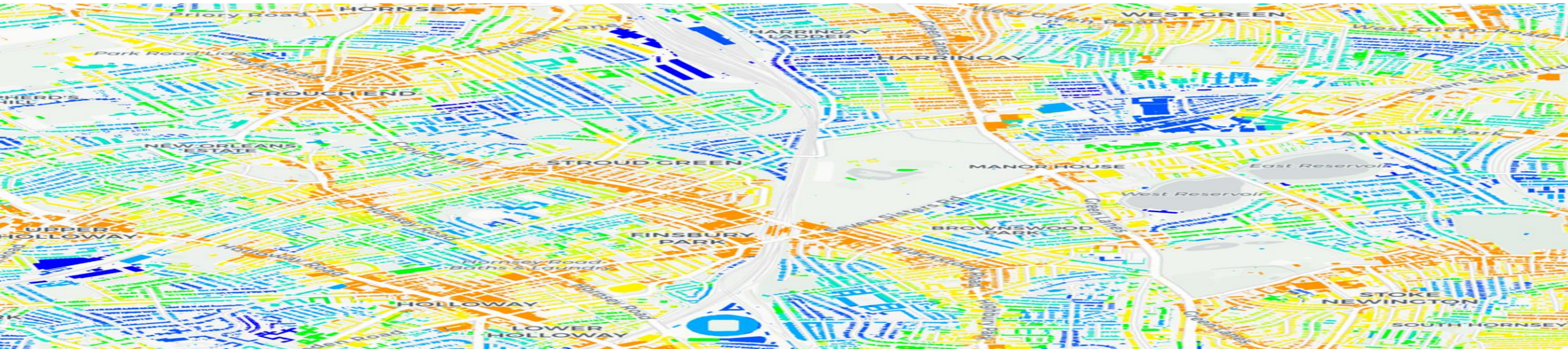


To make the SMEs work you need to make the city work!

How the urban structure enables sustainable urban functions



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 **UCL**

Space Syntax



29.April.2022

Space Syntax and UCL knowledge transfer, collaboration, co-creation

Space Syntax

**Strategic consulting
Technology development**

created by UCL in 1989 to provide consultancy services for the planning, design and management of buildings and urban areas.



Space Syntax, SME, 20-25 employees



Space Syntax Laboratory
Bartlett Faculty of the Built Environment,
UCL

MSc/MRes Space Syntax: Architecture and Cities,
Space
and Computation PhD Programme



UCL, Large Enterprise, +6000 employees



Professor Bill Hillier 1937-2019



Space Syntax

B Hillier, A Leaman, P Stansall,
First Published December 1, 1976

- **Professor Bill Hillier Honorary Doctor of Science (DSc) – posth. award**, Professor of Architectural and Urban Morphology, University of London; formerly Director, Space Syntax Laboratory, UCL



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[UCL awards 2021 Honorary Degrees and Fellowships](#)

UCL awards 2021 Honorary Degrees and Fellowships

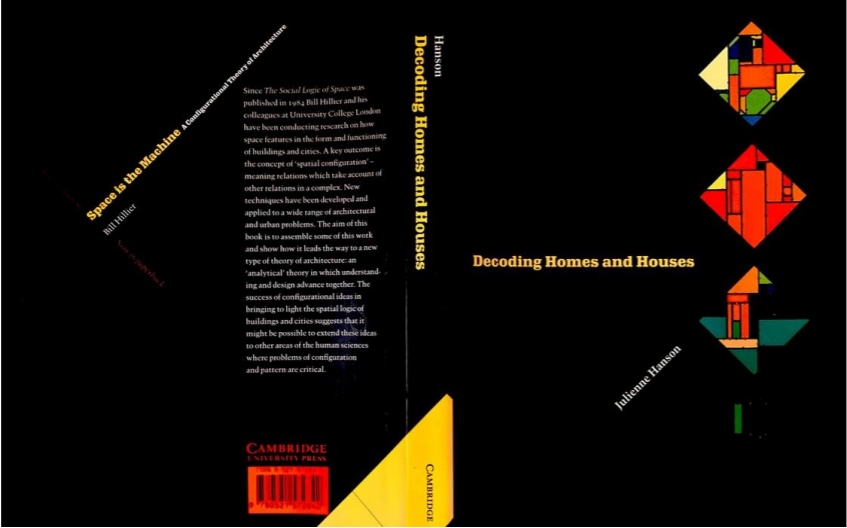
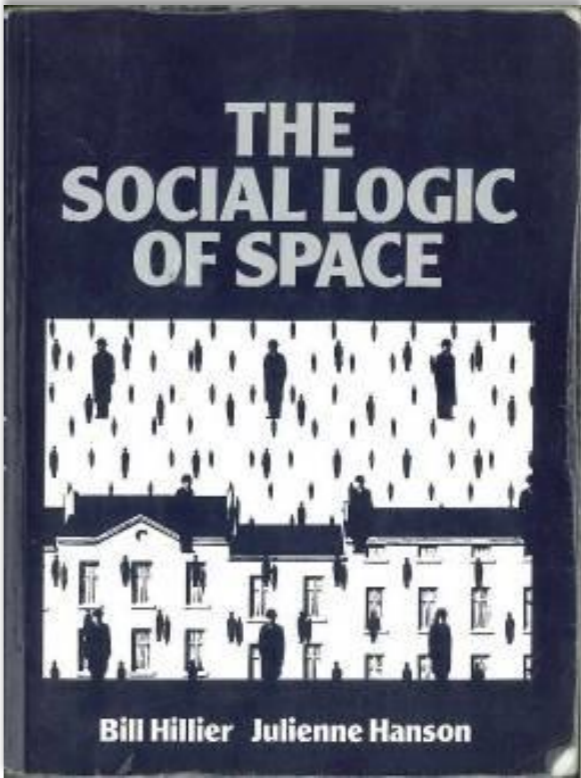
15 July 2021

UCL has awarded Honorary Degrees and Fellowships to recognise the exceptional achievements and contributions of those in our community and those who support us.



Among the award recipients this year are the Rt Hon. the Baroness Hale of Richmond DBE, former President of the Supreme Court of the United Kingdom and Honorary Professor within the UCL Faculty of Laws, Dame DeAnne Julius DCMG CBE, international economist and former Chair of UCL Council, and Rokhsana Fiaz OBE, Mayor of Newham – the first directly elected female mayor for any London borough.

Professor Bill Hillier 1937-2019



Space and Society can space cause social malaise?



Space Syntax a theory of space and society

Space Syntax theory has two fundamental propositions:

- **Space is 'intrinsic' to human activity, not a background to it.**

We shape space in ways which reflect this and, by doing so, the space we make becomes 'humanised'.

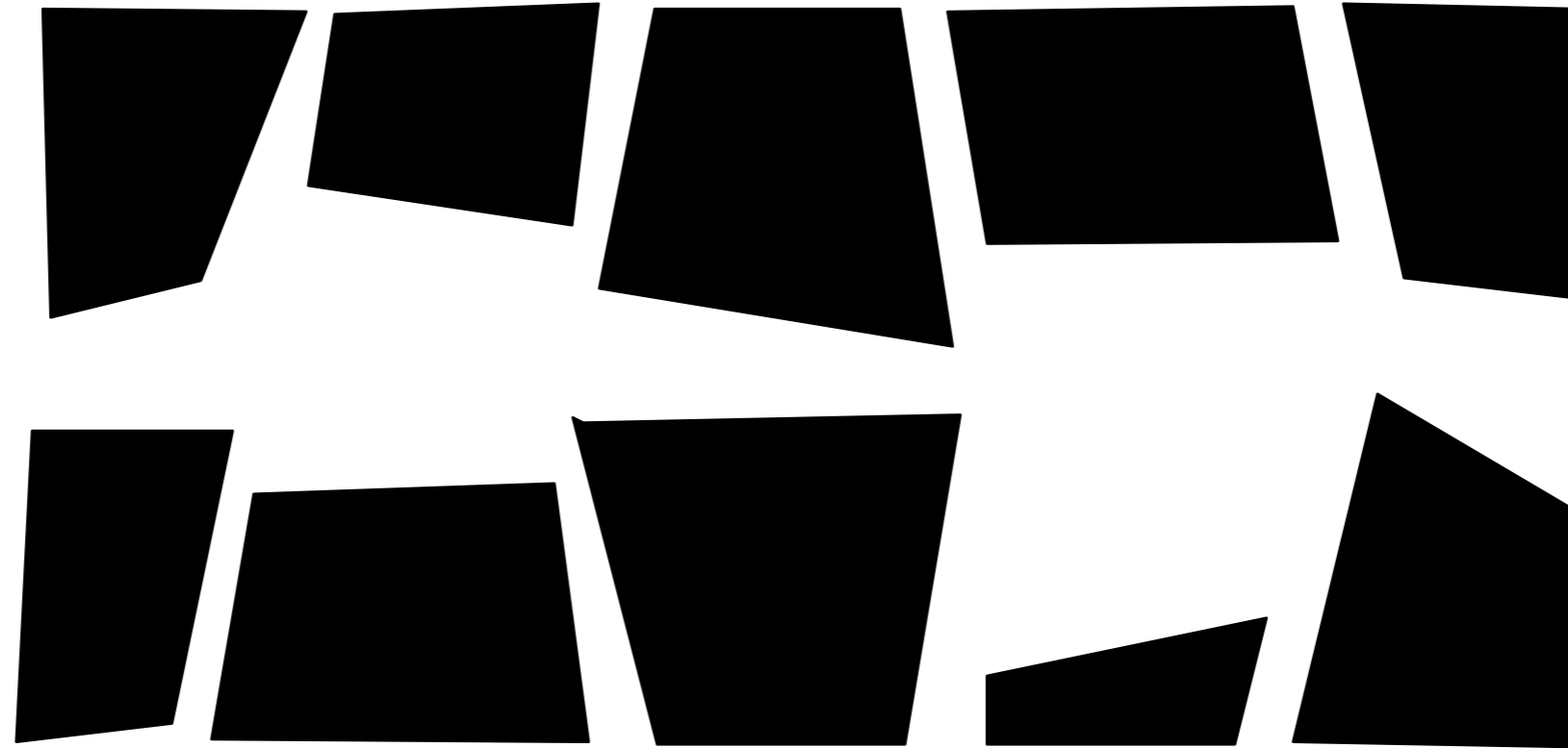
(Hillier and Hanson, 1984; Hillier, 2008; Hanson and Hillier, 1987)

- **Space is fundamentally a configurational entity**

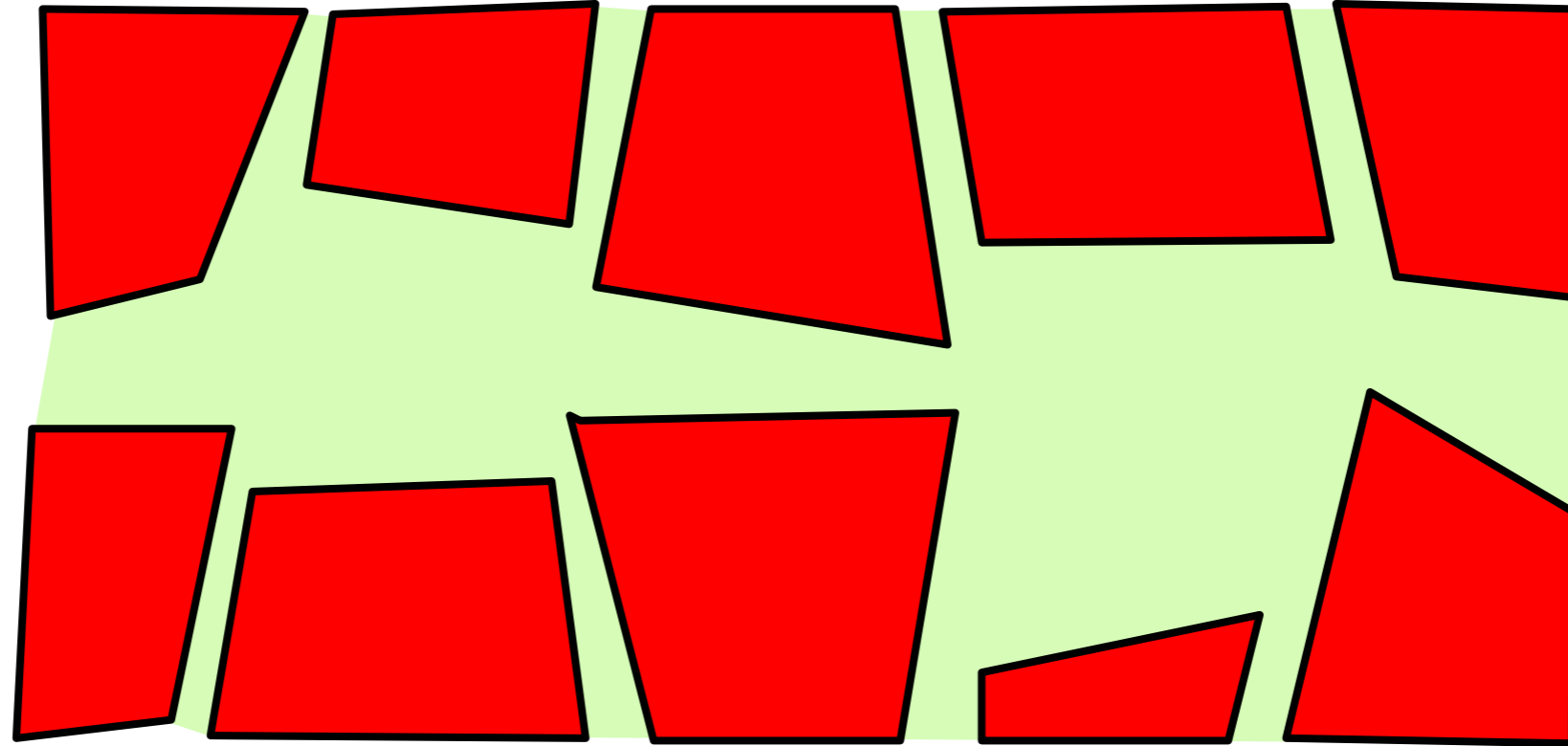
'configuration' is the key (language) to understanding the non-discursive nature of space and design

(Hillier and Hanson, 1984; Hillier, 1996; Hillier and Penn, 1991; Hillier, 2008)

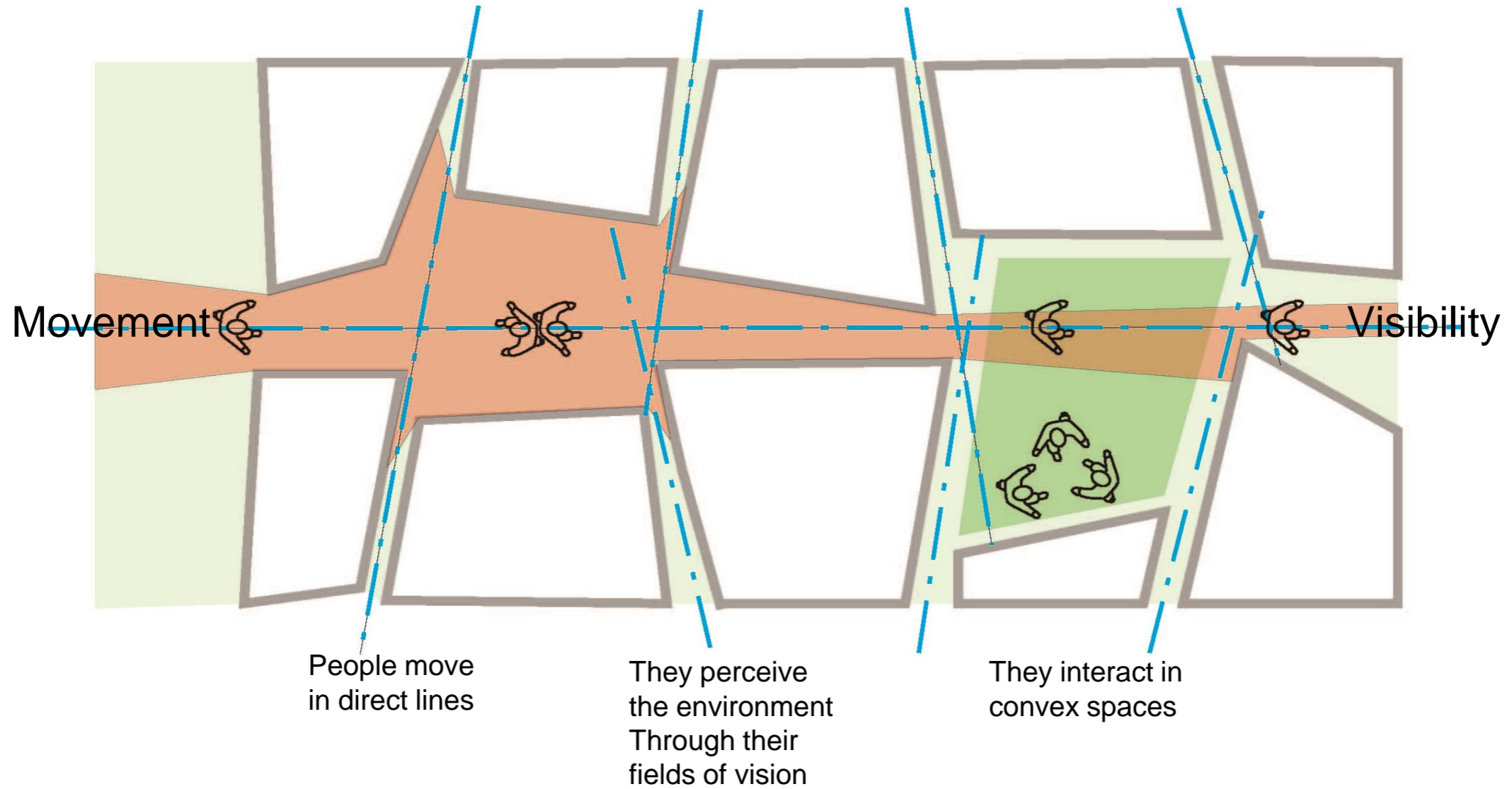
Space Syntax analysis spatial configuration and people



Space Syntax analysis spatial configuration and people



Space Syntax analysis spatial configuration and people



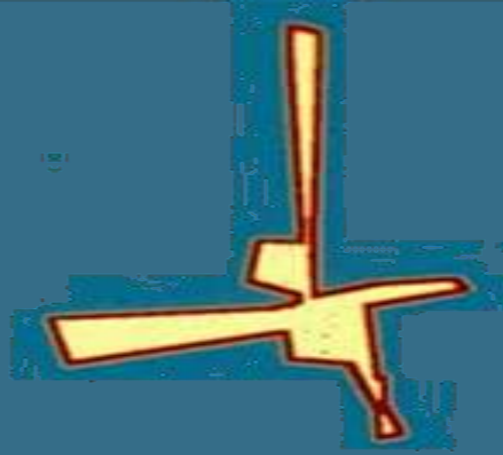
Space Syntax model people-based spatial abstractions



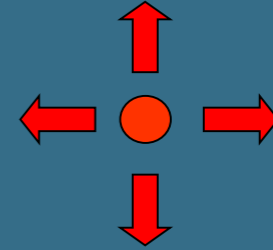
Axial Lines



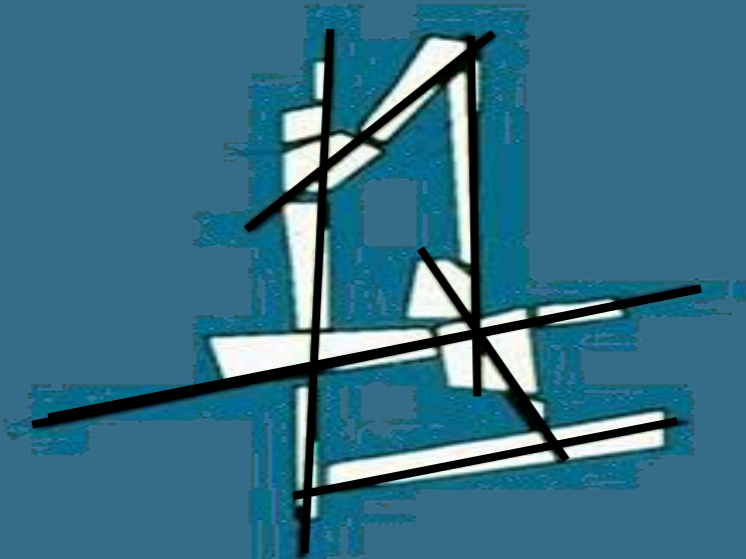
Convex Spaces



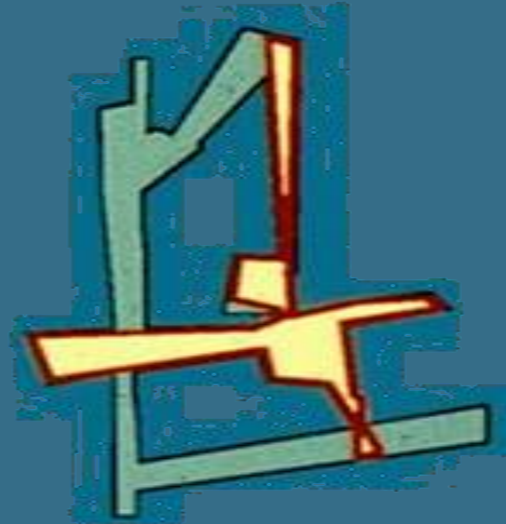
Convex Isovists



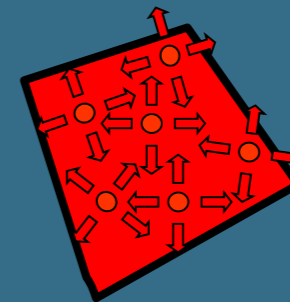
Agents



Axial model



Isovist model



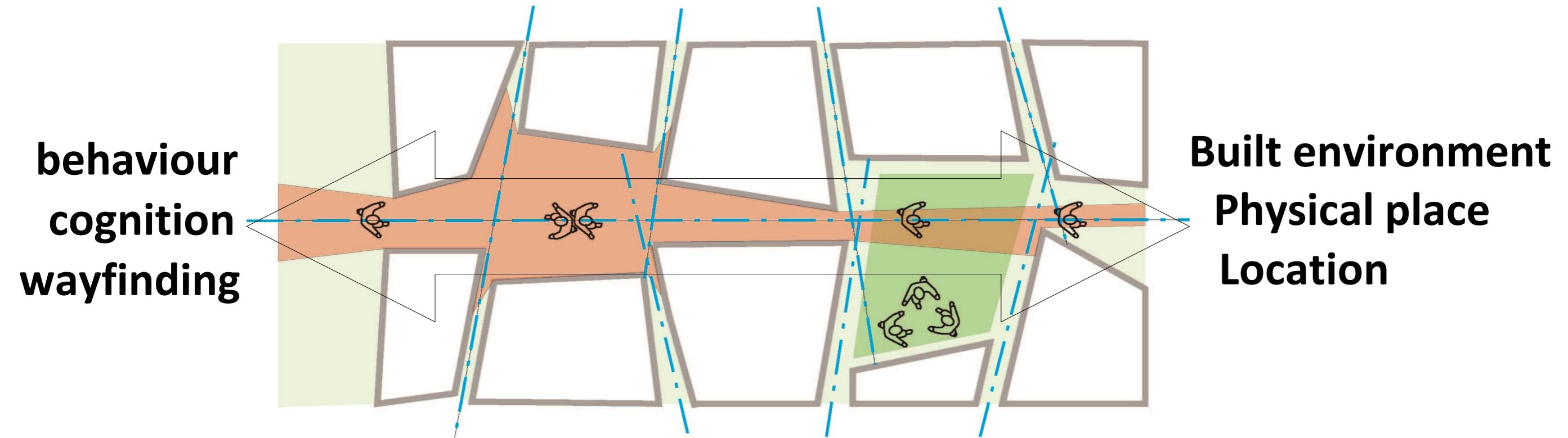
Agent-based model

Spatial Network Analysis an efficient way of investigating urban structures



Street segment

Space syntax model linking space and society

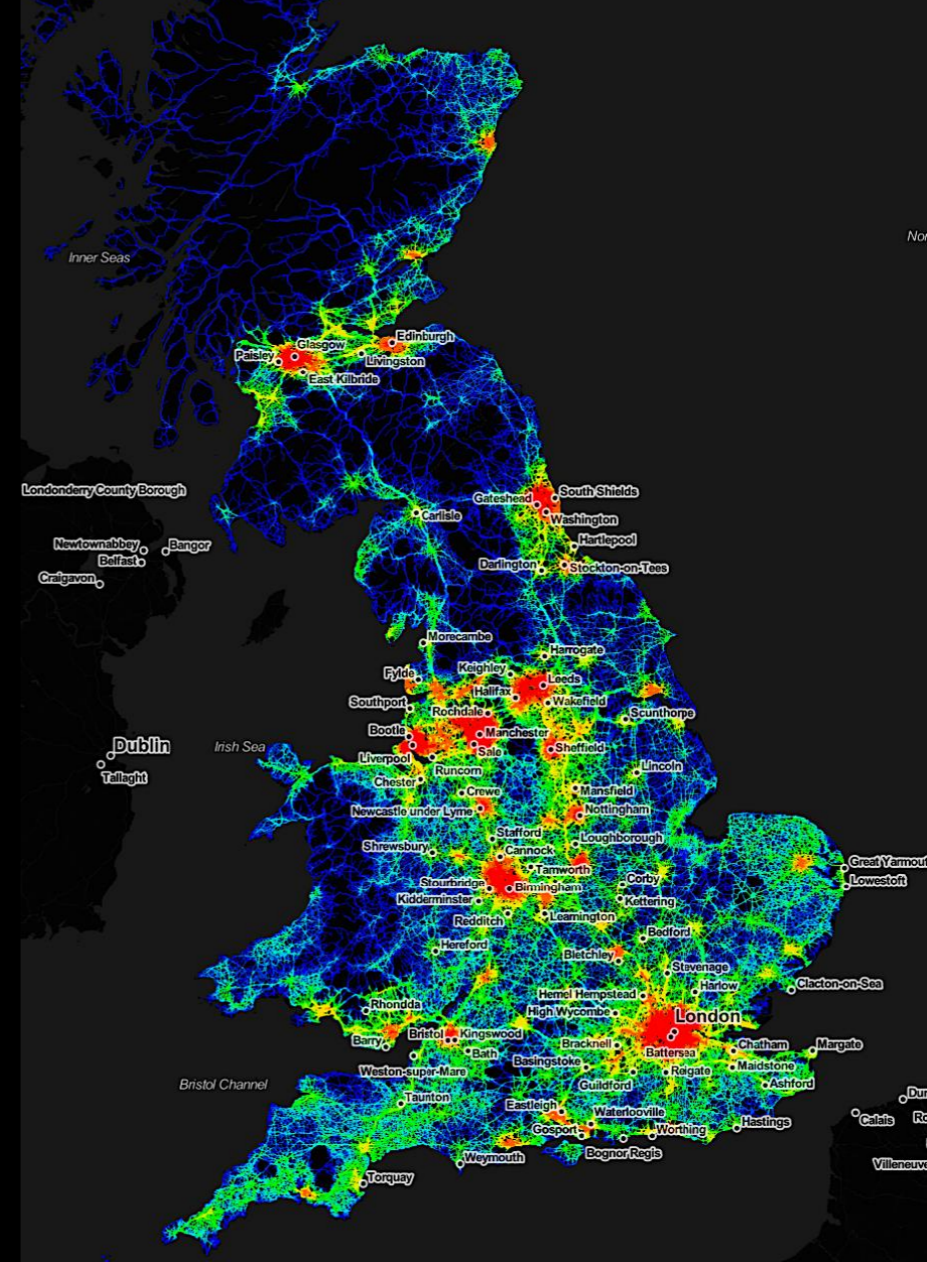


Spatial Network Analysis a universal way to define urban structure

<https://spacesyntax-openmapping.netlify.app/#6/55.597/-3.263>

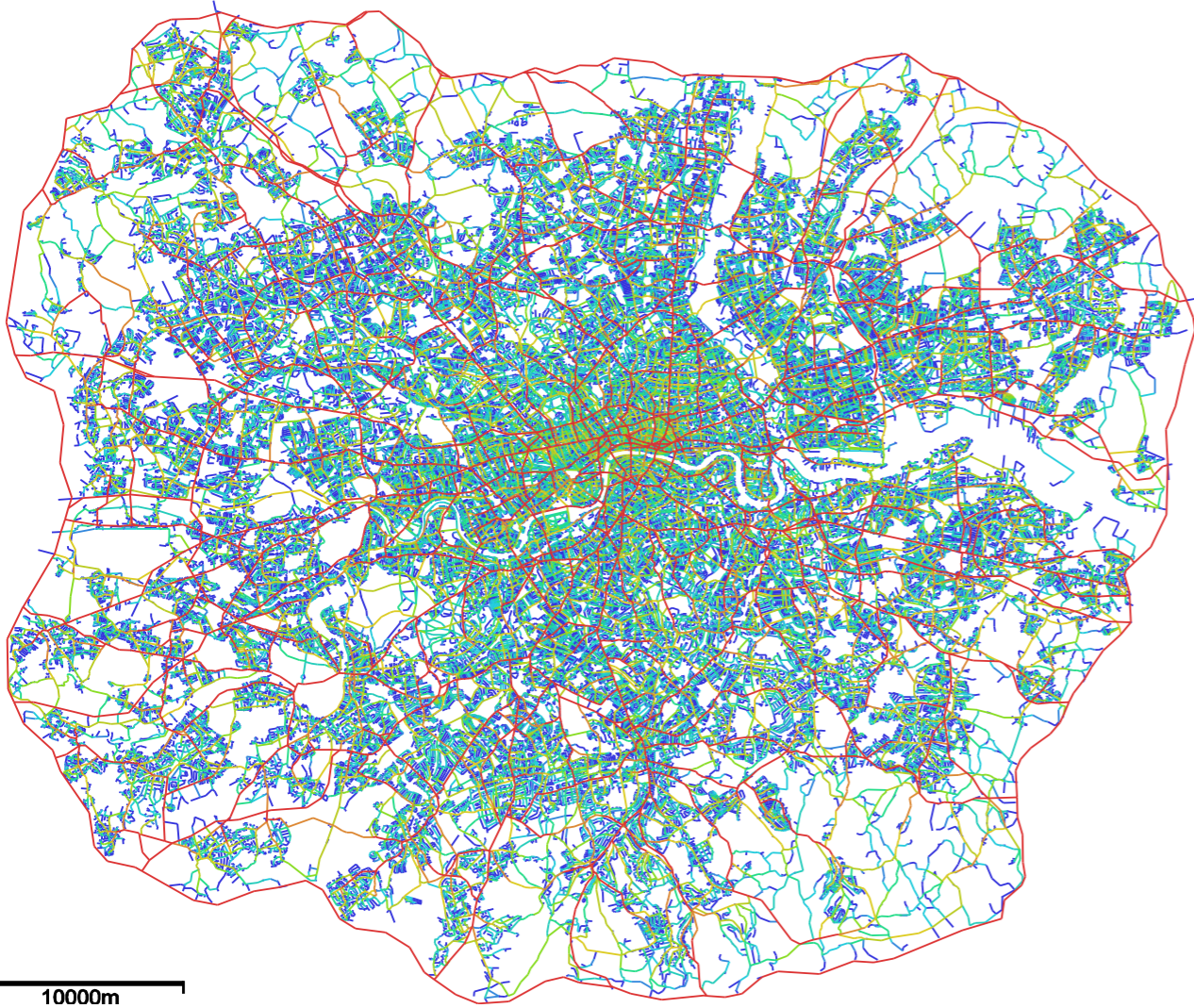


Old Shiraz, c. 1700 AD

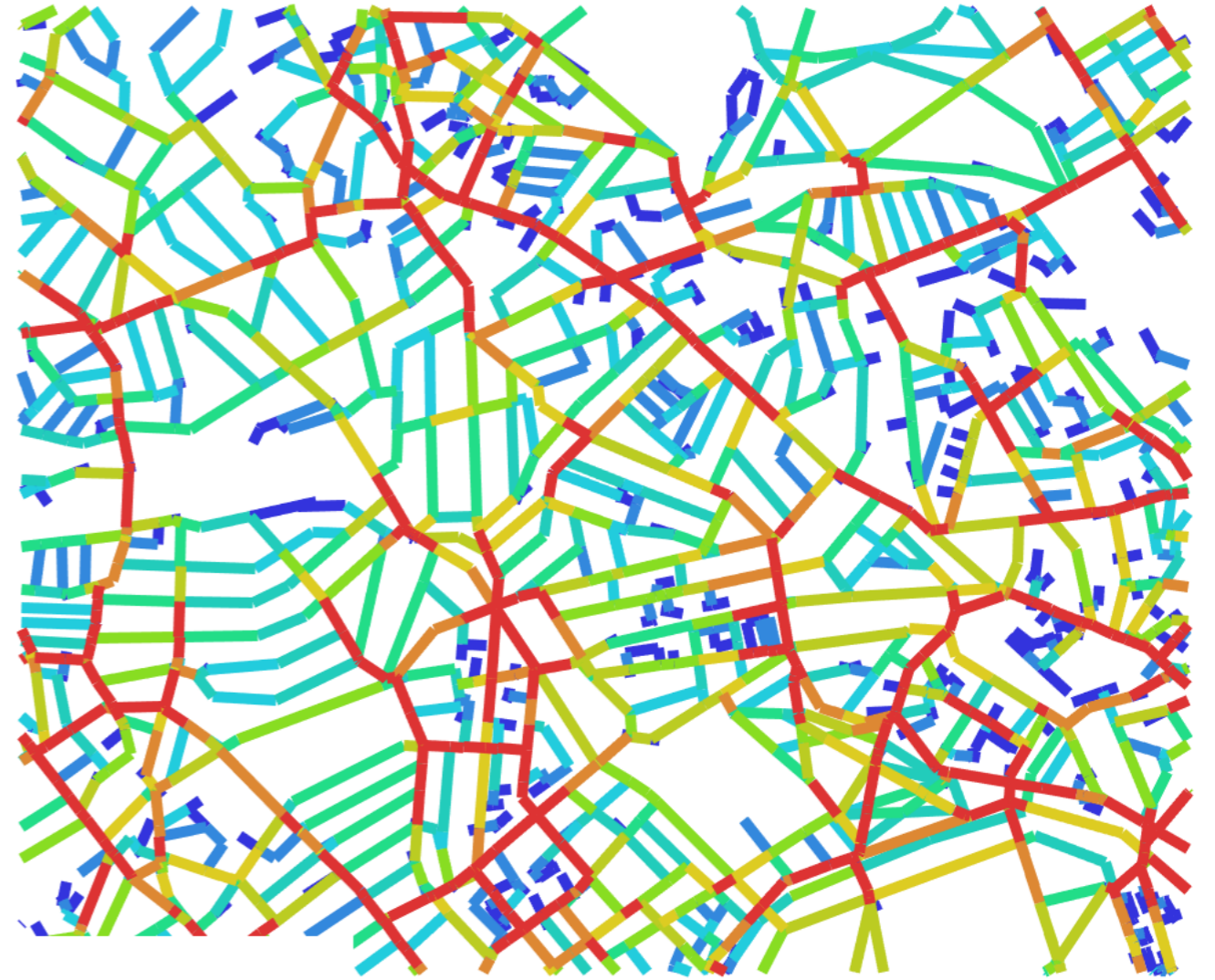


Great Britain, c. 2020

Pervasive Centrality global and local structures in the spatial network

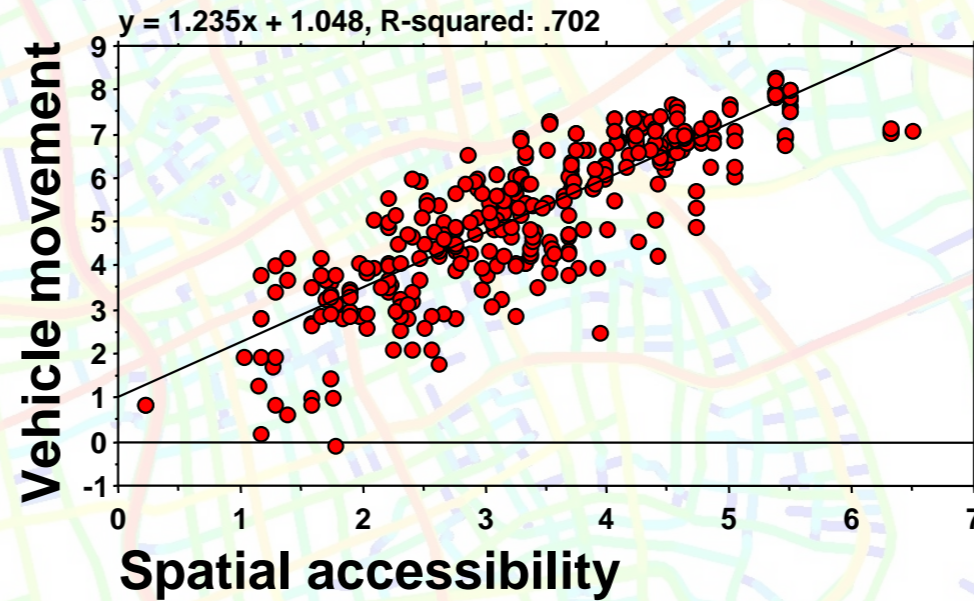
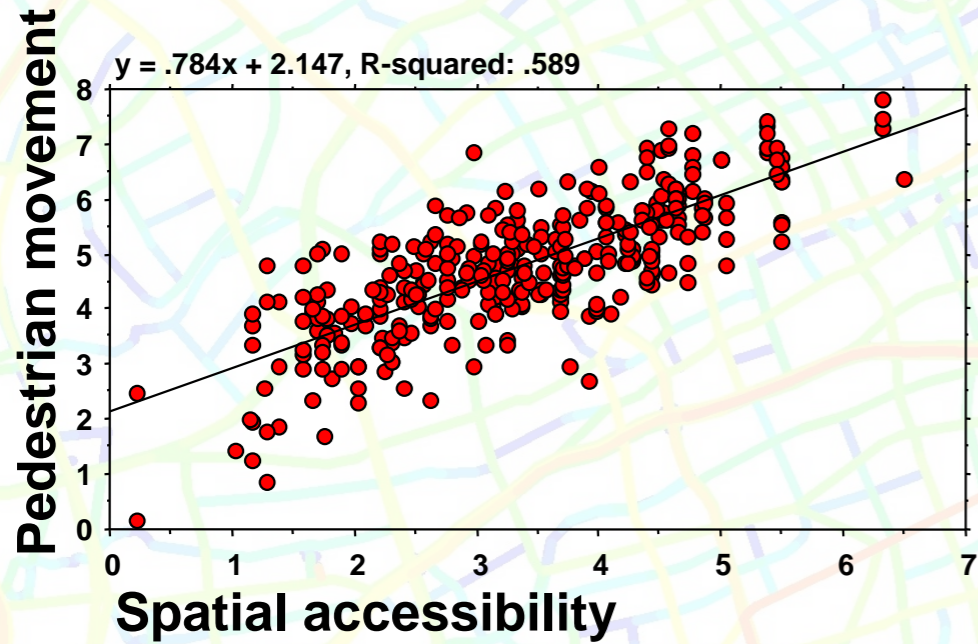


the movement potentials of each of the 285,000 segments of London within the M25 for **city-wide movement**. It predicts the large-scale movement and city-wide centrality.



a much finer-scale structure for **local movement** potentials up to 750m. The red pattern is essentially London's 'urban villages' and the links between them.

Key correspondence spatial accessibility predicts movement



Spatial Layout Attraction and Natural Movement

Key correspondence spatial accessibility influences land use viability



80% retail located on 20% most spatially accessible streets

Movement Economy

Key correspondence spatial accessibility influences crime & safety



Key correspondence spatial accessibility influences economic viability

Disconnected layout

Low accessibility score



Connected layout

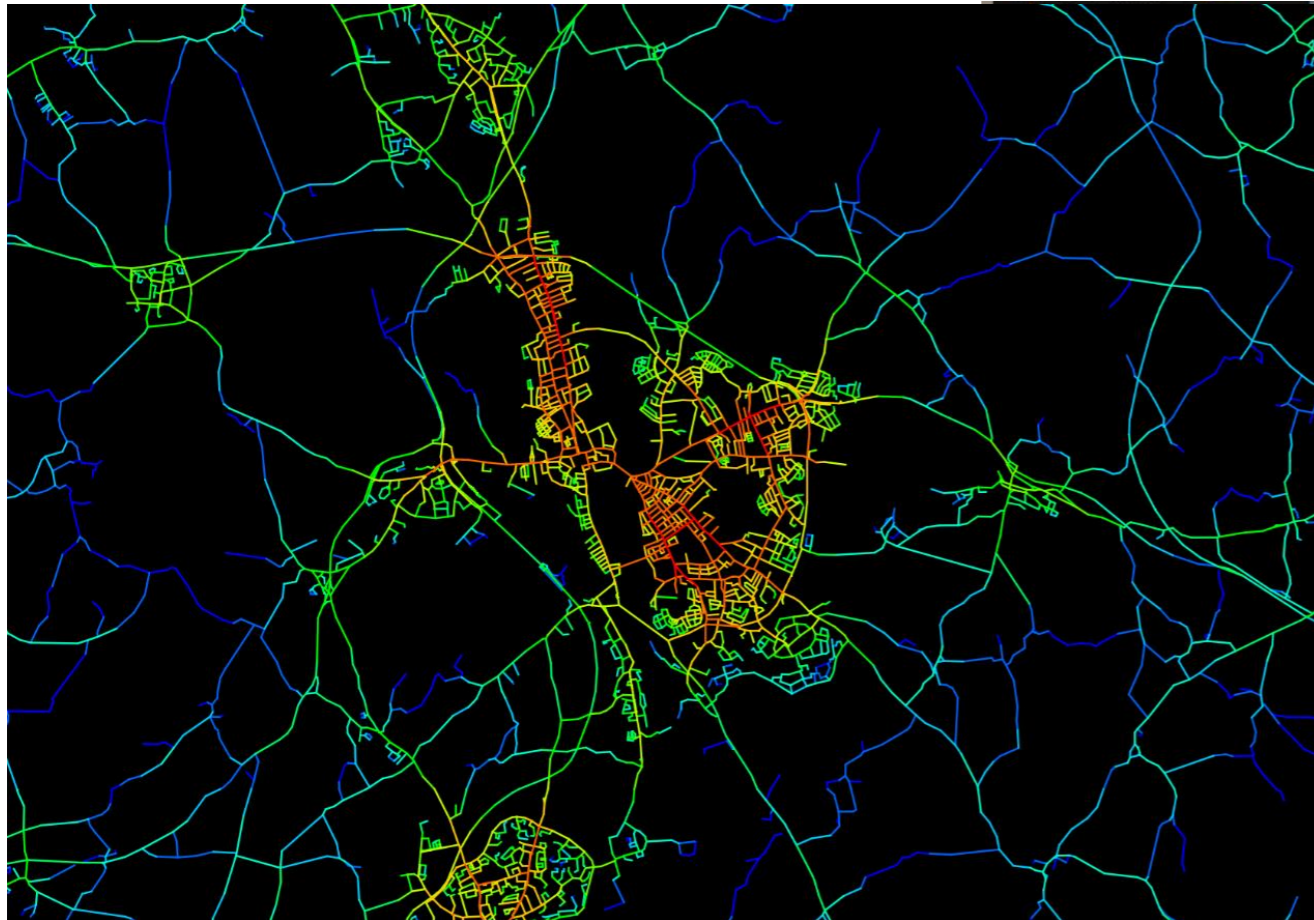
High accessibility score



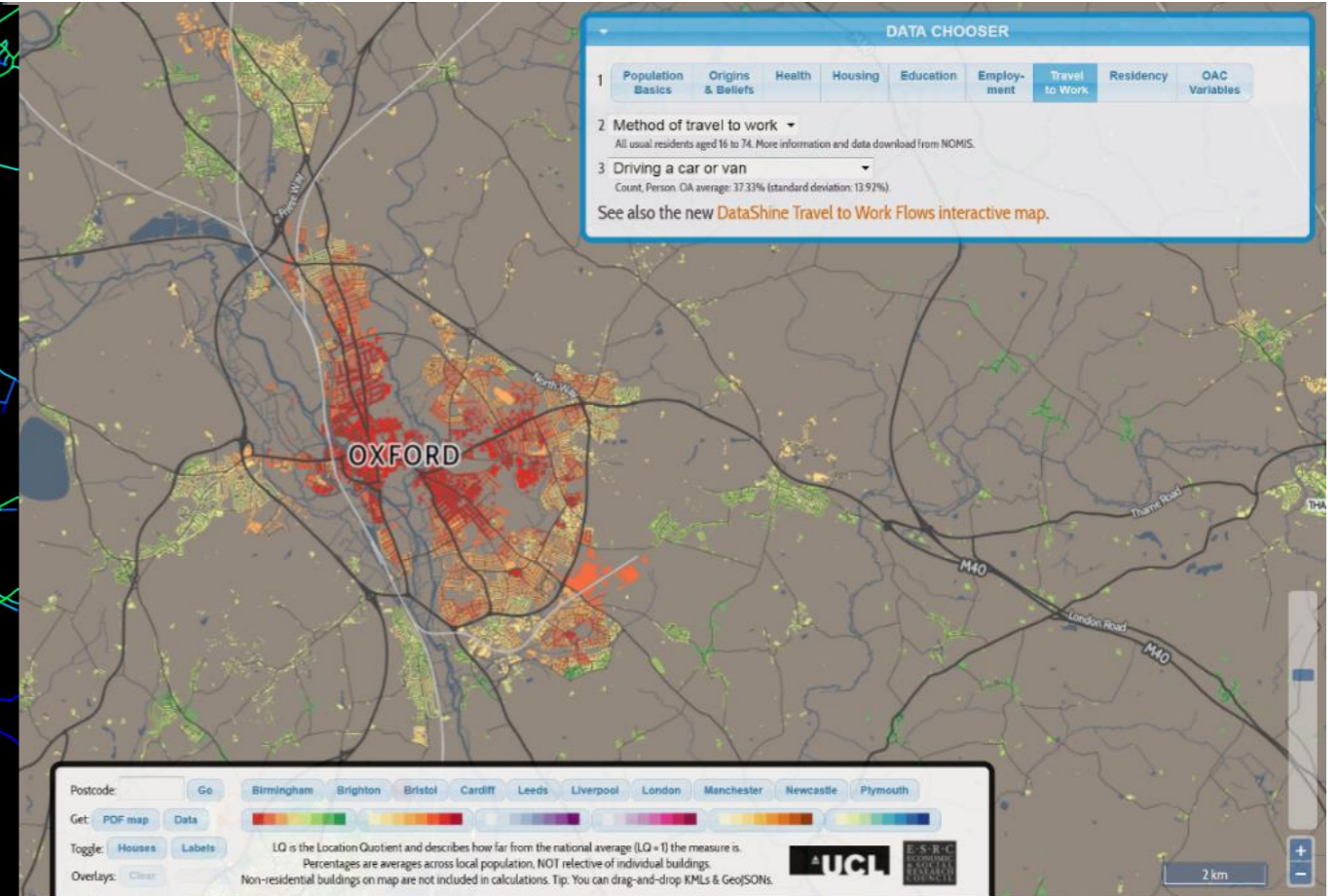
	Disconnected layout	Connected layout	Difference
IRR	15%	18%	3%
NPV	RMB 6.65 Billion	RMB 10.0 Billion	RMB3.35 Billion

Key correspondence spatial accessibility influences mobility choices

Local scale accessibility
Active centres



Travel to work
Drive car or van

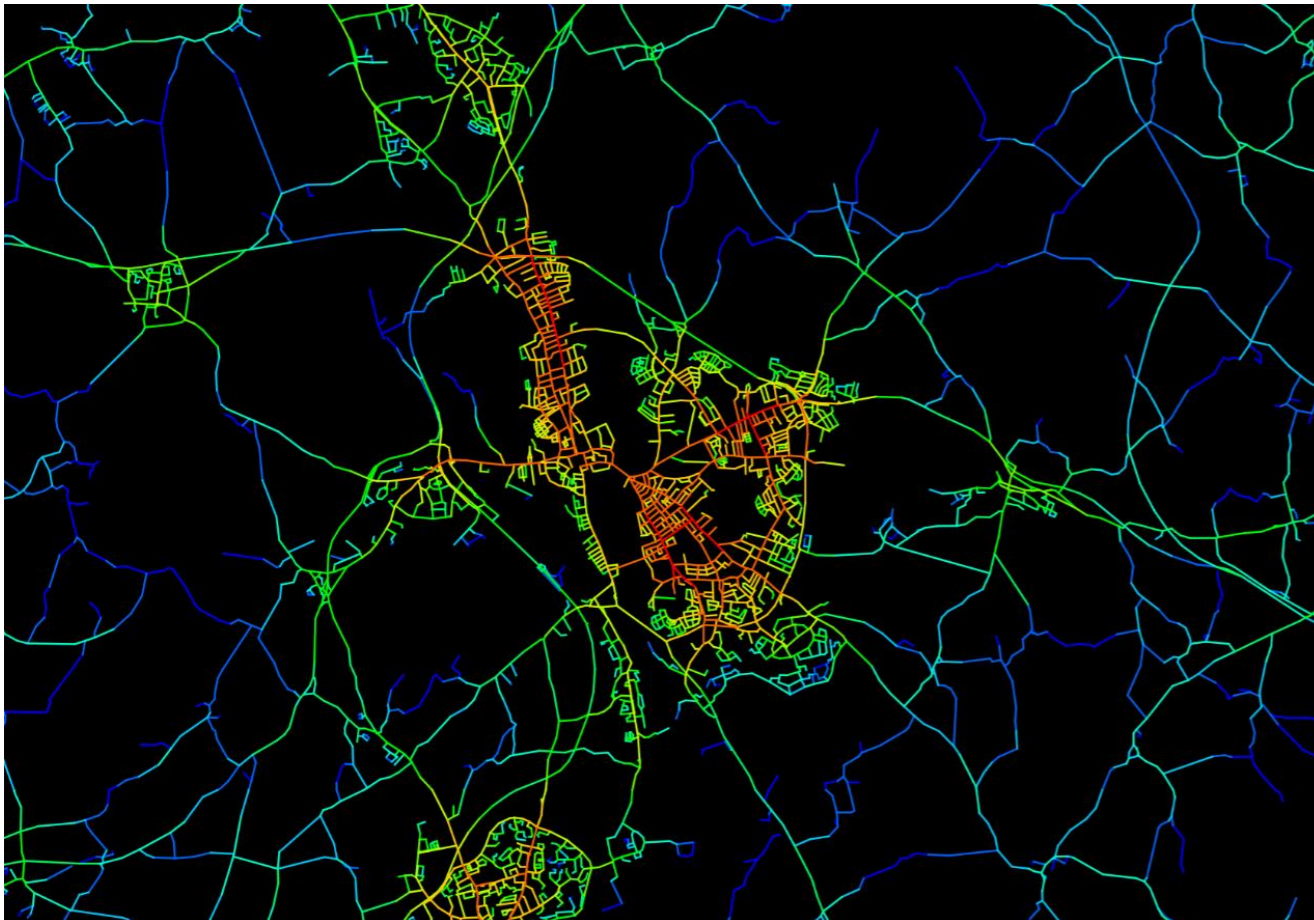


Oxford

Key correspondence spatial accessibility influences health and well-being

Local scale accessibility

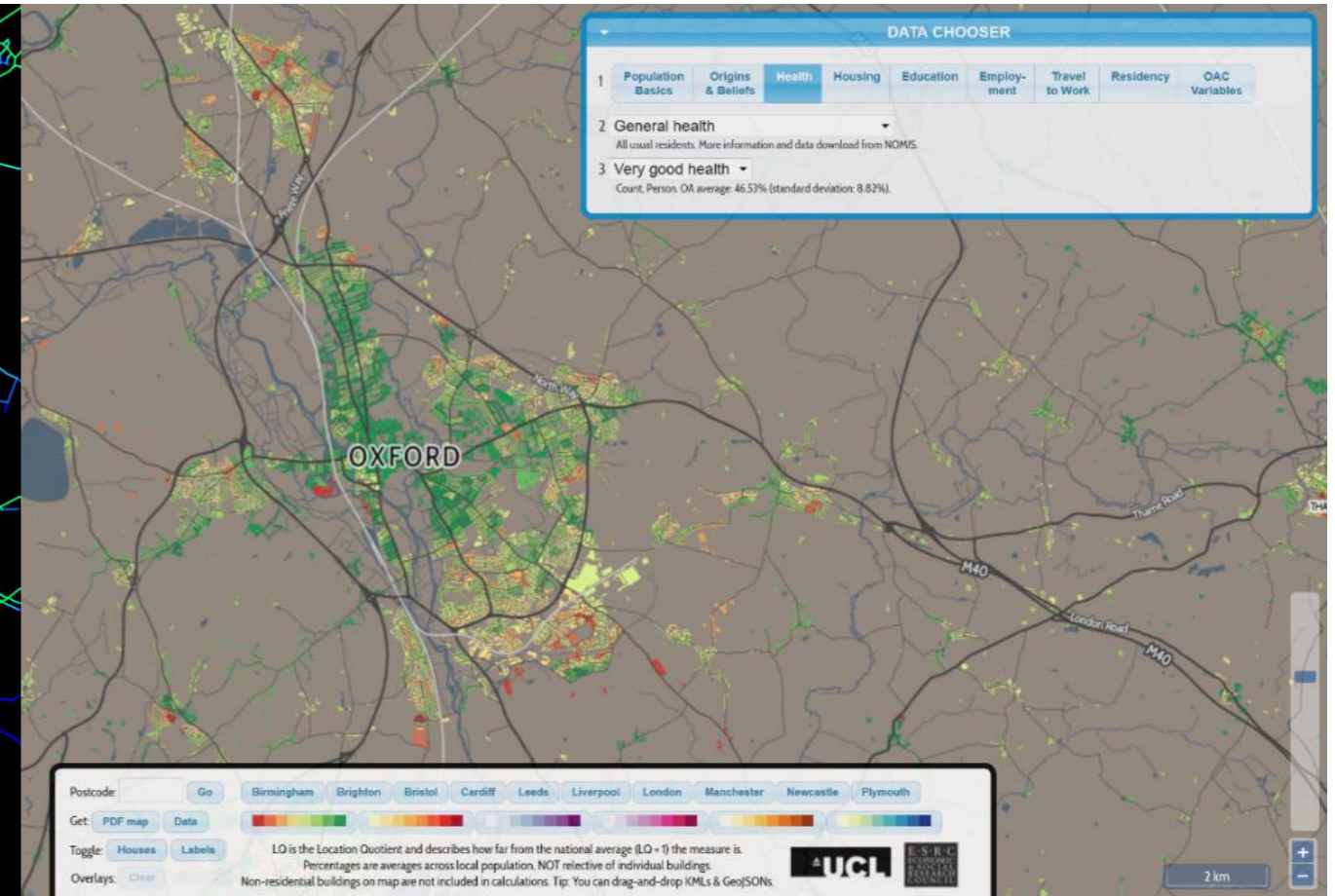
Active centres



Oxford

Health

Very good health

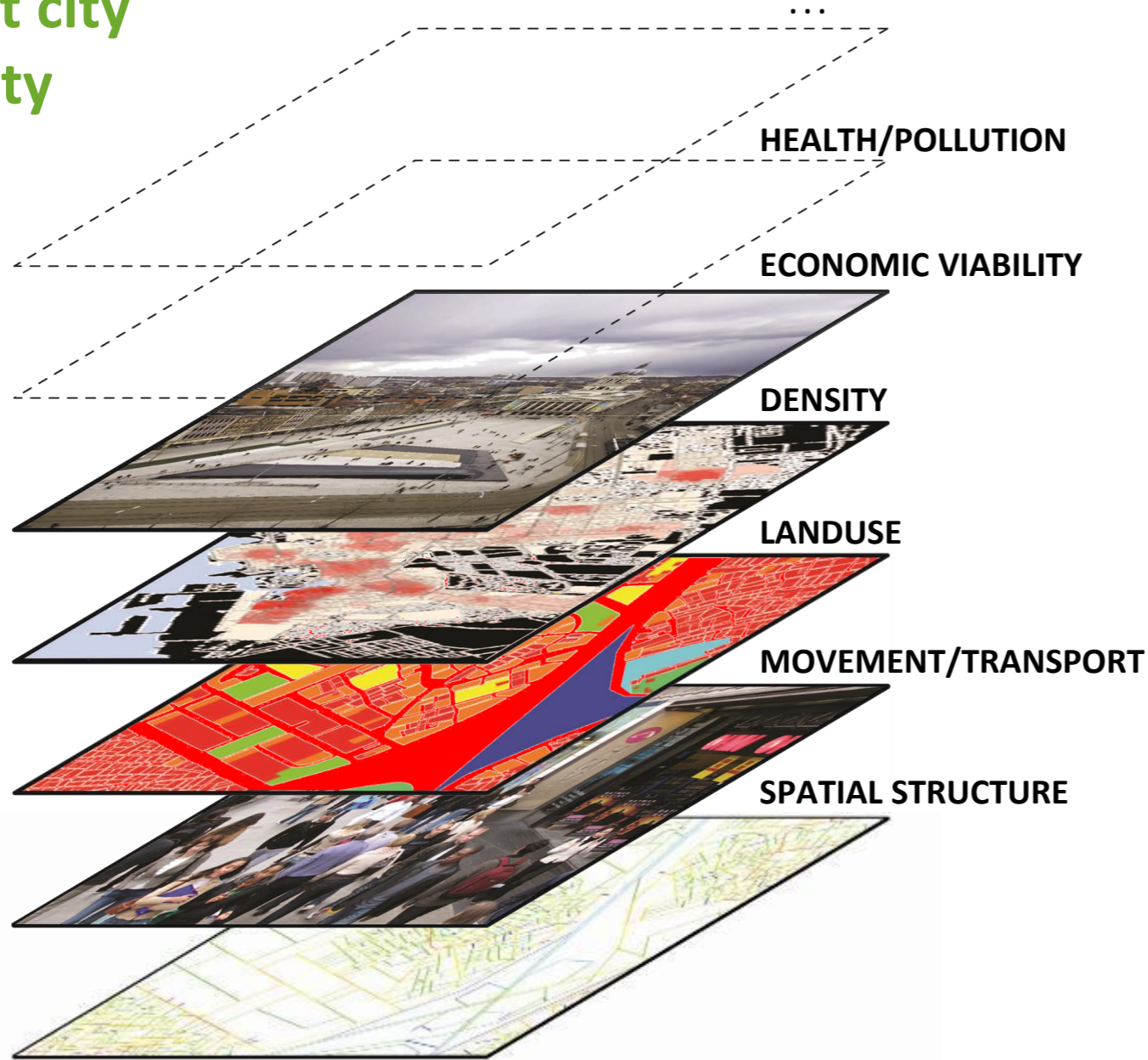


Sustainable city: close correspondence of spatial structure with other urban layers

Resilient city

Lively city

...



Sustainable city: how cities create foundations for activity?

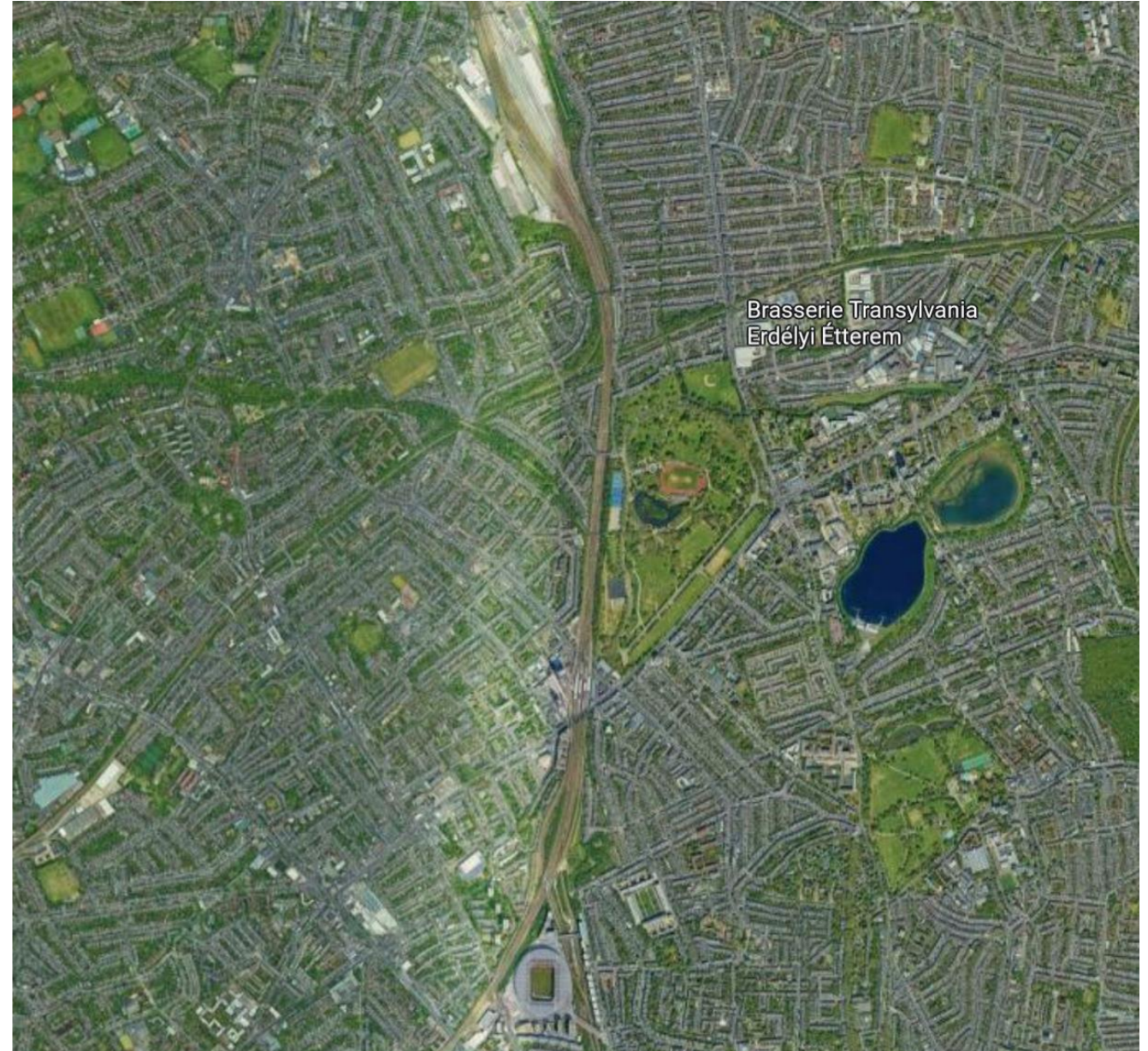
Sustainable urban forms create:

- **continuously connected street networks that overlap local and wider-scale movement, rather than work in discrete clusters.**
- **densities that reduce distances, make uses and public transport feasible.**
- **convenient and accessible public transport network.**
- **walkable scale urban blocks.**
- **mix of daily uses (employment/shops, offices, ...) in accessible locations on a city-wide scale and on a local scale.**

Shape of the city: evolved urban grid vs. planned 'New Towns'

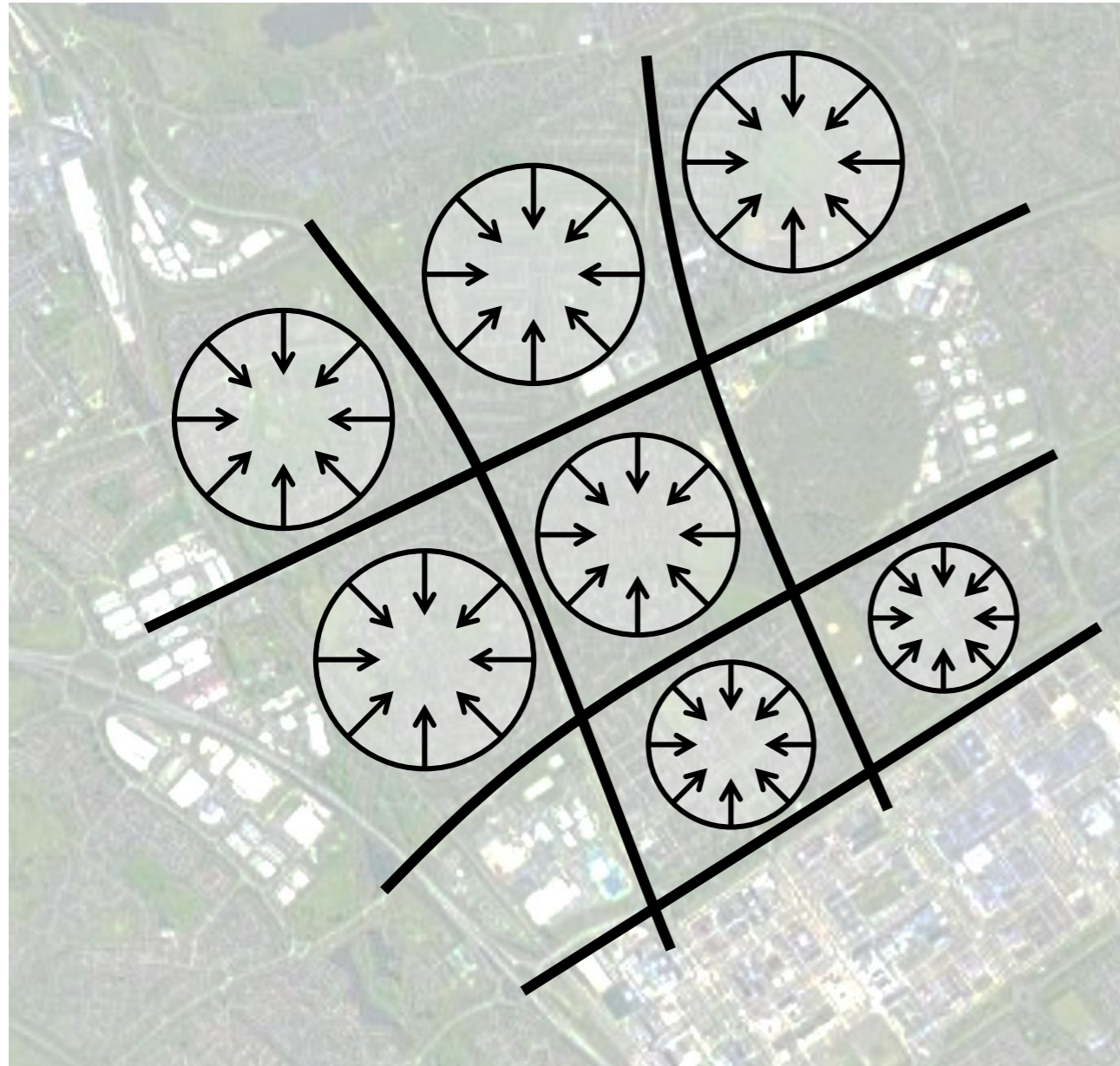


A New Town near London

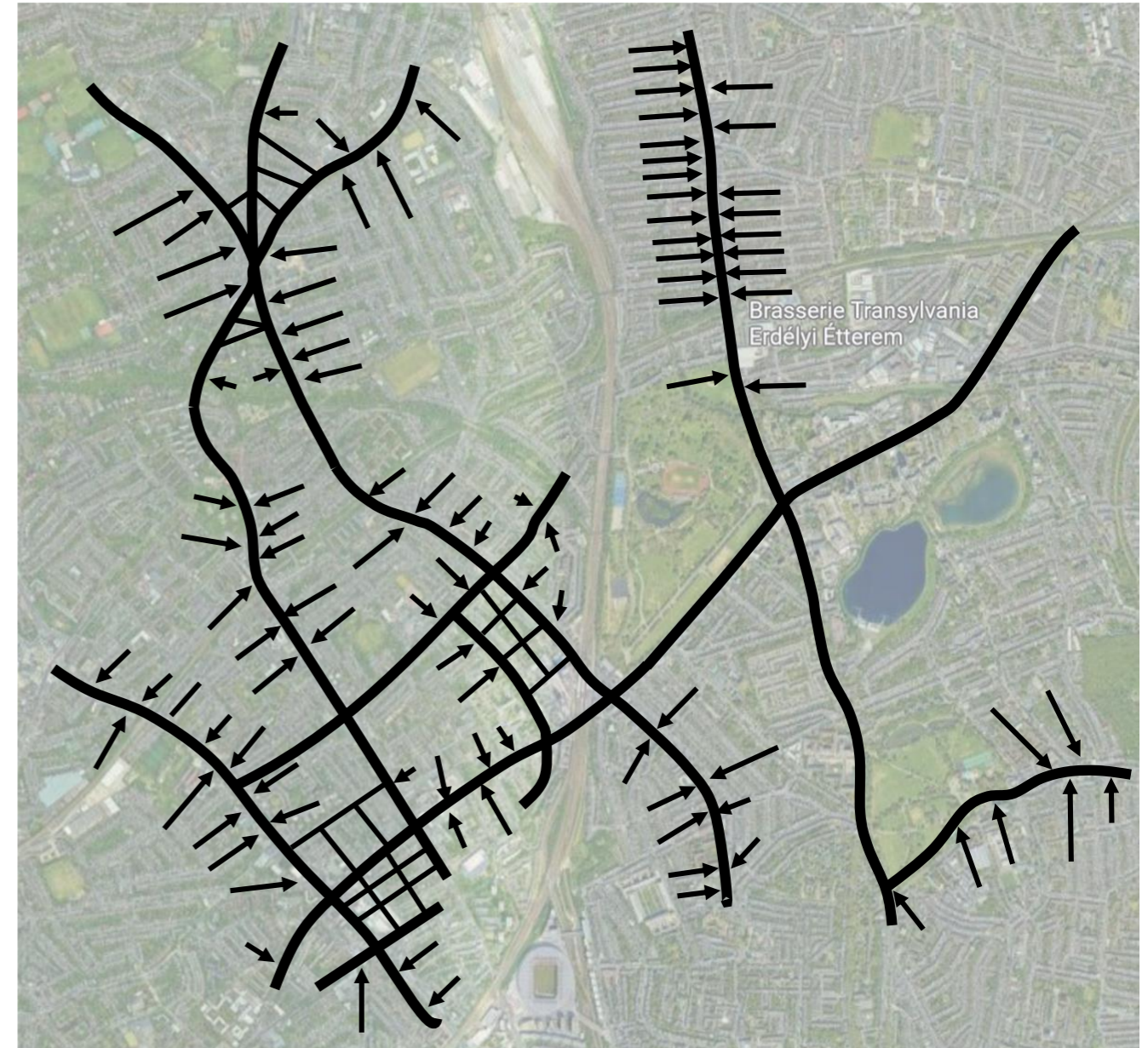


Part of the urban fabric in North London

Shape of the city: evolved urban grid vs. planned 'New Towns'

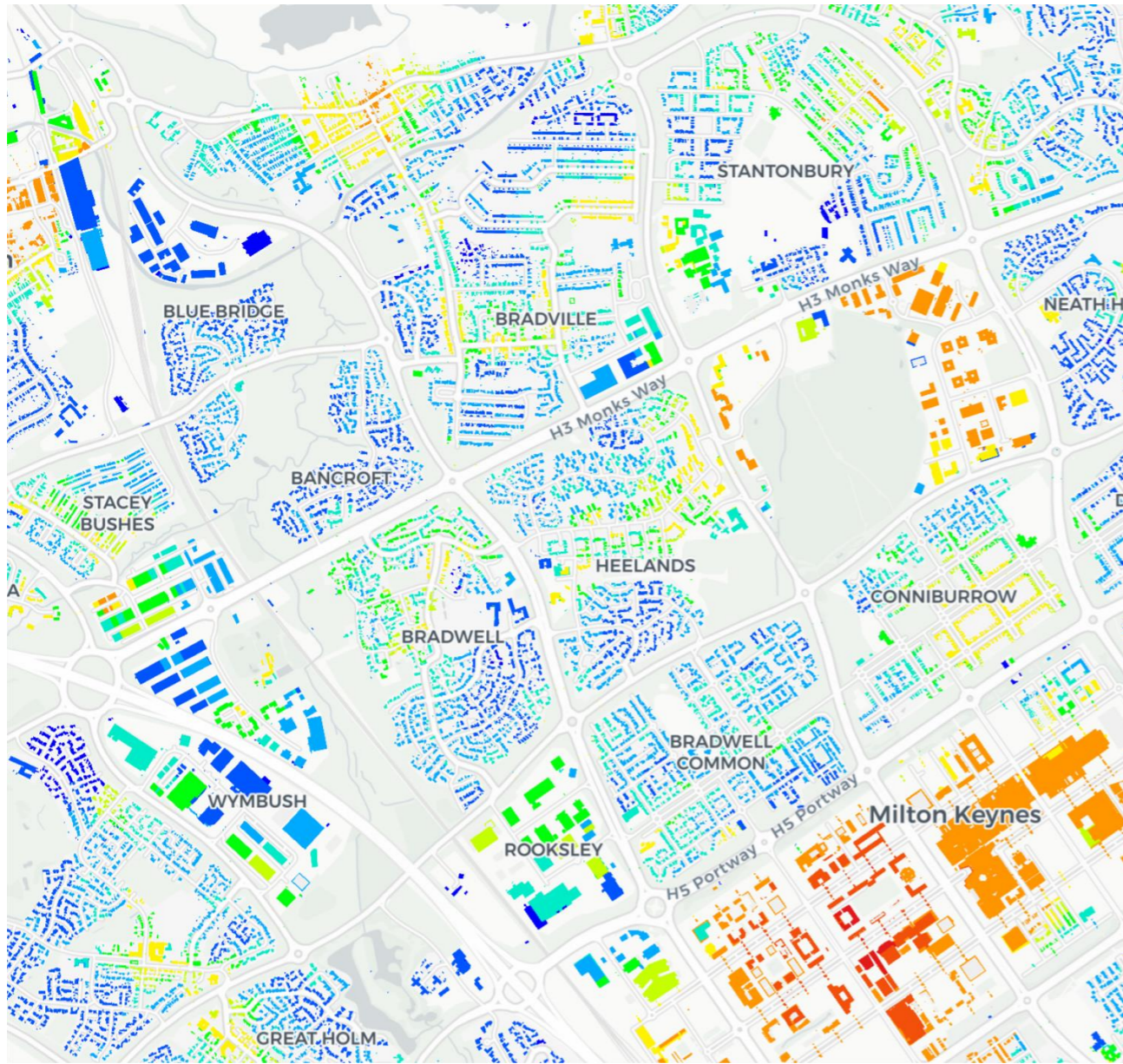


Discrete, inward clusters separated by city-scale infrastructure.

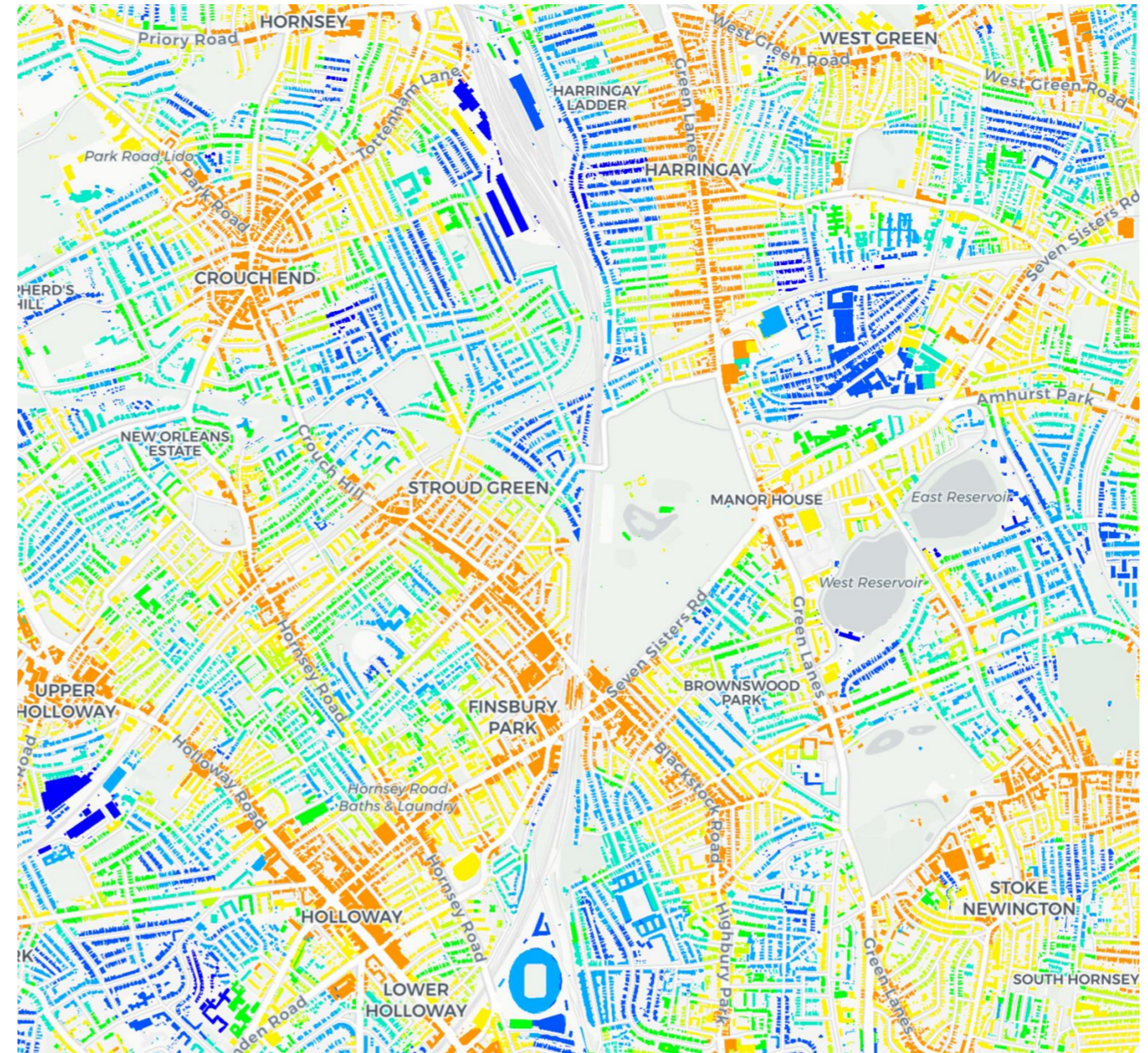


Continuously connected grids that overlap local and city-wide scale infrastructure.

Walkability to mixed land uses: evolved urban grid vs. planned 'New Towns'

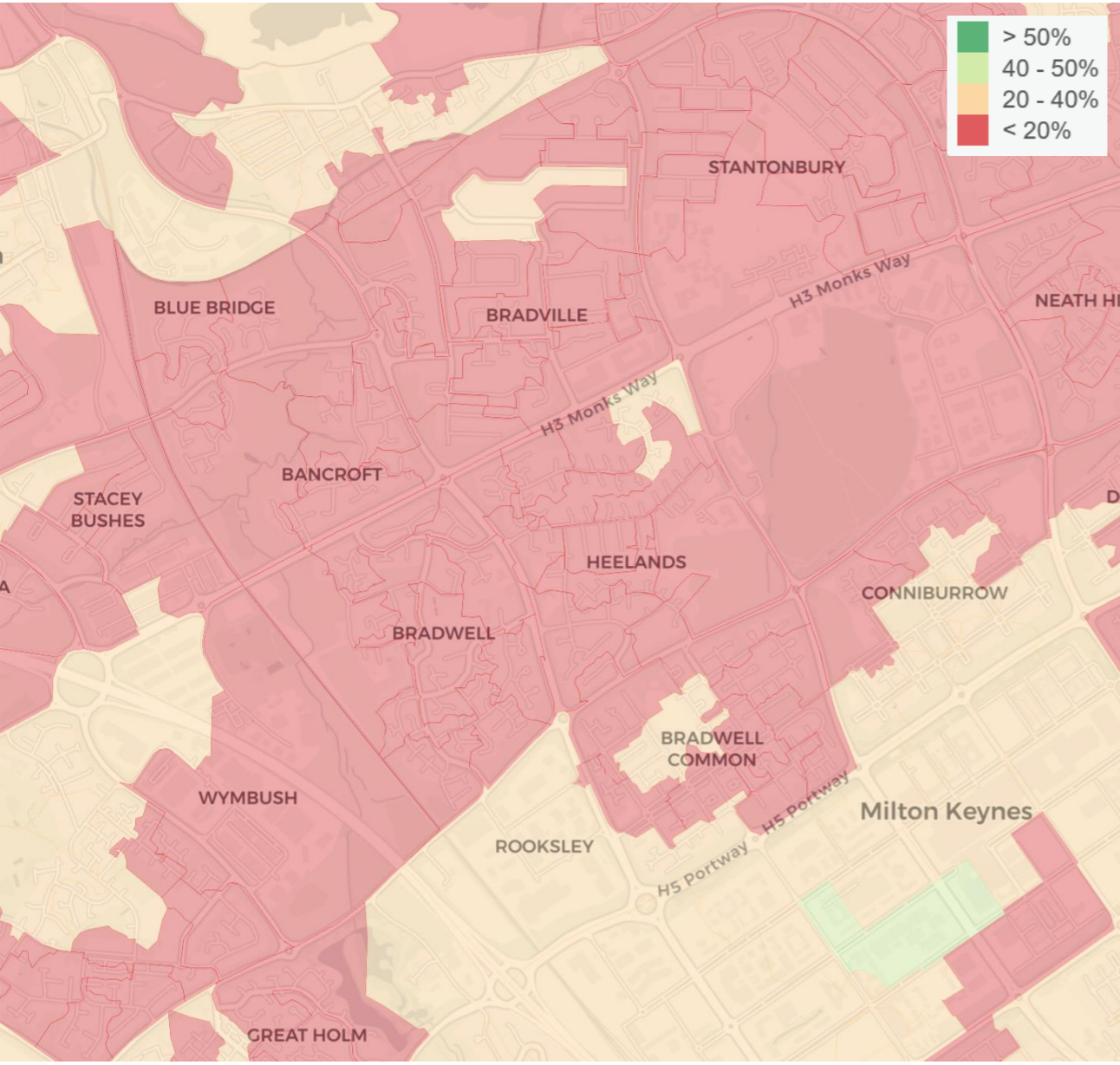


Less walkable and sharp drop-off from high to low areas.

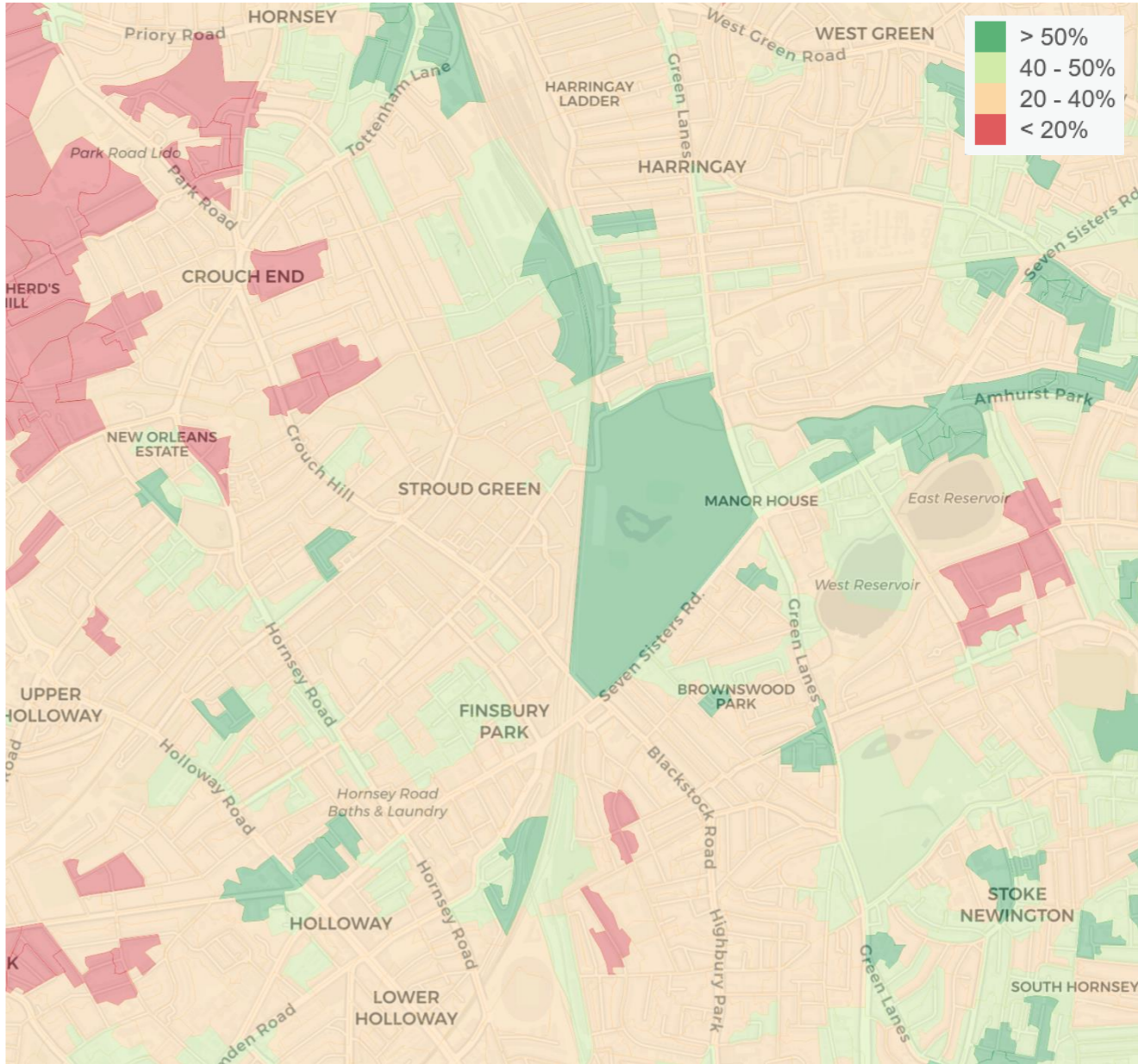


More walkable, smoother transition, all areas within 10 mins of multiple centres

Public transport mode share: evolved urban grid vs. planned 'New Towns'

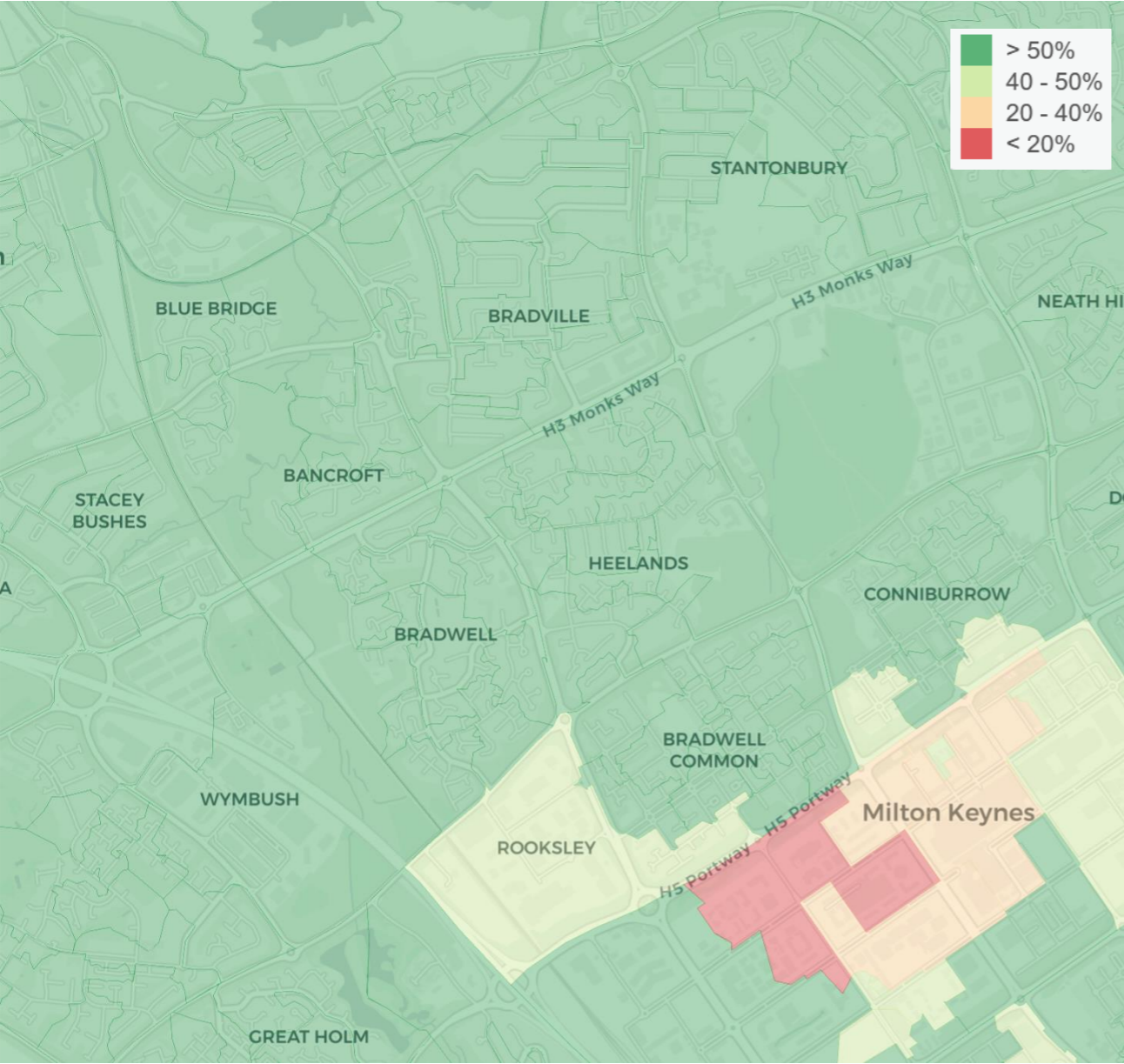


Lower levels of Public Transport use.

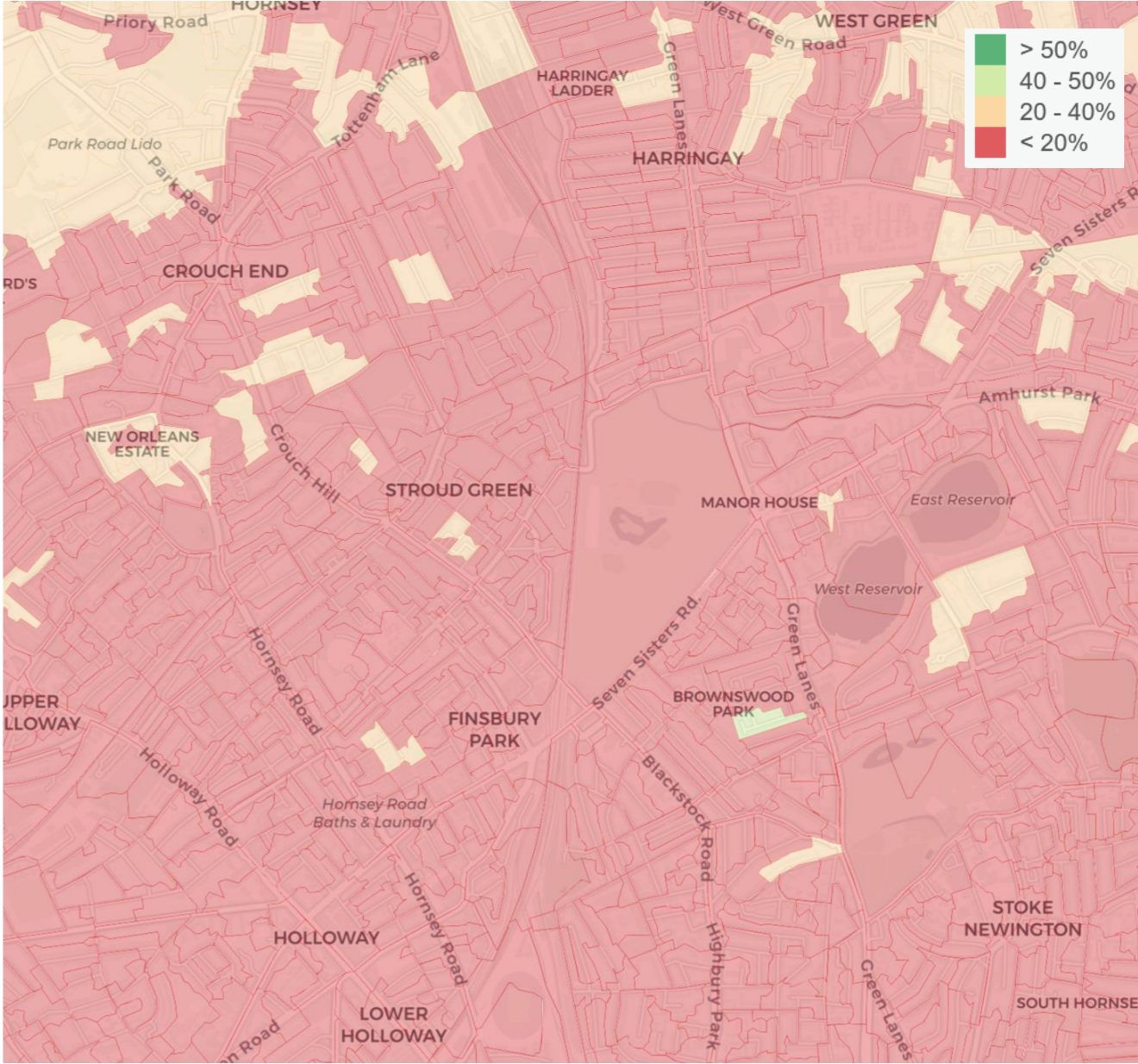


Higher levels of Public Transport use.

Private vehicle mode share: evolved urban grid vs. planned 'New Towns'



Higher levels of Private Car use.



Lower levels of Private Car use.

Sustainable cities and temporal disasters the impact of Covid-19 pandemic

Sustainable cities and temporal disasters the impact of Covid-19 pandemic

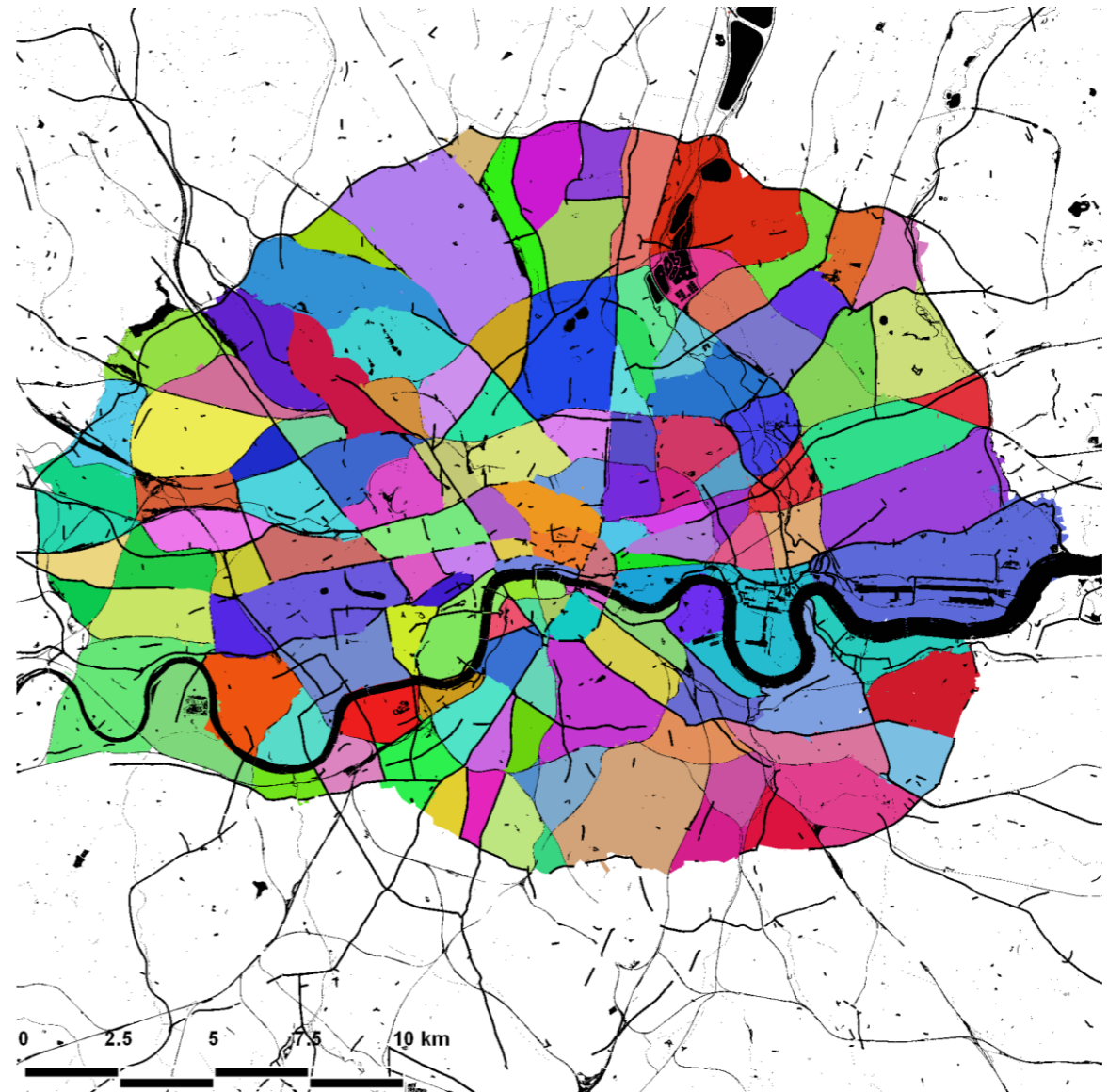
Defining functional areas to unlock UK cities

April 2020

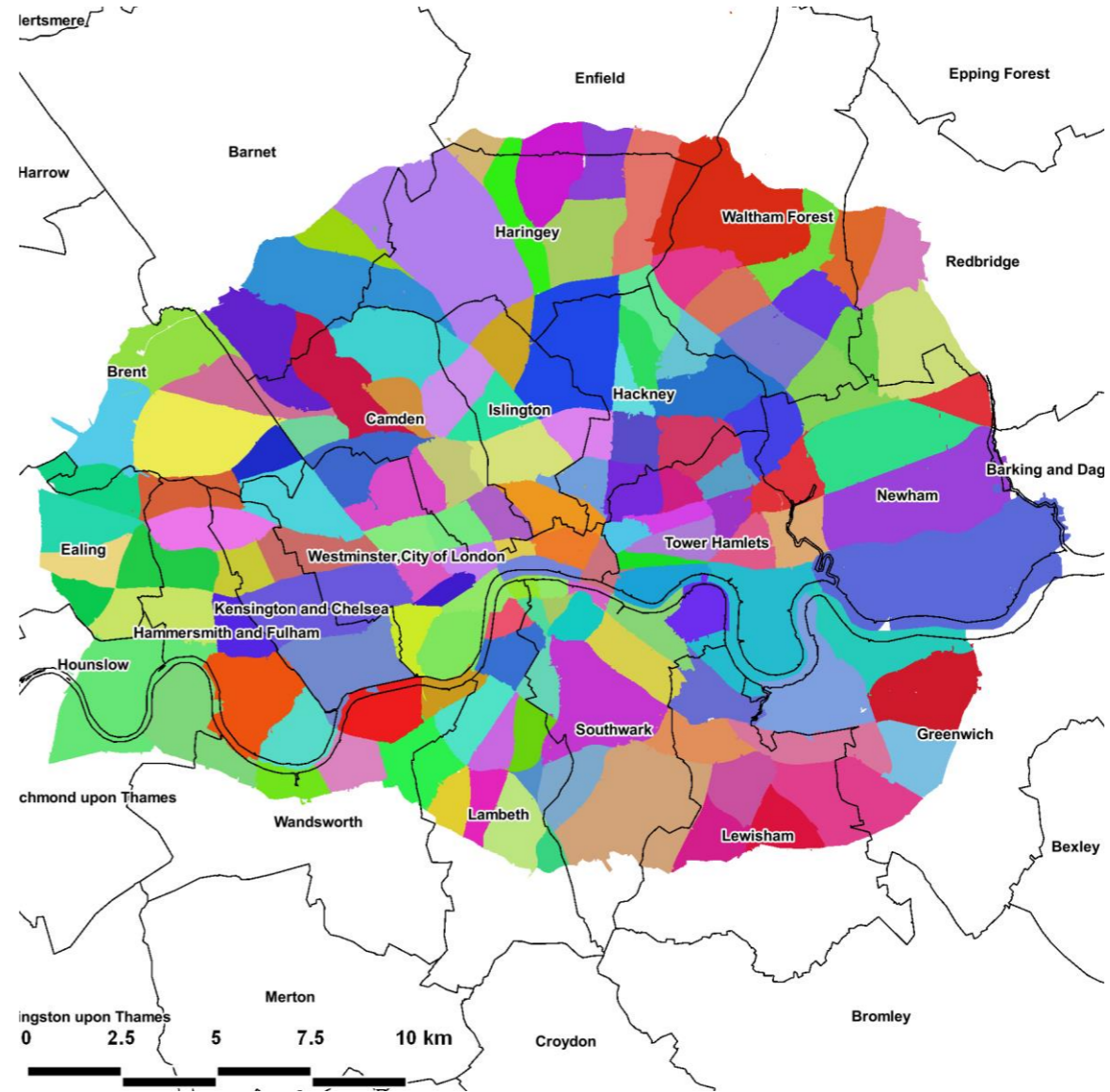
Space Syntax

Defining functional areas using the spatial network and physical barriers

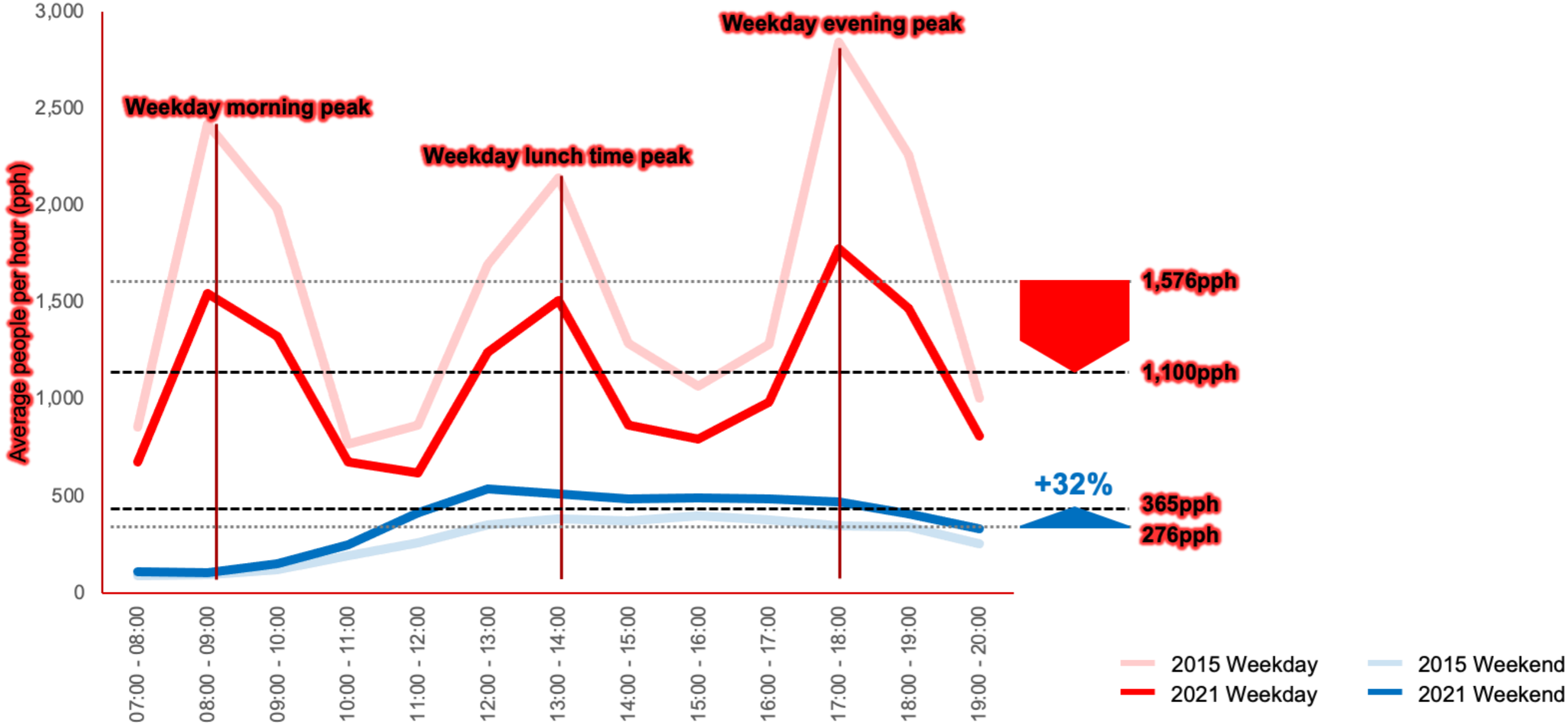
- Creates approximately 135 functional areas across London (within the North and South Circular)
- Populations typically between 5,000 and 120,000
- Areas range from 0.5 to 15 sq km



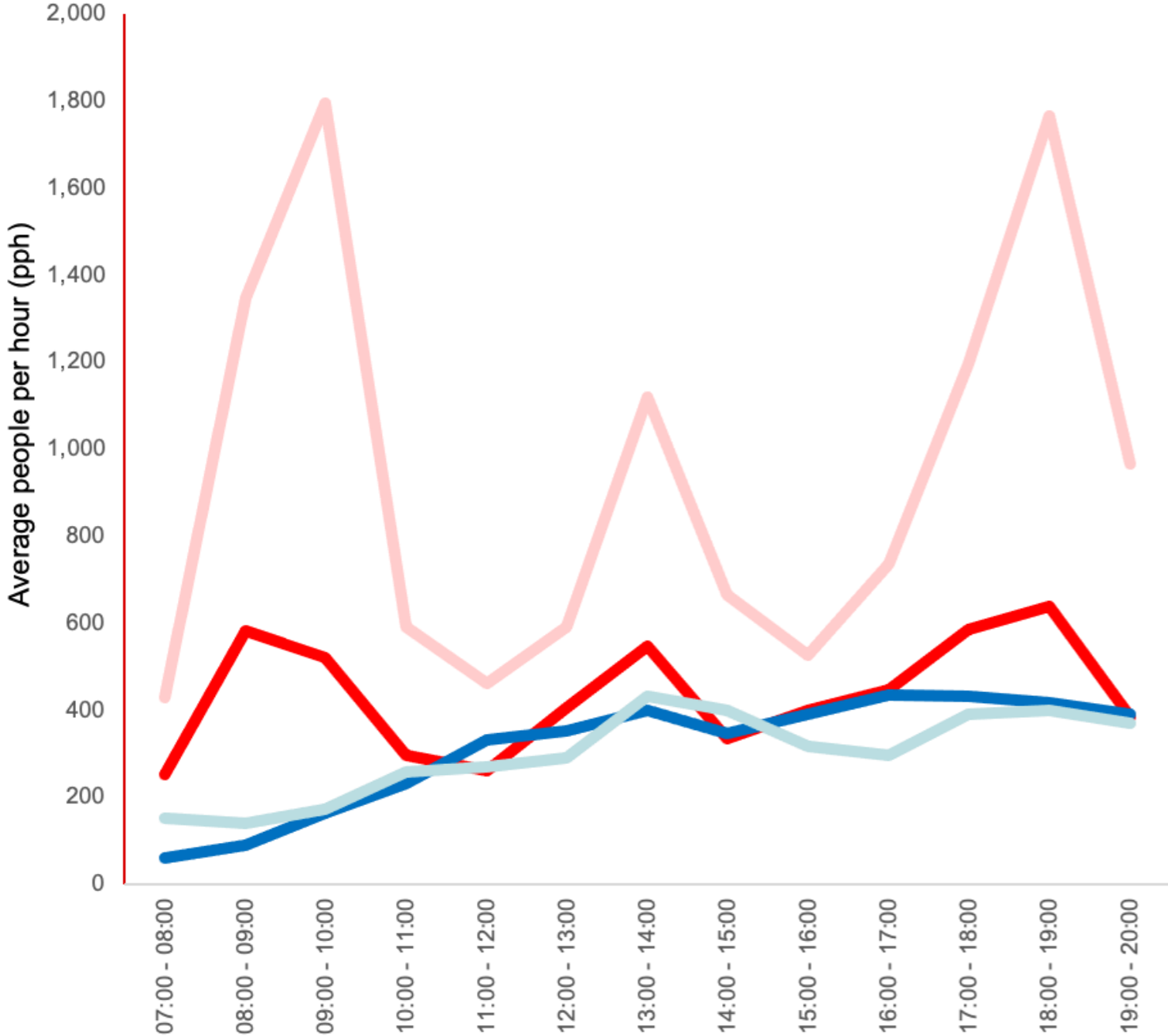
Defining functional areas compared to Local Authority boundaries



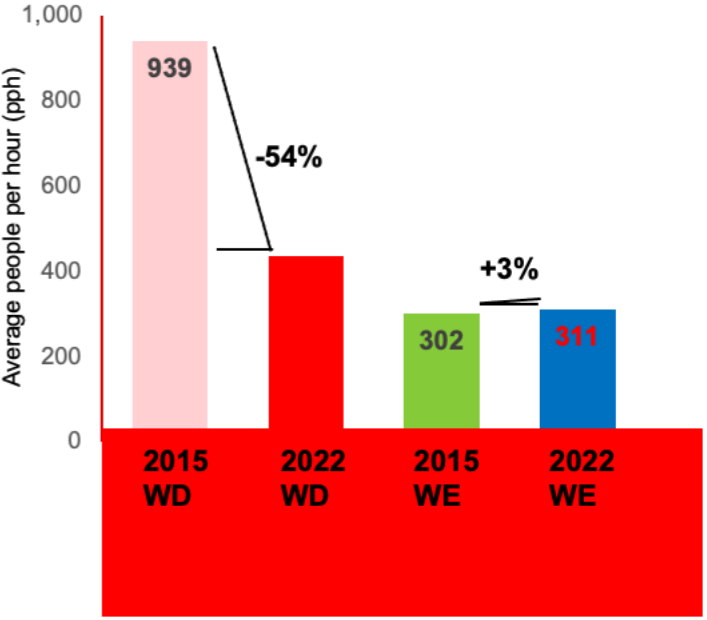
Study A Central London pedestrian flows compared to pre-pandemic time



Study B Central London pedestrian flows compared to pre-pandemic time



- 2022 Weekday
- 2015 Weekday
- 2022 Weekend
- 2015 Weekend



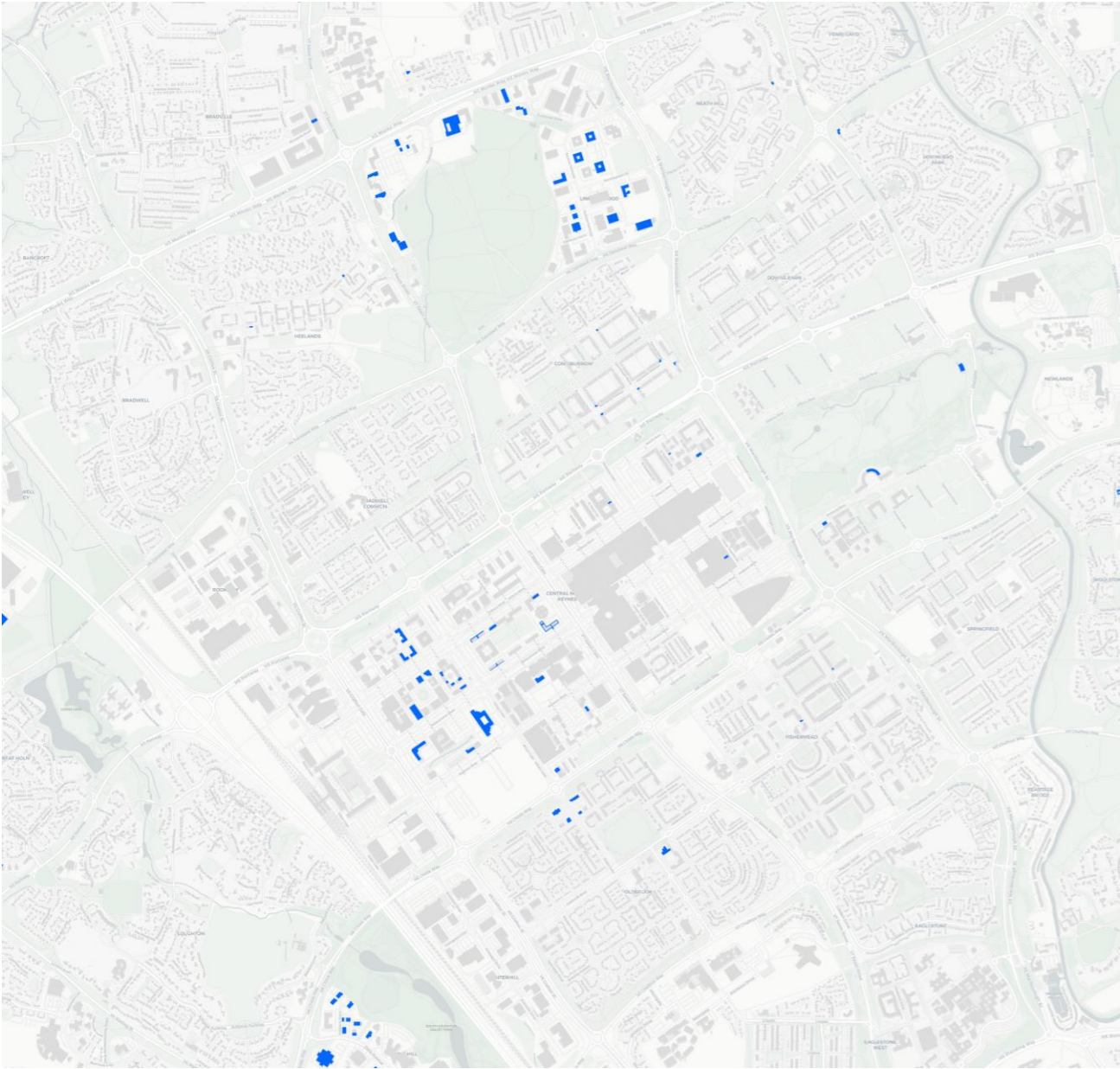
Sustainable cities and temporal disasters the impact of Covid-19 pandemic

Our recent studies show that in central London:

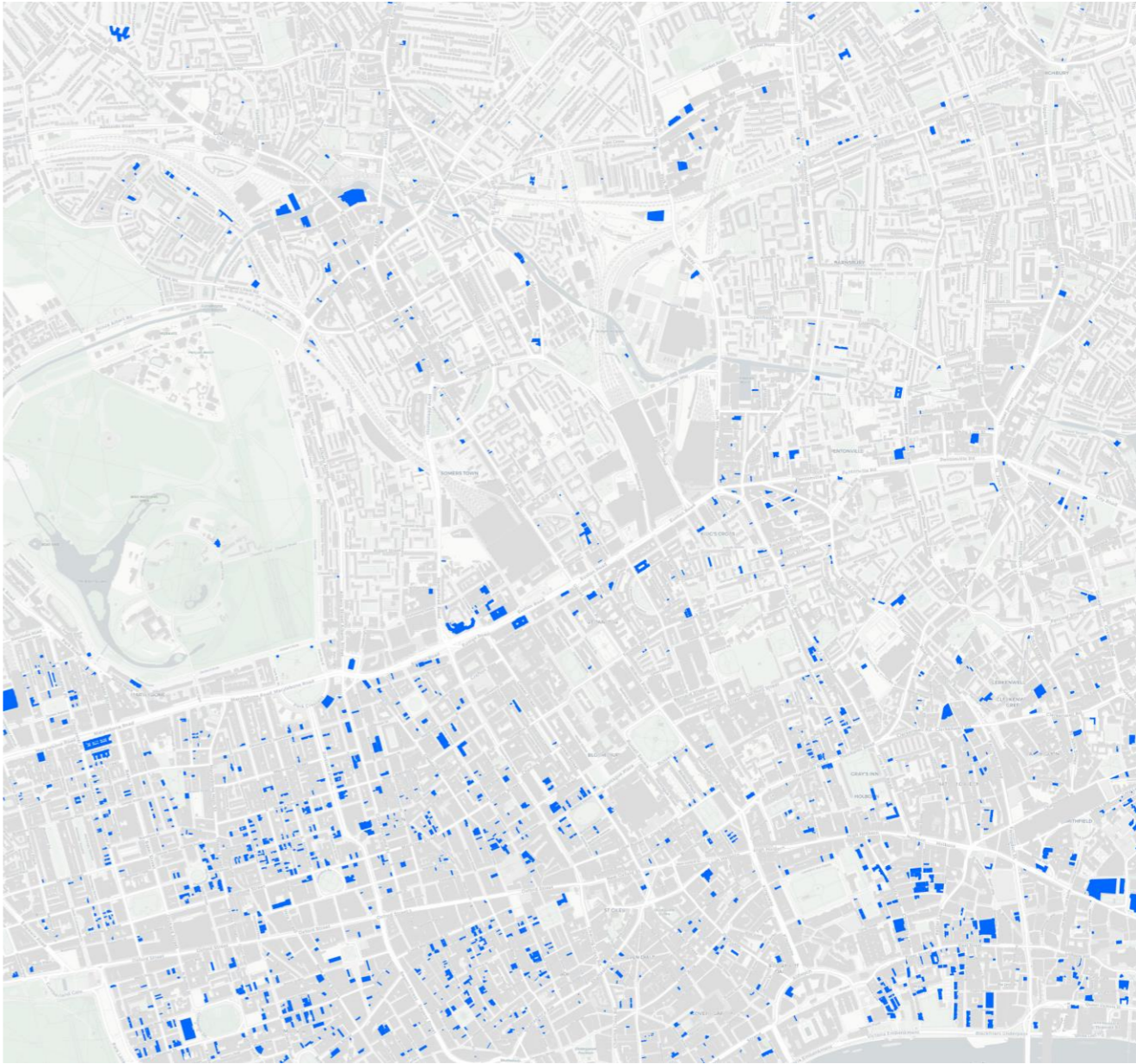
- **The total flows of pedestrian activity are still lower than the pre-pandemic years.**
- **However, the distribution of activities follow the pre-pandemic patterns.**
- **There seems to be lower levels of activities in morning and evening rush hours (perhaps influenced by greater levels of working from home).**
- **There are some positive signs of improvement, e.g. the pedestrian activities on Saturdays and Sundays are the same or even higher in the post-pandemic conditions.**
- **It seems that there is a good chance to reach the same level of activities after a period of normalisation.**

Sustainable city: how SMEs work with/in the city?

Distribution of SMEs: evolved urban grid vs. planned 'New Towns'

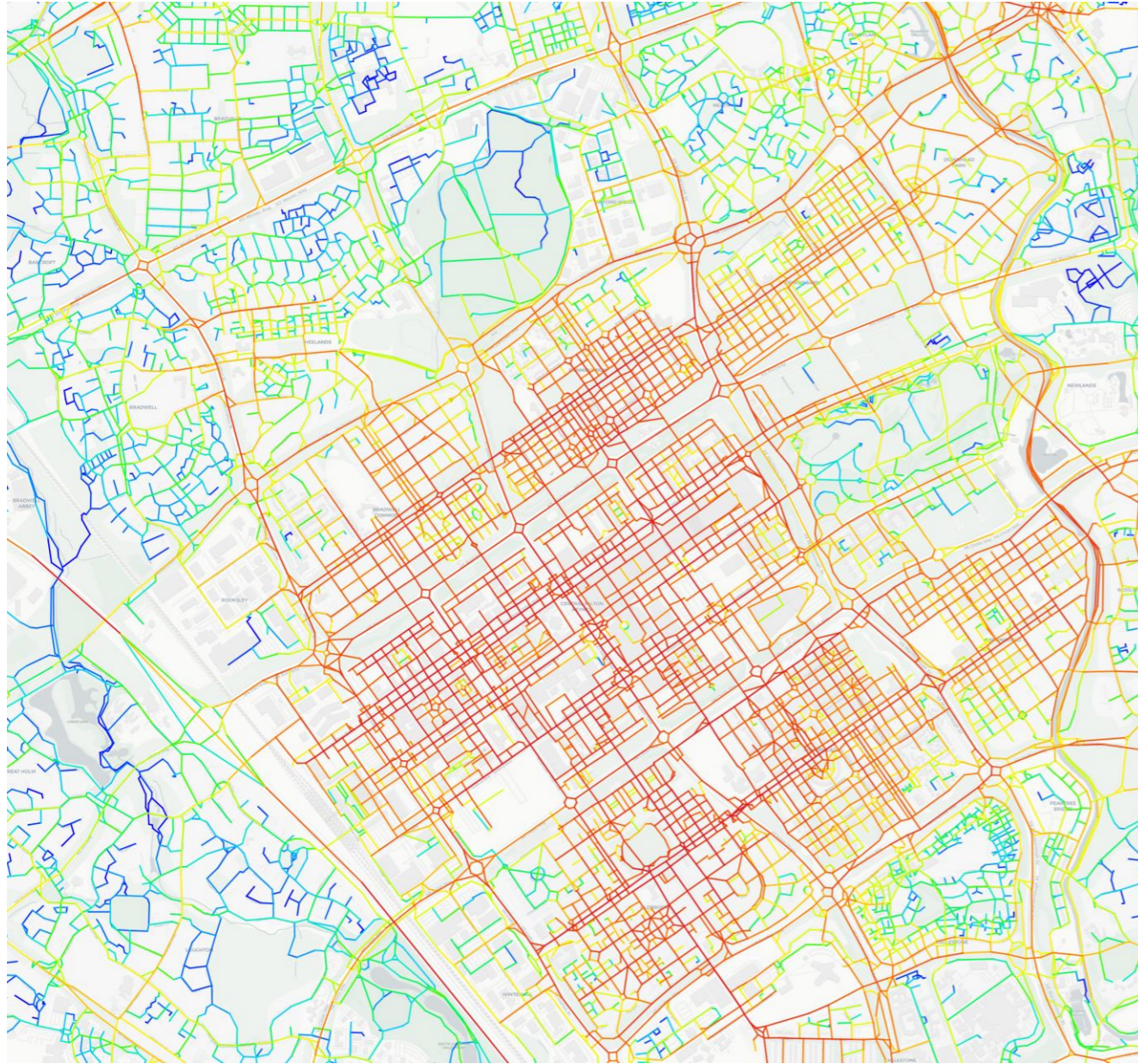


Central Milton Keynes

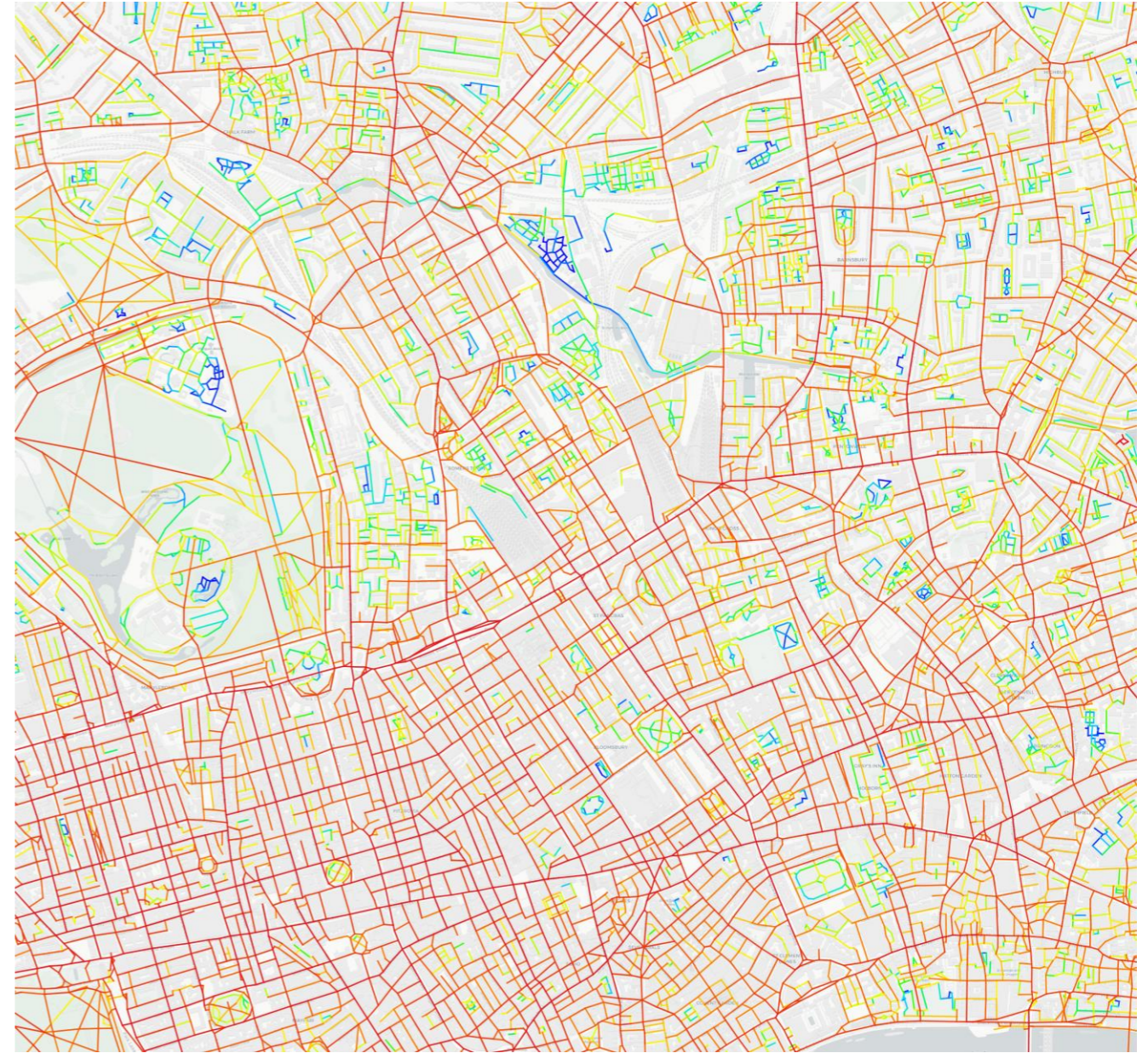


Part of Central London

Local accessibility: evolved urban grid vs. planned 'New Towns'

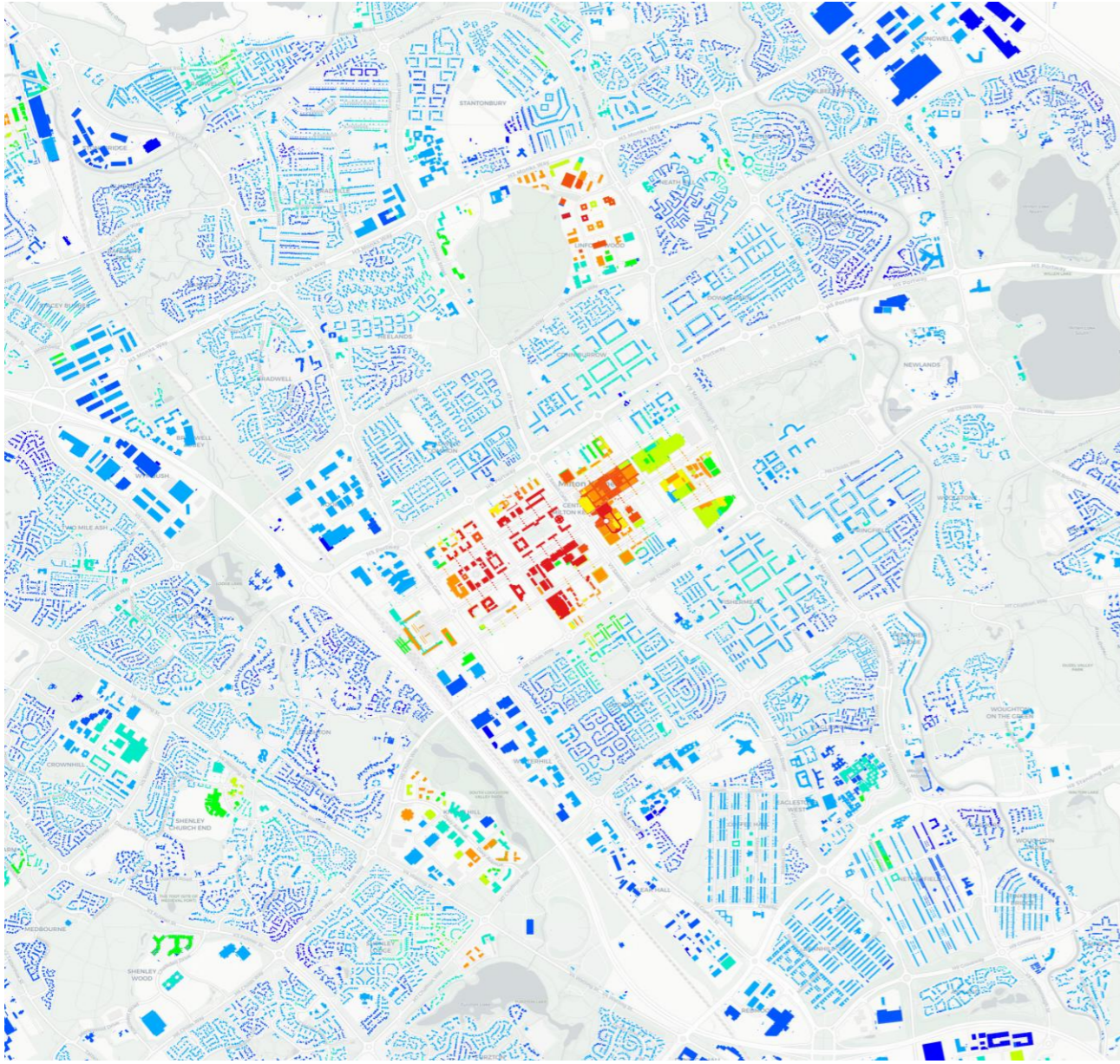


Patterns of spatial centrality are focused on the Town Centre and isolated from the surroundings.

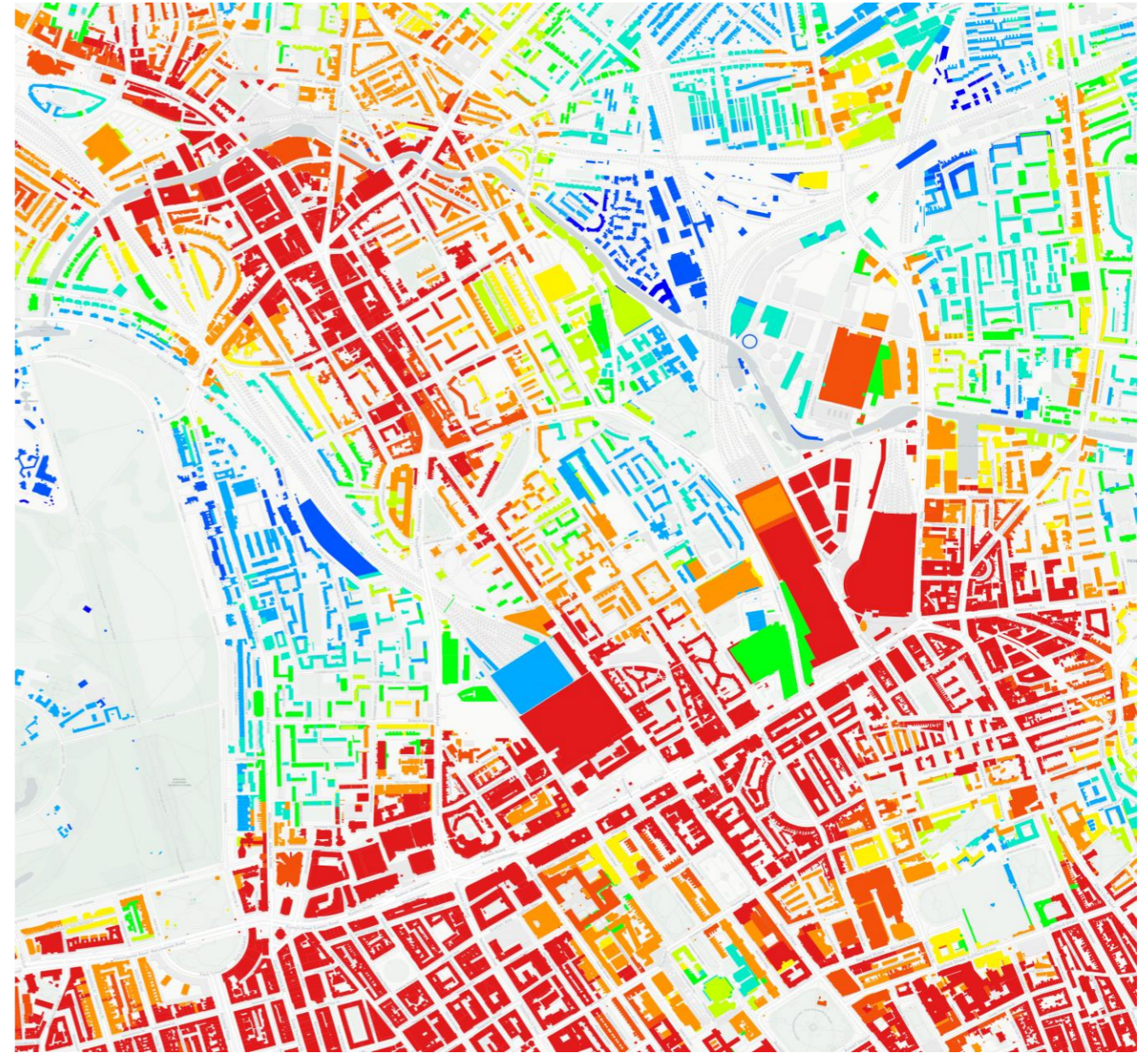


Spatial accessibility shapes a 'pervasive centrality' patterns.

Walkability to SMEs: evolved urban grid vs. planned 'New Towns'



Less walkable and sharp drop-off from high to low areas.



More walkable, smoother transition, all areas within 10 mins of multiple centres

To make the SMEs work you need to make the city work!

How the urban structure enables sustainable urban functions

To make the city work you need to make the SMEs work!

How the urban structure enables sustainable urban functions

To make the SMEs work you need to make the city work!

How the urban structure enables sustainable urban functions

Thank You!

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29.April.2022