Remote Sensing and Geographical Information Systems Project

Submitted to :-

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Accessibility to Electric Vehicle Charging Power Stations

Study Area

Bristol City

Electric Vehicle Charging Power Stations

In world every country initiated to converting into EVs for next 10 years the automobile market completely shifts into electric vehicles

So, the requirement of electric charging stations is more currently there are 98 charging stations in Bristol city.

Our view is to work on the EV charging stations in Bristol by using ARCGIS Pro software and implementing the no of houses and population in the various area so will create a Data.

Need of the study

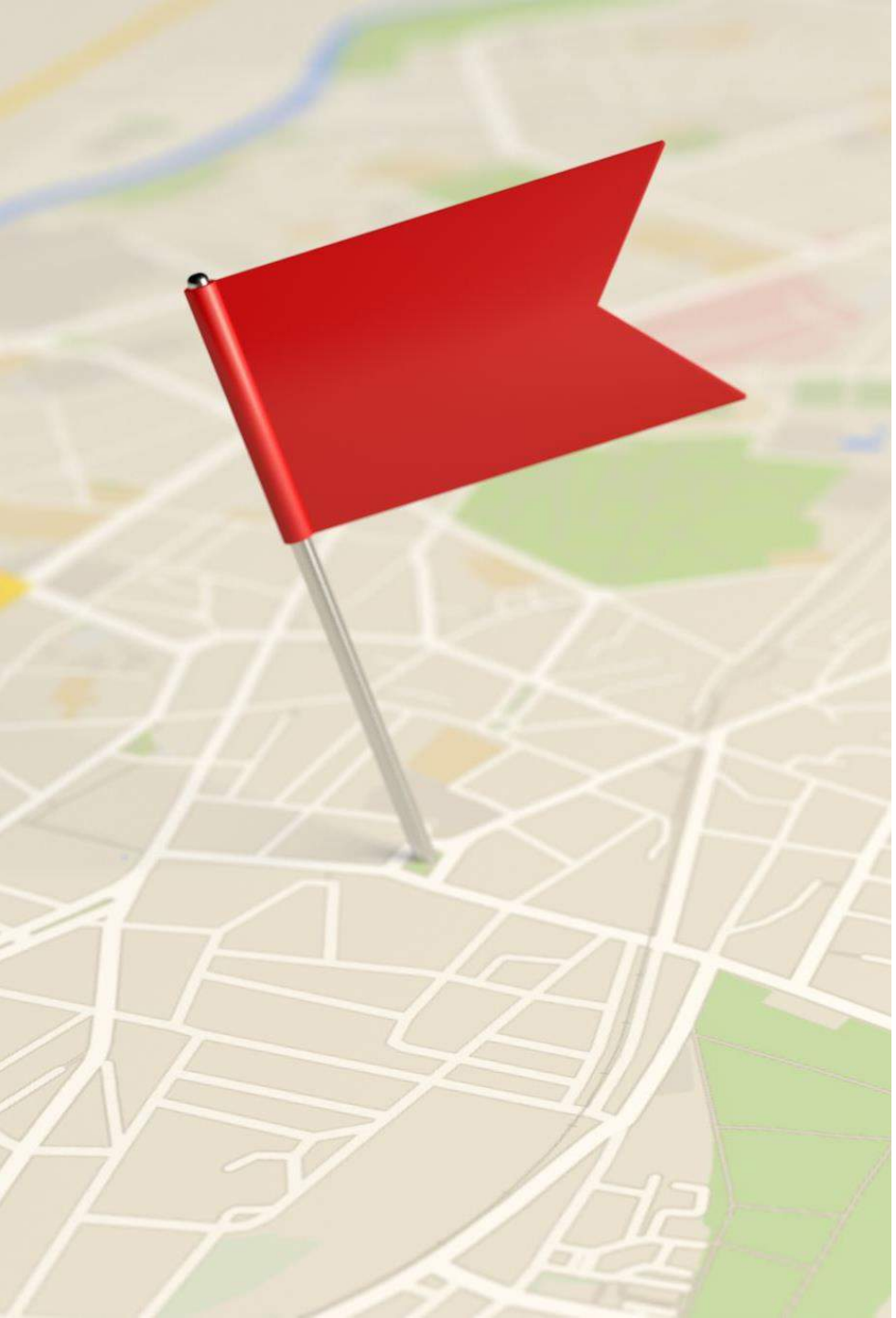
- As EVs continue to grow, additional electric vehicle charging stations (EVCSs) will be needed for EV drivers to utilize.
- However, before implementing EVCSs in the public, there are various criteria that need to be considered.
- One of these criteria is public EVCSs' accessibility to amenities and different things.
- When people are charging their EVs that require a significant amount of waiting time, having amenities nearby will provide them with the option to spend their time efficiently on worthwhile activities etc..
- We are making the suitable areas and nearest to the people accessible areas which they charge their vehicles.

Data availability and status of data collection

- No of vehicles In Bristol city EV 59,740 vehicles
- No of present charging stations in Bristol = 98
- Population in Bristol = 700,630

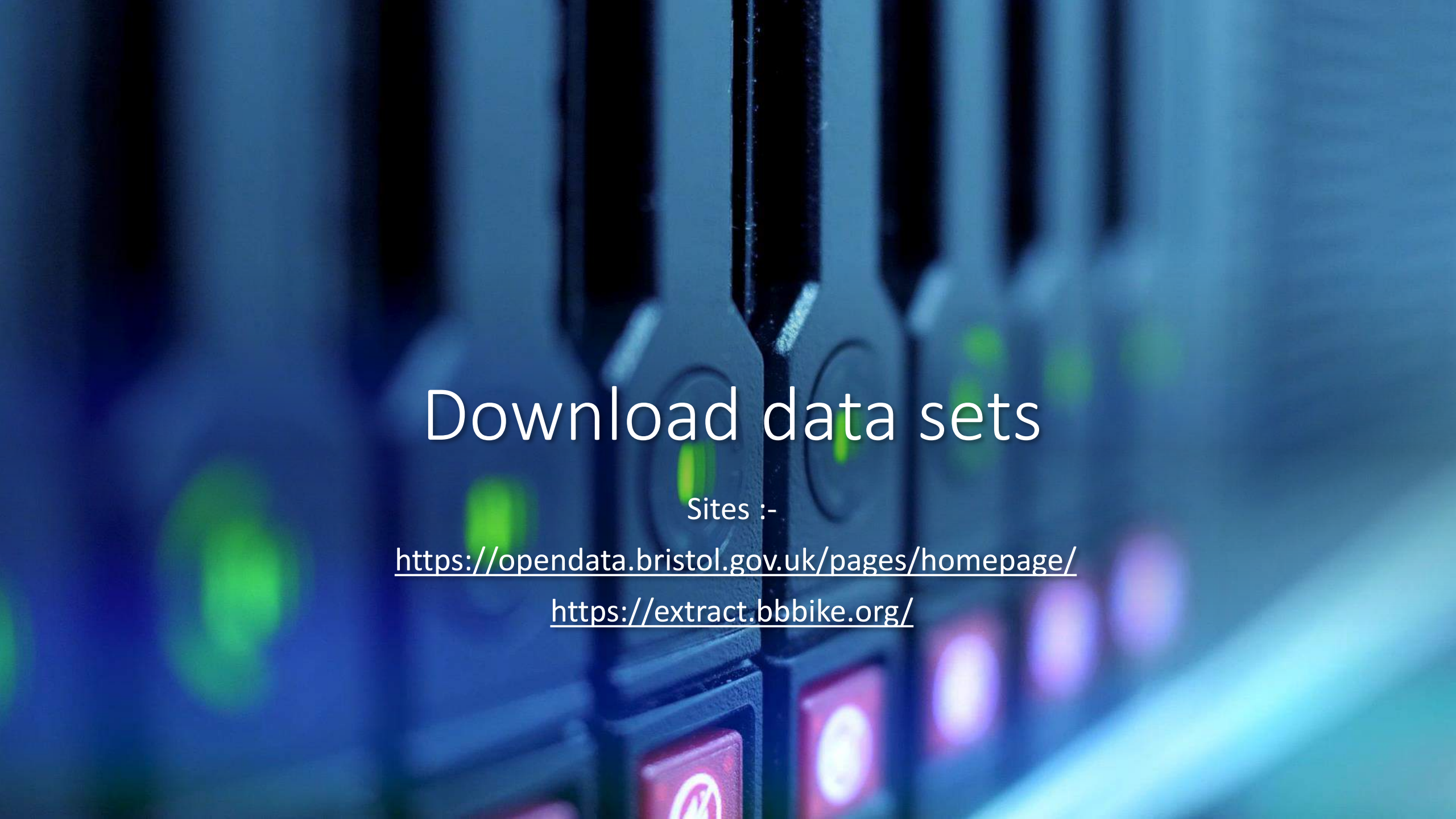
literature review

- https://repository.usfca.edu/cgi/viewcontent.cgi?article=1587&context=capstone
- Full article: Suitable location selection for the electric vehicle fast charging station with AHP and fuzzy AHP methods using GIS
- Optimal siting of electric vehicle charging stations: A GIS-based fuzzy Multi-Criteria Decision Analysis – ScienceDirect
- Sustainability | Free Full-Text | Electric Charging Demand Location Model—A User- and Destination-Based Locating Approach for Electric Vehicle Charging Stations
- Solving Location Problem for Electric Vehicle Charging Stations—A Sharing Charging Model | IEEE Journals & Magazine | IEEE Xplore
- An enhanced two-step floating catchment area (E2SFCA) method for measuring spatial accessibility to primary care physicians
- These are the different papers we are referring for the project.



ACTION PLAN

- We will download Bristol map and from Bristol open source we will download electric charging stations and the road map of the city and the buildings in the city we will be doing in ArcGIS.
- The two-step floating catchment area method has emerged in the last decade as a key measure of spatial accessibility, particularly in its application to charging stations access. Many recent ‘improvements’ to the original 2SFCA method have been developed, which generally either account for distance-decay within a catchment or enable the usage of variable catchment sizes.
- We will be using network analysis for the finding the near Ev charging station.



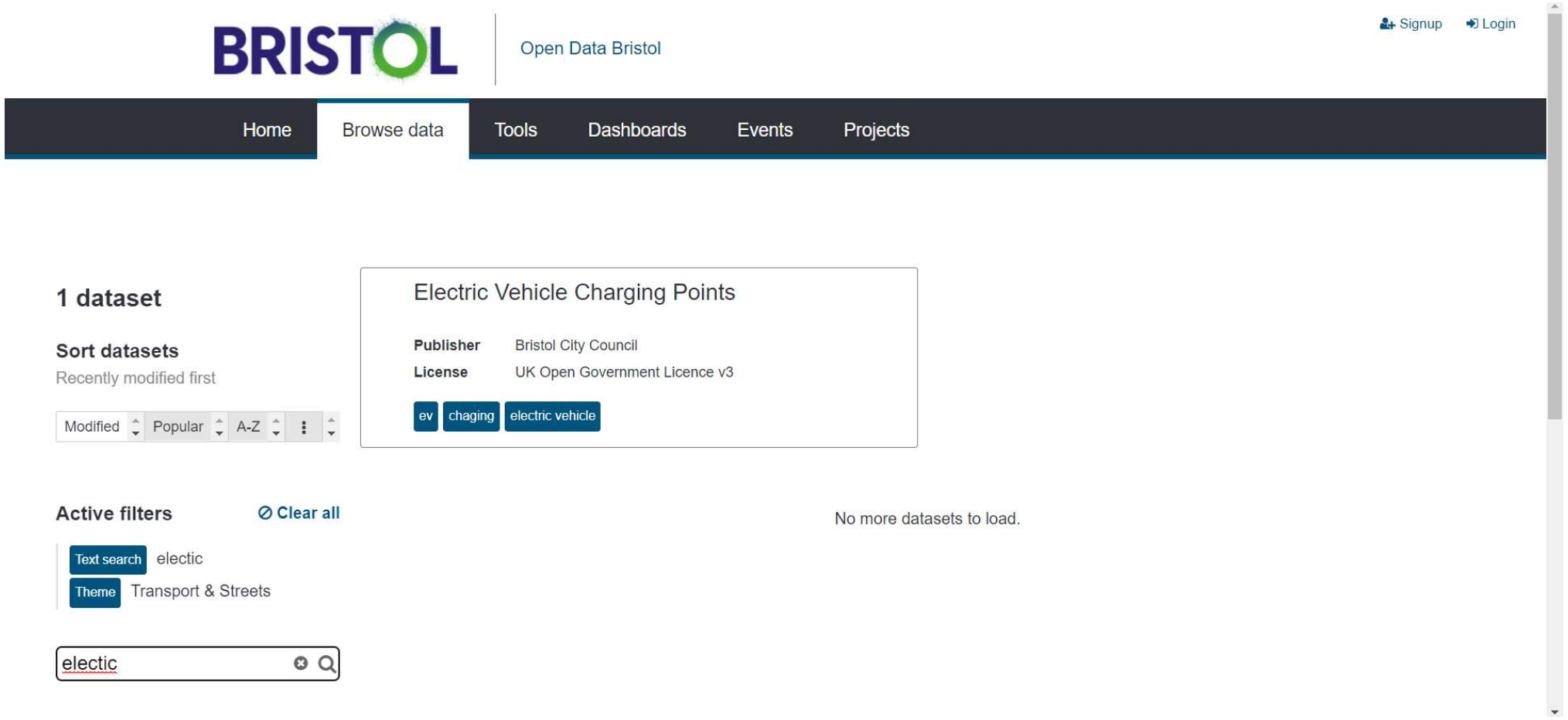
Download data sets

Sites :-

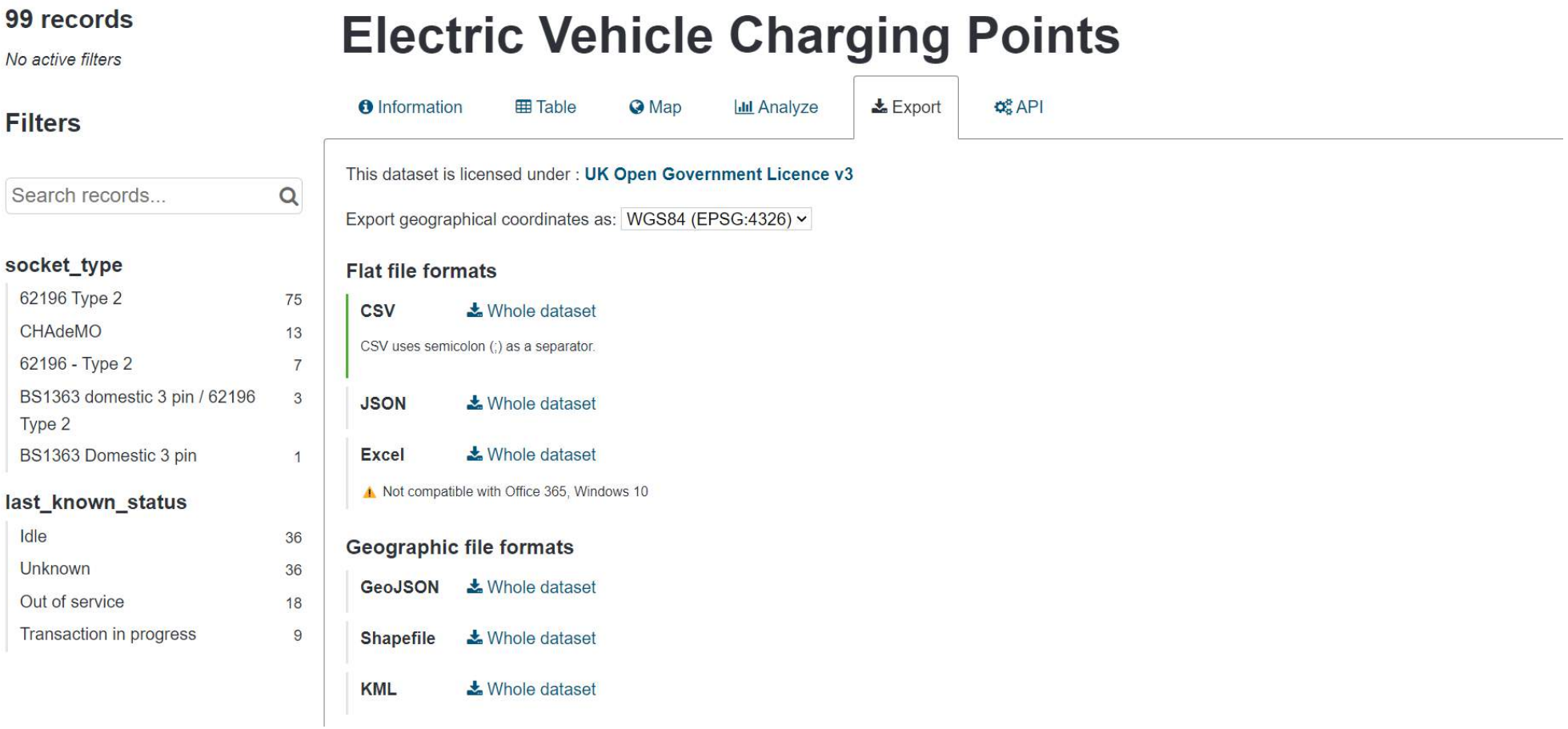
https://opendata.bristol.gov.uk/pages/homepage/

https://extract.bbbike.org/

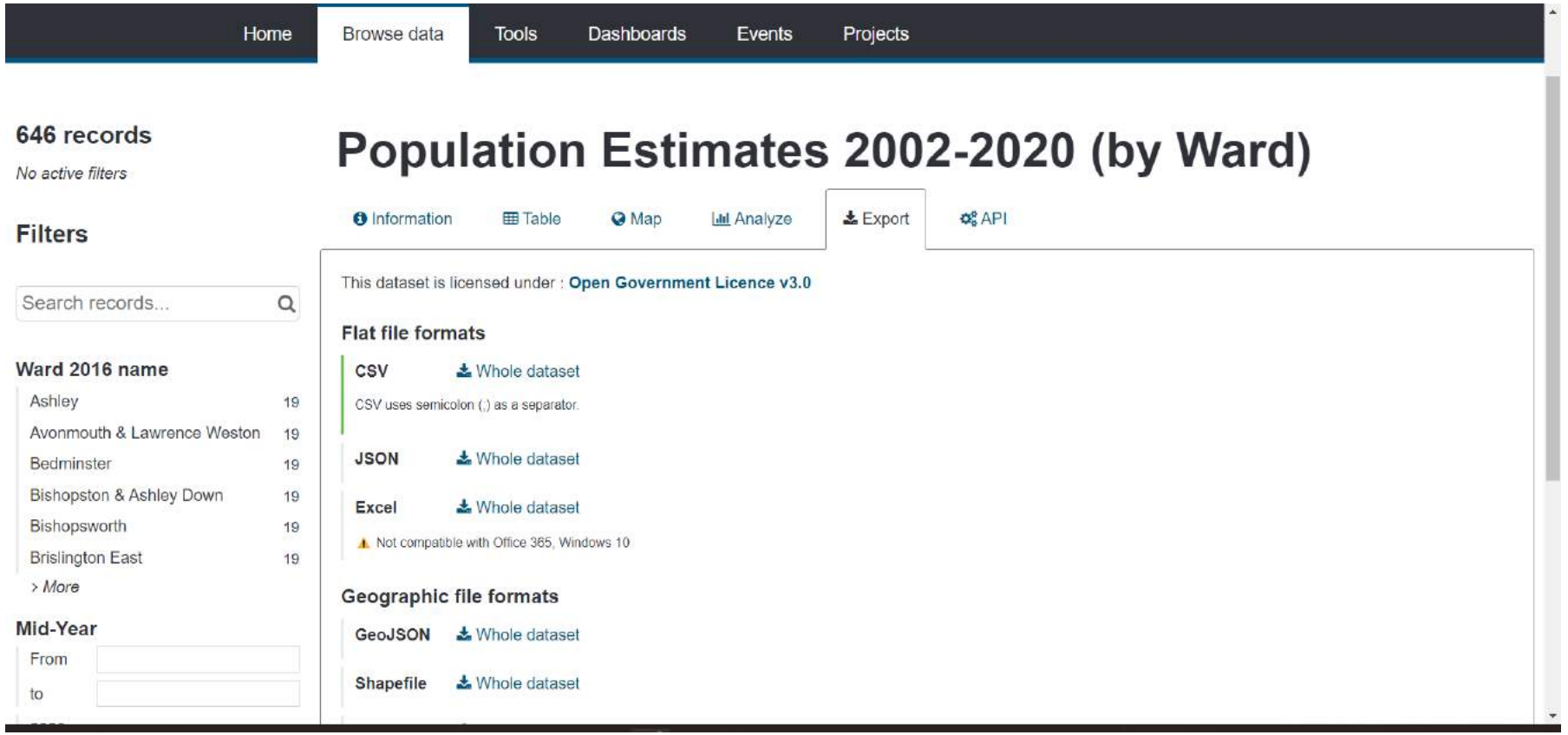
Electric Vehicle stations data



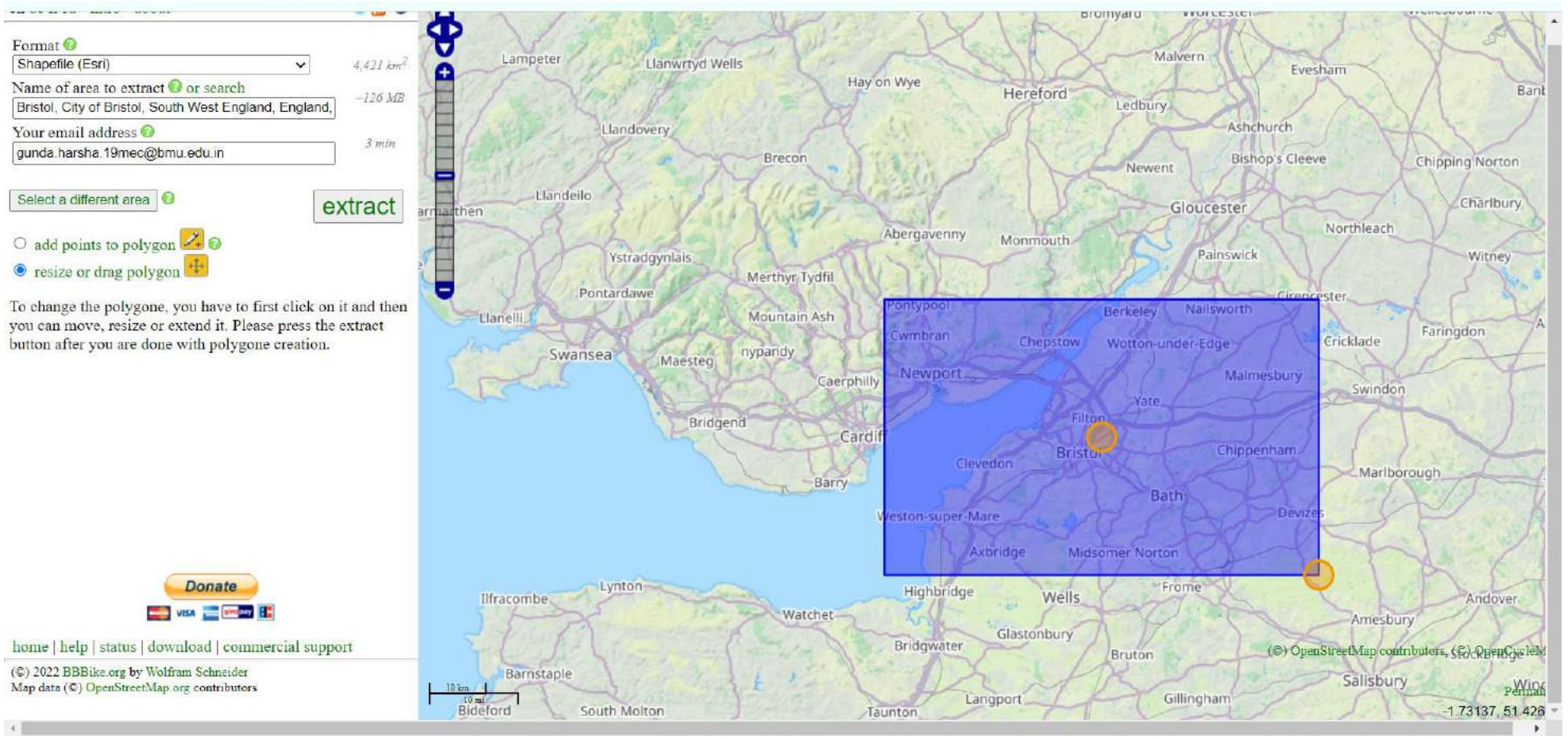
Data Set Download



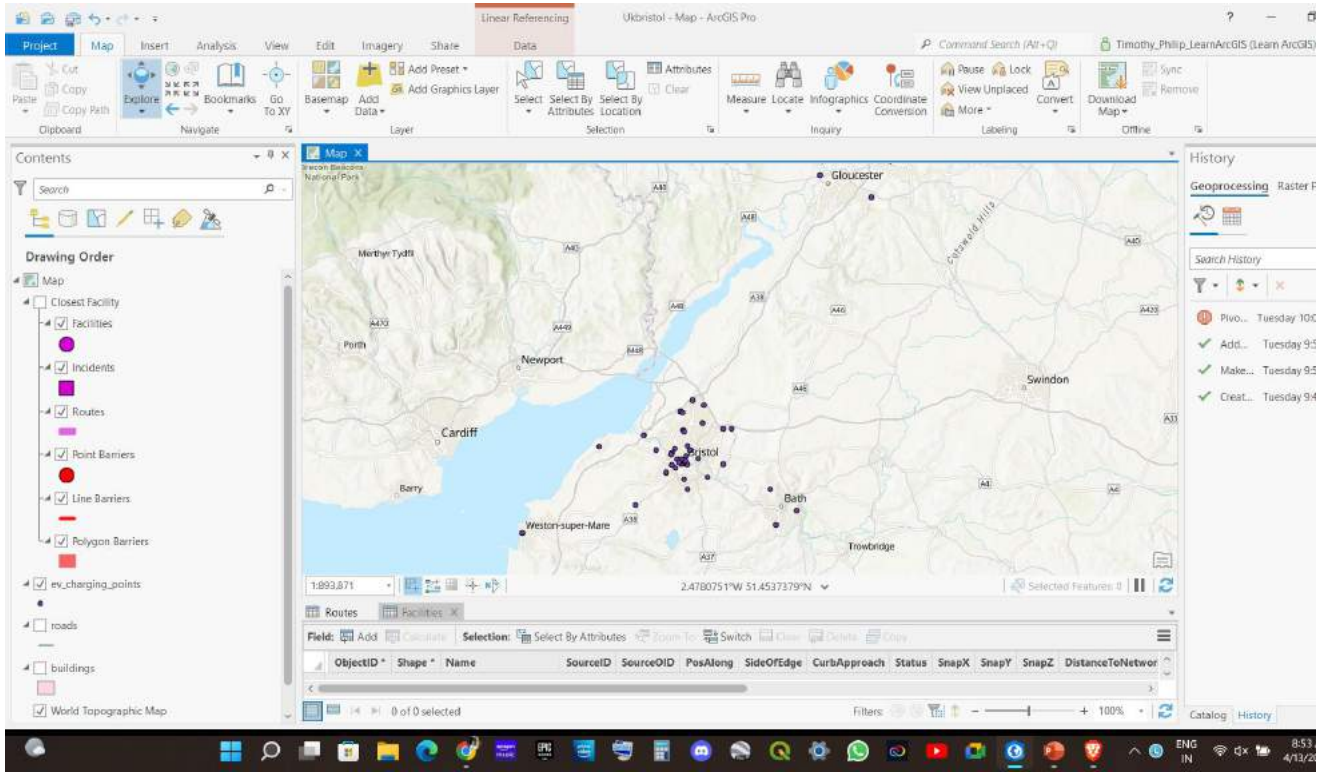
Population data set



Data set of Bristol City.



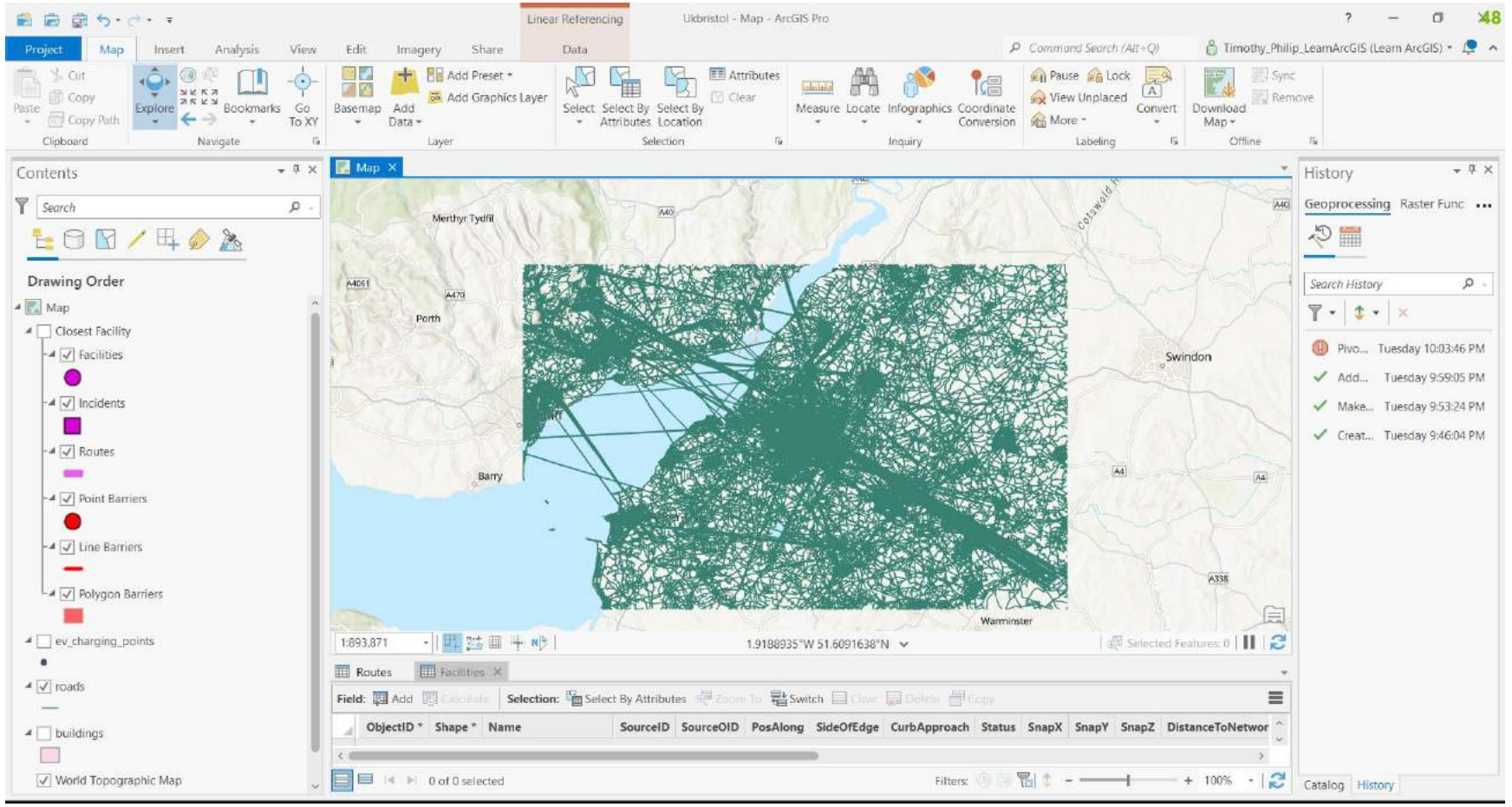
Processing in ArcGIS



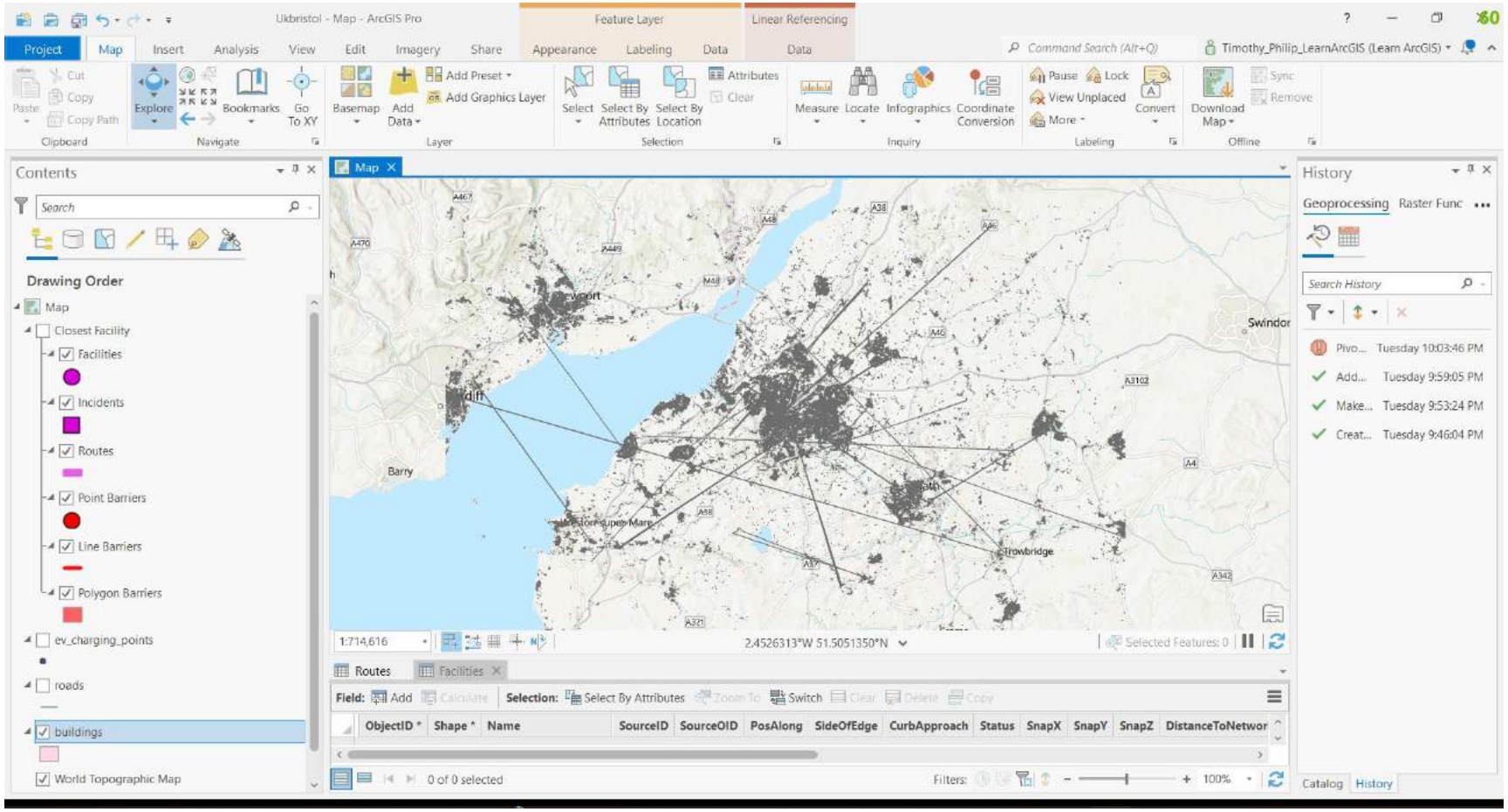
Step 1

- Add data option to add the Electric stations points in Bristol city.

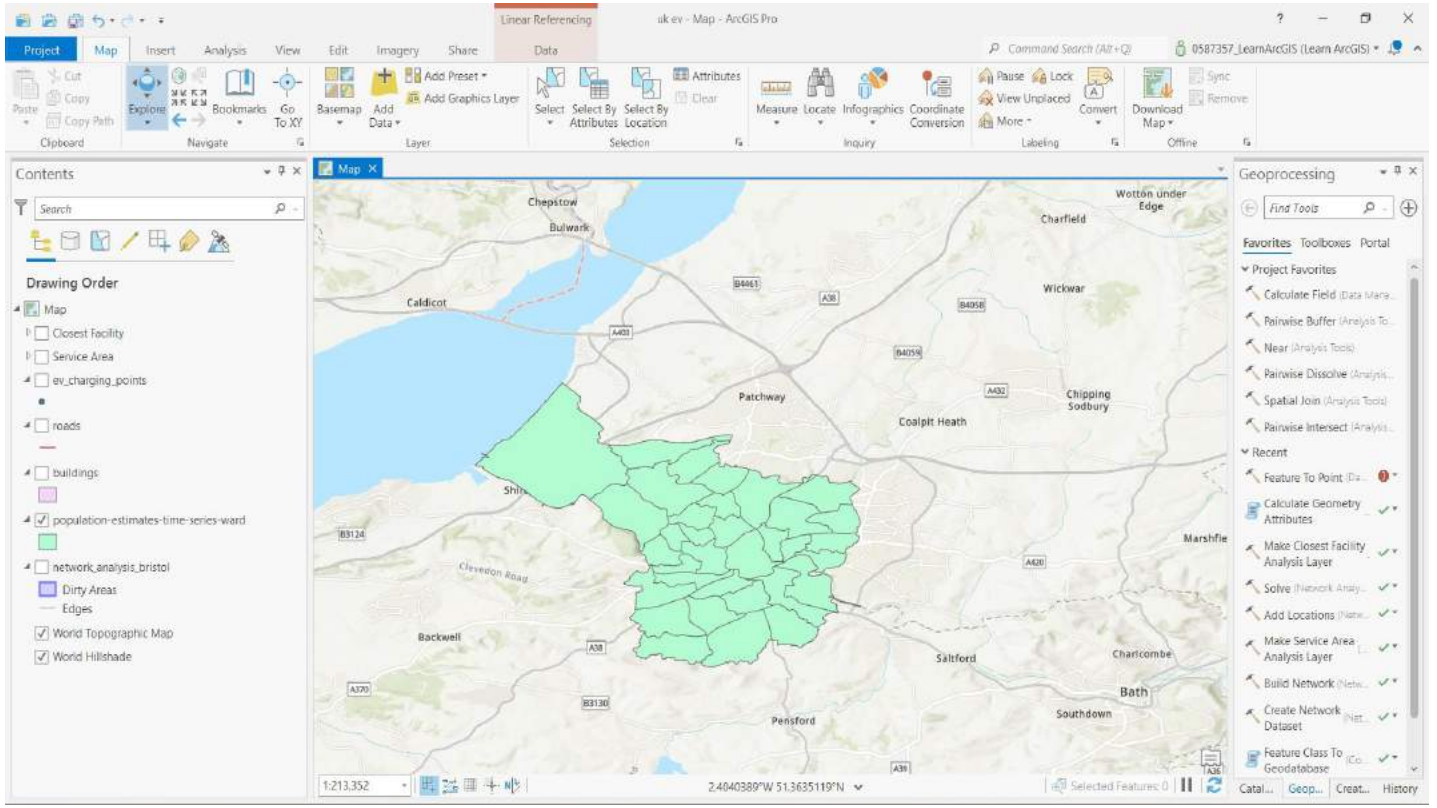
Step 2
Add data option to add the road map of Bristol City.

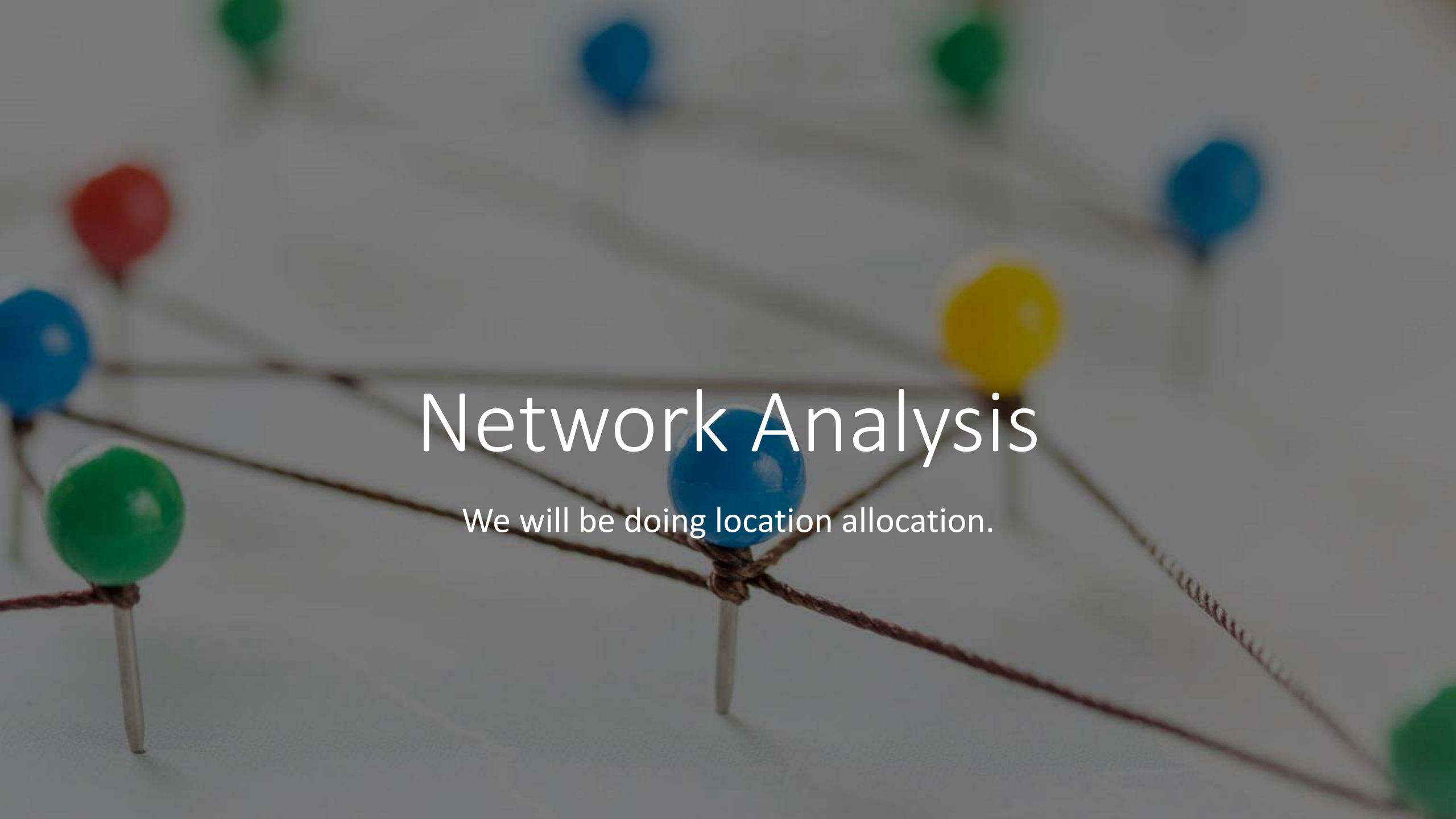


Step 3
Add data option to add the buildings of Bristol City.



Step 4
Add data option to add the population.



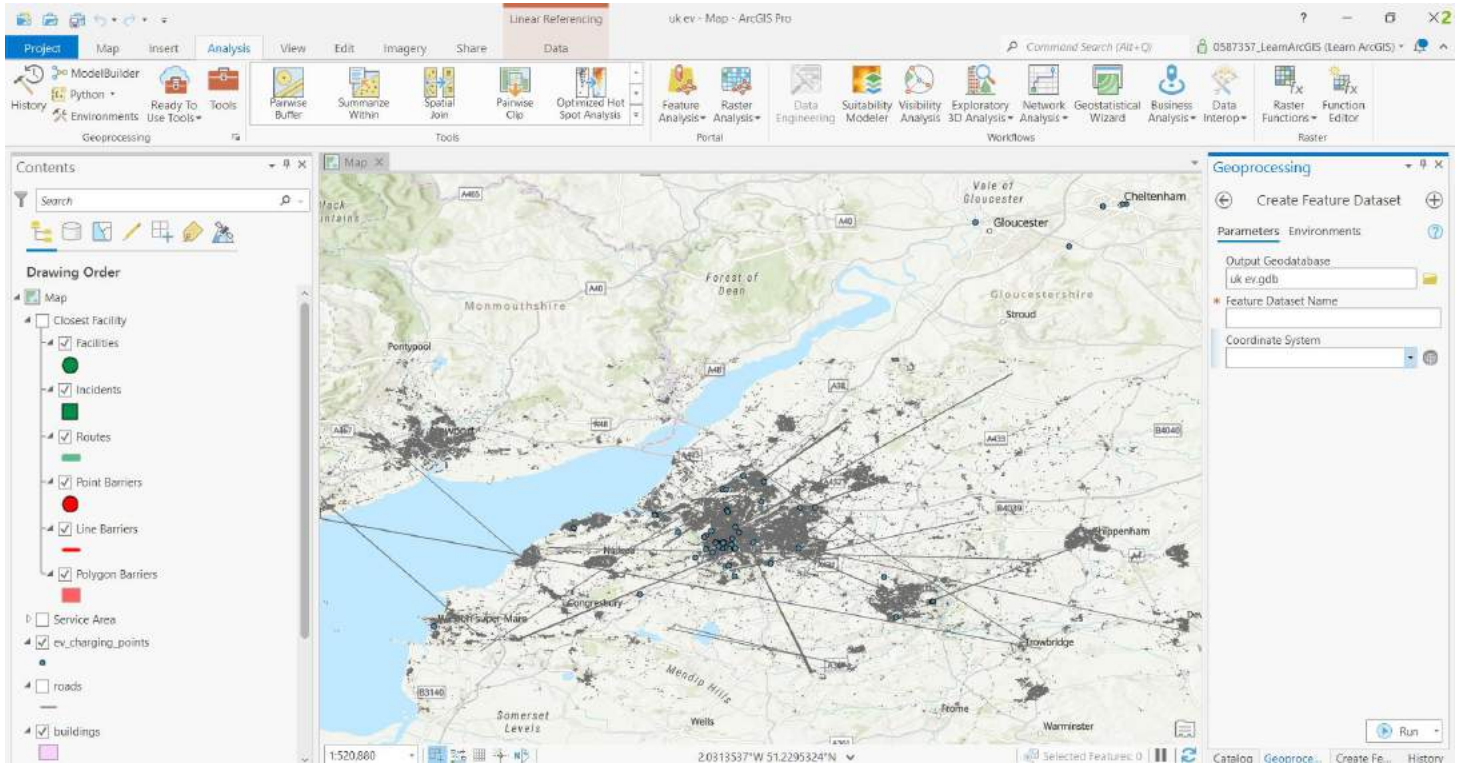


Network Analysis

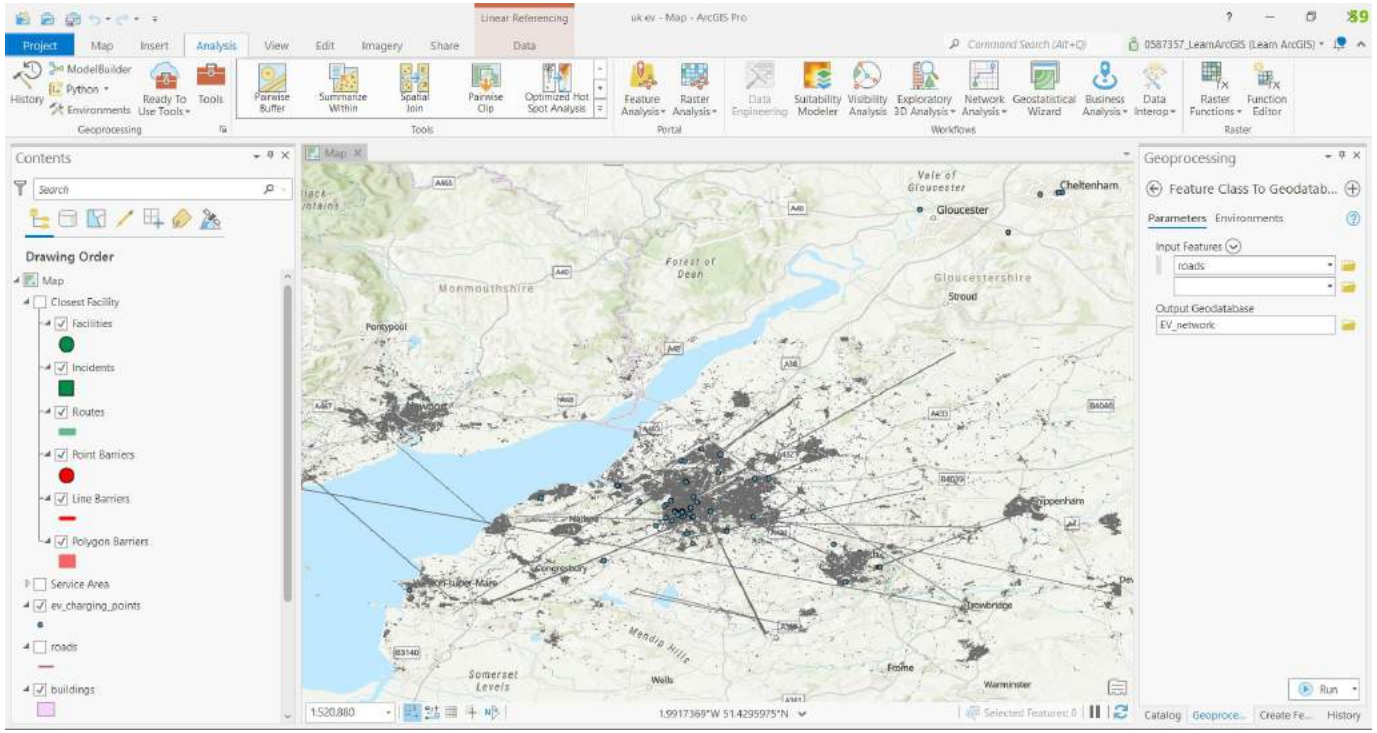
We will be doing location allocation.

First, we must create feature dataset

- We add Feature Dataset name as EV network.
- A feature dataset is a collection of related feature classes that share a common coordinate system.

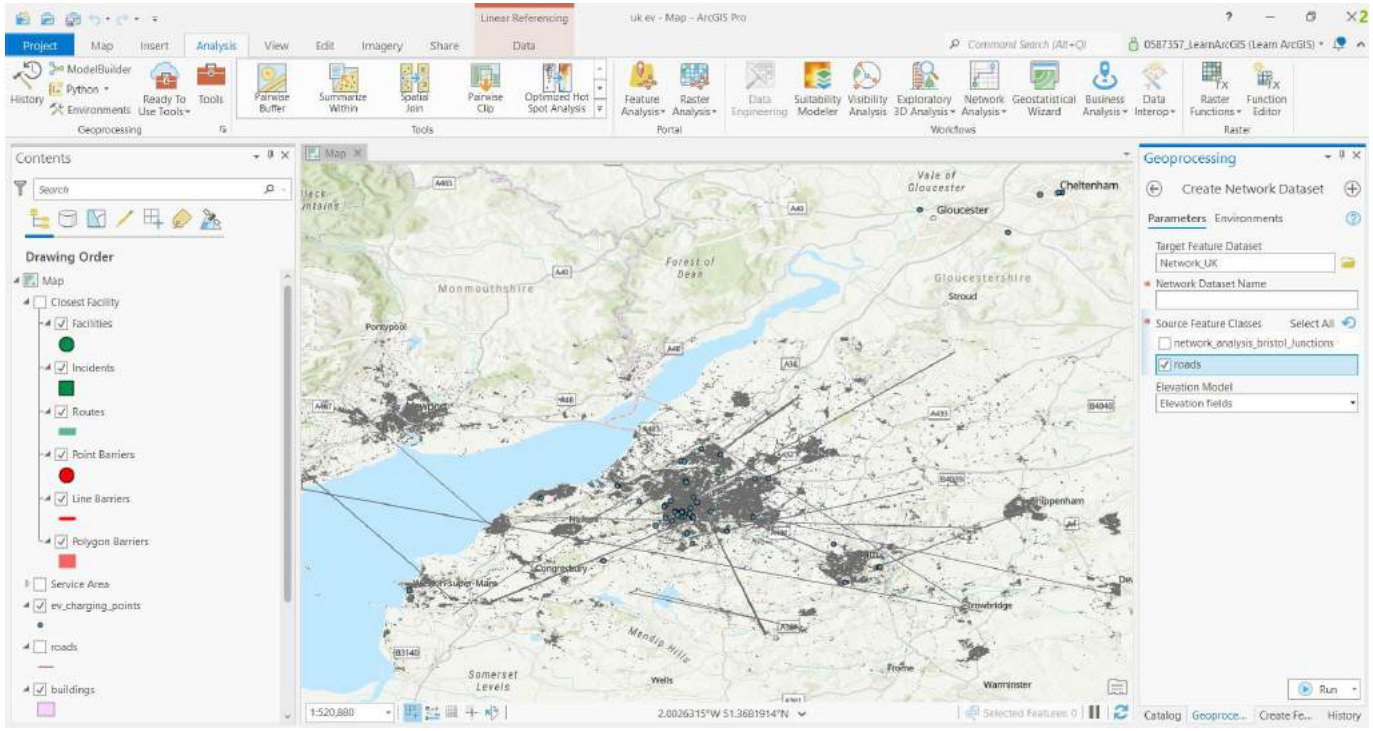


Feature class to Geodatabase



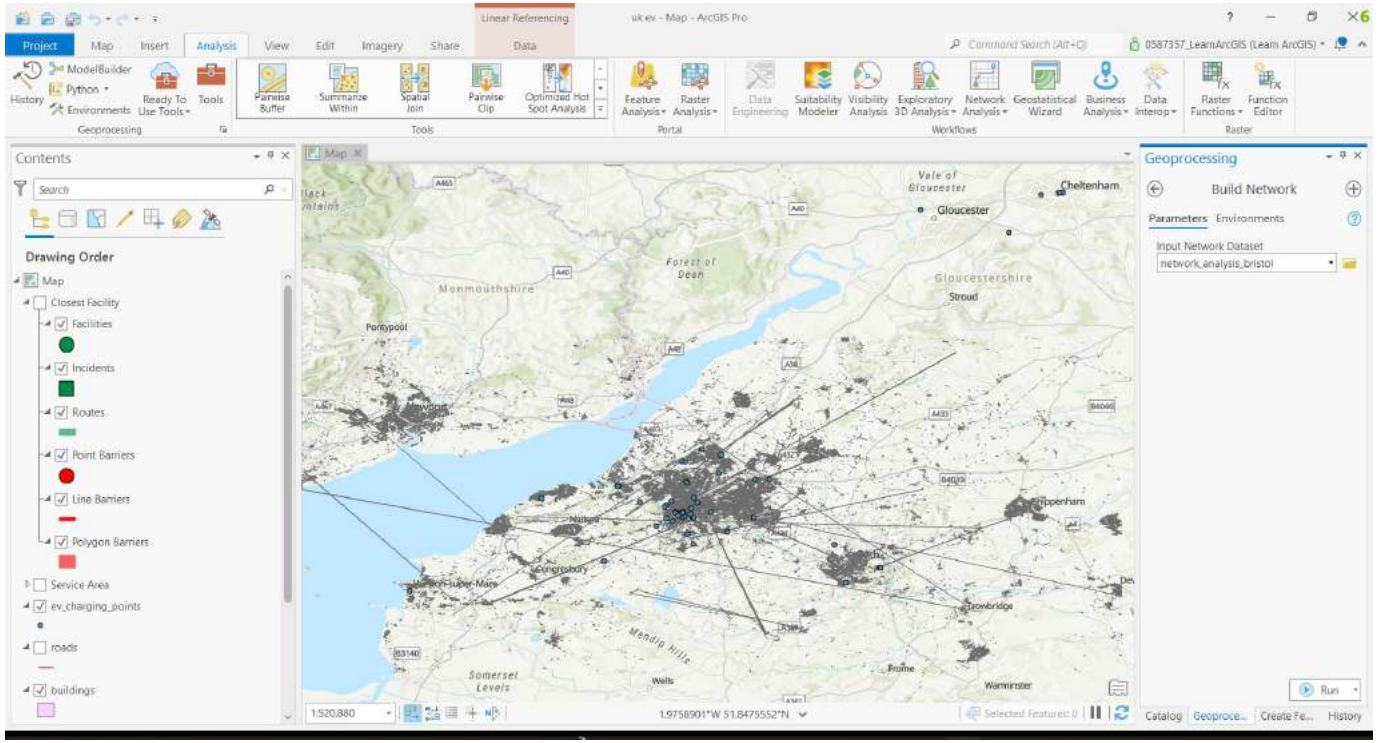
- The Geodatabase is the native data structure for ArcGIS and is the primary data format used for editing and data management.

Create network Dataset

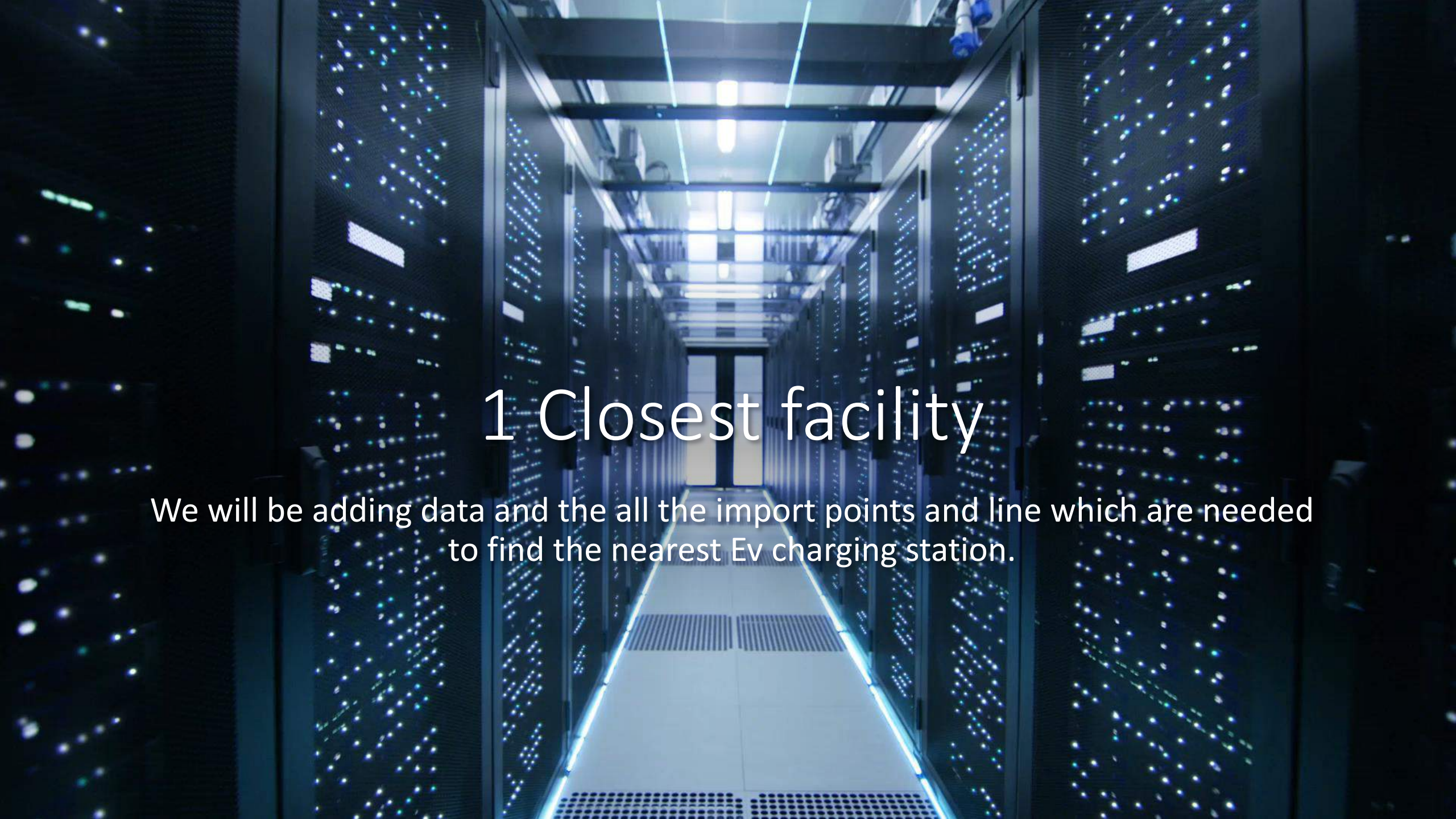


- Network datasets are well suited to model transportation networks. They are created from source features, which can include simple features (lines and points) and turns, and they store the connectivity of the source features

Build network



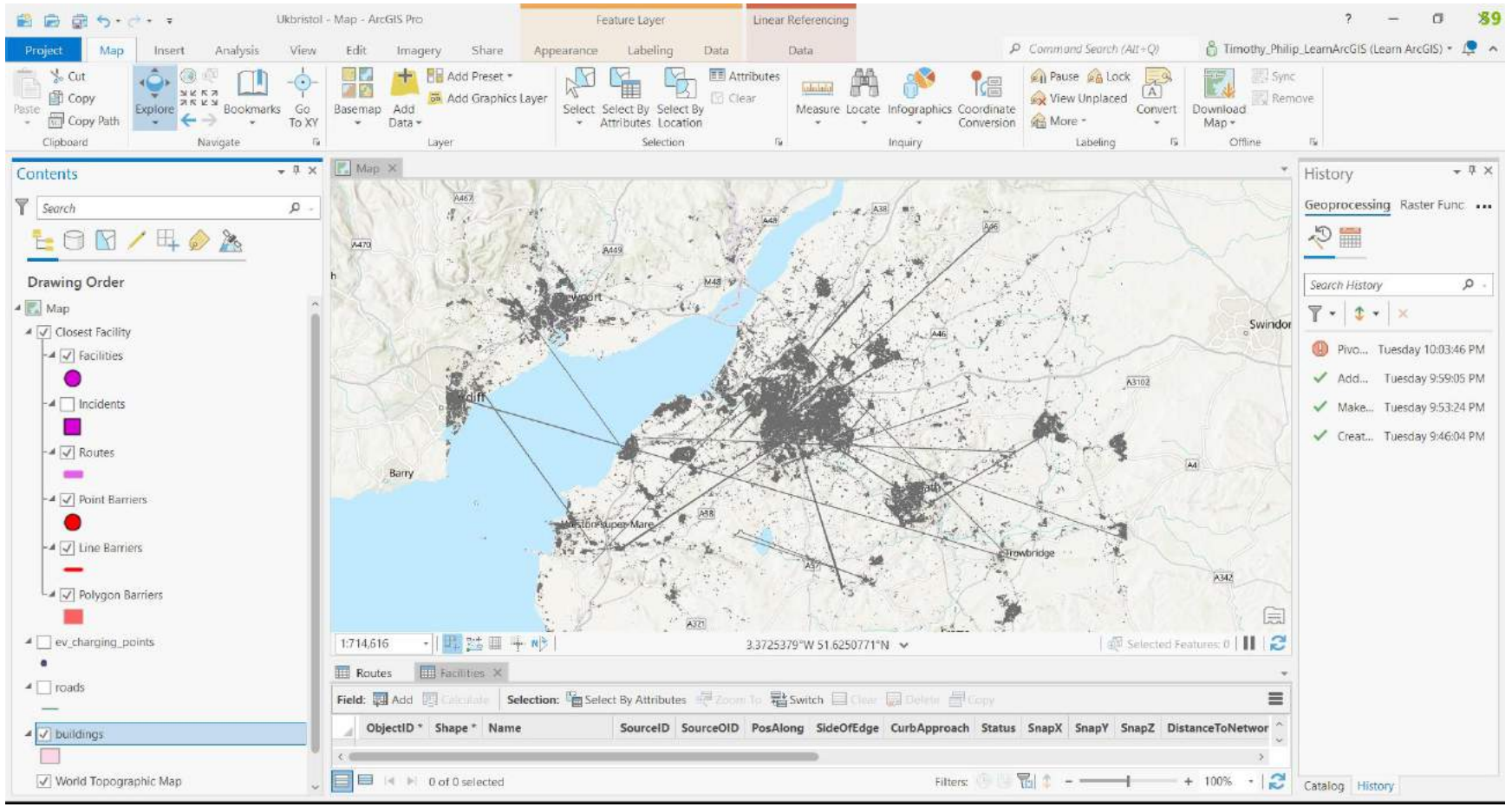
- The first build process on a new network dataset creates network elements, establishes connectivity, and assigns values to the network attributes based on the properties you defined in the New Network Dataset.



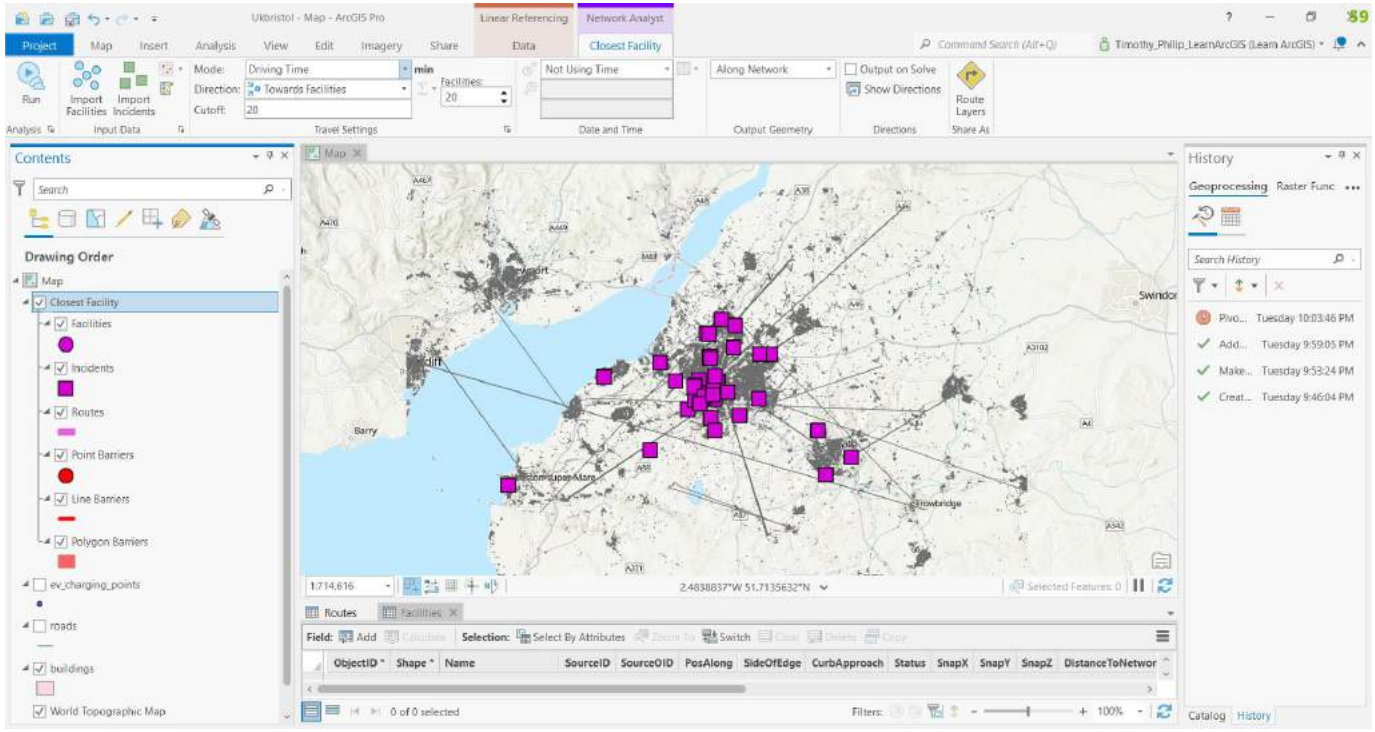
1 Closest facility

We will be adding data and the all the import points and line which are needed to find the nearest Ev charging station.

Add Closet Facility.



By closest Facility option.



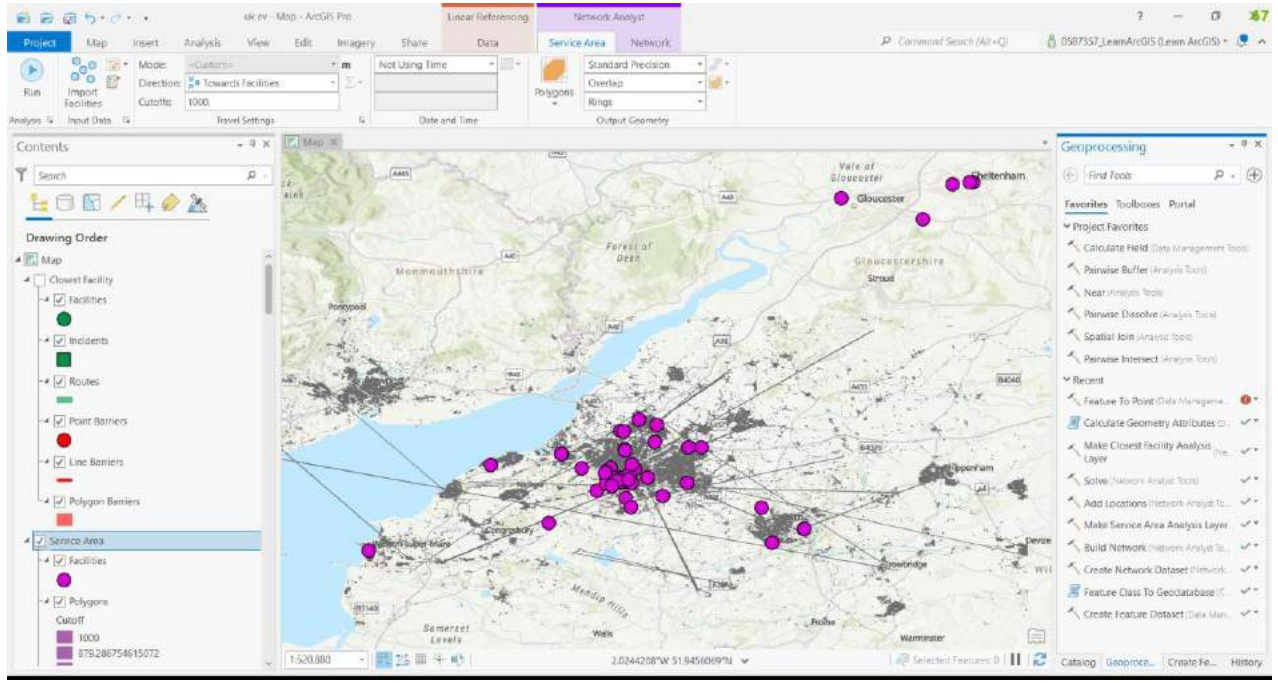
- First, we will import the import incidents electric charging stations. Then buildings and roads.
- Then we will get the closest data set of each station.

2 Service Analysis

We will be adding data and all the import points and line which are needed to find the nearest Ev charging station.

By service analysis option.

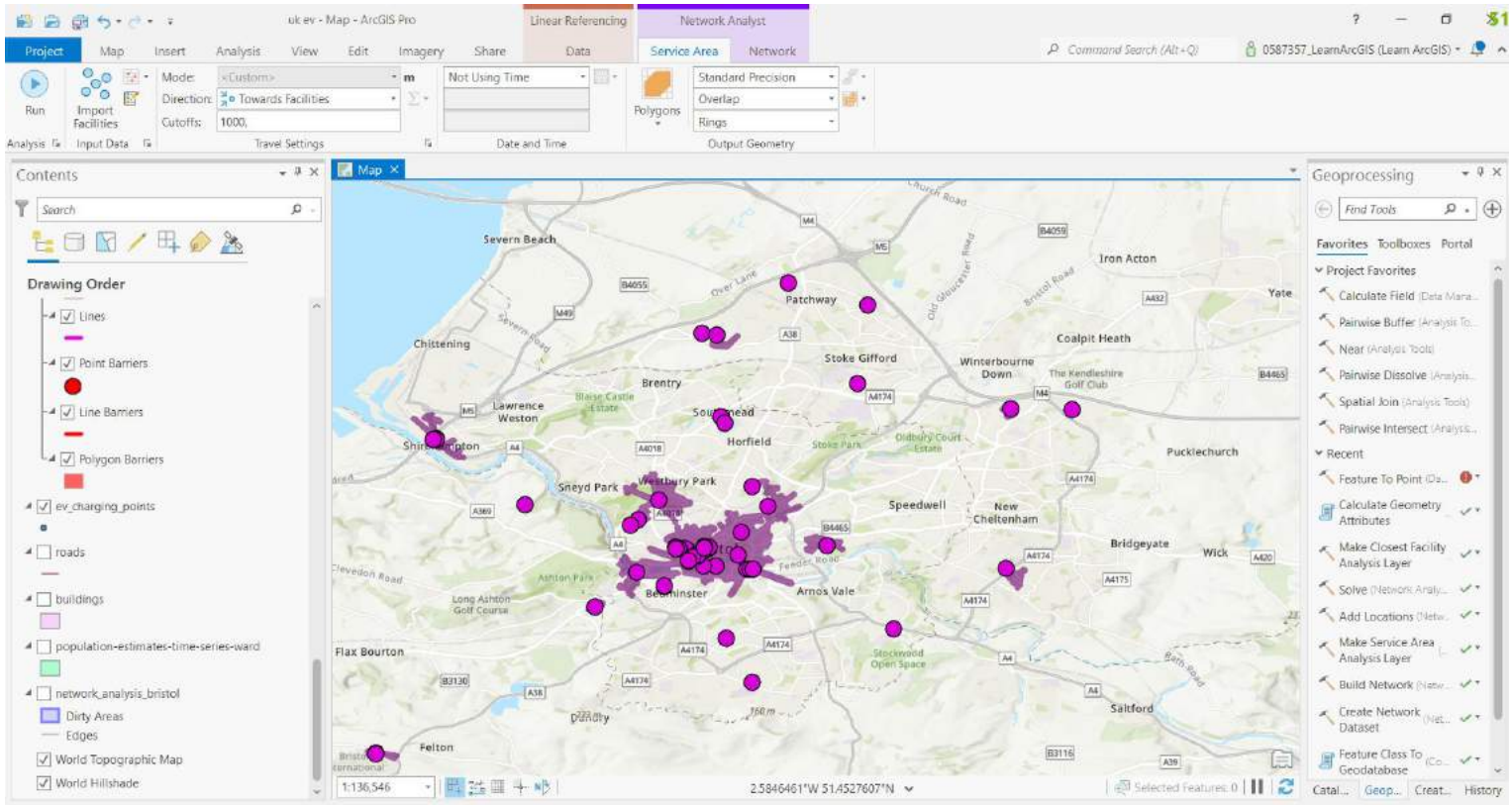
- First, we will import the import incidents electric charging stations. Then buildings and roads.
- Then we will get the service data set. In polygon shape we have



Service Area

- We will use Direction as Towards the facilities and the cutoff as 1000 and not using time then we have run the process. We will be getting the results in polygon nearer to the Ev charging Stations.

Results



- We will be getting the polygon shape of 1000m nearer to the EV charging station.
- Those shape Represent nearer to the station.


THANK YOU