

# HANDOUT – EXPLORING GEOSPATIAL DATA

## INTRODUCTION

This handout details the steps associated with the import and exploration of shapefiles using the examples in the **N-CATT GIS Workshop > Day One > Module 2 > Data > Exploring Geospatial Data** folder.

## OUTLINE

*To jump to a page, click the section.*

1. Exploring Shapefiles .....	2
2. Adding Layers to a Project and Inspecting their Contents .....	3
3. Navigating in QGIS .....	8
4. Managing Geospatial Data .....	10

# 1. EXPLORING SHAPEFILES











## 1.1. Open the File Manager

- Open the File Explorer (Windows) or Finder (macOS)
  - If you are using Windows: select the File Explorer icon in the Taskbar; alternatively, search for “File Explorer” in the search bar on the left side of your taskbar – if you do not see this, press the **Windows** key on your keyboard and begin typing
  - If you are using macOS: select the Finder icon in the dock; alternatively, press **Command** and **Space** on your keyboard and begin typing “Finder”

## 1.2. Inspect Shapefiles

- Navigate to the folder containing routes.shp and stops.shp
  - You will see at least three files associated with each shapefile (*Figure 1*)
    - .shp – contains feature geometry
    - .shx – index file
    - .dbf – database file that stores attribute data
  - Shapefiles optionally include:
    - .prj – contains the coordinate and projection system
    - .xml – stores metadata
    - .sbn – index file (works in tandem with .sbx)
    - .sbx – index file (works in tandem with .sbn)
    - .cpg – specifies the encoding applied

Figure 1: Shapefile Viewed from a File Manager

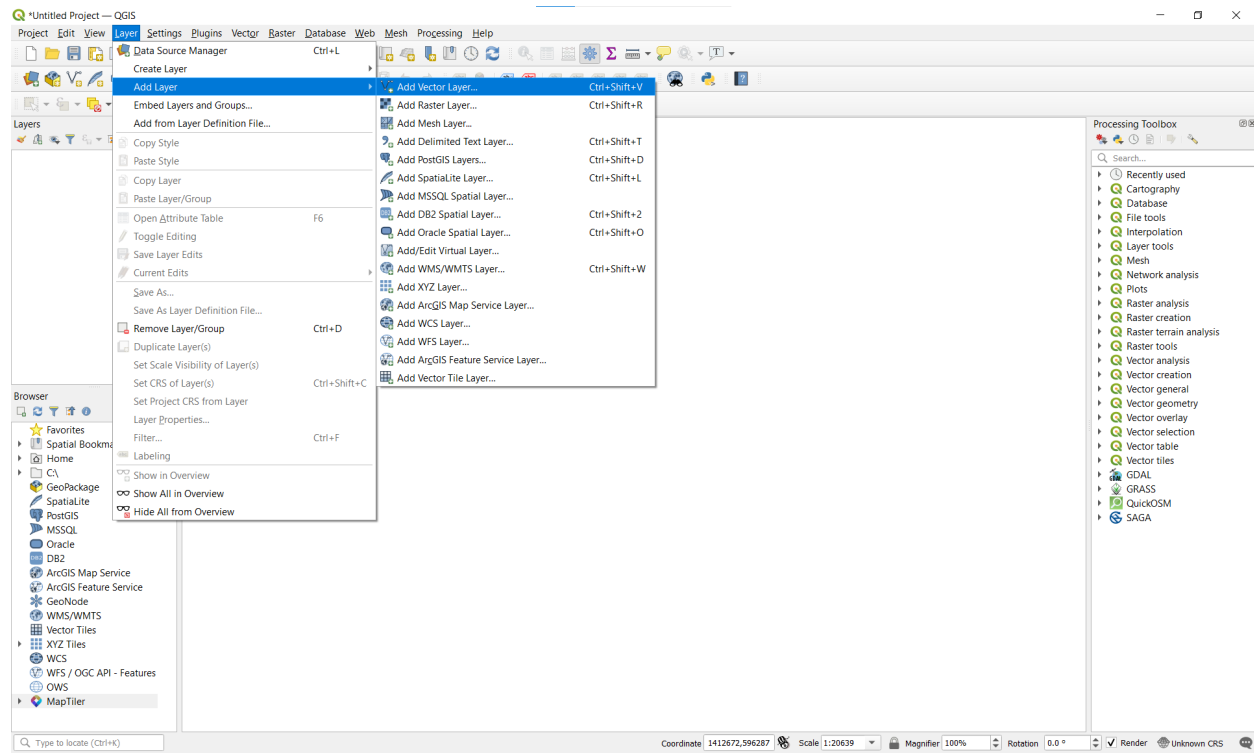
 routes.cpg		12/17/2021 4:26 PM	CPG File
 routes.dbf		12/17/2021 4:26 PM	DBF File
 routes		12/17/2021 4:26 PM	PRJ File
 routes.shp		12/17/2021 4:26 PM	SHP File
 routes.shx		12/17/2021 4:26 PM	SHX File

## 2. ADDING LAYERS TO A PROJECT AND INSPECTING THEIR CONTENTS

### 2.1. Add Layers From the Data Source Manager

- There are multiple options for how you can add new vector layers using the Data Source Manager:
  - Option 1: Select **Layer > Add Layer > Add Vector Layer** (Figure 2)
  - Option 2: Press **CONTROL, SHIFT, and V**

Figure 2: Adding Layers



- Select the **Browse** button (it looks like three dots) and navigate to the circulator folder within Module 2 > Data (Figure 3)
- Holding **Control**, select routes.shp and stops.shp (Figure 4)
  - Select **Open**
  - Select **Add**

Figure 3: Browsing for Layers

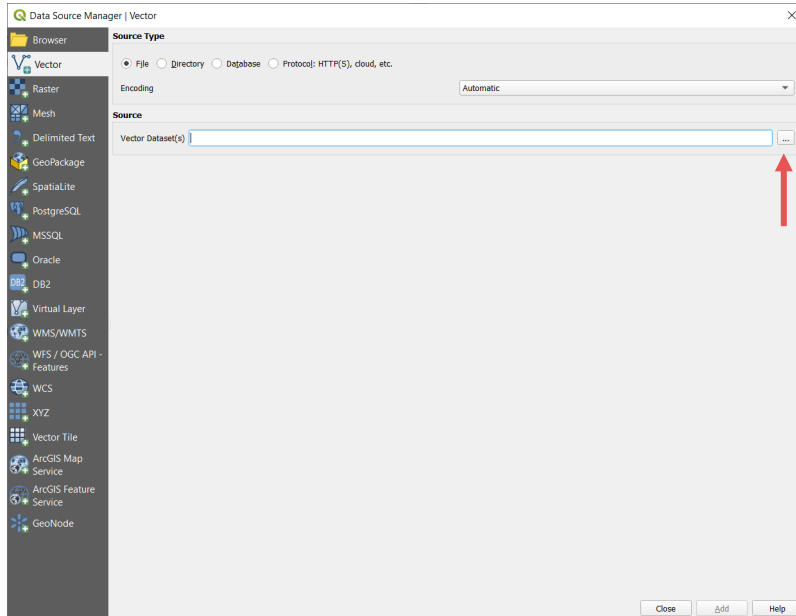
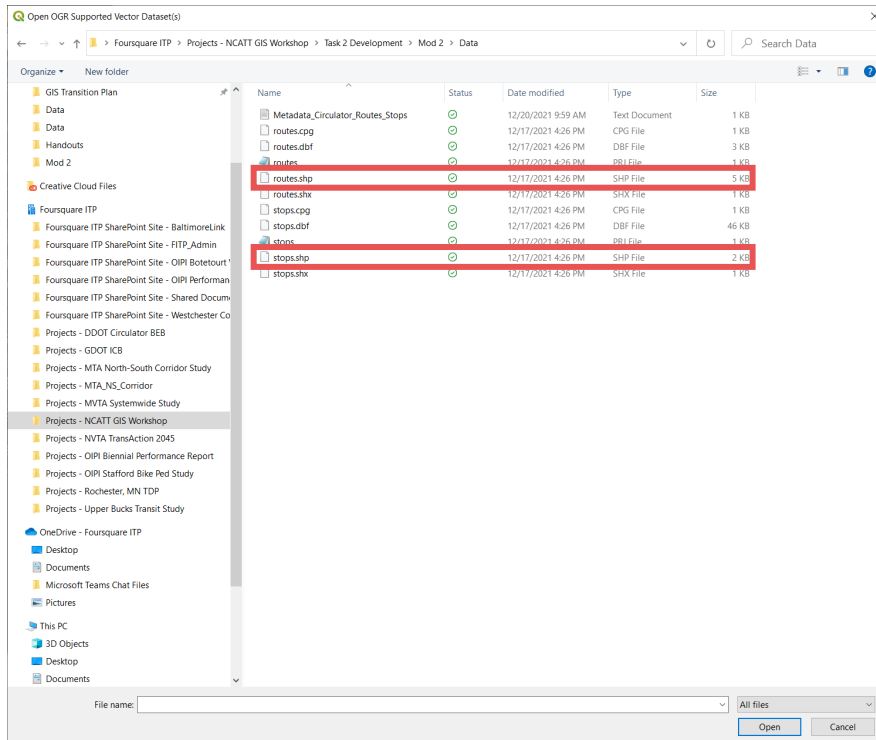


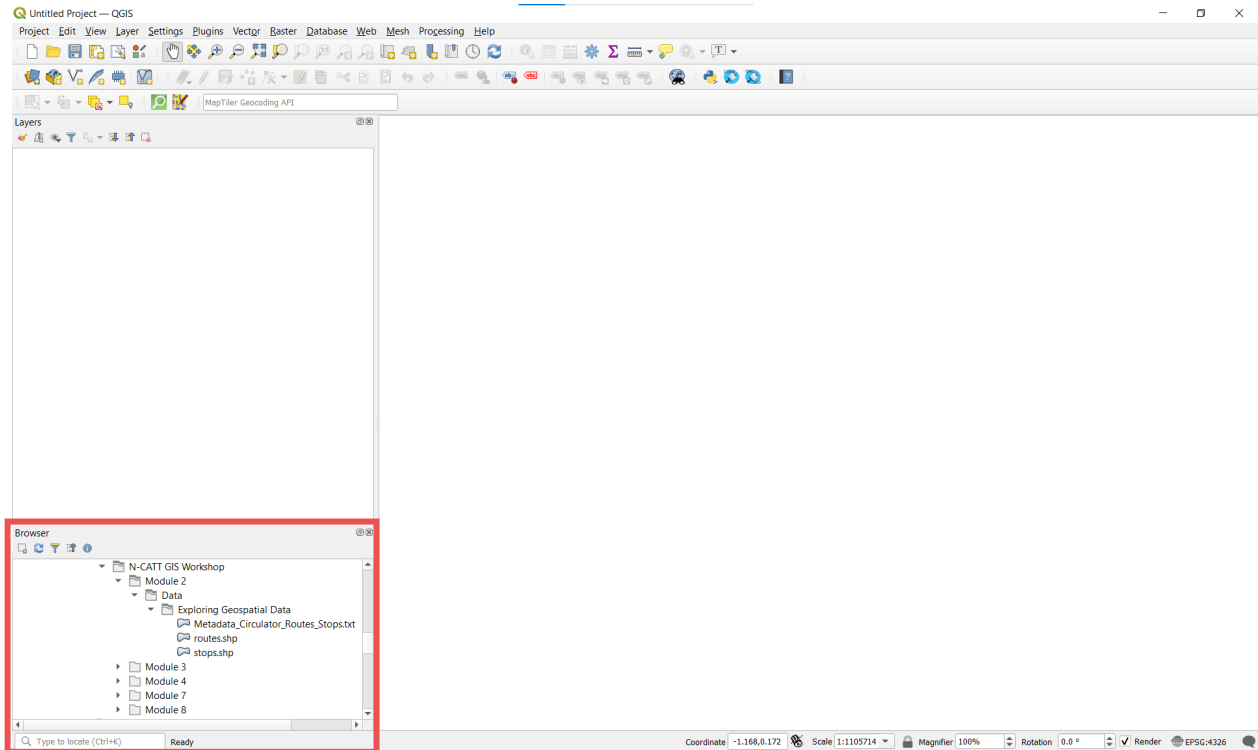
Figure 4: Selecting Layers



## 2.2. Add Layers from the Browser Panel

- There are also multiple ways to add layers from the Browser Panel:
  - Navigate to the Browser Panel (*Figure 5*)
  - Drag routes.shp and stops.shp onto onto the Map Canvas
  - Right click on routes.shp and stops.shp and select **Add Layer to Project**

Figure 5: Adding a Layer from the Browser Panel



## 2.3. View Layer Properties

- Right-click on the "routes" layer in the Layers Panel and select **Properties** (Figure 6)
- The Layer Properties dialog contains information on the layer and allows for the modification of its appearance, or symbology
  - Information: contains metadata and the layer filepath
  - Source: contains the coordinate and projection system
  - Symbology: allows for the manipulation of the color and appearance of features within the layer
  - Labels: allows for labeling of features within the layer
  - Fields: describes the name and type of fields in the Attribute Table

Figure 6: Viewing Layer Properties

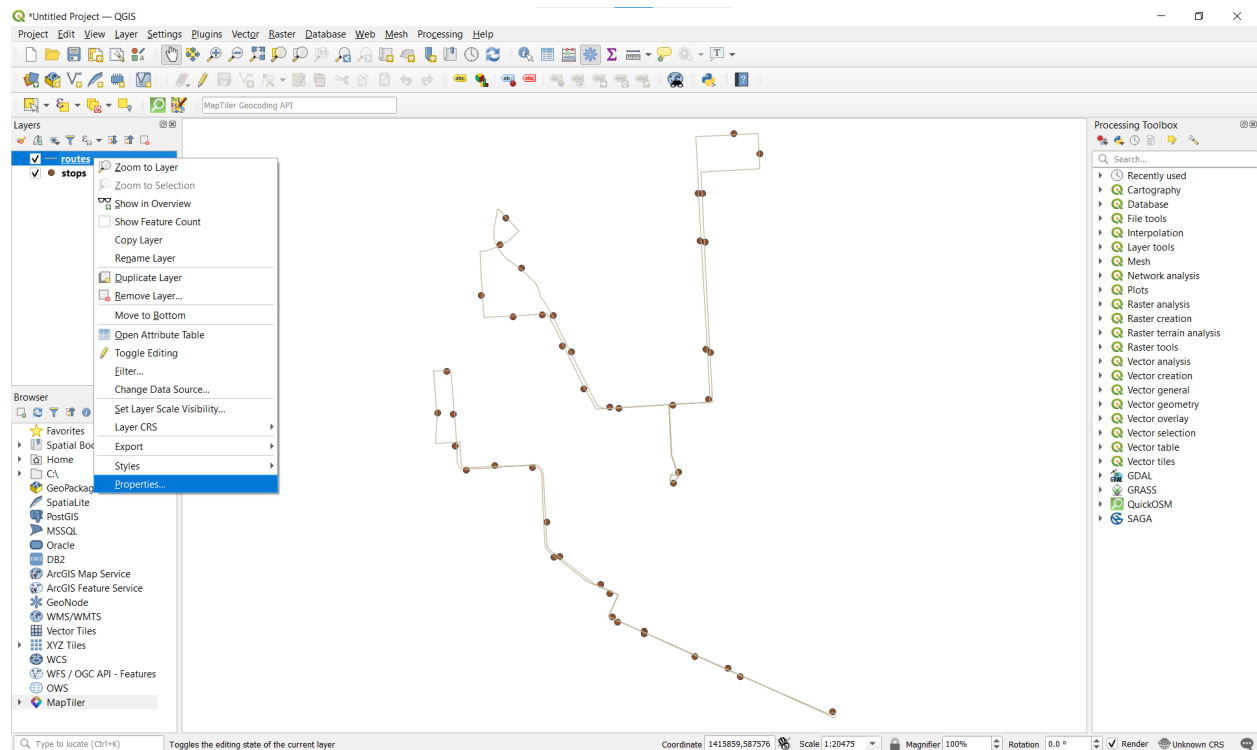
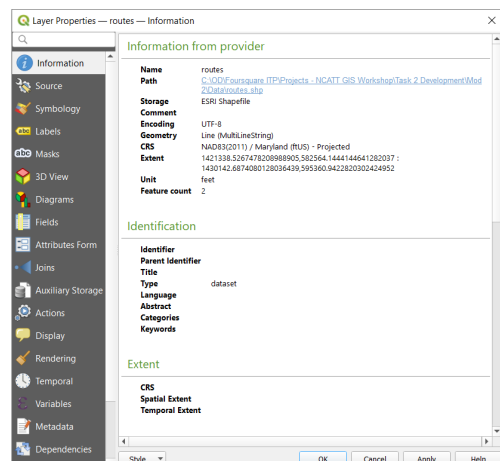


Figure 7: Layer Properties Dialog



## 2.4. Open an Attribute Table

- Right-click on the “stops” layer in the Layers Panel and select **Open Attribute Table** (Figure 8)
- Metadata contains information about the data; for example, the metadata associated with this stops layer reveals that the wheelchair field documents the presence of an ADA-compliant surface for boarding/alighting

Figure 8: Opening an Attribute Table

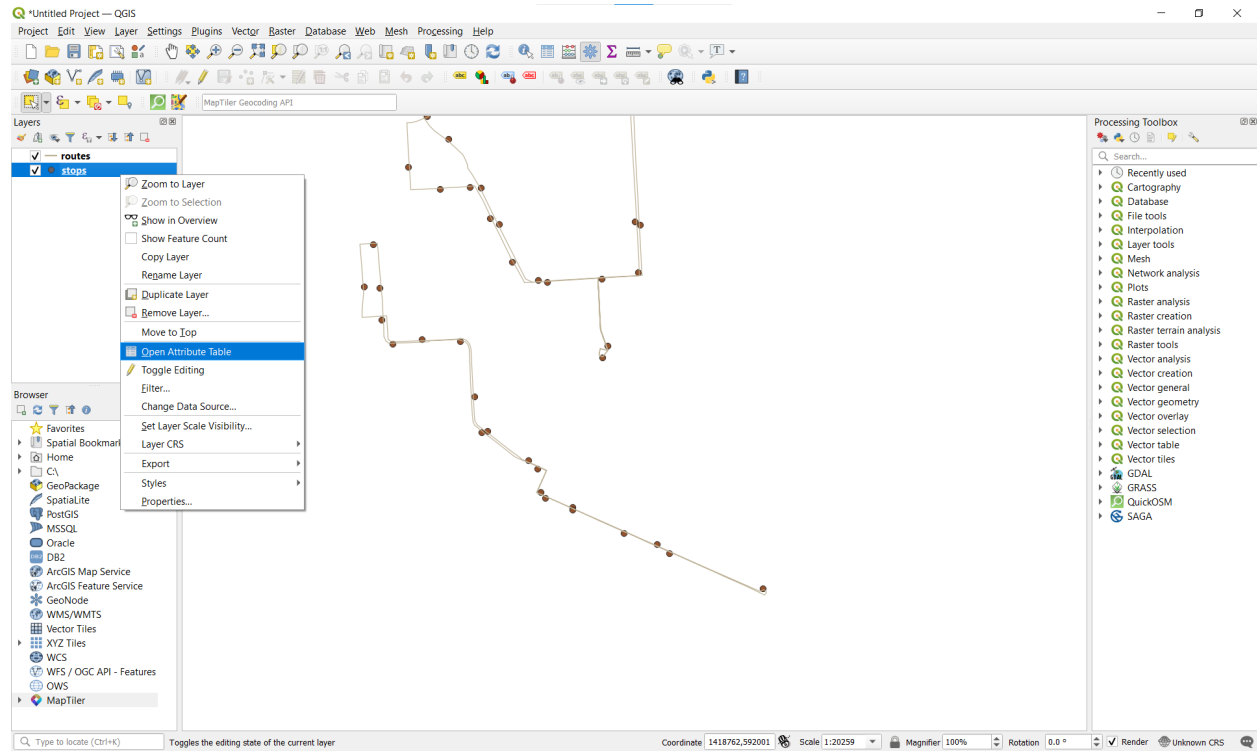


Figure 9: Attribute Table

The screenshot shows the Attribute Table window for the 'stops' layer. The table contains 44 rows of data. The first row is highlighted. The columns are: stop\_id, stop\_code, stop\_name, stop\_lat, stop\_lon, and wheelchair.

stop_id	stop_code	stop_name	stop_lat	stop_lon	wheelchair
1	330/401	Conway Street	39.283885000000	-76.613369000000	1
2	331/402	Lee Street	39.281978000000	-76.613214000000	1
3	411	Fort McHenry	39.265901000000	-76.584145000000	1
4	412	Towson Street	39.268576000000	-76.592229000000	1
5	413	Woodall St	39.270813000000	-76.598666000000	1
6	414	Lawrence Street	39.271683000000	-76.601107000000	1
7	415	Museum of Ind...	39.273610000000	-76.602040000000	1
8	416	Harborview	39.275330000000	-76.605190000000	1
9	417	Pierside Drive	39.277404000000	-76.606169000000	1
10	418	Rash Field	39.280799000000	-76.610169000000	1
11	419	Otterbein	39.283964000000	-76.614574000000	1
12	221/420	Pratt Street	39.286471000000	-76.613866000000	1
13	403	Federal Hill Par...	39.280536000000	-76.612386000000	1
14	404	American Visio...	39.280687000000	-76.607239000000	1
15	405	Jackson Street	39.275269000000	-76.605626000000	1
16	406	Boyle Street	39.273090000000	-76.601340000000	1
17	407	Fort Avenue	39.271350000000	-76.600750000000	1
18	408	Whetstone Way	39.270640000000	-76.598700000000	1
19	409	Decatur Street	39.269260000000	-76.594780000000	1
20	410	Andre Street	39.268040000000	-76.591280000000	1
21	117/225	Little Italy	39.285368000000	-76.603247000000	1
22	118/226	Fleet & Exeter	39.284189000000	-76.600559000000	1
23	101	Rutland Avenue	39.300691000000	-76.591558000000	1

## 3. NAVIGATING IN QGIS

### 3.1. The Map Navigation Toolbar

- The Map Navigation Toolbar (Figure 10) includes several tools for navigating layers within QGIS (Figure 11), including but not limited to:
  1. **Pan Map** – click the map canvas to pan to the cursor position; click and hold to drag the map canvas
  2. **Zoom In** – click the map canvas to zoom in one level and center the map on the cursor position; drag a rectangle to zoom in to an area
  3. **Zoom Out** – click the map canvas to zoom out one level and center the map on the cursor position; drag a rectangle to zoom out on an area
  4. **Zoom Full** – zooms to depict all layers

Figure 10: Map Navigation Toolbar

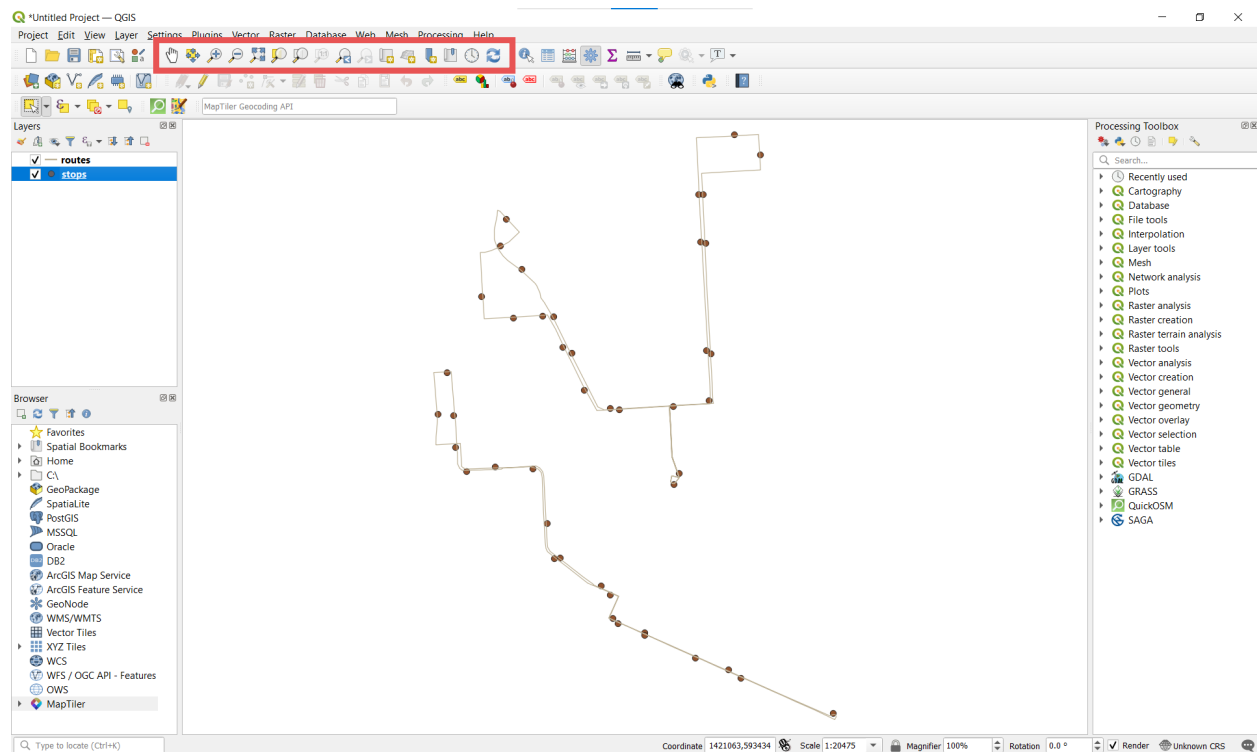
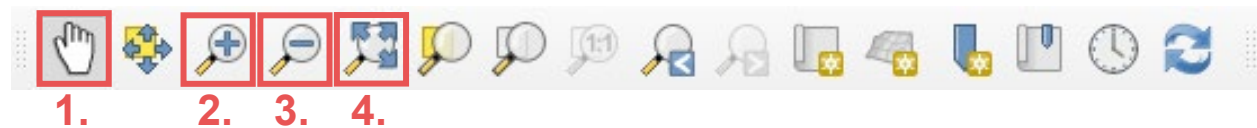


Figure 11: Map Navigation Toolbar Tools





### 3.2. Other Useful Navigation Commands

- Other navigation commands include:
  - Right-click on a layer in the Layers Panel and select **Zoom to Layer** to center the map on features within that layer
  - Scroll up/down to zoom in/out
  - Click the scroll wheel (if available) to drag the map canvas, regardless of what tool is selected

## 4. MANAGING GEOSPATIAL DATA

### 4.1. Moving Shapefiles

- Moving a shapefile:
  - Requires that you move all of the constituent files; failure to do so will likely result in a loss of data
  - Will not be possible if it is in use by a QGIS project
  - Will require that you re-link it to the QGIS project file, unless you move it using QGIS (see below)

### 4.2. Best Practices

- Do not move shapefiles once you have begun working with them, unless absolutely necessary; this is why it is critical that you establish a folder hierarchy early-on and stick to it!
- If you do need to move a shapefile, the best way to do that is within the Browser Panel in QGIS; this will ensure that you do not lose any of its constituent parts