Micro-module A: Online Urban Data Gathering

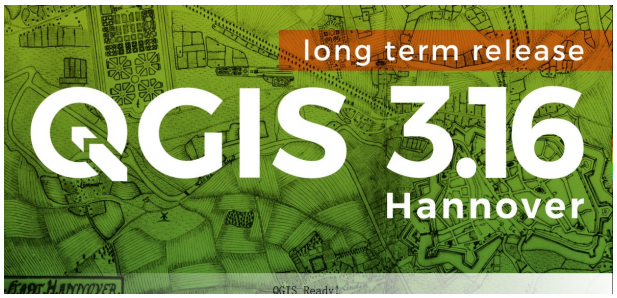
A1-Geographic Information Systems (GIS), Online Data Gathering and Processing

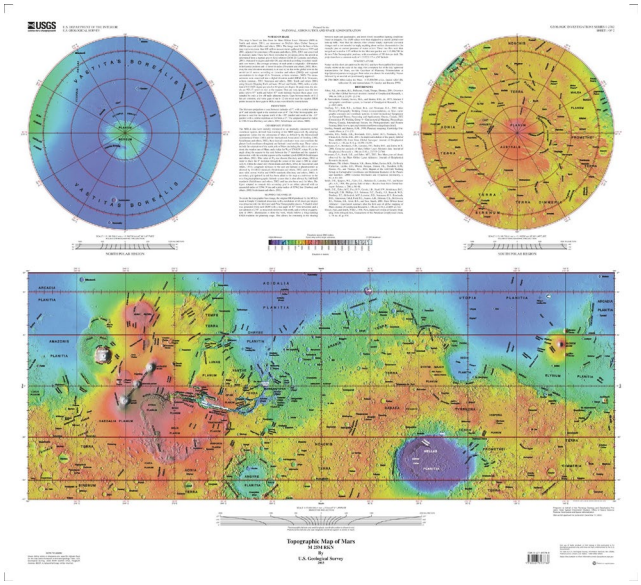
In this micromodule, you will learn the basic skills of using QGIS for processing geographic information and different types of available urban data for geoprocessing in Hong Kong.
In the first part, the tutorial will introduce the overall QGIS interface, data categories, coordination system in the geographic information system. It also shows how to open data/ add layer/ open attribute table.
In the second part, this tutorial will show different types of urban data in Hong Kong, the Vector data includes Land Use/ Road Network/ Building/ Contour/Boundary Map. Geo-tagged CSV data includes Census Data, Infrastructure (elderly care and childcare information), and Point of Interests (POIs).

1. Introduction of the features of QGIS and ArcMap (ArcGIS)

1.1 A guideline of QGIS for beginners

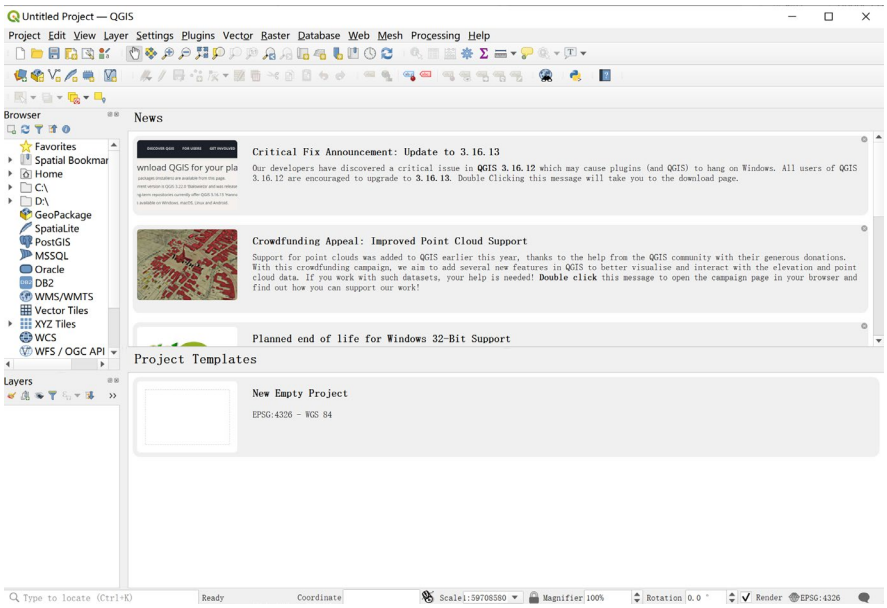
A geographic information system (GIS) is a system that creates, manages, analyzes, and maps all types of data. GIS connects data to a map, integrating location data (where things are) with all types of descriptive information (what things are like there). This provides a foundation for mapping and analysis that is used in science and almost every industry. GIS helps users understand patterns, relationships, and geographic context.
QGIS is a free, open-source, cross-platform (lin/win/mac) geographical information system (GIS) for creating, editing, visualizing, analyzing and publishing geospatial information.





1.2 Introduction of QGIS interface

When you first start QGIS, you'll see a very simple and clear interface, which is mainly made up of 4 parts. On the top, is the main menu bar, browser bars and layers on the left, and a big area in the centre-right. At the bottom of window, there is a status bar with the information of projection.



1.3 Types of data

Before we jump into introducing the specific function on how to input, edit, output geographic information via QGIS, we would like to first introduce different types of data we will use in the following sessions, which is available for urban analytics.

There are mainly 2 types of data: raster data and vector data:

Raster data (geo-tiff):

A raster dataset is composed of rows (running across) and columns (running down) of pixels (also known as cells). Each pixel represents a geographical region, and the value in that pixel represents some characteristic of that region.

The size of pixels in a raster determines its spatial resolution.

Raster images can contain one or more bands, each covering the same spatial area, but containing different information.

For example, land use information or satellite image are typical raster data.

Reference: https://docs.qgis.org/3.4/en/docs/gentle_gis_introduction/raster_data.html

Vector data:

Vector data are composed of vertices and paths. For example, the three types of vectors are points, polylines, and polygons.

Vector points are simple XY coordinates in space.

Polylines connect XY coordinates called vertices with paths.

Lastly, vector polygons are a set of closed vertices and paths.

And we often store these points, lines and polygons in shapefiles, geodatabases and various other GIS file formats.

Another important thing is geo-tagged csv/excel dataset that contains X and Y coordinates could be converted to points (vector data), we'll show the process in the following tutorial.

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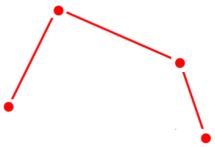

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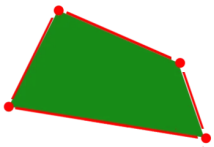
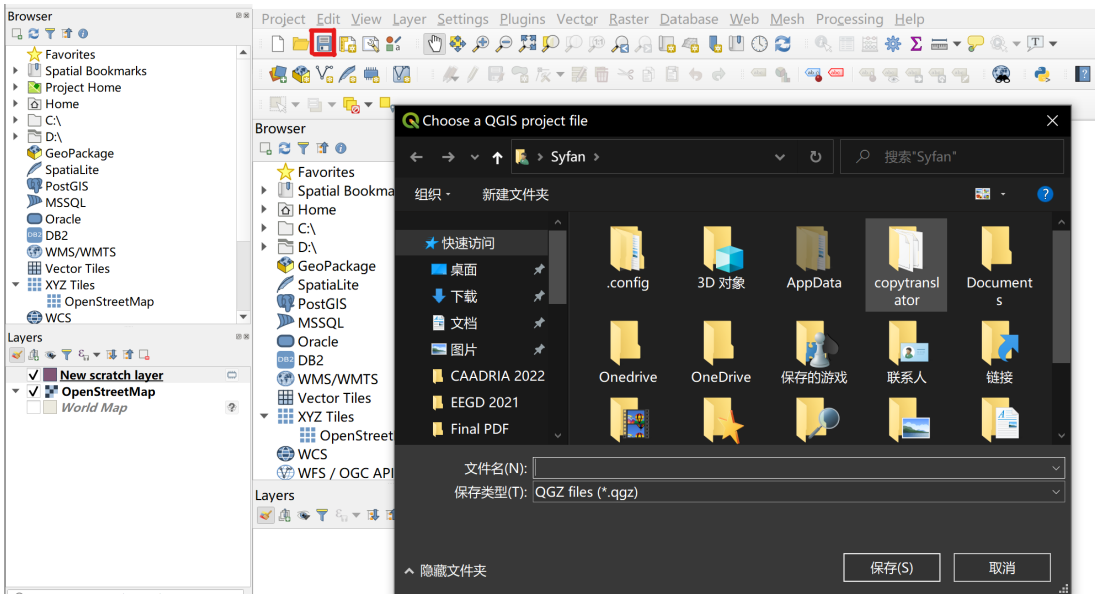


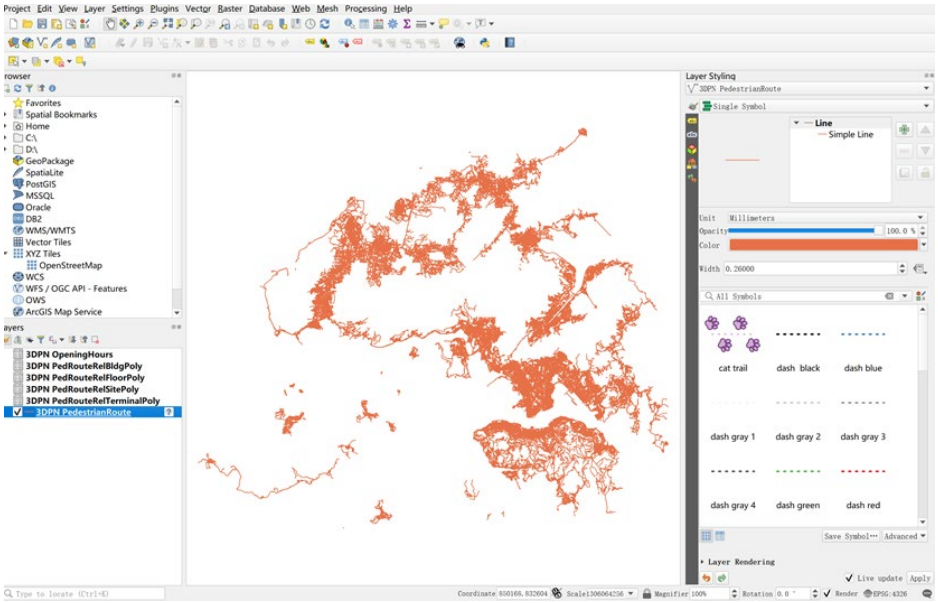
Reference: https://gisgeography.com/rasterization-vectorization/

1.4 Open data (local or online); Save data; Change layers



Open .gdb data (just drag into QGIS)

A file geodatabase is a collection of files in a folder on a disk that can store, query, and manage both spatial and nonspatial data.



1.5 Projections and coordinate systems

General introduction of projection

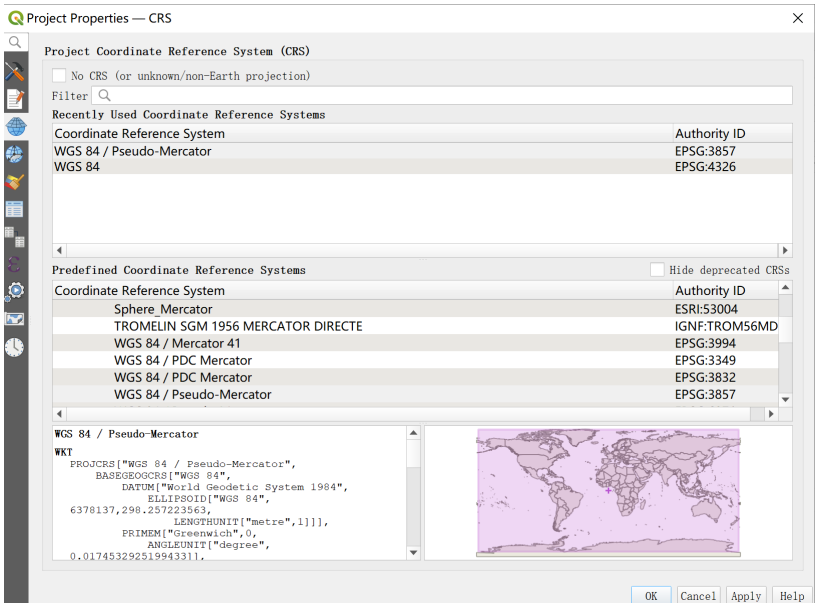
A Coordinate Reference System, or CRS, is a method of associating numerical coordinates with a position on the surface of the Earth. QGIS has support for approximately 7,000 standard CRSs, each with different use cases, pros and cons!

For our needs, the common WGS 84 latitude/ longitude CRS is known by the identifier EPSG:4326, and the web mapping standard CRS is EPSG:3857.

In order to correctly project data into a specific target CRS, either your data must contain information about its coordinate reference system or you will need to manually assign the correct CRS to the layer.

To assign the same CRS to multiple layers that have no crs or have a wrong one in one operation:

1. Select the layers in the Layers panel
2. Press Ctrl+Shift+C. You could also right-click over one of the selected layers or go to Layer
▸ Set CRS of layer(s)
3. Find and select the right CRS to use
4. And press OK. You can confirm that it has been set correctly in the Source tab of the layers' properties dialogue.



1.6 Attributes and tables

3DPN PedRouteRelBldgPoly — Features Total: 10604, Filtered: 10604, Selected: 0

	ObjectID	BuildingID	BuildingPolyID	ChineseName	EnglishName	CreationDate	Modifiec
1	1	250000000	1103124591	采逸軒	La Maison Du ...	2021-09-01 00...	HEYA
2	2	250000001	1103124923			2021-09-01 00...	HEYA
3	3	250000002	1103124695	美暉大廈	Markfield Build...	2021-09-01 00...	HEYA
4	4	250000003	1810148431	浚峯	The Hudson	2021-09-01 00...	HEYA
5	5	250000004	1103125898	聯安新樓	Luen On Apart...	2021-09-01 00...	HEYA
6	6	250000005	1103124710	大德樓	Tai Tak Mansion	2021-09-01 00...	HEYA
7	7	250000006	1103124523	順興大廈	Shun Hing Buil...	2021-09-01 00...	HEYA
8	8	250000007	1810129529	加多近山	Cadogan	2021-09-01 00...	HEYA
9	9	250000008	1103125591	嘉都大廈	Cado Building	2021-09-01 00...	HEYA

Show All Features

2. Introduction of the available data for urban studies, which could be processed in GIS

Resource

Hong Kong

-Overview

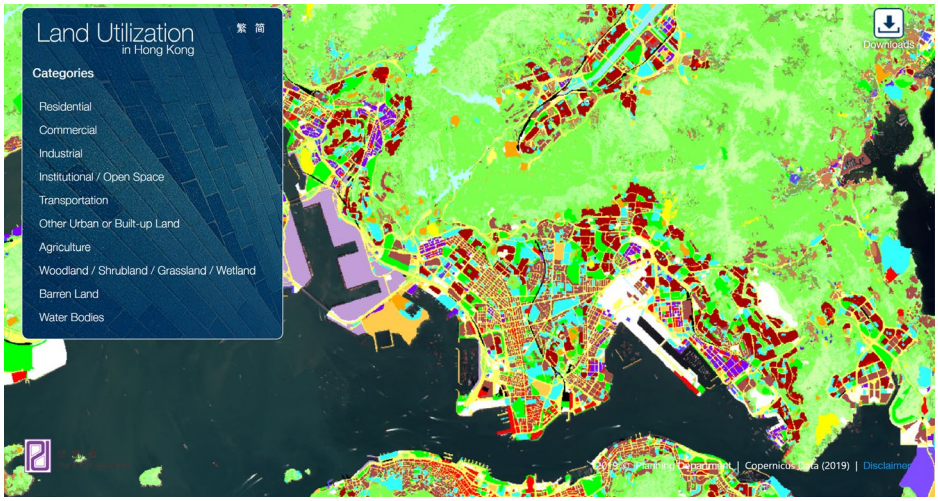
https://data.gov.hk/sc/

Vector data:

Land Use/ Road Network/ Building/ Contour/Boundary Map

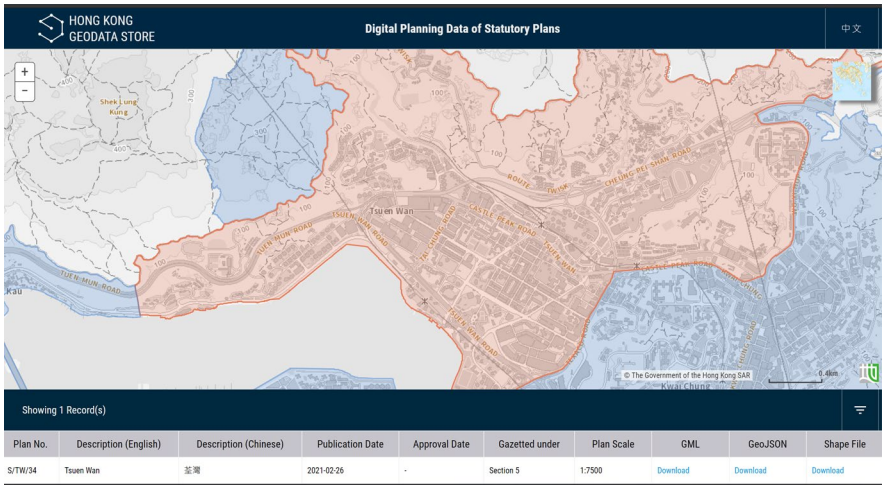
-Landuse (current condition)

https://www.pland.gov.hk/pland_en/info_serv/open_data/landu/index.html#!



-Planning

https://geodata.gov.hk/gs/view-dataset?uuid=a860f3fb-af71-4ef1-823f-fa9990d77953&sidx=0

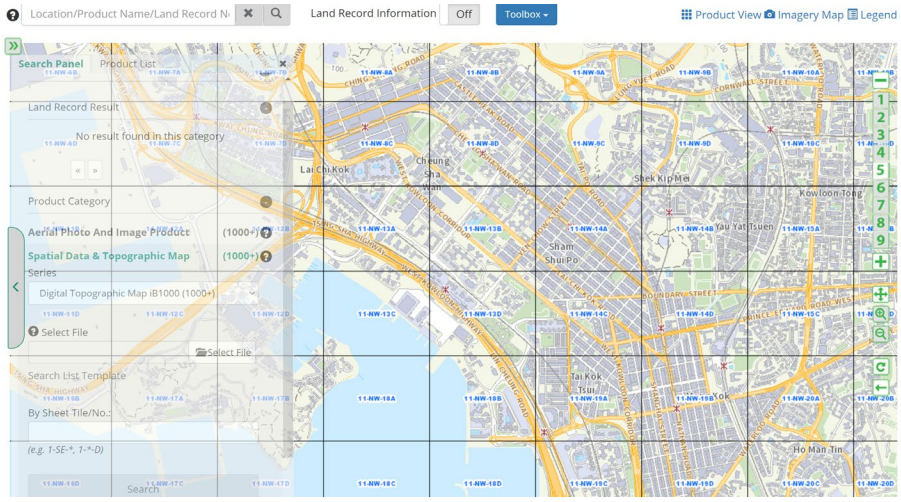


planning dataset (could be output as .shp)

-Road Network/Buildings/Contour

https://www.hkmapservice.gov.hk/OneStopSystem/map-search

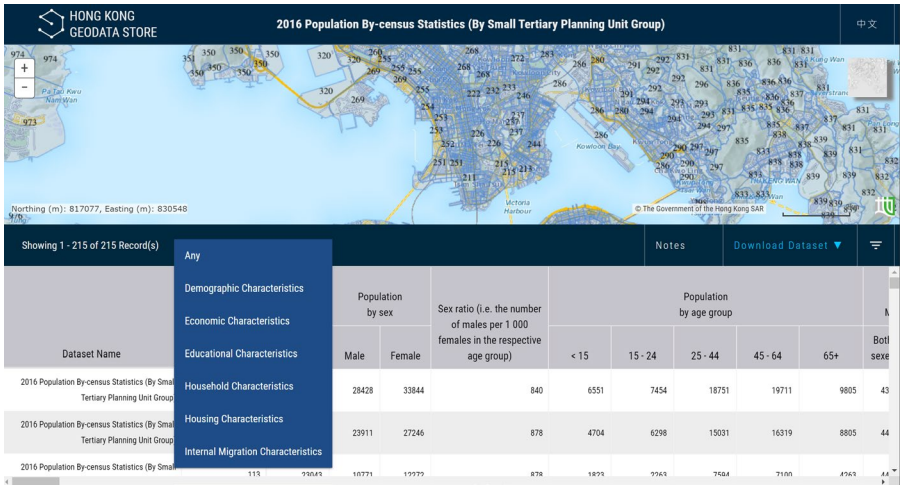
different grid with different scale (most used 'Digital topographical map iB1000)



CSV geo-tagged:

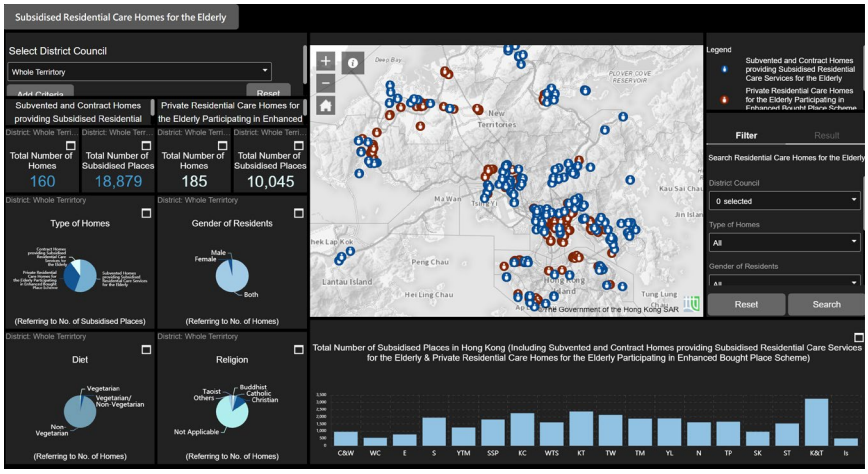
-Census Data:

https://geodata.gov.hk/gs/

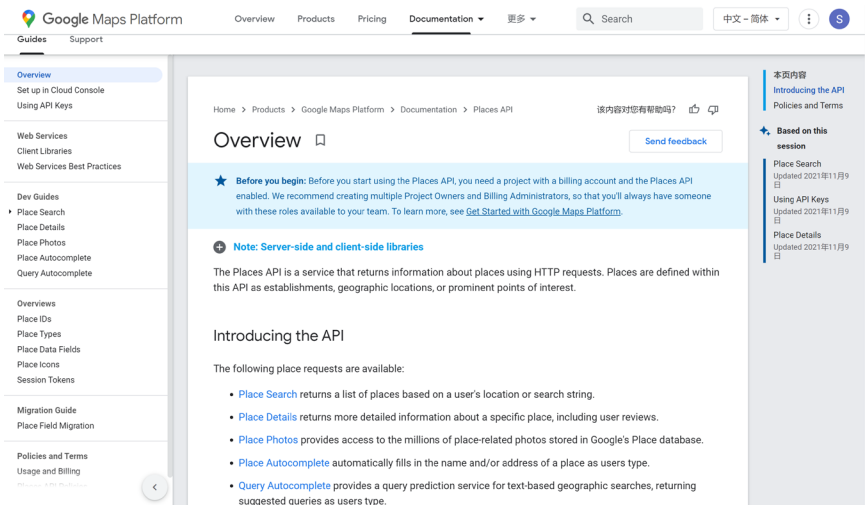


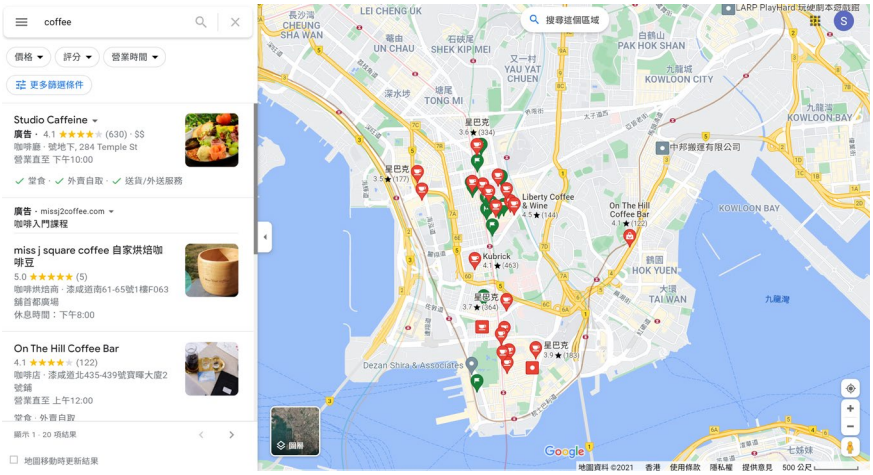
-Infrastructure:

http://hk.centamap.com/gc/home.aspx
including elderly care and childcare information
https://csdi-dashboard.geodata.gov.hk/landing/?lang=en&fontSize=1



POIs
including maps of bus, food, school, etc




coffee
價格
評分
營業時間
更多篩選條件
Studio Caffeine
廣告 · 4.1 (630) · $$
咖啡廳 · 號地下, 284 Temple St
營業直至 下午10:00
堂食 · 外賣自取 · 送貨/外送服務
廣告 · missj2coffee.com
咖啡入門課程
miss j square coffee 自家烘焙咖啡豆
5.0 (5)
咖啡烘焙商 · 漆咸道南61-65號1樓F063
舖首都廣場
休息時間：下午8:00
On The Hill Coffee Bar
4.1 (122)
咖啡店 · 漆咸道北435-439號寶暉大廈2號舖
營業直至 上午12:00
堂食 · 外賣自取
顯示 1 - 20 項結果
地圖移動時更新結果
搜尋這個區域
LEI CHENG UK
CHEUNG SHA WAN
UN CHAU
SHEK KIP MEI
YAU YAT CHUEN
TONG MI
PAK HOK SHAN
KOWLOON CITY
KOWLOON BAY
中邦搬運有限公司
Liberty Coffee & Wine
On The Hill Coffee Bar
Kubrick
HOK YUEN
TAI WAN
九龍灣
Dezan Shira & Associates
Google