

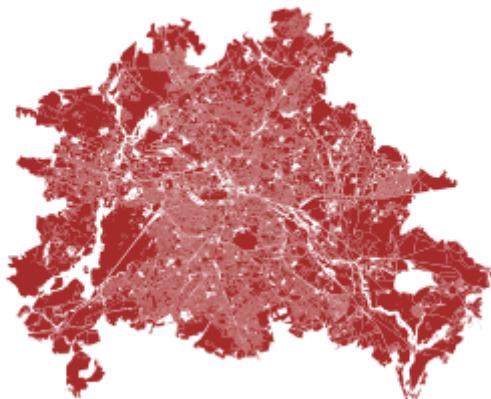
## **BERLIN URBAN ANALYSIS**

- Selecting Berlin allows for analysis that provides insight into a continuously evolving urban development, characterised by a well-considered plan that yields a wealth of diverse information.
- Utilising advanced methods, the objective is to provide clarity amidst complex datasets. systematically examine through each dataset to uncover patterns in settlement distribution and the layout of infrastructure, whether clustered or scattered.
- Additionally, aiming to present diverse conditions by integrating quantitative metrics.This involves employing geoprocessing tools and applications to filter and analyse data, enabling precise insights.
- This endeavour extends to comprehending the city's plan by aligning it with population and resource distribution. This integrated approach fosters a thorough grasp of urban dynamics, facilitating strategic planning for sustainable development.

DATASOURCE: GEOFABRIK

LIBRARIES USED: Geopandas,Matplotlib,Pandas,shaply,seaborn

Berlin Landcover



The Berlin\_landcover GeoDataFrame encompasses in total of 44091 in which various land cover types, with grass being the most prevalent at 16166 occurrences, followed by residential areas at 9870 occurrences, scrublands at 5934 occurrences, forests at 2956 occurrences, and parks at 2692 occurrences, among others, including commercial areas (1793 occurrences), allotments (1333 occurrences), retail spaces (1116 occurrences), meadows (732 occurrences), industrial areas (681 occurrences), cemeteries (239 occurrences), farmlands (217 occurrences), recreation grounds (130 occurrences), farmyards (65 occurrences), nature reserves (55 occurrences), orchards (38 occurrences), military zones (33 occurrences), heaths (32 occurrences), vineyards (8 occurrences)

Berlin Buildings



The Berlin Building GeoDataFrame encompasses in total of 527337 in which various building types, apartments being the most prevalent type of building at 79574 occurrences, followed by houses at 31990 occurrences, detached houses at 25523 occurrences, sheds at 20705 occurrences, and garages at 19502 occurrences.

Berlin waterbodies



The Berlin waterbodies GeoDataFrame encompasses a total of 2113 features, including various water features, with water bodies being the most prevalent at 1453 occurrences, followed by wetlands at 466 occurrences, riverbanks at 151 occurrences, and reservoirs at 43 occurrences.

Berlin Road



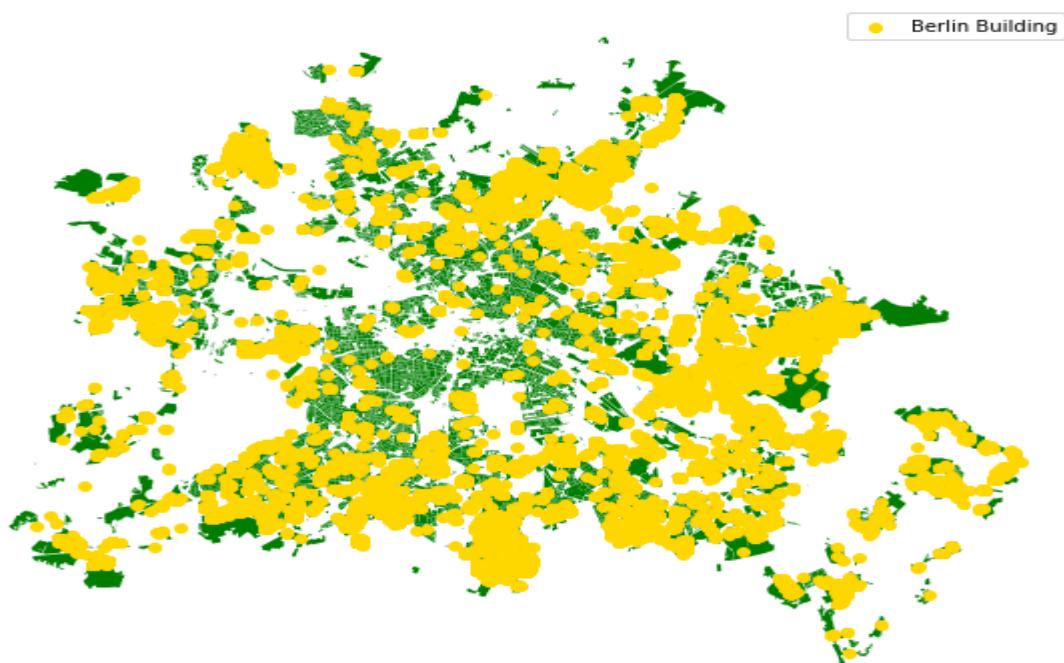
The Berlin Road GeoDataFrame encompasses a total of 349926 features with footway being the most prevalent at 165794 occurrences, followed by service roads at 91493 occurrences, residential areas at 29205 occurrences, paths at 11558 occurrences, and secondary roads at 11009 occurrences. Other notable categories include steps at 9834 occurrences, cycleways at 8871 occurrences, tertiary roads at 6618 occurrences, and primary roads at 4137 occurrences. Less common categories include living streets at 2325 occurrences, grade 4 tracks at 1480 occurrences, grade 3 tracks at 1315 occurrences, unclassified roads at 994 occurrences, and grade 2

tracks at 971 occurrences. There's also data for motorways at 691 occurrences, tracks at 674 occurrences, pedestrian areas at 642 occurrences, motorway links at 634 occurrences, grade 1 tracks at 512 occurrences, grade 5 tracks at 481 occurrences, secondary road links at 239 occurrences, bridleways at 186 occurrences, primary road links at 134 occurrences, trunk roads at 61 occurrences, tertiary road links at 54 occurrences, trunk road links at 13 occurrences, and one occurrence of an unknown category.

#### Areas with maxspeed greater than 50



In total 1493 maxspeed more than 50 has been recorded. Motorway=664, motorway link=420, primary=279, secondary=86, tertiary=16, trunk=9, serves6, unclassified=5, primary link =3, secondary link=3, residential=2

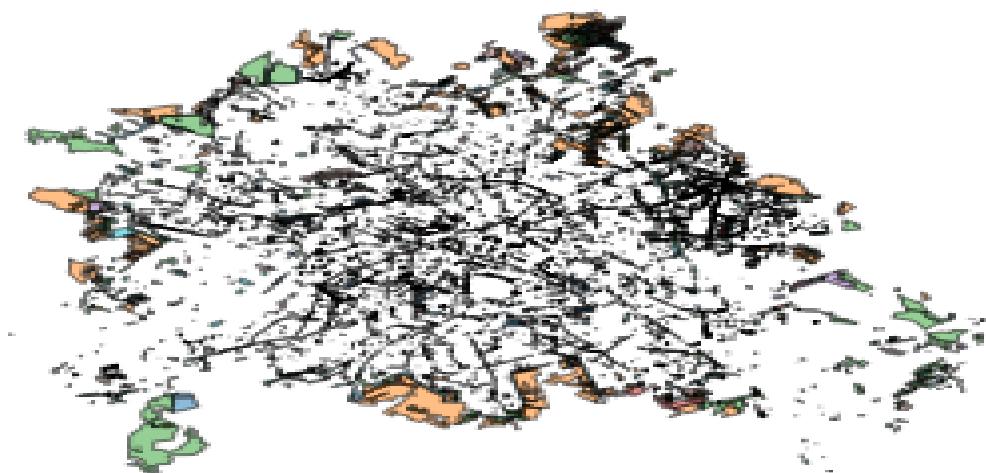


Most of the houses are coinciding with residence.recorded:31990,[Independent houses] with land cover residence being 9870.



Filtering out with conditions.Allotments[land cover],apartment[Building] and 30[maxspeed road].Apartments is 79574,allotments is 1333 and maxspeed is 33636

#### Land areas where buildings do not reside

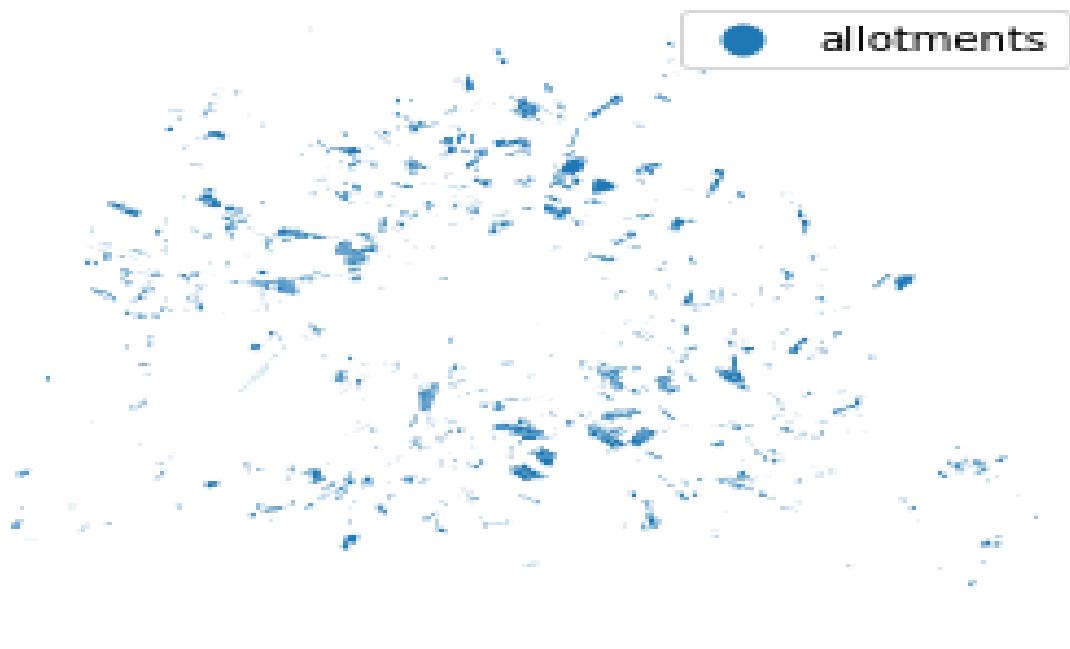


Geoprocessing tools were employed, utilising the overlay operation with 'difference' as the method. Notably, the 'grass' land cover type was the most prevalent, with a count of 7715 occurrences, followed by 'scrub' with 2147 occurrences, 'forest' with 1390 occurrences, 'park' with 965 occurrences, 'meadow' with 451 occurrences, 'allotments' with 318 occurrences, 'residential' areas with 253 occurrences, and 'farmland' with 185 occurrences.

### Berlin Building Houses



Observed record of Independent houses are 31990 in Berlin



1333 allotments is been recorded out of 44091 land covers

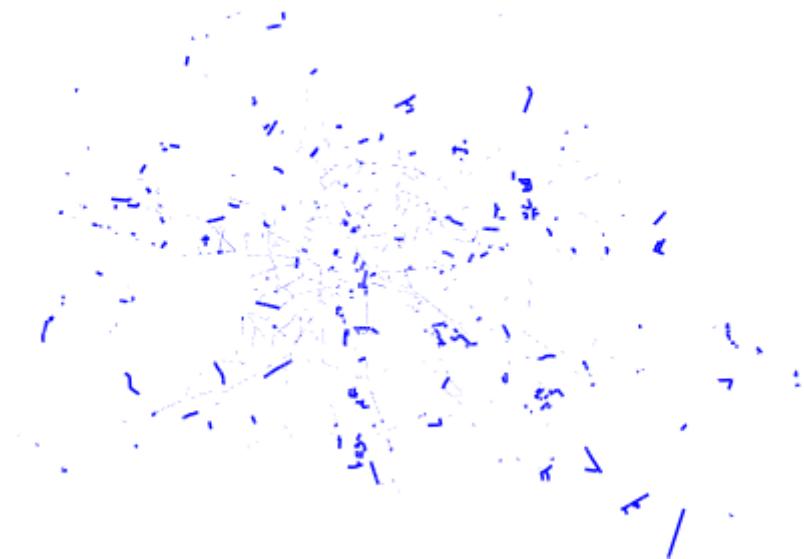
### Riverbanks



In total 151 riverbanks is been recorded which is been used for drinking water supply

### Filtered Data

— Roads with maxspeed[30] in residential areas



In total 1601 maxspeed being 30 is been recorded in residential areas

Buildings Touching Roads



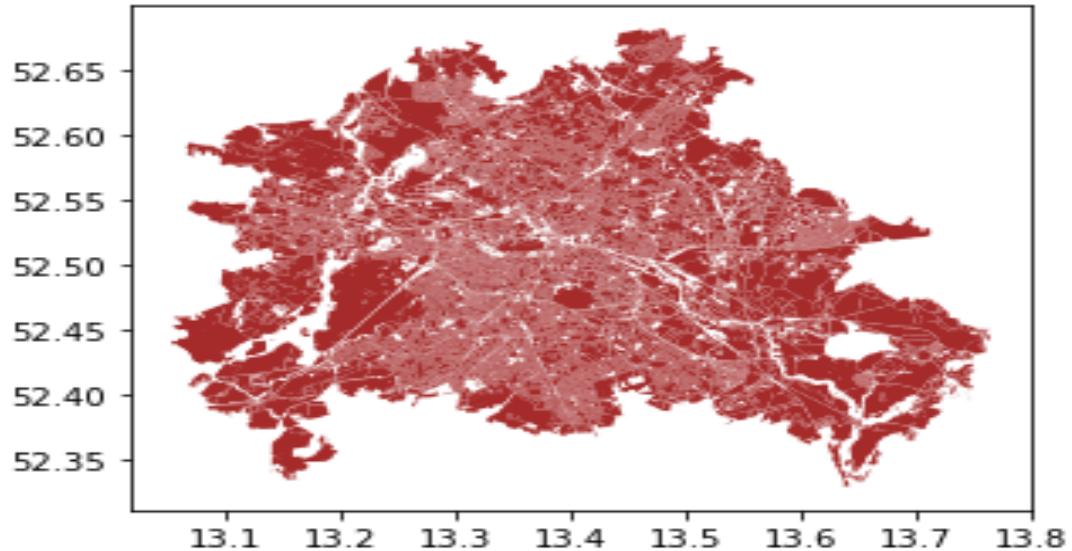
Used spatial join in which 'contain'[geometric predicate] is used where 50180 intersection is seen mostly apartments=22444,residential buildings=3123,trainstation=2312[RED=intersect]



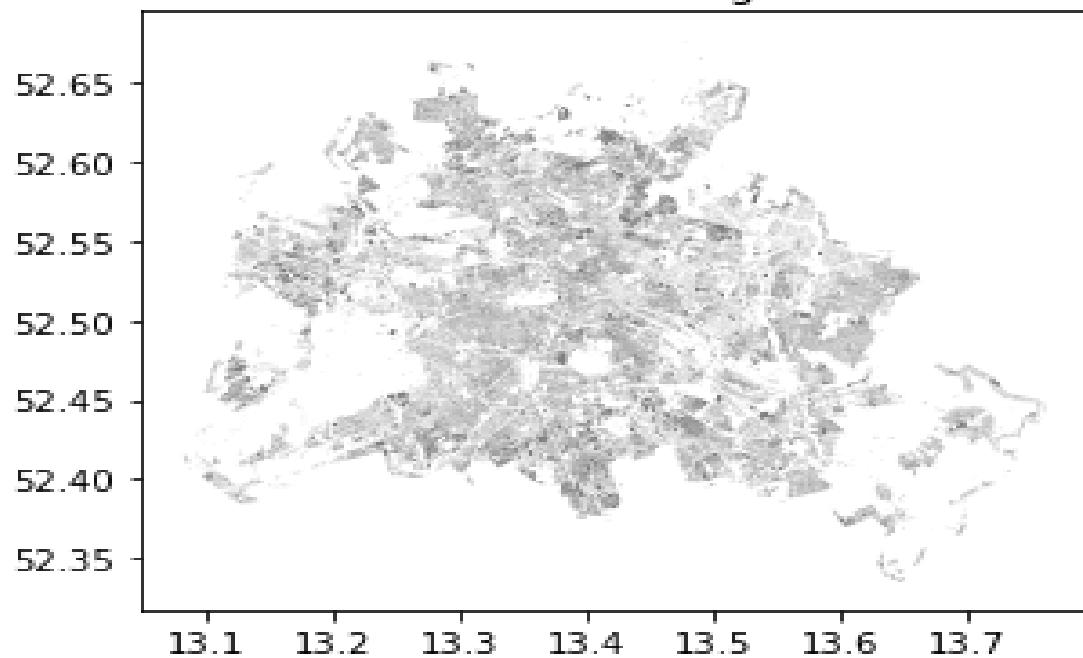
Found 88674 union. these operation identifies and combines the spatially overlapping areas between two geo dataframes, resulting in a new geodataframe containing the combined geometries.union[geoprocessing tool] for developing a spatial awareness which involves interacting with two geo datasets in this case allotments[Land Cover] and apartments[Buildings].a process that can be useful for various urban planning analyses, such as assessing. the impact of apartment buildings on allotment areas or identifying areas suitable for mixed-use development. [RED=union] [BROWN=Building apartments] [GREEN=allotment land cover].

Maps(plots) with axis[Latitude and Longitude]

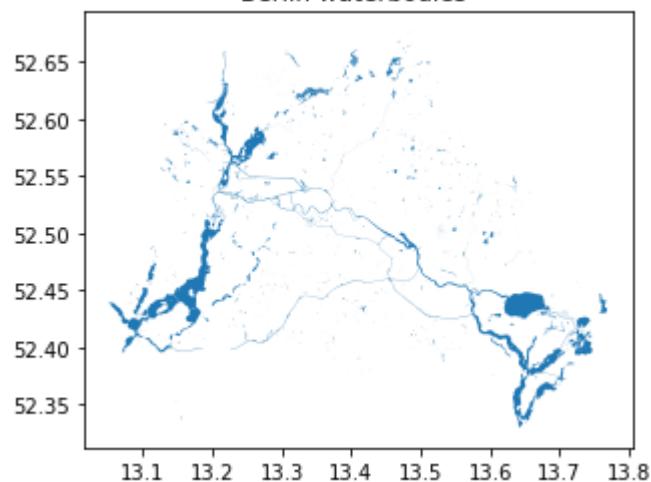
Berlin Landcover



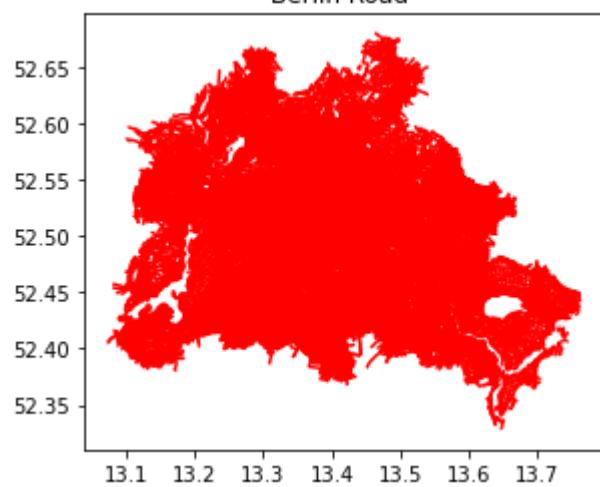
Berlin Buildings



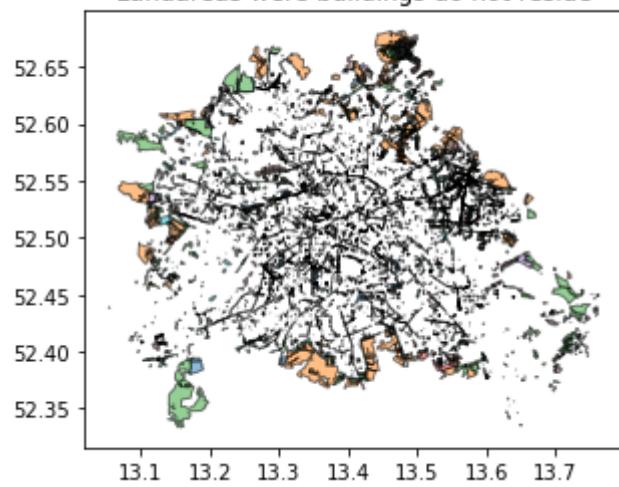
Berlin waterbodies



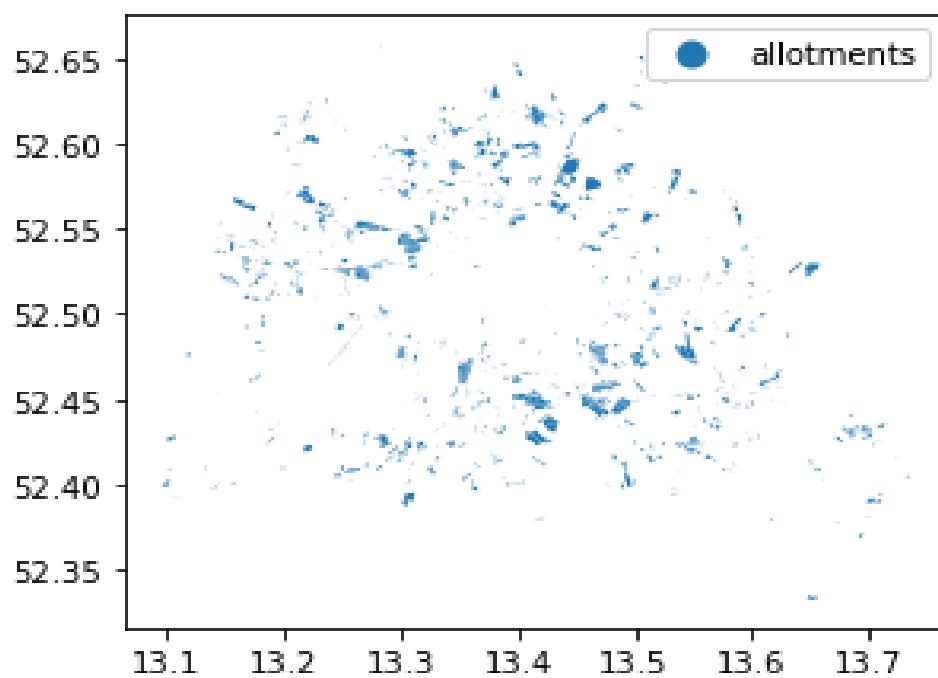
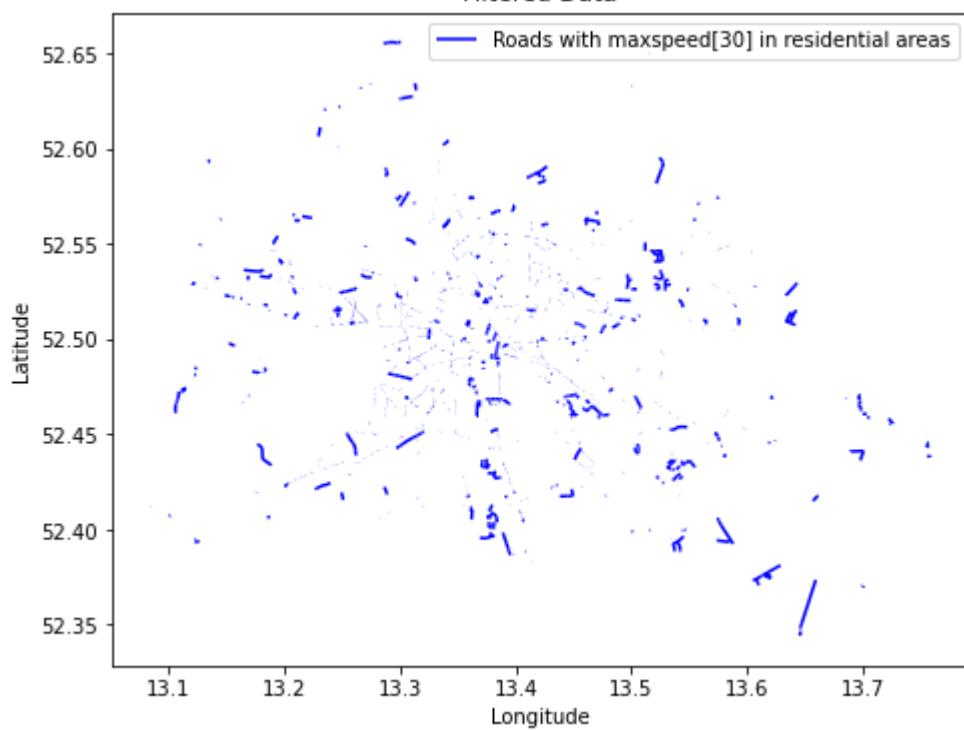
Berlin Road



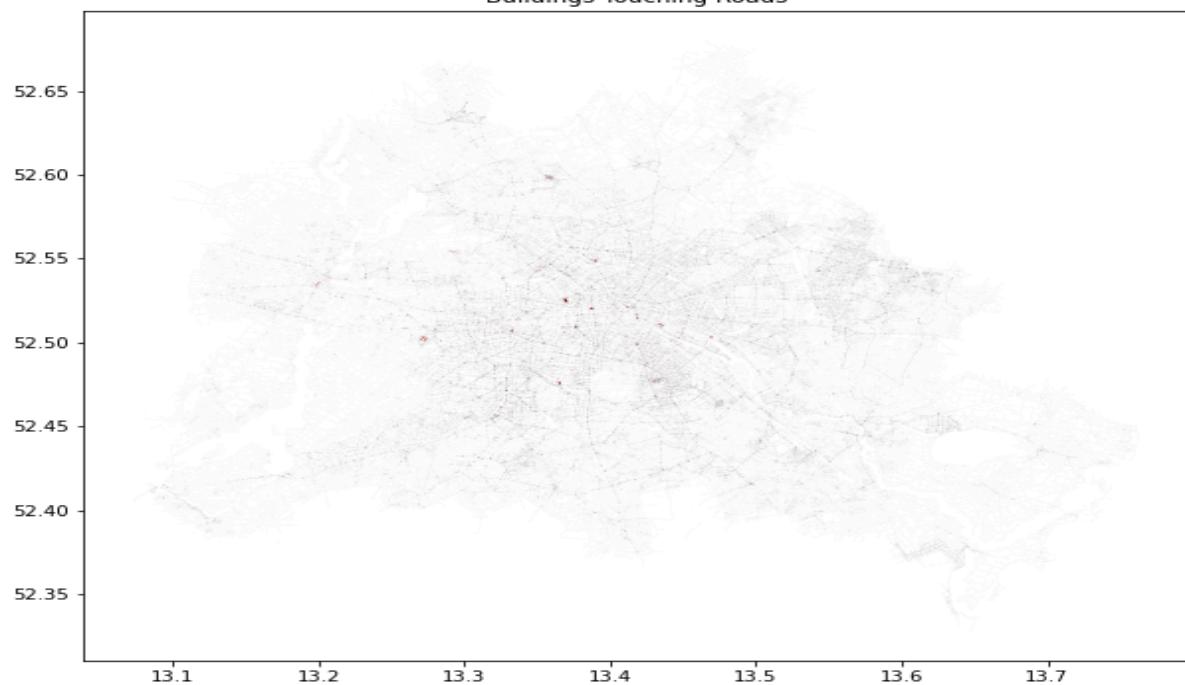
Landareas were buildings do not reside



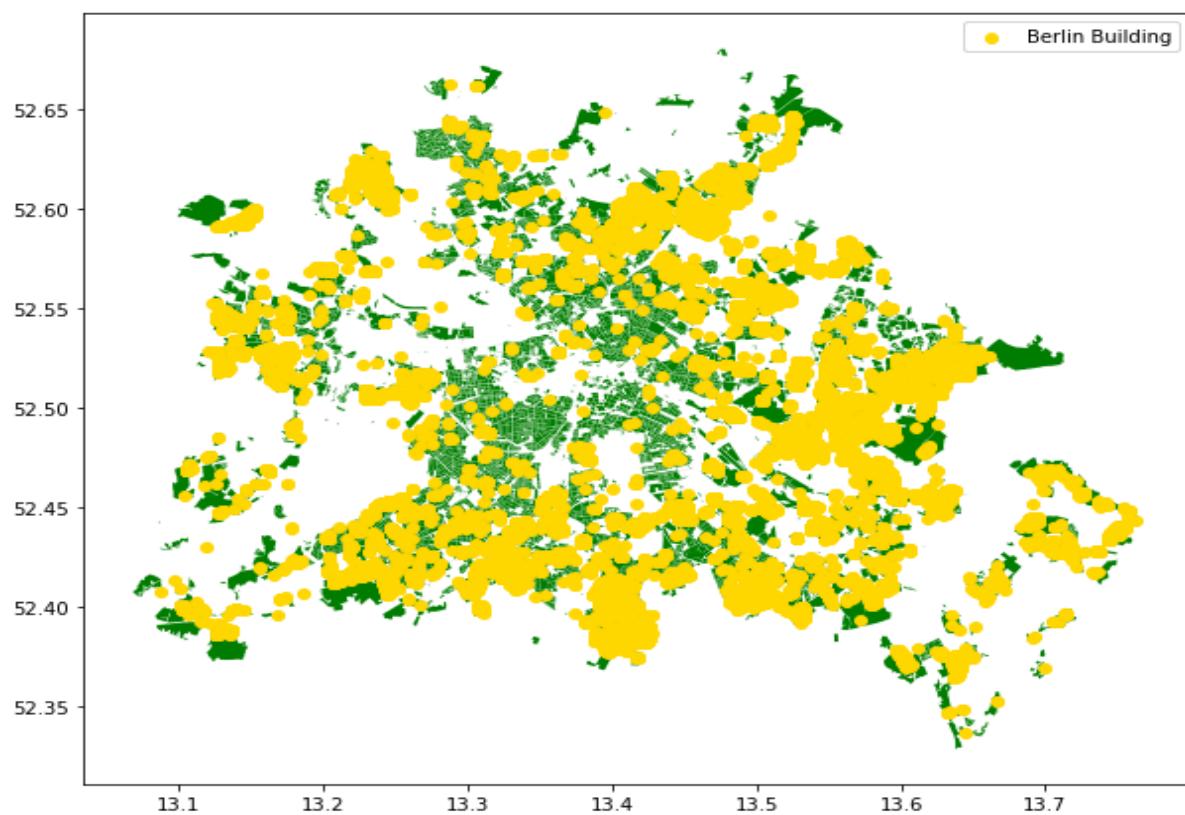
Filtered Data



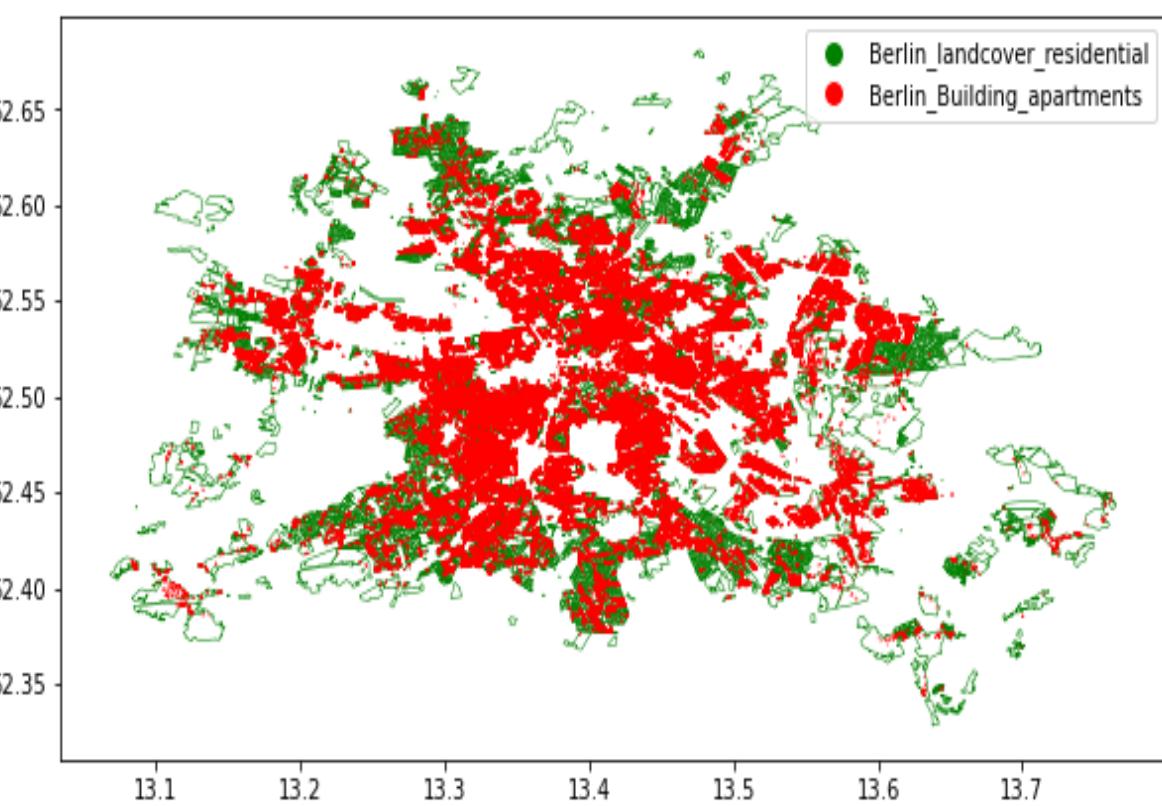
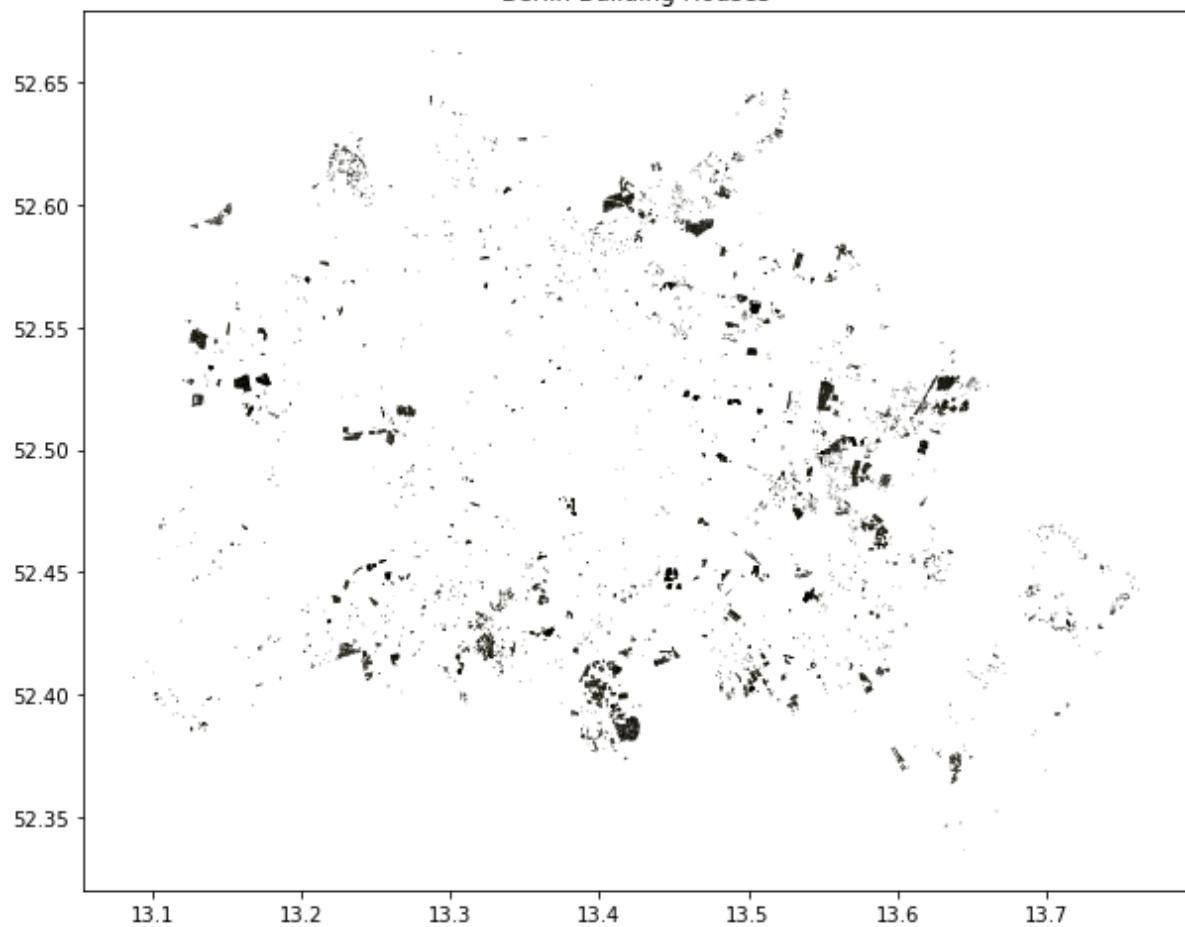
Buildings Touching Roads



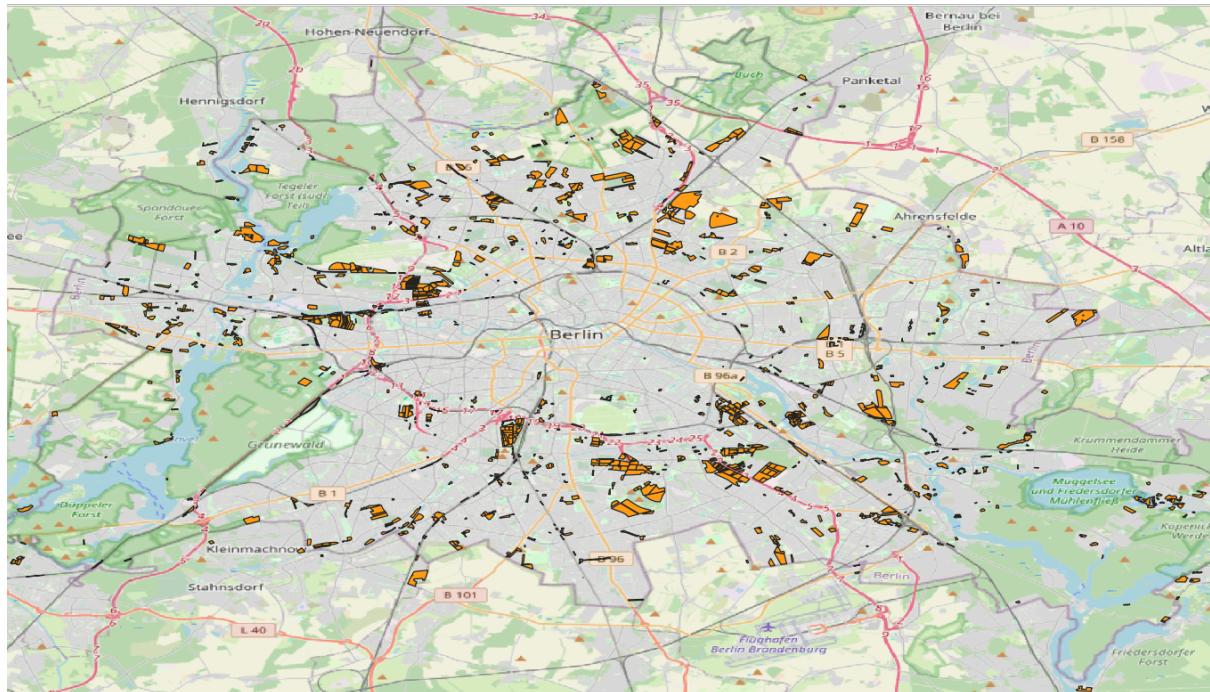
Berlin Building



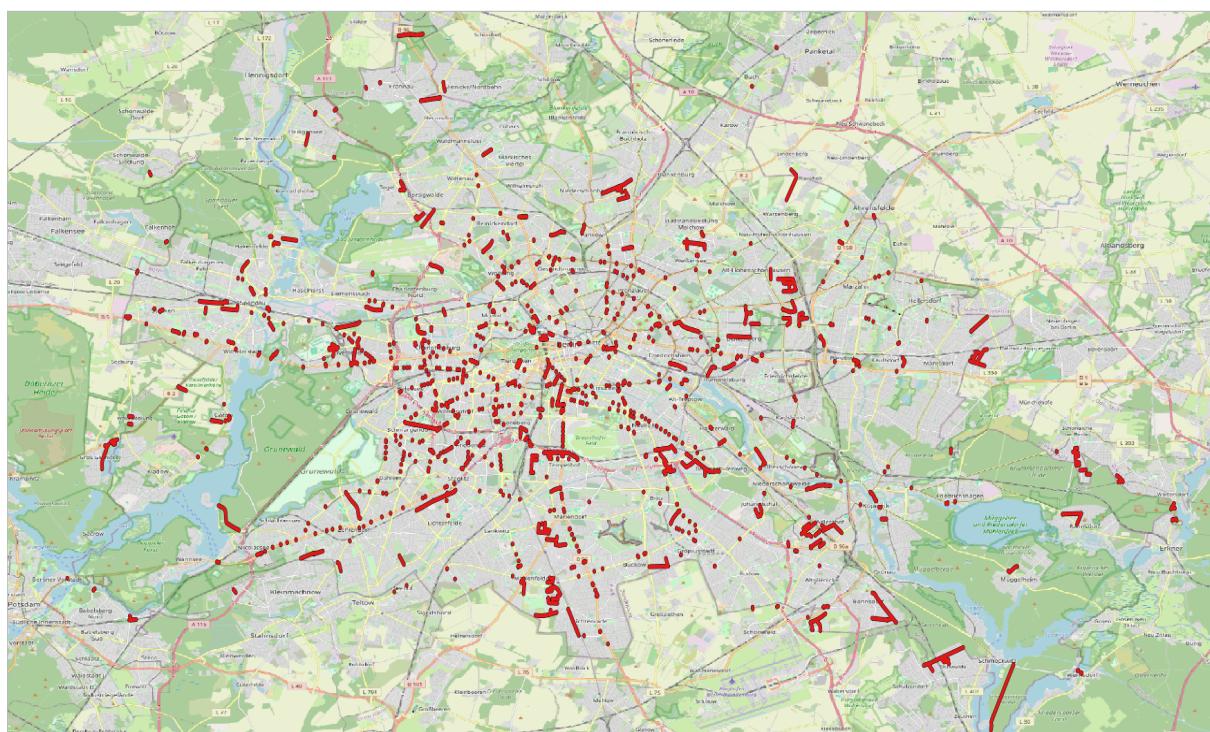
Berlin Building Houses



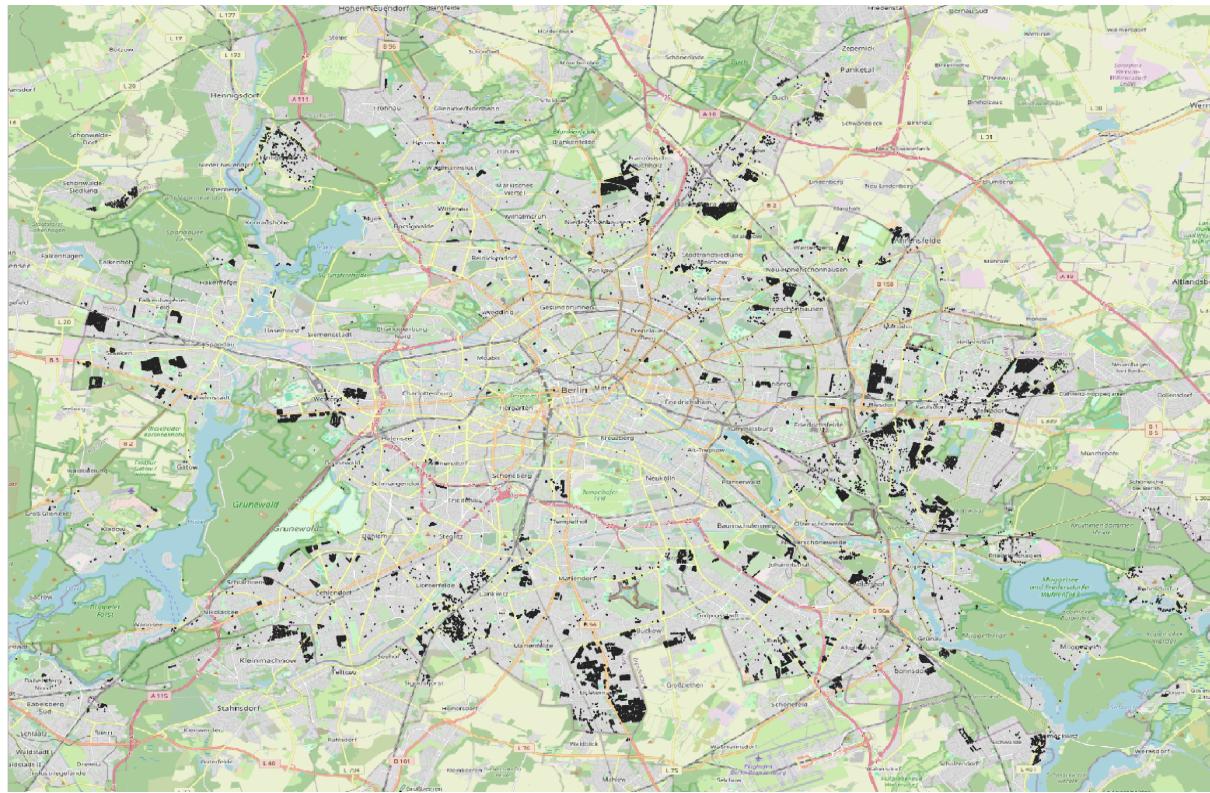
## OPENSTREETMAP AS REFERENCE



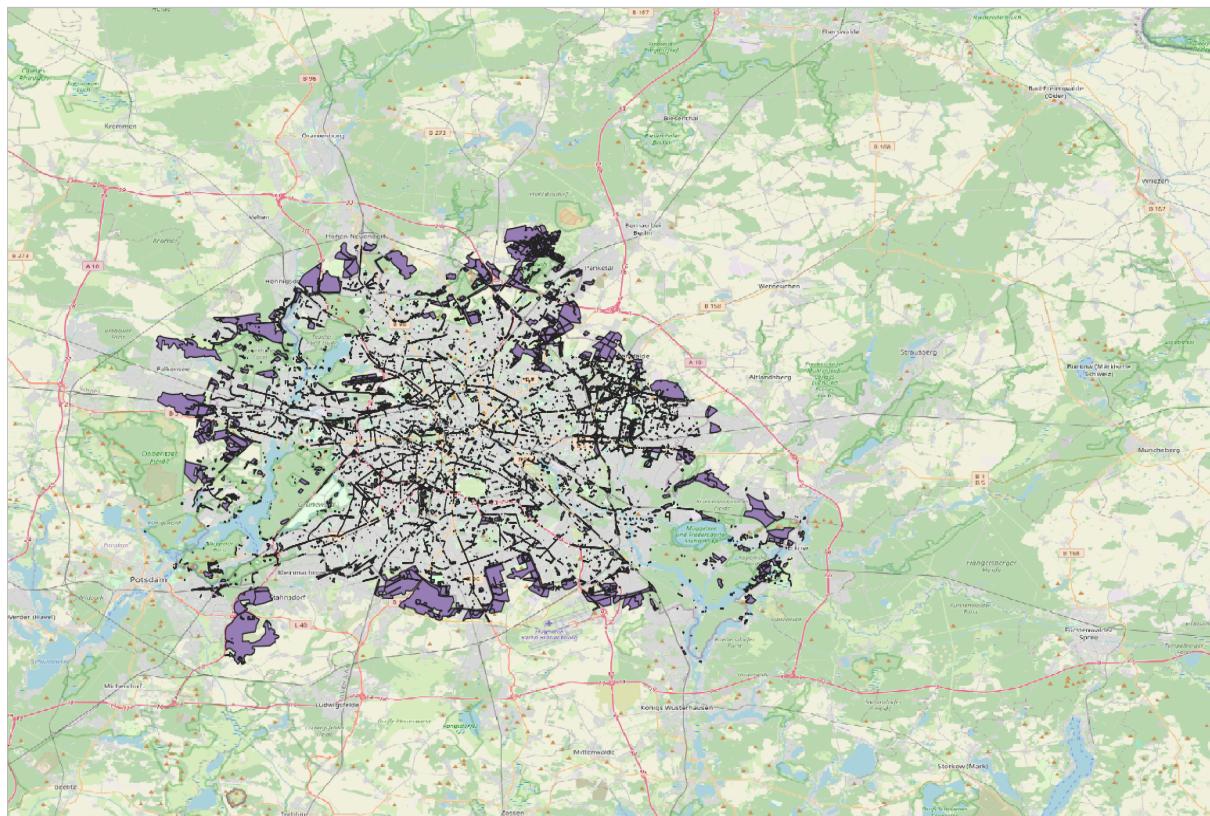
Allotments[land cover]



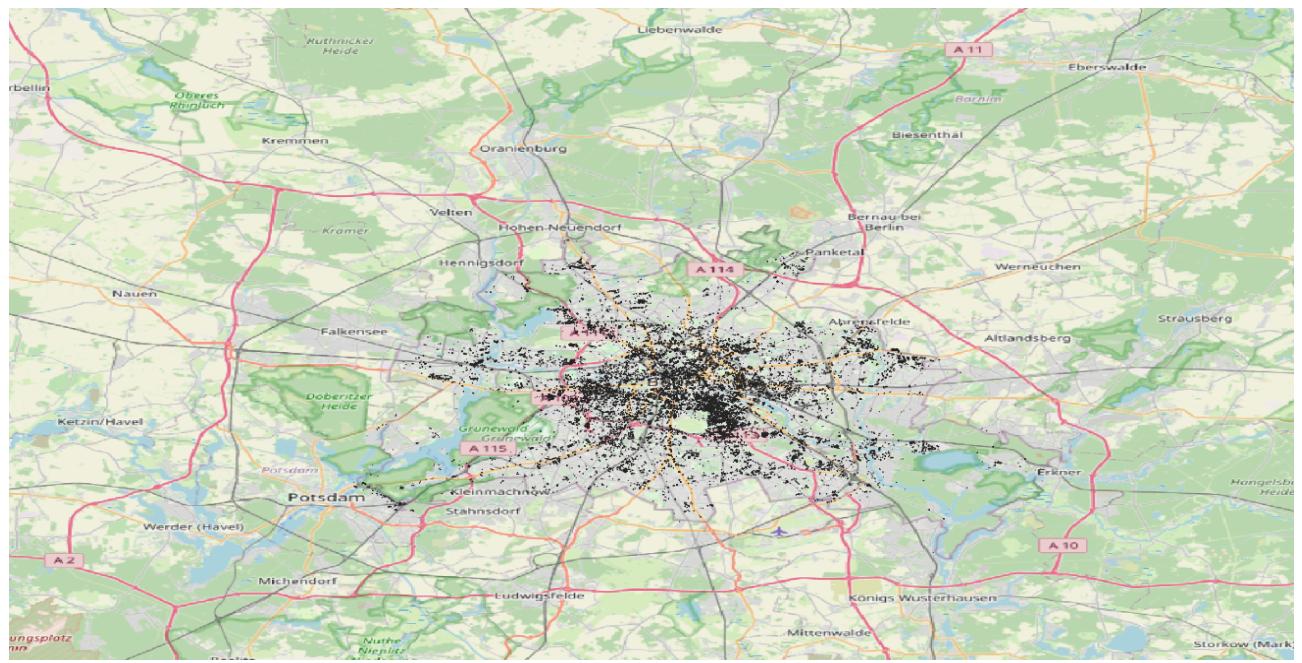
Residential areas with 30 as the maxspeed



Berlin houses



Land Covers were buildings does not exist



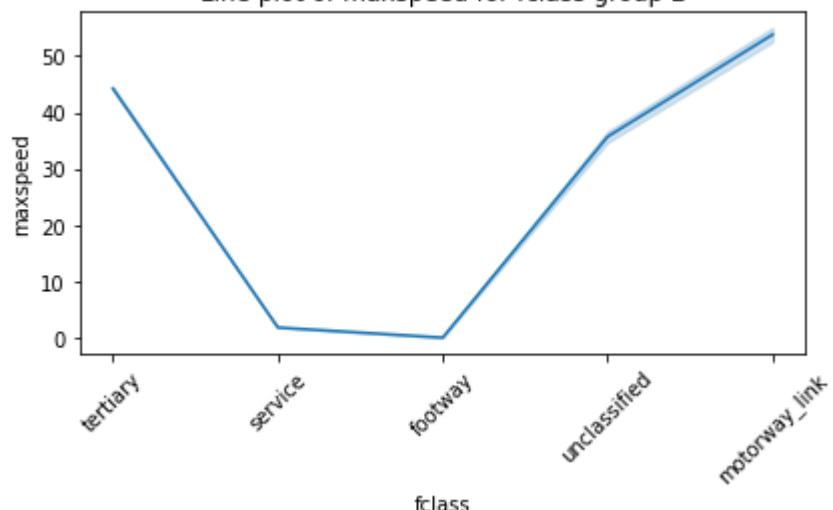
Road Intersecting buildings



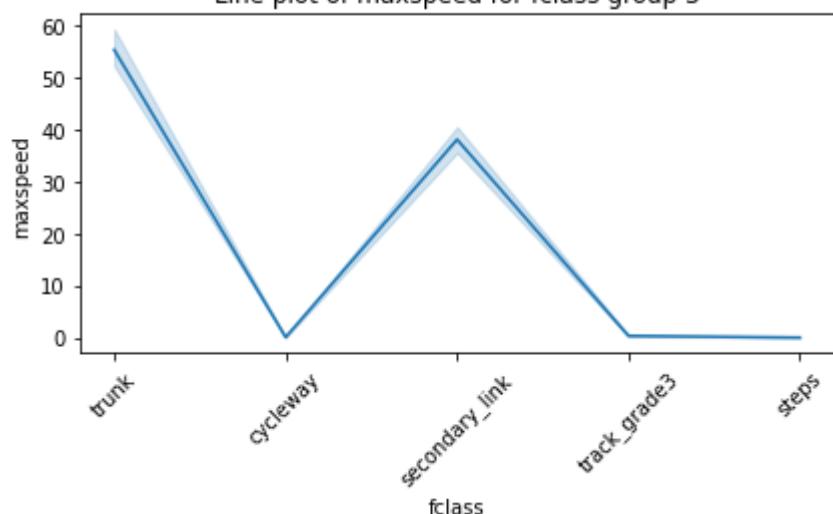
Zoomed

## ROAD SPEED WITH RELATION TO ROAD TYPE

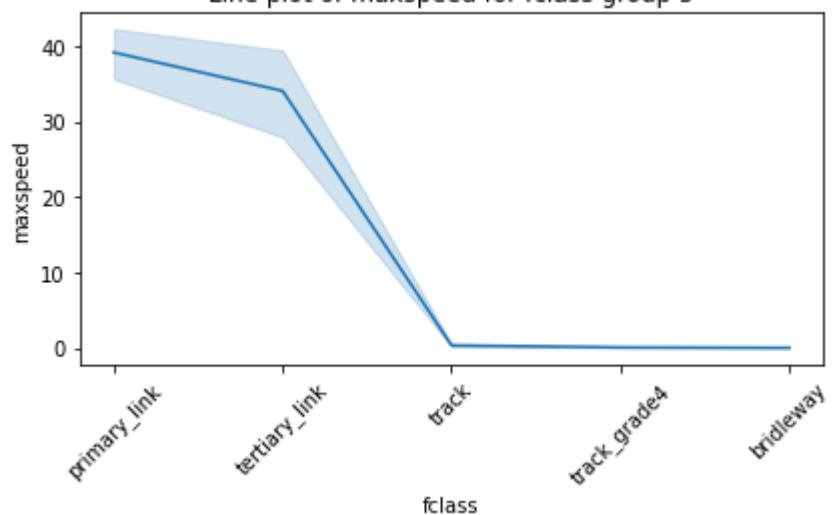
Line plot of maxspeed for fclass group 2



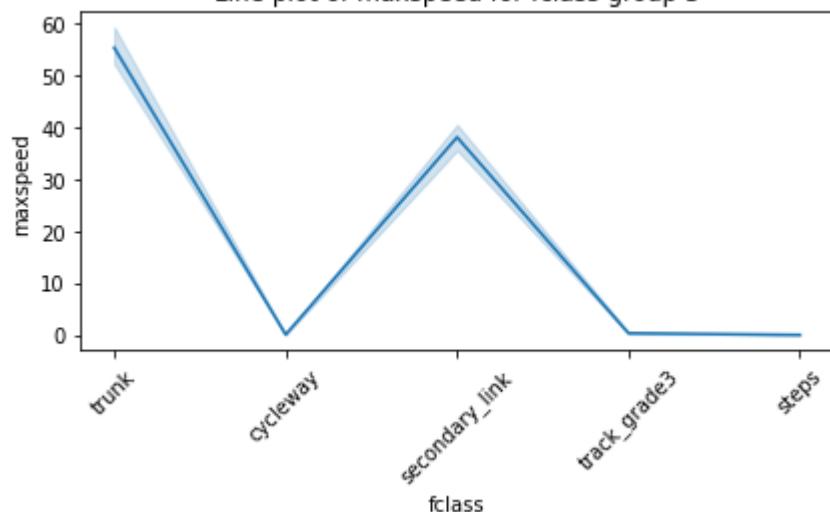
Line plot of maxspeed for fclass group 3



Line plot of maxspeed for fclass group 5



Line plot of maxspeed for fclass group 3



Line plot of maxspeed for fclass group 6



Line plot of maxspeed for fclass group 4

