4.2.4.5. PCT Commuter Flows - Desire Lines

The direct point-to-point desire lines in the PCT between home and work were reviewed to understand the commuter trips in the Borough with greatest potential for increased cycle usage. The straight lines based on number of commuters per day of origin/destination (O/D) pairs are illustrated in Figure 23 (MSOA[1] pairs) and the key outcomes of this analysis are:

» The top MSOA and LSOA[2] - O/D pairs indicate one key centre of O/D: Guildford town centre.
» Distribution of shorter trips between areas of Guildford Borough, particularly outer residential areas, such as Boxgrove, Park Barn, and Bellfields, and into Guildford town centre.
» The University of Surrey creates significant commuter demand from surrounding areas.
» Guildford town centre creates high demand from trips from the northern and southern areas of the Borough and beyond, including Woking Borough, and Shalford, as well as the west, including Ash and into Rushmoor Borough.
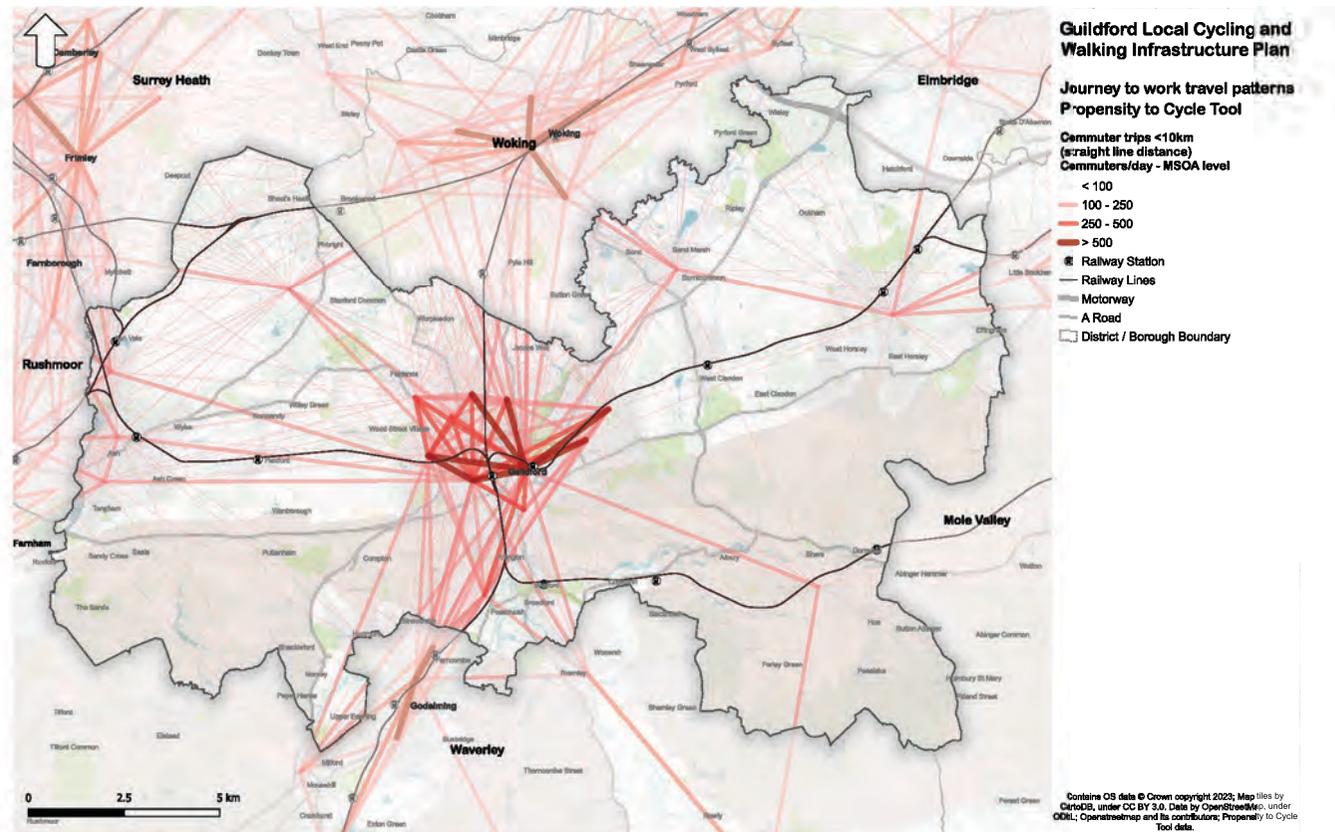

Figure 23. Number of commuter trips by car of <2km based on PCT, 2011 Census

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1 MSOA stands for Middle Layer Super Ouput area, made up of groups of LSOAs, and usually includes a resident population between 5000 and 15000 people.
2 LSOA stands for Lower Layer Super Output Area, and usually includes a resident population between 1000 and 3000 people.

4.2.5. Resident Population and Employment

Population data can provide a proxy for potential demand for walking and cycling trips.[1] As many trips begin or end at home, higher population densities can indicate a greater propensity for walking and cycling trips. Higher densities can also indicate a more conducive environment for walking and cycling, such as closer proximity of origins and destinations and a more compact built-up area.

Workplace population density is indicative of key employment areas and is another key input into the identification of walking and cycling networks.

Figure 24 shows the highest population densities and dominant employment zones are concentrated in Guildford urban area as the primary urban centre, and Ash. This suggests there are greater opportunities for short distance walking or cycling trips in these urban areas.

The data also shows that key employment zones include Guildford urban area, Woking, Godalming, Farnborough and Frimley. Though the majority of these towns are located outside of the Borough, they should

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1 During the development of the LCWIP, 2021 Census data were not available in MSOA and LSOA levels. The information provided in the section uses ONS data estimating the population in 2020.
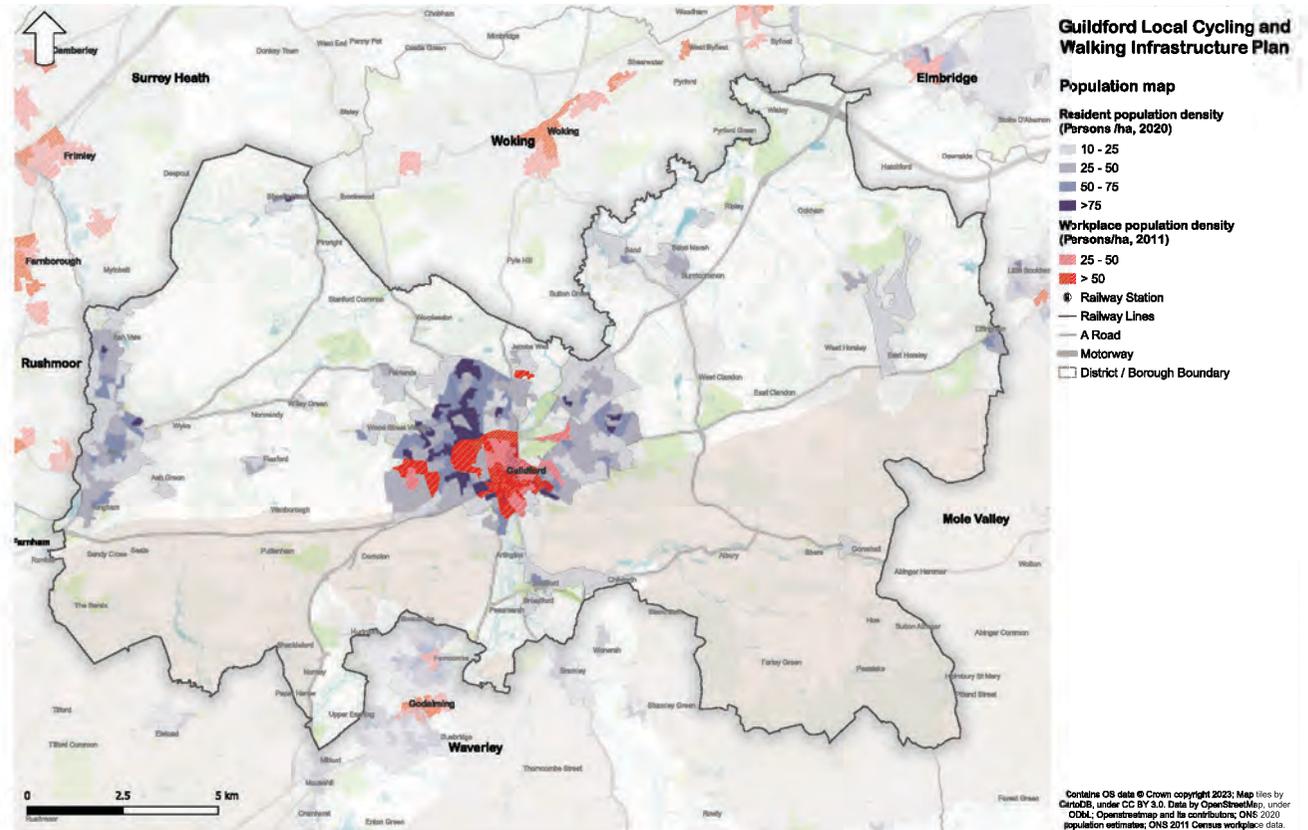

Figure 24. Population and Employment

Table 5. Population data for Guildford Borough (Source - ONS Census 2021)

Area	2011 Census	2021 Census	% Change	Population Density[1]
Guildford Borough	137,200	143,650	4.7%	531
Surrey County	1,132,390	1,203,100	6.2%	724
England	53,012,456	56,489,800	6.6%	434

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1 Usual residents per sq km

be taken into consideration due to being places of employment, which are likely to attract workers from Guildford and the surrounding region.

4.2.5.1. Future Developments

It is important to understand where future growth is likely to take place. Appropriate walking and cycling infrastructure can then be provided, which creates opportunities for active travel and supports local communities.

Figure 25 highlights large housing sites, their status, and sites allocated for future development. Guildford urban area is a key area of growth with the following large developments proposed:

» Blackwell Farm (1800 homes)
» Gosden Hill Farm (1800 homes)
» Weyside Urban Village regeneration project (1500 homes proposed).

Extensions to the Ash urban area are also planned and being built out. For example, 1750 new homes are allocated as part of Policy A31: 'Land to the south and east of Ash and Tongham'. Furthermore, the redevelopment of the former Wisley Airfield will deliver 2000 homes in Ockham.

The future of each of these proposals is not certain, but the proposals should be taken into consideration due to the scale of the sites and the potential effects on surrounding areas. Section 3: Previous Studies explains potential improvements to the active travel network that would complement these developments.
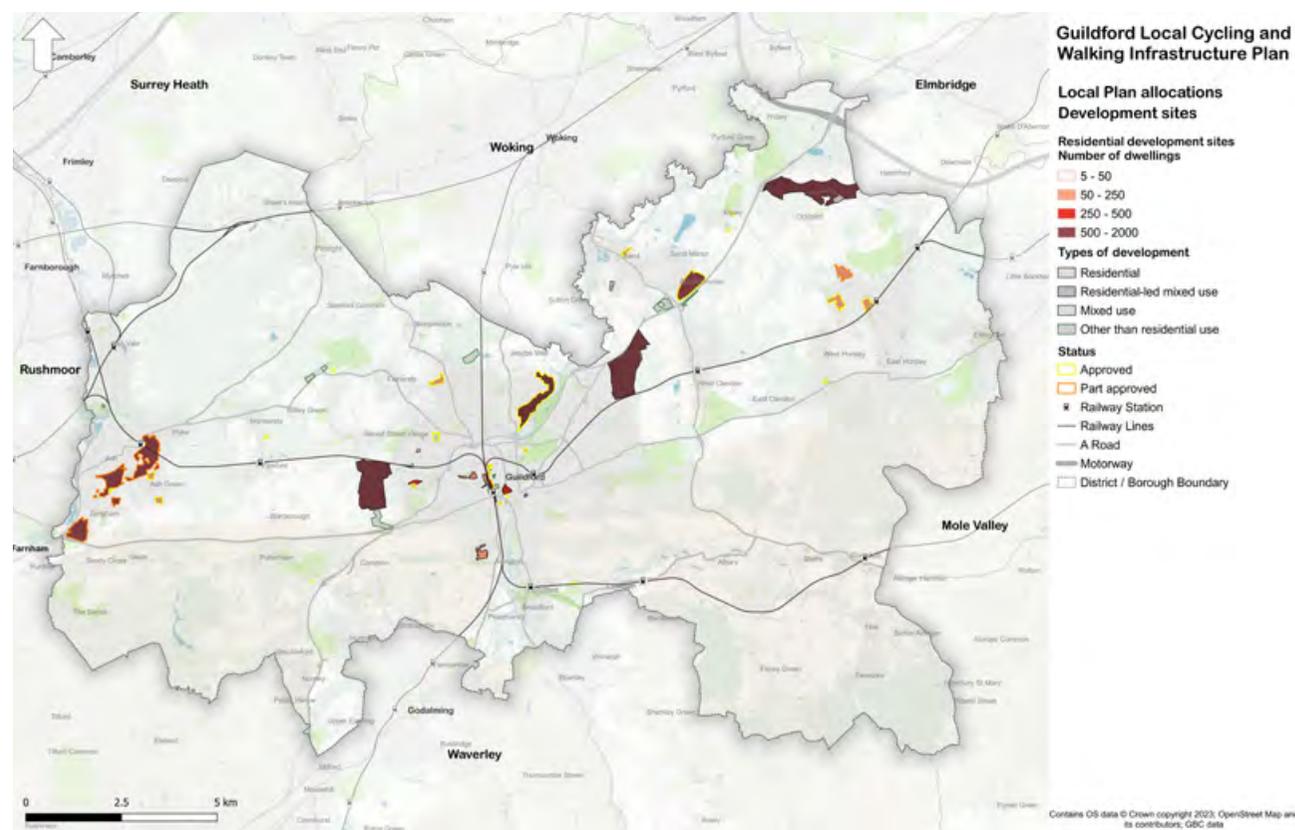

Figure 25. Future development sites in Guildford

4.2.6. Indices of Multiple Deprivation

The Indices of Multiple Deprivation (IMD) is a measure of relative deprivation for small areas/ neighbourhoods in England. It measures income, employment, health, education, crime, living environment and barriers to housing and services. The information was used for the identification of under served areas featuring greater deprivation and therefore which areas may benefit the most from walking and cycle corridor improvements.

Areas in the first decile represent the most deprived areas, whereas the 10th decile represents least deprived areas.

Figure 26 shows that a large proportion of wards are in the top four IMD deciles (7th-10th deciles), suggesting high levels of affluence and low deprivation for much of the Borough. There are areas where wards have low IMD rankings (2nd - 4th deciles), these being in areas north and west of the Guildford urban area, Ash, and north east of the Borough. It should be noted that these areas of lower affluence and higher deprivation are located adjacent to areas with the highest levels of affluence. Key barriers, such as railway lines and major roads affect the deprivation ranking of these areas.
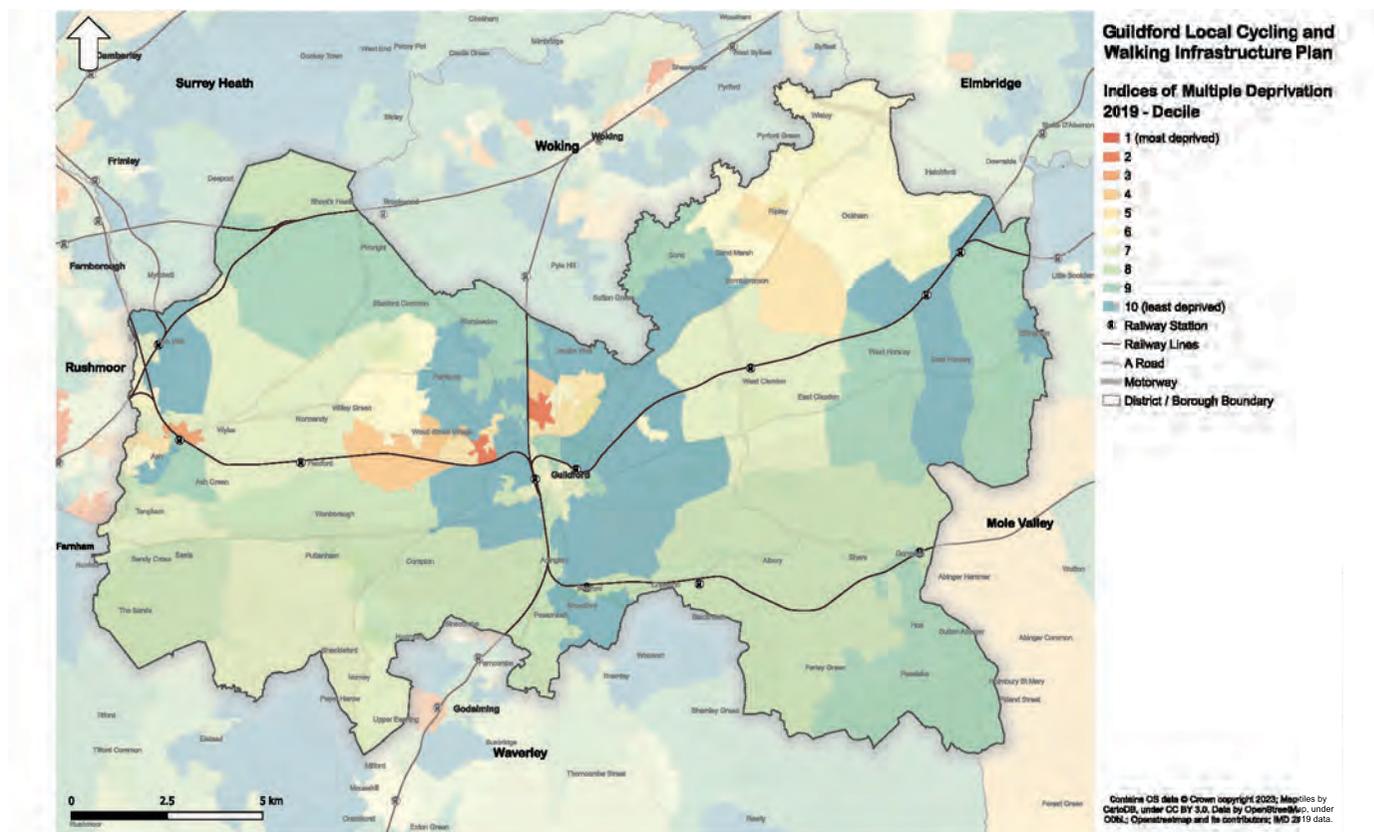

Figure 26. Index of Multiple Deprivation

4.2.7. Population with disabilities

There is a relatively high proportion of the Borough where more than 15% of the population has a disability. This is spread relatively evenly across the Borough. Compared to the national UK average of 22%, these rates are relatively low.[1] There are a number of inequalities that exist between abled and disabled people, including in education, employment, housing, and wellbeing.[2] Better walking connections to

1 Family Resources Survey 2020-21, https://www.gov.uk/government/ statistics/family-resources-survey-financ ial-year-2020-to-2021/family-resource s-survey-financial-year-2020-to-2021

2 ONS 2021, Outcomes for disabled people in the UK: https://www.ons.gov. uk/peoplepopulationandcommunity/

local services can improve well-being for this group, and it is the aim of the LCWIP to provide positive outcomes for physical and mental health. A map showing the geographic distribution of people with disabilities can be found in Appendix 1 (separate document).

4.2.7.1. Car Availability

Overall, car availability is found to be relatively high across Guildford, potentially reflecting the affluent prosperity of the Borough. The highest levels of car ownership are found in rural areas of the Borough, where there is greater dependency on private vehicle use to access local facilities, due to the relatively limited and infrequent provision of public transport.

The lowest rates of vehicle availability are found in the centre of the Borough, in the primary urban area of Guildford Town, with multiple wards having more than 30% of households without a car/van. Specifically, the area surrounding the University of Surrey has a low rate of car ownership, reflecting the local student population that relies on active travel and public transport to access amenities. Further settlements of Ash, Shalford, and parts of Send and Ripley have lower levels of car ownership compared to the Borough overall (see Figure 27).

There is evidence that some households in these urban areas do not own a car at all, suggesting a greater reliance on walking,

healthandsocialcare/disability/articles/
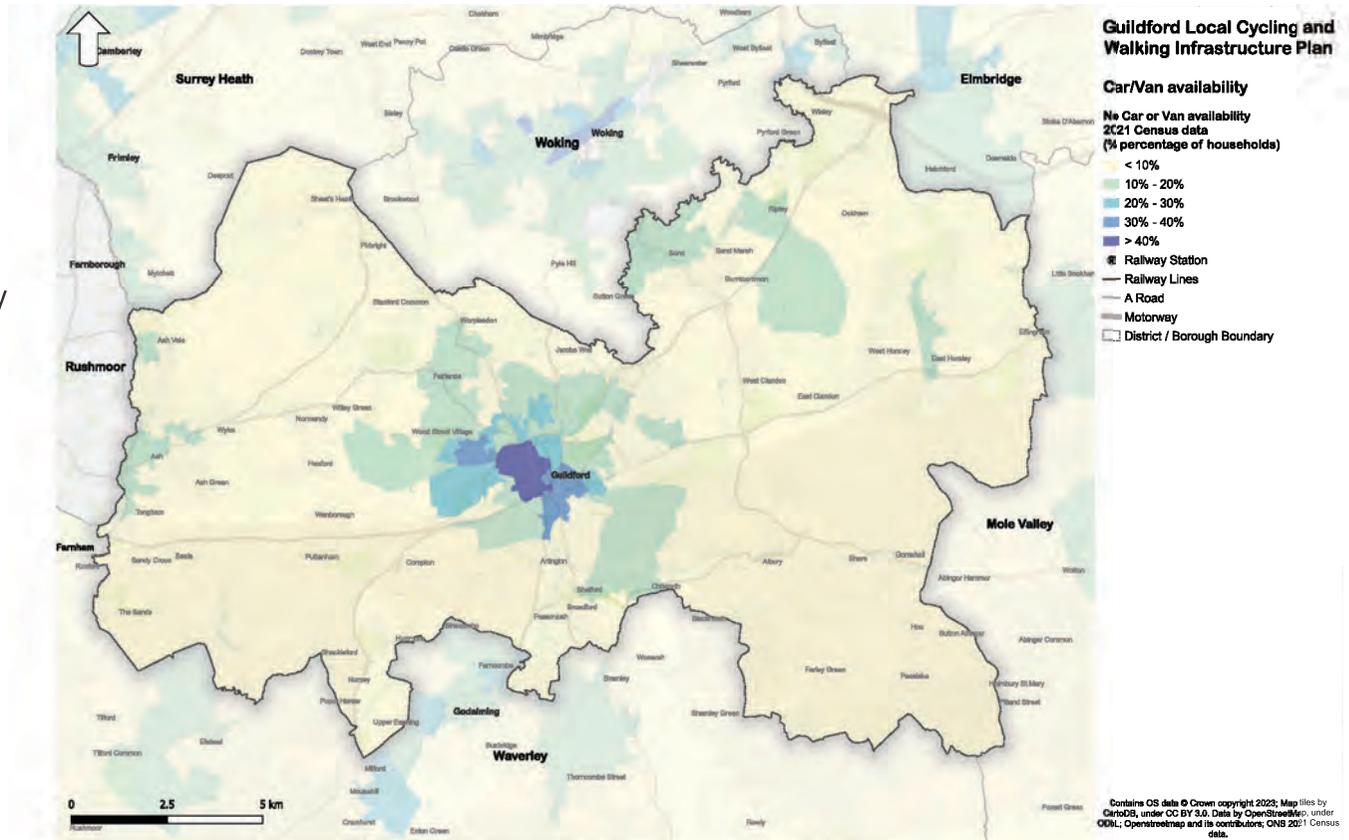outcomesfordisabledpeopleintheuk/2021

Figure 27. Percentage of households with no car or van availability

cycling or public transport. Lower levels of ownership in these urban centres may reflect the high level of facilities within walking distance and the relatively good provision of public transport services.

4.2.8. Collision Data

As part of the LCWIP, a high-level review of recent collision data (2018-2023) involving pedestrians and people cycling was undertaken. This provided an understanding of where collisions are occurring and routes that could benefit from safety improvements as part of an LCWIP scheme. A summary of pedestrian and cyclist collisions is shown in Table 6 on page 63.

4.2.8.1. Pedestrian Collisions

Figure 28 presents a 'heatmap' illustrating the location, severity and relative concentration of pedestrian collisions within Guildford. Concentrations of collisions are recorded in the urban areas of Guildford, Ash and Tongham.

This is likely due to the higher population density and agglomeration of key destinations in these parts of the Borough (as summarised in previous sections), hence greater propensity for walking and cycling activity and higher traffic in these areas.

Relative collision 'hotspots' for pedestrians include:

» Guildford Gyratory.
» North Street, Guildford.
» Guildford Park Road.
» Epsom Road.

4.2.8.2. Cyclist Collisions

The locations and severity of cyclists' collisions are shown in Figure 29. As with the pedestrian collisions, clustering of cycling incidents is visible in the built up urban areas, where there are relatively higher population densities and vibrant commercial areas. Concentrations of cyclist collisions include the urban areas of Guildford, Ash and Tongham.

Hotspots for cyclist collisions include the following areas:

» Ladymead/Parkway, Guildford.
» A320/Stoke Road, Guildford.
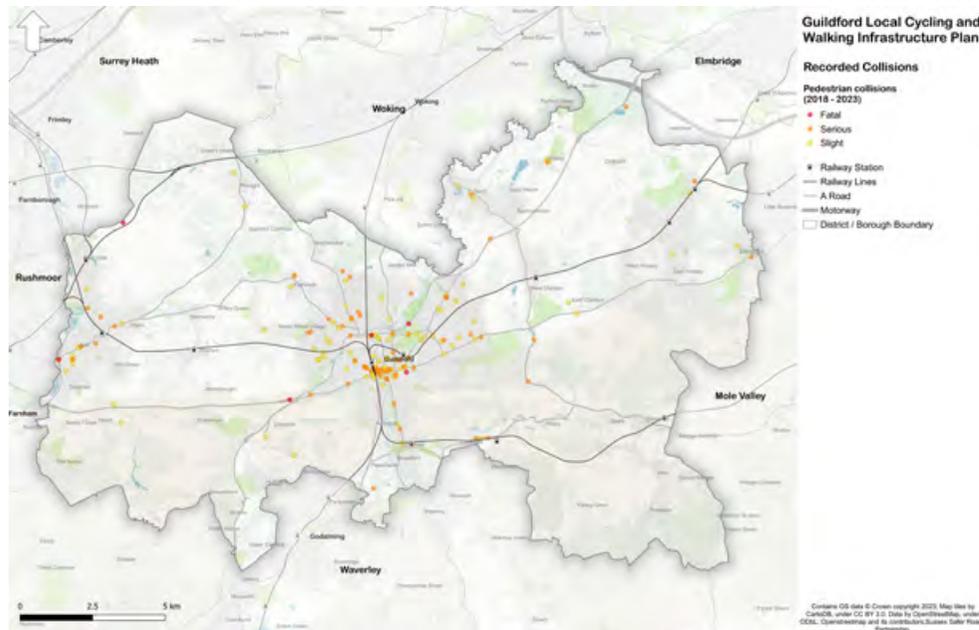» London Road, Guildford.
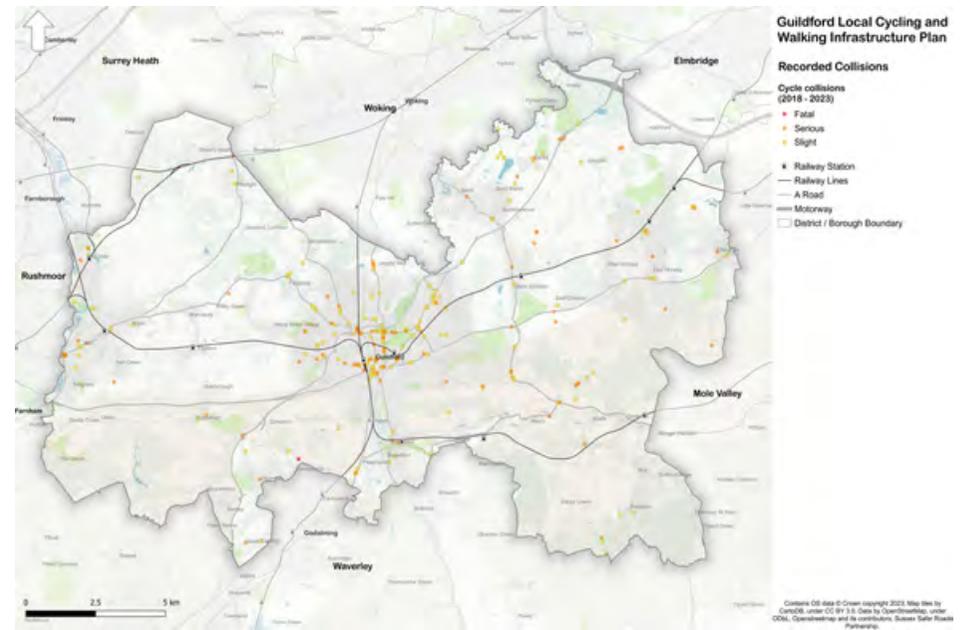» B2215, Send to Ripley.

Figure 28. Pedestrian collisions

Figure 29. Cyclist collisions

Table 6. Collisions, by severity

2018-23	Pedestrians		Cyclists	
Severity	Total	Avg/Yr	Total	Avg/Yr
Fatal	7	1.4	1	0.2
Serious	63	12.6	88	17.6
Slight	116	23.2	177	35.4

4.2.9. Barriers and Constraints

Severance is a significant barrier to mobility in Guildford Borough, particularly for active travel modes. Some of the main barriers and constraints are illustrated in Figure 30. These include:

» Four railway lines traverse the Borough, severing the local road network and funneling all modes of traffic to a limited number of crossing points.

» Guildford Town Centre has significant level differences, making some areas unattractive for active travel, especially for cycling.

» Several A and B roads, along with the local street network, create physical and psychological barriers to active travel. In particular, the A3, A31, A246 and A25 are busy dual carriageways that provide east-west connectivity, but impede north-south movement, with access limited to main crossing points. The distance between crossing opportunities creates a significant barrier for all modes, particularly the viability of short trips via walking or cycling.

» Motor vehicle speed can be a barrier to active travel, where walking or cycling
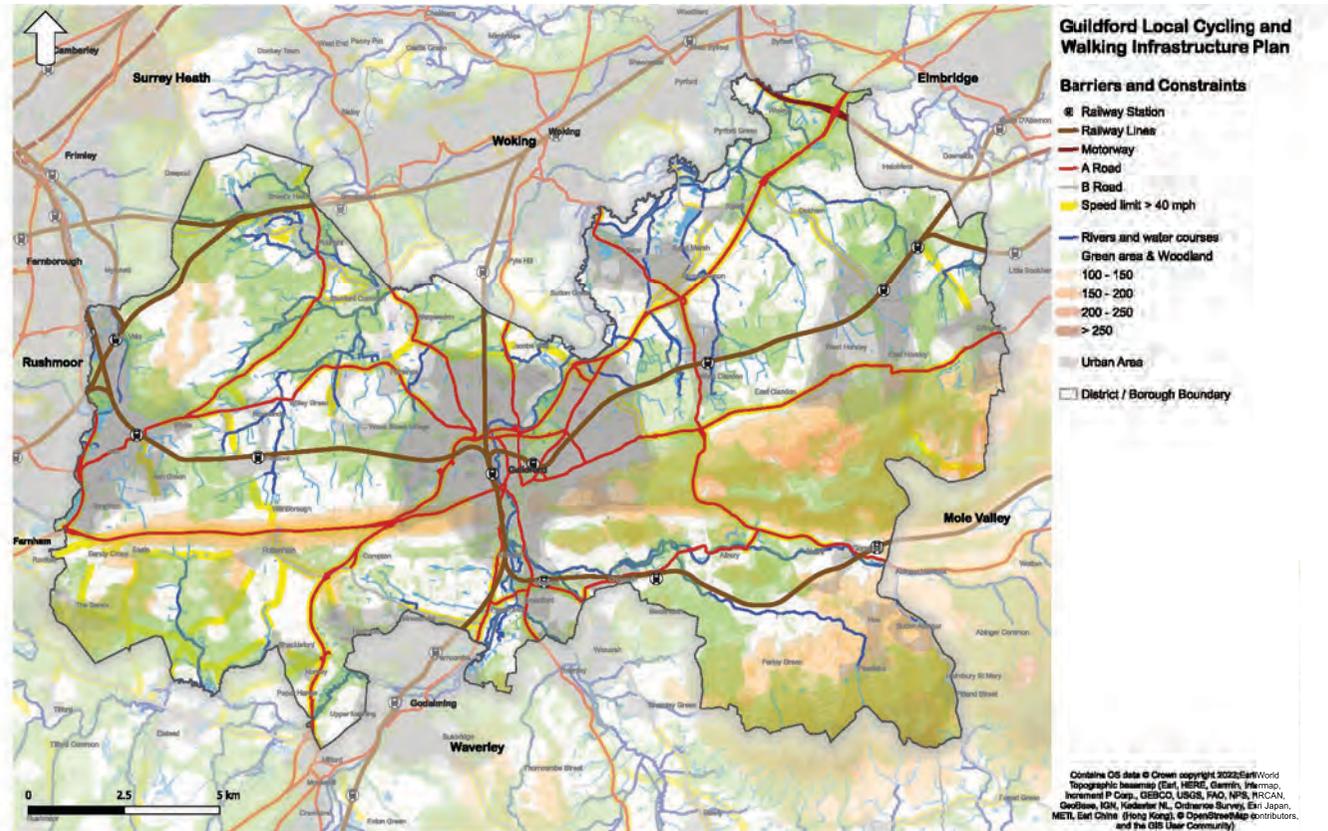
Figure 30. Barriers and Constraints in Guildford Borough

alongside or crossing high speed traffic can create an unpleasant, uncomfortable, or unsafe environment.

» Villages are dispersed throughout the Borough, and are often distant from each other, increasing reliance on motor vehicles.

» Watercourses, including the River Wey, meander through Guildford, providing valuable wildlife habitat and a destination for outdoor recreation, but they also create natural barriers to active travel movements, restricting journeys to designated crossing points.

» The Surrey Hills are depicted by the dark brown contour lines in Figure 30. A horizontal band of steep terrain is identified along the south of the Borough, with terrain of 150-200m in this band south of Horsley. The steepest terrain is identified in the south-east corner of the Borough, near Peaslake. This landscape may appeal to competitive cyclists, but the challenging ascents may deter casual riders and commuters from cycling in this region.

Pedestrians and cyclists can be deterred from using paths with a steep gradient or declination, due to the associated difficulties of using the route. The difficulty is often experienced more significantly amongst user groups with disabilities and mobility impairments. In contrast, flat and low lying areas can be found in the north and north east of the Borough near Worplesdon and Burntcommon, which are likely to be more conducive for cycling.

4.2.10. Online Public Comments

'Widen My Path' and 'SCC LCWIP Commonplace map' are online tools where the public can register a comment with regards to walking and cycling infrastructure. This information helps local authorities identify and prioritise interventions to better enable and promote active travel.

In total, 990 comments were logged on the Commonplace platform for Guildford Borough, with 3247 agreements on the comments.1

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1 Users are able to 'agree' with existing comments on Commonplace, showing agreement and/or support for a view or issue identified.

Comments on pedestrian and cycling facilities were evenly split. The Widen my path platform registered 91 comments on the cycle facilities in the Borough, with 469 agreements.

Data from these online platforms has been reviewed as part of the option identification process and has also subsequently informed the measures that are required at specific locations. Figure 31 provides a visual representation of higher priority areas for walking and cycling improvements, from the perspective of local residents.

A high number of comments were recorded in Guildford urban area, with further areas including Ash, Tongham, Shalford, and East
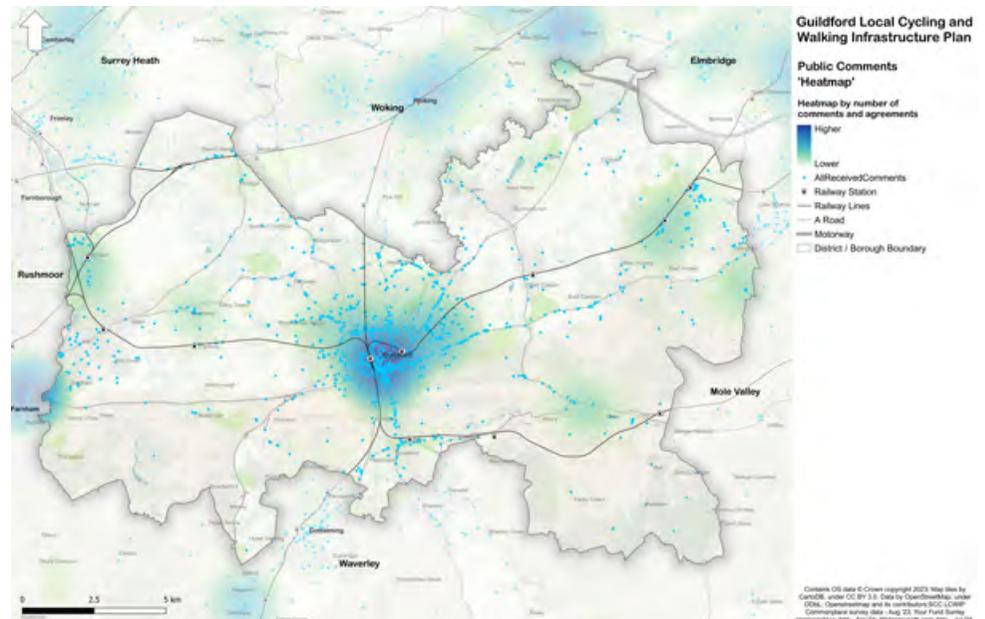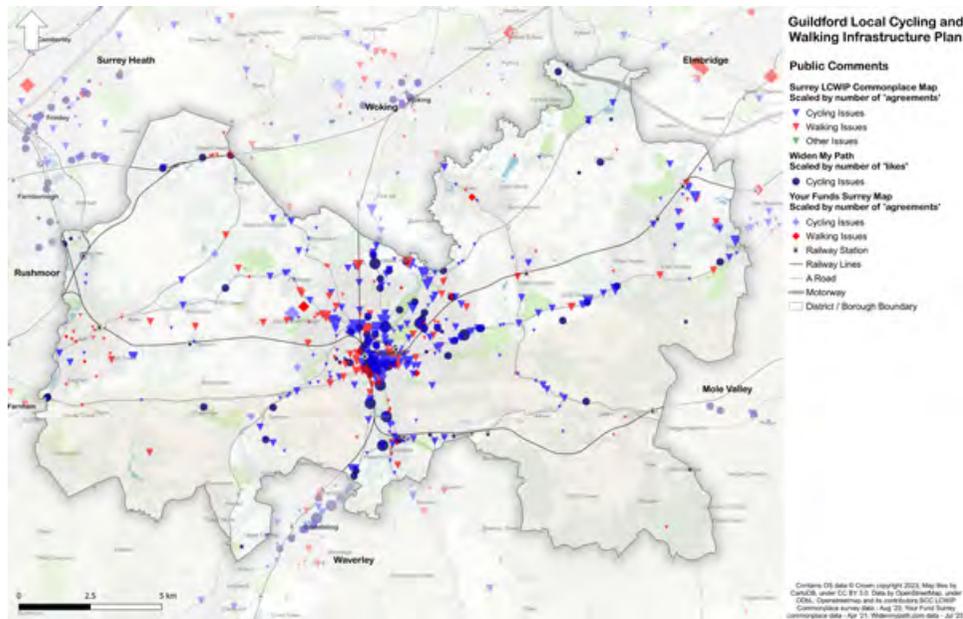

Figure 31. Online Public Comments

Figure 32. Heatmap of online comments

Guildford Borough Local Cycling and Walking Infrastructure Plan

Horsley. Key roads received a number of comments, including Epsom Road (between Guildford and Effingham) and Woking Road.

The following issues and themes were raised across the Borough:

» Lack of dedicated cycle lanes.
» Where cycle lanes do exist, they are in a poor condition and considered unsuitable for cyclists.
» Lack of appropriate road crossing infrastructure for cyclists and pedestrians.
» Support for new cycle lanes, safer road crossings, junction enhancements to improve safety, reduced speed limits and the introduction of road interventions to slow traffic.

4.2.11. Composite Commonplace

A composite heatmap illustrating the location and level agreement for both pedestrian and cycling issues across the available online comment platforms is illustrated in Figure 32. This map provides a visual representation of higher priority areas for walking and cycling improvements, from the perspective of local residents.

4.2.12. Crime levels

Crime data from Surrey Police (2009 - 2022) shows that although crimes were reported across the Borough, these largely correlated to more urban areas. All types of crime were clustered around Guildford urban area. A further cluster was identified along the
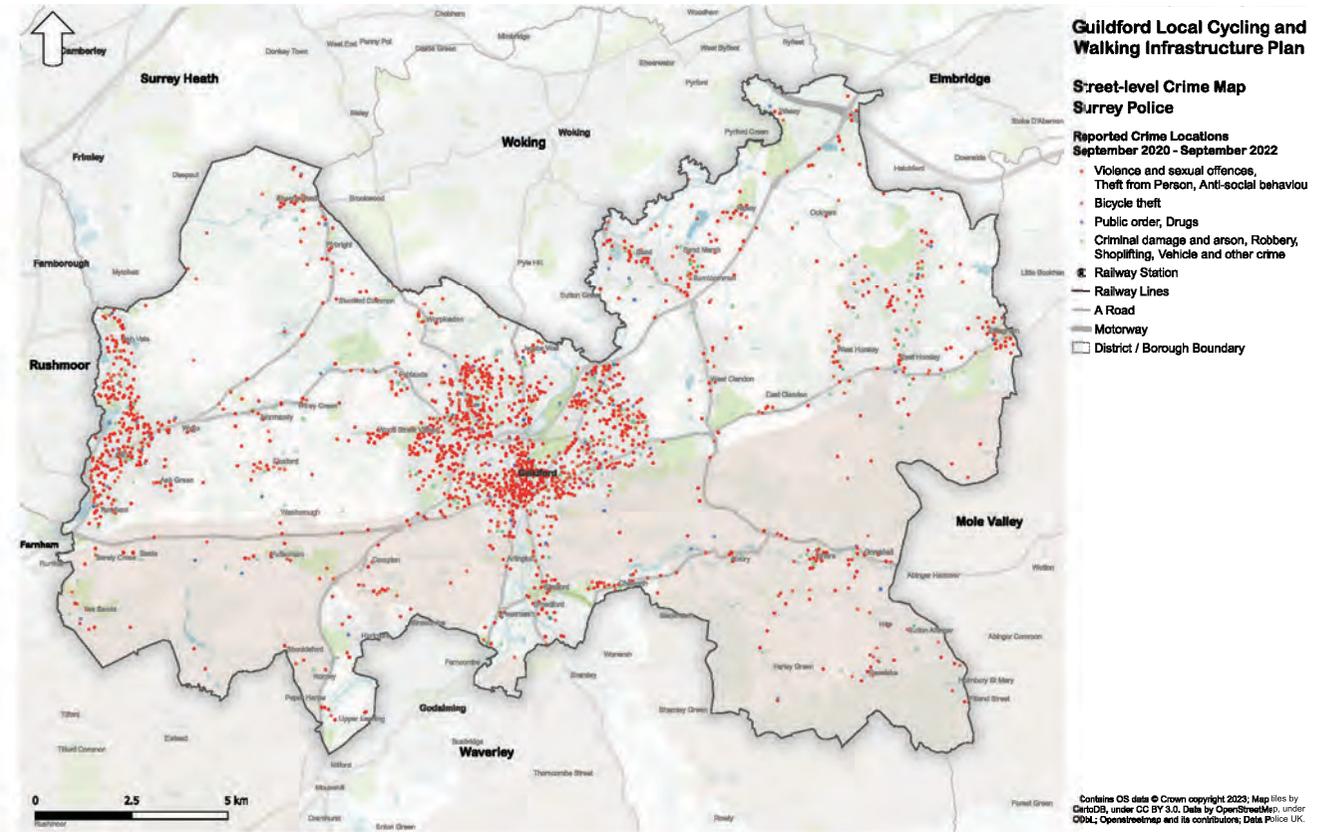
Figure 33. Reported crime in Guildford Borough

western border of the Borough in the Ash area.

Most crimes reported were violence and sexual offences, theft from person, and anti-social behaviour, and this was clustered in Guildford urban area and Ash, correlating with denser urban areas. Higher real or perceived criminality deter people from walking and cycling during the hours of darkness and

hotspot locations help us identify areas where improvements to personal safety should be considered.

It should be noted that this data considers only reported crime, and so is not fully reflective of all crimes, which may not be reported.

4.2.13. Commuting patterns

Census data provides information on the main commuting inflows and outflows to/from Guildford, which is shown in Figure 34 and Figure 35.[1]

Guildford's neighbouring boroughs, Woking, Waverley, Rushmoor, Surrey Heath and Elmbridge are among the top five inflows and/or outflows. This indicates the importance of inter-borough connectivity when developing

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1 The 2021 Census was undertaken during the Covid-19 pandemic, and so reflects a specific period where commuting patterns were significantly impacted.

Figure 34. Commuter inflows to Guildford Borough (ONS)
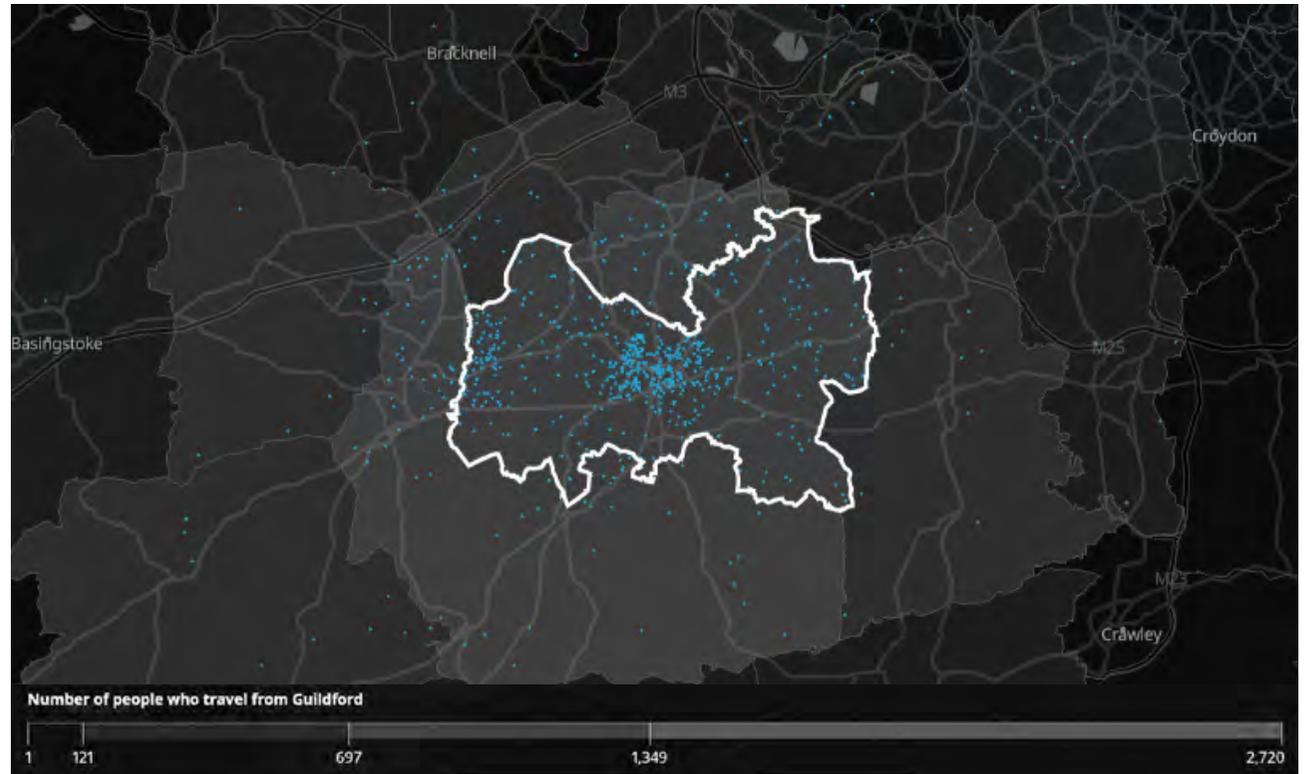
Figure 35. Commuter outflows from Guildford Borough (ONS, Census 2021, Travel to Work Dataset)

the cycle (primarily) network.[2] Many of the commuter flows are also connected by railway services, including Guildford, Woking and London. This indicates the importance of providing high-quality walking and cycling links to railway stations, to facilitate

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2 Pedestrian movements are limited to shorter distances, however there are instances that inter-borough connectivity on foot may be achievable.

and encourage linked active travel/public transport trips.

Within Guildford Borough, movement included 16'000 people living and working in the Borough, and an additional 40'000 people who work from home and do not commute. As noted, the 2021 Census was undertaken during the Covid-19 Pandemic.

The largest movement into Guildford was 4,334 people from Waverley, followed by Rushmoor (2,866 people) and Woking (2,626 people).

Guildford Borough Local Cycling and Walking Infrastructure Plan

The largest movement of people out of Guildford was 2,720 people to Waverley, followed by Woking (1,702 people) and Rushmoor (1,349 people).

4.2.14. Cycling Infrastructure Prioritisation Toolkit

The Cycling Infrastructure Prioritisation Toolkit (CyIPT) is a collection of tools aiming to provide an evidence-base for prioritisation of transport infrastructure that will get more people cycling.[1]

CyIPT uses the PCT to provide data on the existing and future cycling flows on each road. This data is in turn taken from the 2011 Census commuting flow data. CyIPT is biased towards commuter cycling due to using the PCT data.

CyIPT has a 2011 view of travel patterns but for existing travel and as a baseline for predicting future demand.

The top routes, cohesive networks and existing cycleways within Guildford, identified through the CyIPT tool are shown in Figure 36. As indicated, most of the top routes are located towards the centre of the Borough, mainly in Guildford Town Centre and towards Jacobs Well.

Similarly, the cohesive networks identified by the CyIPT tool includes the top routes mentioned above and others, including:

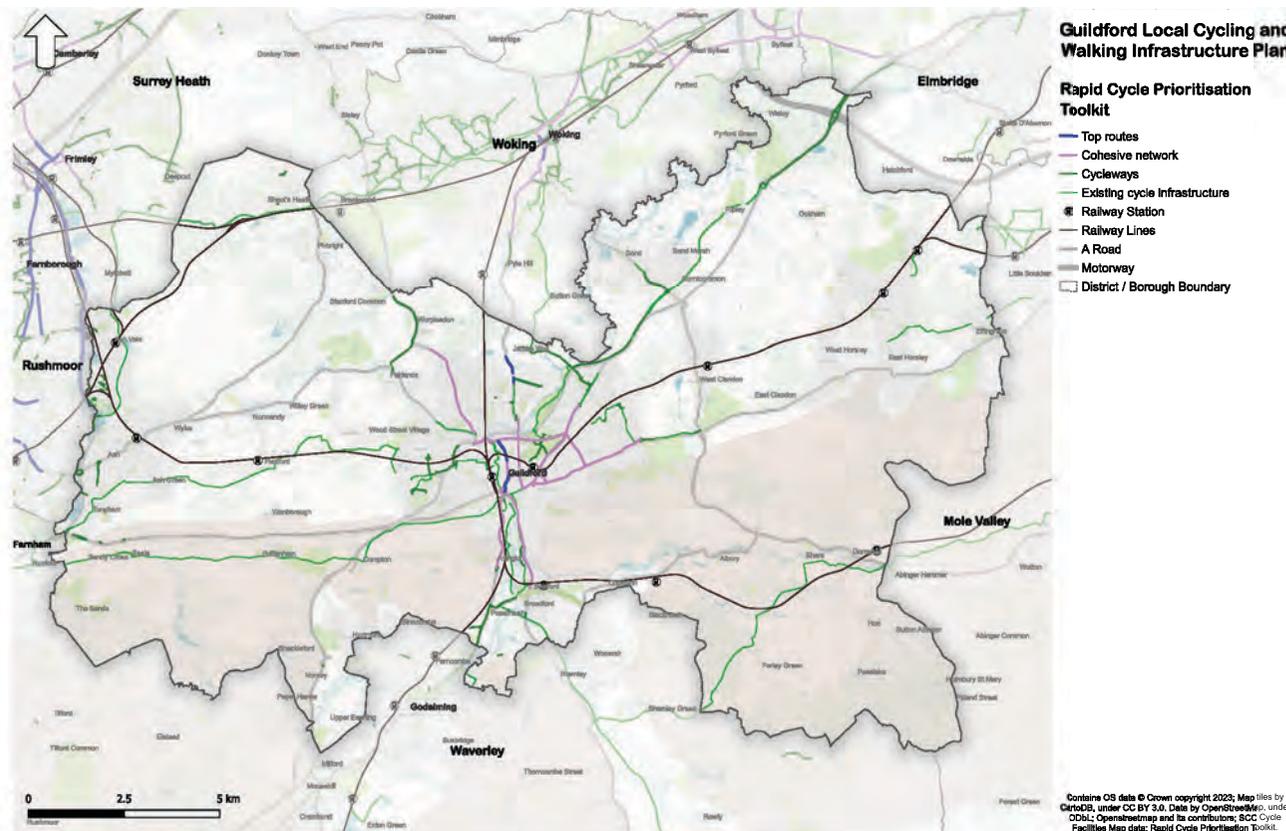Figure 36. Cycling infrastructure prioritisation toolkit for Guildford

»   Guildford Town Centre access to Boxgrove and Merrow
»   Guildford Town Centre to Abbotswood and Burpham
»   Access to Shalford
»   Link to Worplesdon

The aim of the LCWIP is to fill in the gaps in the existing network with the cycle corridors that were identified as top priorities within the Borough.

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1   https://www.cyipt.bike/

4.2.15. Strava

Publicly available data for cycle trips recorded using Strava were also reviewed[1]. Strava is a mobile and internet-based application for tracking various activities (i.e., cycling, running, etc.). The data presented represents cycle trips recorded by users of Strava's app[2]. Although the data tends to be skewed more heavily towards leisure/recreational trips rather than utilitarian trips, it provides a snapshot of preferred routes that supplement the commuter cycling trips provided in the PCT analysis.

Strava is publicly available as an online heatmap, which illustrates routes that are more heavily used by people cycling. The Strava data for Guildford Borough is shown in Figure 37.

The Strava data highlights some the Borough's leisure/recreation areas which are known to be popular amongst recreational/sport cyclists, through Surrey Hills, and many of the rural country lanes in the east of the Borough. Other routes with relatively high usage include:

Figure 37. Strava cycling trips heatmap (2023)

» Basingstoke Canal
» Pirbright Road (between Ash and Pirbright)
» Shalford Road
» Shere Road
» Sections of the A25

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1 https://www.strava.com/
2 The Strava data is illustrative only, limited to those trips recorded by Strava users and with data privacy settings allowing public access. Hence, the Strava data only reflects journeys by a limited number of users and may not reflect a representative proportion of trips types (e.g., commuting, utilitarian journeys) or types of cyclists.

4.3. Summary of Key Findings

The evidence base review provided a wealth of data and information related to walking and cycling in Guildford, the population data and locations of key destinations. The higher density and proximity of trip attractors leads to a higher propensity for walking and cycling in these areas of the Borough, as demonstrated by the PCT data.

» Census data indicates that Guildford Borough is one of the least deprived areas in the country, with relatively high levels of car ownership and affluence.

» Travel movements are concentrated in the centre of the Borough, within Guildford Town Centre and its periphery, as well as a few key east-west and north south routes.

» Commuting data highlights the importance of linkages to Guildford Town Centre, the University of Surrey as well as access to railway stations to facilitate linked active travel/public transport journeys.

» There are several physical barriers that sever active travel networks, including railway lines, rivers and A roads.

» The topography of Guildford Borough is steep in places, with the Surrey Hills in the southern and eastern areas potentially deterring cycling activity.

» Collision history is reflective of settlement patterns, with the highest occurrences of cycle and pedestrian collisions recorded in the populated areas of Guildford Town.

» A number of online public engagement tools were available, which captured existing public input on active travel issues and suggestions. Mapping of this data highlights perceived local priorities amongst the general public.

» The PCT indicates a relatively high propensity for cycling in Guildford Borough, both for commuter and school trips. Propensity is again highest in the built-up urban areas of Guildford Town Centre, south to Shalford and to the west in Ash.

5. Stakeholder Engagement

5.1. Introduction

5.2. Stakeholder Workshops

5.3. Other Engagement Activities

5.1. Introduction

Stakeholder engagement is a key element of this LCWIP as it ensures that the views and knowledge of local people are taken into account.

During the project, two sets of stakeholder workshops were held: Phase 1 and Phase 2 workshops.

Both Phase 1 and Phase 2 workshops were held with:

» Internal stakeholders (officers from SCC and GBC).
» Elected members (with representatives from parish councils, SCC and GBC).
» External stakeholders (such as representatives from walking and cycling groups).
» Neighbouring Boroughs.

The first workshop presented the existing issues and the identification of draft walking and cycle routes. The second workshop reviewed the proposed infrastructure interventions.

Stakeholders' comments provided important feedback throughout each stage of the study. Comments were taken on board to refine the selection of CWZs, walking and cycling routes and the proposed intervention measures.

5.2. Stakeholder Workshops

For all workshops, the relevant stakeholder groups were identified by GBC and SCC and invitations were issued prior to the events, with AtkinsRéalis facilitating the workshop. Invitees included:

» SCC officers.
» GBC officers.
» GBC Elected Members.
» Community Rail Partnership.
» Guildford Access Forum.
» Guildford Bike User Group / G-BUG.
» Guildford Group of the Ramblers' Association.
» Guildford Residents Association.
» Guildford Society.
» Guildford Vision Group.
» Royal Surrey County Hospital.
» Surrey Coalition of Disabled People.
» Sustrans.
» University of Surrey.

For the Neighbouring Boroughs workshops, attendees included officers from:

» Elmbridge Borough Council.
» Guildford Borough Council.
» Hampshire County Council.
» Rushmoor Borough Council.
» Surrey County Council.
» Surrey Heath Borough Council.
» Waverley Borough Council.

Workshops were held primarily via Microsoft Teams. For the external stakeholders, hybrid workshops were held enabling attendees to join in person or via Microsoft Team.

5.2.1. Phase 1 Workshop

During the first stage of the LCWIP stakeholder workshops were held in July and August 2023 where representatives from SCC, GBC and various Borough organisations, user groups, and residents' associations representatives attended.

Each workshop was divided into three main parts:

» Presentation of the project and work so far (data collected and review of policies and relevant schemes).
» Presentation of the proposed cycle network.
» Presentation of the proposed core walking zones and walking routes.

After the presentation of the proposed cycle and walking networks, there was an interactive session where participants' comments were added to the relevant map. Participants were also asked to vote for their top five cycle routes and top five core walking zones / walking routes and the outcome was incorporated into the MCAF process (refer to Walking and Cycle Network sections) to select

the routes to be advanced to the development of potential interventions.

The project team asked for feedback on:

» The proposed cycle routes / walking zones, and their relative priority.
» Alternative routes / zones that attendees felt should be included and / or alternative alignments.
» Key issues, barriers, constraints, or opportunities the LCWIP project team should be aware of.
» Types of interventions attendees would like to see.

All stakeholder comments were considered prior to the Phase 2 engagement. In total 67 participants attended the five[1] Phase 1 workshops, excluding AtkinsRéalis project team.

5.2.2. Phase 2 Workshop

During the second stage of the LCWIP, stakeholder workshops were held in November and December 2023. The lists of invitees were very similar to the ones for the Phase 1 workshops, although additional stakeholders were included throughout the process.

The workshop was divided into two main parts. The first included a presentation on the proposed interventions for the cycle routes and the second part a presentation on the proposed interventions for the selected core walking zones and walking routes.

As per the Phase 1 stakeholder workshops, after the presentation of the cycle and walking networks, there was an interactive session where participants' comments were added to the relevant map.

The project team asked for feedback on:

» The proposed interventions for each route.
» Alternative interventions attendees would like to see.
» Additional information and/or issues to be aware of to help guide proposals and future assessments.

Once again, following the comments received during the Phase 2 workshop, the proposed interventions for the Phase 1 selected cycle and walking routes were subsequently updated. Subsequently, a workshop was held in January 24 to discuss updates to proposed interventions in Shalford following feedback in the Phase 2 workshops. In total 55 participants (excluding AtkinsRéalis project team) attended the six[2] Phase 2 workshops.

For detailed information on the comments received and responses/actions taken by the project team, refer to Appendix 9a and 9b (separate document).

Figure 38. Phase 1 external stakeholder meeting

1 Internal, Neighbouring Boroughs, Elected Members and External Stakeholders (in person and on line).

2 Internal, Neighbouring Boroughs, Elected Members and External Stakeholders (in person and on line) as well as Shalford with representatives.

5.3. Other Engagement Activities

5.3.1. Public Engagement

Early public engagement was carried out via a number of web-based surveys. The primary tool was SCC's LCWIP Commonplace survey. Originally used during the Covid-19 pandemic, to identify potential schemes for Emergency Active Travel Fund support, the survey was re-publicised at the start of the Guildford Borough LCWIP study to encourage additional public input. Comments logged on Widen My Path public survey platform were also considered.

The interactive sites allowed the public to leave comments about deficiencies and desired improvements related to walking, cycling and other issues. The information was used to help identify the proposed walking and cycling networks.

The surveys were opened to the public during the COVID-19 pandemic and are still opened for comments. AtkinsRéalis processed the available data up to July 2023.

5.3.2. Member Briefing

An online briefing for local GBC and SCC members was held on 2 November to introduce the Guildford Borough LCWIP at the start of the study process. The briefing provided an overview of the LCWIP process, objectives, key outputs, and programme. It also provided an overview of the Surrey-wide LCWIP programme and how the LCWIP fits into broader policy objectives (e.g., LTP4 and Climate Change Strategy) and active travel scheme development and funding opportunities.

5.3.3. Other Meetings

Throughout the development of the LCWIP, fortnightly meetings took place with the GBC and SCC project team to review, discuss, and provide feedback on the direction of the study, cycle and walking network proposals, and potential interventions.

The team also attended monthly wider coordination Guildford urban area - Sustainable Movement projects meetings led by SCC, as well as alongside meetings for other SCC-led schemes to ensure the schemes were coordinated and complementary.

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.
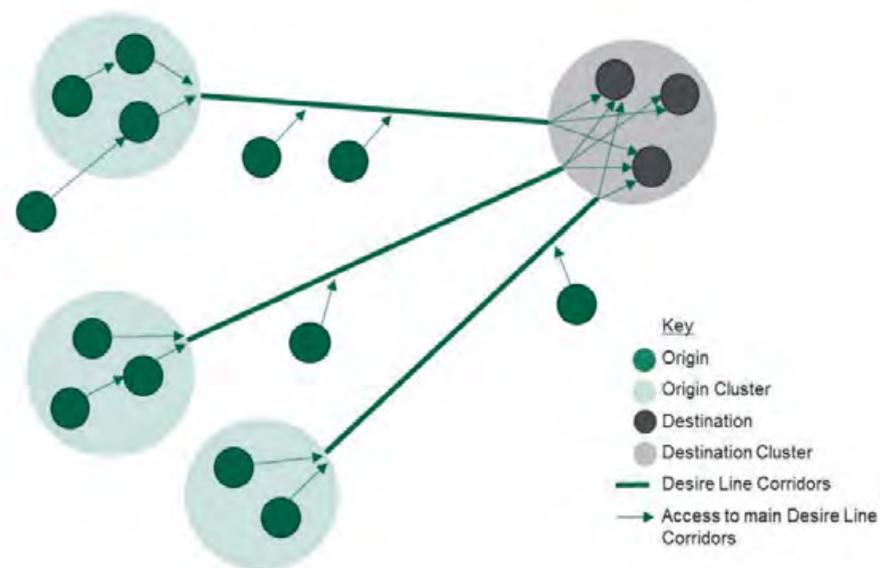

Key
● Origin
○ Origin Cluster
● Destination
○ Destination Cluster
— Desire Line Corridors
→ Access to main Desire Line Corridors

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.

Guildford Local Cycling and Walking Infrastructure Plan

Data Overlay

Heat Map

More Issues & Opportunities

Fewer Issues & Opportunities

⊗ Railway Station
--- Railway Lines
— A Road
— Motorway
☐ District / Borough Boundary

Layers:

IMD Deprived Areas + Workplace Zones + Population + Development Sites + No Access to Car Areas + Schools + Railway Stations + Retail Areas + Hospital/Medical Care + Employment Sites + Greenspace + Collisions Sites + Comments Cycling + PCT Short Car Trips + PCT Commuters Ebikes + PCT School + Cycle Facilities + Cycle Infrastructure Points + National Trails + Guildford Comprehensive Cycle Network

Contains OS data © Crown copyright 2023; Map tiles by CartoDB, under CC BY 3.0. Data by OpenStreetMap, under ODbL; Openstreetmap and its contributors; SCC PRoW data 2022
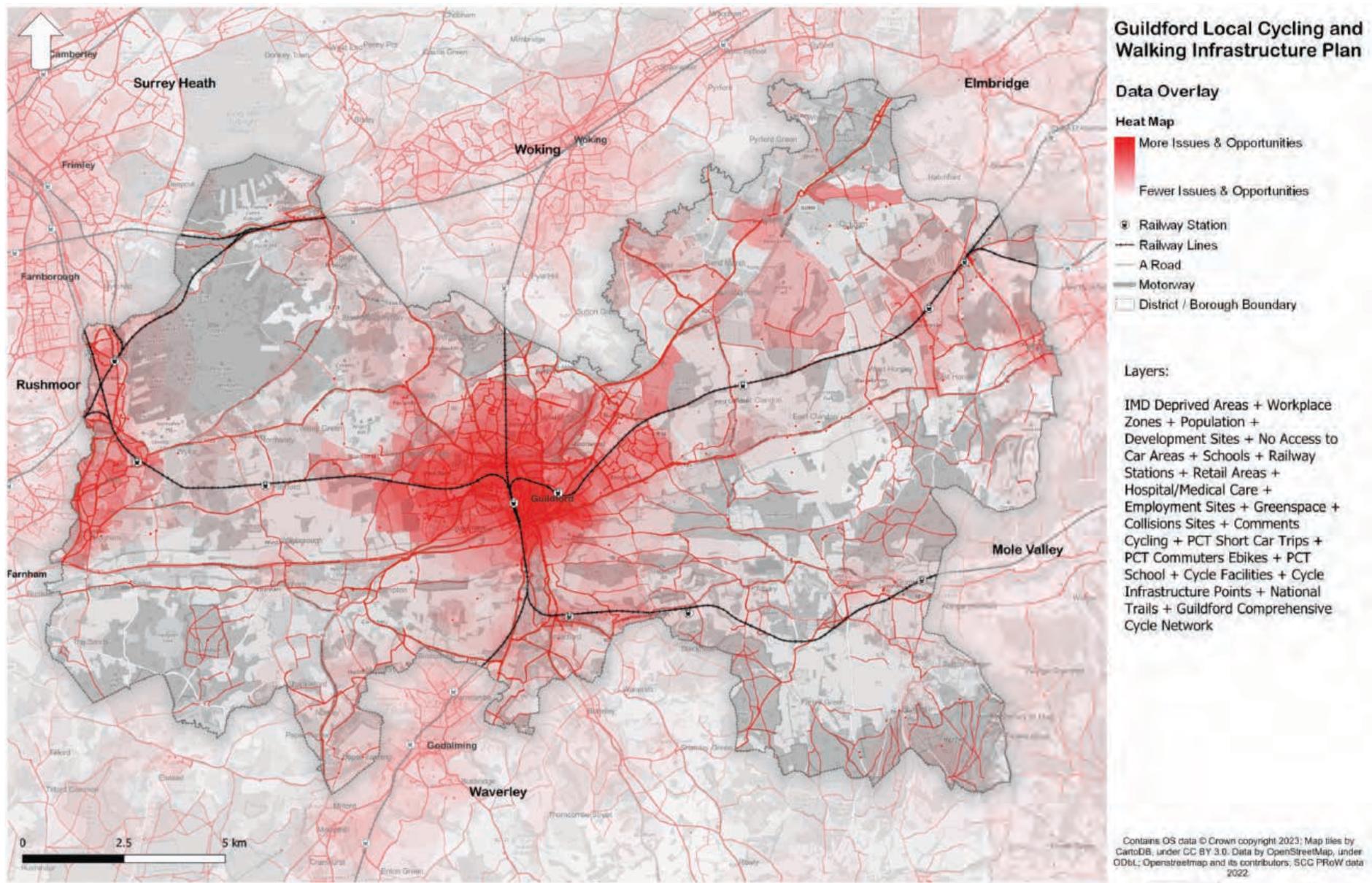
Figure 40. Qualitative 'Heat Map' showing the various data elements overlaid to illustrate areas with higher concentrations of issues and opportunities
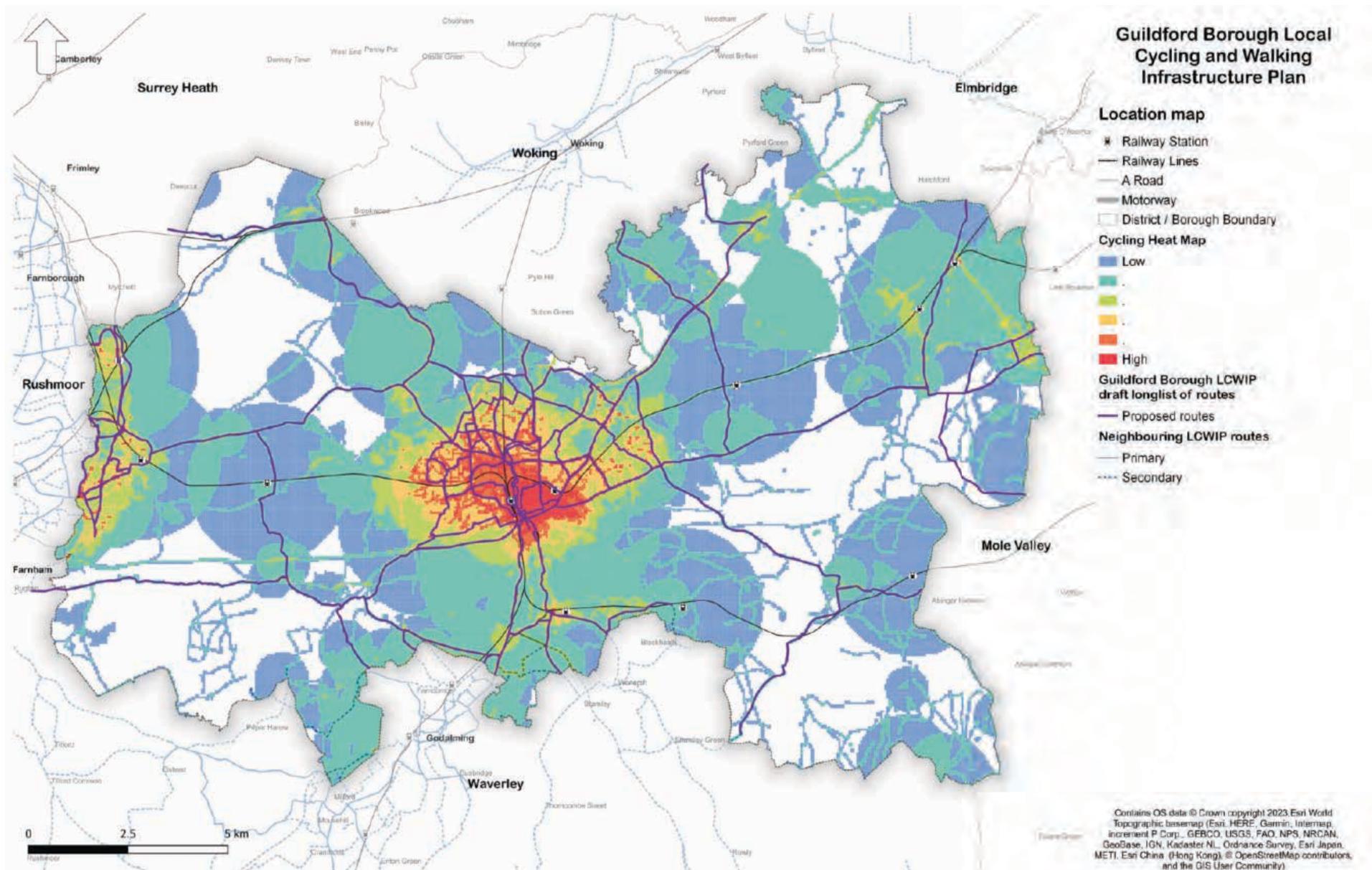
Figure 41. The initial Cycling Network Map resulting from the quantitative analysis showing low to high potential demand for cycling

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

Guildford Borough Local Cycling and Walking Infrastructure Plan

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.
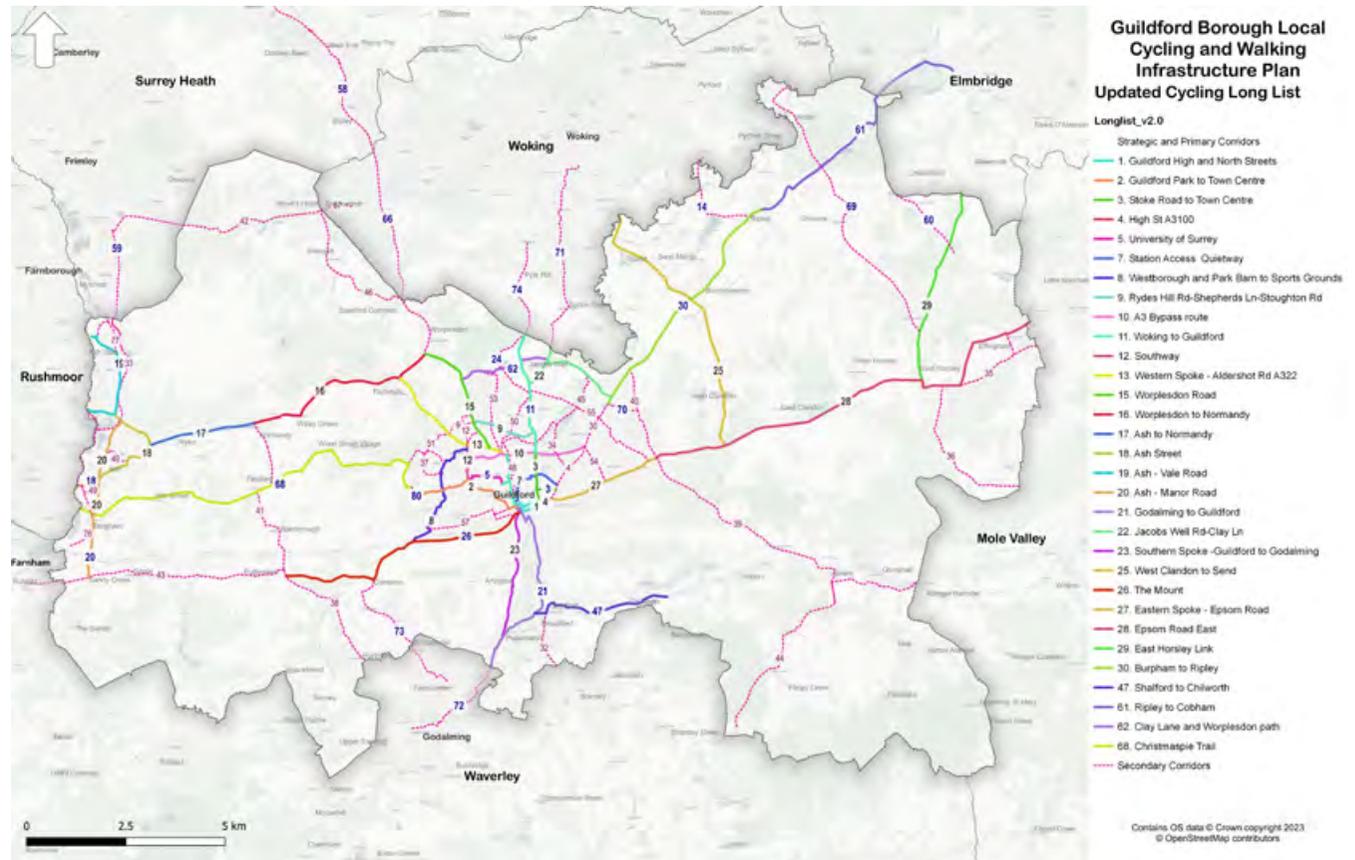

Figure 43. Aspirational cycle network

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
Demand (30%)	Number of schools[2] - within 400m (3)	1= low number of schools 2= medium number of schools 3= high number of schools
	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)

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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.
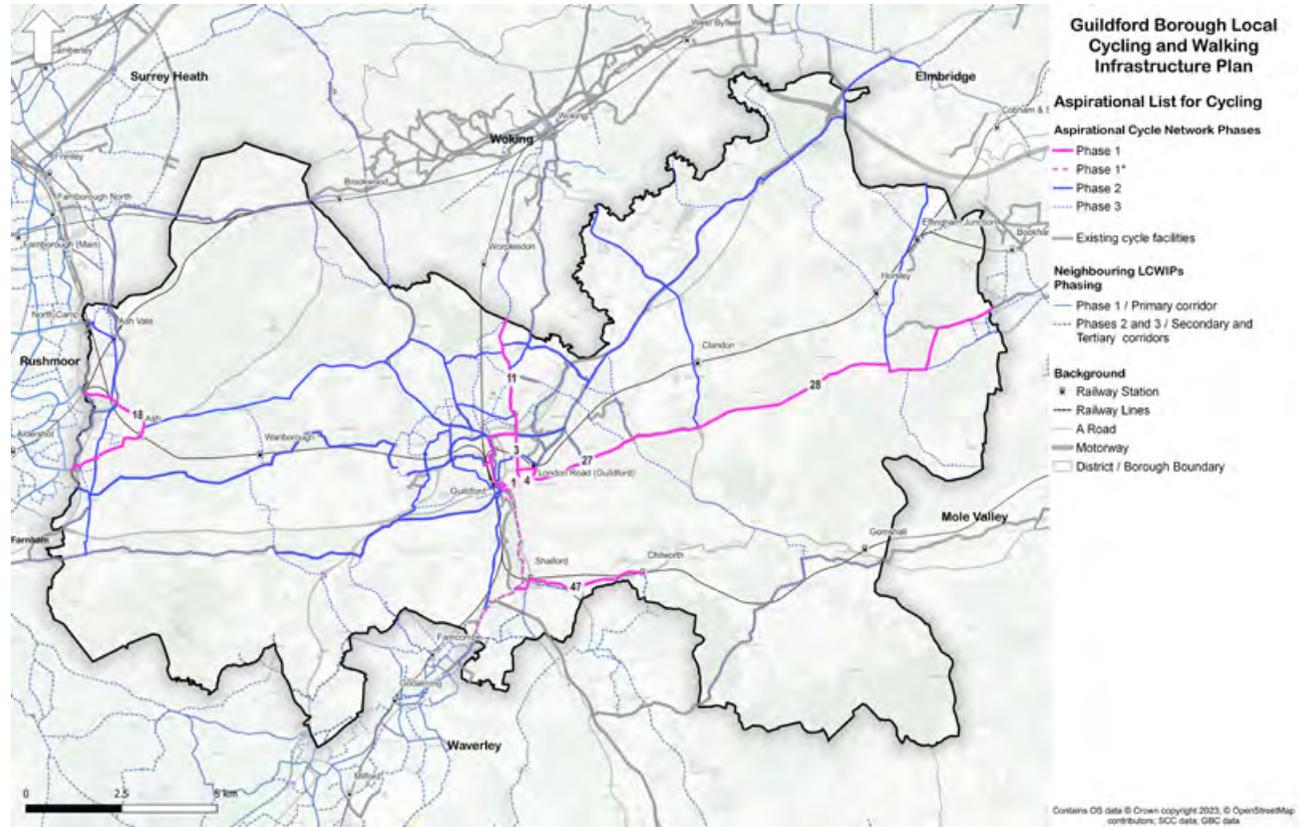

Figure 44. Guildford LCWIP MCAF Results

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.

7. Cycle Network Proposals

7.1. Design Tools and Best Practice Examples

7.1.1. Introduction

Following the identification of the high scoring cycle corridors, proposals or high-level infrastructure improvements were developed. The following section gives a summary of the type of tools that can be used in the schemes developments.

7.1.2. Design Outcomes

Potential improvements for cycling were developed following a set of desired core design outcomes, informed by LTN 1/20. These desired design outcomes have been identified to make cycling more attractive and encourage more users to make journeys within the town by cycle.

7.1.2.1. Directness

Cycle corridors which serve key origins and destinations directly - and preferably not significantly longer than the route a vehicle would take.

7.1.2.2. Comfort

Cycle corridors that are comfortable to use with a surfacing that is smooth and a width that supports the expected volume of cyclists whilst also considering other road users.

7.1.2.3. Gradient

Cycle corridors which do not have an excessive gradient, which could potentially put off everyday cycling trips.

7.1.2.4. Safety

Cycle corridors that are in areas which have speeds and traffic volumes that support and encourage cycling of people of all ages and abilities.

7.1.2.5. Coherence

Cycle networks should be planned and implemented to enable users to reach their desired destinations, should be easy to navigate and be of a consistent high quality.

7.1.2.6. Attractiveness

Cycle corridors should provide an environment that is welcoming for users so that cycling can be an enjoyable activity and contribute to public realm enhancements.

7.1.2.7. Context Sensitive Design

Improvements should complement and enhance the character of urban and rural environment. The high-level concepts developed in the LCWIP should be suitable for the setting, and design guidance should be adapted to fit the local context and space constraints.

7.1.2.8. Adaptability

Cycle infrastructure should be developed to accommodate all types of users, and potential growth in demand. The provided facilities should be accessed and used by as many people as possible, regardless of age, gender and disability.

7.1.2.9. Inclusive Design

Facilities for cycling should provide equal access for people with disabilities and ensure that streets meet the requirements for all users. To facilitate these cycling improvements they will follow several general principles, which can be applied throughout Guildford Borough.

Examples of design elements that support these principles are shown on the following pages.

» Cycle facility hierarchy - The type of cycle facility appropriate for a given street is highly dependent on its context, including vehicle flows and speeds, carriageway space, surrounding development, and general character. However, as a general principle, selection of an appropriate cycle facility should consider the following hierarchy: segregated facilities, quiet corridors, shared-use paths/footways, mixed traffic.

» The hierarchy follows the cycle design principles of segregation from traffic and low traffic speeds/volumes. Segregated facilities are typically preferred, creating a comfortable and attractive facility for users of all ages and abilities and providing the greatest potential to encourage mode shift to cycling. Alternatively, cycle corridor alignments or design measures to support low traffic speeds (≤20mph) and flows may provide an attractive option if the corridor is direct.

» Access to schools - Safe cycle corridors are essential to encourage more children to cycle to school. Several primary cycle corridors seek to accomplish this, while additional secondary corridors may be developed in future.

» Lower traffic speeds - High vehicle speeds reduce comfort and safety for people cycling. Motor vehicle speeds of 20mph or lower are preferred to minimise speed differential with people cycling[1]. Design elements such as vertical deflection (e.g. speed cushions, raised tables/raised junctions) or horizontal deflection (e.g. kerb build-outs, tight kerb radii, priority working) may be used, as appropriate, to support the desired vehicle speeds and create an environment where the speed limit is self-regulating. Traffic calming measures should also be considered for people cycling, such as providing cycle bypasses at kerb build-outs to manage potential conflicts with other road users.

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1 Studies shown that 20 mph zones would be beneficial to encourage cycling particularly by women.

» Reduce motor vehicle flows - Strategies to reduce motor vehicle flows (e.g. local access only restrictions, time restrictions, or modal filters) should be considered on cycle corridors where segregation is not feasible to improve comfort for people cycling and create a more attractive cycle corridor.

» Review on-street parking - On-street parking provisions can create potential conflict points between people cycling and motor vehicles, particularly where there is a high parking turnover. Conflicts can arise from either vehicles entering/leaving a parking space or opening of vehicle doors, or when parking obstructs visibility. Reducing parking could free carriageway space to be reallocated for active uses, such as improvements for people walking or cycling. Where parking is retained, providing parking on raised pads can provide wider, more flexible footway space and encourage slower speeds by reducing the carriageway width. To inform further design development, parking surveys will be undertaken to estimate the demand for parking and consider the need for alternative parking locations.

» Junction and crossing improvements - Improvements should seek to improve priority for people cycling and visibility at junctions, enhancing safety and continuity of the cycle corridor. At uncontrolled junctions and side road crossings, improvements should seek to reduce motor vehicle speeds (e.g., tighten junctions, reduce bellmouth at side roads, increase vehicle deflection at roundabouts).

» Wayfinding - Good sight lines and visibility of destinations and of cycle corridors are important elements that affect how easy a corridor is to navigate, how many people cycling use the corridor, and perceived personal security. Wayfinding signage should be used to aid navigation and encourage use of the designated corridors. Appropriate signage can improve confidence in using the corridor and encourage more cycling trips, particularly for those unfamiliar with the area. Signage that includes a distance and estimated travel time can also help avoid overestimating the time it takes to make a trip by cycle, encouraging increased cycle use for short journeys. A consistent Wayfinding system should be applied on cycle corridors throughout the county.

» Avoid potential conflict with pedestrians - Cyclists should ideally be physically separated from pedestrians and should not share space[2].

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2 Shared use facilities are generally not favoured by either pedestrians or cyclists, particularly when flows are high. It can create difficulties for visually impaired people. Actual conflict may be rare, but the interactions between people moving at different speeds can be perceived to be unsafe and inaccessible, particularly by vulnerable pedestrians. This adversely affects the comfort of both types of users, as well as directness for the cyclist. However, LTN 1/20 does accept that Shared use may be appropriate in some situations such as alongside interurban and arterial

Shared routes away from streets and at areas where pedestrian flows are low if there are space constraints may be considered. Conversion of existing footways to shared use may be considered when options that reuse carriageway or other (e.g. verge) space have been rejected as unworkable, or in situations where a length of shared use may be acceptable to achieve continuity of a cycle corridor.

» Secure cycle parking - Offer a variety of cycle parking to improve convenience and security, including parking facilities for non-standard cycles, which can include trailers, tricycles, and adapted cycles.

» Green buffers - Where possible, provide green buffers between motor vehicle traffic and people cycling and walking. This increases safety and comfort, and provides opportunities for planting or sustainable drainage systems (SuDs). Minimum width of the buffer is dependent on traffic speeds, as per LTN 1/20. (Refer to Share Use Path image below).

» Context sensitive design - Improvements should complement and enhance the character of urban and rural environments. The high-level proposals for infrastructure improvements developed in the LCWIP should be suitable for the setting, and design guidance should be adapted to fit the local context and space

roads where there are few pedestrians or in situations where high cycle and high pedestrian flows occur at different times. For more information, refer to Cycle Corridor Typology on page 99.

constraints. Particular attention will be paid to the treatment of heritage assets.

» Inclusive design - Cycle infrastructure should be accessible to everyone, regardless of age, gender, ethnicity, or disability, and should not create hazards for vulnerable pedestrians.

» Adaptability - Improvements should be developed to accommodate all types of users, including bikes with trailers, cargo bikes and other, and anticipate potential growth in the numbers of people cycling.

» Design Standards - As proposed cycle improvements are advanced, design stages should utilise the latest best practice design guidance and standards available at the time, such as:
  – London Cycle Design Standards (TfL).
  – The Highway Code (DfT)
  – Cycle Infrastructure Design (LTN 1/20)
  – London Cycle Design Standards (TfL)
  – Manual for Streets (Chartered Institution of Highways & Transportation)
  – Inclusive Mobility (Department for Transport)

» Protected cycling facilities - These will be best aligned to national design guidance and help to reduce collisions involving people cycling.

» Compete with motor vehicle journey times. By considering the alignment of the corridor and the nature of the interventions it can help to promote the mode of travel as an equal to motorised modes.

» Continuity of typology: Cycle corridors should be continuous and coherent. Frequent change

of cycling infrastructure typology can cause delay to travel and discourage potential users who are not willing to switch between multiple infrastructure types.

7.1.3. Examples of Cycle Infrastructure

The following pages provide examples of types of cycle facilities that could be considered in the Guildford Borough LCWIP proposals.

Segregated Cycle Lane / Cycle Track

Provides raised, physical separation between people cycling and motor vehicles, providing a more comfortable, more attractive, and safer facility for people cycling of all ages and abilities. A segregated cycle track can be one-way or two-way and can be used to accommodate contraflow cycling on one-way streets. Side road treatments are required to provide continuity of the facility and priority at junctions.

Lightly Segregated Cycle Lane

Provides some physical barrier from motor vehicles to improve comfort for people cycling. May be applicable where space constraints limit segregation options. Types of segregation could include kerbing, bollards (as shown above), planters, or armadillo humps / orcas. Side road treatments are required to provide continuity of the facility and priority at junctions.
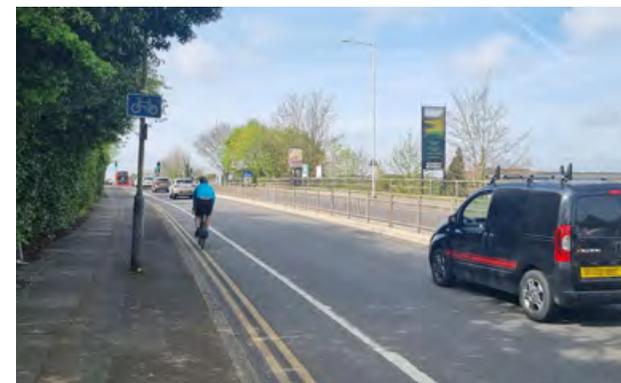
Mandatory Cycle Lane

Provides a dedicated space for people cycling within the carriageway, separated by road markings only. Motor vehicles are not permitted to enter the cycle lane.

Off-carriageway Cycle Track

Motorised-traffic free corridors away from the highway can form important links for everyday trips. They are attractive to those who prefer to avoid traffic and can provide more direct corridor options than the road network. They need to be designed and maintained to a high quality, particularly in terms of surfacing, accessibility, clearance of vegetation, and lighting.

Shared Use Path

Provides an off-carriageway facility shared with people walking. While segregated from motor vehicles, conflicts between people walking, wheeling and cycling may arise, depending on the relative flows of each. If space allows, light segregation may be considered to encourage separation of people walking and cycling (e.g., raised trapezoidal strip). Side road treatments are required to provide continuity of the facility and priority at junctions.

Advisory Cycle Lane

Delineates an area intended for cyclists within the carriageway where the street is too narrow to accommodate dedicated cycle facilities. Advisory lanes should only be used when limitations on the overall space available mean that motor vehicles will sometimes need to enter the cycle lane.

'Dutch-Style' Cycle Street Facilities

Seeks to prioritise people cycling over motor vehicles. Elements may include advisory cycle lanes to delineate space for people cycling, 20mph speed limit, and removal of the centre line to narrow the apparent space for motorists and prioritise the outside of the carriageway for people cycling. The design elements should make it understood that the streets are principally for cycling.

Contraflow Cycle Lane

Improves the convenience, directness, and attractiveness of cycling by accommodating contraflow cycling on one-way streets, shortening cycle trips and improving cycle access. Contraflow cycle lanes may be segregated or non-segregated, depending on context and available width.

Side Road Entry Treatment

Encourages motorists to reduce speeds, indicates pedestrian and cycle activity, and encourages driver compliance with the (updated) Highway Code. Also enhances priority for people wheeling, walking and cycling and makes the side road crossing easier and more convenient for people by maintaining the continuity of the corridor at footway level.

Quiet Mixed Traffic Street

Where traffic flows are light and speeds are low, people cycling are likely to be able to cycle on-carriageway without segregation. Traffic calming and/or traffic management measures may be required to reduce traffic speeds and/or flows to provide appropriate conditions for an inclusive and attractive facility.

Pedestrian/Cycle Priority Street

Reduces vehicle dominance of the street and prioritises people walking, wheeling and cycling. Elements may include restricted motor vehicle access, materials/markings to delineate space for different users, low traffic speeds, or features of a shared space environment.

Cycle Parking

Cycle parking is an essential component of cycle infrastructure. Sufficient capacity, convenient, and secure cycle parking enables people to choose cycling. Proximity to destinations and security concerns can be a factor. Design should consider access for all types of cycles and their passengers.

Parallel Crossing

Provides priority for people walking, wheeling, and cycling at a crossing location, minimising the delay for people cycling, improving the directness of the corridor, maintaining separation from pedestrians, and connecting off-carriageway cycle facilities.

Toucan Crossing

Provides a controlled crossing for people walking, wheeling and cycling, improving user comfort and safety, reducing delay at busy streets where there are limited gaps in traffic, and connecting off-carriageway shared use facilities.

Signal-Controlled Cycle Crossing / CYCLOPs Junction

Provides a controlled crossing, segregating cyclists from pedestrians as well as motor vehicles. A 'cycle optimised protected signals' ('CYCLOPS') junction separates people walking, cycling and wheeling from motor vehicles, reducing the risk of conflict between users.

Cycle Wayfinding

Improves the coherence of the cycle network, making it easier for people to navigate and encouraging more trips to be taken by cycle. Signage can also include indicative journey lengths or times. A consistent system should be applied county-wide.

Bus Stop Bypass

Provides a continuous cycle facility around a bus stop, maintaining separation from the carriageway. The island should be wide enough to accommodate the bus stop and people waiting, boarding, and alighting. Pedestrian crossing points should be controlled if cycle traffic speed and flows are high.

Bus Gate

A type of modal filter that allows buses (and /or other vehicles) to move through a road section but prohibits other motor vehicle traffic. It usually permits cycling and operates with ANPR cameras to enforce the access restrictions. Restrictions may be enforced during specific days or times of the day to reduce traffic volumes.

Guildford Borough Local Cycling and Walking Infrastructure Plan

Lower Traffic Speeds

Improves safety for all road users and fosters a more comfortable environment for walking, wheeling and cycling. Should be supported by traffic calming measures, as needed, to make the speed limit self-enforcing. An area-wide policy could be considered rather than on a street by street basis.

Modal Filter

Supports a safer, more attractive environment for walking, wheeling and cycling by reducing motor vehicle traffic and permitting more direct, convenient access by foot or by cycle. Temporary or permanent highway features that may permit access by certain vehicles (e.g., emergency vehicles, buses, blue badge holders).

School Street

Implements timed vehicle access restrictions during school arrival/dismissal times to encourage more pupils to walk and cycle to school and improve the safety, comfort, and attractiveness of these modes. School streets may be configured to permit access by certain vehicles.

Mobility hubs

Highly visible, safe and accessible spaces where public, shared and active travel modes are co-located alongside improvements to public realm and, where relevant, enhanced community facilities. They help reduce the dominance of private cars, facilitate multi-modal trips, activate public realm, and support placemaking. They can include a wide range of components, such as cycle/e-bike/cargo bike parking/hire, parklets, EV car club, public transport links, parcel collection, cafe, wayfinding, etc.

(image: Collaborative Mobility UK)

7.1.3.1. Cycle Corridor Typology

DfT's LTN 1/20 also provides information in regards to the typology and dimensioning of cycle lanes and cycle tracks. Cycle corridor typology is based on the volume and speed of motor vehicle traffic, as illustrated in Figure 45. Further, the width of the cycle corridors is defined by peak hour cycle flows (Figure 46).

According to LTN 1/20, shared use routes in streets with high pedestrian or cyclist flows should not be used. However, shared use facilities may be appropriate in some situations, if well-designed and implemented:

» Alongside interurban and arterial roads where there are few pedestrians;

» At and around junctions where cyclists are generally moving at a slow speed including in association with toucan facilities;

» In situations where a length of shared use may be acceptable to achieve continuity of a cycle corridor; and

» In situations where high cycle and high pedestrian flows occur at different times."

Figure 45. Cycle facility typology in relation to motor vehicle traffic flows and speed (DfT LTN 1/20)

Figure 46. Cycle lane and track widths in relation to peak hours cycle flows (DfT LTN 1/20)

Cycle Route Type	Direction	Peak hour cycle flow (either one way or two-way depending on cycle route type)	Desirable minimum width* (m)	Absolute minimum at constraints (m)
Protected space for cycling (including light segregation, stepped cycle track, kerbed cycle track)	1 way	<200	2.0	1.5
		200-800	2.2	2.0
		>800	2.5	2.0
	2 way	<300	3.0	2.0
		>300-1000	3.0	2.5
		>1000	4.0	3.0
Cycle lane	1 way	All – cyclists able to use carriageway to overtake	2.0	1.5

*based on a saturation flow of 1 cyclist per second per metre of space. For user comfort a lower density is generally desirable.

7.2. Phase 1 Proposed Cycling Improvements

This chapter proposes potential design measures to enhance the selected cycle corridors in Phase 1. The proposed measures are high level and identify high-level proposed interventions for consideration in the next stage of design. They seek to address issues and deficiencies identified during the audit activities, as well as to incorporate proposals from previous studies.

For cycling, the interventions seek to improve the environment for cycling to a high standard following the LTN 1/20 technical guidance. All proposed measures would be subject to varying levels of additional analysis and future feasibility design.[1] This would involve designs with greater detail and in which further observations and measurements would be taken to continually improve the design. This would also include confirmation of land ownership boundaries as well as surveys as necessary.

As proposed cycle improvements are advanced, design stages should utilise the latest best practice design guidance and standards available at the time, such as:

» Cycle Infrastructure Design (DfT, LTN 1/20).

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[1] This is a concept design. All the proposed interventions are subject to topographic survey, traffic modelling, parking surveys, utilities' survey, environmental surveys and availability of land.

» Manual for Streets 1.
» Inclusive mobility (DFT, 2022).

All proposed interventions will also require further consultation in the next stages of the design following surveys to estimate the impact of the proposals. Representatives of groups of people with disabilities and mobility issues will be further engaged in the design to provide input to the proposed interventions and ensure the outcomes of the interventions will cater to their needs in the most appropriate way.

The proposed improvements are presented for each cycle corridor on the following pages. While these proposals are focused along the primary cycle corridors, they also provide examples of the types of improvements that can be implemented borough-wide as needs or opportunities arise.

It is noted that some of the desirable locations for active travel improvements are privately owned and are not within SCC's publicly maintained roads. As such, collaborative working with the respective owners will be required to explore opportunities to improve conditions for active travel.

Additionally, consideration will need to be given during subsequent development phases to review and co-ordinate future opportunities for integration with other active travel improvements, including those identified within the long-list network and those which may be progressed separate to the LCWIP proposals.

Cycle parking is proposed for all cycle corridors, as part of footway and public realm improvements. Opportunities should be considered to integrate secure cycle parking near local and key destinations, such as railway stations, commercial areas, and educational facilities.

Further, a separate freight strategy may be required in selected areas, for example for servicing Guildford Town Centre. This would investigate opportunities to manage HGV flows in the area, improve road safety and improve cycling in Guildford Town Centre. Opportunities could involve the use of LGVs and cargo bikes for servicing, and consideration of time restrictions on freight movements. Such measures have been identified in parallel workstreams, including the Guildford Town Centre Air Quality Action Plan. Consideration of freight activity in this way could support modal shift to cycling, by improving safety and cycling facilities. Furthermore, such an approach supports the strategic priorities set out in the DfT's Decarbonising Transport: Setting the Challenge, which highlights the need to decarbonise how goods are delivered.

7.2.1. Cycle Corridors Typology

As indicated in pages 98 and 99, the proposed measures consist of a mix of facility typologies, indicative of the varying contexts and constraints across Guildford. As noted previously, future feasibility planning, assessment, and design stages will review local constraints and cycle facility options in more detail.

At this initial stage of option assessment, the proposals aim to include segregated facilities where there is potential to accommodate them. This is reflective of the LCWIP objectives, LTN 1/20 standards and high local aspirations for cycling. In significantly constrained areas, it includes proposals to improve cycling with mixed traffic, reducing traffic speeds[1], restricting motor vehicle access, tightening side road junctions, and/ or redesigning streets to enhance cycle and pedestrian priority.

Design proposals are presented separately for each corridor. However there are a number of interventions that are applicable to all or most routes (wide-area measures) and are summarised below:

» Introduce 20mph zones with additional improvements for crossings at junctions and further traffic calming measures to be reviewed in the next stages of design following speed surveys.
» Wayfinding: Review and update area-wide wayfinding system. Consider measures such as wayfinding totems at key locations (e.g., railway stations, High Street/town centre) to help cyclists (as well as pedestrians) navigate the area, illustrate the locations of local destinations and potential routes between them.
» Cycle parking: As part of footway and public realm improvements, consider opportunities to integrate secure cycle parking near local destinations.
» Mobility hubs: Consider a network of mobility hubs across the area to encourage uptake of active travel modes and support place-making.

The proposed interventions for the cycle corridors will be presented according to their geographical location, as follows (Figure 47);

Guildford town urban / suburban area: 4 cycle corridors

» Cycle Corridor 1: Guildford High Street and North Street
» Cycle Corridor 3: Stoke Road to Town Centre and Cycle Corridor 4: High St A3100 combined
» Cycle Corridor 11: Guildford to Woking
» Cycle Corridor 27: Eastern Spoke - Epsom Road

Ash and Tongham urban area: 1 cycle corridor

» Cycle Corridor 18: Ash Street

Rural areas: 2 cycle corridors

» Cycle Corridor 28: Epsom Road East
» Cycle Corridor 47: Shalford to Chilworth

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1 Additional measures to support speed limit changes to be considered in future design stages, such as traffic calming measures, reduction of carriageway width, etc.
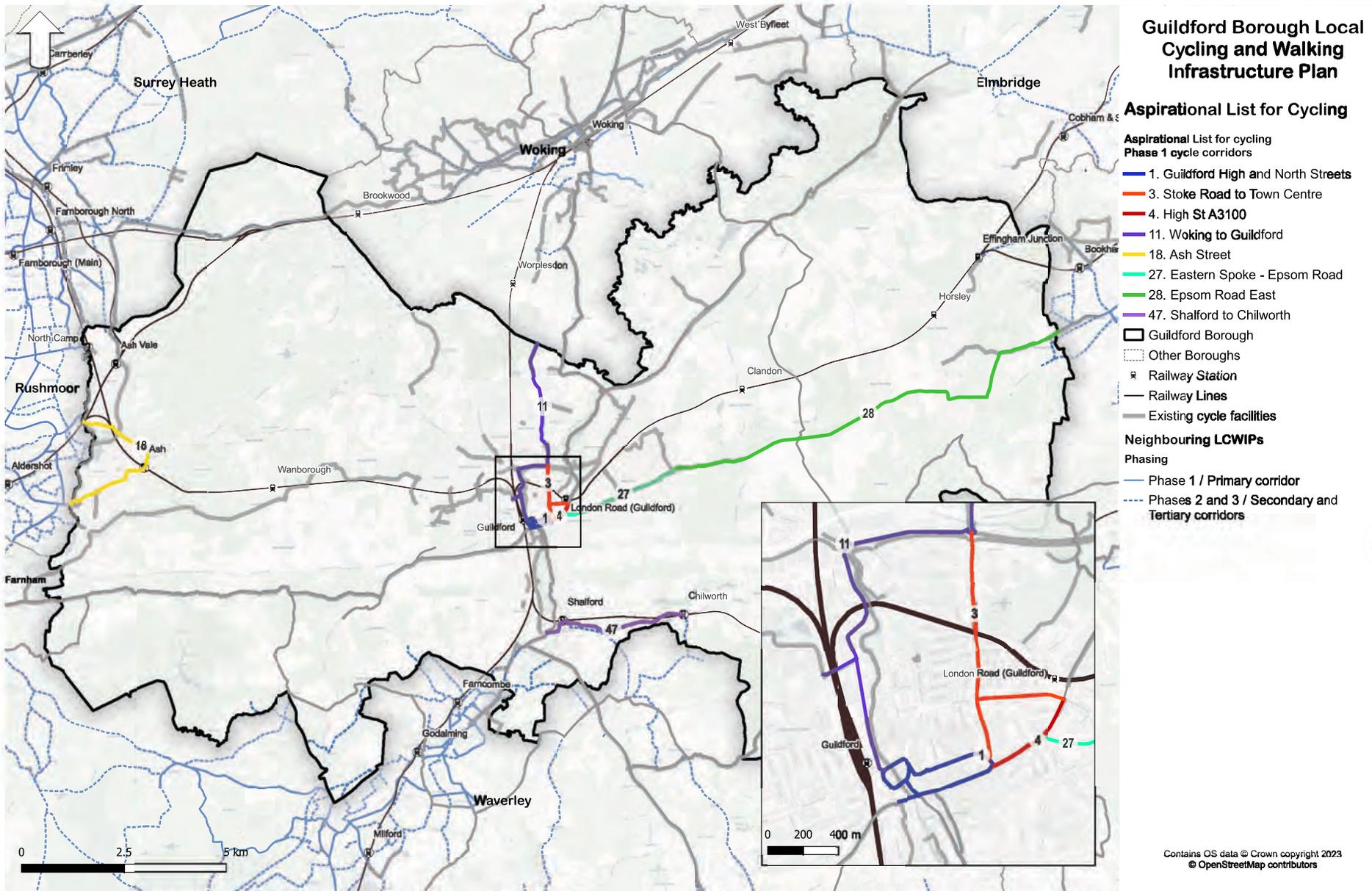
Figure 47. Phase 1 cycle network - Number in brackets (#) shows the number the corridor was initially assigned in the aspirational list

7.2.2. Cycle Network Typology

The proposed cycle facility typologies across the cycle corridor network selected for Phase 1 are illustrated in Figure 48 and Figure 49 (following pages). The proposed facilities reflect the design principles, local aspirations for cycling, and anticipated potential constraints along each route at this initial stage of option assessment.

Future feasibility design stages will be required along some routes to review constraints and cycle facility options in more detail. The proposed cycle network comprises a mix of facility typologies, indicative of the varying facility contexts and constraints across the Borough. It includes, for example sections of segregated cycle facilities where there is potential to reallocate space within the public highway or during future development. In significantly constrained areas, it includes proposals to improve cycling with mixed traffic, reducing traffic speeds[1], providing advisory cycle lanes, restricting motor vehicle access, tightening side road junctions, providing cycle markings, or redesigning streets to enhance cycle and pedestrian priority.

Alternative alignments are proposed in selected locations where LTN 1/20 compliant infrastructures are likely not feasible. Additionally, short links within the local road network , that do not require any improvements are proposed as 'connector routes', to provide access to key destinations that are not along the main corridor, and between sections of the main alignment.

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1 Additional measures to support the speed limit change to be proposed in the feasibility stage, such as traffic calming measures, CCTV, reduction of carriageway width, etc.

Guildford Borough Local Cycling and Walking Infrastructure Plan

Proposed Cycle Facility Typology

- Two-way cycle track
- Two-way cycle track - off carriageway
- One-way cycle track
- Stepped track
- Shared use path
- Shared use path - off carriageway
- Mandatory cycle lane
- Advisory cycle lane
- Pedestrian and cycle priority street / Quietway
- Mixed traffic
- Bus and cycle lane
- Alternative alignment
- Existing cycle facility / Bridleway
- Guildford to Godalming Greenway
- Neighbouring authorities proposed LCWIP network
- Railway Station
- Railway Lines
- Borough boundary

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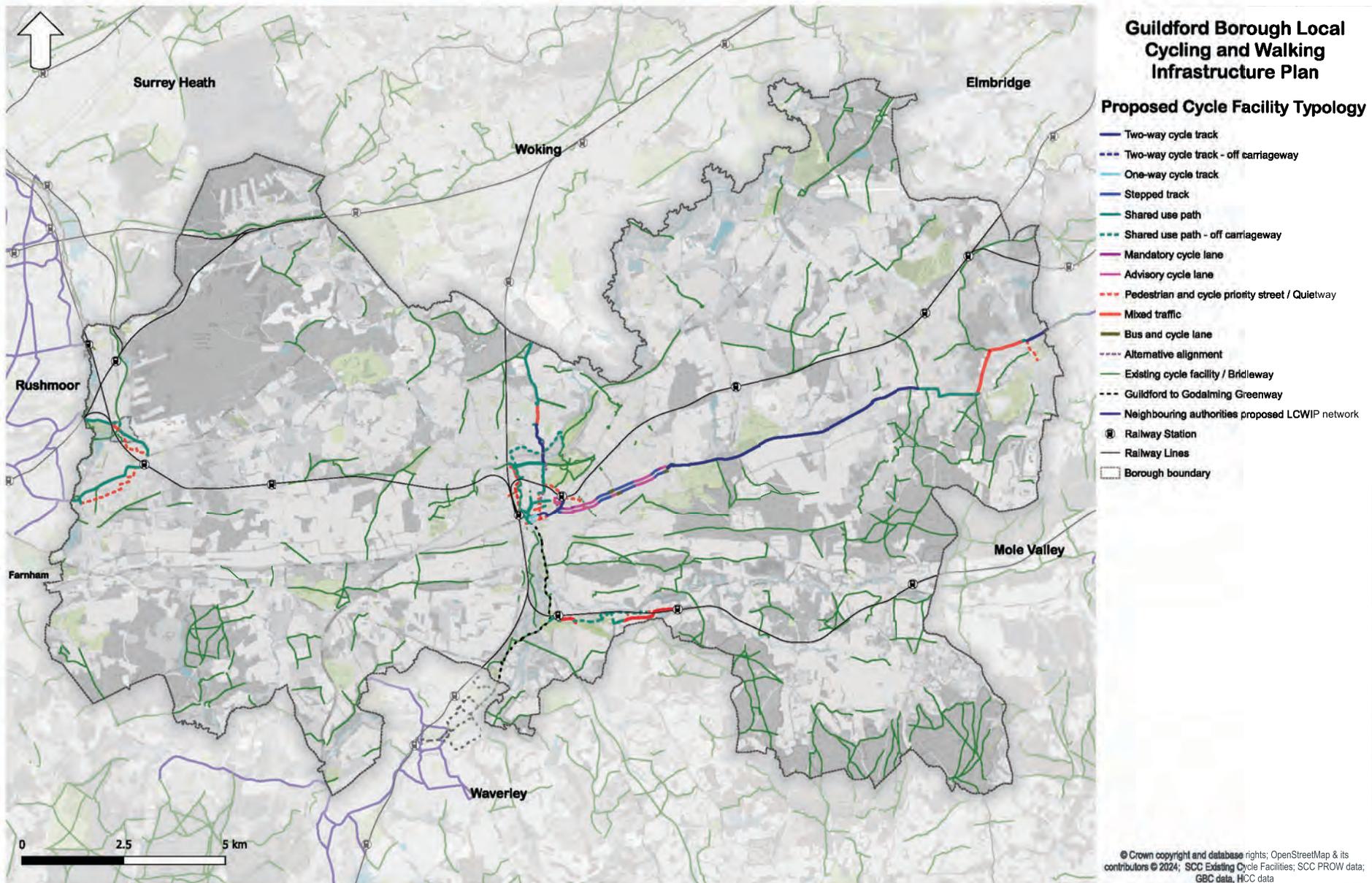
Figure 48. Overview network map of proposed Phase 1 cycle typologies

Guildford Borough Local Cycling and Walking Infrastructure Plan