

HERE GIS Day Lightning Talk, November '24

TOWARDS DATA-DRIVEN, EQUITABLE TRANSPORT INFRASTRUCTURE PLANNING

Dr Patrick Ballantyne

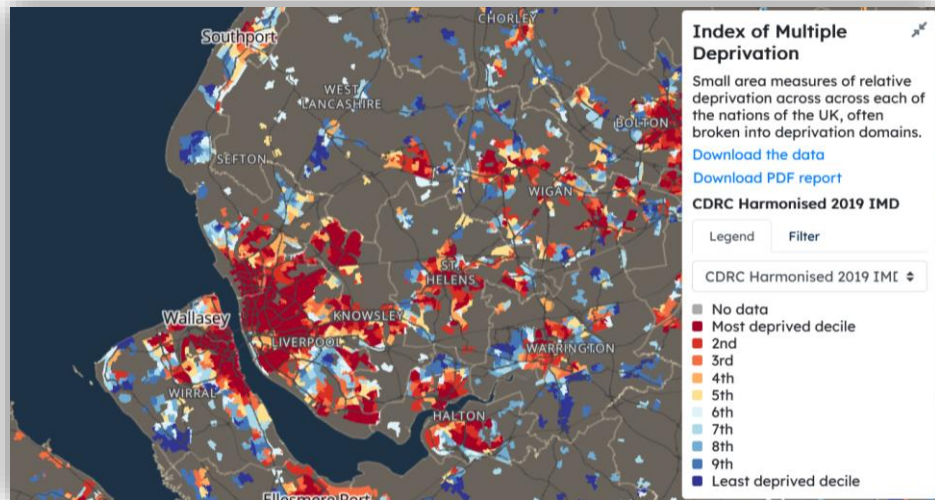
Postdoctoral Researcher, University of Liverpool



An ESRC Data Investment



CONTEXT



Liverpool as a “City of Inequality” (Sykes, 2013)

Strategic powers:

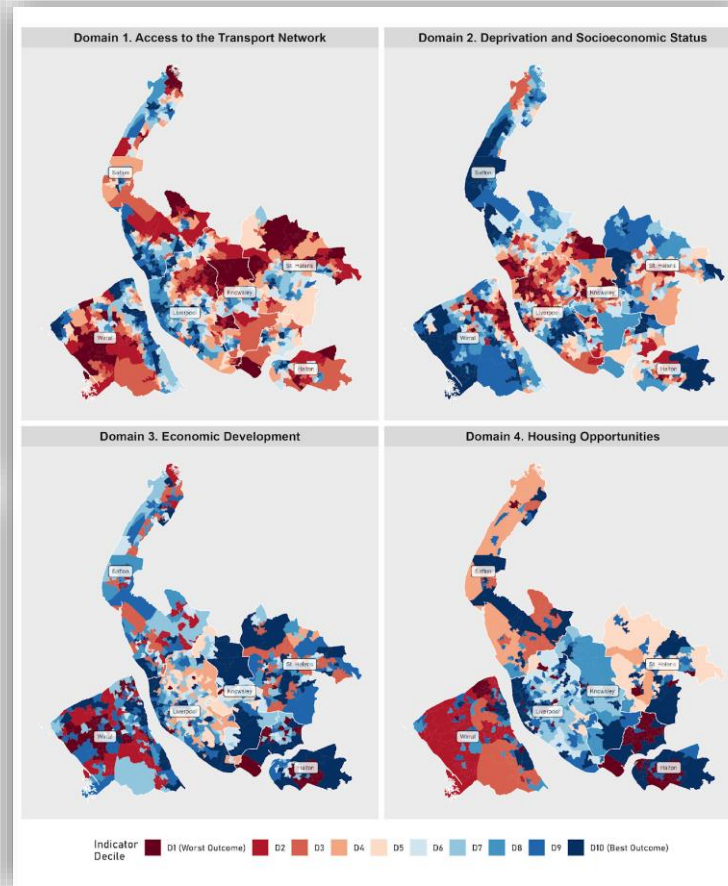
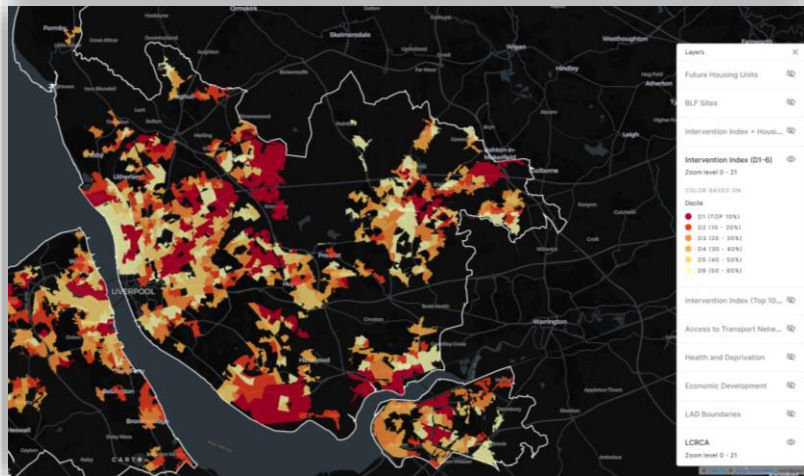
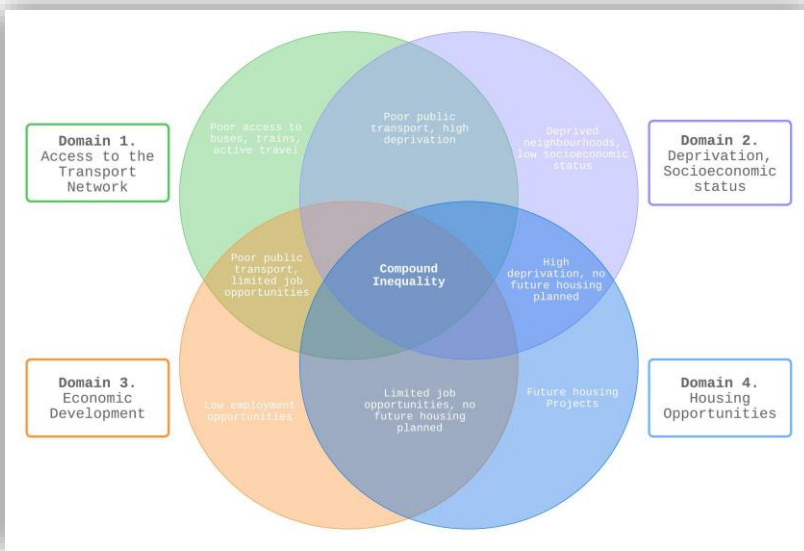


Aim:

To support LCRC with data and analysis to prioritise **DATA-DRIVEN EQUITABLE INFRASTRUCTURE PLANNING**



PRIORITISING EQUITABLE INVESTMENT



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Using composite indicators and city dashboards to promote place-based policy interventions

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ARTICLE INFO

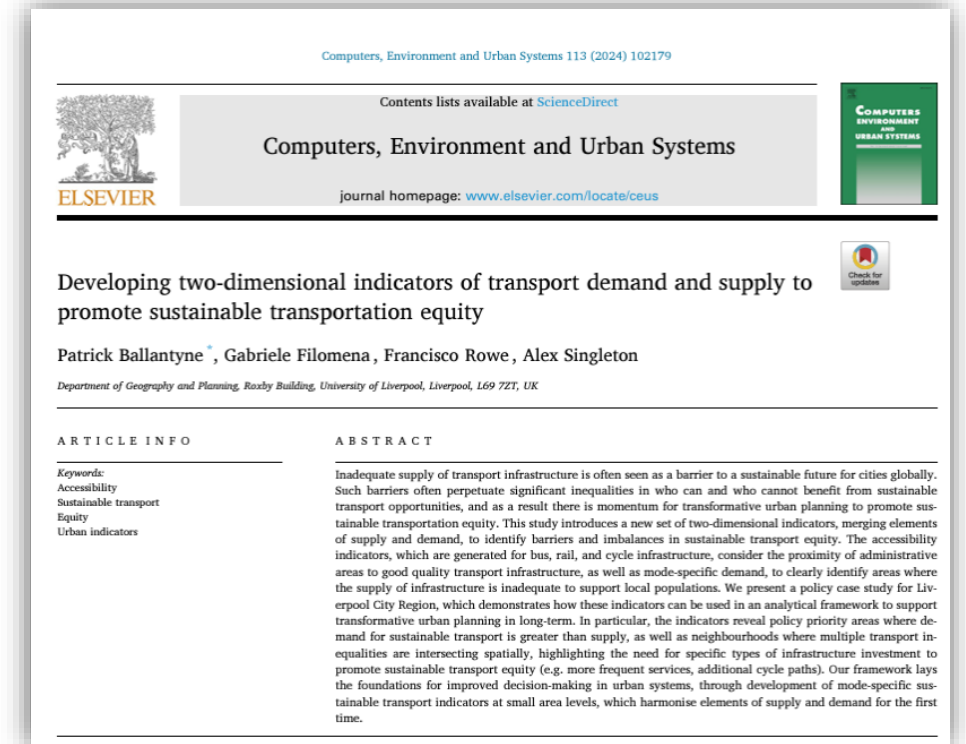
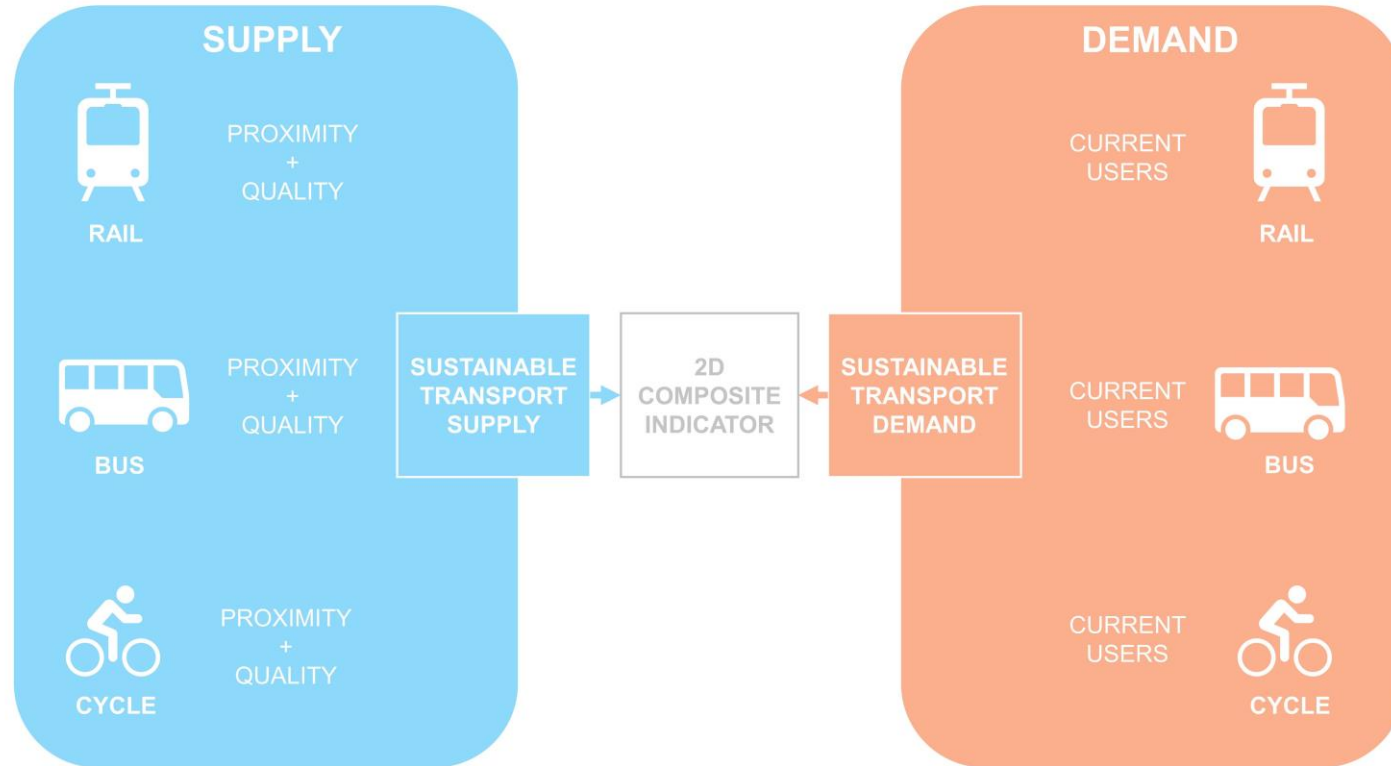
Keywords:
Inequality
Urban indicators
Dashboard
Liverpool City Region

ABSTRACT

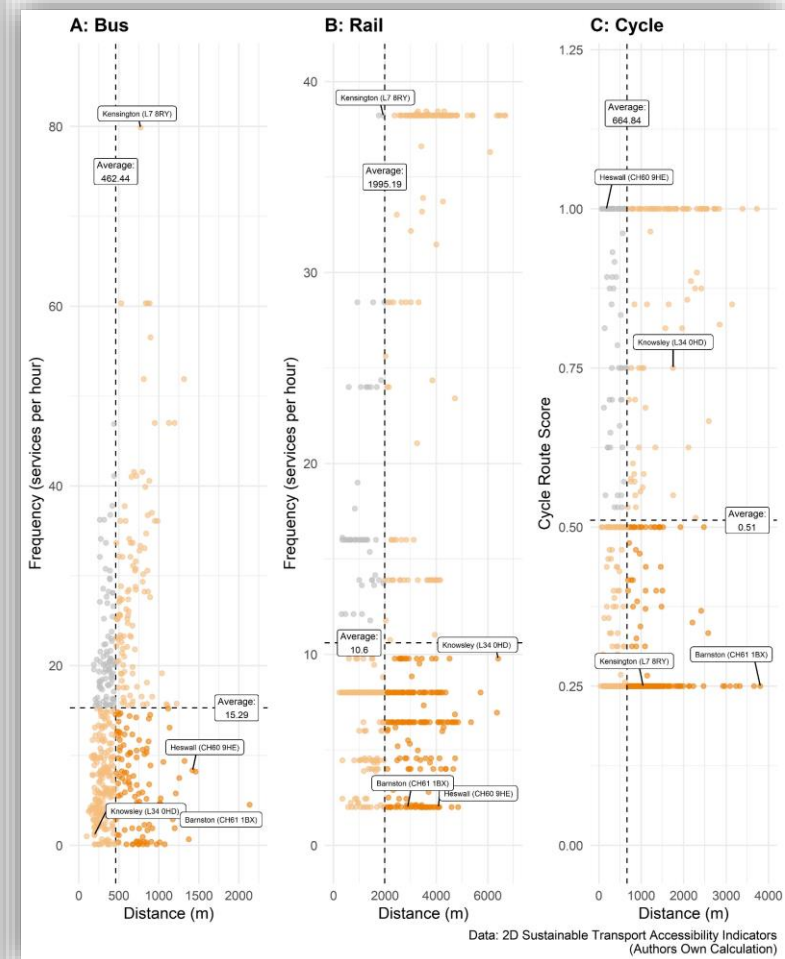
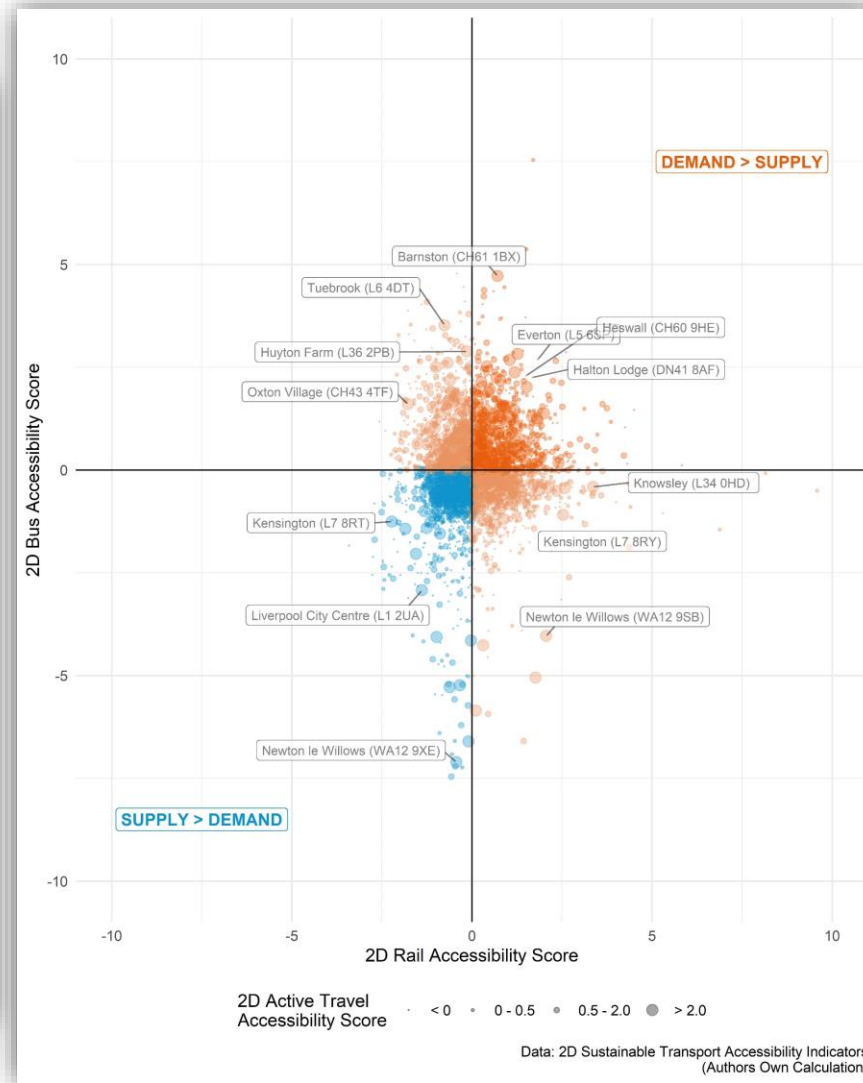
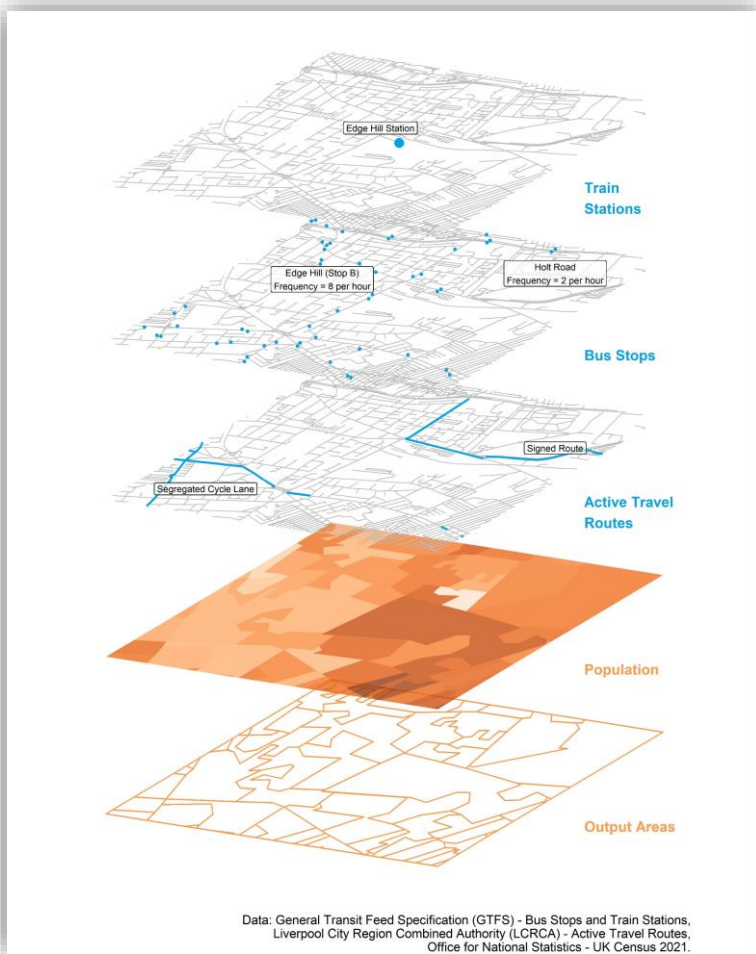
Spatial inequality is a common urban phenomena in cities around the world, where stark contrasts in a variety of different social and economic outcomes paint a vivid picture of compound inequalities. Tackling these influences from a policy perspective remains challenging, as political economies often span multiple actors and municipal bodies, lacking effective policy instruments to challenge multiple forms of inequality at once. This paper provides a new data-driven perspective, which seeks to improve how policy is developed when trying to mitigate the impacts of compound inequality. Utilising a place-based approach, we present an evidence base which has been co-produced with policymakers, comprising composite spatial indicators and a city dashboard for Liverpool City Region. The assembled evidence base highlights clear patterns of compound inequality across the region, identifying places in greatest need of support. In the paper we discuss how this evidence base is now being used to distribute investment from the City Region Sustainable Transport Settlements, generating positive outcomes for people and places across the region. Finally, we conclude by reflecting on the benefits of building collaborative relationships between academics and policymakers, and the utility of our approach, which uses urban indicators and city dashboards, which we argue can secure a more equitable future for cities globally.

EVIDENCE
+
EVALUATION

IDENTIFYING SUPPLY/DEMAND MISMATCH



IDENTIFYING SUPPLY/DEMAND MISMATCH



IMPROVING PEDESTRIAN SAFETY

Wirral Pedestrian Infrastructure Validation

Prepared by Dr. Patrick Ballantyne, University of Liverpool (mail: P.Ballantyne@liverpool.ac.uk)

Dashboard Purpose

This dashboard has been constructed to evaluate whether pedestrian infrastructure data in Local Authorities is complete. The dashboard tool enables local stakeholders to explore the distribution of different types of **controlled** pedestrian crossing in their Local Authority. By **controlled** we mean those where the pedestrian has priority over vehicles either via a zebra, or a signalled pedestrian crossing.

We Need Your Help!

You have received a link to this dashboard as you have been identified as someone who has a good working knowledge of pedestrian infrastructure in your Local Authority. Below you will see the specific task we would like you to complete. A detailed data processing methodology and project background is included below for your information.

TASK: Explore the distribution of **controlled** pedestrian crossings in your LA and see if you feel that this is accurate and representative. Please report any missing **controlled** crossings, either by sending through coordinates or a screenshot of it's location on a map. If any of the existing infrastructure points are incorrect, please note down the *SiteReference* number (e.g., HALTON-C-9), and report it back to us.

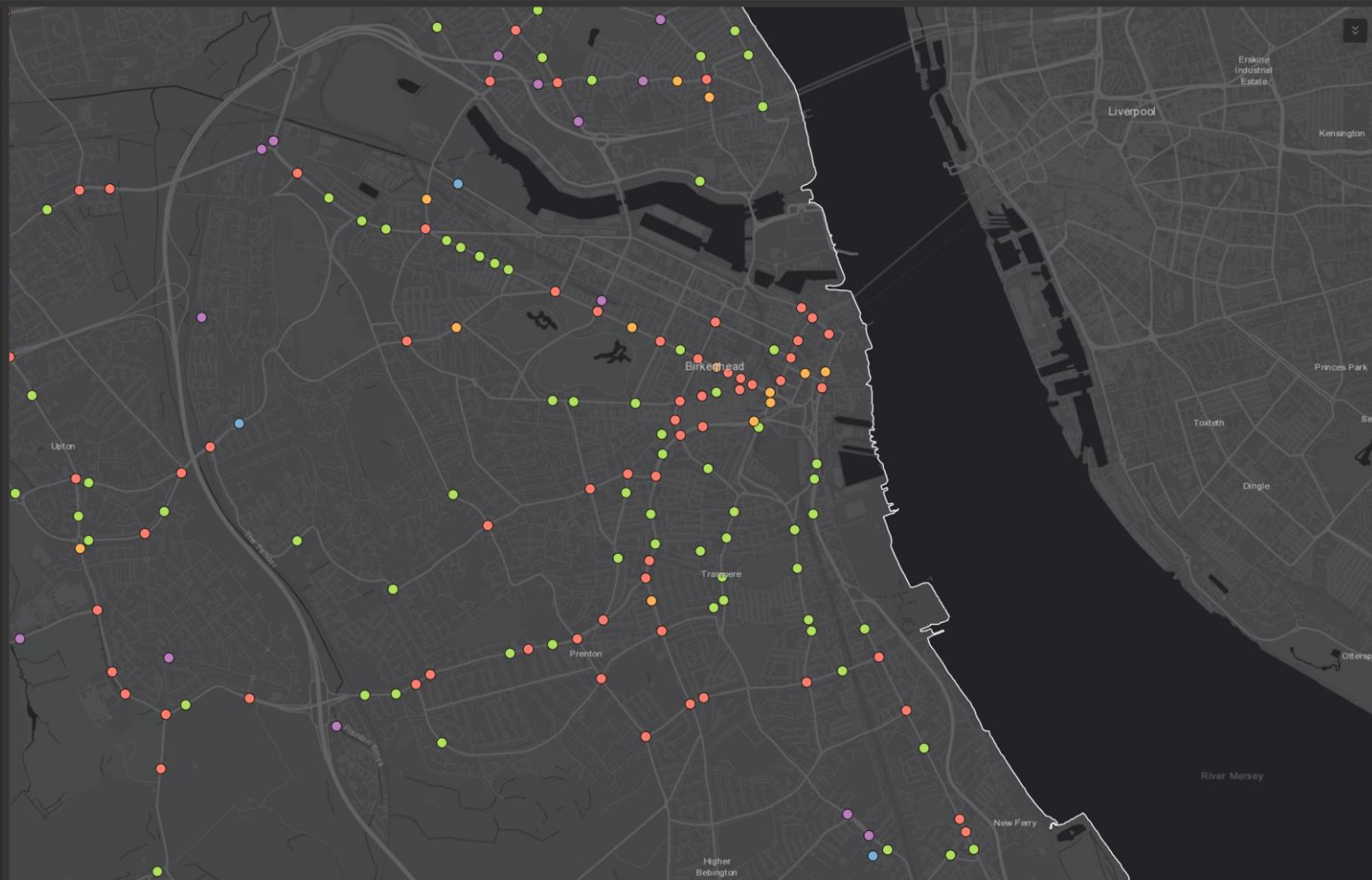
Data Processing

Two main types of controlled crossing were extracted for Wirral. Zebra crossings were obtained from the 'TRAFFIC SIGNAL JUNCTIONS - PEDESTRIAN CROSSINGS.xlsx' file (Sheet 3). Controlled crossing locations were also obtained from the same file, bringing together Sheets 1 (Junctions) and 2 (Pelicans, Toucans etc.) to gather a complete list of controlled crossings. These were processed into one layer, which contains a unique ID (*SiteReference*), type identifier (*ShortType*) and origin filename (*FileName*).

Project Background

Comprehensive and complete infrastructure data is imperative as we calculate small area accessibility metrics to identify 'gaps' in accessibility. These metrics will be integrated with road traffic collisions data to explore where new infrastructure is needed across Liverpool City Region.

Approach adopted from [this paper](#).



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IMPROVING PEDESTRIAN SAFETY

DATA VALIDATION

Standardisation and validation of locations (& attributes)

SPATIAL OPTIMISATION MODEL

Identifying locations with greatest need for new infrastructure

ROAD SAFETY EXPLORATION

What is the distribution of road traffic accidents across LCR?

NARRATIVE DASHBOARD

Tool that integrates data, methods and key findings for planners

Wirral Pedestrian Infrastructure Validation
Prepared by Dr. Patrick Ballantyne, University of Liverpool (email: P.Ballantyne@liverpool.ac.uk)

Dashboard Purpose

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Tasks: Explore the distribution of controlled pedestrian crossings in your LA, and see if you feel that this is accurate and representative. Please report any missing controlled crossings, either by sending through coordinates or a screenshot of LA location on a map. If any of the existing infrastructure points are incorrect, please note down the StreetReference number (e.g. HALDON C 5), and report it back to us.

Data Processing

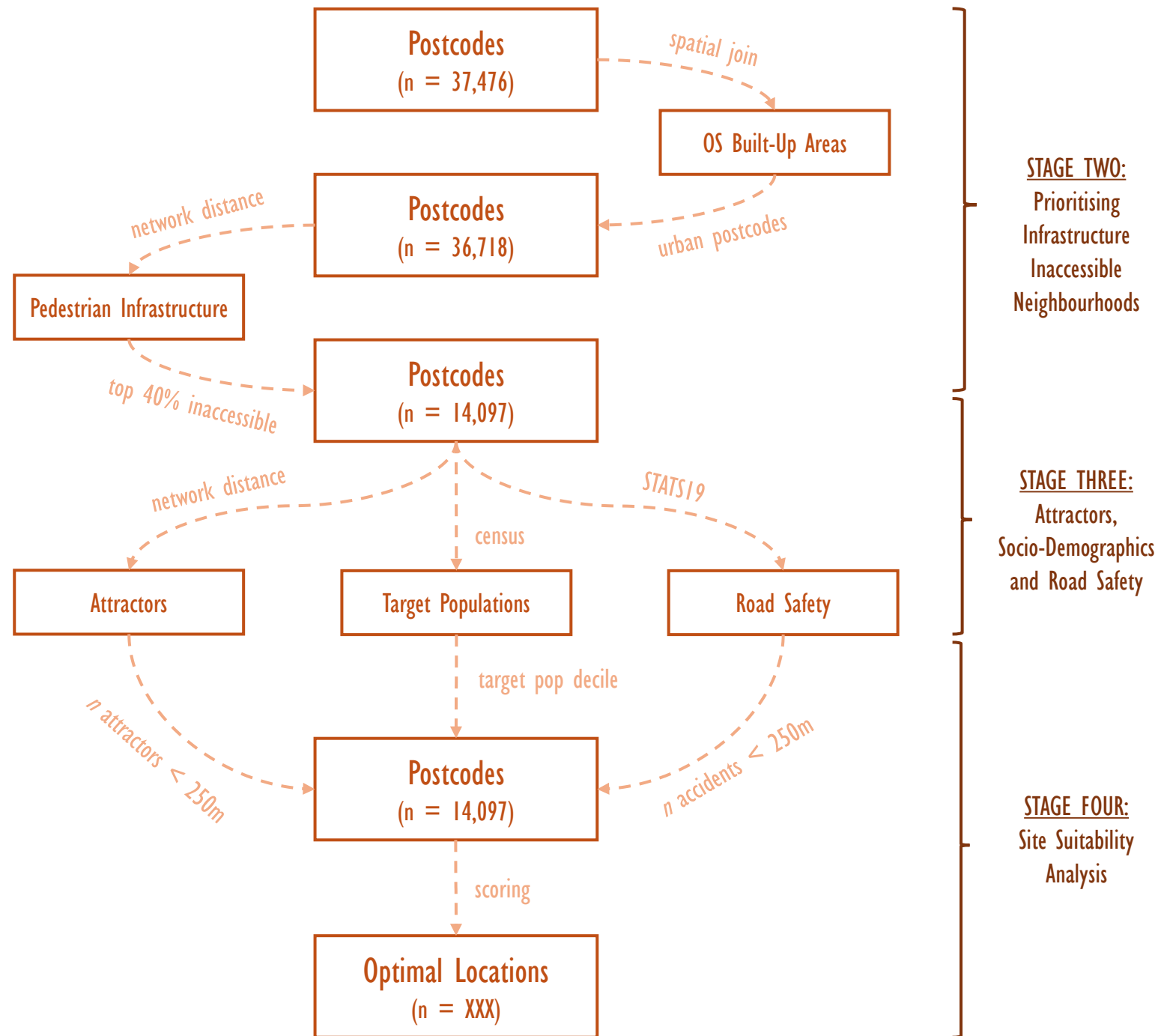
Two basic types of controlled crossing were extracted for Wirral. Zebra crossings were obtained from the TRAFFIC SIGNAL JUNCTIONS PEDESTRIAN CROSSINGS file (Sheet 2). Controlled crossing locations were also obtained from the same file, bringing together sheets 1 (Junctions) and 2 (Pedestrian Crossings) to gather a complete list of controlled crossings. These were processed into one layer, which contains a unique ID (StreetReference), type identifier (OverType) and origin filename (FileName).

Project Background

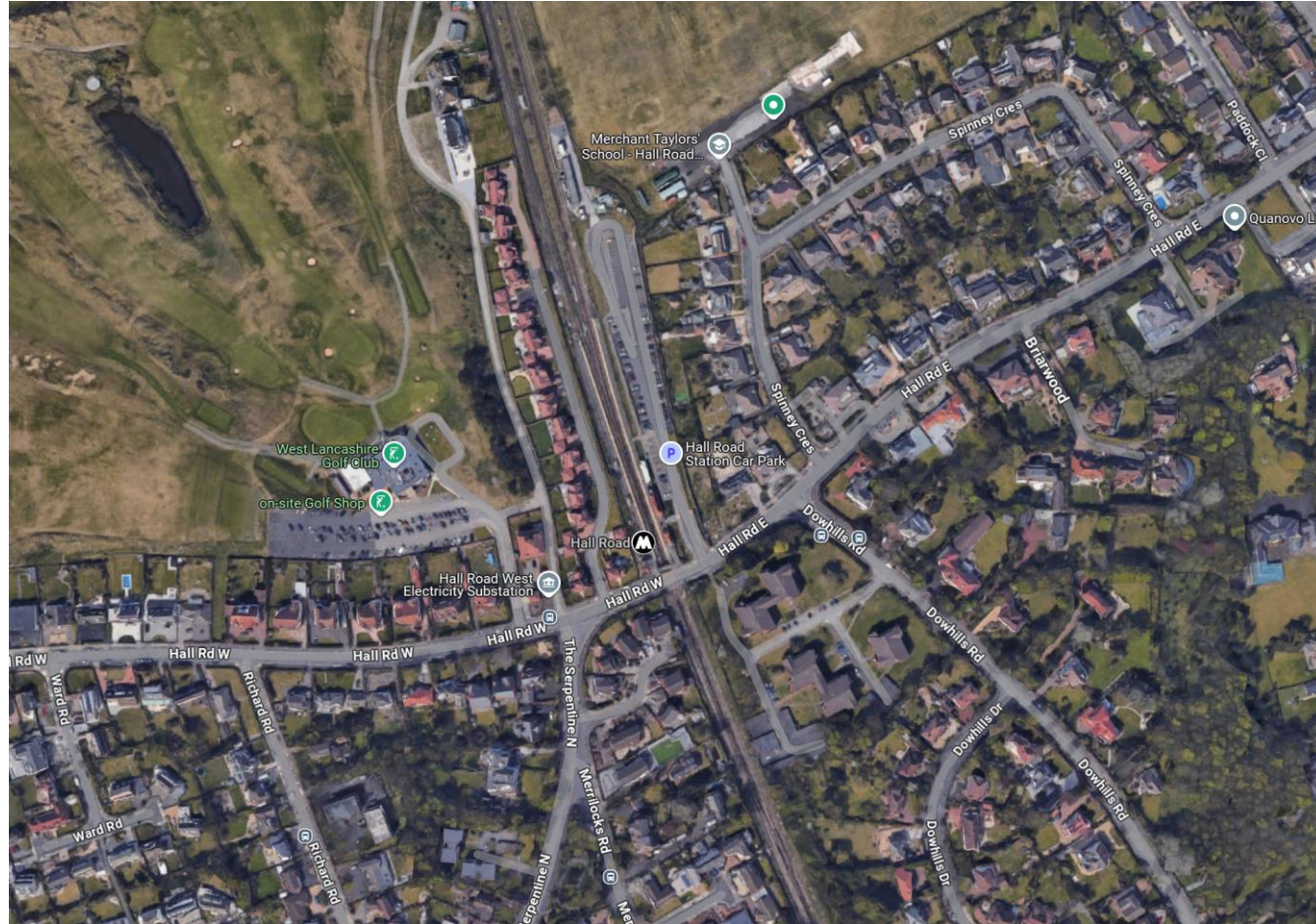
Completeness and completeness of infrastructure data is imperative as we calculate small area accessibility metrics to identify gaps in accessibility. These metrics will be integrated with road traffic collision data to explore where new infrastructure is needed across Liverpool City Region.

Approach adopted from this paper.





SPATIAL OPTIMISATION MODEL OUTPUT

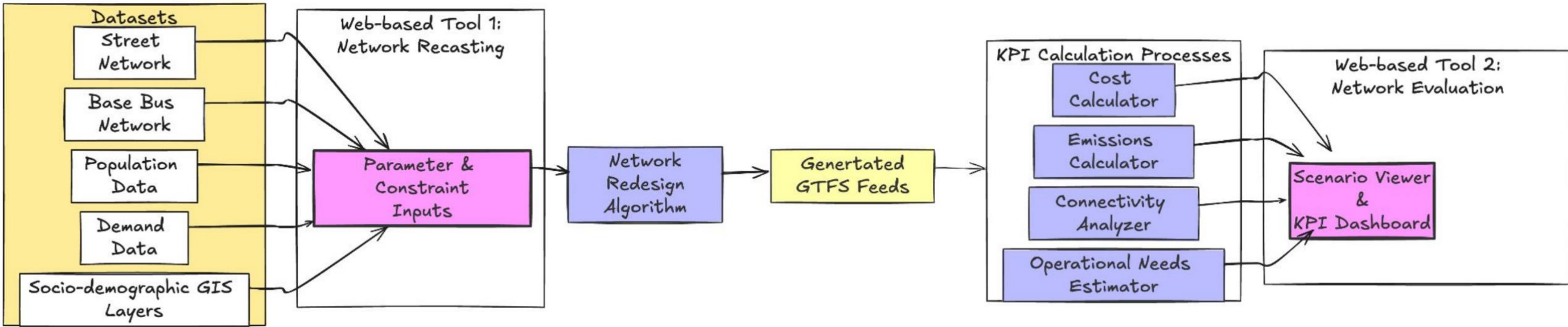


L23 6XX (score 17):

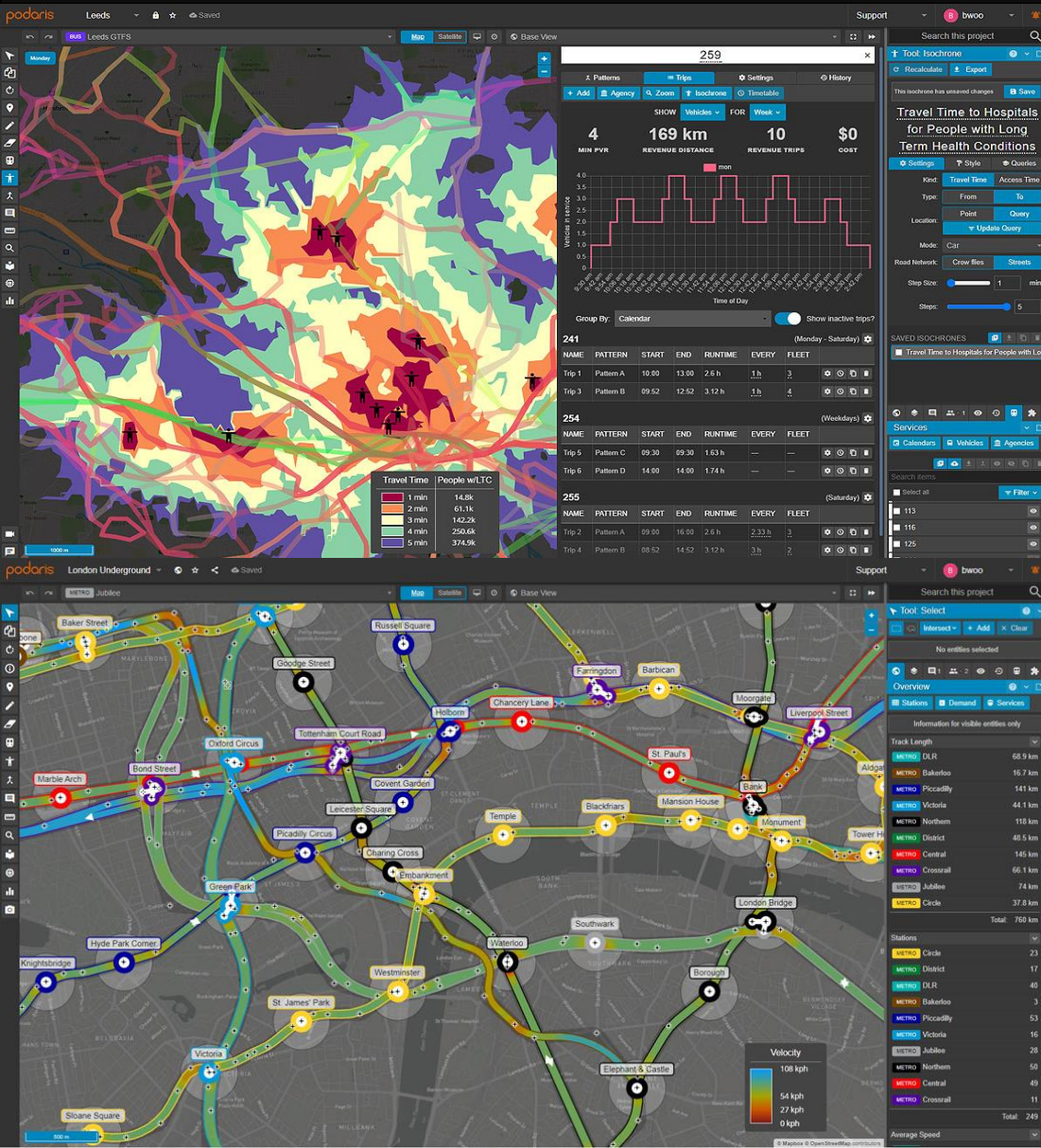
- 1.7km to nearest crossing
- Within 250m of a train station and Merchant Taylors school
- Large numbers of elderly people



A DIGITAL TWIN OF LIVERPOOL'S BUS NETWORK

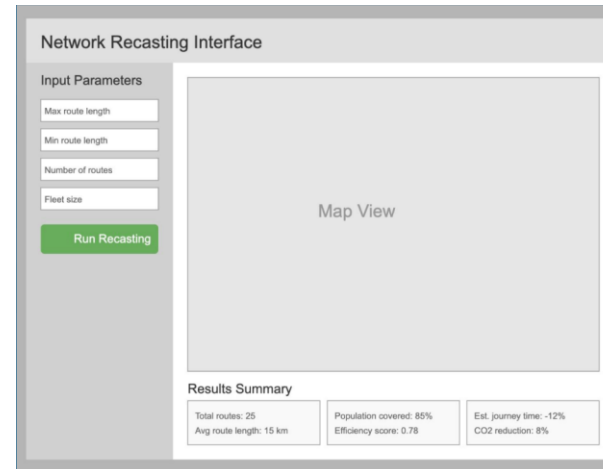


A DIGITAL TWIN OF LIVERPOOL'S BUS NETWORK



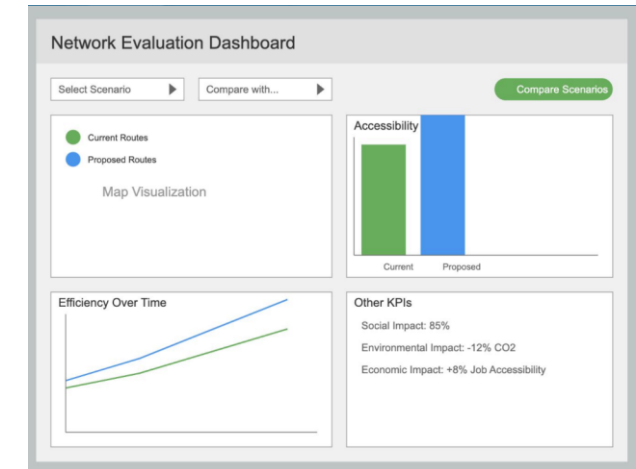
Network Recasting

Automatically redesign the network based on specified parameters and constraints



Network Evaluation

Evaluate proposed networks based on various key performance indicators (KPIs).



REFLECTIONS

LET IMPACT DRIVE OUR RESEARCH QUESTIONS

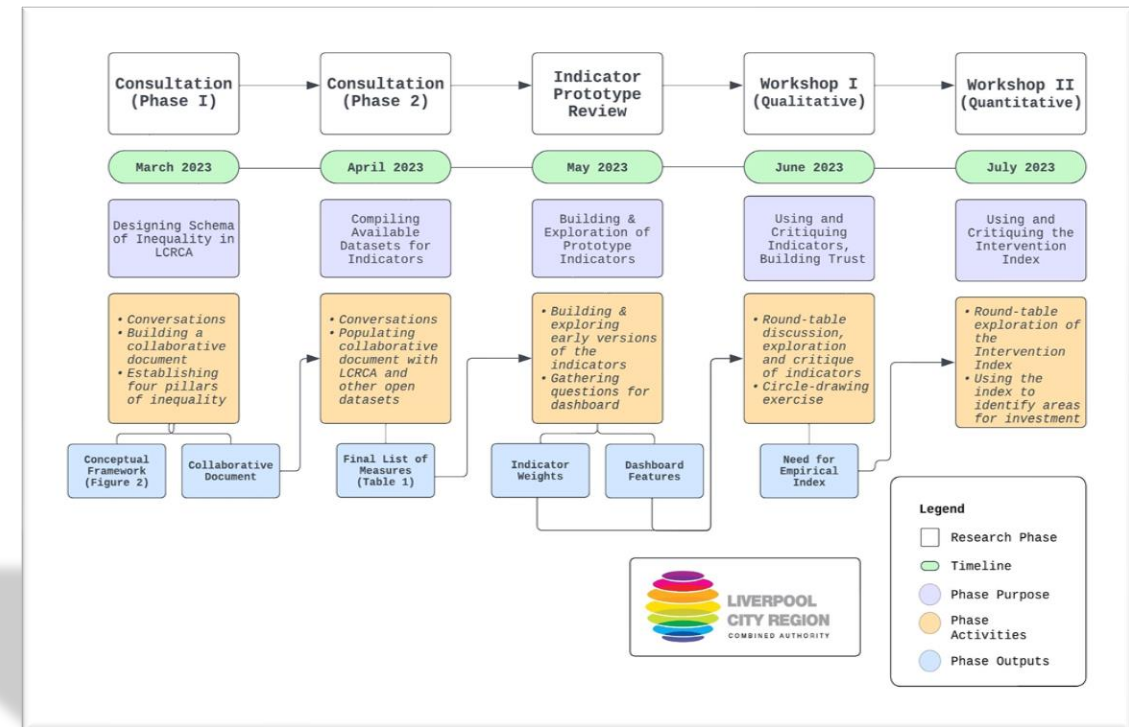
- Academics can work with policymakers to improve how our cities are planned
- Beyond 'academic exercises' to meaningful research

LET'S MAKE GIS (ANALYSIS) ACCESSIBLE

- Focusing on design of outputs is key to utilisation of our findings in policy settings
- Urban indicators are a powerful means of communication

COLLABORATION IS KEY!

- Public, private and academic sectors need to work together more – partnerships & joint research ventures
- Let's not reinvent the wheel...



A framework for collaboration
(taken from Ballantyne and Singleton, 2024).

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