

# OpenStreetMap

Community Meets Cartography

Andy Robinson

# Why?

- Existing Data not Free & Open
  - Artificially Stifles Innovation
- Data as a Static Snapshot
  - Near Real-Time data use not possible
- Real-Time data
  - Interactive data editing by users the next step



# Quote 1

“If you don’t make [lower-resolution mapping data] publicly available, there will be people with their cars and GPS devices, driving around with their laptops .. They will be cataloguing every lane, and enjoying it, driving 4x4s behind your farm at the dead of night. There will, if necessary, be a grass-roots remapping.”

Tim Berners-Lee



## Quote 2

“You could have a community capability where you took the GPS data of people driving around and started to see, oh, there's a new road that we don't have, a new route .. And so that data eventually should just come from the community with the right software infrastructure.”

Bill Gates



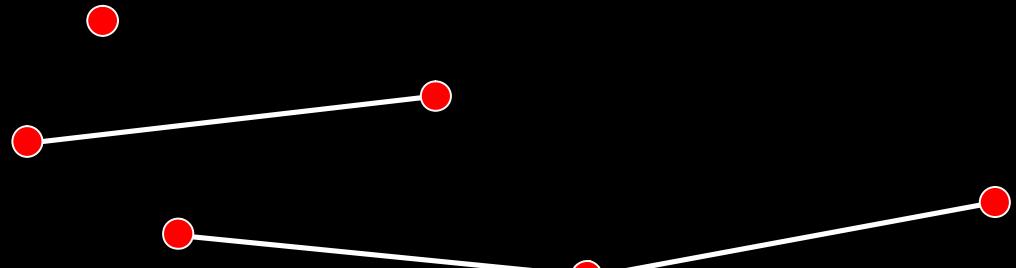
# How?

- **Provide an Open Platform**
  - OSM Users may freely input and extract data
- **Raw sources for OSM Basemap**
  - GPS track logs. Movement Breadcrumbs
  - Existing Free Data Sources (eg TIGER/LINE)
  - Historical Maps – Out of Copyright mapping
- **Users Create Basemap from Raw Sources**
  - Via Online and Offline Editing Software

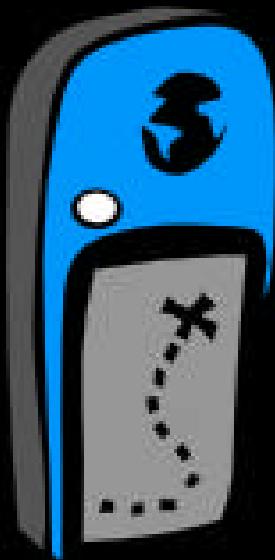


# Building Blocks

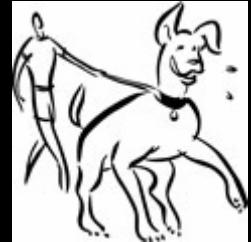
- **Minimal Data Set for Maximum Flexibility**
  - Nodes
  - Segments
  - Ways/Areas
  - Tags – Metadata as key/value pairs
- **Full User History and Rollback ability**



# Fancy a Go?



+





# Your GPS Traces

[see traces from all users](#)

## Editing the trace AJR\_G\_260806.gpx



Help & Wiki  
News blog  
Shop

### User

display name:  
blackadder

[Make a Donation](#)



filename: AJR\_G\_260806.gpx

uploaded: 2006-08-26 20:58:00

description: B75 area

tags: midlands AJR



# Your GPS Traces

[see traces from all users](#)

upload GPX file:  [Browse...](#)

description:

tags:

public?

[Upload](#) | [help](#)

[Help & Wiki](#)  
[News blog](#)  
[Shop](#)

## tags

midlands  
AJR  
Bath  
Midlands  
A46  
M5  
Avon

## User

display name:  
blackadder [save](#)

[Make a Donation](#)



Showing page 0 (1 - 20 of 201) | [next page](#)

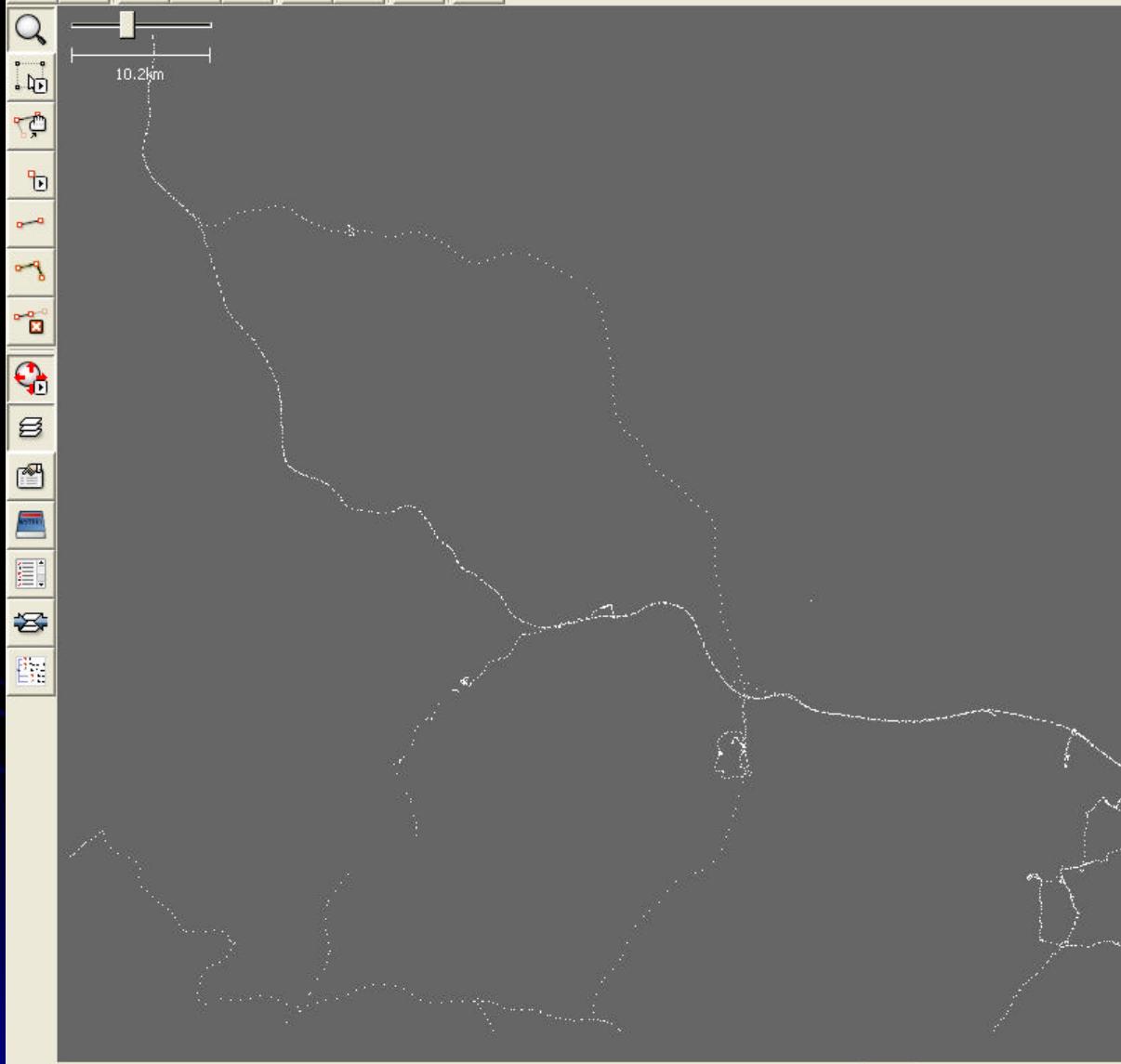
Public? Delete?

- |  |   |                                     |                          |
|--|---|-------------------------------------|--------------------------|
|  | AJR_G_020906.gpx ... (3,313 points) ... on 02-Sep <a href="#">more</a> / <a href="#">map</a><br>Sutton Coldfield and Erdington<br>by blackadder in: midlands AJR                    | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
|  | AJR_G_290806.gpx ... (5,573 points) ... on 29-Aug <a href="#">more</a> / <a href="#">map</a><br>Sutton Coldfield to Fradley + Alrewas<br>by blackadder in: midlands AJR             | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
|  | AJR_G_280806.gpx ... (2,701 points) ... on 28-Aug <a href="#">more</a> / <a href="#">map</a><br>Sutton Coldfield to Solihull rtn<br>by blackadder in: midlands AJR                  | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
|  | AJR_G_270806.gpx ... (9,749 points) ... on 27-Aug <a href="#">more</a> / <a href="#">map</a><br>Sutton Coldfield to Stoneleigh Park rtn<br>by blackadder in: midlands AJR           | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
|  | AJR_G_260806.gpx ... (9,999 points) ... on 26-Aug <a href="#">more</a> / <a href="#">map</a><br>B75 area<br>by blackadder in: midlands AJR  | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
|  | AJR_G_240806b.gpx ... (4,750 points) ... on 25-Aug <a href="#">more</a> / <a href="#">map</a><br>Wylde Green and Boldmere areas<br>by blackadder in: midlands AJR                   | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
|  | AJR_G_240806.gpx ... (8,473 points) ... on 25-Aug <a href="#">more</a> / <a href="#">map</a><br>New Hall, Walmley and Minworth - Sutton Coldfield<br>by blackadder in: midlands AJR | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
|  | AJR_G_090806.gpx ... (2,800 points) ... on 23-Aug <a href="#">more</a> / <a href="#">map</a><br>Fradley Junction area<br>by blackadder in: midlands AJR                             | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
|  | AJR_G_080806.gpx ... (2,059 points) ... on 23-Aug <a href="#">more</a> / <a href="#">map</a><br>Trent & Mersey Canal at Alrewas   | <input checked="" type="checkbox"/> | <input type="checkbox"/> |



Files Connection Layer Edit

Help



Layers

GPS trackpoints[117].gpx

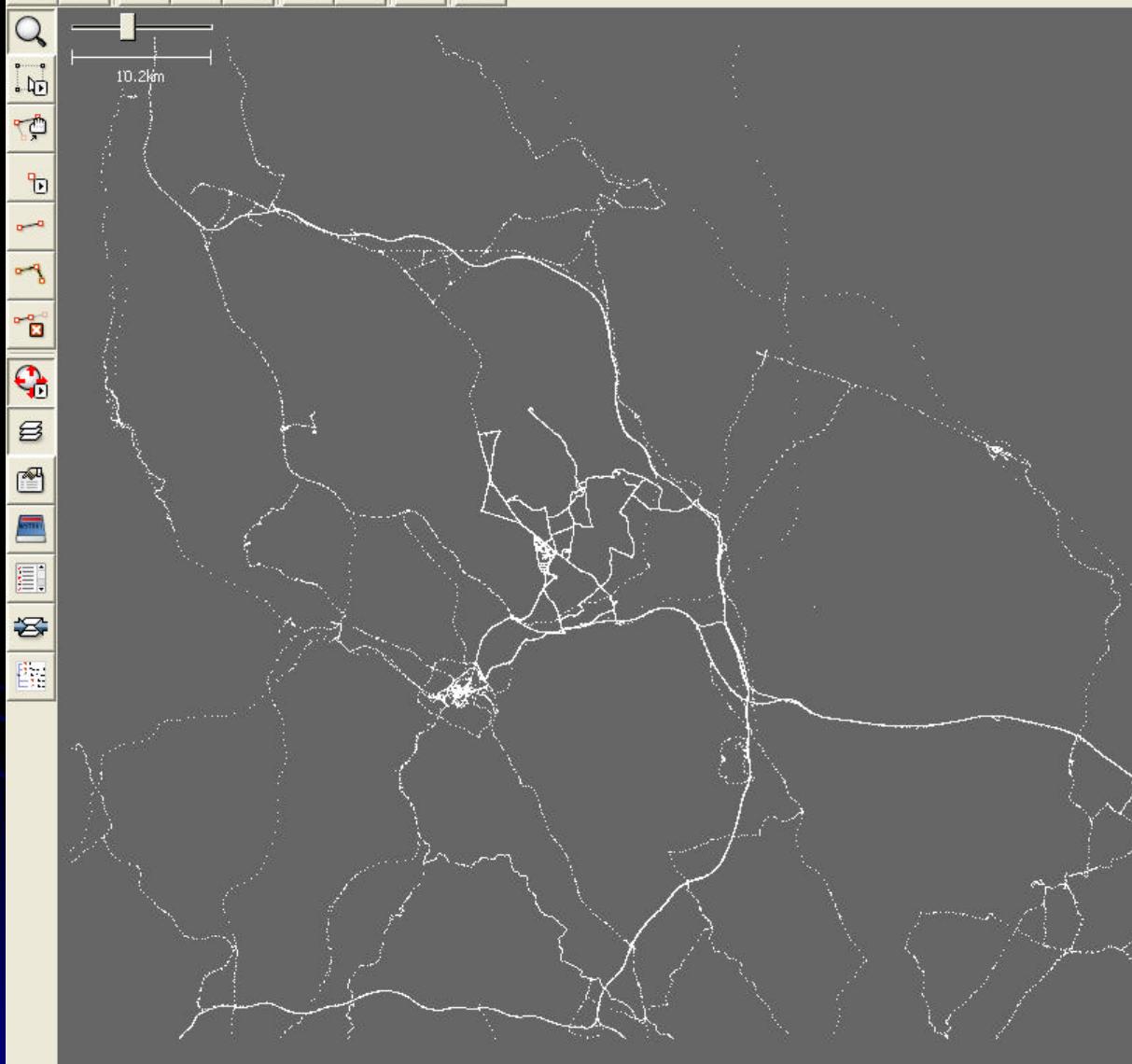


Lat/Lon 52.63277290611614 -2.1595375334640523

Object

West Midlands





## Layers

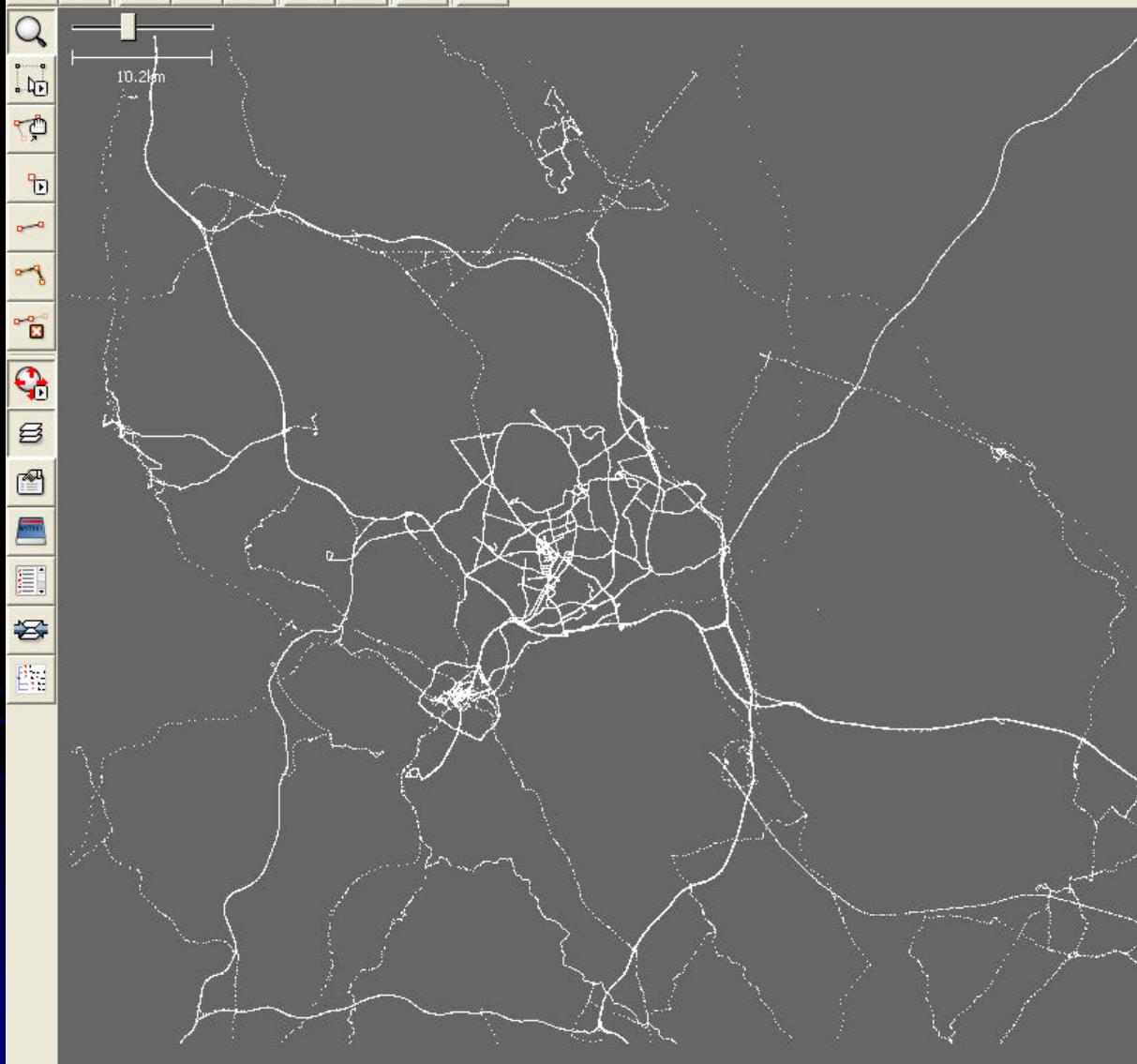
- GPS** trackpoints[110].gpx
- GPS** trackpoints[111].gpx
- GPS** trackpoints[112].gpx
- GPS** trackpoints[113].gpx
- GPS** trackpoints[114].gpx
- GPS** trackpoints[115].gpx
- GPS** trackpoints[116].gpx
- GPS** trackpoints[117].gpx



Lat/Lon 52.41613225337731 -2.128040571520526

Object





## Layers

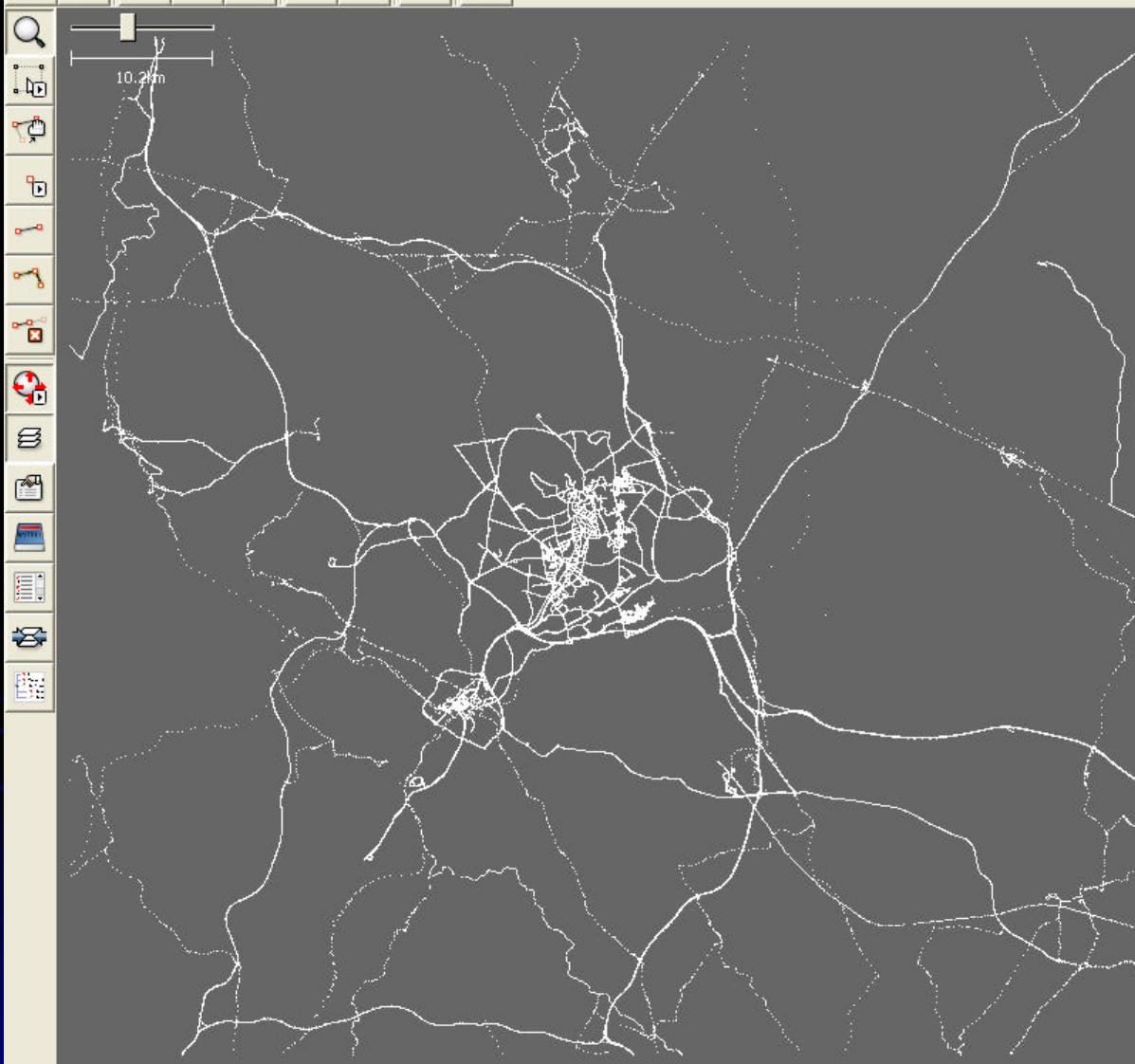
GPS	trackpoints[100].gpx
GPS	trackpoints[101].gpx
GPS	trackpoints[102].gpx
GPS	trackpoints[103].gpx
GPS	trackpoints[104].gpx
GPS	trackpoints[105].gpx
GPS	trackpoints[106].gpx
GPS	trackpoints[107].gpx
GPS	trackpoints[108].gpx
GPS	trackpoints[109].gpx
GPS	trackpoints[110].gpx



Lat/Lon 52.48876118776718 -2.1307878773933715

Object





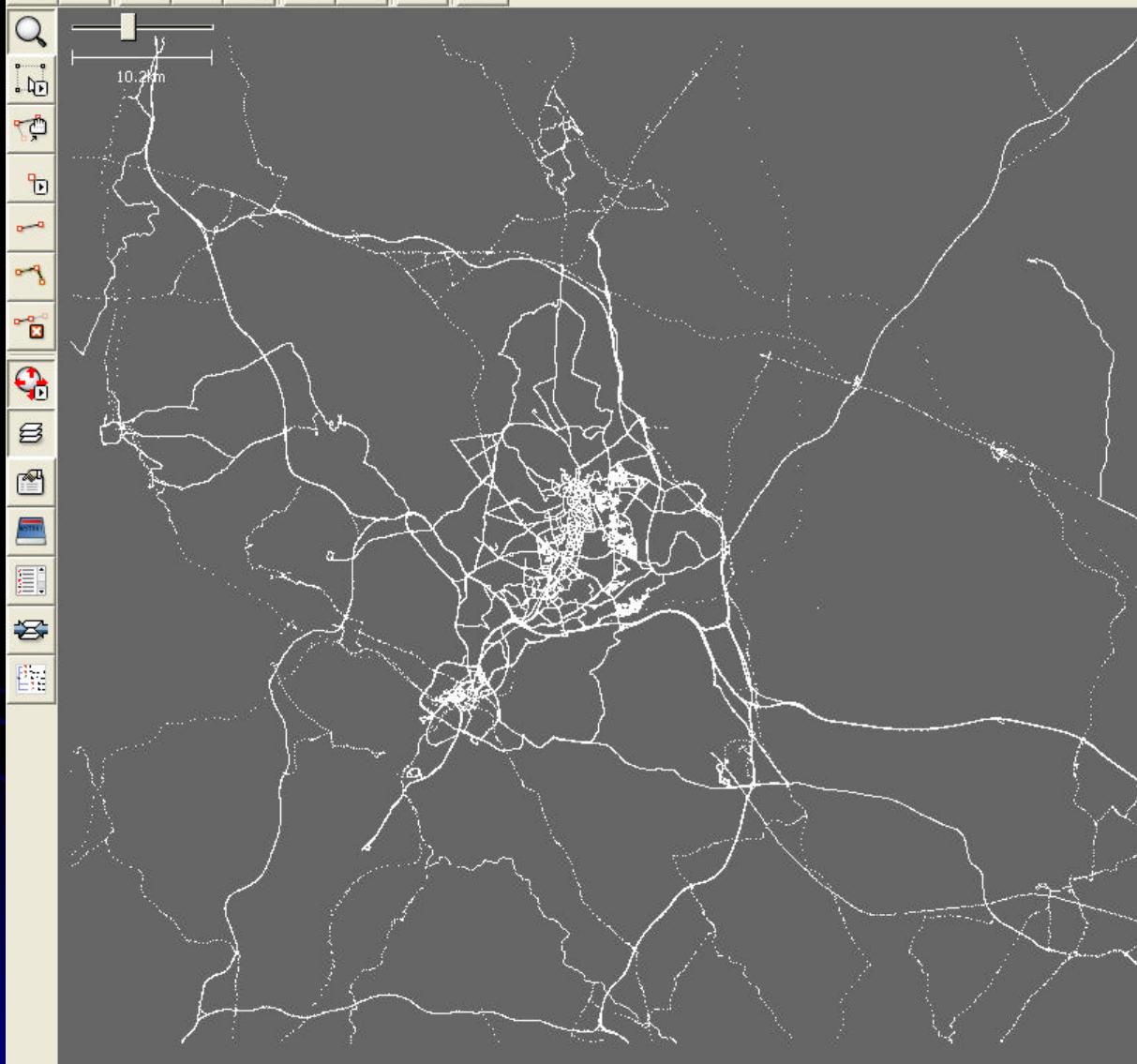
Lat/Lon 52.470267830347844 -2.153411220915032

### — Object

- Layers

  - GPS trackpoints[90].gpx
  - GPS trackpoints[91].gpx
  - GPS trackpoints[92].gpx
  - GPS trackpoints[93].gpx
  - GPS trackpoints[94].gpx
  - GPS trackpoints[95].gpx
  - GPS trackpoints[96].gpx
  - GPS trackpoints[97].gpx
  - GPS trackpoints[98].gpx
  - GPS trackpoints[99].gpx
  - GPS trackpoints[100].gpx





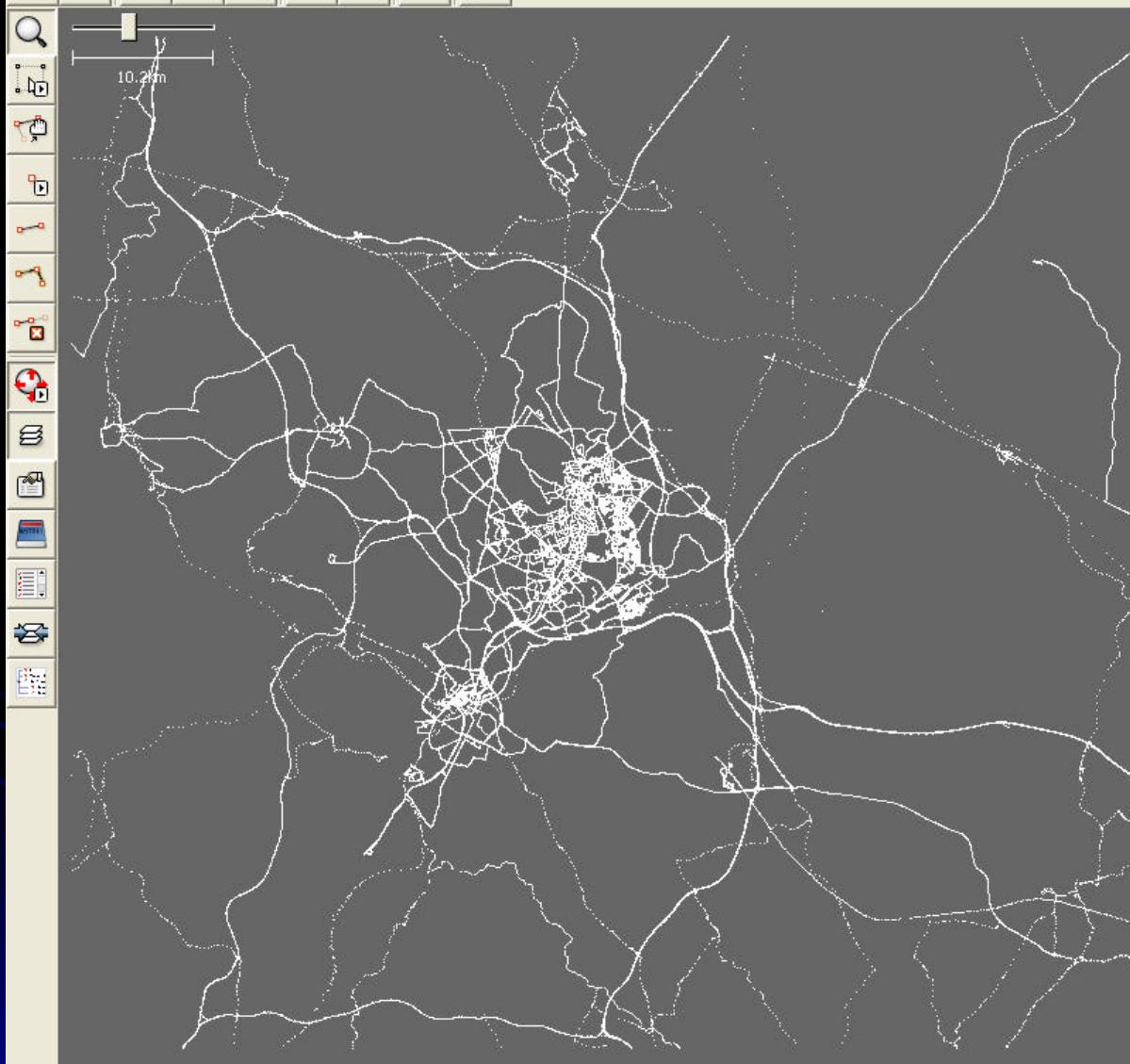
Lat/Lon 52.64101590020989 -1.4522280000000003

Object

## Layers

- GPS trackpoints[80].gpx
  - GPS trackpoints[81].gpx
  - GPS trackpoints[82].gpx
  - GPS trackpoints[83].gpx
  - GPS trackpoints[84].gpx
  - GPS trackpoints[85].gpx
  - GPS trackpoints[86].gpx
  - GPS trackpoints[87].gpx
  - GPS trackpoints[88].gpx
  - GPS trackpoints[89].gpx
  - GPS trackpoints[90].gpx
- ↑ ↓ % ✖ ☰





## Layers

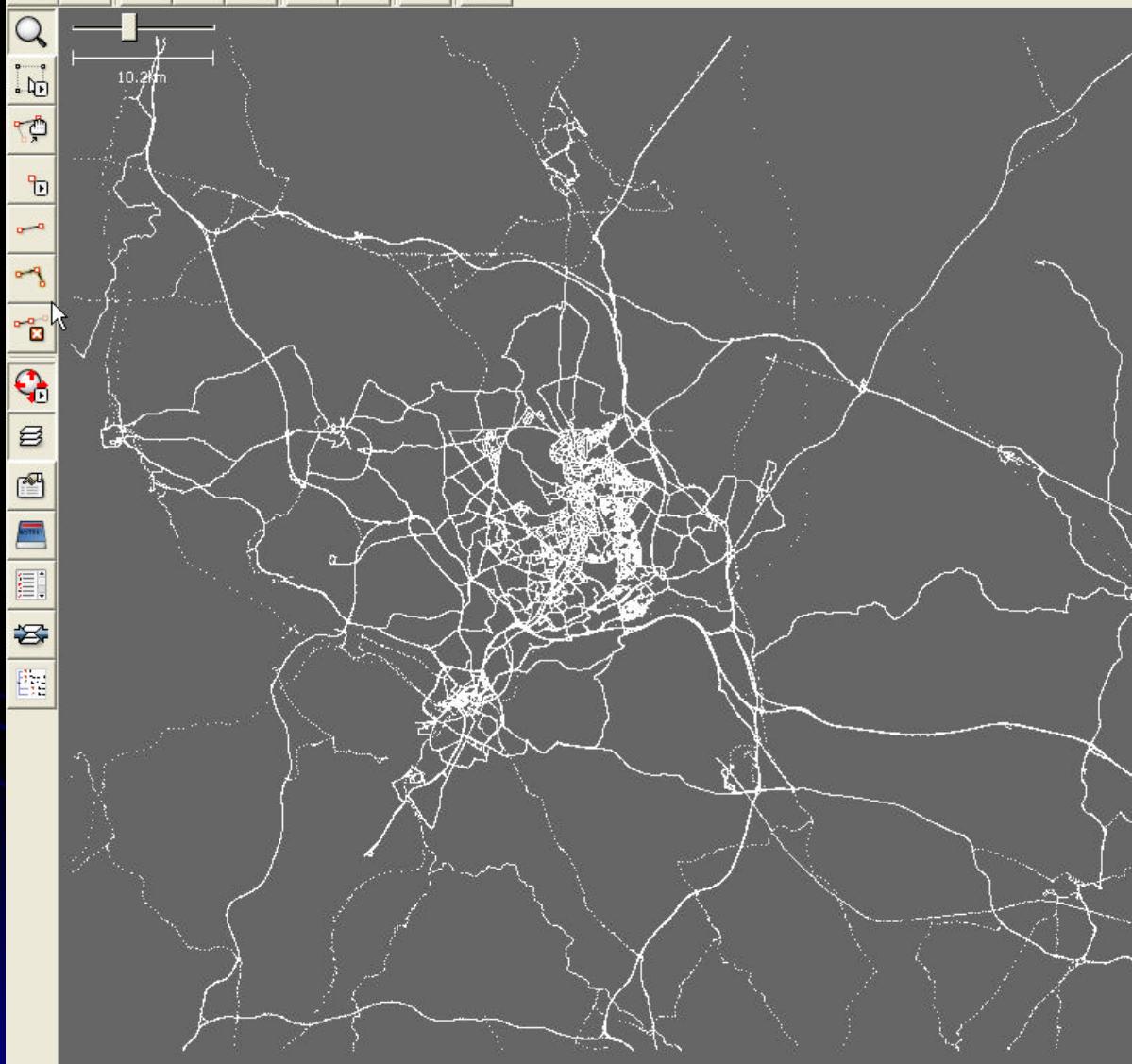
- GPS** trackpoints[70].gpx
- GPS** trackpoints[71].gpx
- GPS** trackpoints[72].gpx
- GPS** trackpoints[73].gpx
- GPS** trackpoints[74].gpx
- GPS** trackpoints[75].gpx
- GPS** trackpoints[76].gpx
- GPS** trackpoints[77].gpx
- GPS** trackpoints[78].gpx
- GPS** trackpoints[79].gpx
- GPS** trackpoints[80].gpx



Lat/Lon 52.430554801884384 -2.113028941176471

Object





## Layers

GPS trackpoints[60].gpx

GPS trackpoints[61].gpx

GPS trackpoints[62].gpx

GPS trackpoints[63].gpx

GPS trackpoints[64].gpx

GPS trackpoints[65].gpx

GPS trackpoints[66].gpx

GPS trackpoints[67].gpx

GPS trackpoints[68].gpx

GPS trackpoints[69].gpx

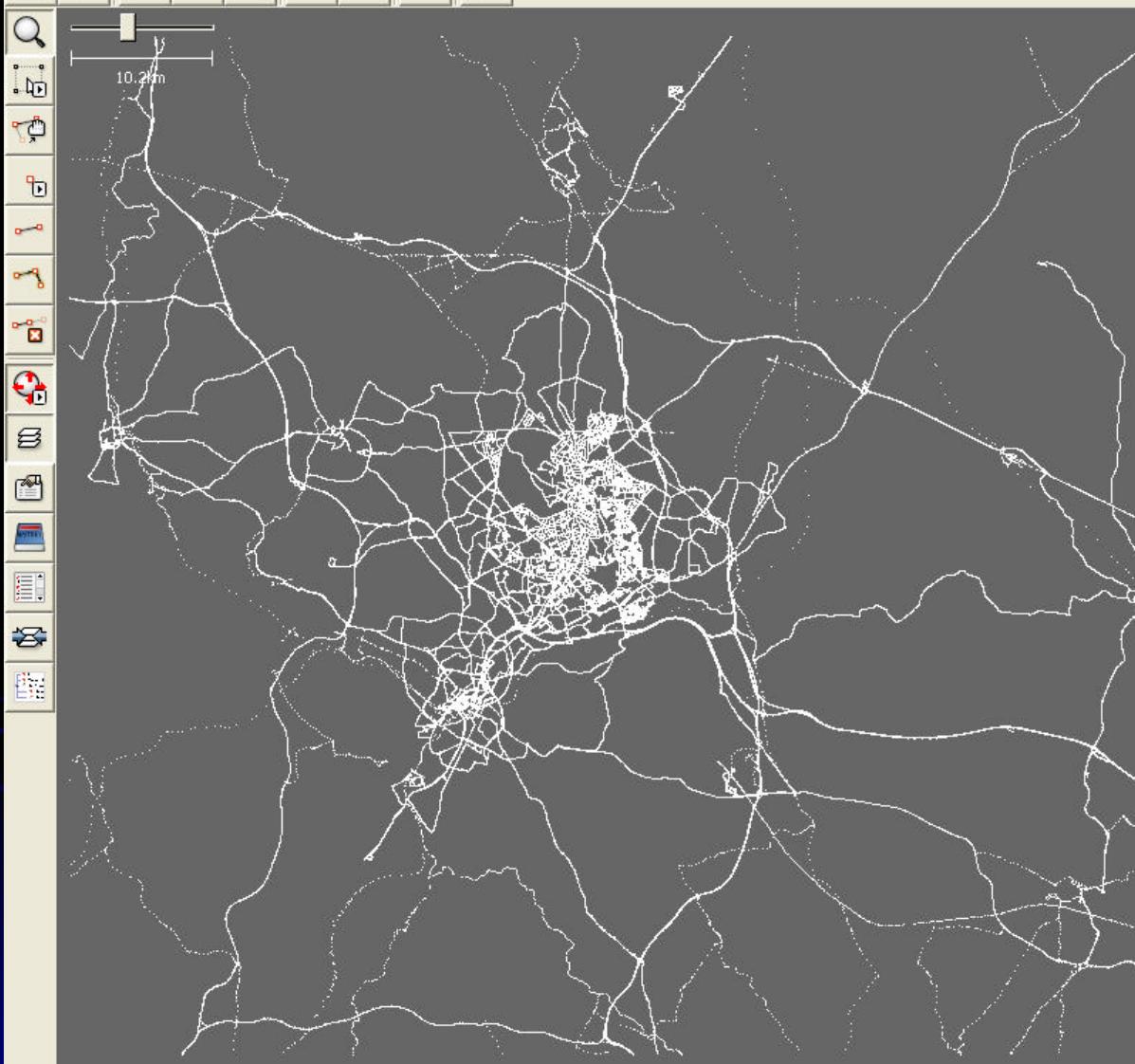
GPS trackpoints[70].gpx



Lat/Lon 52.47250411862238 -2.157082337254902

Object





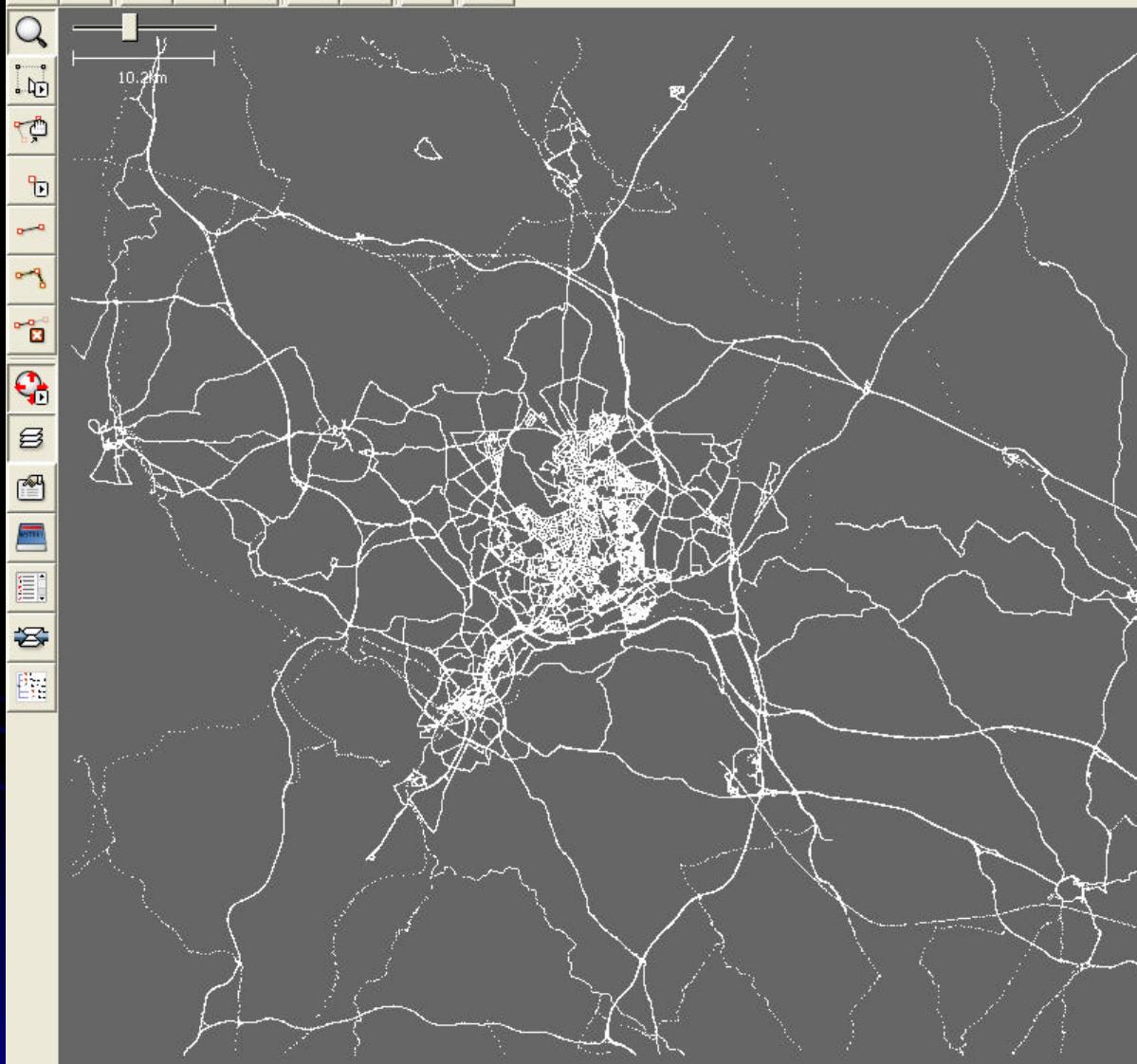
Lat/Lon 52.39752658846005 -2.084577789542483

### — Object

- Layers

  - GPS trackpoints[50].gpx
  - GPS trackpoints[51].gpx
  - GPS trackpoints[52].gpx
  - GPS trackpoints[53].gpx
  - GPS trackpoints[54].gpx
  - GPS trackpoints[55].gpx
  - GPS trackpoints[56].gpx
  - GPS trackpoints[57].gpx
  - GPS trackpoints[58].gpx
  - GPS trackpoints[59].gpx
  - GPS trackpoints[60].gpx





## Layers

GPS trackpoints[40].gpx

GPS trackpoints[41].gpx

GPS trackpoints[42].gpx

GPS trackpoints[43].gpx

GPS trackpoints[44].gpx

GPS trackpoints[45].gpx

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GPS trackpoints[47].gpx

GPS trackpoints[48].gpx

GPS trackpoints[49].gpx

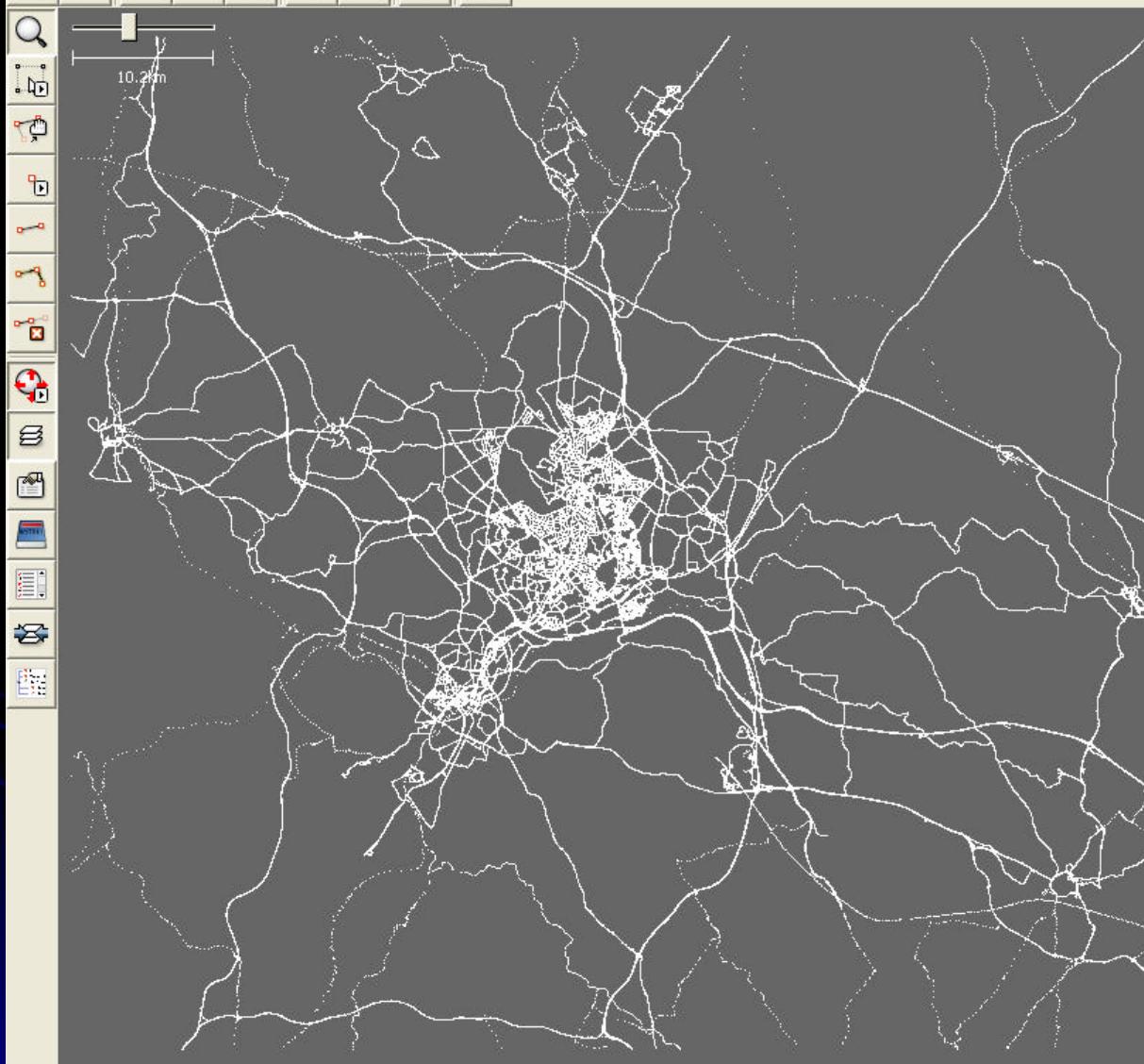
GPS trackpoints[50].gpx



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Object





## Layers

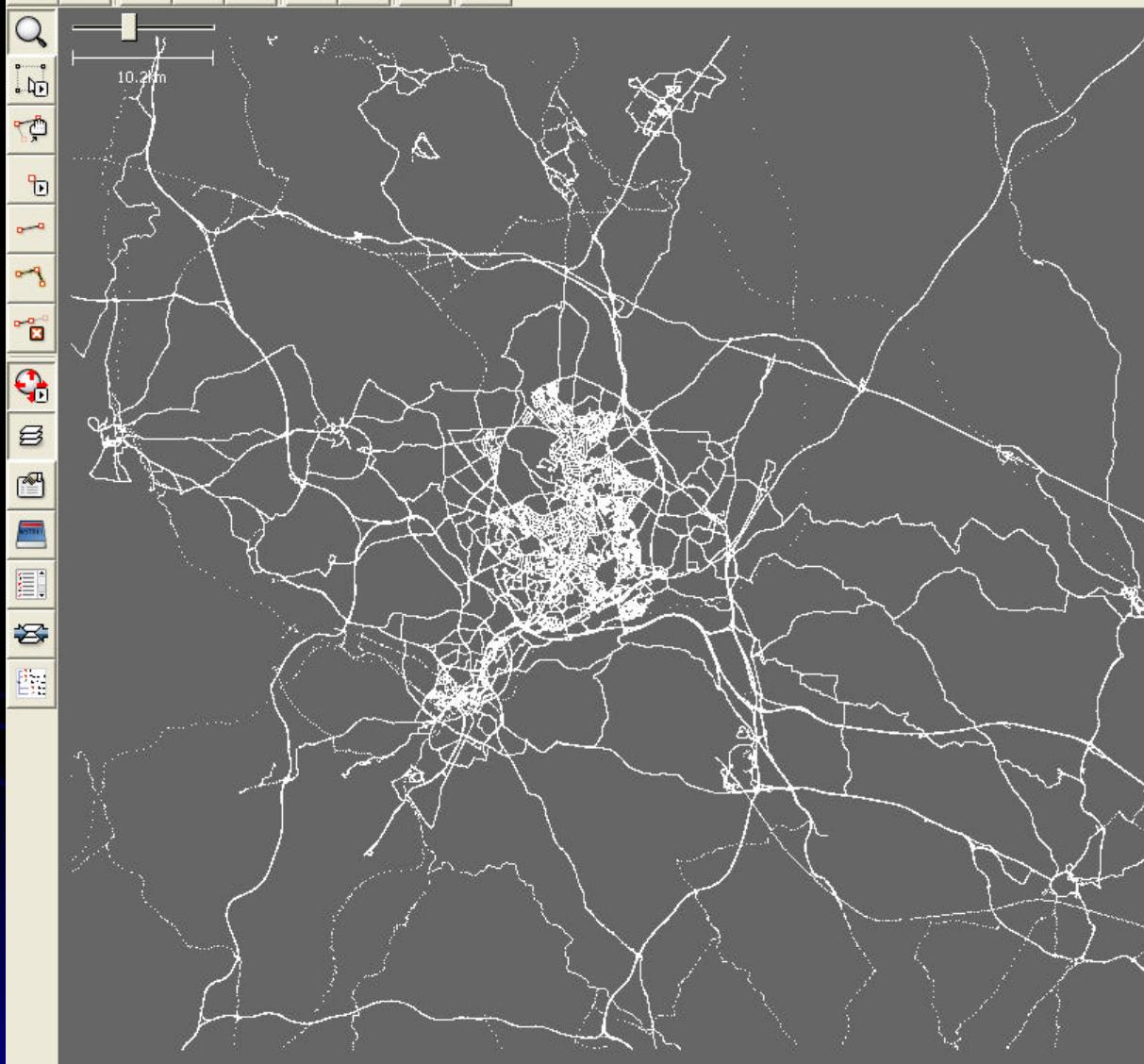
- GPS** trackpoints[30].gpx
- GPS** trackpoints[31].gpx
- GPS** trackpoints[32].gpx
- GPS** trackpoints[33].gpx
- GPS** trackpoints[34].gpx
- GPS** trackpoints[35].gpx
- GPS** trackpoints[36].gpx
- GPS** trackpoints[37].gpx
- GPS** trackpoints[38].gpx
- GPS** trackpoints[39].gpx
- GPS** trackpoints[40].gpx



Lat/Lon 52.47473063195734 -1.456785767215686

Object





## Layers

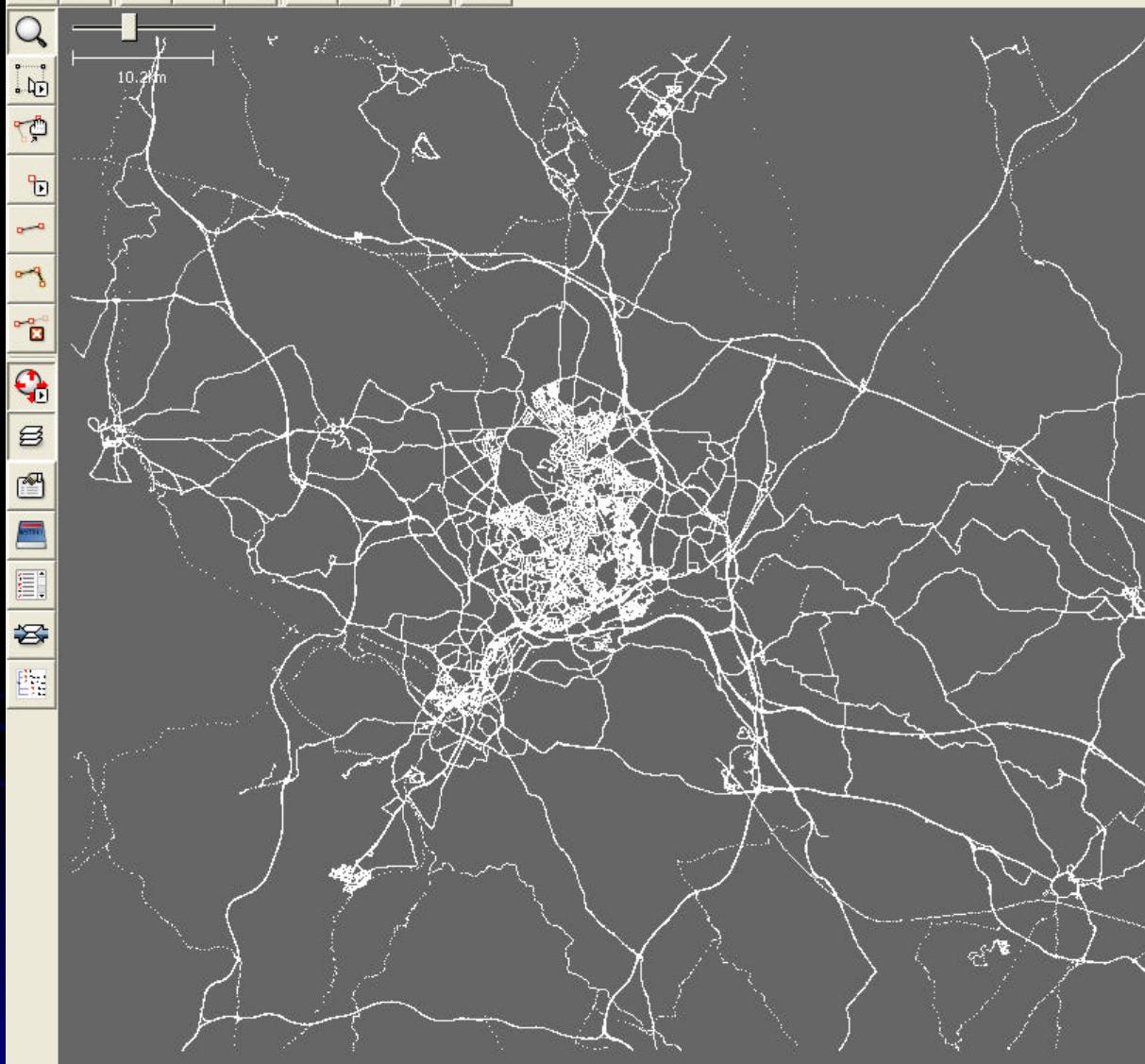
- GPS** trackpoints[20].gpx
- GPS** trackpoints[21].gpx
- GPS** trackpoints[22].gpx
- GPS** trackpoints[23].gpx
- GPS** trackpoints[24].gpx
- GPS** trackpoints[25].gpx
- GPS** trackpoints[26].gpx
- GPS** trackpoints[27].gpx
- GPS** trackpoints[28].gpx
- GPS** trackpoints[29].gpx
- GPS** trackpoints[30].gpx



Lat/Lon 52.620957586156564 -1.7532416411490197

Object





## Layers

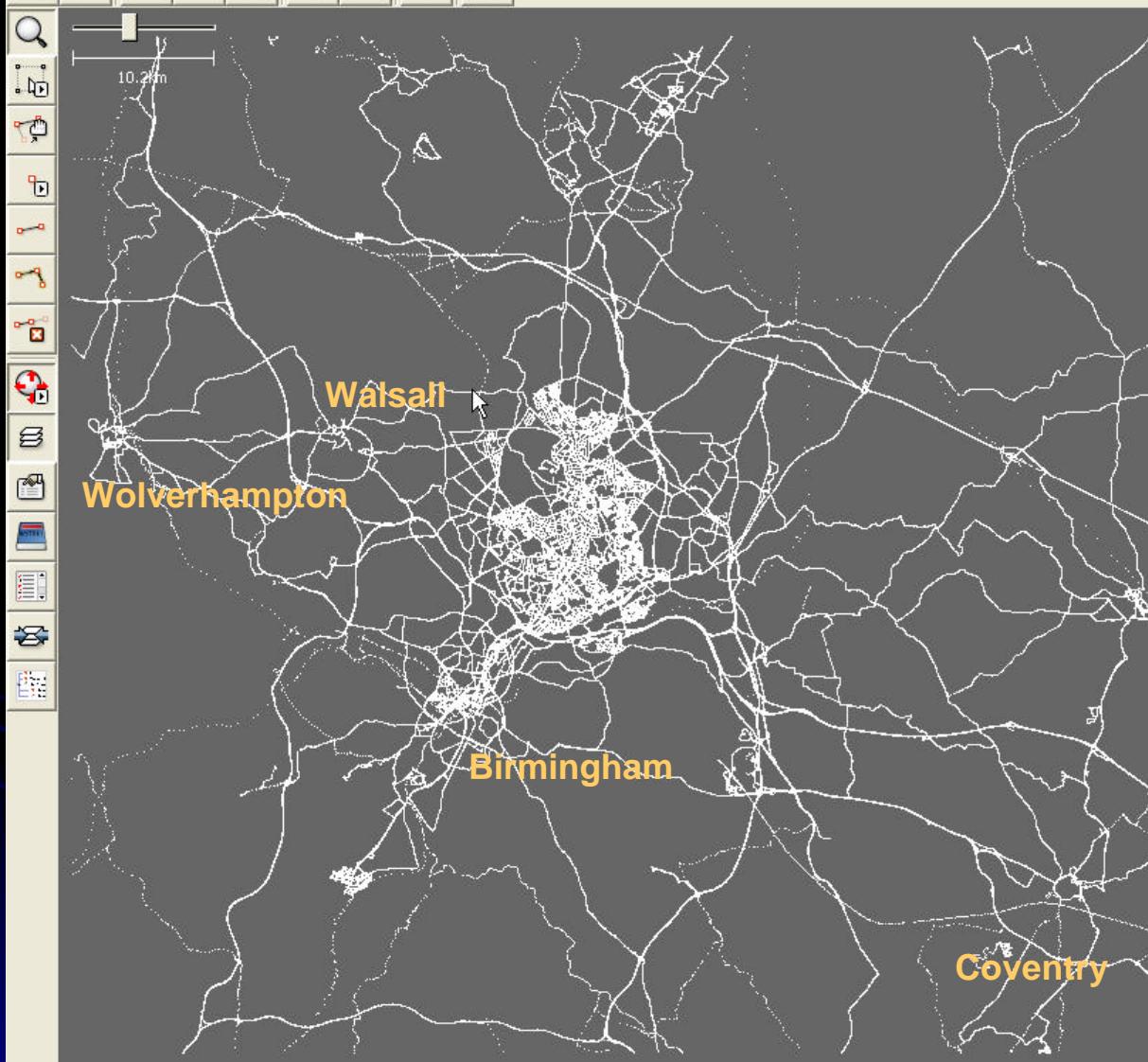
- GPS** trackpoints[00].gpx
- GPS** trackpoints[1].gpx
- GPS** trackpoints[02].gpx
- GPS** trackpoints[03].gpx
- GPS** trackpoints[4].gpx
- GPS** trackpoints[05].gpx
- GPS** trackpoints[06].gpx
- GPS** trackpoints[07].gpx
- GPS** trackpoints[8].gpx
- GPS** trackpoints[9].gpx
- GPS** trackpoints[10].gpx



Lat/Lon 52.56799205176665 -2.153411179956863

Object





Layers	
GPS	trackpoints[00].gpx
GPS	trackpoints[1].gpx
GPS	trackpoints[02].gpx
GPS	trackpoints[03].gpx
GPS	trackpoints[4].gpx
GPS	trackpoints[05].gpx
GPS	trackpoints[06].gpx
GPS	trackpoints[07].gpx
GPS	trackpoints[8].gpx
GPS	trackpoints[9].gpx
GPS	trackpoints[10].gpx

Lat/Lon 52.66495386009186 -2.098341977368628

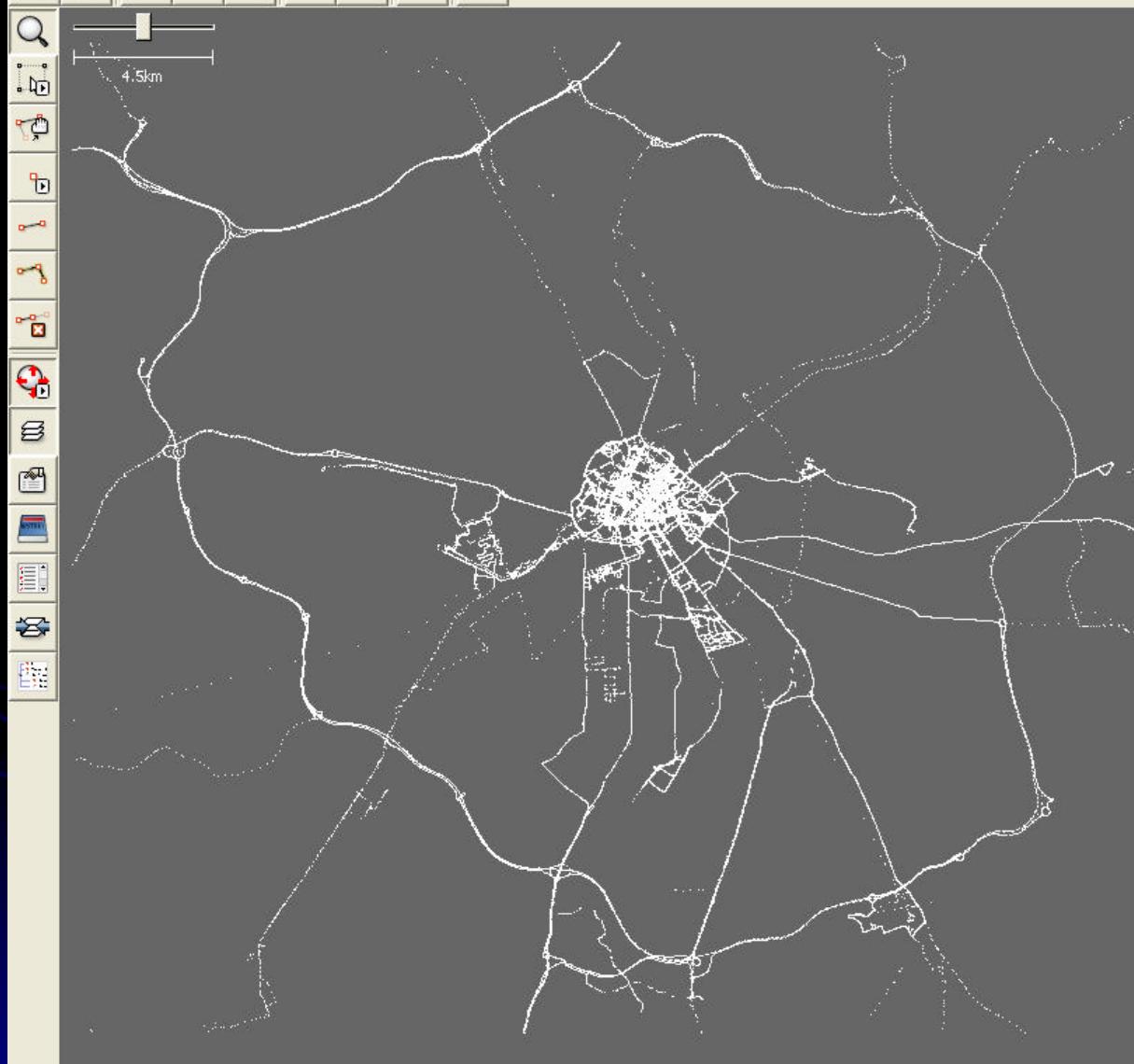
Object

600,000 track points



Files Connection Layer Edit

Help



Lat/Lon 53.560260688468276 -2.3485327890222223

Object

Layers

GPS 53.38579204525405 -2.4068278580876323 x 53.55



Manchester

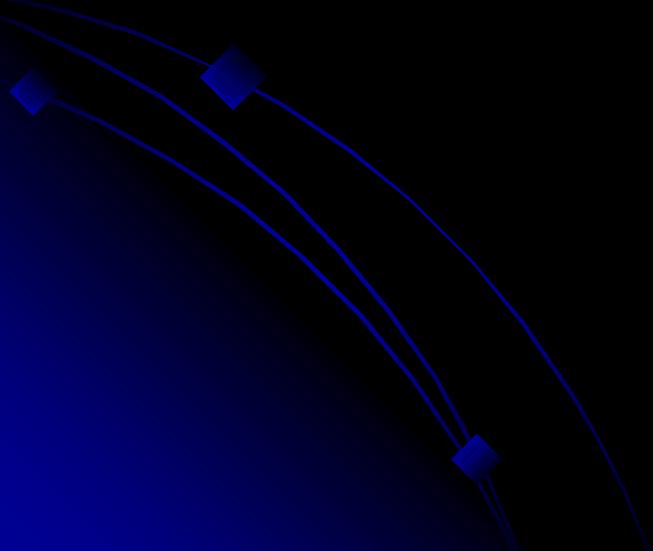


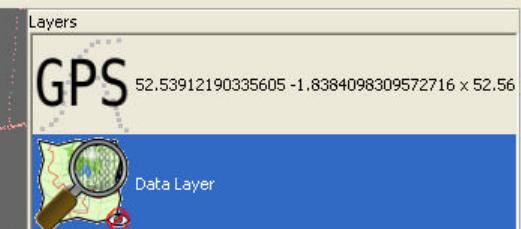
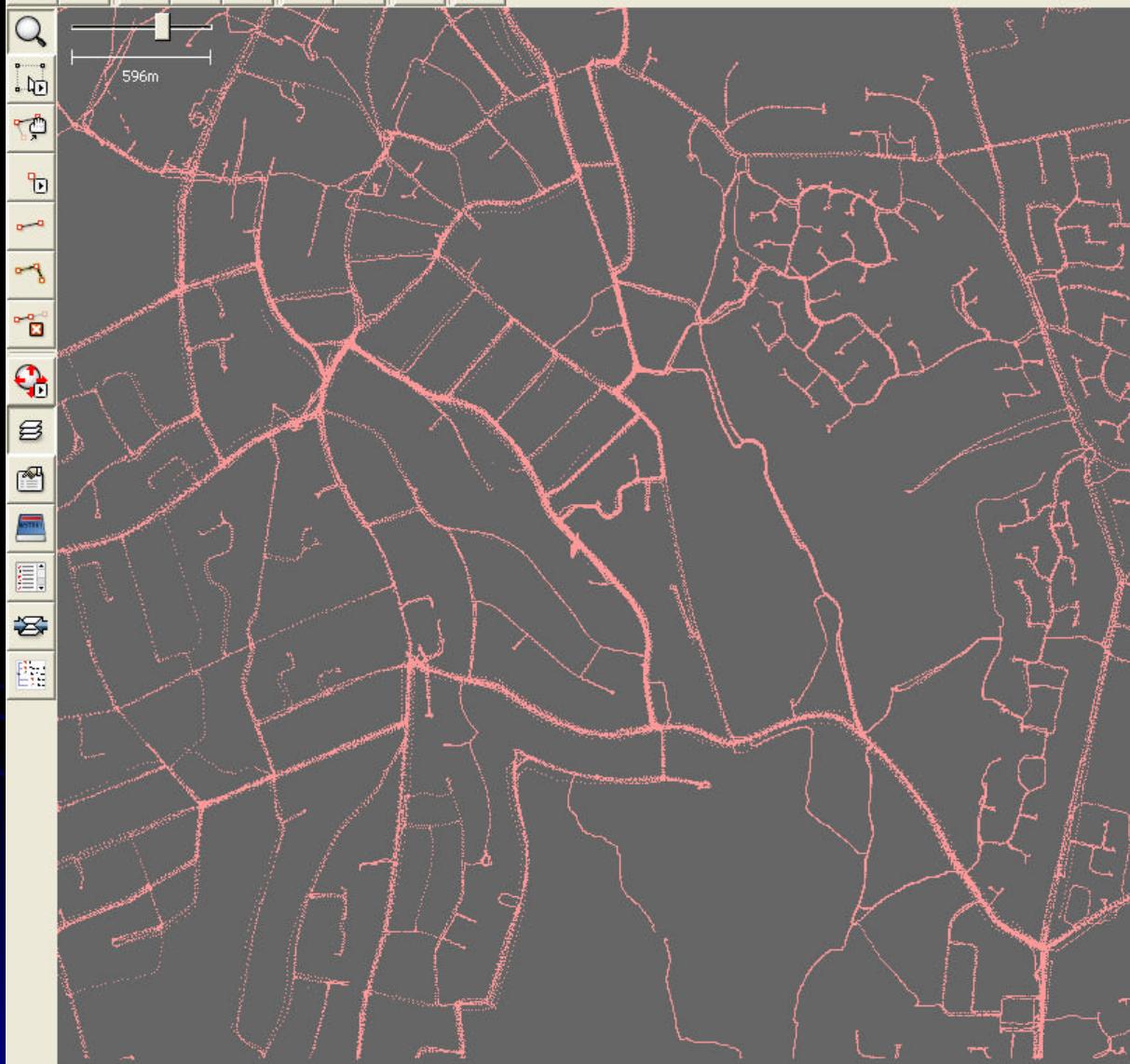
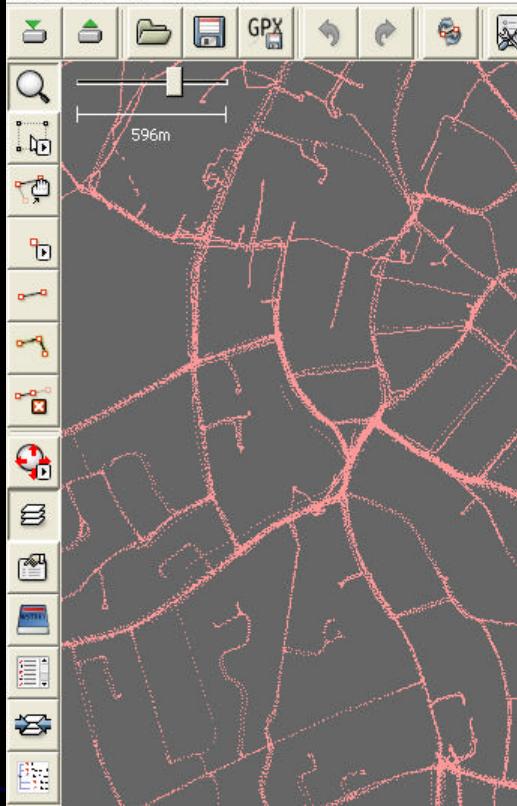


E



# Editing Map Data



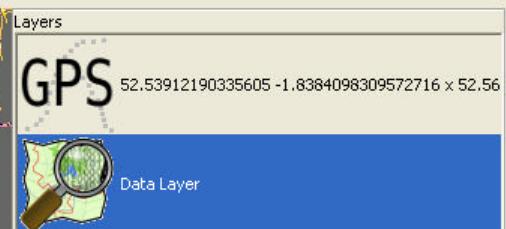


Lat/Lon 52.55315346724071 -1.836825455260609

Object 358682 (52.561384670897, -1.83926582336426)

Local - GPS Trackpoints



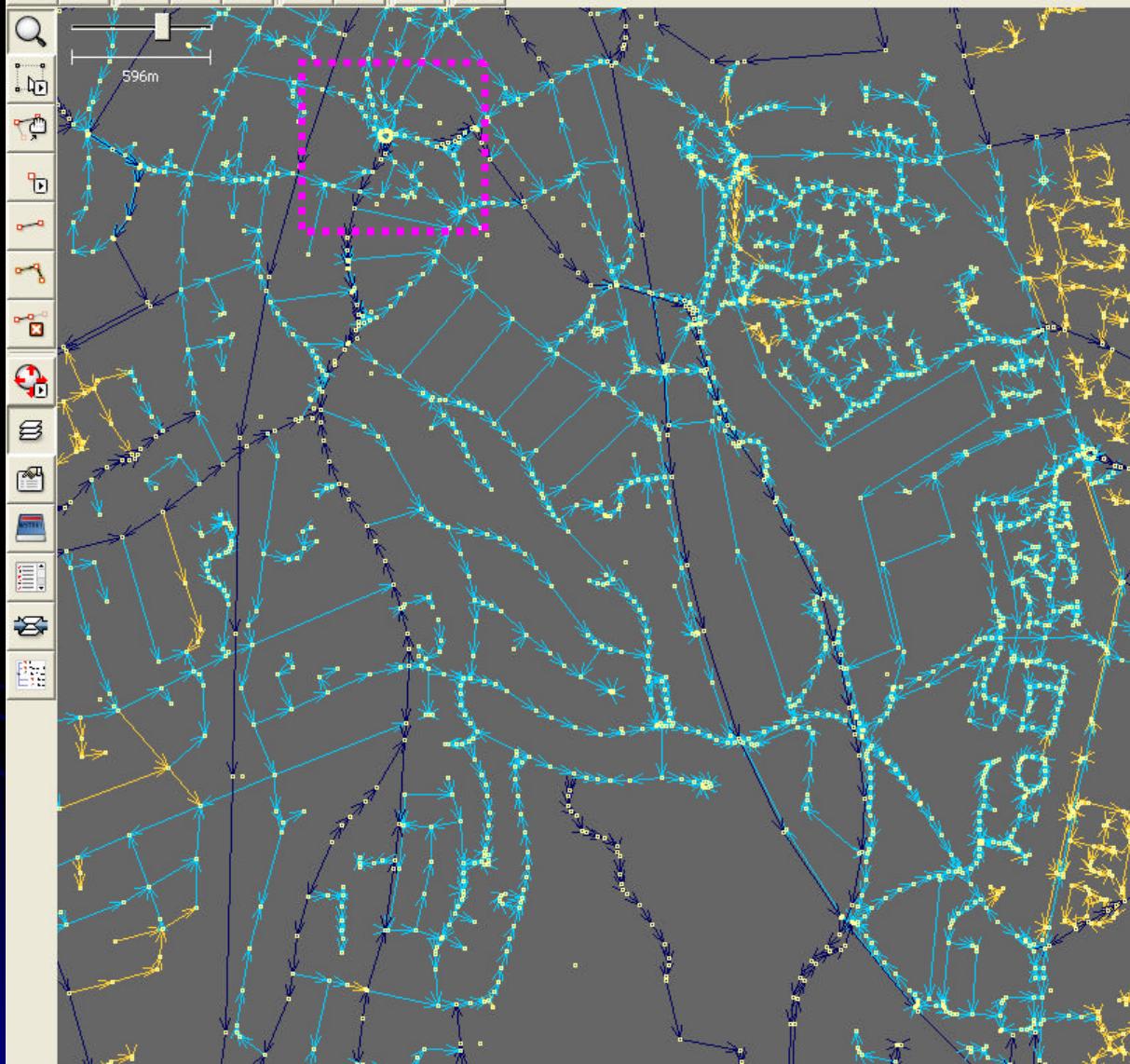
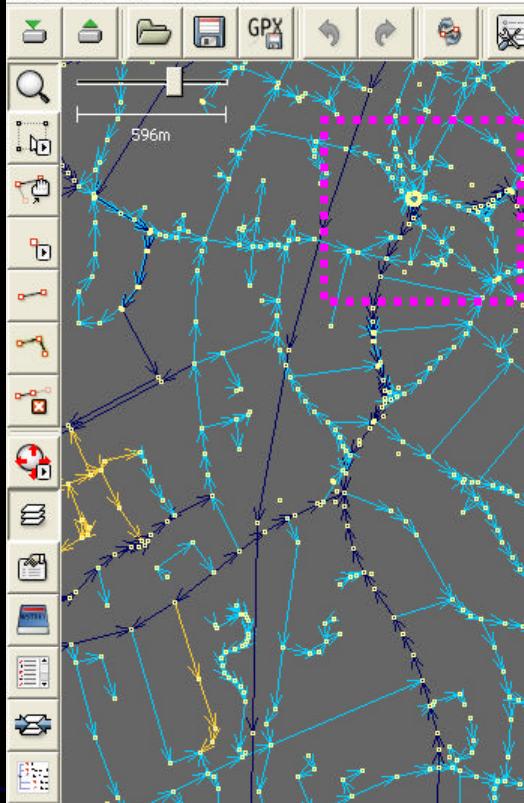


Lat/Lon 52.54579290200859 -1.837468181445159

Object

Local - GPS Trackpoints &amp; Map Data





Layers  
**GPS** 52.53912190335605 -1.8384098309572716 x 52.56

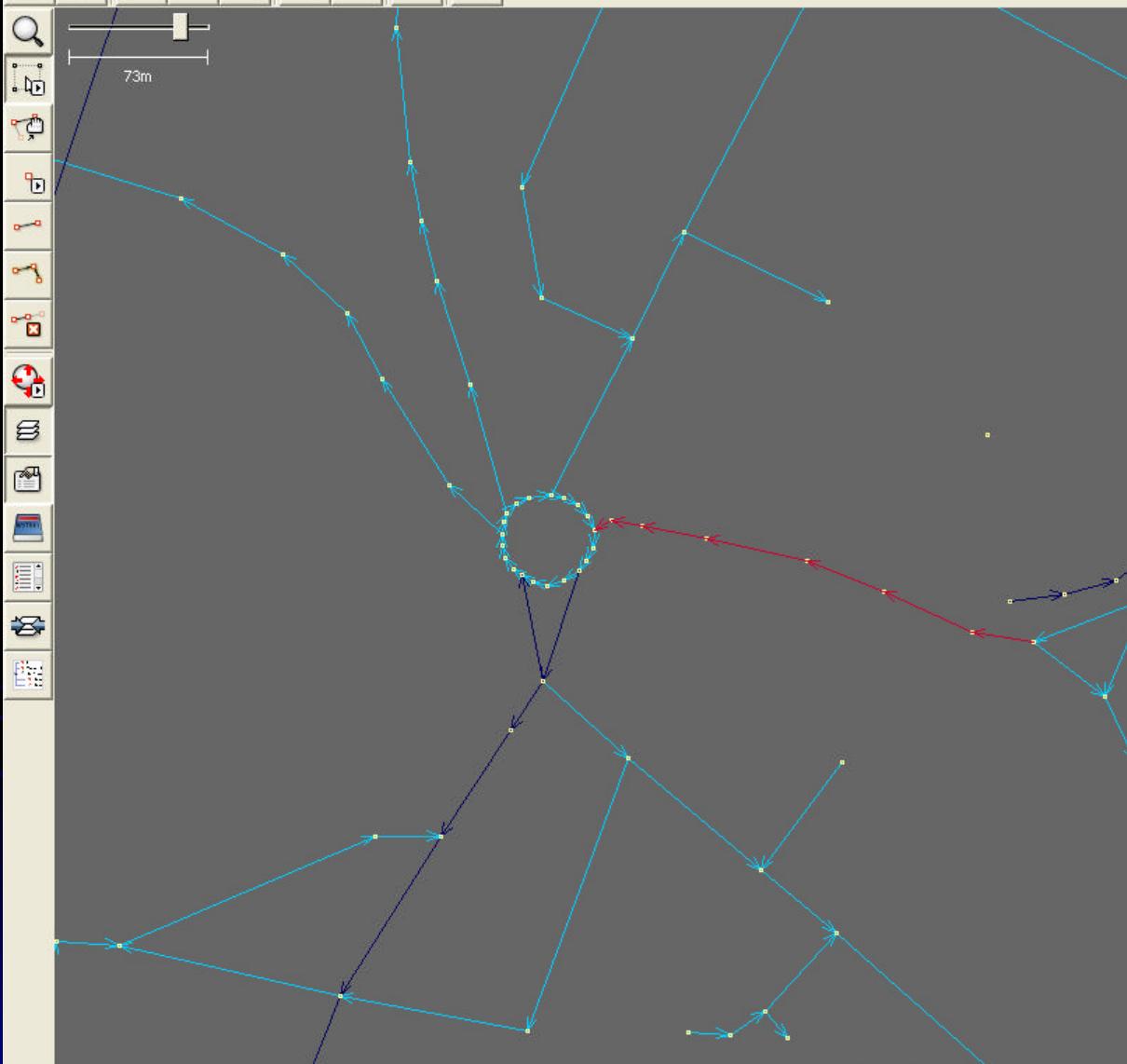
Data Layer

Lat/Lon 52.54159096397995 -1.8086526241711494

Object

Local – Map Data Alone





Layers

GPS 52.53912190335605 -1.8384098309572716 x 52.56

Data Layer

Up Down Delete Add Edit

Key	Value
abutters	retail
created_by	JOSM
highway	primary
name	Queen Street

Lat/Lon 52.56035762638776 -1.8272539523574998

Object

Local – Editing &amp; Annotation





The Free Wiki World Map

Help & Wiki  
News blog  
Shop

User

display name:

blackadder

[Make a Donation](#)



Need help editing?

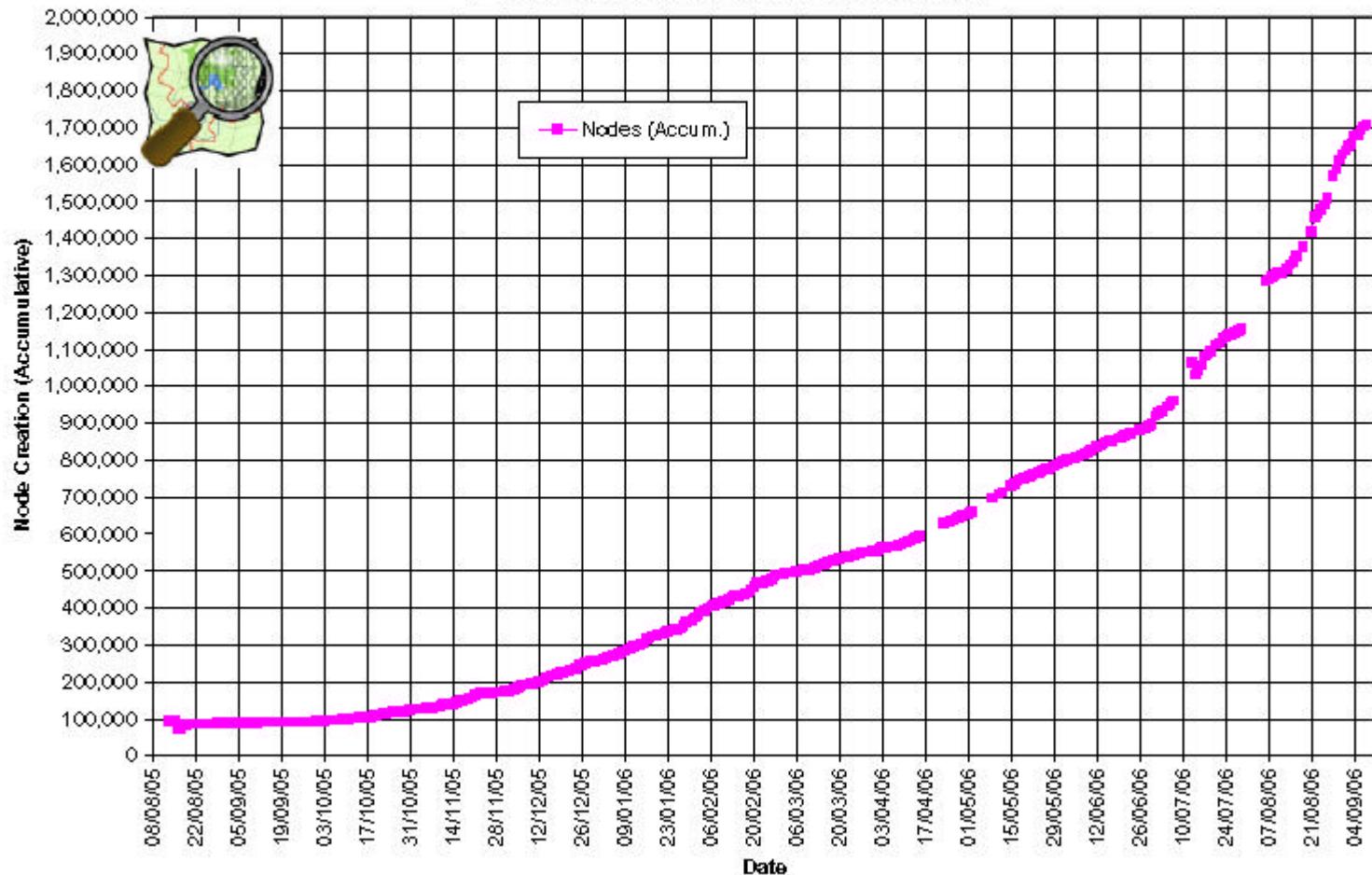


# Current Statistics

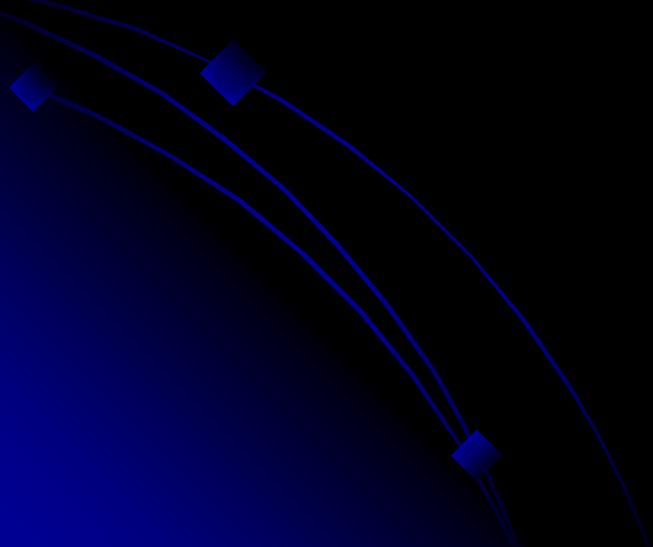
- 3100+ registered users
- 200 active contributors per month
- 30 Million+ gps trackpoints
- 250,000+ km of Linear features created

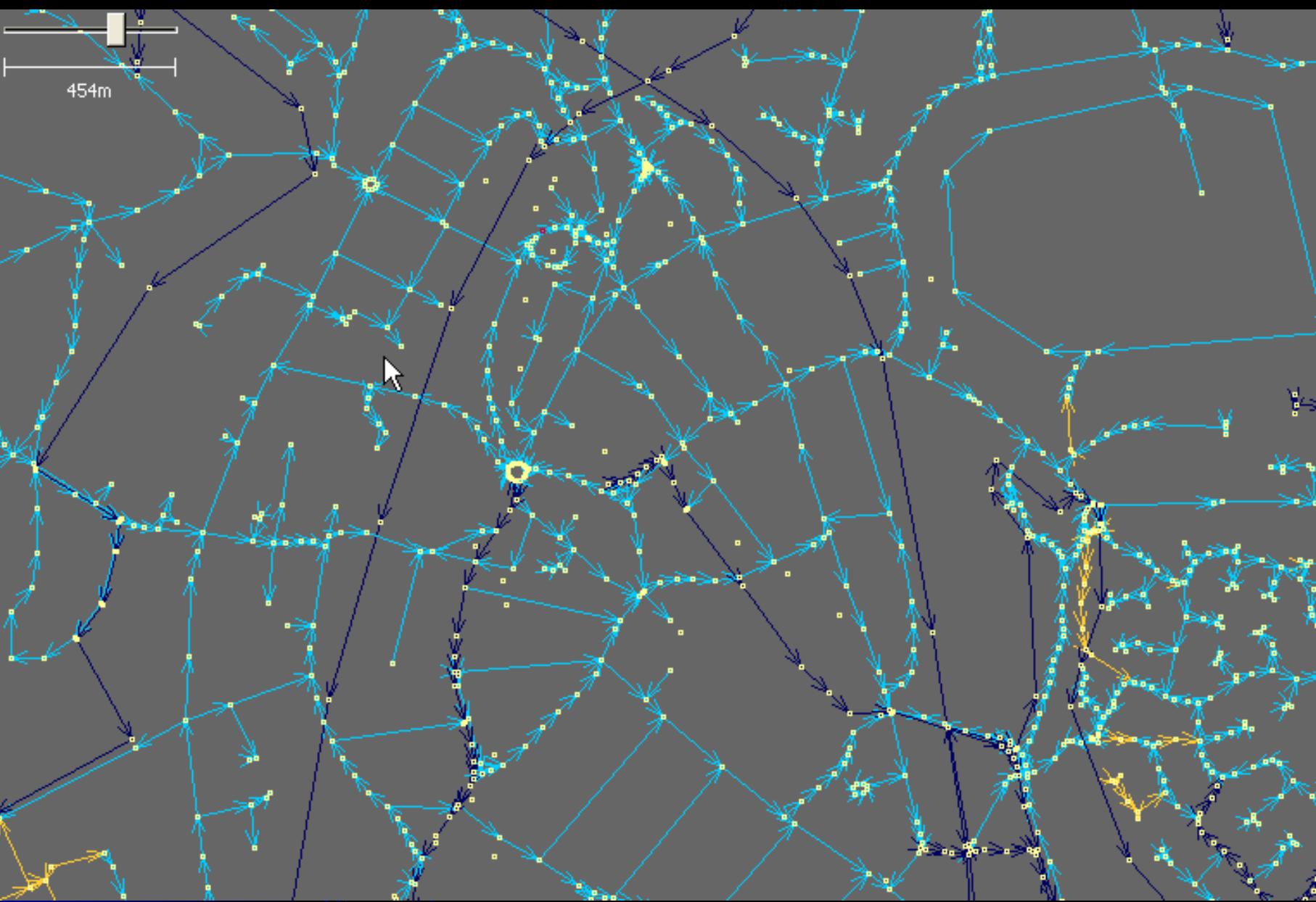


**OpenStreetMap Database Statistics**  
**Node Creation**  
**(EXCLUDES TIGER NODE DATA FROM 16/04/06)**



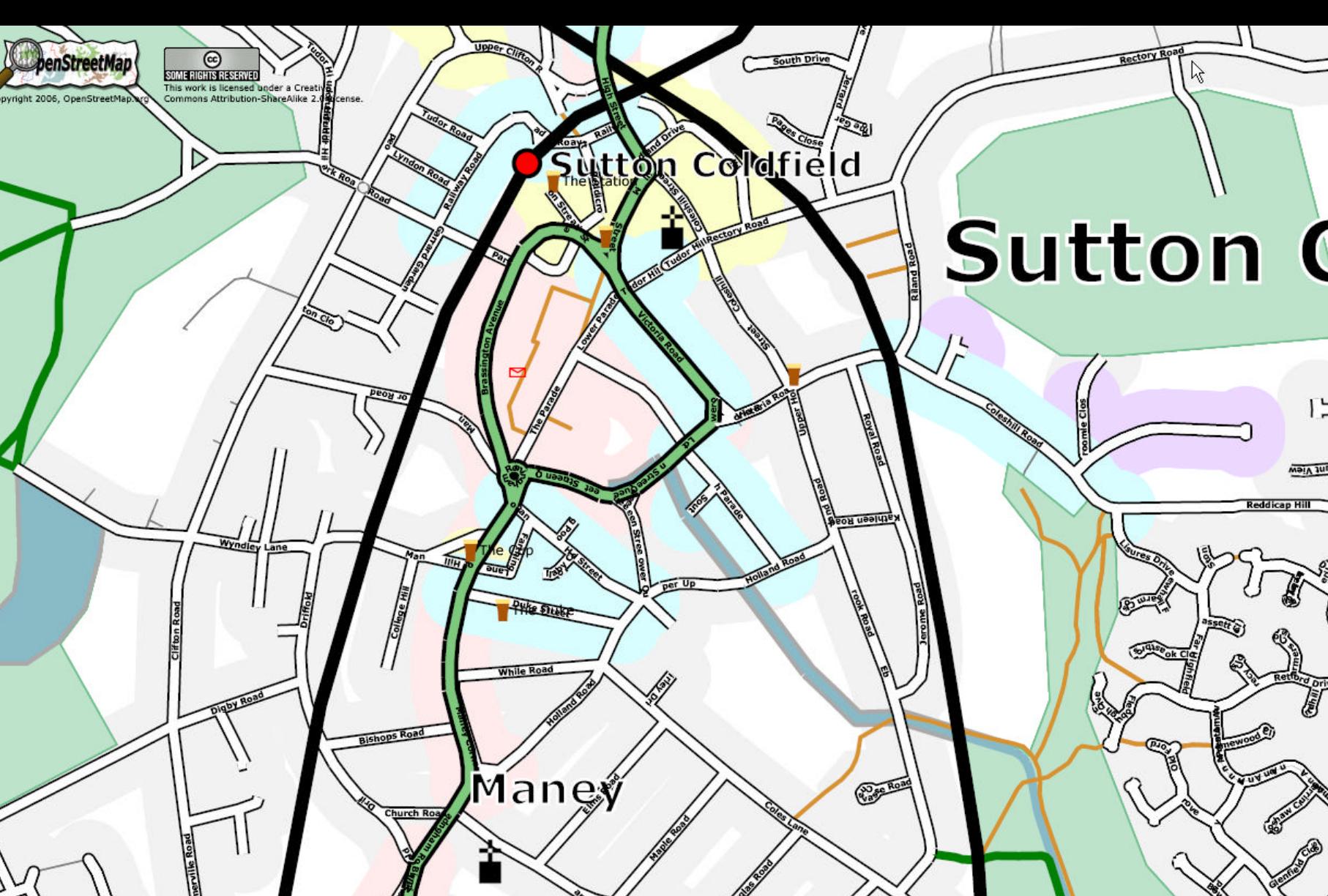
# Rendering Data





Rendering – stage 1





Rendering – stage 2



**OpenStreetMap**

The Free Wiki World Map

[Help & Wiki](#)  
[News blog](#)  
[Shop](#)**User**

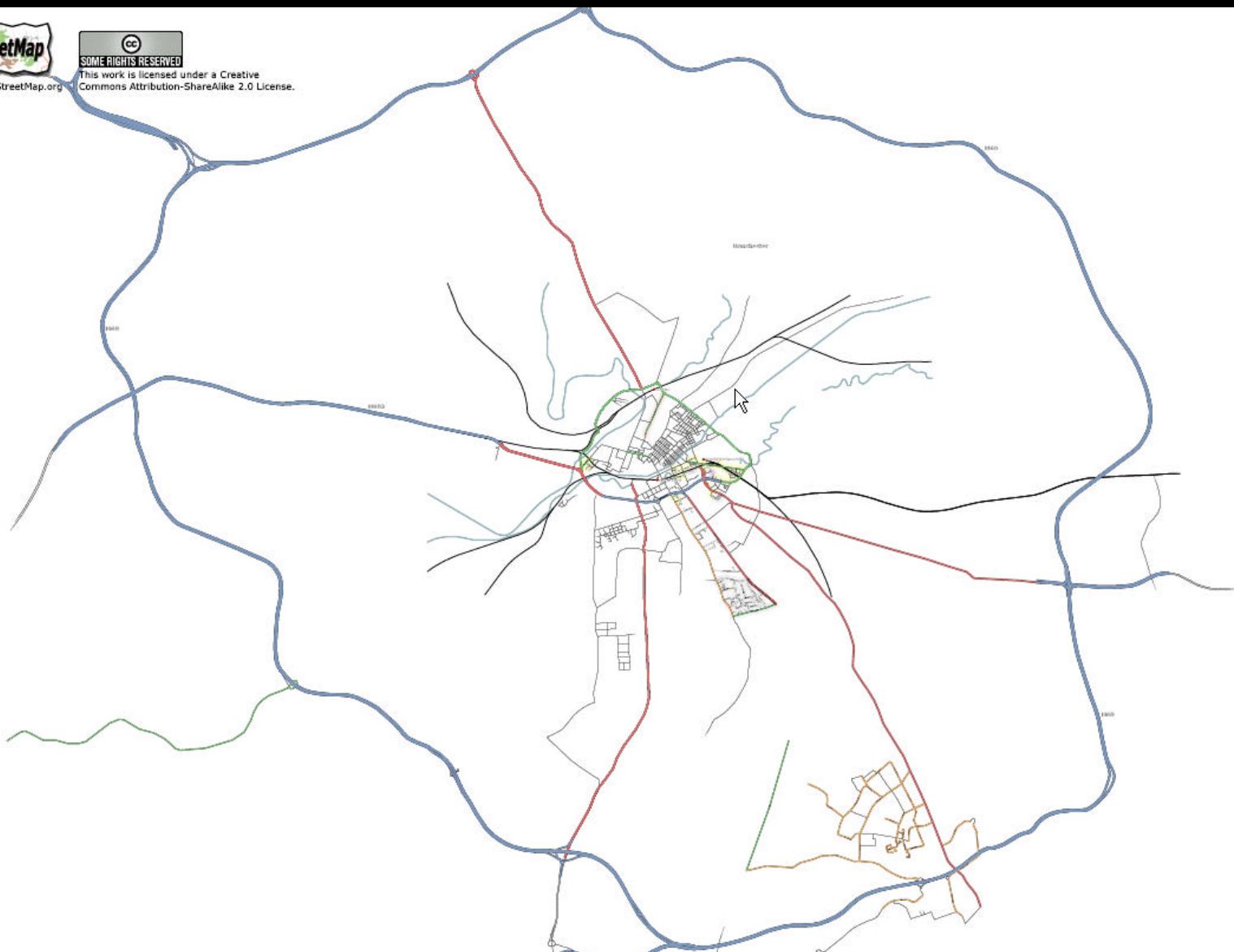
display name:

 [Make a Donation](#)

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Commons Attribution-ShareAlike 2.0 License.



Rendering – Manchester



# Imported Data

- **TIGER/LINE**

**§ 105. Subject matter of copyright: United States Government works**

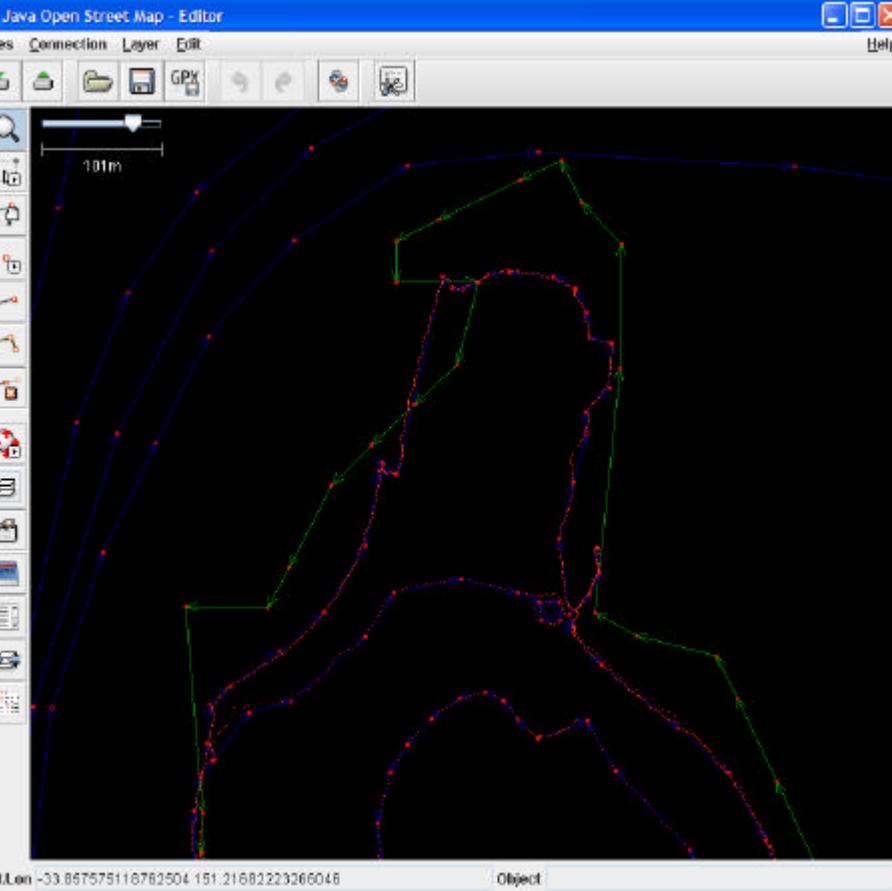
Copyright protection under this title is not available for any work of the United States Government, but the United States Government is not precluded from receiving and holding copyrights transferred to it by assignment, bequest, or otherwise.



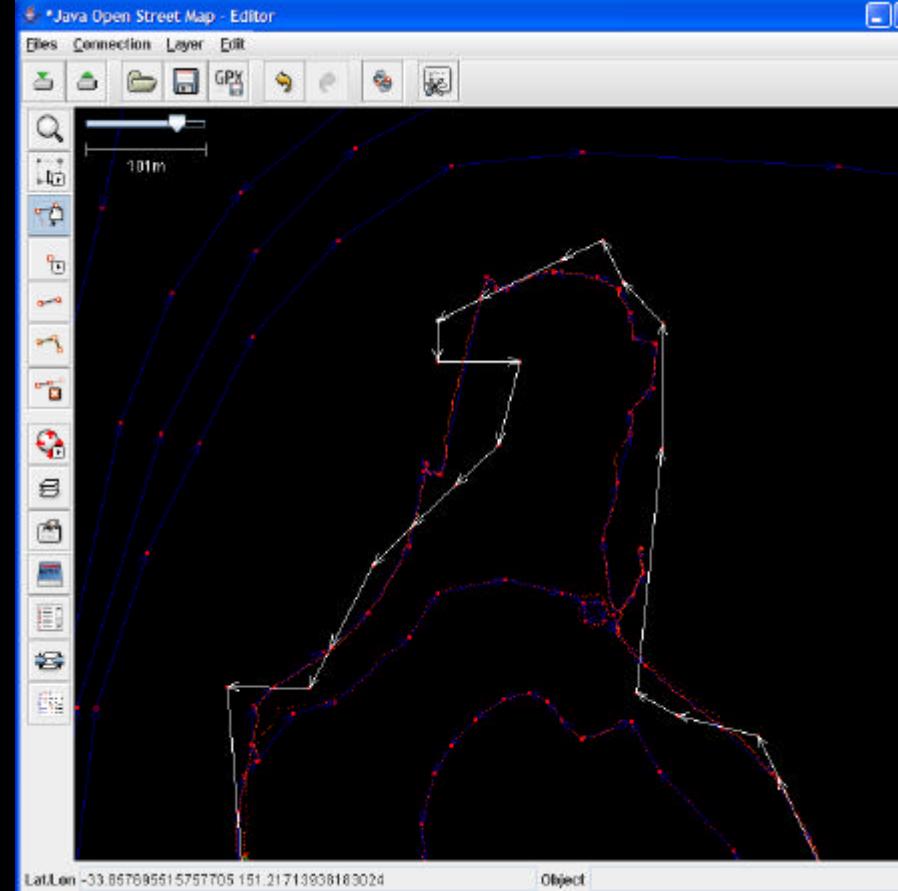


# Prototype Global Shoreline Data (PGS)

- Before adjustment



- Final import

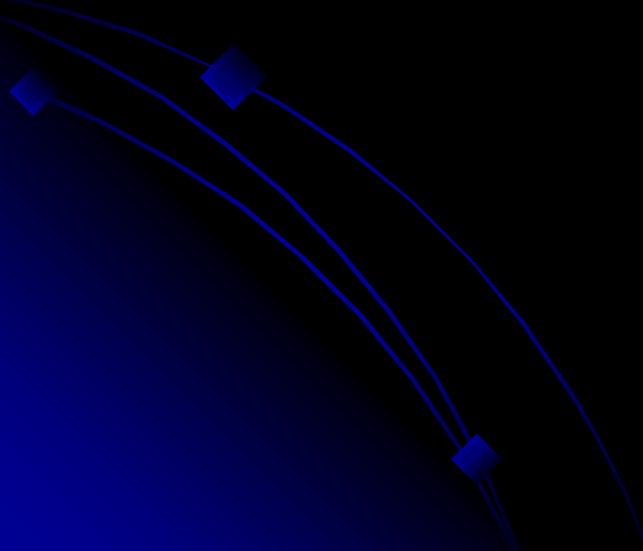


(NGA - Satellite Derived High Water Line Data)



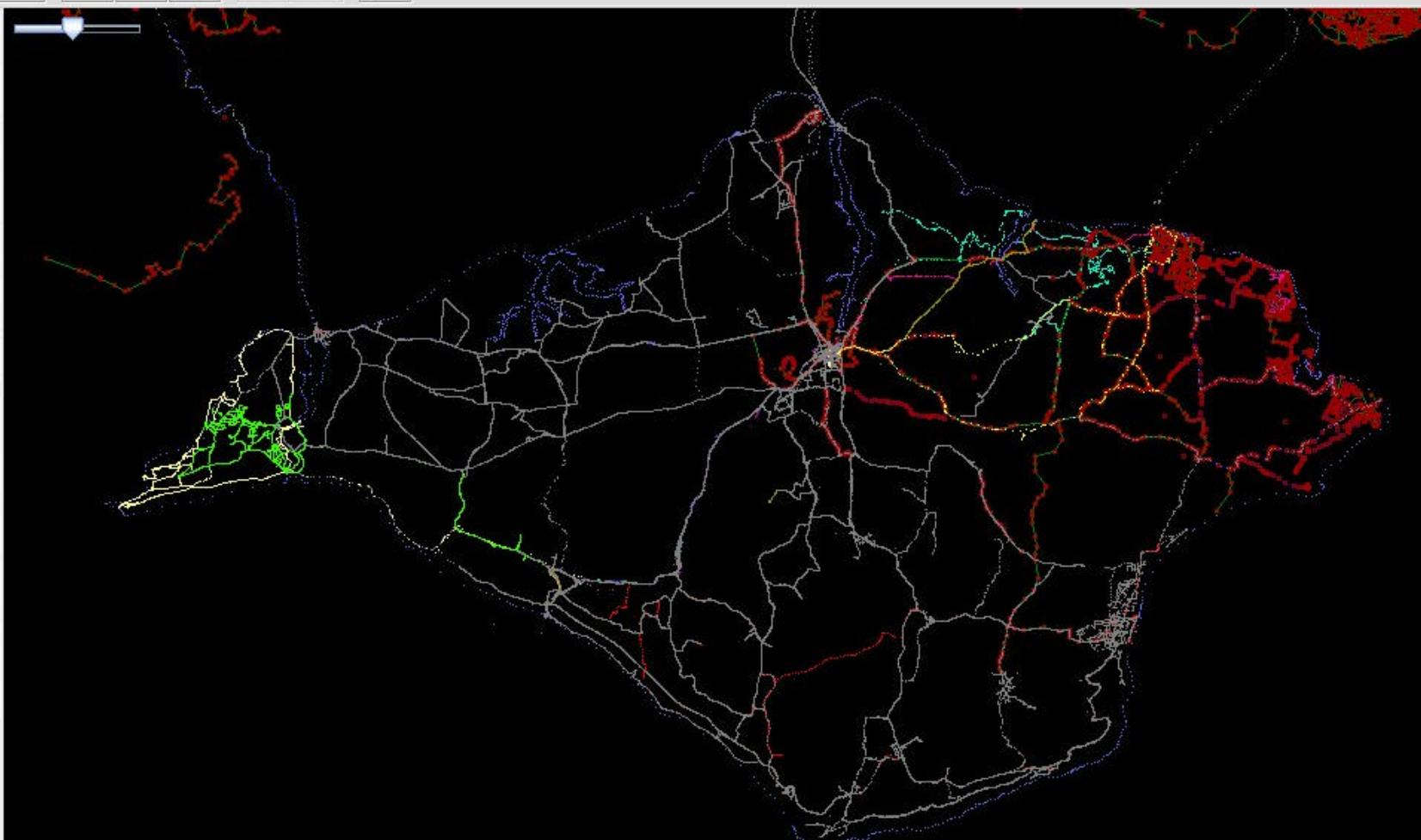
# Mapping Parties

OSM Workshops cum Community Mapping cum  
Social Event



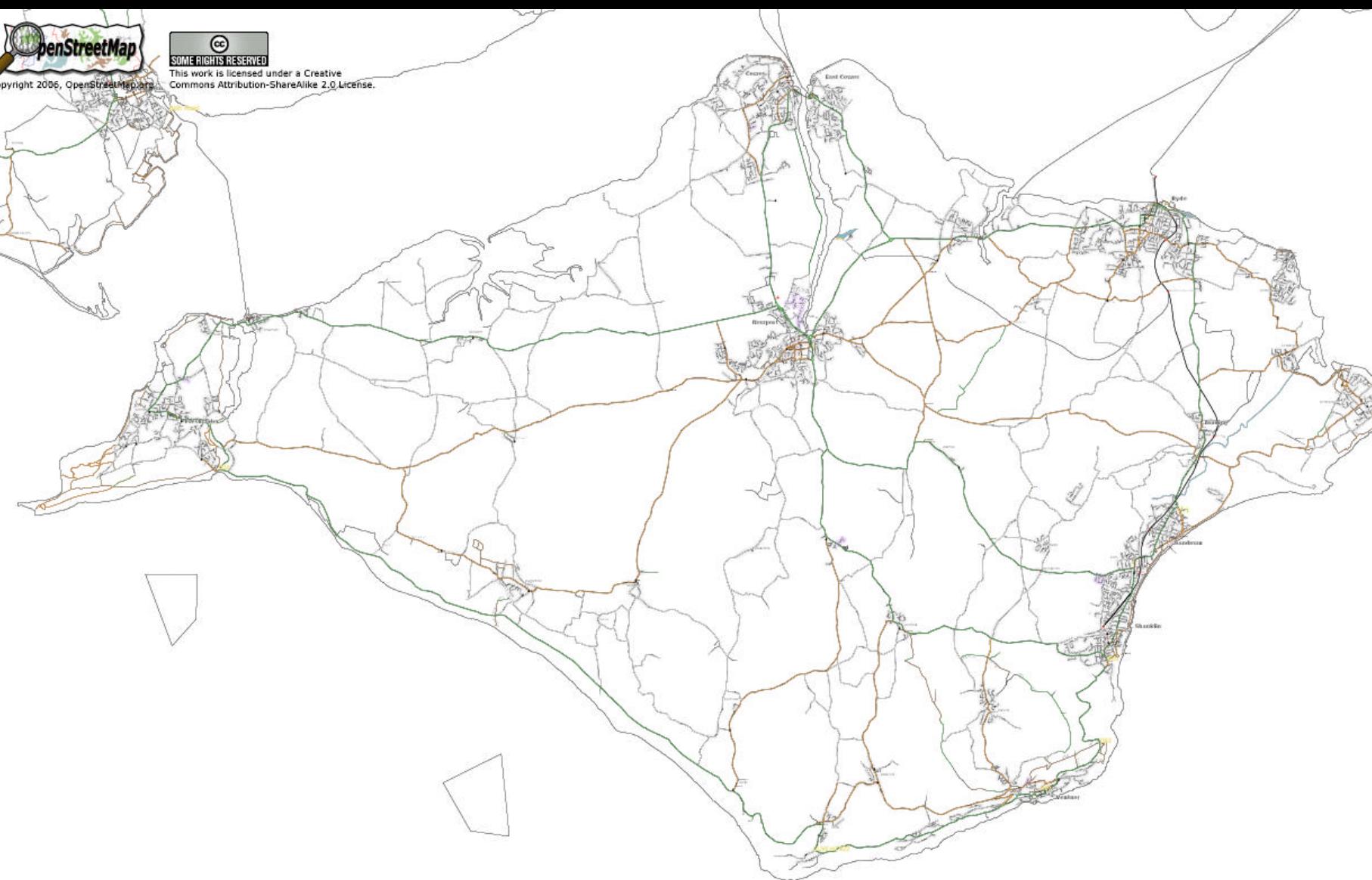
# Isle of Wight



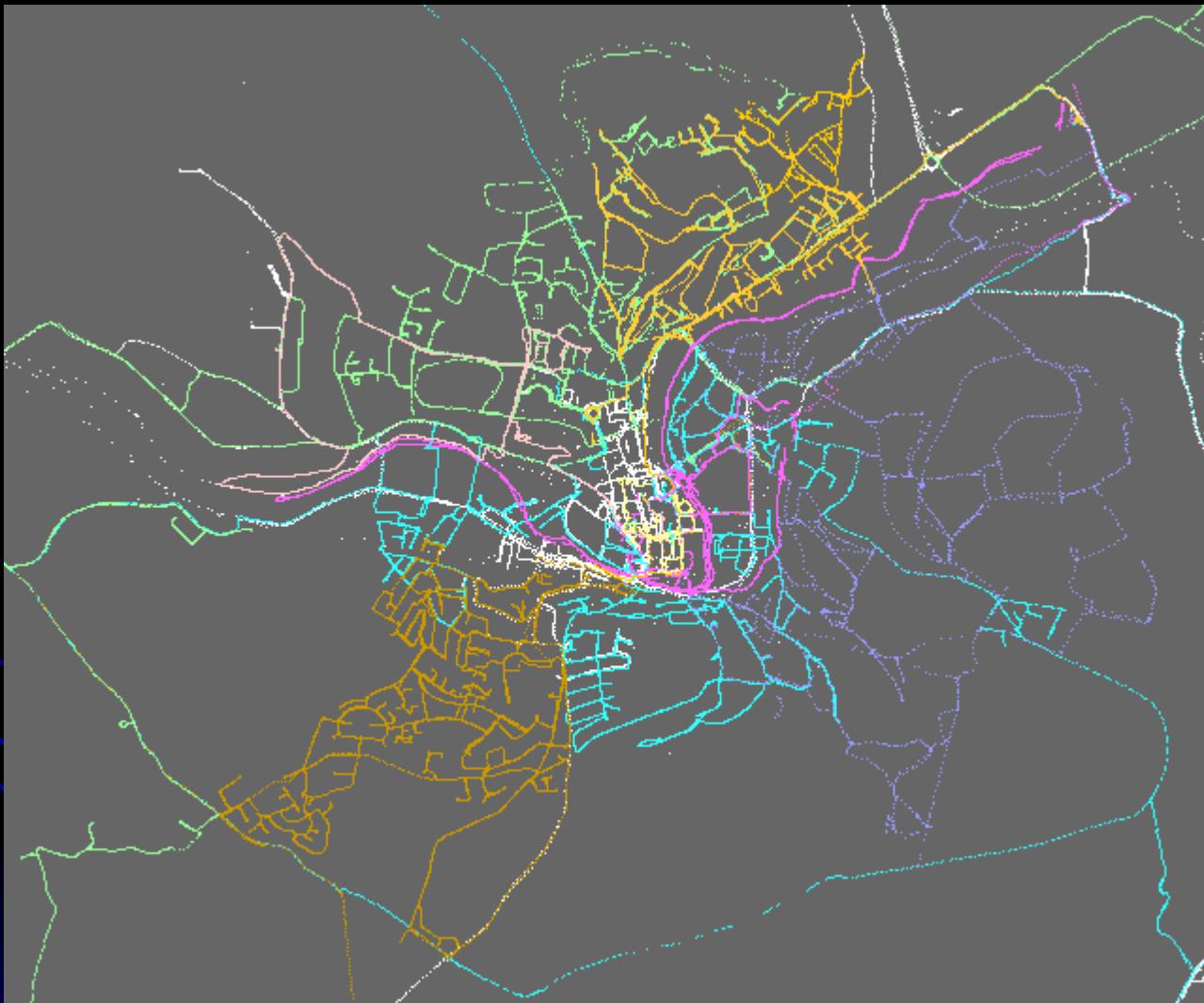
**Files** **Layer** **Edit**

Lat/Lon 50.60508257203862 -1.1324111275132578

Object



# Bath

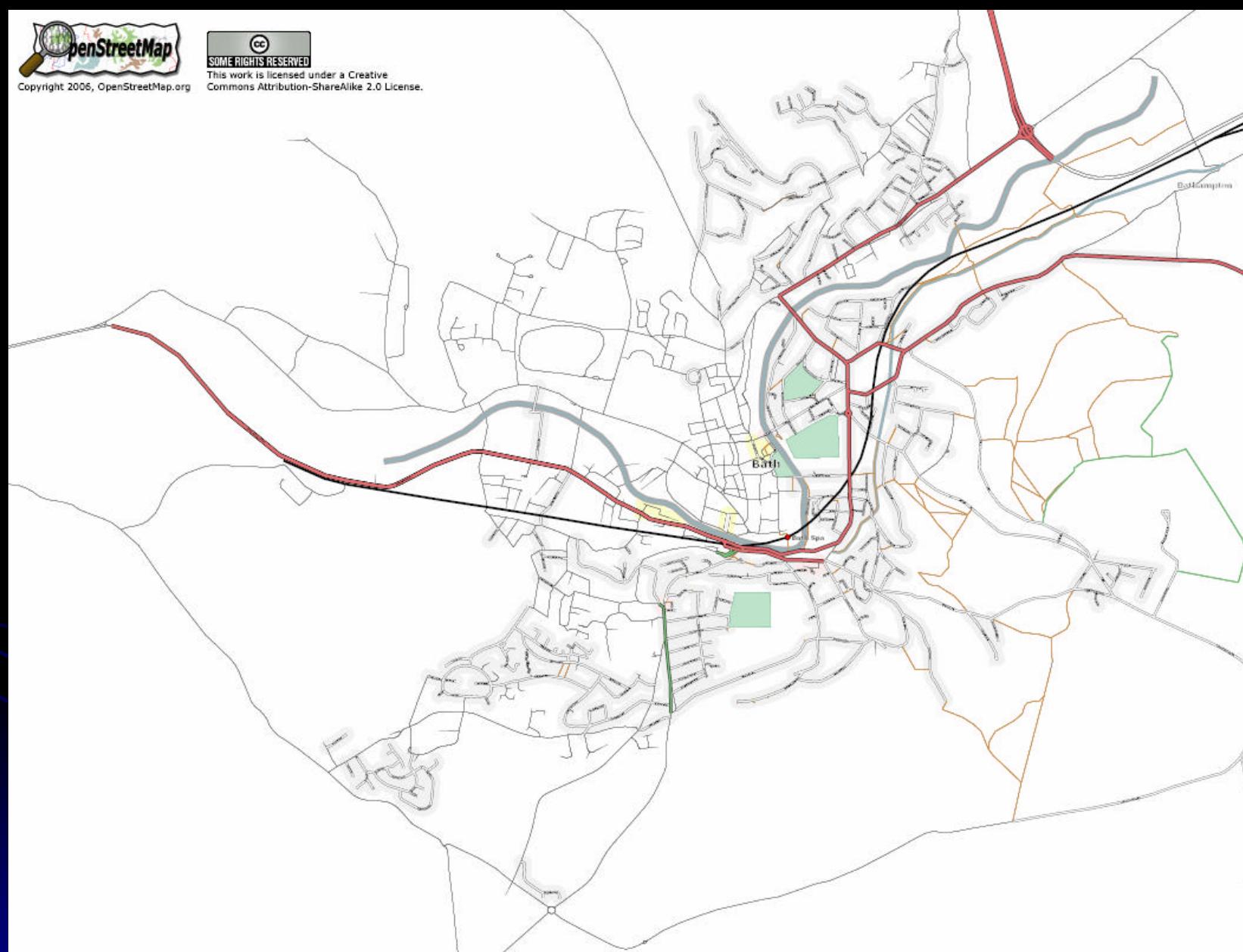




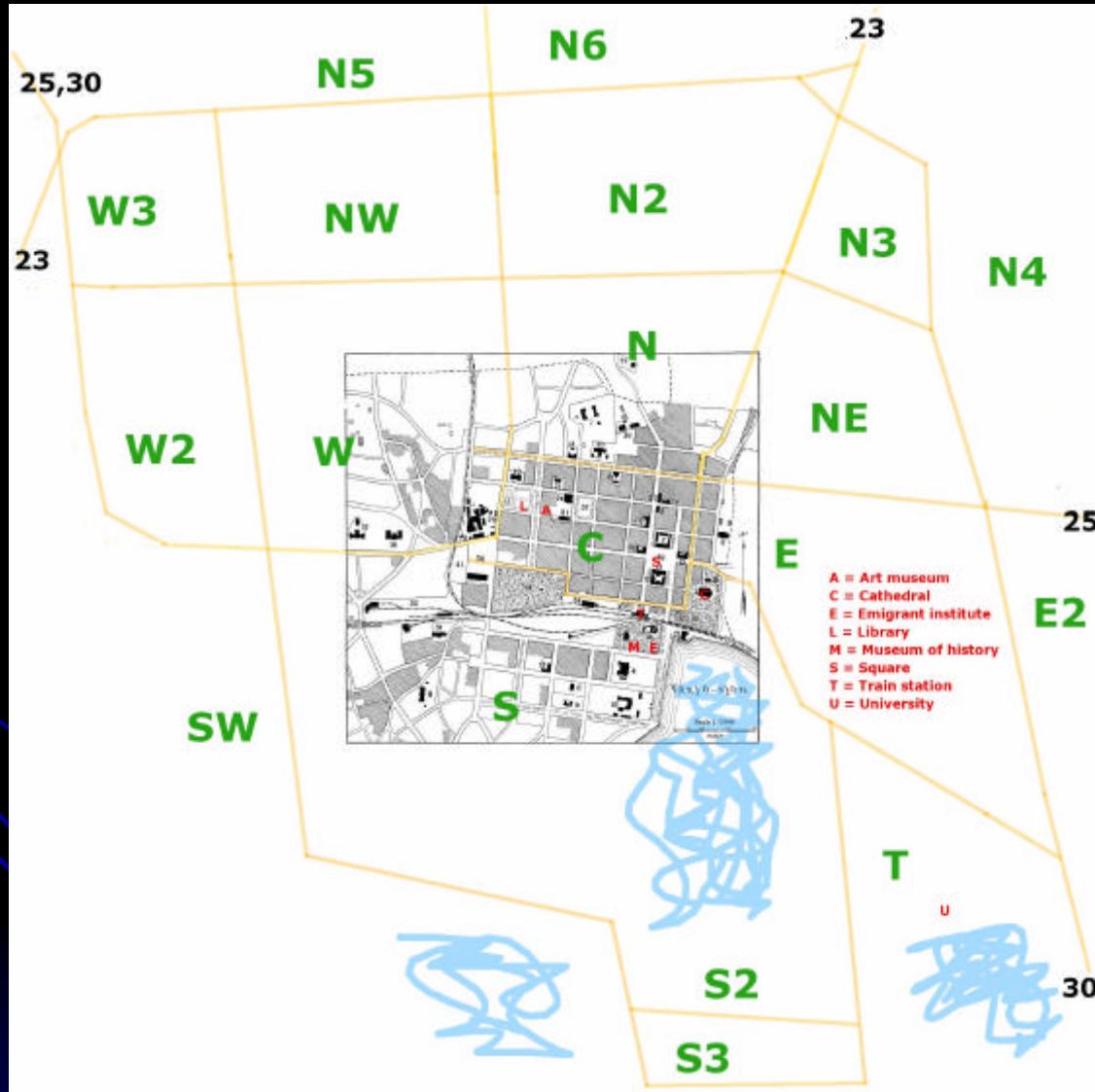
Copyright 2006, OpenStreetMap.org



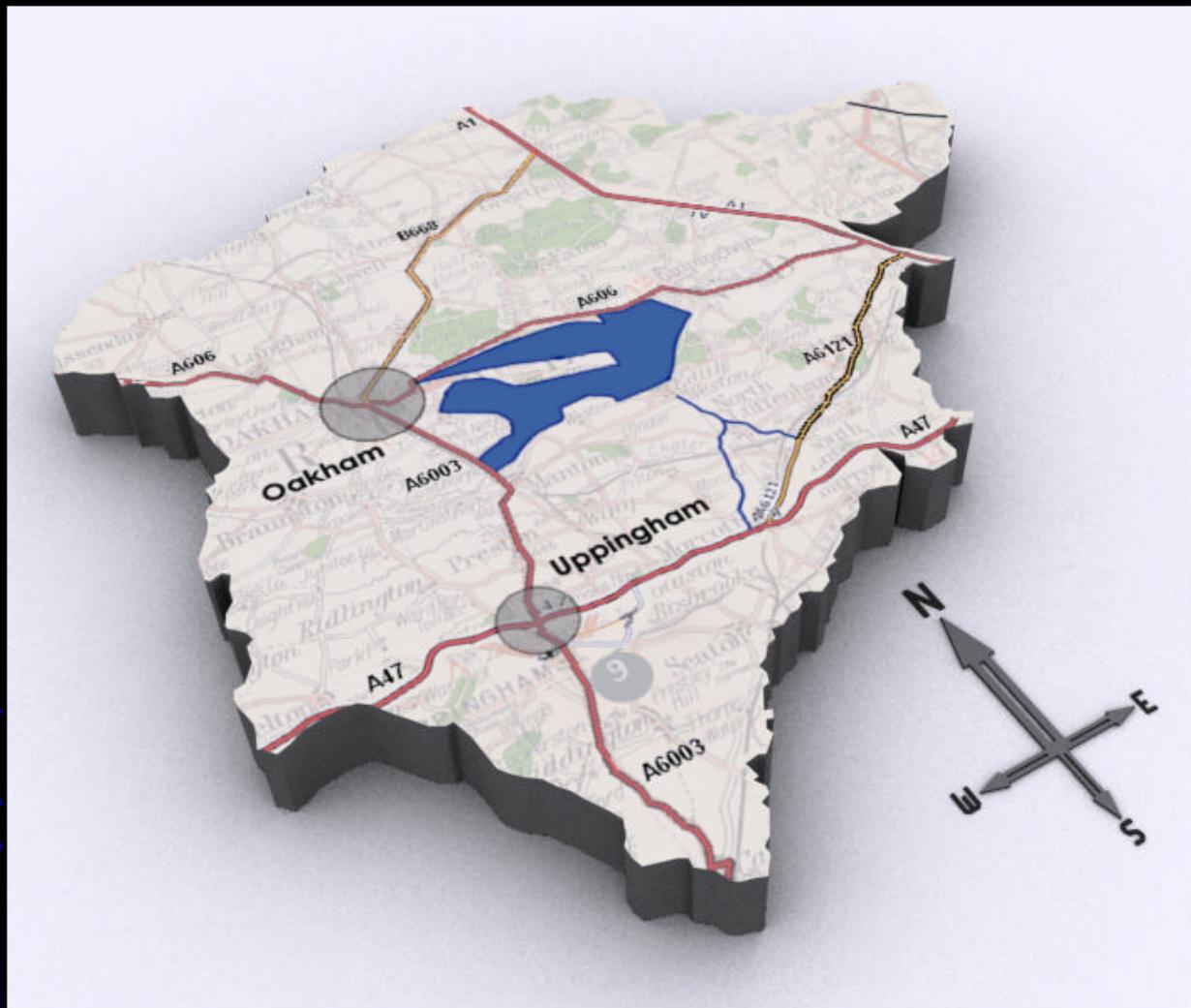
This work is licensed under a Creative  
Commons Attribution-ShareAlike 2.0 License.



# Växjö, Sweden



# Rutland



Sources - Geographia1920s.png  
Rutland 20060824.png  
RutlandCake.png

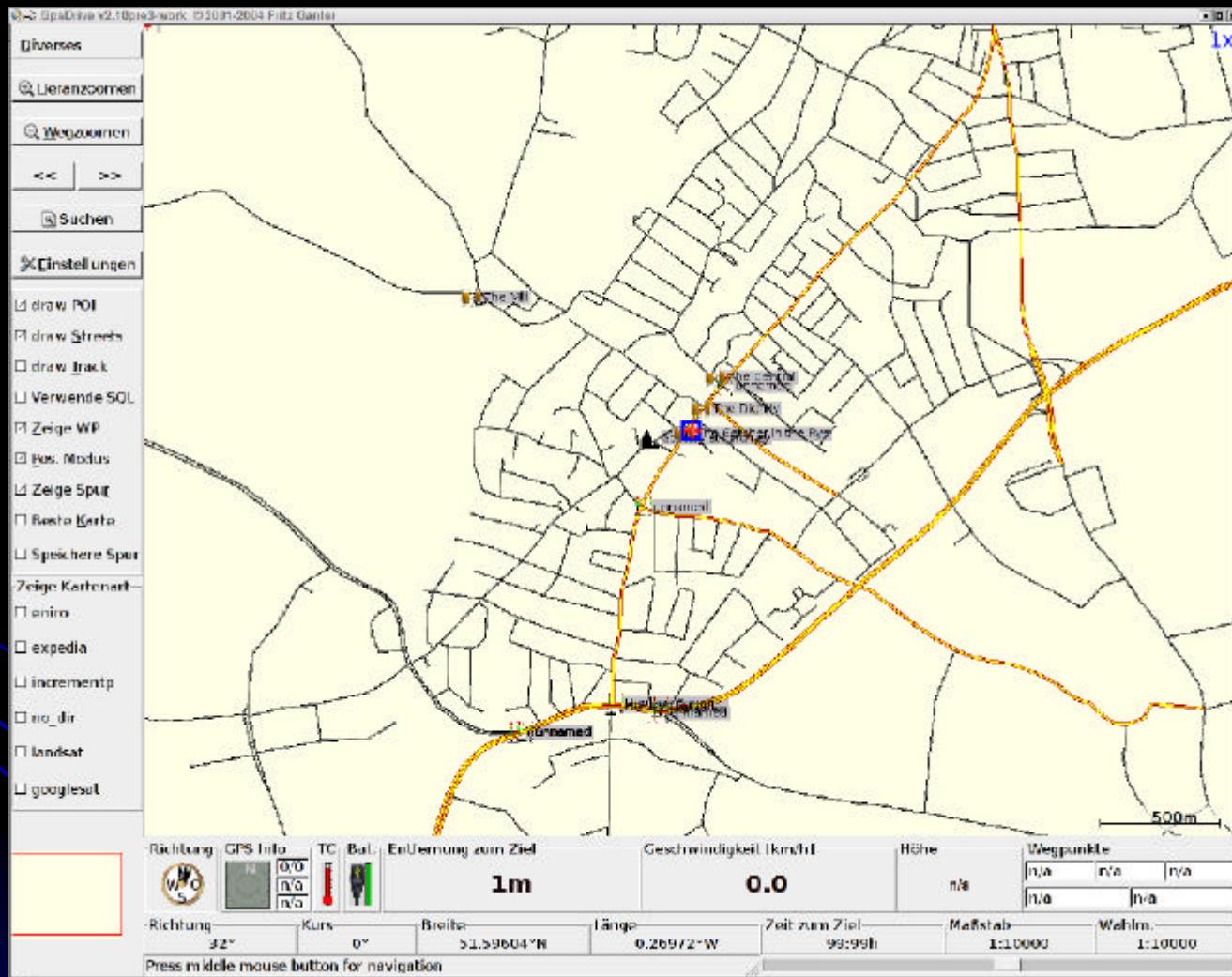


# Beyond Cartography

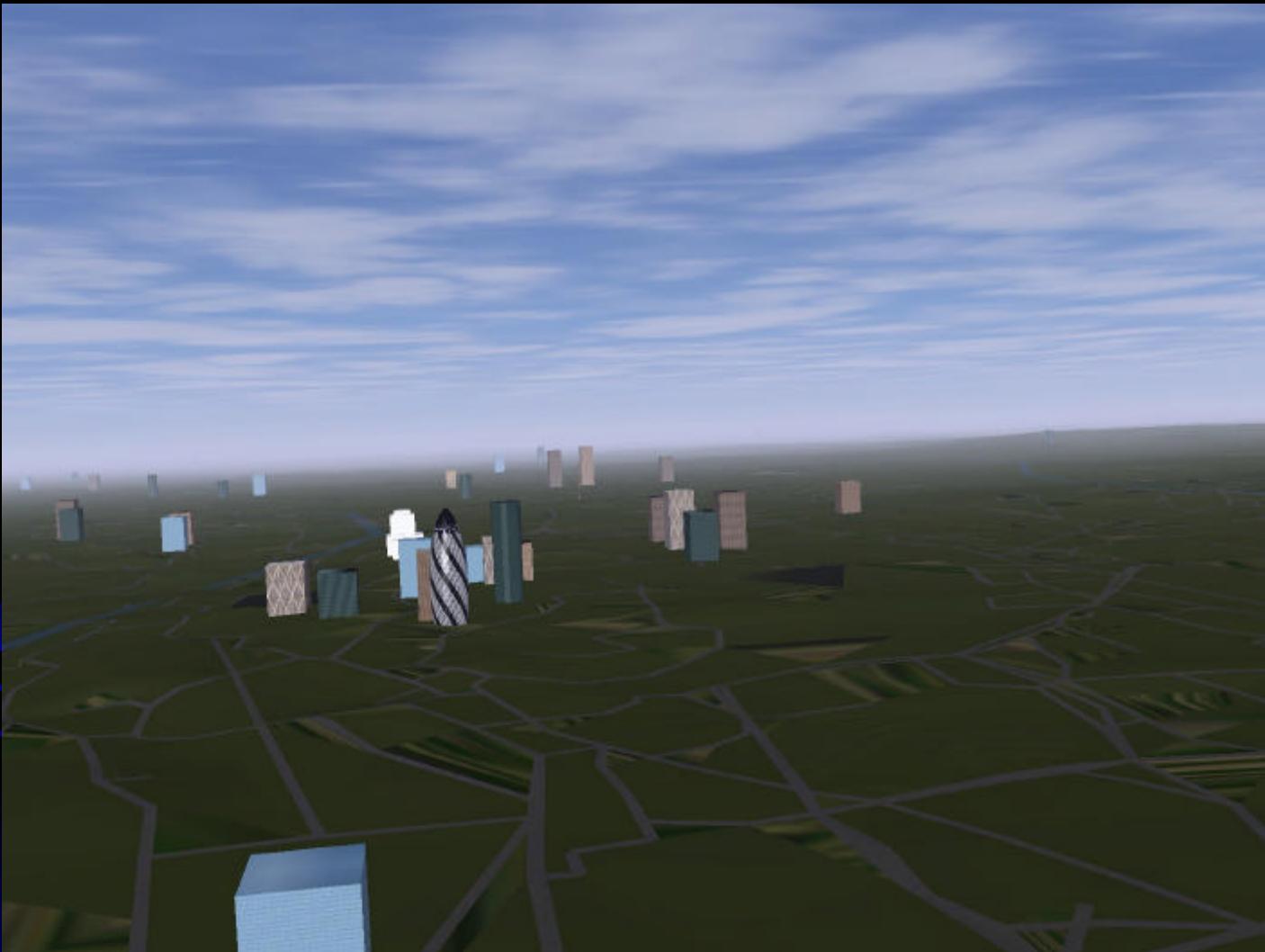
- REAL TIME DATA
  - RESTful API,
  - XML
- STATIC DUMP
  - planet.osm
  - XML
  - Binary



# Navigation



# Simulation



[www.openstreetmap.org](http://www.openstreetmap.org)

[wiki.openstreetmap.org](http://wiki.openstreetmap.org)

Thanks for Listening

Andy Robinson  
[andy@ukstreetwise.com](mailto:andy@ukstreetwise.com)

