



SPACE SYNTAX TOOLKIT FOR QGIS

INTRODUCTION AND RECENT DEVELOPMENTS

Jorge Gil
Stephen Law
Ioanna Kolovou
Abhimanyu Acharya

Space Syntax Laboratory - UCL
Space Syntax Limited

11th International Space Syntax Symposium
Fundação Calouste Gulbenkian, Lisbon
3rd July 2017

Introduction

Who we are

Jorge Gil MSc, PhD

Researcher UCL, Chalmers, TU Delft

Open Source GIS consultant and developer

Author ‘Space Syntax Toolkit’ for QGIS (2013 -)

Author ‘Confeego’ for MapInfo (2004 - 09)

Stephen Law MSc

Researcher, Turing Institute, UCL

Associate, Space Syntax Limited

Ioanna Kolovou MRes

Senior Consultant, Space Syntax Limited

Abhimanyu Acharya MSc

Senior Consultant, Space Syntax Limited

Introduction

Screenshot of the GitHub organization page for Space Syntax Limited.

SpaceGroupUCL / qgisSpaceSyntaxToolkit

Unwatch 11 Star 24 Fork 11

Code Issues 51 Pull requests 0 Projects 0 Wiki Insights

Space Syntax Toolkit for QGIS

162 commits 6 branches 13 releases 2 contributors GPL-3.0

Branches This organization Search Pull requests Issues Marketplace Gist

Space Syntax Limited

Original technology that forecasts the impacts of planning, transport, economic and design decisions on people and property for all scales of development

London http://www.spacesyntax.... london@spacesyntax.com

Repositories People 1

Pinned repositories

- Rcl-simplification-**
QGIS plug-in to simplify a road centre line for angular segment analysis
Python
- UrbanDataInputTool**
Urban Data Input Tool for QGIS
Python
- GateTransformer**
Gate Transformer QGIS plugin
Python
- SSS11-workshop**
Material for the 11th Space Syntax Symposium workshop
- MetricCatchmentAnalyser**
Network based metric catchment analysis
Python
- Rcl-topology-cleaner**
Python



Ioanna
Anafi



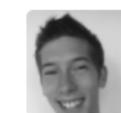
booboo
booboo18



\W/A\double-u-a



Jorge Gil
jorgegil



Laurens Versluis
laurensversluis



Abhimanyu Acharya
Morri1234

Introduction

Who are you?

Name and affiliation

Introduction

Who are you?

	Yes / Some	No
space syntax	6	1
depthmapX	5	2
QGIS	2	5
GIS	3	3

Note: based on 7 participant's responses.

Introduction

Objectives

Learn how to use the 'Space Syntax Toolkit' (SST) for QGIS

Learn about its latest features and tools

Explore various space syntax analysis workflows in QGIS

Main objective is not to...

Learn about space syntax theory and methods

Learn about the depthmapX software

Learn about specific space syntax applications in research

Introduction

Requirements

Participants must bring their own laptops in order to carry out the exercises, **with the necessary software pre-installed:**

QGIS 2.14 LTR (or higher):

<http://qgis.org/en/site/forusers/download.html>

depthmapXnet 0.35:

<http://archtech.gr/varoudis/depthmapX/?dir=depthmapXnet>

Space Syntax Toolkit:

<https://github.com/SpaceGroupUCL/qgisSpaceSyntaxToolkit/wiki/Installation>

Introduction

Programme

09:30	Introduction to the workshop
09:45	Overview of space syntax and the SST project
10:00	Task 1: Preparing and analysing axial models
11:00	Break
11:45	Task 2: Preparing and analysing road centre line models
12:30	Visualisation and discussion of the results
13:00	Lunch Break
14:00	Task 3: Preparing other urban data layers
15:00	Task 4: Connecting and analysing the various results
16:00	Discussion on QGIS methods for space syntax research
16:30	Close

Overview

Space syntax theory and the SST project

- Overview of relevant space syntax concepts
- Overview of the SST project
- SST installation in QGIS and downloading the sample data set

Space syntax theory

Relevant space syntax concepts

- Representing space: axial maps and unlinks
- Topology of space: graphs and centrality analysis
- Segment maps and angular centrality analysis
- Radius and distances

Space syntax theory

Representing space: axial maps and unlinks

The axial map is a linear representation of space, with the fewest longest set of straight lines that covers all spaces.



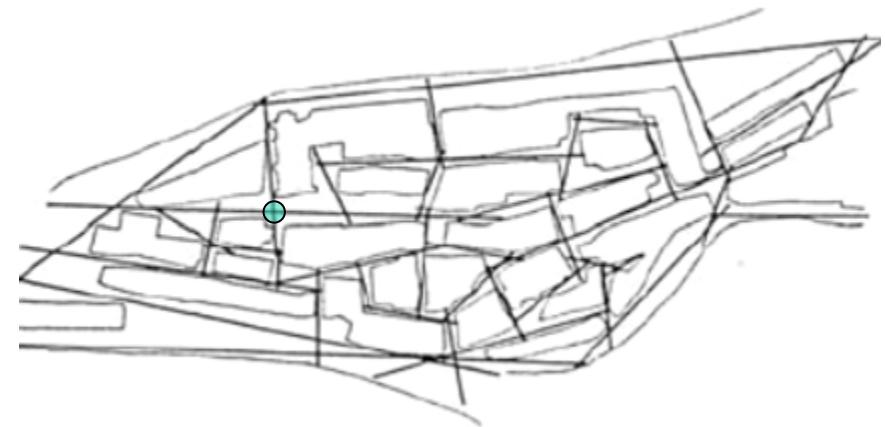
Source: Hillier, B., Hanson, J., 1984. The Social Logic of Space. Cambridge University Press, Cambridge, UK

Space syntax theory

Representing space: axial maps and unlinks



The axial map is a linear representation of space, with the fewest longest set of straight lines that covers all spaces.



Unlinks are features that mark a location where the intersection between two axial lines does not allow a change of direction.

Source: Hillier, B., Hanson, J., 1984. *The Social Logic of Space*. Cambridge University Press, Cambridge, UK

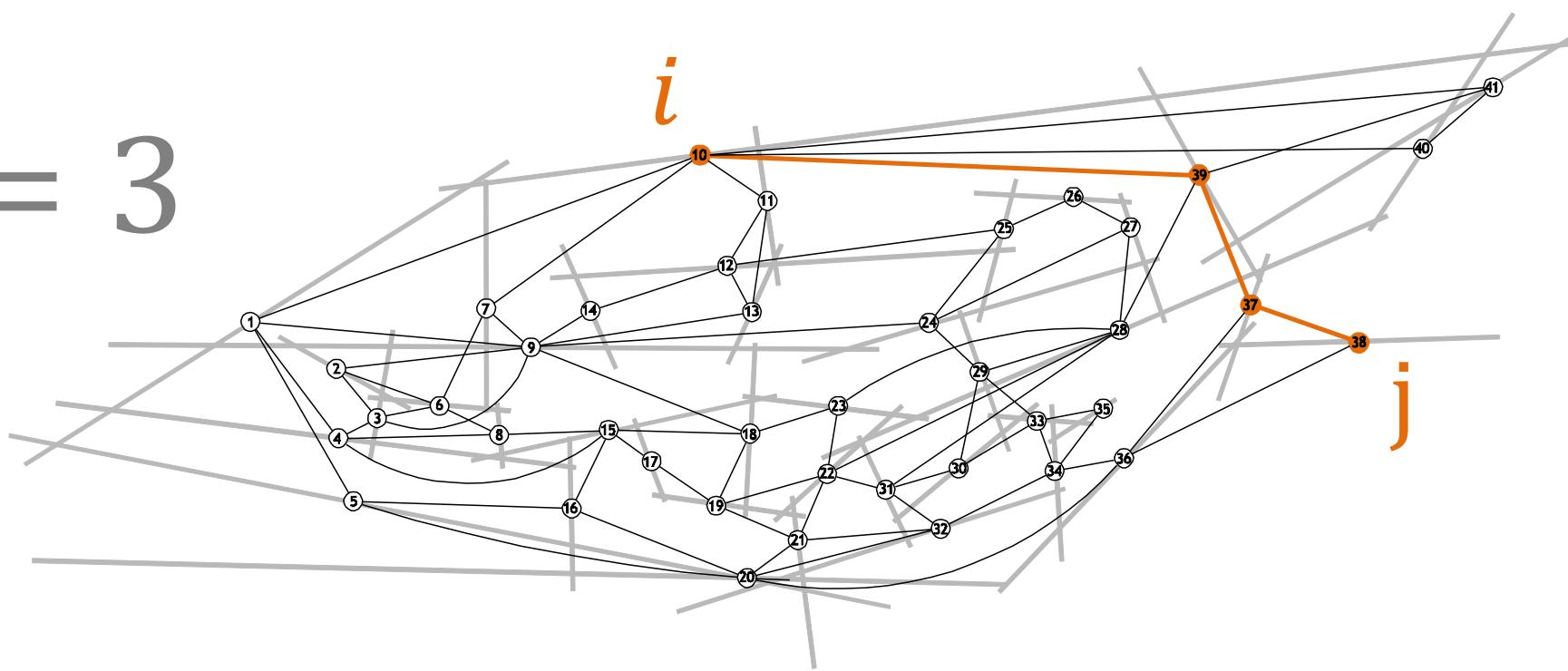
Space syntax theory

$$d_{ij} = 3$$

Topology of space: graphs and centrality analysis

Axial maps are translated into mathematical graphs where every line represents a node, and every intersection between lines represents an edge, or link.

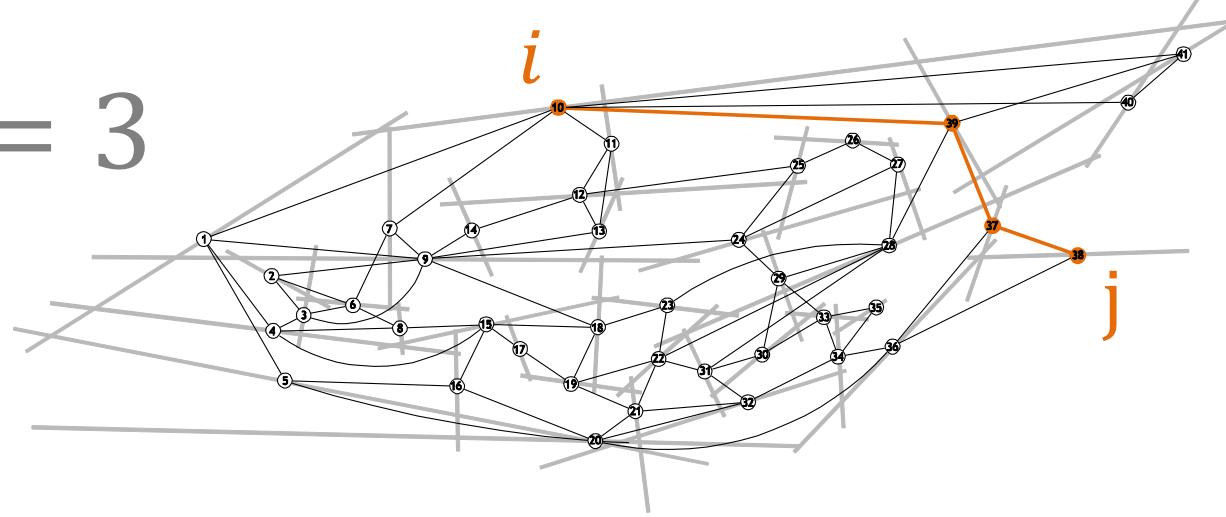
Where there is an unlink, no edge is created, because there is no intersection.



Space syntax theory

Topology of space: graphs and centrality analysis

$$d_{ij} = 3$$



Connectivity
(Degree centrality)

Number of connected nodes

Mean Depth → Integration
(Closeness centrality)

Average distance to all other nodes

Choice
(Betweenness centrality)

Number of times on the shortest path
Between pairs of nodes

$$CON_i = \sum_{i \sim j} d_{ij}$$

$$MD_i = \frac{1}{N-1} \sum d_{ij}$$

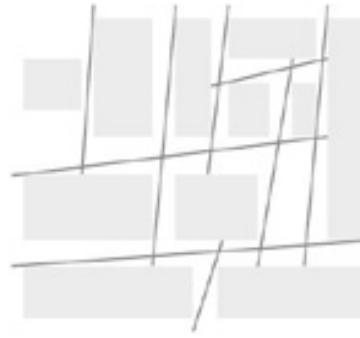
$$C_i = \frac{n_{jk}(i)}{n_{jk}}$$

Space syntax theory

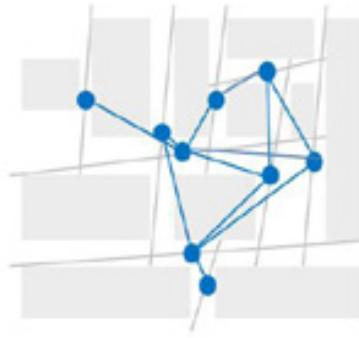
Topology of space: graphs and centrality analysis



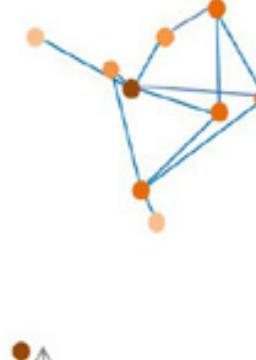
a.



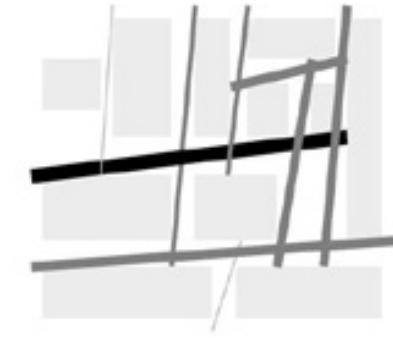
b.



c.



Higher connectivity



e.

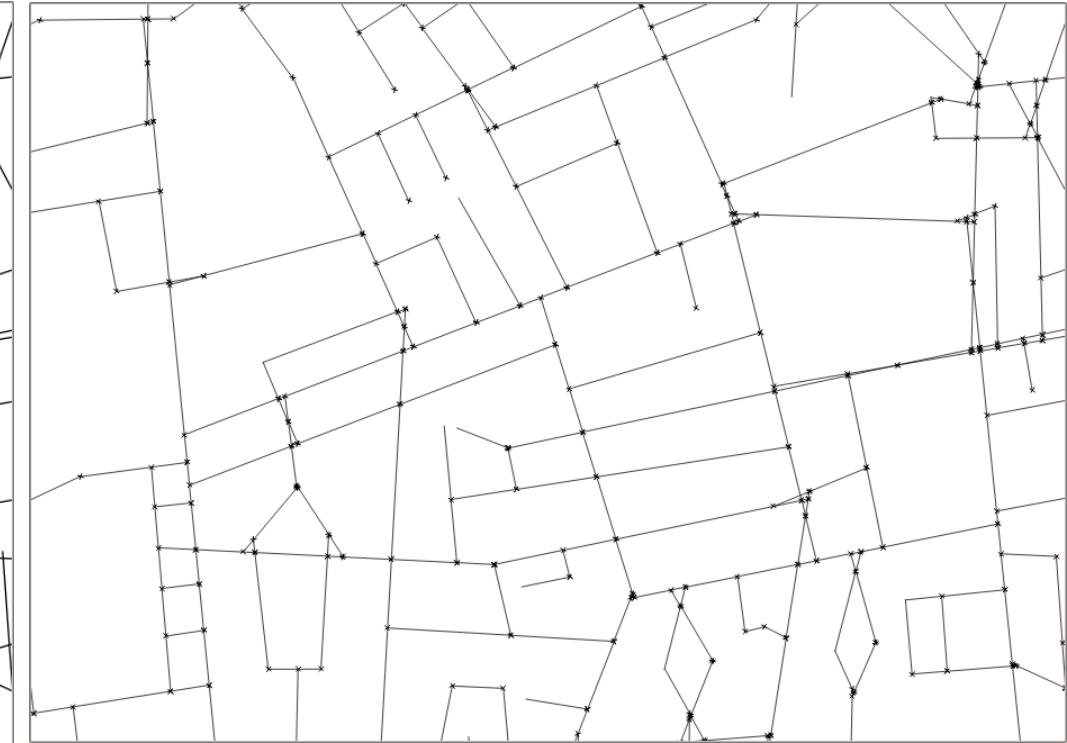
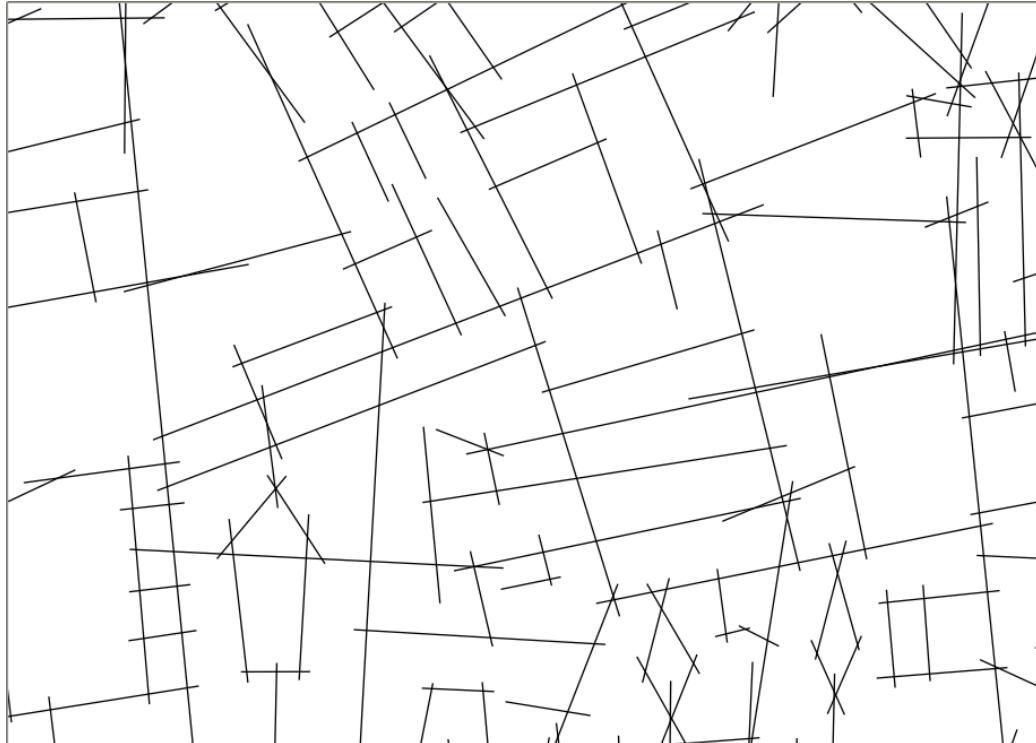
Figure 2.2 The axial representation of Space Syntax. An urban space represented by the fewest and longest axial lines (b), axial lines are represented by a graph (c), the graph Connectivity is highlighted in (d & e).

Source: Al-Sayed, K., Turner, A., Hillier, B., Iida, S., Penn, A., 2015. Space Syntax methodology. Bartlett School of Architecture, UCL, London.

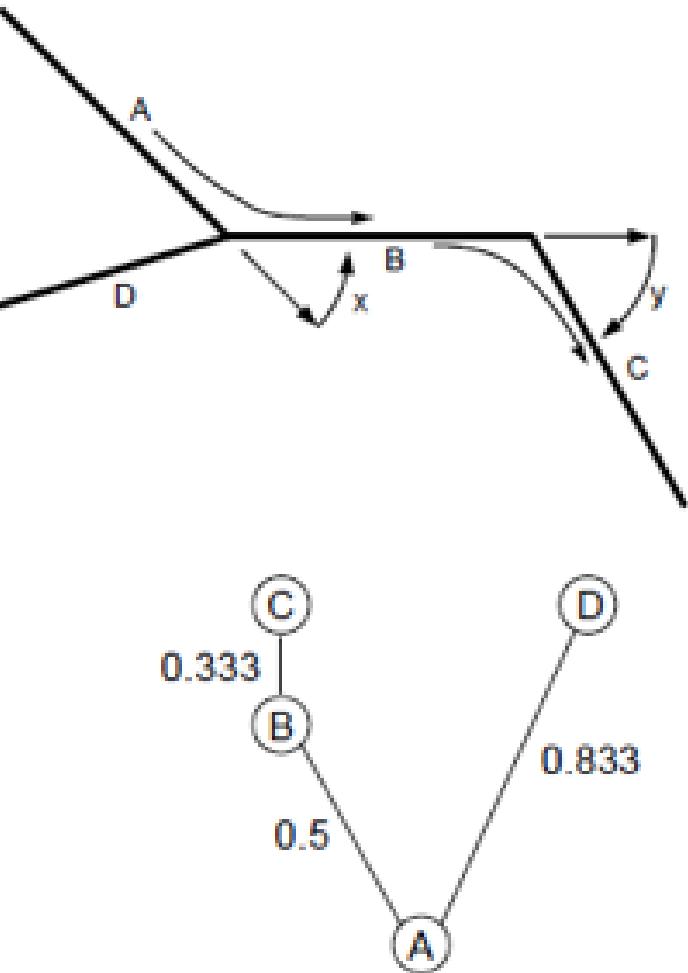
Segment maps and angular analysis

The segment map is the result of a transformation of the axial map, where the lines are broken at every intersection:

- to obtain a more fine-grained measurement on long axial lines;



Space syntax theory



Segment maps and angular analysis

The segment map is the result of a transformation of the axial map, where the lines are broken at every intersection:

- to obtain a more fine-grained measurement on long axial lines;
- to allow the analysis of the different angles of intersection between axial lines

¹⁸ Diagram
source: Turner, A.
(2005) Could A
Road-centre Line
Be An Axial Line
In Disguise?

Space syntax theory

Radius and distance

The graph analysis can be carried out to all nodes in the graph, or just to nodes within a certain distance from a source.

This cut-off point is called the RADIUS of analysis. To all nodes the radius is called 'Radius N'.

The type of COST used to calculate the distance of shortest paths and to determine the radius can vary, depending on the model:

Cost	Distance	Radius
Topological	Axial	Axial
Angular	Segment	
Metric		Segment

Axial analysis: distance is always *Topological*, for paths and radius.

e.g. Axial Integration R3, or Axial Choice RN

Segment analysis: distance can be topological, metric or angular. BUT the standard in space syntax research is, *Angular path distance*, with *Metric radius distance*.

e.g. Segment Angular Choice R800m

The SST Project

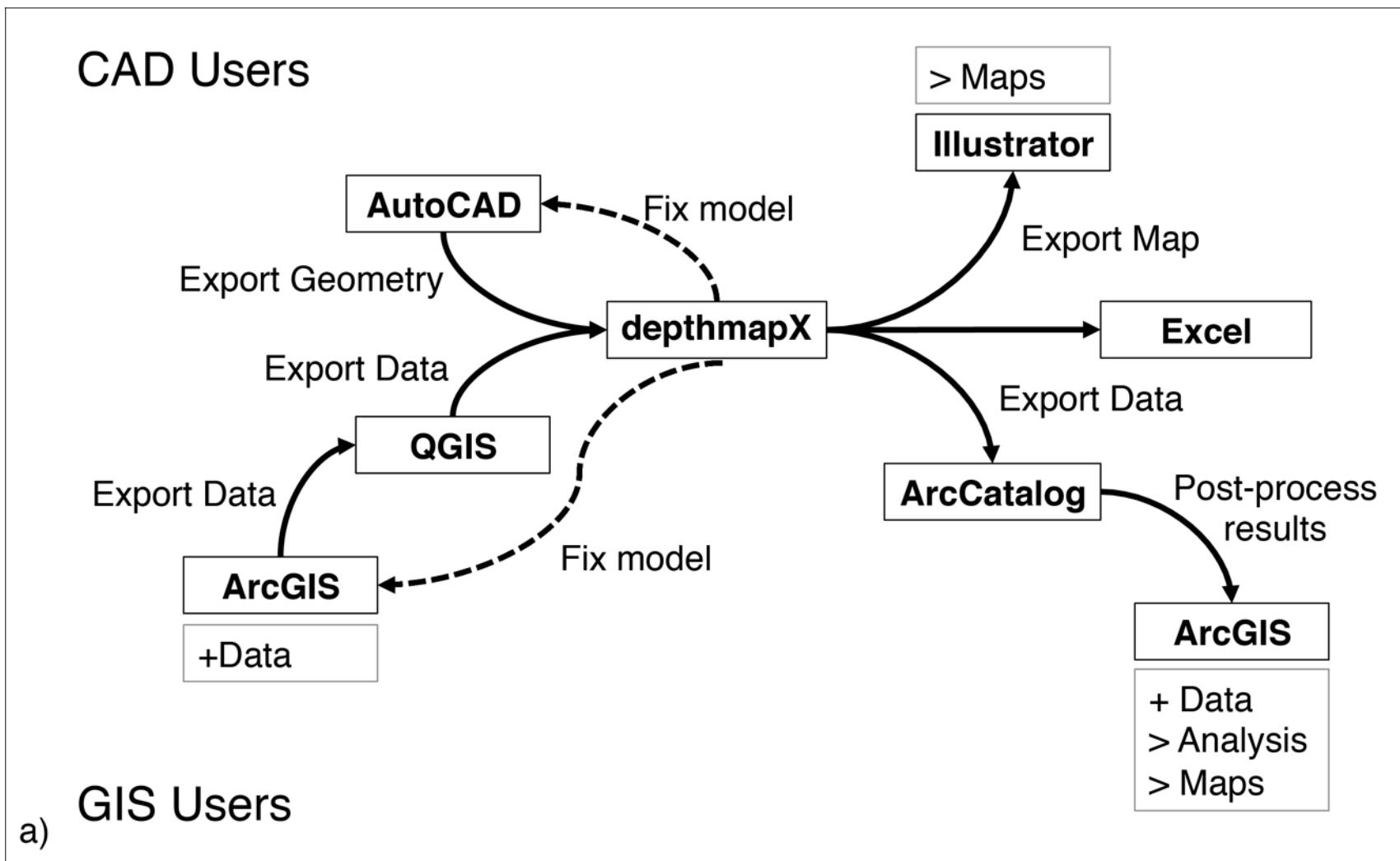
Overview of the project

- An open source project for space syntax education, research and practice
- Initiated by the Space Syntax Laboratory, UCL
- For the space syntax community
- *WITH* contributions from the space syntax community

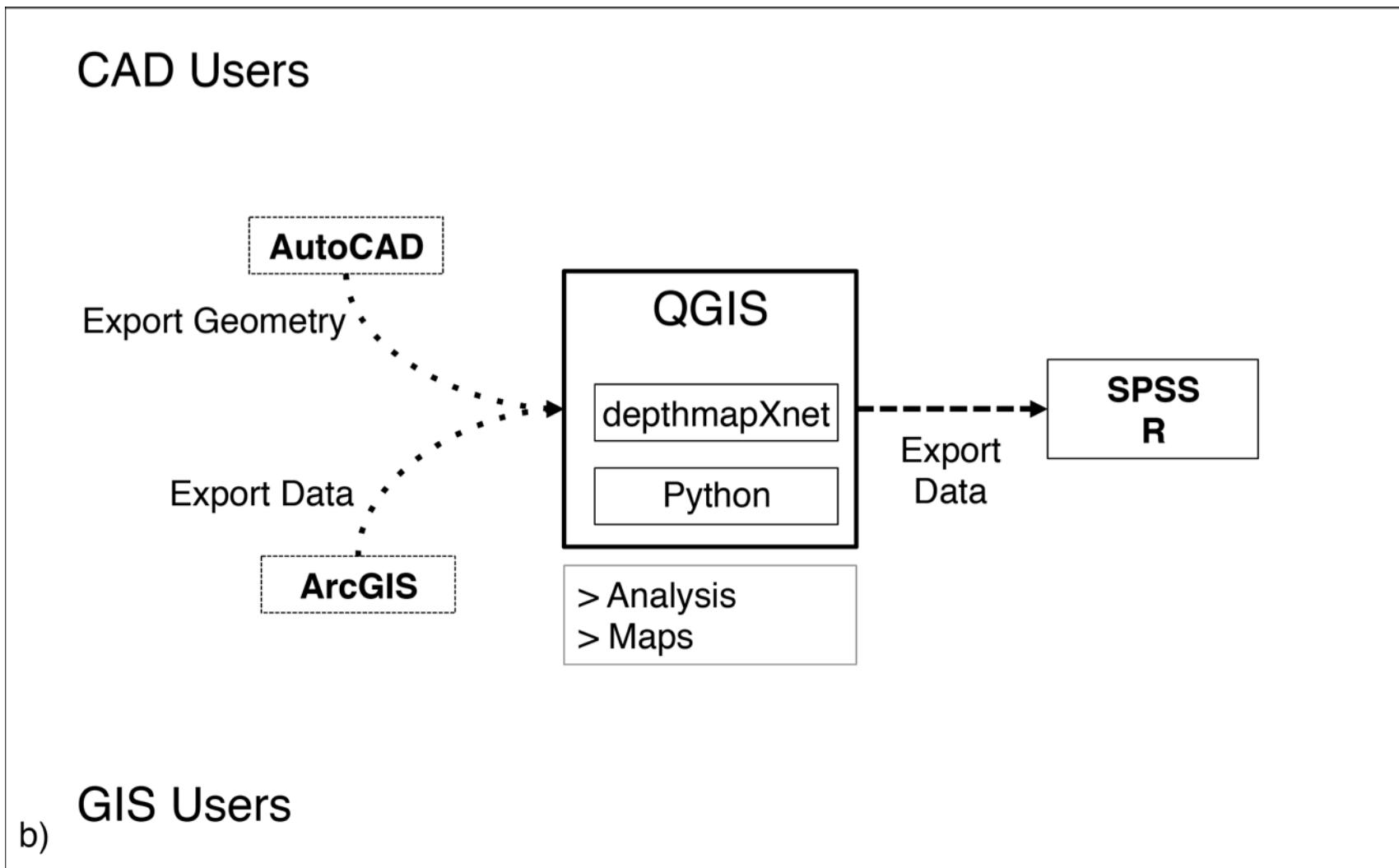
Aims of the project

- *Integrate* space syntax spatial analysis (`depthmapX`) with QGIS
- *User friendly* for students: clear and linear workflows
- *Flexible* for researchers: analytic options and exploratory depth
- *Operational* for practice: robust, fast and optimised workflows

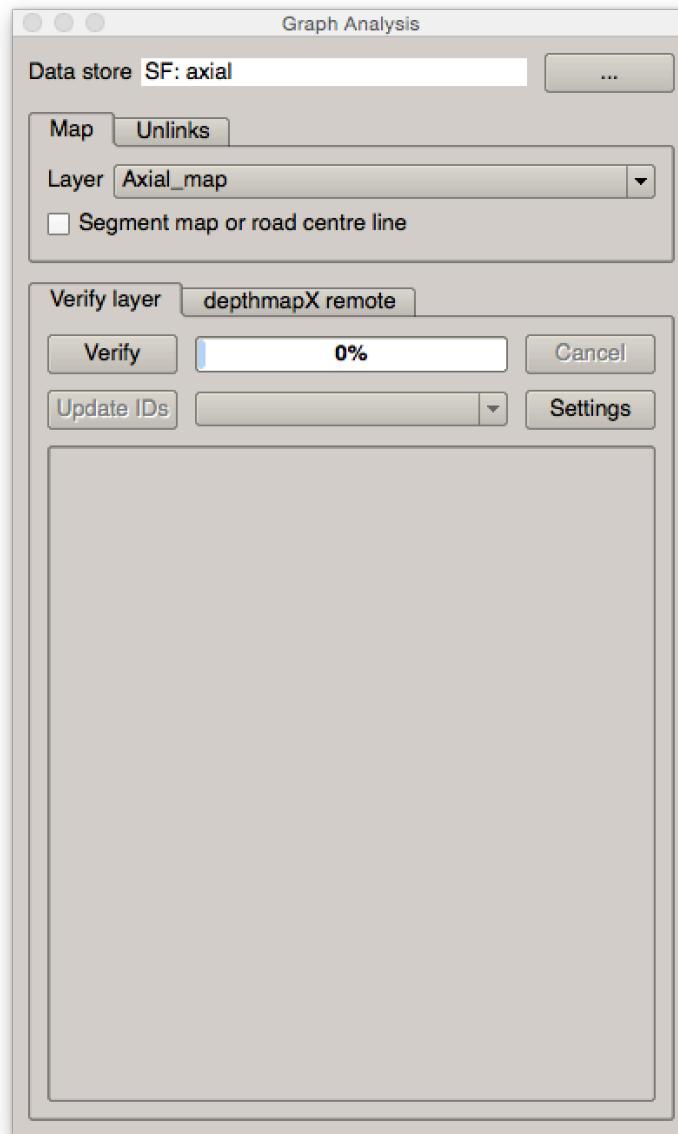
The SST Project



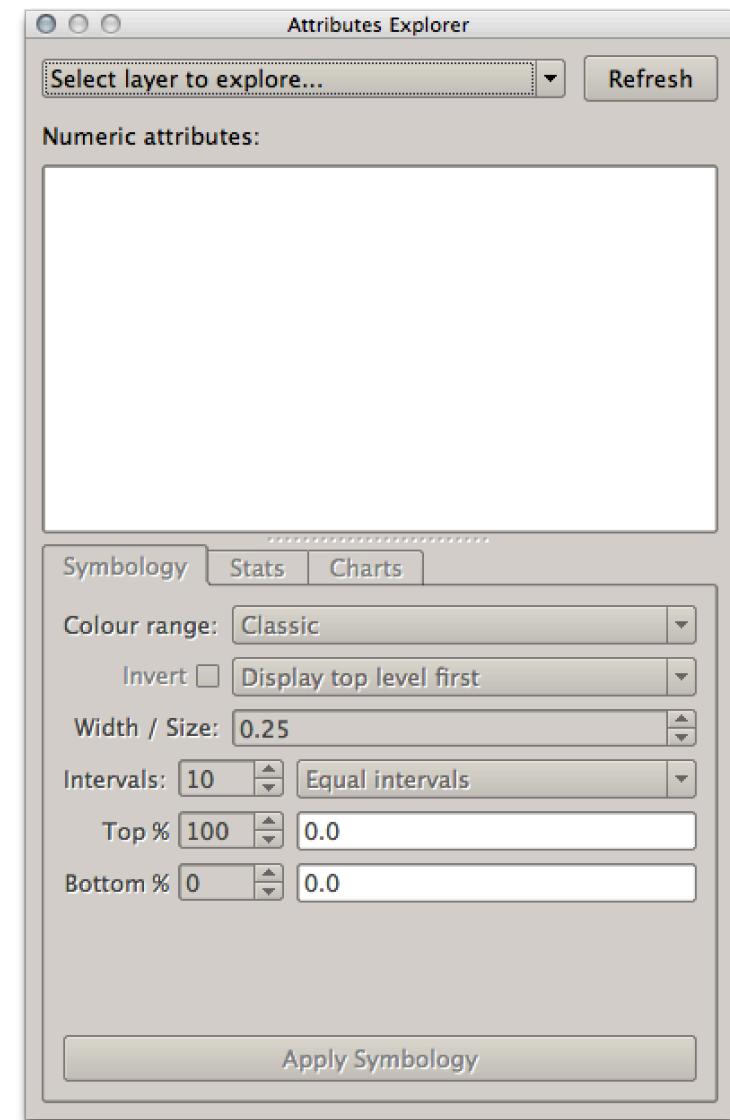
The SST Project



Original tools: SST version 0.1.x

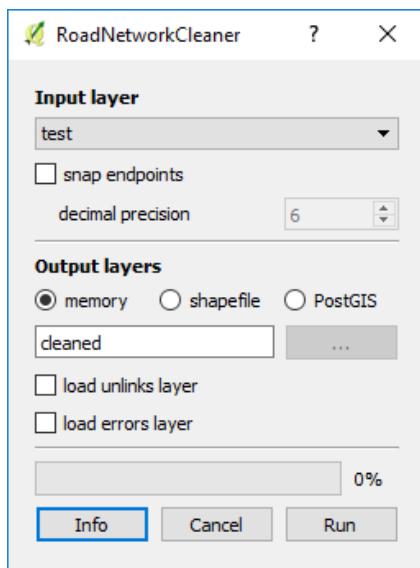


Graph Analysis

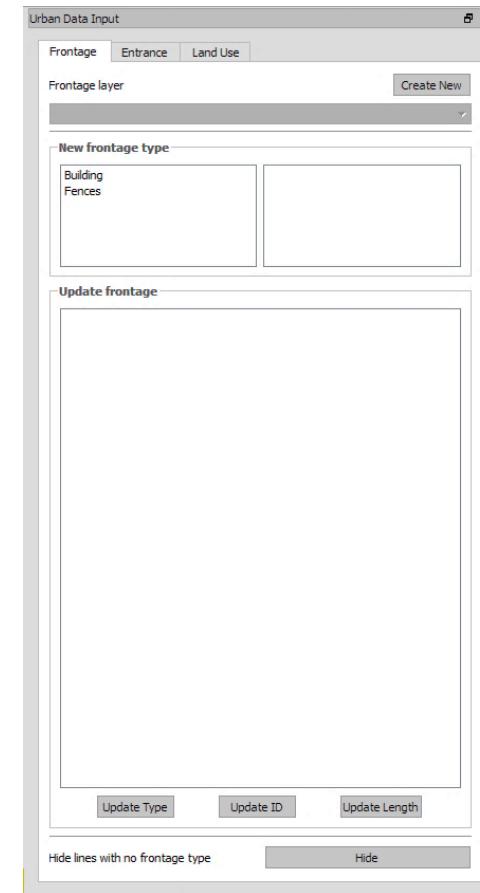


Attribute Explorer

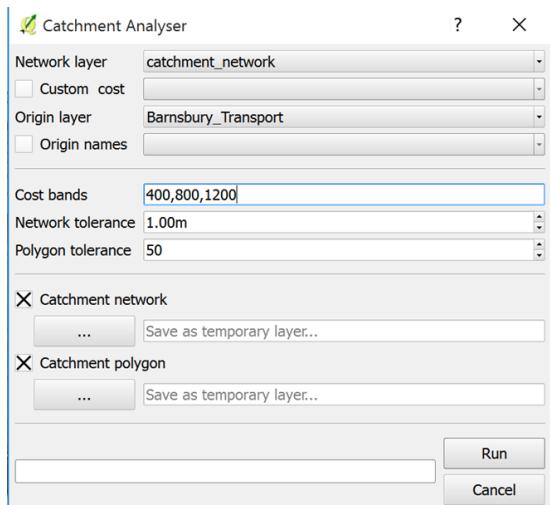
New Set of tools: SST version 0.2.0



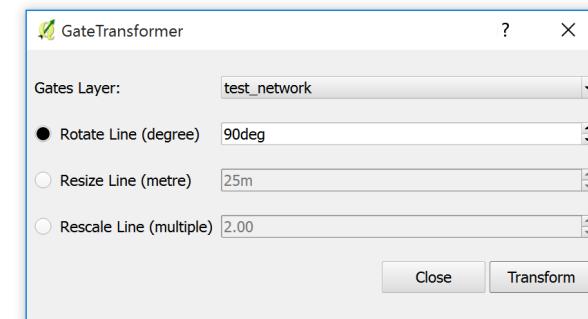
Road network cleaner



Urban Data Input Tool

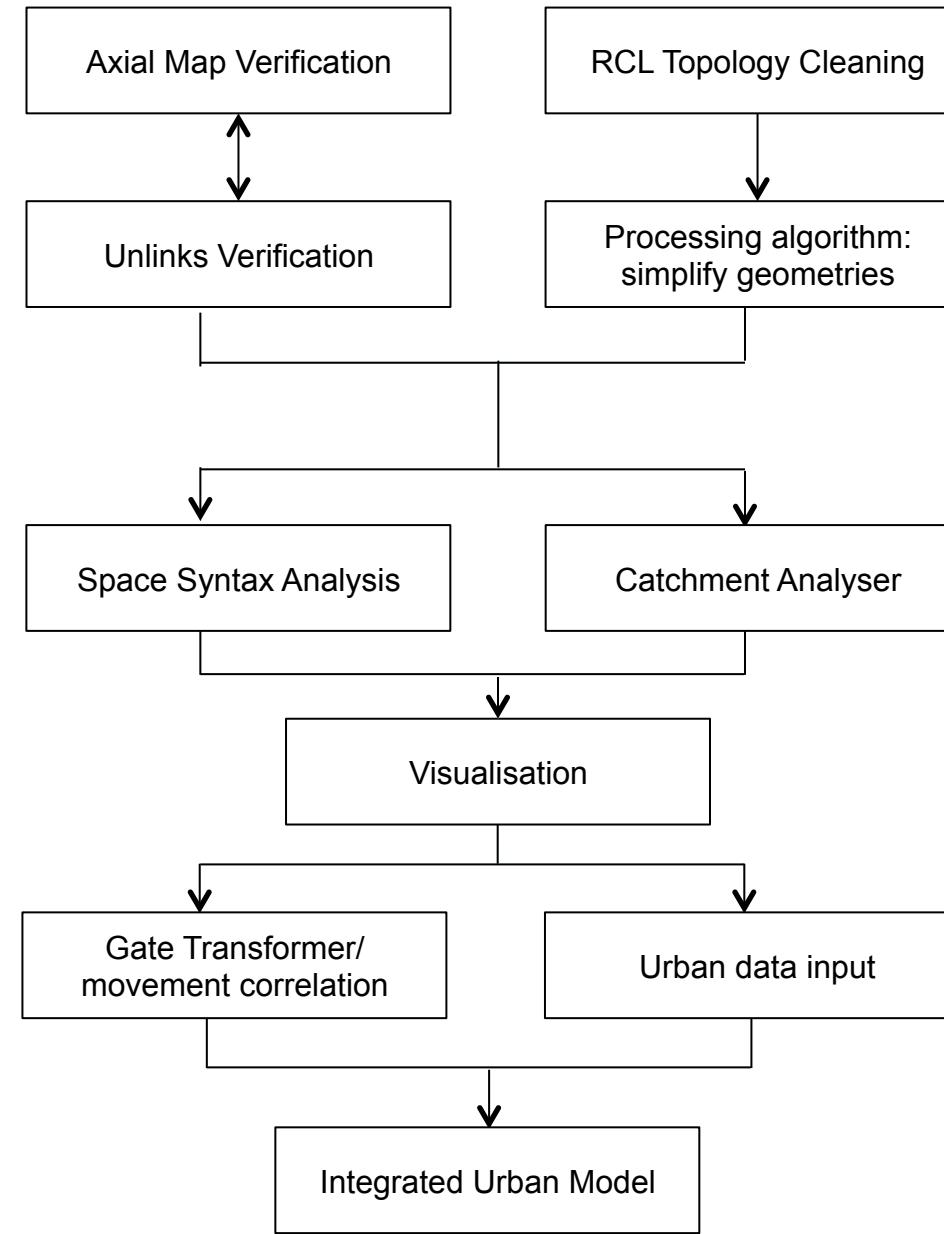


Catchment Analyser

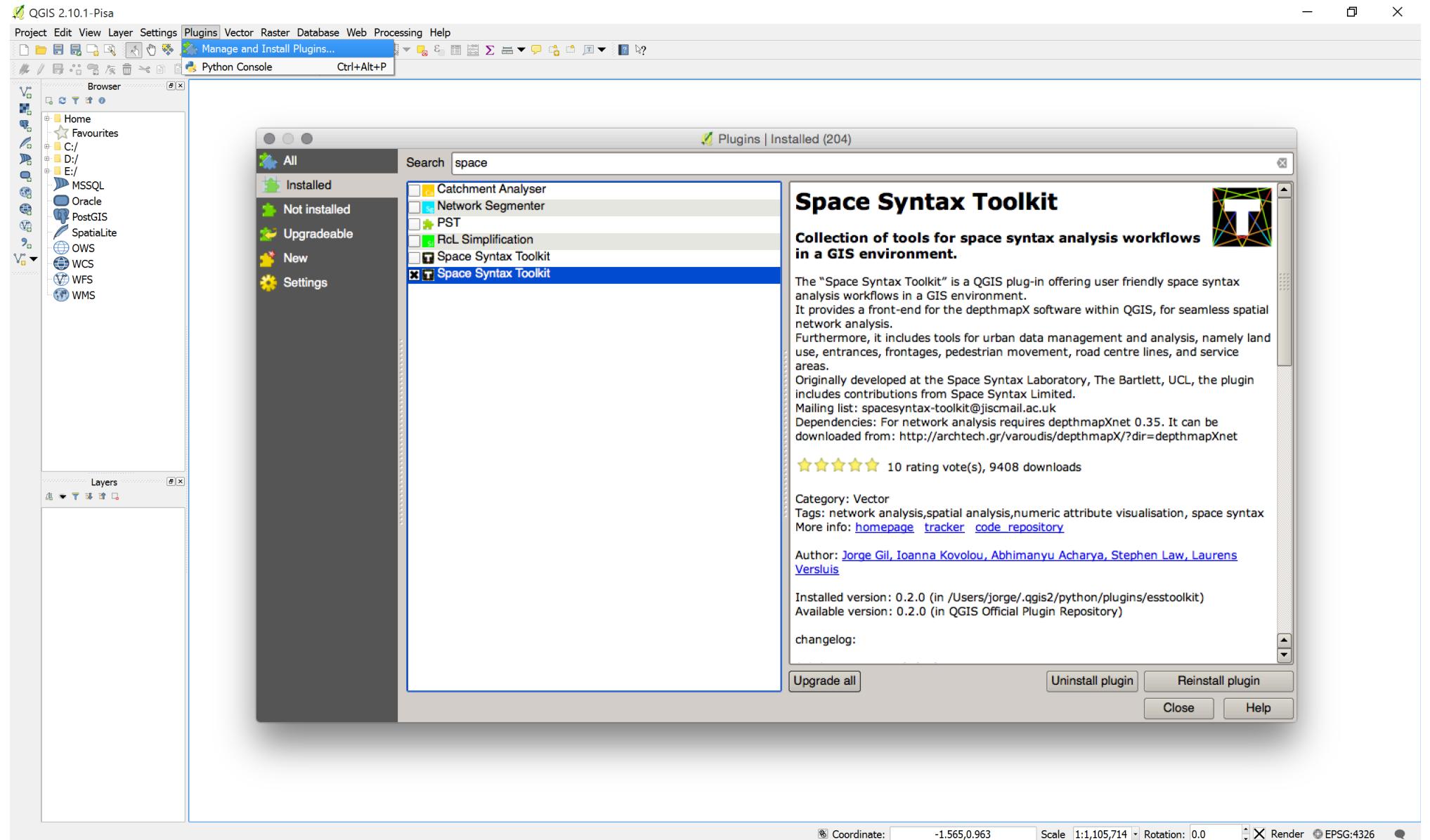


Gate Transformer

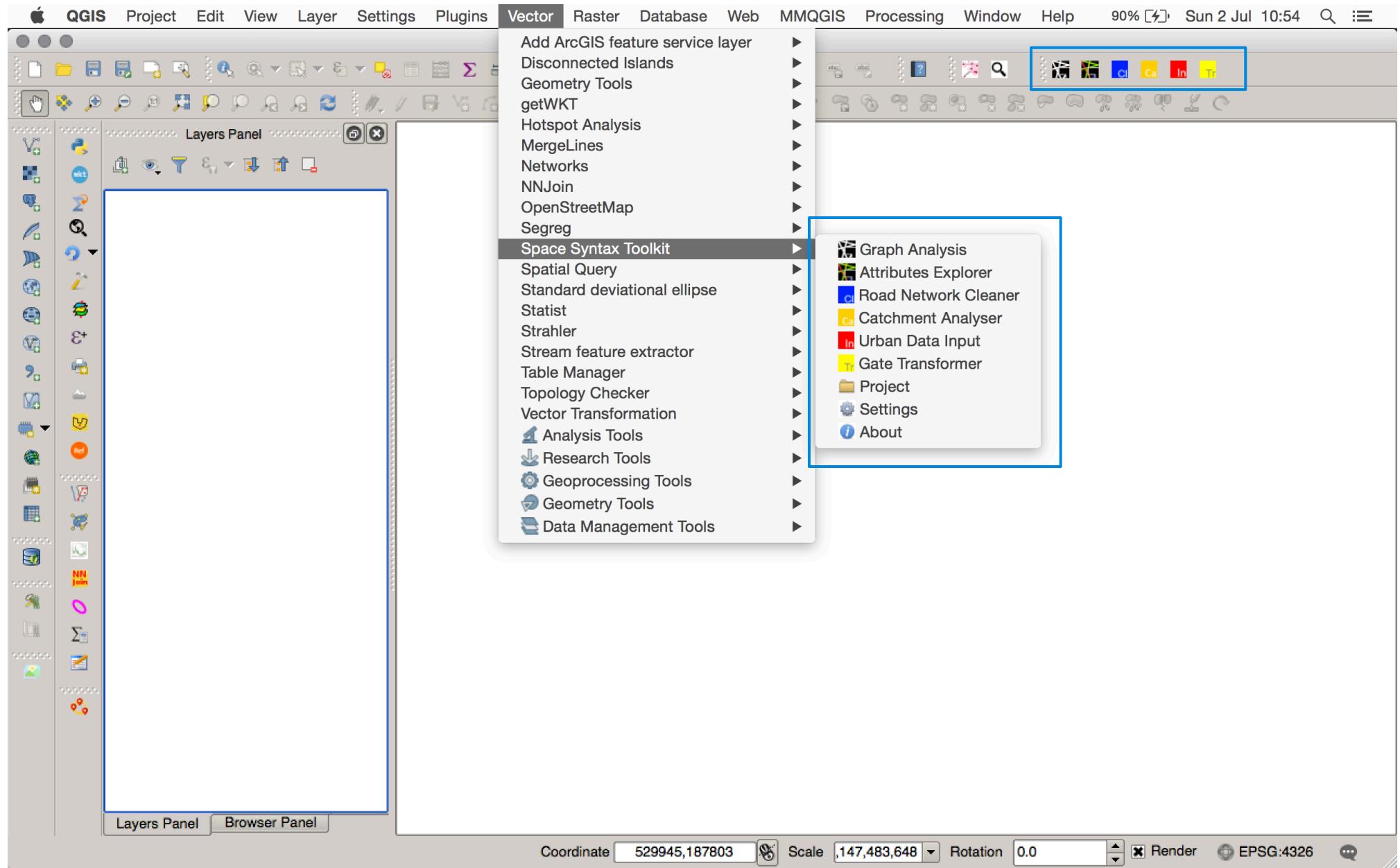
Demo Workflow



SST Installation



SST Installation



SST sample data

<https://github.com/SpaceGroupUCL/qgisSpaceSyntaxToolkit/releases>

SpaceGroupUCL / **qgisSpaceSyntaxToolkit**

Code Issues 53 Pull requests 0 Projects 0 Wiki Insights

Releases Tags Draft a new release

Latest release

v0.2.0 · jorgegil · 3 days ago · 5 commits to master since this release

c5de995

First expanded release

Edit

This is the first release incorporating modules contributed by other members of the space syntax community.

It includes four new modules:

- Road centre line cleaner
- Catchment analyser
- Urban data input
- Gate transformer

The new modules have been developed by Space Syntax Limited's Ioanna Kovolou, Abhimanyu Acharya, Stephen Law and Laurens Versluis.

The new version will be demonstrated and used in a workshop at the 11th Space Syntax Symposium, 3rd of July 2017, in Lisbon.

Downloads

esstoolkit_v0.2.0.zip 2.1 MB

sample_data_v0.2.0.zip 26.2 MB

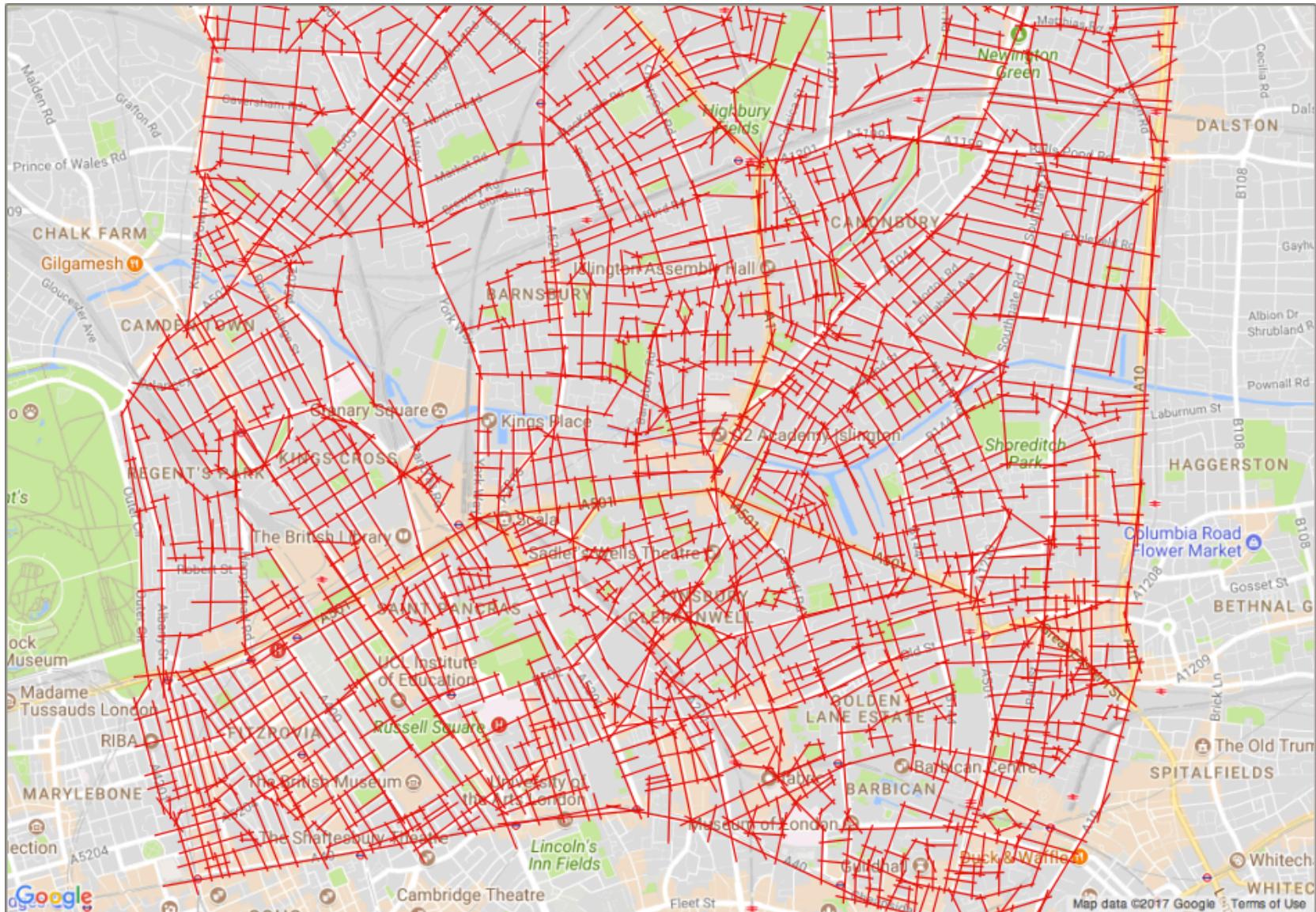
Task I

Preparing and analysing axial models

- Model preparation: making axial and unlinks maps
- Model verification: verifying the axial and unlinks maps
- Model analysis: Axial and segment analysis of the axial model
- Visualising the results

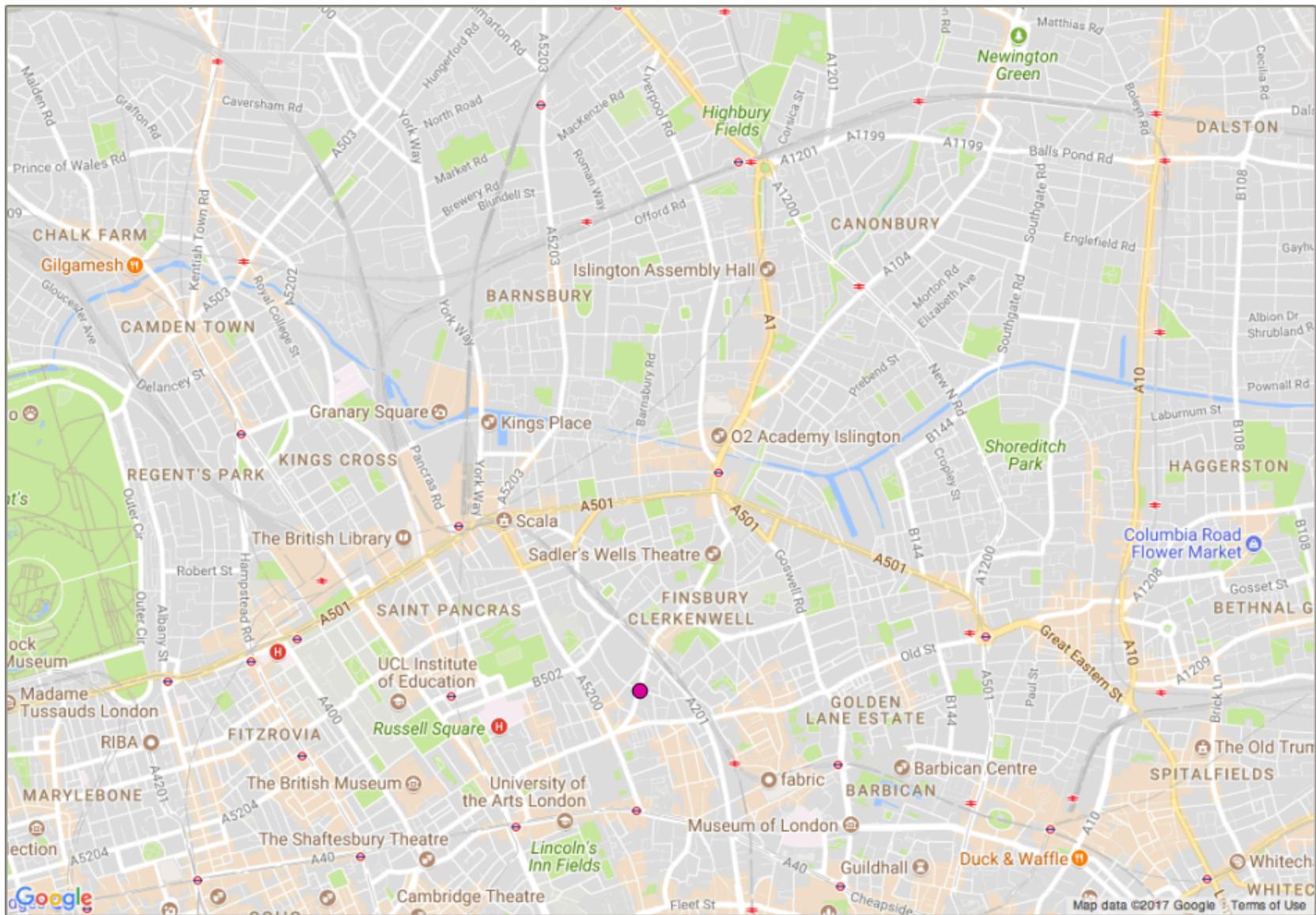
Model preparation: making axial and unlinks maps

Drawing an axial map (use a projected CRS!)



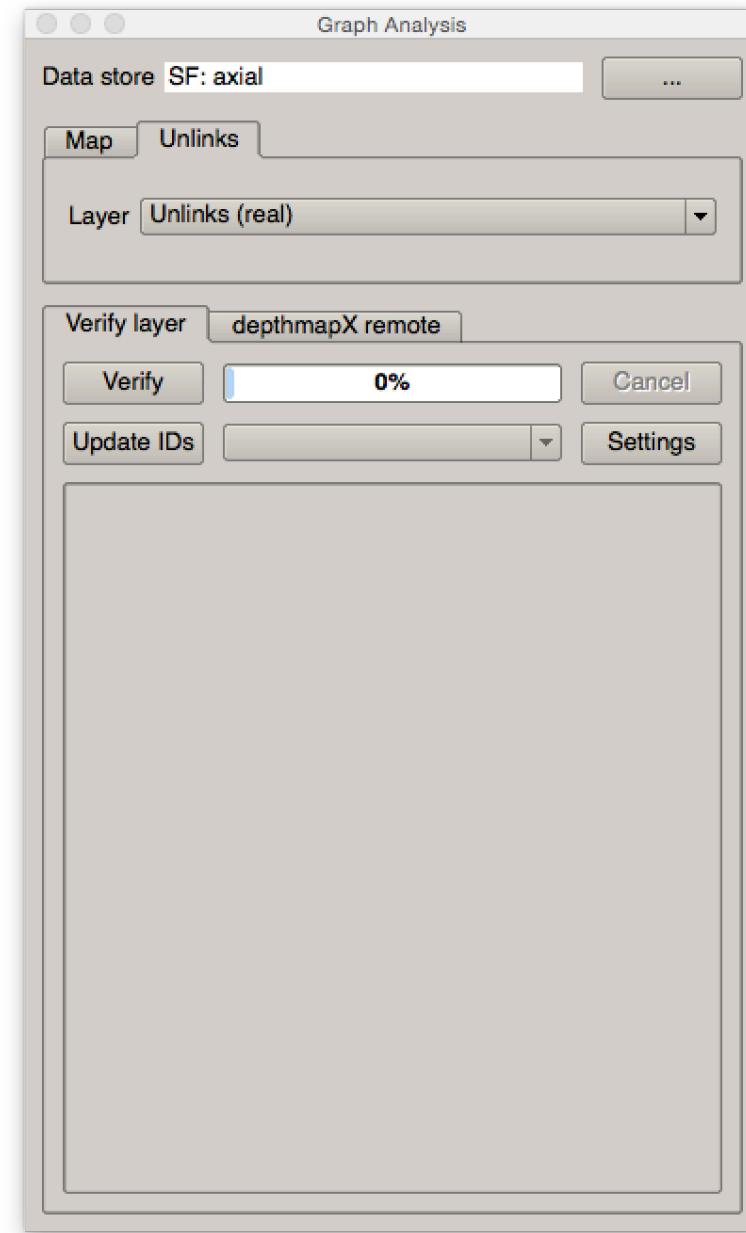
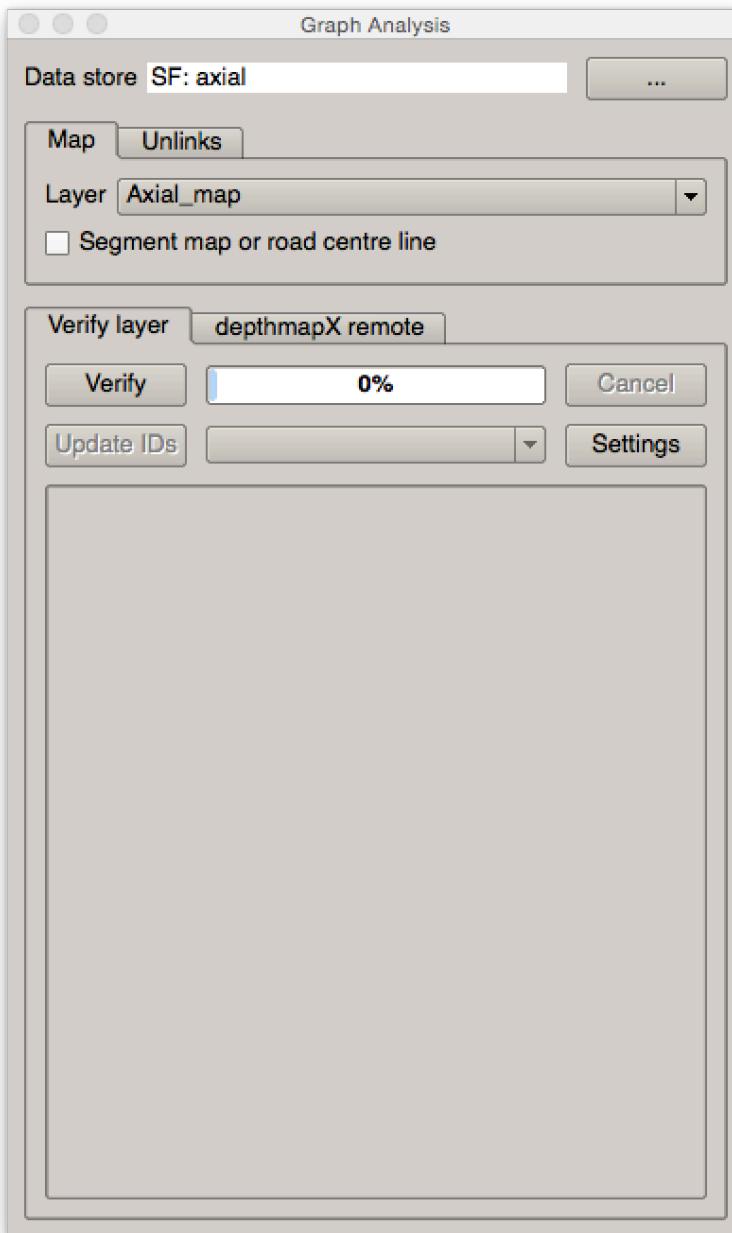
Model preparation: making axial and unlinks maps

Drawing an unlinks map



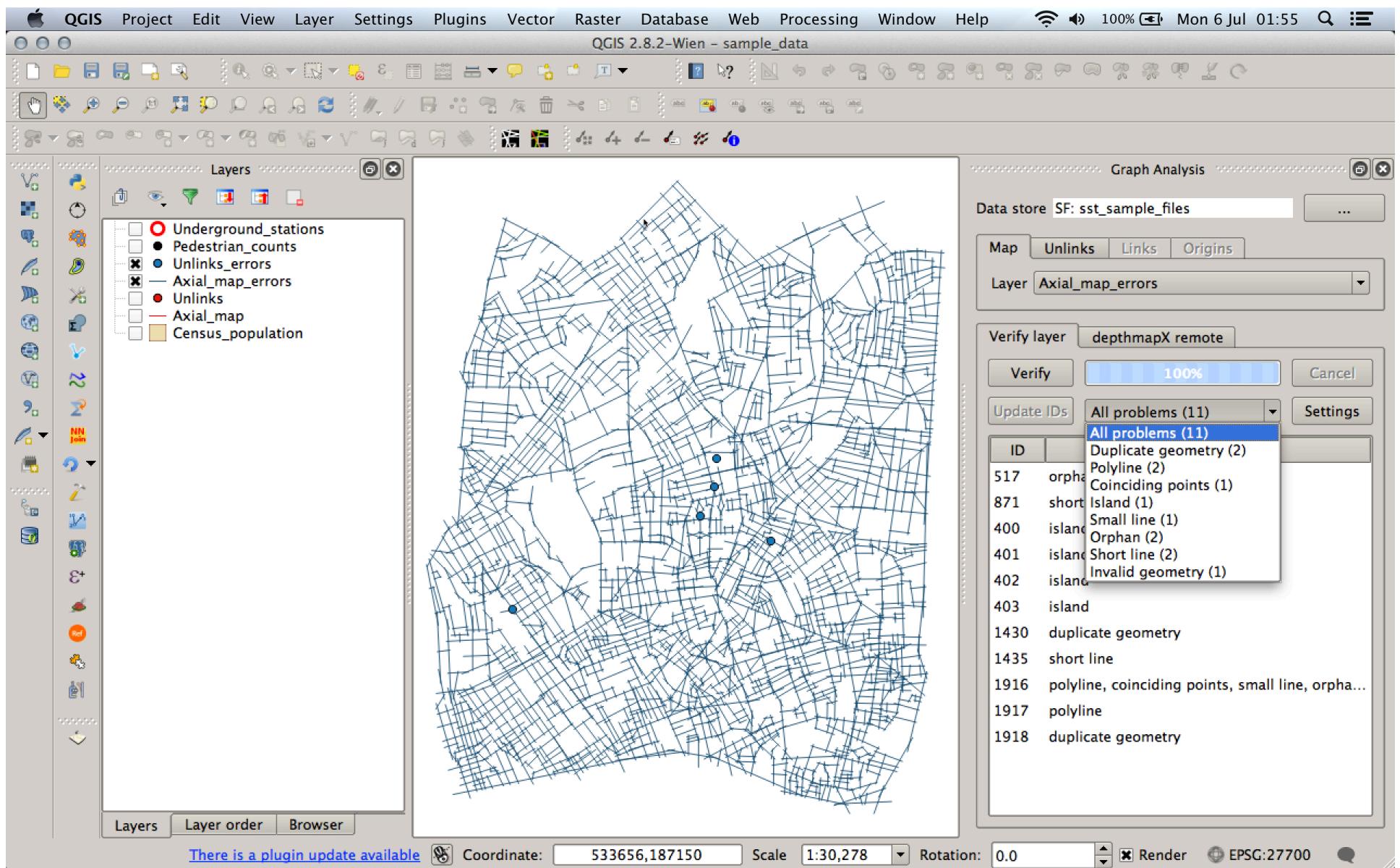
Model verification: verifying the axial and unlinks maps

Load the layers in the Graph Analysis Tool



Model verification: verifying the axial and unlinks maps

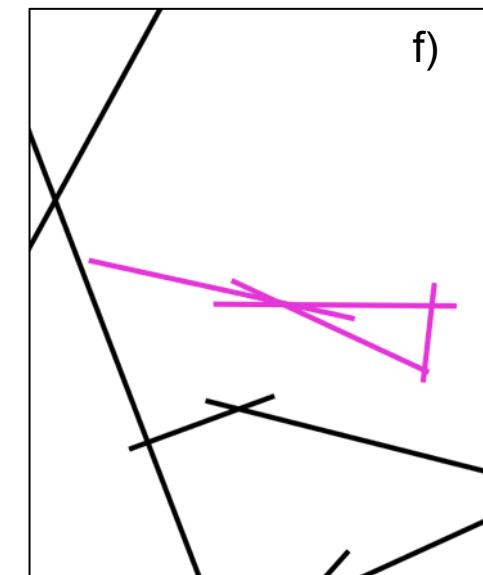
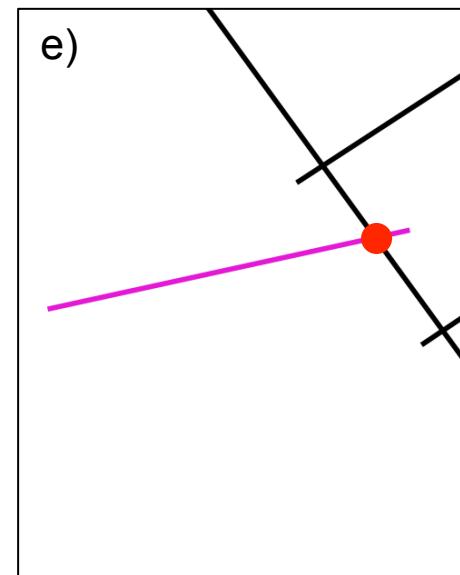
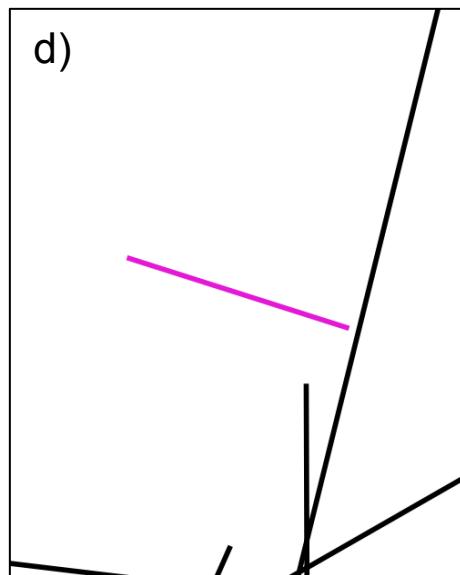
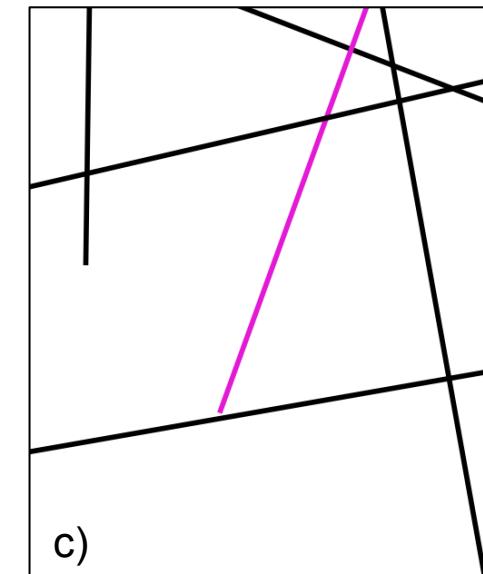
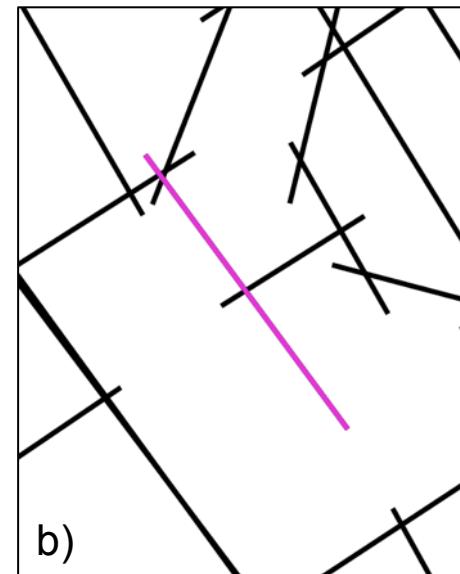
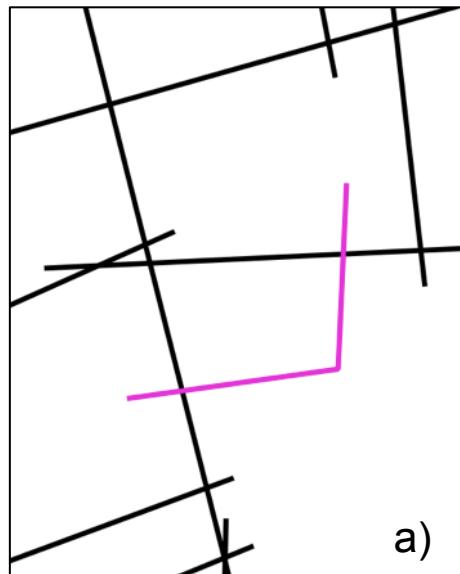
Verification is done on the two layers combined



Model verification: verifying the axial and unlinks maps

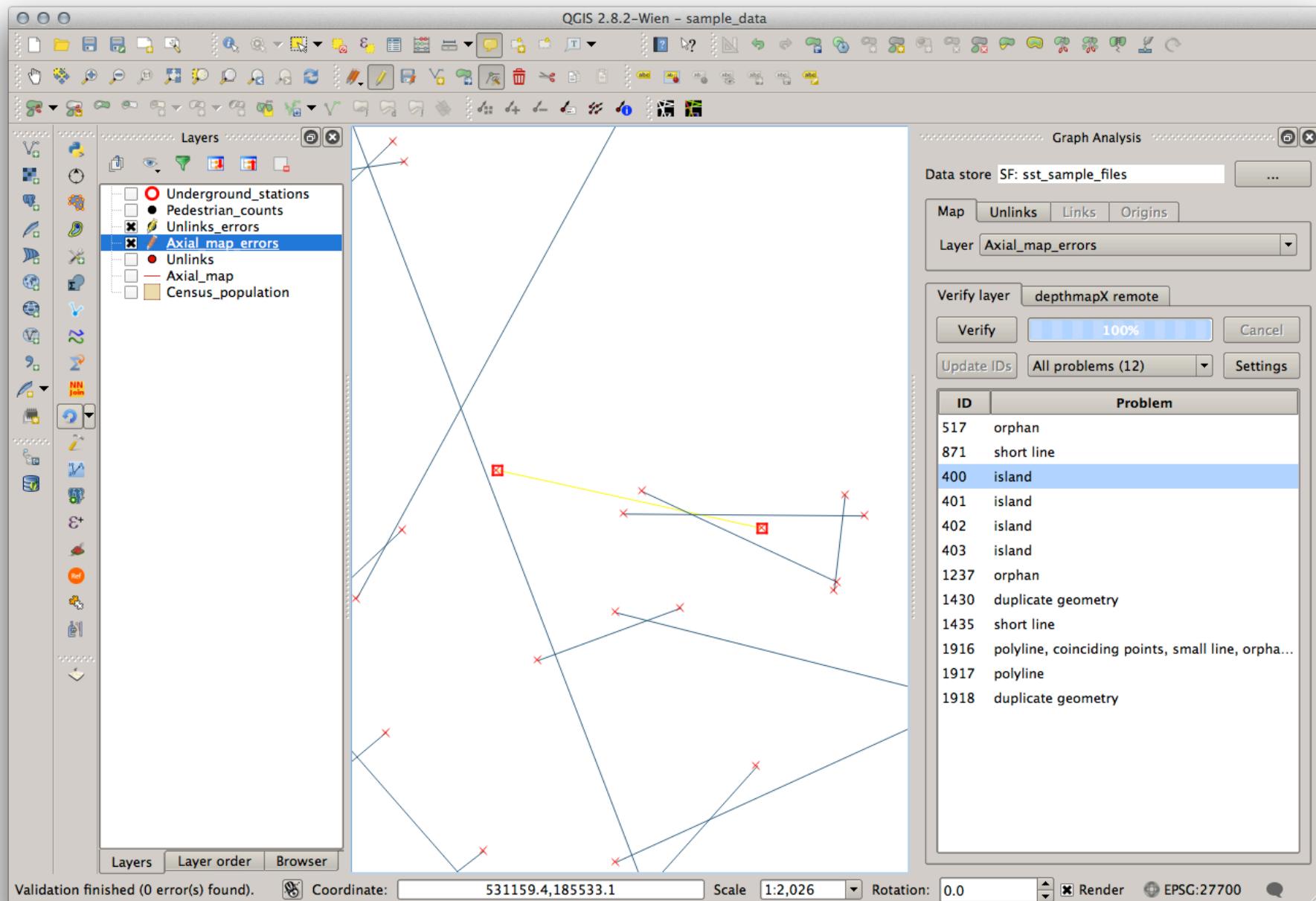
- a) Polyline
- b) Duplicate
- c) Undershoot
(short line)
- d) Orphan
- e) Unlinked
orphan
- f) Island
 - Small
 - Coinciding points

Axial map errors



Model verification: verifying the axial and unlinks maps

Correcting the axial map

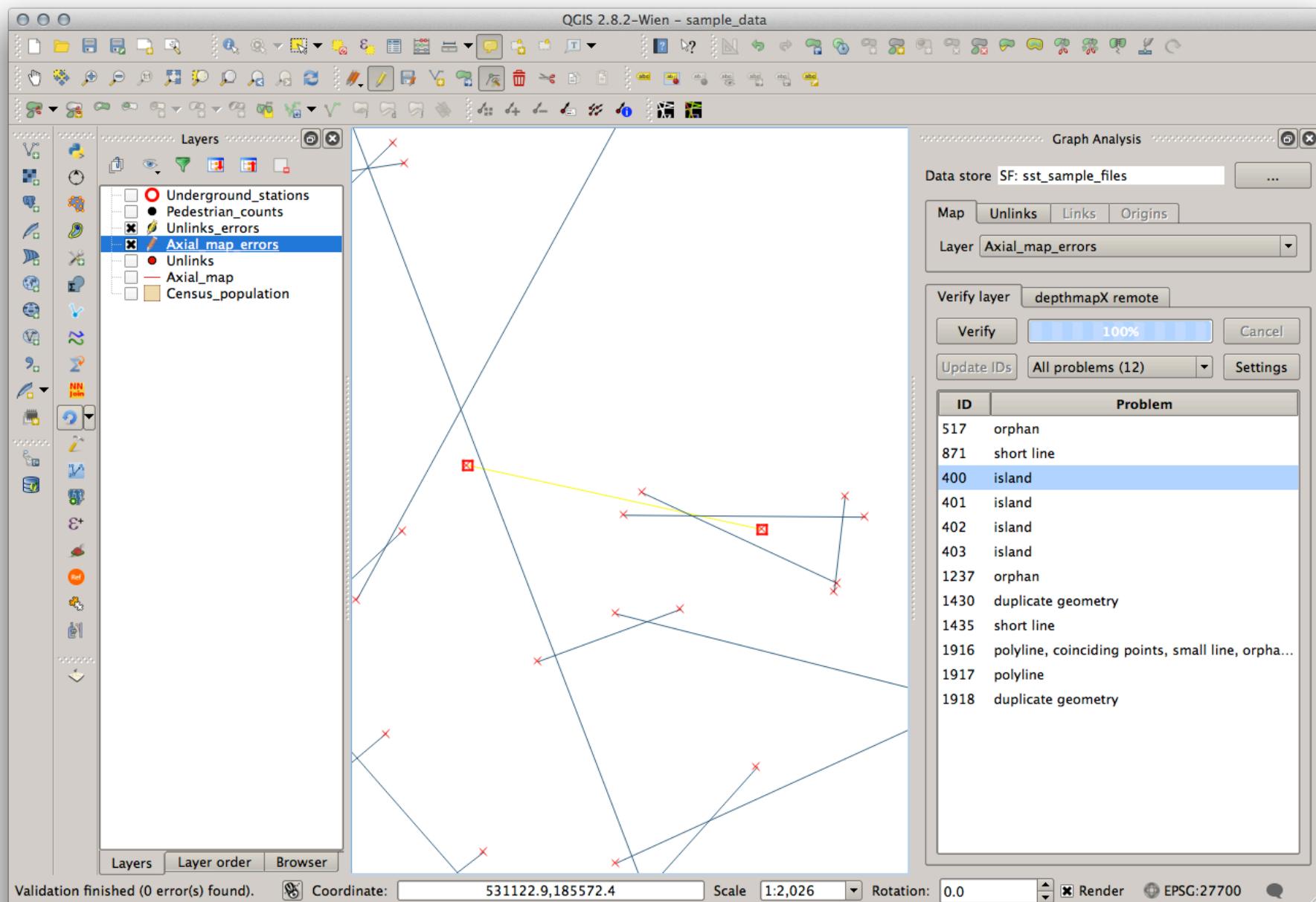


Workshop

Space Syntax Toolkit for QGIS

Model verification: verifying the axial and unlinks maps

Correcting the axial map

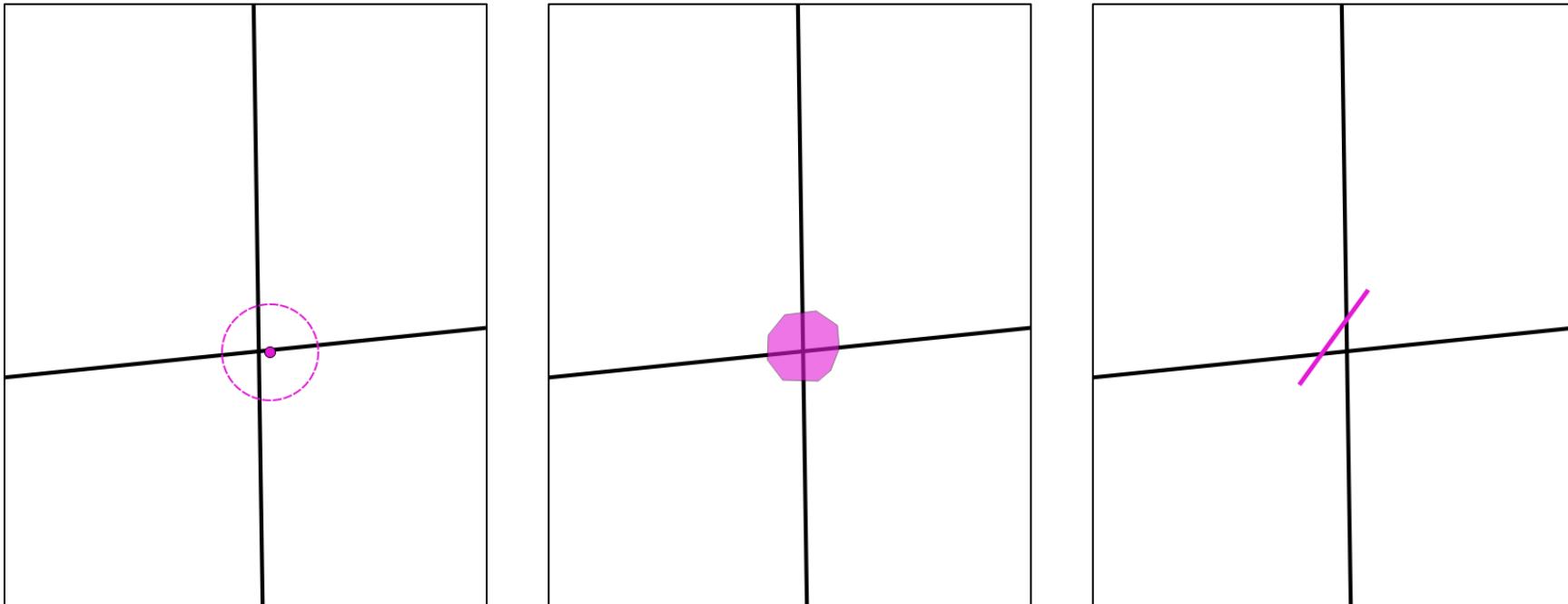


Workshop

Space Syntax Toolkit for QGIS

Model verification: verifying the axial and unlinks maps

Representing unlinks



Model verification: verifying the axial and unlinks maps

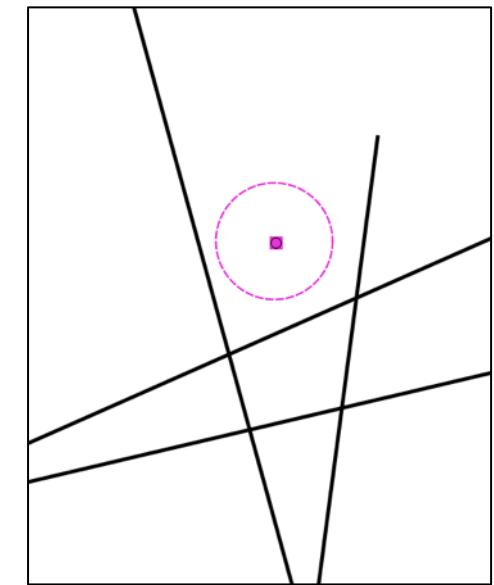
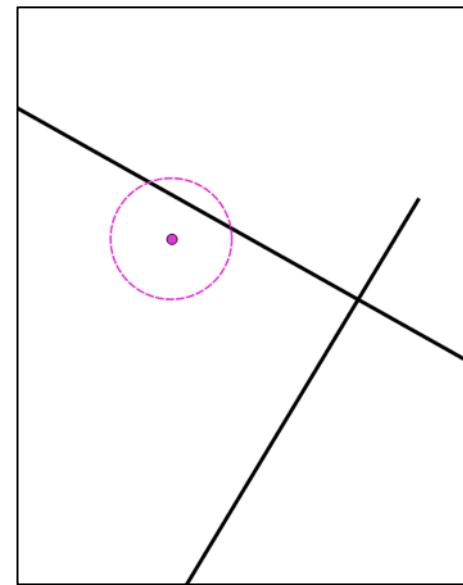
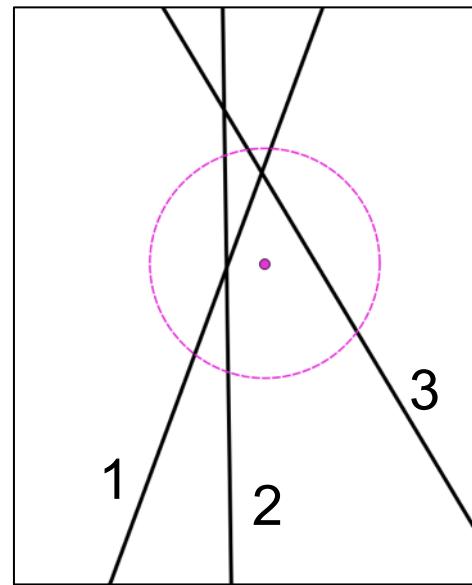
Feature errors:

- More than 2 lines
- Single line
- No lines

Attribute error:

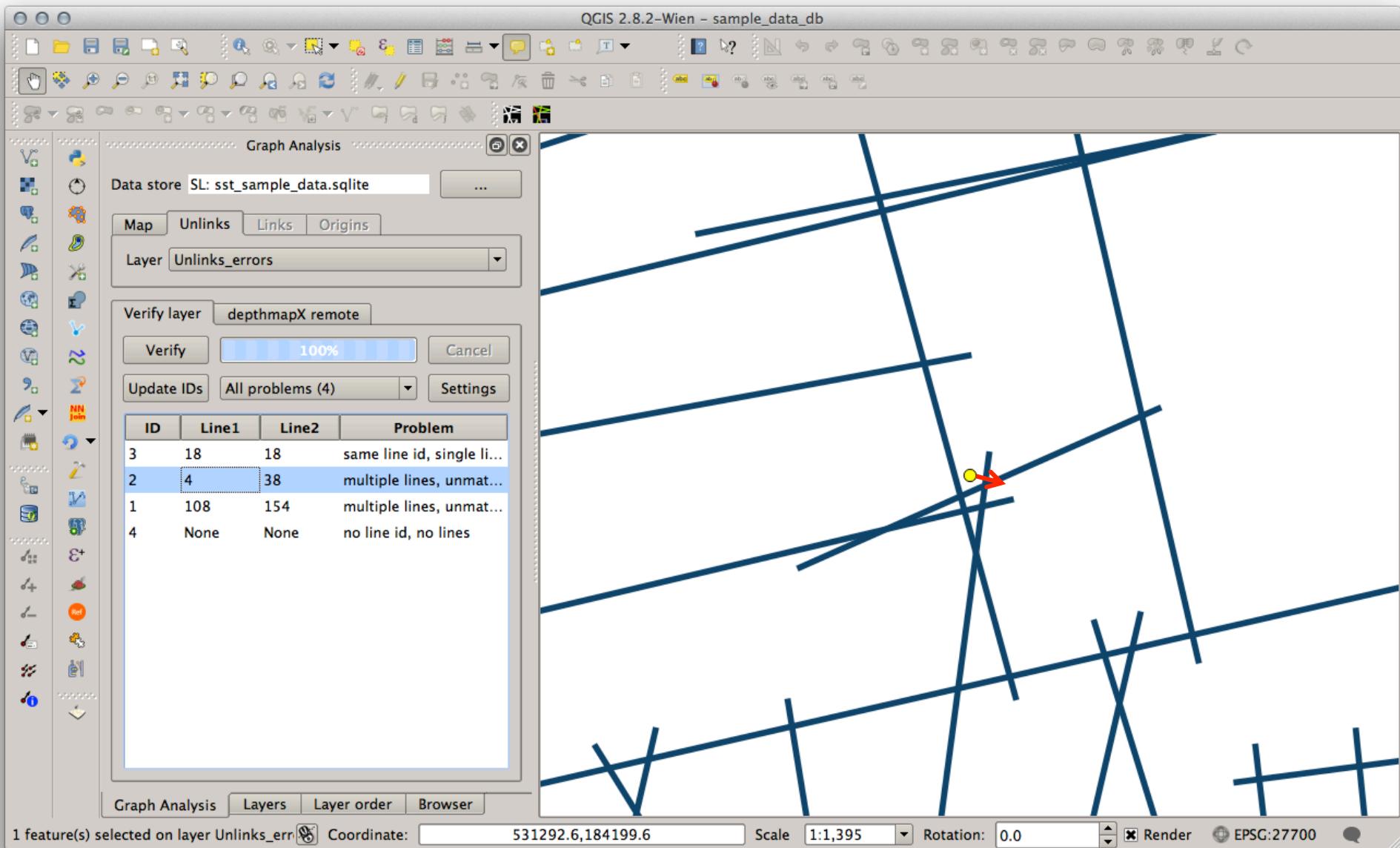
- No line id
- Same line id
- Unmatched line id

Unlink errors

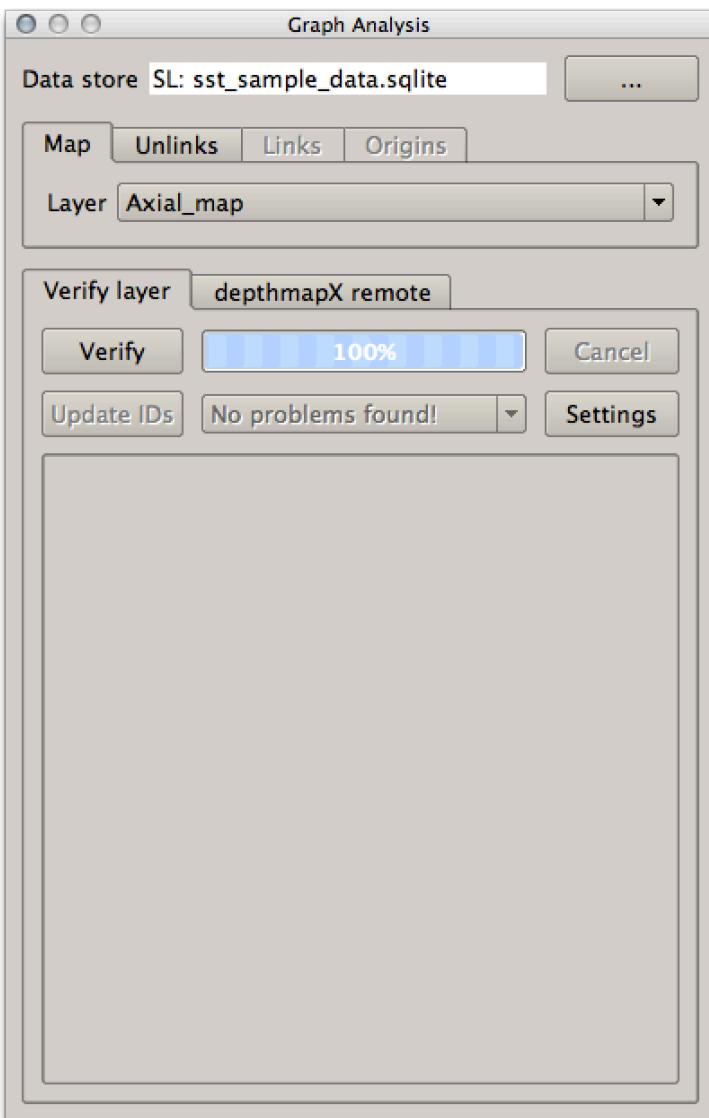


Model verification: verifying the axial and unlinks maps

Correcting the unlinks map



Model verification: verifying the axial and unlinks maps



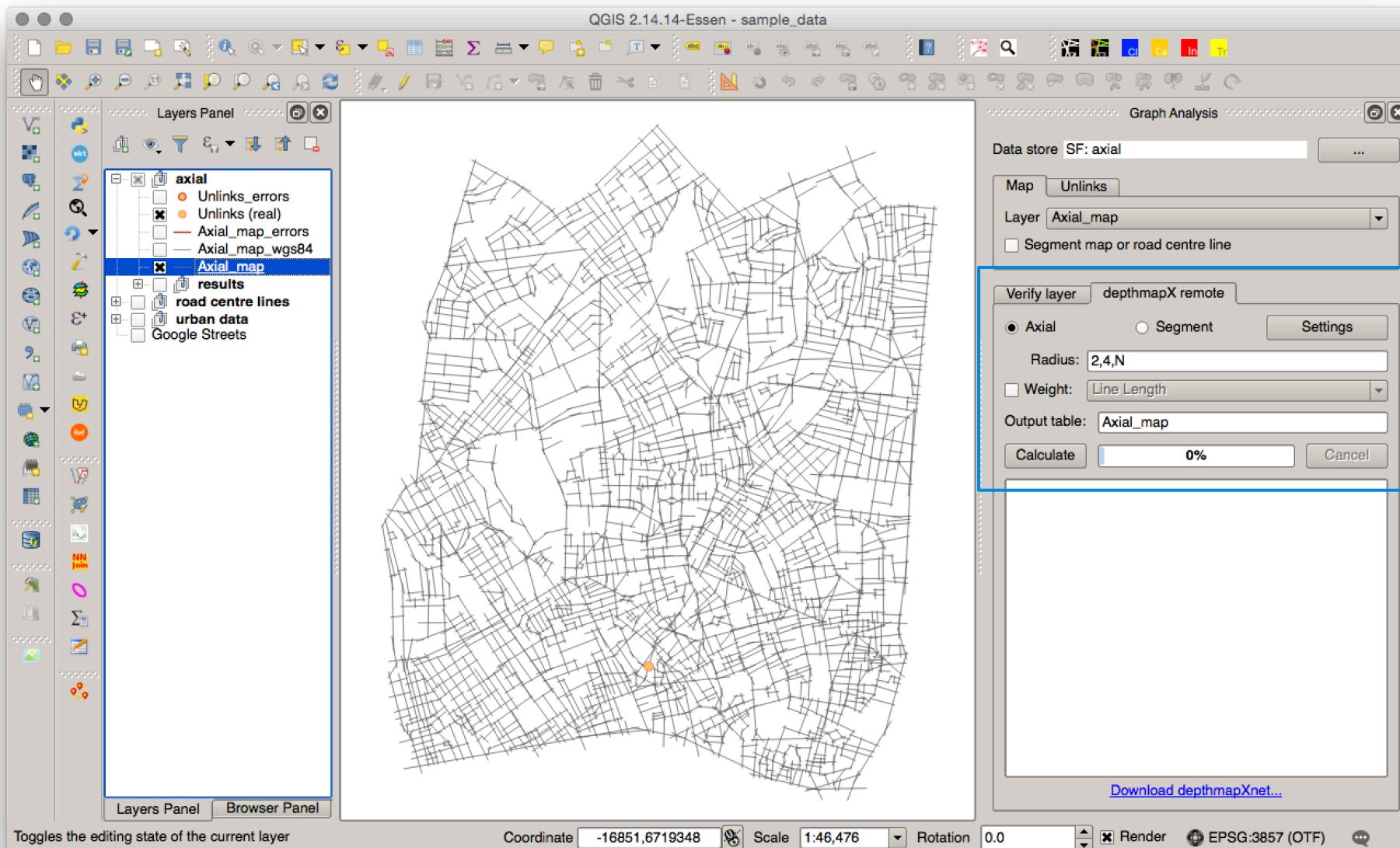
Axial model verification workflow

It's an *iterative* process that stops when the verification of axial map and unlinks returns no errors.

1. Verify and fix axial lines
2. Update unlinks ids
3. Verify and fix unlinks
4. Verify and fix axial lines
5. Verify and fix unlinks
6. Update unlink ids
7. Verify and fix axial lines
8. ...

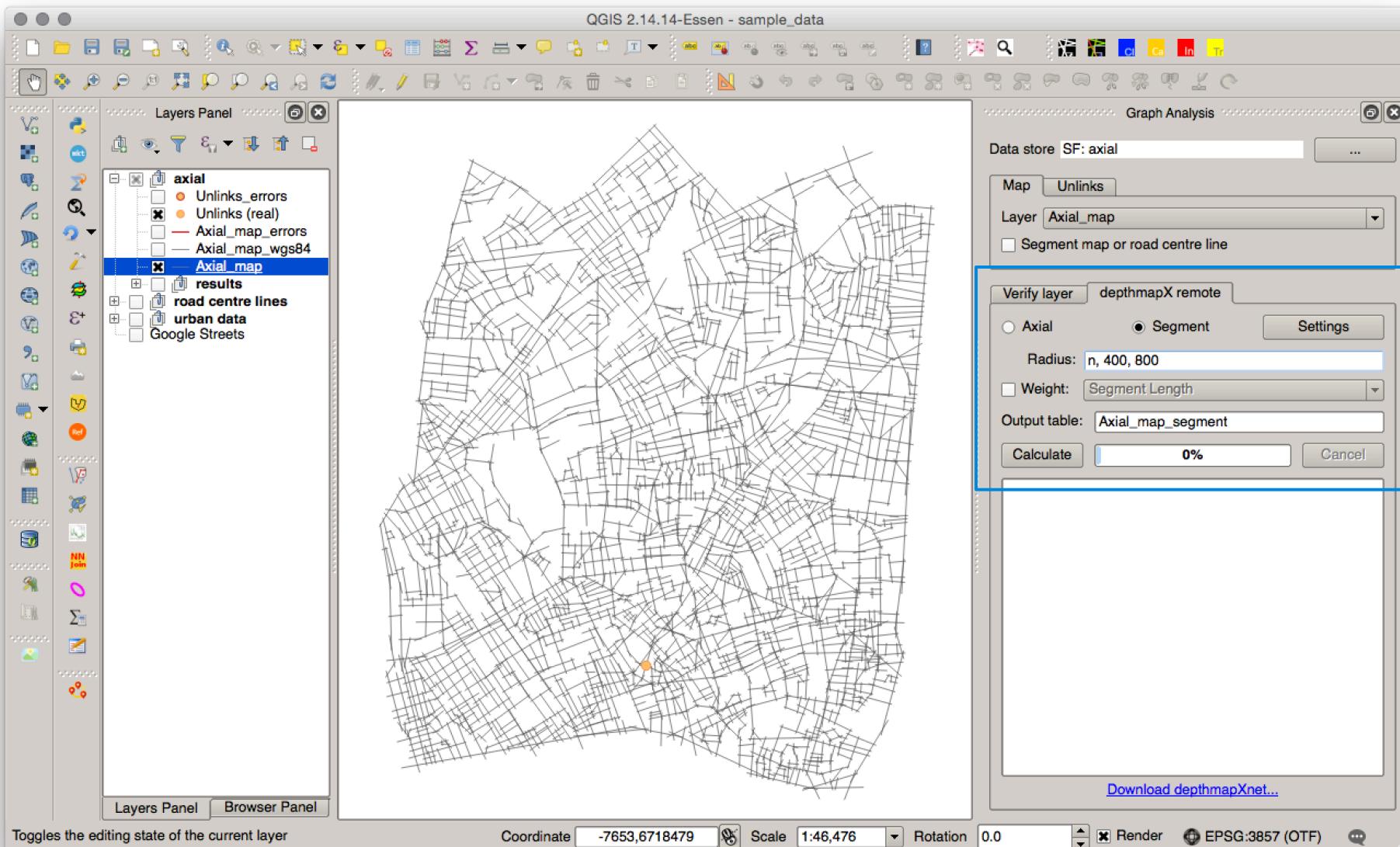
Model analysis: Axial analysis of the axial model

DepthmapX remote axial analysis settings

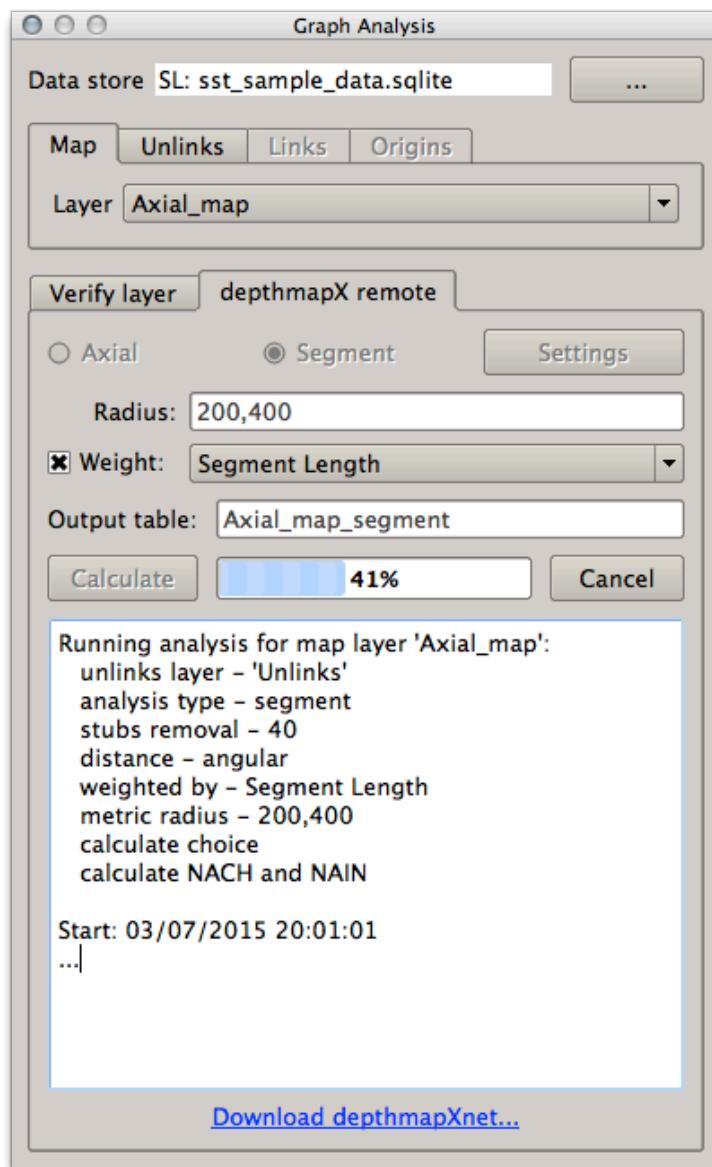


Model analysis: Segment analysis of the axial model

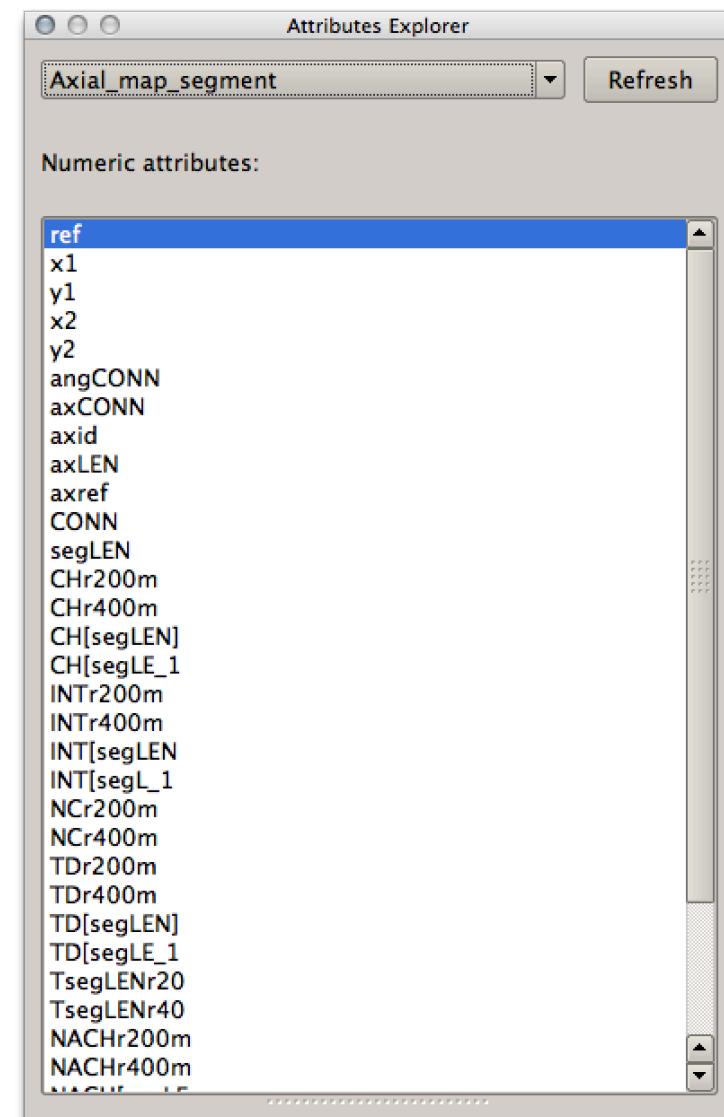
DepthmapX remote segment analysis settings



Model analysis

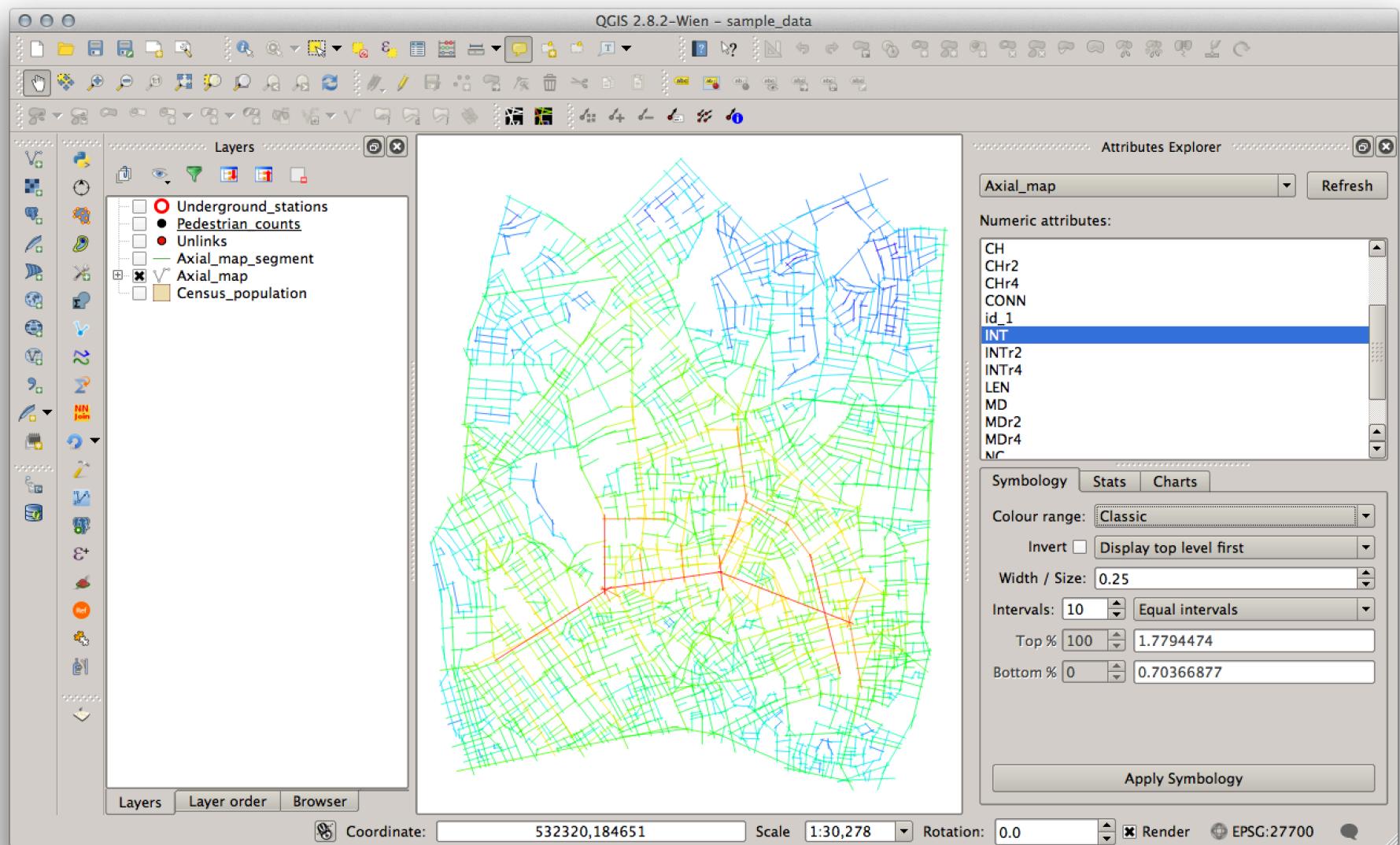


Results report and postprocessing the results



Visualising the results

Loading analysis results in Attributes Explorer Tool





Task 2

Preparing and analysing road centre line (RCL) models

- Comparing RCL maps
- Cleaning RCL maps
- Simplifying RCL maps
- Verifying RCL maps
- Analysing RCL maps

Comparing Road Centre Line maps

OpenStreetMap



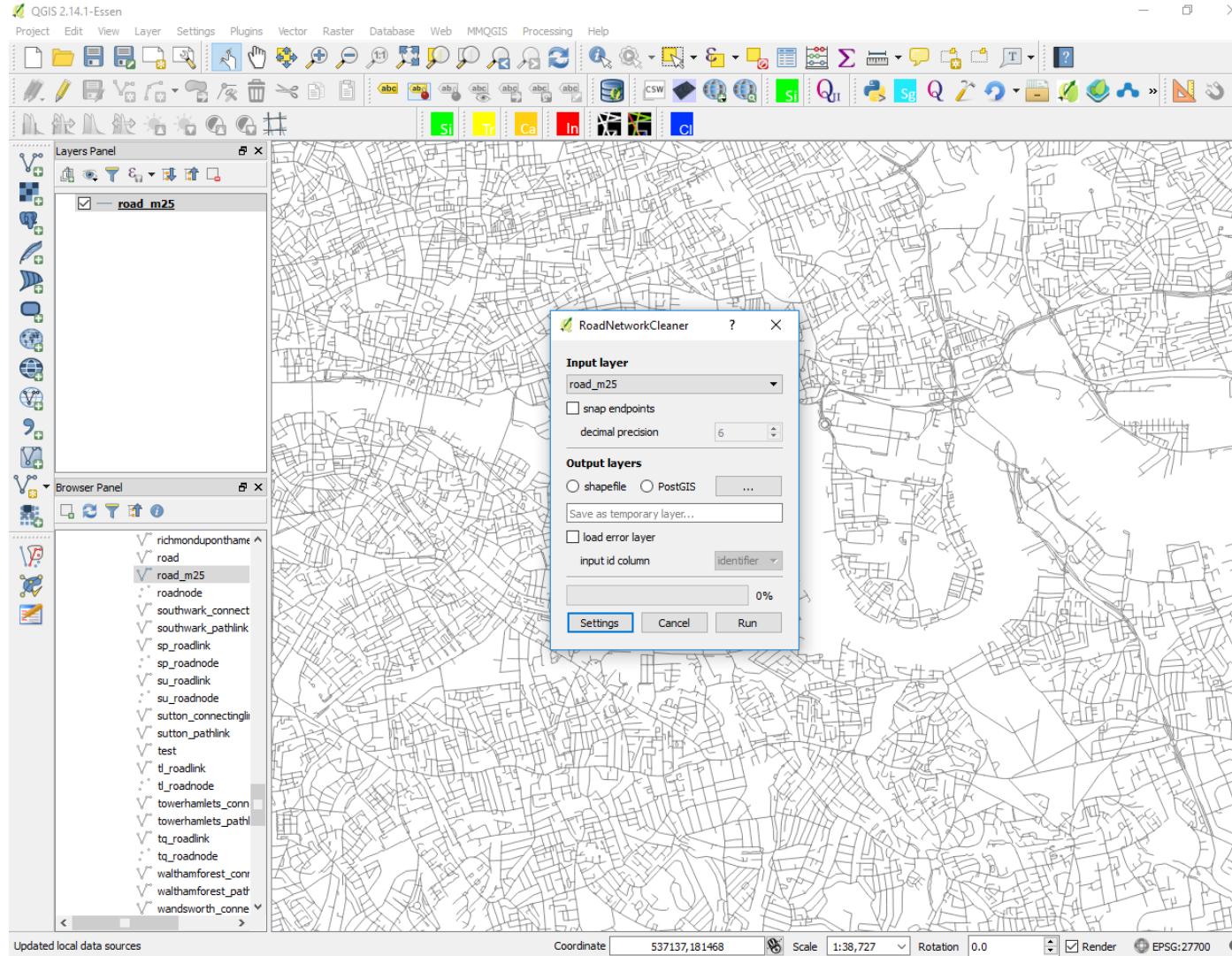
OS Open Roads



OS Meridian 2



Cleaning RCL maps: Road network cleaner tool

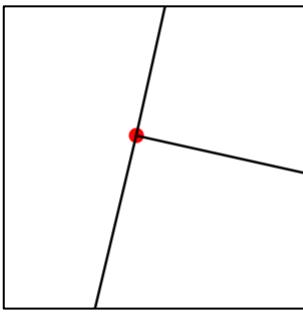


This plugin corrects topological errors of Road-centre-line (RCL) maps. This is a necessary step before performing space syntax analysis to any network.

Road network cleaner

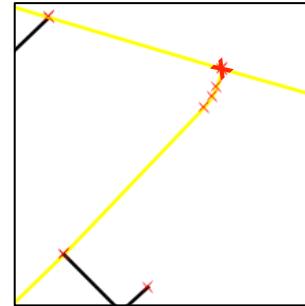
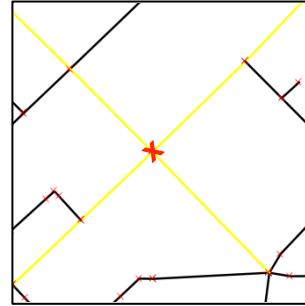
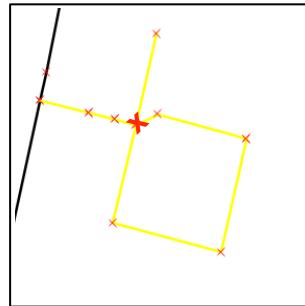
Geometry

- Removes invalid geometries
- Breaks multi-part geometries
- Removes point geometries

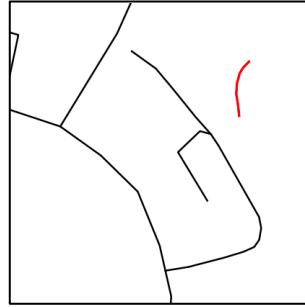
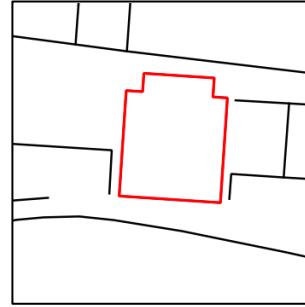
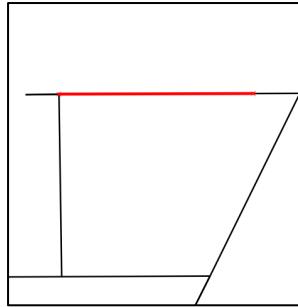


Topology

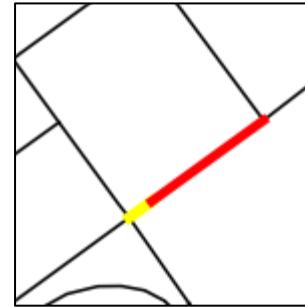
- Breaks geometries at self intersection (1), at shared vertices (2) and where they touch endpoints of other lines (3).



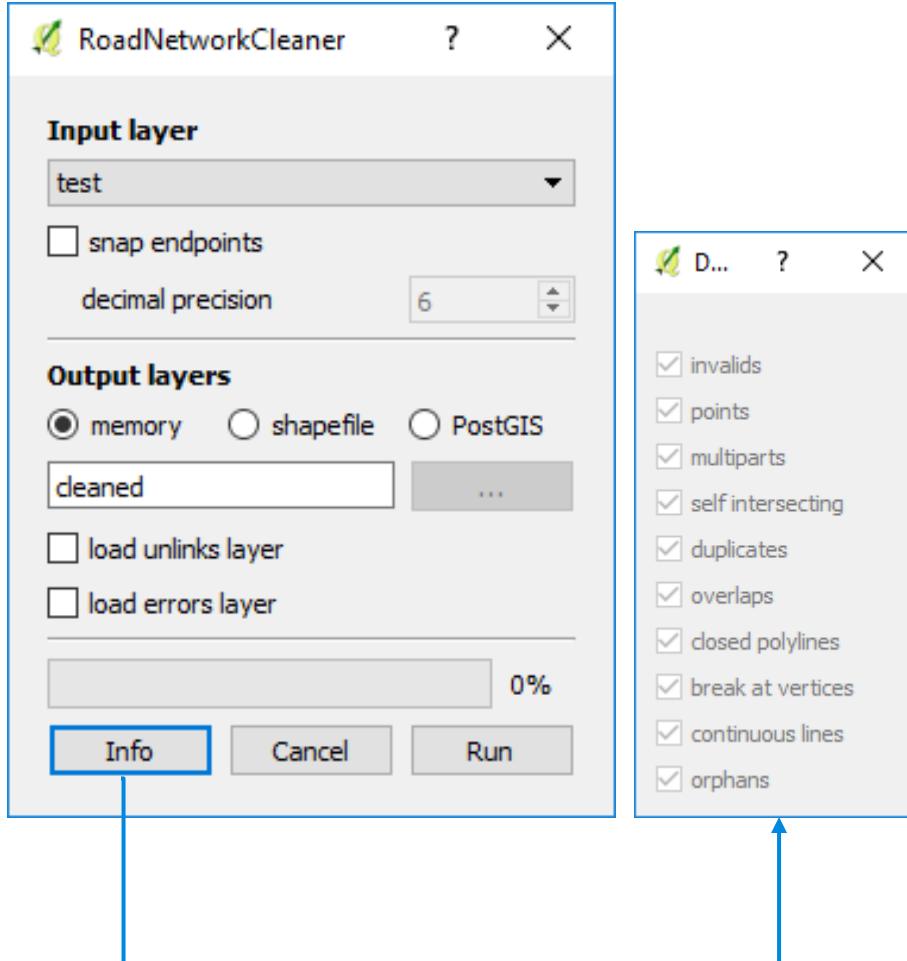
- Removes duplicate and overlapping (1) geometries, closed polylines that do not connect to any other line (2) and isolated lines (3).



- Merges lines between intersections



Road network cleaner



Input layer Choose RCL map to clean. The input can be any QGIS layer.

- **Snap endpoints** The user can specify a decimal precision of the coordinates

Output layers The user can choose between a memory QGIS layer a shapefile or a PostGIS database layer.

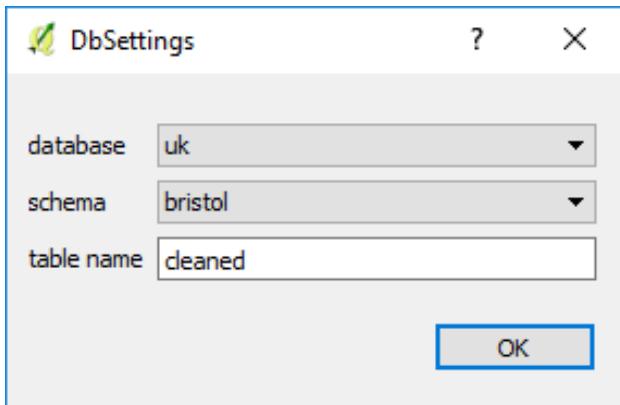
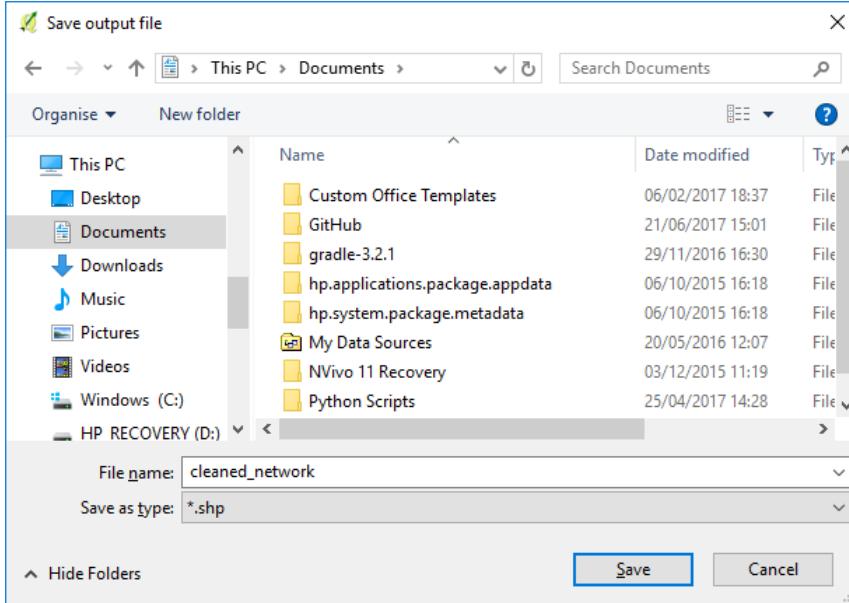
- **Load error layer** The errors that have been corrected by the plugin can be loaded as a memory layer.
- **Load unlinks layer** There is an option to create a memory unlinks layer where the lines of the input layer cross. However, unlinks should be verified by the user as RCL may represent differently unlinked lines.

Info See which topological errors are corrected.

Run Pressing run will perform the cleaning of the selected map

Cancel Pressing close will close and terminate the Road network cleaner

Road network cleaner



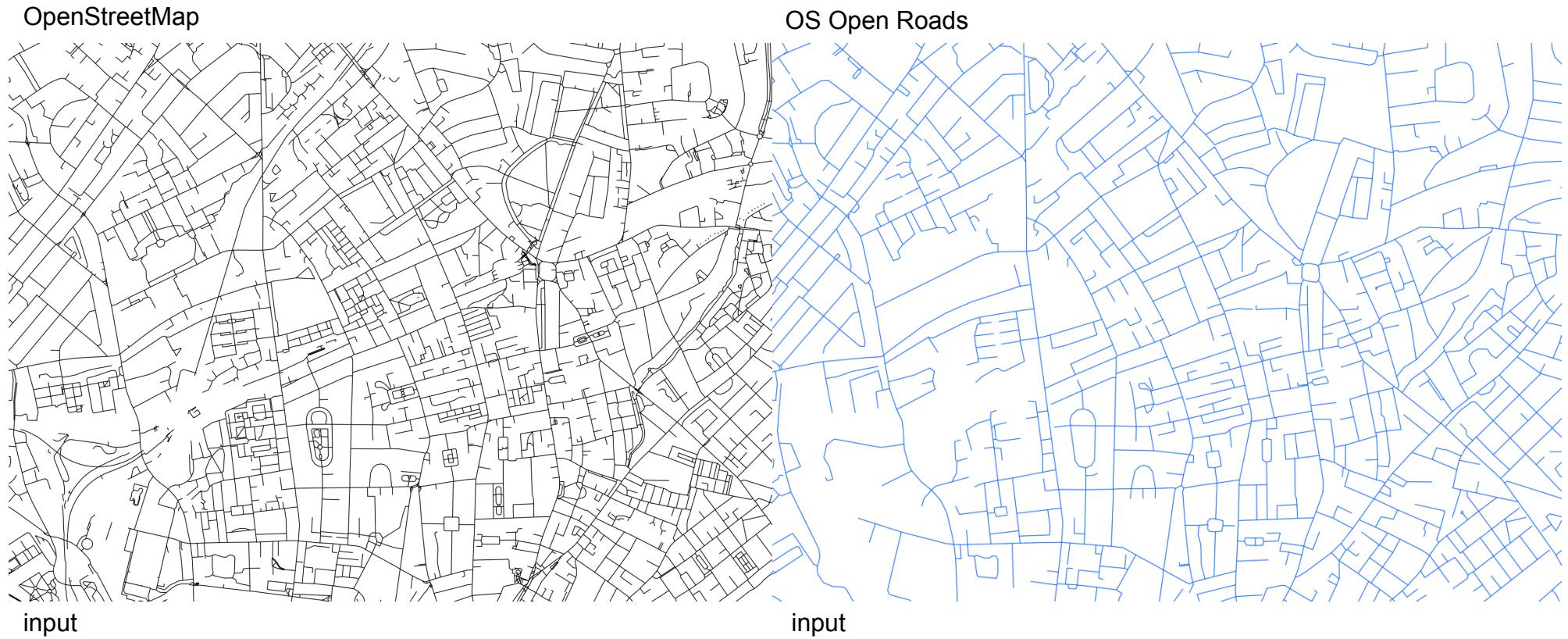
Shapefile

- **Save output file:** Select the location you wish to save the cleaned shapefile.

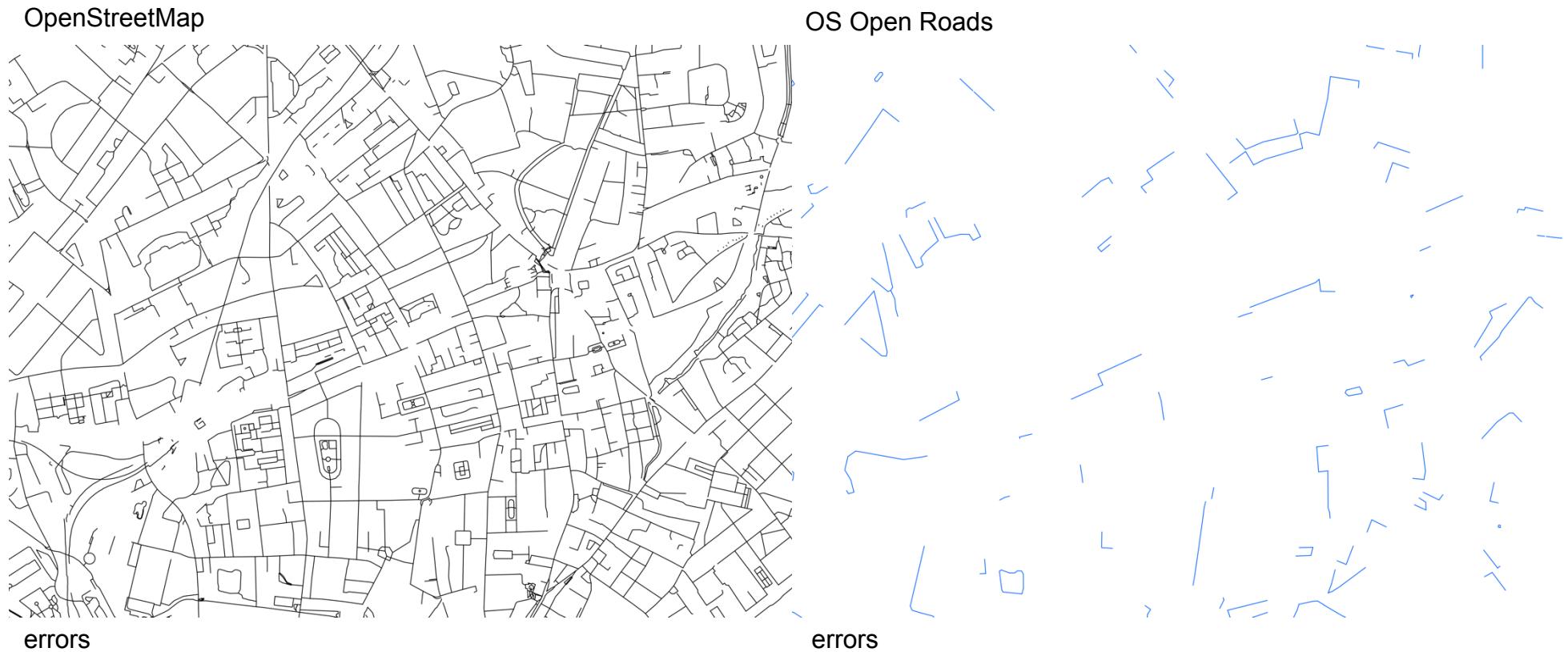
PostGIS layer

- **Database** Select the database where to save the cleaned layer
- **Schema** Select the schema where to save the cleaned layer
- **Table name** Specify the table name of the cleaned layer or leave it as default ('cleaned')

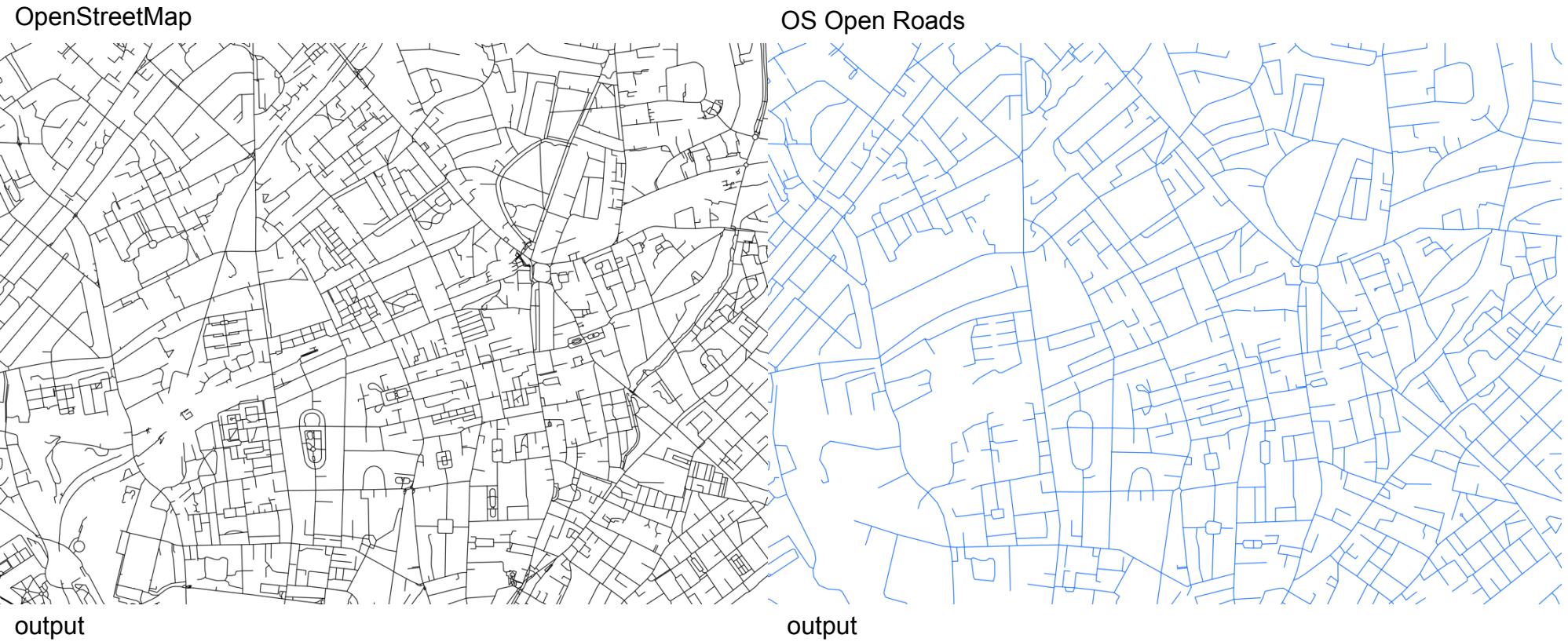
Cleaning RCL maps



Cleaning RCL maps

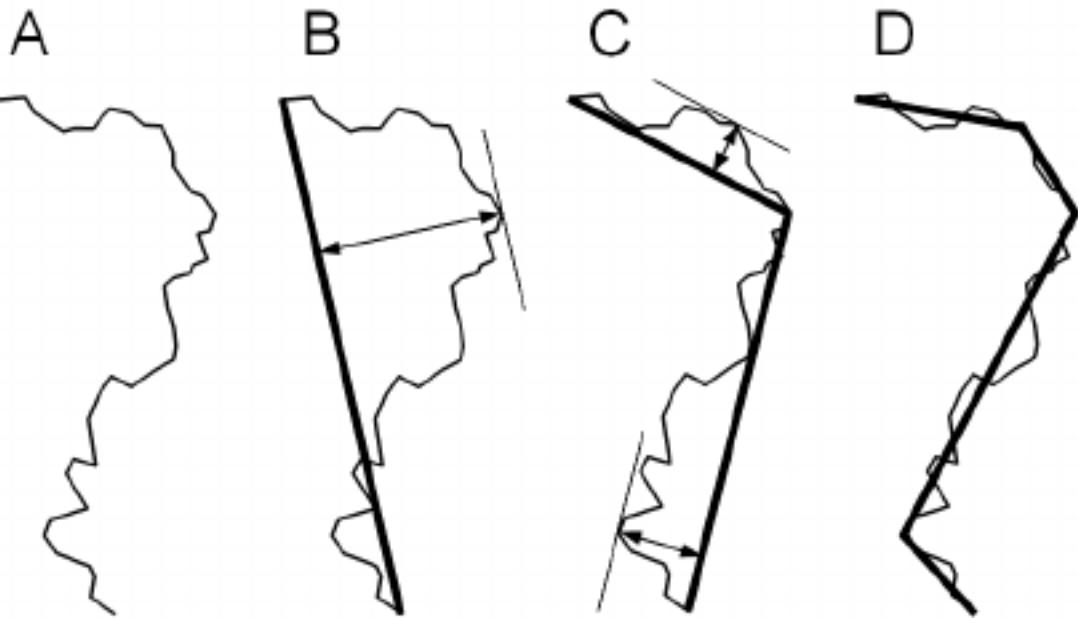


Cleaning RCL maps



Simplifying RCL maps

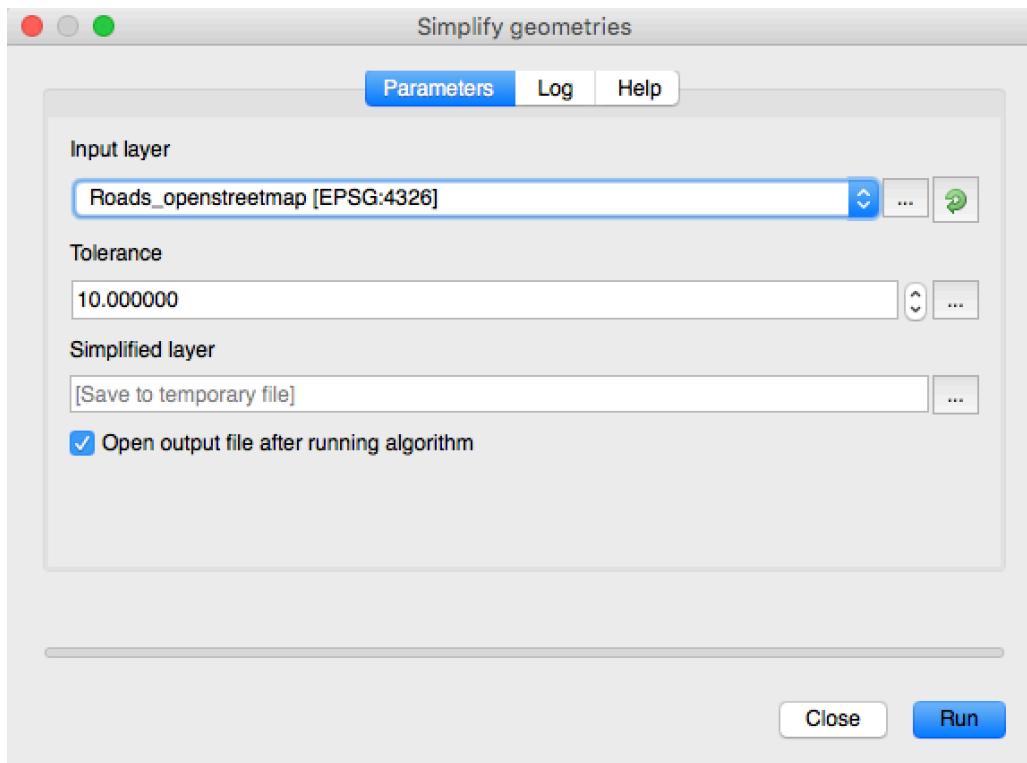
Douglas-Peucker generalisation algorithm



Source: https://www.researchgate.net/figure/260758647_fig6_Figure-6-Simplification-of-a-polygonal-curve-with-the-Douglas-Peucker-algorithm-A

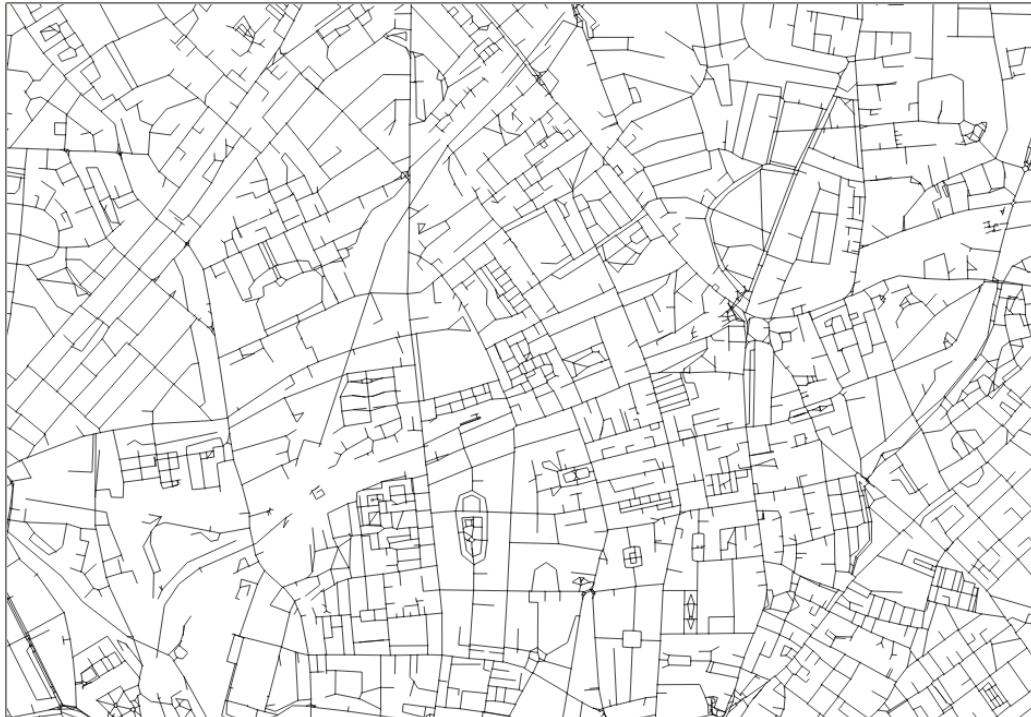
Simplifying RCL maps

QGIS – Simplify geometries



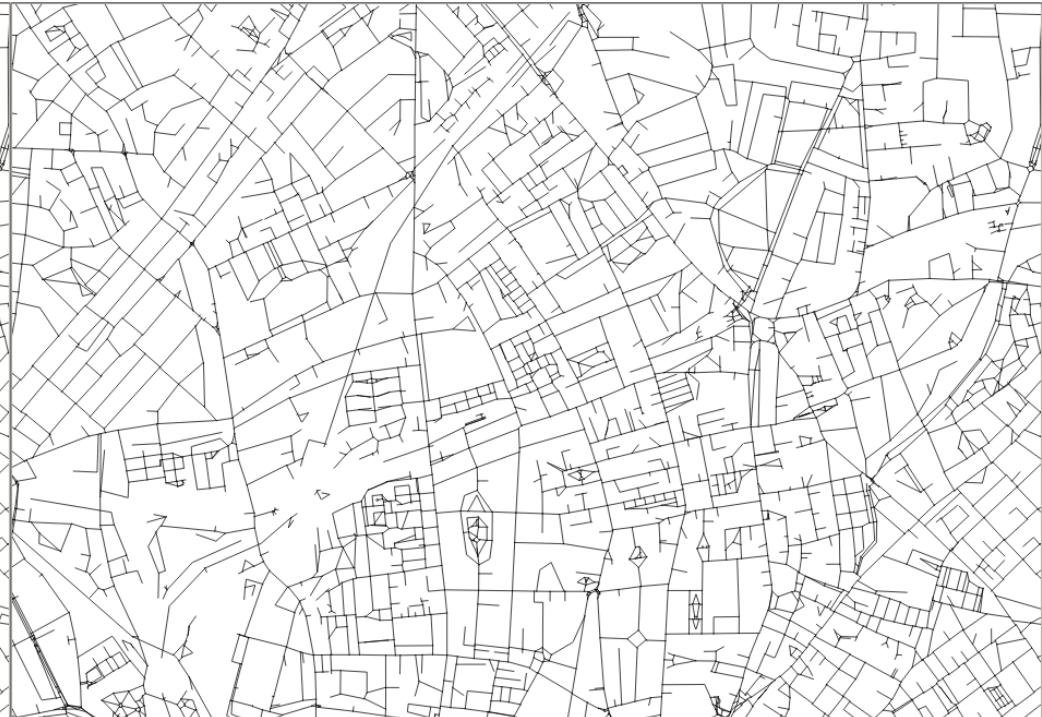
Simplifying RCL maps

OpenStreetMap



Simplification tolerance 10

OpenStreetMap



Simplification tolerance 20

Simplifying RCL maps

OS Open Roads



Simplification tolerance 10

OS Open Roads



Simplification tolerance 20

Simplifying RCL maps

OS Meridian 2



No simplification

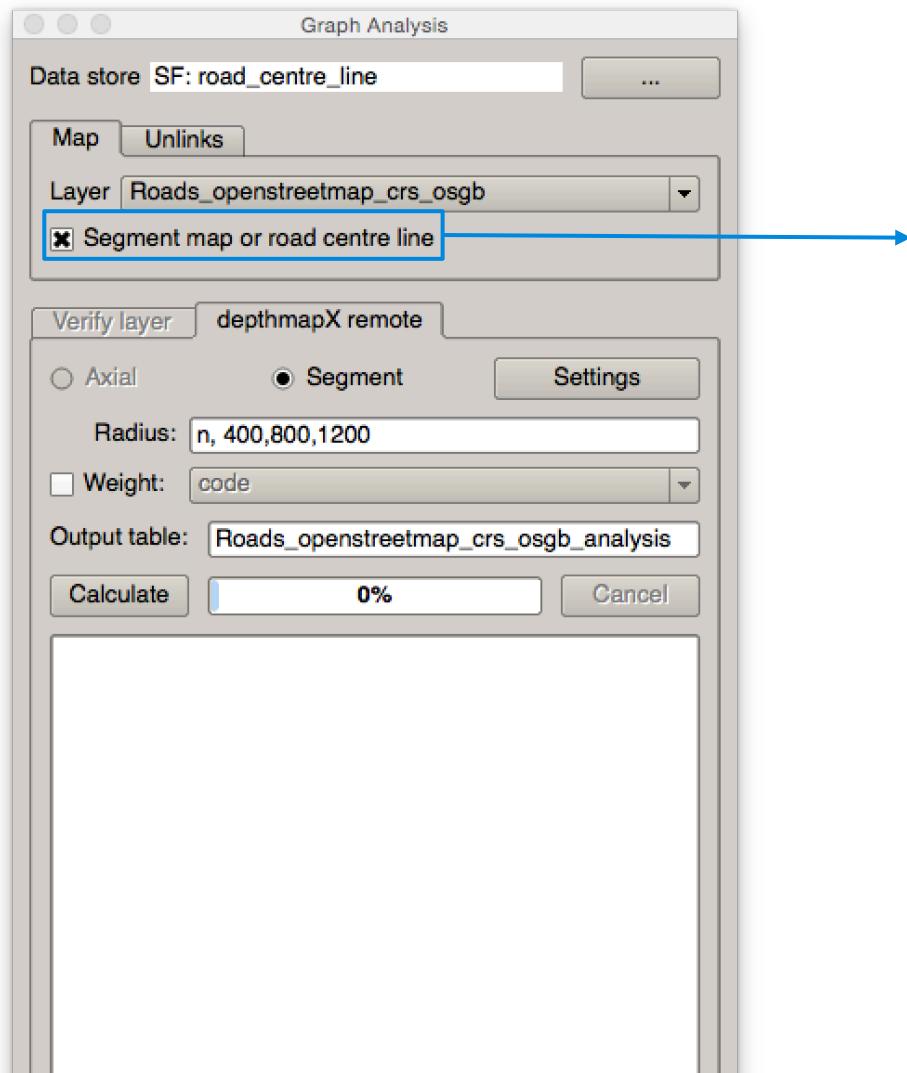
OS Open Roads



Simplification tolerance 20

Analysing RCL maps

Graph Analysis tool

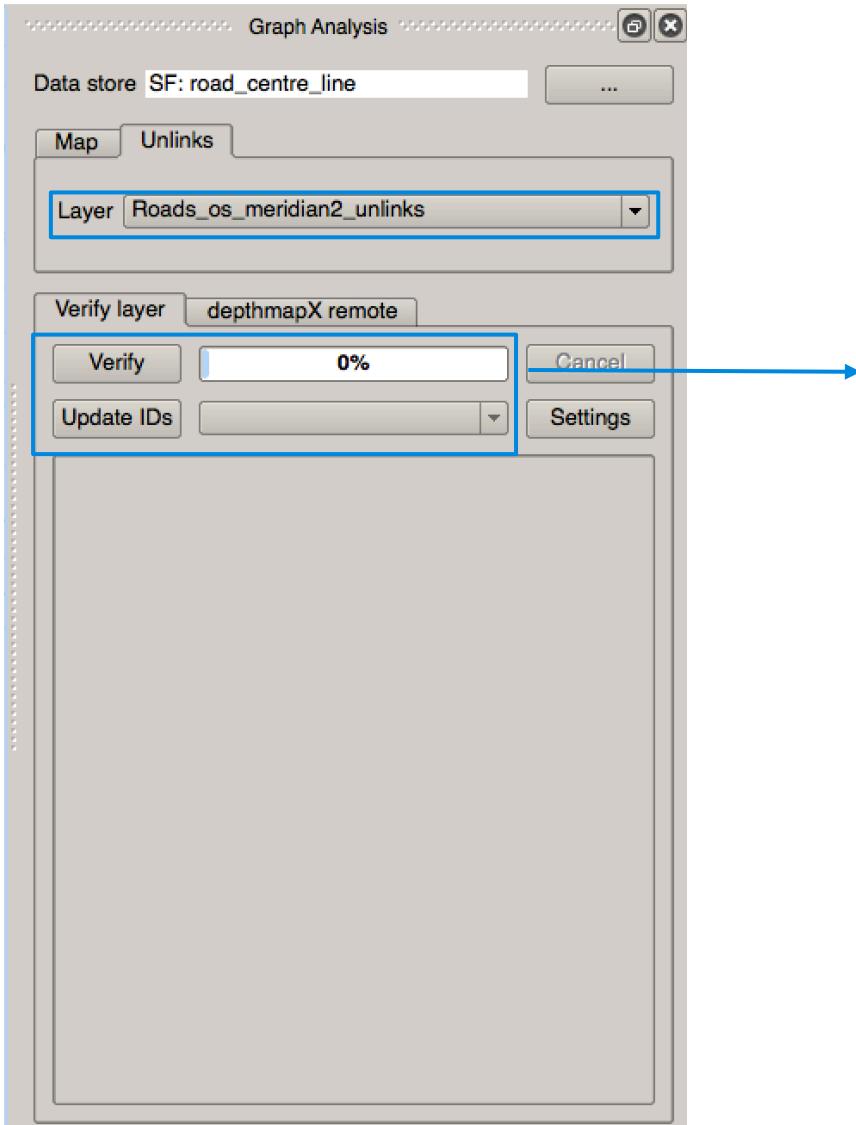


Map

- **Segment map or road centre line:** Tick this option when you are analysing road centre line maps or axial maps already segmented.

Verifying RCL maps

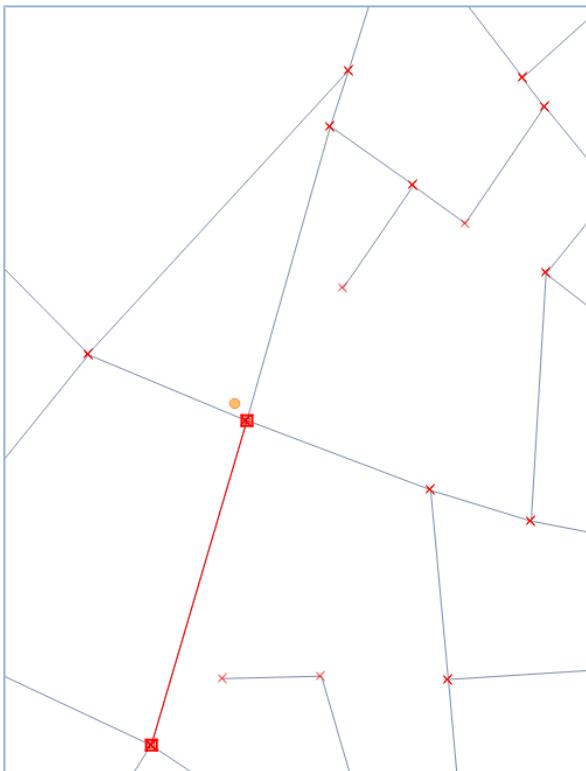
Graph Analysis tool



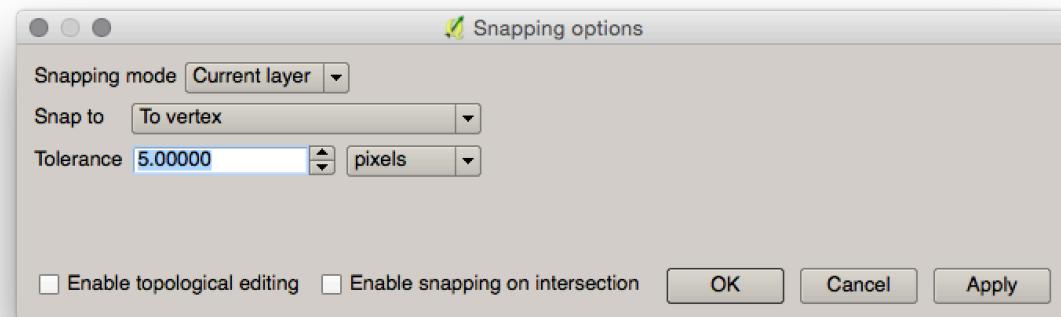
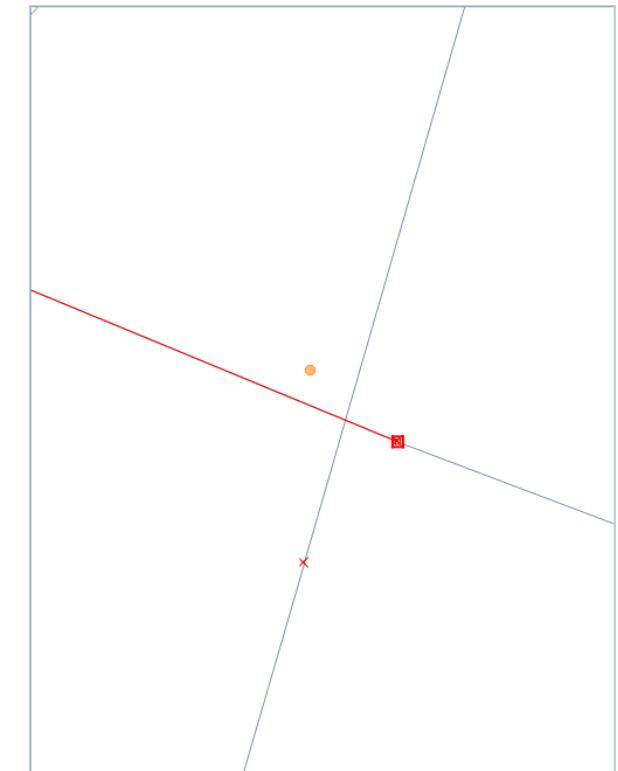
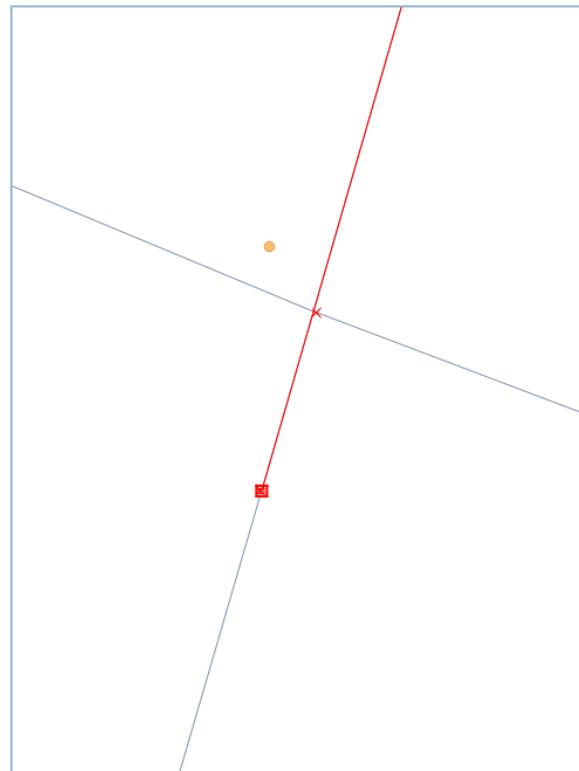
Unlinks

- **Verify the unlinks:** This is required in the cases where the cleaning tool produces a meaningful unlinks result file, e.g. OS OpenRoads and OS Meridian2.

Verifying RCL maps

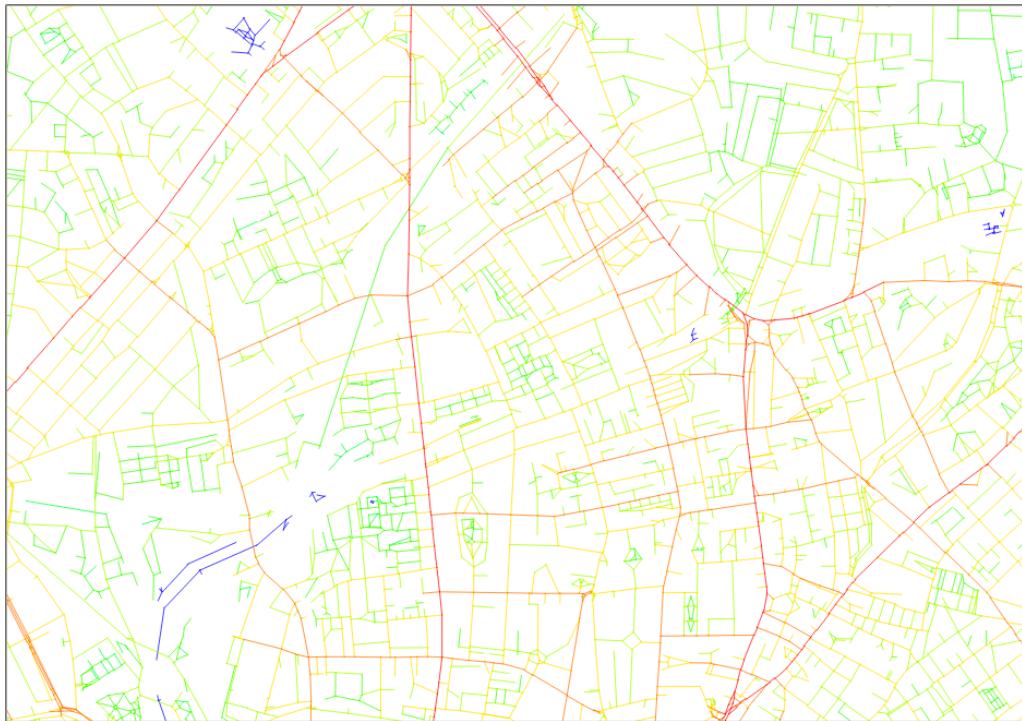


Fixing a missing RCL unlink by moving the nodes so that the segments cross at the location. Use of snapping options is important.



Analysing RCL maps

OpenStreetMap



Integration RN, 10 equal ranges

OS Open Roads



Integration RN, 10 equal ranges

The difference between the two maps is partly to do with the existence of islands in the OpenStreetMap model. These can be verified and fixed using the Axial layer verification tool.

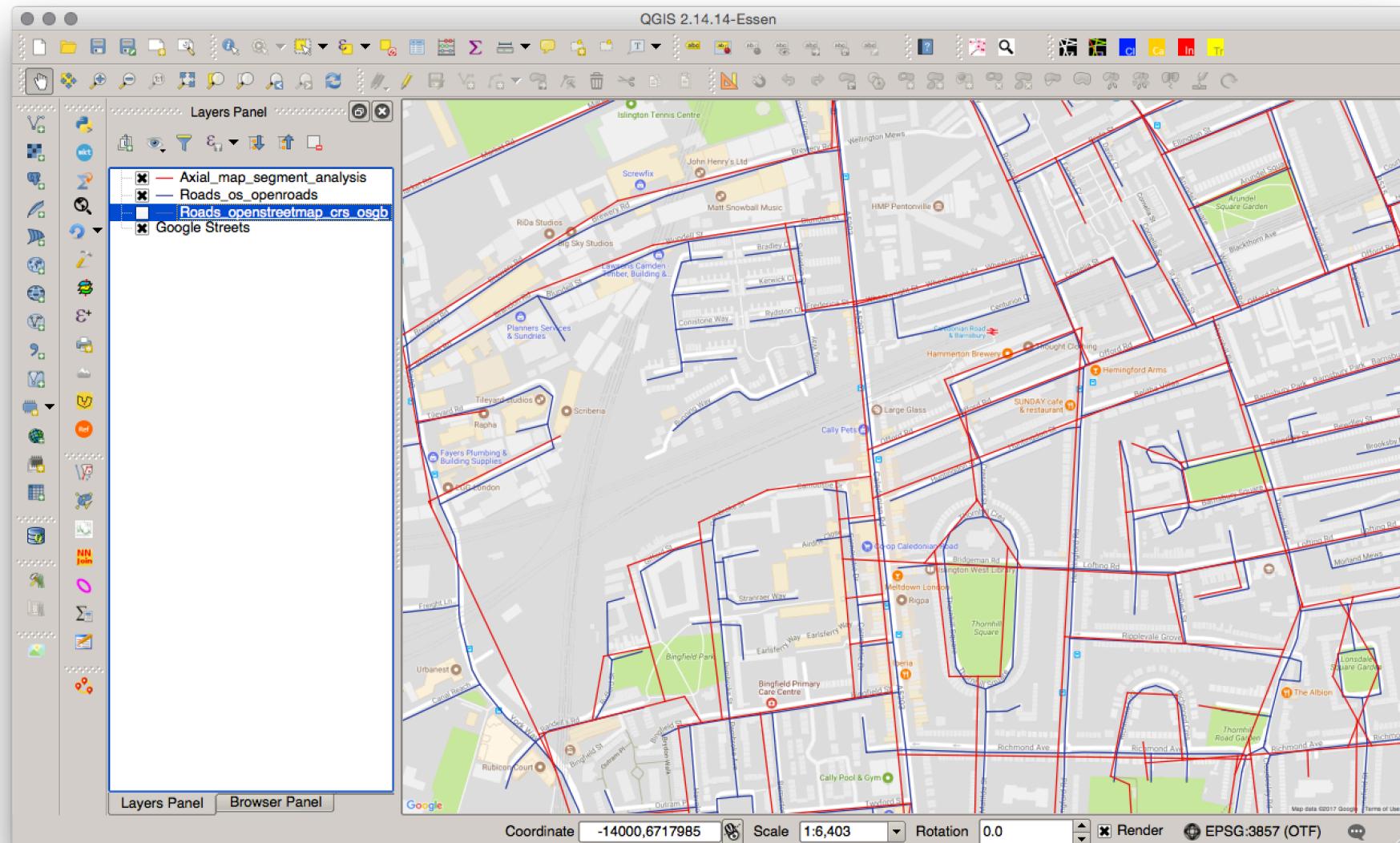
The islands affect the data distribution and consequently the ranges of the colour scale.

Visualisation and discussion of the results so far

- Road centre lines or axial maps: which model is more appropriate?
- How should we visualise different centrality metrics?

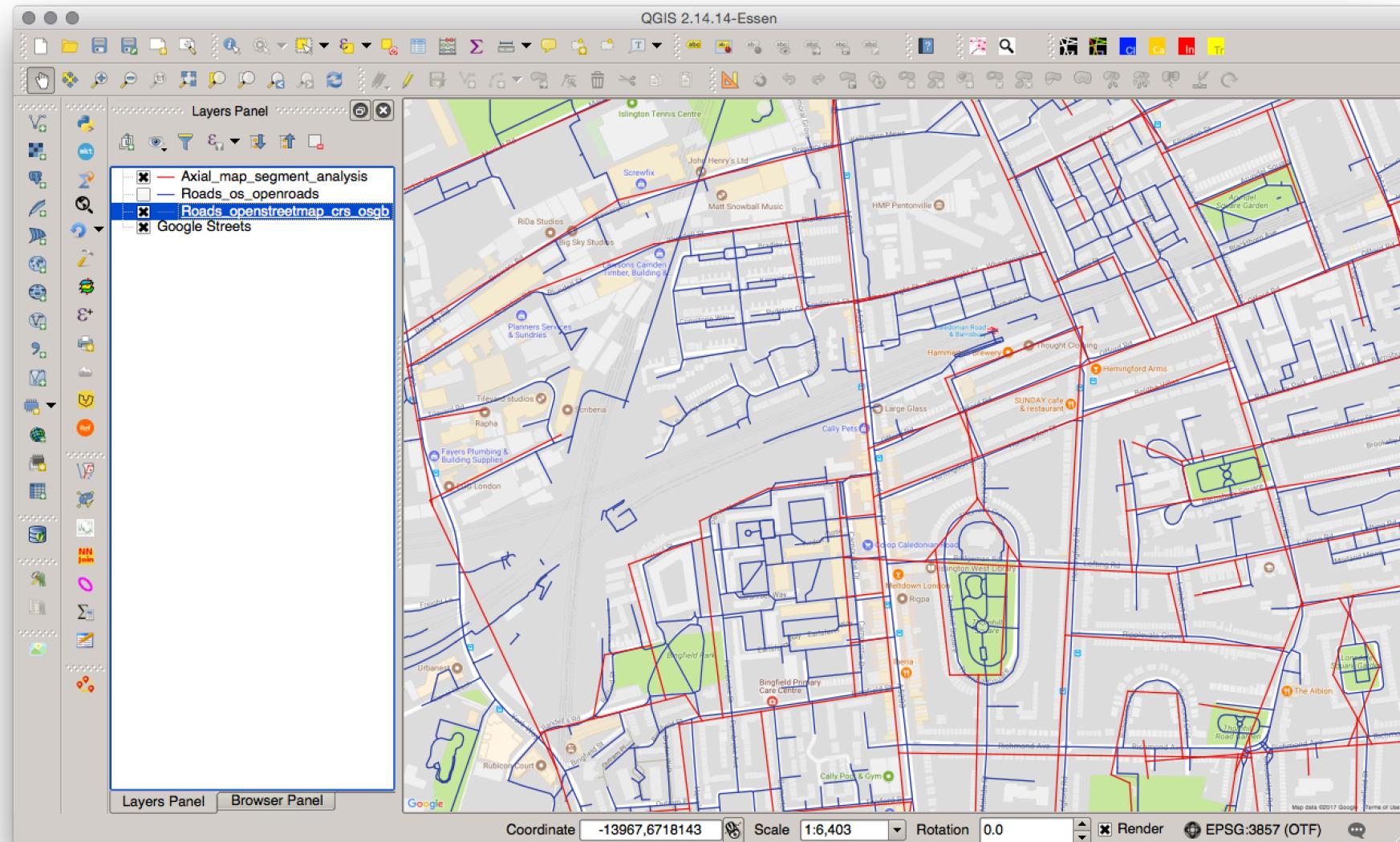
Visualisation and discussion of the results

Road centre lines: which model is more appropriate?



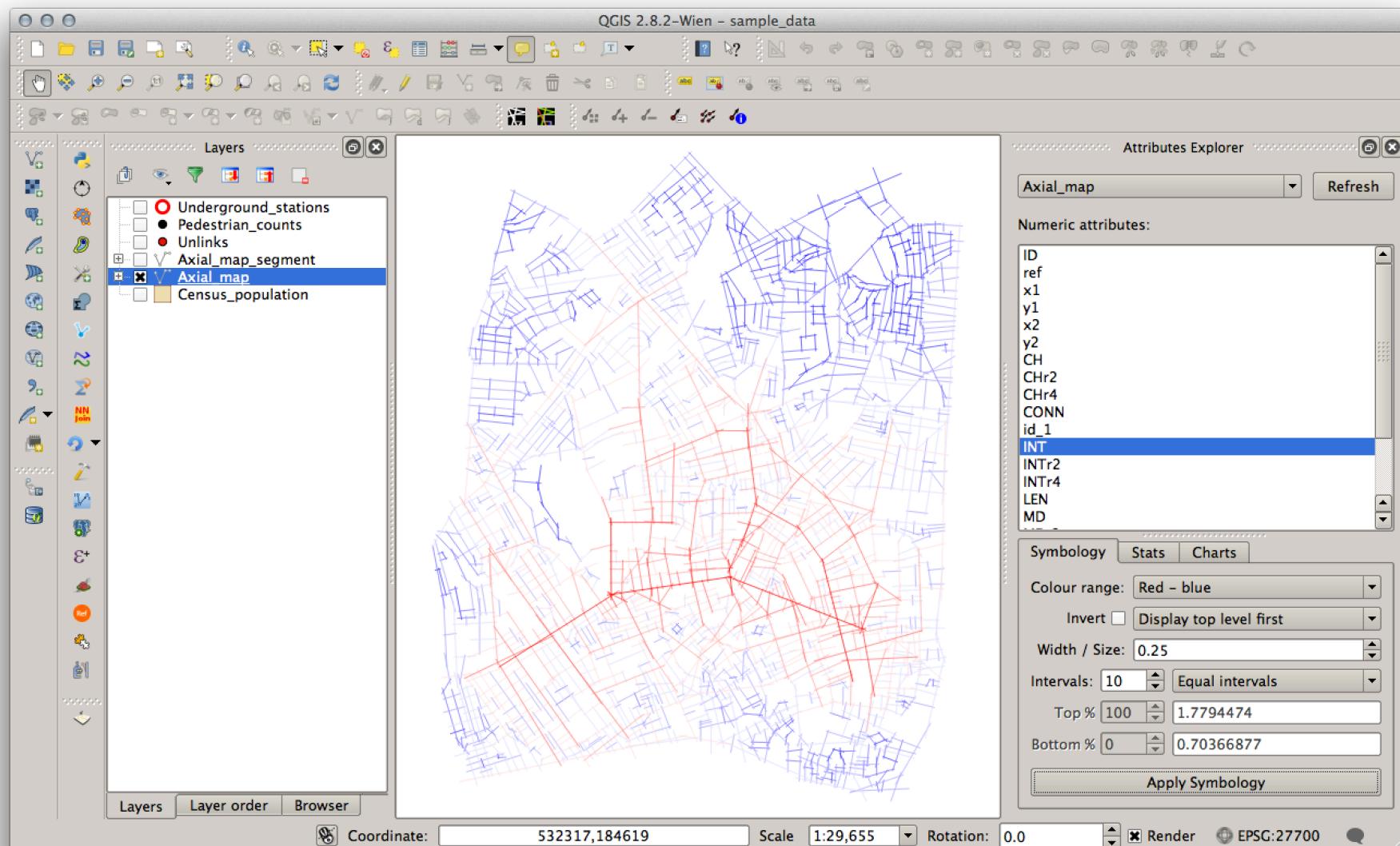
Visualisation and discussion of the results

Road centre lines: which model is more appropriate?



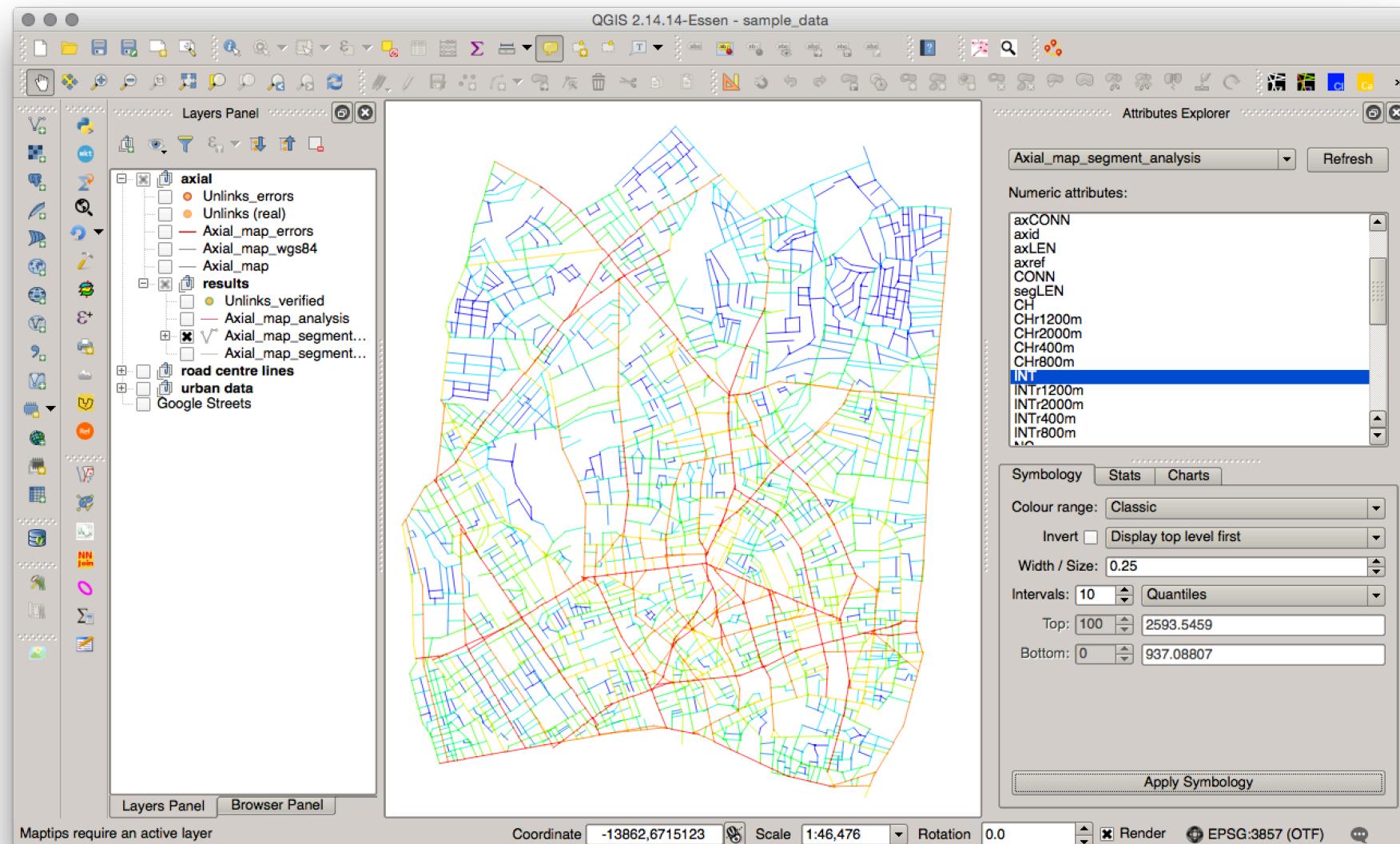
Visualisation and discussion of the results

Changing colour range



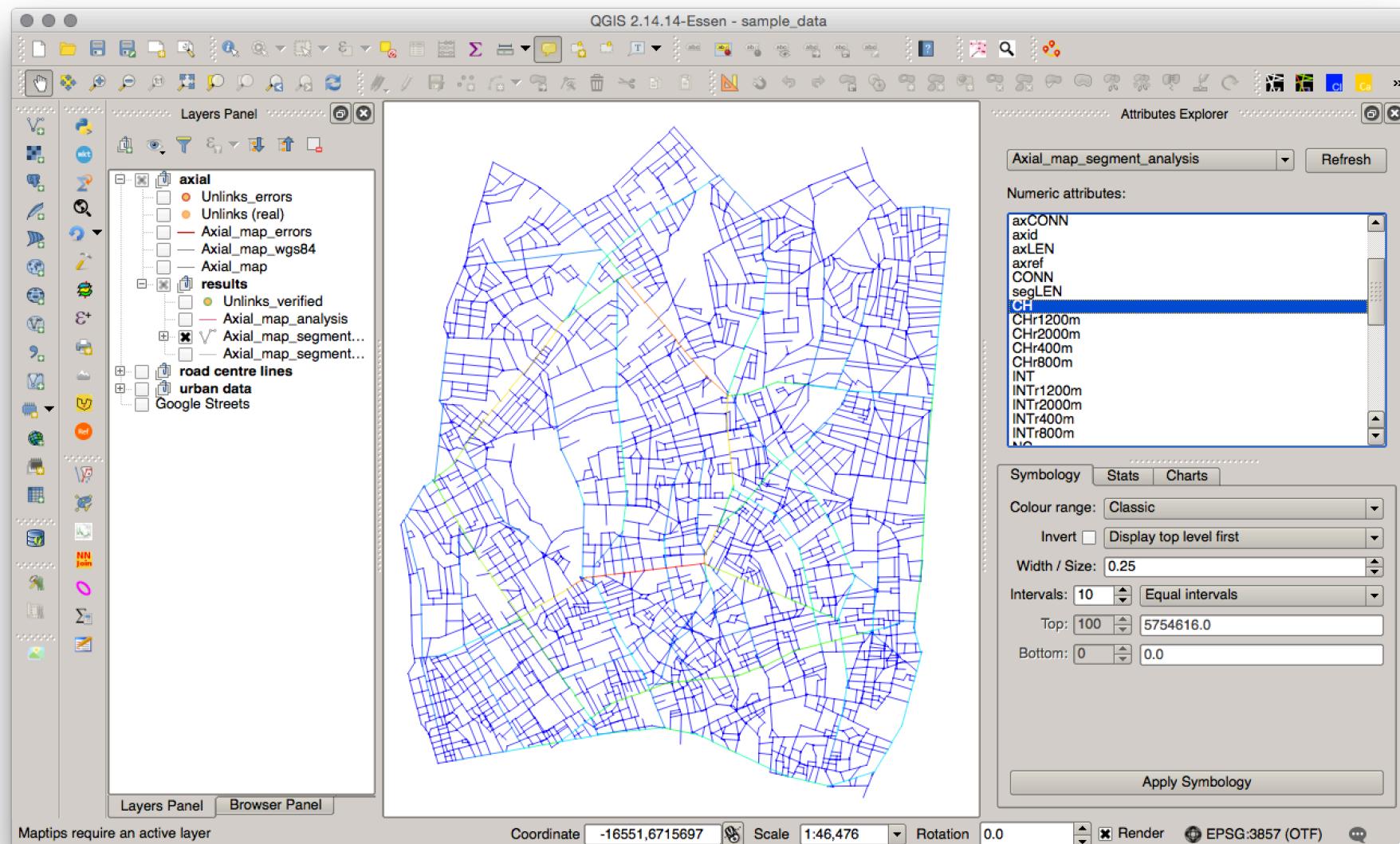
Visualisation and discussion of the results

Changing intervals: 10 quantiles



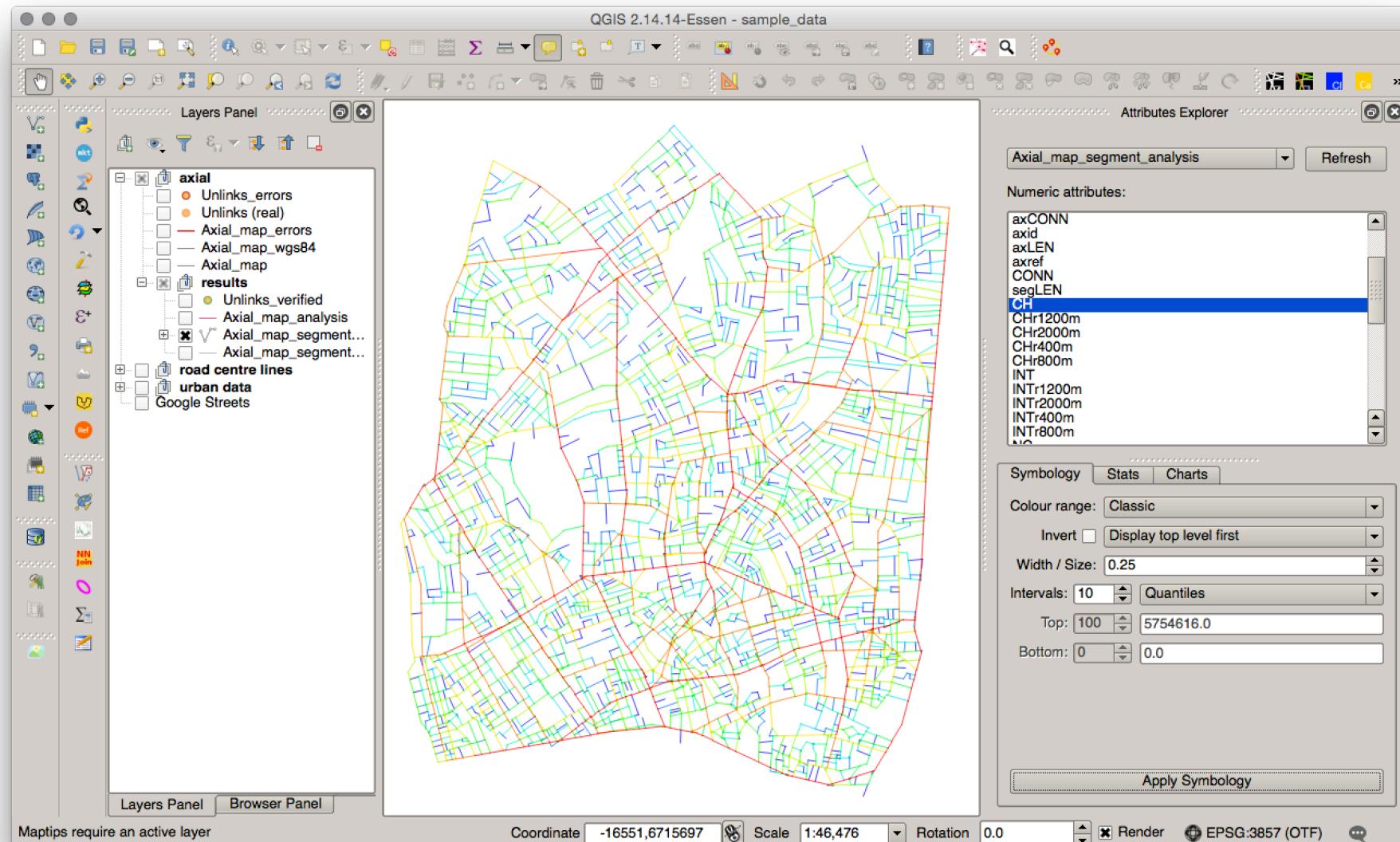
Visualisation and discussion of the results

Changing intervals: equal ranges with Choice



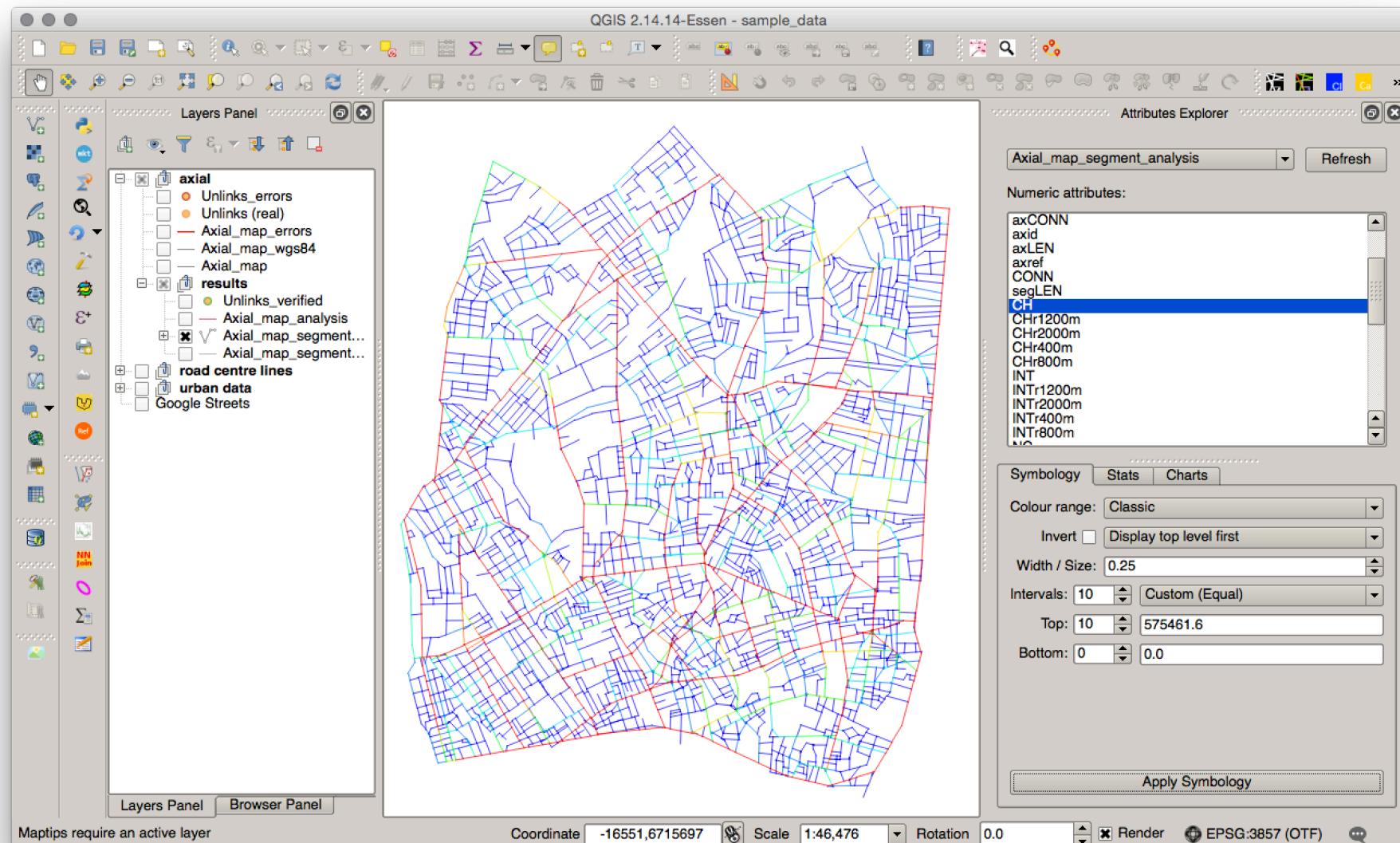
Visualisation and discussion of the results

Changing intervals: 10 quantiles with Choice



Visualisation and discussion of the results

Changing intervals: custom range with Choice





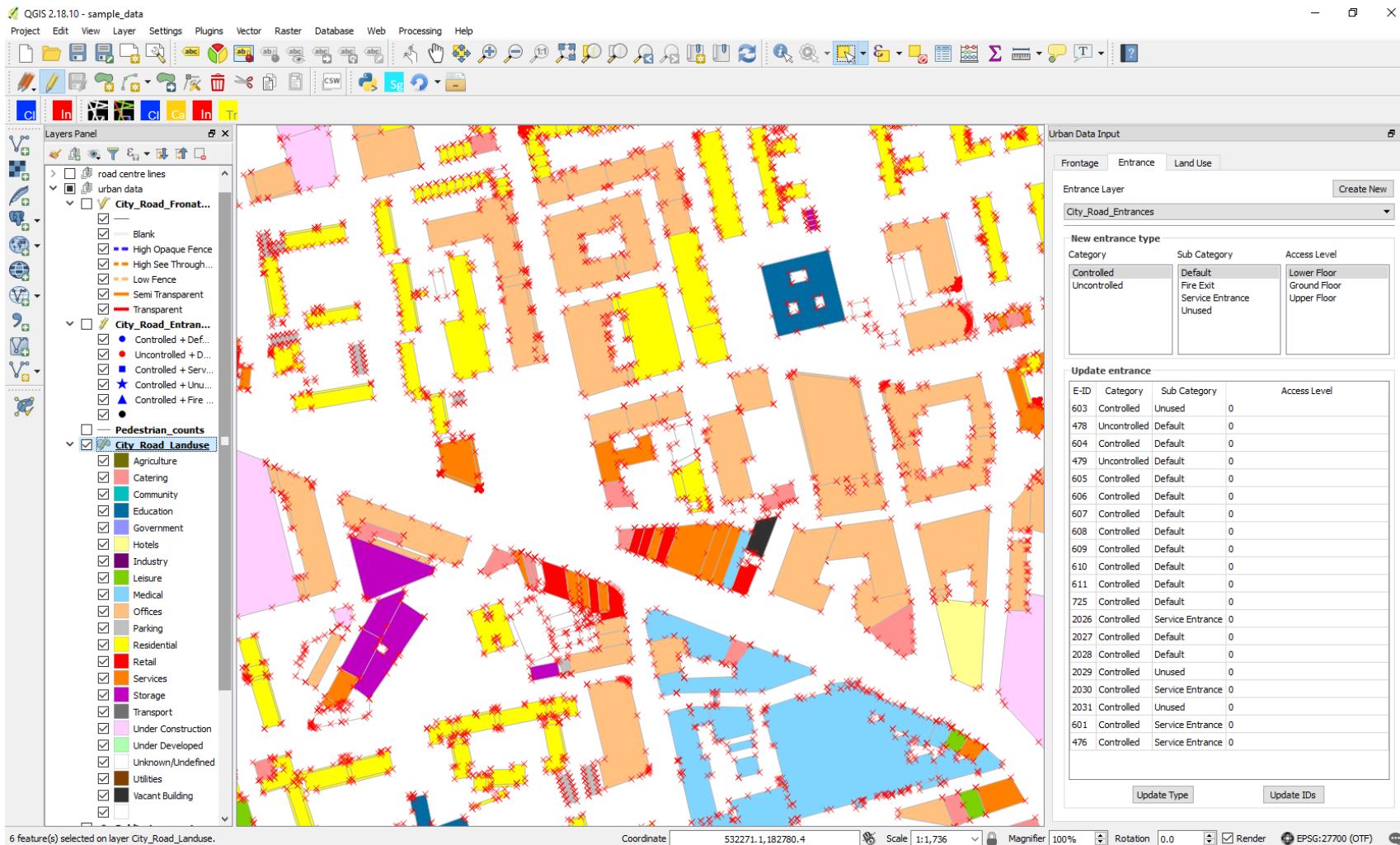
Task 3

Preparing other urban data layers

Urban Data Input Tool: recoding frontages, entrances and land use surveys

- Creating the data layer
- Drawing new features
- Updating features
- Viewing the attributes

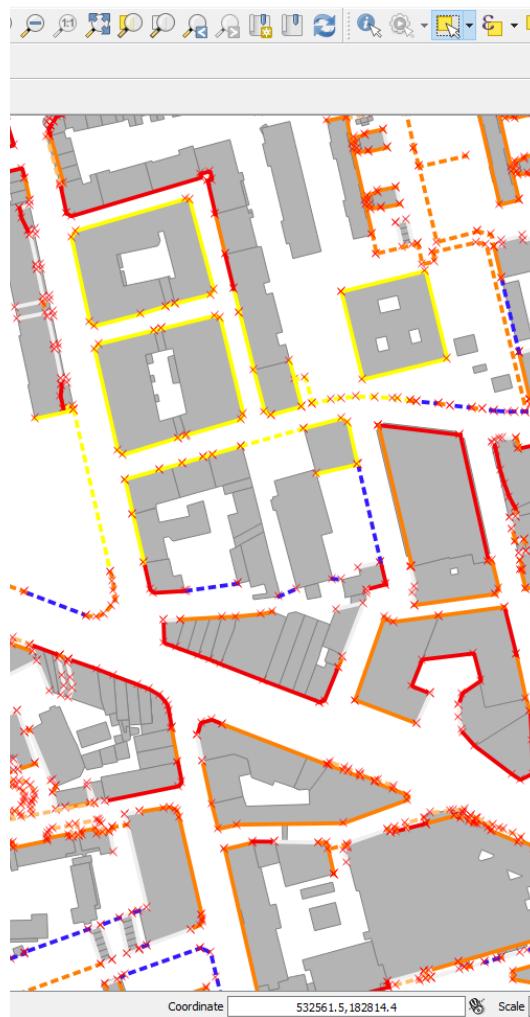
Urban Data Input Tool



Urban Data Input Tool is a plugin to ease aid the input of urban data like frontage type, entrance type and land use type as per Space Syntax Limited standards. The Space Syntax community is the key users for the plugin. The display styles and categories included are as per Space Syntax Limited Standards.

Urban Data Input Tool

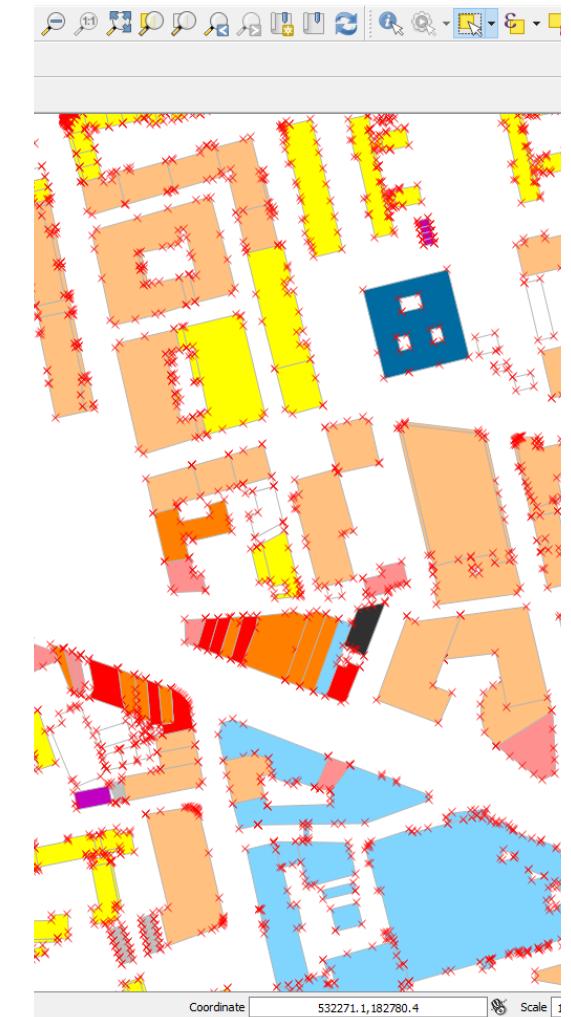
Frontage survey



Entrance survey



Land use survey



Urban Data Input Tool

Frontage tool

Urban Data Input

Frontage **Entrance** **Land Use**

Frontage layer **Create New**

memory:Frontages

New frontage type

Building Fences	Transparent Semi Transparent Blank
--------------------	--

Update frontage

F-ID	Group	Type	Length
1 1	Building	Transparent	132.932686002
2 2	Building	Blank	63.8493628295
3 3	Building	Semi Transparent	166.042669713

Update Type **Update ID** **Update Length**

Hide lines with no frontage type **Hide**

Entrance tool

Urban Data Input

Frontage **Entrance** **Land Use**

Entrance Layer **Create New**

memory:Entrances

New entrance type

Category	Sub Category	Access Level
Controlled Uncontrolled	Default	Lower Floor Ground Floor Upper Floor

Update entrance

E-ID	Category	Sub Category	Access Level
1 1	Controlled	Service Entrance	Ground Floor
2 2	Controlled	Service Entrance	Ground Floor
3 3	Controlled	Service Entrance	Ground Floor
4 4	Controlled	Service Entrance	Ground Floor
5 5	Controlled	Service Entrance	Ground Floor
6 6	Controlled	Service Entrance	Ground Floor
7 7	Controlled	Default	Ground Floor
8 8	Controlled	Default	Ground Floor
9 9	Controlled	Default	Ground Floor
10 10	Controlled	Default	Ground Floor
11 11	Controlled	Default	Ground Floor
12 12	Uncontrolled	Default	Ground Floor
13 13	Uncontrolled	Default	Ground Floor
14 14	Uncontrolled	Default	Ground Floor
15 15	Uncontrolled	Default	Ground Floor
16 16	Uncontrolled	Default	Ground Floor
17 17	Uncontrolled	Default	Ground Floor

Update Type **Update ID**

Land use tool

Urban Data Input

Frontage **Entrance** **Land Use**

Land Use Layer **Create New**

memory:Land use

Select Floor

Ground floor Lower floor Upper floor

New land use type

Category	Sub Category
Offices Parking Retail Residential Services Storage	Commercial Financial

Floors

Description

Update land use

LU-ID	Floors	Area	GF Category	GF Sub Category
1 1	6	11...	Agriculture	
2 2	5	26...	Government	
3 3	4	13...	Catering	Drinking Establishments
4 4	3	66...	Hotels	
5 5	2	11...	Services	Commercial

Update Type **Update ID**

Urban Data Input Tool Frontage tool

The screenshot shows the 'Urban Data Input' dialog box with the 'Frontage' tab selected. The 'Frontage layer' dropdown is set to 'memory:Frontages'. The 'New frontage type' section contains two columns: 'Building' and 'Fences'. The 'Building' column has 'Transparent' selected. The 'Fences' column has 'Semi Transparent' selected. A legend titled 'Data categories' lists six types: Blank (light gray), High Opaque Fence (dark blue), High See Through Fence (orange), Low Fence (yellow-orange), Semi Transparent (orange), and Transparent (red). Below the legend is a table titled 'Update frontage' with three rows of data:

F-ID	Group	Type	Length
1 1	Building	Transparent	132.932686002
2 2	Building	Blank	63.8493628295
3 3	Building	Semi Transparent	166.042669713

At the bottom are 'Update Type', 'Update ID', and 'Update Length' buttons, and checkboxes for 'Hide lines with no frontage type' and 'Hide'.

Create New Frontage layer

- Using buildings/block dataset
- Without using building/block dataset

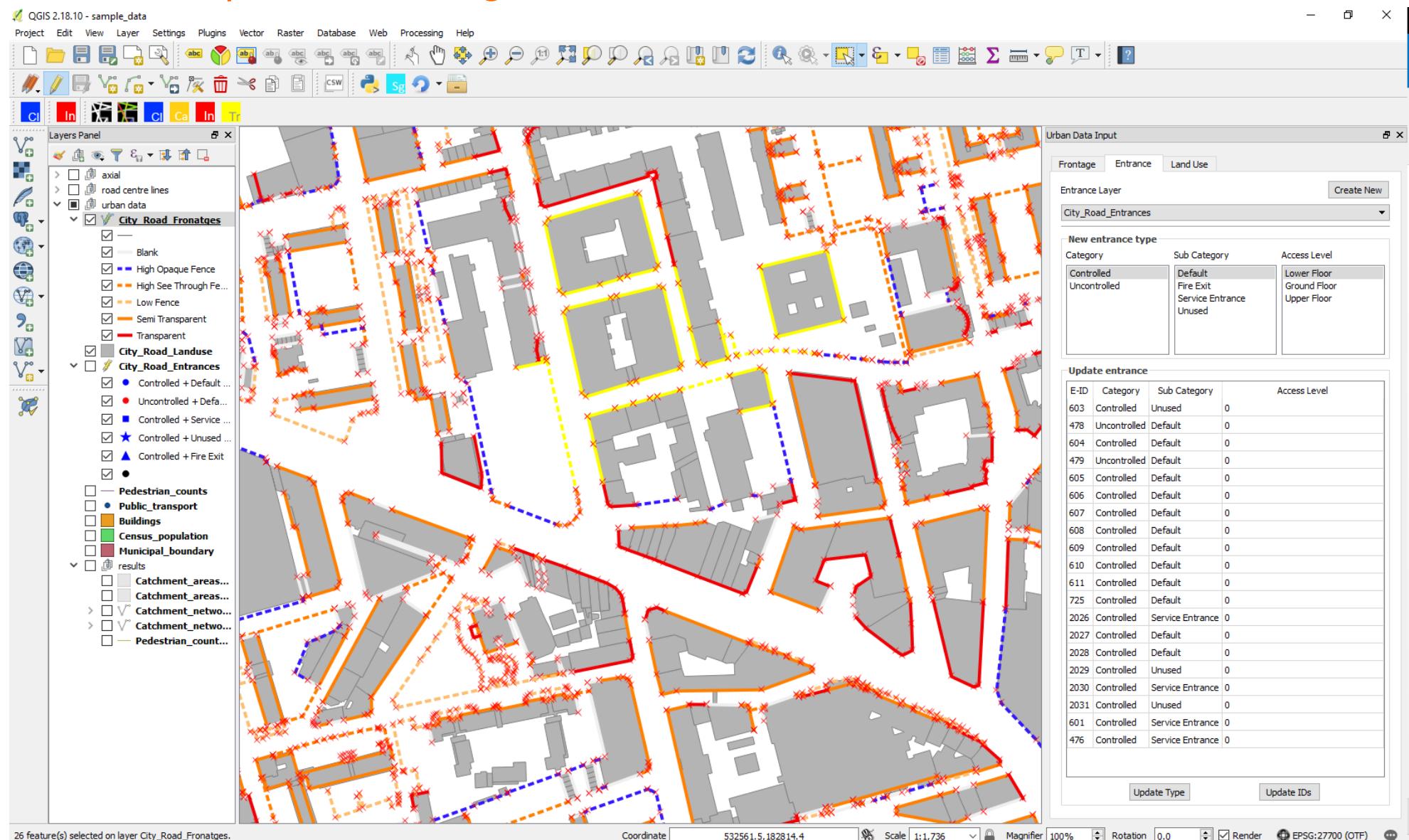
Frontage Category

Selected feature data

Update buttons

Hide lines with no data

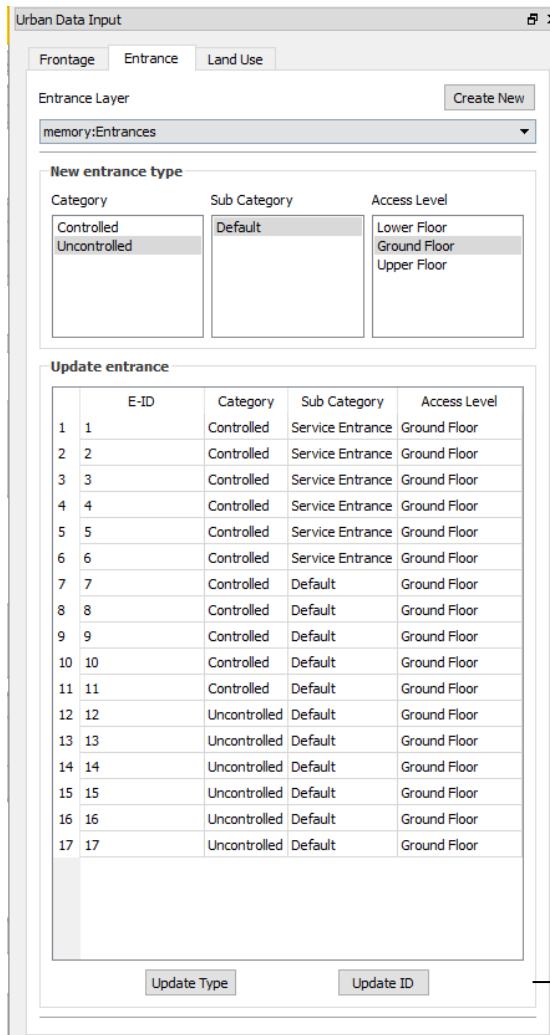
Urban Data Input Tool Frontage tool



Workshop

Space Syntax Toolkit for QGIS

Urban Data Input Tool Entrance tool



Create New Entrance layer

Entrance Category

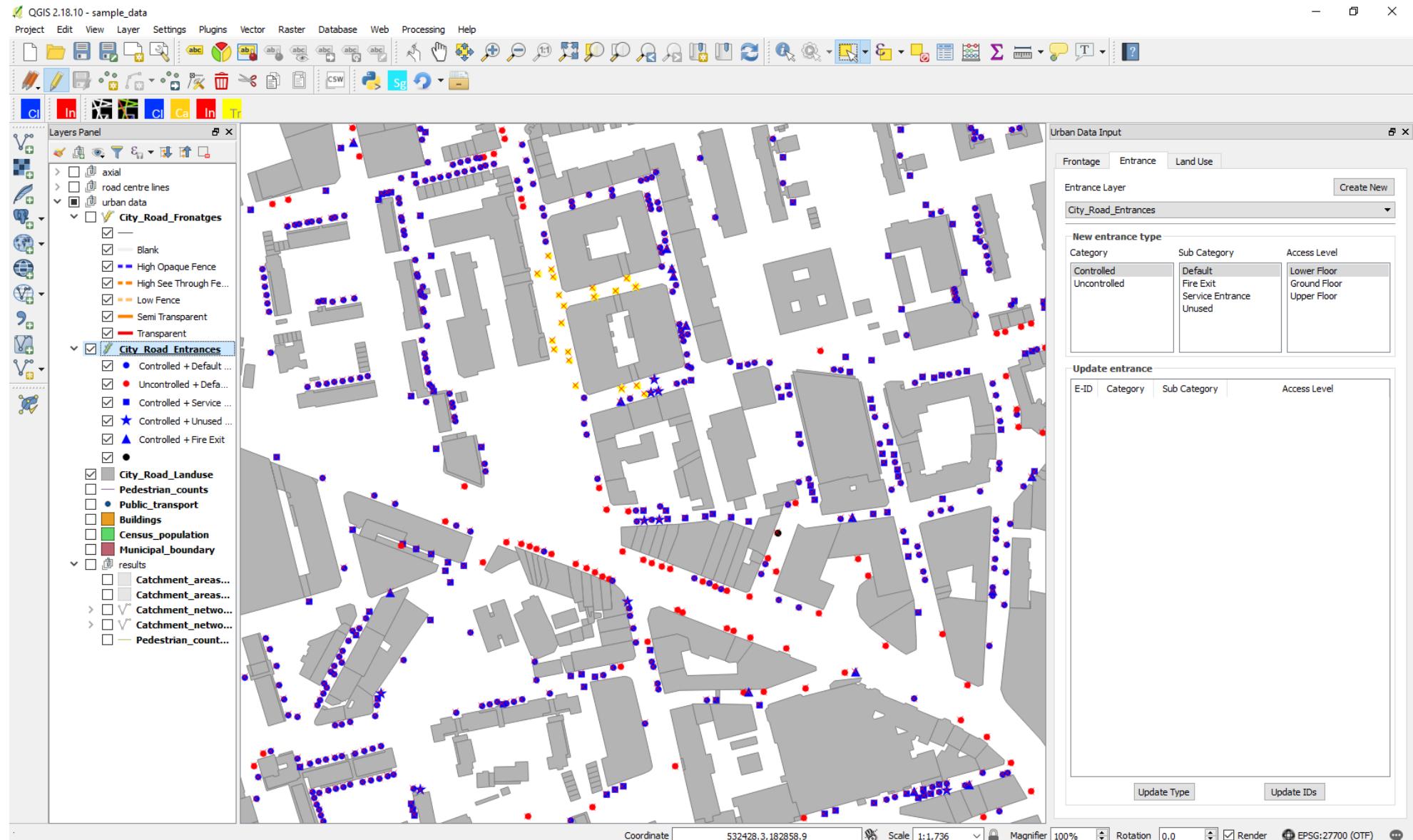
Selected feature data

Update buttons

Data categories

- Controlled + Default Entrance
- Uncontrolled + Default Entrance
- Controlled + Service Entrance
- ★ Controlled + Unused Entrance
- ▲ Controlled + Fire Exit

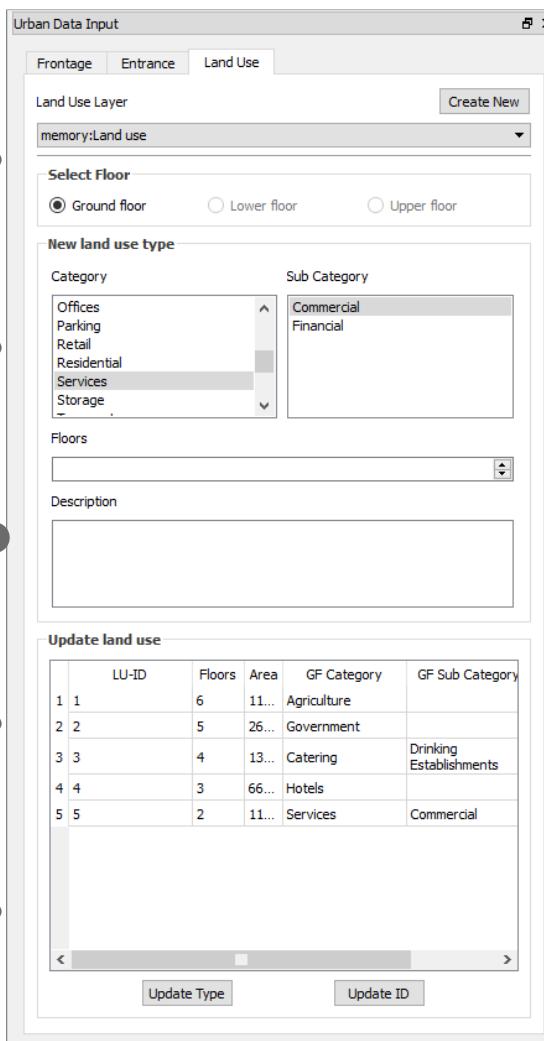
Urban Data Input Tool Entrance tool



Workshop

Space Syntax Toolkit for QGIS

Urban Data Input Tool Land use tool



Create New Land use layer

Land use Category

Building data/ description

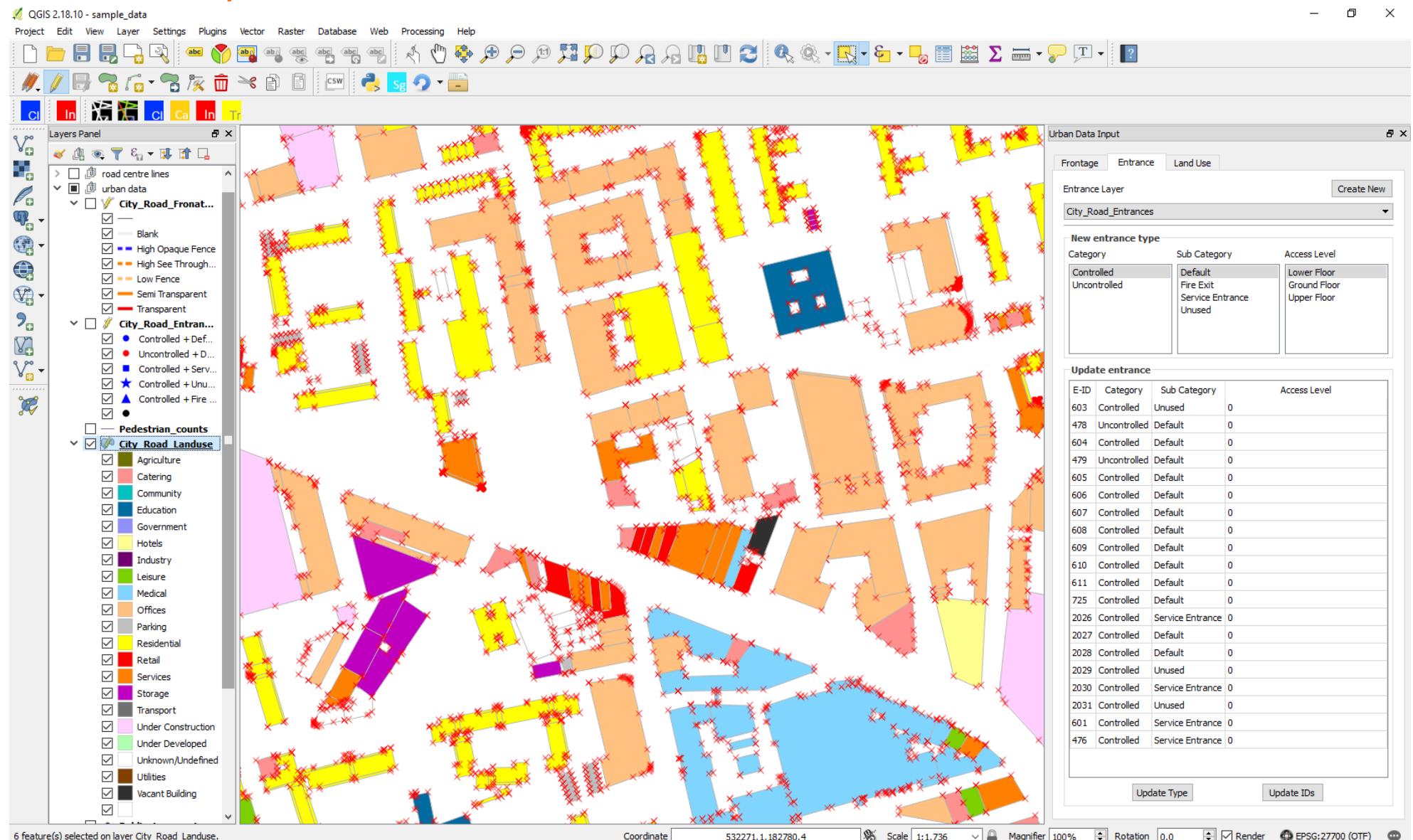
Selected feature data

Update buttons

Data categories

Agriculture
Catering
Community
Education
Government
Hotels
Industry
Leisure
Medical
Offices
Parking
Residential
Retail
Services
Storage
Transport
Under Construction
Under Developed
Unknown/Undefined
Utilities
Vacant Building

Urban Data Input Tool Land use tool



Task 4

Connecting and analysing the various results

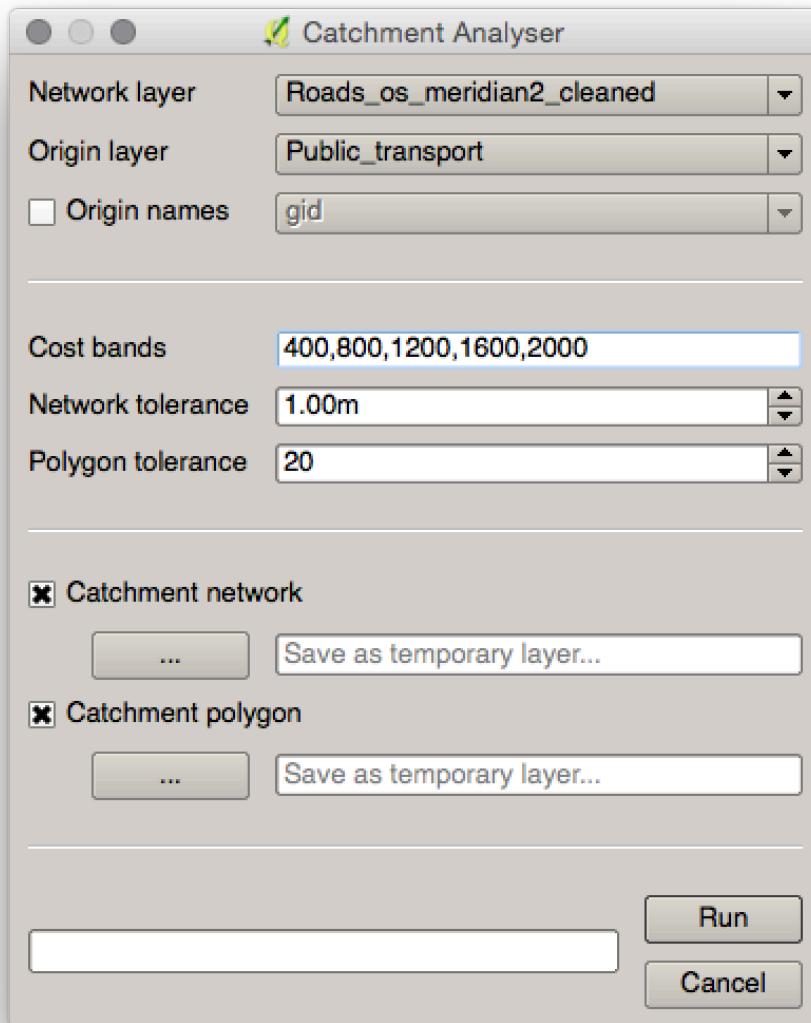
Catchment Analyser: calculating service/catchment areas from different locations (e.g. public transport nodes) along the road centreline network.

Catchment Analyser



This plugin takes a line-based network and point-based origin layer and calculated the distance from each segment within a given distance or list of distances to each of the origins. The tool outputs the catchment as lines and as a concave hull polygon layer. Credit for the concave hull functionality goes to the algorithm described by Adriano Moreira and Maribel Yasmina Santos.

Catchment Analyser



Network layer Choose the line-based vector layer that comprises a topological network you want to analyse. (projected CRS only!!)

Origin layer Choose the point-based vector layer containing the origins from which catchment will be calculated.

Origin Names By default the origin names will be based on the feature ids. If checked the tool will run the catchment analysis based on the column selected.

Cost Bands This sets the radius for the catchment analysis. For example, 400,800,1200,2000.

Network tolerance This is a tolerance for disconnected network. For example, it will connect lines that are within 1m by default.

Polygon tolerance The Catchment Analyser tool creates concave hull polygons from a specific origin. The polygon tolerance defines the level of 'concaveness' of the catchment. The lower the value, the more concave and the higher the value the more convex.

Catchment network The tool provides a catchment network output based on the original network layer with cost information on every origin. If checked the tool will generate the network as a temporary layer or as a shapefile using the browse button.

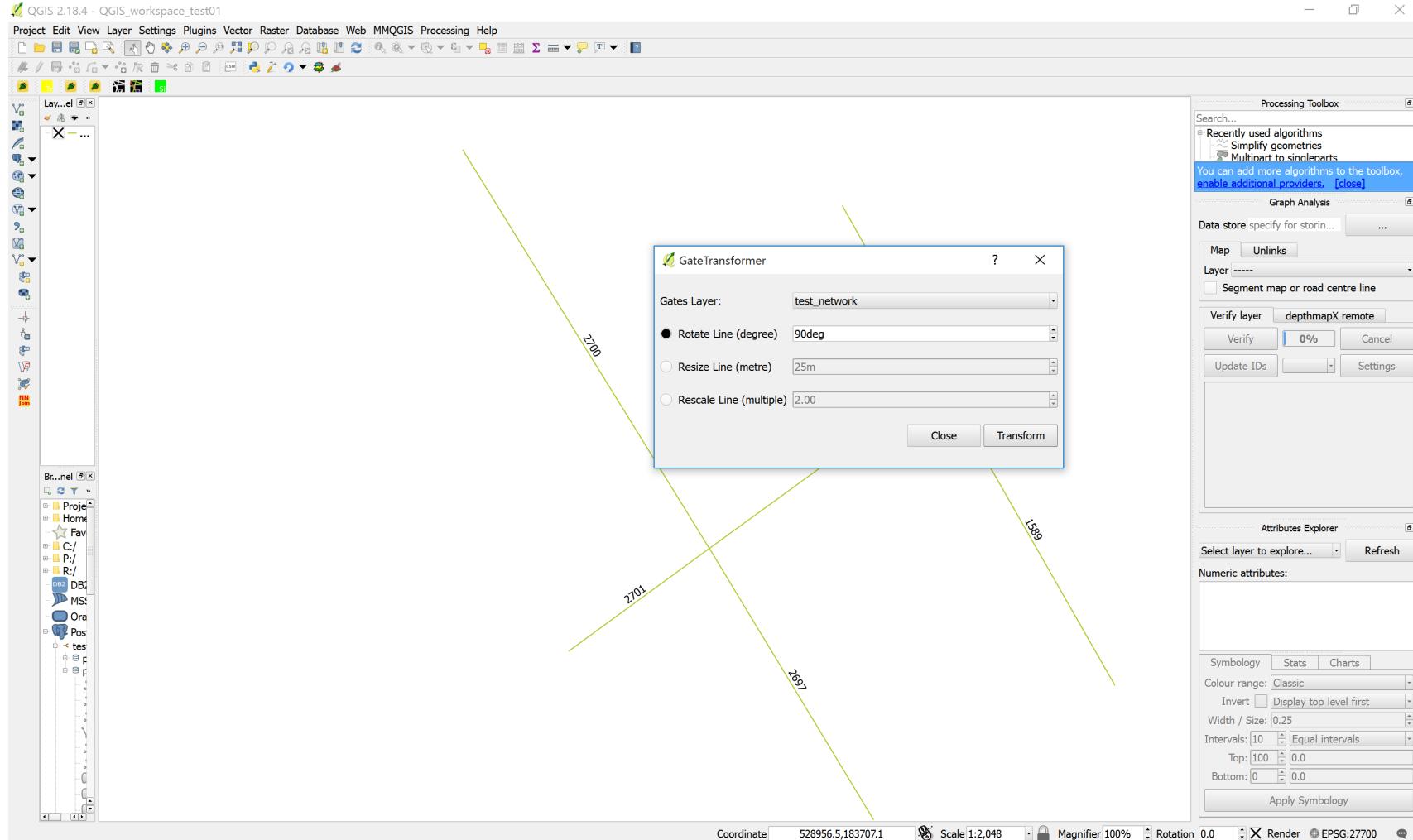
Catchment polygon The tool provides a catchment polygon output for each origin and each specified cost. If checked the tool will generate the polygons as a temporary layer or as a shapefile using the browse button.

Task 4

Connecting and analysing the various results

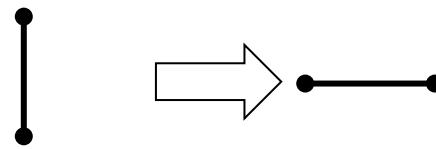
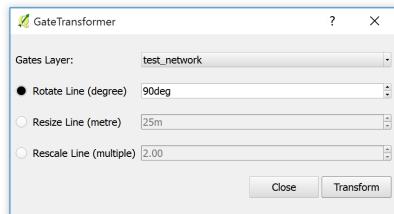
- Gate Transformer: preparing pedestrian counts
- Connecting the results layers with pedestrian counts
- Statistical analysis of two variables

Gate Transformer

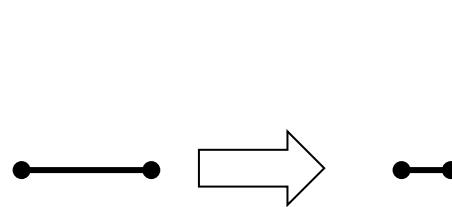
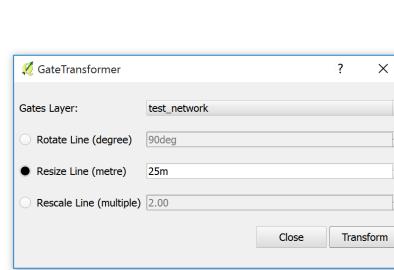


Gate Transformer is a plugin to modify the geometry of gates used in space syntax movement observations. Gates are usually drawn perpendicular to the axial line, with varying lengths. For presentation of movement observations the typical output is a map showing lines along the axial lines to indicate the movement direction. The gates should all be rotated 90degrees and have the same length.

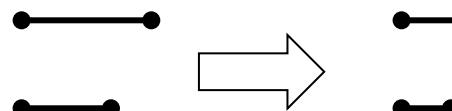
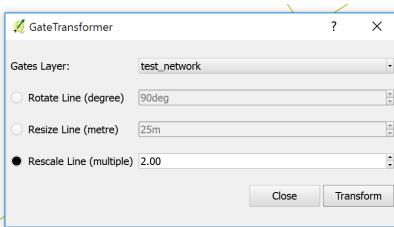
Gate Transformer



Rotate Line



Resize Line



Rescale Line

Gates layer Choose the line-based gate layer from the drop-down menu that you want to transform

Rotate Line (degree) Define the angle in degrees for rotating the selected gates

Resize Line (metre) Define the length in metres for resizing the selected gates

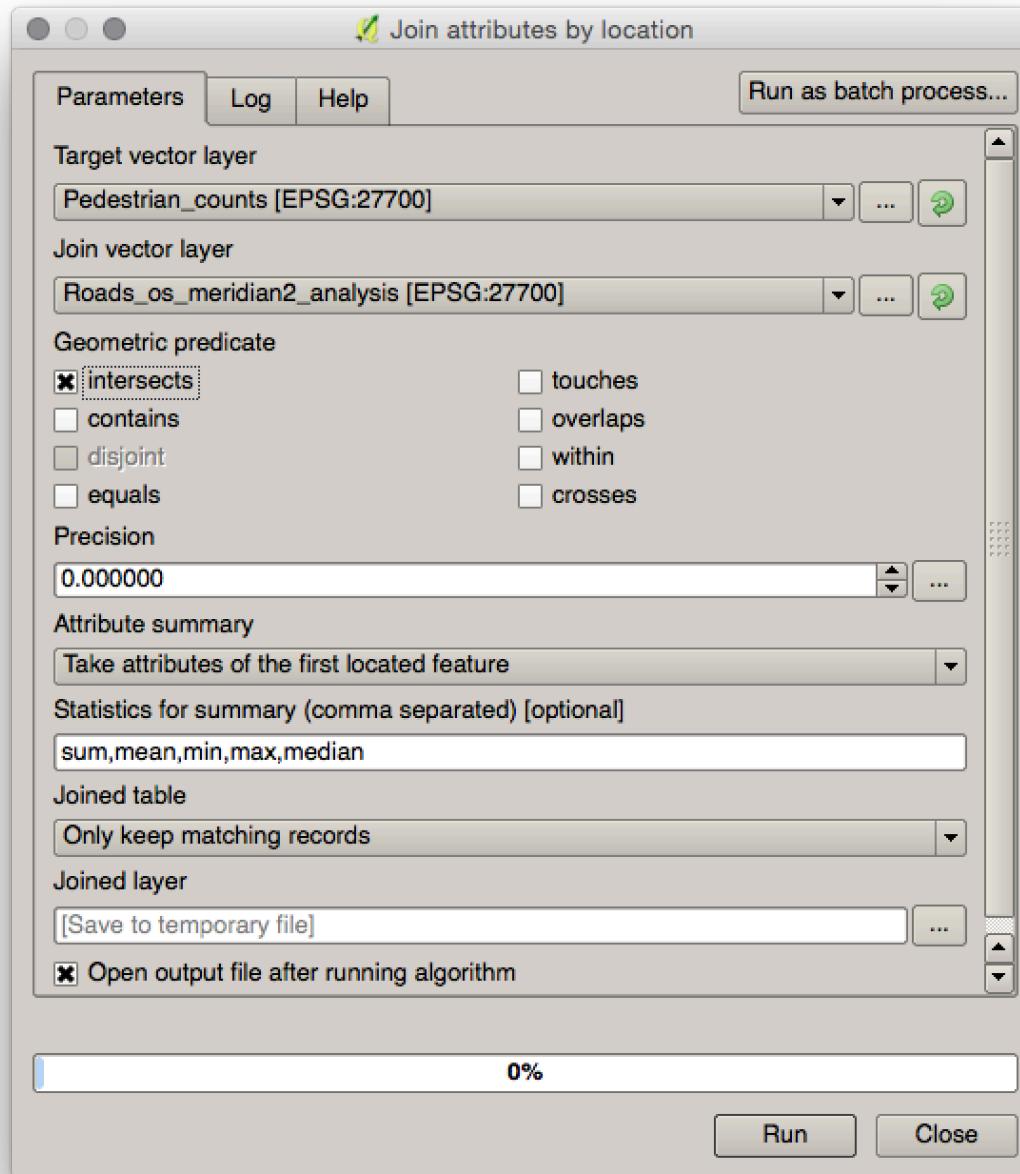
Rescale Line (multiple) Define the multiple in ratio for rescaling the selected gates

Transform Pressing the transform button will activate the analysis for the selected transformation

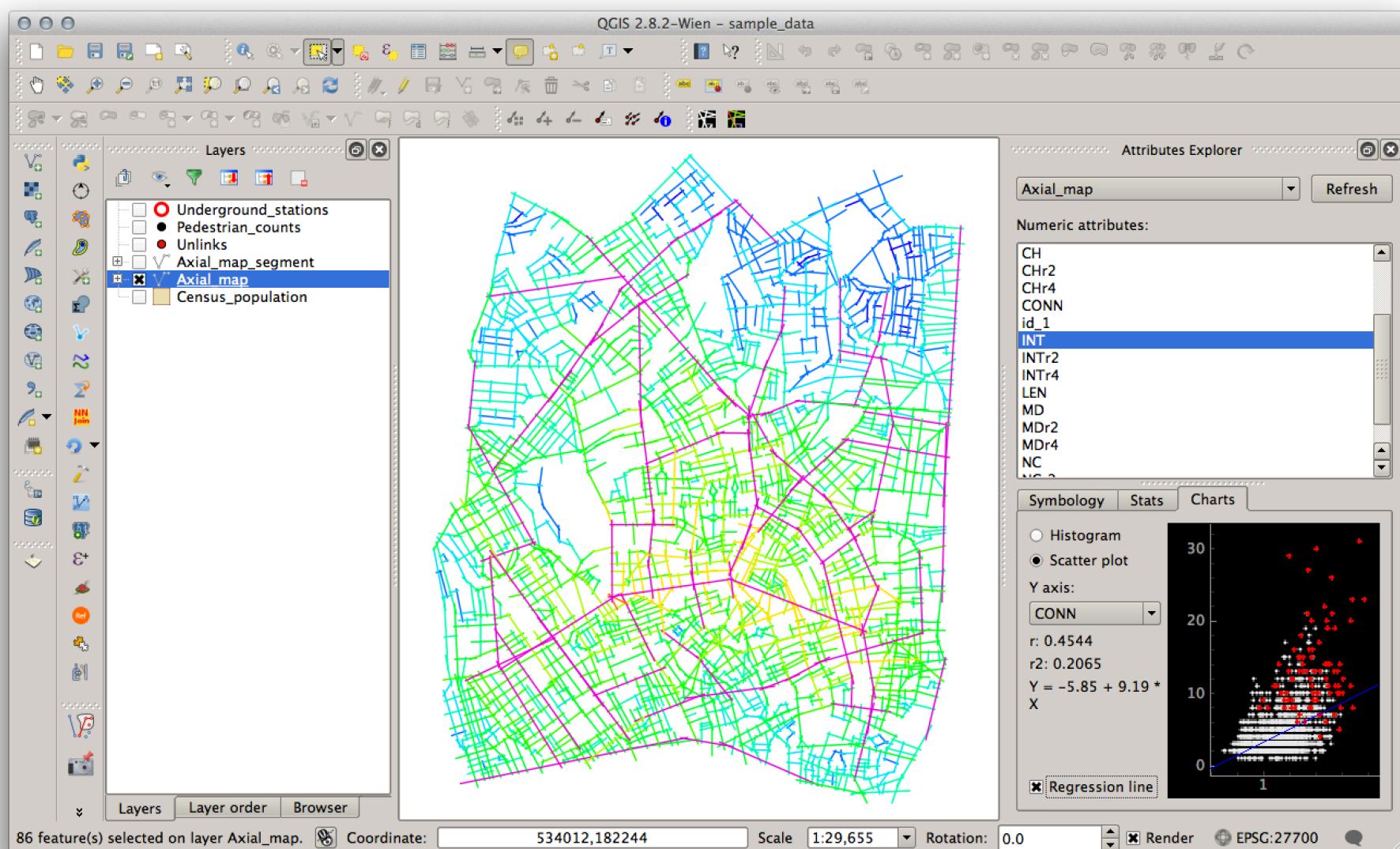
Close Pressing close will close and terminate the Gate Transformer

Connecting layers by spatial join

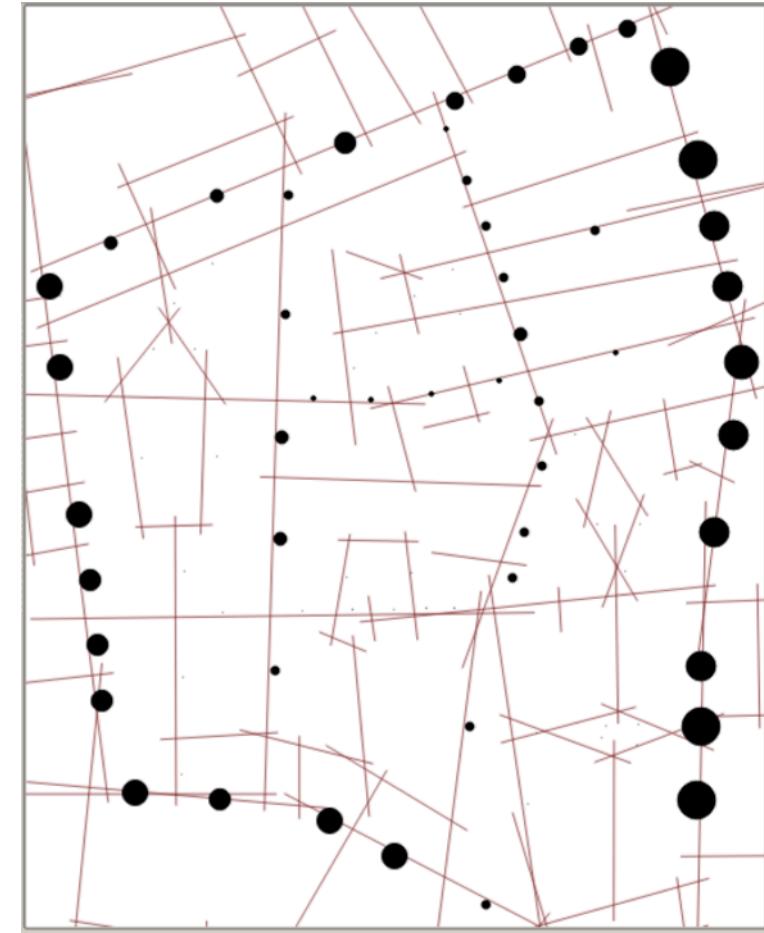
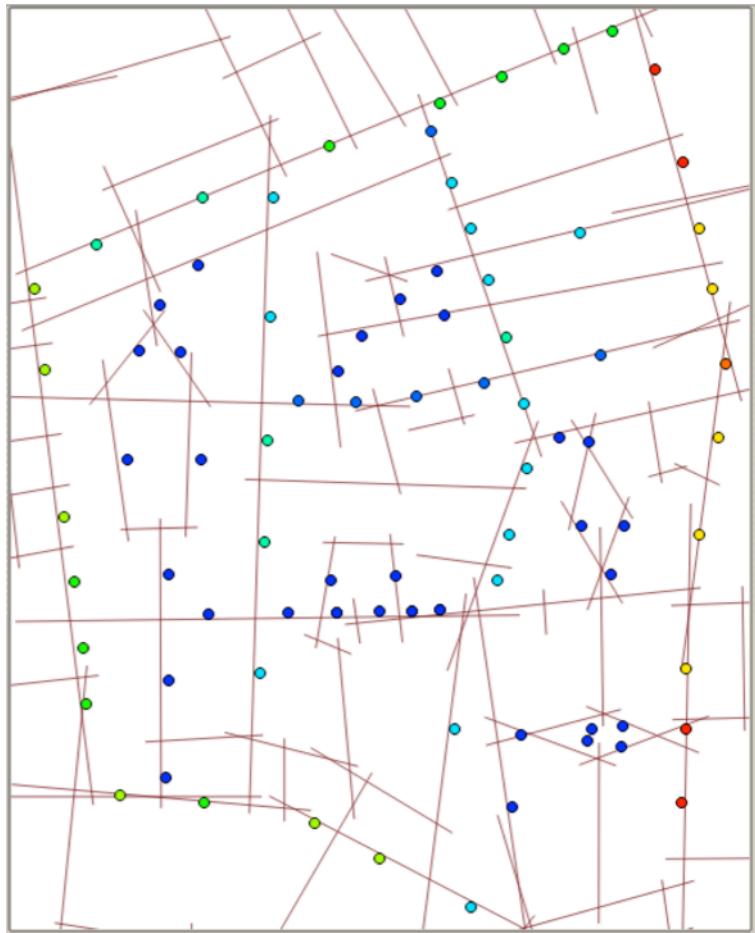
Use the 'Join attributes by location' from the processing toolbox



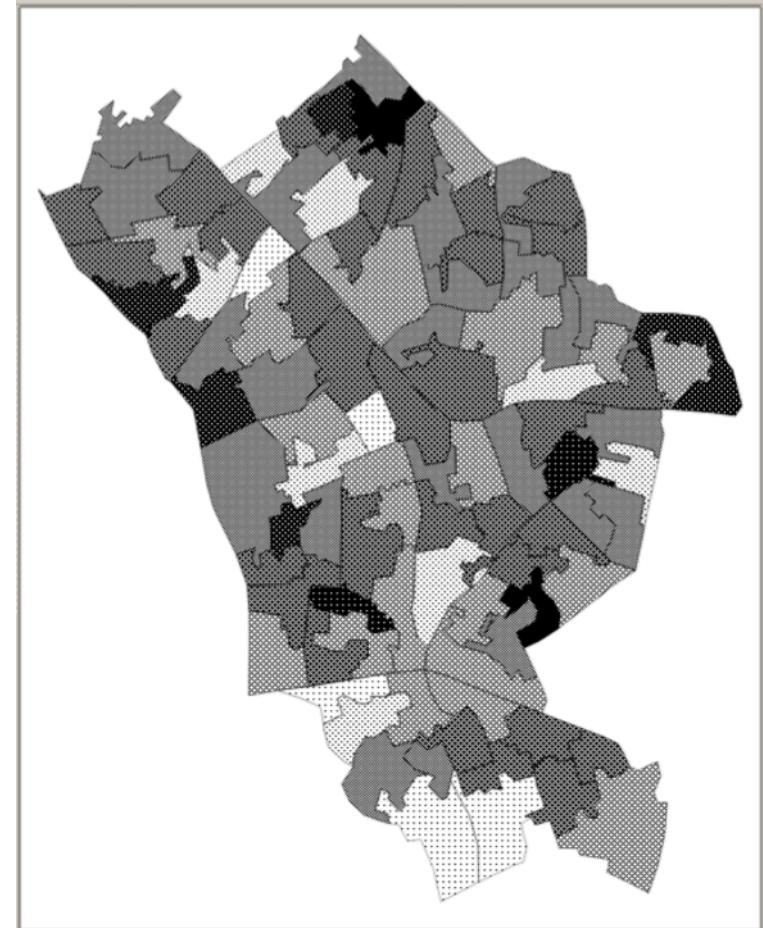
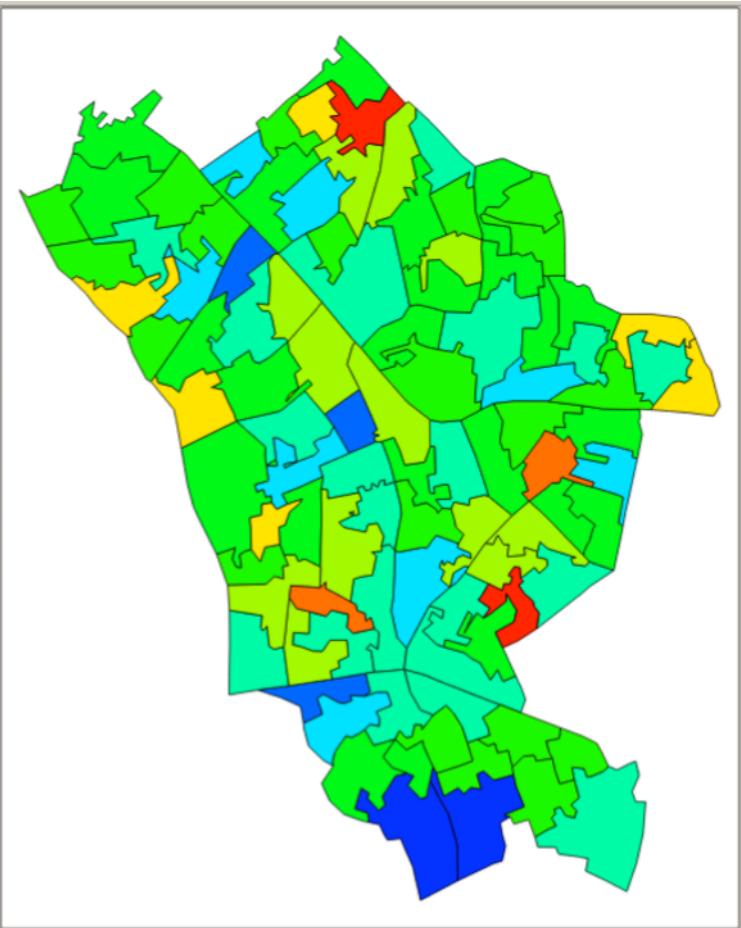
Statistical analysis of two variables



Visualising other layers with Attributes Explorer



Visualising other layers with Attributes Explorer



Questions and Discussion

QGIS methods for space syntax research

- Open to questions from the participants
- Connecting and analysing other data layers?
- Analysis with R and other statistics packages?

SST Github repository

<https://github.com/SpaceGroupUCL/qgisSpaceSyntaxToolkit>

The screenshot shows the GitHub repository page for 'qgisSpaceSyntaxToolkit' owned by 'SpaceGroupUCL'. The repository has 168 commits, 6 branches, 13 releases, and 2 contributors. The latest commit was made 17 seconds ago. The repository follows the GPL-3.0 license. A 'Clone or download' button is visible. The README.md file is displayed, featuring the title 'Space Syntax Toolkit for QGIS' and a 'News' section with updates from July 2017, June 2017, and November 2016.

Space Syntax Toolkit for QGIS

168 commits 6 branches 13 releases 2 contributors GPL-3.0

Branch: master New pull request Create new file Upload files Find file Clone or download

jorgegil committed on GitHub Update README.md Latest commit 9876824 17 seconds ago

File	Commit Message	Time Ago
documents	replaced exercises	5 hours ago
esstoolkit	sample data update with v0.2.0	14 hours ago
sample_data	sample data update with v0.2.0	14 hours ago
.gitignore	help updates	20 days ago
LICENSE.txt	metadata and license update	a year ago
README.md	Update README.md	17 seconds ago

README.md

Space Syntax Toolkit for QGIS

News

03.07.2017 - SST workshop at the 11th International Space Syntax Symposium, in Lisbon, Portugal

30.06.2017 - SST 0.2.0 has been released, including several new modules.

06.11.2016 - For the latest information on the Space Syntax Toolkit you should now consult the [Wiki](#) and its [FAQ](#).

SST Issues

<https://github.com/SpaceGroupUCL/qgisSpaceSyntaxToolkit/issues>

The screenshot shows the GitHub interface for the repository "SpaceGroupUCL / qgisSpaceSyntaxToolkit". The top navigation bar includes links for "This repository", "Search", "Pull requests", "Issues", "Marketplace", and "Gist". Below the navigation, there are buttons for "Unwatch" (11), "Star" (24), and "Fork" (11). The main content area displays a list of 53 open issues. The issues are listed in descending order of creation date, with the most recent at the top. Each issue card includes a title, a brief description, labels (e.g., bug, enhancement, help wanted), and the number of comments. The issues cover various topics such as RCL Cleaner results, FeatureRenderer deprecation warning, Graph Analysis, and CRS limitations.

Issue Title	Description	Labels	Comments
RCL Cleaner results fail to load if memory layer name is changed	#162 opened 2 days ago by Anafi	bug	1
FeatureRenderer deprecation warning	#161 opened 2 days ago by jorgegil	Attribute Explorer	
Canceling analysis does not stop depthmapX process	#153 opened 20 days ago by jorgegil	bug, Graph Analysis, help wanted	
Update wiki for segment/rcl options	#150 opened 20 days ago by jorgegil	enhancement, Graph Analysis	
Features suggestion: order of columns and short names	#142 opened on Dec 10, 2016 by rtsaboya	enhancement, Graph Analysis, new feature	2
MMD in Qgis	#137 opened on May 13, 2016 by mariarosalia	Graph Analysis, new feature	2
Statistics and charts do not consider layer filters	#134 opened on Jan 26, 2016 by jorgegil	Attribute Explorer, enhancement	
Interface appears docked on the QGIS main window	#132 opened on Dec 12, 2015 by jorgegil	bug, General	
Update user manual to explain CRS limitation	#131 opened on Nov 12, 2015 by jorgegil	enhancement, Graph Analysis	
Failed to Import Analysis Results (Mac OSX)	#129 opened on Oct 22, 2015 by JJFriesen	bug, Graph Analysis, help wanted	3
Allow the use of geographic CRS	#126 opened on Sep 15, 2015 by jorgegil	enhancement, Graph Analysis	1

SST Wiki

<https://github.com/SpaceGroupUCL/qgisSpaceSyntaxToolkit/wiki>

The screenshot shows the GitHub repository page for "SpaceGroupUCL / qgisSpaceSyntaxToolkit". The top navigation bar includes links for "This repository", "Search", "Pull requests", "Issues", "Marketplace", and "Gist". Below the repository name, there are buttons for "Unwatch" (11), "Star" (24), and "Fork" (11). The main navigation tabs are "Code", "Issues 53", "Pull requests 0", "Projects 0", "Wiki" (which is highlighted in orange), and "Insights". A "Edit" button and a green "New Page" button are visible on the right.

Home

Jorge Gil edited this page 6 days ago · 9 revisions

#Welcome to the Space Syntax Toolkit wiki!

This is an extended version of the "User Guide", open to contributions from the SST user community. It covers the contents of the user guide, describing the installation, functionality and basic usage of the SST. But it also includes corrections and updates to this content. In addition, it has new sections such as FAQ and simple tutorials or step by step guides.

We welcome your suggestions and contributions to this wiki! Get in touch via the space syntax toolkit mailing list on Jiscmail.

This wiki does not aim to explain the theory and methods of space syntax, nor the standard features and operation of QGIS or depthmapX. Please refer to the respective literature and documentation for information on these other essential aspects, namely:

- Space Syntax Online Training Platform – <http://www.spacesyntax.net/online-training-platform/>
- Space Syntax methodologies manual – <http://discovery.ucl.ac.uk/1415080/>
- depthmapX - <https://varoudis.github.io/depthmapX/>
- Introduction to Depthmap 10 – http://archtech.gr/varoudis/depthmapX/LearningMaterial/introduction_depthmap-v10-website.pdf
- QGIS User Guide – http://docs.qgis.org/2.14/en/docs/user_manual/
- QGIS Training Manual – http://docs.qgis.org/2.14/en/docs/training_manual/
- QGIS Gentle introduction to GIS – <http://qgis.org/gentle-introduction/>

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Thank you!

SST mailing list:

[https://www.jiscmail.ac.uk/cgi-bin/webadmin?A0=SPACESYNTAX-
TOOLKIT](https://www.jiscmail.ac.uk/cgi-bin/webadmin?A0=SPACESYNTAX-TOOLKIT)

Space syntax mailing list:

<https://www.jiscmail.ac.uk/cgi-bin/webadmin?A0=SPACESYNTAX>