Broxbourne Transport Strategy

A Framework for Investment | Public Consultation Draft

Broxbourne Borough Council
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Contents

Executive Summary

Overview

i. The Broxbourne Local Plan is seeking to deliver some 7,700 new houses and help generate between 6,000 and 7,000 new jobs in the seventeen-year period between 2017 and 2033 and this Strategy has been produced to provide a framework for investment in transport infrastructure and services to support this growth.

ii. The Strategy details measures through which to provide the capacity to accommodate an increase in demand to travel, and interventions to improve connectivity to the new jobs and opportunities the Local Plan will facilitate. It also seeks to enable the creation of safe and attractive communities, where people want to live and businesses want to invest.

iii. Central to this is an ethos of providing and improving the travel choices available to those living, working and visiting the borough, upon which to stimulate sustainable, resilient and equitable growth.

Vision: Ensure that growth and regeneration can be effectively and safely accommodated by Broxbourne's transport network and that as many journeys as possible are by bus, rail, walking and cycling so that people have a safe, viable and attractive alternative to driving

Issues

iv. There are many transport issues facing Broxbourne which have the potential to increase in their coverage and complexity in the period up until 2033, even without the level of growth earmarked within the Local Plan coming forward.

v. With high levels of car ownership, a reliance on the car for many journeys, significant levels of out commuting, particularly to London, congestion on the road network and overcrowding on rail services, there are significant constraints to be overcome if the ambitions of the Local Plan are to be realised.

vi. The extent of travel demand to, from, within and through Broxbourne is down in no small part to its strategic position immediately to the north of London and the M25. This generates often conflicting demands on the network in locations where north-south, typically strategic trips, are opposed by more localised east-west movements.

vii. The pinch points on the network that result, can lead to delays and congestion and a dis-connect and severance between adjoining communities. Air quality issues are also of concern, with implications for the health and well-being of local residents.

Opportunities

viii. Notwithstanding the constraints of the local transport network, Broxbourne also possesses many inherent strengths upon which a shift to a more sustainable and robust travel patterns can be secured. As a compact, predominantly urbanised and flat borough, it possess the critical mass to make public transport provision viable, and walking and cycling realistic options for many journeys.

ix. The West Anglia Mainline and the Tottenham Hale Spur provide fast and direct, high capacity rail access into London immediately to the south. With five stations in the borough it is extremely well served in this regard, which a 44% increase in rail patronage in the ten years between 2004/5 and 2014/15 is testament to.

x. The New River also provides a huge asset and opportunity, and another sustainable north-south corridor upon which more localised trips could be encouraged through targeted investment to generate a shift to more active travel.

xi. Finally, the Local Plan and the growth it sets out represents a significant opportunity for Broxbourne in transport terms. The development of a new retail and commercial centre at Brookfield has the potential to reduce the need to travel further afield, with attractive jobs and other opportunities available for local residents.

xii. The growing population may support an increase in the viability and frequency of bus services across the borough, and the transport improvements which new developments may fund, would not come forward without their financial contributions.

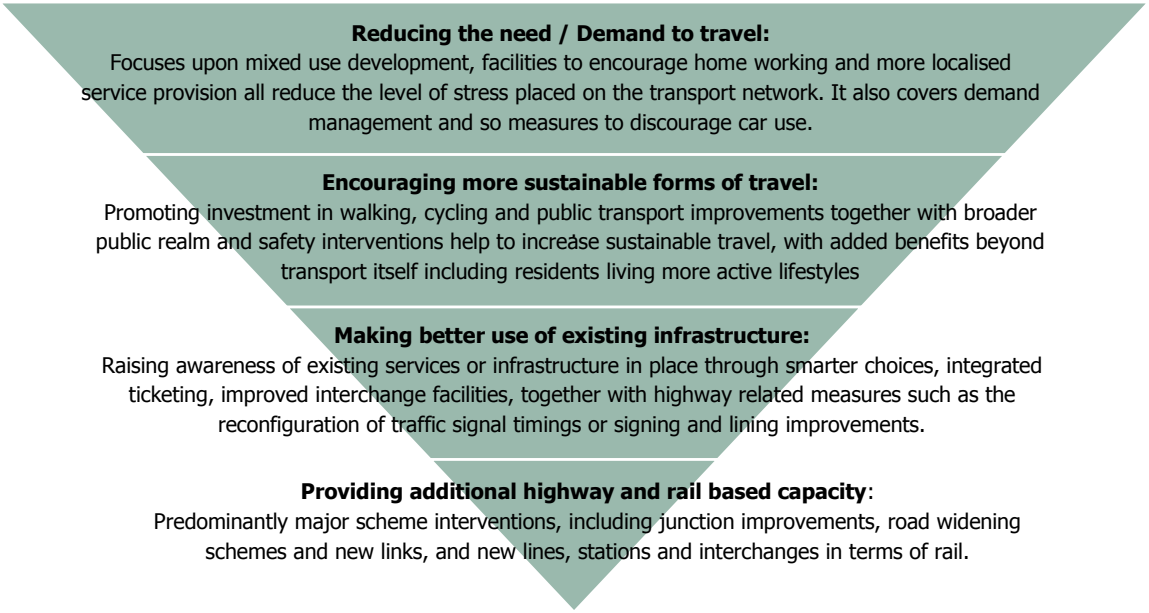
Strategic Approach

xiii. The identification of transport infrastructure and service provision to support the Local Plan has been based upon a series of core principles through which to maximise the sustainability, viability and deliverability of the Strategy.

xiv. Principally, a hierarchical approach was adopted in the identification of schemes, to ensure that road based capacity improvements were only considered as a last resort, once all other alternatives had been exhausted.

xv. This approach led to the inclusion of the most sustainable, cost effective measures, through which to provide the capacity for growth, improve connectivity and create safe and attractive communities. The respective stages of the hierarchy are illustrated in **Figure A** below.

Figure A: Hierarchy of Interventions



xvi. This approach has identified a programme of multi-modal interventions through which to support the Local Plan and the integrated delivery of the full package of measures detailed within the programme will be required to maximise the effectiveness of the Strategy.

xvii. There are many inter-dependencies within the programme and as such individual schemes cannot be 'cherry picked'. As such the co-ordinated delivery of schemes across all modes will be required as part of an integrated approach to delivery throughout the timeframe of the Strategy.

xviii. The programme itself has also been characterised by a need to balance priorities. There are often contradictory demands placed on the transport network which have to be balanced to ensure that it caters for all. Specifically within Broxbourne this relates to:

- North-South capacity and East-West connectivity
- Catering for through traffic and meeting the needs of local traffic
- Reducing journey times and maintaining and improving road safety
- Targeted investment in schemes and widespread investment in schemes
- Planning for traffic and planning for people

xix. The need to balance priorities is particularly evident in the approach the Strategy takes to providing the highway capacity on the A10 to cater for the future increase in demand to travel.

xx. Whilst capacity improvements are detailed within the programme, they are such they will not draw in additional trips from other strategic north-south links such as the A1(M) and M11. This highlights how the Strategy is not purely capacity driven, but one which seeks to balance the needs of local and strategic movements by car and other more sustainable modes.

xxi. The Strategy also seeks to reflect the role of small scale, marginal improvements to existing provision. The principle of 'marginal gains' has been applied through which small scale, local level, low cost improvements to transport provision can have a cumulative impact on the travel choices individuals make.

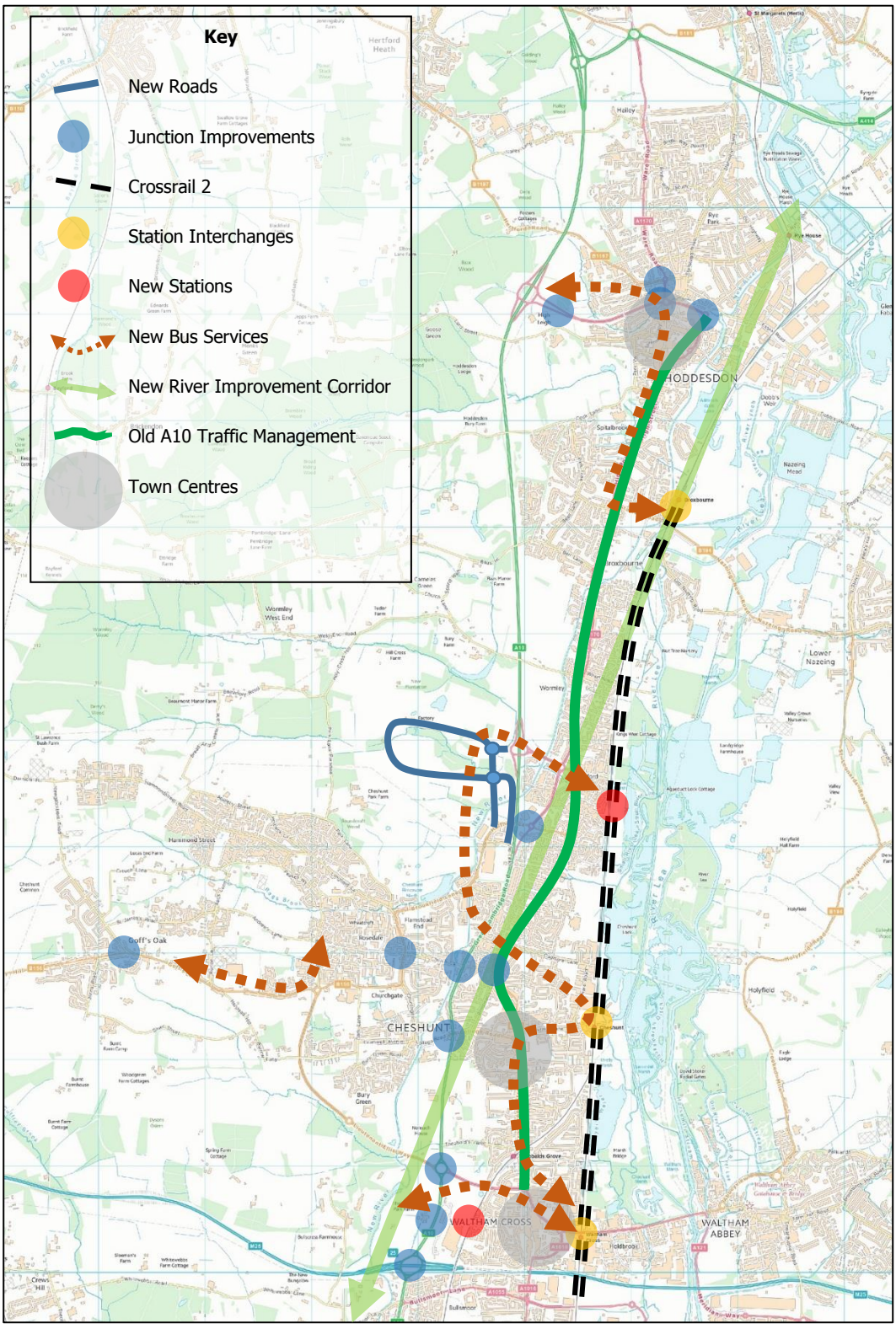
Interventions

xxii. The interventions identified within the Strategy amount to around £130m worth of investment, representing the scale of works required to meet both current and future pressures associated with the travel demands of the anticipated growth.

xxiii. **Figure B** highlights the schemes to be delivered through this Transport Strategy. They seek to provide the capacity for growth, improve connectivity and create safe and attractive communities and have been packaged to ensure that an integrated and holistic approach is taken to dealing with issues on an area by area, and corridor by corridor basis.

xxiv. They also seek to ensure that each of the respective networks – particularly the highway network, public transport provision, and walking and cycling – are subject to coherent and co-ordinated interventions, and which balance the often competing needs of different road users.

Figure B: Overview of Transport Proposals



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xxv. Key measures proposed to be taken forward within this Strategy include:

- **Public Transport Schemes**
  - West Anglia Mainline: Investment in the accessibility of stations on the main rail network into London to both reduce reliance on the car and take advantage of an increase in capacity on the line as part of the Crossrail 2 proposals being taken forward by TfL. The development of multi-modal interchanges at Broxbourne, Cheshunt and Waltham Cross Stations will be at the heart of this approach.
  - Bus Network: A focus on new service and infrastructure provision to create a more attractive and accessible bus network. Bus services are proposed to link large developments at High Leigh, Park Plaza and Cheshunt Lakeside to the main town centres and stations within the borough, with supporting investment in bus shelters, prioritisation at signals, integrated ticketing, information and marketing to provide a realistic alternative to the car.

- **Walking & Cycling Schemes**
  - Cycle Network: Development of a comprehensive network of safe cycle routes using the New River and alignment of the Old A10 as key arteries upon which to cater for both commuter and leisure orientated trips.
  - Primary Pedestrian Routes: Corridor focused pedestrian improvements to improve the accessibility of town centres within the borough, focusing on improved crossing points, wider footways and street furniture.

- **Smarter Choices**
  - Travel Plans: Development of a series of workplace, school and station travel plans through which to raise awareness of travel choices, and encourage the take up of alternatives to the car. This will supplement the physical changes to be provided on the network and help nudge individuals towards changing their travel behaviour.
  - Information: Provision of high quality, bespoke and accessible information on sustainable travel through personalised journey planning, real time information displays and the use of smartphone based technology to enable individuals to make more informed travel choices.

- **Highway Schemes**
  - A10 Capacity Improvements: A series of junction capacity enhancements from the M25 in the south through to Hoddesdon in the north, designed to improve the flow of both north-south and east-west traffic movements, and reduce severance through the provision of new and improved pedestrian and cycling crossing facilities.
  - Brookfield: The reconfiguration of the local road network to facilitate the development of Brookfield as a new local retail and commercial centre. The realignment of Halfhide Lane and provision of new links to open up the development site will ensure that it is an accessible destination from across the borough.
  - Local Junctions: Replacement of mini-roundabouts with signal controlled junctions in several locations on the local road network to provide better management of conflicting traffic flows.

Evidence

xxvi. The Strategy is based upon an extensive and sound evidence base. It is data-led with issues and mitigations identified through robust modelling of a multitude of different scenarios and solutions.

xxvii. The Broxbourne Highways Model and Hertfordshire County Council's COMET Model, both WebTAG compliant models, have provided the platform upon which informed decisions could be made and their implications critiqued

xxviii. The use of the Broxbourne Highways Model highlighted that the overall volume of traffic and level of stress on the road network will be much higher in 2033 than in the 2013 base year assessment of conditions, under various different scenarios. This will impact upon journey times as detailed within **Table A**.

xxix. In total four scenarios were assessed:

- Base year (2013) – to reflect typical existing conditions on the network.
- Do Minimum (2033) – to reflect how the network will operate if only committed growth, background growth and transport investment comes forward, i.e. a scenario with no Local Plan related growth or mitigations detailed within this Strategy.
- No Mitigation (2033) – to reflect how the network would operate with Local Plan growth but without the measures detailed within this Strategy to address the increase in travel demand.
- Preferred Mitigation (2033) – to reflect the impact of this Strategy in supporting the growth earmarked within the Local Plan.

xxx. In each instance journey times were calculated on the following five key routes:

- A10 between M25 J25 and A1170 (Dinant Link Road, Hoddesdon) – north/south.
- Between Brookfield development and Cheshunt Station – east/west.
- Between Park Plaza development and Waltham Cross Station – east/west.
- Between Park Plaza development and Cheshunt Station – east/west.
- Between Goffs Oak and Cheshunt Station – east/west.

xxxi. The key findings of the journey time analysis on these routes in each scenario highlighted that:

- Comparisons with Base Year
  - Journey times will generally increase even without Local Plan related growth between 2013 and 2033, and in some instances, it will add over 3 minutes to a journey.
  - Journey times with Local Plan growth, but without the provision of mitigating measures, will see more substantial increases on almost all routes, in some cases in excess of 7 minutes, and in others in excess of 15 minutes.
  - With Local Plan growth and supporting mitigations in place, journey times will still increase from the 2013 base year, but with smaller increases across the network.

- Comparisons between Future Scenarios
  - The package of preferred mitigations detailed within this Strategy will see reductions in journey times on almost all routes compared to a scenario in which Local Plan growth comes forward without supporting investment in transport provision.
  - On half of the routes assessed, journey times will be faster with growth and mitigations in place than in a Do Minimum scenario with no growth coming forward as sought by the Local Plan.

Table A: Journey Time Comparisons

Journey Times (minutes:seconds)			2013	2033			Differences				
Route	Period	Direction	Base Model	Do Minimum (No Local Plan Growth or Mitigation)	No Mitigation (Local Plan Growth without mitigation)	Local Plan Growth with Preferred Mitigation	Difference Base Model & 2033 Do Minimum	Difference Base Model & Local Plan Growth without mitigation	Difference Base Model & Preferred Mitigation	Difference Do Mimimum & Preferred Mitigation	Difference No Mitigation & Preferred Mitigation
A10 between M25 J25 and A1170 (Dinant Link Road, Hoddesdon)	AM Peak	NB	09:30	10:35	10:58	09:43	01:05	01:28	00:13	-00:52	-01:15
		SB	09:32	10:25	25:47	12:31	00:53	16:15	02:59	02:06	-13:16
	PM Peak	NB	10:29	12:34	26:13	12:28	02:05	15:44	01:59	-00:06	-13:45
		SB	09:37	09:55	11:29	09:41	00:18	01:52	00:04	-00:14	-01:48
Between Brookfield development and Cheshunt Station	AM Peak	EB	05:46	06:22	07:25	06:47	00:36	01:39	01:01	00:25	-00:38
		WB	05:51	06:04	07:29	07:09	00:13	01:38	01:18	01:05	-00:20
	PM Peak	EB	05:13	05:45	06:18	06:13	00:32	01:05	01:00	00:28	-00:05
		WB	06:03	09:07	13:38	07:29	03:04	07:35	01:26	-01:38	-06:09
Between Park Plaza development and Waltham Cross Station	AM Peak	EB	05:27	06:01	13:57	07:43	00:34	08:30	02:16	01:42	-06:14
		WB	05:13	07:51	12:27	13:51	02:38	07:14	08:38	06:00	01:24
	PM Peak	EB	05:55	04:59	05:41	07:42	-00:56	-00:14	01:47	02:43	02:01
		WB	06:14	10:12	20:14	12:53	03:58	14:00	06:39	02:41	-07:21
Between Park Plaza development and Cheshunt Station	AM Peak	EB	06:41	07:25	09:19	08:02	00:44	02:38	01:21	00:37	-01:17
		WB	05:48	06:27	22:13	09:21	00:39	16:25	03:33	02:54	-12:52
	PM Peak	EB	07:09	06:52	08:26	09:02	-00:17	01:17	01:53	02:10	00:36
		WB	06:44	10:14	13:28	06:52	03:30	06:44	00:08	-03:22	-06:36
Between Goffs Oak and Cheshunt Station	AM Peak	EB	09:37	09:47	10:39	09:39	00:10	01:02	00:02	-00:08	-01:00
		WB	10:06	10:44	13:55	10:54	00:38	03:49	00:48	00:10	-03:01
	PM Peak	EB	10:23	10:49	12:31	10:41	00:26	02:08	00:18	-00:08	-01:50
		WB	11:23	14:13	17:44	10:47	02:50	06:21	-00:36	-03:26	-06:57

xxxii. The use of Hertfordshire's COMET multi-modal model highlighted that:

- The schemes along the A10 do not attract more trips from the wider strategic network.
- There are junction delay reductions on the A10 as a result of the schemes introduced, whilst the ban on right turns at College Road and Church Lane improve the junction performance.
- There is some localised re-routeing in Broxbourne/Hoddesdon as a result of the 20mph scheme on the A1170 (Old A10) with reduced flows along the A1170 itself.
- Sustainable transport interventions do not appear to have had a noticeable impact on the modal splits for journeys in Broxbourne.

Implementation

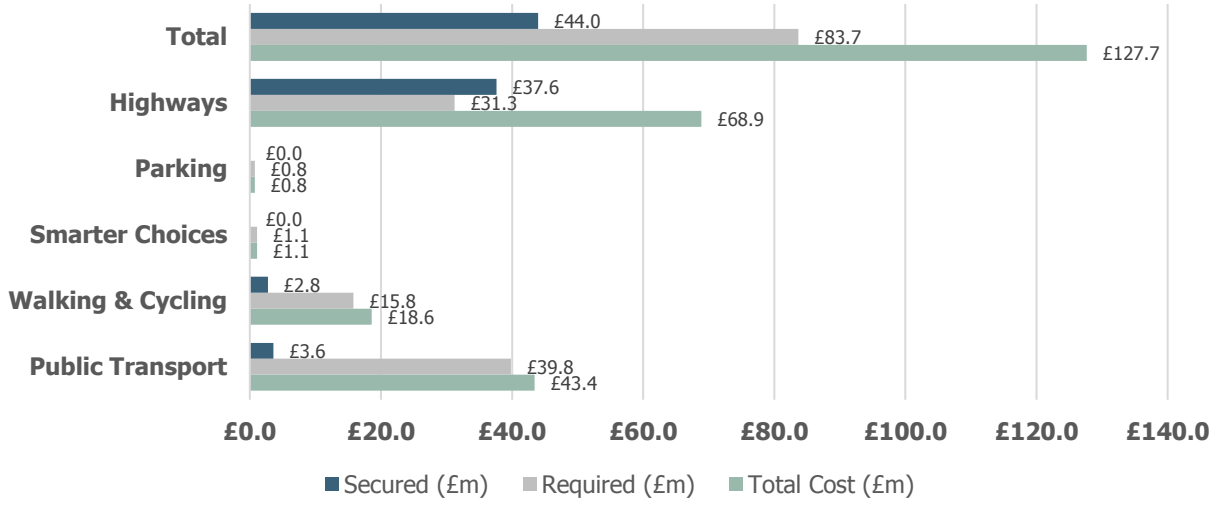
xxxiii. To achieve the Vision of the Strategy and facilitate growth within Broxbourne, it will require:

- A costed and funded programme of viable and deliverable schemes.
- Dedicated partnership working with an array of stakeholders with a vested interest in the future of Broxbourne.
- The appropriate timing of interventions.
- The identification and appropriate management of risks associated with taking £130m of investment forward.

xxxiv. Of the almost £130m worth of investment detailed within this Strategy, around a third of the funding required has already been secured from government grants, developer funding and both Highways England and Network Rail's investment programmes.

xxxv. The Strategy will provide a credible platform from which to secure the balance of funding, from a mix of central government and local funding pots, together with developer funding. **Figure C** highlights the costs associated with the Strategy.

Figure C: Costs & Funding (£m)



xxxvi. Alongside this capital investment, an ongoing revenue commitment will be required through which to support the non-infrastructure based initiatives including the provision of travel information and other measures through which to allow individuals to make smarter travel choices.

xxxvii. The Strategy has been developed in close partnership with Hertfordshire County Council and Highways England in particular, and the borough will seek to build on these relationships and those with other stakeholders to ensure the smooth and co-ordinated delivery of the programme.

xxxviii. This in turn will be aligned with the housing trajectory set out in the Local Plan to ensure that the infrastructure, services and travel choices are available to residents as and when they move into the new dwellings.

1.0 Background

1.1 Purpose

1.1.1 This document forms the Transport Strategy to support the Broxbourne Local Plan. It establishes a strategic framework for investment in transport to support growth and achieve the wider social, environmental and economic objectives of the authority in the period up until 2033. The Strategy provides a sound and robust evidence base and details strategic and site specific interventions to accommodate the increase in demand to travel associated with future development.

1.2 Structure

1.2.1 The Strategy is structured around a series of chapters and overarching questions which reflect the decision making process through which areas of investment have been identified. They comprise:

- **Where? –** Highlights the Broxbourne context, the key characteristics of the transport networks in place, the level of growth envisaged and the inter-relationships with neighbouring authorities.
- **What? –** Details what the Strategy is seeking to achieve in terms of the objectives of the Local Plan, the wider policy context in which it has been produced, and transport specific issues that need resolving.
- **How? –** Sets out a series of core principles to provide a strategic approach to investment. Scheme specific measures, area profiles, cost and funding, and deliverability considerations are all addressed to formulate how the Strategy will translate into investment on the ground.
- **Why? –** Provides the evidence upon which the issues and interventions in the Strategy have been determined, drawing out the specifics of the modelling runs undertaken and the outputs of their application.
- **When? –** Establishes the timeframes for intervention and the trigger points at which investment will be required in the transport network in order to meet the overarching objective of the Strategy and Local Plan.

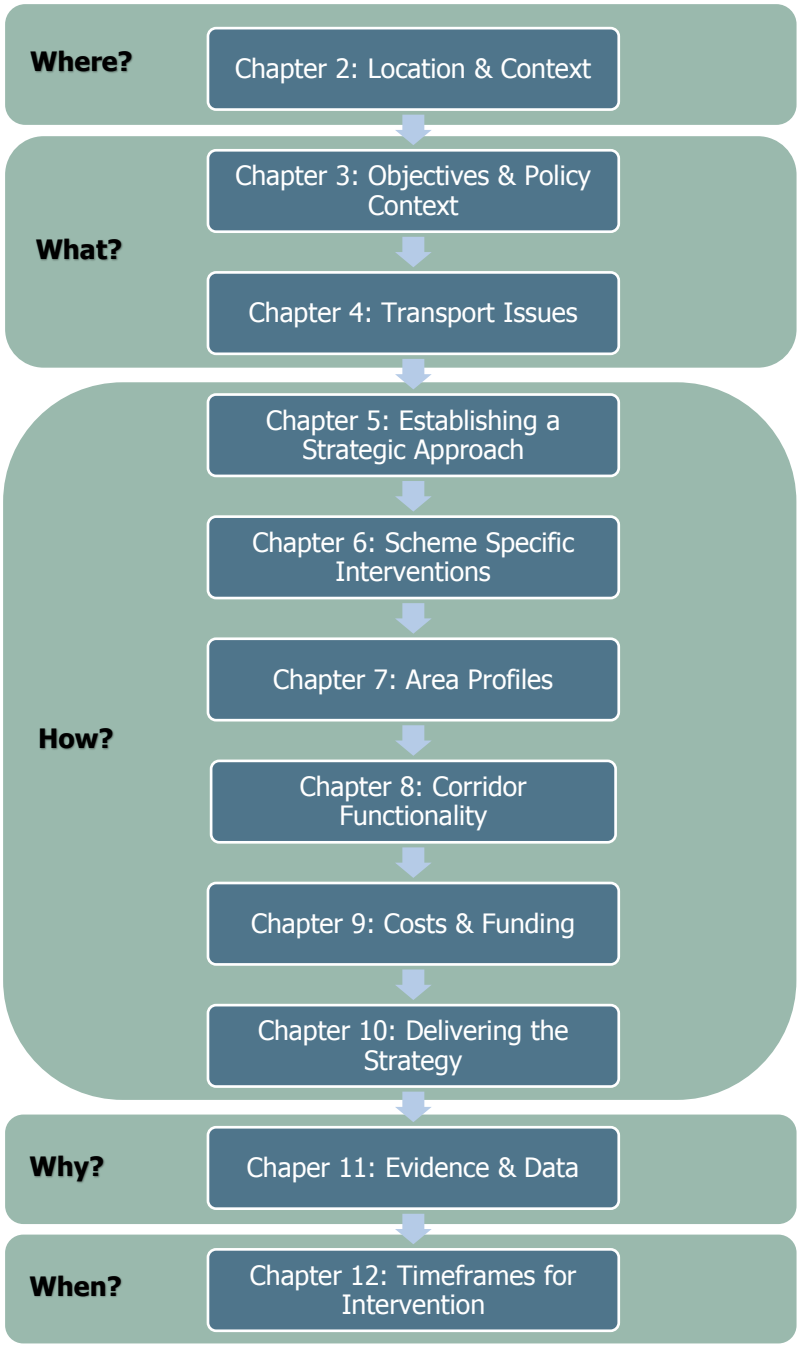
1.2.2 The structure of the Strategy demonstrates the clear, logical and transparent process which has been undertaken to identify the necessary transport investment required to support the Local Plan, as reflected in **Figure 1.1**.

1.3 Process

1.3.1 This draft version of the Strategy has been produced in close collaboration with Hertfordshire County Council, Highways England and neighbouring authorities, particularly Essex County Council. A Transport Discussion Group was established and input sought on issues from the strategic approach through to scheme specific interventions.

1.3.2 We are now seeking the views of the public and other stakeholders in determining the shape and direction of future investment in the local transport network.

Figure 1.1: Structure of the Strategy



2.0 Location & Context

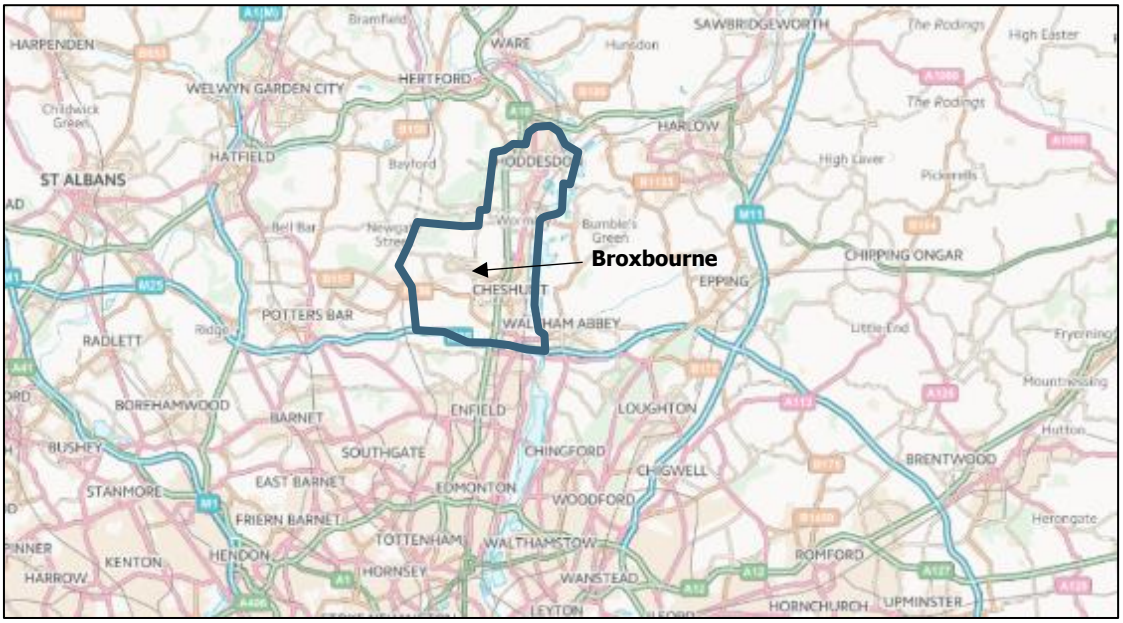
2.1 Overview

2.1.1 This chapter sets out the geographical context of the Strategy, the nature of Broxbourne and the key transport corridors and desire lines within and through the Borough. It highlights the strategic sites being taken forward through the Local Plan and the implications of facilitating growth in Broxbourne on the wider network in neighbouring authorities.

2.2 Broxbourne Context

2.2.1 Broxbourne is located in the south-east of Hertfordshire within the Upper Lee Valley bordered by East Hertfordshire District to the north, Epping Forest District to the east, the London Borough of Enfield to the south and Welwyn Hatfield Borough to the west. The M25 demarcates the southern boundary of the borough, as highlighted in **Figure 2.1**.

Figure 2.1: Location of Broxbourne



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2.2.2 The main towns of Hoddesdon, Cheshunt and Waltham Cross are linked by smaller settlements such as Broxbourne, Wormley and Turnford. These form a near continuous north south corridor of development which is bordered by the West Anglia mainline and Lee Valley Regional Park to the east and the A10, ancient woodland and rolling farmland and countryside to the west.

2.2.3 Cheshunt also extends westwards over the A10 into Bury Green, Rosedale, Flamstead End and along Hammondstreet, whilst further west, both Goffs Oak and St James are settlements located in open countryside in land designated as Green Belt.

2.2.4 The A10 provides direct access to the M25 and the wider motorway network. The Borough's five railway stations provide rail services to central London, Stansted Airport and Cambridge as well as local services to north London, Hertford and Harlow. These routes mean that Broxbourne acts as a gateway between urban London and leafy suburban Hertfordshire.

2.2.5 The 2012 Sub National Population Projections (Office for National Statistics) recorded that the Borough's residential population was in the order of 96,500. The East of England Forecasting Model (EEFM) estimated that the residential population was in the order of 96,700 with 39,200 households. About 35,000 people work in the Borough which has a good range of schools, healthcare centres, community facilities, sports facilities and open spaces.

2.3 Growth Context & Site Allocations

2.3.1 The Broxbourne Local Plan is set to enable the provision of 7,700 homes and the creation of 6,000 to 7,000 new jobs within the period up until 2033. This growth will be accommodated predominantly within a number of strategic sites including:

- **Brookfield** – Brookfield is set to be developed over the course of the Plan period as a sustainable garden suburb. A series of large site allocations will provide a new focus and retail centre forming the commercial hub of the Borough.

  There will be provision of 30,000 square metres of comparison retail provision, around 3,500 square metres of convenience retail, 10,000 square metres of leisure space, a new civic centre, 1,500 new dwellings located around a new link road with access onto the A10 via an improved grade separate junction at Turnford.

- **Park Plaza** – Comprises two sites (Park Plaza West and Park Plaza North) located immediate to the north of the M25 J25, which straddle either side of the A10. Park Plaza West will see the provision of up to 100,000 square metres of floorspace for B1a (offices) and B1b (research) uses. Park Plaza North will complement this provision with further B1 and B2 provision to the east of the A10.

- **Cheshunt Lakeside / Delamare Road** – Located on the site of the former Tesco headquarters and directly to the north of Cheshunt Station, this site will provide in excess of 1,750 new dwellings through the Plan period within a mixed use urban village.

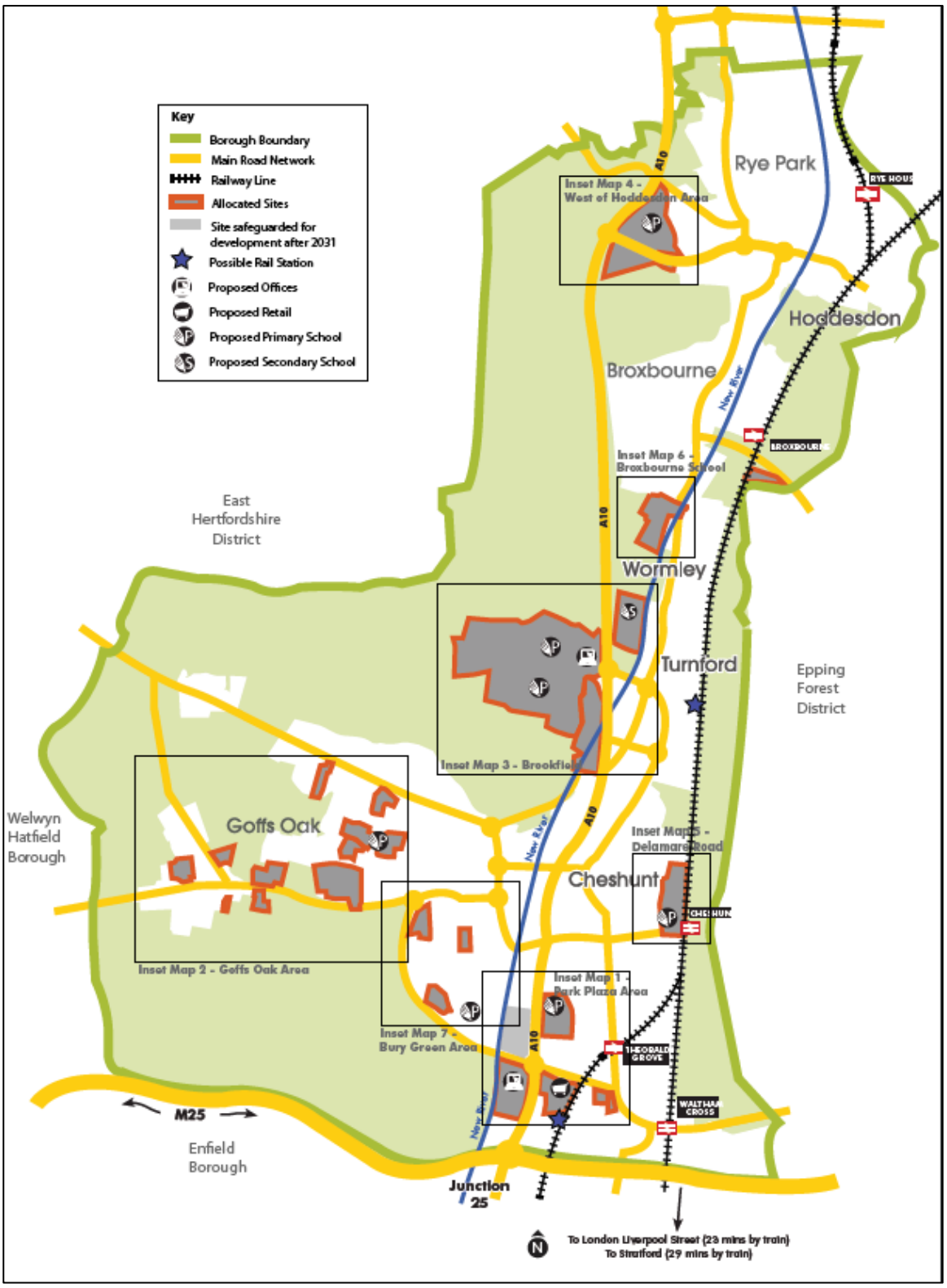
- **Rosedale Park** – A series of sites located in West Cheshunt which together will provide in excess of 700 new dwellings together with local amenities.

- **High Leigh Garden Village** – This site to the west of Hoddesdon already has planning permission for around 520 homes, a new primary school and other complementary uses.

- **Northern High Street, Waltham Cross –** Relocation of existing edge of centre retail uses to provide in excess of 300 new dwellings within walking distance of the town centre.

2.3.2 Other sites to come forward in the period up to 2033 include a mixed use development, including around 150 homes at Broxbourne School, housing to facilitate the redevelopment of Cheshunt Football Club Stadium, allocations for 60 and 100 homes at Dark Lane and Theobalds Brook Field respectively, 75 houses at the former East Playing Field of St Marys School, and around 40 dwellings south of Hammondstreet Road. These sites and the rest of the allocations in the Local Plan are highlighted in **Figure 2.2**.

Figure 2.2: Site Allocations within Broxbourne Local Plan



2.4 Transport Context

2.4.1 Broxbourne is well served by the strategic road network with direct access onto the M25 via Junction 25 on the southernmost boundary of the authority. The A10 connects with the M25 at J25 and in turn provides a high capacity north-south link through the Borough to Hertford, Royston and Cambridge in the north.

2.4.2 Other important routes on the local road network include the A121 which provides a key east-west link between the A10, Waltham Cross and Waltham Abbey, and the B176/A1170 which together forms a parallel north-south link to the A10 through the heart of the main towns within Broxbourne.

2.4.3 Car availability levels are higher than the national average, as evident in **Table 2.1**, and there is a high degree of reliance on the private car in part due to the lack of self-containment[1] which sees many residents travelling further afield to access employment opportunities.

2.4.4 London boroughs are the main destination for work (33%), outside of Broxbourne (31%), with a further 10% commuting to East Hertfordshire. Of these trips, 18% are less than 5 miles, which is lower than the Hertfordshire average of 31%. In addition, 73% of these trips were less than 15 miles, compared to 61% in Hertfordshire[2].

Table 2.1: Level of Car Availability in Broxbourne

Car or Van Availability	Broxbourne	Percentage	National Average
All Households	37,658	100%	100%
No Cars or Vans in Household	6,605	18%	26%
1 Car or Van in Household	15,888	42%	42%
2 Cars or Vans in Household	11,169	30%	25%
3 Cars or Vans in Household	2,837	8%	5%
4 or More Cars or Vans in Household	1,159	3%	2%

Source: Office for National Statistics, January 2013

2.4.5 Broxbourne is extremely well served by rail with five stations providing direct access into London: Broxbourne, Cheshunt, Rye House, Theobald's Grove, and Waltham Cross. Details of the patronage at each of these stations is provided in **Table 4.4**. This provision is concentrated in the east of the borough and access to the stations themselves can prove problematic from areas within the west of Broxbourne.

2.4.6 The bus network provides a mixed level of accessibility and coverage across the Borough. The majority of households are within 400m of a regular bus service with the corridor formed by the old A10 providing the highest level of service frequency.

[1] A lack of self-containment implies a need to travel outside of the local area to meet certain everyday needs such as employment, retail, healthcare or leisure provision.
[2] Hertfordshire County Wide Travel Survey 2015

2.4.7 More people use the bus (5%) to travel to work than the county average of 3%, although there is a general feeling amongst local residents through the Hertfordshire County Wide Travel Survey that bus frequency is too low.

2.4.8 Walking and cycling networks are disjointed across Broxbourne in part due to the dominance of the A10 and the lack of at grade crossing points. The prevalence of subways close to the centres of Waltham Cross and Hoddesdon also sever the networks and create actual and perceived barriers to movement.

2.4.9 Around 40% of Broxbourne residents own a usable bike, significantly lower than the county average of 51%. This is reflected in the fact that Broxbourne has the second lowest level of cycle trips to work across Hertfordshire at around 1% compared to the County wide average of 1.6%. Levels of walking are also lower than across Hertfordshire as a whole with 18% of residents regularly walking compared to 23% on average.

North / South Corridors

2.4.10 A key feature of the Broxbourne transport network is the dominance of north-south links. This is reflected in the fact that the two most popular destinations for out commuting trips are to London in the south and East Hertfordshire in the north.

2.4.11 The north-south corridor comprises a series of routes and links which run parallel and provide capacity for not just trips with an origin or destination within the Borough, but for through trips which originate and terminate outside of Broxbourne.

2.4.12 The A10, the A1170/B176 (which follows the alignment of the old A10) and the West Anglia Mainline are the key components of this corridor and supplement each other's provision to provide a high capacity corridor through the heart of Broxbourne.

East / West Links

2.4.13 The second key feature of the transport network in Broxbourne is the lack of, and difficulties associated with east-west connectivity. Whilst the M25 provides a high capacity east-west link to the south of the Borough, bus, road and rail connectivity within the Borough itself is limited.

2.4.14 The A121 provides an important link in the south of the Borough from Waltham Abbey in the east, through Waltham Cross and across to the A10, where it becomes the B198 Lieutenant Ellis Way to serve the south west of the Borough.

2.4.15 Elsewhere, Church Lane and College Road form important local east-west connections across the A10 but are the cause of significant capacity constraints on the network. The B156 from Cuffley provides a connection to the west and feeds into Church Lane and College Road via Churchgate.

2.4.16 There are few east-west bus services in place, with two services (no. 242 and no.251) operating along College Road during the day, whilst all rail services operate on a north-south alignment. The need to address this feature of the local network is further highlighted in that the Local Plan proposes a series of site allocations, the majority of which are to the west of the A10, whilst the main trip generators, including all of the mainline stations are to the east of the A10 which severely impedes east-west movement.

2.5 Neighbouring Authorities

2.5.1 The transport network within Broxbourne does not operate in isolation but is part of much larger and complex sub-regional, regional and national networks. Furthermore, the level of growth in the neighbouring authorities of East Hertfordshire, Harlow, Enfield, Epping Forest and Welwyn Hatfield is such that Broxbourne will be subject to significant additional demands being placed on the local transport network.

2.5.2 There is subsequently a need to work closely within the wider sub-region to address any issues which may arise. The level of growth proposed in the authorities bordering Broxbourne are detailed in **Table 2.2**.

Table 2.2: Level of Growth in Neighbouring Authorities

Authority	Plan (Date)	Period	Houses	Jobs
East Hertfordshire	Local Plan Pre-Submission Draft (2016)	2011 - 2033	16,390	9,570 to 11,110
Enfield	Local Plan Pre-Submission Draft (2016)	2017 – 2032	25,000 to 35,000	13,000
Epping Forest	Local Plan Pre-Submission Draft (2016)	2011 – 2033	11,400	8,800 to 10,010
Harlow	Local Development Plan Pre-Submission Draft (2016)	2011 - 2031	12,000 to 15,000	8,000 to 12,000
Welwyn Hatfield	Draft Local Plan (2016)	2013 – 2032	12,000	15,960
Total			**76,790 to 89,790**	**55,330 to 62,110**

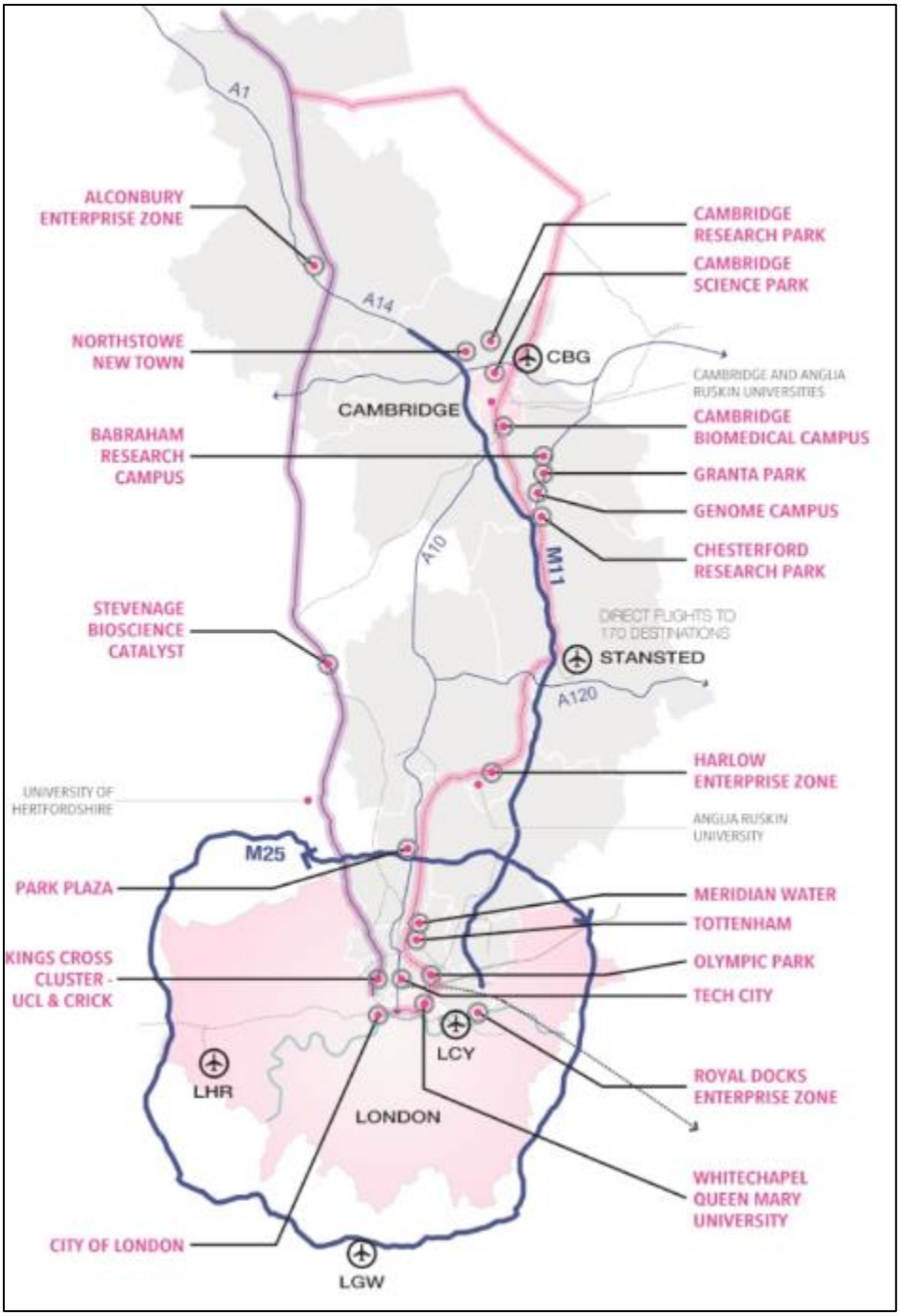
2.6 London to Cambridge Corridor

2.6.1 The London-Stansted-Cambridge Corridor (LSCC)[3] is a large highly integrated market and functional economic area. Despite its location within 3 different counties and Greater London, the corridor shows a high level of self–contained economic activity with travel to work, travel to learn, housing market, and business location patterns recognising the corridor as one economic space with high levels of synergy and inter-dependence.

2.6.2 Given this context, a consortium of local authorities, including Hertfordshire and Broxbourne are seeking to use their collective weight to lobby for investment in priority measures to unlock the growth potential which exists. A number of these opportunities, including Park Plaza within Broxbourne, are highlighted in **Figure 2.3**. Both works to improve the M25 J25 and the A10 are on the consortium's list of priority schemes for which funding is being sought.

[3] http://lscc.co/

Figure 2.3: London-Stansted-Cambridge Corridor



Source: http://www.lsccgrowthcommission.org.uk/

3.0 Objectives & Policy Context

3.1 Overview

3.1.1 This chapter details the overarching objectives of the Broxbourne Local Plan, the policy context within which this Strategy has been produced, and the ability of transport to contribute towards the economic growth agenda and wider issues facing the Borough in the period up until 2033.

3.2 Local Plan Objectives

3.2.1 The Broxbourne Local Plan covers the period between 2017 and 2033. Over the course of this period there is an expectation that some 7,700 new dwellings will be provided and land to accommodate the creation of 6,000-7,000 new jobs will be brought forward.

3.2.2 The provision of around 40,000m^2 of new retail development and 10,000m^2 of leisure facilities at Brookfield Riverside also forms part of the core remit for the Plan.

3.2.3 Alongside this, the Local Plan contains seven overarching objectives including a specific desire in relation to transport to:

"Ensure that growth and regeneration can be effectively and safely accommodated by Broxbourne's transport network and that as many journeys as possible are by bus, rail, walking and cycling so that people have a safe, viable and attractive alternative to driving".

3.2.4 Additional objectives within the Local Plan which are also dependent upon appropriate investment in the transport network comprise:

- **Sustainable Neighbourhoods** – Ensure that growth and regeneration improves the physical quality and social and economic prosperity of neighbourhoods for residents, businesses, workers and visitors.
- **Environment** – Protect and enhance the natural, historic and built environment for its visual beauty, leisure and recreation value, ecology and heritage.
- **Infrastructure** – Ensure that sufficient infrastructure, services and facilities are in place or provided as part of housing, employment, retail/leisure and other developments to meet the education, healthcare, leisure and other needs of residents, businesses, workers and visitors.

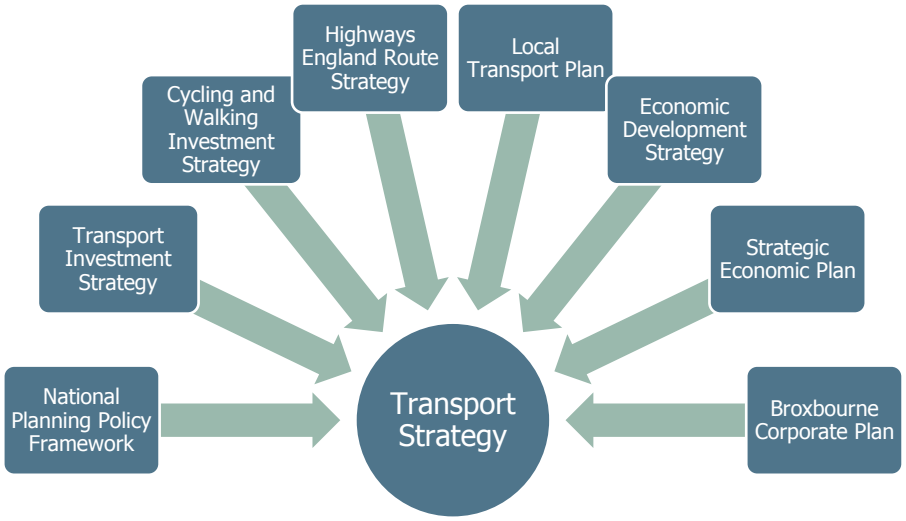
3.2.5 The transport network also has implications for the authority realising the three objectives of the Plan relating to housing, employment and town centres, shopping and leisure, demonstrating the pivotal role of transport in facilitating these wider priorities.

3.3 Policy Context

3.3.1 This Strategy aligns with both national and local policy in place to guide development and investment in the transport network, in particular the National Planning Policy Framework, the Transport Investment Strategy, Highways England London to Leeds Route Strategy, the Hertfordshire Local Transport Plan (LTP4), and supporting strategies, together with the Broxbourne Corporate Plan.

3.3.2 **Figure 3.1** highlights the range of documents which form the policy context for this Strategy.

Figure 3.1: Policy Context of the Strategy



National Planning Policy Framework

3.3.3 The relevance of land use development on influencing transport conditions is highlighted throughout the National Planning Policy Framework (NPPF)[4]. This states that: "In preparing Local Plans, local planning authorities should … support a pattern of development which, where reasonable to do so, facilitates the use of sustainable modes of transport."

3.3.4 The importance of developing infrastructure to widen transport choice and minimise journey lengths for employment, shopping, leisure, education and other activities are highlighted within the guidance and these principles are at the heart of the strategic approach of this Strategy.

Transport Investment Strategy

3.3.5 The Transport Investment Strategy details the case for continued investment in transport infrastructure and its importance in facilitating growth[5]. It details four strategic priorities relating to (i) creating a more reliable, less congested, and better connected network, (ii) building a stronger, more balanced economy by enhancing productivity and responding to local growth priorities, (iii) enhancing our global competitiveness by making Britain a more attractive place to trade and invest, and (iv) supporting the creation of new housing.

[4] National Planning Policy Framework; Department for Communities and Local Government, 2012
[5] Transport Investment Strategy: Moving Britain Ahead; DfT, July 2017

3.3.6 The Strategy highlights the need to invest in the transport network in different ways to address its core capabilities – its condition, capacity and connectivity – whilst also improving the user experience and safeguarding environment and health requirements.

3.3.7 The creation of a new Major Roads Network (MRN) comprising the busiest and most important 'A' roads managed by local authorities is also pinpointed within the Strategy with potential implications for the A10 and other links within Broxbourne.

Highways England Route Strategies

3.3.8 Highways England is responsible for the management and maintenance of the Strategic Road Network (SRN) and as part of this produced a series of Route Strategies to guide future investment in the network. Of relevance to Broxbourne is the London to Leeds (East) Route Strategy[6] which details the issues and priorities for investment in future spending periods.

3.3.9 Whilst the A10 within Broxbourne is not part of this network the A1 and M11 are both considered within this Strategy, and border the Authority to the west and east respectively. Any material changes in the operation of these strategic links may have implications on the A10 and therefore Broxbourne as a whole.

Hertfordshire Local Transport Plan 4 (LTP4)

3.3.10 The County Council is currently in the process of developing a new Local Transport Plan for the County[7]. As part of this a series of reports have been produced to generate a "Transport Vision 2050" which has a vision and series of nine objectives under the themes of prosperity, place and people.

3.3.11 In addition, it establishes a set of four principles upon which to guide the Plan and determine priorities for investment. These comprise:

- Application and adoption of new technology
- Modal shift and encouraging active travel
- Cost effective delivery and maintenance
- Integration of land use and transport planning

3.3.12 The strategic approach which the Plan establishes also draws out six potential policy options focusing upon:

- Adoption of a transport user hierarchy
- Delivering a step change in cycling in larger urban areas
- Greater facilitation and support for shared mobility (car clubs, lift share, bike share)
- Enhanced public transport connectivity between towns, through bus priority measures
- A priority traffic management network
- Growth and transport plans (reflecting transport corridors within the County)

3.3.13 Major schemes proposed within the Transport Vision include the development of a series of Sustainable Travel Towns and a bus rapid transit network which both have the potential to benefit Broxbourne and help facilitate the delivery of growth envisaged within the Local Plan.

[6] London to Leeds (East) Route Strategy, April 2015 (https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/416748/London_to_Leeds_East.pdf)
[7] www.hertfordshire.gov.uk/ltp

LTP Supporting Strategies

3.3.14 A series of strategies have been adopted by Hertfordshire County Council which support the LTP and provide a more detailed framework for investment in the local transport network[8], and these are detailed in **Table 3.1**.

Table 3.1: LTP Supporting Strategies

Strategy	Content
Active Travel Strategy	Updated in April 2013, this seeks to encourage walking and cycling trips to improve health, the environment, congestion and the economy.
Bus Strategy	The County Council's Strategy for ensuring viable and sustainable bus services throughout Hertfordshire.
Intalink Strategy	Focuses upon the provision of public transport information to promote and support passenger transport across the county.
Intelligent Transport Systems (ITS) Strategy	This Strategy was produced in August 2010 and sets out an approach to the provision of Intelligent Transport Systems and Variable Message Signs to help the efficient transport network management.
Inter-Urban Route Strategy	Improvements to inter-urban corridors between Hertfordshire's towns.
Rail Strategy	Details plans for rail services through the county.
Rights of Way Improvement Plan	Sets out proposals to improve and maintain the Rights of Way network across the authority and encourage greater use and access to the provision in place.
Road Safety Strategy	Details how the County Council intend to improve safety on Hertfordshire's road network.
Rural Transport Strategy	Sets out improvements to transport in rural areas of the county to ensure that residents can access important destinations and services whilst contributing to reducing the dominance of the car as a choice of means of travel.
Speed Management Strategy	Speed management of traffic on Hertfordshire's roads
Cheshunt & Waltham Cross Urban Transport Plan	Sets out an approach to the delivery of transport improvements in the period between 2010 and 2020, and longer term to 2026.
Hoddesdon & Broxbourne Urban Transport Plan	Sets out an approach to the delivery of transport improvements in the period between 2012 and 2032.

3.3.15 This Strategy does not revise or replace these strategies in place but details a series of interventions to deliver the planning and transport ambitions of Broxbourne, in line with the approaches established within each of these documents.

[8] http://www.hertfordshire.gov.uk/services/transtreets/ltplive/supporting/

Broxbourne Corporate Plan

3.3.16 Broxbourne Borough Council has established a set of corporate priorities within the Corporate Plan (2017-20) under the three broad priorities of a) Ambition Broxbourne: a thriving economy, b) Beautiful Broxbourne: enhancing the quality of life, and c) Effective Broxbourne: an efficient, enabling Council.

3.3.17 Growth and the associated investment in transport improvements to mitigate the impact of growth has the ability to contribute to each of these areas by providing the transport capacity for growth, connecting residents to jobs and opportunities and creating a safe and attractive transport network and environment where people want to live and businesses want to invest.

3.4 Economic Growth

3.4.1 An effective and efficient transport network plays an important role in increasing the attractiveness of an area to businesses as a result of the competitive edge it provides, both in terms of reducing the cost of logistics and attracting and retaining a wide pool of labour.

3.4.2 It is necessary to provide the transport capacity to accommodate growth, improve connectivity so that local residents can access jobs and opportunities and businesses can take advantage of markets, and to invest in transport to create safe and attractive communities where people want to live and businesses want to invest.

3.4.3 The Broxbourne Economic Development Strategy[9] details some of the current and proposed future transport assets that will be central to the areas economic success, including the excellent road and rail connections, the role of the A10, prospect of Crossrail 2 on the horizon, and international linkages further afield.

3.4.4 Of the strategic priorities the Strategy contains, those relating to "Creating certainty for investment", "nurturing employment and enterprise" and "generating quality places" all directly correlate to the development of a modern, integrated and inclusive transport network which this Strategy will deliver.

Hertfordshire Strategic Economic Plan

3.4.5 The Strategic Economic Plan for the Hertfordshire Local Enterprise Partnership (LEP) seeks to provide a "blueprint for economic growth", within a 2030 horizon, and sets out four overarching priorities relating to:

- Global excellence in science and technology
- Harnessing our relationships with London (and elsewhere).
- Re-invigorating our places
- Foundations for growth

3.4.6 The Plan also highlights a series of transport priorities for the LEP area, including the improvement of access to Broxbourne Station and the need to build upon the strengths of the radial corridors formed by the M1 / West Coast Mainline, the A1(M) / East Coast Mainline / King's Cross to Cambridge railway line, and the M11 / A10 / London Liverpool Street to Cambridge railway line.

[9] www.broxbourne.gov.uk/council/corporate-priorities

3.4.7 This Strategy provides a framework for investment in the local transport network that will contribute towards the achievement of the aims and objectives of both the local Economic Development Strategy and the countywide Strategic Economic Plan.

3.5 Wider Impacts

3.5.1 The Strategy will contribute towards a number of wider priorities and issues within the Borough, whilst facilitating growth, all of which, if addressed, will further ensure the success of the Local Plan and the ability of the authority to deliver sustainable growth, particularly:

- **Reducing Social Exclusion:** Transport has an important role to play in connecting people to jobs, education, healthcare and other service provision to allow them to play an active role in society. Poor connectivity to such provision and a lack of travel choice can therefore contribute towards social exclusion and impacts on individuals' quality of life.

- **Place Making:** Appropriate investment in transport can contribute towards the creation of liveable places, by reducing the dominance of traffic and giving priority to pedestrians. As such it can enable more social interactions and natural surveillance helping to create a more welcoming and attractive urban environment.

- **Health and Well-Being:** Through encouraging more active lifestyles, reducing road safety concerns and threats to personal security, as well as addressing air quality issues and associated respiratory illnesses, transport can benefit the health and well-being of a local population on a number of levels and meet the priorities of the Broxbourne Health and Well-Being Strategy[10].

- **Improving Air Quality & Climate Change:** Emissions from vehicles contribute towards environmental concerns. Poor air quality predominantly associated with diesel engines has implications for health, including cancer and respiratory illnesses, whilst emissions from petrol engines have implications for climate change. Initiating a move away from car dependent travel therefore may help to tackle these concerns (see **Section 4.4**).

  In May 2017, the DfT together with the Department for Environment, Food and Rural Affairs (DEFRA) launched a consultation into improving air quality and tackling harmful emissions in a draft Air Quality Plan specifically targeted at nitrogen dioxide emissions relating to transport[11]. It detailed the impacts of air quality on public health, the environment and the economy and a desire to reduce the concentrations of NO_2 around roads.

- **Quality of Life:** The direct impacts of transport provision and the cumulative implications on other areas of day to day needs, all influence the quality of life of individuals. It highlights the importance of appropriately targeting investment and making effective and efficient use of the resources at the disposal of the Authority.

3.5.2 The ability of transport to contribute towards these different areas is drawn out in more detail in **Chapter 4**.

[10] https://www.broxbourne.gov.uk/sites/default/files/Documents/Community_Planning/1404135HealthDoc_WEB.pdf
[11] https://consult.defra.gov.uk/airquality/air-quality-plan-for-tackling-nitrogen-dioxide/

4.0 Transport Issues

4.1 Overview

4.1.1 There are a series of current and future transport issues that are required to be addressed to enable the delivery of the Local Plan. These have been identified through previous studies[12] which have assessed the operation of the network and which have been established in the wider policy context. The current and future transport issues the Borough is and will be subject to can be categorised into the three broad themes of capacity, connectivity, and communities.

4.2 Capacity

4.2.1 Providing the capacity on both the road and public transport networks to accommodate current and future demands to travel, as a consequence of growth and an overall increase in the level of car ownership and use, is a critical factor to the success of the Local Plan.

4.2.2 Insufficient capacity on the transport network leads to congestion and delays on the road network and overcrowding on public transport that in turn reduces the competitiveness and attractiveness of the Borough and its ability to secure and encourage economic growth.

4.2.3 A lack of capacity and the resultant congestion and delays it causes can also contribute towards air quality concerns, poor health, and an inability (or perceived inability) to access jobs and services, all issues compounded by an increasing reliance on the car where overcrowding on public transport is prevalent. **Figure 4.1** depicts some of the consequences of a lack of capacity on the transport network.

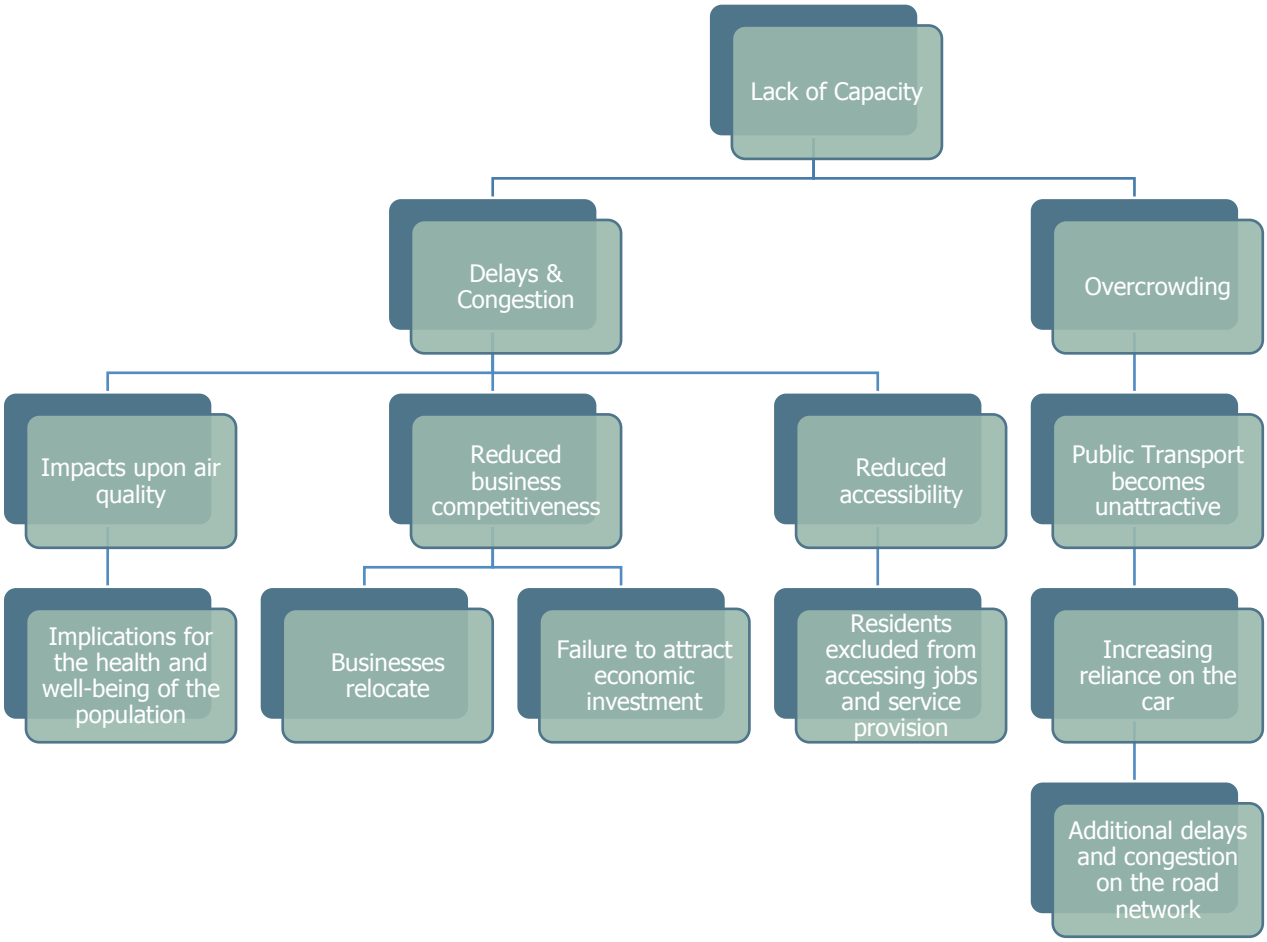
Traffic Growth

4.2.4 There are a number of factors which are driving traffic growth and general demand to travel within Broxbourne, Hertfordshire and across the country as a whole and putting pressure on the existing capacity on the road network. These include:

- **Population growth:** The resident population of Broxbourne will grow from around 96,500 in 2012 to 109,100 by 2033[13].
- **Economic growth:** The number of jobs within Broxbourne will increase by in excess of 6,500, from 35,000 in 2012 to around 42,000 in 2033
- **Car ownership:** With 82% of Broxbourne households having access to a car, ownership is much higher than the national average[14], a figure which is expected to increase with increased prosperity.
- **Modal split:** Reliance on the car for commuting trips with 60% of residents driving to work compared to 54% nationally[15].
- **Lack of self-containment:** More Broxbourne residents work in London than the Borough itself, with only 23% of residents who commute to work (i.e. those who don't work from home), actually working within Broxbourne itself.

[12] Previous studies which have helped to inform this strategy are listed in Appendix A.
[13] Based on 2014 Sub-National Population Projections by the ONS
[14] Hertfordshire Countywide Travel Survey, 2015
[15] Census 2011 Travel to Work Data

Figure 4.1: Implications of a Lack of Transport Capacity

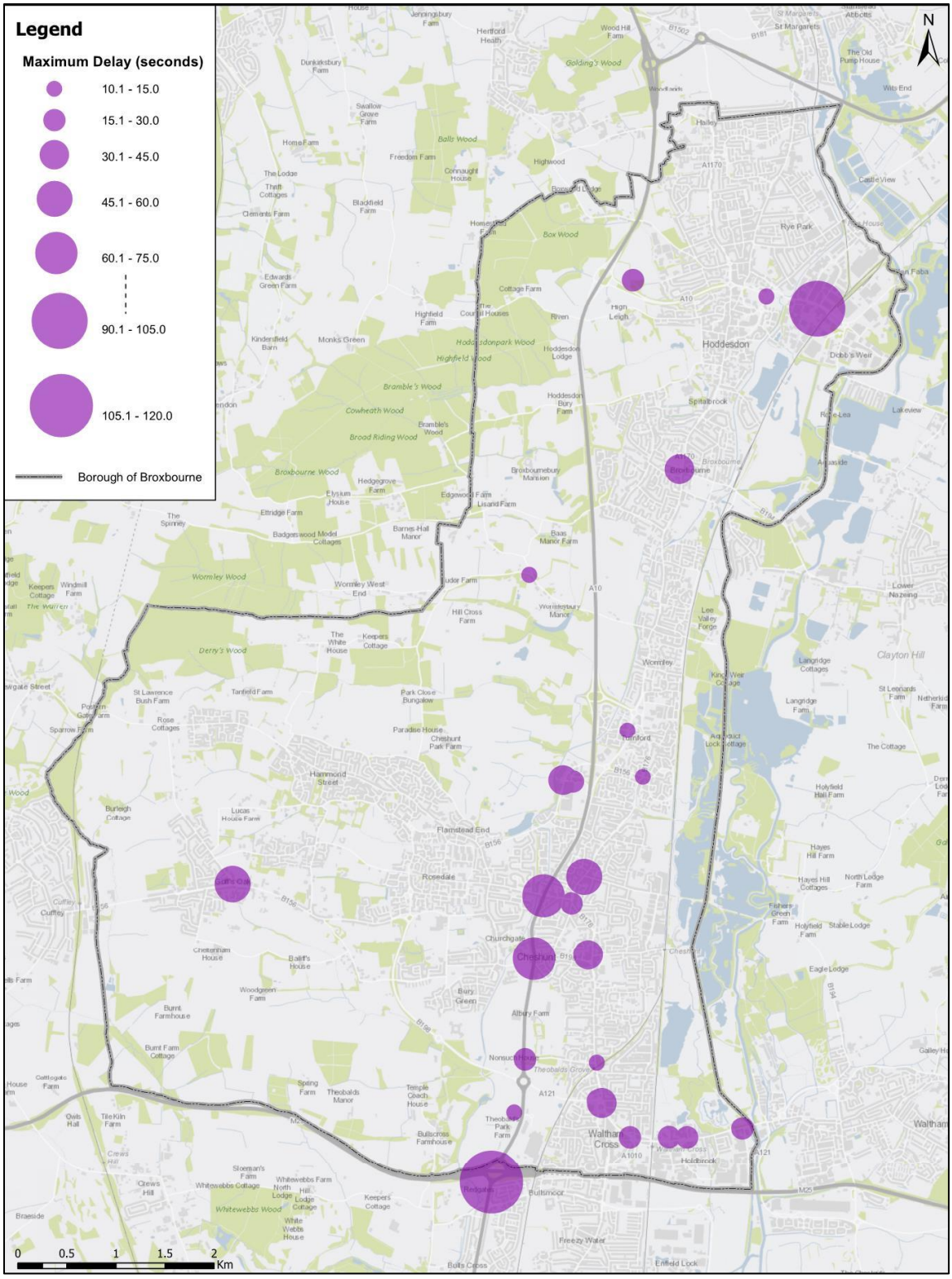


4.2.5 The cumulative impact of these changes will see the overall number of cars on the network in Broxbourne increase by around 11/12% by 2033, even without the growth proposed within the Local Plan being taken into consideration. **Table 4.1** highlights the projected increase in traffic on the network with and without the growth allocated within the Local Plan in the period up until 2033.

Network Specific Issues

4.2.6 There are a number of locations within Broxbourne where the capacity of the road network is resulting in delays and congestion, and which will come under further stress in future years as a consequence of the factors set out previously. **Figure 4.2** highlights the location of these across the authority. In general, these locations occur at junctions on the network as opposed to there being an issue with the link capacity, i.e. the number of lanes on any given route.

Figure 4.2: Location of Existing Capacity Constraints on the Road Network



Source: Contains OS data © Crown copyright and database right (2017)

Table 4.1: Traffic Growth Projections up to 2033

Time Period	Vehicle Type	Without Local Plan	With Local Plan	Difference due to Local Plan
		2033	2033	2033
AM Peak Hour	Car	11%	25%	14%
	LGV	35%	43%	8%
	HGV	17%	18%	1%
PM Peak Hour	Car	12%	24%	12%
	LGV	35%	42%	7%
	HGV	16%	17%	1%

Source: Broxbourne SATURN Model

A10 (North-South Corridor)

4.2.7 The A10, whilst not part of the Strategic Road Network (SRN)[16] forms an important strategic link between London to the south and Hertford and Cambridge to the north. It comprises a two-lane dual carriageway which runs north-south through the centre of the Borough.

4.2.8 It carries around 44,000 vehicles per day, a figure which has remained relatively consistent since 2000 when flows of around 46,000 vehicles per day were recorded[17].

4.2.9 Congestion and subsequent delays occur at various points along the A10. These delays are associated with the at-grade junctions with east-west routes, towards the southern end of the A10. As the road heads further north towards Turnford and Hoddesdon, the grade-separated junctions provide sufficient capacity to ensure that delays are not a concern.

4.2.10 **Figure 4.2** highlights the locations of congestion and delay on various points of the A10 and the rest of the network, whilst **Figure 4.3** illustrates the problems which arise as a result of delays in the morning peak period.

4.2.11 The role of the A10 is such that it is sensitive to changes on the wider network. As a potential alternative to the A1(M) and M11, flows can fluctuate if there are accidents or delays and general traffic seeks quicker routes. Consequently any improvements to the A10 could inadvertently induce more strategic trips and as such a balance needs to be struck between improving the operation of the corridor for local traffic whilst not stimulating latent demand.

Other Routes

4.2.12 A lack of capacity on the highway network to meet demand is also prevalent on a number of the more localised corridors. Evidence from the 2014 base year of the Broxbourne SATURN Highways Model highlights several areas of concern as a result of current levels of traffic, including on the A121 / B198, the old A10 and Halfhide Lane amongst others. The locations of the most congested parts of the network are indicated in **Figure 4.2**.

[16] The Strategic Road Network (SRN) comprises all motorways and trunk roads in England and is the responsibility of Highways England.
[17] https://www.dft.gov.uk/traffic-counts/cp.php?la=Hertfordshire#78365 – based upon flows recorded on the A10 immediately to the north of College Road.

Figure 4.3: Congestion on the A10 at Park Plaza

(Looking south in AM peak)

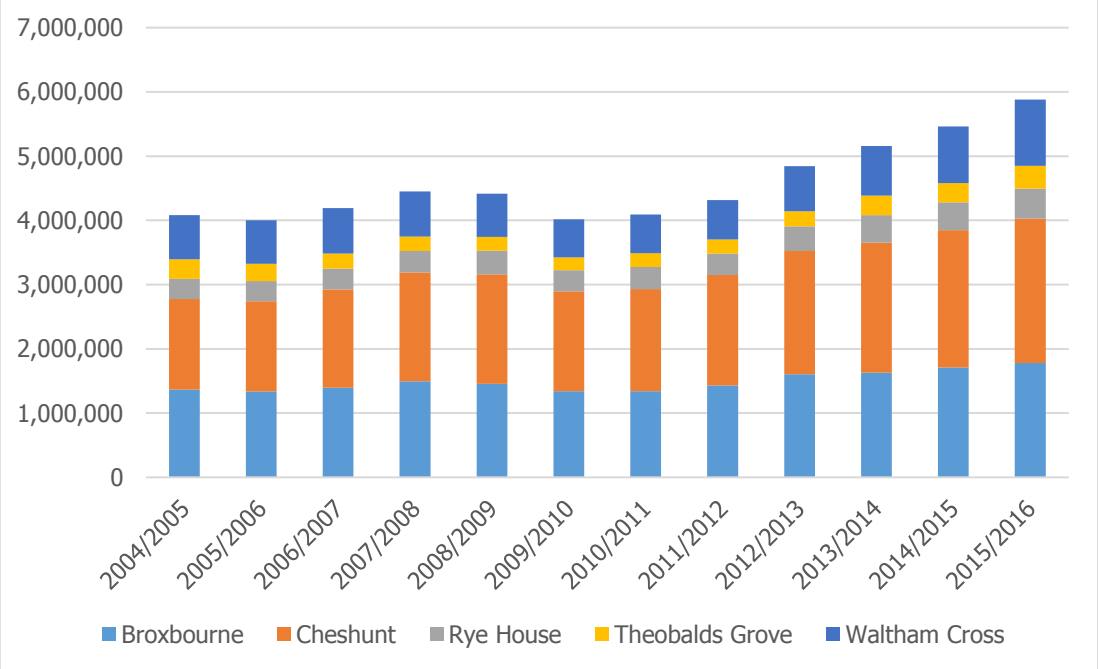
(Looking north in AM peak)

Public Transport Capacity – Trains

4.2.13 Capacity concerns on the transport network in Broxbourne are not limited to the road network. The West Anglia Mainline provides a direct connection into Central London and as such is an extremely popular travel choice for commuters, utilising the stations at Broxbourne, Cheshunt and Waltham Cross in particular, whilst Transport for London (TfL) operate services into the capital from Cheshunt, via Theobalds Grove on the Southbury Loop line as part of the London Overground network.

4.2.14 Overcrowding on these services is a problem during peak periods with capacity constrained due to having only two tracks on the West Anglia Mainline route into London. Patronage at each of the stations within Broxbourne is highlighted in **Table 4.2** and **Figure 4.4**.

Figure 4.4: Station Patronage in Broxbourne



4.2.15 The increasing demand to travel by train is being fuelled by the economic growth in London and the subsequent out commuting to the capital, together with many of the measures that have been introduced by Transport for London (TfL) to reduce reliance on the car and discourage car based commuting.

Public Transport Capacity – Buses

4.2.16 Overcrowding on bus services operating across Broxbourne however, is not at a significant level. Whilst some peak time services do experience high demand, particularly on the 310 service between Hertford and Waltham Cross[18], services generally operate relatively infrequently, reflecting the level of demand across the Borough.

4.2.17 Buses do however suffer from the general delays and congestion on the network. Due to the narrowness of the roads within the authority there is little scope for dedicated bus lanes to be provided and as such services can be delayed at junctions particularly in peak times.

[18] It is not possible to publish the actual data on bus patronage due to commercial sensitivities.

Table 4.2: Station Patronage in Broxbourne

Station	Operator	2004/2005	2005/2006	2006/2007	2007/2008	2008/2009	2009/2010	2010/2011
Broxbourne	Abellio Greater Anglia	1,367,328	1,334,843	1,394,165	1,495,519	1,452,982	1,340,338	1,340,234
Cheshunt	Abellio Greater Anglia Transport for London	1,408,988	1,408,338	1,533,387	1,692,201	1,704,992	1,555,370	1,590,082
Rye House	Abellio Greater Anglia	312,736	312,505	323,112	336,314	368,796	329,172	345,938
Theobalds Grove	Transport for London	302,689	268,974	232,952	222,252	213,558	198,844	214,296
Waltham Cross	Abellio Greater Anglia	691,640	679,556	705,356	704,582	673,310	591,194	601,540
Total		**4,083,381**	**4,004,216**	**4,188,972**	**4,450,868**	**4,413,638**	**4,014,918**	**4,092,090**

Station	Operator	2011/2012	2012/2013	2013/2014	2014/2015	2015/2016	% change 04/5 to 15/16	Actual Change
Broxbourne	Abellio Greater Anglia	1,431,442	1,605,960	1,630,470	1,707,972	1,780,328	**30%**	413,000
Cheshunt	Abellio Greater Anglia Transport for London	1,716,944	1,915,362	2,021,678	2,140,962	2,247,262	**59%**	838,274
Rye House	Abellio Greater Anglia	337,576	384,006	427,966	432,202	468,178	**50%**	155,442
Theobalds Grove	Transport for London	217,304	234,874	305,774	297,524	351,986	**16%**	49,297
Waltham Cross	Abellio Greater Anglia	614,356	703,802	770,040	881,504	1,030,652	**49%**	339,012
Total		**4,317,622**	**4,844,004**	**5,155,928**	**5,460,164**	**5,878,406**	**44%**	**1,795,025**

Source: http://orr.gov.uck/statistics/published-stats/station-usage-estimates

Car Parking

4.2.18 The capacity of car parks to accommodate demand varies across the Authority. The largest car parks within Broxbourne and the operators are detailed within **Table 4.3**.

Table 4.3: Main Public Car Parks within Broxbourne

Car Park	Capacity	Operator	Cost (2 hours)
Broxbourne Station	441	NCP	£7.30
Pavilion Shopping Centre, Waltham Cross	290	PSC	£1.50
Brookfield Centre	260	Tesco	Free (£3 per day)
Broxbourne Lido	246	BBC	£1.30
Windmill Lane, Cheshunt	236	BBC	£1.30
Cheshunt Station	177	NCP	£7.00
High Street, Waltham Cross	176	BBC	£1.30
Eleanor Cross Road, Waltham Cross	99	BBC	£1.30
Waltham Cross Playing Fields	96	BBC	£1.30
Newnham Parade, Cheshunt	90	BBC	£1.30
Wycliffe Close, Cheshunt	58	BBC	£1.30
Waltham Cross Station	51	NCP	£2.70
Valley View, Goffs Oak	48	BBC	£1.30
Burford Street, Hoddesdon	48	BBB	£1.30
Community Hospital, Cheshunt	45	BBC	£1.30
Taverners Way North, Hoddesdon	44	BBC	£1.30
Taverners Way South, Hoddesdon	39	BBC	£1.30

Key to operators: BBC = Broxbourne Borough Council; NCP = National Car Parks; PSC = Pavilion Shopping Centre

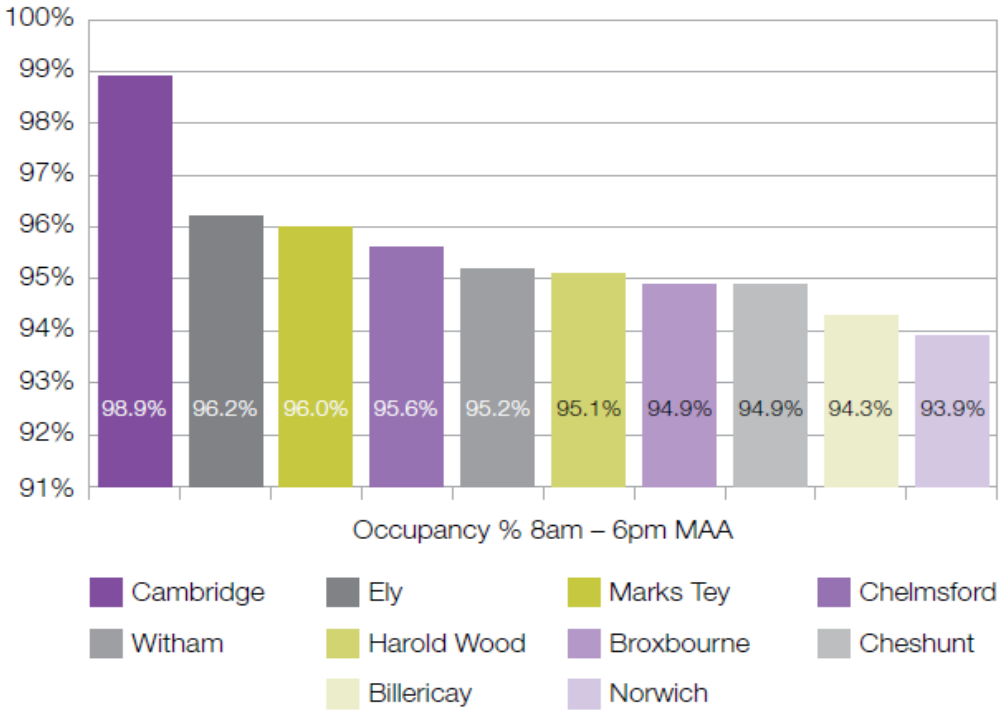
Source: Parkopedia (prices correct as of Spring 2017)

4.2.19 There are several sizeable car parks within the Borough serving the main stations, retail and leisure provision. Ownership of the largest car parks within Broxbourne is varied, and the Borough Council does not control those which may be deemed to cater for peak time travel – at the stations and the main shopping centres.

4.2.20 This lack of control of car parking at key trip generators limits the ability of the authority to utilise parking charges as a demand management tool or as a revenue stream to support other related services, such as the enforcement of inappropriate parking. This is typified by the availability of large quantities of free, surface level parking at the Brookfield Retail Park.

4.2.21 With regard to car parking at stations, both Cheshunt and Broxbourne Station car parks are within the top 10 for car park occupancy of those managed by the Greater Anglia franchise (see **Figure 4.5**), highlighting the pressures on parking capacity in both locations[19].

Figure 4.5: Station Car Park Occupancy



4.2.22 This demonstrates the pressing need to understand the nature of trips to the stations within Broxbourne, particularly commuting trips, and the proposed roll out of Station Travel Plans that Greater Anglia have earmarked will assist in this regard.

4.2.23 With 19% of commuting trips undertaken by Broxbourne residents by rail, it is estimated that a further 1,800 rail based trips per day will have to be accommodated as a result of the growth earmarked within the Borough[20].

[19] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/406010/dft-east-anglia-prospectus.pdf

[20] The estimated increase in commuting trips by rail is based upon 7,000 houses being provided within the Local Plan. With an average occupancy of 2.5 people it equates to an increase in population of 17,500. The Census 2011 indicated that 53% of the local population are in employment, and 19% of these commute by train. Applying these figures to the housing growth would generate the additional 1,800 rail based commuting trips.

4.3 Connectivity

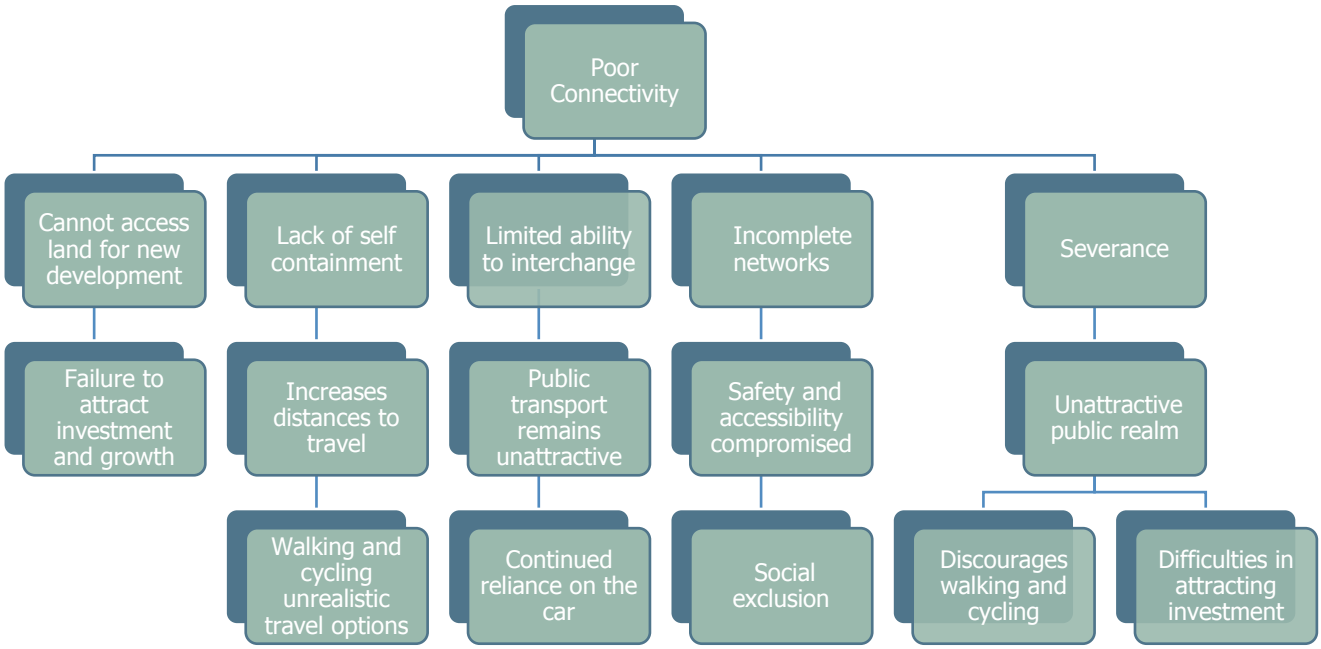
4.3.1 Connecting communities to town centres, jobs, healthcare, education and leisure facilities is central to creating successful and sustainable places. New links also open up land for new development opportunities which wouldn't otherwise have been available.

4.3.2 Connectivity helps to give businesses a competitive edge by increasing their potential pool of labour and reducing the cost of their logistics, whilst also enabling local residents to take advantages of the benefits of new investment in an area by ensuring access to new employment opportunities and service provision provided as part of new developments.

4.3.3 The ability to utilise core services is also a key determinant of social inclusion/exclusion and for those without access to a car it is particularly pertinent that public transport, walking and cycling links are available and provide safe, direct and frequent travel options.

4.3.4 There are a number of implications associated with poor connectivity in Broxbourne and factors which hinder the ability of local residents and visitors alike to readily access what the Borough has to offer. In particular, this relates to lack of self-containment, severance, incomplete networks, ability to interchange, and scope for new development, as illustrated in **Figure 4.6**.

Figure 4.6: Importance of Connectivity



Opening Up Development Opportunities

4.3.5 Several sites are allocated within the Local Plan upon which the growth aspirations of Broxbourne will be realised which require investment in new transport links to open them up for development. These include:

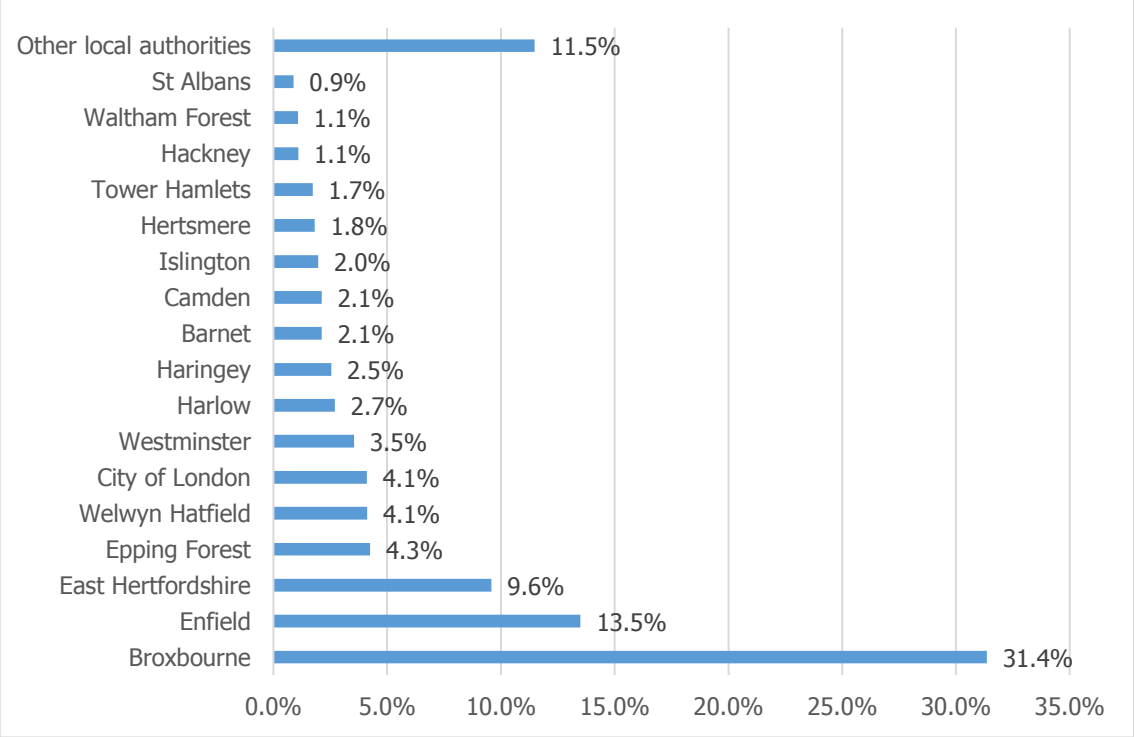
- Brookfield Riverside
- Park Plaza
- Cheshunt Lakeside
- Rosedale Park
- Church Lane, Wormley

4.3.6 A combination of highway and sustainable transport measures will ensure that they can come forward and accommodate new development. More details on these sites is contained in **Chapter 4** – Location & Context.

Lack of Self-Containment

4.3.7 Broxbourne is a relatively small authority and as such many residents have to travel further afield for employment, comparison retail provision and healthcare. The Borough is a net exporter of labour with 69% of local residents working outside Broxbourne and 52% outside of Hertfordshire. **Figure 4.7** highlights the places of employment of Broxbourne residents[21].

Figure 4.7: Place of Employment for Broxbourne Residents



[21] Hertfordshire Countywide Travel Survey, 2015

4.3.8 In terms of healthcare, the nearest hospitals with an accident and emergency facility are in Barnet, at Lister Hospital in Stevenage and the Princess Alexandra Hospital in Harlow, whilst many residents travel to inner and outer London for retail and leisure purposes.

4.3.9 This lack of self-containment and the physical distances between the resident population and some of these everyday needs means that greater pressure is placed on the transport network as more and longer trips are required to be made.

4.3.10 Where public transport provision is not available, it means those without a car have difficulty in accessing the wider jobs market, specialist and emergency healthcare provision or the more extensive retail and leisure offer outside of the Broxbourne boundaries.

Ability to Interchange

4.3.11 The ease of interchange between different modes of travel and between different services has a direct impact upon the ability of people to access jobs and services without access to a car, and the ability and attractiveness of public transport to form a realistic alternative to car based travel.

Stations

4.3.12 The train stations within Broxbourne are under-performing in their roles as strategic transport hubs. Whilst patronage at Broxbourne, Cheshunt and Waltham Cross has increased significantly over the last ten years, it is clear that there is significant reliance on the car for accessing each location.

4.3.13 There are no Station Travel Plans in place through which to ascertain the specific modal split of trips to the stations, but it is evident on the ground that conditions at each are not conducive to encouraging sustainable access and interchange.

4.3.14 Of the three main stations served by the West Anglia Mainline (Broxbourne, Cheshunt and Waltham Cross), only Broxbourne Station is directly accessed via bus. There is no provision at all at Cheshunt Station whilst in Waltham Cross the bus station is located 350m from the train station with the A1010 forming a significant barrier to pedestrian movement in between, as evident in **Figure 4.8**.

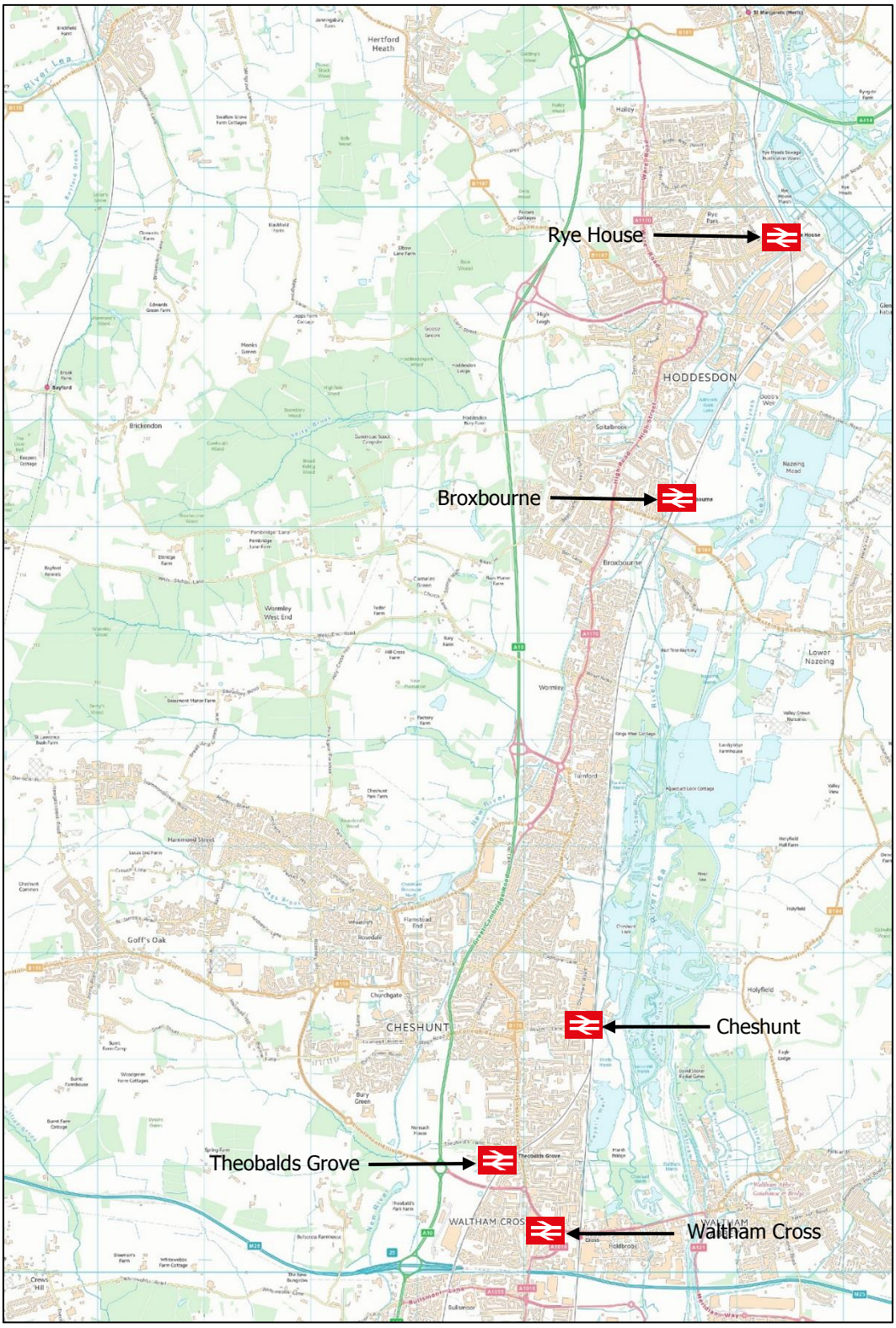
4.3.15 The lack of seamless interchange reduces the attractiveness of public transport as an alternative to the car and increases the journey times of those reliant on such provision with resultant impacts on the economic prosperity of the Borough as a consequence.

4.3.16 **Figure 4.9** highlights the location of each Station whilst **Table 4.4** draws out the issues associated with the three main stations within the Borough.

Figure 4.8: Location of Waltham Cross Bus and Train Stations

Source: Google Maps

Figure 4.9: Location of Stations in Broxbourne



Source: Contains OS data © Crown copyright and database right (2017)

Table 4.4: Integration Issues at the busiest Stations in Broxbourne

Station	Broxbourne	Cheshunt	Waltham Cross
Location	Broxbourne Station is located off the B194 (Station Road) around 500m to the east of Broxbourne town centre. Station Road connects with the High Road which provides north-south access through the heart of the authority.	The station is located at the end of Windmill Lane which provides a link to Turners Hill and Cheshunt town centre around 750m to the west. Immediately to the east of the Station is the River Lee Country Park with no access to the station.	Waltham Cross station is located in the south of Broxbourne, immediately to the north of the M25 and around 350-400m to the east of Waltham Cross town centre. It is accessed via Trust Road, off the A121 Eleanor Cross Road.
General Traffic	The station has a large forecourt area with premium parking and additional multi-storey parking to the rear of the station building. Vehicular access at Station Road is via a tight T-junction, whilst the width of the road bridge over the railway line towards Lower Nazeing provides a further constraint.	All vehicular access into the Station is from the west via Windmill Lane, with a large surface level car park provided. On street parking on the approaches to the station is prevalent.	A small car park is provided by the Borough Council to the west of the station. The road is generally quiet and a drop-off/pick-up point is provided on the approach to the Station. A small car park is provided with further, extensive parking provision available in Waltham Cross town centre.
Buses	The station is served by the 341, 641 and C392 services which provide 2 buses per hour between them. The 341/641 services are operated by UNO whilst the C392 is provided by Epping Forest Community Transport which access the station forecourt to provide a convenient drop off point outside the front of the station. A bus shelter is in place with paper based timetable information.	No buses serve the Station and the lack of space to manoeuvre a bus means that there is little scope to introduce direct services in the future. A bus shelter is in place within the station forecourt from when services did operate. The closest services are on the High Street some 750m from the Station itself.	No buses currently serve the Station. Whilst a bus shelter is located around 50 metres to the west of the station, the closest stops served by buses are those within the Waltham Cross bus station some 350m to the west of the station, on the opposite side of the A1010 Monarch's Way.
Pedestrians & Cyclists	There are no dedicated cycle routes on Station Road and whilst there are footpaths in place up to the station from the west, there is no	There are no dedicated cycle routes on Windmill Lane although the station can be accessed via a north-south cycle path	A shared use cycle/footway provides access to the station from Waltham Cross town centre via a subway under the A121

Station	Broxbourne	Cheshunt	Waltham Cross
	provision for pedestrians on the bridge over New River on Station Road, or dedicated crossing facility close to the entry to the Station off Station Road. An off-road shared use footway and cycleway along New River could provide a high quality, safe and direct link to the north and south of the Borough.	running parallel to the train line to the east. Cycle parking is available but demand outstrips supply with bikes locked to various objects on the station forecourt. Whilst there are footpaths in place along Windmill Lane there are no formalised crossing points or dropped kerbs at the junctions with the side roads, to ease access for those with limited mobility.	Monarch's Way. Some cycle parking is available at the station, albeit limited in number. A surface level signalised crossing is provided over Monarch's Way as an alternative access to the subway for pedestrians. Steps provide access up to Eleanor Cross Road for pedestrians coming from the east. It is a more convoluted route for those with limited mobility.
Other Comments	Demand to use the station will increase with the proposed arrival of Crossrail 2 in 2033. A manned taxi booth in the station forecourt is evident of an accessibility need not being met by sustainable modes of travel.	The site is severely constrained due to its location with little scope to accommodate direct bus service access, and on a road which terminates just beyond the station meaning through services are unfeasible.	The station has the greatest potential to increase the level of interchange between modes and utilise the access road and land potentially available.

Ticketing

4.3.17 The cost of tickets, lack of integrated ticketing (specifically within Broxbourne), uncoordinated services (both in terms of bus and rail provision) and lack of timetabling information, all provide further barriers to seamless interchange between modes and services within the Borough.

4.3.18 Elsewhere within Hertfordshire however, BUSnet tickets in Hemel Hempstead, St Albans, and Watford, provide multi-operator all day travel within a given area, whilst the Intalink mobile ticketing app reduces provides an electronic ticket for use on buses across the County.

Bus Stops

4.3.19 Generally, across Broxbourne, bus stops are poorly equipped. They lack raised kerbs to ease access onto buses for those with limited mobility, often do not provide a shelter or seating, are poorly lit and lack clear and accessible timetable information. this inhibits bus use and the interchange between walking and bus based travel. **Figure 4.10** highlights examples of the bus stops in place within Broxbourne.

Figure 4.10: Bus Stop Provision in Broxbourne

Cycle Parking

4.3.20 There is evidence of insufficient or unsuitable cycle parking currently being provided at a number of large trip generators within Broxbourne, particular the bus and train stations and town centres, with bikes locked to guard railing and lamp posts in many instances, as evidence in **Figure 4.11**.

Figure 4.11: Lack of Dedicated Cycle Parking

Waltham Cross Bus Station

Broxbourne Train Station

Incomplete Networks

4.3.21 Sustainable transport connectivity within Broxbourne is undermined by the lack of network coverage particularly in some of the more outlying parts of the Borough, and absence of facilities for vulnerable road users on the busiest parts of the network where infrastructure is most required.

Cycling

4.3.22 Broxbourne, like many other areas, suffers from a lack of complete, convenient, coherent and convivial walking and cycling networks. Even along routes that are in place the level of supporting infrastructure for cyclists differs significantly and is sometimes non-existent in those locations where dedicated provision is needed the most, such as at junctions and heavily trafficked sections for example.

4.3.23 A lack of segregated infrastructure, junction treatments, training, together with a lack of signing the attractiveness of cycling as an alternative to the car for all but the most confident cyclists. This is reflected in the lack of residents cycling for all types of trips as depicted in **Table 4.5**.

Table 4.5: Cycling Mode Share of All Journeys[22]

Authority	% Mode Share	Authority	% Mode Share
Broxbourne	1.0%	**St Albans**	2.1%
Dacorum	1.1%	**Stevenage**	1.8%
East Hertfordshire	1.2%	**Three Rivers**	2.5%
Hertsmere	0.2%	**Watford**	2.3%
North Hertfordshire	1.8%	**Welwyn Hatfield**	2.1%
England	2.9%		

4.3.24 Compared to other authorities within Hertfordshire and the national average, cycle use in Broxbourne is lower than what could be expected.

Bus Services

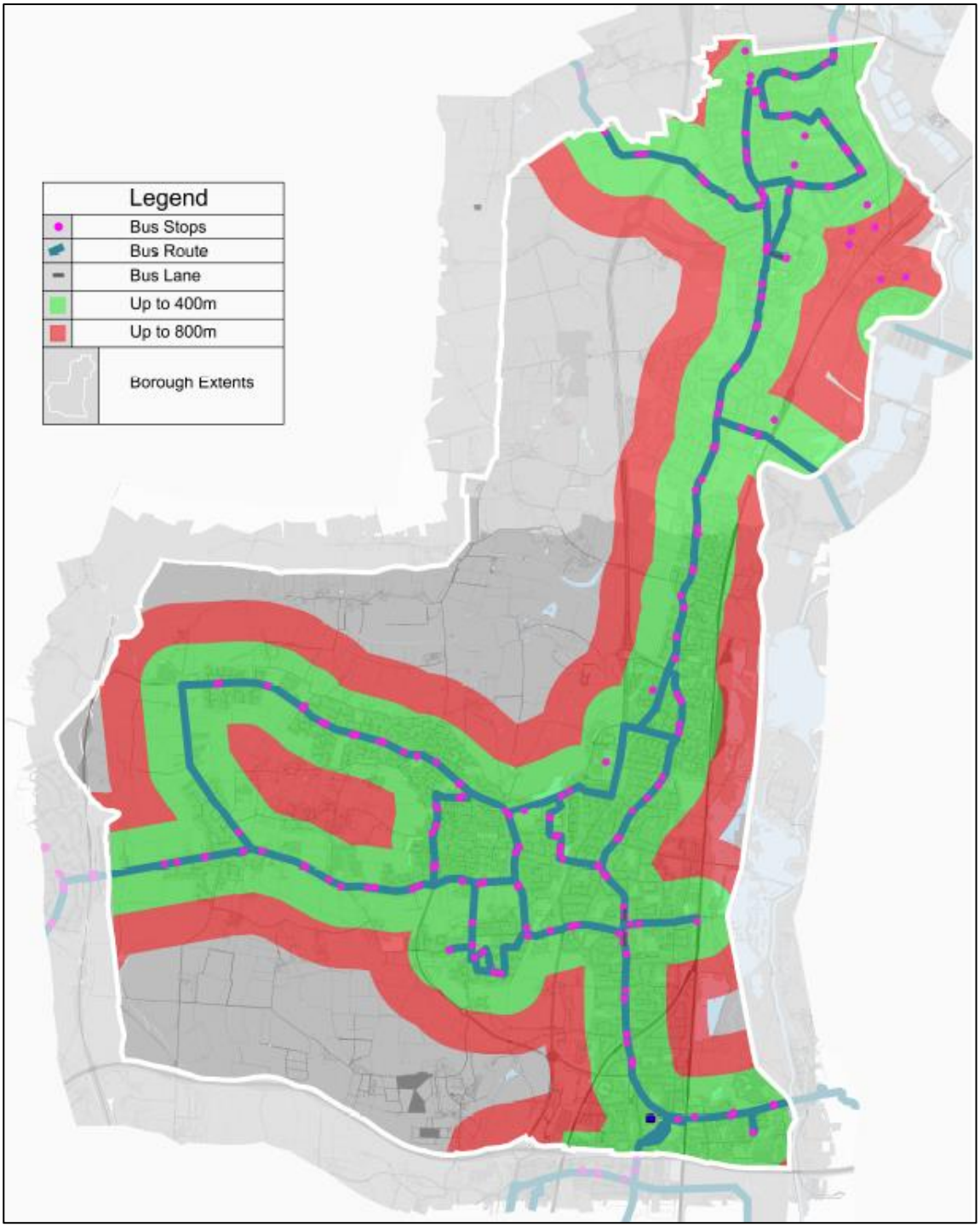
4.3.25 As a result of the reliance on the car, low density of development and rural nature of the west of Broxbourne there is not a commercial case to operate services, particularly frequent services to large parts of the borough.

4.3.26 **Figure 4.12** highlights the areas of Broxbourne within a 400m walk[23] of a service with regular frequency. Notwithstanding the concerns associated with the viability of provision, the vast majority of the population can be seen to be served by a regular bus service.

4.3.27 There are few subsidised routes which complement the commercial network but despite this bus use for journeys to work within the borough is around 5% compared to 3% across Hertfordshire as a whole[24].

[22] Hertfordshire Countywide Travel Survey 2015
[23] This is deemed to be an acceptable distance within which pedestrians could be expected to walk to a bus as detailed within: Providing for Journeys on Foot; Institute of Highways and Transportation, 2000
[24] Hertfordshire Countywide Travel Survey 2015

Figure 4.12: Area within 400m of a Regular Bus Service



Source: AECOM Transport Strategy Initial Issues and Opportunities Report

Severance

4.3.28 Severance is a very visible barrier that limits the connectivity of the Borough. The A10 and West Anglia Mainline in particular result in significant difficulties for east-west movements as a result of the physical barriers they form. The limited number of crossing points of the A10 also places pressure at these inter-sections with the resultant capacity issues and delays detailed within **Section 4.2**.

4.3.29 The severance effect of the A10 and other major roads within the Borough including the A121 in Waltham Cross and A1170 in Hoddesdon for example, is felt most acutely by pedestrians and cyclists. In these locations and elsewhere within Broxbourne, those travelling on foot or by bike are forced to deviate from their desire lines and use bridges or underpasses to cross the dual carriageways in place.

4.3.30 This discourages people from walking and cycling on a number of levels, including the increases in travel time from being able to cross "at-grade", the physical effort required for those with limited mobility to use the steps/ramps provided, and in some instances places, the increases personal security concerns due to the lack of natural surveillance and lighting in the underpasses provided, as illustrated in **Figure 4.13**.

4.3.31 There are subsequently sustainability connotations associated with the severance in the Borough and the ability to present walking and cycling as attractive alternatives to the car.

Figure 4.13: Severance to Pedestrian Movement in Waltham Cross

Unattractive underpass

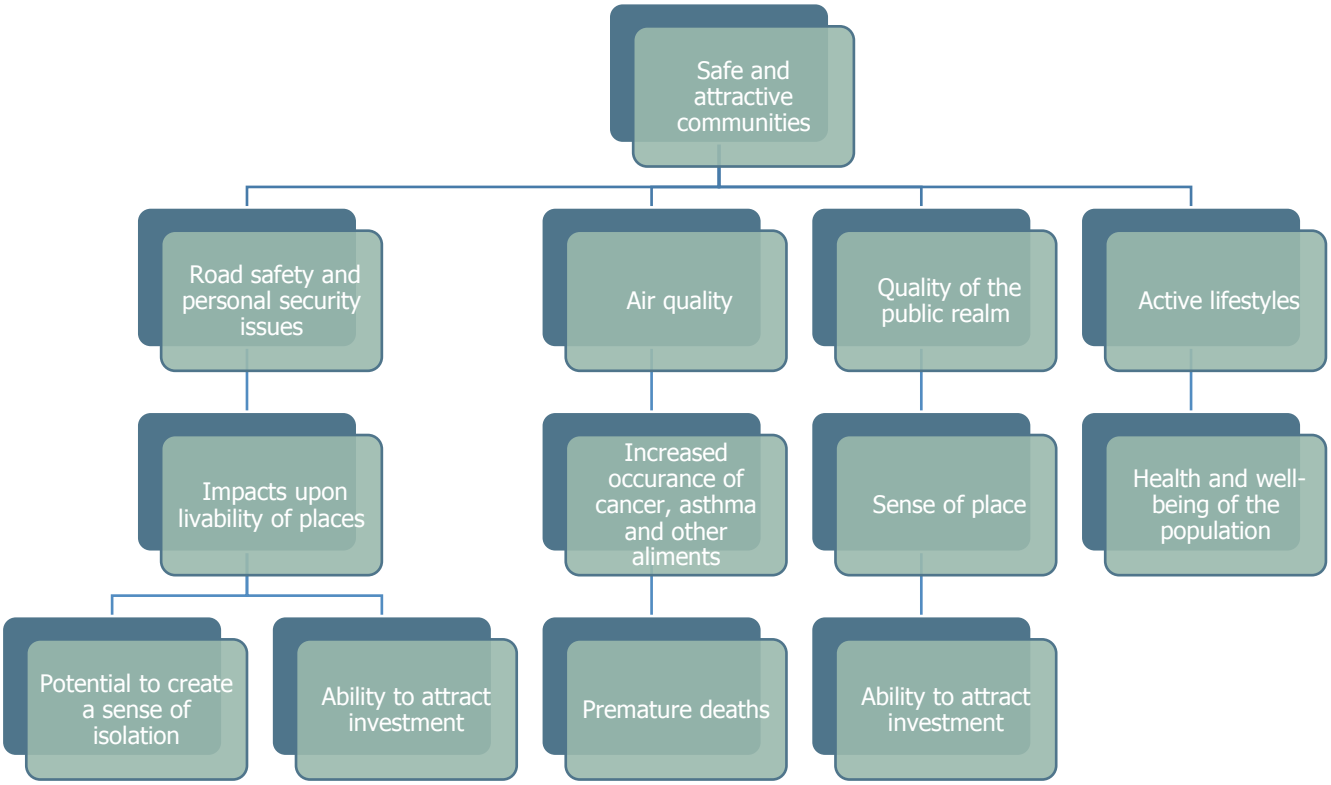
Guard railing and confusing signage

4.4 Communities

4.4.1 Creating safe and attractive communities where people want to live and businesses want to invest is at the heart of the Local Plan. Transport has a key role in achieving this through improving safety and security on the network, improving air quality through reducing emissions from transport, creating more civilised streets that are people focused and not dominated by traffic, and by enabling more active and healthy lifestyles by making walking and cycling viable options.

4.4.2 **Figure 4.14** illustrates the role of transport in creating safe and attractive communities.

Figure 4.14: Creating Safe and Attractive Communities



Safety and Security

4.4.3 Road safety and personal security concerns are both factors which influence the quality of life of local residents and the attractiveness of a locality when encouraging external investment. Road safety concerns can be addressed through the application of the 3e's – engineering, education and enforcement. There are several locations classed as "hazardous sites" by Hertfordshire County Council, and these include:

- Park Plaza Roundabout (junction of the A10 with the A121 and B198),
- A121 in Waltham Cross including at Fishpools Roundabout and at the junction with A1010,
- Great Cambridge Road, at the junction with College Road (Old Pond Roundabout) and close to Hertford Regional College at the junction with High Road, Turnford.

4.4.4 **Figure 4.15** and **Figure 4.16** highlight the locations of accidents on the transport network within the Borough and the severity of those incidents.

4.4.5 In terms of personal security, a lack of activity on the street and the natural surveillance it provides can result in people choosing not to walk or cycle or even access certain locations at given times of the day. Ditto with the reliance on subways in Waltham Cross and Hoddesdon. Such concerns can also exist on public transport particularly at night. These issues in turn can create a sense of isolation and exclusion and undermine a drive to encourage more sustainable travel.

Figure 4.15: Location and Severity of Accidents in Broxbourne, (Five years 2011-2016)

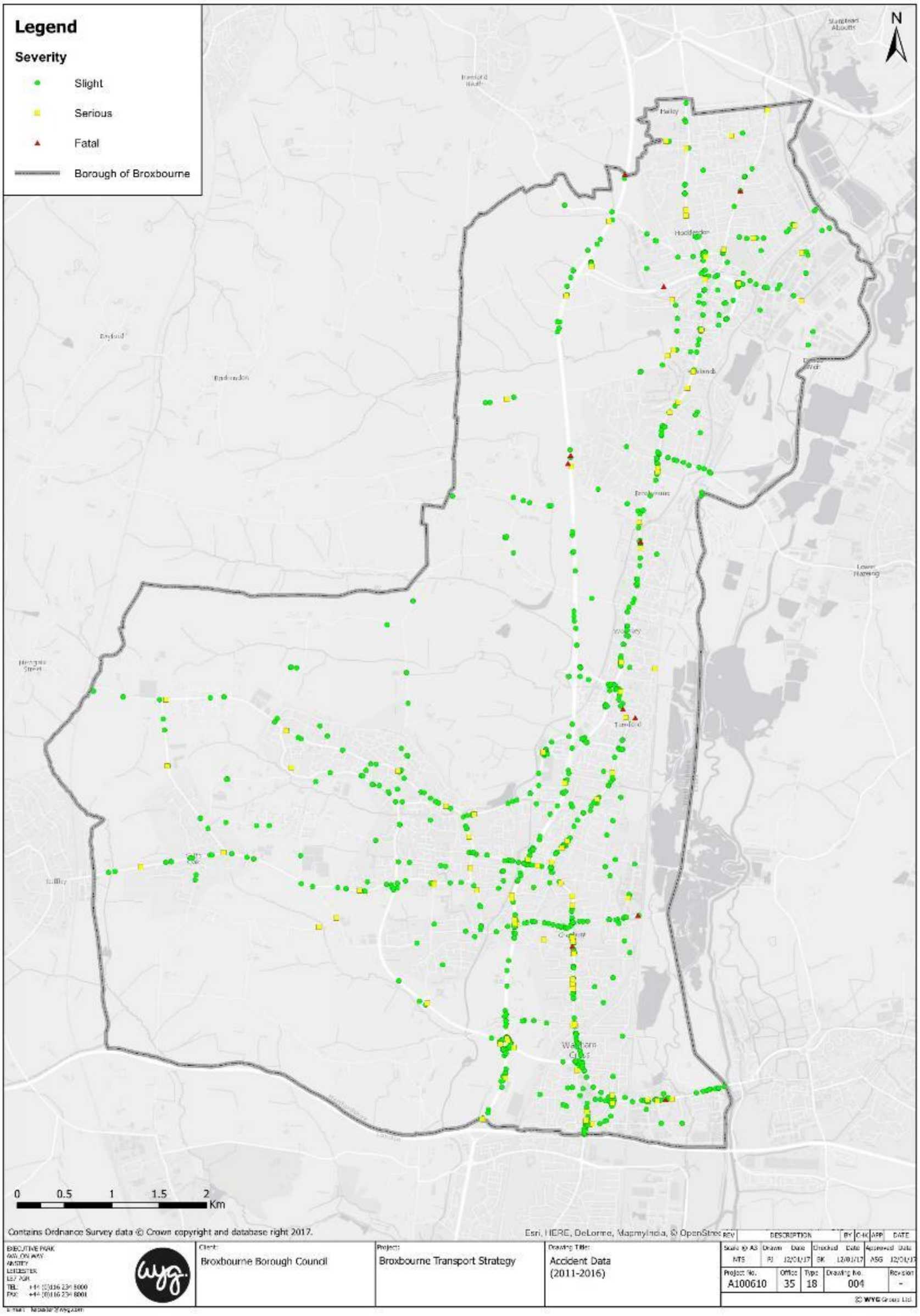
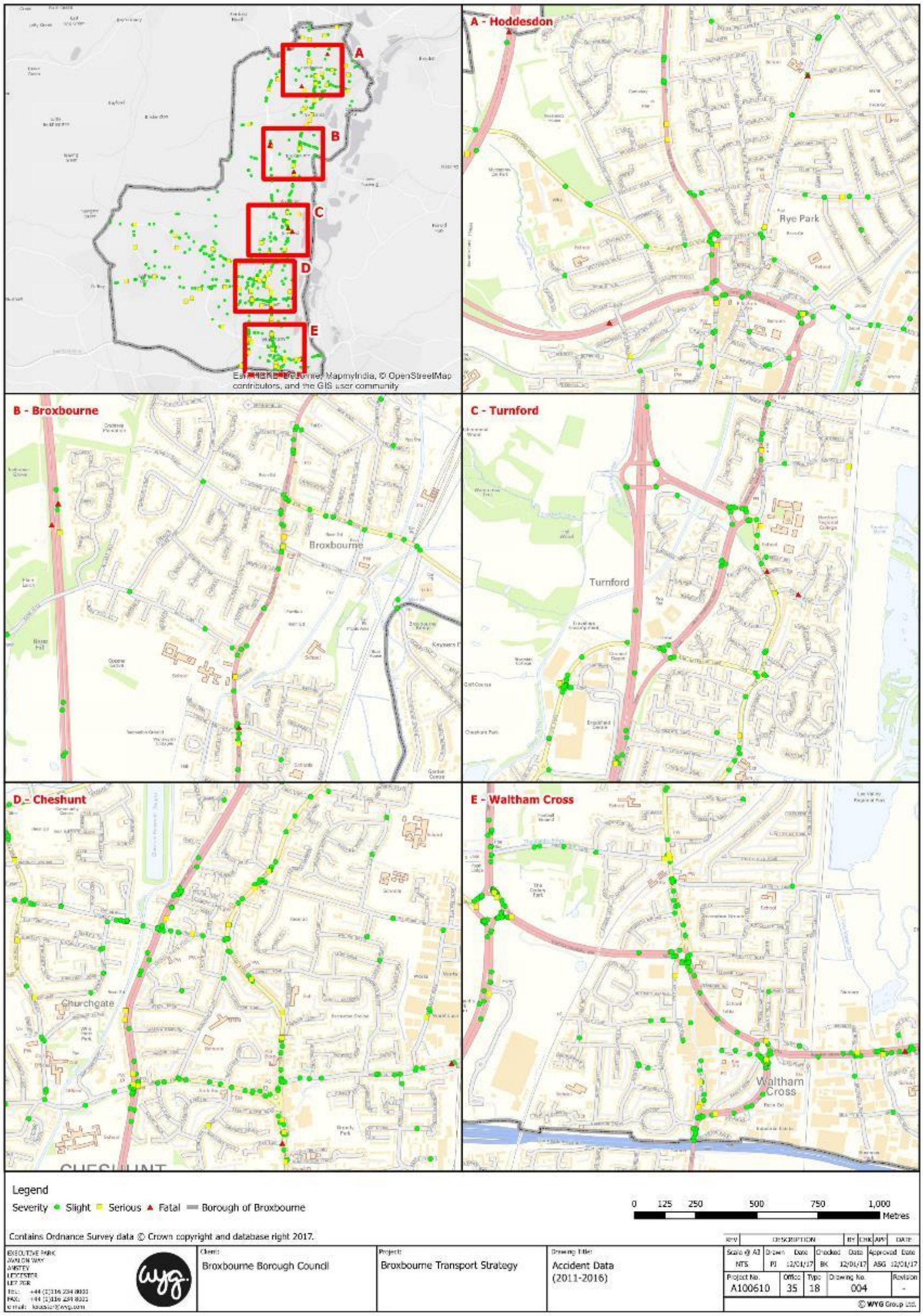


Figure 4.16: Accidents by Town



Air Quality

4.4.6 There are seven locations within Broxbourne designated as Air Quality Management Areas (AQMAs). The locations of these are set out in **Figure 4.17**. Emissions from vehicles, particularly diesel engines are a large source of Nitrogen Oxide (NO^2) and all of these AQMAs have been designated as a result of these emissions.

4.4.7 Poor air quality as a result of emissions from traffic are thought to be the cause of 40,000 premature deaths per year across the country[25], whilst conditions such as asthma are exacerbated by poor air quality[26].

4.4.8 The volume and routing of traffic together with increases in emissions as a result of standing traffic caused by delays and congestion are the main contributors to the poor air quality within the Borough and reducing, removing and regulating this will be the basis upon which these concerns can be addressed.

Liveable Streets

4.4.9 Creating civilised, liveable streets and spaces that are pedestrian friendly and not dominated by traffic are critical to achieving safe and sustainable communities. Reducing the dominance of traffic through the routing of vehicles, removing conflicts with vulnerable road users, and designing down the speed all contribute towards a sense of place and belonging.

4.4.10 Complementary investment in the public realm in term of the provision of high quality paving, dropped kerbs, seating, lighting and signage all add to the attractiveness of a place that encourages shoppers and visitors in spend time in a location and businesses to invest.

4.4.11 Within Broxbourne it is evident that the quality of the pedestrian environment varies significantly by location. In Hoddesdon town centre for example, there are wide footways, access restrictions for general traffic, street furniture and high quality paving. By comparison, in parts of the Borough including the High Street, Waltham Cross, the car dominates and pedestrians are marginalised, as illustrated in **Figure 4.18**.

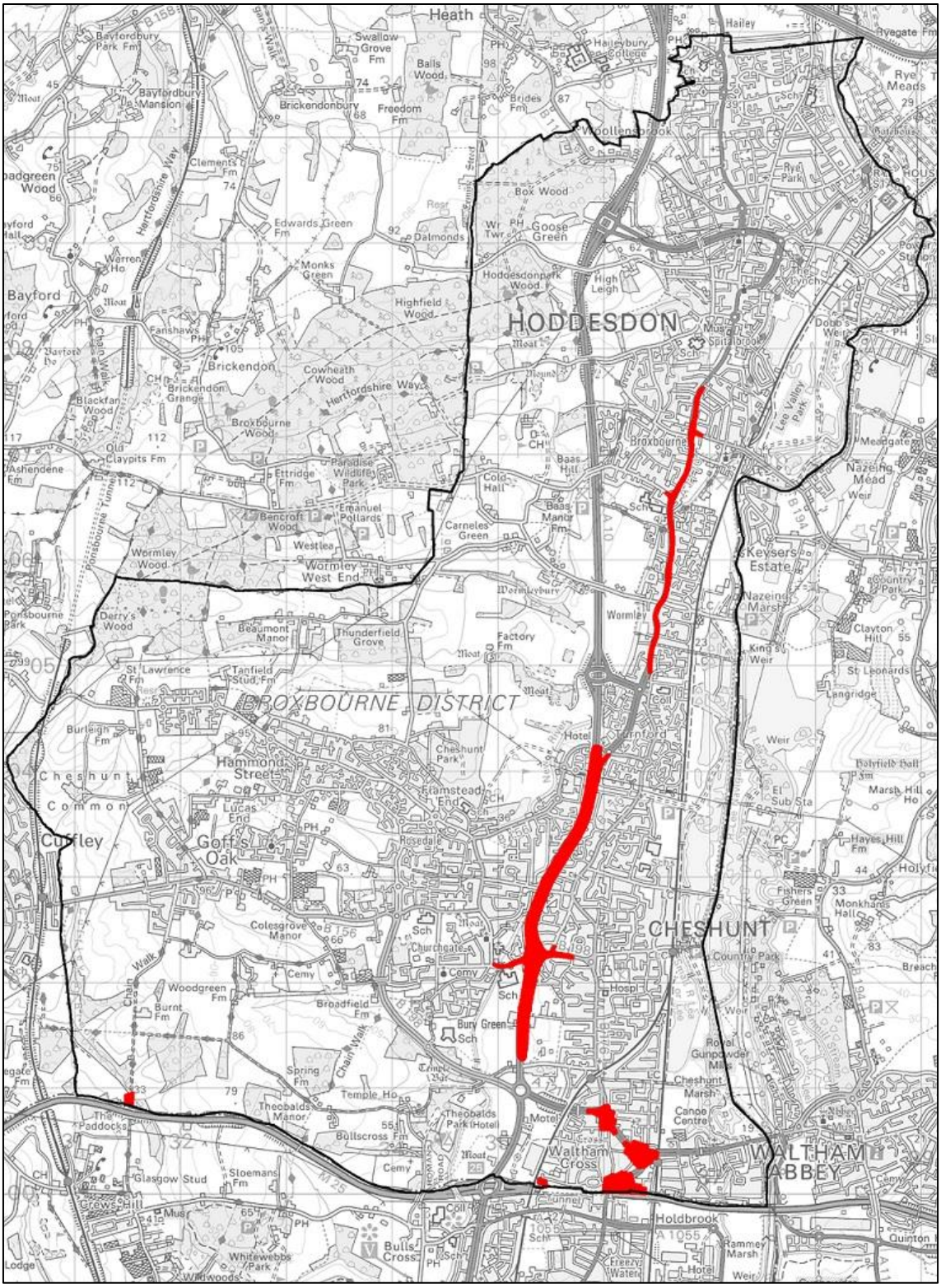
Active Lifestyles

4.4.12 Facilitating active lifestyles has a direct impact on the health and well-being of the local population. A transport network that provides safe and attractive opportunities for walking and cycling will assist local residents in undertaking the daily 30 minutes of exercise prescribed by the NHS as part living a healthy lifestyle[27].

4.4.13 According to the 2011 Census, 4.6% of Broxbourne residents were categorised as being in bad or very bad health whilst almost 12,000 people across the whole of Hertfordshire are classified as obese[28]. With walking and cycling combined only accounting for 19% of all trips on the transport network it demonstrates the scope for investment in sustainable travel to address wider health and well-being concerns.

[25] https://www.rcplondon.ac.uk/projects/outputs/every-breath-we-take-lifelong-impact-air-pollution
[26] https://www.asthma.org.uk/advice/triggers/pollution/
[27] http://www.nhs.uk/Livewell/fitness/Pages/physical-activity-guidelines-for-adults.aspx
[28] https://data.gov.uk/dataset/statistics_on_obesity_physical_activity_and_diet_england

Figure 4.17: Locations of AQMAs in Broxbourne



Source: Contains OS data © Crown copyright and database right (2017)

Figure 4.18: Comparative Pedestrian Environments in Broxbourne

Hoddesdon Town Centre

Source: Google Maps

High Street, Waltham Cross

Source: Google Maps

5.0 Establishing a Strategic Approach

5.1 Overview

5.1.1 This chapter establishes a series of core principles which form the strategic approach to the Transport Strategy. The application of these principles provides a framework for investment and will ensure that a safe, sustainable, effective and efficient network of infrastructure and services are in place to cater for the future needs of Broxbourne.

5.2 Core Principles

5.2.1 Investment in transport infrastructure and service provision to support the Local Plan will be based upon a series of core principles. They align with the wider policy context within which the Transport Strategy has been produced and relate to:

- A hierarchy of interventions
- Marginal gains
- Adopting an integrated approach to delivery
- Balancing priorities

5.3 Hierarchy of Interventions

5.3.1 A hierarchical approach will be undertaken to determine which transport schemes are required to facilitate growth within Broxbourne, as depicted in **Figure 5.1**. The application of this broad principle would maximise the sustainability of growth and ensure that large scale, costly road based schemes would only be delivered as a last resort, once all other alternatives had been explored.

5.3.2 This in turn this would contribute towards the viability of development and allow developer contributions to be invested in facilities to create high quality, attractive communities.

5.3.3 In terms of the emphasis at each stage of the hierarchy:

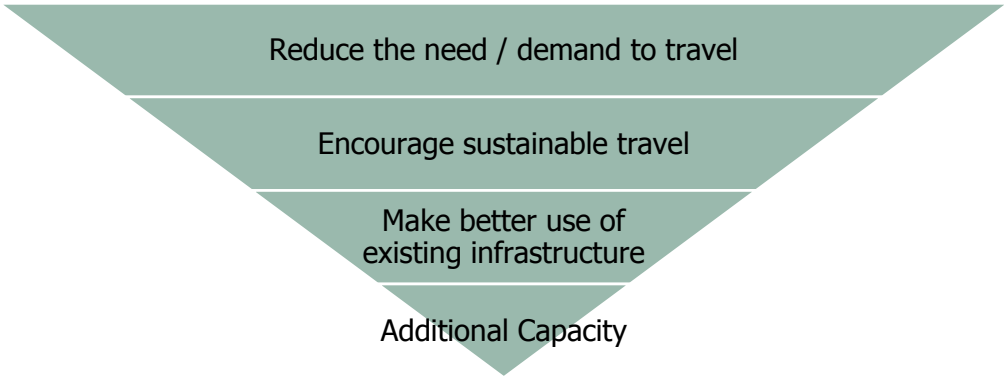
- **Reducing the need / demand to travel:** Focuses upon mixed use development, facilities to encourage home working and more localised service provision all reduce the level of stress placed on the transport network. It also covers demand management and so measures to discourage car use.

- **Encouraging more sustainable forms of travel:** Promoting investment in walking, cycling and public transport improvements together with broader public realm and safety interventions help to increase sustainable travel, with added benefits beyond transport itself including residents living more active lifestyles.

- **Making better use of existing infrastructure:** Raising awareness of existing services or infrastructure in place through smarter choices, integrated ticketing, improved interchange facilities, together with highway related measures such as the reconfiguration of traffic signal timings or signing and lining improvements for example.

- **Providing additional highway and rail based capacity**: Predominantly major scheme interventions, including junction improvements, road widening schemes and new links, and new lines, stations and interchanges in terms of rail.

Figure 5.1: Hierarchy of Transport Interventions



5.4 Marginal Gains

5.4.1 Providing small scale, local level, low cost improvements to transport provision can have a cumulative impact on the travel choices individuals make.

5.4.2 A core principle of this Strategy is therefore to ensure that transport works at a human level, so that through a series of marginal improvements, the transport network and public realm is more inclusive and convivial.

5.4.3 Marginal gains may be achieved through providing:

- The signing and lining of the carriageway
- Timing of traffic signals
- Attractive, accessible bus stops
- Information on existing services
- Dropped kerbs across the pedestrian network
- The removal of guard railing to open up desire lines
- Seating and lighting and general street furniture
- Quality surfacing of footpath and cycle lanes
- Cutting back vegetation and maintenance of links
- Fingerposts and directional signing

5.5 Integrated Approach to Delivery

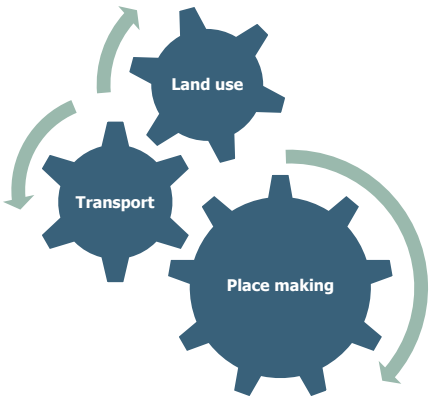
5.5.1 An integrated approach will be taken to scheme delivery across the lifetime of the Local Plan and this supporting Transport Strategy. The need for integration is paramount form the outset of the planning process, in terms of identifying and understanding the issues present, through to the identification and delivery of the most appropriate schemes on the ground.

5.5.2 The success of the Strategy will be dependent upon applying an integrated approach on a number of different levels particularly:

- Land use planning and transport provision
- Different modes of travel
- Service providers
- Neighbouring authorities
- Within identified corridors

5.5.3 An integrated approach will represent more effective and efficient investment, improve travel choice and create a more attractive, user friendly transport network and ultimately urban environment as illustrated in **Figure 5.2**.

Figure 5.2: Integrated Approach to Place Making



5.6 Balancing Priorities

5.6.1 There are often contradictory demands placed on the transport network which have to be balanced to ensure that it caters for all. Examples of these within Broxbourne include:

- North-South capacity and East-West connectivity
- Catering for through traffic and meeting the needs of local traffic
- Reducing journey times and maintaining and improving road safety
- Targeted investment in schemes and widespread investment in schemes
- Planning for traffic and planning for people

5.6.2 Balancing these priorities will be achieved through adopting an evidenced based, data-led approach to investment and Plan making. The Broxbourne SATURN Model and Hertfordshire COMET Model both provide a sound basis upon which investment decisions can be based.

6.0 Proposed Schemes

6.1 Overview

6.1.1 This chapter details a series of interventions through which it is proposed to address the current and future issues facing the transport network in Broxbourne. It is structured upon investment in public transport, walking and cycling, smarter choices, parking and highways measures and relates back to the broad transport themes of capacity, connectivity and communities which reflect the underlying need for intervention.

6.2 Public Transport

6.2.1 Public transport is the most realistic alternative to the car for many trips to, from, within and through Broxbourne. For longer distance trips, particularly commuting trips to London in the south and Cambridge in the north, this is in the form of rail based travel, whilst for more localised journeys the focus should be on buses. **Table 6.1** summarises the scheme specific interventions and the overarching issues they will help to alleviate.

6.2.2 The measures target a number of distinct areas of investment focusing upon:

- Service Provision
- Infrastructure
- Interchange
- Information
- Ticketing

6.2.3 This Strategy advocates an approach which integrates each of these areas of investment to provide a comprehensive package of measures that target every element of the public transport user experience, and aligns with the principles established within the Hertfordshire Bus and Rail Strategies[29].

Service Provision – Rail

6.2.4 Rail based service provision is set to benefit from a commitment to increase train lengths to 12 carriages to boost capacity, as detailed in the London and South East Route Utilisation Strategy[30]. In addition two significant infrastructure improvement schemes will also enable Broxbourne to benefit from higher capacities on the routes into London:

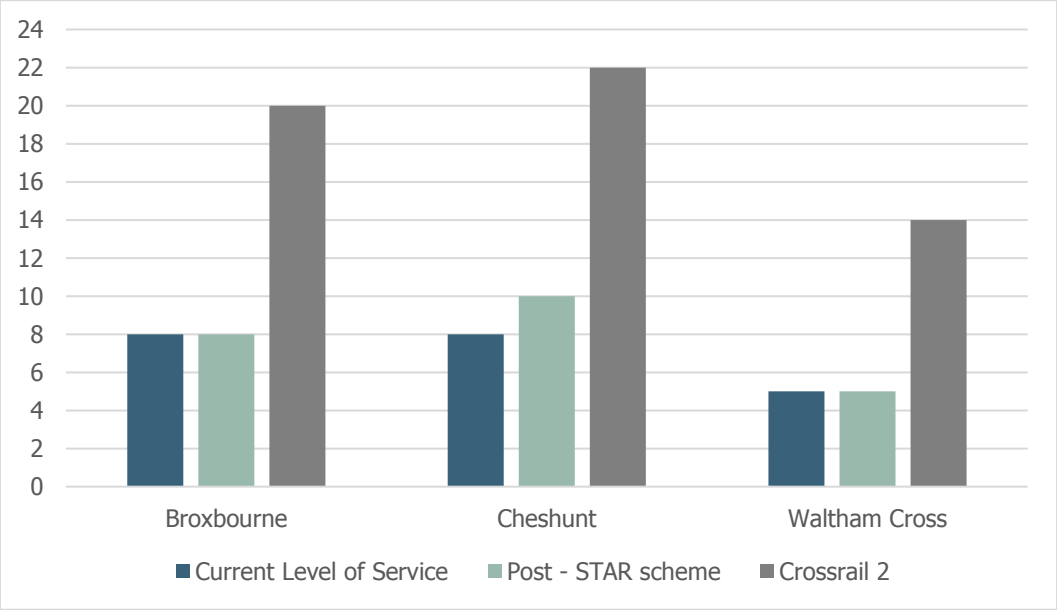
- **Stratford to Angel Road (STAR) Scheme**
  The Stratford to Angel Road (STAR) scheme is part of a larger initiative to provide a third track on the West Anglia Mainline between Tottenham Hale and Angel Road. Funded by the Department for Transport and the Growing Places fund it will permit an increase in service frequency at Cheshunt Station when the initiative opens in March 2018[31].

[29] https://www.hertfordshire.gov.uk/services/recycling-waste-and-environment/planning-in-hertfordshire/transport-planning/transport-policy-and-supporting-strategies.aspx
[30] https://archive.org/details/LondonAndSouthEastRouteUtilisationStrategy
[31] https://www.london.gov.uk/decisions/md1383-west-anglia-route-main-line%E2%80%93-stratford-angel-road-star-scheme

- **Crossrail 2**
  The arrival of Crossrail 2 services from 2033 onwards will provide a step change in the frequency of services into London and the additional capacity that provides. By doubling the number of tracks on the West Anglia Mainline through Broxbourne, often referred to as Four-Tracking, the number of both fast and stopping trains will increase in frequency and therefore capacity.

6.2.5 The respective levels of service provision at the main stations in Broxbourne as a consequence of these two major interventions are set out in **Figure 6.1** whilst **Table 6.1** details supporting measures through which Broxbourne may seek to take advantage of this investment and maximise the associated benefits which will arise.

Figure 6.1: Proposed Level of Rail Service Provision (Trains per Hour)



Service Provision – Buses

6.2.6 It is proposed that the existing commercial bus network across Broxbourne will be supplemented by a series of additional routes to serve the major new development sites allocated within the Local Plan.

6.2.7 New services between High Leigh and Broxbourne Station, Waltham Cross Station and Park Plaza, and Waltham Cross and Hertford Regional College, via Cheshunt Lakeside and Brookfield will all provide sustainable access to the new housing, retail and jobs delivered through the Local Plan, whilst also providing access into established town centres such as Hoddesdon and Waltham Cross. With each of the three main train stations served by these new routes their roles as important local transport interchanges will also be enhanced.

6.2.8 Measures contained within Table 6.1 also seek to enhance patronage on the existing network. Changes to the routing of the 242 service would enable new developments in Rosedale Park to have access to the commercial bus network, whilst investment in ticketing and waiting facilities would also help to contribute to bus services being a realistic alternative to the car.

Infrastructure – Rail

6.2.9 Investment in new infrastructure should seek to provide a competitive advantage to public transport services in relation to the car, and general improvements to the user experience.

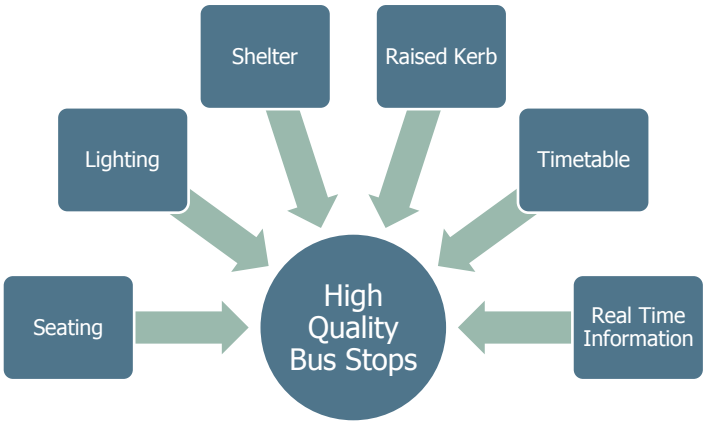
6.2.10 At a long term, strategic level, new rail stations at Turnford and Park Plaza are planned to provide further accessibility to the borough from London in particular. The Stations will serve new developments at both Brookfield and Park Plaza, ensuring high quality, high capacity public transport provision is available as part of the sustainable development proposed at these sites.

6.2.11 The delivery of new Stations are long term projects, which this Strategy recognises, but with the level of growth coming forward through the Local Plan and the increase in service level provision associated with Crossrail 2, it is considered necessary and proportionate to accommodate the growing demand to travel, both into London and to the new commercial opportunities presented by Park Plaza and Brookfield.

Infrastructure – Buses

6.2.12 The bus user experience and the accessibility of the bus network for those with limited mobility will also be enhanced through a programme of bus stop improvements, incorporating the schemes depicted in **Figure 6.2**. Together these measures help to improve the physical accessibility of buses and address personal security concerns that may prevent individuals from using public transport.

Figure 6.2: Bus Stop Improvement Measures



6.2.13 Large scale bus priority measures are not feasible within the borough. Due to the density of development, tight carriageway boundaries and competing demands on a constrained network, opportunities for corridor length prioritisation are unrealistic.

6.2.14 However, Selective Vehicle Detection systems[32] which can identify approaching buses at traffic signals are proposed to be introduced along the alignment of the old A10. This is because it runs through the heart of Broxbourne, serving many of the town centres and the majority of the residential population.

[32] Bus priority system to allow traffic signals to selectively favour buses' movement through a junction by changing traffic light sequences and timings as buses approach. The system works using 'bus detectors' mounted on lampposts which detect transmission made by transmitters aboard buses.

Interchange

6.2.15 The ability to create seamless interchange between different modes of travel and services is subject to several factors including the physical measures or facilities in place, the availability and timing of services, information provision and ticketing options.

6.2.16 The role of Broxbourne, Cheshunt and Waltham Cross Stations as multi-modal transport hubs should form a pivotal feature of future investment in public transport provision. Improvements to the infrastructure in place are required to enable this to happen, particularly with regards to Broxbourne Station where the access via Station Road is constrained for all road users. An improved junction to facilitate quick and safe access for all users, particularly buses, pedestrians and cyclists is proposed within this Strategy.

6.2.17 At Cheshunt Station, the constrained site and lack of through routes makes interchange opportunities more challenging. However investment in pedestrian and cycle links and new bus services along Delamare Road as part of the Cheshunt Lakeside development will reduce the current barriers to interchange.

6.2.18 Finally, at Waltham Cross Station the creation of a multi-modal interchange is a realistic long term aspiration, combining the towns bus and rail stations and the increase in throughput inevitable when Crossrail 2 is in place. In the shorter term however, the re-introduction of bus routes serving the station and investment in the bus waiting facilities and information will enhance its role at the heart of the sustainable transport network in the town.

Information

6.2.19 Raising awareness of service provision and the availability of clear and logical timetable information assists in breaking down some of the actual and perceived barriers which prevent greater use of bus services across Broxbourne. Utilising technology should be central to this including through:

- Real time information displays at bus stops
- Real time information displays within destinations themselves (within doctors' surgeries, libraries, shops or places of work for example)
- Internet and smart phone based information channels

6.2.20 The availability of more bespoke information at bus stops, through Travel Plans and Personalised Journey Planning will also build confidence and understanding of the provision in place and contribute to the marginal gains principle and the ability of individuals to make more informed travel choices.

Ticketing

6.2.21 There are two areas through which ticketing can be improved within the Borough. The first relates to encouraging greater take up of mobile ticketing via the Intalink Mobile Ticketing app[33]. This allows users to purchase tickets via their phone which they then scan on boarding. This provides paperless ticketing and removes the need for users to carry money or have the correct change. Secondly, a Broxbourne wide integrated ticket based upon similar initiatives in Watford, St Albans and Hempel Hempstead, the BUSnet tickets would allow passengers to purchase one ticket for unlimited travel on all services within a given zone, improving the ease of interchange and reducing the cost of bus travel.

[33] https://www.intalink.org.uk/tickets/mobile-ticketing/

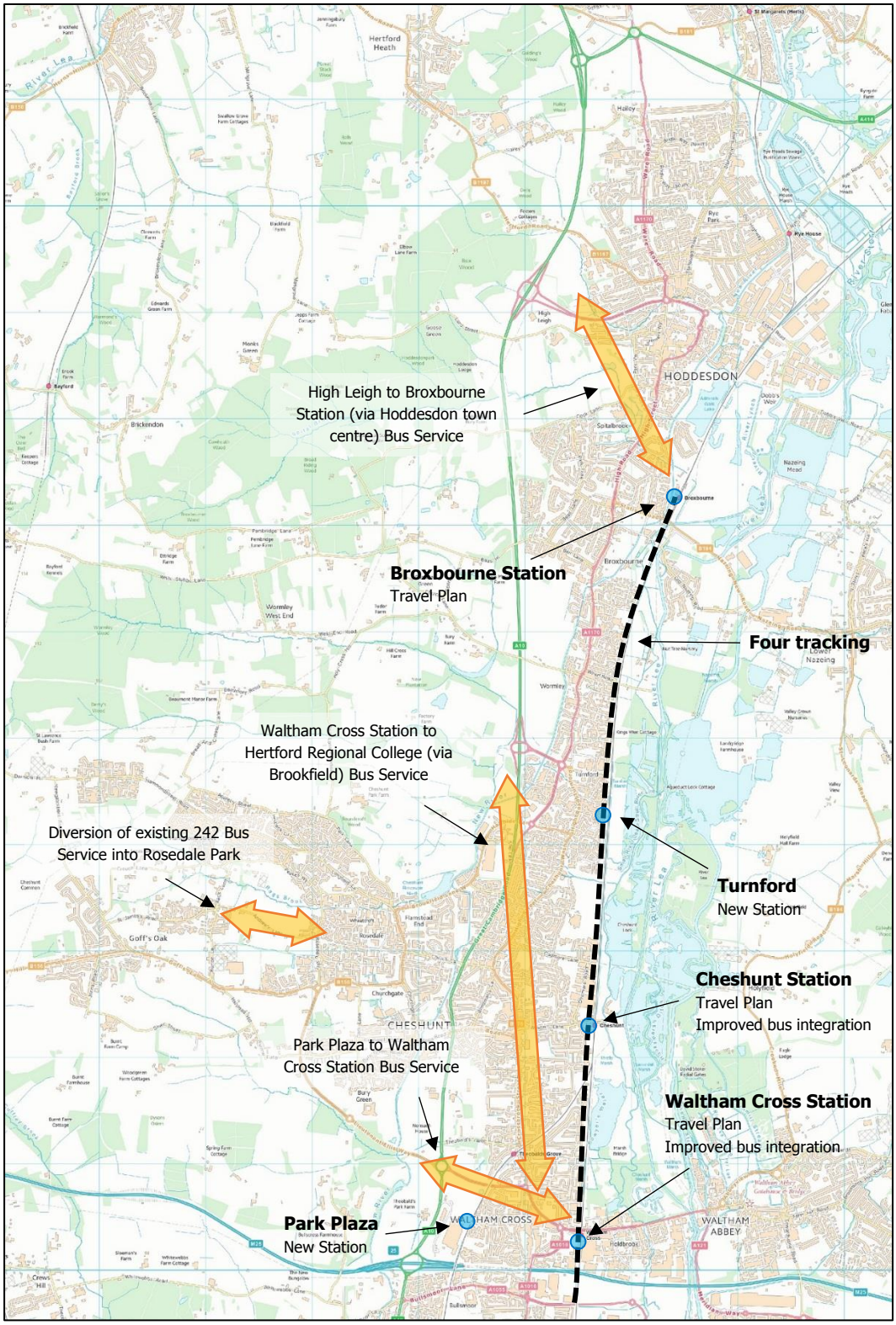
Table 6.1 Summary of Public Transport Interventions

Ref.	Scheme	Capacity		Connectivity					Communities			
		Congestion	Overcrowding	Open Up Land	Self-Containment	Severance	Incomplete Networks	Ability to Interchange	Safety & Security	Air Quality	Public Realm	Active Lifestyles
PT.01	Increased capacity on the West Anglia Main Line arising from 4-tracking (from 2026).	✓	✓					✓		✓		
PT.02	Provide a new bus service running every 30 minutes between High Leigh and Broxbourne Station via Hoddesdon Town Centre.	✓		✓			✓	✓		✓		
PT.03	Provide a new bus service running every 20 minutes between Waltham Cross Station and Brookfield via Cheshunt Station, Delamare Road and Hertford Regional College.	✓					✓	✓		✓		
PT.04	Provide a new bus service running every 15 minutes between Park Plaza and Waltham Cross Station via Waltham Cross Town Centre.	✓		✓			✓	✓		✓		
PT.05	Re-route the existing 242 bus service between Potters Bar and Waltham Cross	✓		✓			✓	✓		✓		

Ref.	Scheme	Capacity		Connectivity					Communities			
		Congestion	Overcrowding	Open Up Land	Self-Containment	Severance	Incomplete Networks	Ability to Interchange	Safety & Security	Air Quality	Public Realm	Active Lifestyles
	into the Rosedale Park North development site to provide a service every 30 minutes.											
PT.06	New station at Turnford.	✓	✓					✓		✓		
PT.07	New station at Park Plaza West.	✓	✓					✓		✓		
PT.08	Provide new and upgraded bus stops across the Borough including shelters, seating, lighting, raised kerbs, and timetables.							✓	✓			
PT.09	Introduce Selective Vehicle Detection systems to provide priority for buses along the old A10 at (i) Junction of Station Road / High Road, Broxbourne, (ii) Vancouver Road / A1170, Turnford, (iii) Church Lane / Turners Hill, Cheshunt, and (iv) Old Pond, Cheshunt.	✓						✓				
PT.10	Provision of new and improved bus shelters at Waltham Cross Train station to be served by extension of existing services from Waltham Cross Bus Station.							✓	✓			

Ref.	Scheme	Capacity		Connectivity					Communities			
		Congestion	Overcrowding	Open Up Land	Self-Containment	Severance	Incomplete Networks	Ability to Interchange	Safety & Security	Air Quality	Public Realm	Active Lifestyles
PT.11	Junction improvements on Station Road to improve access/egress into Broxbourne Station.							✓	✓			
PT.12	Provide real time information displays at bus stops on all commercial routes.						✓	✓				
PT.13	Provide real time information displays in areas which generate a large number of trips (i.e. doctors surgeries, shopping centres and train stations).							✓	✓			
PT.14	Promotion of the existing Intalink mobile app.							✓	✓			
PT.15	Development of an integrated BUSnet ticket for Broxbourne.							✓	✓			

Figure 6.3: Location of Public Transport Improvements



Source: Contains OS data © Crown copyright and database right (2017)

6.3 Walking & Cycling

6.3.1 Increasing levels of walking and cycling generate benefits above and beyond transport itself. The investment detailed within **Table 6.2** will provide a framework upon which both modes of travel can develop into attractive and realistic travel choices for journeys under 2 miles and 5 miles respectively.

6.3.2 The proposed interventions can be categorised into four broad areas, namely:

- Links & Networks
- Junctions & Crossing Facilities
- Public Realm
- Promotion & Awareness
- Complementary Facilities

Links & Networks

6.3.3 Developing a network of connected, coherent, convenient and convivial walking and cycling routes requires investment in a number of areas including the identification and provision of supporting infrastructure along the appropriate links in the network, junction and crossing provision to connect sections of the network, and the signage and promotion of the networks to raise awareness and encourage their use.

6.3.4 At present the network of walking and cycling links within Broxbourne is patchy. However, with the proximity of the Lee Valley, and New River corridor (see **Figure 6.6**) running through the centre of the borough there is significant potential to develop a series of leisure routes based upon the spines they provide.

6.3.5 The Broxbourne Local Cycling and Walking Infrastructure Plan (which sits alongside this overarching Transport Strategy) details a network of cycle routes which will be developed over the period of the Local Plan. It comprises a mixture of on/off street links, segregated paths, quiet routes and junction treatments to serve the main areas of growth within the Borough and provide safe and attractive routes to key destinations.

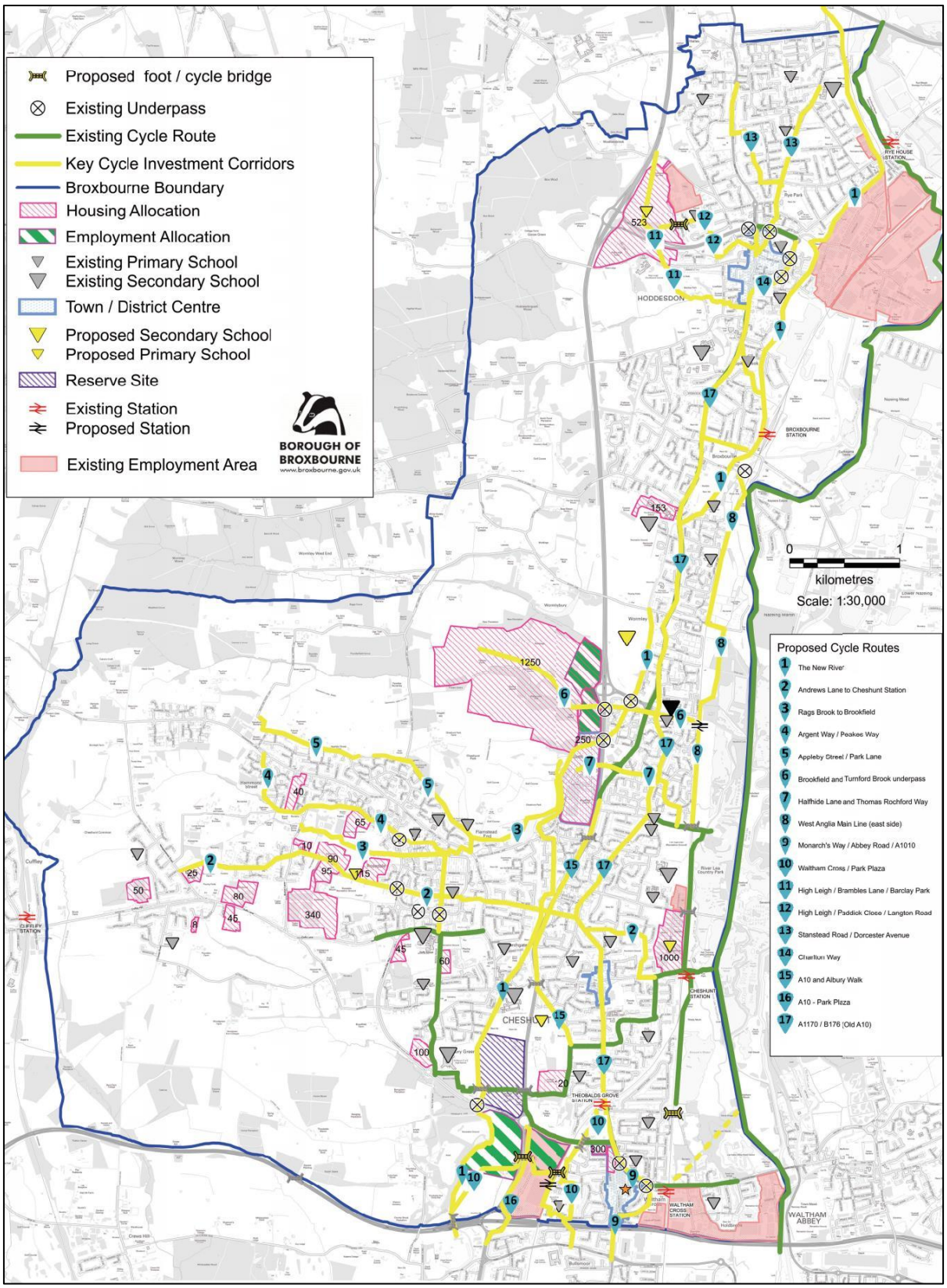
6.3.6 The cycle network, as illustrated in **Figure 6.4** also seeks to cater for the needs of both confident and committed cyclists, who may be regular commuters, and less confident infrequent cyclists who are seeking to cycle for leisure.

6.3.7 Opportunities also exist to build upon the high quality public realm and pedestrian environments within the town centres of Hoddesdon and Waltham Cross in particular. Developing a series of Primary Pedestrian Routes linking into these centres will help to boost their vitality and viability and extend the provision for pedestrians beyond the town centres themselves.

6.3.8 The alignment of the old A10 is an important link for all road user groups. However the additional capacity being provided on the A10 itself provides the opportunity to introduce measures to encourage more walking and cycling along all or sections of the corridor. As such raised tables will be provided, the footway widened, bus priority at signals introduced and the speed limit reviewed and revised down.

6.3.9 This will all help to re-balance road user priorities and encourage more walking and cycling by improving safety through direct physical interventions, and indirectly by impacting upon the volume and speed of general traffic.

Figure 6.4: Broxbourne Cycle Network



Junctions & Crossing Facilities

6.3.10 It is at junctions and crossing points where problems for pedestrians and cyclists often arise, with priority usually given to general traffic. This can result in safety concerns and a need to take convoluted routes which increase journey times and detract from the walking or cycling experience.

6.3.11 Pedestrian subways and the lack of provision for cyclists at busy roundabouts across Broxbourne are examples of where intervention is required to reduce the severance and improve the safety and personal security issues on walking and cycling networks.

6.3.12 The A10 in particular forms a barrier to east-west pedestrian and cycle movements and **Section 6.6** details how proposed schemes at both College Road and Church Lane will provide new controlled crossing facilities.

6.3.13 The provision of formal and informal crossing points on pedestrian desire lines, including an authority wide programme of dropped kerbs would also help to remove barriers which prevent those with limited mobility walking or cycling.

6.3.14 The concept of reprioritising road users at certain junctions across the borough, particularly those in close proximity to schools should be taken forward, whilst catering for the needs of vulnerable road users should be embedded into new developments through the application of the Manual for Streets guidance[34].

6.3.15 Education generates 1 in every 5 trips at peak times and creating School Safety Zones and an overall priority on catering for safe and secure pedestrian and cycling links to such facilities should be at the cornerstone of creating a culture of walking and cycling with the next generations.

6.3.16 Network Rail's level crossing closure programme will see new investment in Broxbourne. A bridge over the West Anglia Mainline at Park Lane providing access into Park Plaza will improve safety and connectivity between this strategic development and Waltham Cross town centre.

Public Realm

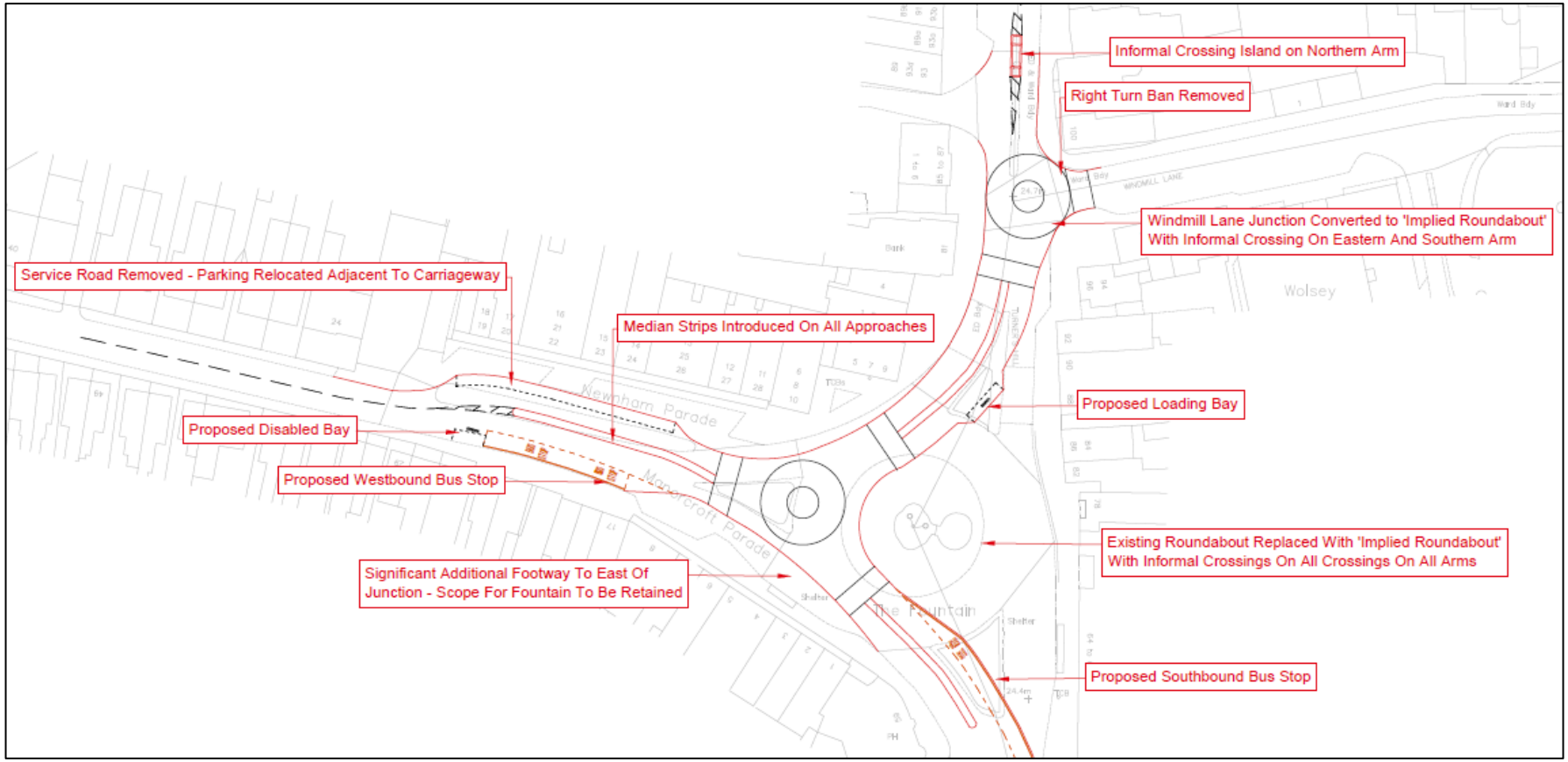
6.3.17 Improvements to the public realm create an environment more conducive to walking and cycling and locations in which people want to live and businesses want to invest. Such improvements can be achieved through of interventions including the reallocation of road space, surfacing, lighting and, the provision of street furniture for example.

6.3.18 The creation of a high quality public realm should be incorporated into every new development within the authority. In addition, it is envisaged that a scheme to reconfigure the Old Pond roundabout in Cheshunt town centre will provide significant benefits to pedestrians, whilst maintaining the flow of traffic in line with requirements for the wider network.

6.3.19 **Figure 6.5** highlights a possible option to create additional public space and enhance the sense of place, vitality and viability of the centre, whilst maintaining access for cyclists, buses, and general traffic. Engagement with local stakeholders will be undertaken prior to formulation of a preferred option for the area, followed by a formal consultation on any proposals resulting from the engagement and technical evidence.

[34] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/341513/pdfmanforstreets.pdf

Figure 6.5: Possible Old Pond Public Realm Improvement Scheme



Source: Markides Associates

Promotion & Awareness

6.3.20 The promotion of both walking and cycling facilities and the benefits they provide should accompany any investment in supporting infrastructure. Such promotion may be in the form of Personalised Journey Planning or Station Travel Plans for example, more detail on which is provided in **Section 6.4**.

Complementary Facilities

6.3.21 Creating an environment which is conducive to walking and cycling is often as a result of many small scale measures in place, that contribute towards a pleasant journey. The principle of marginal gains is particularly relevant to walking and cycling, and investment in cycle parking, the installation of showers and changing facilities in workplaces, lighting, surfacing and maintenance will all contribute towards a more convivial environment.

6.3.22 When seeking to cater for different user groups, particularly the elderly or those with limited mobility, the availability of street furniture, especially dropped kerbs and benches can make a significant difference in walking being a realistic option.

Figure 6.6: New River Pedestrian and Cycle Corridor

Table 6.2: Summary of Walking and Cycling Interventions

Ref.	Scheme	Capacity		Connectivity					Communities			
		Congestion	Overcrowding	Open Up Land	Self-Containment	Severance	Incomplete Networks	Ability to Interchange	Safety & Security	Air Quality	Public Realm	Active Lifestyles
WC.01	Signalised crossing on western arm of Dinant Link Road / Essex Road roundabout.					✓			✓		✓	✓
WC.02	Footpath along western side of Charlton Way between Haslewood Avenue and Dinant Link Road.					✓	✓		✓		✓	✓
WC.03	At grade signalised crossing of Dinant Link Road at junction with Amwell Street.					✓			✓			✓
WC.04	Treatment of Lord Street to widen footway and remove conflicts with parked cars along its length.						✓		✓		✓	✓
WC.05	Improve pedestrian links between Cheshunt Station and bus stops being provided as part of the Delamare Road development.						✓	✓	✓		✓	✓

Ref.	Scheme	Capacity		Connectivity					Communities			
		Congestion	Overcrowding	Open Up Land	Self-Containment	Severance	Incomplete Networks	Ability to Interchange	Safety & Security	Air Quality	Public Realm	Active Lifestyles
WC.06	Old Pond: Reconfiguration of Old Pond junction to provide signalised junction and crossing points for pedestrians.					✓			✓		✓	✓
WC.07	Improve facilities on the existing cycle network and provide new routes to create a more connected and coherent network.					✓	✓	✓	✓	✓		✓
WC.08	Provide appropriate signage across the cycle network.						✓		✓			✓
WC.09	Introduce measures to encourage more walking and cycling along the old A10 including raised tables, widening of footways, and a review of speed limits.					✓	✓	✓	✓	✓	✓	✓
WC.10	Create School Safety Zones outside every school within the Borough, to prioritise pedestrians and other vulnerable road users over general traffic.								✓			✓

Ref.	Scheme	Capacity		Connectivity					Communities			
		Congestion	Overcrowding	Open Up Land	Self-Containment	Severance	Incomplete Networks	Ability to Interchange	Safety & Security	Air Quality	Public Realm	Active Lifestyles
WC.11	Level crossing closures at Trinity Lane, Cadmore Lane and Slipe Lane.								✓			
WC.12	Provide a pedestrian / cycle bridge at Park Lane to cross the railway line and allow access into Park Plaza North.					✓	✓		✓			✓
WC.13	Provide a pedestrian / cycle bridge over the A10 between Park Plaza North and Park Plaza West.			✓		✓	✓		✓			✓
WC.14	Provide dropped kerbs with tactile paving at all pedestrian crossing points within the Borough.								✓		✓	✓
WC.15	Provide significant increases in the volume of cycle parking at key trip generators within Broxbourne.		✓						✓			✓

6.4 Smarter Choices

6.4.1 Smarter choices or 'soft' transport policy measures are those aimed at helping people to choose to reduce their car use while enhancing the attractiveness of alternatives. Such measures may include:

- Travel Plans
- Information and marketing
- More efficient car based travel
- Teleworking, teleconferencing and home shopping

6.4.2 A comprehensive study of smarter choices by the Department for Transport (DfT) back in 2004 found that investment in 'smart' measures could deliver significant changes in travel behaviour and provide excellent value for money.

6.4.3 In urban areas it was deemed that a smarter choices programme implemented over 10 years at high intensity could generate a reduction in car use by around 20% in peak periods, and around 13% off peak[35]. Consequently, it is an area of investment that this Strategy seeks to capitalise upon to reduce pressures on the highway network alongside the funding of sustainable transport infrastructure set out elsewhere within this Strategy.

Travel Plans

6.4.4 Workplace, School, Residential and Station Travel Plans help to provide a detailed understanding of the travel patterns and issues associated with specific sites and identify a series of measures through which individuals can benefit from broader travel choice, particularly in terms of sustainable travel.

6.4.5 The authority will work with organisations to produce, deliver and monitor Travel Plans and offer incentives to identify match funding opportunities:

- **Area Wide Travel Plans:** There is particular scope to work with employers on the development of a series of Area Wide Travel Plans (AWTPs). AWTPs apply the Travel Plan concept on an area basis where there are often a large number of relatively small employers in a given area.

  It helps to avoid a duplication of work in the production of a Plan, give them more collective strength to lobby for improvements in bus service provision for example, and enable them to pool resources to maximise the impact on travel choice.

  Successful AWTPs around the country include the Brackmills Industrial Estate on the edge of Northampton (http://www.brackmillsindustrialestate.co.uk/plan) which could be replicated in Hoddesdon, Waltham Cross, Brookfield and Park Plaza.

35 http://webarchive.nationalarchives.gov.uk/20100304134509/http://dft.gov.uk/pgr/sustainable/smarterchoices/ctwwt/smarterchoiceschangingtheway5769

- **Station Travel Plans:** Greater Anglia, the train operator serving Broxbourne, has a programme in place to roll out a series of Station Travel Plans covering Broxbourne, Cheshunt and Waltham Cross Stations. Both Broxbourne Borough Council and Hertfordshire County Council will work closely with the operator through this process to identify current travel plans and determine measures which may help to increase accessibility and travel choice to each location.

  The evidence the Plans generate will in turn be important in understanding the potential implications of Crossrail 2 on the local transport network and how the increase in demand to travel can be accommodated.

- **School Travel Plans:** It is a statutory requirement for all schools to have a Travel Plan in place. However with the annual turnover of pupils it is important that these remain up to date and relevant. Investment in access and safety measures in areas surrounding schools should be driven by the details within a School Travel Plan and an active role for both school and local authority in monitoring and evaluating their success.

6.4.6 The success of each Travel Plan will be dependent upon the ongoing support of the Plans by the Council and employers, with a long term commitment to monitor and implement the measures they identify.

Information & Marketing

6.4.7 Any investment in transport across the local network should be supported by a co-ordinated communication strategy to raise awareness and understanding of new measures introduced and to target the hearts and minds of user groups. It can result in greater take up of services and reduce barriers to access.

6.4.8 There are a number of channels through which Broxbourne could work with the County Council to raise awareness of existing and emerging infrastructure and services. Personalised travel planning provides a successful, targeted, albeit resource intensive approach to changing travel behavior and encouraging more sustainable travel choices[36].

6.4.9 Increasing access to public transport information particularly through the use of smartphones, apps, the internet and electronic displays further contributes towards breaking down barriers to making more informed travel choices.

More Efficient Car Based Travel

6.4.10 The car is the only realistic option for some trips and a series of measures are proposed within this Strategy which recognises this, but which seek to make such journeys more efficient and reduce the negative impacts of car based travel.

6.4.11 The development and management of a car club or car sharing scheme helps to provide access to car based travel for those with limited income. It addresses social exclusion issues, whilst also ensuring more effective use of road space through increasing car occupancy and therefore reducing the potential number of vehicles on the network.

36 http://webarchive.nationalarchives.gov.uk/20101124142120/http:/www.dft.gov.uk/pgr/sustainable/travelplans/ptp/makingptpworkresearch.pdf

6.4.12 The promotion of Low Emission Vehicles does not help to curb congestion but it does help to reduce many of the other implications of reliance on the car. By greening car use through providing a network of electric charging points for vehicles for example, it contributes towards a move away from petrol or diesel based vehicles which are the cause of many air quality and other environmental concerns.

Tele-working, Tele-conferencing and Home Shopping

6.4.13 Whilst outside of the direct remit of a transport strategy, the promotion of tele-working and tele-conferencing by businesses can help to reduce commuting and business related travel. It is an area which could be explored in more detail within a Workplace Travel Plan as part of a package of improvements to reduce the cost of travel to business.

6.4.14 Elsewhere, the availability of superfast broadband and other technologies is increasingly making home shopping more of a viable option for many, particularly those with limited mobility. This reduces the need to travel and addresses some accessibility concerns.

6.4.15 Details of all proposed smarter choices interventions are included in **Table 6.3**.

Table 6.3: Summary of Smarter Choices Interventions

Ref.	Scheme	Capacity		Connectivity					Communities			
		Congestion	Overcrowding	Open Up Land	Self-Containment	Severance	Incomplete Networks	Ability to Interchange	Safety & Security	Air Quality	Public Realm	Active Lifestyles
Travel Plans												
SC.01	Develop, implement and monitor a series of Area Wide Travel Plans with employers in Hoddesdon, Waltham Cross, Brookfield and Park Plaza.	✓						✓		✓		✓
SC.02	Develop, implement and monitor Station Travel Plans at Broxbourne, Cheshunt and Waltham Cross Stations.	✓						✓		✓		✓
SC.03	Develop, implement and monitor Travel Plans at all schools across the Borough.	✓						✓	✓	✓		✓
Information & Marketing												
SC.04	Undertake a programme of Personalised Journey Planning with target groups.	✓						✓		✓		✓
SC.05	Produce and implement a Communications Strategy associated with all measures to be delivered through the Strategy.	✓						✓	✓			✓

Ref.	Scheme	Capacity		Connectivity					Communities			
		Congestion	Overcrowding	Open Up Land	Self-Containment	Severance	Incomplete Networks	Ability to Interchange	Safety & Security	Air Quality	Public Realm	Active Lifestyles
More Efficient Car Based Travel												
SC.06	Develop and promote car share schemes.	✓								✓		
SC.07	Provide a network of charging points across the Borough for electric vehicles.									✓		

6.5 Parking

6.5.1 The supply and demand for parking provision is a pertinent issue locally within Broxbourne, as it is in many other locations across the country. Its location, availability, cost and enforcement impacts upon the capacity of the borough to accommodate growth, the connectivity of key trip attractors, and the ability of the authority to create safe and attractive communities.

6.5.2 The parking offer has an important role in managing car use and encouraging more sustainable forms of travel, a core principle of this Strategy. Restricting provision or introducing charging at destinations has been demonstrated to reduce the demand to travel by car and prompt a change in travel choice.

6.5.3 There are several areas within which parking management needs to be considered:

- Workplaces
- Stations
- Town Centres
- On-Street
- Schools
- Parking standards in new developments

Workplace Parking

6.5.4 Free parking at a place of work is considered a right by many employees, and this is reflected in the large proportion of Broxbourne residents who commute to work in their cars. However, this trend places significant demands on the road network and results in delays and congestion at peak times, generating hidden costs associated with longer journey times, air quality and general health and well-being.

6.5.5 The Strategy seeks to stimulate a cultural shift in this regard through the promotion of Workplace Travel Plans (as detailed in **Section 6.4**). This will both help to reduce the demand to travel by car to work and promote more sustainable modes of travel.

Station Parking

6.5.6 Car parking demand at the main train stations is very high across Broxbourne as highlighted in **Figure 4.5**. With occupancy levels at over 90% there is demand for additional spaces to be provided. Such provision may increase the attraction and accessibility of rail based travel for some and so reduce the need for longer distance car based commuting.

6.5.7 However in turn, it may place more pressure on the surrounding local roads to accommodate an increase in traffic in the area. As such any increases in station parking should demonstrate the potential impact on traffic flows, mitigate these and seek to complement the additional provision with a similar level of investment in more sustainable travel improvements to provide a real travel choice in accessing local stations.

6.5.8 Notwithstanding this, it is also recognised that where the demand for commuter parking isn't met, it can often be displaced onto surrounding residential streets and result in safety and access issues. Measures will be undertaken to reduce the occurrence and impact of such parking through appropriate parking restrictions.

Town Centre Parking

6.5.9 Town centre car parking should cater for the needs of shopper and visitor parking over the demand for longer stay commuter parking, whilst also performing a demand management function in encouraging more sustainable forms of travel.

6.5.10 The expansion of Brookfield will be supported by the provision of additional parking. Whilst potentially encouraging car based access to the development, if the development is catering for a need that was previously met outside of the borough then it may help see an overall reduction in vehicle miles travelled.

6.5.11 At Brookfield and elsewhere across the borough, the ownership and therefore management of the majority of off-street public parking is out of the control of Broxbourne Borough Council. This limits the ability of the authority to influence use of the provision, particularly with regard to the length of parking stays permitted and the introduction of any charging mechanisms.

6.5.12 In this regard a balance needs to be struck between maintaining the attractiveness of the town centres within the Plan area for car based visitors, yet supporting a move away from the private car towards more sustainable trips.

6.5.13 The hidden costs associated with car based travel to the town centres (the dominance of traffic, a less attractive public realm, increased severance, and poorer air quality for example), should be factored into calculations on the introduction of tariffs for short and long stay parking provision.

6.5.14 The authority will therefore seek to work with the car park operators to ensure a balanced approach is taken.

On-Street Parking

6.5.15 Whilst local authority control of off-street parking is limited, Hertfordshire County Council, as the local highway authority, has the ability to manage the availability, use and cost of on-street provision.

6.5.16 Demand associated with on-street provision is generated by a number of factors including residents parking, shoppers and visitors to the town centres, and parking associated with travel to school. However, on-street parking associated with commuting trips via the main stations in Broxbourne presents particular concerns given the anticipated growth in popularity of rail based travel over the timeframe of the Plan.

6.5.17 On-street parking restrictions are in place on many of the roads surrounding the main stations within Broxbourne. This is to alleviate potential issues associated with commuter parking. Whilst these restrictions are effective in this respect, they reduce the totality of car parking capacity serving each station.

6.5.18 The removal of selected restrictions however, in a way which maintains the safe and efficient operation of the highway could therefore open up additional parking capacity. The introduction of on-street parking charges associated with this could in turn generate an additional revenue stream through which to subsidise alternatives forms of travel.

6.5.19 Such an approach would therefore provide complementary benefits to increase both the capacity and connectivity of the stations, whilst also forming a tool through which to manage any potential impact on local communities.

Parking Around Schools

6.5.20 Parking around schools at peak times is a big concern in terms of the road safety implications it generates, and the impact it has on the ability to encourage more sustainable forms of travel. It is an issue which should be addressed through the School Travel Plans in place in each location.

6.5.21 The role of School Drop Off Zones (SDOZs) will be considered in terms of their ability to provide safe and sustainable access to school. There is no clear evidence to demonstrate that they positively or negatively impact upon safe and sustainable access, whilst the management and operation of SDOZs require careful consideration and a dedicated ongoing resource provided by the school.

6.5.22 SDOZs are only one of a series of interventions which should be considered around schools and they should not be viewed in isolation. Given the complexities of each school site it is not possible to recommend a blanket approach to SDOZs provision, but a case by case approach should be taken which seeks to maximise both the safety of school access and the ability to encourage more sustainable travel.

Parking Standards in New Development

6.5.23 Parking standards for new residential development in Broxbourne are contained within the Broxbourne Local Plan. These provide guidelines as opposed to set standards and will be applied in a way which balances the needs of parking demand, the public realm and the densities of development.

6.5.24 The National Planning Policy Framework[37] states that:

"….If setting local parking standards for residential and non-residential development, local planning authorities should take into account:

- The accessibility of the development,
- The type, mix and use of development,
- The availability of and opportunities for public transport,
- Local car ownership levels, and
- An overall need to reduce the use of high-emission vehicles…."

6.5.25 In light of the above guidance, given its proximity to Cheshunt Station and Cheshunt town centre, it may be appropriate for the quantity of parking to be provided as part of the Cheshunt Lakeside site allocation in the Local Plan to be restricted.

[37] https://www.gov.uk/government/publications/national-planning-policy-framework--2

Table 6.4: Summary of Parking based Interventions

Ref.	Scheme	Capacity		Connectivity					Communities			
		Congestion	Overcrowding	Open Up Land	Self-Containment	Severance	Incomplete Networks	Ability to Interchange	Safety & Security	Air Quality	Public Realm	Active Lifestyles
PK.01	Introduce on street parking charges in areas around Stations to tackle long stay commuter parking related problems.								✓		✓	✓
PK.02	Introduce residents parking permit schemes in areas of high parking demand.								✓		✓	

6.6 Highways

6.6.1 The highway network is subject to a multitude of pressures within Broxbourne. The proposed schemes to address these issues and which are detailed within this chapter are informed by the use of both the Broxbourne SATURN Model[38] and Hertfordshire COMET Model[39]. The outputs and evidence from this modelling work is detailed within **Chapter 10**.

6.6.2 Highway improvements proposed can be categorised under the headings of:

- Junction Capacity
- New Links
- Network Management

Junction Capacity – A10

6.6.3 The congestion and delays experienced on the road network in Broxbourne are associated with junction capacity as opposed to link capacity. As previously detailed, it is the A10 where delays on the network are most pronounced, and its intersections with seven local roads are proposed to be enhanced through this Strategy.

6.6.4 The at-grade junctions at Park Plaza, College Road and Church Lane, together with Halfhide Lane, are inter-related in terms of their operation and as such a co-ordinated package of measures have been identified to alleviate dual concerns associated with north-south capacity and east-west connectivity.

6.6.5 Furthermore, the grade separated junctions with the M25 and at Turnford Interchange are also proposed to be subject to improvements, alongside access into Great Eastern Road at Park Plaza, each of which are discussed in more detail below

6.6.6 In identifying appropriate interventions to address capacity issues on the corridor, the Strategy has sought to do so in a way which maximises the benefits to local traffic, and one which will not draw in latent demand from alternative strategic corridors such as the A1(M) or M11.

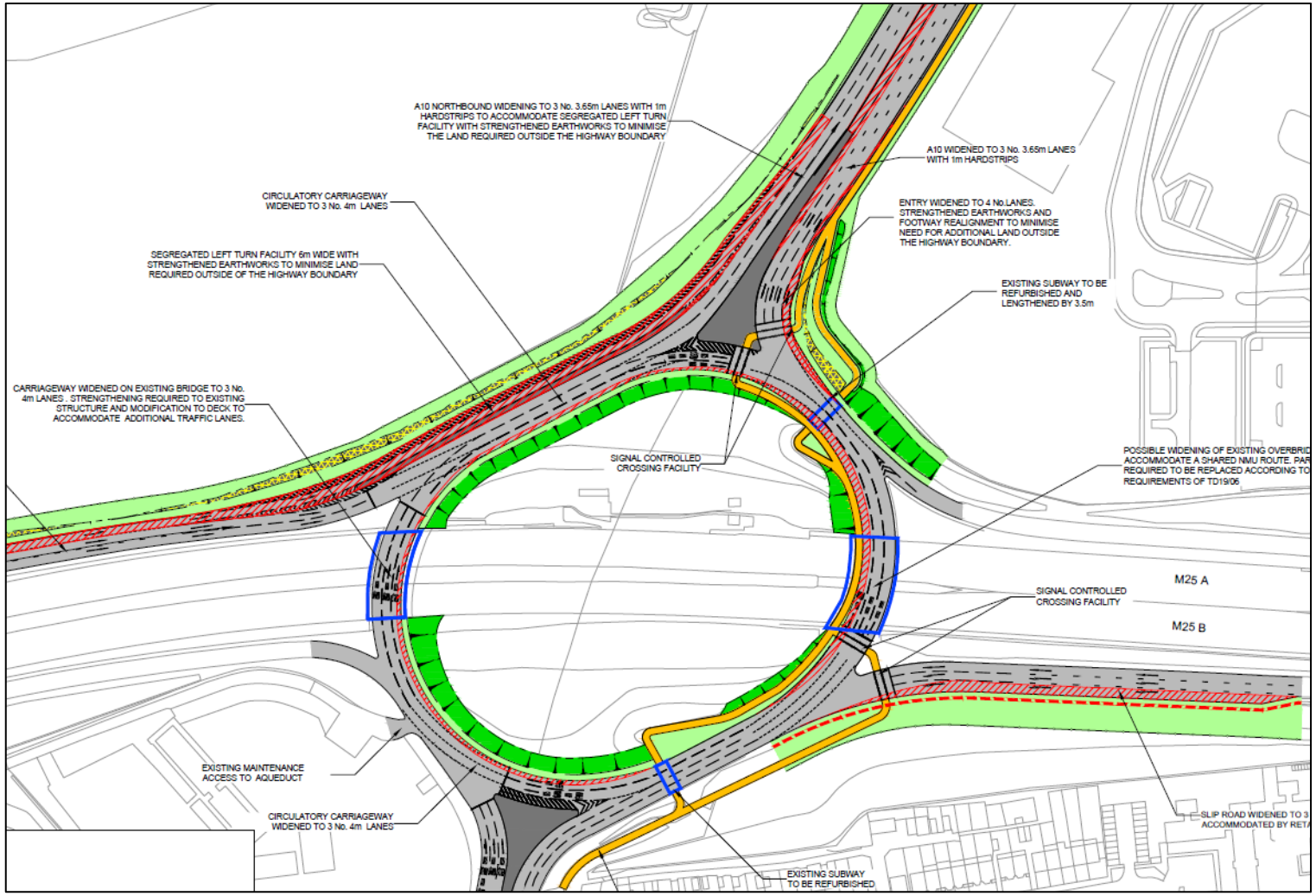
M25 J25

6.6.7 At its southern most point within the borough, the A10/M25 Junction (J25) will benefit from capacity enhancements within the timeframe of the Local Plan. In 2020, Highways England will commence works to reduce the levels of congestion and delays currently experienced by vehicles trying to get on/off the M25 or continue along the A10 into North London.

6.6.8 The scheme comprises additional lanes on the roundabout, widening of the southbound A10 and M25 approaches to the junction, with a dedicated left turn lane onto the A10 northbound. Provision will also be made to improve pedestrian and cycle access through the junction. **Figure 6.7** illustrates the nature of these proposed improvements.

[38] The Broxbourne SATURN Model is a highways model with a 2013 base year which covers the Broxbourne area and immediate surrounds.
[39] The Hertfordshire COMET Model is a multi-modal countywide, SATURN Model with a 2014 base year.

Figure 6.7: M25 J25 Capacity Improvement Scheme



Source: Highways England

Great Eastern Road

6.6.9 As the A10 heads north from the M25, the existing signalised junction enabling access to Park Plaza North will be modified to provide a four-arm signalised junction to also open up access to Park Plaza West, whilst maintaining capacity on the A10.

6.6.10 A shared use pedestrian and cycle bridge will be provided at the junction to reduce the conflict between road users and provide a direct east-west link at this point.

Park Plaza (intersection with Lieutenant Ellis Way and Winston Churchill Way)

6.6.11 The junction of the A10 with Lieutenant Ellis Way and Winston Churchill Way will be subject to significant flows as a consequence of the level of growth earmarked in the adjacent Park Plaza site allocations. However as a grade-separated junction solution is not feasible due to costs, a hamburger style junction with priority given to north-south traffic will be provided.

6.6.12 Signals will be introduced on all arms of the junction and lanes marking will help maximise the efficiency of operation of the gyratory. **Figure 6.8** highlights these proposals together with those at the junction of the A10 and the Great Eastern Road.

6.6.13 As part of the wider access arrangements for the Park Plaza sites, it is also envisaged that a new junction will be constructed on Lieutenant Ellis Way to the north of the Park Plaza West site. This will supplement the improved at-grade junction on the A10 with the Great Eastern Road to ease movement into and out of the site, as also highlighted in **Figure 6.8**.

6.6.14 Alternative schemes which included a grade separation of the junction were considered and dismissed due to a combination of their deliverability, potential to draw in additional traffic from the wider network, and prohibitive costs.

College Road & Church Lane

6.6.15 College Road and Church Lane undertake complementary roles in terms of the east-west connectivity they provide within Broxbourne, across the A10. However both are current pinch points on the highway network because of their inability to accommodate the demand for both north-south and east-west flows through the junctions, and the number of vehicles wishing to turn on/off the A10.

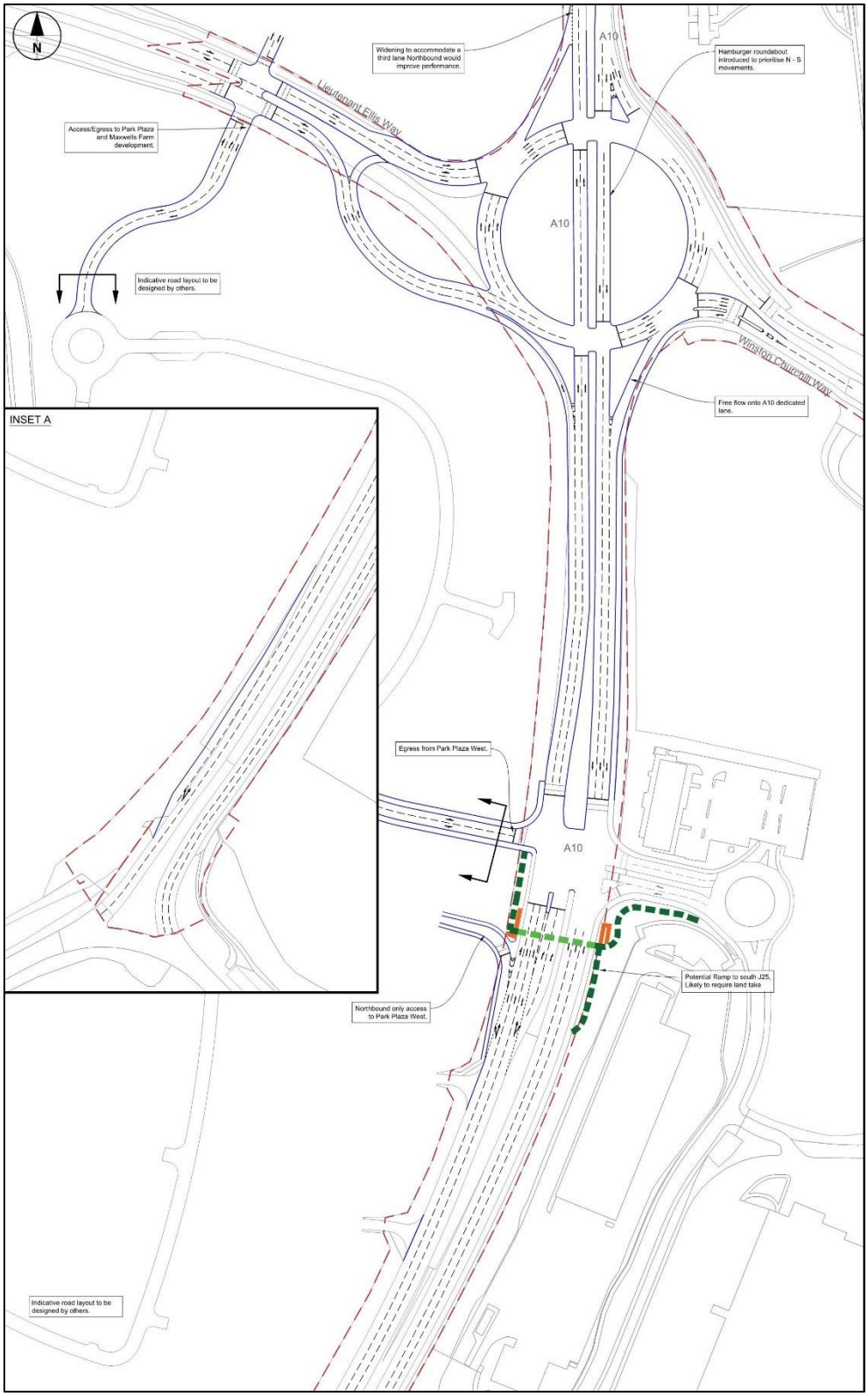
6.6.16 These pressures not only impact upon traffic flows but prevent the provision of safe and attractive pedestrian and cycle crossing facilities.

6.6.17 Given these constraints, it is proposed to build more capacity into both junctions by simplifying their operations and increasing queuing capacity and consequently vehicle throughput. In both locations right turning movements will be prohibited and the number of lanes approaching the junctions increased, as indicted in **Figure 6.9** and **Figure 6.10**.

6.6.18 This will also permit the provision of direct, surface level pedestrian and cycle crossings and reduce the severing effect of the A10 on sustainable east-west movements.

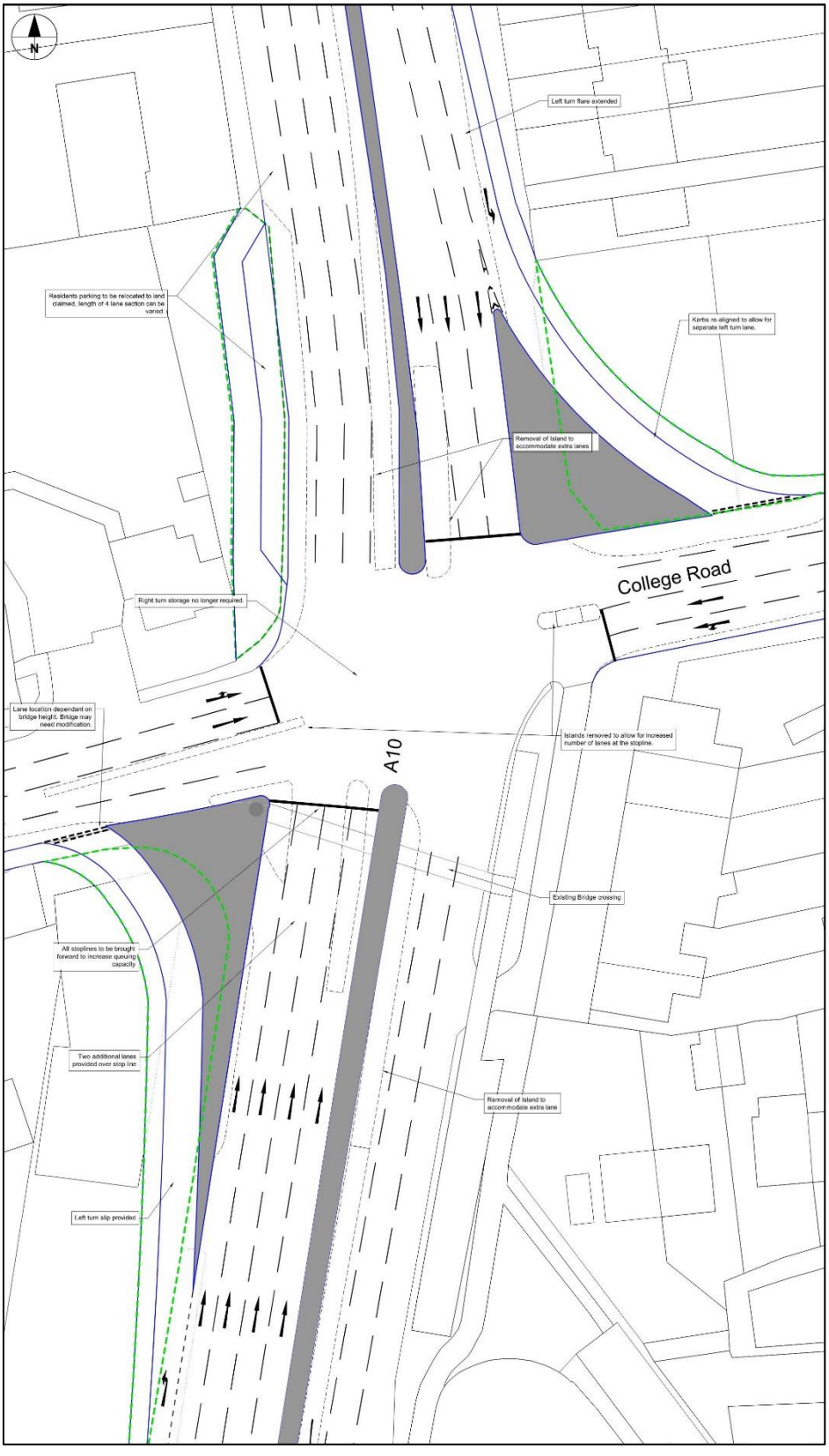
6.6.19 Several options were considered before these interventions were determined to be the most appropriate to take forward. Large scale Grade Separated Junctions (GSJs) were explored and rejected due to a combination of factors including the strategic impact of drawing traffic onto the A10 from alternative strategic north-south routes outside of the borough. This would have resulted in significant expenditure for limited benefit to the local area as a consequence of the increased flows of traffic through the junctions.

Figure 6.8: Park Plaza and Great Eastern Road Junction Improvement Proposals



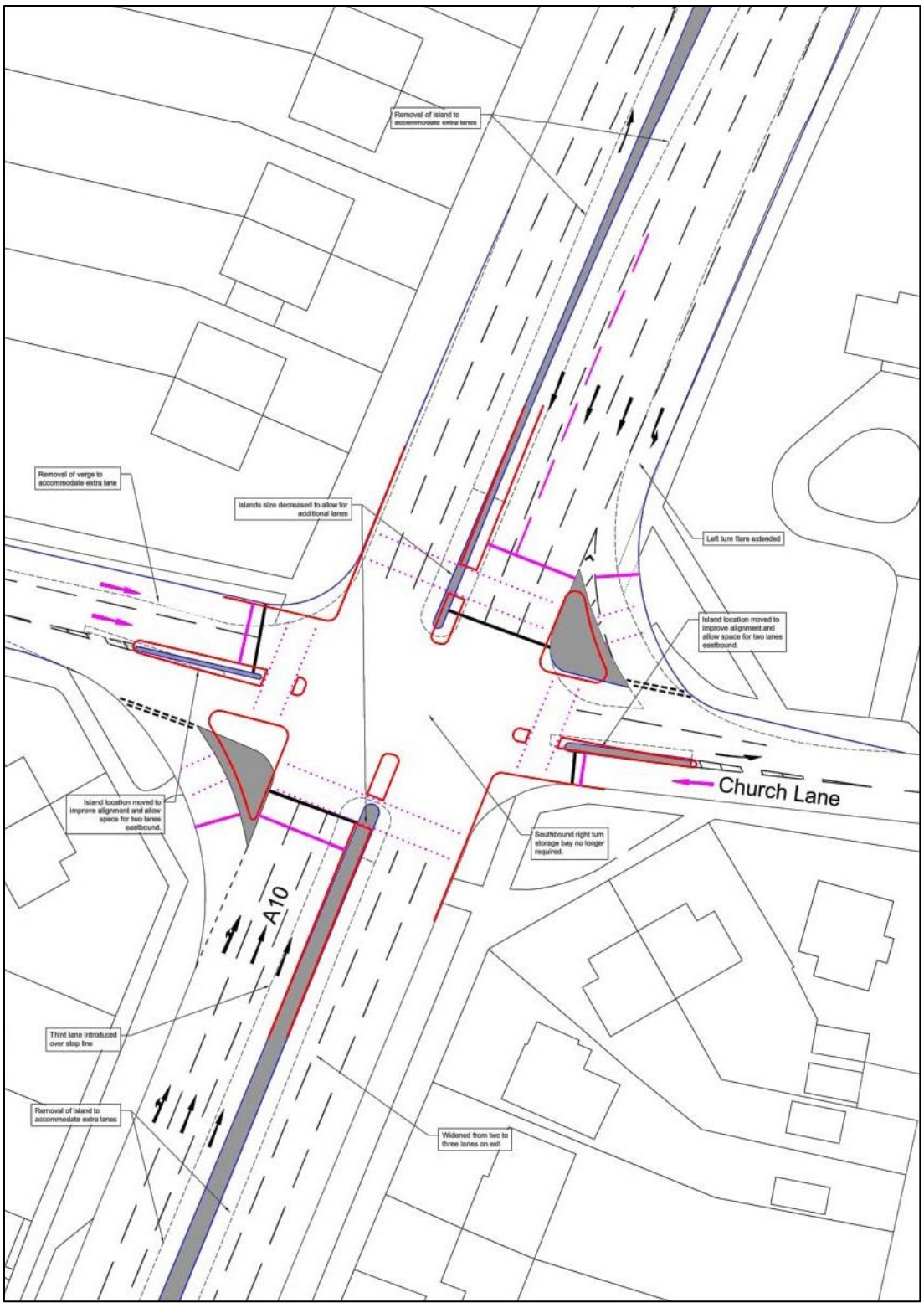
Source: AECOM

Figure 6.9: College Road Improvement Proposals



Source: AECOM

Figure 6.10: Church Lane Improvement Proposals



Source: AECOM / WYG

Halfhide Lane & Turnford Interchange

6.6.20 Halfhide Lane forms an important link in terms of east-west connectivity. An underpass it utilises under the A10 avoids a conflict with north-south movements.

6.6.21 To provide at-grade capacity and connectivity improvements at both Church Lane and College Road, improvements to Halfhide Lane are required. As such, increases to the width of the flares on the Marriott roundabout are proposed, alongside the realignment of Halfhide Lane itself (to the west of the A10 to accommodate a new development parcel) and the creation of a new three-arm junction on the corridor immediately to the north of Tesco, removing access onto Halfhide Lane from The Links.

6.6.22 These measures are part of the wider proposals for the development of Brookfield and negate the need for a southbound slip road from Turnford Interchange onto the A10, as illustrated in **Figure 6.12**. Details on the evidence to support these interventions through the modelling undertaken is set out in **Chapter 11**.

Junction Capacity – Dinant Link Road (A1170)

6.6.23 The High Leigh Garden Village site allocation will provide in excess of 500 dwellings to the west of Hoddesdon and a series of junction capacity improvements are proposed along the Dinant Link Road through which the increase in demand to travel can be accommodated.

6.6.24 These improvements comprise the provision of a new "dumb-bell" type junction immediately to the east of the A10 which will provide access into the sites on either side of the Link Road (see **Figure 6.11**). This is considered to be part of the development costs of the site and is not included within the overall schedule of interventions contained within this Strategy.

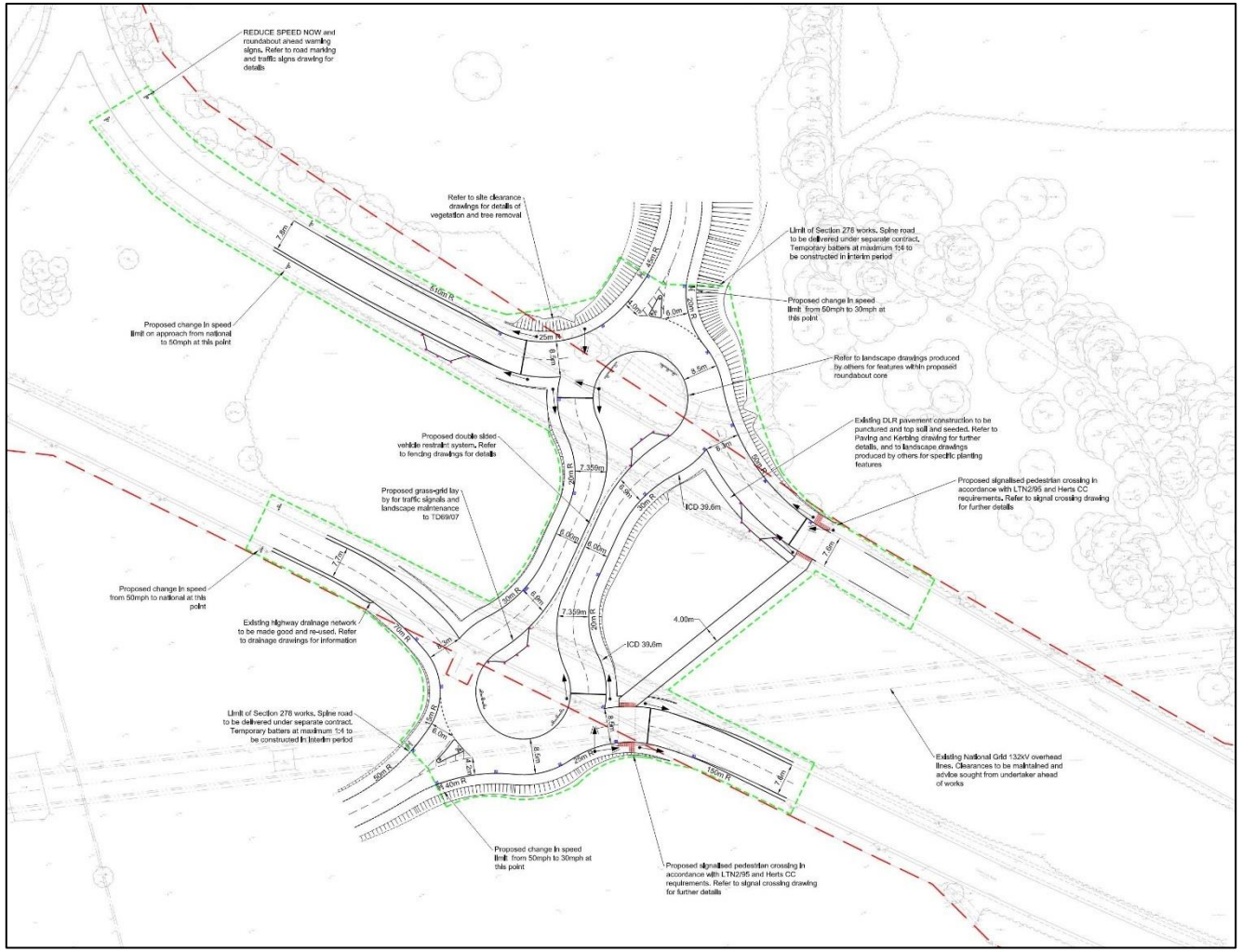
6.6.25 Smaller scale widening of roundabouts on the A1170 at the Sun Roundabout (junction of Dinant Link Road and Ware Road), at the Essex Road Roundabout and to the north of the A1170 at the junction of Hertford Road and Ware Road are also set to be secured on the back of the High Leigh development coming forward.

Junction Capacity – Monarch's Way (A121)

6.6.26 Two large roundabouts in Waltham Cross, the Fishpools roundabout (at the junction with the High Street and Winston Churchill Way) and the KFC roundabout (at the junction with Eleanor Cross Road) will be subject to increasing volumes of traffic over the Plan period and require capacity improvements to accommodate the growing level of demand.

6.6.27 However an Area Action Plan is set to be produced for the town following the adoption of the Local Plan, to reflect transport and development opportunities which may arise as a result of Crossrail 2 proposals coming forward. As such the AAP will provide the wider context and most appropriate channel through which to identify the interventions to address capacity requirements at both roundabouts.

Figure 6.11: High Leigh Access via Dinant Link Road



Source: Brookbanks

Junction Capacity – Local Network

6.6.28 A series of further mitigations are proposed to address junction capacity concerns on the local road network. Existing mini-roundabouts will be replaced with signalised junctions to improve the flow of traffic by providing a more effective tool through which to manage conflicting flows of vehicles based upon the highway modelling undertaken and detailed in **Chapter 11**.

6.6.29 They will also generate significant benefits to pedestrians and cyclists through the inclusion of dedicated crossing phases in the signal timings. The following locations will be targeted:

- Junction of Church Lane and High Street, Cheshunt
- Junction of Church Lane and Flamstead End Road, Cheshunt
- Junction of Cuffley Hill and Newgatestreet Road, Goffs Oak

New Links

6.6.30 To facilitate strategic developments proposed at Brookfield, High Leigh, Delamare Road and Park Plaza, new roads will be required internal to the sites to provide access. In addition, four new links are included within this Strategy that will have a wider impact on the operation of the highway network and these are detailed below.

Turnford Link Road

6.6.31 Two new link roads are proposed to be provided to form the framework upon which the Brookfield Riverside development can come forward. These roads will both run parallel to the A10 and not only open up the area around the New River for commercial and retail development, but also provide important east-west connectivity, as effectively a realignment of Halfhide Lane, and secondly provide a new access onto the A10 via the Turnford Interchange.

6.6.32 The Turnford Link Road will form a 0.8km north-south link between the Turnford Interchange in the north and Halfhide Lane in the south. Planning permission for the link was granted in 2013 which will span the New River and comprise a single carriageway (7.3m wide) with 2m wide footpaths each side set back behind 1.5m wide grass verges.

6.6.33 It will in effect form a part realignment of Halfhide Lane, together with the Hells Wood Link Road, and see the existing junction with The Links severed and new junctions provided towards the north of the corridor off which access roads into the residential development associated with Brookfield can be provided.

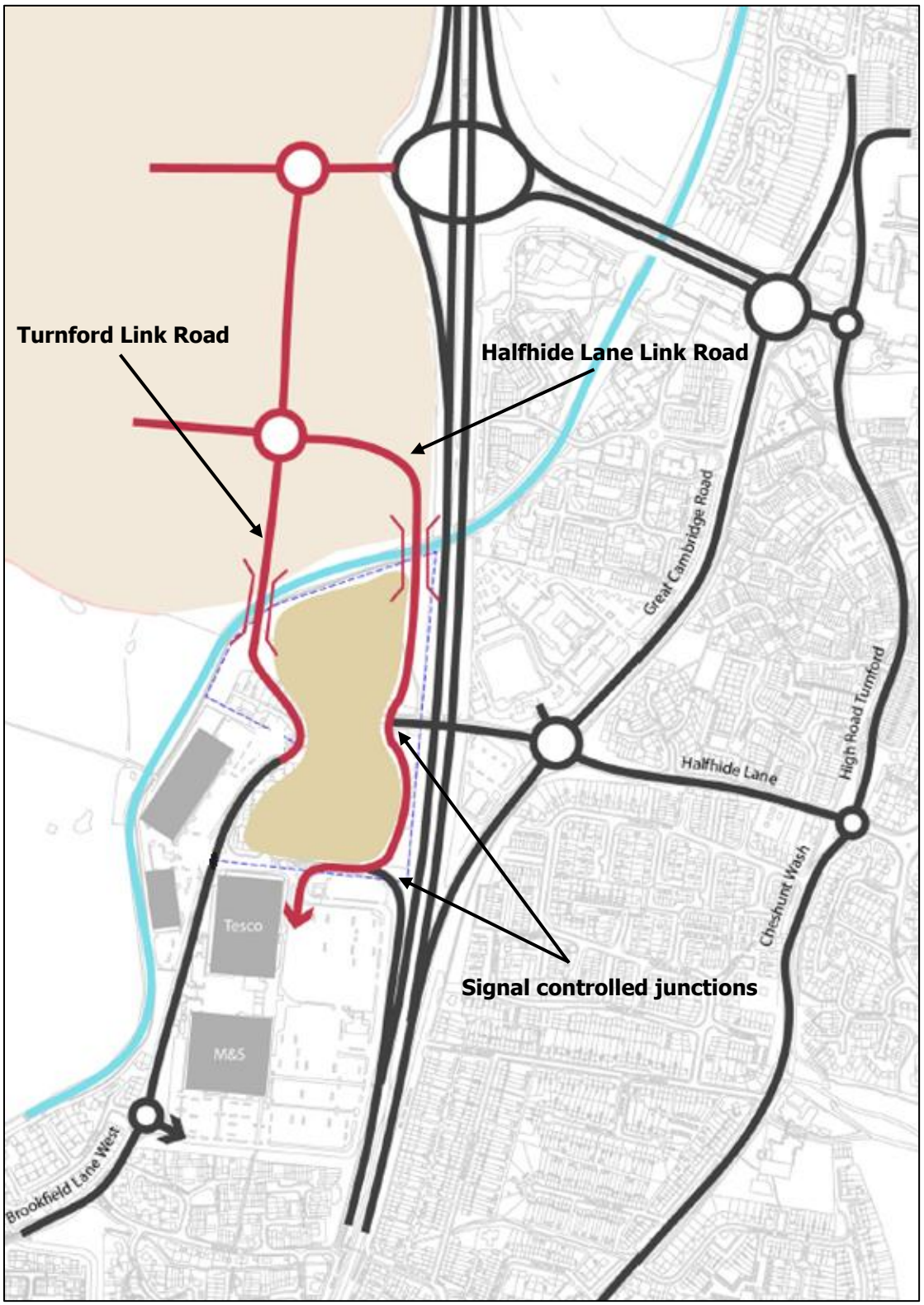
Halfhide Lane Link Road

6.6.34 Running parallel to the Turnford Link Road (to the west) and the A10 (to the east), a second link will complete the realignment of Halfhide Lane and provide access to both the eastern edge of the Brookfield development and act as a replacement access and egress into Tesco to the south (due to the closure of The Links access onto Halfhide Lane).

6.6.35 The route will provide a second bridge over the New River and negates the need for a southbound slip from the Turnford interchange, as traffic looking to travel south from the new residential development will utilise the road and the Marriott Roundabout to join the existing slip road adjacent to the gospel church.

6.6.36 An indicative plan of these links is illustrated in **Figure 6.12**.

Figure 6.12: Indicative Locations of Turnford Link Road and Halfhide Lane Link Road



Source: WYG

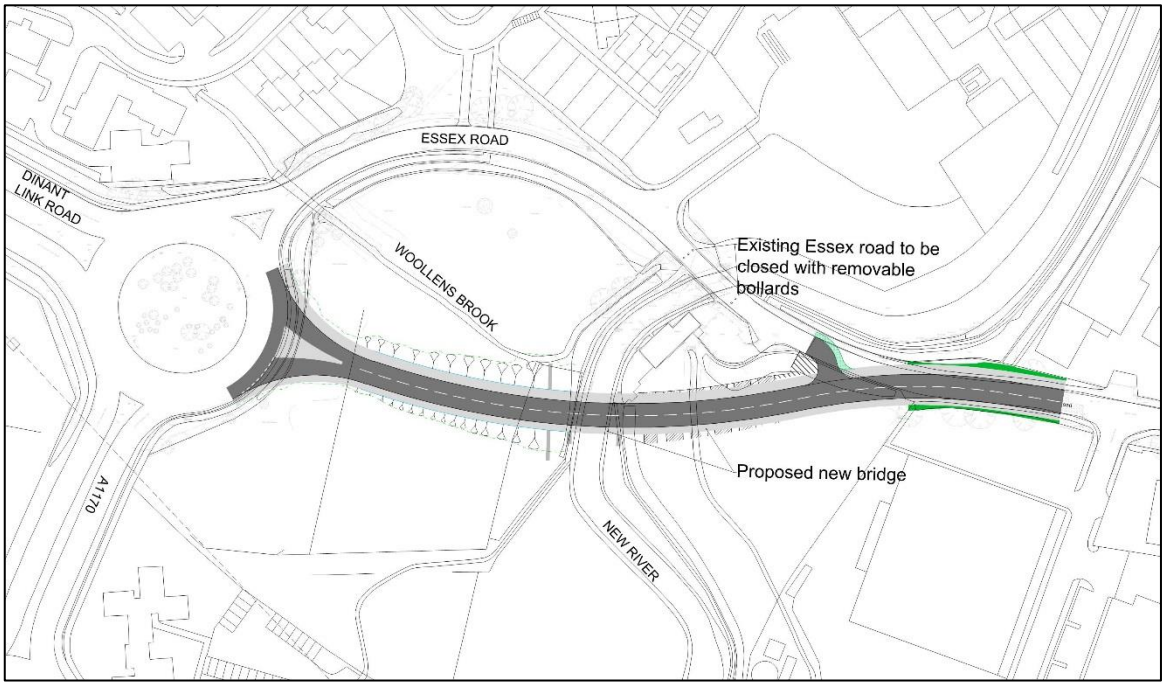
Essex Road

6.6.37 A new link is set to be provided at the junction of Essex Road and Dinant Link Road. This will:

- Improve and maintain access to employment at the Essex Road Business Park.
- Increase the resilience of the transport access to Essex Road to cope with incidents such as collisions, breakdowns and maintenance.
- Improve safety for all road users.
- Improve the quality and connectivity of provision for pedestrians and cyclists.

6.6.38 The indicative alignment of the link is highlighted in **Figure 6.13**.

Figure 6.13: Essex Road Link



Source: Essex Road Gateway Feasibility Study

Wormley School Access

6.6.39 Two new access roads will be provided into a site earmarked for a new secondary school within the Broxbourne Local Plan. The site in Wormley lies immediately to the north of the A10 Spur Road which heads east from the Turnford Interchange.

6.6.40 A left-in / left-out access road is proposed to open up the site for development, with a complementary facility providing access into the school grounds off Church Lane to the north. These schemes will provide no wider benefit to the network and as such are deemed development costs, and so omitted for the overall schedule of interventions this Strategy will take forward.

Network Management

6.6.41 Improving the flow of traffic across the network will improve the efficiency and effectiveness of its operation and ensure the full benefits of the larger scale capacity based interventions are realised.

6.6.42 The Network Management Duty is a requirement to make the best use of the existing highway network so that it operates efficiently and without delays for all road users, and is placed on all local highway authorities across the country, under the Traffic Management Act 2004[40].

6.6.43 The signage of the network is an important element of network management to ensure that vehicles use the appropriate routes. This is particularly pertinent in Broxbourne which is subject to a mixture of local and through traffic especially at peak times, and as a consequence of the revised access arrangements on and off the A10 proposed.

6.6.44 Information provision is another important area of network management. Providing real time information via 'sat-navs', smart phones or the internet can help motorists make more informed route choices and re-route away from congestion and delays.

6.6.45 The A1(M) and M11 supplement the role of the A10 as north-south corridors between London and Hertfordshire and Cambridgeshire and are all connected via the M25. As such Variable Message Signage (VMS) on these routes could advise as to delays and ensure the more efficient operation of the network, although this is beyond the remit of this Strategy.

6.6.46 In terms of the management of speed to address actual and perceived road safety concerns, the Hertfordshire County Council Road Safety Strategy details a series of measures through which issues can be addressed.

6.6.47 Specifically it is proposed to introduce a series of small scale interventions along the alignment of the old A10 through which to reduce the speed of traffic down to around 20mph, and give greater priority to buses, pedestrians and cyclists through changes to signal timings and raised tables at crossing points.

6.6.48 This will not only reduce the speed of traffic but could see the volume of traffic also reduce as it reassigns to faster, more strategic routes (particularly the A10).

[40] http://www.legislation.gov.uk/ukpga/2004/18/section/16

Table 6.5: Summary of Highways Interventions

Ref.	Scheme	Capacity		Connectivity					Communities			
		Congestion	Overcrowding	Open Up Land	Self-Containment	Severance	Incomplete Networks	Ability to Interchange	Safety & Security	Air Quality	Public Realm	Active Lifestyles
HS.01	*M25:* Capacity improvement at M25 J25, through the provision of a dedicated left turn lane for northbound traffic off the M25 and the widening of the A10 southbound on its approach to the junction.	✓				✓						
HS.02	*A10:* Modify existing 3-arm junction on A10 to provide an at-grade 4-arm junction for access into Park Plaza North & West.			✓		✓						
HS.03	*A10:* Provide a 'hamburger' style signalised junction with N/S priority at the intersection of the A10 junction with the A121 Monarch's Way and B198 Lieutenant Ellis Way (Park Plaza junction).	✓		✓		✓						
HS.04	*Lieutenant Ellis Way:* New 4-arm junction on Lieutenant Ellis Way to the north of Park Plaza.			✓								

Ref.	Scheme	Capacity		Connectivity					Communities			
		Congestion	Overcrowding	Open Up Land	Self-Containment	Severance	Incomplete Networks	Ability to Interchange	Safety & Security	Air Quality	Public Realm	Active Lifestyles
HS.05	*College Road:* At grade improvement at College Road / A10 junction, providing additional northbound and southbound lanes at the junction and increased length of northbound left filter into College Road, and banning all right turns.	✓				✓			✓			
HS.06	*Church Lane:* At grade highway capacity improvement at Church Lane / A10 junction, providing an additional north-south lane through the junction and banning all right turns and left turns onto the A10.	✓				✓			✓			✓
HS.07	*Church Lane:* Reconfiguration of Church Lane / High Street, Cheshunt roundabout to provide signalised junction and crossing points for pedestrians.	✓							✓			✓
HS.08	*Church Lane:* Reconfiguration of Church Lane / Flamstead End Road roundabout to	✓							✓			✓

Ref.	Scheme	Capacity		Connectivity					Communities			
		Congestion	Overcrowding	Open Up Land	Self-Containment	Severance	Incomplete Networks	Ability to Interchange	Safety & Security	Air Quality	Public Realm	Active Lifestyles
	provide signalised junction and crossing points for pedestrians.											
HS.09	*Brookfield (Turnford Link Road):* Construction of a Halfhide Lane to Turnford Interchange Link Road, together with provision of a new western arm at the A10 Turnford Interchange.	✓		✓							✓	
HS.10	*Brookfield (Halfhide Lane Link Road):* Construction of new link road immediately to the west of the A10 providing a link from Halfhide Lane north to Hells Wood, where it turns westwards to connect to the Turnford Link Road via a new roundabout, and south to 'The Links' to provide access to Tesco and from the A10 off-slip.	✓		✓							✓	
HS.11	*Brookfield (Garden Village Distributor Road):* Provision of new distributor road to serve the new Brookfield development.			✓								

Ref.	Scheme	Capacity		Connectivity					Communities			
		Congestion	Overcrowding	Open Up Land	Self-Containment	Severance	Incomplete Networks	Ability to Interchange	Safety & Security	Air Quality	Public Realm	Active Lifestyles
HS.12	*Brookfield:* Reconfiguration of the 4-arm signlaised junction on Halfhide Lane at junction with The Links and the access road into Brookfield Retail Park, by removing access to/from The Links and allowing only movements into (and not out of) the Retail Park.	✓		✓		✓			✓		✓	✓
HS.13	*Brookfield:* Provision of additional capacity at Marriott Roundabout.	✓										
HS.14	*Goffs Lane:* Reconfiguration of Newgatestreet Road / Cuffley Hill / Goffs Lane junction give way to provide signalised junction with crossing points for pedestrians.	✓							✓			
HS.15	*Dinant Link Road:* New "dumb-bell" roundabout on Dinant Link Road to permit access into High Leigh development.			✓								

Ref.	Scheme	Capacity		Connectivity					Communities			
		Congestion	Overcrowding	Open Up Land	Self-Containment	Severance	Incomplete Networks	Ability to Interchange	Safety & Security	Air Quality	Public Realm	Active Lifestyles
HS.16	*Dinant Link Road:* Sun roundabout improvements (junction of Dinant Link Road and Ware Road) to provide additional lane on eastbound arm of roundabout.	✓										
HS.17	*Hertford Road:* Hertford Road / Ware Road roundabout improvements to provide additional eastbound and southbound lanes at respective arms of the junction.	✓										
HS.18	*Essex Road:* Provision of new Essex Road Bridge.	✓		✓								
HS.19	*Essex Road:* Improvements to roundabout at junction with Dinant Link Road.	✓										
HS.20	*Signage:* Update the network signage across the Borough to reflect the new access arrangements on/off the A10 at Church Lane.	✓					✓	✓				

Ref.	Scheme	Capacity		Connectivity					Communities			
		Congestion	Overcrowding	Open Up Land	Self-Containment	Severance	Incomplete Networks	Ability to Interchange	Safety & Security	Air Quality	Public Realm	Active Lifestyles
HS.21	*Secondary School Access:* Provision of a new access into the secondary school site from the A10 spur road to the south.			✓								
HS.22	*Secondary School Access:* Provision of a new access into the secondary school site from Church Lane to the north.			✓								

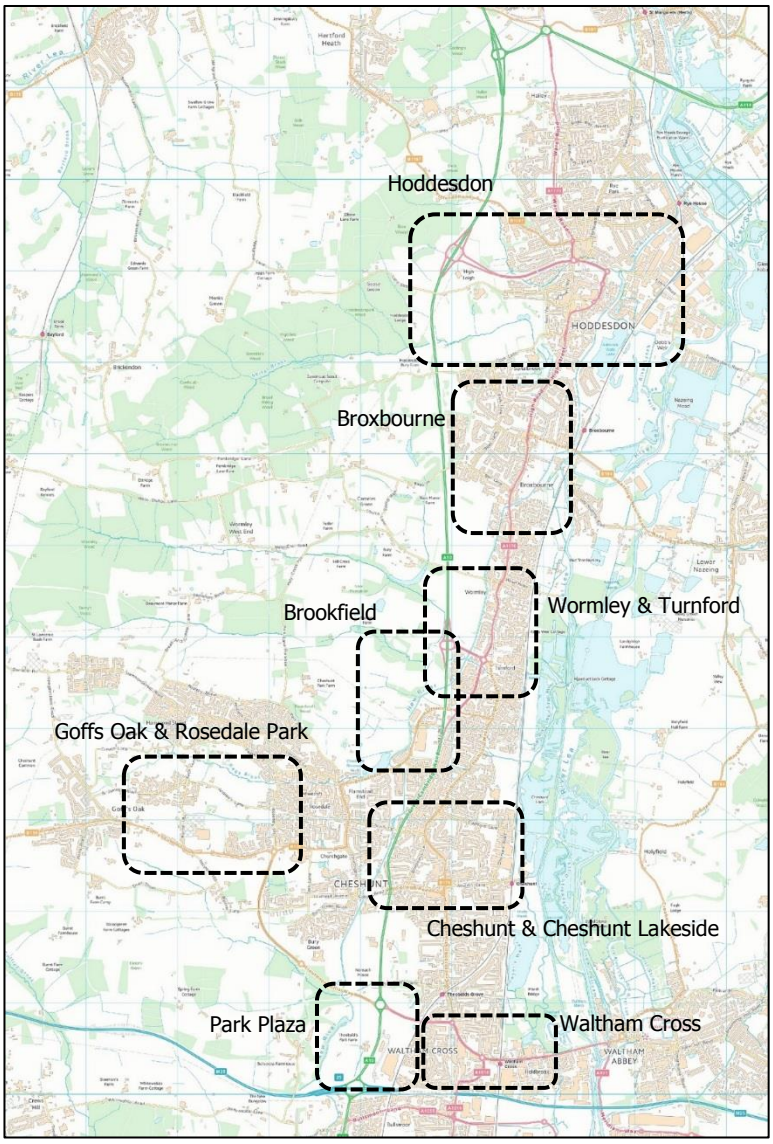
7.0 Area Profiles

7.1 Overview

7.1.1 The nature of investment in transport to mitigate the impacts of growth will differ across the authority and this chapter draws out the interventions relevant to each locality and how these will help shape the places in question. **Figure 7.1** illustrates the locations of the respective area profiles.

7.1.2 Following the adoption of the Local Plan, an Area Action Plan (AAP) will be produced to cover the Waltham Cross area. There are plans for large scale development within the town subject to Crossrail 2 coming forward and as such this chapter also details some of the transport related opportunities to be explored in Waltham Cross through the AAP.

Figure 7.1: Location of Area Profiles



Source: Contains OS data © Crown copyright and database right (2017)

7.2 Brookfield

7.2.1 The scale of growth envisaged at Brookfield, and the future role it will play as a local retail and employment centre, necessitate significant levels of investment to provide the capacity and connectivity to accommodate growth in the area.

7.2.2 At the heart of this is the need to ensure sustainable access and a choice of means of travel to local residents. As such, new bus services will provide fast and direct access from surrounding residential and employment sites, whilst the New River will form a safe and attractive pedestrian and cycle link into the heart of the new community.

7.2.3 The Links will be closed at its junction with Halfhide Lane to remove any severance between the existing retail provision to the south, comprising Tesco and Marks and Spencer, and the new provision earmarked to the north of The Links.

7.2.4 Significant changes to the local highway network are proposed which will see the realignment of Halfhide Lane, improved access to the A10 via a new link road to the Turnford Interchange and capacity improvements at the Marriott Roundabout.

7.2.5 The closure of Halfhide Lane and The Links as through routes will be offset by the provision of a new route running parallel to the A10, north from Halfhide Lane immediately to the west of the A10 before turning west connecting to the new Turnford Link Road.

7.2.6 **Figure 7.2** illustrates areas of investment on the ground, whilst the relevant interventions for each locality are detailed within **Appendix A**.

7.3 Broxbourne

7.3.1 There are a series of interventions earmarked for Broxbourne within this Strategy through which sustainable transport could become a more attractive option for travel through the village. At the heart of these proposals is the identification of Broxbourne Station as the preferred northern terminus of Crossrail 2 in 2033.

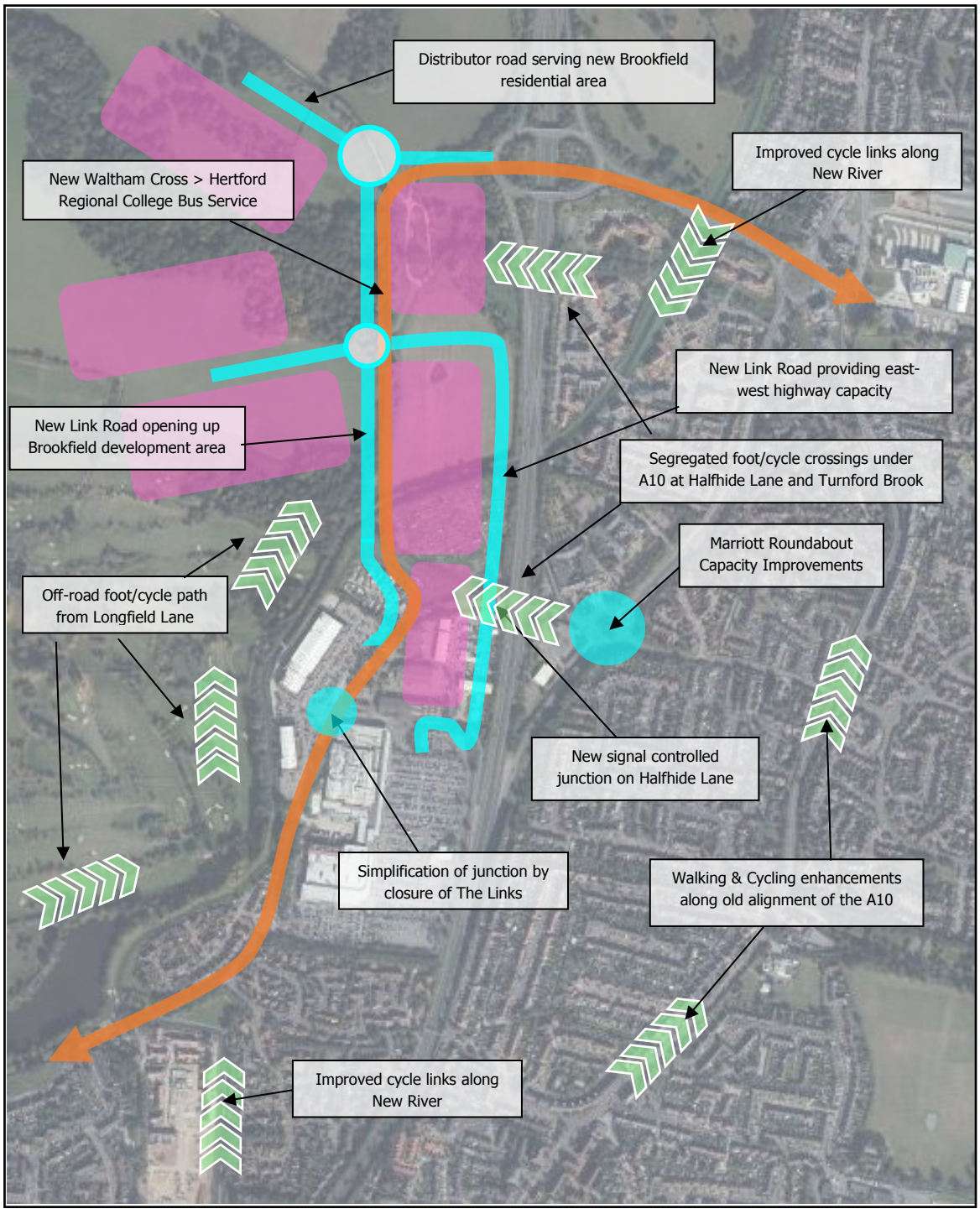
7.3.2 This would see patronage levels increase significantly and therefore the Strategy seeks to broaden the choice of travel options available to station users including through the provision of a Station Travel Plan and the subsequent evidence this would provide in identifying realistic and effective sustainable travel options for commuters.

7.3.3 Frequent bus services are proposed to link the Station to Brookfield and Hoddesdon as well as other parts of the Borough, the New River will provide an attractive, well maintained commuter and leisure cycle route, and junction improvements on Station Road will are envisaged to ensure that pedestrians have safe and direct links into the Station.

7.3.4 Away from the Station, there is the scope for investment in bus prioritisation at key junctions, such as at High Road / Station Road, and new bus shelters in place making bus travel a more attractive alternative to the car.

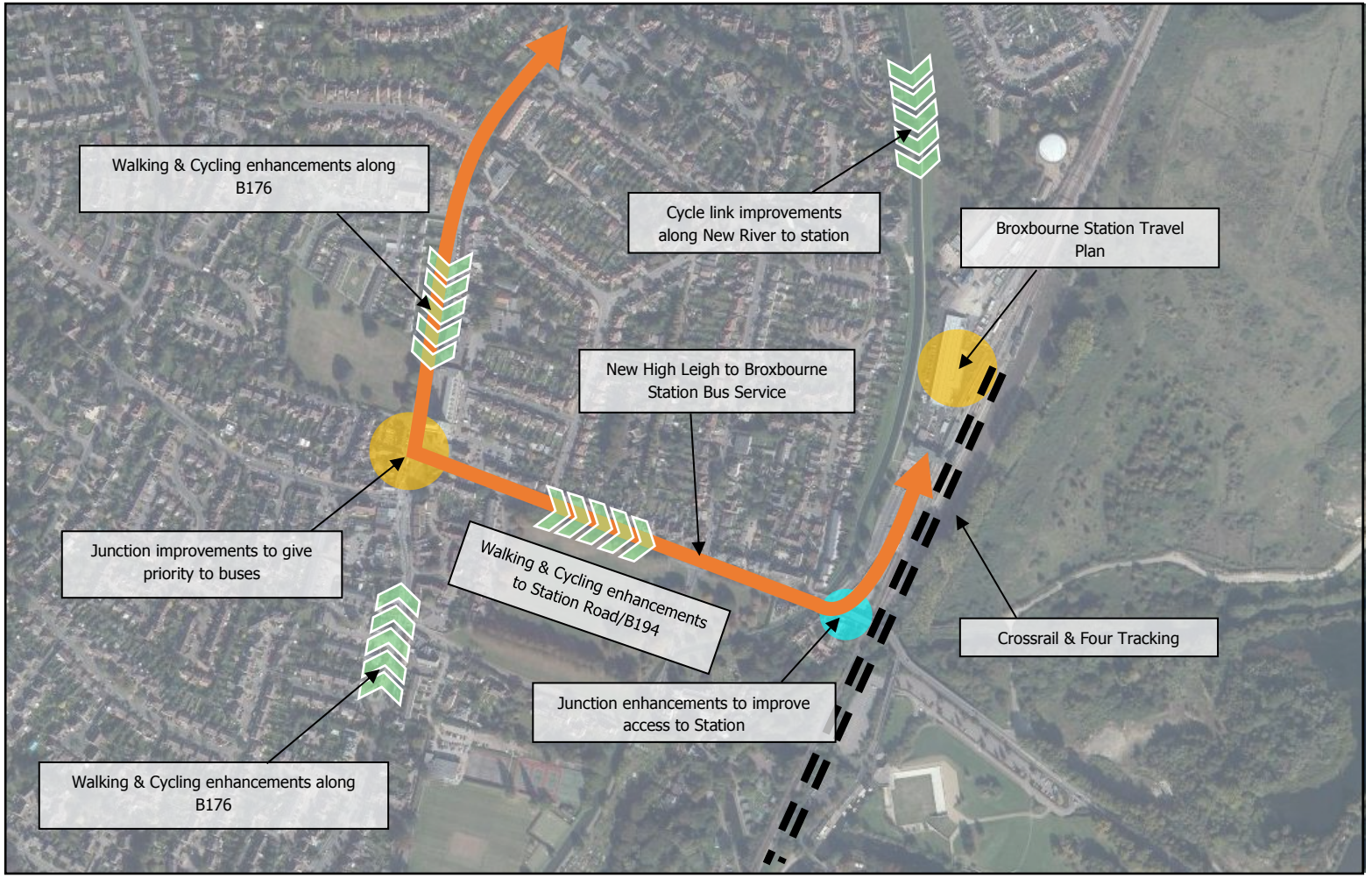
7.3.5 **Figure 7.3** illustrates these proposals.

Figure 7.2: Brookfield Proposals



Source: Bing Maps

Figure 7.3: Broxbourne Proposals



Source: Bing Maps

7.5 Cheshunt

7.5.1 Cheshunt is at the heart of the borough and as such accommodates a number of junctions critical to the operation of the wider highway network. There is a requirement for several of these to be enhanced to provide capacity and connectivity improvements along both north-south and east-west corridors.

7.5.2 At either end of Church Lane, signals will replace the existing mini roundabouts to improve capacity and regulate flow along Flamstead End Road and High Road respectively. These changes will also support changes in access arrangements on/off the A10. All right turns at the Church Lane/A10 junction will be banned and only left turns off the A10 permitted. This will not only improve flow and capacity but allow pedestrians and cyclists to cross via new direct crossings points in a single phase.

7.5.3 College Road operates in conjunction with Church Lane and removing right turns at the junction with the A10 will also improve the operation of high capacity A10 corridor. Supporting works at the Old Pond junction will simplify the existing movements to regulate traffic flow and create a more attractive public realm.

7.5.4 Whilst this may result in longer trips for residents of Church Lane and College Road in trying to access the A10 themselves, it is in the interests of the network as a whole that the ban on right turn movements is introduced. In addition the works to the junctions will provide significant improvements to east-west pedestrian and cyclist connectivity from which the residents will greatly benefit.

7.5.5 With regard to public transport provision, the Station and the Cheshunt Lakeside development will be served by a new bus service providing access to Waltham Cross in the south and Brookfield in the north, whilst a Station Travel Plan would provide a basis for further improvements to encourage more sustainable trips to the Station. **Figure 7.4** illustrates these proposals.

7.6 Goffs Oak & Rosedale Park

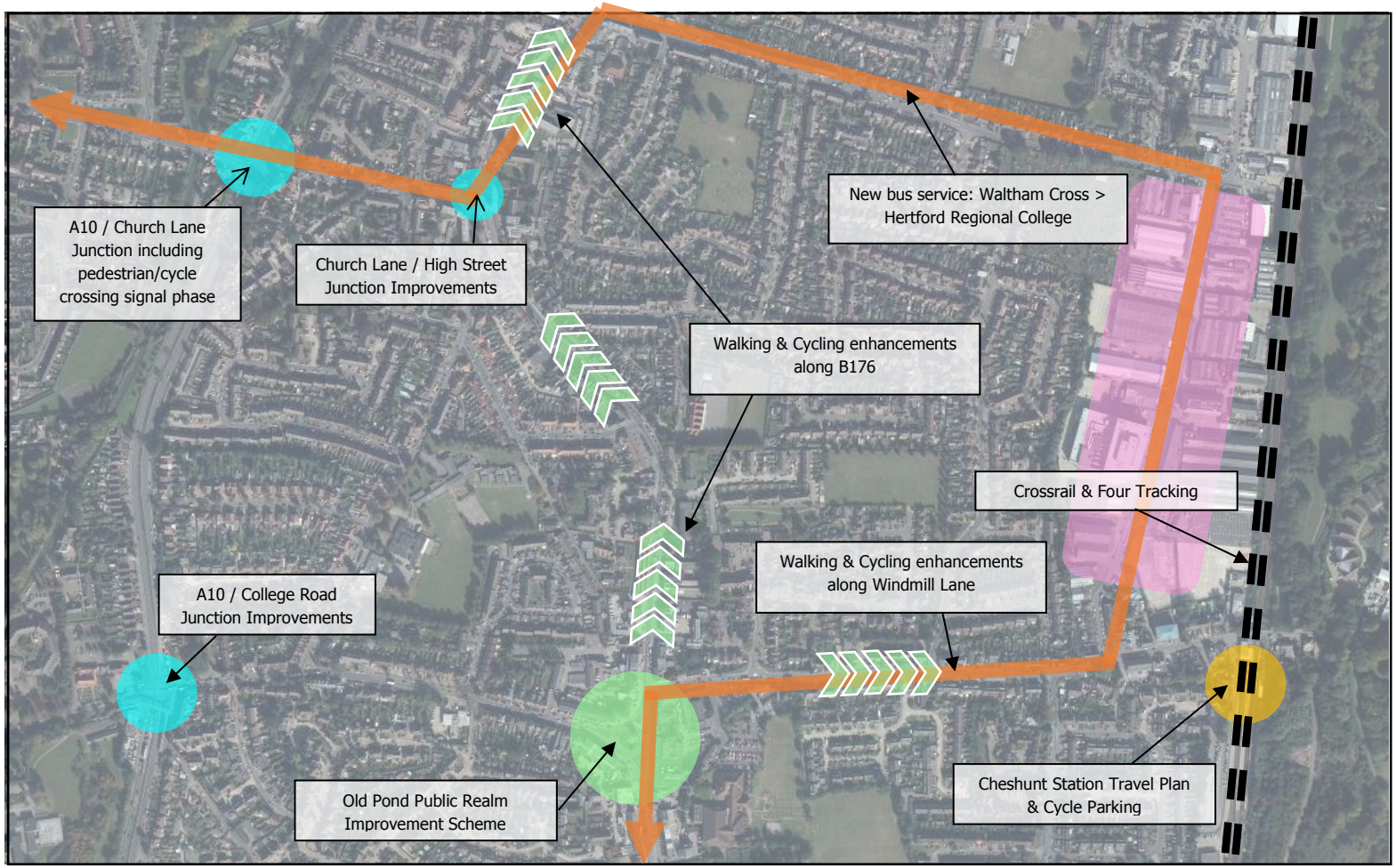
7.6.1 It is envisaged that by the end of the Local Plan period, Rosedale Park will have expanded into a series of inter-linked parkland communities. However as relatively low density communities located away from main public transport corridors and with limited permeability for large vehicles, alternatives to the car could be limited.

7.6.2 Notwithstanding these limitations, there is scope to incorporate changes to the existing 242 bus service with diversions off Rosedale Way into the heart of the area, serving the proposed new school and community centre, whilst investment in waiting facilities along Goffs Lane seek to serve in the south of Rosedale Park.

7.6.3 Internal cycle links will connect to the wider cycle network in the area with a focus on sustainable access to the new primary school to be provided as part of development in the local area.

7.6.4 The Goffs Lane / Cuffley Hill / Newgatestreet Road junction is proposed to benefit from the removal of the existing mini roundabout and service road, and replacement with a signalised junction and improved public realm. This will assist in the management of traffic flow and crossing facilities for pedestrians and cyclists. **Figure 7.5** illustrates these proposals.

Figure 7.4: Cheshunt Proposals



Source: Bing Maps

Figure 7.5: Goffs Oak & Rosedale Park Proposals

Source: Bing Maps

7.7 Hoddesdon

7.7.1 It is envisaged that a clearly defined package of multi-modal interventions will help to accommodate the increase in demand to travel associated with the development earmarked at High Leigh on the western edge of Hoddesdon and other sites in and around the town.

7.7.2 A new roundabout on Dinant Link Road and minor capacity improvements at several others are proposed to help facilitate the increase in traffic flow associated with the High Leigh Garden Village.

7.7.3 These measures will be supported by the provision of a new bus service linking the development of around 500 dwellings to the town centre, and further south to Broxbourne Station. This will provide a realistic alternative to the car particularly for commuting trips further afield.

7.7.4 For more localised journeys, a series of corridor wide improvements along Lord Street would form a Primary Pedestrian Route and secure a safe and attractive link into Hoddesdon town centre.

7.7.5 Providing alternative at-grade pedestrian crossing points to the subways on Dinant Link Road also seek to reconnect the surrounding suburbs to the town centre to improve its connectivity and focal point for trips in the north of the borough. **Figure 7.6** illustrates these proposals.

7.8 Park Plaza

7.8.1 With significant commercial development and a desire to accommodate around 8,000 new jobs within the Local Plan, the transport interventions required to provide the capacity and connectivity for Park Plaza to develop as a sustainable and attractive location for growth are considerable in their scale.

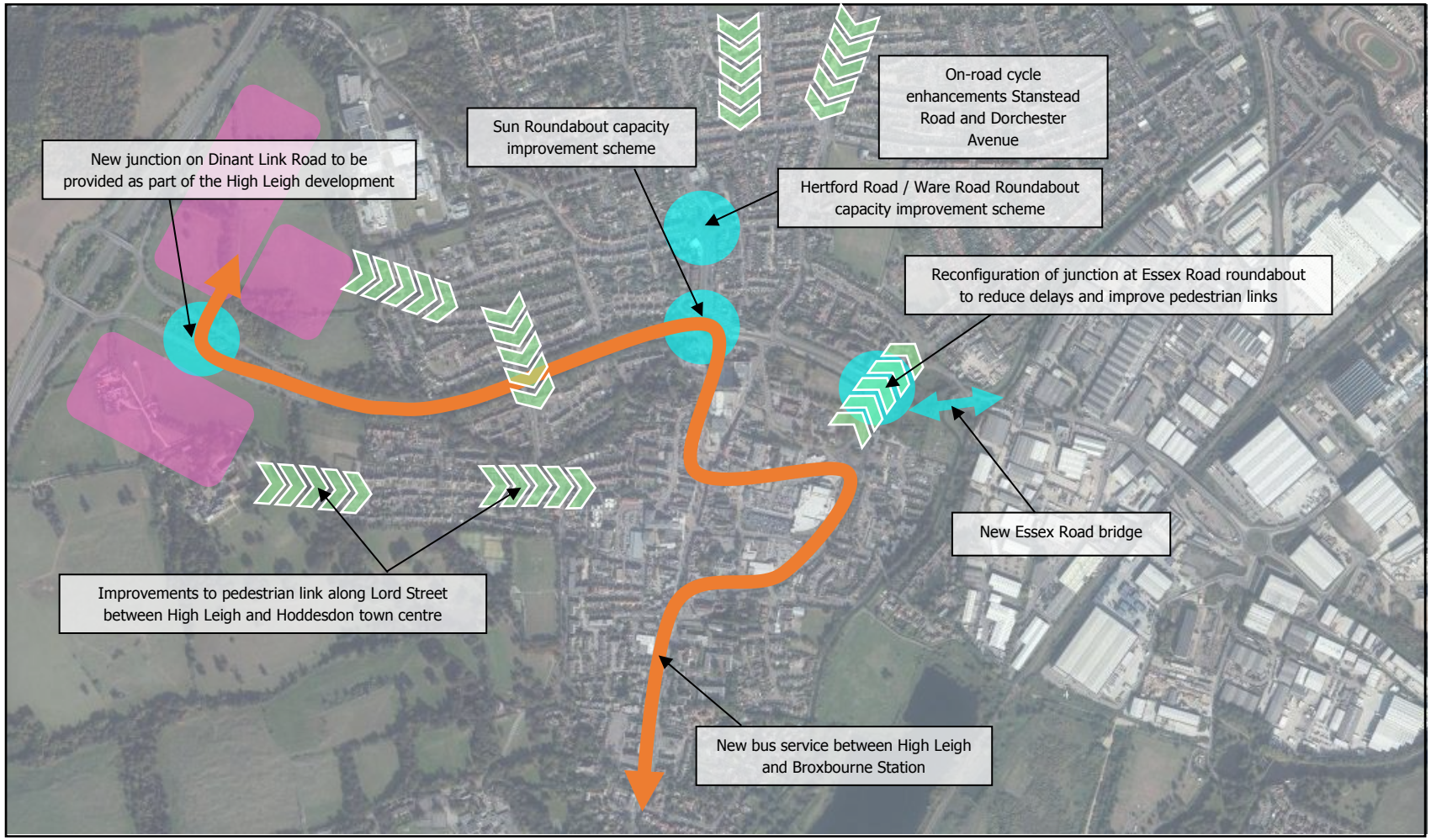
7.8.2 A new station located within Park Plaza North is proposed and would provide a high capacity and attractive link for commuters from the north of the borough and London to the south. As this is likely to be a longer term solution a link bus between the development and Waltham Cross town centre and station could provide the opportunity for sustainable bus/rail based travel to the site in the short to medium term, with improved interchange opportunities in place at the station itself. There is also the scope for this service to be extended to provide a link between Park Plaza and the surrounding residential areas to the north from which many of the employees will be drawn.

7.8.3 With the planned construction of a new footbridge across the Southbury Loop line, sustainable links between Park Plaza and Waltham Cross town centre and station will be in place to offer an alternative to car based travel.

7.8.4 Given Park Plaza's strategically important position at the junction of the M25 and A10 however, it is envisaged that the development will draw in traffic from the wider network. Highways England capacity improvements programmed for Junction 25 of the M25 will be coupled with a new 'Hamburger' type junction at the intersection of the A10 with Lieutenant Ellis Way and Winston Churchill Way. New 4-arm junctions on both the A10 and Lieutenant Ellis Way will provide access into the development sites and connectivity to the rest of the network.

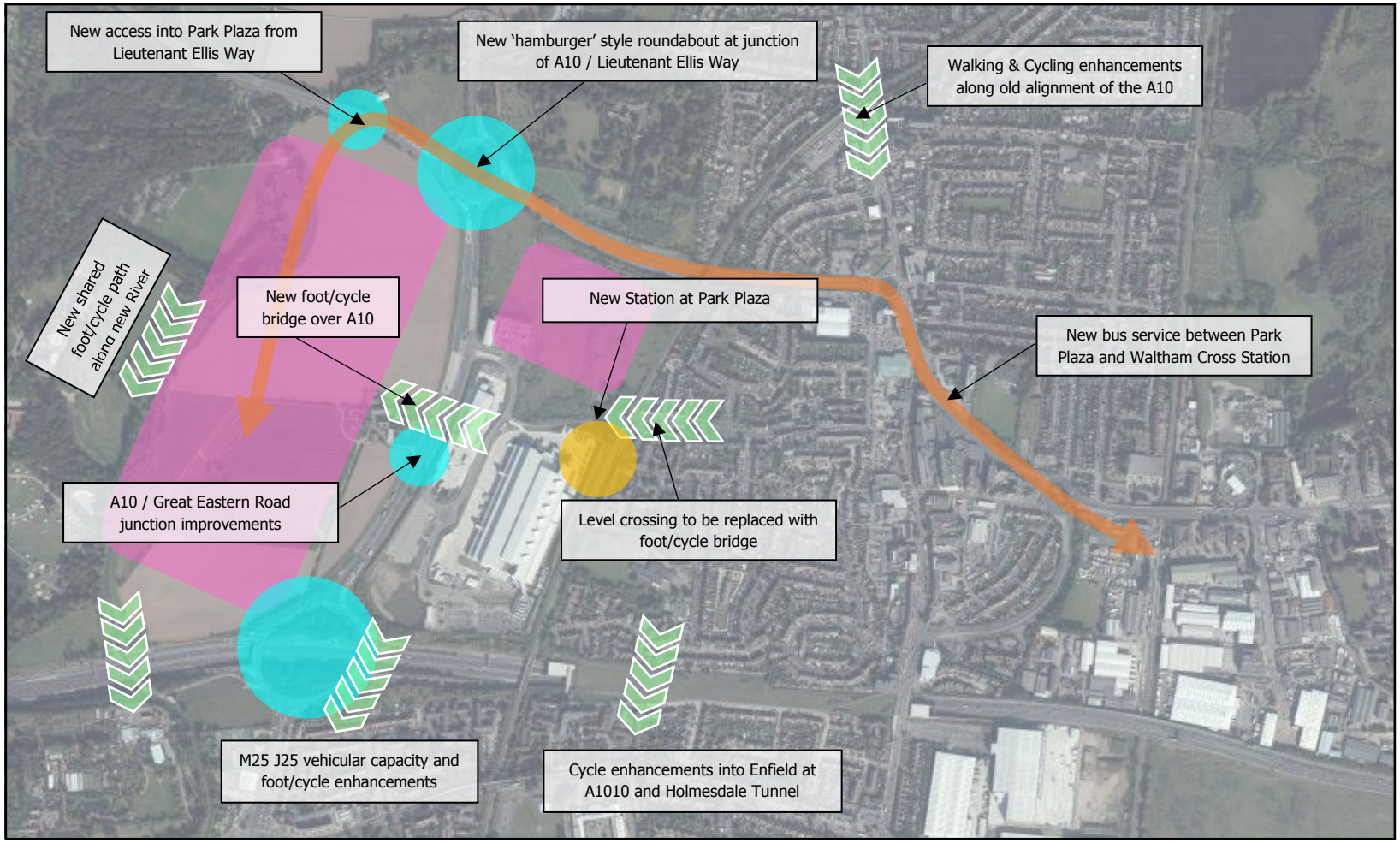
7.8.5 **Figure 7.7** illustrates these proposals.

Figure 7.6: Hoddesdon Proposals



Source: Bing Maps

Figure 7.7: Park Plaza Proposals



Source: Bing Maps

7.9 Waltham Cross

7.9.1 Whilst only limited development is proposed within Waltham Cross during the timeframe of the Local Plan and this accompanying Transport Strategy, in the longer term significant levels of growth are envisaged.

7.9.2 From 2033, in the region of 10,000 new dwellings could come forward associated with the delivery of Crossrail 2 which will serve Waltham Cross Station. This growth will require a comprehensive assessment of opportunities both in terms of development sites and transport infrastructure and will be addressed through the production of a Waltham Cross Area Action Plan (AAP) following the adoption of the Local Plan.

7.9.3 The authority will work in partnership with neighbouring authorities of Enfield and Epping Forest, together with Hertfordshire and Essex County Councils, Highways England and Network Rail to ensure that the infrastructure to support such growth is provided and sustainable travel opportunities are maximised.

7.9.4 In particular the step change in rail service provision Crossrail 2 would provide, could help drive the creation of an multi-modal transport hub at the station through which to ensure that long term growth is sustainable and helps to access both to and from the south of the borough is enhanced. **Figure 7.8** illustrates some of the opportunities which will be explored through the Area Action Plan.

7.10 Wormley & Turnford

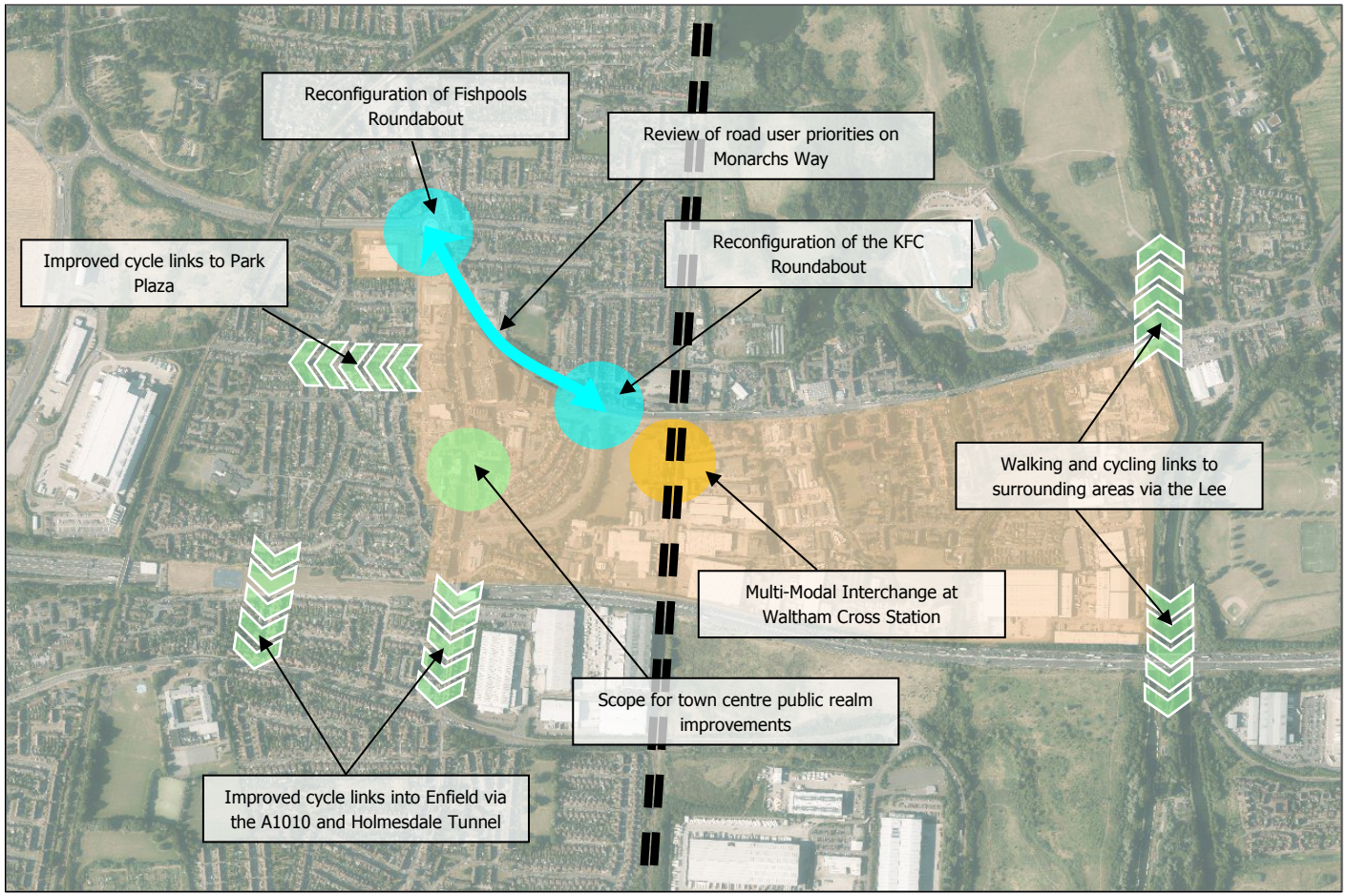
7.10.1 Education related trips characterise the local area with the presence of Hertford Regional College and this will be reinforced through the provision of a new secondary school on land immediately to the north of the A10 spur road. New accesses into the site will provide access onto the wider network.

7.10.2 The development of a School Travel Plan and the use of its evidence base to identify sustainable transport options for pupils will help to reduce reliance on the car and the volume of traffic on the local network.

7.10.3 The provision of a new station on the West Anglia mainline is seen as an opportunity through which to secure a modal shift from road to rail and reduce the impact of commuting on local communities within the borough, whilst measures to reduce the speed of traffic along the old A10 are designed to encourage more strategic trips to use the A10 as opposed to the Great Cambridge Road along which walking and cycling will be encouraged.

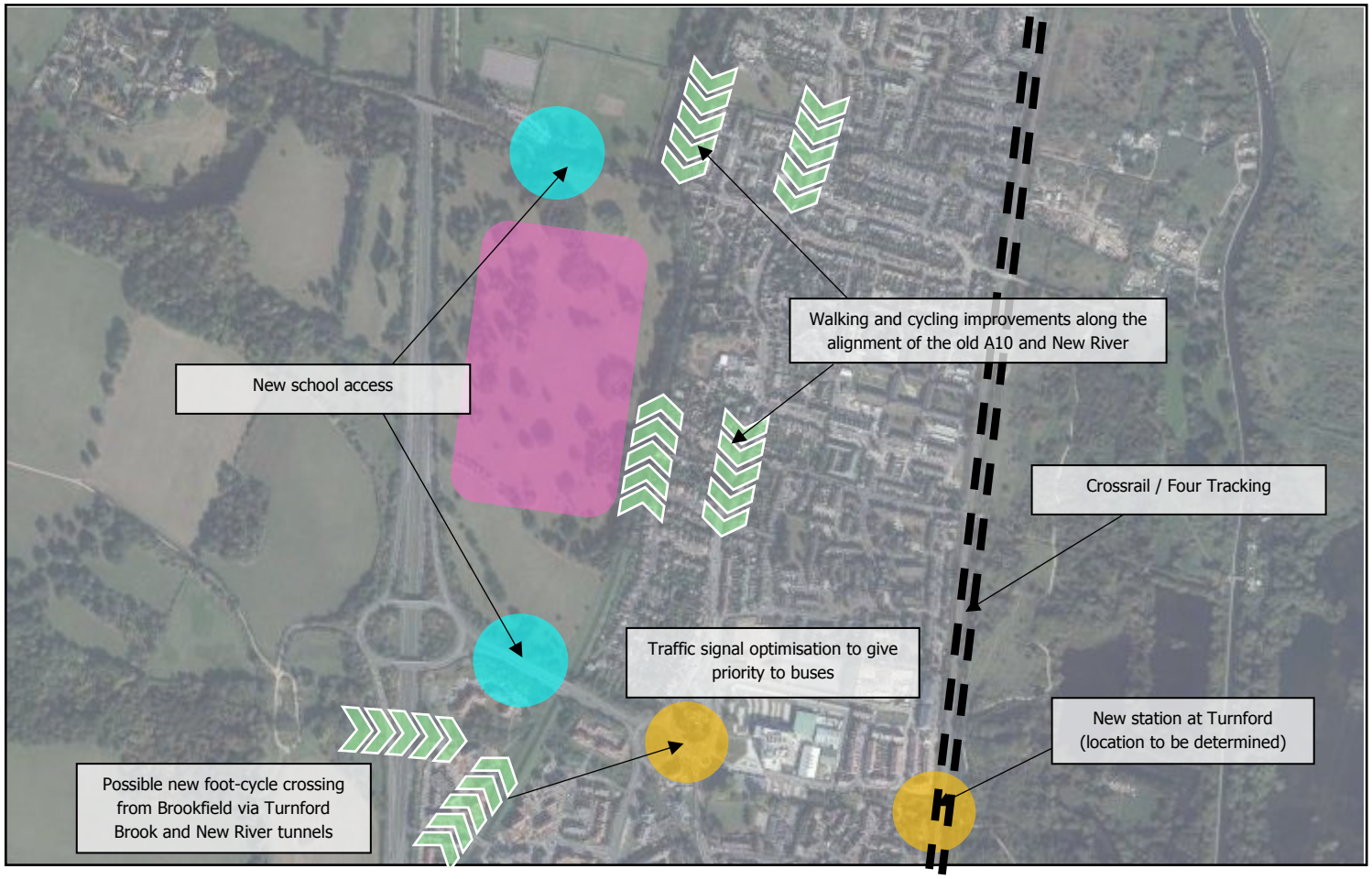
7.10.4 **Figure 7.9** illustrates these proposals.

Figure 7.8: Waltham Cross Opportunities



Source: Bing Maps

Figure 7.9: Indicative Proposals in Wormley & Turnford



Source: Bing Maps

8.0 Corridor Functionality

8.1 Overview

8.1.1 The demand to travel within Broxbourne is characterised by strong north-south movements within the borough. This is a consequence of the linear nature of the settlements, the draw of London to the south and the supporting road and rail network in place. There are several corridors within which these north-south movements are accommodated and this chapter details how they will evolve over the 20-year timeframe of the Strategy.

8.1.2 By contrast east-west movements across Broxbourne are poorly served and whilst many of the key trip generators are in the east of the authority, much of the growth earmarked for delivery is in the west of the borough. The severance of links by the A10 and West Anglia Mainline results in poor east-west connectivity in places and this chapter details how this will be addressed to improve access to jobs and opportunities within the authority.

8.2 North – South Corridors

8.2.1 There are four strategically important north-south corridors within Broxbourne which cater for the movement of all modes of travel. This Strategy contains proposals for investment in each to increase their capacity, improve connectivity and create safer and more attractive communities which in turn will facilitate the delivery of the level of housing earmarked within the Local Plan.

A10 Corridor

8.2.2 The A10 is and will remain an important strategic north-south link. It will continue to cater for both strategic and local traffic as a result of at-grade junction capacity improvements at Park Plaza, College Road and Church Lane. The nature of these works will be such that they will cater for the increases in local demand on the network without drawing in strategic trips from further afield. This is a delicate balance to strike but in doing so will both provide additional north-south capacity along the corridor together with reducing the severance effect of the A10 where it is intersected by College Road and Church Lane in particular.

8.2.3 Investment in the wider Strategic Road Network (SRN) managed by Highways England will also be noticeable on the A10. Additional capacity at M25 J25 will improve the flow of southbound traffic in the morning peak period and northbound in the evening peak, whilst further afield, a new junction on the M11 at J7a could reduce demand for more strategic trips using the A10 from north of the borough.

8.2.4 The perception of the A10 as a barrier to east-west movement and the actual and perceived severance it causes will have been reduced by 2033, largely thanks to pedestrian and cycle crossing improvements at Church Lane. Proposals to limit vehicular turning movements will enable direct, at-grade pedestrian and cycle crossing facilities to be provided enhancing sustainable east-west accessibility.

Figure 8.1: Church Lane & College Road Junctions with the A10

Source: Google Maps

West Anglia Mainline

8.2.5 With the arrival of Crossrail 2 services in 2033, the West Anglia Mainline will form a high capacity, high speed, high quality sustainable transport corridor through Broxbourne. The number of lines along the corridor will double to four and there will be an associated increase in the number of services into London from the borough.

8.2.6 Passenger numbers on the corridor (as detailed within Table 4.4) will be at an all-time high thanks to this increase in capacity but also the ease of interchange between modes of travel at each Station. With integrated, smartphone based ticketing and information, and co-ordinated bus and rail timetables, sustainable trips to Broxbourne, Cheshunt and Waltham Cross Stations in particular will be commonplace.

8.2.7 Beyond 2033, the line will benefit from a new Station at Turnford. This will cater for the Hertford Regional College students and to a degree, serve the now well established Brookfield sub-regional centre and large residential catchment in the area.

Old Cambridge Road

8.2.8 The Old Cambridge Road, comprised of the A1170 in the north and B176 in the south of the borough, will continue to serve a number of retail centres along its course, each of which will have benefited from investment in the public realm to create more pedestrian friendly, people dominated environments.

8.2.9 Whilst there will still be pressures on the corridor and individual junctions leading onto and across the A10, the dominance of general traffic will have been reduced. Through the introduction of a 20mph limit, and other speed reduction measures such as footway widening, build outs, and raised tables at pedestrian crossings, the speed of traffic will be tempered to make walking and cycling a more attractive option.

8.2.10 In turn this will see a reassignment of more strategic car based trips to the A10 – a more appropriate corridor for such movements – and a modal shift from the car to more sustainable forms of travel as conditions for walking, cycling and bus services improve.

8.2.11 The corridor will emerge as a pivotal bus corridor within the more strategic public transport network. Vehicle Detection Systems will give buses priority at junctions and new services will be introduced to improve access to the stations at Broxbourne, Cheshunt and Waltham Cross. Fully equipped bus shelters along the corridor will serve this increase in operations and contribute towards buses being the mode of choice along the Old Cambridge Road.

New River

8.2.12 New River will be an attractive north-south pedestrian and cycle link through the heart of Broxbourne. It will run parallel to the Lea Valley National Cycle Network (NCN) Route 1 and together they will form the spine of a network of cycle links attractive to both commuter and leisure trips.

8.2.13 Increased cycling parking at Broxbourne Station in particular will complement investment in the New River corridor to provide a safe, segregated, seamless and sustainable link for commuters into London via the West Anglia Mainline.

8.3 East – West Corridors

8.3.1 East-west connections across the A10 in the heart of Broxbourne, and into Essex in the east, and Cuffley in the west supplement the higher capacity north-south links to connect the largely residential west of the borough with a number of the key trip generators in the east, particularly the mainline train stations into London.

Church Lane

8.3.2 Church Lane at its intersection with the A10 is a pinch point in the highway network and provides an unattractive, convoluted link for pedestrians and cyclists. This problem would be exacerbated by 2033 with additional pressures placed on the junction as a result of new development across Broxbourne.

8.3.3 The introduction of an at-grade capacity improvement at the junction restricting turning movements and introducing new, direct pedestrian and cycle crossing facilities will help reduce the current severance in place and improve connectivity between the residents of West Cheshunt and Cheshunt town centre and train station in the east.

8.3.4 The replacement of the existing mini roundabouts with signalised junctions incorporating pedestrian and cycle crossings at Flamstead End Road and High Street, will further regulate traffic flow and facilitate safe and direct pedestrian and cycle links in the corridor.

College Road

8.3.5 College Road performs a similar role to that of Church Lane and as with Church Lane, an at-grade capacity improvement will be delivered through this Strategy which provides additional queuing lanes and restricts some turning movements at its junction with the A10 to reduce the impact of the pinch point on north-south and east-west movements.

8.3.6 To the east of the A10, College Road provides access to Cheshunt town centre and the 'Old Pond' junction will be enhanced to both improve the flow and reduce the dominance of traffic. Public realm improvements will ensure that the area becomes a more attractive place for pedestrians and cyclists, whilst the existing footbridge over the A10 provides a safe and segregated, albeit not a direct or attractive, pedestrian and cycle link.

Halfhide Lane

8.3.7 Halfhide Lane will provide critical supplementary east-west capacity to enable both College Road and Church Lane to operate effectively over the course of the Plan period. Its prominence in the local network will increase as development comes forward, providing access from Brookfield onto the wider network via a realigned carriageway immediately to the west of the A10.

8.3.8 Providing additional capacity at the Marriott Roundabout at its junction with the A1170, and simplifying the junction immediately to the north of Tesco by removing connections with The Links, will enable east-west trips to be accommodated on the network and access into the new Brookfield town centre to be secured.

Figure 8.2: Halfhide Lane

Winston Churchill Way / Monarch's Way / Eleanor Cross Road (A121 Corridor)

8.3.9 Winston Churchill Way, Monarch's Way and Eleanor Cross Road (which collectively form the A121) will be subject to significant increases in travel demand over the timeframe of the Local Plan. This could increase further still if Crossrail 2 materialises, as a consequence of the increasing attractiveness of Waltham Cross Station as a multi-modal interchange and the additional growth envisaged to be provided alongside the improved connectivity to Central London.

8.3.10 As such improvements to the A121 within Waltham Cross will be addressed within an Area Action Plan once the scale of development to come forward has been finalised. Junction improvements in the interim would be premature and potentially inappropriate.

Cuffley Hill / Goffs Lane (B156 Corridor)

8.3.11 The B156 corridor comprising Cuffley Hill and Goffs Lane is an important east-west link in the west of the Borough and in effect forms part of a wider east-west corridor alongside the A121/B198. In 2033 it will continue to provide an important link for local traffic and accommodate much of the traffic generated by the Rosedale Park developments.

8.3.12 Enhancements to the existing 242 bus route which operates along the corridor will improve travel choice for residents, whilst Improvements will be made to the Goffs Lane / Cuffley Hill / Newgatestreet Road intersection, through the provision of a new signal control junction. This will regulate flow, improve safety for pedestrians and cyclists and improve the quality of the public realm through the reallocation of part of the carriageway to public space.

Nazeing Road (B194 Corridor)

8.3.13 The B194 provides an important east-west connection linking Broxbourne with Broxbourne Station and beyond to Essex. Nazeing Road and Station Road which form the B194 will still be subject to significant levels of flow at peak times, but issues arise in terms of access into and out of the Station will have been addressed through junction improvement works.

8.3.14 New bus services to and from Brookfield will operate along the corridor enabling Essex based residents to access the sub-regional centre sustainably and off-set the increase in demand to travel along the corridor generated by the development.

9.0 Costs & Funding

9.1 Overview

9.1.1 The ability of the authority to facilitate growth is subject to the necessary mitigation measures required being affordable. Scheme costs which are excessive risk the viability of development and Broxbourne being able to realise its growth ambitions. This risk is particularly acute with regards to accommodating the increasing demand to travel associated with growth.

9.1.2 This Strategy provides a framework for investment which seeks to mitigate the impacts of growth and alleviate existing concerns through an effective and efficient package of both capital and revenue based interventions.

9.2 Capital & Revenue Costs

9.2.1 The capital costs of implementing the Strategy in its entirety equates to approximately £130m (based upon 2017 prices). **Table 9.1** provides a breakdown of these costs by mode whilst **Appendix B** provides a detailed inventory of costs on a scheme by scheme basis.

9.2.2 A number of measures to reduce reliance on the car and provide access to the town centres and jobs within the borough are dependent upon revenue support. It is estimated that in the region of £1m per annum in revenue subsidy will be required to support the delivery of this Strategy, however this has been capitalised over a set 10 year timeframe to allow for direct cost/funding comparisons to be drawn.

9.2.3 Annual revenue requirements associated with the Strategy will change over time. As the population increases and the awareness and use of public transport provision grows, the level of subsidy could potentially be reduced, until a point at which many of the areas of the bus services in operation are viable entities in their own right.

9.2.4 Some areas will require continued support however, including the maintenance costs of many of the new infrastructure schemes proposed.

Table 9.1: Costs & Funding of Interventions

Mode	Costs	Funding	
	Capital	Secured	Required
Public Transport	£43,435,000	£3,600,000	£39,835,000
Walking & Cycling	£18,575,000	£2,750,000	£15,825,000
Smarter Choices	£1,130,000	£0	£1,130,000
Parking	£750,000	£0	£750,000
Highways	£68,880,000	£37,630,000	£31,250,000
Total	**£132,770,000**	**£43,980,000**	**£88,790,000**

9.3 Sources of Funding

9.3.1 All growth within Broxbourne will contribute towards an increase in demand to travel and pressures on the network and as such will be expected to provide contributions commensurate with the size and trip generating potential for their respective developments.

9.3.2 In addition, several schemes included within this Strategy have funding committed to ensure their delivery. The sources of this funding are detailed in **Table 9.2** below together with further capital and revenue streams the authority will utilise to maximise the level of investment in both service and infrastructure improvements.

Table 9.2: Potential Sources of Funding

Source	Background	Funding Secured
Highways England	Highways England has committed almost £27m to a capacity improvement scheme at M25 J25 as part of their Roads Investment Strategy. This scheme, set to commence in 2020, will be funded in its entirety by Highways England and represents the single largest investment within this Strategy. Broxbourne could benefit further from investment in the SRN by Highways England. Proposals for a new J7a on the M11 could draw strategic movements between North London and North Hertfordshire away from the A10, whilst improvements to the resilience of the M25 could improve the number of instances in which traffic is diverted through Waltham Cross during closures.	£26.7m for M25 J25 improvements
Major Roads Network (MRN)	The Transport Investment Strategy published by the DfT in July 2017 announced the creation of a new Major Roads Network classification which will comprise the busiest and most important local authority managed 'A' roads across the country. A dedicated funding stream will be made available for necessary improvements providing opportunities for the authority to secure investment into any local roads included within the network.	None
Hertfordshire Local Enterprise Partnership (LEP)	The Hertfordshire LEP forms the vehicle through which the County and Borough Councils can secure funding from Central Government for transport improvements. Allocations of Local Growth Funding (LGF) are made to LEPs who in turn support prioritised schemes which are deemed best placed to help meet their strategic economic growth objectives. The realignment of Essex Road through the provision of a new bridge has been awarded £6.5m through this process. The scheme will improve connectivity to the industrial estates in the east of Hoddesdon.	£6.5m for Essex Road Bridge

Source	Background	Funding Secured
Network Rail	It is envisaged that Network Rail will provide the resources to implement significant infrastructure projects over the timeframe of the Strategy. Increasing the capacity of the West Anglia Mainline through the provision of 'four-tracking' will be met by the organisation as part of proposals for Crossrail 2. In addition a level crossing closures programme will see investment at Windmill Lane, Slipe Lane and Trinity Lane, whilst a replacement footbridge will be provided as part of the closure on Park Lane, maintaining access to Park Plaza on the west of the track. The level of investment in the level crossing programme is in the region of £2.75m within Broxbourne. Finally, Network Rail have committed to the development of a series of Station Travel Plans. Broxbourne will work will Network Rail in this area to invest in more sustainable access to the Stations on the main line into London.	£2m for a new bridge over the railway line at Park Lane. £0.75m to fund level crossing closures.
Housing Infrastructure Fund	In July 2017 the Department for Communities and Local Government (DCLG) announced the designation of a pot of funding through which to facilitate the delivery of infrastructure to support housing growth in those locations where the financial viability of development would be marginal without the support of additional extra investment.	None
Hertfordshire County Council	Hertfordshire County Council receives an annual settlement from Central Government to deliver schemes earmarked as priorities within their Local Transport Plan. LTP4 which provides a transport vision for the County up until 2050 forms the basis to this process and through the alignment of the Broxbourne Transport Strategy and the Hertfordshire LTP, capital funding can be secured to facilitate the provision of some of the lower cost interventions within the Strategy.	None
Operators	Both bus and train operators will be encouraged to invest in Broxbourne over the Plan period, whether in the form of physical improvement measures at stations and interchanges, or in terms of increases in the frequency of service provision, ticketing or information provision. The authority will work with operators to identify measures through which patronage levels can be increased and through a commitment to invest on the part of the authority it is hoped that operators would follow suit.	None

Source	Background	Funding Secured
	If the new bus services proposed within the Strategy are operated by the County Council then the patronage they generate will in turn generate income to in part cover their operating costs. The extent to which they do so will be subject to the attractiveness of the services and the level of use.	
Businesses	There is scope to lever in external investment for transport improvements from businesses. By making match funding available, it encourages businesses to think about their transport needs, and what measures may benefit both them and their staff. The development of Area Wide Travel Plans provide the opportunity through which this can be targeted on schemes that will most effectively encourage more sustainable travel.	None
Car Parking	As part of a review of parking restrictions in areas around the main train stations, the opportunity is presented to introduce on-street parking charges as both a form of network management and as a source of revenue generation. The scale of this potential revenue stream is subject to a number of variables but it is at present an untapped opportunity through which the authority could support ongoing revenue commitments.	None
Advertising	The provision of new, modern bus shelters provides an opportunity to sell advertising space. This in turn can pay for their installation and upkeep and provide a cost neutral improvement to the bus infrastructure across the borough.	None

9.4 Infrastructure Delivery Plan

9.4.1 The adoption of an Infrastructure Delivery Plan (IDP) alongside the Broxbourne Local Plan and this Strategy however will provide the vehicle through which developer contributions will be sought to bridge the funding gap to secure the delivery of the Strategy.

9.4.2 The IDP has established a schedule of investment required to facilitate growth including the transport improvements detailed within this Strategy. From viability assessments it has undertaken, factoring in the level and type of growth coming forward and the respective costs of mitigations to be introduced, it has determined that the level of investment required from developers to deliver this Strategy is realistic, proportionate and affordable.

10.0 Delivering the Strategy

10.1 Overview

10.1.1 The effective delivery of the Strategy will require the authority to work with partners, secure stakeholder's endorsement, manage and minimise risks, and set performance indicators upon which to measure the success of investment in the local transport network. This chapter details how these issues will be addressed as part of the implementation of the Strategy.

10.2 Roles and Responsibilities

10.2.1 Broxbourne Borough Council will work in conjunction with a number of partners and stakeholders to secure the successful delivery of the Transport Strategy and Local Plan. These organisations and their respective roles and responsibilities are set out in **Table 10.1**.

Table 10.1: Stakeholders, Roles and Responsibilities

Organisation	Role & Responsibilities
Broxbourne Borough Council	As the local planning authority, the Borough Council has the responsibility to deliver growth earmarked within the Local Plan and provide a framework for investment in the public realm to create more sustainable and attractive communities.
Hertfordshire County Council	Hertfordshire County Council is the local highway authority with responsibility for managing, maintaining and improving the safe and efficient operation of the highway network, and facilitating sustainable travel through improved travel choice.
Neighbouring Authorities	Neighbouring local planning and highway authorities have a duty to co-operate in the delivery of the Local Plan and this supporting Transport Strategy and cross border issues associated with trip generation will be addressed jointly.
Hertfordshire LEP	The Local Enterprise Partnership forms the vehicle through which to lever in funding from both Central Government and local businesses to provide financial support and guidance on deliverables.
London Stanstead to Cambridge Consortium	Amalgamation of authorities within the London to Cambridge corridor with a role to lobby Central Government to secure investment in strategically important corridors.
Highways England	Responsible for the management and maintenance of the Strategic Road Network (SRN) which includes the M25. It provides a complementary role to that of Hertfordshire County Council and seeks to ensure that the strategic network meets the demands of strategic traffic.
Network Rail	Network Rail is responsible for the management and maintenance of the rail network. This includes the provision of new track and a level crossing improvement programme to improve safety.

Organisation	Role & Responsibilities
Train Operators	Service providers are responsible for the management of the Stations they serve. Abellio West Anglia operate trains serving all of the stations within the Borough.
Bus Operators	Service providers covering both commercial and subsidised networks across Broxbourne. Include Arriva, Metroline and Galleon Travel.
Developers	Responsible for mitigating the impact of growth on the transport networks and providing measures to ensure the sustainability of their sites.
Businesses	Key generators of traffic particularly at peak times, businesses need to take on increasing responsibility to mitigate the impact of the traffic they generate on the network through the development of Workplace Travel Plans and associated measures to reduce the reliance on the car for employees.
Schools	Key generators of traffic at peak times, with the scope to create a cultural shift in travel patterns amongst the young. The adoption and implementation of School Travel Plans is central to this.
Sustrans	Charitable body with a focus on increasing levels of walking and cycling, with responsibility for managing, maintaining and promoting use of the National Cycle Network, Route 1 of which runs through the Lea Valley.

10.2.2 The Broxbourne Transport Discussion Group meets monthly and comprises representatives from the above organisations. It will form the body through which stakeholder organisations are co-ordinated in the delivery of this Strategy and the Local Plan.

10.2.3 This Strategy has been developed in close co-operation with Hertfordshire County Council with further input from bus operators, Highways England and neighbouring authorities.

10.2.4 Ensuring the support of the public and other stakeholders in terms of the strategic approach and the appropriateness of individual schemes coming forward will help to minimise the risks associated with their delivery.

10.3 Implementation

10.3.1 There are several areas in which close engagement between delivery partners will be necessary facilitate the implementation of the Strategy. Examples of this include:

- The co-ordination of road works to minimise delays on the network during construction.
- Securing agreements with bus operators to serve new development sites and tweak routings and service patterns.
- The harmonisation of service times to improve integration between services.
- Alignment of technologies and systems to enable the provision of electronic based real time information and integrated ticketing for example.
- The pooling of resources and data in the development of effective Travel Plans.

10.4 Risks & Risk Management

10.4.1 There are inherent risks in seeking to accommodate the level of growth earmarked within the Broxbourne Local Plan and the scale of investment required to address the increase in demand to travel. However, this Strategy has identified an approach which minimises risk, through an affordable, balanced and realistic package of improvements, and as a consequence of open and engaging partnership working with Hertfordshire County Council, Highways England and other stakeholders.

10.4.2 **Appendix C** contains a risk register which details all the potential risks which may arise through this process and the framework through which they will be managed and mitigated. These include areas relating to scheme delivery, finance and funding, changes in the level of growth coming forward, legal implications, the policy and political context and support from stakeholders.

10.5 Performance Indicators

10.5.1 Performance indicators provide a gauge upon which to calculate the success of investment and the improvements to the transport network. These can target the inputs, outputs, outcomes and impacts associated with the overarching objectives of the Strategy.

10.5.2 With regard to transport, the Local Plan objective seeks to: "Ensure that growth and regeneration can be effectively accommodated by Broxbourne's transport network and that as many journeys as possible are by bus, rail, walking and cycling so that people have a safe, viable and attractive alternative to driving".

10.5.3 Given this remit **Table 10.2** provides a targeted and proportionate series of indicators to be monitored over the timeframe of the Strategy upon which its impact can be quantified.

Table 10.2: Performance Indicators

Area	Indicator	Target	Source of Data
Inputs	a) Level of developer funding secured for transport improvements	Detailed within IDP	• Section 106 Agreements
	b) Level of Government funding secured for transport improvements	n/a	• Award notifications
Outputs	c) Number of scheme completions	Schemes listed in Appendix B	• Hertfordshire County Council
Outcomes	d) Modal split for all journeys	Reduction in percentage of car based trips	• Census (every 10 years) • Hertfordshire County Wide Travel Survey (every 3 years) • School Travel Surveys (yearly)
	e) Modal split for journeys to work		
	f) Modal split for journeys to school		
	g) Station Patronage at Broxbourne, Cheshunt and Waltham Cross	Yearly increase	• Office of Road and Rail
	h) Levels of walking and cycling		• Hertfordshire County Wide Travel Survey (every 3 years)
	i) Car based journey times	Maintain current journey times	• Journey time surveys
Impacts	j) Number of housing completions	Increases in line with Local Plan trajectories	• Broxbourne Local Plan Annual Performance Reports
	k) Number of new jobs created		• Hertfordshire Local Enterprise Partnership

11.0 Evidence & Data

11.1 Overview

11.1.1 This chapter details the sources of evidence and associated data which have been generated to inform and guide the interventions proposed within the Strategy. Together with the core principles which form the strategic approach to investment as established in **Chapter 5**, this evidence provides the rationale and justification upon which to mitigate the increase in demand to travel in the period up until 2031/33.

11.2 Sources of Evidence

11.2.1 There are a number of sources of evidence which have been utilised to determine a framework of transport improvements. These comprise:

- The Broxbourne Highway Model
- The Hertfordshire COMET Model
- The Hertfordshire Countywide Travel Survey

11.2.2 These sources of evidence form a mix of primary and secondary data which create a comprehensive picture to quantify the current and future transport issues in Broxbourne. Each of these are detailed below, including the key outputs from each source.

11.3 Broxbourne Highway Model

11.3.1 The Broxbourne Highway Model was developed by JMP Consultants Ltd on behalf of Broxbourne Borough Council to assess the highway impacts of a number of different spatial planning scenarios associated with the development of the emerging Broxbourne Local Plan.

11.3.2 The model is a SATURN highways assignment model developed by cordoning and refining the East London Highway Assignment Model (ELHAM) to provide greater detail in the Broxbourne area. It was updated to represent 2013 base year highway conditions.

11.3.3 The model represents the morning and evening peak periods of 08:00-09:00 and 17:00-18:00 respectively.

11.3.4 Three separate user classes are included in the model namely: Cars (including taxis), Light Goods Vehicles (LGV) and Heavy Goods Vehicles (HGV). Vehicle data was converted from numbers of vehicles to Passenger Car Units (PCU's) prior to use in the model. This conversion weights the numbers of vehicles larger than cars in order to more fully represent their impact on the highway infrastructure.

11.3.5 **Forecast Model**

11.3.6 A forecast model forms an important component of the modelling process by identifying future increases in trips on the highway network from the base year to future years. This is achieved for a given period of time through assessments of trips generated for respective development types to provide a reflection of changes in land use developments and changes in factors that cause corresponding changes in background traffic such as income and fuel costs .

11.3.7 In 2017, Broxbourne Borough Council appointed WYG to update forecast highway models to inform the overall strategy. This work reflected changes in development assumptions since 2013, when the original model was first developed and applied the latest version of TEMPRO[41], to ensure that a fair and accurate reflection of background traffic growth was possible prior to the assessment of the additional impact of future development scenarios.

Scenarios Assessed

11.3.8 The Broxbourne Highway Model formed a WebTAG compliant tool[42] through which various schemes and packages of interventions could be assessed in terms of their ability to mitigate against the impacts of an increasing demand to travel associated with development earmarked within the Local Plan. This assessment was undertaken in three distinct phases of modelling each of which are summarised below.

Phase 1: June 2016 – September 2016

11.3.9 Consultants AECOM utilised the model to assess four scenarios containing various potential packages of mitigation. These focused upon improvements to the junctions with the A10 and included the consideration of several grade separated options at the Lieutenant Ellis Way, College Road and Church Lane interchanges.

11.3.10 At grade solutions and an A10 widening scheme were also considered in terms of their impact on volume of traffic, level of stress and delays on the network. Journey times between set points within the Borough were assessed as a measure to test relative connectivity.

11.3.11 The results of this assessment are detailed in the Broxbourne Transport Strategy Phase 2: Interim Evidence Report[43]. Ultimately none of the scenarios were deemed both effective and deliverable. Whilst the scenarios which included grade separation highlighted some benefits, their associated costs would be such that they would be undeliverable under current circumstances.

Phase 2: October 2016 – January 2017

11.3.12 Given the deliverability concerns associated with the scenarios AECOM assessed, a further set of scenarios were identified by WYG. This assessment used the same levels of traffic as the 2016 AECOM assessments in order to allow direct comparison between the results. At the start of this process a series of objectives were identified against which the relative performance of the respective packages would be assessed, namely:

- Improve East-West journey times/connectivity particularly focussing on local trips and the potential to improve journey times and reliability for public transport provision;
- Reduce predicted North-South congestion on the A10 in order to improve journey times for local and through traffic hence reducing the knock-on impact of congestion on local air quality conditions; and
- Provide the most cost effective solution.

[41] TEMPRO stands for the 'Trip End Model Presentation Programme' and enables an analysis of journeys, mileage, car ownership and levels of employment from the National Trip End Model. TEMPRO version 7.2 was used for the development of the forecast model.
[42] WebTAG provides Government guidance on how the transport modelling process should support the identification of investment decisions (https://www.gov.uk/guidance/transport-analysis-guidance-webtag)
[43] Broxbourne Transport Strategy Phase 2: Interim Evidence Report; AECOM, August 2016

11.3.13 The focus of the modelling was on the mitigations to be introduced at three critical points on the A10, at its junctions with Lieutenant Ellis Way, College Road and Church Lane. It resolved that a hamburger style signalised junction with north-south priority was the preferred option to take forward at the A10 / Lieutenant Ellis Way roundabout, and that an at-grade capacity improvement at College Road be introduced.

11.3.14 At Church Lane a grade separated junction with no access on or off the A10 provided the most travel time related benefits. However, concerns associated with its deliverability concluded that an alternative at-grade scheme with limited turning movements would provide a suitable alternative. The results of this assessment are detailed in the Broxbourne Transport Modelling Technical Note 1[44].

Phase 3: February 2017 – April 2017

11.3.15 Following the development of the new forecast model in February 2017, a series of highway network improvement options were considered at several junctions across Broxbourne where congestion issues were identified, and at locations where new development would necessitate changes to the existing network, specifically at:

- Turnford Interchange, Turnford
- Marriott Roundabout, Turnford
- Halfhide Lane, Turnford
- Cheshunt Lakeside development capacity, Cheshunt
- Church Lane / High Street junction, Cheshunt
- Church Lane / Flamstead End Road junction, Cheshunt
- Introduction of speed reduction measures on the previous alignment of the A10
- Fishpools Roundabout, Waltham Cross
- Newgatestreet Road / Goffs Lane junction, Goffs Oak

11.3.16 In order to fully assess the impacts of future development scenarios, this stage included modelling of the most up to date development assumptions available and applied the latest version of TEMPRO. The future year forecasting of traffic is detailed in Broxbourne Transport Modelling Technical Note 2[45].

11.3.17 The options at each junction were manipulated to maximise the safe, effective and efficient operation of the network to generate a 'Preferred Mitigation' Scenario. In total four scenarios were assessed (see **Table 11.1**):

- **Base year (2013)** – to reflect typical existing conditions on the network.
- **Do Minimum (2033)** – to reflect how the network will operate if only committed growth, background growth and transport investment comes forward, i.e. a scenario with no Local Plan related growth or mitigations detailed within this Strategy.
- **No Mitigation (2033)** – to reflect how the network would operate with Local Plan growth but without the measures detailed within this Strategy to address the increase in travel demand.
- **Preferred Mitigation (2033)** – to reflect the impact of this Strategy in supporting the growth earmarked within the Local Plan.

[44] Broxbourne Transport Strategy: Transport Modelling Assessments; WYG, January 2017
[45] Broxbourne Transport Strategy: Broxbourne Forecast Growth Methodology; WYG, March 2017

Table 11.1: Journey Time Comparison

Journey Times (minutes:seconds)			2013	2033			Differences				
Route	Period	Direction	Base Model	Do Minimum (No Local Plan Growth or Mitigation)	No Mitigation (Local Plan Growth without mitigation)	Local Plan Growth with Preferred Mitigation	Difference Base Model & 2033 Do Minimum	Difference Base Model & Local Plan Growth without mitigation	Difference Base Model & Preferred Mitigation	Difference Do Mimimum & Preferred Mitigation	Difference No Mitigation & Preferred Mitigation
A10 between M25 J25 and A1170 (Dinant Link Road, Hoddesdon)	AM Peak	NB	09:30	10:35	10:58	09:43	01:05	01:28	00:13	-00:52	-01:15
		SB	09:32	10:25	25:47	12:31	00:53	16:15	02:59	02:06	-13:16
	PM Peak	NB	10:29	12:34	26:13	12:28	02:05	15:44	01:59	-00:06	-13:45
		SB	09:37	09:55	11:29	09:41	00:18	01:52	00:04	-00:14	-01:48
Between Brookfield development and Cheshunt Station	AM Peak	EB	05:46	06:22	07:25	06:47	00:36	01:39	01:01	00:25	-00:38
		WB	05:51	06:04	07:29	07:09	00:13	01:38	01:18	01:05	-00:20
	PM Peak	EB	05:13	05:45	06:18	06:13	00:32	01:05	01:00	00:28	-00:05
		WB	06:03	09:07	13:38	07:29	03:04	07:35	01:26	-01:38	-06:09
Between Park Plaza development and Waltham Cross Station	AM Peak	EB	05:27	06:01	13:57	07:43	00:34	08:30	02:16	01:42	-06:14
		WB	05:13	07:51	12:27	13:51	02:38	07:14	08:38	06:00	01:24
	PM Peak	EB	05:55	04:59	05:41	07:42	-00:56	-00:14	01:47	02:43	02:01
		WB	06:14	10:12	20:14	12:53	03:58	14:00	06:39	02:41	-07:21
Between Park Plaza development and Cheshunt Station	AM Peak	EB	06:41	07:25	09:19	08:02	00:44	02:38	01:21	00:37	-01:17
		WB	05:48	06:27	22:13	09:21	00:39	16:25	03:33	02:54	-12:52
	PM Peak	EB	07:09	06:52	08:26	09:02	-00:17	01:17	01:53	02:10	00:36
		WB	06:44	10:14	13:28	06:52	03:30	06:44	00:08	-03:22	-06:36
Between Goffs Oak and Cheshunt Station	AM Peak	EB	09:37	09:47	10:39	09:39	00:10	01:02	00:02	-00:08	-01:00
		WB	10:06	10:44	13:55	10:54	00:38	03:49	00:48	00:10	-03:01
	PM Peak	EB	10:23	10:49	12:31	10:41	00:26	02:08	00:18	-00:08	-01:50
		WB	11:23	14:13	17:44	10:47	02:50	06:21	-00:36	-03:26	-06:57

11.3.18 In each instance journey times were calculated on the following five key routes:

- A10 between M25 J25 and A1170 (Dinant Link Road, Hoddesdon) – north/south.
- Between Brookfield development and Cheshunt Station – east/west.
- Between Park Plaza development and Waltham Cross Station – east/west.
- Between Park Plaza development and Cheshunt Station – east/west.
- Between Goffs Oak and Cheshunt Station – east/west.

11.3.19 The key findings of the journey time analysis on these routes in each scenario highlighted that:

- **Comparisons with Base Year**
  - Journey times will generally increase even without Local Plan related growth between 2013 and 2033, and in some instances, it will add over 3 minutes to a journey.
  - Journey times with Local Plan growth, but without the provision of mitigating measures, will see more substantial increases on almost all routes, in some cases in excess of 7 minutes, and in others in excess of 15 minutes.
  - With Local Plan growth and supporting mitigations in place, journey times will still increase from the 2013 base year, but with smaller increases across the network.

- **Comparisons between Future Scenarios**
  - The package of preferred mitigations detailed within this Strategy will see reductions in journey times on almost all routes compared to a scenario in which Local Plan growth comes forward without supporting investment in transport provision.
  - On half of the routes assessed, journey times will be faster with growth and mitigations in place than in a Do Minimum scenario with no growth coming forward as sought by the Local Plan.

11.3.20 A comprehensive modelling report detailing the modelling undertaken using the Broxbourne Highway Model has been produced (Broxbourne Transport Modelling Technical Note 3[46]) and has been published alongside this Strategy.

11.4 Hertfordshire COMET Model

11.4.1 The Hertfordshire COMET Model is a multi-modal model which with variable demand model capability. This allows the model to identify the issues and impacts associated with different growth scenarios and mitigations, whether they are highway based schemes, public transport improvements, or walking, cycling and demand management based interventions.

11.4.2 The model was developed by the County Council to be used as a tool through which to assess transport policies and strategies on a consistent basis across Hertfordshire. As a strategic model, it provides an important overview of the implications of investment in Broxbourne on the wider transport network to supplement the more refined analysis of the Broxbourne Highway modelling. The model has a 2014 base year and utilises a 2031 forecast year.

Scenarios Assessed

11.4.3 Two scenarios were assessed within the COMET Model upon which to determine the impacts of the preferred package of mitigation measures within the Broxbourne SATURN Model and wider strategy. These comprised a 'Do Minimum' and 'Do Something' assessment.

[46] Broxbourne Transport Strategy: Additional Transport Modelling Assessments; WYG, July 2017

- **Do Minimum:** A 'Do Minimum' scenario assessment was undertaken in December 2016[47] and took into account all housing and employment proposed to be delivered in the period up until 2031 across all ten districts within Hertfordshire (i.e. the assessment was not limited to the impacts of Broxbourne growth). It also included transport schemes which at the time had a high level of certainty of coming forward, although not those for which planning or permissions were still required. Explicitly this included the following in Broxbourne:

    a. A10 Turnford Interchange
    b. West Hoddesdon (High Leigh) Development Access onto A10 Link
    c. West Hoddesdon Junction Improvements
    d. Park Plaza

- **Do Something:** A 'Do Something' scenario assessment was undertaken in June 2017 and as with the 'Do Minimum' assessment considered all housing and employment proposed to be delivered in the period up until 2031 across all districts. In addition, it included both the package of highways interventions assessed within the Broxbourne Highway Model together with public transport based improvements and cycle network proposals as detailed within **Appendix D**. These comprised the majority but not all the measures contained within this Strategy with those schemes omitted due to their localised nature and inability of such a strategic model to reflect them in the analysis.

11.4.4 A report on the COMET modelling undertaken to support the Strategy was produced by AECOM in July 2017 and has been published alongside this Strategy.

Outputs of the Modelling

11.4.5 The performance of the road network in Broxbourne was assessed in terms of the changes in flow, comparative volume over capacity on the main road links within Broxbourne and the surrounding areas, together with junction delays in a Local Plan "Do Minimum" and "Do Something" scenarios. **Figure 11.1** illustrates changes in volume over capacity and junction delays between the "Do Minimum" and "Do Something" scenarios in the AM peak in 2033.

11.4.6 The key findings of the COMET modelling highlighted:

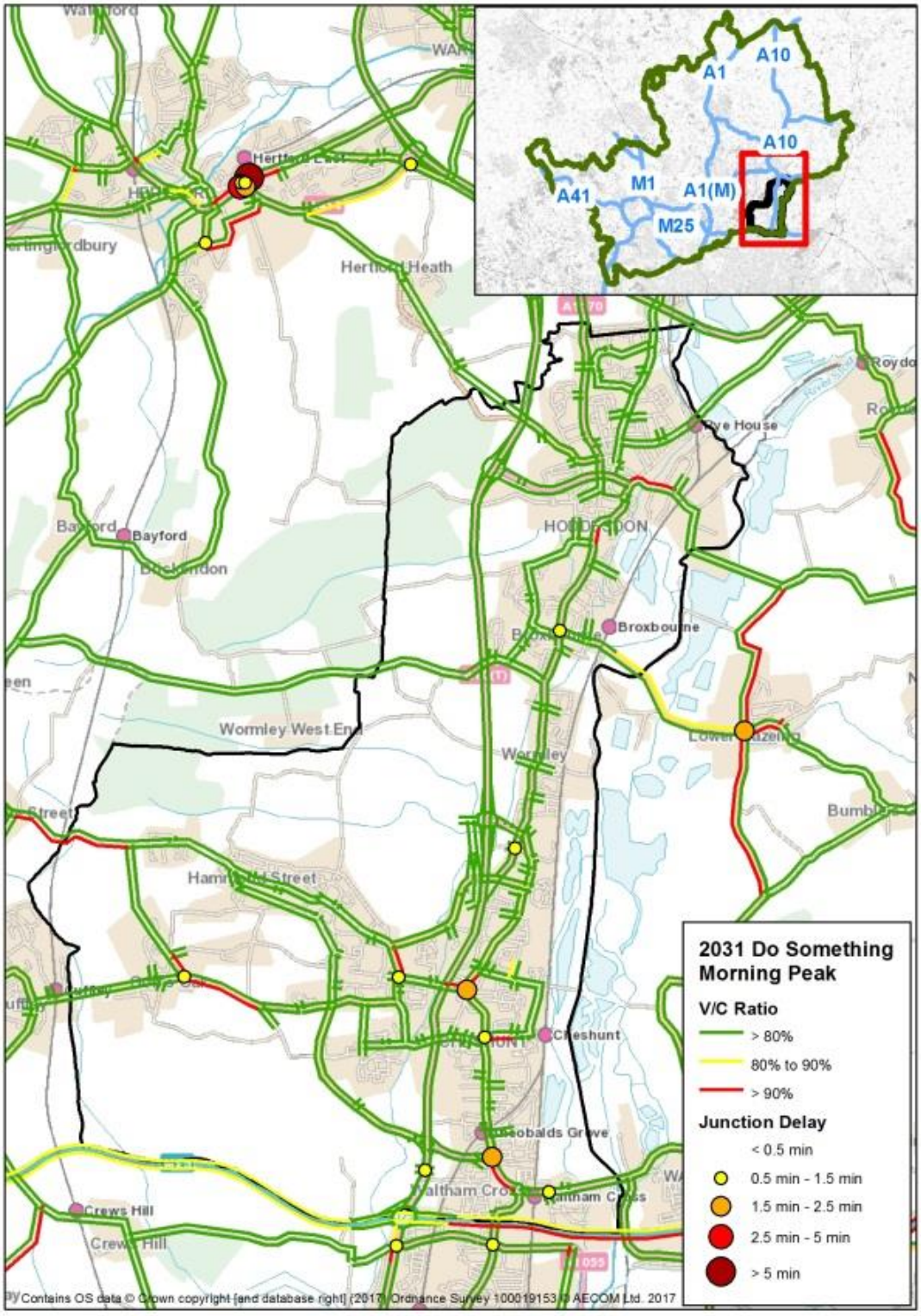
- **Volume of Traffic:** The modelling indicated that there would be an increase in flows along the A10 in the morning and evening peak periods when the mitigations are introduced to along the proposed housing growth. These increases however are envisaged to be offset by a decrease in flows on the alignment of the old A10. This implies that vehicles are reassigning on the network as a consequence of the changes proposed in the "Do Something" approach, reflecting the findings of the Broxbourne Highways Model assessment of proposed highway mitigations.

  Whilst the capacity improvements on the A10 are reflected in local traffic reassignment, the modelling assessment highlighted that there would not be more strategic re-routing. The changes to the A10 will not draw in trips from alternative north-south corridors such as the A1 or M11, which would have seen a number of dis-benefits not just in terms of journey times and delays, but further accentuating safety, severance and air quality concerns.

- **Junction Delays:** A series of delays at junctions across the network were drawn out in the COMET assessment of the Strategy's mitigations. In a number of instances these reflected delays identified within the Broxbourne Highways Model but in other cases, different locations were highlighted as being potential issues.

[47] Hertfordshire COMET: Local Plan Do Minimum Forecasting Report; AECOM & Hertfordshire County Council, December 2016

Figure 11.1: Changes in Volume over Capacity and Junction Delays in AM Peak



Source: Broxbourne Transport Strategy & Local Plan Mitigation Assessment Report, AECOM, July 2017

Upon further analysis this was seen to be due to the fact that in each instance schemes were included into the "Do Something" scenario that introduced traffic signals to replace existing junctions. The timings of these signals were not optimised to maximise capacity in each instance, hence the apparent delays arising.

As with the Broxbourne Highway Model, COMET identified an issue in the Waltham Cross area. The Fishpools and KFC roundabouts operate in close correlation to one another and the respective models highlighted delays in this area which will be addressed within a detailed Area Action Plan for Waltham Cross.

- **Modal Split:** In terms of the modal split of journeys across Broxbourne, the COMET modelling indicated that it would remain consistent despite further investment in bus, rail and cycle schemes being included in the "Do Something" scenario.

  However this was considered to be as a consequence of the model not taking into account local level pedestrian improvements or the benefits of smarter choices measures, particularly Travel Plans. In addition, as consequence of a perceived lack of traffic and delays in the model itself, the level of propensity for modal shift which could be expected as a consequence of congestion was under represented, therefore undermining the competitiveness of alternatives to the car.

11.5 Impact on Neighbouring Authorities

11.5.1 The provision of new housing and the creation of new jobs in Broxbourne has the potential to impact upon the transport network in surrounding local authorities, and likewise growth in close proximity to Broxbourne could impact upon the operation of the local road network. The scenarios assessed using the COMET model provided the basis to identify the impacts of growth in Broxbourne on surrounding routes in neighbouring authorities as summarised below.

Epping Forest

11.5.2 The main links between Broxbourne and Epping Forest to the east are via the A121 which connects Waltham Cross to Waltham Abbey and beyond, Nazeing New Road which links the town of Broxbourne with Nazeing, and Essex Road which accommodates traffic entering the borough from the Harlow area.

- **Lower Nazeing:** COMET modelling highlighted that by 2031 Lower Nazeing would be suffering from delays in the centre of the village and on approaches to it, without the additional growth proposed within the Broxbourne Local Plan. When the Local Plan growth and associated transport mitigations are considered, it highlighted a decrease in the volume of traffic on Lower Nazeing Road in the AM and PM peaks, together with the inter-peak peak. Despite this, the overall level of delay with Lower Nazeing would remain the same.

- **Waltham Abbey:** In terms of the A121 through Waltham Cross and Waltham Abbey, the COMET modelling suggests that there will be little difference in the volume of traffic along the east-west corridor with or without the Local Plan allocated growth coming forward. Delays under both scenarios are estimated to be around the 30-90 seconds mark in the PM peak at the Highbridge Retail Park junction.

- **Essex Road:** Flows into and out of Hodedesdon via Essex Road and Dobbs Weir Road to/from Harlow are envisaged to increase as a consequence of the growth earmarked to come forward through the Broxbourne Local Plan. However these increases in both directions in the morning and evening peaks, are not expected to see a material change in the level of delay experienced by road users.

11.5.3 As the proposed terminus for Crossrail 2 services, Broxbourne will have an increasing role to play as a focus for more strategic rail based trips. Likewise, Waltham Cross Station is also likely to grow in popularity for trips into the capital. Both will draw in additional trips from Epping Forest, the impact of which will require further consideration.

11.5.4 The designation of Harlow as a Garden Town will see significant growth within Epping Forest, East Hertfordshire and Harlow itself with around 20,000 new dwellings set to come forward as part of the growth ambitions of the authorities. The impact of this on the north of Broxbourne will have to be determined through detailed modelling led by these neighbouring authorities.

East Hertfordshire

11.5.5 East Hertfordshire sits to the north of Broxbourne and the A414 through the towns of Hertford and Ware forms an important east-west link which connects to the A10 immediately to the north of Hoddesdon. The urban areas of Ware and Hertford are also continuous with Hoddesdon and as such there are a lot of movements between the towns.

11.5.6 Despite this it is not anticipated that there will be a tangible difference in the volume of trips on the A10 and A414 in 2031 scenarios. Likewise, delays of over 5 minutes are expected to occur in the centre of Hertford in 2031 with or without development within Broxbourne being provided. The COMET model fact indicates volumes on the A10 and A414 will decline as a consequence of Broxbourne growth and subsequent mitigation proposals albeit only marginally.

Enfield

11.5.7 Enfield, to the south of Broxbourne and the M25, is accessed via the A10 and the A1010 (Monarchs Way / Hertford Road). Delays are expected to be experienced on the road network in Enfield in 2031 with or without Broxbourne related growth where the A10 and A1010 meet Bullsmoor Road.

11.5.8 These delays in the morning and evening peaks are anticipated to be between 30-90 seconds at each junction and changes to the transport network in Broxbourne associated with new developments at Park Plaza and in Waltham Cross are not the cause this congestion according to the COMET modelling undertaken.

Welwyn Hatfield

11.5.9 Within the borough of Welwyn Hatfield to the west of Broxbourne, Cuffley Station provides a link into London for many residents of the Goffs Oak area of West Cheshunt. The B156 links the two settlements and in a 2031 scenario and both east and west bound flows in the morning peak period are anticipated to reduce significantly compared to the Local Plan 'Do Minimum' scenario, as a result of the transport mitigations associated with growth coming forward through the Broxbourne Local Plan.

11.5.10 In the evening peak, the picture differs slightly. Whilst westbound traffic into Cuffley is also expected to reduce with growth and mitigations in place, eastbound traffic into Goffs Oak is seen to increase in the results of the COMET modelling assessment.

Wider Network / Strategic Trips

11.5.11 In terms of the Strategic Road Network (SRN), the model suggested that the capacity improvements on the A10 are not such that strategic trips from the A1 or M11 will reassign onto the A10 itself. This will ensure that traffic is not drawn in from the wider network with the negative implications it would have generated for the borough.

11.6 Hertfordshire Countywide Travel Survey

11.6.1 Hertfordshire County Council undertake a countywide travel survey every 3 years. The first survey was undertaken in 1999 and the most recent in 2015, providing 6 sets of data over a 16-year period.

11.6.2 Data is collected in the form of a single day travel diary to represent typical travel behaviour for a representative sample of the population. The 2015 survey size was almost 3,500 residents of which approaching 300 were Broxbourne based.

Access

11.6.3 In terms of access to transport provision the survey highlighted:

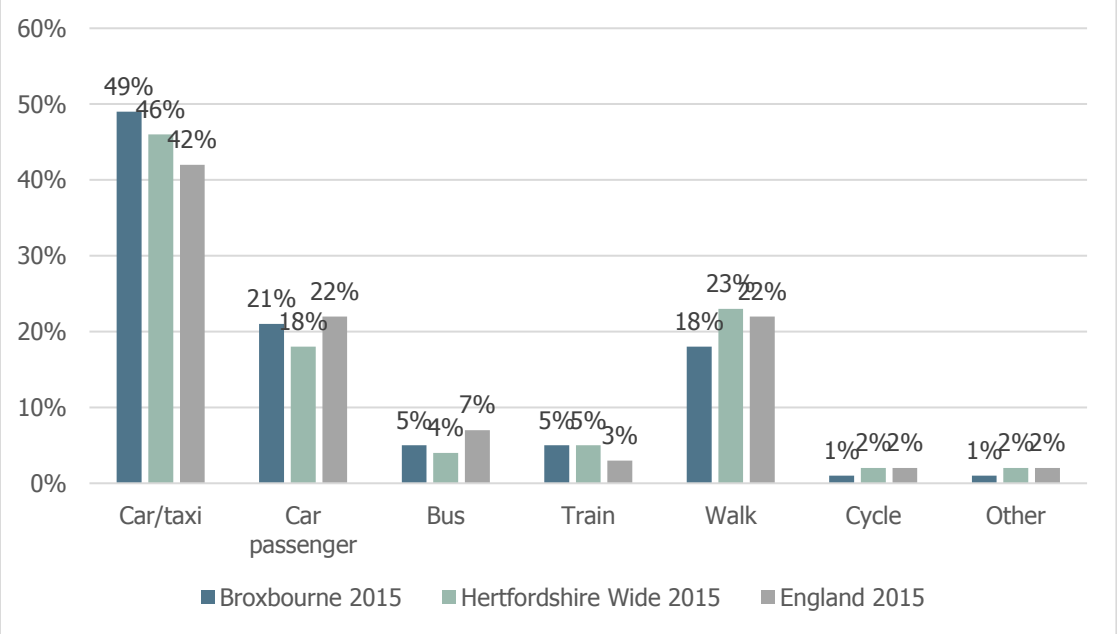
- 85% of Broxbourne residents aged 17+ have a full driving licence
- 82% have access to a car or van
- 40% of residents have access to a useable bicycle
- 18% of residents have a bus pass
- 12% of residents have a health issue which limits mobility

11.6.4 These figures are similar to the Hertfordshire wide averages, although more Hertfordshire residents tend to own a useable bicycle (51%) and have access to a car (84%).

Modal Split for All Journeys

11.6.5 **Figure 11.2** details the modal split for all journeys undertaken by both Broxbourne and Hertfordshire residents. In both instances, the car is the dominant mode of travel, and whilst broadly similar in many regards, reliance on the car as both a driver and a passenger is higher in Broxbourne, despite access to a car being lower. The average trip length at 8.2 miles is broadly the same as that for the rest of the County at 8.0 miles.

Figure 11.2: Modal Split for All Journeys



11.6.6 When viewed against data from the National Travel Survey[48], it is clear that there is greater reliance on the car in Broxbourne than elsewhere in the country. Higher levels of train travel and lower levels of bus use reflect the extent of service provision on the ground.

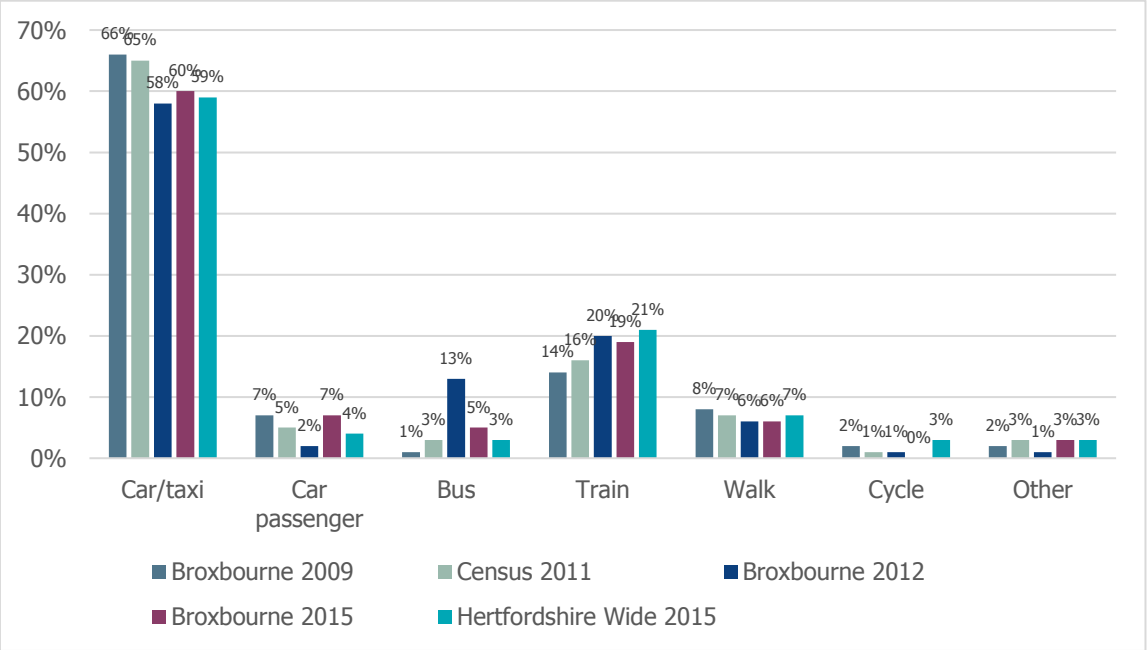
Journeys to Work

11.6.7 In terms of commuting trips, data is available through the Travel Survey from 2009 and 2012, which together with Census data from 2011 allow an analysis of the changes in travel choice over a period of time. **Figure 11.3** illustrates these changes in travel choice.

11.6.8 It highlights that whilst the car remains the dominant mode of travel for journeys to work for both Broxbourne and Hertfordshire residents, this has reduced since 2009. Conversely there has been a general rise in those commuting by train and by bus, which suggests that there has been a slight move towards more sustainable travel during the period in question.

11.6.9 Cycle use however remains very low within Broxbourne (at less than 1%), some way below Hertfordshire wide levels of cycling (at around 3%). Whilst not dissimilar to the national picture, it does demonstrate a disconnect between levels of cycle ownership and actual use.

Figure 11.3: Journey to Work Modal Split



11.6.10 In terms of comparisons with national travel patterns[49]:

- Less reliance on the car in Broxbourne than nationally (60% compared to 64%)
- Higher use of the train in Broxbourne than nationally (19% compared to 9%)
- Lower bus use in Broxbourne than nationally (5% compared to 8%)
- Lower levels of walking in Broxbourne than nationally (6% compared to 11%)

[48] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/551437/national-travel-survey-2015.pdf
[49] National Travel Survey 2015; DfT, September 2016

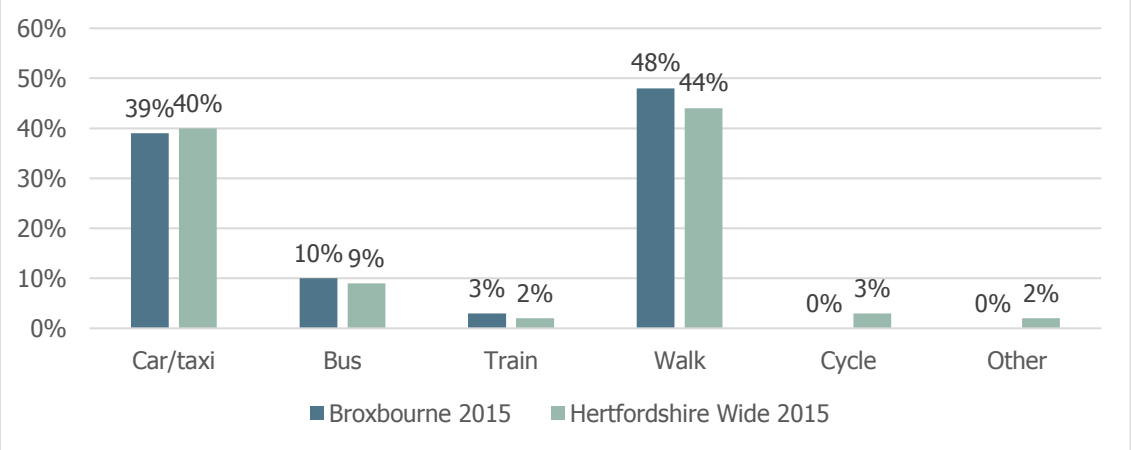
11.6.11 Broxbourne figures should be viewed within the context of which the journeys are made. Some 28% of commuting trips undertaken by Broxbourne residents are under 5 miles, a distance most able bodied adults could be expected to cycle. In terms of the destination of trips, the most common localities are:

- London (31%)
- Within Broxbourne itself (23%)
- East Hertfordshire (18%)

Journeys to School

11.6.12 In terms of journeys to school, which represent around 1 in 5 of all trips at peak times, there is a tendency for higher levels of walking by Broxbourne pupils than those across the county as a whole, although this is offset by lower levels of cycling, with less than 1% of children in Broxbourne cycling to school. **Figure 11.4** highlights the differences based upon responses to the 2015 survey.

Figure 11.4: Mode Split for Journeys to School



11.6.13 Compared to the national picture, levels of walking are slightly higher than the 41% of journeys to school across the rest of the country, car use is broadly similar at 41%, bus based journeys lower than the 17% nationally, whilst cycle use nationally at 2%, is similar to the Hertfordshire average.

12.0 Timeframes for Intervention

12.1 Overview

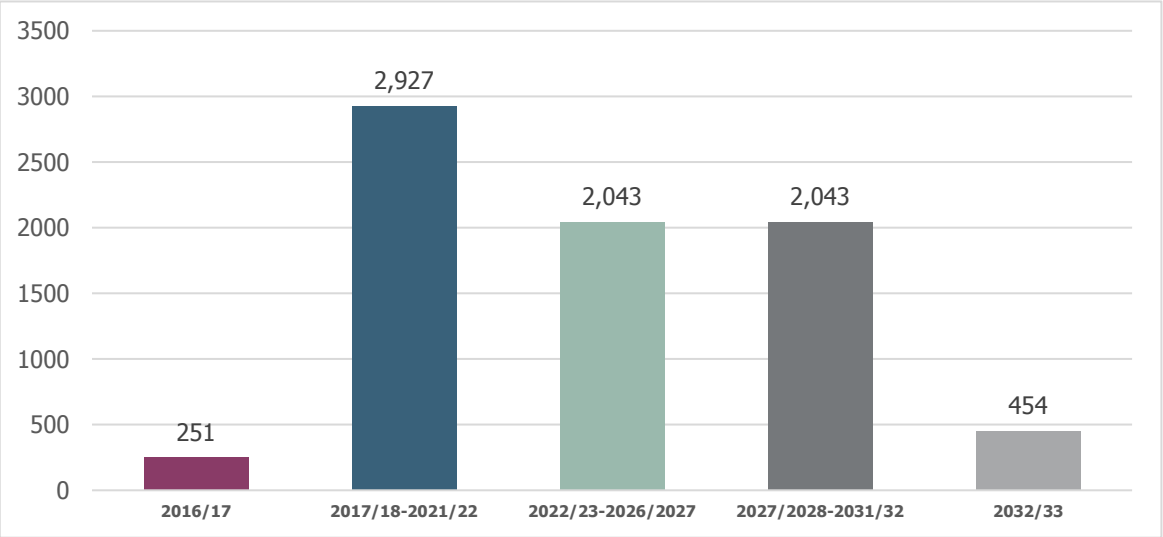
12.1.1 This chapter details the timeframes within which the interventions and mitigations highlighted within this Strategy will be implemented. It highlights a programme of measures and the trigger points identified within the modelling work and from other sources of evidence to direct when schemes should be provided on the ground.

12.1.2 There are three distinct timeframes within which interventions on the transport network will be required to facilitate growth within the Local Plan. These comprise:

- **Short term:** Within the first 5 years of the Local Plan being in place, up to 2021
- **Medium term:** Between 5 and 10 years, and so by the end of the Local Plan period of 2033
- **Long term:** Beyond the timeframe of the Local Plan, and so post 2033

12.1.3 The timing and trigger points for improvements to the transport network will be largely dictated by the timing and trajectory of housing and employment completions. **Figure 12.1** details the timescales when the 7,700 homes earmarked for the borough will come forward.

Figure 12.1: Trajectory of Housing Completions



12.1.4 Given that the bulk of the completions are anticipated to come forward in the first 5 years of the Plan, it will require a series of schemes to be in place in the short term to avoid any deterioration in the operation of the network and to imbed sustainable travel habits from the outset of new residents moving into an area.

12.1.5 **Figure 12.2** provides indicative timescales of when each of the measures identified within this Strategy will come forward.

Figure 12.2: Timeframes for Scheme Delivery

Ref:	Scheme	Short Term	Medium Term	Long Term
HS				
HS.01	*M25:* Capacity improvement at M25 J25, through the provision of a dedicated left turn lane for northbound traffic off the M25 and the widening of the A10 southbound on its approach to the junction.	← →		
HS.02	*A10:* Modify existing 3-arm junction on A10 to provide an at-grade 4-arm junction for access into Park Plaza North & West.		← →	
HS.03	*A10:* Provide a 'hamburger' style signalised junction with N/S priority at the intersection of the A10 junction with the A121 Monarch's Way and B198 Lieutenant Ellis Way (Park Plaza junction).		← →	
HS.04	*Lieutenant Ellis Way:* New 4-arm junction on Lieutenant Ellis Way to the north of Park Plaza.		← →	
HS.05	*College Road:* At grade improvement at College Road / A10 junction, providing additional northbound and southbound lanes at the junction and increased length of northbound left filter into College Road, and banning all right turns.		← →	
HS.06	*Church Lane:* At grade highway capacity improvement at Church Lane / A10 junction, providing an additional north-south lane through the junction and banning all right turns and left turns onto the A10.		← →	
HS.07	*Church Lane:* Reconfiguration of Church Lane / High Street, Cheshunt roundabout to provide signalised junction and crossing points for pedestrians.		← →	
HS.08	*Church Lane:* Reconfiguration of Church Lane / Flamstead End Road roundabout to provide signalised junction and crossing points for pedestrians.		← →	
HS.09	*Brookfield (Turnford Link Road):* Construction of a Halfhide Lane to Turnford Interchange Link Road, together with provision of a new western arm at the A10 Turnford Interchange.	← →		
HS.10	*Brookfield (Halfhide Lane Link Road):* Construction of new link road immediately to the west of the A10 providing a link from Halfhide Lane north to Hells Wood, where it turns westwards to connect to the Turnford Link Road via a new roundabout, and south to 'The Links' to provide access to Tesco and from the A10 off-slip.	← →		
HS.11	*Brookfield (Garden Village Distributor Road):* Provision of new distributor road to serve the new Brookfield development.		← →	
HS.12	*Brookfield:* Reconfiguration of the 4-arm signlaised junction on Halfhide Lane at junction with The Links and the access road into Brookfield Retail Park, by removing access to/from The Links and allowing only movements into (and not out of) the Retail Park.	← →		
HS.13	*Brookfield:* Provision of additonal capacity at Marriott Roundabout.	← →		
HS.14	*Goffs Lane:* Reconfiguration of Newgatestreet Road / Cuffley Hill / Goffs Lane junction give way to provide signalised junction with crossing points for pedestrians.	← →		
HS.15	*Dinant Link Road:* New roundabout on Dinant Link Road to permit access into High Leigh development.	← →		
HS.16	*Dinant Link Road:* Sun roundabout improvements (junction of Dinant Link Road and Ware Road) to provide additional lane on eastbound arm of roundabout.	← →		
HS.17	*Hertford Road:* Hertford Road / Ware Road roundabout improvements to provide additional eastbound and southbound lanes at respective arms of the junction.	← →		
HS.18	*Essex Road:* Provision of new Essex Road Bridge.	← →		
HS.19	*Essex Road:* Improvements to roundabout at junction with Dinant Link Road.	← →		
HS.20	*Signage:* Update the network signage across the Borough to reflect the new access arrangements on/off the A10 at Church Lane.		← →	
HS.21	*Secondary School Access:* Provision of a new access into the secondary school site from the A10 spur road to the south.		← →	
HS.22	*Secondary School Access:* Provision of a new access into the secondary school site from Church Lane to the north.		← →	
PK				
PK.01	Introduce on street parking charges and restrictions in areas around Stations to tackle long stay commuter parking related problems.	← →		
PK.02	Introduce residents parking permit schemes in areas of high parking demand.	← →		
PT				
PT.01	Increased capacity on the West Anglia Main Line arising from 4-tracking (from 2026).		←	→
PT.02	Provide a new bus service running every 30 minutes between High Leigh and Broxbourne Station via Hoddesdon Town Centre.	← →		
PT.03	Provide a new bus service running every 20 minutes between Waltham Cross Station and Brookfield via Cheshunt Station, Delamare Road and Hertford Regional College.	← →		
PT.04	Provide a new bus service running every 15 minutes between Park Plaza and Waltham Cross Station via Waltham Cross Town Centre.	← →		
PT.05	Re-route the existing 242 bus service between Potters Bar and Waltham Cross into the Rosedale Park North development site to provide a service every 30 minutes.	← →		

Ref:	Scheme	Short Term	Medium Term	Long Term
PT.06	New station at Turnford.		←	→
PT.07	New station at Park Plaza West		←	→
PT.08	Provide new and upgraded bus stops across the Borough including shelters, seating, lighting, raised kerbs, and timetables.	←		
PT.09	Introduce Selective Vehicle Detection systems to provide priority for buses along the old A10 at (i) Junction of Station Road / High Road, Broxbourne, (ii) Vancouver Road / A1170, Turnford, (iii) Church Lane / Turners Hill, Cheshunt, and (iv) Old Pond, Cheshunt.	←		
PT.10	Provision of new and improved bus shelters at Waltham Cross Train station to be served by extension of existing services from Waltham Cross Bus Station.	←		
PT.11	Junction improvements on Station Road to improve access/egress into Broxbourne Station.	←		
PT.12	Provide real time information displays at bus stops on all commercial routes.	←		
PT.13	Provide real time information displays in areas which generate a large number of trips (i.e. doctors surgeries, shopping centres and train stations).	←		
PT.14	Promotion of the existing Intalink mobile app.	←	→	
PT.15	Development of an integrated BUSnet ticket for Broxbourne.	←		
SC				
SC.01	Develop, implement and monitor a series of Area Wide Travel Plans with employers in Hoddesdon, Waltham Cross, Brookfield and Park Plaza.	←		
SC.02	Develop, implement and monitor Station Travel Plans at Broxbourne, Cheshunt and Waltham Cross Stations.	←		
SC.03	Develop, implement and monitor Travel Plans at all schools across the Borough.	←		
SC.04	Undertake a programme of Personalised Journey Planning with target groups.	←		
SC.05	Produce and implement a Communications Strategy associated with all measures to be delivered through the Strategy.	←		
SC.06	Develop and promote a car share scheme.	←		
SC.07	Provide a network of charging points for electric vehicles.	←	→	
WC				
WC.01	Signalised crossing on western arm of Dinant Link Road / Essex Road roundabout.	←		
WC.02	Footpath along western side of Charlton Way between Haslewood Avenue and Dinant Link Road.	←		
WC.03	At grade signalised crossing of Dinant Link Road at junction with Amwell Street.	←		
WC.04	Treatment of Lord Street to widened footway and remove conflicts with parked cars along its length.	←		
WC.05	Improve pedestrian links between Cheshunt Station and bus stops being provided as part of the Delamare Road development.	←		
WC.06	*Old Pond:* Reconfiguration of Old Pond junction to provide signalised junction and crossing points for pedestrians.	←		
WC.07	Improve facilities on the existing cycle network and provide new routes to create a more connected and coherent network.	←	→	
WC.08	Provide appropriate signage across the cycle network.	←		
WC.09	Introduce measures to encourage more walking and cycling along the old A10 including raised tables, widening of footways, and a review of speed limits.	←	→	
WC.10	Create School Safety Zones outside every school within the Borough, to prioritise pedestrians and other vulnerable road users over general traffic.	←		
WC.11	Level crossing closures at Trinty Lane, Windmill Lane and Slipe Lane.	←		
WC.12	Provide a pedestrian / cycle bridge at Park Lane to cross the railway line and allow access into Park Plaza North.		←	→
WC.13	Provide a pedestrian / cycle bridge over the A10 between Park Plaza North and Park Plaza West		←	→
WC.14	Provide dropped kerbs with tactile paving at all pedestrian crossing points within the Borough.	←		→
WC.15	Provide significant increases in the volume of cycle parking at key trip generators within Broxbourne.	←		

12.2 Short Term

12.2.1 The Strategy proposes a series of 'quick wins' which can deliver benefits in the short term and pave the way for larger scale interventions in subsequent years. In particular, these relate to:

- **Travel Plans:** The development of Travel Plans with employers, train operators, schools and others will help to increase awareness and understanding of existing patterns. This can be used to target information provision to individuals to help them make more informed travel choices, and also help inform more medium term interventions by generating a more in depth understanding of travel demand.

  Operators Abellio West Anglia have identified Broxbourne and Cheshunt Stations as their focus for the production of new Station Travel Plans in 2018.

- **Bus Shelter Improvements and Information Provision:** A programme of bus stop improvements along the old A10 corridor can be delivered in advance of service improvements. They provide a visible and effective physical improvement to encourage bus use which coupled with the introduction of real time information displays and will encourage increased use of the existing bus network.

- **Integrated Ticketing:** With integrated ticketing already in place in other parts of Hertfordshire it is envisaged that a similar such scheme could be developed for Broxbourne within the first 5 years of the Strategy. Alongside other 'quick wins' it will help to encourage greater use of the existing network without the need for large scale disruption or expense.

- **Pedestrian Improvements:** Investment in relatively small scale pedestrian improvements and new crossings provide marginal gains which cumulatively will ease movement across the borough for short trips.

12.2.2 A focus on sustainable transport investment in measures such as those detailed above in the short term aligns with the core principle of implementing a hierarchy of measures which at first seek to reduce the need to travel and encourage more sustainable travel before higher cost interventions are introduced.

12.2.3 Likewise the reconfiguration of the mini-roundabouts to provide signal controlled junctions on the local road network should be provided in advance of the more major works earmarked for the A10, to provide greater regulation of traffic flows in advance of routing alterations.

12.2.4 A number of larger scale works are also envisaged to be delivered by 2021:

- **High Leigh:** The High Leigh development has planning permission in place and so it is envisaged housing will be provided on the site in advance of 2021. This will generate a requirement for the junction improvement schemes identified along the Dinant Link Road and Hertford Road.

- **Brookfield:** Elements of the Brookfield development are also expected to come forward before 2021. To facilitate this, the new link roads and reconfiguration of access via Halfhide Lane will be required in advance of these works to open up the site and provide the necessary capacity and connectivity to accommodate the travel demand in the area.

Third Party Funding Programmes

12.2.5 Short term measures to be delivered through the Strategy are also dependent upon the availability of funding, often from third parties.

12.2.6 Highways England are committed to funding the M25 J25 capacity improvement scheme in 2020, Network Rail's programme of level crossing closures within Broxbourne has already commenced, whilst the funding earmarked by the Hertfordshire Local Enterprise Partnership for the new Essex Road bridge is programmed to be spent by 2021.

12.2.7 The dependence on developer contributions also dictates that many of the major interventions cannot come forward in the short term.

12.3 Medium Term

12.3.1 The medium term reflects the period up until the end of the Plan period during which 7,700 new homes and 6,000 to 7,000 new jobs will be delivered. As a consequence this Strategy should be delivered in its entirety by 2033.

12.3.2 A number of mitigations are anticipated to come forward in close proximity to each other, and in many instances, they will be required to be implemented alongside each other as a consequence of their interdependencies. These include the following schemes:

- **A10:** Junction improvements on the A10 should be co-ordinated to avoid merely moving the existing congestion and delays from one junction to another. This therefore requires the schemes at Park Plaza, College Road and Church Lane to come forward as a combined package of works.

- **Great Cambridge Road:** Measures to reduce the speed and volume of traffic along the old alignment of the A10 should come forward alongside the increases in capacity of the current A10 as a further impetus for through traffic to use the most appropriate routes through the borough. This will help to 'lock-in' changes in road user prioritises and encourage more sustainable travel along the corridor.

- **Park Plaza:** The introduction of a new hamburger style junction where Lieutenant Ellis Way and Winston Churchill Way intersect with the A10 will stimulate the need for the reconfiguration of the existing junction of the A10 with the Great Eastern Road, and in turn the provision of a new access point in and out of Park Plaza West via Lieutenant Ellis Way.

12.4 Long Term

12.4.1 Whilst the Local Plan covers the period up to 2033 there are potentially a number of strategically important measures that will impact upon both the Local Plan and the nature of transport provision in the long term which are programmed to come forward post 2033.

Crossrail 2

12.4.2 The most important of these is Crossrail 2. This will provide a high capacity heavy rail link between north and south London and is a scheme due to commence operations in 2033. The scale of the project is significant, as are the implications for Broxbourne.

12.4.3 With Broxbourne, Cheshunt or a new Station at Turnford all being considered for the northern terminus of the route, this Strategy and the Local Plan both seek to provide a sound framework upon which the Borough can maximise the benefits that this step change in capacity and connectivity the scheme will provide

12.4.4 Likewise, the arrival of Crossrail 2 could also have significant implications for Waltham Cross. In the region of 10,000 new dwellings may come forward associated with the step change in rail connectivity to the capital and an Area Action Plan (AAP) will provide the platform through which to understand the connotations for the transport network within the town in the longer term.

New Technology

12.4.5 Changes in technology will have an impact on travel behaviour by 2033. Whilst it is not possible to determine exactly what developments will come to the fore, the evolution of more automated vehicles and more sustainable fuel supplies may point towards a 'greening' of car based travel.

12.4.6 Increased ownership of electric and hybrid vehicles are envisaged which could generate demand for charging points for example. This would not alleviate many of the other issues associated with congestion however, such as delays to journey times and a lack of active travel.

12.4.7 Increasing opportunities for remote learning and working from home as a consequence of the roll out of superfast broadband and associated technologies will increasingly reduce the need and demand to travel. In the instances where individuals do choose to travel, in terms of public transport, it is anticipated that integration between services and modes will be more seamless as a result of new apps and pre-paid or digitised ticketing options.

Workplace Parking Levy

12.4.8 Whilst the mitigations to facilitate growth earmarked within the Strategy are deemed sufficient to address the increase in demand to travel to, from, within and through Broxbourne by 2033, it may prove necessary in the medium to long term to consider more radical interventions to prompt a step change in sustainable transport provision and travel behaviour.

12.4.9 Managing the demand to travel, especially by car should continue to be at the forefront of long term transport planning for the authority and two options exist which should be considered for future exploration, namely Road User Charging and a Workplace Parking Levy. **Table 12.2** highlights the key features of each measure.

12.4.10 On balance it is deemed that a Workplace Parking Levy (WPL) would be the more appropriate measure for Broxbourne given the factors in **Table 12.2**. Whilst only one similar scheme is in place in the UK, in Nottingham, there have been a number of benefits on job growth and limiting traffic growth, as well as the improvements made to the transport network on the back of the revenue generated.

Table 12.2: Key Features of Road User Charging & Workplace Parking Levy Schemes

Criteria	Road User Charging	Workplace Parking Levy
Target(s)	- Targets all road users	- Targets commuter parking
Area	- Specific roads or cordon	- Authority wide
Charging	- Charge levied per vehicle - Charge per use	- Employer based charge - Annual charge
Set Up	- Complex set up - Longer implementation timescales	- Relatively straightforward set up - Shorter implementation timescales
Impact	- Higher reduction in car travel	- Lower reduction in car travel
Costs	- Higher set up and maintenance cost	- Lower set up and maintenance costs
Revenue	- Harder to quantify	- Easier to quantify

12.4.11 As a tool in itself, it is considered that WPL would have a positive but modest impact on modal shift. This is because not all employers would pass the levy onto their staff and where they do, as the charge would be quite low, the number of affected employees who decide to transfer to public transport rather than use their car would be relatively small.

12.4.12 However, additional and larger direct positive impacts on modal shift would accrue from the wider demand management impacts of WPL, complementary employer action to actively promote alternatives to the car and by positively managing staff parking provision.

12.4.13 Indirect transport impacts would arise as a result of changes in travel behaviour due to the introduction of public transport infrastructure, integration actions and services funded wholly or in part by WPL income. When these are considered, the introduction of an extensive package of improvements as a result of the availability of WPL income will create a modern transport environment which will have a major impact on modal shift and congestion.

12.4.14 Initial estimates suggest that applying the same parameters as the Nottingham scheme[50], Broxbourne could potentially generate around £2-3m per annum from a WPL, and as an ongoing revenue stream enable the step change in provision and realistic alternatives to the car which the Borough requires.

[50] A levy of £379 p/a is applied to businesses with 11 or more spaces, generating around £9m p/a in revenue based upon 2016 prices.

Appendix A: Packages of Area Based Interventions

		Area						
Ref.	**Scheme**	**Brookfield**	**Broxbourne**	**Cheshunt**	**Goffs Oak & Rosedale Park**	**Hoddesdon**	**Park Plaza**	**Wormley & Turnford**
Highway Schemes								
HS.01	*M25:* Capacity improvement at M25 J25, through the provision of a dedicated left turn lane for northbound traffic off the M25 and the widening of the A10 southbound on its approach to the junction.						✓	
HS.02	*A10:* Modify existing 3-arm junction on A10 to provide an at-grade 4-arm junction for access into Park Plaza North & West.						✓	
HS.03	*A10:* Provide a 'hamburger' style signalised junction with N/S priority at the intersection of the A10 junction with the A121 Monarch's Way and B198 Lieutenant Ellis Way (Park Plaza junction).						✓	
HS.04	*Lieutenant Ellis Way:* New 4-arm junction on Lieutenant Ellis Way to the north of Park Plaza.						✓	
HS.05	*College Road:* At grade improvement at College Road / A10 junction, providing additional northbound and southbound lanes at the junction and increased length of northbound left filter into College Road, and banning all right turns.			✓				

		Area						
Ref.	**Scheme**	**Brookfield**	**Broxbourne**	**Cheshunt**	**Goffs Oak & Rosedale Park**	**Hoddesdon**	**Park Plaza**	**Wormley & Turnford**
HS.06	*Church Lane:* At grade highway capacity improvement at Church Lane / A10 junction, providing an additional north-south lane through the junction and banning all right turns and left turns onto the A10.			✓				
HS.07	*Church Lane:* Reconfiguration of Church Lane / High Street, Cheshunt roundabout to provide signalised junction and crossing points for pedestrians.			✓				
HS.08	*Church Lane:* Reconfiguration of Church Lane / Flamstead End Road roundabout to provide signalised junction and crossing points for pedestrians.			✓				
HS.09	*Brookfield (Turnford Link Road):* Construction of a Halfhide Lane to Turnford Interchange Link Road, together with provision of a new western arm at the A10 Turnford Interchange.	✓						
HS.10	*Brookfield (Halfhide Lane Link Road):* Construction of new link road immediately to the west of the A10 providing a link from Halfhide Lane north to Hells Wood, where it turns westwards to connect to the Turnford Link Road via a new roundabout, and south to 'The Links' to provide access to Tesco and from the A10 off-slip.	✓						

		Area						
Ref.	**Scheme**	**Brookfield**	**Broxbourne**	**Cheshunt**	**Goffs Oak & Rosedale Park**	**Hoddesdon**	**Park Plaza**	**Wormley & Turnford**
HS.11	*Brookfield (Garden Village Distributor Road):* Provision of new distributor road to serve the new Brookfield development.	✓						
HS.12	*Brookfield:* Reconfiguration of the 4-arm signlaised junction on Halfhide Lane at junction with The Links and the access road into Brookfield Retail Park, by removing access to/from The Links and allowing only movements into (and not out of) the Retail Park.	✓						
HS.13	*Brookfield:* Provision of additonal capacity at Marriott Roundabout.	✓						
HS.14	*Goffs Lane:* Reconfiguration of Newgatestreet Road / Cuffley Hill / Goffs Lane junction give way to provide signalised junction with crossing points for pedestrians.					✓		
HS.15	*Dinant Link Road:* New roundabout on Dinant Link Road to permit access into High Leigh development.					✓		
HS.16	*Dinant Link Road:* Sun roundabout improvements (junction of Dinant Link Road and Ware Road) to provide additional lane on eastbound arm of roundabout.					✓		
HS.17	*Hertford Road:* Hertford Road / Ware Road roundabout improvements to provide additional eastbound and southbound lanes at respective arms of the junction.					✓		

		Area						
Ref.	**Scheme**	**Brookfield**	**Broxbourne**	**Cheshunt**	**Goffs Oak & Rosedale Park**	**Hoddesdon**	**Park Plaza**	**Wormley & Turnford**
HS.18	*Essex Road:* Provision of new Essex Road Bridge.					✓		
HS.19	*Essex Road:* Improvements to roundabout at junction with Dinant Link Road.					✓		
HS.20	*Signage:* Update the network signage across the Borough to reflect the new access arrangements on/off the A10 at Church Lane.	✓	✓	✓	✓	✓	✓	✓
HS.21	*Secondary School Access:* Provision of a new access into the secondary school site from the A10 spur road to the south.							✓
HS.22	*Secondary School Access: Provision of a new access into the secondary school site from Church Lane to the north.*							✓
Parking Schemes								
PK.01	Introduce on street parking charges and restrictions in areas around Stations to tackle long stay commuter parking related problems.		✓	✓			✓	
PK.02	Introduce residents parking permit schemes in areas of high parking demand.							

		Area						
Ref.	**Scheme**	**Brookfield**	**Broxbourne**	**Cheshunt**	**Goffs Oak & Rosedale Park**	**Hoddesdon**	**Park Plaza**	**Wormley & Turnford**
Public Transport Schemes								
PT.01	Increased capacity on the West Anglia Main Line arising from 4-tracking (from 2026).		✓	✓			✓	
PT.02	Provide a new bus service running every 30 minutes between High Leigh and Broxbourne Station via Hoddesdon Town Centre.		✓			✓		
PT.03	Provide a new bus service running every 20 minutes between Waltham Cross Station and Brookfield via Cheshunt Station, Delamare Road and Hertford Regional College.	✓		✓			✓	✓
PT.04	Provide a new bus service running every 15 minutes between Park Plaza and Waltham Cross Station via Waltham Cross Town Centre.						✓	
PT.05	Re-route the existing 242 bus service between Potters Bar and Waltham Cross into the Rosedale Park North development site to provide a service every 30 minutes.				✓			
PT.06	New station at Turnford.							✓
PT.07	New station at Park Plaza West						✓	
PT.08	Provide new and upgraded bus stops across the Borough including shelters, seating, lighting, raised kerbs, and timetables.	✓	✓	✓	✓	✓	✓	✓

		Area						
Ref.	**Scheme**	**Brookfield**	**Broxbourne**	**Cheshunt**	**Goffs Oak & Rosedale Park**	**Hoddesdon**	**Park Plaza**	**Wormley & Turnford**
PT.09	Introduce Selective Vehicle Detection systems to provide priority for buses along the old A10 at (i) Junction of Station Road / High Road, Broxbourne, (ii) Vancouver Road / A1170, Turnford, (iii) Church Lane / Turners Hill, Cheshunt, and (iv) Old Pond, Cheshunt.						✓	
PT.10	Provision of new and improved bus shelters at Waltham Cross Train station to be served by extension of existing services from Waltham Cross Bus Station.						✓	
PT.11	Junction improvements on Station Road to improve access/egress into Broxbourne Station.		✓					
PT.12	Provide real time information displays at bus stops on all commercial routes.	✓	✓	✓	✓	✓	✓	✓
PT.13	Provide real time information displays in areas which generate a large number of trips (i.e. doctors surgeries, shopping centres and train stations).	✓	✓	✓	✓	✓	✓	✓
PT.14	Promotion of the existing Intalink mobile app.	✓	✓	✓	✓	✓	✓	✓
PT.15	Development of an integrated BUSnet ticket for Broxbourne.	✓	✓	✓	✓	✓	✓	✓

		Area						
Ref.	**Scheme**	**Brookfield**	**Broxbourne**	**Cheshunt**	**Goffs Oak & Rosedale Park**	**Hoddesdon**	**Park Plaza**	**Wormley & Turnford**
Smarter Choices Schemes								
SC.01	Develop, implement and monitor a series of Area Wide Travel Plans with employers in Hoddesdon, Waltham Cross, Brookfield and Park Plaza.	✓				✓	✓	
SC.02	Develop, implement and monitor Station Travel Plans at Broxbourne, Cheshunt and Waltham Cross Stations.		✓	✓			✓	
SC.03	Develop, implement and monitor Travel Plans at all schools across the Borough.	✓	✓	✓	✓	✓	✓	✓
SC.04	Undertake a programme of Personalised Journey Planning with target groups.	✓	✓	✓	✓	✓	✓	✓
SC.05	Produce and implement a Communications Strategy associated with all measures to be delivered through the Strategy.	✓	✓	✓	✓	✓	✓	✓
SC.06	Develop and promote a car share scheme.	✓	✓	✓	✓	✓	✓	✓
SC.07	Provide a network of charging points for electric vehicles.	✓	✓	✓	✓	✓	✓	✓
Walking & Cycling Schemes								
WC.01	Signalised crossing on western arm of Dinant Link Road / Essex Road roundabout.					✓		
WC.02	Footpath along western side of Charlton Way between Haslewood Avenue and Dinant Link Road.					✓		

		Area						
Ref.	**Scheme**	**Brookfield**	**Broxbourne**	**Cheshunt**	**Goffs Oak & Rosedale Park**	**Hoddesdon**	**Park Plaza**	**Wormley & Turnford**
WC.03	At grade signalised crossing of Dinant Link Road at junction with Amwell Street.					✓		
WC.04	Treatment of Lord Street to widened footway and remove conflicts with parked cars along its length.					✓		
WC.05	Improve pedestrian links between Cheshunt Station and bus stops being provided as part of the Delamare Road development.			✓				
WC.06	*Old Pond:* Reconfiguration of Old Pond junction to provide signalised junction and crossing points for pedestrians.			✓				
WC.07	Improve facilities on the existing cycle network and provide new routes to create a more connected and coherent network.	✓	✓	✓	✓	✓	✓	✓
WC.08	Provide appropriate signage across the cycle network.	✓	✓	✓	✓	✓	✓	✓
WC.09	Introduce measures to encourage more walking and cycling along the old A10 including raised tables, widening of footways, and a review of speed limits.		✓	✓				✓
WC.10	Create School Safety Zones outside every school within the Borough, to prioritise pedestrians and other vulnerable road users over general traffic.	✓	✓	✓	✓	✓	✓	✓
WC.11	Level crossing closures at Trinty Lane, Windmill Lane and Slipe Lane.		✓	✓			✓	

		Area						
Ref.	**Scheme**	**Brookfield**	**Broxbourne**	**Cheshunt**	**Goffs Oak & Rosedale Park**	**Hoddesdon**	**Park Plaza**	**Wormley & Turnford**
WC.12	Provide a pedestrian / cycle bridge at Park Lane to cross the railway line and allow access into Park Plaza North.						✓	
WC.13	Provide a pedestrian / cycle bridge over the A10 between Park Plaza North and Park Plaza West						✓	
WC.14	Provide dropped kerbs with tactile paving at all pedestrian crossing points within the Borough.	✓	✓	✓	✓	✓	✓	✓
WC.15	Provide significant increases in the volume of cycle parking at key trip generators within Broxbourne.	✓	✓	✓	✓	✓	✓	✓

Appendix B: Proposed Schemes, Costs & Funding

			Costs	Funding		
Mode	**Ref:**	**Scheme**	**Capital**	**Secured**	**Required**	**Notes**
Highways	**HS**					
Highways	HS.01	*M25:* Capacity improvement at M25 J25, through the provision of a dedicated left turn lane for northbound traffic off the M25 and the widening of the A10 southbound on its approach to the junction.	-£26,900,000	£26,900,000	£0	Highways England committed scheme. Costs based upon Option 2, which is Broxbourne's preferred scheme.
Highways	HS.02	*A10:* Modify existing 3-arm junction on A10 to provide an at-grade 4-arm junction for access into Park Plaza North & West.	-£500,000	£0	-£500,000	Design provided by AECOM. Funding to be provided by Park Plaza development.
Highways	HS.03	*A10:* Provide a 'hamburger' style signalised junction with N/S priority at the intersection of the A10 junction with the A121 Monarch's Way and B198 Lieutenant Ellis Way (Park Plaza junction).	-£7,700,000	£0	-£7,700,000	Based upon figures provided by AECOM from their initial design which has been tweaked. Due to size of the scheme may be pertinent to commission further feasibility work.
Highways	HS.04	*Lieutenant Ellis Way:* New 4-arm junction on Lieutenant Ellis Way to the north of Park Plaza.	-£750,000	£0	-£750,000	More detailed design work required.
Highways	HS.05	*College Road:* At grade improvement at College Road / A10 junction, providing additional northbound and southbound lanes at the junction and increased length of northbound left filter into College Road, and banning all right turns.	-£1,000,000	£0	-£1,000,000	Based upon figures provided by AECOM. Costs exclude land acquisition.
Highways	HS.06	*Church Lane:* At grade highway capacity improvement at Church Lane / A10 junction, providing an additional north-south lane through the junction and banning all right turns and left turns onto the A10.	-£1,000,000	£0	-£1,000,000	Preliminary design produced by WYG.
Highways	HS.07	*Church Lane:* Reconfiguration of Church Lane / High Street, Cheshunt roundabout to provide signalised junction and crossing points for pedestrians.	-£300,000	£0	-£300,000	Would require a scheme which comprised not just this junction but incorporates the mini roundabout immediately to the south at the junction with Blindmans Lane.
Highways	HS.08	*Church Lane:* Reconfiguration of Church Lane / Flamstead End Road roundabout to provide signalised junction and crossing points for pedestrians.	-£250,000	£0	-£250,000	Indicative design only.
Highways	HS.09	*Brookfield (Turnford Link Road):* Construction of a Halfhide Lane to Turnford Interchange Link Road, together with provision of a new western arm at the A10 Turnford Interchange.	-£8,000,000	£0	-£8,000,000	Costs based upn design produced by TPP and includes cost of bridge over New River.
Highways	HS.10	*Brookfield (Halfhide Lane Link Road):* Construction of new link road immediately to the west of the A10 providing a link from Halfhide Lane north to Hells Wood, where it turns westwards to connect to the Turnford Link Road via a new roundabout, and south to 'The Links' to provide access to Tesco and from the A10 off-slip.	-£6,000,000	£0	-£6,000,000	Design required and so cost estimate is a ball park figure based upon costs of Turnford Link Road.
Highways	HS.11	*Brookfield (Garden Village Distributor Road):* Provision of new distributor road to serve the new Brookfield development.	-£5,000,000	£0	-£5,000,000	Indicative cost estimate.
Highways	HS.12	*Brookfield:* Reconfiguration of the 4-arm signlaised junction on Halfhide Lane at junction with The Links and the access road into Brookfield Retail Park, by removing access to/from The Links and allowing only movements into (and not out of) the Retail Park.	-£200,000	£0	-£200,000	Design required and so cost estimate is a ball park figure.
Highways	HS.13	*Brookfield:* Provision of additonal capacity at Marriott Roundabout.	-£200,000	£0	-£200,000	Preliminary design produced by WYG.
Highways	HS.14	*Goffs Lane:* Reconfiguration of Newgatestreet Road / Cuffley Hill / Goffs Lane junction give way to provide signalised junction with crossing points for pedestrians.	-£250,000	£0	-£250,000	Indicative design produced by WYG.
Highways	HS.15	*Dinant Link Road:* New roundabout on Dinant Link Road to permit access into High Leigh development.	-£3,000,000	£3,000,000	£0	Designed by WSP. To be provided by High Leigh developer through S106 funding.
Highways	HS.16	*Dinant Link Road:* Sun roundabout improvements (junction of Dinant Link Road and Ware Road) to provide additional lane on eastbound arm of roundabout.	-£150,000	£150,000	£0	Design produced by WSP for developer. Costs provided by Broxbourne. Works associated with High Leigh Garden Village.
Highways	HS.17	*Hertford Road:* Hertford Road / Ware Road roundabout improvements to provide additional eastbound and southbound lanes at respective arms of the junction.	-£150,000	£150,000	£0	Design produced by WSP for developer. Costs provided by Broxbourne. Works associated with High Leigh Garden Village.
Highways	HS.18	*Essex Road:* Provision of new Essex Road Bridge.	-£6,500,000	£6,500,000	£0	Scheme to be funded by the LEP.
Highways	HS.19	*Essex Road:* Improvements to roundabout at junction with Dinant Link Road.	-£100,000	£100,000	£0	Design produced by WSP for developer. Costs provided by Broxbourne. Works associated with High Leigh Garden Village.
Highways	HS.20	*Signage:* Update the network signage across the Borough to reflect the new access arrangements on/off the A10 at Church Lane.	-£100,000	£0	-£100,000	Estimate. A comprehensive review of network signage is required as a result of changes in access on/off the A10.
Highways	HS.21	*Secondary School Access:* Provision of a new access into the secondary school site from the A10 spur road to the south.	-£580,000	£580,000	£0	Design and costed by Hertfordshire County Council consultants and required to provide access into new school site.
Highways	HS.22	*Secondary School Access:* Provision of a new access into the secondary school site from Church Lane to the north.	-£250,000	£250,000	£0	Design and costed by Hertfordshire County Council consultants and required to provide access into new school site.
Parking	**PK**					
Parking	PK.01	Introduce on street parking charges and restrictions in areas around Stations to tackle long stay commuter parking related problems.	-£500,000	£0	-£500,000	It is envisaged that the cost of setting up the operation will equate to the revenues generated by the scheme, albeit subject to several variables. The revenue generated is subject to the extent of provision, tariffs and use.
Parking	PK.02	Introduce residents parking permit schemes in areas of high parking demand.	-£250,000	£0	-£250,000	A small proportion of the operating costs will be met by the charges for permits imposed on local residents.

			Costs	Funding		
Mode	**Ref:**	**Scheme**	**Capital**	**Secured**	**Required**	**Notes**
Public Transport	**PT**					
Public Transport	PT.01	Increased capacity on the West Anglia Main Line arising from 4-tracking (from 2026).	£0	£0	£0	To be funded by Network Rail / Crossrail.
Public Transport	PT.02	Provide a new bus service running every 30 minutes between High Leigh and Broxbourne Station via Hoddesdon Town Centre.	-£3,000,000	£600,000	-£2,400,000	High Leigh development providing £600,000 of subsidy for the service over a five year period. Revenue costs based upon £150,000 to operate a bus on a Mon-Sat service > 30 mins round trip on route > 30 mins frequency > 2 buses required > £300,000. This figure has then been factored up to represent the capital costs over a 10 year period. Potential for revenue generation to be discussed with operators.
Public Transport	PT.03	Provide a new bus service running every 20 minutes between Waltham Cross Station and Brookfield via Cheshunt Station, Delamare Road and Hertford Regional College.	-£6,000,000	£0	-£6,000,000	Revenue costs based upon £150,000 to operate a bus on a Mon-Sat service > 64 mins round trip on route > 20 mins frequency > 4 buses required > £600,000. This figure has then been factored up to represent the capital costs over a 10 year period. Potential for revenue generation to be discussed with operators.
Public Transport	PT.04	Provide a new bus service running every 15 minutes between Park Plaza and Waltham Cross Station via Waltham Cross Town Centre.	-£3,000,000	£3,000,000	£0	Service to be provided by News International. Revenue costs based upon £150,000 to operate a bus on a Mon-Sat service > 24 mins round trip on route > 15 mins frequency > 2 buses required > £300,000. This figure has then been factored up to represent the capital costs over a 10 year period. Potential for revenue generation to be discussed with operators. Routing of service to be reviewed.
Public Transport	PT.05	Re-route the existing 242 bus service between Potters Bar and Waltham Cross into the Rosedale Park North development site to provide a service every 30 minutes.	£0	£0	£0	To be discussed with operators.
Public Transport	PT.06	New station at Turnford.	-£20,000,000	£0	-£20,000,000	Estimate, based upon the cost of Ilkeston Station, Derbyshire, currently under construction (opened in March 2017), with additional costs included for longer platforms and lift.
Public Transport	PT.07	New station at Park Plaza West	-£10,000,000	£0	-£10,000,000	Estimate, based upon the cost of Ilkeston Station, Derbyshire, currently under construction (opened in March 2017).
Public Transport	PT.08	Provide new and upgraded bus stops across the Borough including shelters, seating, lighting, raised kerbs, and timetables.	-£500,000	£0	-£500,000	Estimate based upon £10,000 per stop and 50 stops improved, scalable.
Public Transport	PT.09	Introduce Selective Vehicle Detection systems to provide priority for buses along the old A10 at (i) Junction of Station Road / High Road, Broxbourne, (ii) Vancouver Road / A1170, Turnford, (iii) Church Lane / Turners Hill, Cheshunt, and (iv) Old Pond, Cheshunt.	-£80,000	£0	-£80,000	Estimate. More detailed assessment required.
Public Transport	PT.10	Provision of new and improved bus shelters at Waltham Cross Train station to be served by extension of existing services from Waltham Cross Bus Station.	-£25,000	£0	-£25,000	Based upon provision of two shelters, with real time information displays, raised kerbs, lighting, seating, timetable and map.
Public Transport	PT.11	Junction improvements on Station Road to improve access/egress into Broxbourne Station.	-£150,000	£0	-£150,000	No scheme design in place so cost estimate based upon similar examples from elsewhere.
Public Transport	PT.12	Provide real time information displays at bus stops on all commercial routes.	-£150,000	£0	-£150,000	Estimate, based upon £3,000 per display at 50 locations, scalable.
Public Transport	PT.13	Provide real time information displays in areas which generate a large number of trips (i.e. doctors surgeries, shopping centres and train stations).	-£30,000	£0	-£30,000	Estimate based upon £3,000 per display and match funding secured from hosts, scalable.
Public Transport	PT.14	Promotion of the existing Intalink mobile app.	-£250,000	£0	-£250,000	Costs are dependant upon the level of promotion undertaken.
Public Transport	PT.15	Development of an integrated BUSnet ticket for Broxbourne.	-£250,000	£0	-£250,000	Estimate - requires input from HCC.
Smarter Choices	**SC**					
Smarter Choices	SC.01	Develop, implement and monitor a series of Area Wide Travel Plans with employers in Hoddesdon, Waltham Cross, Brookfield and Park Plaza.	-£40,000	£0	-£40,000	Estimate, **scalable** Assumes that employers themselves will also contribute to physical measures and the costs of monitoring the Plans, potentially through a BID. Requires dedicated officer within BBC to monitor and enforce all Travel Plans.
Smarter Choices	SC.02	Develop, implement and monitor Station Travel Plans at Broxbourne, Cheshunt and Waltham Cross Stations.	-£100,000	£0	-£100,000	Estimate, **scalable** Assumes train operating company takes the lead on development.
Smarter Choices	SC.03	Develop, implement and monitor Travel Plans at all schools across the Borough.	-£100,000	£0	-£100,000	Estimate, **scalable**
Smarter Choices	SC.04	Undertake a programme of Personalised Journey Planning with target groups.	-£500,000	£0	-£500,000	Estimate, **scalable**
Smarter Choices	SC.05	Produce and implement a Communications Strategy associated with all measures to be delivered through the Strategy.	-£60,000	£0	-£60,000	Estimate, **scalable**
Smarter Choices	SC.06	Develop and promote a car share scheme.	-£250,000	£0	-£250,000	Estimate, dependant upon any existing schemes which can tap into.
Smarter Choices	SC.07	Provide a network of charging points for electric vehicles.	-£80,000	£0	-£80,000	Estimate based upon cost of £8,000 per charging point and 10 points provided across the Borough, **scalable**

			Costs	Funding		
Mode	**Ref:**	**Scheme**	**Capital**	**Secured**	**Required**	**Notes**
Walking & Cycling	**WC**					
Walking & Cycling	WC.01	Signalised crossing on western arm of Dinant Link Road / Essex Road roundabout.	-£50,000	£0	-£50,000	Provides both access for pedestrians but also regulates flow of traffic to reduce queues on Essex Road.
Walking & Cycling	WC.02	Footpath along western side of Charlton Way between Haslewood Avenue and Dinant Link Road.	-£25,000	£0	-£25,000	Estimate
Walking & Cycling	WC.03	At grade signalised crossing of Dinant Link Road at junction with Amwell Street.	-£50,000	£0	-£50,000	Estimate
Walking & Cycling	WC.04	Treatment of Lord Street to widened footway and remove conflicts with parked cars along its length.	-£100,000	£0	-£100,000	Estimate, including parking restrictions, dropped kerbs, TROs, widening of footway.
Walking & Cycling	WC.05	Improve pedestrian links between Cheshunt Station and bus stops being provided as part of the Delamare Road development.	-£100,000	£0	-£100,000	Estimate. Should provide safe and direct crossings plus wider footway where possible.
Walking & Cycling	WC.06	*Old Pond:* Reconfiguration of Old Pond junction to provide signalised junction and crossing points for pedestrians.	-£3,000,000	£0	-£3,000,000	Design produced by Markides Associates.
Walking & Cycling	WC.07	Improve facilities on the existing cycle network and provide new routes to create a more connected and coherent network.	-£8,100,000	£0	-£8,100,000	Estimate based upon £300,000 cost per km for 27km, **scalable**
Walking & Cycling	WC.08	Provide appropriate signage across the cycle network.	-£100,000	£0	-£100,000	Estiamte, **scalable**
Walking & Cycling	WC.09	Introduce measures to encourage more walking and cycling along the old A10 including raised tables, widening of footways, and a review of speed limits.	-£1,000,000	£0	-£1,000,000	A scaleable scheme with costs subject to the number and size of measures introduced along the corridor.
Walking & Cycling	WC.10	Create School Safety Zones outside every school within the Borough, to prioritise pedestrians and other vulnerable road users over general traffic.	-£1,000,000	£0	-£1,000,000	Estimate based upon targetting 10 schools each with £100,000 schemes, **scalable**
Walking & Cycling	WC.11	Level crossing closures at Trinty Lane, Windmill Lane and Slipe Lane.	-£750,000	£750,000	£0	Three locations have been confirmed by Network Rail and they will fund schemes in their entirity. Costs are estimated but will be cost neutral to BBC.
Walking & Cycling	WC.12	Provide a pedestrian / cycle bridge at Park Lane to cross the railway line and allow access into Park Plaza North.	-£2,000,000	£2,000,000	£0	To be funded by Network Rail.
Walking & Cycling	WC.13	Provide a pedestrian / cycle bridge over the A10 between Park Plaza North and Park Plaza West	-£2,000,000	£0	-£2,000,000	Estimate, based upon cost of Park Lane bridge. Could be more given it has to span a dual carriageway.
Walking & Cycling	WC.14	Provide dropped kerbs with tactile paving at all pedestrian crossing points within the Borough.	-£250,000	£0	-£250,000	Estimate, **scalable**
Walking & Cycling	WC.15	Provide significant increases in the volume of cycle parking at key trip generators within Broxbourne.	-£50,000	£0	-£50,000	Estimate, based upon cost of a secure cycle shelter at each location, **scalable**

	Costs	Funding	
	Capital	**Secured**	**Required**
Total	**-£132,770,000**	**£43,980,000**	**-£88,790,000**

Appendix C: Risk Register

			Pre-Mitigation				Post-Mitigation		
Type	**Risk**	**Risk Owner**	**Probability**	**Impact**	**Rating**	**Mitigation**	**Probability**	**Impact**	**Rating**
Delivery	Difficulties incurred in scheme delivery, particularly highway schemes on the A10.	BBC / HCC	3	4	12	Undertake further feasibility work of schemes. Extent construction time period to enable carriageway to remain open at all times.	2	3	6
Delivery	Changes in timeframes within which development comes forward.	BBC	4	3	12	Identify clear triggers for delivery of transport schemes and incorporate these into the conditions associated with planning applications to ensure that infrastructure is in place prior to development coming forward.	2	2	4
Delivery	Insufficient internal resources to oversee implementation of the strategy and schemes.	BBC / HCC	2	3	6	Procure technical support from external agencies.	1	1	1
Financial	Insufficient capital funding to implement programme of measures.	BBC	2	4	8	Local Plan viability assessment undertaken to determine the level of financial support that is affordable.	1	2	2
Financial	Insufficient revenue to sustain ongoing programme of measures / services.	BBC / HCC	4	5	20	Identify revenue streams through which services can be supported. Extent of service provision pitched at a level which is sustainable in the longer term.	3	3	9
Financial	Increases in project costs undermine the viability of the Strategy and Local Plan growth.	BBC	4	4	16	Design and feasibility work undertaken to refine scheme cost estimates.	2	4	8
Financial	Lack of external funding to support scheme delivery and the viability of the Stratgey.	BBC	2	2	4	Funding commitments from some external organisations in place, whilst BBC will work closely with HCC to tap into additional county-wide and national funding pots.	1	2	2

			Pre-Mitigation				Post-Mitigation		
Type	**Risk**	**Risk Owner**	**Probability**	**Impact**	**Rating**	**Mitigation**	**Probability**	**Impact**	**Rating**
Growth	Higher than expected growth and demand for housing, requiring additional provision within the authority.	BBC	4	5	20	Location of development on sustainable transport corridors and provision of further capaicty and connectivity improvements to accommodate increase in demand to travel.	3	4	12
Growth	Lower than expected growth and demand for housing, and allocations are not built out.	BBC	1	1	1	Alternative sources of funding identified to deliver infrastructure. Infrastructure requirements scaled down as reduced need for further capacity.	1	1	1
Growth	Higher than expected growth in neighbouring authorities results in transport capacity issues in Broxbourne.	HCC	4	2	8	HCC to ensure that the impact of any additional growth in surrounding areas is sufficiently mitigated on the BBC transport network.	2	1	2
Legal	Planning and statutory processes cause unforseen delays	BBC	3	2	6	Project management controls adopted to pre-empt requirements.	1	1	1
Legal	Land take requriements to deliver schemes.	BBC	2	5	10	Programme minimises land take and where there is a requirement land purchase complete before adoption of Local Plan.	1	1	1
Operations	Reductions in relative cost of fuel and driving increase levels of car based travel.	BBC	3	2	6	Provision of realistic alternatives to the car together with introduction of demand management techniques to ensure the network operates effectively.	2	2	4
Policy	Changes in Central Government transport priorities.	BBC / HCC	2	4	8	Strategy provides a multi-modal package of interventions and is consistent with Government policy which has been in place over the last 15-20 years.	2	2	4

			Pre-Mitigation				Post-Mitigation		
Type	**Risk**	**Risk Owner**	**Probability**	**Impact**	**Rating**	**Mitigation**	**Probability**	**Impact**	**Rating**
Policy	Lack of inclusion of transport mitigations in Hertfordshire Transport Strategy undermines delivery of the Strategy.	BBC / HCC	4	2	8	The Strategy is consitent with the principles of the LTP. The package of measures within the Strategy can be funded through developer contributions and are not reliant on external funding, including the HCC LTP.	1	1	1
Political	Failure of Crossrail 2 to be provided.	Network Rail / TfL	4	4	16	Work with NR and TfL to secure other capacity improvements along the West Anglian Line to accommodate the increase in demand to travel to London the Local Plan will generate.	2	3	6
Political	Lack of support from the general public with regard to the strategic approach or specific schemes	BBC	2	5	10	Provide clear, consistent and continuing dialogue and engagement with politicians and an evidenced based justification for interventions.	1	1	1
Stakeholders	Lack of support from the general public with regard to the strategic approach or specific schemes	BBC	3	2	6	Provide clear, consistent and continuing dialogue and engagement with the public and an evidenced based justification for interventions.	2	1	2
Stakeholders	Lack of support from operators with regard to the strategic approach or specific schemes.	BBC / HCC	1	4	4	Provide clear, consistent and continuing dialogue and engagement with partners and an evidenced based justification for interventions.	1	2	2
Stakeholders	Lack of support from neighbouring authorities with regard to the strategic apporach or specific schemes.	BBC	1	2	2	Provide clear, consistent and continuing dialogue and engagement with partners with the evidenced based justification for interventions.	1	1	1
Technology	Advancements in new technology impacting upon travel behaviour.	BBC	3	2	6	Changes in technology likely to make movement more efficent and environmentally friendly. BBC & HCC to look at utilising technology to provide innovative approaches to ongoing issues.	3	2	6

Appendix D: Schemes included in COMET 'Do Something' Scenario

Table 1: **Highway Mitigation Measures**[51]

Location	Ref	Scheme
M25 J25	HS.01	Capacity improvement at M25 J25, through the provision of a dedicated left turn lane for northbound traffic off the M25 and the widening of the A10 southbound on its approach to the junction.
Park Plaza	HS.02	A10: Modify existing 3-arm junction on A10 to provide an at-grade 4-arm junction for access into Park Plaza North & West.
Park Plaza	HS.03	A10: Provide a 'hamburger' style signalised junction with N/S priority at the intersection of the A10 junction with the A121 Monarch's Way and B198 Lieutenant Ellis Way (Park Plaza junction).
Park Plaza	HS.04	Lieutenant Ellis Way: New 4-arm junction on Lieutenant Ellis Way to the north of Park Plaza.
Cheshunt	HS.05	College Road: At grade improvement at College Road / A10 junction, providing additional northbound and southbound lanes at the junction and increased length of northbound left filter into College Road, and banning all right turns.
Cheshunt	HS.06	Church Lane: At grade highway capacity improvement at Church Lane / A10 junction, providing an additional north-south lane through the junction and banning all right turns and left turns onto the A10.
Cheshunt	HS.07	Church Lane: Reconfiguration of Church Lane / High Street, Cheshunt roundabout to provide signalised junction and crossing points for pedestrians.
Cheshunt	HS.08	Church Lane: Reconfiguration of Church Lane / Flamstead End Road roundabout to provide signalised junction and crossing points for pedestrians.
Brookfield	HS.09	Brookfield: Construction of a Halfhide Lane to Turnford Interchange Link Road, together with provision of a new western arm at the A10 Turnford Interchange.
Brookfield	HS.10	Brookfield: Reconfiguration of 4-arm signalised junction on Halfhide Lane at junction with The Links and the access road into Brookfield Retail Park, by removing access to/from The Links and allowing only movements into (and not out of) the Retail Park.
Brookfield	HS.11	Brookfield: Construction of new link road immediately to the west of the A10 providing a link from Halfhide Lane north to Hells Wood, where it turns westwards to connect to the Turnford Link Road via a new roundabout.
Brookfield	HS.12	Brookfield: Construction of new link road immediately to the west of the A10 providing a link from Halfhide Lane south to 'The Links' to provide access into Tesco car park.
Brookfield	HS.13	Brookfield: Provision of additional capacity at Marriott Roundabout.
Brookfield	HS.14	Brookfield: Provision of new distributor road to serve the new Brookfield development.
Waltham Cross	HS.15	Fishpools: Reconfiguration of Fishpools junction to provide signalised junction and crossing points for pedestrians.
Goffs Oak	HS.16	Goffs Lane: Reconfiguration of Newgatestreet Road / Cuffley Hill / Goffs Lane junction give way to provide signalised junction with crossing points for pedestrians.
Hoddesdon	HS.17	Dinant Link Road: New roundabout on Dinant Link Road to permit access into High Leigh development.

[51] Is should be noted that the final package of measures taken forward within the Strategy differs slightly to the list of schemes assessed within COMET.

Location	Ref	Scheme
Hoddesdon	HS.18	Dinant Link Road: Sun roundabout improvements (junction of Dinant Link Road and Ware Road) to provide additional lane on eastbound arm of roundabout.
Hoddesdon	HS.19	Hertford Road: Hertford Road / Ware Road roundabout improvements to provide additional eastbound and southbound lanes at respective arms of the junction.
Hoddesdon	HS.20	Essex Road: Provision of new Essex Road Bridge.
Hoddesdon	HS.21	Essex Road: Improvements to roundabout at junction with Dinant Link Road.
Authority Wide	HS.22	Speed limit: Provision of traffic calming, footway widening measures etc. on the Old A10 which has been modelled as a 20mph limit to reflect the change in conditions for motorists.
Authority Wide	HS.23	Signage: Update the network signage across the Borough to reflect the new access arrangements on/off the A10 at Church Lane.
Brookfield	HS 24	Secondary school site southern access
Brookfield	HS.25	Secondary School site northern access

Table 2: New and Revised Bus Services

No.	Origin	Destination
New Services		
1	High Leigh	Broxbourne Station
2	Waltham Cross Station	Hertford Regional College
3	Park Plaza North	Waltham Cross Bus Station
Revised Service		
4	Waltham Cross	Potters Bar

Table 3: Bus Infrastructure Improvements

Ref.	Scheme
a.	**Interchange:** New multi-modal bus/rail interchange at Waltham Cross Station. Extent of investment subject to the availability of funds from: (i) Lower cost intervention at Church Lane (ii) Potential sale of existing bus station site (t.b.c.)
b.	**Broxbourne Station:** Access improvements, particularly for buses at Broxbourne Station through the replacement of priority give way junction with signalised junction incorporating pedestrian crossing facilities.
c.	**Brookfield:** Provide bus interchange facilities as part of the Brookfield development.
d.	**Bus stops:** Bus stop improvement programme across the authority, to provide shelters, raised kerbs, seating, lighting and timetables.
e.	**Bus priority:** Introduce Selective Vehicle Detection systems to provide priority for buses along the old A10: i. Junction of Station Road / High Road, Broxbourne ii. Vancouver Road/A1170 (Selective Vehicle Detection System at signals) iii. Church Lane / Turners Hill, Cheshunt iv. Old Pond, Cheshunt.

Ref.	Scheme
	Other Measures
a.	Real time information provision at both bus stops and in key trip generators including retail, commercial and employment centres
b.	Development of an integrated BUSnet ticket for Broxbourne
c.	Promotion of the existing Intalink mobile app

Table 2: **Rail Service Changes**

Rail Services	
a.	Increased capacity on the West Anglia Main Line arising from 4-tracking (from 2026)
b.	New stations at Turnford and Park Plaza

Table 3: **Rail Service Frequency Changes**

	WAML (Post – STAR scheme)*	Crossrail 2*
Broxbourne	8 trains per hour in peak	20 trains per hour in peak
Cheshunt	10 trains per hour in peak	20 – 22 trains per hour in peak
Waltham Cross	5 trains per hour in peak	14 trains per hour in peak
* All trains – fast and slow – stopping at station		

Table 6: Cycle Infrastructure

Cycling Interventions	
a.	Development of a cycle network providing 10-20km of dedicated cycle lanes
b.	Increase cycle parking capacity at Broxbourne, Cheshunt and Waltham Cross Stations

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