STREET MOBILITY PROJECT
Walkability Models

LOOKING DOWN WHITEHALL FROM TRAFALGAR SQUARE.

IMAGE BY MARY HINKLEY © UCL MEDIA SERVICES – UNIVERSITY COLLEGE LONDON

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STREET MOBILITY PROJECT TOOLKIT: MEASURING THE EFFECTS OF BUSY ROADS ON LOCAL PEOPLE

This document contains information about one of the tools that we have developed so that local government and local communities can assess community severance in their area.

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WALKABILITY MODELS

What they are

Walkability models[1] predict how easy it is for people to reach the places they want to walk to. It should be noted that 'walkability' does not measure how pleasant it is to walk these routes, but it is a good indicator of the potential for people to make these journeys on foot. Most walkability models include three factors:

- Residential density: how many homes there are in the area, or how many people live in the area;
- Land use mix: the variety of destinations available for people to go to, and how many there are; and
- Connectivity: this assesses how easy it is to walk between two places in the area. It can use standard distances along pavements and paths, or the number of junctions there are in a standard area ('junction density'). Other models use space syntax[2] to assess this.

Some models also include other factors, such as public transport accessibility. This measures the fact that people are more likely to use public transport and less likely to drive if they are in closer proximity to bus stops or train stations.

Why they are useful

Walkability models can be used by local government to ensure that the conditions for pedestrians are particularly good (pavement quality, lighting, greenery, etc.) in areas that have high walkability, particularly if budget cuts prevent good conditions everywhere.

They can also be used to identify areas of community severance, where the effects of busy roads reduce the likelihood of people walking for local trips. Community severance occurs where areas of high walkability occur in the same place as busy roads. Local government may wish to use walkability models to identify these areas as places to reduce traffic speed or traffic volume, or to improve the number of crossings and the time they allow for pedestrians to cross the road.

Specific examples

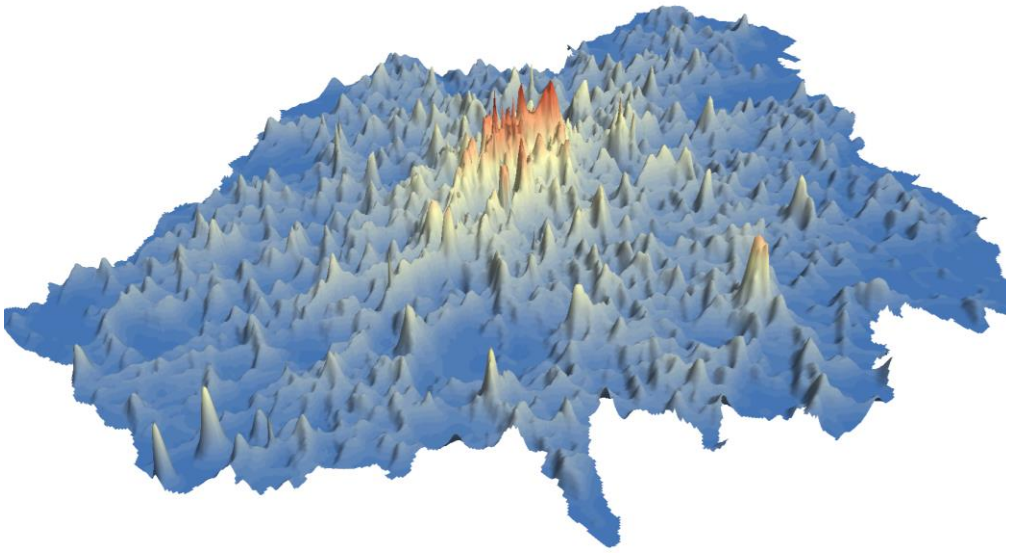
Two different walkability models for London have been created by members of the *Street Mobility and Network Accessibility* research team. Both have been validated using data on walking.

The walkability model developed by Dr Ashley Dhanani uses a multi-layered approach.[3] It measures land use diversity, taking into account all types of use, including all the floors in a building, as well as intensity of that land use, as well as public transport accessibility and office land use intensity. This means that the model includes a large variety and a high number of potential walking destinations. Street network accessibility is then assessed using space syntax[2] methods. The model represents walkability values as continuously varying, while most models use administrative boundaries for their data and modelling. See image below of whole London walkability model.

[1] Frank LD, *et al*. Linking objectively measured physical activity with objectively measured urban form - Findings from SMARTRAQ. *American Journal of Preventive Medicine*. 2005;28:117-125.

[2] See section on space syntax in this toolkit. Available at: www.ucl.ac.uk/street-mobility/toolkit.

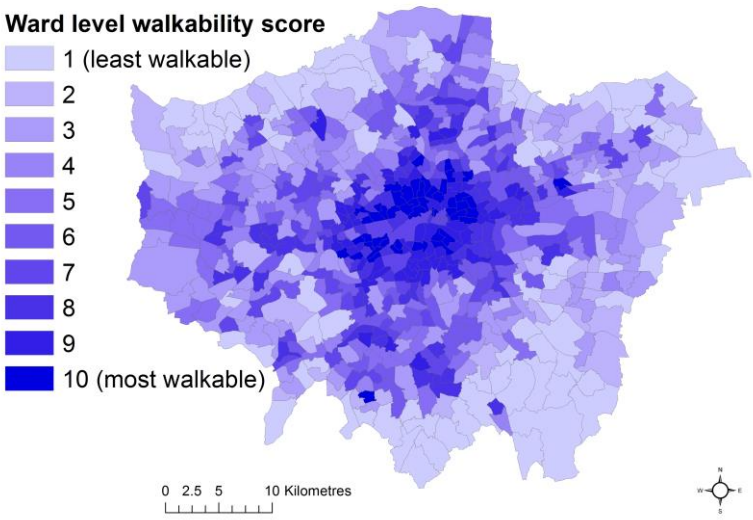
[3] Dhanani, A. N., & Vaughan, L. (2016). Towards a walkability model for strategic evaluation of policy action and urban active transport interventions. *48th Meeting of the Universities' Transport Study Group (UTSG), 48*. Available at: https://iris.ucl.ac.uk/iris/publication/1188700/1



LONDON WALKABILITY MAP COLOURATION: RED (HIGH WALKABILITY) TO BLUE (LOW WALKABILITY). HEIGHT IS ALSO RELATIVE TO WALKABILITY VALUE

This model has been proven to predict observed pedestrian demand (based on a large database of measured pedestrian activity across London), accounting for 82% of the difference in walking activity levels between areas. The model has also been produced for Birmingham (see case study below), and is currently being developed for the whole of the UK. The walkability models themselves are not publicly available, but for further information about the models, their applications and access to them please contact ashley.dhanani@ucl.ac.uk.

Dr Jemima Stockton's model is based on the first three factors listed above.[4] An Excel spreadsheet with the walkability score at local government, ward, or Census output area is available at at www.ucl.ac.uk/street-mobility/toolkit.



MAP OF WALKABILITY DECILE SCORES ACROSS LONDON CENSUS AREA STATISTIC WARDS, WITH A SCORE OF 1 INDICATIVE OF BEING IN THE LOWEST 10% OF WARDS FOR WALKABILITY

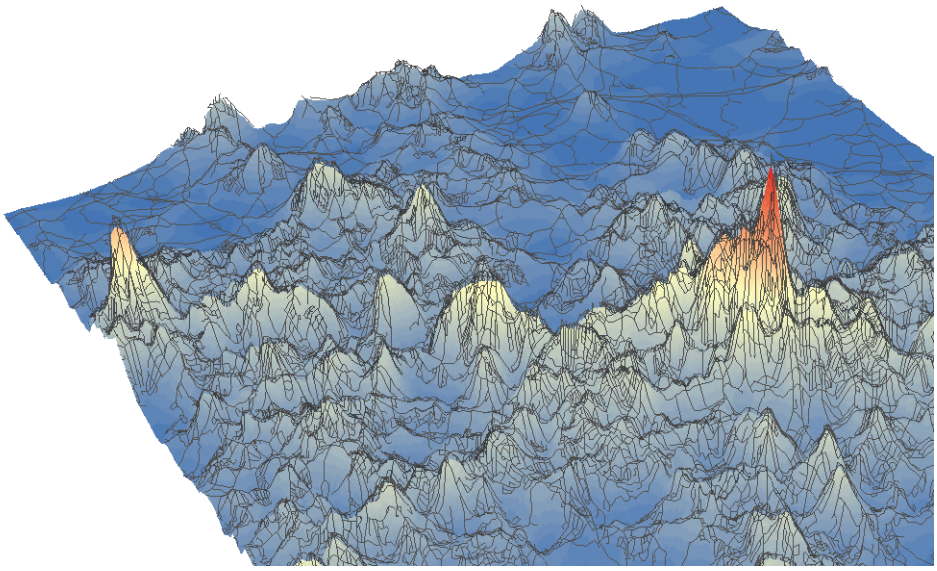
[4] Stockton JC, *et al.* Development of a novel walkability index for London, United Kingdom: cross-sectional application to the Whitehall II Study. *BMC Public Health.* 2016;16:416. doi: 10.1186/s12889-016-3012-2. Detailed maps of London for each of these administrative scales and more detailed explanations can be downloaded from http://discovery.ucl.ac.uk/1457527/

CASE STUDY: WALKABILITY MODELLING

Walkability modelling was used in several instances across the Street Mobility project. This section describes how it was used to identify potential areas with community severance. Birmingham was chosen as the location for one of the project's case studies. While the project team had some knowledge of Birmingham and local traffic issues, we needed to identify a small and appropriate location using objective methods that considered Birmingham as a whole, without any preconceptions about the city.

A walkability model was constructed to objectively assess the walking potential of all the streets in Birmingham and the surrounding area. The model accounted for transport accessibility, street network structure, land use diversity and residential density. It allowed us to assess the potential for walking to take place in every Birmingham street. To then understand the likelihood of community severance occurring, we added data on the volume of motorised traffic, the most likely cause of severance, (annual average daily flow (AADF) from the Department for Transport). This enabled us to identify places with both high motorised traffic levels and high walkability: these are locations where the traffic and pedestrians may come into conflict.

All areas that were in both the top 10% for walkability and top 10% for traffic flow were identified. These then formed the shortlist for possible case study locations. The locations were then examined in more depth, and discussed with people familiar with the areas. Using this process we selected Stratford Road, in south Birmingham, as a study area for the project. This demonstrated that the walkability model, when used in conjunction with other datasets, was a useful and valid approach for objectively identifying potential community severance.



BIRMINGHAM WALKABILITY MAP (ZOOM-IN, SHOWING CITY CENTRE PEAK). COLOURATION: RED (HIGH WALKABILITY) TO BLUE (LOW WALKABILITY). HEIGHT IS ALSO RELATIVE TO WALKABILITY VALUE.