



3. Transport and Movement

Overview

3.1 This chapter of the IDP is concerned with transport and movement. It integrates analysis of the public realm with more traditional transport concerns. Much of the technical analysis on transport impact and mitigation is based upon the Transport Assessment which accompanies the Local Plan.¹

National Issues and Strategies

3.2 Transport planning and strategy is devolved in the UK to country and local levels. The Government's Transport Investment Strategy published in 2017² sets out a number of clear investment ambitions:

- a. create a more reliable, less congested, and better-connected transport network that works for the users who rely on it;
- b. build a stronger, more balanced economy by enhancing productivity and responding to local growth priorities;
- c. enhance our global competitiveness by making Britain a more attractive place to trade and invest, and
- d. support the creation of new housing.

3.3 Within Essex, the county council has set out its broad transport vision in the adopted Local Transport Plan (LTP)³:

Our Vision is for a transport system that supports sustainable economic growth and helps deliver the best quality of life for the residents of Essex.

3.4 Through the transport plan, the Essex County Council is seeking to achieve five broad outcomes:

¹ The Transport Assessment is available to view at: <http://www.brentwood.gov.uk/index.php?cid=966>

² Department for Transport – Transport Investment Strategy: Moving Britain Forward July 2017

³fbvdc

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

3.5 Transport pressure groups such as Transport Focus⁴ highlight five key transport user issues (particularly within the context of passenger transport):

- a. accessibility – around five percent of rail and more than 20 per cent of bus journeys are made by people with disability or long-term illness and accessibility is also an issue with heavy luggage or people with small children;
- b. disruption – changes to services and cancellations can cause significant problems;
- c. retailing – the complexity and confusing nature of ticket purchases for public transport;
- d. tickets and enforcement – developing a more nuanced approach to tackling payment avoidance; and
- e. future trends / transport – transport on demand, electronic and low emission vehicles, technological innovation, mobile mapping.

3.6 There are well-documented recent examples of bus services being dramatically cut in England and populations split over the value of road building and rail investment. Transport policy in England is complex and contested.⁵

3.7 One of the interesting recent findings on transport is that we travel less today, per head of population, than we did one or two decades ago. We make 16% fewer trips than 1996, travel 10% fewer miles than in 2002 and spend 22 hours less travelling than we did a decade ago. This is potentially the outcome of societal shifts - how we work and how we shop, changing demographics, shifts in income across the population as well as policies in the transport sector which have encouraged urbanisation; recessionary cycles; the shift to mobile internet and other advances in information and communication technologies, plus a range of other factors.⁶ The use of mobile technology and 'on call' or subscription transport services is also a potential set of trends.⁷

⁴ <https://www.transportfocus.org.uk/>

⁵ Further information on key transport campaign issues - <https://bettertransport.org.uk/>

⁶ Information taken from - First Report of the Commission on Travel Demand – All Change: The Future of Travel Demand and the Implications for policy and planning 2018

⁷ <https://www.topgear.com/car-news/future-tech/lynkco-future-car-ownership>

Infrastructure Snapshot

- 3.8 The Borough is well located for access to the strategic transport network with direct access to the M25, A127, A12, Great Eastern Mainline (calling at Shenfield and Brentwood) and the C2C rail line connecting London Fenchurch Street with South Essex (with a connection at West Horndon Station). The Elizabeth Line which terminates at Shenfield Rail Station will further increase the accessibility of the area. The Great Eastern Mainline and A12 bisect the centre of the main urban areas in Brentwood and Shenfield, while the A127 and C2C line presents strong physical features towards the south of the Borough.
- 3.9 For strategic transport planning purposes, Brentwood Borough falls within the sub-regional area of the Heart of Essex (Brentwood, Chelmsford and Maldon local authority areas). *The Essex Transport Strategy (June 2011)* (LTP 3) identifies the main centre settlement and local centres within each of the four sub-regions. Chelmsford is identified as the main centre within the Heart of Essex. Brentwood is identified as one of the Local Centres but is identified as serving as an important functional centre in its own right.

Transport and Movement – Local Patterns and Characteristics

- 3.10 According to the 2011 Census data, Brentwood has the highest percentage of residents travelling to work by train in Essex (15.83%) and also the lowest level of driving by car or van to work (36.32%). The East of England travel to work by train figure is 4.83% and travelling by car is 41.39%. Cycling, walking and bus travel to work, are lower in Brentwood than the East of England figures.⁸ A summary of the Census Travel to Work data is detailed below in Table 3.1.

Figure 3.1 Census Travel to Work Data (2001 to 2011)⁹

Method of Travel	2001	% of All Workers	2011	% of All Workers	Percentage point Change
Works mainly at or from home	3197	6.46%	2239	4.23%	- 2.23
Underground, metro, light rail or tram	342	0.69%	683	1.29%	+ 0.6
Train					
	6612	13.35%	8385	15.83%	+ 2.48
Bus, minibus or coach	755	1.53%	655	1.24%	- 0.29

⁸ Method of Travel to Work (QS701EW) (2011)

⁹ There is not an exact comparison available for the datasets in 2001, people who recorded their place of work as working mainly at or from home were considered to have their mode of travel to work as working mainly at or from home (available in dataset UV39). In 2011, people working mainly at or from home could record, for example, that they travelled to work as a driver in a car or van, despite being based at home.

Taxi or minicab	201	0.41%	227	0.43%	+ 0.02
Driving a car or van	17189	34.72%	19234	36.32%	+ 1.6
Passenger in car or van	1420	2.87%	1219	2.30%	- 0.57
Motorcycle, scooter or moped	295	0.60%	238	0.45%	- 0.15
Bicycle	317	0.64%			
	337	0.64%	0		
On Foot	2376	4.80%			
	2828	5.34%	+ 0.54		
Other Method of Travel to Work	103	0.21%	206	0.38%	+ 0.17
Not in Employment	16707	33.74%	16708	31.55%	- 2.19
All People	49514	100%	52959	100%	

3.11 Census data also provides an insight into commuting patterns. Figure 3.2 below summarises the position, with the main destinations for out-commuters including Westminster, the City of London, Chelmsford and Tower Hamlets, while in-commuters mainly came from Basildon, Havering, Chelmsford and Thurrock. The destinations show that Brentwood has strong outward commuting connections with London and much of the Borough's in commuting workforce comes from the surrounding local authorities. There is little out commuting from central London to Brentwood, suggesting that the commuting relationship between Brentwood and London is not reciprocal.¹⁰

Figure 3.2 Commuting Patterns

Variable	Brentwood
Number of working residents	36,620
Number of workplace workers	26,620
Live and work in Brentwood	20,060
Out commuting destinations	20,060
Top out commuting destinations	Westminster / City of London,

¹⁰ Information and Figure reproduced from Brentwood Economic Futures 2013-2033 Final Report – January 2018 (Lichfields)

	Havering, Basildon, Chelmsford, Tower Hamlets
In-commuting workers	17,750
Top in-commuting destinations	Basildon, Havering, Chelmsford, Thurrock, Epping Forest
Net outflow of workers	2,310

- 3.12 It is generally acknowledged that congestion on the M25, A12 and A127 is commonplace, especially at peak times leading to unpredictable journey times within the strategic road network. In recent times there has been some capacity improvements through a Highways Agency major four lane widening scheme to the M25 between Junctions 27-30 completed in Summer 2012. An improvement scheme to Junction 28 Brook Street Interchange was also completed in March 2008.
- 3.13 The main local road network within Brentwood and Shenfield also suffers from traffic congestion especially at peak times and during school terms.
- 3.14 At a non-technical level, there are a number of key local trip destinations within Brentwood town centre which include a number of local authority and independent schools, NHS and private healthcare facilities alongside key town centre shopping, retail and leisure functions. While this is not dissimilar to most comparative sized and located towns, there is a particular concentration of facilities (particularly schools), which add significantly to peak congestion.
- 3.15 What makes Brentwood different to many towns is that there has been no major relief, gyratory or one-way system within the town centre. Therefore, traffic continues to be funnelled into road/route system that has not significantly changed for hundreds of years. The narrowness of the roads in the town centre minimises the scope of local highway interventions.

Strategic Transport Projects

- 3.16 The Brentwood Transport Assessment highlights that a number of studies have been progressing, being led by Essex County Council, on the A127 corridor between Southend-on-Sea in the East to the M25 in the west. The final section of this road is within the Borough, including M25 junction 29. The study involves all local authorities, as well as Highways England. Within the Borough, this route is of strategic importance and much of the proposed growth with the Local Plan is proposed along this corridor.

- 3.17 Highways England are currently undertaking work to develop improvements at M25 Junction 28¹¹. A preferred option has been developed for the junction which involves provision of an additional loop which removes northbound M25 to eastbound A12 traffic from the junction.
- 3.18 The Elizabeth Line is a major infrastructure project, which provides rail services between Reading in the west to Shenfield in the East and which will provide services across London. At peak times the current planned timetable includes 12 services per hour from both stations to London¹², on top of the existing services that serve these two stations. This will provide a very large increase in capacity for rail travel, as well as the improved service frequencies. In addition, the Elizabeth Line will provide improved access to parts of London and beyond, including Heathrow, which were not previously served directly.
- 3.19 The Lower Thames Crossing is a proposed new road crossing of the River Thames which will connect the counties of Essex (north) and Kent (south). The scheme is being developed by Highways England, a decision on the preferred route for the crossing was made on 12 April 2017.¹³ The planned route is expected to run from the M25 near North Ockendon, cross the A13 at Orsett before crossing under the Thames east of Tilbury and Gravesend. A new link road will then take traffic to the A2 near Shorne, close to where the route becomes the M2. The Lower Thames Crossing Statutory Consultation commenced on October 10th 2018¹⁴.

Local Emissions and Pollution

- 3.20 According to the Essex Transport Strategy (June 2011) (LTP3), road transport is one of the largest sources of CO2 emissions within Essex, accounting for 30% of all the county's emissions. Road Transport-related CO2 emissions emitted for Brentwood amounted to 228 tonnes, when measured in 2008¹⁵. This was significantly lower than the top emission Essex Districts (Chelmsford, Braintree, Colchester and Basildon), which accounted for over 40% of total CO2 emissions.
- 3.21 When considering CO2 emissions from road transport on a per person basis, Brentwood has the second highest level of emissions per person in Essex (over 3 tonnes emitted per person). Further information is detailed below in Figure 3.3 and indicates that the figures for Brentwood are significantly higher than the UK and County averages.

¹¹ <https://highwaysengland.co.uk/projects/m25-junction-28-improvements/>

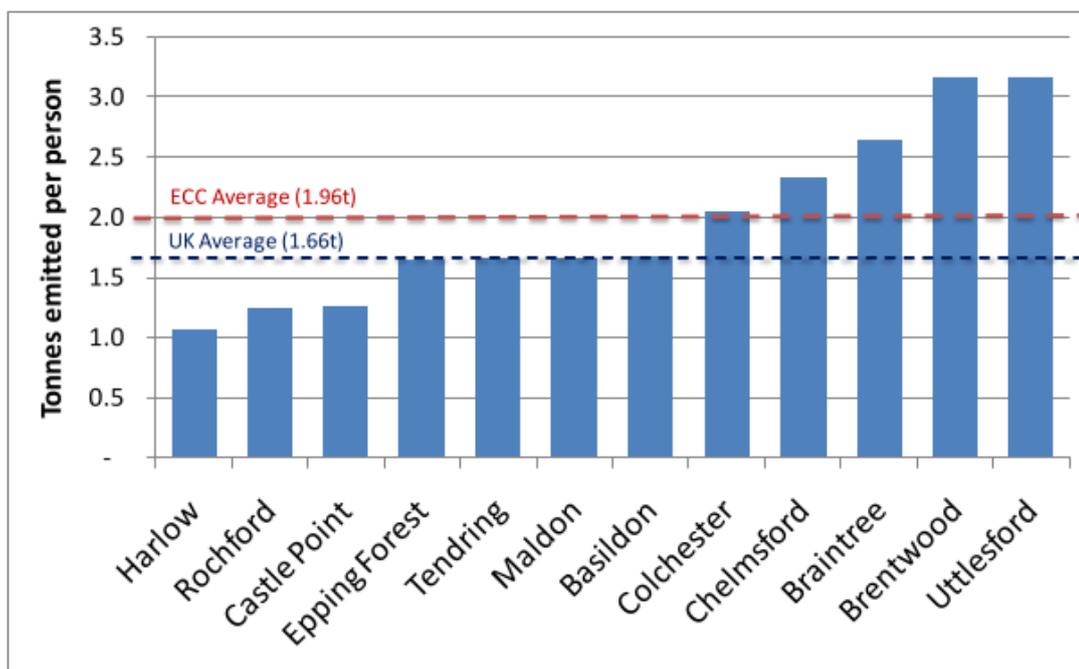
¹² <http://www.crossrail.co.uk/route/eastern-section/>

¹³ <https://www.gov.uk/government/news/new-lower-thames-crossings-to-cut-congestion-and-create-thousands-of-jobs>

¹⁴ <https://highwaysengland.citizenspace.com/ltc/consultation/>

¹⁵ National Indicator 186 Local Authority CO2 Emissions – this information will be updated shortly.

Figure 3.3 Road Transport-related Co2 emissions per person by Essex District



3.22 Figure 3.4 (below) also provides information on the Air Quality Management Areas (AQMA) which have been declared by Brentwood Borough Council¹⁶. Declaring an Air Quality Management Area does not mean that the air quality will improve, but the Council has to produce an action plan to help to reduce the effects of pollution by working with the Highways Agency (the Government body responsible for the major roads such as the M25 and the A12) and Essex County Council (responsible for other main roads such as the A128 and A1023) to examine ways of improving the quality of air in Brentwood. Four of the original AQMAs declared in Brentwood have now been revoked, following several years of compliance with the Air Quality Objectives and a trend towards improved air quality - these AQMAs were associated with the A12.

¹⁶ https://uk-air.defra.gov.uk/aqma/local-authorities?la_id=33

Figure 3.4: Air Quality Management Areas

AQMA	Description	Date Declared	Date Amended	Date Revoked	Pollutants
Brentwood AQMA No.1	The AQMA comprises parts of Nags Head Lane, Brentwood and the M25.	10/01/2005		01/01/2017	Nitrogen dioxide NO ₂
Brentwood AQMA No.2	The AQMA comprises parts of Brook Street, Brentwood and the A12.	10/01/2005			Nitrogen dioxide NO ₂
Brentwood AQMA No.3	The AQMA comprises parts of Greenshaw and Porters Close, Brentwood and the A12.	10/01/2005		01/01/2017	Nitrogen dioxide NO ₂
Brentwood AQMA No.4	The AQMA comprises parts of Warescot Road, Hurstwood Avenue and Ongar Road, Brentwood and the A12.	10/01/2005			Nitrogen dioxide NO ₂
Brentwood AQMA No.5	The AQMA comprises parts of Roman Road and Burnthouse Lane, Mountnessing and the A12.	10/01/2005		01/01/2017	Nitrogen dioxide NO ₂
Brentwood AQMA No.6	The AQMA comprises parts of Fryerning Lane, Pemberton Avenue and Trimble Close, Ingatestone and the A12.	10/01/2005		01/01/2017	Nitrogen dioxide NO ₂
Brentwood AQMA No.7	The AQMA comprises parts of Ongar Road, Ingrave Road, High Street and Shenfield Road, Brentwood in proximity to Wilsons Corner (the junction of the A128 and A1203).	10/01/2005			Nitrogen dioxide NO ₂

Public Spaces and Movement

- 3.23 There is a strong relationship between enhancing the public realm and strategies which make places more walkable, legible and connected. The provision of good quality pedestrian and cycling environments can form part of the overall vision for an area in terms of the place-making and redevelopment. Design Council CABI described attractive and well-used outdoor spaces as one of the seven principles of successful places.¹⁷ In areas where there has been an investment in the public realm it demonstrates a sense of civic pride and a value attached to public life. The public realm including such spaces as squares, paved areas, streets and parks can be designed to bring energy, connectivity and a sense of character to an area. Investment in the public realm also makes long term economic sense- stimulating growth in the visitor economy, raising property values and increasing income and profit for local businesses.
- 3.24 Brentwood Town has seen some significant public realm investment in its main High Street, Crown Street and St. Thomas Road, which included shared surfacing, crossings, seating and other works. The scheme was shortlisted for the Essex Design Initiative Award in 2010 and was runner up for the RICS Award 2010: Community Benefit.

¹⁷ CABI 2011 Seven Principles of Good Design

Walking

- 3.25 The Local Plan places a policy emphasis upon enhancing and increasing options for walking to reduce dependencies on private car use and improvements to public transport – particularly along the Southern Growth Corridor and strategic growth sites. Policy in the LTP also encourages increasing walking levels and the use of Public Rights of Way (PROW). Policy 15 – Walking and Public Rights of Way, highlights that:

The County Council will promote walking and use of the Public Rights of Way network by:

- *promoting the benefits of walking;*
- *facilitating a safe and pleasant walking environment that is accessible to all;*
- *improving the signage of walking routes;*
- *ensuring that the public rights of way network is well maintained and easy to use by walkers, cyclists and equestrians.*

- 3.26 ECC has also produced the Essex Walking Strategy (2010) for the County which focuses upon a wide range of pedestrian related issues including:

- i. Improving pedestrian routes and networks (signage and specific action areas)
- ii. Improving the environment for walking (maintenance, street lighting, street cleaning, utilities works, parking on the footpath and specific action areas)
- iii. Pedestrianisation (commercial considerations, accessibility, pedestrian security and action planning)
- iv. Planning and designing for sensory and mobility impairment
- v. Road safety and speed reduction
- vi. Making crossing easier
- vii. Public transport interchanges
- viii. Walking and cycling infrastructure
- ix. Crime and fear of crime
- x. Recreational walking
- xi. Travel plans and safer journeys to school
- xii. Promotion and health benefits

- 3.27 While Census figures indicate a low percentage of people travelling to work by foot, Department for Transport analysis taken from the Sport England Active People survey

indicates that a higher than Essex and England percentage of adults walk at least once per month (90.6%); once per week (86.2%) and at least three times per week (62.7%). Walking for both recreation and utility purposes score above Essex and England averages. Brentwood is also the only Essex Borough which scores higher than the Essex and England averages for percentage of adults usually walking recreationally across all lengths of time per day.

Cycling

3.28 The Local Transport Plan provides a strong focus upon enabling and promoting increases in cycling activities for all types of trips. Policy 14 – Cycling states:

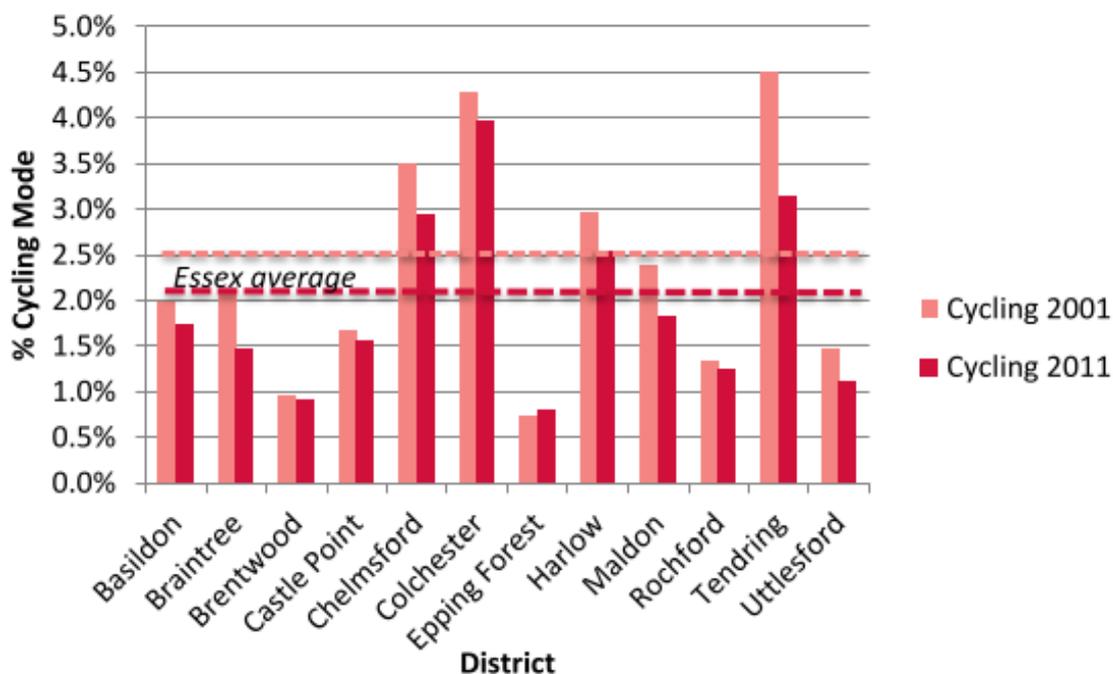
The County Council will encourage cycling by:

- *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.*

3.29 Baseline data in the Brentwood Cycle Strategy (Sept 2014) (BCS) on cycling activity in Brentwood Borough indicates a very low level of participation. Figure 3.5 below is taken from the BCS and indicates that Brentwood has the second lowest level of cycling to work in Essex, with less than 1% of journeys to work being made by bike. When comparing the Census periods, the statistics indicate a slight reduction in cycle to work activity in 2011 compared to 2001. Department for Transport data (based upon Sport England survey analysis) suggests that a lower than Essex average percentage of adults cycle at least once per month and 3 times per week. The data would tend to suggest a very small proportion of the adult population who cycle for recreation at least 5 times per week, at a percentage rate which is significantly higher than the Essex averages. Brentwood scores low for adults who cycle for utility against Essex, East of England and England averages.¹⁸

¹⁸ Department for Transport – Local Area Walking and Cycling in England: 2015 to 2015 (Published July 2016)

Figure 3.5: Cycling to Work



3.30 When comparing national Census Cycling to Work 2011 data indicates that In Cambridge, 29% of working residents cycled to work, making it the local authority with highest rate of cycling to work. The next highest rate was in Oxford (17%) followed by Isles of Scilly and Hackney at 14%. The data also indicates that there are 31 local authorities where over 5% of working residents cycled to work. The proportion was greater than 10% in six of these local authorities. There were also 29 local authorities where less than 1% of working residents cycled to work (including Brentwood). The four local authorities with the lowest rates were all in Wales with Merthyr Tydfil the lowest with 0.3% of working residents cycling to work in 2011.¹⁹

3.31 The Census data pre-dates the London 2012 and Rio 2016 Olympics, with research conducted by the London School of Economic (LSE)²⁰ suggesting that people are increasingly taking up cycling for fun with family and friends as a recreational pursuit rather than just transport, with a connection being made between elite sporting success and grassroots participation. The ‘Olympics effect’ has raised the profile of cycling across the UK and it would be unreasonable to consider that there has not been an impact in Essex, although this is difficult to measure. This effect has also potentially been enhanced by recent UK success in the Tour de France and other major cycling events.

3.32 In 2016, Brentwood Borough Council started to develop through a partnership of local cycling enthusiasts, highways engineers, rights of way specialists, planners, healthcare and environmental health specialists a comprehensive network of existing and potential cycle routes covering the Borough and beyond. Some of this work is now informing an update to the current cycle action plan for Brentwood.

¹⁹ ONS ‘2011 Census Analysis – Cycling to Work’ 26 March 2014 (England and Wales)

²⁰ LSE September 2012 ‘The Olympic Cycling Effect’ (Report Prepared for Sky and British Cycling)

- 3.33 The Local Plan places a policy emphasis upon supporting cycle friendly developments across the Borough and with a particular focus upon strategic sites, including Dunton Hills Garden Village. The LTP also encourages increasing walking levels and the use of Public Rights of Way (PROW). Policy 15 – Walking and Public Rights of Way, highlights that:

The County Council will promote walking and use of the Public Rights of Way network by:

- *promoting the benefits of walking;*
- *facilitating a safe and pleasant walking environment that is accessible to all;*
- *improving the signage of walking routes;*
- *ensuring that the public rights of way network is well maintained and easy to use by walkers, cyclists and equestrians.*

Passenger Transport – Bus

- 3.34 When a bus network is operating effectively it has a number of key benefits for society including:
- a. Freeing up time, the time of users to catch-up on correspondence or simply sit back and relax;
 - b. Providing an economical form of transport particularly if multi-purchase / seasonal tickets are purchased;
 - c. Convenient – can link people close to services and facilities with bus information now available online and in real time;
 - d. Can help improve mental and physical health by walking to and from the bus stop;
 - e. Improve road safety by taking more cars off the road (one bus can do the job of 40 cars) and reducing the incidents of road accidents;
 - f. Cut congestion and reduce the cost of delays and constraints on growth to the economy and
 - g. Help reduce greenhouse gases - just one person opting to take the bus rather than drive to work every day can reduce their carbon footprint by up to 3.8 tonnes per year .
- 3.35 Census data for England and Wales indicates that workers commuting by public transport increased by 14.5 percentage points in 2001 to 15.9 percentage points in 2011 . However, Bus / coach travel dropped from 7.4 to 7.2 percentage points in total. When comparing Census data for the Brentwood area, it indicates a slight reduction in bus, minibus and coach travel.
- 3.36 Figure 3.6 below benchmarks bus travel to work 2011 Census data with Essex District, East of England and England data.

Figure 3.6: Benchmarking Bus Travel

Locations	% of Travel to Work by Bus, Minibus or Coach	Lowest Quartile	Highest Quartile
Basildon	2.23		
Braintree	1.55		
Brentwood	1.24		
Castle Point	2.27		
Chelmsford	2.74		
Colchester	3.83		
Epping Forest	1.42		
Harlow	3.70		
Maldon	1.04		
Rochford	2.21		
Tendring	1.31		
Uttlesford	1.04		
East of England	2.50		
England	4.85		

3.37 From this Census analysis it indicates that bus travel to work within Brentwood Borough is within the lowest quartile of districts within Essex, with only Maldon and Uttlesford showing lower levels of bus travel to work. Chelmsford, Colchester and Harlow are showing the highest level of travel to work by bus in Essex, based upon this 2011 Census data analysis.

Passenger Transport – Rail

3.38 The method of travel to work rates by rail in Brentwood are by percentage of usual residents, the highest in Essex and significantly higher as a percentage than the regional and England rates. Figure 3.7 below provides a summary of comparative travel to work by train data for Essex.²¹

²¹ Datasets – Methods of Travel to Work – Resident Population (UV39) 2001 Census, and Method of Travel to Work (QS701EW) All Usual Residents Aged 16-74, 2011 Census

Figure 3.7 Method of Travel to Work by Train

Local Authority Area	Number of Residents Travelling by Train to Work	Percentage of All Usual Residents (aged 16-74)
Basildon	13737	10.92%
Braintree	6295	5.90%
Brentwood	8385	15.83%
Castle Point	5747	8.89%
Chelmsford	11364	9.19%
Colchester	6655	5.18%
Epping Forest	2732	3.01%
Harlow	1723	2.94%
Maldon	2339	5.15%
Rochford	6423	10.63%
Tendring	2815	2.90%
Uttlesford	3495	6.12%
East of England	205077	4.83%
England	1343684	3.46%

3.39 Figure 3.8 below provides an analysis of the number of entries and exit per railway station within the Brentwood Borough over the time-period 2010/11 to 2014/15. It can be noted that Shenfield has witnessed the highest number increase in passengers entering and exiting the station - up by 550,344 from the 2010/11 baseline position - a percentage growth of 18.74%. Ingatestone Station has witnessed a lower growth in the overall total number of passenger exits / entries, but the highest percentage growth of any of the stations (based upon the original baseline) at 19.41%. West Horndon Station's growth levels are very modest.²²

²² Data for Table 3.8 extracted from Office for Rail and Road Estimates of Station Usage Time Series – 1997/98 to 2014/15

Figure 3.8 Railway Station Usage – Exits and Entries

	2010/11 Total number of entries and exits made at the station	2011/12 Total number of entries and exits made at the station	Number and % Growth (2010/11 - 2011/12)	2012/13 total number of entries and exits made at the station	Number and % Growth (2011/12 - 2012/13)	2013/14 total number of entries and exits made at the station	Number and % Growth (2012/13 - 2013/14)	2014/15 total number of entries and exits made at the station	Number and % Growth (2013/14 - 2014/15)	Total Number of Passenger exits / entries (2010/11 to 2014/15)	Total % Growth (based upon 2010/11 baseline)
Brentwood Railway Station	2,420,930	2,495,480	74,550	2,701,998	206,518	2,809,578	107,580	2,871,330	61,752	450,400	
% Growth			3.08%		8.28%		3.98%		2.20%		18.60%
Shenfield Railway Station	2,936,428	2,991,100	54,672	3,131,298	140,198	3,314,120	182,822	3,486,772	172,652	550,344	
% Growth			1.86%		4.69%		5.84%		5.21%		18.74%
Ingatestone Railway Station	636,170	694,754	58,584	715,974	21,220	750,746	34,772	759,626	8,880	123,456	
% Growth			9.21%		3.05%		4.86%		1.18%		19.41%
West Horndon Railway Station	338,058	329,908	-8,150	350,210	20,302	355,416	5,206	355,630	214	17,572	
% Growth			-2.41%		6.15%		1.49%		0.06%		5.20%
Benchmarks											
Chelmsford	7,335,952	7,876,686	540,734	8,002,126	125,440	8,286,879	284,753	8,381,166	94,287	1,045,214	
% Growth			7.37%		1.59%		3.56%		1.14%		14.25%

Community Transport, Taxis and Private Hire Vehicles

- 3.40 Community and voluntary transport can play an important role in the provision of transport for people who are unable to access conventional public transport services, due to a variety of reasons including impaired mobility, lack of public transport provision and cost of transport.
- 3.41 Taxi services (more formally known as hackney carriages) and Private Hire Vehicles (PHV) provide an individual, mostly door-to-door micro transit system offered to the public by commercial businesses at a local level. They provide services which fill the gap left by public transport services and can provide a flexible alternative to private car use. In 2008, the average person made 11 trips in taxis or private hire vehicles. Taxis and PHVs are used by all social groups, with low-income young women (amongst whom car ownership is low) being one of the largest groups of users. Taxis and PHVs are also increasingly used in innovative ways - for example as taxi-buses - to provide innovative local transport services.²³

Private Vehicles

- 3.42 Comparative Census travel to work data indicates that those travelling to work in Brentwood by car or van has increased from 17,189 (2001) or 34.72% to 19,234 (2011) or 36.32%. However, it can be noted that the figures for 2011 are still lower than the England rate of 36.90% and the East of England figure of 41.39%.²⁴
- 3.43 According to the Census 2011, there is an average access to 1.43 cars / vans per household in Brentwood, which is higher than the East of England rate of 1.33 and England rate of 1.17. In the Brentwood area, where households have an available vehicle there are higher levels of accessibility across all quantities of vehicle access (households with 1, 2, 3 and 4+ vehicles), than the regional and national (England) rates. Only 14.86% of households did not have access to cars / vans, this compares to 18.55% for East of England and 25.80% for England.²⁵
- 3.44 In line with earlier observations about declining levels of travel, the Brentwood Transport Assessment indicates that the reliance on private car overall is also falling in recent years. Figure 3.9 shows that whilst population has increased between 2002 and 2014, car traffic has remained static and car traffic per capita and average distance travelled has decreased over the same period. Whilst the past may not be a full indication of future trends, this should be considered important in the context of Local Plan growth.²⁶

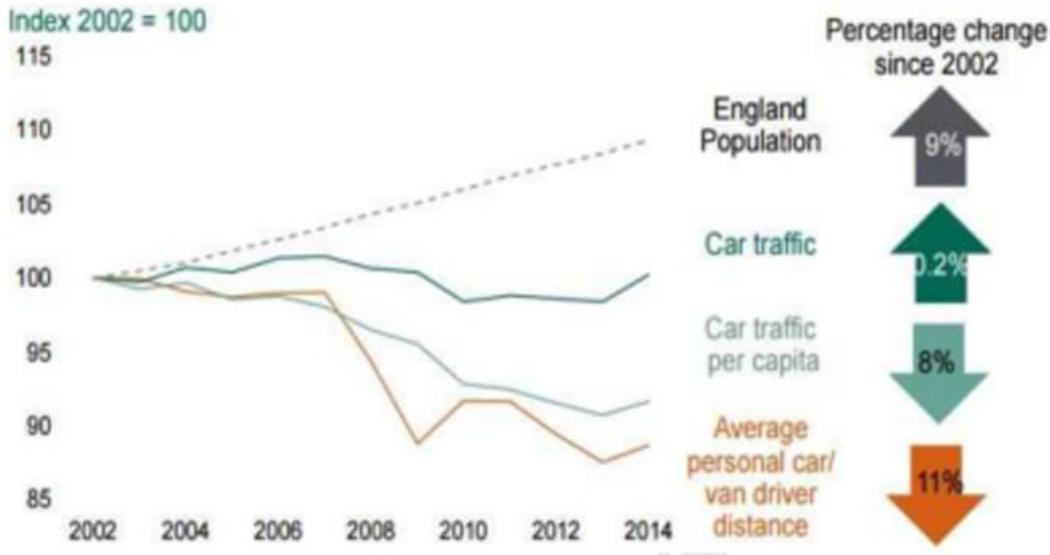
Figure 3.9: Traffic and Travel Trends 2002 to 2014

²³ Information from DfT Taxi and Private Hire Vehicle Licensing – Best Practice Guidance March 2010

²⁴ Census data – Method of Travel to Work (QS701EW) (2011)

²⁵ Census data – Car or Van Availability (QS416EW) (2011)

²⁶ Information from Transport Assessment



Source: On the Move 2, Dec 2016, Peter Headicar & Gordon Stokes on behalf of ITC

Freight

3.45 With the proximity of Essex to international gateways and the ports at Felixstowe, London Gateway and Tilbury in close proximity to the county’s boundaries, significant volumes of freight are transported through Essex. Around 6% of traffic on Essex’s roads is made up of HGVs, rising to nearly a fifth on the Essex section of the M25, 16% on the M11 and around 14% on sections of the A12 and A1208. In addition, around 50 freight trains pass through Essex each day, travelling mainly between Felixstowe and the North-West via London .

Existing Infrastructure, Gaps and Projects

3.46 This section of the transport chapter reviews existing infrastructure in more detail and pulls out key gaps or infrastructure pressures and any initiatives to tackle current infrastructure problems.

Modelling Brentwood's Highways Network

3.47 Traffic modelling work has been undertaken by Stantec on behalf of the Council to inform the transport assessment to support the Local Plan²⁷. To derive traffic volumes for the assessment a three-stepped approach has been undertaken:

- obtaining base data from observed counts – The Base Case Scenario;
- applying background growth – The Reference Case Scenario, and
- adding on trips associated with the Local Plan proposals – The Local Plan Growth Scenario.

The traffic modelling has been progressed using a spreadsheet model, which then provides for a series of modelled junction.

3.48 The key junctions modelled in the transport assessment are detailed below in Figure 3.10.

Figure 3.10: Modelled Junctions

ID	Junction	Junction Type
1	A1023 Chelmsford Road / A129 Hutton Road / A1023 Shenfield Road	Signalised Junction
2	A129 Rayleigh Road / Hanging Hill Lane	Mini Roundabout
3	A128 Ongar Road / Doddinghurst Road	Mini Roundabout
5	A128 Ongar Road / William Hunter	Mini Roundabout
6	A128 Ongar Road / A1023 Shenfield Road / A128 Ingrave Road / A1023 High Street	Double Mini Roundabout
7	A128 Ingrave Road / B186 Queens Road	Mini Roundabout
8	A128 Ingrave Road / Middleton Hall Lane / Seven Arches Road	Signalised Junction
10	A1023 High Street/ B185 Kings Road / A1023 London Road / Weald Road	Signalised Junction
12	Western Road / William Hunter Way	Mini Roundabout
13	A127 / A128 Brentwood Road / A128 Tilbury Road	Grade Separated Roundabout
14	A127 / Childerditch Lane	Priority Junction
15	A128 Ingrave Road / The Avenue	Double Mini Roundabout (linked with J16)
16	A128 Brentwood Road / Running Waters	Double Mini Roundabout (linked with J15)

²⁷ This section of the IDP uses extracted information from the Brentwood Transport Assessment – further technical details are available in the main publication.

17	A1023 Brook Street / Mascalls Lane	Signalised Junction
18	B186 Warley Hill / Eagle Way / B186 Warley Road / Mascalls Lane	Signalised Junction
19	B186 Warley Street / A127 eastbound	Priority Junction
20	B186 Warley Street / A127 westbound	Priority Junction
22	A1023 Chelmsford Road / Alexander Lane	Priority Junction
23	A12 Junction 12	Grade Separated Roundabout
24	Roman Road / A12 Slip	Priority Junction (Staggered)
25	M25 Junction 28	Grade Separated Roundabout
26	M25 Junction 29	Grade Separated Roundabout
27	A128 Tilbury Road / Station Road	Priority Junction

3.49 Using a geographical information system, the road network was extracted from a digital road network for all of Essex, with mean link speeds derived from GPS data. Based upon a geographical zoning system, zone connectors were generated between each zone centroid(s) and its nearest node on the road network, then the road network and zoning system were imported into specialist transport modelling software. This was used to generate:

- i. travel-time and distance matrices for use in the trip distribution and mode share elements of trip modelling, and
- ii. after trip matrices had been calculated, assigning the trip matrices to the network to determine link flows and turning flows at road junctions.

3.50 Within the modelling, the origin of trips is assumed to be residential dwellings, which is used to determine how many people live in each defined zone and how many trips each person is likely to make. The trip modelling also includes variables for different levels of accessibility (for example urban / rural) and trend data indicating a reduction in commute trips per person over time. In the model homes-based generated trips were also separated by purpose (e.g. education or shopping trips) and non-homes based trips used a similar method. The trip distribution stage, produces a matrix of trips for each purpose, selected option and time-period. Further work was then undertaken to separate out mode share by type (walking, cycling, public transport and car-derived).

3.51 The outputs from the spreadsheet approach detailed above are used within specific junction models with associated specialist software to understand the performance of each junction (which are calibrated and validated), before and after Local Plan development levels is applied.

3.52 Based upon the approach detailed above, Stantec then run an unconstrained (worst case) or reference case scenario to understand network and junction performance. It is assumed within a congested network that travellers will only accept a certain level of 'pain' before

changing travel behaviour. The output from the worst-case scenario modelling shows a number of key junctions²⁸ under stress, the worst being:

- a. A128 Ongar Road / William Hunter Way
- b. A128 Ingrave Road / B186 Queens Road
- c. A128 Ingrave Road / The Avenue / A128 Brentwood Road / Running Waters
- d. A1023 Brook Street / Mascalls Lane
- e. Warley Hill/Eagle Way
- f. M25 Junction 28
- g. M25 Junction 29

3.53 Importantly, in order to more realistically model the change in travel behavior due to congested junctions, a hierarchy of choices approach has been used. The key elements of the hierarchy of choices approach include: route reassignment, peak spreading (people travelling earlier or later because of congestion) and sensitivity analysis applied to trip frequency (recognising the changing patterns and frequency of travel). To reduce the impact of developments on the overall road network, a wide range of sustainable transport mitigation is also considered as part of the transport assessment. The discussion on Local Plan development impact and mitigation is detailed further in this chapter under the 'Impact of Growth' sub-heading.

3.54 Local Highways Panels (LHP) have been set up by Essex County Council in all 12 Boroughs, City and Districts to make recommendations and set priorities for smaller (<£100k capital) highways schemes in their area. The panels meet on a quarterly basis and discuss a rolling work programme. The detailed programmes are not covered within this part of the IDP, but an indication of programmes and priorities is available in Part B of the IDP document.

Off-Street Car Parking

3.55 The Council commissioned JMP to develop a baseline report and parking strategy for LA off-street parking facilities within the Borough. A number of key issues and opportunities were highlighted during the baseline reporting and stakeholder engagement process. These are summarised below:

- a. There are some constraints on the level of parking provision within Brentwood, Shenfield and Ingatestone, with a number of central car parks operating close to or at

²⁸ The A127/B186 junction is not included within this list, as there is a committed scheme which provides adequate capacity for growth.

capacity. Projected future employment and housing growth is likely to increase parking demand within the three locations.

- b. Whilst the general condition of most Council-operated car parks is considered good, there are a number of locations that require improvements in order to provide high quality, safe and secure environment. Coptfold Road multi-storey is a notable example; however, other car parks in need of improvement works include Sir Francis Way and Westbury Road.
 - c. Whilst on-street and off-street parking are managed by separate authorities, it is important that neither are considered in isolation.
 - d. The provision of additional short-term parking in the three locations would be beneficial for accessing the available retail offer; however, geographical constraints impede the ability to expand current parking provision.
 - e. Given the key role of Brentwood, Shenfield and Ingatestone as commuter locations, an appropriate balance between short-stay and commuter parking is required.
 - f. The introduction of 'pay on exit' payment systems, as used at Coptfold Road, may encourage longer dwell times in the town centre.
 - g. It is important that off-street parking is managed appropriately to ensure minimal impact upon wider traffic movements on the local highway network.
 - h. Appropriate provision for disabled blue badge parking across the three locations is important.
 - i. Improving way-finding and signage infrastructure can help improve navigation for visitors and help to identify the location of all car parks.
 - j. Effective enforcement can help to improve the efficiency and management of parking and minimises incidences of inappropriate parking.
- 3.56 Although not a focus of the car park strategy, there are clear opportunities within Brentwood to introduce public e-charging points in appropriate car park locations.

Brentwood Town Centre – Public Realm

- 3.57 The Brentwood Town Centre Regeneration Strategy²⁹, sets out a range of regeneration priorities which relate to the public realm including:
- a. Improving the pedestrian links and passages to William Hunter Way and Kings Road;
 - b. Physical improvements to Chapel of St Thomas a Beckett area and Baytree Centre;
 - c. Enhancing the connectivity to Brentwood Railway Station;

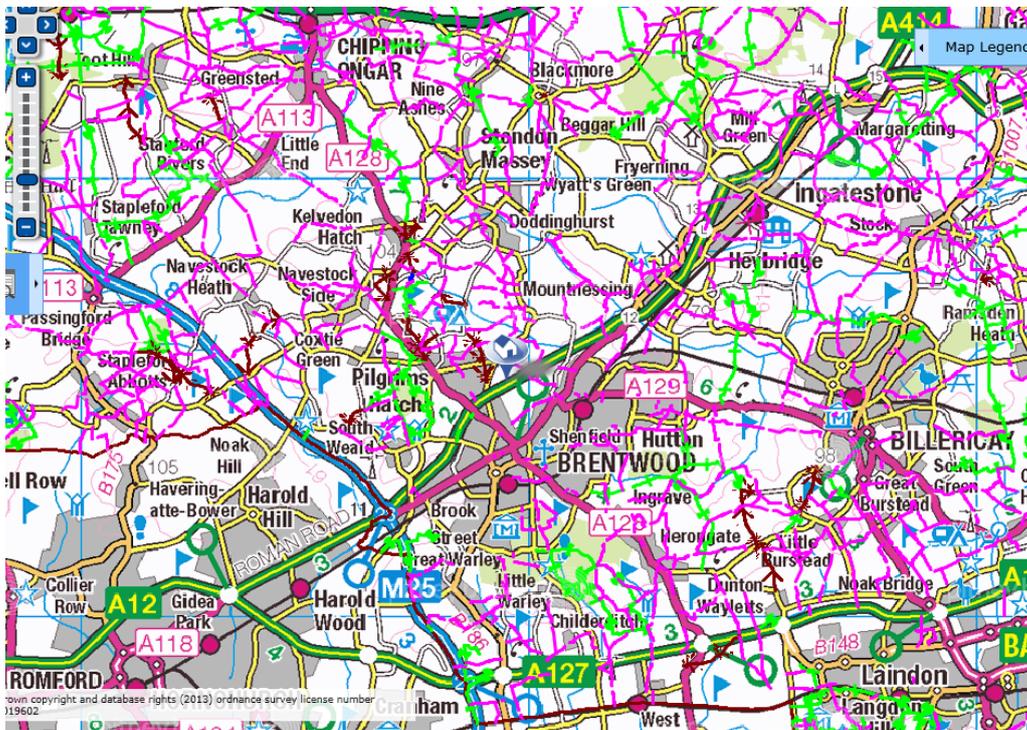
²⁹ Brentwood Town Centre Regeneration Strategy (2010)

- d. Improving the quality of the Town's key side streets including Moores Place, South Street and Hart Street; and
 - e. Tackling the wider issues, symptoms and cures surrounding town centre car use, congestion and car parking.
- 3.58 Building upon the Town Centre Regeneration work, the Town Centre Design Plan (Levitt Bernstein, September 2016) which focuses upon place-shaping and ultimately producing a plan (effectively policy guidance) for Brentwood Town to help shape new buildings, spaces, links, and uses. This plan contains a number of observations on the town centre public realms including:
- a. the lack of spatial character of Kings Road compared to the High Street;
 - b. the downscaling of certain streets in the centre (Crown Street and Hart Street in particular) has contributed to them becoming secondary public realm elements that complement the High Street, and
 - c. the gateways to the High Street and entrance space north of Brentwood Train Station are important but currently lack place-making are poorly defined spatially and car dominated.
- 3.59 The key areas identified in the plan for site development and public realm enhancement include:
- a. William Hunter Way Car Park – significant potential to become an extended quarter of the town centre with residential and non-residential uses;
 - b. Baytree Centre Area – improving the linkages and connections through the centres at various levels of intervention;
 - c. Westbury Road Car Park – infill development that also looks to improve the western gateway to the High Street;
 - d. Chatham Car Park – residential infill development and public realm enhancement to include possibly recovering the historic market square.
- 3.60 The study also recognises the importance of improving the spatial character of Kings Road, enhancements to the Chapel of St Thomas a Beckett area and the public realm surrounding Brentwood Railway Station. The public realm around the railway station has been subject to masterplanning in conjunction with Essex County Council, Brentwood Borough Council and the train operators.
- 3.61 Shenfield Railway Station acts as a new terminus for Elizabeth Line but suffers from significant congestion and a public realm environment within the immediate vicinity of the station which is of extremely poor quality with limited disabled access and a confusing array of vehicle, pedestrian and cyclist movement. The main High Street is also of low quality in terms of the public realm with poor accessible connections to the car parks. Greater Anglia is currently working upon an 'Access to All' bid for access improvements at the station. The public realm environment around the station has also been subject to masterplanning in conjunction with Essex County Council, Brentwood Borough Council and the Greater Anglia.

Walking and Public Rights of Way

- 3.62 Brentwood Borough Council encourages people to use the local countryside through access to defined Public Rights of Way (PROW). The Council works with the Brentwood Countryside Management Volunteers (BCMV) jointly to help maintain 243 km of rights of way in the Borough on behalf of Essex County Council. The network is made up of a diverse series of footpaths, bridleways and byways.
- 3.63 The PROW interactive map is reproduced below (Figure 3.11) and illustrates a particularly strong network of routes to the north of Pilgrims Hatch with linkages to Doddinghurst and Kelvedon Hatch (routes in pink dashes). There is also a reasonably strong network of routes between Standon Massey, Blackmore and beyond. There are more limited PROW networks south and south east of Brentwood Town, although there is strong connectivity through Thorndon Country Park.

Figure 3.11 Public Rights of Way – Brentwood Borough



- 3.64 There are also cross-over issues between walking and some of the issues detailed under the public realm sections. There are also opportunities to improve connectivity and walkability to key destinations such as schools, health facilities and transport hubs.

Cycling

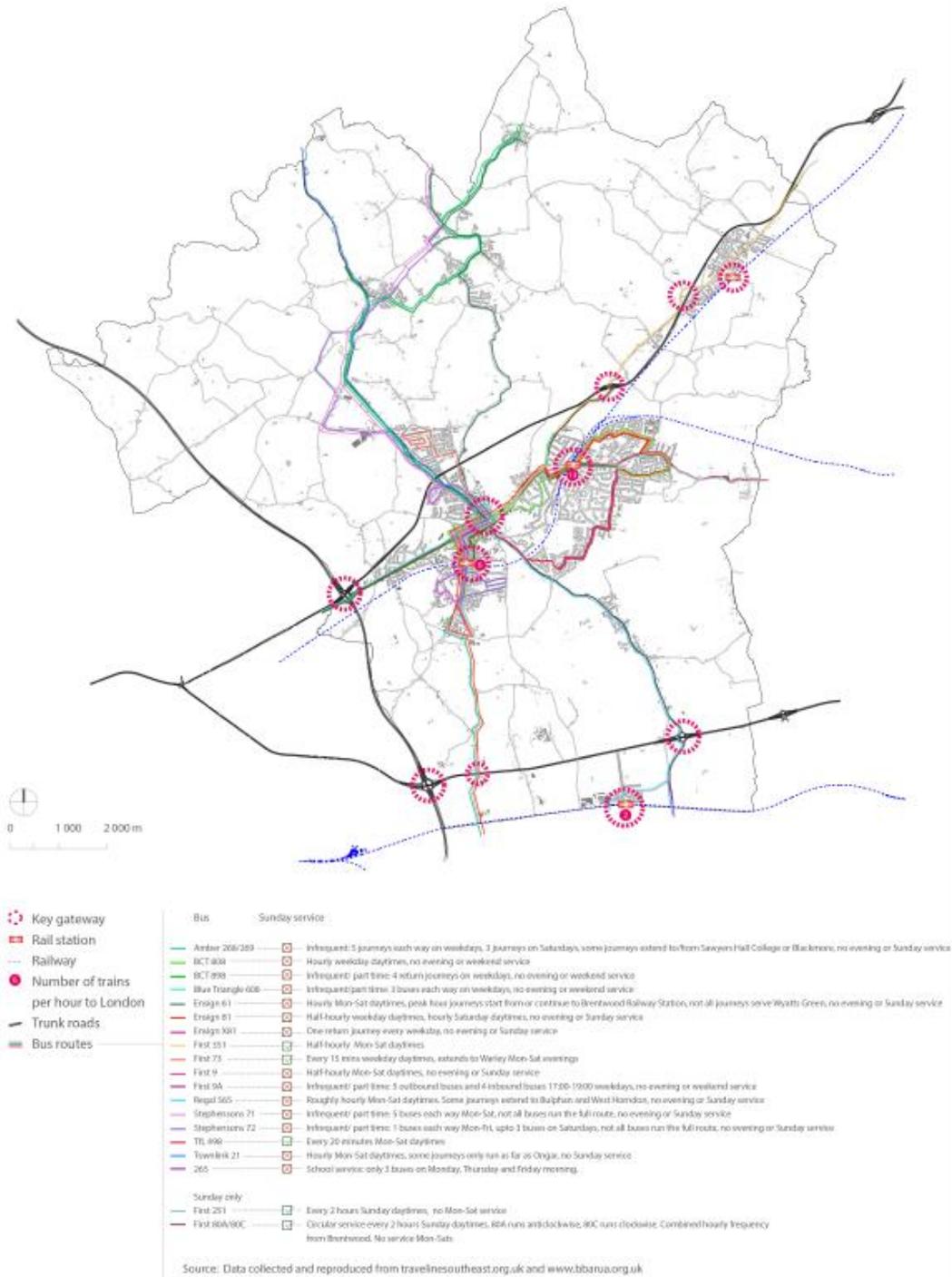
- 3.65 The current cycling infrastructure network and infrastructure within the Borough is poorly developed and consists mainly of:

- a. a limited fragmented range of urban on street cycle routes – primarily focused upon Brentwood Town;
 - b. a fragmented network of off-road routes to the south of Brentwood but connected to part of Thorndon Country Park;
 - c. linear longer routes (mixture of off-road and on-road) through and to the north and west of Pilgrims Hatch;
 - d. a longer linear route to the north west of Shenfield, and
 - e. well used railway station cycle parking, often of poor quality and lacking security or supporting facilities;
- 3.66 The Brentwood Cycling Group historically identified a range of barriers to the growth of cycling in the Brentwood Borough. These included:
- a. overcoming physical barriers to cycling, including strategic transport corridors and difficult road junctions;
 - b. high traffic speeds in rural areas;
 - c. improvements required to cycle-parking facilities – particularly linked to Town Centres and Transport Hubs;
 - d. lack of connected and segregated cycle lane infrastructure;
 - e. disconnected village and countryside routes, and
 - f. a lack of awareness of cycling opportunities locally.
- 3.67 It is understood that ECC is undertaking further work on a cycle action plan for Brentwood, building upon the original work of the group.

Bus Infrastructure

- 3.68 The frequency of services and extensiveness of the bus network within the Borough is illustrated thematically below in Figure 3.12.

Figure 3.12 Bus Network³⁰



³⁰ Information was collected in 2016 and is subject to updating.

- 3.69 The key headlines from the mapping of bus services includes:
- a. Brentwood, Hutton and Shenfield – Urban Core: Frequent linear and circular services. Shenfield Railway Station not as well served as Brentwood Railway Station for bus connections. Some of the suburban estate services are more limited.
 - b. North West of the Borough - Very frequent but limited stop weekday and Saturday services between Pilgrims Hatch and Brentwood Town and Brentwood Railway Station (no.37). More limited and often infrequent services north of Pilgrims Hatch, covering rural areas and villages. The No.61 service (formerly 261 service) linking Brentwood with Blackmore was recently saved from closure by ECC and is currently run by Ensign Bus.
 - c. South East of the Borough - Limited weekday and Saturday service via West Horndon (no.565).
 - d. Connections to Other Locations: Fairly frequent daytime weekday and Saturday services between Brentwood and Basildon (no.9) and fairly frequent and extensive weekday, Saturday and Sunday service between Brentwood and Romford (no.498). Fairly frequent weekday and Saturday services between Brentwood and Chelmsford. More infrequent weekday and Saturday services to Grays (no. 268/269).
 - e. Sunday and Evening Services: Very limited (every 2 hour) Sunday services to Pilgrims Hatch no.37; Mountnessing / Ingatestone / Chelmsford no.351; Brentwood circular via Shenfield and Hutton no 80A/C. Recent cut-backs in evening services (no.37).
- 3.70 Whilst Brentwood Town Centre is well serviced by daytime and evening bus services, services are restricted in both Shenfield and Ingatestone (and very restricted towards the south of the Borough). The majority of bus services that serve Shenfield offer either limited or no service at weekends. Similarly, no night buses serve Shenfield. Only one daytime bus service serves Ingatestone, and broadly follows the route of rail services, with no evening or night service serving the area. The provision of improved bus services, both in terms of locations served and service frequency may help to reduce parking demand in the main built-up areas. A series of measures such as Park and Ride, reduced car parking levels / premium priced spaces and express bus routing to key destinations may help improve bus viability.

Rail Infrastructure

- 3.71 The Borough is well served by rail transport with two active rail lines. The Abellio Greater Anglia (AGA) runs north east/south west across the Borough and the c2c line runs east/west across the southern portion of the Borough. As noted earlier in the chapter, the Travel to Work Census data indicates that rail travel is the second most popular form of transport to work (15.83% of the working population travel by this mode), with only travel by car / van being more popular (36.32%).
- 3.72 The AGA service connects London Liverpool Street with Norwich and there are stations serving Brentwood Town, Shenfield and Ingatestone. The c2c line connects Shoeburyness via Southend Central and Basildon with London Fenchurch Street with one rail station in the

Borough at West Horndon. Shenfield represents the most strategically important as it is an interchange rail station which allows connections to the AGA branch to Southend Victoria and intervening stations to Stratford. Shenfield Station is also the north-eastern terminus of Elizabeth Line which is currently under construction.

- 3.73 A significant proportion of the fast trains on the AGA call at Shenfield and all of the Southend Victoria bound train. Through trains serve Ingatestone on a less frequent basis and Brentwood Station is currently served solely by the slower Metro service (which will be effectively replaced by the Elizabeth Line service) which stops at intervening stations to London Liverpool Street. West Horndon is served by trains to travelling east towards Shoeburyness and Southend and west towards London Fenchurch Street.
- 3.74 The Elizabeth Line will increase capacity especially at Brentwood Station from 12 trains in peak hours³¹ to 24 trains. There is also a slight improvement in travel times to key London destinations. Shenfield Station will benefit from an increased frequency of train services to London and the convenience of services which enable passengers to travel to key London destinations without changing train. Fast services into Liverpool Street will be unaffected by the introduction of the Elizabeth Line service; full services from Brentwood and Shenfield started in 2019.

Community Transport, Taxis and Private Hire Vehicles

- 3.75 Brentwood Community Transport (BCT) plays an important role in the provision of transport for people who are unable to access conventional public transport services, due to a variety of reasons including impaired mobility, lack of public transport provision and cost of transport.
- 3.76 In addition to the 898 Queens Shopper Bus service and 808 Community Hospital circular service, noted under bus services earlier in this chapter, the BCT also delivers a:
- a. Social Car Scheme - used by members when they need transport for – Shopping, Doctor, Dentist, Chiropodist, Optician, Visit Friends / Family, Hospital (visits only, not appointments), Social, Further Education, Lunch Clubs.
 - b. Minibus Brokerage Scheme - available to local non-profit making groups who need fully accessible transport. Bookings are subject to vehicle and driver availability. Groups can provide their own drivers, providing they meet our training standards. The minibuses can be booked for – Group Outings, Theatre Trips, Shopping, Kids Clubs, Restaurants, Social Clubs, Exercise Classes, Luncheon Clubs, Meetings. An annual membership fee is payable to join the scheme. Groups assist with the cost of the journey by making a contribution depending on usage.
 - c. BCT Organised Day Trips - throughout the year, a number of outings are arranged on our accessible minibuses, using a volunteer driver. The trips are planned in advance and members are notified. Trips can be around various parts of Essex, such as Essex Villages, or perhaps a trip to a shopping centre.

³¹ Morning peak 07.00-09.00, Evening Peak 17.00-19.00

Implications of Growth

- 3.77 This section of the chapter focuses upon the impact of growth on transport infrastructure and potential mitigation measures. The information in the IDP draws extensively from the Transport Assessment which accompanies the Local Plan.

Highways Modelling

- 3.78 The overall impact of growth has been measured using the proposed Local Plan development sites (housing and employment) plus any Local Plan or committed developments from adjacent local authorities that would be likely to have an impact upon highways within the Borough. Where no information was made available from Local Authorities (e.g. Thurrock), growth is included as part of the overall background growth. The growth from neighbouring authorities have been added to a 'reference case scenario' from which the Brentwood Local Plan sites are tested.
- 3.79 To reduce the impact of developments on the overall road network within Brentwood Borough the Transport Assessment considers alternative methods of transport other than the car to lessen the impact of strategic development sites. As required within NPPF and the Local Plan Transport Evidence base guidance, sustainable transport interventions will form the main part of any mitigation required to provide additional mobility capacity within the system. These issues are discussed in the relevant sections below, before detailed consideration of physical highways mitigation measures.

Sustainable Transport

- 3.80 The potential to create an integrated sustainable transport network, linking railway stations, places of employment, new residential developments and existing development in the wider Brentwood area is key in achieving a reduction in car dependency and influencing other travel, where there is capacity already available or where it can be created through various travel initiatives. These will have an impact on travel, both related to specific Local Plan sites, but also the wider community, as the Local Plan facilitates the investment required.
- 3.81 A key part of the Transport Assessment mitigation strategy is to influence school travel, which is adding to congestion within Brentwood town centre in the AM peak. This creates not just issues with junction capacity but impacts on the ability of traffic to travel smoothly through the area, as parked vehicles cause conflicts. One example of how improvements could be achieved in a relatively cheap and achievable way is through the provision of a School Clear Zone which is a key element in reducing peak hour trips within Brentwood town centre.
- 3.82 The Transport Assessment also sets out a range of measures to support the delivery of sustainable growth within the A127 growth corridor associated with Dunton Hills Garden Village, redevelopment of West Horndon Industrial Estate, expansion of Childerditch

Industrial Estate and new strategic scale employment opportunities proposed Brentwood Enterprise Park.³²

- 3.83 There are specific policy requirements within the Dunton Hills Garden Village to promote car light development and a strong network of walkways and cycleways throughout the scheme and the early adoption of bus infrastructure. There are also opportunities on the project to innovate with significant new infrastructure for e-charging, cycle hubs and smart infrastructure during the delivery period of the project. Establishing strong connectivity to West Horndon Railway station and wider areas through sustainable transport infrastructure will also be a key marker of success for the scheme. Both DHGV and West Horndon development will also necessitate the development of new village centres, with associated public realm infrastructure.
- 3.84 Figure 3.15 below pulls out the key headline sustainable transport projects from the Transport Assessment with supplements with a range of other measures linked to issues identified earlier in this chapter. As a package of measures to reduce car dependency, these projects need to be central to the Local Plan. It is recognised that further feasibility / business case analysis is required in some measures and the timing of delivery will be across the plan period, broadly in line with the timeframe outlined in the Figure 3.15. Long-term project concepts, which are potentially beyond the plan period such as the Essex Rapid Transit system are not included in Figure 3.14.

Figure 3.14: Sustainable Transport Measures

Reference in the IDP Part B	Description	Timeline	Comment
Mitigating the impact of traffic in Brentwood Urban Area			
T1	Create School Clear Zone to restrict all vehicles from stopping, parking for drop off during AM/PM peaks from a specific area(s).	SHORT - MEDIUM	Parking allowed in legally designated car parks and spaces on the High St within the zone. Should reduce congestion at AM peak. Additional benefit of improving air quality at Wilson Corner. Public Transport exempt.
T2 & T3	Deliver Park, Ride or Stride facilities for workers within Brentwood T.C. or drop off / pick up points for parents to drop off their children..	MEDIUM	Impact on local traffic patterns would need to be understood. Work needed with schools to re-educate parents. Consider an electric and ordinary bicycle hire scheme hub. Additional
Reduce vehicle emission levels and future-proof infrastructure			
T4	Introduce electrical parking points to encourage use of such vehicles and plan and deliver other IT infrastructure redundancy to allow future implementation of emerging SMART systems.	SHORT / MEDIUM	All new residential and commercial developments should include e-charging spaces for car clubs using e-vehicles and charging hubs for e-bikes. Important to facilitate sustainable north/south movements from DHGV to Central Brentwood.

³² See

T5	Ban all large freight vehicle from stopping deliveries within the Central Brentwood zone and A128 corridor during AM/PM peaks.	MEDIUM	New developments sites won't compete with Central Brentwood as the retail centre. The larger population could lead to more large vehicles stopping for extended periods to service new developments and a busier High Street.
Public Realm Improvements			
T6	Introduce a pedestrian wayfinding system like Legible London, e.g. installation of totems, fingers post and integrating wayfinding maps at existing bus stops and street furnitures, to encourage and facilitate walking.	SHORT / MEDIUM	Residents and employees of new developments and the existing population should be encouraged to walk more.
T7	Prioritise public realm improvements within Brentwood Town Centre linked to site development opportunities	MEDIUM / LONG	There are opportunities for significant enhancement of the public realm linked to key brownfield development sites including William Hunter Way.
T8	Support major improvements to public realm at Shenfield and Brentwood Railway Stations	MEDIUM / LONG	
Encourage Walking / Cycling			
T9	Introduce new walking and cycling infrastructure within new developments – particularly strategic sites	MEDIUM / LONG	Site by site analysis required of options to introduce new walking and cycling infrastructure linked to new development and wider green infrastructure
Cycle Infrastructure			
T10	Plan and deliver in phases 'Quietway' cycle routes in Brentwood initially connecting Transfer Hubs to Town Centre schools	MEDIUM	Segregated routes where possible. Where not consider contra-flow cycling routes by creating new one-way streets. Consider 20mph in the zone.
T11	Improvements and potential new cycle routes across the Borough, as identified in the Cycle Action Plan. Infrastructure improvements have been considered for the urban areas of Brentwood, Shenfield and Ingatestone	MEDIUM / LONG	Work by the local cycle group identified a wide range of cycle network enhancement which require further analysis as part of cycle action planning
T12	Introduce high quality cycle parking and supporting facilities at the Borough's railway stations	SHORT	Many of Brentwood's key rail stations suffer from poor cycle infrastructure, which requires upgrading
Bus Infrastructure			
T13	Feasibility study into bus service improvements – particularly linked to new developments and major transport hubs	SHORT	Some evidence that service improvements could be made to bus services to support transport hubs such as Shenfield Station.
Community Transport			
T14	Create and/or promote a multiple service App making access to smart car hire/ car lubs / community buses/ booking bikes (including e-bikes) etc. easier.	SHORT	Partner with software organisation that creates community-based apps. Pays for itself through advertising

Southern Growth Corridor			
T15	West Horndon New Transport Interchange - Create through phases a new multi-modal interchange at West Horndon Station	MEDIUM	This interchange will serve the DHGV, Childerditch, West Horndon and Enterprise Development sites, plus any future Northern Thurrock developments
T16	West Horndon Public Realm Improvements	MEDIUM / LONG	Remodel Station Road to improve bus movement and accommodate safer cycling and pedestrian movements.
T17	A127 Corridor Strategic Improvement	MEDIUM / LONG	Revise the layout of the A127 from M25 J.29 to A128 to incorporate segregated cycle tracks and better pedestrian provision.
T18	A127 Bus Infrastructure - New Bus Route Infrastructure – new linked bus and/or demand responsive transport (DRT) route serving key new developments within the southern growth corridor. Early adoption of bus infrastructure within DHGV and other key extension / development sites supported with appropriate infrastructure with connection via West Horndon Transport Interchange. Also review changes to NHS hospital services and transport implications.	MEDIUM	Early adoption of bus infrastructure within DHGV and other key extension / development sites supported with appropriate infrastructure with connection via West Horndon Transport Interchange. Also review changes to NHS hospital services and transport implications.
T19	B186 Warley Street - Revise the B186 with the A127 to accommodate cyclist pedestrian and vehicle movements in a more balanced way.	SHORT / MEDIUM	To be delivered with J.19 & J.20 (A127/B186) Mitigation
Dunton Hills Garden Village			
T20	DHGV - Widening Connectivity (A128 and Tilbury Road)	SHORT	Options to be explored looking at feasibility of providing additional connectivity to surrounding areas.
T21	DHGV - Walkways / Cycleways	MEDIUM / LONG	Network of new walkways / cycleways across the development potentially linked to rights of ways and key ecology corridors across the scheme
T22	DHGV - Sustainable Transport Hub	MEDIUM / LONG	Cycle Hub and Charging Points - Dunton Hills e-bike / cycle hub – integrated cycle hub with supporting facilities. Opportunity to engrain enhanced cycle facilities within the scheme to promote and support the uptake of e-cycles and conventional bikes / possible link to e-charging infrastructure.
T23	DHGV - Public Realm and Village Square	MEDIUM / LONG	Subject to detailed masterplanning there will be a need to provide high quality public realm or civic square associated with the garden village

Highways Mitigations

3.85 Post implementation of sustainable transport measures as detailed above in Figure 3.15, there are a number of highways junction improvements which will need to be made connected to the impact of new growth across the Borough. These are detailed below in Figure 3.16.

Figure 3.16: Highways Mitigations

Reference in the IDP Part B	Mitigation	Detail
T24	J.19 & J.20 (A127/B186) Mitigation	Mitigation scheme to facilitate the additional traffic associated with Brentwood Enterprise Park. To be delivered with B186 Warley Street revision.
T25	J.13 (A127/A128 Brentwood Road / Tilbury Road) Mitigation	Further mitigation to Junction 13, which enhances ECC's mitigation scheme. The estimated cost outlined here is only for the addition of the Traffic Signals to the A127 Eastbound exit arm. Costs associated with the Ringway Jacobs and Essex County Council mitigation have not been included.
T26	J.15 and J.16 - Double Mini-Roundabout Mitigation	Mitigation to convert the Running Waters/ Brentwood Road roundabout into a signalised junction. The two signalised junctions will be linked to improve traffic management through the two junctions.
T27	J.24 Staggered Priority Junctions	Widening of A12 Off-Slip Road, provision of traffic signals at A12 Off-Slip / Roman Road junction and a splitter island.
T28	J.28 (M25) Improvements	
T29	J.29 (M25) Improvements	
T30	Signalised Junctions Improvements	Implementing Microprocessor Optimised Vehicle Actuation (MOVA) to improve performance of four junctions that are identified as close to or only just above a reasonable level of capacity: <ul style="list-style-type: none"> • A1023 Chelmsford Road/ A129 Hutton Road/A1023 Shenfield Road • A1023 High Street/B185 Kings Road/ A1023 London Road/Weald Road • B186 Warley Hill/Eagle Way/B186 Warley Road/Mascalls Lane • A1023 Brook Street/Mascalls Lane

Financial Implications

- 3.86 Part B of the IDP outlines indicative costs associated with the various transport mitigation measures. Further work will be required on updating the costs as the Local Plan and its various supporting transport projects move forward.