

Brentwood Borough Cycling Action Plan

Highways/Transport Planning

March 2018



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Executive Summary

Essex Highways was commissioned by Essex County Council to produce a Cycling Action Plan (CAP) for Brentwood Borough, as part of a commitment in the Essex Cycling Strategy to create Cycling Action Plans for every Borough/District/City.

The purpose of the Essex Cycling Strategy is to set out the key elements of a long term plan that will lead to a significant and sustained increase in cycling in Essex, establishing it in the public's mind as a 'normal or regular' mode of travel, especially for short A-to-B trips, and as a major participation activity and sport for all ages.

To help achieve this, Essex is committed to establishing a coherent, comprehensive and advantageous cycle network in every major urban area, utilising a combination of on-carriageway and off-carriageway cycle facilities. To enable this, each Borough/District/City in Essex will have an up-to-date Cycling Action Plan (renewed every five years). These are seen as key elements of a long term plan that will lead to a significant and sustained increase in cycling in Brentwood Borough and in Essex.

This Brentwood Borough CAP is targeted towards the specific needs of Brentwood residents, which will assist Essex County Council (ECC) in tackling wider problems associated with poor health, pollution, traffic congestion and inequalities of opportunities for Brentwood's youth population and people on low incomes.

The aims of this Action Plan are to:

- Identify how cycling levels can be increased in the Borough;
- Prioritise funding for new cycling schemes in Brentwood;
- Create a usable, high-quality cycle network that connects residential areas with key employment locations, railway stations, and town centres; and
- Create opportunities to increase recreational cycling in Brentwood.

Understanding current levels and conditions for cycling has been important in developing this CAP, which has involved analysis and consideration of 2011 Census data, the Propensity to Cycle tool, the Active People Survey (by Sport England), Department for Transport count data, collision data, cycle crime statistics and topography.

In order to create an environment where cycling is normal for the residents of Brentwood, it will be necessary to remove existing barriers to cycling and a series of cycle routes provided, with the aim of creating a connected cycle network over time. Cycling infrastructure should provide for both key utility journeys and encourage leisure cycling.

The key recommendations and schemes are listed in Sections 7 and 8 of this CAP and are summarised in Section 11 and below.

Key Recommendations

Taking into account the current barriers to cycling in Brentwood Borough, commuter flow analysis and locations of committed development, the following key recommendations have been made for cycle enhancements in the Borough:

- Review existing route signage and lighting;
- Improve maintenance of existing routes;
- Prioritise the E-W Flagship route, providing access to the town centre and railway station;
- Increased provision of useful cycle routes in Brentwood, Shenfield and Ingatestone, in particular;
- Provide new and improved cycle parking with a focus on satiating the considerable demand for commuter trips at railway stations. In particular, additional/ relocated cycle parking at Brentwood and Shenfield stations, with additional cycle parking at Ingatestone station on the northern side of the railway tracks;
- Fill obvious gaps in the existing cycle-route network (on alignments with cycle-friendly topography);
- Provide new infrastructure on key roads with cycle-friendly topography but no existing facilities;
- Investigate how to incorporate a N-S cycle route along Ingrave Road, to enable residents of Ingrave, Herongate and the future Dunton Garden Village to access Brentwood town and its cycle network;
- Consider future expansion of the cycle network north to connect the villages of Kelvedon Hatch and Doddinghurst to Brentwood town and its cycle network;
- Investigate how to improve N-S access for cyclists across the railway line as part of longer term improvements for cycling in Brentwood Borough;
- Redesign the public realm at Brentwood railway station, including provision for cyclist commuters to the station and for cyclists wishing to cross the railway;
- Update the existing cycle map every two years taking on board new innovation in cycle-map design, and promote it and disseminate it widely through a range of channels and outlets;
- Develop Flagship Routes through Feasibility Studies to Detailed Design; and
- Promote and market Flagship Routes with 'Cycle Superhighway' style branding and disseminating techniques.

Next Steps

This is a draft Action Plan and, although the potential schemes have been developed in discussion with Council representatives, further consultation is required before the overall Action Plan can be finalised.

The character of the existing highway network has been taken into account, when developing potential cycle routes and schemes – in particular existing traffic levels. Broad costs of schemes have been identified, as well as broadly prioritising schemes against deliverability, directness, extension of the existing network and proximity to key attractors. However, the potential routes and schemes have not been constrained to a set budget and the feasibility and the precise cost of the routes can only be established through further study.

1 Introduction

1.1 Preamble

As part of the county-wide Essex Cycling Strategy, Cycling Action Plans are being developed for the individual Boroughs and Districts of Essex, including one for Brentwood Borough. The document provides an opportunity to develop and promote cycling in Brentwood through improved infrastructure, together with the wider promotion of cycling by Active Essex, Essex County Council (ECC) and Brentwood Borough Council (BBC), to establish it in the public's mind as a 'normal' mode of travel, especially for short a-to-b trips, and as a major participation activity and sport for all ages.

Two key commitments of the Essex Cycling Strategy are to:

- Establish a coherent, comprehensive and advantageous cycle network in every major urban area, utilising a combination of on-carriageway and off-carriageway cycle facilities; and
- Ensure each Borough/District has an up to date Cycling Action Plan (renewed every 5 years).

The Cycling Action Plans should help to identify high quality and well planned infrastructure which will be vital in encouraging cycling and improving safety. ECC will ensure that every urban area has a well-planned cycle network that:

- Connects key destinations;
- Supports a network of recreational routes; and
- Caters for all users and abilities.

Coherent cycle networks will ensure that:

- The physical barriers to cycling in many of Essex's urban areas are progressively broken down; and
- Cycling becomes a prioritised mode of transport in the mind of Essex residents.

In addition, Active Essex (County Sports Partnership) priority aims and how cycling helps achieve these aims are included in Table 1.1.

Table 1.1: Active Essex priority aims

Active Essex priority aims	How cycling helps achieve these aims
Increase participation in sport and physical activity	Cycling is one of the most popular sports in Essex and can be enjoyed by people of all ages
Encourage healthy and active lifestyles	Cycling provides a means of active transport that can help to reduce the number of short car journeys
Develop sporting pathways	Alex Dowsett, cycling world record breaker, is from Essex and benefited from Active Essex Sporting Ambassador funding and support when he was a talented young cyclist
Encourage lifelong learning and skills development	Bikeability courses help children and adults to acquire physical skills and road safety awareness

1.2 Background

Location

Brentwood Borough, illustrated in Figure 1.1, is located between Epping Forest District, Chelmsford District, Basildon District, the Unitary Authority of Thurrock and the London Borough of Havering. Within Brentwood Borough, there are three key towns, of Brentwood, Shenfield and Ingatestone, with smaller villages as well including Pilgrims Hatch, Warley, Hutton and West Horndon. The A12 and A127 run directly through the Borough, providing Brentwood with two key strategic links to the M25 and to London. The population of Brentwood Borough, as estimated in mid-2016, is just over 76,000.

Brentwood is also home to large areas of woodland including Shenfield Common, Hartswood, Weald Country Park and Thorndon Country Park.

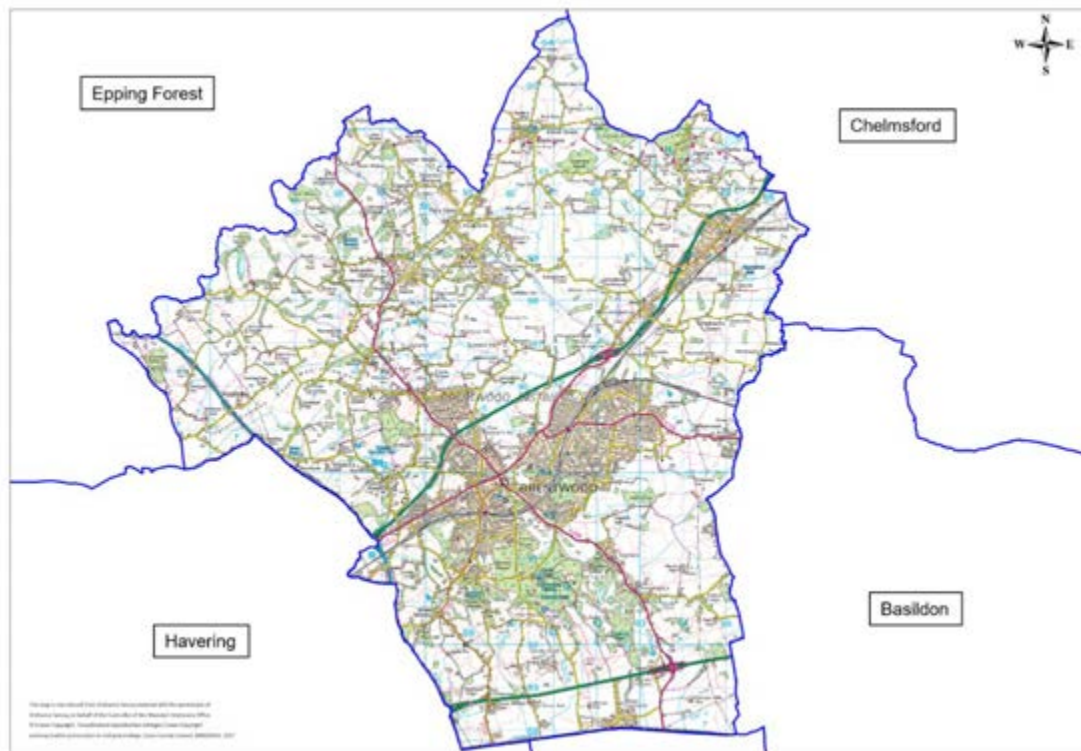


Figure 1.1: Brentwood Borough area

1.3 Aims of the Action Plan

Although Essex County Council (ECC) have been promoting and facilitating cycling for many years, the lack of a planned and justifiable list of interventions aimed at widening the appeal of cycling within the Borough means that it has not always been prioritised.

Previously a Brentwood Cycle Strategy has been produced in 2014 for the Brentwood Local Highway Panel. This aimed to increase levels of cycling in Brentwood and to reduce congestion and promote healthy living. The key recommendations of this strategy were to have sustained investment in high quality cycle infrastructure, to incorporate cycling into other infrastructure schemes or significant land development, to improve cycle parking at key destinations and to promote cycling in Brentwood through cycle maps, events and activities.

The aims of the Action Plan are to:

- Identify how cycling levels can be increased in the Borough;
- Enable any funding for new cycling schemes in Brentwood to be prioritised;
- Create a usable, high-quality cycle network that connects residential areas with key employment locations, rail stations and town centres; and
- Create opportunities to increase recreational cycling in Brentwood.

This is a draft Action Plan and, although the potential schemes have been developed in discussion with Council representatives, including the Brentwood Cycling Furtherance Group, further consultation is required before the overall Action Plan can be finalised.

1.5 Report Structure

The remainder of this Action Plan is set out as follows:

- Section 2 – Policy Review;
- Section 3 – Data Analysis;
- Section 4 – Existing Network Provision and Barriers;
- Section 5 – Brentwood’s Cycling Potential;
- Section 6 – Potential Infrastructure Improvements;
- Section 7 – Prioritisation and Costings of Potential Schemes;
- Section 8 – Flagship Routes;
- Section 9 – Smarter Travel Measures;
- Section 10 – Delivery and Funding; and
- Section 11 – Key Recommendations.

2 Policy Review

2.1 Introduction

This section provides a summary of the relevant national and local policies related specifically to cycling and where the promotion of cycling and provision of infrastructure could have a role to play. Relevant National, Regional and Local Policy contexts have been examined through consideration of the following documents: the UK Government's Cycling and Walking Investment Strategy (CWIS, 2017), the Essex Transport Strategy (2011) and the Local Development Plan for Brentwood Borough (2016).

These documents indicate that there is a great deal of support for cycling at all levels. At a national level, there is a long term vision for cycling to become the normal mode of choice for short journeys or as part of a longer journey. At a regional level, there is a particular emphasis on providing sustainable access and travel choice for Essex residents. It is recommended that cycling will be promoted as a way to reduce congestion within urban areas, to encourage healthier lifestyles, and as a valuable leisure and tourism opportunity that is important to the local economy. At a local level, the Borough are focusing on utilising future developments to help advance cycling infrastructure.

2.2 National Policy Context

2.2.1 Cycling and Walking Investment Strategy (CWIS)

Under the Infrastructure Act 2015, the UK Government is required to set a Cycling and Walking Investment Strategy (CWIS) for England. A Draft First CWIS was published at the end of March 2016, which set out the UK Government's ambition for creating a walking and cycling nation, the targets and objectives they are working towards, the financial resources available to meet their objectives, the strategy for delivering the objectives, and the governance arrangements that will review this delivery. Following consultation, a final version of the Strategy was published in 2017.

The final Cycling and Walking Investment Strategy states that the Government "wants to make cycling and walking the natural choices for shorter journeys, or as part of a longer journey". The aim is for more people to have access to safe, attractive routes for cycling and walking by 2040. By 2040, the ambition is to deliver:

Better Safety (a safe and reliable way to travel for short journeys), through:

- Streets where cyclists and walkers feel they belong, and are safe;
- Better connected communities;

- Safer traffic speeds, with lower speed limits where appropriate to the local area; and
- Cycle training opportunities for all children.

Better mobility (more people cycling and walking – easy, normal and enjoyable), through:

- More high quality cycling facilities
- More urban areas that are considered walkable;
- Rural roads which provide improved safety for walking and cycling;
- More networks of routes around public transport hubs and town centres; with safe paths along busy roads;
- Better links to schools and workplaces;
- Technological innovations that can promote more and safer walking and cycling;
- Behaviour change opportunities to support increased walking and cycling; and
- Better integrated routes for those with disabilities or health conditions.

Better streets (places that have cycling and walking at their heart), by:

- Places designed for people of all abilities and ages so they can choose to walk or cycle with ease;
- Improved public realm;
- Better planning for walking and cycling;
- More community-based activities, such as led rides and play streets where local places want them; and
- A wider green network of paths, routes and open spaces.

The document recognises that great progress has been made on cycling in the past six years. Cycling rates have increased in areas where dedicated funding has been made available and spend on cycling has risen from around £2 per person in 2010 to £6 per person in England in 2016-17. The Government want to build on these successes and to help achieve this have made over £1 billion of Government funding available to local bodies that may be invested in walking and cycling over the next five years. The £1.2 billion is allocated as follows:

- £50 million to provide cycling proficiency training for further 1.3 million children;
- £101 million to improve cycling infrastructure and expand cycle routes between the city centres, local communities, and key employment and retail sites;
- £85 million to make improvements to 200 sections of roads for cyclists;

- £80 million for safety and awareness training for cyclists, extra secure cycle storage, bike repair, maintenance courses and road safety measures;
- £389.5 million for councils to invest in walking and cycling schemes; and
- £476.4 million from local growth funding to support walking and cycling.

In addition, the government is investing an extra:

- £5 million on improving cycle facilities at railway stations;
- £1 million on Living Streets' outreach programmes to encourage children to walk to school; and
- £1 million on [Cycling UK's 'Big Bike Revival' scheme](#) which provides free bike maintenance and cycling classes.

By 2020, the objectives of the CWIS are to:

- Increase cycling activity, where cycling activity is measured as the estimated total number of cycle stages made;
- Increase walking activity, where walking activity is measured as the total number of walking stages per person;
- Reduce the rate of cyclists killed or seriously injured on England's roads, measured as the number of fatalities and serious injuries per billion miles cycled; and
- Increase the percentage of children aged 5 to 10 that usually walk to school.

2.2.2 Cycling and Walking Infrastructure Plans (CWIP)

A National CWIP is being developed to inform the CWIS. This will include the identification of nationally significant locations/infrastructure. Six outputs are currently being developed, three national and three local:

- The national outputs focus on identifying criteria for national significance and developing a pipeline of potential schemes.
- The local outputs are focused on developing a Level of Service tool, and guidance to Local Authorities on developing their own Local CWIP.

Local Cycling and Walking Infrastructure Plans (LCWIPs), as set out in the Government's Cycling and Walking Investment Strategy, are a new, strategic approach to identifying cycling and walking improvements required at the local level. They enable a long-term approach to developing local cycling and walking networks, ideally over a 10 year period, and form a vital part of the Government's strategy to increase the number of trips made on foot or by cycle.

While only focusing on cycling it is hoped that ECC's suite of Cycling Action Plans will contribute to the future development of an Essex CWIP by providing:

- A network plan for cycling which identifies preferred routes and core zones for further development;
- A prioritised programme of infrastructure improvements for future investment; and
- A report which sets out the underlying analysis carried out and provides a narrative which supports the identified improvements and network.

2.3 Regional Policy Context

2.3.1 Essex Transport Policy

The Essex Transport Strategy (2011) will seek to achieve the following five broad outcomes:

- Provide connectivity for Essex communities and international gateways to support sustainable economic growth and regeneration;
- Reduce carbon dioxide emissions and improve air quality through lifestyle changes, innovation and technology;
- Improve safety on the transport network and enhance and promote a safe travelling environment;
- Secure and maintain all transport assets to an appropriate standard and ensure that the network is available for use; and
- Provide sustainable access and travel choice for Essex residents to help create sustainable communities.

'Policy 14 – Cycling' states that Essex County Council will encourage cycling by:

- Promoting the benefits of cycling;
- Continuing to improve the cycling facilities within the main urban areas of Basildon, Chelmsford, Colchester and Harlow;
- Developing existing cycling networks in other towns where cycling offers an appropriate local solution;
- Working with schools and employers to improve facilities for cyclists;
- Improving access to local services by integrating the Public Rights of Way, walking and cycling networks to form continuous routes; and
- Providing training opportunities to school children and adults.

Cycling will be promoted as a way to reduce congestion within urban areas, to encourage healthier lifestyles, and as a valuable leisure and tourism opportunity that is important to the local economy.

Improving the safety of the cycling network is also a key concern within the *Essex Transport Strategy*. Policy 14 of the plan sets out Essex County Council's approach to encouraging cycling, which includes developing cycle networks

within towns across Essex and improving access to local services and schools for cyclists. In terms of locational priorities in relation to cycling, the plan identifies that as a local centre Brentwood should focus on providing links to key services and how passenger transport interchanges are essential.

The *Essex Transport Strategy* seeks to promote sustainable travel, by providing the infrastructure for sustainable travel and promoting the use of travel plans. With regard to cycling, the *Essex Transport Strategy* considers actions to improve access for cyclists and pedestrians in particular, and identifies the following improvements as essential:

- Addressing gaps in existing networks;
- Better linkages for walking and cycling routes within the Public Rights of Way network;
- Improving signing;
- Improving crossing facilities; and
- Ensuring that pedestrian routes are accessible for everyone.

The *Infrastructure Act 2015* includes a new legal requirement for the Government to produce a cycling and walking investment strategy. The DfT's *Cycling Delivery Plan (2014)* refers to a new national cycling target, to double the number of cycling stages (trips) nationally over a 10 year period. This new target will be adopted by Essex County Council as part of the *Essex Cycle Strategy (2015)*.

Additionally, the Government has introduced a £6bn Local Growth Fund for cycling and walking. It has also set a target of achieving an annual cycling spend of £10 to £20 per head of the population. For Brentwood Borough this could see between £750,000 and £1.5m spent on improving cycling provision.

2.3.2 Essex Cycle Strategy (2016)

In response to the legal requirement, and also the requirements of the Essex Transport Strategy, the Essex Cycle Strategy has been prepared with the aim of setting out a strategy for providing coherent cycle networks. The purpose of the strategy is to set out the key elements of a long term plan that will lead to a significant and sustained increase in cycling in Essex, establishing it in the public's mind as a 'normal' mode of travel, especially for short a-to-b trips, and as a major participation activity and sport for all ages. The strategy has been produced in conjunction with Essex County Council, the 12 Essex Boroughs/ Districts, the two Unitary Authorities (Southend-on-Sea and Thurrock) and other key stakeholders. It has taken account of current UK policy, data on cycling levels within Essex and best practice from around the world. Specifically, it commits to:

- I. Establishing a coherent, comprehensive and advantageous cycle network in every major urban area, utilising a combination of on-carriageway and off-carriageway cycle facilities;

- II. Ensuring each Borough or District has an up to date cycling action plan (renewed every 5 years);
- III. Providing well placed and high quality cycle parking at key public destinations such as town centres, leisure facilities and railway stations;
- IV. Ensuring that all new housing includes secure and easily accessible cycle storage and that new secure cycle storage is facilitated in existing housing developments;
- V. Ensuring that cycling is prioritised over motorised transport in all new developments – making it easier to carry out short trips by bicycle than by car. Cycle routes within commercial and residential developments will be more direct and convenient than car routes and will connect in to existing cycling infrastructure on leaving the site;
- VI. Prioritising more frequent and good maintenance of our cycle network;
- VII. Providing a clear and consistent standard of good quality, well placed cycle signage – to an appropriate density, with provision of journey times as well as distances (to cater for all audiences) where possible;
- VIII. Continuing to improve cycle safety at sites with actual and perceived safety problems; and
- IX. Developing an improved mechanism for the reporting of safety issues.

2.4 Local Policy Context

2.4.1 Brentwood Local Plan

The Council is currently preparing a new Local Plan for the Borough which, once adopted, will supersede saved policies in the current Replacement Local Plan (2005).

The Replacement Local Plan seeks to implement an overall strategy for future development of the Borough based on planning for sustainable development and taking into account these Community Plan Core Values and Strategic Objectives.

Two of the strategic aims of the Replacement Local Plan are:

- To direct development towards locations that provide the greatest opportunities for the use of transport modes other than the private motorcar; and
- To seek to improve the quality of public transport and facilities for pedestrians and cyclists

In terms of cycling, the Replacement Local Plan identifies the need for sustainable development and notes that a key objective of planning for sustainable development is to both reduce the need to travel and maximise accessibility by public transport, cycling and walking.

The document identifies that a balance needs to be struck between the need to manage car use and the need to maintain the commercial viability of town centres. It states that this will continue to be achieved through the existing

package approach applied to all large towns, including Brentwood, whereby schemes and measures are implemented which encourage alternative modes of travel to the car, especially at peak times i.e. provision of bus priorities, footpaths and cycle-ways.

There is an emphasis in the document on the use of travel plans for businesses, schools, hospitals and other users to identify how walking and cycling will be encouraged to reduce the level of access by car.

Policy T3 notes that traffic management will be used in the Borough to encourage safe walking and cycling.

The benefit of increased cycling in the Borough are recognised in the document and the encouragement and support for greater use of cycling as a mode of transport is identified as an important element of a more sustainable transport strategy. Cycles take up less road space, reduce congestion and do not give rise to the pollutants associated with motor vehicles. Cycling is not only environmentally friendly but has recreational and health benefits. Brentwood currently has low cycle usage, with the number of cyclists in Brentwood reaching only approximately a third of the national average, and few cycle routes. According to the Replacement Local Plan, opportunities for encouraging cycling by improving facilities for cyclists at, for example, rail stations and within shopping areas as well as through developing more safe cycle routes will be pursued.

2.4.2 Brentwood Draft Local Plan, January 2018

The Council is currently preparing a new Local Plan for the Borough which, once adopted, will supersede saved policies in the current Replacement Local Plan (2005). The Plan will set out policies, proposals and site allocations to guide future development in the Borough. The Council is currently consulting on a stage of Local Plan preparation.

It sets out a summary of the overall housing and specialist accommodation need across the plan period (2013-2033) (Table 2.2).

Table 2.1: Distribution of new dwellings in Brentwood Borough

Distribution	Net homes	%
Completions 2013/14 - 2016/17	527	6.38
Extant permissions (April 2017)	825	9.98
Forecast Forward – Additional Completions and Permissions (1 April 2017 – 31 March 2018)	250	3.03
Windfall allowance (2020/21-2032/33) (inc non-implementation discount)	507	6.14
Brownfield land within Brentwood Urban Area/ Settlement Boundary	1,152	13.94

Greenfield land within Brentwood Urban Area/ settlement boundary	95	1.15
Brownfield Land within settlement boundary-other locations	580	7.02
Green Belt Land - Edge of Brentwood Urban Area	1,440	17.43
Green Belt Land – Edge of Ingatestone	218	2.64
Green Belt Land – larger villages	169	2.05
Strategic Allocation – Dunton Hills Garden Village	2,500	30.26
Total	8,263	100.00
Allocation total	6,154	74.48

The Strategic Site of 2,500 homes is the Garden Village at Dunton Hills, which is split across both Brentwood Borough and Basildon District. The garden village proposals are meant to be distinct new places with their own amenities.

The majority of other housing sites are greenfield and brownfield sites located closely to existing urban centres, the largest of which are: West Horndon Industrial Estate, Childrer ditch Lane and Station Road, West Horndon (580 dwellings); Officer’s Meadow, land off Alexander Lane, Shenfield (510 dwellings); Ford Offices, Eagle Way, Warley, Brentwood (350 dwellings); William Hunter Way car park, Brentwood (179-300 dwellings); land east of Chelmsford Road, Shenfield (215 dwellings); land at Honeypot Lane, Brentwood (200 dwellings); Council depot, The Drive, Warley (123 dwellings); land east of Nags Head Lane, Brentwood (125 dwellings); Ingatestone Garden Centre, Roman Road, Ingatestone (120 dwellings); and Brentwood railway station car park (100 dwellings).

Key things to note, in terms of cycling, from the Local Development Plan include:

- Cycling to work is below the national average, though walking is above the national average
- One of the Borough’s strategic objectives is to improve public transport, cycling and walking facilities and encourage sustainable transport choices
- New housing development proposals must meet the criteria of providing satisfactory means of access to the site for people who cycle
- New employment developments must also meet the criteria of being accessible for people who cycle
- In Brentwood Town Centre, developments must provide/ensure the availability of an efficient, convenient network for people who cycle
- Promotion of cycling through improved cycle parking and other facilities
- Highway infrastructure improvements and/or traffic management measures to help provide new cycle routes, if appropriate with planning permission for a new development

- Creating an attractive urban realm that is safe to encourage school trips to be by walking or cycling
- Additional benefits from cycling, such as health and wellbeing
- Cycleways to enhance the Borough's network of multi-functional green space

3 Data Analysis

3.1 Introduction

When planning for cycling infrastructure it is important to first understand current levels and conditions for cycling. This section includes analysis of:

- 2011 Census data;
- The Active People Survey (by Sport England);
- Department for Transport count data;
- Collision data;
- Cycle crime statistics; and
- Topography.

3.2 Census Data

As part of the 10 year national Census, respondents are asked to state their main mode of travel to work by distance. The 2001 and 2011 Census results for Essex are provided in Figure 3.1, below.

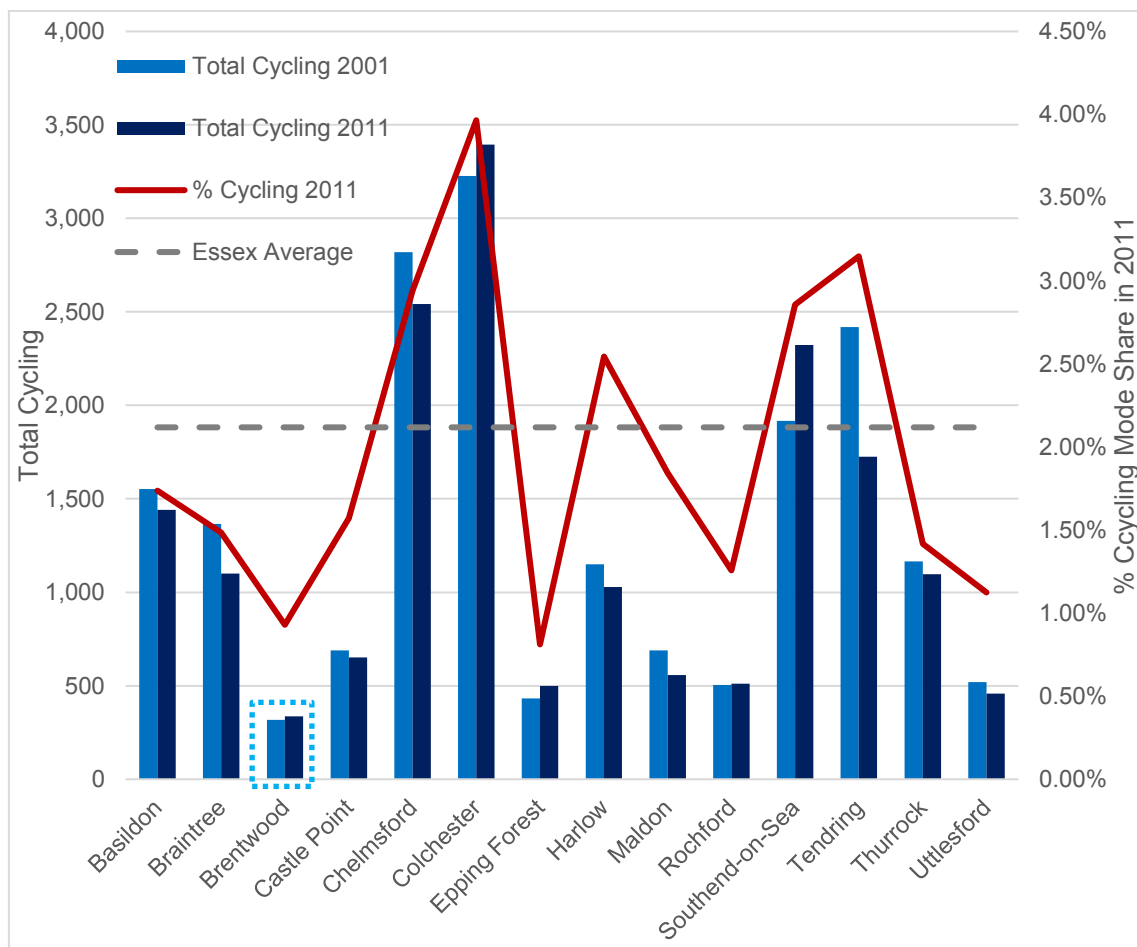


Figure 3.1: 2001 and 2011 Census Cycling to Work by District

Based on 2011 Census data, Brentwood Borough has the lowest levels of cycling numbers within the Essex Boroughs/Districts, with just over 300 people cycling to work every day in 2011. This equates to just 0.6% of all journeys to work being made by bicycle from Brentwood Borough. Brentwood has the lowest total number of people cycling to work of any district or unitary authority, though as a percentage of total trips Epping Forest District has the lowest percentage of all trips cycling.

Between 2001 and 2011, Brentwood Borough has seen a slight increase in the total number cycling to work. Cycling as a mode share however has remained consistent from 2001 to 2011. Of the 14 Essex Boroughs/Districts, 9 saw total numbers of cyclists declining, and as a percentage mode share 11 saw decreases. This is encouraging in terms of the consistency of people travelling by cycle to work in Brentwood Borough compared to other areas in Essex.

The dispersed nature of rural and shire areas (e.g. rural residents drive longer distances to access retail services etc.) is likely to encourage car use, which in turn could displace cycling as an everyday choice of transport mode. The implementation of improved infrastructure will obviously be important to encourage more people to travel by bike. The measures outlined in this Cycling Action Plan will attempt to make cycling more popular as a modal choice especially for shorter trips within, to and through the town centres, as well as encouraging cycling for leisure.

Within Brentwood Borough itself, 2.2% of internal journeys to work are made by bicycle, equating to approximately 190 cyclists per day. Figure 3.2 shows the percentage of people cycling to work by origin in Brentwood Borough.

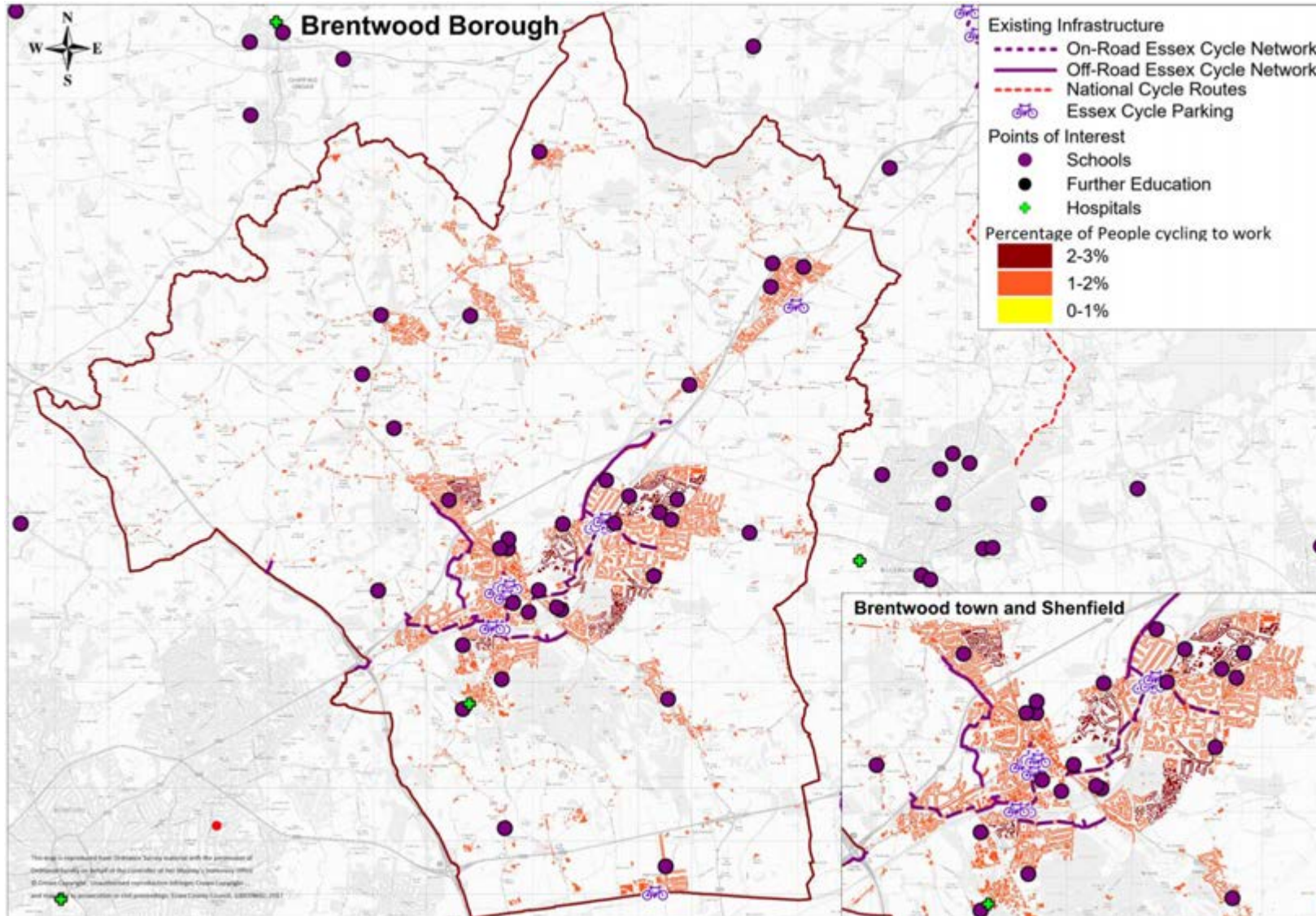


Figure 3.2:

Percentage of people cycling to work (Source: DfT Propensity to Cycle Tool)

3.3 Sport England Active People Survey

Sport England carry out an Active People Survey annually, which involves interviewing 500 people from every District in England about their propensity to do physical activity. It is the largest survey of sport and active recreation in Europe.

Figure 3.3 shows 2010-2013 average propensity to cycle at least once per month for any purpose based on the Sport England data. The results show that 12.4% of Brentwood residents cycle for any purpose at least once per month (between 2010 and 2013). Brentwood has the third lowest propensity to cycle of all Boroughs/ districts across Essex, only achieving levels higher than Thurrock and Epping Forest.

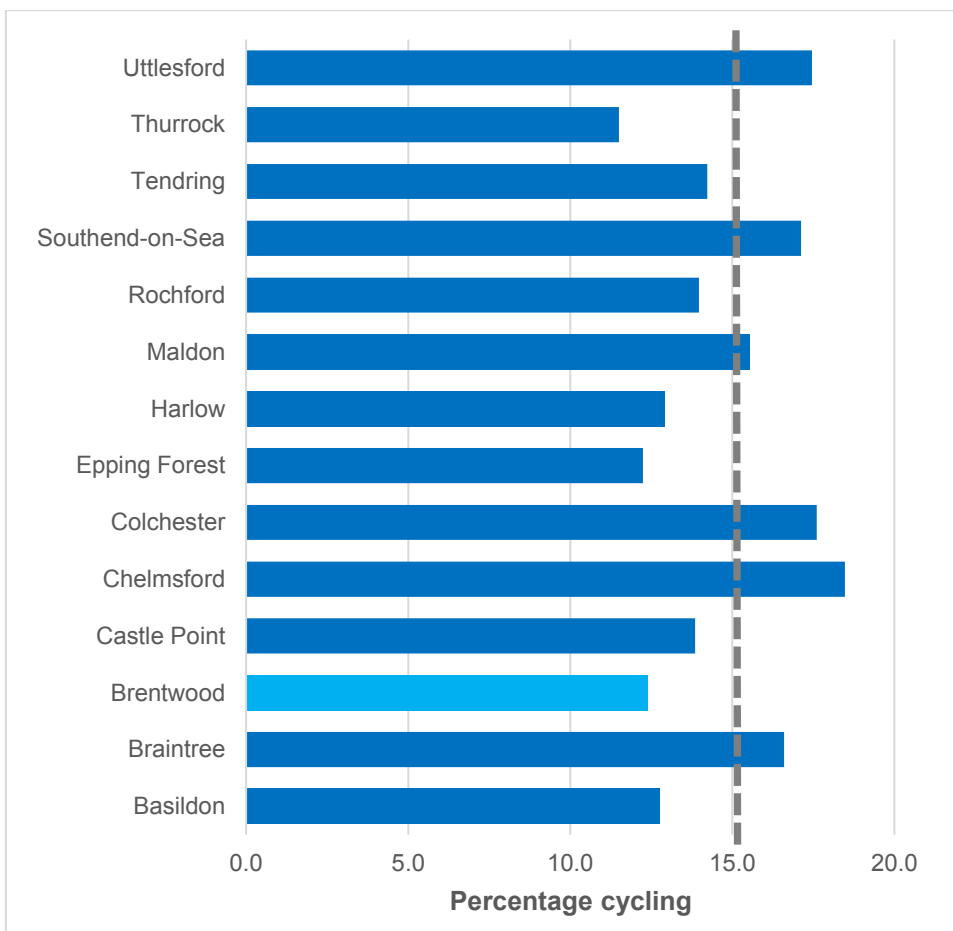


Figure 3.3 Sport England Propensity to cycle at least once per month 2010-2013

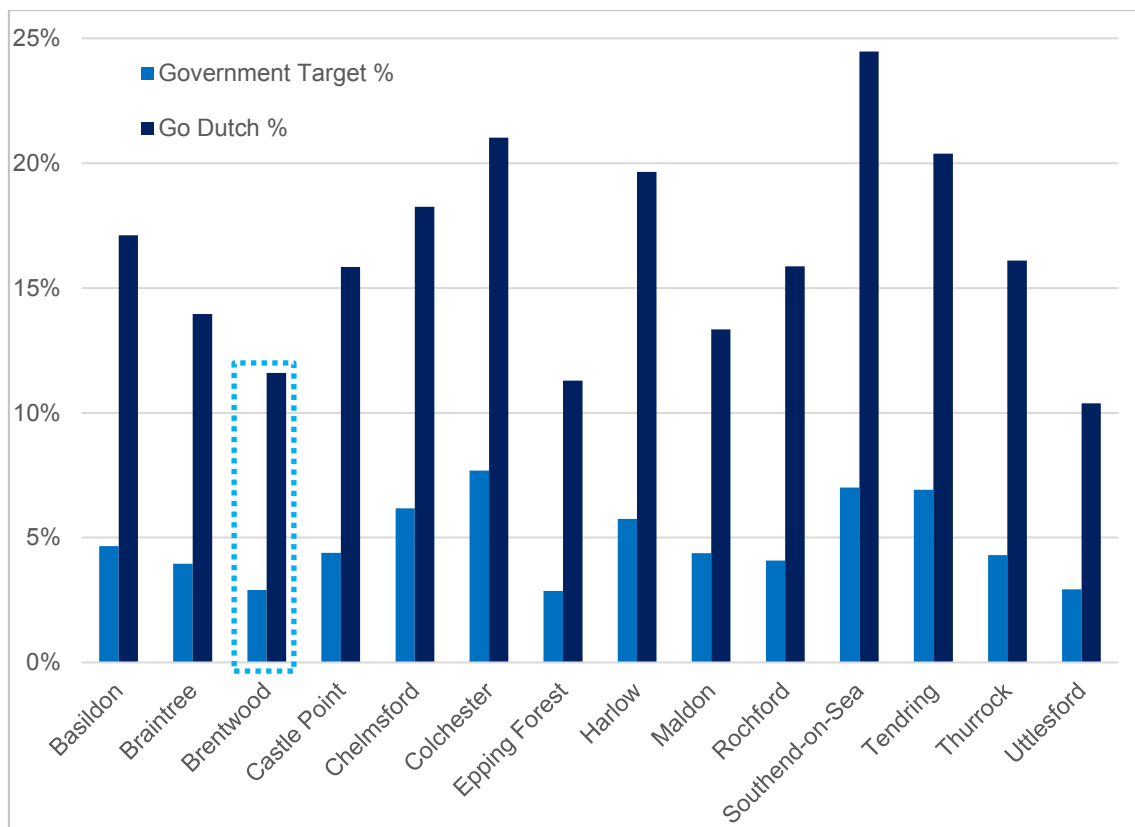
3.5 DfT Propensity to Cycle Tool

The Propensity to Cycle tool was funded by the Department for Transport and it has two main purposes:

1. As a strategic planning tool to inform policies to achieve a modal shift by demonstrating potential future scenarios, such as the government’s draft Cycling Delivery Plan¹ target and the ‘Go Dutch’ scenario whereby Dutch cycling levels are reached in England (allowing for English hilliness and trip distances)

The Council is currently preparing a new Local Plan for the Borough which, once adopted, will supersede saved policies in the current Replacement Local Plan (2005). The Plan will set out policies, proposals and site allocations to guide future development in the Borough. The Council is currently consulting on a stage of Local Plan preparation.

2. At a smaller scale to estimate future mode share for cycling along a corridor and potentially identify where to re-allocate from less sustainable modes or where barriers causing severance exist.



¹ Department for Transport, 2014, Cycling Delivery Plan, https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/364791/141015_Cycling_Delivery_Plan.pdf

Figure 3.4: Government target and Go Dutch scenario for Essex Districts/Boroughs

In the government target scenario, Brentwood Borough has the joint lowest percentage of cycling to work with Epping Forest and Uttlesford, with just 3% cycling to work. In the Go Dutch scenario, Brentwood Borough has the third lowest percentage, with 12% cycling to work, ahead of Epping Forest and Uttlesford. The Government Target scenario is reflective of the existing levels of cycling in the Borough, as it aims to double this. Therefore where Brentwood Borough currently has low levels of cycling compared to other Essex Districts/Boroughs, the Government Target scenario is also low in comparison. This models relatively modest increases in cycle commuting. The Go Dutch scenario represents the level of cycling that would be expected if English people were as likely as Dutch people to cycle a trip of a given distance and level of hilliness. This scenario demonstrates the level of commuter cycling if the area had the same cycling infrastructure and cycling culture as the Netherlands. This indicates that levels of cycling under this scenario are more favourable in Brentwood Borough than Epping Forest and Uttlesford.

3.6 DfT Count Data

The Department for Transport (DfT) collects vehicular flow data at various locations on the road network around the country. These counts record all vehicles using the carriageway, including cyclists, and the data provides a snapshot overview of the cycle usage along particular routes within the Borough.

There are 14 count sites located in Brentwood Borough. The Annual Average Daily Flow (AADF) of pedal cycles is shown in Figure 3.5 below.

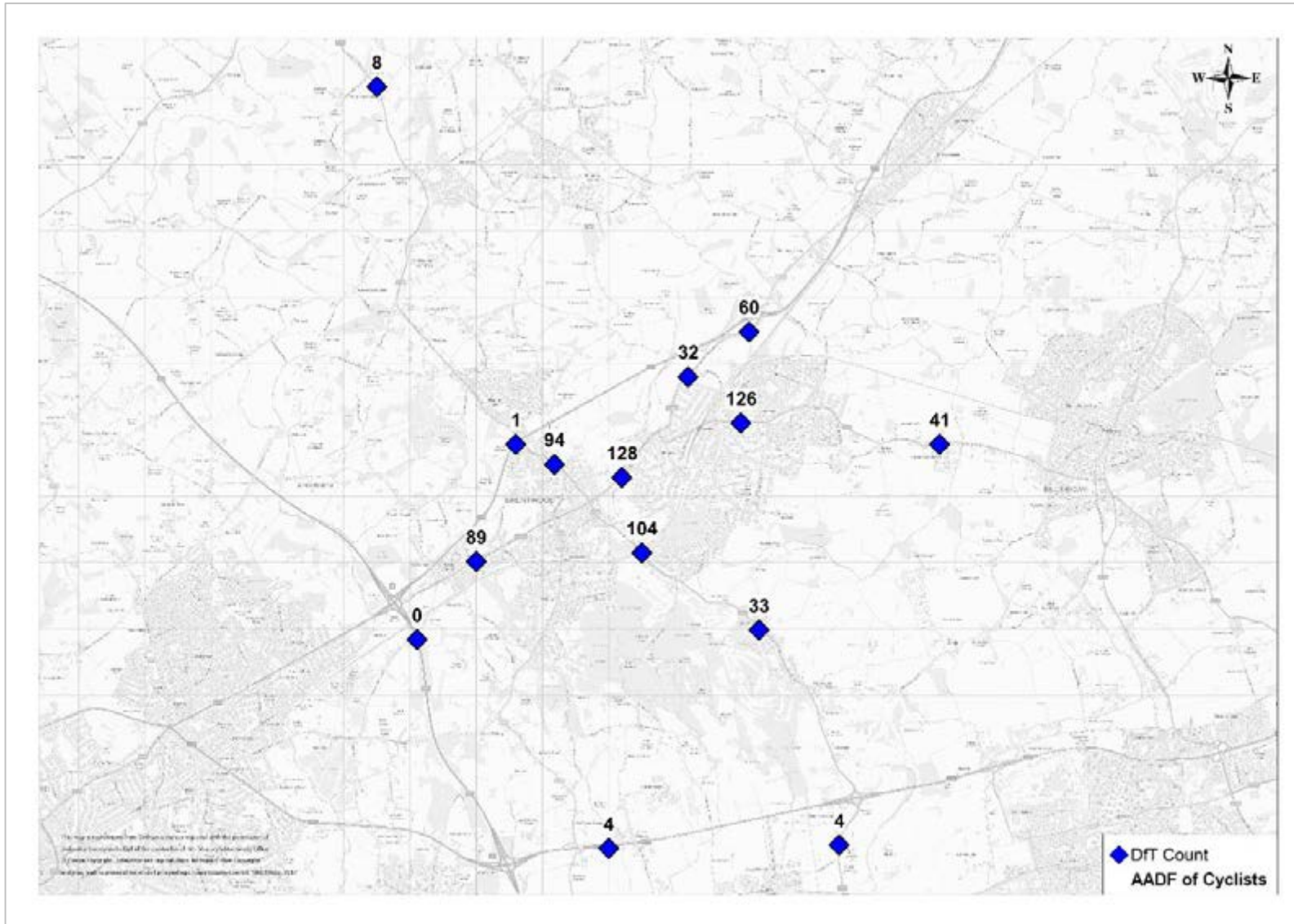


Figure 3.5: Annual Average Daily Flow of cyclists at DfT count locations

The above map clearly demonstrates higher flows of pedal cycles in Brentwood/Shenfield town than in the outlying areas. The highest flow is estimated to be on the A1023 Shenfield Road just east of Brentwood Sports Ground, closely followed by the count on Rayleigh Road. This indicates that Shenfield has slightly more people who cycle in its town centre, which may be reflective of a higher number of commuters who use Shenfield railway station for the more frequent London train service compared to Brentwood railway station.

There is also a high flow of people who cycle on the A128 Brentwood Road which connects southern Brentwood with Brentwood and Shenfield town centres. In contrast, the flow from north of the A12 is very small but rises significantly south of the A12. This suggests the A12 acts as a barrier to people who cycle causing severance between north of the A12 and the town centres. The existing infrastructure connecting north Brentwood and the town centres is an overbridge with a segregated footway/cycle track.

In terms of east/west cycle flows, there is a considerable flow on the A1023 London Road which connects western Brentwood with the town centres. This is nearly three times as many on the A1023 Chelmsford Road which connects east Brentwood with the town centres.

3.7 Collision Data

Fear of personal injury is often cited as a barrier to cycling but whilst this important issue, it is useful to use statistics rather than just perception to improvements to highway infrastructure to improve the cycling location of cycling personal injury collisions also serves to identify where are travelling in higher numbers which can be useful when deciding where prioritise new infrastructure.

Table 3.1, below, shows the total number of recorded collisions involving cyclists by District/Borough for the 5 year period between August 2012 and July 2017. Also included are the number of casualties by severity. Figures below for 'Essex' exclude the Unitary Authorities of Southend and Thurrock, figures for 'Greater Essex' include these areas.

Table 3.1: Cycle collisions statistics August 2012 to July 2017

	Fatal	Serious	Slight	Grand Total	% of total cycle accidents in Greater Essex	Number cycling to work ²	% of total cycling to work in Greater Essex
BASILDON	0	37	135	172	8%	1412	8%
BRAINTREE	2	37	90	129	6%	1070	6%
BRENTWOOD	0	16	41	57	3%	320	2%
CASTLE POINT	0	24	69	93	5%	631	4%
CHELMSFORD	2	56	194	252	12%	2486	14%
COLCHESTER	0	72	227	299	15%	3310	19%
EPPING FOREST	1	36	105	142	7%	482	3%
HARLOW	2	13	60	75	4%	1018	6%
MALDON	1	15	42	58	3%	548	3%
ROCHFORD	1	25	63	89	4%	498	3%
SOUTHEND	1	63	266	330	16%	2260	13%
TENDRING	3	28	117	148	7%	1683	10%
THURROCK	0	35	101	136	7%	1078	6%
UTTLESFORD	0	18	41	59	3%	433	3%
ESSEX	12	412	1285	1709		13891	
GREATER ESSEX	13	475	1551	2039	100%	17229	100%

Table 3.1 shows the total number of cycle collisions for each District/Borough, classified into fatal, serious or slight, and also shows the total number of people who cycle to work in each district and the corresponding percentage across Greater Essex. For Brentwood it shows that the Borough accounts for 2% of the total number of people who cycle in Essex, and has 3% of collisions. Generally the percentage of people who cycle to work corresponds with the number of collisions in that District/Borough. The number of collisions per cycle trips would potentially be lower if it were to be compared with all cycle trips, as the current figure is based on 2011 Census journey to work data only, thus it does not include leisure trips, children cycling to school and people cycling part of their journey where the Census only records the main mode. However, it is reasonable to assume that the relationship between cycling to work and all cycle trips is relatively consistent across Essex. The data here suggests that there could be an improvement in cycle safety in Brentwood Borough.

Figure 3.6 shows the location and severity of the recorded collisions involving cyclists between August 2012 and July 2017. It indicates that the majority of collisions are clustered around Brentwood town centre and this could potentially

² Source: ONS Cycling to Work Summary Table, taken from Census Table CT0015EW.

be a focus for town-wide cycle safety improvements. More focused areas for safety considerations include A129 Rayleigh Road (see Table 7.2, potential scheme 24) from Wash Road to access to Shenfield Station, A128 Ongar Road (see Table 7.2, potential scheme 15 and 37) and Doddinghurst Road (see Table 7.2, potential scheme 15) as routes connecting Pilgrims' Hatch and Brentwood town centre, Sawyers Hall Lane and Highland Avenue (see Table 7.2, potential scheme 18) particularly around access to schools here, and also along Brentwood High Street.

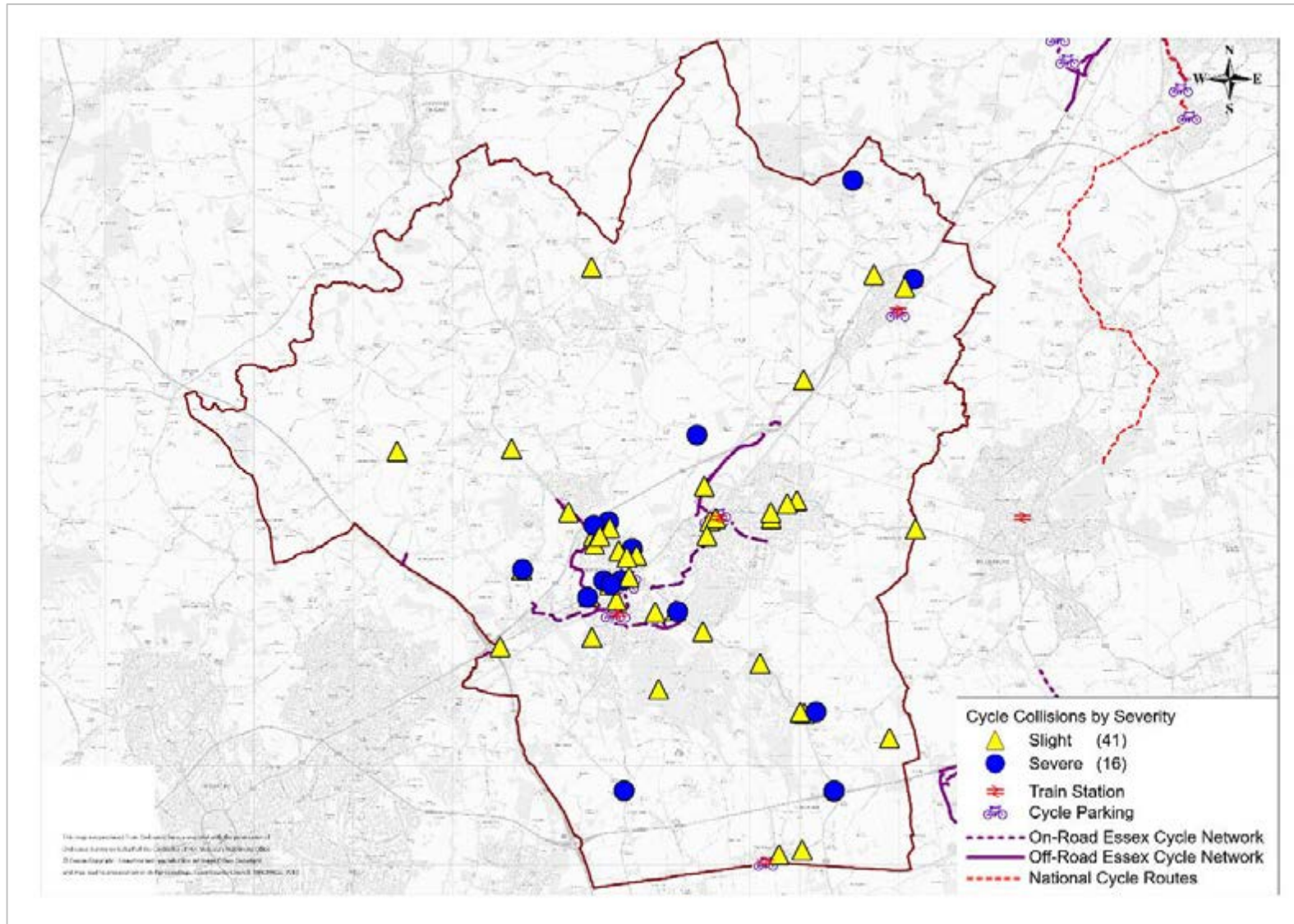


Figure 3.6: Cycle collisions by severity

3.8 Cycle Crime

Cycle crime (mainly theft) is reported both to Essex Police and British Transport Police, though it should be noted that cycle thefts are generally accepted as being under reported. Figures for both these constabularies are combined by District/Borough in Table 3.2 below. Note that the figures below for 'Essex' exclude the Unitary Authorities of Southend and Thurrock, figures for 'Greater Essex' include these areas.

Table 3.2: Cycle crime by District/Borough

All Essex Reported Cycle Thefts	2013	2014*	Year ending June 2016	Year ending June 2017	% of all cycle thefts in Greater Essex (2017)	Annual number of cycle thefts per cycle commuter ²
Basildon	221	208	173	203	8%	0.15
Braintree	116	98	160	154	6%	0.15
Brentwood	63	59	34	71	3%	0.23
Castle Point	45	73	63	81	3%	0.13
Chelmsford	292	274	334	450	17%	0.19
Colchester	355	373	247	390	15%	0.12
Epping Forest	37	53	69	53	2%	0.12
Harlow	127	108	166	244	9%	0.25
Maldon	26	28	14	21	1%	0.04
Rochford	43	50	51	23	1%	0.05
Southend-on-Sea	450	326	403	467	18%	0.22
Tendring	180	167	124	160	6%	0.10
Thurrock	217	205	251	235	9%	0.23
Uttlesford	41	30	23	27	1%	0.07
Essex	1546	1521	1458	1877		0.14
Greater Essex	2213	2052	2112	2579	100%	0.16

*to Nov 20th only

2. Based on 2017 thefts and ONS Census 2011 Journey to work by cycle total for District/ Borough/ City (ONS Cycling to Work Summary Table, taken from Census Table CT0015EW)

Brentwood Borough accounts for 3% of the total number of thefts in Essex, which is marginally greater than the percentage of people that cycle to work in the Borough. However, the annual number of cycle thefts per cycle commuter indicates that theft is relatively high in Brentwood, and among the highest levels in the county.

Cycle parking at train stations are key attractors for cycle crime. Table 3.3 shows the number of cycle thefts at train stations in Brentwood Borough. Ensuring all cycle parking is kept secure is important and will be considered in any recommended improvements that stem from this Cycling Action Plan. Cycle thefts increased at both Brentwood and Shenfield stations between 2015 and 2016.

Table 3.3: Cycle thefts at train stations

Station	2015	2016
Brentwood	6	11
Shenfield	2	4
Ingatestone	2	2

3.9 Topography

There are a number of factors which determine the popularity of cycling in any given area. Of the geographical factors, by far the most significant is topography, as identified in many research studies and policy statements. These include research carried out by Dr John Parkin who concluded that ‘hilliness was found to be, by far, the most significant determiner of the proportion that cycled to work in a Borough³. The topography of Brentwood Borough is shown in Figure 3.7, overleaf.

Within Brentwood Borough, the areas with the highest elevation lie in the western part of the Borough, near Warley and Pilgrims Hatch, reaching up to 110m above mean sea level. The southernmost part of the Borough sees a drop in elevation relatively steeply into West Horndon, which may be a barrier to those potentially cycling from West Horndon. Brentwood station is located at a low point in the borough, so most onward journeys from there involve an uphill section.

The elevation across Brentwood and Shenfield town centres is fairly level. Few changes in elevation mean there are not many steep gradients to act as a barrier for people who cycle. Ingatestone is also relatively level in elevation. Potential cycle routes will aim to avoid areas of steep incline. However, elevation increases between Shenfield and Brentwood, which could be a barrier to cycle movement, particularly for those commuters using Shenfield station.

³ Parkin, J. Wardman, M and Matthew, P. (2008) *Estimation of the determinants of bicycle mode share for the journey to work using census data*. Transportation, 35 (1). pp. 93-109.

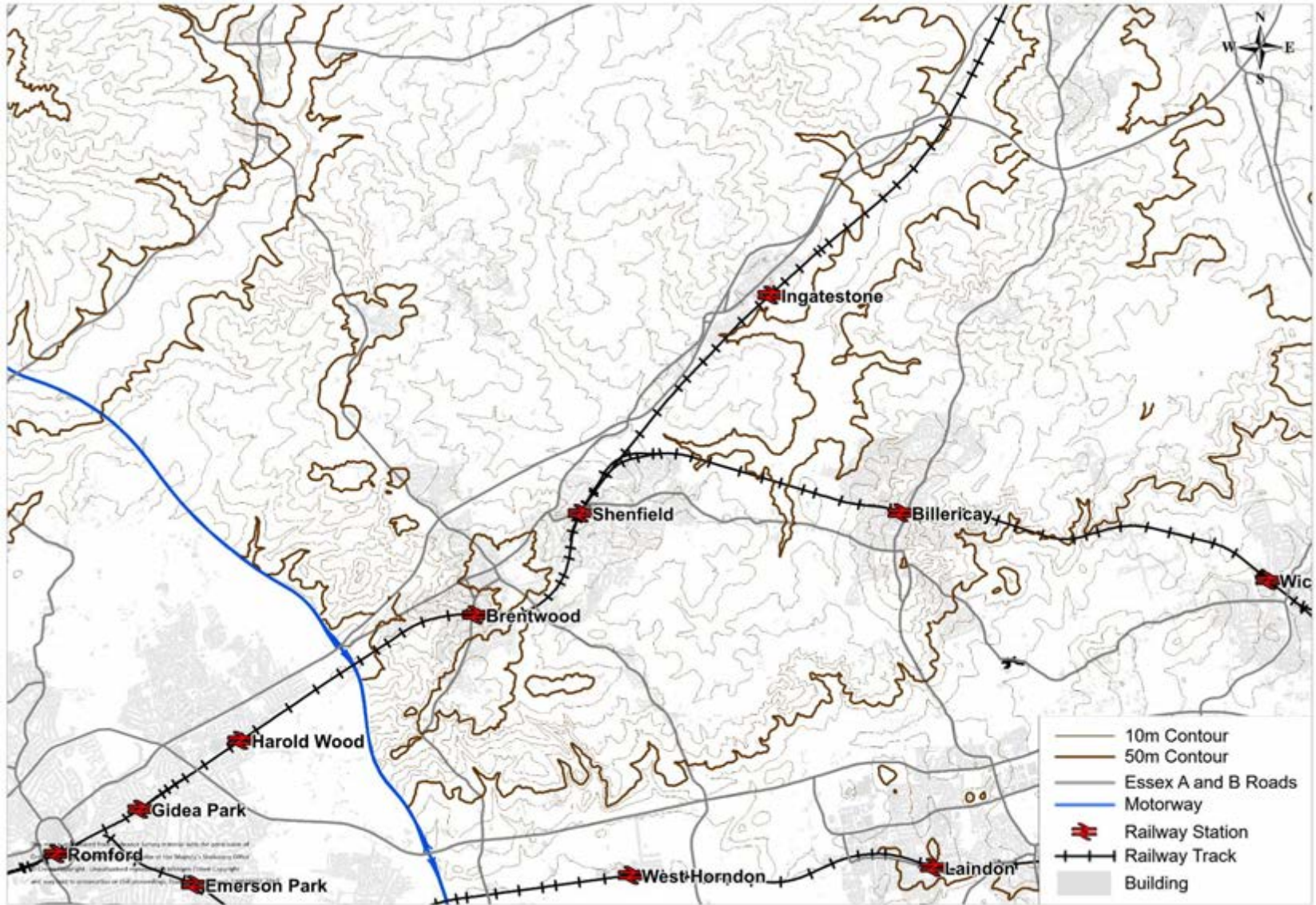


Figure 3.7: Topography of Brentwood Borough

4 Existing Network Provision and Barriers

4.1 Introduction

Brentwood Borough, illustrated in Figure 1.1, is located between Epping Forest District, Chelmsford City, Basildon District, Thurrock and the London Borough of Havering. Within Brentwood, are the key towns of Brentwood, Shenfield and Ingatestone, with smaller village areas including Pilgrims Hatch, Warley and Hutton. The A12 runs directly through the Borough, providing Essex with a key strategic link to the M25 and to London. The population of Brentwood Borough, as estimated in mid-2016, is just over 76,000.

Brentwood is also home to large areas of woodland including Shenfield Common, Hartswood, Weald Country Park and Thorndon Country Park, which are popular leisure destinations.

4.2 Existing Cycling Infrastructure

Cycling infrastructure in Brentwood Borough is limited at present. Figure 4.1 provides an overview of the extent of the existing cycle routes in the Borough, which includes a few unconnected sections of on and off road cycle routes.

The following subsections describe the current cycling provision in the major settlements within the Borough.

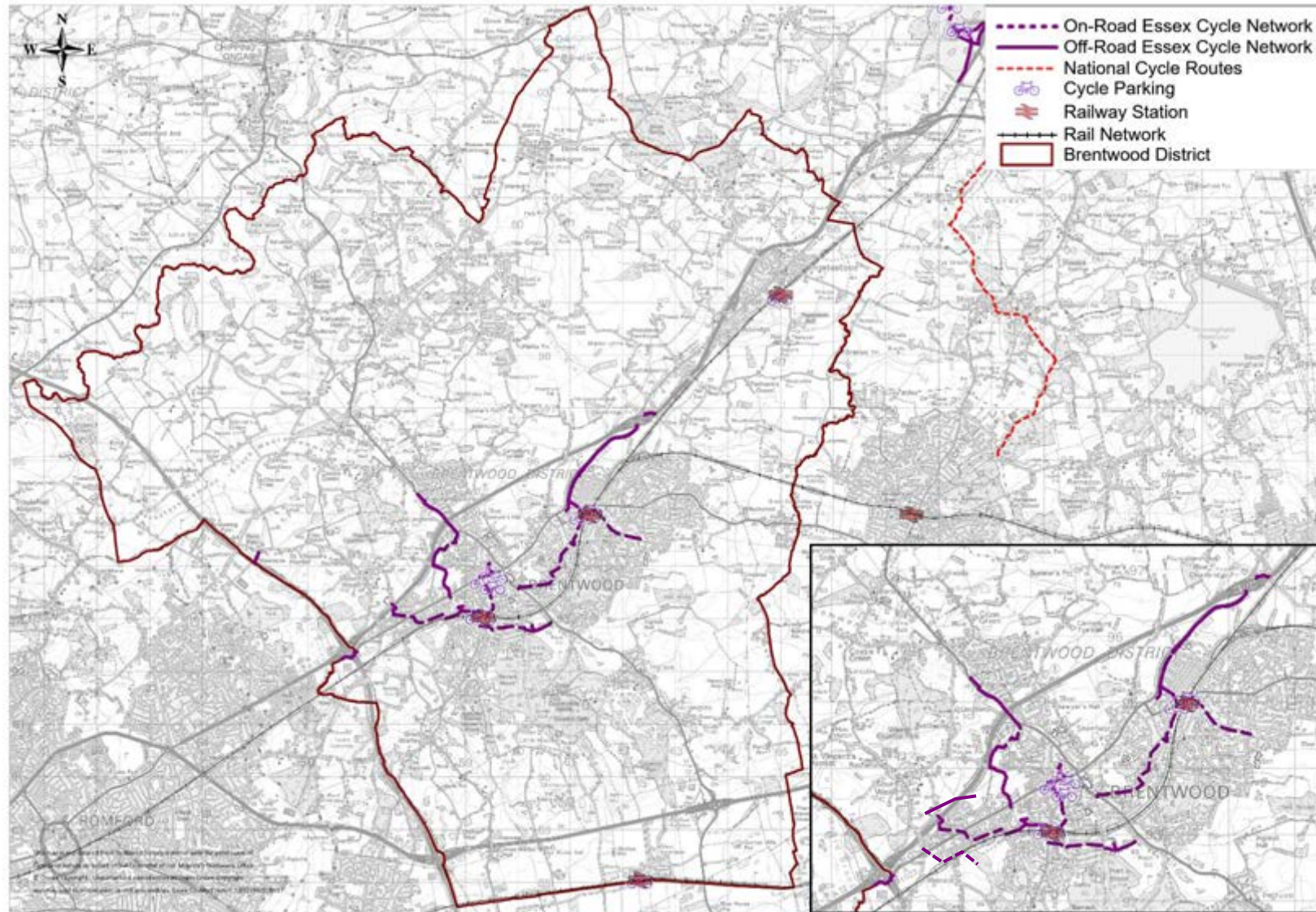


Figure 4.1: Existing cycling infrastructure in Brentwood Borough

4.2.1 Brentwood

At present, Brentwood town and the surrounding area have some cycling-related infrastructure, as depicted in Figure 4.2. The network that does exist has small gaps between sections. One such example is the section between Weald Park Way and Kavanaghs Road and then further south on Kavanaghs Road to Brentwood train station.

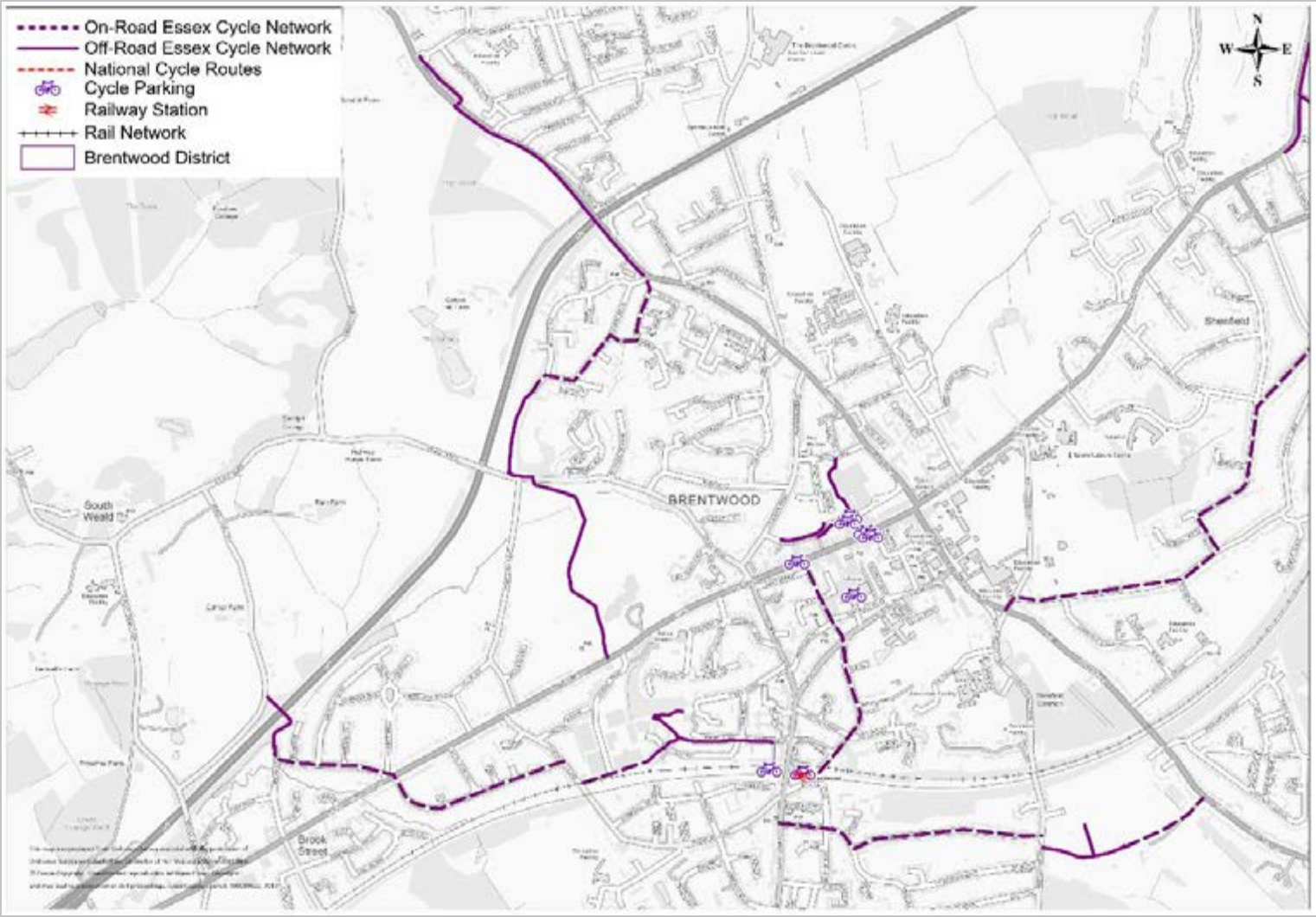


Figure 4.2: Brentwood town existing cycling provision



Figure 4.3: Ongar Road cycling infrastructure over A12 facing south

Figure 4.3 shows the existing infrastructure to connect the area north of the A12 to Brentwood town centre. This is an off-road segregated footway/cycle track along the Ongar Road, which runs between Pilgrims Hatch (around 0.8km north of the A12) and Costead Manor Road. The Propensity to Cycle tool's Fast and Quieter Routes element advises an alternative route along Doddinghurst Road, further east, to cross the A12. This could be due to safety perceptions of a bridge over the A12 versus an underbridge, or it could be due to perceptions of traffic speed/volume.



Figure 4.4: King George's Playing Field cycling route (left: segregated footpath/cycling track through King George's Playing Fields, right: on-road cycle lane on Mount Crescent)

Figure 4.4 shows the infrastructure on a cycle route connecting the B186 Warley Hill and A128 Ingrave Road. Through King George's Fields, the route is completely off-carriageway and also connects Hartswood Golf Club, Brentwood Skate Park, Brentwood RFC and the Playing Fields. This route can potentially be

closed as there are gates on entry to the space. There is a small gap in the official network on Hartswood Road between the Playing Fields and Mount Crescent, but there is a zebra crossing providing people who cycle with a crossing of Hartswood Road (see Table 7.2, potential scheme 29). Along Mount Crescent, a residential road, there is no existing infrastructure (observed from site visit, February 2018), although this is shown as an existing route on the Brentwood cycle map.

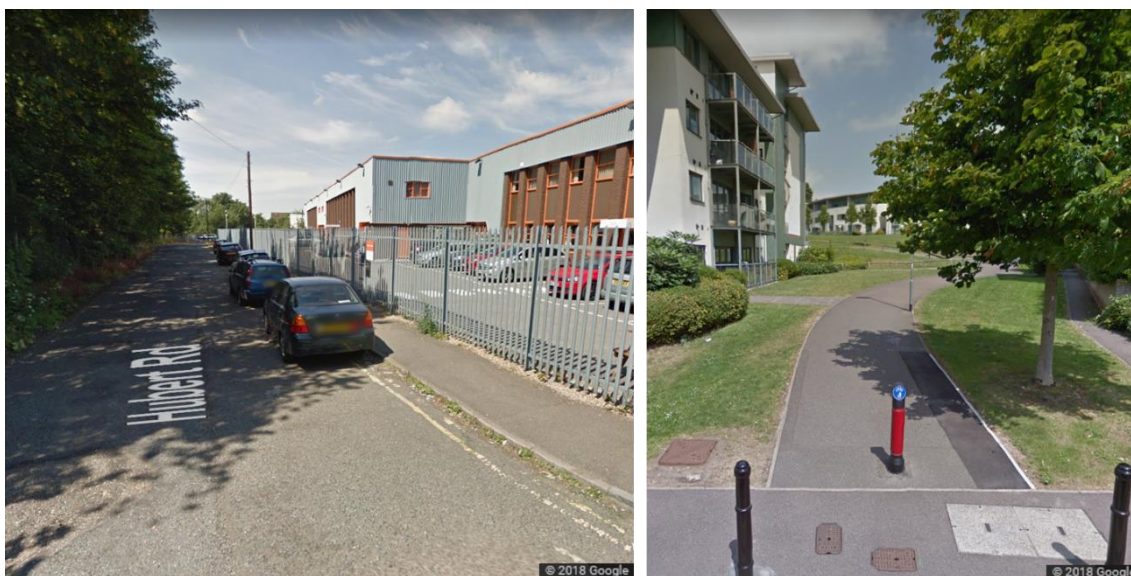


Figure 4.5: Between Hubert Road Industrial Park and Brentwood Station car park (left: Hubert Road on-road cycle route, right: shared use cycle track through Rollason Way estate)

There is a cycle route between the entrance to Brentwood Station car park on St James's Road to Kavanaghs Road. There is a small gap on Kavanaghs Road but this links further west along Westwood Avenue, Brook Road and across the A12 to Weald Park Way. Through Hubert Road Industrial Park, the route is quiet but may not be very well lit, potentially causing issues with safety perceptions. Neither is it marked, or signed. Through the Rollason Way estate a lot of the infrastructure is off-carriageway on shared use paths through the residential estate. Along Westwood Avenue, aside from a direction sign from Kavanaghs Road, there are no other markings or signings to indicate that this is a cycle route.



Figure 4.6: Between Brentwood High Street and Brentwood Station (left: High Street looking south at Crown Street, right: Rose Valley facing north)



Figure 4.7: No Entry to Queens Road from Rose Valley, and Segregated footpath/cycle track by Brentwood Sainsburys

There is an existing cycle route between Brentwood High Street and Brentwood railway station. One end of the route is at the junction of Crown Street and Brentwood High Street, which is a relatively quiet turning used for access to Crown Street shops. Crown Street is closed to through traffic through the use of bollards. Vehicles are not permitted, except for access. From Crown Street, the route heads south, crossing Queens Road and continuing along Rose Valley to the station. For cyclists travelling from the station towards the High Street, there is a steep incline along Rose Valley and the entrance to Crown Street, which may be a deterrent to some users. In addition, Rose Valley is no entry northbound at its northern end (at its junction with Queens Road), with no carriageway access onto the junction from the south. Cyclists are essentially required to dismount at

this point (Figure 4.7). There are no signs or road markings to indicate that this is a cycle route.

Figure 4.7 shows the segregated footpath/cycle track that runs down one side of a superstore in Brentwood, leading, with gaps, to Brentwood High Street. The left image was taken on the site visit and the right image was taken in June 2017 by Google Streetview.



Figure 4.8: Bicycle parking facilities in the car park at Brentwood station, adjacent to Platform 4 and bicycles parked at the railings outside Brentwood station entrance

At Brentwood railway station, National Rail⁴ state that there are 50 cycle parking spaces across Platform 4 and the car park, with CCTV coverage. This compares to just under 500 car parking spaces provided (Figure 4.8).

Figure 4.8 demonstrates people locking bicycles to the railings outside the train station. This could possibly indicate either the existing cycle parking is inconveniently located (some cycle parking adjacent to the main station entrance would be beneficial) or there is not enough of it.

4.2.2 Shenfield

In Shenfield town centre there are fewer cycle routes, however they have better connectivity than Brentwood town in terms of gaps in the network. Figure 4.9 illustrates the existing cycling infrastructure.

⁴ National Rail, <http://www.nationalrail.co.uk/stations/bre/details.html>

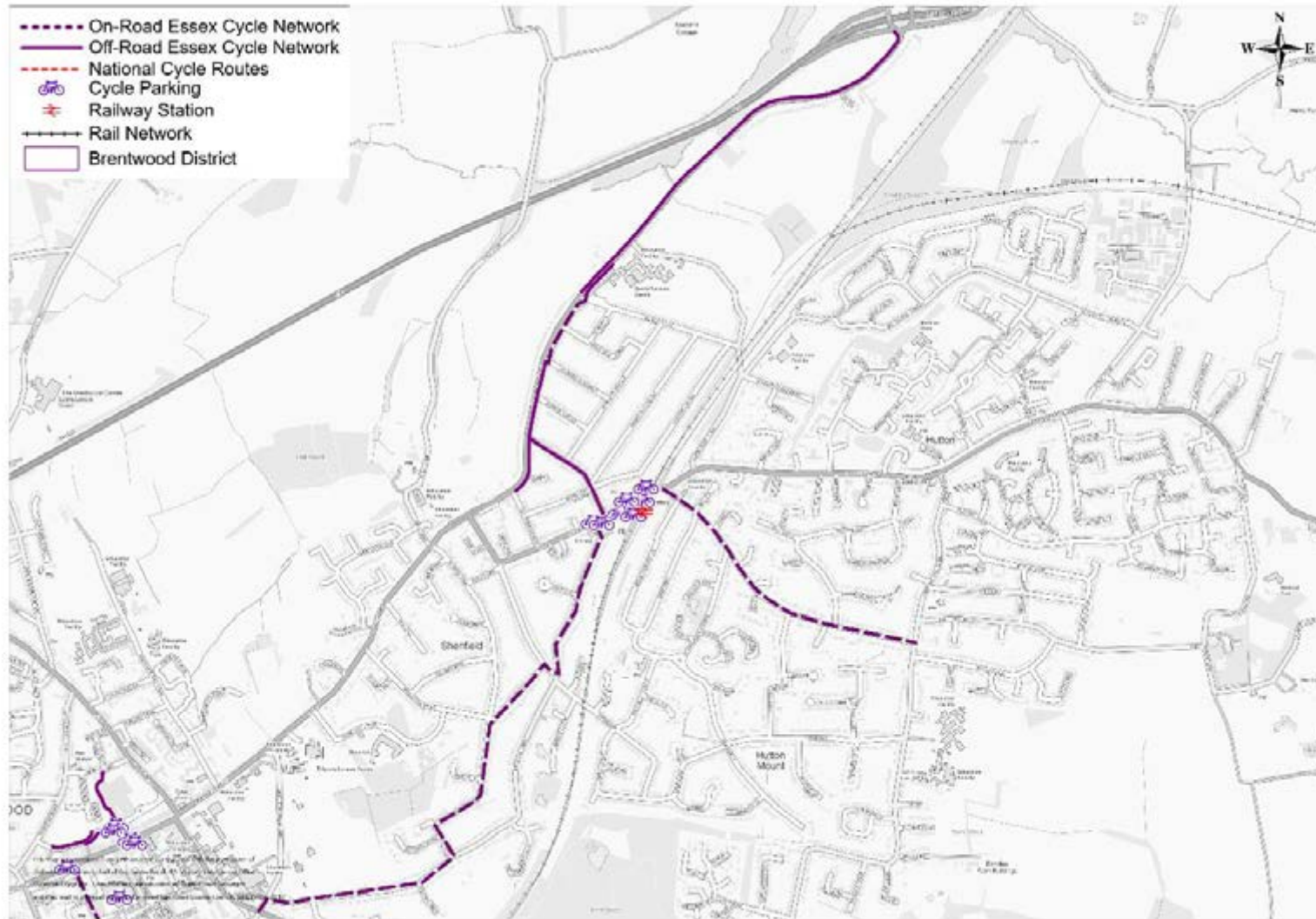


Figure 4.9: Shenfield town existing cycling provision



Figure 4.10: Route between the A12 junction 12 and Shenfield High Street (left: segregated footway/cycle track on A1023 Chelmsford Road, right: signage to Shenfield Station via cycle down Crossways)

The map shows the Essex Cycle Network extends to junction 12 of the A12. Between the A12 junction 12 and Shenfield High School, the infrastructure is a shared use foot/cycleway adjacent to the eastbound carriageway of Chelmsford Road (signed incorrectly as a cycle track). The foot/cycleway is very narrow and would not meet current standards. Outside of Shenfield High School there is a segregated footway/cycle track on both sides of the road. Some of the markings are faded, which can cause issues for those who are visually impaired with knowing what side of the path is for pedestrians. Between Oliver Road and Shorter Avenue, the off-road shared use foot/ cycle way continues adjacent to the westbound carriageway of Chelmsford Road. The cycle route ends at Shorter Avenue.

Some of the existing cycle routes in the Borough are simply signposted, with no road markings or other cycle-specific infrastructure. At the junction of Crossways and Chelmsford Road, a blue cycle direction sign, directs cyclists towards Shenfield station. A direction sign on Shorter Avenue at the junction with Chelmsford Road directs cyclists towards Hutton Road. These routes are on-road through residential roads.



Figure 4.11: Route connecting Shenfield High Street and the A128 Ingrave Road (left: section of the route along Priests Lane, right: where the route ends at Shenfield High Street)

There is an existing on-road route along Mount Avenue, which is a privately owned road. It is a no through road for vehicles from Rayleigh Road, just east of Shenfield station, though pedestrians can pass along the entire length, accessing the route via a pedestrian access from Hanging Hill Lane at the southern end of the road. There is no physical cycle-specific infrastructure on the road to indicate that this is a cycle route.

At Shenfield train station, National Rail⁴ state that there are 112 cycle parking stands with CCTV coverage of the stands. There are 2 car parks, one standard and one premium, with over 500 spaces provided.



Figure 4.12: Cycle parking around Shenfield station (source: Google Streetview from July 2017)

It can be evidenced in Figure 4.12 that the demand for cycle parking is outweighing the provision as people are locking their bicycles to railings. This could also potentially indicate the cycle parking provision is not located where users would like them to be. One recommendation from this CAP could be to increase cycle parking around Shenfield train station.

4.2.3 Ingatestone

There is currently very little cycling infrastructure in Ingatestone village, with the exception of the cycle parking at Ingatestone train station depicted in Figure 4.13, and the small amount of cycle parking in the High Street.

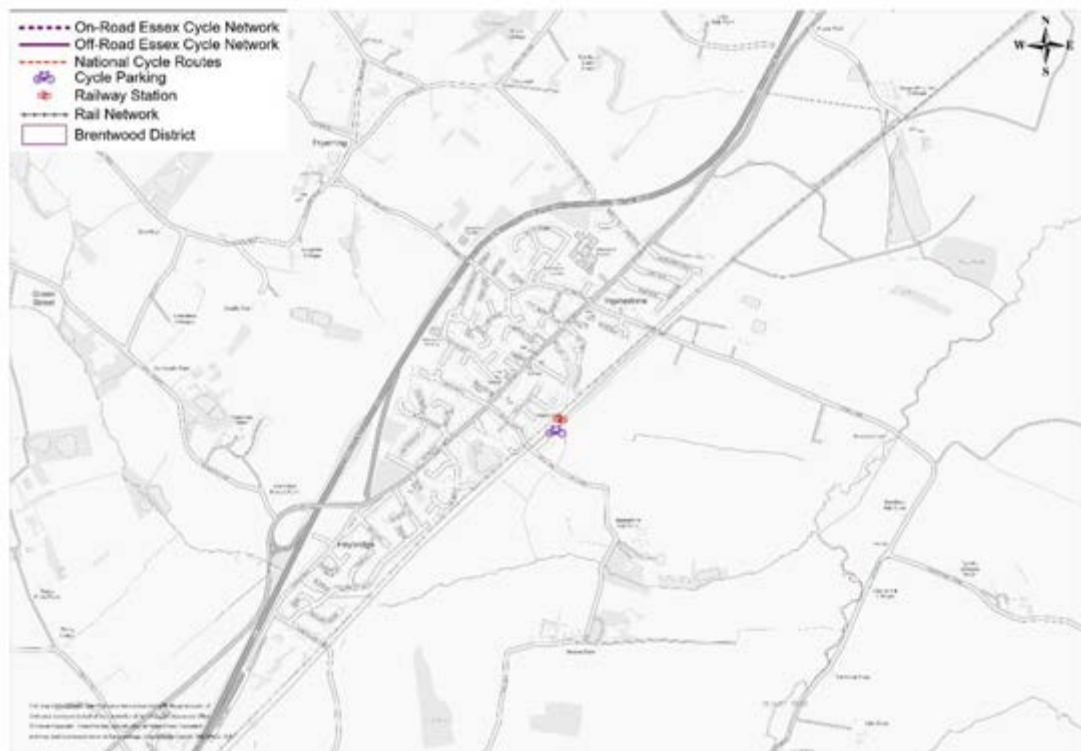


Figure 4.13: Ingatestone village existing cycling provision

At Ingatestone train station, National Rail⁴ state that there are 18 Sheffield stand cycle parking spaces located in the station car park and covered by CCTV. These are located on the southern side of the railway track, so cyclists travelling from Ingatestone village are required to cross the railway track via the level crossing to access the cycle parking.

There is space in the car park on the northern side of the railway line where the existing cycle parking could be moved to, or where additional cycle racks could be provided, so that people cycling from Ingatestone have more convenient access to the cycle parking and do not have to cross the level crossing.

There are currently 3 Sheffield stands located in the Ingatestone & Fryerning Community Centre car park, off of Ingatestone High Street. Some additional provision in the vicinity of the High Street would be beneficial.

4.2.4 Wider District

In terms of barriers to cycling outside of the main populated areas, topography may be an issue faced by those wanting to travel between Warley and Brentwood town, or between Shenfield and Brentwood town. In the north of the Borough, including the villages of Pilgrims Hatch, South Weald and Kelvedon Hatch, the A12 may act as a barrier to people wanting to cycle into Brentwood or Shenfield town centre. Although there is existing infrastructure to cross this, the perception of safety at these crossings and lack of cycle infrastructure to reach main destinations may discourage those who want to cycle. In the south of the Borough, including Childerditch, Herongate and West Horndon, both the topography and the A127 may be barriers.

Many of the roads in Brentwood are relatively narrow and busy with traffic, which is off-putting, particularly to new or inexperienced cyclists. This is a particular issue on Chelmsford Road, between Brentwood High Street and Hutton Road (see Section 8), as well as along Ingrave Road (see Table 7.2, potential schemes 12 and 29), Warley Hill (see Table 7.2, potential scheme 11) and Ongar Road (see Table 7.2, potential schemes 14, 15 and 37).

A lack of cycling infrastructure on rural roads is another issue raised as part of the preparation of this CAP. Stakeholder consultation (and STRAVA data) confirms that many local rural roads are used by club/experienced leisure cyclists. This can cause annoyance for car drivers on occasion, if cyclists are riding in groups. However, the promotion of awareness of all road users' needs and mutual respect is a more appropriate response to this kind of issue, rather than physical infrastructure measures such as carriageway widening or dedicated lanes.

4.3 Summary of key barriers

The key barriers to cycling in Brentwood Borough can be summarised as follows:

- Lack of signed routes
- Lack of existing infrastructure provision generally in main populated areas
- Where infrastructure exists, it can be disconnected and not always cater for cyclists when they reach either end
- High traffic flows on main roads
- Lack of off-road cycle routes as alternatives to busy and fast roads
- Lack of road width on key routes, preventing fully segregated routes which are recommended by Sustrans guidance (see Section 6.3)

- Hilly topography with a lot of short steep sections
- Lack of cycling infrastructure on rural roads, and poor awareness of all road users' needs in these areas

5 Brentwood's Cycling Potential

5.1 Introduction

This section provides a summary of existing travel behaviour within Brentwood Borough, as well as identifying the potential for cycling.

5.2 Commuter Flow Analysis

The 2011 Census records how residents choose to travel to work as well as the location of their workplace. The aim of analysing this information is to establish where the predominant local commuter movements exist that could feasibly be undertaken by bicycle. This data can then be used to assess the commuter cycle potential for an area.

The predominant commuter flows for Brentwood Borough have been calculated based on travel between Lower Super Output Areas (LSOAs) from the DfT's Propensity to Cycle tool, which uses 2011 Census data. It has been assumed that commuters would choose the same route and mode of travel to work (in the AM) as they do to return from work (in the PM).

Only trips from LSOAs with more than 3 commuting trips by bicycle have been shown on the following figures. The top three destinations from each LSOA have been indicated by desire lines annotated with the number of people making that movement. Where there are less than 3 people making a desired movement, that movement has not been shown.

5.2.1 Cycling to Work Trips

Figure 5.1 shows the predominant commuter flows for journey to work by bicycle within Brentwood and Shenfield⁵. This shows the highest number of trips in Brentwood town centre, both as the origin and destination. Pilgrims' Hatch has more cycle movements than a lot of the rest of Brentwood and Shenfield, both staying within Pilgrims' Hatch and from/to Brentwood town centre. Potential routes 37 and 14 will improve access to/from the town centre, by connecting existing sections of cycle route.

Another area with a higher number of cycle trips is the residential area around Thrift Wood. These are largely between here and Brentwood town centre, but also from/to Warley. Potential route 12 provides an E-W link, connecting Warley and Thrift Wood, with onward routes to Brentwood town centre and station.

There are further trips from/to Warley from/ to other areas of Brentwood, including Shenfield and Brentwood town centre. These trips will be facilitated by potential

⁵ Data from <http://pct.bike/m/?r=essex>

schemes 8, 11 and 29 (to Brentwood town centre) and potential schemes 13, 28, 29 and 7 (to Shenfield). Hutton also has higher numbers of cycle to work trips.

Figure 5.2 shows cycle trips in Ingatestone. The majority stay within Ingatestone village. There are a few cycle trips between Ingatestone and Mountnessing.

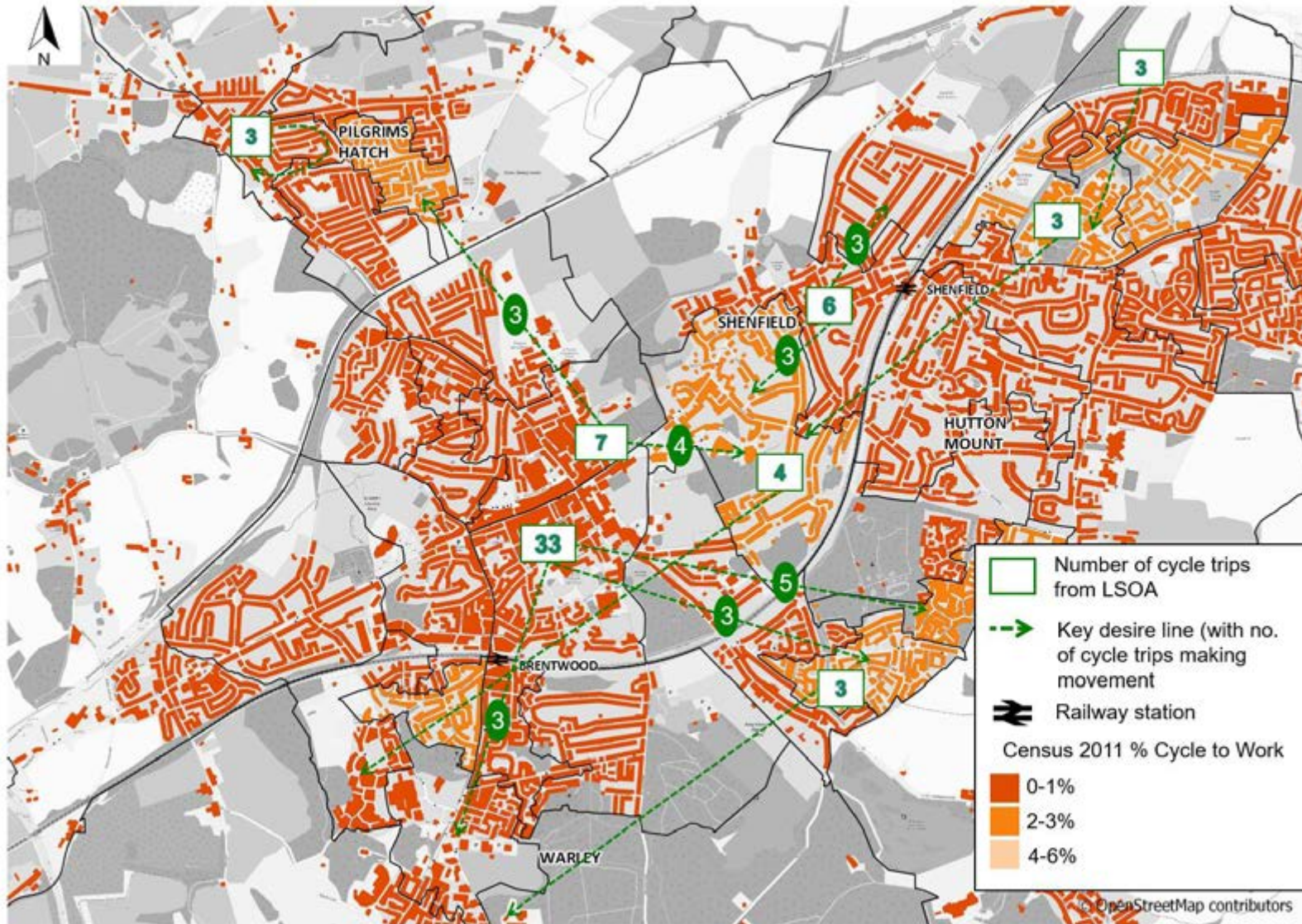


Figure 5.1: Predominant commuter flows for journeys to work by bicycle in Brentwood and Shenfield

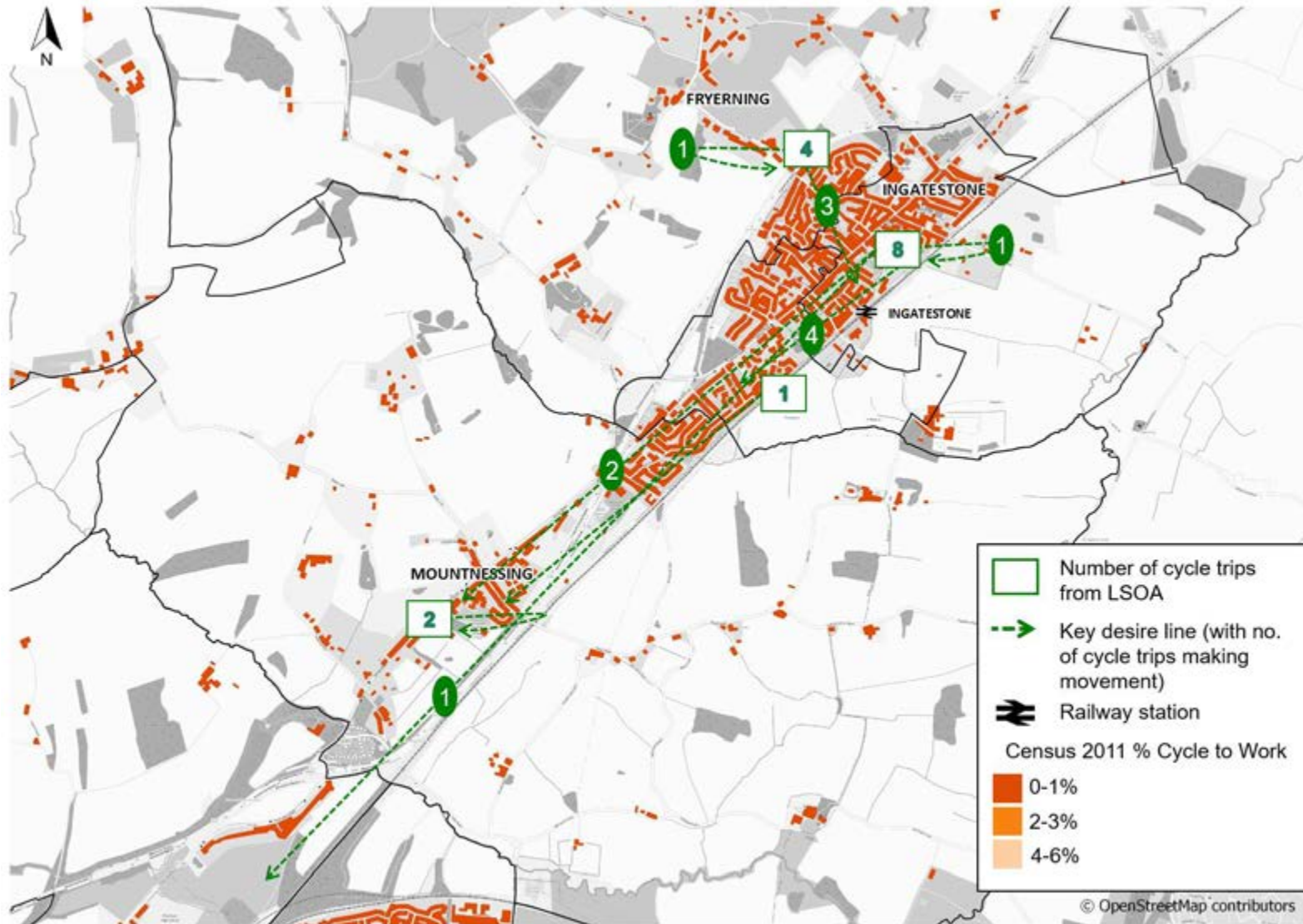


Figure 5.2: Predominant commuter flows for journeys to work by bicycle in Ingatestone

5.2.2 Access to Rail Stations

In Brentwood Borough there are four railway stations: Brentwood, Shenfield, Ingatestone and West Horndon. Brentwood, Shenfield and Ingatestone railway stations are on the Great Eastern Main Line. West Horndon is on the London, Tilbury and Southend Railway Line.

Brentwood railway station is currently managed by Transport for London (TfL) Rail and this offers a stopping service between Shenfield and London Liverpool Street, except for on Sundays the station is incorporated into the service run by Greater Anglia. The usual weekday and Saturday service takes approximately 42 minutes between Brentwood and London Liverpool Street.

Shenfield and Ingatestone services are operated by Greater Anglia. Ingatestone is a smaller station with only around 2 services per hour to London Liverpool Street, taking around 30 minutes. Shenfield can have up to 15 services per hour to London Liverpool Street, taking between 25 to 40 minutes.

Services from West Horndon are run by c2c, with on average 2 services per hour to London Fenchurch Street, though this increases in the peak times (07:00 – 10:00 and 16:00 – 19:00). From West Horndon to London Fenchurch Street, the journey takes approximately 30 minutes.

Table 5.1: Brentwood Borough's railway stations entries and exits⁶

Station Name	2016-17 Entries & Exits	2015-16 Entries & Exits	2016-17 Interchanges
Brentwood	2,883,890	2,818,560	N/A
Ingatestone	836,418	781,838	N/A
Shenfield	3,746,572	3,689,850	1,411,378
West Horndon	402,954	367,256	N/A

Table 5.1 illustrates the entries and exits at railway stations in Brentwood Borough. Shenfield is the busiest station in the Borough, with just under 4 million entries and exits, and this has grown from the previous year. It also has just under 1.5 million people using the station as an interchange. This is most likely because of the fast, direct service into the City of London and it provides a link to north and south Essex. Shenfield railway station has the sixth largest number of entries and exits in 2016-2017 in Greater Essex, behind Chelmsford, Stansted Airport,

⁶ Office of Rail and Road, 2017, <http://orr.gov.uk/statistics/published-stats/station-usage-estimates>

Colchester, Grays and Benfleet. Shenfield has the highest number of interchanges in Greater Essex.

Brentwood railway station has just under 3 million entries and exits in 2016-2017, making it the tenth busiest station in Greater Essex.

West Horndon is the quietest railway station in the Borough with just over 400,000 entries and exits. This station has a much smaller catchment area compared to Shenfield, Brentwood and Ingatestone. Ingatestone railway station has more than double the number of entries and exits of West Horndon, which is reflective of its larger catchment area.

5.2.3 'Rail' Heading

In many cases, cycling can form a key part of commuter rail journeys. The 2011 Census only records main mode by distance, therefore assumptions must be made when analysing journeys that would be multi-modal. Therefore where commuters have stated their main mode of travel to work to be by rail, as certain locations have no rail station it has been assumed that commuters would predominantly choose the closest station to them. Cycling to stations has been one of the priorities for this Cycling Action Plan.

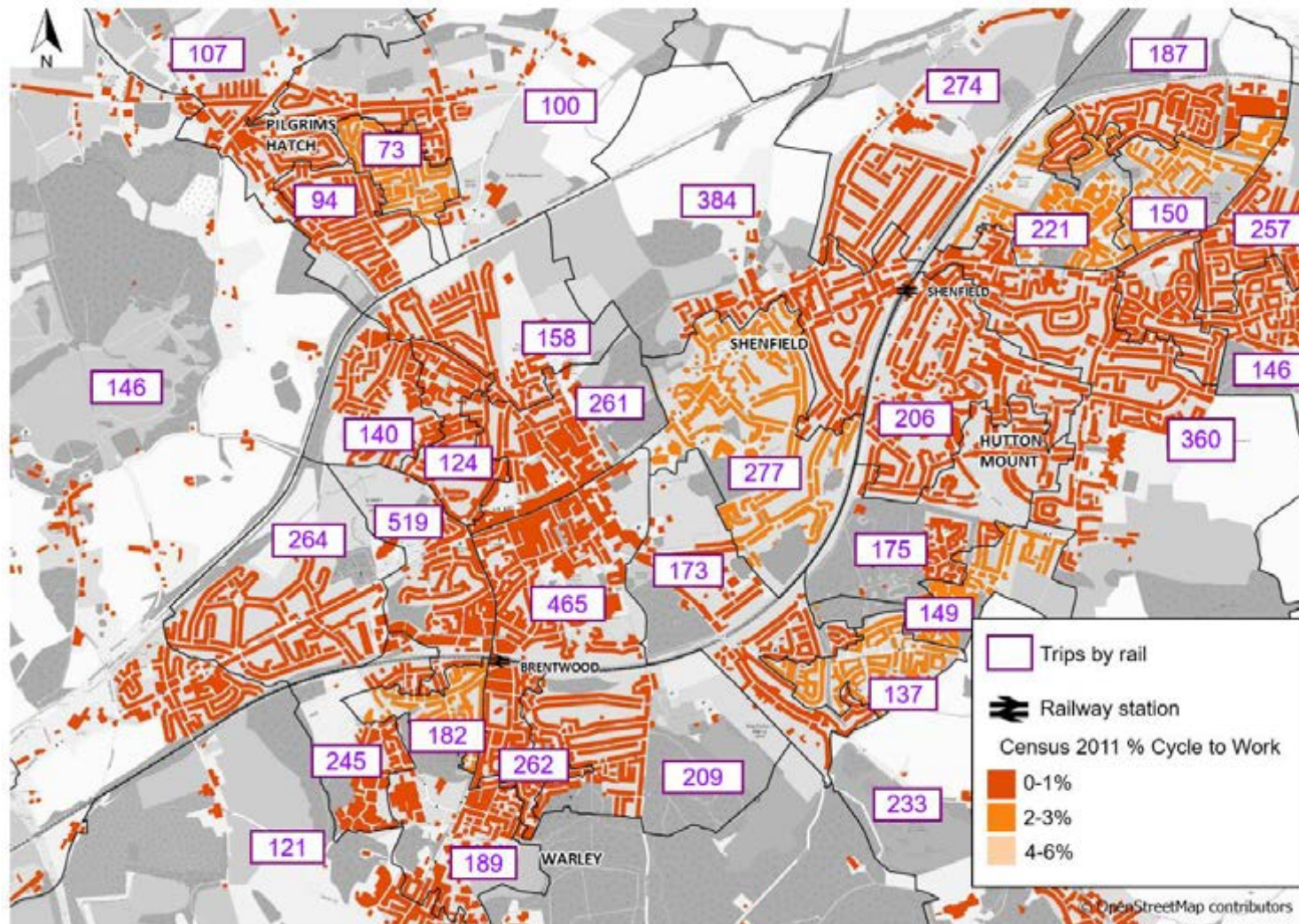


Figure 5.3: Predominant commuter flows for journeys to work by train in Brentwood and Shenfield

In the Brentwood and Shenfield area, where commuters live equidistant to Brentwood and Shenfield stations, they could be considered more likely to use Shenfield railway station because of the faster and more frequent service into the City of London.

Census Journey to Work data (2011) indicates that the largest number of rail users originate from the area just west of Brentwood town centre, however some of these may still travel to Shenfield railway station rather than Brentwood railway station despite Brentwood being geographically closer. The potential Flagship Route will better connect Brentwood town centre with Shenfield station and an improvement/ upgrade to the existing route, will better connect the town centre to Brentwood station (along Crown Street and Rose Valley) (potential scheme 8). The connection between the town centre and Brentwood station is particularly challenging as the main road connection, utilising Queens Road and Kings Road (B186) is characterised by high traffic volumes. Onward routes, which would enable cyclists to cycle past the station to Warley, are further complicated by the railway bridge at the station, which restricts road width and the uphill topography of Warley Hill.

This is followed by the area around Brentwood town centre. The third largest origin for rail trips is western Shenfield. Shenfield railway station is geographically closer to this area, however some may travel to Brentwood railway station in order to use the stopping service if their destination is Greater London. All potential schemes in Shenfield route to the High Street and railway station, since they are in close proximity. Potential schemes 19, 22, 32 and 33 will help to improve this connection.

The smallest number of rail trip origins shown in Figure 5.3 are in Pilgrims Hatch.

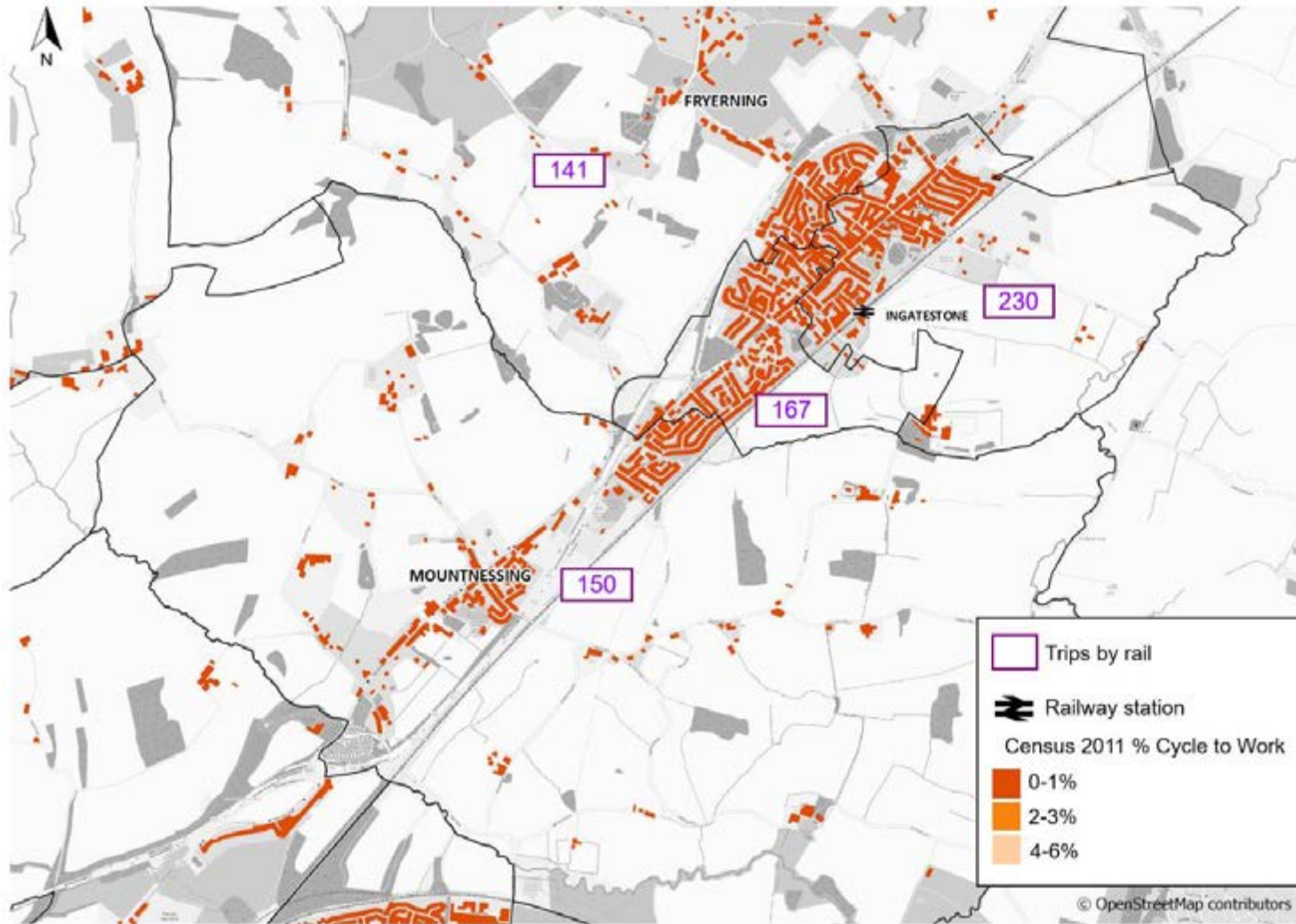


Figure 5.4: Predominant commuter flows for journeys to work by train in Ingatestone

The largest number of rail trips originate in the same zone where Ingatestone railway station is located. Those originating from Mountnessing area travel, from the Mountnessing village centre, 1.7 miles to Ingatestone railway station or 2.2 miles to Shenfield railway station.

5.2.4 Car trips

Shown in Figure 5.5 and Figure 5.6 are the most significant internal trips by car from Brentwood LSOAs to other Brentwood LSOAs. Trips shown are from the origin LSOAs with three largest total car trips and the three largest specific movements from that LSOA to other Brentwood LSOAs. For example from the zone south of Brentwood High Street there are 759 car trips originating and travelling to other Brentwood LSOAs. Of these 759 car trips, the largest specific movement is 34 car trips towards Ingrave. These trips are short car-based trips that could potentially see a mode shift to cycling.

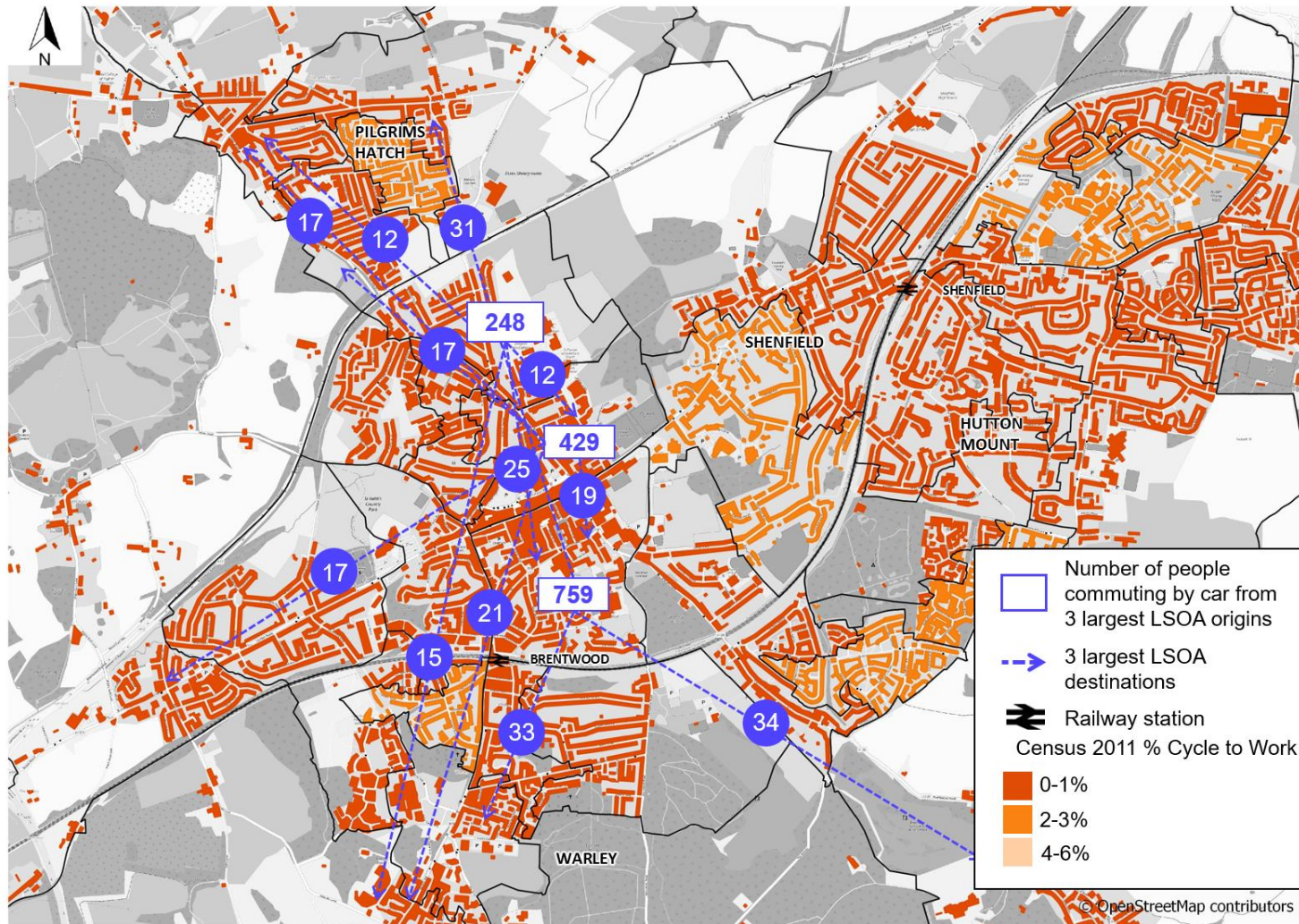


Figure 5.5: Predominant commuter flows for journeys to work by car in Brentwood and Shenfield

Figure 5.5 shows a significant number of north-south short car trips taking place between Pilgrims Hatch, Brentwood town centre and Warley.

- Potential schemes 15, 16, 17, 37 and 14 serve to link Pilgrims Hatch to the town centre, with potential scheme 8 linking Warley to the town centre).
- Cycle routes to Ingrave are too challenging to recommend in this CAP, although there would be merit in pursuing a route if one could be identified that is safe and meets recommendations, especially with the Dunton Hills Garden Community emerging in local planning documents.

There are only a couple of trips that do not follow this pattern, and they originate in Brentwood town centre and go towards Ingrave and Brook Street roundabout. None of the trips shown in Figure 5.5 are in Shenfield, Hutton or Hutton Mount area, demonstrating these areas may have fewer short car trips occurring in comparison to Brentwood.

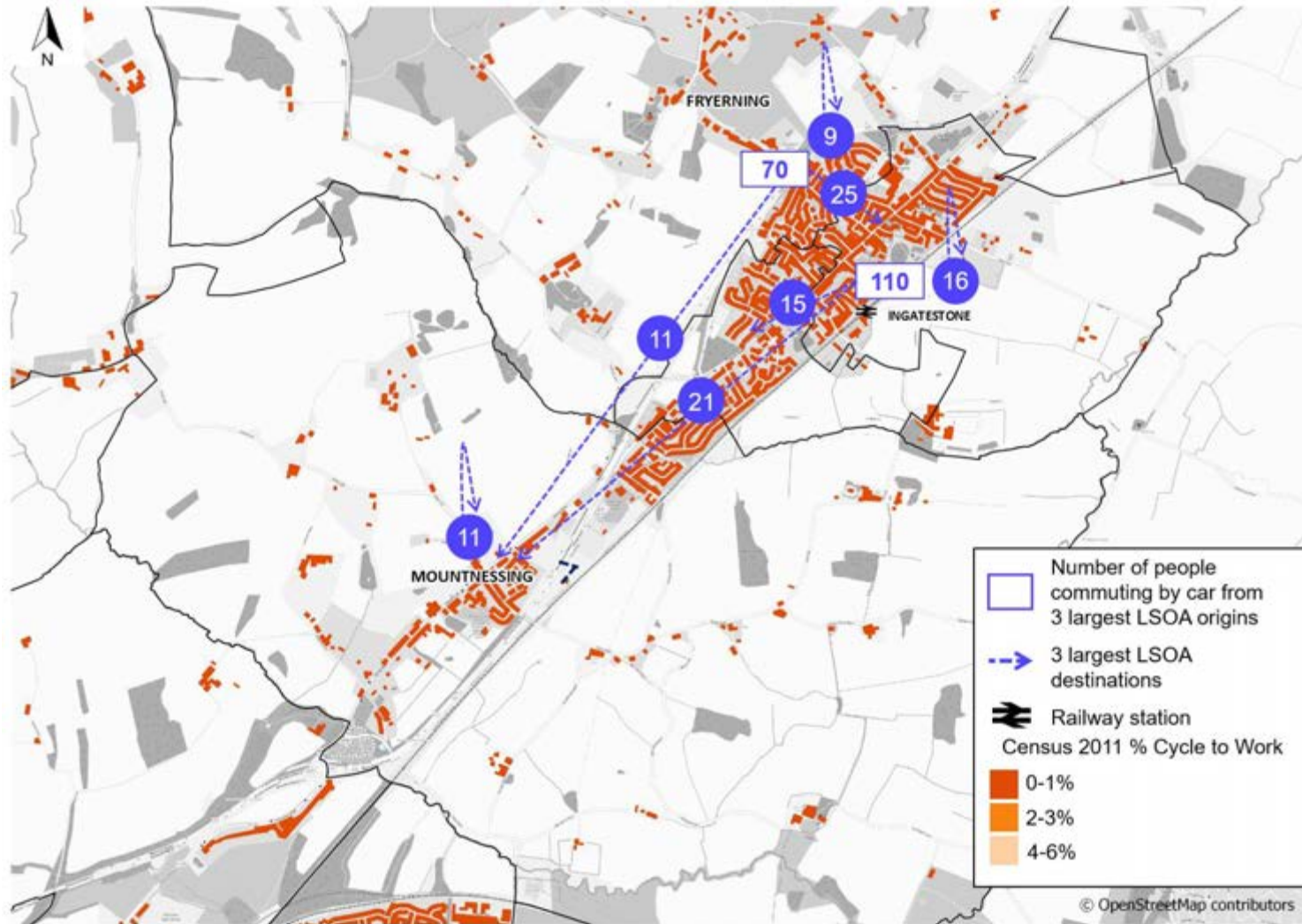


Figure 5.6: Predominant commuter flows for journeys to work by car in Ingatestone

In comparison to Figure 5.5, Figure 5.6 illustrates the fewer short car trips being undertaken within the Ingatestone and Mountnessing area. It is likely that, because this is journey to work data, there are simply fewer people living and working in the area.

5.3 Propensity to Cycle Tool

In previous Cycling Action Plans, the MOSAIC Propensity to Cycle has been examined to help target areas of opportunity to best increase mode share and assist in increasing trips. This, however, has now been superseded by the Propensity to Cycle Tool. This has already been referred to in Section 3.3. The four scenarios examined here are:

- Government target – this represents a doubling of the level of cycling in line with the government’s target to double the number of ‘stages’ (legs of a trip using a single mode) cycled by 2025⁷. This is not uniform and at the local level being studied here will not be exactly doubled. For example, in an area with many short, flat trips and below-average levels of cycling, it may be projected to have more than doubled⁸.
- Gender equality – this represents the increase in cycling levels that would occur if women were as likely as men to cycle a given trip⁸.
- Go Dutch – this represents what would happen should English people were as likely as Dutch people to cycle a trip of a given distance and level of hilliness. This would be the situation if England had the same infrastructure and cycling culture as the Netherlands but retained their hilliness and commute distance patterns.
- Ebikes – this represents the additional increase in cycling that would be achieved through the widespread uptake of electric cycles (‘ebikes’). This is generated by taking the baseline propensity to cycle and applying both the Dutch scaling factors from the Go Dutch scenario and applying Ebike scaling factors, which takes account of the fact that electric cycles enable longer journeys and reduce the barrier of hills.

5.3.1 Propensity to Cycle Analysis of Brentwood

Across Brentwood town, the Government Target scenario is between 1-2% of the population cycling (see Figure 5.2). However, in Pilgrim’s Hatch, just north of the A12, and east of the A128 the Government Target Scenario is slightly higher at 4-6%. Schools in Brentwood that fall in areas with higher propensity to cycle

⁷ Department for Transport, 2014, Cycling as transport, <http://www.tandfonline.com/doi/full/10.1080/01441647.2015.1114271>

⁸ Lovelace *et al.* 2016, The Propensity to Cycle Tool: An open source online system for sustainable transport planning, <https://www.jtlu.org/index.php/jtlu/article/view/862/859> sustainable transport planning, <https://www.jtlu.org/index.php/jtlu/article/view/862/859>

under the Government Target scenario include Larchwood Primary School in Pilgrims Hatch, Brentwood Preparatory School/Brentwood School, Hogarth County Primary School and The Endeavour School. St Mary's CE Primary School is on the boundary of 4-6% propensity to cycle. If routes are to be considered close to schools, segregated facilities may be more appropriate to ensure parents and pupils feel confident to use the infrastructure. Brentwood railway station and the employments zones⁹ all fall within 1-2%.

The Gender Equality scenario shows the lowest levels of cycling across all four scenarios, with 0-1% cycling in the majority of Brentwood. Pilgrim's Hatch and east of the A128 again do slightly better in this scenario than the rest of Brentwood with 2-3% and 4-6% respectively. The higher areas for propensity to cycle under this scenario include the following schools: Larchwood Primary School in Pilgrims Hatch, Brentwood Preparatory School/Brentwood School, Hogarth County Primary School and The Endeavour School. Brentwood railway station and the employments zones¹⁰ all fall within 0-1%.

The Go Dutch scenario has largest propensity to cycle in the south of Pilgrim's Hatch and between Ongar Road and Weald Road with 15-19%. The rest of Brentwood town largely falls under the 10-14% range, apart from the area directly around Brentwood rail station which falls into the lower category of 7-9% cycling. This could be due to the steeper gradients in west Brentwood. Larchwood Primary School is the only school in the area with the highest propensity to cycle at 15-19% under the Go Dutch scenario. Holly Trees Primary School is located in the area with the lowest propensity to cycle at 7-9%. All other schools are in areas with 10-14% cycling. Brentwood railway station and the employment zone of Hubert Road Industrial Park are on the border of the lower (7-9%) propensity to cycle area. All other employment zones are in areas of 10-14% cycling.

The Ebikes scenario shows the greatest potential almost directly around Brentwood High Street at 25-29% of people cycling. The lowest percent is in the west of Warley at 10-14%, because this scenario builds on the Go Dutch scenario which primarily considers distance and gradient. Under this scenario, two schools, Brentwood Ursuline Convent High School for Girls and Brentwood County High School, Brentwood railway station and Ongar Road industrial park fall within the highest area of propensity to cycle at 25-29%. Holly Trees Primary School is in the area with the lowest propensity to cycle at 10-14%.

⁹ Defined by Brentwood Borough Council

¹⁰ Defined by Brentwood Borough Council

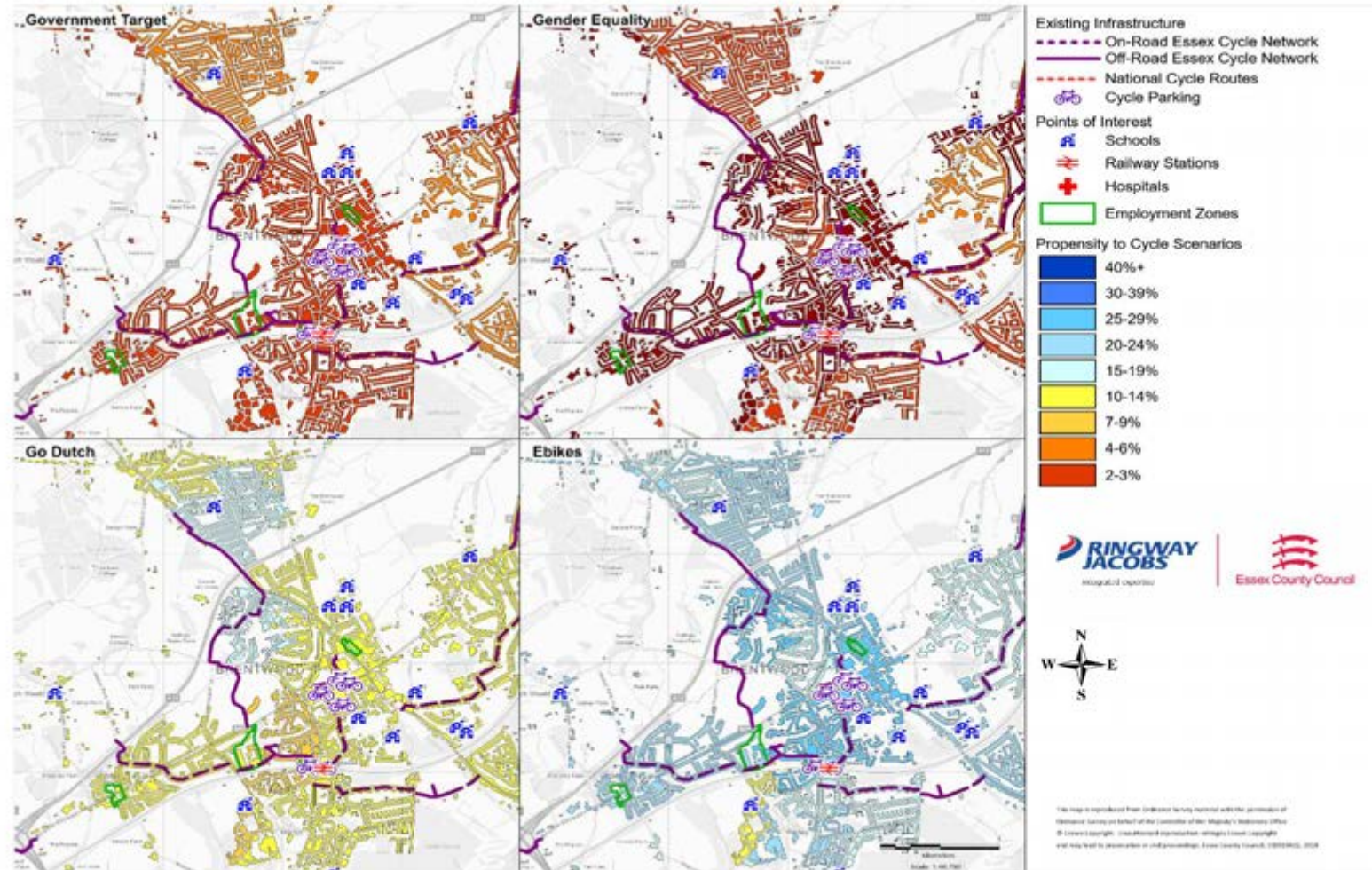


Figure 5.7: Propensity to Cycle scenarios for Brentwood town

5.3.2 Propensity to Cycle Analysis of Shenfield

In Figure 5.8 (see overleaf) the four propensity to cycle scenarios are shown for Shenfield. Under the Government Target scenario the area around Shenfield railway station and Hutton Mount have the lowest propensity to cycle at 0-1%. The area just east of the A128 and in Hutton there is 4-6% propensity to cycle. Schools within this zone include Long Ridings Primary School, St Joseph the Worker Catholic Primary School and Hutton All Saints Church of England Primary School. The Wash Road Industrial Park falls on the boundary of areas with 4-6% propensity to cycle.

Under the Gender Equality scenario, the area south of Rayleigh Road, including Shenfield railway station has 0-1% propensity to cycle. This also includes Herington House School, Saint Martin's School and Willowbrook Primary School. The area around A1023 Shenfield Road and north of Rayleigh Road have 4-6% propensity to cycle, which includes Long Ridings Primary School.

The Go Dutch scenario has the highest propensity to cycle at 15-19% in the area just east of Thrift Wood. Saint Martin's School is on the boundary of this area. The lowest propensity to cycle is at 7-9% around Mount Avenue, including Shenfield railway station. The rest of Shenfield falls within 10-14% propensity to cycle.

The Ebikes scenario has the lowest propensity to cycle around Mount Avenue, including Shenfield railway station and Herington House School, with 7-9%. The area just north of Rayleigh Road also has a lower propensity to cycle at 10-14%, which includes Long Ridings Primary School. In the east of Hutton, south of Rayleigh Road and around Thrift Wood all have 20-24% propensity to cycle. These areas include the Wash Road Industrial Park and Hutton All Saints Church of England Primary School.

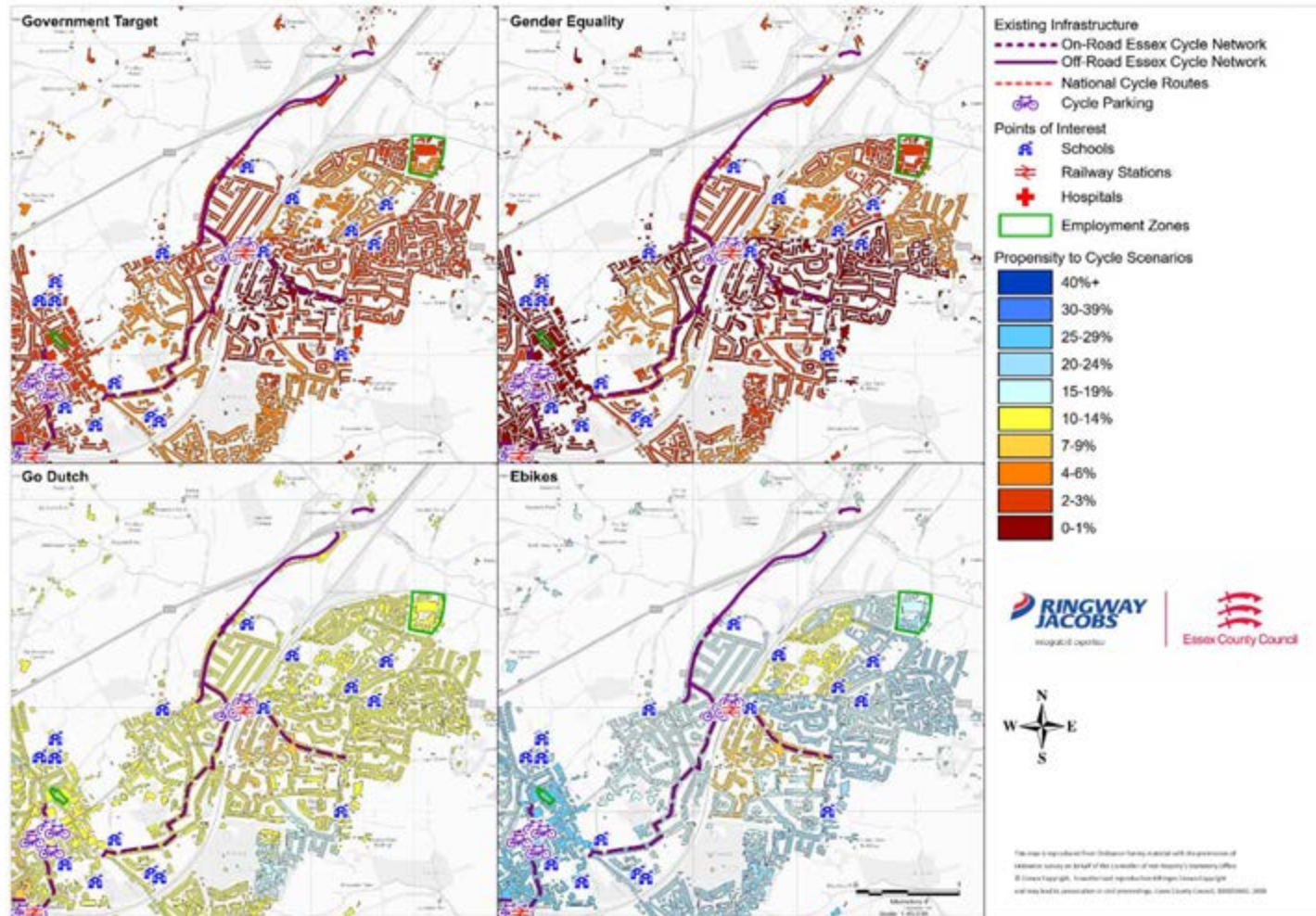


Figure 5.8: Propensity to Cycle scenarios for Shenfield town

5.3.3 Propensity to Cycle Analysis of Ingatestone

Figure 5.9 shows the four propensity to cycle scenarios in Ingatestone. In the Government Target scenario, all of Ingatestone falls under 2-3% propensity to cycle. Points of interest in Ingatestone that all have 2-3% propensity to cycle include Ingatestone railway station, Anglo European School, multiple primary schools and the high street.

In the Gender Equality scenario, north-west Ingatestone has a slightly higher propensity to cycle with 2-3% compared to south-east Ingatestone with only 0-1% propensity to cycle. In the area with a lower propensity to cycle is Ingatestone's only secondary school, Anglo European School, and Ingatestone railway station. The north-west area includes Ingatestone Infant School and Ingatestone and Fryerning Church of England Junior School. South-west of Ingatestone in Mountnessing also has a 2-3% propensity to cycle, which includes Mountnessing C of E Primary School.

The Go Dutch Scenario has a similar split as the Gender Equality scenario whereby north-west Ingatestone falls into a higher propensity to cycle band of 10-14% compared to south-east Ingatestone. The village of Mountnessing also has 10-14% propensity to cycle under this scenario. However, in this scenario more of Ingatestone high street falls into the lower propensity to cycle of 7-9%.

In the Ebikes scenario, north-west Ingatestone and Mountnessing have a higher propensity to cycle of 15-19%. South-east Ingatestone, including Ingatestone railway station, the high street and Anglo European School, have a propensity cycle between 10-14%.

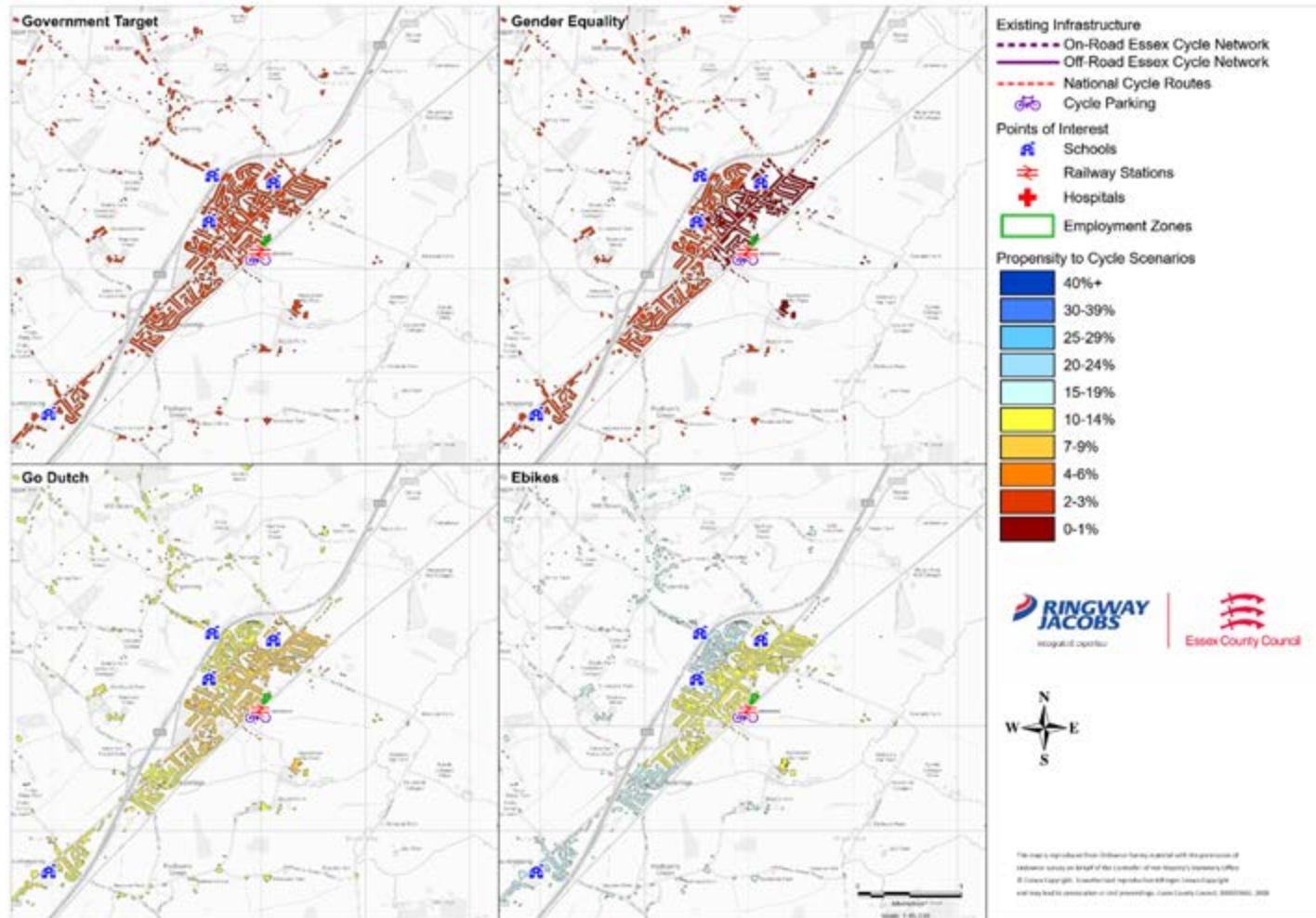


Figure 5.9: Propensity to Cycle scenarios for Ingatestone

5.3.4 Summary of Potential in Brentwood and Shenfield

Pilgrims' Hatch was identified in the Census analysis as having both an existing higher level of people who cycle and make short car trips between Pilgrims Hatch and Brentwood town centre. This suggests that the existing infrastructure and willingness to travel by cycle is there but even more could be done in converting the short car trips to cycle trips instead. The primary barrier to cycle trips in Pilgrims' Hatch is the A12. Potential schemes 14, 15, 16, 17 and 37 should improve connectivity between Pilgrims' Hatch and Brentwood town centre.

Warley was another area identified from the Census analysis as having a higher number of existing cycle trips and short car trips to/from here. Similar to Pilgrims' Hatch, the majority of these movements are between Warley and Brentwood town centre. The primary barrier to cycle trips in Warley is the steep topography, the fast, narrow and busy roads and limited number of (and narrow) crossing points of the railway (forcing cyclists to use the main roads).

Station entries and exits at all Brentwood Borough railway stations are increasing and cycle parking provision should reflect this increase. Access to railway stations is very important in Brentwood with approximately 36% working in Greater London¹¹. It is important for commuters to be able to access the railway stations by cycle so routes connecting residential areas to railway stations should be prioritised. However, it is not appropriate to assume people will try to access their closest railway station geographically because of the different lines serving Brentwood and Shenfield railway stations. Therefore it is necessary to provide those in the Brentwood area with a cycle route to Shenfield railway station and vice versa. This is addressed in the flagship route for Brentwood (See Section 8).

Areas identified as having a high propensity to cycle are Pilgrims' Hatch, northwest Brentwood town, and south Shenfield near Thrift Wood. In comparison to west Warley and Hutton Mount just south east of Shenfield station where the propensity to cycle is the lowest across Brentwood and Shenfield.

5.3.5 Summary of Potential in Ingatestone

There is potential for internal trips to be made by cycle, including to the railway station. However the Propensity to Cycle tool indicates that the village outskirts have a higher propensity to cycle, which could be explained by those closer the village centre are more likely to walk to their destination.

Despite close proximity to services, there are a lot of short car trips happening within Ingatestone which could reasonably change mode to cycling.

¹¹ Census 2011 data – percentage of economically active residents

6 Potential Infrastructure Improvements

6.1 Introduction

In order to overcome barriers to cycling and provide suitable infrastructure, it is essential that all new developments in the District include, where possible, cycling and walking links to key services and areas of employment. To this end, all potential developments associated with the Local Development Plan for Brentwood Borough should contribute towards creating a wider cycle network, connecting key cycle corridors and desire lines.

A coordinated approach should be taken whereby development planning in Brentwood Borough is linked with highway infrastructure provision, complemented by soft measures that promote cycling as part of a range of alternatives to single-occupancy car travel.

This CAP is identifying a network of strategic cycle routes, as well as, within this, specific Flagship Routes. These Flagship Routes for the Brentwood Borough are described later in this report, in Section 8.

6.2 Potential cycle routes

Potential new cycle routes have been identified to help create a step-change in cycling conditions across the Borough. These might include signed routes (with journey times and surface markings), networks of interconnected cycle routes on quiet residential streets, filtered permeability (e.g. convenient cut-throughs and contraflows) and, where appropriate, 2nd generation cycling infrastructure, such as Dutch, Danish, or light segregation. Infrastructure improvements have been considered for the urban areas of Brentwood, Shenfield and Ingatestone.

6.3 Methodology Statement

The potential routes have not, as this stage, been subject to detailed scheme design or feasibility, they are the results of an initial scoping study which is recommending a strategic network. Local knowledge, obtained through Stakeholder Consultation, has been used to inform this process. Where possible, the Sustrans Design Manual has been used to inform provision, particularly with regard to the acceptable provision related to traffic speed and volume conditions in specific locations.

Where traffic volume and speed data is available, the potential schemes have been subjected to Sustrans design principles, which recommend the type of scheme that should be considered under those conditions (Figure 6.1). Traffic volume and speed may influence the decision on the need to segregate cyclists from other traffic. For example, where low speeds and traffic volumes are evident, there is no need to segregate cycle and other traffic and a shared carriageway is

acceptable. As traffic speeds and volumes increase, cycle lanes are found to be more desirable, until the threshold is reached whereby physical segregation is required. Beyond this point, where 85 percentile traffic speeds exceed 40mph, and/or volumes exceed 9500 vehicles/day (or 950 vehicles/hour), conditions become unsuitable for cycling on the carriageway and physical segregation with a verge is necessary. Where traffic volume and speed data are not currently available, it may be necessary to undertake a traffic survey to determine the provision that is required.

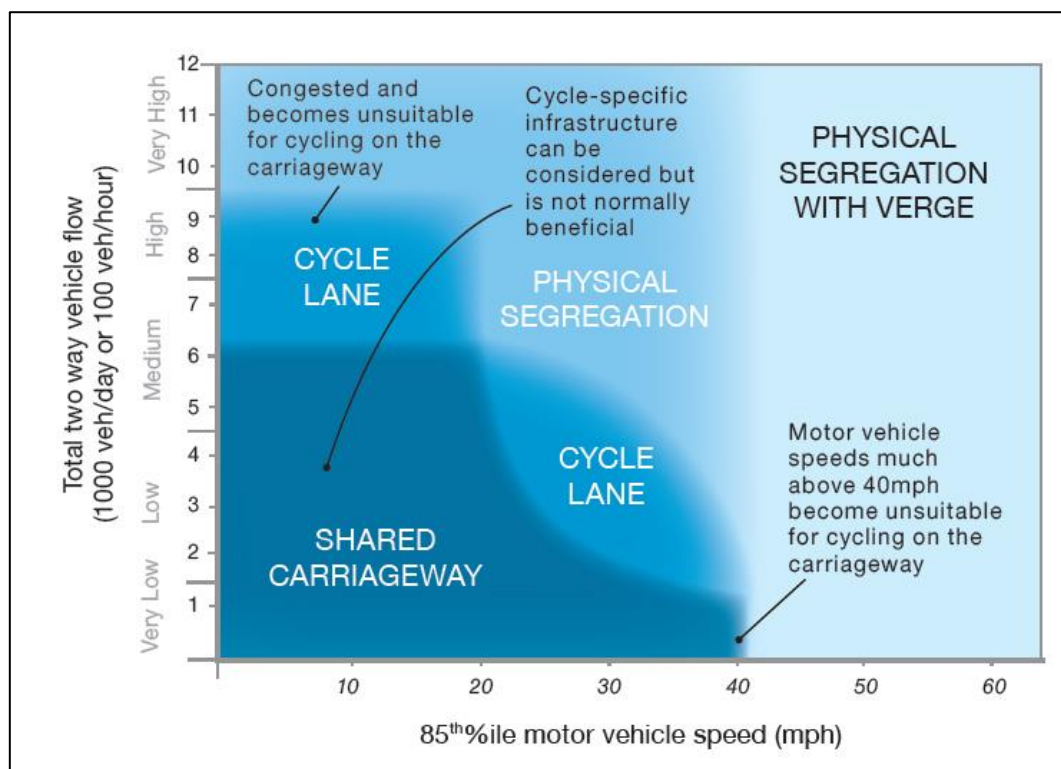


Figure 6.1: Sustrans Segregation and traffic flow¹²

In some locations, it has been noted that cycle-friendly crossings will be required. In most incidences, further work and traffic surveys will be required to enable the exact type of crossing provision to be determined.

*There are some examples where footway/footpath conversions to shared use have been identified. The conversion of footpaths and footways to permit bicycle use is not regarded as a general or area wide remedy, but has been confined to specific links and locations. It is recommended that where footpath conversion and/or footway conversion to shared use is considered then further studies are undertaken to demonstrate that alternative options have been discounted and that clear benefits can be derived. In such situations it is vital that the benefits to

¹² Sustrans Design Manual. Handbook for cycle-friendly design, Sustrans, April 2014

people who cycle are balanced against the increased risk and inconvenience to pedestrians

ECC aims to limit the use of footway conversion/shared use paths, and engineers and designers should first consider alternative options.

6.4 Construction Design and Management (CDM)

The potential new cycle routes identified in this CAP all require further feasibility assessment before they can be finalised or confirmed. In some cases, the alignment of the routes may need to be amended to ensure that the safest scheme design, in terms of operation, construction design and management, is identified. In some cases, a route might need to be deleted entirely, if it is determined that CDM risks cannot be reasonably mitigated through early design stages.

Some of the potential routes are alongside or cross features such as high speed roads, water courses or railway lines and may either require a new structure or widening of an existing structure in order to be implemented. It is recognised that these features raise the potential for significant risk (and indeed cost) during construction and operational management and they will need to be given particular consideration during the feasibility assessment.

6.5 Brentwood Cycling Furtherance Group

Brentwood Borough Council created a Cycling Furtherance Group as a result of its commitment to Health and Wellbeing. Their primary aim was to assist local residents in becoming more healthy and active. Currently they have started mapping a network of on and off-road cycle pathways across the Borough with the aim of enabling travel to work and school from outlying areas by bicycle safely and away from traffic where possible. In the future they hope to have a dedicated webpage with routes that people who cycle are able to download and import for bike navigation devices, as well as advising the County Council with the Brentwood Cycling Strategy. The Brentwood Cycling Furtherance Group's potential network has been considered and where there is alignment with the potential CAP schemes this has been noted in Table 7.2.

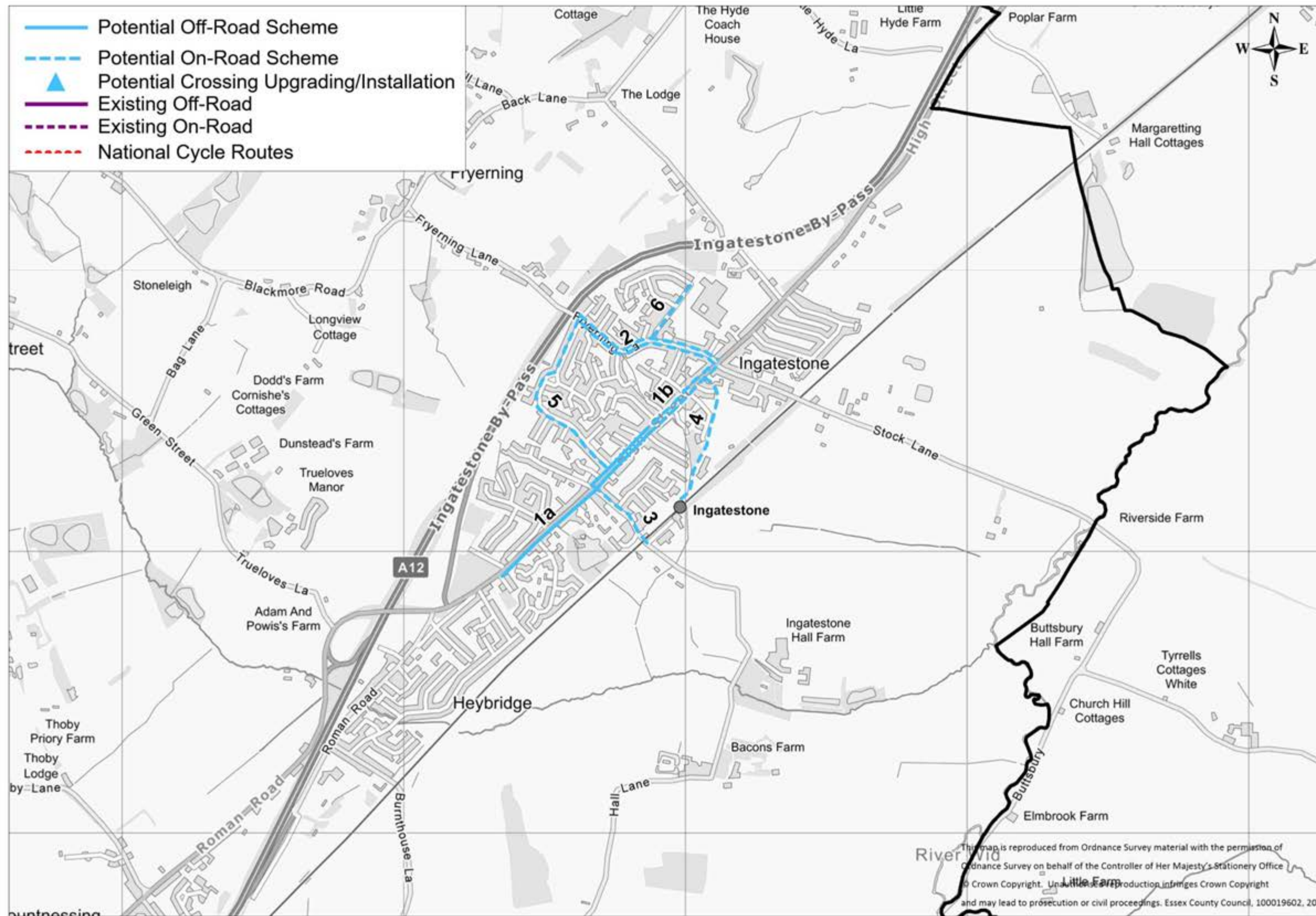


Figure 6.2: Potential Schemes in Ingatestone

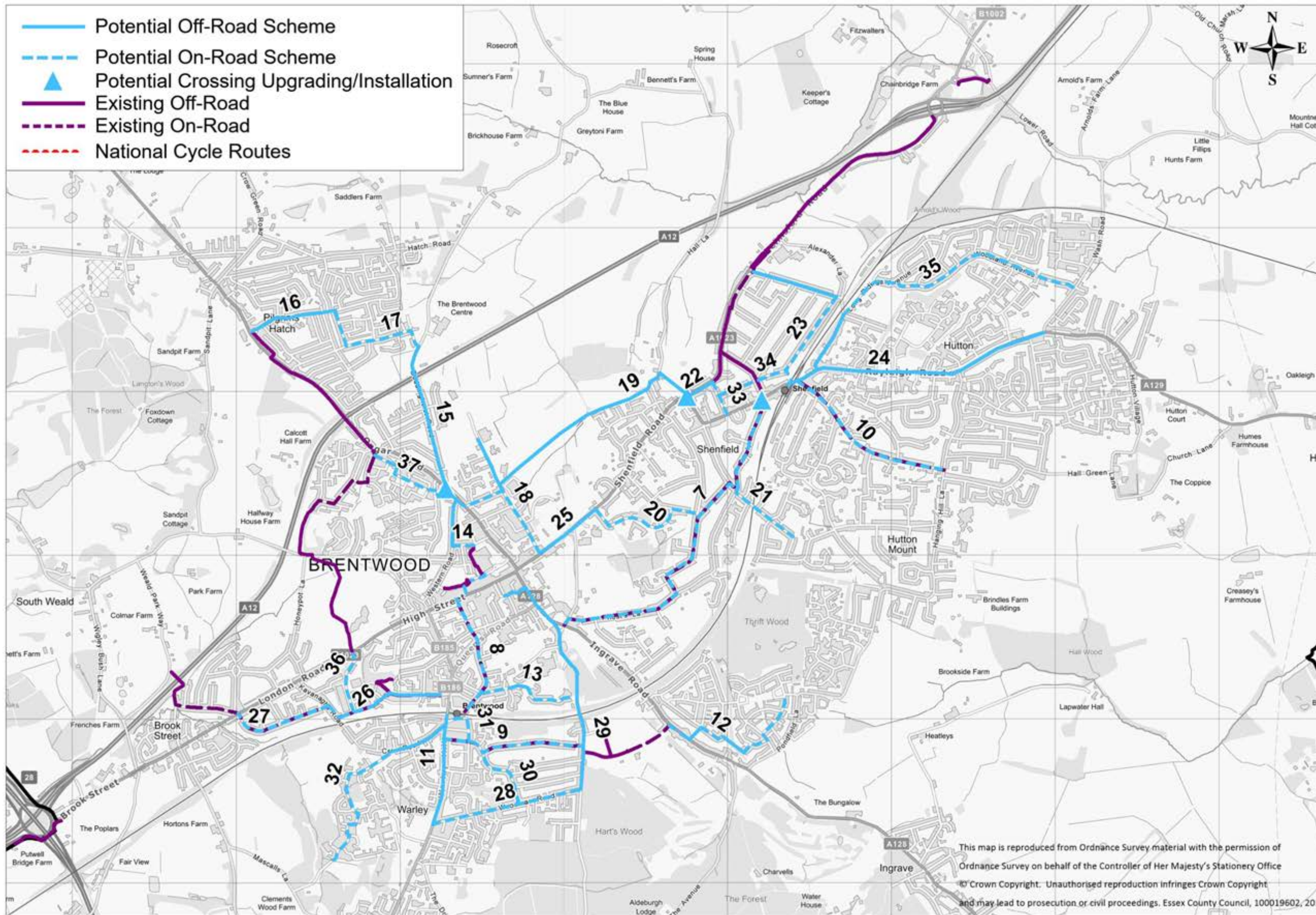


Figure 6.3: Potential Schemes in Brentwood and Shenfield

7 Prioritisation and Costings of Potential Schemes

7.1 Prioritising Schemes

The potential schemes have been prioritised according to four criteria of their design:

- Deliverability;
- Directness;
- Extension of existing network; and
- Key attractors.

A score of high, medium or low has been given for each potential scheme against each of the prioritisation elements. It was then possible to determine the overall prioritisation score for each scheme (again, scoring each potential scheme as high, medium or low).

7.2 Deliverability

The deliverability of a scheme has been assessed according to land ownership issues, which will determine how easy the scheme will be to deliver:

- H: High being a scheme that lies wholly within the highway boundary, straightforward to deliver, with no land ownership issues.
- M: Medium being any route that requires conversion of Public Rights of Way (PROW); and
- L: Low being any scheme which is likely to encounter private land ownership issues, or requires a singular large expense, such as a bridge.

7.3 Directness

The directness of the route is considered in terms of where it is proposed to provide access to, for instance a town centre or a railway station:

- H: High being a scheme that provides direct access, using as short a distance as reasonably possible, or could provide a real improvement on the corresponding car journey time;
- M: Medium being a link route, providing access to the main radial cycle route(s);
- L: Low being indirect routes, which are routed along relatively longer distances.

7.4 Extension of existing network

The extent to which a potential route extends the existing network is considered against this criteria:

- H: High being a route which extends, or fills a gap in, the existing network;
- L: Low being a route which is isolated and/ or unlinked to the existing network.

It should be noted that in some urban areas, for example Ingatestone, there is little or no existing network to connect to, so most of the potential schemes will achieve a low score in this case.

7.5 Key attractors

Under this criteria, the number of key attractors that a route connects is considered. Key attractors include town centres, other urban areas, railway stations, secondary schools/ education facilities, employment (including hospitals), and leisure destinations (parks, sports centres, etc.). The scoring is undertaken as follows:

- H: High being a route which connects to three attractors;
- M: Medium being a route which connects to two of these attractors; and
- L: Low being a route which connects to none (or just a leisure destination) of these attractors.

Within this criteria, town centres and railway stations are considered to be the most important attractors, so if a route connects to both it is likely to score high rather than medium. On the converse, leisure destinations are considered to be less important, so may attract a lower score.

7.6 Overall prioritisation

Once a score has been obtained for each of the four criteria (Deliverability, Directness, Extension of Existing Network and Key Attractors), its overall prioritisation can be determined, giving an overall score of low (L), medium (M) or high (H). As a general rule, the most frequent score obtained across the four criteria will be the resulting overall score. Where there are an equal number of different scores, there may be some element of subjective judgement used to decide the overall result.

The resulting prioritisation for each of the potential schemes is shown in Table 7.1 and 7.2.

7.7 Estimated costs of potential schemes

As with the prioritisation, the costs of the potential schemes are rated on a low (L), medium (M), high (H) and exceptionally High (H+) scale. The cost estimates relate to the following broad ranges:

- L: Low being less than £100,000;
- M: Medium being within the range £100,000 to £500,000;
- H: High being within the range £500,000 to £1,000,000; and
- H+: Exceptionally High being more than £1,000,000.

The outline costs are indicative of a feasibility proposal stage costing, prior to detailed surveys being undertaken for design and construction. Costs exclude the following:

- VAT (costs are exclusive of VAT);
- Inflation beyond 2015 or significant changes to markets;
- Land costs, legal fees, Highways consultation;
- Construction on contaminated land;
- Diversion of services;
- Landscaping; and
- Access roads for construction.

Realistic unit costs have been derived for each of the elements that are identified in the potential schemes and they have been applied to a length of route where appropriate and as a series of elements to enable the overall cost of each scheme to be built up. The resulting estimated cost for each scheme is included in Table 7.1 and 7.2.

7.8 Potential Cycle Routes

7.8.1 Ingatestone

Routes suggested in this Cycling Action Plan focus on linking the residential areas of the village with the high street and railway station.

The primary issue with Ingatestone is that a lot of internal trips that we would like to target to be cycling trips can equally be made on foot. From one of the outermost points in Ingatestone to access Ingatestone train station or the High Street is approximately 1 mile and would take 20 minutes to walk or 5 minutes to cycle according to Google. People may decide to walk unless full cycle provision is provided.

Table 7.1 overleaf contains a summary list of potential cycle infrastructure in Ingatestone.

7.8.2 Brentwood and Shenfield

Routes suggested in this Cycling Action Plan are focused on linking residential areas in the north and south of Brentwood to the town centre and the railway station, linking these areas to shops and services, and closing gaps in the existing infrastructure.

Routes in Shenfield have aimed to provide commuters with infrastructure from residential areas to the high street and railway station. Potential schemes have also considered linking Brentwood and Shenfield to provide access for people who cycle to both railway stations.

There are multiple over-arching issues with encouraging cycling in Brentwood and Shenfield. Both towns have a lot of fast and busy roads, meaning by Sustrans standards cycle infrastructure should be fully segregated. In reality, this is very difficult to achieve because the roads are too narrow to easily accommodate fully segregated cycle facilities. In addition to this, if infrastructure is there, Brentwood and Shenfield are one of the hilliest places in Essex and this is potentially a significant hindrance to people taking up cycling here.

Table 7.1: List of Cycle Infrastructure Proposals/Schemes in Ingatestone

Scheme ID	Scheme Name	Opportunity	Potential Solution – subject to Feasibility Study	Overall Prioritisation	Est. Cost
1a	B1002 Roman Road	Speed reduction measures and advisory cycle lane	<p>This scheme would commence at the priority junction of B1002.Ptere Close where the speed limit goes from 40mph to 30mph heading eastbound. Sustrans recommend segregated facilities here because the 85th%ile motor vehicle speed here is 37mph with an average daily volume of 8,400. However if speed could be reduced through traffic management measures to less than 20mph, Sustrans would recommend a cycle lane.</p> <p>Therefore, the recommendation is introduce traffic management measures and install a new on-road advisory cycle lane.</p> <p>At the B1002 High Street/The Furlongs priority junction, there is a small section of resident’s permit parking opposite which would also need to be considered.</p> <p>To be able to fully connect scheme 1a and scheme 1b, the westbound movement will need to be able cross the road, if the cycle infrastructure from scheme 1a is on the southern side of the carriageway, to the northern side of the carriageway. This could be achieved by upgrading the zebra crossing outside Ingatestone library to a tiger crossing.</p> <p>This route is included in the Brentwood Cycling Furtherance Group’s list of cycle route proposals.</p>	L	L
1b	Ingatestone High Street	Public realm improvements and new on-road advisory cycle lane	<p>New on-road advisory cycle lane from junction with Post Office Road to crossroads with Stock Lane and Fryerning Lane.</p> <p>Rationalise car parking on High Street to enable new advisory cycle lanes to be implemented.</p> <p>Redesign public realm area of Ingatestone High Street to better suit sustainable transport modes, through removal of centre line to encourage slower speeds through the High Street. If speeds can be reduced to less than 20mph, through the above point and potentially other speed reduction schemes, such as vehicle activated signage, then shared carriageway would also be viable.</p> <p>The High Street currently causes severance through Ingatestone for people who cycle and any improvements that could lessen this severance will benefit the rest of Ingatestone’s existing and potential cycle infrastructure.</p> <p>This route is included in the Brentwood Cycling Furtherance Group’s list of cycle route proposals</p>	H	L
2	Fryerning Lane	Quietway	<p>New on-road quietway, connecting B1002 High Street to Fryerning Lane by the A12 bridge. The southernmost part of this scheme, at the junction of Fryerning Lane and High Street, is located on a crossroads with very narrow roads and very limited visibility, owing to building lines very close to the carriageway. The poor visibility is due to buildings, some of which are listed. It will therefore be a challenge to recommend a cycle route through this narrow section of carriageway (approx. 2.7m). Driver awareness of people who cycle could be addressed through including on road cycle symbol markings¹³.</p> <p>Fryerning Lane is on the borderline in terms of Sustrans recommendations, with very low flow but speeds putting the scheme closer towards requiring a cycle lane. Therefore, speed reduction measures may be beneficial. There is insufficient width for much of Fryerning Lane to provide anything other than advisory cycle lanes (with centre-line removal).</p> <p>Currently there is limited footway and in many locations, no footway at all. There could be potential issues arising from the lack of footway between driveways and the carriageway. There is also some parking on the carriageway which would push people who cycle further into the carriageway.</p> <p>Owing to the various challenges of this potential route, a feasibility study to investigate options is advisable.</p> <p>This scheme would connect with potential schemes 1a and 7 as well as provides a link to Anglo European School.</p> <p>This route is included in the Brentwood Cycling Furtherance Group’s list of cycle route proposals.</p>	H	L
3	Station Lane	Advisory cycle lane	<p>New on-road advisory cycle lane connecting the B1002 Roman Road (scheme 1a) with Ingatestone train station. Currently the cycle parking at Ingatestone train station is on the southern side of the train tracks. This means anyone travelling from Ingatestone to the train station has to cross the level crossing to access the cycle parking. Provision of additional cycle parking in the main car park at Ingatestone train station on the northern side of the railway line would be beneficial for cyclists commuting to the station.</p>	H	L

¹³ Chapter 6 Signs and Marking, London Cycling Design Standards, <http://content.tfl.gov.uk/lcnds-chapter6-signsandmarkings.pdf>

Scheme ID	Scheme Name	Opportunity	Potential Solution – subject to Feasibility Study	Overall Prioritisation	Est. Cost
			There is no accessible traffic data on this road. However Station Lane is similar to Fryerning Lane in its characteristics, therefore a shared carriageway scheme is deemed appropriate. This route is included in the Brentwood Cycling Furtherance Group's list of cycle route proposals.		
4	Church Green Quietway	Quietway	Footpath conversion* to shared foot/cycle way of PROW274_38 from Ingatestone High Street past 'St Edmund and St Mary' Church and across the green where the PROW ends at Ingatestone railway station car park. This would provide an alternative route from the High Street to Ingatestone train station avoiding a lot of the High Street. There could potentially be width issues along the PROW once the route gets closer to the train station. This scheme, like scheme 3, is based on the cycle parking at Ingatestone train station being moved to the northern side of the railway line.	H	L
5	The Furlongs/ Pemberton Avenue	Quietway	New signed and marked on-road quietway around The Furlongs and Pemberton Avenue. This provides access to Ingatestone and Fryerning CofE Junior School. It could also benefit those accessing Ingatestone Infant School which is just north of the A12. It is also an alternative route to/from the High Street for those in northwest Ingatestone. It would also be important to ensure continuity between other schemes, such as coming in/out of The Furlongs to the B1002 Roman Road connecting to scheme 1a.	L	L
6	Willow Green	Quietway	New signed and marked on-road quietway from Fryerning Lane along Willow Green to access Anglo European School. This connects with potential scheme 2, providing a link to Ingatestone High Street.	L	L

Table 7.2: List of Cycle Infrastructure Proposals/Schemes in Brentwood and Shenfield

Scheme ID	Scheme Name	Opportunity	Scheme Description	Overall Prioritisation	Est Cost
7	Priests Lane/Friars Avenue	Upgrade crossings and existing infrastructure	<p>Upgrade Hutton Road zebra crossing (by Costa) to a Tiger crossing and provide a link between existing infrastructure on Crossways and Friars Avenue.</p> <p>Potential to utilise the large area of footway in the vicinity of Hutton Road junctions with Friars Avenue and Crossways to develop an off-road footway conversion* to shared or segregated use, to facilitate a continuous cycle link across the town centre. This is potentially a public realm exercise-feasibility study required.</p> <p>Priests Lane/Friars Avenue is part of the existing Essex Cycle Network but should be better signed as a route.</p> <p>New advisory cycle lane could be installed on this existing route, which currently has no visible infrastructure on it. The speeds on the route are currently slightly too high for Sustrans to recommend shared carriageway. If speed reduction measures were considered, then shared carriageway may be possible.</p> <p>This route is also relatively undulating and from one end to the other there is a difference of about 30m in height above sea level. This means extra provision may be beneficial for those travelling up hill, which is the eastbound direction.</p> <p>This scheme would provide the proposed housing development site on land at Priests Lane (Site reference 44 and 178) with a route to Shenfield train station by cycle.</p>	H	L
8	Rose Valley/Crown Street	Advisory cycle lane with public realm improvements for sustainable transport access	<p>Rose Valley and Crown Street from Brentwood train station to Brentwood High Street is part of the existing Essex Cycle Network but should be better signed as a route.</p> <p>New advisory cycle lane to be installed on uphill (northbound) section of Rose Valley. At the junction with Queens Road, the cyclists will go onto the pavement. The zebra crossing on the west of the junction to be upgraded to tiger crossing for people who cycle, with a flush entry/exit to the infrastructure on Rose Valley and Crown Street.</p> <p>Crown Street can be made one way allowing southbound traffic movements only (between the junction with Coptfold Road and the B186), no access for motor vehicles to Crown Street from the B186 Queens Road/Rose Valley junction, but allowing access for people who cycle and pedestrians. This would provide space for a two-way cycle track with one-way working for motor vehicles.</p> <p>This will entail some reallocation of carriageway space and reducing to a single lane on approach to the junction from Crown Street. Refuge to be created on island in centre of Crown Street junction, to enable cyclists to wait whilst crossing the road. Southbound cyclists then use new two way cycle track on shared use footway conversion* on western side of junction, as well as new tiger crossing and cycle track to return to carriageway on Rose Valley. New signed on-road advisory cycle lane continues along Rose Valley to station.</p> <p>It is worth noting this route is steep, climbing approximately 30m uphill from Brentwood train station northbound to Brentwood High Street.</p> <p>This scheme would provide the proposed housing development site at the Baytree Centre, Brentwood (Site reference 100) and the town centre itself with a route to Brentwood train station by cycle.</p>	H	M
9	Mount Crescent/Avenue Road	Advisory cycle lane and Quietway	<p>Mount Crescent/Avenue Road are part of the existing Essex Cycle Network but should be better signed as a route</p> <p>New on-road advisory cycle lanes to be installed in both directions along Avenue Road and Headley Chase, from Warley Hill to Mount Crescent. This will require removal of the centre-line markings. There may be some potential issues with on-street parking along Avenue Road, which will require further investigation.</p> <p>The route continues along Mount Crescent, from Headley Chase to Hartwood Road as a new signed quietway. Note, that for people cycling eastbound along Mount Crescent, the route is uphill climbing approximately 20m travelling eastbound.</p>	M	L
10	Mount Avenue, Shenfield	Quietway	<p>Mount Avenue is part of the existing Essex Cycle Network but should be better signed as a route.</p> <p>New signed quietway along Mount Avenue between Rayleigh Road and Hanging Hill Lane. This a no through road and currently there is are wooden posts that would cause people who cycle to dismount. It is recommended that these posts are replaced by bollards and the vegetation on Hanging Hill Lane around this is significantly reduced/cut back, along with implementation of new signing to improve visibility and raise</p>	M	L

Scheme ID	Scheme Name	Opportunity	Scheme Description	Overall Prioritisation	Est Cost
			<p>awareness for people who cycle on turning out of Mount Avenue on to Hanging Hill Lane. Currently, there is no potential infrastructure considered on Hanging Hill Lane because of the steep nature of this road. However, this could be considered an extension of the existing network in the future.</p> <p>There could be some potential land ownership issues as this is on a privately owned road network. This could lead to issues with maintenance.</p> <p>This route is included in the Brentwood Cycling Furtherance Group's list of cycle route proposals.</p>		
11	B186 Warley Hill	Physical segregation and public realm improvements	<p>Off-road cycle route connecting Woodman Road and Brentwood railway station. Sustrans guidance recommends physical segregation in this location but there is insufficient road width to enable this currently.</p> <p>This route would provide a key N-S link in the town, linking to existing network on Avenue Road and Rose Valley, as well as facilitating access between the employment areas on The Drive and Brentwood train station.</p> <p>Some suggestions that could overcome the issue of the lack of space for cycle infrastructure include:</p> <ul style="list-style-type: none"> Remove existing car parking bays on southbound carriageway between Myrtle Road and Avenue Road to implement a new mandatory cycle lane to facilitate uphill cycling. If possible, install wands to physically segregate the cycle lane from road traffic. A feasibility study will be required. Open up a new south side station access, with cycle parking, to enable people who cycle to the station from Warley to benefit from improved access. Significant level differences in this location means this may not be possible. A feasibility study will be required. A new bridge across railway, with sufficient width for a segregated cycle lane, would significantly improve conditions for cycling and connections between Warley and the town centre. The existing bridge (B186 Warley Hill) across the railway is 10m wide. There are currently footways on both sides. It may be possible to reallocate the total carriageway (including footway) space to provide 2 traffic lanes (3m width each) and a footway conversion to shared use on the eastern side of the carriageway. This option could be repackaged as a public realm exercise/station gateway study and would likely require one new toucan crossing on the southern side of the railway bridge and an upgrade to the existing pelican crossing to a toucan, to enable pedestrians and cyclists to return to the usual network. This should also consider scheme 37 with a study area going approximately 50m down Crescent Road and scheme 11 connecting those coming from Myrtle Road. <p>The northernmost section of this scheme is included in the Brentwood Cycling Furtherance Group's list of cycle route proposals.</p>	H	H
12	A128 Ingrave Road/Pondfield Lane	Physical segregation and quietway	<p>Ingrave Road, from King George's Playing Fields entrance to PROW 272_138. Sustrans recommends physical segregation along this route. The average daily volume of traffic is nearly 16,000 over 7 days with the average daily 85th percentile speeds around 33mph. Therefore, an off-road cycle route is required to connect the pedestrian access of King George's Playing Fields to PROW272_138. This would require an upgrade of the existing pelican crossing to a toucan crossing to avoid any severance for cyclists along this route. The total carriageway width, including footways is 10m minimum along this section of road.</p> <p>This link is very important to achieving connectivity but the available space makes this very challenging. Alternative routes have been considered and this still seems the most deliverable option currently. It is also noted that this is on the PR1 network which prioritises the movement of traffic. However this section is outside of a park making it more reasonable to reduce localised traffic speeds on this section and provide a short section of an on-road cycle lane. It should be noted that this may be sub-standard because of the high volume of traffic. This is another key N-S link in Brentwood and a feasibility study will be required.</p> <p>New signed on-road quietway using PROW272_138, Hawthorn Avenue, and using PROW272_139 to St Stephens Crescent then left onto Knights Way. From Knights Way the route carries on along Eastham Crescent and Pondfield Lane. This provides an alternative between King George's Playing Fields, and on to</p>	M	M

Scheme ID	Scheme Name	Opportunity	Scheme Description	Overall Prioritisation	Est Cost
			<p>Brentwood town centre and train station, and residential area, avoiding the busier and higher speed A128 Ingrave Road, although it is less direct.</p> <p>This scheme requires two PRowWs to be converted, which may cause some issues in terms of conversion, widths and vegetation clearance.</p> <p>Some of this route is included in the Brentwood Cycling Furtherance Group's list of cycle route proposals.</p>		
13	Cornsland	Quietway	<p>New signed on-road quietway along Cornsland between Rose Valley and Seven Arches Road.</p> <p>This scheme requires a PRowW conversion, which may cause some issues in terms of conversion, widths and vegetation clearance.</p> <p>It includes a small section of private road, which provides a crucial link to this useful E-W route. Consideration should be given to whether the existing road closure (a locked single arm gate) requires replacement/adaption to allow improved cycle access through it (potential ownership issues).</p> <p>This route is included in the Brentwood Cycling Furtherance Group's list of cycle route proposals.</p>	H	L
14	Western Avenue	Physical segregation	<p>New off-road footway conversion* to shared use along Western Avenue, between Ongar Road and North Road. In order to achieve this some carriageway width may need to be reallocated and the permit parking on the western side should be removed to provide space to achieve this off-road link.</p> <p>Alternatively, provide on-road advisory cycle lanes. Just before the junction with North Road there is permit parking in a bay on the eastern side of the carriageway which could also be removed. This would provide space to take people who cycle off-road in both directions to avoid navigating the Western Avenue/North Road junction, though the southbound movement on Western Avenue and the westbound movement on North Road would need to be able to cross the road to access this. New marked and signed advisory cycle lanes along North Road to connect to the existing network that runs alongside Sainsburys. There is no current traffic data along here, but it is deemed slow and quiet enough for advisory cycle lanes to be sufficient.</p> <p>To deliver complete connectivity a further new section should be provided from the southern part of the shared use foot/cycleway around Sainsburys along William Hunter Way to the existing infrastructure located on the southern side of the carriageway.. On-road advisory cycle lanes are also recommended along this section.</p>	M	M
15	Doddinghurst Road	Footway conversion and highway space reallocation	<p>New off-road cycle route along Doddinghurst Road from junction with A128 Ongar Road in the south to Elizabeth Road in the north.</p> <p>This scheme will be constrained in the location of the A12 underbridge as footways beneath here are narrow (<1m). North of the A12 underbridge new on-road light segregation cycle lanes can be installed. Highway space could be reallocated from the carriageway to the footway in order to provide a shared use foot/cycleway. However, there is insufficient footway width for much of this route south of the A12 underbridge to enable a footway conversion to meet current standards. Sustrans recommend physical segregation because of the traffic flows and speeds, even if speeds could be reduced a mandatory cycle lane would still be needed.</p> <p>The existing pavement parking would need to be enforced, to prevent motorists parking across any cycle infrastructure and thereby preventing its use. The recommendation here is to introduce double yellows to stop this fly parking. There have been a couple of collisions along Doddinghurst Road, including one serious collision. Any provision along this route should ensure the safety of people who cycle along this route.</p> <p>At the junction where Doddinghurst Road meets A128 Ongar Road, people who cycle can be bought up onto the pavement to the west of the carriageway. This can then lead them to an upgraded crossing.</p> <p>New toucan crossing on A128 Ongar Road to south-west side of street and links to the top of Western Avenue scheme and the Doddinghurst Road scheme.</p> <p>Reallocate highways space from new toucan crossing to Western Avenue and connect in with scheme 14. Even with reallocation, there still may not be enough space to provide an off-road connection. This connection is important to avoid gaps in the network.</p> <p>This route is included in the Brentwood Cycling Furtherance Group's list of cycle route proposals.</p>	L	M

Scheme ID	Scheme Name	Opportunity	Scheme Description	Overall Prioritisation	Est Cost
			This scheme would provide the proposed housing development site on land off Doddinghurst Road, either side of the A12 (Site reference 23) with a route to Brentwood High Street by cycle.		
16	Larchwood Gardens/Balmoral Road	Quietway	<p>New signed and marked on-road quietway route along Larchwood Gardens from existing network on Ongar Road to junction with Clarence Road. The connection between the Ongar Road cycle infrastructure should be seamless. It is worth noting there is a one-way working system on access to Larchwood Gardens. Therefore people who cycle who want to travel east on Larchwood Gardens will have a couple of options:</p> <ul style="list-style-type: none"> a) They have to cross the traffic island on the existing infrastructure and then cycle with the flow to Larchwood Gardens. b) Remove the traffic island and create a new priority junction of A128 Ongar Road/Larchwood Gardens and provide a new cycle track between Ongar Road existing infrastructure and Larchwood Gardens. Ongar Road housing access will become a no through road for traffic and a turning circle will need to be provided for residents. <p>There is some parking on the side of the road to be aware of. This provides access by cycle to Larchwood Gardens Children's Centre and Larchwood Primary School.</p>	M	L
17	Clarence Road/Elizabeth Road	Quietway	<p>New signed and marked on road quietway along Clarence Road from potential scheme 16 on Balmoral Road, east on Elizabeth Road, to Doddinghurst Road, connecting with potential scheme 15.</p> <p>At the junction of Doddinghurst Road/Elizabeth Road there is enough space on the western side of the carriageway to provide an off-road link around to potential infrastructure on Doddinghurst Road.</p> <p>This provides access to Bishops Hall Park Community Centre.</p>	L	L
18	Highland Avenue/Sawyers Hall Lane	New cycle route	<p>It would be beneficial to have a new cycle route along Highland Avenue, between Ongar Road and Sawyers Hall Lane, to cater for the multiple schools located at the northern end of Sawyers Hall Lane and to enable cyclists to avoid travelling through Wilsons Corner, which is a busy, congested double mini-roundabout that would be very difficult to navigate for people who cycle. Some options to be considered include:</p> <ul style="list-style-type: none"> a) Quietway along Highland Avenue and Sawyers Hall Lane between Ongar Road and Shenfield Road. b) Highland Avenue road and footways become extremely busy at school times, along with on-street parking. Footway on northern side of Highland Avenue carriageway is particularly used by pedestrians accessing schools on Sawyers Hall Lane. Potential to utilise footway and verge on southern side of carriageway (width approx. 3.5m) to provide a footway conversion* to shared use foot/cycle way, although this would require the removal of the verge and several trees which line the route. c) New signed and marked on-road advisory cycle lanes along Sawyers Hall Lane, between Highland Avenue and Shenfield Road <p>Consider provision of toucan crossings of Sawyers Hall Lane and Highland Avenue at that junction to facilitate a link between Highland Avenue foot/cycle way, Sawyers Hall Lane cycle lanes and potential scheme 26.</p> <p>There have been a couple of collisions along Sawyers Hall Lane, including one serious collision. Any provision along this section should ensure the safety of people who cycle. One collision was a result of a motor vehicle pulling out of a side road into a cyclist, therefore awareness of people who cycle may be beneficial, such as on road cycle symbol markings¹⁴.</p> <p>There are six schools located at the northern end of Sawyers Hall Lane, which are all accessed from Sawyers Hall Lane. All access points to the schools on foot or cycle are from Sawyers Hall Lane. Consequently, the road becomes very busy with cars moving, parking, turning, as well as children and parents walking to/from the schools.</p> <p>Public realm study to determine how to make this area safer for all users and to enable safe consideration of cycle access. Potential to close the road to motor vehicles (except for access) at school start and finish times in term time. This would create an opportunity to develop a gateway scheme and</p>	H	L/M (dependent on chosen option)

¹⁴ Chapter 6 Signs and Markings, London Cycling Design Standards, <http://content.tfl.gov.uk/lcds-chapter6-signsandmarkings.pdf>

Scheme ID	Scheme Name	Opportunity	Scheme Description	Overall Prioritisation	Est Cost
			<p>enable cycle routes to be safely connected. A feasibility study would be required.</p> <p>This route is included in the Brentwood Cycling Furtherance Group's list of cycle route proposals. This suggests they may be supportive of this potential scheme.</p> <p>Part of this route is included in the Brentwood Cycling Furtherance Group's list of cycle route proposals.</p>		
19	Public footpath 25 (PROW 272_25)	Quietway	<p>New off road segregated cycle track utilising a conversion* of PROW_272_25 from Sawyers Hall Lane to Shenfield (Hall Lane, or Shenfield Place/ Shenfield Road), enabling cyclists to avoid much of Shenfield Road.</p> <p>One option for the route passes around the back of the primary school through the park on to Shenfield Road, meaning much of the route would be traffic free. However, the on-road section (Hall Lane) is very narrow and therefore potentially unsafe for cyclists. Feasibility study would be required to investigate options and safety concerns further.</p> <p>Full resurfacing of the route would be required. Consideration of upgrading/ widening of footbridge across stream to enable safer cycle access.</p> <p>An alternative option for the eastern section of the route would require a new section of route N-S to connect existing footpath to Shenfield Place, which will likely require purchase of land (potential land ownership issues). The route would then continue E-W as a new signed and marked quietway network in Shenfield Place and Hall Lane (potential for advisory cycle lanes in Hall Lane, between Shenfield Place and Shenfield Road)</p> <p>Quietway network in Shenfield Place and Hall Lane, enables cyclists to connect to Shenfield Road.</p> <p>Alternatively, continue route along entire length of PROW272_25, as far as Hall Lane. However due to the rural nature of this road, it is important this is completely safe for people who cycle. A recommendation for this section is to implement white line markings on both sides of the carriageway to visually narrow the road to one-way and considerably slow motor vehicles down, as well as including on-road cycle symbol markings¹⁵. It is noted also, that for this section the topography becomes quite hilly (uphill eastbound). Utilise an off road footpath conversion of PROW 272_23 through the park, to enable cyclists to connect with Shenfield Road and potential scheme 26.</p> <p>This route is included in the Brentwood Cycling Furtherance Group's list of cycle route proposals.</p>	L	H
20	Crescent Drive/Middleton Road	Advisory cycle lane	<p>New advisory on-road cycle route between Shenfield Road and existing network on Park Way, utilising new on road advisory cycle lanes along Crescent Drive and southern part of Middleton Road.</p> <p>This provides access to/ from Brentwood Community Hospital and has onward connections to Shenfield town centre and station.</p> <p>This scheme can be connected to the existing infrastructure on Worrin Road in the south and to potential scheme 25 in the north.</p>	H	L
21	Woodway	Quietway	<p>New signed and marked quietway from existing network on Priests Lane along Woodway to PRoW 272_166.</p> <p>Future potential to extend route along PRoW (conversion* required, although width issues for the length of the footpath meaning this section of route would be sub-standard) and Spurgate, connecting to Hanging Hill Lane, to create a wider quietway network/residential permeability. As with all PRoW conversions there can be issues with conversion, width and vegetation clearance.</p> <p>It should be noted that this is in Hutton Mount which can be a particularly sensitive area due to the majority of roads being privately owned and not Essex Highways assets.</p> <p>Part of this route is included in the Brentwood Cycling Furtherance Group's list of cycle route proposals.</p>	M	L
22	A1023 Chelmsford Road	Crossing upgrade and gap closure	<p>Upgrade existing puffin crossing to a toucan crossing at Hutton Road/Chelmsford Road junction, significantly improving connection with potential route 19, with onward links to existing network. This would provide a key connection in providing a continuous E-W cycle route between Brentwood and Shenfield Provide a link with a new off-road cycle route between potential route 19 and the existing Essex Cycle Network which ends at the Chelmsford Road/Shorter Avenue junction. The new off-</p>	H	M

¹⁵ Chapter 6 Signs and Markings, London Cycling Design Standards, <http://content.tfl.gov.uk/lcds-chapter6-signsandmarkings.pdf>

Scheme ID	Scheme Name	Opportunity	Scheme Description	Overall Prioritisation	Est Cost
			<p>road footway conversion* to shared use could be provided on either the north or south side of the Chelmsford Road carriageway. Though the existing facilities which terminate at Shorter Road are on the southern side.</p> <p>An alternative option would be to reallocate the available carriageway width (10m) to provide a segregated cycle track for the whole section of Chelmsford Road, between Hutton Road and the A12 roundabout. This would link with the effective quietway network of Shorter Avenue, Crossways, Alwyne Avenue and Holmwood Avenue and Oliver Road to provide effective cycle links to Shenfield town centre and railway station.</p> <p>This route is included in the Brentwood Cycling Furtherance Group's list of cycle route proposals.</p>		
23	Oliver Road/Hunter Avenue	Shared use foot/cycleway and quietway	<p>New signed and marked quietway along Oliver Road and Hunter Avenue connecting Chelmsford Road to cycle parking in Hunter Avenue car park.</p> <p>Potential to create a new quietway on Oliver Road, between Hunter Avenue and Chelmsford Road.</p> <p>Could help link new development in north Shenfield to Shenfield railway station, as well as connecting to Shenfield High School/Sports Centre.</p> <p>Part of this route (Oliver Road) is included in the Brentwood Cycling Furtherance Group's list of cycle route proposals.</p>	H	M
24	A129 Rayleigh Road	Segregated cycle lane	<p>New off-road cycle footway conversion* to shared use on south side of Rayleigh Road, between Shenfield train station and junction with Wash Road. This would require removal of verges and vegetation on south side of road. Consideration of provision of a safe cycle crossing of Hanging Hill Lane and Mount Avenue is needed also.</p> <p>Potential width issues in some locations, particularly between Yew Tree Close and Alexander Lane. The scheme is also constrained at the railway bridge, where there is 7.5m of carriageway (excluding footways). However, the traffic volume is too high here to have anything but physical segregation by Sustrans' standards. Potential solutions for improving access for people who cycle here, include:</p> <ol style="list-style-type: none"> Replace the existing bridge with a wider bridge to allow room for pedestrians, people who cycle and motor vehicles. Make the bridge one-way working for motor vehicles and use the extra width to provide a stepped/hybrid cycle track. <p>This is a key E-W link from Hutton to Shenfield train station. The DfT count data shows this to have the second largest number of people who cycle (after A1023 Shenfield Road) already on this road. There have been a few collisions with cyclists along this route. Therefore any potential cycle infrastructure along this route will ensure the safety of people who cycle.</p> <p>A small part of this route, the westernmost section by Shenfield train station, is included in the Brentwood Cycling Furtherance Group's list of cycle route proposals.</p>	H	H
25	A1023 Shenfield Road	Shared use foot/cycleway	<p>New off-road shared use foot/cycleway, utilising footway conversion* on NW side of carriageway, connecting from Sawyers Hall Lane to Crescent Road. Potential to extend route to Ongar Road, and to provide a high quality link to Brentwood High Street. Although, this would likely require some carriageway reallocation but there appears to be sufficient road width here to facilitate this.</p> <p>This may require new toucan crossings at junction with Crescent Road and an upgrade of existing pelican crossing to a toucan at Ongar Road.</p> <p>Part of this route, the western half, is included in the Brentwood Cycling Furtherance Group's list of cycle route proposals.</p>	M	M
26	Rollason Way/Hubert Road/Westwood Avenue	Improvement to existing network	<p>This is part of the existing Essex Cycle Network but needs to be better signed as a route.</p> <p>The route through Hubert Road is an industrial estate car park, where there is space to accommodate cyclists by Sustrans standards on a shared carriageway. Though it will be important to ensure all motor vehicles, particularly HGVs, are aware that people who cycle are likely to be passing through. This could be addressed through on-road cycle symbol markings¹⁶. The section between Hubert Road and Rollason Way needs to be signed, as currently visible signage appears east of Rollason Way.</p>	H	L

¹⁶ Chapter 6 Signs and Markings, London Cycling Design Standards, <http://content.tfl.gov.uk/lcds-chapter6-signsandmarkings.pdf>

Scheme ID	Scheme Name	Opportunity	Scheme Description	Overall Prioritisation	Est Cost
			This section is off carriageway and re-joins the carriageway at the double mini-roundabout of Wharf Road/Rollason Way/Chase Road. The shared use foot/cycleway continues down Wharf Road/St James Road to Brentwood Station car park where there is cycle parking. This route is included in the Brentwood Cycling Furtherance Group's list of cycle route proposals.		
27	Kavanaghs Road	Gap closure	This would close a gap in existing Essex Cycle Network infrastructure along Kavanaghs Road. An on-road advisory cycle lane may be sufficient here, as well as a tiger crossing to allow people who cycle to cross Kavanaghs Road and have a continuous route between Westwood Avenue and Hubert Road.	H	L
28	Woodman Road	Speed reduction and advisory cycle lane	Woodman Road could provide a useful E-W link across Brentwood but current traffic speeds are considered to be too high. Existing speed humps along the length of the road need to be bolstered and made cycle friendly with other traffic management measures to effectively reduce speeds to 20mph which would then enable an advisory cycle lane to be provided. Existing on-street parking along much of the road may need to be rationalised to enable safe passage of cyclists. Further investigation required.	L	L
29	Hartswood Road/Seven Arches Road/A128 Ingrave Road	Segregated cycle infrastructure	A key cycle route to create would be along Hartswood Road, Seven Arches Road and the A128 Ingrave Road to create a continuous N-S route between Warley and Brentwood High Street. However, this is also a key route for traffic and has high speeds and traffic volumes (along with a pinch point at the railway bridge), requiring any cycle infrastructure to be fully segregated. Ideally the route could commence around the Hartswood Road/Woodman Road junction and provide a seamless connection with this and scheme 29. However, currently there is not enough width to provide full segregation from here to the railway bridge. To provide enough width, it would likely require land purchase, and on the east of the carriageway the land is either privately owned driveways or part of King George's Playing Fields. This scheme should also ensure a continuous E-W link by connecting the existing infrastructure on Mount Crescent and through King George's Playing Fields. This is currently a zebra crossing, which could potentially be upgraded to a tiger crossing. The railway bridge is the biggest constraint on this route. It is a Network Rail asset, with a narrow (approximately 6m) two-way carriageway and a footway on the eastern side of the carriageway only. There are three potential options for this bridge: a) Replace the existing bridge with a wider bridge to allow room for pedestrians, people who cycle and motor vehicles. b) Make the bridge one-way working for motor vehicles and use the extra width to provide a stepped/hybrid cycle track. c) Close the bridge to motor traffic completely, facilitating a traffic free connection for pedestrians and cyclists North of the railway line there is more space alongside the carriageway to provide a fully segregated off-road cycle lane. This may require some vegetation removal. Outside of Brentwood County High School is a zebra crossing that may be beneficial to upgrade to a tiger crossing. Once the route reaches Shenfield Common it becomes constrained again by the pond on Shenfield Common to the east and housing to the west. To provide fully segregated cycle facilities here, it is likely private land may have to be purchased to the west of the carriageway. A couple of small parts of this route are included in the Brentwood Cycling Furtherance Group's list of cycle route proposals.	H	H
30	Headley Chase	Quietway	New on-road quietway from existing Essex Cycle Network on Avenue Road (note, no cycle infrastructure on the ground), to connect to Woodman Road (potential scheme 29). It is important here that the connection between the existing and new infrastructure is seamless. One potential issue with this scheme is near the Headley Chase/Woodman Road junction, where there are significant amounts of on street parking. It may be safer for people who cycle to restrict this.	M	L

Scheme ID	Scheme Name	Opportunity	Scheme Description	Overall Prioritisation	Est Cost
			This section of road also has quite a steep gradient, with those travelling southbound climbing 15m over the 450m stretch.		
31	Myrtle Road	Contraflow cycle lane	<p>Connect from existing Essex Cycle Network on Avenue Road (note that this does not include any cycle infrastructure on the ground) on Avenue Road along Warley Mount and Myrtle Road to B186 Warley Hill and Brentwood railway station using an advisory cycle lane along Warley Mount and then providing a contraflow cycle lane along Myrtle Road for people who cycle to go against the existing one-way system.</p> <p>Connecting to the existing network on the south of the route is a quiet junction which people who cycle should be able to navigate without any further infrastructure here.</p> <p>In the northern part of the route, Myrtle Road connects onto B186 Warley Hill, which is a busy junction with buses currently using an island on the Myrtle Road junction to perform U-turns. It is recommended that the access for people who cycle from here to be considered as part of potential scheme 11 (public realm improvements in the vicinity of the station).</p>	H	L
32	Vaughan Williams Way/Crescent Road	Quietway and shared use foot/cycleway	<p>New on-road quietway through residential estate along Vaughan Williams Way. The southern end will begin where the footway first begins (approximately 300m north of the junction with Mascalls Lane). The route will follow Vaughan Williams Way to Crescent Road.</p> <p>On Crescent Road there currently is not enough width to provide an off-road cycle lane. Trafficmaster speed data indicates that this road may be congested in the morning peak hour, therefore off-road infrastructure would be recommended by Sustrans. There is residents permit parking on the south side of the carriageway directly east of Vaughan Williams Way, which if removed would then provide enough space for an off-road cycle lane.</p> <p>Past the permit parking, there is potential to build the footway out to provide a shared use foot/cycle way, by taking space away from the carriageway.</p> <p>Past the Crescent Road/Milton Road/Junction Road crossroads there is more residential permit parking on the north of the carriageway. It will be important to ensure all sections of this route are effectively connected. Once this ends just before the junction with Warley Hill, there is insufficient space for an off-road cycle lane and a feasibility study will be required here, possibly as part of scheme 11.</p> <p>This scheme would provide access for these residents by cycle to Warley Country Park, Holly Trees Primary School and Brentwood train station.</p>	H	M
33	Shorter Avenue	Advisory cycle lane	<p>New signed and marked on-road advisory cycle lane connecting to/from any new infrastructure on A1023 Chelmsford Road to Hutton Road. This would provide an alternative route for people who cycle to Hutton Road which is narrow and busy.</p> <p>As part of this scheme, cycle parking could also be provided in front of the parade of shops on Hutton Road just east of Shorter Avenue.</p>	H	L
34	Margaret Avenue/Hunter Avenue	Advisory cycle lane	<p>New on-road advisory cycle lane along Margaret Avenue and Hunter Avenue, between junction with Shorter Avenue and any potential new infrastructure there and Hunter Avenue car park where there is existing cycle parking. Dependent on existing usage of this cycle parking it may be deemed necessary to increase the cycle parking available here. The Shenfield Station Forecourt and Public Realm Masterplan (EC, Ringway Jacobs), indicates significant expansion of this cycle parking, as well as ramped access from Hutton Road.</p> <p>A small section of this route is included in the Brentwood Cycling Furtherance Group's list of cycle route proposals.</p>	H	L
35	Alexander Lane/Long Ridings Avenue/Woodland Avenue	Shared use foot/cycleway and quietway	<p>Traffic calming measures required along Alexander Lane from the junction with Long Ridings Avenue to the A129 Rayleigh Road junction to reduce traffic speeds to below 30mph and enable advisory cycle lanes to be provided. Sustrans guidance recommends physical segregation along Alexander Lane because of the speed. However, limited carriageway width means a segregated solution is not possible.</p> <p>New on-road quietway along Long Ridings Avenue and Woodland Avenue from Alexander Lane to Wash Road. This should link seamlessly from any potential infrastructure on Alexander Lane.</p> <p>Consider removal of on street parking on the road outside Long Ridings Primary School to improve the safety of people who cycle by avoiding conflict of movements.</p> <p>If it can be achieved, this route would provide a useful extension of the Flagship Route, identified in this CAP. Part of</p>	M	M/H (dependent on cost of land purchase)

Scheme ID	Scheme Name	Opportunity	Scheme Description	Overall Prioritisation	Est Cost
			this route, along Alexander Lane, is included in the Brentwood Cycling Furtherance Group's list of cycle route proposals.		
36	Hubert Road	Advisory cycle lane and new crossing	<p>This link would connect the existing off-road shared use cycle track that ends on A1023 London Road opposite Esso/Tesco Express petrol garage to the existing Essex Cycle Network (no existing infrastructure but some is proposed as potential scheme 26/27) at the bottom of Hubert Road Industrial Estate. Land will need to be bought from the business (currently British Telecoms) where there is vegetation just north of the A1023 London Road to connect from the off-road cycle lane to opposite Hubert Road. This land could also provide sustainable transport access for the business, connecting to Brentwood train station. Provision of a new toucan crossing would improve the continuity of the cycle route. An advisory cycle lane can then be provided along Hubert Road, connecting to the existing cycle network and improvements identified in potential scheme 26.</p> <p>It may also improve use of this facility by providing cycle parking at Hubert Road Industrial Estate.</p>	H	M
37	Highwood Hospital estate	Quietway	<p>New signed and marked quietway through the Highwood Hospital Estate, which would connect the existing cycle route on the A128 Ongar Road (that ends on this road at the junction with Costead Manor Road), to potential scheme 15. Using the existing shared use cycle/footway facility that takes people who cycle from Ongar Road on to Little Highwood Way. New on-road quietway along Little Highwood Way which runs parallel to A128 Ongar Road. Quietway continues down Little Highwood way, Regent Way, Kensington Way, Chelsea Way, Geary Drive and Wingway and connects with potential scheme 15. Note, there is currently only pedestrian access between Ongar Road and Wingway, facilitated by a kerb and bollards. Implementing some flush kerbs and localised widening in this location would create a useful link for cyclists. The crossing just north of the A128 Ongar Road/Doddinghurst Road will need to be upgraded to a toucan crossing. The existing bus stop located on this mini-roundabout should be moved to allow space to widen the footway and create an off-road shared use cycle lane connecting to the new access between Wingway and Ongar Road created using filtered permeability. It is likely that the junctions along this route where marked as quietway should not need further infrastructure to aid people who cycle through the junctions. The connection with scheme 15 in the south of the route should be seamless to ensure there are no gaps in the network along this route.</p>	H	L

8 Flagship Routes

8.1 Introduction

A Flagship Cycle Route is a key corridor providing safer, faster and more direct access to one or more key attractors (town centres, employment sites, education establishments, transport hubs, visitor attractions and existing/proposed developments). The routes will be on high demand corridors, be able to meet demand (both existing and potential), encourage a focus on innovation/design best practice and will include continental standard facilities, where appropriate.

It is hoped that a county-wide suite of Flagship Routes will be a focus for future funding, high quality infrastructure, design best practice and innovation.

8.2 Potential Flagship Routes in Brentwood/Shenfield

It is proposed that an East/West flagship route is created to link Brentwood and Shenfield. The route would connect Brentwood commuters to Shenfield railway station, where a faster, more frequent London service runs from. Equally, to facilitate the movement of Shenfield residents to the broader provision of shops and services of Brentwood town centre. The potential Flagship Route is shown in Figure 8.1.

8.2.1 Prioritisation

The Flagship Route has been considered against the four prioritisation criteria, as per the other potential schemes:

- Deliverability;
- Directness;
- Extension of existing network; and
- Key attractors

For the Flagship Route (FR), this assessment found that the route is difficult to achieve, is direct, it connects with the limited existing network and connects to both Brentwood and Shenfield town centres, as well as Shenfield railway station. Thereby, this route would overall achieve a high prioritisation. The primary issue being deliverability, however, in Table 7.2 which lists the potential schemes in Brentwood and Shenfield there are a few schemes which are segmented sections of this Flagship Route. These are potential schemes 22, 25, 33 and 34.

The inference from the prioritisation exercise is that it supports the basis for identifying the Flagship Routes in the first instance, in that they are key corridors, providing important benefits for cycling in Brentwood Borough and should therefore be considered a high priority going forward.

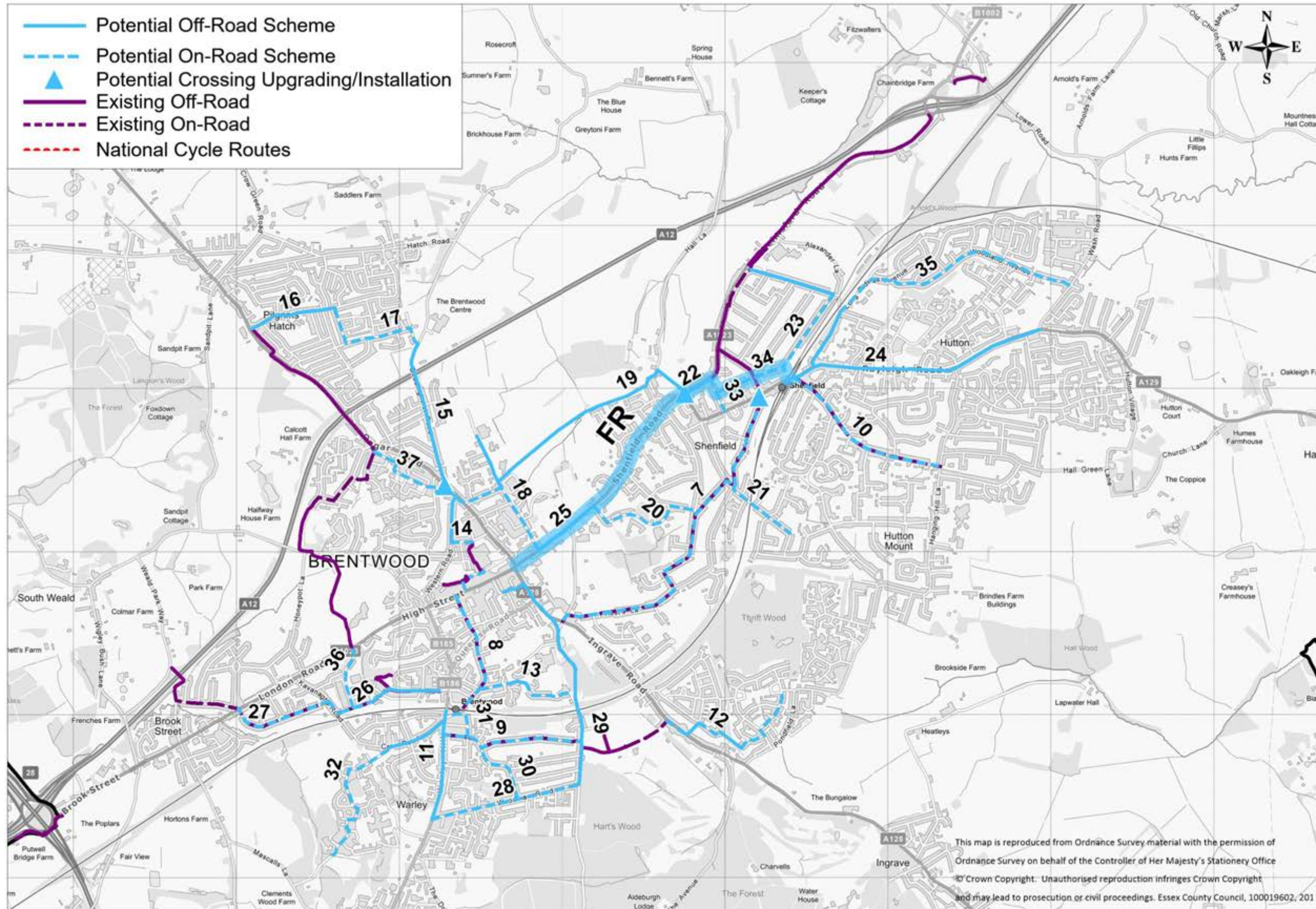


Figure 8.1: Potential Flagship Route for Brentwood Borough

9 Smarter Travel Measures

9.1 Introduction

To ensure the potential for cycling is fully realised, new infrastructure must be accompanied by targeted promotion and events.

Local promotion of cycling should be increased to convince residents that cycling is a normal and accessible activity for all as well as highlighting the health benefits of cycling.

In addition, cycling has the potential to alleviate congestion and persuading people to replace a local car journey by cycling. This could include workplace travel planning in the town centres within the Borough.

9.2 Marketing and promotion

The Essex Cycling Strategy sets out a number of overarching themes for marketing and promoting cycling which are as follows:

9.2.1 Cycle Essex

ECC are committed to running high profile campaigns under the “Cycle Essex” umbrella which aim to change the image of cycling in Essex, break down perceptual barriers, communicate a safety message and tie in with existing organisations such as Active Essex.

9.2.2 High profile events

Essex has been successful in attracting high profile cycling events to the County that have been well attended by the public, such as hosting Stage 3 of the 2014 Tour de France. ECC would like people to continue to support these events but also give cycling a try through further mass event, car free days in town centres and bike festivals.

9.2.3 Support for local initiatives

ECC recognise that local initiatives are particularly effective at engaging with people on a personal level. Therefore they aim to empower Boroughs/Districts to promote cycling locally, support community providers/charities, support cycling clubs and ensuring that secondary schools, large employers, large council offices and major hospitals have up to date travel plans.

9.2.4 Cycling Maps

Cycling maps (digital and on paper) aid in navigation and are an effective marketing tool for raising the profile of cycling. If the maps are legible, well

designed and effectively disseminated, they can be the nudge that is needed to motivate the 'near market' to start making some trips by bike.

In addition, in order to maximise the benefits of cycling maps, future cycling maps for Brentwood should be designed with the following principles in mind:

- The maps should be prepared under the same design guidelines as the promotion of 'Cycle Essex'. This will help to raise their profile and visibility;
- Information included in the maps should correspond with the signage by the roadside;
- Include more information about local points of interest. This might encourage leisure cycling, local tourism and increase patronage to local attractions; and
- Widely distribute the maps (if more than one) in a bundle and on as many online and physical outlets as possible.

Furthermore, official and unofficial routes are also available through mobile phone apps, social media and specialised websites such as *mapmyride.com* and *strava.com*, which allows people to track their routes whilst cycling and share them on various platforms.

For example, there is some interest in cycling at a community level in Brentwood as demonstrated by the website *mapmyride.com* displaying just under 2,000 routes¹⁷ recommended in the local area by its users.

9.3 Potential Local Considerations

Local considerations, improvements and factors that may have an effect on encouraging cycling in Brentwood Borough include:

- Updating the existing cycle map of Brentwood to include isochrones and mode-switch motivational information;
- Cycle access – promoting access to bicycles through the cycle to work scheme, cycle hire, provision of subsidised bikes;
- National Bike Week events to include a commuter challenge where people using different modes make the same journey in the morning peak – would normally show the advantageousness of cycle travel in the peak time) and a cycle commuter's breakfast where free refreshments are laid on at a central location for all those who arrive by bike.

¹⁷ Brentwood Cycling Trails, <http://www.mapmyride.com/gb/brentwood-eng/>

10 Delivery and Funding

10.1 Delivery

The recent Infrastructure Act (February 2015) places a commitment on the Government to produce a Cycling and Walking Investment Strategy. The strategy would specify the objectives to be achieved and the financial resources available. This new bill shows a change in the government's thinking and a clear commitment to providing for cycling as well as accepting responsibility for targets and funding.

The Department for Transport's Cycling Delivery Plan (October 2014) refers to a new national cycling target, to double the number of cycling stages (trips) nationally over a 10 year period. This new target will be adopted by Essex as part of this strategy.

The Government has also set a target of achieving an annual cycling spend of £10 to £20 per head of the population. In Essex this would equate to approximately £17million to £34million per year spent on cycling.

A step change in the provision of cycling infrastructure and promotion will require an increase in funding over and above the current level of funding for cycling in Essex. Essex County has committed to:

- Ensuring a consistent level of revenue and capital funding to support the delivery of this strategy;
- Increasing the level of funding in Essex from its current level of £2 - £3 per head of population to £10 per head of population by 2025;
- Increasing the utilisation and prioritisation of other funding sources such as developer contributions and central Government grants/allocations; and
- Developing a clear and cohesive methodology for the allocation of cycle funding across Essex Districts.

This will ensure that new proposals are not frustrated by a lack of funding and designers and promoters are set free to develop measures that will lead to a consistent growth in cycling numbers, frequency and safety.

10.2 Funding Options

Current UK Government spending on cycling is approximately £2.50 per person per year; the aim is to increase this to at least £10 per person per year by 2020/2021. Essex will also aim to spend £10 per person per year, with an initial

increase to £5 per person by 2017. In Essex this would equate to £17 million per year (£10 per person) spent on cycling.

There are a range of funding sources available for the schemes suggested in the Cycling Action Plans which are as follows:

- Local Highways Panels (LHPs)
- DfT Access Fund for Sustainable Travel (from 2017/18 through 2019/20)
- Local Growth Funds (via SELEP)
- Section 106 (S106) Developer Contribution monies
- Community Infrastructure Levy (CIL)
- Highways England Cycling, Safety and Integration Designated Fund (CSIDF)

10.3 Funding for Brentwood District

The delivery of the potential schemes, soft measures and smarter travel measures will require additional funding and so for this Cycling Action Plan to be successful, it is imperative that funding is provided and sustained over a number of years.

ECC Local Highway Panels are a source of capital funding for local highway schemes and are an appropriate way for new cycle infrastructure to be funded.

Planning contributions from new developments are an important source of finance and can either provide funding towards new or improved cycle infrastructure in Brentwood Borough or, if in the vicinity, actually construct schemes as part of the development.

Current UK Government spending is £2.50 per person per year; the aim is to increase this to at least £10 per person per year by 2020/2021. Essex will also aim to spend £10 per person per year, with an initial increase to £5 by 2017.

The Government has a £6 billion Local Growth Fund for cycling and walking and wishes to reduce the administrative budget Local Authorities have to use in bidding for funding.

Other sources of funding also become available from time to time such as from the DfT. Therefore it is important that there are schemes readily available to be put forward for funding, should such opportunities arise.

In addition to the above, other possible funding options include:

- As part of road safety schemes;
- As part of health and safety schemes;
- Sustrans;
- Local growth funds;
- Network Rail and/or rail operating companies;
- Active Essex / Essex Health;
- SELEP Local Growth Funds for local sustainable transport programme;
- European Union funding (e.g. European Regional Development Fund and Rural Development Programme); and
- Acquire and investigate corporate sponsorship opportunities for any high profile public schemes/events.

11 Key Recommendations

In order to create an environment where cycling is normal for the residents of Brentwood Borough, existing barriers to cycling should be removed and a series of cycle routes provided with the aim of creating a connected cycle network over time. Cycling infrastructure should provide for both key utility journeys and encourage leisure cycling.

To ensure the potential for cycling is fully realised, new infrastructure must be accompanied by high profile and targeted promotion of cycling to ensure the full cycling potential is realised in Brentwood, particularly in urban areas.

Analysis was undertaken to assess existing travel patterns, not only for cyclists but rail and car commuters as well. Alongside this, the propensity to cycle was also analysed to assess whether there were similarities between those that commute by other methods of travel and the areas where there is a high propensity to cycle.

Taking into account the current barriers to cycling in Brentwood Borough, commuter flow analysis and locations of committed development, the following key recommendations have been made for cycle enhancements in the Borough:

- Review existing route signage and lighting;
- Improve maintenance of existing routes;
- Prioritise the E-W Flagship route, providing access to the town centre and railway station;
- Increased provision of useful cycle routes in Brentwood, Shenfield and Ingatestone, in particular;
- Provide new and improved cycle parking with a focus on satiating the considerable demand for commuter trips at railway stations. In particular, additional/ relocated cycle parking at Brentwood and Shenfield stations, with additional cycle parking at Ingatestone station on the northern side of the railway tracks;
- Fill obvious gaps in the existing cycle-route network (on alignments with cycle-friendly topography);
- Provide new infrastructure on key roads with cycle-friendly topography but no existing facilities;
- Investigate how to incorporate a N-S cycle route along Ingrave Road, to enable residents of Ingrave, Herongate and the future Dunton Garden Village to access Brentwood town and its cycle network;
- Consider future expansion of the cycle network north to connect the villages of Kelvedon Hatch and Doddinghurst to Brentwood town and its cycle network;

- Investigate how to improve N-S access for cyclists across the railway line as part of longer term improvements for cycling in Brentwood Borough;
- Redesign the public realm at Brentwood railway station, including provision for cyclist commuters to the station and for cyclists wishing to cross the railway;
- Update the existing cycle map every two years taking on board new innovation in cycle-map design, and promote it and disseminate it widely through a range of channels and outlets;
- Develop Flagship Routes through Feasibility Studies to Detailed Design; and
- Promote and market Flagship Routes with 'Cycle Superhighway' style branding and disseminating techniques.