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Regulation 19 Transport Evidence

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Executive summary

Overview

This report assesses the transportation impact of proposed new local plan growth described in Tendring District Council's (TDC's) submission draft of the Regulation 19 Local 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 Tendring Local Plan Review Sustainable Travel Assessment (March 2025) and Regulation 18 Assessment Case (January 2026) which identified parts of the network requiring mitigation and the contribution of sustainable transport connections. In this new evidence report, the mitigation strategy is developed further by outlining integrated transport schemes required to facilitate growth. The schemes address traffic movement problems along key corridors, including the A133 and A120, improve network efficiency and enhance connectivity between and within key settlements, town centres, employment areas and new developments.

Chapter 1: Framework for Assessment

Chapter 1 of the report explains how the assessment methodology is framed in the National Planning Policy Framework (NPPF), which encourages a vision-led approach in which transport and land use plans should seek to meet tomorrow's vision and not that of yesteryear. 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. This uses growth as an opportunity to shape the future transport network for the benefit of all with improved connectivity and choice of travel modes.

While there is a presumption in favour of growth in sustainable, well-connected locations such as near stations with frequent rail 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: setting up a 2043 reference case of committed and expected growth; comparing a 2043 assessment case of local plan growth without mitigation against the reference case; using the findings to identify and test a 2043 assessment case of local plan growth with mitigation to demonstrate the transport impact of how growth can be managed.

Chapter 2: Transport Challenges for Growth

Chapter 2 introduces the North Essex Model (NEMo), which is a strategic highway and public transport model, that has been used as the principal tool to assess the cumulative impacts of growth. NEMo is run with variable demand modelling (VDM) which allows trip makers to respond to traffic conditions by changing mode or destination. At key junctions along the A133, A120, B1029, B1033 and in Manningtree local junction modelling has been carried out using Junctions and LinSig software, which provides a finer grain of traffic assessment. The chapter also introduces a movement index to help identify when the impact of growth might have unacceptable consequences on movement affecting general traffic, buses and active travel.

Reference case growth reflects housing and employment growth that would be certain or more than likely to come forward without the new local plan. It is estimated in Tendring this could amount to over 8,500 homes and over 1,300 jobs, in addition to its share of the Tendring Colchester Borders Garden Community (TCBGC). As Tendring's neighbouring authority, Colchester, is also updating its local plan, it was considered appropriate to include residential and employment growth as set out in Colchester's Regulation 18 preferred option plans. Whilst allocations in these plans are hypothetical, the scale of growth is aligned to government targets so, on balance, they were considered apposite to include in the reference case. It also allows for a robust cumulative test of the impacts of growth.

Using the movement index, Chapter 2 shows that committed reference case growth significantly increases traffic along locally strategic corridors such as the A133, B1027 and B1352. The introduction of the A1331 link road, combined with the growth of trips from the TCBGC development, increases traffic on the A120, with queuing at the A12 J29 westbound off slip causing blocking back onto the A120. TCBGC and wider reference case growth in Tendring also cause pronounced traffic problems along Clingoe Hill and at Greenstead roundabout. Within Tendring itself, growth at Long Road, Clacton Road and other sites surrounding Manningtree exacerbate issues already experienced on the network, with the potential for substantial congestion by 2043. Whilst there are large committed developments on the fringes of Clacton, traffic continues to move relatively efficiently through the network and around the town.

The cause and responsibility for mitigating these problems lie across reference case developments in Tendring and Colchester. This current assessment does not mitigate the unacceptable highway impacts at these locations in the reference case. Instead, it seeks to show how the cumulative impact of both reference case and new local plan growth can be mitigated so the end point is known. Then, as developments come forward, the end point schemes can be delivered incrementally with scheme increments apportioned fairly between those developments contributing to the need for mitigations with regard to planning rules set out in The Community Infrastructure Levy Regulations 2010.

Chapter 2 then describes how TDC's new local plan is represented in the strategic transport model, adding a further 9,250 homes and 10,250 jobs on top of reference case growth (that is, almost 18,000 more homes and 11,500 more jobs in total by 2043). Assessment case allocations drive traffic increases along the A120 corridor and increase the movement indices compared to the reference case. Severe congestion is identified at the A12 J29 / A120, whilst substantial congestion is expected in Manningtree and on the A133 Colchester Road roundabout, although performance stays close to that of the reference case. Traffic movements are also expected to be slower along the A120-A133 to Harwich route between Hare Green, Horsley Cross and Dovercourt allocations. Mitigation will be required Horsley Cross roundabout to manage increased traffic by 2043. However, significant mitigation will be required at this location to support the possibility of growing Hare Green and Horsley Cross sites by a further 7,000 homes post-2043.

Impact in outlying areas is not considered problematic in terms of severe highway congestion in villages with growth, but this should not be interpreted as implying growth can occur without transport mitigations in these locations, which are also required to improve connectivity.

Chapter 3: Integrated Transport Solutions

Chapter 3 introduces an integrated and vision-based approach to mitigation. As mentioned above, the mitigations would need to be delivered incrementally as reference case and new local plan growth come forward.

The first group of measures explain how traffic movements arising from growth can be balanced and how existing and future pinch points on the highway network can be managed to keep traffic moving safely and sustainably, with greater priority given to public transport and active travel. Key schemes are:

- A133 corridor improvements package including junction improvements at key junctions in Frating and Weeley
- A120 corridor improvements including the A12 J29 signalisation and Horsley Cross roundabout
- B1029 improvements in Brightlingsea
- Cross-boundary A133 improvements at Greenstead roundabout and Wivenhoe Park corner to address severe queues along Clingoe Hill and extend priority for the bus-based rapid transit system (RTS)
- upgrades to urban traffic control technologies to co-ordinate traffic movements by all modes across built up areas

These highway and traffic management schemes support the introduction of a second group of measures for public transport improvements. Key mitigations include a rapid transit system (RTS), connecting Hare Green and Horsley Cross garden villages with Colchester and Manningtree. An extension to this service will also provide a fast and direct link between Horsley Cross and Harwich, facilitating access to a key employment and growth area.

Furthermore, the reach of people to public transport is enhanced through a network of mobility hubs – improving access to public transport and interchange facilities between high quality public transport services and other modes. A Park and Choose (P&C) site in Clacton is proposed to support seasonal access to the seaside town and additional P&C facilities have been identified to increase modal choice across the area and support growth beyond 2043.

Rail upgrades also have a significant role in supporting sustainable development but long term, strategic investment is required to increase train frequencies on the Sunshine Coast Line, between Colchester, Clacton-on-Sea and Walton-on-the-Naze. Hence, rail mitigations are not directly included since they were considered impractical for site promoters and developers to deliver in the plan period to 2043. However, rail enhancements, when delivered, will sustain opportunities for long term growth beyond 2043.

The highway and public transport mitigations support and co-ordinate with a third group of measures for active travel and placemaking. Walking and cycling mitigations focus on connecting allocations to nearby destinations including stations and mobility hubs. The routes need to run through allocations and support placemaking on and off allocations. It is recognised that use of active travel infrastructure and public transport networks will be enhanced by placemaking on allocations, travel planning and parking standards.

Chapter 4: Transport Assessment of Growth with Mitigation

Chapter 4 then presents findings from NEMo and local junction models in which local plan growth is assessed with the integrated vision-based mitigation. It is first assumed that travel choice is based on today's behaviour referred to as business as usual (BaU).

NEMo is used with VDM to assess the combined impact of the key highway and public transport changes using this BaU trip demand assumption. It is shown that the most severe congestion problems can be largely mitigated, particularly at the cross-border locations with Colchester, whilst maintaining priority for public transport. Supplementary information predicting changes in delay and queue lengths at key problem areas, including the A12 J29, Greenstead roundabout, the A133 Colchester Road roundabout and junctions around Manningtree, is also summarised.

NEMo is also run with an assumption of a greater shift away from car travel due to more uptake of walking, cycling and public transport than assumed with BaU demand. This scenario with reduced car demand is referred to as the sustainable transport (ST) scenario. The method to derive ST demand identifies car trips for which is it feasible that a small number could 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. When NEMo is run with ST demand – which also includes the highway and public transport network mitigations which are necessary to deliver improved active travel and public transport connectivity – the movement index shows that acceptable performance of the highway network can be achieved. That is, the cumulative transport impact of reference case and local plan growth can be acceptably managed using the mitigation strategy.

Chapter 5: Long Range Forecast Beyond the Plan Period

It is recognised that significant further growth could extend beyond 2043 at some allocations. The committed site at TCBGC is expected to grow to circa 7,500 homes and the proposed new local plan garden villages at Hare Green and Horsley Cross to circa 10,500 homes. Consequently, Chapter 5 describes findings from long range NEMo forecasts to 2058. A 2058 reference case was set up which includes TCBGC growth

and low levels of growth elsewhere aligned to predictions in the DfT's National Trip End Model (NTEM); and a 2058 assessment case which adds in Hare Green and Horsley Cross garden village growth. The 2058 reference and assessment case scenario do not add any further mitigation to that identified in 2058.

Comparing the 2058 reference case to the 2043 new local plan scenario with mitigation shows that the cross-boundary A120 and A133 problem locations are in need of additional mitigation if traffic demand continues at BaU rates of car travel. The 2058 reference case problems therefore show the importance of investing in sustainable transport improvements, including rail frequency upgrades, to manage long term growth.

Comparing the 2058 assessment case with the 2058 reference case scenarios show that movement problems extend further along the A120 and A133 corridors into Tendring. This emphasises the need for long term strategic investment on the A120 and A133 corridors alongside the sustainable transport investment required in the 2058 reference case.

Chapter 6: Conclusion

Chapter 6 concludes the report by summarising the key finding that the impact of growth to 2043 can be managed through integrated and vision-based mitigation in which key highway schemes support reliable journey times and create the space for further improvements to public transport and active travel networks in Tendring.

The conclusion also explains how there will be a need to co-ordinate and fairly apportion the cost of measures between:

- strategic infrastructure bodies such as Network Rail and National Highways (NH) for rail enhancements and a portion of Strategic Road Network (SRN) improvements
- committed sites including TCBGC to contribute to a share of the mitigations needed to address unacceptable reference case problems particularly at A12 J29 and along the A133 corridor
- proposed new local plan allocations in Tendring, which also need to consider connectivity as well as mitigation.

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1. Framework for Assessment

Tendring's proposed new Local Plan identifies allocations that can provide approximately 9,250 more homes and 10,250 more jobs by 2043. This is in addition to 8,500 homes, on top of its share of Tendring Colchester Borders Garden Commitments (TCBGC), and an estimated 1,300 jobs from its adopted local plan commitments.

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 Tendring 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 Tendring District Council's Regulation 19 Local Plan to 2043 and develop and test an appropriate vision-based mitigation strategy. The study extends the 2025 study, which supported the evidence base for the Regulation 18 Preferred Options Local Plan[1].

The Regulation 18 phase focussed on identifying an integrated and sustainable transport strategy associated with different development options, 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 plausible 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 tactics, which confirms what is required to implement the strategy (the 'what') – 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 Preferred Options report[2] .

The figure then shows that transport assessment at 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] Tendring District Local Plan Review Preferred Options Consultation Document (Regulation 18), 2026

[2] ibid

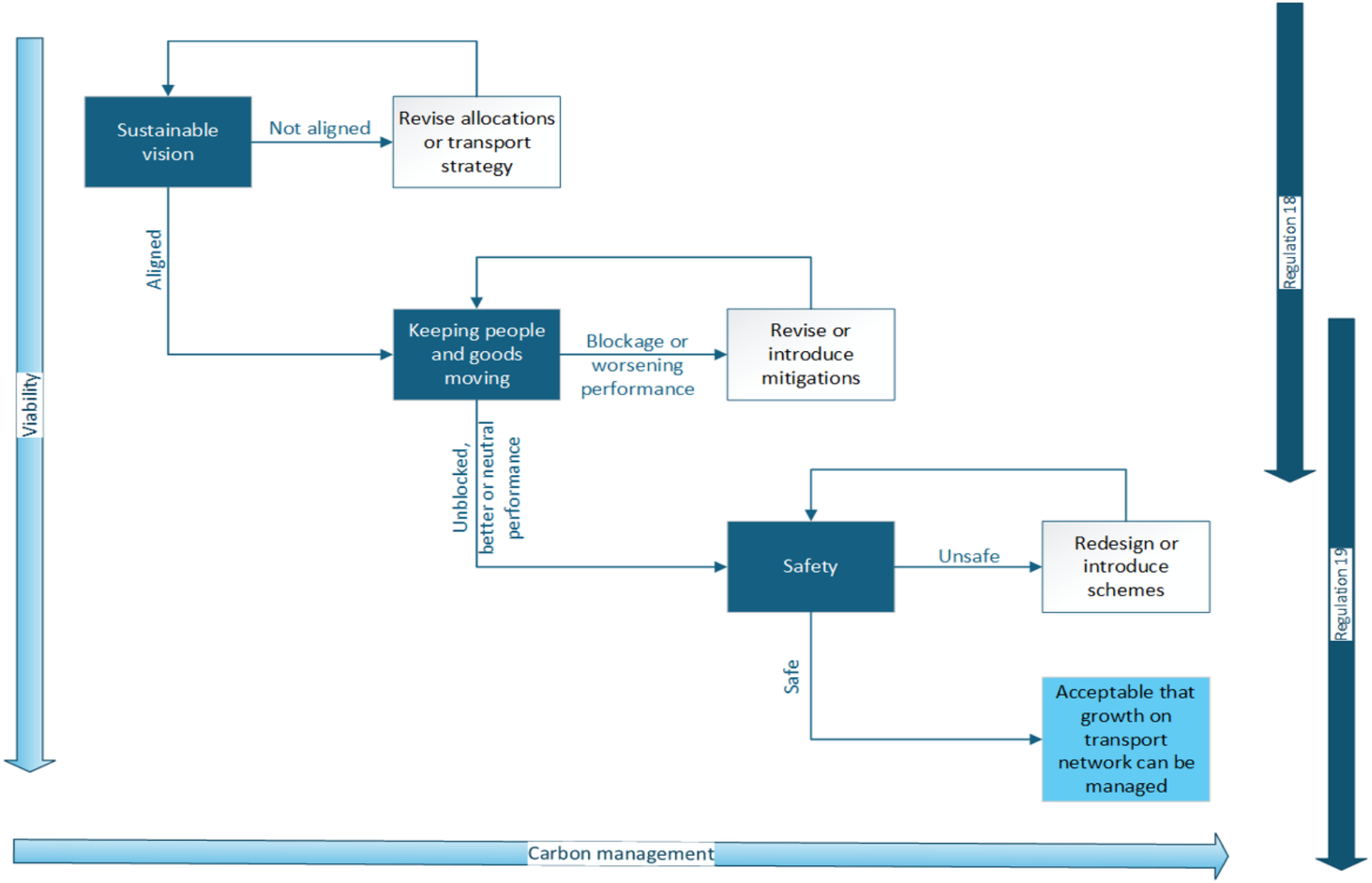

Figure 1.1 Criteria to inform assessment of acceptability of growth from the perspective of transport

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 a final check, which might prevent or necessitate changes to elements of the Local Plan and its mitigation approach. In this report, safety concerns have informed the requirement for mitigation measures to accompany growth, such as at Frating junctions and the A12 J29.

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 first seeks to understand the significant transportation and movement problems that arise from a reference case of committed growth in Tendring, which includes TCBGC, and expected growth in the neighbouring planning authority of Colchester. In Tendring, reference case growth is represented in the modelling at 8,500 homes and 1,300 jobs – which would occur without the proposed new local plan.

The assessment then seeks to identify the impact of proposed new local plan growth on top of the reference case which is modelled at a further 9,250 homes and 10,250 jobs, leading to almost 18,000 more homes and 11,500 more jobs by 2043 across both the reference and assessment cases. This could increase demand for car trips in the Tendring areas by an average of 17% if people's travel choice remained as today.

The report next seeks to provide confidence that feasible, deliverable and affordable transport mitigations can be found that are able to alleviate the cumulative impact of reference and new local plan growth in a manner consistent with a vision and national and local transport policies. This vision seeks to avoid severe impact and support increased connectivity by widening the choice of viable transport options for trips beyond cars. It is recognised that mitigation will need to be phased to align with reference and new local plan developments as they come forward, since the need for some of the mitigation is caused by reference case growth.

The report then seeks to demonstrate that the transport impact of local plan growth with vision-based mitigations 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 (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 A1331 link road could be fully completed by 2043 along with the rapid transit system connecting TCBGC with the Colchester urban area.

1.3 Planning Guidelines and Regulation

1.3.1 National Planning Policy Framework

This report was developed in line with the NPPF guidance published December 2024 and emerging Draft NPPF in early 2026. On the 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 NPPF[3] 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.109[4]). 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 Tendring, with concentrated growth in towns and garden communities, 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 2026[5] have reinforced a shift towards a vision-led approach to transport planning and the importance of considering sustainable transport options.

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.

[3] National Planning Policy Framework (2024 Archived Version), MHCLG, 2024

[4] 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.

[5] National Planning Policy Framework (NPPF), MHCLG, August 2026

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 all reasonable future assessment scenarios.

Consequently, the national approach to transport assessment is increasingly focused on demonstrating how development supports sustainable travel objectives and placemaking 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 2008[6] and the Community Infrastructure Levy (CIL) Regulations 2010[7] provide the legal tests on the use of S106 planning obligations.

Regulation 122[8] 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.

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 Policy Context

1.4.1 Transport East

The vision of the Transport East Transport Strategy 2023-2050[9], published in February 2023, is centred around establishing a thriving eastern region with safe and efficient networks advancing a future of inclusive and sustainable growth for decades to come. The strategy sets out how the vision will be experienced by people and businesses in different parts of the Transport East region. For rural and coastal communities this looks like:

- A flexible public transport network providing accessible, reliable connections to the nearest urban centres.
- An efficient, safe and well-maintained local road network providing good connections to important local destinations.

[6] The Planning Act, UK Government (gov.uk), 2008

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

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

[9] Transport East Strategy 2023-2050, Transport East, 2023

- High-quality, inclusive walking and cycling networks to local centres, public transport hubs and for leisure purposes.
- A high-quality public realm in and around villages, town centres and visitor attractions.

1.4.2 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]

1.4.3 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 Main Line Great Eastern Main Line Strategic Advice[12]. 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 Region [21, p.77]. it is also developing a strategic case for branch line improvements between Colchester and Clacton and Walton & Frinton[13].

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 (ref). 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.

1.4.4 Local Transport Plan

The vision-based approach to transport recommended in the NPPF is continued through the county's draft Local Transport Plan (LTP4) which identifies desired outcomes for which transport is a means to an end. The draft LTP4 articulates a vision "for a safe transport system that supports economic growth and prosperity, provides access to our homes, services, education, work and leisure and enables more sustainable choices and journeys to be made"[14].

LTP4 embeds integration of planning and transport to ensure people and places are at the heart of all decisions to secure new development at the most appropriate and sustainable locations. Furthermore, it supports connectivity and journey reliability for all modes of transport, which would provide choice of travel alternatives.

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

[11] ibid

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

[13] Identification and Prioritisation of Shorter Term Rail Opportunities in the Transport East Region, Steer (on behalf of Transport East), August 2025

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

The draft transport plan explains that this will be achieved by:

- Balancing better the location-specific needs of cars, buses, goods vehicles, and other motorised traffic, with the needs of cyclists, pedestrians, residents, shoppers, and local businesses, in both urban, suburban and rural locations (a place and movement approach)
- Providing attractive local spaces, easy access to local and wider services and facilities
- Requiring developers to consider the impact of travel and transport – both positive and negative on the health and wellbeing of residents and communities

1.4.5 Tendring District's Local Plan

Tendring District's Local Plan 2013-2033 and beyond establishes a spatial strategy that seeks to accommodate growth in a sustainable manner whilst ensuring that development is supported by appropriate infrastructure and improved connectivity. Policy SP6 Infrastructure and Connectivity[15] recognises that economic growth, housing delivery and sustainable communities depend upon effective transport networks, active travel opportunities and digital connectivity. The policy seeks to ensure that new development is supported by infrastructure delivered in a coordinated timely manner.

The shared strategic vision for North Essex promotes sustainable patterns of growth by directing development towards accessible locations and by improving connections between homes, jobs, services and facilities. This is intended to support economic prosperity whilst encouraging a reduction in the need to travel by private car and increasing opportunities for travel by sustainable modes.

The Local Plan emphasises that infrastructure and connectivity are fundamental to the delivery of sustainable development and that growth should be accompanied by improvements to transport networks and services. The plan therefore supports:

- The efficient use of existing transport infrastructure;
- The promotion of sustainable and active travel opportunities in all new development;
- The creation of neighbourhoods where daily needs can be met by walking and cycling;
- Improvements to public transport accessibility and facilities;
- Protection and enhancement of the strategic transport network; and
- Protection and enhancement of the strategic transport infrastructure where needed to support growth

In addition, the Local Plan seeks to ensure that everyone living, working or visiting Tendring is able to travel efficiently and sustainably. It recognises that encouraging travel by walking, cycling and public transport can help reduce congestion, improve accessibility and support wider environmental and health objectives.

Consequently, to be consistent with the vision and policies of the adopted Local Plan, the transport assessment of growth should consider how development proposals can:

- Minimise the need to travel and support sustainable patterns of development;
- Maximise opportunities for walking and cycling through safe, direct and attractive routes;
- Provide good access to existing and proposed public transport services;
- Support improvements to the wider transport network where required;
- Encourage modal shift away from single-occupancy car travel;
- Ensure infrastructure is delivered alongside development in a phased and coordinated manner; and

[15] Tendring District Local Plan 2013-2033, Section 1. North Essex Authorities' Shared Strategic Section, 2021

- Improve connectivity between residential areas, employment locations, town centres and key services.

This approach aligns with the adopted Tendring Local Plan's objective of delivering sustainable communities supported by effective transport infrastructure, whilst ensuring that future growth contributes positively to accessibility, economic prosperity, environmental quality and public health.

The emerging Tendring Local Plan Review (2025-2042), published for Regulation 18 Preferred Options consultation in 2026, reinforces the transport and accessibility principles contained within the adopted Local Plan. The emerging vision seeks to create sustainable communities where residents can access employment, education, shopping and other services whilst minimising the need to travel, particularly by private car. The Preferred Options document[16] emphasises the importance of locating development in accessible locations and maximising opportunities for walking, cycling and public transport use, alongside timely provision of supporting infrastructure. This demonstrates the Council's ongoing commitment to sustainable transport, active travel and integrated land-use planning as key considerations in accommodating future growth.

1.5 Conclusion

This chapter has set the scene for the transport analysis of the impact of new local plan growth. It has considered the vision and 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.

[16] Tendring District Local Plan Review Preferred Options Consultation Document (Regulation 18), 2026

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 Junctions11 and LinSig local junction 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 is supported by information on traffic speed to identify 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 Transport Models

2.1.1 North Essex Model (NEMo)

NEMo is a strategic highway and public transport model with a base year of 2023. The model has been independently reviewed by National Highways (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, with detail increased particularly along the A120 corridor to Harwich.

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 better reflect 2023 travel patterns. The resulting NEMo was then validated against 2023 flow and journey time data to confirm it represents post-Covid travel conditions.

CTM, and hence NEMo, has been built following Department for Transport (DfT) Transport Analysis Guidance (TAG) and best modelling practice (including [17] [18] [19]), and the update process has followed DfT guidance on present day updates, in which models are refreshed rather than reconstructed entirely.

NEMo includes a variable demand modelling (VDM), also developed in line with DfT guidance[20], 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

[17] Department for Transport. TAG Unit M2-2 Base Year Matrix Development. London ,UK, May 2020. url: https://assets.publishing.service.gov.uk/media/5fbfbd998fa8f559e32b4d25/tag-m2-2-base-year-matrix.pdf.

[18] Department for Transport. TAG Unit M3-1 Highway Assignment Modelling. London, UK, May 2024. url: https://assets.publishing.service.gov.uk/media/67ed0e54e9c76fa33048c634/tag-m3-1-highway-assignment-modelling.pdf.

[19] Department for Transport. TAG Unit M3-2 Public Transport Assignment Modelling. London, UK, May 2024. url: https://assets.publishing.service.gov.uk/media/666af32effd07973a043d110/tag-unit-m3.2-public-transport-assignment-modelling.pdf.

[20] TAG Unit M2-1 Variable Demand Modelling, Department for Transport, 2025

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 for the assignment of individual peak period models.

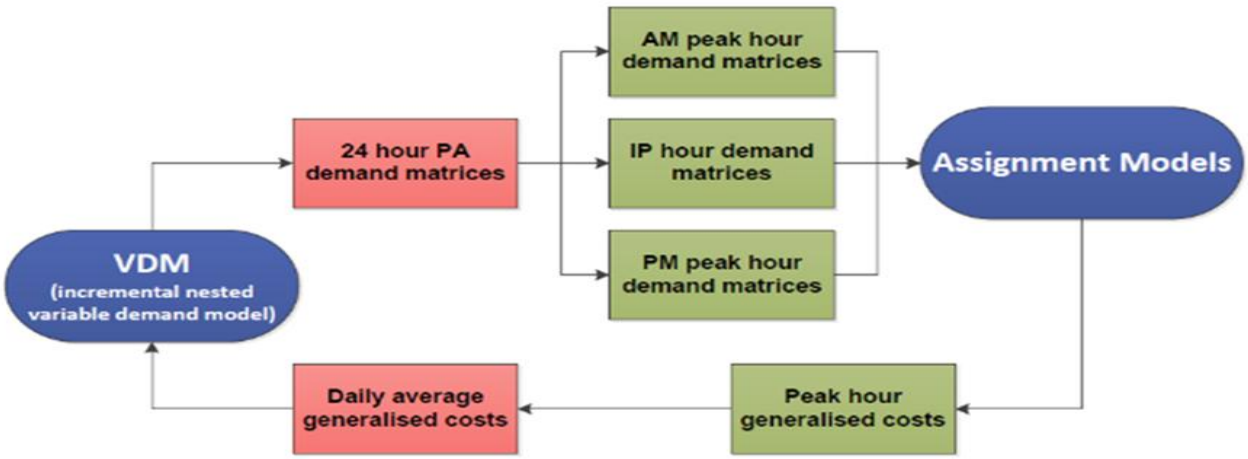


Figure 2.1 Relationship between demand and assignment models

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 assumed always to run on 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 practice[21]. 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.

NEMo is used to assess forecast 2043 scenarios shown in Table 2-1. 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.

[21] Traffic Modelling Guidelines, Version 4.0, DfT, 2021

3. Scenario 3 – Assessment case with mitigation, in which key highway and public transport 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 2-1 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	A120 to Ramsey Road Link	✓	✓	✓	✓
	A1331 link road (TCBGC)	✓	✓	✓	✓
	P&C options and RTS at TCBGC	✓	✓	✓	✓
Key further mitigation needed for reference growth	A12 J29 scheme			✓	✓
	Greenstead and Clingoe Hill package			✓	✓
Key mitigation needed for Local Plan Growth	RTS East to proposed Tendring garden villages, linking Colchester, Harwich & Manningtree			✓	✓
	A120/A133 Junction improvements in the vicinity of Hare Green and Horsley Cross			✓	✓
	Local bus general improvements				✓
	Improvements to and at interchanges, and mobility hubs				✓
	Active travel connections to major sites				✓
	Travel planning to support ST				✓

2.1.1.1 Microsimulation and Junction Models

NEMo is complemented by VISSIM 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. VISSIM models have been developed and used for complementary assessment of Tendring's impact on the approaches to Colchester at:

- A12 J29 which includes the A120 merge with the A12
- A133 Clingoe Hill, which extends from the new A1331 roundabout through Greenstead roundabout

Further information on the VISSIM models is provided under section 4.3 and Appendix G, as their main purpose has been to help derive solutions to complex highway problems arising from growth. The VISSIM models provide a level of analysis beyond many Regulation 19 local plan transport assessments and would usually be used at a much later stage of scheme development. Using the models help increase confidence that solutions can be found to keep people and goods moving. However, the ideas for the cross-boundary mitigations would still need to go through typical scheme development stages of optioneering, design and consultation, so are subject to change.

In addition to the detailed microsimulation modelling, 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.

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 2.2 and were selected based on locations identified through a review of expected development impacts.

Figure 2.2 Local Junction Model Locations

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.

Detailed methodology and model outputs are provided in Appendix D, with summary findings and mitigation testing in these platforms presented under section 4.3.2.

2.2 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.

This approach involves identifying the areas of the Tendring 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 2.3 and listed in Table 2-2.

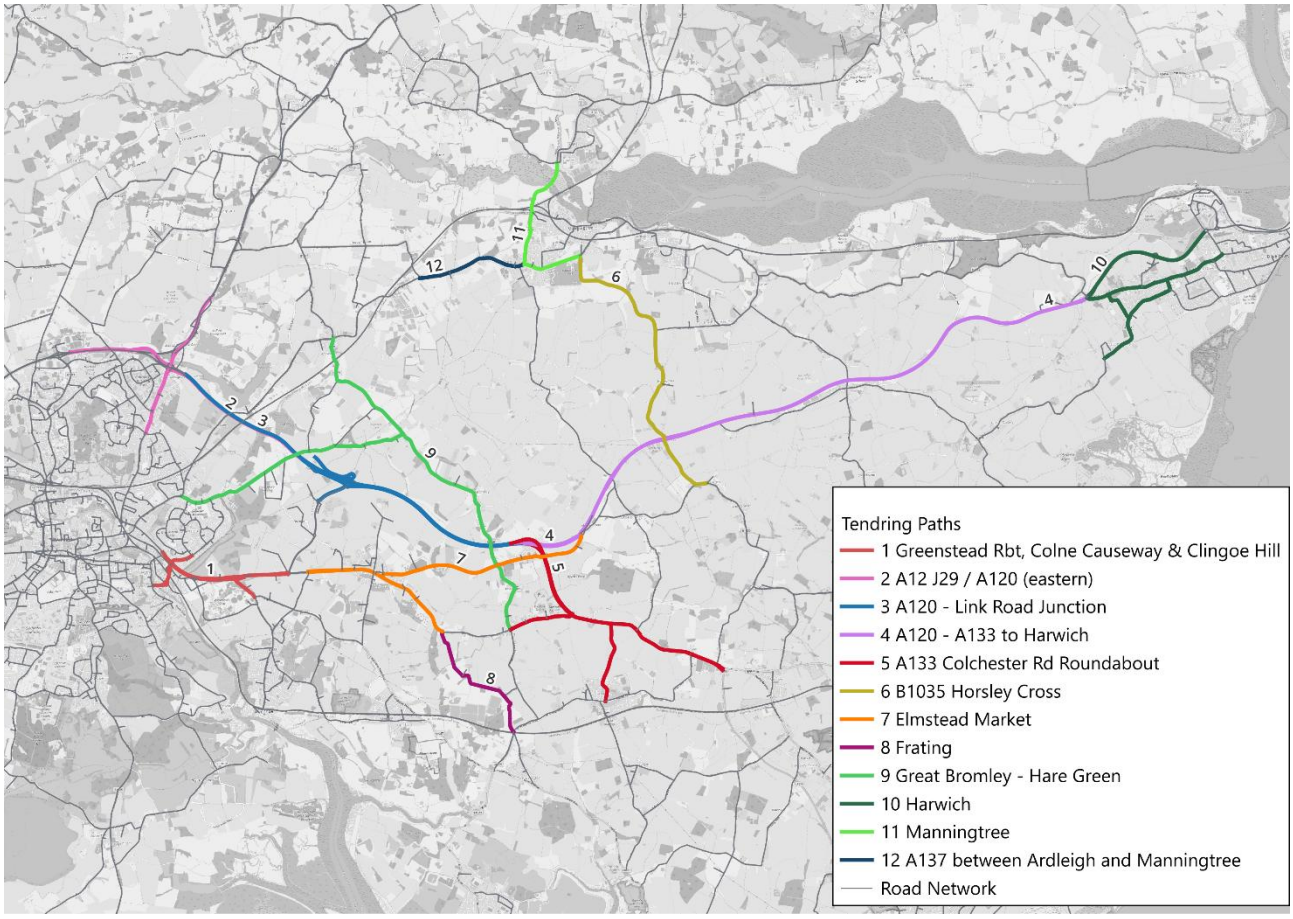


Figure 2.3 Corridor areas of network interest

Table 2-2 Areas of interest on the highway network

Sector	Location
East Colchester	Greenstead Roundabout, Colne Causeway & Clingoe Hill
	A12 J29 / A120 (eastern)
North Tendring	A120 - Link Road Junction
	A120 - A133 to Harwich
	A133 Colchester Rd Roundabout
	B1035 Horsley Cross
	Elmstead Market
	Frating
	Great Bromley - Hare Green
	Harwich
	Manningtree
	A137 - Between Ardleigh and Manningtree

Focusing on the areas of interest shown in Table 2-2 provides an appropriate barometer to assess and cover traffic impact across Tendring. However, the analysis also involves inspecting model outputs and plots to check if there are significant changes in other areas beyond the selected areas of interest. For example, in south Tendring, where the movement index scores do not tend to display excessive congestion issues, it is still important to review the full extent of any marginal impacts of either the committed or assessment case development.

The approach then involves calculating a movement index on a scale of 1-15 for each of the areas 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 in on detailed issues. The movement scale can be seen in Table 2-3.

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 areas 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 2-3 Movement 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 Without Mitigation

2.3.1 Reference Case Growth

Without Tendring'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 jobs figures are derived from assumptions contained in the baseline scenario of Tendring's Employment Land Review, then distributed across the committed sites. Some of the largest developments include Hartley, Oakwood and Rouses Farm, all situated on the outskirts of Clacton.

It is worth noting that TCBGC growth has been informed by latest developer assumptions, in which employment to 2043 is concentrated in the Colchester model zones and housing in the Tendring model zones. Hence, the representation of trips in the transport model does not reflect how CCC and TDC report on housing delivery plans to the government, in which growth at TCBGC is shared between CCC and TDC. However, this results in no difference in the accuracy of assigning TCBGC trips to the transport network. The location of committed sites in the Tendring council area are shown in Figure 2.4.

Tendring will be influenced by growth in the neighbouring North Essex authorities of Braintree and Colchester, which particularly affects 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 Braintree and Colchester, aligned to NTEM (Version 8) or only including certain and near certain development in those authorities — since their 2043 local plans are still hypothetical. However, if a lower level of growth were used, the impact of Tendring's new local plan growth alongside estimated Braintree and Colchester 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 Braintree and Colchester in the Tendring 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 in the Tendring reference case for each of the North Essex planning authorities is shown in Table 2-4 below, with the standard core growth in NTEM also shown alongside this for comparison.

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.

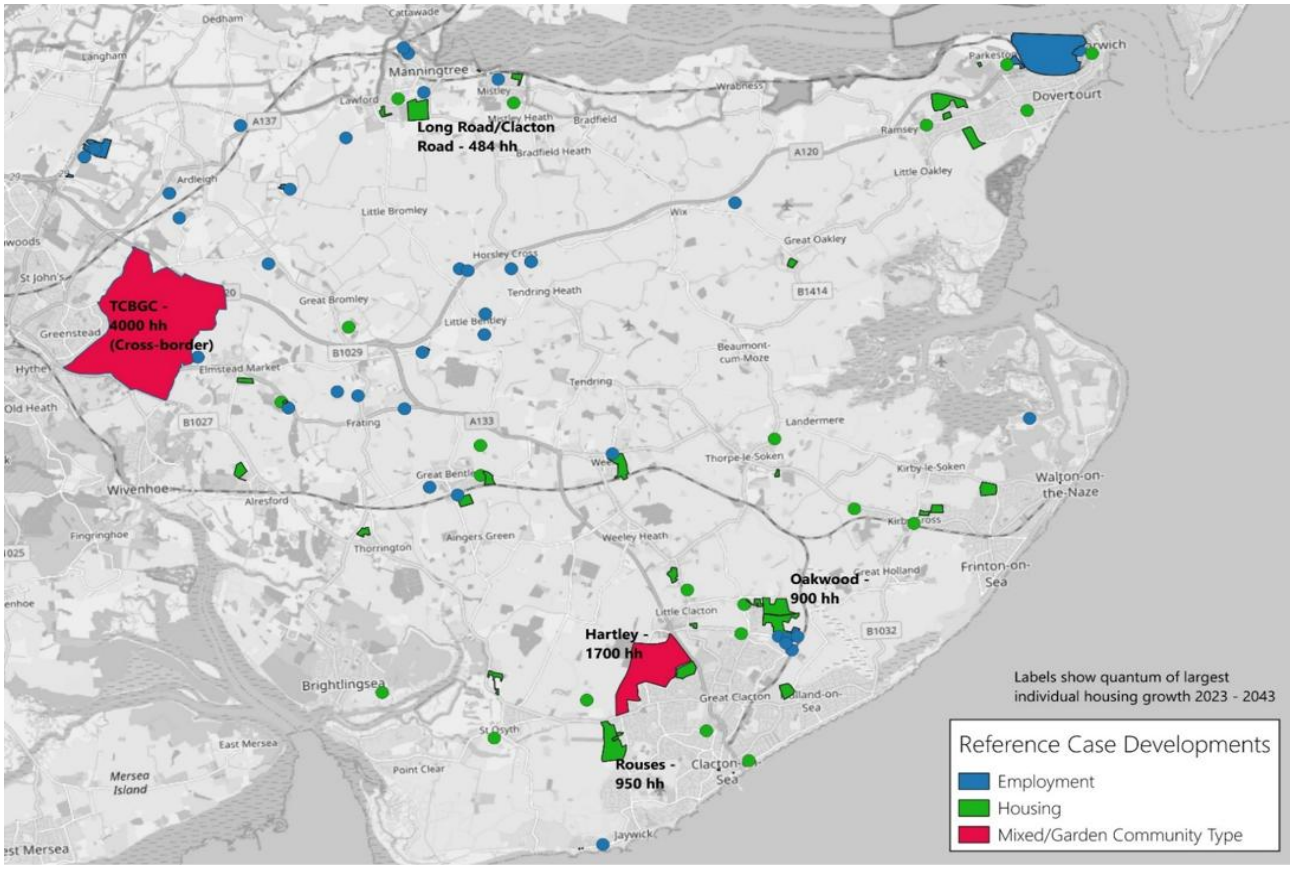


Figure 2.4 Reference Case developments

Table 2-4 Reference Case assumptions across North Essex

Local Authority	Households			Jobs		
	2023 Base	2043 Reference Case Growth (% growth vs NTEM 8 base)	*2043 NTEM 8 'Core' Forecast Growth (% growth vs NTEM base)*	2023 Base	2043 Reference Case Growth (% growth vs NTEM base)	*2043 NTEM 8 'Core' Forecast Growth (% growth vs NTEM base)*
Tendring	**66,906**	**+8,533 (+13%)**	*+9,531 (+14%)*	**51,341**	**+1,333 (+3%)**	*+2,727 (+5%)*
Colchester	81,086	+17,141 (+21%)	*+12,388 (+11%)*	97,188	+14,122 (+15%)	*+5,258 (+5%)*
Braintree	65,039	+21,517 (+33%)	*+5,146 (+8%)*	66,221	+10,000 (+15%)	*+3,326 (+5%)*

**TCBGC 2043 growth (4,000 houses) is split across Tendring and Colchester districts and comes in addition to the totals shown above*

Since NTEM provides trip growth assumptions at the 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 Tendring, as well as the adjacent authorities of Colchester and Braintree that include developments, 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 isolates 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.

Step 4: Additional Growth at TCBGC Zones - Additional trip growth was incorporated for the TCBGC zones, consistent with assumptions used in its planning application.

For all other areas of the model, default 'Core' scenario TEMPro growth factors (2023-2043) were applied to base year demand.

2.3.2 Committed Schemes

As well as identifying growth in trips ends, the reference case highway model reflects changes in the highway network — that is, highway schemes that are reasonably expected to come forward because funding and decisions are in place. The highway schemes included in the reference case model are listed shown in Figure 2.5and Figure 2.6 below. Meanwhile, the public transport model includes the RTS service connecting TCBGC to destinations in Colchester.

The following points should be noted with regards to the reference case forecast network:

- Within the Tendring boundary, the A120 - Ramsey Road Link Road to the west of Harwich is the major committed scheme currently scheduled for the period up to 2043.

- 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.
- Although it is expected that TCBGC would promote or part fund solutions to mitigate its impact at A12 Junction 29 and Greenstead roundabout, details regarding the arrangements around possible mitigation measures related to TCBGC are as yet unconfirmed. Therefore, improvement schemes at these two junctions have been excluded from the reference case forecast network. Therefore, only committed infrastructure in the adjacent authority of Colchester is included.

Table 2-5 Committed schemes included in the Reference Case

Committed schemes in Tendring & Colchester included in the Reference Case Forecast	A120 – Ramsey Rd Link Road, West of Harwich
	A120/A133 Link Road (fully built)
	RTS Section A (dedicated RTS and cycle lane between Bruff Close and Mill Road)
	RTS Section C (westbound RTS lane between Knowledge Gateway and Greenstead roundabout)
	Colne Bank Roundabout Improvements including signalisation
	Axial Way
	Speed limit of 30 mph on Northern Approach + signals (part of RTS Section A)
	Headgate/Crouch St/St John's St/Head Street junction signals
	Head Street - 1 lane NB from the Crouch Street/St John's Street junction
	St Botolph's Circus - Stage 3A
	P&C East - TCBGC
	LCWIP4 (Head Street cycle lane; 1 lane northbound from Crouch Street/St John's Street)

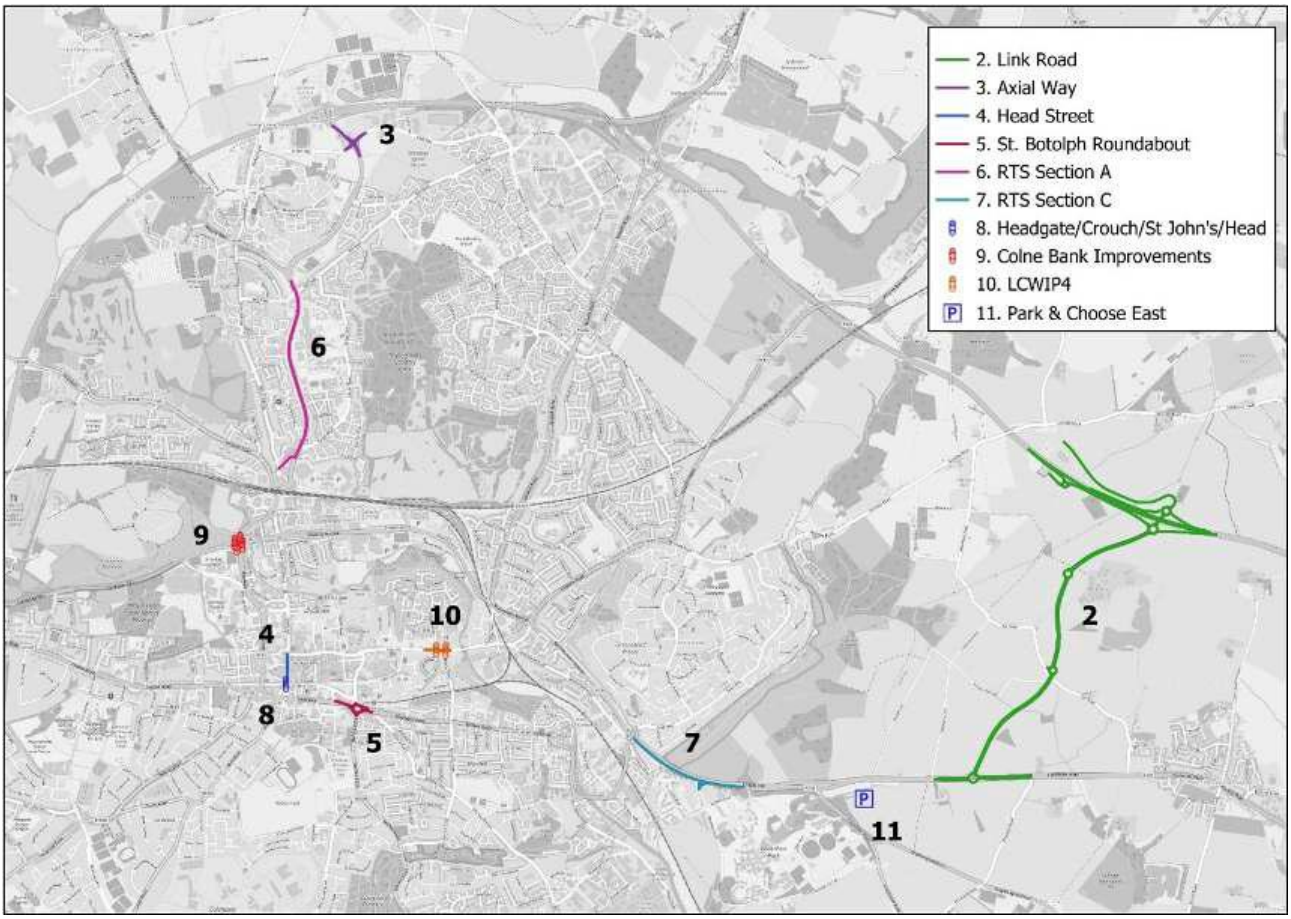


Figure 2.5 Committed schemes in the adjacent authority of Colchester

Figure 2.6 A120-Ramsey Road Link Road Scheme

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. By aligning the connectors with representative junctions and corridors, the modelling process captures the likely distribution of traffic flows more effectively, thereby improving the robustness of the assessment and ensuring that the impacts of the development are evaluated in a credible and transparent manner.

2.3.3 Reference Case Performance

Figure 2.7, and Figure 2.8 show absolute speed ratio plots for the base and the reference case (post-VDM) models for the AM peak. Speed ratio is defined as the ratio between speed in the modelled hour and the free flow speed. The darkest colours on the plots highlight where peak hour traffic is largely at a standstill and queuing is most likely to form. Yellow and orange shaded bars indicate traffic is moving slower than the speed limit, but is not yet at a queued state.

The base year model plot (Figure 2.7) reflects current conditions, showing substantial congestion along Clingoe Hill backing up from Greenstead roundabout, as well as moderate congestion where the A133 meets the A120 at the roundabout east of Frating. There is also moderate congestion in Manningtree. There are small pockets of congestion in Clacton and Harwich town centres.

The growth in trips from committed development increases traffic along locally significant corridors such as B1027/B1029 from Brightlingsea through Thorrington. Figure 2.8shows how in the forecast, while traffic speeds decrease along these corridors, this does not amount to a severe congested impact. Similarly, traffic along the A120 between Harwich runs slightly below its speed limit along the entirety of the section. The growth at Long Road/Clacton Road and other sites surrounding Manningtree exacerbates issues already experienced in the current year, with the potential for the area to experience more substantial congestion in the forecast. Similarly, conditions at the A133 roundabouts worsen, although as they are already congested in the Base condition there is already a limit to additional traffic that can be accommodated at the location.

The large sites of Hartley, Rouses and Oakwood drive traffic growth on the fringes of Clacton. The strategic modelling assesses that traffic continues moving through the network relatively efficiently around Clacton in this scenario, although the speed ratio figure does show a slight increase in the number of links travelling slower than their speed limit.

At cross-boundary locations, development within the Tendring boundary combined with the growth of trips from the TCBGC development, leaves traffic queuing back onto the mainline approaching A12 J29 from the eastern A120 arm. Clingoe Hill becomes severely congested on the approach to Greenstead roundabout.

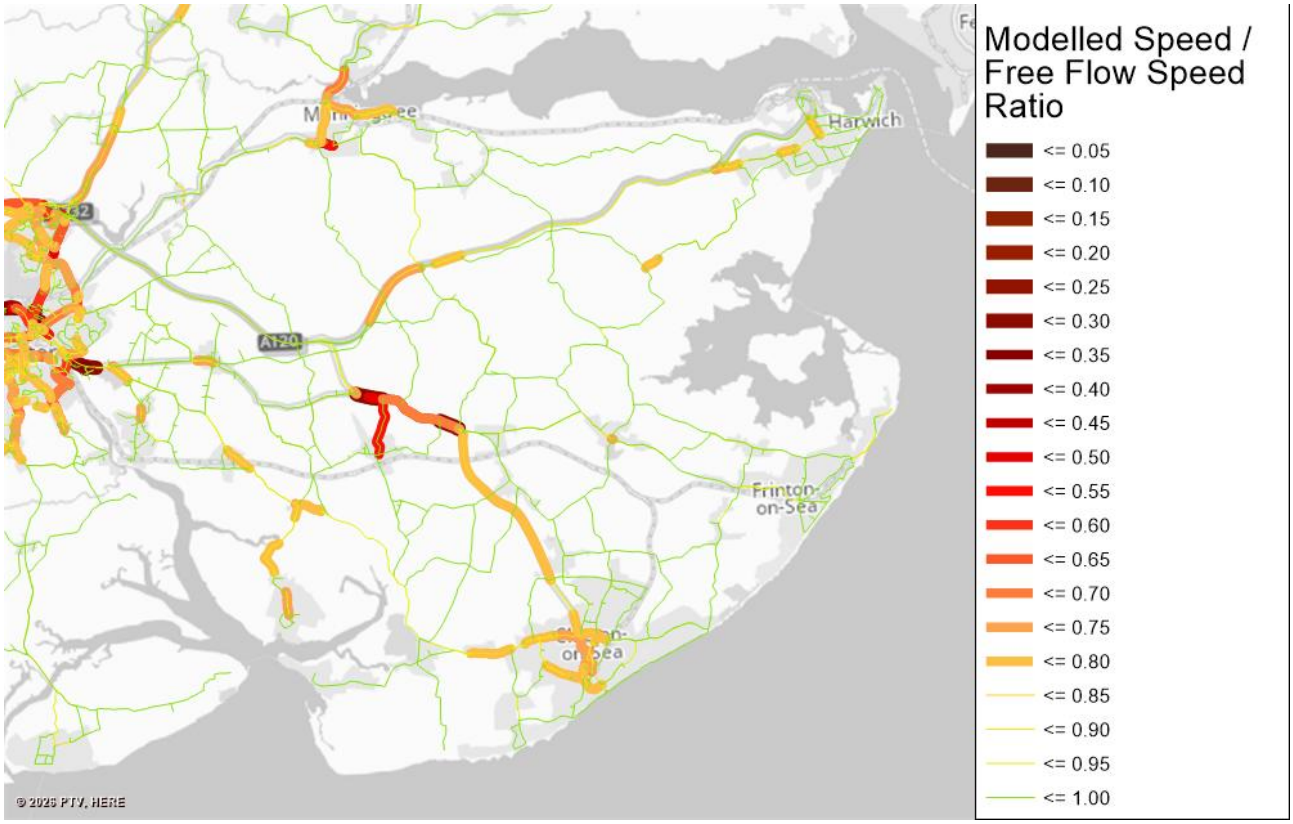


Figure 2.7 2023 Base AM peak Speed Ratio

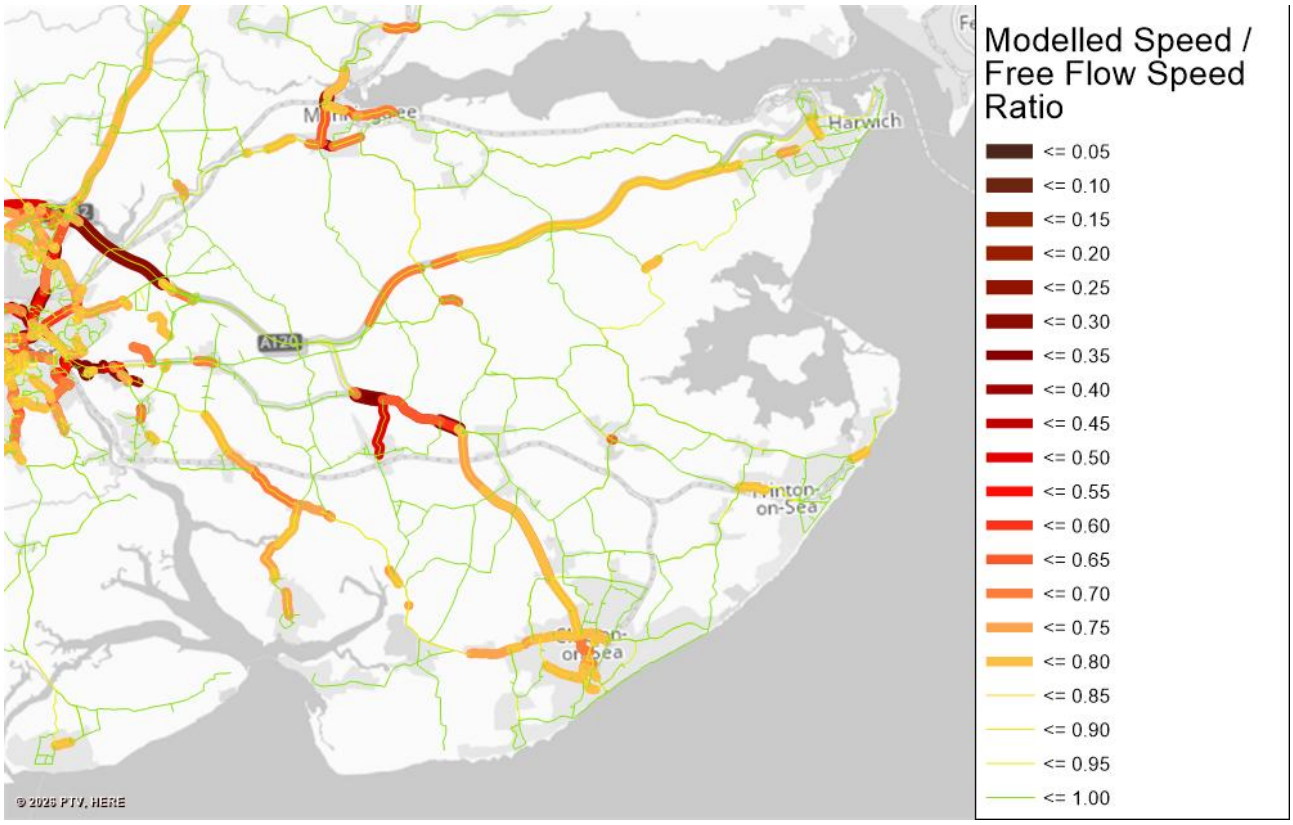


Figure 2.8 2043 S1 Reference Forecast AM peak Speed Ratio

Problem areas faced in the PM peak are similar. Appendix D provides a full set of flow difference plots, absolute speed ratio and relative queue plots for the reference case. It should be noted that the slow moving traffic at A12 J29 shown above indicate the strong possibility of safety problems with queueing traffic on the A120 off -slip extending back onto the A120 mainline.

2.4 Assessment Case Forecast Without Mitigation

2.4.1 Assessment Case Growth

The proposed new local plan allocations will grow households and jobs in Tendring beyond the reference case estimate. Growth elsewhere remains at reference case levels.

The location of new local plan residential and employment site allocations for households and jobs growth in Tendring is depicted in Figure 2.9. Appendix C provides further details on the allocations. In addition, TDC advised including an assumption for windfall growth of 1,462 dwellings. Although the allowance is not located in specific locations, it was proportionally 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.) Table 2-6 shows a summary of the new local plan increment housing and jobs included in the modelling, that is additional to the reference case growth shared under Figure 2.4.

Table 2-6 Assessment Case growth in Tendring

Local Authority Area	Households		Jobs	
	2043 Reference Case Total	2043 Assessment Case Growth Increment (vs Reference Case)	2043 Reference Case Total	2043 Assessment Case Growth Increment (vs Reference Case)
Tendring	75,459	9,251 (+12%)	52,674	10,248 (+19%)

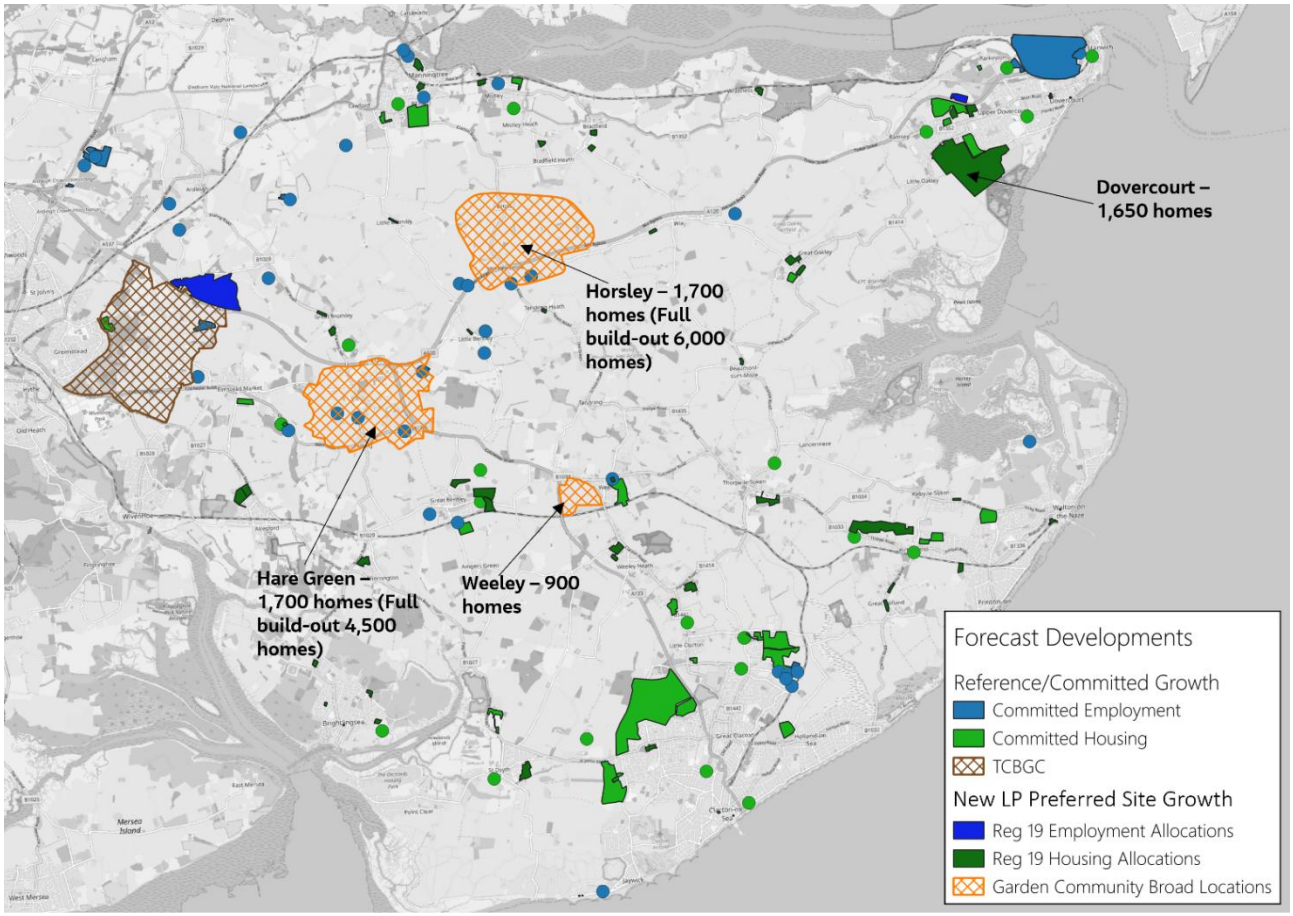


Figure 2.9 Tendring Assessment Case development

To calculate the trip generation of local plan allocation the process described in sub- section 2.3.1was 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.

2.4.2 Assessment Case Network

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, particularly in sensibly representing Hare Green and Horsley Cross allocations.

2.4.3 Assessment Case Performance Without Mitigation

Table 2-7 provides the movement scores, in which Scenario 2 (new local plan growth without mitigation) can be compared to Scenario 1 (reference case) and the base performance.

It shows the issues that already occur in the reference case are further compounded by growth from allocations, particularly at A12 J29 in the AM peak and the Clingoe Hill corridor in the PM peak moving to severely congested conditions. The A133 section immediately adjacent to the A120 and network around Manningtree move firmly into a substantially congested condition across both peak periods.

Table 2-7 Movement index scores for base, reference (S1) and assessment (S2) scenarios without mitigation

Sector	Location	AM Peak Impact			PM Peak Impact		
		2023 Base	2043 S1 RC	2043 S2 BAU	2023 Base	2043 S1 RC	2043 S2 BAU
East Colchester	Greenstead Roundabout, Colne Causeway & Clingoe Hill	10	15	15	12	14	15
	A12 J29 / A120 (eastern)	7	12	14	7	10	11
North Tendring	A120 - Link Road Junction	3	4	4	2	3	4
	A120 – Horsley Cross to Harwich	3	4	5	3	4	4
	A120 - A133 to Horsley Cross	3	3	7	2	3	4
	A133 Colchester Rd Roundabout	9	10	10	8	10	11
	B1035 Horsley Cross	2	3	4	2	2	3
	Elmstead Market	3	4	4	3	3	4
	Frating	2	3	4	1	1	1
	Great Bromley - Hare Green	3	4	6	3	5	7
	Harwich	3	3	4	2	3	3
	Manningtree	8	10	10	9	9	10
	A137 - Between Ardleigh and Manningtree	4	5	6	4	5	5
Overall assessment combining all areas		**6**	**8**	**9**	**6**	**8**	**8**

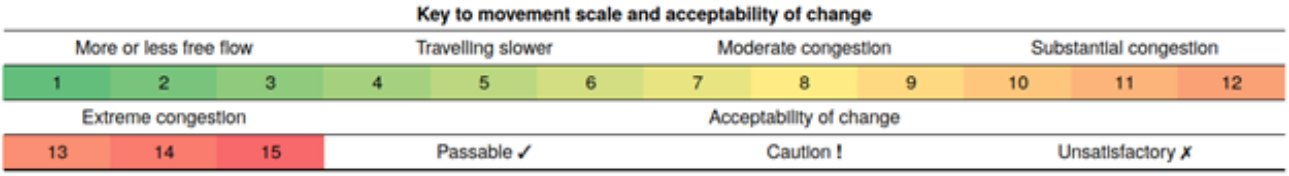
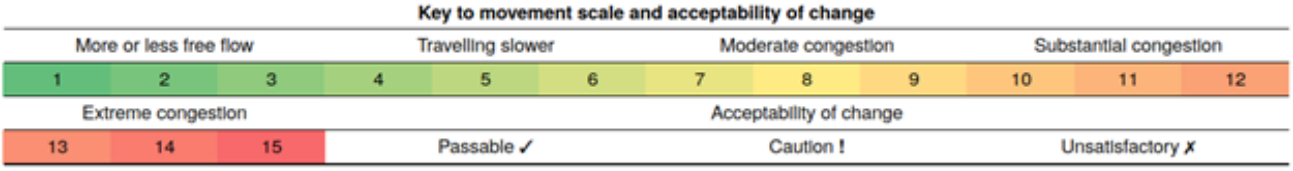


Table 2-8 then uses the change in score to provide an assessment on the acceptability of the change from the perspective of a highway authority. In this table Scenario 1 is compared to the 2023 base – for the which the AM and PM period indicates unacceptable performance along Clingoe Hill and the A133 Colchester Road roundabouts. The index also brings up a caution around the network performance around Manningtree.

Table 2-8 also shows the acceptability of Scenario 2 – which is assessed by comparing the change from Scenario 1 (the reference case). This shows severe impact remains at A12 J29, Clingoe Hill and Colchester roundabout. This is because if a section of the network is already experiencing substantial to extreme congestion, small increases in traffic can be unacceptable. Meanwhile, movement along the A120 west of the Horsley Cross junction is flagged as a concern, particularly in the westbound direction. Should the Horsley Cross garden village build out further than the 2043 quantum, it would be expected that the concern flag could worsen to being unacceptable – indicating the need to consider mitigations on the A120 route. A concern flag also appears on the Great Bromley to Hare Green link.

Table 2-8 Movement index acceptability for base, reference and assessment scenarios without mitigation

Sector	Location	AM Peak Impact			PM Peak Impact		
		2023 Base	2043 S1 RC	2043 S2 BAU	2023 Base	2043 S1 RC	2043 S2 BAU
East Colchester	Greenstead Roundabout, Colne Causeway & Clingoe Hill	10	✗	✗	12	✗	✗
	A12 J29 / A120 (eastern)	7	✗	✗	7	!	✗
North Tendring	A120 - Link Road Junction	3	✓	✓	2	✓	✓
	A120 – Horsley Cross to Harwich	3	✓	✓	3	✓	✓
	A120 - A133 to Horsley Cross	3	✓	!	2	✓	✓
	A133 Colchester Rd Roundabout	9	✗	✗	8	✗	✗
	B1035 Horsley Cross	2	✓	✓	2	✓	✓
	Elmstead Market	3	✓	✓	3	✓	✓
	Frating	2	✓	✓	1	✓	✓
	Great Bromley - Hare Green	3	✓	!	3	✓	!
	Harwich	3	✓	✓	2	✓	✓
	Manningtree	8	!	✓	9	✓	!
	A137 - Between Ardleigh and Manningtree	4	✓	✓	4	✓	✓
Overall assessment combining all areas		**6**	**8**	**9**	**6**	**8**	**8**



The aggregated conclusions gathered in the tabular analysis can be supported by the specific sections of network on Figure 2.10 that further darken and are far below their free flow speed compared to the equivalent Figure 2.8 for the reference case; namely along the A120 west of Horsley Cross and routes feeding into the A133 Weeley to Frating corridor which now interact with Hare Green demand. There is also an extension of the slower speeds previously confined to some parts of Manningtree to the entire B1035 down to Horsley Cross. The AM peak, although problem areas in the PM peak are similar and the plots can be viewed in full in Appendix D.

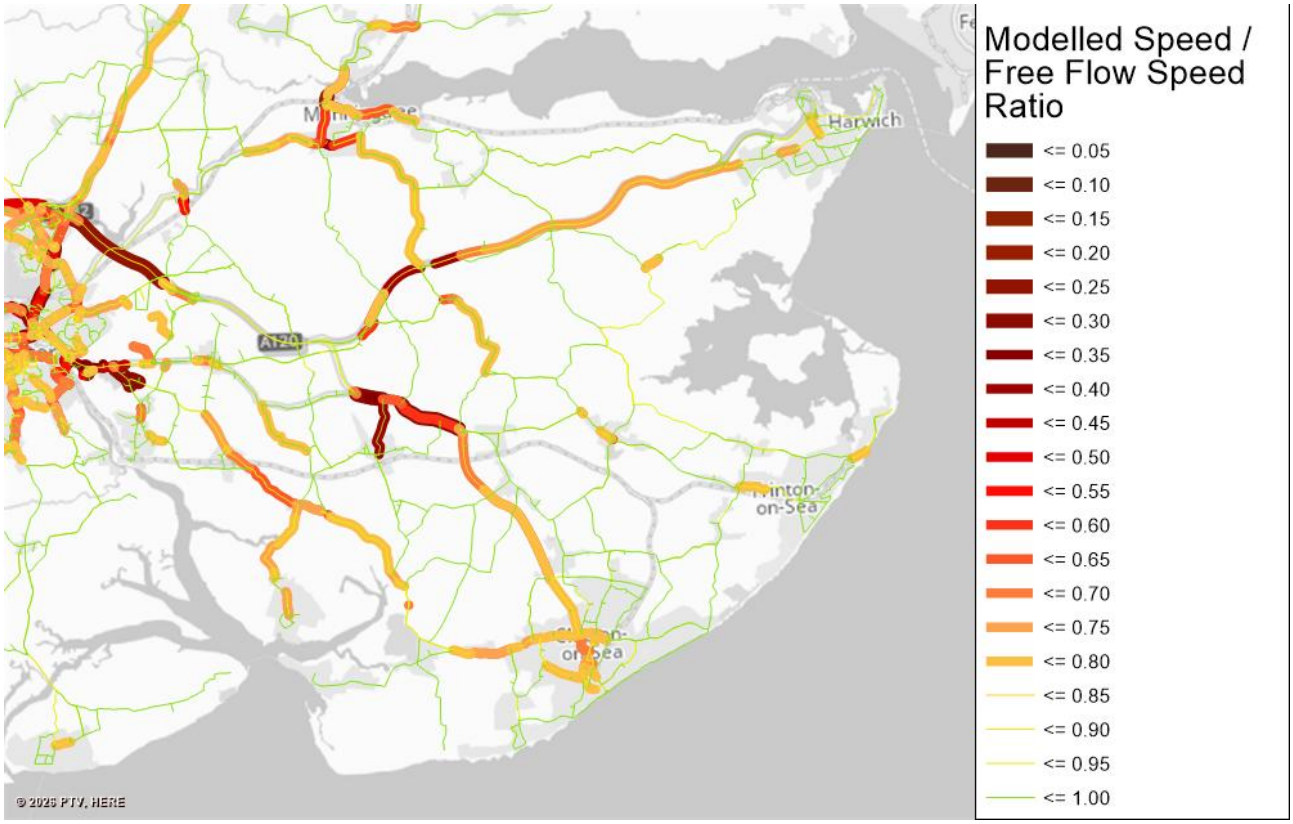


Figure 2.10 2043 S2 Assessment Forecast AM peak Speed Ratio

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 explained the assumptions for housing and employment growth in the scenarios, how trip quantities were generated and the modelled network.

Substantial and extreme congestion was observed in the reference case, indicating the requirement for reference case growth, including TCBGC, to contribute to mitigations. When proposed new plan growth was added, network performance problems worsened, which are considered unacceptable from the perspective of a highway authority.

Problem locations include approaches to Colchester at A12 J29 and along Clingoe Hill; along the A133 between the A120 and Weeley, which can be affected by seasonal traffic; A120 past Horsley Cross garden village; the route between Great Bromley and Hare Green; and at Manningtree.

The next chapter proceeds to consider vision-led mitigation to address the cumulative impact of reference case and new local plan growth.

3. Integrated Transport Solutions

Chapter 2 presented evidence from North Essex Model (NEMo) that the unmitigated business as usual (BaU) transport impacts of preferred site allocations lead to unsatisfactory impact on movement through the network, most especially at the A133 Colchester Road Roundabout and junctions around Manningtree. Traffic is also expected to be slower along the A120-A133 to Harwich route between Hare Green, Horsley Cross and Dovercourt allocations. The local plan growth also worsens the performance of the network in East Colchester and adds to the requirements for mitigation at A12 J29 and the Greenstead roundabout, that have already been identified in the equivalent Colchester Local Plan Reg 19 mitigation report.

3.1 Mitigation Strategy

3.1.1 Overview and Vision Led

In order to develop the vision-led mitigation approach categories of interventions have been identified:

- **land use** – such as land use planning and parking policies to support ST
- **walking** – including legible, safe and secure streetscape design and, where appropriate, pedestrianisation
- **cycling** – which can include cycle lanes, secure cycle parking and cycle training but also cycle and scooter hire (sometimes called shared micromobility)
- **rapid transit and bus** – including new or enhanced bus rapid transit (BRT), local bus or Park and Choose (P&C) services along with supporting measures such as bus priority schemes, real time information and fare incentives
- **mobility hubs and interchanges** – which support integrated transport and can include car clubs, demand responsive transport and last mile freight consolidation at key rail and bus interchanges
- **travel planning** – which include measures to encourage ST at new developments
- **highways and networks** – which recognise that rebalancing the network towards ST whilst keeping people and goods moving will involve highway schemes, enhanced
- **traffic management systems**, interventions to support road safety and extended maintenance to look after highway, railway and infrastructure

New rail services per se have not been mentioned in the description of the categories as they are not considered a practicable or affordable interventions or aligned with specific problems. However, the categories do cover better access to stations by bus, cycling and BRT, improvements at stations with mobility hub features, and are considered within the highway and networks category.

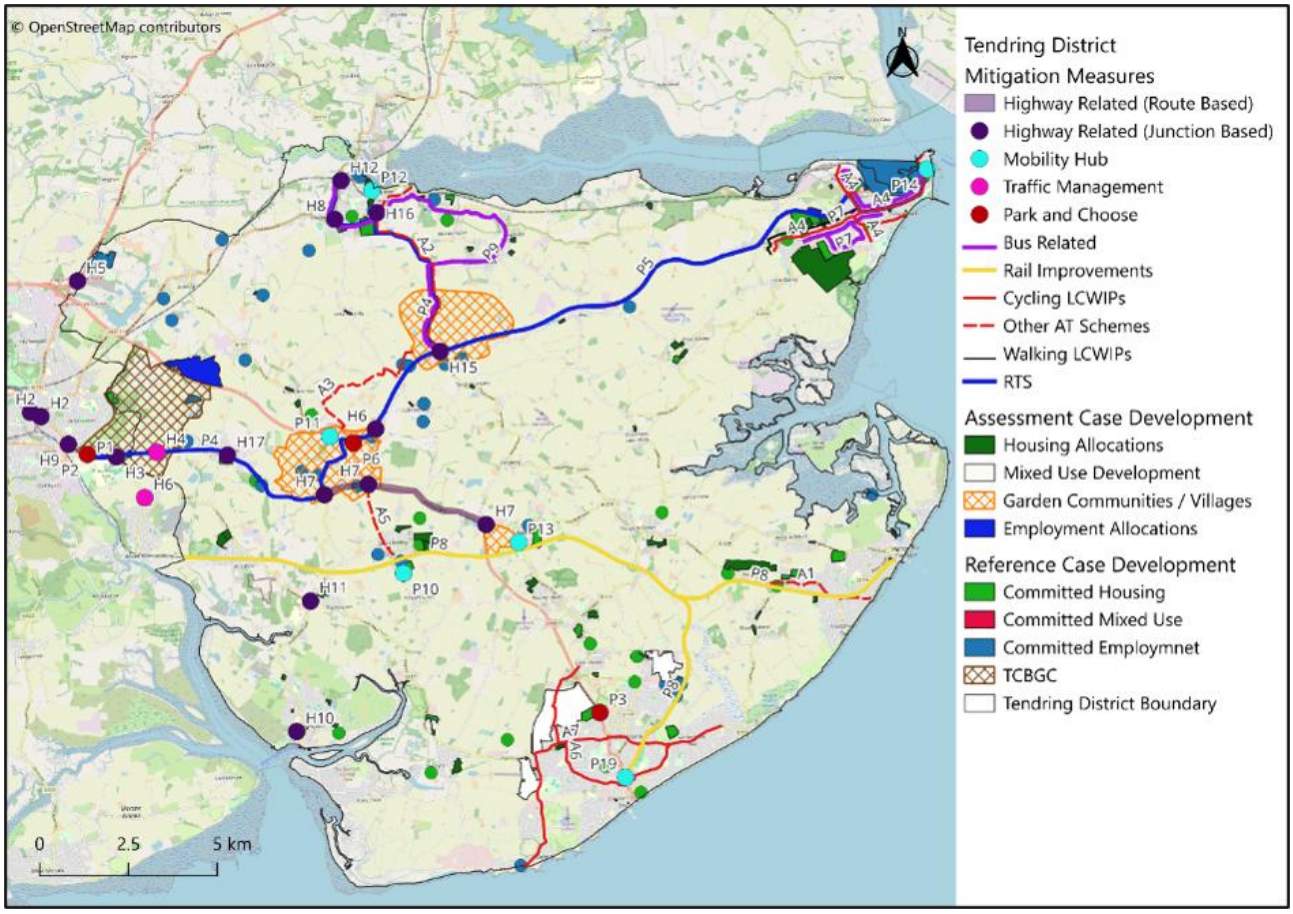


Figure 3.1 Tendring sustainable mitigation strategy

3.1.2 Background Changes and Trends

Tendring District continues to experience change through planned housing and employment growth as outlined within Section 2.3. With this growth, the district is experiencing regeneration and changing demographic patterns within its existing market towns and emerging new communities at Hare Green, Horsley Cross and at the Tendring Colchester Borders Garden Community. As these areas develop, travel demand is expected to increase, placing additional pressure on key transport corridors and local transport networks.

Tendring's transport characteristics differ from other more urban authorities within Essex, with a mix of coastal towns, market towns and rural settlements, there are varied travel patterns and differing levels of access to services. Many communities are dependent on connections to larger centres, particularly Colchester, for employment, retail, education and healthcare. This creates strong travel flows along key east-west corridors and highlights the importance of public transport and sustainable travel links between Tendring and neighbouring authorities.

Historically, growth in travel demand has been accommodated primarily through private car use. This reliance is particularly evident within Tendring, where dispersed settlements, rural communities and longer travel distances can limit opportunities to travel by public transport or active modes. However, this approach is becoming increasingly difficult to sustain, with congestion and journey time reliability remaining key challenges along the strategic routes of A120 and A133 arteries through the district. Further growth in car-based travel would place additional pressure on network capacity, accessibility, connectivity and economic

productivity. Recognising these challenges, Essex County Council's (ECC) draft Local Transport Plan (LTP)[22] 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.

Transport planning priorities have evolved significantly in recent years. Whilst supporting growth remains a key objective, greater emphasis is now placed on creating places that are more connected, healthier, more sustainable and less dependent on car travel. This approach is reflected through national planning policy, ECC transport strategies including ECC's LTP4 implementation plan for Tendring[23] and the Tendring District Local Plan. Collectively these documents aim to ensure that new development is supported by high-quality sustainable transport infrastructure and that opportunities exist to walk, cycle and use public transport are maximised wherever possible. In addition, local masterplans including Dovercourt's Town Masterplan[24] and Clacton's 'Love Clacton' regeneration plan[25] place a greater emphasis on placemaking initiatives and making these areas more pedestrian friendly to encourage active journeys, create safe, characterful places and attract tourism which is central to Tendring's economy.

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, environment 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. Whilst travel distances can be longer in Tendring than those typically experienced in urban areas, there is significant potential to increase active travel for local journeys within the district's towns, neighbourhood centres and tourist destinations Improving connections between residential areas, town centres, schools, rail stations and employment sites can support healthier and more sustainable travel choices.

Tendring's Local Cycling and Walking Infrastructure Plans (LCWIP) in Clacton, Harwich and Dovercourt, Manningtree, Frinton and Walton, seek to improve connectivity between key destinations across the towns by delivering a coherent network of walking and cycling routes. This responds to evidence that a significant proportion of journeys within these towns are relatively short and could be undertaken by active modes where suitable infrastructure is available. These networks could be particularly beneficial in these town centres and rail station locations, helping to improve access to local services while strengthening connections between towns.

Technology is also influencing how transport networks are planned and used. Improvements to 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, the Mobility Hubs and Integrated Transport Halts[26] 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 car ownership.

A similar evolution can be seen in parking guidance. The EPOA Essex Parking Guidance (2024)[27] recognises the importance of parking in supporting residents, visitors and businesses, whilst encouraging its careful integration to promote active and sustainable journeys and enable lifestyles free from car ownership, where possible. This reflects an increasing focus on managing travel demand and influencing travel behaviour, rather than simply providing additional parking capacity.

[22] A Better Connected Essex - Essex Transport Strategy Full Draft, 2025

[23] Implementation Plan: Tendring Coast, A Better Connected Essex – Essex Transport Strategy, 2025

[24] Dovercourt Masterplan Revisited (Dovercourt Rediscovered): Final Report, 2019

[25] Clacton Town Vision and Regeneration Programme, Clacton Town Board, 2025

[26] Mobility Hubs and Integrated Transport Halts, ECC, September 2024.

[27] Essex Parking Guidance Part I: Parking Standards, Design and Good Practice, Essex Planning Officers Association (EPOA), 2024

Collectively, these strategies demonstrate a clear and consistent shift in the direction of transport planning within Tendring and across Essex. Whilst accommodating future growth remains a key objective, there is increasing emphasis on providing greater transport choice, improving access to sustainable modes and creating a more integrated transport network. This is particularly important in strengthening connections between Tendring's communities and key destinations, as well as to Colchester, where significant proportions of residents' travel for employment, education, healthcare and leisure purposes. As Tendring continues to grow and connectivity by sustainable modes improves, travel behaviour is expected to evolve, supporting a gradual rebalancing between transport modes for both local journeys and cross-boundary trips.

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 equally 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 cycling connections, frontage works and other measures necessary to make the development accessible 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 within this evidence base.

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. These 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 that development.

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 the 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 networks, 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 outstanding non-consented developments, including developments currently progressing through the planning application process where planning permission has not yet been granted and planning obligations have not been finalised. Contributions should be sought only where mechanisms exist to secure or revise infrastructure contributions, or where developments would derive measurable benefits from the strategic transport interventions identified within this 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 this 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 necessary to support planned growth from committed developments and growth over the local plan period to 2043 and to mitigate the impacts arising from forecast increase 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 Tendring.

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 decisions and consideration with 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 Appendix B. 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 workstreams.

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 placemaking 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 opportunities. The key highway schemes are:

- Upgrades to town traffic control technologies to coordinate traffic movements by all modes across Tendring's towns.
- A133 corridor improvements package including junction improvements at key junctions in Frating and Weeley
- B1029 improvements in Brightlingsea
- Horsley Cross Roundabout
- Harwich Road roundabout junction with the A120

With close links with Colchester and the growth in travel demand accessing the city, highway impacts are seen at key junctions within Colchester where Tendring demand predominantly routes. There is a need for Tendring to contribute towards mitigating these impacts to support cross-border travel and access to Colchester services. The key cross-border highway schemes are:

- A12 J29 signalisation and widening of the A120 off-slip
- Greenstead roundabout and Wivenhoe Park Corner junction coordinated with RTS priority and crossings
- Part signalisation of St Andrews Avenue junctions with Ipswich Road and Harwich Roads.

3.2.2 Dynamic Traffic Management

New homes, jobs, market town 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 traffic management 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 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.

The outcome will be improved traffic flows, journey time reliability and reduced congestion on the network. This matters because traffic management is an enabler for many things – growth, public transport reliability, active travel, air quality, town centre vitality, development viability and ultimately value for money.

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 time 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 efficiently, 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 reduction of up to 8% in the peaks.

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. Its six-month pilot reported 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 on going revenue support 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. It would also naturally coordinate with NH traffic management systems on the Strategic Road Network (SRN).

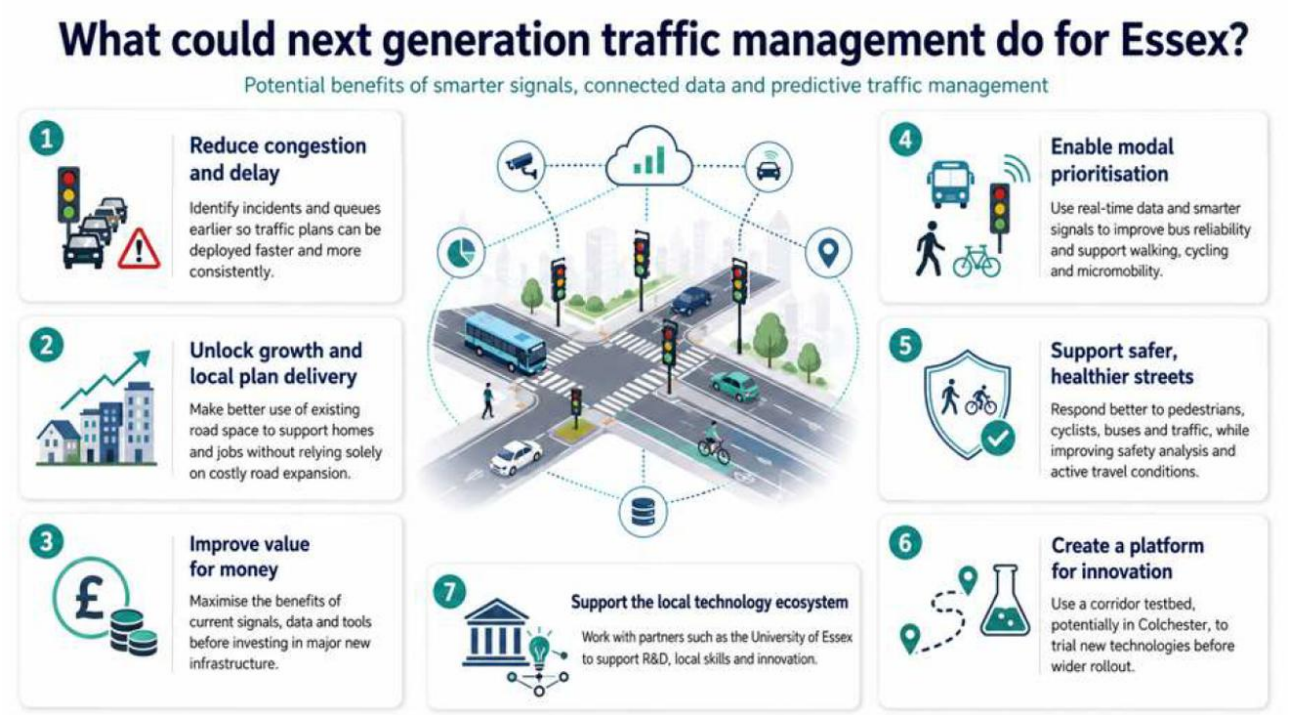


Figure 3.2 Dynamic traffic management vision

3.2.3 A120 to Harwich

Along the A120 to Harwich corridor, traffic movements are expected to be slower between Hare Green, Horsley Cross and Dovercourt allocations. Whilst modelling indicates that the impact of development growth is not significant within the local plan period, Horsley Cross Roundabout is an existing pinch point on the network, and its operational performance is not fully reflected within the strategic modelling.

To address this, mitigation at Horsley Cross Roundabout is likely to be achieved through:

- targeted capacity improvements to the existing roundabout to support the initial phases of development
- delivery of a more significant improvement scheme beyond 2043, as outlined within Section 4.2.

To support efficient access to the proposed Hare Green Garden Village and minimise additional delay on the A120, improvement needs at the Harwich Road/A120 roundabout have also been identified. These measures will help maintain journey time reliability along the corridor whilst accommodating planned growth.

3.2.4 A133 – Hare Green to Clacton (N-S)

The A133 provides a key North-South connection between the A120 Hare Green junction in North Tendring and Clacton-on-Sea and is one of the principal routes to the Tendring coast. The corridor experiences high traffic volumes, particularly during the summer months when seasonal demand increases. Whilst these seasonal variations are not reflected within the strategic modelling (due to its focus on average weekday peak hours), congestion is expected to be heightened during the peak summer months and is likely to be exacerbated by planned growth at either end of the corridor.

To help improve traffic movements along the A133 and enable reliable journeys all year round, the following highway improvements have been identified for the A133 corridor:

- Improvements at Frating Crossroads to manage development-related traffic movements and support priority measures associated with the RTS;
- Improvements at Colchester Roundabout to address existing capacity constraints and accommodate additional demand arising from planned growth; and
- Improvements at the A133 Weeley Roundabout to facilitate access to the proposed Weeley Garden Village and manage increasing traffic movements through the junction.

The above measures have been identified as a coordinated package due to their collective effectiveness at helping to mitigate impacts of development along the corridor. In addition, the section of the A133 between Frating Crossroads and Weeley Roundabout would benefit from further corridor-wide enhancements to improve network performance, journey time reliability and resilience. Consideration should also be given to the operation of adjacent junctions in the vicinity of Colchester Roundabout, including the junctions serving Ravens Green and Heckford's Road, to ensure that any improvements are effective at a wider network level.

3.2.5 Manningtree

Existing congestion within and around Manningtree, particularly along the B1352, is expected to worsen with local plan growth, forecast to reach 'substantial' levels by 2043. The corridor performs an important local function, providing access between residential areas, Manningtree town centre, the wider strategic road network and Manningtree mainline railway station.

To alleviate the forecasted impacts, mitigation along the corridor could be achieved through:

- Improvements to the B1352 junction with A137 Wignal Street to improve junction operation and reduce delay
- Improvements at the B1352 Long Road/Trinity Road junction to accommodate future traffic demand and support network performance
- Improvements at the B1352 Station Road/A137 Cox's Hill Road junction to facilitate access to Manningtree station and manage increased movements

The improvements at the B1352 Station Road junction with A137 Cox's Hill are proposed as part of a wider package to improve multi-modal access to Manningtree station and encouraging more sustainable travel choices. In addition to proposed junction changes, the package is likely to include enhancements for walking, cycling and public transport, together with measures to improve access and connectivity in the vicinity of the station.

3.2.6 B1029

The B1029 has been identified as an important corridor connecting north Tendring with Brightlingsea and plays a key role in supporting local movements between towns, provides access to services, education and employment opportunities. Whilst modelling indicates that the impact of growth on corridor is not

'significant' within the Local Plan period, targeted improvements would help improve traffic movements from committed development, improve network efficiency and help to future proof the highway network.

This is likely to be achieved through improvements at the B1029 intersection with B1027 in Thorrington to improve junction operation and accommodate future traffic demand. Further interventions should seek to support reliable journey times and maintain connectivity for local communities and businesses.

This junction has been identified as a key location on the corridor where intervention may be required to support planned growth and maintain efficient traffic movement. Improvements in this location would help to enhance connectivity between north Tendring and Brightlingsea whilst contributing to the overall performance and resilience of the wider local highway network.

3.2.7 A133 Cross-Boundary

The A133 also serves as a key East-West corridor between Tendring and Colchester, connecting Hare Green and Frating to the TCBGC, Greenstead and central Colchester. The corridor plays an important strategic role in facilitating movement between the two authority areas and is expected to experience increased demand as growth is delivered across both Tendring and Colchester.

The main eastern approach to Colchester from Tendring is via Clingoe Hill and Greenstead Roundabout. Modelling indicates that this corridor already experiences congestion and delay, especially during peak periods, and opportunities for sustainable travel are currently limited. Traffic demand is expected to increase significantly as a result of planned development, including the TCBGC and growth proposed with Tendring. The corridor will also be required to accommodate the proposed Rapid Transit System, providing direct connections to the TCBGC and Park and Choose East site, and supporting the sustainable transport objectives of the Garden Community.

Appropriate mitigation along the corridor is likely to be achieved by:

- Improvements to Wivenhoe Park Corner (A133 Clingoe Hill junction with Colchester Road) to address forecast capacity constraints, improve connectivity between Tendring and Colchester, and facilitate priority measures for RTS, bus services, walking and cycling.
- Improvements at Greenstead Roundabout (Figure 3.3) to address existing congestion, accommodate future growth and facilitate the operation of RTS and other sustainable transport measures
- Complementary improvements at the Colne Causeway/Elmstead Road junction to support network operation, improve accessibility and facilitate safe pedestrian and cycle movements
- Improvements at the A133 Clacton Road/Bromley Road junction to accommodate increased demand arising from planned development and maintain network performance
- Coordinated improvements at Lower Ipswich Road and Lower Harwich Road to support the efficient movement of all modes and complement wider corridor interventions.

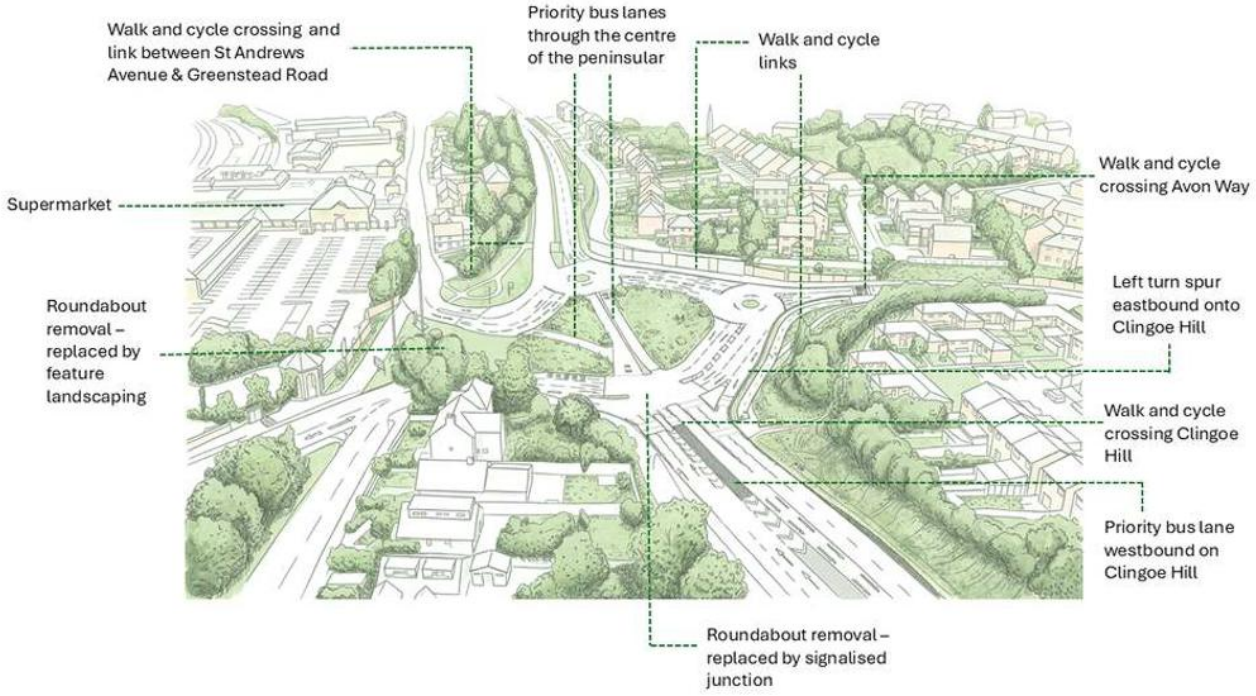


Figure 3.3 Greenstead roundabout integrated transport mitigation ideas

3.2.7.1 A12 Junction 29

A12 Junction 29, located on the Tendring-Colchester boundary where the A12, A120 and Ipswich Road converge, is a key junction on the strategic road network. The junction provides an important connection between Colchester, Tendring and Suffolk and facilitates movement along both the A12 and A120 corridors.

Strategic modelling has identified A12 Junction 29 as a significant network constraint, with demand expected to increase as a result of planned growth in both Tendring and Colchester, particularly the TCBGC. Existing congestion can result in traffic queuing back onto the A120, creating operational and road safety concerns.

Appropriate mitigation at A12 Junction 29 would likely be achieved through:

- extended signalisation to improve the management of traffic movements through the junction
- additional capacity on key junction approaches and slip roads to accommodate future traffic demand
- improvements to junction geometry and operation to reduce delay and improve network resilience

Given the number of individual elements likely to comprise the overall scheme, delivery may be phased over time, allowing improvements to be implemented incrementally as funding becomes available.

Together, the A12 Junction 29 and A133 corridor improvements are expected to play a critical role in maintaining connectivity between Tendring and Colchester, supporting planned growth and improving the performance of the wider strategic transport network.

3.3 High Quality Public Transport

High Quality Public Transport (HQPT) will play a fundamental role in accommodating future growth in Tendring, providing an attractive alternative to private car travel and supporting the creation of sustainable, well-connected communities. The concept of HQPT extends beyond the provision of conventional bus services and is characterised by a combination of six principles which help create a public transport offer that can compete effectively with the convenience of the private car:

- **Fast** – competitive journey times through priority and direct routing
- **Reliable** – protected from congestion and supported by traffic signal priority
- **Frequent** – turn-up-and-go services throughout the day
- **Integrated** – seamless interchange with rail, active travel, mobility hubs and Park and Choose
- **Accessible** – inclusive infrastructure and services for all users
- **Scalable** – capable of increased capacity and service enhancements as demand grows

Figure 3.4 shows the aim for a rapid transit network extending from Colchester to Tendring (further detail in Section 3.3.2), which combines rail and rubber-tyred RTS routes, which connects with P&C facilities. These routes are integrated with the local bus, cycling and walking networks. The list of public transport related mitigation and connectivity measures for the IADP is provided in Appendix E.

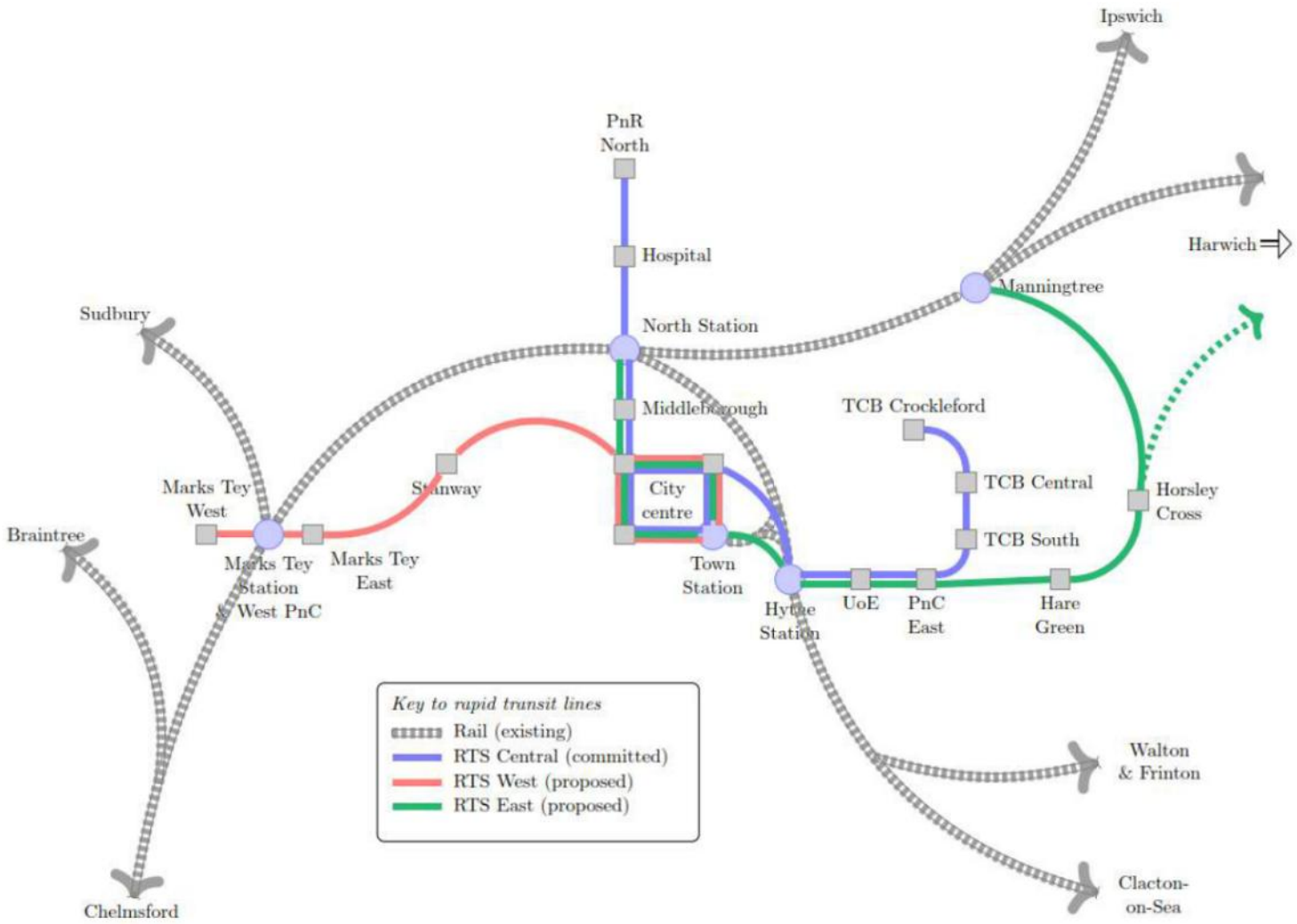


Figure 3.4 Proposed rapid transit system

3.3.1 Rail

Tendring has two main railway lines providing E-W connections between Colchester and Tendring's coastal towns. The Sunshine Coast railway line branches off the Great Eastern Main Line and splits at Thorpe-le-Soken to provide services to both Clacton-on-Sea and Walton-on-the-Naze. The Harwich line in North Tendring connects Colchester to Harwich Town and International Port, providing both passenger and freight services. Clacton-on-Sea has direct hourly trains running to Colchester, Chelmsford and London. Walton-on-the-Naze provides an hourly shuttle to Colchester and the Harwich branch line offers a service to Manningtree with connections to London and Norwich.

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

Mobility hubs are proposed at several stations within Tendring's council area, in accordance with the Mobility Hubs and Integrated Transport Halts[28]. The scale and typology of each hub will reflect station characteristics, including service frequency, passenger demand, surrounding land uses and wider transport connectivity. Stations located within existing urban areas including Manningtree, Great Bentley and Clacton-on-Sea are likely to require Typology 1 or 2 hubs, which are the highest grade of hubs, whilst Weeley station is likely to be more appropriately served by Typology 2 or 3 hubs, which are lower grade provisions tailored specifically to communities.

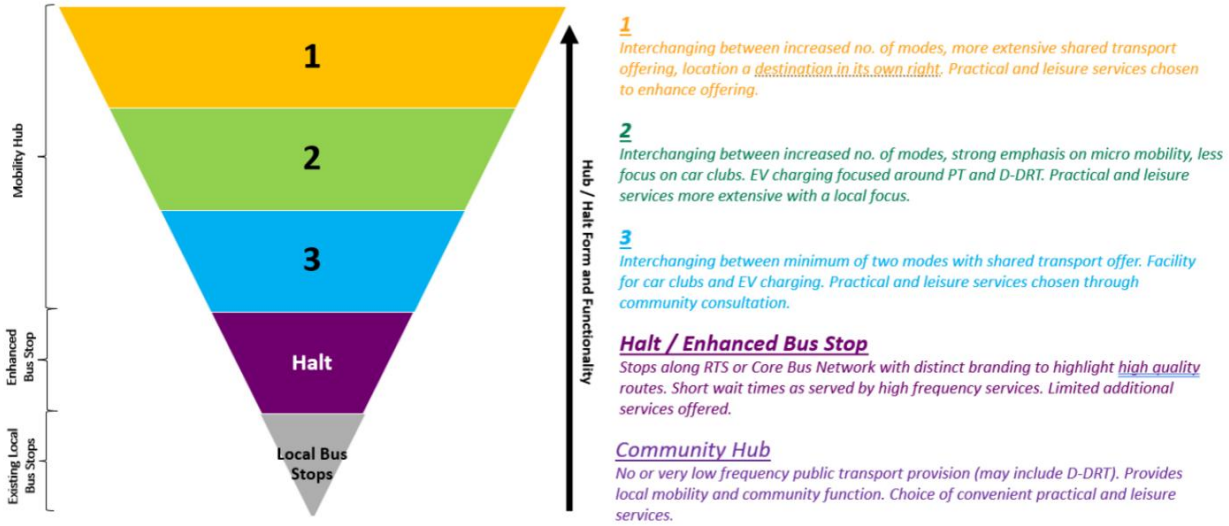


Figure 3.5 Types of mobility hubs

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 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.

Manningtree Station is a key transport hub, with direct access to the Great Eastern Main Line and is proposed to receive the most significant package of accessibility and interchange improvements. Building on work undertaken through the Manningtree Transport Package, the proposals aim to address existing constraints around station access and connectivity. The provisions including a mobility hub facility to improve interchange between transport modes; walking and cycling access improvements; a level crossing replacement; and some targeted highway junction alterations to enable better access to the station and facilitate bus priority.

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

At Great Bentley, Weeley and Clacton-on-Sea Stations, mobility hub interventions would focus on strengthening links with local bus services, walking and cycling networks and town or development centres. These interventions will support the role of the rail network as a key component of the district's sustainable transport strategy and enable increased rail mode share throughout the Local Plan period.

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 improvement would likely fall beyond the plan period but are considered critical to supporting growth post-2043. Table 3-1 summarises the key schemes required which have been informed by Transport East studies. Not shown in the table is also the need for capacity enhancements at Liverpool Street and Stratford Stations since these support national and regional growth beyond Tendring.

Table 3-1 Transport East Rail Schemes

Line	Journey	Current service	Longer term aspiration	Rail journey time	Road journey time	Key schemes needed to unlock longer term aspiration
Great Eastern Main Line	London – Manningtree	2tph (fast) + 3tph (stopping)	3tph (fast) + 3tph (stopping)	47 mins (fast), 1hr (stopping)	1hr 30	• Remodelling of Bow junction west of Stratford • Remodelling of Haughley Junction north of Chelmsford
	Manningtree – Norwich	2tph (fast)	3tph (fast)	1hr	1hr 30	
Branch Lines	Colchester – Clacton-on-Sea	2tph in peak/ 1tph off-peak	2tph	30 mins	35 mins	• Increasing frequency to 2tph considered feasible • Possibly reconfiguration of Marks Tey station
	Colchester – Walton-on-the-Naze	1tph	2tph	50 mins	40 mins	

3.3.2 Rapid Transit System

3.3.2.1 RTS East

RTS East is the third of Colchester's RTS services proposed to connect to the proposed garden village developments at Hare Green and Horsley Cross. This route is shown in Figure 3.4and will be part of the strategy to mitigate the traffic impact of growth and improve sustainable connections. RTS East would be supported by highway infrastructure and dedicated running lanes along the A133.

The intention would be to provide an initial RTS route between Colchester, Hare Green, Horsley Cross and Manningtree within the local plan period. However, a viability assessment is required to understand whether this is feasible within this timeframe. Beyond the plan period it is anticipated that the RTS would then be extended out to Harwich, facilitating access to the freeport employment areas, with further detail in Section 4.2.

3.3.3 Local Buses

The local bus network forms a key component of the approach to improve the integration of transport in Tendring's key market 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, the city centre 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 Tendring 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 increased service frequencies, 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 to improve access to key destinations across the wider Tendring and inter-urban cross-border Colchester 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 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.

Areas identified for local bus service improvements include Manningtree and Harwich. There is an opportunity to provide a town and port shuttle service within Harwich town to improve sustainable transport connections from local development sites to the Harwich freeport employment areas. However, this requires further investigation to determine routing and feasibility.

In addition to route improvements, several mobility hubs will be provided across Tendring to expand the reach of public transport services. These will include hubs at the stations identified in Section 3.3.1and those that operate as separate interchange locations including one in Harwich town centre and one at the Hare Green development site.

Two Park and Choose sites have also been identified, including one in Clacton and one at Hare Green. Provision of a P&C site at Clacton would help to reduce traffic flows into the town centre, support bus use and seasonal access to the coast. Whilst the network impact of the local plan growth is not significant in Clacton, improving bus connections will help to improve network resilience and sustainable access. Hare Green's P&C location on the A133 would help to manage growing and seasonal demand along an already busy corridor and would strengthen access to the RTS for residents and visitors travelling from southern Tendring. It would also provide greater flexibility for local bus network planning, enabling services to focus on higher-frequency connections between the P&C sites and Tendring's towns rather than longer inter-urban routes.

3.3.4 Active Travel and Placemaking

Active travel form a fundamental component of Tendring'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.

Tendring has the opportunity to improve network connectivity, accessibility, safety and route quality to support a greater proportion of journeys being made by active modes. In line with national, regional and local transport objectives, Tendring seeks to create coherent and connected networks concentrated within its key market towns, that enables more trips to be undertaken by foot, wheel or cycle, providing choice for users whilst supporting wider health, wellbeing, placemaking and environmental objectives.

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

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

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

3.3.5 Integration with Land Use Planning and Placemaking

Integrating active travel infrastructure with land use planning and placemaking is fundamental to delivering sustainable growth across Tendring. The provision of high-quality walking, wheeling and cycling infrastructure alongside alternatives to private car travel from the outset, help to establish sustainable travel patterns and support 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 Tendring and 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.

Future development and detailed design of active travel infrastructure should be guided by Healthy Streets principles[29], creating streets and public spaces that are safe, attractive, inclusive and accessible for all users. By prioritising the movement of people and providing walking, wheeling and cycling whilst delivering wider benefits relating to health, well-being, social interaction, environmental quality and placemaking.

The focus of the proposed mitigation measures is to provide direct, attractive, continuous connections between and within existing communities, planned growth locations and the wider active travel network.

Two cycling LCWIP routes in Clacton and a small network of cycling and walking routes in Harwich and Dovercourt have been identified from Tendring's LCWIP, discussed further in subsection 3.4.2. These routes connect local plan growth areas to key destinations, public transport interchanges, employment areas, education facilities and/or local centres. The LCWIPs provide a strategic framework for active travel, establishing priority corridors for walking and cycling improvements, 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.

In addition to the LCWIP routes in Clacton, Harwich and Dovercourt, other active travel routes have been identified in other local plan growth areas.

A key focus area for active travel investment is the Manningtree to Great Bentley corridor, where significant planned growth coincides with substantial gaps in active travel infrastructure, providing a significant barrier to non-motorised user travel and so impacting modal share within these new developments. To address this, a greenway has been identified extending from Manningtree Station to both the Horsley Cross and Hare Green developments. An additional active travel link is proposed between Hare Green development and Great Bentley Station and mobility hub, extending this connection further and facilitating multi-modal journeys. There are additional opportunities to connect these routes into the wider LCWIP networks to form a more comprehensive active travel network between these key areas of growth. It is important that land ownership is considered when assessing the feasibility of these routes.

By integrating active travel infrastructure with the location and design of future growth, opportunities can be created to establish connected and accessible neighbourhoods where a greater proportion of daily journeys can be undertaken by sustainable modes. This will help to manage future transport demand, support the efficient operation of the wider transport network and contribute to broader objectives relating to public

[29] Healthy Streets online guidance, 2026

health, carbon reduction and place quality. Active travel infrastructure should therefore be viewed not only as a transport intervention, but as a fundamental component of successful placemaking and the creation of sustainable communities across Tendring.

3.3.6 Connecting Development to LCWIP and Safe Routes

The urban areas of Clacton, Dovercourt and Harwich all have LCWIP networks which provide a strategic framework for the long-term development of walking and cycling infrastructure. 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. The primary LCWIP routes are focused within urban areas where there are multiple trip attractors and more potential to replace short car journeys with active travel.

Countywide LCWIPs have also been identified for Essex, providing a network of longer distance active travel links. These routes typically connect rural areas to settlements and towns and provide opportunities for recreational walking and cycling.

The phased implementation of the LCWIP networks will be essential to realising its long-term vision and supporting sustainable travel patterns as Tendring grows over the local plan period.

To support planned growth, a number of 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 LCWIPs from the outset will help to 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 Tendring area.

Figure 3.6 and Figure 3.7 illustrate the strategic walking and cycling networks identified within the LCWIP and their relationship to other proposed active travel mitigation measures.

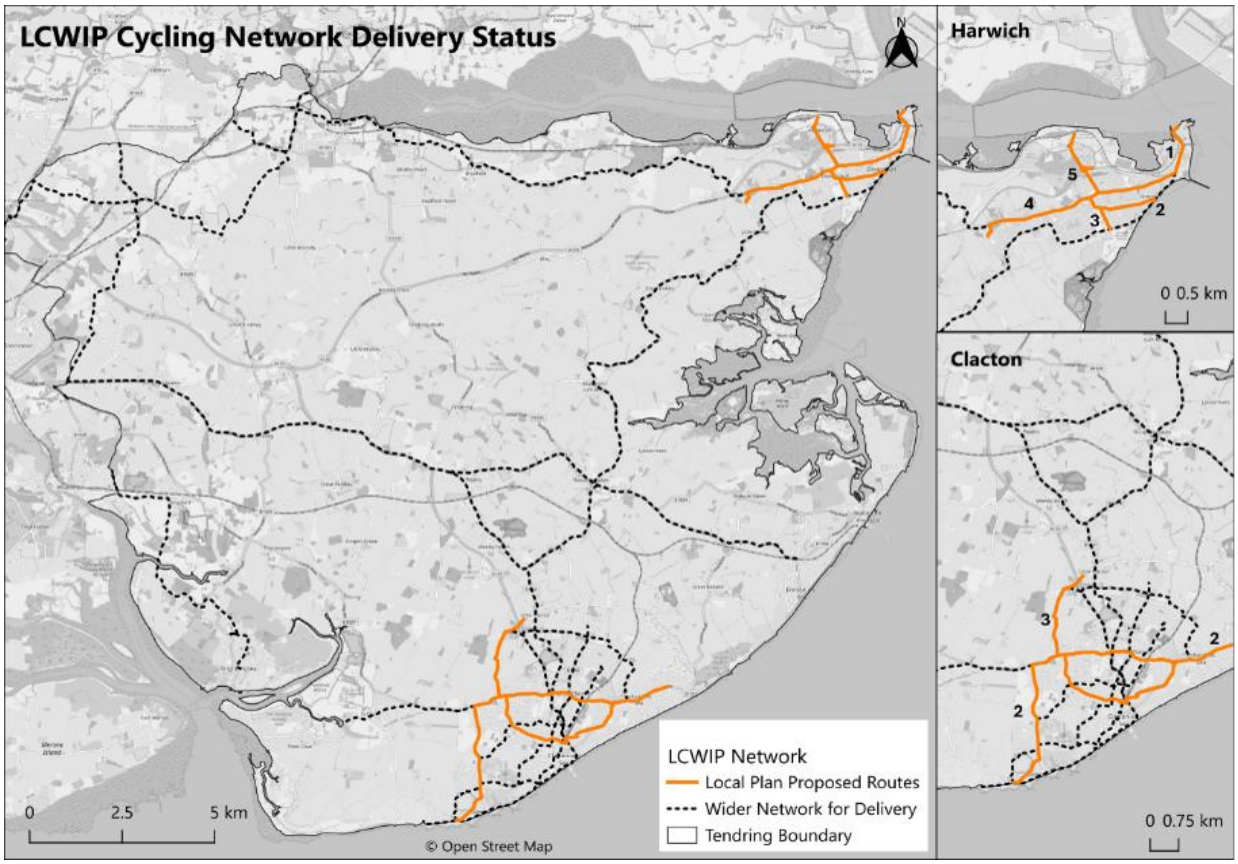


Figure 3.6 Proposed LCWIP cycling network

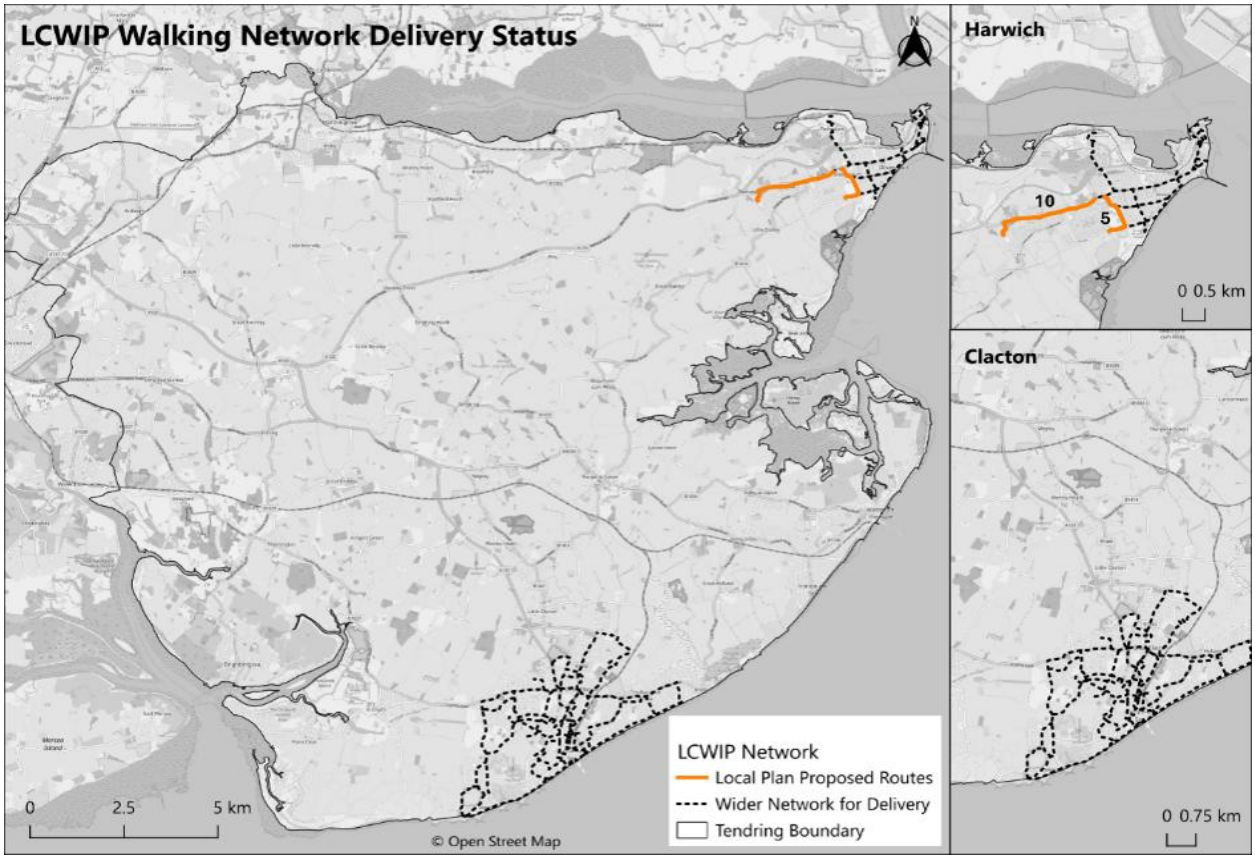


Figure 3.7 Proposed LCWIP walking network

In addition to the strategic LCWIP corridors, a series of complementary active travel connections have been identified to provide, safe, direct and attractive access between development areas and the wider active travel network. These links will help address existing gaps in connectivity, reduce barriers to active travel and support seamless journeys between neighbourhoods and destinations. Collectively, this approach will enhance the attractiveness and practicality of active travel for a broad range of trip purposes and journey lengths.

Figure 3.8 and Figure 3.9 identifies the proposed development 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.

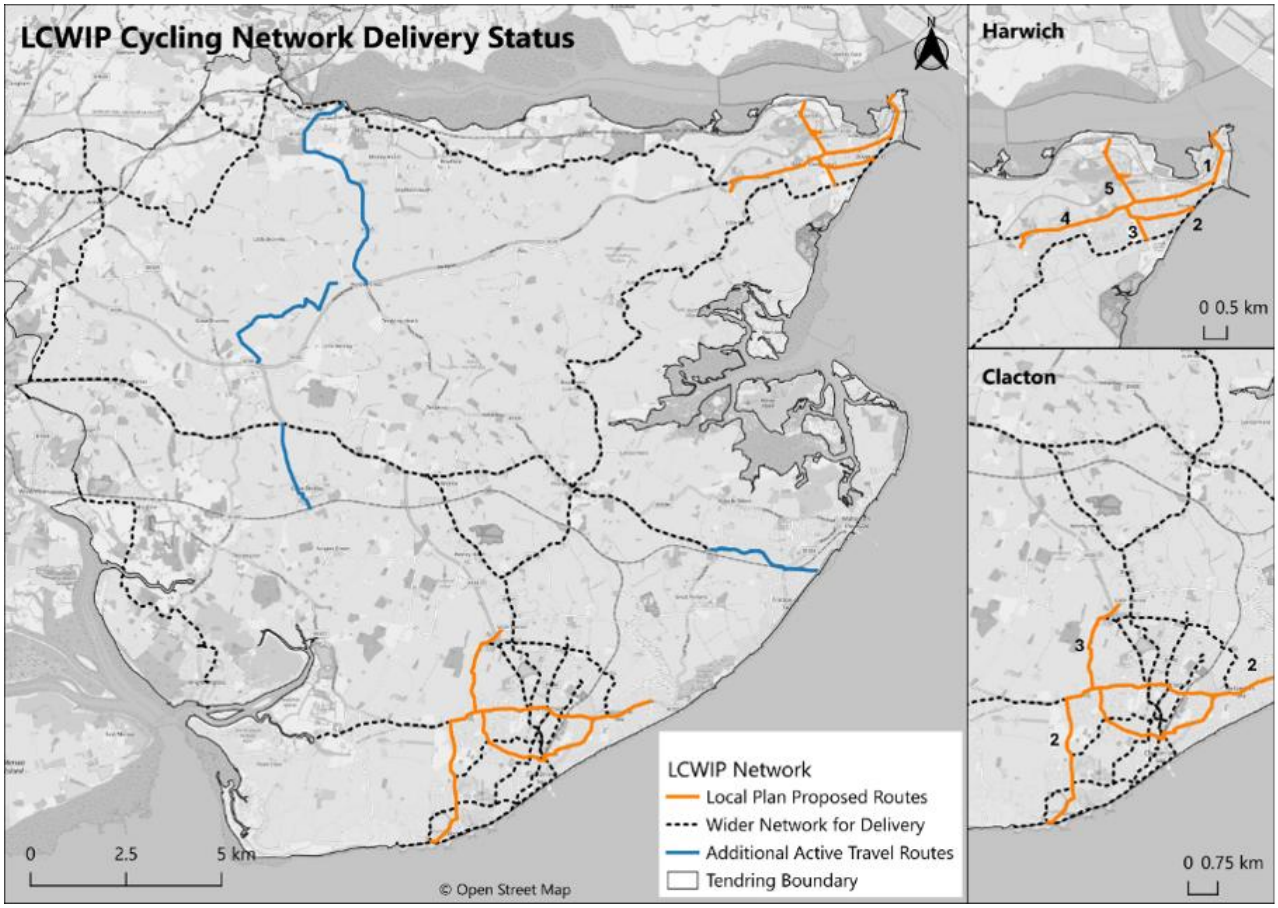


Figure 3.8 Proposed LCWIP cycling network alongside additional Local Plan active travel schemes

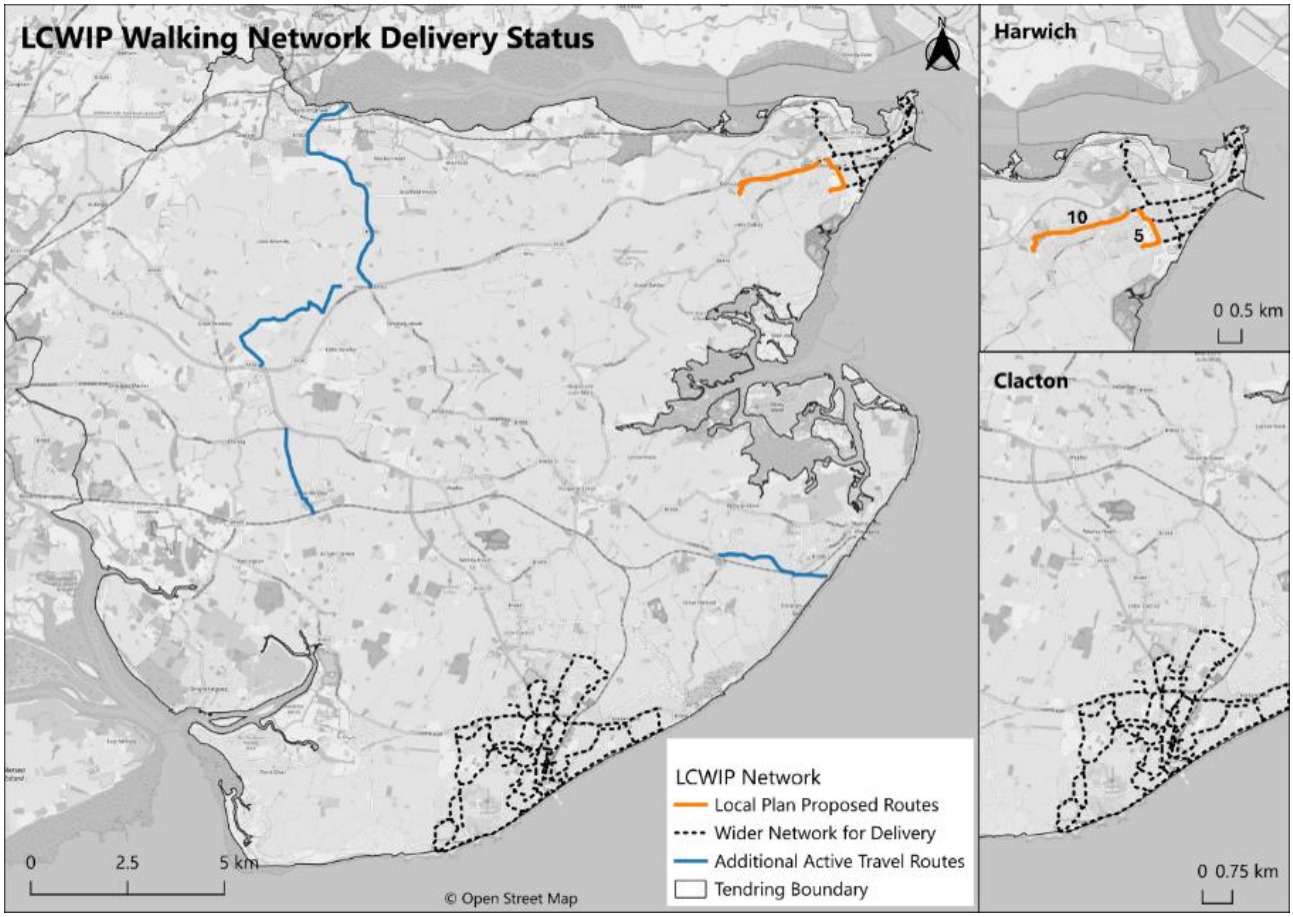


Figure 3.9 Proposed LCWIP walking network alongside Local Plan active travel schemes

3.3.7 Proportionate Contributions to LCWIP

The delivery of the Tendring LCWIP networks 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 LCWIP 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 LCWIP. This will broaden the funding base and reflect the cumulative nature of impacts.

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

3.4 Conclusion

This chapter has set out a comprehensive and vision-led transport mitigation strategy to support the preferred site allocations and planned growth across Tendring to 2043. Building upon the transport

challenges identified in the baseline assessment 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, and broader national and regional ambitions for growth, liveability, and placemaking.

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, high quality 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 choices for residents, businesses and visitors.

This 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, this 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 tests the measures in NEMo, microsimulation and junction models, and finds that the transport impact of growth can be acceptably managed if the integrated transport schemes are delivered.

The chapter uses NEMo to test the key highway and public transport schemes with a BaU assumption of trip demand, in which transport behaviour is similar to now. NEMo is then run taking into account a switch to greater levels of sustainable travel to reflect the impact of measures not directly applied in the strategic model.

The next chapter explores how robust the integrated transport measures will be to support growth beyond 2043 and the extent to which they provide the foundations for a transport system aligned to the long term vision for sustainable, well-connected, inclusive, vibrant and diverse places.

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 Tendring as well as some already committed sites, which is further explained in Chapter 6.

4.1 Key Findings of Assessment Growth with Mitigation

Two mitigation scenarios have been developed in NEMo to test the likely effectiveness of the mitigation approach described in Chapter 3.

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

- A12 J29 scheme
- A133 corridor package including Greenstead roundabout and Wivenhoe Park corner changes, partial signalisation at St Andrews Avenue roundabout with Ipswich and Harwich Roads, and extension of RTS and local bus priorities.
- Small enhancements, such as widening of entry arms to roundabouts, along the A133 corridor between Frating and Weeley.
- Widening of entry arms for the Harwich Road approaches to the roundabout with the A120 north of Raven's Green.
- RTS East serving Tendring growth areas.

It should be noted that, the above lists measures tested in the NEMo. Further options for junction schemes at locations identified in Chapter 3, that have not yet been assessed in the strategic model, are discussed under the local junction modelling section 4.4.2.

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. While Scenario 3 is run with VDM, Scenario 4 is run as a fixed assignment model to control the amount of car trips.

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

- P&C options for the Horsley Garden community
- mobility hubs and improved rail access
- comprehensive active travel infrastructure
- travel planning and behavioural change measures

As explained in Section 2.2, the movement performance of the scenarios in NEMo involve 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 provide the movement index scores and interpretation of acceptability for movement for Scenarios 1-4. As a reminder, the movement performance is shown on the coloured scale 1-15, whilst concern over the level of change is denoted as passable ✓, caution ! or unsatisfactory X. The acceptability of performance across Scenario 2, 3 and 4 is assessed against Scenario 1, the forecast reference case.

The modelling evidence indicates that Scenario 3 satisfactorily addresses the cumulative impact of reference case and assessment case BaU demand, particularly with respect to returning acceptable conditions at cross-border locations. Some areas of caution, requiring further consideration of details of mitigations, remain. In particular, the individual roundabout schemes tested along the A133 Frating to Weeley, while bringing a modest improvement, do not return the movement of traffic back to acceptable levels (although it should be acknowledged this corridor already suffers with slower travel speeds under present travel conditions). Manningtree and the A120 section between Horsley Cross and the A133 junction also continue to show signs of slower speeds. Consideration of overall satisfactory performance also recognises that further enhancement of the outline concepts is likely as schemes are developed through optioneering and consultation stages.

Performance can be improved further with modest modal shift – which is attainable for short journeys and through the offer of greater choice through P&C or improved cycling infrastructure or access to mobility hubs. This slight improvement using ST demand can be seen in the changes between Scenario 3 and 4, for example in the caution falling away at Manningtree in the PM peak or in the AM peak the removal of the caution at the A120 between Horsley and the A133 junction. While the modelling evidence does not include a reliance on the high levels of ST demand, the ST interventions are considered a critical part of delivery of a comprehensive, integrated transport strategy, improving connectivity and choice of mode.

Therefore, the transport modelling shows that an integrated, vision-led strategy combining infrastructure investment and sustainable travel interventions can largely successfully accommodate planned growth to 2043 and address the severe transport impacts arising from unmitigated growth. Achieving this outcome will require coordinated delivery, appropriate cost apportionment between growth locations in Tendring and Colchester, and sustained mode shift away from private car dependence.

Table 4-1 Movement Index for Scenarios 1-4

Sector	Location	AM Peak Impact				PM Peak Impact			
		2043 S1 RC	2043 S2 AC	2043 S3 BAU Mit	2043 S4 ST Mit	2043 S1 RC	2043 S2 AC	2043 S3 BAU Mit	2043 S4 ST Mit
East Colchester	Greenstead Roundabout, Colne Causeway & Clingoe Hill	15	15	11	9	14	15	10	9
	A12 J29 / A120 (eastern)	12	14	9	9	10	11	9	9
North Tendring	A120 - Link Road Junction	4	4	5	4	3	4	4	4
	A120 – Horsley Cross to Harwich	4	5	4	4	4	4	4	4
	A120 - A133 to Horsley Cross	3	7	6	5	3	4	4	3
	A133 Colchester Rd Roundabout	10	10	10	10	10	11	11	10
	B1035 Horsley Cross	3	4	3	3	2	3	3	3
	Elmstead Market	4	4	4	4	3	4	4	4
	Frating	3	4	3	3	1	1	1	1
	Great Bromley - Hare Green	4	6	5	5	5	7	6	6
	Harwich	3	4	3	3	3	3	3	3
	Manningtree	10	10	9	9	9	10	10	9
	A137 - Between Ardleigh and Manningtree	5	6	5	5	5	5	5	5
	Overall assessment combining all areas	**8**	**9**	**7**	**7**	**8**	**8**	**7**	**7**

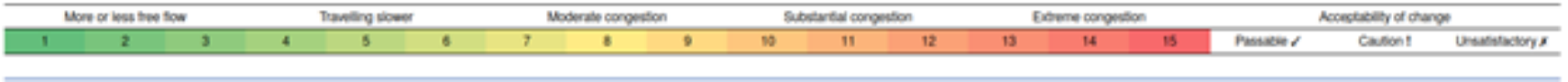
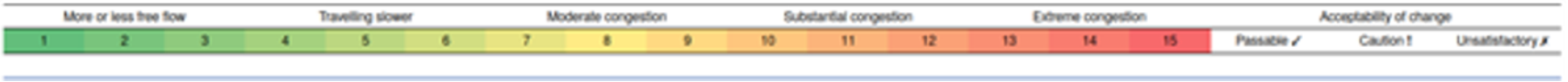


Table 4-2 Movement acceptability index for Scenarios 1 – 4

Sector	Location	AM Peak Impact				PM Peak Impact			
		2043 S1 RC	2043 S2 AC	2043 S3 BAU Mit	2043 S4 ST Mit	2043 S1 RC	2043 S2 AC	2043 S3 BAU Mit	2043 S4 ST Mit
East Colchester	Greenstead Roundabout, Colne Causeway & Clingoe Hill	✗	✗	✓	✓	✗	✗	✓	✓
	A12 J29 / A120 (eastern)	✗	✗	✓	✓	!	✗	✓	✓
North Tendring	A120 - Link Road Junction	✓	✓	✓	✓	✓	✓	✓	✓
	A120 – Horsley Cross to Harwich	✓	✓	✓	✓	✓	✓	✓	✓
	A120 - A133 to Horsley Cross	✓	!	!	✓	✓	✓	✓	✓
	A133 Colchester Rd Roundabout	✗	✗	✗	✗	✗	✗	✗	✗
	B1035 Horsley Cross	✓	✓	✓	✓	✓	✓	✓	✓
	Elmstead Market	✓	✓	✓	✓	✓	✓	✓	✓
	Frating	✓	✓	✓	✓	✓	✓	✓	✓
	Great Bromley - Hare Green	✓	!	✓	✓	✓	!	✓	✓
	Harwich	✓	✓	✓	✓	✓	✓	✓	✓
	Manningtree	!	✓	✓	✓	✓	!	!	✓
	A137 - Between Ardleigh and Manningtree	✓	✓	✓	✓	✓	✓	✓	✓
	Overall assessment combining all areas	8	9	7	7	8	8	7	7



4.2 Assessment Case Forecast with Mitigation and BaU Demand

4.2.1 Balancing Speed and Blocking Back in Each Area of Interest

To help understand why the impact is becoming more satisfactory in Scenario 3 with key highway and public transport mitigation, it is also useful to consider changes in speed and blocking back indicators, which are used in the movement index, for each of the areas of interest.

In the transport model, a blocking back indicator called relative queue is used to identify parts of the network where the desired amount of modelled traffic is not able to pass through in the modelled time period, which causes queues to form. Relative queue is shown as percentages and ranges between 0 (no queue) to 100% (where the entire path link is blocked by the end of the modelled hour). This indicator only appears on the worst performing parts of the modelled network.

The overall assessment has been based on applying the movement index, which com- bines three indicators, queues, speed and capacity, over a selection of areas of interest which would likely be affected by growth at preferred site allocations. This approach has been taken since it helps identify the cumulative impact of growth as well as providing an objective and concise assessment framework. Relevantly, the approach also aligns with the NPPF, which states that "development should only be prevented or refused on highways 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" [December 2024 version of NPPF, para.106].

Each area of interest comprises several paths, which are routes or corridors through an area. For example, one path may go straight ahead at a junction whereas another path may turn left or right. The movement index combines information on speed and blocking back for each path. (The index also includes another indicator of capacity, though this is not considered in this subsection).

Within the movement index, each path comprises a number of links. For each of these links information on speed (as a ratio of free flow speed) and relative queue is extracted from the model. The movement index then combines the information to provide a score for each area of interest, which is then represented on the coloured 1-15 movement scale. In combining the information, weighted averages are used in order that paths with greater demand influence the movement index score more than paths with less demand. An increase in car trips likely leads to a decrease in speed but people and goods could still be able to move around the network acceptably if there is sufficient capacity. An increase in blocking back, however, indicates a build-up of severe queues on sections of the network where there is insufficient capacity. Where this happens, there is likely to be greater variability in journey time and people and goods would not be moving acceptably through the network.

Figures 4.1 and 4.2 show the speed ratio aspect of the index calculation, for Scenario 2 and 3 respectively, for the AM peak. The AM peak is overall more congested than the PM, and viewing the individual speed ratio plots helps unpack smaller changes in speed ratio at a more granular level compared to the more aggregated movement index in the tables above. More generally, blocking back effects seen via relative queue length plots, are limited in the 2043 forecasts for Tendring, therefore focus is placed on exploring the speed ratio picture, as in without mitigation modelling impacts in Sections 2.3 and 2.4.

Starting from the northern end of Tendring, speeds around Manningtree and Ardleigh improve because of reduced traffic routeing through local routes in the area, following introduction of the A12 J29 scheme consolidating more traffic onto the SRN. There is also a reduction of traffic as the NEMo VDM represents some trips previously made by car switching to the new Colchester - Manningtree RTS (that also goes via Horsley Cross). Similarly, traffic moves more efficiently along the A120 between Horsley Cross and the A133 junction, albeit speeds remain far below the speed limit on the single lane sections of the A120.

Consistent with the movement indices, the testing of individual junction improvements has not fully mitigated A133 issues between Frating and Weeley. Cross-boundary improvements are evident at approaches to A12 J29 and to Greenstead, with the stationary speeds indicated by black and dark red seen in Figure 4.1 turning to orange or yellow colours in Figure 4.2, indicating speeds are still not at free flow conditions, but are no longer stationary. The safety risk of traffic blocking back onto the A120 mainline is largely removed.

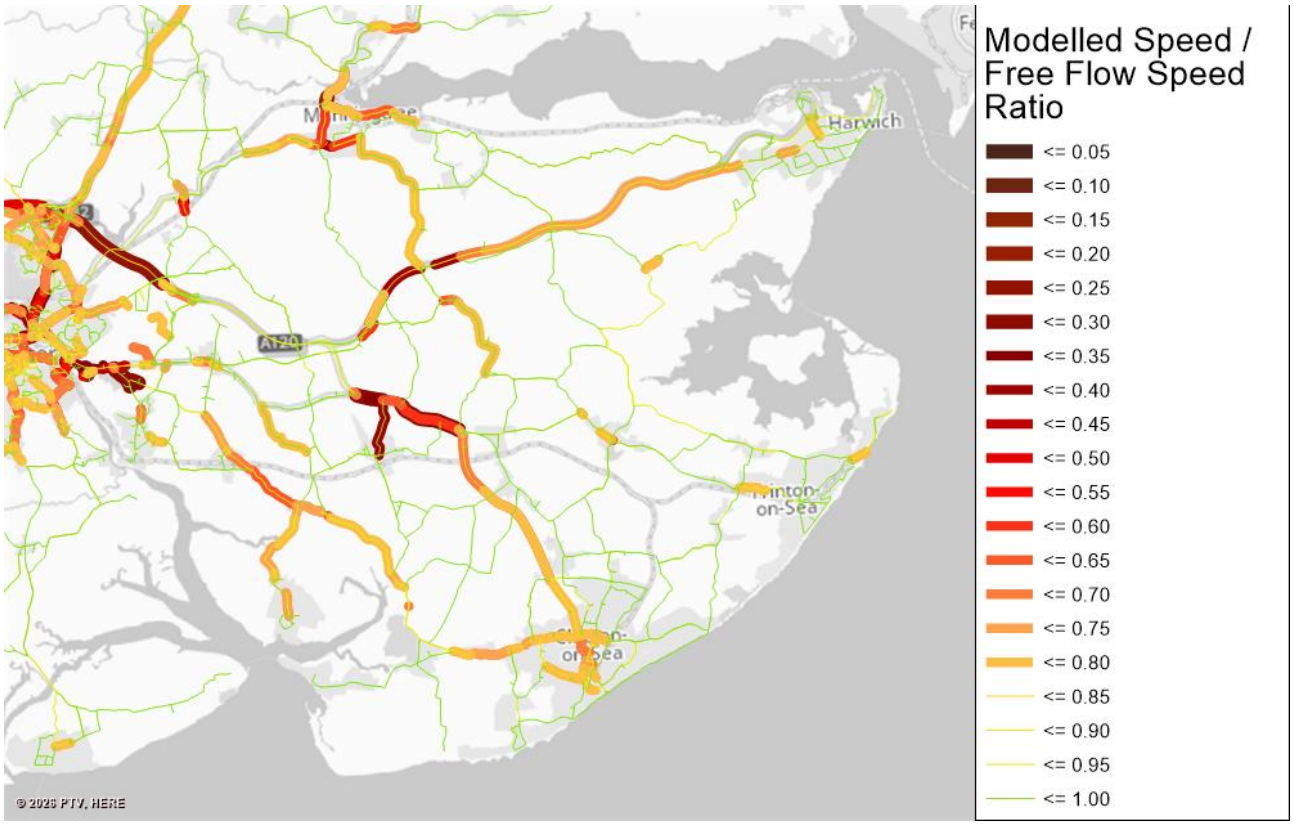


Figure 4.1 2043 S2 BAU Demand Without Mitigation AM peak Speed Ratio

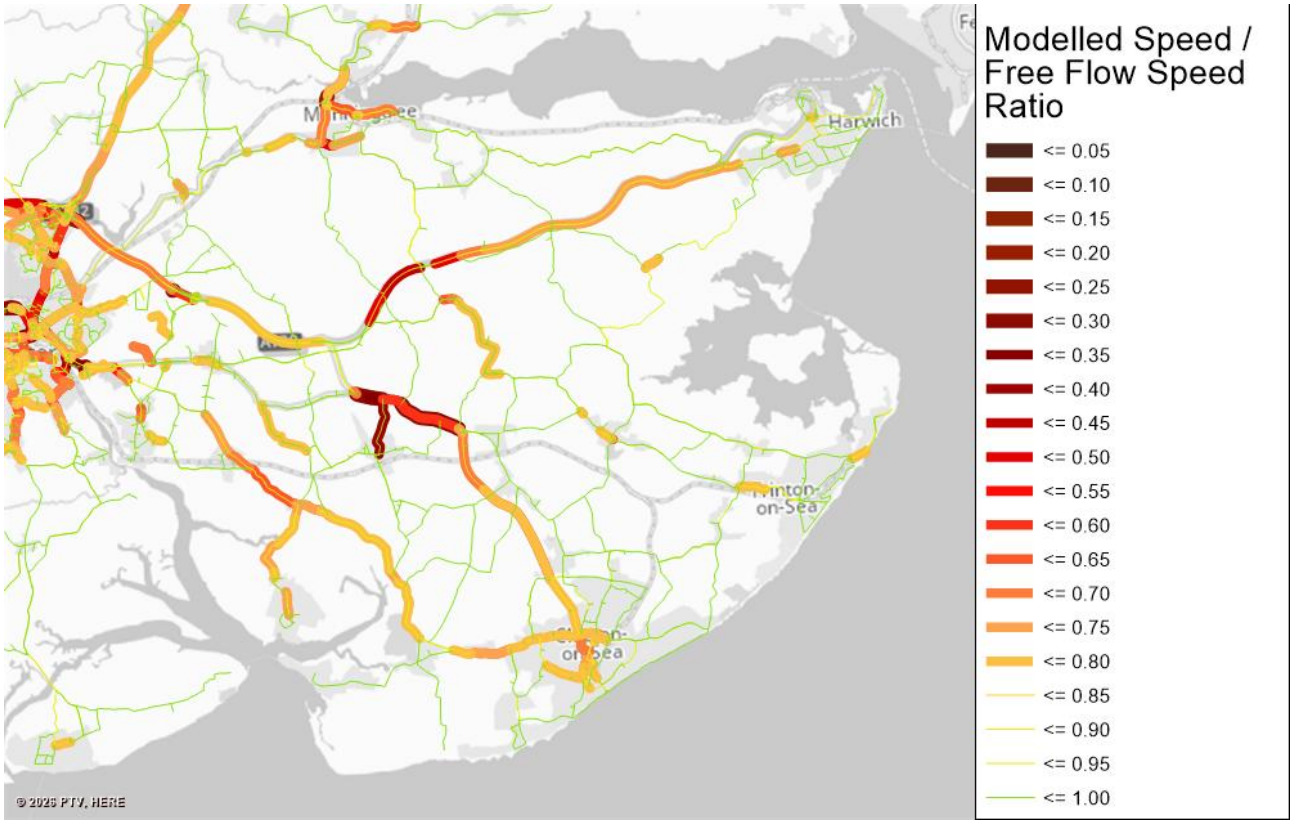


Figure 4.2 2043 S3 BAU Demand With Mitigation Forecast AM peak Speed Ratio

Full flow difference plots between Scenarios 3 and 2, along with the relative queue indicators differences and absolute values for the AM and PM peaks are shared under Appendix D

4.2.2 Overall Findings from Scenario 3

Overall, Scenario 3 in NEMo demonstrates that the introduction of targeted highway and rapid transit mitigation delivers significant improvements in network operation when compared with the unmitigated local plan scenario. The package reduces some of the most severe queueing and blocking back issues, improves journey time reliability and increases the resilience of key strategic corridors. The model tests show:

- noticeable improvements in network performance compared with the BaU scenario
- significant reductions in severe queueing and blocking back across several strategic corridors
- improved operation of the wider highway network and better movement of people, freight and public transport throughout Tendring
- reduced severity of some of the worst transport impacts associated with cumulative growth
- enhanced support for rapid transit and public transport reliability through corridor improvements and junction interventions, albeit these are yet to be fully tested in the NEMo strategic model.

Whilst the mitigation package improves overall performance, it does not fully resolve all capacity constraints. Some locations continue to experience congestion and operational challenges, reflecting the scale of cumulative growth being accommodated. The modelling indicates that some issues remain on the A133 corridor around Greenstead, and at A12 Junction 29, although the severity of impacts is significantly reduced compared with the BaU and unmitigated Local Plan scenarios. While conditions improve at Manningtree and the A120 around Horsley Cross, pockets of congestion remain. The A133 between Frating and Weeley continues to face traffic challenges, as is already the case in present day conditions.

The assessment therefore demonstrates that highway and rapid transit interventions are effective in managing many of the severe impacts of growth and improving overall network performance. However, residual congestion remains at several key locations, confirming that infrastructure delivery alone is insufficient to fully mitigate cumulative growth. Further improvements through sustainable transport measures and mode shift are required to achieve an acceptable overall transport outcome.

4.3 Assessment Case Forecast with Mitigation and With Sustainable Transport Demand

4.3.1 Summary of Approach

Scenario 4 has been developed further to understand the level of trip reduction that could be achieved as a result of investment in sustainable modes. Chapter 3 has identified sustainable schemes, which support multi-modal connectivity and contribute to mitigation. However, Scenario 3 only includes the impact of RTS linking Hare Green and Horsley Cross garden villages to Colchester and Manningtree and bus service improvements to Harwich. Scenario 4 reflects the impact of other sustainable transport improvements, such as walking, cycling, bus services and mobility hubs. It also includes an adjustment to account for car trips that access the P&C schemes.

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/ 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 4-3below.

Table 4-3 Sustainable Travel Trip Reductions

Demand Segment	AM Peak	PM Peak
Car Commute	694	601
Car Other	962	1,377

4.3.2 Overall Findings from Scenario 4

The assessment demonstrates that infrastructure investment and sustainable trans- port measures work together to improve overall network performance. Compared with the unmitigated Local Plan scenario, the modelling indicates a significant reduction in queueing, blocking back and journey time variability across much of the network.

Whilst the integrated mitigation package significantly improves overall network performance, including around Clacton and the south of the district where many of the measures are implemented, some locations

continue to experience operational pressure. Manningtree, A120 around Horsley Cross and A133 Frating to Weeley remain congested. Congestion also remains evident on Greenstead roundabout, while residual delays persist at A12 Junction 29. However, the severity and extent of these impacts are substantially reduced compared with both the Business as Usual and unmitigated Local Plan scenarios, demonstrating that the integrated transport strategy can manage the cumulative effects of growth to a generally acceptable level.

The modelling therefore demonstrates that whilst some problem locations remain, the cumulative impacts of growth can be brought to a generally manageable and acceptable level through the integrated transport strategy. The objective is not to create free-flow traffic conditions across the network, but to ensure that people, goods and services can move efficiently whilst supporting a significant shift towards more sustainable travel behaviour.

Figure 4.3 shows the speed ratio for Scenario 4 in the AM peak, for comparison back to Figure 4.2. Flow difference plots between Scenarios 4 and 3 along with plots showing the absolute values for speed ratio and relative queue indicators for the AM and PM peaks are provided in Appendix D

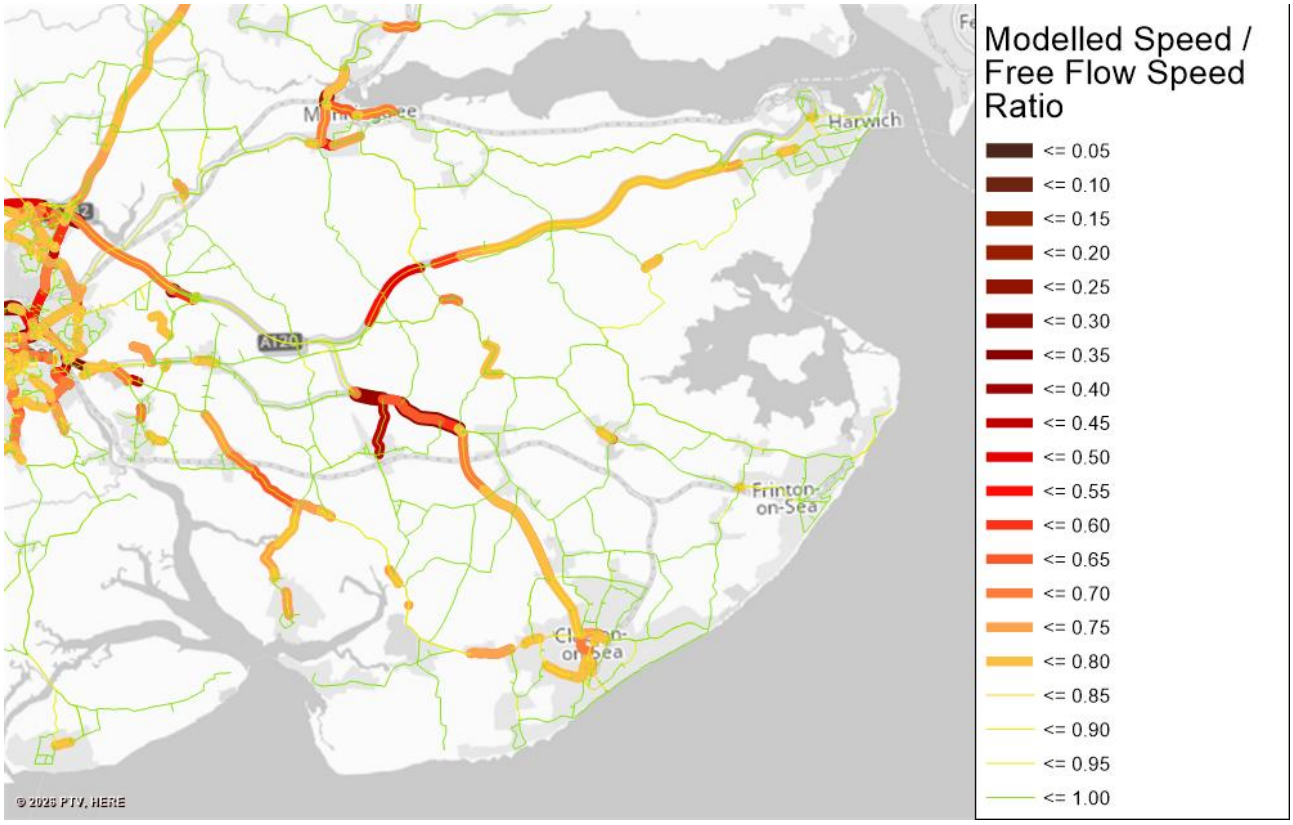


Figure 4.3 2043 S4 ST Demand With Mitigation Forecast AM peak Speed Ratio

4.4 Microsimulation and Local Junction Modelling

4.4.1 Microsimulation modelling

VISSIM microsimulation models have been developed for the A12 J29, and the Greenstead roundabout and Clingoe Hill area to provide a more detailed assessment of operational performance and support the development of appropriate mitigation strategies at these key locations. Each of the microsimulation assessments have considered performance with:

- 2043 proposed new local plan growth with BaU demand without mitigation
- 2043 proposed new local plan growth with BaU demand with mitigation

Traffic demand inputs were derived from NEMo, ensuring consistency with growth assumptions. The strategic model outputs were translated into microsimulation demand matrices, enabling a more granular representation of vehicle interactions, route choice behaviour, queue formation, lane utilisation and junction operation within each study area.

This section summarises the key findings from the microsimulation modelling, including the identification of operational issues and the effectiveness of tested mitigation measures. The findings informed the network changes and signal timings that were applied in NEMo Scenarios 3 and 4 -- new local plan growth with mitigation.

4.4.1.1 A12 J29

A VISSIM model covering A12 Junction 29 was developed, with the model extent shown in the AM and PM peak hour heat maps in Figures XX and XX. The model includes the junction where the A12, A120 and Ipswich Road converge, a key strategic highway node serving movements between Colchester, Tendring and Suffolk, as well as along the A12 corridor. Strategic transport modelling identified the junction as a critical network constraint, with future traffic demand expected to increase as a result of planned growth, particularly at TCBGC. The introduction of the A1331 link road will improve connectivity between the garden community and the A120 corridor, further increasing demand through the junction.

The heat maps indicate the relative delay with green indicating good movement and red to dark red worsening congestion. Both the AM and PM 2019 base models show congestion building up on the A12 and A12 off slips, consistent with patterns identified within NEMo. In the AM peak, the most significant delays are concentrated on the westbound off-slip, with sustained queues extending back towards the A120 mainline. In the PM peak, congestion remains focused on the A12 southbound and eastbound off slips. While the heat maps represent average modelled conditions, the simulation indicates that on some days and during periods of demand fluctuations, queues can extend beyond those shown, resulting in longer queue lengths with the potential to reach both the A120 westbound and A12 southbound mainlines, posing road safety risks.

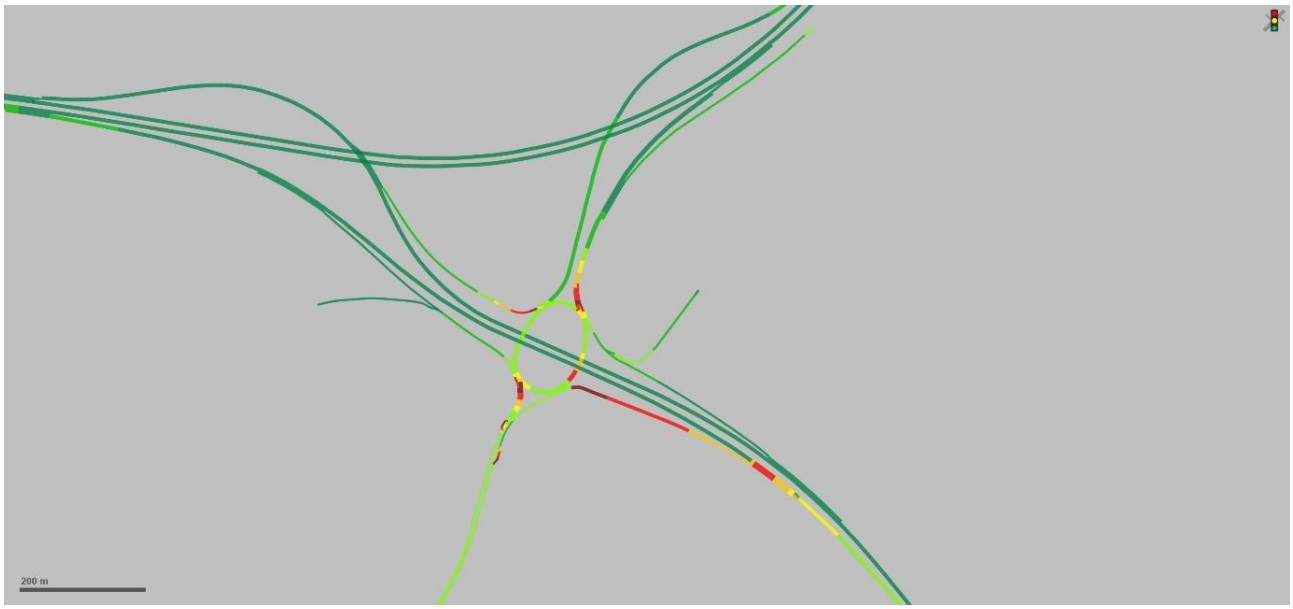


Figure 4.4 A12 J29 AM peak 2043 VISSIM reference case heatmap

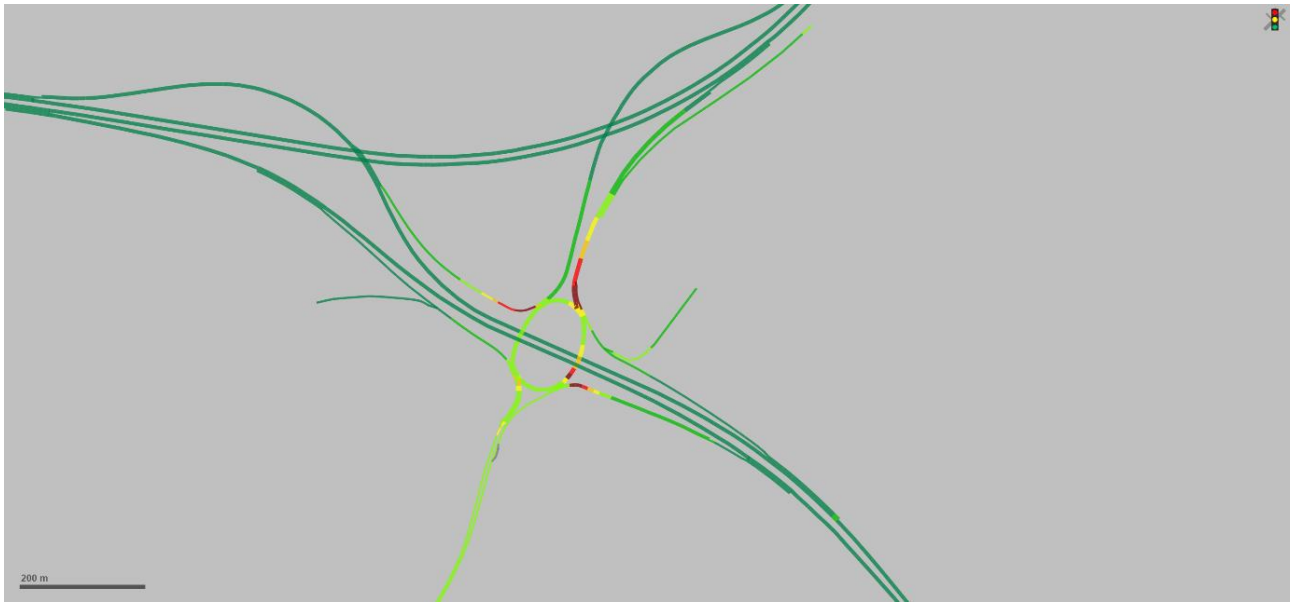


Figure 4.5 A12 J29 PM peak 2043 VISSIM reference case heatmap

The impact of the new local plan BaU traffic demand in Figure 4.6 and Figure 4.7 for the AM and PM peak hours, respectively, shows significantly worsening operational performance of the junction. The most pronounced effects are observed on the A12 southbound off-slip, where extensive queueing and severe delay are evident. In both the AM and PM peaks, queues reach back to the A12 mainline, creating potential for blocking back onto the mainline. Additional delays are observed on the A120 eastbound off-slip and Ipswich Road approach to the roundabout, demonstrating that the junction is unable to accommodate forecast demand without mitigation. The increase in queue lengths and journey time delay highlights a worsening of existing congestion and raises road safety concerns.

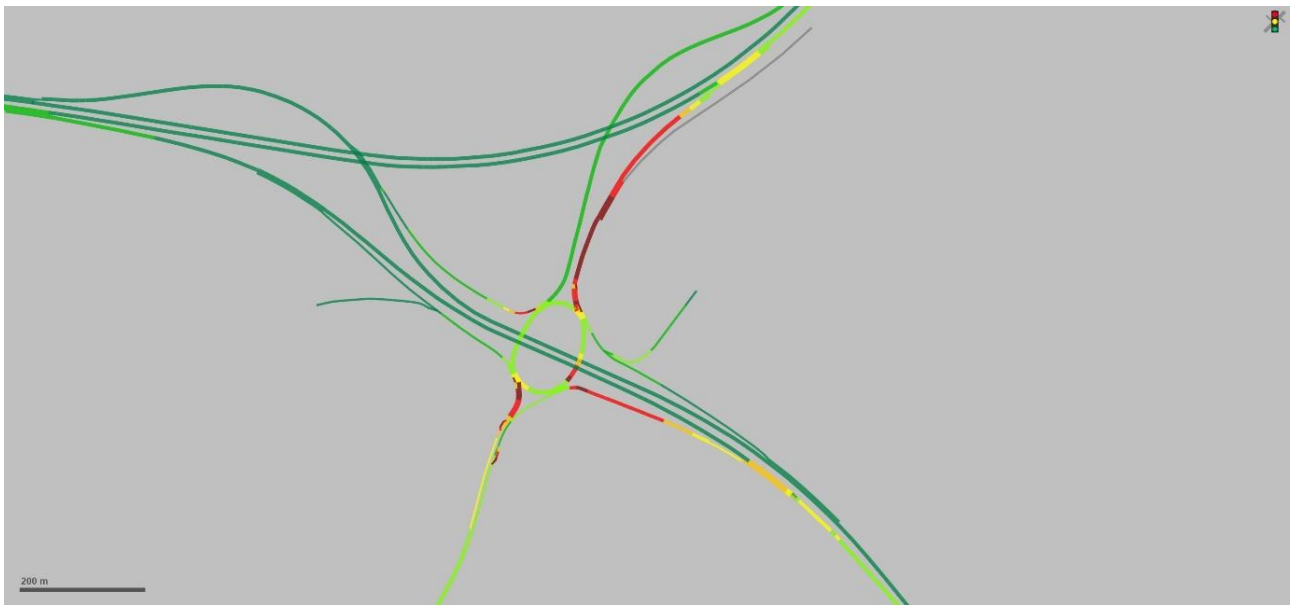


Figure 4.6 A12 J29 AM peak 2043 VISSIM new local plan without mitigation heatmap

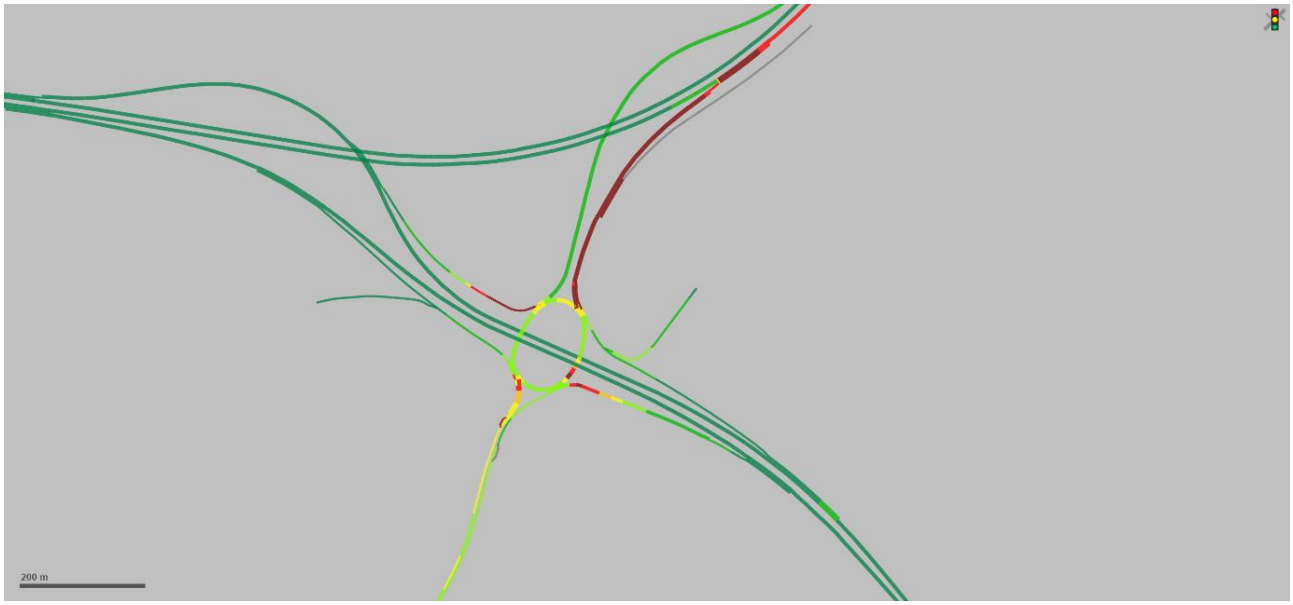


Figure 4.7 A12 J29 PM peak VISSIM new local plan without mitigation heatmap

Having identified the network problems arising from growth, the VISSIM model was used to identify possible solutions to traffic problems which support traffic movements on the SRN. The possible solutions area described in Section 3.2 and include:

- extended signalisation on all arms
- widening of the A120 to Ipswich Road off-slip to three lanes
- widening of slip approach to Newcomen Way to two lanes
- widening of the A120 eastbound on-slip to two lanes

The impact of the measures is shown in Figure 4.8 and Figure 4.9 for the AM and PM peak hours, respectively. For general traffic, the proposals result in a junction that continues to operate effectively, with the majority of links experiencing low levels of delay and good traffic movement during both peaks. Whilst some localised congestion remains on sections of the carriageway and on individual approaches, particularly on the A12 southbound off-slip, these effects are limited in extent and do not result in widespread network delay. The operation of the junction is broadly consistent in the AM and PM peaks. Overall the proposals maintain acceptable performance for general traffic while addressing the safety concerns by reducing conflict points.

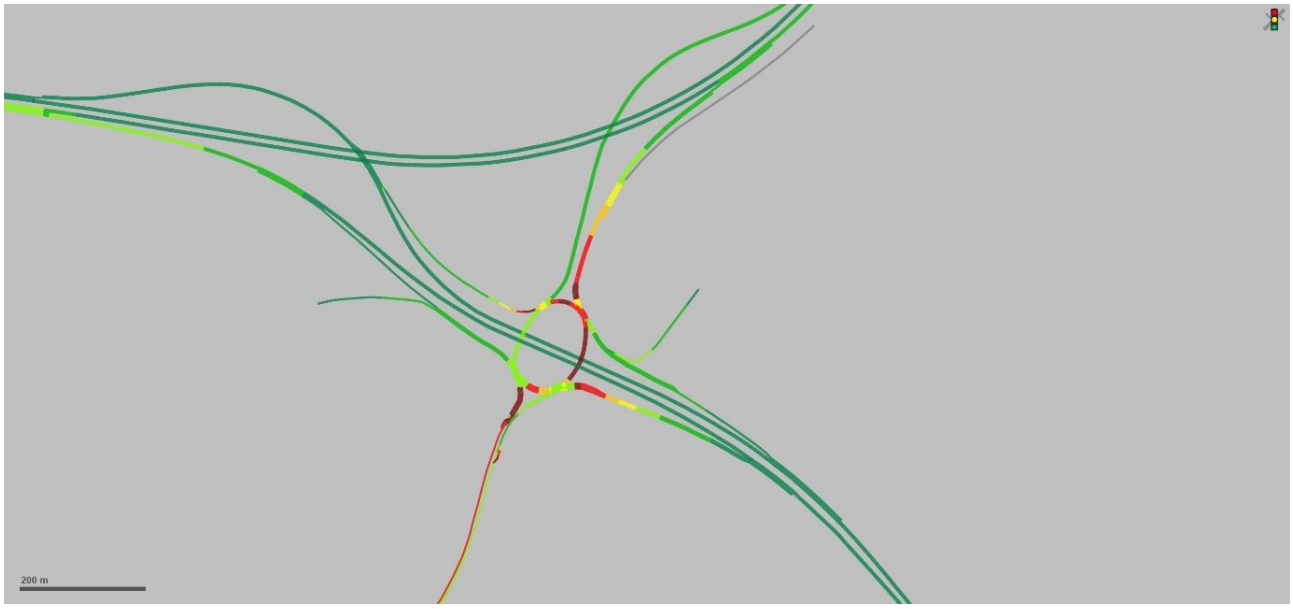


Figure 4.8 A12 J29 AM peak 2043 VISSIM new local plan with mitigation heatmap

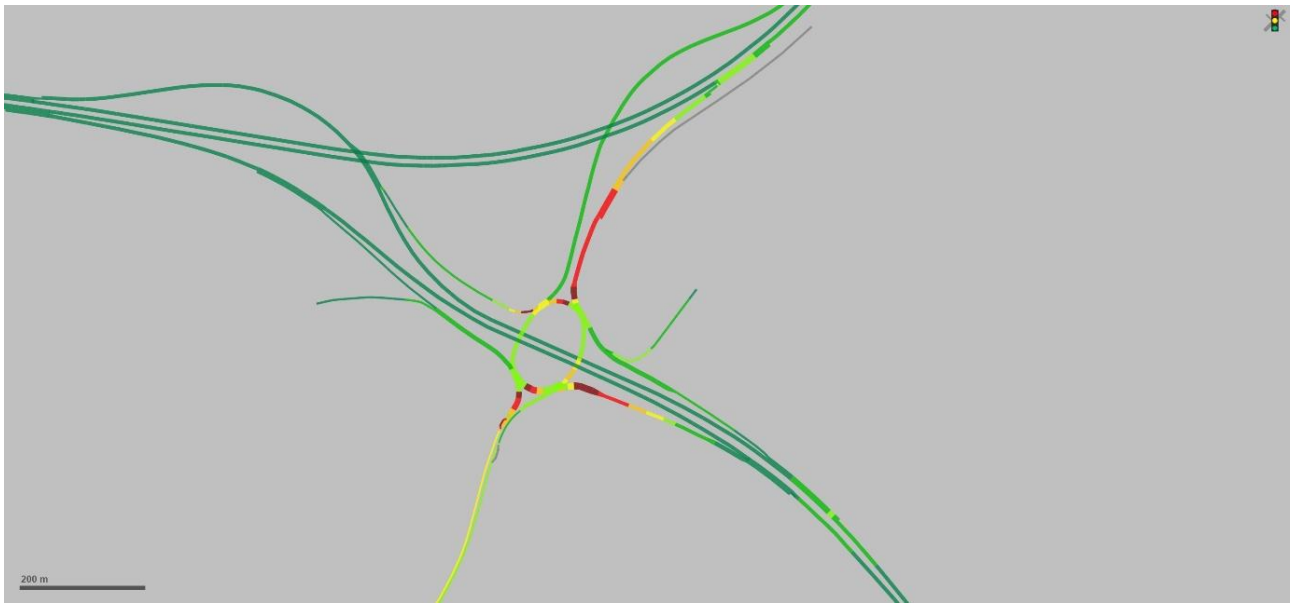


Figure 4.9 J29 PM peak 2043 VISSIM new local plan with mitigation heatmap

4.4.1.2 A133 Clingoe Hill

The VISSIM model covers the A133 corridor and its connections to the A120 and A12 strategic road network, including the area surrounding TCBGC and its principal access points to Colchester. Key junctions represented within the model include Greenstead roundabout and Colne Causeway, Wivenhoe Park corner, the A1331 link road junctions with the A133 and A120, and A12 J29.

The A133 Clingoe Hill VISSIM modelling involved refining the A133 and Colne Causeway section of the model –- whilst the A12 J29 VISSIM modelling described in the previous subsection focussed on the A120 and A12 section. The area of interest is shown in the AM and PM peak base model heat maps in Figure 4.10 and Figure 4.11 show that the A133 corridor generally operates with low levels of delay during peak periods, with principal delay in the westbound approach to Greenstead roundabout, where significant queuing is seen in both peaks. The PM peak shows a slightly higher intensity of delay, with congestion extending further along

the A133 approach. In contrast, delays along Colne Causeway are comparatively localised on approach to Greenstead roundabout.

Figure 4.10 A133 Clingoe Hill AM peak 2019 VISSIM base heatmap

Figure 4.11 A133 Clingoe Hill PM peak 2019 VISSIM base heatmap

The impact of the new Local Plan BaU traffic demand is shown in Figure 4.12 and Figure 4.13 for the AM and PM peak hours, respectively. The results indicate the most noticeable impacts are concentrated along the A133 corridor, particularly the approaches to Wivenhoe Park corner and Greenstead roundabout, where delay exceeds 75\% and isolated sections exceeding 90\%. The PM peak identifies more significant delay approaching Greenstead from Colne Causeway and St Andrews Avenue.

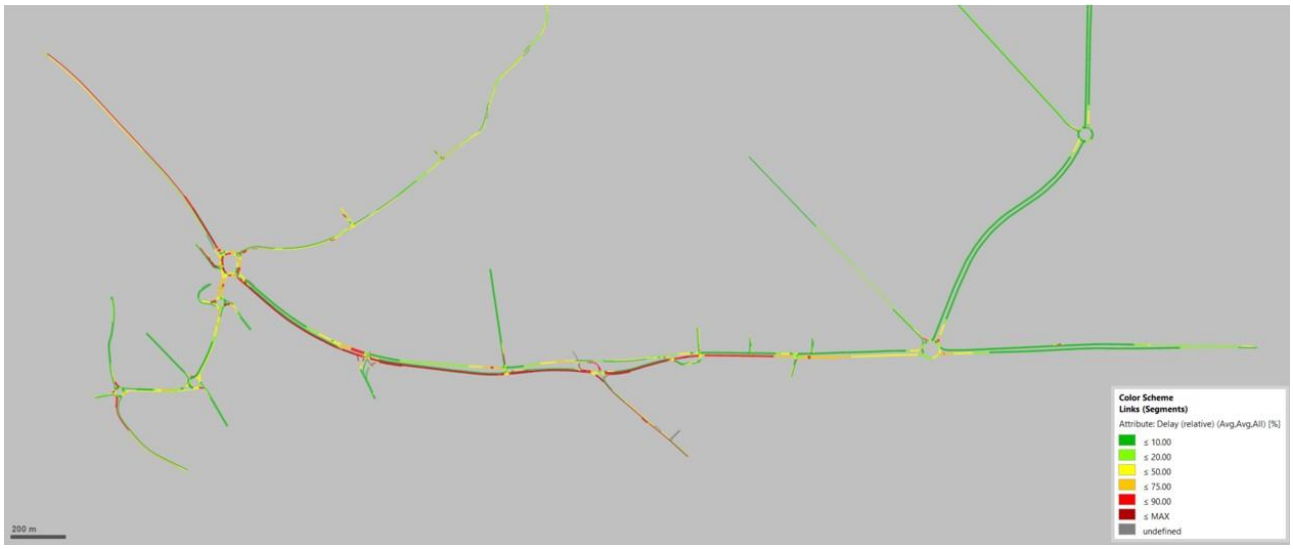


Figure 4.12 A133 Clingoe Hill AM peak 2043 VISSIM new local plan without mitigation heatmap

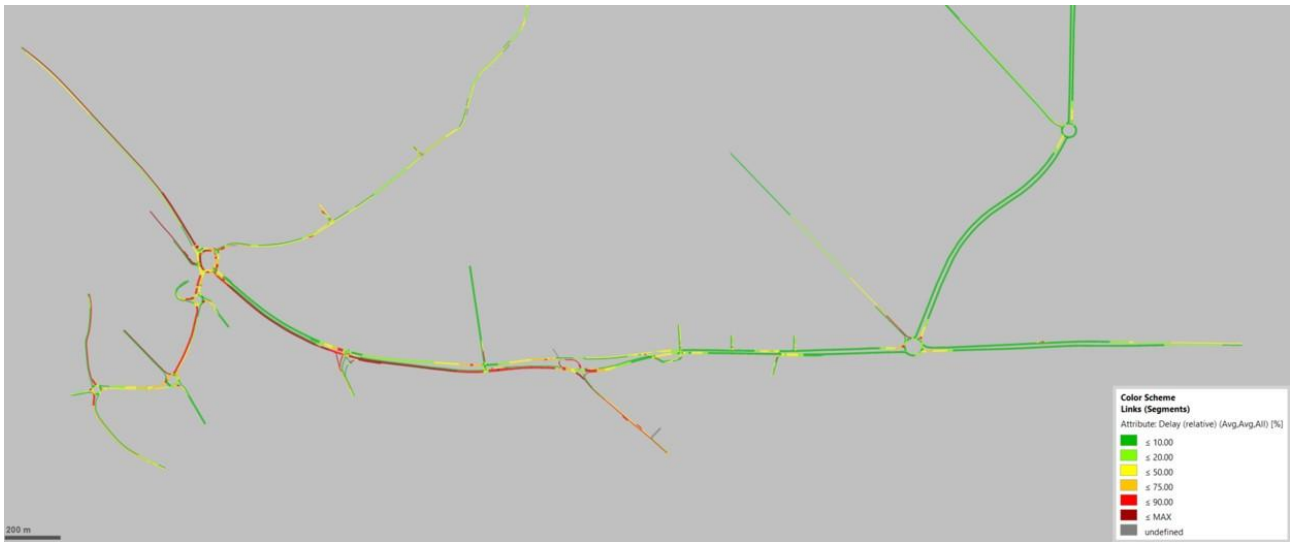


Figure 4.13 A133 Clingoe Hill PM peak 2043 VISSIM new local plan without mitigation heatmap

Having identified the network problems arising from growth, the VISSIM model was used to identify possible solutions to traffic problems which support traffic movements. The possible solutions area described in Section 3.2 and include:

- Greenstead roundabout which involves peninsularisation of the southwest side of the roundabout, full signalisation, and RTS lane and local bus priority between Clingoe Hill and St Andrews Avenue and between Colne Causeway and Greenstead Road
- complementary measures at Colne Causeway/Elmstead Road roundabout
- Wivenhoe Park corner redesign to a conventional roundabout which includes RTS priority lanes to access P&C East
- dedicated westbound RTS lane between Wivenhoe Park corner and Knowledge Gateway junction

The impact of the measures is shown in Figure 4.14 and Figure 4.15 for the AM and PM peak hours, respectively. For general traffic, the proposals result in largely localised increases in delay across the A133 corridor, with the greatest impacts on the westbound approach to Wivenhoe Park corner in both peaks. However, delays generally reduce along the corridor towards Greenstead roundabout, where there are only minor and localised impact on some approaches and turning movements. Overall, the impacts are

concentrated on the westbound section of the corridor, with impacts reducing on approach to Greenstead roundabout. This indicates that general traffic is managed through the junctions of the corridor, taking the pressure off the Greenstead junction.

Figure 4.14 A133 Clingoe Hill AM peak 2043 VISSIM new local plan with mitigation heatmap

Figure 4.15 A133 Clingoe Hill PM peak 2043 VISSIM new local plan with mitigation heatmap

4.4.2 Tendring Local Junction Modelling

In addition to the strategic modelling undertaken using NEMo and the detailed VISSIM assessments described above, a programme of local junction modelling was undertaken using TRL Junctions 11. The purpose of this work was to provide a more detailed assessment of operational performance at key junctions where the strategic modelling indicated that growth could result in increased congestion or where potential mitigation measures required testing at a local level.

The local junction models were developed using turning movement flows extracted from the 2043 Reference Case and 2043 Assessment Case scenarios within NEMo. The Reference Case represents committed and background growth, whilst the Assessment Case includes the additional traffic generated by the proposed Local Plan allocations. Comparing the two scenarios enabled the specific impacts of Local Plan growth to be identified at a junction level.

The junctions selected for detailed assessment were identified through a review of the transport impacts of proposed allocations in NEMo and comprise Harwich Road/A120 Roundabout, A133/Colchester Road Roundabout, A137 Manningtree, Elmstead Road/A133, Colchester Road/A133, Weeley Roundabout, A133/B1029 Frating Crossroads, B1029 Brightlingsea, the B1027/B1029 staggered junction at Thorrington, Horsley Cross and the B1033 High Street junction in Thorpe-le-Soken:

Figure 4.16: Local junction modelling assessment locations

Junction performance was assessed using queue length, delay and Level of Service (LoS) indicators. Where the Assessment Case resulted in a material deterioration in operational performance compared with the Reference Case, mitigation measures were identified and tested using Junctions 11.

The assessment demonstrated that most junctions continue to operate satisfactorily under the Assessment Case and require no intervention beyond normal monitoring as development comes forward. However, a small number of locations were shown to experience a notable deterioration in operational performance as a result of Local Plan growth. At these locations, mitigation measures were developed and tested to demonstrate that performance could be returned to a level broadly comparable with the Reference Case.

4.4.2.1 Harwich Road Roundabout

The local modelling indicates that Harwich Road Roundabout continues to operate satisfactorily under both the Reference Case and Assessment Case scenarios. The Assessment Case is expected to result in a slight increase in congestion, with the impact primarily affecting the Harwich Road South approach. The remaining approaches continue to operate without any material increase in queueing or delay and do not warrant geometric improvements to provide additional capacity.

Potential mitigation options were investigated using Junctions 11. The modelling demonstrated that the most effective intervention would be the provision of a small entry flare on both of the Harwich Road

approaches. This would not necessarily require an additional traffic lane, but rather a modest widening of the entry to increase effective capacity. The testing indicated that such a measure would be sufficient to largely offset the additional congestion associated with the Assessment Case and return operation closer to Reference Case conditions. Whilst mitigation is not considered essential within the Local Plan period, the improvement has been identified as a proportionate future enhancement should traffic growth exceed current forecasts.

4.4.2.2 A133/Colchester Road Roundabout

The Junctions 11 modelling identified that the A133 / Colchester Road Roundabout experiences operational constraints under the Reference Case, particularly on the southern approach during the AM peak. The addition of Assessment Case traffic further increases pressure on the junction and results in worsening delays and queue lengths on the principal approaches.

To mitigate these impacts, improvements were tested comprising an additional left-turn lane together with increased entry width and flare length on the southern approach. These changes increase entry capacity and improve the ability of the roundabout to accommodate forecast traffic demand.

The modelling demonstrated that the proposed improvements significantly reduce delay and queue lengths compared with the unmitigated Assessment Case. Whilst some congestion remains during peak periods, the mitigation substantially improves operational performance and reduces the impact of Local Plan growth to a level broadly comparable with the Reference Case.

4.4.2.3 A137/B1352 Junction, Manningtree

The A137 / B1352 junction forms an important gateway into Manningtree and provides access between planned development areas, the town centre and Manningtree railway station. The Reference Case modelling indicates existing operational pressure during the AM peak, particularly on the B1352 approach. The Assessment Case results in a notable worsening of conditions, with substantial increases in delay and queueing.

Mitigation was therefore tested through increases to entry width and flare length on the affected approach. This intervention provides additional stacking capacity and improves junction performance under forecast traffic conditions.

The modelling demonstrated that the proposed improvement results in a significant reduction in congestion and improves the operational performance of the junction from a poor Level of Service in the unmitigated Assessment Case to a level comparable with the Reference Case. The testing therefore indicates that the impacts of Local Plan growth can be effectively accommodated through a relatively modest junction improvement.

4.4.2.4 Elmstead Road

The local modelling indicates that the Elmstead Road junction continues to operate within capacity under both the Reference Case and Assessment Case scenarios. No material increases in queueing, delay or operational stress were identified as a result of Local Plan growth and therefore no mitigation measures are required at this location.

4.4.2.5 Weeley Roundabout

Weeley Roundabout was identified as one of the most constrained locations assessed as part of the local junction modelling programme. Existing pressures are evident under the Reference Case scenario, particularly on the A133 approaches, and the addition of Assessment Case traffic further increases congestion during both peak periods.

To address the additional impact of Local Plan growth, improvements were tested through increases to entry width and flare length on the most constrained approaches. These measures improve entry capacity and facilitate more efficient traffic circulation through the roundabout.

The modelling demonstrates that these improvements provide a substantial reduction in queue lengths and delays and significantly improve Levels of Service compared with the unmitigated Assessment Case. Following mitigation, the junction operates at a level broadly comparable with, and in some cases better than, the Reference Case scenario, demonstrating that the impacts of Local Plan growth can be effectively managed.

4.4.2.6 Elmstead Road/A133

The local modelling indicates that the Elmstead Road / A133 junction continues to operate within capacity under both the Reference Case and Assessment Case scenarios. No material increase in queueing, delay or operational stress was identified as a result of Local Plan growth and therefore no mitigation measures are proposed at this location.

4.4.2.7 Colchester Road/A133

The Colchester Road / A133 junction was assessed to determine whether the additional traffic associated with Local Plan growth would create operational issues on this section of the network. The modelling indicates that the junction continues to operate satisfactorily under both the Reference Case and Assessment Case scenarios, with no significant deterioration in performance. Consequently, no mitigation measures are currently required.

4.4.2.8 A133/B1029 Frating Crossroads

Frating Crossroads was assessed due to its strategic role on the A133 corridor and its importance in accommodating movements associated with planned growth, including traffic associated with development at Hare Green and along the wider A133 corridor. The modelling demonstrated that, whilst the junction continues to operate acceptably overall, the Assessment Case results in an increase in congestion on the Great Bentley Road approach. This increase in delay is primarily driven by additional turning movements associated with Local Plan growth and places additional pressure on the signal-controlled junction during peak periods.

To address the impact of Local Plan growth, a preliminary mitigation option was tested through the LinSig model. This comprised optimisation of the signal timings to provide additional green time to the most constrained approaches, alongside the introduction of a short right-turn flare lane on the Great Bentley Road approach. The modelling demonstrated that these relatively modest interventions are capable of reducing the additional delays associated with the Assessment Case and maintaining operation at a level broadly comparable with the Reference Case.

It should be noted that the junction forms part of a wider package of potential improvements being considered along the A133 corridor. In particular, there remains an option to replace the existing signalised crossroads with a roundabout arrangement as part of future corridor enhancement works. Given the preliminary nature of the current assessment and the potential for a more fundamental change in junction form, a detailed investigation of alternative signal-based mitigation options has not been undertaken at this stage. The Local Plan evidence nevertheless demonstrates that suitable mitigation measures are available to address the additional impacts of growth should they be required.

4.4.2.9 B1029 Brightlingsea

The assessment of the B1029 corridor within Brightlingsea indicates that the additional traffic generated by Local Plan growth does not result in a material deterioration in junction performance. Existing operational

conditions are generally maintained and no specific junction mitigation is required as a consequence of the Assessment Case.

4.4.2.10 B1027/B1029 Staggered Junction, Thorrington

The staggered junction between the B1027 and B1029 at Thorrington was included within the local modelling programme owing to its role in serving movements between Brightlingsea and the wider strategic highway network. The modelling demonstrates that the junction continues to operate within acceptable limits under both forecast scenarios and that Local Plan growth does not create a requirement for additional junction capacity. No mitigation is therefore proposed.

4.4.2.11 B1033 High Street, Thorpe-le-Soken

The junction at B1033 High Street, Thorpe-le-Soken was assessed to understand the impact of Local Plan growth on local network operation. Results indicate that operational performance remains acceptable in both peak periods under the Assessment Case and that increases in traffic demand can be accommodated within the existing junction arrangement. No mitigation measures are required.

4.4.2.12 Horsley Cross

The Junctions 11 modelling identified that the Horsley Cross Roundabout operates within capacity in the Reference Case but experiences operational constraints with local plan development. In particular, both single lane B1035 approaches are affected.

To mitigate these impacts, improvements were tested comprising of a 30 metre two lane flared section on both Clacton Road and the B1035 south arm. The Clacton Road exit also has a 30 metre two to one lane merge to allow B1035 to Clacton Road traffic to use both lanes.

The modelling demonstrated that the proposed improvements significantly reduce delay and queue lengths compared with the unmitigated Assessment Case. Whilst some congestion remains during peak periods, the mitigation substantially improves operational performance and reduces the impact of Local Plan growth to a level broadly comparable with the Reference Case.

4.4.2.13 Local Junction Modelling Summary

The local junction modelling provides further confidence that the transport impacts of Local Plan growth can be effectively managed through targeted local interventions. Whilst a small number of junctions experience increased congestion under the Assessment Case, the modelling demonstrates that suitable mitigation measures are available and capable of restoring operational performance to a level broadly comparable with the Reference Case. The majority of junctions assessed continue to operate within acceptable limits throughout the Plan period and do not require mitigation. Collectively, these findings support the conclusion that the cumulative highway impacts of growth can be accommodated through the integrated transport strategy outlined in Chapter 3.

4.5 Conclusion

Chapter 4 has presented findings from NEMo and microsimulation models to test the mitigations described in Chapter 3. The transport modelling shows that an integrated, vision-led strategy combining infrastructure investment and sustainable travel interventions can successfully accommodate planned growth to 2043 and address the severe transport impacts arising from unmitigated growth. However, achieving this outcome will require coordinated delivery, appropriate cost apportionment between growth locations, and sustained mode shift away from private car dependence.

Chapter 5 explores how robust the integrated transport measures will be to support growth beyond 2043. Then Chapter 6 returns to requirements for delivery.

5. Long Range Forecast Beyond the Plan Period

Chapter 5 assesses the implications of growth beyond the proposed new local plan period by considering conditions in 2058, 15 years beyond the 2043 assessment year.

It describes the methodology and performance results of the 2058 assessment. The analysis highlights the extent to which future growth further constrains the operation of the highway network and affects overall network performance.

The chapter also reflects on the effectiveness of the mitigation strategy, recognising that growth beyond 2043 is likely to be constrained by unresolved transport deficiencies and increasing demand on critical parts of the network. This reinforces the need for a longer-term approach to transport investment and infrastructure delivery.

5.1 Growth Beyond 2043

Table 5-1 provides a summary of key trip demand and highway and public transport network assumptions for two scenarios developed to test the impact of growth in 2058:

- Scenario 5 - 2058 reference case, which includes committed growth at TCBGC, caps growth at 2043 levels at Hare Green and Horsley Cross, and grows else- where by the levels predicted by NTEM. The highway and public transport network is that used in the 2043 mitigated new local plan scenario (Scenario 3). ST demand reductions as used in 2043 Scenario 4 have not been applied since Scenario 5 is run with VDM, which requires 24-hour trip demand and these get applied at the individual AM and PM peak model level.
- Scenario 6 - 2058 assessment case, which grows Hare Green and Horsley Cross proposed garden villages to 10,500 homes. Elsewhere, the demand is as per Scenario 5. The highway and public transport network is also the same as Scenario 5.

Table 5-1:NEMo 2058 Scenario Assumptions

Long-term scenario Assumptions		Scenario 5	Scenario 6
Summary	Year	2058	2058
	Description	Reference case	Assessment case
Demand	VDM	✓	✓
	TCBGC at 7,500 homes	✓	✓
	Hare Green and Horsley Cross at 10,500 homes		✓
	Elsewhere, 2043 new local plan growth increased by NTEM	✓	✓
Key Committed Mitigation Measures	A120 to Ramsey Road Link	✓	✓
	A1331 link road (TCBGC)	✓	✓
	P&C options and RTS at TCBGC	✓	✓
Key further mitigation needed for 2043 reference growth	A12 J29 scheme	✓	✓
	Greenstead and Clingoe Hill package	✓	✓
Key mitigation needed for 2043 Local Plan Growth	RTS East to proposed Tendring garden villages, linking Colchester, Harwich & Manningtree	✓	✓
	A120/A133 Junction improvements in the vicinity of Hare Green and Horsley Cross	✓	✓
	Local bus general improvements		
	Improvements to and at interchanges, and mobility hubs		
	Active travel connections to major sites		
	Travel planning to support ST		

5.1.1 2058 Reference and Assessment Case Demand Approach

The growth in the 2058 reference case is determined by comparing jobs and housing figures already represented in the 2043 new local plan assessment case, against NTEM forecasts. This comparison was undertaken at the MSOA level, to determine the appropriate level of any additional growth in housing and jobs to be applied at relevant MSOAs in North Essex that goes beyond that of the 2043 new local plan assessment case.

In the comparison, there were instances where the level of growth for an MSOA identified through NTEM between 2043 and 2058 was lower than the growth already represented in the 2043 assessment case. In these cases, no additional growth was applied beyond the proposed new local plan household or job figures. In these locations, the 2058 growth was therefore taken to be equivalent to the local plan 2043 growth. This approach avoids reducing the level of growth already assumed within the assessment case as a result of a lower NTEM forecast and ensures that the 2058 uses the new local plan growth position as a minimum bound for the 2058 assessment. This is considered to provide a consistent and robust basis for assessing the potential impact of longer-term growth on the highway network. This approach has been applied to the council areas in the North Essex study area – Colchester, Tendring and Braintree. Background growth from 2043-2058 from NTEM has been assumed for the districts outside of North Essex.

Following the approach to trip generation in the 2043 reference case, TCBGC growth has been included in the trip ends as this has been informed by latest developer assumptions, where the employment growth is concentrated in Colchester model zones and housing growth in the Tendring model zones. However, TCBGC growth is at 2050 levels (estimated at 7,500 homes).

In summary, growth expected to happen in the district and surrounding areas is represented as below.

- Growth in the study area has been informed by the difference of houses and jobs between the 2058 NTEM growth and the local plan 2043.
- Background growth (from NTEM) between 2043 and 2058 is assumed in local authorities outside of this area
- For TCBGC, residential and employment growth has been taken from developer assumptions

Table 5-2 shares how this translates into modest housing growth and negligible employment growth when compared to the 2043 Assessment Case.

Table 5-2:2058 Reference Case across North Essex

Local Authority	Households		Jobs	
	2043 Assessment Case Figure (Scenario 2 Demand)	2058 Reference Case Growth (% change vs 2043 Assessment Case)	2043 Assessment Case Figure (Scenario 2 Demand)	2058 Reference Case Growth (% change vs 2043 Assessment Case)
Tendring	84,710	**+7,599 (+9%)**	62,922	**+1,103 (+2%)**
Colchester	98,239	**+8,317 (+8%)**	111,310	**+425 (+0%)**
Braintree	86,556	**+2,475 (+6%)**	76,221	**+1,004 (+1%)**
**TCBGC 2058 growth is split across Tendring and Colchester districts as described in accompanying text and comes in addition to the totals shown above*				

The assessment case demand increment focusses on growing the Hare Green and Horsley Cross garden villages to their full potential post 2043 allocation of 10,500 homes (6,000 of which are estimated at Horsley Cross, 4,500 at Hare Green), which amounts to an over 7,000 increase to what was modelled in the 2043 Assessment Case and 2058 Reference, as shown in Table 5-3.

Table 5-3:2058 Assessment Case growth assumptions in Tendring

Local Authority Area	Households		Jobs	
	2058 Reference Case Total	2058 Assessment Case Growth Increment (vs Reference Case)	2058 Reference Case Total	2058 Assessment Case Growth Increment (vs Reference Case)
Tendring	92,309	7,500 (+8%)	64,025	0 (0%)

Trip demand applied in NEMo for both scenarios was generated as in the approach previously described in 2.3.1. The 2058 household and jobs assumptions shown in Table 5-2 and Table 5-3 were input into TEMPro using alternative planning assumptions. This generated car and public transport trip demand in a 24-hour production-attraction format, which is required for VDM. As TEMPro uses the MSOA geography, disaggregation was undertaken to calculate growth in each model zone, which tend to be smaller than MSOAs in the detailed area of the model. As no specific development sites were identified in the reference case scenario, except at TCBGC which is treated separately, the trip growth was spread around model zones proportionate to the number of trip ends in the zones. For TCBGC, the trip demand provided by the developer was used for the productions and attractions in the TCBGC model zones.

In the case of the 2058 assessment case scenario, the growth was distributed among zones representing Hare Green and Horsley Cross only.

5.2 Post-2043 Forecasts Network Performance

For a summary assessment of network performance for Scenarios 5 and 6, the movement index has been applied for a comparison against Scenarios 1-4. Table 5-4 shows how severe congestion returns at the A133 Colchester Road roundabout, Greenstead and A12 J29 when looking at 2058 scenario 5 compared to the mitigated 2043 scenario 4 or 3. As expected, conditions at the A120 west of Horsley Cross and on local routes around Hare Green and Great Bromley start moving into being moderately congested, with the full impacts of the garden community added in scenario 6. These sections were previously largely free flowing in 2043 Reference Case forecasts. Overall, the results indicate that growth between 2043 and 2058 generates significant additional pressure on the highway network, reducing the effectiveness of the mitigation measures identified for the earlier scenarios. Appendix H provides a full set of flow difference, speed ratio and relative queue plots for the AM and PM peaks for each scenario.

Table 5-4:Movement Index for Scenarios 1-6

		AM Peak Impact						PM Peak Impact					
Sector	Location	2043 S1 RC	2043 S2 AC	2043 S3 BAU Mit	2043 S4 ST Mit	2058 S5 RC	2058 S6 AC	2043 S1 RC	2043 S2 AC	2043 S3 BAU Mit	2043 S4 ST Mit	2058 S5 RC	2058 S6 AC
East Colchester	Greenstead Roundabout, Colne Causeway & Clingoe Hill	15	15	11	9	15	15	14	15	10	9	14	15
	A12 J29 / A120 (eastern)	12	14	9	9	12	12	10	11	9	9	10	10
North Tendring	A120 - Link Road Junction	4	4	5	4	6	6	3	4	4	4	5	5
	A120 – Horsley Cross to Harwich	4	5	4	4	5	6	4	4	4	4	4	4
	A120 - A133 to Horsley Cross	3	7	6	5	7	8	3	4	4	3	4	6
	A133 Colchester Rd Roundabout	10	10	10	10	15	15	10	11	11	10	11	12
	B1035 Horsley Cross	3	4	3	3	3	4	2	3	3	3	3	4
	Elmstead Market	4	4	4	4	4	4	3	4	4	4	4	4
	Frating	3	4	3	3	4	4	1	1	1	1	1	1
	Great Bromley - Hare Green	4	6	5	5	5	6	5	7	6	6	7	7
	Harwich	3	4	3	3	4	4	3	3	3	3	3	3
	Manningtree	10	10	9	9	10	10	9	10	10	9	10	10
	A137 - Between Ardleigh and Manningtree	5	6	5	5	5	6	5	5	5	5	5	5
	Overall assessment combining all areas	**8**	**9**	**7**	**7**	**10**	**10**	**8**	**8**	**7**	**7**	**8**	**9**

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

5.3 Reflections on the Mitigation Approach

The impacts of future development beyond 2043 will place existing pressures on the network, and opportunities for sustainable growth beyond the plan period will be increasingly constrained. The 2043 local plan mitigation package provides a foundation of integrated highway, public transport and active travel improvements; however, the 2043 mitigations will not be sufficient through to 2058 and will require significant additional mitigations.

The mitigation measures identified within Section 3 have been developed to support the level of growth forecast within the local plan period. Without delivery of the local plan mitigations package, further development would not simply place additional pressure on the network from an already higher baseline. Instead, growth beyond 2043 would be constrained by unresolved transport deficiencies, reducing the ability of the network to accommodate additional demand and limiting opportunities for sustainable regeneration and housing delivery. These measures therefore form the foundation of a long-term transport strategy that will support sustainable growth, enhance connectivity and improve quality of life across the council area. Continued investment beyond the new local plan period will be essential to ensure that transport infrastructure evolves alongside future development and continues to support economic prosperity, environmental objectives and creation of well-connected places.

5.3.1 Requirement to Progress Transport Mitigations in the New Local Plan Period

Development areas such as Hare Green and Horsley Cross villages within the Tendring council boundary, as well as TCBGC, all expect significant growth beyond the 2043 Local Plan period. These communities will commence development within the proposed new local plan period and so consideration is needed to understand the vision and viability of these developments and associated trip generation beyond the local plan period.

Future growth is primarily located along the A133 and A120 corridors and at the Colchester/Tendring border, creating a strong spatial relationship between future development and the strategic transport interventions identified within this study. Interventions along these corridors / in these areas will provide the essential transport infrastructure upon which future allocations, regeneration opportunities and placemaking initiatives will depend. They act as a catalyst for longer-term investment by improving accessibility, strengthening sustainable travel connectivity, enhancing network efficiency and increasing overall transport capacity. Without implementation of these measures, the ability of Tendring to accommodate growth beyond the Local Plan period would be limited, with increasing pressure placed on an already constrained network.

5.3.2 Need for Strategic Schemes and Connectivity Improvements

Tendring's continued growth requires more than incremental capacity improvements at individual junctions or corridors. The scale and distribution of existing and future development demand a coordinated programme of strategic transport interventions that improve connectivity across the city and district as a whole.

Strategic transport schemes play a critical role in shaping growth patterns and ensuring that development can be accommodated in a sustainable manner. These improvements not only support movement but also contribute to wider economic competitiveness, social inclusion and placemaking objectives.

The interventions identified within this evidence base should therefore be viewed as a coordinated package of infrastructure improvements that collectively strengthen network resilience, increase travel choice and unlock opportunities for future growth and connectivity. Delivery of these schemes will help establish a transport network that is capable of supporting Tendring's long-term aspirations, ensuring that growth beyond the current Local Plan period can be accommodated efficiently and sustainably.

5.3.2.1 Rail and High Quality Public Transport

Rail and high-quality public transport connections will be fundamental to supporting future growth and reducing reliance on private car travel. As travel demand increases, it will become increasingly difficult to accommodate all journeys through highway capacity enhancements alone. Investment in rail services, stations, rapid transit corridors, bus priority measures and high-quality passenger facilities will therefore be critical in providing attractive and competitive alternatives to private vehicle use.

Improved integration between rail services, bus networks and active travel infrastructure can facilitate seamless journeys, increase public transport mode share and help to manage congestion on the highway network.

The development of the RTS East corridor will form a key component of the area's future sustainable transport network. During the Local Plan period, the corridor will connect TCBGC, Hare Green and Horsley Cross with Manningtree, providing a high-quality sustainable transport link into Colchester and connecting key development sites with rail services at Manningtree. Investment in bus priority measures in and around Manningtree is anticipated during this period, improving journey time reliability and supporting the introduction of RTS services.

Beyond the Local Plan period (post-2043), the corridor is expected to extend eastwards from Horsley Cross to Harwich, providing enhanced access to the Freeport, rail services and planned growth areas in and around Harwich. This longer-term extension will strengthen sustainable cross-border connectivity and support the continued growth of TCBGC and other strategic development locations.

As development progresses, future demand may justify further enhancements and extensions to the corridor. The safeguarding of routes and junction capacity to accommodate these improvements should therefore be considered as part of a long-term, integrated network approach rather than through standalone schemes. This will help support future development while limiting pressure on the highway network.

While future bus routes, frequencies and capacities will evolve through the Enhanced Partnership between ECC and operators, the infrastructure needed to support these services must be planned alongside growth. Targeted infrastructure, including bus priority measures, dedicated links and new crossings where required, will be necessary to enable direct, reliable and attractive bus connections, helping future services avoid highway congestion and providing a competitive alternative to private car travel.

Rail connectivity will play a key role in supporting long-term growth across Tendring, providing sustainable access to jobs, services and the district's seaside towns. Realising these benefits will require close collaboration with Network Rail and train operators to ensure rail services, capacity and station infrastructure evolve in line with growth and seasonal tourism demand. Enhancements to station access and interchange facilities will be particularly important at Manningtree, Clacton, Great Bentley and Weeley stations, with Weeley and Great Bentley stations expected to play a key role in serving Garden Villages close by.

As growth continues beyond the Local Plan period, further investment in rail infrastructure, service frequencies, station facilities, integrated ticketing and other demand management measures will be required to maintain accessibility and accommodate increasing travel demand. Early and continued partnership working with the rail industry will therefore be essential to identify, plan and deliver the improvements needed to support both planned growth and longer-term sustainable travel objectives.

Beyond the Local Plan period, high-quality public transport infrastructure has the potential to act as a catalyst for growth by increasing the attractiveness and accessibility of development locations, supporting higher-density and mixed-use development, and improving sustainable connections between growth areas and key destinations including employment centres and Tendring's seaside towns. Continued investment in public transport connectivity will therefore be essential to accommodating future demand, supporting economic growth and delivering on wider environmental and carbon reduction objectives.

5.3.2.2 Highway Interventions and Active Travel

Whilst public transport will play an increasingly important role in meeting future travel demand, targeted highway interventions will remain necessary to maintain network performance, improve resilience and address existing constraints. Strategic highway improvements can help manage the cumulative impacts of growth by increasing network efficiency, reducing bottlenecks and enhancing connectivity between key destinations.

Beyond the Local Plan period, more substantial improvements to Horsley Cross Roundabout are likely to be required to accommodate forecast traffic growth and maintain the strategic function of the A120 corridor. These enhancements could include comprehensive junction reconstruction and the extension of dual carriageway sections on both approaches to the roundabout. As a key gateway between Tendring, Colchester and the wider strategic road network, ensuring the continued efficient movement of people and goods through Horsley Cross will be critical. Such improvements would help maintain journey time reliability, support access to new development and employment areas, and prevent increasing delays to strategic east-west movements on the A120.

A key focus for future investment in the longer term will be the junctions on the A12 corridor, including A12 J29 on the border of Tendring and Colchester. These junctions perform a critical strategic function for both local and longer, cross border movements. Whilst a number of improvements are anticipated within the Local Plan period, continued growth beyond this timeframe is likely to place additional pressure on key junctions. Further intervention may therefore be required to maintain operational performance, support access to emerging development areas and ensure the continued efficient movement of people and goods along this nationally significant route. Within Tendring, a number of strategic highway junctions are also expected to experience increasing pressure as development progresses. Beyond the Local Plan period, a combination of intelligent transport systems, dynamic traffic management, signal optimisation and targeted capacity enhancements will be required where highway space and environmental constraints permit. Such measures will help improve network resilience and maximise the efficiency of existing infrastructure, reducing the need for more extensive highway widening schemes.

Importantly, future highway interventions should not be considered solely in terms of vehicle capacity. A modern transport network must support the movement of people rather than simply the movement of vehicles. As such, highway schemes should be designed to incorporate active travel infrastructure wherever feasible, creating safer and more attractive environments for walking, wheeling and cycling.

Whilst the active travel mitigation measures identified in Section 3 are expected to be delivered within the local plan period, continued investment beyond the current Local Plan period will help to extend the catchment for active travel and improve walking, cycling and wheeling connections between settlements, within urban areas and to key destinations. The continued development of the urban LCWIP routes and Countywide routes, shown in Figure 3.6 to Figure 3.9, alongside additional Local Plan active travel schemes, will help to support future growth and encourage more sustainable travel movements within and to new communities from the outset.

Collectively, strategic highway and active travel improvements will play a vital role in unlocking future development opportunities, enhancing network resilience and supporting sustainable growth across Tendring. Delivery of these measures will ensure that the transport network remains adaptable and capable of accommodating future demand beyond the current Local Plan period.

5.4 Conclusion

This chapter has considered the transport impact to 2058 under two scenarios: a 2058 reference case with a low level of growth including TCBGC; and a 2058 assessment case with additional growth concentrated at Hare Green and Horsley Cross garden villages.

The 2058 reference case indicates a worsening of transport performance particularly on approaches to Colchester and on the A133 between Frating and Weeley. However, since the reference case scenario did not reflect ST demand but used BaU demand, there is some evidence that 2043 mitigations, if combined with trends for public transport and active travel, would be robust post 2058 for low levels of growth.

The 2058 assessment case shows a further worsening of movement performance particularly along the A120 affected by the garden villages. While the 2043 new local plan mitigations provide the foundation for an integrated transport system, the 2058 assessment case shows there will be requirements for:

- strategic investment in the A120 route
- strategic investment in the rail network with increased train frequencies on the Great Eastern Main Line and branch lines to Walton & Frinton
- continued investment in sustainable transport connectivity measures including LCWIP, RTS, P&C and local buses

Whilst growth up to 2043 can be managed with a small shift to sustainable travel, growth post-2043 will depend on people choosing a wider range of modes than private car travel. The concluding chapter summarises the key requirements for strategic investment and contributions from reference case and new local plan developments in transport mitigation and multi-modal connectivity, which is essential to manage the transport impact of growth up to 2043 and provide the foundation for continued growth beyond.

6. 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 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 growth across North Essex. Whilst the Regulation 19 Local Plan increases these pressures, the modelling confirms 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.

6.1 Summary of Findings

The transport evidence demonstrates that the principal transport challenge arises from cumulative growth across Tendring and neighbouring Colchester, rather than Regulation 19 growth in isolation. By 2043, existing network constraints are forecast to worsen, with local plan growth widening transport problems.

The reference case represents a significant level of growth without the new local plan, comprising 8,500 homes and 1,300 jobs in Tendring, together with substantial growth in Colchester, including the cross-border development at TCBGC. The Regulation 19 Local Plan adds approximately 9,250 homes and 10,250 jobs to the reference case growth, increasing total forecast growth to around 18,000 homes and 11,500 jobs by 2043.

NEMo has been used to test the following scenarios:

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. BaU trip demand is assumed.
3. Scenario 3 – assessment case growth with mitigation, in which key highway and public transport 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 ST mitigation not accounted for in Scenario 3. This scenario replaces BaU trip demand with ST trip demand.

The key integrated transport mitigations reflected in Scenarios 3 and 4 include cross-boundary mitigations at A12 J29 and Clingoe Hill along with highway capacity improvements along the A133 to Weeley, the A120 route past Horsley Cross garden village and Manningtree. High quality public transport services are introduced connecting the Hare Green and Horsley Cross garden villages to Colchester, Manningtree and Harwich. Further walking, cycling and interchange improvements are introduced to support access to rail stations and bus services and provide options for some short distance car trips to be cycled or walked.

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 6-1 and Table 6-2 respectively.

Table 6-1 Movement Index for 2023 base and Scenarios 1-4, AM peak

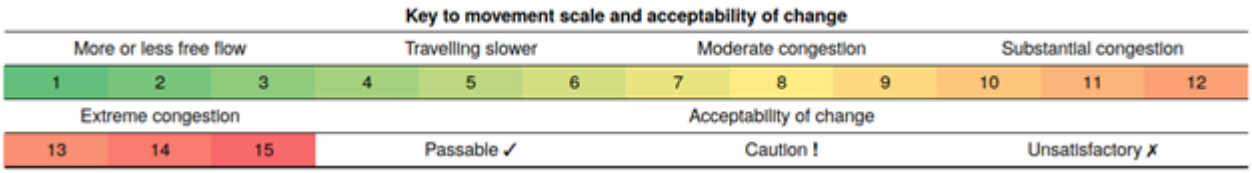
AM peak impacts						
Sector	**Location**	**2023 Base**	**2043 S1 RC**	**2043 S2 BAU**	**2043 S3 BAU Mit**	**2043 S4 BAU Mit ST**
East Colchester	**Greenstead Roundabout, Colne Causeway & Clingoe Hill**	10	15	15	11	9
	A12 J29 / A120 (eastern)	7	12	14	9	9
North Tendring	**A120 - Link Road Junction**	3	4	4	5	4
	A120 – Horsley Cross to Harwich	3	4	5	4	4
	A120 - A133 to Horsley Cross	3	3	7	6	5
	A133 Colchester Rd Roundabout	9	10	10	10	10
	B1035 Horsley Cross	2	3	4	3	3
	Elmstead Market	3	4	4	4	4
	Frating	2	3	4	3	3
	Great Bromley - Hare Green	3	4	6	5	5
	Harwich	3	3	4	3	3
	Manningtree	8	10	10	9	9
	A137 - Between Ardleigh and Manningtree	4	5	6	5	5
Overall assessment combining all areas		**6**	**8**	**9**	**7**	**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 6-2 Movement Index for Base and Scenarios 1-4, PM peak

PM peak impacts						
Sector	**Location**	**2023 Base**	**2043 S1 RC**	**2043 S2 BAU**	**2043 S3 BAU Mit**	**2043 S4 BAU Mit ST**
East Colchester	**Greenstead Roundabout, Colne Causeway & Clingoe Hill**	12	14	15	10	9
	A12 J29 / A120 (eastern)	7	10	11	9	9
North Tendring	**A120 - Link Road Junction**	2	3	4	4	4
	A120 – Horsley Cross to Harwich	3	4	4	4	4
	A120 - A133 to Horsley Cross	2	3	4	4	3
	A133 Colchester Rd Roundabout	8	10	11	11	10
	B1035 Horsley Cross	2	2	3	3	3
	Elmstead Market	3	3	4	4	4
	Frating	1	1	1	1	1
	Great Bromley - Hare Green	3	5	7	6	6
	Harwich	2	3	3	3	3
	Manningtree	9	9	10	10	9
	A137 - Between Ardleigh and Manningtree	4	5	5	5	5
Overall assessment combining all areas		**6**	**8**	**8**	**7**	**7**



Scenario 1 already shows movement problems on approaches to Colchester at A12 J29 and along Clingoe Hill, and through the A133 Colchester Road roundabout and at Manningtree. Reference case developments, especially TCBGC, would be expected to contribute to the mitigation of problems at A12 J29 and Clingoe Hill, however, reference case mitigation is not known at this point in time.

Therefore, when proposed new local plan growth is added to reference case growth in Scenario 2, it is added to a network already with unsatisfactory performance at locations. Movement problems are worsened at problem locations in Scenario 1 and extended to locations affected by development, which include routes past Hare Green and Horsley Cross developments.

However, Scenarios 3 and 4 show that performance with mitigation is considered much improved. The overall movement score returns to the reference case level though it is noted that further work will be required to

mitigate the movement problems along A133 between Colchester Road and Weeley roundabouts. The contribution of the proposed RTS route connecting the Hare Green and Horsley Cross garden villages proves particularly useful in helping manage traffic impact by providing a viable choice to driving to Colchester and Manningtree. Movement performance is best in Scenario 4, in which short distance local car trips take advantage of cycle infrastructure improvements.

The approach to managing growth needs to anticipate that there will be requirements for contributions from reference case and proposed new local plan sites. In addition, due to the impact on the SRN and the role of rail to support sustainable travel, strategic investment via National Highways and Network Rail is also recommended to support the plan to 2043 and secure sustainable growth beyond.

The following sections recommend requirements from local transport bodies, reference case developments and proposed new local plan developments; and how they should be coordinated to deliver to achieve the end point mitigations.

6.2 Strategic Investment Requirements

6.2.1 Highways

Significant improvements are required along the A120 route at A12 J29 and on westbound section adjacent to the proposed Horsley Cross garden village. 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 A120 route unless there were to be further junction improvements and widening, particularly around Horsley Cross. Therefore, there is a requirement for the highway authorities NH and ECC to:

- use evidence in this study to develop options for long term A120 improvements post 2043 which are co-ordinated with changes pre-2043 and investment plans for the A12
- 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.

6.2.2 Rail

Sustainable travel will be supported by improved frequencies of services on the Great Eastern Main Line and local services to Clacton and Walton & Frinton. Such improvements help to mitigate the highway impact of Tendring growth.

Table 3-1 lists the rail infrastructure needed to unlock frequency increases. 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 North Essex.

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.

6.3 Requirements to Mitigate Reference Case Growth

Reference case growth covers

- Committed growth in Tendring

- Committed and proposed new local plan growth in Colchester and Braintree
- Growth from outside North Essex in line with DfT NTEM forecasts

It has been found that committed growth, primarily from TCBGC and large sites around Clacton necessitates the need for highway schemes along the A133, A120 and A12 J29. 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 endpoint schemes, which as described in the section above, would usefully look beyond 2043.

TDC 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 end point scheme
- identify contributions and that it is proportionate to the remaining changes that would be needed.

Endpoint schemes along the A120, particularly around Frating and Weeley, to support emerging garden communities can be broken down into junction amendments, slip and flare alterations, signalisation and traffic management. Hence the scheme could readily be delivered in increments following the above steps.

End point schemes associated with the TCBGC development, at the A12 J29, can be broken down into signalisation, slip road changes of different scales and realignment of the central roundabout. Similarly, the A133 corridor improvements accessing Colchester can be broken down into changes around lower Ipswich Road and lower Harwich Road, Greenstead roundabout, Wivenhoe Park Corner and extension of a dedicated RTS lane. Again, these can be broken down into deliverable increments fairly apportioned.

6.4 Requirements to Mitigate Assessment Case Growth

Appendix E identifies which transport mitigations require contributions from reference case development, applying the approach described in Section 6.3– for which a coordinated approach to contributions would be required. Even if a mechanism for a community infrastructure levy was used, it is likely an incremental approach to delivery would still be required aligned to contributions.

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. It is expected that the case for contributions to key strategic schemes such as the A12 J29 would be minimal, with more significant contributions towards the A120/A133 confluence at Frating and Weeley.

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 Networkl Rail.

6.5 Recommendations

This transport evidence report has identified the impact of Tendring's proposed new local plan growth and compared it to a reference case of growth comprising committed allocations and proposed new local plan sites in other North Essex authorities of Colchester and Braintree. It is found that movement is unsatisfactory on parts of the network with reference case growth and noticeably worsens with the addition of new local plan growth.

Since new local plan growth will overlap with reference case growth and required mitigations at reference case sites are uncertain, the report has outlined integrated and vision led mitigations which would address the cumulative transport impact of reference and assessment case growth and provide adequate levels of connectivity. It should be noted at the local plan stage only outline concepts can be provided, which indicate

the scale and type of interventions required. Each package of mitigation needs to be designed in detail which should involve further optioneering and consultation.

The integrated transport plan of mitigations is consistent with the county's draft LTP and national and regional plans being developed by NH, Network Rail and Transport East. The report finds that if the mitigations were provided as outlined that the transport impacts of cumulative growth from reference case and proposed new local plan development can be acceptably managed. Furthermore, the measures provide a foundation for continued growth post 2043.

Starting with committed developments and then extending to new local plan sites, it is recommended that developers work collaboratively with the planning transport authorities to deliver the necessary integrated transport and vision-led mitigations. While the transport plan to 2043 is not dependent on government funding, there would be efficiencies if the more complex schemes on the SRN and rail network were delivered as part of established programmes, to which government funding complements developer funding. This would help accelerate housing delivery, reduce the amount of disruption from works and ensure infrastructure improvements are delivered ahead of development. Post 2043, strategic investment in A120 accessibility upgrades, particularly cross border between Tendring and Colchester but equally further west in Colchester and the A12 widening, and rail frequency improvements are considered essential to support continued growth.

In order to ensure that this collaborative approach to deliver the integrated transport vision the report has also recommended requirements for reference case and proposed new local plan developments to:

- keep the endpoint schemes under review, recognising changes may be required over time
- identify proportionate contributions that can deliver meaningful increments of the endpoint schemes
- check that the remaining increment necessary to realise completion of the endpoint schemes are viable for future expected development to fund

The recommended approach is cognisant of planning regulations but also able to be adapted as conditions change. The scale of the transport challenge requires the transport authorities – principally ECC – to maintain details of the endpoint schemes in order to support collaborative review and transport assessments as developments come forward. Should this be done then the transport impacts of growth can be acceptably managed, and the future transport system support the wider objectives for liveability, environmental quality and economic growth.

Appendix A. Method for assessing the acceptability of the transport impact of growth

Appendix B. Reference Case Sites

Appendix C. New Local Plan Site Allocations

Appendix D. Strategic Model Plots

Appendix E. Vision-Led Mitigation Measures

Appendix F. Maps of Vision-Led Mitigation Measures

Appendix G. Findings from Local Junction Models

Appendix H. Strategic Model Plots for Long Range Forecasts