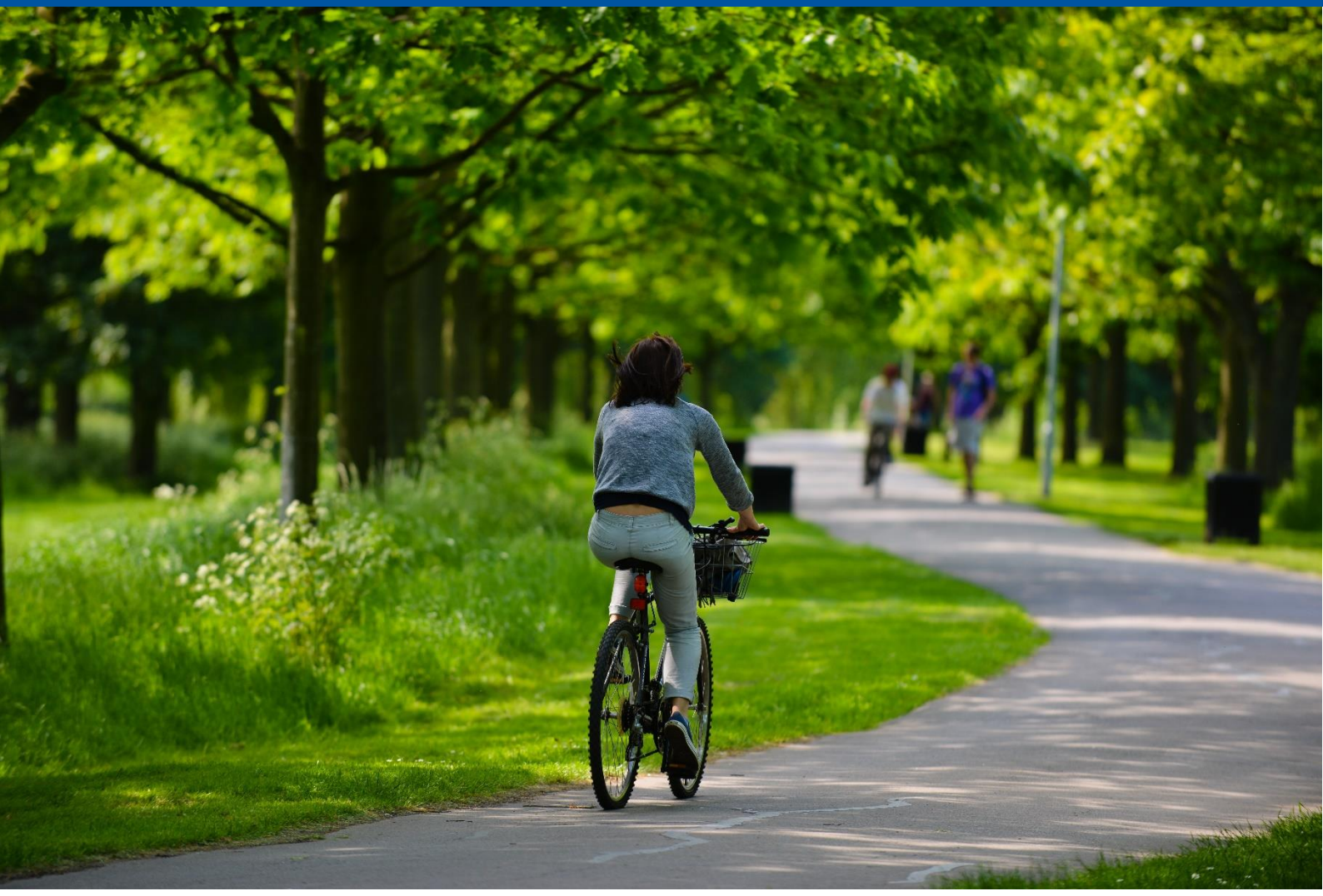
EB 025

Chelmsford Local Plan

Transport Impact of Local Plan Preferred Spatial Option

March 2017



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Executive Summary

This report presents the outputs and analysis of highways modelling undertaken for the assessment of Chelmsford City Council's (CCC) Local Plan Preferred Spatial Option.

Outputs from the VISUM modelling highlight areas of network congestion that are likely to be sensitive to the addition of development traffic associated with the Local Plan Preferred Spatial Option. These include main urban corridors and city centre routes as follows:

- Main Road, Broomfield - in the vicinity of Hospital Approach
- Main Road, Broomfield – in the vicinity of Parkway
- Rainsford Road, Waterhouse Lane and New London Road corridors
- Springfield Road, Victoria Road, High Bridge Road in the city centre
- Rectory Lane and New Street in the city centre
- Central Parkway
- The Army & Navy Flyover & Baddow Road

Further areas of congestion are highlighted at the following locations when modelling the Preferred Option:

- A12 carriageway between junctions 15 and 19
- London Road Widford Viaduct, Wood Street & the Miami Roundabout
- Roxwell Road & Chignal Road (notably in the PM Peak)
- Lordship Road & The Green in Writtle
- A414 east of A12 (notably in the PM Peak)
- A131 Braintree Road between Sheepcotes and Deres Bridge Roundabouts (not shown on plots below)

With reference to earlier testing of Spatial Options 1-3 and the Local Plan Sensitivity Testing, it has been difficult to differentiate between the modelled network performance of the Preferred Spatial Option and that of the three Spatial Options and sensitivity testing that preceded it. The patterns and severity of congestion across Chelmsford in the modelling remain broadly consistent regardless of differences in Local Plan development allocation.

There are likely to be a number of factors contributing to the consistency in the model performance. These are:

- The relatively small difference in the quantum of development proposed between the three Spatial Options and sensitivity testing

- The broad spread of development proposed across the administrative area – including Great Leighs and South Woodham Ferrers
- The high levels of background congestion predicted in the city centre and along corridor routes by 2036
- The influence of wider traffic re-routing as a result of A12 congestion

A 5% reduction in traffic flow is shown in the model to result in lower traffic flows along the A12, A1016 Chelmer Valley Road and central Parkway in particular. There is however, little-to-no impact on modelled traffic congestion in the city centre and along urban corridors, indicating the scale of network congestion and latent vehicular demand modelled in and around the city centre. Plots of model outputs illustrating this point can be found in Section 5 of this report.

The results of the sensitivity test suggest that future congestion along urban corridors and in the city centre will likely remain high, regardless of a reasonable variability in peak hour demand. The scale of this congestion would appear to contribute towards the homogeneity in model outputs across the three Spatial Options and sensitivity testing.

With peak hour congestion observed on the approaches to junctions along the B1012 Burnham Road to the north of South Woodham Ferrers, and in the vicinity of the town's rail station, it is anticipated that the addition of development traffic will place further pressure on surrounding network capacity. There should, however, be an opportunity to reduce levels of traffic generated by the proposed development through the provision and promotion of walking and cycling links between the site and the nearby rail station.

The quantum of development proposed in Great Leighs and Moulsham Hall is likely to place additional strain on the capacity of the A131 Braintree Road between Deres Bridge and Sheepcotes Roundabout. Proposals for a Chelmsford North East Bypass are likely to help accommodate this additional traffic, but in the shorter term, emphasis would need to be placed on encouraging the use of public transport for journeys into Chelmsford city centre to help limit the impact of traffic growth.

A further study has been commissioned to consider the likely traffic impact on local junctions significantly affected by the location of the Local Plan developments. The outputs presented in this report have been used to identify and prioritise the junctions to be taken forward for assessment based on their proximity to proposed housing locations and the scale of congestion modelled.

1 Introduction

This report presents the outputs and analysis of highways modelling undertaken for the assessment of Chelmsford City Council's (CCC) Local Plan Preferred Spatial Option.

The work summarised in this report follows an earlier assessment of the transport impact of CCC's Local Plan Spatial Options and mitigation proposals as outlined in the 'Issues and Options Consultation Document – November 2015'. It also follows Local Plan Sensitivity Testing of hybrid Spatial Options identified by CCC alongside a review of potential sustainable transport infrastructure to help mitigate the impact of development traffic.

This study, and those immediately preceding it, have used the Chelmsford Strategic Model - a fixed-demand VISUM traffic model – to appraise the impact of proposed Spatial Options on the strategic (wide-area) road network. Headline findings and model outputs have been largely consistent across the various assessments.

Follow-on work has since been commissioned to consider the local junction impact of developments associated with CCC's Preferred Option. This will use the recently developed Variable Demand VISUM model for Chelmsford and will incorporate the latest agreed development and infrastructure assumptions. Subsequent reporting will include an updated assessment of the strategic network impact and detailed assessment of the impact of development traffic on local junctions.

The findings from this initial appraisal of the Preferred Option will help to identify the junctions likely to be most impacted by Local Plan proposals, and these junctions will be taken forward for detailed assessment as part of the upcoming study.

It is envisaged that these studies will provide evidence to support a Preferred Spatial Option and package of mitigation measures to include in the Local Plan submission in 2017.

1.1 Document Layout

This document consist of five chapters, as follows:

- Chapter 1: **Introduction**
- Chapter 2: **Modelling Assumptions** – this provides detail on the VISUM model, development assumptions and the trip generation/distributions used in this study
- Chapter 3: **Model Outputs & Analysis** – this provides summary analysis of the outputs from modelling the Preferred Option, and also a qualitative review of the highway impact of development proposals in South Woodham Ferrers and Great Leighs
- Chapter 4: **Sustainability Review** – this summarises content from an earlier sustainable infrastructure review of the three Spatial Options and sensitivity tests, with a re-focus on the Preferred Option
- Chapter 5: **Next Steps** – this references an upcoming modelling study of the Preferred Spatial Option with a focus on the impact of proposals on local junctions

1.2 Glossary of Modelling Terms

Fixed Demand	Demand for peak hour travel that does not change to take account of congestion on the road network.
Matrix Furness	Process of creating a matrix of vehicle journeys based on known trip ends for both origins and destinations.
NTEM / TEMPRO	National Trip End Model – produced by the Department for Transport, it uses a number of forecasts for population, employment and households by car ownership to forecast changes in trip ends (trips by origin and by destination). The results are viewed in software called TEMPro (Trip End Model Presentation Program).

Trafficmaster	A database managed by the Department for Transport containing Global Positioning System derived journey times of vehicles
Variable Demand	Demand for peak hour travel that is adjusted to take account of congestion on the road network.
VISUM	An area-wide assignment modelling package used in this study to assess the impact of development traffic on the wider 'strategic' road network in and around Chelmsford.
Volume/Capacity Ratio	The volume of traffic calculated as a percentage of the capacity of the road. 100% equates to the road being at full capacity – often characterised by large queue extents and delays.

2 Modelling Assumptions

2.1 The VISUM Model

The VISUM model used to assess the Preferred Spatial Option has a fixed-demand highway assignment. This means that travel behaviour responses to congestion have not been modelled, i.e. there have been no changes to the numbers of car trips people make, no changes to the destinations of car trips, no switching to other modes such as bus or rail and no changes in time of travel. As such the results, although consistent with each other, will likely represent an overestimate of traffic levels.

A sensitivity test considering the highway impact of a model-wide 5% reduction in vehicle trips has subsequently been undertaken to gain an insight into what might happen if congestion did have an impact on travel behaviour in the peak hours. It should be noted that while a reduction of 5% is considered to be a reasonable level for such a change, there is no evidence to suggest that this will be achieved or that it will be achieved uniformly across all origins and destinations of trips, as has been tested here.

This assessment of the Preferred Spatial Option incorporates the latest TEMPro 7.0 growth assumptions released by the Department for Transport and adopts a 2036 forecast year (the end of the Local Plan period).

Upcoming work in Spring 2017 to consider the local junction impact of developments associated with CCC's Preferred Option, will make use of the recently developed Variable Demand VISUM model for Chelmsford. This updated model will account for travel behaviour responses to congestion on the road network.

2.2 The Preferred Spatial Option

Table on the following page provides detail on the Preferred Spatial Option dwelling and employment allocations for the period 2021-2036 included in the forecast modelling. The development allocations shown are correct as of November 2016, at the time this study was undertaken.

It is acknowledged that the Preferred Option allocations have since changed in the period leading up to Public Consultation in March 2017. The extent of these changes is documented in Section 5 of this report.

Preferred Spatial Option – November 2016 allocations		
Development Locations	**Dwellings**	**Employment**
Growth zone – Central and Urban Chelmsford		
Location 1 Chelmsford Urban Area	2,500	Office 4,000 sqm Food Retail 11,500 sqm
Location 2 West Chelmsford – Warren Farm	800	
Location 3 East Chelmsford – East of Great Baddow / North of Sandon	400	Office / Business Parks 5,000 sqm
Growth zone – North Chelmsford		
Location 5 North of Broomfield	800	
Location 6 North East Chelmsford Beaulieu Post 2021 Roll-Over	2,500	
Location 7 North East Chelmsford	3,000	Office / Business Parks 45,000 sqm
Location 8 Moulsham Hall and North Great Leighs	1,000	
Location 9 Boreham	145	

Preferred Spatial Option – November 2016 allocations		
Development Locations	**Dwellings**	**Employment**
Growth zone – South Chelmsford		
Location 10 North of South Woodham Ferrers	1,500	Office 1,000 sqm Food Retail 1,900 sqm
Location 11 Rettendon Place	150	
Location 12 Bicknacre	35	
Location 13 East Hanningfield	75	
Location 14 Danbury	100	
Windfall allowance	1,500	

Table 2-1: Preferred Spatial Option development allocations – November 2016

Traveller pitches identified across Chelmsford have not been included in this modelling assessment, as the trip generation from these sites is not expected to significantly impact the road network in the peak hours modelled. It is also noted that Location 4 – East Chelmsford: East of the A12 (Hammonds Farm) is no longer under consideration and has therefore not been included in the modelling. Location numbers 1-14 as shown in Table 2-1 have been based on a numbering system adopted by CCC in November 2016, but which has been amended for the March 2017 Preferred Spatial Option allocation.

Table 2-2*Table 2-2* below details the mitigation infrastructure included in the modelling of the Preferred Spatial Option. Modelling also includes the proposed Chelmsford North East Bypass[1] and Radial Distributor Road around Beaulieu Park. An assumption has also been made that the A12 will maintain its current two lane dual carriageway layout between Junctions 15 and 19 within the plan period.

Infrastructure	Description
Eastern Gateway Access Road	Road linking Navigation Road to Chelmer Viaduct via Chelmer Waterside providing an eastern gateway route into City Centre
A132 dualling	Dualling of A132 between junction with B1418 and A130

[1] Based on the Design Freeze A scheme design documented in 'Chelmsford North East Bypass – Scheme Review Report: Volume 1' Jacobs, 12th November 2015

Infrastructure	Description
Additional Park and Ride in NE Chelmsford	Potential location to be tested off General's Lane at J19 A12 Boreham Interchange
Additional Park and Ride in west Chelmsford	Potential location to be tested on A414 between London Road and Margaretting Road.
New junction on A130 Essex Regiment Way	New roundabout junction on the A130 Essex Regiment Way located north of the Park and Ride site off Pratt's Farm Lane. Development associated with the high-tech business park in Zone 91, has been reassigned to access via this new junction.

Table 2-2: Preferred Spatial Option mitigation infrastructure modelled

2.3 Development trip generation and distribution

Vehicle trips to and from the developments by model zone have been calculated based on the assumptions listed above and using the same method as that employed for the Chelmsford Strategic Model initial forecasting as reported in the Traffic Forecasting Report, Version 2, August 2016. Zone connector shares have been updated to load the quantities of traffic associated with the development on the assumed connector nodes in the proportions detailed, whilst leaving the quantity of base traffic assigned as per the base model.

The total forecast year trips (base year trips and development trips for each option) have been distributed between start and end points (origins and destination zones) through a Furness process to create the demand matrices for the model. This method is also the same as that employed for the Chelmsford Strategic Model initial forecasting as reported in the Traffic Forecasting Report, Version 2, August 2016 and uses the distribution from the base model as a starting point.

Fuel and income factors as reported in the Traffic Forecasting Report, Version 2, August 2016 have been used to grow the vehicle matrices further to account for changes in those variables.

3 Model Outputs & Analysis

3.1 Forecast Network Congestion

Outputs from the modelling of a 2036 future year highlight areas of network congestion that are likely to be sensitive to the addition of development traffic associated with the Local Plan Preferred Spatial Option. These include main urban corridors and city centre routes as follows:

- Main Road, Broomfield - in the vicinity of Hospital Approach
- Main Road, Broomfield – in the vicinity of Parkway
- Rainsford Road, Waterhouse Lane and New London Road corridors
- Springfield Road, Victoria Road, High Bridge Road in the city centre
- Rectory Lane and New Street in the city centre
- Central Parkway
- The Army & Navy Flyover & Baddow Road

Further areas of congestion are highlighted at the following locations when modelling the Preferred Option:

- A12 carriageway between junctions 15 and 19
- London Road Widford Viaduct, Wood Street & the Miami Roundabout
- Roxwell Road & Chignal Road (notably in the PM Peak)
- Lordship Road & The Green in Writtle
- A414 east of A12 (notably in the PM Peak)
- A131 Braintree Road between Sheepcotes and Deres Bridge Roundabouts (not shown on plots below)

Figures 3.1–3.6 below are plots taken from the VISUM model to illustrate the levels of congestion modelled across Chelmsford during the peak hours.

Road links with a Volume/Capacity (V/C) ratio of 85% or more can be considered to be approaching capacity. It is likely that these links will be affected by rising levels of congestion as the ratio increases. Those shown in the V/C plots as having a ratio exceeding 90% have been highlighted as likely to experience moderate levels of congestion.

The following time periods have been modelled:

- AM Peak 08:00-09:00
- Inter Peak (IP) 12:00-13:00
- PM Peak 17:00-18:00

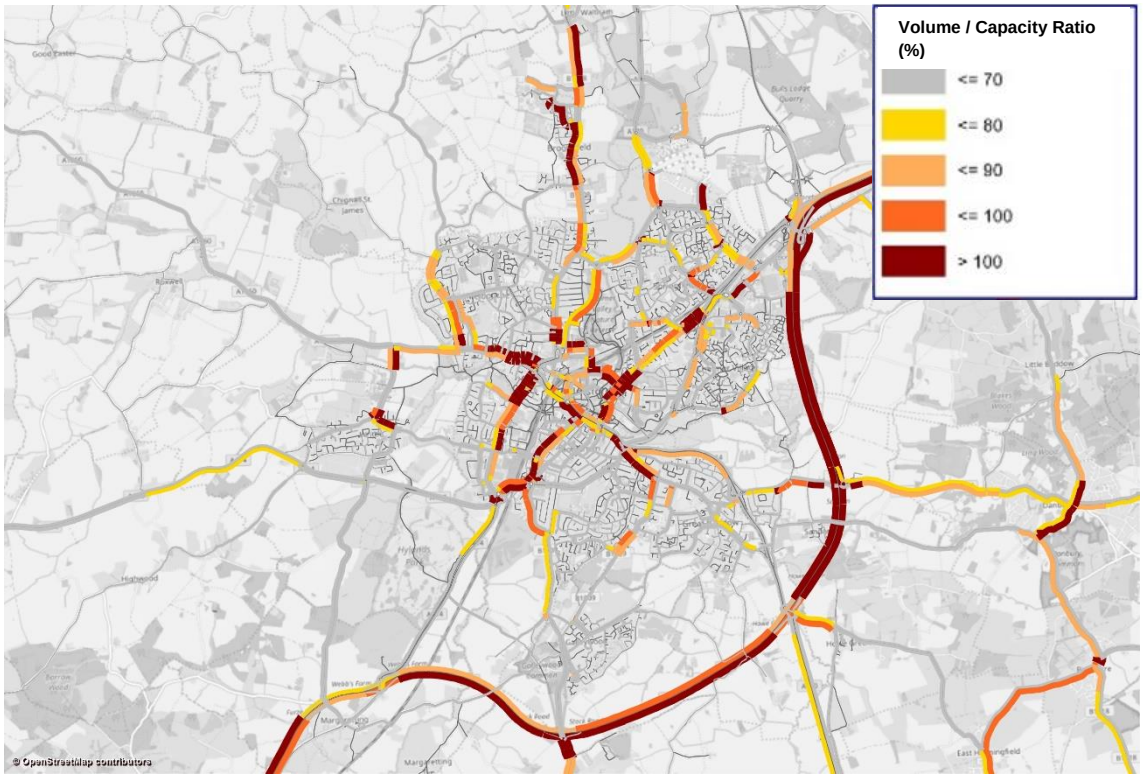

Figure 3.1: AM 2036 Volume/Capacity Plot – Preferred Spatial Option

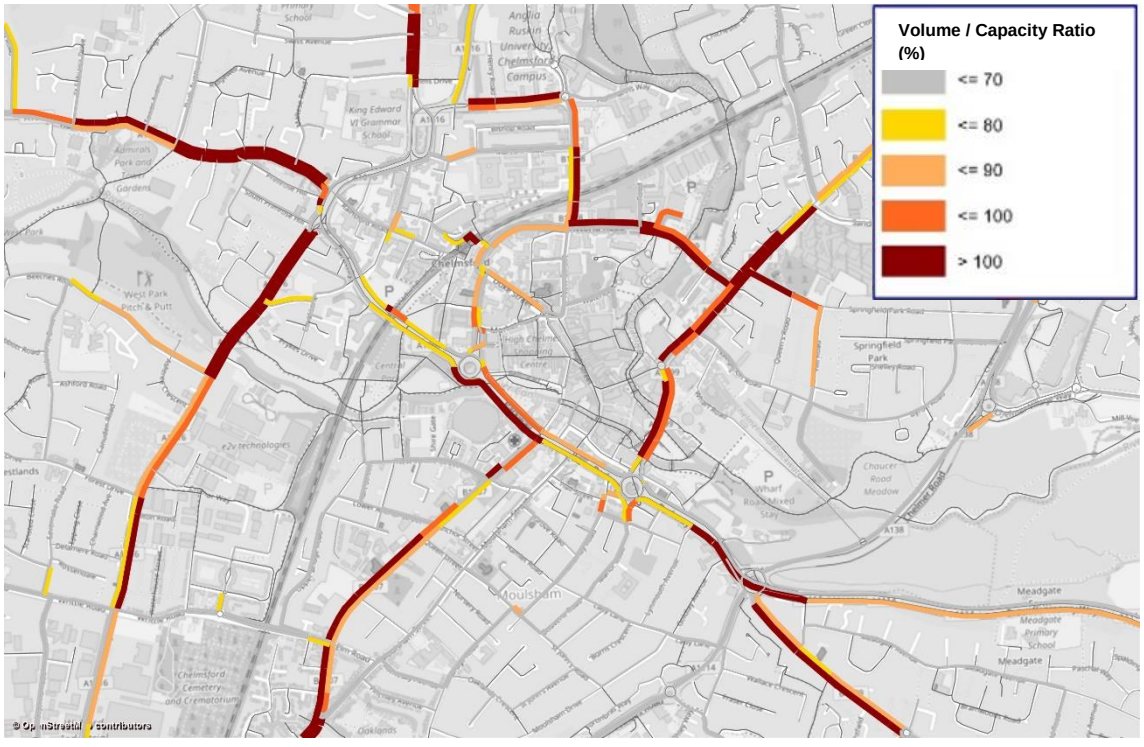

Figure 3-2: AM 2036 Volume/Capacity Plot – Preferred Spatial Option (City Centre)

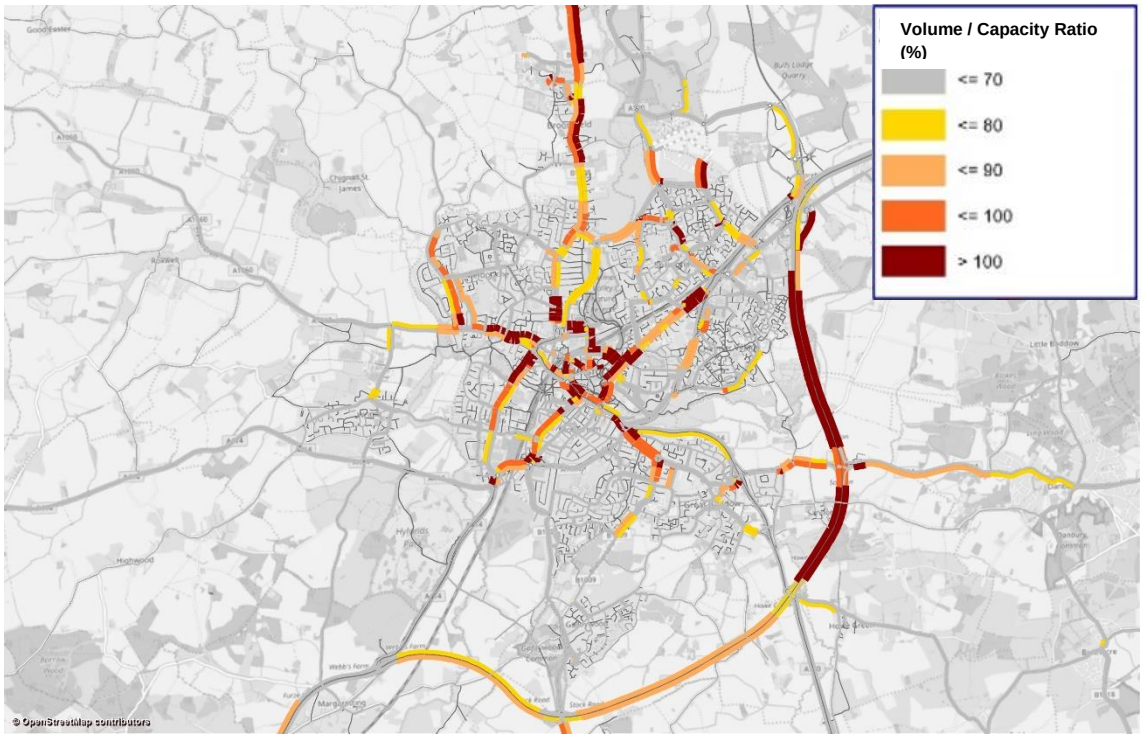

Figure 3-3: IP 2036 Volume/Capacity Plot – Preferred Spatial Option

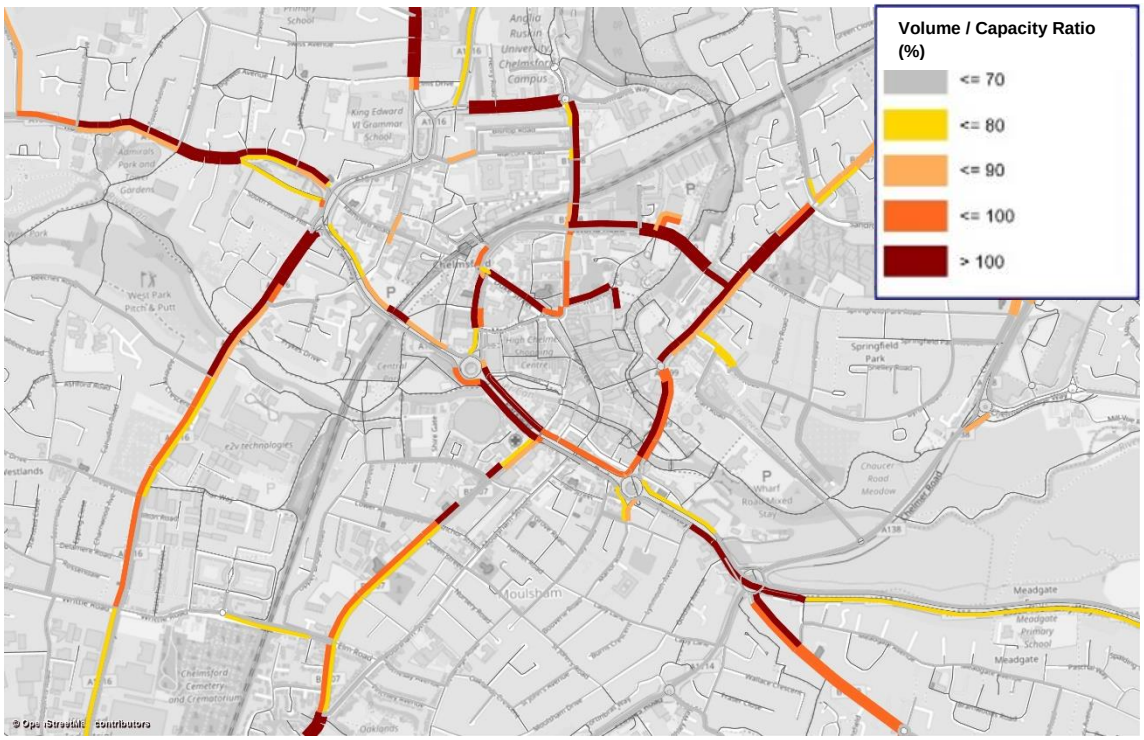

Figure 3-4: IP 2036 Volume/Capacity Plot – Preferred Spatial Option (City Centre)

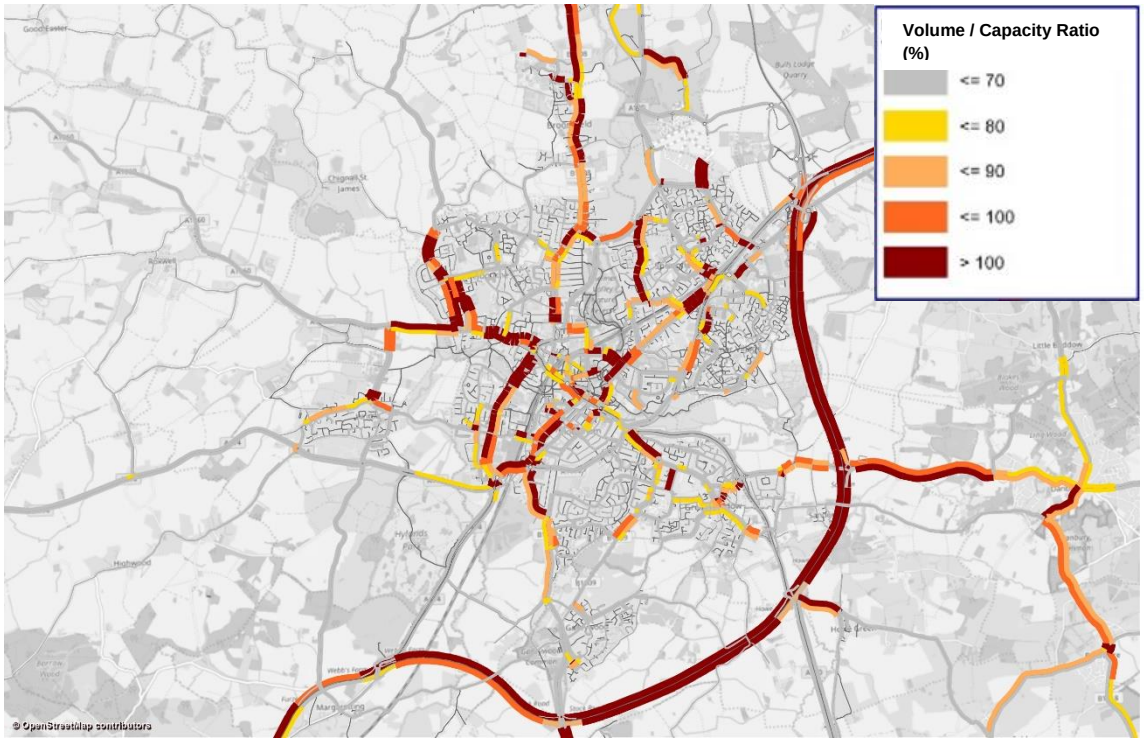

Figure 3-5: PM 2036 Volume/Capacity Plot – Preferred Spatial Option

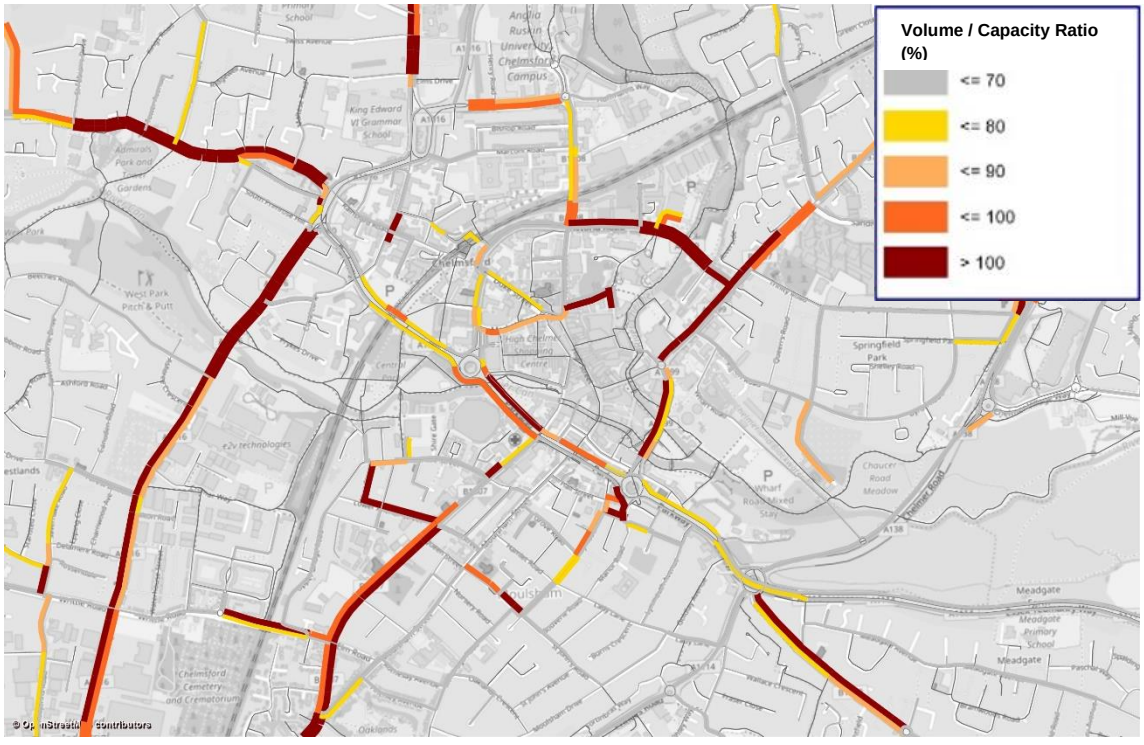

Figure 3-6: PM 2036 Volume/Capacity Plot – Preferred Spatial Option (City Centre)

With reference to earlier testing of Spatial Options 1-3 and the Local Plan Sensitivity Testing, it has been difficult to differentiate between the modelled network performance of the Preferred Spatial Option and that of the three Spatial Options and sensitivity testing that preceded it. The patterns and severity of congestion across Chelmsford in the modelling remain broadly consistent regardless of differences in Local Plan development allocation.

There are likely to be a number of factors contributing to the consistency in the model performance. These are:

- The relatively small difference in the quantum of development proposed between the three Spatial Options and sensitivity testing
- The broad spread of development proposed across the administrative area – including Great Leighs and South Woodham Ferrers
- The high levels of background congestion predicted in the city centre and along corridor routes by 2036
- The influence of wider traffic re-routing as a result of A12 congestion

3.2 Forecast Network Congestion with 5% reduction in vehicle trips

To simulate the effects of peak hour demand responsiveness to network congestion, all vehicle trips contained within the model matrices were reduced by 5% before re-running the model assignment.

Figures 3.7-3.9 below illustrate the change in vehicle flow modelled during the peak hours following a 5% reduction in vehicle trips across the network.

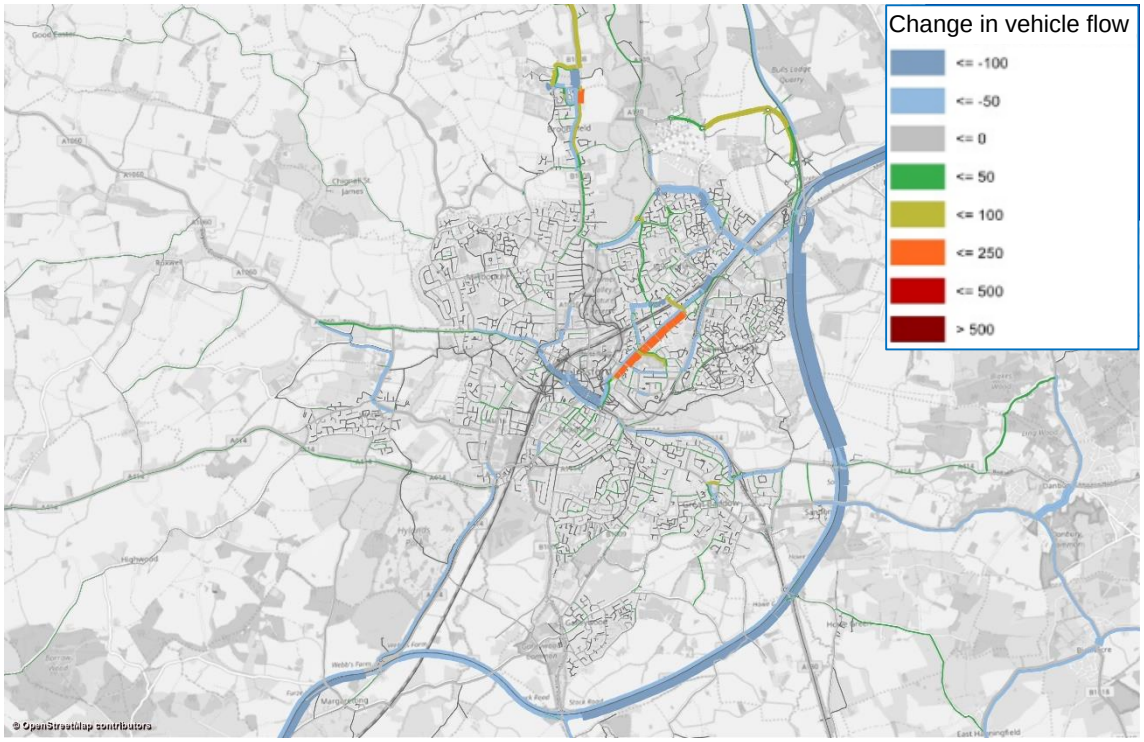

Figure 3-7: AM 2036 flow difference plot – Impact on link flows of a 5% reduction in vehicle trips

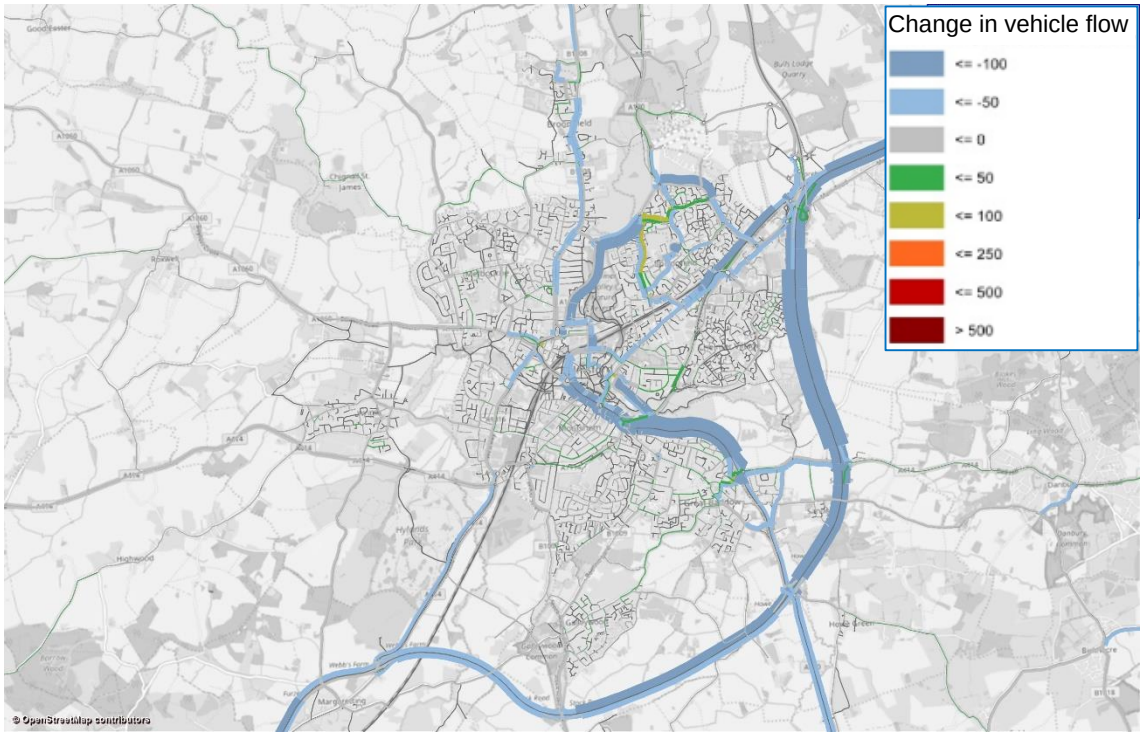

Figure 3-8: IP 2036 flow difference plot – Impact on link flows of a 5% reduction in vehicle trips

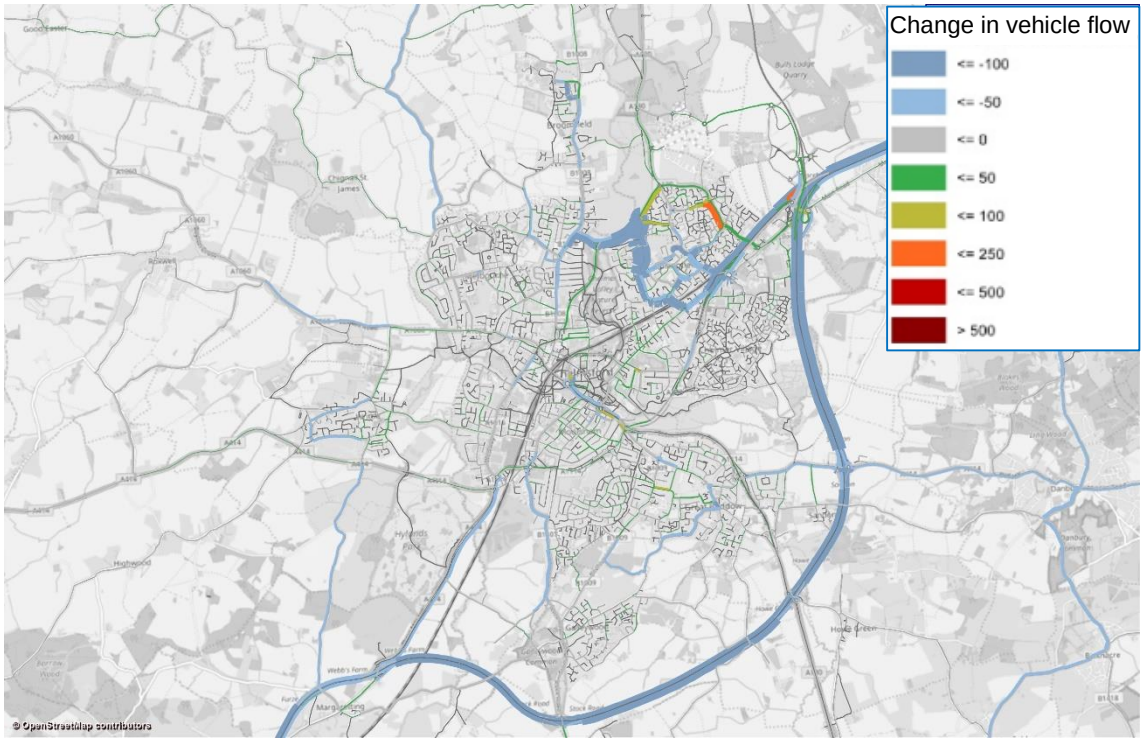

Figure 3-9: PM 2036 flow difference plot – Impact on link flows of a 5% reduction in vehicle trips

As might be expected, a 5% reduction in peak hour trips is shown in the model to result in lower traffic flows along the busiest routes into and around Chelmsford – most notably the A12, A1016 Chelmer Valley Road and central Parkway. It is also noticeable that the reduction in peak hour trips reduces the extent of apparent rat-running through North Springfield in the PM peak.

Figures 3.10-3.15 below are plots taken from the VISUM model to illustrate the subsequent levels of congestion modelled across Chelmsford during the peak hours following a 5% reduction in vehicle trips across the network.

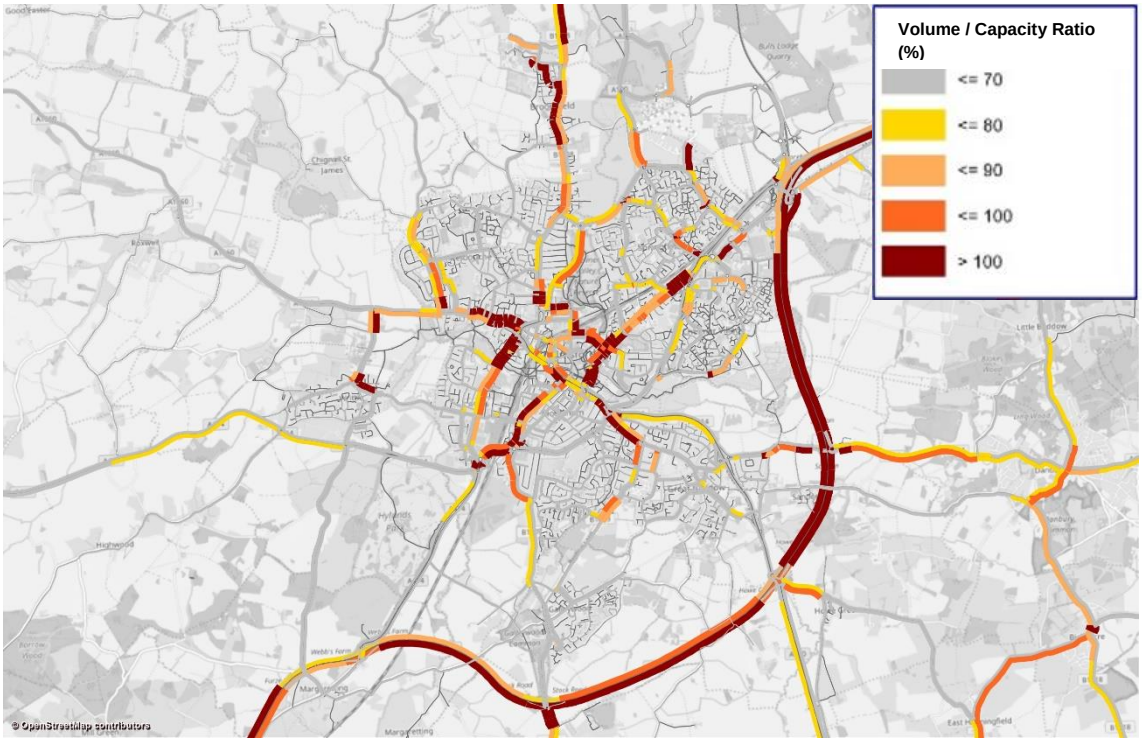

Figure 3-10: AM 2036 Volume/Capacity Plot – Preferred Spatial Option with 5% vehicle trips reduction

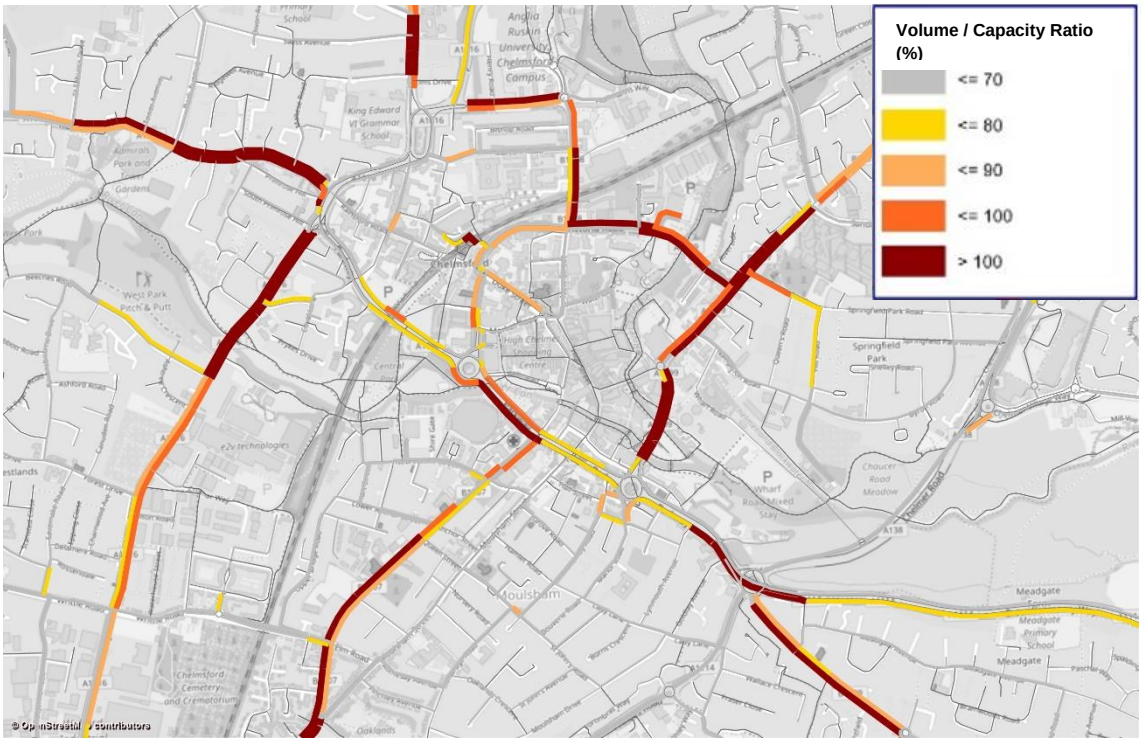

Figure 3-11: AM 2036 Volume/Capacity Plot – Preferred Spatial Option with 5% vehicle trips reduction (City Centre)

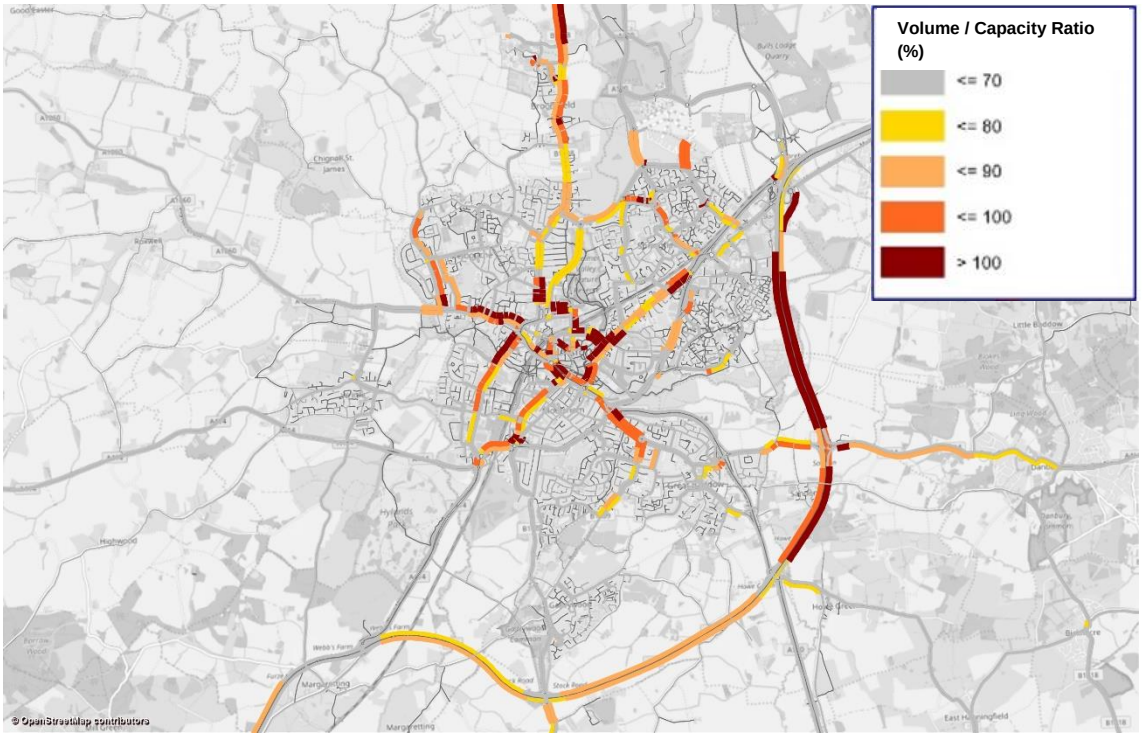

Figure 3-12: IP 2036 Volume/Capacity Plot – Preferred Spatial Option with 5% vehicle trips reduction

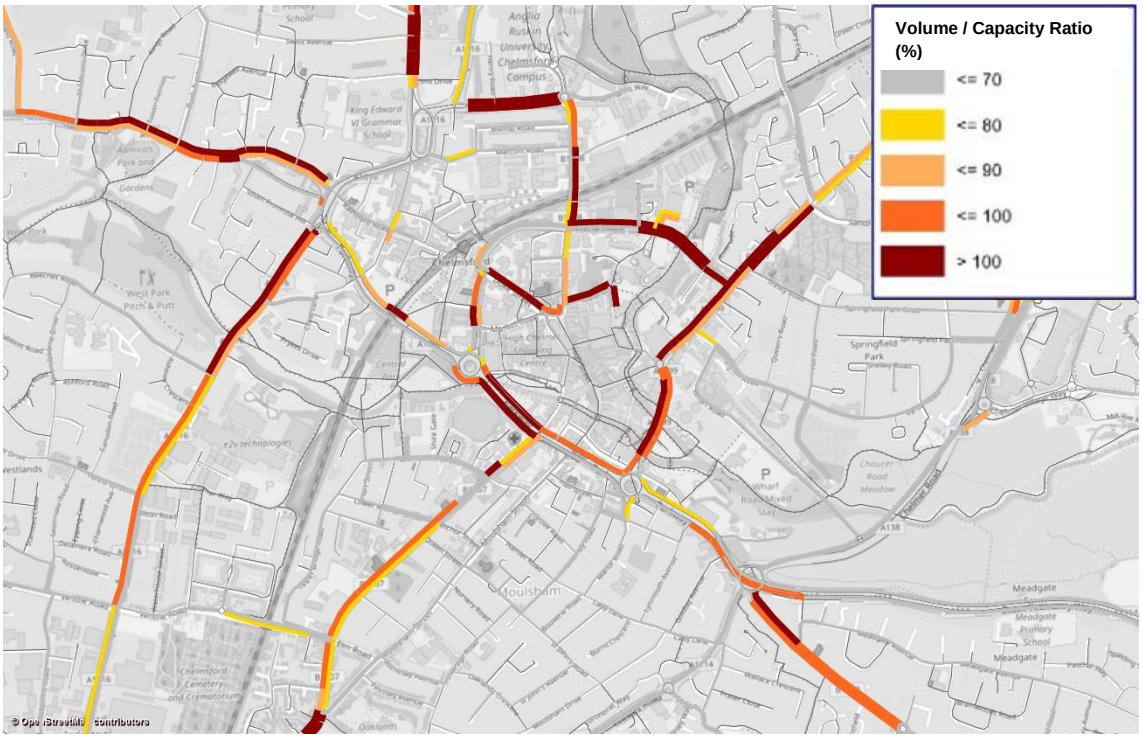

Figure 3-13: IP 2036 Volume/Capacity Plot – Preferred Spatial Option with 5% vehicle trips reduction (City Centre)

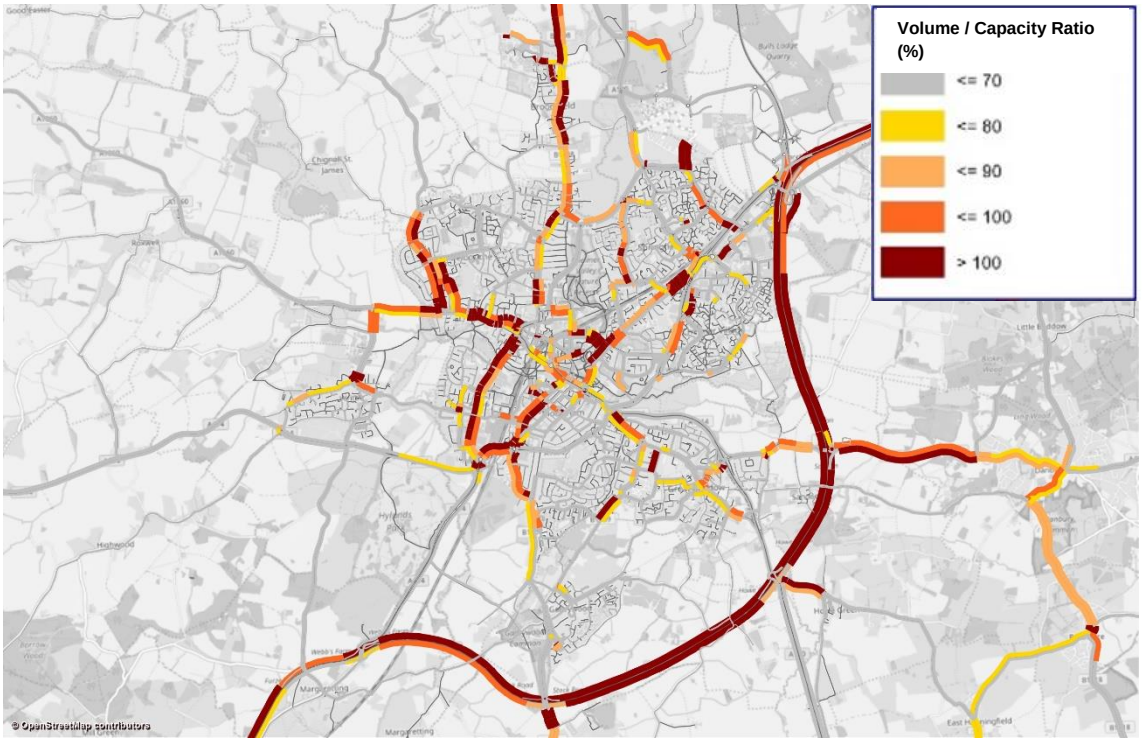

Figure 3-14: PM 2036 Volume/Capacity Plot – Preferred Spatial Option with 5% vehicle trips reduction

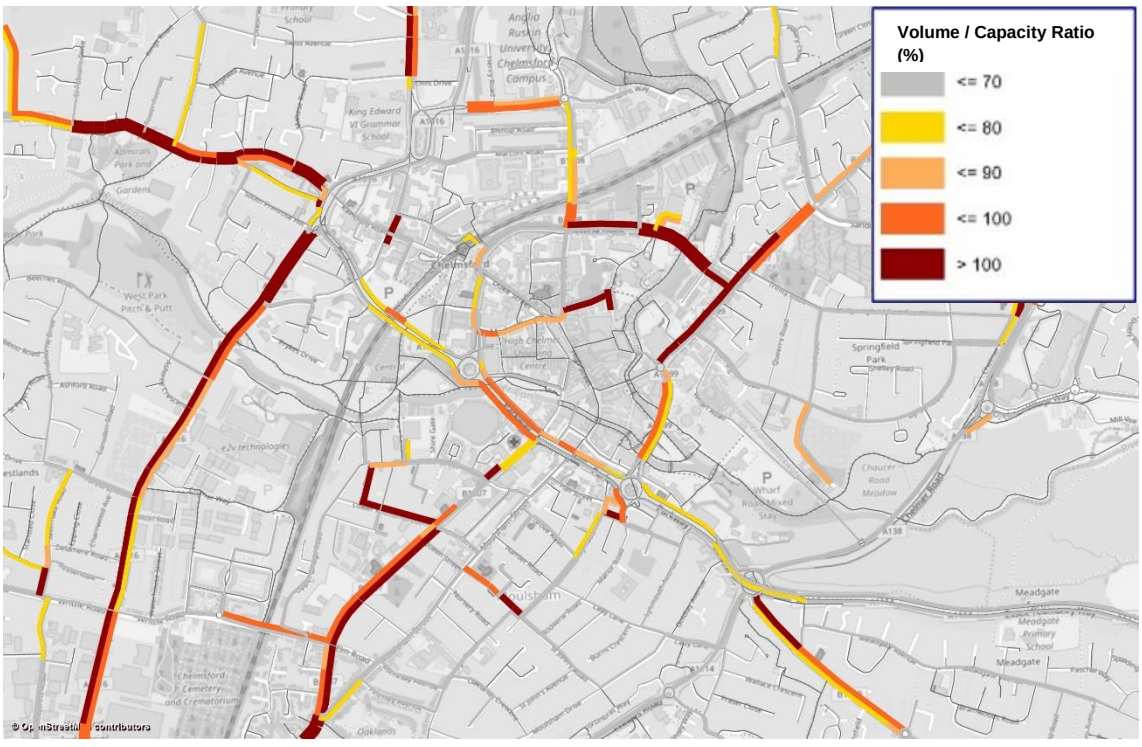

Figure 3-15: PM 2036 Volume/Capacity Plot – Preferred Spatial Option with 5% vehicle trips reduction (City Centre)

Analysis of the model outputs suggests that future congestion along urban corridors and in the city centre will likely remain high, regardless of a reasonable variability in peak hour demand. This provides a strong indication as to the scale of network congestion and latent vehicular demand modelled in and around the city centre.

The scale of congestion modelled in Chelmsford by 2036 would therefore appear to contribute towards the homogeneity in model outputs previously reported across the three Spatial Options and associated sensitivity tests.

3.3 South Woodham Ferrers and Great Leighs

The wider highways impact of the Local Plan Preferred Option has been reviewed at a high level as part of this study. It is important to acknowledge however, that outputs from the VISUM model that are extracted from peripheral areas of the Chelmsford Local Authority area should be considered less robust, with network validation focussed on the urban area of Chelmsford.

Coverage of the road network at the periphery of the VISUM model is also less detailed and this has the potential to impact the assignment of traffic at a more local level through areas such as South Woodham Ferrers and Great Leighs.

Consequently, the strategic highway impact of Local Plan development in these areas cannot be robustly quantified using the same modelling approach adopted for developments closer to Chelmsford.

Table 3-1 below provides a calculation of the quantum of development traffic expected at the proposed housing locations in South Woodham Ferrers and Great Leighs.

Development Locations	Total vehicle arrivals and departures 2021-2036		
	AM	IP	PM
Location 10: North of South Woodham Ferrers	644	687	896
Location 8: Moulsham Hall and North Great Leighs	392	361	502

Table 3-1: Vehicle trip generation from developments in South Woodham Ferrers and Great Leighs

Figure 3-16 and Figure 3-17 illustrate current average peak hour vehicle speeds as a percentage of free-flow speed, based on values taken from 2014-15 Trafficmaster datasets for a typical neutral month. This analysis effectively serves to inform the levels of congestion experienced on the road network.

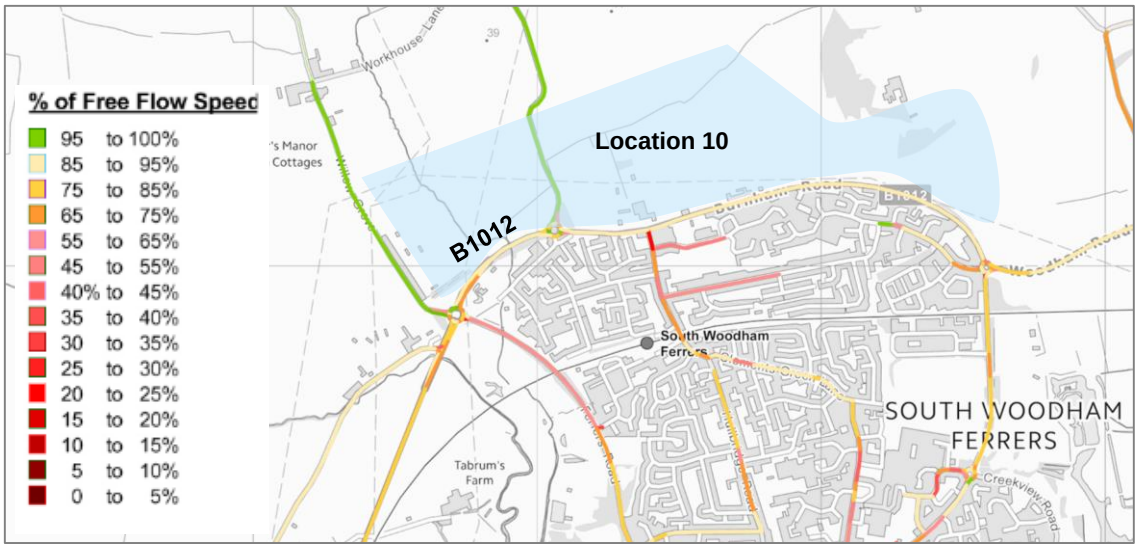

Figure 3-16: AM observed levels of congestion in South Woodham Ferrers 2014-2015

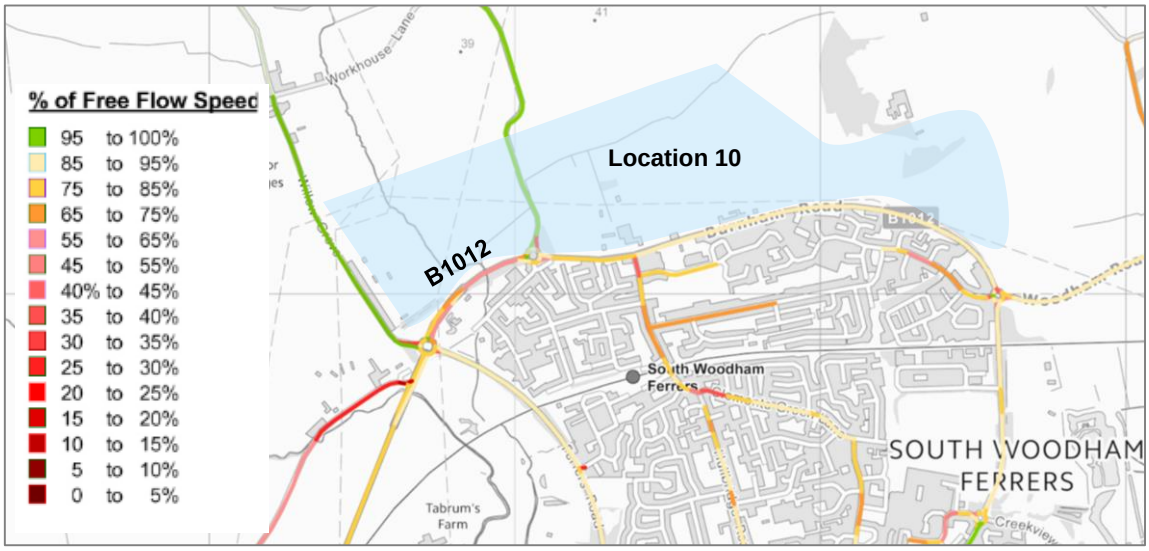

Figure 3-17: PM observed levels of congestion in South Woodham Ferrers 2014-2015

With peak hour congestion observed on the approaches to junctions along the B1012 Burnham Road to the north of South Woodham Ferrers, and in the vicinity of the town's rail station, it is anticipated that the addition of development traffic will place further pressure on surrounding network capacity.

However, given the close proximity of the rail station to the proposed area of development to the north of South Woodham Ferrers, there should be an opportunity to reduce levels of traffic generated by the development through the provision and promotion of walking and cycling links between the site and the rail station.

Figure 3-18 below illustrates current average peak hour vehicle speeds as a percentage of free-flow speed in Great Leighs, based on values taken from 2014-15 Trafficmaster datasets for a typical neutral month.

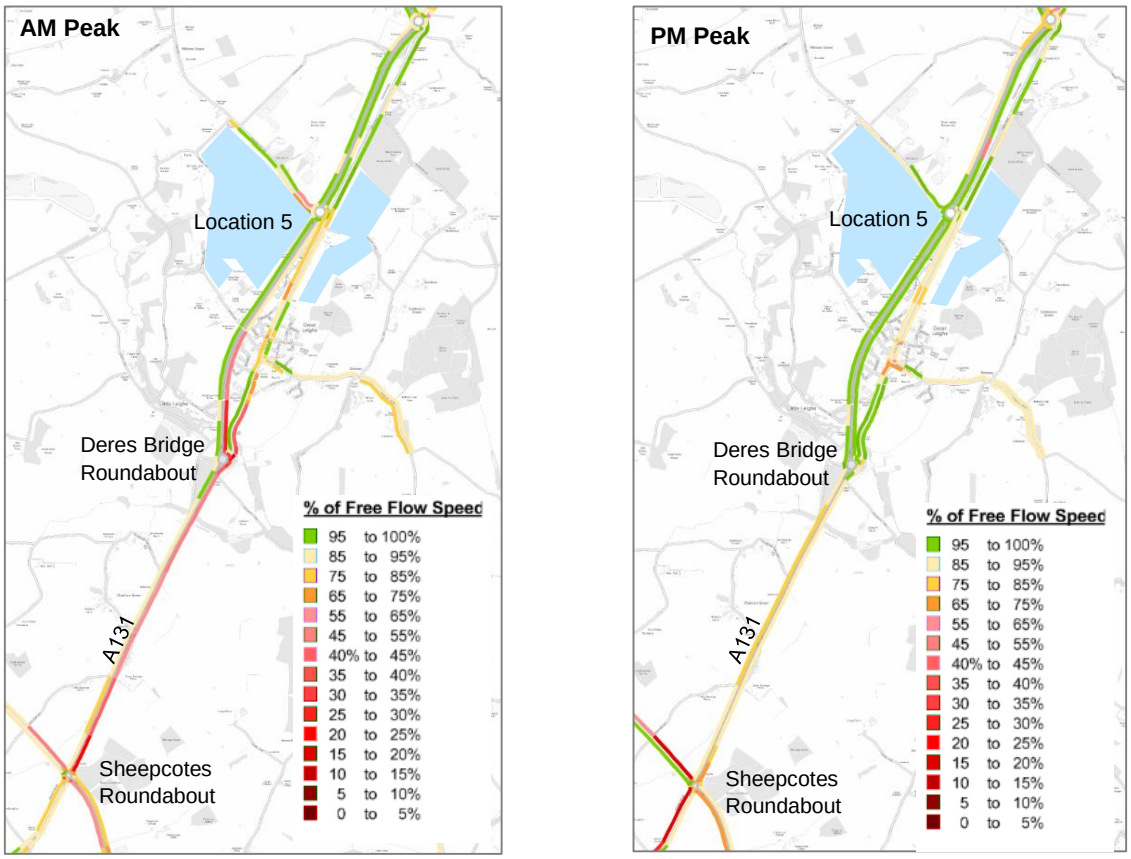

Figure 3-18: Peak hour observed levels of congestion in Great Leighs 2014-2015

The quantum of development proposed in Great Leighs and Moulsham Hall is likely to place additional strain on the capacity of the A131 Braintree Road between Deres Bridge and Sheepcotes Roundabout. Proposals for a Chelmsford North East Bypass will help accommodate this additional traffic, but in the shorter term, emphasis would need to be placed on encouraging the use of public transport for journeys into Chelmsford city centre to help limit the impact of traffic growth.

Further consideration of sustainable infrastructure to help mitigate the impact of Local Plan development traffic is summarised in the following section of this report. The local junction impact of developments in South Woodham Ferrers and Great Leighs will be quantified in more detail in the upcoming modelling work detailed in Section 5 of this report.

4 Sustainability Review

A sustainable infrastructure review has been undertaken for proposed housing developments over 500 dwellings as part of the review of the initial Spatial Options and subsequent sensitivity testing[2]. It is understood that the main development areas included in the Preferred Option are comparable. Therefore, the analysis and recommendations taken from the sustainable infrastructure review are directly relevant for the larger developments in the Preferred Option.

A summary of the main findings from the review are covered below.

4.1.1 Travel Statistics

Over half of Chelmsford residents (55.5%) currently commute within the Chelmsford administrative area for work, and over half of these residents travel to work by car (53.0%). To reduce car travel, the focus should be to target the 53% of residents who drive to work within the Chelmsford administrative area, and encourage a modal shift to more sustainable modes of travel (bus travel, cycling and walking).

In order to sustainably tackle growth in Chelmsford and the impact of additional traffic within the local area, there is a need to promote and encourage sustainable travel to both existing residents and those from new development.

For developments located within 4km of the city centre, focus should be placed on promoting walking, cycling and bus travel for journey to work trips into the city centre.

For development locations more than 4km from the city centre, focus should be placed on making public transport more attractive for journey to work trips to the city centre. As the majority of commuters travelling from Chelmsford and beyond, drive to work in Chelmsford, the use of Park and Ride facilities should be encouraged to intercept car trips on the outskirts of Chelmsford.

4.1.2 Public Transport

It has been emphasised in the Getting around Essex - A bus and passenger Transport Strategy Summary (September 2015) that buses play an important role in Essex as a sustainable transport alternative to the car. Around 85% of bus services in Essex are commercially operated, however in Chelmsford, a number

[2] Contained within the report "Chelmsford Local Plan – Transport Impact of Local Plan Spatial Option Sensitivity Testing & Sustainability Review" – March 2017

of bus routes are funded by Essex County Council at certain times of the day (mostly evening and weekend services).

Bus services are concentrated within the centre of Chelmsford, linking the city centre, railway station and the surrounding areas. The majority of services run through the bus station, and therefore the city centre is well served by existing bus services. Further out from the centre, the number of buses serving the local area decreases. Accessible transport is also provided via a passenger transport scheme in Chelmsford, the Chelmsford Community Transport, which helps people who are rurally isolated or have restricted mobility.

Preferred Option housing locations in the Chelmsford Urban Area and North of Broomfield would be the best served in terms of existing bus provision. With the exception of Chelmsford Urban Area, none of the proposed development locations fall completely within 400m of an existing bus stop. With the exception of development at South Woodham Ferrers, the majority of the remaining Local Plan locations would likely fall within walking distance of an existing bus stop, and/or there would be an expectation that bus access would be facilitated as part of planning consent (e.g. in North East Chelmsford).

In order to improve bus service accessibility to/from new developments, actions may include extension of an existing bus route into the development, addition of bus stops along an existing route, or addition of a new service to connect the development to local facilities in the city centre or nearby settlements. Possible ways of improving bus accessibility to/from specific Preferred Option development locations are covered in more detail in the full sustainable infrastructure review.

There is the proposed additional rail station within Chelmsford administrative area, at Beaulieu (North East Chelmsford), which will provide existing and new residents in north/north-east Chelmsford with a more convenient alternative to Chelmsford rail station. This would likely reduce the demand for Chelmsford station and ease the number of car trips into the centre, especially trips solely for the rail station. Locations 6 and 7 are located within 2.5km of the proposed station, and improvements to bus and cycle facilities could potentially minimise the number of short trips from these new housing locations to the rail station.

4.1.3 Cycling

Chelmsford has an existing cycle network which provides connections between different parts of Chelmsford (e.g. city centre, Chelmer Village, Moulsham, Melbourne). There is already significant growth planned in the cycling network (subject to funding) with increasing connectivity by bicycle between different parts

of the Chelmsford administrative area. This forms part of the £15 million Chelmsford Growth Package and the Chelmsford Cycle Action Plan, part of the county-wide Essex Cycling Strategy, and hopes to assist in increasing level of cycling to work for shorter journeys.

Preferred Option development locations in the Chelmsford Urban Area, East and West Chelmsford, and North East Chelmsford Beaulieu (roll-over development area) are located within a 4km cycling distance[3] of the city centre. Chelmsford Urban Area and East Chelmsford are already well connected by existing cycle routes, and the Chelmsford Growth Package will increase connectivity to other parts of the Chelmsford administrative area including the West Chelmsford location. There is potential for extension of the safe cycle route to connect the development to the proposed cycle routes within the vicinity (which includes off-road cycle links to the city centre through Admirals Park, and extends to Writtle).

Development in North East Chelmsford would be located within cycling distance of the proposed Beaulieu rail station and associated park and ride. Elsewhere, development to the North of South Woodham Ferrers would also be located within cycling distance of a rail station and South Woodham Ferrers town centre. No cycling infrastructure currently exists at these locations, and provision should therefore be sought to accompany the development proposals.

Development locations in North of Broomfield and Moulsham Hall and North Great Leighs (along with the smaller allocations in Danbury, East Hanningfield and Bicknacre) are located away from urban centres and transport hubs. Local cycling routes to community/village services could be considered. However, focus might be better placed on encouraging the use of bus services for trips to/from these areas.

A number of studies have been undertaken in order to assess the impact of improving cycling levels through the provision of infrastructure, promotion/ marketing of cycling and cycle training. Results demonstrate that a targeted and integrated approach leads to a positive result in modal shift from car use to cycling. The Essex Cycle Strategy and the subsequent District / Borough / City based Cycling Action Plans aim to provide a similar approach which will help to boost cycling levels in the City.

[3] Department for Transport (DfT) LTN 1/04 3.10.13 – acceptable cycling limits

4.1.4 Sustainable Travel Planning

Sustainable travel planning will need to play an important role in promoting sustainable travel. Implementation of a travel plans for new developments can influence travel behaviour locally. Measures may include:

- implementation of car sharing schemes;
- inclusion of public transport vouchers or discount schemes for residents of new developments (in conjunction with any new bus services/routes);
- shuttle bus services for employment travel (for example the implementation of the Channels bus service); and
- facilities for encouraging cycling – e.g. secure storage lockers and changing facilities.

5 Next Steps

Having highlighted the key areas of likely future congestion in the Chelmsford administrative area using an area-wide modelling package, a further study has been commissioned to consider the likely traffic impact on local junctions significantly affected by the location of the Local Plan developments. The outputs presented in this report have been used to identify and prioritise the junctions to be taken forward for assessment based on their proximity to proposed development locations and the scale of congestion modelled.

The study will make use of the recently developed Variable Demand VISUM model for Chelmsford and, in doing so, will model changes to peak hour travel demand as a consequence of network congestion and delay.

The study will update the development assumptions modelled. The allocations to be used are shown in Table 5-1 and are reflective of the latest assumptions determined by CCC as of March 2017 for Public Consultation.

Preferred Spatial Option - March 2017 allocations		
Development Locations	**Dwellings**	**Employment**
Growth zone – Central and Urban Chelmsford		
Location 1 Chelmsford Urban Area (Brownfield)	2,900	Office / Business Parks 17,000 sqm Retail 5,000 sqm
Location 2 West Chelmsford – Warren Farm	800	

Preferred Spatial Option - March 2017 allocations		
Development Locations	**Dwellings**	**Employment**
Location 3 East Chelmsford – East of Great Baddow / North of Sandon	400	Office / Business Parks 5,000 sqm
Growth zone – North Chelmsford		
Location 4 North East Chelmsford	3,000	Office / Business Parks 45,000 sqm
North East Chelmsford Beaulieu Post 2021 Roll-Over	2,500	
Location 5 Moulsham Hall and North Great Leighs	1,100	
Location 6 North of Broomfield	800	
Location 7 Boreham	145	
Growth zone – South Chelmsford		
Location 8 North of South Woodham Ferrers	1,000	Office 1,000 sqm
Location 9 Bicknacre	30	
Location 10 Danbury	100	
Windfall allowance	1,500	

Table 5-1: Preferred Spatial Option development allocations – March 2017

The upcoming study will report an updated assessment of the strategic network impact as well as a detailed assessment of the impact of development traffic on local junctions.

Findings from the earlier appraisal of the three Spatial Options, along with the subsequent sensitivity testing, suggest that a small change in development allocation (as shown in Table 5-1) to that modelled for this study, would likely have little impact on the outcomes of the modelling when using the fixed-demand VISUM model.

Based on Local Plan assumptions from November 2016, it is acknowledged that at least 17% of Local Plan development is proposed on brownfield sites in the city centre. Around a further 50% of Local Plan development is proposed at locations within 4km of Chelmsford's city centre. Assuming journey-to-work trips made from future Local Plan development will largely follow commuting patterns identified in the 2011 Census, over half of trips generated by these developments will likely be contained within a 4km radius of the city centre.

This places a large volume of commuting trips from proposed Local Plan developments within the scope of sustainable travel initiatives that, for example, encourage walking and cycling modes. Such initiatives will be expected to play a key role in mitigating future traffic growth in the urban areas of Chelmsford – particularly where physical constraints prevent infrastructure improvements from being considered. At the same time, Park and Ride will likely remain a key strategy in managing the volume of longer-distance journeys from outlying developments along congested corridor routes into the city centre.


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