Download Spatial Data and Convert them into a Required Format for GIS Applications

Source of Spatial data

- **Data from Hong Kong *Geodata Store*, HKSAR Government** https://geodata.gov.hk/gs/
  - Free download of spatial data such as topographic maps 1:1000, 1:10000, 1:20000, Aerial Photo (DOP5000 and DOP1000 and 3D spatial data
- **Data from Open Data, HKSAR Government** https://data.gov.hk/tc/
  - Data about CoVID-19 and IRNP data (road Network data) can be downloaded here.
- **OpenStreetmap** https://www.openstreetmap.org/
  - OpenStreetMap is built by the community and it's free for anyone to fix, update, download and use.
- **Open Geo-Spatial Data in HK** https://opendata.esrichina.hk/
  - Esri China (Hong Kong) Limited utilized data from DATA.GOV.HK and created different types of layers and webmaps to enrich users' GIS applications.

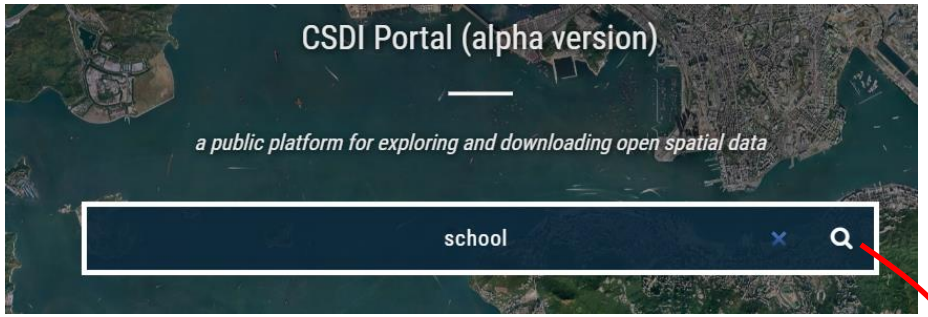
Guidance in this Manual

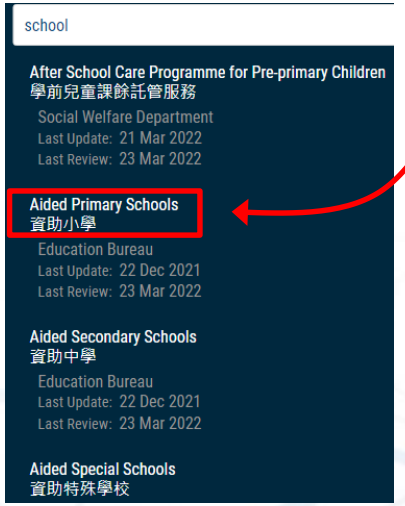
- This document instructs you how to download spatial data from different open sources, mainly the *Geodata Store*.
- The downloaded data can be of various formats. The most common one are:
  - Geojson (.geojson)
  - Shapefiles(.shp)
  - GML (.gml)
  - Excel (.xlsx)
  - Comma Separated Value (.csv)
  - KML(.kml)
  - Feature Geodatabase (FGDB)
- All these data formats can be displayed and processed by a free GIS software called *QGIS*
- However, if your data are transferred to *ArcGIS Online and desktop* for further processing, then the data format allowable for these applications are Geojson, KML, Shapefile(zipped), Excel and CSV and FGDB.

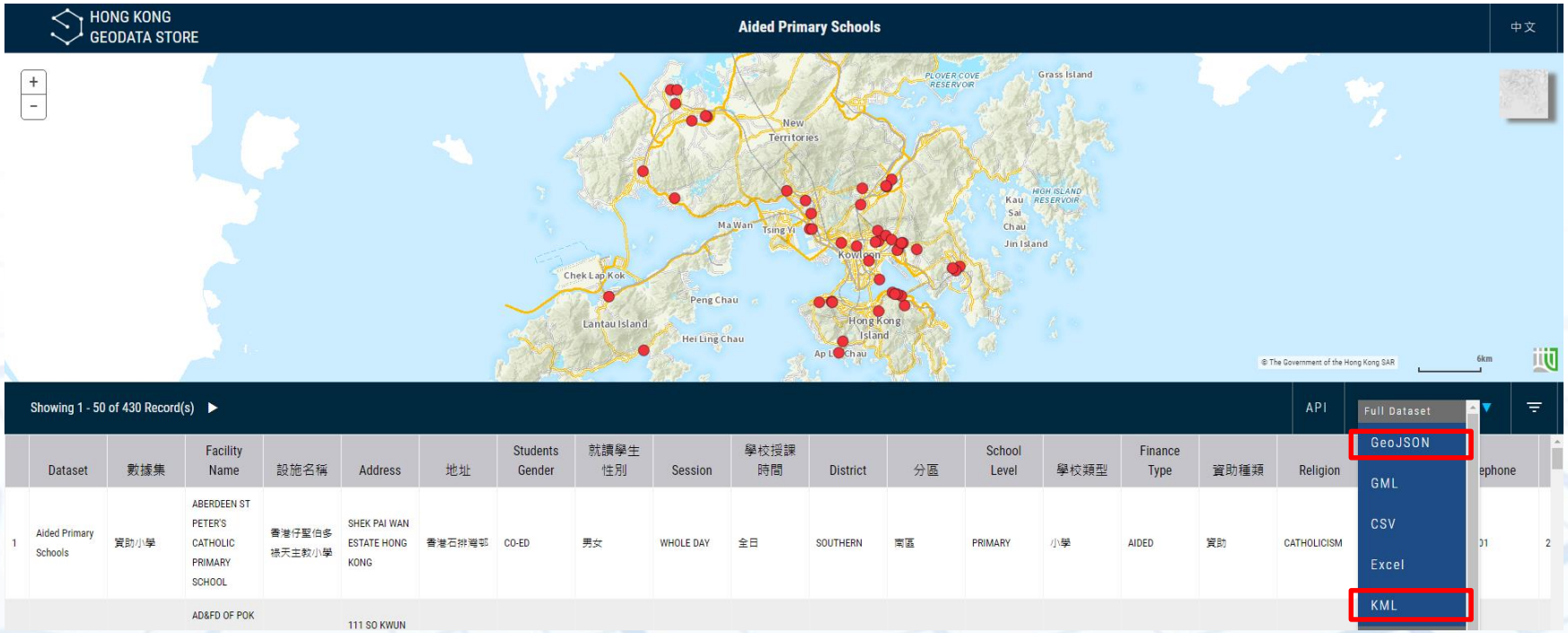
GeoJSON / KML

Download GeoJSON / KML from *Geodata Store* (1)

- Open Geodata Store. Enter School on the **Search** bench.
- It will provide a number of datasets that contain the name of schools. Select “Aided Primary Schools”
- The process of downloading and conversion of GeoJSON and KML is the same. Here we will use GeoJSON as an example to show the conversion process.

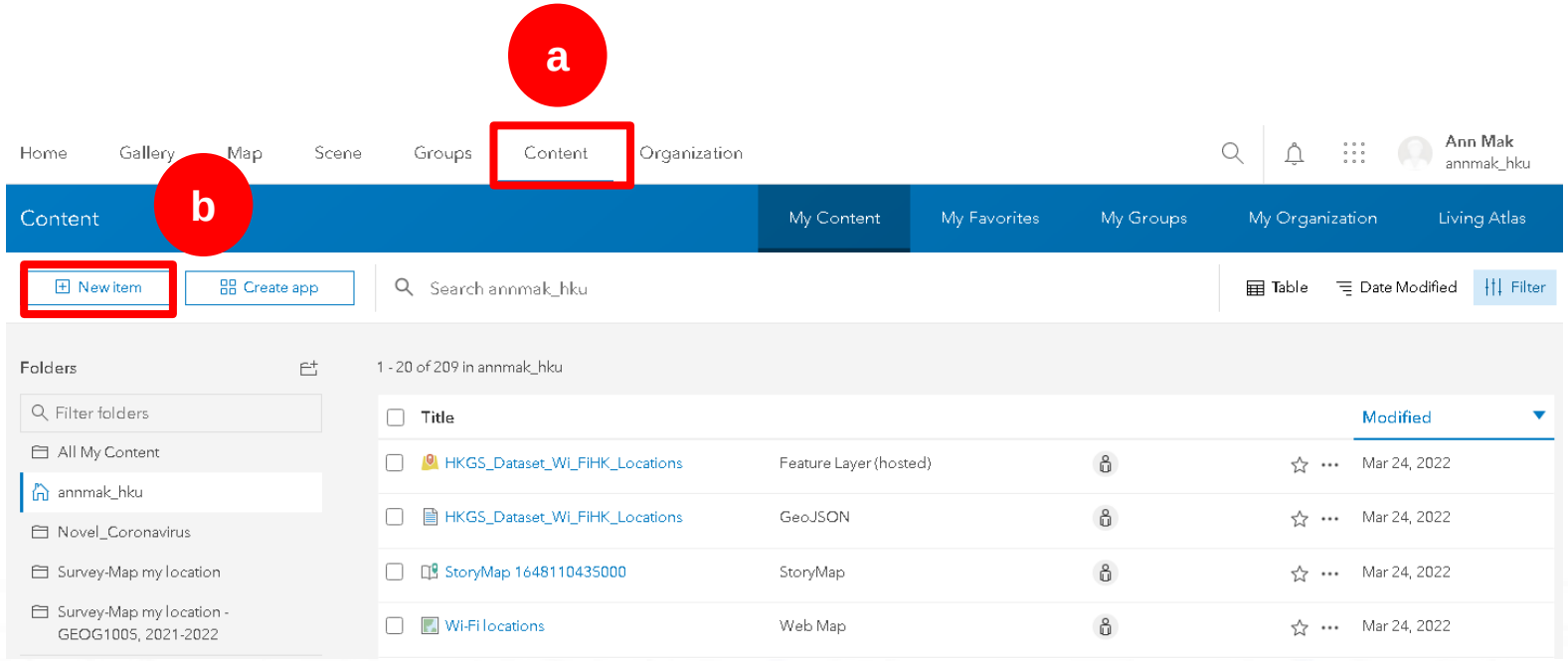






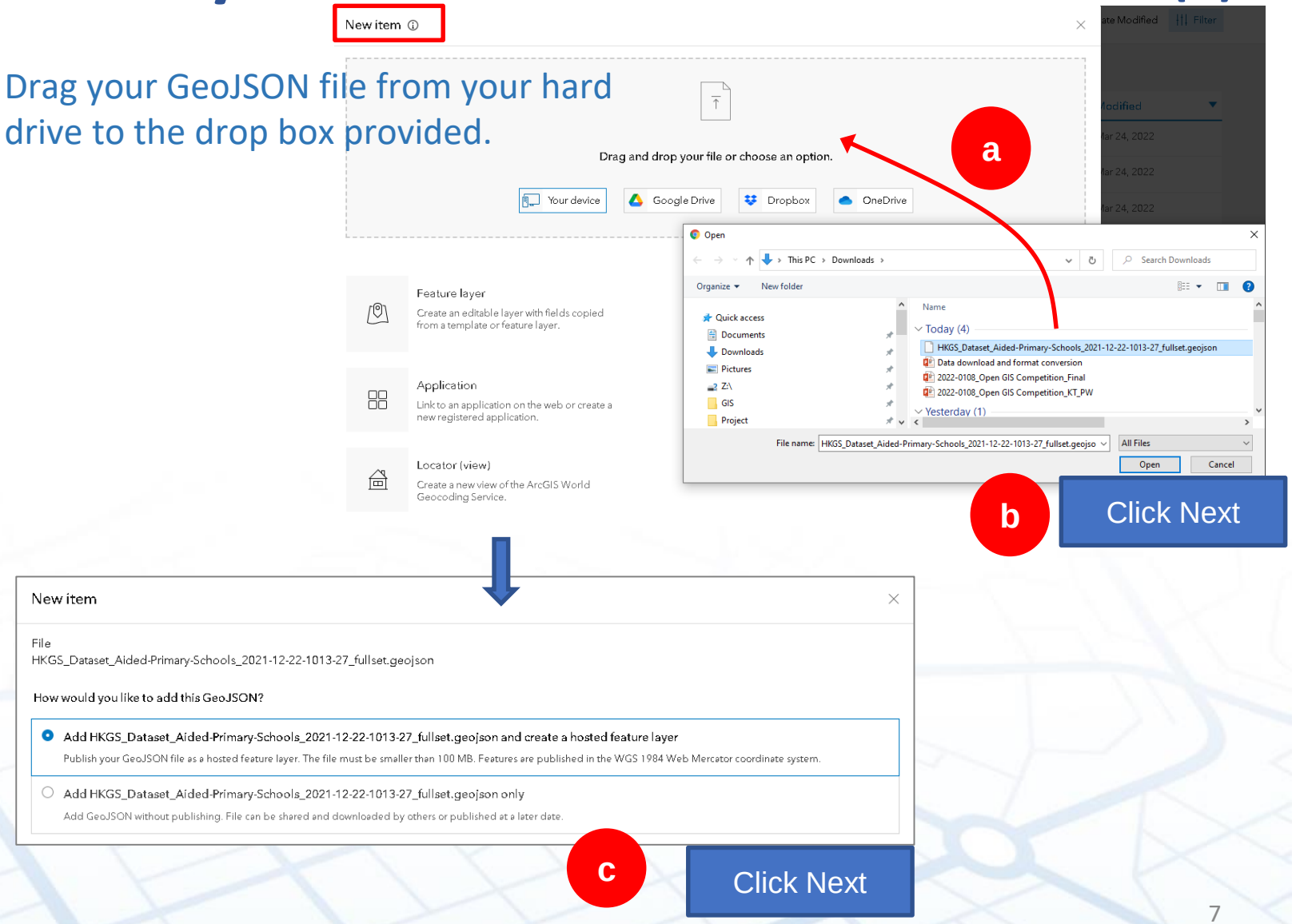
Download GeoJSON / KML from *Geodata Store* (2)

- Launch *ArcGIS Online* on your browser and sign in with your credentials (ask GeoLab for it if you do not own any account).
- a) Go to **Content** on the top of the page.
- It will interface to the page of **My Content**.
  b) Click **New Item** located on the upper left corner.



Download GeoJSON / KML from *Geodata Store* (3)

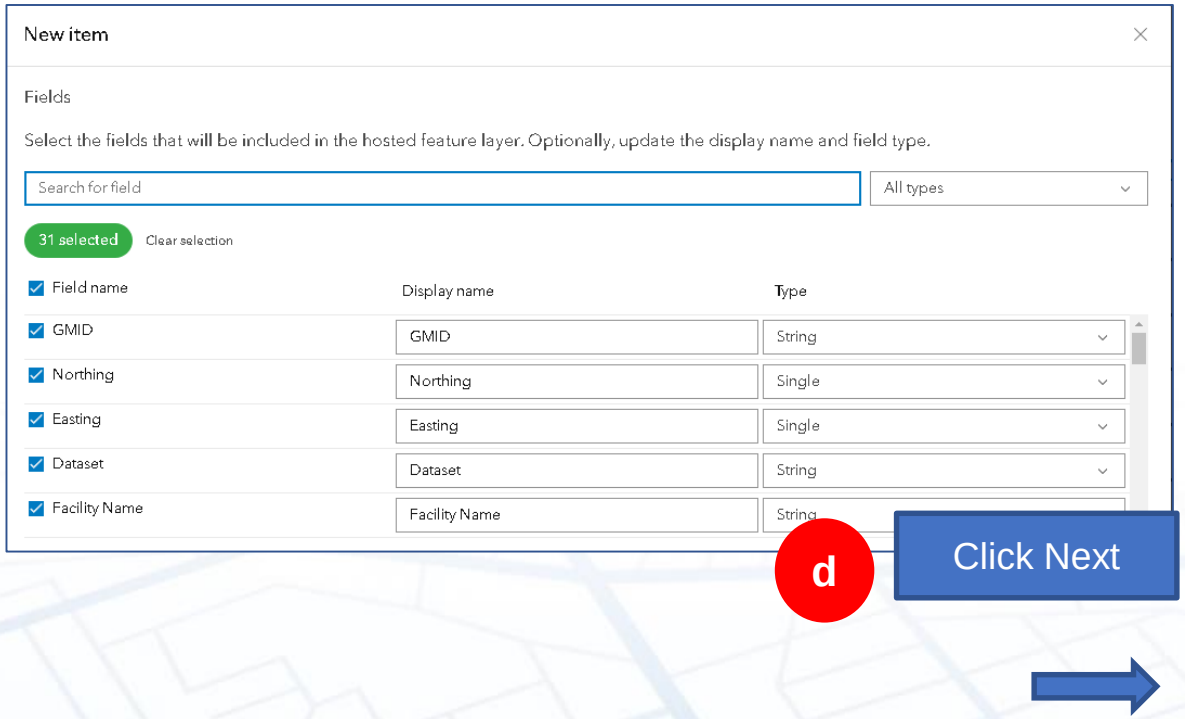
a) Again **New Item** (located on the upper left corner)**.**
b) Then drag the GeoJSON (or the KML) file from your hard drive to the drop box there. Then click **Next**.
c) Make sure you check the radio box that add the GeoJSON (or the KML) as hosted feature layer. Then click **Next**. Click **Next**.

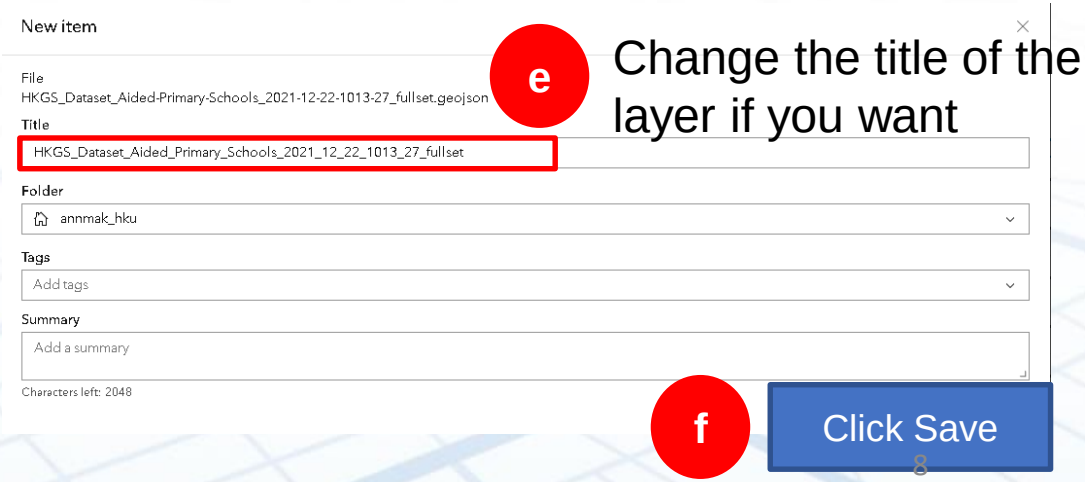


Download GeoJSON / KML from *Geodata Store* (4)

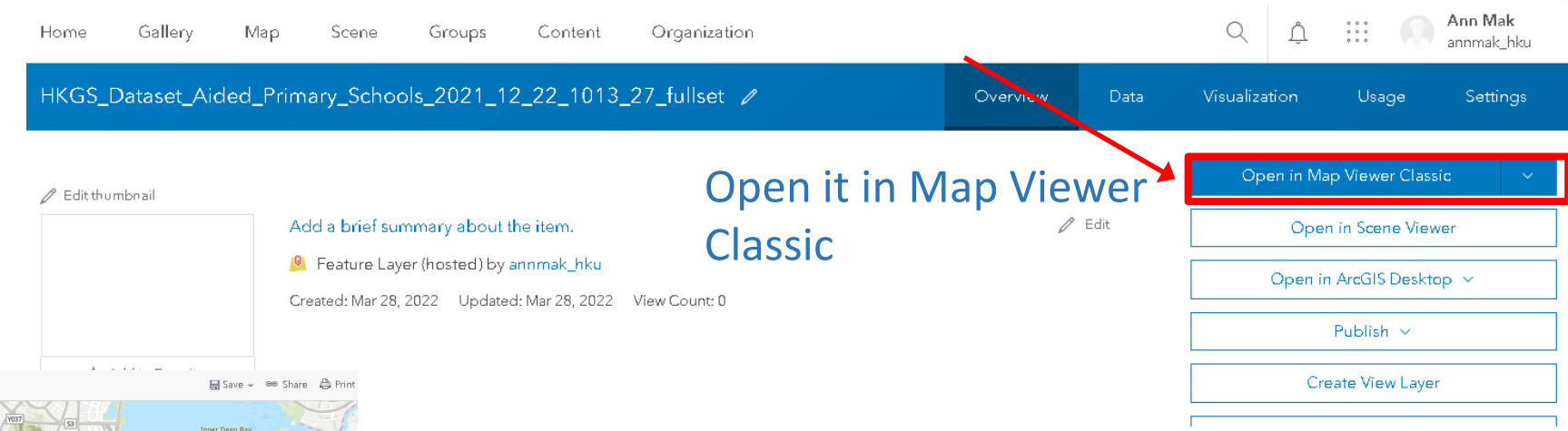
d) Click **Next** to upload all the attributes fields in the hosted feature layer.

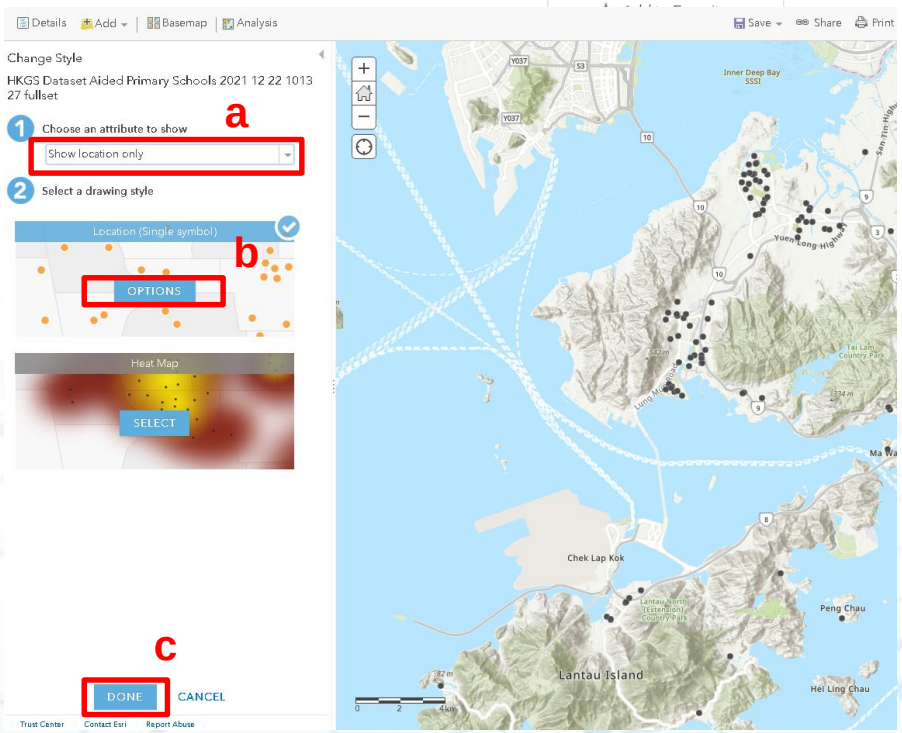
e) You may rename the uploaded file and then click **Save** to save it.





Open GeoJSON / KML in Map Viewer Classic



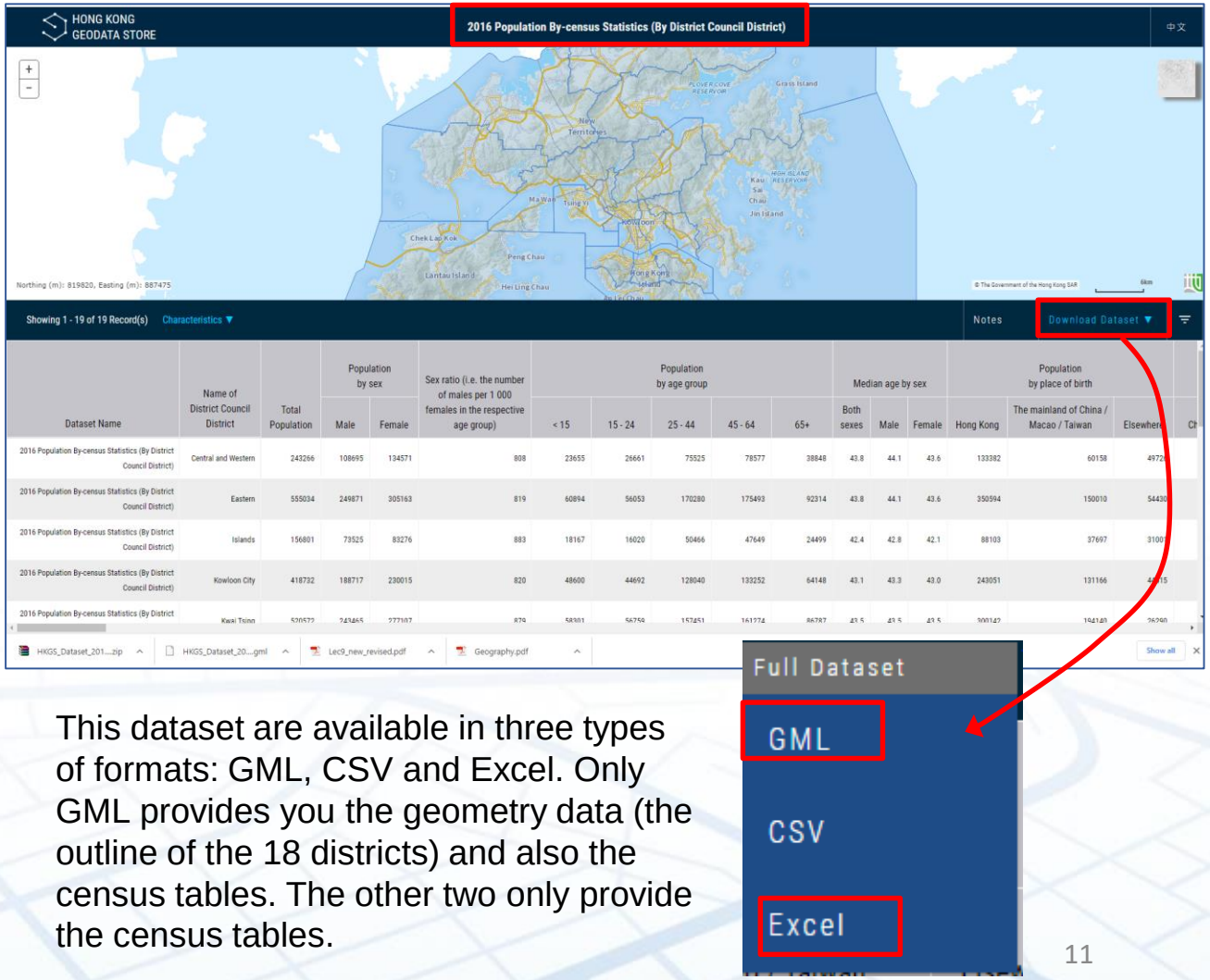


a. Select “Show location only” if you just want to show the locations of the schools on the map.
b. Click the **Option** box under **Location (Single symbol)** to change the symbol shape, size and colour.
c. Click **Done** to show it.

GML

Download GML from *Geodata Store* (1)

- Download census data (e.g. 2016 Population by census Statistics (By District Council District) in both GML and Excel format.
- Only GML provides you the geometry data (the outline of the 18 districts) and also the census tables. Excel only provide the census tables but it provides reference for the field name.
- GML cannot be directly added in *ArcGIS Online* for mapping purpose.
- Instead you have to import it in *QGIS* for map display, then export it out as shapefiles or GeoJSON.
- Here we will demonstrate how to download "2016 Population By-census Statistics (By District Council District)" from *Geodata Store*

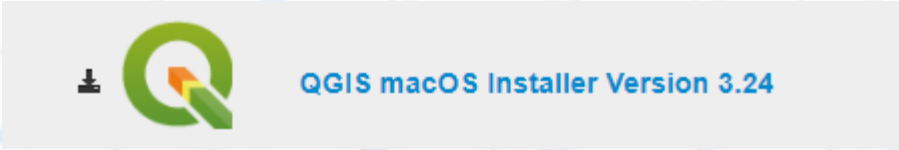


This dataset are available in three types of formats: GML, CSV and Excel. Only GML provides you the geometry data (the outline of the 18 districts) and also the census tables. The other two only provide the census tables.

Download GML from *Geodata Store* (2)
Download *QGIS*

- Download a GIS/mapping software called *QGIS* (Free) (https://qgis.org/en/site/forusers/download.html)
- Available for Mac, OSX Linux and Windows
- If your computer is **Windows-Operated**, please perform the following:

- If your computer is **Mac OS**, then download the **Mac version**.

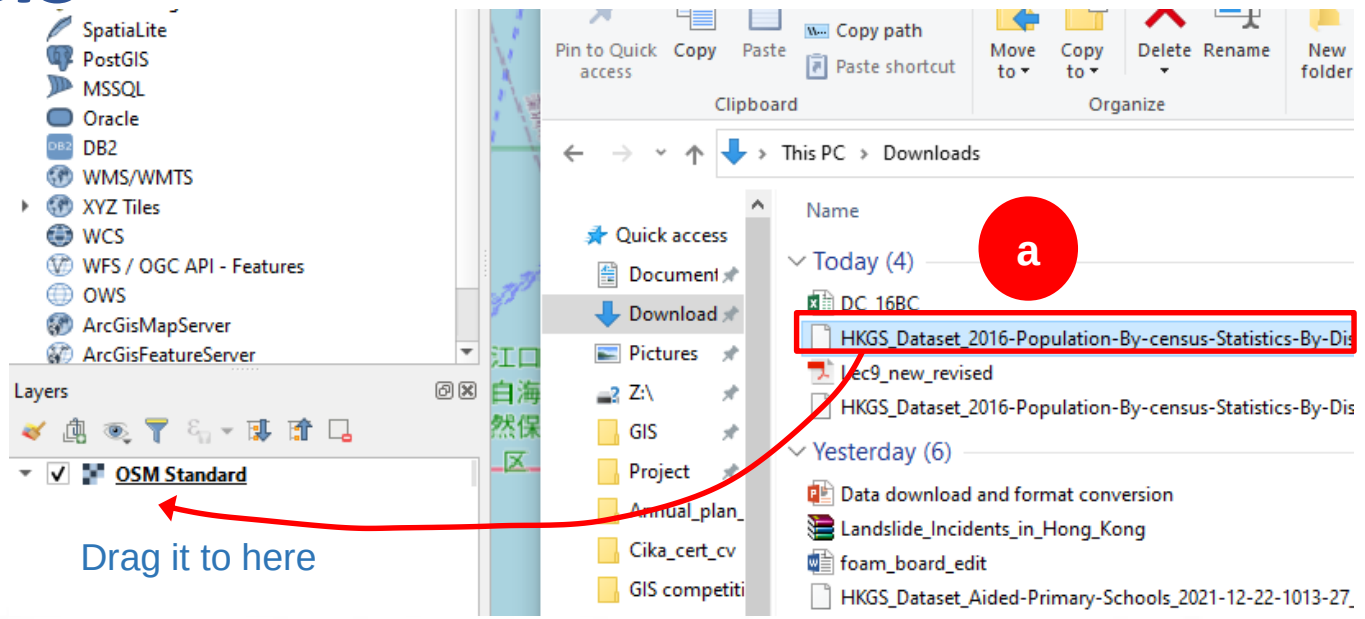


Download GML from *Geodata Store* (3) Import GML to *QGIS*

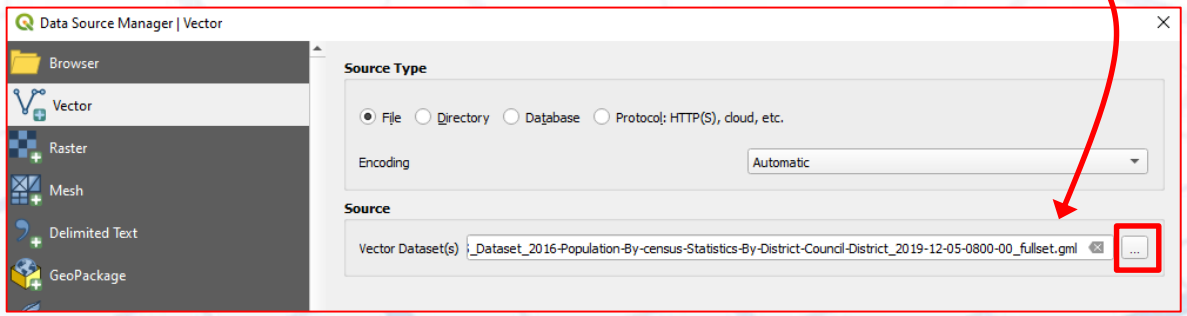
There are two ways to upload the layer to *QGIS*:

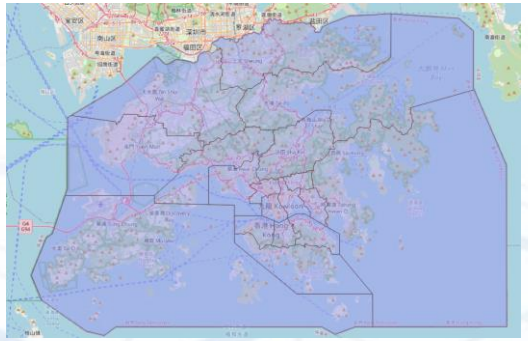
a) Launch *QGIS*, and drag your file from Window explorer to the Layers panel in *QGIS*.

b) Or under **Layer** manual, click **Add Layer**, then **Add Vector Layer**. Then click the folder button besides the link field under **Source**. Navigate to your data path to add in the corresponding GML layer. Then click **Add**. The layer will directly show on the display area.



b





Click this to open the .gml layer saved in your hard drive and then add into it

Download GML from *Geodata Store* (4)
Export GML to Shapefiles

Then export it out in either the format of Shapefile (or GeoJSON).

a) Right click the layer to open **Export**.

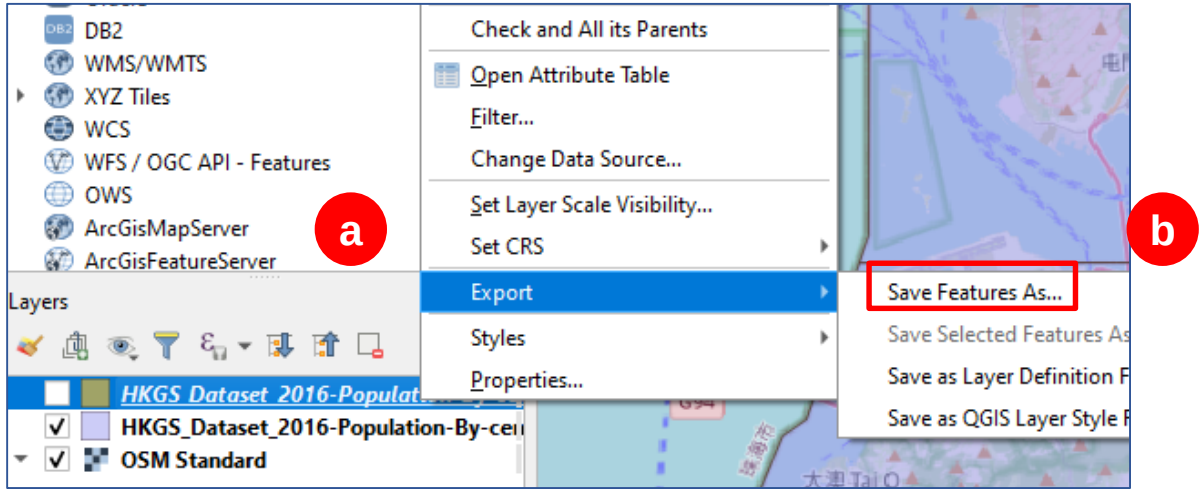
b) Then click **Save Features as**.

c) Click the dropdown arrow against **Format** to select “ESRI Shapefile”.

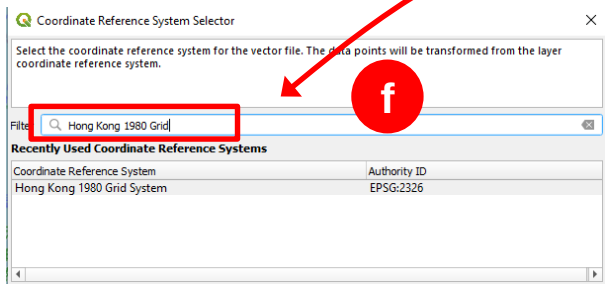
d) Click the dropdown box against **File name** and save it in a desired data path by also giving a new name to it.

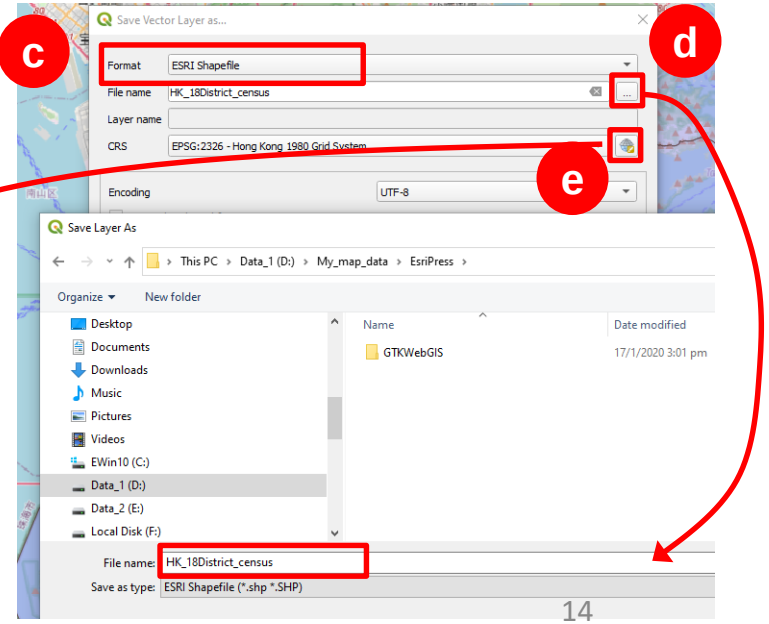
e) If the projection system “EPSG2326 - Hong Kong 1980 Grid” is not already available, f) then click the box against CRS and search the projection system “Hong Kong 1980 Grid” to furnish it with the local projection system.

g) When done, just click **OK** to export it as a new Shapefile. Then you can upload it in *ArcGIS Online*. Remember to zip it before you upload it.



select the projection system “Hong Kong 1980 Grid”

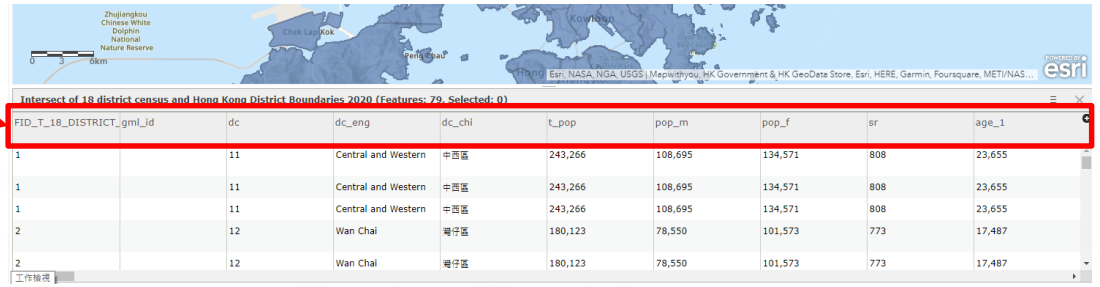




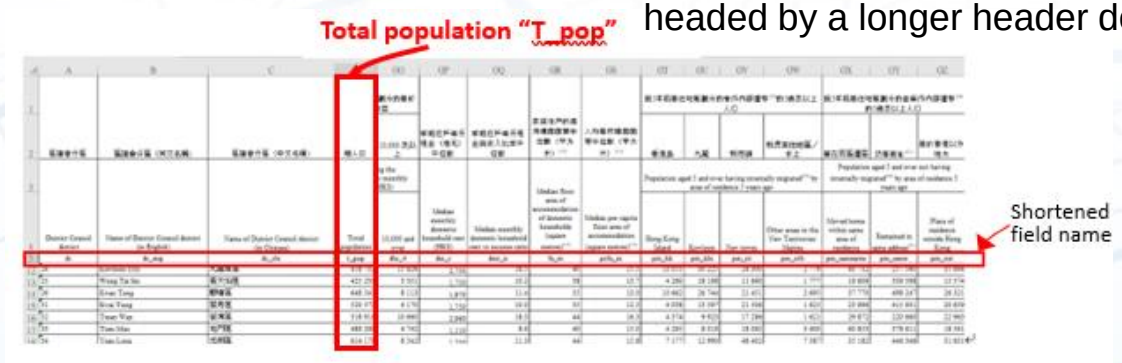
Translate the Field name of the Census table

- You may find the attribute table of the census table a bit confusing. The column field name has been shortened to 8 or fewer characteristics, as restricted by the schematic rules of shapefiles. E.g. What does “t_pop” represent?

Shortened field name



The column of Excel file “DC_16BC is headed by a longer header description

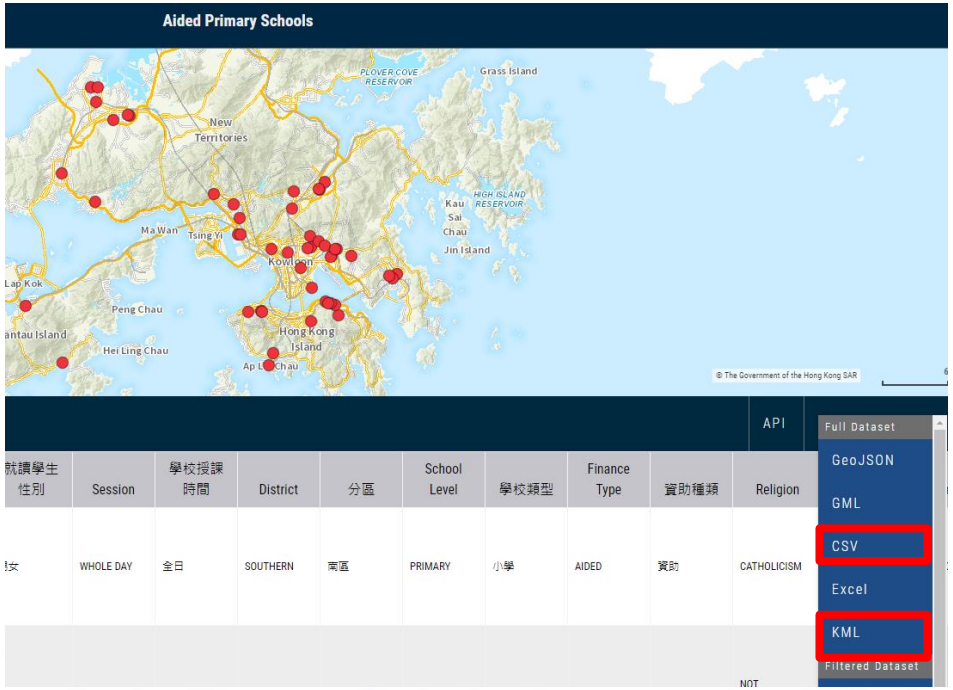


Open the *Excel* file “DC_16BC” from Geodata store. You may find each column field name is a long descriptive text spreading in two levels of heading that makes it easier to understand what each column represents. The shortened field name you find in the *shapefiles* is also shown in row 5 of the Excel table under the corresponding long descriptive name. In this way you can translate the shortened field with the long descriptive name shown in the Excel table for your reference.

Excel / CSV

Download Excel / CSV from *Geodata Store* (1)

- Both of CSV and Excel are spreadsheet that you can exam it in Excel.
- Here try to download “Aided Primary Schools” in either the CSV or Excel format.
- If you open CSV or Excel in the *Excel* program, you will find there are 4 columns already registered the location of each school in a pair of co-ordinates.
- We will make use of the latitude and longitude to locate each school on a map.



The x, y in the local projection system – HK 1980 Grid

Latitude and longitude in spherical co-ordinates system

W	X	Y	Z	AA	AB	AC	AD	AE
site 網頁	Religior 宗教		SCHOO	學校編號	Northing	Easting	Latitude	Longitude
	CATHOLIC	天主教	51206000	512060000	821330.0	837359.0	22.33101279	114.18746445
	PROTEST.	基督教	11558400	115584000	828988.0	838442.0	22.40016765	114.19798732
	NOT APPL	不適用	61827600	618276000	820287.0	835492.0	22.32159406	114.16934241
	PROTEST.	基督教	61812800	618128000	840524.0	834094.0	22.50434289	114.15574568
	CATHOLIC	天主教	17005400	170054000	814908.0	837050.0	22.27301836	114.1844619
	PROTEST.	基督教	11500200	115002000	826772.0	836103.0	22.38015741	114.17527219

The process of uploading Excel and CSV in *ArcGIS Online* will be the same.

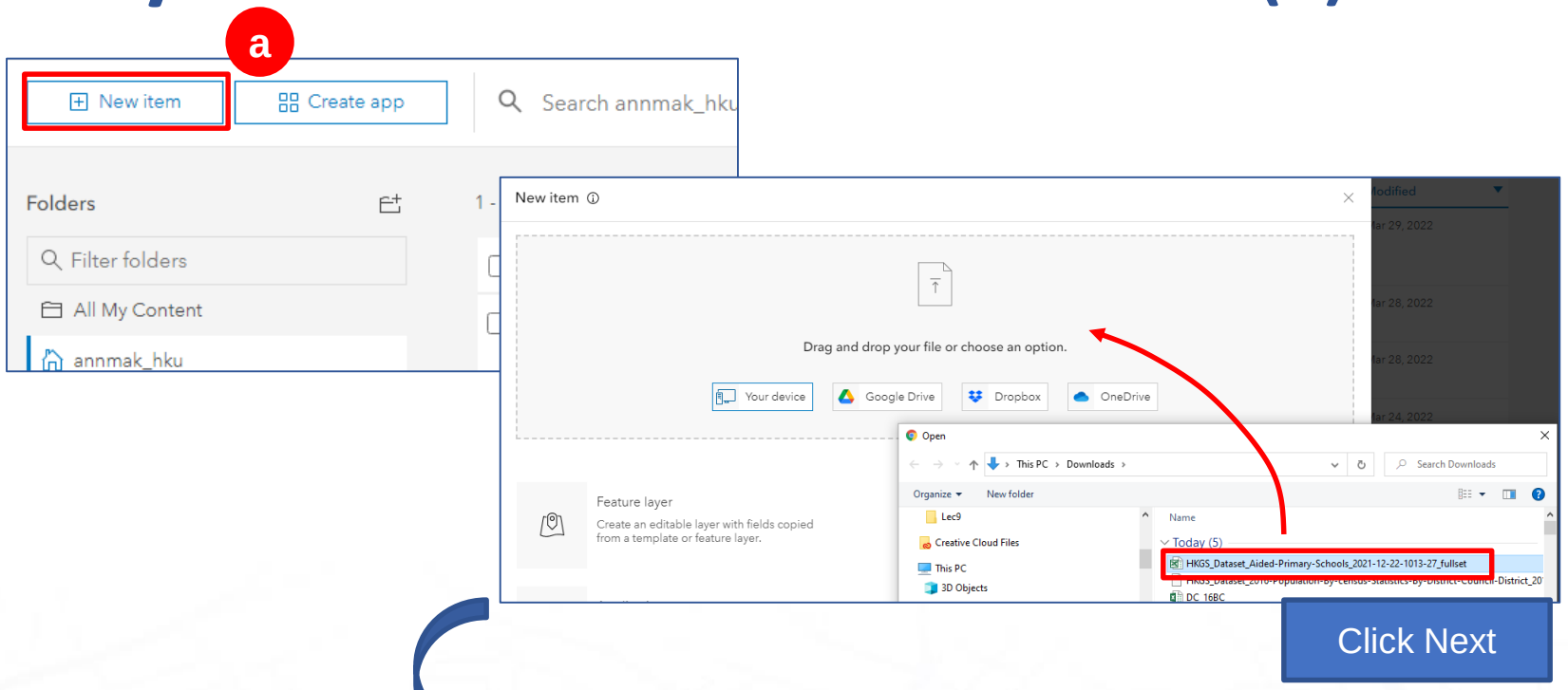
Download Excel / CSV from *Geodata Store* (2)

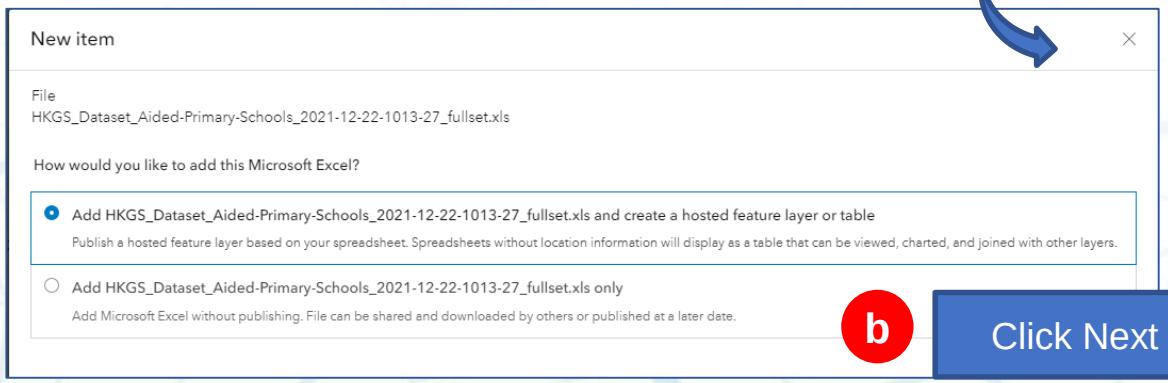
- Launch *ArcGIS Online* on your browser.

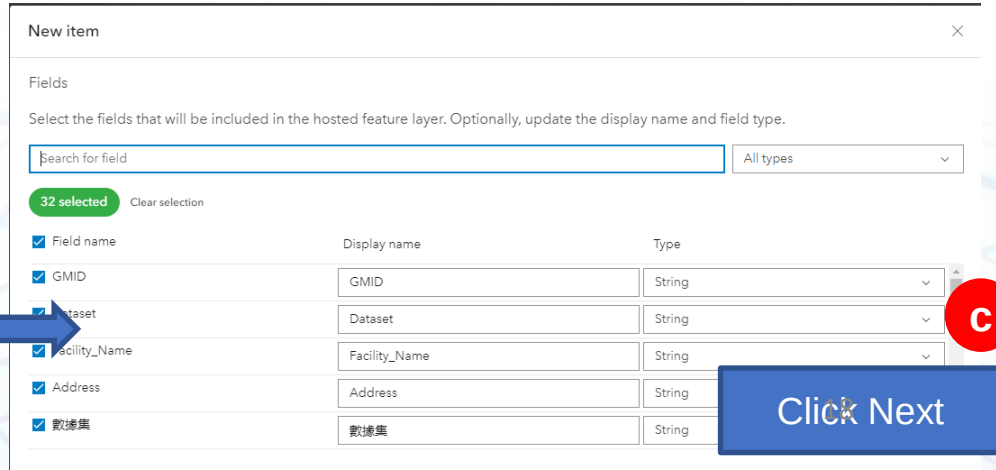
a) Click **New Item**, then drag the Excel (or CSV) file from your hard drive to the drop box there. Then click **Next**.

b) Make sure you check the radio box that add the Excel (or CSV) as hosted feature layer. Then click **Next**.

c) Click **Next** to upload all the attributes fields in the hosted feature layer.





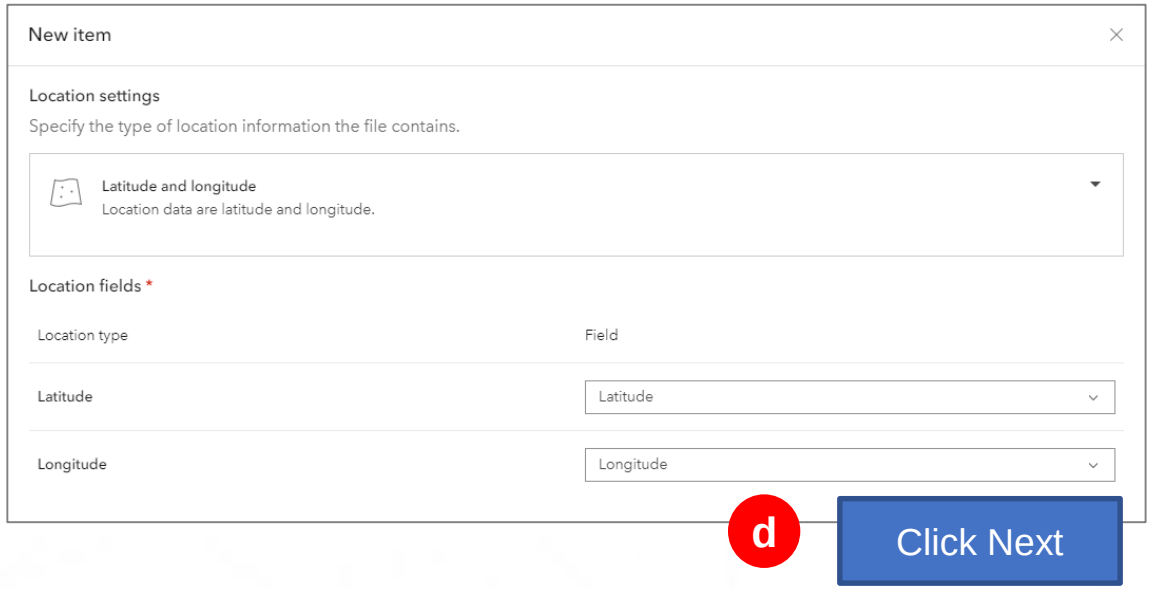


Download Excel / CSV from *Geodata Store* (3)

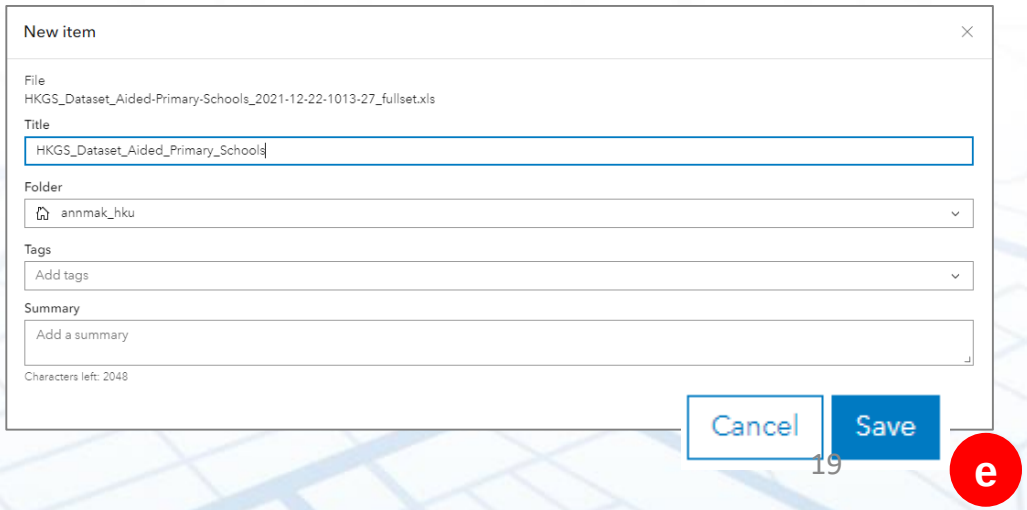
d) Next you will use the **Latitude** and in your *Excel (or CSV)* file as the **location setting**. By default, they will immediately identify the two columns that named as Latitude and Longitude.

e) Next it will ask you to provide the name to this imported Excel file. You can give a new name or keep the original name. Then click **Saved** to finish it.

- You then open it in a **Map Viewer** to check the school locations and proceed to further steps.



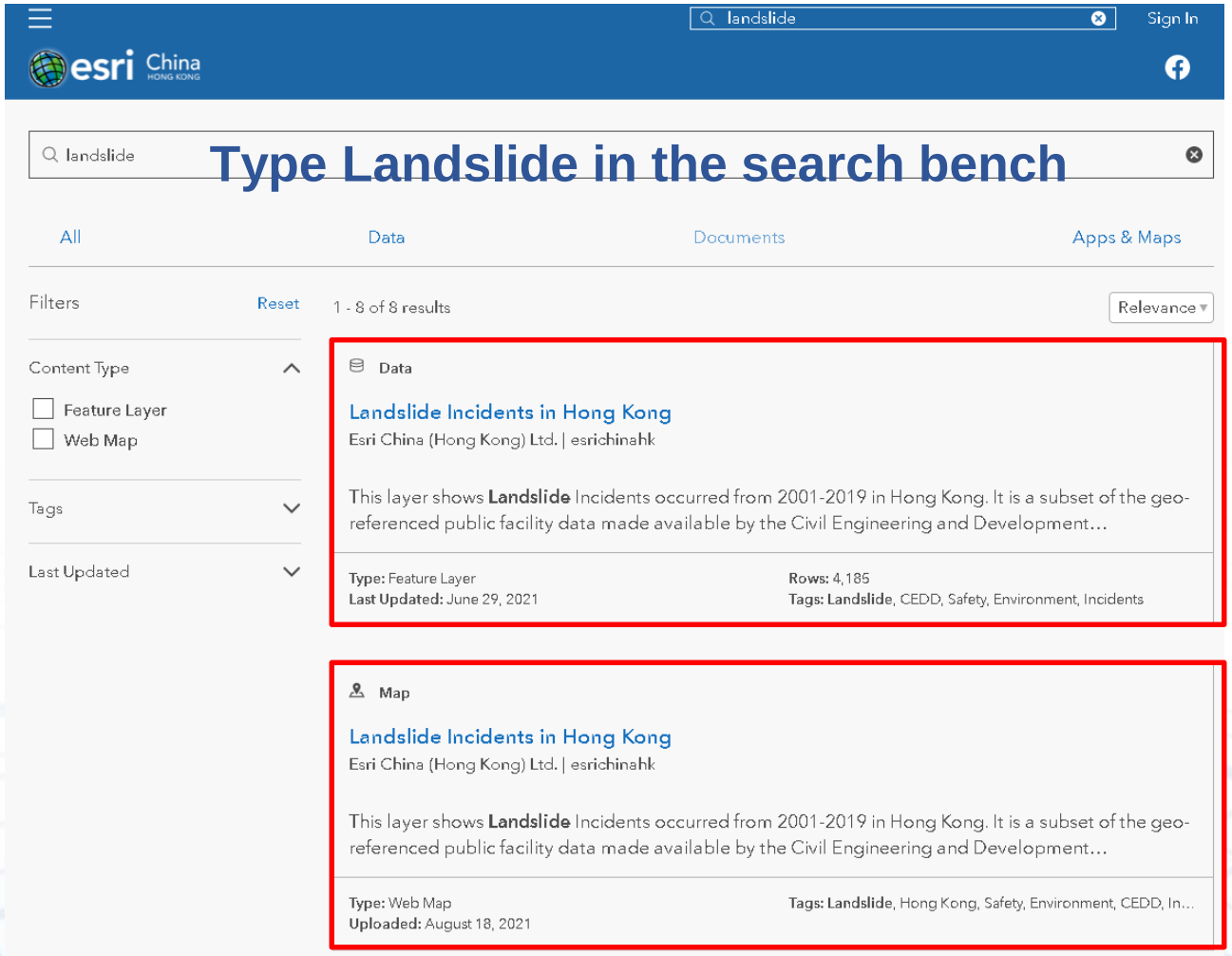
Use Latitude and Longitude to locate the schools. DO NOT use Northing and Easting as the *Map Viewer* using the spherical co-ordinates system that only adopts latitude and longitude.



Shapefile

Download Shapefile from Open Geo-Spatial Data in HK

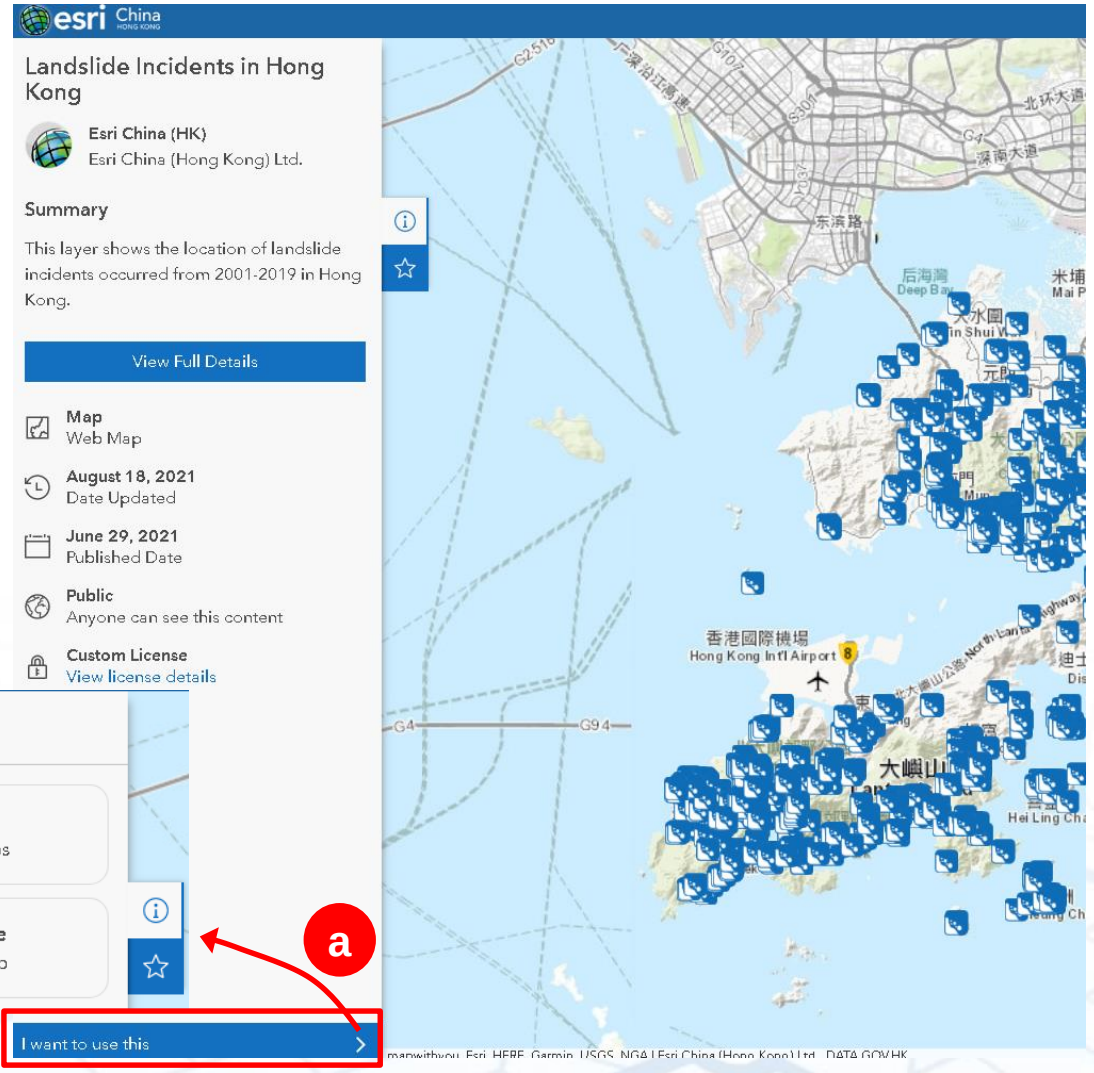
- Access Open Geo-spatial data in HK
- This Web site provides many spatial data (mainly sourced from the Government) that are ready in a GIS data format such as shapefiles, KML, Geojson, CSV, etc.
- It usually provides you two options of output: **Data** and **Map**.



Select “Map” from Open Geo-Spatial Data in HK

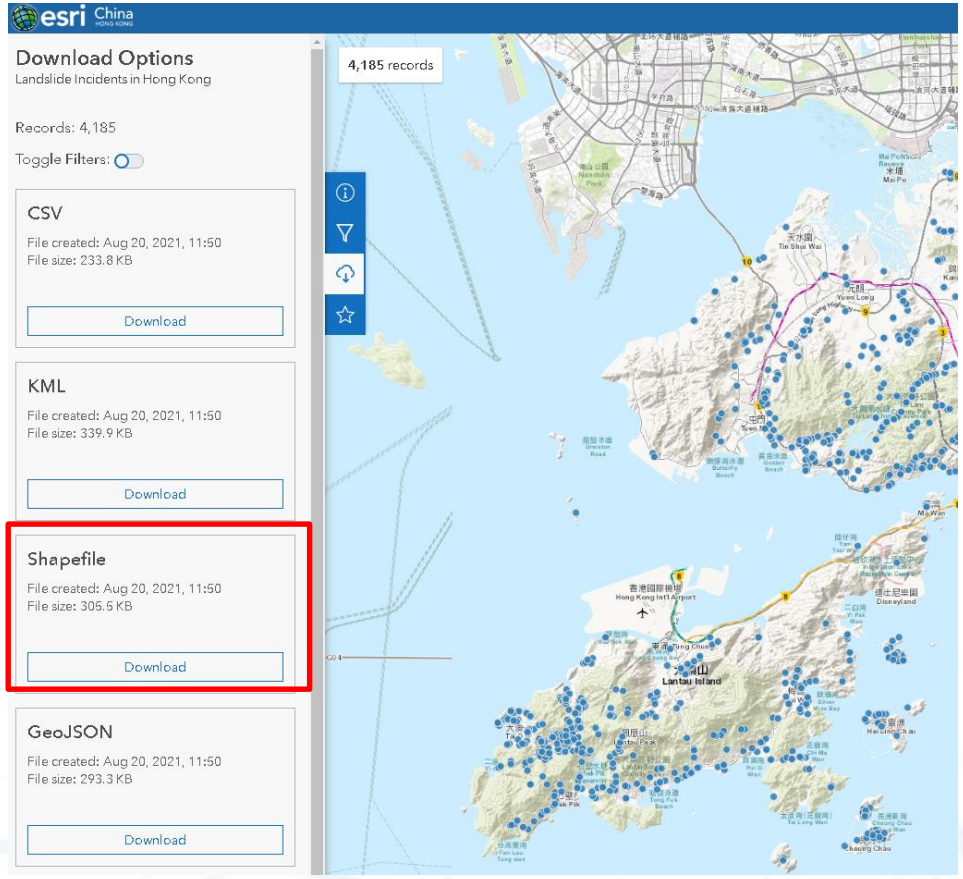
- If you select **Map**, it will just show the spatial data in the map on the right panel.
- It does not allow you to download the data.
- But you can display the map in *ArcGIS Online* or *StoryMaps*. a) Click “I want to use this” located at the left bottom bar.

- Two options are given: Create a Story (in *StoryMaps*) or Open in ArcGIS Online. Select a desired option to directly display or analyse the data in the application you selected.



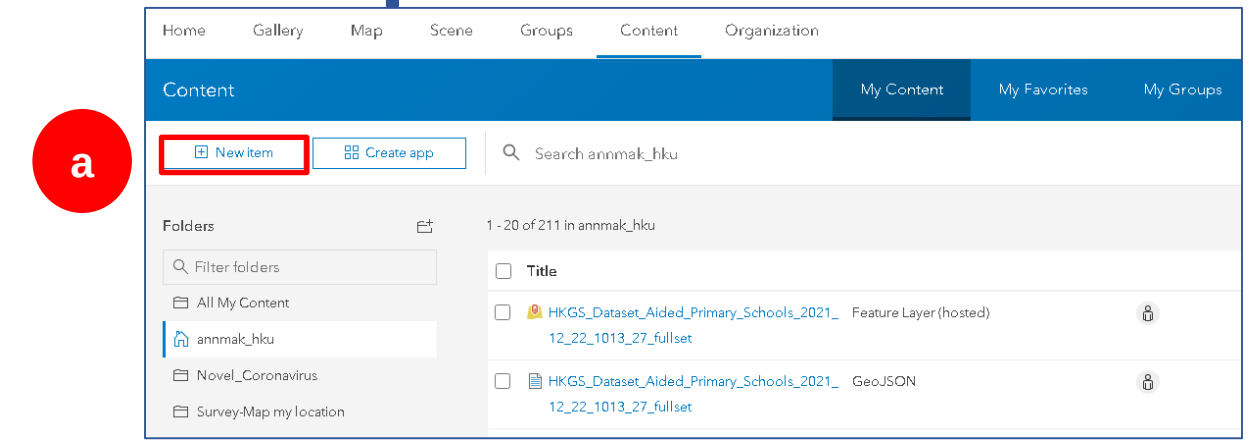
Select “Data” from Open Geo-Spatial Data in HK (1)

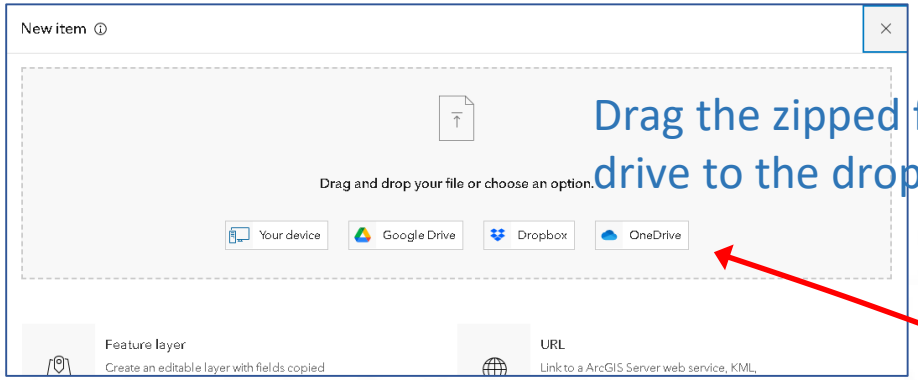
- If you select **Data** Option, it will interface you to a page for downloading data in different formats.
- Select **Shapefile** and click **Download**.
- The download file will be saved in **Download** folder in a zip file.
- If you unzip it, it actually consists of a number of related Shapefiles.
- You have to keep all the files intact so you can open and display them properly in an intended application.
- If you want to transfer them to *ArcGIS Online* for further processing, then you must warp up all the files in a single zip file before you upload it.



Select “Data” from Open Geo-Spatial Data in HK (2)

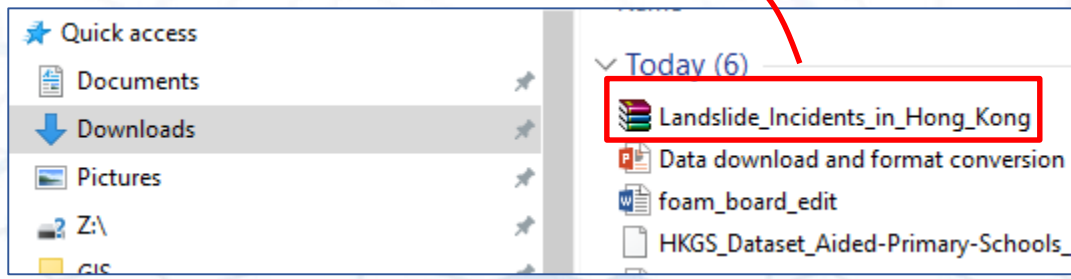
- Then launch *ArcGIS Online*
- Similar to open the GeoJSON /KML/GeoJSON in ArcGIS Online, go to **Content** on the top of the page.
- It will switch you to **My Content**. a) Click **New Item** located on the upper left corner.
- b) Drag the zipped Shapefile to the box under **New Item**.
- Then click **Next** on next three successive steps, until it asks you to **Save** the file. Keep all the default setting.
- Open it in a new *Map Viewer* for further processing and analyses in it.





Drag the zipped file from your hard drive to the drop box provided.

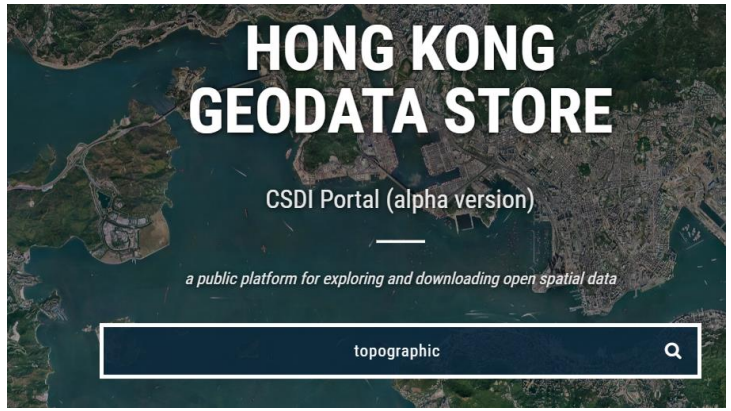
b



Topographic Maps

Download Topographic Maps from *Geodata Store* (1)

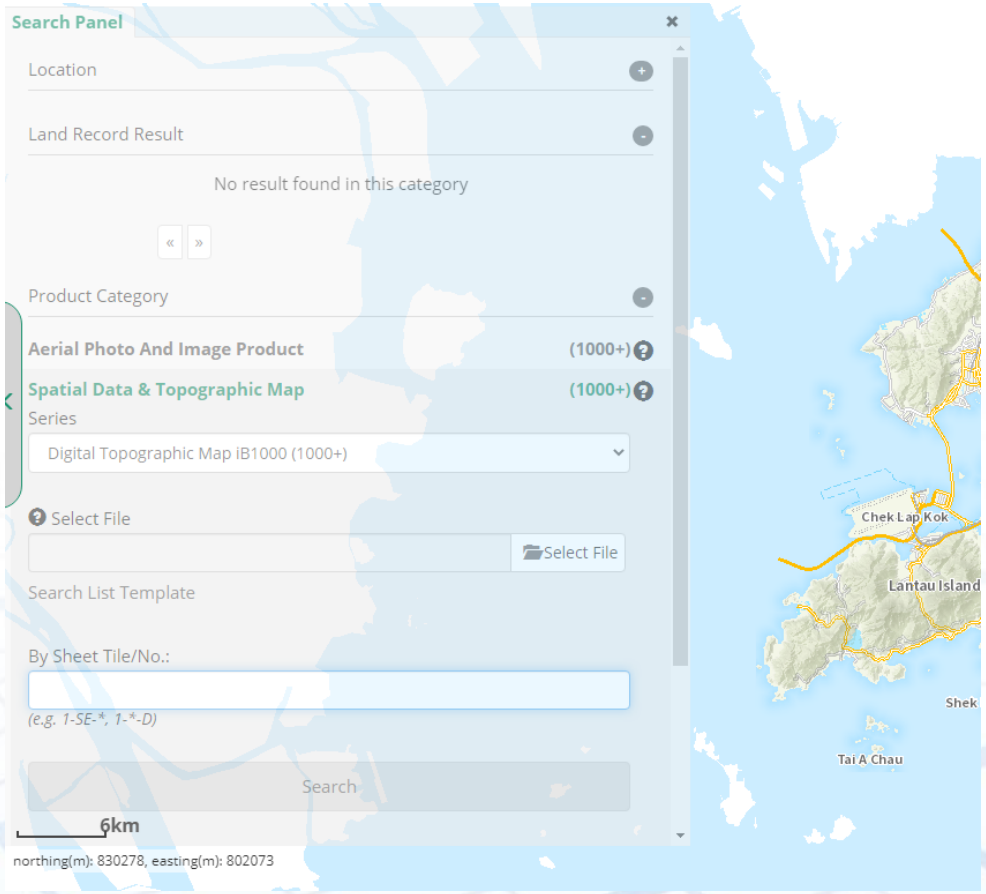
- Topographic map refers all natural and man-made features you can find on the earth surface.
- Topographic maps in Hong Kong are developed by the Lands Department offering in different map scales: iB1000, iB5000, iB10000 and iB20000, and so forth. The smaller the value, the larger the scale, which provide more details but cover a smaller area.
- Go to *Geodata Store* and enter “topographic” on the **Search** Bench.
- All the topographic maps will show to you.



Download Topographic Maps from *Geodata Store* (2)

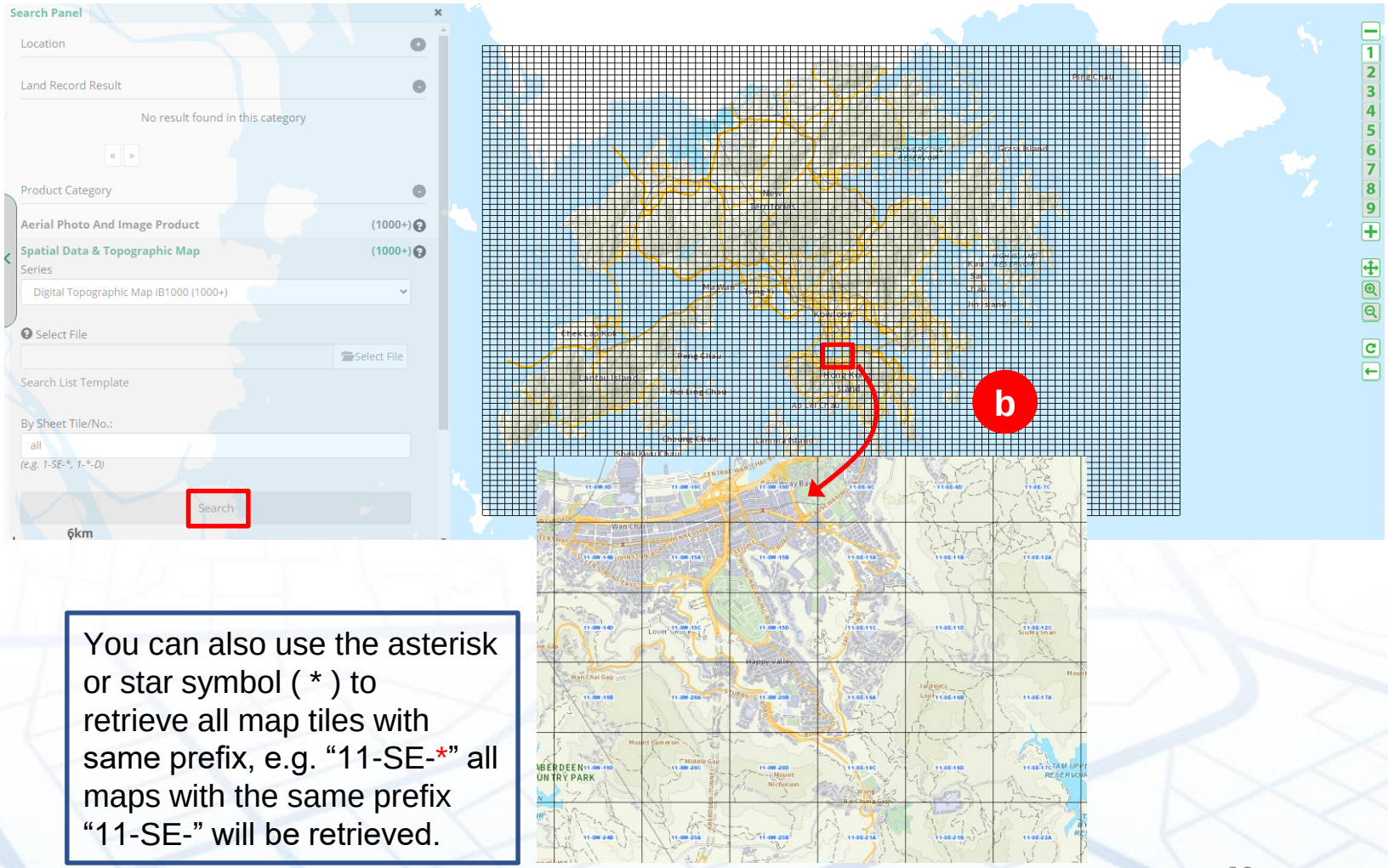
- Click Digital Topographic Map iB1000.
- Wait for a while, it will interface you to a **Search Panel of HKMS 2.0** where you can search your desired map tiles.
- It is because the whole Hong Kong will be divided into different map tiles. iB1000 is covered by over 200 map tiles. You need to enter your desired map tile ID so the search engine can retrieve the right maps for you.
- If this is your first time to fetch maps from here, you may not have the idea what tile ID shall you enter.

Hong Kong Map Service 2.0 is a website providing online service for ordering and downloading digital map products, paper map products and cadastral survey records, to the public



Download Topographic Maps from *Geodata Store* (3)

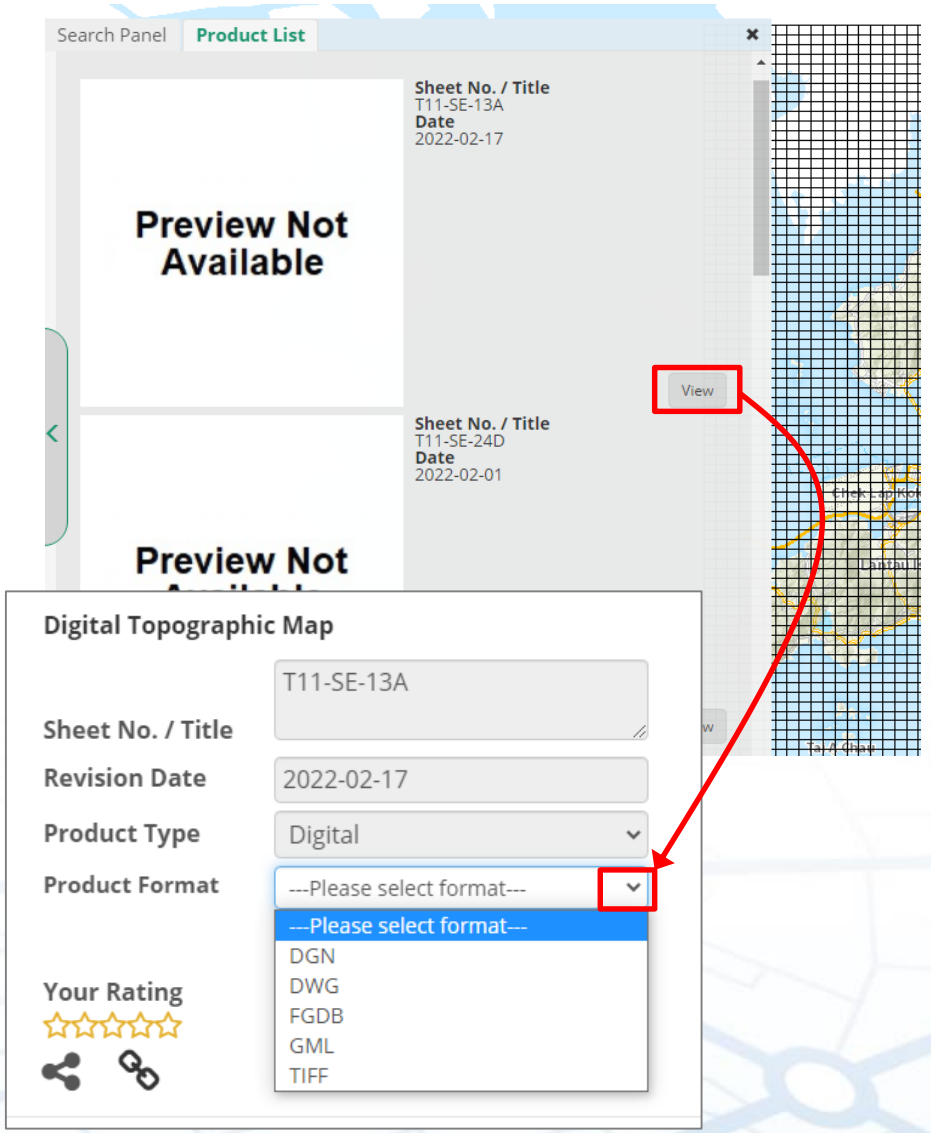
- a) Click **Search** button, it will immediately b) show you all the map tiles.
- Zoom in the map by scrolling the mouse wheel towards the screen or click the zoom level “5” (located on the right side of the map panel). Then you will see the ID of each sheet tile.
- When you get the tile number, enter it into the search field again to activate the search.



You can also use the asterisk or star symbol (*) to retrieve all map tiles with same prefix, e.g. “11-SE-*” all maps with the same prefix “11-SE-” will be retrieved.

Download Topographic Maps from *Geodata Store* (4)

- When all the desired map tiles are retrieved, click the **View** button on an available sheet to begin the download process.
- Click the dropdown arrow against Product Format. Here you can select one of the map format



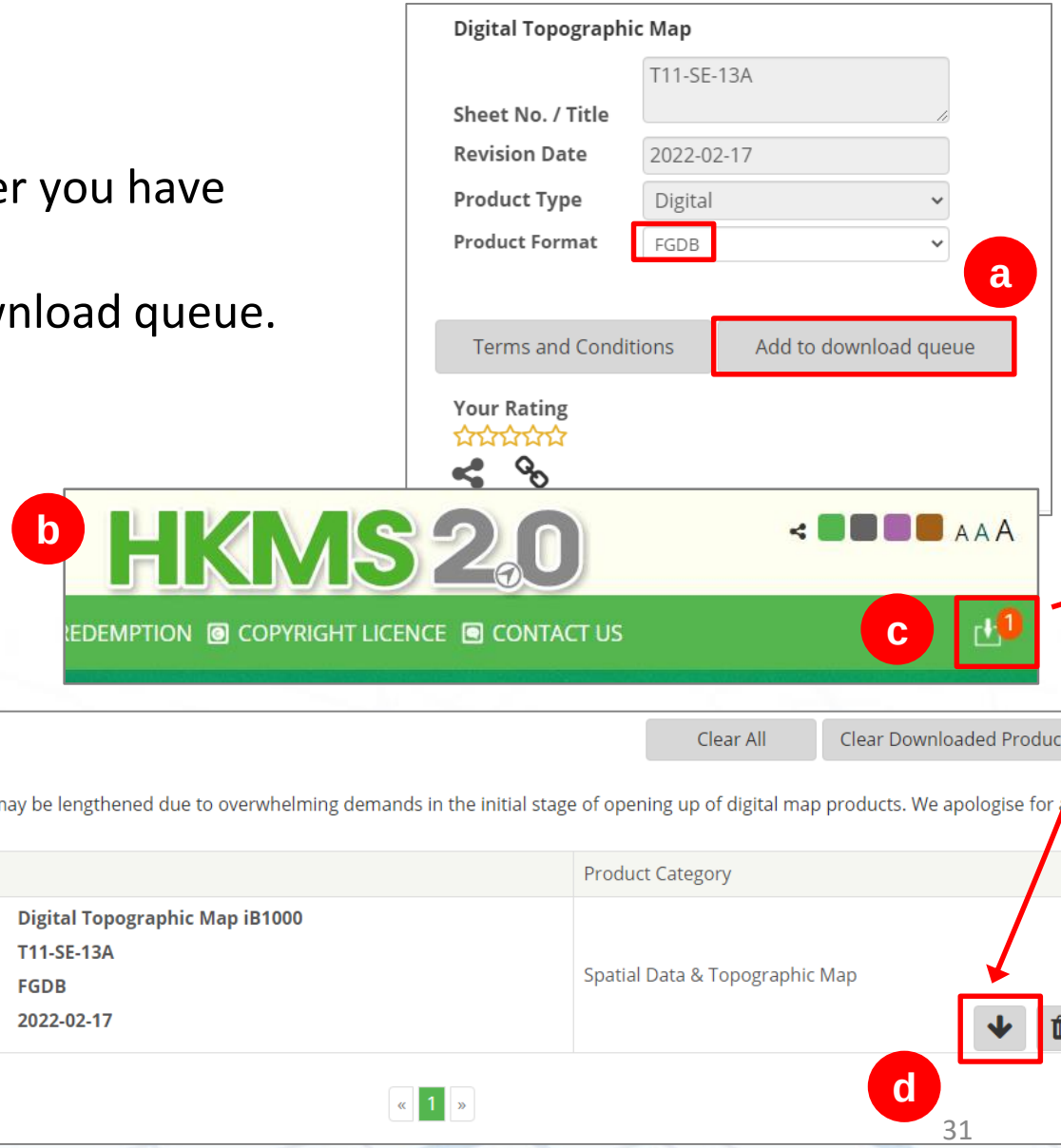
File Formats of Topographic Maps

- DGN - Computer-Aid Designed (CAD), not supported by ArcGIS Online
- DWG - Computer-Aid Designed (CAD), not supported by ArcGIS Online
- FGDB – Feature Geodatabase, propriety data of ArcGIS desktop. Support by ArcGIS Online, but it must be zipped first. You can add it through ArcGIS Online, select **Content** > **My Content** > **New item**. Then follow the wizard to add the FGDB to ArcGIS online.
- GML – Not supported by ArcGIS Online, consult pages 10 -14 of this manual if you want to use this dataset.
- TIFF - Image file (.jpg, .jpeg, .png, .tif, or .tiff) can be uploaded (but not displayed) on the map viewer of *ArcGIS Online*

Please consult this site for the data layers that you want to add into *ArcGIS Online* :
https://doc.arcgis.com/en/arcgis-online/reference/supported-items.htm

Download Topographic Maps from *Geodata Store* (5)

- a) Click the **Add to download** queue button after you have selected a desired map format.
- It will inform you when it is available in the download queue. Close it.
- b) Scroll up to the top of site. Under the banner of HKMS 2.0, you will see the download queue box.
- c) Click the box to show the download info page. d) Click the download arrow under the **Product Category** to begin the download process.



More conversion processes

For more conversion information for data from Hong Kong Geodata Store especially on the following:

- 3D Visualisation Map & 3D Photo-realistic models
- 3D Pedestrian Network
- Intelligent Road Network from Transport Dept

Please visit this site for more conversion solutions: https://www.esrichina.hk/en-hk/technical-support/resources-for-hk-user