6. Cycle Network Development

6.1. Introduction

This chapter summarises the identification of the cycle network for Guildford Borough.

The proposed network aims to address gaps in Guildford Borough's strategic cycling network to connect urban areas and settlements, to each other and to key destinations (such as railway stations).

The development of the cycling network had two key stages:

» Development of the 'aspirational cycle network', which identified key cycle corridors in the Borough. A total of 81 corridors are included in the aspirational network.
» Selection of the 'short list', which prioritised 7 corridors as 'Phase 1' for further assessment and high-level concept development as part of the LCWIP.

The remaining corridors (categorised as Phase 2 or 3) may be further developed in future, as part of future workstreams or as other funding opportunities arise.

6.2. Development of Long List

Guildford Borough has good growth potential for cycling. Most of the Borough's population live within a short cycle distance from Guildford Town Centre and its amenities. Nevertheless, the rural character of the rest of the Borough alongside the hilliness of the network due to the Surrey Hills could act as barriers to some cycle trips. These factors mean that many short trips into town centres, railway stations, leisure assets and neighbouring areas are overwhelmingly made by private car.

A key barrier to cycling at present is the inconsistent quality and accessibility of cycle corridors and the lack of a cycling network across the Borough.

In order to identify and close the gaps, a network of preferred corridors has been defined by drawing on the analysis from the existing data. The background information included mapping of trip origins and destinations, identifying desire lines for cycle movement and allocating trips to specific routes, as well as defining potential demand for cycling across the Borough.

The development of the cycling aspect of the Guildford Borough LCWIP focused on the identification of a cycling network map detailing preferred corridors for further development, as per the DfT's LCWIP technical guidance.

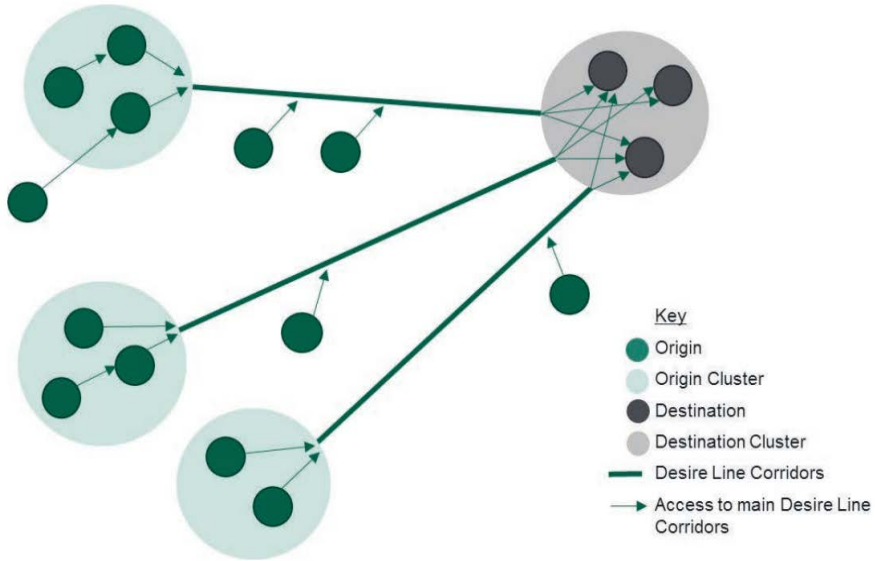

Figure 39. Clusters of trip origins and destinations and desire lines connecting them (DfT LCWIP Guidance)

6.2.1. Identification of Cycling Corridors

In Guildford Borough, and more widely in Surrey, there is a wealth of background information that can inform an understanding of travel patterns, propensity for cycling and highlight areas in need of improvement. The aim of this analysis piece is to meet the goal of significant modal shift to more sustainable travel. This includes targeting short trips and utility trips such as school travel and commuting, as well as access to areas of leisure that can allow active and sustainable travel habits to appeal to the residents of the Borough.

The methodology used to identify key links in the study areas involved the gradual overlaying of the following information to create a qualitative 'Heat Map' (see Figure 40). The intersection of relevant criteria suggests locations where infrastructure improvements could provide the greatest level of service, connectivity, and safety benefits.

The following data were considered for the identification of preliminary cycling networks:

- Key Trip attractors: railway stations, retail centres and high streets, educational facilities, workplace areas, parks, and others, along with their catchment areas.
- Key Trip origins: such as denser residential areas as well as completed and planned developments.
- Propensity to Cycle Tool: highlighting areas with higher potential for cycle commuter and school flows (E- bike scenario based on 2011 Census).
- Commuting travel patterns: highlighting the routes, origins, and destinations of short motor vehicle commuter trips which could reasonably be replaced by cycling trips (up to 8km).
- Cycle Collision points for the latest five years of available data.
- Indices of Multiple Deprivation and areas of low car-ownership (targeting areas of higher deprivation and lower car ownership, which would benefit from cycle corridor improvements).
- Existing cycle facilities and recently proposed facilities from SCC and GBC.
- Geolocated public suggestions for active travel improvements, including Commonplace and Widen My Path.

It is important to note that this assessment provides an initial indication of possible routes between key origins and destinations and that with further development of the LCWIP (future stages). Further investigations will be undertaken as to whether the proposed alignments could be made compliant with LTN 1/20 and therefore whether alternative routes also need to be investigated.

Visual vs Quantified Heatmaps

Background data was overlayed with a transparency to produce a 'visual heatmap' (Figure 40). The heatmap illustrates issues and opportunities for cycling, where the relevant criteria suggests areas with a higher propensity for cycling trips and greater potential benefit from infrastructure interventions. The higher intensity colour shows a potential higher demand for utility cycling trips or cycling improvements, and was used to identify the concentration of issues and opportunities for cycling.

To further explore the location of hotspots, a 'quantified heatmap' overlaid with the initial cycle network (Figure 41) was produced using a defined grid of 50m x 50m. The method enabled the enumeration of issues and opportunities within each grid unit, highlighting the relative importance of an intersecting cycle corridor. The quantified heatmap provided an initial indication of the priority of corridors, and informed the prioritisation of Phase 1/2, and Phase 3 cycle corridors, prior to the multi criteria assessment framework (MCAF), explained later in this section.

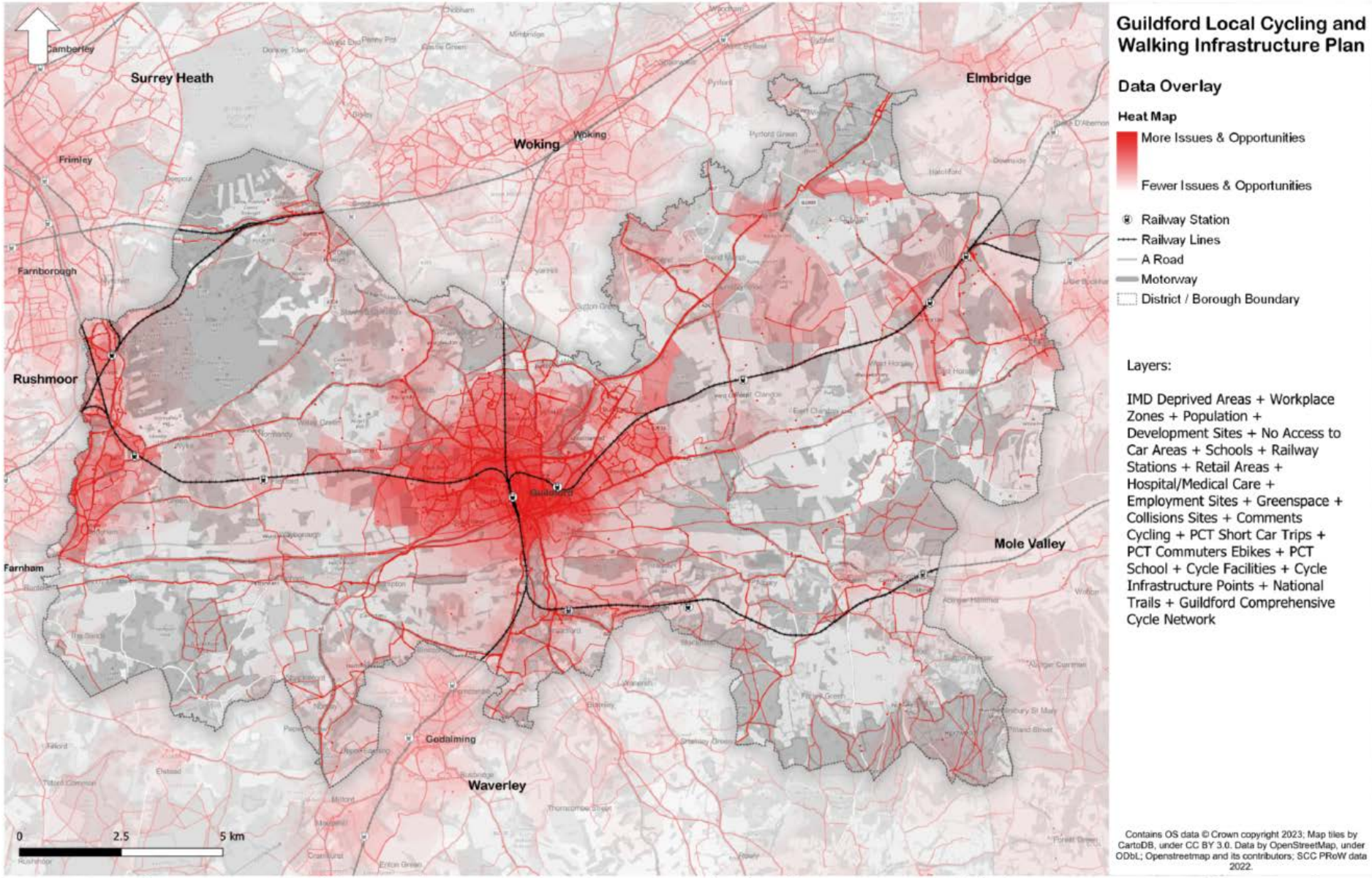

Figure 40. Qualitative 'Heat Map' showing the various data elements overlaid to illustrate areas with higher concentrations of issues and opportunities

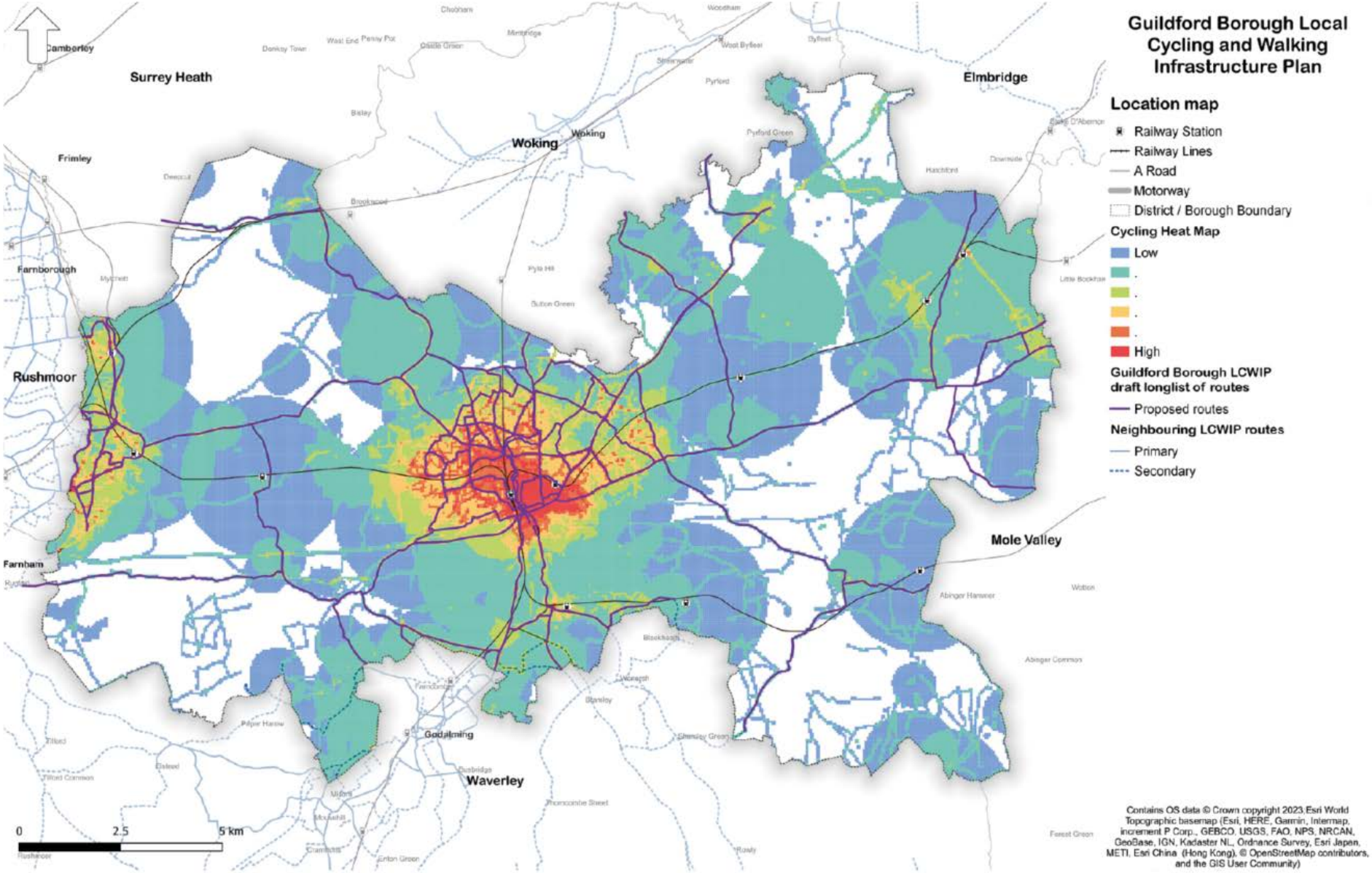

Figure 41. The initial Cycling Network Map resulting from the quantitative analysis showing low to high potential demand for cycling

6.2.1. Aspirational cycle network

The identified draft cycle network from the 'heatmap' (Figure 41) was overlaid onto the existing cycle network as well as the proposals set out in the Comprehensive Guildford Borough Cycle Network (Local Plan: Development Management Policy ID9) (see Figure 42). Analysis showed some overlap between the 'heatmap' initial cycle network and existing routes.

The proposed network is distributed across the Borough and provides connections with existing and proposed facilities in other Surrey and Hampshire Boroughs.

This draft cycle network was refined and prioritised, drawing on data analysis, stakeholder input and desktop investigations to create an aspirational cycle network, as shown in Figure 43. The network includes 31 corridors categorised as Phase 1/Phase 2, plus an additional 50 corridors/links categorised as Phase 3 for future consideration.

The phasing categories are intended to assist with the prioritisation process, whereby the Phase 1 & 2 corridors would be carried forward for further prioritisation. These reflect a higher propensity for cycle trips based on the data analysis undertaken and described previously.

However, all the cycle links (including Phase 3) are retained as part of the aspirational network for future consideration as opportunities arise. The proposed corridors were presented to local stakeholders during the early engagement workshops and amended following received comments. Aspirational proposals from the local stakeholders, including improvements to bridleways, byways and existing footpaths, were included in the aspirational list for cyclists as Phase 3 corridors.

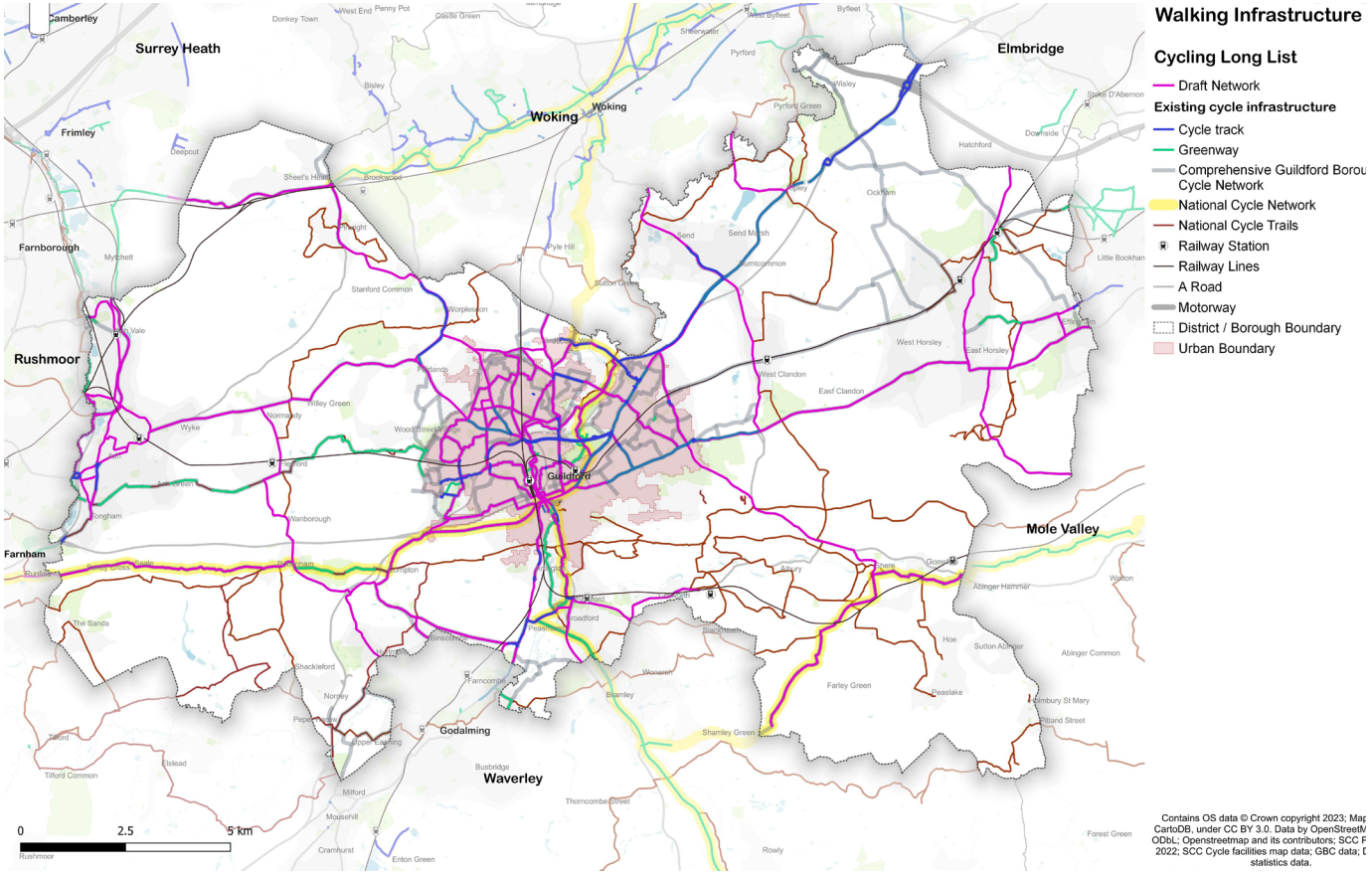

Figure 42. Draft cycle network with the initial proposed network, GBC proposed corridors and key destinations

6.2.1. Aspirational List for cycling

The proposed aspirational network is distributed across the study area (Figure 43).

- 1. Guildford High and North Streets
- 2. Guildford Park to Town Centre
- 3. Stoke Road to Town Centre
- 4. High St A3100
- 5. University of Surrey
- 7. Station Access Quietway
- 8. Westborough and Park Barn to Sports Grounds
- 9. Rydes Hill Rd-Shepherds Ln-Stoughton Rd
- 10. A3 Bypass route
- 11. Guildford College to Woking
- 12. Southway
- 13. Western Spoke - Aldershot Rd A322
- 15. Worplesdon Road
- 16. Worplesdon to Normandy
- 17. Ash to Normandy
- 18. Ash Street
- 19. Ash - Vale Road
- 20. Ash - Manor Road
- 21. Peasmarsh to Shalford
- 22. Jacobs Well Rd-Clay Ln
- 23. Southern Spoke -Guildford to Godalming
- 25. West Clandon to Send
- 26. The Mount
- 27. Eastern Spoke - Epsom Road
- 28. Epsom Road East
- 29. East Horsley Link
- 30. Northeastern Spoke
- 47. Shalford to Chilworth
- 61. Ripley to Cobham
- 62. Clay Lane and Worplesdon path
- 68. Christmas Pie Trail

Some of the routes overlap with existing cycle facilities. These should be included in the aspirational network as the existing facilities are either of substandard quality or will not be able to accommodate the high demand for cycling trips aimed for the area. The intention for these routes is to improve the quality to a high and accessible standard. Table 1 (Appendix 2a - separate document) provides a summary of each corridor in the aspirational cycle list (excluding Phase 3 corridors), considering key destinations served, connections to other aspirational corridors, PCT scores and cycle collisions.

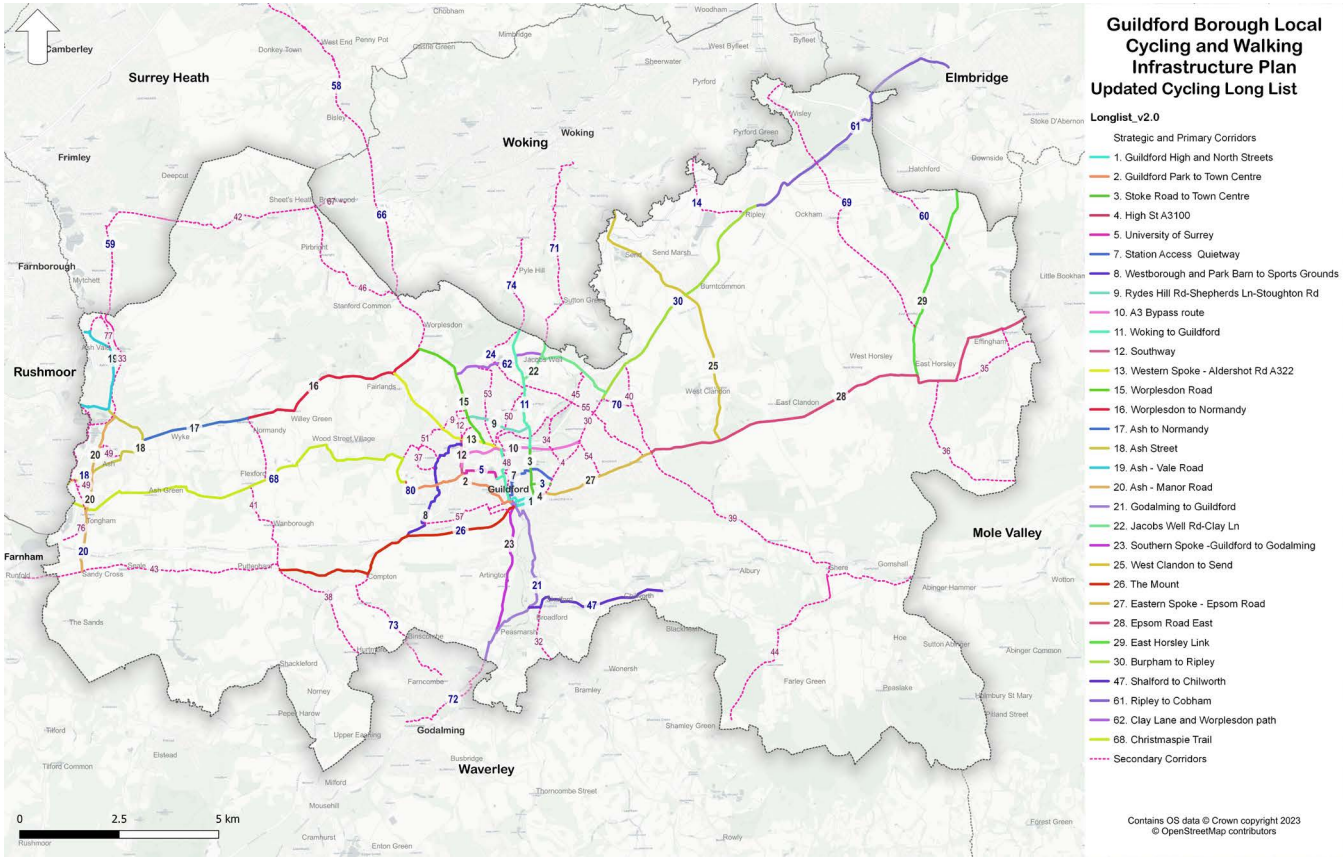

Figure 43. Aspirational cycle network

6.3. Identification of Phase 1 Cycle Corridors

6.2.1. Multi-Criteria Assessment Framework

Once the aspirational cycle network was identified an assessment using both qualitative and quantitative criteria was used to provide an initial prioritisation of the network proposals and identify a first phase of corridors to progress to identification of potential interventions.

A multi-criteria assessment framework (MCAF) was developed to identify the Phase 1 ('short list') cycle corridors, utilising various data inputs from the evidence base previously gathered. In combination, the MCAF criteria are intended to help identify and prioritise corridors with both a higher relative propensity for cycle trips and corridors with a greater relative potential to benefit from improvements (i.e., areas 'in need' or with lower quality existing cycling environment).

» The criteria were categorised in five main groupings:

» Access - This reflects the number of key destinations along or close (400m distance) to the corridor, to which cycle access would be improved. This includes local high streets, potential development areas, railway stations, and schools. A higher number of destinations would indicate a greater propensity for utilitarian cycling trips, and would result in a higher score. This criteria had a weighting of 30% in the overall score.

» Potential Demand - This is based on the DfT's Propensity to Cycle (PCT) flows. High aspirational scenarios were used for both schools' flows (Go Dutch scenario) and commuter flows (E-Bike scenario). A higher score indicated higher potential demand. This had a weighting of 30% in the overall score.

» Cycle network - This is intended to give a higher score to routes which may have minimal (to none) existing cycle facilities and therefore have a greater benefit, rather than improving existing facilities to LTN 1/20 standards. Criteria includes the centrality of the route to the broader proposed aspirational cycle network, and the extent to which a proposed route has some form of existing cycling provision. This category also includes the number of collisions involving cyclists per kilometre along the route. A higher rate suggests a greater need or benefit from cycle interventions. This criteria had a weighting of 15% in the overall score.

» Deliverability - This criterion aims to characterise the potential feasibility for cycling improvements in the area, based on a cursory desktop check of potential constraints. Lower scores are given to areas with significant constraints where significant improvements may not be feasible or very difficult (e.g., land constraints, railway lines' underpasses etc). As the team had not been to all sites at this point in the process, this category has a lower weighting than the others, at 10%.

» Stakeholder Input - This criterion considered feedback from the Stage 1 stakeholder workshops, considering comments and the results of an online poll. Additionally, comments from 'Surrey LCWIP Commonplace' and 'Widen my Path' platforms were also considered. High scores indicate a relatively high number of issues/comments noted by the public and known support for the corridor. This had a weighting of 15% in the overall score.

Each criterion was scored on a scale from 1 (low) to 3 (high). Within each category, the criteria were also given a relative weighting of 1 (low) to 3 (high), allowing some criteria to be given higher significance (e.g., access to schools weighted more heavily than other 'access' criteria).

The total score for each category was also given a weighting. The intent of this weighting was to give a higher significance to factors relating to Access and Demand, which utilised more quantitative data and suggest the potential usage of each proposed route. A lower weighting was given to qualitative criteria.

The MCAF criteria for the selection of the Phase 1 cycle corridor short list and their weightings are listed in Table 7 on the following page.

The MCAF scoring and output is provided in Appendix 3 for reference (separate document).

Table 7. MCAF table for cycle corridors aspirational list

Category	Criterion[1]	Cycle Corridors Rating
Access (30%)	Commercial area served by corridor - within 400m (2)	0 = no CWZs 1 = 1 CWZ 2 = 2 CWZs 3 = 3 or more CWZs
	Development Areas (number of dwellings) - within 400m (2)	0 = no site allocations 1 = 5 - 100 dwellings 2 = 101 - 400 dwellings 3 = more than 400 dwellings
	Railway Station access (number of stations) - within 400m (2)	0 = None 3 = one station
	Number of schools[2] - within 400m (3)	1= low number of schools 2= medium number of schools 3= high number of schools
Demand (30%)	PCT School Flows[3] - Go Dutch scenario (3)	1 = less than 50 2 - 50 - 200 3 = 0ver 200
	PCT Commuter Flows[3] - E-Bike scenario (3)	1 = less than 75 2 = 75 - 200 3= over 200

1 Number in brackets indicates the relative weighting of each criterion.
2 Each route was scored depending on the number of schools, weighted depending on the level of education (ages of pupils using the route): 30% Primary schools, 50% Secondary schools, 20% Special needs schools for all ages.
3 The highest recorded number of flows along the corridor on PCT.

Category	Criterion[1]	Cycle Corridors Rating
Cycle Network (15%)	Number of links to other segments of proposed LCWIP cycling network[4] (2)	1 = fewer than 1 connection per km 2 = 1 - 1.5 connections per km 3 = over 1.5 connections per km
	Existing cycle facilities and bridleways (2)	1= over 25% of the route is existing cycleway/bridleway 2 = less than 25% of the route is existing cycleway/bridleway 3= no section of the route is existing cycleway/bridleway (0%)
	Pedal cycle collision rate along the corridor (2)	1= fewer than 0.25 collisions per km 2 = 0.25-0.5 collisions per km 3 = over 0.5 collisions per km
Deliverability (10%)	Potential ease of implementation[5] (2)	1: likely major constraints, such as limited public highway, bridges, steep gradient 2: significant constraints, narrow country lanes with no significant traffic flows 3: use of footpaths, bridleways and sections of country lanes with no traffic Note -

4 Includes connections to all proposed cycle corridors within Guildford Borough (including the identified Phase 3 cycle corridors) as well as connections with neighbouring LCWIP's aspirational cycle network (all Phases): Farnham Town, Waverley, Mole Valley, Elmbridge, Woking Town, Surrey Heath, and Rushmoor (HCC).

5 Due to significant constrains along the proposed cycle corridors the rating rules were adjusted to reflect the existing situation of the local network.

Category	Criterion[1]	Cycle Corridors Rating
Stakeholder Input (15%)	Stakeholder feedback[6] (2)	1= fewer than 4 votes 2= 4-7 votes 3= over 7 votes
	Public comments[7] (2)	1= fewer than 0.5 comments/agreements per km 2 = 0.5-1 comments/agreements per km 3 = over 1 comments/agreements per km

6 Votes from Stage 1 workshops polls.
7 https://surreylcwip.commonplace.is/ and https://www.widenmypath.com/ including comments and agreements.

6.2.1. MCAF Short list

The MCAF was applied to the Guildford Borough cycle corridor aspirational list (Phase 1 and Phase 2 selected corridors).[1] Using this criteria, the top scoring routes in each of these geographic areas were selected:

» Guildford Urban/Suburban Areas
» Ash & Tongham urban area
» Rural areas

The following short-list of corridors was identified, displayed by ranking order (highest score to the lowest MCAF score)[2]. Numbers in brackets denote Phase 1 original list reference number.

1. Stoke Road to Town Centre (#3) and High St A3100 (#4) combined
2. Guildford College to Woking (#11)
3. Guildford High and North Streets (#1)
4. Ash Street (#18)
5. Epsom Road East (#28)
6. Shalford to Chilworth (#47)
7. Eastern Spoke - Epsom Road (#27)

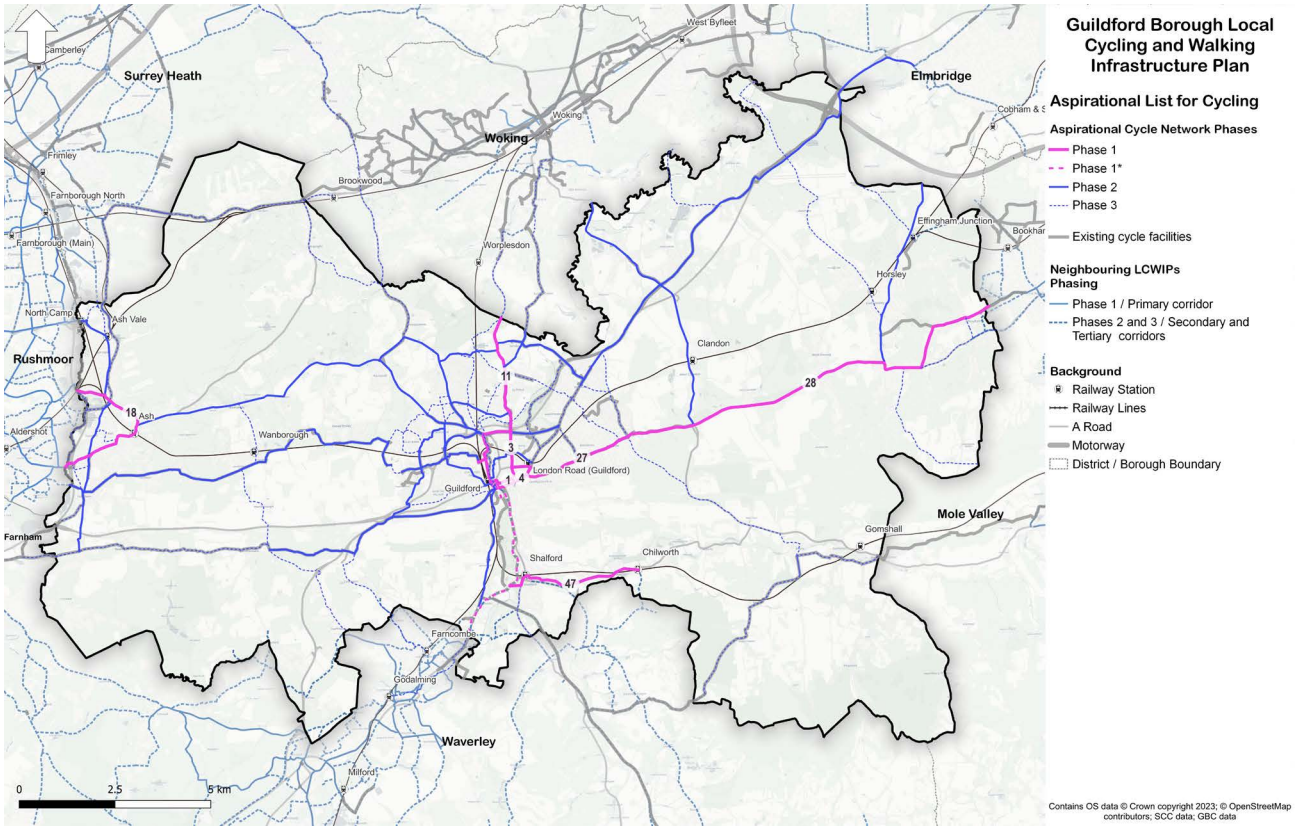

Figure 44. Guildford LCWIP MCAF Results

The Eastern Spoke was an additional corridor requested by Stakeholders to be carried forward as a Phase 1 route to connect to the town centre as well as corridor 28 Epsom Road East.

All of the shortlisted (Phase 1) routes were further assessed using the DfT's Route Selection Tool (RST). The RST was used to determine the best alignment for cycle corridors using the following criteria:

» Directness.
» Gradient.
» Safety.
» Connectivity.
» Comfort.
» Critical Junctions.

Figure 44 illustrates the output of the MCAF, with each route being scored and thus categorised as Phase 1 and Phase 2, and presents the Phase 3 corridors that were not assessed in the MCAF.

1 It was determined to exclude Corridor 30 Northeastern Spoke from the MCAF assessment as there was an existing scheme already in progress. If this existing scheme is not to be delivered, then this corridor should be considered for development. The corridor is included in the Aspirational Network.
2 Number in brackets (#) shows the number the corridor was assigned in the aspirational list.