221	134723.0000000...	NULL	3	96	DEPOT ROAD	109668	S	25917.31271140...	29300.44101220...	5.51993779678
6	231	108591.0000000...	BOAT QUAY CO...	1	78	BOAT QUAY	049866	U	29764.67951170...	30078.64915540...	65.17508638430
7	239	32148.0000000...	HONG LEONG B...	1	16	RAFFLES QUAY	048581	K	29958.79157210...	29312.13831670...	245.92411508800
8	250	99425.0000000...	NULL	NULL	1A	EVERTON PARK	083001	H	28772.27525990...	28850.76474240...	56.78621749040
9	270	84448.0000000...	NULL	3	717	HAVELOCK ROAD	169643	U	27403.75187120...	30175.67069530...	63.44003681010
10	298	48745.0000000...	NULL	3	14	BUKIT TERESA C...	099786	S	27187.33236730...	28793.69445910...	45.66329901900
11	312	85588.0000000...	BOAT QUAY CO...	1	8	LORONG TELOK	049021	U	29695.19284740...	29927.52356440...	59.01840001780
12	345	28963.0000000...	TANJONG PAGA...	1	161	NEIL ROAD	088885	S	28437.04514220...	28843.09453260...	77.42513786000
13	348	55641.0000000...	MND BUILDING ...	2	7	MAXWELL ROAD	069111	K	29478.87861560...	29075.00437330...	305.06211243900
14	371	8227.0000000...	TIONG BAHRU E...	1	71	SENG POH ROAD	160071	H	27909.45756890...	29630.65914530...	154.33878200000
15	446	101226.0000000...	NULL	3	25	KRETA AYER RO...	088993	U	28991.73224670...	29219.45829530...	64.73914826100
16	458	104540.0000000...	MASONIC HALL	1	23A	COLEMAN STREET	179806	S	29742.62190010...	30523.59211800...	144.42839468600
17	493	49146.0000000...	BESTWAY BUILD...	1	12	PRINCE EDWAR...	079212	K	29590.40181890...	28505.23467200...	127.16239630900
18	501	78187.0000000...	NULL	3	9	SMITH STREET	058923	U	29249.64270920...	29375.53690890...	47.22732439360

The table provide detail information of each geographical feature (i.e. building) such as building name, postal code, road name, block number, just to name a few of them.

DIY: Using the steps you had learned from this section, review the attribute table of Shopping and URA MP2014 Planning Area layers.

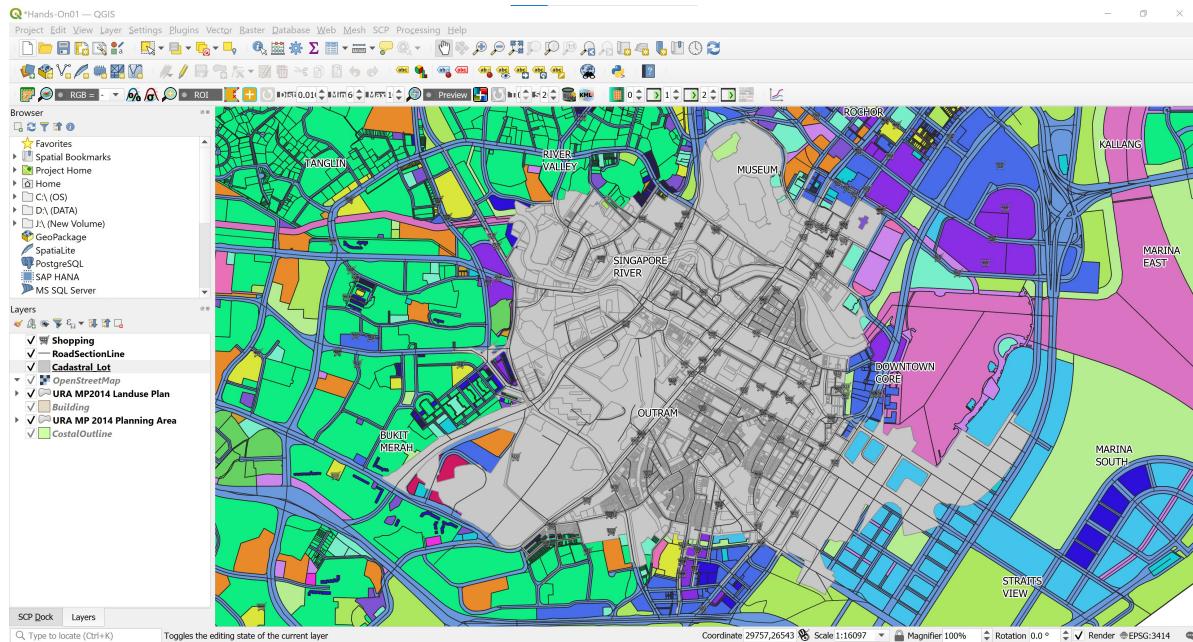
## 2.5 Spatial Bookmarking

Spatial Bookmarks allow us to “bookmark” a geographic location and return to it later. In this sub-section, you will learn how to create a spatial bookmark. You will also learn how to navigate using spatial bookmark.

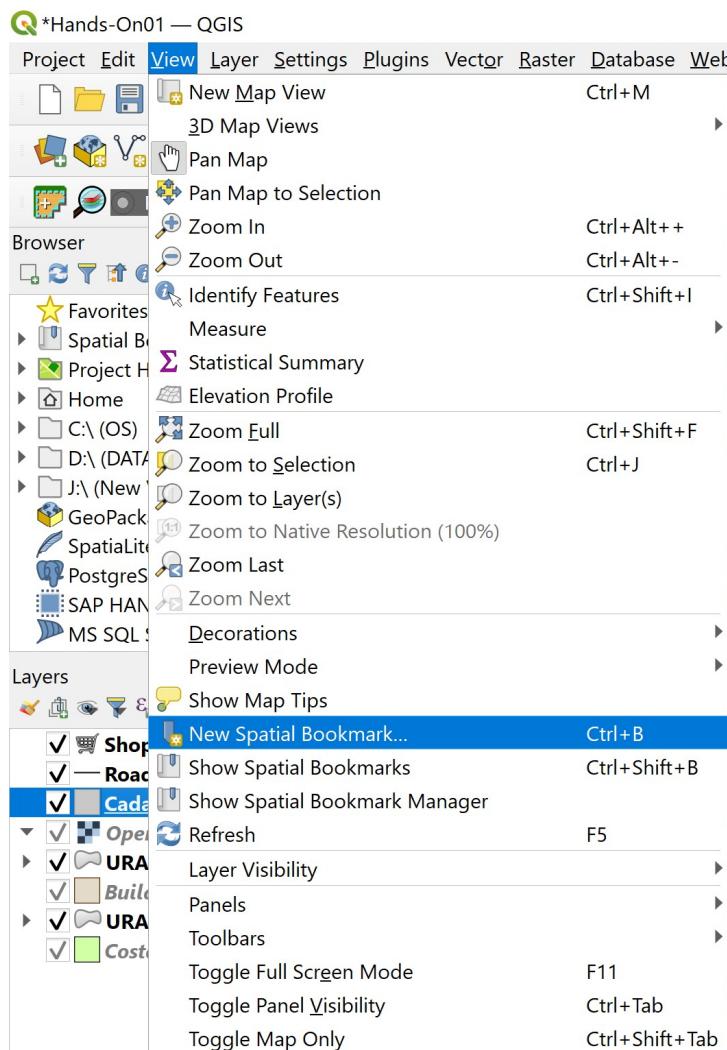
### 2.5.1 Create spatial bookmark

We are interested to create a bookmark for the downtown centre.

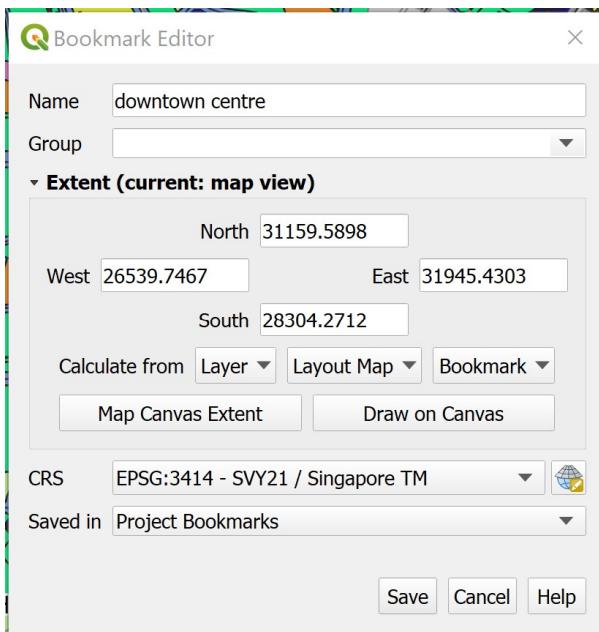
- At the layer panel, right click on Cadastral Lot, select **Zoom to Layer(s)** from the context menu.\*



- From the menu bar, click on **View -> New Spatial Bookmark**.



Bookmark Editor dialog window appears.



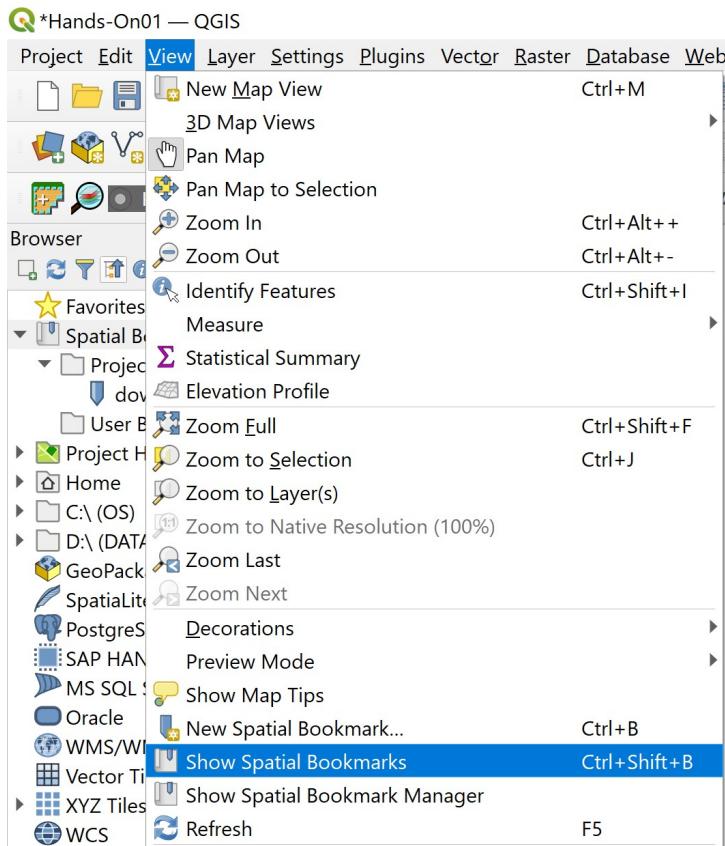
- For **Name:**, type `downtown centre`.
- For **Save in**, select **Project Bookmarks** from the dropdown list. This will save the spatial bookmark in the project file.
- Click **Save** button.

Now, you are ready to test if the newly create spatial bookmark works correctly.

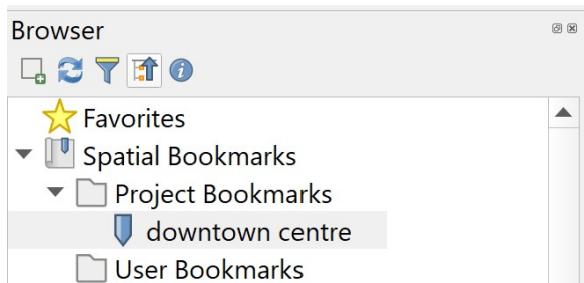
First, we will zoom out to the extend of planning area.

DIY: Using the steps you had learned from earlier section,zoom to the extend of URA MP 2014 Planning Area layer.

- From the menu bar select **View -> Show Spatial Bookmarks**.



Notice that a new item call Spatial Bookmarks is added on the Browser pane as shown in the screenshot below.



- Double-click on downtown centre.

Notice that the view will zoom to the same map extend centre at the Downtown Centre you have saved as spatial bookmark not long ago.

DIY: Choose a planning area i.e. Choa Chu Kang. Next, using the steps you had learned from earlier section, create a new spatial bookmark.

Whew! That was a lot to take in! Take a deep breath and relax. By now you should have a good understanding of the basic operations of QGIS. You can start playing with it and practice the techniques that you have learned.

# **3 Working with GIS Data**

A GIS is specially designed to manage geospatial data. This hands-on exercise consists of five sections. First, you will learn how to import geospatial data from different sources and file format into QGIS. At the same time, you will also learn how to check their feature type, coordinate system and other related information. You will also learn how to create a GIS data from an aspatial data by using QGIS. Next, you will learn how to transform this newly created GIS layer into Singapore National projected coordinates systems (i.e. SVY21). Lastly, you will also learn how to use the geocoding function of QGIS to create geospatially referenced data from a non-spatial data.

## **3.1 Learning Outcome**

By the end of this session, you will be able to:

- work with geospatial data from [data.gov.sg](http://data.gov.sg)
- create geospatially-enabled data
- create GIS Layer from a text data with georeference information
- transform a GIS data onto a different projection system
- work with raster GIS data • work with internet geospatial services • work with geospatial database

## **3.2 Working with Geospatial Data from [data.gov.sg](http://data.gov.sg)**

In this section, you will learn how to download geospatial data from [data.gov.sg](http://data.gov.sg) and import them into QGIS.

### **3.2.1 Downloading geospatial data from [data.gov.sg](http://data.gov.sg)**

First, you are required to download the following geospatial and aspatial data from [data.gov.sg](http://data.gov.sg):

- Master Plan 2014 Subzone Boundary (No Sea),
- Child Care Services,

- Street and Places, and
- School Directory and Information

### **3.2.2 Managing the imported data**

For any GIS project, it is important for us to practice good document management. Assuming that the root directory of this project is called `Hands-on_Ex02`,

- created a sub-folder call `data.gov`.
- inside `data.gov`, create two new sub-folders. Call them `geospatial` and `aspatial` respectively.
- place the downloaded Master Plan 2014 Subzone Boundary (No Sea), Child Care Services and Street and Places into the geospatial folder.
  - unzipped their respective zipped files,
  - extract the unzipped files, and
  - place them in `geospatial` folder.
- place the downloaded School Directory and Information zipped file into aspatial sub-folder.
  - unzipped the file,
  - copy and paste `general-information-of-schools.csv` into `aspatial` sub-folder.

The geospatial folder should look similar to the screenshot below.

Name	Date modified	Type	Size
child-care-services-geojson	29/8/2020 8:03 am	GEOJSON File	2,066 KB
child-care-services-kml	29/8/2020 8:02 am	KML File	2,897 KB
metadata-child-care-services	29/8/2020 8:02 am	Text Document	2 KB
metadata-master-plan-2014-subzone-boundary-no-sea	6/2/2017 3:15 pm	Text Document	2 KB
metadata-street-and-places	6/6/2017 11:56 am	Text Document	2 KB
MP14_SUBZONE_NO_SEA_PL.dbf	2/6/2016 12:46 pm	DBF File	80 KB
MP14_SUBZONE_NO_SEA_PL		KML File	2,782 KB
MP14_SUBZONE_NO_SEA_PL	2/6/2016 12:46 pm	PRJ File	1 KB
MP14_SUBZONE_NO_SEA_PL.sbn	2/6/2016 12:46 pm	SBN File	4 KB
MP14_SUBZONE_NO_SEA_PL.sbx	2/6/2016 12:46 pm	SBX File	1 KB
MP14_SUBZONE_NO_SEA_PL.shp	2/6/2016 12:46 pm	SHP File	890 KB
MP14_SUBZONE_NO_SEA_PL.shp	2/6/2016 12:46 pm	XML Document	12 KB
MP14_SUBZONE_NO_SEA_PL.shx	2/6/2016 12:46 pm	SHX File	3 KB
StreetsandPlaces.dbf	5/6/2017 2:57 pm	DBF File	930 KB
StreetsandPlaces		KML File	959 KB
StreetsandPlaces	5/6/2017 2:57 pm	PRJ File	1 KB
StreetsandPlaces.sbn	5/6/2017 2:57 pm	SBN File	4 KB
StreetsandPlaces.sbx	5/6/2017 2:57 pm	SBX File	1 KB
StreetsandPlaces.shp	5/6/2017 2:57 pm	SHP File	11 KB
StreetsandPlaces.shp	5/6/2017 2:57 pm	XML Document	13 KB
StreetsandPlaces.shx	5/6/2017 2:57 pm	SHX File	3 KB

Notice that besides the geospatial data files, I also include the metadata of the data into the folder. This is because the metadata provide useful information of the data and it is important for us to keep them for future references.

### 3.2.3 Examining the geospatial data

Before you add the GIS data into QGIS, you should spend some time to examine the files in **geospatial** folder.

Notice that the shapefile version of MP14\_SUBZONE\_NO\_SEA\_PL and StreetsandPlaces data sets are actually made up of multiples files that have the same names but with different extensions.

Mandatory files :

- .shp — shape format; the feature geometry itself
- .shx — shape index format; a positional index of the feature geometry to allow seeking forwards and backwards
- .dbf — attribute format; columnar attributes for each shape, in dBase IV format

Optional files :

- .prj — projection format; the coordinate system and projection information, a plain text file describing the spatial reference system
- .sbn and .sbx — a spatial index of the features
- .fbn and .fbx — a spatial index of the features for shapefiles that are read-only
- .ain and .aih — an attribute index of the active fields in a table or a theme's attribute table
- .lxs — a geocoding index for read-write shapefiles
- .mxs — a geocoding index for read-write shapefiles (ODB format)
- .atx — an attribute index for the .dbf file in the form of *shapefile.columnname.atx* (ArcGIS 8 and later)
- .shp.xml — geospatial metadata in XML format, such as ISO 19115 or other schemas
- .cpg — used to specify the code page (only for .dbf) for identifying the character encoding to be used

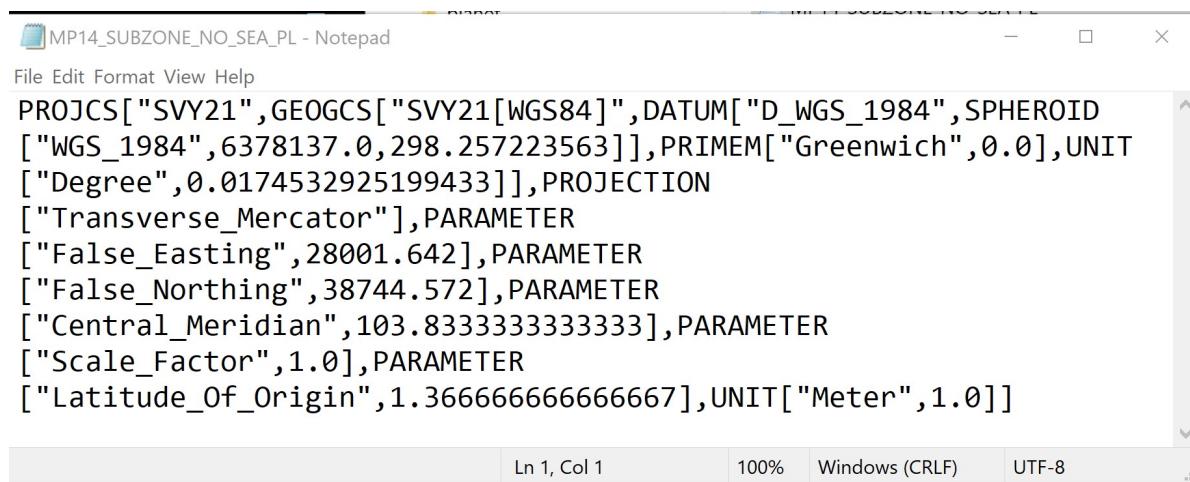
Table below details the meaning of each file.

Source: <https://en.wikipedia.org/wiki/Shapefile>

Next, you should also check the projection of the shapefile.

- Right-click on the PRJ file of MP14\_SUBZONE\_NO\_SEA\_PL
- Select *Open with -> NotePad*.

Your NotePad should look similar to the figure below.



```
MP14_SUBZONE_NO_SEA_PL - Notepad
File Edit Format View Help
PROJCS["SVY21",GEOGCS["SVY21[WGS84]",DATUM["D_WGS_1984",SPHEROID
["WGS_1984",6378137.0,298.257223563]],PRIMEM["Greenwich",0.0],UNIT
["Degree",0.0174532925199433]],PROJECTION
["Transverse_Mercator"],PARAMETER
["False_Easting",28001.642],PARAMETER
["False_Northing",38744.572],PARAMETER
["Central_Meridian",103.833333333333],PARAMETER
["Scale_Factor",1.0],PARAMETER
["Latitude_Of_Origin",1.3666666666666667],UNIT["Meter",1.0]]
```

From the screenshot, it is clear that MP14\_SUBZONE\_NO\_SEA\_PL is in svy21 projected coordinate system.

- Close the NotePad.

Different from shapefile, the geojson and kml files are editing in xml format. You can examine the content of these two files by using either Notepad or WordPad.