Intro to *QGIS* with Vector Data: EXERCISE

2026

University of Victoria Libraries

Activity #1

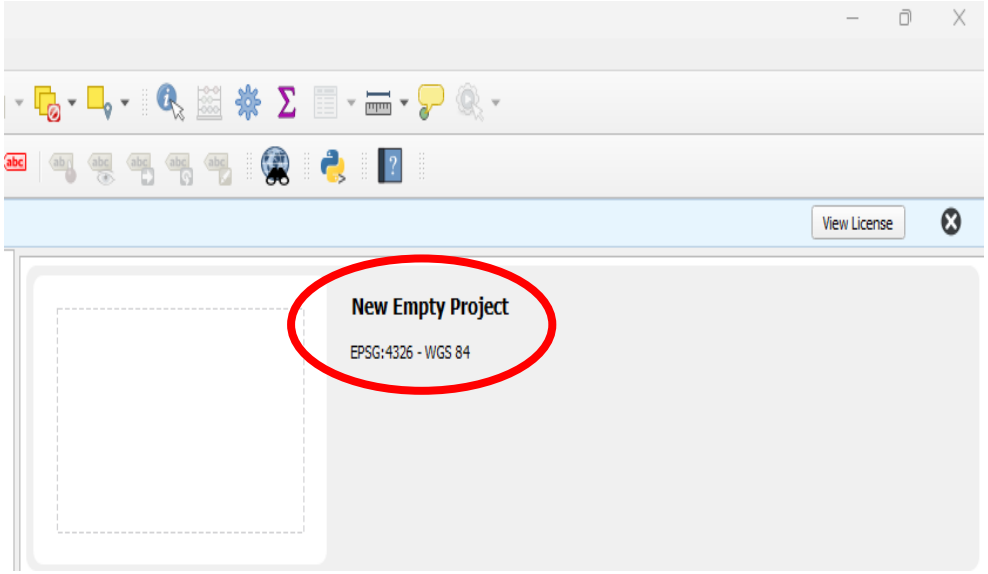
Start *QGIS* *(if you haven't already)*

Download workshop data

- Extract /unzip the .zip file
- Save it where you can find it…

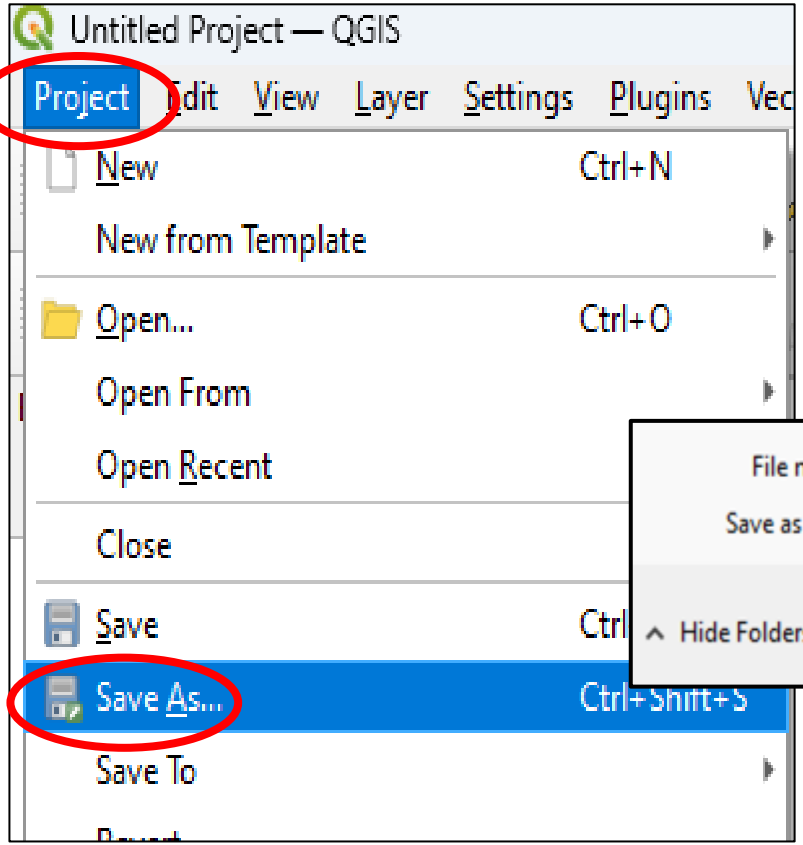
Open QGIS (your version may be different)

- Double click on *New Empty Project*

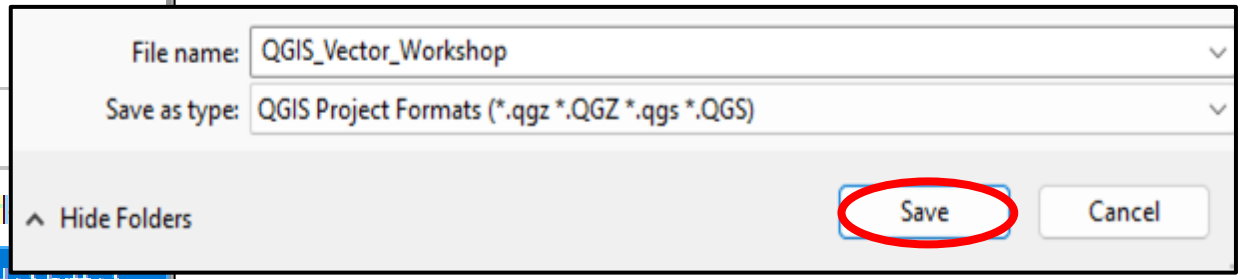


Note: new *QGIS* projects open with Geographic Coordinate System (GCS) **EPSG 4326**

Save new project

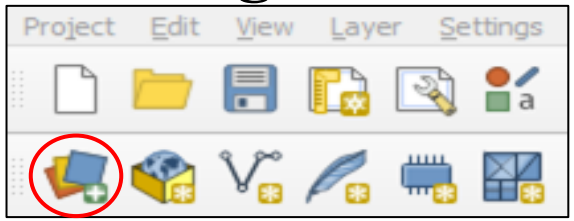


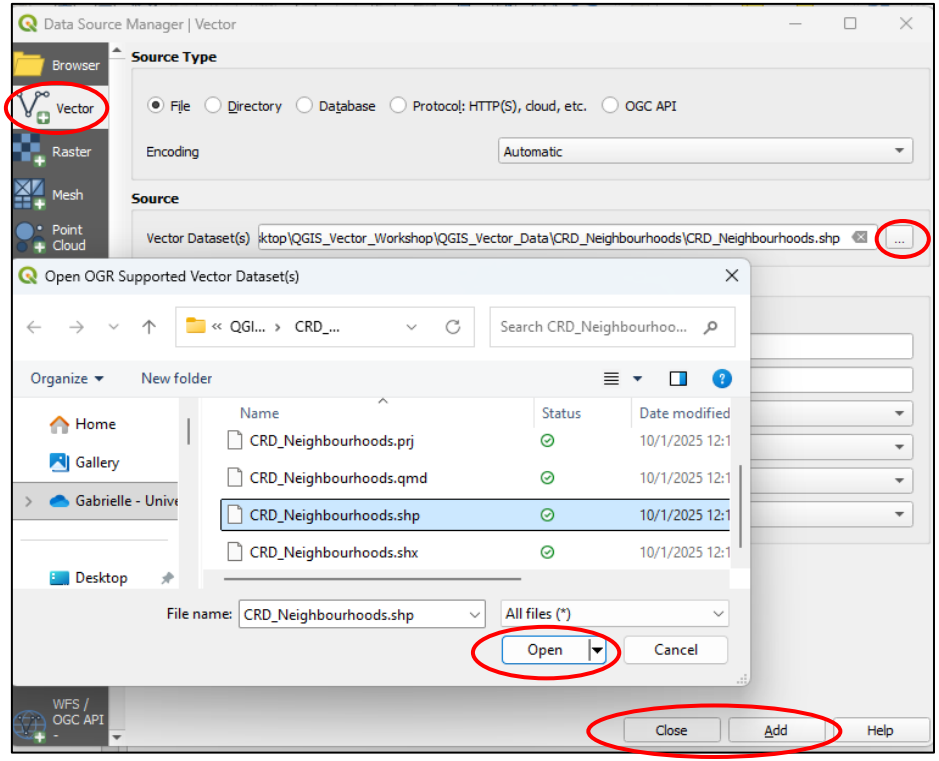
- In *QGIS* Menu Bar, select *Project* then *Save As*
- Name your project "QGIS_Vector_Workshop"
- Save your project as **.qgz** to where you can find it



Note: .qgz is the project file format for *QGIS*

add Neighbourhoods polygon data





- Select *Open Data Source Manager*
- Select the *Vector* tab
- Under the *Source* heading click the ...
- Navigate to workshop data
- Select **CRD_Neighbourhoods.shp**, Open
- **Add** and **Close**

Navigate / Examine neighbourhoods data layer

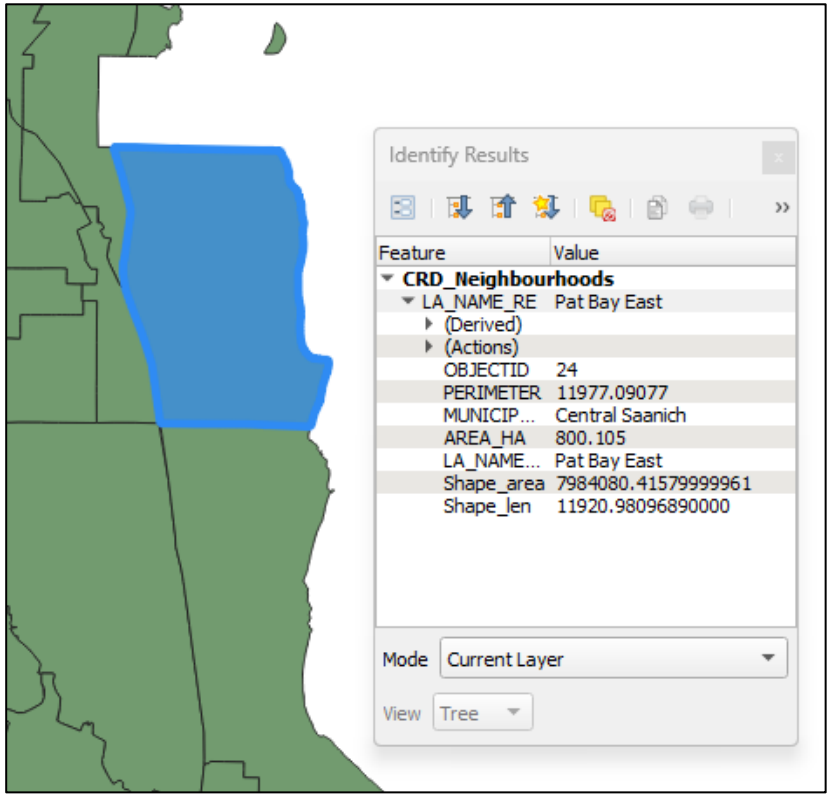
Navigate Neighbourhoods with the *Pan* tool

Zoom in and out

Use *zoom full* to see full data extent

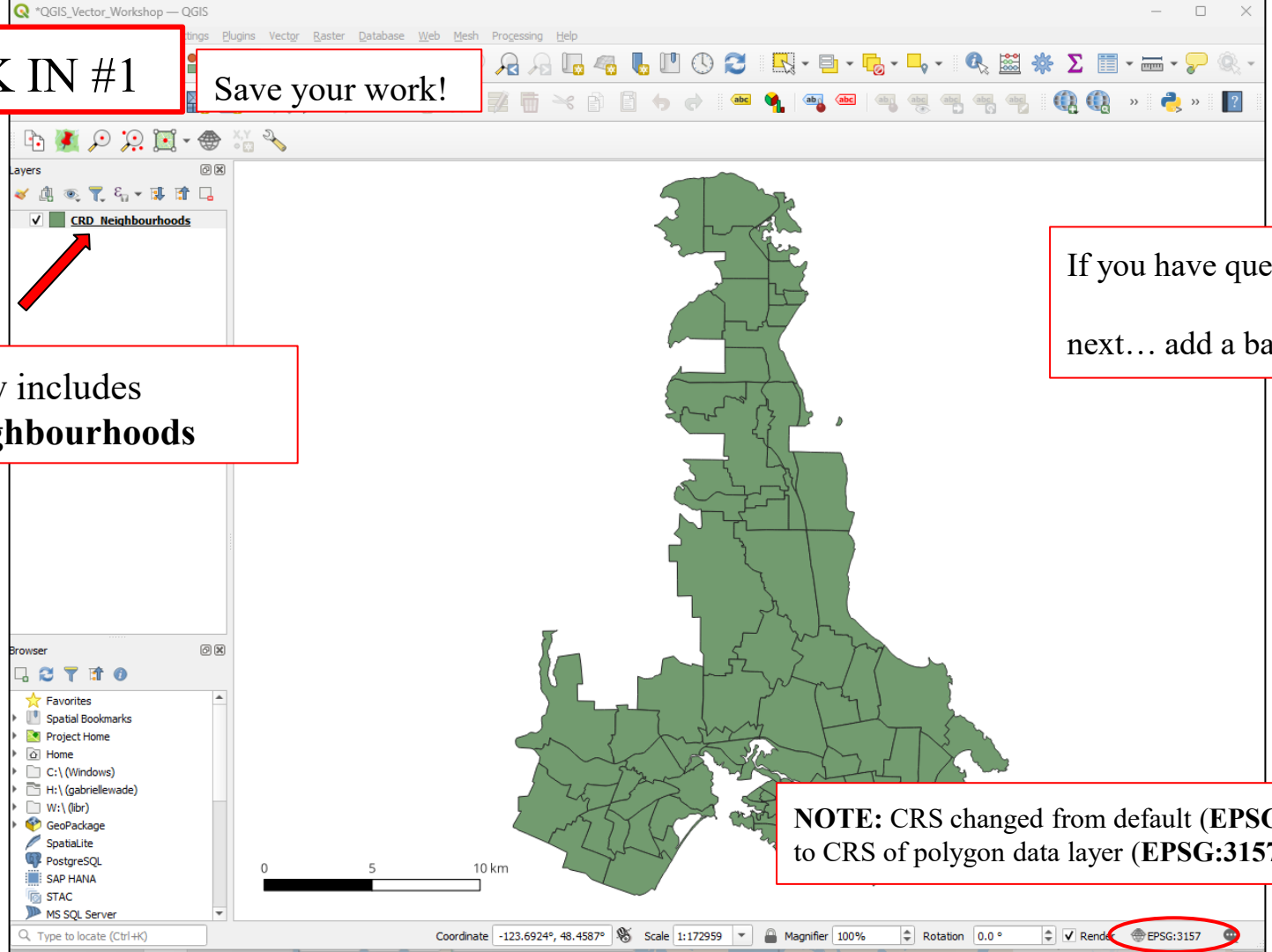
Select the *Identify Features* tool
to examine **CRD_Neighbourhoods**

Click on different neighbourhoods to display their associated attributes



CHECK IN #1

Save your work!



Layers now includes **CRD_Neighbourhoods**

If you have questions, **ask**!

next… add a basemap

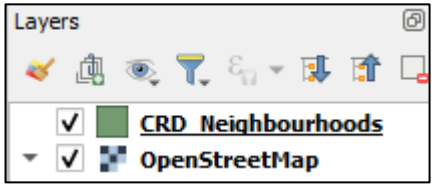
NOTE: CRS changed from default (**EPSG:4326**) to CRS of polygon data layer (**EPSG:3157**)

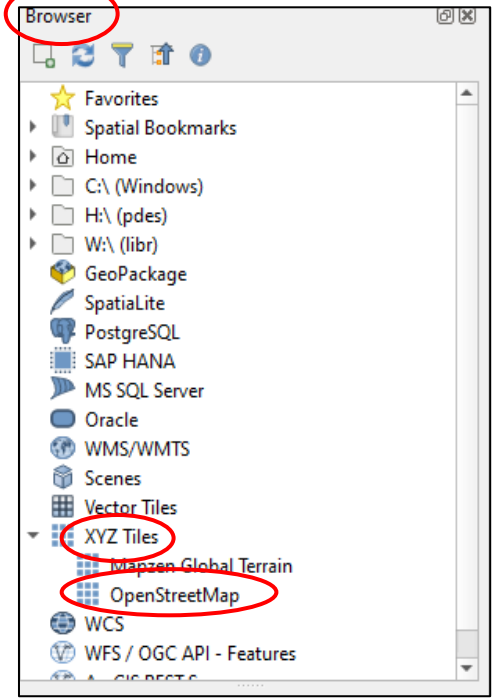
Activity #2

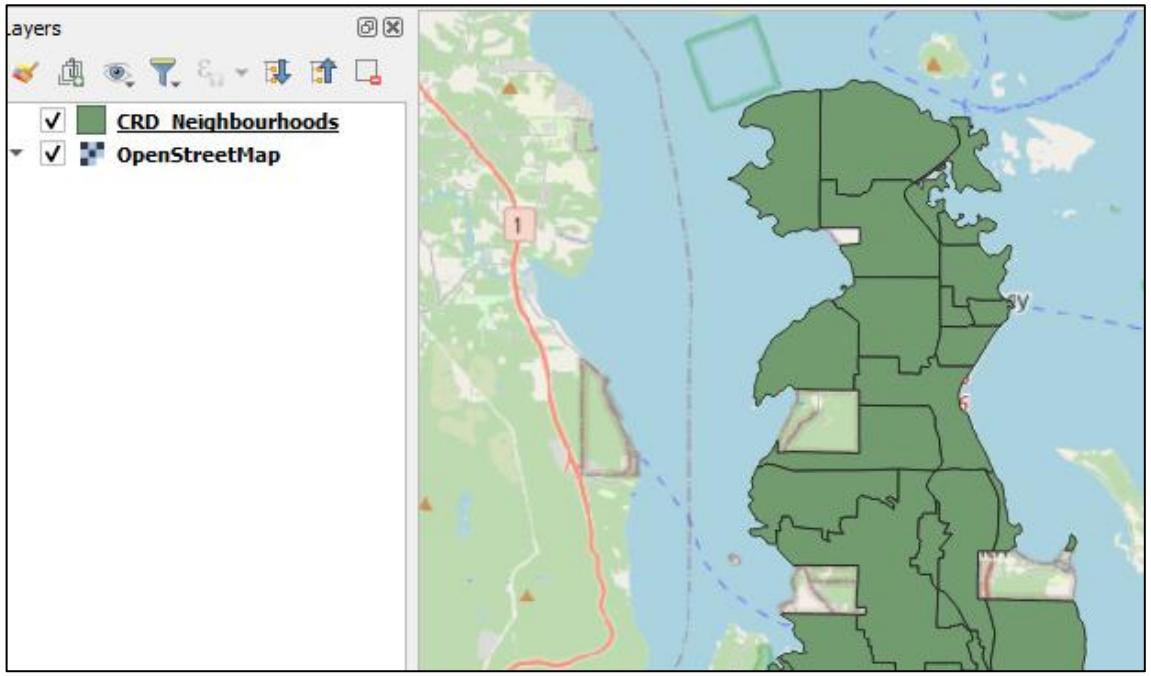
Add a Basemap

Add a **basemap** for location context for **CRD_Neighbourhoods**

- In the ‘Browser’, expand *XYZ Tiles*
- Double-click *OpenStreetMap* to add to map (if a warning appears, press OK)
- Click and drag to move *OpenStreetMap* layer below **CRD_Neighbourhoods**



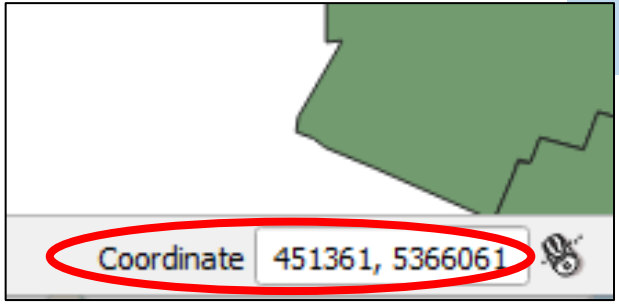


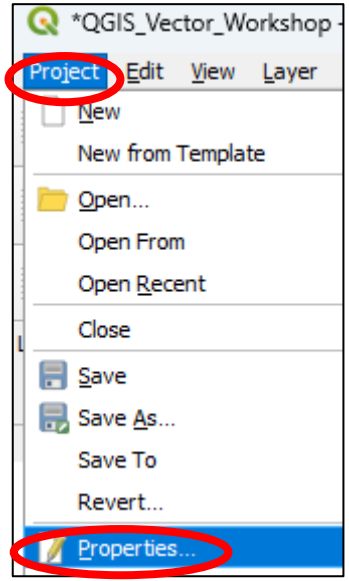


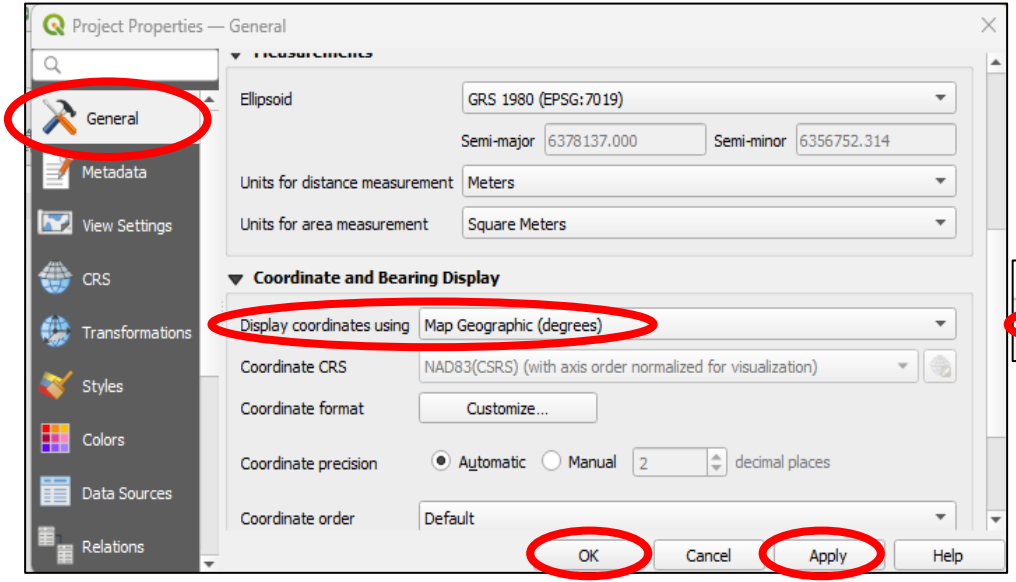
Change coordinate settings

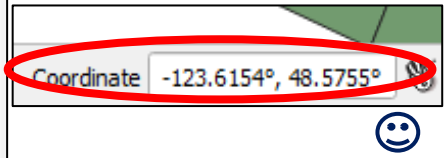
QGIS defaults to *Coordinate* in the Status Bar shown in metres.
Change settings so coordinates show in decimal degrees when moving mouse around the map

- In the Menu Bar, go to *Project* then *Properties*
- In the *General* tab, change *Display coordinates using* to **Map Geographic (degrees)**
- **Apply** and **OK**





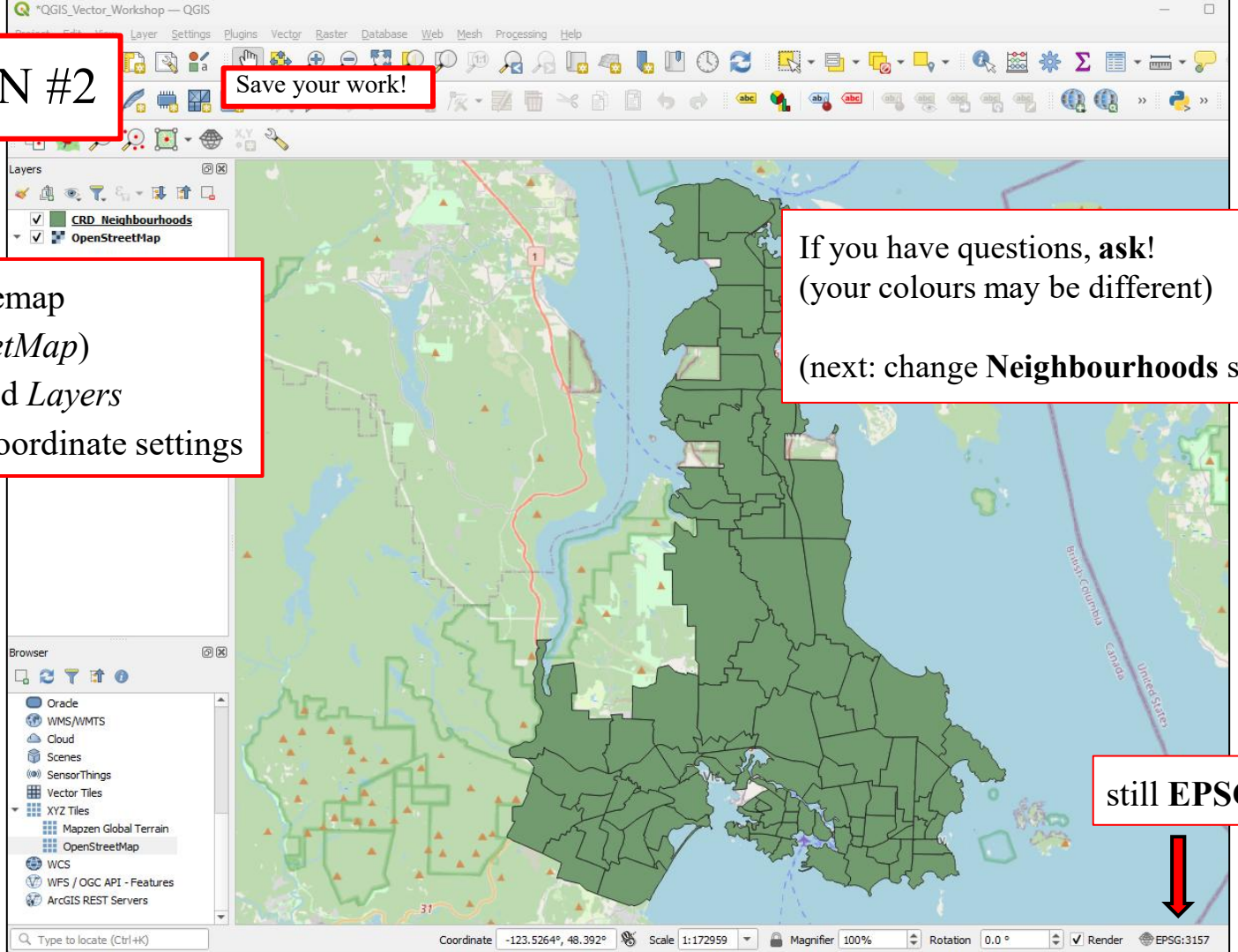




CHECK IN #2

Save your work!

- added Basemap (*OpenStreetMap*)
- Re-arranged *Layers*
- Changed coordinate settings



If you have questions, **ask**!
(your colours may be different)

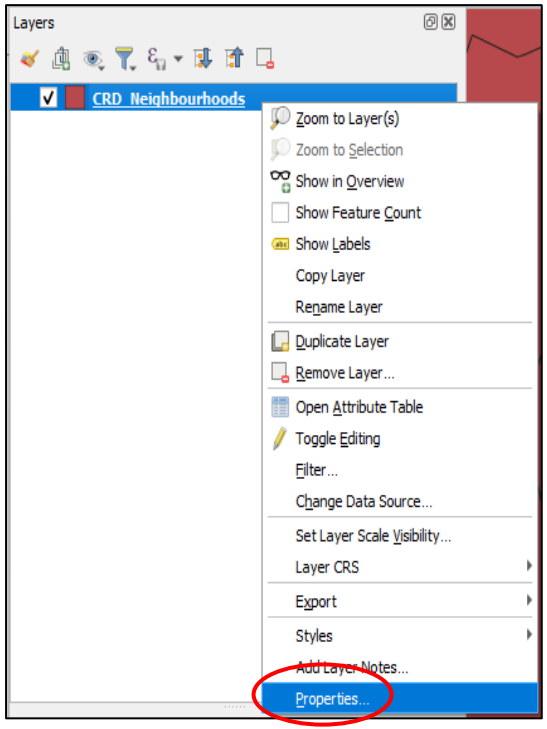
(next: change **Neighbourhoods** symbology…)

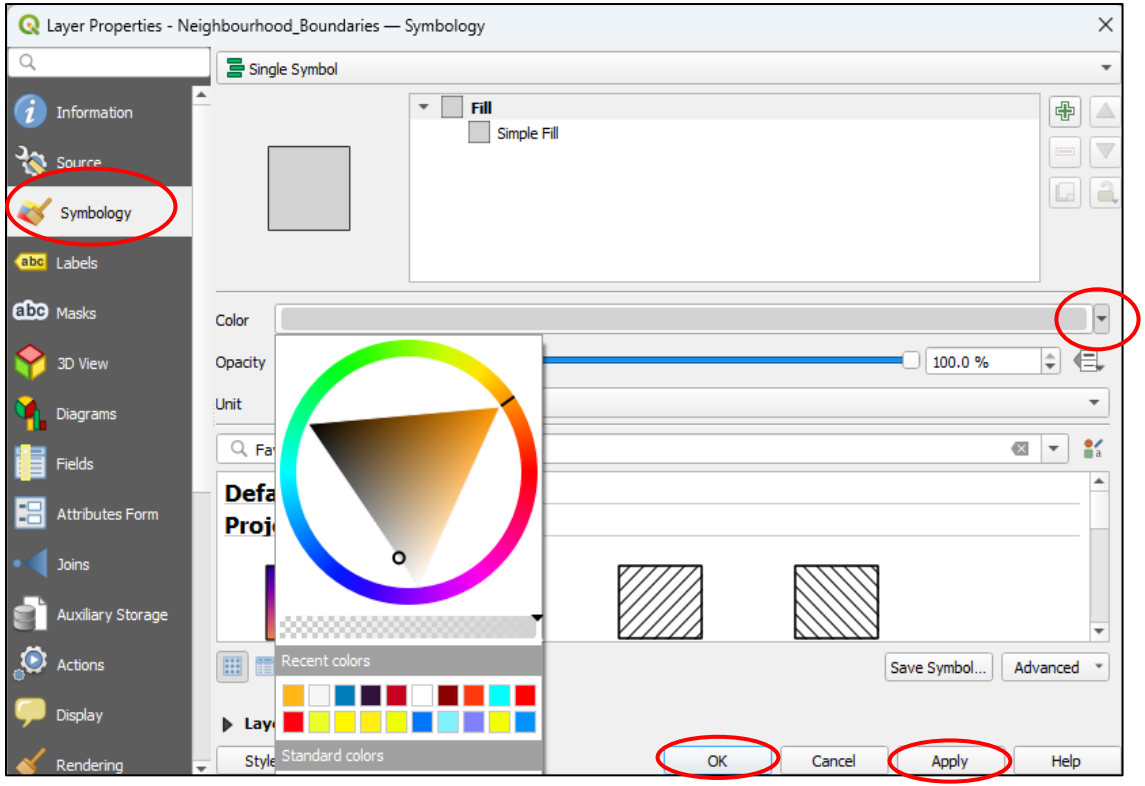
still **EPSG:3157**

Activity #3

Change CRD_Neighbourhoods symbology

- In the *Layers* panel right click **CRD_Neighbourhoods**
- Select *Properties* and then *Symbology*
- With *Colour* field, click the arrow and use colour palette to select light grey (or light colour of your choice)
- **Apply** and **OK**



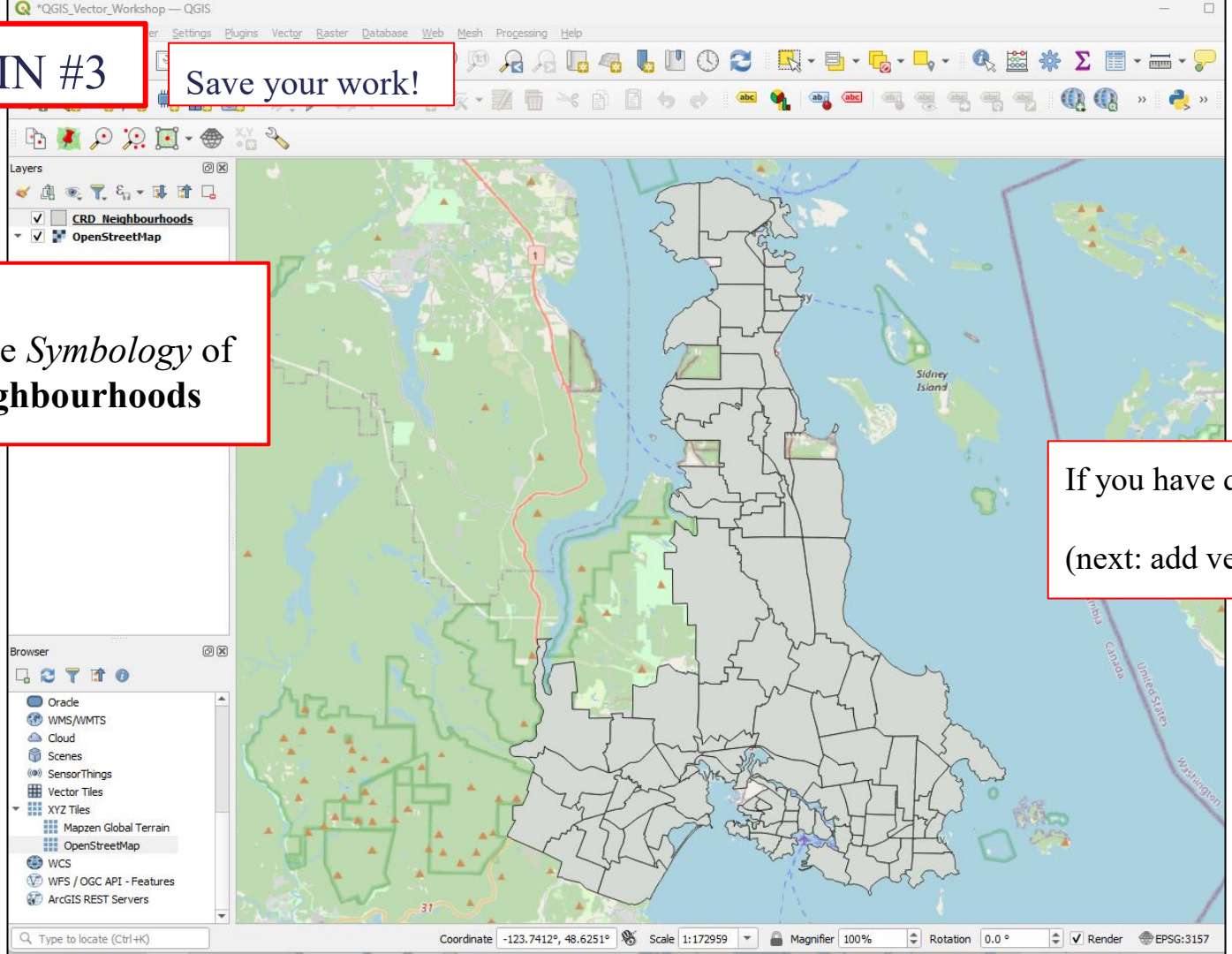


CHECK IN #3

Save your work!

You have:

- changed the *Symbology* of **CRD_Neighbourhoods**

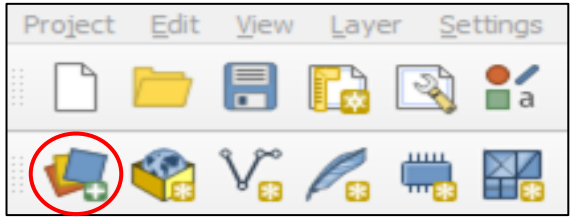


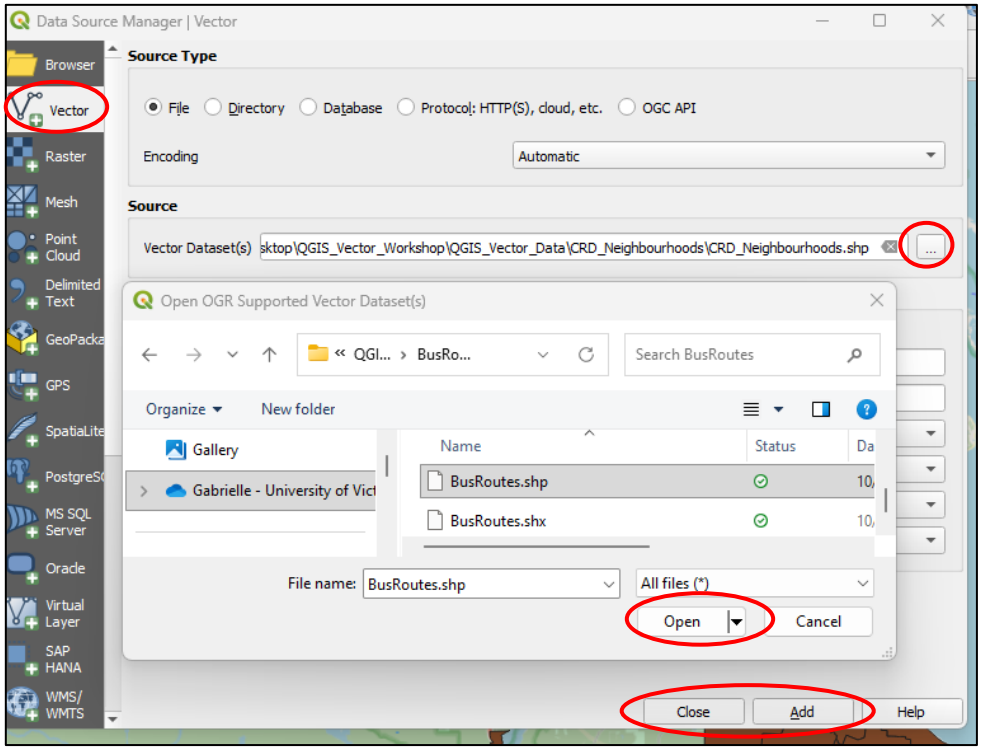
If you have questions, **ask**!

(next: add vector lines…)

Activity #4

add BusRoutes line shapefile

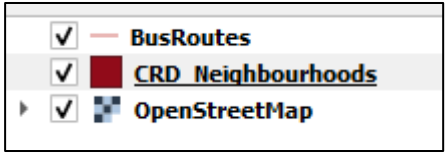




- Select *Open Data Source Manager* 
- Select the *Vector* tab
- Under the *Source* heading click the 
- Navigate to workshop data
- Select **BusRoutes.shp**, Open
- **Add** and **Close**

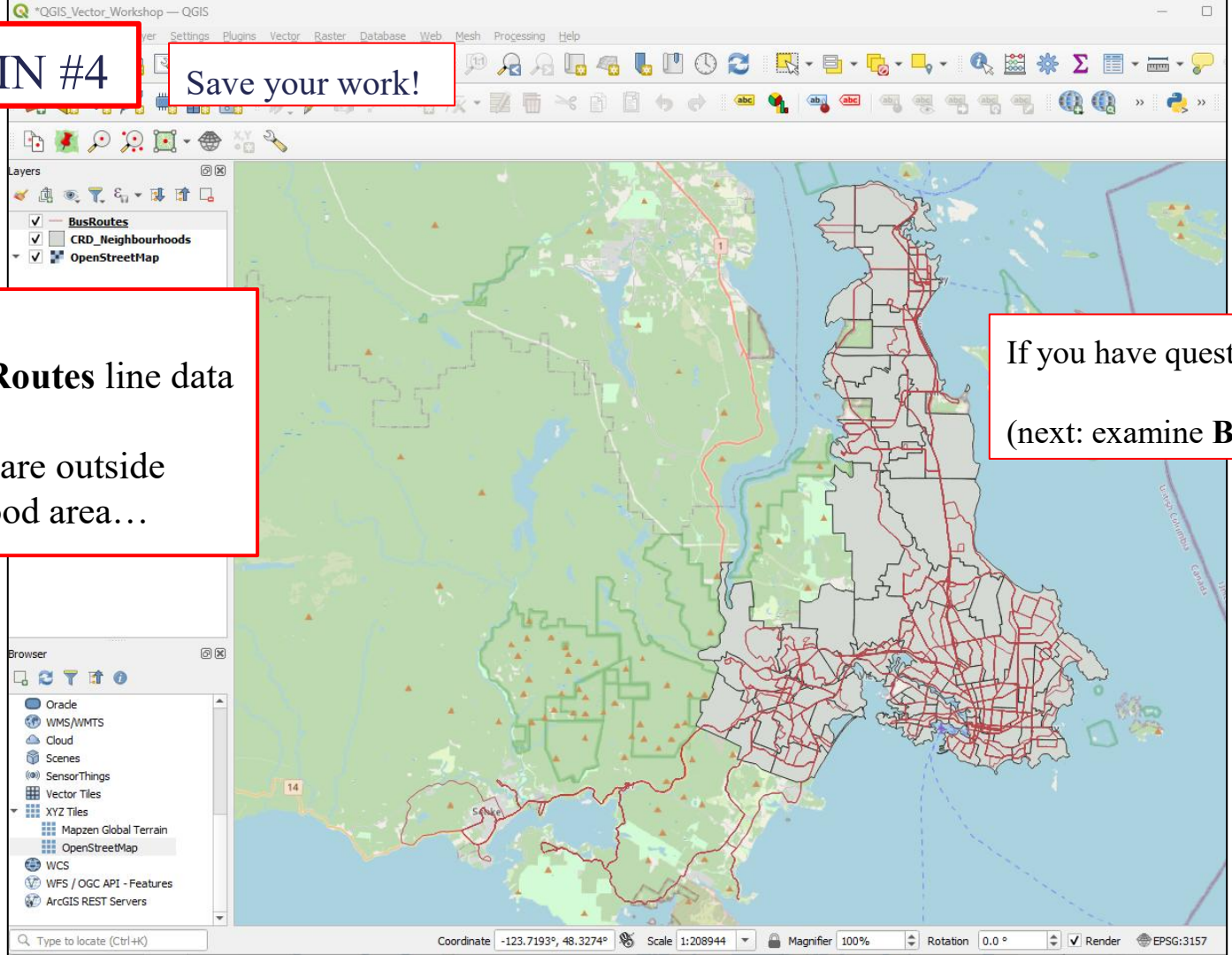
Check that **BusRoutes** is above **CRD_Neighbourhoods**

if not, click and drag **BusRoutes** to the top



CHECK IN #4

Save your work!



You have:
- added **BusRoutes** line data

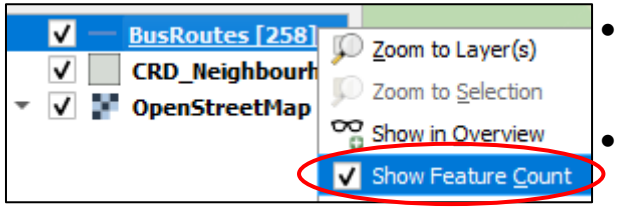
Some routes are outside Neighbourhood area…

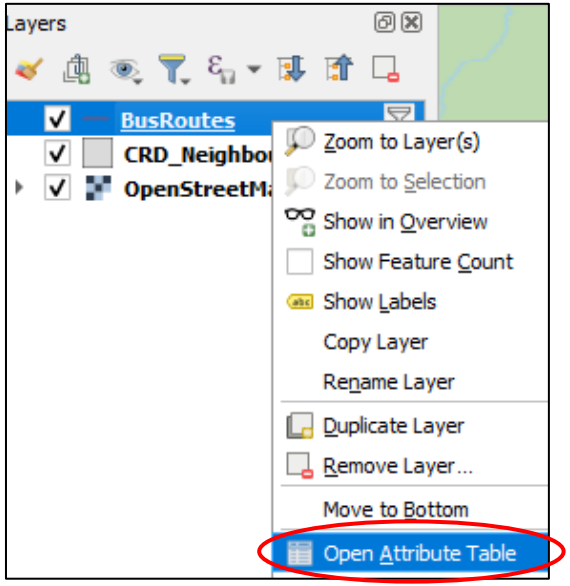
If you have questions, **ask**!

(next: examine **BusRoutes**…)

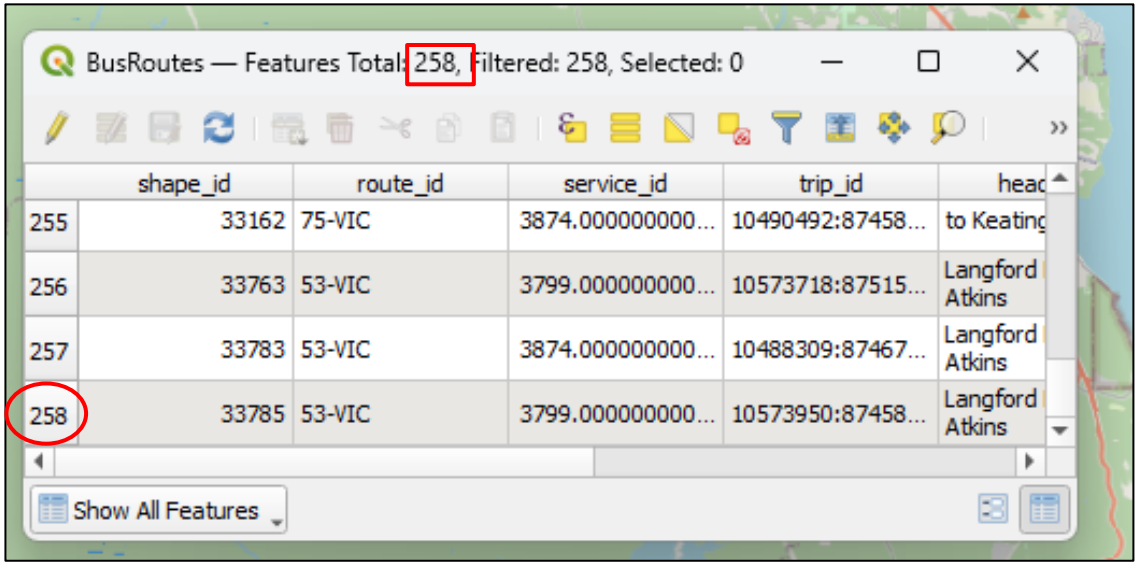
Activity #5

examine BusRoutes Attributes



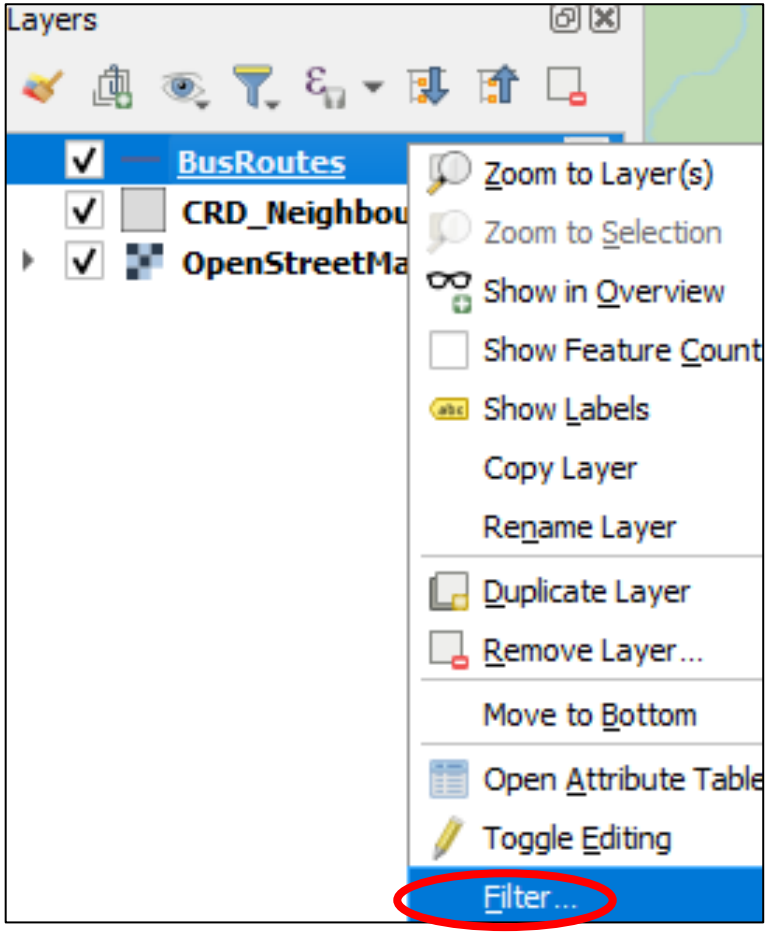


- In the *Layers* panel, right-click **BusRoutes** and choose "Show Feature Count" and *Open Attribute Table*
- Can see that **BusRoutes** has 258 features and various attribute table columns including route ID, heading, etc.



Next…*Filter* **BusRoutes**

Filter BusRoutes layer



Sometimes, datasets provide more than needed, are massive, and 'overcrowd' a map

'**Filter**' is <u>one way</u> to sub-select a dataset.

Only want to include bus routes that go to and from UVic

- In the *Layers* panel, right click on **BusRoutes** and choose *Filter*

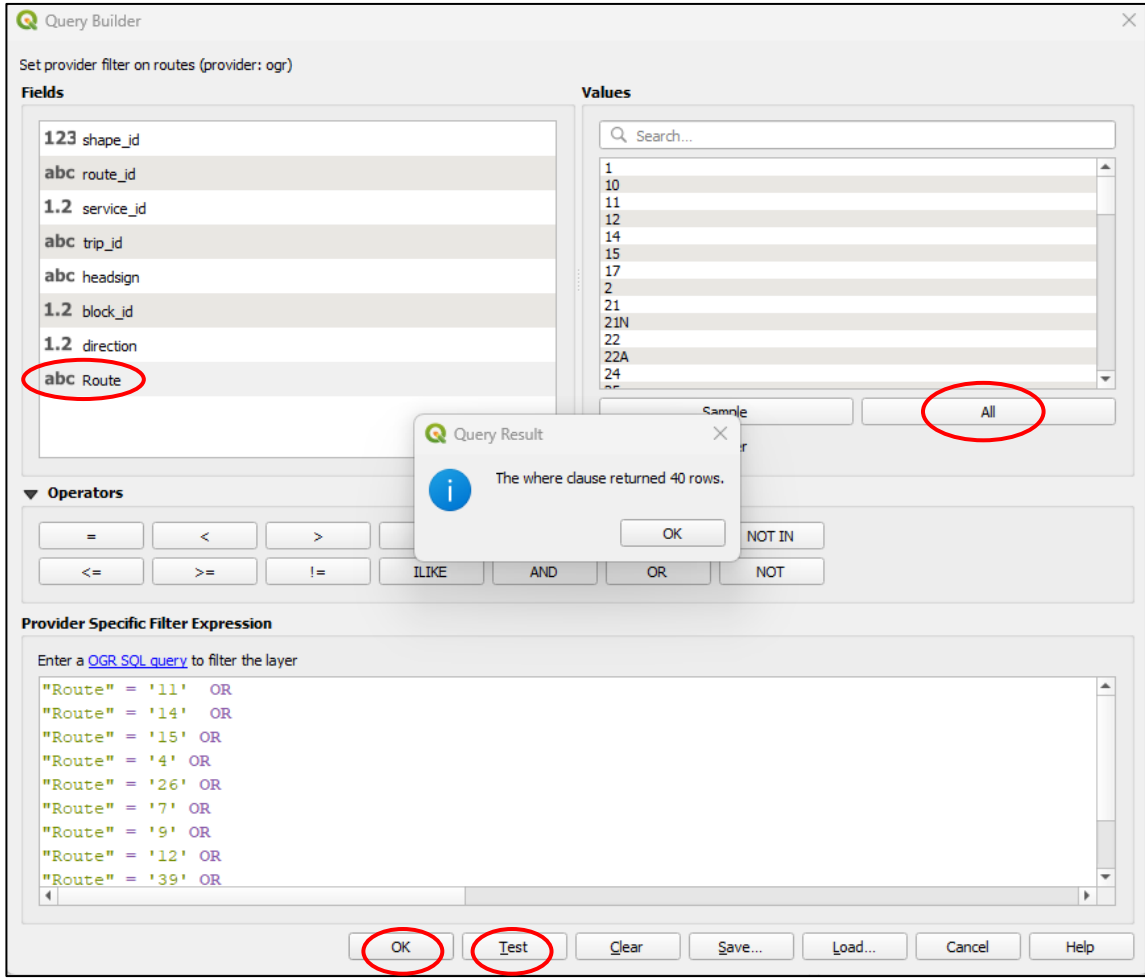
Filter BusRoutes layer

- Select **Route** under *Fields*, then click *All* under *Values*

- Copy and paste the expression below into the *Filter Expression* box

```
"Route"='11' OR
"Route"='12' OR
"Route"='14' OR
"Route"='15' OR
"Route"='26' OR
"Route"='4' OR
"Route"='39' OR
"Route"='51' OR
"Route"='7' OR
"Route"='76' OR
"Route"='9'
```

- **Test** then **OK**

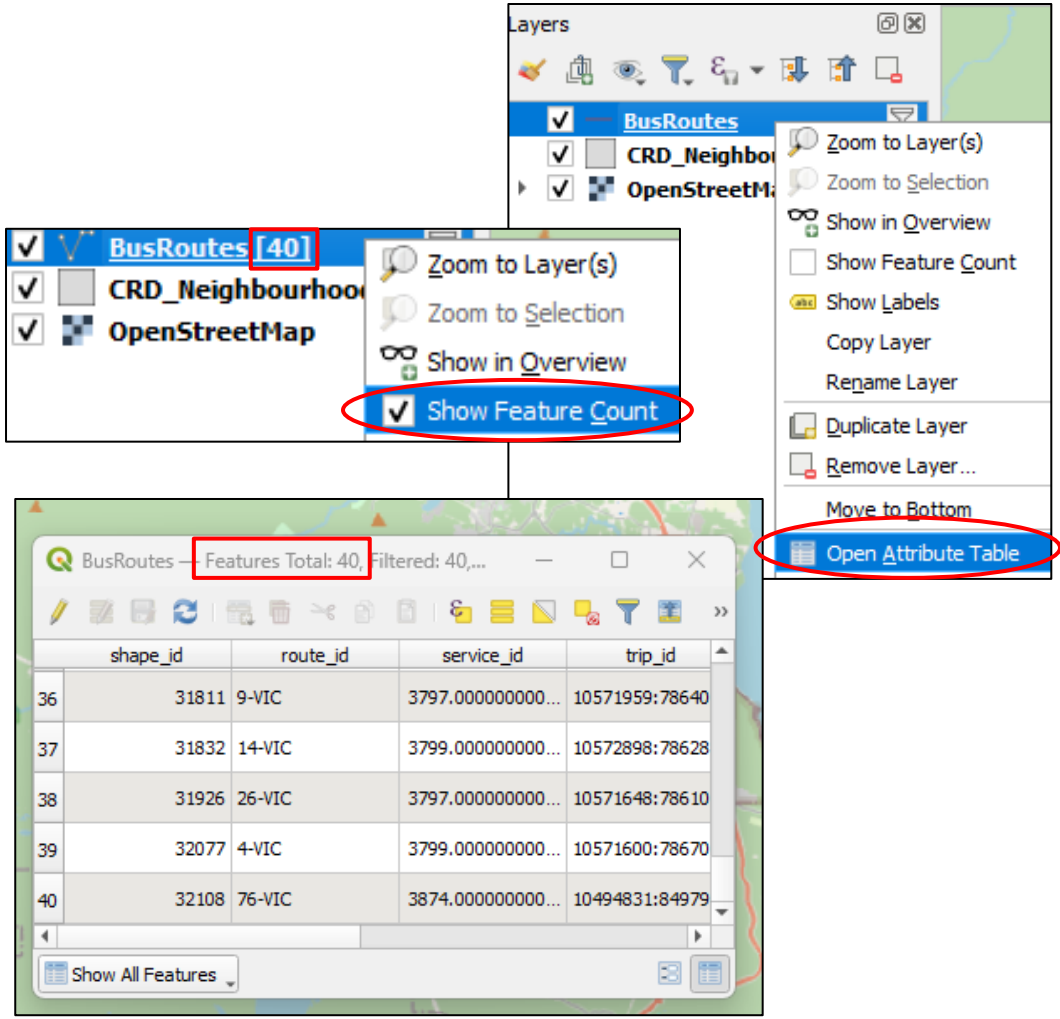


examine BusRoutes Attributes

- In the *Layers* panel, see Feature Count of **BusRoutes** is now 40
- Right-click **BusRoutes** and *Open Attribute Table*

after *Filter*, 40 rows of (**BusRoutes)** data remain

(**NOTE**: The original dataset has NOT been permanently changed, only 'filtered')

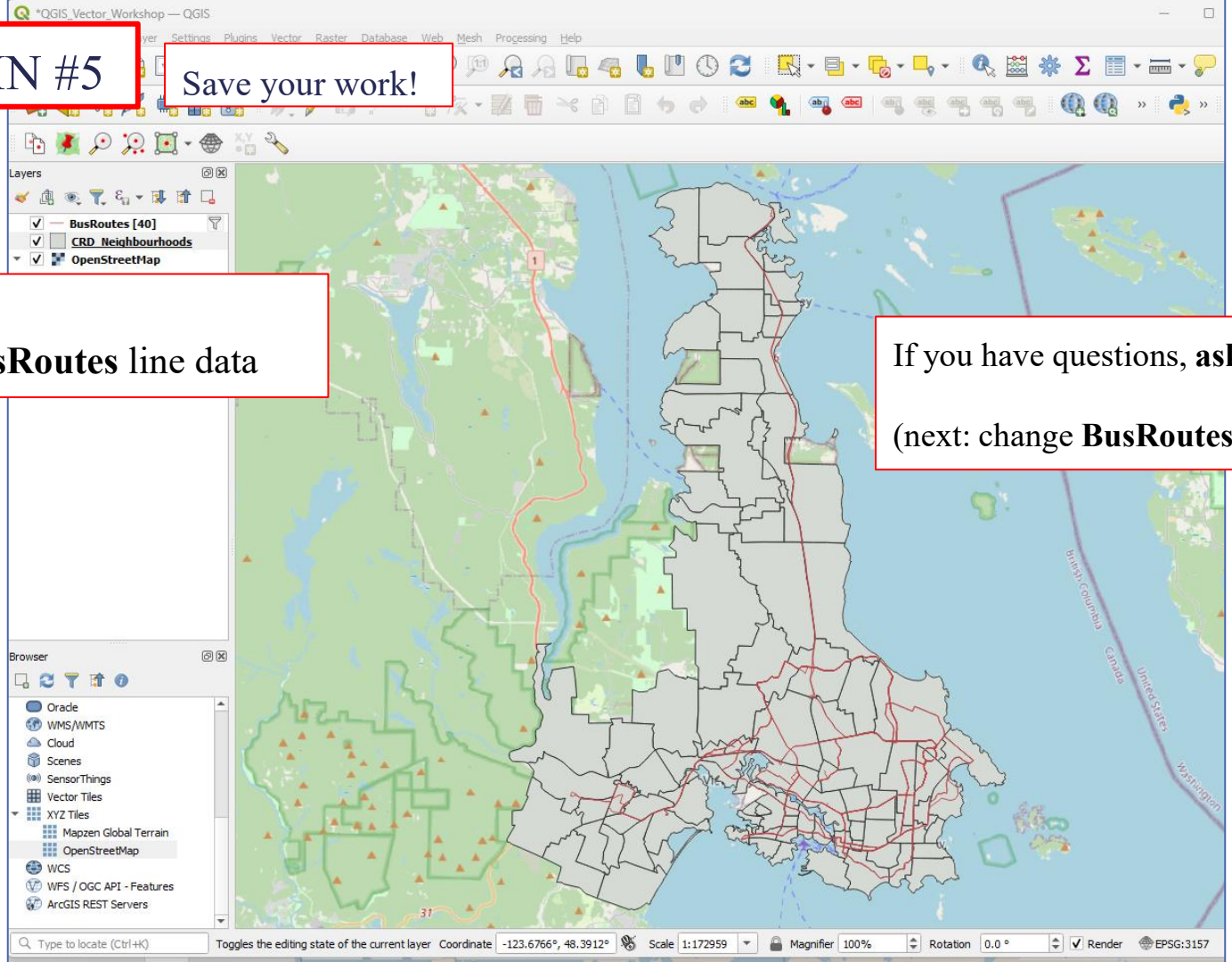


CHECK IN #5

Save your work!

You have:

- Filtered **BusRoutes** line data



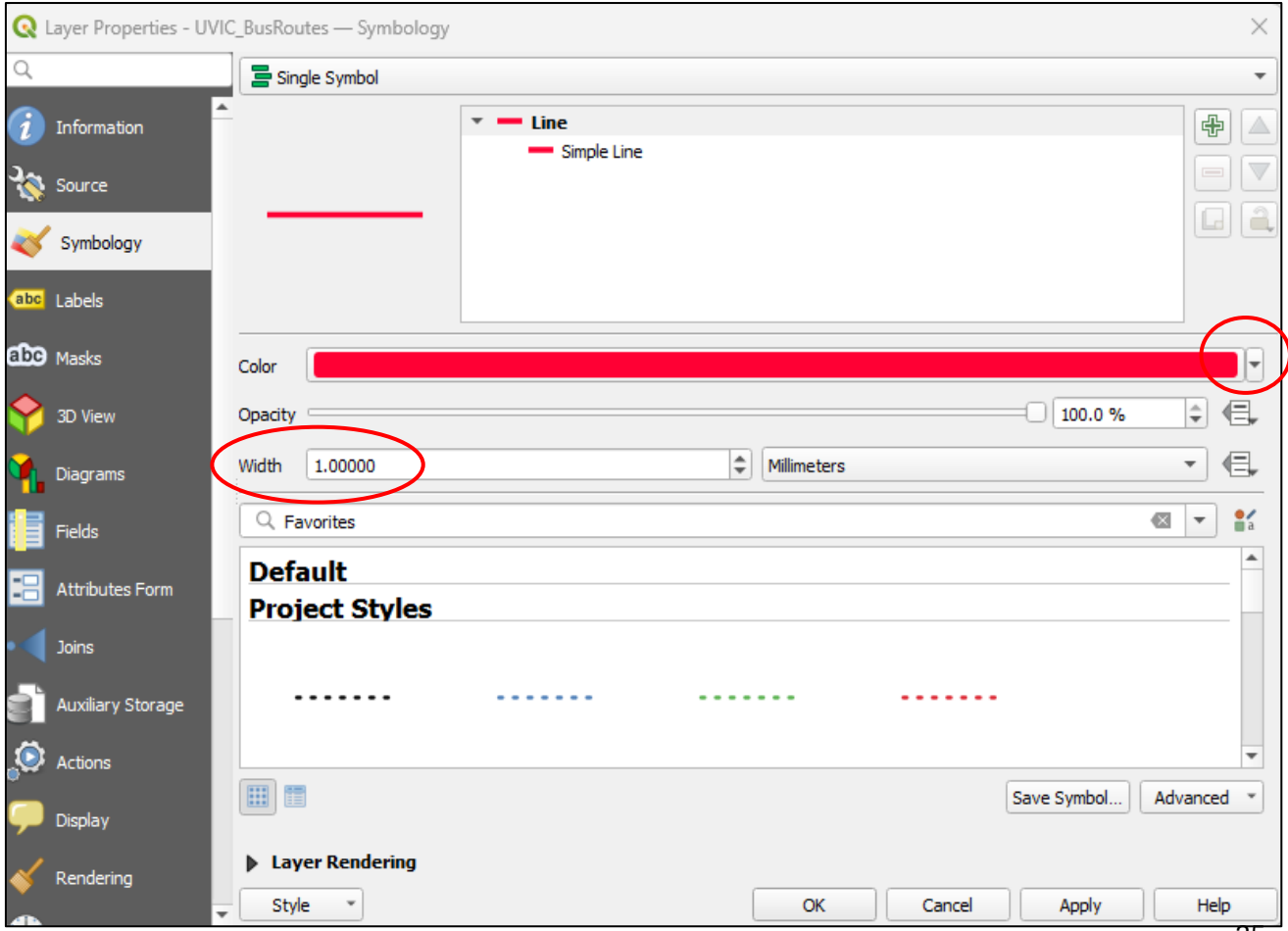
If you have questions, **ask**!

(next: change **BusRoutes** symbology…)

Activity #6

edit BusRoutes symbology

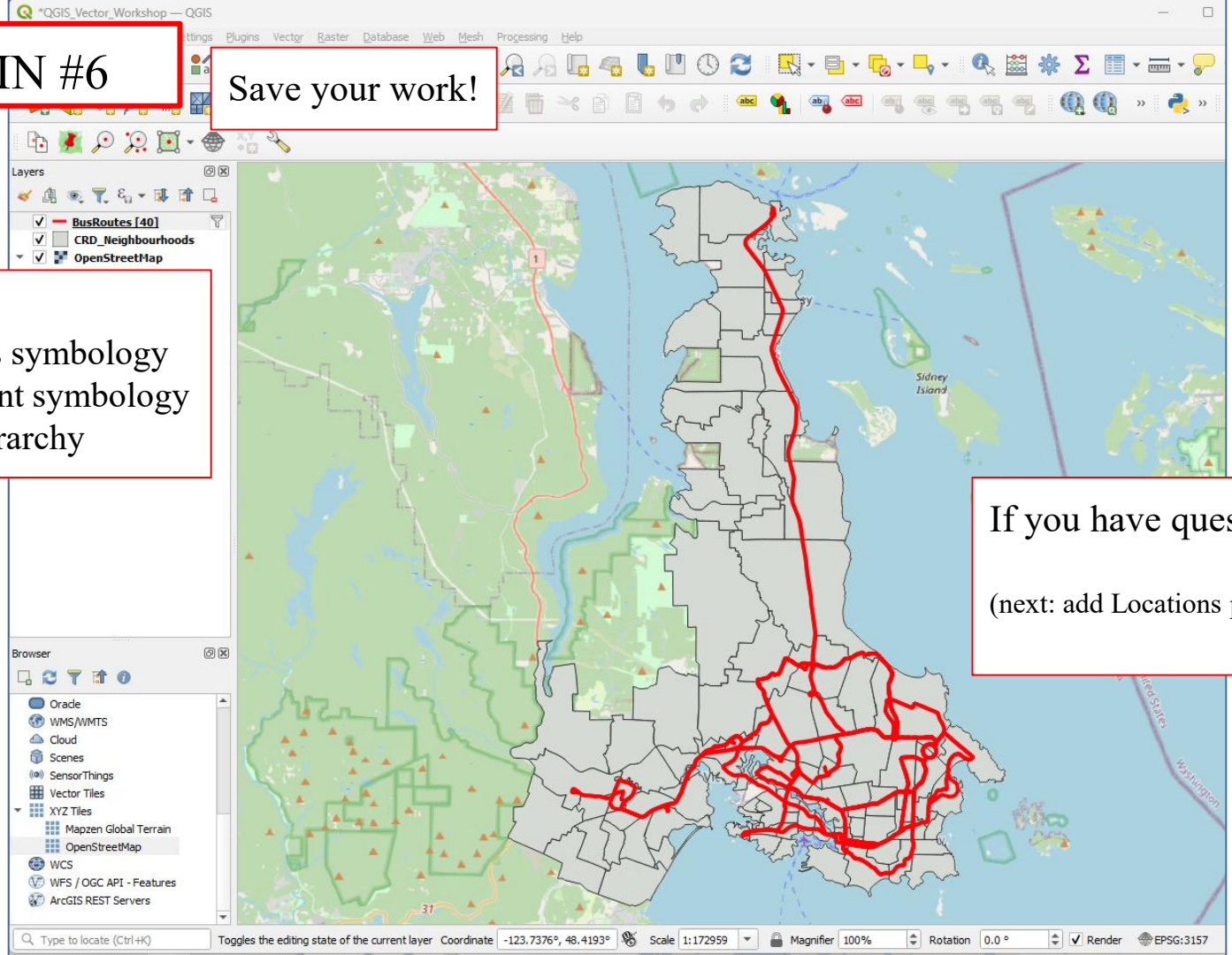
- in the *Layers* panel, double-click **BusRoutes** to open *Properties*
- click *Symbology*
- in *Colour* field, click on the arrow and select a visible colour
- Change *Width* to 1.0
- **Apply** and **OK**



CHECK IN #6

Save your work!

You have:
- edited Lines symbology
- used different symbology for visual hierarchy



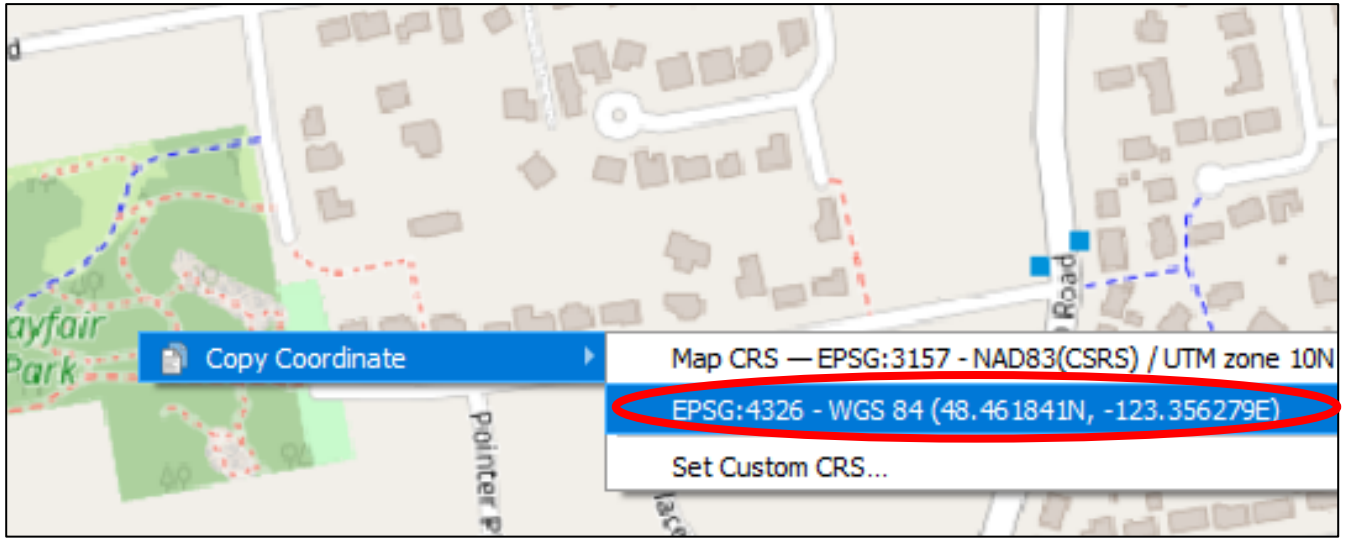
If you have questions, **ask**!

(next: add Locations point data)

Activity #7

work with Locations.csv point data

- Go to a location in Victoria (within *QGIS* map area)
  - If needed, click **CRD_Neighbourhoods** off to see the basemap →
- Right-click on a location and copy coordinate in **EPSG:4326**
- Paste these Coordinates somewhere so you can copy each coordinate individually (see next slide)



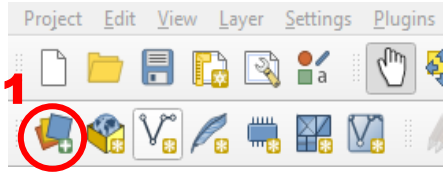
Work with Locations.csv point data

- Navigate to workshop data and open **Locations.csv** in Excel or Google Sheets
  - Note Name, Latitude, and Longitude columns
- In the row with "**Your Location**" paste in your **Latitude** and **Longitude** and put the name of your location
  - Can also change name of location (e.g. "My House") if desired
- Save the .csv **(must be .csv)**

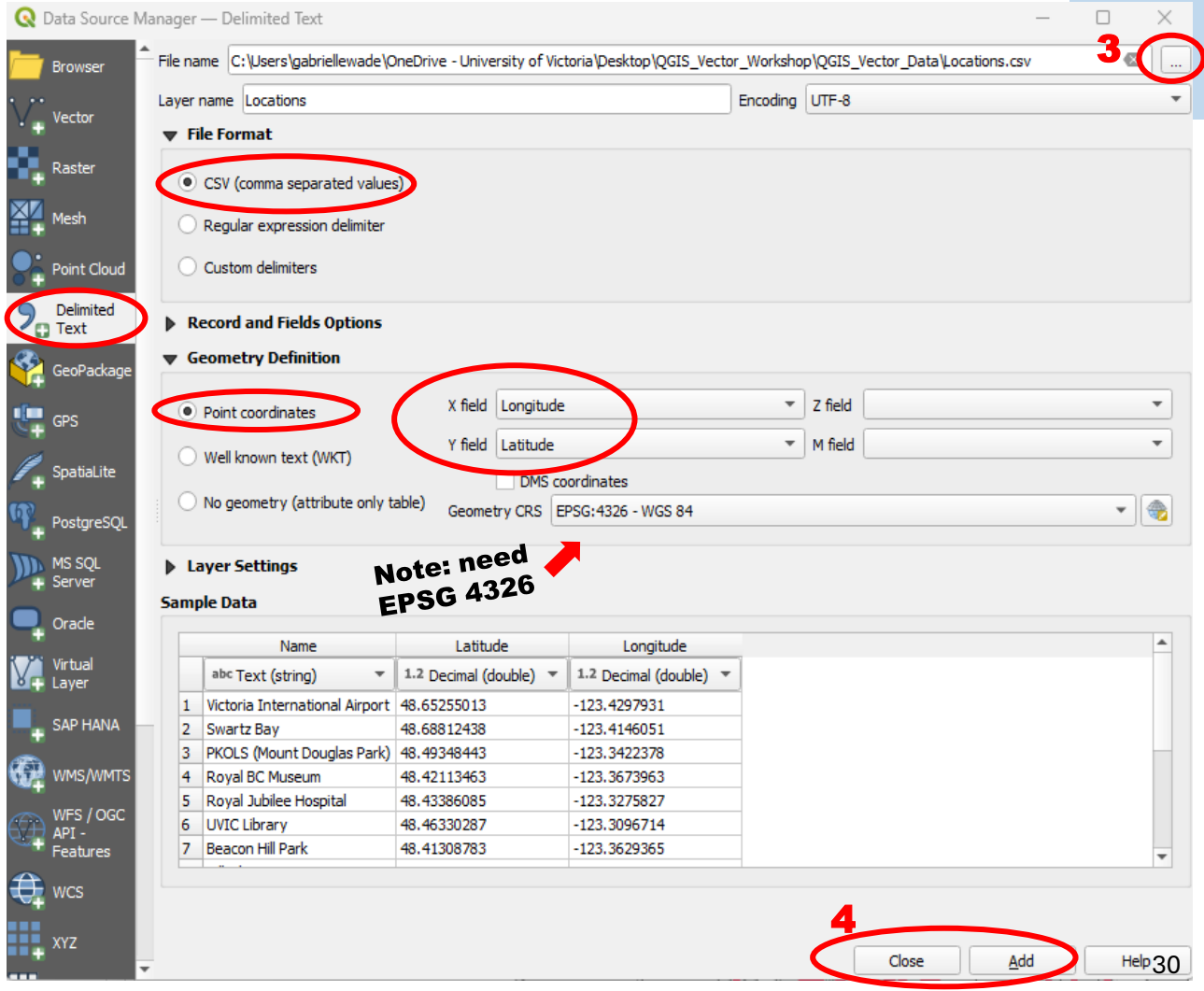
Name	Latitude	Longitude
Your Location		
YYJ	48.65255013	-123.4297931
Swartz Bay	48.68812438	-123.4146051
PKOLS	48.49348443	-123.3422378
Royal BC Museum	48.42113463	-123.3673963

Add the Locations.csv point data

- Open *Data Source Manager*



- Select *Delimited Text*
- Navigate to workshop data
- Select and Open **Locations.csv**
- Set other requirements
- **Add** then **Close**

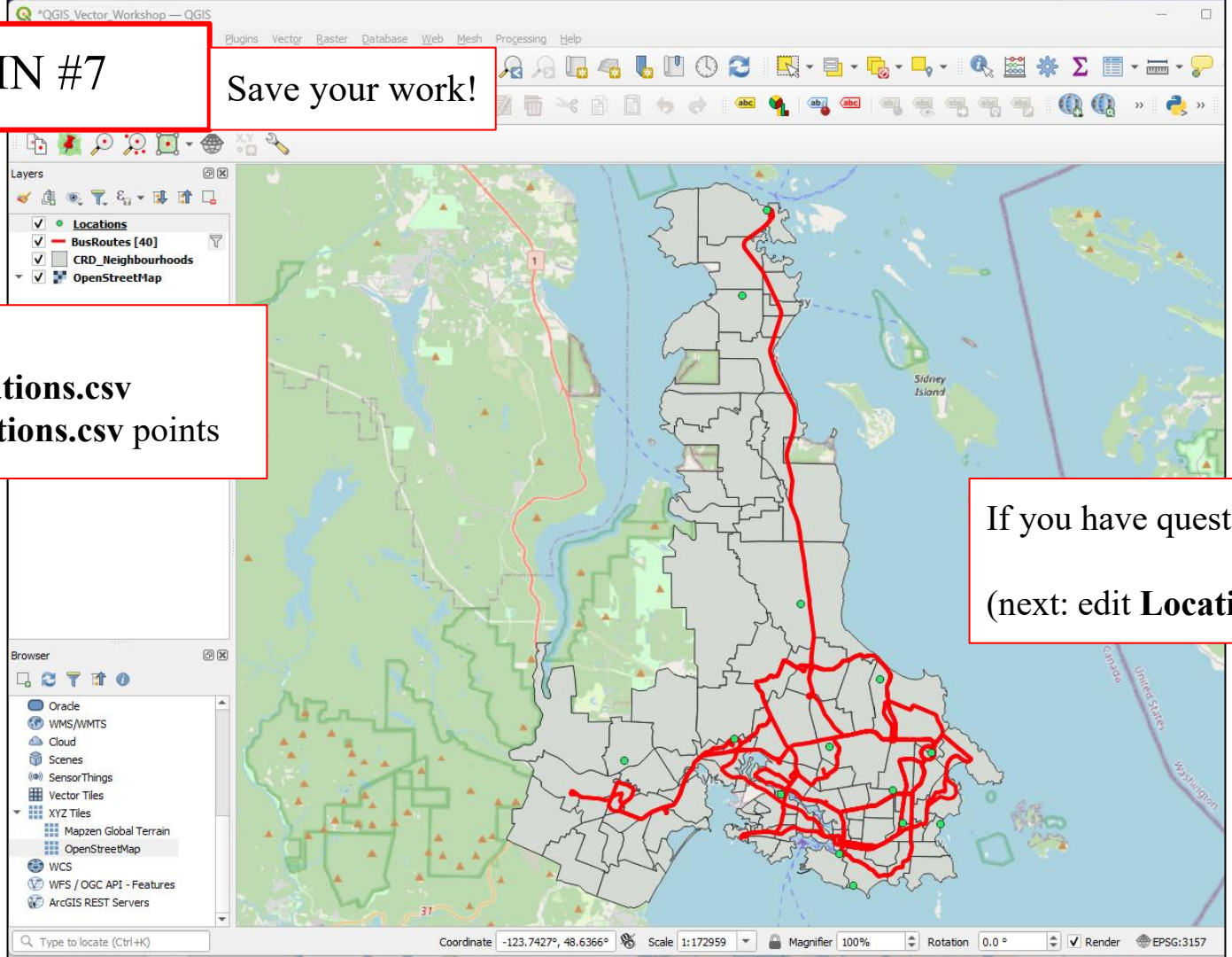


CHECK IN #7

Save your work!

You have:

- Edited **Locations.csv**
- added **Locations.csv** points



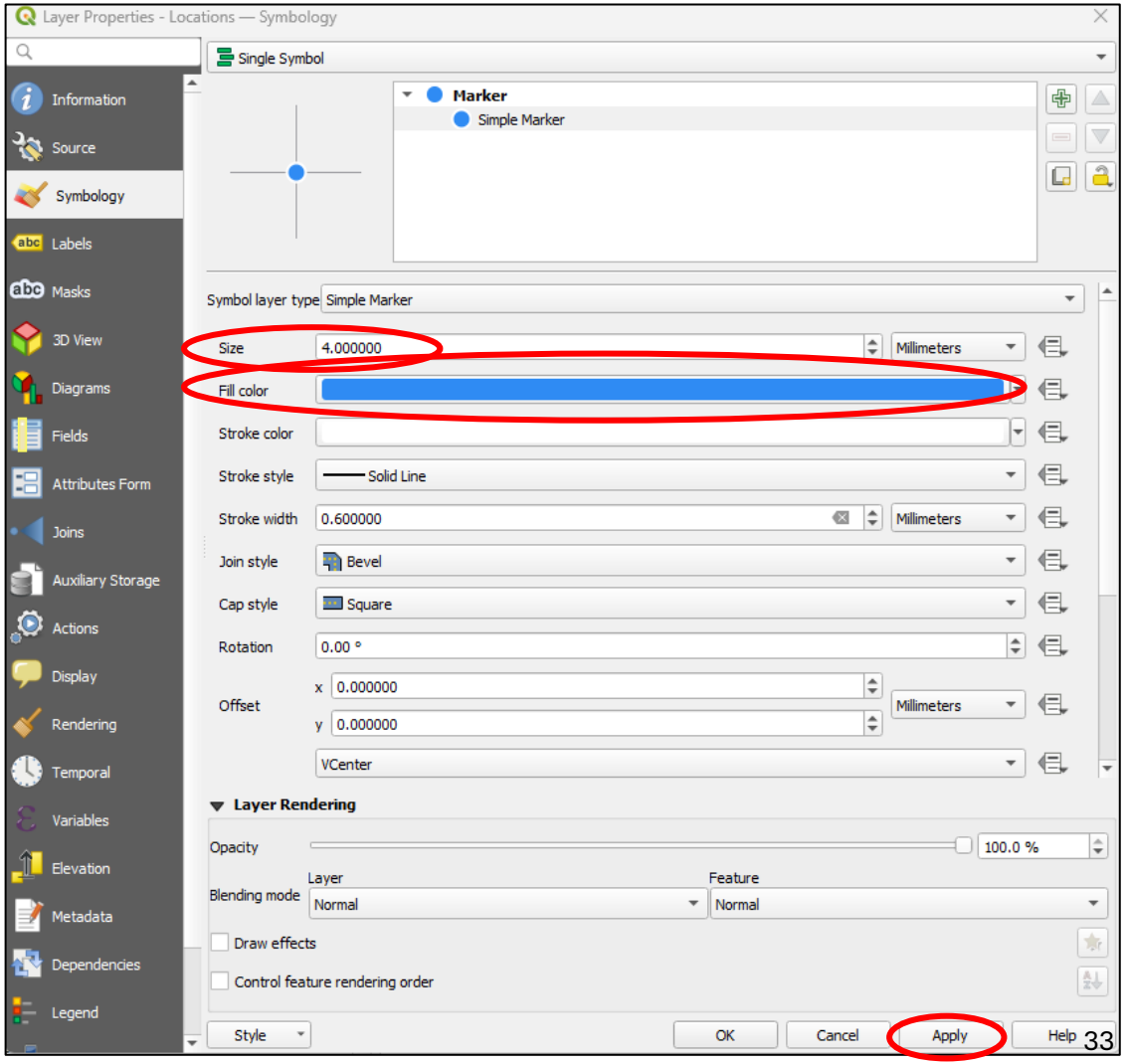
If you have questions, **ask**!

(next: edit **Locations.csv**…)

Activity #8

edit Locations.csv symbology

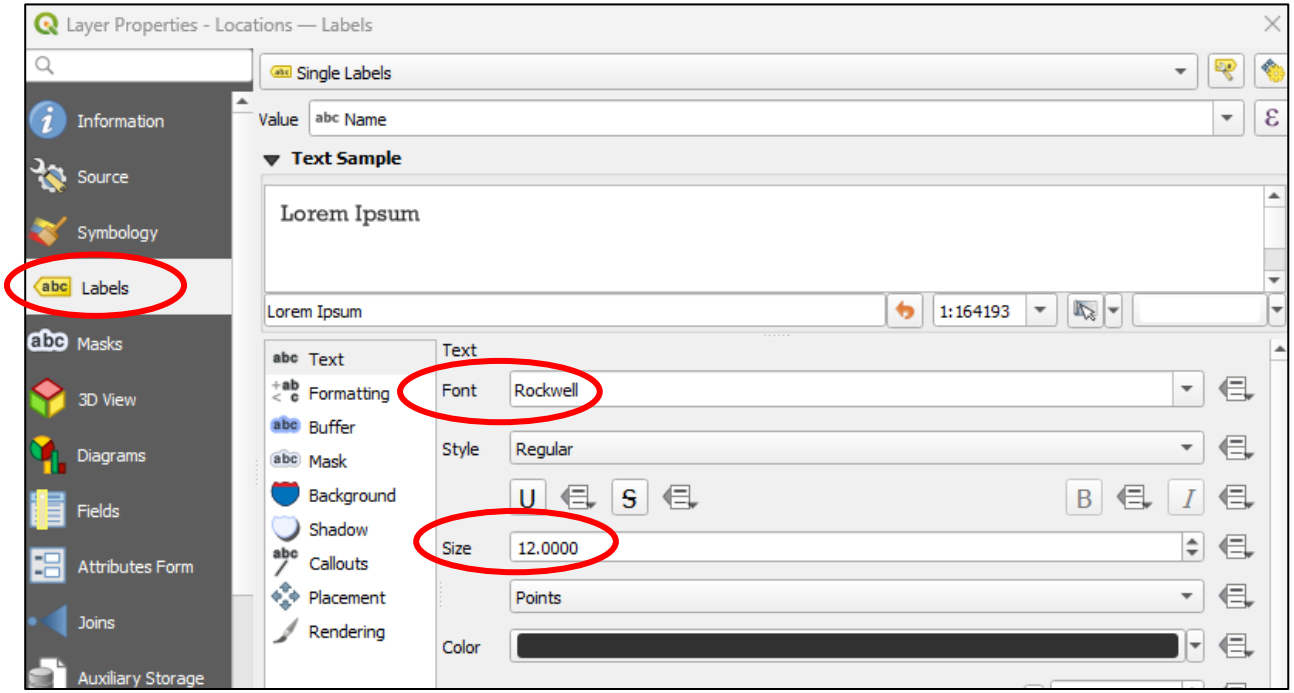
- In *Layers* panel, double-click on **Locations** to open *Properties* then *Symbology*
- Change *Size* to 4.0
- Change *Fill Colour* to a visible colour
- click **Apply** but not OK yet



Label Locations.csv

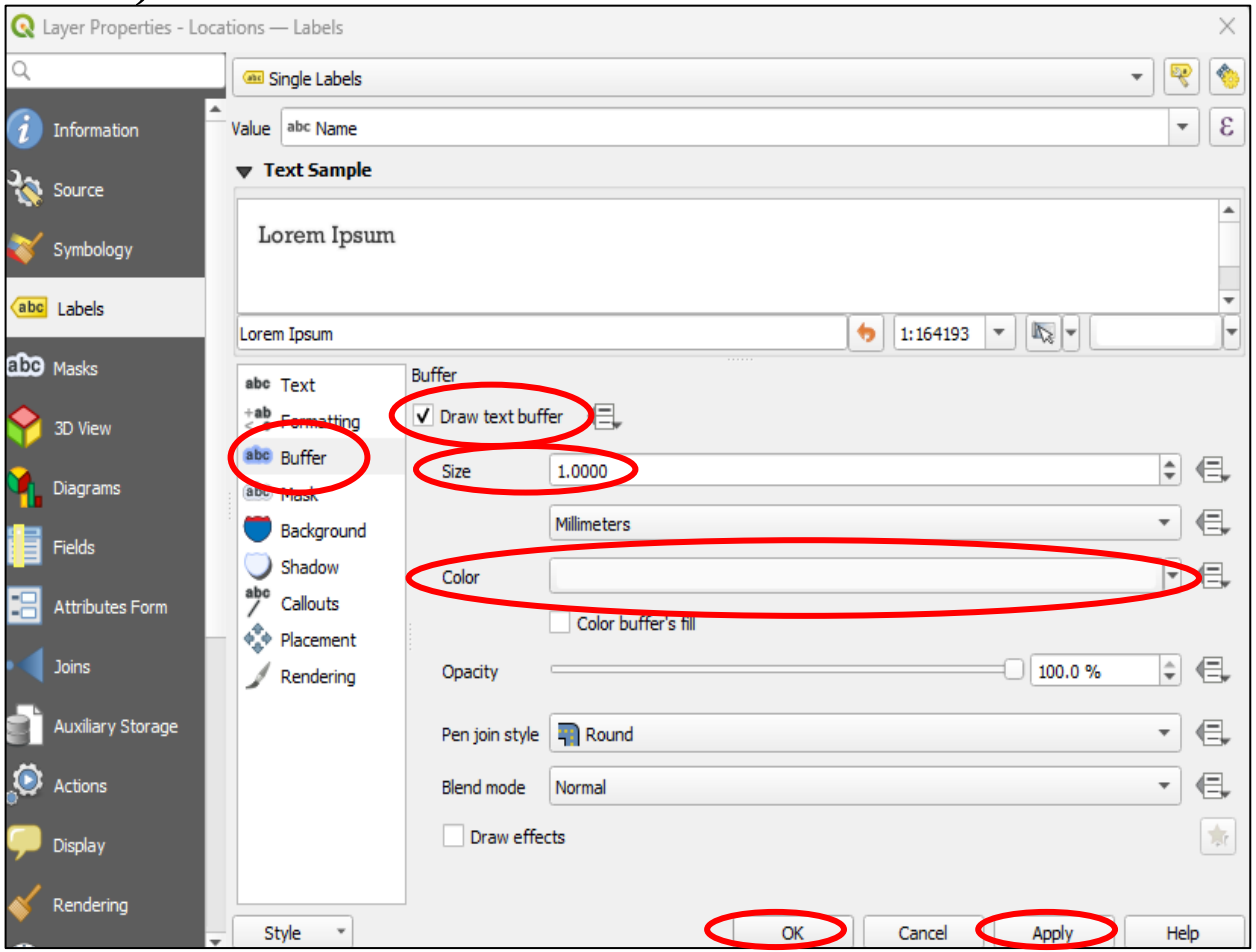
- while still in *Properties,* select the *Labels* tab
- Select *Single Labels* from the drop-down
- *Value* should be “Name”
- change *Font* (if desired)

  and Size (if desired)
- Colour should be Black
- click **Apply** but not OK yet



Buffer Labels (for Locations.csv)

- while still in *Labels*, choose “Buffer” and check “Draw text buffer”
- *Size* 1.0 and *Colour* white
- **Apply** and **OK**



CHECK IN #8

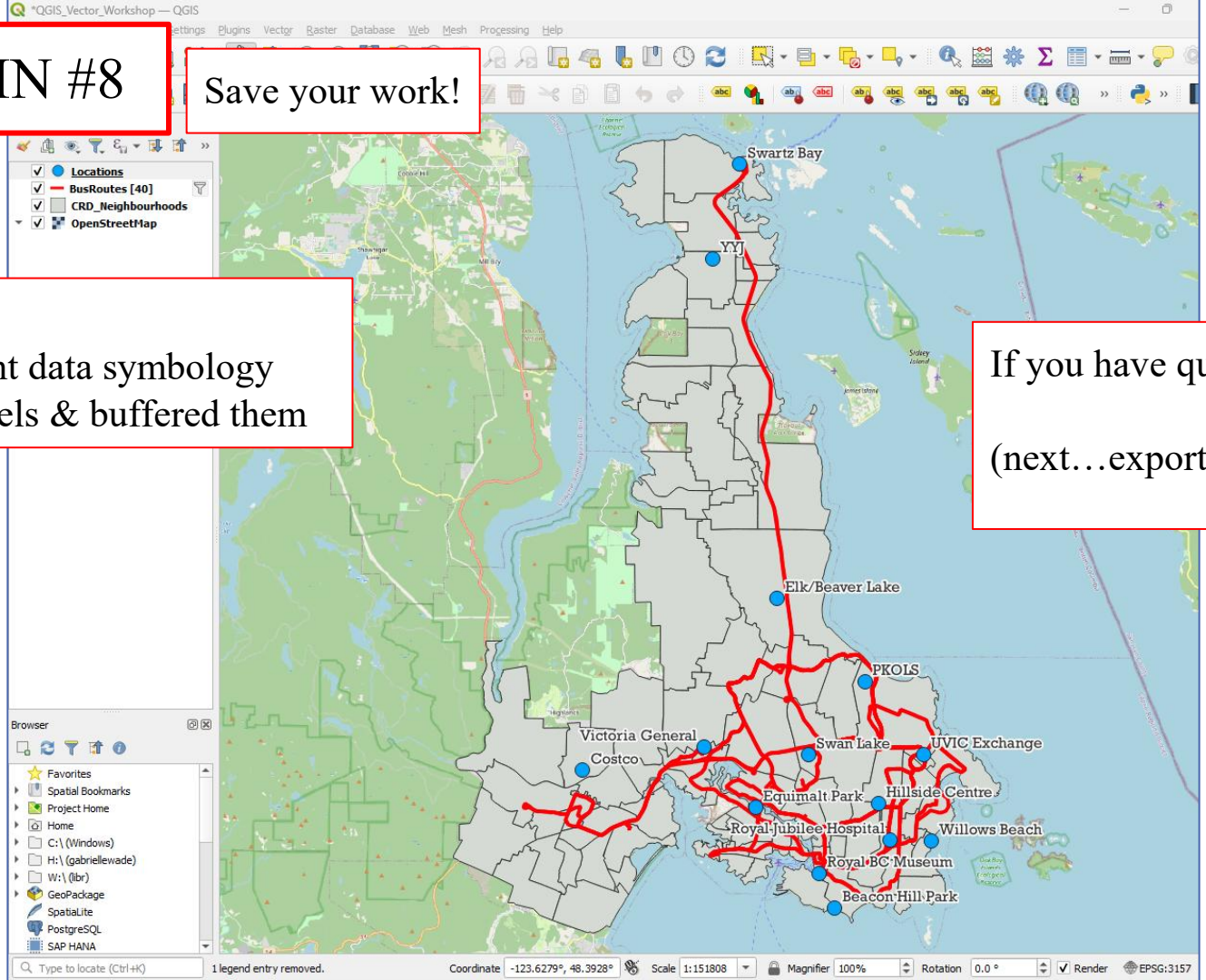
Save your work!

You have:

- edited point data symbology
- added Labels & buffered them

If you have questions, **ask**!

(next…export ‘quick’ map)



Activity #9

Export “quick” map

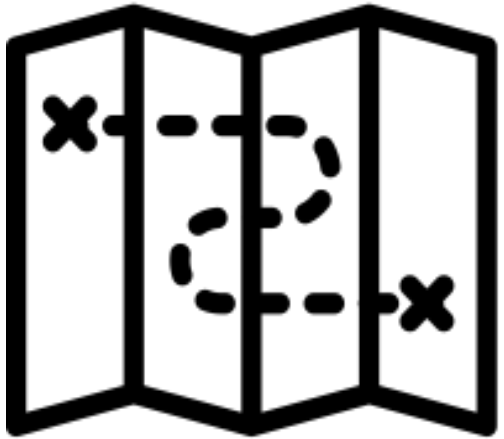
- .pdf
- several raster files

Note: quick and dirty with limited options

- No legend (unless copy and paste)

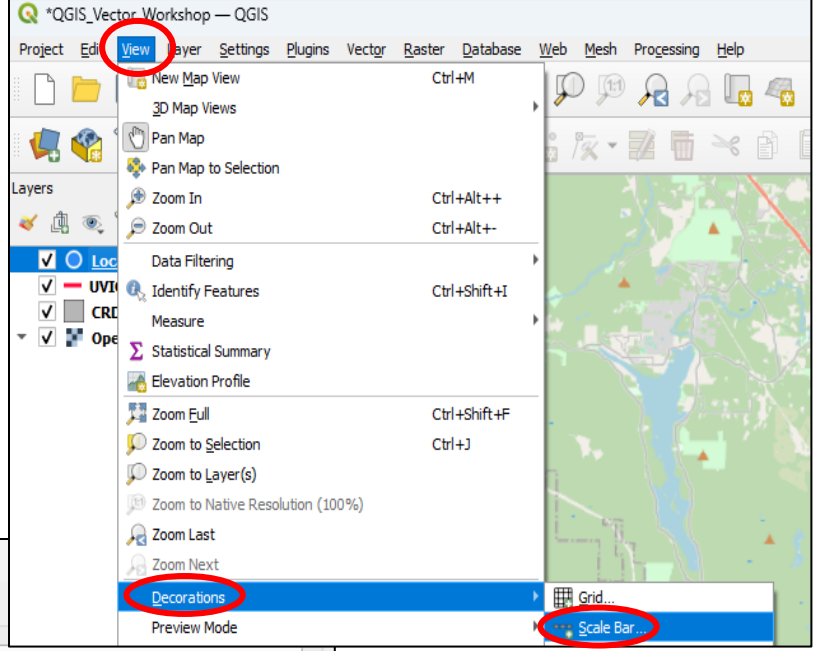
“Printer composter layout” is the detailed way to export a map

- **NOT** today (separate workshop)



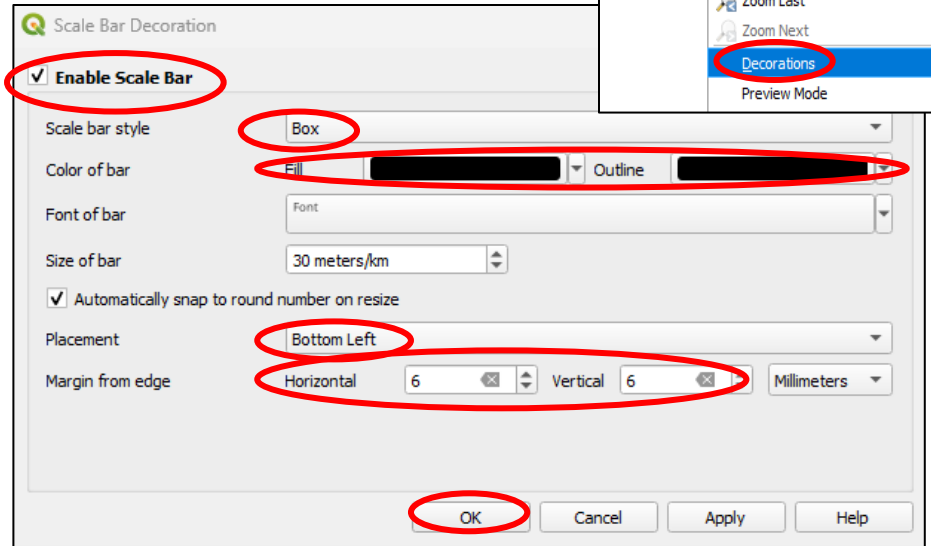
Export “quick” map

Add scale bar →



Scale bar options:

- Style
- Colour
- Font size
- Size of scale bar
- Placement
- Margin from edge
- etc

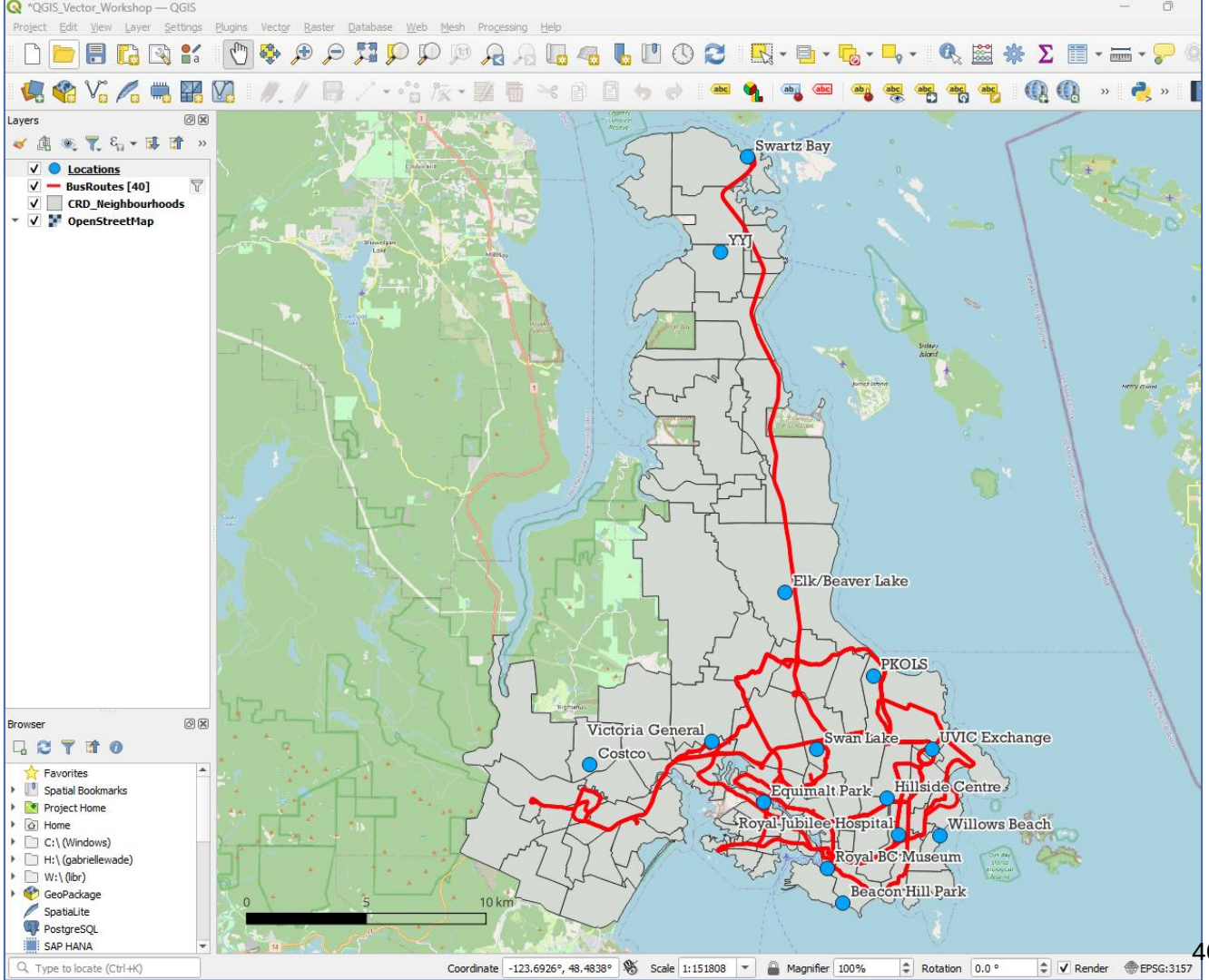


Export “quick” map

Scale bar added

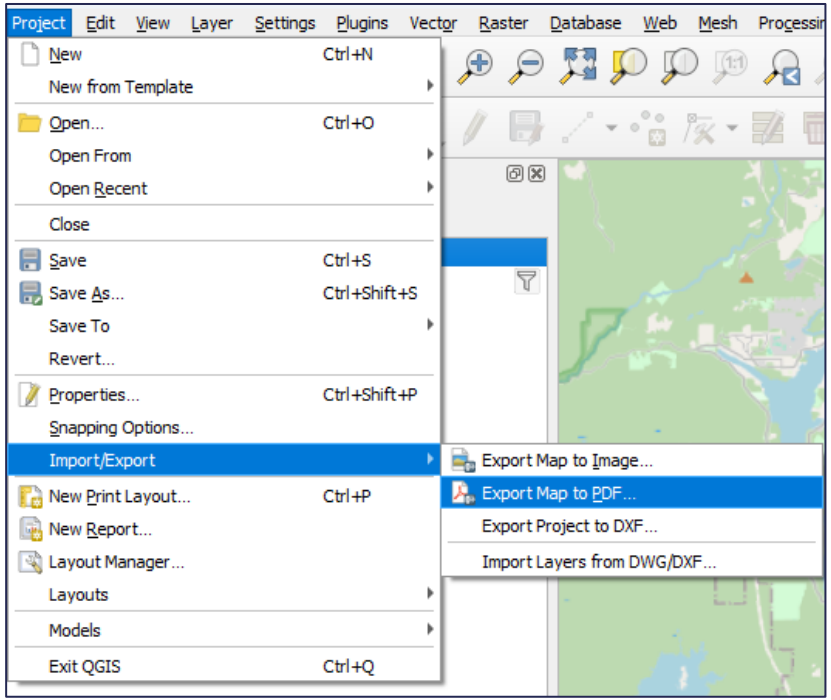
(other options to add: **not** today)

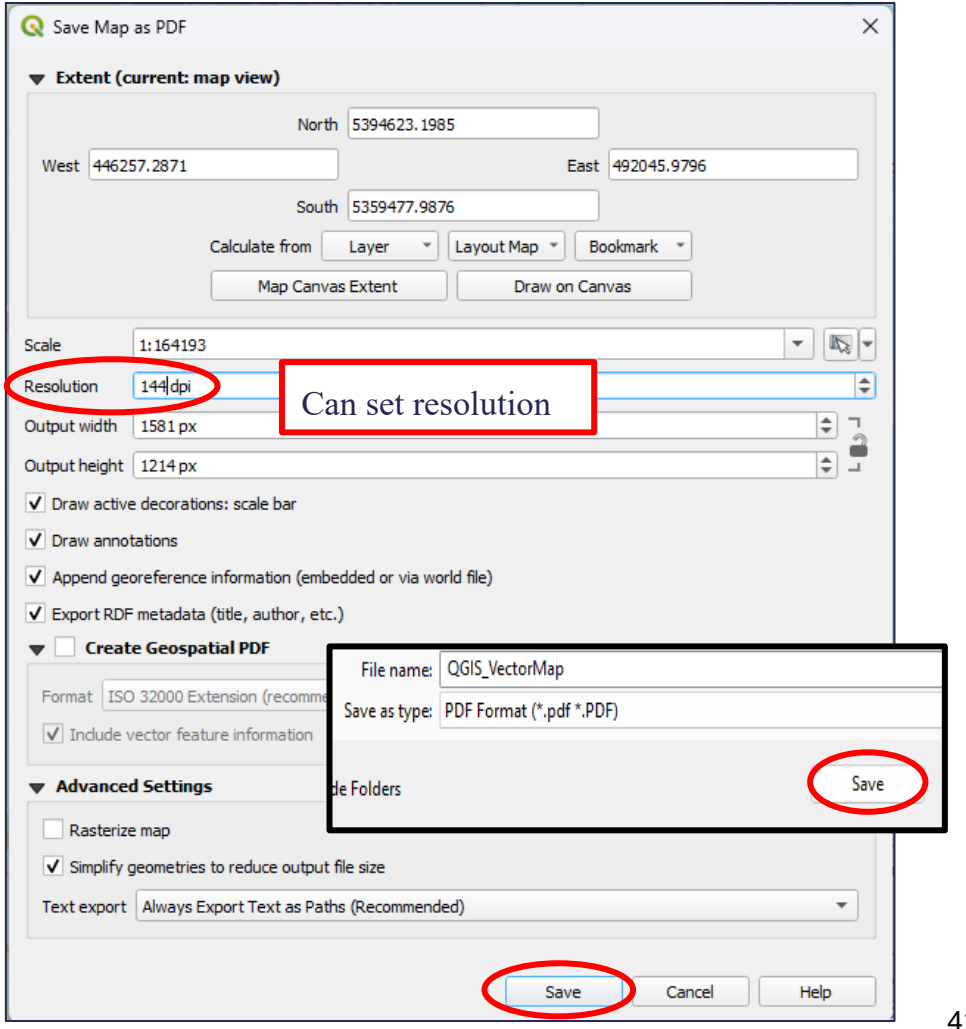
- Title
- North Arrow
- Grid
- etc



Export “quick” map

Export map





CHECK IN #9

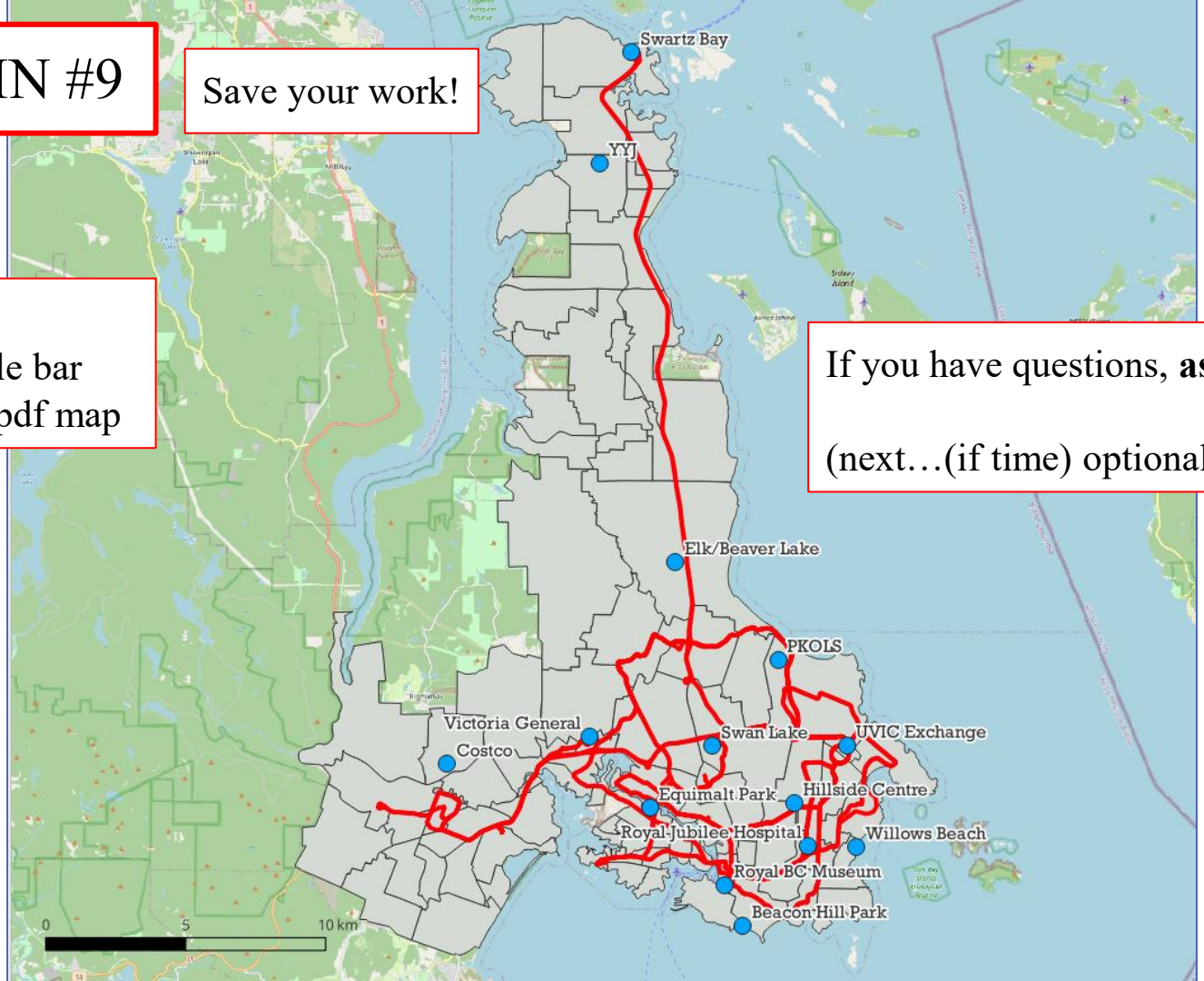
Save your work!

You have:

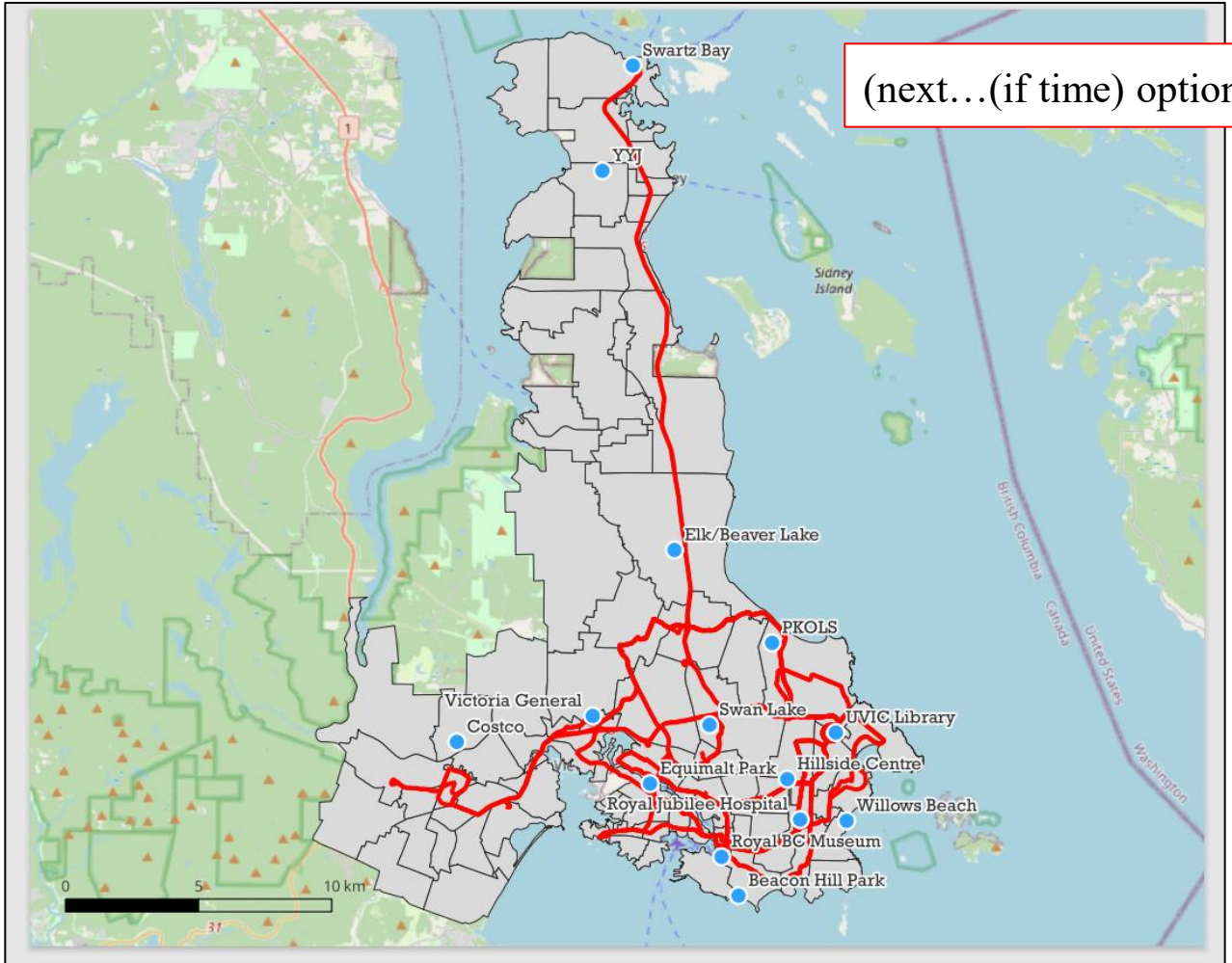
- Added scale bar
- Exported .pdf map

If you have questions, **ask**!

(next…(if time) optional exercises…)



Congratulations!

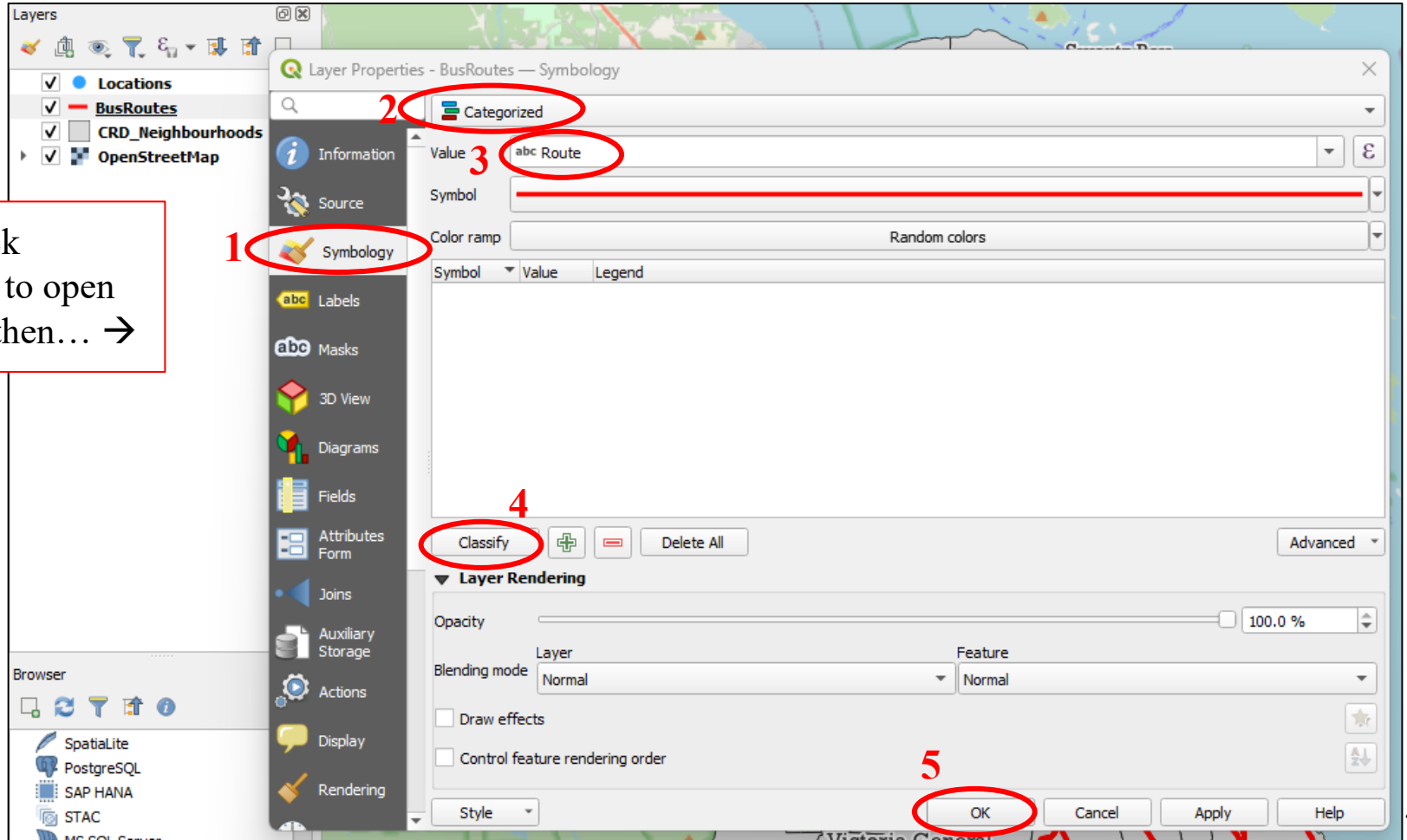


(next…(if time) optional activity…)

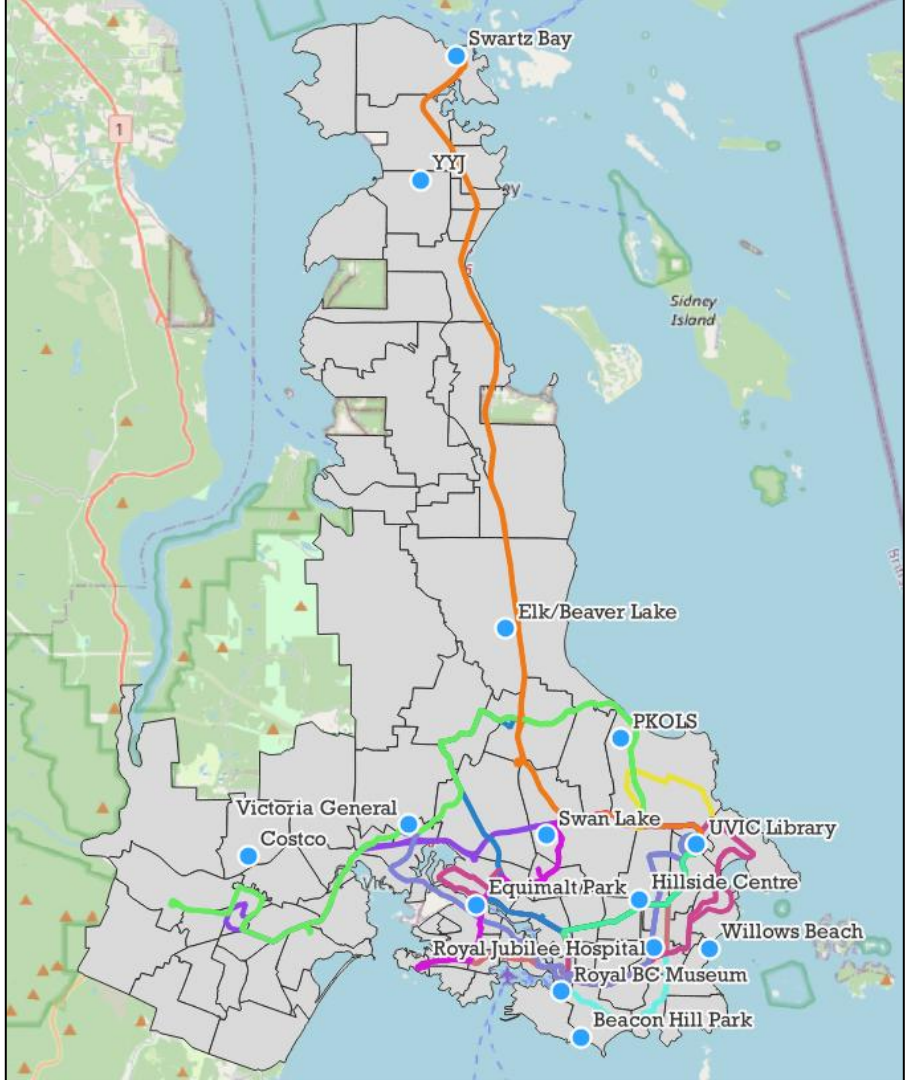
Optional Activity

Optional Exercise: ‘Symbol’ lines to differentiate between bus routes

Double-click **BusRoutes** to open *Properties* then… →



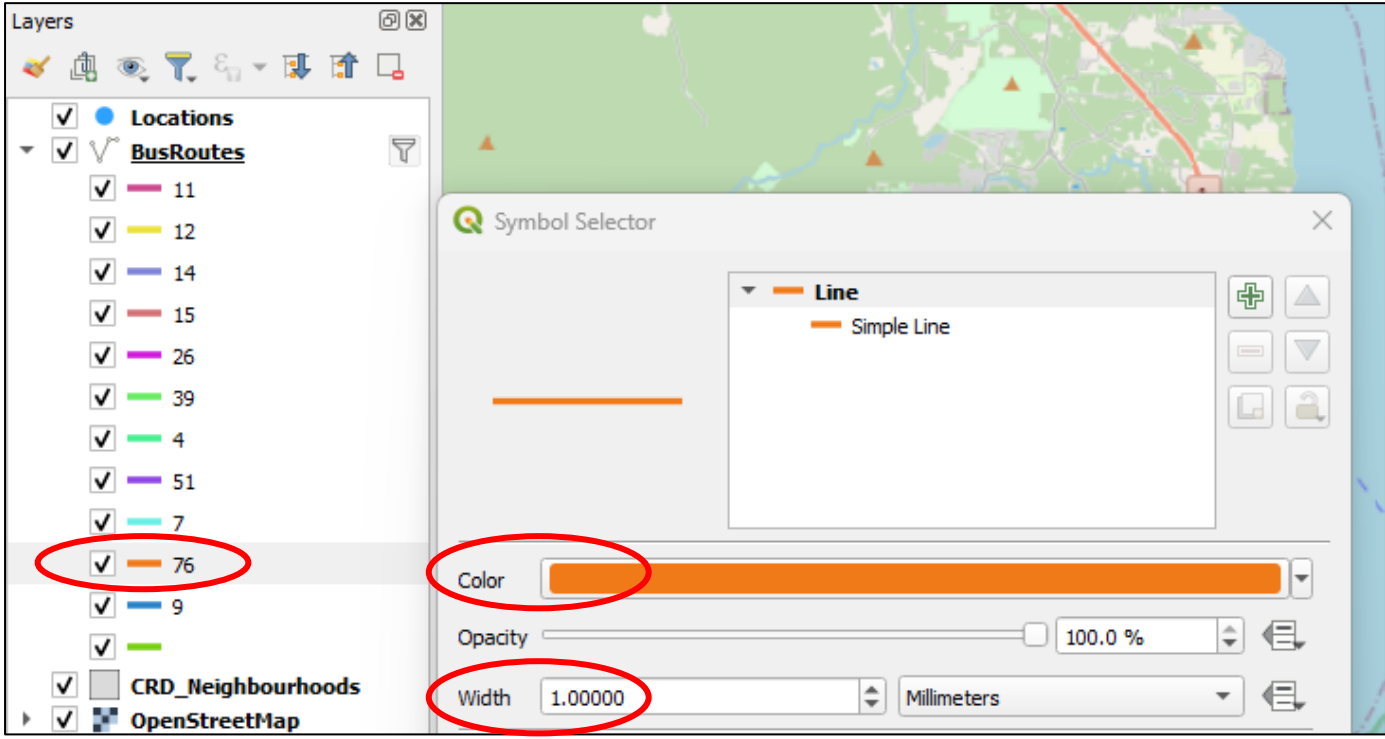
All bus routes are different (random) colours, but…



You can change each one individually via drop-down on *Layers* panel

- Can change style, colours, sizes, etc.
- Can also do these steps to point layers, polygon layers
- Style by different attributes

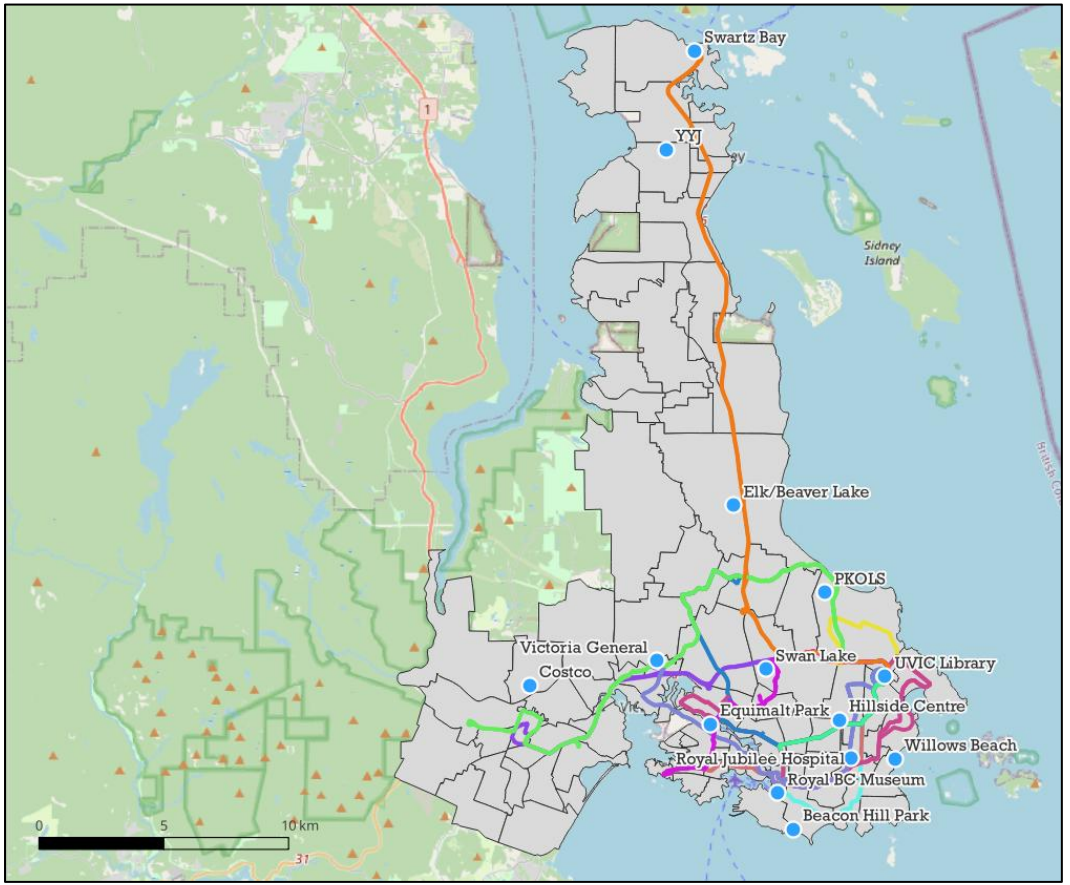
Many styling options!



Congratulations!

You:

- Explored *QGIS* software and its layout
- Imported Vector and .csv data using the *Data Source Manager*
- Edited Vector data symbology
- used *Filter* to remove unwanted data
- Created and exported a map



Congratulations!

You can:

- Define and differentiate basic features of:
  - Geospatial Tools
  - Geospatial data
  - Data types
  - File formats
- Load and edit vector symbology data
- Create and export a map in *QGIS*

Resources going forward:

QGIS – additional resources:

- QGIS Training Manual: https://docs.qgis.org/3.40/en/docs/training_manual/index.html
- QGIS User Guide: https://docs.qgis.org/3.40/en/docs/user_manual/index.html
- QGIS Tutorials & Tips: https://www.qgistutorials.com/

Find data:

- GeoSpatial Data Guide: http://libguides.uvic.ca/geospatialdata

Questions or problems:

- UVic Geospatial Librarian (danielbm@uvic.ca), YCW Geospatial Intern (gabriellewade@uvic.ca), or KULA Geospatial Assistant (jeronimo.elenes@gmail.com)

UVic full semester GIS courses in the Department of Geography:

- GEOG222 – Intro to Maps and GIS
- GEOG328 – GIS Analysis

GIS Skills and Mapping Micro-certificate

https://continuingstudies.uvic.ca/science-and-the-environment/programs/gis-skills-and-mapping