

PCT Case Study: Going Dutch in Preston

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Introduction

This short case study explores the impact of Going Dutch in Preston, Lancashire. It uses the Propensity to Cycle Tool (PCT: www.pct.bike) to explore cycle commuting potential in Preston.

Preston was chosen because the lead report writer is familiar with the local area and because it is a flat, compact city where one might expect high cycling potential; although this potential is some way off being realised. The case study uses the 'Go Dutch' scenario to examine the potential for cycling locally and its benefits, and to consider where a priority route network might be for the Preston area, comparing this to existing cycle routes in the area.

About the PCT

The PCT is a Department for Transport-funded tool that uses information about current trip lengths and hilliness to identify trips that might be most easily switched to cycling. Currently, the tool uses travel to work data from the 2011 Census, which has origins and destinations for almost all commuters in England. The PCT provides a range of scenarios to explore cycling potential at area and route levels. This data is currently at the level of a Middle layer Super Output Area (MSOA), a unit of population of around 7500 people, with on average 3325 commuters. In time further data and more geographical detail will be used.

Data for the first wave of case studies was downloaded from the Propensity to Cycle Tool (PCT) as of 1st September 2016. Some of the underlying data may change slightly in future updates to PCT. In particular, an update to be applied in October/November 2016 will improve our estimates of route hilliness, and so reduce measurement error in modelling propensity to cycle, although we do not expect this significantly to change the model results.

About "Go Dutch"

The Go Dutch scenario uses Dutch likelihoods of cycling trips of particular length and hilliness, and applies this to English commutes. In other words, it adjusts for the effect of any land-use and topographical barriers to cycling, in the region in question. This means that Go Dutch provides an ambitious scenario under which we assume that infrastructural and cultural barriers to cycling have been overcome. Reaching Go Dutch potential is likely to require substantial investment in high quality cycling infrastructure and related programmes. The tool helps identify where an authority might wish to consider initially investing, to start unlocking some of this potential.

For Lancashire as a whole, the PCT methodology allows the calculation of regional cycling potential. While Lancashire's cycle commuting rate was 2.3% in the 2011 Census, the county has cycling potential of 19.5% using the Go Dutch scenario. As the county is hilly, the even more ambitious E-bike scenario (which adds in the use of e-bikes for longer or hillier trips) has a substantially higher cycling rate, 27.2%.

Achieving "Go Dutch" in England

The PCT helps authorities decide *where* to build, but does not in itself tell us *what* to build. However, achieving Dutch cycling propensities anywhere in England is likely to require substantial change in planning for cycling, including concentrating on the stated and revealed preferences of under-represented groups (Aldred et al, 2016). The shift required is fundamentally two-fold: including both

a greater focus on substantial separation from motor traffic and on creating routes that are as flat and direct as possible (given limitations imposed by local topography).

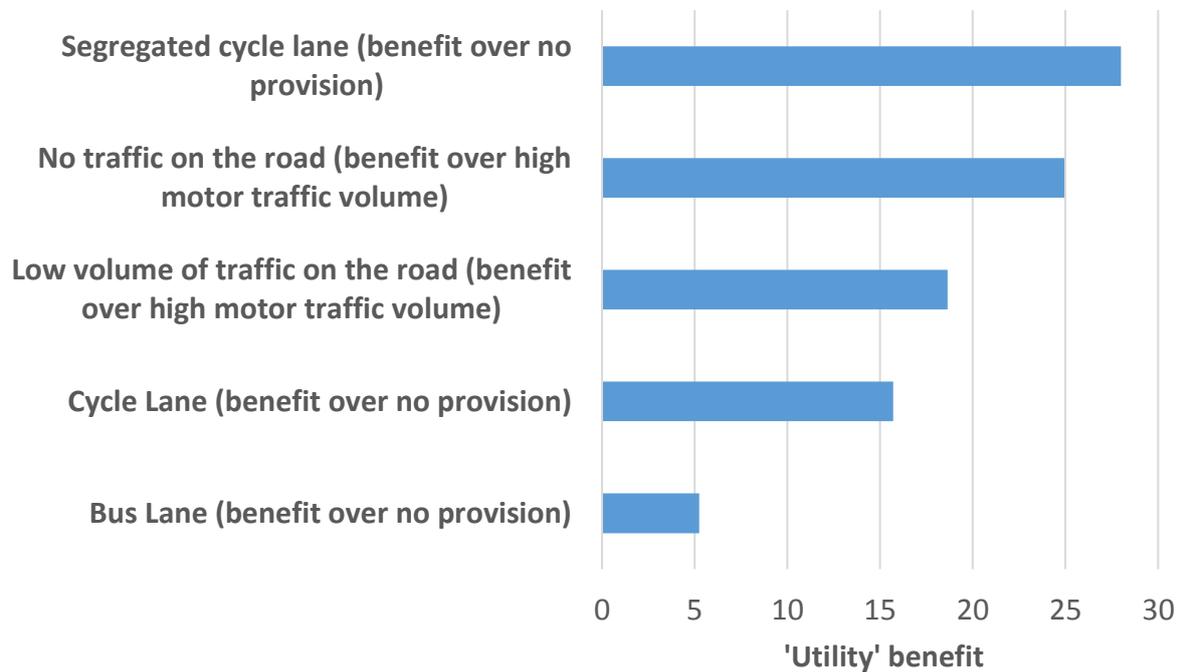


Figure 1: preferences for different infrastructure types (adapted from TfL 2010)

The figure above illustrates the 'gold standard' of provision: cycle lanes segregated from motor traffic, or else routes completely or very substantially separate from motorised traffic. Broadly speaking, this corresponds to three different types of route: segregated infrastructure on main roads, residential streets from which almost all motor traffic has been removed, and 'Greenway' routes through parks or other traffic-free corridors. Painted cycle lanes and bus lanes, traditionally key components of English cycle networks, score relatively poorly in this and other research.

While moving kerb lines, drainage, etc. often appears dauntingly expensive, it is much cheaper than big-budget highway schemes, also generating health and carbon benefits (which can be monetised for business cases). It may also often be possible to introduce low-cost schemes, potentially on a trial basis. In Kingston-upon-Thames, for example, a bi-directional cycle track has been built very quickly and cheaply using bolt-down plastic 'kerbing', while in Waltham Forest road closures were introduced on a trial basis using temporary street furniture. In Canadian cities including Vancouver and in Calgary, cones, planters, and temporary bollards have all been used to create segregated cycle tracks on busy roads. These tracks have often quickly become busy with a relatively diverse group of cyclists, evidencing a strong suppressed demand for cycling, despite the cultural, topographical and weather-related challenges these cities experience.

More broadly, TfL (2014) found that a consistently positive mindset towards cycling (for all ages and abilities) characterises successful cycling cities. Such cities do not, for example, use the 'Cyclists Dismount' and 'End of Route' signs commonly found in England, nor do they place barriers on cycle routes that exclude those using non-standard cycles. Successful cycling cities still struggle with perennial problems, such as relocating car parking, but these are challenges rather than intractable barriers to creating good quality cycle infrastructure (TfL 2014).

Going Dutch in Preston, then, is likely to require a step-change in the infrastructure provided for cycling. The PCT can help identify where to prioritise building such infrastructure. For example, looking at the A6 (a key desire line for high quality infrastructure), South of Broughton would be an obvious priority, with a continuation North of Broughton less urgent, at least from a cycle commuting perspective.

About how trips are routed

The PCT uses the Cyclestreets.net routing algorithm. This is used by individual cyclists for journey planning, but it can also be used to route a series of trips. Cyclestreets provides both 'fast' and 'quieter' routes, and comparing these (in terms of distance and hilliness) can help provide information about the quality of a network. Analysis conducted for the PCT project has illustrated how propensity to cycle declines as distance and hilliness rise. As we know that cyclists will preferentially choose quieter routes, this implies that where such routes are longer and/or hillier than busier alternatives, cycling demand will be suppressed.

Analysis conducted for this report

The analysis conducted for this report uses the .csv and .geojson downloads available from pct.bike, downloaded into free QGIS software and into Microsoft Excel.

About Preston

Preston is the county town of Lancashire, in North-West England. Granted city status in 2002, it has a population of just over 140,000 residents, of whom approximately 60,000 are regular commuters. As a district, the City of Preston is largely flat although its highest point, the summit of Beacon Fell, is 266 m (873 ft) above sea level.

Cycling levels in Preston have fallen, from 2.9% in 2001 to 2.5% in 2011. Over 80% of cycle commuters in 2011 were male. Cycle routes in Preston are shown below (Figure 1). Green routes include the relatively new and mostly motor-traffic-free 'Guild Wheel' which encircles the city, while red routes largely comprise painted advisory or mandatory lanes on busier roads, or on quieter lanes marked as cycle routes.



Figure 2: Red route - advisory cycle lane, A6, Garstang Rd (Google Maps)



Figure 3: Green route - Preston Guild Wheel. Picture: Lancashire County Council

<http://www.lancashire.gov.uk/leisure-and-culture/cycling/cycle-routes.aspx>

The very pale green routes shown on the map are major roads, including for example the A6 which is the main route North out of the city. It is incidentally the first British road to be bypassed by a motorway (the M6; originally the Preston bypass, marked in blue to the East).

Cycling routes

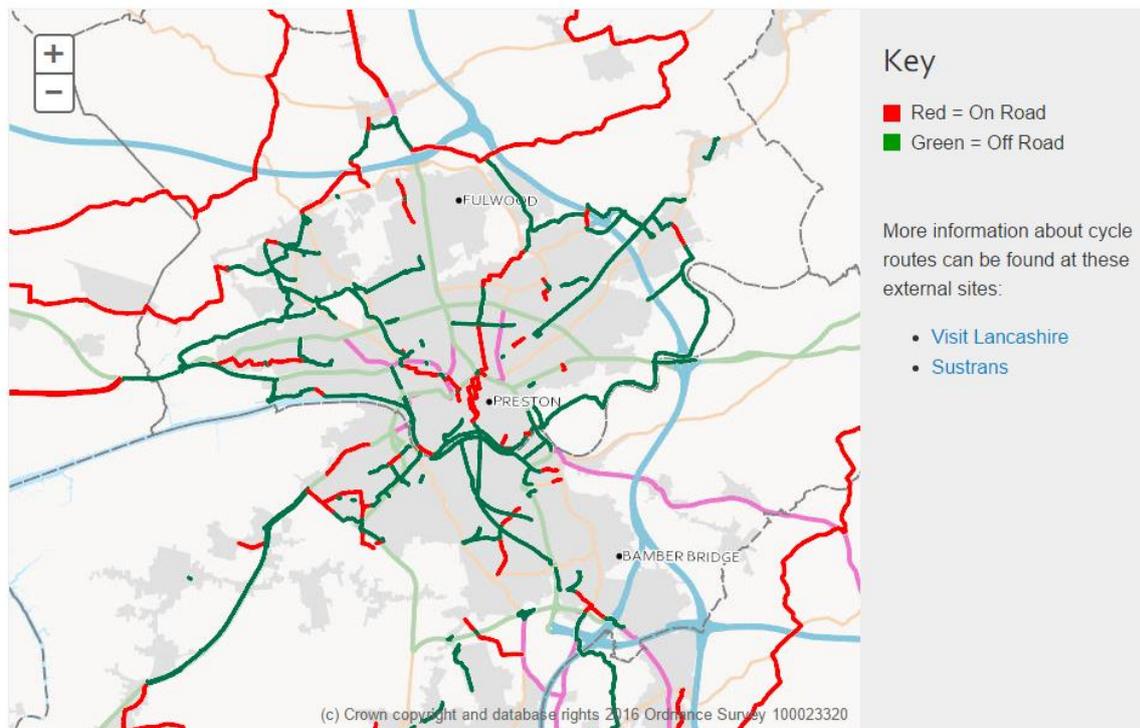


Figure 4: Lancashire County Council Cycle Map

Commuter Cycling in Lancashire: area level data and co-benefits

The figure below illustrates the current (Census 2011) distribution of commuter cycling in Lancashire. The highest-cycling areas are concentrated around the urban centres of Lancaster, Preston, and the Fylde towns, with the more rural and hillier areas unsurprisingly lower. Even so, no MSOA has cycling rates of over 7%.

Current cycling levels

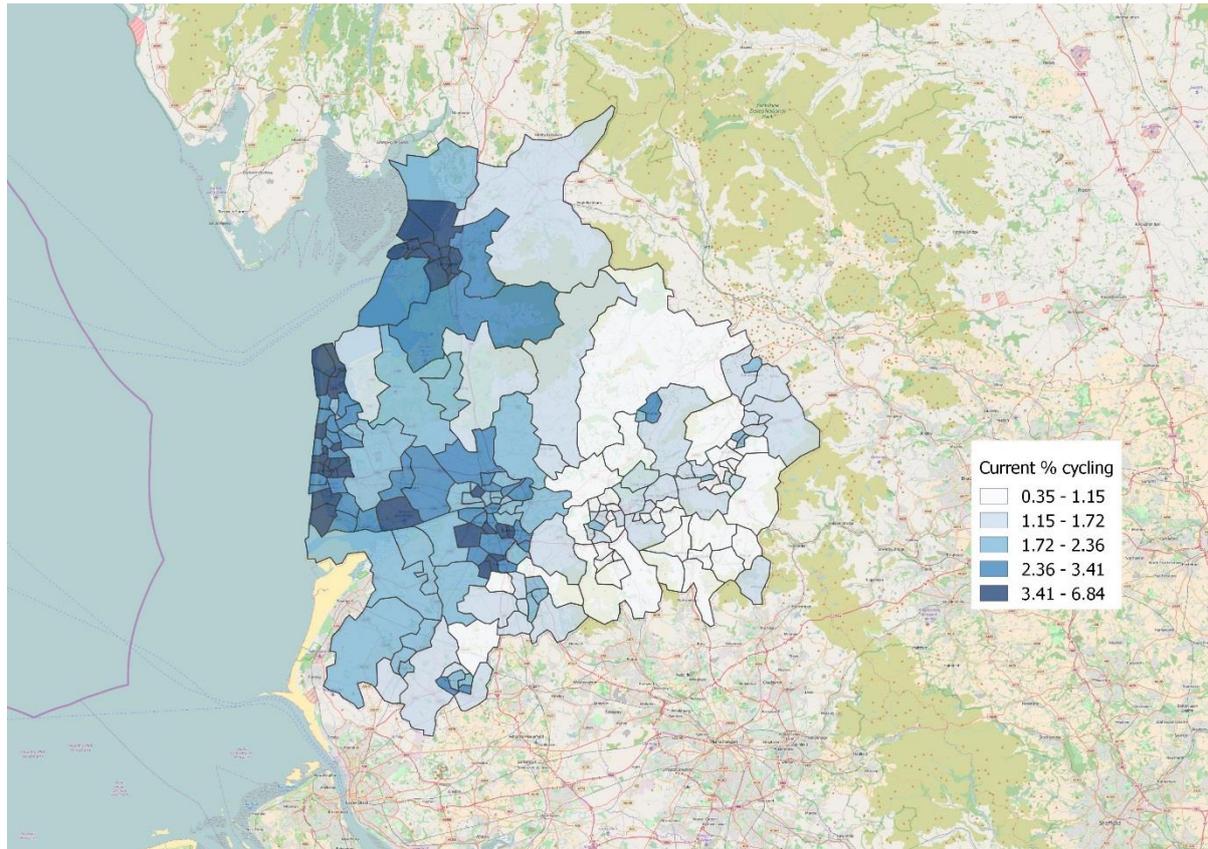


Figure 5: Commuter cycling in Lancashire, 2011

'Go Dutch' cycling levels

Using the 'Go Dutch' scenario, the hotspots do not substantially change, although there are more local hotspots towards the East of the area (corresponding to some smaller market towns). Preston, Lancaster and even more so the Fylde towns stand out as having very high potential – in some MSOAs the potential exceeds a third of commute trips.

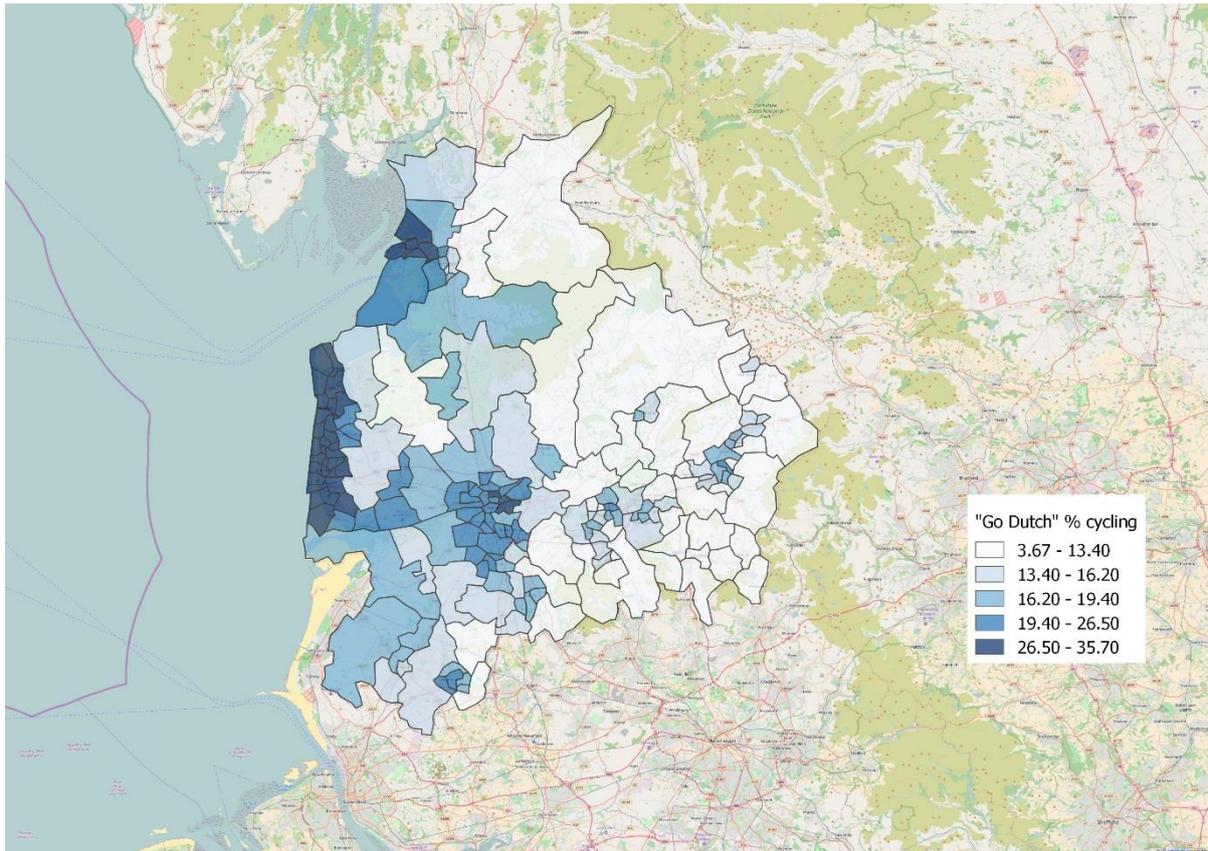


Figure 6: 'Go Dutch' scenario, Lancashire

'E-bike' cycling levels

While this report focuses on 'Go Dutch' cycling levels, the 'e-bike' scenario is presented briefly to illustrate the potential impacts of mass take-up of e-bikes alongside infrastructural and other improvements. The e-bike scenario adds to 'Go Dutch' the assumption that e-bikes will be used for some longer and hillier trips, based on Dutch data (on the use of e-bikes for longer trips) and Swiss data (on the use of e-bikes for hillier trips). Cycling levels increase substantially in the more sparsely populated, hillier rural areas of the county – to over 10% in all MSOAs. This also affects some Northern areas within the Preston boundary.

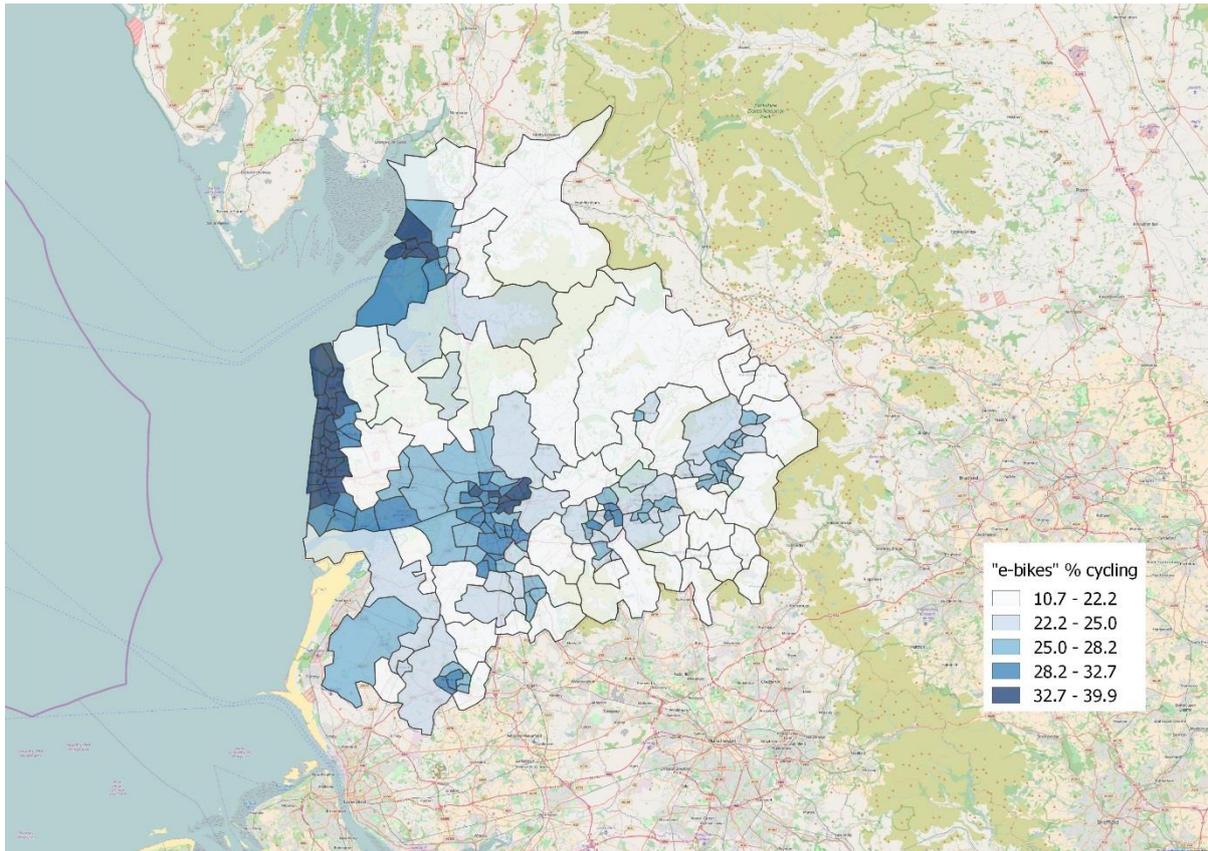


Figure 7: e-bike scenario, Lancashire

However, while the e-bike potential might represent a longer-term vision, the urban area of Preston itself already has high potential just with ‘Go Dutch’. It is also likely that getting more cycling from the hilly and rural areas will necessitate fixing infrastructural and other problems that currently deter people from cycling in the city itself.

Health benefits of ‘Go Dutch’ cycling levels

Many English areas, including Lancashire, face substantial health challenges related to low levels of physical activity. This has led to a chronic disease burden with major impacts on individuals, carers, families and local health care services. Guidance from organisations including the National Institute for Health and Care Excellence and Public Health England suggests that one of the most effective ways to increase physical activity is to get more people taking up active travel (walking and cycling), as this can become a habit built into everyday life and is cheap or free.

We are using a modified version of the WHO’s Health Economic Assessment Tool to calculate health benefits. These are affected by (a) numbers of commuters and of potential cyclists, (b) current age structure of local populations, and their health, (c) where the new commuters come from (e.g. from driving or from walking, another active mode), and (d) the length of the commutes. Some of the more deprived areas around Preston and the Fylde have particularly large health benefits, while for the more affluent and lower-cycling-potential rural areas this is smaller (but still substantial).

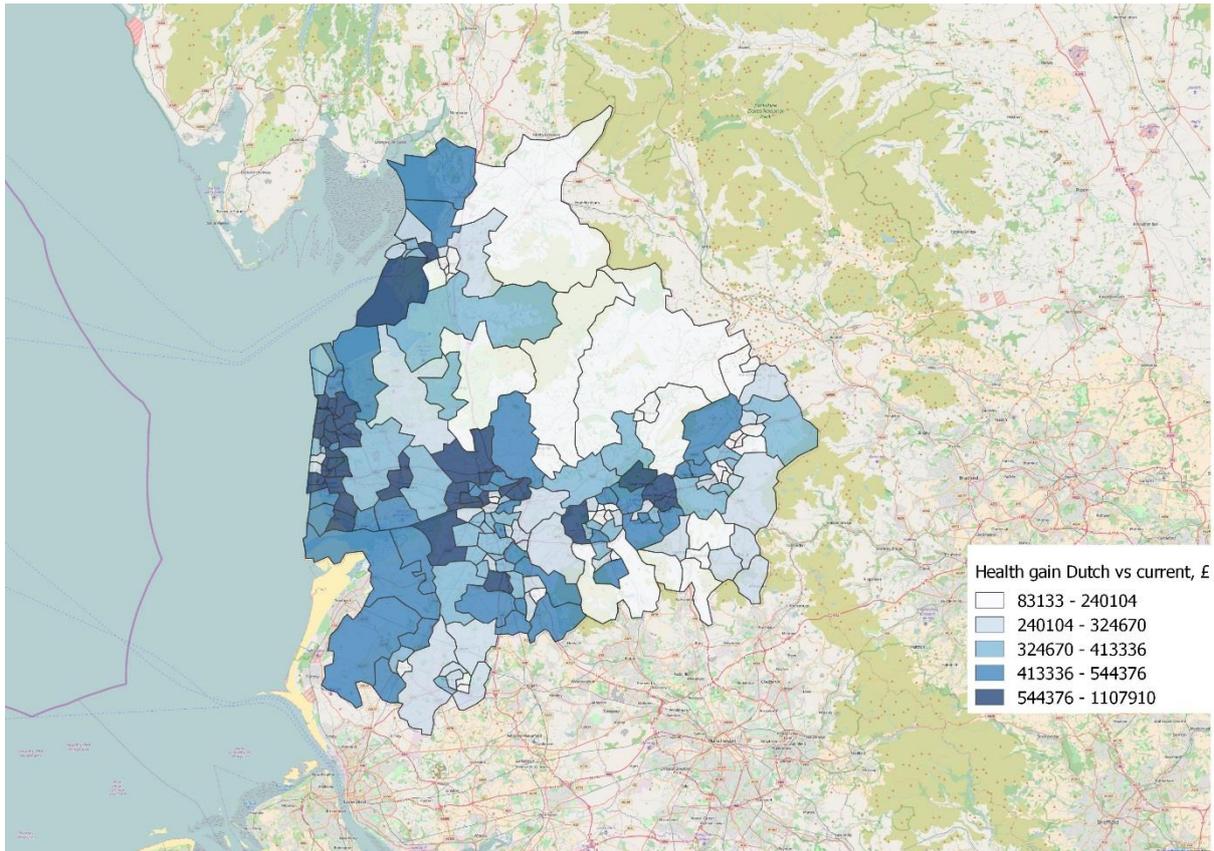


Figure 8: Annual health gain from Go Dutch scenario

Carbon reduction benefits of 'Go Dutch' cycling levels

The tool also calculates carbon reduction benefits from increasing cycling. This depends on the reduction in car journeys, the length of these trips, and hence the subsequent reductions in CO₂ emissions. Here the image is almost reversed: in the more affluent areas out to the North and East of the authority, even though numbers of potential cyclists are lower, carbon benefits are particularly large because currently many of these journeys are made by car (and because distances are relatively long).

The differences between the two maps illustrate how priorities for investment may differ, depending on whether an authority seeks (a) to maximise cycling uptake, (b) to maximise health benefits, or (c) to maximise carbon reduction.

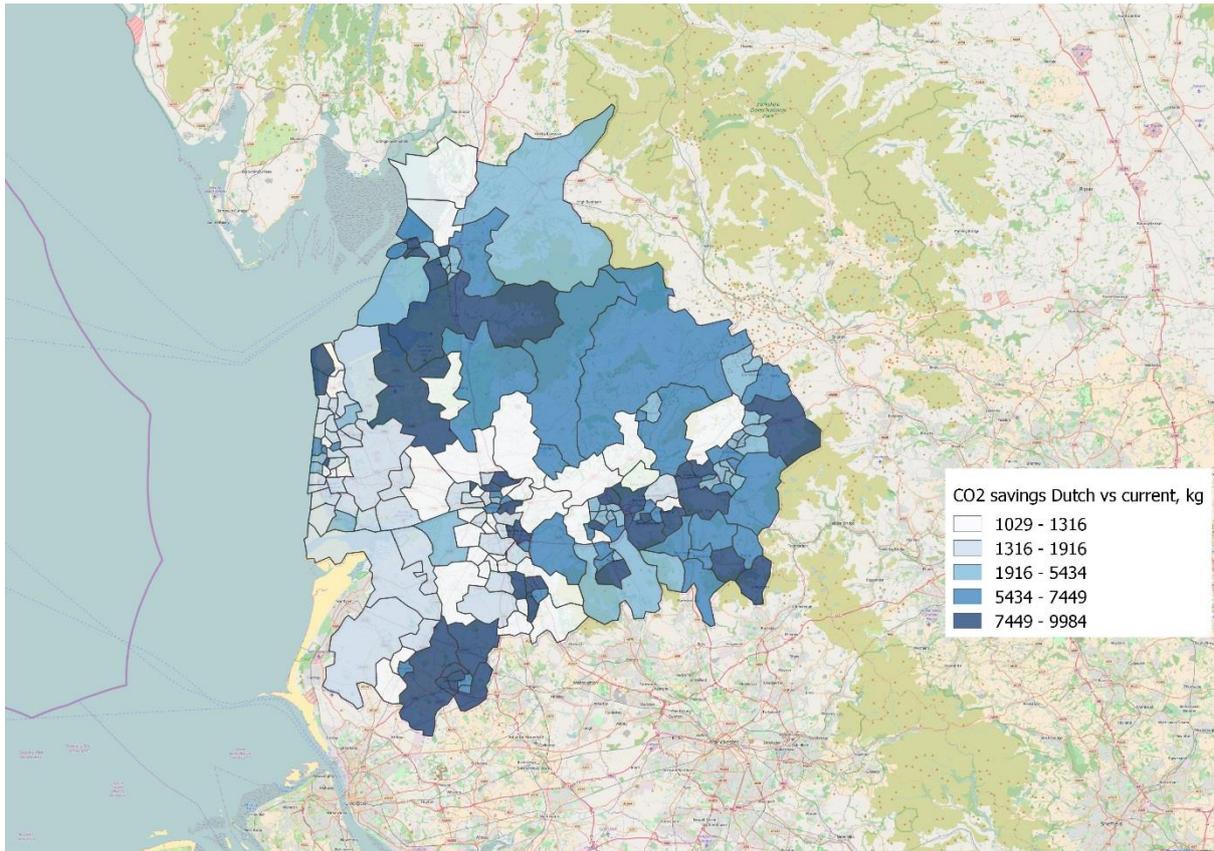


Figure 9: Annual carbon savings from Go Dutch scenario

Commuter Cycling at Route Level, with a focus on Preston

We now move to consider more closely the Preston area. The area chosen includes all Preston MSOAs, plus the adjacent South Ribble MSOAs (to also capture commutes from just South of Preston into the city and vice versa).

Current cycling desire lines

By 'desire lines' we mean crow-fly routes between origins and destinations. Current cycling desire lines within the Preston area are shown below, with the darker lines representing higher numbers of cycle commuters. These are concentrated towards the South of the district, with similar flows between South Ribble and Preston.

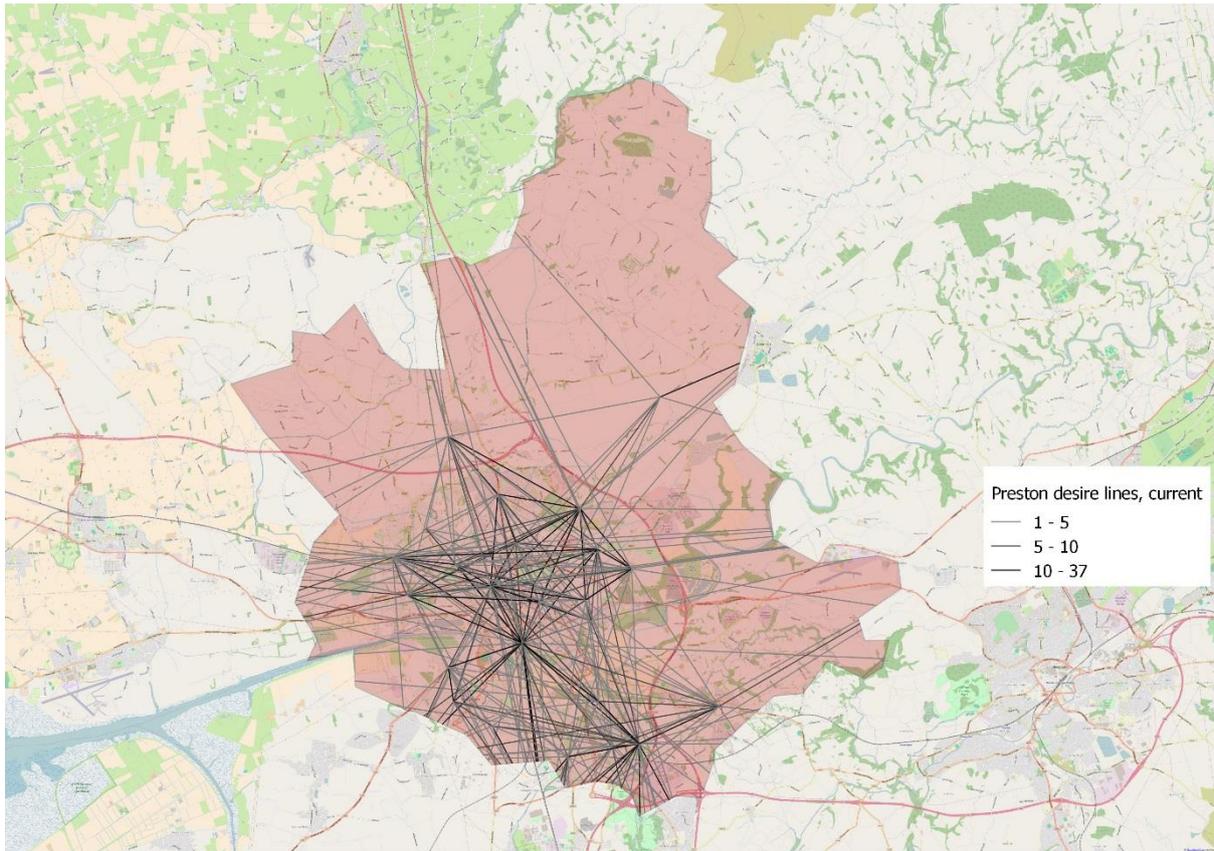


Figure 10: current cycling desire lines, Preston area

'Go Dutch' desire lines

How do the desire lines change under the 'Go Dutch' scenario? The numbers increase substantially, in some cases more than tenfold. Key desire lines are still concentrated in the South-West of the study area, but with towns such as Longridge and Goosnargh, currently with very low cycling rates, also highlighted.

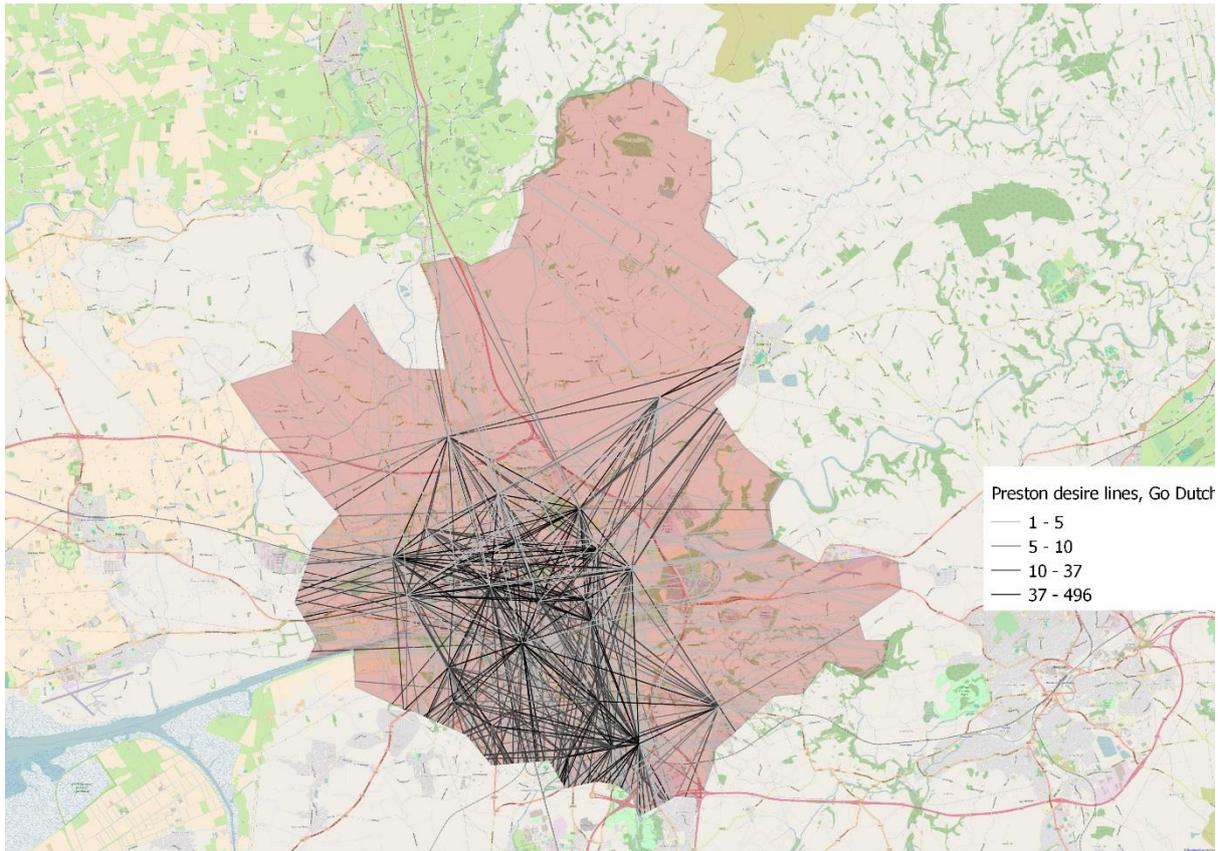


Figure 11: 'Go Dutch' cycling desire lines, Preston area

Fast routes

The figure below shows these desire lines mapped onto the fastest routes available for cycling in the Preston area. Note that only cycleable routes are included so, for instance, the routes will not include the motorways or parks through which cycling is forbidden.

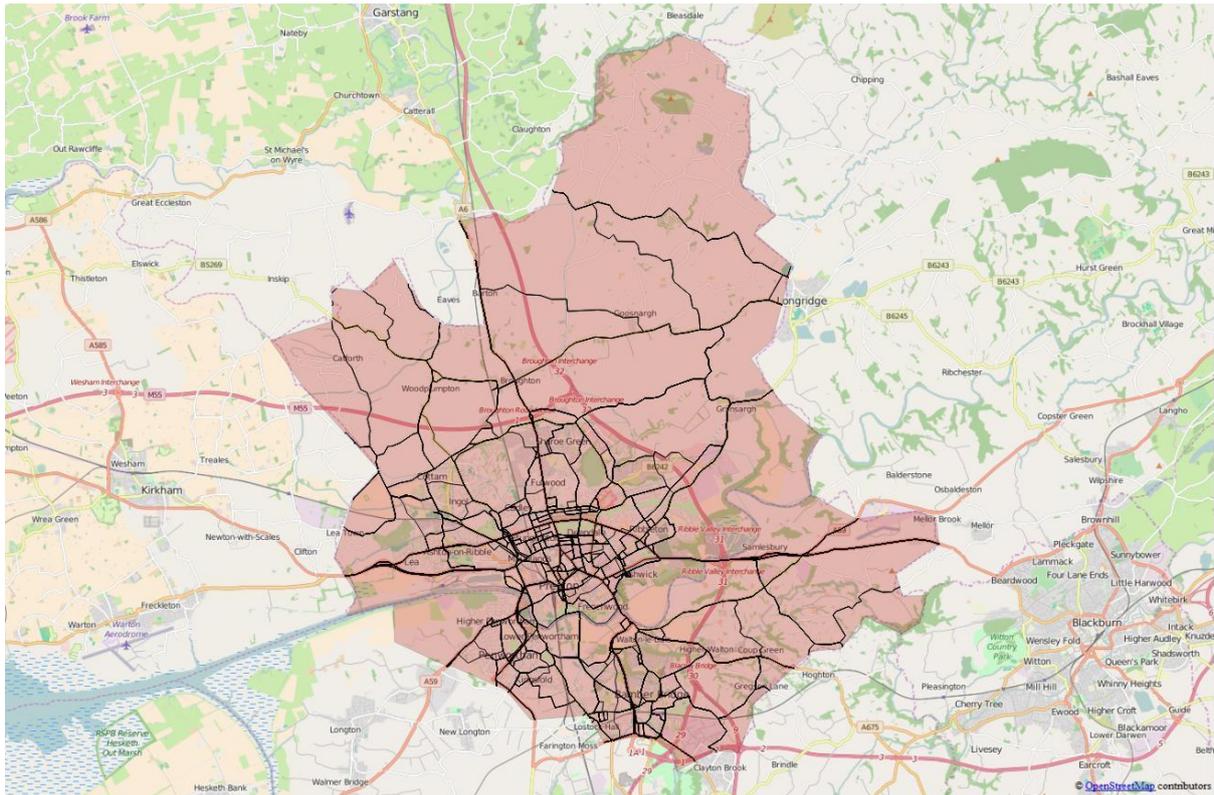


Figure 12: desire lines mapped to fastest cycling routes, Preston area

Below these cycling routes are shown against the cycle network in the Preston area (according to OpenCycleMap). It can be seen that some sections of cycle network do not correspond to any commuting routes, although some do.

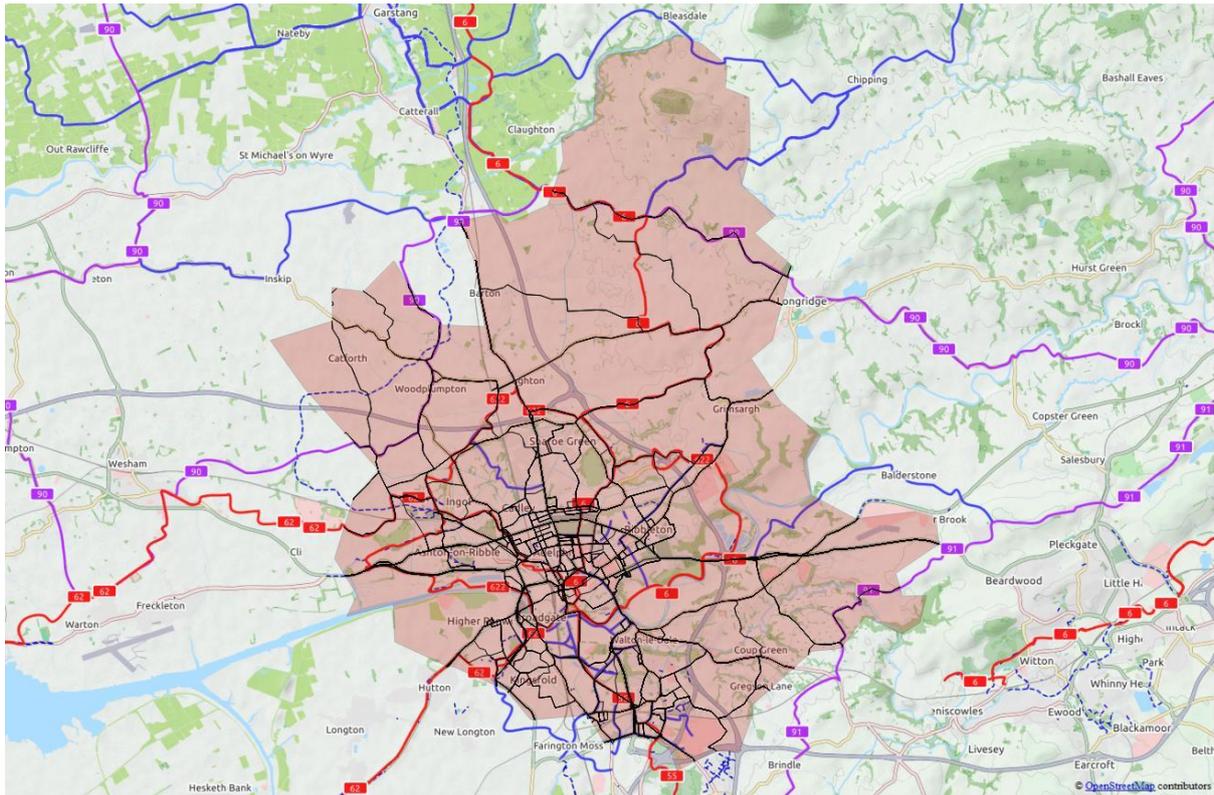


Figure 13: fastest cycling routes and cycle network, Preston area

Quiet routes

By contrast, there is more similarity between quieter recommended cycle routes (according to Cyclestreets.net) and the local cycle network, such as some of the quieter rural streets and the Guild Wheel shown above. The quieter routes will for example avoid the A6 and detour along residential streets through Fulwood (although some may still suffer from high levels of through motor traffic, where drivers are also avoiding the A6).

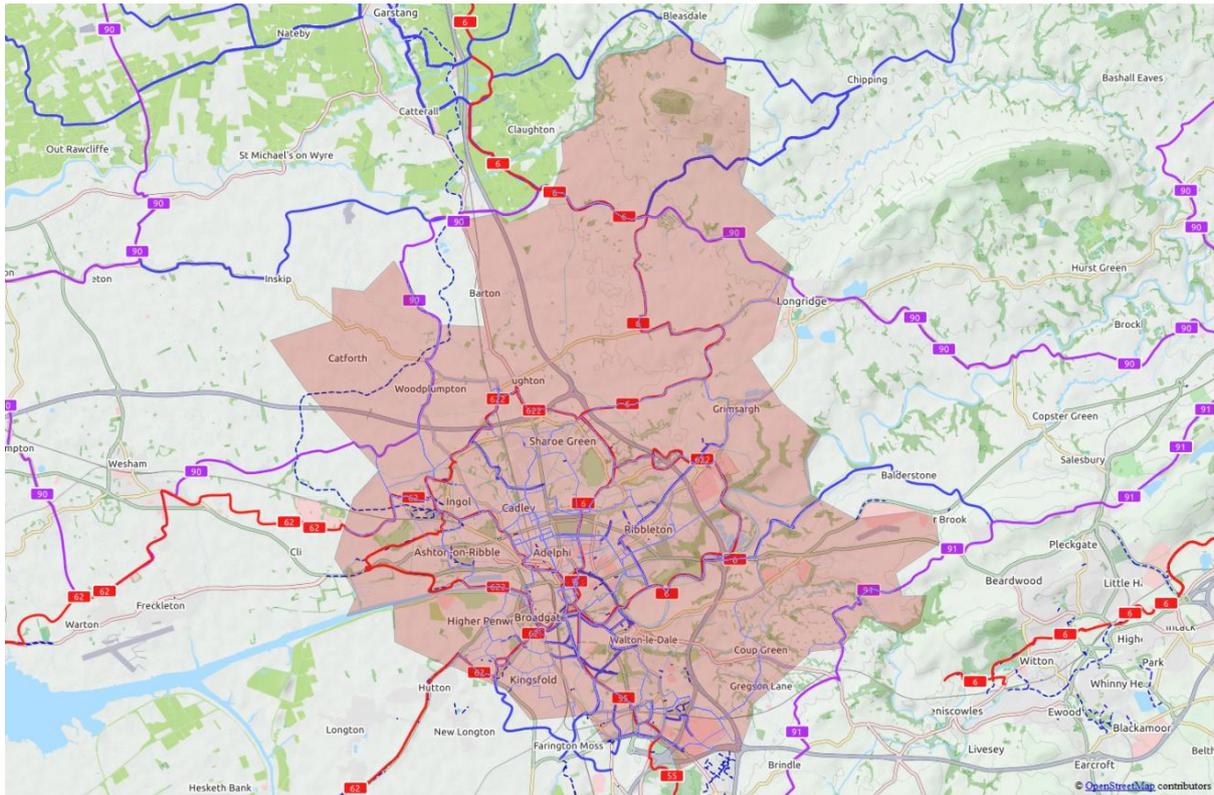


Figure 14: quieter recommended routes and cycle network, Preston area

In terms of length the Guild Wheel makes up a substantial proportion of the cycle infrastructure near and within Preston.

As described in a publicity leaflet, the Wheel was primarily created for leisure purposes. It is

‘a 21 mile circular route that takes you round the city of Preston. You can use it for walking, running and cycling or in your mobility scooter or wheelchair. The Wheel is best enjoyed at a slow pace stopping off at attractions and cafes on the way. It is also great for short walks and cycle rides’.¹

It is perhaps not surprising that at least the Southern half of the Guild Wheel in particular does not correspond closely to commuter routes, although the Northern half does connect with some potential and existing alternative commute routes into Preston.

How well does the existing network serve current and potential cycle commutes?

One way of measuring network quality is included in the Dutch CROW manual. This suggests a ‘detour factor’ as a way of measuring directness (or lack of it). The detour factor is the distance between two points on the network, divided by the distance as the crow flies. 1.2 is the recommended target, with detour factors recommended not to exceed 1.4-1.5².

Using the ‘quiet route’ origin-destination pairs for the whole of Lancashire, it can be seen that very few are below 1.2, while around half exceed 1.4. Over a third exceed the Dutch upper limit of 1.5.

¹ <http://www.lancashire.gov.uk/leisure-and-culture/cycling/guild-wheel.aspx>

² <http://www.cycling-embassy.org.uk/wiki/network>

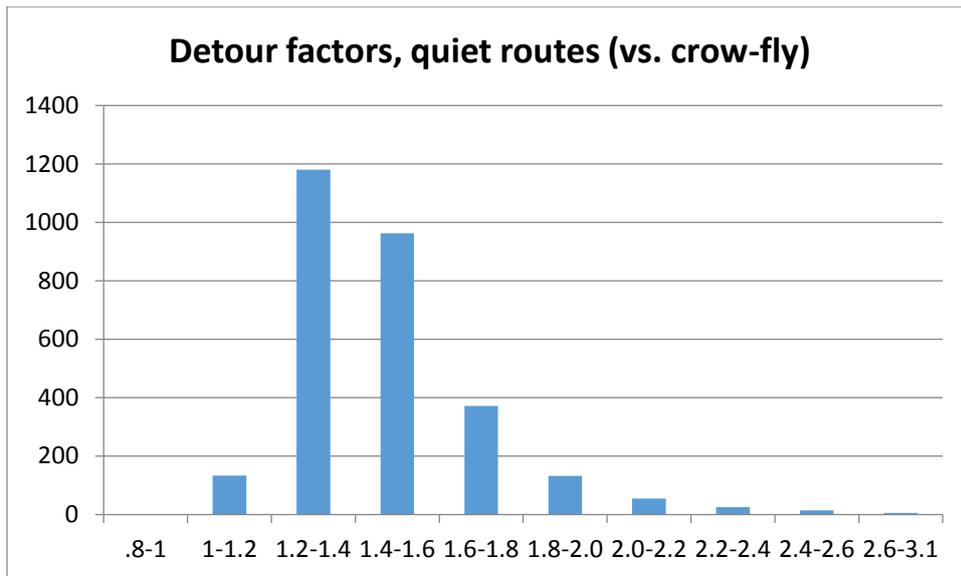


Figure 15: detour factors, quieter routes

Why does this matter? Where cycling time and distance are lengthened, cycling potential is suppressed, disproportionately affecting under-represented groups such as women (as noted above, four in five cycle commuters in Preston are male). Analysis conducted as part of the PCT has shown:

‘If a quieter route creates a detour such that a 2 mile trip becomes effectively a 3 mile trip, younger men’s propensity to cycle the route will decrease 11%. But for younger women, the decline is 19%, and for older adults (60+) the propensity would decrease by 35%.

This hits women’s and older men’s cycling twice: they are less likely than men to want to cycle the direct route, but then are also less likely to be willing to cycle an effectively longer alternative route. It’s likely to be part of the reason for disparities in cycling by age and gender.’³

Sketching out a priority route network

The model also allows us to estimate cycling potential along specific route sections. This uses the fastest routes; based on the assumption that to achieve ‘Go Dutch’ levels of cycling it will be necessary to create safe cycle routes that provide the most direct route possible to destinations.

The image below shows the ‘Go Dutch’ cycling desire lines aggregated to the route network: the thicker lines represent higher flows. For example, the A6 South of Broughton has a modelled flow of 500-600 cycle commuters. These thicker lines could be seen to represent a core priority network, generating substantial health benefits. By contrast the thinner lines to the North-East of the Preston district could be seen as less crucial (although they potentially become more important in the more ambitious e-bikes scenario; and they provide relatively high carbon reduction benefits).

³ www.pct.bike

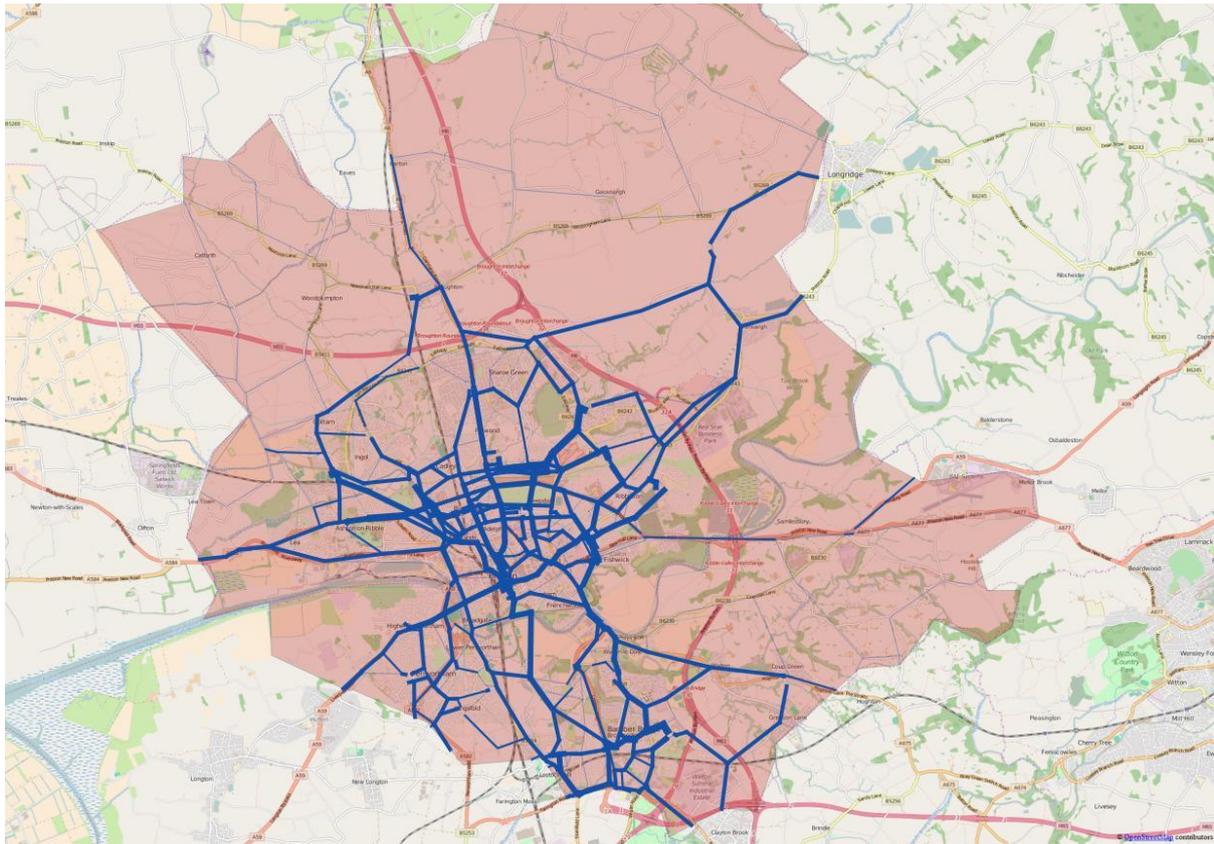


Figure 16: route network based on 'Go Dutch' scenario, Preston area

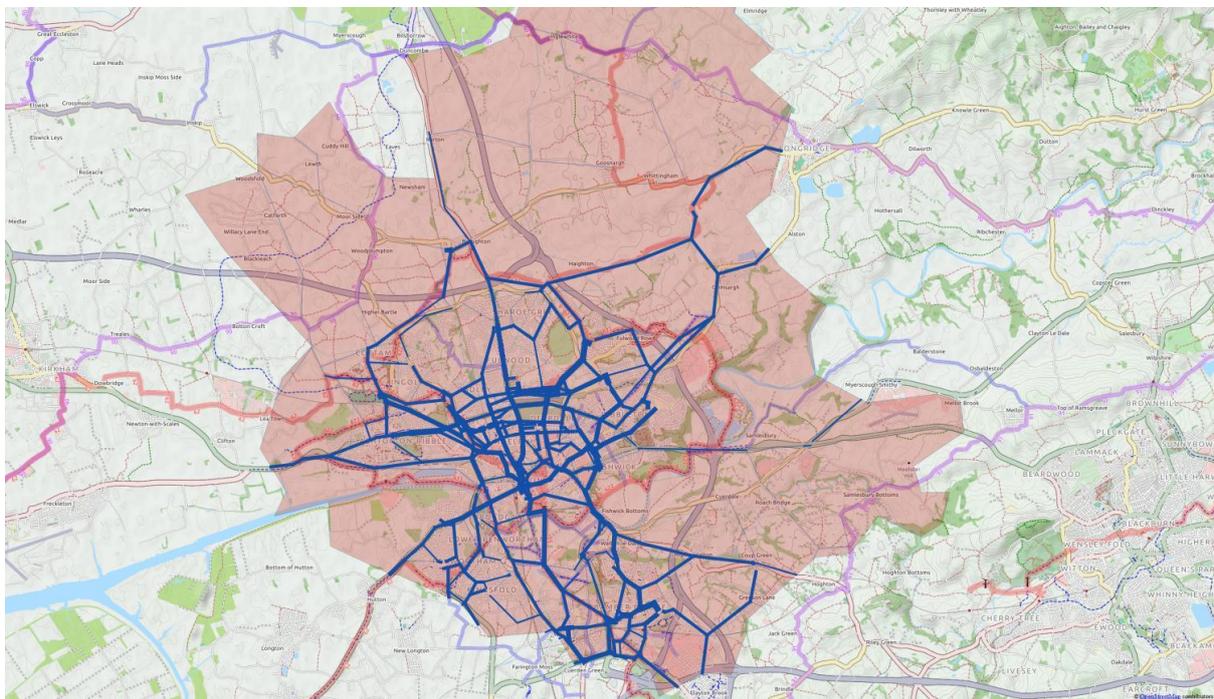


Figure 17: 'Go Dutch' route network against existing cycle routes, Preston area

Conclusion

Within Lancashire, Preston and its surrounding urban areas represent relatively strong cycling potential. Clearly there are substantial barriers to cycling, as shown by the decline in commuter cycling between 2001 and 2011 (from an already low base). The recently constructed Guild Wheel is

a scenic route, which encircles the city, providing access to leisure walking and cycling. However, this report suggests that its utility for commuter cycling is likely to be relatively low, particularly the Southern part of the Wheel near the Ribble. Key commuter desire lines are radial rather than orbital; moreover maximising commuter cycling uptake depends upon route directness.

Building for Dutch-style utility cycling is therefore likely to require tackling the arterial routes, such as the A6, and routes between Bamber Bridge and Preston; creating consistent, high-quality infrastructure along these. This should be supported by feeder routes along residential streets where cycling and walking are prioritised over motor traffic. This fundamentally involves removal or substantial reduction of through motor traffic, but should also include exploring the possibility to increase access both to cycles and to cycle storage, particularly in low-income neighbourhoods and/or those characterised by flatted or multiple occupancy housing.

Were such changes to be considered, the PCT can be used in preparing a business case; the updated user manual and second wave case studies will discuss this further. Based on our scenario cycling potential, we can directly calculate possible health and carbon gains. The PCT-generated data can further be used to calculate decongestion and absenteeism benefits, using the formulae given in WebTAG (transport appraisal guidance from DfT), and to calculate journey quality benefits.

References

The Propensity to Cycle Tool: www.pct.bike

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