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

Source of Spatial data

- **Data from Common Spatial Data Infrastructure Portal (CSDI Portal)** https://portal.csdi.gov.hk/
  - Free download of spatial data such as topographic maps 1:1000, 1:10000, 1:20000, Aerial Photos (DOP5000 and DOP1000 and 3D spatial data)
- **Data from DATA.GOV.HK, HKSAR Government** https://data.gov.hk/tc/
  - Data about CoVID-19 and IRNP data (Intelligent Road Network Package) 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.

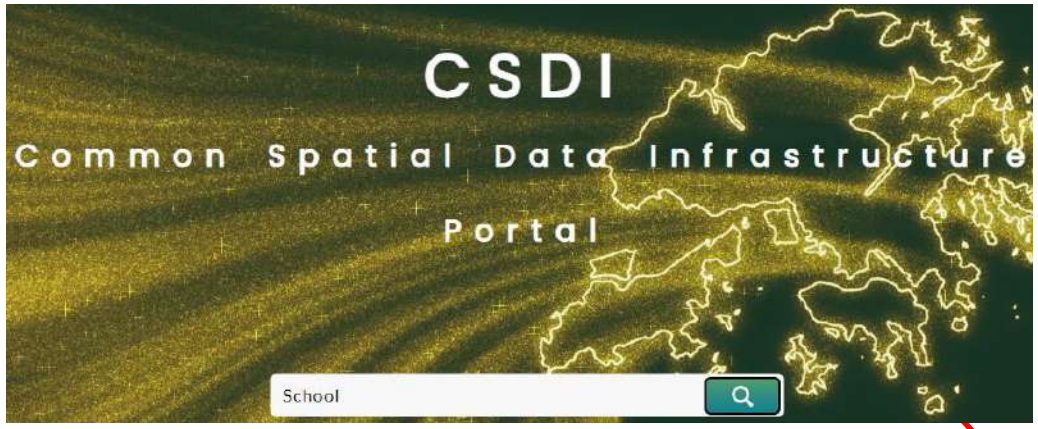
Guidance in this Manual

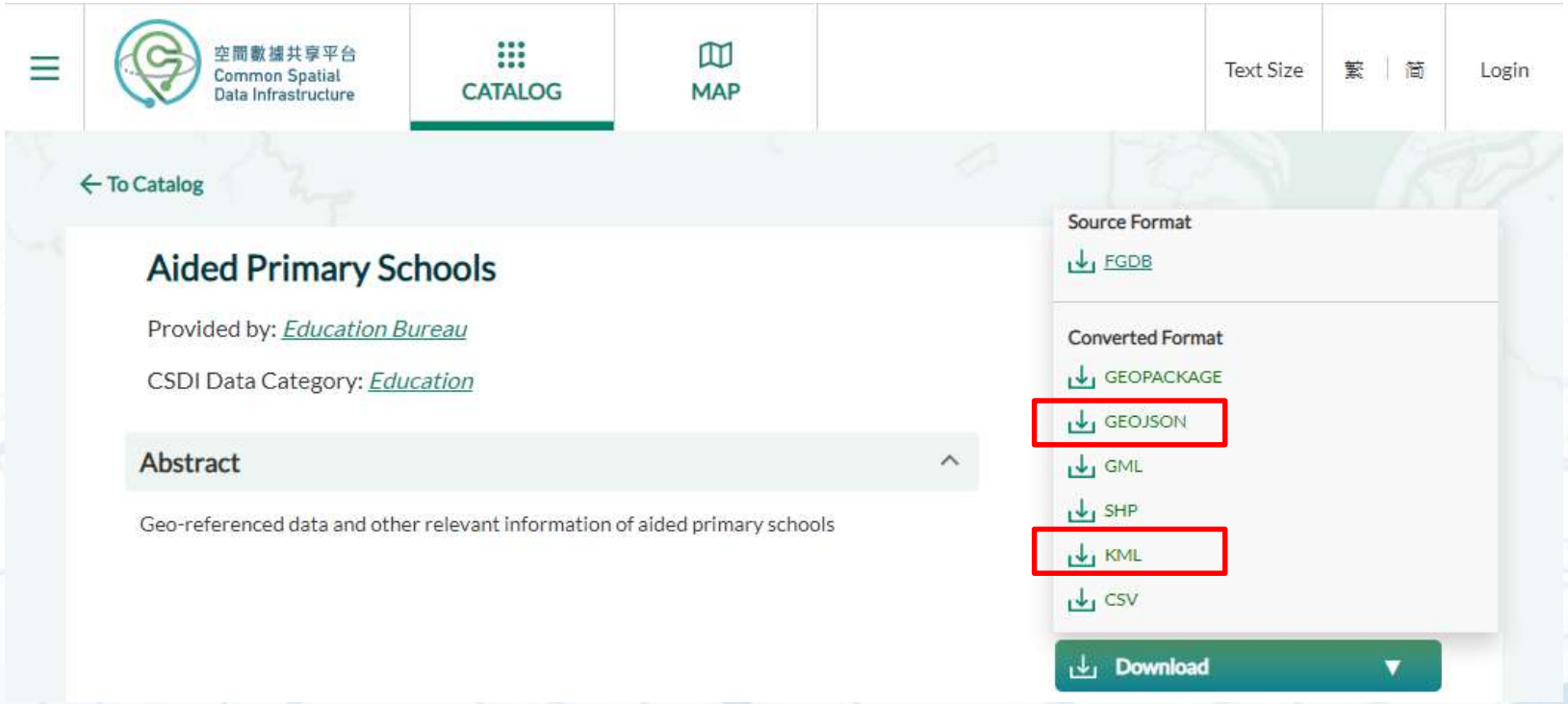
- This document instructs you how to download spatial data from different open sources, mainly the ***CSDI Portal***.
- The downloaded data can be in various formats. The most common ones are:
  - Geojson (.geojson)
  - Shapefile(.shp)
  - GML (.gml)
  - Excel (.xlsx)
  - Comma Separated Value (.csv)
  - KML(.kml)
  - File Geodatabase (FGDB)
  - GeoPackage (.gpkg)
- 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.

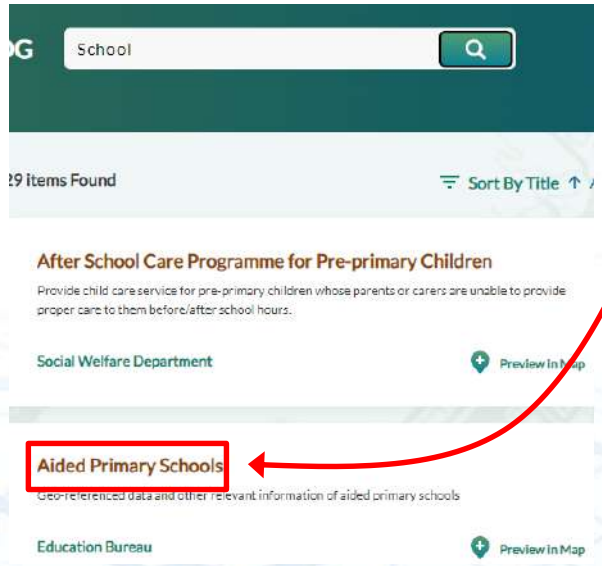
GeoJSON / KML

Download GeoJSON / KML from *CSDI Portal* (1)

- Open CSDI Portal. 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.

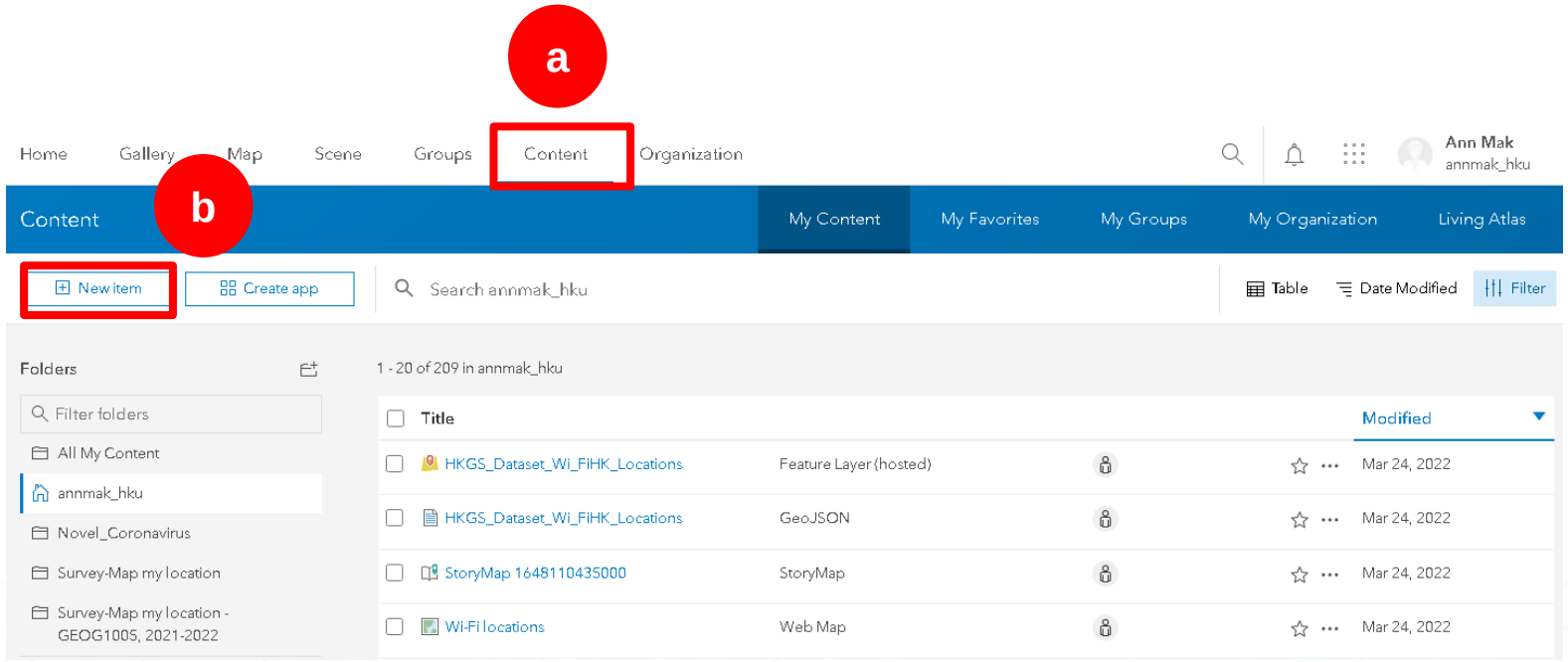






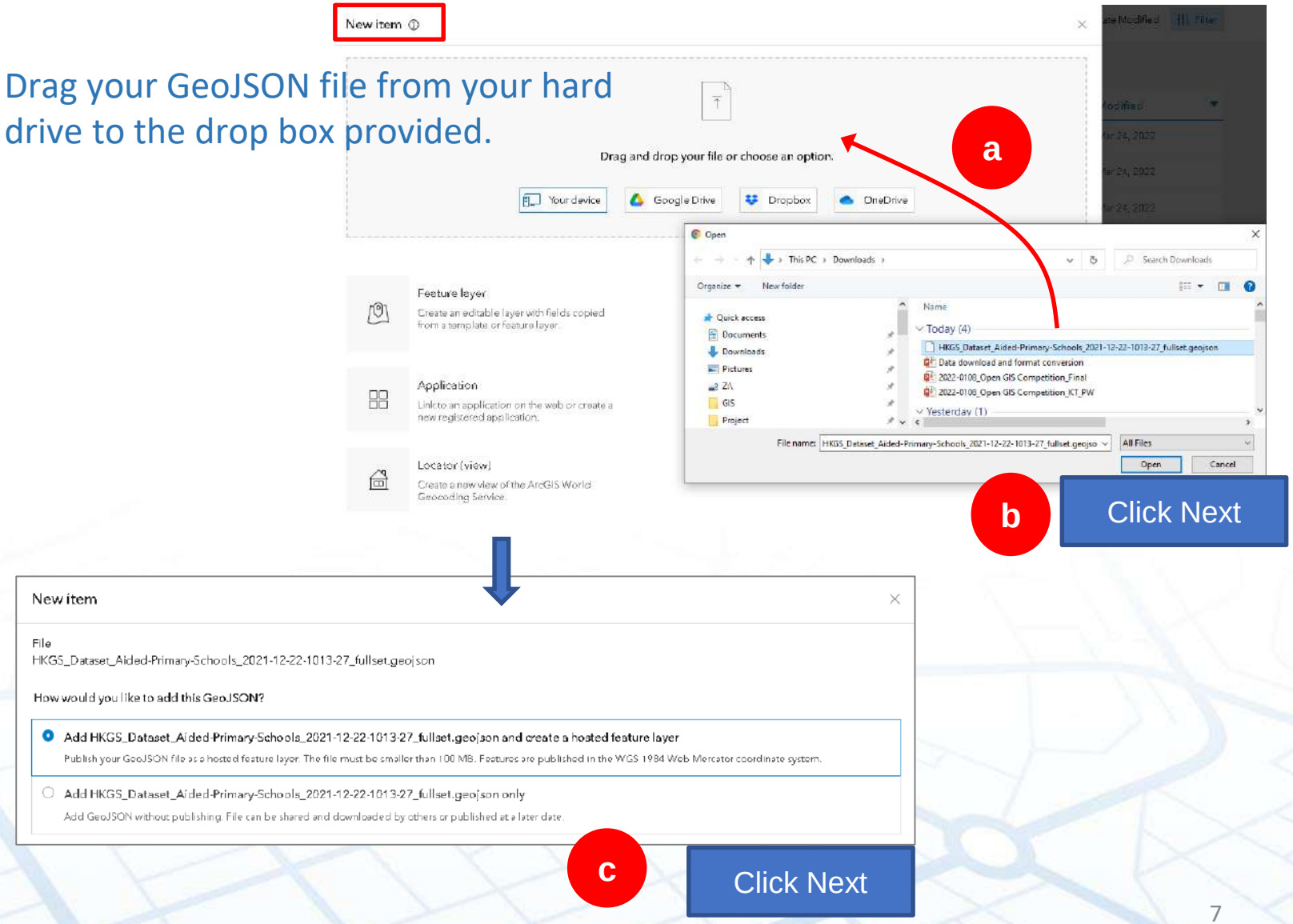
Download GeoJSON / KML from *CSDI Portal* (2)

- 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 *CSDI Portal* (3)

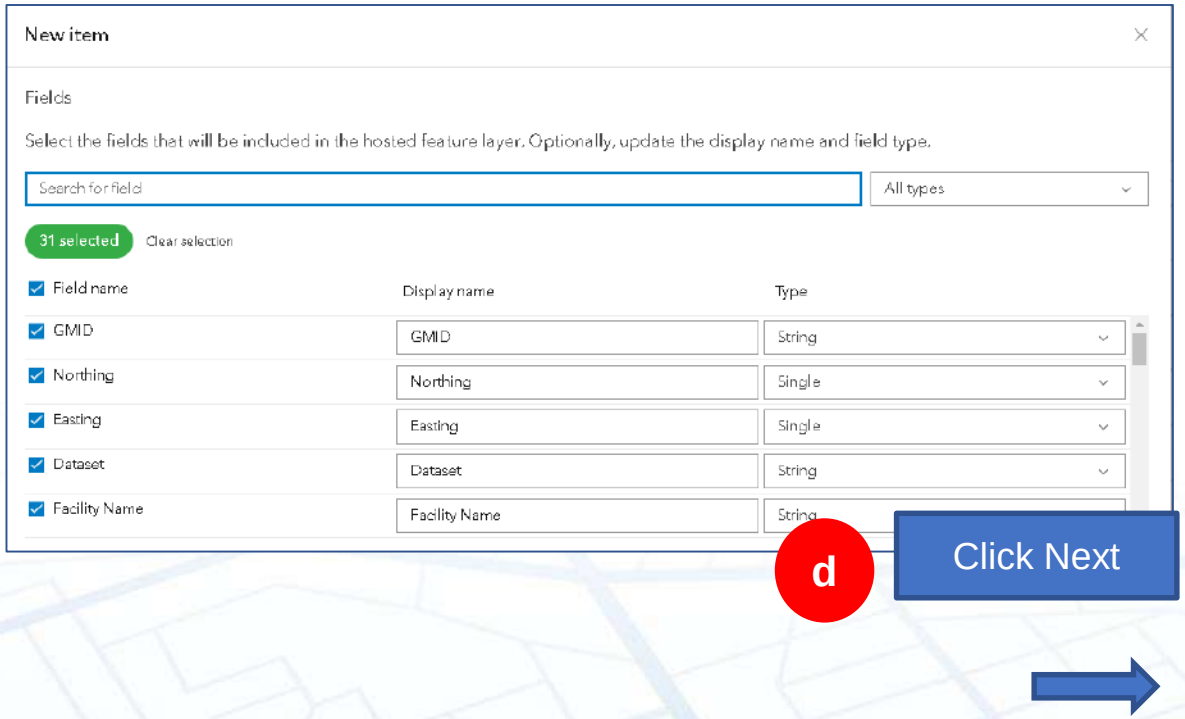
a) Again **New Item** (located on the upper left corner)**.**
b) Then drag the GeoJSON (or the KML) file from your hard drive to the drop box there. Then click **Next**.
c) Make sure you check the radio box that add the GeoJSON (or the KML) as hosted feature layer. Then click **Next**. Click **Next**.

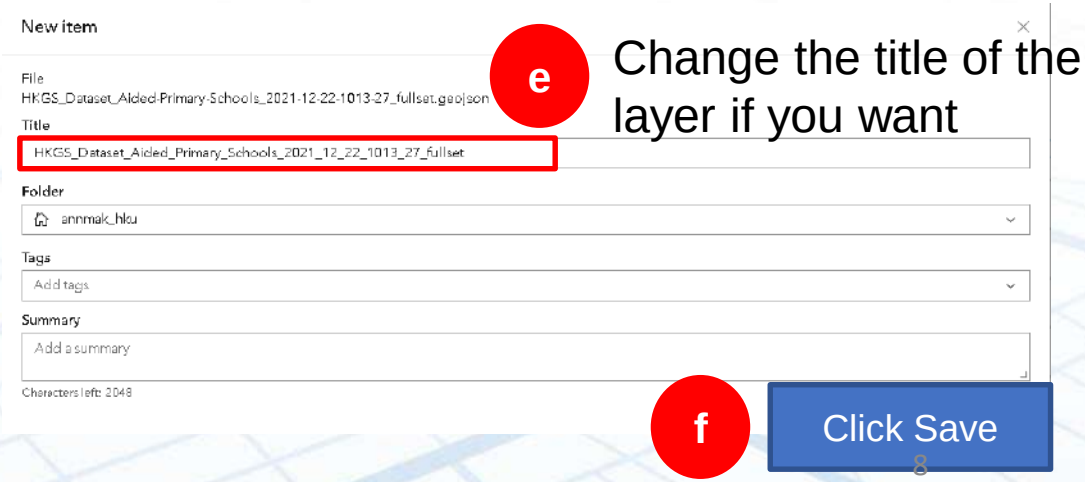


Download GeoJSON / KML from *CSDI Portal* (4)

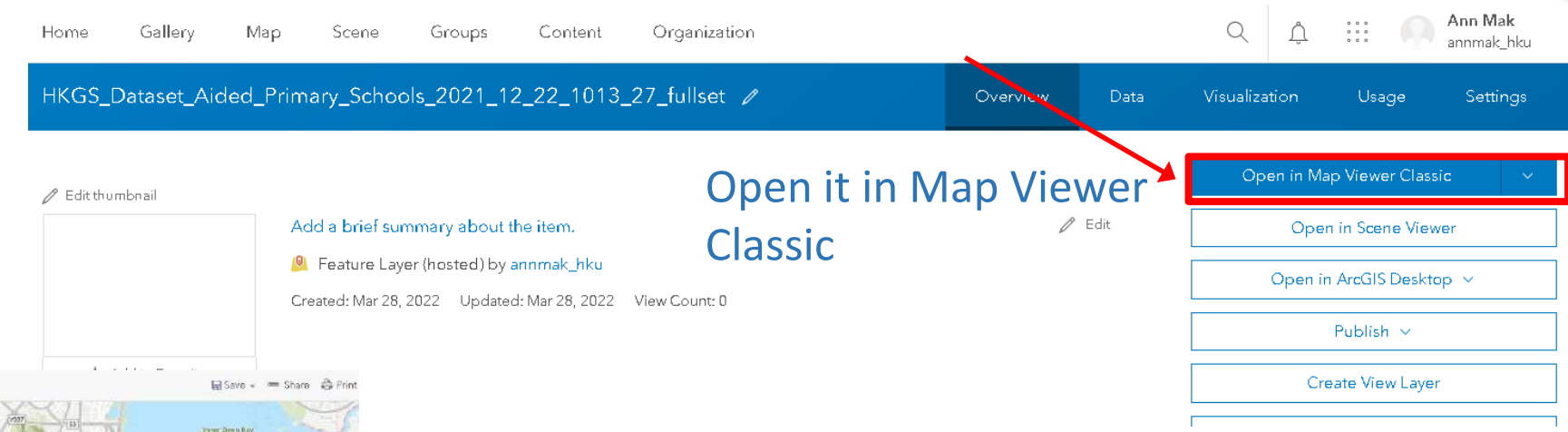
d) Click **Next** to upload all the attributes fields in the hosted feature layer.

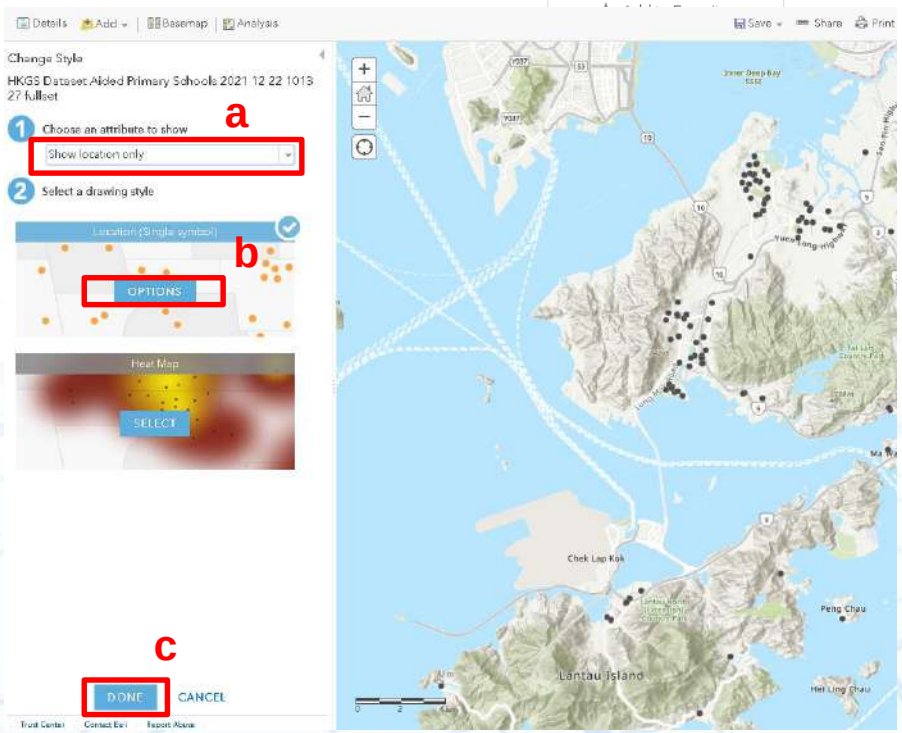
e) You may rename the uploaded file and then click **Save** to save it.





Open GeoJSON / KML in Map Viewer Classic



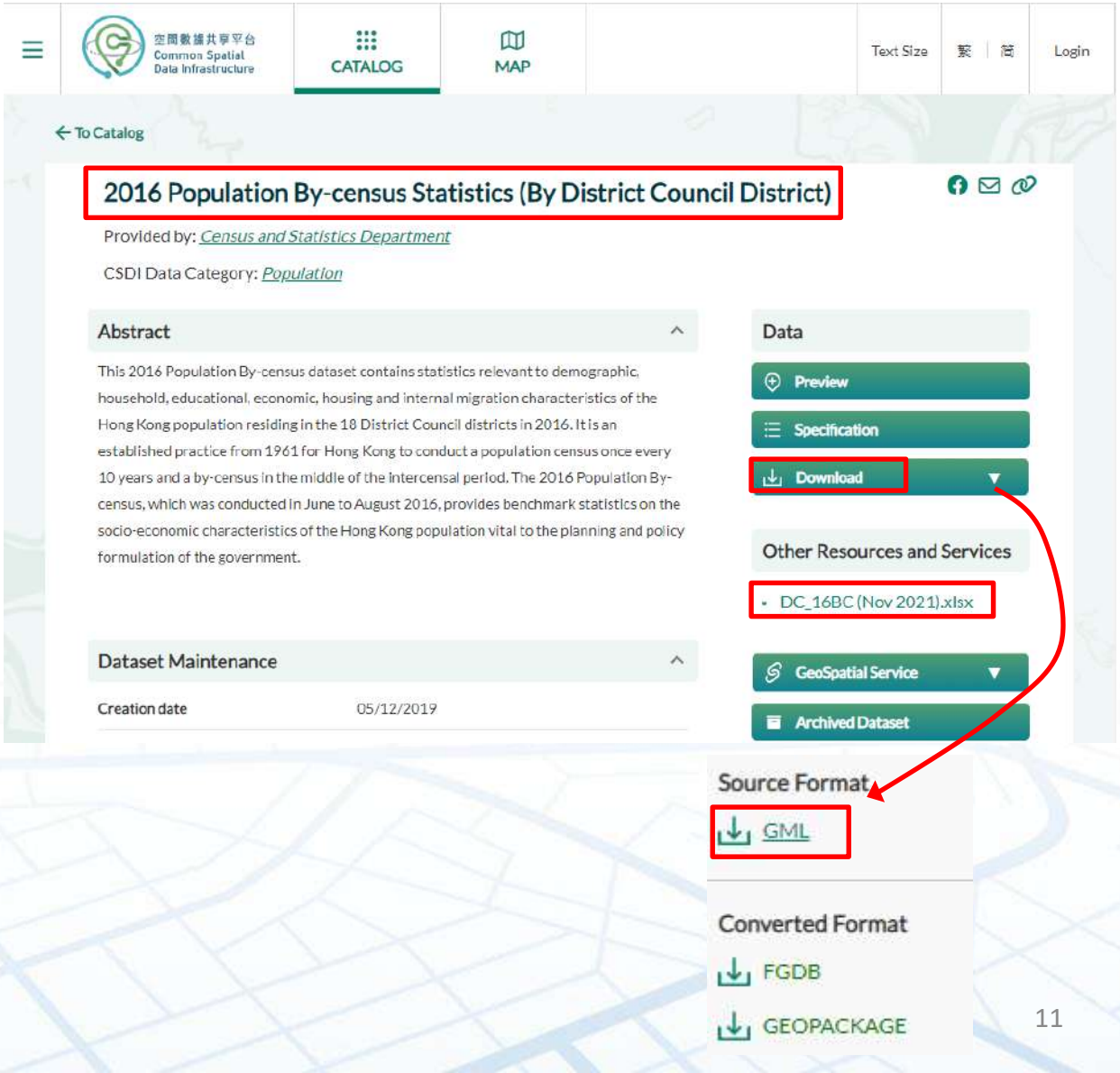


a. Select “Show location only” if you just want to show the locations of the schools on the map.
b. Click the **Option** box under **Location (Single symbol)** to change the symbol shape, size and colour.
c. Click **Done** to show it.

GML

Download GML from *CSDI Portal* (1)

- Download census data (e.g. 2016 Population by census Statistics (By District Council District) in both GML and Excel format.
- 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 shapefile or GeoJSON.
- Here we will demonstrate how to download "2016 Population By-census Statistics (By District Council District)" from *CSDI Portal*



Download GML from *CSDI Portal* (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:

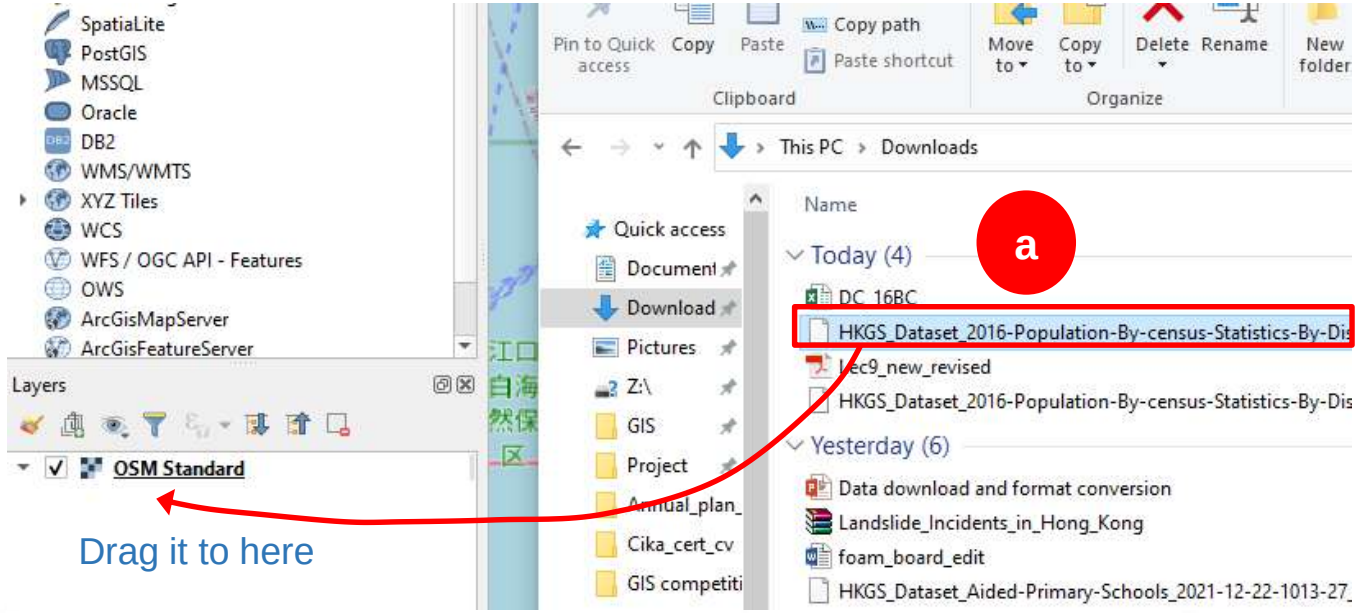
- If your computer is **Mac OS**, then download the **Mac version**.

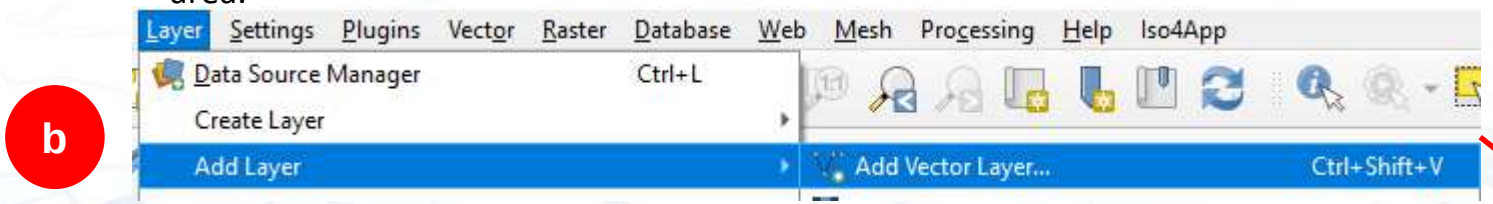
Download GML from *CSDI Portal* (3)
Import GML to *QGIS*

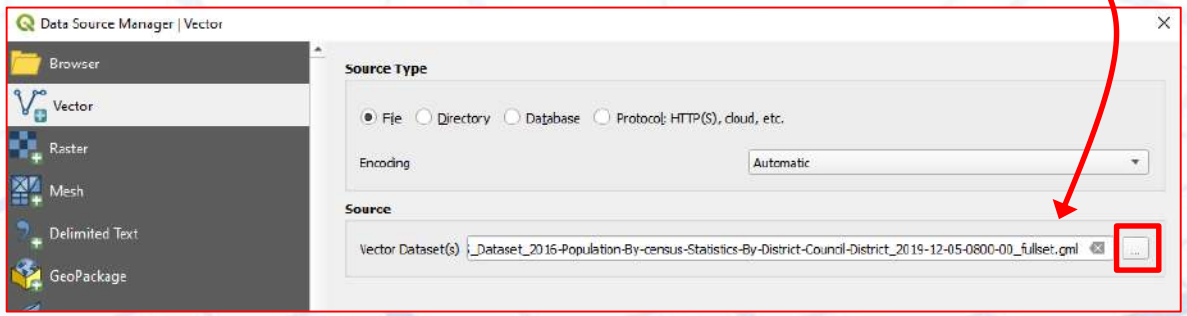
There are two ways to upload the layer to *QGIS*:

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.







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

Download GML from *CSDI Portal* (4)
Export GML to Shapefile

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

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

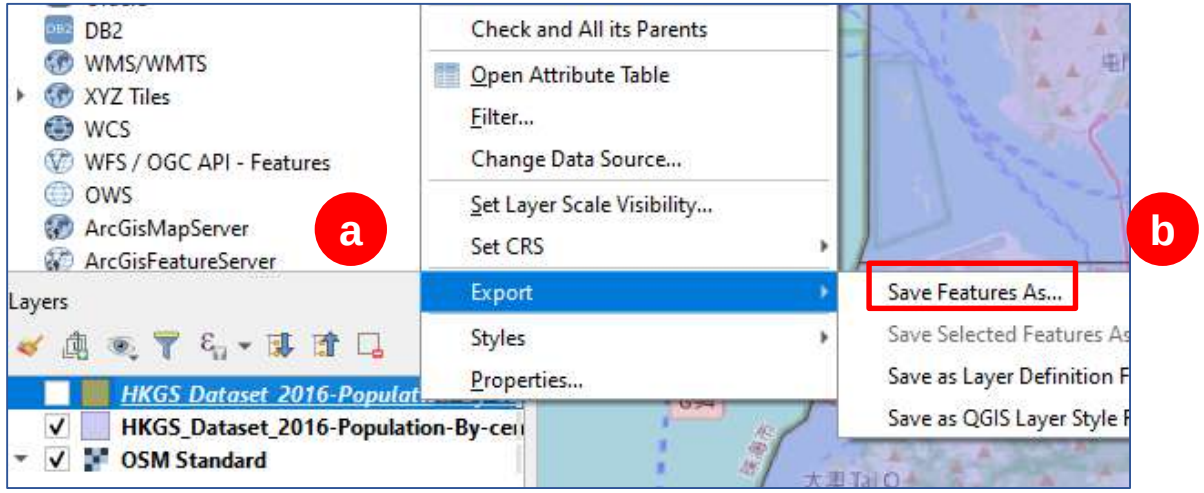
b) Then click **Save Features as**.

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

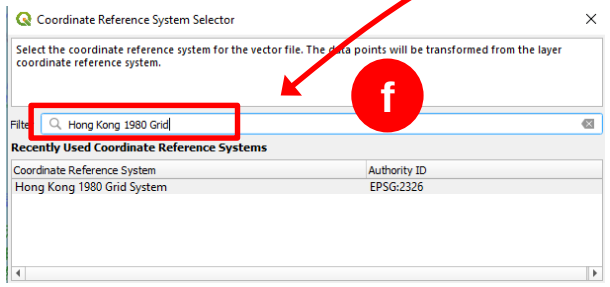
d) Click the dropdown box against **File name** and save it in a desired data path by also giving a new name to it.

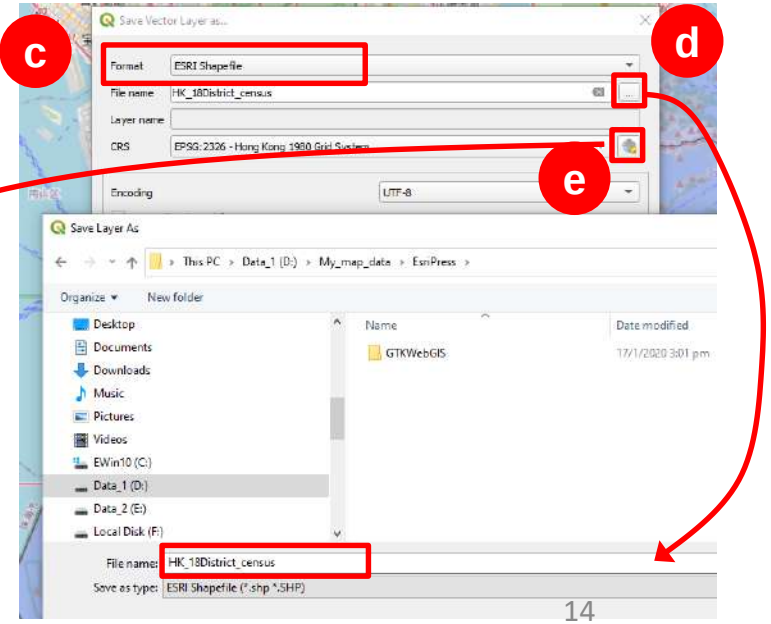
e) If the projection system “EPSG2326 - Hong Kong 1980 Grid” is not already available, f) then click the box against CRS and search the projection system “Hong Kong 1980 Grid” to furnish it with the local projection system.

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”



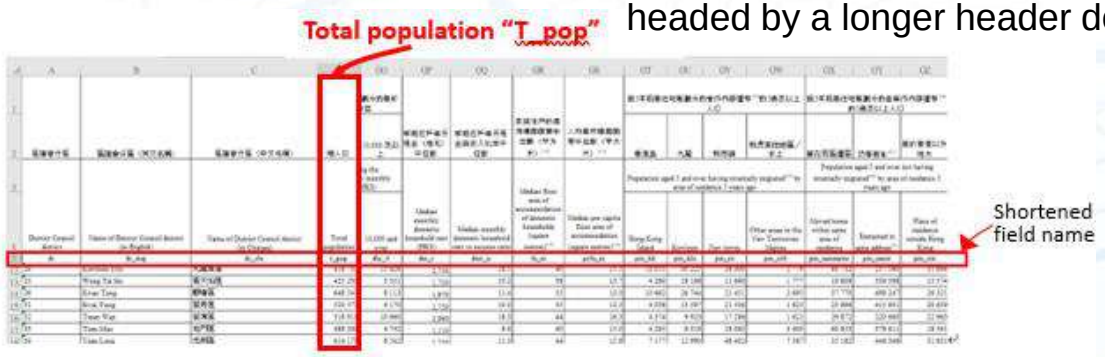


Translate the Field name of the Census table

- 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 shapefile. E.g. What does “t_pop” represent?

Shortened field name

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

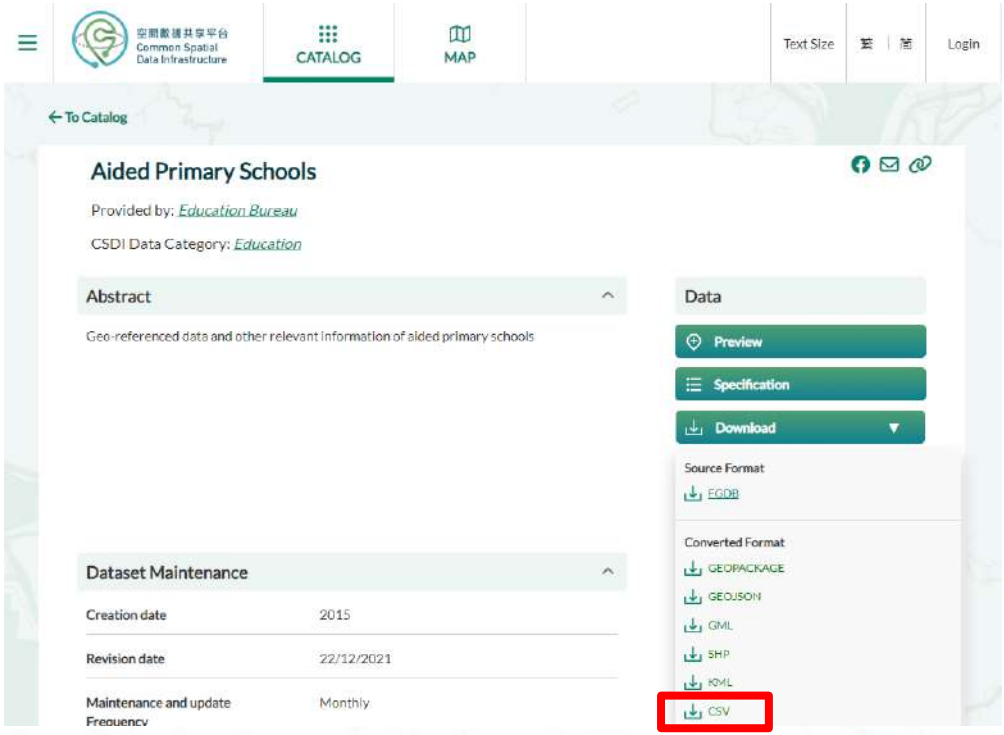


Open the *Excel* file “DC_16BC (Nov 2021).xlsx” from the CSDI portal. You may find each column field name is a long descriptive text spreading in two levels of heading that makes it easier to understand what each column represents. The shortened field name you find in the *shapefile* is also shown in 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 *CSDI Portal* (1)

- Both of CSV and Excel are spreadsheet that you can examine it in Excel.
- Here try to download “Aided Primary Schools” in CSV format.
- If you open CSV in the *Excel* program, you will find there are 4 columns already registered the location of each school in a pair of coordinates.
- 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.

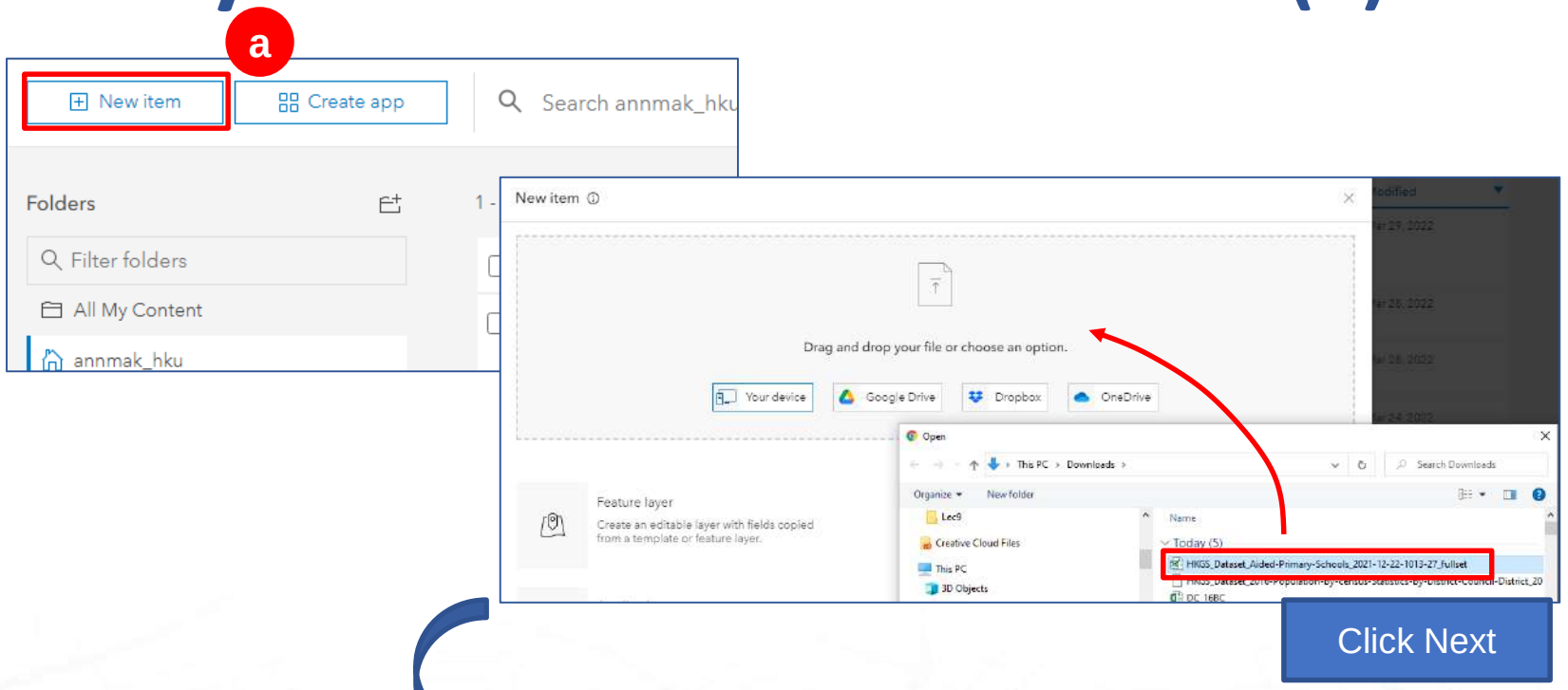
Download Excel / CSV from *CSDI Portal* (2)

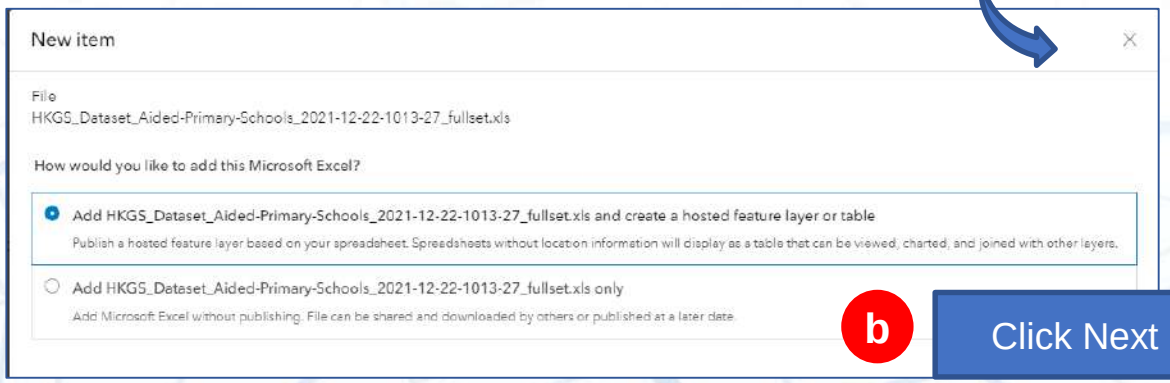
- Launch *ArcGIS Online* on your browser.

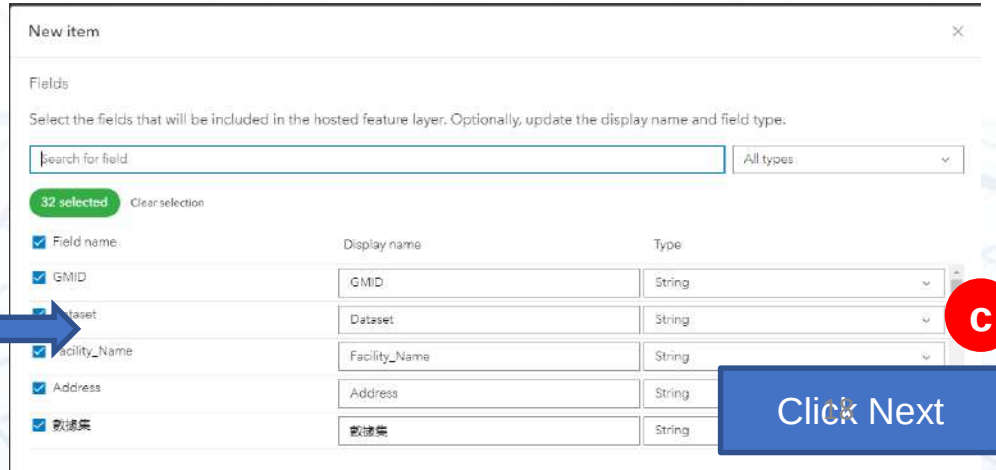
a) Click **New Item**, then drag the Excel (or CSV) file from your hard drive to the drop box there. Then click **Next**.

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.





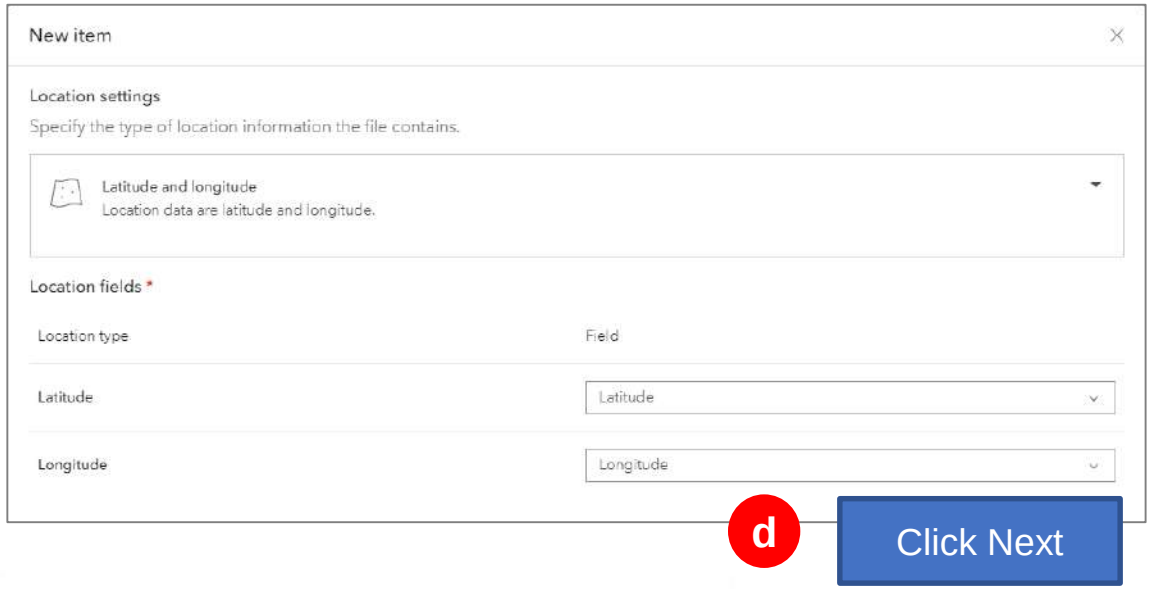


Download Excel / CSV from *CSDI Portal* (3)

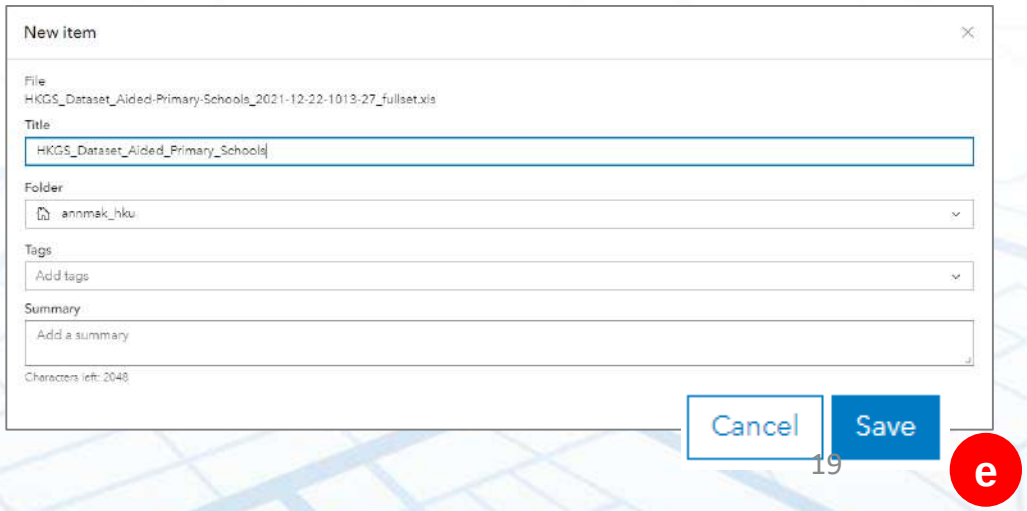
d) Next you will use the **Latitude** and in your *Excel (or CSV)* file as the **location setting**. By default, they will immediately identify the two columns that named as Latitude and Longitude.

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.



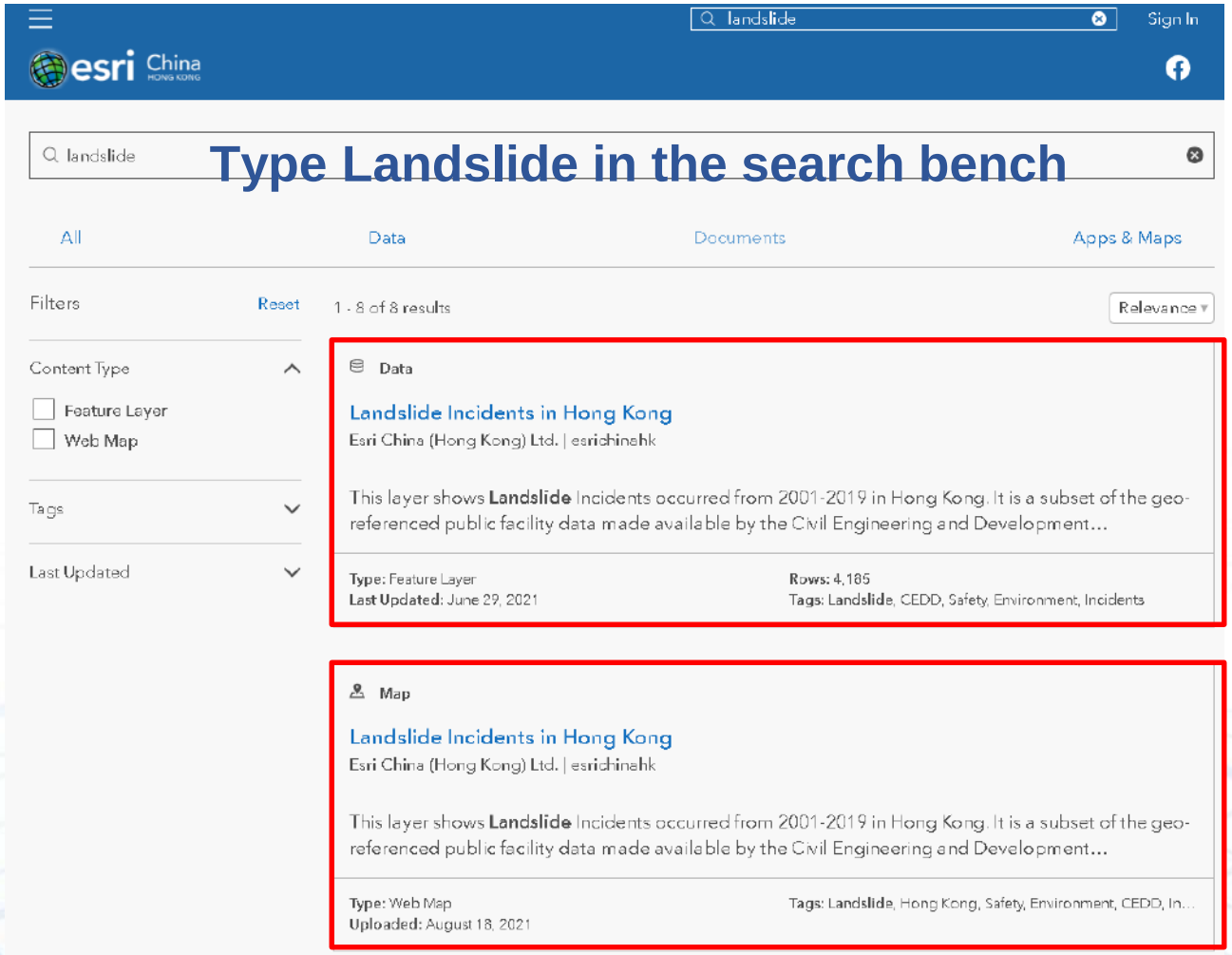
Use Latitude and Longitude to locate the schools. DO NOT use Northing and Easting as the *Map Viewer* using the spherical co-ordinates system that only adopts latitude and longitude.



Shapefile

Download Shapefile from Open Geo-Spatial Data in HK

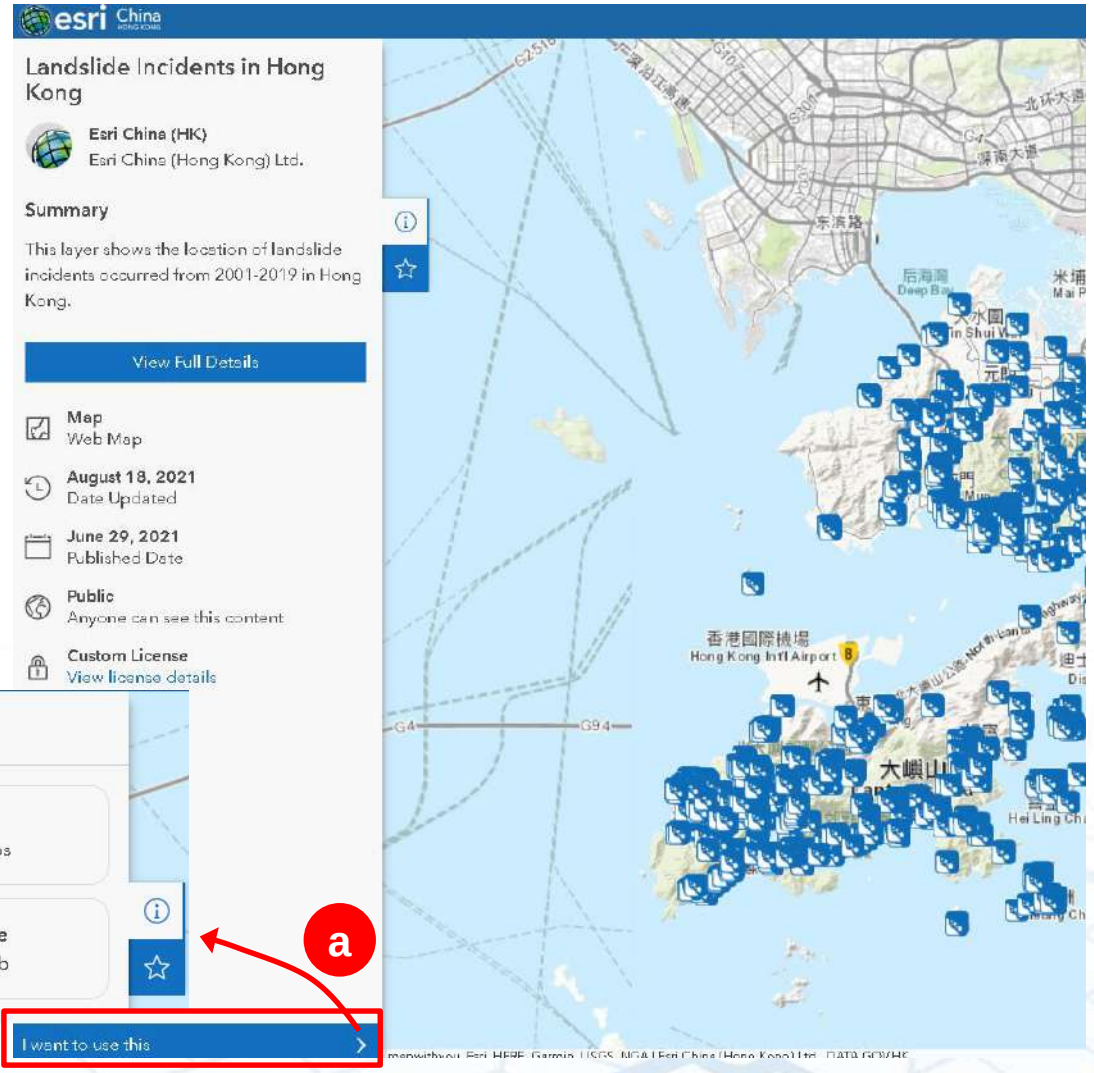
- Access Open Geo-spatial data in HK
- This Web site provides many spatial data (mainly sourced from the Government) that are ready in a GIS data format such as shapefile, KML, Geojson, CSV, etc.
- It usually provides you two options of output: **Data** and **Map**.



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

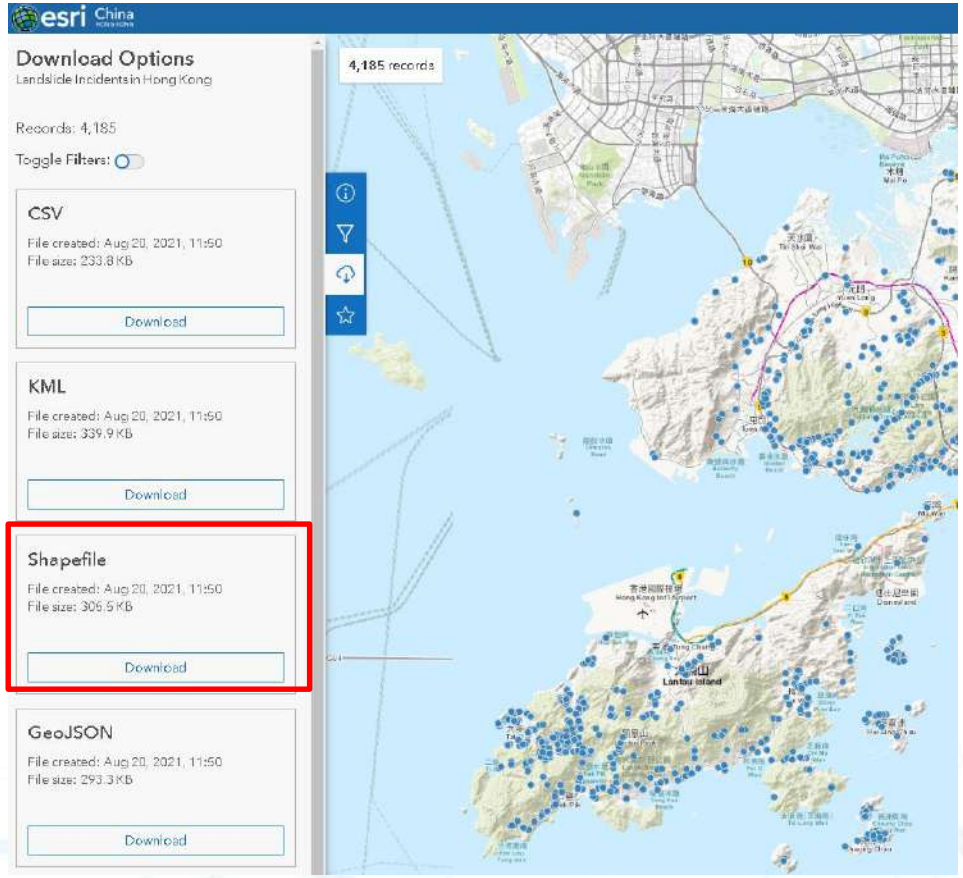
- If you select **Map**, it will just show the spatial data in the map on the right panel.
- It does not allow you to download the data.
- But you can display the map in *ArcGIS Online* or *StoryMaps*. a) Click “I want to use this” located at the left bottom bar.

- 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.



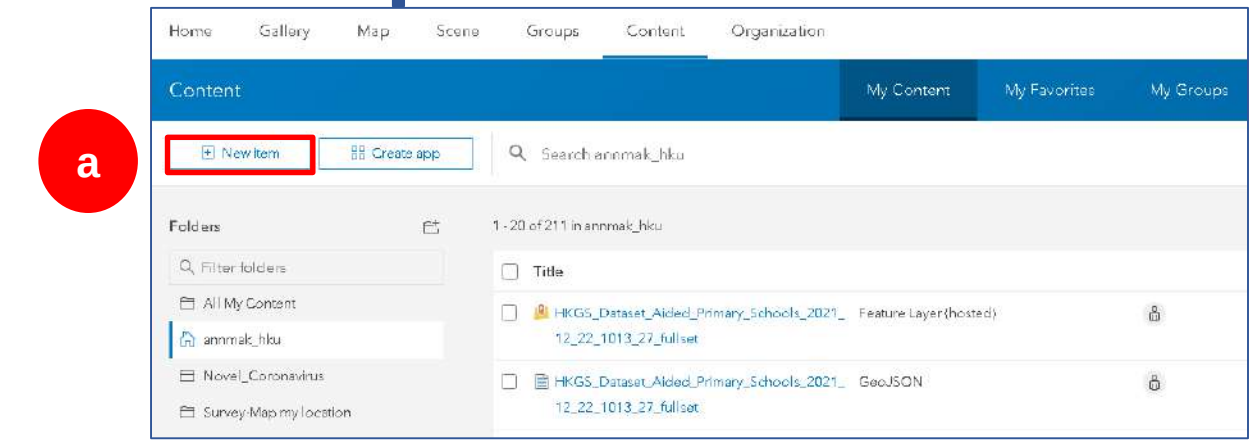
Select “Data” from Open Geo-Spatial Data in HK (1)

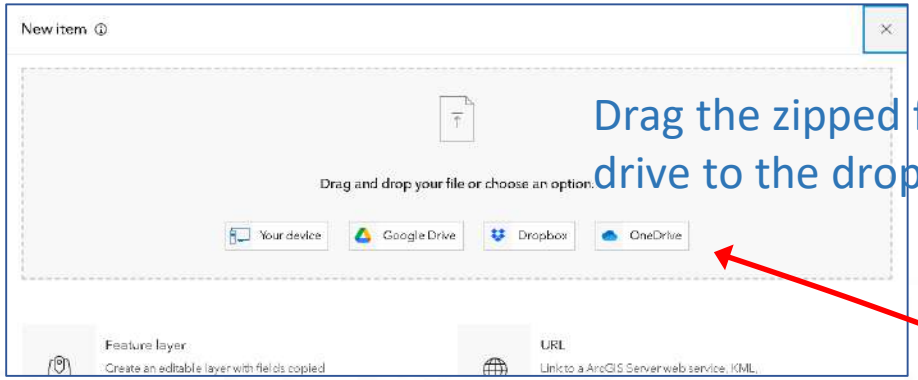
- If you select **Data** Option, it will interface you to a page for downloading data in different formats.
- Select **Shapefile** and click **Download**.
- The download file will be saved in **Download** folder in a zip file.
- If you unzip it, it actually consists of a number of related Shapefile files.
- 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.



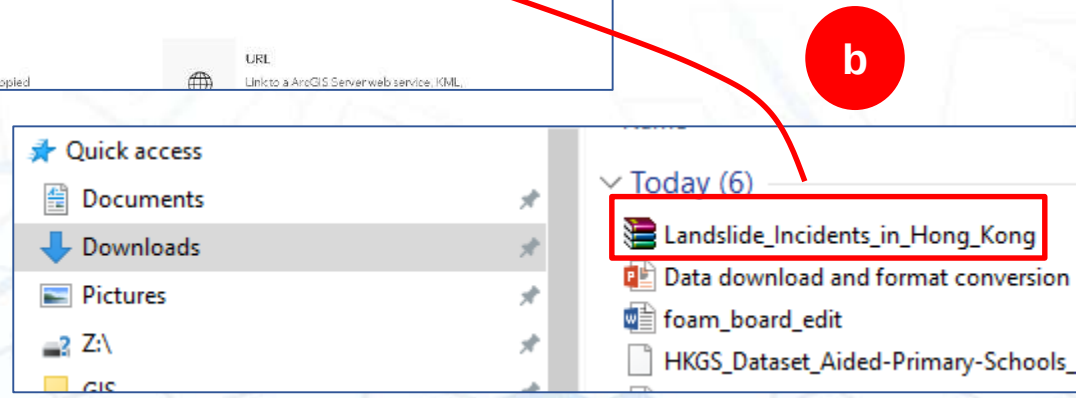
Select “Data” from Open Geo-Spatial Data in HK (2)

- 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.





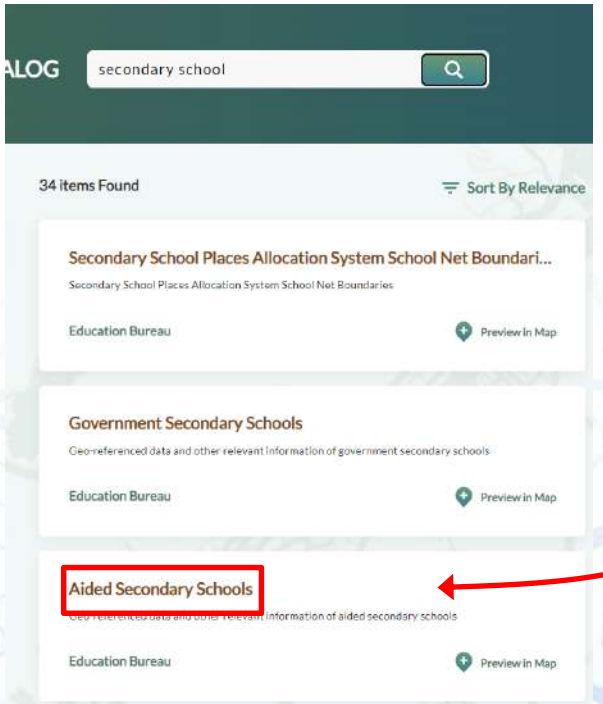
Drag the zipped file from your hard drive to the drop box provided.

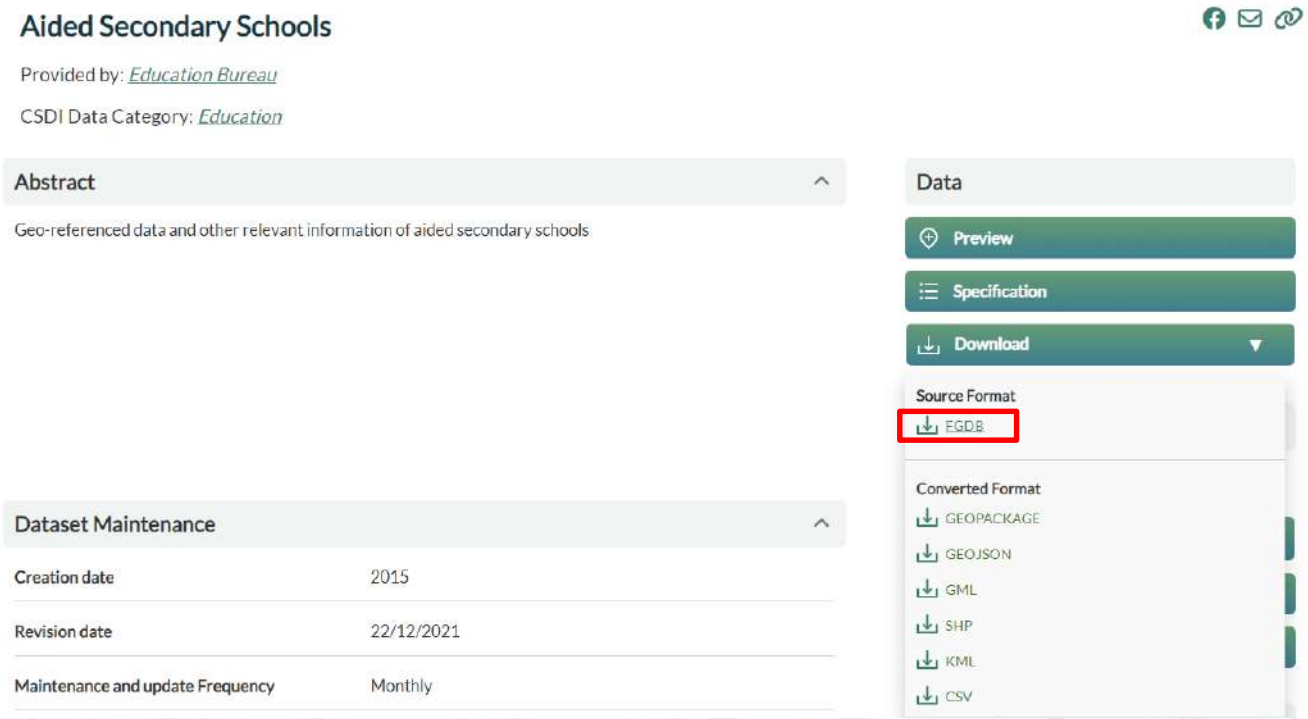


FGDB

Download FGDB from *CSDI Portal* (1)

- Open CSDI Portal. Enter secondary school on the **Search** bench.
- It will provide several datasets containing the name of schools. Select “Aided Secondary Schools”
- Click download and select “FGDB” to download the dataset





Download FGDB from *CSDI Portal* (2)

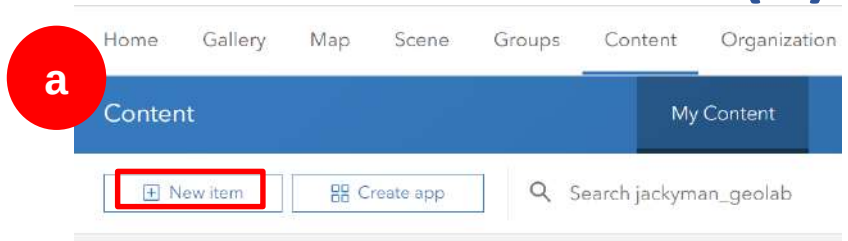
- Then launch *ArcGIS Online*

a) Click **New Item** located on the upper left corner.

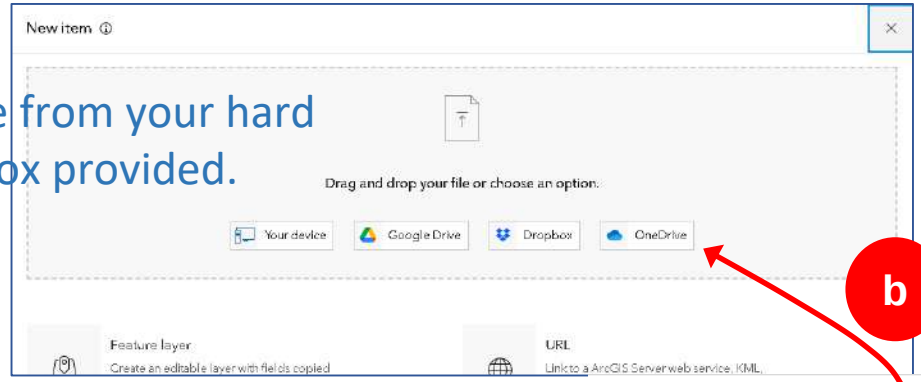
b) Drag the zipped FGDB file to the box under **New Item**.

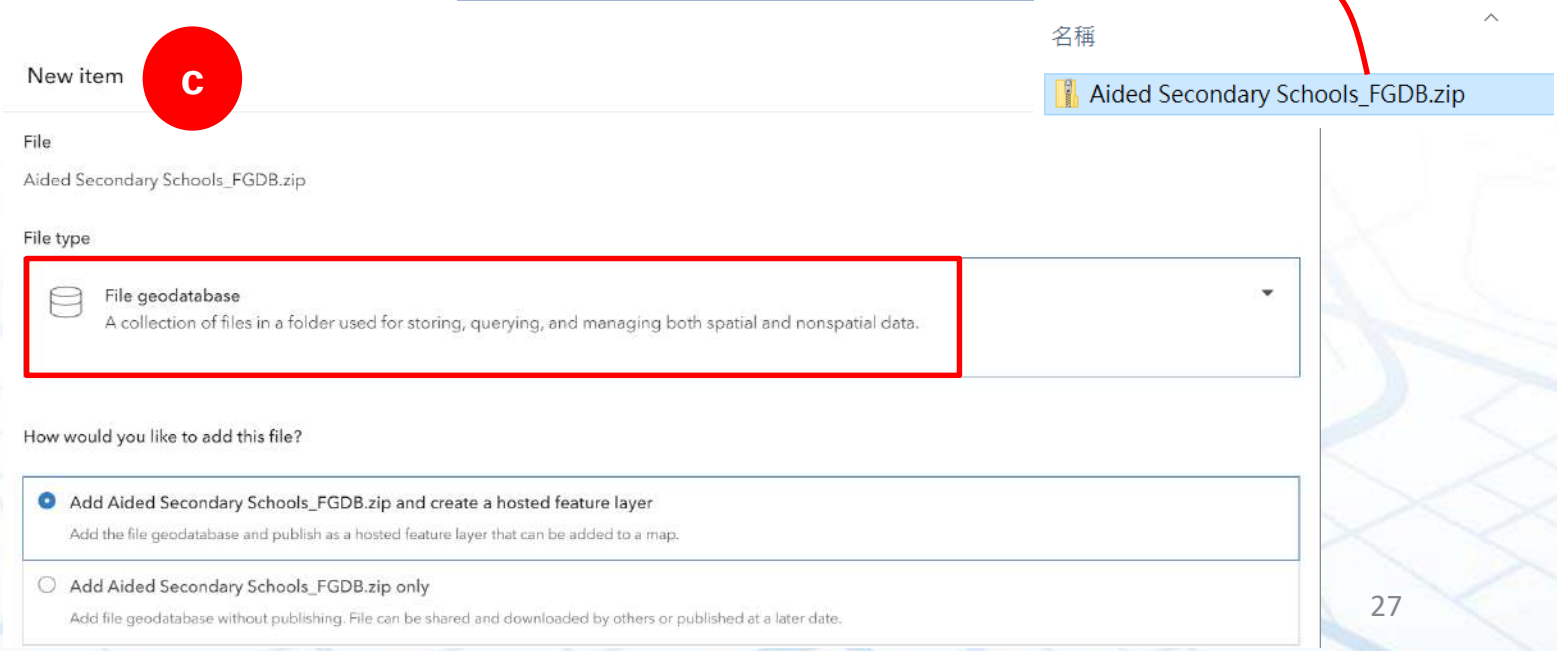
c) Select “File geodatabase” as File Type and set it as a hosted feature layer, then click **Next**.

d) 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.

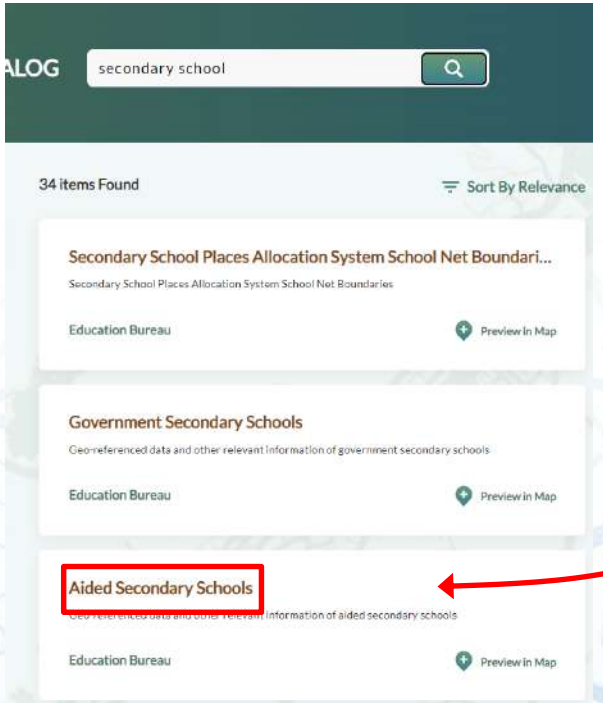


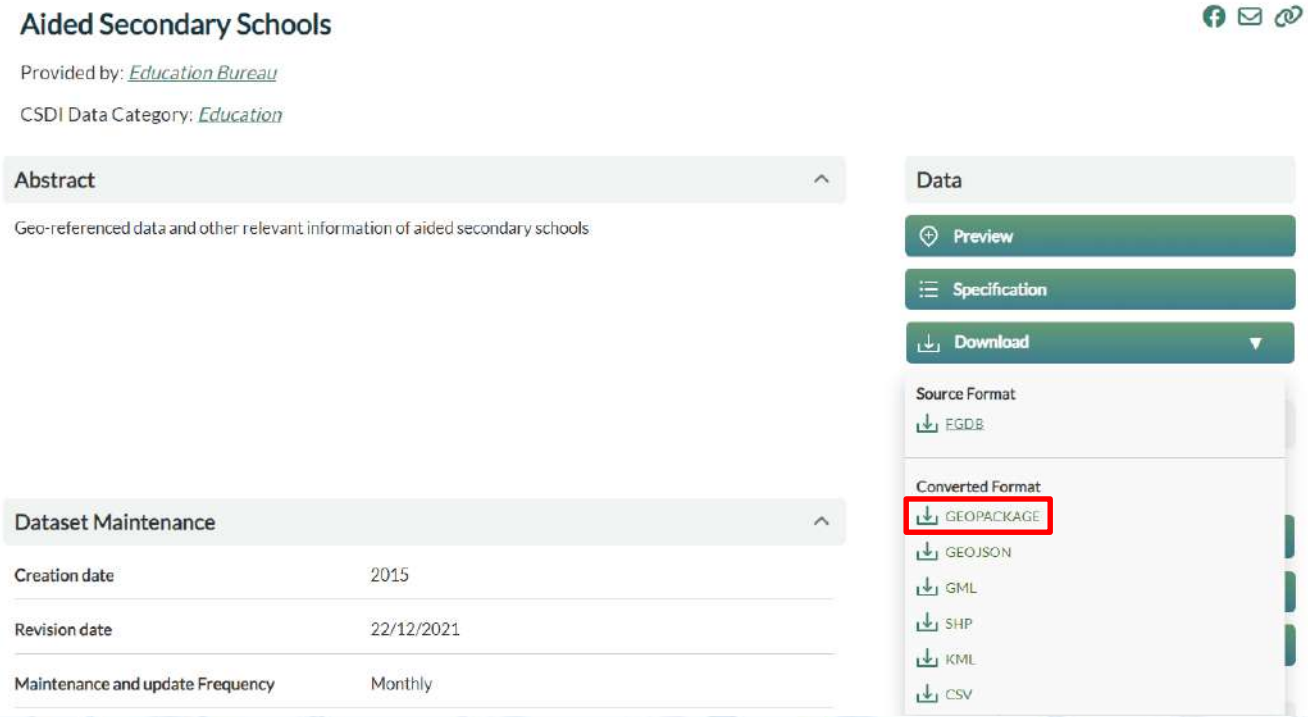


Geopackage

Download GeoPackage from *CSDI Portal* (1)

- Open CSDI Portal. Enter secondary school on the **Search** bench.
- It will provide several datasets containing the name of schools. Select “Aided Secondary Schools”
- Click download and select “GeoPackage” to download the dataset

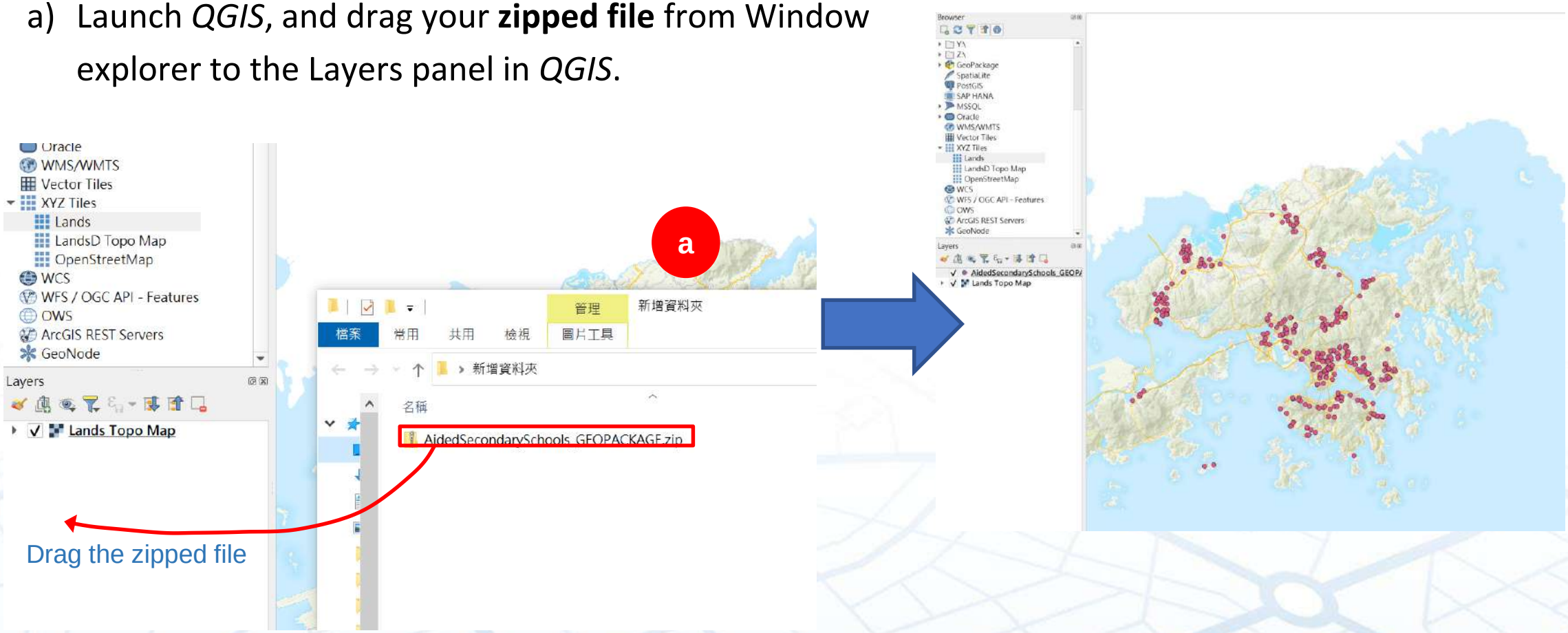




Download GeoPackage from *CSDI Portal* (2)

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

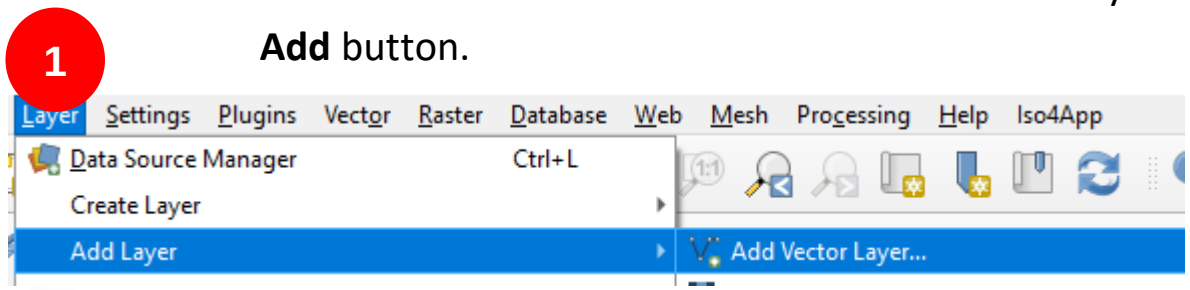
a) Launch *QGIS*, and drag your **zipped file** from Window explorer to the Layers panel in *QGIS*.

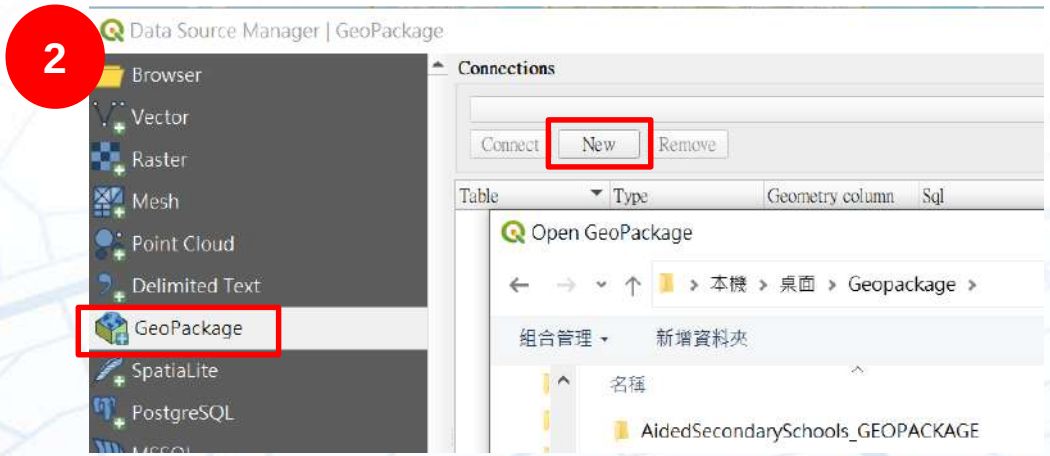


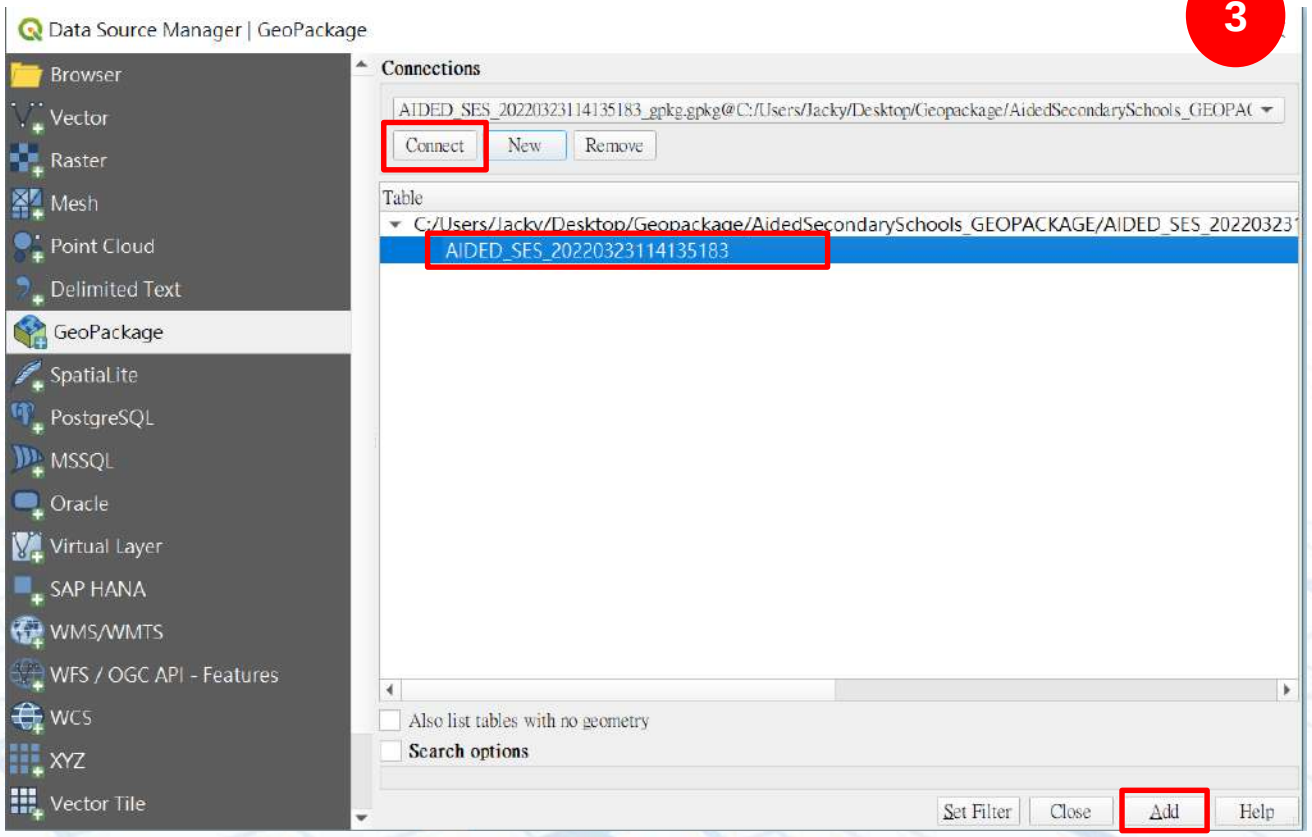
Download GeoPackage from *CSDI Portal* (3)

b) Or under **Layer** manual,

1. Click **Add Layer**, then **Add Vector Layer**.
2. Click the **GeoPackage** tab on the left and click **New** to add the unzipped GeoPackage file
3. Then click **Connect**. You should now see a new layer contained in the GeoPackage file. Select the layer and click on the **Add** button.



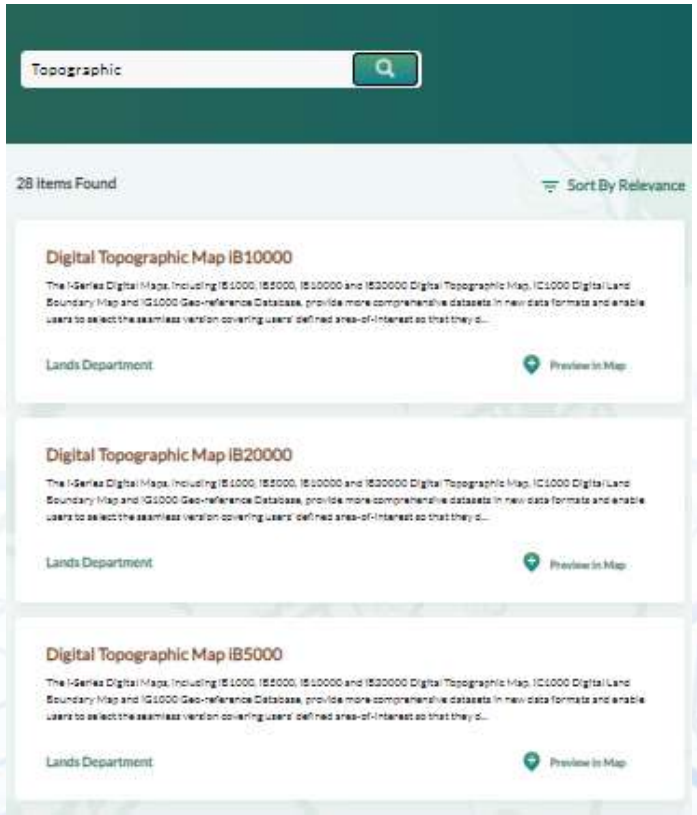




Digital Topographic Maps

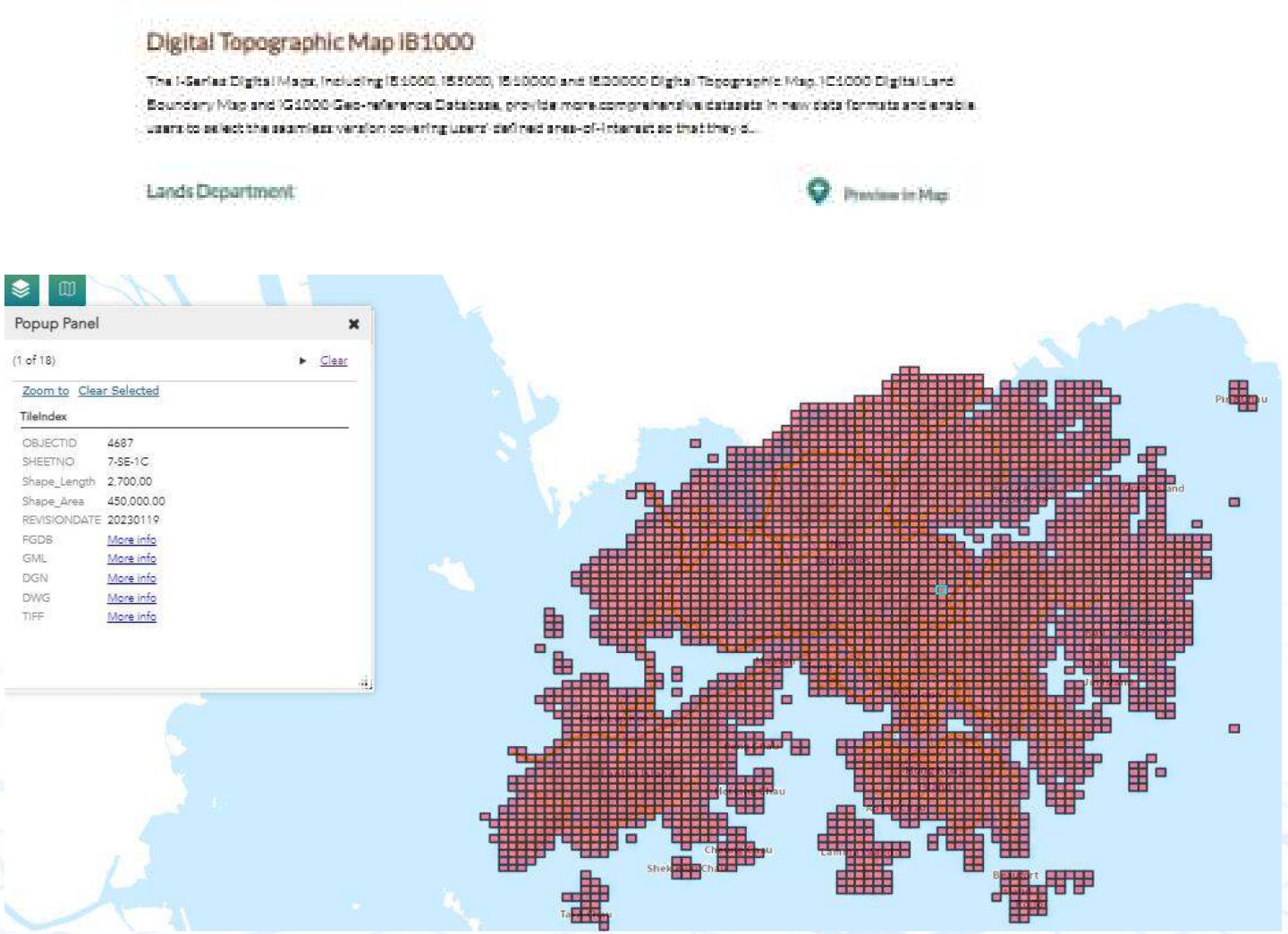
Download Digital Topographic Maps from *CSDI Portal* (1)

- 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 *CSDI Portal* and enter “topographic” on the **Search** Bench.
- All the topographic maps will show to you.



Download Digital Topographic Maps from *CSDI Portal* (2)

- Click “Preview in Map” under the title of “Digital Topographic Map iB1000” to explore the dataset in map view.
- Select a tile of data and one of the map formats
- Click “More Info” in the table on the left of the page. It will download a ZIP that contains the map.



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 – File 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

More conversion processes

For more conversion information for data from CSDI Portal 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