Iver Model

Buckinghamshire County Council

Model Forecasting Report - Planning Application

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Executive Summary

As framework consultants to Buckinghamshire County Council (BCC), Jacobs has been asked to develop the required strategic modelling necessary to form an evidence base to asses a Planning Application for the proposed Area North of Iver Station development (referred to in this report as the 'tested development') and associated infrastructure. A new model for Iver, developed in accordance with TAG has been developed using the existing Countywide and Chiltern and South Bucks models as a basis, supplemented with new traffic survey data. This report covers the development of the forecast year models used for the planning application assessment.

It is anticipated that in time, the model may be required for an evidence base for a DfT business case; this would necessitate a new forecast model and an update to this report. For the time being, this report is concerned with the modelling required to form an evidence base necessary for the purpose of highways development management.

The forecast networks developed, and the demand generated, have been produced for use in assessment of the impacts of the proposed development for development planning purposes. The model forecasts have been developed following a methodology which will be followed for all future development management purposes.

Consistent with the expectations of BCC's Highways Development Management team, the forecast demand was fixed rather than variable. The do minimum scenario (containing only committed developments) had all future land use demographics capped to NTEMv7.2 levels, with all additional development appearing in the do something scenarios in exceedance of NTEM. NTEM is the DfT's own model for trip growth across the country and outputs from it are required by TAG to be used in the development of models used for appraising DfT business cases. With the exception of fixed demand and exceedance of NTEM growth, the Iver forecast model scenarios are in all other ways consistent with TAG guidance for fixed demand models.

The forecast year was set as 2036. A number of forecast scenarios were tested. These included a scenario without the tested development and with only committed development and infrastructure (also known as 'do minimum' (DM)), and a variety of scenarios with the development (known as the 'do something' (DS) scenarios). These scenarios are:

- DS1: Similar to the DM, but with the addition of the tested development
- DS2: Similar to the DM but with the addition of the tested development and the Iver Relief Road
- DS3: Similar to DS1 but with the addition of non-committed local plan growth
- DS4: Similar to DS2 but with the addition of non-committed local plan growth
- DS5: Similar to DS1 but with the closure of Hollow Hill Lane
- DS6: Similar to DS2 but with the closure of Hollow Hill Lane

Forecast land use growth has been derived from the National Trip End Model (NTEM) v7.2 and planning data from BCC and Chiltern & South Bucks District Councils (CDC & SBDC), which are the combined local planning authorities. This data identified the locations of potential new development, the size and type of development proposed, and the likelihood of each development being realised. It also included potential infrastructure. This data has been processed into an uncertainty log. Methodologies used in building the Iver forecast models are consistent with guidance set out in TAG (for a fixed demand methodology). Consideration has been given towards the amount of development that should be included in the modelled forecast year, as well as towards future transport schemes with due regard to the level of certainty of those schemes coming forwards.

The forecast models have been developed from the calibrated and validated base year model, the creation of which is described in a separate Local Model Validation Report (LMVR). To aid analysis of the forecast

scenarios, they have been compared with the base year in terms of traffic demand and flows. Additionally, forecast DS scenarios have been compared with the DM scenario.

Based on the methodology used, the inputs, and a review of the results, the forecast model is considered a reliable tool for the purposes of development control and highways development management in the Ivers area.

1. Introduction

As framework consultants to Buckinghamshire County Council (BCC), Jacobs has been asked to develop the required strategic modelling necessary to form an evidence base to assess planning applications and appraise major schemes around Iver, including a potential planning application for proposed development around Thorney Lane, Iver, (referred to in the Local Plan as the 'Area North of Iver Station'), with associated infrastructure. This development is also referred to in this report as the 'tested development'.

Using the existing Countywide and Chiltern and South Bucks models as a starting point, a new TAG compliant model for Iver has been developed. The model combines elements of the two existing models and has been further supplemented with new traffic survey data. The Local Model Validation Report[1] (LMVR) details the creation, calibration and validation of the base year model upon which the forecast models are based. Figure 1.1 below shows the model study area and the scheme area location.

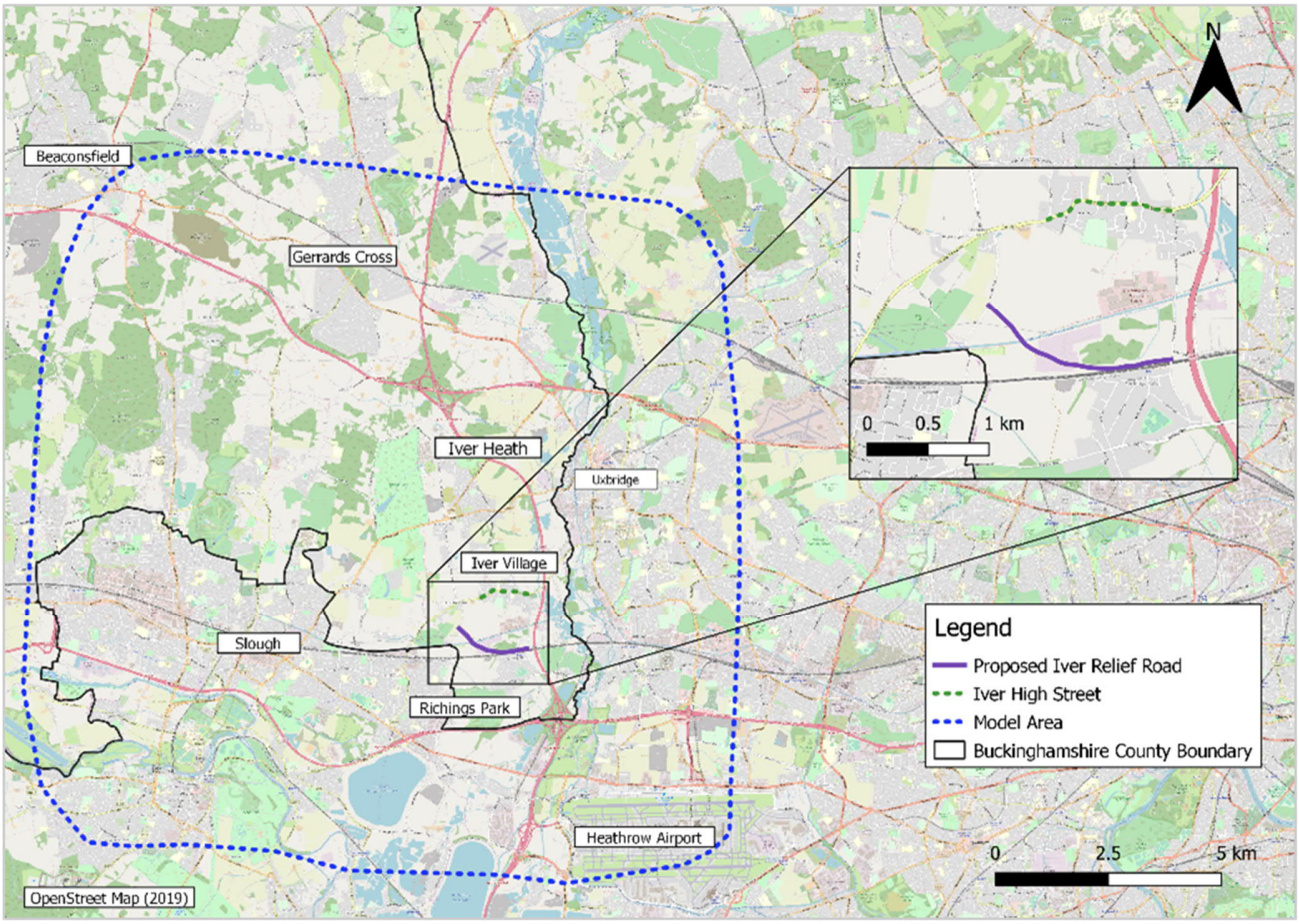


Figure 1.1: Scheme area

This report details the forecast modelling work carried out to form the evidence base for the purposes of appraisal of the planning application around the Area North of Iver Station, the "tested development".

[1] Iver Model, Local Model Validation Report, Jacobs 2019

The tested development includes 1,200 residential dwellings, 22,942sqm GFA of employment and retail space, a 6,613sqm GFA Hotel, and a two-form entry primary school. The proposed Iver Relief Road (IRR) will connect the new development to Mansion Lane and Thorney Lane North, allowing improved access to B470 Langley Park Road for both development traffic and existing road users. The development will replace the existing industrial land uses on the site.

1.1 Report Structure

The remainder of this report is set out as follows:

- Section 2 – Provides an overview of the forecast methodology
- Section 3 – Details the updates to the modelled networks
- Section 4 – Describes the creation of the forecast matrices
- Section 5 – Provides an overview of general cost changes and assignment convergence
- Section 6 – Describes the key outputs from the model
- Section 7 – Contains the conclusions of the modelling work

2. Forecasting Methodology

2.1 Forecasting Approach

The Iver model has been built according to guidance in TAG unit M4. However, for the purposes of providing an evidence base to assess planning applications around Iver, it has been agreed with BCC's Highways Development Management team that the planning application work will not include a Variable Demand Model (VDM) and will not necessarily cap total planning growth to National Trip End Model (NTEM) levels. The rationale for these decisions is provided in section 4.

In summary, the forecasting methodology was to develop a Do Minimum (DM) scenario to form the reference case against which various Do Something (DS) scenarios can be assessed. The DM scenario excludes the tested development and the DS scenarios include it. In developing the forecast scenarios:

- Land developments to include explicitly in the modelling were identified and were modelled with trip generation based on those defined within a Transport Assessment (TA) for the development, if available, or otherwise based on trip rates from a TA for a similar development, or from TRICS (v7.1.3).
- Trip distribution for land developments were based on the distribution of trips from existing areas of the study area which had similar land uses and geographic locations. These are known as 'donor zones'
- All land use data considered committed and included in the DM scenario was discounted from the TEMPro derived background growth factors. The resulting background growth forecasts were applied to the base year trip ends to create forecast target trip ends for background growth for car users
- All non-committed land use data included in the various DS scenarios were NOT discounted from TEMPro. These developments were added to the model as an addition to the net growth from the DM scenario; the background growth factors from the DM scenario were preserved for the DS scenario and not further adjusted or discounted.
- The DfT's Road Traffic Forecasts 2018 (RTF18) were used to determine forecast background growth and trip ends for LGVs and HGVs
- The base year matrices were then furnessed to match the forecast target trip ends and these were then assigned to the network.
- Proposed forecast schemes to include explicitly in the modelling were identified and coded into the base year network as appropriate to the scenario, to derive the forecast networks.

Given the growth assumptions outlined above it is emphasised that the forecast model scenarios described in this report are only suitable for use in assessment of development for planning purposes, and not for a DfT business case.

One DM scenario and six DS scenarios were derived, as described below.

2.2 Forecast Scenarios

For the purpose of this work, one forecast year of 2036 has been modelled. There are seven modelled scenarios which are all variations of the Do Minimum (DM) scenario as follows:

- DM: Committed development and infrastructure only
- DS1: Similar to the DM, but with the addition of the tested development
- DS2: Similar to the DM but with the addition of the tested development and the Iver Relief Road
- DS3: Similar to DS1 but with the addition of non-committed local plan growth

- DS4: Similar to DS2 but with the addition of non-committed local plan growth
- DS5: Similar to DS1 but with the closure of Hollow Hill Lane
- DS6: Similar to DS2 but with the closure of Hollow Hill Lane

2.3 Forecast Years

For planning application assessment purposes, one forecast year (2036) has been modelled. The forecast land use and infrastructure assumptions for 2036 were determined from assumed phasing dates presented in the uncertainty log (detailed in Appendix A).

2.4 Forecast Demand

Forecast demand for travel was generated using local and national data to identify the changes in land use that could be expected in the future.

Background growth in forecast land use was derived from NTEM v7.2. Additionally, planning data from BCC and Chiltern & South Bucks District was used to identify specific land development proposals in the area covered by the model. This data identified the locations of potential new development, and the size and type of development proposed. Through consultation with BCC and the district, the likelihood of each development being realised was also identified, allowing an uncertainty log to be compiled. A copy of the uncertainty log is presented in Appendix A. Based on this, future land uses at a local level could be identified.

New developments were represented by adding new zones, in addition to the zones from the base year model. The trip generation for those zones was based on data provided in transport assessments (where available) for the respective developments; where a transport assessment wasn't available, assumptions on trip rates were made based on either a transport assessment for a similar development or taken from TRICS (v7.1.3).

Trip ends for existing base year zones were calculated by applying TEMPro derived growth to the base year matrix trip ends. In addition, since the model utilises a fixed demand approach, adjustment factors for fuel price changes and income growth in the future were also applied to the trip ends. The fixed demand approach was preferable for the planning application as it was considered to represent a more robust assessment of the planning application as it is likely that variable demand would suppress future year trip generation.

Base year matrices were then furnessed to match the target trip ends. For new developments the trip distribution was based on that of nearby zones with similar land uses, making use of a "donor zone". A "donor zone" is used in forecasting to duplicate distribution of a development zone from the distribution of a base year zone in close proximity to the development zone. A donor zone will also have similar land use characteristics as the development. For example, a development zone that contains a residential development, should use a donor zone containing housing only.

The process for factoring up LGV and HGV trips was slightly different. In those cases, the DfT's Road Traffic Forecasts 18 (RTF18) based on the National Transport Model for the South East Region were used in place of NTEM, which does not provide data on freight movement.

Further detail on the creation of the forecast demand is provided in section 4.

2.5 Forecast Network

To identify transport schemes to be considered for inclusion in the forecast network, an uncertainty log was drawn up in consultation with BCC, CDC and SBDC. Schemes in Slough (a neighbouring authority) were also

considered. These were modelled in the forecast network using scheme drawings made available by the planning authorities.

For each forecast scenario, an appropriate network was developed, cognisant of relevant transport schemes, and any infrastructure associated with new developments.

The creation of the forecast networks is described in section 3.

2.6 Forecast Assignment

The forecast demand matrices were assigned to the forecast networks using the same methodologies used in the base year assignment; essentially, this was using VISUM's 'Assignment with ICA' methodology, using the LUCE methodology within each sub-assignment. The generalised cost parameters were however updated to reflect the changes in value of time and vehicle operating costs in the future, using values from the TAG data book (May 2019), which was the latest data book available at the time of model commencement. Parameters have been calculated for each user class (Business, Commute, Other, LGV, OGV1 and OGV2).

3. Forecast Network

3.1 Committed Transport Infrastructure Schemes

Data on potential transport infrastructure schemes within the South Bucks District, Chiltern District and neighbouring Slough Borough has been collated, using data provided by the planning authorities and the highway authority.

A full list of all schemes considered for inclusion in the model, and for which information was received and verified has been summarised in the uncertainty log, which is presented in Appendix A.

The likelihoods associated with the developments included in the uncertainty log are listed below and taken from TAG unit M4, Table A2, and outlined below in Table 3.1.

Probability of the input	Status
Near certain: The outcome will happen or there is a high probability that it will happen.	Intent announced by proponent to regulatory agencies. Approved development proposals. Projects under construction.
More than likely: The outcome is likely to happen but there is some uncertainty.	Submission of planning or consent application imminent. Development application within the consent process.
Reasonably foreseeable: The outcome may happen, but there is significant uncertainty	Identified within a development plan. Not directly associated with the transport strategy/scheme but may occur if the strategy/scheme is implemented. Development conditional upon the transport strategy/scheme proceeding. Or, a committed policy goal, subject to tests (e.g. of deliverability) whose outcomes are subject to significant uncertainty
Hypothetical: There is considerable uncertainty whether the outcome will ever happen.	Conjecture based upon currently available information. Discussed on a conceptual basis. One of a number of possible inputs in an initial consultation process. Or, a policy aspiration

Table 3.1: Classification of future inputs

Of the schemes listed in the Appendix, only those that were considered “Certain”, “Near Certain” or “More than Likely” were added to the forecast model. For a small number of schemes, drawings were provided which formed the basis for the coding of the schemes into the model.

The coding of the more notable schemes is illustrated below. First, the Iver Relief Road:

Figure 3.1: Iver Relief Road network coding

The development loading points are shown as the three side roads on the north side of the relief road. These loading points were selected as they would ensure appropriate representation of traffic flows through the junctions of the relief road such that their operational performance could be assessed through separate junction modelling using the modelled flows. For the purpose of the modelling, the junctions were coded such that they had sufficient capacity in the model to accommodate all of the traffic demand. A masterplan for the development upon which the model coding was based is below:

Figure 3.2: Site Masterplan used to inform loading points

Coding of the closure of Hollow Hill Lane is shown below:

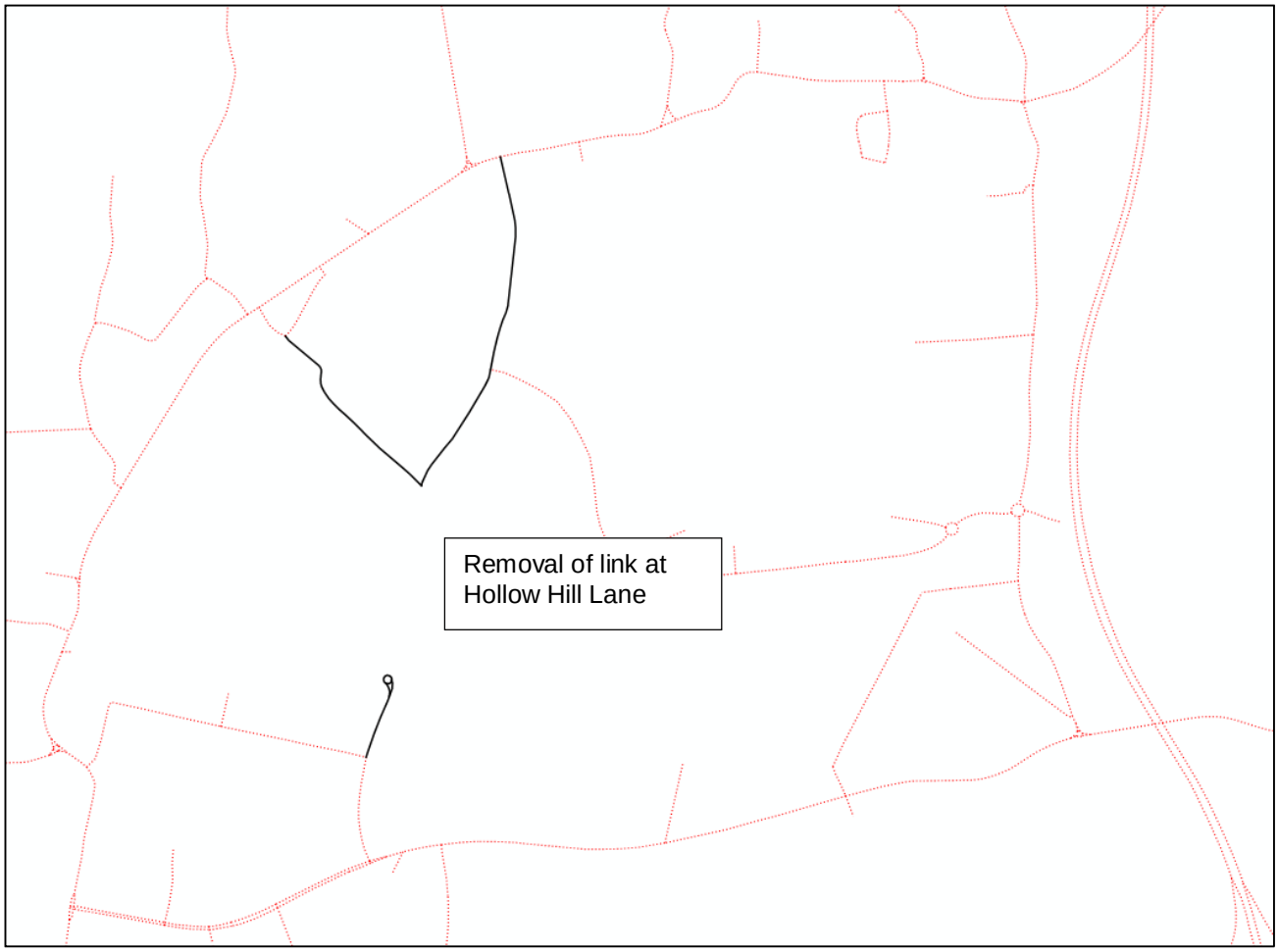


Figure 3.3 Hollow Hill Lane coding change

Finally, coding of the A355 relief road is shown below:

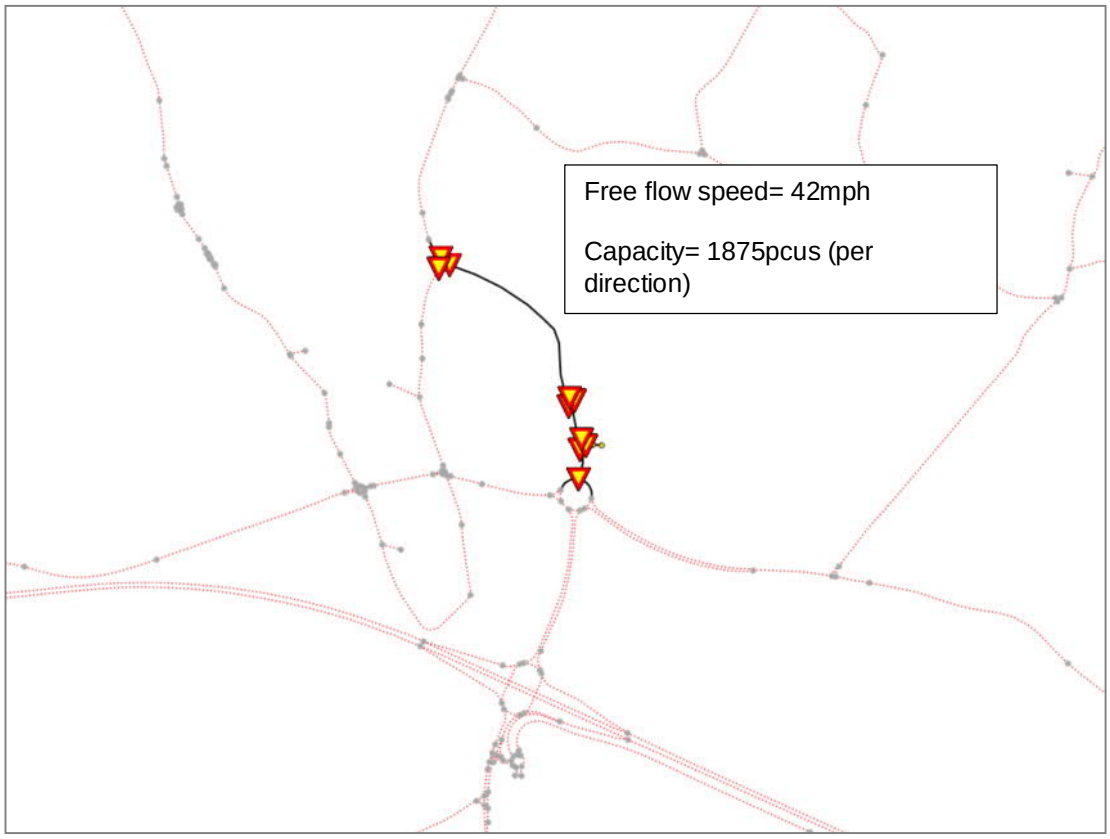


Figure 3.4 A355 Relief Road coding

The schemes were included in the forecast network according to each scheme's expected completion year and the requirements of the relevant scenario. This is detailed in Table 3.1 which indicates which scenario of the 2036 forecast the scheme is included within. The table corresponds with Figure 3.5 which illustrates the forecast infrastructure location in the area.

No.	Scheme	In place by 2018	In place in DM	In place in DS1	In place in DS2	In place in DS3	In place in DS4	In place in DS5	In place in DS6
1	A355 Relief Road	N	Y	Y	Y	Y	Y	Y	Y
2	Chalfont Lane widening	N	Y	Y	Y	Y	Y	Y	Y
3	A4 London Road Improvement	N	Y	Y	Y	Y	Y	Y	Y
4	M4 Smart Motorway	N	Y	Y	Y	Y	Y	Y	Y

No.	Scheme	In place by 2018	In place in DM	In place in DS1	In place in DS2	In place in DS3	In place in DS4	In place in DS5	In place in DS6
5	Hollow Hill Lane Closure	N	N	N	N	N	N	Y	Y
6	Seven Hills Road upgrade	N	Y	Y	Y	Y	Y	Y	Y
7	Stoke Road improvement	N	Y	Y	Y	Y	Y	Y	Y
8	Iver Relief Road	N	N	N	Y	N	Y	N	Y

Table 3.2: Network changes included in the model

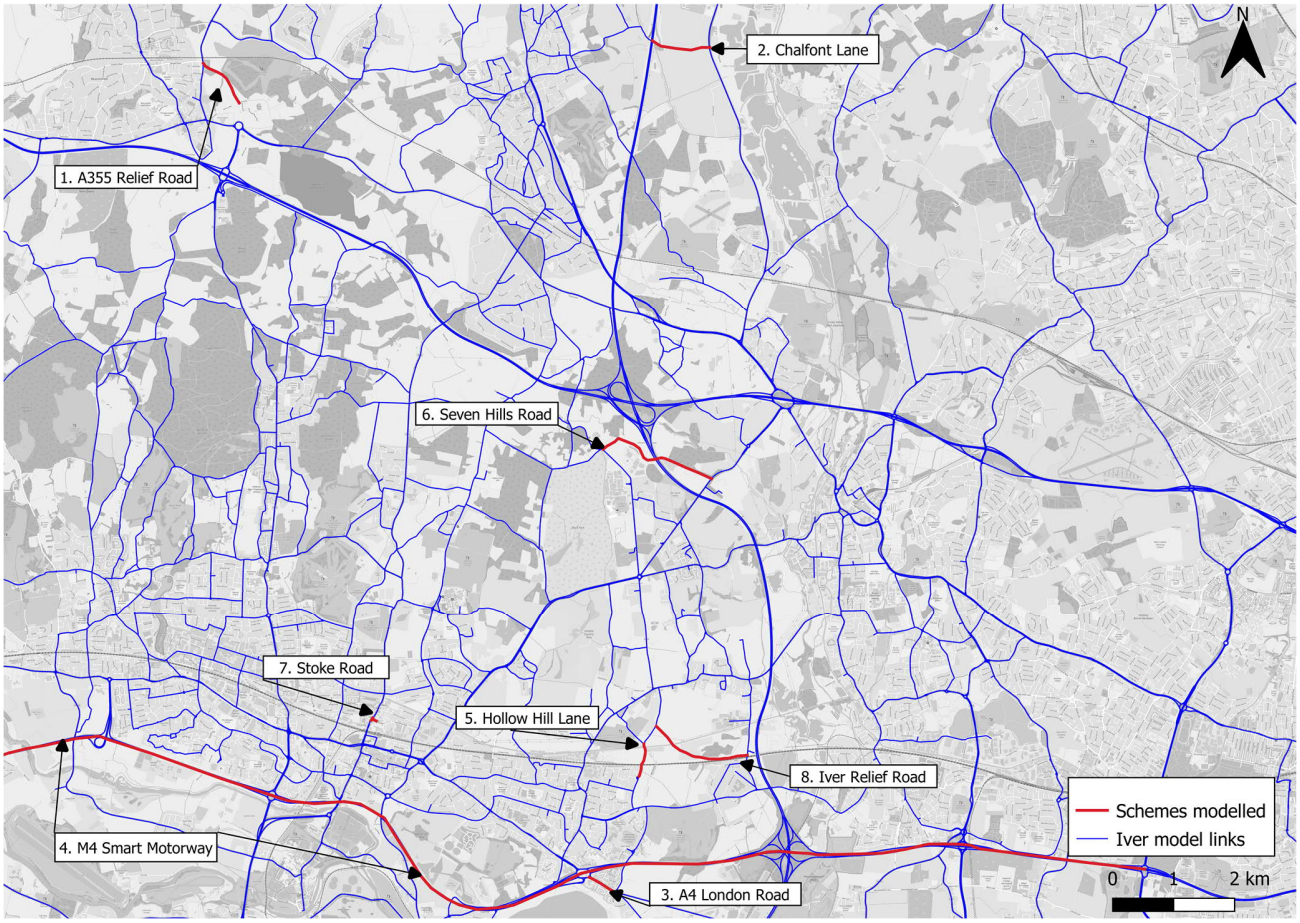


Figure 3.5: Forecast Network Infrastructure

It is also worth noting that the gap acceptance value for a node at the Thorney Lane South/ Industrial site junction was reduced for those scenarios which included the development but not the relief road (i.e. scenarios DS1, DS3 and DS5). This is because at the original value there were extensive delays and blocking back for

trips trying to get out of the development site, meaning not all the development traffic could load onto the network; although the gap acceptance change here would represent an unrealistic situation, it facilitated the loading of all the development trips onto the downstream network (rather than having a bottle neck which would limit the traffic flow downstream of the junction), such that the full impact of the trips could be identified.

Away from the immediate study area, if queues were found to form on approaches to roundabouts or on the minor arm of a priority junction, consideration was given to reducing the gap acceptance parameter at those locations. The changes made were very small and within sensible limits, on the basis that it has been observed that driver behaviour changes in congested conditions such that drivers are willing to accept smaller gaps in traffic before proceeding from a minor arm. Similarly, it has been observed that drivers on the major arm are more likely to allow a vehicle from the minor arm to proceed when there is significant queuing on that arm. This effect was approximated in the model through the use of smaller gap acceptance values.

4. Forecast Demand

4.1 Overview

It was agreed with BCC's Highways Development Management team, that for development management assessments, VDM would not be used as it is considered likely to supress traffic demand within the vicinity of the assessment. This ensures a more robust assessment of development impacts.

Forecast demand was originally calculated using data derived from local authorities on specific land uses (encapsulated within an uncertainty log), and national data sets for wider growth trends. Those data sets were used to calculate the future trip generation (origins and destinations) at the zonal level and were used as targets against which to furness the base year matrices.

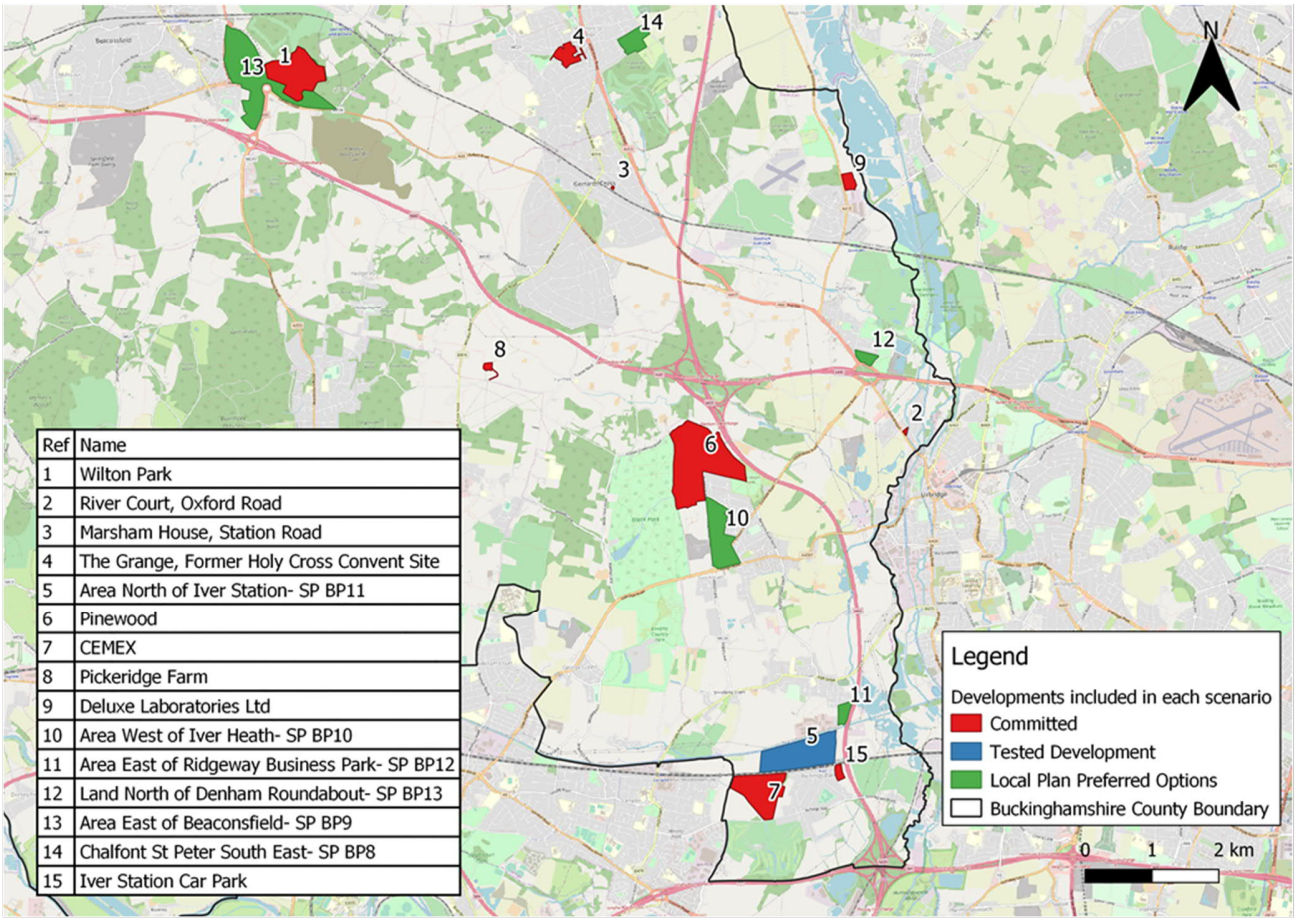
4.2 Future Developments

The specific developments to be included were identified through an uncertainty log which was compiled using planning data from BCC, CDC and SBDC. The development quanta and the likelihood of each development being realised (according to the classifications detailed in Table 3.1) was verified by BCC and the planning authorities.

The developments considered appropriate for inclusion in the model's core forecasts were generally those whose likelihood of being built were either "Near Certain" or "More than likely". Sensitivity tests which included local plan allocation sites with no planning application yet submitted (i.e. sites with likelihood "Reasonably foreseeable") were also developed.

The uncertainty log includes all developments within the Chiltern and South Bucks districts; developments which were too small to warrant inclusion, or that were too far away from the study area to have any material impact within the study area were also excluded. The uncertainty log is included in Appendix A, and also identifies which developments were included in the model scenarios, and their justification for inclusion/exclusion.

The developments that were included within the modelling are shown in Figure 4.1, the reference number in the figure below matches to that in Appendix A, in which the development quanta are identified.



Ref	Name
1	Wilton Park
2	River Court, Oxford Road
3	Marsham House, Station Road
4	The Grange, Former Holy Cross Convent Site
5	Area North of Iver Station- SP BP11
6	Pinewood
7	CEMEX
8	Pickeridge Farm
9	Deluxe Laboratories Ltd
10	Area West of Iver Heath- SP BP10
11	Area East of Ridgeway Business Park- SP BP12
12	Land North of Denham Roundabout- SP BP13
13	Area East of Beaconsfield- SP BP9
14	Chalfont St Peter South East- SP BP8
15	Iver Station Car Park

Figure 4.1: Developments around Iver

Development build out rates were agreed with BCC, CDC and SBDC in terms of identifying the amount of the development anticipated to be completed by 2036.

The key pieces of development information required in order to generate the trip rates was taken from Transport Assessments (TAs). The TAs also confirmed, for residential developments, the number of households, and for employment developments, the gross floor area (GFA). Where a TA was not available, trip generation rates for the development were taken from TRICs (v7.1.3), using rates that were consistent with previous modelling work in the local area.

Development sizes for employments sites were given in terms of square metres of GFA for each land use class (B1, B2, B8. etc.). In order to discount employment land uses from NTEM forecasts for the purposes of deriving background growth, an indication of the number of jobs was required. Where the number of jobs was not otherwise described in a TA, they were estimated using data on employment densities from the Homes & Communities Agency (HCA)[2]. The densities assumed for the model are shown below in Table 4.1:

[2] Employment Densities Guide, 3rd Edition, 2015

Use type	Area (m^2) per FTE
B1	12
B2	36
Retail	15-20
Care Home	1 emp. per 5 bedrooms
Hotel	1 emp. per 3 bedrooms

Table 4.1: Employment Densities

For each development, a new modelled zone was created; where the development was mixed, a separate zone was created for each land use type (residential or employment), which ensured that separate trip distributions could be applied. The total amount of new development by district was summarised and used to inform the discounting of land uses from NTEM background growth assumptions, used for the DM scenario, as described in the following sections.

Table 4.2 below summarises the increases from specific development included in the model for the 2036 forecast year scenario for Chiltern District and South Bucks District.

Scenario	Household Increases (no. households) from specific development		Job Increases (no. jobs) from specific development	
	Chiltern District	South Bucks District	Chiltern District	South Bucks District
DM	187	645	15	894
DS1	187	1,845	15	721
DS2	187	1,845	15	721
DS3	187	4,095	15	3,782
DS4	187	4,095	15	3,782
DS5	187	1,845	15	721
DS6	187	1,845	15	721

Table 4.2: Increases from specific development

It should be noted that there is a decrease in jobs in South Bucks between the DM and DS1 scenarios. This is due to the replacement of industrial land at the site of the Thorney Lane development.

4.3 TEMPro Growth

The DfT's Trip End Modelling Programme (TEMPro) was used to provide background growth rates in the model forecasts, derived from NTEM v7.2, i.e. growth arising from sources other than the specific developments described in section 4.2. It was agreed with BCC's Highways Development Management team, that a certain amount of the development included in the model should be discounted from TEMPro forecasts in order to ensure there was no double counting of development growth. All of the developments included in the DM scenario were discounted, and all additional development included in the DS scenarios was not discounted. In

effect, all 'committed' development, with a likelihood of 'near certain' or 'more than likely' was discounted. The tested development, and the local plan developments included in the relevant DS scenarios were not discounted. Thus, total growth in the DM scenario matched NTEM, and growth in the DS scenarios exceeded NTEM.

Using the latest version of NTEM (v7.2), the table below summarises the default household and job increase assumptions for Chiltern District and South Bucks District.

Growth period	Household Increases (no. households)		Job Increases (no. jobs)	
	Chiltern District	South Bucks District	Chiltern District	South Bucks District
2018-2036	2,615	2,631	2,577	2,568

Table 4.3: Default land use increases

Table 4.4 below summarises the total household and job increase for each scenario, from specific development and discounted NTEM background growth.

Scenario	Household Increases (no, households)			Job Increases (no, jobs)		
	Chiltern District	South Bucks District	Total	Chiltern District	South Bucks District	Total
DM	2,615	2,631	5,246	2,577	2,568	5,145
DS1	2,615	3,831	6,286	2,577	2,395	4,972
DS2	2,615	3,831	6,286	2,577	2,395	4,972
DS3	2,615	6,081	8,536	2,577	5,457	8,034
DS4	2,615	6,081	8,536	2,577	5,457	8,034
DS5	2,615	3,831	6,286	2,577	2,395	4,972
DS6	2,615	3,831	6,286	2,577	2,395	4,972

Table 4.4: Total household and job increases (TEMPro and development)

The overall increase in land use in the DM scenario was therefore consistent with the default NTEM land uses (set out in Table 4.3). Increases in the DS scenarios were in exceedance of the NTEM land uses.

For all areas outside of Chiltern District and South Bucks District, no specific development was modelled, and growth was based on default NTEM land use assumptions.

4.4 Trip Generation by Zone

To derive forecast matrices for each scenario, growth was applied to the trip matrices from the validated base year model. The trip ends from the base year matrices, by time period and trip purpose, were factored up to forecast levels using NTEM growth as described in the previous section.

New zones were added to represent new development with trip end totals based on the trip generation identified through a TA or from TRICS, as described in section 4.2. Trip purpose splits for the new zones were based on proportions from an existing base year zone which had similar land use characteristics. Forecast zones were

seeded with the trip distribution from an appropriate donor zone and the whole was then furnessed to match the forecast trip ends.

For goods vehicles, alternative methods to derive the background growth had to be employed as NTEM only provides trip end data for car trips. Instead of NTEM, goods vehicle growth was derived from RTF18 growth factors at the regional level, specifically South East England region.

Since there is no methodology for discounting trips from specific development for HGVs, these RTF18 growth factors were used unadjusted for the 2036 scenarios. The growth from 2018 to 2036 was calculated as 25% for LGVs and 9% for both OGV1 and OGV2 for the South-East region. The regional growth factors were applied to the base year trip ends appropriately based on geography.

4.5 Fuel and Income adjustment factors

As the model uses fixed highway demand, it was necessary to adjust the matrices to take account of future changes in income and fuel price. The factors applied were derived in accordance with TAG, using the TAG data book (May 2019). The income adjustment factors for the base year and forecast years are given below in Table 4.5:

Year	Income adjustment factor (A)	Fuel cost adjustment factor (B)	Applied adjustment (C= AxB)
2018	1.018	1.064	-
2036	1.057	1.131	-
2018 to 2036 growth	1.038	1.062	1.103

Table 4.5: Fuel and Income adjustment factors

The factor that was applied was therefore 1.103. This factor was applied to the base year car trip ends prior to furnessing.

4.6 Trip matrix comparisons

Trip totals for the base year are presented in Table 4.6 below. The percentage growth for the forecast scenarios is also presented in the table.

Vehicle Type		2018 Base	% Change 2036 Scenario DM	% Change 2036 Scenario DS1	% Change 2036 Scenario DS2	% Change 2036 Scenario DS3	% Change 2036 Scenario DS4	% Change 2036 Scenario DS5	% Change 2036 Scenario DS6
AM									
Car	Commute	364,041	22	22	22	22	22	22	22
	Business	46,452	23	23	23	23	23	23	23
	Other	490,313	34	34	34	34	34	34	34
LGV		74,905	25	26	26	26	26	26	26
OGV1		89,392	3	3	3	3	3	3	3

OGV2		48,325	3	3	3	3	3	3	3
PM									
Car	Commute	303,703	22	22	22	22	22	22	22
	Business	46,658	23	23	23	23	23	23	23
	Other	542,079	32	32	32	32	32	32	32
LGV		75,230	25	25	25	25	25	25	25
OGV1		66,534	3	3	3	3	3	3	3
OGV2		57,012	3	3	3	3	3	3	3

Table 4.6 Trip Matrix Totals

The growth in the table above is for all trips in the matrix, including those which have an origin or destination outside of Iver but which pass through the model area, and those which do not pass through the study area at all. The growth is inclusive of background growth and trips from specific developments.

Table 4.7 below compares the growth in the matrices for trips with an origin or destination in South Bucks district, which is the district in which the tested development lies. The effect of the fuel and income adjustment factor has been removed to aid comparison of the underlying growth against unadjusted NTEM growth and RTF18 growth in good vehicles for the South East region.

Vehicle Type		2018 Base		% TEMPro growth South Bucks 2036 / RTF growth SE region 2036		% Change 2036 – DM (exc. fuel and income factor)		% Change 2036 – DS 1 (exc. fuel and income factor)		% Change 2036 DS2 (exc. fuel and income factor)		% Change 2036 – DS 3 (exc. fuel and income factor)		% Change 2036 – DS 4 (exc. fuel and income factor)		% Change 2036 – DS 5 (exc. fuel and income factor)		% Change 2036 – DS 6 (exc. fuel and income factor)	
AM		Origin	Dest	Origin	Dest.	Origin	Dest	Origin	Dest	Origin	Dest	Origin	Dest	Origin	Dest.	Origin	Dest	Origin	Dest
Car	Commute	4,697	4,718	0	11	0	14	5	15	5	15	14	22	14	22	5	15	5	15
	Business	739	682	4	11	5	12	9	12	9	12	17	17	17	17	9	12	9	12
	Other	4,775	4,418	14	19	14	19	21	24	21	24	27	31	27	31	21	24	21	24
LGV		914	495	25		32	37	37	37	37	37	49	48	49	48	37	37	37	37
OGV1		116	88	9		13	10	13	9	13	9	16	11	16	11	13	9	13	9
OGV2		143	125	9		13	8	0	4	0	4	3	6	3	6	0	4	0	4
PM		Origin	Dest	Origin	Dest.	Origin	Dest	Origin	Dest	Origin	Dest	Origin	Dest	Origin	Dest	Origin	Dest	Origin	Dest
Car	Commute	3,647	3,604	9	0	13	1	17	7	17	7	30	18	30	18	17	7	17	7
	Business	519	558	11	5	13	7	14	10	14	10	20	18	20	18	14	10	14	10
	Other	4,774	4,882	15	13	16	13	18	17	18	17	24	23	24	23	18	17	18	17
LGV		720	381	25		30	30	29	33	29	33	34	43	34	43	29	33	29	33
OGV1		76	62	9		14	13	13	11	13	11	18	13	18	13	13	11	13	11
OGV2		77	135	9		11	12	10	8	10	8	13	9	13	9	10	8	10	8

Table 4.7: South Bucks trip matrix comparison

For the DM scenario, committed land uses have been discounted from the TEMPro growth figures, however, there are still differences in growth between the DM matrices and the undiscounted TEMPro figures. The reason for this is that, the discounting of land uses doesn't fully ameliorate the trip generation from those sites. This is because the trip generation rates from for those sites, as detailed in their respective TAs tend to be higher than assumed trip generation rates in TEMPro, which are derived from National Travel Survey (NTS) data.

It is also notable that growth in goods vehicles, specifically LGV growth exceeds the RTF estimates in the DM scenario. In this case, there is no mechanism for discounting RTF growth, hence total growth exceeds the forecasts. It is notable too that in the DS scenarios, OGV2 growth is lower than in the DM and in the RTF estimates. This is because those scenarios include development at Land North of Iver Station, and that this development replaces the existing industrial land use on the site, hence there is a reduction in GV trips due to the loss of the industrial land use.

Appendix B details the forecast matrices on a sector to sector basis using the same sector system specified in the LMVR, as illustrated in Figure 4.2**Error! Reference source not found.**. The tables identify the trips for each sector and also notes the absolute changes from the base year.

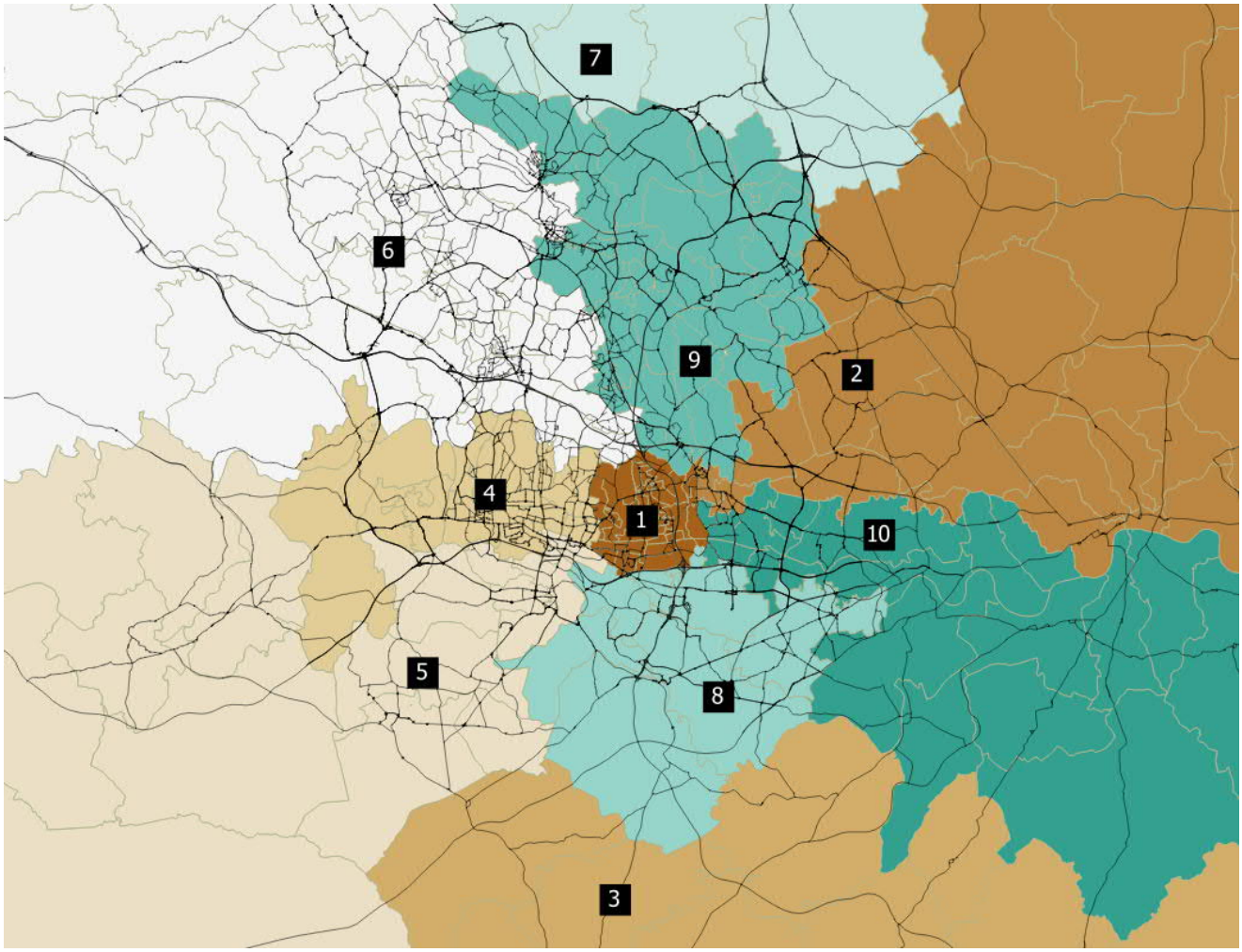


Figure 4.2: Iver sector system for trip matrix comparison

5. Forecast Assignment

5.1 Generalised cost changes

The values of time (VOT) and vehicle operating costs (VOC) that were calculated for the base year and detailed in the LMVR, were updated for the forecast year (2036) to represent changes in the perceived values of time and vehicle operating costs in the future, as detailed in the TAG data book (May 2019). The original base year and updated forecast VOTs and VOCs are shown below in Table 5.1 and Table 5.2.

Vehicle type	Trip Purpose	Time Period	Value of Time (p/min)	Vehicle operating cost (p/km)	Generalised cost coefficient for time (per second)	Generalised cost coefficient for distance (per metre)
Car	Business	AM	30.82	13.50	1	0.0263
Car	Commute	AM	20.67	6.20	1	0.0180
Car	Other	AM	14.26	6.20	1	0.0261
LGV	Business	AM	21.79	13.91	1	0.0383
OGV1	Business	AM	44.24	35.26	1	0.0478
OGV2	Business	AM	44.24	65.13	1	0.0883
Car	Business	PM	31.27	13.50	1	0.0259
Car	Commute	PM	20.74	6.20	1	0.0179
Car	Other	PM	14.93	6.20	1	0.0249
LGV	Business	PM	21.79	13.91	1	0.0383
OGV1	Business	PM	44.24	35.26	1	0.0478
OGV2	Business	PM	44.24	65.13	1	0.0883

Table 5.1: 2018 base year cost parameters

Vehicle type	Trip Purpose	Time Period	Value of Time (p/min)	Vehicle operating cost (p/km)	Generalised cost coefficient for time (per second)	Generalised cost coefficient for distance (per metre)
Car	Business	AM	40.49	12.10	1	0.0179
Car	Commute	AM	27.15	5.73	1	0.0127
Car	Other	AM	18.73	5.73	1	0.0183
LGV	Business	AM	28.62	13.75	1	0.0288
OGV1	Business	AM	58.10	41.28	1	0.0426
OGV2	Business	AM	58.10	75.92	1	0.0784
Car	Business	PM	41.07	12.10	1	0.0177
Car	Commute	PM	27.25	5.73	1	0.0126
Car	Other	PM	19.62	5.73	1	0.0175
LGV	Business	PM	28.62	13.75	1	0.0288
OGV1	Business	PM	58.10	41.28	1	0.0426
OGV2	Business	PM	58.10	75.92	1	0.0784

Table 5.2: 2036 cost parameters

5.2 Assignment convergence

A high level of model convergence is key to ensuring that the results contained within the model are a true reflection of the demand and modelled network. A model that is not sufficiently converged will include a large amount of random bias and white noise due to appropriate trip routing not yet having been achieved. To avoid that situation, the modelled assignments have been run with the intention to achieve a high level of convergence, attempting to obey Wardrop's First Principle of Traffic Equilibrium as per TAG U3.1 2.7.3:

"Traffic arranges itself on networks such that the cost of travel on all routes used between each OD pair is equal to the minimum cost of travel and all unused routes have equal or greater cost."

In order to meet TAG criteria, Unit 3.1 Chapter 3.3, the convergence analysis was done by using the following measures of convergence:

- Proximity to the assignment objective
- Stability of model outputs between consecutive iterations

Proximity to the assignment objective is measured by how close the model is to a particular converged solution. In VISUM this equates to how close the model is to Wardrop's Principle of Equilibrium and is measured using the GAP function. GAP (denoted δ) is calculated according to the formula below:

$$\delta = \frac{\sum T_{pij}(C_{pij} - C^*_{ij})}{\sum T_{ij} C^*_{ij}}$$

Where:

Tpij	is the flow on route p from origin to destination
Tij	is the total travel from I to j
Cpij	is the congested cost of travelling from i to j on path p
C*ij	is the minimum cost of travelling from I to j

The GAP value therefore represents the excess cost incurred by failing to travel on the route with the lowest generalised cost and is expressed relative to that minimum route cost. The excess cost is summed over each route between each origin-destination (O/D) pair and multiplied by the number of trips between each O/D pair. This is divided by the minimum cost summed over each route between each O/D pair, also multiplied by the number of trips between each O/D pair.

TAG states that GAP is the single most valuable indicator of overall model convergence. It requires that reasonable levels of convergence are achieved, and that a GAP value of 0.1% or less is required. In addition to Delta and GAP, TAG recommends a series of tests be run to assess the model's stability and demonstrate the level of flow change on links between consecutive iterations, percentage of links with flow and cost change.

The table below summarises the TAG requirements for convergence.

Measure of Convergence	Base Model Acceptable Values
Delta and %Gap	Less than 0.1% or at least with convergence fully documented and all other criteria met
Percentage of links with flow change < 1%	Four consecutive iterations greater than 98%
Percentage of links with cost change < 1%	Four consecutive iterations greater than 98%

Table 5.3: TAG convergence measures

The assignment convergence statistics achieved for the model scenarios are summarised below:

Scenario	Time Period	Last four iterations	Final %GAP	Percentage of links with flow change < 1%	Percentage of links with cost change < 1%
DM	AM	22	0.00070099	0.982	0.999
		23	0.00069391	0.988	0.999
		24	0.00069699	0.985	0.999
		25	0.00069512	0.985	0.999
	PM	29	0.00076319	0.985	0.999
		30	0.00076373	0.985	0.999
		31	0.00075894	0.989	0.999
		32	0.00077710	0.981	0.999
DS1	AM	25	0.00073867	0.980	0.999
		26	0.00073394	0.986	0.999
		27	0.00073534	0.990	0.999
		28	0.00074513	0.981	0.998
	PM	23	0.00075791	0.985	0.999
		24	0.00075961	0.983	0.999
		25	0.00075926	0.987	0.999
		26	0.00076654	0.982	0.999
DS2	AM	28	0.00072014	0.981	0.998
		29	0.00072235	0.983	0.999
		30	0.00071818	0.980	0.999
		31	0.00071539	0.984	0.999
	PM	20	0.00075573	0.983	0.999
		21	0.00074303	0.982	0.999
		22	0.00073860	0.984	0.999
		23	0.00074970	0.981	0.999
DS3	AM	61	0.00087560	0.982	0.999
		62	0.00088146	0.985	0.999
		63	0.00087658	0.985	0.999
		64	0.00089016	0.982	0.999
	PM	42	0.00081383	0.987	0.999
		43	0.00083364	0.982	0.999
		44	0.00080728	0.983	0.999
		45	0.00081027	0.985	0.999
DS4	AM	43	0.00084305	0.988	0.999
		44	0.00084630	0.989	1.000
		45	0.00083873	0.984	0.999
		46	0.00084960	0.983	0.999
	PM	72	0.00079742	0.981	0.999
		73	0.00080185	0.983	0.999
		74	0.00082600	0.981	0.999
		75	0.00080124	0.988	0.999
DS5	AM	26	0.00085873	0.985	0.999

		27	0.00085731	0.987	0.999
		28	0.00088385	0.982	0.999
		29	0.00088845	0.981	0.999
	PM	54	0.00073990	0.985	0.999
		55	0.00073630	0.983	0.999
		56	0.00073667	0.982	0.999
		57	0.00077194	0.989	1.000
DS6	AM	36	0.00072485	0.984	0.998
		37	0.00074725	0.983	0.998
		38	0.00071787	0.981	0.998
		39	0.00072243	0.992	0.999
	PM	20	0.00075575	0.983	0.999
		21	0.00074761	0.987	1.000
		22	0.00074168	0.983	0.999
		23	0.00074543	0.986	1.000

Table 5.4: Assignment statistics for the last 4 iterations

The table demonstrates that the TAG criteria for convergences was met and exceeded in all cases.

6. Model Output

The change in traffic flows between the DM and DS scenarios are summarised here.

6.1 Flow changes

6.1.1 Tested development

The flow changes that occur due to the tested development (i.e. the flow differences between the DM and DS1 scenarios) are shown below in Figure 6.1 and Figure 6.2. The red bars represent increases and the green bars decreases as a result of the scheme being in place.

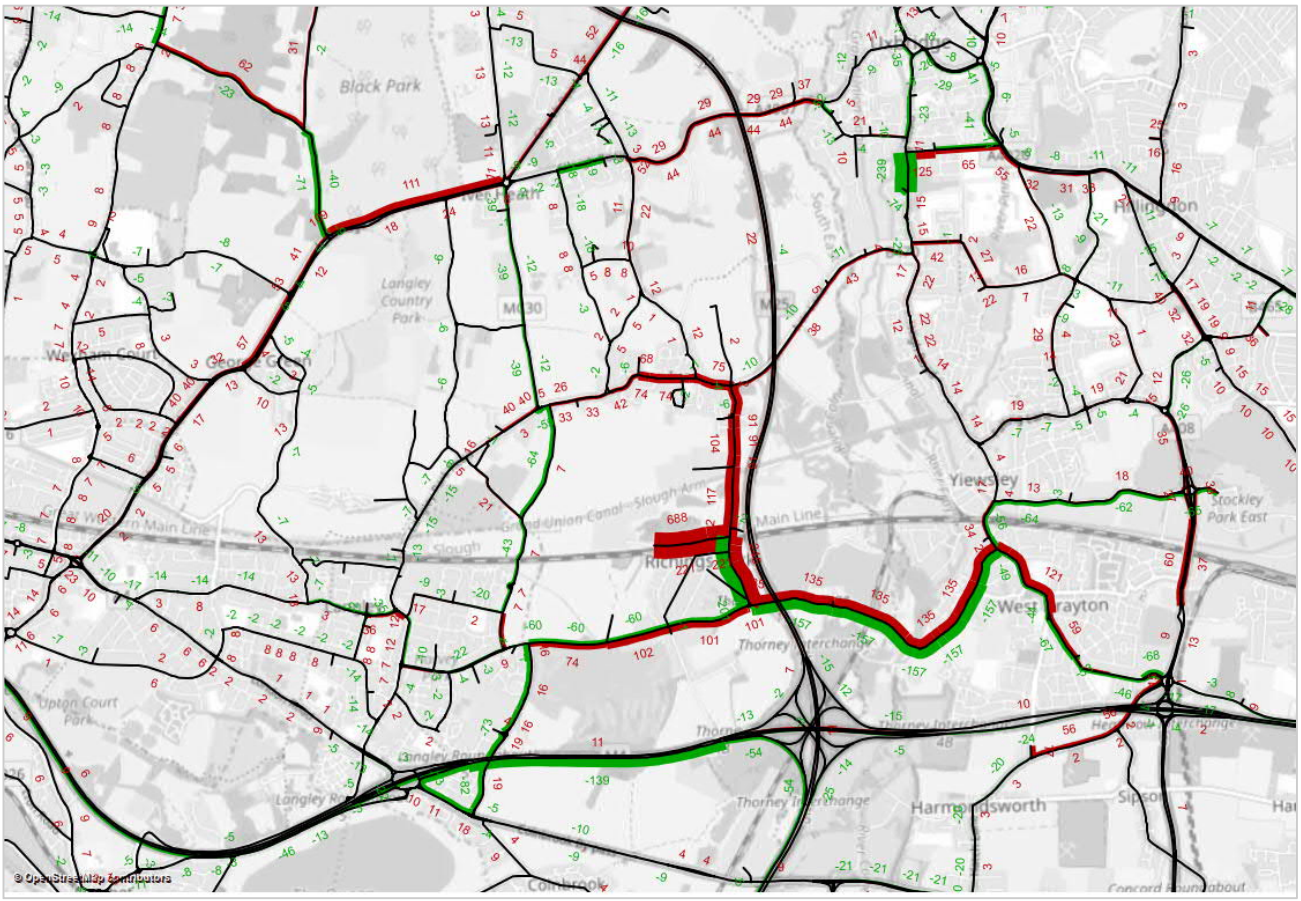


Figure 6.1 2036 DS1 AM peak flow change from DM

In the DS1 AM scenario, the addition of the Thorney Lane development has produced increases in flow along Thorney Lane South SB, Thorney Lane North and Iver High Street, due to development traffic routing along the network in these locations. There are also increases in traffic along Thorney Mill Road EB, North Park and Richings Way WB due to additional development traffic.

A reduction in traffic flow is observed on Thorney Lane South NB on the approach to the development access. This is caused by an increase in traffic on Thorney Lane North produced by additional traffic flow from the development which subsequently results in further delays at the Iver High Street/ Thorney lane junction. In turn,

this leads to the rerouting of traffic previously using Thorney Ln South to gain access to Iver High Street as the route becomes less attractive than alternatives.

Figure 6.1 shows there to be a reduction in traffic along Thorney Mill Road WB as a result of land use change at the development site and reduction in destination trips to the development zone.

A reduction in trips heading towards the development site from M4 J5 via Suttons lane can be seen in Figure 6.1. Increased queueing at the Sutton Lane junction, produced by development traffic, causes some traffic to reassign to alternative parallel routes. The impact of this rerouting causes small increases in flow on the newly reassigned routes however no particular route is adversely affected. In the DM, traffic flow around M4J5 is already severe and the introduction of the development site in DS, exacerbates the traffic flow in this location. Although the extra traffic coming from the development site is small in quantity, queueing worsens. This makes M4 J5 unattractive to road users, thus producing a decrease in traffic flow along the M4 Westbound back towards J4B.

Figure 6.2 2036 DS1 PM peak flow change from DM

Contrary to the AM peak, the PM peak shows a generally smaller magnitude of flow change across the network with a relatively higher magnitude on Thorney Lane as a result of the new development.

6.1.2 Tested development and infrastructure

The combined effect on traffic flows of both the development and the relief road (i.e the flow differences between the DM and DS2 scenarios) are shown in Figure 6.3 and Figure 6.4.

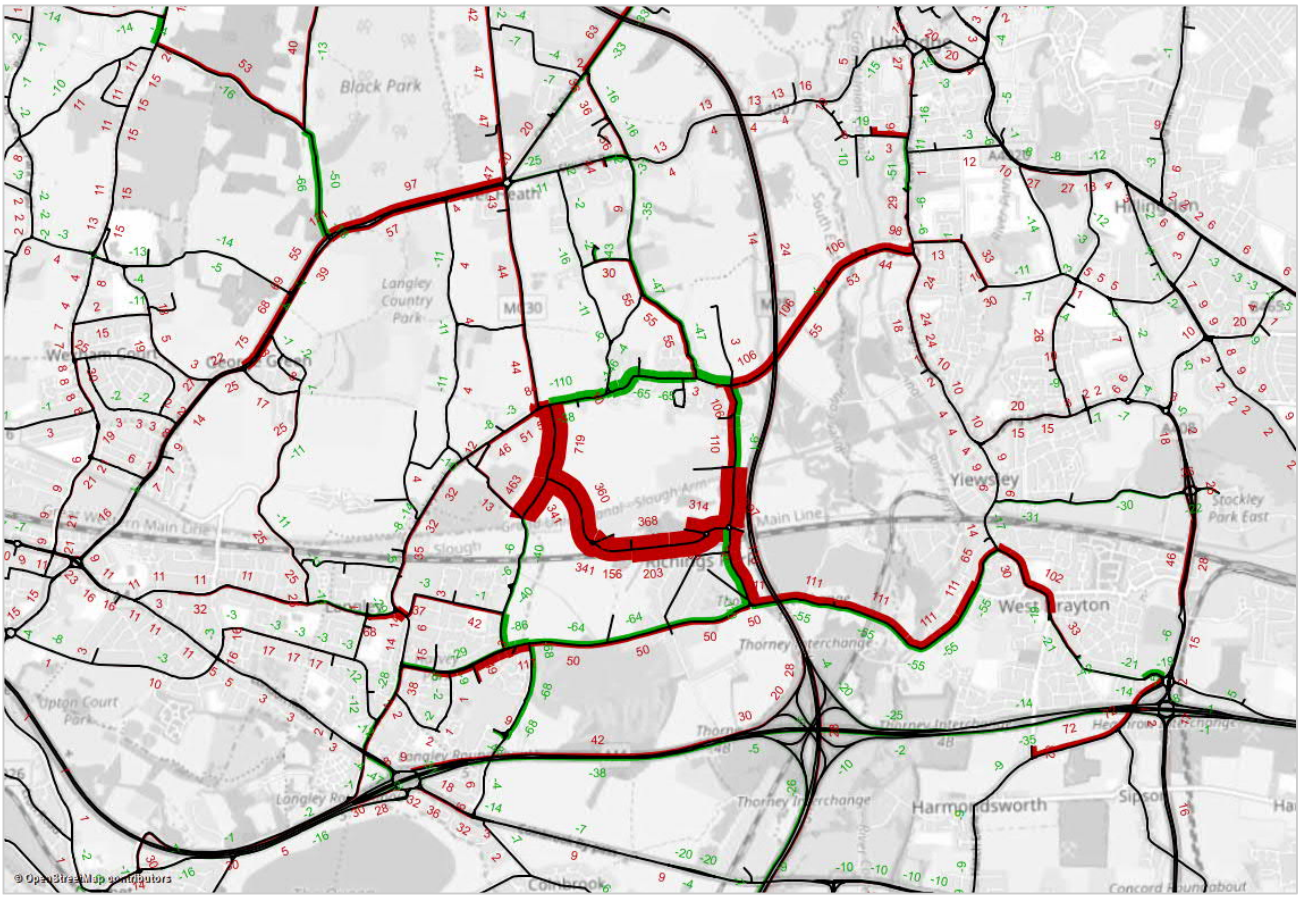


Figure 6.3: 2036 DS2 AM peak flow change from DM

The DS2 scenario contains the same forecast demand as DS1 combined with the addition of the Relief Road within the network. Figure 6.3 shows that much of the traffic re-routes to the relief road, leading to a reduction in all traffic using the High Street and North Park/ Richings Way. The apparent large increases on Mansion Lane should be disregarded – this occurs because the model has no DM reference link to compare to due to the link being split to accommodate the new relief road. Other notable increases in traffic occur on the B470, where traffic uses this road instead of the High Street and Bangors Road South to head north.

Like DS1 AM, there is an increase along Thorney Mill Lane EB due to development traffic heading away from the development site. Other slight flow differences are observed due to re-routing because of the relief road.

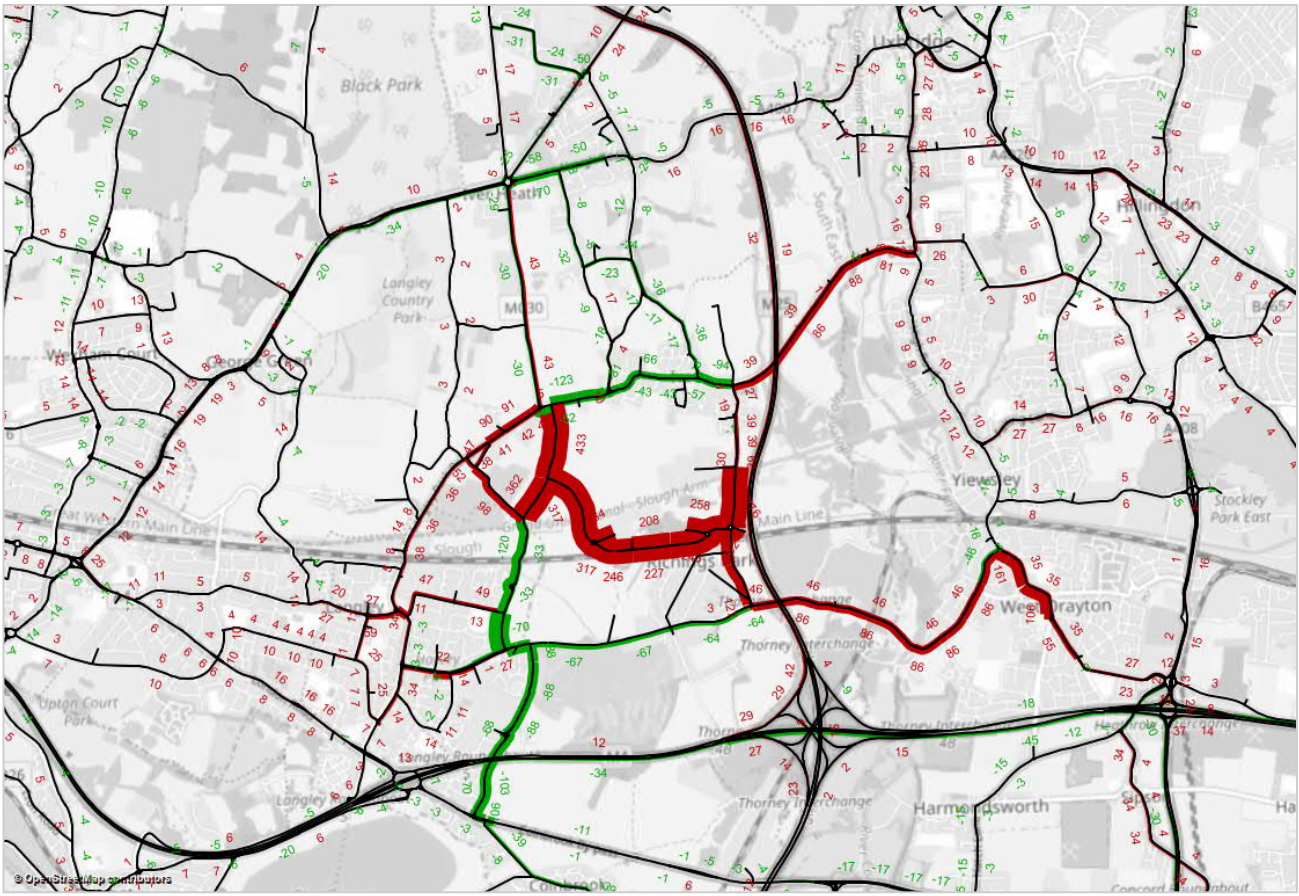


Figure 6.4 2036 DS2 PM peak flow change from DM

Like the DS2 AM peak, the PM peak shows the same re-routing of traffic on to the Relief Road. This means there are large increases in flow on Mansion Lane and Thorney Lane South. A reduction in traffic is observed on the High Street, where this traffic is re-assigned to the relief road instead.

6.1.3 Additional Effect of Local Plan site allocations

The combined flow changes that occur due to the tested development and the Local Plan preferred site allocations (i.e. a comparison of the DM and DS3 scenarios) and the tested development, Iver Relief Road and Local Plan preferred site allocations (i.e. a comparison of the DM and DS4 scenarios) are shown below in Figure 6.5 to Figure 6.8.

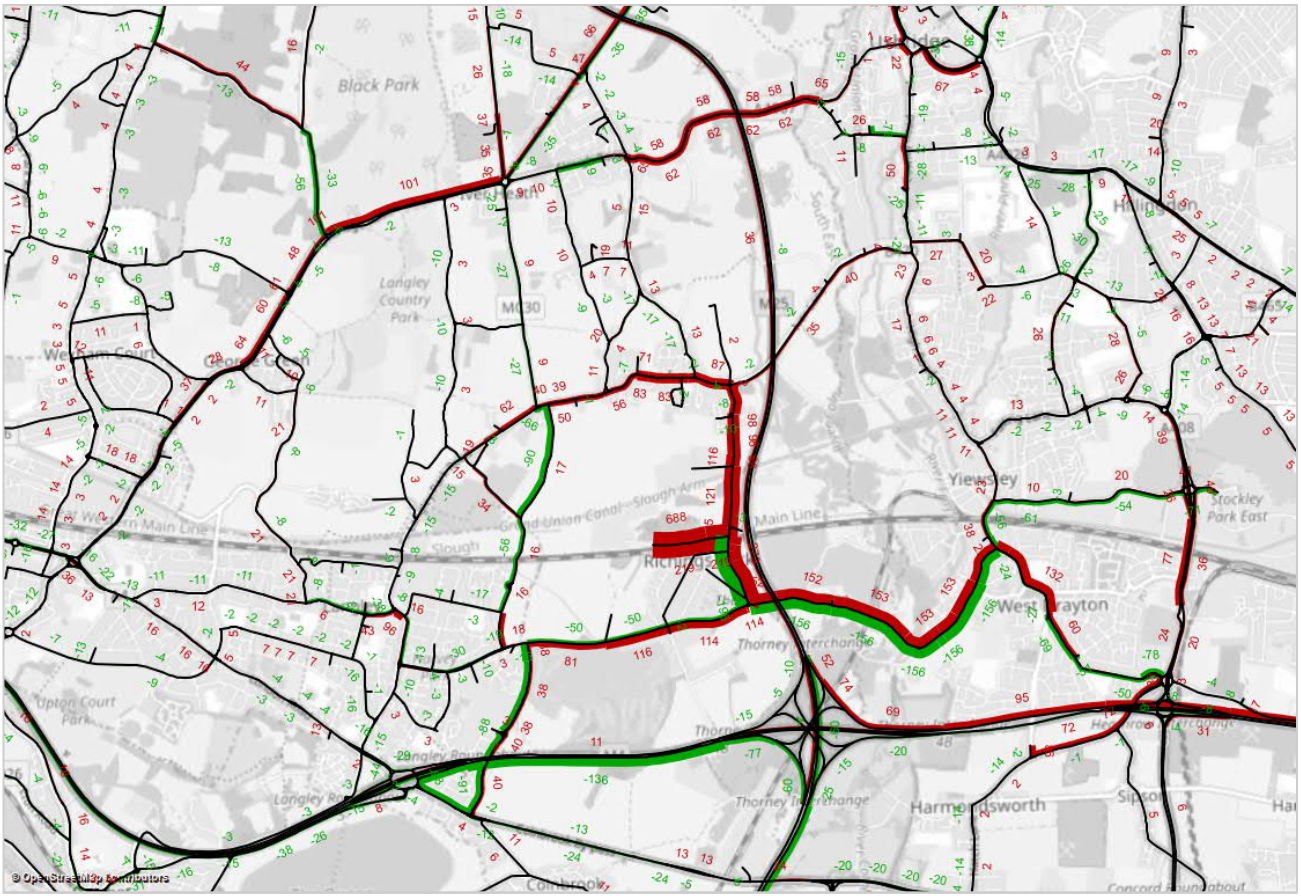


Figure 6.5 2036 DS3 AM peak flow change from DM

Figure 6.6 2036 DS3 PM peak flow change from DM

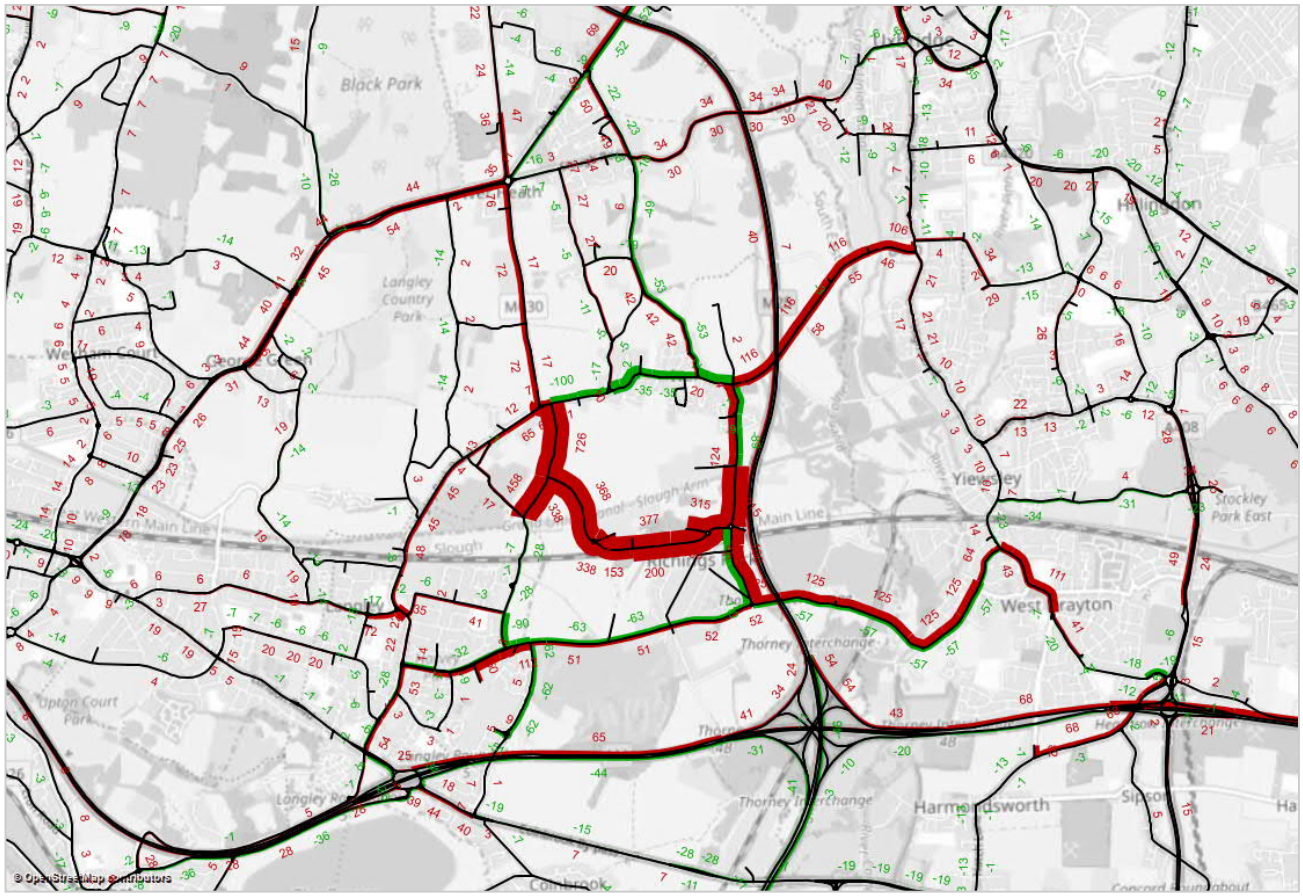


Figure 6.7: 2036 DS4 AM peak flow change from DM

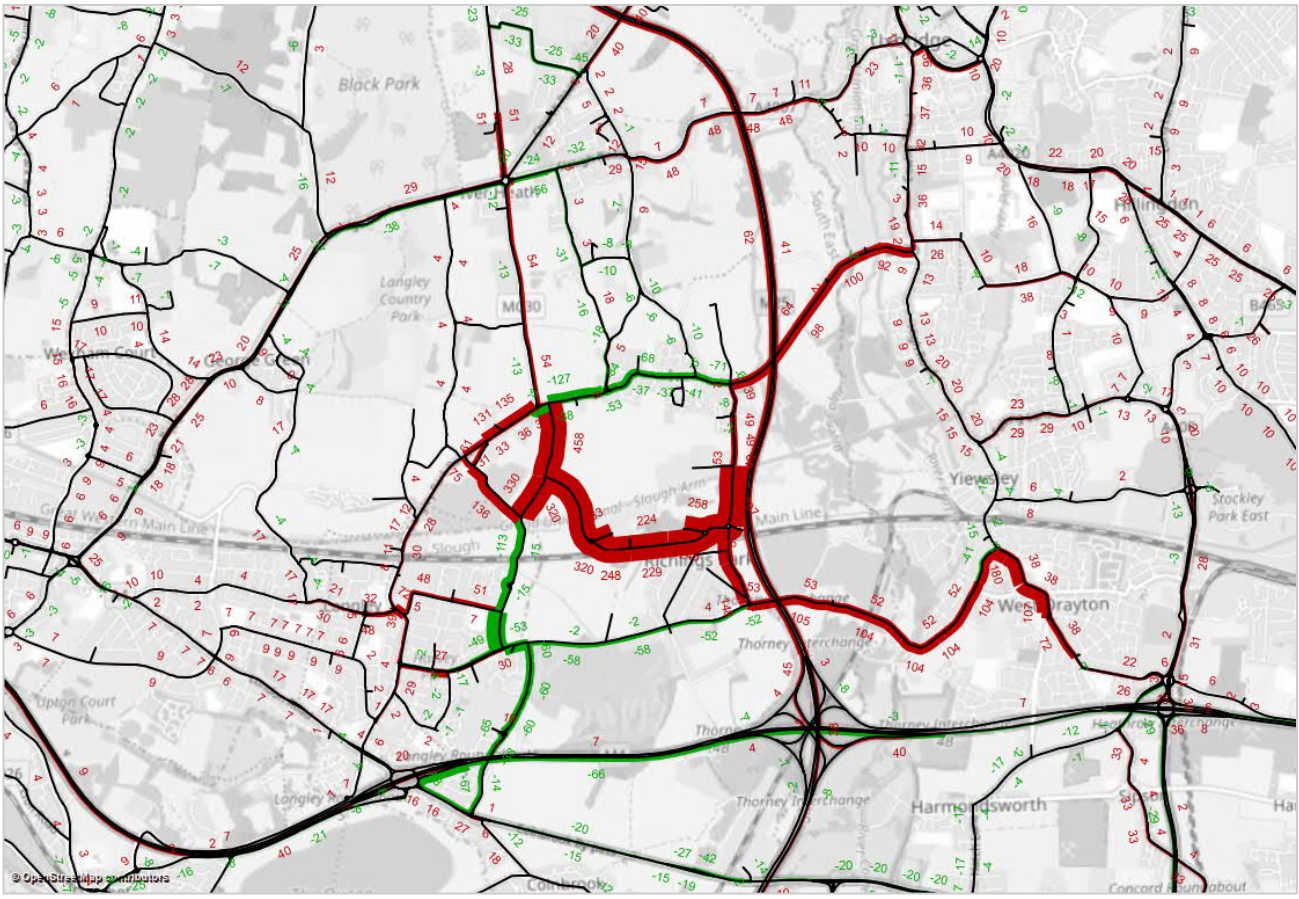


Figure 6.8 2036 DS4 PM peak flow change from DM

The addition of the local plan allocations does not significantly change the flow patterns seen in scenarios DS1 and DS2; simply, the flow changes between the DS3 and DS4 scenarios and the DM scenario are slightly higher than the equivalent for DS1 and DS2 due to the presence of additional local plan development.

6.1.4 Additional effect of Hollow Hill Lane closure

The flow changes that occur due to the closure of Hollow Hill Lane, and the development are shown in Figure 6.9 and Figure 6.10. Flow changes due to the closure of Hollow Hill Lane, the development and Iver Relief Road are show in Figure 6.11 and Figure 6.12. The red bars represent increases and the green bars decreases as a result of the closure being in place.

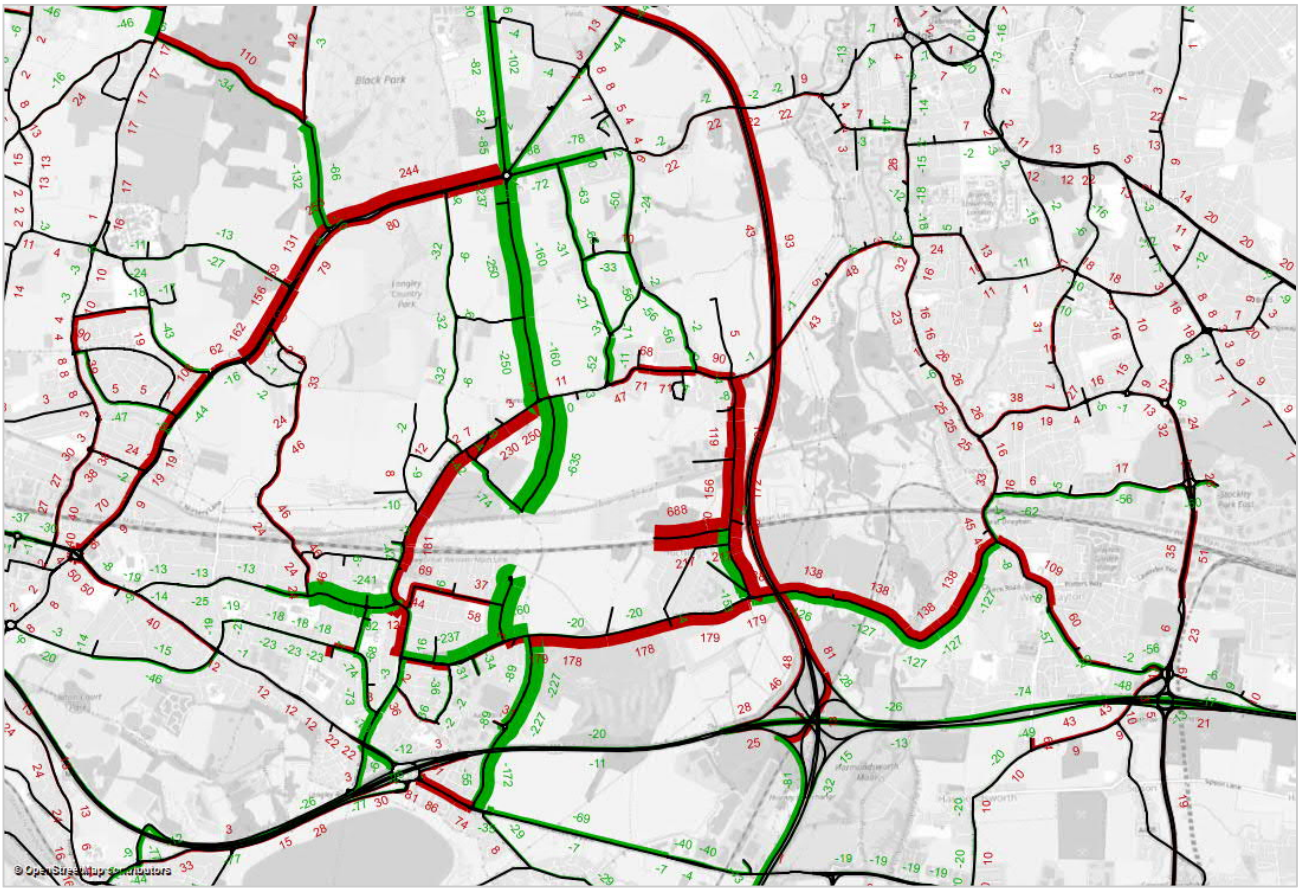


Figure 6.9: 2036 DS5 AM peak flow change from DM

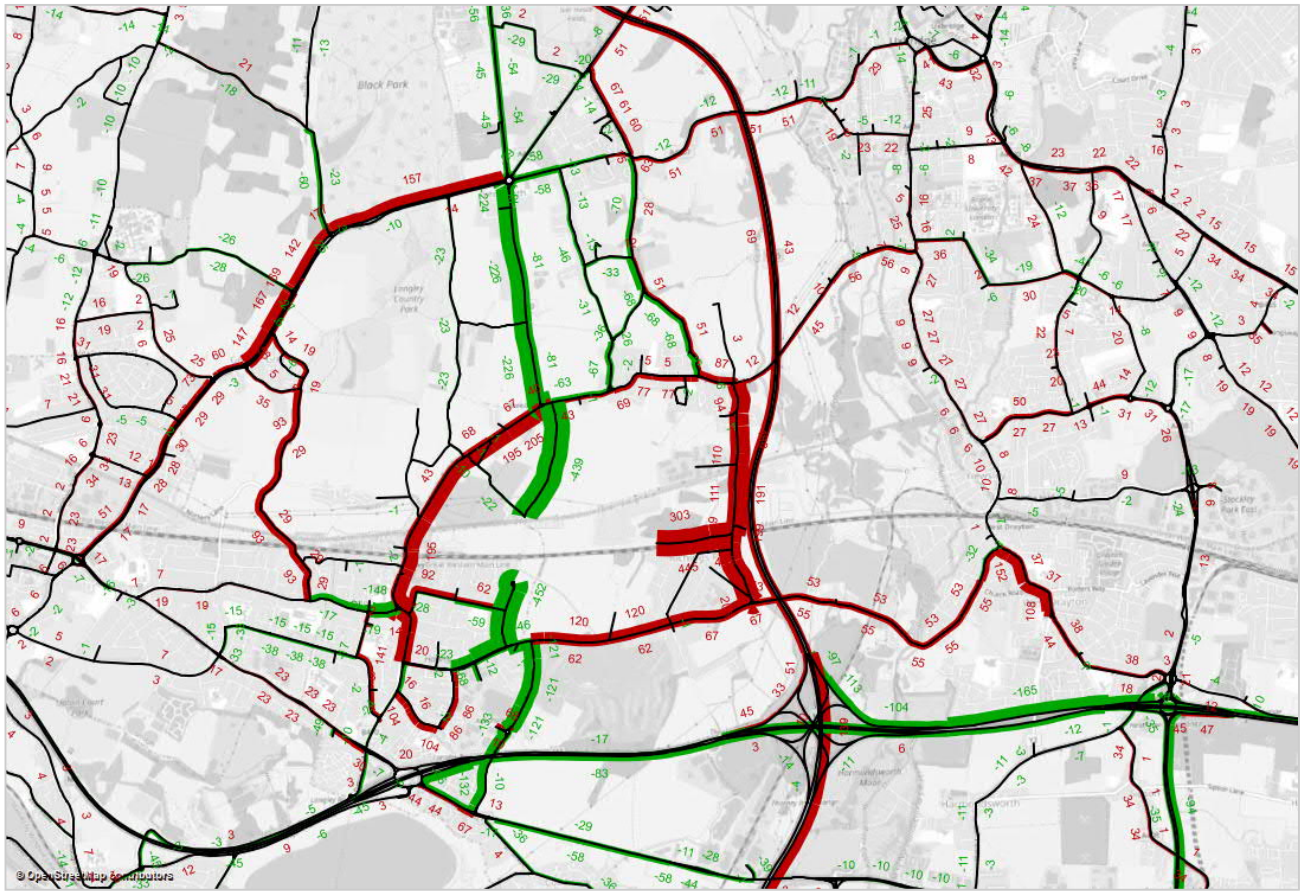


Figure 6.10: 2036 DS5 PM peak flow change from DM

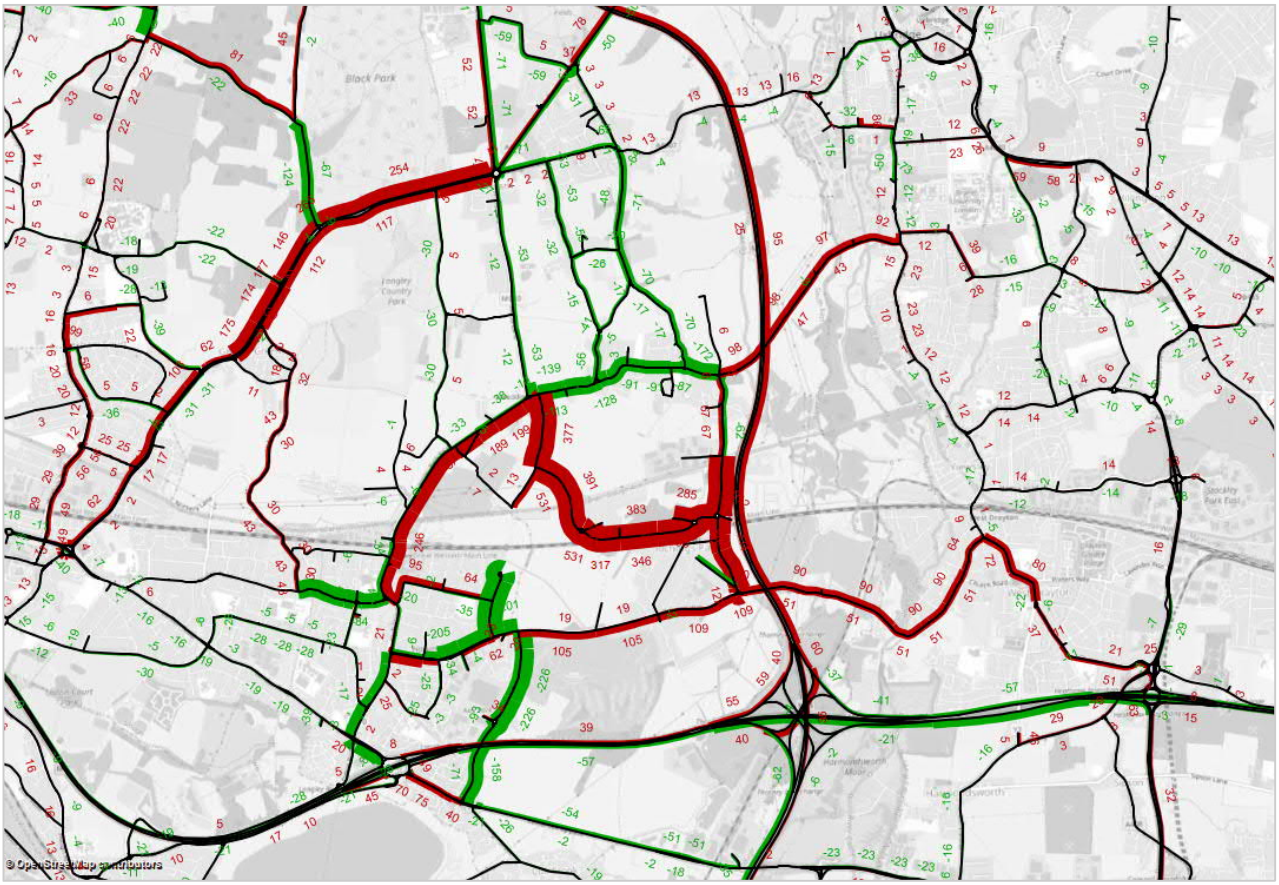


Figure 6.11: 2036 DS6 AM peak flow change from DM

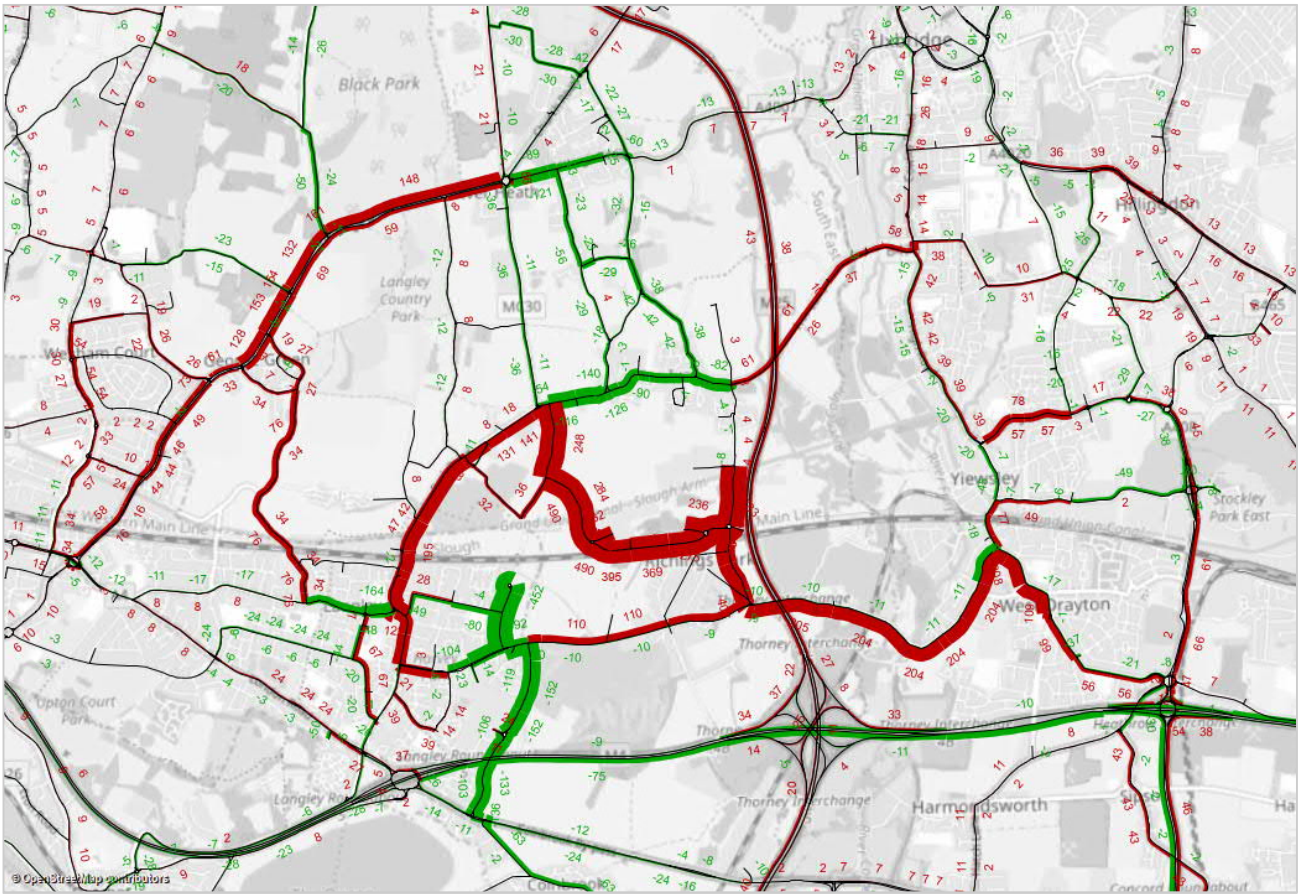


Figure 6.12: 2036 DS6 PM peak flow change from DM

The closure at Hollow Hill Lane results in a reduction in traffic on Market Lane and Sutton Lane, as there is traffic no longer using these roads as a through route to cross the railway. Despite the closure, there is a significant increase in both directions on Mansion Lane due to the development and re-assignment to the Relief Road. Like DS2 and DS4 the inclusion of the Relief Road causes a shift in traffic off Iver High Street. Increases in traffic on Langley Park Road are also observed due to re-routing of trips heading south that would have used Hollow Hill Lane.

The PM peak flow change is similar to the AM peak. The closure at Hollow Hill Lane and inclusion of the Relief Road results in re-routing of traffic off the High Street and Sutton Lane. There are increases in flow along the Relief Road, Langley Park Road and Thorney Lane South mainly due to development traffic.

7. Conclusions

The methodologies used in building the Iver forecast models are consistent with TAG guidance for fixed demand models, except for deviations agreed with highways Development Management for the purposes of the planning application.

The modelled network gave due consideration to all proposed future transport schemes and where there was enough certainty over these schemes being delivered.

Modelled demand was developed using guidance from TAG and utilises appropriate future land use data sources in the form of Transport Assessments together with data from NTEM extracted via TEMPro, and for Goods Vehicles, the Road Traffic Forecasts (RTF) 18 based on the National Transport Model.

As agreed with BCC one forecast year of 2036 has been produced together with DS1, DS2, DS3 and DS4, along with sensitivity tests relating to the closure of Hollow Hill Lane, presented as DS5 and DS6.

The methodology to produce the forecast networks and the modelled demand has been described in this report. The outputs from the model have shown that the tested development results in an increase in traffic flow on the surrounding roads, particularly on Thorney Lane South and Iver High Street. However, the scenarios containing the Relief Road show there to be a reduction in flow along the High Street as well as other minor re-routing across the Iver area.

Based on the evidence contained within the LMVR and the detail of this forecasting report, the forecast models are considered a suitable tool for assessing the impacts of development in the Ivers for development management purposes. The scenarios directly reported on within this report are appropriate for forming an evidence base of the likely highway impacts of the Land North of Iver Station development; additional scenarios would need to be developed in order to assess the impacts of other development.

As noted previously, the forecast scenarios described in this report would not form a suitable evidence base for development of a DfT business case to Outline Business Case Level – it's likely that a Variable Demand Model, and a constraint to NTEM growth would be required in order to achieve that.

Appendix A. Uncertainty Logs

A.1 Developments

Ref to Figure 4.1	Description	Quantum of Development			Likelihood	Included in Forecast Model?	Reason	DM	DS1	DS2	DS3	DS4
		Residential	Commercial	Other								
-	Land North of Iver Heath, South East of Pinewood	0			Reasonably foreseeable	N	No longer an allocated site	N	N	N	N	N
-	SP BP2- Chesham	500 dwellings			Reasonably foreseeable	N	Too distant from Iver	N	N	N	N	N
-	SP BP3- Holmer Green	300 dwellings			Reasonably foreseeable	N	Too distant from Iver	N	N	N	N	N
-	SP BP4- Amersham Old Town- London Road West	40 dwellings			Reasonably foreseeable	N	Too distant from Iver	N	N	N	N	N
-	SP BP5- Amersham Old Town- South East of Whielden Street	50 dwellings			Reasonably foreseeable	N	Too distant from Iver	N	N	N	N	N
-	SP BP6- Little Chalfont	700 dwellings			Reasonably foreseeable	N	Too distant from Iver	N	N	N	N	N
10	SP BP10 Iver Heath. Area West of Iver Heath	360 dwellings			Reasonably foreseeable	Y		N	N	N	Y	Y
5	SP BP11- Area North of Iver Station	1040 dwellings	17,483sqm B1 1,806sqm B2 3,313sqm A1 340sqm A3		Reasonably foreseeable	Y		N	Y	Y	Y	Y
11	SP BP12 Area to East of Ridgeway Business Park, Iver	90 dwellings	4,000sqm B2		Reasonably foreseeable	Y		N	N	N	Y	Y
12	SP BP13 Land North of Denham Roundabout	0	16,000sqm B1		Reasonably foreseeable	Y		N	N	N	Y	Y
13	SP BP9- Beaconsfield. Area East of Beaconsfield	1,600 dwellings	20,000sqm B1		Reasonably foreseeable	Y		N	N	N	Y	Y
-	SO BP14- Land adjacent to Taplow Station	0	4,000sqm		Reasonably foreseeable	N	Too distant from Iver	N	N	N	N	N
1	Wilton Park	350 dwellings	0		More than likely	Y		Y	Y	Y	Y	Y
-	77 Stomp Road, Burnham	23 dwellings	0		Near certain	N	Too small	N	N	N	N	N
2	River Court, 50 Oxford Road, New Denham	22 dwellings	0		Near certain	Y		Y	Y	Y	Y	Y
9	Deluxe Laboratories Ltd, Denham Film	224 dwellings	0		Near certain	Y		Y	Y	Y	Y	Y

	Laboratories, Denham Media Park, North Orbital Road, Denham Green, Buckinghamshire, UB9 5HQ											
-	49 Station Road	18 dwellings	-771		Near certain	N	Too small	N	N	N	N	N
3	Marsham House, Station Road	50 dwellings	0		Near certain	Y		Y	Y	Y	Y	Y
-	Olympia House, Unit 2 Reflection West, 28 The Ridgeway, Iver, Buckinghamshire, SL0 9HX	57 dwellings	-1780		Near certain	N	Already complete by base year	N	N	N	N	N
-	The Fox and Pheasant, Thorney Lane North	9 dwellings	0		Near certain	N	Too small	N	N	N	N	N
-	20 - 22 High Street, Iver, Buckinghamshire, SL0 9NG	12 dwellings			Near certain	N	Too small	N	N	N	N	N
-	Iver Delivery Office 2 Bathurst Walk	10 dwellings	-219sqm		Near certain	N	Too small	N	N	N	N	N
-	Land at Meadow Cottage, Longridge & Saltmarshe, Bangors Rd South	36 dwellings	0		Near certain	N	Too small	N	N	N	N	N
-	Stoke House and Old Coach House, Grays Park Road	31 dwellings	0		Near certain	N	Too small	N	N	N	N	N
-	Newlands Park, Gorelands Lane, Chalfont St Giles, Buckinghamshire, HP8 4AB	306 dwellings	0		More than likely	N	Too distant from Iver	N	N	N	N	N
-	SP BP7- Chalfont St Peter- North East. National Society For Epilepsy, Chesham Lane, Chalfont St Peter, Buckinghamshire, SL9 0RJ	360 dwellings	0		Near certain	N	Too distant from Iver	N	N	N	N	N
14	SP BP8- Chalfont St Peter – South East	200 dwellings	0		Reasonably foreseeable	Y		N	N	N	Y	Y
4	(The Grange) Former Holy Cross Convent Site	196 dwellings	0		Near certain	Y		Y	Y	Y	Y	Y
-	Gerrards Cross Tennis Club, Bull Lane	37 dwellings	0		Reasonably foreseeable	N	Too small	N	N	N	N	N
-	73 High Street and Land to Rear, Burnham	15 dwellings			Reasonably foreseeable	N	Too small	N	N	N	N	N

-	Summers Road Car Park, Warwick Road, Burnham	10 dwellings			Reasonably foreseeable	N	Too small	N	N	N	N	N
-	53 Huntercombe Lane, Burnham,	10 dwellings			Reasonably foreseeable	N	Too small	N	N	N	N	N
-	Cherry Tree Corner, Puers Lane, Jordans	8 dwellings			Reasonably foreseeable	N	Too small	N	N	N	N	N
-	Chalfont St Peter Youth Centre, Tithe Barn, Sandy Rise	8 dwellings			Reasonably foreseeable	N	Too small	N	N	N	N	N
-	Gold Hill Baptist Church, Gold Hill East, Chalfont St Peter	10 dwellings			Reasonably foreseeable	N	Too small	N	N	N	N	N
-	Blizzards Yard Car Park, High Street, Chalfont St Giles	10 dwellings			Reasonably foreseeable	N	Too small	N	N	N	N	N
-	Church Lane Car Park, Church Lane, Chalfont St Peter	10 dwellings	500sqm		Reasonably foreseeable	N	Too small	N	N	N	N	N
-	Gerrards Cross Police Station, Oxford Road (Tatling End, Denham)	11 dwellings			Near certain	N	Too small	N	N	N	N	N
-	4a The Broadway, Farnham Common,	8 dwellings			Reasonably foreseeable	N	Too small	N	N	N	N	N
-	Phil Whitaker Cars, Beaconsfield Road	18 dwellings			Reasonably foreseeable	N	Too small	N	N	N	N	N
-	Bulstrode Way Car Park, Gerrards Cross	10 dwellings			Reasonably foreseeable	N	Too small	N	N	N	N	N
-	Packhorse Road Car Park, Gerrards Cross	9 dwellings			Reasonably foreseeable	N	Too small	N	N	N	N	N
-	Bulstrode, Oxford Road, Gerrards Cross,	11 dwellings			Reasonably foreseeable	N	Too small	N	N	N	N	N
-	Winkers Club, Denham Lane, Chlafont St Peter	31 dwellings			Reasonably foreseeable	N	Too small	N	N	N	N	N
-	The Randall Building, Church Lane, Chalfont St Peter	24 dwellings			Reasonably foreseeable	N	Too small	N	N	N	N	N
-	Robert Bosch Ltd, Broadwater Park, North Orbital Road, Denham Green	20 dwellings	22,000sqm		Reasonably foreseeable	N	Likelihood too low	N	N	N	N	N
-	3-5 Chiltern Hill, Chalfont St Peter		967sqm increase in B1a 1,213 decrease in B1c		Near certain	N	Too small	N	N	N	N	N
-	Grant & Stone Ltd The Value		821sqm employment (B1)		More than likely	N	Too small	N	N	N	N	N

	Chalfont St Peter											
-	Tims Dairy, Mopes Farm, Chalfont St Peter		1,419sqm B1c		More than likely	N	Too small	N	N	N	N	N
-	Martin Baker Aircraft Co Ltd, 61 Lower Road		1,979sqm B1a		More than likely	N	Net change is small	N	N	N	N	N
-	29 Ridgeway, Iver		421sqm B1a 1445.55sqm B2 increase 510sqm B2 decrease 1570.55 B8 increase 635sqm B8 decrease	2291	More than likely	N	Net change is small	N	N	N	N	N
6	Pinewood		67,250sqm		Near certain	Y		Y	Y	Y	Y	Y
-	Heathrow Express Depot				Reasonably foreseeable	N	Scheme is no longer going ahead	N	N	N	N	N
-	HOAC					N	Already completed by the base year	N	N	N	N	N
7	CEMEX				Near certain	N	Extraction assumed completed by 2036	N	N	N	N	N
-	East Building Supplies, Amersham		3,000sqm		Reasonably foreseeable	N	Likelihood too low	N	N	N	N	N
-	Postal Sorting Office, Amersham		700 sqm		Reasonably foreseeable	N	Likelihood too low	N	N	N	N	N
-	Star Yard Car Park/ Darvell's Bakery, Chesham		5,500 sqm		Reasonably foreseeable	N	Likelihood too low	N	N	N	N	N
-	Coal Yard and Station Car Park, Station Approach, Chesham		2,500 sqm		Reasonably foreseeable	N	Likelihood too low	N	N	N	N	N
-	Burkes Road, Gregories Road, Beaconsfield		3,000sqm		Reasonably foreseeable	N	Likelihood too low	N	N	N	N	N
-	Lynbury, 14 South Park Crescent	7 dwellings			More than likely	N	Too small	N	N	N	N	N
-	D X House, The Ridgeway	51 dwellings	1780sqm		More than likely	N	Already complete by base year	N	N	N	N	N
-	6 - 8 High Street	12 dwellings	620sqm		More than likely	N	Too small	N	N	N	N	N
-	Beaconsfield Garden Centre, London Road	9 dwellings			Near certain	N	Too small	N	N	N	N	N
-	Corner of Institute Road, Maidenhead	17 dwellings			Near certain	N	Too small	N	N	N	N	N
-	Land North of M40 and South Hedgerley Lane	11 dwellings			Near certain	N	Too small	N	N	N	N	N
8	Pickeridge Farm		-1,578sqm, 45 C2 units		Near certain	Y		Y	Y	Y	Y	Y

-	The Inn on the Green	37 dwellings	627sqm		More than likely	N	Too small	N	N	N	N	N
-	Tendercare Nurseries	30 dwellings			Near certain	N	Too small	N	N	N	N	N
-	Aston House, 62-68 Oak End Way	24 dwellings	-1,160sqm		Near certain	N	Too small	N	N	N	N	N
-	Alpha Garden Centre, 142-144 Swallow Street	18 dwellings			more than likely	N	Too small	N	N	N	N	N
-	20 to 22 High Street, Iver	12 dwellings	95sqm		Near certain	N	Too small	N	N	N	N	N
-	Norfolk Lea	10 dwellings			more than likely	N	Too small	N	N	N	N	N
-	Hampton Lodge	10 dwellings			more than likely	N	Too small	N	N	N	N	N
-	34-36 Oak End Way	8 dwellings	-250sqm		Near certain	N	Too small	N	N	N	N	N
-	Milbourne House, 31 Oak End Way	7 dwellings			Near certain	N	Too small	N	N	N	N	N
-	Alpine Lodge, 3 Lower Road	6 dwellings			Near certain	N	Too small	N	N	N	N	N
-	Finlandia Centre, Oxford Road	6 dwellings	-200sqm		Near certain	N	Too small	N	N	N	N	N
-	Lanterns & Oak House Hollybush Hill	6 dwellings			Near certain	N	Too small	N	N	N	N	N
-	15 and 17 South Park Crescent	6 dwellings			Near certain	N	Too small	N	N	N	N	N
-	Oakley, 12 South Park Crescent	5 dwellings			More than likely	N	Too small	N	N	N	N	N
-	Old Slade Farm, 41 Old Slade Lane	5 dwellings	-268sqm		Near certain	N	Too small	N	N	N	N	N
-	Landrecies	5 dwellings			Near certain	N	Too small	N	N	N	N	N
-	Mill Lane	199 dwellings			Near certain	N	Too distant from Iver	N	N	N	N	N
-	Wyvale Garden Centre	45 dwellings			Near certain	N	Too small	N	N	N	N	N
-	Beaconsfield Town Hall and Adjacent Land	50 dwellings			Near certain	N	Too distant from Iver	N	N	N	N	N
-	S G T Site, Station Road	66 dwellings			more than likely	N	Too distant from Iver	N	N	N	N	N
-	Huntercombe Park (formerly Pfizer)	86 dwellings			Near certain	N	Too distant from Iver	N	N	N	N	N

-	Beacon Centre, Holtspur Way	20 dwellings			Near certain	N	Too small	N	N	N	N	N
-	The Triangle, Baring Road	21 dwellings			more than likely	N	Too small	N	N	N	N	N
-	Altons Car Park, Burkes Road	22 dwellings			Near certain	N	Too small	N	N	N	N	N
-	77 Stomp Road	23 dwellings			Near certain	N	Too small	N	N	N	N	N
-	Lillyfee Farm	10 dwellings			Near certain	N	Too small	N	N	N	N	N
-	Silchester Manor Day Nursery	10 dwellings			Near certain	N	Too small	N	N	N	N	N
-	Greenacres, 199 Station Road	10 dwellings			Near certain	N	Too small	N	N	N	N	N
-	Gas Holder Station	12 dwellings			Near certain	N	Too small	N	N	N	N	N
-	Chalfont Grove	0	10,000 sqm		Near certain	N	Too distant from Iver	N	N	N	N	N
-	Pollards Wood	0	6,850 sqm		Near certain	N	Too distant from Iver	N	N	N	N	N
-	42/44 London Road West		3,250 sqm		Near certain	N	Too distant from Iver	N	N	N	N	N
-	Knotty Green Garage Site		25 c2 units		more than likely	N	Too distant from Iver	N	N	N	N	N
-	Amersham Hospital	172 dwellings			Reasonably foreseeable	N	Too distant from Iver	N	N	N	N	N
-	Chalfont and Latimer Station Car Park	80 dwellings			Near certain	N	Too distant from Iver	N	N	N	N	N
-	Chiltern District Council Offices and adjoining uses	57 dwellings			Near certain	N	Too distant from Iver	N	N	N	N	N
-	Land adjacent to Lincoln Park and Amersham & Wycombe College	32 dwellings			Near certain	N	Too small	N	N	N	N	N
-	Area around Chalfont and Latimer Station	31 dwellings			Near certain	N	Too small	N	N	N	N	N
-	Harvard Grange (The Donkey Field)	31 dwellings			more than likely	N	Too small	N	N	N	N	N
-	Chalfonts and Gerrards Cross Hospital	25 dwellings			Reasonably foreseeable	N	Too small	N	N	N	N	N
-	206 White Lion Road	17 dwellings			Near certain	N	Too small	N	N	N	N	N
-	Little Chalfont Tennis Club, Pavilion Way	14 dwellings			Near certain	N	Too small	N	N	N	N	N

-	Citygate and Adjoining land	10 dwellings	-380sqm		Near certain	N	Too small	N	N	N	N	N
-	Rear of St Georges Church, White Lion Road	10 dwellings	347sqm		Near certain	N	Too small	N	N	N	N	N
-	178 White Lion Road	9 dwellings			more than likely	N	Too small	N	N	N	N	N
-	Thomas Valentine House, Deanway	9 dwellings			more than likely	N	Too small	N	N	N	N	N
-	Land between Chenies Parade and Garage	8 dwellings	204sqm		Near certain	N	Too small	N	N	N	N	N
-	68 to 78 Elizabeth Avenue	8 dwellings	227sqm		Near certain	N	Too small	N	N	N	N	N
-	Glenock House	7 dwellings			more than likely	N	Too small	N	N	N	N	N
-	Great Green Street Farm, Green Street	6 dwellings			Near certain	N	Too small	N	N	N	N	N
-	Milton Court, Churchfield Road	6 dwellings	-340sqm		Near certain	N	Too small	N	N	N	N	N
-	66 and 68 Penn Road	6 dwellings			Near certain	N	Too small	N	N	N	N	N
-	Churchfield House, Churchfield Road	6 dwellings	-200sqm		Near certain	N	Too small	N	N	N	N	N
-	Hillcroft, 72 Penn Road	6 dwellings			Near certain	N	Too small	N	N	N	N	N
-	Lodge Farm	5 dwellings			Near certain	N	Too small	N	N	N	N	N
-	Blays House	5 dwellings	-360sqm		more than likely	N	Too small	N	N	N	N	N
-	Rear of 64 Whielden Street and 1-3 Alpha Court	5 dwellings			Near certain	N	Too small	N	N	N	N	N
-	175, 177, 177a and Land Rear of 173 Woodside Road	5 dwellings			Near certain	N	Too small	N	N	N	N	N
-	Hill Farm Industrial Estate	3 dwellings			Near certain	N	Too small	N	N	N	N	N
-	Land to rear of 65 Denham Lane	2 dwellings			Near certain	N	Too small	N	N	N	N	N
-	Land at Burtons Timber Yard	2 dwellings			Near certain	N	Too small	N	N	N	N	N

-	Burnham Grammar School	921 sqm			Near certain	N	Too small	N	N	N	N	N
-	180-182 Maxwell Road	8 dwellings			Near certain	N	Too small	N	N	N	N	N
-	Prospect House, The Broadway	8 dwellings			more than likely	N	Too small	N	N	N	N	N
-	153 Amersham Road	7 dwellings			Near certain	N	Too small	N	N	N	N	N
-	Chopra Manor, Crown Lane	7 dwellings			Near certain	N	Too small	N	N	N	N	N
-	Land Rear of St. Johns Church, Victoria Road	7 dwellings	-136sqm		Near certain	N	Too small	N	N	N	N	N
-	1-3 Warwick Road	6 dwellings			Near certain	N	Too small	N	N	N	N	N
-	Lockwoods Farm	6 dwellings			Near certain	N	Too small	N	N	N	N	N
-	Old Telephone Exchange, Kingsway	6 dwellings			more than likely	N	Too small	N	N	N	N	N
-	96 Gregories Road	5 dwellings			Near certain	N	Too small	N	N	N	N	N
-	Land At Bridge Cottage, 45A Baring Road	5 dwellings			Near certain	N	Too small	N	N	N	N	N
-	Natwest Bank, 63 High Street	5 dwellings	-167sqm		Near certain	N	Too small	N	N	N	N	N
-	Northfield, 40 Penn Road	5 dwellings			Near certain	N	Too small	N	N	N	N	N
-	The Crown, Farnham Road	5 dwellings			Near certain	N	Too small	N	N	N	N	N
-	Brockhurst Park	3 dwellings			Near certain	N	Too small	N	N	N	N	N
15	Iver Station Car Park	500 car park spaces			Near certain	Y		Y	Y	Y	Y	Y

Table A.1: Development Uncertainty Log

A.2 Infrastructure

Description	Type	Likelihood	Included in Forecast Model?	Reason	DM	DS1	DS2	DS3	DS4
M4 Smart Motorway Widening J3-J12	Road scheme	Will go ahead	Y		Y	Y	Y	Y	Y
HS2	Rail scheme	Will go ahead	Y		Y	Y	Y	Y	Y
HS2 Spur	Rail scheme	Unlikely	N	Too much uncertainty	N	N	N	N	N
Heathrow Expansion	Third runway	Expected to go ahead	N	Too much uncertainty	N	N	N	N	N
Western Rail Link to Heathrow, Hollow Hill Lane Closure	Road closure	Expected to go ahead	Y	Tested in DS5 and DS6 only	N	N	N	N	N
Five Points roundabout upgrade	Road scheme	Unknown	N	BCC confirmed not to be included	N	N	N	N	N
Seven Hills improvement	Road scheme	Unknown	Y		Y	Y	Y	Y	Y
Crossrail	Rail scheme	Will go ahead	Y		Y	Y	Y	Y	Y
Cycle Route Iver to Rail Station	Cycle scheme		N	Impact not significant	N	N	N	N	N
Motorway service station	Road services		N	No primary trip generation	N	N	N	N	N
SIFE	Freight road scheme	Awaiting outcome form public inquiry	N		N	N	N	N	N
A355 Relief Road	Road scheme	Certain	Y		Y	Y	Y	Y	Y
Iver Relief Road	Road scheme	Dependent on developmen t	Y		N	N	Y	N	Y
Closing Mill Lane to traffic	Road closure	Certain	N	Mill Lane not included in model	N	N	N	N	N
Mill Lane Improvements-new roundabout with the A4	Road scheme	Complete	N	Mill Lane not included in model	N	N	N	N	N
Chalfont Lane Widening	Road scheme	Likely	Y		Y	Y	Y	Y	Y
A355 (Tuns Lane) route enhancement	Road scheme	Near certain	Y		Y	Y	Y	Y	Y

Langley Station and access improvements	Road scheme	Near certain	Y		Y	Y	Y	Y	Y
Stoke Road Corridor improvements (junction improvements)	Road scheme	Near certain	Y		Y	Y	Y	Y	Y
A4 London Road improvements (widening)	Road scheme	Near certain	Y		Y	Y	Y	Y	Y

Table A.2: Infrastructure Uncertainty Log

Appendix B. Sector to sector trips

	1	2	3	4	5	6	7	8	9	10
1	1985	777	143	1117	712	175	44	599	361	1073
2	1129	197506	274	483	2299	2233	4878	2812	12240	3838
3	101	141	96910	276	2805	488	720	1156	766	315
4	958	650	297	8937	5568	3856	809	1046	1274	1581
5	739	538	5307	7494	73315	9056	2194	3022	1878	1174
6	581	1184	1006	5017	7746	100133	15653	2089	4706	1698
7	103	4309	1227	225	765	12620	161426	333	5642	3019
8	778	1057	686	1542	3651	1249	1335	26916	1654	2577
9	498	6395	479	663	1227	2369	4542	3250	28897	1479
10	1872	5033	343	465	1668	1612	467	4470	1754	251722

Table B.1: DM AM Cars

	1	2	3	4	5	6	7	8	9	10
1	2149	973	200	1225	897	249	206	770	397	1224
2	1214	215789	717	568	2818	3008	8393	3192	12756	7281
3	134	534	102165	370	3801	769	1040	1405	818	1178
4	1046	754	386	9255	6043	4167	939	1179	1346	1675
5	888	1350	6314	7997	99961	11966	3701	3398	2063	1788
6	650	2420	1307	5339	10685	142277	23198	2352	4995	2478
7	168	7868	1687	291	1874	20434	228153	414	6252	4243
8	895	1384	864	2054	3934	1396	1533	27478	1735	2996
9	589	6798	514	707	1398	2551	5039	3573	29472	1585
10	2011	8114	1327	538	2043	2422	1763	4937	1838	262846

Table B.2: DM AM All Vehicles

	1	2	3	4	5	6	7	8	9	10
1	2291	812	147	1190	775	190	47	658	383	1162
2	1116	197550	275	479	2289	2232	4883	2801	12238	3830
3	99	140	96925	275	2802	488	721	1151	764	313
4	950	650	298	8929	5567	3863	814	1046	1276	1582
5	729	538	5316	7474	73322	9062	2201	3019	1878	1177
6	574	1183	1008	5004	7740	100155	15666	2080	4703	1701
7	102	4302	1226	223	762	12614	161450	331	5632	3027
8	770	1059	690	1537	3651	1253	1342	26915	1657	2572
9	491	6397	480	659	1225	2371	4550	3243	28905	1478
10	1857	5038	345	462	1664	1616	469	4466	1757	251730

Table B.3: DS1/2/5/6 AM Cars

	1	2	3	4	5	6	7	8	9	10
1	2456	1016	204	1299	965	262	207	831	419	1318
2	1200	215831	718	564	2808	3008	8399	3181	12754	7273
3	132	534	102181	369	3798	770	1041	1400	817	1175
4	1037	754	388	9247	6042	4174	945	1180	1347	1676
5	877	1350	6324	7977	99968	11974	3709	3394	2063	1792
6	642	2418	1309	5325	10678	142303	23212	2343	4992	2481
7	165	7860	1686	289	1871	20428	228182	411	6242	4251
8	887	1386	868	2048	3933	1400	1541	27478	1739	2990
9	581	6800	516	703	1396	2553	5048	3566	29481	1583
10	1997	8118	1329	535	2039	2426	1766	4933	1841	262854

Table B.4: DS1/2/5/6 AM All Vehicles

	1	2	3	4	5	6	7	8	9	10
1	2362	811	147	1197	791	190	48	675	404	1187
2	1113	197532	275	476	2284	2225	4882	2795	12290	3822
3	98	140	96918	273	2799	487	721	1149	778	312
4	947	650	299	8906	5564	3849	814	1044	1322	1579
5	728	538	5320	7453	73313	9055	2201	3017	1911	1178
6	583	1201	1012	5052	7758	100458	15676	2092	4834	1714
7	102	4302	1225	223	762	12607	161455	330	5636	3026
8	770	1059	690	1530	3644	1249	1342	26904	1691	2567
9	496	6396	480	663	1228	2375	4548	3245	28998	1476
10	1856	5038	346	460	1661	1610	469	4460	1792	251714

Table B.5: DS3/4 AM Cars

	1	2	3	4	5	6	7	8	9	10
1	2528	1018	205	1307	982	264	209	854	441	1349
2	1197	215812	718	560	2802	3001	8399	3173	12809	7264
3	131	534	102174	367	3795	769	1041	1398	832	1174
4	1034	755	389	9222	6038	4159	945	1177	1399	1672
5	875	1351	6328	7952	99957	11966	3711	3390	2104	1793
6	654	2439	1314	5379	10703	142619	23229	2355	5137	2495
7	165	7859	1685	289	1870	20420	228190	410	6248	4249
8	887	1386	869	2040	3926	1396	1541	27464	1777	2984
9	587	6802	517	708	1403	2562	5048	3575	29587	1584
10	1995	8118	1329	533	2036	2420	1766	4925	1878	262838

Table B.6: DS3/4 AM All vehicles

	1	2	3	4	5	6	7	8	9	10
1	1320	1183	95	1304	778	677	279	566	475	1493
2	517	189876	165	331	570	3751	6653	1580	9557	3677
3	97	319	93443	311	4183	198	1850	767	292	329
4	963	402	272	8096	5082	4859	1173	1962	2726	991
5	774	714	3814	5789	70934	9129	2332	2911	672	1043
6	202	1473	439	3485	7076	97289	14344	1631	3185	536
7	143	3662	937	195	1162	15694	164401	113	4568	489
8	763	2886	1051	443	847	1319	1332	23214	987	6265
9	418	9107	1005	690	3761	5214	6323	1550	24114	1305
10	1579	5588	340	1444	2932	1585	1744	2870	2173	257489

Table B.7: DM PM Cars

	1	2	3	4	5	6	7	8	9	10
1	1404	1316	145	1409	921	760	335	632	518	1666
2	593	207168	607	391	1496	4635	10258	1937	10071	7003
3	129	708	98347	374	5158	352	2320	963	320	1137
4	1037	457	352	8375	5528	5209	1306	2057	2822	1043
5	909	1326	4783	6178	95410	12007	3696	3171	769	1361
6	234	2390	671	3701	9927	136085	21487	1745	3371	1289
7	203	7142	1359	266	2130	23618	226633	272	5066	1730
8	883	3270	1258	535	1135	1508	1572	23781	1064	7165
9	456	9571	1058	731	3976	5479	6913	1631	24681	1407
10	1706	8561	1256	1537	3542	2441	3092	3261	2281	268225

Table B.8: DM PM All vehicles

	1	2	3	4	5	6	7	8	9	10
1	1492	1203	96	1326	795	693	281	592	488	1524
2	541	189887	164	331	570	3749	6652	1579	9557	3676
3	100	319	93448	312	4184	198	1851	768	292	329
4	1004	401	272	8087	5075	4855	1170	1959	2719	988
5	816	712	3813	5782	70931	9126	2329	2907	671	1041
6	220	1471	439	3484	7077	97287	14343	1631	3185	536
7	146	3660	938	196	1163	15696	164415	113	4571	490
8	809	2878	1049	442	846	1316	1328	23203	985	6254
9	443	9102	1004	689	3757	5210	6321	1549	24113	1304
10	1665	5577	339	1440	2927	1583	1741	2864	2168	257474

Table B.9: DS1/2/5/6 PM Cars

	1	2	3	4	5	6	7	8	9	10
1	1575	1333	145	1431	935	774	336	656	530	1694
2	618	207181	607	391	1496	4632	10256	1936	10072	7003
3	131	709	98354	374	5160	352	2320	964	320	1138
4	1078	455	352	8366	5521	5205	1303	2054	2815	1040
5	949	1324	4782	6171	95409	12004	3692	3167	767	1358
6	252	2389	671	3701	9928	136085	21485	1746	3371	1290
7	205	7141	1359	267	2131	23621	226651	273	5069	1731
8	934	3261	1256	534	1134	1506	1567	23769	1062	7153
9	481	9567	1057	730	3971	5475	6910	1631	24680	1406
10	1795	8550	1255	1532	3537	2439	3088	3255	2275	268212

Table B.10: DS1/2/5/6 PM All vehicles

	1	2	3	4	5	6	7	8	9	10
1	1542	1204	96	1325	793	701	280	596	492	1558
2	546	189868	164	331	569	3777	6651	1577	9557	3670
3	101	319	93445	312	4182	202	1852	767	293	329
4	1014	399	271	8067	5055	4898	1167	1951	2729	981
5	838	711	3810	5780	70901	9147	2327	2902	673	1038
6	225	1478	439	3488	7074	97579	14343	1629	3207	537
7	147	3656	937	196	1163	15704	164414	113	4570	489
8	822	2877	1048	442	845	1326	1328	23195	986	6243
9	462	9131	1014	710	3821	5340	6330	1575	24194	1319
10	1699	5568	338	1439	2922	1599	1740	2861	2166	257452

Table B.11:DS3/4 PM Cars

	1	2	3	4	5	6	7	8	9	10
1	1625	1334	145	1429	933	783	335	660	535	1728
2	623	207161	607	390	1495	4661	10255	1933	10072	6996
3	133	708	98350	374	5157	356	2321	963	321	1137
4	1088	453	350	8345	5499	5250	1299	2045	2826	1033
5	972	1323	4779	6169	95376	12026	3691	3162	770	1356
6	257	2395	672	3704	9925	136379	21485	1743	3394	1290
7	206	7136	1359	267	2130	23629	226648	272	5068	1731
8	948	3259	1254	534	1133	1516	1567	23760	1063	7141
9	502	9600	1068	752	4042	5617	6922	1659	24767	1424
10	1830	8540	1254	1531	3531	2455	3087	3251	2274	268189

Table B.12: DS3/4 PM All vehicles

	1	2	3	4	5	6	7	8	9	10
1	474	108	85	194	101	28	7	73	62	207
2	323	48529	114	158	880	760	1686	946	3458	1135
3	11	1	19571	30	277	25	36	53	45	18
4	223	49	98	1679	909	691	121	165	236	567
5	191	76	1725	1740	15853	2121	449	618	472	751
6	145	162	358	1003	1720	21062	3317	456	964	1064
7	25	550	446	55	170	2703	34741	68	865	2605
8	216	131	254	329	680	226	244	6095	384	717
9	102	786	175	107	171	330	800	439	5776	494
10	469	1047	145	119	391	361	93	1099	470	54119

Table B.13: DM- Base AM Cars

	1	2	3	4	5	6	7	8	9	10
1	512	149	94	211	137	45	41	94	67	235
2	339	50858	174	169	955	862	2115	1001	3544	1547
3	17	57	20317	41	416	67	78	93	53	134
4	240	64	110	1736	985	742	141	186	247	581
5	215	173	1858	1822	18117	2413	596	677	498	819
6	160	299	393	1058	1988	24524	3883	495	1011	1154
7	35	935	503	62	285	3274	39942	79	953	2743
8	248	173	281	402	722	247	270	6193	397	775
9	124	853	181	115	195	358	867	506	5879	511
10	505	1364	265	127	438	460	244	1164	481	55697

Table B.14: DM- Base AM All Vehicles

	1	2	3	4	5	6	7	8	9	10
1	780	142	89	266	164	42	10	132	84	296
2	310	48573	115	154	870	760	1690	935	3456	1127
3	9	1	19586	28	274	25	37	48	43	16
4	215	49	100	1672	908	697	126	165	237	568
5	182	76	1735	1720	15859	2128	455	615	472	754
6	138	160	359	990	1713	21085	3330	448	962	1067
7	23	542	445	53	167	2697	34765	66	855	2613
8	207	132	258	324	680	230	251	6095	388	712
9	96	787	177	103	169	332	808	432	5785	492
10	454	1051	148	117	387	365	96	1095	473	54127

Table B.15: DS1/2/5/6- Base AM Cars

	1	2	3	4	5	6	7	8	9	10
1	819	192	98	286	204	59	42	155	89	328
2	326	50900	176	165	945	862	2121	989	3543	1540
3	14	56	20332	39	413	67	79	88	52	131
4	231	64	111	1728	984	749	146	187	249	582
5	204	173	1868	1801	18125	2420	603	674	498	822
6	152	297	395	1045	1981	24550	3896	486	1008	1157
7	32	926	502	60	282	3268	39972	77	943	2751
8	240	174	284	396	721	251	277	6192	401	770
9	117	854	182	110	193	360	876	499	5888	510
10	490	1368	268	125	434	464	248	1160	484	55706

Table B.16: DS1/2/5/6- Base AM All vehicles

	1	2	3	4	5	6	7	8	9	10
1	852	142	90	274	180	43	11	149	105	322
2	308	48555	115	151	864	752	1690	929	3507	1119
3	9	1	19580	27	271	24	37	46	57	15
4	212	50	100	1649	904	684	126	164	283	564
5	181	77	1739	1698	15851	2121	456	613	505	755
6	147	179	364	1038	1732	21388	3340	459	1092	1080
7	23	543	444	53	167	2690	34770	65	859	2612
8	208	133	258	317	673	226	251	6083	421	707
9	100	786	177	107	172	337	805	434	5877	491
10	453	1051	148	115	384	359	95	1089	508	54111

Table B.17:DS3/4- Base AM Cars

	1	2	3	4	5	6	7	8	9	10
1	891	194	99	294	222	60	44	177	112	360
2	322	50881	175	162	939	855	2122	981	3598	1531
3	14	56	20326	38	409	66	79	85	67	130
4	228	65	112	1703	980	734	147	184	301	578
5	202	173	1872	1777	18114	2413	605	670	539	823
6	164	318	401	1098	2006	24866	3914	498	1153	1171
7	32	926	501	59	280	3260	39979	76	950	2749
8	240	175	285	388	715	247	277	6178	439	764
9	123	856	183	116	200	368	876	508	5993	510
10	489	1368	268	122	431	459	248	1152	521	55689

Table B.18: DS3/4- Base AM Vehicles

	1	2	3	4	5	6	7	8	9	10
1	267	343	18	310	187	166	70	145	89	343
2	71	46785	12	47	102	719	1260	271	1417	727
3	37	111	18605	84	1151	77	571	232	88	96
4	171	120	35	1503	1062	1025	306	390	452	215
5	120	251	518	1038	15448	2087	570	536	106	178
6	23	434	50	581	1597	20607	3171	261	436	84
7	14	945	85	25	207	3219	35600	16	695	41
8	95	748	114	84	166	313	338	5105	158	1275
9	60	2334	87	119	805	1020	1326	309	4563	302
10	481	1628	42	440	1275	698	1172	780	907	54848

Table B.19: DM- Base PM Cars

	1	2	3	4	5	6	7	8	9	10
1	288	369	29	330	217	183	78	159	97	381
2	83	49105	73	54	221	840	1714	322	1507	1138
3	42	167	19331	93	1294	95	643	262	92	207
4	184	127	46	1553	1134	1085	328	406	470	222
5	140	307	647	1098	17651	2380	740	572	118	207
6	29	558	79	614	1855	24004	3685	276	463	170
7	23	1313	138	33	328	3830	40748	31	765	178
8	119	806	148	96	208	344	373	5206	173	1440
9	67	2413	96	125	841	1064	1413	324	4665	317
10	505	1952	158	453	1350	807	1329	834	925	56461

Table B.20: DM- Base PM All vehicles

	1	2	3	4	5	6	7	8	9	10
1	438	362	19	333	204	182	72	170	101	374
2	95	46795	12	46	102	717	1259	269	1417	726
3	40	112	18611	84	1153	77	572	233	88	96
4	213	119	34	1495	1055	1020	303	386	445	212
5	162	249	516	1031	15445	2083	567	532	105	176
6	41	433	50	581	1598	20606	3170	261	436	84
7	17	944	85	25	208	3222	35615	16	698	42
8	141	741	112	83	165	310	334	5094	157	1264
9	85	2329	86	118	801	1016	1324	308	4562	301
10	567	1617	41	435	1270	696	1169	774	902	54834

Table B.21: DS1/2/5/6- Base PM Cars

	1	2	3	4	5	6	7	8	9	10
1	459	387	28	352	231	198	79	183	110	409
2	108	49118	73	53	220	838	1712	321	1507	1138
3	44	167	19338	93	1295	95	644	263	92	208
4	225	126	45	1544	1128	1081	325	402	463	219
5	180	305	645	1091	17650	2376	737	568	117	205
6	47	557	79	613	1856	24005	3684	277	463	170
7	24	1312	138	33	329	3833	40766	31	768	179
8	170	798	146	96	207	341	369	5195	171	1428
9	92	2409	95	125	836	1061	1411	323	4665	317
10	594	1941	157	449	1345	805	1325	828	919	56448

Table B.22: DS1/2/5/6- Base PM All vehicles

	1	2	3	4	5	6	7	8	9	10
1	488	363	19	332	202	190	71	174	106	408
2	100	46777	12	46	101	745	1258	267	1417	719
3	42	111	18607	84	1150	81	573	232	89	96
4	223	117	33	1475	1035	1063	300	378	455	205
5	184	248	513	1029	15415	2104	565	527	107	173
6	46	439	50	585	1595	20897	3170	259	458	85
7	18	940	85	25	207	3229	35613	16	697	42
8	154	739	111	83	164	320	333	5086	158	1254
9	104	2358	96	138	865	1146	1333	334	4643	316
10	601	1608	41	434	1264	712	1168	771	900	54812

Table B.23: DS3/4- Base PM Cars

	1	2	3	4	5	6	7	8	9	10
1	509	388	28	351	229	206	78	187	114	444
2	113	49097	73	53	219	867	1711	319	1508	1131
3	46	167	19334	93	1293	99	645	262	94	207
4	235	124	44	1524	1106	1126	321	394	474	212
5	203	304	642	1089	17618	2398	735	563	120	202
6	51	563	80	616	1852	24298	3683	275	486	171
7	25	1307	137	33	329	3841	40763	31	767	178
8	184	796	144	95	206	351	368	5186	172	1417
9	113	2442	106	147	908	1202	1422	352	4752	335
10	629	1931	156	447	1339	821	1324	824	918	56425

Table B.24: DS3/4- Base PM All vehicles