

Improving the Underlying Data for Active Travel Route Planning

Presentation to TfSE Transport Forum 28 February 2023

Introduction

The Government has the ambition for walking and cycling to be the first choice of travel mode for shorter journeys and to be better integrated with public transport for longer journeys.

No comprehensive routable geospatial network dataset exists for active travel infrastructure

How can this gap be filled?

The Routable Active Travel Infrastructure Networks project aims to help with this...



Project Team



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RATIN Research Overview

Investigate approaches and datasets required to achieve a comprehensive Routable Active Travel Infrastructure Network (RATIN)

- Literature review to identify a shortlist of potential approaches for creating such a network
- Development and application of shortlisted methods for a study area (Hampshire) to establish feasibility
- Refinement of preferred method
- Testing and validation of dataset for network routing
- Scoping and methodological design for automation and wider roll-out of validated method

Project duration (phases 1 and 2): Jan 2022-Mar 2023

Conceptual Framework

Detailed View

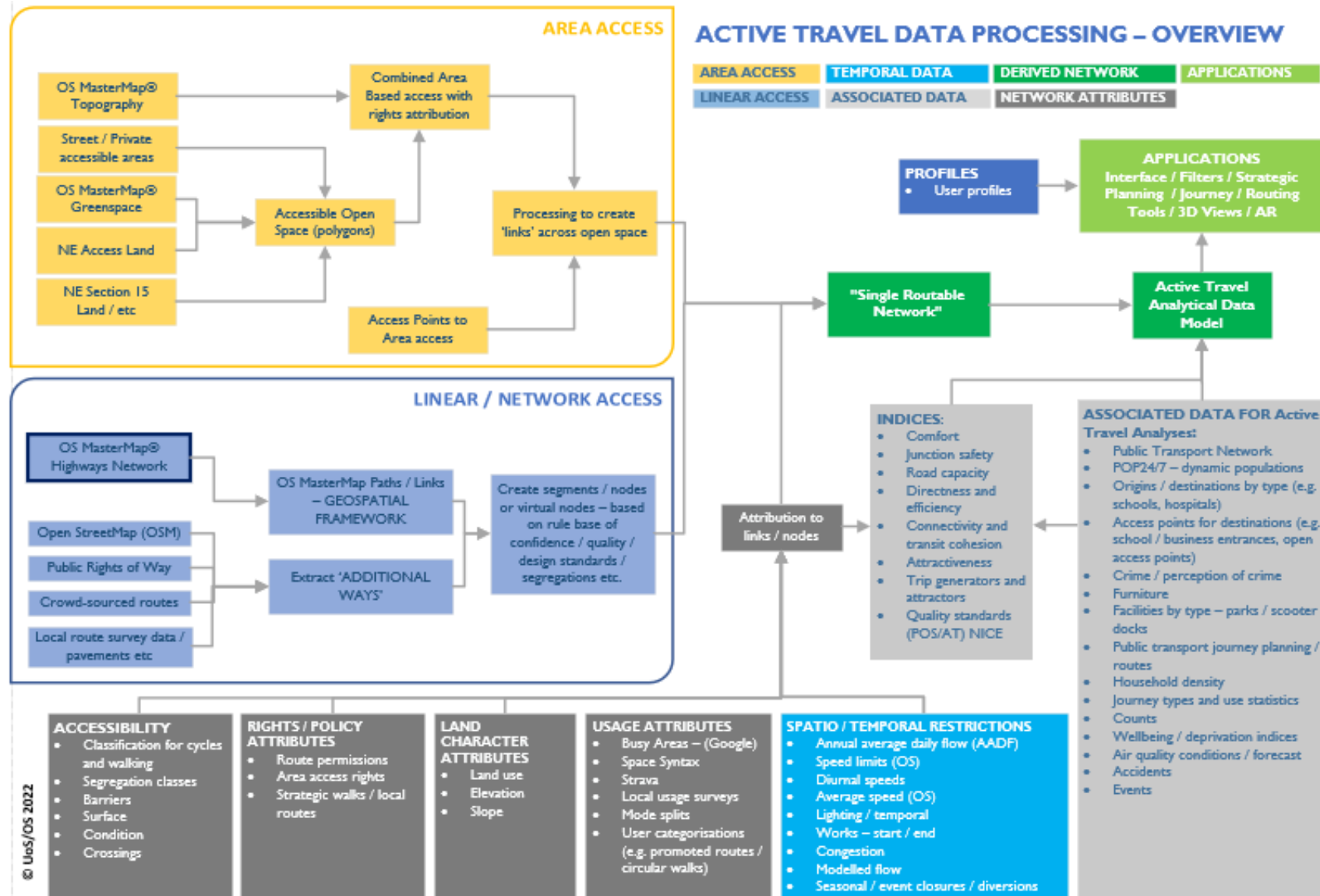
Combines Area and Linear access

Attributes of accessibility, rights, land character, usage and spatio-temporal constraints

Indices - built from attributes - e.g., connectivity, quality, attractiveness

Associated Data for spatial analyses - e.g., air quality, crime etc

Applications driven by User profiles...

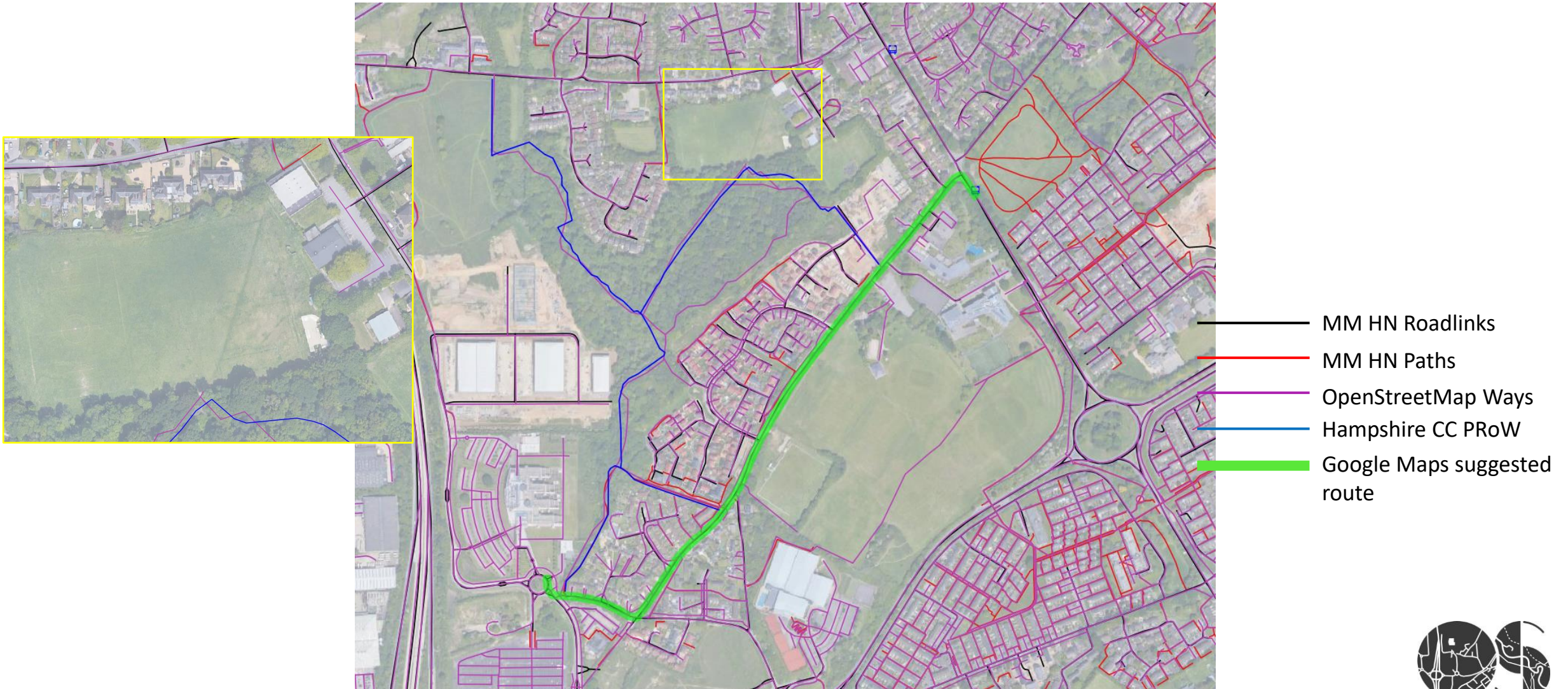


Enhanced data: Path presence



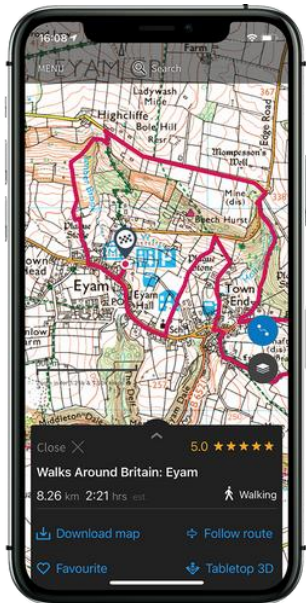
- MM HN Roadlinks
- MM HN Paths
- Google Maps suggested route

Enhanced data: Path presence



Enhanced data: Path presence

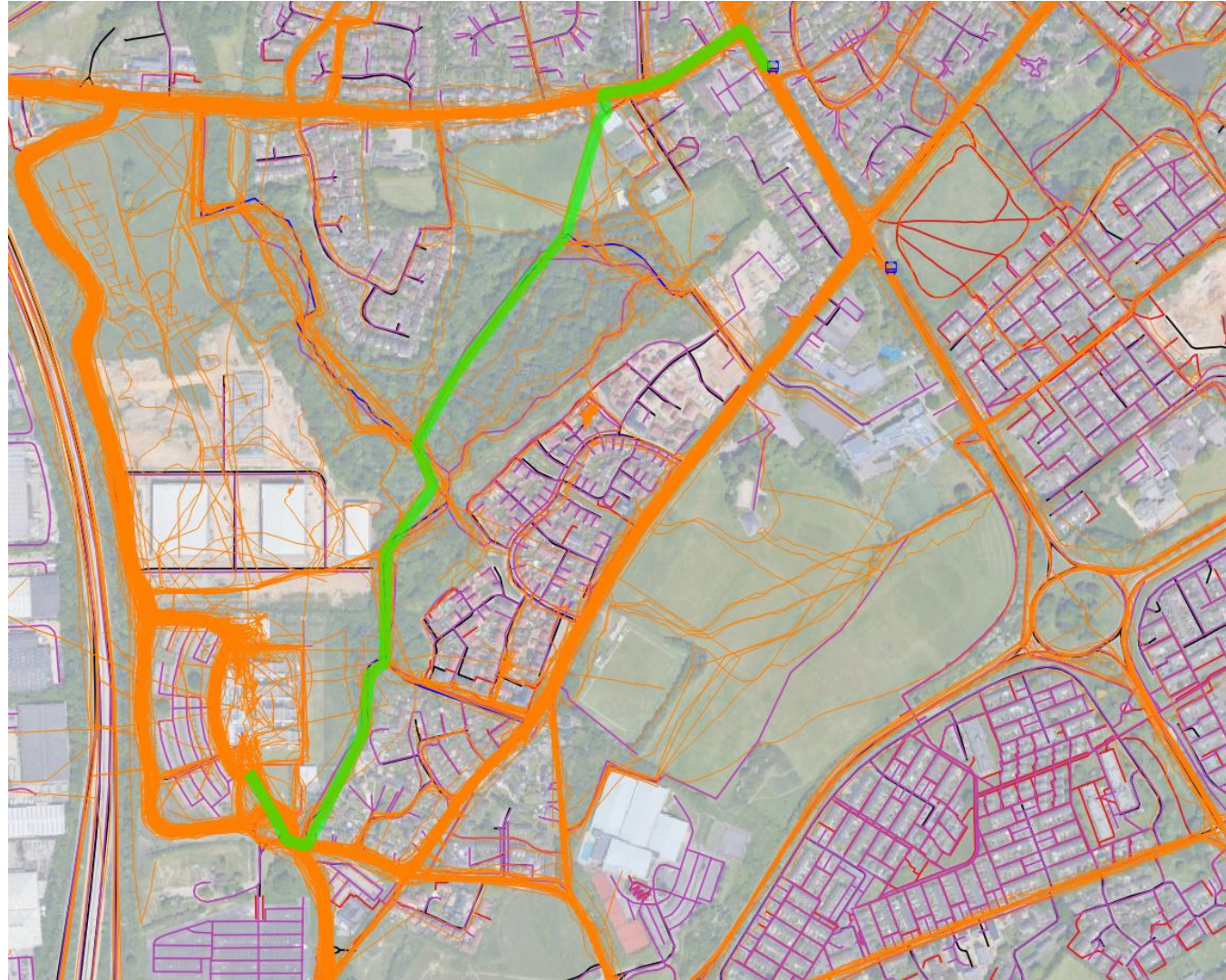
OS Maps App data



Enhanced data: Path presence

Now have the information to select a plausible route based on assessing multiple datasets.

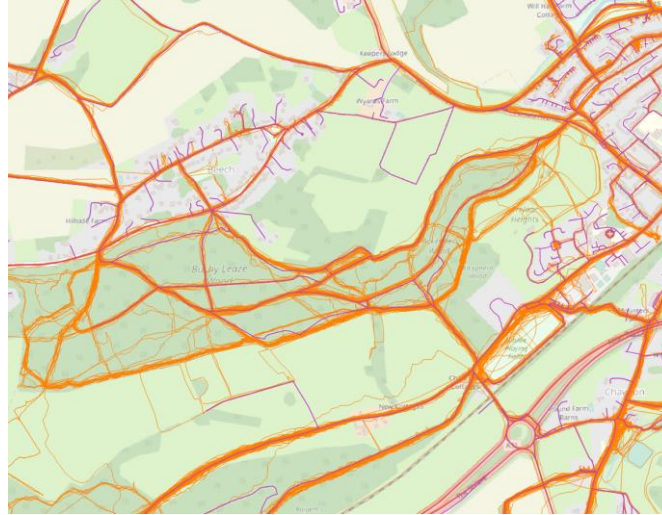
Challenge: to integrate multiple networks (conflation), incorporate new pathways (map construction), and provide rich attribution.



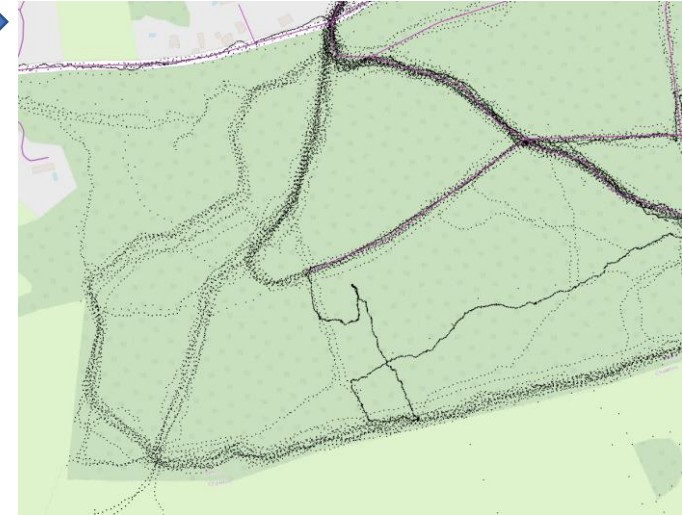
Enhanced data: Path presence


Map
Construction

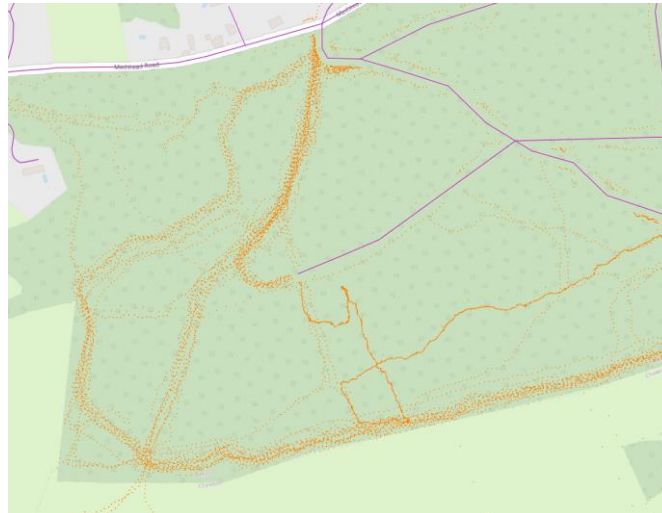
Stage 1: Identify
the GPS traces
that are using
unrecorded
pathways




Extract vertices 



 Remove
vertices <10m
from existing
OSM way



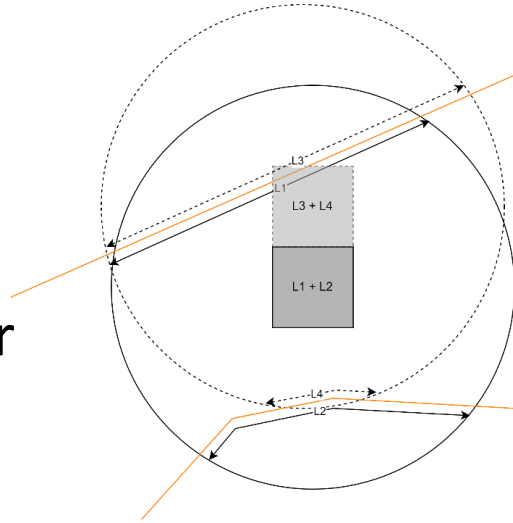
Reconstruct
routes (or
part routes) 



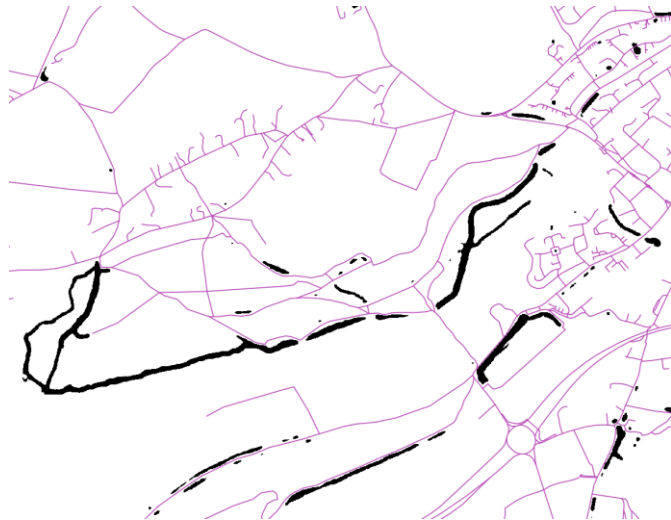
Enhanced data: Path presence

Map
Construction

Stage 2: Convert
multiple traces
to a single vector
line

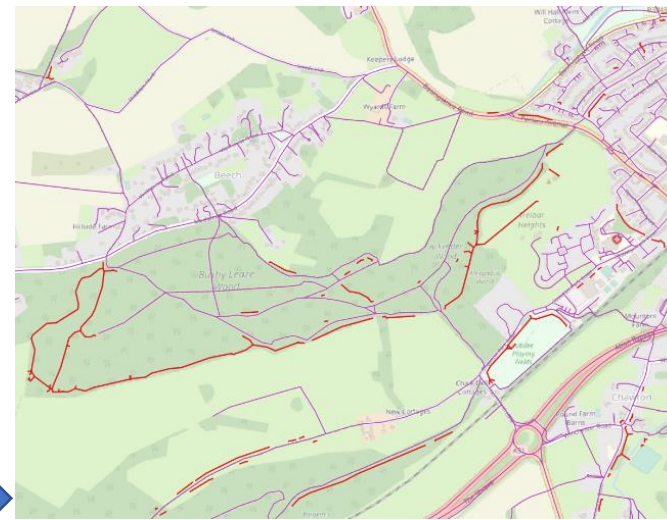


Generate line
density raster –
2m cells, 10m
neighbourhood
radius

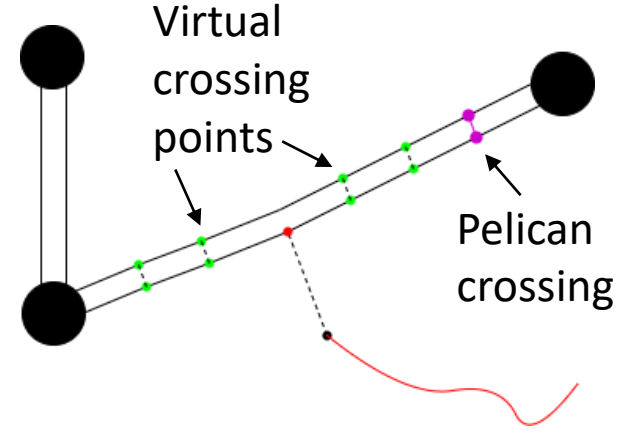
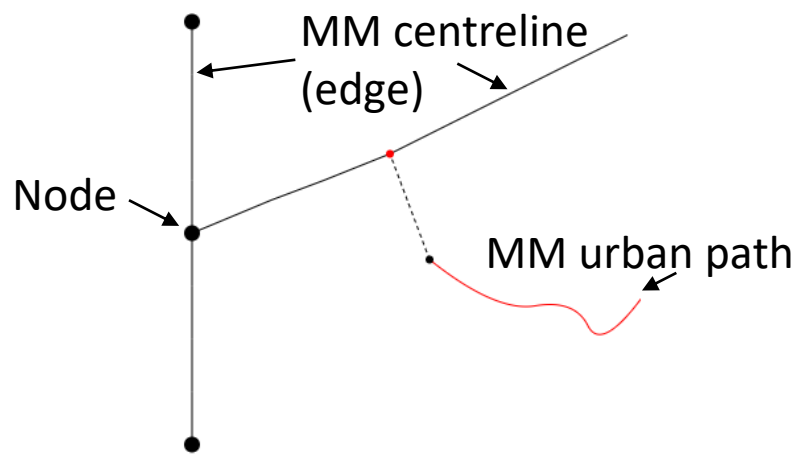


Create
binary raster
- apply a line
density
threshold

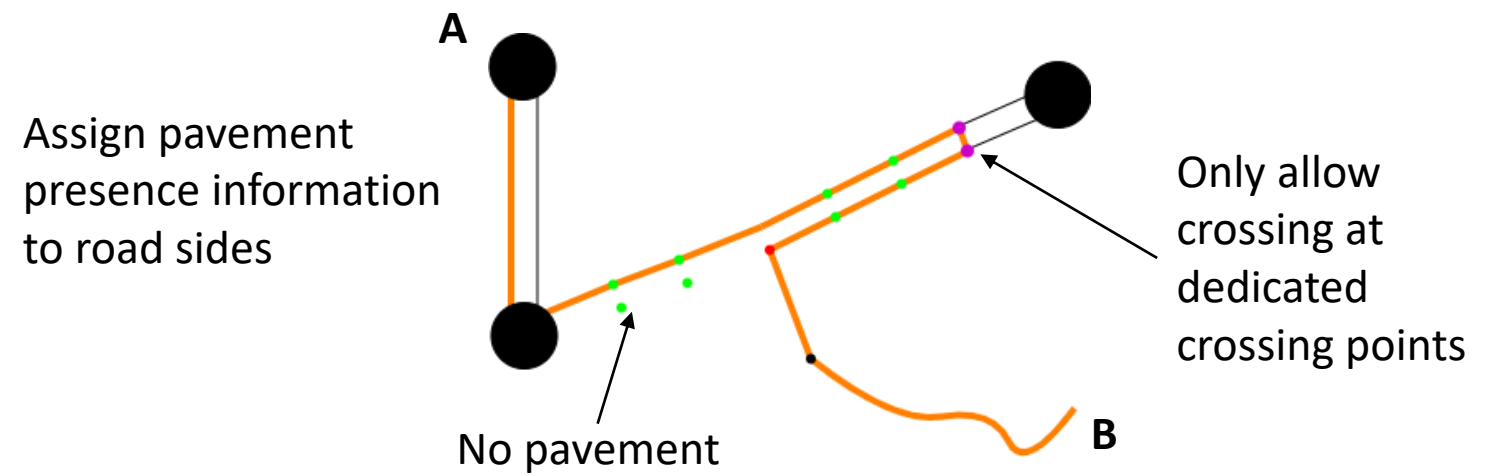
Skeletonize
raster to
vector line



Enhanced data: Two-sided links



Duplicate the edges and insert virtual nodes for crossing points



Enhanced data: Pavements

What is a pavement and how can pavements be extracted definitively from OS MasterMap?

No definitive 'pavement' attribute exists, certainly not one that contains widths / surface type and other Active Travel attributes.

“A pavement is a path with a hard surface, usually by the side of a road.”

Comparison of approaches:








ESRI methodology vs OS NGD approach






- Extending ESRI methodology beyond the COVID-19 use case
- Extra width thresholds, removing central reservations etc.



Enhanced data: Pavements

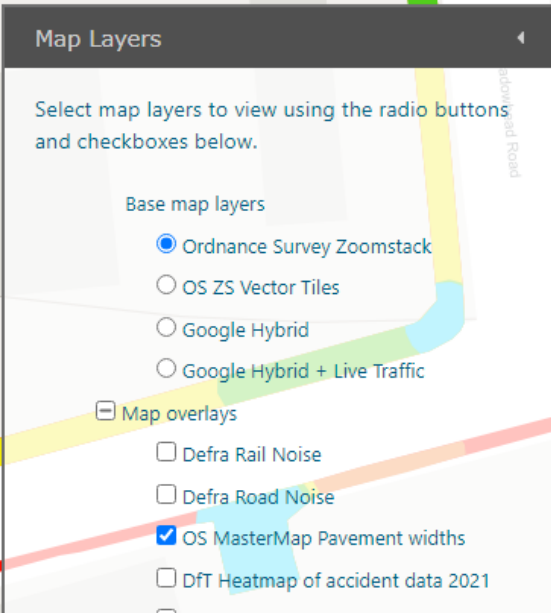


Enhanced data: Pavements

← → ↻ <https://ratin.geodata.soton.ac.uk/map/>       

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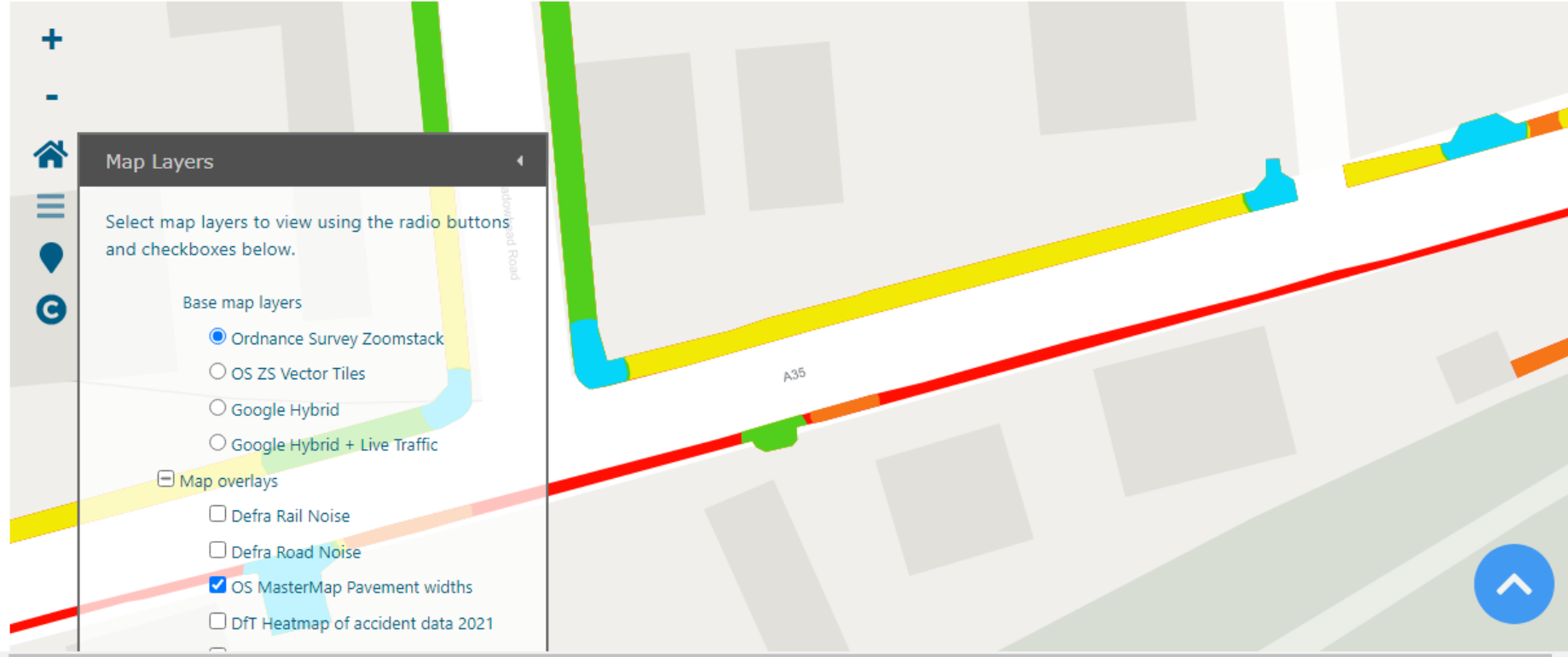
**Map Layers**
Select map layers to view using the radio buttons and checkboxes below.

Base map layers

- Ordnance Survey Zoomstack
- OS ZS Vector Tiles
- Google Hybrid
- Google Hybrid + Live Traffic

Map overlays

- Defra Rail Noise
- Defra Road Noise
- OS MasterMap Pavement widths
- DfT Heatmap of accident data 2021



The map displays a section of the A35 road with various pavement widths highlighted in different colors: green, yellow, blue, and red. The map interface includes a sidebar with navigation controls (home, layers, location, compass) and a search bar. The 'Map Layers' panel is open, showing the 'OS MasterMap Pavement widths' layer is selected.

Next Steps and Outcomes

Identify and develop an **automated methodology** to create an active travel routable infrastructure network (RATIN) based on features and attributes extracted from existing OS products enhanced by third party data.

Provide a **working demonstrator** presenting a viable approach to create a routable active travel network capable of unlocking a series of services expected by government policy (e.g. Gear Change) that are currently not served.

Develop and apply methods for enhancing the routable network with **additional attribution** to widen the set of potential use cases.



Questions?