

Braintree Local Plan Review Regulation 19 Transport Evidence

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Essex County Council and Braintree District Council

Braintree Regulation 19 Local Plan Transport Evidence

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Braintree Local Plan Review Regulation 19 Transport Evidence

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Address

Regent House
 90-96 Victoria Road, Chelmsford, Essex, CM1 1QU

www.essex.gov.uk/highways

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The analysis and forecasts contained in this report make use of information and input assumptions made available to Jacobs at a point in time. As conditions change the analysis and forecasts would be expected to change. Hence the findings set out in this report should be understood as relevant to that point in time when the information and assumptions were made.

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Acronyms and abbreviations

Acronym	Definition
BDC	Braintree District Council
BRT	Bus Rapid Transit
BSIP	Bus Service Improvement Plan
CTM	Colchester Transport Model
DfT	Department for Transport
ECC	Essex County Council
HGV	Heavy Goods Vehicle
HQPT	High Quality Public Transport
IDP	Infrastructure Delivery Plan
LCWIP	Local Cycling and Walking Infrastructure Plan
LGV	Light Goods Vehicle
LTP	Local Transport Plan
MSOA	Middle-layer Super Output Area
NEMo	North Essex Model
NH	National Highways
NPPF	National Planning Policy Framework
NTEM	National Trip End Model
NTS	National Travel Survey
SRN	Strategic Road Network
ST	Sustainable Transport
TAG	Transport Analysis Guidance
TEMPro	Trip End Model Programme
UTC	Urban Traffic Control
V/C	Volume divided by capacity
VDM	Variable Demand Modelling

Executive summary

Overview

This report assesses the transportation impact of proposed new Local Plan growth described in Braintree District's Local Plan submission draft of the Regulation 19 Plan to 2043. Grounded in planning guidance, the assessment identifies integrated transport improvements required to mitigate adverse impacts on the network, balance traffic movements, improve connectivity and support the plan's vision for high quality, sustainable, vibrant and healthy places.

The assessment extends the transportation evidence collated in the 'Braintree Local Plan Review Sustainable Accessibility and Baseline Appraisal and 'Braintree Local Plan Review Regulation 18: Highway Impact Appraisal of Preferred Spatial Option' (December 2025, Essex Highways) which identified parts of the network requiring mitigation and how sustainable measures could help to achieve this.

The Regulation 19 evidence report develops the strategy further by providing additional information on the integrated schemes aimed at easing traffic movements through urban centres and along key strategic corridors, improving network efficiency and enhancing connectivity between and within key settlements, town centres, employment areas and new developments. The report also explores Local Plan impact and associated mitigation benefits at key junctions across the district, and also provides analysis of traffic growth at junctions along the A12 and A120 corridors comprising National Highway's Strategic Road Network (SRN) through the district.

Chapter 1: Framework for Assessment

Chapter 1 of the report explains how the assessment methodology is informed by the National Planning Policy Framework (NPPF), which encourages a vision-led approach to Plan development. Accordingly, the chapter describes how the regional, county and local visions align and guide the integrated and sustainable approach to mitigating the impacts of growth with improved connectivity and choice of travel modes.

As documented in the Infrastructure Delivery Plan (IDP), the emerging plan identifies sites to meet the housing requirement of 19,261 new dwellings during the plan period 2026 to 2043. There is a committed supply of 4,336 dwellings, consisting of sites under construction or with extant planning permission. There is also a capacity of 2,905 dwellings on allocated sites from the existing Local Plan to be carried forward and a windfall projection of 975 dwellings.

Within the emerging plan, new allocations are identified which can deliver a total of 11,082 dwellings within the plan period and a total of 4,110 beyond the plan period.

Table ES 1: Summary of housing targets/projections 2026-2043

Measure (2026 – 2043)	Homes
Total housing requirement (2026–2043)	19,261
Average annual requirement	1,133 per year
Committed supply + allocated adopted LP sites*	7,241
Windfall allowance	975
Emerging new Local Plan allocation (2026-2043)	11,082

** Extant permissions plus adopted Local Plan allocations with planning permission*

While there is a presumption in favour of growth in sustainable, well-connected locations such as near rail stations with frequent train services, there is a requirement to also mitigate adverse impacts and maintain network efficiency. Hence, Chapter 1 explains the sequential method used to predict and resolve problems which involves:

- Modelling a 2043 ‘reference case’ of committed and expected background growth;
- Comparing a 2043 ‘assessment case’ of Local Plan growth associated with the proposed new Local Plan without mitigation against the reference case;
- Using the findings to identify mitigations and test a 2043 assessment case of proposed new Local Plan growth with mitigation to evaluate how future growth can be managed.

Chapter 2: Transport Challenges for Growth

The North Essex Model (NEMo), which is a strategic highway and public transport model covering Braintree, Colchester and Tendring, has been used as the principal tool to assess the cumulative impacts of growth. NEMo has a 2023 base year and shows traffic conditions in the AM peak hour 07:30-08:30 and the PM peak hour 16:30-17:30, since these are the busiest hours in 2023 across North Essex in the respective peaks. NEMo is run with variable demand modelling (VDM) which allows trip makers to respond to traffic conditions by changing mode or destination.

Reference case growth reflects housing and employment that would be certain or more than likely to come forward without the new Local Plan. It is estimated this could amount to over 11,000 homes and around 150 hectares of employment across Braintree district. Since the other North Essex authorities of Colchester and Tendring are also updating Local Plans, it was considered appropriate to include residential and employment growth as set out in their Regulation 18 plans to allow for a robust cumulative test of the impacts of growth. Whilst allocations modelled in neighbouring authorities are consistent with emerging Local Plan housing requirements, they are subject to change as they progress through to adoption. The scale of growth is aligned to government targets with development quanta not expected to change significantly.

To accommodate this growth, the reference case scenario also includes three committed highway interventions: 1) Panfield Lane link road in north-west Braintree, 2) Springwood Drive roundabout

capacity improvements, 3) Marks Farm roundabout capacity improvements (Straits Mill developer proposals).

Figure ES 1 below illustrates the impact of background growth and committed development on traffic flows across Braintree District by the end of the Local Plan period in 2043.

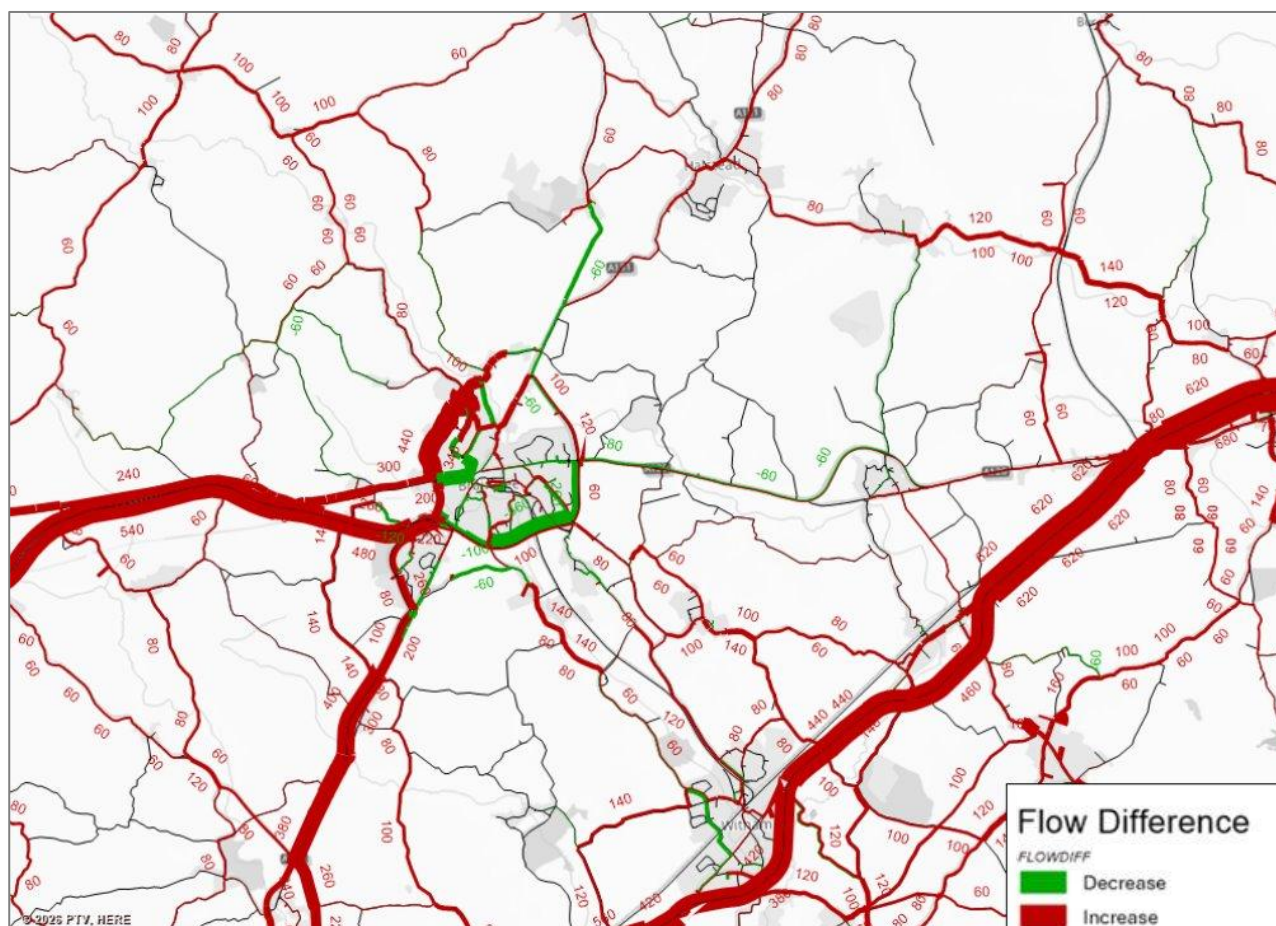


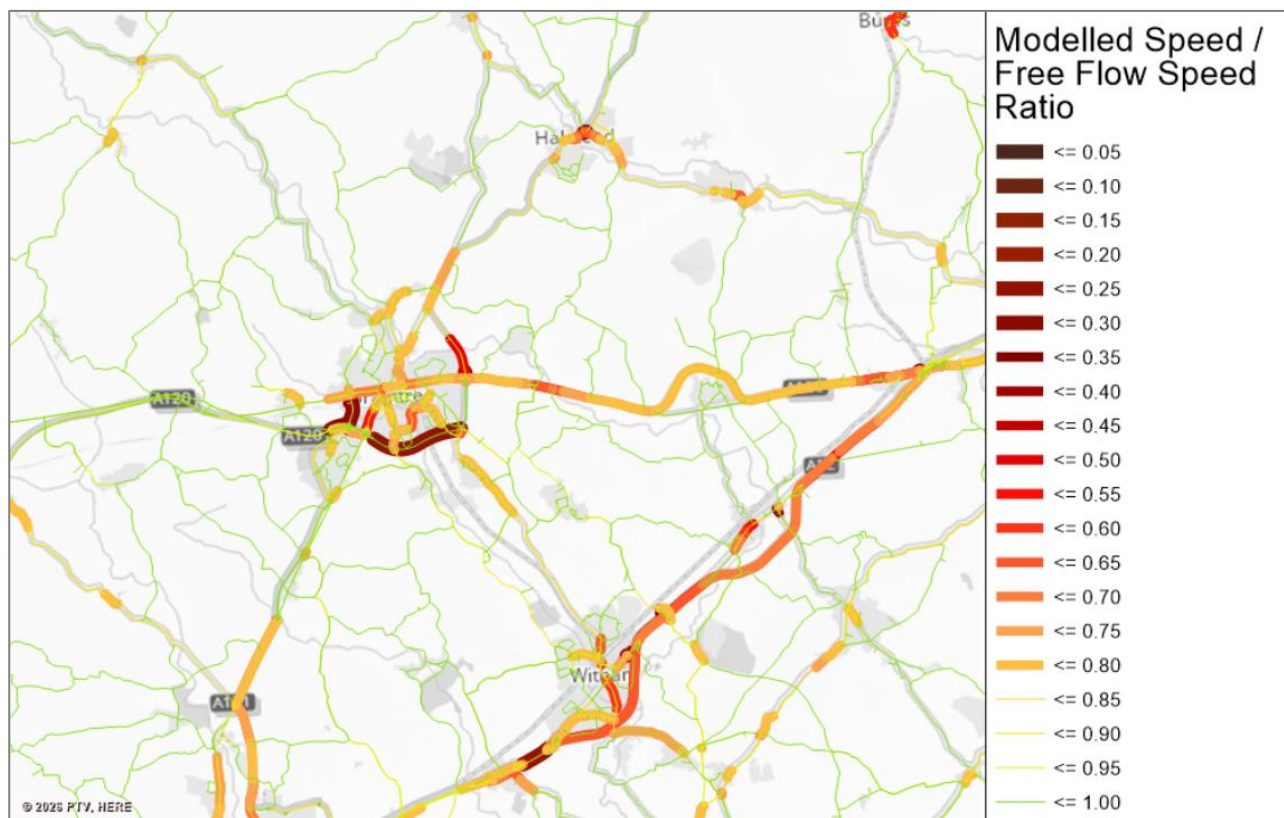
Figure ES 1: Impact on traffic flows of committed development and background growth to 2043 (Reference Case) – PM Peak

Overall network performance and patterns of traffic flow change is broadly similar across the AM and PM peak periods. PM peak conditions are shown in Figure ES 1 above as the evening peak hour is shown to be more congested across key routes in district.

Proportionally higher increases in traffic flow are forecast along main routes through the district – notably the strategic A12 and A120 corridors, the A131 between Braintree and Chelmsford, the A1124 between Halstead and Colchester, and the B1018 (and local parallel routes) around Cressing. Significant vehicle routing is shown in both peak periods via the future Panfield Lane link road, adding to delay along Pod's Brook Road and at the junction with Springwood Drive as shown in Figure ES 2 below. Significant delays are also modelled at Galleys Corner and Marks Farm Roundabouts, which results in traffic routing away from the A120 corridor.

In addition to rerouting via the Panfield Lane link road, limited traffic flow increases are modelled along already congested Braintree Town Centre routes and along local/rural rat-runs. Despite these localised challenges, the new Panfield Lane link road is designed to provide important connectivity

benefits and helps accommodate future growth by distributing traffic more effectively across the highway network, reducing traffic flows through the town centre and providing an alternative route between the A120 and destinations to the north of Braintree.



**Figure ES 2: Network delay with committed development and background growth in 2043
(Reference Case) – PM Peak**

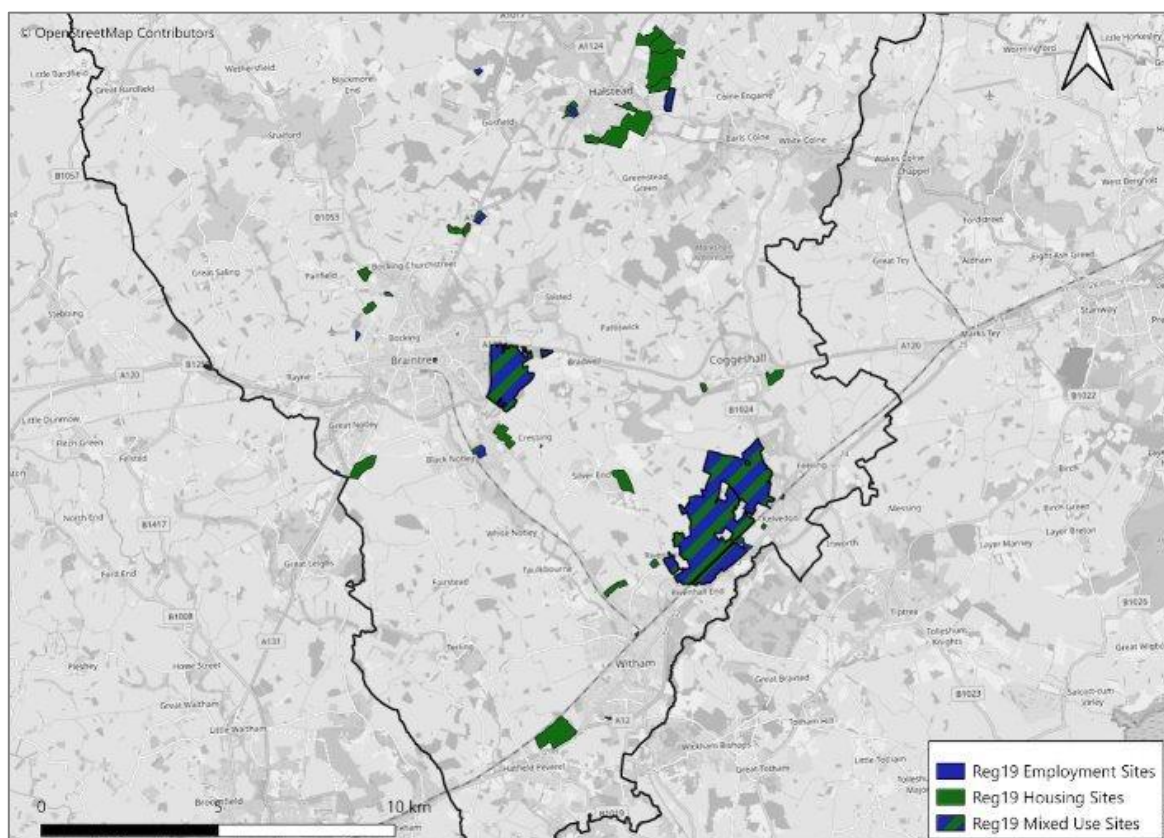


Figure ES 3: Location of allocated Local Plan sites in Preferred Spatial Option

The latest Local Plan development allocations in the Preferred Spatial Option are included in the 'assessment case' for the strategic modelling, with a further 11,964 homes and 6,674 jobs added on top of committed development and background growth. The locations of the allocated housing and employment sites comprising the Preferred Spatial Option are shown in Figure ES 3 overleaf, and a summary of housing and employment across the main sites is shown in Table ES 2.

Table ES 2: Summary of allocated housing and employment numbers in Preferred Spatial Option

Local Plan Sites	Housing	Employment (Ha)
South and NE of Halstead	2,850	24.11
Kings Dene, Kelvedon	2,250	18.1
Land East of Braintree	1,900	
Hatfield Peverel	1,150	
Additional Large Sites	2,670	38.55
Additional Small Sites	160	
Windfall Allowance	975	
Reserved Sites	947	

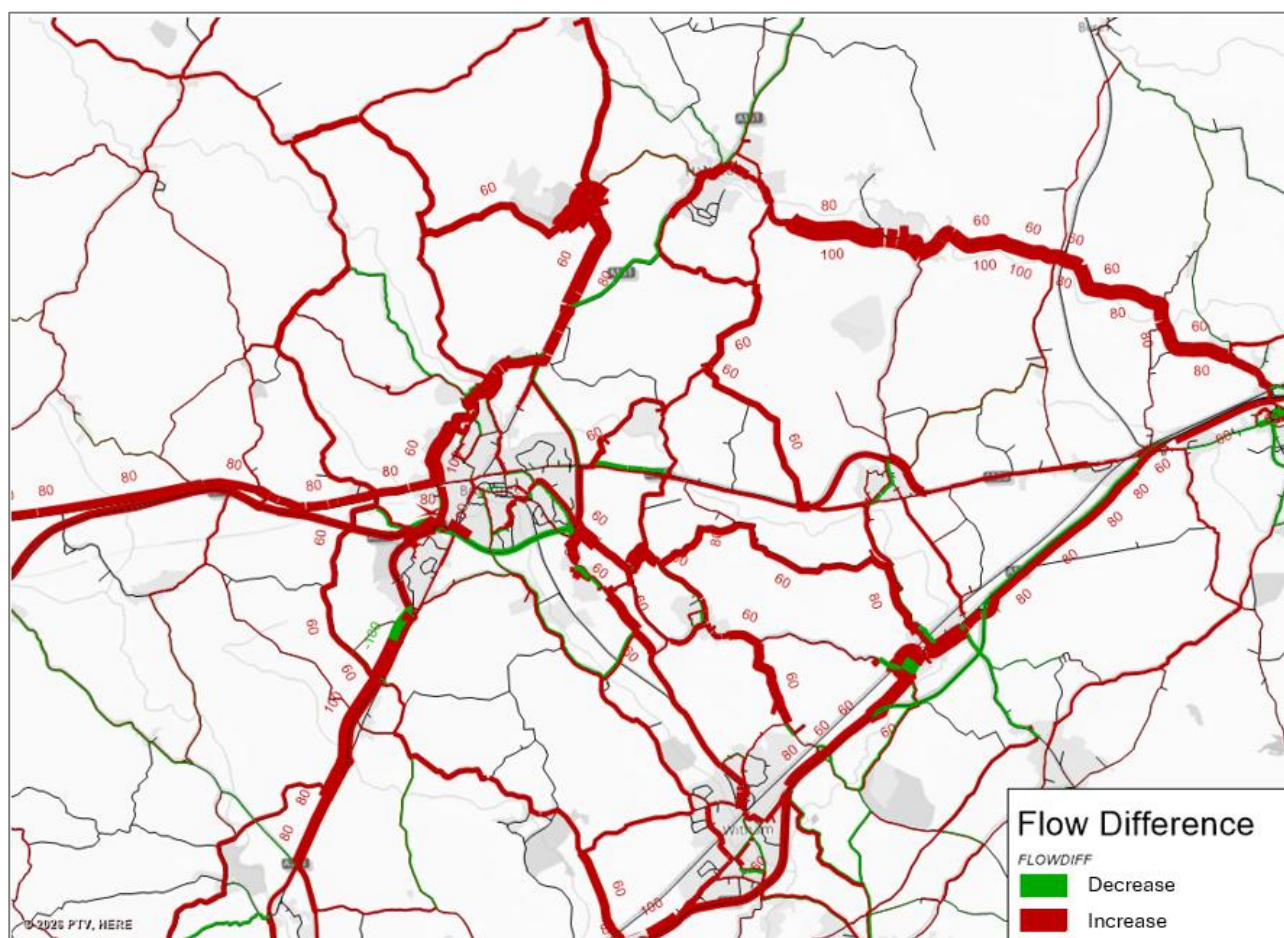


Figure ES 4: Additional impact on traffic flows of Local Plan Development in 2043 (Assessment Case) – PM Peak

As shown in Figure ES 4, the addition of Local Plan development increases traffic flows along main routes across Braintree District, notably in the vicinity of the Strategic Growth Locations - for example: the A1124 to the east of Halstead, the B1024 through Kelvedon and Feering, and the B1018 plus local routes in Rivenhall and Cressing.

Traffic from the East of Braintree site adds further pressure to the A120 corridor, notably at Galleys Corner. This results in a further increase in background traffic routing away from the A120 strategic route and via alternative town centre and local/rural routes, including the new Panfield Lane Link.

These additional flows place further pressure on existing congestion hotspots, particularly Galleys Corner and Marks Farm roundabouts. Additional delays are also modelled along the B1024 through Kelvedon and Feering, and at junctions along the route, with notable speed reductions shown on Station Road and Inworth Road.

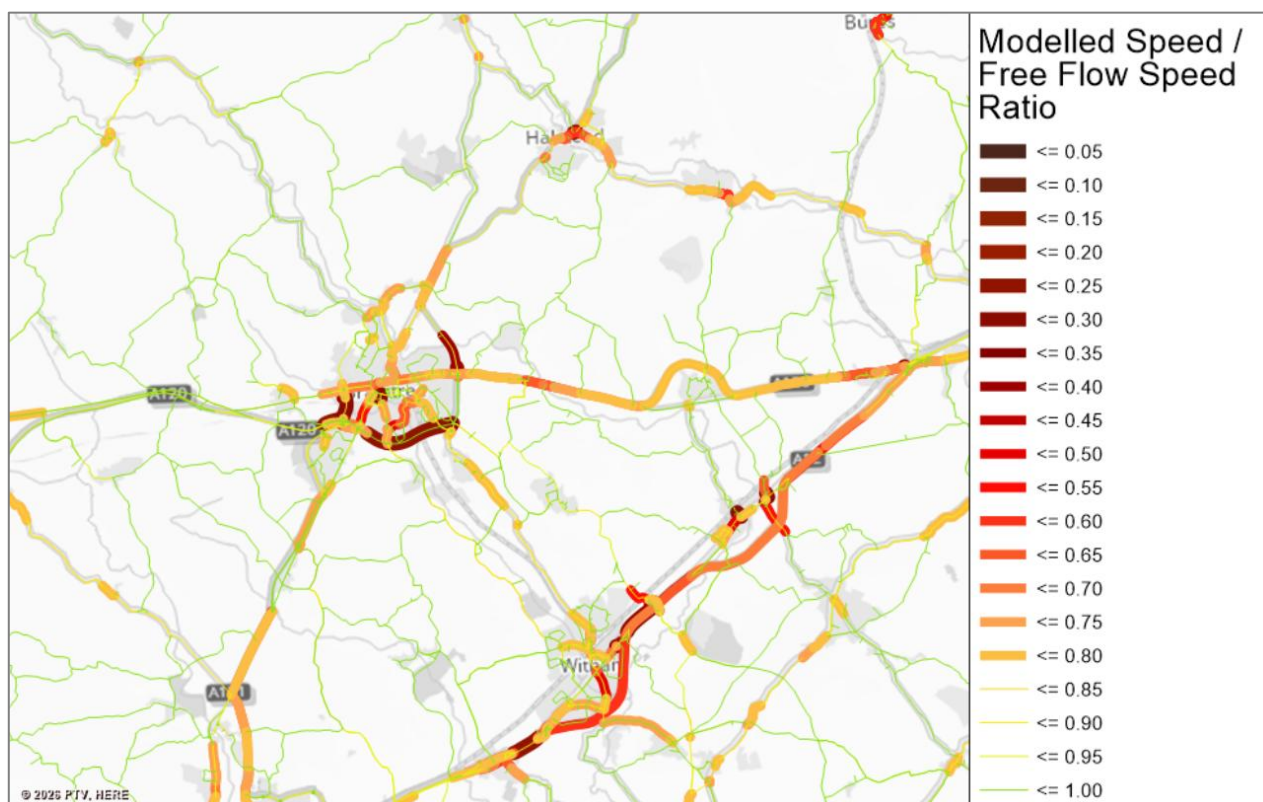


Figure ES 5: Network delay with Local Plan development included in 2043 (Assessment Case) – PM Peak

Chapter 3: Integrated Transport Solutions

The transport mitigation strategy sets out how planned growth in Braintree District to 2043 can be accommodated through the delivery of an integrated transport network. It aligns with national and local transport policy objectives by seeking to create a more sustainable, accessible and resilient transport system that supports economic prosperity, improves connectivity and contributes to environmental and health outcomes.

A comprehensive package of transport interventions has been identified to support future development. Strategic highway improvements, including upgrades along the A120 corridor and the introduction of advanced traffic management technologies, are proposed to improve network efficiency, reduce congestion and support the movement of people and goods. At the same time, these measures are intended to create opportunities to prioritise public transport and active travel within the existing transport network. Key schemes include:

- Dynamic Traffic Management (investment in next generation traffic management systems)
- A120 Millennium Way Slips
- A131 corridor including junction with the A1017, High Garrett
- Galleys Corner Roundabout
- Marks Farm Roundabout
- A12 Access options
- Coggeshall Road to Oak Road link road, Kelvedon (Kings Dene development)
- Halstead Link Road

Public transport improvements form a key component of the strategy. Proposed measures include enhancements to rail station accessibility, improved integration between bus and rail services, targeted bus network improvements and the delivery of a network of mobility hubs. These interventions are intended to provide more convenient and attractive alternatives to private car travel while improving access to employment, education, services and town centres across the district. Key schemes include:

- Bus service alterations (new services, re-routing and timetable amendments) to accommodate developments
- Shuttle bus between Braintree and Beaulieu Park Stations
- Braintree Station Access Improvements
- Mobility Hubs
- Halstead town bus network
- Rerouting buses through Hatfield Peverel Station
- Improved connectivity to Kelvedon Station and enhancing role as a multi-modal interchange
- Temple Border Developer Sustainable proposals (5-year bus/BRT subsidy, ebike hire, car club and travel plan)
- Travel planning and behavioural change measures (cycle parking study, safer school streets, business and school travel planning, YouSmart Travel Planning app)

Walking, wheeling and cycling are identified as essential elements of the future transport system to support multi-modal connectivity. The strategy supports the potential delivery of routes identified in the Braintree, Witham and Essex-wide Local Cycling and Walking Infrastructure Plans (LCWIPs) where feasible, the creation of strategic active travel corridors linking communities and key destinations, and the integration of active travel infrastructure within new developments. These measures will help create safer, more attractive and more connected places while increasing opportunities for sustainable travel. Key schemes include:

- Countywide Cycle Link 10 & associated connections – Kelvedon to Hatfield Peverel
- Braintree LCWIP 2 (including improvements to provision at Porter’s Field)
- Braintree LCWIP 3 – South-East Braintree town centre corridor
- Braintree LCWIP 7 Countywide Cycle Route – A1124 Greenstead Hall road to Hospital
- Halstead local cycle routes

The strategy is underpinned by principles of fair and proportionate infrastructure delivery. Developers will be expected to fund site-specific transport measures required to support their proposals, while strategic infrastructure will be delivered through a combination of developer contributions and public sector funding. This approach recognises the cumulative impacts of growth and seeks to ensure that costs are shared proportionately between developments and wider funding sources.

Overall, the mitigation strategy demonstrates that the transport impacts of growth can be addressed through an integrated package of measures that improves transport choice, supports sustainable development and makes more efficient use of existing infrastructure. The approach aims to ensure that future growth is accompanied by a transport network that is reliable, accessible,

resilient and capable of supporting the long-term social, economic and environmental ambitions of Braintree District. Figure ES 6 to Figure ES 9 summarise the mitigation proposed in each study area.

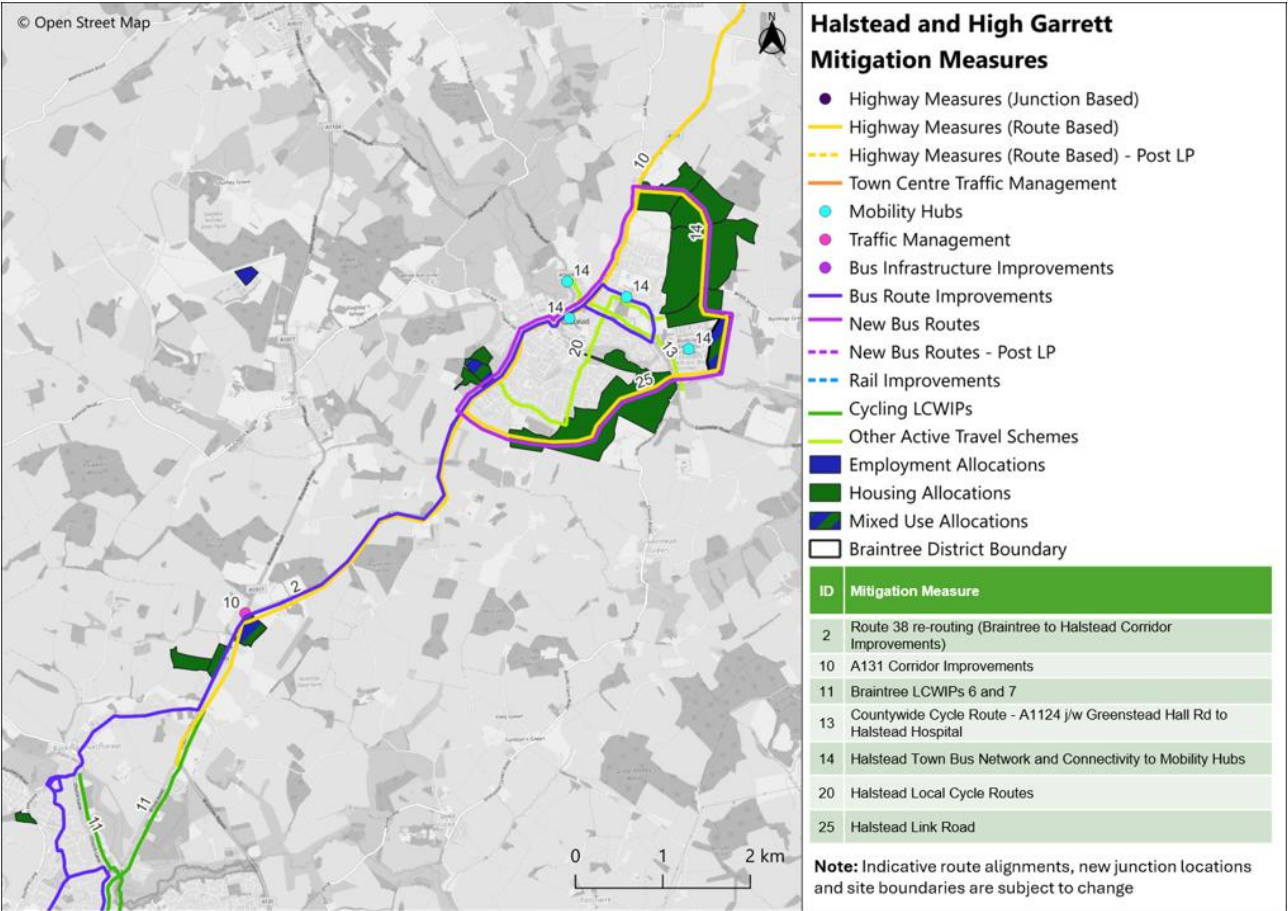


Figure ES 6: Proposed Halstead Mitigation

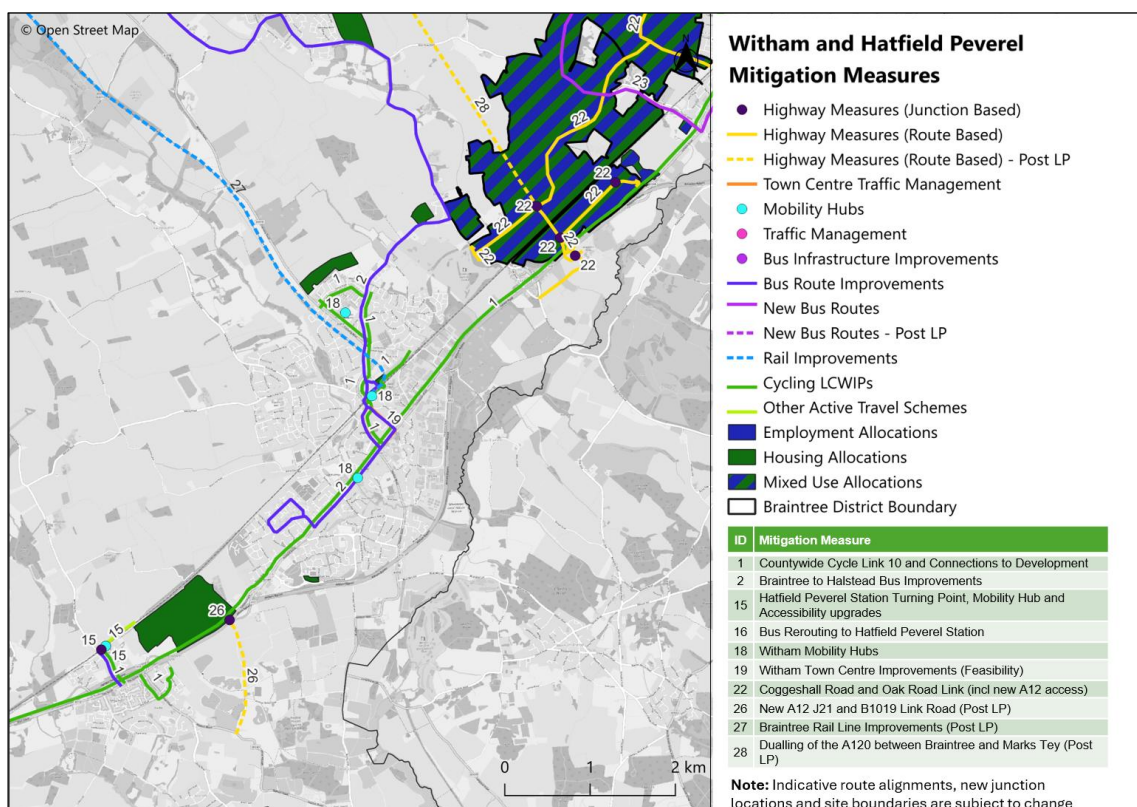


Figure ES 7: Proposed Witham and Hatfield Peverel Mitigation

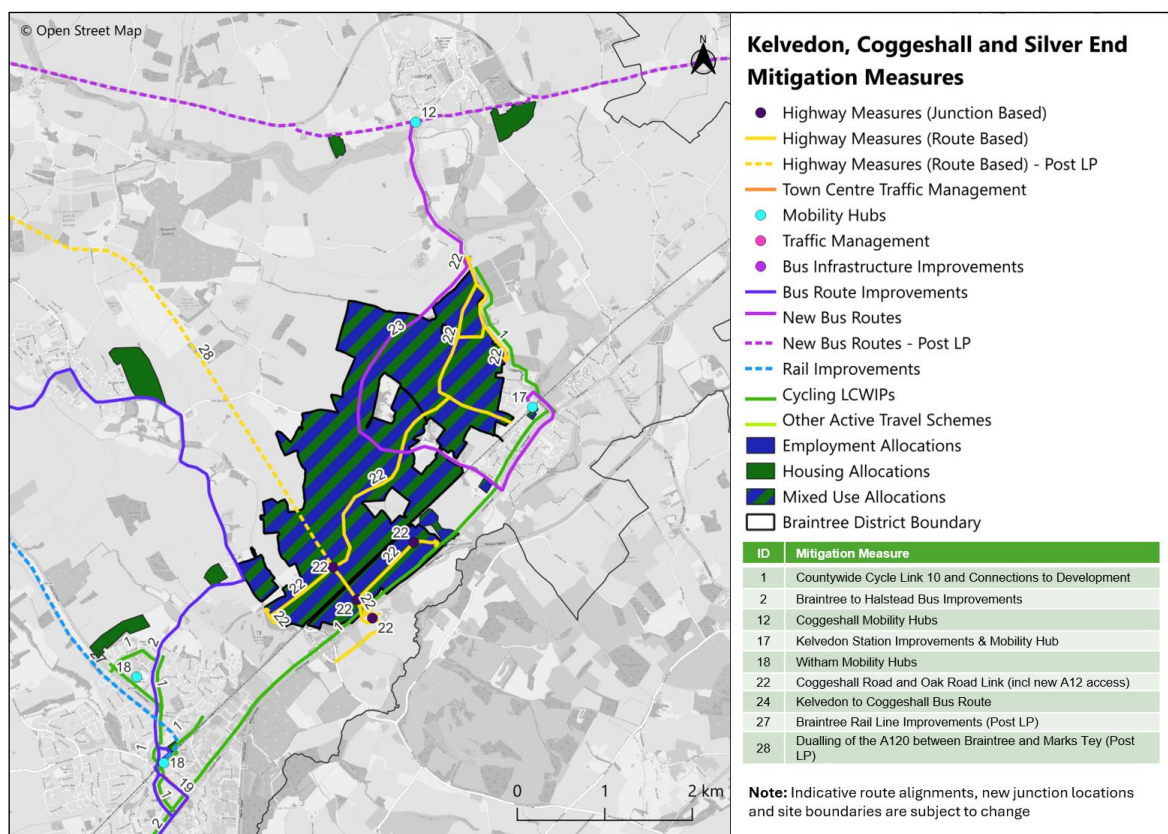


Figure ES 8: Proposed Kelvedon, Coggeshall and Silver End Mitigation

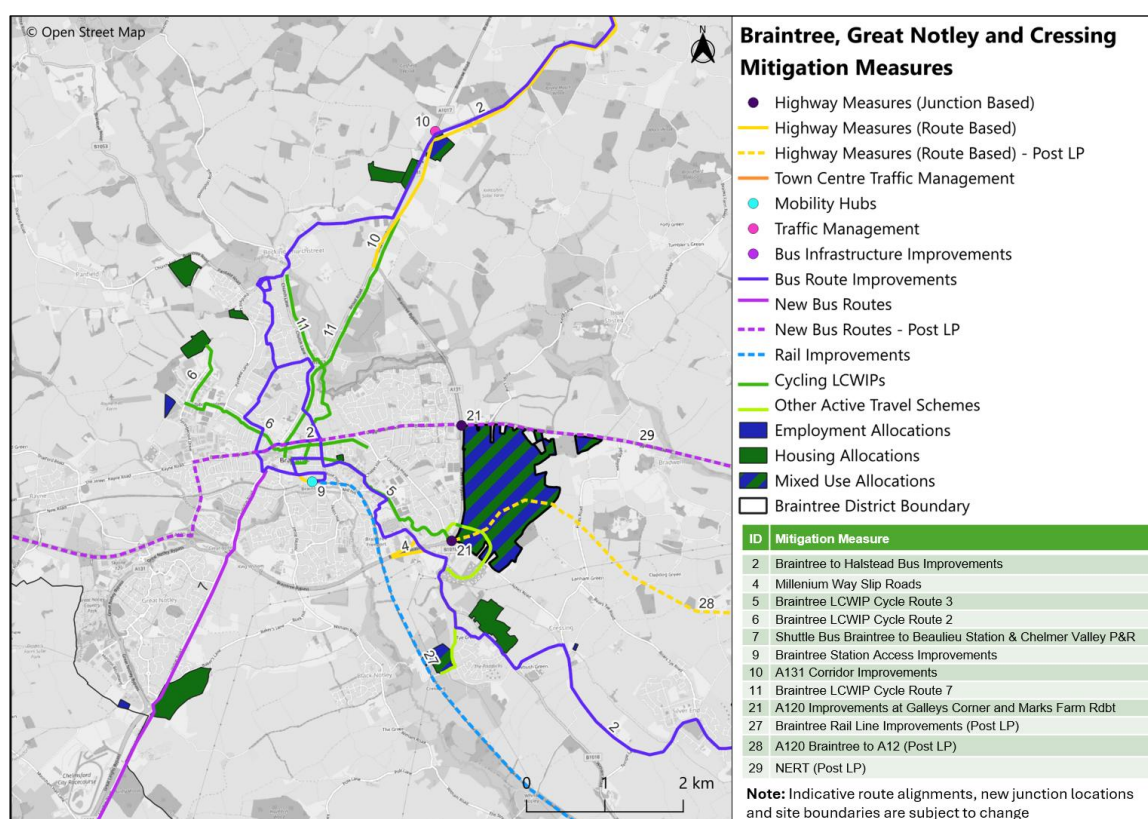


Figure ES 9: Proposed Braintree, Great Notley and Cressing Mitigation

Chapter 4: Transport Assessment of Growth with Mitigation

Scenario modelling has been undertaken to assess the impact of the integrated vision-based mitigation strategy in managing the traffic impact of Local Plan growth. Modelling of mitigation has considered the impact of both highway infrastructure and trip reductions attributable to the increase in the provision and uptake of active mode and public transport measures.

For the purposes of the Regulation 19 modelling, Millennium Way Slips has been modelled as the main Local Plan infrastructure scheme introduced along the A120 corridor to assess the traffic impact of capacity improvements along the strategic route. Other key infrastructure measures modelled include the proposed Halstead Relied Road and developer-proposed replacement A12 junction at Rivenhall.

Sustainable trip reductions attributed to the various active mode and public transport schemes with the mitigation strategy have been calculated and integrated into the forecast modelling. Reductions have been made through the identification of car trips for which is it feasible for a small number to switch to active travel or public transport modes based on the geography of the trip and the length of the trip. Applying such a reduction is also consistent with planning policies which seek to monitor and manage car trips at large sites and decrease the distance of trips through land use planning choices – which make it more likely that car trip demand would decrease.

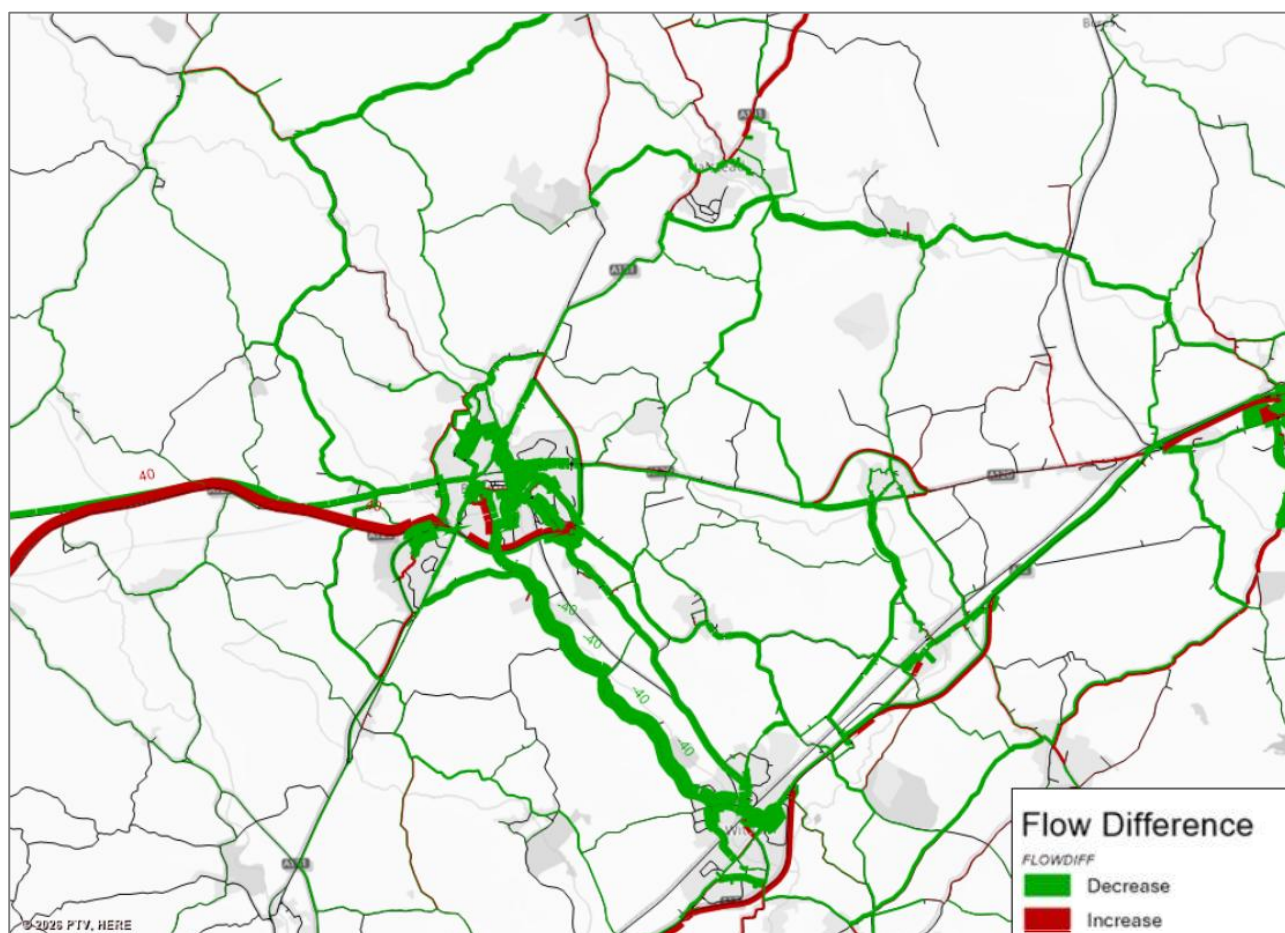


Figure ES 10: Sustainable Travel Trip Reductions modelled in 2043 – PM Peak

Typical peak hour trip reductions of between 20-40 vehicles have been modelled on key routes through the district, and in Braintree and Witham town centres – as shown in Figure ES 10. Although not significant, these reductions should be seen within the context of wider integrated package to maximise the potential for mode shift and to encourage behaviour change over the long-term.

Highway interventions on the A120 would be expected to provide significant capacity benefits along the strategic corridor. However, high traffic volumes and journey time delays are shown in the modelling to likely remain along the A120 corridor in the peak periods – as shown in Figure ES 11 overleaf. Infrastructure improvements are shown to facilitate greater use of the A120 by allowing trips to return to the corridor from rerouting via the town centre and rural routes, thereby keeping trips on the strategic network.

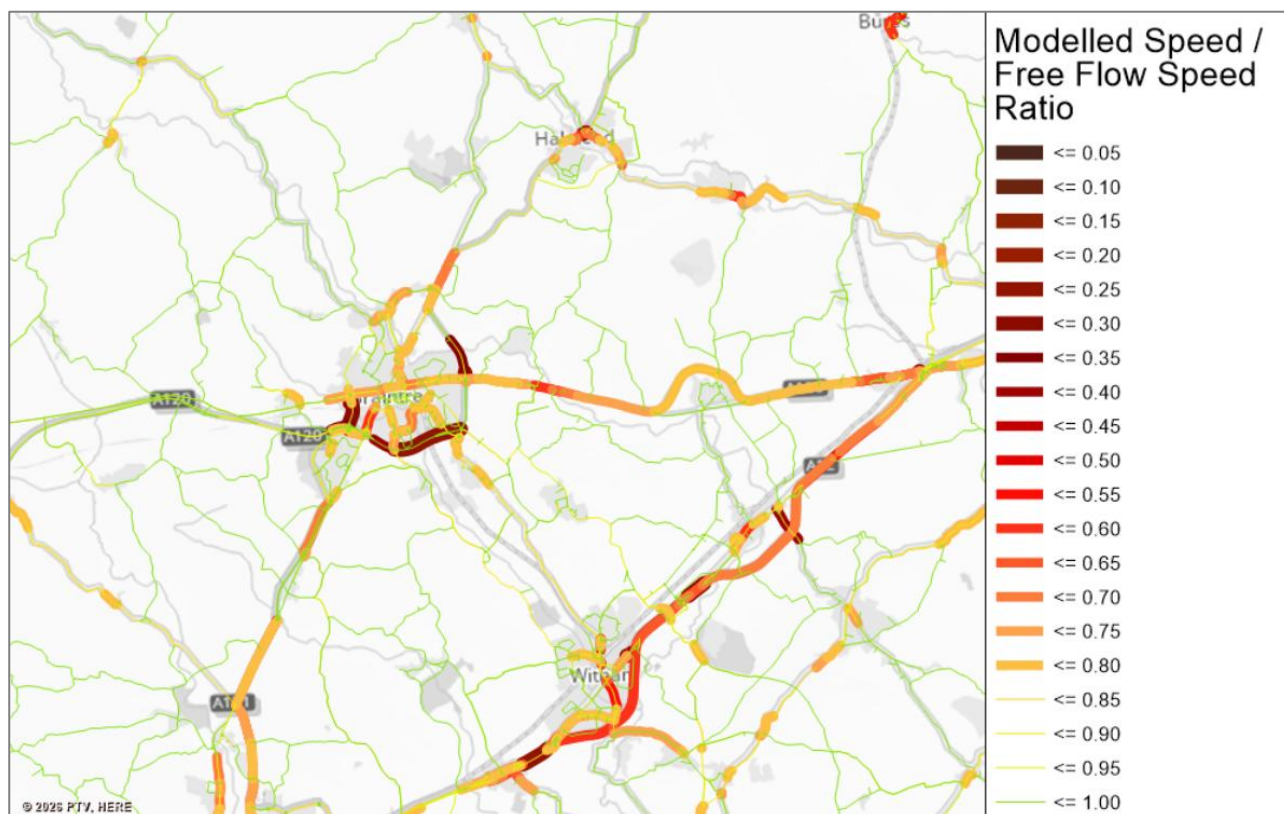


Figure ES 11: Network delay with Local Plan development, plus mitigation and sustainable trip reductions included in 2043 – PM Peak

Therefore, a key benefit of proposed highway interventions on the A120 is in relieving pressure on local routes, notably those through Braintree Town Centre. Elsewhere, the proposed Halstead Link Road and replacement A12 junction at Rivenhall both serve to accommodate development trips associated with nearby Strategic Growth Locations east of Halstead and at Kings Dene respectively, and help mitigate delay on local routes in Halstead and Kelvedon/Feering.

Travel conditions around selected locations in Braintree have been examined to understand the scale of change between existing and future scenarios with and without Local Plan growth, and with and without mitigation. The method of analysis applied is referred to as a movement index which combines three key modelling indicators:

- a) Queue Lengths
- b) Vehicle Speed
- c) Network Capacity

Data has been extracted from strategic model runs along main 'A' roads and at key junctions in Braintree District, with outputs averaged across all approach arms. The movement index shown in

Table ES 3, serves as a comparative summary of network impact across all assessed scenarios.

Table ES 3: Table ES-3: Movement Index summary table of network impact across modelled scenarios

ID	Location	AM peak rating					PM peak rating				
		2023 base	Sc1: 2043 ref case	Sc2: 2043 LP no mit	Sc3: 2043 LP mit BaU	Sc4: 2043 LP mit ST	2023 base	Sc1: 2043 ref case	Sc2: 2043 LP no mit	Sc3: 2043 LP mit BaU	Sc4: 2043 LP mit ST
1	Halstead	5	6	7	7	6	5	6	6	6	6
2	High Garrett	1	6	7	7	6	1	6	6	6	6
3	Broad Rd / A131	8	7	7	7	7	6	6	6	6	6
4	Coggeshall	5	6	6	6	6	4	5	5	5	5
5	Marks Farm rbt	5	7	8	9	9	5	6	7	7	7
6	Galleys Corner rbt	7	13	15	7	7	9	15	15	15	14
7	Millenium Way	2	2	8	7	7	2	3	3	6	6
8	Rayne Rd / Pods Brook Rd	4	4	5	5	4	5	11	11	9	9
9	Rayne Rd / Pierrefitte Way	15	9	9	9	9	15	11	12	12	11
10	London Rd / Pierrefitte Way	10	9	10	10	10	10	10	10	10	10
11	Coggeshall Rd / Railway St	4	3	4	4	4	4	4	5	5	4
12	Rose Hill / Railway St	9	10	10	9	9	8	11	11	10	10
13	Hatfield Peverel	6	7	7	7	7	6	6	7	7	7
14	Hatfield Rd / Howbridge Rd	9	9	9	9	9	7	7	10	9	7
15	Kelvedon	4	6	6	5	5	4	5	6	6	5
16	B1018 / The Avenue	5	6	7	7	6	4	5	5	5	5
17	London Rd / Coggeshall Rd	2	3	4	2	2	1	2	3	2	2
18	A131 / London Rd	3	3	3	3	3	4	3	3	4	3
19	Andrewsfield	1	1	1	1	1	1	2	2	2	2
20	Pattiswick	6	7	7	7	7	6	6	6	6	6
21	South Haverhill	1	1	1	1	1	1	1	1	1	1
Overall assessment combining all areas		5	6	7	6	6	5	6	7	7	6

Key to movement scale and acceptability of change

More or less free flow				Travelling slower				Moderate congestion				Substantial congestion	
1	2	3	4	5	6	7	8	9	10	11	12		
Extreme congestion				Acceptability of change									
13	14	15		Passable ✓				Caution !				Unsatisfactory ✗	

Overall, the mitigation strategy is shown to largely accommodate Local Plan development across Braintree District, with conditions left no worse than those experienced in the future with committed development and background growth alone.

However, understanding that the A120 corridor around Galleys Corner and Marks Farm is a notable 'pinch-point' under current-day peak hour conditions, concerns remain around the extent of forecast congestion modelled at Galleys Corner and Marks Farm roundabouts in the peak hours – regardless of Local Plan development. It is therefore recognised that further optioneering to consider an optimal package of mitigation measures across both roundabouts, and potentially alongside Millennium Way Slips, will be required to manage concerns around future network capacity.

Similar concerns are noted around the extent of forecast congestion modelled at Rayne Road/Pod's Brook Road (Springwood Drive) Roundabout. This has been shown in the modelling to be linked to higher usage of the Panfield Lane link road in the future as an alternative route to avoid congestion on the A120. Should further capacity improvements be made along the A120 corridor, traffic flow increases along Pods Brook Road and congestion levels at Springwood Drive Roundabout might be better mitigated in the future.

Chapter 5: Conclusion

Modelling demonstrates that, when proposed Local Plan growth is added to background growth in Braintree District, it is added to a transport network that is already experiencing significant operational pressure in several locations. Unsurprisingly, this results in further deterioration in movement conditions and extends existing transport challenges.

With highway and sustainable travel mitigation in place, modelling suggests that trips associated with Local Plan development across Braintree District can be largely accommodated, with network conditions left no worse than those experienced in the future with committed development and background growth alone.

Vehicle delay will, however, still be present along the A120 corridor by the end of the Plan period. As capacity improvements are provided along the strategic corridor, these are shown in the transport model to attract diverted trips back to the A120. Mitigation could therefore lead to reductions in traffic flow along urban routes through Braintree town centre, and across rural routes previously used as rat-runs. In this sense, the Local Plan mitigation strategy is expected to enable a greater number of journeys in the future to be made on their preferred route of choice, at their time of choosing and with multiple modes of transport available for use.

However, understanding that the A120 corridor around Galleys Corner and Marks Farm is a notable 'pinch-point' under current-day peak hour conditions, concerns remain around the extent of forecast congestion modelled at Galleys Corner and Marks Farm roundabouts in the peak hours – regardless of Local Plan development. It is therefore recognised that further optioneering to consider an optimal package of mitigation measures will be required to manage concerns around future network capacity.

Modelling indicates that the best outcomes are achieved where highway improvements are combined with measures that improve sustainable travel connectivity, including enhanced bus services, mobility hubs, rail accessibility improvements and active travel infrastructure. These

measures are not simply enhancements to the network; they form a key part of the mitigation strategy by providing viable alternatives to car travel and improving access to jobs, services, education and leisure opportunities.

The evidence therefore demonstrates that Local Plan growth can be accommodated through a combination of targeted highway improvements and a significant enhancement in connectivity across Braintree. Key interventions such as mobility hubs in main settlement areas including Braintree, Witham and Halstead, active travel links between developments and key services, improvements to Kelvedon, Braintree and Hatfield Peverel Station accessibility and strategic corridor improvements along the A120 and A131 not only mitigate transport impacts, but also create a more connected and accessible transport network capable of supporting sustainable communities and economic growth.

The approach to managing growth should anticipate contributions from committed developments within Braintree, growth in neighbouring authorities and proposed Local Plan allocations within Braintree itself. Contributions should reflect both the need to mitigate transport impacts and the benefits arising from improved connectivity. In addition, given the importance of the Strategic Road Network and the role of rail and high-quality public transport in supporting long-term sustainable growth, continued strategic investment from organisations including National Highways and Network Rail will also be required to support the Local Plan period and establish the foundations for growth beyond 2043.

Ongoing Transport Analysis – Pre-Submission Modelling Tasks

As part of a scope of work for the Local Plan Pre-Submission, further assessment will test and refine mitigation measures at Galleys Corner and Marks Farm Roundabouts using National Highways' VISSIM microsimulation model to identify an optimal package of improvements across the A120 corridor to help bring traffic conditions – notably in the PM Peak, closer to (of better than) those currently experienced. The optimal package of mitigation will then be incorporated into strategic modelling to assess the wider network impact alongside other proposed junction improvements including: signalisation of priority junctions in Kelvedon and Feering to provide further access improvements through the town and to the rail station, and a revised roundabout layout proposed at the junction of A131 and A1017 in High Garrett.

A post-Local Plan assessment will be undertaken using strategic modelling to understand the longer-term impacts of growth beyond the Plan period covering the full build-out of the proposed Strategic Growth Locations in Kings Dene and East Braintree. Network capacity benefits attributable to long-term strategic infrastructure measures will be modelled, including the potential new A120 route between Braintree and the A12, the potential B1019 link road connecting to a new A12 junction in Hatfield Peverel, North Essex Rapid Transit, and a potential passing loop on the Braintree branch line.

It is recognised that whilst mitigation has been identified to manage growth to 2043, growth beyond the plan period will require significant investment in infrastructure to improve capacity on the Strategic Road Network and the rail network (mainline and branch lines).

Work will be undertaken as part of the Local Plan Pre-Submission evidence base in Autumn 2026.

1. Framework for Assessment

This chapter explains that the approach to assessment and mitigation is grounded in the National Planning Policy Framework (NPPF), which encourages a vision-led approach to transport planning. The chapter describes the vision for Braintree and how it is aligned with regional and county objectives. This vision sees growth as an opportunity to shape the future by improving connectivity and choice of travel modes.

1.1 Purpose of Transport Evidence

The purpose of this report is to assess the transportation impact of Braintree District Council's (BDC) Regulation 19 Local Plan to 2043, and develop and test an appropriate vision-based mitigation strategy. The assessment extends the transportation evidence collated in the 'Braintree Local Plan Review Sustainable Accessibility and Baseline Appraisal (December 2025, Essex Highways)' and 'Braintree Local Plan Review Regulation 18: Highway Impact Appraisal of Preferred Spatial Option' (December 2025, Essex Highways) which identified parts of the network requiring mitigation and how sustainable measures could help to achieve this.

The Regulation 18 phase focussed on identifying an integrated and sustainable transport strategy to align with a vision, and network-wide assessment of impacts. Meanwhile, the Regulation 19 transport evidence seeks to provide greater confidence that the strategy is deliverable through providing more details of measures. That is:

- Regulation 18 is setting the strategy, which identifies how the transport authorities can respond to growth (the 'how')
- Regulation 19 is setting the 'what', which confirms what is required to implement the strategy – which is the focus of this report on transport evidence.

Figure 1-1 shows how the process of transport assessment commences with a vision, reflecting planning guidance summarised in Section 1.3. The integrated and sustainable transport vision referred to in the figure reflects the vision introduced in Section 1.4 and the sustainability of locations for site allocation has been considered in the earlier transport evidence report¹. The figure then shows that transport assessment at the Regulation 19 stage needs to consider how people and goods can move acceptably around the network by all modes (e.g. private vehicles, deliveries, rail, bus, cycling, wheeling and walking). Strategic and microsimulation transport models provide indicators that help assess if people and goods are predicted to move acceptably through the highway network.

¹ Braintree Local Plan Review – Sustainable Accessibility & Baseline Appraisal Technical Report, Essex Highways, December 2025

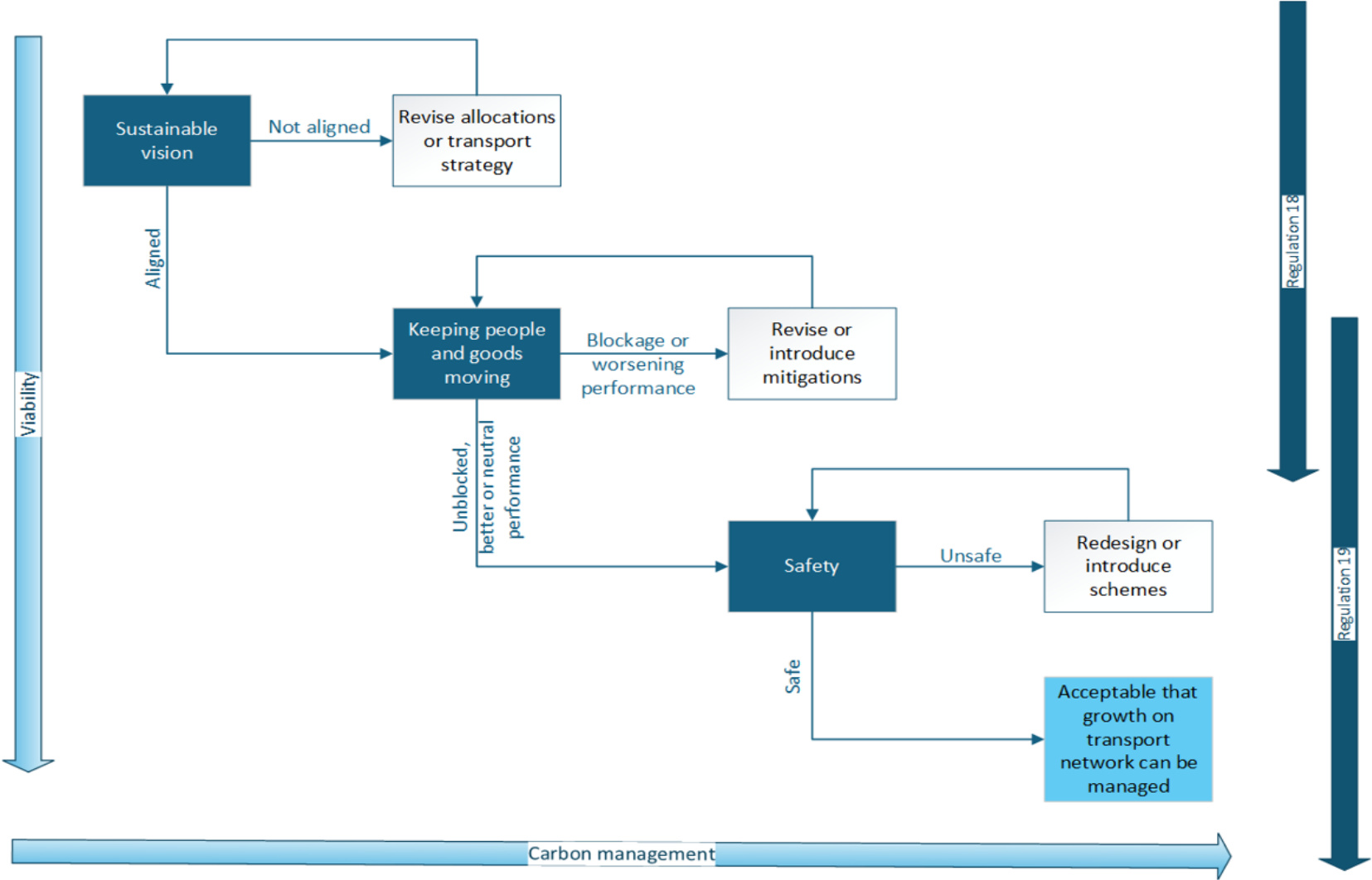


Figure 1-1: Criteria to inform assessment of acceptability of growth from the perspective of transport

To some extent, safety is a requirement considered throughout. However, it is only after details on movements, mode shift and mitigation measures are derived that a judgement can be made on residual safety issues. Hence, safety is suggested as a final check, which might prevent or necessitate changes to elements of the Local Plan and its mitigation approach.

Throughout the steps shown in Figure 1-1 it is also important to consider viability since the vision, mitigations and schemes need to be affordable and deliverable. Furthermore, it is recommended that carbon implications and the approach to carbon management is developed from the outset. By doing so, opportunities for whole life carbon reductions can be incorporated into decision making.

1.2 Structure

The Regulation 19 transport assessment seeks to identify the transportation and movement issues arising from the 'reference case' growth in Braintree and expected growth in surrounding districts including the planning authorities of Colchester and Tendring. In Braintree, reference case growth is estimated at 11,000 homes and 150 hectares of employment – which would occur without the proposed new Local Plan.

The assessment then seeks to identify the impact of an 'assessment case' with proposed Local Plan development in addition to the reference case which would contribute a further 11,964 homes and 6,674 jobs by 2043.

The report next seeks to identify and demonstrate that feasible, deliverable and affordable transport mitigations will alleviate the cumulative impact of the 'reference' and 'assessment' cases in a manner consistent with a vision approach set out in both national and local transport policies. This vision seeks to avoid severe impact on the highway network and supports increased connectivity by widening the choice of viable active and sustainable transport options for trips beyond cars. It is recognised that mitigation will need to be phased to align with that identified in both the 'reference' and 'assessment' cases as they come forward.

The report then seeks to demonstrate that the transport impact of Local Plan growth with vision-based mitigation is manageable, with people able to move reliably through the network on all modes. Consideration is also given to the implications of growth beyond the plan period.

It has been assumed that neither the J19-25 A12 (Chelmsford to A120) widening scheme nor the proposed A120 Braintree to A12 scheme come forward by 2043 over the life of the new plan. It is assumed that committed infrastructure such as the Panfield Lane / Springwood Drive link road, Springwood Drive Roundabout and Marks Farm Roundabout would be fully completed by 2043.

1.3 Planning Guidelines and Regulation

1.3.1 National Planning Policy Framework

This report was developed in line with the NPPF guidance published in December 2024. Shortly before finalisation of this report, 17th August 2026, the government issued updated NPPF guidance. The report is aligned with this revised guidance, although it should be noted that there is now an even greater focus on the shift towards a vision-led approach to transport planning, and the

importance of sustainable transport. More detail on the implications of both versions of NPPF guidance is below.

1.3.1.1 December 2024 NPPF

The NPPF² mandates how transport issues arising from growth should be approached and assessed.

The NPPF has a presumption in favour of sustainable growth which is summarised as meeting the "needs of the present without compromising the ability of future generations to meet their own needs" (para.7). To guide sustainable development, it also introduces three interdependent overarching economic, social and environmental objectives (para.8).

It states that strategic policies should, as a minimum, provide for objectively assessed needs for housing and other uses unless the "adverse impact of doing so would significantly and demonstrably outweigh the benefits, when assessed against the policies in the Framework taken as a whole" (para.11). Hence potentially adverse transport impacts need to be weighed against the benefits of growth.

The NPPF explains that "transport issues should be considered from the earliest stages of plan-making and development proposals, using a vision-led approach to identify transport solutions that deliver well-designed, sustainable and popular places" (para.109³). Furthermore, it states that "development should only be prevented or refused on highway grounds if there would be an unacceptable impact on highway safety, or the residual cumulative impacts on the road network, following mitigation, would be severe, taking into account all reasonable future scenarios" (para. 116).

Connecting NPPF paragraphs (8), (11), and (116), above implies that severe impact should be defined with respect to demonstrable impact on the overarching objectives. It would be expected that growth leads to increases in delay on the highway network; but a mitigation approach should be guided by desired policy outcomes not the alleviation of delay per se.

In a dispersed development area across Braintree District, with concentrated growth in towns and strategic growth locations, the intention of the NPPF is especially pertinent. Transport issues of growth cannot be mitigated through highway capacity alone, which would work against environmental and social objectives; rather growth should be approached as an enabler of more sustainable modes of travel and better integration and connectivity between land uses and the transport system, which balances progress across all the overarching objectives.

1.3.1.2 NPPF 2026 Update

Recent updates to the National Planning Policy Framework in August 2026⁴ have reinforced a shift towards a vision-led approach to transport planning and the importance of considering sustainable transport options.

² [National Planning Policy Framework \(2024 Archived Version\), MHCLG, 2024](#)

³ In the updated 2026 NPPF, there is a shift in emphasis to focus on considering 'sustainable transport' from the earliest stages of plan making and development.

⁴ [National Planning Policy Framework \(NPPF\), MHCLG, August 2026](#)

This approach seeks to move away from the traditional ‘predict and provide’ methodology, whereby transport interventions are primarily focused on accommodating forecast traffic growth, and towards the creation of high-quality, sustainable places supported by integrated transport networks. Under this approach, transport assessment should begin with defining the desired outcomes for a development and identifying the measures required to achieve them, before validating whether those outcomes can be delivered in practice.

The updated approach places increased emphasis on locating development in sustainable and well-connected locations, promoting opportunities for walking, cycling and public transport use, and creating environments which reduce reliance on private vehicle travel. Transport planning is therefore expected to support wider placemaking, health, environmental and climate objectives alongside network operation and capacity considerations.

In assessing potential transport impacts, the revised approach requires consideration of a range of reasonable future scenarios rather than reliance upon a single forecast position. This recognises the uncertainty associated with future travel behaviour and transport demand and encourages the testing of scenarios that reflect the intended transport vision for a site or area.

The framework continues to state that development should only be prevented or refused on transport grounds where there would be unacceptable impact on highway safety, or where the residual cumulative impacts on the transport network would be severe, taking account of mitigation measures and are all reasonable future assessment scenarios.

Consequently, the national approach to transport assessment is increasingly focused on demonstrating how development supports sustainable travel objectives and place-making aspirations, whilst validating that any residual impacts on the transport network remain acceptable. This can broadly be summarised as a ‘vision and validate’ approach to transport planning and assessment.

1.3.2 Section 122

The approach to assessment and mitigation also needs to consider planning regulations. The Planning Act 2008⁵ and the Community Infrastructure Levy (CIL) Regulations 2010⁶ provide the legal tests on the use of S106 planning obligations.

Regulation 122⁷ of the Community Infrastructure Levy Regulations 2010 states that a planning obligation may only constitute a reason for granting planning permission for the development if the obligation is:

- Necessary to make the development acceptable in planning terms;
- Directly related to the development; and
- Fairly and reasonably related in scale and kind of the development.

⁵ [The Planning Act, UK Government \(gov.uk\), 2008](#)

⁶ [The Community Infrastructure Levy Regulations, UK Government \(gov.uk\), 2010](#)

⁷ [Regulation 122, The Community Infrastructure Levy Regulations, UK Government \(gov.uk\), 2010](#)

Hence in considering the assessment of growth, the methodology needs to further consider if the problems are related to the developments, but also what connections might be required to align to planning policies. For example, growth might not cause severe impact on the network, but it would be reasonable to require connections by public transport and active travel to be made.

1.4 Vision and Objectives

1.4.1 Integrated Transport Strategy

The Integrated Transport Strategy⁸ published in April 2026 has the vision of “Transport will work well for people; it will be safe, reliable, affordable and accessible so they can get on in life and make the journeys they need to easily.”

The three principles underpinning the strategy include:

- Place – Use transport to create better connected places
- People – Put people at the heart of everything we do
- Partnership – Work in partnership with local leaders and experts

There are eight priorities for the strategy, those most relevant to Local Plans and their mitigation include:

Provide safe and dependable journeys

Reliability is one of the biggest issues that people face in transport, whether driving or using public transport. The Government states it is targeting investment and setting strategies that ensure operators and infrastructure owners prioritise improving reliability for drivers and public transport users. The strategy also remains committed to reducing those killed and seriously injured on our transport network.

Making travel accessible and affordable

The strategy wants to see physical barriers to travel reduced as far as possible so that people can move around their streets and access transport easily

Making transport more affordable is also important for the strategy, recognising that reducing the cost of public transport relies on ensuring good quality of service so more people choose to use it

Create healthier communities

This priority ensures that making healthy travel choices will be easy and convenient, supporting cleaner, quieter and more liveable places. To do this it commits to improving walking, wheeling and cycling routes, seamless cycle and rail integration and scaling up shared mobility.

Align transport and development

⁸ [Better Connected: a strategy for integrated transport. Department for Transport \(DfT\), 2026](#)

Another priority is to align transport and development, recognising that currently transport, housing and wider land use planning are often considered in isolation leading to developments that lack good public transport and safe walking, wheeling and cycling routes. A joined-up approach is proposed that will lead to better places. The strategy includes using transport to unlock new development and embedding vision led transport planning

While roads are essential growth corridors increasing road capacity alone is often the default choice which increases car dependence, leading to congestion and poor health outcomes. Evidence shows that car dependency in new developments has risen or stayed the same largely due to homes being built without the provision of sustainable and affordable transport services. Through this guidance and the NPPF the government will set out how local authorities and developers should maximise sustainable transport measures first, before increasing road capacity.

1.4.2 Transport East Strategy

Transport East is the sub national transport body for Norfolk, Suffolk, Essex, Southend and Thurrock. Their strategy running from 2023-2050⁹, brings together a collective vision for the future of transport in the region and set out the investment priorities needed to deliver it.

The role of transport in unlocking new development and supporting the levelling up of deprived communities is a core element of the Strategy.

Transport East aims to provide planning authorities with the evidence needed to support new development in areas with the most potential to support sustainable travel, for example urban areas and locations around existing and new public transport hubs or in other areas where access to local jobs can reduce the need for longer distance commutes. They will work with local authorities and national government to strengthen the evidence, guidance, funding structures and assessments to make sure planned new developments increase sustainable travel behaviour from day one.

1.4.3 National Highways

‘Planning for the Future’¹⁰ provides a guide to working with National Highways (NH) on planning matters. It states that one of the key assessment considerations for NH is the principles of sustainable development. The guide states that “where developments are located, how they are designed and how well delivery and public transport services are integrated has a huge impact on people’s mode of travel for short journeys” [para. 29]

This supports a vision-led approach in which mitigation measures aim to improve sustainable transport connections and generate a mode shift from private car reliance to walking, cycling and public transport use. The guidance further solidifies this connection by stating that NH “will therefore expect those responsible for preparing local and neighbourhood plans to only promote development at locations that are or can be made sustainable and where opportunities to maximise walking, wheeling, cycling, public transport and shared travel have been identified”¹¹.

⁹ [Transport East Strategy 2023-2050, Transport East, 2023](#)

¹⁰ [Planning for the Future: A Guide to Working with National Highways on Planning Matters. National Highways, 2023](#)

¹¹ *ibid*

1.4.4 Network Rail

The Transport East and NH strategies are supported by Network Rail, whose long-term strategy recognises the need to increase capacity on the Great Eastern Mainline¹². Such improvements support growth, noting the draft NPPF aspiration mentioned above to introduce a permanent assumption in favour of growth close to rail stations with frequent services.

Transport East is currently working collaboratively with Network Rail to prioritise capacity improvements as set out in Shorter-Term Rail opportunities in the Transport East Region¹³.

It should be recognised that the frequency of passenger trains in the East region is constrained by the need to balance passenger movement with rail freight. Nevertheless, the strategies and priorities of national and regional transport bodies support an integrated and vision-led approach assessing and mitigating the impact of growth.

1.4.5 Essex Draft Local Transport Plan 4

Essex transport policy is currently led by the Essex Local Transport Plan 3¹⁴, published in July 2011. Since its publication, there have been significant national, regional and local policy changes which have evolved the transport policy context, including the recommendations of the Essex Climate Action Commission in Net Zero: Making Essex Carbon Neutral and the Transport East Transport Strategy, endorsed by ECC in July 2022.

ECC has commenced preparation of Local Transport Plan 4. The emerging LTP4¹⁵ places stronger emphasis on active and sustainable travel, public transport reliability, safer streets, and the relationship between movement and place. It has a theme of ‘creating sustainable places and communities’, with an outcome relating to working with partners to design sustainable development from the start, recognising that growth needs to be managed in a planned and sustainable way. It states that a clear and credible vision for transport influences the design of new developments from the start. Rather than waiting until they are completed.

The strategy recognises that nationally too many new housing developments have made the car the only mode of travel with residents of new homes typically finding it one and a half times faster to reach essential services by car rather than public transport. ECC’s new strategy recognises the importance of travel choices and wants to ensure that essential services are easily accessible for everyone with a new home – whether they are walking, cycling or taking the bus.

1.4.6 LTP4: Braintree and North Essex Place Based Strategy

As part of LTP4 more local place-based strategies¹⁶ were developed to review the local state of transport in the area and what is needed to achieve the LTP4 outcomes.

¹² [Great Eastern Main Line Strategic Advice. Network Rail Eastern Region, 2025](#)

¹³ [Shorter-Term Rail Opportunities in the Transport East Region. Transport East, 2025.](#)

¹⁴ [Essex Transport Strategy: The Local Transport Plan for Essex. Essex County Council, 2011](#)

¹⁵ [A Better Connected Essex – Essex Transport Strategy, Public Consultation \(Part Two\), ECC, 2025](#)

¹⁶ [Essex County Council. Place Based Strategy: Braintree and North Essex \(DRAFT\). 2025](#)

The key transport ambitions for Braintree and North Essex are:

- Promote, deliver and improve active and sustainable modes of transport to help reduce car dependency by connecting rural villages and improving the reach, frequency, and capacity of public transport.
- Maximise Braintree's strategic location by improving access to skills, training and jobs, such as those at London Stansted Airport and Freeport East, accommodating new and existing housing, and meeting the demands of future growth, sustainably and inclusively.
- Promote and deliver a safer and pleasant travelling environment, reducing accidents, tackling air and noise pollution and ensuring infrastructure is well maintained.

This place-based strategy used information and schemes that were developed for the Braintree Town Future Transport Strategy¹⁷ which was produced in 2023, and which involved input from Braintree District Council, local cycling groups and wider public engagement.

1.4.7 Essex Cycling Strategy

As presented in their Cycling Strategy¹⁸, Essex County Council's vision for cycling is to "see more people, of all abilities, ages and backgrounds, cycling in Essex more safely and more frequently". ECC want cycling to be part of everyday lives in order to create more inclusive and connected communities and improving health and wellbeing. Activities and actions in the strategy include creating a joined-up network, safe and effective cycle infrastructure and for cycling to be designed into new developments from the start.

Therefore, providing cycling links from developments to town centres, schools and employment is important when considering mitigation for a Local Plan and in line with updated NPPF guidance. ECC have developed plans across Essex for better cycle routes in towns and cities named Local Cycling and Walking Infrastructure Plans (LCWIPs), these routes could help mitigate the impact of development where appropriate.

1.4.8 Essex Walking Strategy

The Essex Walking Strategy¹⁹ seeks to create an awareness of the many benefits of walking and aims to re-establish walking as the first choice for everyday travel wherever appropriate, while accommodating and enhancing walking provision in Local Plans. The strategy states that Plans should include policies that seek to provide high-quality walking and cycling networks and also identify places where new walking routes can be delivered by new developments, whilst ensuring the protection of alignments for future planned cycling and walking routes.

¹⁷ [Braintree Town Future Transport Strategy. Braintree District Council, 2023.](#)

¹⁸ [Essex Cycling Strategy. Essex County Council, 2025](#)

¹⁹ [Essex Walking Strategy. Essex County Council, 2021](#)

1.4.9 Bus Service Improvement Plan

The overall vision for bus services within Essex is ‘to have an aspirational bus network which provides residents and visitors with real travel choice’. Eight objectives have been developed to help work towards this vision. These include ensuring buses serve the right locations, at the right time and at the right frequency. Local policy highlights the need for public transport improvements as an alternative to the private car. At present, many routes within Braintree District radiate from Braintree Town Centre, with relatively good connections to other main towns namely Halstead, Witham and Chelmsford. However, the frequency and hours of operation vary considerably, with relatively poor, and in some cases, no services in some of the more rural and remote parts of the district. These are mostly located to the north of the district and to the north-east of Witham. To encourage bus use from new developments, service provision must be accommodated by either diverting existing routes or new services for a development.

1.4.10 Braintree Local Plan

Braintree’s Local Plan vision for their Local Plan as stated in their Regulation 18²⁰consultation is:

“By 2041, the District will be the most successful in Essex. Jobs and businesses will have increased in both quantity and quality, making the District a desirable place to live and work. Housing growth has been achieved, with the expansion of the main town of Braintree providing sustainable, attractive new homes within a market town setting. Witham, Halstead, Kelvedon and Feering have also continued to expand, making the most of their excellent transport links to provide high-quality homes and new community facilities. Smaller scale growth will continue in other areas of the District, including Halstead, meeting the local needs of smaller, rural communities.

The strategic transport routes of the A120, A12, Halstead link road and rail routes from Braintree and Witham have been improved, allowing fast and reliable connections to London, London Stansted Airport, the east coast ports and other key regional centres.

Developments in the District will have been designed and built to the highest quality, making the best use of new technologies to ensure suitability and sustainability now and in the future. High-speed reliable broadband is accessible for all homes and businesses.

All residents in the District will have access to the highest quality community facilities including health and education provision and green infrastructure. Outstanding leisure facilities continue to be provided to ensure residents can make healthy choices, and retail and other community needs are met. The unique natural and historic environment continues to be protected and enhanced.

Braintree District continues to be an aspirational place to live with a successful economy, wide range of affordable, sustainable homes situated within a high-quality urban and rural landscape, all within easy reach of London and the wider region.”

²⁰ [Braintree Local Plan Review 2041, Preferred Options Consultation \(Regulation 18\). Braintree District Council, 2026.](#)

1.4.11 Braintree Cycling Strategy

Braintree's cycling strategy²¹ sets out its vision 'To make Braintree a leader in cycling provision, to make it safer and more attractive for a greater number of people from as many backgrounds as possible to cycle more frequently'.

The strategy sets out seven objectives including:

- To develop a safer and more legible cycle network for cyclists to give greater assurance, particularly for less experienced cyclists.
- To support cycling to ensure access to jobs and services, both in urban and rural areas, in so doing, supporting the local economy.
- To work with relevant partners, looking for opportunities to support and enable improved cycle access in rural areas.
- All development sites would be expected to include cycle infrastructure, in order that internal short trips can be made by bicycle. In addition, all development sites should consider strategic cycle plans and create strategic links to key attractors and/or existing networks/quietways.

1.5 Conclusion

This chapter provides a platform for the transport analysis of the impact of proposed Local Plan development. It has considered the vision and strategic objectives at national, regional and local levels to provide a framework to guide the assessment of transport issues and mitigation measures in line with NPPF guidance.

The following chapter (Transport Challenges of Growth) introduces the transport model North Essex Model (NEMo) and explains how household and jobs growth is used to derive growth in trips to input into the model. NEMo outputs are then summarised to understand the unmitigated transport impact of this growth.

²¹ [Braintree Cycling Strategy. Braintree District Council, 2021.](#)

2. Transport Challenges of Growth

This chapter introduces the North Essex Model (NEMo), that is the principal tool used to carry out the assessment of the impact of growth on the performance of the highway network. It is complemented in some locations by Junctions and LinSig microsimulation models, which provide a finer grain of assessment.

The chapter also introduces a movement index which helps to objectively compare a reference case scenario to new Local Plan scenarios without and with vision-based and integrated transport mitigations. The index uses a scale of 1-15 to quantify network impacts utilising key performance criteria and facilitates scenario comparison.

In this chapter, the movement index identifies unacceptable movement problems in the reference case, which worsen with proposed new Local Plan growth. This represents an unacceptable operating position with only committed transport schemes in operation. The challenge of growth informs the development of mitigation measures described in Chapter 3.

2.1 Summary of Growth Braintree

2.1.1 Committed, windfall and proposed Local Plan assumptions

Table 2-1 sets out the housing requirement for Braintree, which is defined for 19,261 new dwellings between 2026-2043. This will be delivered through existing commitments, windfall and allocations in the proposed new Local Plan. While the detailed trajectory used in the Infrastructure Delivery Plan (IDP) and viability assessment includes a 10% contingency reduction on the expected delivery of allocated sites to ensure the plan is robust in meeting its targets, this reduction has not been used in transport modelling assumptions for Local Plan growth.

There is a committed supply of 4,336 dwellings, consisting of sites under construction or with extant planning permission. There is also a capacity of 2,905 dwellings on allocated sites from the adopted Local Plan to be carried forward and a windfall projection of 975 dwellings. Within the proposed new Local Plan, new sites have been identified which can deliver a total of 11,082 dwellings within the plan period and a total of 4,110 beyond the plan period.

Table 2-1: Requirements for and sources of housing supply (2026-2043)

Requirements for sources of housing supply (2026 – 2043)	Number of homes
<i>Total housing requirement (2026–2043)</i>	<i>19,261</i>
<i>which leads to an average annual requirement of</i>	<i>1,132 per year</i>
Committed supply + Allocated sites for the adopted LP	7,241
Windfall allowance	975
Emerging Local Plan allocation (2026-2043)	11,082
<i>Total identified number of homes (2026-2043)</i>	<i>19,298</i>
<i>which leads to an average annual supply of</i>	<i>1,133 per year</i>

Table 2-2 shows the emerging sizes of housing and employment allocations proposed in the new Local Plan, which informs Table 2-1. The table includes a breakdown of the Strategic Growth Locations in Braintree and summarises the overall allocations for both large and small development sites.

Table 2-2: Requirements for and sources of housing supply (2026-2043)

Proposed Local Plan allocations and windfall	Housing	Employment (ha)
Strategic Growth Locations		
Kings Dene	2,250	18.1
Land North and East of Halstead, Land East of Bluebridge Industrial Estate	1,750	
Land East of Bluebridge Industrial Estate		6
Land to South East of Halstead, Land East of Colchester Road, Halstead	1,100	
Land East of Colchester Road, Halstead		18.11
Land East of Braintree	1,900	
Land north of A12, Hatfield Peverel, Land at Bovington's Farm, Hatfield Peverel	1,150	
Additional Large Sites	2,670	38.55
Additional Small Sites	160	
Windfall Allowance	975	
Reserved Sites (as part of Sensitivity Test)	947	

2.1.2 Transport modelling growth assumptions

The growth data supplied by Braintree as outlined above from the IDP, represents the latest available position regarding land use assumptions across the district. The transport modelling used to inform the Regulation 19 evidence base was undertaken using a previous iteration of these growth assumptions. However, a review of the updated growth information confirmed that the differences between the earlier and current assumptions are not material to the outcome of the transport assessment. All the major sites are included and the quantity of growth is of the correct order.

The following subsections describe the reference case and assessment case growth assumptions used in the transport model.

2.1.2.1 Reference Case

Without Braintree's preferred site allocations, some level of growth would reasonably be expected to occur in the council area and in surrounding areas. As at the Regulation 18 stage, overall job figures are derived from assumptions contained in the baseline scenario of Braintree's land review, then distributed across the committed sites. Some of the largest developments include land east of Great Notley (1750 HHs) in Black Notley, land south of Feering west of A12 (835 HHs), land at Straits Mill (1000 HHs) and land west of Panfield Lane (825 HHs) in Braintree.

Braintree will be influenced by growth in neighbouring North Essex authorities, which particularly affects the assessment of the cross-boundary impacts and flows on the strategic road network moving across all the districts. For both authorities, housing and employment growth use their Regulation 18 preferred options published in January 2026.

Consideration was given to using lower levels of growth in Colchester and Tendring, aligned to NTEM (Version 8) or only including certain and near certain development in those authorities – since their 2043 Local Plans are subject to change as they progress through to adoption. However, if a lower level of growth were used, the impact of Braintree's new Local Plan growth alongside estimated Colchester and Tendring 2043 Local Plan growth would not have been identified. Given there is limited time to produce the Regulation 19 transport evidence, it was considered more efficient to include this 2043 Local Plan growth in Colchester and Tendring in the Braintree reference case. Growth in districts beyond North Essex is assumed to be at 2043 levels predicted by the core scenario of NTEM. The growth applied to the Braintree reference case for each of the North Essex planning authorities is shown in Table 2-3 below. It should be noted that this growth is from 2023, which is the base year of the transport model.

Table 2-3: Reference case growth assumptions across North Essex

Council area	Households		Jobs	
	2023 base	2043 reference case growth	2023 base	2043 reference case growth
Braintree	65,039	11,310 (+17%)	66,221	3,336 (+5%)*
Tendring	66,906	17,808 (+26%)	51,341	9,748 (+19%)

Council area	Households		Jobs	
	2023 base	2043 reference case growth	2023 base	2043 reference case growth
Colchester	81,086	17,153 (+21%)	97,188	15,285 (+16%)

**Net increase in jobs taking into account job loss*

2.1.2.2 Assessment Case

The proposed new Local Plan allocations will grow households and jobs in Braintree beyond the reference case estimate to the quantities shown in Table 2-4. Growth elsewhere remains at reference case levels.

The location of new Local Plan residential and employment site allocations for households and jobs growth in Braintree is shown in Figure 2-1. Appendix C provides further details on the allocations. In addition, the windfall allowance of 975 dwellings has been included. Although the allowance is not located in specific locations, it was proportionately spread across model zones with committed and allocation sites (where the amount of windfall growth is proportionate to the total amount of growth in each zone.). The main development sites in the transport model align with those shown in Table 2-2.

Table 2-4: Assessment case new Local Plan growth assumptions

Council Area	Households		Jobs	
	2043 reference case growth	2043 assessment case growth	2023 base	2043 reference case growth
Braintree	76,348	11,964 (+16%)	66,221	6,674 (+10%)*

The total growth in the transport model in both reference and assessment cases shown in Table 2-3 and Table 2-4 is therefore 23,274 homes, which exceeds the total of 19,238 shown in Table 2-1. The difference of 4,036 homes is growth between 2023 and 2026.

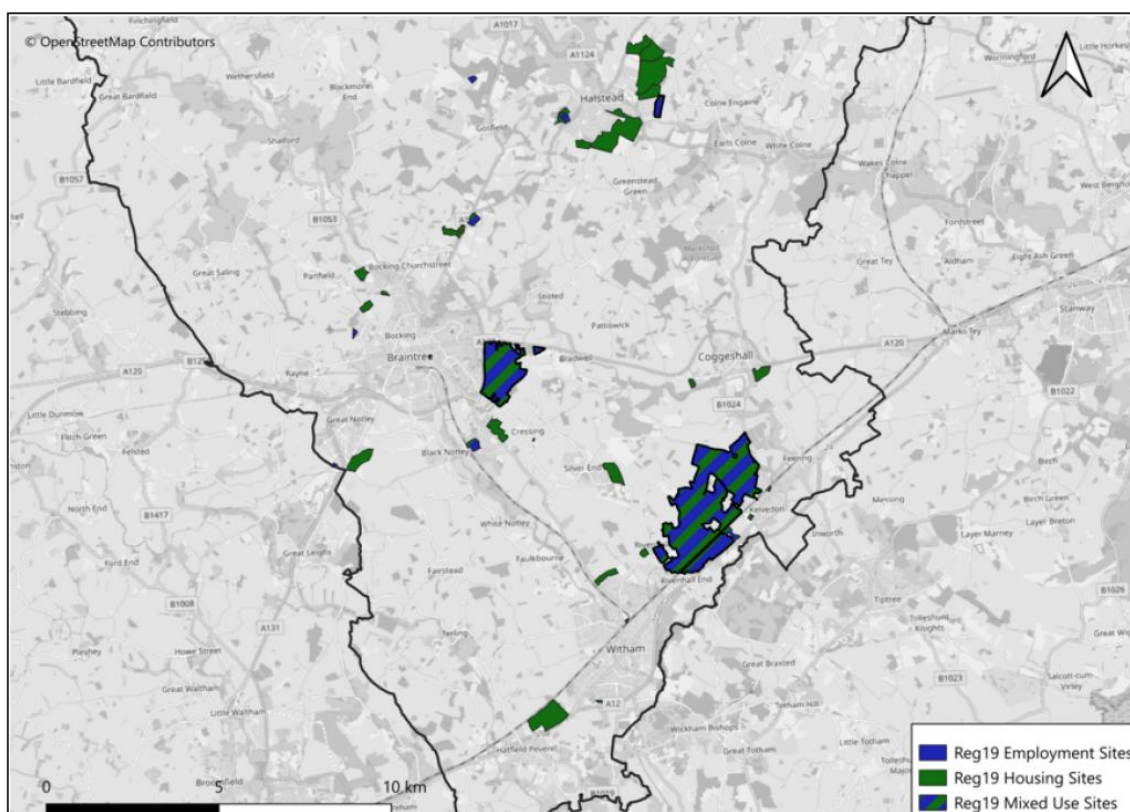


Figure 2-1: Braintree Assessment Case development

2.2 Models and movement index

2.2.1 The North Essex Model

NEMo is a strategic highway and public transport model with a base year of 2023. The model has been independently reviewed by NH to verify that it is suitable to use to assess the impact of Local Plans across North Essex. Forecast year assessments involve changing the network in the base model along with trip demand to reflect scenarios to be tested.

The NEMo base year model has been developed by expanding and updating the Colchester Transport Model (CTM), which has a base year of 2019. The detailed area of modelling in the CTM was expanded to include parts of Braintree and Tendring to align with options being considered in their Local Plan reviews. Updates were made to the highway and public transport networks to reflect 2023 conditions; and car, light goods vehicles (LGV), heavy goods vehicles (HGV), bus and rail demand was adjusted to reflect better 2023 travel patterns. The resulting NEMo was then validated against 2023 flow and journey time data to confirm it represents travel conditions.

CTM, and hence NEMo, has been built following Department for Transport (DfT) Transport Analysis Guidance (TAG) and best modelling practice, and the update process has followed DfT guidance on present day updates, in which models are refreshed rather than reconstructed entirely.

NEMo includes variable demand modelling (VDM), also developed in line with DfT guidance²², which allows trip makers to change destination and switch between car and public transport modes. The VDM considers trip purposes over a 24-hour period and predicts from where trips will be produced, to where they will be attracted and which mode will be used. It then produces origin and destination car, bus and rail matrices for the AM and PM peak hours and average interpeak hours.

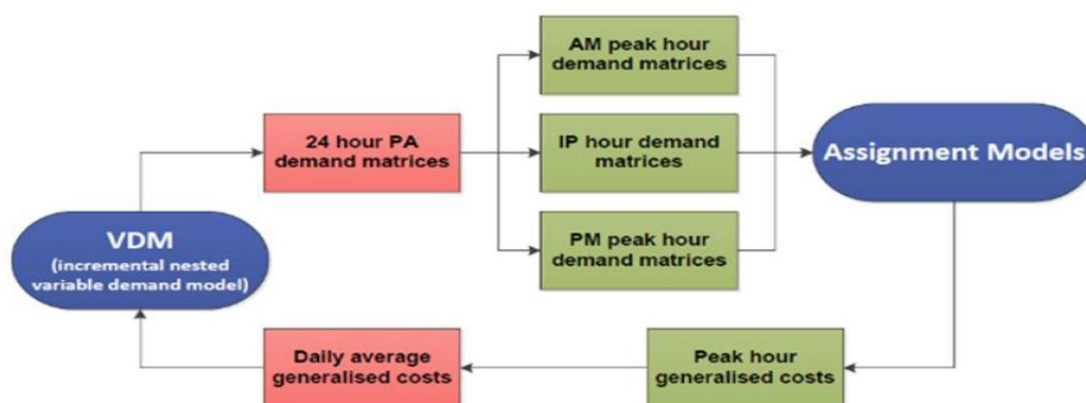


Figure 2-2: Relationship between demand and assignment models

The trips in the car matrix are subdivided into commuting, business and other trips and assigned onto the highway network alongside estimates of LGVs and HGVs using VISUM software. Buses, which travel on the highway network, are also included but follow designated routes. Meanwhile the bus and rail trips are assigned onto the public transport network using EMME software. Some public transport trips use both bus and rail to complete a journey.

Since destination and mode choice is affected by congestion levels, the VDM and assignment models iterate with each other until they reach convergence – which means that the level of congestion in the highway assignment model does not lead to a change in destination or mode choice. For information, the highway assignment model forecasts delay as more trips are added to the network. The public transport assignment model allows buses to fall behind scheduled timetables as a result of congestion on the highway network, but rail services are always assumed to run to schedule.

NEMo represents a typical mid-weekday in a month without major holidays; hence is skewed towards days with heavier traffic flow. Choosing such conditions tends to maximise normal traffic flow through all parts of the transport network and follows modelling best practice²³. The highway assignment model shows traffic conditions in the AM peak hour 07.30-08.30 and the PM peak hour 16.30-17.30, since these are, overall, the busiest hours in 2023 across North Essex in the respective peaks. The highway model can also show traffic conditions for an average interpeak hour between 10.00-16.00. The public transport model shows public transport trips for average peak hours in the AM (07.00-10.00), interpeak (10.00-16.00) and PM (16.00-19.00) periods.

²² Department for Transport. TAG Unit M2-1 Variable Demand Modelling. 2024. Available at: <https://assets.publishing.service.gov.uk/media/666af2a3ffd07973a043d10f/tag-unit-m2.1-variable-demand-modelling.pdf> [Accessed August 2026]

²³ Transport For London. Traffic Modelling Guidelines. Version 4.0. 2021. Available at: <https://content.tfl.gov.uk/traffic-modelling-guidelines.pdf> [Accessed August 2026]

NEMo is used to assess forecast 2043 scenarios shown in Table 2-3. As set out in the table, this involves making assumptions for trip demand changes and highway and public transport network changes between the base and future year.

1. Scenario 1 – Reference case growth without new Local Plan mitigation (though it does include committed mitigation).
2. Scenario 2 – Assessment case without mitigation, in which proposed new Local Plan growth is added on top of reference case growth and no mitigation is added to that included in the reference case. A business as usual (BaU) trip demand is assumed.
3. Scenario 3 – Assessment case with mitigation, in which key highway mitigations are added to Scenario 2. Trip demand is based on the BaU assumption used in Scenario 2.
4. Scenario 4 – Assessment case with mitigation and reduced car demand to reflect sustainable transport (ST) mitigation not accounted for in Scenario 3. This scenario replaces BaU trip demand with ST trip demand.

Table 2-5: NEMo Scenarios

Assumptions		Scenario 1	Scenario 2	Scenario 3	Scenario 4
Summary	Year	2043	2043	2043	2043
	Description	Reference case with only committed mitigation	Assessment case without mitigation and with BAU demand	Assessment case with mitigation and BAU demand	Assessment case with mitigation and ST demand
Demand	VDM	✓	✓	✓	
	Reference case growth	✓	✓	✓	✓
	New Local Plan growth		✓	✓	✓
	Reduced car demand reflecting ST mitigation				✓
Key Committed Mitigation Measures	Panfield Lane / Springwood Drive Link Road	✓	✓	✓	✓
	Springwood Drive roundabout	✓	✓	✓	✓
	Marks Farm Roundabout	✓	✓	✓	✓
	Chelmsford Northeast Bypass – Section 1a	✓	✓	✓	✓
	Greenstead and Clingoe Hill package			✓	✓
Key mitigation needed for Local Plan Growth	Highway improvements: Millenium Way slip roads, Halstead Link Road, Braintree Station access improvement, Kings Dene developer proposed A12 junction and link road			✓	✓
	Local bus general improvements				✓

Assumptions	Scenario 1	Scenario 2	Scenario 3	Scenario 4
Improvements to and at interchanges, and mobility hubs				✓
Active travel connections to major sites				✓
Travel planning to support ST				✓

2.2.2 Local Junction Models

NEMo is complemented by detailed microsimulation modelling to help assess traffic performance on complex parts of the road network, and identify and test appropriate highway mitigations, including how public transport priority and active travel crossings can be incorporated.

A programme of local junction modelling has been undertaken using Junctions and LinSig, which are proprietary software packages used in traffic engineering at unsignalized and signalised intersections, respectively. These models complement the strategic assessment provided by NEMo by offering a more detailed understanding of individual junction operation and performance.

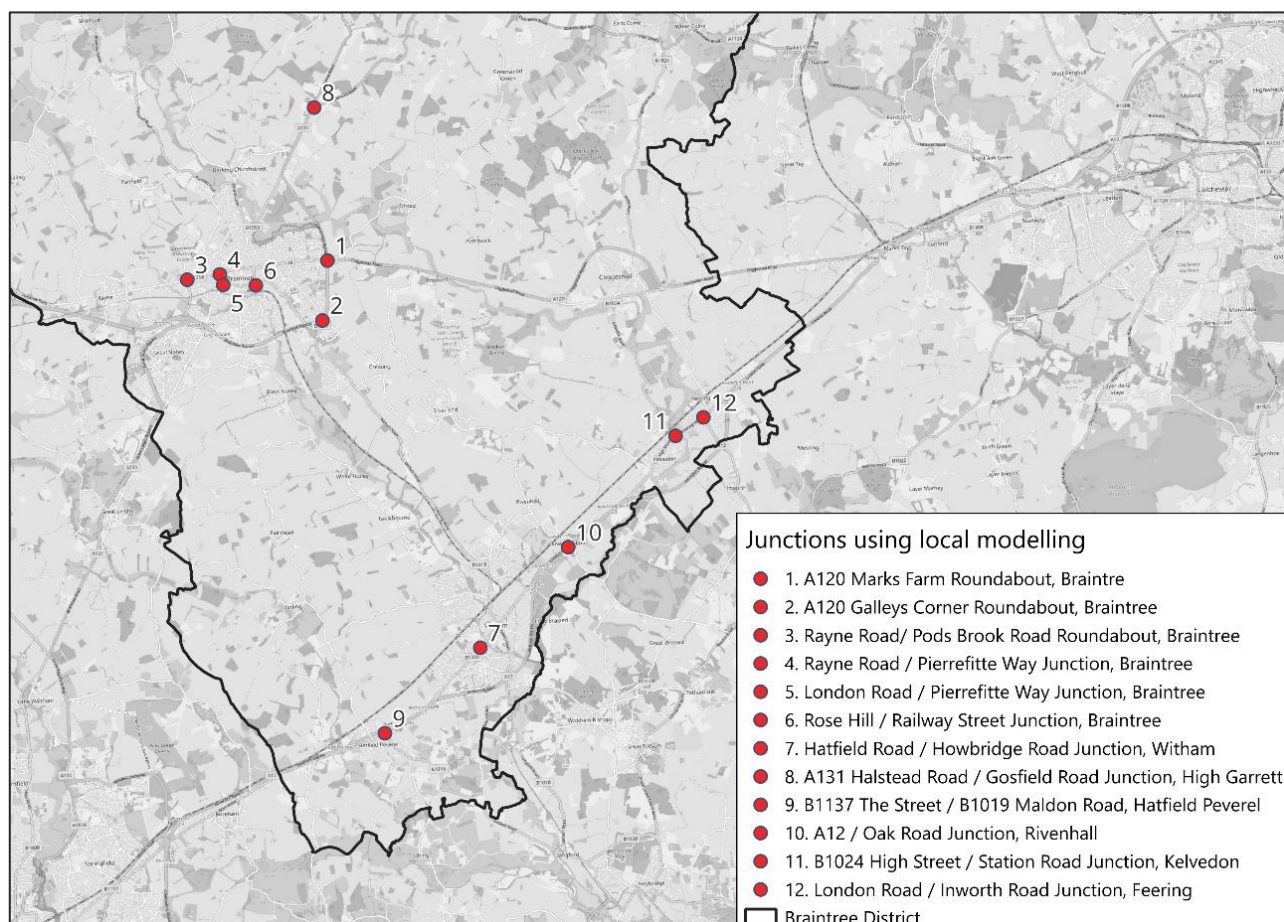


Figure 2-3: Local junction model locations

Whilst NEMo is used to assess the cumulative impacts of growth across the wider transport network, individual junctions are necessarily represented at a more strategic level. Detailed junction modelling has therefore been undertaken at locations where existing constraints are known to occur, where future growth is forecast to increase traffic demand, or where potential mitigation measures require more detailed testing. The junctions assessed are shown in Figure 2-3 and were selected based on locations identified through a review of expected development impacts.

The models have been informed by turning movement flows extracted from NEMo, ensuring consistency between the strategic and local assessments. This approach enables the impacts identified in the strategic model to be assessed at a junction level and provides greater confidence that suitable mitigation measures can be developed where required.

More information on the junction models along with model outputs is provided in Appendix G.

2.2.3 Movement Index

This section outlines the approach to assessing movement performance of scenarios tested in NEMo. The approach is based on assessing if the impact of a scenario when compared to another scenario can be considered acceptable in terms of impact on the transport network. Appendix A provides further technical information underlying the approach.

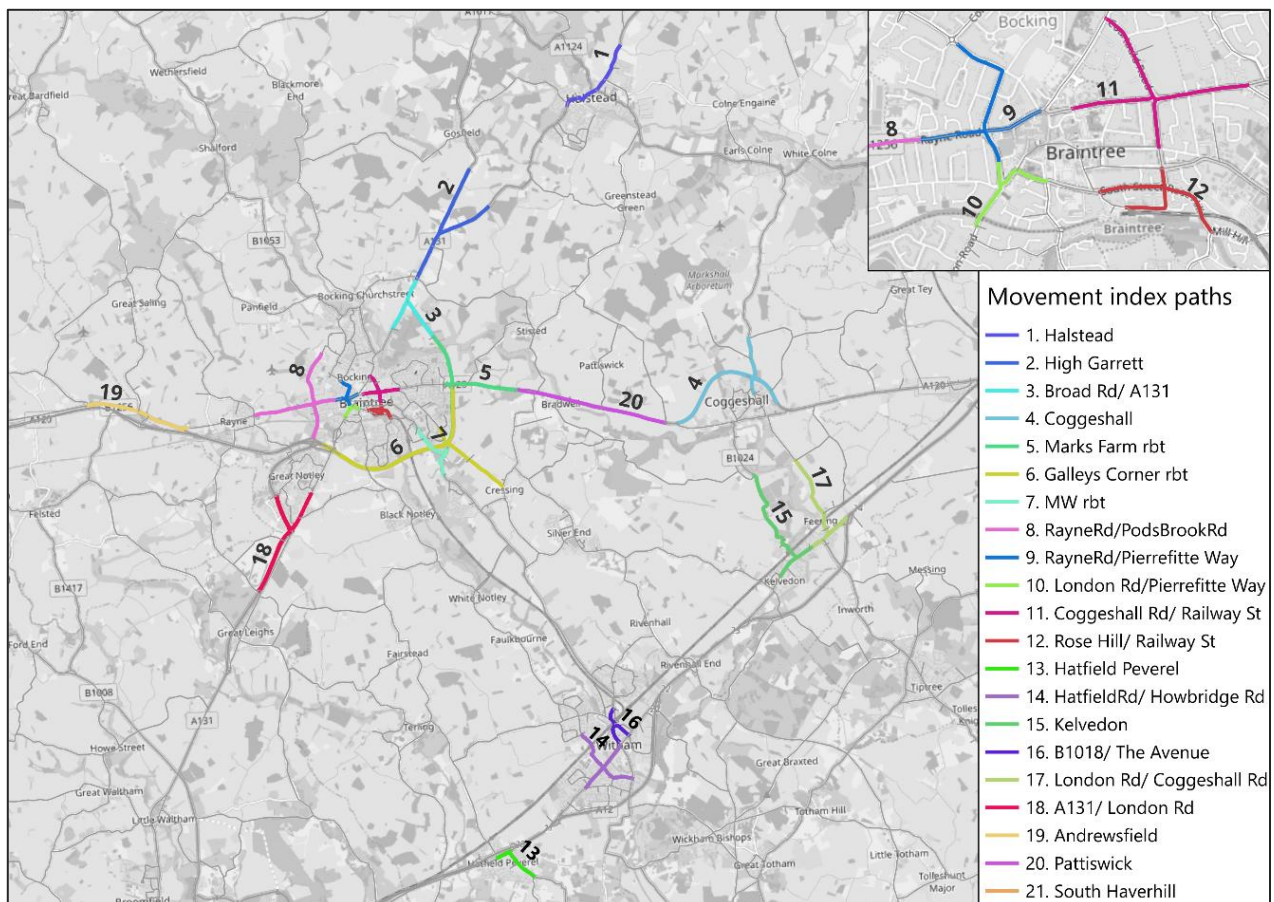


Figure 2-4: Movement index areas in Braintree

This approach involves identifying the areas of the Braintree highway network of interest. These were identified by considering the location of existing problems and the impact of both reference

case and assessment case growth, accounting for where mitigation measures are likely to be needed to improve network operating conditions. They are also selected to capture cross-boundary highway issues. The areas of the network of interest are shown in Figure 2-4 and listed in Table 2-4. For ease of reference, and to maintain a suitable map scale, areas to the north of the district including locations to the south of Haverhill are not shown in Figure 2-4.

The travel conditions around selected locations in Braintree have been examined to understand the scale of change between the various Local Plan scenarios and the Reference Case. The method of analysis applied is referred to as movement index which combines three key modelling indicators such as speed, queues and capacity resulting in a movement index.

This approach involves identifying key areas of Braintree considering the location of existing problems and the impact of both reference case and assessment case growth. The selected routes are shown in Figure 2-4 and listed in Table 2-6.

Table 2-6: Areas of interest on the highway network

ID	Location
1	Halstead
2	High Garrett
3	Broad Rd / A131
4	Coggeshall
5	Marks Farm rbt
6	Galleys Corner rbt
7	Millenium Way
8	Rayne Rd / Pods Brook Rd
9	Rayne Rd / Pierrefitte Way
10	London Rd / Pierrefitte Way
11	Coggeshall Rd / Railway St
12	Rose Hill / Railway St
13	Hatfield Peverel
14	Hatfield Rd / Howbridge Rd
15	Kelvedon
16	B1018 / The Avenue
17	London Rd / Coggeshall Rd
18	A131 / London Rd
19	Andrewsfield
20	Pattiswick
21	South Haverhill

Focusing on the areas of interest provides an appropriate barometer to assess and cover traffic impact across Braintree. However, the analysis also involves inspecting model outputs such as speed and queue difference plots to check if there are significant changes in other areas beyond the selected areas of interest.

The approach then involves calculating a movement index on a scale of 1-15 for each area of interest for the scenarios to be compared. A scale of 15 has been chosen in order that differences between areas of interest and scenarios can be perceived. The movement index combines indicators typically used in modelling assessment: queues, speed and capacity. It has an advantage of conciseness over using individual indicators and plots. The index provides an immediate overview of the key performance criteria to keep people and goods moving and helps to identify locations with problems. In addition, the more severe problem movements within each area of interest can be identified, which help focus on detailed issues. The movement scale can be seen in Table 2-7.

In addition, an overall score for each scenario tested has been calculated. The overall score is a weighted average of the movement scores of the area of interest by demand. Thus, areas with higher demand contribute more to the overall score than those with lower demand. The overall score is shown in the final row of the assessment tables.

Depending on the change between the scenarios being compared, the change in the movement indices also help identify the level of concern to inform acceptability:

- Passable ✓
- Caution !
- Unsatisfactory ✕

Table 2-7: Movement index scale

Description	Movement Scale
More or less free-flow	1
	2
	3
Travelling slower	4
	5
	6
Moderate congestion	7
	8
	9
Substantial congestion	10
	11
	12
Extreme congestion	13
	14
	15

2.3 Reference case forecast

The following subsections describe the development of the reference case forecast scenario, highlighting the demand and network changes as well as a summary of its performance.

2.3.1 Reference case demand set up

Having established the growth in homes and jobs, the DfT's NTEM was used to calculate trip generation from growth using its database tool called Trip End Model Programme (TEMPro). NTEM was used since it provides outputs in 24-hour production-attraction format, which is required as an input for VDM, for both car and public transport. Furthermore, NTEM considers characteristics of Middle-layer Super Output Areas (MSOA) in which people in urban MSOAs would have different travel behaviour to rural MSOAs. Meanwhile TEMPro also has a useful feature called alternative planning assumptions in which bespoke housing and employment growth assumptions can be added. The alternative planning assumptions mechanism, therefore, allows us to use the NTEM core scenario prediction of growth outside the North Essex authorities and to match North Essex housing and jobs growth to our desired reference case.

Since NTEM provides trip growth assumptions at the Census Middle Super Output Areas (MSOA) level, further refinements are made to allocate a greater share of growth to the specific model zones within each MSOA where developments are actually located. For MSOAs in Braintree, as well as the adjacent Colchester and Tendring that include development, the following steps were undertaken:

Step 1: Baseline Growth without Development Assumptions – A TEMPro growth factor was applied to the base year trip ends, assuming no growth in dwellings or jobs. This was achieved by modifying the default 2043 household and job figures in TEMPro to match the 2023 values. This adjustment isolated the background growth captured by TEMPro, excluding any development-related growth.

Step 2: Incorporating Committed Developments – Alternative planning assumptions were then applied to the default 2043 household and job figures in TEMPro to reflect the committed developments included in the reference case. The adjusted 2043 figures were extracted, and the development-related trip ends were calculated as the difference between this output and the trip ends extracted from TEMPro from Step 1. These development trip ends were then added to the adjusted trip ends from Step 1 (i.e. base year trip ends multiplied with the adjusted growth factor from Step 1)

Step 3: Spatial Allocation Within MSOAs – Where an MSOA spans multiple model zones (e.g. zones 1,2 and 3), but development is known to occur only in a specific zone (e.g. zone 1), all development-related growth was allocated to that zone. No growth was assigned to the other zones within the same MSOA.

For all other areas of the model, default 'Core' scenario TEMPro growth factors (2023-2043) were applied to base model demand. For Tendring and Colchester Garden Community (TCBGC) demand aligns to that in its planning application.

2.3.2 Committed Schemes

As well as identifying growth in trip ends, the reference case highway model reflects changes in the highway network – that is, highway schemes that are reasonably expected to come forward because of funding and decisions are in place. The highway scheme included in the reference case model are listed and shown in Table 2-8 and Figure 2-5 overleaf. Meanwhile, the public transport model includes the RTS service operating in Colchester.

Following the cancellation of the A12 J19-25 widening, this scheme has not been included in the reference case network, or any subsequent scenarios discussed later in the report. Table 2-8 lists the committed schemes included in the reference case.

Table 2-8: Committed schemes included in the reference case

District	Scheme description
Braintree	Panfield Lane/ Springwood Drive Link Road - New link road connecting Panfield Lane and Springwood Drive, with a new roundabout on Panfield Lane
	Springwood Drive roundabout - Improvements to Springwood Drive/ Rayne Road roundabout
	Marks Farm Roundabout - Widened approaches to northern, eastern and southern arms of Marks Farm Roundabout
Chelmsford	Chelmsford North East Bypass – Section 1a

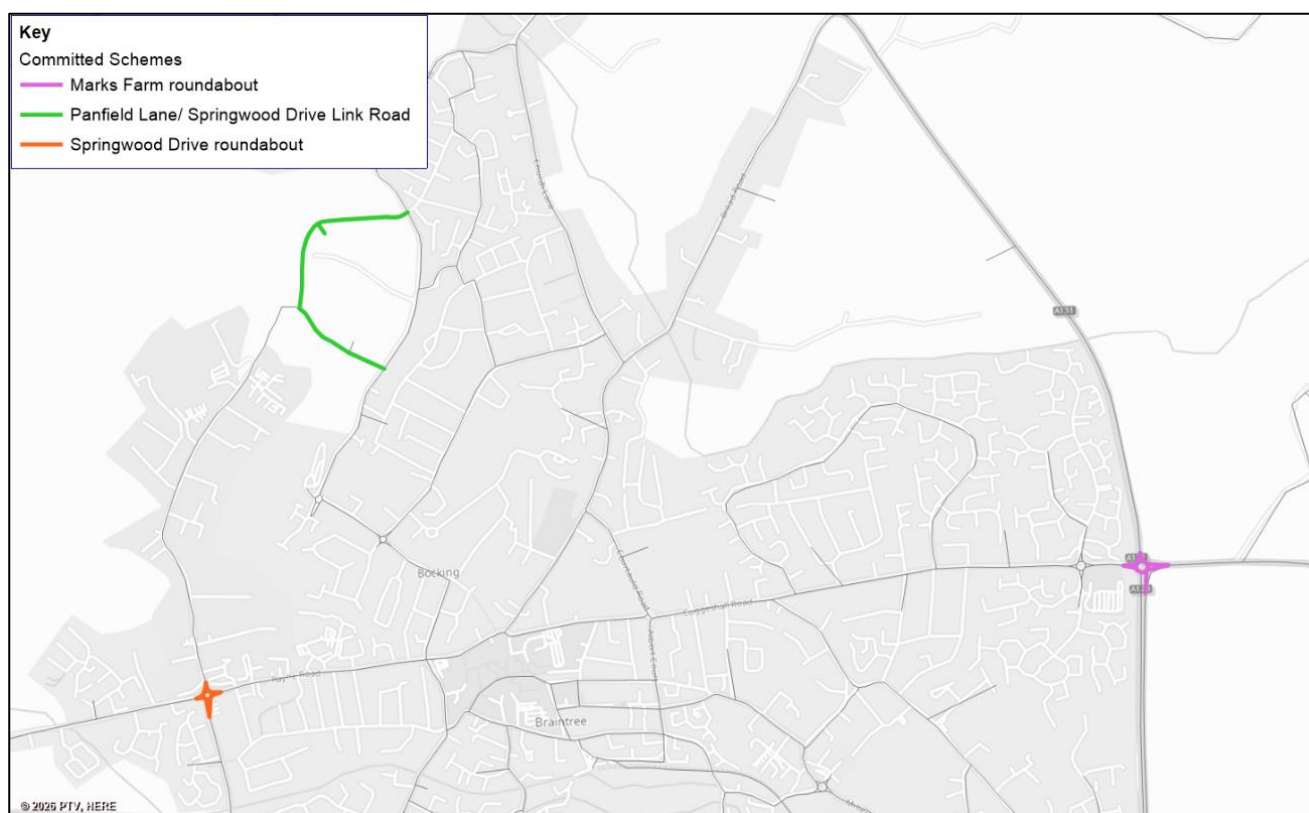


Figure 2-5: Committed schemes in Braintree

To ensure that development-related trips are accurately represented within the transport model, additional zone connectors have also been incorporated. These connectors provide appropriate access points, allowing trips to enter and exit the model network at locations that reflect realistic travel behaviour and network usage.

2.3.3 Reference case performance

2043 reference case performance is assessed using the movement index scores detailed in Table 2-7 and compared to the 2023 base model. The scores are shown in Table 2-9 where they can also be compared to the 2043 assessment case without mitigation.

Overall network performance increases from a rating of 5 in the base year to 6 in both the AM and PM peaks, but remains operating within acceptable limits. Most junctions continue to operate within the free-flow to moderate congestion range; however, a number of locations experience a noticeable worsening.

The most significant deterioration is at Galley's Corner Roundabout, where ratings increase from 7 to 13 in the AM peak and from 9 to 15 in the PM peak, which represents extreme congestion. This reflects a substantial increase in congestion and identifies the junction as a principal network constraint. Other junctions experiencing notable deterioration include Rayne Road/Pods Brook Road, where the rating increases from 5 to 11, and Rose Hill/Railway Street, where ratings increase to 10 in the AM peak and 11 in the PM peak, which indicates substantial congestion.

At the Rayne Road / Pierrefitte Way signalised junction, despite remaining one of the more constrained locations in the network, the movement score improves from 15 to 9 in the AM peak and from 15 to 11 in the PM peak. This is due traffic redistributing through the new link road between Rayne Road and Panfield Lane.

The change between the reference and base can also be seen in the speed ratio difference and relative queue difference plots shown in Figure 2-6Figure 2-9. These plots also help illustrate how the movement index score is affected by changes in speed and relative queue. Relative queue is also known as blocking back, which indicates sections of the network where queues build up when all the traffic demand cannot pass through in the modelled hour. It is similar to water blocking back in a constricted drain.

The speed ratio and relative queue difference plots demonstrate that the change in network performance is concentrated along a relatively small number of strategic corridors rather than being widespread across the network. In the AM peak, the most pronounced reductions in speed and increases in blocking back occur on approaches to Galleys Corner Roundabout and along sections of the A120 corridor east of Braintree. Additional speed reductions are evident on roads connecting to the town centre and on links associated with the Rayne Road corridor. Similar patterns are observed in the PM peak, with speed reductions and longer queues becoming more widespread on approaches to Braintree town centre, particularly along the B1256 corridor and routes linking the A120 and A131.

Difference flow figures, absolute speed ratio and relative queue plots for the reference case scenario are shown in Appendix D.

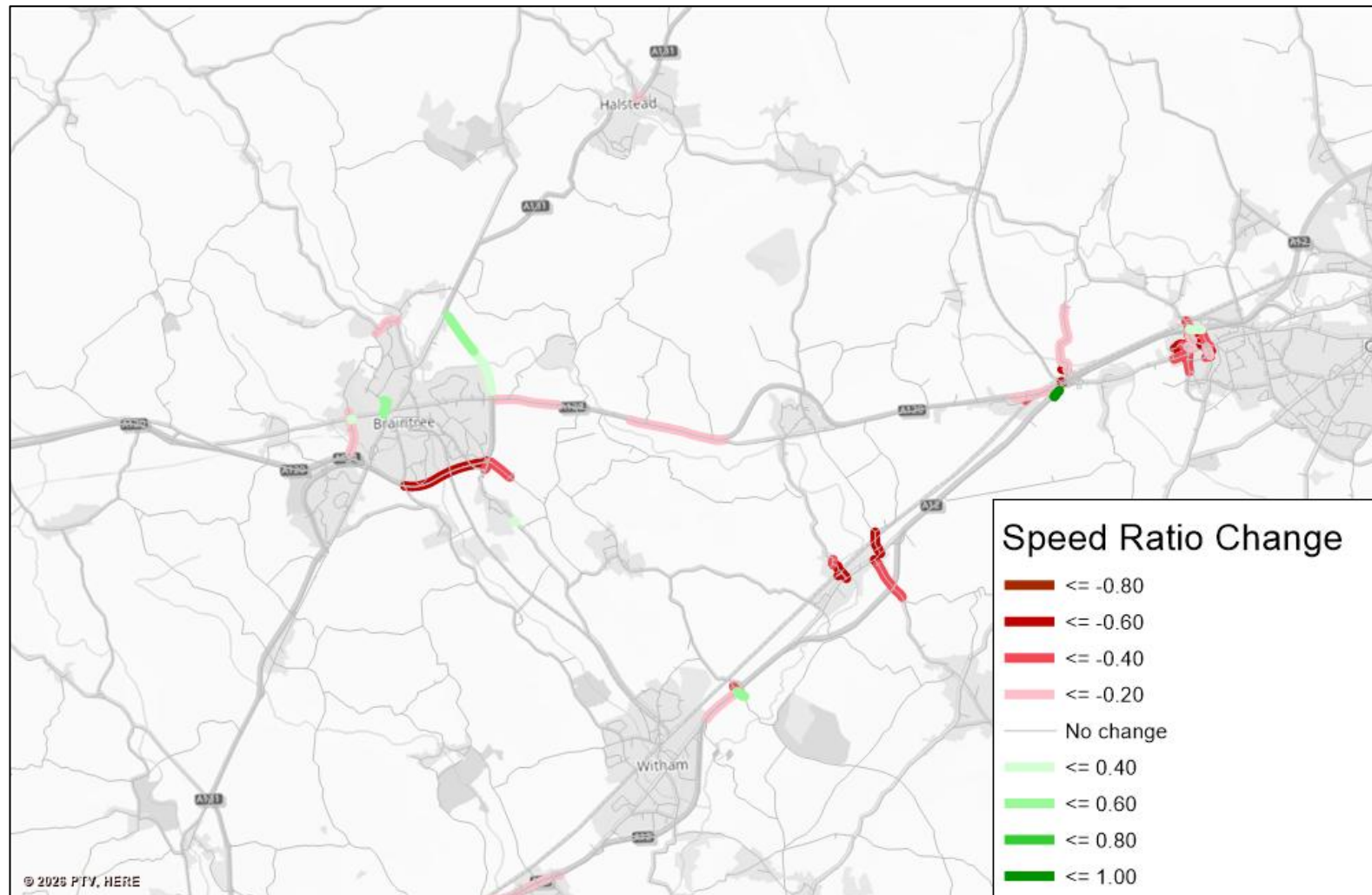


Figure 2-6: AM speed ratio difference - 2043 Scenario 1 vs 2023 Base



Figure 2-7: PM Speed ratio difference - 2043 Scenario 1 vs 2023 Base

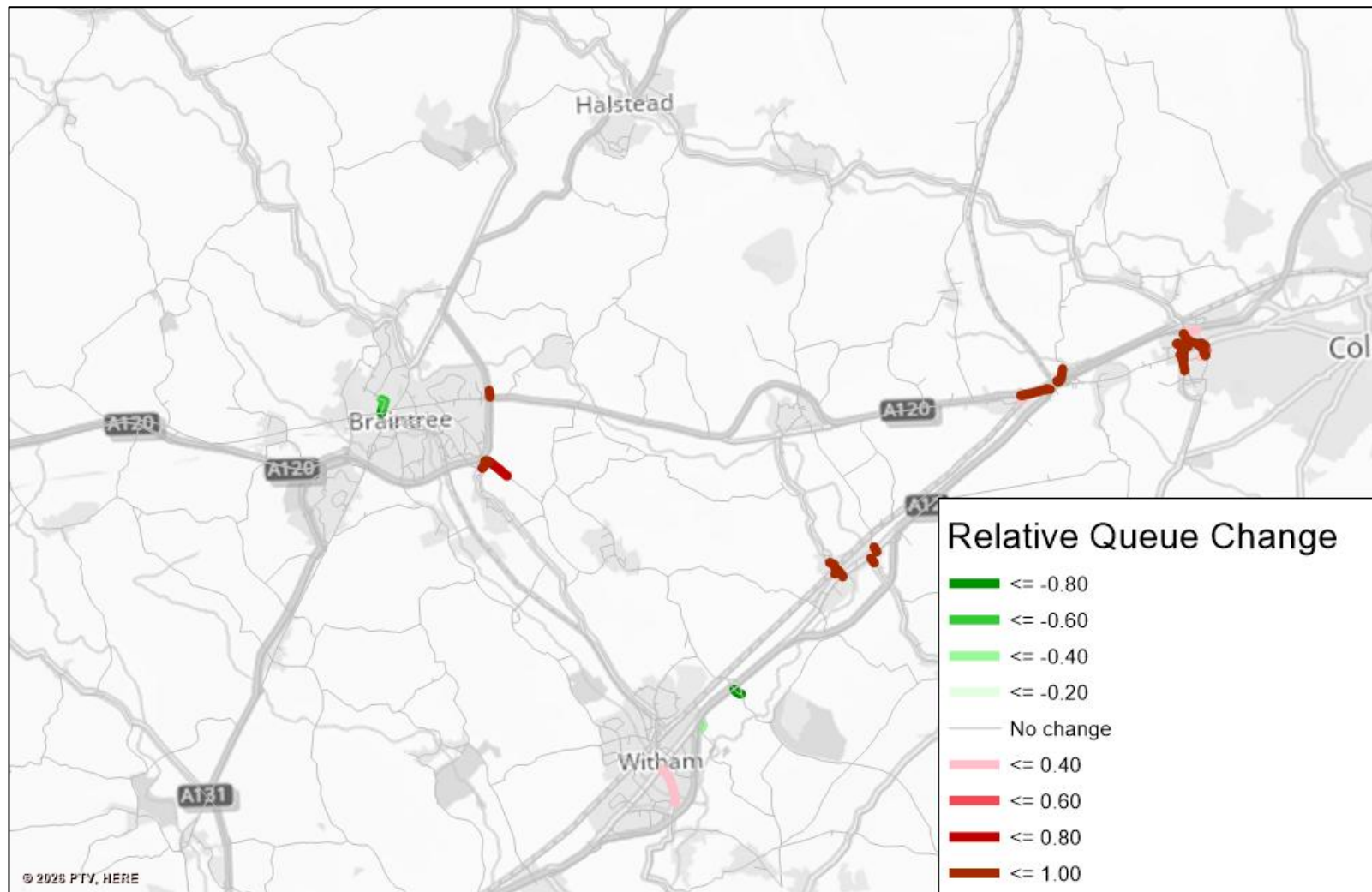


Figure 2-8: AM Relative queue difference - 2043 Scenario 1 vs 2023 Base

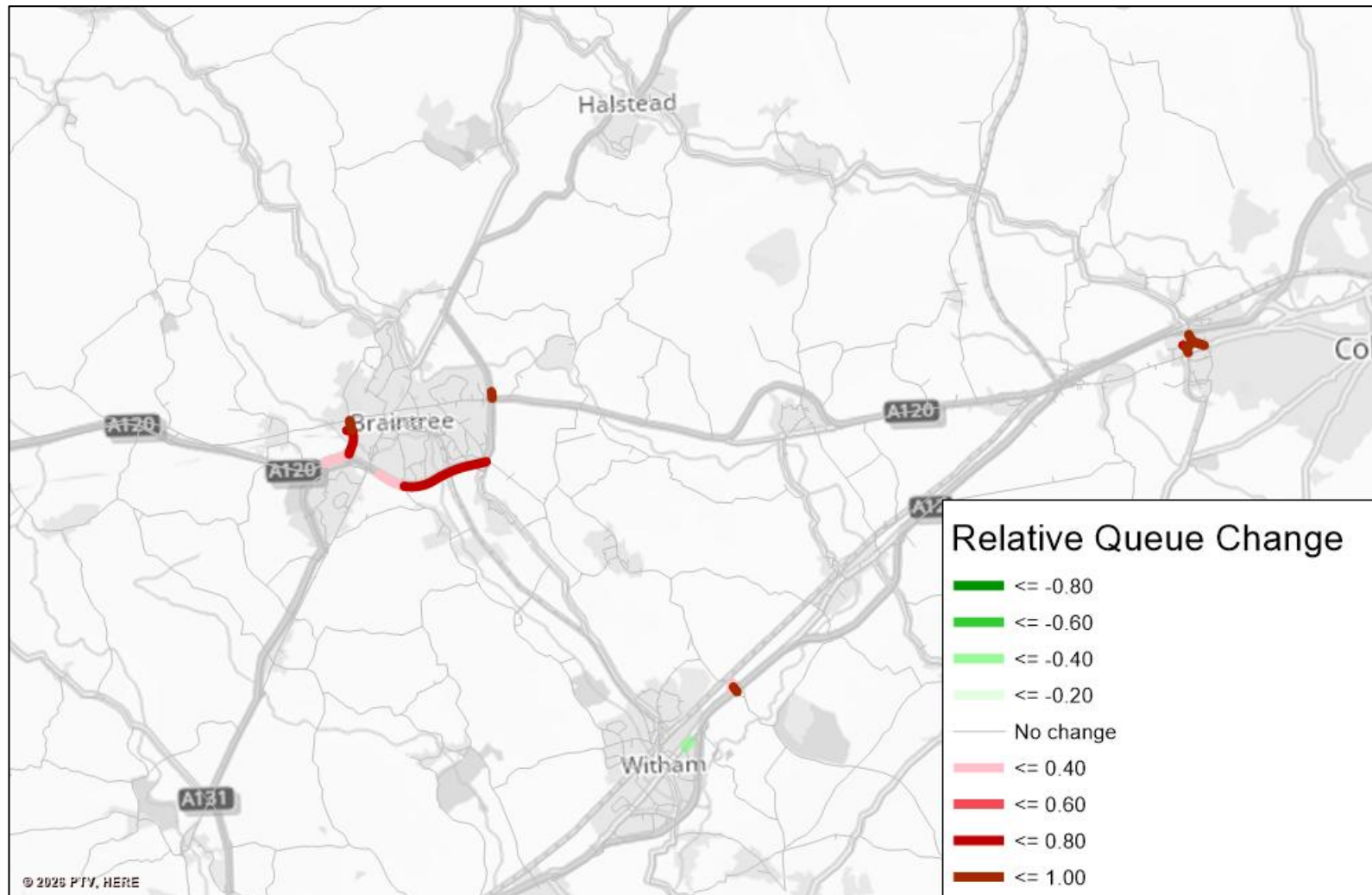


Figure 2-9: PM Relative queue difference - 2043 Scenario 1 vs 2023 Base

2.4 Assessment case forecast without mitigation

2.4.1 Assessment case set up

2.4.1.1 Demand set-up

To calculate the trip generation of Local Plan allocation the process described in subsection 2.3.1 was followed. Households and jobs were assigned to MSOAs and input into TEMPro as alternative assumptions to generate the number of trips in a production-attraction format required for VDM. The trip demand was then assigned to model zones based on the proportion of the developments falling within the model zone. Finally, the growth was added to the reference case trip ends. Since the assessment case is run with VDM, the VDM process handles the distribution of trips.

2.4.1.2 Network set up

The reference case forecast model network is used as the base to create the assessment case forecast network. To ensure that Local Plan allocation site-related trips are accurately represented within the transport model, additional zone connectors have been incorporated as described in subsection 2.3.2. Access and connector changes occur in model zones containing larger allocations such as Kings Dene at North Kelvedon (2250 hhs), land north and east of Halstead (1750 hhs), and land east of Braintree (1900 hhs).

2.4.2 Assessment case performance without mitigation

The assessment case increases traffic demand across the network showing a further deterioration in operational performance across the network, with increased congestion, lower travel speeds and longer queues at a number of key junctions and corridors. Much of the network operates within acceptable limits, however additional development demand places greater pressure on several existing congestion hotspots and reduces the overall resilience of the highway network.

The movement index scores for the proposed new Local Plan growth are shown in Table 2-9 where they can be compared to the 2043 reference case and 2023 base. The average movement score increases from 6 in the reference case to 7 in the assessment case in both the AM and PM peaks. This indicates that moderate congestion would be the overall experience for many journeys, especially those through the problem areas.

The most significant impacts continue to be concentrated at locations that are already constrained in the reference case. Galleys Corner Roundabout remains the principal network constraint and experiences a further deterioration in the AM peak, increasing from a score of 13 in the reference case to 15 in the assessment case, whilst remaining at 15 in the PM peak. This indicates extreme congestion conditions and confirms that the junction has limited capacity to accommodate additional development traffic. Performance also worsens at Marks Farm Roundabout, where scores increase from 7 to 8 in the AM peak and from 6 to 7 in the PM peak, reflecting increased pressure on the strategic route network around Braintree.

A number of other junctions also experience reductions in operational performance. In the AM peak, the most notable change occurs at Millennium Way, where the score increases from 2 in the reference case to 8 in the assessment case, showing an unsatisfactory performance. This is due to

the proximity of the junction to Land East of Braintree development which is projected to deliver 1,900 dwellings causing queues on Braintree Road approaching Millenium Way roundabout. Problems persist at areas of interest along Pierrefitte Way at its junctions with London Road and Rayne Road where the movement index indicates worsening substantial congestion in the peaks. Another area showing worsening performance is the Hatfield Road / Howbridge Road junction which changes from moderate congestion in the reference to substantial congestion in the assessment in the PM peak.

The change in movement index can also be used to provide an assessment on the acceptability of the change from the perspective of a highway authority, which is shown in Table 2-10. Concern over the level of change is denoted as passable ✓, caution ! or unsatisfactory X.

In this table Scenario 1 (the 2043 reference) is compared to the 2023 base. The change in scores from the base to the reference in the AM and PM periods indicate unacceptable performance at Galleys Corner and widespread caution warnings. The PM peak also indicates unacceptable performance at the areas of interest at Raynes Road and Rose Hill.

Table 2-10 also shows the acceptability of Scenario 2 (2043 proposed new Local Plan growth) – which is assessed by comparing the change from Scenario 1 (the reference case). This shows unacceptable performance at Galleys Corner, Millenium Way and London Road / Pierrefitte Way in the AM peak; and unacceptable performance at Millenium Way, Rayne Road and Hatfield Road areas of interest in the PM peak. There are also widespread caution warning indicating a network under stress.

The speed ratio and relative queue plots in Figure 2-10 to, Figure 2-13 demonstrate that the demand from the proposed new Local Plan produces relatively localised but clear reductions in travel speeds compared with the reference case. In both time periods, speed reductions are predicted on routes to the west of Braintree, including links associated with Galleys Corner Roundabout and the Millennium Way corridor, on the A12 corridor and local roads around Rivenhall and Feering, suggesting that additional demand is affecting both strategic and local routes.

Difference flow figures, absolute speed ratio and relative queue plots for the reference case scenario are shown in Appendix D.

Table 2-9: Movement index scores for base, reference and assessment scenarios without mitigation

ID	Location	AM peak rating			PM peak rating		
		2023 base	Sc1: 2043 ref case	Sc2: 2043 LP no mit	2023 base	Sc1: 2043 ref case	Sc2: 2043 LP no mit
1	Halstead	5	6	7	5	6	6
2	High Garrett	1	6	7	1	6	6
3	Broad Rd / A131	8	7	7	6	6	6
4	Coggeshall	5	6	6	4	5	5
5	Marks Farm rbt	5	7	8	5	6	7
6	Galleys Corner rbt	7	13	15	9	15	15
7	Millenium Way	2	2	8	2	3	3
8	Rayne Rd / Pods Brook Rd	4	4	5	5	11	11
9	Rayne Rd / Pierrefitte Way	15	9	9	15	11	12
10	London Rd / Pierrefitte Way	10	9	10	10	10	10
11	Coggeshall Rd / Railway St	4	3	4	4	4	5
12	Rose Hill / Railway St	9	10	10	8	11	11
13	Hatfield Peverel	6	7	7	6	6	7
14	Hatfield Rd / Howbridge Rd	9	9	9	7	7	10
15	Kelvedon	4	6	6	4	5	6
16	B1018 / The Avenue	5	6	7	4	5	5
17	London Rd / Coggeshall Rd	2	3	4	1	2	3
18	A131 / London Rd	3	3	3	4	3	3
19	Andrewsfield	1	1	1	1	2	2
20	Pattiswick	6	7	7	6	6	6
21	South Haverhill	1	1	1	1	1	1
Overall assesement combining all areas		5	6	7	5	6	7

Key to movement scale and acceptability of change

More or less free flow			Travelling slower			Moderate congestion			Substantial congestion		
1	2	3	4	5	6	7	8	9	10	11	12
Extreme congestion			Acceptability of change								
13	14	15	Passable ✓				Caution !			Unsatisfactory ✗	

Table 2-10: Movement index acceptability for base, reference and assessment scenarios without mitigation

ID	Location	AM peak impact			PM peak impact		
		2023 base	Sc1: 2043 ref case	Sc2: 2043 LP no mit	2023 base	Sc1: 2043 ref case	Sc2: 2043 LP no mit
1	Halstead	5	!	!	5	!	✓
2	High Garrett	1	!	!	1	!	✓
3	Broad Rd / A131	8	✓	✓	6	✓	✓
4	Coggeshall	5	!	✓	4	!	✓
5	Marks Farm rbt	5	!	!	5	!	!
6	Galleys Corner rbt	7	x	x	9	x	x
7	Millenium Way	2	✓	x	2	✓	✓
8	Rayne Rd / Pods Brook Rd	4	✓	!	5	x	!
9	Rayne Rd / Pierrefitte Way	15	✓	!	15	✓	x
10	London Rd / Pierrefitte Way	10	✓	x	10	!	!
11	Coggeshall Rd / Railway St	4	✓	✓	4	✓	!
12	Rose Hill / Railway St	9	!	!	8	x	!
13	Hatfield Peverel	6	!	✓	6	✓	!
14	Hatfield Rd / Howbridge Rd	9	!	!	7	✓	x
15	Kelvedon	4	!	✓	4	!	!
16	B1018 / The Avenue	5	!	!	4	!	✓
17	London Rd / Coggeshall Rd	2	!	✓	1	✓	✓
18	A131 / London Rd	3	✓	✓	4	✓	✓
19	Andrewsfield	1	✓	✓	1	✓	✓
20	Pattiswick	6	!	✓	6	✓	✓
21	South Haverhill	1	✓	✓	1	✓	✓
Overall assessment combining all areas		5	6	7	5	6	7

Key to movement scale and acceptability of change

More or less free flow			Travelling slower			Moderate congestion			Substantial congestion		
1	2	3	4	5	6	7	8	9	10	11	12
Extreme congestion			Acceptability of change								
13	14	15	Passable ✓			Caution !			Unsatisfactory x		

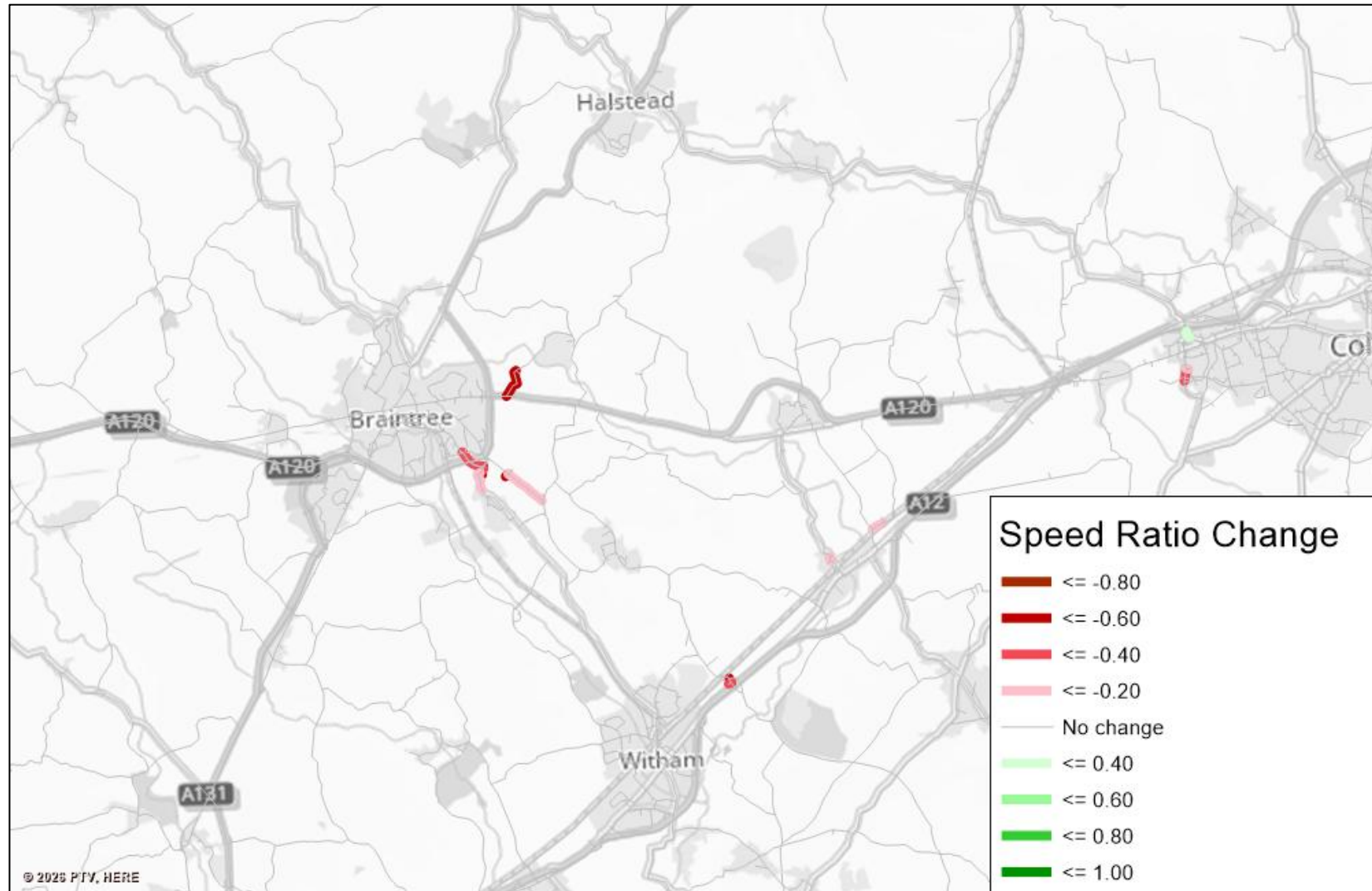


Figure 2-10: AM Speed ratio difference – 2043 scenario 2 vs 2043 Scenario 1

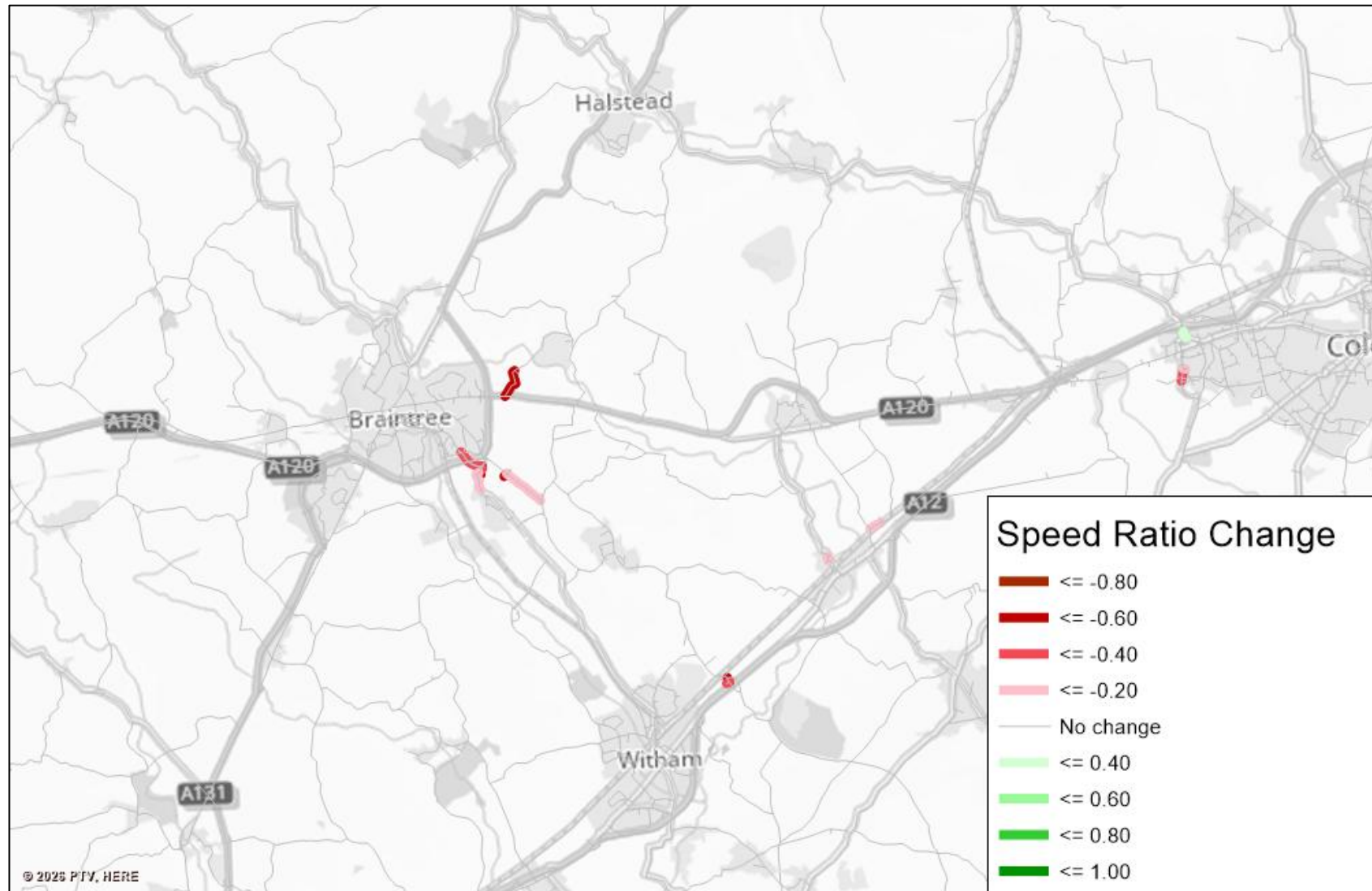


Figure 2-11: AM Speed ratio difference – 2043 scenario 2 vs 2043 Scenario 1



Figure 2-12: PM Speed ratio difference – 2043 scenario 2 vs 2043 Scenario 1

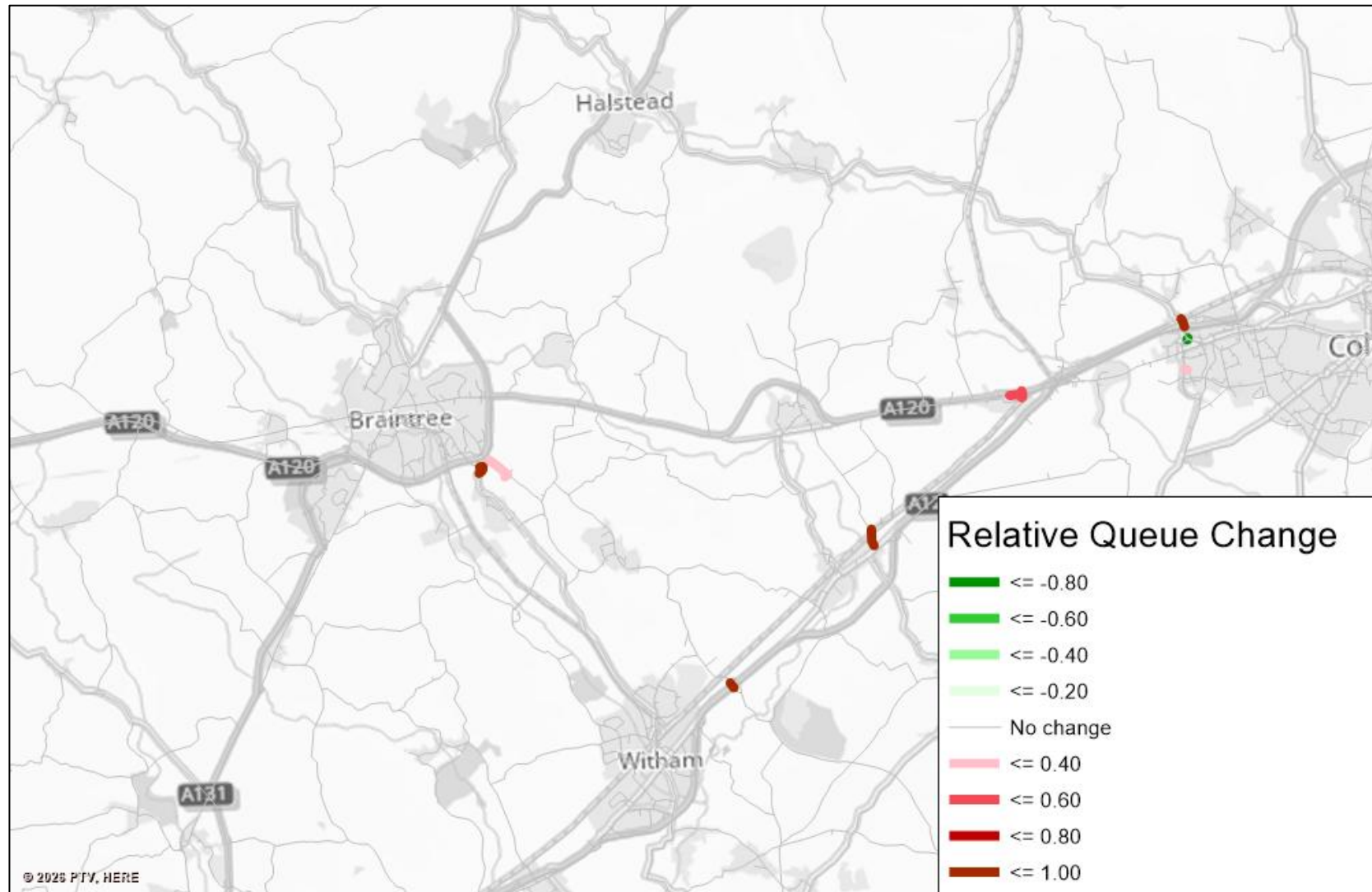


Figure 2-13: AM Relative queue difference – 2043 scenario 2 vs 2043 Scenario 1

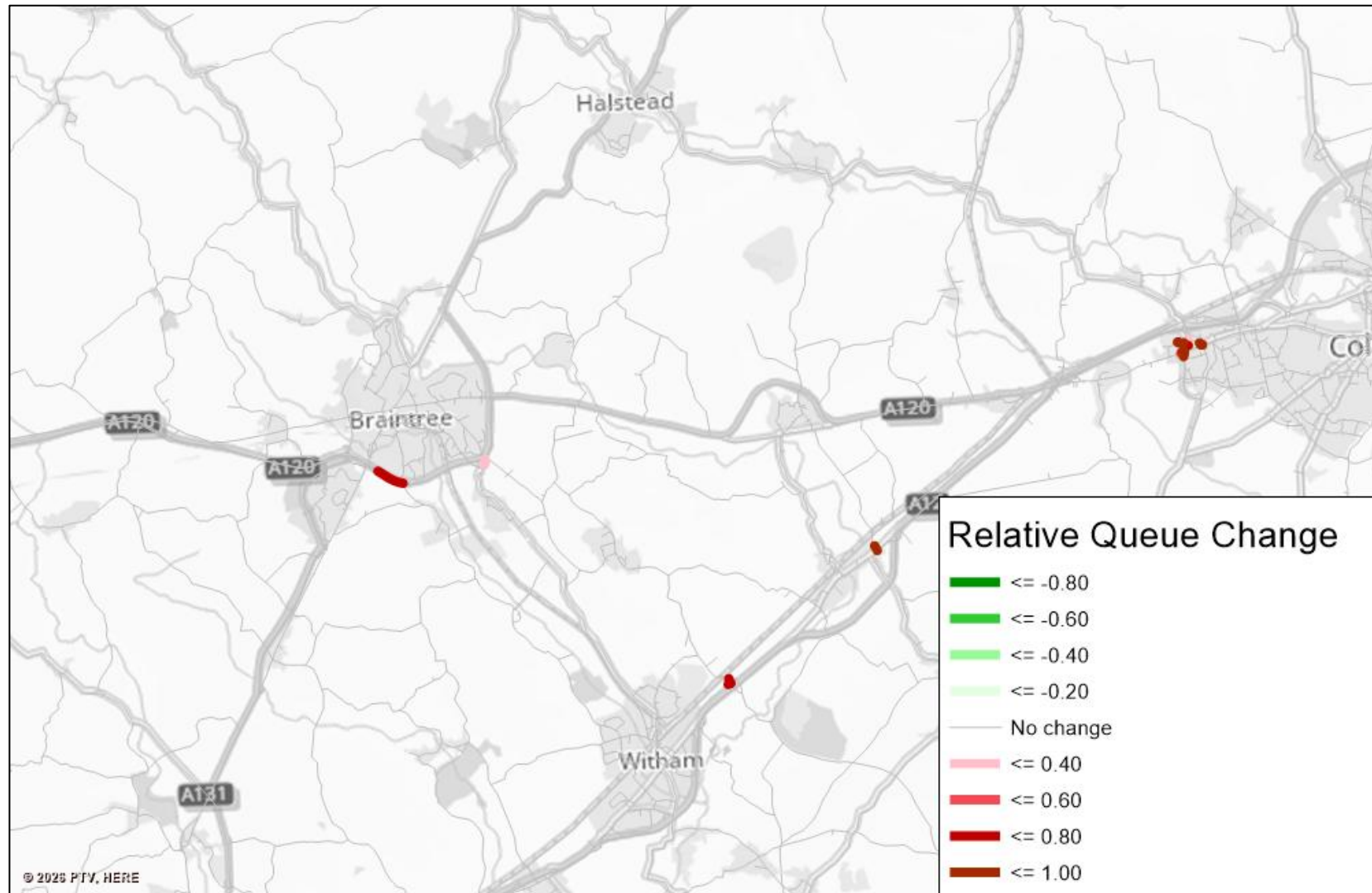


Figure 2-14: PM Relative queue difference – 2043 scenario 2 vs 2043 scenario 1

2.5 Conclusion

This chapter has introduced the transport model NEMo and explained how reference case and assessment case without mitigation scenarios were derived. This explains the assumptions for housing and employment growth in the scenarios, how trip quantities were generated and the modelled network.

The reference case results suggest that future development growth creates additional pressure at several strategically important junctions, particularly Galleys Corner Roundabout, Marks Farm Roundabout and locations along the Rayne Road corridor. Whilst the network continues to function effectively in most locations, the forecast increases in congestion, reduced speeds and longer queues at these key nodes indicate that further mitigation measures may be required to maintain acceptable levels of service over the forecast period.

The assessment case demonstrates that proposed new Local Plan growth without mitigation results in a noticeable reduction in network performance compared with the reference case. The greatest impacts are concentrated at Galleys Corner Roundabout, Marks Farm Roundabout, Millennium Way, and along sections of the A12 corridor between Braintree, Rivenhall, Feering and Colchester. Increased congestion, lower travel speeds and longer queues at these locations suggest that the network would operate with reduced resilience and journey time reliability, highlighting the need for mitigation measures to ensure planned growth can be accommodated without unacceptable impacts on the transport network.

The next chapter proceeds to consider vision-led mitigation to assess the cumulative impact of reference case and new Local Plan growth.

3. Integrated Transport Solutions

The previous chapter explained that proposed new Local Plan growth worsens conditions on a network which already has safety and capacity issues at peak periods. The scale of transport problems would be expected to impact on the economy of Braintree and the sub-region if not addressed.

This chapter develops an integrated and vision-based mitigation strategy to solve problems arising from cumulative committed developments, Local Plan growth in bordering authorities and Braintree's new Local Plan. The responsibility to fund and deliver the end point mitigations would need to be fairly and reasonably apportioned across reference case and new Local Plan developments.

Highway related mitigations include major schemes to address congestion problems on the strategic routes through Braintree at A120 Galleys Corner Roundabout and Marks Farm Roundabout and balance the movement needs of all modes. In addition, investment in dynamic traffic management technology is recommended to harness the potential of artificial intelligence along with junction improvements to support connections to developments by all modes.

The mitigation package also enhances the high-quality public transport network and walking and cycling routes to provide viable choices of travel mode. The role of place- making and land use planning is also recommended to reduce distances between activities.

Chapter 4 shows the impact of the measures whilst Chapter 5 looks at future modelling work and potential mitigation post Local Plan to be undertaken as part of the Pre-Submission evidence.

3.1 Mitigation Strategy

3.1.1 Introduction

Chapter 2 established the imperative for the transport system to evolve to accommodate growth. The mitigation strategy is grounded in a vision for an integrated transport system in which there is choice to travel by different modes. This recognises that not everyone has access to a car at all times in their life; that different modes can suit different trip purposes better than others; and that in busy, economic centres it is infeasible, unattractive and counter-productive to be car dominated.

The delivery of an integrated transport system implies achieving a better balance between modes, which will keep people and goods moving, and support a clean and pleasant local street environment. This will help businesses thrive, good jobs be created and customers, visitors and tourists reach attractions whether in the city centre, business parks, countryside parks or village centres.

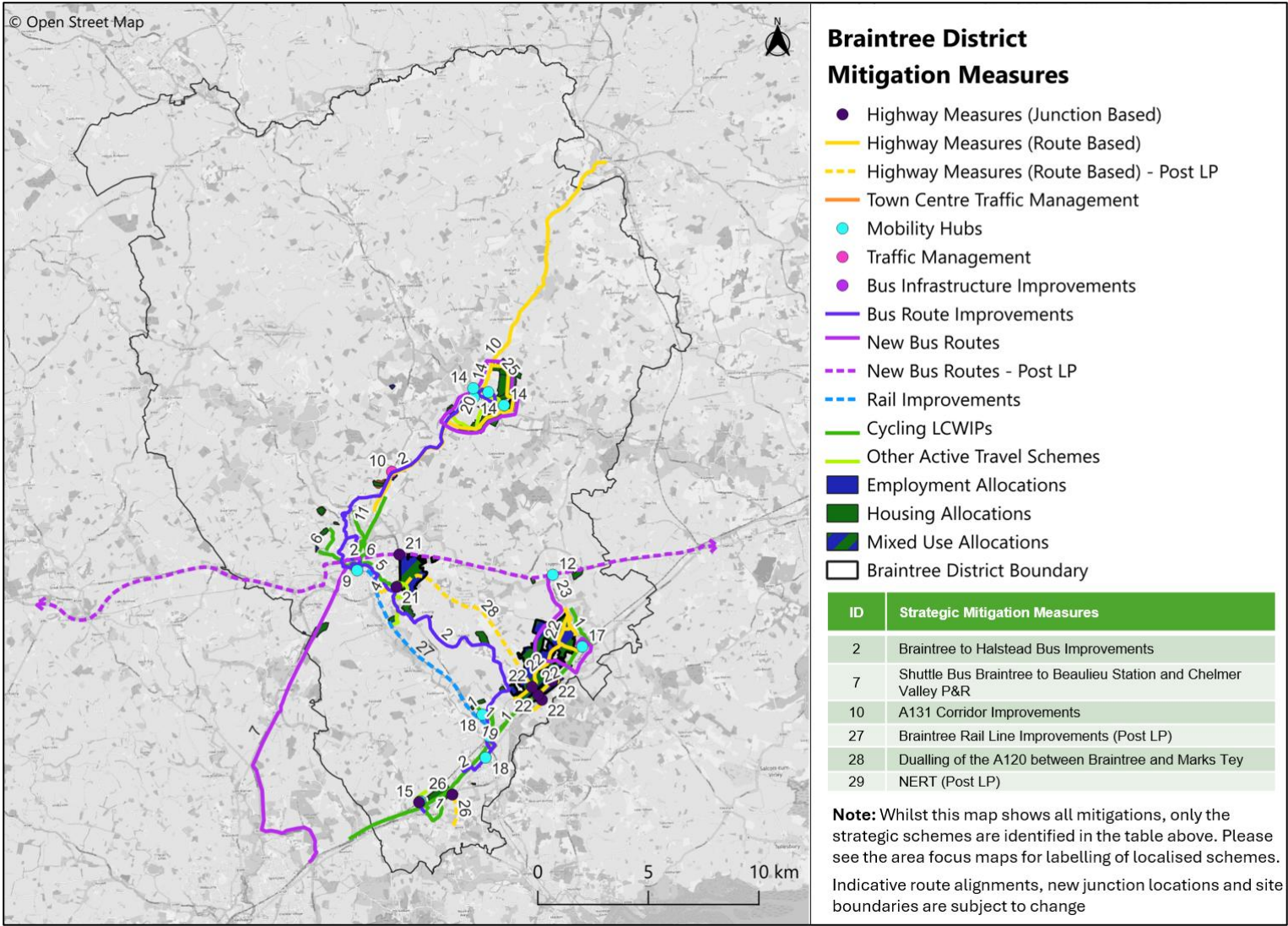


Figure 3-1: Interaction of proposed district-wide measures and development allocations

To create a better integrated transport system able to accommodate growth satisfactorily, in line with the NPPF requirement to balance economic, environmental and social objectives (which the severe and road safety problems would disrupt) there is a need to improve connectivity by bus, cycling and walking in particular. Together with rail, these modes form sustainable transport options. However, supporting sustainable transport connectivity alone would not be sufficient to keep people and goods moving. An integrated transport system also needs to consider the strategic road and rail connections; local road distributors; and how safer and more attractive bus, cycling and pedestrian priority routes can be weaved into the often congested road network.

The integrated transport measures in this chapter have been divided into three groups: highway measures, public transport measures and active travel and place making measures. However, there is a strong overlap between measures since highway measures facilitate priority for buses, cycling and walking, place-making and, at time, access to rail stations. Similarly, public transport measures consider interchanges between modes such as found at bus and rail stations and mobility hubs.

Figure 3-1 maps the proposed district-wide integrated transport measures alongside development allocations. Meanwhile Appendix E lists all the proposed highway, public transport and active travel measures. Whilst Appendix F provides detailed maps by settlement area. These are also provided in the Executive Summary of this report.

3.1.2 Background Changes and Trends

Braintree District is experiencing continued population, housing and employment growth even without new Local Plan growth as shown in Section 2.1.2.2. As the district expands through local development, urban extensions and large strategic sites, travel demand is expected to increase, placing additional pressure on an already constrained transport network.

Historically, growth in travel demand has been accommodated primarily through private car use. However, this approach is becoming increasingly difficult to sustain. Congestion and journey time reliability remain key challenges on parts of the network, while further growth in car-based travel would place additional pressure on network capacity, accessibility and economic productivity. Recognising these challenges, Essex County Council's (ECC) draft Local Transport Plan (LTP)²⁴ identifies a need to reduce reliance on private vehicles and establish a transport network that prioritises active, safe and sustainable travel, delivering health, environmental and economic benefits.

Alongside growth pressures, travel patterns and user expectations are evolving. Increased levels of hybrid and flexible working have changed commuting behaviours and reduced reliance on traditional peak-hour travel patterns. At the same time, there is growing awareness of the health, environmental and economic benefits associated with walking, cycling and public transport. As a result, users increasingly expect transport networks to provide convenient, connected and flexible travel options.

Braintree, Witham and the Essex-wide Local Cycling and Walking Infrastructure Plans (LCWIP) seek to improve connectivity between key destinations across the towns by delivering a coherent

²⁴ [A Better Connected Essex - Essex Transport Strategy Full Draft, 2025](#)

network of walking and cycling routes supporting a long-term shift towards sustainable travel requires both high-quality infrastructure and the creation of environments that make active travel an attractive and convenient choice.

Technology is also influencing how transport networks are planned and used. Improvements in digital journey planning, intelligent transport systems, shared mobility services and vehicle electrification are creating opportunities to provide more flexible and integrated travel options. Reflecting these changes, Mobility Hubs and Integrated Transport Halts²⁵ promotes mobility hubs as locations where public transport, active travel and shared mobility services are brought together, supporting seamless multi-modal journeys and reducing reliance on private vehicle ownership.

Collectively, these strategies demonstrate a clear and consistent shift in the direction of transport planning within Braintree. While supporting future growth remains a key objective, there is increasing emphasis on creating an integrated transport network that offers attractive alternatives to private car use, supports healthier lifestyles, improves accessibility and contributes to broader environmental, social and economic outcomes.

3.1.3 Fair and Reasonable Apportionment

The identification of transport mitigation measures within this evidence base has been informed by the scale and distribution of planned growth, forecast travel demand and the operational requirements of the future transport network. While some measures are directly related to individual development locations, many interventions provide benefits across a wider geographical area, supporting movement between communities, key destinations and transport corridors. As a result, the delivery and funding of transport infrastructure will require a coordinated approach that reflects the cumulative impacts of growth across the Local Plan area.

A key principle of the transport evidence is that development should contribute fairly and proportionately towards the infrastructure required to mitigate its transport impacts. Contributions should reflect the scale of development proposed, the level of travel demand generated and the extent to which individual developments benefit from the infrastructure being delivered. This approach will ensure that the costs associated with transport improvements are distributed equitably across developments and that no single site is required to fund infrastructure that delivers substantial benefits beyond its direct impacts.

It is important to distinguish between strategic transport mitigation and site-specific accommodation works. All development proposals will be required to provide appropriate access arrangements to the public highway, together with any associated junction improvements, pedestrian and cycle connections, frontage works and other measures necessary to make the development acceptable in transport terms. These works are considered site-specific requirements and are a direct responsibility of developers. Consequently, allowances for site access and associated accommodation works have not been included within the strategic mitigation package identified in this evidence base.

²⁵ [Mobility Hubs and Integrated Transport Halts, ECC, September 2024.](#)

In addition, developers of large sites would be required to prepare, implement and monitor travel plans for residents, employees and other site users, as appropriate to the nature and scale of development. The costs associated with Travel Plans are site specific obligations and have not been included within the strategic mitigation costs or the apportionment of funding contributions set out within this study.

Where mitigation is required solely to support a specific development, including site access arrangements, local junction improvements, frontage works, internal circulation measures and Travel Plan obligations, infrastructure and associated measures should be delivered directly by that development and funded by the developer. However, where interventions form part of a wider strategic movement corridor, support multiple development locations or address the cumulative impacts of growth, a proportionate cost apportionment should be applied. This will enable contributions from multiple developments to be combined towards the delivery of larger strategic schemes appropriate to the relationship with development impacts.

The delivery of transport infrastructure over the Local Plan period is anticipated to require a blend of funding sources. Developer contributions secured through the planning process will represent an important mechanism for delivery; however, opportunities should also be pursued to secure funding from national, regional and local sources. A coordinated funding strategy will maximise opportunities to bring forward infrastructure in a timely manner whilst reducing reliance on any single funding source.

The timing of infrastructure delivery should also be accounted for, given some strategic interventions are intended not only to mitigate planned growth to 2043, but also to establish foundations for longer-term development beyond the plan period. This is particularly relevant for strategic highway improvements, rapid transit infrastructure and the wider comprehensive LCWIP network, where schemes may need to be delivered in phases over an extended period.

In such cases, it may not be appropriate for development planned to 2043 to fund the entirety of the scheme where a substantial proportion of future benefits will be realised through growth occurring beyond the plan period. Local Plan developments should contribute towards the proportion of infrastructure required to accommodate growth forecasts to 2043, with future development, external funding opportunities and subsequent plan-making processes contributing towards later phases where appropriate. This ensures that infrastructure can be planned and safeguarded on a long-term basis while maintaining a fair relationship between development impacts and funding obligations.

Opportunities should be explored to secure contributions from existing committed developments where planning obligations have not yet been finalised, where mechanisms exist to revise infrastructure contributions, or where developments derive measurable benefits from strategic transport interventions identified within this transport evidence. This would recognise the cumulative nature of growth impacts and broaden the funding base available to support delivery of strategic transport infrastructure.

3.1.4 Infrastructure Audit and Delivery Plan (IADP) and Viability

Transport infrastructure requirements identified through this evidence base should be considered as part of the wider Local Plan infrastructure planning, funding and delivery discussions. Whilst this document does not constitute an Infrastructure Audit and Delivery Plan (IADP) or viability assessment, the development of the evidence base and associated mitigation strategy has been undertaken with due regard to these parallel workstreams, including the need to support an appropriate balance between infrastructure provision, housing delivery and sustainable growth objectives.

The transport interventions identified within this evidence base are considered important to support planned growth over the Local Plan period to 2043 and to mitigate the impacts arising from forecast increases in travel demand. Collectively, they demonstrate the scale and nature of the infrastructure required to accommodate growth whilst supporting the delivery of a proportionate and integrated transport network across Braintree.

All proposed interventions have been informed by the transport evidence and modelling undertaken as part of this study, with their contribution to network performance, accessibility and sustainable travel objectives assessed through the appraisal process. The resulting package of measures therefore provides an evidence-led basis for future infrastructure planning, funding discussions and consideration within parallel IADP and viability assessments.

3.2 Shaping the Highway Network

3.2.1 Key Highway Schemes

The current list of proposed highway and traffic management interventions is shown in Table E.1. It should be noted that these measures do not include local access arrangements to developments as, in most cases, these details are not known. Nevertheless, allowances for access arrangements, proportionate to the sizes and locations of site allocations, have been provided to the IADP and viability work streams.

The highway mitigations involve changes to the highway layout or the control of traffic through the highway. The highway schemes are integrated with the public transport, active travel and place-making so not only serve the needs of general traffic. The schemes address severe traffic problems and also unlock the capacity on the network to provide public transport priority, and active travel routes and crossings.

The following subsections of this report provide more detail on the measures included in the Local Plan mitigation strategy. It should be noted that not all measures have been modelled as part of the Regulation 19 transport impact appraisal – as discussed below.

3.2.2 Dynamic Traffic Management

New homes, jobs, town centre regeneration and Local Plan allocations will all place more pressure on an already busy highway network. In many locations, it will not be practical or affordable to keep responding to growth by building more road capacity. The better opportunity is to improve the intelligence of the existing network to improve traffic flows, reduce congestion and prioritise certain modes.

The dynamic traffic management mitigation seeks to upgrade urban traffic control systems to support the delivery of integrated transport. By improving how traffic signals, sensors, operational systems and wider datasets are integrated, this will support more reliable movement of people and goods, enable housing and economic growth, improve access to sustainable transport choices and contribute to improved health, environmental and decarbonisation outcomes.

Next generation traffic management innovations provide ECC a way to do this; they use better data, sensors, traffic signal systems, communication networks (5G), real time modelling and AI and digital tools to understand and predict what is happening on the network to optimise traffic signal phasing. It supports proactive versus reactive network management, with future systems being able to use wider data sources to manage the local network and other wider network data to predict and manage flows in real-time.

Leading authorities are starting to treat traffic management technology as strategic infrastructure, not a back-office system. It is becoming part of how places support growth, improve journey reliability and make better use of public money. Alongside this, the commercial models to fund the digital and physical infrastructure are also evolving.

Essex already operates Urban Traffic Control using SCOOT, MOVA and bus priority, alongside other technologies such as Vivacity sensors and environmental monitoring. Therefore, the approach is to extend this capability to integrate existing systems and data more effectively, maximise their current value and identify where targeted investment could unlock further benefits.

In 2021, York became the first UK city to deploy real-time traffic modelling within its traffic management operations. In 2024, the city implemented a real-world pilot to automatically simulate alternative signal plans within the real-time model, and to send recommendations to be implemented via the UTC. This resulted in traffic delay reductions of up to 8% in the peak hours.

Tees Valley has developed a digital regional traffic simulation using live roadside data: in-road sensors and GPS-tracked buses to simulate and predict traffic conditions. A six-month pilot scheme reported a reduction in delays where the system was deployed, and improvements in bus journey times.

The vision for the system in Essex is shown in Figure 3-2. The investment in the system would require ongoing revenue support as opposed to a one-off single investment. Therefore, in many respects, it is a more affordable option than large infrastructure projects as developers could pay contributions only after housing has been completed.

Such innovation would be expected support the local technology sector. It would also naturally coordinate with NH traffic management systems used on the Strategic Road Network (SRN).

What could next generation traffic management do for Essex?

Potential benefits of smarter signals, connected data and predictive traffic management



Figure 3-2: Dynamic traffic management vision

3.2.3 A120 Corridor

The A120 is a strategically important transport corridor that supports economic growth, housing delivery and connectivity across North Essex. Managed by National Highways, it is a critical east-west route providing links to Stansted Airport, the wider strategic road network (M11) and the Port of Harwich. The modelling outlined in Chapter 2 identifies congestion on the A12 and A120 around Braintree Town Centre and highlights the need for targeted mitigation improvements that enhance capacity and journey time reliability.

3.2.3.1 Galleys Corner Roundabout

The Land East of Braintree development proposals include improvements to Galleys Corner Roundabout. The proposed mitigation scheme is set out in the 'Galleys Corner Junction Capacity Improvements' technical note produced by SLR Consulting (2025). The proposed scheme has the following key elements:

- Elongated, part-signalised roundabout with an improved circulatory layout;
- Additional entry lanes on the A120, B1018, and Long Green approaches;
- Optimised signal control to manage conflicting flows and improve throughput;
- Enhanced pedestrian and cycle facilities, including at grade crossings that complement existing subways;
- Geometric refinements designed to improve lane discipline and overall operational

efficiency; and

- Safeguards proposed alignment for A120 to A12 (Option D) Route

Figure 3-3 shows the proposed design of the Galleys Corner scheme included in submitted planning documentation.

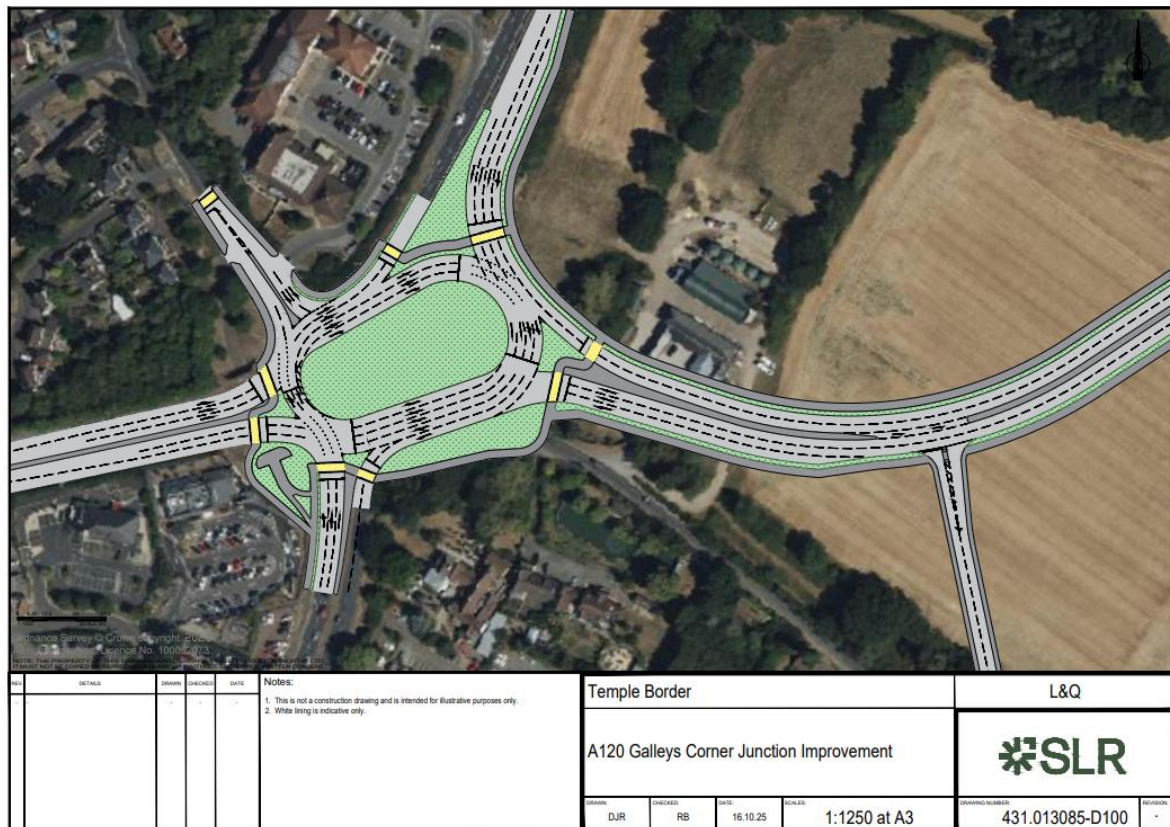


Figure 3-3: Galleys Corner Roundabout Developer Proposals (Source: SLR Consulting)

Due to the complexity of the proposals and concerns around the possible impact on traffic volumes at downstream junctions including Marks Farm Roundabout, it is proposed to model the revised developer layout using a microsimulation (VISSIM) model developed by National Highways to assess network impact along the A120 corridor. The outcomes from this modelling will be documented as part of upcoming Local Plan Pre-Submission evidence.

Strategic modelling for the current Regulation 19 appraisal assumes no network revisions at Galleys Corner. Instead, Millennium Way Slip proposals (see Section 3.2.3.2 below) have been included in the modelling to illustrate the local and wider network impact of possible infrastructure measures along the A120 corridor south-east of Braintree town.

3.2.3.2 Millennium Way Slips

Proposals for a Millennium Way Slips scheme providing direct connections to/from the A120 to Braintree Village, involve the creation of an eastbound off-slip and westbound on-slip between the A120 and the Millennium Way overbridge to allow users to directly access local access routes without the need to route through Galleys Corner and Millennium Way Roundabouts. Figure 3-4

below shows the modelled scheme drawing as set out in the 'A120 Braintree Study Option Testing report' (2014, AECOM) and which is illustrated in a presentation video on Essex Highways' website²⁶.

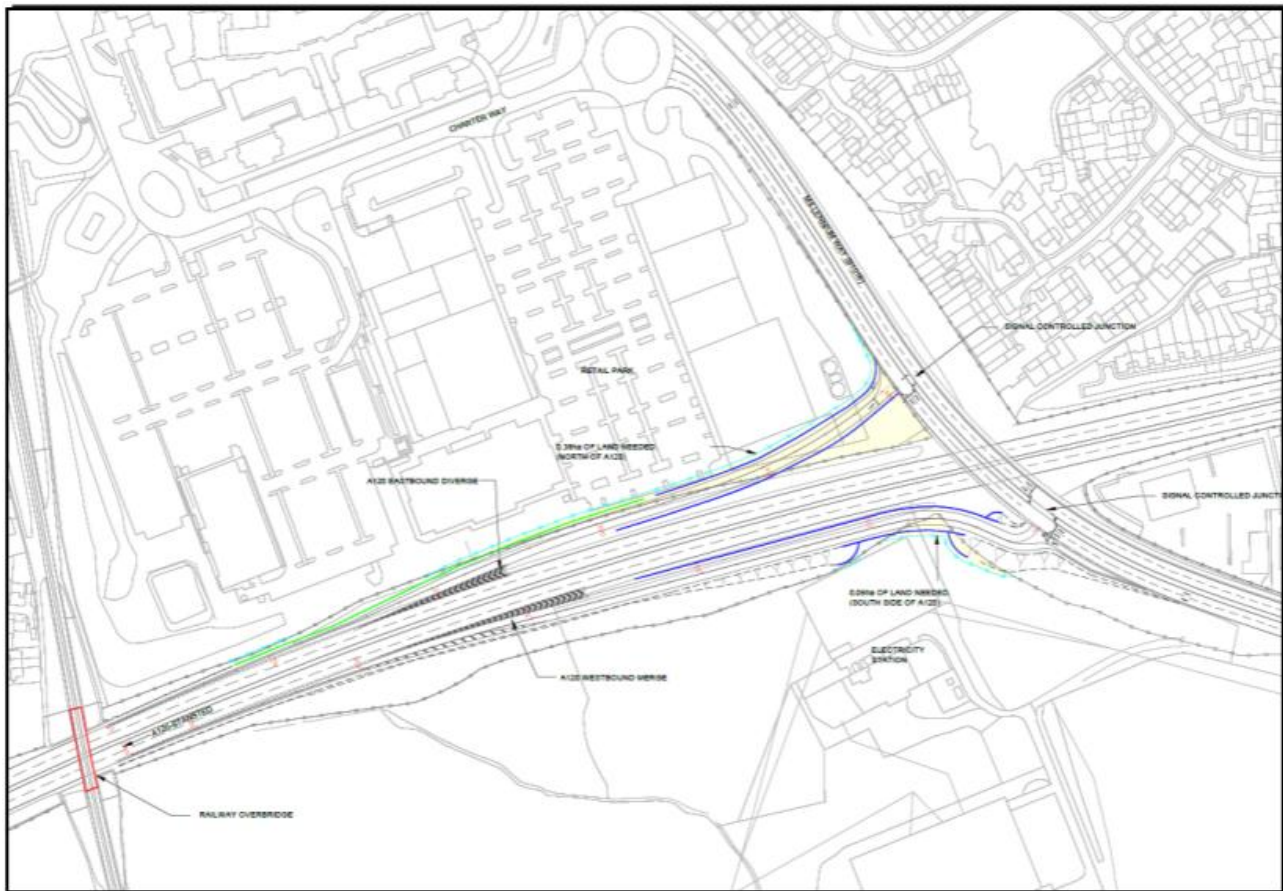


Figure 3-4: Millennium Way Slips proposals (Source: AECOM)

These improvements have the potential to not only manage future traffic growth and alleviate congestion on the strategic road network, but also to improve public transport accessibility to/from Braintree Town Centre via prioritised bus movements through the new signalised junction on Millennium Way.

Inclusion of the Millennium Way Slips in a finalised mitigation strategy will be dependent on the outcomes of further microsimulation modelling of the A120 corridor to determine an optimal arrangement of network improvements alongside developer proposals at Galleys Corner Roundabout.

3.2.3.3 Marks Farm Roundabout

Capacity improvements to Marks Farm Roundabout have been put forward as part of permitted development at Straits Mill. These are assumed to be committed and have been modelled within the reference case documented in Section 2.3 of the report.

²⁶ <https://www.essexhighways.org/a120-millennium-way>

In addition to the committed design upgrades, developer proposals to accommodate Local Plan trips associated with the Land East of Braintree site include a cost allocation for further improvements to be made to the junction. However, specific interventions have yet to be determined/disclosed at the time of writing.

No additional capacity upgrades have been considered for inclusion in the Local Plan mitigation strategy for Marks Farm Roundabout, nor have they been included in the Regulation 19 strategic modelling. However, the junction will form part of the A120 corridor to be modelled with microsimulation as part of the Pre-Submission evidence, to determine an optimal package of interventions to accommodate traffic flows through Marks Farm and Galleys Corner roundabouts.

3.2.3.4 A131 Corridor & A131/A1017 Junction at High Garrett

The A131 is a key corridor linking Braintree, Halstead and Sudbury, and regularly experiences congestion during peak periods, resulting in delays for all traffic, including bus services. Congestion is particularly noticeable through the village of High Garrett and along the A131 bypassing east of Braintree. As part of an overall Local Plan mitigation strategy, further feasibility work is proposed to identify potential measures to improve safety, network resilience and journey time reliability for all users along the corridor.

For now, specific Local Plan mitigation measures identified along the A131 corridor include proposals to redesign the signalised junction of the A131 and A1017 at High Garrett as a roundabout to better manage growth along the A131 corridor and delay on the A1017 Gosfield Road approach arm. Journeys along the A131 corridor will also benefit from possible further improvements at the Marks Farm Roundabout junction with the A120 – which will be subject to further modelling for the Local Plan Pre-Submission evidence.

3.2.3.5 Witham

With larger Local Plan sites proposed at locations away from Witham, specific highway interventions have not been identified in the town centre as part of the proposed Local Plan mitigation strategy. However, active mode proposals documented in Section 3.4.2 will provide sustainable accessibility benefits to the local population.

The mitigation strategy also acknowledges a need to undertake further feasibility work during the Local Plan period to identify additional local measures to manage future traffic volumes through Witham and reduce congestion within the town centre.

3.2.3.6 Halstead Link Road

To mitigate the increase in traffic through Halstead arising from background traffic growth and planned development, and to improve the resilience and operation of the wider A131 corridor, a Halstead Link Road is being proposed by developers of the Local Plan sites across the eastern periphery of the town. The proposed route would connect the A131 to the south of Halstead with the A1124, with onward connections feeding back into A131 to the north of the town centre.

The scheme would provide significant transport and development benefits by reducing traffic congestion within the town centre, improving access to employment areas, removing strategic through traffic and HGV movements from the High Street, and supporting the delivery of planned

housing and community infrastructure allocations identified within the emerging Braintree Local Plan. The scheme would also support sustainable growth through the delivery of associated walking, cycling and public realm improvements.

Given the scheme is essential for delivering the larger development sites in Halstead, it is expected that the link road will be funded entirely by the site developers. Figure 3-5, below, shows an indicative route for the link road as set out by the 'Land East of Halstead Highways Technical Note' (2025, Ardent Consulting Engineers).

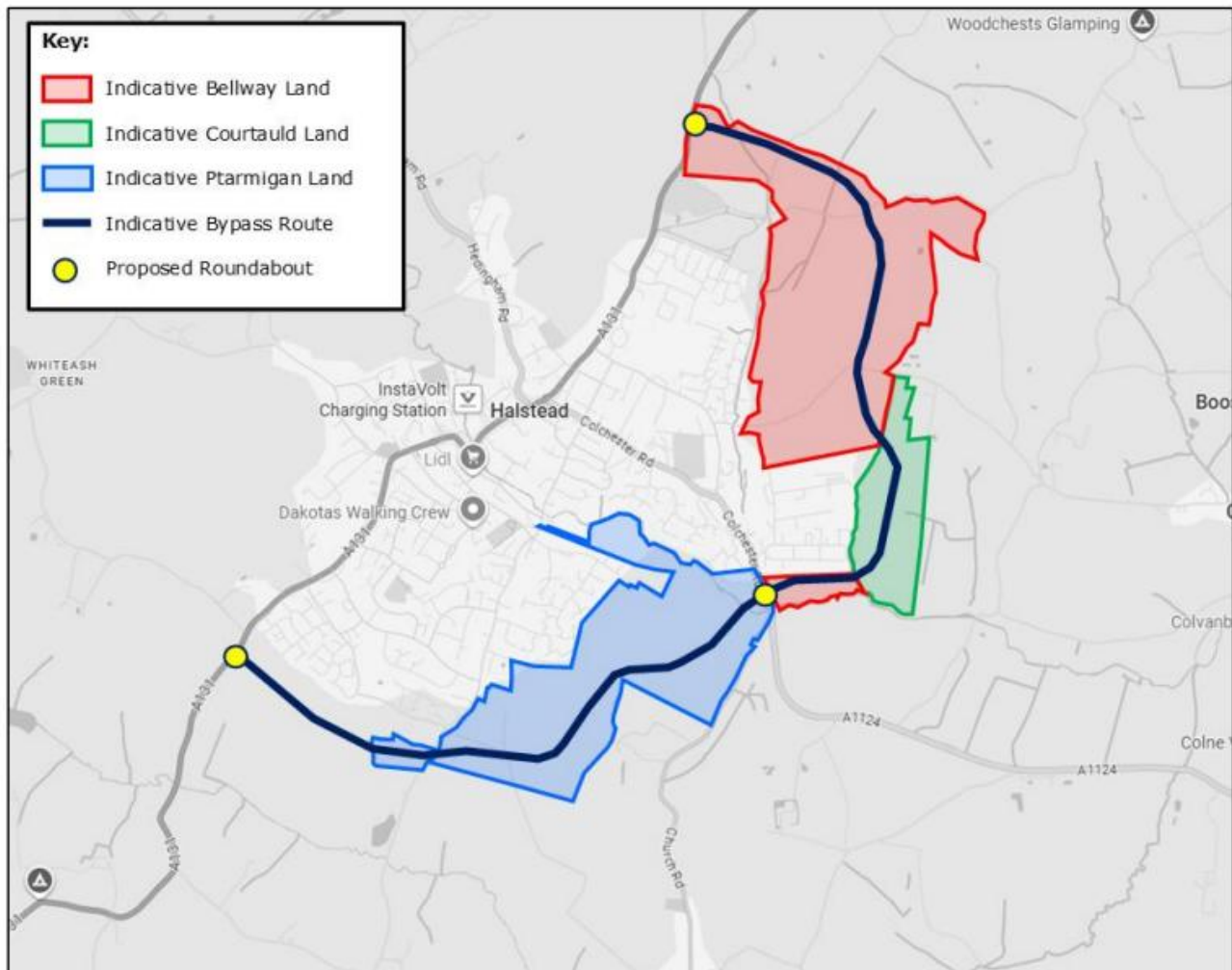


Figure 3-5: Indicative plan for the Halstead Link Road (Source: Ardent Consulting Engineers)

3.3 Public Transport

Public transport will play a fundamental role in accommodating future growth in Braintree district, providing an attractive alternative to private car travel and supporting the creation of sustainable well-connected communities.

3.3.1 Rail Improvements

Braintree has three Great Eastern mainline railway line stations providing frequent north-south connections to London, Chelmsford, Colchester and Ipswich. The Braintree railway line branches off the Great Eastern Main Line to provide services to Braintree via White Notley, Cressing, and Braintree Village. However, these services only run once an hour, limiting the capacity of the train line. Additionally, there is a station in Bures on the Gainsborough branch line which provides connections between Sudbury and Marks Tey station for onward connections to the Great Eastern Mainline.

Proposed mitigations focus on improved station accessibility and the integration of transport modes to enhance access to the rail network and support sustainable transport choices.

It is proposed to improve accessibility and safety at Braintree Town Station by introducing a one-way eastbound system along Station Approach, reducing conflicts between buses, taxis and other vehicles accessing the station and car park. Opportunities could also be explored to provide a contra-flow cycle lane along Station Approach, improving cycling connectivity to the station. In addition, enhancements to the public realm, including a new pedestrianised area and mobility hub, would help create a more attractive and accessible station environment.

Hatfield Peverel Station currently lacks bus services in its immediate vicinity, requiring passengers to walk approximately 500 metres to the nearest bus stop on The Street. The existing forecourt layout also makes it difficult for buses to turn around safely. Modifications to the forecourt would therefore be required to accommodate a suitable bus turning facility and improve integration between bus and rail services. In addition, accessibility to the station should be reviewed to identify opportunities to improve access for all users, especially those who are mobility impaired.

Both the developer of the Kings Dene site and Essex County Council's bus service improvement plan have identified the need to improve Kelvedon Station. Proposals include:

- Bridge accessibility improvements
- Additional car parking capacity
- Mobility hub enabling active modes integration with cycle parking, bus turn around, scooter hire/parking and dedicated drop off/pick up provision
- Cycle connectivity from Kings Dene site to rail station

As with Hatfield Peverel station, presently buses are unable to drop off within the station itself. Given proposals for improved bus connectivity serving Kings Dene and the station, this is considered important to provide a seamless integration between bus and rail services. Further design work should be carried out to understand the land take possibly required for the scheme, however this is

expected to be largely paid for by the developer with contributions from external sources including Network Rail along with other elements of the plans outlined above.

It is recommended that North Essex planning authorities continue to build the case for Network Rail to invest in frequency and rail capacity improvements through Transport East. Such improvements would likely fall beyond the Local Plan period but are considered important for supporting growth post-2043. Within their 'Shorter-term rail opportunities in the Transport East Region'18 report ²⁷, Transport East states that there are longer term aspirations to double track the branch line to increase service frequency and that previous business cases developed by BDC should be evaluated in light of the Local Plan review. Transport East states their next steps are to "work with local stakeholders to develop the strategic case for double tracking; and work with Network Rail to identify and assess the infrastructure requirements and other network impacts from increasing services to Braintree, such that the scheme can be ready for delivery if funding were to become available." For this Local Plan review, it has been assumed that this is a long-term aspiration and will not be in place by 2043. In place of branch line improvements, a bus alternative is proposed in the short term, which is discussed in the next section.

There will also be a future need for capacity enhancements at Liverpool Street and Stratford stations since these support national and regional growth beyond Braintree District.

3.3.2 Buses

The local bus network forms a key component of the approach to improve the integration of transport in Braintree District's key towns in order to mitigate the transport impact of growth and support sustainable travel choices. Local buses provide connectivity between residential areas, employment locations, educational facilities, healthcare services, town centres and strategic transport hubs. Alongside walking, cycling and rail, local bus services support travel to a wide range of day-to-day destinations and provide an important alternative to private car travel. As Braintree continues to grow over the Local Plan period, a reliable, accessible and attractive bus network will be required to support sustainable travel patterns, improve accessibility and contribute to wider objectives relating to congestion reduction, social inclusion and decarbonisation.

To support these objectives, provision should be made for enhancements to the local bus network, including network extensions and the introduction of new services where justified by future travel demand. Establishing high-quality public transport provision from the early phases of growth will be important in encouraging sustainable travel behaviour and reduced car dependency. In many locations, achieving an attractive level of service is likely to require revenue funding support during the period in which passenger demand develops and services mature towards long-term viability.

The scale and distribution of planned growth across the Local Plan area is likely to require a combination of enhancements to existing services and the introduction of new routes, both local and strategic, to improve access to key destinations across the wider Braintree area. The precise form of these interventions will continue to evolve as development proposals and service requirements are refined in partnership with local authorities and bus operators. Given the cross-boundary nature of several strategic travel movements, coordination with neighbouring authorities

²⁷ [Shorter-Term Rail Opportunities in the Transport East Region. Transport East, 2025.](#)

will also be required to ensure that future bus services provide effective connectivity across the wider functional area. To secure the delivery of these improvements, contributions towards bus service support will be required to fund service enhancements and network development during the early years of operation.

The Braintree branch line runs between Witham on the Great Eastern Mainline and Braintree. As the route is single track throughout there are limited opportunities to increase frequency without passing loops or double tracking. While a long-term aspiration for the route, it is unlikely that passing loops will be installed within the Local Plan period, with the cost of installation unlikely to be covered by developer contributions as it requires significant investment from Network Rail. In the interim, it is proposed to provide a shuttle bus service between Braintree Town Station and Beaulieu Park Station in Chelmsford, via Chelmer Valley Park and Ride, to improve commuter provision. Funding for this measure will be sought through S106 contributions from development in Braintree.

3.3.3 Mobility Hubs

For many areas within Braintree District, mobility hubs are proposed in accordance with the Mobility Hubs and Integrated Transport Halts guidance²⁸. The scale and typology of each hub will reflect area characteristics, whether it is an existing train or bus station/stop and its service frequency, passenger demand, surrounding land uses and wider transport connectivity.

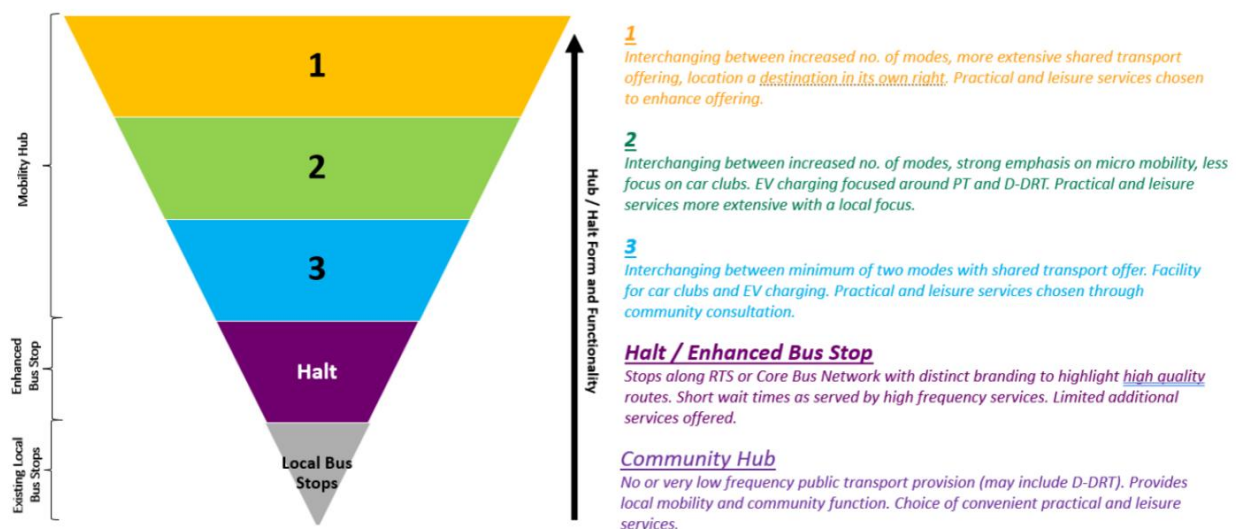


Figure 3-6: Types of mobility hubs

The proposed mobility hubs will provide a coordinated package of measures to improve integration between rail services and onward travel options, in accordance with the Mobility Hubs and Integrated Transport Halts. By creating accessible and attractive station environments, the hubs will strengthen multimodal connectivity, support sustainable travel choices and reduce dependence on private car access across the district.

Mobility hubs are proposed (subject to feasibility and engagement) at locations in line with Draft Local Plan Policy LPR 46 on Sustainable Transport which states that hubs should be of appropriate

²⁸ [Mobility Hubs and Integrated Transport Halts, ECC, September 2024.](#)

scale at neighbourhood centres, public transport interchanges or other suitable locations, and be of high-quality design and accessible. Proposed locations are as follows:

- Braintree: Rail Station
- Braintree: Springfield Industrial Estate
- Braintree: Town Centre
- Cressing: Rail Station
- Halstead: Town Centre
- Halstead: Hospital
- Halstead: Ramsey Academy
- Halstead: Bluebridge Industrial Estate
- Kelvedon: Rail Station
- Kelvedon: High Street
- Witham: Templars Primary School
- Witham: Rail Station
- Witham: Newland Street
- Hatfield Peverel: High Street
- Hatfield Peverel: Rail Station

3.4 Active Travel and Place Making

Active travel forms a fundamental component of Braintree District's integrated transport system and will play an increasingly important role in supporting sustainable growth across the Local Plan period. Walking, wheeling and cycling provide direct access to local destinations whilst also enabling seamless first and last mile connections to bus services, rail stations, community facilities, employment locations and town centres. As a result, active travel infrastructure is critical to maximising the effectiveness of the wider transport network and providing genuine travel choice for residents, workers and visitors.

There is a strong opportunity to improve network connectivity, accessibility, safety and route quality to support a greater proportion of journeys being made by active modes across Braintree District. In line with national, regional and local transport objectives, the district should seek to create a coherent and connected network that enables more trips to be undertaken by foot, by wheel or by cycle, providing choice for users whilst supporting wider health, wellbeing, place-making and environmental objectives.

Active travel infrastructure will enhance connectivity between existing communities, planned growth areas, transport interchanges and key destinations across the district. Together these

measures will support the development of attractive, accessible and inclusive streets and places, whilst strengthening integration with the wider public transport network.

A full list of active travel and placemaking mitigation measures is provided in Table E.3.

3.4.1 Integration with Land Use Planning and Place Making

Integrating active travel infrastructure with land use planning and placemaking is fundamental to delivering sustainable growth across Braintree District. The provision of high-quality walking, wheeling and cycling infrastructure alongside future development will provide residents, employees and visitors with attractive alternatives to private car travel from the outset, helping to establish sustainable travel patterns and supporting greater use of active modes for both local and strategic journeys.

This approach builds upon a strong existing policy and evidence base for active travel across Essex. The identification of active travel mitigation measures has been informed by ECC's plans for well-designed neighbourhoods. These principles promote the creation of places where day-to-day needs can be accessed conveniently by walking, wheeling and cycling, reducing dependence on private vehicle travel and supporting more sustainable patterns of movement. They seek to ensure that streets, public spaces and movement corridors are designed around people, creating connected communities that prioritise accessibility, place quality and modal choice.

The focus of the proposed mitigation measures is to provide direct, attractive and continuous connections between existing communities, planned growth locations and the wider active travel network. In particular, measures have been designed to support access to key destinations, public transport interchanges, employment areas, education facilities and local centres. LCWIPs, discussed further in Section 3.4.2, provide the strategic framework for many of these interventions and identify the longer-term active travel corridors into which new infrastructure should connect. There should be an obligation for all developments to provide a connection to the strategic LCWIP network or to a safe cycling network, where an LCWIP route is not provided.

Future development and detailed design of active travel infrastructure should be guided by Healthy Streets²⁹ principles creating streets and public spaces that are safe, attractive, inclusive and accessible for all users. By prioritising the movement of people and providing high-quality public realms, these principles support increased levels of walking, wheeling and cycling whilst delivering wider benefits relating to health, wellbeing, social interaction, environmental quality and placemaking.

3.4.2 Walking and Cycling Links

The Braintree and Witham LCWIPs provide the strategic framework for the long-term development of walking and cycling infrastructure within these towns. Additionally, Countywide LCWIPs have identified more strategic and rural linkages. The LCWIPs identify a comprehensive network of routes and interventions designed to improve connectivity, accessibility and safety for active travel, supporting both local journeys and longer strategic movements between key destinations. They

²⁹ [Healthy Streets Indicators. Healthy Streets, 2026](#)

establish a prioritised programme of investment that will, over time, deliver a coherent and connected active travel network across the district.

The continued phased implementation of the LCWIP network will be essential to realising the long-term vision and supporting sustainable travel patterns as Braintree District grows over the Local Plan period.

To support planned growth, several LCWIP corridors and associated active travel schemes have been identified for delivery through full or partial developer contributions where they provide strategic connectivity to allocated development sites. Integrating development with the LCWIP network from the outset will help ensure that walking, wheeling and cycling are viable and attractive travel options, supporting mode share aspirations and providing direct access to employment, education, transport interchanges, local centres and other key destinations across the district.

It should be noted that several LCWIP routes across the district have not undergone feasibility assessment and, as such, their deliverability remains uncertain. BDC and ECC should therefore prioritise the completion of feasibility studies ahead of planned growth to support the early identification and delivery of the required active travel infrastructure alongside development. It is also the responsibility of site promoters to ensure their developments give regard to and /or tie in with these corridors.

Given the number of site allocations along the A12 corridor in Kelvedon, Witham and Hatfield Peverel, a long-distance strategic link incorporating a mixture of proposed LCWIPs should be delivered to provide active travel access to education, employment and retail in Witham town centre or access to Witham train station with more frequent train services. This would include a main strategic route with off spurs connecting to specific development sites to provide a continuous link to the network.

It is proposed the strategic route would comprise the following:

- Countywide Cycle Link 10 (Kelvedon to Hatfield Peverel)
- Witham LCWIP 2 (Cressing Road to Station)
- Witham LCWIP 3 (linking to local development)
- Witham LCWIP 7 (Witham train station to NE Witham linking to local development)
- Connection to Hatfield Peverel Station

Additional LCWIP proposals have been recommended for further feasibility that link Local Plan development sites to key attractors. These include:

- Braintree LCWIP 2 – Route to link development in North-West Braintree to the town centre. Additional improvements could be made to Porters Field.
- Braintree LCWIP 3 – Route to link development in South-West Braintree to the town centre, should additionally tie into developer proposals for a bridge over the A120 for walking and cycling linkages.

- Braintree LCWIP 3 Extension – extension of the proposed LCWIP 3 outlined above to connect to additional development in Cressing. Also provides a link to Cressing Station.
- Braintree LCWIP 6 and 7 – Routes to provide north to centre connections and connect to developments in and around Bocking. Would also include the extension of these routes to meet development sites.

Figure 3-7 illustrates the strategic walking and cycling networks identified within the LCWIP and their relationship to other proposed active travel mitigation measures.

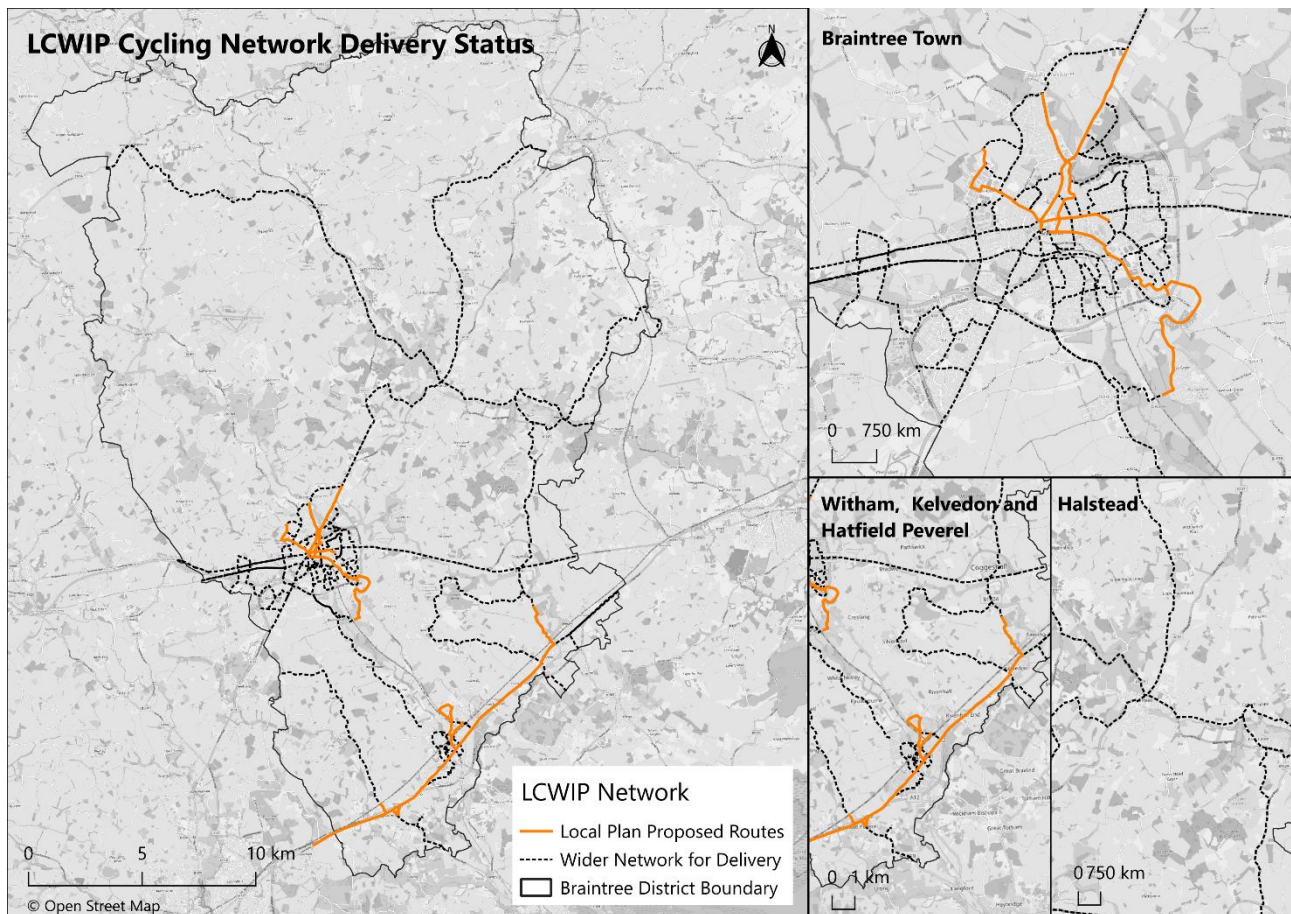


Figure 3-7: Proposed LCWIP cycling network

In addition to the strategic LCWIP corridors, complementary active travel connections have been identified to provide, safe, direct and attractive access between development areas and the wider active travel network in Halstead. These include:

- Halstead County Cycle Route (North Essex Greenway link) – section of route that is part of the North Essex Greenway proposals linking the edge of Halstead to the town centre via the Colchester Road corridor. Can provide an active mode link for local development sites north east and south of Halstead.
- Additional Halstead Routes – linkages to and from the rest of the development in Halstead to connect to the County Cycle Route, bus routes and proposed mobility hubs to establish a cross-town network for cycling.

Figure 3-8 shows the proposed Halstead connections to the strategic network, with particular emphasis on the cycling network, reflecting the wider catchment and journey distances that can be effectively served by cycling infrastructure.

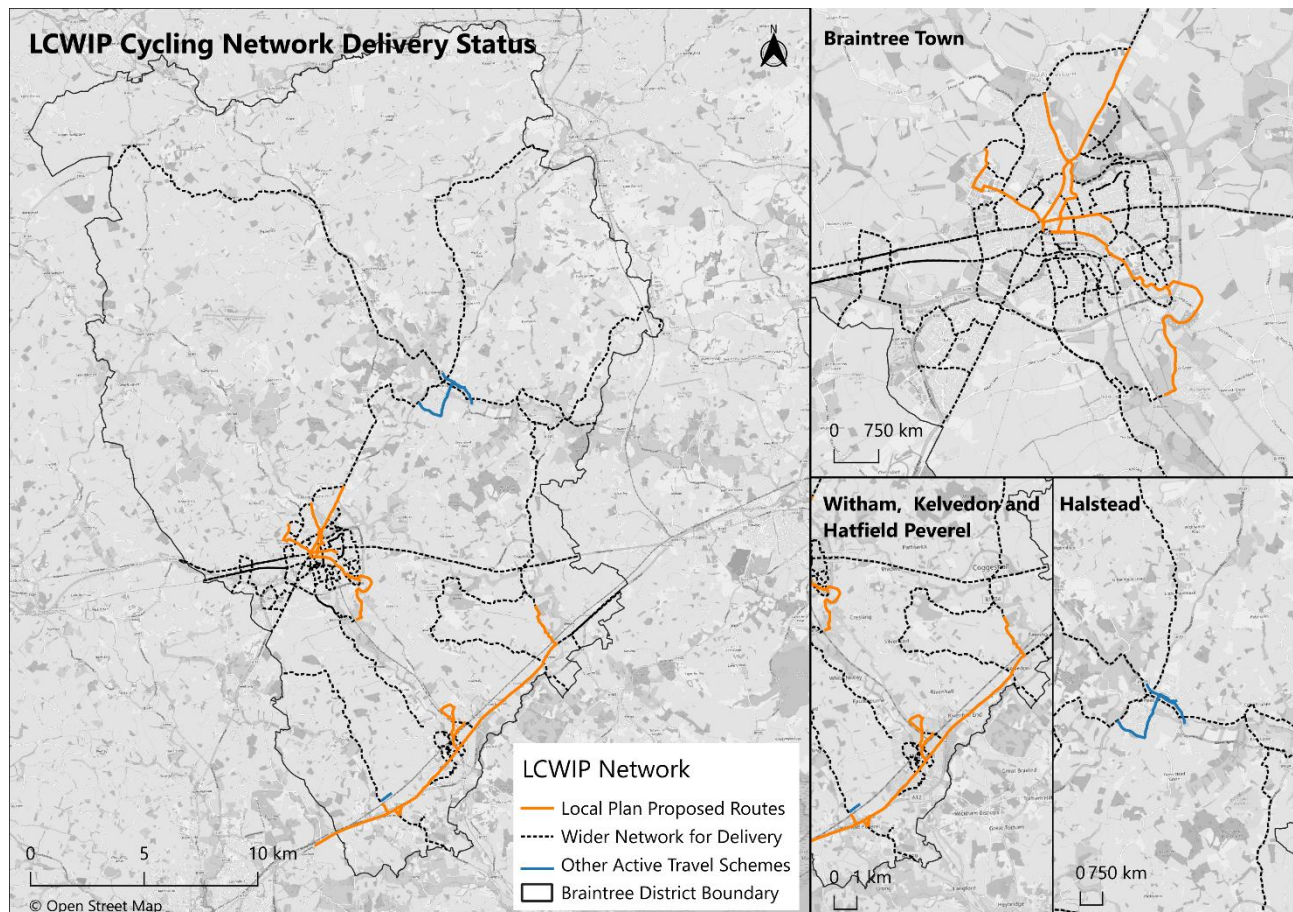


Figure 3-8: Proposed LCWIP cycling network alongside Local Plan active travel schemes

3.4.3 LCWIP Contributions

The delivery of the LCWIP network and other proposed walking and cycling routes will require investment from a range of sources over the Local Plan period. Many LCWIP schemes form part of strategic active travel corridors serving multiple development locations, existing communities and key destinations. As a result, the benefits of these routes extend beyond individual sites and support the cumulative impacts of growth.

Development should therefore contribute fairly and proportionately towards walking and cycling infrastructure, reflecting the scale of development, the level of active travel demand generated, and the extent to which a development benefits from the infrastructure delivered. This will ensure costs are evenly distributed equitably across developments, contributions pooled and coordinated to support phased delivery of the proposed network.

Opportunities should be explored to secure contributions from existing committed developments where mechanisms remain available and a clear relationship can be demonstrated between the development and the benefits of the walking and cycling route. This will broaden the funding base and reflect the cumulative nature of growth impacts.

This approach will support the delivery of the proposed LCWIP network while providing flexibility to respond to future funding opportunities to further strengthen the proposed and wider network as development phases emerge.

3.5 Conclusion

This chapter has set out a comprehensive and vision-led transport mitigation strategy to support the preferred site allocations and planned growth across Braintree to 2043. Building upon the transport challenges identified in Chapter 2, the strategy has been developed to ensure that growth is accommodated in a manner that supports the wider objectives of the emerging Local Plan, the draft LTP for Essex, and broader national and regional ambitions for growth, liveability, and place-making.

The evidence presented demonstrates that addressing the transport impacts of growth cannot be achieved through highway infrastructure alone. Instead, a coordinated package of interventions is required that integrates land use planning, active travel, public transport, mobility hubs, travel planning, highway improvements and advanced traffic management. Together, these measures are intended to influence travel behaviour, improve access to sustainable modes, enhance network efficiency and provide genuine travel choice for residents, businesses and visitors.

The chapter has identified a substantial opportunity to widen transport choices, particularly for shorter journeys where walking, wheeling, cycling and public transport can provide realistic alternatives. The proposed measures build upon existing strategies, programmes and committed schemes, whilst also establishing a framework for future investment that can evolve alongside development and technological change. Particular emphasis has been placed on strengthening connections between new and existing communities, improving access to key destinations and transport interchanges, and creating a transport network that supports healthier, more accessible and more attractive places.

Recognising the cumulative nature of growth impacts, the chapter has also established principles for fair and proportionate infrastructure delivery, funding and cost apportionment. This acknowledges that many proposed interventions provide strategic benefits across the wider council area and will require coordinated delivery through a combination of developer contributions, public sector funding and future investment opportunities.

Whilst a range of highway and traffic management interventions have been identified where necessary, the overall approach seeks to maximise the contribution of sustainable transport measures before considering the extent of further highway intervention required. In this respect, the mitigation strategy reflects a shift from a traditional capacity-led approach towards one focused on moving people and goods more efficiently, supporting sustainable travel choices and making best use of existing infrastructure.

4. Transport Assessment of Growth with Mitigation

Chapter 2 identified significant transport challenges related to reference case and proposed new Local Plan growth. Chapter 3 explained the logic for packages of integrated transport schemes to keep people and goods moving, and address gaps in multi-modal connectivity.

This chapter explains how the North Essex Model (NEMo) was set up to reflect the mitigation strategy. Scenario 3 assesses the impact of proposed new Local Plan growth with key highway mitigation using an assumption for a business as usual (BaU) level of car trips. Meanwhile Scenario 4 assesses the impact of key highway mitigation and sustainable transport (ST) measures by reducing BaU demand to a ST level of car trips.

The chapter finds that the mitigation measures are able to manage the cumulative impact of reference case and proposed new Local Plan growth. However, it will be necessary to enhance and optimise the high level scheme concepts that were tested in the model to address residual problems. The chapter references information on junction models in Appendix G which provides further detail of performance at key junctions and those outside the detailed area of modelling in NEMo. The junction models have also been used to identify and test mitigations where appropriate.

The chapter notes that in order to fund the integrated transport schemes through the planning system that incremental delivery will be required with contributions from proposed new Local Plan sites in Braintree as well as some already committed sites, which is further explained in Chapter 5.

4.1 Key findings of assessment growth with mitigation

4.1.1 Mitigation scenarios

Two mitigation scenarios have been tested within the NEMo model to understand the scale of mitigation required to address transport problems arising from proposed new Local Plan growth.

Scenario 3 uses the BaU trip demand from Scenario 2 – which includes reference case and proposed new Local Plan growth – and changes the highway transport network by adding:

- Millenium Way slip roads
- Halstead Link Road
- Kings Dene developer proposed A12 junction and link road
- Braintree station access improvements: one way system from east to west
- Traffic signals improvement at junction A131 Halstead Road/A1017 Braintree Road

It should be noted that the above list includes only measures tested in the NEMo model. Further options for junction schemes have been identified in Chapter 3 and assessed using local junction modelling, which is described in Appendix G.

Meanwhile, Scenario 4 applies modest reductions to the BaU car trip demand to reflect the impact of ST measures not able to be reflected in NEMo. The reduction method, which is described in Section 4.3, considers the geography and distance of car trips so a proportion of those able to be undertaken by sustainable transport are allowed to switch modes. While Scenario 3 is run with VDM, Scenario 4 is run as a fixed assignment model to control the amount of car trips based on the sustainable transport mitigation available for each area. The ST demand in Scenario 4 takes into account the reduction in car trips coming from schemes that are not accounted for in the Scenario 3 model and includes:

- Enhanced bus services
- Mobility hubs and improved rail access
- Comprehensive active travel infrastructure
- Travel planning and behaviour change measures

4.1.2 Summary findings

As explained in subsection 2.2.3, the movement performance of the scenarios in NEMo involves calculating an index score, which combines indicators for queueing, speed and capacity, for areas of interest where the greatest impact is expected. Table 4-1 and Table 4-2 show the movement index scores and acceptability for Scenarios 1-4. The movement performance is depicted on a coloured scale 1-15, whilst concern over the level of change is denoted as passable ✓, caution !, or unsatisfactory ✗. The acceptability of performance across Scenarios 2, 3 and 4 is assessed against Scenario 1, the forecast reference case.

In the AM peak, Table 4-1 shows that the average movement score returns to 6 in Scenario 3 indicating that overall conditions return to reference case levels. Extreme congestion problems have been avoided but, as shown in Table 4-2, movement performance at Millenium Way and London Road / Pierrerrfitte Way is still considered unacceptable. In Scenario 4 with ST demand, the London Road / Pierrerrfitte Way problem reduces to being an area caution.

In the PM peak, average movement score remains at 7 in Scenario 3 but reduces to the reference case level of 6 in Scenario 4 as a result of ST measures. Extreme congestion, however, does persist at Galleys Corner in both scenarios leading to an assessment of unacceptable performance.

Table 4-2 indicates residual problems at locations where unsatisfactory and caution flags remain. However, NEMo has only partly reflected the mitigation strategy and, for the schemes that have been included, only initial high-level concepts were available which can be improved upon. Therefore, it is considered that there is sufficient evidence to conclude that the integrated package of highway and sustainable transport measures will be able to manage the transport impact of growth.

The next section explores Scenarios 3 and 4 in more detail and presents speed and relative queue plots.

Table 4-1: Movement index scores for scenarios 1-4

ID	Location	AM peak rating				PM peak rating			
		Sc1: 2043 ref case	Sc2: 2043 LP no mit	Sc3: 2043 LP mit BaU	Sc4: 2043 LP mit ST	Sc1: 2043 ref case	Sc2: 2043 LP no mit	Sc3: 2043 LP mit BaU	Sc4: 2043 LP mit ST
1	Halstead	6	7	7	6	6	6	6	6
2	High Garrett	6	7	7	6	6	6	6	6
3	Broad Rd / A131	7	7	7	7	6	6	6	6
4	Coggeshall	6	6	6	6	5	5	5	5
5	Marks Farm rbt	7	8	9	9	6	7	7	7
6	Galleys Corner rbt	13	15	7	7	15	15	15	14
7	Millenium Way	2	8	7	7	3	3	6	6
8	Rayne Rd / Pods Brook Rd	4	5	5	4	11	11	9	9
9	Rayne Rd / Pierrefitte Way	9	9	9	9	11	12	12	11
10	London Rd / Pierrefitte Way	9	10	10	10	10	10	10	10
11	Coggeshall Rd / Railway St	3	4	4	4	4	5	5	4
12	Rose Hill / Railway St	10	10	9	9	11	11	10	10
13	Hatfield Peverel	7	7	7	7	6	7	7	7
14	Hatfield Rd / Howbridge Rd	9	9	9	9	7	10	9	7
15	Kelvedon	6	6	5	5	5	6	6	5
16	B1018 / The Avenue	6	7	7	6	5	5	5	5
17	London Rd / Coggeshall Rd	3	4	2	2	2	3	2	2
18	A131 / London Rd	3	3	3	3	3	3	4	3
19	Andrewsfield	1	1	1	1	2	2	2	2
20	Pattiswick	7	7	7	7	6	6	6	6
21	South Haverhill	1	1	1	1	1	1	1	1
Overall assessment combining all areas		6	7	6	6	6	7	7	6

Key to movement scale and acceptability of change

More or less free flow				Travelling slower		Moderate congestion			Substantial congestion		
1	2	3	4	5	6	7	8	9	10	11	12
Extreme congestion				Acceptability of change							
13	14	15	Passable ✓				Caution !		Unsatisfactory ✗		

Table 4-2: Movement index acceptability for scenarios 1-4

ID	Location	AM peak impact				PM peak impact			
		Sc1: 2043 ref case	Sc2: 2043 LP no mit	Sc3: 2043 LP mit BaU	Sc4: 2043 LP mit ST	Sc1: 2043 ref case	Sc2: 2043 LP no mit	Sc3: 2043 LP mit BaU	Sc4: 2043 LP mit ST
1	Halstead	6	!	!	✓	6	!	!	!
2	High Garrett	6	!	!	✓	6	!	!	!
3	Broad Rd / A131	7	✓	✓	✓	6	✓	✓	✓
4	Coggeshall	6	✓	✓	✓	5	!	!	!
5	Marks Farm rbt	7	!	!	!	6	!	!	!
6	Galleys Corner rbt	13	✗	✓	✓	15	✗	✗	✗
7	Millentum Way	2	✗	✗	✗	3	✓	!	!
8	Rayne Rd / Pods Brook Rd	4	!	!	✓	11	✗	✗	✗
9	Rayne Rd / Pierrefitte Way	9	!	!	!	11	✓	✓	✓
10	London Rd / Pierrefitte Way	9	✗	✗	!	10	!	!	!
11	Coggeshall Rd / Railway St	3	✓	✓	✓	4	!	!	✓
12	Rose Hill / Railway St	10	!	✓	✓	11	✗	!	!
13	Hatfield Peverel	7	✓	✓	✓	6	!	!	!
14	Hatfield Rd / Howbridge Rd	9	!	!	!	7	✗	!	✓
15	Kelvedon	6	✓	✓	✓	5	!	!	!
16	B1018 / The Avenue	6	!	!	✓	5	!	!	!
17	London Rd / Coggeshall Rd	3	✓	✓	✓	2	!	✓	✓
18	A131 / London Rd	3	✓	✓	✓	3	✓	✓	✓
19	Andrewsfield	1	✓	✓	✓	2	✓	✓	✓
20	Pattiswick	7	✓	✓	✓	6	✓	✓	✓
21	South Haverhill	1	✓	✓	✓	1	✓	✓	✓
Overall assessment combining all areas		6	7	6	6	6	7	7	6

Key to movement scale and acceptability of change

More or less free flow			Travelling slower			Moderate congestion			Substantial congestion		
1	2	3	4	5	6	7	8	9	10	11	12
Extreme congestion			Acceptability of change								
13	14	15	Passable ✓			Caution !			Unsatisfactory ✗		

4.2 Scenario 3 performance

The movement index scores in Table 4 2 show that average network performance has a score of 7 in both peak periods in the assessment case without mitigation (Scenario 2). In the assessment case with mitigation using BaU car demand, the average index score lowers to the reference case score of 6 in the AM peak but stays at 7 in the PM.

The most significant improvement in the AM peak is observed at Galleys Corner Roundabout, which was identified as the primary network constraint in Scenario 2. The AM peak movement score improves from 15 to 7, changing from unsatisfactory in the reference case to passable in the assessment case. The scale of improvement in the AM peak reflects the benefits of the proposed A120 Millennium Way slips scheme, which provides a more direct connection to the strategic road network and reduces the need for traffic to route through Galleys Corner.

Change in movement scores in other areas, however, are slight. Furthermore, some junctions continue to experience congestion under forecast growth conditions. Marks Farm Roundabout remains moderately congested, with scores of 9 in the AM peak and 7 in the PM peak, whilst Rayne Road / Pierrefitte Way continues to operate within the substantial congestion range despite a slight improvement in the PM peak. These locations remain sensitive to future growth and may require ongoing monitoring as development comes forward.

The speed ratio and queue difference plots in Figure 4 1, Figure 4 2, Figure 4 3 and Figure 4 4 show that compared to the assessment case without mitigation (Scenario 2) that the highway mitigation that has been included in the model (Scenario 3) improves movement overall. In the AM and PM peaks there are improvements in speed and queue reduction along routes connecting Braintree with the A120 and A12 corridors, particularly around the proposed Millennium Way slip roads and links serving the Rivenhall and Kelvedon area.

The improvements at Kelvedon and Feering that are seen in the plots, while not significant enough to move the movement index score, arise from the Kings Dene access and link changes, which indicates that growth at this location is being managed.

Local junction modelling has also been carried out which explores performance in more detail at key junctions alongside additional mitigation suggestions. This evidence is provided in Appendix G.

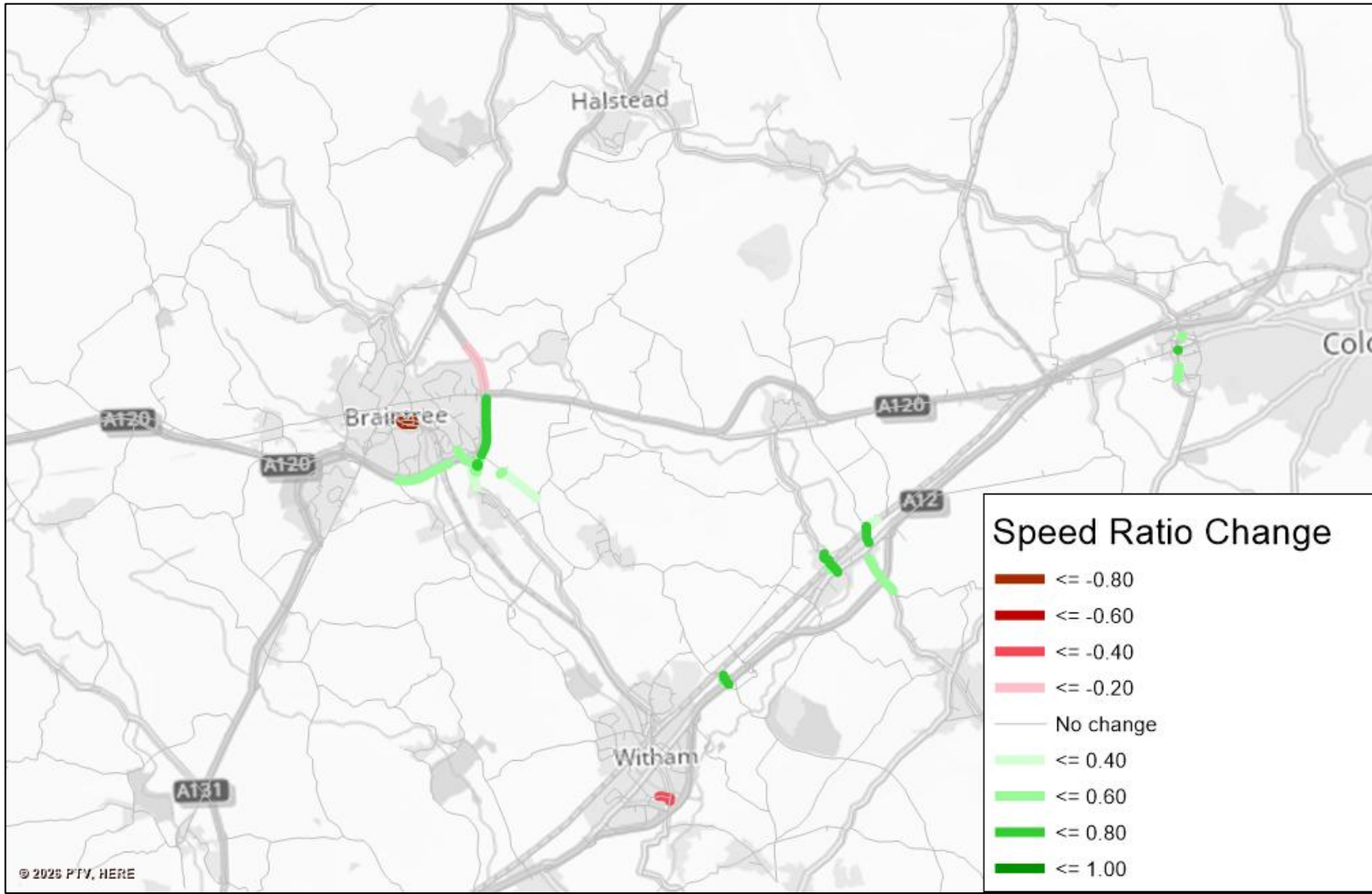


Figure 4-1: AM Speed ratio difference – 2043 Scenario 3 vs 2043 Scenario 2

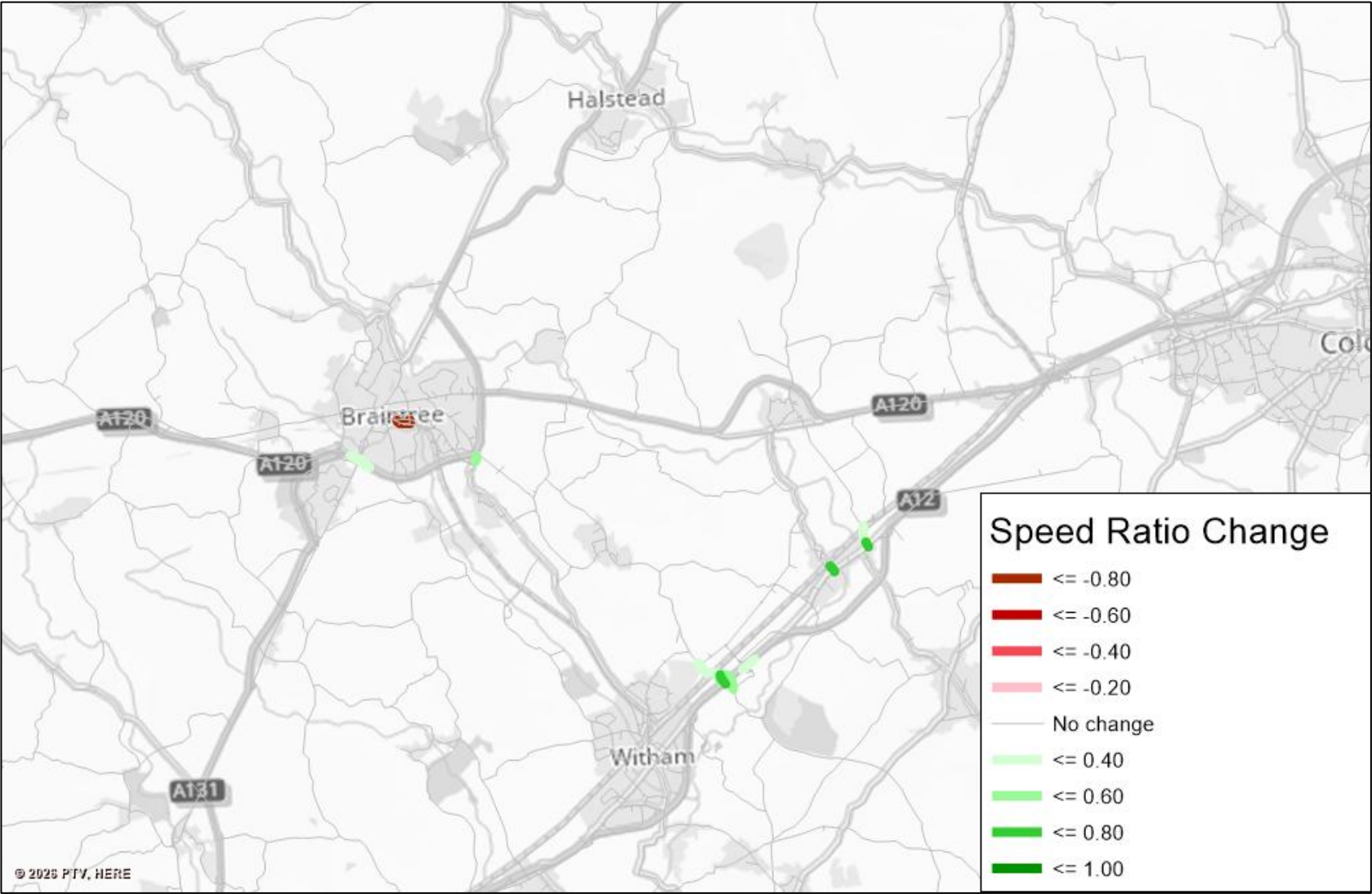


Figure 4-2: PM Speed ratio difference – 2043 scenario 3 vs 2043 scenario 2

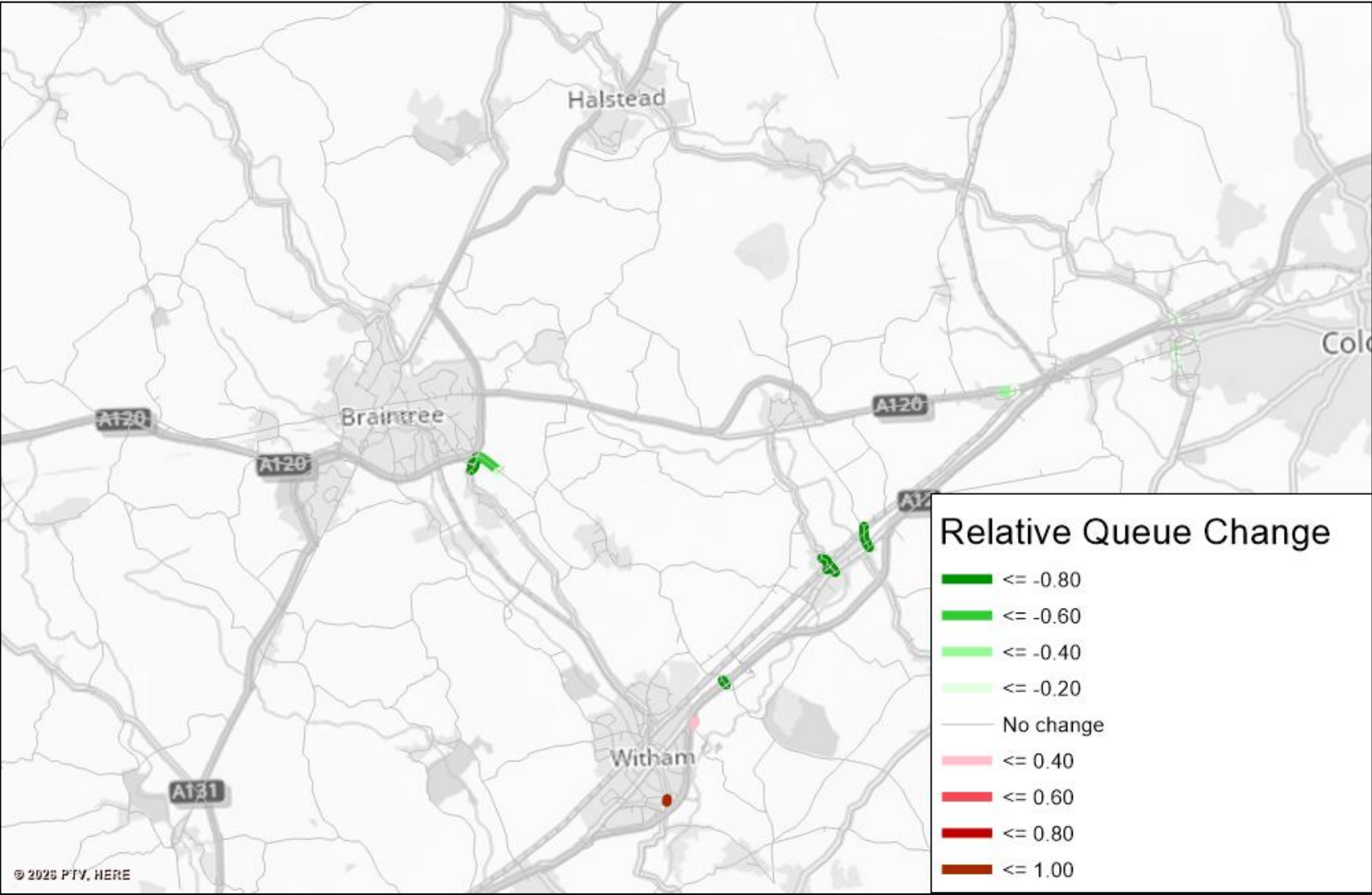


Figure 4-3: AM Relative queue difference – 2043 scenario 3 vs 2043 scenario 2

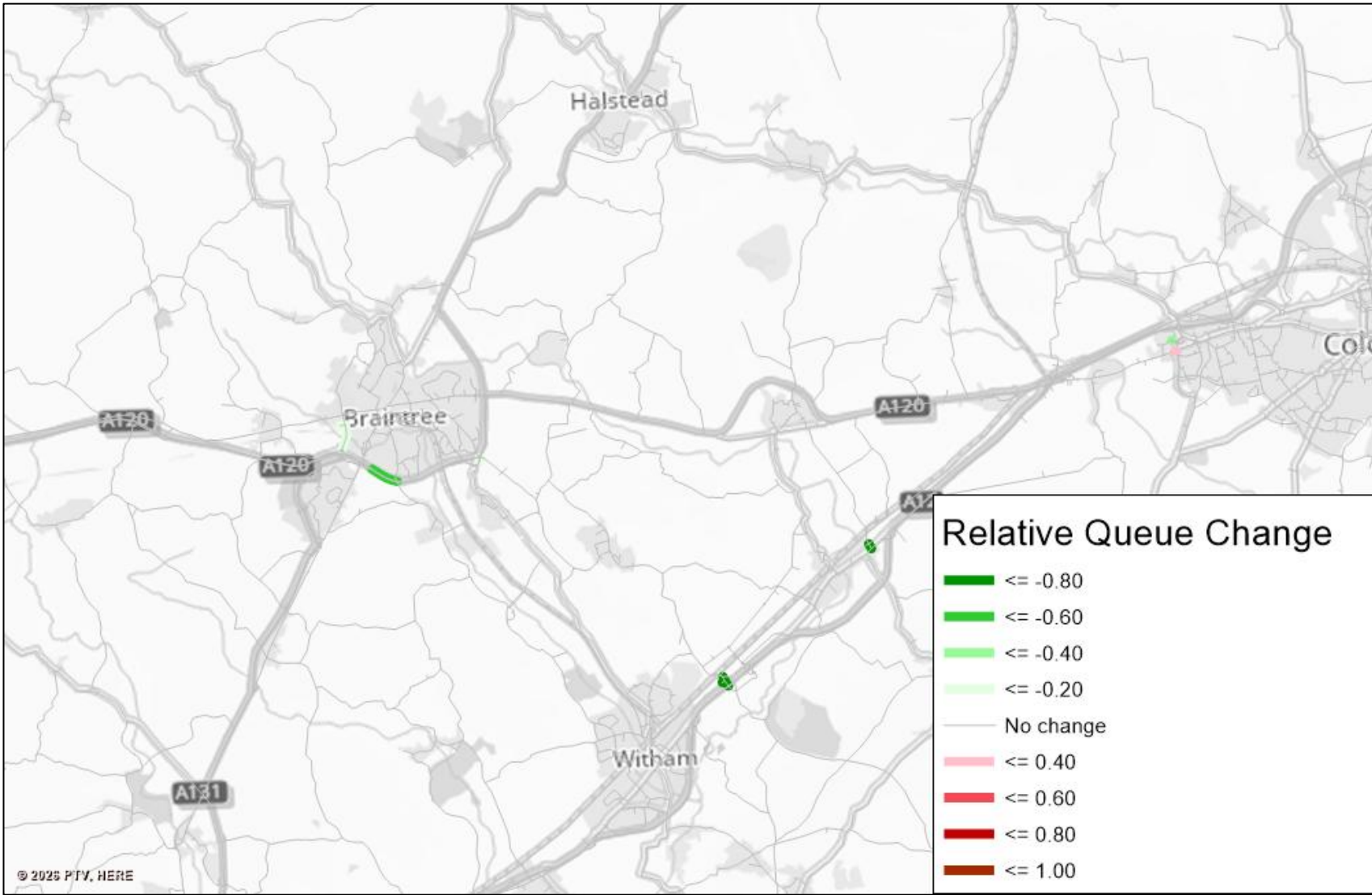


Figure 4-4: PM Relative queue difference – 2043 scenario 3 vs 2043 scenario 2

4.3 Scenario 4 performance

4.3.1 Sustainable transport demand

In Scenario 4, the highway and public transport network changes are retained, however, the amount of car trips is reduced slightly to reflect increased uptake of walking, cycling and public transport.

To calculate the sustainable transport reductions, the sustainable schemes described in Chapter 3 have been mapped against the NEMo zones. Based on the location of the sustainable schemes, the model zones in scope for mode shift via each sustainable travel mode were identified. A single model zone can be in scope for mode shift via more than one sustainable travel mode, e.g. bus and cycle. The trips in scope for mode shift via each sustainable travel mode were then isolated using distance filters (longer distance trips are eligible to shift to rail, whereas short distance trips are eligible to shift to cycling, walking or bus).

Different factors were used to calculate the potential trip reduction for different zone-to-zone movements. These factors were dependent on urban/ rural classification of the zones and the amount of development in each zone. For example, lower factors were used for movements between rural zones to reflect the lower likelihood of shifting away from car travel. Similarly, lower factors were used for movements to and from zones with less development to reflect the lower likelihood of change. It has been assumed that both existing trips and development trips have the potential to shift to sustainable modes, however, lower factors have been used for existing trips to reflect the lower likelihood of change.

The trips shifting to sustainable modes have been removed from the trip matrices to create an adjusted demand for both “car commute” and “car other” purposes. It has been assumed that the “car employers’ business” will not be affected by mode shift. The total number of trips removed from the demand matrices are shown in Table 4-3 below. No further changes to the network with mitigations were assumed for this scenario.

Table 4-3: Sustainable travel trip reductions

Demand Segment	AM Peak	PM Peak
Car Commute	1,325 (0.72%)	1,069 (0.66%)
Car Other	1,430 (0.95%)	2,048 (0.92%)

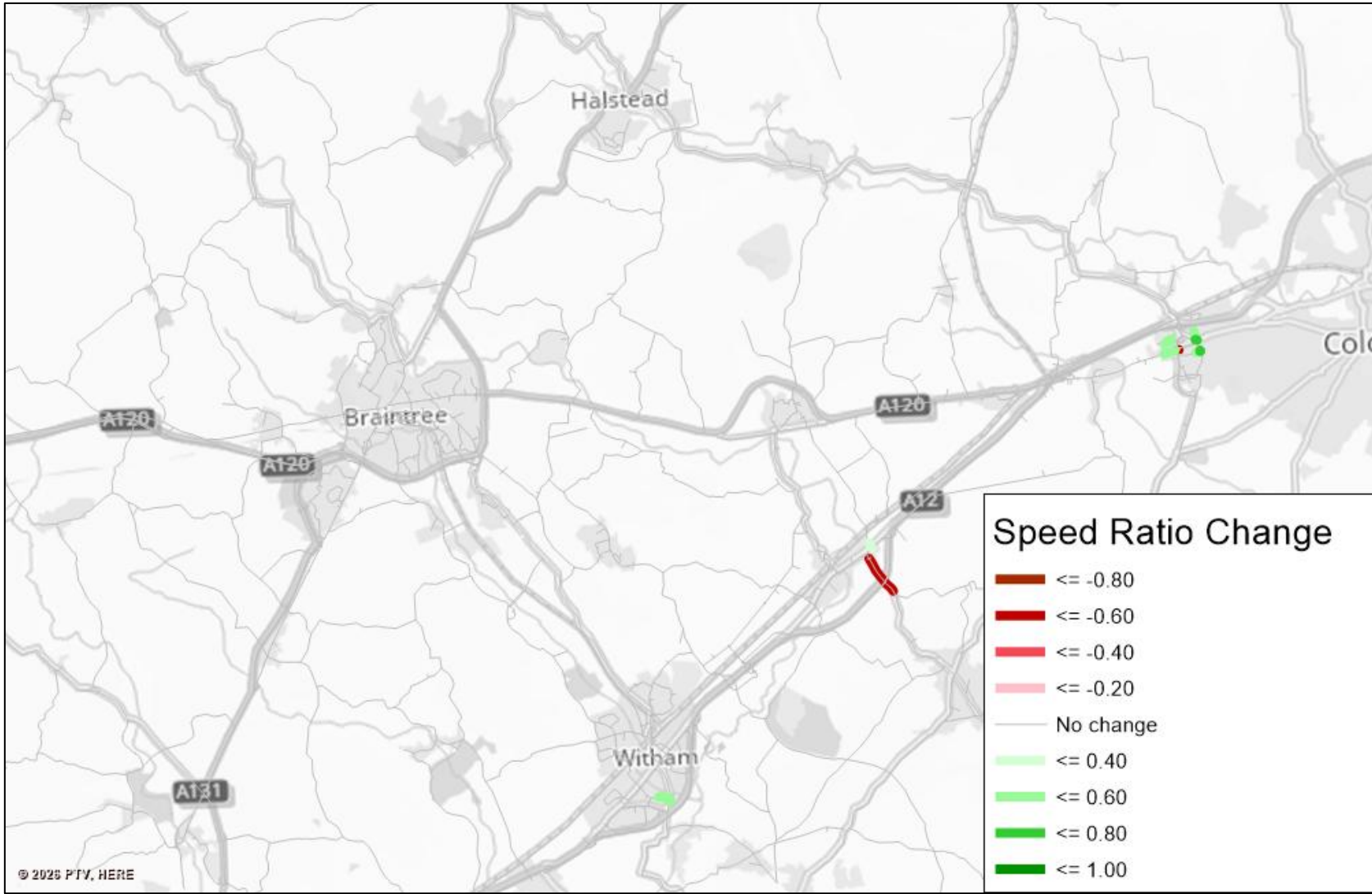


Figure 4-5: AM Speed ratio difference - 2043 Scenario 3 vs 2043 Scenario 2

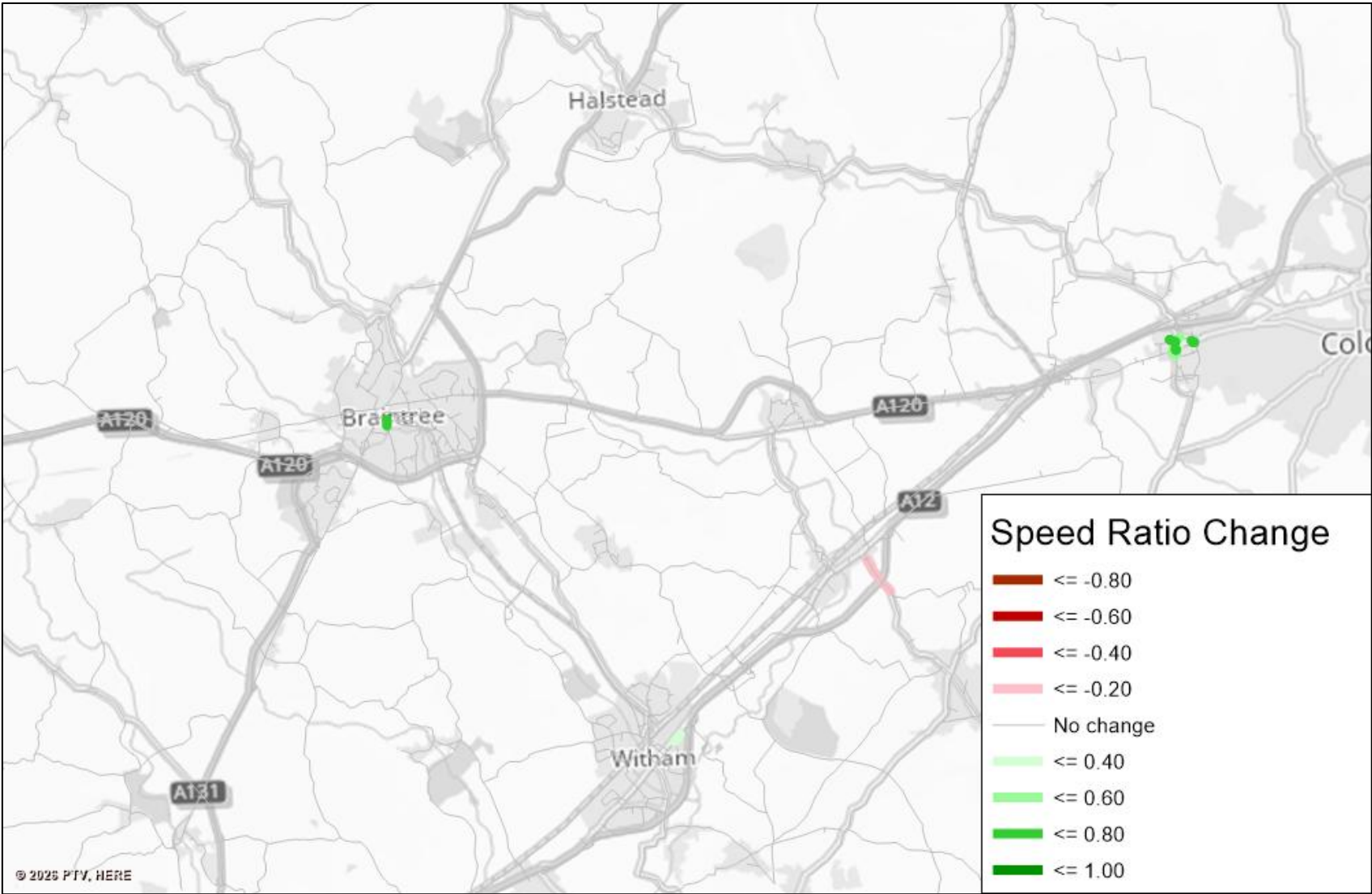


Figure 4-6: Speed ratio difference - 2043 Scenario 3 vs 2043 Scenario 2

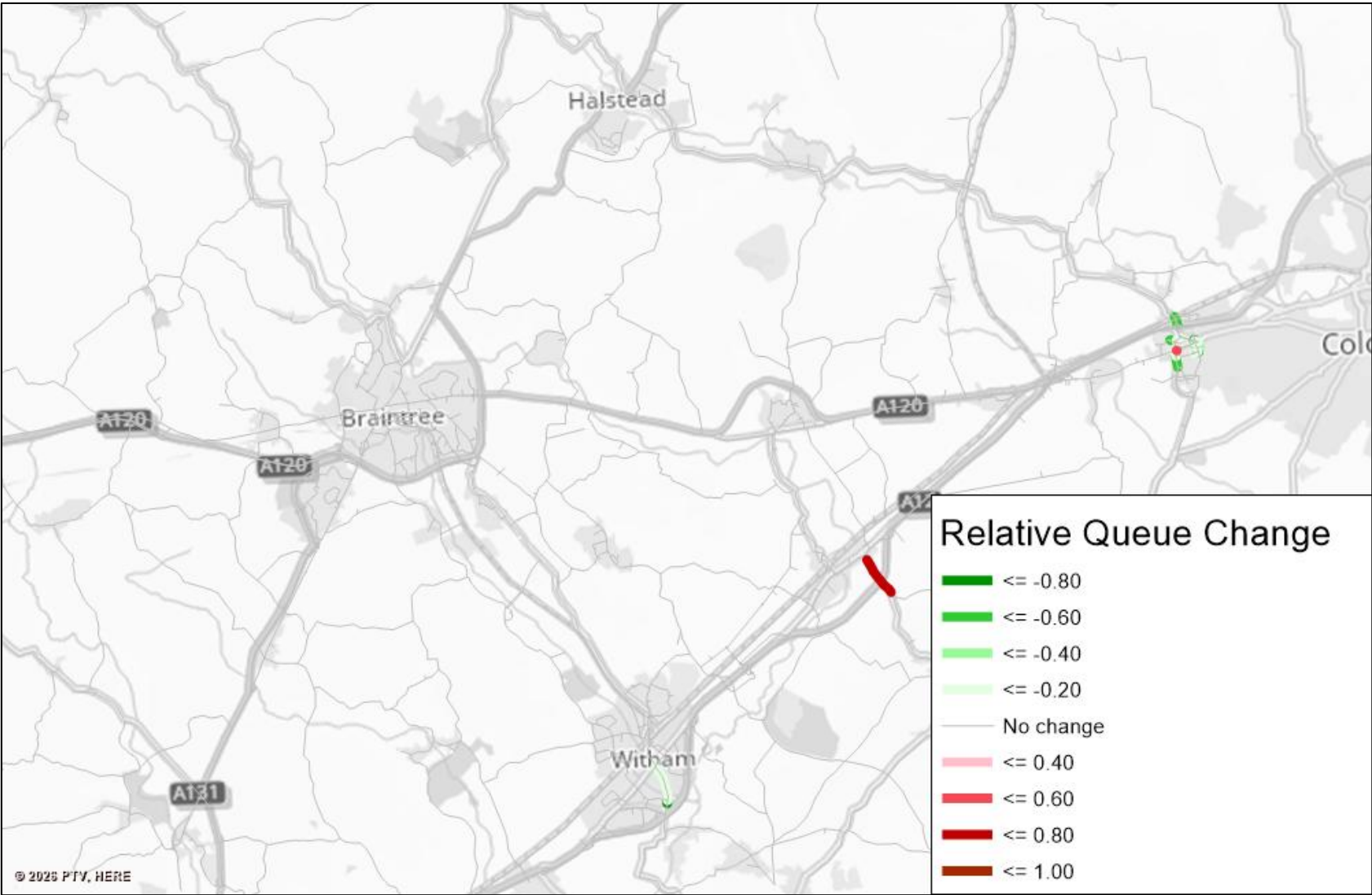


Figure 4-7: AM Relative queue difference - 2043 Scenario 3 vs 2043 Scenario 2

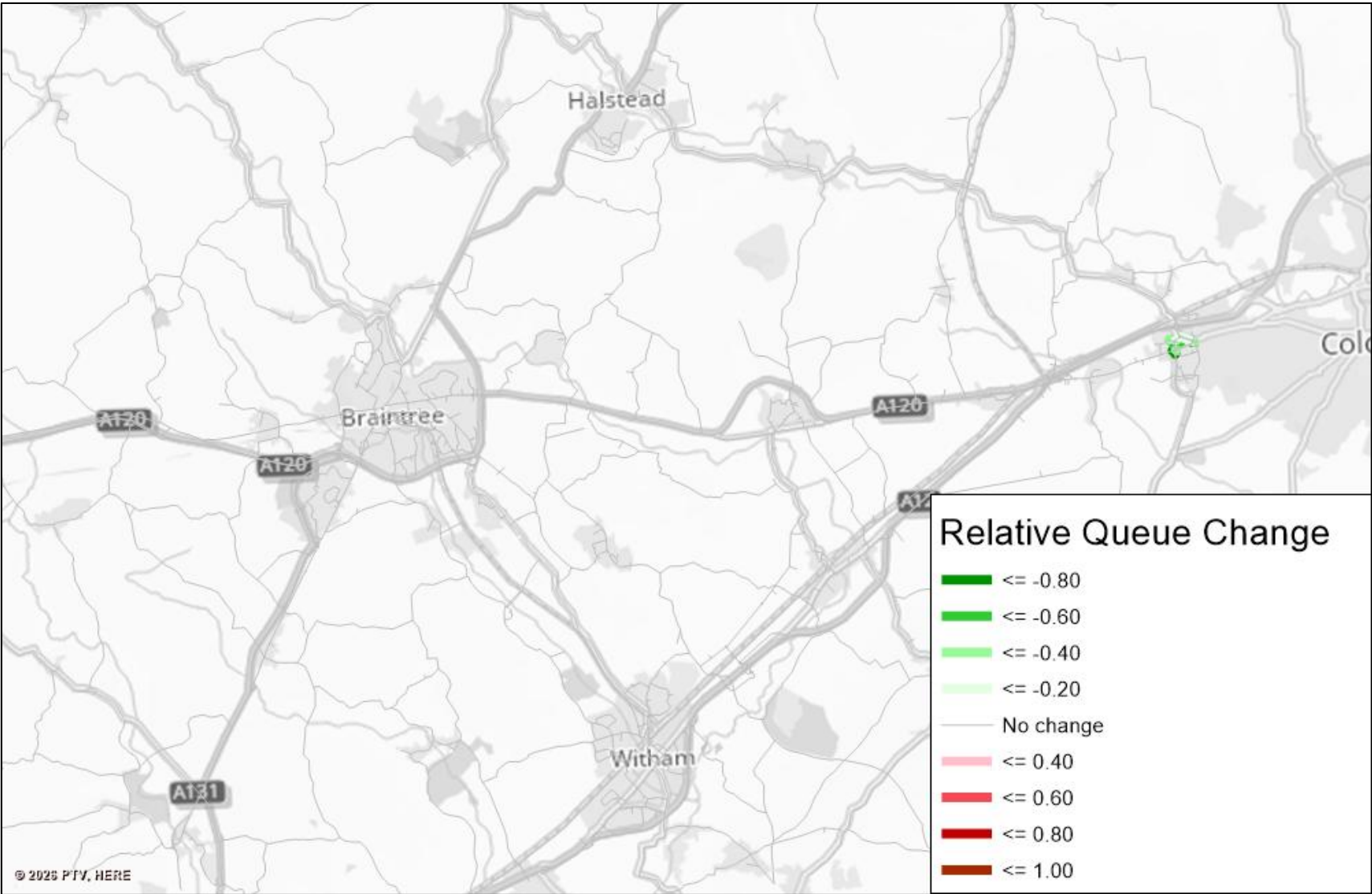


Figure 4-8: PM Relative queue difference - 2043 Scenario 3 vs 2043 Scenario

4.3.2 Performance

The average overall movement index scores in the end row of Table 4 2 show that overall network performance in both the AM and PM peaks improves from a score of 7 in the assessment case without mitigation (Scenario 2) to 6 in the assessment case with highway and ST mitigation (Scenario 4). This returns overall movement index scores to reference case levels (Scenario 1).

The speed and relative queue plots indicate that the highway interventions continue to deliver the majority of network benefits, while the sustainable transport measures provide targeted improvements at several locations and help further reduce traffic demand on the local highway network.

Compared with the assessment case without mitigation, the most significant benefit continues to be observed at Galleys Corner Roundabout, where the AM peak movement score improves from 15 to 7 and the PM peak score improves from 15 to 14.

When compared directly with Scenario 3, the movement score index identifies modest but positive improvements at a number of locations. In the AM peak, Halstead, High Garrett and B1018 / The Avenue improve from a score of 7 to 6, returning these junctions to conditions comparable with the reference case. In the PM peak, the most notable improvement occurs at Hatfield Road / Howbridge Road, where the movement score reduces from 9 to 7. A smaller improvement is also observed at Rayne Road / Pierrefitte Way, where the score reduces from 12 to 11. These changes indicate that even relatively modest reductions in vehicle demand can provide operational benefits at junctions operating close to capacity.

The speed ratio and queue difference plots in Figure 4 5, Figure 4 6, Figure 4 7 and Figure 4 8 show that the introduction of sustainable transport measures results in limited changes, only showing a reduction of speed in the PM peak near Braintree town centre.

4.4 Conclusion

This chapter has presented findings from NEMo tests of proposed new Local Plan growth with key highway mitigations with two levels of car trip demand: business as usual (BaU) demand in Scenario 3 and sustainable transport (ST) demand in Scenario 4. The latter reflects the impact of highway mitigation alongside sustainable transport measures, which contribute to mitigating highway impacts but also support multi-modal connectivity.

It is recognised that the full set of highway mitigations described in Chapter 3 has not been able to be included in NEMo as concept designs are not yet available. In addition, the schemes that have been included would likely be improved and optimised if they were to be taken forward to a design stage.

By comparing Scenario 4 with Scenario 2 (assessment case without mitigation) in the movement index, it is shown that average movement performance at key location across the district return to the level seen in the reference case (Scenario 1). However, some residual problems remain, particularly at Galley's Corner in the PM peak. In addition, the impact of developments along the A12 corridor including those at Hatfield Peverel and Kelvedon would require further mitigation to that include in NEMo.

Comparing Scenarios 3 and 4 indicate that the highway interventions continue to deliver the majority of network benefits, while the sustainable transport measures provide targeted improvements at several locations and help further reduce traffic demand on the local highway network.

Taking into account only partial mitigation has been modelled, it is considered that the NEMo tests of Scenario 3 and 4 provide sufficient evidence to conclude that the integrated package of highway and sustainable transport measures would be able to manage the transport impact of growth. Local junction modelling has also been carried out, shown in Appendix G, which explores performance in more detail at key junctions alongside additional mitigation suggestions.

5. Conclusion: Looking Forward

This report has assessed the cumulative transport impacts of committed growth, neighbouring authority growth and the proposed Regulation 19 Local Plan allocations to 2043. Using the North Essex Model (NEMo) and complementary junction modelling, the assessment has examined the scale of transport challenges arising from growth and the effectiveness of a vision-led mitigation strategy designed to support sustainable development.

The findings demonstrate that transport challenges are already emerging as a result of committed and background growth, which put additional pressure on the strategic A12 and A120 corridors, and on the Great Eastern mainline railway. Whilst the Regulation 19 Local Plan increases these pressures, the modelling assessment concludes that growth can be managed through a coordinated package of highway improvements, public transport investment, active travel measures and behavioural change initiatives.

The conclusion summarises findings and explains requirements for reference case and proposed new Local Plan sites to contribute to integrated transport improvements necessary to manage growth. Strategic investment via National Highways and Network Rail is also recommended to support the plan to 2043 and secure sustainable growth beyond.

5.1 Summary of Findings

5.1.1 Strategic modelling findings

The emerging plan identifies site to meet the housing requirement of 19,261 new dwellings during the plan period 2026 to 2043. There is a committed supply of 4,336 dwellings, consisting of sites under construction or with extant planning permission. There is also a capacity of 2,905 dwellings on allocated sites from the adopted 2033 Local Plan to be carried forward and a windfall projection of 975 dwellings. Within the emerging plan, new allocations are identified which can deliver a total of 11,082 dwellings within the plan period and a total of 4,110 beyond the plan period.

NEMo, which as a base year of 2023, has been used to assess new Local Plan growth with and without mitigation by comparing it against a reference case of growth which would be expected to occur without the new Local Plan. The reference case growth of 11,310 homes and 3,336 jobs includes growth from 2023-2026 as well as growth to 2043. The new Local Plan assessment scenarios add an additional 11,904 homes and 6,674 jobs on top of the reference case.

The four NEMo scenarios are:

1. Scenario 1 – reference case growth without new Local Plan mitigation (though it does include committed mitigations)
2. Scenario 2 – assessment case growth without mitigation, in which proposed new Local Plan growth is added on top of reference case growth and no mitigation is added to that included in the reference case. Business as usual (BaU) trip demand is assumed.

3. Scenario 3 – assessment case growth with mitigation, in which key highway mitigations are added to Scenario 2. Trip demand is based on the BaU assumption used in Scenario 2.

4. Scenario 4 – assessment case growth with mitigation and reduced car demand to reflect sustainable transport (ST) mitigation not accounted for in Scenario 3. This scenario replaces BaU trip demand with ST trip demand.

Since concepts for all highway mitigations are not yet available only the following key highway mitigation were included in Scenario 3:

- Millenium Way slip roads
- Halstead Link Road
- Kings Dene developer proposed A12 junction and link road
- Braintree station access improvements: one way system from east to west
- Traffic signals improvement at junction A131 Halstead Road/A1017 Braintree Road

Meanwhile, Scenario 4 applies modest reductions to the BaU car trip demand to reflect the impact of ST measures not able to be reflected in NEMO. The reduction method considers the geography and distance of car trips so a proportion of those trips able to be undertaken by sustainable transport are allowed to switch modes. The ST demand in Scenario 4 takes into account the reduction in car trips coming from schemes that are not accounted for in the Scenario 3 model and includes:

- Enhanced bus services
- Mobility hubs and improved rail access
- Comprehensive active travel infrastructure
- Travel planning and behaviour change measures

A movement index has been used to objectively assess each of the scenarios. The movement index scores for the AM and PM peak periods are shown in Table 5-1 and Table 5-2, respectively.

Modelling demonstrates that, when proposed Local Plan growth is added to background growth in Braintree District, it is added to a transport network that is already experiencing significant operational pressure in several locations. Unsurprisingly, this results in further deterioration in movement conditions and extends existing transport challenges.

By comparing Scenario 4 with Scenario 2 (assessment case without mitigation) in the movement index, it is shown that average movement performance at key location across the district return to the level seen in the reference case (Scenario 1). However, some residual problems remain, particularly at Galley's Corner in the PM peak. In addition, the impact of developments along the A12 corridor including those at Hatfield Peverel and Kelvedon would require further mitigation to that include in NEMO.

Table 5-1: AM peak movement index scores for base and scenarios 1-4

ID	Location	AM peak movement index ratings				
		2023 base	Sc1: 2043 ref case	Sc2: 2043 LP no mit	Sc3: 2043 LP mit BaU	Sc4: 2043 LP mit ST
1	Halstead	5	6	7	7	6
2	High Garrett	1	6	7	7	6
3	Broad Rd / A131	8	7	7	7	7
4	Coggeshall	5	6	6	6	6
5	Marks Farm rbt	5	7	8	9	9
6	Galleys Corner rbt	7	13	15	7	7
7	Millenium Way	2	2	8	7	7
8	Rayne Rd / Pods Brook Rd	4	4	5	5	4
9	Rayne Rd / Pierrefitte Way	15	9	9	9	9
10	London Rd / Pierrefitte Way	10	9	10	10	10
11	Coggeshall Rd / Railway St	4	3	4	4	4
12	Rose Hill / Railway St	9	10	10	9	9
13	Hatfield Peverel	6	7	7	7	7
14	Hatfield Rd / Howbridge Rd	9	9	9	9	9
15	Kelvedon	4	6	6	5	5
16	B1018 / The Avenue	5	6	7	7	6
17	London Rd / Coggeshall Rd	2	3	4	2	2
18	A131 / London Rd	3	3	3	3	3
19	Andrewsfield	1	1	1	1	1
20	Pattiswick	6	7	7	7	7
21	South Haverhill	1	1	1	1	1
Overall assessment combining all areas		5	6	7	6	6

Key to movement scale and acceptability of change

More or less free flow			Travelling slower			Moderate congestion			Substantial congestion		
1	2	3	4	5	6	7	8	9	10	11	12
Extreme congestion						Acceptability of change					
13	14	15	Passable ✓			Caution !			Unsatisfactory ✗		

Table 5-2: PM peak movement index scores for base and scenarios 1-4

ID	Location	PM peak movement index ratings				
		2023 base	Sc1: 2043 ref case	Sc2: 2043 LP no mit	Sc3: 2043 LP mit BaU	Sc4: 2043 LP mit ST
1	Halstead	5	6	6	6	6
2	High Garrett	1	6	6	6	6
3	Broad Rd / A131	6	6	6	6	6
4	Coggeshall	4	5	5	5	5
5	Marks Farm rbt	5	6	7	7	7
6	Galleys Corner rbt	9	15	15	15	14
7	Millenium Way	2	3	3	6	6
8	Rayne Rd / Pods Brook Rd	5	11	11	9	9
9	Rayne Rd / Pierrefitte Way	15	11	12	12	11
10	London Rd / Pierrefitte Way	10	10	10	10	10
11	Coggeshall Rd / Railway St	4	4	5	5	4
12	Rose Hill / Railway St	8	11	11	10	10
13	Hatfield Peverel	6	6	7	7	7
14	Hatfield Rd / Howbridge Rd	7	7	10	9	7
15	Kelvedon	4	5	6	6	5
16	B1018 / The Avenue	4	5	5	5	5
17	London Rd / Coggeshall Rd	1	2	3	2	2
18	A131 / London Rd	4	3	3	4	3
19	Andrewsfield	1	2	2	2	2
20	Pattiswick	6	6	6	6	6
21	South Haverhill	1	1	1	1	1
Overall assessment combining all areas		5	6	7	7	6

Key to movement scale and acceptability of change											
More or less free flow			Travelling slower			Moderate congestion			Substantial congestion		
1	2	3	4	5	6	7	8	9	10	11	12
Extreme congestion			Acceptability of change								
13	14	15	Passable ✓			Caution !			Unsatisfactory ✗		

Comparing Scenarios 3 and 4 indicate that the highway interventions continue to deliver the majority of network benefits, while the sustainable transport measures provide targeted improvements at several locations and help further reduce traffic demand on the local highway network.

Taking into account only partial mitigation has been modelled, it is considered that the NEMo tests of Scenario 3 and 4 provide sufficient evidence to conclude that the integrated package of highway and sustainable transport measures would be able to manage the transport impact of growth. Local junction modelling has also been carried out, shown in Appendix G, which explores performance in more detail at key junctions alongside additional mitigation suggestions.

5.1.2 Further transport analysis

As part of a scope of work for the Local Plan Pre-Submission, further assessment will test and refine mitigation measures at Galleys Corner and Marks Farm Roundabouts using National Highways' VISSIM microsimulation model to identify an optimal package of improvements across the A120 corridor to help bring traffic conditions – notably in the PM Peak, closer to (of better than) those currently experienced.

The optimal package of mitigation will then be incorporated into strategic modelling to assess the wider network impact alongside other proposed junction improvements including: signalisation of priority junctions in Kelvedon and Feering to provide further access improvements through the town and to the rail station, and a revised roundabout layout proposed at the junction of A131 and A1017 in High Garrett.

A post-Local Plan assessment will be undertaken in a 2058 assessment year using strategic modelling to understand the longer-term impacts of growth beyond the Plan period covering the full build-out of the proposed strategic sites in: Kings Dene, Halstead, Hatfield Peverel and East Braintree. Network capacity benefits attributable to long-term strategic infrastructure measures will be modelled, including the potential A120 route between Braintree and the A12, the potential B1019 link road connecting to a new A12 junction in Hatfield Peverel, North Essex Rapid Transit, and a potential passing loop on the Braintree branch line.

5.2 Investment Requirements

Further transport analysis will also consider fair and reasonable apportionment of contributions from committed developments within Braintree, growth in neighbouring authorities and proposed Local Plan allocations within Braintree itself. Contributions should reflect both the need to mitigate transport impacts and the benefits arising from improved connectivity. In addition, given the importance of the Strategic Road Network and the role of rail and high-quality public transport in supporting long-term sustainable growth, continued strategic investment from organisations including National Highways and Network Rail will also be required to support the Local Plan period and establish the foundations for growth beyond 2043.

5.2.1 Strategic investment requirements

5.2.1.1 Highways

Significant improvements are required along the A12 and A120 corridors. Mitigations to 2043 do not assume that there will be any contributions from National Highways so the transport impact of growth would be funded by developments themselves.

However, growth beyond 2043 would be constrained as movement would be expected to deteriorate along the A12 and A120 routes unless there were to be further junction improvements and widening. Therefore, there is a requirement for the highway authorities NH and ECC to:

- use evidence in this study and follow-on work to develop A12 and A120 options (informed by the cancelled J19-25 scheme and A120 Braintree to A12 realignment options)
- safeguard land for options
- seek funding through the Road Investment Strategy and Major Road Networks programmes co-ordinated with developer contributions pre and post 2043.

5.2.1.2 Rail

Sustainable travel will be supported by improved frequencies of services on the Great Eastern Main Line and branch line improvements to Braintree and Sudbury.

Rail infrastructure needed to unlock frequency increases have been identified in recent reports by Network Rail. However, these changes, while desirable, are not considered practicable mitigations – in the sense that they would alleviate specific problems, be financially viable and be deliverable in the plan period.

Post-2043, rail frequency improvements, however are considered essential to maximise sustainable travel opportunities and manage the impact of growth from potential large new developments across Braintree district and North and Central Essex more widely.

Consequently, in the plan period to 2043, it is recommended that the case for rail investment is continued to be made by ECC through Transport East and Network Rail.

5.2.2 Requirements to Mitigate Reference Case Growth

Reference case growth covers

- Committed growth in Braintree
- Committed and proposed new Local Plan growth North Essex
- Growth from outside North Essex in line with DfT NTEM forecasts

It has been found that reference case growth is worsening traffic problems on the A120 route, in particular. Since the proposed new Local Plan growth will overlap with reference case growth, there is a requirement to establish fair and reasonable contributions to the schemes including but not limited to Millenium Way Slips and Galleys Corner.

BDC and ECC should then work collaboratively with reference case developments to establish contributions and implementation stages, recognising some changes could be delivered incrementally. As developments come forward there would be a need to:

- establish if there is a case for contribution to mitigations
- confirm if any revisions are needed to the schemes

- identify phases to which contributions are required

5.2.3 Requirements to Mitigate Assessment Case Growth

Contributions from proposed Local Plan developments to the reference case mitigations also needs to be considered where new Local Plan growth is contributing to tangible worsening.

The majority of mitigations proposed in Appendix E, however, are associated with avoiding severe movement or road safety problems, or providing acceptable levels of connectivity. The appendix therefore provides a reasonably comprehensive starting point for developers to use to develop details of mitigations collaboratively with ECC, NH and Network Rail.