Market Harborough Core Strategy

DISTRICT OF HARBOROUGH

Market Harborough Core Strategy

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Whilst the modelling work outlined in this report has been carried out using the Leicester and Leicestershire Integrated Transport Model (LLITM), its findings and any conclusions do not necessarily represent the views of Leicestershire County Council as the Highway Authority.

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Executive Summary

To support Market Harborough Core Strategy planning, modelling work has been undertaken to assess the impacts of three growth options. These growth options are located to the north-west of Market Harborough, with Option 1 including an additional 1,000 dwellings, and Options 3 and 3a including an additional 1,500 dwellings. These three growth options include different assumptions on the access points for the development, with Option 3a including a new link road between the A4304 and Leicester Road.

For each of these three growth options, two levels of transport mitigation have been tested. The first includes changes to a local bus service, improvements to the walk and cycling networks and Smarter Choices measures, seeking to influence travel behaviour. The second includes these interventions plus changes to St Mary's Road and Welland Park Road (a one-way system and OGV ban respectively), a reduction in the number of long-stay parking spaces within Market Harborough, and an increase in the frequency of the bus service between Market Harborough and Leicester City.

A core scenario, without any of the aforementioned additional growth options or mitigation has been run as part of this work. The following are some of the key results of this scenario:

- Leicestershire highway traffic, measured in terms of vehicle-kms, is forecast to increase by between 19% and 24%, depending on time period, from 2008 to 2026. Within Harborough District this increase is between 25% and 28%, with growth of between 33% and 40% forecast within Market Harborough (defined as the urban area of Market Harborough, excluding the site of the new growth options and excluding Great Bowden).
- As a result of this increase in traffic there is a forecast decrease in the average speeds on the highway network; within Market Harborough the average speeds reduce in 2026 by between 2.7% and 7.1%, with queues on the network and vehicle delays increasing markedly.

Adding in the three growth options, without mitigation, to this core scenario increases the forecast level of local growth in demand. The growth in Option 1 produces a total of 3,860 person trips across all modes over 24-hours, of which 73% is highway demand. Option 3 produces 5,504 person trips for all modes over 24-hours, of which 74% is highway demand. Option 3a has the same planning assumptions, but different network assumptions, and this has resulted in this growth option producing a total of 4,929 person trips, of which 68% are highway.

This increase in demand has increased the level of traffic on the network. The following is a summary of the results from the highway assignments.

- Traffic, measured in vehicle-kms, is forecast to increase by between 0.3% and 0.8% across Harborough District with the introduction of the growth options.
- Within Market Harborough, traffic is forecast (for Options 1 and 3) to increase by between 1.1% and 3.9% depending on the growth option and time period. Average traffic speeds are correspondingly forecast to decrease by up to 2.2%.
- In Option 3a traffic in Market Harborough is forecast to reduce by between 2.3% and 4.7%, depending on time period. This is coupled by increases in average speeds of between 0.4% and 1.1%
- In terms of emissions, including carbon and hydrocarbons, introducing Option 1 increases emissions in Market Harborough by around 3%, with Option 3 increasing the same set of emissions by around 1.5%. In Option 3a there is a reduction in emissions of around 4% to 5%.

The following are some of the key changes from the growth scenarios when introducing Mitigation 1:

- Highway person trip productions across Harborough District and within Market Harborough reduce by around 400 trips over 24-hours with the introduction of Mitigation 1 in all growth options. This represents roughly 10% of the additional trips generated by the growth options. There is little change in the level of public transport demand, with increases in active mode trips. There is also very little change in the demand produced by the development zone.
- The average speeds forecast within Market Harborough show between no change as a result of the mitigation measures, and an increase of 0.2% depending on the development option and the time period.
- As a result of Mitigation 1, all vehicle emissions are forecast to reduce by approximately 1% within Market Harborough from the development scenarios.

The following are some of the main outcomes from these tests:

- 24-hour highway person trips reduce by approximately 500 trips across Harborough District and within Market Harborough when Mitigation 2 is introduced. As in Mitigation 1, there is little change in forecast public transport demand, with increases in active mode demand. Also there is little change in the demand produced by the development zone.
- Converting St Mary's Road to one-way in the eastbound direction between The Square and Kettering Road has had a significant effect on the routeing of westbound traffic through Market Harborough. The majority of demand is forecast to re-route to the north of the town, through Great Bowden, and rejoins the A4304 via either Burnmill Road in Market Harborough, or via Gartree to rejoin at Lubenham. In Option 3a this traffic re-routes via the new link road though the development to rejoin the A4304.
- Average speeds within Market Harborough are forecast to increase by between 1.8% and 3.5% depending on the development option and time period in consideration.
- Emissions within Market Harborough are forecast to decrease as a result of these mitigation measures. In Option 1 and Option 3 air pollutants such as hydrocarbons decrease by around 2.5%, with carbon emissions decreasing by around 1% compared to the development option with no mitigation. In Option 3a the emissions of air pollutants is forecast to decrease by around 4%, and carbon emissions by approximately 2.5%.

Section 1 – Overview

1.1 Introduction

This report has been commissioned from Leicestershire County Council, as the Highway Authority, by Harborough District Council for Core Strategy purposes, and to assist in the assessment of a major planning application by William Davis Homes and Hallam Land Management.

This planning application relates to the Airfield Farm site to the north-west of Market Harborough, and this modelling work focuses on the assessment of three growth options and two levels of mitigation measures for each of these growth scenarios.

The District Council's draft Core Strategy document (published October 2010) proposes a direction of growth to the north-western side of Market Harborough. Market Harborough already suffers from existing transport problems and the impact of further growth in and around Market Harborough requires assessment.

The forecast year for this modelling work is 2026, with the mitigation measures being tested in this forecast year. However, due to the interaction of the demand model and the land-use model within LLITM, models have been run at five-yearly intervals up to 2026 for the „without mitigation' scenario for all development options.

Whilst the modelling work outlined in this report has been carried out using the Leicester and Leicestershire Integrated Transport Model (LLITM), its findings and any conclusions do not necessarily represent the views of Leicestershire County Council as the Highway Authority.

The LLITM model is a robust, WebTAG compliant integrated model, which is based on assumptions including economic forecasts and predictions regarding travel behaviour. These assumptions are based on observed base year data, recent trends and DfT WebTAG forecasting assumptions. These assumptions should be taken into account when considering the forecasts contained in this report.

1.2 Model Overview

More details on the structure and use of the model can be found in the demand model report (*PR05-Demand Model*) and the user guide for LLITM. However, in summary the Leicester and Leicestershire Integrated Transport Model (LLITM) consists of four main components:

- a highway supply model (LLITM-HW), developed in SATURN by Scott Wilson;
- a public transport supply model (LLITM-PT), developed in CUBE Voyager by Scott Wilson;
- a variable demand model (LLITM-DM), built in EMME by AECOM; and
- a land-use model (LLITM-LUM), built in bespoke DELTA software by David Simmonds Consultancy.

In addition to this LLITM also includes a reporting tool called EASE which calculates and graphically represents results from the model. These results include information on flows from the highway and public transport models, delays from the highway model, the results of the land-use model, and calculated emissions and noise levels.

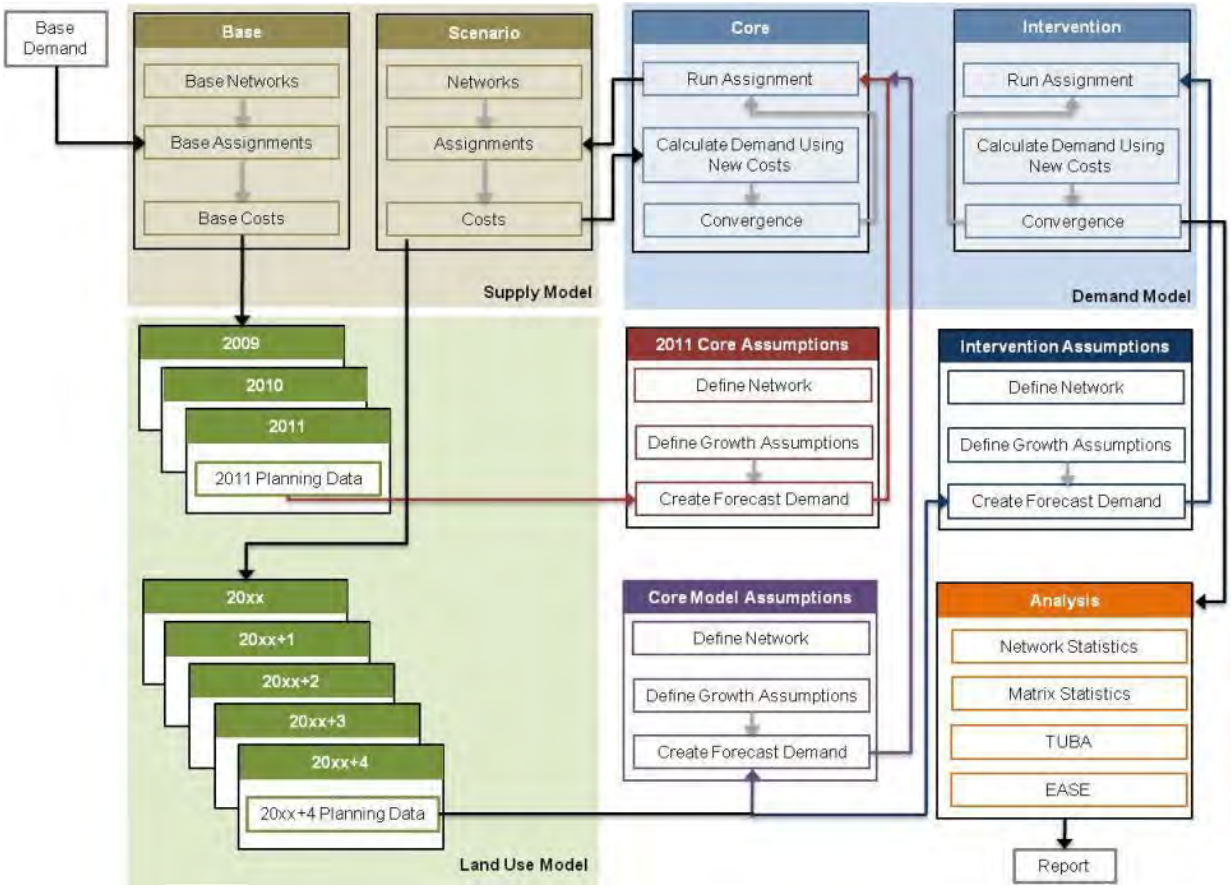
Further details on these elements of the integrated model can be found in the following documents:

- PR01: Data Collection Report;

- PR02: Highway Local Model Validation Report;
- PR03: Public Transport Local Model Validation Report;
- PR04: Land Use Model Development Report;
- PR05: Demand Model Development Report (this document);
- PR06: Forecasting Report;
- PR07: Demonstration Testing Report; and
- PR08: LLITM User Guide.

Within the integrated model there is a flow of information between all of these four components. Figure 1.1 gives an overview of this flow of information between the various process and components of LLITM.

Figure 1.1: Overview of flow of data and process within LLITM



This shows the flow of information required in building up a core scenario, with costs from previous years being used in the land-use model, which in-turn then allocates growth in the subsequent years; trip growth is calculated by applying a customised version of the DfT's trip-end model to the planning data generated in LLITM-LUM. This means that the core scenario years need to be run in sequential order, with the output from one forecast year forming some of the inputs for the next.

1.3 Terminology

Within this report there are a number of modelling scenarios referred to, and the following is a list of these and how they are referred to.

Growth Scenarios

- Core – this is the planning scenario without any of the additional growth being assessed.
- Option 1 – this is the core scenario plus growth of 1,000 dwellings and 5 ha of employment to the north-west of Market Harborough, and 200 dwellings located elsewhere in Market Harborough. This growth will be served by two access points directly onto Leicester Road (B6047).
- Option 3 – additional growth of 1,500 dwellings and 5 ha of employment to the north-west of Market Harborough, and 200 dwellings located elsewhere within Market Harborough. This growth is served by two access points onto Leicester Road (B6047) and one onto Lubenham Hill (A4304). There is no through route provided, in contrast Option 3a, discussed below.
- Option 3a – the same dwelling and employment assumptions as Option 3, but a direct link between Leicester Road and Lubenham Hill is provided through the development.

Option 3a would not normally be considered as a separate development option, but the costs from this scenario will differ from those in Option 3, due to the difference in the highway network assumptions, and therefore this will affect the results of the land-use model.

An Option 2, containing 1,000 dwellings with two access points to Leicester Road and Coventry Road, was not carried forward into the detailed modelling work on the basis of Strategic Housing Land Availability Assessment (SHLAA) evidence and that obtained from landowner / developer interests. It was concluded that provision of 1,000 dwellings with two access points was an undeliverable solution and thus was not appropriate to test to achieve a sound Core Strategy.

The planning assumptions for all scenarios are identical for all years up to and including 2016. It is from 2017 onwards that the developments are phased in, and the planning scenarios differ.

More detailed discussion of these development scenarios and the results of the land-use model can be found in „*Section 3 – Land-use Model Results Summary*'.

Network Assumptions

- Core – this includes the committed, or „highly likely' schemes for each forecast year, including Leicestershire Smarter Choices assumptions.
- Option 1, Option 3 and Option 3a – these networks contain the same schemes and assumptions as in the core network, with changes made in and around the growth area to reflect the different access and network options assumed for the three development scenarios.
- Mitigation 1 – this is the core network, with the required development access option, and with the following changes:
    - An increase in the frequency of bus route 44, serving the development;
    - Improvements in the cycling network;
    - Improvements in the walking network; and

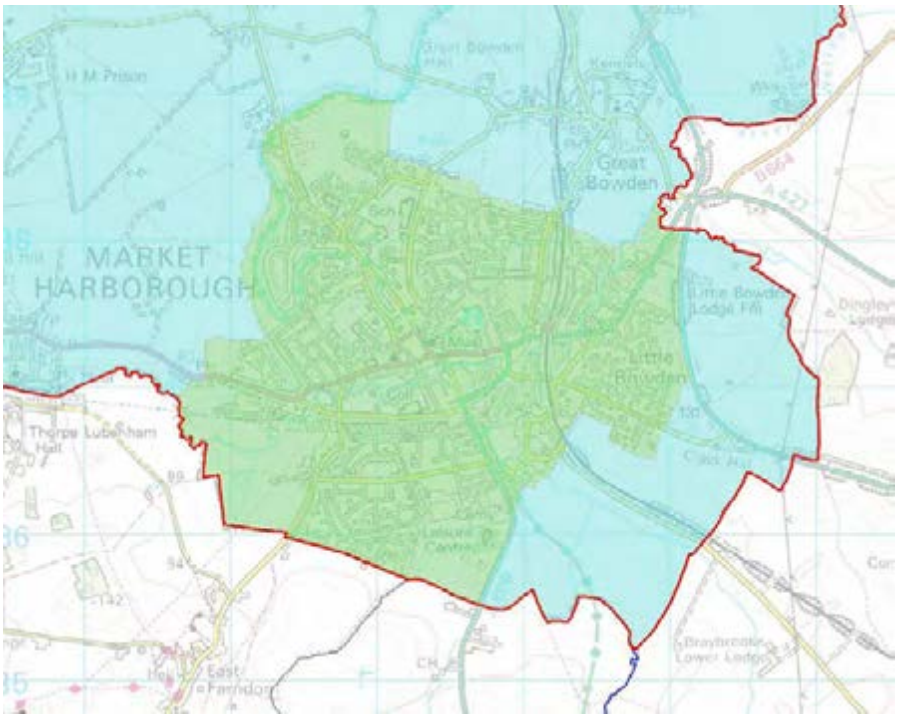
- Additional Market Harborough Smarter Choices initiatives.

- Mitigation 2 – this is Mitigation 1 plus the following changes:
  - A4304 St. Mary's Road to become one-way only, eastbound, between The Square and Kettering Road;
  - To impose a 7.5t weight restriction on Welland Park Road;
  - A 25% reduction in the number of long-stay parking spaces in Market Harborough; and
  - An increase in the service frequency of the X3 between Market Harborough and Leicester.

Further details on these network assumptions can be found in „*Section 2 – Forecasting Assumptions*'.

When reporting on the results of these tests, references to Market Harborough refers to the section of the modelled zoning or links that represents the current extent of the urban area of Market Harborough. The zone representing the growth options lies outside the boundary of this area, to the north-west of the urban area. Figure 1.2 shows the area considered as Market Harborough, highlighted in green in this plot.

Figure 1.2: Extent of Area Defined as Market Harborough



1.4 Report Structure

This report contains the following sections and appendices:

- Section 2 – Forecasting Assumptions. This section contains the assumptions used within the model in forecasting. This includes the application of WebTAG guidance and other assumptions, as well as the network changes assumed over time in the highway model and the

service changes assumed within the public transport model, and the application of the mitigation options.

- Section 3 – Land-use Model Results Summary. This section contains the results of the land-use model for the different development options.
- Section 4 – Core and Growth Scenario Results. This section details the results of the core scenario and for the three development options without mitigation.
- Section 5 – Mitigation Results. This section details the results of the introduction of the two levels of mitigation measures in the three development scenarios.

- Appendix A – Smarter Choices Benchmarking. This appendix gives details on the sources used for the calibration of Smarter Choices and the derivation of the targets applied.
- Appendix B – Derivation of Long-Stay Parking ASCs. This gives the derivation of the alternative specific constants used to model the decrease in long-stay parking in Market Harborough.
- Appendix C – Highway Flow Changes Due to Development. This appendix contains flow change plots comparing the development highway assignment with the core highway assignment. These plots are for all three time periods and for all three development options.
- Appendix D – Highway Flow Changes Due to Mitigation 1. This contains flow change plots for all three time periods and all three development options showing the effect of Mitigation 1 measures on the highway assignment results.
- Appendix E – Highway Flow Changes Due to Mitigation 2. This appendix contains flow change plot showing the effect of Mitigation 2 measures from the development scenarios on the highway assignment results for all three time periods and all three development options.
- Appendix F – Public Transport Flow Changes Due to Development. This appendix contains the bus passenger flow change plots comparing the assignment results in the core scenario against the three development options. These plots are for all three time periods and all three development options.
- Appendix G – Public Transport Flow Changes Due to Mitigation 1. This appendix contains the bus passenger flow differences as a result of Mitigation 1 measures for all three development options, and all three modelled time periods.
- Appendix H – Public Transport Flow Changes Due to Mitigation 2. This appendix contains bus plots showing the impact of Mitigation 2 measures on the bus passenger flows in the public transport assignment.
- Appendix I – Highway Link Volumes for Development Options. This appendix contains the link flows on selected links within the highway model for the base year, core scenario and the three development options.
- Appendix J – Highway Link Volumes for Mitigation Options. This contains the link volumes from the highway model for the selected links for the mitigation measures in all three development options.

Section 2 – Forecasting Assumptions

2.1 Core Scenario Assumptions

There are a number of assumptions, i.e. model inputs, which are required when running the integrated model in forecasting mode. These include network inputs for highway and public transport, assumptions on the supply and cost of parking in Leicester and Loughborough, economic assumptions on such items as values of time and fuel costs, and planning policy assumptions for the land use model.

Table 2.1 lists the assumptions used within the core scenario, excluding the network assumptions for the highway and public transport models.

Table 2.1: Forecast Assumptions

Input	Assumptions / Source
Economic growth (GDP growth, value of time)	Information on changes in GDP and thus values of time are taken from DfT advice (WebTAG 3.5.6D, March 2010). Values of time are assumed to be constant across modes, time periods, productions and attractions, and vary only by purpose, income segment and length of trip. Highway values of time have been used for business PT trips.
Public transport fares	Bus - 2008 to 2010 based on observed data; 2010 to 2015 1.5% per annum; and 0.75% per annum thereafter. Rail - 2008 to 2010 based on observed data (with regulated and unregulated components based on published information evident at end of last year). Growth from 2010 to 2011 is based on the observed growth between 2008 and 2010, and has been assumed to be 3.1%. Growth from 2011 to 2015 has been assumed to be 3% per annum; and 1% thereafter.
Vehicle operating costs	Changes in fuel prices, vehicle fuel efficiency, and non-fuel operating costs have been taken from WebTAG 3.5.6C, March 2010.
Parking charges	Parking charges assumed to grow 2% per annum over inflation, in approximate line with historic salary increases. For new park-and-ride sites the changes have been taken from the existing Meynell's Gorse park-and-ride site.
Parking capacities	The zone capacities of private / non-residential parking (PNR) increase in relation to the changes in employment within each zone. In terms of the new park-and-ride sites, where no specific information is available, the same capacity as Meynell's Gorse in 2008, of 500 spaces, has been assumed. This applies to all new park-and-ride sites except Birstall which has a known capacity of 1,000 spaces. Aside from new park-and-ride sites and PNR, the only parking capacity change from the base year is an increase in the capacity at Meynell's Gorse of 500 spaces.

Input	Assumptions / Source
Land use: population and employment forecasts	Population and employment growth across the East Midlands sub-region have been constrained to TEMPRO forecasts. Detailed information on planning policy (land allocated by development type) has been collated from individual districts and used in LLITM-LUM.
Car ownership	Car ownership is forecast within LLITM-LUM.
Car occupancy	Changes in car occupancy over time have been taken from WebTAG 3.5.6C, March 2010
Trip rates	Assumed to be constant over time. Demand growth is applied at a 24-hour level, so „reference demand' time period proportions by purpose are also assumed to be constant over time; modelled proportions may of course vary due to time-period choice model.
Highway congestion changes (for external buffer network).	Derived from average changes in congestion in the internal simulation network, for two forecast years: 2021 and 2031; other forecast years are interpolated based on these. NTM was initially considered as a source, but these congestion changes were found incompatibly low compared with other model assumptions, unless considerable, and unlikely, infrastructure improvement in external areas was assumed. Analysis based on historic trends was found to result in congestion increases that were incompatibly *high* with other model assumptions.
Active mode costs	No changes to active mode costs relating to specific infrastructure (cycle lanes for example) have been included. There are calibrated mode shifts included in the „core' scenario relating to „Smarter Choices'.

Smarter Choices	Based on investment levels into Smarter Choices measures of £200,000 pa for both Leicester City and the remainder of Leicestershire, target mode shifts have been derived from existing research and demonstration towns (discussed in Appendix A). These targets come into effect in 2016, and the calibration parameters are constant thereafter, assuming that investment continues at the same rate.
	
	The mode shifts calibrated in 2016 are:
	
	• Workplace travel plans:
	  ○ 5% reduction in commuting car drivers to Leicester City
	  ○ 6% reduction in commuting car drivers to Leicestershire market towns
	• School travel plans:
	  ○ 3% reduction in education car drivers to Leicester City
	  ○ 6% reduction in education car drivers to the rest of Leicestershire
	• Targeted marketing:
	  ○ 0.4% reduction in car drivers from Leicester City
	  ○ 0.1% reduction in car drivers from the rest of Leicestershire
	
	There are also calibrated changes in car occupancy as a result of these Smarter Choices measures for workplace and school travel

Input	Assumptions / Source
	plans.
Freight growth	Freight growth is not forecast by the land-use model, so growth from the 2009 version of NTM. This provides growth forecasts for vehicle-kms for freight, with these growth rates being applied separately to LGV and OGV base year matrices.

There are also a number of infrastructure schemes relating to the highway and public transport networks that are included in the forecast models in the core scenario. The core scenario schemes have been identified by Leicestershire County Council, the Highway Authority, as being either „committed' or „highly likely' going forward. These schemes have been included in the network models over time based on their assumed completion dates.

2.2 Growth Scenario Assumptions

There are a number of network changes that have been made to the core networks as defined above. These network changes differ by growth scenario, and are as follows:

- Option 1: the development will load onto two locations on Leicester Road (B6047), one at the existing roundabout to the south of Gallow Field Road and Leicester Lane, and the other at a new priority junction north of The Woodlands. This new priority junction has a dedicated right-turn lane for southbound traffic on Leicester Road.

  These two access points provide a route through the additional development in order to allow public transport to serve the development directly.
- Option 3: this is as Option 1 but with an additional access point to the development from the south via Harborough Road (A4304). This is a new junction, and is again assumed to be a priority junction with a dedicated right-turn lane for westbound traffic on Harborough Road entering the development. There is no through-route linking Leicester Road (B6047) and Lubenham Hill (A4304) in this option.
- Option 3a: this is similar to Option 3 but there is a new link through the development from Harborough Road to the northern access point on Leicester Road that is available to all traffic. This has been coded as a single-carriageway link with a speed limit of 40mph. With the introduction of this through route, the junction on Harborough Road has been changed from a priority junction to a roundabout.

  The development loads onto this through route via a priority junction with a dedicated right-turn into the development for link road traffic.

2.3 Mitigation Scenario Assumptions

There are two levels of mitigation tested as part of this study, each of which contains a number of schemes affecting different aspects of the model. These mitigation measures have been modelled as follows:

- Mitigation 1:
  - Increase in service frequency for bus route 44. In the core scenario this bus service has an hourly frequency in all modelled time periods. This has been increased in frequency within Mitigation 1 to provide a half-hourly service. Together with bus service

X3, which has a half-hourly service in the core scenario, this provides a bus service between the development and the town centre with a 15-minute frequency.

- Improvements to the cycling and walking network. LLITM contains a representation of active mode (walking and cycling) demand. It should be recognised that the active mode demand and network has not been calibrated or validated.

  In order to represent improvements to the walking and cycling network within Market Harborough, the times for active mode trips within Market Harborough have been reduced by 2%. Testing of this intervention suggests that this change results in an approximate 1% increase in active mode demand within Market Harborough, which is broadly in-line with our expectations based on limited available data.

  WebTAG 3.14.1 gives some indication of the likely impacts of various improvements to the active mode network. Depending on the relative intensity of the measures proposed, this suggests decreases in perceived times of between approximately 0.5% and 4.25%.

  The DfT also has published a series of case studies on the impacts of changes to the walking and cycling networks: *"Encouraging walking and cycling: Success stories – December 2005"*. There is limited data which can be used in this context, but the most comparable scheme to that proposed for Market Harborough with measured results is that within Lyndhurst. This scheme reallocated road space to the benefit of pedestrians and cyclists, and saw volumes "rose slightly" as a result.
- Smarter Choices Initiatives: the core scenario already contains a calibrated effect of Smarter Choices in 2016 across the county, and these initiatives are assumed to be additional to those initiatives. The funding for these Smarter Choices initiatives has been assumed to be of a similar level, pro rata, to that for Leicester City in the 2016 Smarter Choices. The target changes for the Market Harborough Smarter Choices are therefore:
  - a 5% reduction in car commuting vehicles to Market Harborough, including a 1.5% reduction in car passengers, due to workplace travel plans
  - a 3% reduction in car education vehicles to Market Harborough, including a 0.9% reduction in car passengers, due to school travel plans
  - a 0.4% reduction in total car drivers from Market Harborough as a result of targeted marketing

  The derivation of these targets can be found in Appendix A.

  The process of calibrating these effects is as follows:
  - Assess the impact of the „hard' measures, assumed to be the bus service frequency change and the improvements to the cycling / walking network in this case, in a converged model. This effect is then subtracted from the targets, with the remainder being represented by „soft' measures.
  - Alternative specific constants (ASCs) are added to the highway costs to achieve the remainder of the targets. This is done through a one iteration run of the model, as the evidence for these effects does not include the impact of induced traffic.

- Mitigation 2:
  - St Mary's Road between The Square and Kettering Road was changed to a one-way link in the eastbound direction. The westbound direction is still available to bus services, and the signal timings at the junction of St Mary's Road and The Square were amended to give more priority to the north-south movements.

- A 7.5 tonne limit has been placed on Welland Park Road by the inclusion of a OGV „knobs' value for the links that represent this road. This is the methodology of representing OGV bans within the highway network, and in effect places a very high additional cost on these links for OGVs. This methodology allows access for OGVs to the zone that loads onto Welland Park Road, but does not allow through traffic.
- The X3 bus service between Market Harborough and Leicester has a 30-minutely service in the core scenario. This has been increased to a 15-minute frequency as part of Mitigation 2.
- A 25% reduction in the number of long-stay parking spaces in Market Harborough. LLITM does contain a parking model; however this applies only in central Leicester City and Loughborough. It was not possible to develop and calibrate a parking model for Market Harborough in the required project timescales, so an alternative method has been applied.

  This method has been to apply model parameters (ASCs) to the highway costs for movements to the four zones in the centre of Market Harborough in order to represent the likely additional cost due to the reduction in the long-stay parking availability. These ASCs have only been applied to certain time-period-pairs for home-based trips to represent its effect on only long-stay parking, and the ASCs applied are as in Table 2.2. The derivation of these ASCs, and the time-period-pairs to which they have been applied, can be found in Appendix B.

Table 2.2: Market Harborough Long-Stay Parking ASCs (minutes)

	ASC
Commuting	1.38
Education	0.88
Business	1.74
Other	0.91
Shopping	0.94

Section 3 – Land-use Model Results Summary

This section describes the use of the land-use model contained within LLITM to appraise the impacts of three growth options within Harborough District. Those options are:

- A residential development of 1,000 dwellings to the north west of Market Harborough, 200 dwellings within Market Harborough, and 5ha of employment land to the north west of Harborough (Option 1);
- A residential development of 1,500 dwellings to the north west of Market Harborough, 200 dwellings within Market Harborough, 5ha of employment land to the north west of Harborough, access to Leicester Road and Lubenham Hill (Option 3); and
- A residential development of 1,500 dwellings to the north west of Market Harborough, 200 dwellings within Market Harborough, 5ha of employment land to the north west of Harborough, access to and between Leicester Road and Lubenham Hill (Option 3a).

The land-use model forecasts changes in population, households, employment and levels of development across Leicester, Leicestershire and the surrounding areas. This information, on where people live and where jobs are located is used by the transport model to forecast the patterns of usage on the highway network and public transport.

In this application the land-use model has been run four times. Firstly with none of the additional development that is described above. This model run is known as the „core strategy' and forecasts change over the period to 2026 assuming all the other assumptions on land being made available for development take place.

The model has then been run for each of the three growth options. In analysing the output from these model runs we have compared the forecasts of population, households and employment with those of the „core strategy'. The differences (in terms of scale and distribution) between the two will be the result of the additional provision of dwellings and employment land in the growth options.

A full description of the land use model and its application is available in:

- the Model Description Report – this provides a technical description of the model; and
- the Model Demonstration Report – this reports on several model runs and shows how changing inputs to the model will affect the model's forecasts (or outputs).

3.1 The Core Strategy

3.1.1 Core Strategy Inputs

The planning policy inputs to the land-use model's core strategy are based upon the information provided by Harborough District in 2009. They identify the following permissible development.

Residential

Over the period 2010-2026 sites with potential for the development of 1,593 dwellings within Harborough District are included in the Core Strategy. Of these 930 dwelling units are within Market Harborough.

Retail

The planning inputs received in 2009 provided for 937 m^2 of retail commitments (of which 466 m^2 were in Market Harborough). Additional „soft' planning policy inputs were input to reflect the levels of growth in retail-related employment that were implied by the LLITM-LUM economic scenario (i.e. TEMPRO). A total of 57,148 m^2 of retail floorspace was input in this way during the period to 2026.

Employment

The Planning inputs received in 2009 provided for:

- 4.35 ha of office development (equivalent to 21,750 m^2 of office floorspace assuming plot ratio of 50%), 2,400 m^2 of this was within Market Harborough;
- 10.48 ha of employment development (assumed to equate to 26,200 m^2 of office floorspace and 26,200 m^2 of industrial floorspace), 1,600 m^2 of this was within Market Harborough;
- allocations for an additional 28.9 ha of employment land, (equivalent to 118,875 m^2 of office floorspace and 25,625 m^2 of industrial floorspace); and
- 0.48ha of warehouse-related commitments, equivalent to 2,400 m^2 of floorspace.

The above provision amounted to 35,000 m^2 of office floorspace, 12,166 m^2 of industrial floorspace and 666 m^2 of warehouse floorspace, within Market Harborough, in the period 2010-2026. Additional inputs were included to reflect the higher levels of commitments that were described in an email from Stephen Pointer (Harborough District Council) on 7th March 2011.

3.1.2 Core Strategy Outputs

Figure 3.1 and Table 3.1 show the forecast change in households for Harborough District and Market Harborough. Over the period from 2008 to 2026 the number of households in Harborough District is forecast to increase by 17% and in Market Harborough by 19%.

Figure 3.1: Forecast of Households – Core Strategy

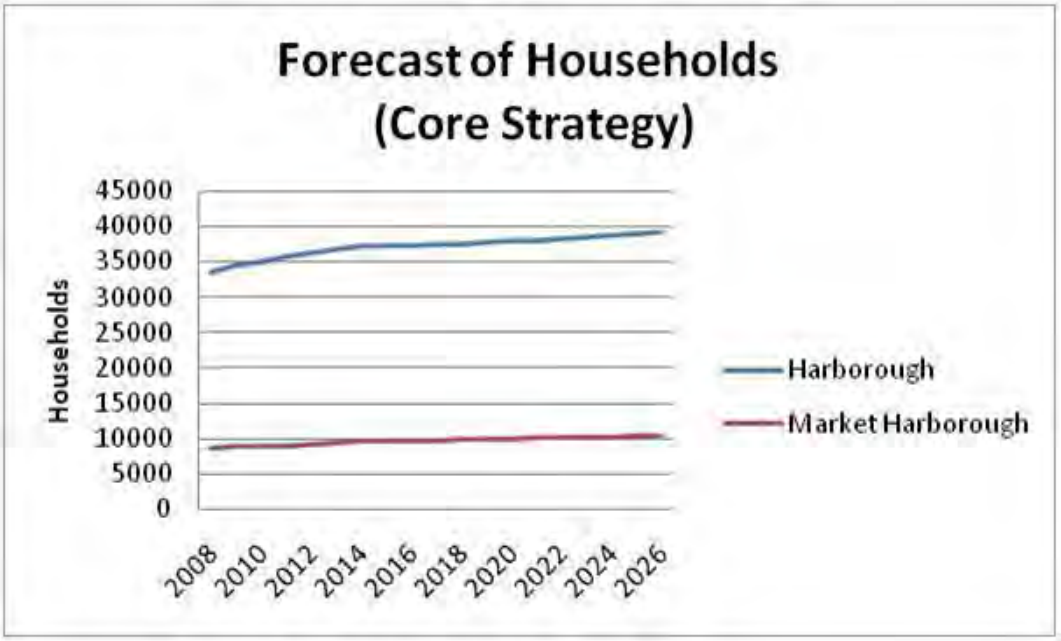
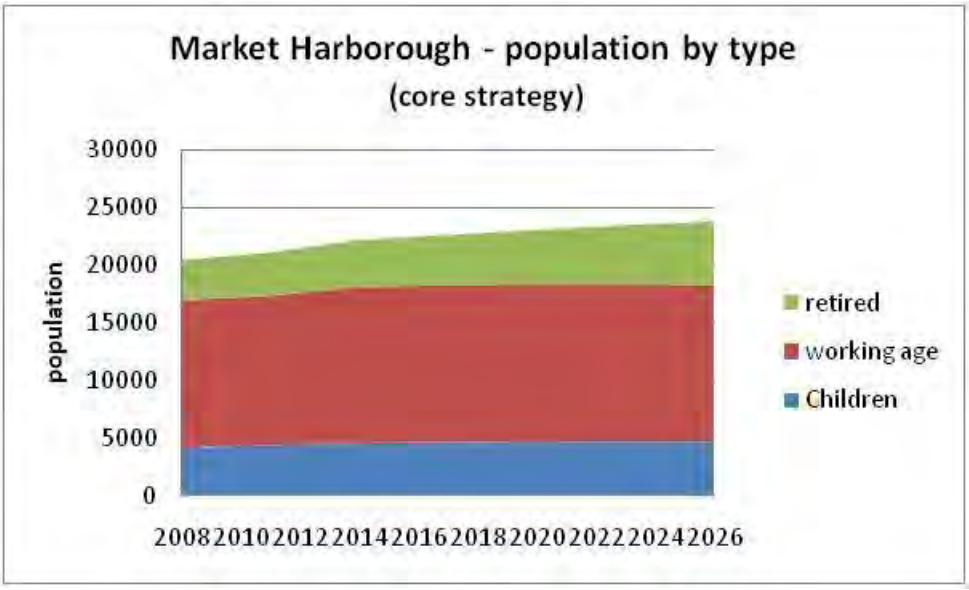


Table 3.1: Forecast Household Numbers – Core Strategy

	2008	2011	2016	2021	2026	% 2008-26
Harborough	33,606	35,678	37,291	38,091	39,256	17%
Market Harborough	8,744	9,021	9,686	10,056	10,412	19%

Figure 3.2: Market Harborough Population Profile 2008-2026 – Core Strategy



There is an ageing of the population of Market Harborough with an increased proportion of residents of retirement age and a decreasing proportion of working age. The proportion of the population described as retired increases from 16% to 22% whilst the proportion of working age declines from 63% to 58%.

The number of jobs within Harborough is forecast to rise over the period from 2008-2026 by 7%. The increase is slightly greater in Market Harborough, where a 10% increase is forecast (see Table 3.2).

Table 3.2: Forecast Employment Numbers – Core Strategy

	2008	2011	2016	2021	2026	% 2008-26
Harborough	37,407	37,550	39,523	39,495	40,026	7%
Market Harborough	9,694	9,655	10,236	10,472	10,644	10%

3.2 Option 1

3.2.1 Option 1 Inputs

Option 1 includes provision for:

- 1,000 dwellings to the north-west of Market Harborough, in zone 576 (zone 5772 in the highway and demand models). It is assumed that these are built and available for occupation after 2016.
- 200 additional dwellings within Market Harborough. These have been allocated across the model's Market Harborough zones pro-rata to the existing residential provision; and
- 5 hectares of employment floorspace to the north-west of Market Harborough (again in zone 576). It is assumed that half of this is developed as office and half as industrial floorspace. An assumption has been made that the ratio of floorspace to plot size is 50% (i.e. that a total of 25,000 sq metres of additional employment floorspace is provided).

3.2.2 Option 1 Outputs

In analysing the outputs the comparison is made with the core strategy above.

Residential

By 2026 the model forecasts an additional 977 households within zone 576 to the north-west of Market Harborough.

At a district level the model forecasts an additional 789 households. This would imply that some of the new development to the north-west of Market Harborough will be occupied by households that would otherwise have resided elsewhere in the district.

Within Market Harborough (including zone 576) there is an increase of 1,008 households forecast.

Figure 3.3 shows the percentage change in households by (LLITM) zone. There is a small percentage decrease (of less than 1%) in the number of households across a large part of Harborough District and parts of Northamptonshire. There are percentage increases both in zone 576 and parts of Market Harborough.

Population

By 2026 the model forecasts an additional 2,285 residents living within zone 576 to the north-west of Market Harborough.

At a district level the model forecasts an additional 1,865 persons. Again this would imply that some of the new development to the north-west of Market Harborough will be occupied by people that would otherwise have resided elsewhere in the district.

Within Market Harborough (excluding zone 576) there is a small decrease of 33 in the town's forecast population.

Figure 3.4 shows the percentage change in populations by LLITM zone. The picture is similar to the previously described household change with decreases across a large part of Harborough District and parts of Northamptonshire and increases both in zone 576 and parts of Market Harborough.

Employment

By 2026 the model forecasts an additional 744 jobs located within zone 576 to the north-west of Market Harborough.

At a district level the model forecasts an additional 791 jobs. This suggests that the provision of the additional employment floorspace close to Market Harborough is drawing more jobs into the district.

Within Market Harborough (excluding zone 576) there is a small decrease in employment (with some 32 fewer jobs in 2026). This would suggest that there is some relocation of jobs out of Market Harborough and into the new floorspace that is developed within zone 576.

Figure 3.5 shows the percentage change in employment by LLITM zone. The picture is less clear than for population and households. Whilst there is an increase in employment within zone 576 there are also small increases in employment elsewhere within the District. We need to look further into the reasons for this; however it would appear to be a response to the increased economic activity in zone 576 making the wider area a more attractive location for businesses.

Figure 3.3: Household Outputs in 2026 – Percentage Difference between Option 1 and Core Strategy

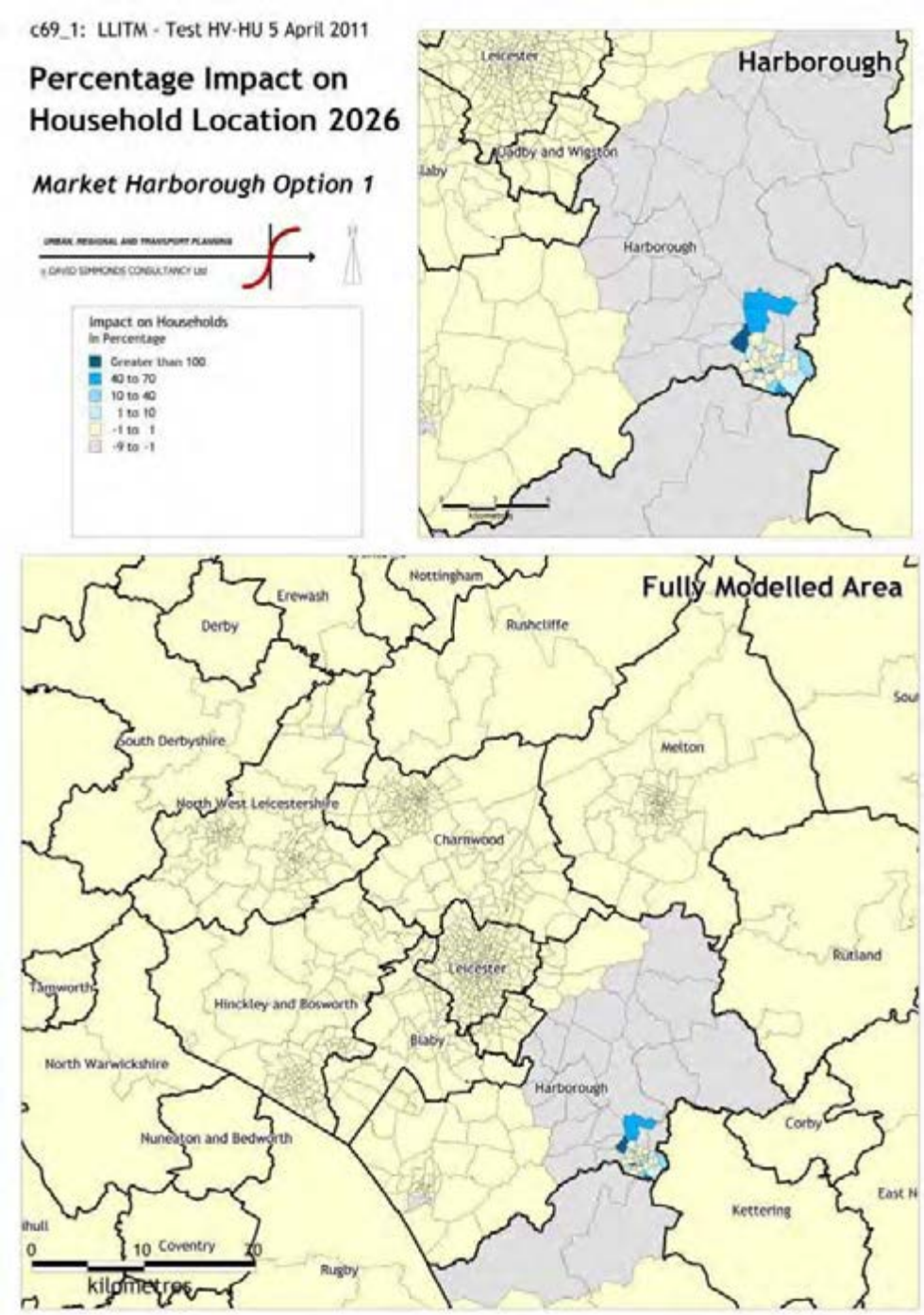


Figure 3.4: Population Outputs in 2026 – Percentage Difference between Option 1 and Core Strategy

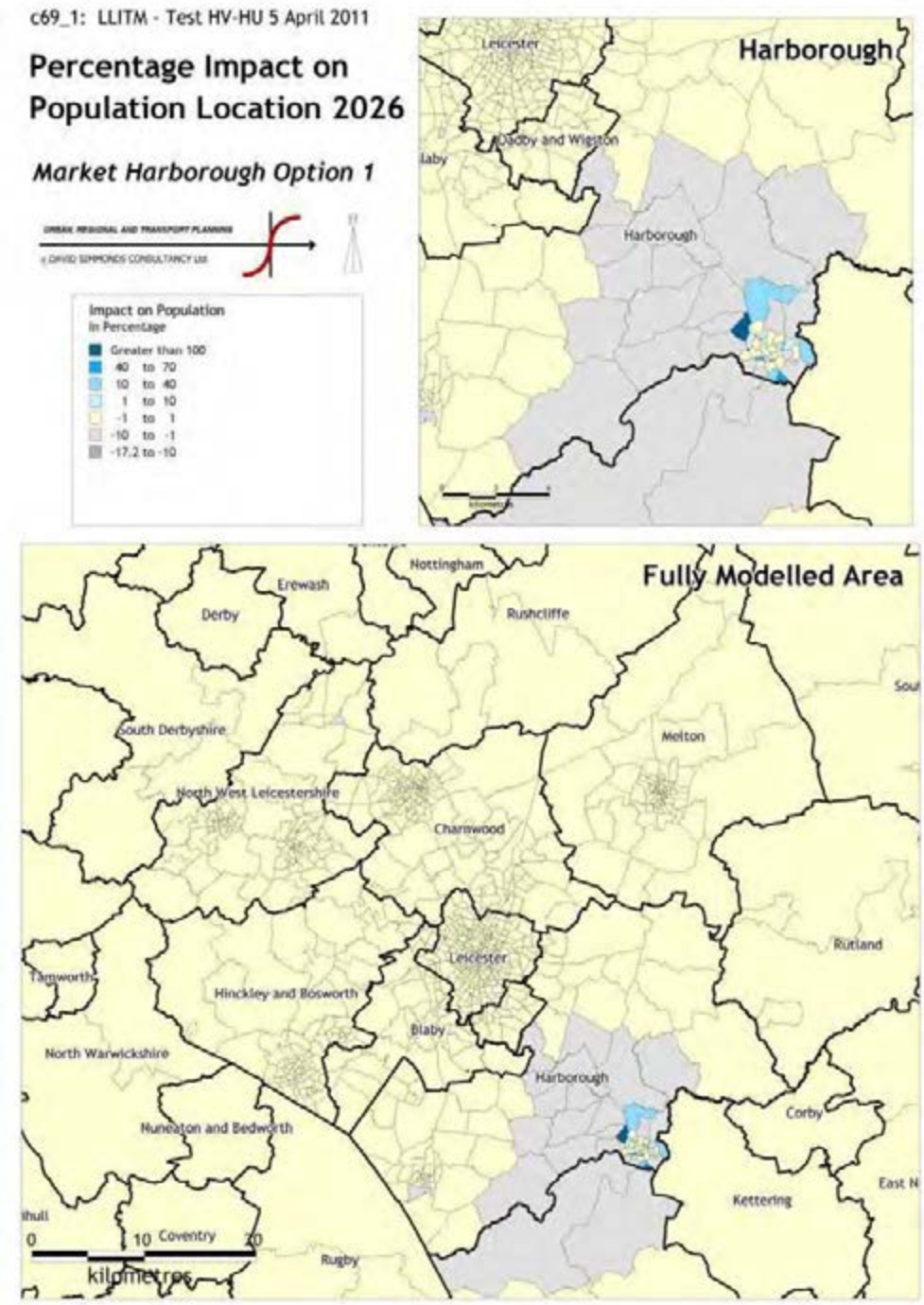
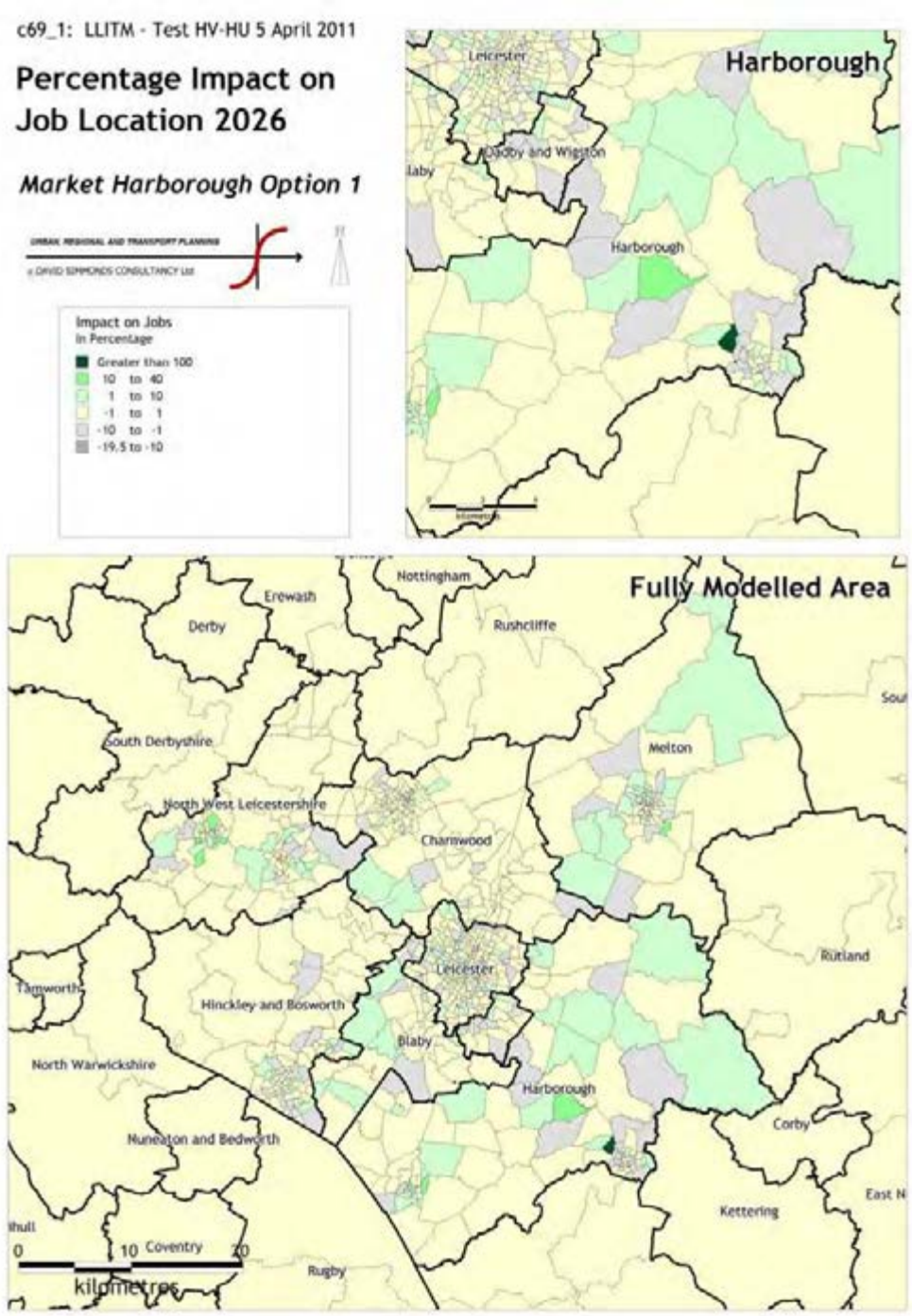


Figure 3.5: Employment Outputs in 2026 – Percentage Difference between Option 1 and Core Strategy



3.3 Option 3

3.3.1 Option 3 Inputs

Option 3 includes provision for:

- 1,500 dwellings to the north-west of Market Harborough, in zone 576. It is assumed that these are built and available for occupation after 2016. Part of the development lies outside the geographical extent of zone 576, however the entire development has been allocated to this zone for modelling purposes. This assumption has no impact on the model results for this growth option.
- 200 additional dwellings within Market Harborough. These have been allocated across the model's Market Harborough zones pro-rata to the existing residential provision; and
- 5 hectares of employment floorspace to the north-west of Market Harborough (again in zone 576). It is assumed that half of this is developed as office and half as industrial floorspace. An assumption has been made that the ratio of floorspace to plot size is 50% (i.e. that a total of 25,000 sq metres of additional employment floorspace is provided).

3.3.2 Option 3 Outputs

In analysing the outputs the comparison is made with the core strategy; described in Section 3.1.

Residential

By 2026 the model forecasts an additional 1,443 households within zone 576 to the north-west of Market Harborough.

At a district level the model forecasts an additional 1,091 households. This would imply that around 30% of the new development to the north-west of Market Harborough will be occupied by households that would otherwise have resided elsewhere in the district.

Within Market Harborough (including zone 576) there is an increase of 1,594 households forecast.

Figure 3.6 shows the percentage change in households by LLITM zone. The overall pattern is similar to that for Option 1, for example there is a small percentage decrease in the number of households across a large part of Harborough District and parts of Northamptonshire. There are percentage increases both in zone 576 and parts of Market Harborough.

Population

By 2026 the model forecasts an additional 3,413 residents living within zone 576 to the north-west of Market Harborough.

At a district level the model forecasts an additional 2,599 persons. Again this would imply that around 30% of the new development to the north-west of Market Harborough will be occupied by people that would otherwise have resided elsewhere in the district.

Within Market Harborough (excluding zone 576) there is a small decrease of 247 in the town's population.

Figure 3.7 shows the percentage change in populations by LLITM zone. The picture is similar to that for Option 1 with decreases across a large part of Harborough District and parts of Northamptonshire and increases both in zone 576 and parts of Market Harborough.

Employment

By 2026 the model forecasts an additional 753 jobs located within zone 576 to the north-west of Market Harborough.

At a district level the model forecasts an additional 900 jobs. This suggests that the provision of the additional employment floorspace close to Market Harborough is drawing more jobs into the district.

Within Market Harborough (excluding zone 576) there is a small increase in employment of 11 jobs in 2026.

Figure 3.8 shows the percentage change in employment by model zone. Again the picture is less clear than for population and households. Whilst there is an increase in employment within zone 576 there are also small percentage increases in employment elsewhere within the District. We need to look further into the reasons for this; however it would appear to be a response to the increased economic activity in zone 576 making the wider area a more attractive location for businesses.

Figure 3.6: Household Outputs in 2026 – Percentage Difference between Option 3 and Core Strategy

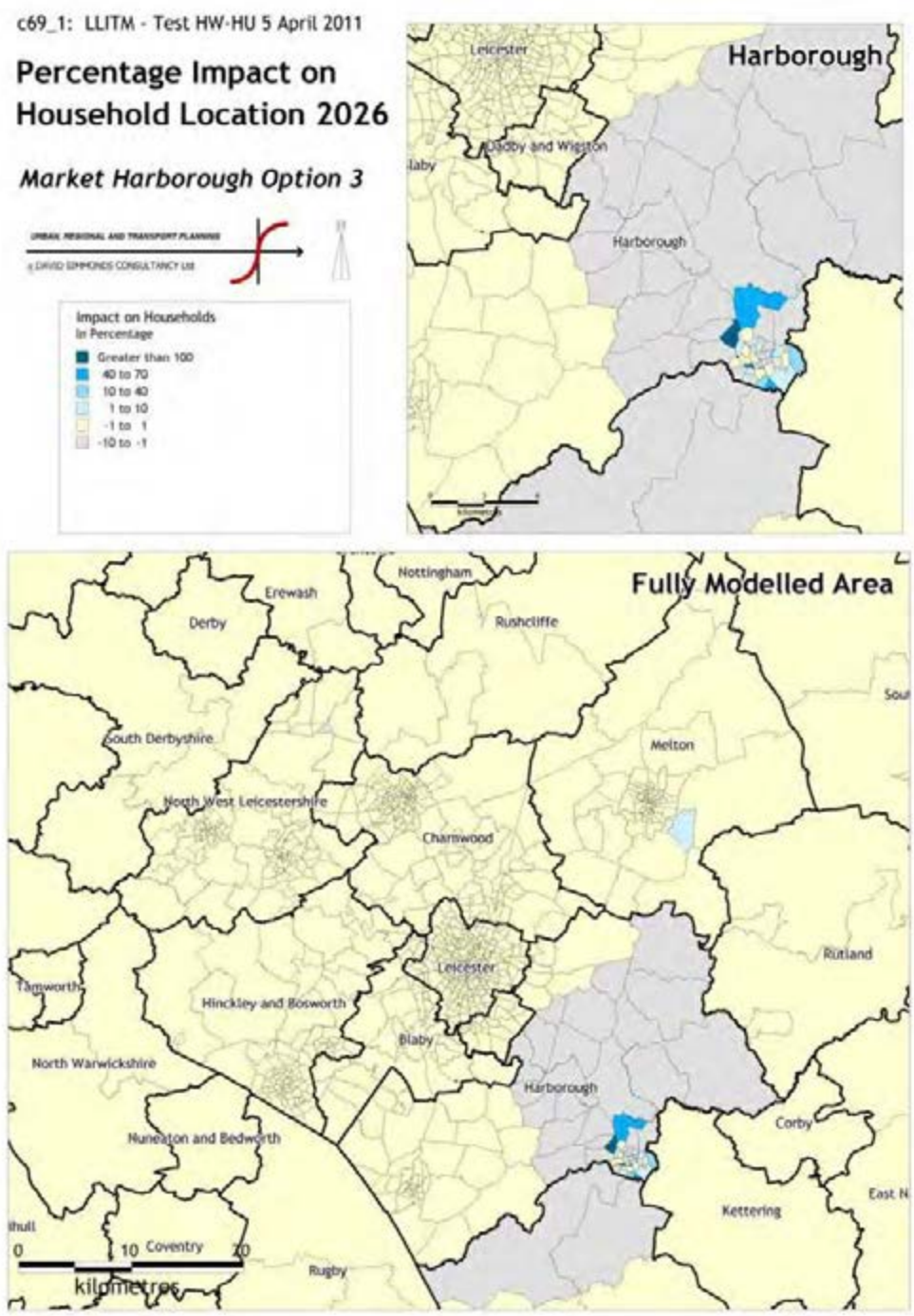


Figure 3.7: Population Outputs in 2026 – Percentage Difference between Option 3 and Core Strategy

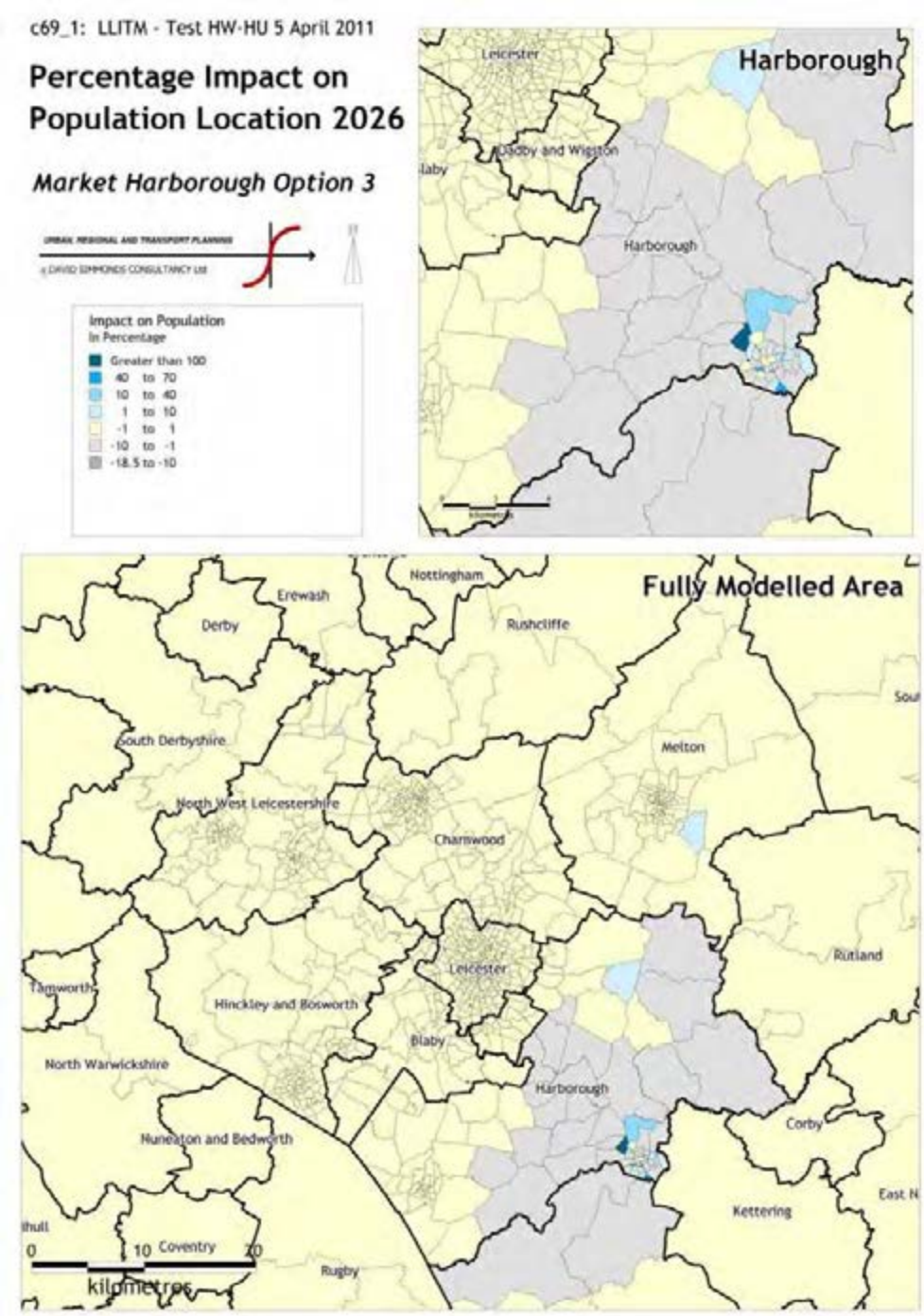
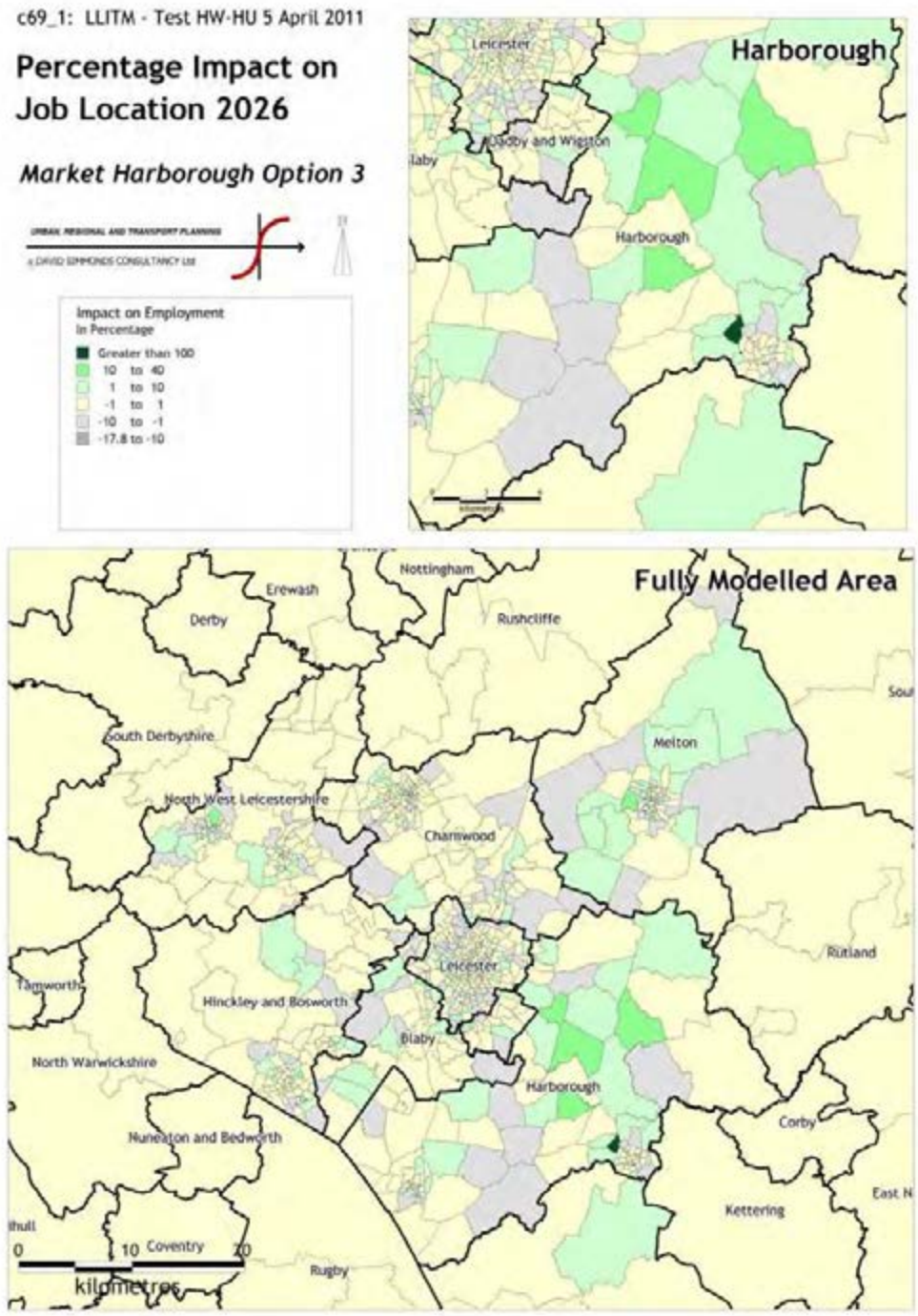


Figure 3.8: Employment Outputs in 2026 – Percentage Difference between Option 3 and Core Strategy



3.4 Option 3a

3.4.1 Option 3a Inputs

Option 3a has the same set of planning assumptions as contained in Option 3, but different assumptions on the access to the development. This includes provision for:

- 1,500 dwellings to the north-west of Market Harborough, in zone 576. It is assumed that these are built and available for occupation after 2016. As with Option 3, part of the development lies outside zone 576, but has been allocated to this zone for modelling purposes. This has no impact on the results of the models for this growth option.
- 200 additional dwellings within Market Harborough. These have been allocated across the model's Market Harborough zones pro-rata to the existing residential provision; and
- 5 hectares of employment floorspace to the north-west of Market Harborough (again in zone 576). It is assumed that half of this is developed as office and half as industrial floorspace. An assumption has been made that the ratio of floorspace to plot size is 50% (ie that a total of 25,000 sq metres of additional employment floorspace is provided.

3.4.2 Option 3a Outputs

In analysing the outputs the comparison is made with the core strategy; described in Section 3.1.

Residential

By 2026 the model forecasts an additional 1,411 households within zone 576 to the north-west of Market Harborough.

At a district level the model forecasts an additional 1,050 households. This would imply that around 30% of the new development to the north-west of Market Harborough will be occupied by households that would otherwise have resided elsewhere in the district.

Within Market Harborough (excluding zone 576) there is a decrease of 1,594 households forecast.

Figure 3.9 shows the percentage change in households by LLITM zone. The overall pattern is similar to that for the other two options, for example there is a small percentage decrease in the number of households across a large part of Harborough District and parts of Northamptonshire. There are percentage increases both in zone 576 and parts of Market Harborough.

Population

By 2026 the model forecasts an additional 2,999 residents living within zone 576 to the north-west of Market Harborough.

At a district level the model forecasts an additional 2,403 persons. Again this would imply that around 30% of the new development to the north-west of Market Harborough will be occupied by people that would otherwise have resided elsewhere in the district.

Within Market Harborough (excluding zone 576) there is a decrease of 129 in the town's population.

Figure 3.10 shows the percentage change in populations by LLITM zone. The picture is similar to that for the previous two options with decreases across a large part of Harborough District and parts of Northamptonshire and increases both in zone 576 and parts of Market Harborough.

Employment

By 2026 the model forecasts an additional 736 jobs located within zone 576 to the north-west of Market Harborough.

At a district level the model forecasts an additional 898 jobs. This suggests that the provision of the additional employment floorspace close to Market Harborough is drawing more jobs into the district.

Within Market Harborough (excluding zone 576) there is a small decrease in employment of 10 jobs in 2026.

Figure 3.11 shows the percentage change in employment by LLITM zone. Again the picture is less clear than for population and households. Whilst there is an increase in employment within zone 576 there are also small percentage increases in employment elsewhere within the District. We need to look further into the reasons for this; however it would appear to be a response to the increased economic activity in zone 576 making the wider area a more attractive location for businesses.

Figure 3.9: Household Outputs in 2026 – Percentage Difference between Option 3a and Core Strategy

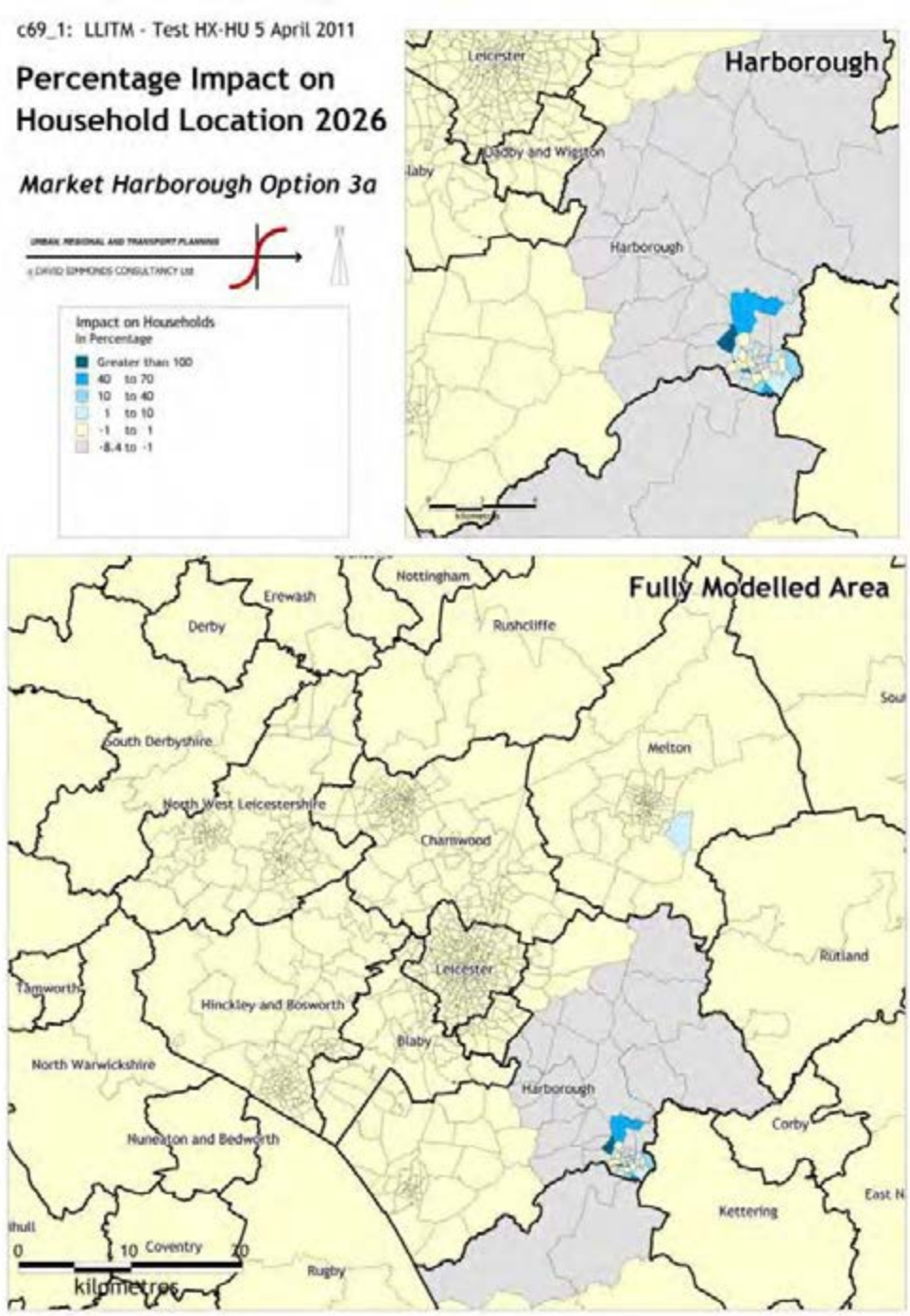


Figure 3.10: Population Outputs in 2026 – Percentage Difference between Option 3a and Core Strategy

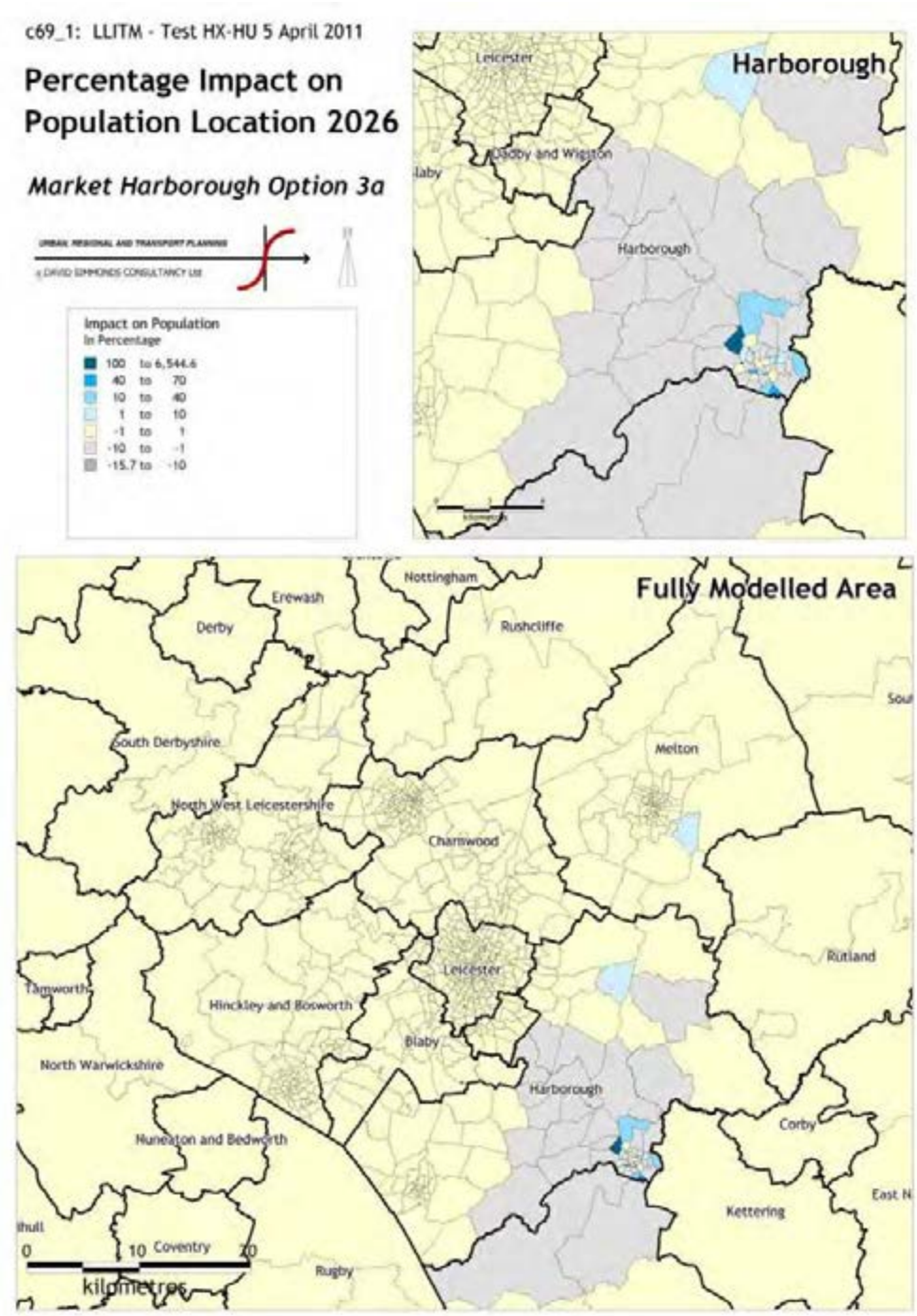
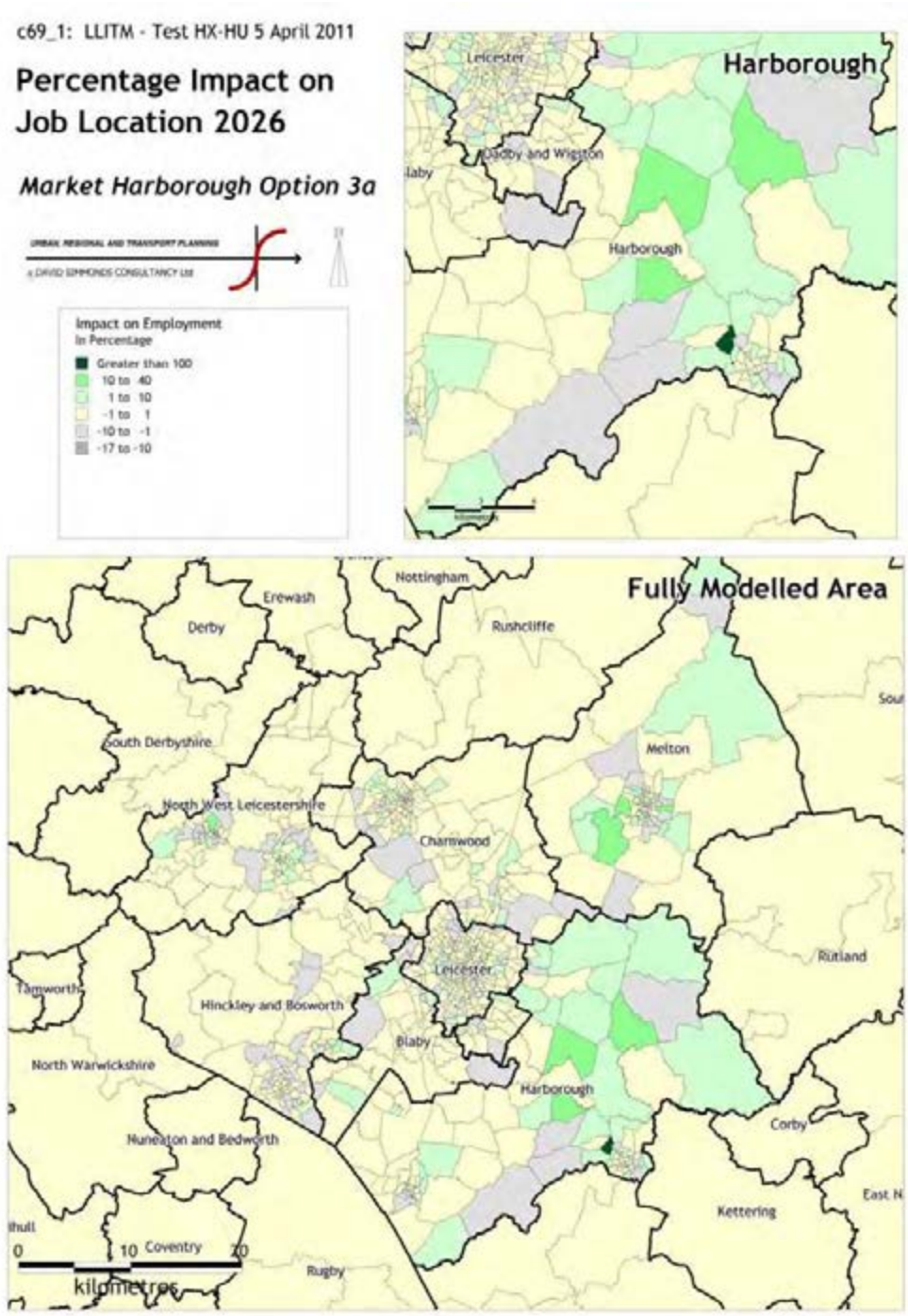


Figure 3.11: Employment Outputs in 2026 – Percentage Difference between Option 3a and Core Strategy



3.5 Comparison of the Core Strategy and the Three Growth Options

In the previous sections we have described the land use model outputs. These are brought together in this section to allow comparison of the growth options.

Comparing the results of Option 3 and Option 3a, where the growth assumptions are the same, shows that there is a forecast lower level of population and households in Option 3a compared to Option 3. This effect is discussed in more detail in Section 4.4.1, but is a reflection of the transport model costs used by the land-use model.

The land-use model takes transport costs from the assignments, and uses these to determine the accessibility of each model zone. Due to the coding standards adopted in the highway model and the different network assumptions in these two scenarios, the costs to and from the zone representing the development in Option 3a are higher than those in Option 3. This makes the zone less accessible, and therefore less „attractive' to households in Option 3a compared to Option 3. This results in lower levels of households and population for zone 576 produced by the land-use model in Option 3a.

The trend for the modelled area, over period to 2026, is for increases in both the number and proportion of the population of retirement age. Similarly the composition of the households changes with larger than average increases in the number of retired households (both single and couple households) and below average increases in „young' couples and households with two adults and children. The number of young single adult households is forecast to decline. These forecasts are based upon TEMPRO household forecasts for the modelled area.

The change are the local level with differ from this regional picture and reflect local influences. These will include:

- The household composition in the base year (2008). There is an in built assumption, within the model, that if there is vacant residential floorspace within a zone then households of a similar type to those already resident there will seek to move to the zone. (Vacant floorspace may be the result of the construction of new dwellings, the outmigration of households or the dissolution of households).
- The assumed mobility rates for different types of households. These rates, based upon Census outputs, reflect the propensity of different household groups to move: typically young households have a higher propensity to move than older or retired households. Consequently areas with an older profile in the base year will see lower levels of migration (out and in) then areas with a predominantly young household profile.
- The rent levels within the zone. These are the consequence of a demand for and supply of residential floorspace. The demand will be influenced, in turn, by (the model's calculation of) accessibility, housing quality and environmental factors.

Within Harborough District and Market Harborough areas the consequence of these factors is:

- an ageing of the population;
- declines within Market Harborough in the numbers of young single[1], young couple and (to a lesser extent) families with children; and
- declines within Harborough District in the numbers of young couples and families with households.

3.5.1 Population

Table 3.3, Table 3.4 and Table 3.5 shows the changes in population by type in zone 576, Market Harborough and Harborough district for the Core Strategy and each of the three growth options.

[1] Young households are defined as households where the household representative is aged 44 or under

Table 3.3: Zone 576 Change in Population by Type

	Persons	Change in Persons 2008-26			
	2008	Core Strategy	Option 1	Option 3	Option 3a
Children	8	13	489	740	542
Working Age	14	9	1,684	2,492	2,289
Retired	3	-1	133	202	189
Total	**25**	**21**	**2,306**	**3,434**	**3,020**

Table 3.4: Market Harborough Change in Population by Type

	Persons	Change in Persons 2008-26			
	2008	Core Strategy	Option 1	Option 3	Option 3a
Children	4,127	572	544	494	564
Working Age	12,817	770	691	508	561
Retired	3,521	2,015	2,088	2,108	2,103
Total	**20,465**	**3,356**	**3,323**	**3,109**	**3,227**

(Note development zone is assumed to be outside Market Harborough in this table)

Table 3.5: Harborough District Change in Population by Type

	Persons	Change in Persons 2008-26			
	2008	Core Strategy	Option 1	Option 3	Option 3a
Children	17,270	203	622	793	717
Working Age	51,227	154	1,484	2,000	1,891
Retired	13,401	6,422	6,538	6,586	6,574
Total	**81,898**	**6,779**	**8,644**	**9,378**	**9,183**

Although the employment and dwelling assumptions are the same for Options 3 and 3a, there are differences in the population forecast in these growth options. This is attributable to the dynamic way in that the transport and land-use models interact, whereby accessibility and environmental indicators are taken from the transport model and used to influence the numbers and composition of households (and employment).

Contributing to these forecast data is the influence of the environmental indicator taken from the transport model, which uses the traffic in a zone as an indicator. Option 3a provides a through-route through the development, which adversely affects this environmental indicator, which influences the household and population composition.

3.5.2 Households

Table 3.6, Table 3.7 and Table 3.8 show the changes in households by type in zone 576, Market Harborough and Harborough district for the Core Strategy and each of the three growth options.

Table 3.6: Zone 576 Change in Households by Type

	Households	Change in Households 2008-26			
	2008	Core Strategy	Option 1	Option 3	Option 3a
Young Single	0		361	512	590
Older Single	0	0	27	41	45
Retired Single	0	0	23	37	43
Single Parent	2	2	43	64	53
Young Couple	1	-1	251	367	364
Older Couple	2	-1	26	41	37
Couples with Children	2	4	173	265	186
Retired Couple	1	0	17	26	24
3+ Adults	0	0	45	70	53
3+ Adults with Children	0	0	16	24	21
Total	**8**	**4**	**981**	**1,448**	**1,415**

Table 3.7: Market Harborough Change in Households by Type

	Households	Change in Households 2008-26			
	2008	Core Strategy	Option 1	Option 3	Option 3a
Young Single	878	-195	-237	-284	-319
Older Single	597	184	198	199	196
Retired Single	1,013	417	436	441	435
Single Parent	311	351	355	353	355
Young Couple	1,352	-226	-240	-271	-275
Older Couple	1,367	255	283	290	289
Couples with Children	1,806	43	-46	-64	-34
Retired Couple	771	735	764	775	773
3+ Adults	493	147	143	138	144
3+ Adults with Children	156	43	43	42	42
Total	**8,744**	**1,668**	**1,699**	**1,618**	**1,607**

Table 3.8: Harborough District Change in Households by Type

	Households	Change in Households 2008-26			
	2008	Core Strategy	Option 1	Option 3	Option 3a
Young Single	2,537	514	715	784	809
Older Single	2,043	512	551	566	564
Retired Single	3,097	2,586	2,598	2,603	2,602
Single Parent	1,181	1,120	1,165	1,182	1,177
Young Couple	4,437	-429	-271	-213	-222
Older Couple	6,542	362	449	482	476
Couples with Children	7,732	-1,167	-1,004	-937	-968
Retired Couple	3,173	1,904	1,923	1,931	1,929
3+ Adults	2,220	40	87	107	100
3+ Adults with Children	643	207	227	235	232
Total	**33,606**	**5,650**	**6,439**	**6,740**	**6,700**

3.5.3 Employment

Table 3.9 show the changes in employment in zone 576, Market Harborough and Harborough District for the Core Strategy and each of the three growth options.

Table 3.9: Change in employment

	Employment	Change in Employment 2008-26			
	2008	Core Strategy	Option 1	Option 3	Option 3a
Zone 576	94	123	867	875	858
Market Harborough	9,694	950	918	961	940
Harborough District	37,407	2,619	3,410	3,519	3,517

As discussed previously, although the employment and dwelling assumptions are the same for Options 3 and 3a, there are differences in the employment forecast in these growth options. This is attributable to the dynamic way in that the transport and land-use models interact, whereby accessibility and environmental indicators are taken from the transport model and used to influence the numbers and composition of employment (and households and population).

Section 4 – Core and Growth Scenario Results

This section details the results of the core scenario and then the results of the three development options with no mitigation in turn.

4.1 Core Scenario Results

4.1.1 Core Scenario Reference Growth

Reference growth is the growth driven by, primarily, planning data and car ownership changes over time, but excluding any changes in travel costs or journey times. The model takes the results of the land-use model, calculates the future year trip-ends using the DfT's trip-end model, and then applies these changes to the base year demand matrices. The resulting reference demand is the starting point for the demand model which forecast the effects of travel cost and journey time changes on travel patterns.

Figure 4.1, Figure 4.2 and Figure 4.3 show the forecast growth in 24-hour person reference demand for highway (non-freight), public transport and active mode respectively from the base year. This data is for all productions in Leicestershire, including Leicester City.

Figure 4.1: Core Reference Highway (non-freight) Person Demand Growth for Leicestershire Productions

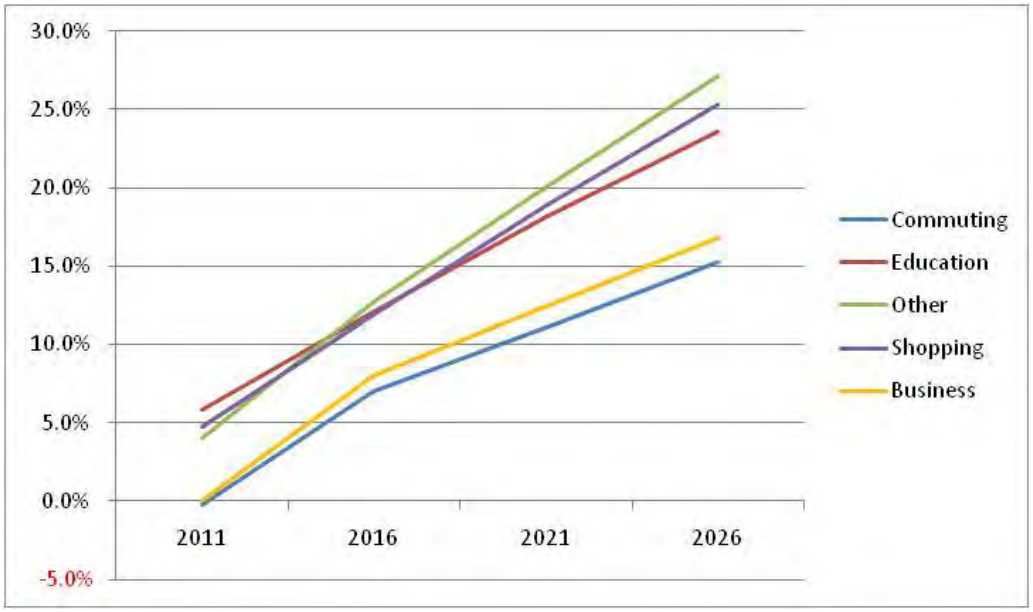


Figure 4.2: Core Reference Public Transport Person Demand Growth for Leicestershire Productions

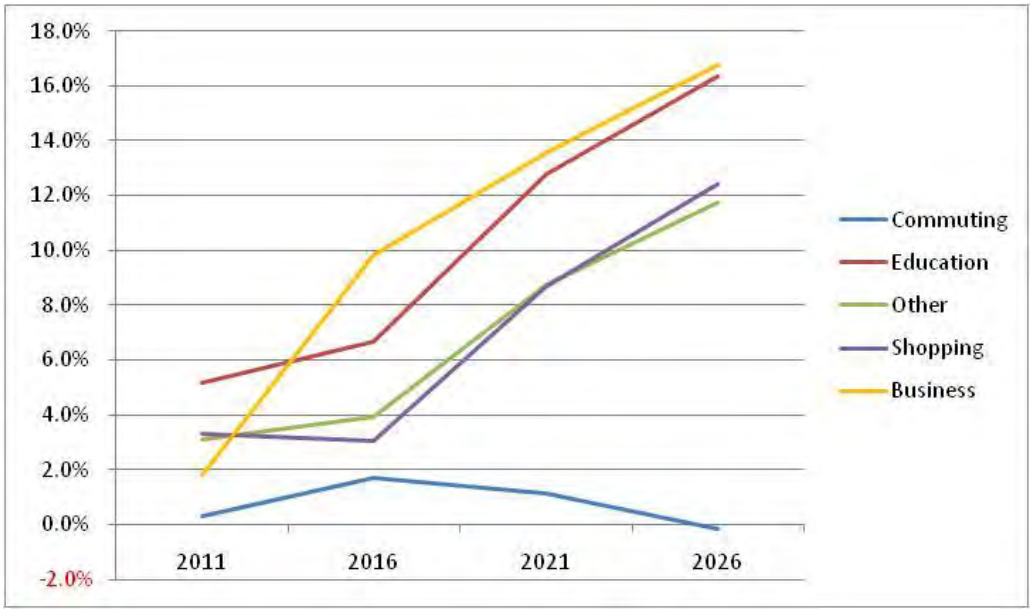


Figure 4.3: Core Reference Active Mode Person Demand Growth for Leicestershire Productions

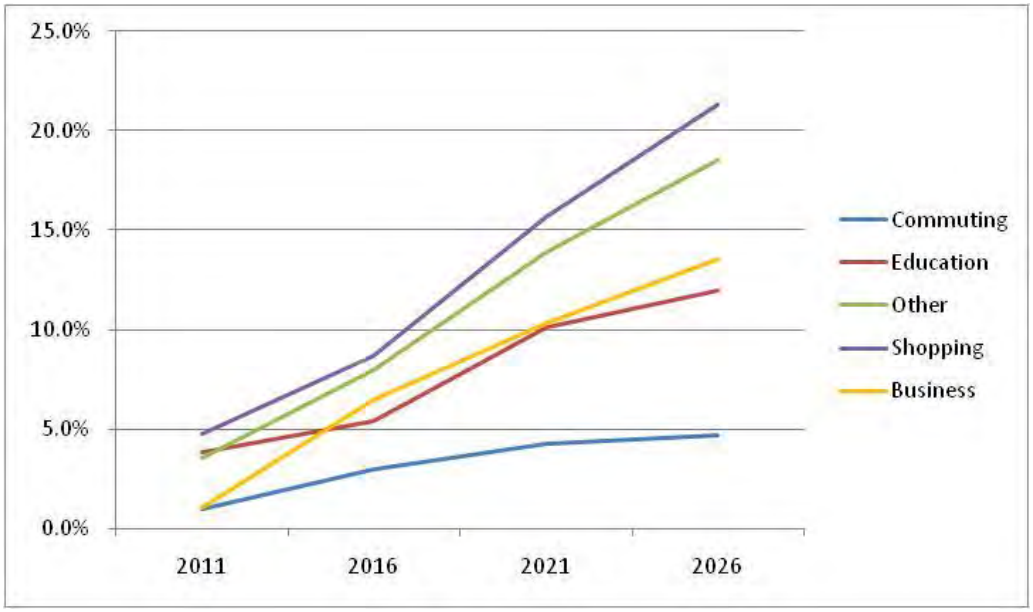


Figure 4.1 shows that there is a similar level of growth across the county in education, shopping and other trips over time, with commuting and business demand having similar, lower levels of growth. In terms of public transport, Figure 4.2 shows that there are similar levels of growth in business and education trips, other and shopping trips, with commuting having a significantly lower level of public transport reference growth. In fact there is a marginal decrease in commuting reference demand from 2008 to 2026 across Leicestershire.

In terms of active mode reference growth, the pattern of growth is similar to that for public transport. There are comparable levels of growth between shopping and other, between education and business, and lower levels of growth for commuting. However there is growth in active mode reference demand over time, with almost a 5% growth from the base year in 2026.

Table 4.1 gives the 24-hour person reference demand growth from the base year in the core scenario which underpins the above figures.

Table 4.1: Core Reference 24-hour Person Demand Growth from 2008 for Productions in Leicestershire

Mode	Segment	2011	2016	2021	2026
Highway	Commuting	-0.3%	7.0%	11.1%	15.2%
	Education	5.8%	12.0%	18.2%	23.6%
	Other	4.0%	12.7%	20.1%	27.1%
	Shopping	4.8%	11.9%	18.9%	25.3%
	Business	0.1%	8.0%	12.5%	16.8%
	Total Car	**2.9%**	**10.7%**	**16.9%**	**22.8%**
	LGV	6.9%	19.5%	33.5%	49.2%
	OGV	1.5%	4.3%	7.4%	10.9%
Public Transport	Commuting	0.3%	1.7%	1.1%	-0.1%
	Education	5.2%	6.7%	12.8%	16.4%
	Other	3.1%	3.9%	8.7%	11.8%
	Shopping	3.3%	3.1%	8.7%	12.4%
	Business	1.8%	9.9%	13.5%	16.7%
	Total PT	**2.7%**	**3.8%**	**7.5%**	**9.7%**
Active	Commuting	1.0%	3.0%	4.3%	4.7%
	Education	3.9%	5.4%	10.1%	12.0%
	Other	3.6%	8.0%	13.9%	18.5%
	Shopping	4.8%	8.7%	15.7%	21.3%
	Business	1.1%	6.5%	10.3%	13.5%
	Total Active	**3.6%**	**7.2%**	**12.6%**	**16.5%**
All Modes		**3.2%**	**9.8%**	**16.1%**	**21.8%**

4.1.2 Core Demand Model Effects

There are a number of factors that impact on the results of the demand model once the reference demand has been calculated. These are changes in the relative levels of fuel cost and public transport fares to the values of time, the forecast changes in car occupancy over time, the impact of policies such as network changes and Smarter Choices, and the congestion on the highway network. Note that there

is no crowding represented within the public transport model, and there are also no cost or time changes assumed for active modes in the core scenario.

It should be noted that, as active mode demand is represented in the demand model, and in-line with WebTAG guidance, there is no frequency effect within the demand model. Any increase in one mode's 24-hour person demand must be balanced by a decrease in another mode or modes. Therefore the 24-hour person demand across all modes stays fixed at the reference demand total for each demand segment.

Figure 4.4, Figure 4.5 and Figure 4.6 show the change in 24-hour person demand from reference demand within the demand model for highway (non-freight), public transport and active mode demand respectively.

Figure 4.4: Effect of Demand Model on Core Highway (non-freight) Person Demand for Leicestershire Productions

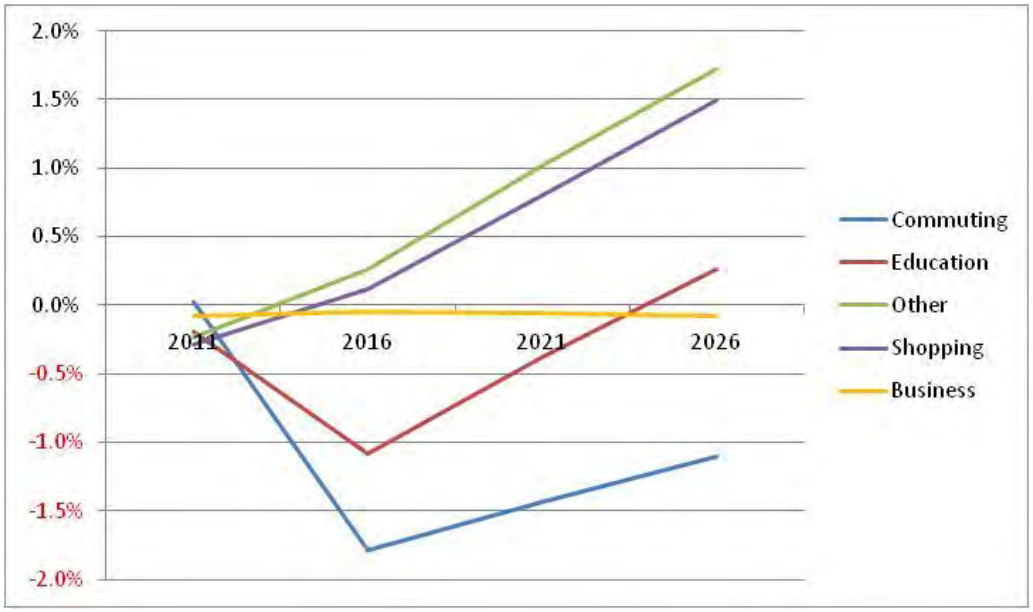


Figure 4.5: Effect of Demand Model on Core Public Transport Person Demand for Leicestershire Productions

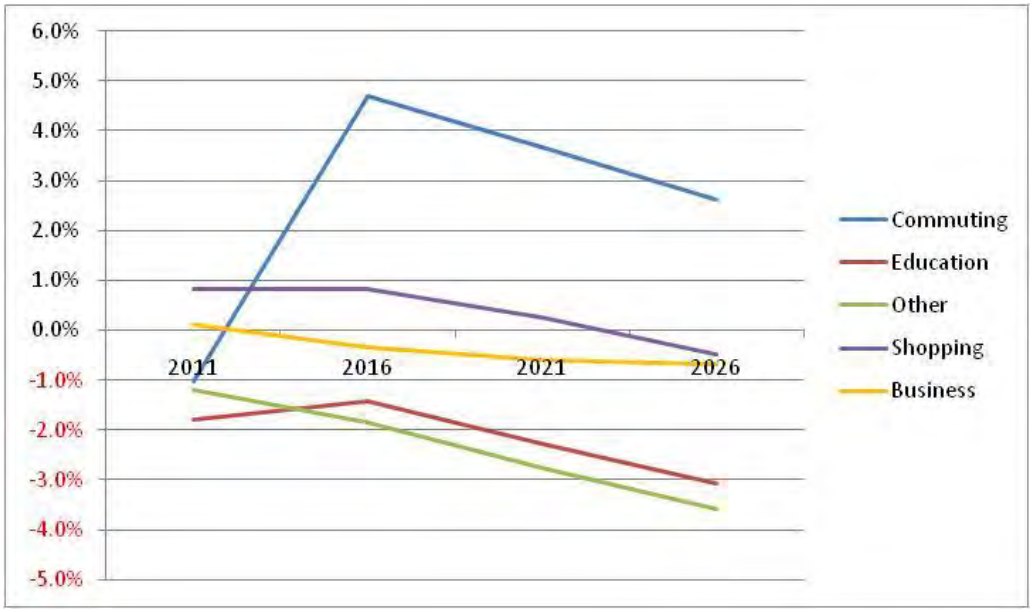
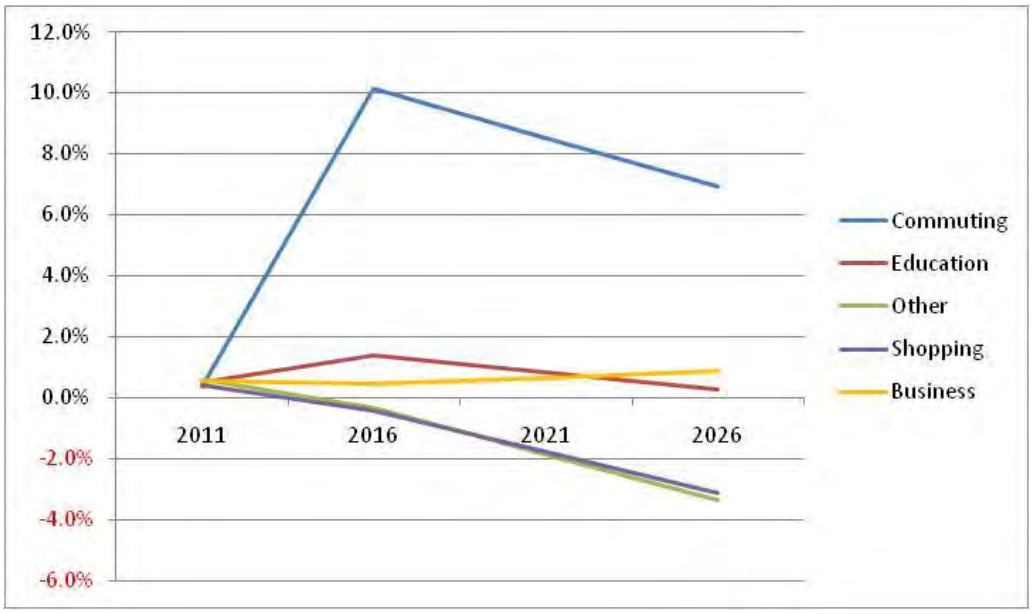


Figure 4.6: Effect of Demand Model on Core Active Mode Person Demand for Leicestershire Productions



In terms of highway demand, for non-freight purposes, there is forecast to be little change to business demand as a result of the demand model, with increases in shopping and other demand, and decreases in commuting and education highway demand, although education demand marginally increases in 2026. Figure 4.5 shows a general decrease in public transport as a result of the demand model, with the exception of an increase for commuting. In terms active mode demand, Figure 4.6 shows that there

is a forecast increase in commuting demand within the demand model, a smaller increase in business and education demand, and reductions in shopping and other active mode demand.

The effect of the introduction of Smarter Choices on highway demand in 2016 is the primary driver for the reductions in commuting and education person highway demand in this modelled year. The main effects of the Smarter Choices initiatives are workplace and school travel plans, and it is these that cause the reduction in Leicestershire highway productions for commuting and education. This reduction is countered by increases in public transport and active mode demand for commuting, and an increase in active mode demand for education.

The effect of Smarter Choices appears greatest in 2016, and reduces in subsequent years. However this effect is difficult to isolate due to the changes in travel cost and other assumptions in years post-2016. These changes in costs tend to increase the propensity to travel by car over time, and therefore work in the opposite direction to Smarter Choices.

Table 4.2 gives the change in 24-hour person demand in the core scenario as a result of the demand model for productions within Leicestershire.

Table 4.2: Effect of Demand Model on 24-hour Person Core Demand Productions in Leicestershire

Mode	Segment	2011	2016	2021	2026
Highway	Commuting	0.0%	-1.8%	-1.4%	-1.1%
	Education	-0.2%	-1.1%	-0.4%	0.3%
	Other	-0.2%	0.3%	1.0%	1.7%
	Shopping	-0.3%	0.1%	0.8%	1.5%
	Business	-0.1%	-0.0%	-0.1%	-0.1%
	Total Car	**-0.2%**	**-0.4%**	**0.2%**	**0.8%**
	LGV	-0.0%	-0.0%	0.0%	0.0%
	OGV	-0.0%	-0.0%	-0.0%	0.0%
Public Transport	Commuting	-1.0%	4.7%	3.7%	2.6%
	Education	-1.8%	-1.4%	-2.3%	-3.1%
	Other	-1.2%	-1.8%	-2.8%	-3.6%
	Shopping	0.8%	0.8%	0.3%	-0.5%
	Business	0.1%	-0.3%	-0.6%	-0.7%
	Total PT	**-0.7%**	**0.6%**	**-0.3%**	**-1.2%**
Active	Commuting	0.4%	10.2%	8.5%	6.9%
	Education	0.5%	1.4%	0.8%	0.3%
	Other	0.6%	-0.4%	-1.9%	-3.3%
	Shopping	0.4%	-0.4%	-1.8%	-3.1%
	Business	0.6%	0.5%	0.6%	0.9%
	Total Active	**0.5%**	**0.8%**	**-0.5%**	**-1.8%**
All Modes		**0.0%**	**0.0%**	**0.0%**	**0.0%**

One of the other key changes in demand within the demand model, other than mode shifting, is time period choice. Table 4.3 shows the changes in highway, public transport and active mode person demand by period (not hour) as a result of the demand model for trips produced within Leicestershire.

This shows that there is a general movement away from the AM Peak and PM Peak periods for highway demand due to the congestion in those periods. This is countered by an increase in the interpeak period, and also in the off-peak period. This suppression is greater in the PM Peak period compared with the AM Peak period, suggesting that this is the most congested period.

Table 4.3: Effect of Demand Model by Time Period for Productions in Leicestershire

Year	Mode	OP	AM	IP	PM	24-hour
2011	Highway (car)	0.2%	-0.2%	-0.1%	-0.6%	-0.2%
	Public Transport	-0.9%	-1.1%	-0.6%	1.4%	-0.7%
	Active	0.5%	0.5%	0.5%	0.6%	0.5%
2016	Highway (car)	1.4%	-1.0%	-0.0%	-1.7%	-0.4%
	Public Transport	3.0%	0.7%	-0.4%	1.3%	0.6%
	Active	1.9%	1.9%	0.1%	-0.1%	0.8%
2021	Highway (car)	3.8%	-1.1%	0.8%	-2.3%	0.2%
	Public Transport	2.2%	-0.3%	-1.2%	0.4%	-0.3%
	Active	0.3%	0.8%	-1.3%	-1.6%	-0.5%
2026	Highway (car)	6.3%	-1.2%	1.8%	-3.2%	0.8%
	Public Transport	1.4%	-1.2%	-2.0%	-0.4%	-1.2%
	Active	-1.3%	-0.2%	-2.6%	-3.0%	-1.8%

4.1.3 Core Highway Assignment Results

Figure 4.7, Figure 4.8 and Figure 4.9 show the effect of the demand model on the highway assignments in the 2026 core scenario for the AM Peak hour, the interpeak hour and the PM Peak hour respectively. Green links show where flow has increase as a result of the demand model, with blue links showing where flow has decreased. The bandwidths are also proportional to the change in flow, so the thicker the bandwidth the greater the change in assigned volume.

It is worth noting that the effect of the parking model is also included in these plots. The reference demand has not been subject to the parking model, whereas the demand produced by the demand model has, and this changes the assigned flows in the centre of Leicester and Loughborough.

These plots show that there is relatively little change in the assigned flows in the interpeak hour as a result of the demand model away from the parking model areas. There is more change in the AM Peak and PM Peak hours with areas of blue links showing where the suppression is taking place within the demand model.

Figure 4.7: Effect of Demand Model on 2026 Core AM Peak Hour Highway Assignment (Green = increase / Blue = decrease)

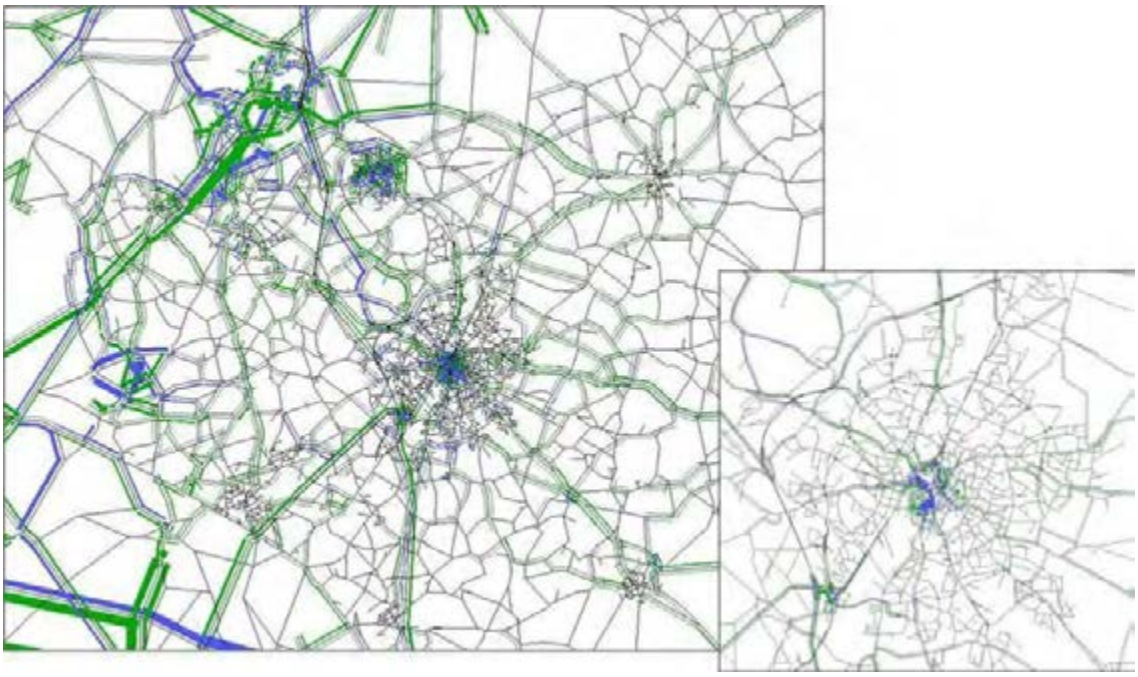


Figure 4.8: Effect of Demand Model on 2026 Core Interpeak Hour Highway Assignment (Green = increase / Blue = decrease)

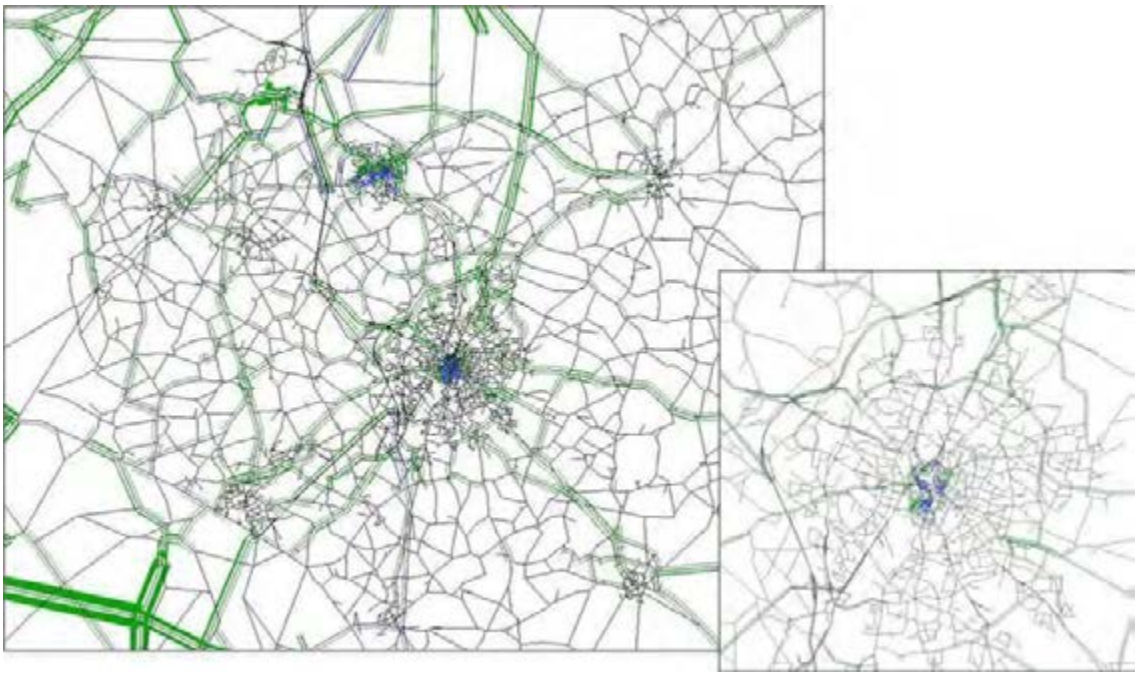


Figure 4.9: Effect of Demand Model on 2026 Core PM Peak Hour Highway Assignment (Green = increase / Blue = decrease)

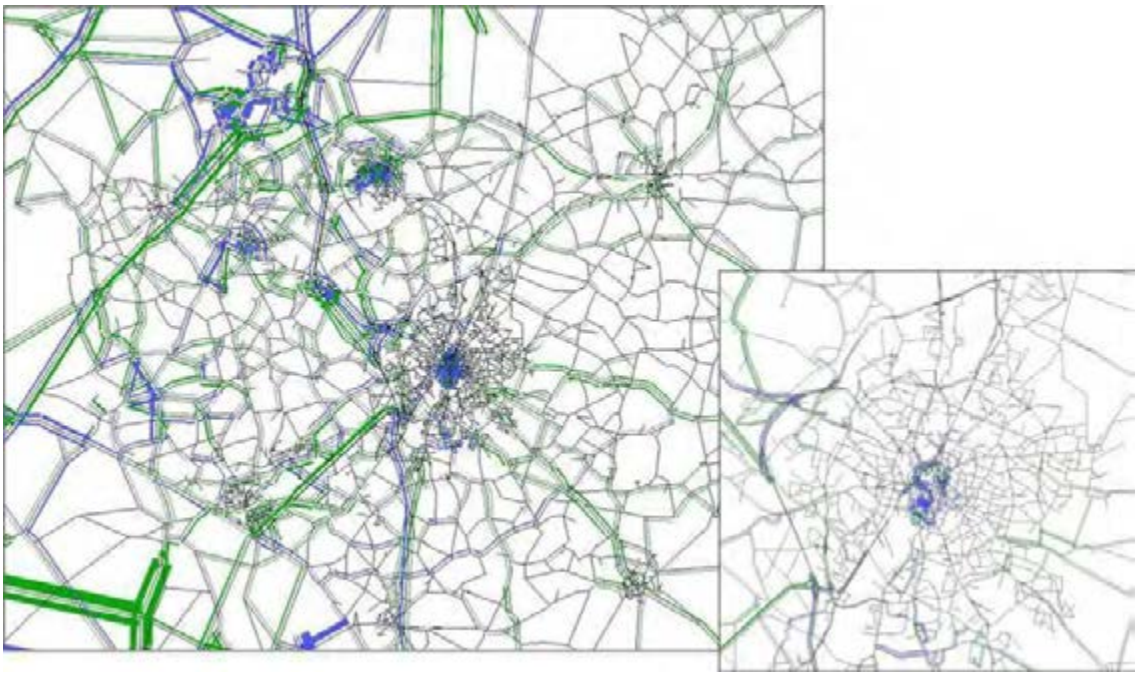


Table 4.4, Table 4.5 and Table 4.6 give some network statistics from the highway model for the base year and the 2026 core scenario model for the AM Peak hour, interpeak hour and PM Peak hour respectively. These tables give the vehicle-kms on the network, the total vehicle delay, measured in vehicle-hours, the number of vehicles queued at the end of the modelled hour and the average speed on the network. These statistics have been extracted for all the links within Leicestershire, Harborough District and Market Harborough itself separately.

These tables show that the growth in traffic, measured in terms of vehicle-kms, is greater in Harborough District compared with Leicestershire as a whole, and is greater still in Market Harborough itself. For example, the growth in traffic in the AM Peak hour is 19% across Leicestershire, with 26% growth in Harborough District, and 33% in Market Harborough. The growth in traffic is also generally higher in the interpeak hour compared with the AM Peak and PM Peak hours.

Similarly, in general, the reductions in average speeds over time are greatest across Leicestershire than compared with Harborough District, with the lowest decreases in Market Harborough. An exception to this is in the PM Peak hour where the decrease in average speeds is greater in Harborough District than compared with Leicestershire.

It would appear that, particularly in the AM Peak hour and interpeak hour, the highway modelled speeds are relatively insensitive to increases in volume in Market Harborough. For example, in the AM Peak hour we have 33% more traffic in 2026 than compared with the base year but the average speeds only decrease by 4%. The PM Peak hour sees greater reductions in speed in Market Harborough as a result of increased traffic, with a 7% reduction in speeds with a 39% increase in traffic.

It is worth noting at this point that the journey time validation within Market Harborough in the base year model shows that the model generally underestimates journey times compared with the observed values, particularly in the AM Peak hour and interpeak hour.

Table 4.4: 2026 Core AM Peak Hour SATURN Network Statistics

	Leicestershire		Harborough District		Market Harborough	
	2008	**2026**	**2008**	**2026**	**2008**	**2026**
Vehicle distance (veh-km)	**3,008,955**	**3,581,963**	**369,630**	**465,604**	**9,549**	**12,687**
		19.0%		26.0%		32.9%
Vehicle delay time (veh-hours)	**17,504**	**28,277**	**1,377**	**2,144**	**74**	**113**
		61.5%		55.7%		51.4%
Vehicles queued end of hour (veh)	**7,644**	**13,352**	**688**	**1,136**	**27**	**39**
		74.7%		65.0%		48.3%
Speed (km/hr)	**52**	**46**	**60**	**56**	**34**	**32**
		-10.9%		-6.5%		-3.9%

Table 4.5: 2026 Core Interpeak Hour SATURN Network Statistics

	Leicestershire		Harborough District		Market Harborough	
	2008	**2026**	**2008**	**2026**	**2008**	**2026**
Vehicle distance (veh-km)	**2,377,606**	**2,938,512**	**270,765**	**346,986**	**6,311**	**8,843**
		23.6%		28.2%		40.1%
Vehicle delay time (veh-hours)	**10,043**	**16,101**	**749**	**1,055**	**44**	**68**
		60.3%		40.8%		55.6%
Vehicles queued end of hour (veh)	**3,763**	**5,987**	**324**	**403**	**16**	**25**
		59.1%		24.3%		63.0%
Speed (km/hr)	**58**	**53**	**66**	**64**	**35**	**34**
		-8.4%		-3.9%		-2.7%

Table 4.6: 2026 Core PM Peak Hour SATURN Network Statistics

	Leicestershire		Harborough District		Market Harborough	
	2008	**2026**	**2008**	**2026**	**2008**	**2026**
Vehicle distance (veh-km)	**3,148,762**	**3,766,476**	**405,930**	**507,909**	**10,044**	**13,917**
		19.6%		25.1%		38.6%
Vehicle delay time (veh-hours)	**20,563**	**31,160**	**1,345**	**2,491**	**77**	**138**
		51.5%		85.2%		78.1%
Vehicles queued end of hour (veh)	**9,729**	**14,825**	**564**	**1,329**	**28**	**55**
		52.4%		135.6%		95.7%
Speed (km/hr)	**49**	**45**	**63**	**56**	**34**	**31**
		-9.0%		-10.5%		-7.1%

4.2 Option 1 Results

This following section details the impacts of the introduction of Option 1 development. These results exclude any mitigation measures, where the only changes to the networks from the core scenario are related to the access points for the development.

4.2.1 Option 1 Change in Demand Matrices

Table 4.7 shows the forecast difference in the 24-hour person demand between Option 1 and the core scenario for highway, public transport and active mode, for Harborough District, Market Harborough and the development zone in 2026. These demand totals are taken from the matrices produced by the demand model, and are not the reference demand totals.

It is worth noting that the zone which represents the additional growth falls outside the Market Harborough sector defined by the existing urban area. Therefore the totals quoted for Market Harborough exclude the zone representing the growth option itself. The zone representing the development is given separately, and is also included in the total for Harborough District.

Table 4.7: Change in 24-hour Person Demand in 2026 Option 1 Compared to Core Scenario

		Highway		Public Transport		Active		All Modes	
		Prod.	Attr.	Prod.	Attr.	Prod.	Attr.	Prod.	Attr.
Harborough District	Core	135,422	140,686	3,736	1,396	41,677	41,546	180,835	183,627
	Option 1	137,811	143,242	3,921	1,483	43,371	43,242	185,104	187,967
	Abs. Change	2,390	2,557	185	87	1,694	1,696	4,269	4,340
	%Change	1.8%	1.8%	5.0%	6.3%	4.1%	4.1%	2.4%	2.4%
Market Harborough	Core	27,183	36,912	1,608	690	15,954	16,004	44,745	53,606
	Option 1	27,165	37,805	1,606	707	16,866	16,919	45,636	55,432
	Abs. Change	-18	894	-2	17	912	915	891	1,825
	%Change	-0.1%	2.4%	-0.1%	2.4%	5.7%	5.7%	2.0%	3.4%
Development Zone	Core	186	470	3	2	52	52	241	524
	Option 1	2,832	1,518	148	69	880	880	3,860	2,467
	Abs. Change	2,646	1,048	146	66	828	828	3,620	1,942
	%Change	1,421%	223%	5,533%	2,699%	1,600%	1,600%	1,504%	370%

Within Market Harborough there is little change in terms of productions for highway and public transport, with an increase in the active mode productions. There is a forecast 2.4% increase in terms of attractions within Market Harborough for both highway and public transport, with a larger increase in terms of active mode attractions.

Considering Harborough District there are approximately 2,500 additional productions and attractions for highway person demand over 24-hours. This is an increase of 1.8% as a result of the Option 1 development. There are bigger percentage increases in public transport and active mode, although in absolute terms these are smaller than highway, particularly for public transport. Forecast public transport productions and attractions increase by 185 and 87 respectively for Harborough District.

This table also shows the level of demand produced by the zone representing the additional growth. Over the 24-hour period the development is forecast to produce approximately 2,800 highway person trips, 150 public transport trips and 900 active mode trips. It is also forecast to attract around 1,500 highway person trips, 70 public transport trips, and 900 active mode trips.

Table 4.8 shows the mode share in the 2026 core scenario and the Option 1 development scenario for productions in Harborough District, Market Harborough and for the development zone itself. This table shows that Harborough District has a higher highway mode share compared with Market Harborough, with Market Harborough having a higher proportion of active mode trips. This reflects the more urban nature of Market Harborough compared to the district as a whole.

In Option 1, the development has a highway mode share slightly above that of the district average, but a public transport mode share comparable with Market Harborough of around 4%.

Table 4.8: Change in 24-hour Mode Share in 2026 Option 1 Compared to Core Scenario

		Highway	Public Transport	Active Mode
Harborough District	Core	74.9%	2.1%	23.0%
	Option 1	74.5%	2.1%	23.4%
Market Harborough	Core	60.8%	3.6%	35.7%
	Option 1	59.5%	3.5%	37.0%
Development Zone	Core	77.4%	1.1%	21.5%
	Option 1	73.4%	3.8%	22.8%

Table 4.9 and Table 4.10 show the period demand totals for Harborough District, Market Harborough and the development zone, for person demand at a production / attraction level and assignment demand at an origin / destination level respectively. The production / attraction, person demand is derived from the tour-based matrices, and so is not directly comparable with the assignment matrices. The fifteen time-period-pair matrices have been condensed to the four periods in this table by summing based on the production leg of the tour. Therefore, all tours where the outbound leg takes place in the AM period have been summed to give the AM period total. The assignment, origin / destination demand is in units of PCUs for highway demand, and person demand for public transport and active mode matrices.

These demand totals are for the period, and not hour. Therefore the AM period covers demand from 7:00 to 10:00, with the Interpeak covering 10:00 to 16:00, the PM covering 16:00 to 19:00, with the off-peak being defined as between 19:00 and 7:00.

Table 4.9: Person Demand by Period for 2026 Option 1

		Highway		Public Transport		Active		All Modes	
		Prod.	Attr.	Prod.	Attr.	Prod.	Attr.	Prod.	Attr.
Harborough District	OP	22,107	22,621	412	146	4,059	4,033	26,578	26,800
	AM	37,758	38,990	1,847	601	13,770	13,870	53,374	53,461
	IP	52,872	55,473	1,426	612	19,627	19,463	73,925	75,548
	PM	25,074	26,158	237	125	5,915	5,876	31,226	32,159
	24hr	137,811	143,242	3,921	1,483	43,371	43,242	185,104	187,967
Market Harborough	OP	4,101	4,947	207	86	1,629	1,639	5,936	6,672
	AM	7,518	9,759	696	282	5,438	5,464	13,652	15,505
	IP	10,610	16,118	581	269	7,535	7,548	18,727	23,935
	PM	4,935	6,981	122	70	2,264	2,268	7,321	9,319
	24hr	27,165	37,805	1,606	707	16,866	16,919	45,636	55,432
Development Zone	OP	403	235	16	9	79	79	498	323
	AM	817	489	82	23	288	288	1,188	800
	IP	1,132	512	45	29	398	398	1,576	939
	PM	479	283	5	8	114	114	598	405
	24hr	2,832	1,518	148	69	880	880	3,860	2,467

Table 4.10: Assignment Demand by Period for 2026 Option 1

		Highway		Public Transport		Active		All Modes	
		Origin	Dest.	Origin	Dest.	Origin	Dest.	Origin	Dest.
Harborough District	OP	32,327	32,768	561	517	16,466	16,575	49,354	49,860
	AM	38,344	39,512	1,283	607	37,400	37,314	77,027	77,433
	IP	69,928	67,134	1,793	2,097	12,743	12,782	84,464	82,012
	PM	46,443	41,919	587	1,221	7,765	7,782	54,795	50,922
	24hr	187,043	181,333	4,224	4,442	74,373	74,453	265,640	260,228
Market Harborough	OP	6,918	6,297	274	274	6,402	6,426	13,594	12,998
	AM	8,335	9,460	337	190	14,050	14,045	22,722	23,695
	IP	16,265	15,996	802	684	4,916	4,896	21,983	21,577
	PM	11,748	9,448	346	131	2,946	2,951	15,040	12,530
	24hr	43,265	41,201	1,759	1,279	28,315	28,319	73,339	70,799
Development Zone	OP	506	546	31	19	354	354	891	919
	AM	675	616	83	24	832	832	1,590	1,472
	IP	1,236	1,123	76	107	284	284	1,596	1,514
	PM	828	780	21	54	175	175	1,024	1,009
	24hr	3,245	3,065	211	204	1,645	1,645	5,101	4,914

4.2.2 Option 1 Impact on Assignment Results

Highway Assignment

A complete set of flow change plots showing the effect of introducing Option 1 development are given in Appendix C, but Figure 4.10 shows the change in flows from the 2026 core scenario to Option 1 development in the AM Peak hour highway assignment. Green represents an increase in flow from the core scenario whereas blue represents a decrease in traffic volumes. It is worth noting that SATURN does not show a comparison where there are link differences between networks, so no differences are shown near the access points for the development on Leicester Road.

Figure 4.10: 2026 AM Peak Hour Flow Change Due to Option 1 Development

The majority of significant flow changes due to the Option 1 development do not extend a great distance from Market Harborough. To the north of Market Harborough there are no significant flow changes further north than approximately Kibworth, and there are only minor flow changes to the east, south and west of the town. It appears that the majority of traffic generated by the development is internal to Market Harborough.

Taking the AM Peak origins for the development zone, approximately 50% of the demand has a destination within Market Harborough. Just less than 10% has a destination within Leicester City, with the remaining 40% having a destination elsewhere.

The flow change plots for the other time periods show a broadly similar pattern of flow change, with a smaller impact in the interpeak hour, and more of an increase in flow in the PM Peak hour on the A6 south of Market Harborough.

Table 4.11, Table 4.12 and Table 4.13 give some network statistics from the highway model for the AM Peak hour, interpeak hour and the PM Peak hour respectively in 2026. These tables compare these statistics in the core scenario with the Option 1 model for both links in Harborough District and those in

Market Harborough. These tables also include the 2008 base year data, and show the change from the base year to the core scenario, and from the core scenario to the development option.

These tables show that there is an increase in traffic in both the district and Market Harborough as a result of including Option 1 development. The increase across the district is between 0.3% and 0.5% depending on the time period, with increases of between 1.3% and 3.9% within Market Harborough.

These increases in traffic generally result in decreases in average speeds across the network. Across the district the changes in speed are marginal, although the PM Peak hour sees a 1.6% reduction in speeds with the development. Within Market Harborough the speeds generally reduce, by 0.3%, in the AM peak hour and interpeak hour and by 2.2% in the PM peak hour. This corresponds with the results of the core scenario model which showed that the PM Peak average speeds are more sensitive to change in flow.

Table 4.11: AM Peak Hour Option 1 and Core Scenario SATURN Network Statistics

	Harborough District			Market Harborough		
	2008	Core	Option 1	2008	Core	Option 1
Vehicle distance (veh-km)	**369,630**	**465,604**	**467,714**	**9,549**	**12,687**	**12,855**
		26.0%	0.5%		32.9%	1.3%
Vehicle delay time (veh-hours)	**1,377**	**2,144**	**2,135**	**74**	**113**	**115**
		55.7%	-0.5%		51.4%	2.2%
Vehicles queued end of hour (veh)	**688**	**1,136**	**1,118**	**27**	**39**	**40**
		65.0%	-1.6%		48.3%	0.7%
Speed (km/hr)	**60**	**56**	**56**	**34**	**32**	**32**
		-6.5%	0.2%		-3.9%	-0.3%

Table 4.12: Interpeak Hour Option 1 and Core Scenario SATURN Network Statistics

	Harborough District			Market Harborough		
	2008	Core	Option 1	2008	Core	Option 1
Vehicle distance (veh-km)	**270,765**	**346,986**	**348,079**	**6,311**	**8,843**	**9,150**
		28.2%	0.3%		40.1%	3.5%
Vehicle delay time (veh-hours)	**749**	**1,055**	**1,062**	**44**	**68**	**72**
		40.8%	0.7%		55.6%	4.9%
Vehicles queued end of hour (veh)	**324**	**403**	**405**	**16**	**25**	**27**
		24.3%	0.4%		63.0%	4.1%
Speed (km/hr)	**66**	**64**	**63**	**35**	**34**	**34**
		-3.9%	-0.2%		-2.7%	-0.3%

Table 4.13: PM Peak Hour Option 1 and Core Scenario SATURN Network Statistics

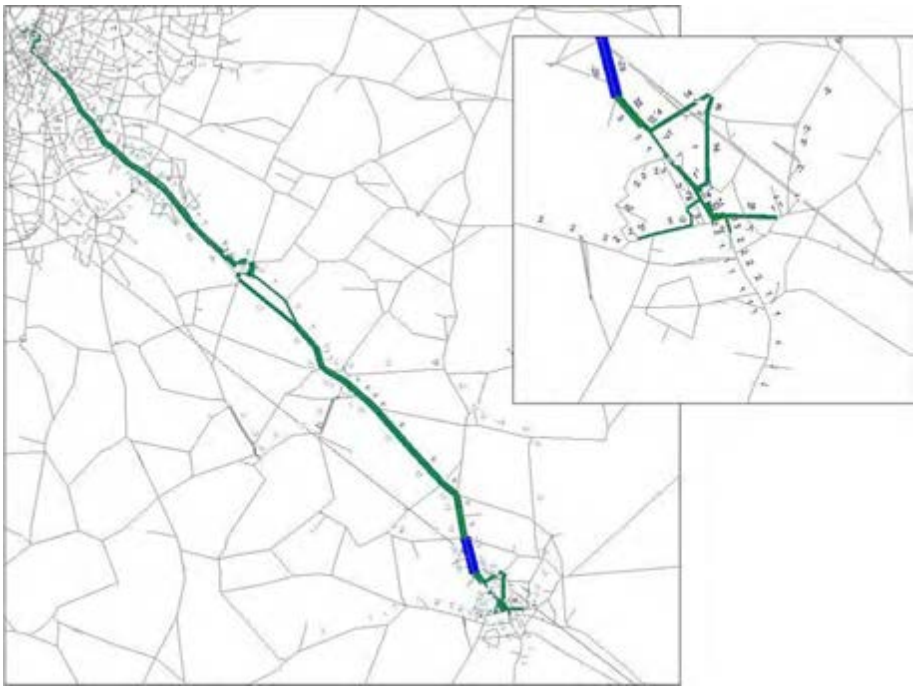
	Harborough District			Market Harborough		
	2008	Core	Option 1	2008	Core	Option 1
Vehicle distance (veh-km)	**405,930**	**507,909**	**510,029**	**10,044**	**13,917**	**14,462**
		25.1%	0.4%		38.6%	3.9%
Vehicle delay time (veh-hours)	**1,345**	**2,491**	**2,643**	**77**	**138**	**55**
		85.2%	6.1%		78.1%	0.0%
Vehicles queued end of hour (veh)	**564**	**1,329**	**1,449**	**28**	**55**	**60**
		135.6%	9.0%		95.7%	8.6%
Speed (km/hr)	**63**	**56**	**55**	**34**	**31**	**31**
		-10.5%	-1.6%		-7.1%	-2.2%

Public Transport Assignment

Figure 4.11 shows the change in the bus passenger flows in the public transport assignment as a result of the introduction of Option 1 development in the AM Peak hour. This shows that there is an increase in the bus flows between the development and Market Harborough town centre, and between the development and Leicester City.

The corresponding bus passenger flow change plots for the interpeak hour and PM Peak hour show a similar pattern of change, and can be found in Appendix F. It is worth noting that where the two networks differ between scenarios CUBE shows this as a decrease in bus passenger flow. This is relevant when looking at the network adjacent to the development.

Figure 4.11: 2026 AM Peak Hour Bus Passenger Flow Change Due to Option 1 Development



4.3 Option 3 Results

This section details the changes in model results with the introduction of Option 3 development compared to the core scenario. These results are for the Option 3 with no mitigation measures included.

4.3.1 Option 3 Change in Demand Matrices

Table 4.14 shows the change in 24-hour person demand for highway, public transport and active mode between the core scenario and the Option 3 development scenario in 2026. These demand totals are from the results of the demand model, and are not the reference demand totals. As with the Option 1 analysis, the zone representing the development falls outside the Market Harborough sector, and is therefore included in the Harborough District total.

Table 4.14: Change in 24-hour Person Demand in 2026 Option 3 Compared to Core Scenario

		Highway		Public Transport		Active		All Modes	
		Prod.	Attr.	Prod.	Attr.	Prod.	Attr.	Prod.	Attr.
Harborough District	Core	135,422	140,686	3,736	1,396	41,677	41,546	180,835	183,627
	Option 3	138,763	143,725	4,014	1,529	43,631	43,502	186,407	188,756
	Abs. Change	3,341	3,039	278	133	1,954	1,956	5,572	5,128
	%Change	2.5%	2.2%	7.4%	9.6%	4.7%	4.7%	3.1%	2.8%
Market Harborough	Core	27,183	36,912	1,608	690	15,954	16,004	44,745	53,606
	Option 3	26,994	37,935	1,589	720	16,841	16,895	45,424	55,550
	Abs. Change	-188	1,024	-19	29	886	890	679	1,943
	%Change	-0.7%	2.8%	-1.2%	4.2%	5.6%	5.6%	1.5%	3.6%
Development Zone	Core	186	470	3	2	52	52	241	524
	Option 3	4,081	1,619	232	99	1,190	1,190	5,504	2,909
	Abs. Change	3,895	1,149	230	97	1,139	1,139	5,263	2,384
	%Change	2,091%	244%	8,731%	3,932%	2,200%	2,200%	2,187%	455%

These demand totals show a similar pattern of change to that in Option 1, although the magnitude of the changes is greater in Option 3 compared with Option 1. This corresponds with the greater level of development assumed in Option 3 compared to Option 1. The growth in Option 1 is for 1,000 additional dwellings to the north-west of Market Harborough, compared with growth of 1,500 additional dwellings in Option 3.

In Option 3 we have an increase in highway productions in Harborough District of approximately 3,350 person trips from the core scenario, with an approximate increase of 3,000 person trips in terms of trip attractions. Again, there is a small increase in the number of public transport productions and attractions, and an increase of almost 2,000 productions and attractions for active mode demand.

Within Market Harborough this is a an increase in highway attractions of just over 1,000 trips, little change in terms of public transport, and increases of nearly 900 trips in terms of both productions and attractions for active mode demand.

Table 4.15 compares the mode share for the 24-hour person demand in the core scenario and in the Option 3 development scenario. These results are similar to those with Option 1 development whereby the development has little impact on Harborough District and Market Harborough mode share. As with Option 1 the development zone's public transport mode share is comparable to the average for Market Harborough when the development is introduced.

Table 4.15: Change in 24-hour Mode Share in 2026 Option 3 Compared to Core Scenario

		Highway	Public Transport	Active Mode
Harborough District	Core	74.9%	2.1%	23.0%
	Option 3	74.4%	2.2%	23.4%
Market Harborough	Core	60.8%	3.6%	35.7%
	Option 3	59.4%	3.5%	37.1%
Development Zone	Core	77.4%	1.1%	21.5%
	Option 3	74.1%	4.2%	21.6%

Table 4.16 and Table 4.17 show the period demand totals for Harborough District, Market Harborough and the development zone, for person demand at a production / attraction level and assignment demand at an origin / destination level respectively. The assignment demand is in units of PCUs for highway demand, and person demand for public transport and active mode matrices.

As with the results for Option 1 these demand totals are for the period, and not hour level.

Table 4.16: Person Demand by Period for 2026 Option 3

		Highway		Public Transport		Active		All Modes	
		Prod.	Attr.	Prod.	Attr.	Prod.	Attr.	Prod.	Attr.
Harborough District	OP	22,243	22,699	421	150	4,086	4,060	26,751	26,910
	AM	38,009	39,118	1,897	618	13,823	13,924	53,729	53,659
	IP	53,279	55,679	1,455	632	19,763	19,600	74,497	75,911
	PM	25,232	26,228	240	130	5,958	5,918	31,430	32,276
	24hr	138,763	143,725	4,014	1,529	43,631	43,502	186,407	188,756
Market Harborough	OP	4,070	4,964	205	87	1,626	1,637	5,900	6,688
	AM	7,451	9,794	683	289	5,426	5,452	13,560	15,536
	IP	10,564	16,193	579	273	7,525	7,538	18,668	24,005
	PM	4,910	6,984	122	70	2,263	2,267	7,295	9,321
	24hr	26,994	37,935	1,589	720	16,841	16,895	45,424	55,550
Development Zone	OP	584	251	24	11	110	110	718	373
	AM	1,206	508	131	31	367	367	1,704	906
	IP	1,607	555	71	43	554	554	2,231	1,152
	PM	685	305	7	13	159	159	850	477
	24hr	4,081	1,619	232	99	1,190	1,190	5,504	2,909

Table 4.17: Assignment Demand by Period for 2026 Option 3

		Highway		Public Transport		Active		All Modes	
		Origin	Dest.	Origin	Dest.	Origin	Dest.	Origin	Dest.
Harborough District	OP	32,479	32,931	579	530	16,535	16,644	49,594	50,106
	AM	38,546	39,644	1,335	625	37,639	37,553	77,520	77,821
	IP	70,397	67,588	1,849	2,172	12,832	12,870	85,077	82,630
	PM	46,584	42,162	600	1,255	7,821	7,838	55,006	51,255
	24hr	188,007	182,324	4,363	4,583	74,827	74,906	267,197	261,812
Market Harborough	OP	6,901	6,272	272	275	6,386	6,410	13,559	12,957
	AM	8,292	9,444	325	196	14,007	14,002	22,624	23,642
	IP	16,313	16,045	807	680	4,899	4,879	22,019	21,604
	PM	11,694	9,422	351	127	2,935	2,939	14,980	12,488
	24hr	43,201	41,183	1,755	1,279	28,226	28,230	73,183	70,691
Development Zone	OP	656	736	49	27	459	459	1,163	1,223
	AM	966	720	131	33	1,153	1,153	2,250	1,905
	IP	1,638	1,512	119	171	402	402	2,159	2,085
	PM	1,000	1,076	26	86	250	250	1,277	1,412
	24hr	4,260	4,044	325	317	2,264	2,264	6,850	6,625

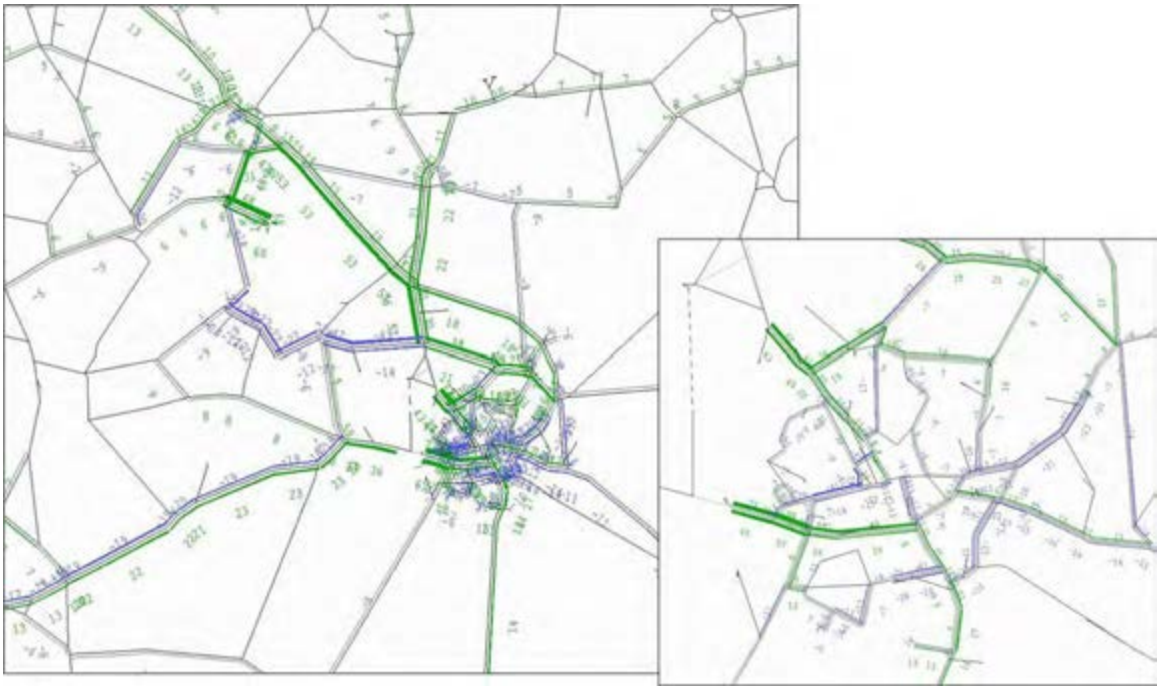
4.3.2 Option 3 Impact on Assignment Results

Highway Assignment

Figure 4.12 shows the changes in assigned volumes in the AM Peak hour between the core scenario and with Option 3 development. As with the Option 1 flow difference plots, the other time periods can be found in Appendix C.

As with the Option 1 development there is little change in volumes away from Market Harborough. On the A6 to the north of Market Harborough there is only a marginal change in flow north of Kibworth, and there is little change in flow to the south or east of the town. The change in assigned volumes on the A6 to the south of Kibworth is approximately 50 PCUs in the northbound direction and only 15 PCUs in the southbound direction.

Figure 4.12: 2026 AM Peak Hour Flow Change Due to Option 3 Development



The flow difference plots for the other time periods show a similar pattern to the changes in flows due to the development. The changes in the interpeak hour are generally smaller in magnitude, with the PM Peak hour showing more change in volumes to the south of Market Harborough on the A6.

One difference from the results of Option 1 is the change in flows due to the additional access point to the growth area. Option 3 development scenario contains an access point onto the A4304, and due to this there are increases in flow along this route, and along Welland Park Road, on the western side of Market Harborough.

Table 4.18, Table 4.19 and Table 4.20 show a selection of network statistics from the highway model for links within Harborough District and the subset within Market Harborough for the AM Peak, interpeak and PM Peak hours. These show that there is a slight increase in traffic across the district as a result of the Option 3 development, with increases of between 0.4% and 0.5% depending on the time period. In Market Harborough the increases are larger in magnitude, with increases in traffic of between 1.1% and 3.1% depending on the time period.

In terms of average speeds on the network, in the AM Peak hour the average speeds does not change as a result of the development across Market Harborough, and actually increase marginally in Market Harborough. In the interpeak and PM Peak hours there is a slight reduction in average speeds across the district, of between 0.2% and 0.3%, and reductions in average speeds of between 0.1% and 1.1% in Market Harborough.

Table 4.18: AM Peak Hour Option 3 and Core Scenario SATURN Network Statistics

	Harborough District			Market Harborough		
	2008	Core	Option 3	2008	Core	Option 3
Vehicle distance (veh-km)	**369,630**	**465,604**	**467,859**	**9,549**	**12,687**	**12,821**
		26.0%	0.5%		32.9%	1.1%
Vehicle delay time (veh-hours)	**1,377**	**2,144**	**2,150**	**74**	**113**	**112**
		55.7%	0.2%		51.4%	-0.1%
Vehicles queued end of hour (veh)	**688**	**1,136**	**1,124**	**27**	**39**	**39**
		65.0%	-1.1%		48.3%	-0.5%
Speed (km/hr)	**60**	**56**	**56**	**34**	**32**	**32**
		-6.5%	0.0%		-3.9%	0.3%

Table 4.19: Interpeak Hour Option 3 and Core Scenario SATURN Network Statistics

	Harborough District			Market Harborough		
	2008	Core	Option 3	2008	Core	Option 3
Vehicle distance (veh-km)	**270,765**	**346,986**	**348,683**	**6,311**	**8,843**	**9,119**
		28.2%	0.5%		40.1%	3.1%
Vehicle delay time (veh-hours)	**749**	**1,055**	**1,068**	**44**	**68**	**71**
		40.8%	1.3%		55.6%	3.4%
Vehicles queued end of hour (veh)	**324**	**403**	**407**	**16**	**25**	**26**
		24.3%	1.2%		63.0%	2.0%
Speed (km/hr)	**66**	**64**	**63**	**35**	**34**	**34**
		-3.9%	-0.3%		-2.7%	-0.1%

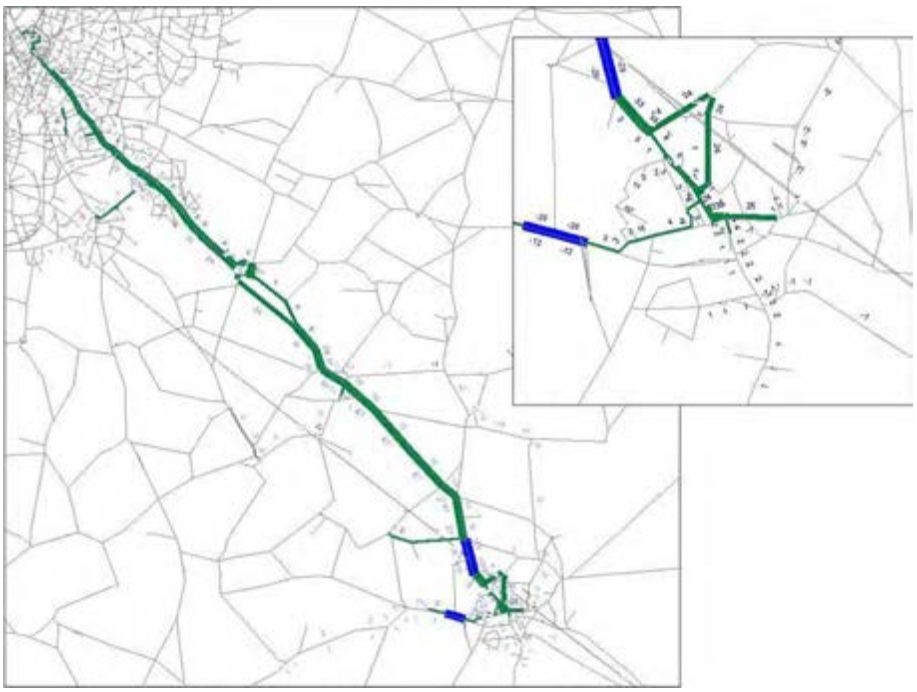
Table 4.20: PM Peak Hour Option 3 and Core Scenario SATURN Network Statistics

	Harborough District			Market Harborough		
	2008	Core	Option 3	2008	Core	Option 3
Vehicle distance (veh-km)	**405,930**	**507,909**	**509,863**	**10,044**	**13,917**	**14,335**
		25.1%	0.4%		38.6%	3.0%
Vehicle delay time (veh-hours)	**1,345**	**2,491**	**2,501**	**77**	**138**	**55**
		85.2%	0.4%		78.1%	0.0%
Vehicles queued end of hour (veh)	**564**	**1,329**	**1,329**	**28**	**55**	**58**
		135.6%	0.0%		95.7%	5.0%
Speed (km/hr)	**63**	**56**	**56**	**34**	**31**	**31**
		-10.5%	-0.2%		-7.1%	-1.1%

Public Transport Assignment

Figure 4.13 shows the change in bus passenger flows as a result of the introduction of Option 3 development in the AM Peak hour compared to the core scenario. These changes in bus flows are similar to those in Option 1, although the magnitude of the bus passenger flow increase in Option 3 is greater than in Option 1. As with Option 1, the corresponding plots for the interpeak hour and PM Peak hour can be found in Appendix F.

Figure 4.13: 2026 AM Peak Hour Bus Passenger Flow Change Due to Option 3 Development



4.4 Option 3a Results

This section outlines the impacts of the Option 3a development compared to the core scenario. No mitigation measures have been included in these model results.

4.4.1 Option 3a Change in Demand Matrices

Table 4.21 shows the change in 24-hour person demand from the core scenario to the Option 3a development option across Harborough District, within Market Harborough and for the development zone. These demand totals are from the demand model matrices, and are not the reference demand.

Table 4.21: Change in 24-hour Person Demand in 2026 Option 3a Compared to Core Scenario

		Highway		Public Transport		Active		All Modes	
		Prod.	Attr.	Prod.	Attr.	Prod.	Attr.	Prod.	Attr.
Harborough District	Core	135,422	140,686	3,736	1,396	41,677	41,546	180,835	183,627
	Option 3a	138,173	143,156	4,006	1,519	43,928	43,800	186,107	188,475
	Abs. Change	2,752	2,470	270	123	2,251	2,254	5,272	4,847
	%Change	2.0%	1.8%	7.2%	8.8%	5.4%	5.4%	2.9%	2.6%
Market Harborough	Core	27,183	36,912	1,608	690	15,954	16,004	44,745	53,606
	Option 3a	27,018	37,573	1,596	719	16,907	16,961	45,521	55,252
	Abs. Change	-165	661	-12	28	952	956	776	1,646
	%Change	-0.6%	1.8%	-0.7%	4.1%	6.0%	6.0%	1.7%	3.1%
Development Zone	Core	186	470	3	2	52	52	241	524
	Option 3a	3,338	1,136	227	87	1,363	1,363	4,929	2,587
	Abs. Change	3,152	666	225	85	1,312	1,312	4,688	2,063
	%Change	1,693%	142%	8,536%	3,458%	2,534%	2,534%	1,948%	393%

The increase in Harborough District productions and attractions is approximately 2,750 and 2,450 person trips respectively, or 2% and 1.8%. Conversely the change in active mode demand in Harborough District is greater in Option 3a compared to Option 3. The growth in Option 3a active mode demand is approximately 2,250 person trips for both productions and attractions, or 5.4%.

The number of additional dwellings in Option 3 and Option 3a is the same, but the way in which the development loads onto the network differs. In Option 3 the demand loads onto a priority junction along Harborough Road to the south, and a priority junction and roundabout on Leicester Road to the north. Using the highway coding methodology the capacities for priority junctions that only serve zones are relatively high, which leads to very little delay for these movements.

In Option 3a there is a new link road between Leicester Road and Harborough Road, with roundabouts at either end. The development loads onto this link road and experiences the delays at the two ends of this link. To the north the delays are broadly the same in the two models, but the delays at the access point onto Harborough Road are different in the two options. The priority junction in Option 3 produces very little delay, but when this is changed to a roundabout in Option 3a there are delays of between 15 and 20 seconds at this junction.

This difference in highway cost will affect the results of the land-use model, and will also impact on the results of the demand model. The higher costs will make the development less attractive in the land-use model, and the higher highway costs will make highway a less attractive mode compared to public transport and active mode in the demand model.

Table 4.22 shows the mode shares over 24-hours for the core scenario and for the Option 3a development scenario. As with Option 1 and Option 3 there is little change across the district or within Market Harborough, however there are differences in the results for the development zone.

This corresponds with the observations regarding additional highway delay for Option 3a development demand compared to Option 3 at the site access. This highway delay has made this mode less attractive, and so demand has shifted to public transport and active mode.

Table 4.22: Change in 24-hour Mode Share in 2026 Option 3a Compared to Core Scenario

		Highway	Public Transport	Active Mode
Harborough District	Core	74.9%	2.1%	23.0%
	Option 3a	74.2%	2.2%	23.6%
Market Harborough	Core	60.8%	3.6%	35.7%
	Option 3a	59.4%	3.5%	37.1%
Development Zone	Core	77.4%	1.1%	21.5%
	Option 3a	67.7%	4.6%	27.7%

Table 4.23 and Table 4.24 show the period demand totals for Harborough District, Market Harborough and the development zone, for person demand at a production / attraction level and assignment demand at an origin / destination level respectively. The assignment demand is in units of PCUs for highway demand, and person demand for public transport and active mode matrices.

As with the results for Option 1 and Option 3 these demand totals are for the period, and not hour level.

Table 4.23: Person Demand by Period for 2026 Option 3a

		Highway		Public Transport		Active		All Modes	
		Prod.	Attr.	Prod.	Attr.	Prod.	Attr.	Prod.	Attr.
Harborough District	OP	22,151	22,614	420	150	4,122	4,096	26,693	26,859
	AM	37,854	39,000	1,893	615	13,921	14,022	53,668	53,638
	IP	53,037	55,420	1,453	626	19,888	19,725	74,378	75,771
	PM	25,131	26,121	240	128	5,997	5,958	31,368	32,207
	24hr	138,173	143,156	4,006	1,519	43,928	43,800	186,107	188,475
Market Harborough	OP	4,070	4,919	205	87	1,632	1,643	5,907	6,650
	AM	7,469	9,727	688	288	5,455	5,481	13,611	15,497
	IP	10,565	16,002	581	272	7,549	7,562	18,695	23,836
	PM	4,914	6,925	123	70	2,270	2,274	7,307	9,270
	24hr	27,018	37,573	1,596	719	16,907	16,961	45,521	55,252
Development Zone	OP	474	175	24	11	135	135	633	321
	AM	993	379	129	28	415	415	1,537	822
	IP	1,317	375	68	37	630	630	2,016	1,043
	PM	554	207	6	11	183	183	743	401
	24hr	3,338	1,136	227	87	1,363	1,363	4,929	2,587

Table 4.24: Assignment Demand by Period for 2026 Option 3a

		Highway		Public Transport		Active		All Modes	
		Origin	Dest.	Origin	Dest.	Origin	Dest.	Origin	Dest.
Harborough District	OP	32,347	32,792	576	529	16,654	16,763	49,577	50,085
	AM	38,421	39,537	1,330	623	37,901	37,815	77,652	77,975
	IP	70,072	67,224	1,839	2,160	12,946	12,985	84,857	82,369
	PM	46,386	41,974	599	1,251	7,897	7,914	54,882	51,139
	24hr	187,226	181,528	4,345	4,562	75,398	75,477	266,969	261,567
Market Harborough	OP	6,865	6,249	273	275	6,422	6,446	13,560	12,971
	AM	8,288	9,429	329	196	14,075	14,070	22,693	23,695
	IP	16,212	15,911	807	683	4,924	4,904	21,943	21,498
	PM	11,635	9,384	352	129	2,952	2,957	14,939	12,470
	24hr	43,001	40,974	1,761	1,283	28,373	28,377	73,134	70,634
Development Zone	OP	515	576	46	26	517	517	1,077	1,119
	AM	804	560	129	30	1,299	1,299	2,232	1,888
	IP	1,300	1,179	109	161	476	476	1,886	1,817
	PM	790	865	25	82	300	300	1,115	1,247
	24hr	3,410	3,180	309	300	2,591	2,591	6,311	6,072

4.4.2 Option 3a Impact on Assignment Results

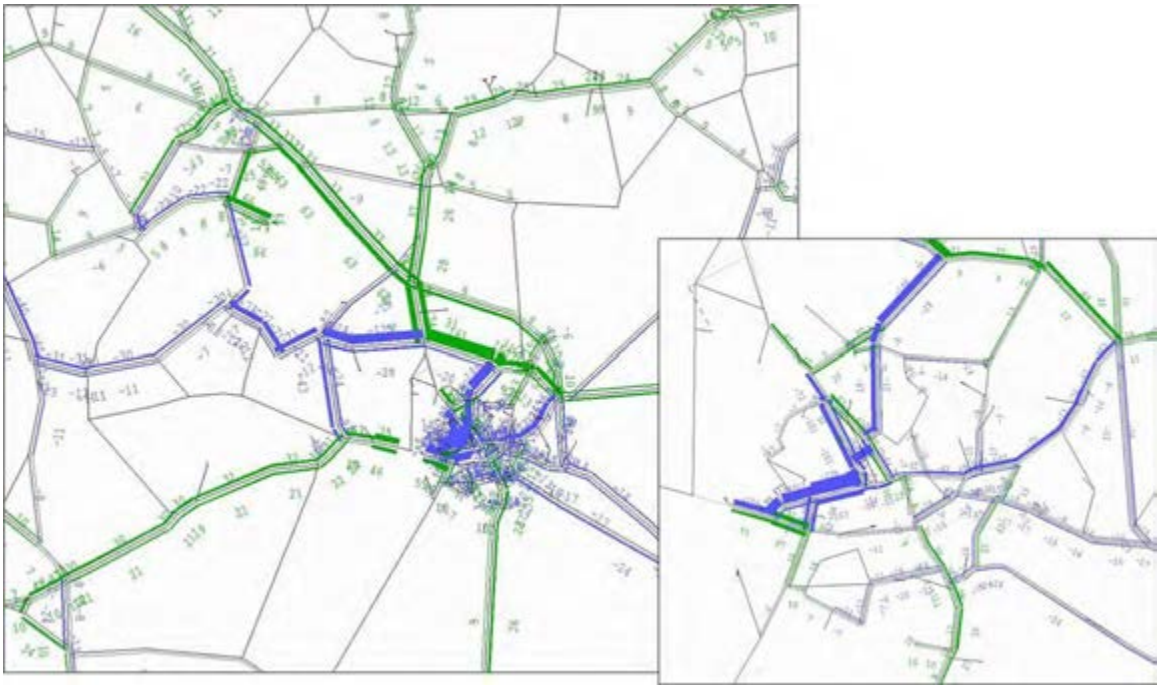
Highway Assignment

Option 3a shows a more significant level of flow change compared with Option 1 and Option 3. The flow changes away from Market Harborough are slightly larger in magnitude compared with Option 3, although some of these flow changes are relatively small.

The link road between Leicester Road and Harborough Road has provided an alternative route for some traffic in the model. This link road provides for between approximately 225 and 370 non-development PCUs northbound and between 90 and 205 PCUs southbound depending on the time period. The assignment suggests that this new route has attracted traffic away from Market Harborough town centre and from Gallow Field Road / Foxton Road to the north of Lubenham. It should be noted that there has been an increase in traffic through Great Bowden.

The corresponding plots for the other time periods show a similar pattern of flow changes from the core scenario.

Figure 4.14: 2026 AM Peak Hour Flow Change Due to Option 3a Development



This re-routing effect can be seen in the network statistics for this development option. Table 4.25, Table 4.26 and Table 4.27 show a selection of network statistics for the 2026 core scenario and Option 3a development option for the AM Peak hour, interpeak hour and PM Peak hour respectively.

These tables show that there is an increase in the traffic level across Harborough District as a whole, with increases of between 0.4% and 0.8% depending on the time period. However, as demand routes away from Market Harborough town centre via the new link road we see a reduction in traffic in the town. This reduction is between 2.3% and 4.7% depending on the time period.

In-line with this reduction in flow in Market Harborough we have an increase in average speeds compared to the core scenario. These increases in average speeds are 1.1% in the AM Peak hour, 0.4% in the interpeak hour and 0.7% in the PM Peak hour.

Table 4.25: AM Peak Hour Option 3a and Core Scenario SATURN Network Statistics

	Harborough District			Market Harborough		
	2008	Core	Option 3a	2008	Core	Option 3a
Vehicle distance (veh-km)	**369,630**	**465,604**	**469,107**	**9,549**	**12,687**	**12,085**
		26.0%	0.8%		32.9%	-4.7%
Vehicle delay time (veh-hours)	**1,377**	**2,144**	**2,152**	**74**	**113**	**103**
		55.7%	0.4%		51.4%	-8.2%
Vehicles queued end of hour (veh)	**688**	**1,136**	**1,125**	**27**	**39**	**37**
		65.0%	-0.9%		48.3%	-5.0%
Speed (km/hr)	**60**	**56**	**56**	**34**	**32**	**33**
		-6.5%	0.1%		-3.9%	1.1%

Table 4.26: Interpeak Hour Option 3a and Core Scenario SATURN Network Statistics

	Harborough District			Market Harborough		
	2008	Core	Option 3a	2008	Core	Option 3a
Vehicle distance (veh-km)	**270,765**	**346,986**	**348,963**	**6,311**	**8,843**	**8,640**
		28.2%	0.6%		40.1%	-2.3%
Vehicle delay time (veh-hours)	**749**	**1,055**	**1,063**	**44**	**68**	**65**
		40.8%	0.8%		55.6%	-4.1%
Vehicles queued end of hour (veh)	**324**	**403**	**402**	**16**	**25**	**24**
		24.3%	-0.1%		63.0%	-5.5%
Speed (km/hr)	**66**	**64**	**63**	**35**	**34**	**34**
		-3.9%	-0.2%		-2.7%	0.4%

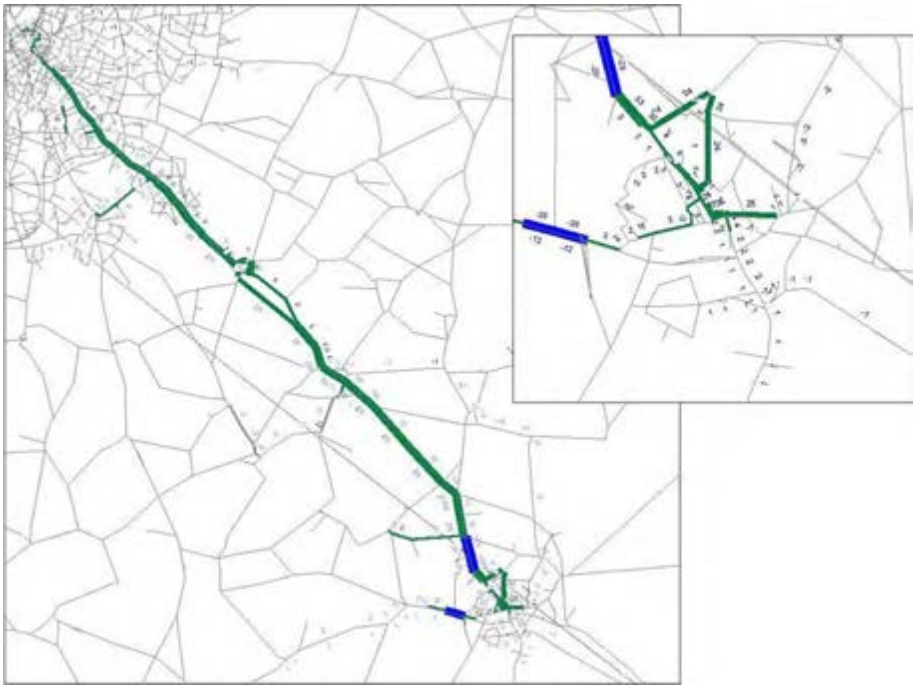
Table 4.27: PM Peak Hour Option 3a and Core Scenario SATURN Network Statistics

	Harborough District			Market Harborough		
	2008	Core	Option 3a	2008	Core	Option 3a
Vehicle distance (veh-km)	**405,930**	**507,909**	**510,018**	**10,044**	**13,917**	**13,341**
		25.1%	0.4%		38.6%	-4.1%
Vehicle delay time (veh-hours)	**1,345**	**2,491**	**2,562**	**77**	**138**	**55**
		85.2%	2.9%		78.1%	0.0%
Vehicles queued end of hour (veh)	**564**	**1,329**	**1,377**	**28**	**55**	**52**
		135.6%	3.6%		95.7%	-6.0%
Speed (km/hr)	**63**	**56**	**56**	**34**	**31**	**32**
		-10.5%	-0.7%		-7.1%	0.7%

Public Transport Assignment

Figure 4.15 shows the change in bus passenger flows between the core scenario and the Option 3a development. The pattern of bus flow change is similar to that when comparing Option 3 with the core scenario. As with the results of the other development options, the plots for the interpeak and PM Peak hour can be found in Appendix F.

Figure 4.15: 2026 AM Peak Hour Bus Passenger Flow Change Due to Option 3a Development



4.5 Summary of Development Results

This section summarises some of the results given in detail for the development options in the preceding sections. The aim of these summaries is to be able to compare results from the different development options against one another.

4.5.1 Demand Changes

Table 4.28 shows the change in 24-hour person demand for Harborough District, Market Harborough and the zone representing the development for the core scenario and the three development options. For each development option the absolute and percentage differences are given against the core scenario.

As noted previously, Option 3 and Option 3a development create a larger increase in person demand than in Option 1, in-line with the planning assumptions for each option. Option 3a produces slightly less demand than Option 3 due to the different network assumptions in the two scenarios. The additional highway delay in Option 3a impacts on the results of both the land-use and demand models, resulting in this lower level of trips.

Similarly, Table 4.29 shows the 24-hour person mode share for the core scenario and the three development options for Harborough District, market Harborough and for the development zone. This table shows that the mode share results are similar for the three development options, with the exception of Option 3a. Option 3a, due to the higher highway costs in comparison to the other development options results in a lower highway mode share for the development zone, countered by a higher proportion of active mode demand.

Table 4.28: Change in 24-hour Person Demand in 2026 Due to Development Options

		Highway		Public Transport		Active		All Modes	
		Prod.	Attr.	Prod.	Attr.	Prod.	Attr.	Prod.	Attr.
Harborough District	Core	135,422	140,686	3,736	1,396	41,677	41,546	180,835	183,627
	Option 1	137,811	143,242	3,921	1,483	43,371	43,242	185,104	187,967
	Abs. Change	2,390	2,557	185	87	1,694	1,696	4,269	4,340
	%Change	1.8%	1.8%	5.0%	6.3%	4.1%	4.1%	2.4%	2.4%
	Option 3	138,763	143,725	4,014	1,529	43,631	43,502	186,407	188,756
	Abs. Change	3,341	3,039	278	133	1,954	1,956	5,572	5,128
	%Change	2.5%	2.2%	7.4%	9.6%	4.7%	4.7%	3.1%	2.8%
	Option 3a	138,173	143,156	4,006	1,519	43,928	43,800	186,107	188,475
	Abs. Change	2,752	2,470	270	123	2,251	2,254	5,272	4,847
	%Change	2.0%	1.8%	7.2%	8.8%	5.4%	5.4%	2.9%	2.6%
Market Harborough	Core	27,183	36,912	1,608	690	15,954	16,004	44,745	53,606
	Option 1	27,165	37,805	1,606	707	16,866	16,919	45,636	55,432
	Abs. Change	-18	894	-2	17	912	915	891	1,825
	%Change	-0.1%	2.4%	-0.1%	2.4%	5.7%	5.7%	2.0%	3.4%
	Option 3	26,994	37,935	1,589	720	16,841	16,895	45,424	55,550
	Abs. Change	-188	1,024	-19	29	886	890	679	1,943
	%Change	-0.7%	2.8%	-1.2%	4.2%	5.6%	5.6%	1.5%	3.6%
	Option 3a	27,018	37,573	1,596	719	16,907	16,961	45,521	55,252
	Abs. Change	-165	661	-12	28	952	956	776	1,646
	%Change	-0.6%	1.8%	-0.7%	4.1%	6.0%	6.0%	1.7%	3.1%
Development Zone	Core	186	470	3	2	52	52	241	524
	Option 1	2,832	1,518	148	69	880	880	3,860	2,467
	Abs. Change	2,646	1,048	146	66	828	828	3,620	1,942
	%Change	1,421%	223%	5,533%	2,699%	1,600%	1,600%	1,504%	370%
	Option 3	4,081	1,619	232	99	1,190	1,190	5,504	2,909
	Abs. Change	3,895	1,149	230	97	1,139	1,139	5,263	2,384
	%Change	2,091%	244%	8,731%	3,932%	2,200%	2,200%	2,187%	455%
	Option 3a	3,338	1,136	227	87	1,363	1,363	4,929	2,587
	Abs. Change	3,152	666	225	85	1,312	1,312	4,688	2,063
	%Change	1,693%	142%	8,536%	3,458%	2,534%	2,534%	1,948%	393%

Table 4.29: Change in 24-hour Mode Share in 2026 Due to Development Options

		Highway	Public Transport	Active Mode
Harborough District	Core	74.9%	2.1%	23.0%
	Option 1	74.5%	2.1%	23.4%
	Option 3	74.4%	2.2%	23.4%
	Option 3a	74.2%	2.2%	23.6%
Market Harborough	Core	60.8%	3.6%	35.7%
	Option 1	59.5%	3.5%	37.0%
	Option 3	59.4%	3.5%	37.1%
	Option 3a	59.4%	3.5%	37.1%
Development Zone	Core	77.4%	1.1%	21.5%
	Option 1	73.4%	3.8%	22.8%
	Option 3	74.1%	4.2%	21.6%
	Option 3a	67.7%	4.6%	27.7%

4.5.2 Highway Assignment Changes

Table 4.30, Table 4.31 and Table 4.32 give the highway network statistics for the AM Peak hour, interpeak hour and PM Peak hour for the 2008 base year assignment, the 2026 core scenario and the three development options in 2026. These statistics are given for links within Harborough District and the subset of links within Market Harborough. The percentage changes given in these tables show the change from the base year to the core scenario, and then the changes from the core scenario to each of the three development options.

These tables show there is little difference in the effect on these network statistics in the three development options across Harborough District as a whole. Traffic increases by between 0.3% and 0.8% depending on the development options and the time period.

Within Market Harborough, Option 1 and Option 3 show broadly similar results of increases in traffic and general reductions in average speeds. The impact of Option 1 appears to be greater than that in Option 3, probably attributable to the extra access point to the development in Option 3. This extra access point spreads the loading of demand on the network, and therefore reduces the impact on average speeds within Market Harborough.

Option 3a sees a reduction in traffic within Market Harborough as the link road through the development provides relief to the town centre. Traffic reduces by between 2.3% and 4.7% in the three time periods, with average speeds increasing by between 0.4% and 1.1%.

Table 4.30: AM Peak Hour SATURN Network Statistics for Base Year and 2026 Core and Development Scenarios

	Harborough District					Market Harborough				
	2008	Core	Option 1	Option 3	Option 3a	2008	Core	Option 1	Option 3	Option 3a
Vehicle distance (veh-km)	**369,630**	**465,604**	**467,714**	**467,859**	**469,107**	**9,549**	**12,687**	**12,855**	**12,821**	**12,085**
		26.0%	0.5%	0.5%	0.8%		32.9%	1.3%	1.1%	-4.7%
Vehicle delay time (veh-hours)	**1,377**	**2,144**	**2,135**	**2,150**	**2,152**	**74**	**113**	**115**	**112**	**103**
		55.7%	-0.5%	0.2%	0.4%		51.4%	2.2%	-0.1%	-8.2%
Vehicles queued end of hour (veh)	**688**	**1,136**	**1,118**	**1,124**	**1,125**	**27**	**39**	**40**	**39**	**37**
		65.0%	-1.6%	-1.1%	-0.9%		48.3%	0.7%	-0.5%	-5.0%
Speed (km/hr)	**60**	**56**	**56**	**56**	**56**	**34**	**32**	**32**	**32**	**33**
		-6.5%	0.2%	0.0%	0.1%		-3.9%	-0.3%	0.3%	1.1%

Table 4.31: Interpeak Hour SATURN Network Statistics for Base Year and 2026 Core and Development Scenarios

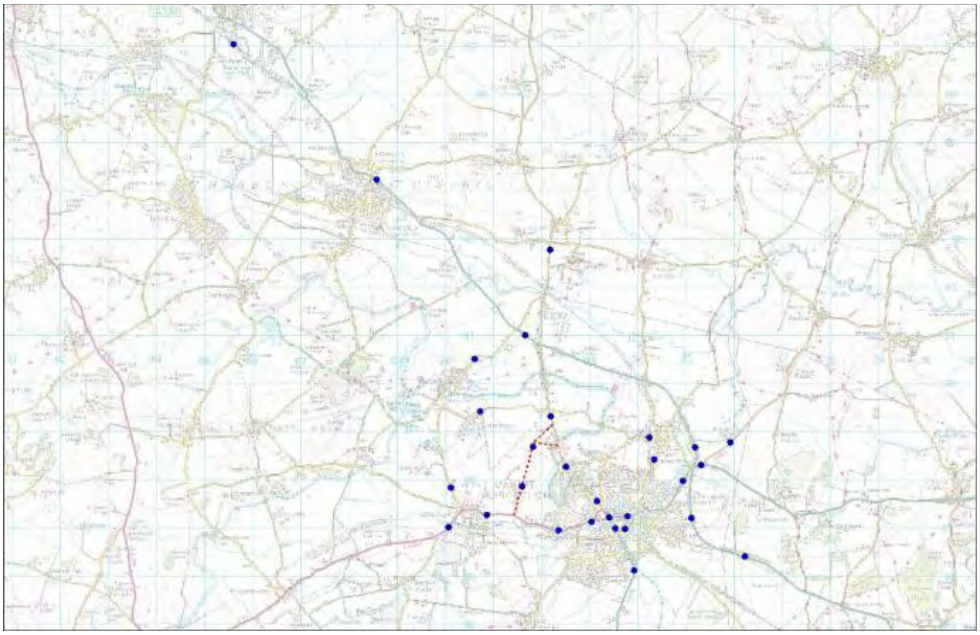
	Harborough District					Market Harborough				
	2008	Core	Option 1	Option 3	Option 3a	2008	Core	Option 1	Option 3	Option 3a
Vehicle distance (veh-km)	**270,765**	**346,986**	**348,079**	**348,683**	**348,963**	**6,311**	**8,843**	**9,150**	**9,119**	**8,640**
		28.2%	0.3%	0.5%	0.6%		40.1%	3.5%	3.1%	-2.3%
Vehicle delay time (veh-hours)	**749**	**1,055**	**1,062**	**1,068**	**1,063**	**44**	**68**	**72**	**71**	**65**
		40.8%	0.7%	1.3%	0.8%		55.6%	4.9%	3.4%	-4.1%
Vehicles queued end of hour (veh)	**324**	**403**	**405**	**407**	**402**	**16**	**25**	**27**	**26**	**24**
		24.3%	0.4%	1.2%	-0.1%		63.0%	4.1%	2.0%	-5.5%
Speed (km/hr)	**66**	**64**	**63**	**63**	**63**	**35**	**34**	**34**	**34**	**34**
		-3.9%	-0.2%	-0.3%	-0.2%		-2.7%	-0.3%	-0.1%	0.4%

Table 4.32: PM Peak Hour SATURN Network Statistics for Base Year and 2026 Core and Development Scenarios

	Harborough District					Market Harborough				
	2008	**Core**	**Option 1**	**Option 3**	**Option 3a**	**2008**	**Core**	**Option 1**	**Option 3**	**Option 3a**
Vehicle distance (veh-km)	**405,930**	**507,909**	**510,029**	**509,863**	**510,018**	**10,044**	**13,917**	**14,462**	**14,335**	**13,341**
		25.1%	0.4%	0.4%	0.4%		38.6%	3.9%	3.0%	-4.1%
Vehicle delay time (veh-hours)	**1,345**	**2,491**	**2,643**	**2,501**	**2,562**	**77**	**138**	**55**	**55**	**55**
		85.2%	6.1%	0.4%	2.9%		78.1%	0.0%	0.0%	0.0%
Vehicles queued end of hour (veh)	**564**	**1,329**	**1,449**	**1,329**	**1,377**	**28**	**55**	**60**	**58**	**52**
		135.6%	9.0%	0.0%	3.6%		95.7%	8.6%	5.0%	-6.0%
Speed (km/hr)	**63**	**56**	**55**	**56**	**56**	**34**	**31**	**31**	**31**	**32**
		-10.5%	-1.6%	-0.2%	-0.7%		-7.1%	-2.2%	-1.1%	0.7%

In addition the this analysis, flows on selected links in the highway network in the AM Peak hour, interpeak hour and PM Peak hour respectively have been included in Appendix I. These flows are in units of total PCUs on each link, and Figure 4.16 shows the location of the links selected for this analysis.

Figure 4.16: Location of Selected Links for Flow Analysis



Another indicator of the impact of the three development options are journey times in and around Market Harborough. These have been extracted for a selection of routes, shown in Figure 4.17, and Table 4.33, Table 4.34 and Table 4.35 show the times along these routes in the AM Peak hour, interpeak hour and PM Peak hour respectively. This information has been extracted for the 2008 base year model, the 2026 core scenario and the three development options, with differences shown between the base year and the core scenario, and from the core scenario to each of the development options.

Figure 4.17: Location of Journey Time Analysis Routes

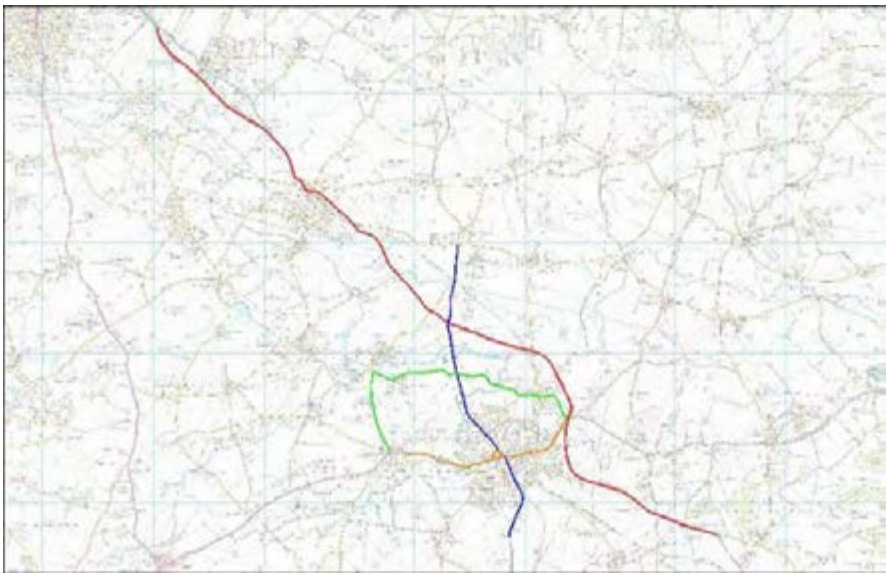


Table 4.33: AM Peak Hour Journey Times for Base Year and 2026 Core and Development Scenarios

	2008	Core	Option 1	Option 3	Option 3a
B6047 / A508 Northbound	09:41	10:03	10:11	10:08	10:06
		00:22	00:08	00:05	00:03
B6047 / A508 Southbound	10:06	10:56	11:09	11:02	10:54
		00:50	00:13	00:06	-00:02
A4304 Eastbound	08:41	09:24	09:29	09:26	09:25
		00:43	00:05	00:02	00:01
A4304 Westbound	07:36	07:47	07:47	07:50	08:00
		00:11	00:00	00:03	00:13
Lubenham to A6 via Great Bowden Eastbound	08:30	10:01	10:23	10:24	11:17
		01:31	00:22	00:23	01:16
Lubenham to A6 via Great Bowden Westbound	08:04	08:30	08:38	08:39	08:55
		00:26	00:08	00:09	00:25
A6 Northbound	17:50	18:55	19:02	19:04	19:05
		01:05	00:07	00:09	00:10
A6 Southbound	18:03	19:48	19:50	19:48	19:55
		01:45	00:02	00:00	00:07

Table 4.34: Interpeak Hour Journey Times for Base Year and 2026 Core and Development Scenarios

	2008	Core	Option 1	Option 3	Option 3a
B6047 / A508 Northbound	09:29	09:42	09:48	09:47	09:47
		00:13	00:06	00:05	00:05
B6047 / A508 Southbound	09:35	09:49	09:57	09:57	09:54
		00:14	00:08	00:08	00:05
A4304 Eastbound	08:11	08:20	08:25	08:25	08:38
		00:09	00:05	00:05	00:18
A4304 Westbound	07:25	07:50	07:51	07:51	07:58
		00:25	00:01	00:01	00:08
Lubenham to A6 via Great Bowden Eastbound	08:14	08:30	08:34	08:35	08:34
		00:16	00:04	00:05	00:04
Lubenham to A6 via Great Bowden Westbound	07:56	08:03	08:05	08:05	08:09
		00:07	00:02	00:02	00:06
A6 Northbound	17:04	17:51	17:53	17:54	17:56
		00:47	00:02	00:03	00:05
A6 Southbound	16:37	17:09	17:10	17:10	17:11
		00:32	00:01	00:01	00:02

Table 4.35: PM Peak Hour Journey Times for Base Year and 2026 Core and Development Scenarios

	2008	Core	Option 1	Option 3	Option 3a
B6047 / A508 Northbound	09:44	10:24	10:46	10:39	10:34
		00:40	00:22	00:15	00:10
B6047 / A508 Southbound	09:51	10:19	10:33	10:28	10:23
		00:28	00:14	00:09	00:04
A4304 Eastbound	08:34	09:44	10:02	09:55	09:37
		01:10	00:18	00:11	-00:07
A4304 Westbound	07:48	08:26	08:28	08:31	08:28
		00:38	00:02	00:05	00:02
Lubenham to A6 via Great Bowden Eastbound	08:26	10:12	10:36	10:31	11:08
		01:46	00:24	00:19	00:56
Lubenham to A6 via Great Bowden Westbound	08:01	08:37	08:48	08:48	09:01
		00:36	00:11	00:11	00:24
A6 Northbound	18:30	19:56	20:05	20:01	20:01
		01:26	00:09	00:05	00:05
A6 Southbound	17:08	18:31	18:25	18:28	18:42
		01:23	-00:06	-00:03	00:11

4.5.3 Change in Emissions

Using EASE, the reporting tool contained within LLITM, it is possible to calculate the emissions in a given scenario using the DfT's emissions spreadsheet. This outputs the amount of hydrocarbons, NOx (mono-nitrogen oxides NO and NO_2,) PM10, PM2.5 and carbon emitted on a link basis. This allows the emissions on subsets of the network to be calculated and compared by scenario.

Table 4.36 shows the emissions for the aforementioned pollutants in the base year, the 2026 core scenario and with the three development options for links within Market Harborough. Percentage changes are given from the base year to the 2026 core scenario, and then between the core scenario and the three development options.

Table 4.36: Emissions on Links within Market Harborough

	2008	Core	Option 1	Option 3	Option 3a
Hydrocarbons (g/km/day)	**121,261**	**50,455**	**51,935**	**51,239**	**48,348**
		-58.4%	2.9%	1.6%	-4.2%
NOx (g/km/day)	**334,798**	**73,864**	**75,616**	**74,783**	**70,273**
		-77.9%	2.4%	1.2%	-4.9%
PM10 (g/km/day)	**25,142**	**22,766**	**23,368**	**23,085**	**21,743**
		-9.5%	2.6%	1.4%	-4.5%
PM2.5 (g/km/day)	**17,331**	**12,628**	**12,964**	**12,806**	**12,064**
		-27.1%	2.7%	1.4%	-4.5%
Carbon (tonnes/year)	**1,987**	**2,171**	**2,231**	**2,219**	**2,068**
		9.3%	2.8%	2.2%	-4.8%
Carbon (£/year)	**165,286**	**257,905**	**265,043**	**263,594**	**245,646**
		56.0%	2.8%	2.2%	-4.8%

Considering the change between the base year and the 2026 core scenario, there is a forecast fall in all emissions except carbon in Market Harborough. In addition to the forecast traffic growth these forecasts reflect assumptions relating to vehicle emissions which are based on government guidance.

Forecasts for Option 1 are for increases in all pollutants by around 2.5% to 3% from the core scenario within Market Harborough. Option 3 development also increases pollutants within Market Harborough, but not by the same magnitude. These increases with Option 3 development are generally between 1.5% and 2% from the core scenario.

This lower level of increase in emissions in Option 3 may be as a result of the additional access points to the development in this scenario. Option 3 has a higher growth in households, and demand, compared with Option 1, but this additional demand is spread across both Harborough Road and the A4304. This spreading of demand means that the additional traffic does not have as great an impact on the network performance, as demonstrated by the highway network statistics in Table 4.30, Table 4.31 and Table 4.32, and therefore a creates a lower increase in emissions.

In Option 3a the level of emissions within Market Harborough reduces from the core scenario as traffic re-routes away from the town centre, around Market Harborough. All emissions, including carbon, fall by between approximately 4% and 5% with the introduction of Option 3a development.

One of the key drivers in the change in emissions are changes in assigned highway flows, so the pattern of emission changes as a result of introducing the development options are similar to those for the corresponding highway flow changes.

Figure 4.18 shows the change in hydrocarbons from the core scenario when Option 1 development is introduced. Links highlighted in red show where emissions, in this case hydrocarbons, have increased, and green links show where emissions have decreased. This shows that there is an increase in hydrocarbons on Leicester Road adjacent to the development, and little change elsewhere.

Figure 4.19 shows the change in NOx from the core scenario when Option 3 development is added. This again shows an increase in emissions on Leicester Road, but also an increase on Lubenham Hill and Welland Park Road on the western side of Market Harborough.

The change in PM10 emissions from the core scenario with the introduction of Option 3a development is shown in Figure 4.20. The new link road provides an alternative route for east-west traffic across Market Harborough, and therefore has reduced PM10 emissions in the town centre, with increases through Great Bowden and on the A4304 near Lubenham.

Figure 4.18: Change in Hydrocarbons (g/km/day) from Core Scenario to Option 1 Development

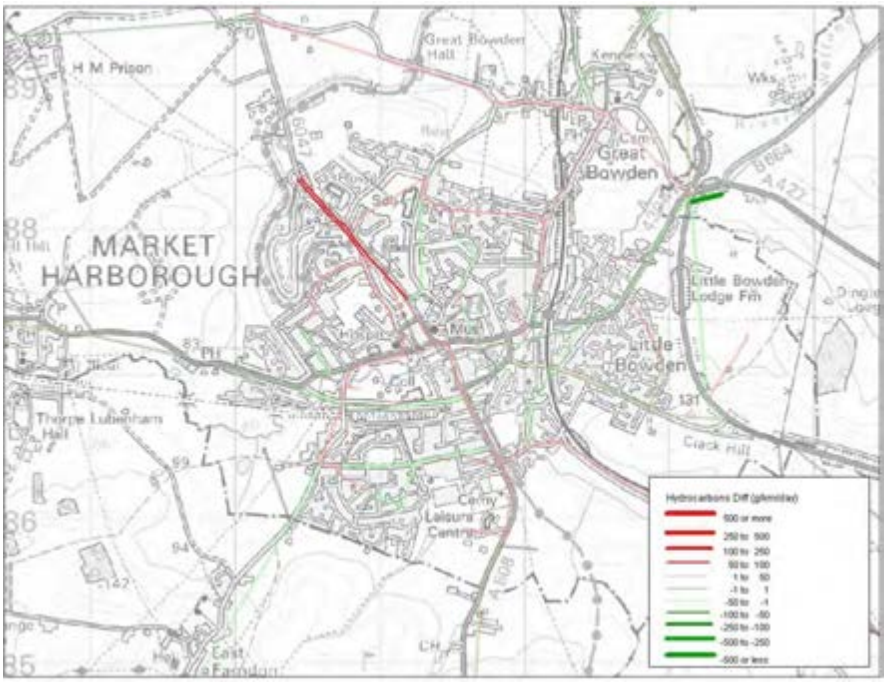


Figure 4.19: Change in NOx (g/km/day) from Core Scenario to Option 3 Development

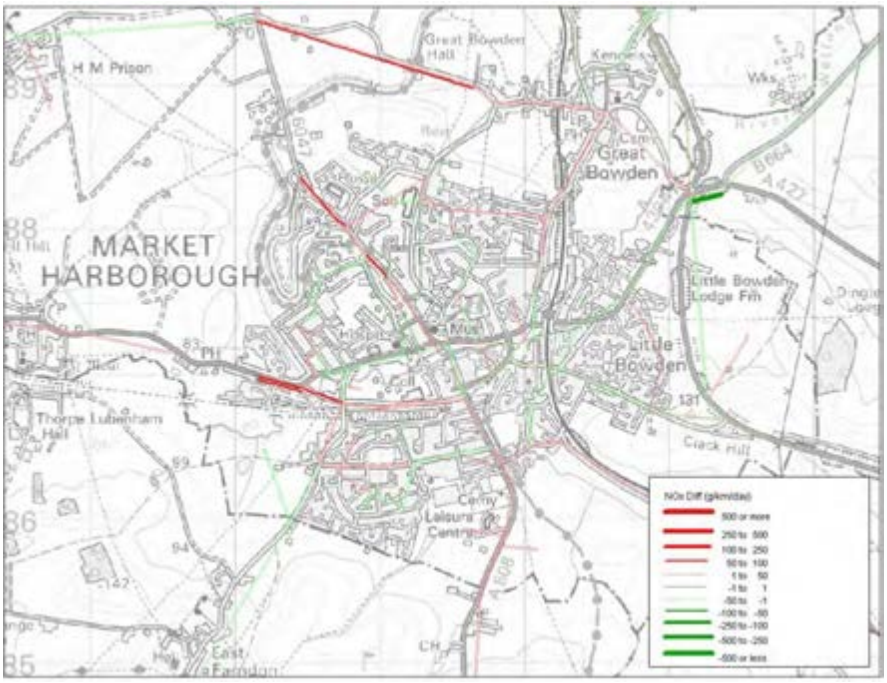
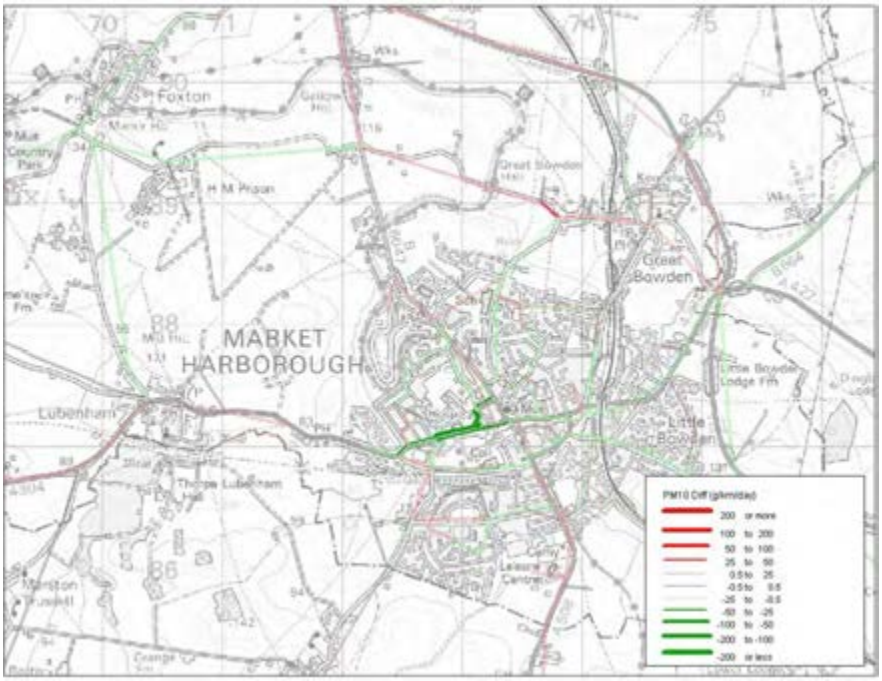


Figure 4.20: Change in PM10 (g/km/day) from Core Scenario to Option 3a Development



Section 5 – Mitigation Results

5.1 Mitigation 1 Model Results

Mitigation 1 measures include the following interventions to the development scenarios:

- an increase in the frequency of bus route 44, serving the development, to a half-hourly service;
- improvements in the cycling network;
- improvements in the walking network; and
- additional Market Harborough Smarter Choices initiatives.

The increase in bus service frequency has been coded directly into the public transport and highway networks, with the improvements to the walking and cycling networks being represented by 2% increases in active mode speeds within Market Harborough.

The additional Smarter Choices measures as part of this level of mitigation requires the calibration of alternative specific constants (ASCs) to replicate the targeted levels of car driver reductions. The level of funding for the Smarter Choices measures has been assumed to be of a similar level, pro rata, to that assumed in the core scenario for Leicester City. This means that the target changes due to Smarter Choices are as follows:

- a 5% reduction in car commuting vehicles to Market Harborough, including a 1.5% reduction in car passengers, due to workplace travel plans;
- a 3% reduction in car education vehicles to Market Harborough, including a 0.9% reduction in car passengers, due to school travel plans; and
- a 0.4% reduction in total car drivers from Market Harborough as a result of targeted marketing.

The derivation of these targets can be found in Appendix A.

The process of calibrating these effects is to run with the „hard' measures only, namely the increased bus service provision and the improvements to the walking and cycling networks, and calculate the effect of these measures. The ASCs are then calibrated to achieve the remainder of the effects benchmarked for Smarter Choices at the end of the first iteration of the demand model.

The results of the calibration of Smarter Choices are the very similar for all development options, and these focus on the effects of workplace and school travel planning. The effect of the targeted marketing is relatively small compared to the travel plans, and experience has shown that this effect is generally exceeded with the introduction of the travel plans. The results of the calibration are a follows:

- a 5.1% reduction in car commuting vehicles to Market Harborough in all development scenarios, compared with a target of a 5% reduction
- a reduction in car education vehicles by between 3.5% and 3.7% to Market Harborough in the three development options, compared to a target of a 3% reduction

The calibration for the workplace travel plan is very close to the target, but the effect of the school travel plan is overestimated in the model. Given the changes in highway flows as a result of these mitigation measures, discussed in Sections 5.1.1 to 5.1.3, it was not felt that this overestimate was material to the results.

The following sections compare the results of the models with Mitigation 1 interventions against the corresponding results of the development scenarios.

5.1.1 Option 1 Mitigation 1 Results

Demand Changes

Table 5.1 shows the changes in the 24-hour person demand by mode between the development option without any mitigation measures, and with Mitigation 1 measures. The results for the core scenario, without development or mitigation, have been included for comparison. These demand totals are from the results of the demand model, and are for productions and attractions for Harborough district, the subset of cells within Market Harborough, and the zone representing the additional growth.

These demand totals show that there is a reduction in car person demand over 24-hours in Mitigation 1 of around 400 trips for both productions and attractions, for both Harborough District and Market Harborough. These numbers suggest that the main shift in mode has occurred between highway and active mode, rather than to public transport. The demand totals for public transport show little change between the two scenarios.

In terms of the development zone, there is little change in 24-hour person demand as a result of these mitigation measures. These measures reduce the 24-hour car person demand by 5 trips in comparison to the development option without any mitigation.

Table 5.1: Change in 24-hour Person Demand in 2026 Option 1 Due to Mitigation 1 Measures

		Highway		Public Transport		Active		All Modes	
		Prod.	Attr.	Prod.	Attr.	Prod.	Attr.	Prod.	Attr.
Harborough District	Core	135,422	140,686	3,736	1,396	41,677	41,546	180,835	183,627
	Option 1	137,811	143,242	3,921	1,483	43,371	43,242	185,104	187,967
	Abs. Change	2,390	2,557	185	87	1,694	1,696	4,269	4,340
	%Change	1.8%	1.8%	5.0%	6.3%	4.1%	4.1%	2.4%	2.4%
	Mitigation 1	137,391	142,836	3,922	1,525	43,790	43,668	185,104	188,029
	Abs. Change	-420	-407	1	42	419	426	0	62
	%Change	-0.3%	-0.3%	0.0%	2.8%	1.0%	1.0%	0.0%	0.0%
Market Harborough	Core	27,183	36,912	1,608	690	15,954	16,004	44,745	53,606
	Option 1	27,165	37,805	1,606	707	16,866	16,919	45,636	55,432
	Abs. Change	-18	894	-2	17	912	915	891	1,825
	%Change	-0.1%	2.4%	-0.1%	2.4%	5.7%	5.7%	2.0%	3.4%
	Mitigation 1	26,763	37,412	1,590	744	17,283	17,344	45,636	55,500
	Abs. Change	-402	-393	-15	37	417	425	0	68
	%Change	-1.5%	-1.0%	-1.0%	5.2%	2.5%	2.5%	0.0%	0.1%
Development Zone	Core	186	470	3	2	52	52	241	524
	Option 1	2,832	1,518	148	69	880	880	3,860	2,467
	Abs. Change	2,646	1,048	146	66	828	828	3,620	1,942
	%Change	1,421%	223%	5,533%	2,699%	1,600%	1,600%	1,504%	370%
	Mitigation 1	2,827	1,513	149	70	884	884	3,860	2,467
	Abs. Change	-5	-5	1	1	4	4	0	0
	%Change	-0.2%	-0.3%	0.7%	1.2%	0.5%	0.5%	0.0%	0.0%

Table 5.2 shows the change in 24-hour mode share with the introduction of Mitigation 1 measures with Option 1 development. This shows that there is little change to either the Harborough District or the development zone's mode share as a result of Mitigation 1. Within Market Harborough there is an increase in active mode share, by almost 1%, with a corresponding decrease in highway demand. This corresponds with the 24-hour person demand totals given above.

Table 5.2: Change in 24-hour Mode Share in 2026 Option 1 Due to Mitigation 1

		Highway	Public Transport	Active Mode
Harborough District	Option 1	74.5%	2.1%	23.4%
	Mitigation 1	74.2%	2.1%	23.7%
Market Harborough	Option 1	59.5%	3.5%	37.0%
	Mitigation 1	58.6%	3.5%	37.9%
Development Zone	Option 1	73.4%	3.8%	22.8%
	Mitigation 1	73.2%	3.9%	22.9%

Highway Assignment

Figure 5.1 shows the changes in assigned highway flows in the PM Peak hour between the development scenario and Mitigation 1 in and around Market Harborough. This shows that there is a general reduction in traffic within Market Harborough as a result of these measures, although the reductions in assigned volumes are small in magnitude. Most links see a flow redetection of around 5 PCUs as a result of Mitigation 1 measures.

The corresponding plots for the AM Peak hour and interpeak hour can be found in Appendix D. These show a similar pattern of flow reductions with more flow differences around Market Harborough in the AM Peak hour, and less flow changes in the interpeak hour as a result of Mitigation 1 measures.

Figure 5.1: 2026 PM Peak Hour Flow Change in Option 1 Due to Mitigation 1

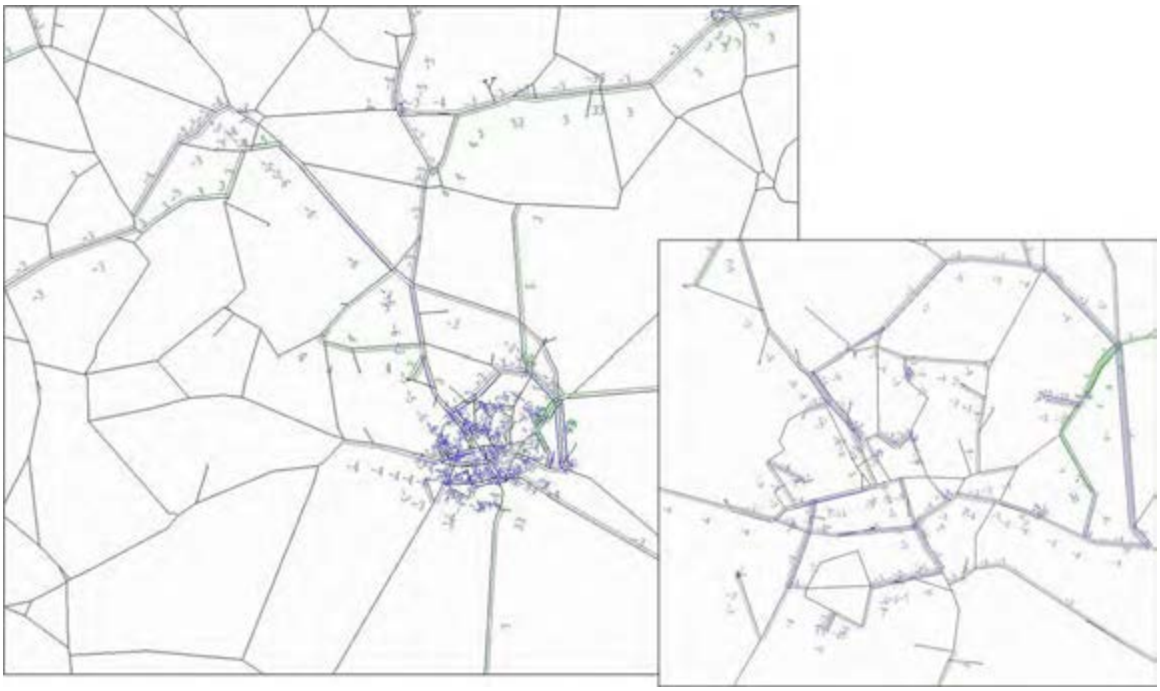


Table 5.3, Table 5.4 and Table 5.5 gives a selection of network statistics from the highway model for both links within Harborough District and the subset of links within Market Harborough for the AM Peak

hour, interpeak hour and the PM Peak hour respectively. These statistics are given for the 2026 core models, the development option and the Mitigation 1 results, and show the change between the core and the development option, and between the development option and the mitigation measures.

These show that there is generally a small decrease in traffic as a result of Mitigation 1 measures, both across Harborough District and within Market Harborough. Traffic levels reduce by between 0.7% and 0.9% in Market Harborough, and between 0.1% and 0.4% across Harborough District. The exception is in the interpeak hour where traffic increases marginally by 0.1% as a result of Mitigation 1.

Coupled with these general decreases in traffic, there are small increases in average speeds across the network. Within Market Harborough the average speeds increase by between 0.1% and 0.2% depending on the time period, and by between 0% and 0.8% across Harborough District.

Table 5.3: AM Peak Hour Option 1 and Mitigation 1 SATURN Network Statistics

	Harborough District			Market Harborough		
	Core	Option 1	Mitigation 1	Core	Option 1	Mitigation 1
Vehicle distance (veh-km)	**465,604**	**467,714**	**465,989**	**12,687**	**12,855**	**12,743**
		0.5%	-0.4%		1.3%	-0.9%
Vehicle delay time (veh-hours)	**2,144**	**2,135**	**2,058**	**113**	**115**	**114**
		-0.5%	-3.6%		2.2%	-1.0%
Vehicles queued end of hour (veh)	**1,136**	**1,118**	**1,063**	**39**	**40**	**39**
		-1.6%	-4.9%		0.7%	-0.5%
Speed (km/hr)	**56**	**56**	**57**	**32**	**32**	**32**
		0.2%	0.8%		-0.3%	0.1%

Table 5.4: Interpeak Hour Option 1 and Mitigation 1 SATURN Network Statistics

	Harborough District			Market Harborough		
	Core	Option 1	Mitigation 1	Core	Option 1	Mitigation 1
Vehicle distance (veh-km)	**346,986**	**348,079**	**348,387**	**8,843**	**9,150**	**9,090**
		0.3%	0.1%		3.5%	-0.7%
Vehicle delay time (veh-hours)	**1,055**	**1,062**	**1,063**	**68**	**72**	**71**
		0.7%	0.1%		4.9%	-0.9%
Vehicles queued end of hour (veh)	**403**	**405**	**405**	**25**	**27**	**26**
		0.4%	0.1%		4.1%	-1.1%
Speed (km/hr)	**64**	**63**	**63**	**34**	**34**	**34**
		-0.2%	0.0%		-0.3%	0.1%

Table 5.5: PM Peak Hour Option 1 and Mitigation 1 SATURN Network Statistics

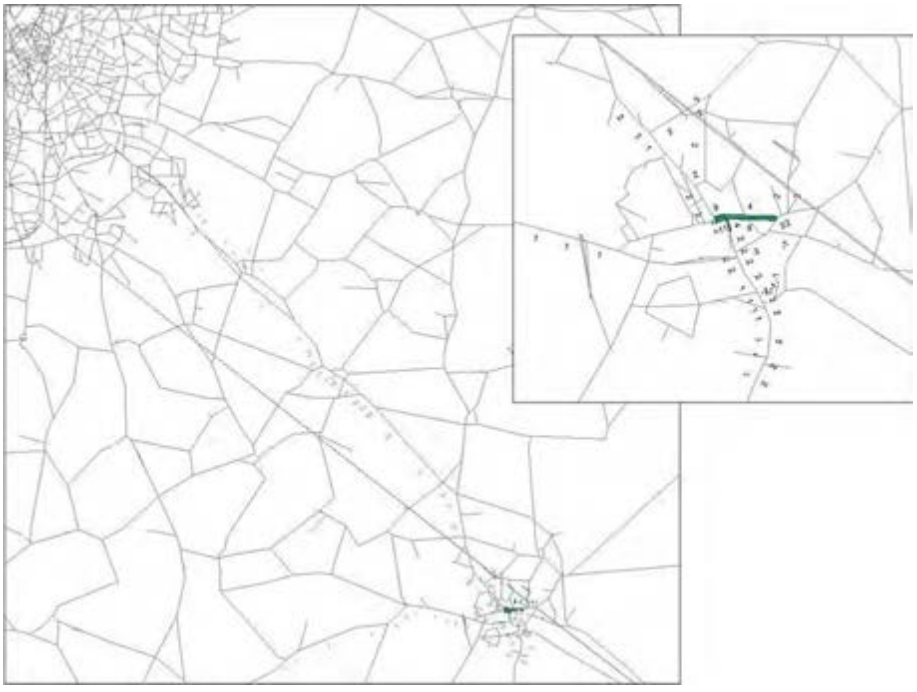
	Harborough District			Market Harborough		
	Core	Option 1	Mitigation 1	Core	Option 1	Mitigation 1
Vehicle distance (veh-km)	**507,909**	**510,029**	**509,444**	**13,917**	**14,462**	**14,336**
		0.4%	-0.1%		3.9%	-0.9%
Vehicle delay time (veh-hours)	**2,491**	**2,643**	**2,616**	**55**	**55**	**151**
		6.1%	-1.0%		0.0%	-1.5%
Vehicles queued end of hour (veh)	**1,329**	**1,449**	**1,429**	**55**	**60**	**59**
		9.0%	-1.4%		8.6%	-1.3%
Speed (km/hr)	**56**	**55**	**55**	**31**	**31**	**31**
		-1.6%	0.2%		-2.2%	0.2%

Public Transport Assignment

Figure 5.2 shows the changes in forecast bus passenger flows in the public transport assignment in the PM Peak hour between the Option 1 development option and the corresponding scenario with Mitigation 1. This shows that there is little change in the public transport assignment results due to Mitigation 1. Most flow differences are less than 5 passengers between these two scenarios, with marginally larger increases in Market Harborough town centre.

The corresponding plots for the AM Peak hour and interpeak hour can be found in Appendix G, with these time periods showing a similar pattern of bus passenger flow changes as in the PM Peak hour.

Figure 5.2: 2026 PM Peak Hour Bus Passenger Flow Change in Option 1 Due to Mitigation 1



5.1.2 Option 3 Mitigation 1 Results

Demand Changes

The results of Mitigation 1 on the Option 3 development scenario are similar to those for Option 1. Table 5.6 shows the change in 24-hour person demand within Harborough District and Market Harborough as a result of Mitigation 1. This again shows an approximate reduction of 400 car person trips with the mitigation measures, with active mode demand increasing by a similar amount and public transport demand remaining relatively unchanged.

Table 5.7 shows the change in 24-hour mode share with the introduction of Mitigation 1 measures with Option 3 development. This again shows that there is little change to either the Harborough District or the development zone's mode share as a result of Mitigation 1. Within Market Harborough there is an increase in active mode share, by almost 1%, with a corresponding decrease in highway demand.

Table 5.6: Change in 24-hour Person Demand in 2026 Option 3 Due to Mitigation 1 Measures

		Highway		Public Transport		Active		All Modes	
		Prod.	Attr.	Prod.	Attr.	Prod.	Attr.	Prod.	Attr.
Harborough District	Core	135,422	140,686	3,736	1,396	41,677	41,546	180,835	183,627
	Option 3	138,763	143,725	4,014	1,529	43,631	43,502	186,407	188,756
	Abs. Change	3,341	3,039	278	133	1,954	1,956	5,572	5,128
	%Change	2.5%	2.2%	7.4%	9.6%	4.7%	4.7%	3.1%	2.8%
	Mitigation 1	138,355	143,351	4,015	1,572	44,037	43,915	186,407	188,839
	Abs. Change	-408	-374	1	43	406	414	0	83
	%Change	-0.3%	-0.3%	0.0%	2.8%	0.9%	1.0%	0.0%	0.0%
Market Harborough	Core	27,183	36,912	1,608	690	15,954	16,004	44,745	53,606
	Option 3	26,994	37,935	1,589	720	16,841	16,895	45,424	55,550
	Abs. Change	-188	1,024	-19	29	886	890	679	1,943
	%Change	-0.7%	2.8%	-1.2%	4.2%	5.6%	5.6%	1.5%	3.6%
	Mitigation 1	26,597	37,542	1,574	758	17,254	17,316	45,424	55,616
	Abs. Change	-398	-393	-16	38	413	421	0	66
	%Change	-1.5%	-1.0%	-1.0%	5.3%	2.5%	2.5%	0.0%	0.1%
Development Zone	Core	186	470	3	2	52	52	241	524
	Option 3	4,081	1,619	232	99	1,190	1,190	5,504	2,909
	Abs. Change	3,895	1,149	230	97	1,139	1,139	5,263	2,384
	%Change	2,091%	244%	8,731%	3,932%	2,200%	2,200%	2,187%	455%
	Mitigation 1	4,074	1,613	234	100	1,196	1,196	5,504	2,909
	Abs. Change	-7	-6	1	1	6	6	0	0
	%Change	-0.2%	-0.4%	0.6%	0.7%	0.5%	0.5%	0.0%	0.0%

Table 5.7: Change in 24-hour Mode Share in 2026 Option 3 Due to Mitigation 1

		Highway	Public Transport	Active Mode
Harborough District	Option 3	74.4%	2.2%	23.4%
	Mitigation 1	74.2%	2.2%	23.6%
Market Harborough	Option 3	59.4%	3.5%	37.1%
	Mitigation 1	58.6%	3.5%	38.0%
Development Zone	Option 3	74.1%	4.2%	21.6%
	Mitigation 1	74.0%	4.2%	21.7%

Highway Assignment

Figure 5.3 shows the changes in assigned volumes in the PM Peak hour from the Option 3 development scenario to the Mitigation 1 scenario. Like in Option 1 development, most links within Market Harborough see a reduction in flow as a result of the mitigation measures, with the flow reductions generally of the order of around 5 PCUs.

As with Option 1, these plots for the AM Peak hour and interpeak hour can be found in Appendix D, and these show a similar pattern of flow changes to these in the corresponding time periods in Option 1 development.

Figure 5.3: 2026 PM Peak Hour Flow Change in Option 3 Due to Mitigation 1

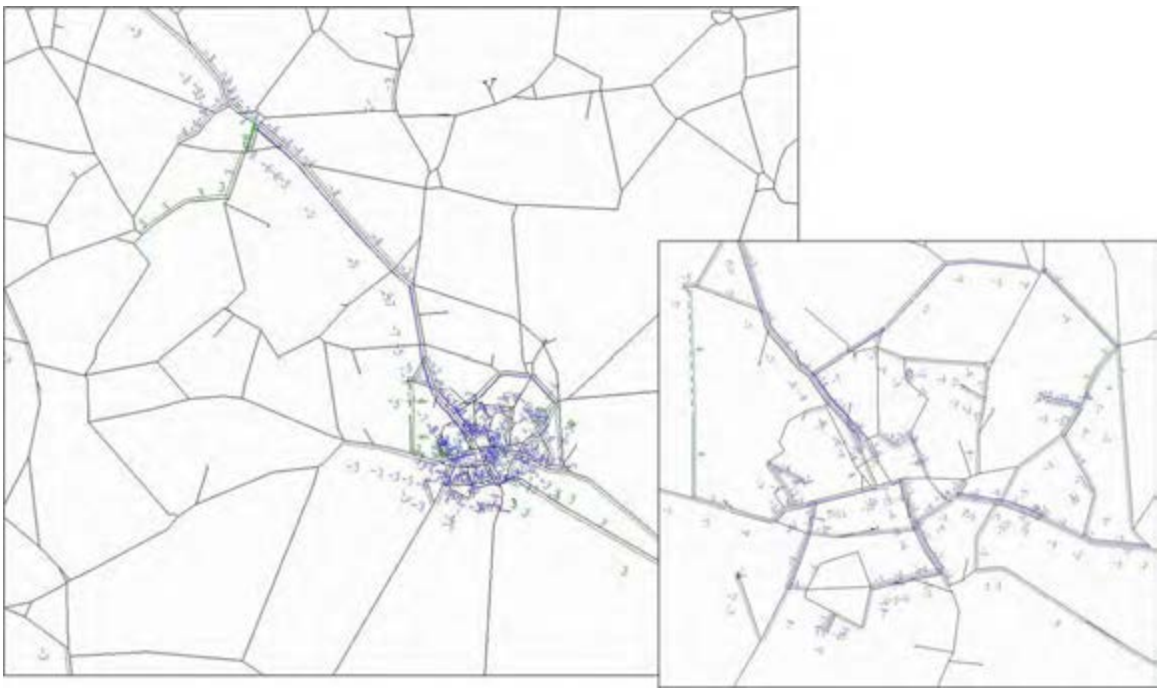


Table 5.8, Table 5.9 and Table 5.10 show the highway network statistics for the AM Peak hour, interpeak hour and PM Peak hour respectively for links within both Harborough District and Market Harborough. These tables show the statistics for the core scenario and the Option 3 development

scenario, with the percentage change between these scenarios. In addition to this the results of the Mitigation 1 assignment are included, and a percentage change from the Option 3 development scenario is given.

This shows that there is a general reduction in traffic in both the district and in Market Harborough, and a corresponding increase in the average speeds on the network.

In Harborough District the levels of traffic decrease by between 0% and 0.4%, with changes in average speeds of between a decrease of 0.1% and an increase of 0.9% in the three modelled hours. In Market Harborough the reductions in traffic are between 0.3% and 1% with the introduction of these mitigation measures, and on this subset of the network we see changes in average speeds of between no change and an increase of 0.2%.

Table 5.8: AM Peak Hour Option 3 and Mitigation 1 SATURN Network Statistics

	Harborough District			Market Harborough		
	Core	Option 3	Mitigation 1	Core	Option 3	Mitigation 1
Vehicle distance (veh-km)	**465,604**	**467,859**	**466,024**	**12,687**	**12,821**	**12,711**
		0.5%	-0.4%		1.1%	-0.9%
Vehicle delay time (veh-hours)	**2,144**	**2,150**	**2,061**	**113**	**112**	**112**
		0.2%	-4.1%		-0.1%	-0.8%
Vehicles queued end of hour (veh)	**1,136**	**1,124**	**1,062**	**39**	**39**	**39**
		-1.1%	-5.4%		-0.5%	-1.0%
Speed (km/hr)	**56**	**56**	**57**	**32**	**32**	**32**
		0.0%	0.9%		0.3%	0.0%

Table 5.9: Interpeak Hour Option 3 and Mitigation 1 SATURN Network Statistics

	Harborough District			Market Harborough		
	Core	Option 3	Mitigation 1	Core	Option 3	Mitigation 1
Vehicle distance (veh-km)	**346,986**	**348,683**	**348,802**	**8,843**	**9,119**	**9,093**
		0.5%	0.0%		3.1%	-0.3%
Vehicle delay time (veh-hours)	**1,055**	**1,068**	**1,062**	**68**	**71**	**70**
		1.3%	-0.6%		3.4%	-0.3%
Vehicles queued end of hour (veh)	**403**	**407**	**403**	**25**	**26**	**26**
		1.2%	-1.1%		2.0%	-0.4%
Speed (km/hr)	**64**	**63**	**63**	**34**	**34**	**34**
		-0.3%	0.1%		-0.1%	0.0%

Table 5.10: PM Peak Hour Option 3 and Mitigation 1 SATURN Network Statistics

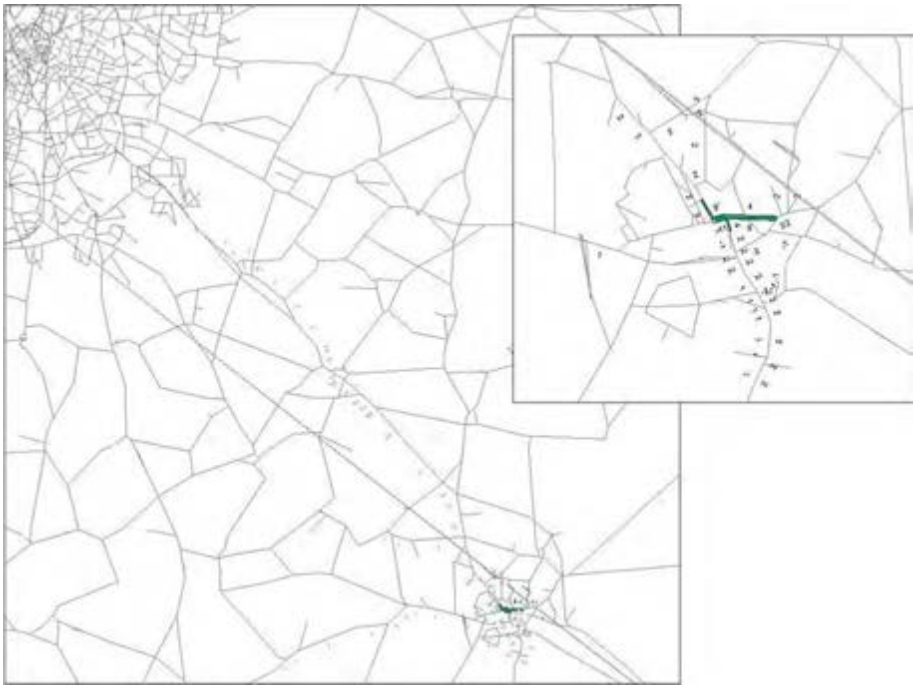
	Harborough District			Market Harborough		
	Core	Option 3	Mitigation 1	Core	Option 3	Mitigation 1
Vehicle distance (veh-km)	**507,909**	**509,863**	**509,672**	**13,917**	**14,335**	**14,192**
		0.4%	0.0%		3.0%	-1.0%
Vehicle delay time (veh-hours)	**2,491**	**2,501**	**2,507**	**55**	**55**	**144**
		0.4%	0.2%		0.0%	-1.7%
Vehicles queued end of hour (veh)	**1,329**	**1,329**	**1,336**	**55**	**58**	**57**
		0.0%	0.5%		5.0%	-1.6%
Speed (km/hr)	**56**	**56**	**56**	**31**	**31**	**31**
		-0.2%	-0.1%		-1.1%	0.2%

Public Transport Assignment

Figure 5.4 shows the changes in bus passenger flows in the public transport assignment in the PM Peak hour between the Option 3 development option and the corresponding scenario with Mitigation 1. This shows that there is little change in the public transport assignment results due to Mitigation 1. Most flow differences are less than 5 bus passengers between these two scenarios, with marginally larger increases in Market Harborough town centre.

The corresponding plots for the AM Peak hour and interpeak hour can be found in Appendix G, with these time periods showing a similar pattern of bus passenger flow changes as in the PM Peak hour.

Figure 5.4: 2026 PM Peak Hour Bus Passenger Flow Change in Option 3 Due to Mitigation 1



5.1.3 Option 3a Mitigation 1 Results

Demand Changes

As with Option 3, the results of the changes in demand do not differ markedly in Option 3a compared to Option 1 and Option 3 development. Table 5.11 shows the changes in the 24-hour person demand as a result of these mitigation measures by mode for Harborough District, the subset of zones within Market Harborough and the development zone.

This again shows that the is an approximate decrease in the number of car person trips by 400 with the introduction of Mitigation 1, with active mode demand showing a corresponding 400 person trip increase in demand. There is little change in the public transport demand between the core and Mitigation 1 scenarios. There is also little change in the 24-hour demand totals for the zone representing the additional growth itself.

Table 5.11: Change in 24-hour Person Demand in 2026 Option 3a Due to Mitigation 1 Measures

		Highway		Public Transport		Active		All Modes	
		Prod.	Attr.	Prod.	Attr.	Prod.	Attr.	Prod.	Attr.
Harborough District	Core	135,422	140,686	3,736	1,396	41,677	41,546	180,835	183,627
	Option 3a	138,173	143,156	4,006	1,519	43,928	43,800	186,107	188,475
	Abs. Change	2,752	2,470	270	123	2,251	2,254	5,272	4,847
	%Change	2.0%	1.8%	7.2%	8.8%	5.4%	5.4%	2.9%	2.6%
	Mitigation 1	137,752	142,733	4,007	1,562	44,348	44,227	186,107	188,522
	Abs. Change	-422	-423	1	43	420	428	0	47
	%Change	-0.3%	-0.3%	0.0%	2.8%	1.0%	1.0%	0.0%	0.0%
Market Harborough	Core	27,183	36,912	1,608	690	15,954	16,004	44,745	53,606
	Option 3a	27,018	37,573	1,596	719	16,907	16,961	45,521	55,252
	Abs. Change	-165	661	-12	28	952	956	776	1,646
	%Change	-0.6%	1.8%	-0.7%	4.1%	6.0%	6.0%	1.7%	3.1%
	Mitigation 1	26,616	37,177	1,580	757	17,324	17,386	45,521	55,320
	Abs. Change	-402	-396	-16	38	417	425	0	67
	%Change	-1.5%	-1.1%	-1.0%	5.3%	2.5%	2.5%	0.0%	0.1%
Development Zone	Core	186	470	3	2	52	52	241	524
	Option 3a	3,338	1,136	227	87	1,363	1,363	4,929	2,587
	Abs. Change	3,152	666	225	85	1,312	1,312	4,688	2,063
	%Change	1,693%	142%	8,536%	3,458%	2,534%	2,534%	1,948%	393%
	Mitigation 1	3,330	1,132	229	88	1,370	1,370	4,929	2,590
	Abs. Change	-8	-4	2	1	6	6	0	3
	%Change	-0.2%	-0.4%	0.7%	0.6%	0.5%	0.5%	0.0%	0.1%

Table 5.12 shows the change in 24-hour mode share in Option 3a with and with Mitigation 1. As with Option 1 and Option 3, this shows that there is little change in mode share for Harborough District and for the development zone itself. For Market Harborough the active mode share increases by 1%, with a corresponding decrease in highway mode share and no change in public transport.

Table 5.12: Change in 24-hour Mode Share in 2026 Option 3a Due to Mitigation 1

		Highway	Public Transport	Active Mode
Harborough District	Option 3a	74.2%	2.2%	23.6%
	Mitigation 1	74.0%	2.2%	23.8%
Market Harborough	Option 3a	59.4%	3.5%	37.1%
	Mitigation 1	58.5%	3.5%	38.1%
Development Zone	Option 3a	67.7%	4.6%	27.7%
	Mitigation 1	67.6%	4.6%	27.8%

Highway Assignment

Figure 5.5 shows the changes in flow as a result of these mitigation measures on the PM Peak hour highway assignment. As in Option 1 and Option 3 development scenarios there are reductions in flow on the links within Market Harborough, approximately of the order of 5 PCUs. The corresponding plots for the AM Peak hour and interpeak hour can be found in Appendix D.

Figure 5.5: 2026 PM Peak Hour Flow Change in Option 3a Due to Mitigation 1

Table 5.13, Table 5.14 and Table 5.15 show the highway network statistics for the AM Peak hour, interpeak hour and PM Peak hour respectively for links within Harborough District and the subset within Market Harborough.

These statistics show that across the district, Mitigation 1 reduces traffic by between 0% and 0.6% depending on the modelled time period, with the average speeds on these links in the network changing by between a decrease of 0.8% to an increase of 0.7% in average speeds. On links within Market Harborough the level of traffic reduces by between 0.6% and 1.2% with the introduction of Mitigation 1 measures, with average speeds increasing by between 0% and 0.1%.

Table 5.13: AM Peak Hour Option 3a and Mitigation 1 SATURN Network Statistics

	Harborough District			Market Harborough		
	Core	Option 3a	Mitigation 1	Core	Option 3a	Mitigation 1
Vehicle distance (veh-km)	**465,604**	**469,107**	**466,457**	**12,687**	**12,085**	**11,943**
		0.8%	-0.6%		-4.7%	-1.2%
Vehicle delay time (veh-hours)	**2,144**	**2,152**	**2,082**	**113**	**103**	**102**
		0.4%	-3.3%		-8.2%	-1.5%
Vehicles queued end of hour (veh)	**1,136**	**1,125**	**1,069**	**39**	**37**	**37**
		-0.9%	-5.0%		-5.0%	-1.4%
Speed (km/hr)	**56**	**56**	**57**	**32**	**33**	**33**
		0.1%	0.7%		1.1%	0.1%

Table 5.14: Interpeak Hour Option 3a and Mitigation 1 SATURN Network Statistics

	Harborough District			Market Harborough		
	Core	Option 3a	Mitigation 1	Core	Option 3a	Mitigation 1
Vehicle distance (veh-km)	**346,986**	**348,963**	**348,873**	**8,843**	**8,640**	**8,587**
		0.6%	0.0%		-2.3%	-0.6%
Vehicle delay time (veh-hours)	**1,055**	**1,063**	**1,064**	**68**	**65**	**65**
		0.8%	0.1%		-4.1%	-0.6%
Vehicles queued end of hour (veh)	**403**	**402**	**403**	**25**	**24**	**24**
		-0.1%	0.2%		-5.5%	-0.5%
Speed (km/hr)	**64**	**63**	**63**	**34**	**34**	**34**
		-0.2%	0.0%		0.4%	0.0%

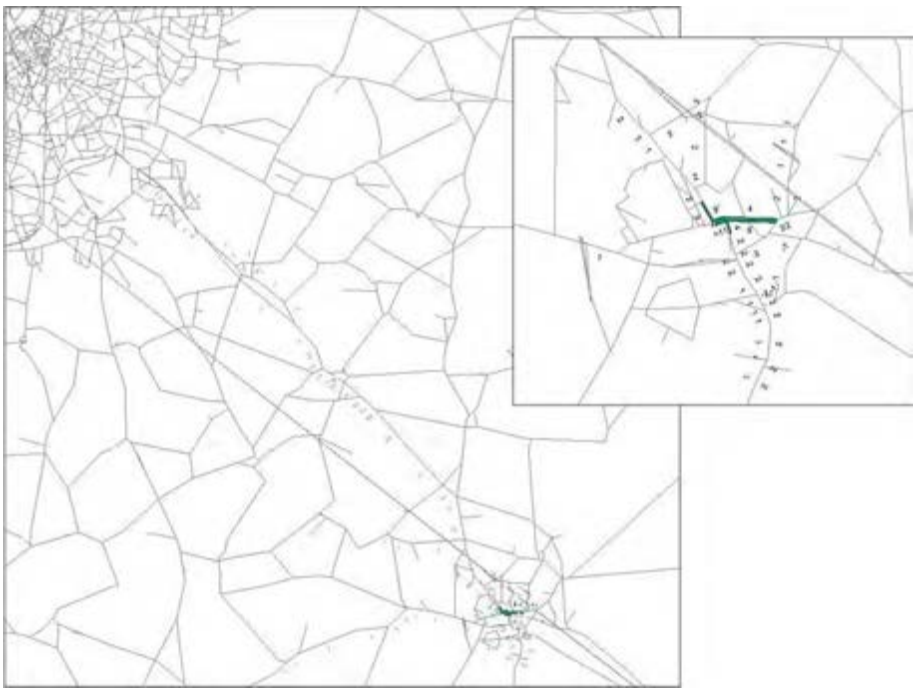
Table 5.15: PM Peak Hour Option 3a and Mitigation 1 SATURN Network Statistics

	Harborough District			Market Harborough		
	Core	Option 3a	Mitigation 1	Core	Option 3a	Mitigation 1
Vehicle distance (veh-km)	**507,909**	**510,018**	**510,105**	**13,917**	**13,341**	**13,181**
		0.4%	0.0%		-4.1%	-1.2%
Vehicle delay time (veh-hours)	**2,491**	**2,562**	**2,643**	**138**	**129**	**127**
		2.9%	3.2%		-5.9%	-1.7%
Vehicles queued end of hour (veh)	**1,329**	**1,377**	**1,448**	**55**	**52**	**51**
		3.6%	5.2%		-6.0%	-1.6%
Speed (km/hr)	**56**	**56**	**55**	**31**	**32**	**32**
		-0.7%	-0.8%		0.7%	0.1%

Public Transport Assignment

As with Option 1 and Option 3 development there is little change in the assigned bus passenger flows as a result of introducing Mitigation 1 to Option 3a development scenario. Figure 5.6 shows the change in bus passenger flow in the PM Peak hour due to Mitigation 1, and like in the other development scenarios there is little change in assigned volumes. The most significant differences are in the centre of Market Harborough with increase in bus passengers of around 5 people.

Figure 5.6: 2026 PM Peak Hour Bus Passenger Flow Change in Option 3a Due to Mitigation 1



5.2 Mitigation 2 Model Results

Mitigation 2 includes the measures outlined in the Mitigation 1 tests, with the calibrated ASCs for the Smarter Choices remaining unchanged as part of Mitigation 2. In addition to the Mitigation 1 measures, the following interventions are included:

- St Mary's Road between The Square and Kettering Road has been changed to a one-way link in the eastbound direction. The westbound direction is still available to bus services, and the signal timings at the junction of St Mary's Road and The Square have been amended to give more priority to the north-south movements.
- A 7.5 tonne limit has been placed on Welland Park Road by the inclusion of a OGV „knobs' value for the links that make up this road.
- The X3 bus service between Market Harborough and Leicester has a 30-minutely service in the core scenario. This has been increased to a 15-minute frequency as part of these mitigation measures.
- A 25% reduction in the number of long-stay parking spaces in Market Harborough. This has been applied through the application of ASCs to the highway costs for movements to the four zones in the centre of Market Harborough in order to represent the likely additional cost due to the reduction in the long-stay parking availability. The derivation of these ASCs, and the time-period-pairs to which they have been applied, can be found in Appendix B.

As with the results of Mitigation 1 measures, the comparisons contained in the following sections are for each development scenario without any mitigation, against the Mitigation 2 scenario for the corresponding development option.

5.2.1 Option 1 Mitigation 2 Results

Demand Changes

Table 5.16 shows the changes in 24-hour productions and attractions by mode for Harborough District, Market Harborough and for the development zone between the core scenario, Option 1 without any mitigation and Option 1 with Mitigation 2 measures.

This table shows that Mitigation 2 results in a reduction of around 500 car person trips in both the district and within Market Harborough. This is a greater reduction than in Mitigation 1, which saw a reduction of around 400 car person trips. As with Mitigation 1 measures, the reduction in car driver trips as a result of these mitigation measures results in an increase in active mode demand. Public transport demand is relatively unchanged as a result of Mitigation 2 measures.

Similarly to the results of Mitigation 1, there is little change to the demand produced / attracted to the development as a result of these mitigation measures.

Table 5.16: Change in 24-hour Person Demand in 2026 Option 1 Due to Mitigation 2 Measures

		Highway		Public Transport		Active		All Modes	
		Prod.	Attr.	Prod.	Attr.	Prod.	Attr.	Prod.	Attr.
Harborough District	Core	135,422	140,686	3,736	1,396	41,677	41,546	180,835	183,627
	Option 1	137,811	143,242	3,921	1,483	43,371	43,242	185,104	187,967
	Abs. Change	2,390	2,557	185	87	1,694	1,696	4,269	4,340
	%Change	1.8%	1.8%	5.0%	6.3%	4.1%	4.1%	2.4%	2.4%
	Mitigation 2	137,314	142,690	3,959	1,548	43,830	43,708	185,104	187,946
	Abs. Change	-497	-552	38	65	459	466	0	-21
	%Change	-0.4%	-0.4%	1.0%	4.4%	1.1%	1.1%	0.0%	0.0%
Market Harborough	Core	27,183	36,912	1,608	690	15,954	16,004	44,745	53,606
	Option 1	27,165	37,805	1,606	707	16,866	16,919	45,636	55,432
	Abs. Change	-18	894	-2	17	912	915	891	1,825
	%Change	-0.1%	2.4%	-0.1%	2.4%	5.7%	5.7%	2.0%	3.4%
	Mitigation 2	26,706	37,280	1,598	754	17,332	17,393	45,636	55,428
	Abs. Change	-458	-525	-8	47	466	474	0	-4
	%Change	-1.7%	-1.4%	-0.5%	6.6%	2.8%	2.8%	0.0%	0.0%
Development Zone	Core	186	470	3	2	52	52	241	524
	Option 1	2,832	1,518	148	69	880	880	3,860	2,467
	Abs. Change	2,646	1,048	146	66	828	828	3,620	1,942
	%Change	1,421%	223%	5,533%	2,699%	1,600%	1,600%	1,504%	370%
	Mitigation 2	2,827	1,516	152	72	882	882	3,860	2,470
	Abs. Change	-5	-3	3	3	2	2	0	3
	%Change	-0.2%	-0.2%	2.3%	4.9%	0.2%	0.2%	0.0%	0.1%

Table 5.17 shows the change in mode share at a 24-hour level with and without Mitigation 2 measures with the Option 1 development. The results of this comparison are very similar to those for Mitigation 1, which suggests that the additional measures in Mitigation 2 have had little impact on the mode share within the district, but increase active mode share by around 1% within Market Harborough.

Table 5.17: Change in 24-hour Mode Share in 2026 Option 1 Due to Mitigation 2

		Highway	Public Transport	Active Mode
Harborough District	Option 1	74.5%	2.1%	23.4%
	Mitigation 2	74.2%	2.1%	23.7%
Market Harborough	Option 1	59.5%	3.5%	37.0%
	Mitigation 2	58.5%	3.5%	38.0%
Development Zone	Option 1	73.4%	3.8%	22.8%
	Mitigation 2	73.2%	3.9%	22.8%

Highway Assignment

Figure 5.7 shows the changes in assigned highway flows in the AM Peak hour model between the Option1 development scenario and the corresponding Mitigation 2 scenario. The corresponding plots for the interpeak hour and PM Peak hour can be found in Appendix E.

In the AM Peak and PM Peak hours the flow changes show a similar pattern of changes. There are reductions in westbound traffic on the A4304 through Market Harborough as a result of the change to make St Mary's Road one-way in the eastbound direction within the town centre. The majority of this traffic appears to re-route via Great Bowden and Burnmill Road when travelling across Market Harborough in the westbound direction.

In the interpeak hour the reduction in flow within the town centre is similar to that in the AM Peak and PM Peak hours, however this traffic appears to re-route around Market Harborough via Great Bowden and Gartree to rejoin the A4304 at Lubenham.

In all time periods there is little change away from Market Harborough and the surrounding area as a result of these mitigation measures.

Figure 5.7: 2026 AM Peak Hour Flow Change in Option 1 Due to Mitigation 2

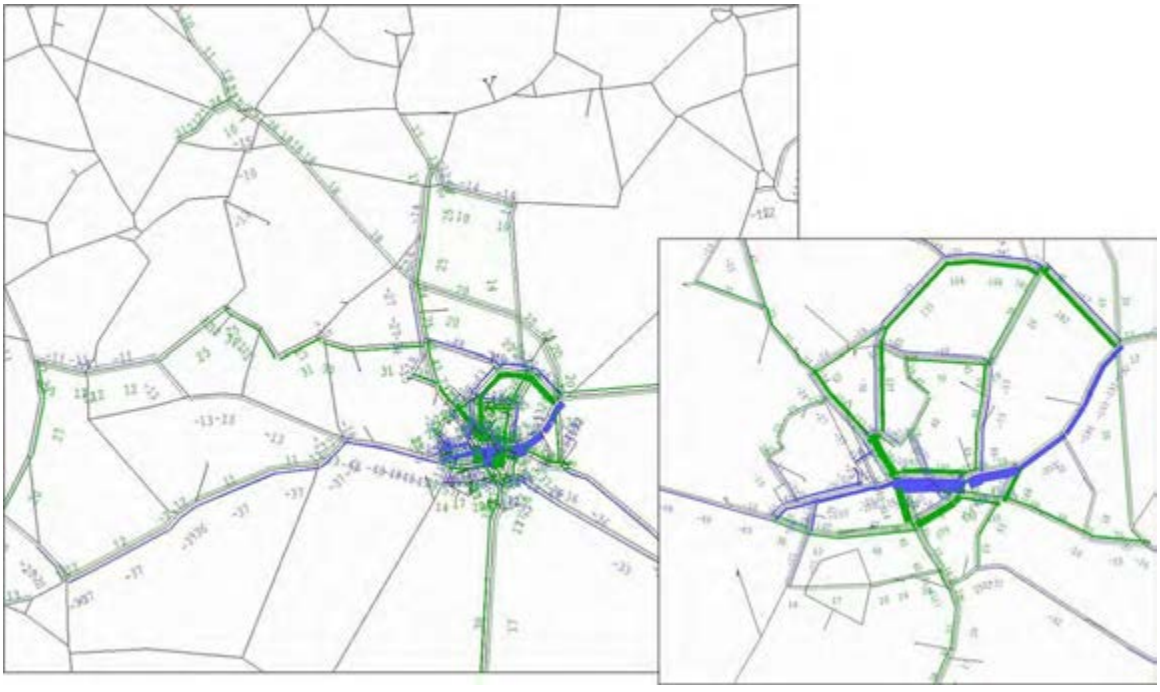


Table 5.18, Table 5.19 and Table 5.20 give the highway network statistics for links in Harborough District and within Market Harborough for the AM Peak hour, interpeak hour and the PM Peak hour. These tables compare the Option 1 development scenario with and without the Mitigation 2 measures, and include the results of the core scenario for comparison.

Across the district there is little forecast change in the level of vehicle-kms, with changes between an increase of 0.1% and a decrease of 0.1%. The average speeds over these links show that there is between no change and an increase in average speeds of 1.2% as a result of this mitigation.

Within Market Harborough the average speeds increase by between 2.3% and 3.5% depending on the time period in question. However, the level of traffic, measured in terms of vehicle-kms, shows between a 2.4% decrease with the mitigation measures to a 0.6% increase.

It is important to note that the vehicle-km statistic includes the effect of any re-routeing in the model. As some traffic re-routes away from the town centre due to the changes to St Mary's Road, this may lengthen their journey. This would result in an increase in vehicle-kms for the same level of demand.

Table 5.18: AM Peak Hour Option 1 and Mitigation 2 SATURN Network Statistics

	Harborough District			Market Harborough		
	Core	Option 1	Mitigation 2	Core	Option 1	Mitigation 2
Vehicle distance (veh-km)	**465,604**	**467,714**	**467,459**	**12,687**	**12,855**	**12,935**
		0.5%	-0.1%		1.3%	0.6%
Vehicle delay time (veh-hours)	**2,144**	**2,135**	**2,133**	**113**	**115**	**106**
		-0.5%	-0.1%		2.2%	-7.9%
Vehicles queued end of hour (veh)	**1,136**	**1,118**	**1,122**	**39**	**40**	**38**
		-1.6%	0.4%		0.7%	-5.2%
Speed (km/hr)	**56**	**56**	**56**	**32**	**32**	**33**
		0.2%	0.0%		-0.3%	2.3%

Table 5.19: Interpeak Hour Option 1 and Mitigation 2 SATURN Network Statistics

	Harborough District			Market Harborough		
	Core	Option 1	Mitigation 2	Core	Option 1	Mitigation 2
Vehicle distance (veh-km)	**346,986**	**348,079**	**348,368**	**8,843**	**9,150**	**8,930**
		0.3%	0.1%		3.5%	-2.4%
Vehicle delay time (veh-hours)	**1,055**	**1,062**	**1,050**	**68**	**72**	**62**
		0.7%	-1.1%		4.9%	-12.9%
Vehicles queued end of hour (veh)	**403**	**405**	**394**	**25**	**27**	**20**
		0.4%	-2.5%		4.1%	-24.5%
Speed (km/hr)	**64**	**63**	**64**	**34**	**34**	**35**
		-0.2%	0.2%		-0.3%	2.4%

Table 5.20: PM Peak Hour Option 1 and Mitigation 2 SATURN Network Statistics

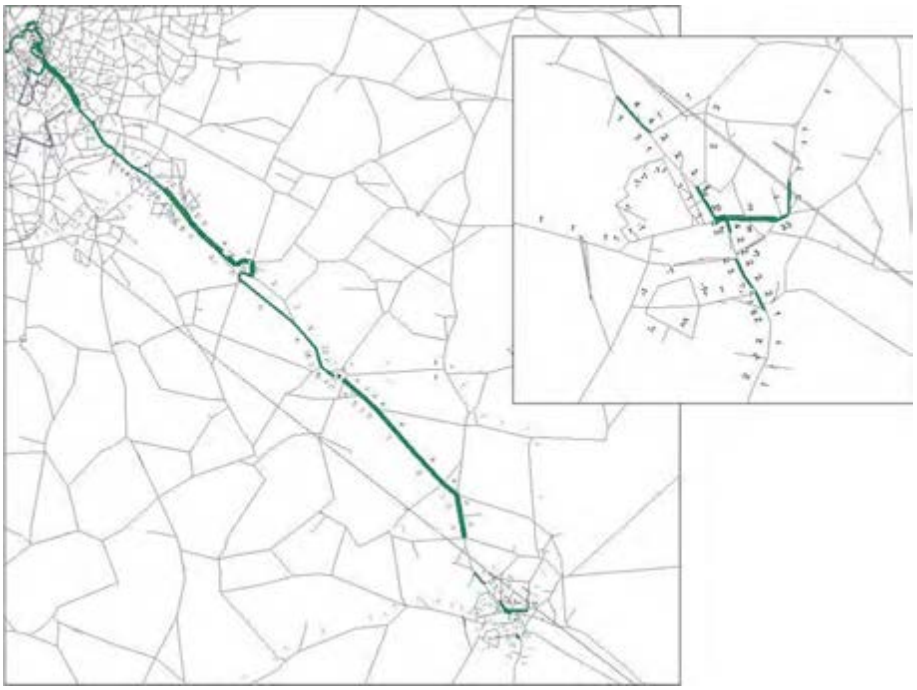
	Harborough District			Market Harborough		
	Core	Option 1	Mitigation 2	Core	Option 1	Mitigation 2
Vehicle distance (veh-km)	**507,909**	**510,029**	**510,511**	**13,917**	**14,462**	**14,376**
		0.4%	0.1%		3.9%	-0.6%
Vehicle delay time (veh-hours)	**2,491**	**2,643**	**2,528**	**55**	**55**	**136**
		6.1%	-4.4%		0.0%	-11.5%
Vehicles queued end of hour (veh)	**1,329**	**1,449**	**1,349**	**55**	**60**	**46**
		9.0%	-6.9%		8.6%	-22.3%
Speed (km/hr)	**56**	**55**	**56**	**31**	**31**	**32**
		-1.6%	1.2%		-2.2%	3.5%

Public Transport Assignment

Figure 5.8 shows the change in bus passenger flows as a result of the introduction of Mitigation 2 measures. This plot compares the flows in the Option 1 development scenario, without any mitigation, against the corresponding development scenario with Mitigation 2 measures for the AM Peak hour. The plots for the other time periods can be found in Appendix H.

This plot shows that is more change in bus passenger flows as a result of Mitigation 2 compared with Mitigation 1. There is an increase in flow between Market Harborough and Leicester City due to the increased frequency of the X3 service between the two urban areas, although this forecast increase is of the order of 5 passengers.

Figure 5.8: 2026 AM Peak Hour Bus Passenger Flow Change in Option 1 Due to Mitigation 2



5.2.2 *Option 3 Mitigation 2 Results*

Demand Changes

The results of Mitigation 2 on Option 3 development are similar to those for Option 1. Table 5.21 shows the changes in 24-hour person demand from the development scenario due to Mitigation 2 for productions and attractions in Harborough District and Market Harborough. As in Option 1 there is an approximate reduction in car person demand of 500 trips in both the district and in Market Harborough. This reduction is greater than the reduction seen for car person demand in Option 3 for Mitigation 1. The reduction in car person demand is mainly countered by an increase in active mode demand, similar to the results of Option 1 development.

As in Option 1, there is little change to the demand produced / attracted to the development zone as a result of these mitigation measures.

Table 5.21: Change in 24-hour Person Demand in 2026 Option 3 Due to Mitigation 2 Measures

		Highway		Public Transport		Active		All Modes	
		Prod.	Attr.	Prod.	Attr.	Prod.	Attr.	Prod.	Attr.
Harborough District	Core	135,422	140,686	3,736	1,396	41,677	41,546	180,835	183,627
	Option 3	138,763	143,725	4,014	1,529	43,631	43,502	186,407	188,756
	Abs. Change	3,341	3,039	278	133	1,954	1,956	5,572	5,128
	%Change	2.5%	2.2%	7.4%	9.6%	4.7%	4.7%	3.1%	2.8%
	Mitigation 2	138,266	143,170	4,054	1,596	44,087	43,965	186,407	188,731
	Abs. Change	-496	-555	40	67	456	463	0	-24
	%Change	-0.4%	-0.4%	1.0%	4.4%	1.0%	1.1%	0.0%	0.0%
Market Harborough	Core	27,183	36,912	1,608	690	15,954	16,004	44,745	53,606
	Option 3	26,994	37,935	1,589	720	16,841	16,895	45,424	55,550
	Abs. Change	-188	1,024	-19	29	886	890	679	1,943
	%Change	-0.7%	2.8%	-1.2%	4.2%	5.6%	5.6%	1.5%	3.6%
	Mitigation 2	26,539	37,409	1,581	768	17,304	17,366	45,424	55,543
	Abs. Change	-455	-526	-8	48	464	472	0	-7
	%Change	-1.7%	-1.4%	-0.5%	6.7%	2.8%	2.8%	0.0%	0.0%
Development Zone	Core	186	470	3	2	52	52	241	524
	Option 3	4,081	1,619	232	99	1,190	1,190	5,504	2,909
	Abs. Change	3,895	1,149	230	97	1,139	1,139	5,263	2,384
	%Change	2,091%	244%	8,731%	3,932%	2,200%	2,200%	2,187%	455%
	Mitigation 2	4,073	1,617	237	103	1,193	1,193	5,504	2,913
	Abs. Change	-8	-3	5	4	3	3	0	4
	%Change	-0.2%	-0.2%	2.2%	4.2%	0.2%	0.2%	0.0%	0.1%

Table 5.22 shows the change in mode share at a 24-hour level with and without Mitigation 2 measures with the Option 3 development. The results of this comparison are very similar to the mode shift observed for Mitigation 1, which suggests that the additional measures in Mitigation 2 have had little impact on the mode share within the district over and above that due to Mitigation 1.

Table 5.22: Change in 24-hour Mode Share in 2026 Option 3 Due to Mitigation 2

		Highway	Public Transport	Active Mode
Harborough District	Option 3	74.4%	2.2%	23.4%
	Mitigation 2	74.2%	2.2%	23.7%
Market Harborough	Option 3	59.4%	3.5%	37.1%
	Mitigation 2	58.4%	3.5%	38.1%
Development Zone	Option 3	74.1%	4.2%	21.6%
	Mitigation 2	74.0%	4.3%	21.7%

Highway Assignment

The patterns of flow changes by time period are again similar to those for Mitigation 2 in Option 1. Figure 5.9 shows the flow changes from the core scenario for the AM Peak hour, with the corresponding plots for the interpeak and PM Peak hours in Appendix E.

As in Option 1 development, we see a reduction in westbound traffic on the A4304 through Market Harborough in all time periods. In the AM and PM Peak hours is appears that the demand re-routes through the town via Great Bowden and Burnmill Road. In the interpeak hour this traffic appears to re-route via Great Bowden and Gartree to Lubenham.

Figure 5.9: 2026 AM Peak Hour Flow Change in Option 3 Due to Mitigation 2

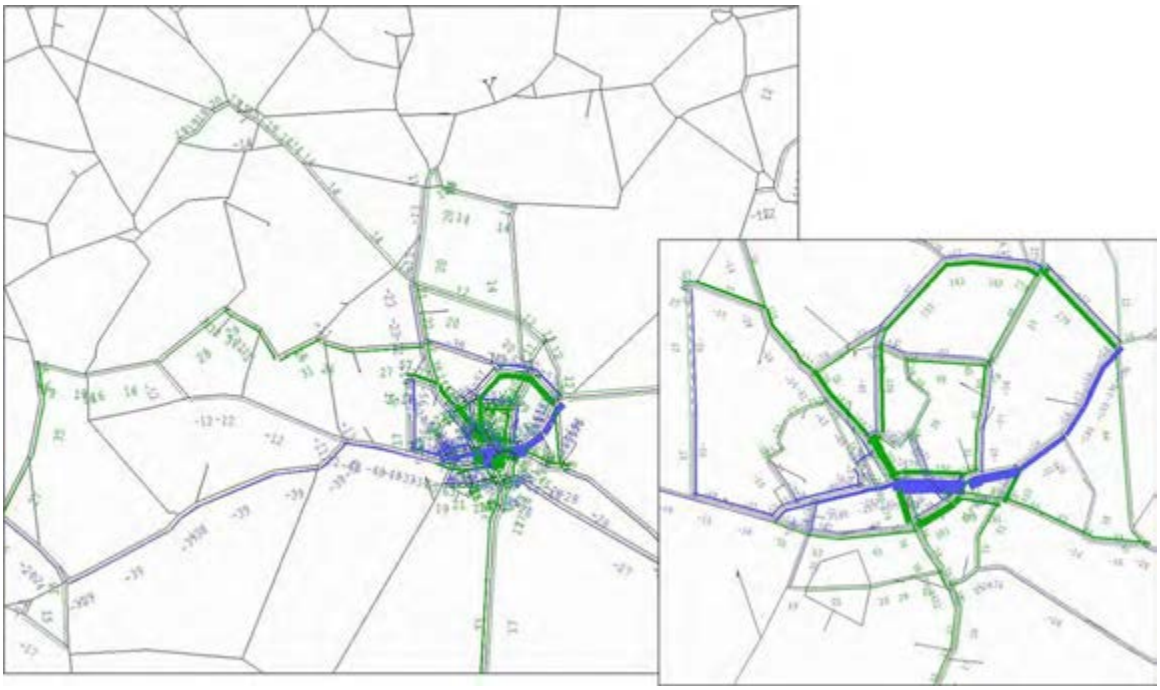


Table 5.23, Table 5.24 and Table 5.25 show the changes in the highway network statistics between Option 3 development with and without Mitigation 2 measures. The results of the core scenario are also included for comparison. The results of this comparison are not dissimilar to the results for Option1 development.

Over Harborough District, the highway network sees a change in vehicle-kms of between no change and an increase of 0.2% depending on the time period. In terms of average speeds on this section of the network, there is a change between a 1.9% reduction to a 0.3% increase in average speeds form the development scenario.

Considering the subset of links within Market Harborough we see a change in vehicle-kms of between a decrease of 2.4% and an increase of 0.1% in the three time periods, and an increase in average speeds of between 1.8% and 3.2% on this section of the highway network.

Table 5.23: AM Peak Hour Option 3 and Mitigation 2 SATURN Network Statistics

	Harborough District			Market Harborough		
	Core	Option 3	Mitigation 2	Core	Option 3	Mitigation 2
Vehicle distance (veh-km)	**465,604**	**467,859**	**468,363**	**12,687**	**12,821**	**12,838**
		0.5%	0.1%		1.1%	0.1%
Vehicle delay time (veh-hours)	**2,144**	**2,150**	**2,155**	**113**	**112**	**105**
		0.2%	0.2%		-0.1%	-6.9%
Vehicles queued end of hour (veh)	**1,136**	**1,124**	**1,133**	**39**	**39**	**37**
		-1.1%	0.9%		-0.5%	-5.5%
Speed (km/hr)	**56**	**56**	**56**	**32**	**32**	**33**
		0.0%	0.0%		0.3%	1.8%

Table 5.24: Interpeak Hour Option 3 and Mitigation 2 SATURN Network Statistics

	Harborough District			Market Harborough		
	Core	Option 3	Mitigation 2	Core	Option 3	Mitigation 2
Vehicle distance (veh-km)	**346,986**	**348,683**	**348,723**	**8,843**	**9,119**	**8,899**
		0.5%	0.0%		3.1%	-2.4%
Vehicle delay time (veh-hours)	**1,055**	**1,068**	**1,054**	**68**	**71**	**62**
		1.3%	-1.3%		3.4%	-12.2%
Vehicles queued end of hour (veh)	**403**	**407**	**398**	**25**	**26**	**20**
		1.2%	-2.3%		2.0%	-23.7%
Speed (km/hr)	**64**	**63**	**64**	**34**	**34**	**35**
		-0.3%	0.3%		-0.1%	2.3%

Table 5.25: PM Peak Hour Option 3 and Mitigation 2 SATURN Network Statistics

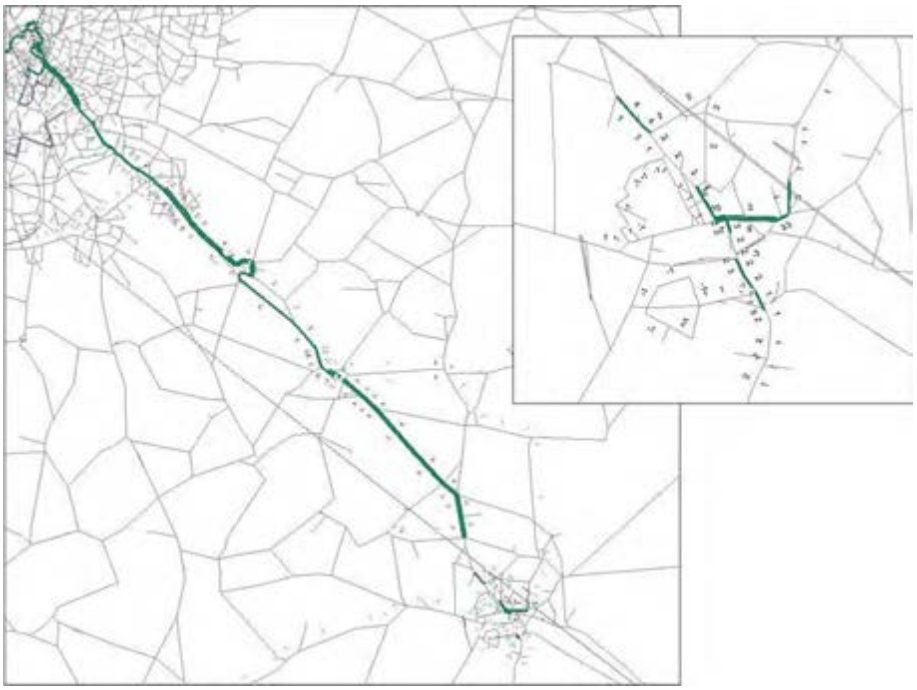
	Harborough District			Market Harborough		
	Core	Option 3	Mitigation 2	Core	Option 3	Mitigation 2
Vehicle distance (veh-km)	**507,909**	**509,863**	**510,808**	**13,917**	**14,335**	**14,293**
		0.4%	0.2%		3.0%	-0.3%
Vehicle delay time (veh-hours)	**2,491**	**2,501**	**2,685**	**55**	**55**	**131**
		0.4%	7.4%		0.0%	-10.6%
Vehicles queued end of hour (veh)	**1,329**	**1,329**	**1,487**	**55**	**58**	**45**
		0.0%	11.8%		5.0%	-22.3%
Speed (km/hr)	**56**	**56**	**55**	**31**	**31**	**32**
		-0.2%	-1.9%		-1.1%	3.2%

Public Transport Assignment

Figure 5.10 shows the change in bus passenger flows as a result of the introduction of Mitigation 2 measures in the Option 3 development scenario in the AM Peak hour. As with Option 1, the plots for the other time periods can be found in Appendix H.

Similarly to Option 1, this plot shows that is more change in bus passenger flows as a result of Mitigation 2 compared with Mitigation 1. There is an increase in flow between Market Harborough and Leicester City due to the increased frequency of the X3 service.

Figure 5.10: 2026 AM Peak Hour Bus Passenger Flow Change in Option 3 Due to Mitigation 2



5.2.3 Option 3a Mitigation 2 Results

Demand Changes

In terms of the effect on the resultant person demand matrices, Table 5.26 shows that the change in 24-hour person demand is comparable with the effects seen due to Mitigation 2 in Option 1 and Option 3 development. There is a reduction in car person demand of around 500 trips, with a corresponding increase in active mode demand, and little change for public transport.

Table 5.26: Change in 24-hour Person Demand in 2026 Option 3a Due to Mitigation 2 Measures

		Highway		Public Transport		Active		All Modes	
		Prod.	Attr.	Prod.	Attr.	Prod.	Attr.	Prod.	Attr.
Harborough District	Core	135,422	140,686	3,736	1,396	41,677	41,546	180,835	183,627
	Option 3a	138,173	143,156	4,006	1,519	43,928	43,800	186,107	188,475
	Abs. Change	2,752	2,470	270	123	2,251	2,254	5,272	4,847
	%Change	2.0%	1.8%	7.2%	8.8%	5.4%	5.4%	2.9%	2.6%
	Mitigation 2	137,668	142,568	4,046	1,585	44,394	44,273	186,107	188,426
	Abs. Change	-506	-587	40	66	466	473	0	-48
	%Change	-0.4%	-0.4%	1.0%	4.3%	1.1%	1.1%	0.0%	0.0%
Market Harborough	Core	27,183	36,912	1,608	690	15,954	16,004	44,745	53,606
	Option 3a	27,018	37,573	1,596	719	16,907	16,961	45,521	55,252
	Abs. Change	-165	661	-12	28	952	956	776	1,646
	%Change	-0.6%	1.8%	-0.7%	4.1%	6.0%	6.0%	1.7%	3.1%
	Mitigation 2	26,557	37,028	1,588	767	17,376	17,438	45,521	55,233
	Abs. Change	-461	-545	-8	48	470	478	0	-19
	%Change	-1.7%	-1.4%	-0.5%	6.7%	2.8%	2.8%	0.0%	0.0%
Development Zone	Core	186	470	3	2	52	52	241	524
	Option 3a	3,338	1,136	227	87	1,363	1,363	4,929	2,587
	Abs. Change	3,152	666	225	85	1,312	1,312	4,688	2,063
	%Change	1,693%	142%	8,536%	3,458%	2,534%	2,534%	1,948%	393%
	Mitigation 2	3,328	1,133	233	91	1,369	1,369	4,929	2,592
	Abs. Change	-11	-4	5	4	5	5	0	5
	%Change	-0.3%	-0.3%	2.3%	4.0%	0.4%	0.4%	0.0%	0.2%

Table 5.27 shows the change in mode share at a 24-hour level with and without Mitigation 2 measures with the Option 3a development. The results of this comparison are very similar to those for Mitigation 1, and for the other development options.

These results show that the additional measures in Mitigation 2 have had little impact on the mode share within the district. Within Market Harborough the proportion of active mode demand increases by around 1%, with a corresponding decrease in highway demand, which is broadly the same effect as with Mitigation 1 measures.

Table 5.27: Change in 24-hour Mode Share in 2026 Option 3a Due to Mitigation 2

		Highway	Public Transport	Active Mode
Harborough District	Option 3a	74.2%	2.2%	23.6%
	Mitigation 2	74.0%	2.2%	23.9%
Market Harborough	Option 3a	59.4%	3.5%	37.1%
	Mitigation 2	58.3%	3.5%	38.2%
Development Zone	Option 3a	67.7%	4.6%	27.7%
	Mitigation 2	67.5%	4.7%	27.8%

Highway Assignment

Unlike the demand responses, there are some differences in the affects on routing in the network in Option 3a due to the inclusion of a new link road between Leicester Road and Harborough Road in this scenario. This link provides and alternative route east-west across Market Harborough via Great Bowden.

In Option 3a there is still the reduction in the flows westbound on the A4304 through Market Harborough, however in the AM Peak and PM Peak hours the majority of this demand does not re-route via Burnmill Road, but instead routes via Great Bowden and the new link road through the development. In the interpeak hour there is still some traffic that re-routes via Gartree to Lubenham, but this re-routing is split between this route and new link road adjacent to the development.

The non-development flows on the link road do not increase markedly in the northbound direction, by up to 10 PCUs, but increase more significantly in the southbound direction. In the southbound direction there are between approximately 170 and 290 PCUs of non-development traffic on the link road.

Figure 5.11 shows the flow changes in the AM Peak hour highway model, with the corresponding plots for the interpeak and PM Peak hours contained within Appendix E.

Figure 5.11: 2026 AM Peak Hour Flow Change in Option 3a Due to Mitigation 2

The changes in highway network statistics due to Mitigation 2 measures in Option 3a development are similar to those in the other two development options. Table 5.28, Table 5.29 and Table 5.30 show these network statistics for Option 3a with and without Mitigation 2, and the results from the core scenario for the AM Peak hour, interpeak hour and PM Peak hour respectively..

These tables show that there is between a 0.3% increase and a 0.3% decrease in vehicle-kms within Harborough District as a result of Mitigation 2 measures. Over the same subset of highway links we see the average speed increase by between 0.4% and 1.1% depending on the time period.

Within Market Harborough we see a decrease in vehicle-kms of between 2.1% and 4.4% in the three time periods, and an increase in speeds of between 2.4% and 3.1%. These changes are generally larger in magnitude than in either Option 1 or Option 3 development scenarios. This is due to the new link road through the development, providing an additional alternative route for traffic. This link road is not included within the subset of links for Market Harborough, but is included within the results for Harborough District.

Table 5.28: AM Peak Hour Option 3a and Mitigation 2 SATURN Network Statistics

	Harborough District			Market Harborough		
	Core	Option 3a	Mitigation 2	Core	Option 3a	Mitigation 2
Vehicle distance (veh-km)	**465,604**	**469,107**	**467,779**	**12,687**	**12,085**	**11,740**
		0.8%	-0.1%		-4.7%	-2.8%
Vehicle delay time (veh-hours)	**2,144**	**2,152**	**2,074**	**113**	**103**	**91**
		0.4%	-3.6%		-8.2%	-11.6%
Vehicles queued end of hour (veh)	**1,136**	**1,125**	**1,059**	**39**	**37**	**32**
		-0.9%	-5.8%		-5.0%	-15.7%
Speed (km/hr)	**56**	**56**	**57**	**32**	**33**	**34**
		0.1%	0.9%		1.1%	2.5%

Table 5.29: Interpeak Hour Option 3a and Mitigation 2 SATURN Network Statistics

	Harborough District			Market Harborough		
	Core	Option 3a	Mitigation 2	Core	Option 3a	Mitigation 2
Vehicle distance (veh-km)	**346,986**	**348,963**	**348,008**	**8,843**	**8,640**	**8,261**
		0.6%	-0.3%		-2.3%	-4.4%
Vehicle delay time (veh-hours)	**1,055**	**1,063**	**1,043**	**68**	**65**	**56**
		0.8%	-1.9%		-4.1%	-15.0%
Vehicles queued end of hour (veh)	**403**	**402**	**385**	**25**	**24**	**18**
		-0.1%	-4.4%		-5.5%	-26.9%
Speed (km/hr)	**64**	**63**	**64**	**34**	**34**	**35**
		-0.2%	0.4%		0.4%	2.4%

Table 5.30: PM Peak Hour Option 3a and Mitigation 2 SATURN Network Statistics

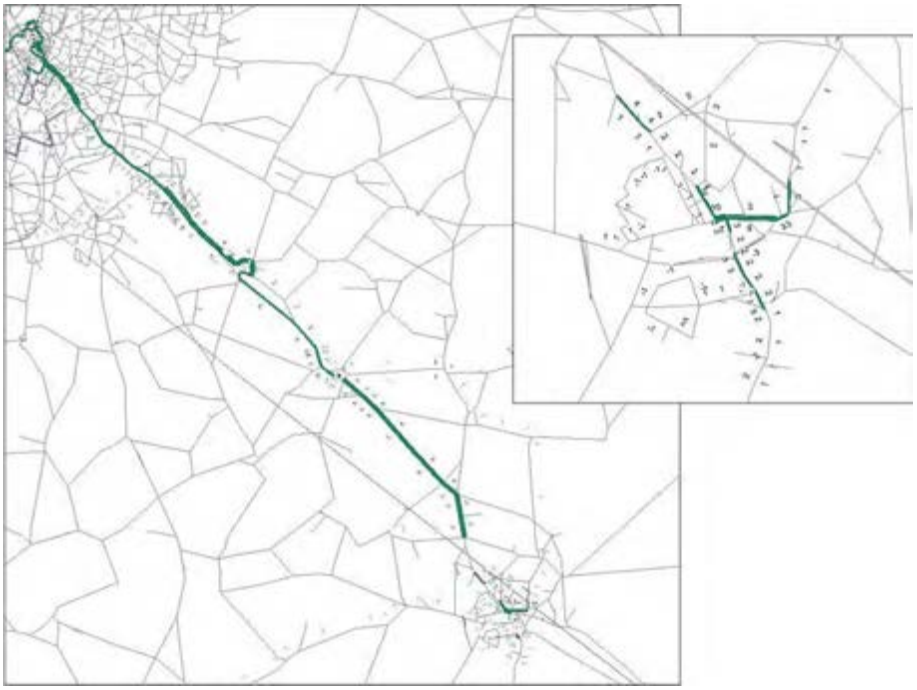
	Harborough District			Market Harborough		
	Core	Option 3a	Mitigation 2	Core	Option 3a	Mitigation 2
Vehicle distance (veh-km)	**507,909**	**510,018**	**511,700**	**13,917**	**13,341**	**13,065**
		0.4%	0.3%		-4.1%	-2.1%
Vehicle delay time (veh-hours)	**2,491**	**2,562**	**2,473**	**138**	**129**	**113**
		2.9%	-3.5%		-5.9%	-12.3%
Vehicles queued end of hour (veh)	**1,329**	**1,377**	**1,292**	**55**	**52**	**40**
		3.6%	-6.1%		-6.0%	-22.8%
Speed (km/hr)	**56**	**56**	**56**	**31**	**32**	**33**
		-0.7%	1.1%		0.7%	3.1%

Public Transport Assignment

Figure 5.12 shows the change in bus passenger flows as a result of the introduction of Mitigation 2 measures with Option 3a development in the AM Peak hour. The plots for the other time periods can be found in Appendix H.

As with the other development options, this plot shows that is more change in bus passenger flows as a result of Mitigation 2 compared with Mitigation 1. There is an increase in flow between Market Harborough and Leicester City due to the increased frequency of the X3 service between the two urban areas.

Figure 5.12: 2026 AM Peak Hour Bus Passenger Flow Change in Option 3a Due to Mitigation 2



5.3 Summary of Mitigation

This section compares the results detailed above for the two levels of mitigation and the three development options. Comparisons are made with both the base year and the 2026 core scenario where possible.

5.3.1 Demand Changes

Table 5.31, Table 5.32 and Table 5.33 show the changes in 24-hour person demand between the core scenario and the development scenario, and then between the development scenario and the two mitigation levels for Option 1, Option 3 and Option 3a development respectively.

The results of these comparisons for the three development options show broadly similar effects due to the introduction of the two levels of mitigation measures. Mitigation 1 reduces highway demand by around 400 person trips in all development options for both Harborough District and for Market Harborough itself. This equates to an approximate reduction in highway person demand of 0.3% for

Harborough District and a decrease of between 1% and 1.5% within Market Harborough. This reduction in highway person demand is compensated by a corresponding increase in active mode demand. There is little change in public transport demand as a result of Mitigation 1.

The reductions in highway person demand are greater with Mitigation 2 compared to Mitigation 1. Across both Harborough District and Market Harborough, highway person demand reduces by around 500 trips in the three development options. This is the equivalent of a 0.4% reduction across the district, and between a 1.4% and 1.7% reduction within Market Harborough. As in Mitigation 1, this reduction in highway person demand is complimented by an increase in active mode demand; public transport demand does not change significantly.

It is worth noting that neither set of mitigation measures has a significant effect on the forecast demand produced / attracted to the development zone. In all development options the demand for the zone representing the additional development is relatively unaffected by either Mitigation 1 or Mitigation 2 measures.

Table 5.31: Change in 24-hour Person Demand in 2026 Due to Mitigation Measures for Option 1

		Highway		Public Transport		Active		All Modes	
		Prod.	Attr.	Prod.	Attr.	Prod.	Attr.	Prod.	Attr.
Harborough District	Core	135,422	140,686	3,736	1,396	41,677	41,546	180,835	183,627
	Option 1	137,811	143,242	3,921	1,483	43,371	43,242	185,104	187,967
	Abs. Change	2,390	2,557	185	87	1,694	1,696	4,269	4,340
	%Change	1.8%	1.8%	5.0%	6.3%	4.1%	4.1%	2.4%	2.4%
	Mitigation 1	137,391	142,836	3,922	1,525	43,790	43,668	185,104	188,029
	Abs. Change	-420	-407	1	42	419	426	-0	62
	%Change	-0.3%	-0.3%	0.0%	2.8%	1.0%	1.0%	0.0%	0.0%
	Mitigation 2	137,314	142,690	3,959	1,548	43,830	43,708	185,104	187,946
	Abs. Change	-497	-552	38	65	459	466	-0	-21
	%Change	-0.4%	-0.4%	1.0%	4.4%	1.1%	1.1%	0.0%	0.0%
Market Harborough	Core	27,183	36,912	1,608	690	15,954	16,004	44,745	53,606
	Option 1	27,165	37,805	1,606	707	16,866	16,919	45,636	55,432
	Abs. Change	-18	894	-2	17	912	915	891	1,825
	%Change	-0.1%	2.4%	-0.1%	2.4%	5.7%	5.7%	2.0%	3.4%
	Mitigation 1	26,763	37,412	1,590	744	17,283	17,344	45,636	55,500
	Abs. Change	-402	-393	-15	37	417	425	0	68
	%Change	-1.5%	-1.0%	-1.0%	5.2%	2.5%	2.5%	0.0%	0.1%
	Mitigation 2	26,706	37,280	1,598	754	17,332	17,393	45,636	55,428
	Abs. Change	-458	-525	-8	47	466	474	-0	-4
	%Change	-1.7%	-1.4%	-0.5%	6.6%	2.8%	2.8%	0.0%	0.0%
Development Zone	Core	186	470	3	2	52	52	241	524
	Option 1	2,832	1,518	148	69	880	880	3,860	2,467
	Abs. Change	2,646	1,048	146	66	828	828	3,620	1,942
	%Change	1,421%	223%	5,533%	2,699%	1,600%	1,600%	1,504%	370%
	Mitigation 1	2,827	1,513	149	70	884	884	3,860	2,467
	Abs. Change	-5	-5	1	1	4	4	0	-0
	%Change	-0.2%	-0.3%	0.7%	1.2%	0.5%	0.5%	0.0%	0.0%
	Mitigation 2	2,827	1,516	152	72	882	882	3,860	2,470
	Abs. Change	-5	-3	3	3	2	2	0	3
	%Change	-0.2%	-0.2%	2.3%	4.9%	0.2%	0.2%	0.0%	0.1%

Table 5.32: Change in 24-hour Person Demand in 2026 Due to Mitigation Measures for Option 3

		Highway		Public Transport		Active		All Modes	
		Prod.	Attr.	Prod.	Attr.	Prod.	Attr.	Prod.	Attr.
Harborough District	Core	135,422	140,686	3,736	1,396	41,677	41,546	180,835	183,627
	Option 1	138,763	143,725	4,014	1,529	43,631	43,502	186,407	188,756
	Abs. Change	3,341	3,039	278	133	1,954	1,956	5,572	5,128
	%Change	2.5%	2.2%	7.4%	9.6%	4.7%	4.7%	3.1%	2.8%
	Mitigation 1	138,355	143,351	4,015	1,572	44,037	43,915	186,407	188,839
	Abs. Change	-408	-374	1	43	406	414	-0	83
	%Change	-0.3%	-0.3%	0.0%	2.8%	0.9%	1.0%	0.0%	0.0%
	Mitigation 2	138,266	143,170	4,054	1,596	44,087	43,965	186,407	188,731
	Abs. Change	-496	-555	40	67	456	463	-0	-24
	%Change	-0.4%	-0.4%	1.0%	4.4%	1.0%	1.1%	0.0%	0.0%
Market Harborough	Core	27,183	36,912	1,608	690	15,954	16,004	44,745	53,606
	Option 1	26,994	37,935	1,589	720	16,841	16,895	45,424	55,550
	Abs. Change	-188	1,024	-19	29	886	890	679	1,943
	%Change	-0.7%	2.8%	-1.2%	4.2%	5.6%	5.6%	1.5%	3.6%
	Mitigation 1	26,597	37,542	1,574	758	17,254	17,316	45,424	55,616
	Abs. Change	-398	-393	-16	38	413	421	0	66
	%Change	-1.5%	-1.0%	-1.0%	5.3%	2.5%	2.5%	0.0%	0.1%
	Mitigation 2	26,539	37,409	1,581	768	17,304	17,366	45,424	55,543
	Abs. Change	-455	-526	-8	48	464	472	-0	-7
	%Change	-1.7%	-1.4%	-0.5%	6.7%	2.8%	2.8%	0.0%	0.0%
Development Zone	Core	186	470	3	2	52	52	241	524
	Option 1	4,081	1,619	232	99	1,190	1,190	5,504	2,909
	Abs. Change	3,895	1,149	230	97	1,139	1,139	5,263	2,384
	%Change	2,091%	2,44%	8,731%	3,932%	2,200%	2,200%	2,187%	455%
	Mitigation 1	4,074	1,613	234	100	1,196	1,196	5,504	2,909
	Abs. Change	-7	-6	1	1	6	6	-0	0
	%Change	-0.2%	-0.4%	0.6%	0.7%	0.5%	0.5%	0.0%	0.0%
	Mitigation 2	4,073	1,617	237	103	1,193	1,193	5,504	2,913
	Abs. Change	-8	-3	5	4	3	3	-0	4
	%Change	-0.2%	-0.2%	2.2%	4.2%	0.2%	0.2%	0.0%	0.1%

Table 5.33: Change in 24-hour Person Demand in 2026 Due to Mitigation Measures for Option 3a

		Highway		Public Transport		Active		All Modes	
		Prod.	Attr.	Prod.	Attr.	Prod.	Attr.	Prod.	Attr.
Harborough District	Core	135,422	140,686	3,736	1,396	41,677	41,546	180,835	183,627
	Option 1	138,173	143,156	4,006	1,519	43,928	43,800	186,107	188,475
	Abs. Change	2,752	2,470	270	123	2,251	2,254	5,272	4,847
	%Change	2.0%	1.8%	7.2%	8.8%	5.4%	5.4%	2.9%	2.6%
	Mitigation 1	137,752	142,733	4,007	1,562	44,348	44,227	186,107	188,522
	Abs. Change	-422	-423	1	43	420	428	0	47
	%Change	-0.3%	-0.3%	0.0%	2.8%	1.0%	1.0%	0.0%	0.0%
	Mitigation 2	137,668	142,568	4,046	1,585	44,394	44,273	186,107	188,426
	Abs. Change	-506	-587	40	66	466	473	-0	-48
	%Change	-0.4%	-0.4%	1.0%	4.3%	1.1%	1.1%	0.0%	0.0%
Market Harborough	Core	27,183	36,912	1,608	690	15,954	16,004	44,745	53,606
	Option 1	27,018	37,573	1,596	719	16,907	16,961	45,521	55,252
	Abs. Change	-165	661	-12	28	952	956	776	1,646
	%Change	-0.6%	1.8%	-0.7%	4.1%	6.0%	6.0%	1.7%	3.1%
	Mitigation 1	26,616	37,177	1,580	757	17,324	17,386	45,521	55,320
	Abs. Change	-402	-396	-16	38	417	425	0	67
	%Change	-1.5%	-1.1%	-1.0%	5.3%	2.5%	2.5%	0.0%	0.1%
	Mitigation 2	26,557	37,028	1,588	767	17,376	17,438	45,521	55,233
	Abs. Change	-461	-545	-8	48	470	478	-0	-19
	%Change	-1.7%	-1.4%	-0.5%	6.7%	2.8%	2.8%	0.0%	0.0%
Development Zone	Core	186	470	3	2	52	52	241	524
	Option 1	3,338	1,136	227	87	1,363	1,363	4,929	2,587
	Abs. Change	3,152	666	225	85	1,312	1,312	4,688	2,063
	%Change	1,693%	142%	8,536%	3,458%	2,534%	2,534%	1,948%	393%
	Mitigation 1	3,330	1,132	229	88	1,370	1,370	4,929	2,590
	Abs. Change	-8	-4	2	1	6	6	0	3
	%Change	-0.2%	-0.4%	0.7%	0.6%	0.5%	0.5%	0.0%	0.1%
	Mitigation 2	3,328	1,133	233	91	1,369	1,369	4,929	2,592
	Abs. Change	-11	-4	5	4	5	5	0	5
	%Change	-0.3%	-0.3%	2.3%	4.0%	0.4%	0.4%	0.0%	0.2%

Table 5.34 shows the mode shares over 24-hours for productions in Harborough District, Market Harborough and the development zone in the core scenario, the three development options, and the two mitigation levels for each development option.

As with the 24-hour person demand, the results of this comparison for the two levels of mitigation are similar in the three development options. Within Harborough District highway person model share

reduces by around 0.2% and 0.3% with both levels of mitigation, and this is countered by a comparable increase in the active demand mode share.

Within Market Harborough the forecast active demand mode share increases by around 1% with the introduction of the mitigation measures in all three development options. There is a corresponding reduction in highway mode share, and little change in public transport mode share.

The results for the development zone show that neither set of mitigation measures has a significant impact on the mode share for demand produced by the development. This is in-line with the absence of significant demand changes over 24-hours as detailed above.

It is also worth noting that the results for Mitigation 1 and Mitigation 2 are very similar, which suggests that the additional measures included in Mitigation 2 do not have a significant impact on mode share within the district.

Table 5.34: Change in 24-hour Mode Share in 2026 Due to Mitigation Options

		Highway	Public Transport	Active Mode
Harborough District	Core	74.9%	2.1%	23.0%
	Option 1	74.5%	2.1%	23.4%
	Mitigation 1	74.2%	2.1%	23.7%
	Mitigation 2	74.2%	2.1%	23.7%
	Option 3	74.4%	2.2%	23.4%
	Mitigation 1	74.2%	2.2%	23.6%
	Mitigation 2	74.2%	2.2%	23.7%
	Option 3a	74.2%	2.2%	23.6%
	Mitigation 1	74.0%	2.2%	23.8%
	Mitigation 2	74.0%	2.2%	23.9%
Market Harborough	Core	60.8%	3.6%	35.7%
	Option 1	59.5%	3.5%	37.0%
	Mitigation 1	58.6%	3.5%	37.9%
	Mitigation 2	58.5%	3.5%	38.0%
	Option 3	59.4%	3.5%	37.1%
	Mitigation 1	58.6%	3.5%	38.0%
	Mitigation 2	58.4%	3.5%	38.1%
	Option 3a	59.4%	3.5%	37.1%
	Mitigation 1	58.5%	3.5%	38.1%
	Mitigation 2	58.3%	3.5%	38.2%
Development Zone	Core	77.4%	1.1%	21.5%
	Option 1	73.4%	3.8%	22.8%
	Mitigation 1	73.2%	3.9%	22.9%
	Mitigation 2	73.2%	3.9%	22.8%
	Option 3	74.1%	4.2%	21.6%
	Mitigation 1	74.0%	4.2%	21.7%
	Mitigation 2	74.0%	4.3%	21.7%
	Option 3a	67.7%	4.6%	27.7%
	Mitigation 1	67.6%	4.6%	27.8%
	Mitigation 2	67.5%	4.7%	27.8%

5.3.2 Change in Highway Assignment

Table 5.35, Table 5.36 and Table 5.37 give the highway model statistics for the three modelled time periods for the mitigation measures in Option 1 development, Option 3 development and Option 3a development respectively.

The effects of the mitigation have been commented on in the previous sections, with broadly comparable results between development options. Option 1 and Option 3 results are very similar; however Option 3a results differ slightly due to the additional link road for demand provided in the Option 3a scenarios.

As in the summary of the impact on the highway assignment of the introduction of the three development options, the PCU flows on selected links in the model for the mitigation measures for all three development options can be found in Appendix J.

Using the same journey time routes as in the analysis of the development options, as shown in Figure 4.17 in Section 4.5.2, the impact of the mitigation on the journey times along these routes can be also be given. Table 5.38, Table 5.39 and Table 5.40 give these journey times for the AM Peak hour, interpeak hour and PM Peak hour for the mitigation measures in Option 1 development, Option 3 and Option 3a respectively.

In the journey time analysis, differences are shown between the base year and the core scenario, between the core scenario and the development option without any mitigation, and between the development option and the two levels of mitigation.

Table 5.35: SATURN Network Statistics for Option 1 Development Mitigation Levels

		Harborough District					Market Harborough				
		2008	Core	Option 1	Mitigation 1	Mitigation 2	2008	Core	Option 1	Mitigation 1	Mitigation 2
AM Peak Hour	Vehicle distance (veh-km)	**369,630**	**465,604**	**467,714**	**465,989**	**467,459**	**9,549**	**12,687**	**12,855**	**12,743**	**12,935**
			26.0%	0.5%	-0.4%	-0.1%		32.9%	1.3%	-0.9%	0.6%
	Vehicle delay time (veh-hours)	**1,377**	**2,144**	**2,135**	**2,058**	**2,133**	**74**	**113**	**115**	**114**	**106**
			55.7%	-0.5%	-3.6%	-0.1%		51.4%	2.2%	-1.0%	-7.9%
	Vehicles queued end of hour (veh)	**688**	**1,136**	**1,118**	**1,063**	**1,122**	**27**	**39**	**40**	**39**	**38**
			65.0%	-1.6%	-4.9%	0.4%		48.3%	0.7%	-0.5%	-5.2%
	Speed (km/hr)	**60**	**56**	**56**	**57**	**56**	**34**	**32**	**32**	**32**	**33**
			-6.5%	0.2%	0.8%	0.0%		-3.9%	-0.3%	0.1%	2.3%
Interpeak Hour	Vehicle distance (veh-km)	**270,765**	**346,986**	**348,079**	**348,387**	**348,368**	**6,311**	**8,843**	**9,150**	**9,090**	**8,930**
			28.2%	0.3%	0.1%	0.1%		40.1%	3.5%	-0.7%	-2.4%
	Vehicle delay time (veh-hours)	**749**	**1,055**	**1,062**	**1,063**	**1,050**	**44**	**68**	**72**	**71**	**62**
			40.8%	0.7%	0.1%	-1.1%		55.6%	4.9%	-0.9%	-12.9%
	Vehicles queued end of hour (veh)	**324**	**403**	**405**	**405**	**394**	**16**	**25**	**27**	**26**	**20**
			24.3%	0.4%	0.1%	-2.5%		63.0%	4.1%	-1.1%	-24.5%
	Speed (km/hr)	**66**	**64**	**63**	**63**	**64**	**35**	**34**	**34**	**34**	**35**
			-3.9%	-0.2%	0.0%	0.2%		-2.7%	-0.3%	0.1%	2.4%
PM Peak Hour	Vehicle distance (veh-km)	**405,930**	**507,909**	**510,029**	**509,444**	**510,511**	**10,044**	**13,917**	**14,462**	**14,336**	**14,376**
			25.1%	0.4%	-0.1%	0.1%		38.6%	3.9%	-0.9%	-0.6%
	Vehicle delay time (veh-hours)	**1,345**	**2,491**	**2,643**	**2,616**	**2,528**	**77**	**138**	**154**	**151**	**136**
			85.2%	6.1%	-1.0%	-4.4%		78.1%	11.6%	-1.5%	-11.5%
	Vehicles queued end of hour (veh)	**564**	**1,329**	**1,449**	**1,429**	**1,349**	**28**	**55**	**60**	**59**	**46**
			135.6%	9.0%	-1.4%	-6.9%		95.7%	8.6%	-1.3%	-22.3%
	Speed (km/hr)	**63**	**56**	**55**	**55**	**56**	**34**	**31**	**31**	**31**	**32**
			-10.5%	-1.6%	0.2%	1.2%		-7.1%	-2.2%	0.2%	3.5%

Table 5.36: SATURN Network Statistics for Option 3 Development Mitigation Levels

		Harborough District					Market Harborough				
		2008	Core	Option 3	Mitigation 1	Mitigation 2	2008	Core	Option 3	Mitigation 1	Mitigation 2
AM Peak Hour	Vehicle distance (veh-km)	**369,630**	**465,604**	**467,859**	**466,024**	**468,363**	**9,549**	**12,687**	**12,821**	**12,711**	**12,838**
			26.0%	0.5%	-0.4%	0.1%		32.9%	1.1%	-0.9%	0.1%
	Vehicle delay time (veh-hours)	**1,377**	**2,144**	**2,150**	**2,061**	**2,155**	**74**	**113**	**112**	**112**	**105**
			55.7%	0.2%	-4.1%	0.2%		51.4%	-0.1%	-0.8%	-6.9%
	Vehicles queued end of hour (veh)	**688**	**1,136**	**1,124**	**1,062**	**1,133**	**27**	**39**	**39**	**39**	**37**
			65.0%	-1.1%	-5.4%	0.9%		48.3%	-0.5%	-1.0%	-5.5%
	Speed (km/hr)	**60**	**56**	**56**	**57**	**56**	**34**	**32**	**32**	**32**	**33**
			-6.5%	0.0%	0.9%	0.0%		-3.9%	0.3%	0.0%	1.8%
Interpeak Hour	Vehicle distance (veh-km)	**270,765**	**346,986**	**348,683**	**348,802**	**348,723**	**6,311**	**8,843**	**9,119**	**9,093**	**8,899**
			28.2%	0.5%	0.0%	0.0%		40.1%	3.1%	-0.3%	-2.4%
	Vehicle delay time (veh-hours)	**749**	**1,055**	**1,068**	**1,062**	**1,054**	**44**	**68**	**71**	**70**	**62**
			40.8%	1.3%	-0.6%	-1.3%		55.6%	3.4%	-0.3%	-12.2%
	Vehicles queued end of hour (veh)	**324**	**403**	**407**	**403**	**398**	**16**	**25**	**26**	**26**	**20**
			24.3%	1.2%	-1.1%	-2.3%		63.0%	2.0%	-0.4%	-23.7%
	Speed (km/hr)	**66**	**64**	**63**	**63**	**64**	**35**	**34**	**34**	**34**	**35**
			-3.9%	-0.3%	0.1%	0.3%		-2.7%	-0.1%	0.0%	2.3%
PM Peak Hour	Vehicle distance (veh-km)	**405,930**	**507,909**	**509,863**	**509,672**	**510,808**	**10,044**	**13,917**	**14,335**	**14,192**	**14,293**
			25.1%	0.4%	0.0%	0.2%		38.6%	3.0%	-1.0%	-0.3%
	Vehicle delay time (veh-hours)	**1,345**	**2,491**	**2,501**	**2,507**	**2,685**	**77**	**138**	**147**	**144**	**131**
			85.2%	0.4%	0.2%	7.4%		78.1%	6.6%	-1.7%	-10.6%
	Vehicles queued end of hour (veh)	**564**	**1,329**	**1,329**	**1,336**	**1,487**	**28**	**55**	**58**	**57**	**45**
			135.6%	0.0%	0.5%	11.8%		95.7%	5.0%	-1.6%	-22.3%
	Speed (km/hr)	**63**	**56**	**56**	**56**	**55**	**34**	**31**	**31**	**31**	**32**
			-10.5%	-0.2%	-0.1%	-1.9%		-7.1%	-1.1%	0.2%	3.2%

Table 5.37: SATURN Network Statistics for Option 3a Development Mitigation Levels

		Harborough District					Market Harborough				
		2008	Core	Option 3a	Mitigation 1	Mitigation 2	2008	Core	Option 3a	Mitigation 1	Mitigation 2
AM Peak Hour	Vehicle distance (veh-km)	**369,630**	**465,604**	**469,107**	**466,457**	**468,779**	**9,549**	**12,687**	**12,085**	**11,943**	**11,740**
			26.0%	0.8%	-0.6%	-0.1%		32.9%	-4.7%	-1.2%	-2.8%
	Vehicle delay time (veh-hours)	**1,377**	**2,144**	**2,152**	**2,082**	**2,074**	**74**	**113**	**103**	**102**	**91**
			55.7%	0.4%	-3.3%	-3.6%		51.4%	-8.2%	-1.5%	-11.6%
	Vehicles queued end of hour (veh)	**688**	**1,136**	**1,125**	**1,069**	**1,059**	**27**	**39**	**37**	**37**	**32**
			65.0%	-0.9%	-5.0%	-5.8%		48.3%	-5.0%	-1.4%	-15.7%
	Speed (km/hr)	**60**	**56**	**56**	**57**	**57**	**34**	**32**	**33**	**33**	**34**
			-6.5%	0.1%	0.7%	0.9%		-3.9%	1.1%	0.1%	2.5%
Interpeak Hour	Vehicle distance (veh-km)	**270,765**	**346,986**	**348,963**	**348,873**	**348,008**	**6,311**	**8,843**	**8,640**	**8,587**	**8,261**
			28.2%	0.6%	0.0%	-0.3%		40.1%	-2.3%	-0.6%	-4.4%
	Vehicle delay time (veh-hours)	**749**	**1,055**	**1,063**	**1,064**	**1,043**	**44**	**68**	**65**	**65**	**56**
			40.8%	0.8%	0.1%	-1.9%		55.6%	-4.1%	-0.6%	-15.0%
	Vehicles queued end of hour (veh)	**324**	**403**	**402**	**403**	**385**	**16**	**25**	**24**	**24**	**18**
			24.3%	-0.1%	0.2%	-4.4%		63.0%	-5.5%	-0.5%	-26.9%
	Speed (km/hr)	**66**	**64**	**63**	**63**	**64**	**35**	**34**	**34**	**34**	**35**
			-3.9%	-0.2%	0.0%	0.4%		-2.7%	0.4%	0.0%	2.4%
PM Peak Hour	Vehicle distance (veh-km)	**405,930**	**507,909**	**510,018**	**510,105**	**511,700**	**10,044**	**13,917**	**13,341**	**13,181**	**13,065**
			25.1%	0.4%	0.0%	0.3%		38.6%	-4.1%	-1.2%	-2.1%
	Vehicle delay time (veh-hours)	**1,345**	**2,491**	**2,562**	**2,643**	**2,473**	**77**	**138**	**129**	**127**	**113**
			85.2%	2.9%	3.2%	-3.5%		78.1%	-5.9%	-1.7%	-12.3%
	Vehicles queued end of hour (veh)	**564**	**1,329**	**1,377**	**1,448**	**1,292**	**28**	**55**	**52**	**51**	**40**
			135.6%	3.6%	5.2%	-6.1%		95.7%	-6.0%	-1.6%	-22.8%
	Speed (km/hr)	**63**	**56**	**56**	**55**	**56**	**34**	**31**	**32**	**32**	**33**
			-10.5%	-0.7%	-0.8%	1.1%		-7.1%	0.7%	0.1%	3.1%

Table 5.38: Journey Times for Base Year and 2026 Core and Option 1 Development Scenarios

		2008	Core	Option 1	Mit. 1	Mit. 2
AM Peak Hour	B6047 / A508 Northbound	09:41	10:03	10:11	10:10	09:57
			00:22	00:08	-00:01	-00:14
	B6047 / A508 Southbound	10:06	10:56	11:09	11:07	10:24
			00:50	00:13	-00:02	-00:43
	A4304 Eastbound	08:41	09:24	09:29	09:28	09:33
			00:43	00:05	-00:01	00:04
	A4304 Westbound	07:36	07:47	07:47	07:48	07:40
			00:11	00:00	00:01	-00:07
	Lubenham to A6 via Great Bowden Eastbound	08:30	10:01	10:23	10:21	10:17
			01:31	00:22	-00:02	-00:06
	Lubenham to A6 via Great Bowden Westbound	08:04	08:30	08:38	08:38	08:47
			00:26	00:08	00:00	00:09
	A6 Northbound	17:50	18:55	19:02	19:02	19:08
			01:05	00:07	00:00	00:06
	A6 Southbound	18:03	19:48	19:50	19:45	19:42
			01:45	00:02	-00:05	-00:08
Interpeak Hour	B6047 / A508 Northbound	09:29	09:42	09:48	09:48	09:35
			00:13	00:06	00:00	-00:13
	B6047 / A508 Southbound	09:35	09:49	09:57	09:57	09:44
			00:14	00:08	00:00	-00:13
	A4304 Eastbound	08:11	08:20	08:25	08:25	08:15
			00:09	00:05	00:00	-00:10
	A4304 Westbound	07:25	07:50	07:51	07:49	07:36
			00:25	00:01	-00:02	-00:25
	Lubenham to A6 via Great Bowden Eastbound	08:14	08:30	08:34	08:34	08:30
			00:16	00:04	00:00	-00:04
	Lubenham to A6 via Great Bowden Westbound	07:56	08:03	08:05	08:05	08:14
			00:07	00:02	00:00	00:09
	A6 Northbound	17:04	17:51	17:53	17:53	17:56
			00:47	00:02	00:00	00:03
	A6 Southbound	16:37	17:09	17:10	17:09	17:10
			00:32	00:01	-00:01	00:00
PM Peak Hour	B6047 / A508 Northbound	09:44	10:24	10:46	10:44	10:31
			00:40	00:22	-00:02	-00:17
	B6047 / A508 Southbound	09:51	10:19	10:33	10:32	10:06
			00:28	00:14	-00:01	-00:27
	A4304 Eastbound	08:34	09:44	10:02	09:59	10:11
			01:10	00:18	-00:03	00:09
	A4304 Westbound	07:48	08:26	08:28	08:27	07:49
			00:38	00:02	-00:01	-00:39
	Lubenham to A6 via Great Bowden Eastbound	08:26	10:12	10:36	10:38	10:25
			01:46	00:24	00:02	-00:11
	Lubenham to A6 via Great Bowden Westbound	08:01	08:37	08:48	08:47	08:54
			00:36	00:11	-00:01	00:06
	A6 Northbound	18:30	19:56	20:05	20:03	20:19
			01:26	00:09	-00:02	00:14
	A6 Southbound	17:08	18:31	18:25	18:26	18:18
			01:23	-00:06	00:01	-00:07

Table 5.39: Journey Times for Base Year and 2026 Core and Option 3 Development Scenarios

		2008	Core	Option 3	Mit. 1	Mit. 2
AM Peak Hour	B6047 / A508 Northbound	09:41	10:03	10:08	10:08	09:55
			00:22	00:05	00:00	-00:13
	B6047 / A508 Southbound	10:06	10:56	11:02	11:02	10:25
			00:50	00:06	00:00	-00:37
	A4304 Eastbound	08:41	09:24	09:26	09:27	09:34
			00:43	00:02	00:01	00:08
	A4304 Westbound	07:36	07:47	07:50	07:50	07:42
			00:11	00:03	00:00	-00:08
	Lubenham to A6 via Great Bowden Eastbound	08:30	10:01	10:24	10:23	10:20
			01:31	00:23	-00:01	-00:04
	Lubenham to A6 via Great Bowden Westbound	08:04	08:30	08:39	08:39	08:50
			00:26	00:09	00:00	00:11
	A6 Northbound	17:50	18:55	19:04	19:03	19:10
			01:05	00:09	-00:01	00:06
	A6 Southbound	18:03	19:48	19:48	19:48	19:36
			01:45	00:00	00:00	-00:12
Interpeak Hour	B6047 / A508 Northbound	09:29	09:42	09:47	09:47	09:35
			00:13	00:05	00:00	-00:12
	B6047 / A508 Southbound	09:35	09:49	09:57	09:56	09:44
			00:14	00:08	-00:01	-00:13
	A4304 Eastbound	08:11	08:20	08:25	08:25	08:15
			00:09	00:05	00:00	-00:10
	A4304 Westbound	07:25	07:50	07:51	07:51	07:38
			00:25	00:01	00:00	-00:13
	Lubenham to A6 via Great Bowden Eastbound	08:14	08:30	08:35	08:35	08:30
			00:16	00:05	00:00	-00:05
	Lubenham to A6 via Great Bowden Westbound	07:56	08:03	08:05	08:05	08:14
			00:07	00:02	00:00	00:09
	A6 Northbound	17:04	17:51	17:54	17:54	17:56
			00:47	00:03	00:00	00:02
	A6 Southbound	16:37	17:09	17:10	17:10	17:10
			00:32	00:01	00:00	00:00
PM Peak Hour	B6047 / A508 Northbound	09:44	10:24	10:39	10:37	10:25
			00:40	00:15	-00:02	-00:14
	B6047 / A508 Southbound	09:51	10:19	10:28	10:27	10:07
			00:28	00:09	-00:01	-00:21
	A4304 Eastbound	08:34	09:44	09:55	09:53	10:03
			01:10	00:11	-00:02	00:08
	A4304 Westbound	07:48	08:26	08:31	08:30	07:51
			00:38	00:05	-00:01	-00:40
	Lubenham to A6 via Great Bowden Eastbound	08:26	10:12	10:31	10:31	10:17
			01:46	00:19	00:00	-00:14
	Lubenham to A6 via Great Bowden Westbound	08:01	08:37	08:48	08:46	08:52
			00:36	00:11	-00:02	00:04
	A6 Northbound	18:30	19:56	20:01	19:59	20:09
			01:26	00:05	-00:02	00:08
	A6 Southbound	17:08	18:31	18:28	18:27	18:14
			01:23	-00:03	-00:01	-00:14

Table 5.40: Journey Times for Base Year and 2026 Core and Option 3a Development Scenarios

		2008	Core	Option 3a	Mit. 1	Mit. 2
AM Peak Hour	B6047 / A508 Northbound	09:41	10:03	10:06	10:06	09:51
			00:22	00:03	00:00	-00:15
	B6047 / A508 Southbound	10:06	10:56	10:54	10:53	10:26
			00:50	-00:02	-00:01	-00:28
	A4304 Eastbound	08:41	09:24	09:25	09:24	09:06
			00:43	00:01	-00:01	-00:19
	A4304 Westbound	07:36	07:47	08:00	08:00	07:51
			00:11	00:13	00:00	-00:09
	Lubenham to A6 via Great Bowden Eastbound	08:30	10:01	11:17	11:17	11:12
			01:31	01:16	00:00	-00:05
	Lubenham to A6 via Great Bowden Westbound	08:04	08:30	08:55	08:55	08:58
			00:26	00:25	00:00	00:03
	A6 Northbound	17:50	18:55	19:05	19:05	19:07
			01:05	00:10	00:00	00:02
	A6 Southbound	18:03	19:48	19:55	19:51	19:46
			01:45	00:07	-00:04	-00:09
Interpeak Hour	B6047 / A508 Northbound	09:29	09:42	09:47	09:46	09:34
			00:13	00:05	-00:01	-00:13
	B6047 / A508 Southbound	09:35	09:49	09:54	09:53	09:42
			00:14	00:05	-00:01	-00:12
	A4304 Eastbound	08:11	08:20	08:38	08:38	08:25
			00:09	00:18	00:00	-00:13
	A4304 Westbound	07:25	07:50	07:58	07:59	07:48
			00:25	00:08	00:01	-00:10
	Lubenham to A6 via Great Bowden Eastbound	08:14	08:30	08:34	08:34	08:34
			00:16	00:04	00:00	00:00
	Lubenham to A6 via Great Bowden Westbound	07:56	08:03	08:09	08:08	08:15
			00:07	00:06	-00:01	00:06
	A6 Northbound	17:04	17:51	17:56	17:55	17:56
			00:47	00:05	-00:01	00:00
	A6 Southbound	16:37	17:09	17:11	17:10	17:10
			00:32	00:02	-00:01	-00:01
PM Peak Hour	B6047 / A508 Northbound	09:44	10:24	10:34	10:33	10:15
			00:40	00:10	-00:01	-00:19
	B6047 / A508 Southbound	09:51	10:19	10:23	10:22	10:06
			00:28	00:04	-00:01	-00:17
	A4304 Eastbound	08:34	09:44	09:37	09:34	09:54
			01:10	-00:07	-00:03	00:17
	A4304 Westbound	07:48	08:26	08:28	08:26	07:57
			00:38	00:02	-00:02	-00:31
	Lubenham to A6 via Great Bowden Eastbound	08:26	10:12	11:08	11:07	10:49
			01:46	00:56	-00:01	-00:19
	Lubenham to A6 via Great Bowden Westbound	08:01	08:37	09:01	09:00	09:03
			00:36	00:24	-00:01	00:02
	A6 Northbound	18:30	19:56	20:01	20:00	19:59
			01:26	00:05	-00:01	-00:02
	A6 Southbound	17:08	18:31	18:42	18:42	18:31
			01:23	00:11	00:00	-00:11

5.3.3 Change in Emissions

Using the emissions calculation contained within EASE the level of pollutants in the various scenarios has been calculated. These have been calculated for hydrocarbons, NOx, PM10, PM2.5 and carbon for

the base year, the 2026 core scenario, the three development options, and also for the two levels of mitigation for the development options.

Table 5.41, Table 5.42 and Table 5.43 give these emissions for Option 1, Option 3 and Option 3a developments with the two levels of mitigation for each for links within Market Harborough. Differences are shown between the base year and the core scenario, between the core scenario and the development option, and also between the development option and the two mitigation options.

These tables show that Mitigation 1 measures are forecast to reduce all emissions, including carbon, within Market Harborough by around 1% in all development options. With Mitigation 2 measures emission decrease from the scenario without any mitigation by between 2% and 2.5%, with carbon reducing by 1% within Market Harborough in Option 1 and Option 3. In Option 3a these reductions are larger in magnitude, with emissions reducing by around 4%, and carbon reducing by 2.7%

Table 5.41: Change in Emission in Market Harborough Due to Mitigation in Option 1 Development

	2008	Core	Option 1	Mitigation 1	Mitigation 2
Hydrocarbons (g/km/day)	**121,261**	**50,455**	**51,935**	**51,415**	**50,587**
		-58.4%	2.9%	-1.0%	-2.6%
NOx (g/km/day)	**334,798**	**73,864**	**75,616**	**74,971**	**74,012**
		-77.9%	2.4%	-0.9%	-2.1%
PM10 (g/km/day)	**25,142**	**22,766**	**23,368**	**23,154**	**22,778**
		-9.5%	2.6%	-0.9%	-2.5%
PM2.5 (g/km/day)	**17,331**	**12,628**	**12,964**	**12,844**	**12,633**
		-27.1%	2.7%	-0.9%	-2.6%
Carbon (tonnes/year)	**1,987**	**2,171**	**2,231**	**2,211**	**2,209**
		9.3%	2.8%	-0.9%	-1.0%
Carbon (£/year)	**165,286**	**257,905**	**265,043**	**262,632**	**262,399**
		56.0%	2.8%	-0.9%	-1.0%

Table 5.42: Change in Emission in Market Harborough Due to Mitigation in Option 3 Development

	2008	Core	Option 3	Mitigation 1	Mitigation 2
Hydrocarbons (g/km/day)	**121,261**	**50,455**	**51,239**	**50,741**	**50,044**
		-58.4%	1.6%	-1.0%	-2.3%
NOx (g/km/day)	**334,798**	**73,864**	**74,783**	**74,152**	**73,318**
		-77.9%	1.2%	-0.8%	-2.0%
PM10 (g/km/day)	**25,142**	**22,766**	**23,085**	**22,875**	**22,549**
		-9.5%	1.4%	-0.9%	-2.3%
PM2.5 (g/km/day)	**17,331**	**12,628**	**12,806**	**12,689**	**12,505**
		-27.1%	1.4%	-0.9%	-2.3%
Carbon (tonnes/year)	**1,987**	**2,171**	**2,219**	**2,198**	**2,198**
		9.3%	2.2%	-0.9%	-0.9%
Carbon (£/year)	**165,286**	**257,905**	**263,594**	**261,176**	**261,123**
		56.0%	2.2%	-0.9%	-0.9%

Table 5.43: Change in Emission in Market Harborough Due to Mitigation in Option 3a Development

	2008	Core	Option 3a	Mitigation 1	Mitigation 2
Hydrocarbons (g/km/day)	**121,261**	**50,455**	**48,348**	**47,808**	**46,383**
		-58.4%	-4.2%	-1.1%	-4.1%
NOx (g/km/day)	**334,798**	**73,864**	**70,273**	**69,578**	**67,901**
		-77.9%	-4.9%	-1.0%	-3.4%
PM10 (g/km/day)	**25,142**	**22,766**	**21,743**	**21,515**	**20,898**
		-9.5%	-4.5%	-1.1%	-3.9%
PM2.5 (g/km/day)	**17,331**	**12,628**	**12,064**	**11,937**	**11,591**
		-27.1%	-4.5%	-1.1%	-3.9%
Carbon (tonnes/year)	**1,987**	**2,171**	**2,068**	**2,046**	**2,012**
		9.3%	-4.8%	-1.1%	-2.7%
Carbon (£/year)	**165,286**	**257,905**	**245,646**	**243,048**	**239,086**
		56.0%	-4.8%	-1.1%	-2.7%

Figure 5.13 shows the forecast change in PM10 emission in Option 3 development with the introduction of Mitigation 1 measures. This shows that there is a small, and general, decrease in emissions in Market Harborough, displayed as light green links, with the introduction of Mitigation 1 measures. This is in-line with the highway flow changes seen for this mitigation option, and the results are similar in both Option 1 and Option 3a development.

Figure 5.13: Change in PM10 (g/km/day) from Due to Mitigation 1 in Option 3 Development

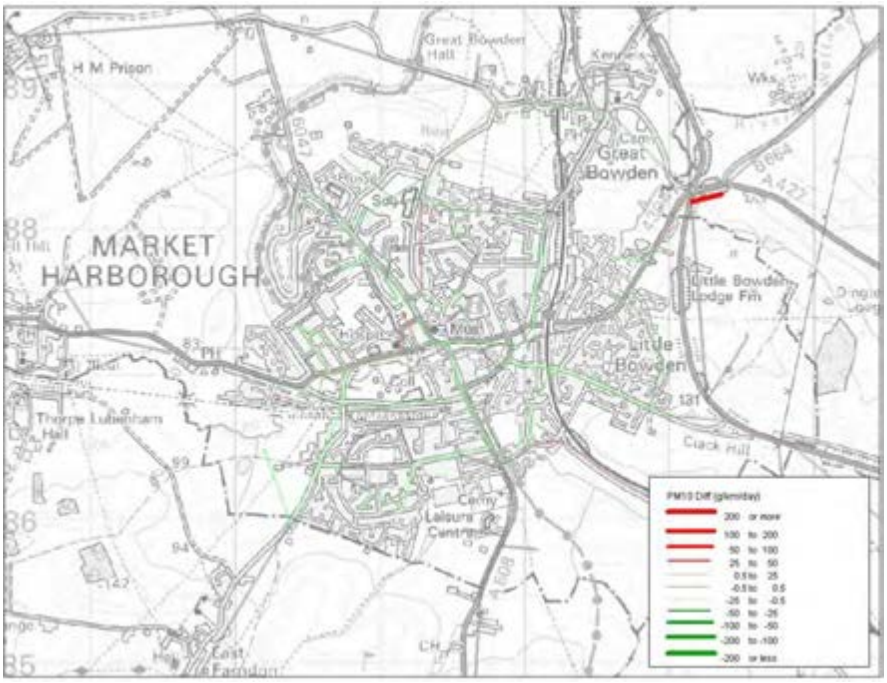


Figure 5.14 and Figure 5.15 show the change in emissions due to Mitigation 2 for NOx with Option 1 development and for hydrocarbons with Option 3a development respectively. Both these plots show a similar pattern of changes to their respective highway flow changes, with decreases on the A4304 westbound through Market Harborough and increases on the alternative routes taken by traffic.

Figure 5.14: Change in NOx (g/km/day) from Due to Mitigation 2 in Option 1 Development

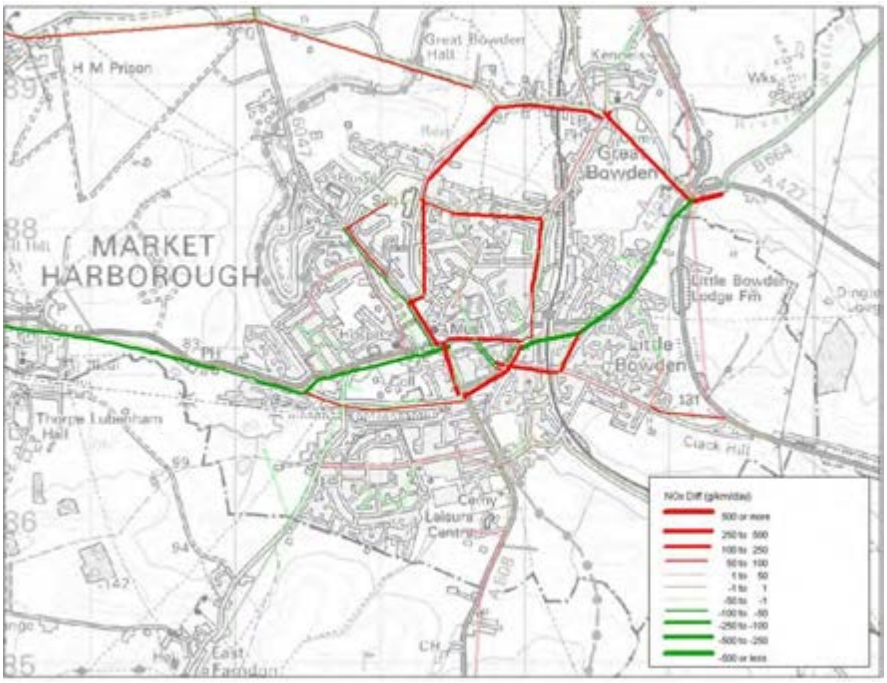
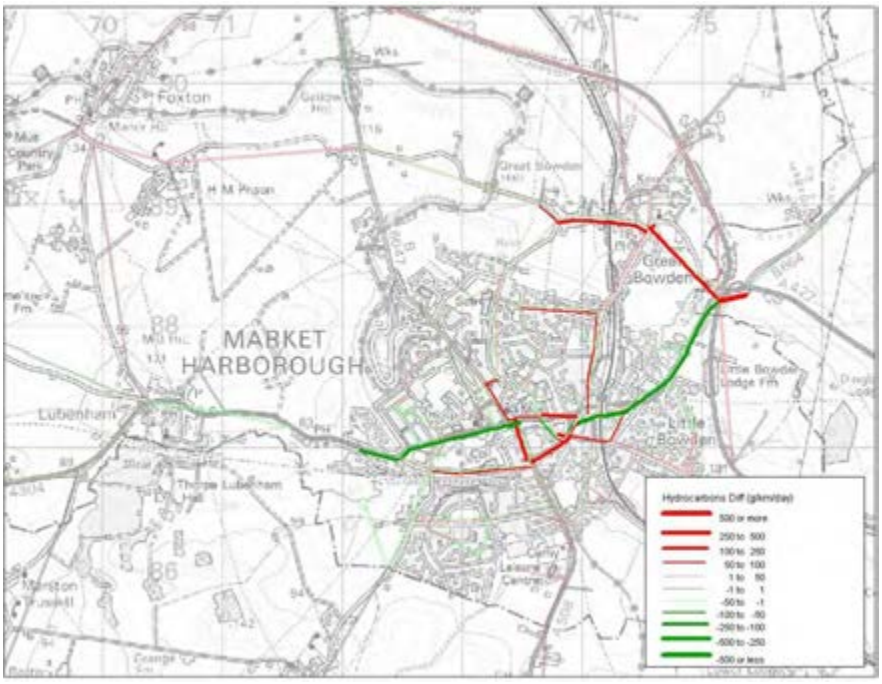


Figure 5.15: Change in Hydrocarbons (g/km/day) from Due to Mitigation 2 in Option 3a Development



Appendix A Smarter Choices Benchmarking

Evidence on the effectiveness of soft measures suggests that these can, in conjunction with hard elements, effect appreciable changes in mode share, particularly in respect of relatively short trips within inner urban areas.

There is variation in the willingness of individuals to engage with travel planning initiatives and in the extent to which they respond. Taking these variations into account, the various studies suggest that in the long term, 10 years or more, the effect of sustained smarter choice initiatives at a high level of intensity, at about £30 per person, might be as high as the reductions given in Table A.1.

Table A.1: Potential Reduction in Car Trips

Measure	Möser and Bamberg	Demonstration towns/Cairns	Synthesis
Workplace Travel Plan	18%	5%-17%	18%
School Travel Plan	10%	9% - 17%	10%
Targeted Marketing	8%	9% (5 years, moderate intensity), including school	10%

Benchmark impacts of specific measures should be derived as proportions of these upper limits by considering the intensity of application. For example, if it is proposed that workplace travel plans are to apply to 50% of the workforce in the study area, the benchmark would be a 9% reduction in commuting car trips.

A.1 Workplace Travel Pan

Currently, there is little evidence about the impacts of car clubs and car sharing schemes, and their application is not currently widespread. These initiatives are considered, therefore, as potential components of workplace travel plans. Similarly teleworking and teleconferencing are now used quite widely, although there is little evidence about their impacts, and these initiatives are therefore also treated in this guidance as potential components of workplace travel plans.

A schedule is required describing the intensity and geographic focus on investment in workplace travel plans. The scale of effectiveness assumed should be reviewed in terms of the level of investment proposed, against a benchmark cost likely to be in the region of £3 per person per year.

The level of investment and proposed allocation is summarised in Table A.2 for Leicester City, and assumed to be the same budget per head for Market Harborough. Relative to the cost benchmark, the investment proposed would be 27% in Market Harborough. On this basis the effect of workplace travel plans should be represented in terms of a:

- **5 percent reduction** in car driver home-based work trips to work places attracted to **Market Harborough**

including a:

- **1.5 percent reduction** in car passengers for home-based work trips to work places attracted to **Market Harborough**

Table A.2: Summary of Investment in Workplace Travel Plans

	Market Harborough / City
Annual investment	£200,000
Allocated to Workplace travel plans (%)	70%
Allocated Budget	£140,000
Job places	170,000
Budget / head	£0.82
Benchmark	£3 **(27%)**

A.2 School Travel Plan

A schedule is required describing the intensity and geographic focus on investment in school travel plans. The scale of effectiveness assumed should be reviewed in terms of the level of investment proposed: cost likely to be in the region of £5 per person per year.

The level of investment and proposed allocation is summarised in Table A.3 for Leicester City. Relative to the cost benchmark, the investment proposed would be 27% in Leicester City, with the same benchmark being used for Market Harborough. On this basis the effect of school travel plans should be represented by a:

- **3 percent reduction** in car driver home-based education trips attracted to **Market Harborough**

including a:

- **0.9 percent reduction** in car passengers for home-based education trips attracted to **Market Harborough**

Table A.3: Summary of Investment in School Travel Plans

	Market Harborough / City
Annual investment	£200,000
Allocated to Workplace travel plans (%)	15%
Allocated Budget	£30,000
Job places	22,000
Budget / head	£1.34
Benchmark	£5 **(27%)**

A.3 Targeted Marketing

Personalised travel planning, travel awareness campaigns, and public transport information and marketing are considered as part of this category. Due consideration should be applied in considering the relative intensity and consequent behavioural change that results from these initiatives.

A schedule is required describing the intensity and geographic focus of the personalised travel planning. The scale of effectiveness assumed should be reviewed in terms of the level of investment proposed: large scale personalised travel planning might be expected to cost £20-£30 per person per year.

The level of investment and proposed allocation for Leicester City is summarised in Table A.4, with the same effect assumed for Market Harborough. Relative to the cost benchmark for personalised travel planning, the investment proposed would be 0.4% in Market Harborough. On this basis the effect of travel awareness campaigns would be a:

- **0.4 percent reduction** in car driver trips by all purposes produced in **Market Harborough**

Table A.4: Summary of Investment in Targeted Marketing

	Market Harborough / City
Annual investment	£200,000
Allocated to Workplace travel plans (%)	15%
Allocated Budget	£20,000
Job places	218,000
Budget / head	£0.09
Benchmark	£25 **(0.4%)**

A.4 Evidence for Smarter Choices Benchmarking

***Evidence 1**: Möser and Bamberg[2] meta-analysis*

For **workplace travel plans**, the effects are the combined effects of both „soft' and associated „hard' measures (e.g. public transport improvements and parking measures). The analysis suggests that workplace travel plans would increase the overall non-car mode share by 12 percentage points. Given the base mode share (35%), this implies an increase in the number of non-car trips by 34%, or a reduction in the number of car trips by 18% on the assumption that the total number of trips stays unchanged.

For **school travel plans**, the sample reviewed by Möser and Bamberg could be divided into a small group of six best-practice schools where a lot had been achieved, and the rest, where the impacts were marginal, perhaps due to the lack of intensity of application or coordination with the „hard' measures involved (in those cases the „hard' measures were „Yellow' buses). This means that the average increase in the number of non-car trips of 7 percentage points, or the implied reduction in the number of car trips of 10% (from a base mode share of 60%), would have under-estimated the best-practice examples, but over-estimated the others in the school travel sample.

For **targeted marketing**, the analysis suggests that predominantly information and promotional campaigns would increase the overall non-car mode share by 5 percentage points. Given the base mode share (34%), this implies an increase in the number of non-car trips by 14%, or a reduction in the number of car trips by 8%.

[2] Möser, G and S Bamberg (2008). The effectiveness of soft transport policy measures: a critical assessment and meta-analysis of empirical evidence. Journal of Environmental Psychology, Vol 28, pp10-26

Table A.5: Möser and Bamberg Results

Smarter Choice Measure	Möser and Bamberg	Increase in Non-Car Trips
Workplace Travel Plan	18%	34%
School Travel Plan	10%	7%
Targeted Marketing	8%	14%

Given the nature of meta-analysis, these impacts are likely to be close to the upper limit in the possible range of impacts, especially as they take no account of induced traffic effects.

***Evidence 2**: Sloman et al[3] reported the outcome of smarter choice measures the DfT Demonstration towns (Worcester, Peterborough and Darlington)*

Scheme costs were about £10/person/year (£11 in 2009 prices), with investment spread broadly as follows:

- Work place travel plans (3-10% of costs) with just over 10% of workforce employed in company with active plan
- School travel plans (20-30% of costs) with 25-55% of pupils attending schools with active plans
- Personal travel planning (30-45% of costs) with 25-45% of population provided with information
- Walking and cycling information and facilities (20-25% of costs); note Darlington was also cycling demonstration town.
- Travel awareness (5-10% of costs)
- Public transport information and marketing (10-15% of costs)

A decrease in car driver trip of 9% was observed across the three owns, compared with a national reduction in comparable towns. This was focussed on the inner area with limited changes in traffic counts in outer areas, and car driver kilometres reducing by 5-7%.

Limited evidence of a change in total trips (reduced by between 0.5% and 1.8% across three towns), and changes in trips by mode for residents were:

- Car driver (-10.7 to -12.4 per 124 trips made by 100 residents per day)
- Car passenger (-2.2 to -5.1, per 63 trips)
- Bus (-1.8 to +5.3 per 20 trips)
- Cycle (1.5 to 1.7, per 9 trips); Darlington with cycle demonstration town investment (5.1)
- Walk (8.7 to 9.6, per 72 trips)

Very limited information was collected on work travel plans; for the employers surveys there was an average reduction in car driver trips of 3.5%. This is substantially lower than previous reviews, e.g. Cairns[4] summarised reduction of 17.8%.

[3] Sloman L, Cairns S, Newson C, Anable J, Pridmore A, Goodwin P; Feb 2010, The Effects of Smarter Choice Programmes in the Sustainable Travel Towns; DfT

[4] Cairns S, Sloman L, Newson C,Anable J,Kirkbride A, Goodwin P; July 2004; Smarter Choices – Changing the Way We Travel; DfT

Between 9% and 17% reduction in car based trips to school, across (nearly) all schools, not just those with an active travel plan.

Appendix B Derivation of Long-Stay Parking ASCs

As part of Mitigation 2, a reduction of 25% in the number of long-stay parking spaces in Market Harborough is to be represented. Without the parking model being calibrated for Market Harborough, this effect has to be modelled by the use of alternative specific constants (ASCs). These have only been applied to home-based trips, and for certain time-period-pairs in order to best represent the likely effect of this intervention.

In order to define the time-period-pairs to which the ASCs are to be applied, the off-street average stays in Leicester have been used as an approximation of the lengths of stay for Market Harborough. These average lengths of stay are given by purpose in Table B.1. The Harborough District Parking Strategy Report (October 2008) states that long-stay parking is parking over 4 hours in duration, and the time-period-pairs for each purpose that fall above this threshold have been highlight in Table B.1. It is to these time-period-pairs that the ASCs have been applied.

Table B.1: Leicester Off-Street Average Stays by Purpose

	Commuting	Education	Business	Shopping	Other
OP-OP	2.0	2.0	2.0	2.0	2.0
OP-AM	5.3	4.6	3.1	2.1	2.6
OP-IP	5.0	5.0	5.0	5.0	5.0
OP-PM	14.0	14.0	14.0	14.0	14.0
AM-AM	1.0	1.0	1.0	1.0	1.0
AM-IP	5.3	4.6	3.1	2.1	2.6
AM-PM	8.6	10.3	8.0	8.0	7.2
AM-OP	10.5	10.5	10.5	10.5	10.5
IP-IP	4.7	2.8	1.4	1.5	1.4
IP-PM	3.0	2.0	2.8	1.5	2.0
IP-OP	8.5	7.5	4.6	6.4	8.6
PM-PM	1.0	1.0	1.0	1.0	1.0
PM-OP	5.3	2.5	2.5	1.0	2.3

Using the standard logit formulation, the proportion of demand choosing to use the long-stay parking sites can be given by:

$$P = \frac{e^{-\lambda c_i}}{A + e^{-\lambda c_i}}$$

where;

P is the proportion of demand using the long-stay parking sites in the „base case'

λ is the destination sensitivity parameter for a given segment

c_i is the cost over parking options

A is the cost of all non-parking sites options

Rearranging this equation gives:

$$P = \frac{e^{-\lambda c_i}}{A + e^{-\lambda c_i}}$$
$$\Rightarrow P\left(A + e^{-\lambda c_i}\right) = e^{-\lambda c_i}$$
$$\Rightarrow (1-P)e^{-\lambda c_i} = AP$$
$$\Rightarrow e^{-\lambda c_i} = \frac{AP}{1-P}$$
$$\Rightarrow -\lambda c_i = \ln\left(\frac{AP}{1-P}\right)$$

Now if $\hat{P}$ is the proportion of demand using the long-stay parking sites with the reduction in spaces by 25, with costs of $\hat{c}_i$, then

$$-\lambda \hat{c}_i = \ln\left(\frac{A\hat{P}}{1-\hat{P}}\right)$$

Considering the change in cost required to create this change in demand, then

$$-\lambda \Delta c_i = \ln\left(\frac{A\hat{P}}{1-\hat{P}}\right) - \ln\left(\frac{AP}{1-P}\right)$$
$$= \ln\left(\frac{\hat{P}}{1-\hat{P}}\right) - \ln\left(\frac{P}{1-P}\right)$$

Now assuming that the proportion of demand using car parking is small in comparison to overall demand, then $1-P \approx 1$. Substituting this gives

$$-\lambda \Delta c_i = \ln\left(\hat{P}\right) - \ln\left(P\right)$$
$$= \ln\left(\frac{\hat{P}}{P}\right)$$

$$\Rightarrow \Delta c_i = -\frac{1}{\lambda}\ln\left(\frac{\hat{P}}{P}\right)$$

Now in this scheme we want to reduce the number of long-stay parking sites by 25%, therefore $\frac{\hat{P}}{P} = 0.75$, so

$$\Delta c_i = -\frac{1}{\lambda}\ln\left(0.75\right)$$

If we applied the ASCs generated by this formula to all attractions to the town centre, this would reduce all demand to the town centre by 25%. We want to apply this reduction to the subset of demand that is using long-stay parking. Using the Option 3 reference demand, there are a total of 1,217 attractions to the four zones that make up Market Harborough town centre (5704, 5718, 5726 and 5731).

According to the Harborough District Parking Strategy Report there are 223 long-stay spaces in Market Harborough. Assuming that each space is used between once and twice a day, and taking an average usage of 1.5 times, this would suggest that the 233 spaces cater for 335 attractions in a given day, or 27.5% of the total attractions to these zones.

Assuming we apply our calculated ASC to all demand, we would get the following change in demand:

$$\Delta D = \frac{\hat{D}}{D} = e^{-\lambda \Delta c_i}$$

But we only want to apply this to a proportion of demand, 27.5%, so we want a new ASC, B, which creates a change in demand of $1-(1-\Delta D)*0.275$. Therefore

$$e^{-\lambda B} = 1-(1-\Delta D)*0.275$$

$$\Rightarrow B = -\frac{1}{\lambda}\ln(1-(1-\Delta D)*0.275)$$

$$\Rightarrow B = -\frac{1}{\lambda}\ln(1-(1-e^{-\lambda \Delta c_i})*0.275)$$

Using the distribution sensitivity parameters in the model, and applying this formula gives the following values for the ASCs by purpose:

Table B.2: Market Harborough Long-Stay Parking ASCs

	ASC
Commuting	1.38
Education	0.88
Business	1.74
Other	0.91
Shopping	0.94

Appendix C Highway Flow Changes Due to Development

This appendix contains the SATURN flow difference plots between the 2026 core and the three development options. These plots are for the 2026 forecast for the AM Peak hour, interpeak hour and PM Peak hour. Green values represent an increase in flow as a result of the development, whereas blue indicates a decrease in flow.

It is worth noting that SATURN does not show differences where the links are not the same in the two models. This is particularly relevant adjacent to the development to the north-west of Market Harborough, as the network changes in this area to accommodate the development.

Option 1 Development

Figure C.1: 2026 AM Peak Hour Flow Change Due to Option 1 Development

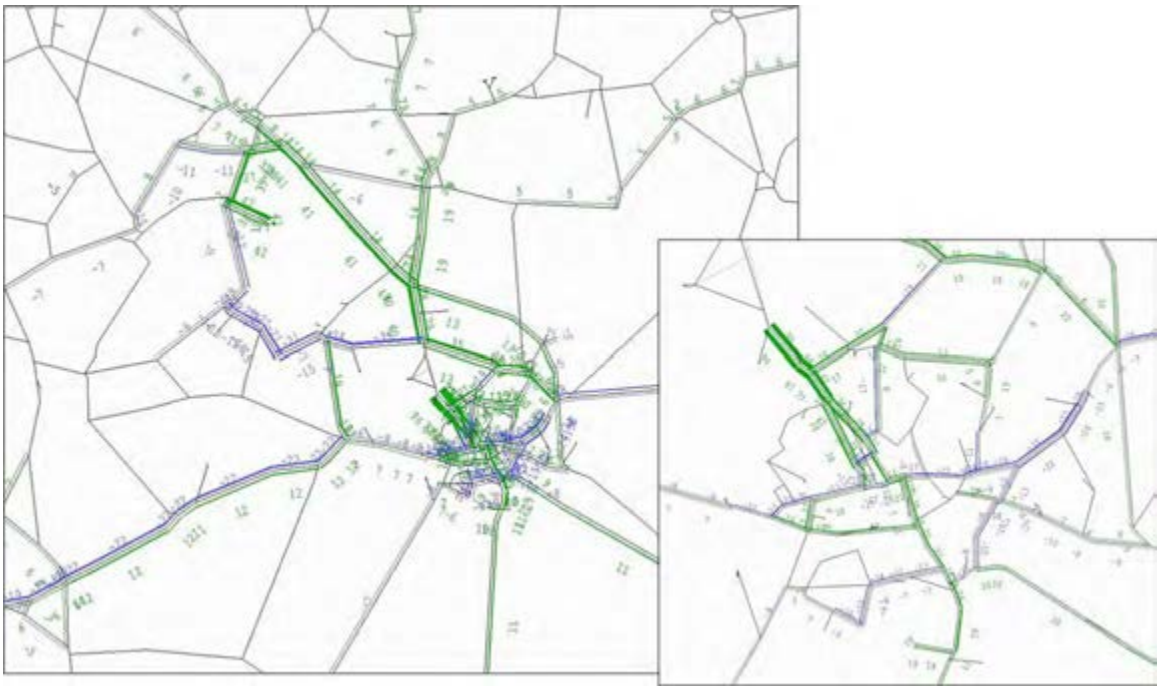


Figure C.2: 2026 Interpeak Hour Flow Change Due to Option 1 Development

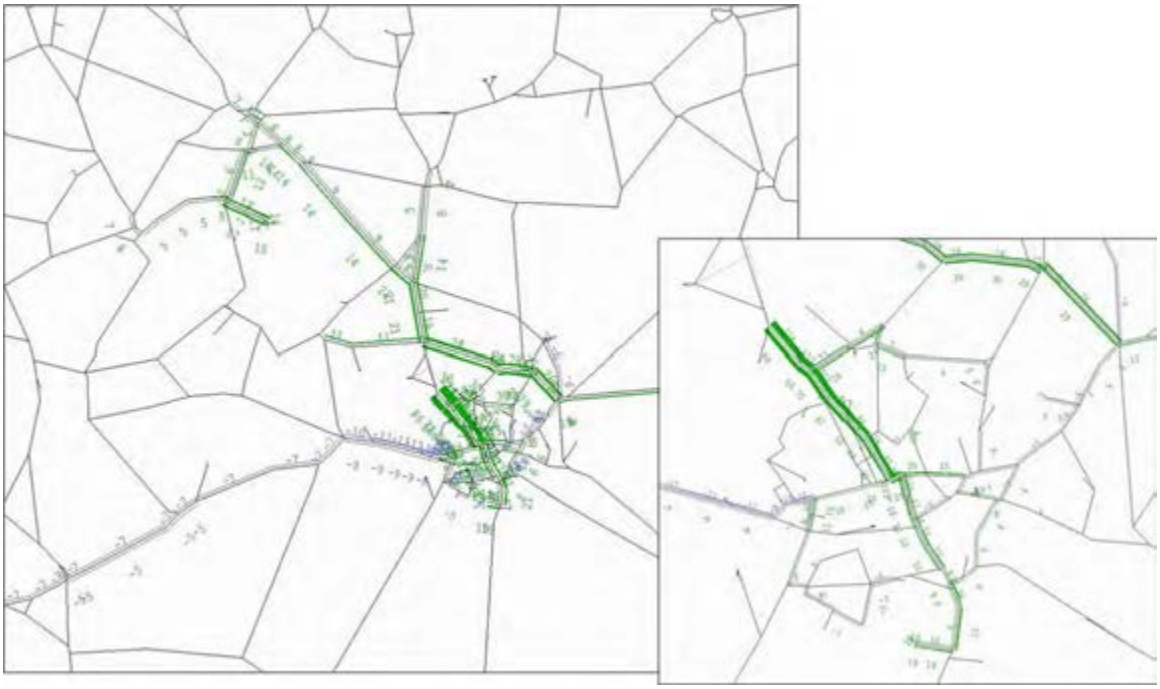


Figure C.3: 2026 PM Peak Hour Flow Change Due to Option 1 Development

Option 3 Development

Figure C.4: 2026 AM Peak Hour Flow Change Due to Option 3 Development

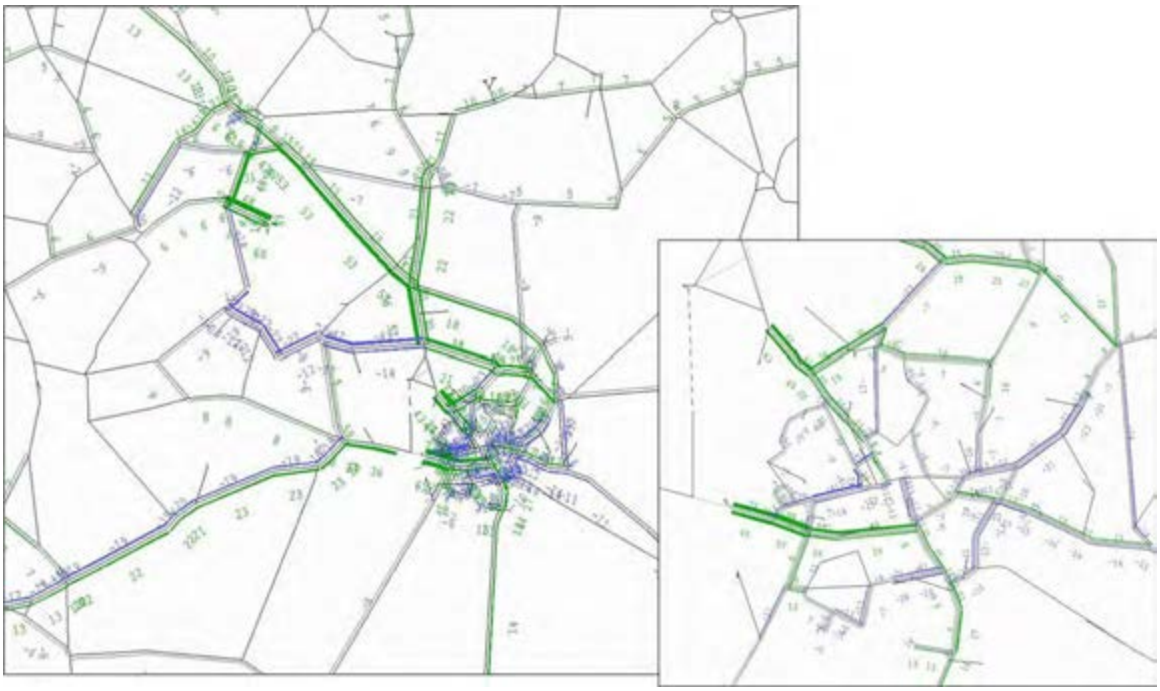


Figure C.5: 2026 Interpeak Hour Flow Change Due to Option 3 Development

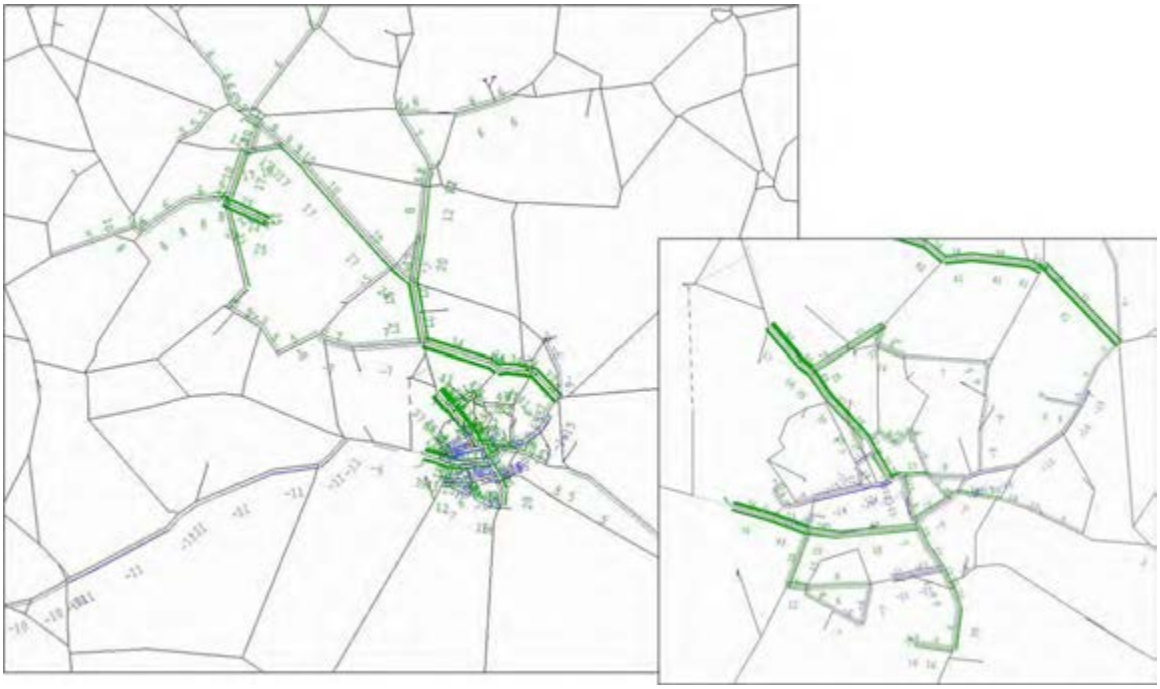
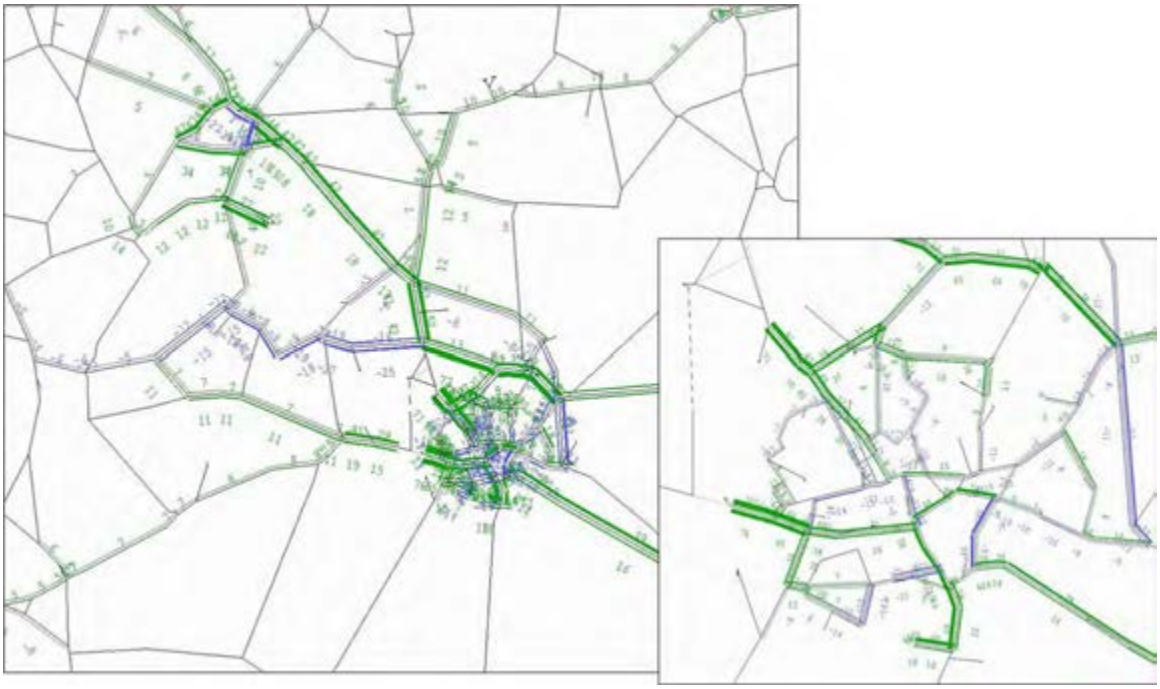


Figure C.6: 2026 PM Peak Hour Flow Change Due to Option 3 Development



Option 3a Development

Figure C.7: 2026 AM Peak Hour Flow Change Due to Option 3a Development

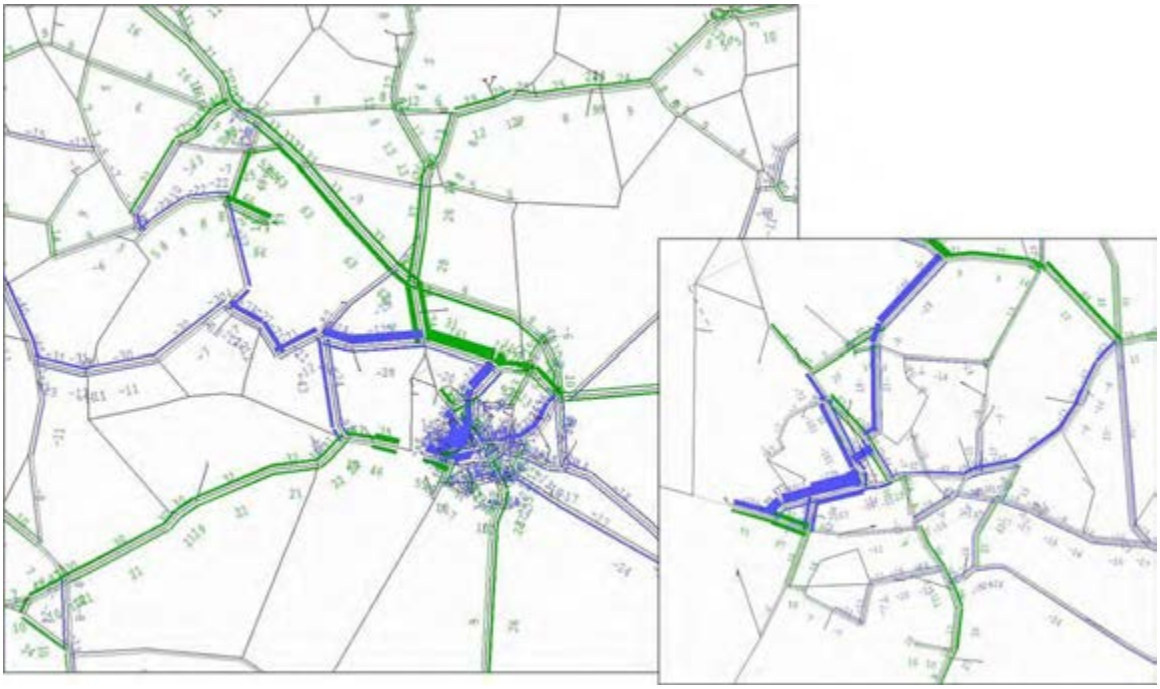


Figure C.8: 2026 Interpeak Hour Flow Change Due to Option 3a Development

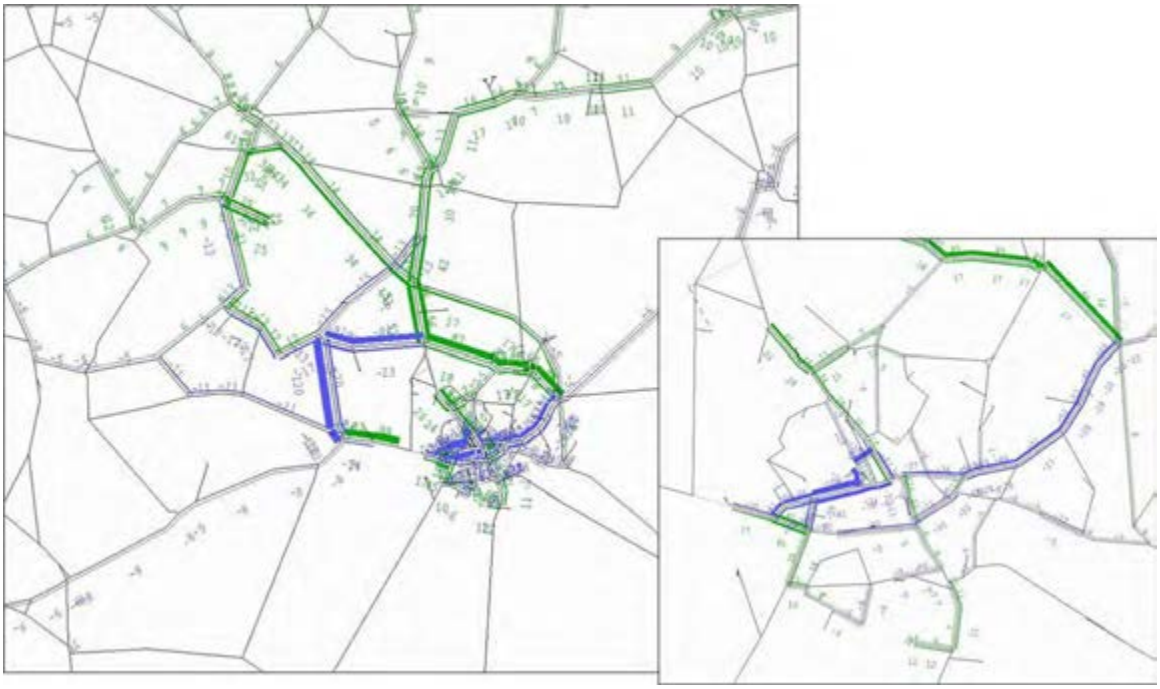
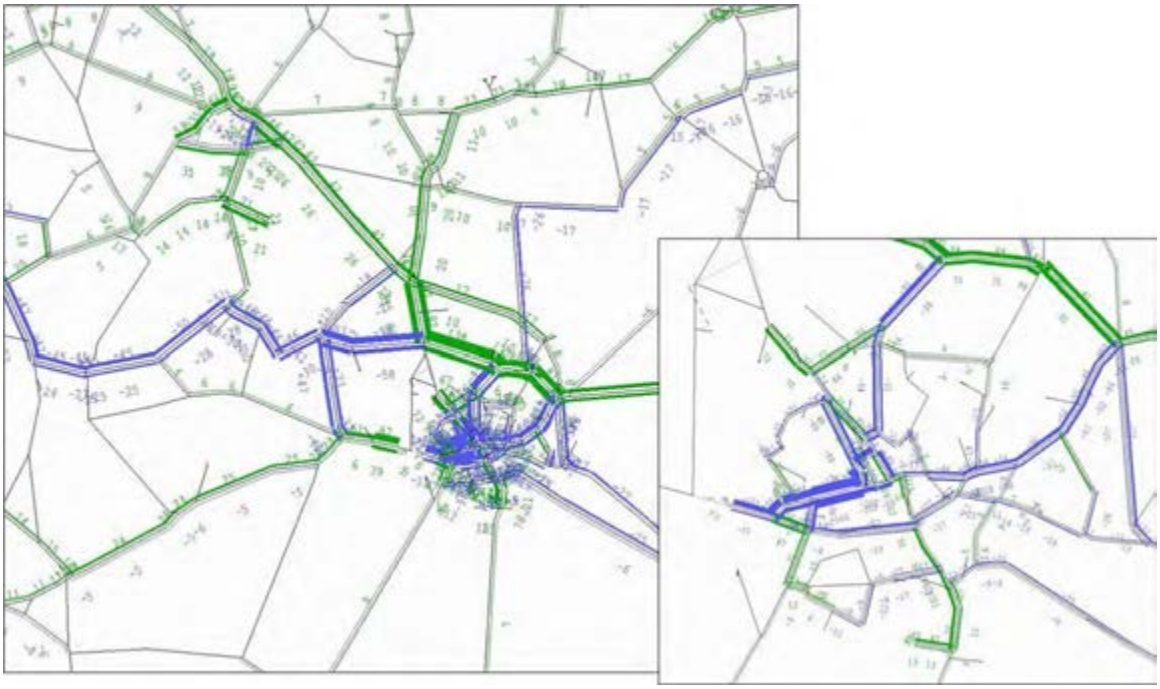


Figure C.9: 2026 PM Peak Hour Flow Change Due to Option 3a Development



Appendix D Highway Flow Changes Due to Mitigation 1

This appendix contains the SATURN flow difference plots between each development scenario without any mitigation and the corresponding development option with Mitigation 1 measures. These plots are for the 2026 forecast for the AM Peak hour, interpeak hour and PM Peak hour. Green values represent an increase in flow as a result of the development, whereas blue indicates a decrease in flow.

Mitigation 1 consist of an increase in bus frequency for service 44, improvements to the cycling and walking network, and Smarter Choices initiatives.

Option 1 Mitigation 1

Figure D.1: 2026 AM Peak Hour Flow Change in Option 1 Due to Mitigation 1

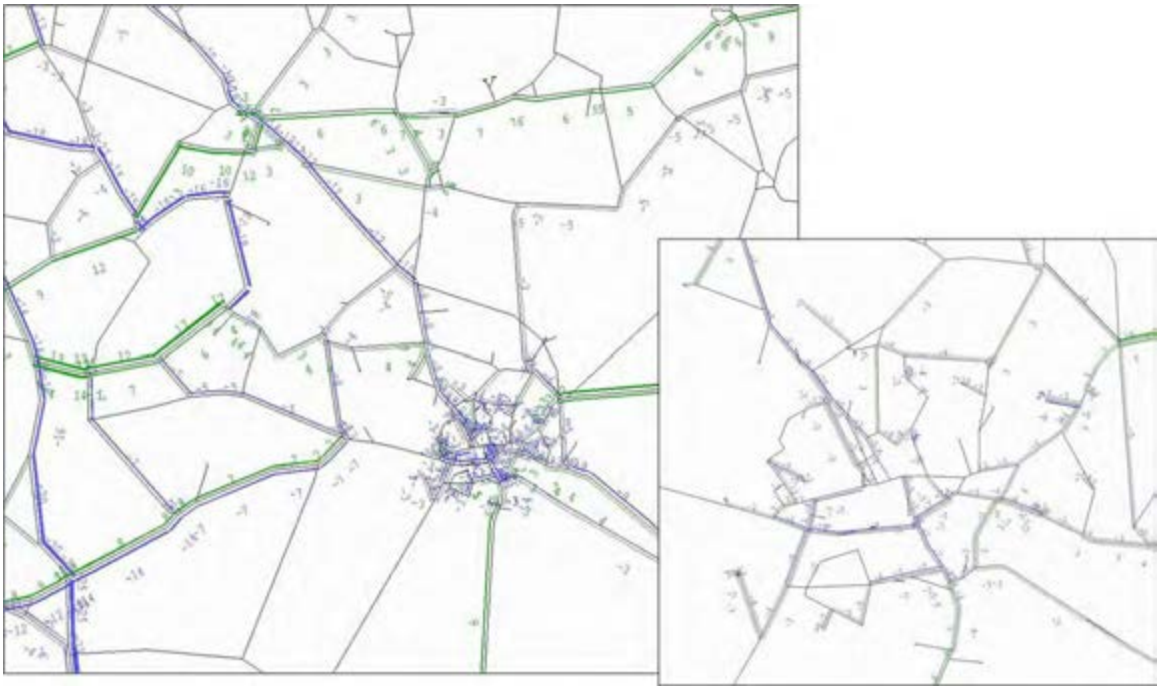
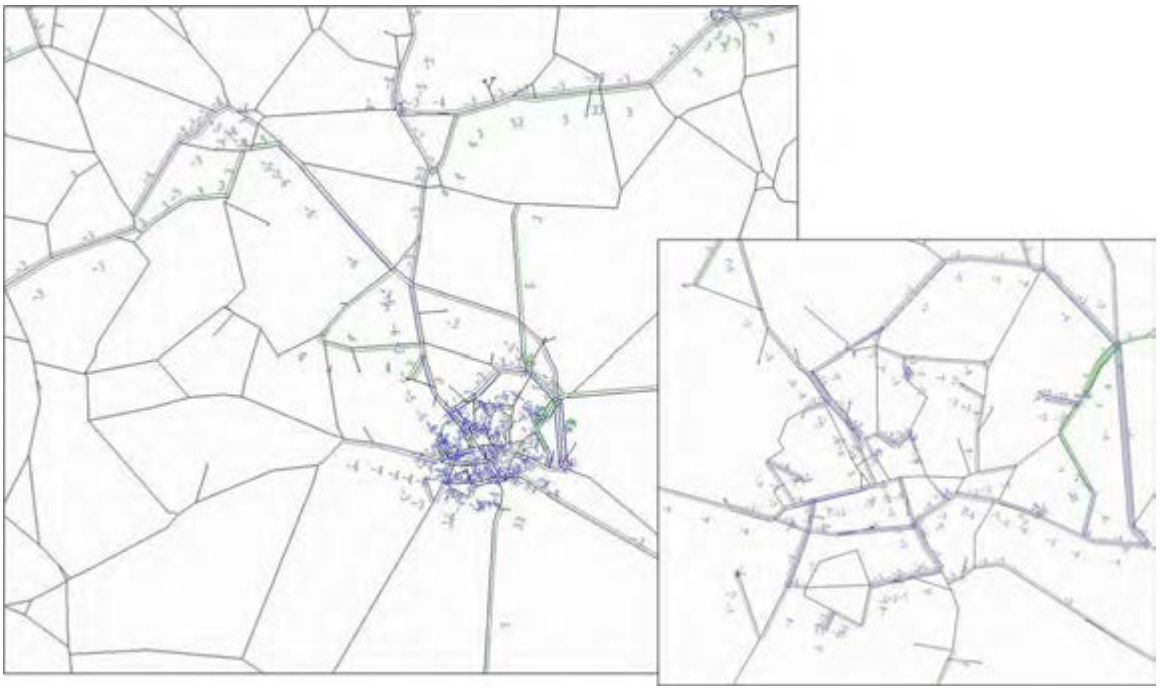


Figure D.2: 2026 Interpeak Hour Flow Change in Option 1 Due to Mitigation 1

Figure D.3: 2026 PM Peak Hour Flow Change in Option 1 Due to Mitigation 1



Option 3 Mitigation 1

Figure D.4: 2026 AM Peak Hour Flow Change in Option 3 Due to Mitigation 1

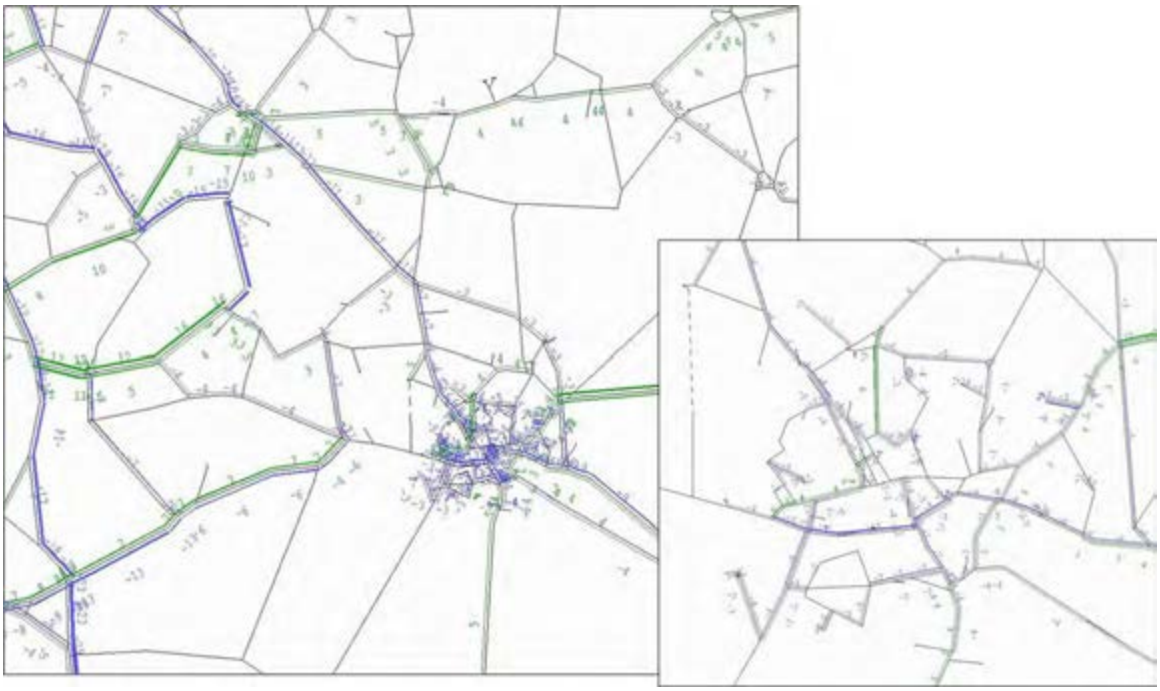


Figure D.5: 2026 Interpeak Hour Flow Change in Option 3 Due to Mitigation 1

Figure D.6: 2026 PM Peak Hour Flow Change in Option 3 Due to Mitigation 1

Option 3a Mitigation 1

Figure D.7: 2026 AM Peak Hour Flow Change in Option 3a Due to Mitigation 1

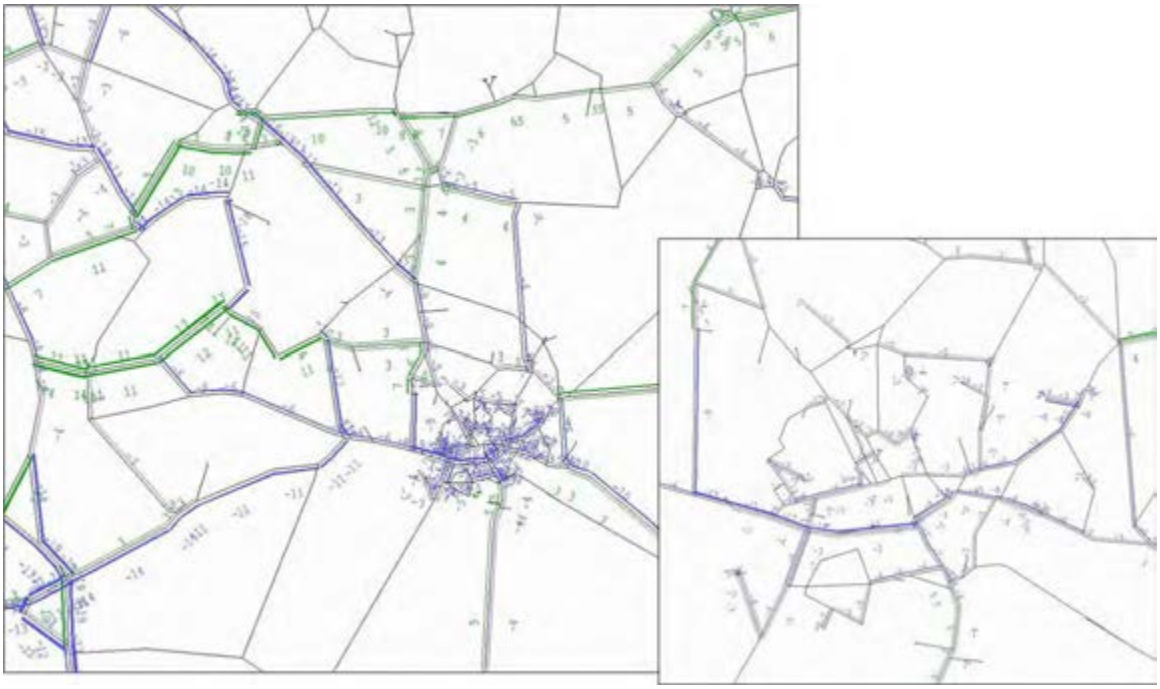


Figure D.8: 2026 Interpeak Hour Flow Change in Option 3a Due to Mitigation 1

Figure D.9: 2026 PM Peak Hour Flow Change in Option 3a Due to Mitigation 1

Appendix E Highway Flow Changes Due to Mitigation 2

This appendix contains the SATURN flow difference plots between each development scenario without any mitigation and the corresponding development option with Mitigation 2 measures. These plots are for the 2026 forecast for the AM Peak hour, interpeak hour and PM Peak hour. Green values represent an increase in flow as a result of the development, whereas blue indicates a decrease in flow.

Mitigation 2 consists of the measures included in Mitigation 1 plus making St Mary's Road one way in the eastbound direction between The Square and Kettering Road, imposing a 7.5 tonnes limit on Welland Park Road, an increase in service frequency for the X3 bus service, and a 25% reduction in the number of long-stay parking spaces in the town centre.

Option 1 Mitigation 2

Figure E.1: 2026 AM Peak Hour Flow Change in Option 1 Due to Mitigation 2

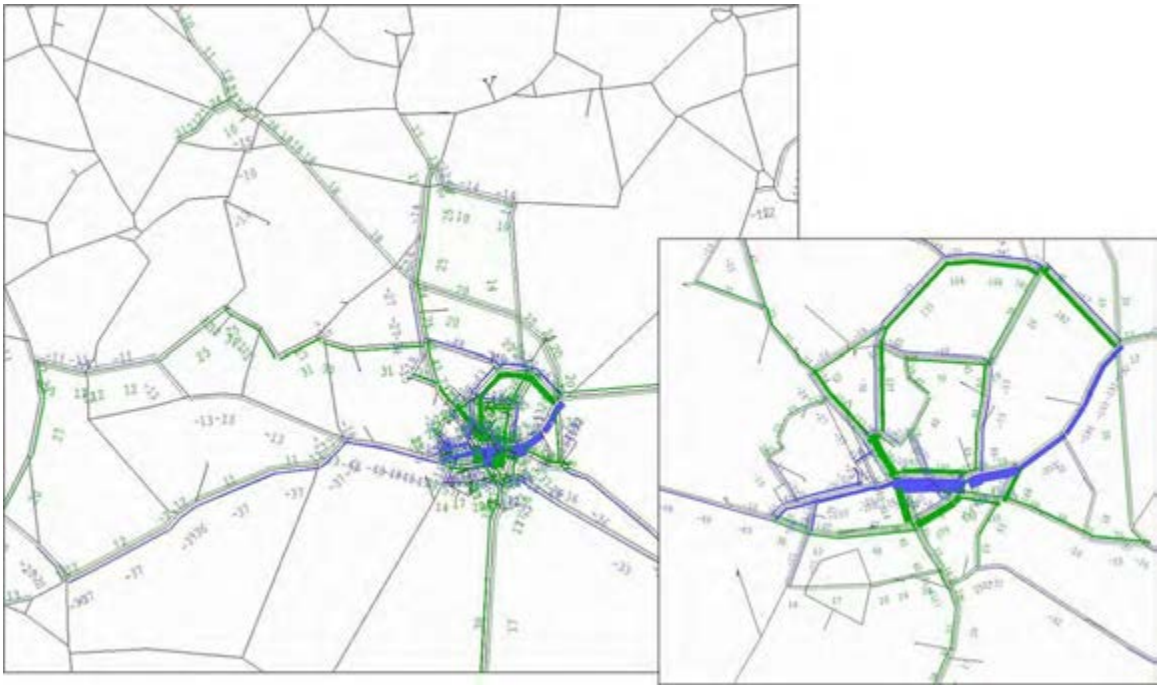


Figure E.2: 2026 Interpeak Hour Flow Change in Option 1 Due to Mitigation 2

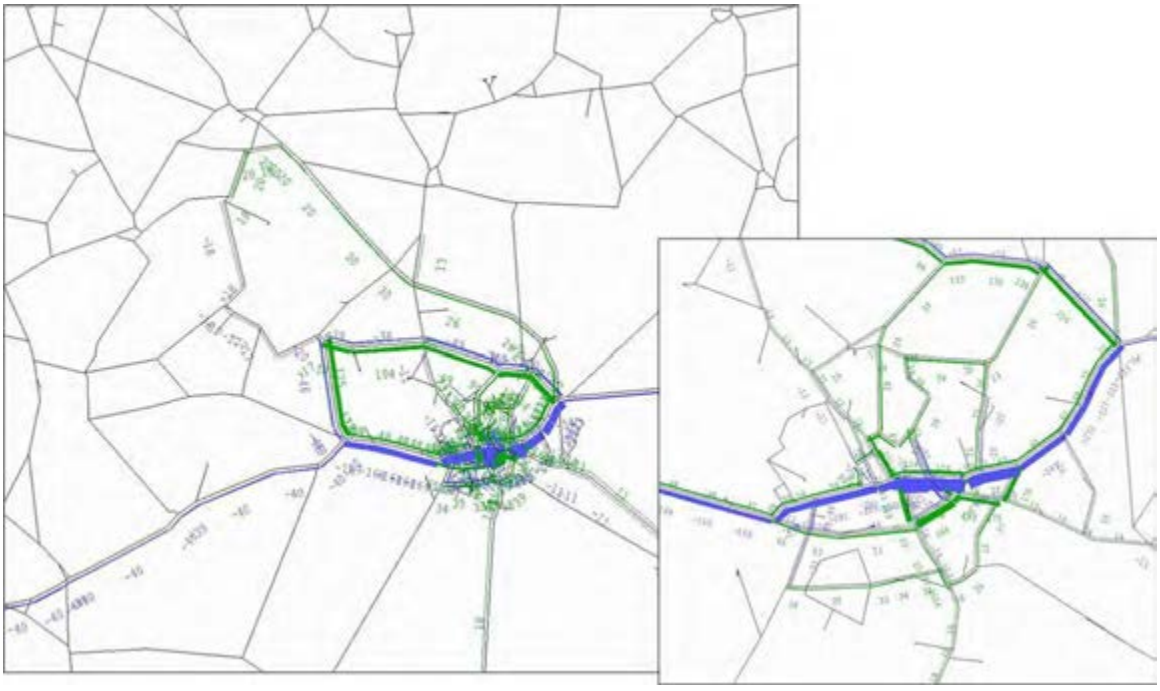
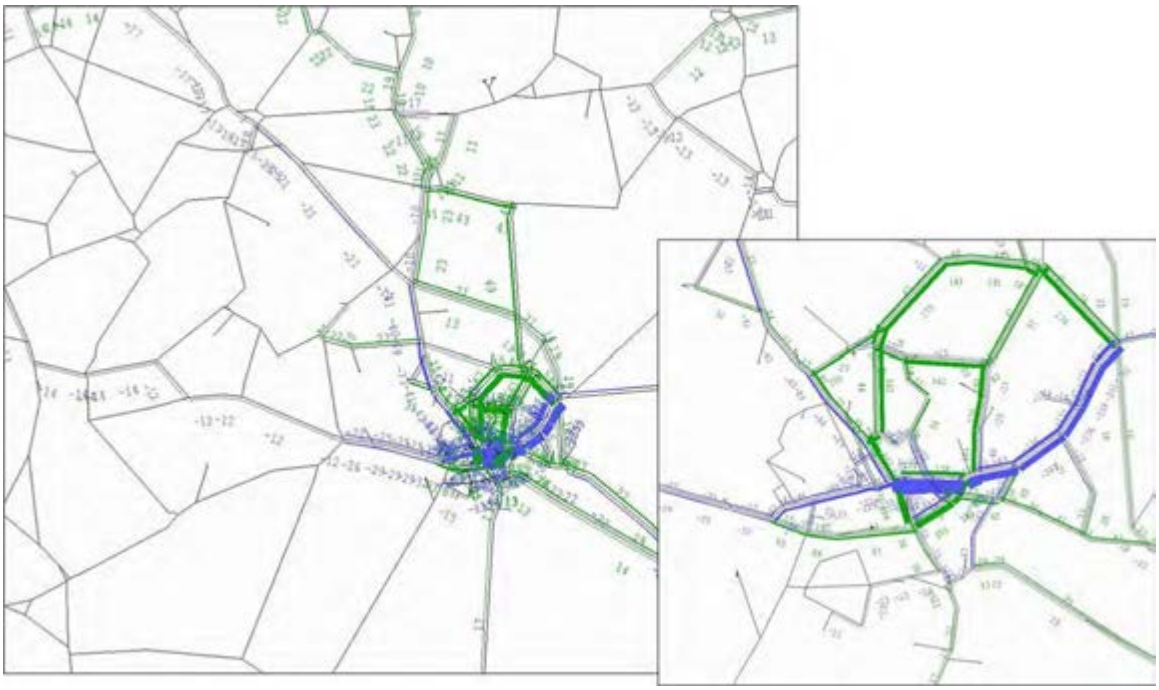


Figure E.3: 2026 PM Peak Hour Flow Change in Option 1 Due to Mitigation 2



Option 3 Mitigation 2

Figure E.4: 2026 AM Peak Hour Flow Change in Option 3 Due to Mitigation 2

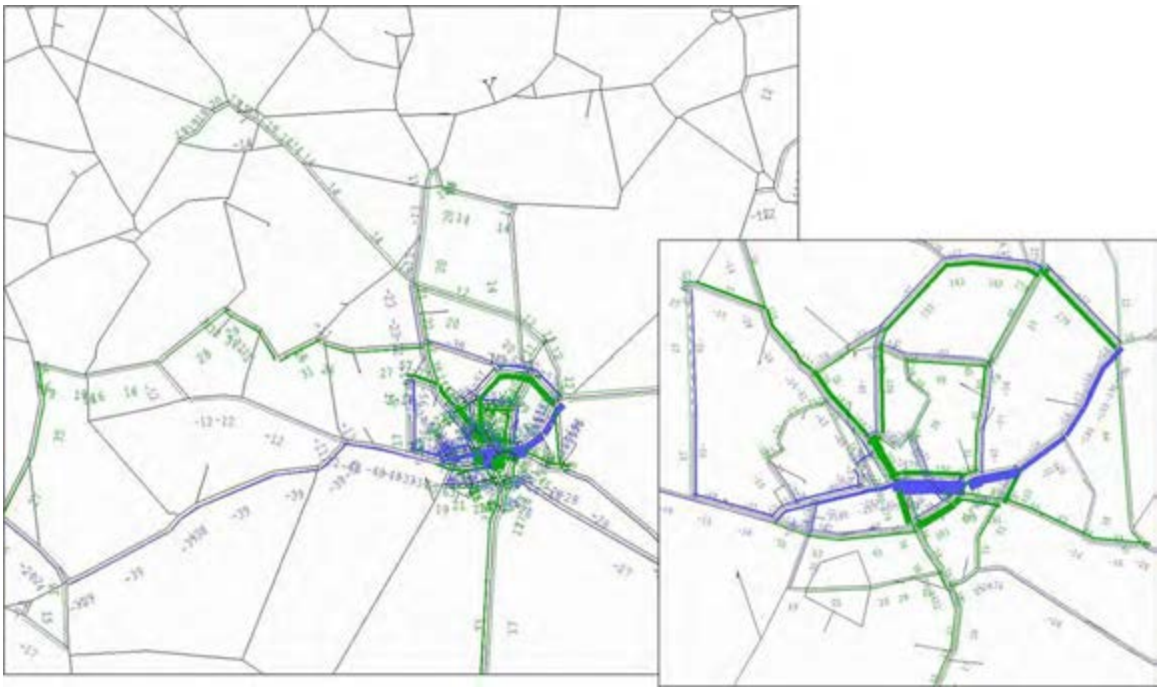


Figure E.5: 2026 Interpeak Hour Flow Change in Option 3 Due to Mitigation 2

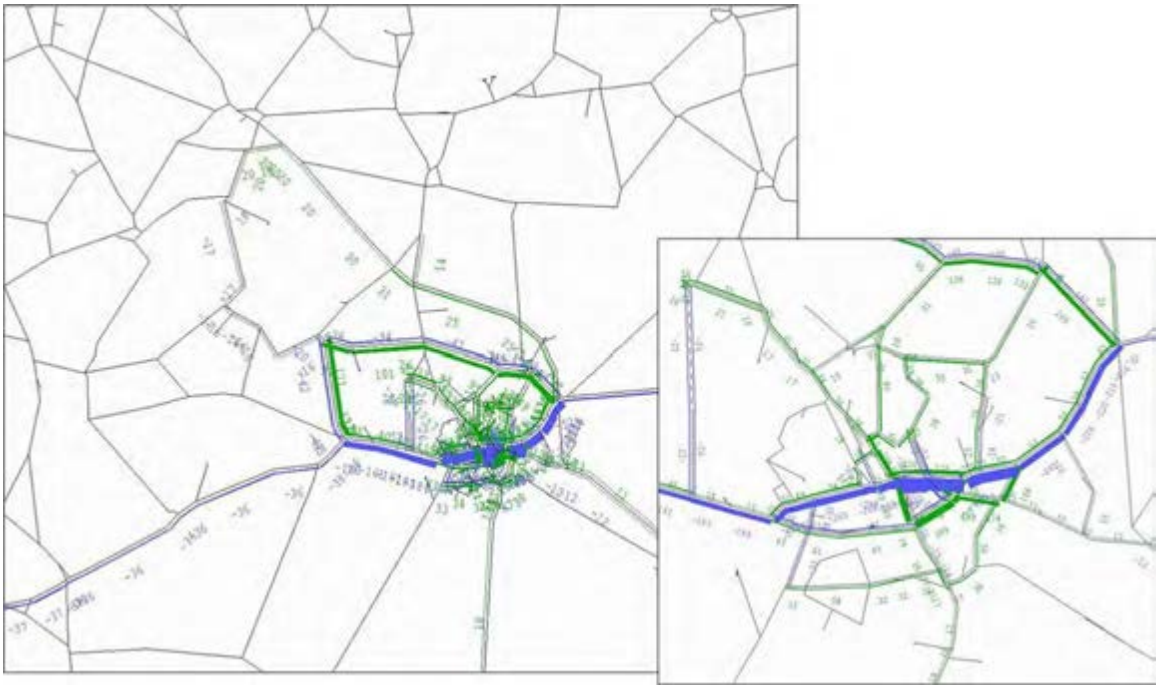
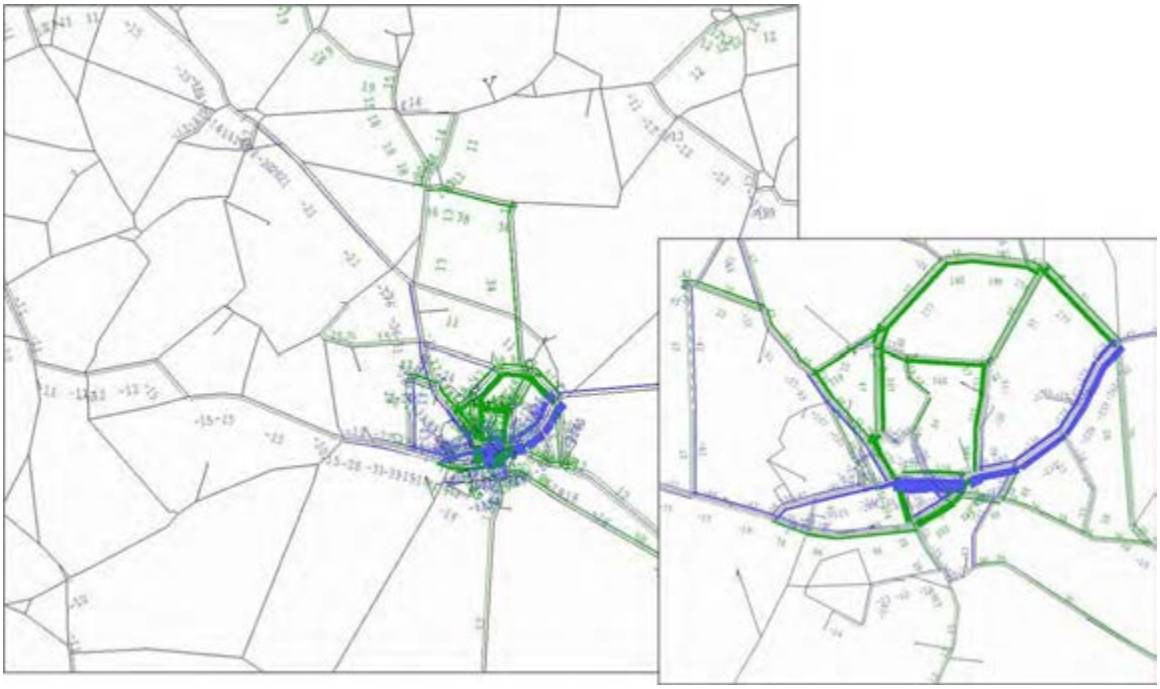


Figure E.6: 2026 PM Peak Hour Flow Change in Option 3 Due to Mitigation 2



Option 3a Mitigation 2

Figure E.7: 2026 AM Peak Hour Flow Change in Option 3a Due to Mitigation 2

Figure E.8: 2026 Interpeak Hour Flow Change in Option 3a Due to Mitigation 2

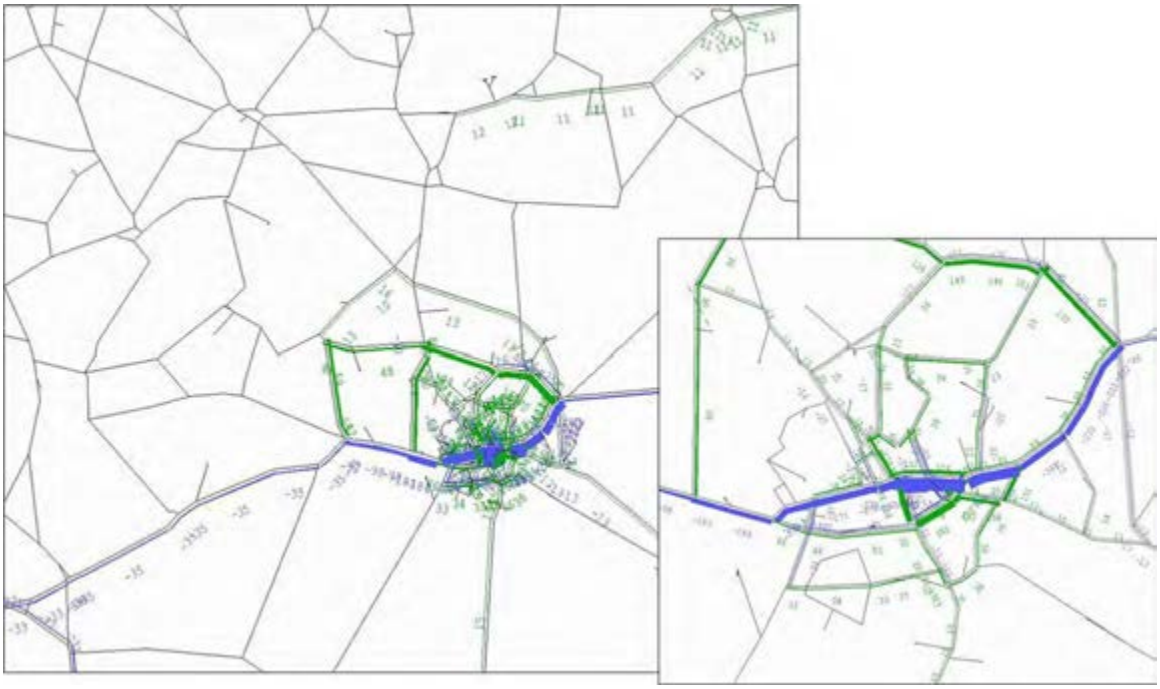


Figure E.9: 2026 PM Peak Hour Flow Change in Option 3a Due to Mitigation 2

Appendix F Public Transport Flow Changes Due to Development

This appendix contains the CUBE flow difference plots between the 2026 core and the three development options. These plots are for the 2026 forecast for the AM Peak hour, interpeak hour and PM Peak hour, and show the flow changes in bus passenger flows in and around Market Harborough. Green values represent an increase in flow as a result of the development, whereas blue indicates a decrease in flow.

It is worth noting that CUBE shows a decrease in flow where the links are not the same in the two models. This is particularly relevant adjacent to the development as the network changes in this area to accommodate the development.

Option 1 Development

Figure F.1: 2026 AM Peak Hour Bus Passenger Flow Change Due to Option 1 Development

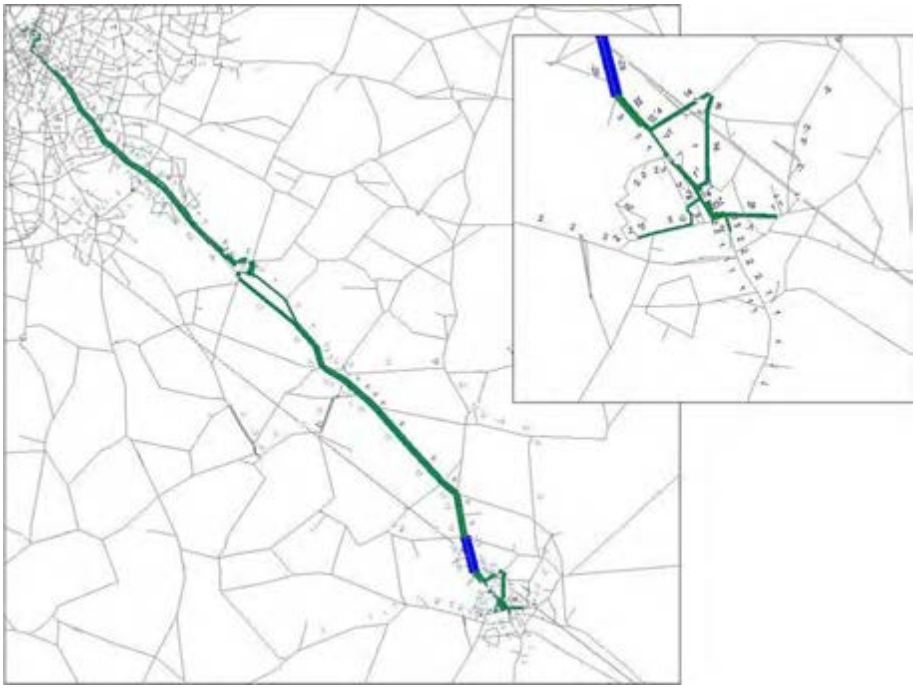


Figure F.2: 2026 Interpeak Hour Bus Passenger Flow Change Due to Option 1 Development

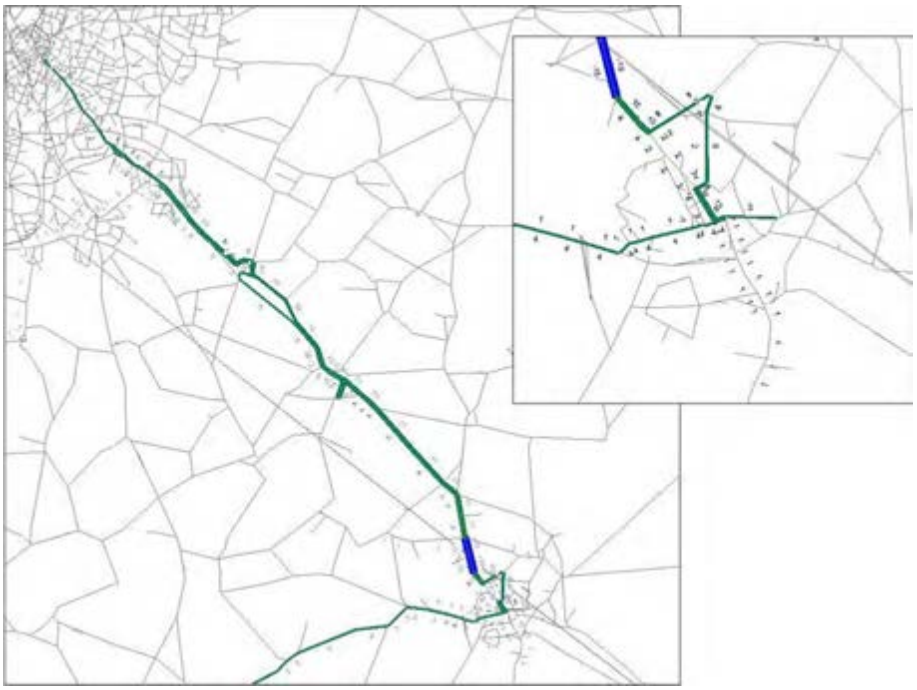
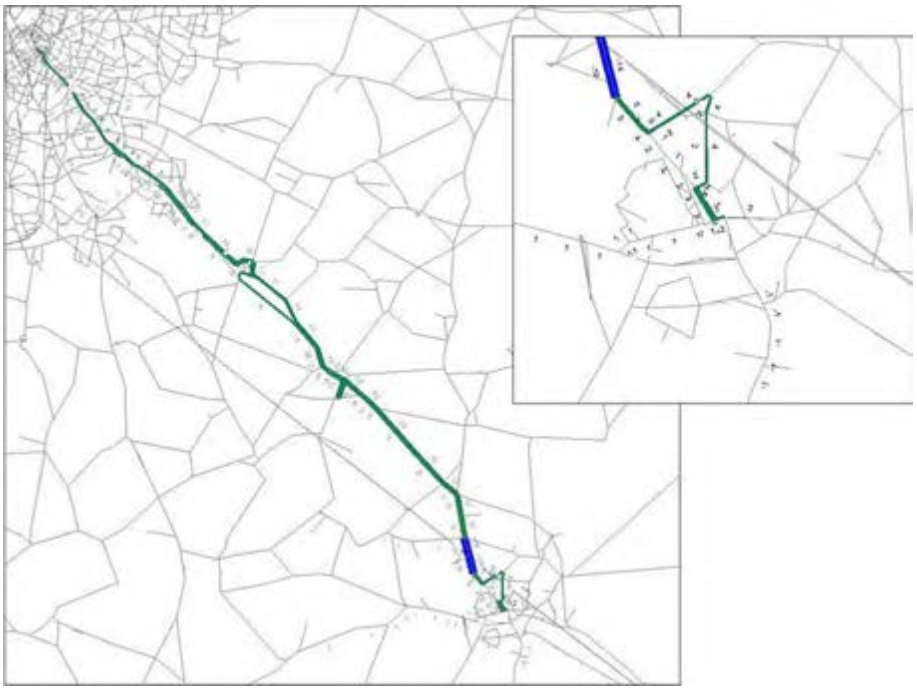


Figure F.3: 2026 PM Peak Hour Bus Passenger Flow Change Due to Option 1 Development



Option 3 Development

Figure F.4: 2026 AM Peak Hour Bus Passenger Flow Change Due to Option 3 Development

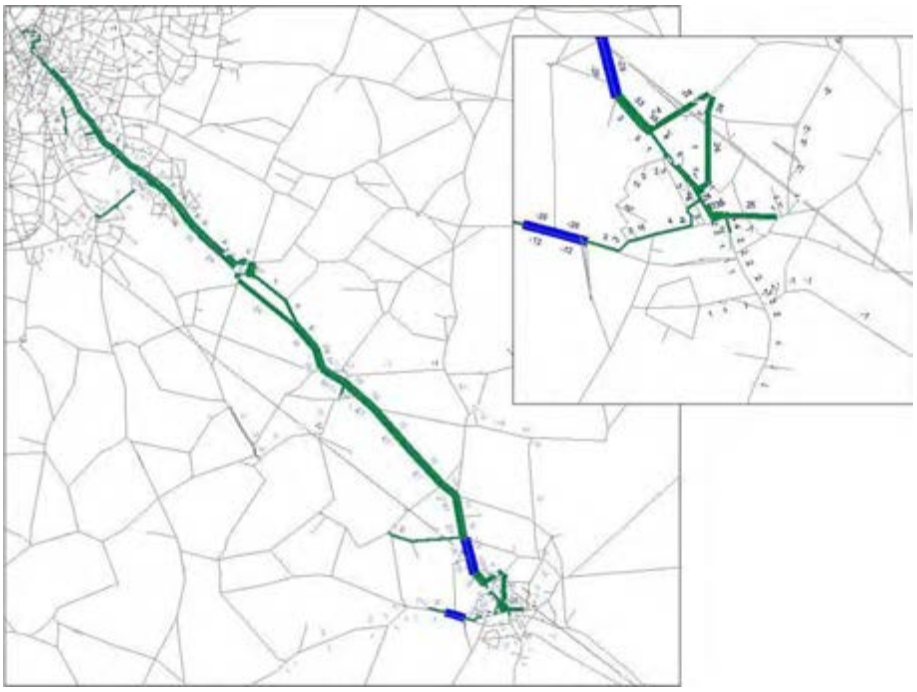


Figure F.5: 2026 Interpeak Hour Bus Passenger Flow Change Due to Option 3 Development

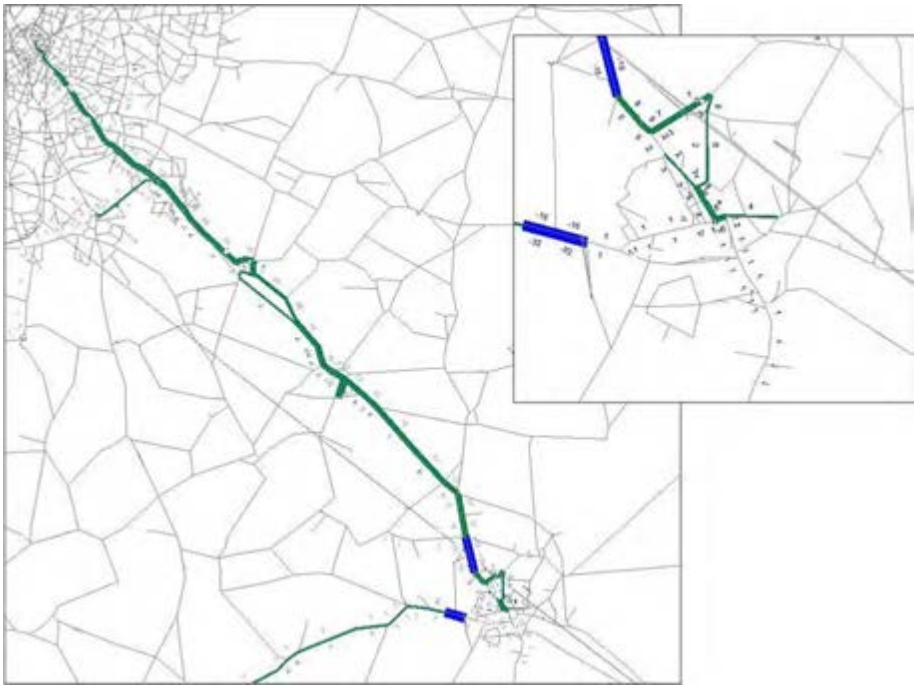
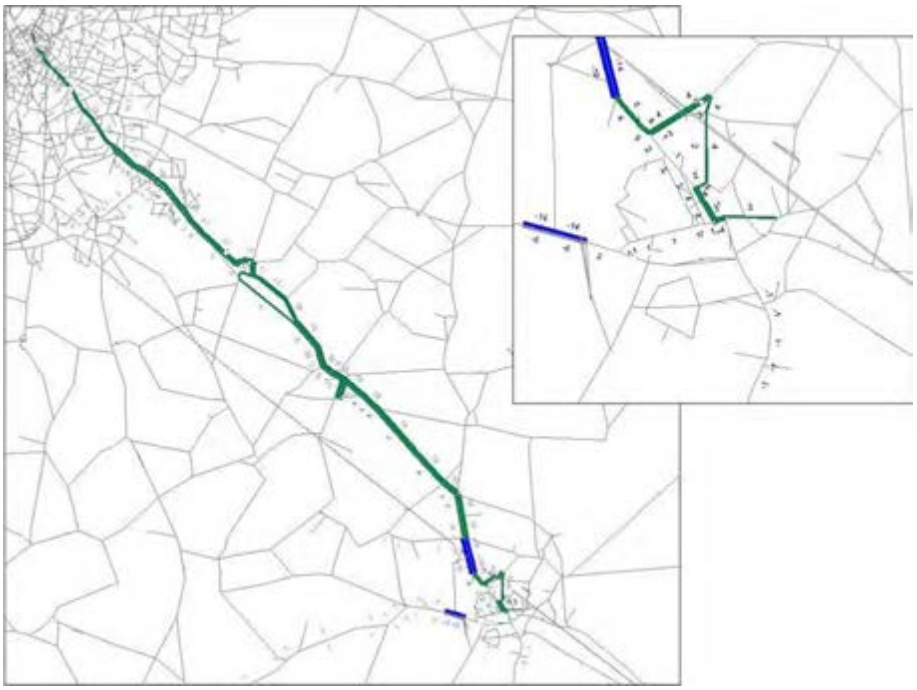


Figure F.6: 2026 PM Peak Hour Bus Passenger Flow Change Due to Option 3 Development



Option 3a Development

Figure F.7: 2026 AM Peak Hour Bus Passenger Flow Change Due to Option 3a Development

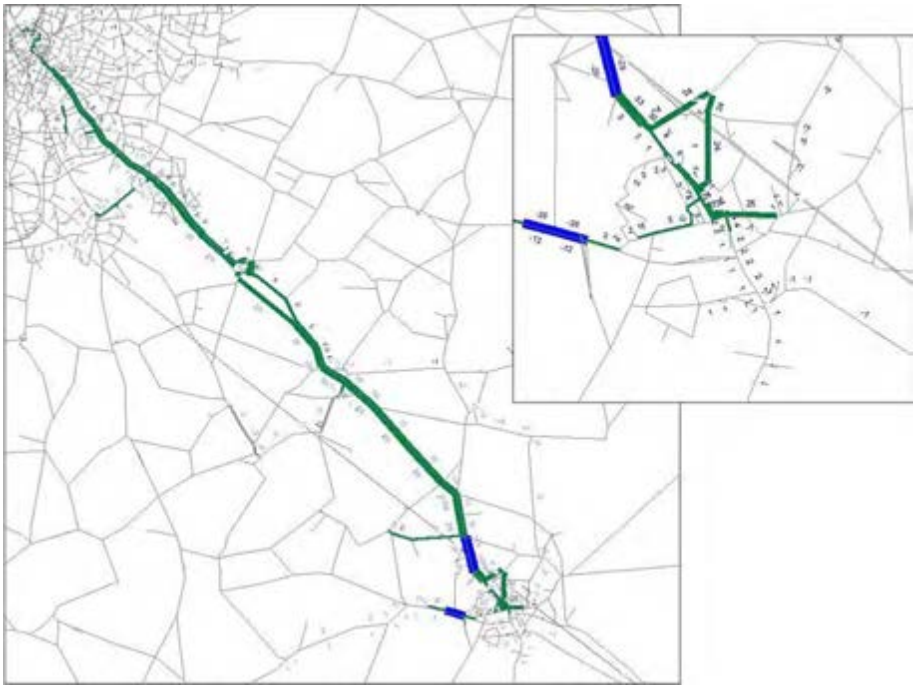


Figure F.8: 2026 Interpeak Hour Bus Passenger Flow Change Due to Option 3a Development

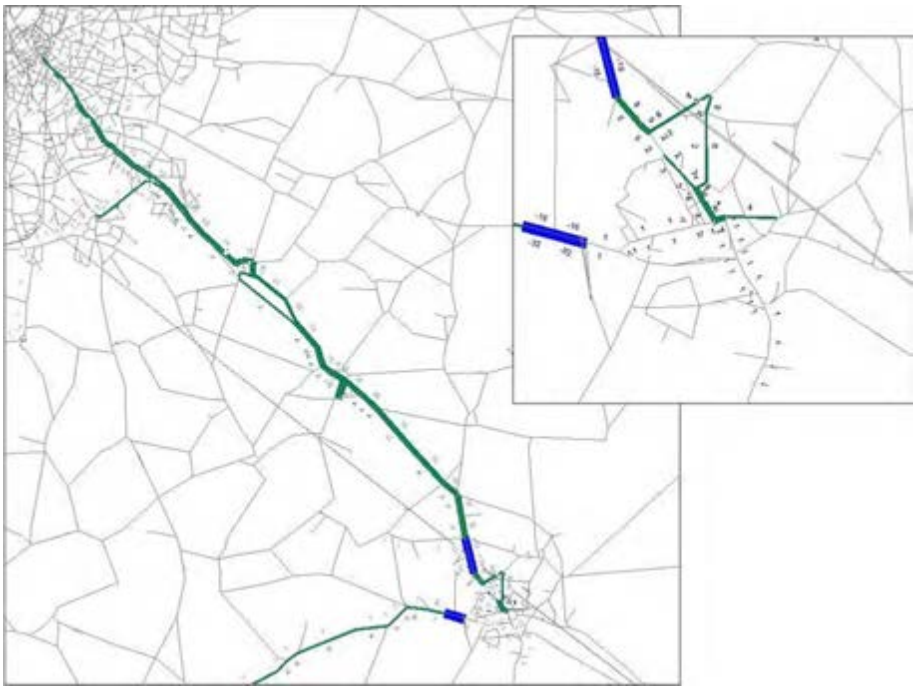
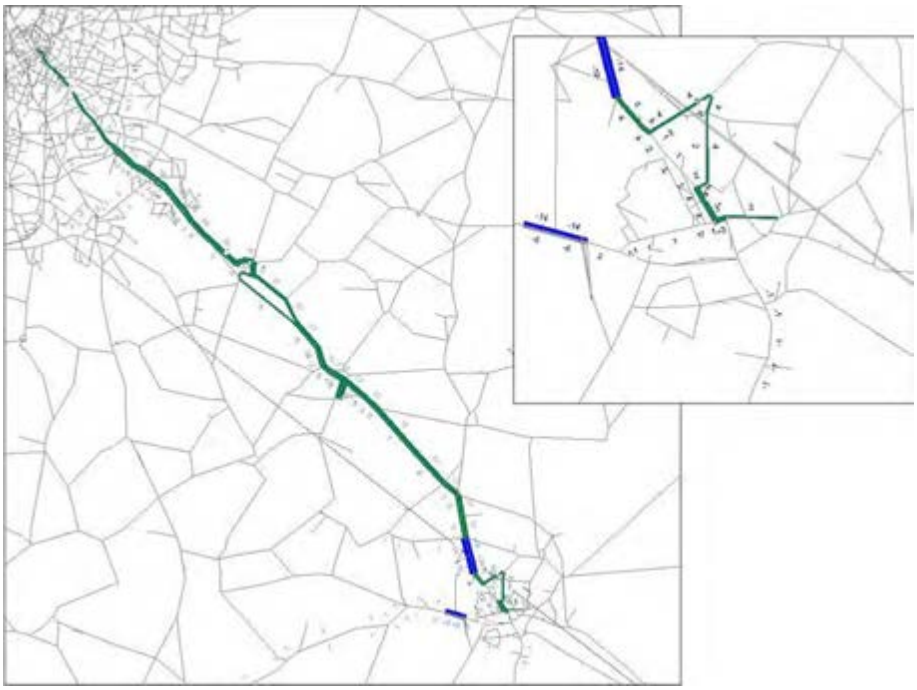


Figure F.9: 2026 PM Peak Hour Bus Passenger Flow Change Due to Option 3a Development



Appendix G Public Transport Flow Changes Due to Mitigation 1

This appendix contains the CUBE bus passenger flow difference plots between each development scenario without any mitigation and the corresponding development option with Mitigation 1 measures. These plots are for the 2026 forecast for the AM Peak hour, interpeak hour and PM Peak hour. Green values represent an increase in flow as a result of the development, whereas blue indicates a decrease in flow.

Mitigation 1 consist of an increase in bus frequency for service 44, improvements to the cycling and walking network, and Smarter Choices initiatives.

Option 1 Mitigation 1

Figure G.1: 2026 AM Peak Hour Bus Passenger Flow Change in Option 1 Due to Mitigation 1

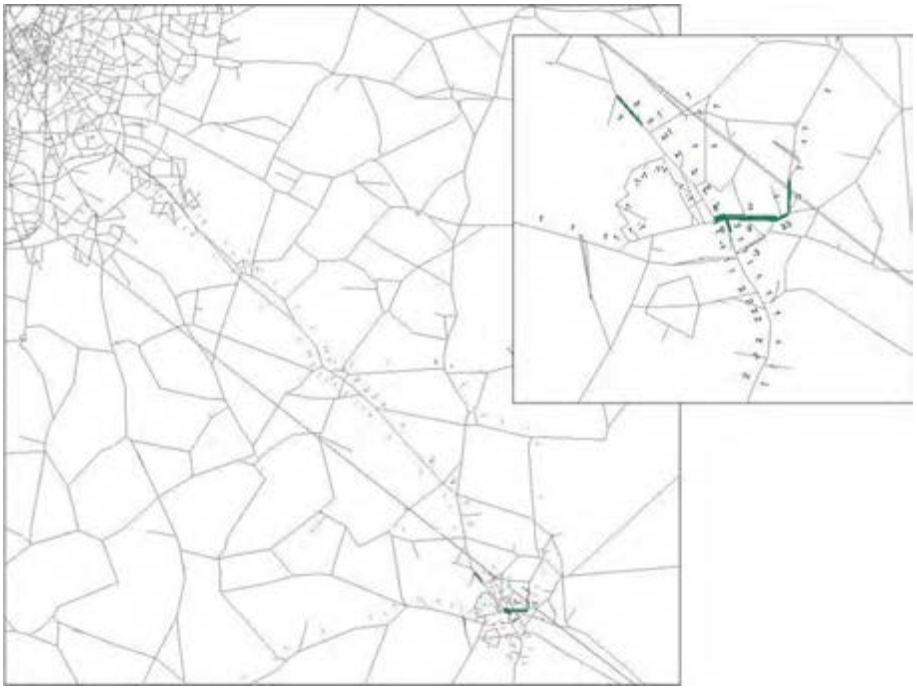


Figure G.2: 2026 Interpeak Hour Bus Passenger Flow Change in Option 1 Due to Mitigation 1

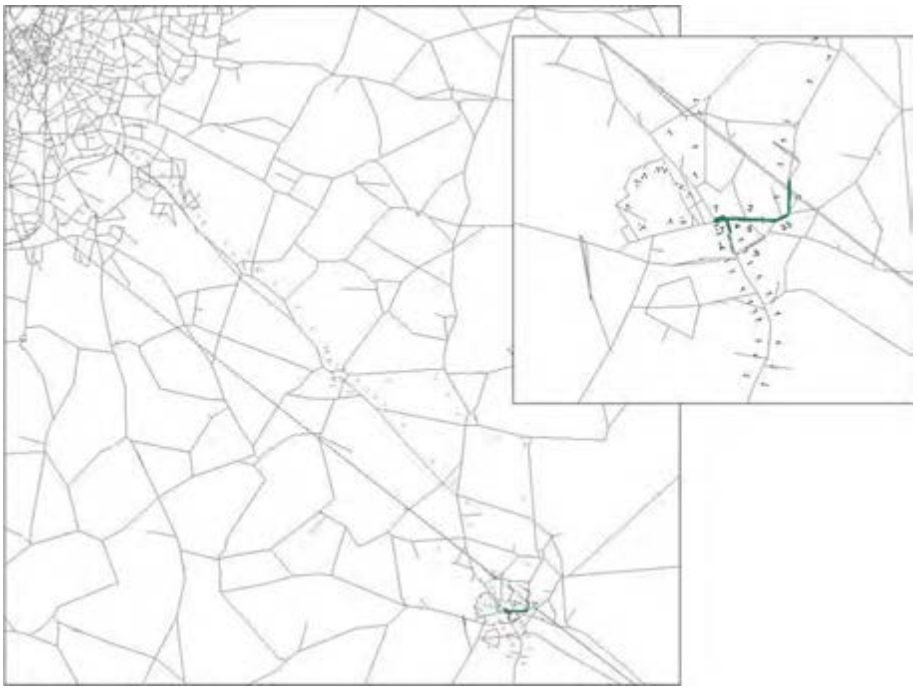
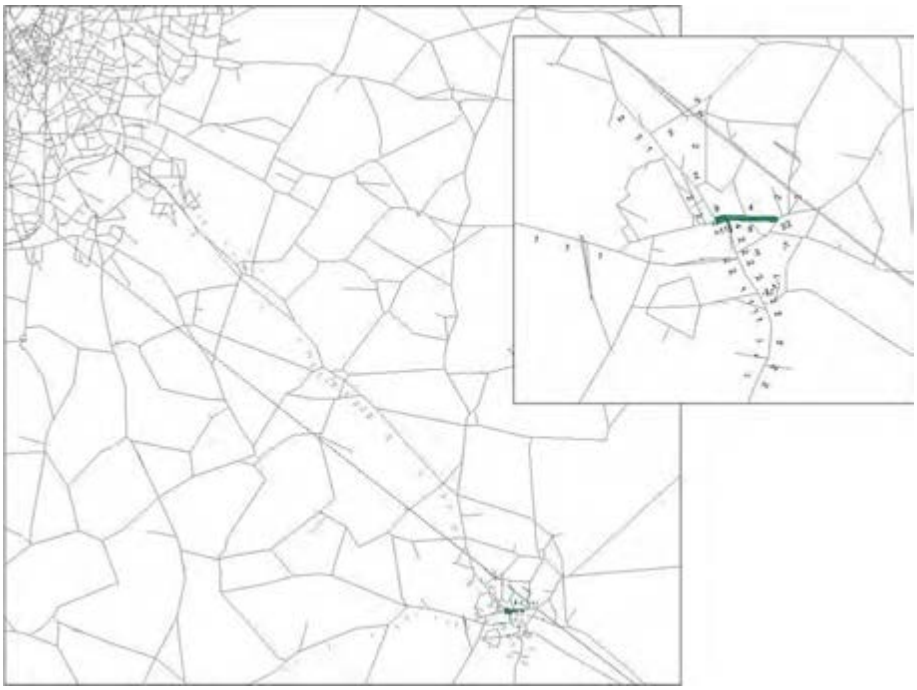


Figure G.3: 2026 PM Peak Hour Bus Passenger Flow Change in Option 1 Due to Mitigation 1



Option 3 Mitigation 1

Figure G.4: 2026 AM Peak Hour Bus Passenger Flow Change in Option 3 Due to Mitigation 1

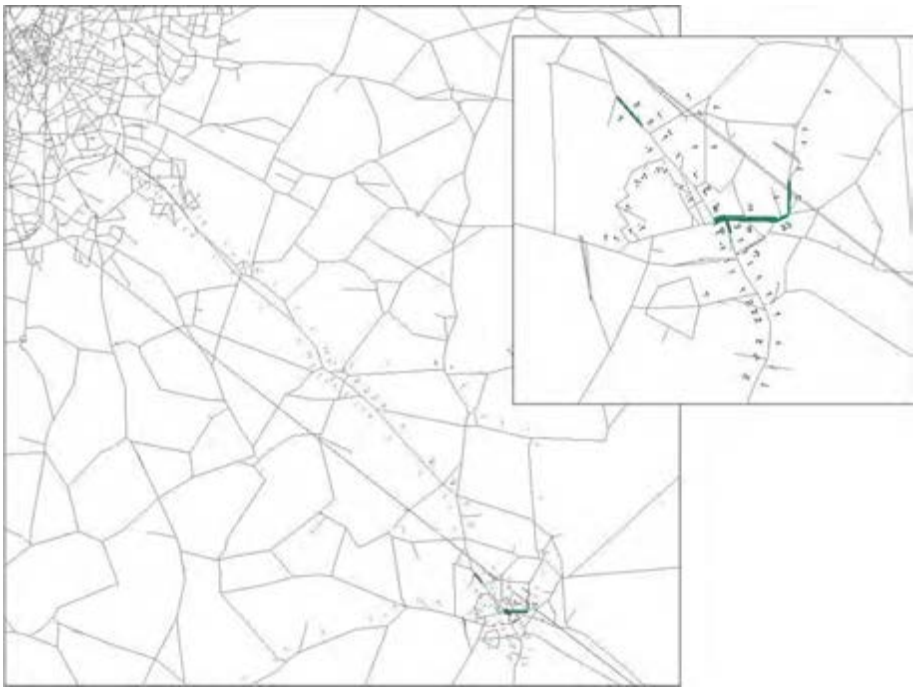


Figure G.5: 2026 Interpeak Hour Bus Passenger Flow Change in Option 3 Due to Mitigation 1

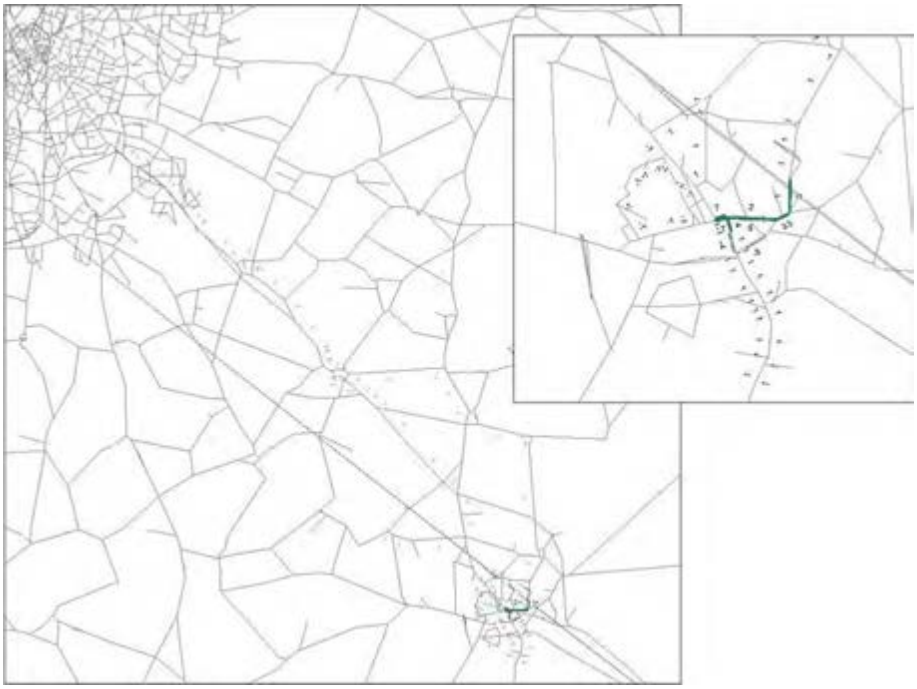
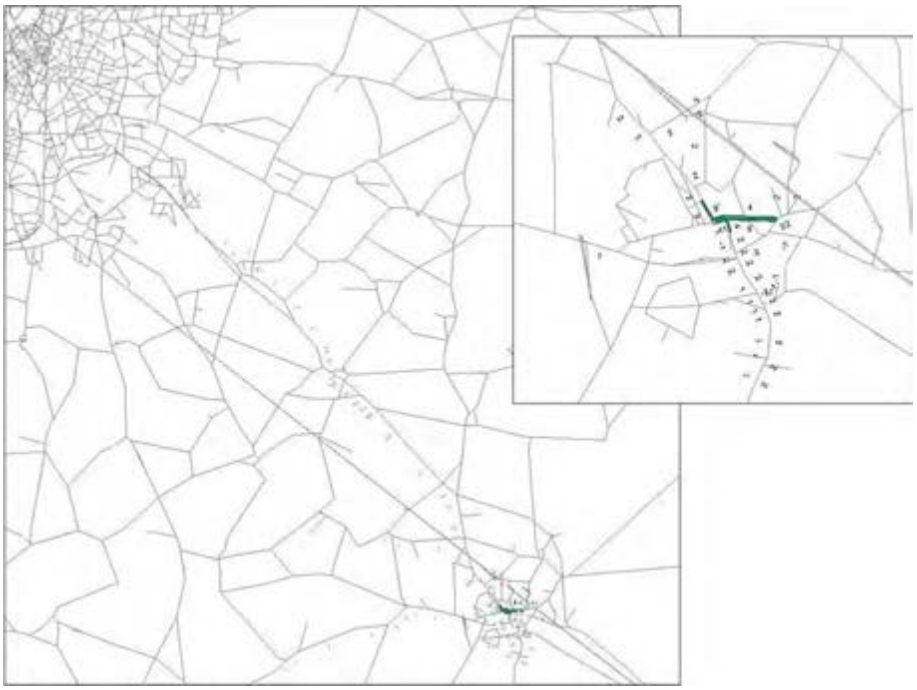


Figure G.6: 2026 PM Peak Hour Bus Passenger Flow Change in Option 3 Due to Mitigation 1



Option 3a Mitigation 1

Figure G.7: 2026 AM Peak Hour Bus Passenger Flow Change in Option 3a Due to Mitigation 1

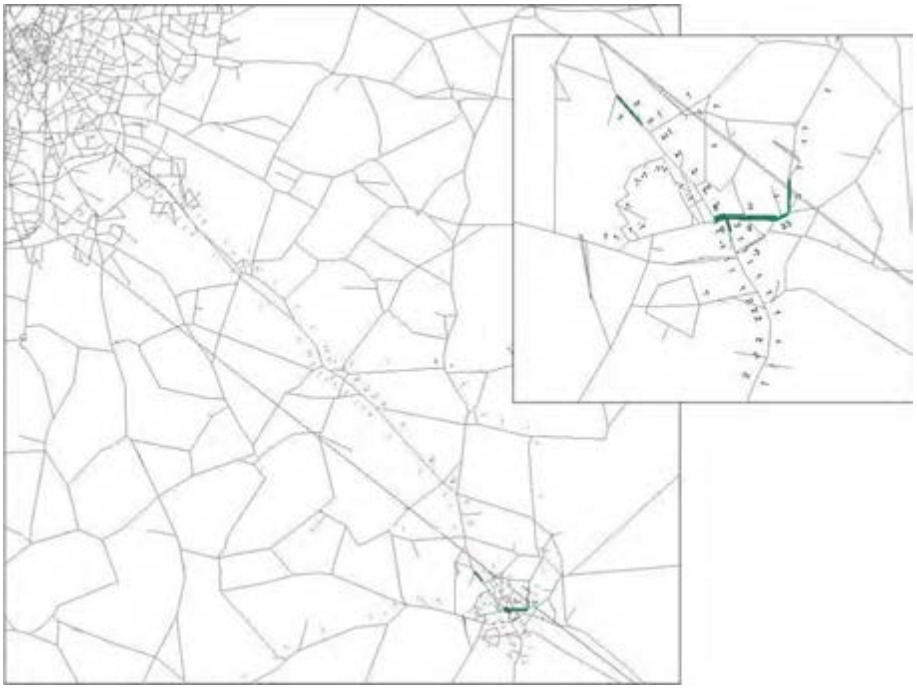


Figure G.8: 2026 Interpeak Hour Bus Passenger Flow Change in Option 3a Due to Mitigation 1

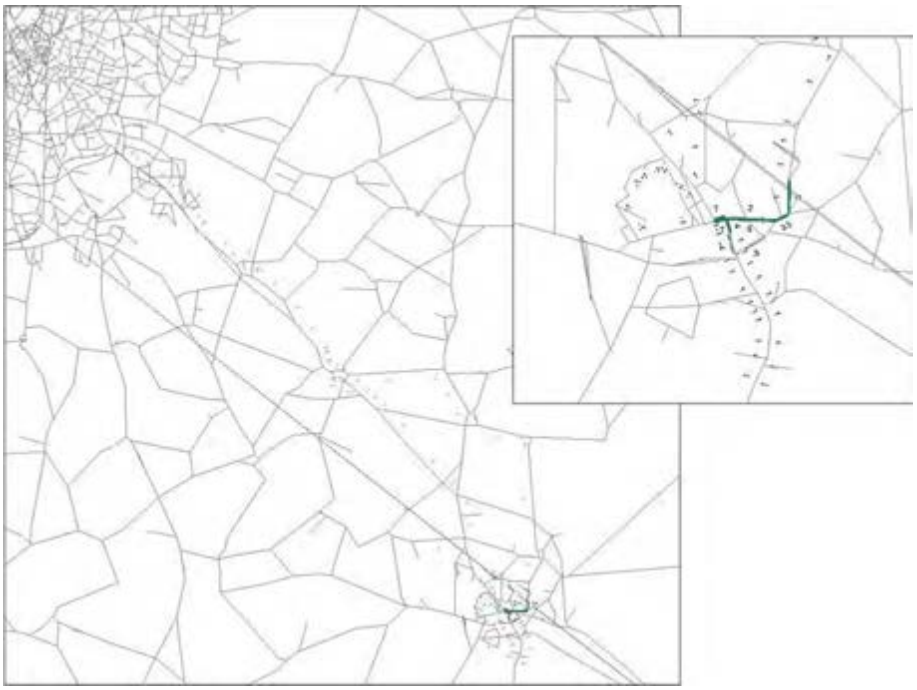
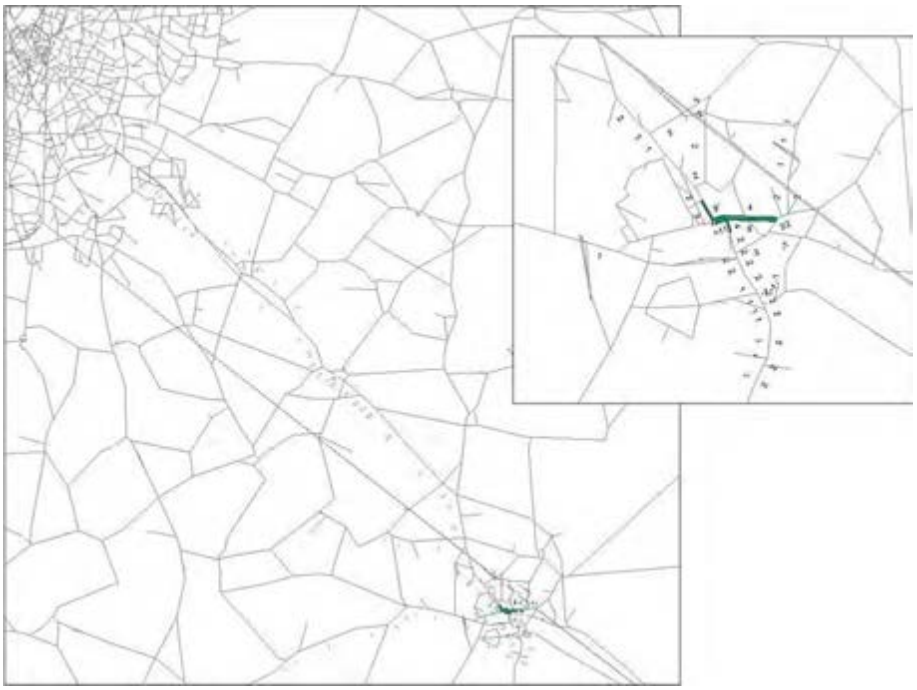


Figure G.9: 2026 PM Peak Hour Bus Passenger Flow Change in Option 3a Due to Mitigation 1



Appendix H Public Transport Flow Changes Due to Mitigation 2

This appendix contains the CUBE bus passenger flow difference plots between each development scenario without any mitigation and the corresponding development option with Mitigation 2 measures. These plots are for the 2026 forecast for the AM Peak hour, interpeak hour and PM Peak hour. Green values represent an increase in bus passenger flow as a result of the development, whereas blue indicates a decrease in flow.

Mitigation 2 consists of the measures included in Mitigation 1 plus making St Mary's Road one way in the eastbound direction between The Square and Kettering Road, imposing a 7.5 tonnes limit on Welland Park Road, an increase in service frequency for the X3 bus service, and a 25% reduction in the number of long-stay parking spaces in the town centre.

Option 1 Mitigation 2

Figure H.1: 2026 AM Peak Hour Bus Passenger Flow Change in Option 1 Due to Mitigation 2

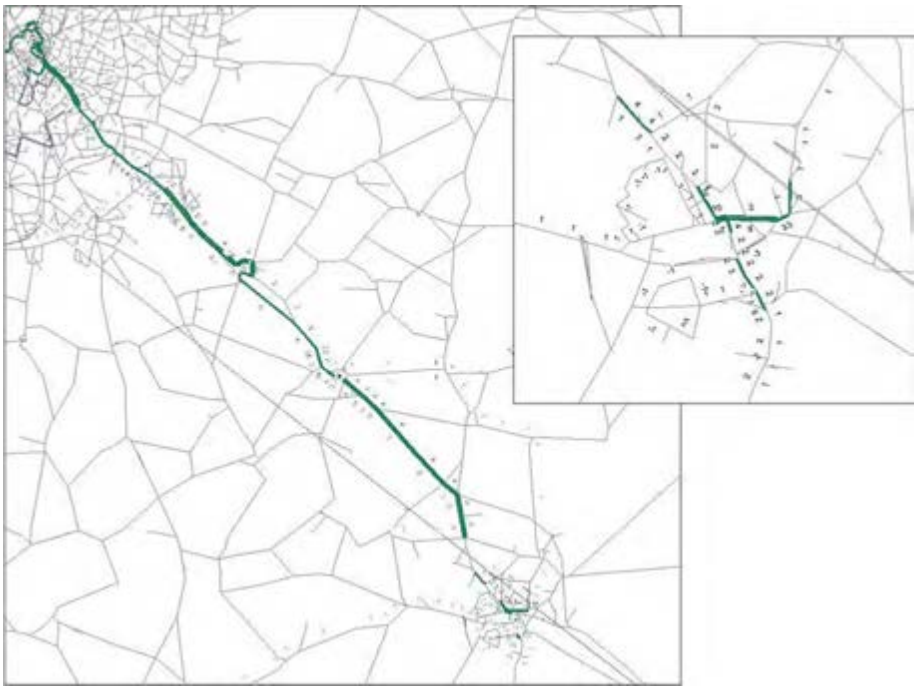


Figure H.2: 2026 Interpeak Hour Bus Passenger Flow Change in Option 1 Due to Mitigation 2

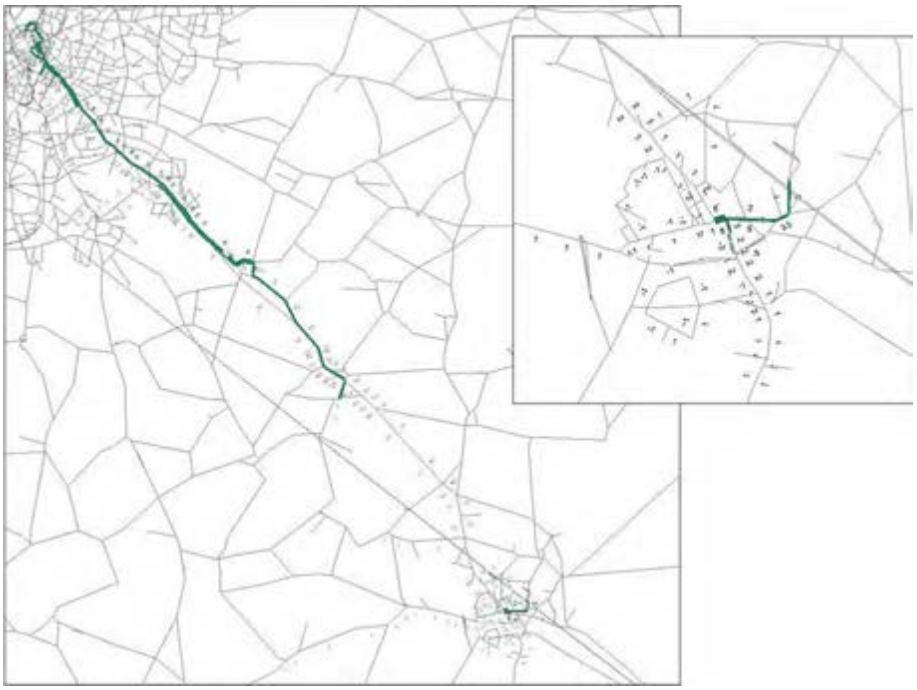
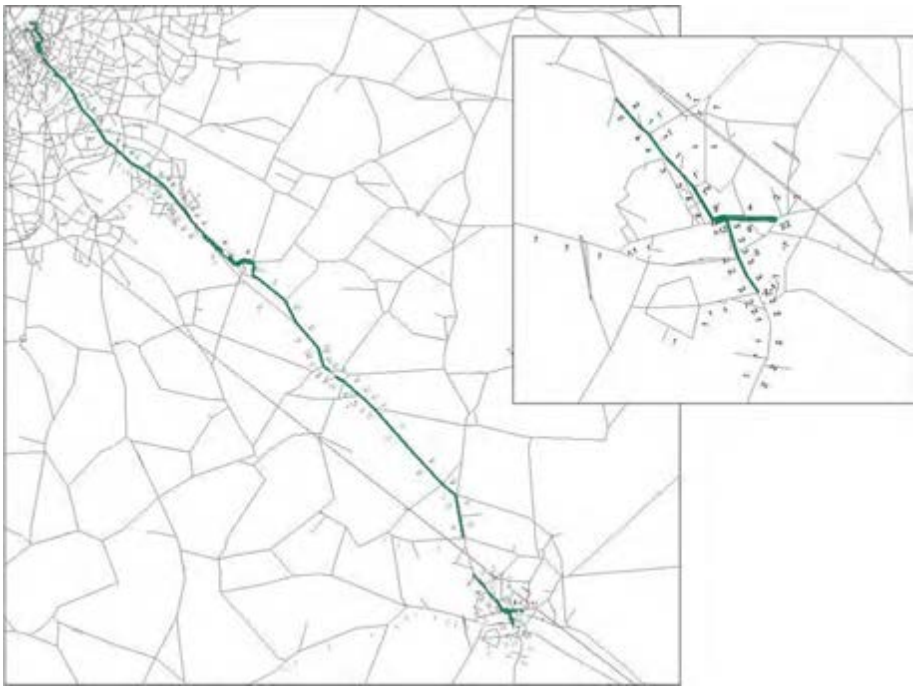


Figure H.3: 2026 PM Peak Hour Bus Passenger Flow Change in Option 1 Due to Mitigation 2



Option 3 Mitigation 2

Figure H.4: 2026 AM Peak Hour Bus Passenger Flow Change in Option 3 Due to Mitigation 2

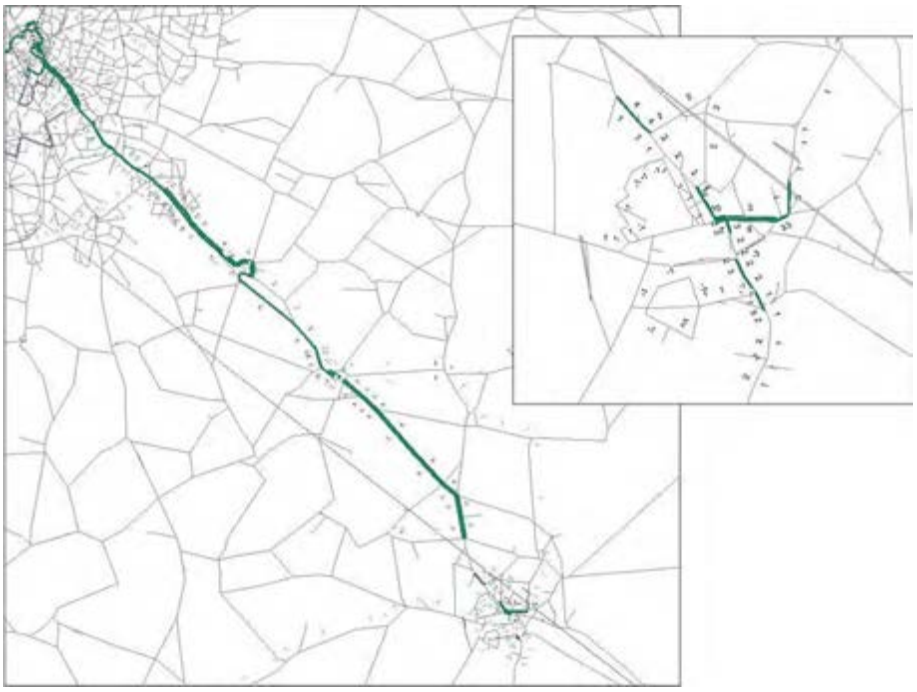


Figure H.5: 2026 Interpeak Hour Bus Passenger Flow Change in Option 3 Due to Mitigation 2

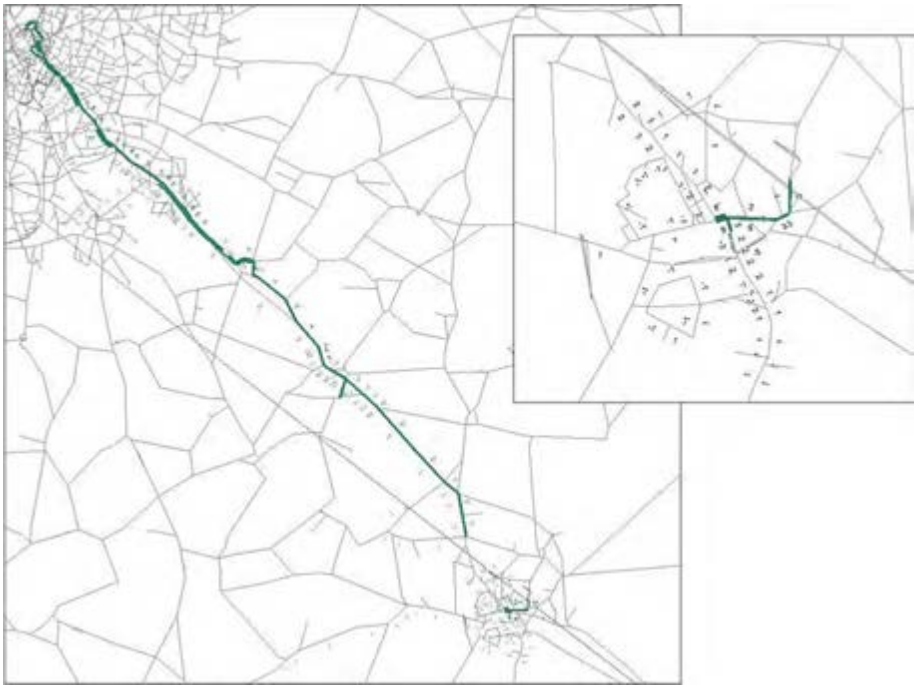


Figure H.6: 2026 PM Peak Hour Bus Passenger Flow Change in Option 3 Due to Mitigation 2

Option 3a Mitigation 2

Figure H.7: 2026 AM Peak Hour Bus Passenger Flow Change in Option 3a Due to Mitigation 2

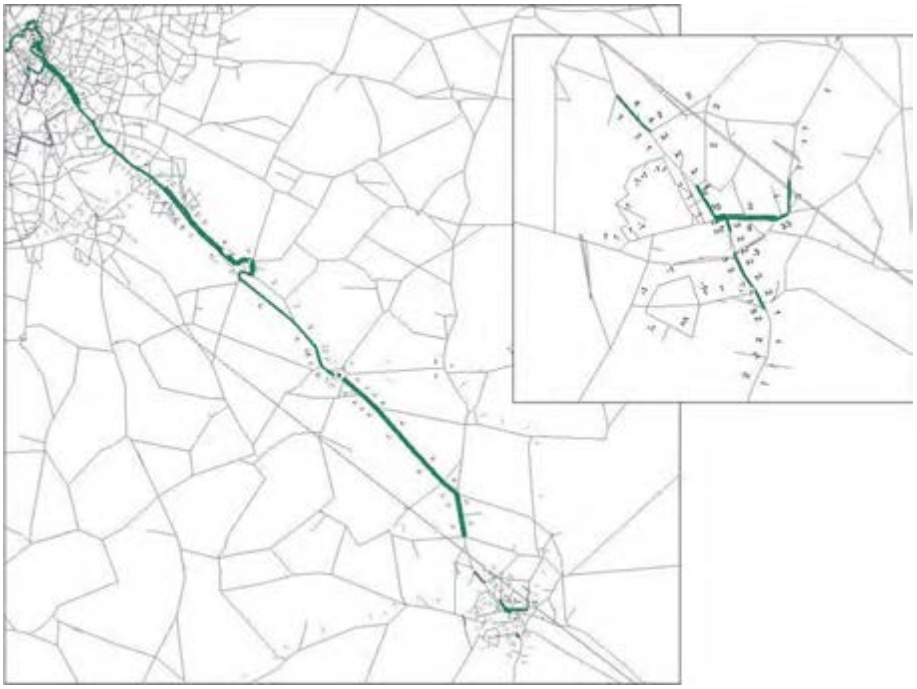


Figure H.8: 2026 Interpeak Hour Bus Passenger Flow Change in Option 3a Due to Mitigation 2

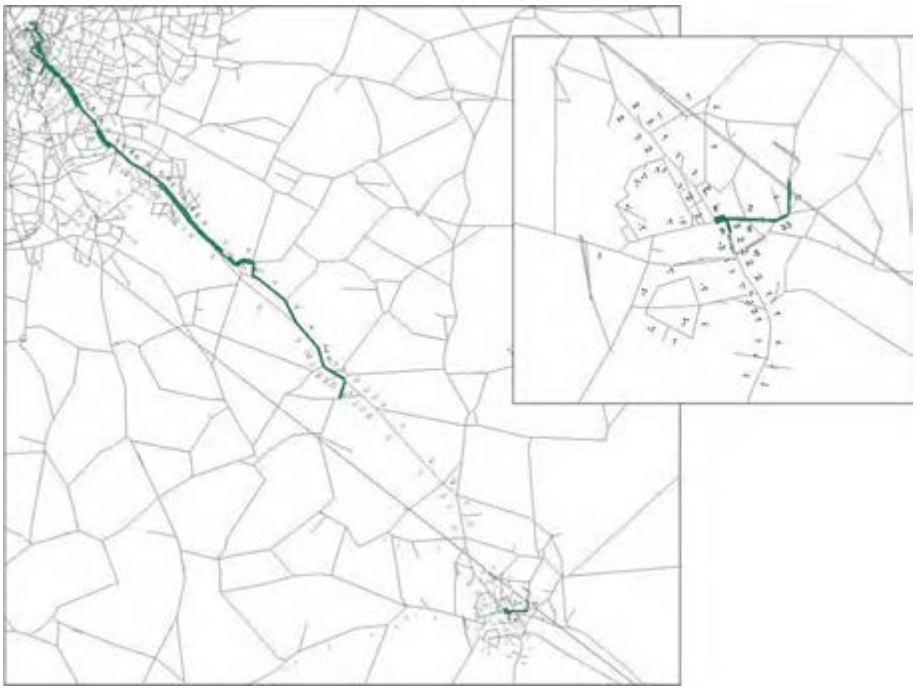


Figure H.9: 2026 PM Peak Hour Bus Passenger Flow Change in Option 3a Due to Mitigation 2

Appendix I Highway Link Volumes for Development Options

This appendix contains the link volumes on selected links within the highway model, and Figure I.1 shows the location of these links. These volumes are in total PCUs, including buses, from the AM Peak hour, interpeak hour and PM Peak hour highway assignment for the base year, 2026 core scenario, and the three development options.

Figure I.1: Location of Selected Links for Flow Analysis

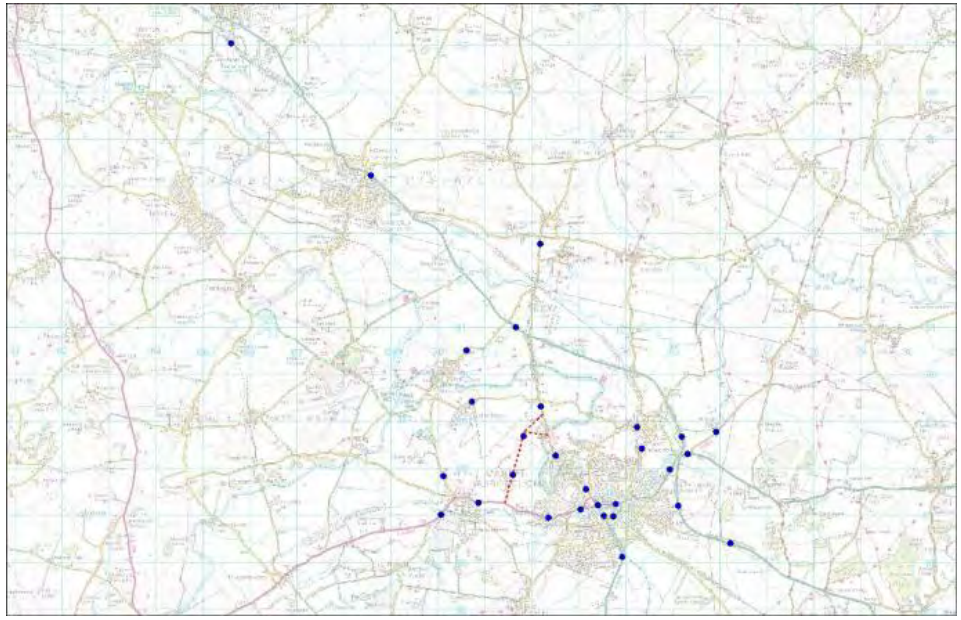


Table I.1: AM Peak Hour SATURN Link Volumes (PCUs) on Selected Links for Base Year and 2026 Core and Development Scenarios

	Northbound / Westbound					*Southbound / Eastbound*				
Market Harborough Links	**2008**	**Core**	**Option 1**	**Option 3**	**Option 3a**	**2008**	**Core**	**Option 1**	**Option 3**	**Option 3a**
B6047 North of Development	449	566	699	716	837	495	695	762	770	837
B6047 South of Development	461	579	675	622	577	498	677	771	739	718
A4304 East of Lubenham	425	567	574	602	613	451	717	709	714	792
A4304 West of Brookfield Road	444	585	588	648	640	514	778	767	851	672
The Square	732	888	910	888	900	655	742	753	737	728
Leicester Road North of Bowden Lane	400	447	486	468	474	509	623	652	638	670
St Mary's Road West of Kettering Road	518	585	584	582	576	445	494	472	488	453
A508 Springfield Street	153	256	251	247	240	223	414	414	419	390
Northampton Road South of The Square	312	421	433	410	431	292	418	442	405	432
A4304 Coventry Road West of Fairfield Road	482	611	621	593	504	425	589	576	548	314
Rockingham Road West of A6	552	728	722	721	720	477	571	567	579	507
A508 Northampton Road South of Lathkill Street	315	448	450	457	459	366	644	674	671	680
Development Link Road North of Development	n/a	n/a	n/a	n/a	610	n/a	n/a	n/a	n/a	312
Development Link Road South of Development	n/a	n/a	n/a	n/a	429	n/a	n/a	n/a	n/a	239
A6 Links										
South of Kettering Road	470	719	715	708	702	532	608	606	609	595
South of Rockingham Road / A427	379	600	609	600	587	514	513	509	498	497
North of Rockingham Road / A427	675	866	876	878	881	950	855	856	859	865
West of B6047 (Melton Road)	929	1,217	1,261	1,274	1,279	1,108	1,253	1,268	1,268	1,298
Kibworth Beauchamp	875	1,042	1,057	1,060	1,060	1,149	1,461	1,475	1,480	1,496
Great Glen Bypass	649	747	752	760	763	528	615	617	620	625
Surrounding Area										
Station Road South of Great Bowden	36	44	44	48	58	27	37	43	43	39
Leicester Lane West of Great Bowden	191	310	326	336	319	277	459	479	484	531
Gallow Field Road, Gartree	163	233	229	219	205	267	337	301	294	212

Foxton Road North of Lubenham	156	124	120	118	80	142	219	238	224	196
Langton Road North of Foxton	82	56	58	57	54	186	281	285	286	267
B6047 (Melton Road) South of Church Langton	323	431	445	452	468	421	603	622	626	631
B664 (Sutton Road) East of A6	60	76	74	74	65	73	131	130	128	126
A427 (Harborough Road) East of A6	923	1,274	1,267	1,273	1,285	1,100	1,427	1,409	1,419	1,437
A4304 (Theddingworth Road) West of Lubenham	491	629	641	653	651	408	514	492	496	545

Table I.2: Interpeak Hour SATURN Link Volumes (PCUs) on Selected Links for Base Year and 2026 Core and Development Scenarios

	Northbound / Westbound					*Southbound / Eastbound*				
Market Harborough Links	**2008**	**Core**	**Option 1**	**Option 3**	**Option 3a**	**2008**	**Core**	**Option 1**	**Option 3**	**Option 3a**
B6047 North of Development	328	497	545	549	572	316	472	531	546	572
B6047 South of Development	334	494	580	550	520	323	473	587	560	519
A4304 East of Lubenham	275	520	511	514	521	284	345	334	346	443
A4304 West of Brookfield Road	304	548	540	587	565	309	370	359	425	350
The Square	564	880	905	873	874	438	533	579	571	525
Leicester Road North of Bowden Lane	303	466	518	486	454	347	501	586	556	521
St Mary's Road West of Kettering Road	360	543	540	537	537	322	355	370	363	318
A508 Springfield Street	104	159	158	153	139	165	236	231	248	224
Northampton Road South of The Square	236	377	399	367	370	215	316	337	331	332
A4304 Coventry Road West of Fairfield Road	337	567	576	542	485	257	278	279	263	169
Rockingham Road West of A6	352	657	664	654	638	379	439	440	447	391
A508 Northampton Road South of Lathkill Street	247	410	418	418	417	253	458	479	478	470
Development Link Road North of Development	n/a	n/a	n/a	n/a	389	n/a	n/a	n/a	n/a	237
Development Link Road South of Development	n/a	n/a	n/a	n/a	274	n/a	n/a	n/a	n/a	142
A6 Links										
South of Kettering Road	330	490	494	495	493	333	519	523	524	524

South of Rockingham Road / A427	264	436	439	440	439	272	427	428	424	436
North of Rockingham Road / A427	513	719	720	721	735	547	755	749	749	750
West of B6047 (Melton Road)	642	912	932	935	955	629	779	787	788	796
Kibworth Beauchamp	618	900	908	911	912	614	804	814	816	820
Great Glen Bypass	460	630	631	632	633	364	414	416	419	420
Surrounding Area										
Station Road South of Great Bowden	25	34	32	32	32	23	16	16	16	17
Leicester Lane West of Great Bowden	103	194	224	235	211	120	267	295	301	352
Gallow Field Road, Gartree	82	151	152	144	128	82	245	256	252	159
Foxton Road North of Lubenham	70	206	210	203	86	65	129	133	126	110
Langton Road North of Foxton	102	131	127	126	116	102	162	163	161	153
B6047 (Melton Road) South of Church Langton	236	396	401	404	416	271	505	513	517	535
B664 (Sutton Road) East of A6	39	52	51	51	43	46	63	62	61	56
A427 (Harborough Road) East of A6	629	1,072	1,084	1,076	1,059	703	998	996	1,001	995
A4304 (Theddingworth Road) West of Lubenham	265	549	544	538	541	271	426	419	421	421

Table I.3: PM Peak Hour SATURN Link Volumes (PCUs) on Selected Links for Base Year and 2026 Core and Development Scenarios

	Northbound / Westbound					***Southbound / Eastbound***				
Market Harborough Links	**2008**	**Core**	**Option 1**	**Option 3**	**Option 3a**	**2008**	**Core**	**Option 1**	**Option 3**	**Option 3a**
B6047 North of Development	479	739	803	800	806	411	568	681	708	806
B6047 South of Development	483	723	830	794	795	420	576	724	657	608
A4304 East of Lubenham	411	584	585	600	624	442	623	629	651	711
A4304 West of Brookfield Road	492	659	661	735	628	474	653	659	754	552
The Square	887	1,128	1,156	1,129	1,146	570	649	684	658	627
Leicester Road North of Bowden Lane	496	642	685	673	684	476	619	686	661	652
St Mary's Road West of Kettering Road	549	577	572	570	544	450	482	493	496	436
A508 Springfield Street	151	379	371	377	362	232	502	556	546	481

Northampton Road South of The Square	391	633	659	631	659	297	401	416	383	414
A4304 Coventry Road West of Fairfield Road	562	741	771	718	576	350	355	376	351	179
Rockingham Road West of A6	475	583	575	575	538	671	663	644	647	616
A508 Northampton Road South of Lathkill Street	391	1,210	1,298	1,279	1,261	328	617	644	639	638
Development Link Road North of Development	n/a	n/a	n/a	n/a	541	n/a	n/a	n/a	n/a	455
Development Link Road South of Development	n/a	n/a	n/a	n/a	401	n/a	n/a	n/a	n/a	285
A6 Links										
South of Kettering Road	547	732	729	732	733	475	677	673	680	650
South of Rockingham Road / A427	491	777	776	766	762	427	558	527	525	522
North of Rockingham Road / A427	949	1,044	1,035	1,031	1,045	712	860	860	865	869
West of B6047 (Melton Road)	1,117	1,371	1,388	1,384	1,398	812	1,025	1,057	1,063	1,072
Kibworth Beauchamp	1,036	1,192	1,176	1,173	1,178	813	1,063	1,101	1,111	1,113
Great Glen Bypass	660	819	825	825	831	386	503	513	514	515
Surrounding Area										
Station Road South of Great Bowden	28	69	73	72	69	35	26	30	29	28
Leicester Lane West of Great Bowden	193	352	393	418	423	234	412	430	445	496
Gallow Field Road, Gartree	138	250	239	225	192	190	301	292	285	210
Foxton Road North of Lubenham	125	113	123	112	66	140	272	283	272	238
Langton Road North of Foxton	106	90	85	84	72	192	278	273	272	256
B6047 (Melton Road) South of Church Langton	398	589	596	596	619	410	591	595	603	611
B664 (Sutton Road) East of A6	53	68	69	68	67	85	88	83	85	81
A427 (Harborough Road) East of A6	1,044	1,329	1,344	1,341	1,358	1,097	1,516	1,541	1,531	1,562
A4304 (Theddingworth Road) West of Lubenham	403	606	600	602	601	451	510	514	518	534

Appendix J Highway Link Volumes for Mitigation Options

This appendix contains the link volumes on selected links within the highway model, and Figure I.1, in the previous appendix, shows the location of these links. These volumes are in total PCUs, including buses, from the AM Peak hour, interpeak hour and PM Peak hour highway assignment for the base year, 2026 core scenario, the three development options and the two levels of mitigation for each development options.

Option 1 Development

Table J.1: AM Peak Hour SATURN Link Volumes (PCUs) on Selected Links for Base Year and 2026 Core and Option 1 Scenario

	Northbound / Westbound					*Southbound / Eastbound*				
Market Harborough Links	**2008**	**Core**	**Option 1**	**Mit. 1**	**Mit. 2**	**2008**	**Core**	**Option 1**	**Mit. 1**	**Mit. 2**
B6047 North of Development	449	566	699	702	810	495	695	762	758	810
B6047 South of Development	461	579	675	674	666	498	677	771	763	843
A4304 East of Lubenham	425	567	574	572	526	451	717	709	708	702
A4304 West of Brookfield Road	444	585	588	586	539	514	778	767	764	757
The Square	732	888	910	909	562	655	742	753	751	892
Leicester Road North of Bowden Lane	400	447	486	483	453	509	623	652	645	785
St Mary's Road West of Kettering Road	518	585	584	585	14	445	494	472	473	637
A508 Springfield Street	153	256	251	249	530	223	414	414	407	380
Northampton Road South of The Square	312	421	433	431	741	292	418	442	436	458
A4304 Coventry Road West of Fairfield Road	482	611	621	614	468	425	589	576	575	500
Rockingham Road West of A6	552	728	722	724	531	477	571	567	570	561
A508 Northampton Road South of Lathkill Street	315	448	450	455	488	366	644	674	670	694
A6 Links										
South of Kettering Road	470	719	715	720	680	532	608	606	597	612
South of Rockingham Road / A427	379	600	609	612	646	514	513	509	504	499
North of Rockingham Road / A427	675	866	876	876	887	950	855	856	856	876

West of B6047 (Melton Road)	929	1,217	1,261	1,256	1,265	1,108	1,253	1,268	1,258	1,285
Kibworth Beauchamp	875	1,042	1,057	1,059	1,058	1,149	1,461	1,475	1,469	1,493
Great Glen Bypass	649	747	752	753	757	528	615	617	609	617
Surrounding Area										
Station Road South of Great Bowden	36	44	44	46	83	27	37	43	46	67
Leicester Lane West of Great Bowden	191	310	326	325	490	277	459	479	479	410
Gallow Field Road, Gartree	163	233	229	233	259	267	337	301	303	306
Foxton Road North of Lubenham	156	124	120	121	122	142	219	238	230	229
Langton Road North of Foxton	82	56	58	59	55	186	281	285	281	284
B6047 (Melton Road) South of Church Langton	323	431	445	447	431	421	603	622	621	647
B664 (Sutton Road) East of A6	60	76	74	75	67	73	131	130	129	123
A427 (Harborough Road) East of A6	923	1,274	1,267	1,273	1,279	1,100	1,427	1,409	1,420	1,432
A4304 (Theddingworth Road) West of Lubenham	491	629	641	634	605	408	514	492	499	503

Table J.2: Interpeak Hour SATURN Link Volumes (PCUs) on Selected Links for Base Year and 2026 Core and Option 1 Scenario

	Northbound / Westbound					***Southbound / Eastbound***				
Market Harborough Links	**2008**	**Core**	**Option 1**	**Mit. 1**	**Mit. 2**	**2008**	**Core**	**Option 1**	**Mit. 1**	**Mit. 2**
B6047 North of Development	328	497	545	547	541	316	472	531	532	541
B6047 South of Development	334	494	580	580	575	323	473	587	586	600
A4304 East of Lubenham	275	520	511	504	343	284	345	334	336	382
A4304 West of Brookfield Road	304	548	540	532	371	309	370	359	360	406
The Square	564	880	905	898	531	438	533	579	580	674
Leicester Road North of Bowden Lane	303	466	518	517	517	347	501	586	583	598
St Mary's Road West of Kettering Road	360	543	540	539	12	322	355	370	372	488
A508 Springfield Street	104	159	158	151	421	165	236	231	229	207
Northampton Road South of The Square	236	377	399	392	606	215	316	337	335	309
A4304 Coventry Road West of Fairfield Road	337	567	576	567	295	257	278	279	279	337

Rockingham Road West of A6	352	657	664	657	441	379	439	440	441	513
A508 Northampton Road South of Lathkill Street	247	410	418	419	434	253	458	479	479	474
A6 Links										
South of Kettering Road	330	490	494	495	483	333	519	523	523	534
South of Rockingham Road / A427	264	436	439	439	435	272	427	428	428	423
North of Rockingham Road / A427	513	719	720	720	746	547	755	749	749	748
West of B6047 (Melton Road)	642	912	932	930	962	629	779	787	785	792
Kibworth Beauchamp	618	900	908	908	912	614	804	814	813	819
Great Glen Bypass	460	630	631	630	632	364	414	416	415	415
Surrounding Area										
Station Road South of Great Bowden	25	34	32	34	38	23	16	16	18	40
Leicester Lane West of Great Bowden	103	194	224	223	357	120	267	295	294	242
Gallow Field Road, Gartree	82	151	152	153	256	82	245	256	257	218
Foxton Road North of Lubenham	70	206	210	210	164	65	129	133	133	258
Langton Road North of Foxton	102	131	127	128	122	102	162	163	162	167
B6047 (Melton Road) South of Church Langton	236	396	401	403	398	271	505	513	513	521
B664 (Sutton Road) East of A6	39	52	51	51	46	46	63	62	62	63
A427 (Harborough Road) East of A6	629	1,072	1,084	1,078	1,030	703	998	996	998	1,005
A4304 (Theddingworth Road) West of Lubenham	265	549	544	538	504	271	426	419	421	423

Table J.3: PM Peak Hour SATURN Link Volumes (PCUs) on Selected Links for Base Year and 2026 Core and Option 1 Scenario

	Northbound / Westbound					*Southbound / Eastbound*				
Market Harborough Links	**2008**	**Core**	**Option 1**	**Mit. 1**	**Mit. 2**	**2008**	**Core**	**Option 1**	**Mit. 1**	**Mit. 2**

B6047 North of Development	479	739	803	800	674	411	568	681	682	674
B6047 South of Development	483	723	830	824	788	420	576	724	722	747
A4304 East of Lubenham	411	584	585	581	556	442	623	629	627	604
A4304 West of Brookfield Road	492	659	661	654	629	474	653	659	656	632
The Square	887	1,128	1,156	1,151	729	570	649	684	684	666
Leicester Road North of Bowden Lane	496	642	685	680	597	476	619	686	682	735
St Mary's Road West of Kettering Road	549	577	572	571	12	450	482	493	494	632
A508 Springfield Street	151	379	371	367	626	232	502	556	552	468
Northampton Road South of The Square	391	633	659	653	929	297	401	416	414	366
A4304 Coventry Road West of Fairfield Road	562	741	771	759	649	350	355	376	374	328
Rockingham Road West of A6	475	583	575	583	320	671	663	644	649	473
A508 Northampton Road South of Lathkill Street	391	1,210	1,298	1,297	1,318	328	617	644	645	648
A6 Links										
South of Kettering Road	547	732	729	731	707	475	677	673	674	700
South of Rockingham Road / A427	491	777	776	770	793	427	558	527	521	543
North of Rockingham Road / A427	949	1,044	1,035	1,032	1,047	712	860	860	859	879
West of B6047 (Melton Road)	1,117	1,371	1,388	1,384	1,375	812	1,025	1,057	1,058	1,066
Kibworth Beauchamp	1,036	1,192	1,176	1,173	1,159	813	1,063	1,101	1,103	1,106
Great Glen Bypass	660	819	825	823	808	386	503	513	514	511
Surrounding Area										
Station Road South of Great Bowden	28	69	73	75	134	35	26	30	32	67
Leicester Lane West of Great Bowden	193	352	393	388	534	234	412	430	427	469
Gallow Field Road, Gartree	138	250	239	242	238	190	301	292	293	313
Foxton Road North of Lubenham	125	113	123	124	132	140	272	283	285	282
Langton Road North of Foxton	106	90	85	86	86	192	278	273	276	282
B6047 (Melton Road) South of Church Langton	398	589	596	594	586	410	591	595	592	618
B664 (Sutton Road) East of A6	53	68	69	69	61	85	88	83	83	76
A427 (Harborough Road) East of A6	1,044	1,329	1,344	1,347	1,336	1,097	1,516	1,541	1,544	1,494
A4304 (Theddingworth Road) West of Lubenham	403	606	600	601	594	451	510	514	513	511

Option 3 Development

Table J.4: AM Peak Hour SATURN Link Volumes (PCUs) on Selected Links for Base Year and 2026 Core and Option 3 Scenario

	Northbound / Westbound					*Southbound / Eastbound*				
Market Harborough Links	**2008**	**Core**	**Option 3**	**Mit. 1**	**Mit. 2**	**2008**	**Core**	**Option 3**	**Mit. 1**	**Mit. 2**
B6047 North of Development	449	566	716	718	814	495	695	770	766	814
B6047 South of Development	461	579	622	620	598	498	677	739	733	853
A4304 East of Lubenham	425	567	602	602	555	451	717	714	714	705
A4304 West of Brookfield Road	444	585	648	648	614	514	778	851	848	780
The Square	732	888	888	886	531	655	742	737	737	904
Leicester Road North of Bowden Lane	400	447	468	464	420	509	623	638	634	797
St Mary's Road West of Kettering Road	518	585	582	583	14	445	494	488	489	644
A508 Springfield Street	153	256	247	244	529	223	414	419	410	380
Northampton Road South of The Square	312	421	410	407	690	292	418	405	401	446
A4304 Coventry Road West of Fairfield Road	482	611	593	588	453	425	589	548	552	468
Rockingham Road West of A6	552	728	721	724	526	477	571	579	582	563
A508 Northampton Road South of Lathkill Street	315	448	457	461	489	366	644	671	668	692
A6 Links										
South of Kettering Road	470	719	708	712	679	532	608	609	600	615
South of Rockingham Road / A427	379	600	600	599	645	514	513	498	493	498
North of Rockingham Road / A427	675	866	878	876	887	950	855	859	856	871
West of B6047 (Melton Road)	929	1,217	1,274	1,271	1,284	1,108	1,253	1,268	1,258	1,281
Kibworth Beauchamp	875	1,042	1,060	1,062	1,061	1,149	1,461	1,480	1,473	1,494
Great Glen Bypass	649	747	760	759	763	528	615	620	610	617
Surrounding Area										
Station Road South of Great Bowden	36	44	48	49	88	27	37	43	45	67

Leicester Lane West of Great Bowden	191	310	336	335	498	277	459	484	488	417
Gallow Field Road, Gartree	163	233	219	221	246	267	337	294	295	295
Foxton Road North of Lubenham	156	124	118	118	120	142	219	224	217	215
Langton Road North of Foxton	82	56	57	58	55	186	281	286	282	286
B6047 (Melton Road) South of Church Langton	323	431	452	453	439	421	603	626	624	645
B664 (Sutton Road) East of A6	60	76	74	74	67	73	131	128	129	122
A427 (Harborough Road) East of A6	923	1,274	1,273	1,279	1,280	1,100	1,427	1,419	1,431	1,435
A4304 (Theddingworth Road) West of Lubenham	491	629	653	646	613	408	514	496	502	498

Table J.5: Interpeak Hour SATURN Link Volumes (PCUs) on Selected Links for Base Year and 2026 Core and Option 3 Scenario

	Northbound / Westbound					*Southbound / Eastbound*				
Market Harborough Links	**2008**	**Core**	**Option 3**	**Mit. 1**	**Mit. 2**	**2008**	**Core**	**Option 3**	**Mit. 1**	**Mit. 2**
B6047 North of Development	328	497	549	551	555	316	472	546	547	555
B6047 South of Development	334	494	550	551	568	323	473	560	559	595
A4304 East of Lubenham	275	520	514	518	353	284	345	346	347	386
A4304 West of Brookfield Road	304	548	587	590	404	309	370	425	425	438
The Square	564	880	873	878	529	438	533	571	571	680
Leicester Road North of Bowden Lane	303	466	486	484	504	347	501	556	553	590
St Mary's Road West of Kettering Road	360	543	537	537	12	322	355	363	365	488
A508 Springfield Street	104	159	153	156	421	165	236	248	247	208
Northampton Road South of The Square	236	377	367	371	596	215	316	331	329	304
A4304 Coventry Road West of Fairfield Road	337	567	542	545	273	257	278	263	263	317
Rockingham Road West of A6	352	657	654	658	438	379	439	447	447	510
A508 Northampton Road South of Lathkill Street	247	410	418	419	435	253	458	478	477	473
A6 Links										
South of Kettering Road	330	490	495	495	483	333	519	524	524	535
South of Rockingham Road / A427	264	436	440	440	435	272	427	424	425	423

North of Rockingham Road / A427	513	719	721	721	746	547	755	749	748	747
West of B6047 (Melton Road)	642	912	935	933	967	629	779	788	786	791
Kibworth Beauchamp	618	900	911	911	914	614	804	816	816	820
Great Glen Bypass	460	630	632	631	633	364	414	419	418	418
Surrounding Area										
Station Road South of Great Bowden	25	34	32	34	38	23	16	16	18	40
Leicester Lane West of Great Bowden	103	194	235	234	364	120	267	301	300	256
Gallow Field Road, Gartree	82	151	144	145	244	82	245	252	252	218
Foxton Road North of Lubenham	70	206	203	202	161	65	129	126	126	247
Langton Road North of Foxton	102	131	126	126	120	102	162	161	162	167
B6047 (Melton Road) South of Church Langton	236	396	404	405	400	271	505	517	517	527
B664 (Sutton Road) East of A6	39	52	51	51	45	46	63	61	61	63
A427 (Harborough Road) East of A6	629	1,072	1,076	1,081	1,025	703	998	1,001	1,001	1,004
A4304 (Theddingworth Road) West of Lubenham	265	549	538	543	502	271	426	421	422	421

Table J.6: PM Peak Hour SATURN Link Volumes (PCUs) on Selected Links for Base Year and 2026 Core and Option 3 Scenario

	Northbound / Westbound					*Southbound / Eastbound*				
Market Harborough Links	**2008**	**Core**	**Option 3**	**Mit. 1**	**Mit. 2**	**2008**	**Core**	**Option 3**	**Mit. 1**	**Mit. 2**
B6047 North of Development	479	739	800	795	693	411	568	708	708	693
B6047 South of Development	483	723	794	786	760	420	576	657	651	723
A4304 East of Lubenham	411	584	600	596	568	442	623	651	650	629
A4304 West of Brookfield Road	492	659	735	728	717	474	653	754	756	687

The Square	887	1,128	1,129	1,123	698	570	649	658	657	678
Leicester Road North of Bowden Lane	496	642	673	666	571	476	619	661	653	726
St Mary's Road West of Kettering Road	549	577	570	570	12	450	482	496	496	617
A508 Springfield Street	151	379	377	373	637	232	502	546	543	445
Northampton Road South of The Square	391	633	631	624	889	297	401	383	380	363
A4304 Coventry Road West of Fairfield Road	562	741	718	707	603	350	355	351	351	305
Rockingham Road West of A6	475	583	575	579	314	671	663	647	651	471
A508 Northampton Road South of Lathkill Street	391	1,210	1,279	1,278	1,294	328	617	639	639	644
A6 Links										
South of Kettering Road	547	732	732	735	714	475	677	680	682	692
South of Rockingham Road / A427	491	777	766	763	792	427	558	525	525	545
North of Rockingham Road / A427	949	1,044	1,031	1,031	1,041	712	860	865	863	871
West of B6047 (Melton Road)	1,117	1,371	1,384	1,379	1,373	812	1,025	1,063	1,060	1,070
Kibworth Beauchamp	1,036	1,192	1,173	1,173	1,160	813	1,063	1,111	1,107	1,113
Great Glen Bypass	660	819	825	823	810	386	503	514	513	514
Surrounding Area										
Station Road South of Great Bowden	28	69	72	73	120	35	26	29	31	66
Leicester Lane West of Great Bowden	193	352	418	412	558	234	412	445	443	482
Gallow Field Road, Gartree	138	250	225	227	230	190	301	285	287	300
Foxton Road North of Lubenham	125	113	112	111	116	140	272	272	272	270
Langton Road North of Foxton	106	90	84	85	86	192	278	272	272	282
B6047 (Melton Road) South of Church Langton	398	589	596	594	590	410	591	603	603	617
B664 (Sutton Road) East of A6	53	68	68	68	60	85	88	85	85	83
A427 (Harborough Road) East of A6	1,044	1,329	1,341	1,340	1,339	1,097	1,516	1,531	1,531	1,488
A4304 (Theddingworth Road) West of Lubenham	403	606	602	602	597	451	510	518	518	516

Table J.7: AM Peak Hour SATURN Link Volumes (PCUs) on Selected Links for Base Year and 2026 Core and Option 3a Scenario

	Northbound / Westbound					*Southbound / Eastbound*				
Market Harborough Links	**2008**	**Core**	**Option 3a**	**Mit. 1**	**Mit. 2**	**2008**	**Core**	**Option 3a**	**Mit. 1**	**Mit. 2**
B6047 North of Development	449	566	995	1,000	1,005	495	695	837	831	1,005
B6047 South of Development	461	579	577	577	580	498	677	718	718	770
A4304 East of Lubenham	425	567	613	612	592	451	717	792	786	787
A4304 West of Brookfield Road	444	585	640	637	466	514	778	672	651	640
The Square	732	888	900	900	560	655	742	728	727	894
Leicester Road North of Bowden Lane	400	447	474	472	457	509	623	670	667	762
St Mary's Road West of Kettering Road	518	585	576	578	14	445	494	453	449	608
A508 Springfield Street	153	256	240	235	520	223	414	390	381	314
Northampton Road South of The Square	312	421	431	429	682	292	418	432	432	441
A4304 Coventry Road West of Fairfield Road	482	611	504	501	252	425	589	314	308	341
Rockingham Road West of A6	552	728	720	722	508	477	571	507	506	533
A508 Northampton Road South of Lathkill Street	315	448	459	464	491	366	644	680	676	691
Development Link Road North of Development	n/a	n/a	610	618	626	n/a	n/a	312	308	456
Development Link Road South of Development	n/a	n/a	429	431	431	n/a	n/a	239	229	369
A6 Links										
South of Kettering Road	470	719	702	706	682	532	608	595	585	600
South of Rockingham Road / A427	379	600	587	588	583	514	513	497	491	485
North of Rockingham Road / A427	675	866	881	881	897	950	855	865	867	885
West of B6047 (Melton Road)	929	1,217	1,279	1,275	1,295	1,108	1,253	1,298	1,285	1,301
Kibworth Beauchamp	875	1,042	1,060	1,062	1,065	1,149	1,461	1,496	1,489	1,503
Great Glen Bypass	649	747	763	762	766	528	615	625	614	614
Surrounding Area										
Station Road South of Great Bowden	36	44	58	60	81	27	37	39	40	66
Leicester Lane West of Great Bowden	191	310	319	320	498	277	459	531	534	490
Gallow Field Road, Gartree	163	233	205	208	218	267	337	212	214	211

Foxton Road North of Lubenham	156	124	80	82	79	142	219	196	184	190
Langton Road North of Foxton	82	56	54	54	54	186	281	267	264	274
B6047 (Melton Road) South of Church Langton	323	431	468	471	463	421	603	631	635	664
B664 (Sutton Road) East of A6	60	76	65	65	72	73	131	126	126	121
A427 (Harborough Road) East of A6	923	1,274	1,285	1,289	1,290	1,100	1,427	1,437	1,446	1,457
A4304 (Theddingworth Road) West of Lubenham	491	629	651	640	636	408	514	545	547	545

Table J.8: Interpeak Hour SATURN Link Volumes (PCUs) on Selected Links for Base Year and 2026 Core and Option 3a Scenario

	Northbound / Westbound					*Southbound / Eastbound*				
Market Harborough Links	**2008**	**Core**	**Option 3a**	**Mit. 1**	**Mit. 2**	**2008**	**Core**	**Option 3a**	**Mit. 1**	**Mit. 2**
B6047 North of Development	328	497	727	727	658	316	472	572	572	658
B6047 South of Development	334	494	520	519	516	323	473	519	518	532
A4304 East of Lubenham	275	520	521	521	424	284	345	443	443	449
A4304 West of Brookfield Road	304	548	565	563	381	309	370	350	348	350
The Square	564	880	874	870	514	438	533	525	524	605
Leicester Road North of Bowden Lane	303	466	454	451	461	347	501	521	518	533
St Mary's Road West of Kettering Road	360	543	537	538	12	322	355	318	318	436
A508 Springfield Street	104	159	139	136	400	165	236	224	222	170
Northampton Road South of The Square	236	377	370	365	595	215	316	332	330	297
A4304 Coventry Road West of Fairfield Road	337	567	485	483	215	257	278	169	168	203
Rockingham Road West of A6	352	657	638	638	416	379	439	391	390	435
A508 Northampton Road South of Lathkill Street	247	410	417	415	432	253	458	470	469	467
Development Link Road North of Development	n/a	n/a	389	388	389	n/a	n/a	237	236	317
Development Link Road South of Development	n/a	n/a	274	273	274	n/a	n/a	142	141	222
A6 Links										
South of Kettering Road	330	490	493	493	480	333	519	524	524	534

South of Rockingham Road / A427	264	436	439	438	422	272	427	436	436	424
North of Rockingham Road / A427	513	719	735	734	746	547	755	750	749	748
West of B6047 (Melton Road)	642	912	955	952	971	629	779	796	794	799
Kibworth Beauchamp	618	900	912	911	916	614	804	820	821	827
Great Glen Bypass	460	630	633	632	633	364	414	420	420	418
Surrounding Area										
Station Road South of Great Bowden	25	34	32	34	39	23	16	17	19	40
Leicester Lane West of Great Bowden	103	194	211	209	360	120	267	352	353	326
Gallow Field Road, Gartree	82	151	128	129	176	82	245	159	160	158
Foxton Road North of Lubenham	70	206	86	87	84	65	129	110	110	169
Langton Road North of Foxton	102	131	116	117	113	102	162	153	154	164
B6047 (Melton Road) South of Church Langton	236	396	416	415	413	271	505	535	534	543
B664 (Sutton Road) East of A6	39	52	43	43	41	46	63	56	56	57
A427 (Harborough Road) East of A6	629	1,072	1,059	1,059	1,010	703	998	995	997	998
A4304 (Theddingworth Road) West of Lubenham	265	549	541	540	505	271	426	421	423	424

Table J.9: PM Peak Hour SATURN Link Volumes (PCUs) on Selected Links for Base Year and 2026 Core and Option 3a Scenario

	Northbound / Westbound					***Southbound / Eastbound***				
Market Harborough Links	**2008**	**Core**	**Option 3a**	**Mit. 1**	**Mit. 2**	**2008**	**Core**	**Option 3a**	**Mit. 1**	**Mit. 2**
B6047 North of Development	479	739	1,078	1,071	869	411	568	806	805	869
B6047 South of Development	483	723	795	784	773	420	576	608	606	626
A4304 East of Lubenham	411	584	624	622	588	442	623	711	708	694
A4304 West of Brookfield Road	492	659	628	622	523	474	653	552	547	520
The Square	887	1,128	1,146	1,140	736	570	649	627	626	661
Leicester Road North of Bowden Lane	496	642	684	676	613	476	619	652	646	669
St Mary's Road West of Kettering Road	549	577	544	538	12	450	482	436	437	577
A508 Springfield Street	151	379	362	357	627	232	502	481	475	396

Northampton Road South of The Square	391	633	659	653	888	297	401	414	411	365
A4304 Coventry Road West of Fairfield Road	562	741	576	565	379	350	355	179	175	184
Rockingham Road West of A6	475	583	538	547	311	671	663	616	616	480
A508 Northampton Road South of Lathkill Street	391	1,210	1,261	1,260	1,280	328	617	638	638	638
Development Link Road North of Development	n/a	n/a	541	541	551	n/a	n/a	455	454	515
Development Link Road South of Development	n/a	n/a	401	401	411	n/a	n/a	285	284	347
A6 Links										
South of Kettering Road	547	732	733	734	719	475	677	650	652	687
South of Rockingham Road / A427	491	777	762	757	780	427	558	522	515	553
North of Rockingham Road / A427	949	1,044	1,045	1,043	1,056	712	860	869	868	906
West of B6047 (Melton Road)	1,117	1,371	1,398	1,395	1,389	812	1,025	1,072	1,070	1,086
Kibworth Beauchamp	1,036	1,192	1,178	1,177	1,163	813	1,063	1,113	1,109	1,124
Great Glen Bypass	660	819	831	828	816	386	503	515	515	519
Surrounding Area										
Station Road South of Great Bowden	28	69	69	70	120	35	26	28	30	67
Leicester Lane West of Great Bowden	193	352	423	420	555	234	412	496	494	512
Gallow Field Road, Gartree	138	250	192	192	204	190	301	210	212	229
Foxton Road North of Lubenham	125	113	66	65	67	140	272	238	240	235
Langton Road North of Foxton	106	90	72	73	74	192	278	256	259	266
B6047 (Melton Road) South of Church Langton	398	589	619	616	605	410	591	611	614	635
B664 (Sutton Road) East of A6	53	68	67	67	61	85	88	81	82	80
A427 (Harborough Road) East of A6	1,044	1,329	1,358	1,356	1,351	1,097	1,516	1,562	1,557	1,527
A4304 (Theddingworth Road) West of Lubenham	403	606	601	604	600	451	510	534	533	535