SURREY
COUNTY COUNCIL
Transport for Surrey

TRANSPORT EVALUATION FOR WAVERLEY BOROUGH COUNCIL'S CORE STRATEGY

2026 Transport Assessment Report

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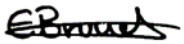
Sign 

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Amendment List

Iss. / Rev.	Iss. / Rev Date	Remove		Insert	
		Page	Iss. / Rev.	Page	Iss. / Rev.
Issue 3	08/04/10				Section 6 – AQMA's
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EXECUTIVE SUMMARY

Surrey County Council (SCC) is assisting Waverley Borough Council (WBC) with the development of their Local Development Framework (LDF). WBC need to consider the impact that their proposed development strategy will have on the highway network within the borough.

The key objective of this evaluation is to provide an assessment of the transport impact from future development and the sensitivity of the highway network with regard to traffic distribution from the proposed development.

The model used for the evaluation was SCC's County Model (SINTRAM). SINTRAM is a strategic traffic model that covers the key road network in Surrey. The county model makes use of three vehicle types: Cars, Light Good Vehicles (LGVs) and Heavy Goods Vehicles (HGVs) and at present only assesses the AM peak hour (0800 – 0900). The base year of the model is 2005 and the future forecast year is 2026.

WBC provided SCC with planning data that is proposed to occur in the borough between 2005 and 2026. The data was provided in accordance with the models zoning system and consisted of residential data only. Commercial forecasts were obtained from TEMPRO. From this data two future year scenarios were created, Scenario A and Scenario B. 2026 Scenario A consisted only of developments that already have been approved by planning permission, whereas 2026 Scenario B consisted of all developments irrespective of whether they have received planning permission or not.

The amount of trips projected to be generated from all developments stated in WBC's planning data was calculated using the Trip Rate Information and Computer System (TRICS) database. These projections of trip generation along with TEMPROs growth factors for commercial developments were imported into the future 2026 matrices of the test scenarios to produce future matrices and projections of traffic flows.

In addition to the two test scenarios (Scenario A and Scenario B), two other reference scenarios were incorporated. Firstly a 2005 Base year scenario was used to reflect the road network at the present time. Secondly a 2026 Do-Minimum scenario was created to act as a reference case to the two test scenarios. The 2026 Do-Minimum scenario retains the Waverley borough trips at 2005 base year levels but all other external trips grow at rates as forecast by the DfT's TEMPRO database.

Two networks were used in the modelling process, a 2005 and 2026 network. The 2005 network reflects the road network in its current state. The 2026 network is the same as the 2005 but includes the Highways Agency's Hindhead Improvement Scheme. This is because the Hindhead scheme is programmed to open to traffic in 2011, and inclusion of this scheme in the assessment will produce a more robust and representative analysis of future traffic conditions.

The total number of estimated additional departures in the Borough of Waverley for Scenario A is 720 and 218 arrivals. Whilst in Scenario B, the estimated total number of additional departures is 1,686 and 2,582 additional arrivals.

The model predicts that total non-trunk traffic flow within Waverley during the AM peak hour would increase by approximately 10,100vkm (3.2%) in 2026 Scenario A when

compared to the 2026 Do-Minimum. In 2026 Scenario B, traffic flow would increase by approximately 36,400 (11%) when compared with 2026 Scenario A.

The model predicts that total trunk road traffic flow generated within Waverley during the AM peak hour would increase by 1,300vkm (3.9%) in 2026 Scenario A when compared to the 2026 Do-Minimum. In 2026 Scenario B, trunk road traffic flow would increase by approximately 3,100 (9%) when compared to 2026 Scenario A.

The main areas in the Borough of Waverley which are most affected by the additional trips generated from the proposed developments are the four main urban settlements: Farnham, Godalming, Cranleigh and Haslemere. Specifically Farnham, the A31 corridor, between the Runfold Junction and Hickleys Corner, could potentially be impacted by a general increase in link and junction delay.

With regard to the three AQMA sites within Waverley, all sites could potentially be impacted by the new trips generated from the forecast planning data. None of the these traffic impacts are significant but it was found that 2026 Scenario B produced the largest impacts when compared to 2026 Scenario A.

Scenario B is the scenario that generates the largest amount of additional trips and presents the largest traffic impacts within the context of this evaluation. A general trend from the outputs is that Scenario B has the greatest impacts on the local traffic flows in Waverley, when compared to 2026 Scenario A. However, none of the impacts produced from 2026 Scenario B are of a significant amount to cause disruption or lead to major improvement measures on the road network in the Borough of Waverley.

1 INTRODUCTION

1.1.1 Waverley Borough Council (WBC) is in the process of developing their Local Development Framework (LDF). As part of the LDF and to inform the Core Strategy, WBC need to present and consult on their preferred options for development in the borough. One of the aspects that need to be considered when developing the preferred options is the impact that the development strategy will have on movement and transport. In February 2009, WBC commissioned Surrey County Council's (SCC) Transport Studies Team to evaluate the transport implications for future developments identified in their draft Core Strategy.

1.1.2 SCC is working in partnership with WBC, assisting with the development of their LDF. This assistance includes the provision of technical expertise to ensure that the resulting LDF will pass all the "test of soundness" and meet SCC policies and objectives.

1.1.3 The main aims of the evaluation are to:

- Determine the sensitivity of the highway network to the distribution of development within the borough.
- Provide a general assessment of the transport impact from future development within Waverley for the forecast year of 2026.

1.1.4 This report considers the impacts of the LDF between 2005 and 2026. The evaluation will also focus upon identified Air Quality Management Areas (AQMA) in Waverley (see *Section 6*).

1.2 Objectives

1.2.1 The main objectives of the evaluation were to:

- Identify the locations and estimates of additional commercial and residential development in the borough;
- Calculate the distribution of vehicle trips resulting from the additional development;
- Prepare a 2026 traffic forecast based on these developments;
- Compare the resulting 2026 traffic forecasts for each development scenario against a suitable reference;
- Report the main traffic impacts and conclusions arising.

1.3 Scope

1.3.1 The study will use the existing County Model (SINTRAM). This model is currently an AM peak hour model, and study will be based upon this time period. The model base year is 2005, and the future forecast year is 2026.

1.3.2 For comparison purposes a 2026 Do-Minimum scenario was developed as a reference. This is described later in *paragraph 4.1.3*. Two networks were used in the modelling process: a 2005 network and 2026 network. The 2005 base network replicates the road network in its current state, whereas the 2026 network is the

same as 2005 but includes the Highways Agency's Hindhead Improvement Scheme, which is currently under construction. There are no other committed highway schemes in the area so the Hindhead Scheme is the only highway alteration involved in the forecasting. Forecasts based on WBC scenarios are developed using traffic generation rates derived from the TRICS database and TEMPRO growth factors, in conjunction with the County's transport model (SINTRAM).

1.4 Report Structure

1.4.1 This document describes both the methodology and transport evaluation. It has been split into the main tasks as listed below:

- Section 2: A description of the model and its constraints;
- Section 3: The estimation of trip rates for the proposed developments and scenarios;
- Section 4: The development and summary results of the 2026 forecast year trip matrices used in the model;
- Section 5: The detailed results and network analysis from the model;
- Section 6: Results of analysis concerning the AQMA sites; and
- Section 7: Main conclusions and summary of the evaluation.

2 MODEL DESCRIPTION

2.1 Context

2.1.1 The County model (SINTRAM version 3.3 /100204Wav_V2) was used to evaluate the development proposals. This is a strategic model that encapsulates the road network of Surrey and its surrounding local authorities; at a national level the model incorporates all strategic roads within Great Britain.

2.1.2 All motorways, A and B roads together with some local roads are explicitly modelled within SINTRAM. Where traffic junctions and traffic signals are likely to have significant effects, the details of their general layout or the timing of the signals are also included in the modelling. However, strategic modelling uses aggregate descriptions of traffic such as flow, density and speed, and the relationships between them and hence does not include every road or junction. As a result the model is unable to answer detailed questions regarding traffic interactions, such as queuing and individual driver behaviour. It can, however, provide approximate answers to a wide range of transport problems (i.e. re-distribution effects), making it a reasonable tool for the initial transport assessment for Waverley's Core Strategy at the area wide level.

2.2 Vehicle Types

2.2.1 Cars, LGVs (light goods vehicles) and HGVs (heavy goods vehicles) are separately represented in the model. Trips by public transport are not modelled.

2.3 Time Period

2.3.1 The evaluation was performed in the AM peak hour time period (0800 – 0900 hours).

2.4 Assignment Method

2.4.1 A fixed matrix equilibrium assignment was performed for 30 iterations using the Method of Successive Averages (MSA). This is an assignment using volume averaging with (optional) Burrell type perturbations. The assignment allocates given travel demand (a set of trips with fixed origins and destinations) on the travel network (roads and junctions) in order to obtain distribution of the traffic flow. The resulting traffic flow represents the average conditions for the time period under study.

2.5 Zoning System

2.5.1 The Borough of Waverley was split into multiple zones (37 in total) to match the zoning system of the traffic model (SINTRAM version 3.3), to which the planning data was allocated. The zoning system of the county model is based on the national census output areas.

2.5.2 *Figures 2.1* and *2.2* show the location of the 37 modelled zones in the Borough of Waverley.

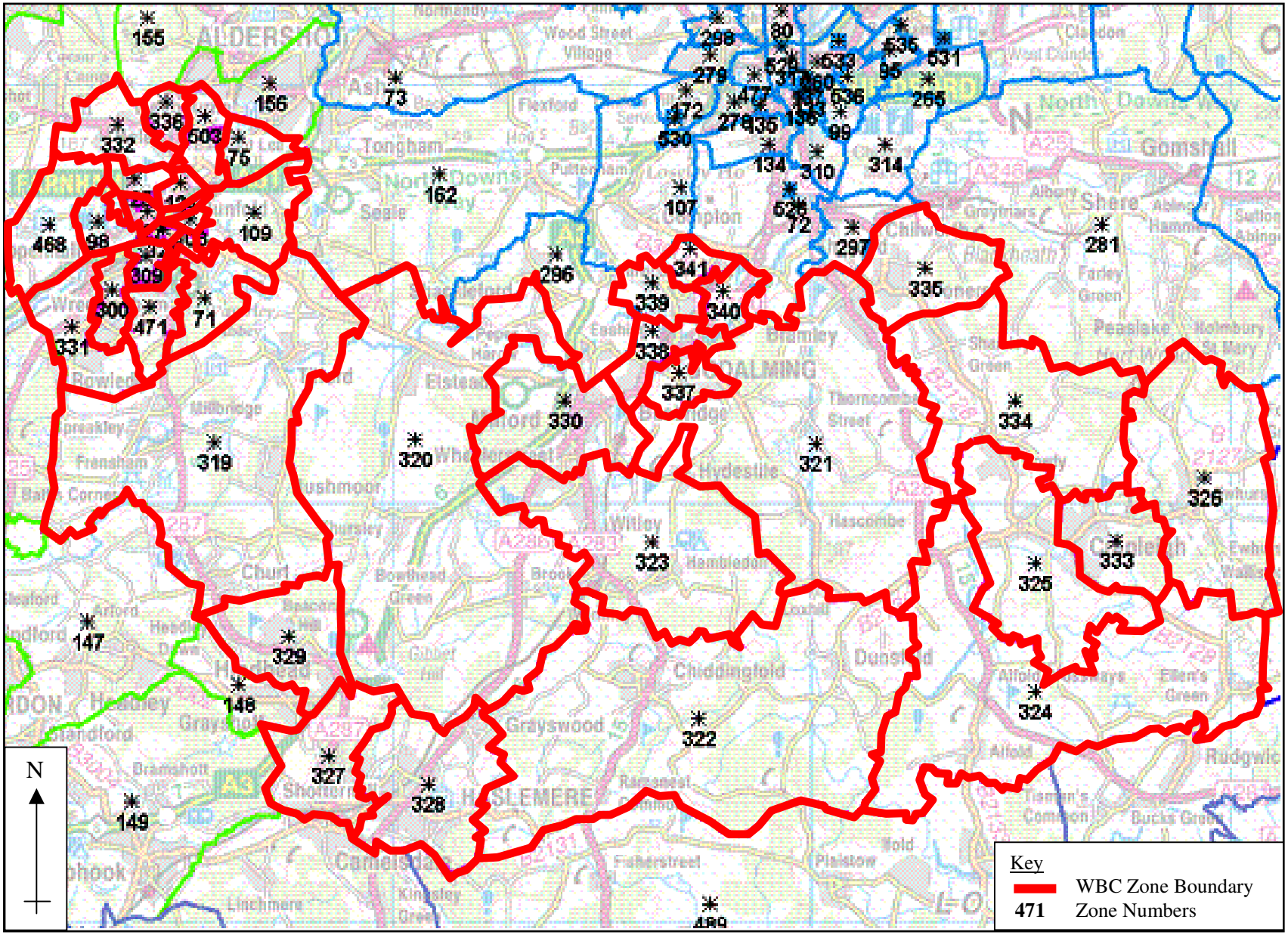

N
Key
WBC Zone Boundary
471 Zone Numbers

Figure 2.1: Waverley Borough Zone Plan

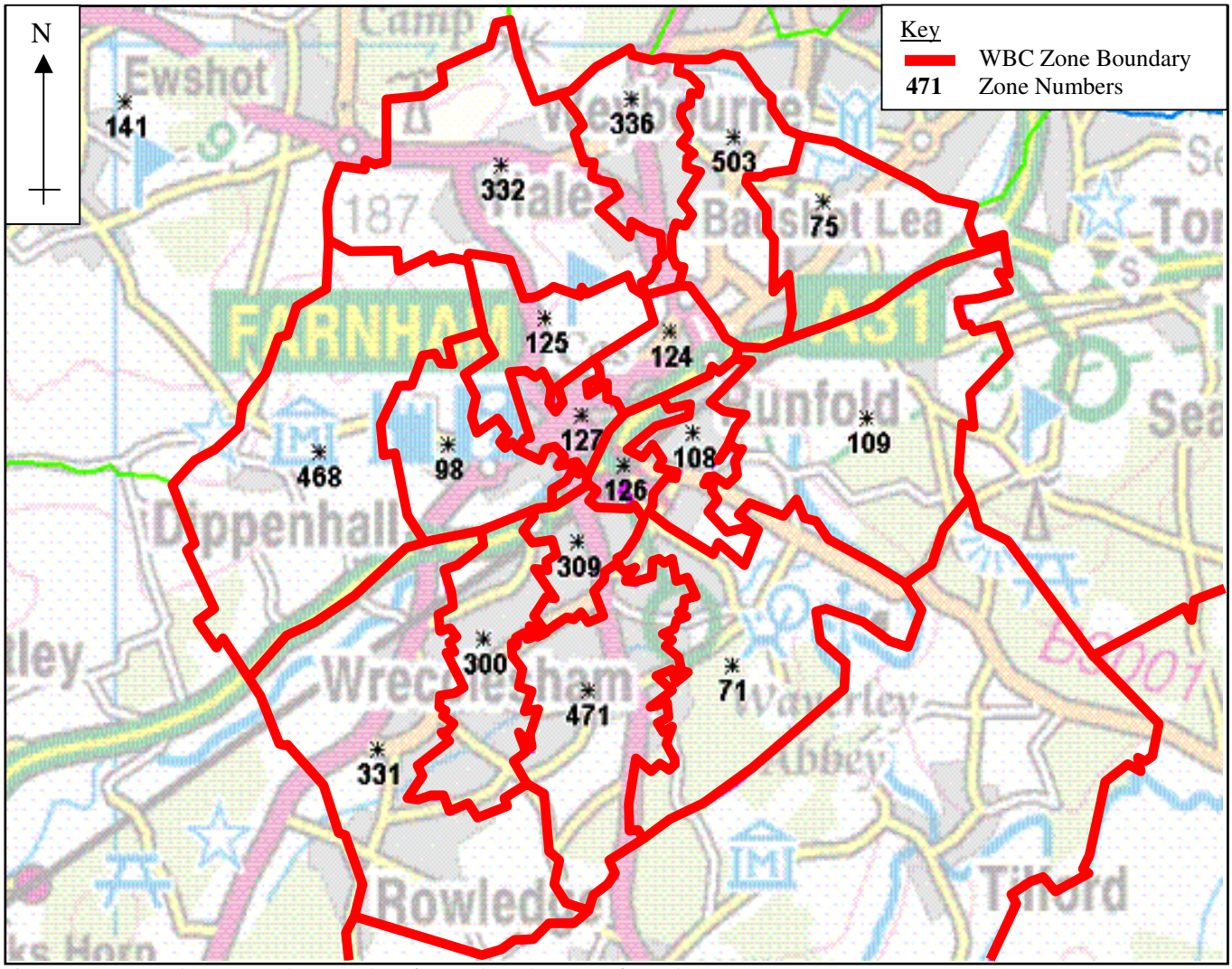


Figure 2.2: Waverley Borough zone plan, focused on the area of Farnham

3 TRIP RATE ESTIMATES FOR INDIVIDUAL SITES

3.1 Residential Planning Data

3.1.1 Planning data concerning residential developments forecast to occur between 2005 and 2026 in the Borough of Waverley was presented to SCC's Transport Studies Team in August 2009.

3.1.2 WBC provided the residential planning data in the form of three sub-categories that relates to the planning status of the developments. The three residential sub-categories of development are:

- Completions: residential units that have been approved by planning permission and construction has been completed. Units included are dated between 2005 and 2009.
- Outstanding Permissions: residential units that have been approved by planning permission but have not yet been constructed.
- Outstanding Allocation: WBC's remaining Strategic Housing Allocation.

3.1.3 The Completions and Outstanding Permissions data informed the amount of houses and flats, with the number of bedrooms, that has or is estimated to occur within each zone of Waverley between the base and forecast year.

3.1.4 WBC could not provide any information concerning the Outstanding Allocation of residential units, with reference to the composition and distribution.

3.1.5 It was therefore agreed that the number of units categorised as Outstanding Allocation was to be calculated by deducting the amount of units classified as Completions and Outstanding Permissions from the Strategic Housing Allocation of the borough (5,000 units). To distribute the units categorised as the Outstanding Allocation, WBC instructed SCC to only distribute to the zones which covered the four main urban settlements of the Borough; Farnham, Godalming, Haslemere and Cranleigh. It was thought most appropriate to proportion the Outstanding Allocation to the population of each zone classified as part of the four main urban settlements. The previous trend of house/flat and bedroom composition from the Completions and Outstanding Permissions was applied.

3.1.6 It was agreed by WBC and SCC to use gross figures for the residential planning data, due to the difference between the gross and net figures being minimal. Therefore all residential data will be additional developments.

3.1.7 See *Appendices A and B* for a summary of the residential planning data provided by WBC.

3.2 Commercial Planning Data

3.2.1 WBC has minimal history of employment land use in the borough, however they recently commissioned an Employment Land Review (ELR). The ELR concluded that "…provision is sufficiently flexible to allow for the following net additional increases in floorspace by land use type (up to 2026) 46,335 in B1a, B1b and B1c; and 6,516 warehousing / B8." However, due to no detail being provided

concerning the distribution of future commercial floorspace it was thought best to use TEMPRO forecasts instead. Growth factors concerning jobs (commercial developments) were extracted from TEMPRO for every modelled zone in Waverley.

3.2.2 WBC was also able to provide additional details of three large commercial developments, these developments being: East Street Redevelopment in Farnham; Key Site in Godalming; and Milford Hospital in Milford.

3.3 Scenarios

3.3.1 WBC provided details of whether each development had been approved by planning permission or not. Status of planning permission affects the implications of developments because it is not possible to influence developments that have received planning permission.

3.3.2 It was thought most appropriate by SCC to create two test scenarios: Scenario A and Scenario B. Scenario A refers only to proposed developments between 2005 and 2026 that have been approved by planning permission. Whereas Scenario B includes all developments proposed to occur between 2005 and 2026, irrespective of whether they have received planning permission (i.e. approved and non-approved developments). Both scenarios exclude windfalls.

3.3.3 It should be noted that WBC suggested including a larger number of scenarios to test the distribution of the planning data categorised as the Outstanding Allocation. However, SCC informed WBC that a large amount of their suggestions were unlikely to produce any significant differences in the model outputs when using a strategic model. SCC therefore advised that two scenarios would be sufficient. See *Appendix C* for email correspondence.

3.3.4 There is potential for large developments to occur within neighbouring boroughs and counties of Waverley between the present day and 2026. Examples of such potential developments are the Bordon/Whitehill Eco-Town, Aldershot Urban Extension, Guildford Hub and Horsham. Due to a lack of certainty and trip generation data for these developments they were not included within this transport evaluation. However, further assessment may be required if relevant data (e.g. greater trip generation data or a Transport Assessment) for these development areas become available in the future.

Approved Developments (Scenario A)		**Non-approved Developments (Scenario B)**	
Development Category	**Development Sub-Category**	**Development Category**	**Development Sub-Category**
Residential	Completions	Residential	Outstanding Allocation
Residential	Outstanding Permissions	Commercial	All Commercial Developments

Table 3.1: Planning data defined by planning status, approved and non-approved developments.

3.3.5 Therefore the only difference between the two scenarios is the proportion of developments that have been approved and non-approved by planning permission.

3.4 TRICS

3.4.1 Development trip rates have been obtained from the Trip Rate Information Computer System (TRICS) database, version 2009(b).

3.4.2 A trip rate refers to the amount of trips generated by a development. These include both trips that arrive and depart at a development.

3.4.3 The TRICS database stores information recorded from past surveys completed in the UK for a range of locations and land uses, counting the number of vehicular trips made to and from individual sites. The TRICS database allows users to select sites that are relevant and have similar criteria to a site in question. This enables the estimation of trip rates to and from proposed developments based on past surveyed sites.

3.4.4 Due to WBC not being able to provide planning data concerning commercial developments, the only land uses interrogated within TRICS consisted of houses privately owned and flats privately owned.

3.4.5 It should be noted that the TRICS database is a subjective tool. This is because personal choice and judgement plays a leading role in decision making when choosing appropriate sites to compare with the proposed development.

3.5 TRICS Methodology

3.5.1 TRICS Good Practice Guide 2009 was followed for the interrogation of the database to determine appropriate comparative sites.

3.5.2 Trip rates produced from the TRICS database were calculated as a trip rate estimate per bedroom for residential developments. Trip rate estimates were then multiplied by the number of bedrooms relevant to the house or flat for each development, by modelled zone.

3.5.3 It was necessary to create different trip rates for each type of residential dwelling (house or flat). Different trip rates also needed to be extracted to appropriate corresponding TRICS locations. The TRICS database classifies all surveys conducted at a development as one of the following locations: town centre; edge of town centre; neighbourhood centre; suburban area; edge of town; free standing. See *Appendix D* for the TRICS definitions for each location.

3.5.4 The residential planning data did not provide addresses of each development. Therefore it was necessary to award and proportion TRICS locations to entire zones of the Borough of Waverley. *Table 3.2* shows the TRICS locations assigned to the zones of Waverley.

3.5.5 Three vehicle types are modelled within SINTRAM: Cars, LGVs and HGVs. Consequently vehicle proportions were calculated for these vehicle types from the corresponding surveys in the TRICS databases.

Zone No.	Zone Name	TRICS Location	Comments
71	Alice Holt	50% Edge of Town 50% Free Standing	Northern half of the zone (north of Monks Walk), is primarily residential and at the edge of Farnham town. Southern half of the zone is very rural and sparse, containing Alice Holt Forest and Bourne Wood.
75	Badshot Lea	80% Neighbourhood Centre 20% Suburban Area	Majority of the zone contains residential housing with local amenities, such as a school and local shops. The southern area of the zone (running parallel with the A31) is a small area used for industrial purposes.
98	Farnham-West St	60% Town Centre 40% Edge of Town Centre	In the centre of the zone is the western part of Farnham town centre, containing a key link, West Street. Peripheral areas of the zone in walking distance to the town centre. Land use of businesses and public amenities.
108	Farnham – Compton	100% Suburban Area	Entire zone is centred on a residential land use and has local amenities such as schools and local shops.
109	Runfold	30% Suburban Area 70% Edge of Town	The northern area of the zone (bordering the A31) contains an area of industrial land e.g. sand quarries. Remainder of the zone is relatively sparse but contains an area of residential housing.
124	Farnham Hospitals	100% Edge of Town Centre	Zone is in walking distance to town centre and contains a mixture of land uses. E.g. hospital and local businesses.
125	Farnham Park	80% Edge of Town 20% Edge of Town Centre	Farnham Park is within walking distance to Farnham town centre, but is a large and rural area. South-west area of the zone in close proximity to Farnham town centre and covers Surrey Institute of Art and Design.
126	Farnham Station	100% Edge of Town Centre	Main focus of the zone is Farnham train station. Parking facilities also present within walking distance to town centre.
127	Farnham Town Centre	100% Town Centre	Zone covers Farnham town centre.
300	Farnham-Weydon Ln & Shortheath	100% Neighbourhood Centre	Entire zone comprised of a large residential area with local amenities such as schools and recreation grounds.
309	Farnham-Firgrove Hill	100% Neighbourhood Centre	Primary land use in the zone is residential. Also features Farnham College.
319	Frensham & Tilford	30% Neighbourhood Centre 70% Free Standing	Multiple small villages located within a predominantly rural zone e.g. Tilford, Frensham and Churt. Rest of the zone is very remote and rural.
320	Elstead & Thursley	15% Neighbourhood Centre 85% Free Standing	Small proportion of the zone contains sparse settlements and villages, such as Elstead and Thursley. Rest of the zone is very remote and rural.
321	Bramley & Winkworth Arboretum	10% Neighbourhood Centre 90% Free Standing	Few settlements scattered throughout and also cover the village of Bramley, (surrounding the A281). Rest of the zone is very remote and rural.
322	Chiddingfold & Dunsfold	5% Neighbourhood Centre 95% Free Standing	Very small amount of settlements in the zone, and these are predominantly in the village of Chiddingfold. Rest of the zone is very remote and rural.
323	Witley	15% Neighbourhood Centre 85% Free Standing	Small amount of settlements in the zone, centred on the A283. Rest of the zone is very rural with large open spaces.
324	Alfold	30% Suburban Area 70% Free Standing	Dunsfold Aerodrome and other small businesses associated with this are located in the west area of the zone. The remaining area of the zone is very rural with small-scattered settlements.
325	Cranleigh Town Centre	30% Town Centre 70% Edge of Town	Cranleigh town centre is located in the centre and eastern edge of the zone. Rest of the zone contains a mixture of land uses (residential and industrial) but in a rural landscape.
326	Ewhurst	20% Neighbourhood Centre 80% Free Standing	Small village of Ewhurst is located in the centre of the zone. Individual dwellings scattered throughout the zone. Rest of the zone is remote and rural.
327	Haslemere-Shottermill	100% Neighbourhood Centre	The entire zone is a residential area with public services and amenities, such as the hospital and school.

Zone No.	Zone Name	TRICS Location	Comments
328	Haslemere	20% Town Centre 60% Edge of Town Centre 20% Edge of Town	Haslemere town centre is located in the centre of the zone. Surrounding the town centre is an area that has urban characteristics and is within walking distance to the town centre. A small proportion of the zone (south-east and north-west corners) is sparse and rural. The town meets the countryside.
329	Hindhead	40% Neighbourhood Centre 60% Free Standing	Central to the zone is Hindhead, which is a predominantly residential settlement. The rest of the zone is very rural and has few scattered settlements.
330	Milford	50% Neighbourhood Centre 50% Edge of Town	Milford located in the centre of the zone. Transport links of a train station and is in very close proximity to the A3. The perimeter of the zone (north-west corner) is an area of land where settlements begin to spread into the countryside.
331	Wrecclesham	70% Neighbourhood Centre 30% Edge of Town	Majority of the zone is residential land and contains public services for this area, in the form of schools and local shops. Land close to the perimeter of zone (exception to east boundary) has open space and borders woodlands e.g. Alice Holt.
332	Farnham – Hale	70% Neighbourhood Centre 30% Edge of Town	Northern half of the zone is primarily a residential area. Multiple schools and recreation areas serve the zone. Rest of the zone (southern section and western perimeter) has large areas of open space, including Farnham Park.
333	Cranleigh East	40% Edge of Town Centre 60% Free Standing	Western area of the zone (bordering Cranleigh town centre) is a residential area but in close proximity to town centre. The eastern part of the zone is very rural and has few settlements within it.
334	Shamley Green	25% Neighbourhood Centre 75% Free Standing	Surrounding the B2128 Guildford Road is a small isolated residential area, small businesses scattered within the zone. The rest of the zone is very rural and within the countryside.
335	Wonersh	50% Neighbourhood Centre 50% Free Standing	The western half of the zone covers the village of Wonersh. The eastern half of the zone is rural and includes large areas of open space.
336	Farnham-Weybourne West	100% Neighbourhood Centre	Zone covers part of Weybourne and Heath End. Both areas are residential located between Farnham and Aldershot.
337	Godalming-Busbridge	15% Edge of Town Centre 85% Neighbourhood Centre	Land at the northern edge of the zone (bordering the A3100) is close to Godalming town centre. Rest of the zone has the main land use is residential. Schools and recreation grounds are also present.
338	Godalming Town Centre	60% Town Centre 40% Edge of Town Centre	The eastern half of the zone covers Godalming town centre. Western half of zone is relatively urban but contains more characteristics of an edge of town location e.g. less dense.
339	Godalming-Charterhouse	100% Neighbourhood Centre	Zone covers exterior area to Farncombe; mainly residential area with public facilities such as schools e.g. Charterhouse.
340	Farncombe	100% Neighbourhood Centre	Farncombe village is located within this zone, and includes facilities such as a train station and local leisure centre.
341	Binscombe	100% Neighbourhood Centre	Area of land that has a primary land use of residential housing.
468	Farnham-Dippenhall	100% Free Standing	Zone is very rural and has few areas of settlements, Dippenhall being one.
471	Farnham-The Bournes	50% Neighbourhood Centre 50% Edge of Town	Middle and Lower Bourne both located in the northern half of the zone. Primarily residential land uses. The southern half of zone encompassing The Bourne, more rural and is an area where rural and urban land uses merge.
503	Farnham-Weybourne East	100% Neighbourhood Centre	Entire zone is a residential area located between Farnham and Aldershot towns. Multiple schools located in this zone.

Table 3.2: Zones within the Borough of Waverley classified and proportioned to TRICS locations

3.6 Commercial Developments

3.6.1 The details WBC provided concerning the three large commercial developments indicated that the East Street and Key Site developments were mixed uses, but the Milford Hospital development was an entirely residential development.

3.6.2 It became apparent that SCC held Transport Assessments (TA), produced by RPS Transport, for the East Street and Key Site developments. It was therefore thought most appropriate to use the trip generation projections from these TAs than to create new trip rates from TRICS.

3.6.3 A TA does not exist for Milford Hospital development, but as it is a completely residential development trip rates were generated using the TRICS database.

3.7 TEMPRO Methodology

3.7.1 Commercial growth factors were extracted for the weekday AM peak period (0700 – 0959), using a base year of 2005 and a future year of 2026, for all journey purposes from TEMPRO. TEMPRO V5.4 was used.

3.7.2 The county model, SINTRAM, models three vehicle types (Cars, LGVs and HGVs). TEMPRO's mode entitled "Car Driver" for "All Purposes" was used to represent Car. To retrieve representative figures for LGV and HGV, growth factors were extracted for "Car Driver" using the Non-Home Based Employers Business purpose. This methodology coincides with the methodology used to create the 2026 Do-Minimum matrices.

3.7.3 It was assumed that all additional commercial trips generated from such TEMPRO growth factors would have a status of being unapproved by planning permission. This was assumed as potentially only four years (2005 – 2009) worth of developments could be approved by planning permission. This would be a minimal proportion of the total amount of commercial growth and is a small amount of growth to show significant outputs in a strategic model.

3.8 Additional Trips per Zone

3.8.1 *Tables 3.3* to *3.5* show the estimated departures and arrivals for the proposed development by zone during the AM peak hour (0800 – 0900) for Scenarios A (approved developments only) and B (approved and non-approved developments), using a base year of 2005 and the forecast year of 2026. The total number of departures in Waverley for Scenario A is 720 and 218 arrivals. Whilst in Scenario B, the estimated number of departures is 1,686 and 2,582 arrivals.

Zone	Total Additional Trips							
	Additional Departures				Additional Arrivals			
	Total	Car	LGV	HGV	Total	Car	LGV	HGV
71	7.9	7.1	0.7	0.1	2.3	2.1	0.2	0.0
75	2.1	1.9	0.2	0.0	0.5	0.5	0.0	0.0
98	9.3	8.5	0.7	0.1	3.9	3.5	0.4	0.0
108	11.3	10.3	0.9	0.1	3.7	3.3	0.3	0.0
109	13.9	12.8	1.1	0.1	4.0	3.7	0.3	0.0
124	25.6	23.6	1.7	0.2	10.3	9.4	0.9	0.1
125	3.8	3.5	0.3	0.0	1.1	1.0	0.1	0.0
126	3.0	2.8	0.2	0.0	1.3	1.2	0.1	0.0
127	8.1	7.3	0.7	0.1	3.5	3.1	0.3	0.0
300	25.2	22.8	2.1	0.2	6.1	5.5	0.5	0.1
309	9.8	9.0	0.7	0.1	2.5	2.3	0.2	0.0
319	10.4	9.4	0.9	0.1	2.9	2.6	0.2	0.0
320	29.9	26.5	3.1	0.3	8.9	7.8	0.9	0.1
321	8.8	8.0	0.7	0.1	2.5	2.3	0.2	0.0
322	15.8	14.3	1.4	0.1	5.4	4.9	0.5	0.1
323	33.5	31.1	2.2	0.2	8.9	8.2	0.6	0.1
324	2.4	2.1	0.2	0.0	0.8	0.7	0.1	0.0
325	9.1	8.2	0.8	0.1	4.5	4.0	0.4	0.0
326	2.8	2.5	0.3	0.0	0.8	0.7	0.1	0.0
327	41.6	38.6	2.7	0.3	10.9	10.2	0.7	0.1
328	64.7	58.4	5.6	0.6	28.3	25.3	2.7	0.3
329	62.1	57.5	4.2	0.5	16.6	15.3	1.1	0.1
330	25.0	23.0	1.9	0.2	6.7	6.1	0.5	0.1
331	67.2	59.7	6.8	0.7	16.7	14.8	1.7	0.2
332	18.5	16.5	1.8	0.2	4.6	4.1	0.5	0.0
333	39.3	35.3	3.6	0.4	14.2	12.7	1.4	0.1
334	5.3	4.8	0.5	0.1	1.5	1.4	0.2	0.0
335	2.6	2.4	0.2	0.0	2.6	2.4	0.2	0.0
336	3.5	3.1	0.4	0.0	0.8	0.7	0.1	0.0
337	34.3	31.0	3.0	0.3	9.0	8.2	0.8	0.1
338	30.4	28.6	1.6	0.2	8.6	7.9	0.6	0.1
339	31.1	28.7	2.2	0.2	8.0	7.4	0.5	0.1
340	30.4	28.2	2.0	0.2	7.9	7.4	0.5	0.1
341	4.0	3.7	0.3	0.0	1.0	0.9	0.1	0.0
468	1.3	1.2	0.1	0.0	0.4	0.3	0.0	0.0
471	21.9	19.7	1.9	0.2	5.8	5.2	0.5	0.1
503	4.0	3.6	0.3	0.0	1.0	0.9	0.1	0.0
Total	**720**	**655**	**58**	**6**	**218**	**198**	**18**	**2**

Table 3.3: Estimated additional departures and arrivals in the AM peak (0800 – 0900) for Scenario A 2005 – 2026 by vehicle type for the proposed developments.

Zone	Total Additional Trips							
	Additional Departures				Additional Arrivals			
	Total	Car	LGV	HGV	Total	Car	LGV	HGV
71	18.5	12.5	3.6	2.3	25.0	21.8	2.4	0.8
75	14.4	7.7	3.8	2.9	49.8	41.3	5.3	3.2
98	33.2	18.2	8.4	6.7	21.4	19.2	1.9	0.3
108	20.3	14.3	3.7	2.4	17.9	15.5	1.8	0.6
109	21.3	16.5	3.2	1.6	23.1	20.0	2.2	0.9
124	47.5	34.1	8.3	5.1	103.1	88.7	9.5	4.9
125	10.2	6.1	2.3	1.8	15.7	13.6	1.5	0.6
126	15.5	8.7	3.8	3.0	18.9	16.4	1.8	0.7
127	131.5	113.1	15.5	2.9	57.5	49.7	6.6	1.2
300	74.4	46.0	16.1	12.3	99.1	88.5	8.3	2.3
309	33.0	20.1	7.2	5.6	51.0	45.1	4.5	1.4
319	28.2	12.4	8.6	7.1	28.1	22.4	3.2	2.6
320	40.9	28.4	8.0	4.5	54.1	43.4	5.8	4.8
321	24.0	11.3	6.7	6.0	45.8	36.2	4.5	5.1
322	26.9	16.3	6.0	4.6	84.7	64.8	13.7	6.2
323	44.8	32.8	7.2	4.9	39.0	31.8	4.0	3.1
324	14.8	4.3	5.8	4.7	9.1	6.7	1.3	1.1
325	43.4	24.8	11.5	7.1	98.7	80.9	11.7	6.1
326	12.5	4.1	4.5	3.8	18.7	13.9	2.5	2.3
327	91.7	64.6	17.4	9.7	173.7	150.8	16.2	6.7
328	104.3	81.8	15.6	6.9	133.2	114.6	12.8	5.8
329	97.0	71.9	16.2	8.8	99.6	87.7	8.6	3.3
330	35.8	24.5	6.8	4.5	27.3	22.7	2.8	1.9
331	108.8	76.9	20.2	11.7	93.6	82.1	8.5	3.0
332	61.4	34.4	15.2	11.8	102.3	89.2	9.7	3.4
333	81.5	54.9	16.9	9.7	141.7	118.6	14.7	8.3
334	15.3	7.2	5.9	2.3	23.1	18.7	2.9	1.4
335	11.0	3.9	4.4	2.7	28.2	22.6	3.9	1.6
336	51.3	23.2	15.9	12.2	111.1	94.7	10.2	6.2
337	63.5	47.7	10.6	5.2	160.6	137.4	15.1	8.0
338	41.8	38.5	3.0	0.3	39.6	36.1	3.2	0.3
339	62.4	47.6	9.2	5.6	169.9	143.4	15.6	10.9
340	76.0	49.0	16.6	10.4	162.2	138.6	14.0	9.6
341	37.6	22.3	8.9	6.4	115.4	99.8	10.8	4.8
468	3.4	2.1	0.8	0.6	3.2	2.9	0.3	0.1
471	53.2	34.8	10.8	7.7	71.8	62.8	6.8	2.2
503	34.9	15.8	10.9	8.2	64.7	55.2	5.8	3.7
Total	**1,686**	**1,133**	**340**	**214**	**2,582**	**2,198**	**254**	**130**

Table 3.4: Estimated additional departures and arrivals in the AM peak (0800 – 0900) for Scenario B 2005 – 2026 by vehicle type for the proposed developments.

3.8.2 In summary *Table 3.5* below presents the proportion of commercial and residential additional trips by scenario and forecast year.

Development Type	Proportion of Trips		
	Departures	**Arrivals**	**Both Departures and Arrivals**
Scenario A 2005 – 2026			
Commercial	0%	0%	0%
Residential	100%	100%	100%
Total	*100%*	*100%*	*100%*
Scenario B 2005 – 2026			
Commercial	50%	57%	52%
Residential	50%	43%	48%
Total	*100%*	*100%*	*100%*

Table 3.5: Proportion of additional trips by type of development and scenario.

3.8.3 This illustrates that no additional trips generated by commercial development are present in Scenario A. This is because none of the commercial development has been approved by planning permission.

3.8.4 *Figures 3.1* to *3.4* show plots of disposition of allocated growth for both commercial and residential development sites in percentage terms by departures and arrivals in Waverley for 2026 Scenarios A and B respectively. *(The areas of the pie chart diagrams show the allocated growth).*

3.8.5 It can be seen that Scenario B contains commercial development where Scenario A does not. A larger proportion of departure trips are present in Scenario A, whereas arrival trips are slightly more dominant in Scenario B. The disposition of growth is predominant in the four main urban settlements of the borough: Farnham, Godalming, Cranleigh and Haslemere.

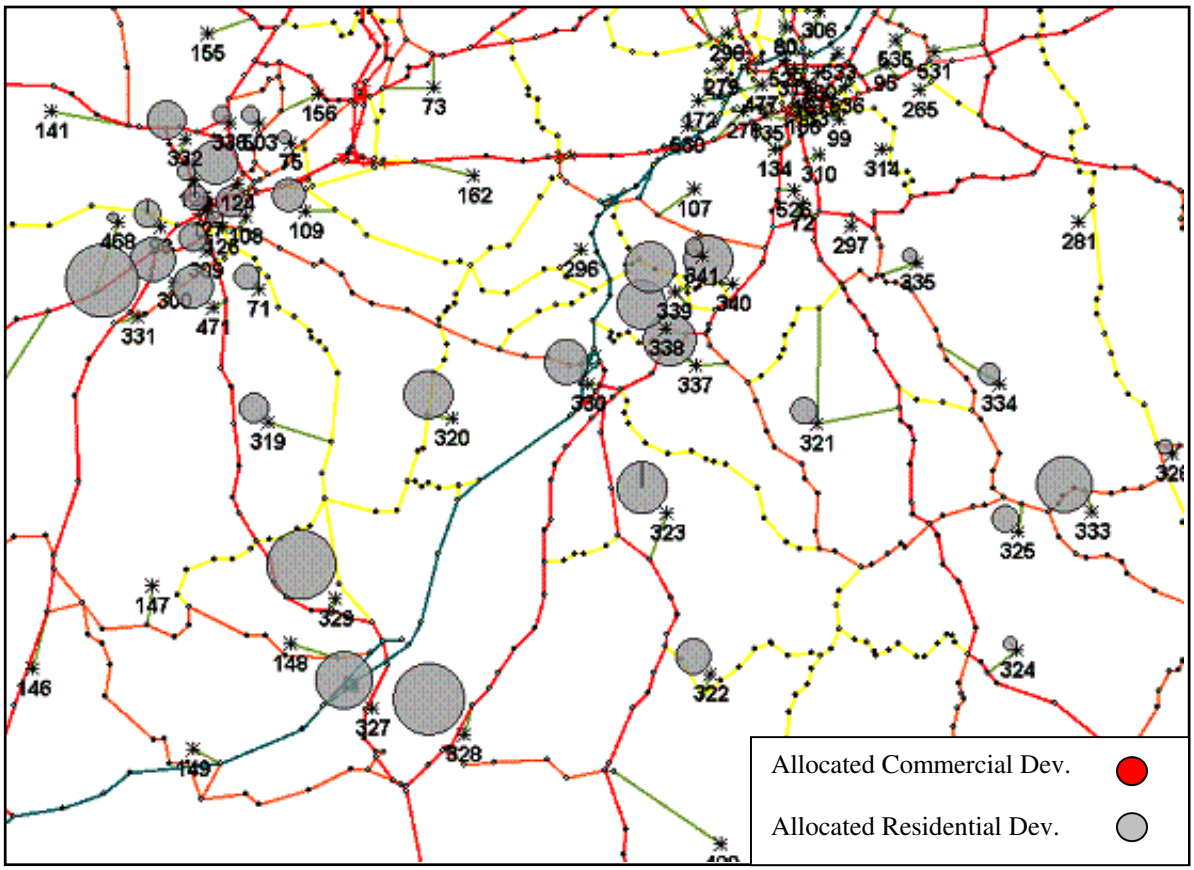


Figure 3.1: 2026 Scenario A disposition of development growth by departures

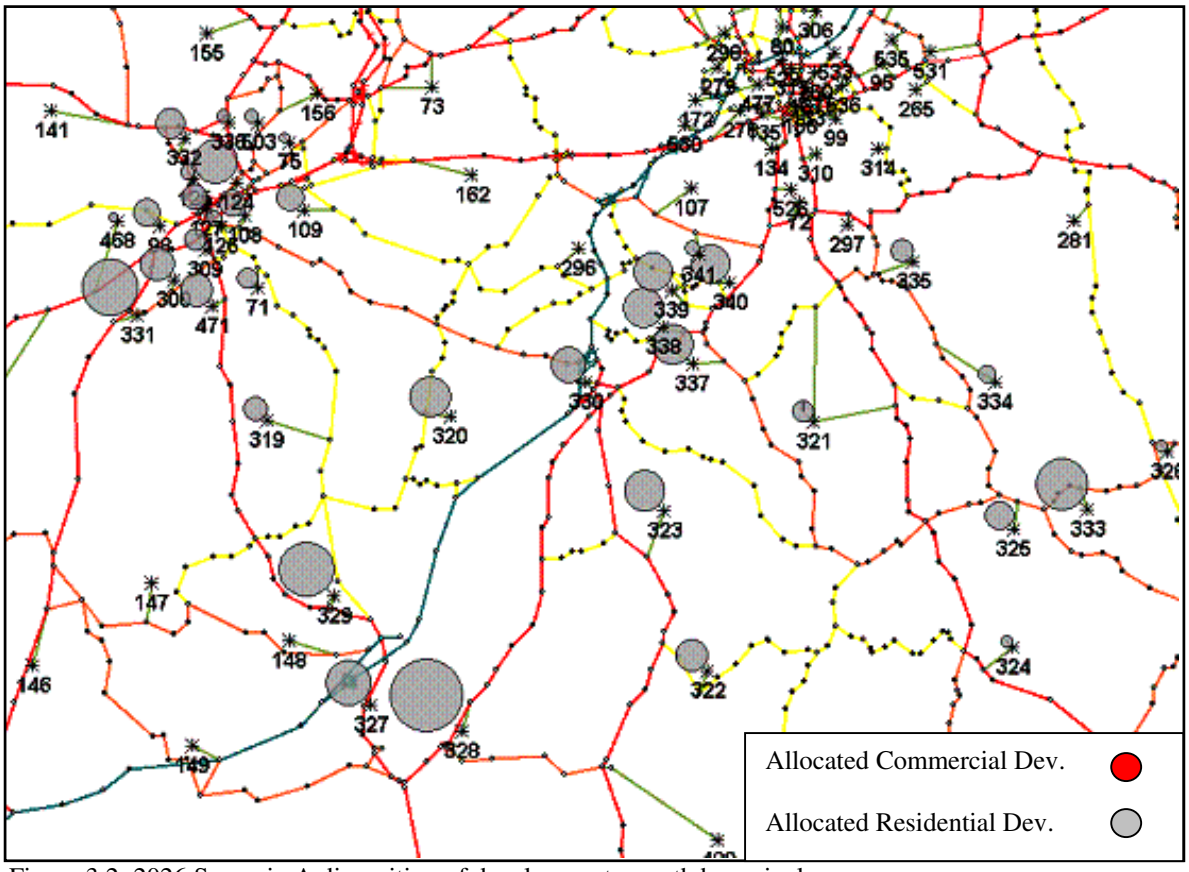


Figure 3.2: 2026 Scenario A disposition of development growth by arrivals

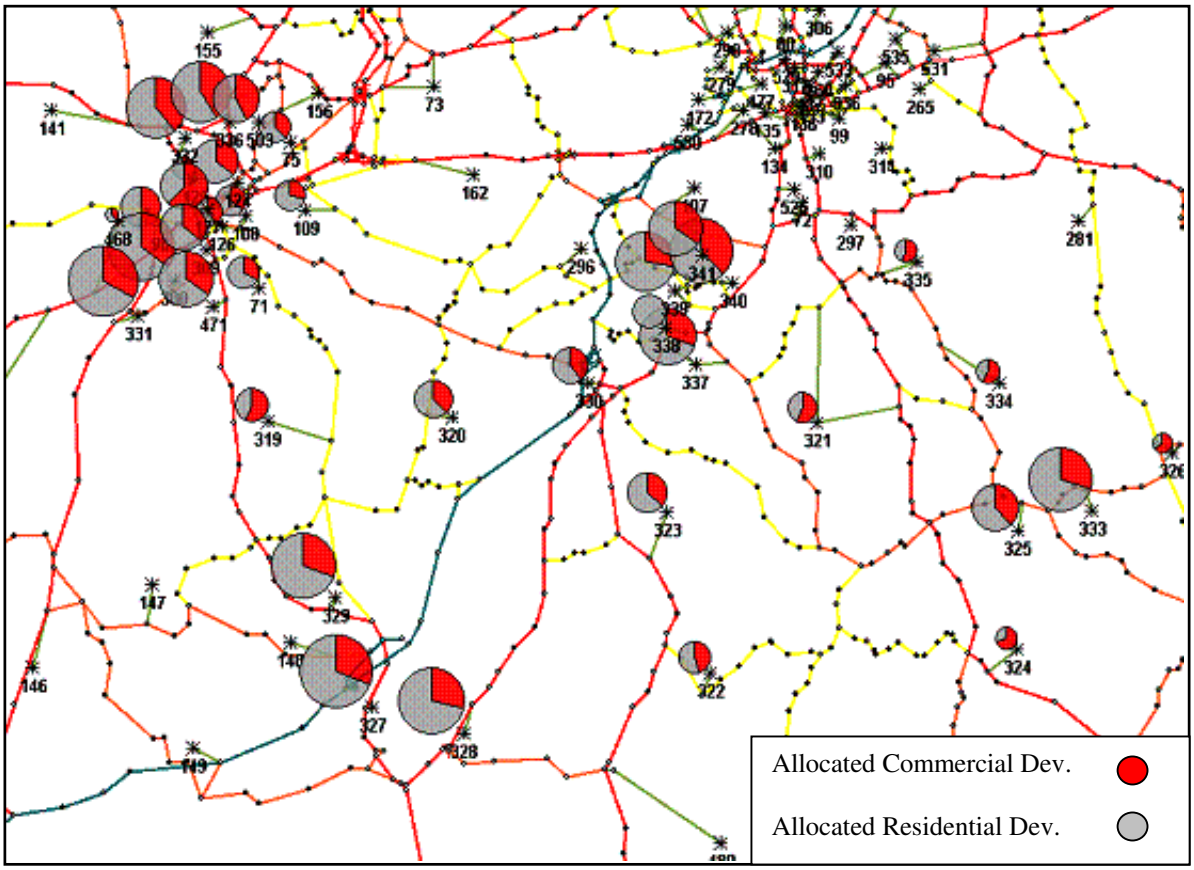


Figure 3.3: 2026 Scenario B disposition of development growth by departures

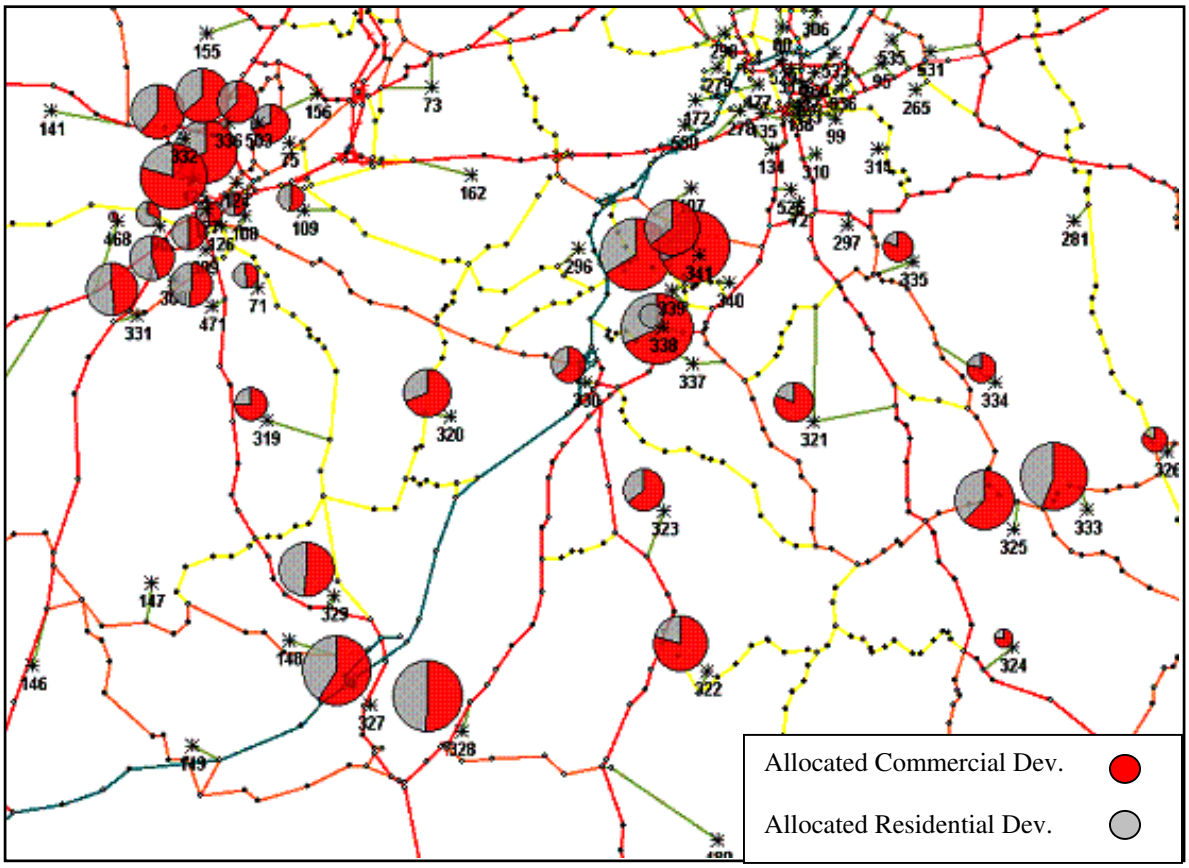


Figure 3.4: 2026 Scenario B disposition of development growths by arrivals

3.8.6 Trip ends are the total number of trips that either have an origin (origin trip ends) or destination (destination trip ends) within the defined modelled zone.

3.8.7 The model base year is 2005. Trip ends from the 2005 matrix (reference 2005_Wav a derivative of SINTRAM Ref 2005_RB_MV_GU_WK) were extracted for zones within the Borough of Waverley. To acquire 2026 trip ends for Waverley, these 2005 trip ends were summed with the estimated trips from 2005 to 2026 produced from the TRICS database and TEMPRO (see *Tables 3.3* and *3.4*).

3.8.8 2026 matrices were created using the Waverley 2026 Do-Minimum matrix and combining this with the new estimated trip ends generated from WBC planning data. The trip ends were distributed using a growth factor method. This process was initially performed for Scenario A and again for Scenario B. However, to create Scenario B, Scenario A was used as the starting point instead of the 2026 Do-Minimum (refer to *Section 4* for further detail). The creation of multiple scenarios enables comparisons and reference cases to be used, providing the results with more relevance. The 2026 Do-Minimum acts as a reference case for Scenario A and Scenario A a reference case for Scenario B.

3.8.9 *Table 3.6* displays trip ends for the three forecast scenarios (2026 Do-Minimum, 2026 Scenario A and 2026 Scenario B). Trip ends for the 2005 base matrix are not shown, as these are exactly the same as the 2026 Do-Minimum. This is due to the methodology used to create the Do-Minimum scenario retaining the study area at 2005 base year levels.

3.8.10 Due to a growth factor method being used to combine the new trip ends produced from WBC planning data with the 2026 Do-Minimum, extra growth is caused to occur as well as the additional trip ends. These differences can be seen from comparing *Tables 3.3* and *3.4* with *3.6*. Therefore the growth factor method allows a more representative method of forecasting.

Zone No.	ORIGIN					DESTINATION				
	2026 Do-Min	2026 Scenario A	2026 Scenario B	Difference: Scen A – Do-Min	Difference: Scen B – Scen A	2026 Do-Min	2026 Scenario A	2026 Scenario B	Difference: Scen A – Do-Min	Difference: Scen B – Scen A
71	118	125	140	7	15	38	40	65	2	25
75	155	157	174	2	17	191	192	244	1	52
98	340	351	385	11	34	13	16	34	3	18
108	118	128	142	10	14	30	34	48	4	14
109	80	94	103	14	9	43	47	68	4	21
124	280	305	337	25	32	409	424	524	15	100
125	91	95	104	4	9	55	56	70	1	14
126	157	160	178	3	18	39	40	59	1	19
127	173	182	314	9	132	237	242	300	5	58
300	617	645	713	28	68	95	102	198	7	96
309	291	302	335	11	33	73	76	127	3	51
319	390	402	432	12	30	174	178	204	4	26
320	223	254	272	31	18	199	213	267	14	54
321	343	352	377	9	25	290	293	337	3	44
322	248	264	282	16	18	282	300	402	18	102
323	250	285	304	35	19	176	187	219	11	32
324	280	283	304	3	21	58	58	68	0	10
325	422	433	481	11	48	386	392	490	6	98
326	218	221	236	3	15	103	105	126	2	21
327	674	717	788	43	71	436	450	618	14	168
328	378	444	497	66	53	311	341	449	30	108
329	513	576	627	63	51	162	182	271	20	89
330	238	264	282	26	18	125	133	155	8	22
331	575	643	703	68	60	129	148	229	19	81
332	597	617	677	20	60	295	299	400	4	101
333	552	592	652	40	60	318	337	474	19	137
334	297	303	322	6	19	148	151	172	3	21
335	167	170	183	3	13	115	121	150	6	29
336	652	657	724	5	67	217	222	343	5	121
337	326	361	402	35	41	549	565	727	16	162
338	935	967	1005	32	38	836	848	881	12	33
339	278	309	351	31	42	461	476	656	15	180
340	630	661	726	31	65	508	522	693	14	171
341	397	403	449	6	46	287	290	412	3	122
468	31	32	35	1	3	4	4	8	0	4
471	407	430	473	23	43	111	119	188	8	69
503	454	460	504	6	44	134	138	208	4	70
Total	**12,895**	**13,644**	**15,013**	**749**	**1,369**	**8,037**	**8,341**	**10,884**	**304**	**2,543**

Table 3.6: 2026 AM peak (0800 – 0900) trip ends for all vehicle types and all forecast scenarios

4 FORECAST MATRICES

4.1 Do-Minimum Forecast

4.1.1 In order to assess the effects of the additional residential and commercial development provided by WBC in the forecast year of 2026, it is useful to have a reference case, which for this assessment is provided by the Do-Minimum scenario.

4.1.2 The 2026 Do-Minimum highway network includes the highway alteration of the Highways Agency's Hindhead Improvement Scheme. The Hindhead Improvement Scheme is currently under construction but is planned to be open for traffic in mid 2011 (Highways Agency, 2009). The main outcome of the scheme will convert the current single carriageway section of the A3, between the Thursley Junction and Hammer Lane, to dual carriageway. Therefore the Hindhead Improvement Scheme has been incorporated into the 2026 network for the purpose of creating realistic future traffic flows and interactions. Highways Agency documents showing the locations of key highway alterations were used to incorporate the scheme in the modelled network. Therefore the only difference between the 2005 and 2026 network is the Hindhead Improvement Scheme.

4.1.3 The 2026 Do-Minimum trip matrix retains the Waverley Borough trips (internal, internal to external and external to internal trips) at 2005 base year levels, all other (external) trips grow at rates as forecast by the DfT's TEMPRO database.

4.1.4 A comparison between the Do-Minimum and the 2005 base will therefore show the impact of growth in traffic from the "Rest of Britain," while growth within the Borough will remain static at 2005 levels.

4.2 2026 Do-Something Forecasts

4.2.1 Forecast matrices for Scenario A and B were obtained following the procedure outlined in *Figure 4.1*. The Hindhead Improvement Scheme was incorporated in the network used for both scenarios.

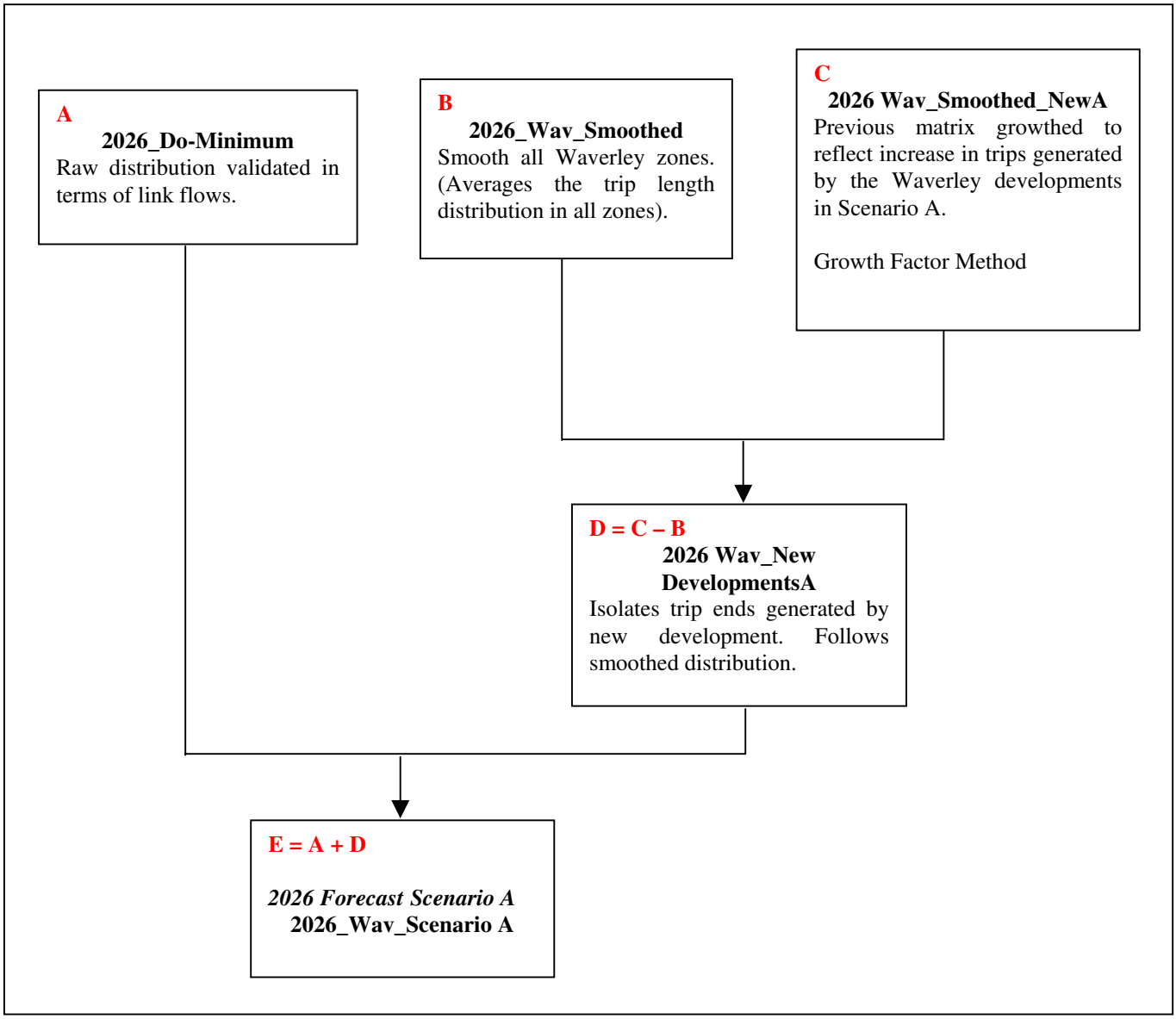


Figure 4.1: Processes undertaken to create the forecast matrix for Scenario A

N.B. The same process was used to create Scenario B but using Scenario A as the starting point, instead of the Do-Minimum

4.2.2 The trip ends in the Waverley zones are smoothed in the 2026 Do-Minimum matrix to allow the new trip ends to follow a more representative distribution. A smoothed distribution refers to the origin and destination trip ends being averaged for a selected area (i.e. the Borough of Waverley).

4.2.3 The new trips derived from WBC's planning data follows this smoothed distribution but has been added to the original raw distribution of the SINTRAM model. Raw distribution is lumpy but validates well in terms of link flows. Combining the two types of distribution enables a more robust forecast.

4.2.4 The 2005 base matrix travel demand total for the morning peak (0800 – 0900) is 1,773,113 trips. *Table 4.1* shows the matrix totals and the absolute and percentage differences between the modelled 2026 future scenarios and the base year.

Scenario	Borough Internal Trips	Abs. Diff (Base)	% Diff (Base)	Matrix Total	Abs. Diff (Base)	% Diff (Base)
2005 Base	1,232			1,773,113		
2026 Do-Minimum	1,129	-103	-8.4%	2,089,470	316,357	17.8%
2026 Scenario A	1,223	-9	-0.7%	2,089,666	316,553	17.9%
2026 Scenario B	1,684	452	36.7%	2,092,992	319,879	18.0%

Table 4.1: AM Peak Aggregated Matrix Totals

4.2.5 *Tables 4.2* and *4.5* show the aggregated Car, LGV and HGV matrices for each modelled scenario. The matrices have been further aggregated into 7 sectors covering geographic areas, for each borough or district in Surrey, neighbouring counties and London boroughs and other areas of the country.

	Waverley	East Surrey	West Surrey	London	Kent / Sussex	Home Counties	Rest of Britain	{All}
Waverley	**1,232**	357	4,064	37	2,059	4,637	22	**12,406**
East Surrey	700	18,984	6,583	15,221	7,736	2,288	11	51,523
West Surrey	2,797	5,868	23,399	9,026	1,996	16,331	36	59,451
London	110	15,003	4,814	300,803	13,929	22,081	13,284	370,024
Kent / Sussex	1,933	6,124	1,548	10,596	202,390	8,544	143	231,279
Home Counties	971	1,203	12,954	21,432	8,703	342,908	42,673	430,845
Rest of Britain	5	54	337	13,148	826	43,720	559,494	617,585
{All}	**7,747**	47,593	53,699	370,264	237,639	440,509	615,662	**1,773,113**

Table 4.2: 2005 Base Aggregated Matrix Totals (7 Sectors)

Note:
Waverley Intra Borough AM Trips = 1,232
External to Borough Trips = 7,747 – 1,232 = 6,515
Borough to External Trips = 12,406 – 1,232 = 11,174
Total (All) = 1,773,113

	Waverley	East Surrey	West Surrey	London	Kent / Sussex	Home Counties	Rest of Britain	{All}
Waverley	**1,129**	387	4,151	33	2,063	4,622	20	**12,406**
East Surrey	697	24,336	7,704	17,071	8,961	2,689	11	61,469
West Surrey	2,800	7,391	27,758	9,594	2,225	18,482	38	68,287
London	124	20,212	5,934	360,277	17,262	27,770	16,838	448,417
Kent / Sussex	1,946	8,092	1,900	11,902	238,722	9,878	135	272,576
Home Counties	977	1,494	15,665	22,973	10,206	404,430	51,852	507,597
Rest of Britain	6	84	521	14,126	1,147	52,553	650,281	718,718
{All}	**7,679**	61,996	63,633	435,976	280,588	520,425	719,175	**2,089,470**

Table 4.3: 2026 Do-Minimum Aggregated Matrix Totals (7 Sectors)

Note:
Waverley Intra Borough AM Trips = 1,129
External to Borough Trips = 7,679 – 1,129 = 6,550
Borough to External Trips = 12,406 – 1,129 = 11,277
Total (All) = 2,089,470

	Waverley	East Surrey	West Surrey	London	Kent / Sussex	Home Counties	Rest of Britain	{All}
Waverley	**1,223**	413	4,386	36	2,177	4,891	22	**13,148**
East Surrey	719	24,340	7,709	17,054	8,966	2,690	11	61,489
West Surrey	2,885	7,386	27,766	9,587	2,225	18,484	38	68,370
London	129	20,226	5,938	359,472	17,286	27,797	16,837	447,685
Kent / Sussex	2,001	8,089	1,902	11,879	238,740	9,883	136	272,630
Home Counties	1,003	1,492	15,667	22,967	10,202	404,433	51,862	507,626
Rest of Britain	6	83	521	14,126	1,141	52,547	650,294	718,718
{All}	**7,966**	62,029	63,889	435,121	280,737	520,724	719,199	**2,089,666**

Table 4.4: 2026 Scenario A Aggregated Matrix Totals (7 Sectors)

Note:
Waverley Intra Borough AM Trips = 1,223
External to Borough Trips = 7,966 – 1,223 = 6,743
Borough to External Trips = 13,148 – 1,223 = 11,925
Total (All) = 2,089,666

	Waverley	East Surrey	West Surrey	London	Kent / Sussex	Home Counties	Rest of Britain	{All}
Waverley	**1,684**	444	4,682	41	2,324	5,267	23	**14,466**
East Surrey	934	24,338	7,720	17,047	8,963	2,685	11	61,697
West Surrey	3,730	7,381	27,810	9,583	2,229	18,477	38	69,248
London	176	20,230	5,943	359,463	17,287	27,793	16,836	447,728
Kent / Sussex	2,542	8,089	1,931	11,879	238,733	9,886	136	273,196
Home Counties	1,281	1,493	15,695	22,965	10,206	404,435	51,859	507,935
Rest of Britain	11	83	524	14,127	1,141	52,548	650,289	718,723
{All}	**10,358**	62,059	64,304	435,104	280,884	521,092	719,192	**2,092,992**

Table 4.5: 2026 Scenario B Aggregated Matrix Totals (7 Sectors)

Note:
Waverley Intra Borough AM Trips = 1,684
External to Borough Trips = 10,358 – 1,684 = 8,674
Borough to External Trips = 14,466 – 1,684 = 12,782
Total (All) = 2,092,992

4.3 Trunk Road Select Link Matrices

4.3.1 The impact of the new housing and commercial developments on the trunk road network was investigated by undertaking "select link" analyses of the trunk road network links of interest. The analysis uses the SINTRAM model to reveal origins and destinations of all traffic using a particular link or selection of links. These results have been tabulated below in terms of summary tables (matrices) showing those movements from and to WBC to neighbouring geographical regions.

4.3.2 The analysis was conducted on two roads within the Borough of Waverley: the A3 and the A31. Even though the A31 is not a trunk road it is a key road within Waverley, and bordering Waverley, that carries a large volume of traffic (see *Figures 5.1* to *5.4*). A select link analysis was performed twice for each road, once at each boundary of the borough. Therefore the select link analyses of the A3 were performed north of the Milford Junction (northern borough boundary) and south of the Hindhead Junction (southern borough boundary). The locations of the select link analyses of the A31 were west of the Coxbridge Roundabout (western borough boundary) and east of the A331 Blackwater Valley Junction (eastern borough boundary).

4.3.3 *Tables 4.6* to *4.21* show the aggregated Car, LGV and HGV matrices for traffic using the local trunk network for all future scenarios as well as the base year. The matrices have been further aggregated into Waverley sectors and neighbouring geographical regions. All results are for the morning AM peak hour.

4.3.4 The A3 at the northern borough boundary and the A31 at the eastern borough boundary are the links that have the largest amount of trips, originating from and destined to the Borough of Waverley in the AM peak hour (see *Tables 4.6* to *4.9*).

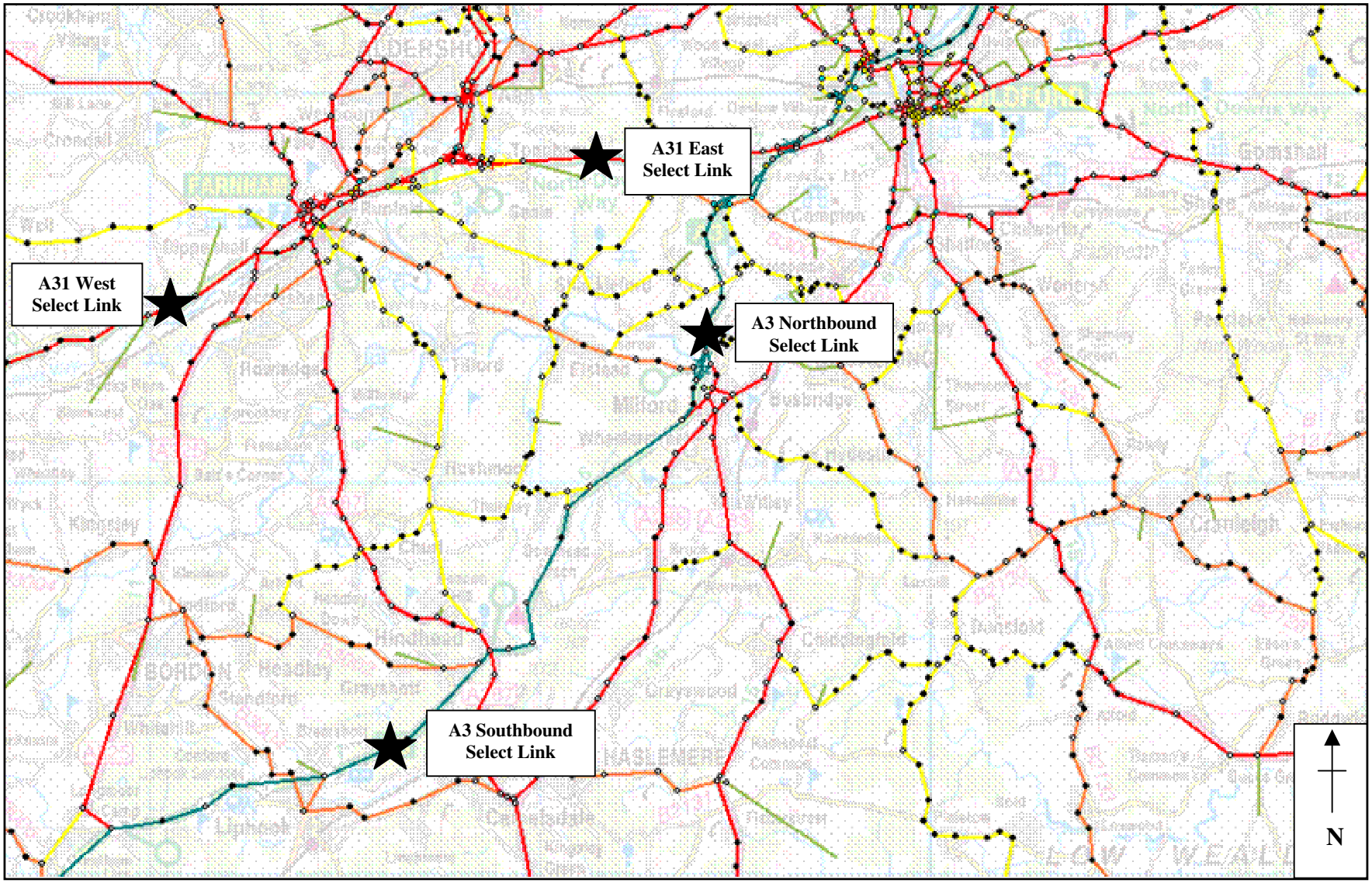


Figure 4.2: Locations of Trunk Road Select Link Analyses

A3 - Northern Borough Boundary Select Link Analysis

	Waverley	East Surrey	West Surrey	London	Kent / Sussex	Home Counties	Rest of Britain	{All}
Waverley	**279**	82	356	8	189	253	0	**1,166**
East Surrey	30	0	0	0	0	0	0	30
West Surrey	124	0	0	0	0	0	0	124
London	3	0	0	0	0	0	0	3
Kent / Sussex	209	0	0	0	0	0	0	209
Home Counties	100	0	0	0	0	0	0	100
Rest of Britain	0	0	0	0	0	0	0	0
{All}	**745**	82	356	8	189	253	0	**1,633**

Table 4.6: 2005 Base, select link analysis of A3 (northern borough boundary)

Waverley Intra Borough AM Trips = 279
External to Borough Trips = 745 – 279 = 466
Borough to External Trips = 1,166– 279 = 887
Total (All) = 1,633

	Waverley	East Surrey	West Surrey	London	Kent / Sussex	Home Counties	Rest of Britain	{All}
Waverley	**230**	85	375	6	189	249	0	**1,134**
East Surrey	37	0	0	0	0	0	0	37
West Surrey	160	0	0	0	0	0	0	160
London	5	0	0	0	0	0	0	5
Kent / Sussex	216	0	0	0	0	0	0	216
Home Counties	99	0	0	0	0	0	0	99
Rest of Britain	1	0	0	0	0	0	0	1
{All}	**747**	85	375	6	189	249	0	**1,651**

Table 4.7: 2026 Do-Minimum, select link analysis of A3 (northern borough boundary)

Waverley Intra Borough AM Trips = 230
External to Borough Trips = 747 – 230 = 517
Borough to External Trips = 1,134– 230 = 904
Total (All) = 1,651

	Waverley	East Surrey	West Surrey	London	Kent / Sussex	Home Counties	Rest of Britain	{All}
Waverley	**250**	89	418	6	198	278	0	**1,240**
East Surrey	41	0	0	0	0	0	0	41
West Surrey	188	0	0	0	0	0	0	188
London	5	0	0	0	0	0	0	5
Kent / Sussex	227	0	0	0	0	0	0	227
Home Counties	103	0	0	0	0	0	0	103
Rest of Britain	1	0	0	0	0	0	0	1
{All}	**815**	89	418	6	198	278	0	**1,805**

Table 4.8: 2026 Scenario A, select link analysis of A3 (northern borough boundary)

Waverley Intra Borough AM Trips = 250
External to Borough Trips = 815 – 250 = 565
Borough to External Trips = 1,240 – 250 = 990
Total (All) = 1,805

	Waverley	East Surrey	West Surrey	London	Kent / Sussex	Home Counties	Rest of Britain	{All}
Waverley	**332**	96	446	7	217	308	1	**1,406**
East Surrey	67	0	0	0	0	0	0	67
West Surrey	321	0	0	0	0	0	0	321
London	11	0	0	0	0	0	0	11
Kent / Sussex	304	0	0	0	0	0	0	304
Home Counties	150	0	0	0	0	0	0	150
Rest of Britain	1	0	0	0	0	0	0	1
{All}	**1,188**	96	446	7	217	308	1	**2,262**

Table 4.9: 2026 Scenario B, select link analysis of A3 (northern borough boundary)

Waverley Intra Borough AM Trips = 332
External to Borough Trips = 1,188 – 332 = 856
Borough to External Trips = 1,406– 332 = 1,074
Total (All) = 2,262

4.3.5 *Tables 4.6* to *4.9* display the select link analyses of the A3 at the northern borough boundary. The matrices show the amount of trips originating from and destined to Waverley using this link for all forecast scenarios. There is a general progression (increases) in the number of trips associated with Waverley using the A3 at this location between the 2005 Base and 2026 Scenario B forecast.

4.3.6 The 2005 Base matrix shows that 1,633 trips to and from Waverley use the northern part of the A3 for some part of their journey in the AM peak hour. In Scenario A and B this rises to 1,805 and 2,262 respectively (*Tables 4.8* to *4.9*).

A3 - Southern Borough Boundary Select Link Analysis

	Waverley	East Surrey	West Surrey	London	Kent / Sussex	Home Counties	Rest of Britain	{All}
Waverley	**0**	0	0	0	36	295	2	**333**
East Surrey	0	0	0	0	0	0	0	0
West Surrey	0	0	0	0	0	0	0	0
London	0	0	0	0	0	0	0	0
Kent / Sussex	20	0	0	0	0	0	0	20
Home Counties	166	0	0	0	0	0	0	166
Rest of Britain	0	0	0	0	0	0	0	0
{All}	**186**	0	0	0	36	295	2	**518**

Table 4.10: 2005 Base, select link analysis of A3 (southern borough boundary)

Waverley Intra Borough AM Trips = 0
External to Borough Trips = 186 – 0 = 186
Borough to External Trips = 333 – 0 = 333
Total (All) = 518

	Waverley	East Surrey	West Surrey	London	Kent / Sussex	Home Counties	Rest of Britain	{All}
Waverley	**0**	0	0	0	30	473	4	**506**
East Surrey	0	0	0	0	0	0	0	0
West Surrey	0	0	0	0	0	0	0	0
London	0	0	0	0	0	0	0	0
Kent / Sussex	5	0	0	0	0	0	0	5
Home Counties	182	0	0	0	0	0	0	182
Rest of Britain	0	0	0	0	0	0	0	0
{All}	**187**	0	0	0	30	473	4	**694**

Table 4.11: 2026 Do-Minimum, select link analysis of A3 (southern borough boundary)

Waverley Intra Borough AM Trips = 0
External to Borough Trips = 187 – 0 = 187
Borough to External Trips = 506– 0 = 506
Total (All) = 694

	Waverley	East Surrey	West Surrey	London	Kent / Sussex	Home Counties	Rest of Britain	{All}
Waverley	**0**	0	0	0	32	523	4	**559**
East Surrey	0	0	0	0	0	0	0	0
West Surrey	0	0	0	0	0	0	0	0
London	0	0	0	0	0	0	0	0
Kent / Sussex	5	0	0	0	0	0	0	5
Home Counties	184	0	0	0	0	0	0	184
Rest of Britain	0	0	0	0	0	0	0	0
{All}	**188**	0	0	0	32	523	4	**747**

Table 4.12: 2026 Scenario A, select link analysis of A3 (southern borough boundary)

Waverley Intra Borough AM Trips = 0
External to Borough Trips = 188 – 0 = 188
Borough to External Trips = 559 – 0 = 559
Total (All) = 747

	Waverley	East Surrey	West Surrey	London	Kent / Sussex	Home Counties	Rest of Britain	{All}
Waverley	**0**	0	0	0	34	574	5	**613**
East Surrey	0	0	0	0	0	0	0	0
West Surrey	0	0	0	0	0	0	0	0
London	0	0	0	0	0	0	0	0
Kent / Sussex	16	0	0	0	0	0	0	16
Home Counties	235	0	0	0	0	0	0	235
Rest of Britain	0	0	0	0	0	0	0	0
{All}	**251**	0	0	0	34	574	5	**864**

Table 4.13: 2026 Scenario B, select link analysis of A3 (southern borough boundary)

Waverley Intra Borough AM Trips = 0
External to Borough Trips = 251 – 0 = 251
Borough to External Trips = 613 – 0 = 613
Total (All) = 864

4.3.7 *Tables 4.10* to *4.13* display the select link analyses of the A3 at the southern borough boundary. The matrices show the amount of trips originating from and destined to Waverley using the A3 south of Hindhead. There is a general progression (increases) in the amount of trips associated with Waverley using this part of the A3 between the 2005 Base (518 trips) and 2026 Scenario B (864 trips).

4.3.8 There are no in intra borough trips in any of the forecast matrices. This is as expected as its highly unlikely for the this link to be used with the aim of leaving and re-entering the borough due to its location at the south borough boundary.

A31 - Eastern Borough Boundary Select Link Analysis

Table 4.14: 2005 Base, select link analysis of A31 (eastern borough boundary)

Waverley Intra Borough AM Trips = 45
External to Borough Trips = 776 – 45 = 731
Borough to External Trips = 829 – 45 = 784

	Waverley	East Surrey	West Surrey	London	Kent / Sussex	Home Counties	Rest of Britain	{All}
Waverley	**45**	32	609	0	35	107	0	**829**
East Surrey	342	0	0	0	0	0	0	342
West Surrey	311	0	0	0	0	0	0	311
London	14	0	0	0	0	0	0	14
Kent / Sussex	43	0	0	0	0	0	0	43
Home Counties	21	0	0	0	0	0	0	21
Rest of Britain	0	0	0	0	0	0	0	0
{All}	**776**	32	609	0	35	107	0	**1,560**

Total (All) = 1,560

	Waverley	East Surrey	West Surrey	London	Kent / Sussex	Home Counties	Rest of Britain	{All}
Waverley	**56**	37	671	6	28	160	0	**958**
East Surrey	314	0	0	0	0	0	0	314
West Surrey	358	0	0	0	0	0	0	358
London	23	0	0	0	0	0	0	23
Kent / Sussex	51	0	0	0	0	0	0	51
Home Counties	32	0	0	0	0	0	0	32
Rest of Britain	1	0	0	0	0	0	0	1
{All}	**837**	37	671	6	28	160	0	**1,738**

Table 4.15: 2026 Do-Minimum, select link analysis of A31 (eastern borough boundary)

Waverley Intra Borough AM Trips = 56
External to Borough Trips = 837 – 56 = 781
Borough to External Trips = 958– 56 = 902
Total (All) = 1,738

	Waverley	East Surrey	West Surrey	London	Kent / Sussex	Home Counties	Rest of Britain	{All}
Waverley	**63**	41	719	6	31	175	0	**1,035**
East Surrey	325	0	0	0	0	0	0	325
West Surrey	374	0	0	0	0	0	0	374
London	23	0	0	0	0	0	0	23
Kent / Sussex	54	0	0	0	0	0	0	54
Home Counties	33	0	0	0	0	0	0	33
Rest of Britain	2	0	0	0	0	0	0	2
{All}	**873**	41	719	6	31	175	0	**1,845**

Table 4.16: 2026 Scenario A, select link analysis of A31 (eastern borough boundary)

Waverley Intra Borough AM Trips = 63
External to Borough Trips = 873 – 63 = 810
Borough to External Trips = 1,035 – 63 = 972
Total (All) = 1,845

	Waverley	East Surrey	West Surrey	London	Kent / Sussex	Home Counties	Rest of Britain	{All}
Waverley	**99**	48	796	6	38	209	0	**1,196**
East Surrey	362	0	0	0	0	0	0	362
West Surrey	547	0	0	0	0	0	0	547
London	30	0	0	0	0	0	0	30
Kent / Sussex	73	0	0	0	0	0	0	73
Home Counties	57	0	0	0	0	0	0	57
Rest of Britain	2	0	0	0	0	0	0	2
{All}	**1,171**	48	796	6	38	209	0	**2,267**

Table 4.17: 2026 Scenario B, select link analysis of A31 (eastern borough boundary)

Waverley Intra Borough AM Trips = 99
External to Borough Trips = 1,171 – 99 = 1,072
Borough to External Trips = 1,196 – 99 = 1,097
Total (All) = 2,267

4.3.9 *Tables 4.14* to *4.17* display the select link analyses of the A31 at the eastern borough boundary. A large amount of flow is carried on this link, similar to the A3 at the northern borough boundary. All forecast matrices from the 2005 Base to 2026 Scenario B experience increases in the number of trips using this specific link.

4.3.10 The 2026 Do-Minimum matrix shows that 1,738 trips to and from Waverley use this part of the A31 for some of their journey in the AM peak hour. In 2026

Scenarios A and B this rises to 1,845 and 2,267 respectively. Therefore the difference between 2026 Scenario A and B is 422 trips.

A31 - Western Borough Boundary Select Link Analysis

	Waverley	East Surrey	West Surrey	London	Kent / Sussex	Home Counties	Rest of Britain	{All}
Waverley	**5**	0	9	0	32	703	9	**758**
East Surrey	0	0	0	0	0	0	0	0
West Surrey	3	0	0	0	0	0	0	3
London	0	0	0	0	0	0	0	0
Kent / Sussex	0	0	0	0	0	0	0	0
Home Counties	131	0	0	0	0	0	0	131
Rest of Britain	0	0	0	0	0	0	0	0
{All}	**140**	0	9	0	32	703	9	**893**

Table 4.18: 2005 Base, select link analysis of A31 (western borough boundary)

Waverley Intra Borough AM Trips = 5
External to Borough Trips = 140 – 5 = 135
Borough to External Trips = 758 – 5 = 753
Total (All) = 893

	Waverley	East Surrey	West Surrey	London	Kent / Sussex	Home Counties	Rest of Britain	{All}
Waverley	**5**	0	10	0	17	715	8	**753**
East Surrey	0	0	0	0	0	0	0	0
West Surrey	3	0	0	0	0	0	0	3
London	0	0	0	0	0	0	0	0
Kent / Sussex	2	0	0	0	0	0	0	2
Home Counties	134	0	0	0	0	0	0	134
Rest of Britain	0	0	0	0	0	0	0	0
{All}	**144**	0	10	0	17	715	8	**892**

Table 4.19: 2026 Do-Minimum, select link analysis of A31 (western borough boundary)

Waverley Intra Borough AM Trips = 5
External to Borough Trips = 144 – 5 = 139
Borough to External Trips = 753– 5 = 748
Total (All) = 892

	Waverley	East Surrey	West Surrey	London	Kent / Sussex	Home Counties	Rest of Britain	{All}
Waverley	**5**	0	10	0	17	749	8	**789**
East Surrey	0	0	0	0	0	0	0	0
West Surrey	3	0	0	0	0	0	0	3
London	0	0	0	0	0	0	0	0
Kent / Sussex	2	0	0	0	0	0	0	2
Home Counties	140	0	0	0	0	0	0	140
Rest of Britain	0	0	0	0	0	0	0	0
{All}	**151**	0	10	0	17	749	8	**935**

Table 4.20: 2026 Scenario A, select link analysis of A31 (western borough boundary)

Waverley Intra Borough AM Trips = 5
External to Borough Trips = 151 – 5 = 146
Borough to External Trips = 789 – 5 = 784
Total (All) = 935

	Waverley	East Surrey	West Surrey	London	Kent / Sussex	Home Counties	Rest of Britain	{All}
Waverley	**6**	0	11	0	21	815	9	**862**
East Surrey	1	0	0	0	0	0	0	1
West Surrey	4	0	0	0	0	0	0	4
London	0	0	0	0	0	0	0	0
Kent / Sussex	11	0	0	0	0	0	0	11
Home Counties	180	0	0	0	0	0	0	180
Rest of Britain	0	0	0	0	0	0	0	0
{All}	**202**	0	11	0	21	815	9	**1,059**

Table 4.21: 2026 Scenario B, select link analysis of A31 (western borough boundary)

Waverley Intra Borough AM Trips = 6
External to Borough Trips = 202 – 5 = 197
Borough to External Trips = 862 – 6 = 857
Total (All) = 1,059

4.3.11 *Tables 4.18* to *4.21* show that the A31 at the western borough boundary accommodates a smaller amount of trips in all scenarios when compared to the select link analysis of the A31 at the eastern borough boundary. 2026 Scenario B is the forecast scenario that contains the largest amount of trips using this link for part of their journey in the AM peak hour, 1,059 trips.

5 MODELLING RESULTS AD ANALYSES

5.1 Summary Statistics

5.1.1 *Table 5.1* presents matrix based trip statistics for the Borough of Waverley.

AM Vehicle Trips	2005 Base	2026 Do-Minimum	2026 Scenario A	2026 Scenario B
Waverley Intra Borough Trips	1,232	1,129	1,223	1,684
External to Borough Trips	6,515	6,550	6,743	8,674
Borough to External Trips	11,174	11,277	11,925	12,782

Table 5.1: Summary Trip Matrix AM Peak

5.1.2 *Tables 5.2* and *5.3* present the network based summary statistics for the Borough of Waverley. It compares the key outputs from the modelling of the base situation 2005, the 2026 Do-Minimum, and the forecast Scenarios A and B. These network based results report trunk road and non-trunk road statistics separately. The tables include both link and (for non-trunk road) junction based statistics.

Key Statistics	2005	2026		
		Do-Minimum	Scenario A (Do-Min as reference case)	Scenario B (Scenario A as reference case)
Total Vehicle Kilometrage (Veh Kms)	301,429	319,685	329,831	366,232
Total Link Travel Time (Veh Hrs)	6,045	6,493	6,731	7,611
Total Junction Delay (Veh Hrs)	903	779	860	1,020
Total Network Travel Time (Veh Hrs)	6,948	7,272	7,591	8,631
Average Speed (Km/hr)	56.4	55.8	55.5	54.4
Difference Between Scenario and 2026 Do-Minimum				
Total Vehicle Kilometrage (Veh Kms)			10,146	46,547
Total Link Travel Time (Veh Hrs)			238	1,118
Total Junction Delay (Veh Hrs)			81	241
Total Network Travel Time (Veh Hrs)			319	1,360
Average Speed (Km/hr)			-0.3	-1.4
Percentage Difference Between Scenario and 2026 Do-Minimum				
Total Vehicle Kilometrage (Veh Kms)			3.2%	14.6%
Total Link Travel Time (Veh Hrs)			3.7%	17.2%
Total Junction Delay (Veh Hrs)			10.4%	31.0%
Total Network Travel Time (Veh Hrs)			4.4%	18.7%
Average Speed (Km/hr)			-0.6%	-2.6%
Difference Between Scenarios A and B				
Total Vehicle Kilometrage (Veh Kms)				36,401
Total Link Travel Time (Veh Hrs)				880
Total Junction Delay (Veh Hrs)				160
Total Network Travel Time (Veh Hrs)				1,040
Average Speed (Km/hr)				-1.1
Percentage Difference Between Scenarios A and B				
Total Vehicle Kilometrage (Veh Kms)				11.0%
Total Link Travel Time (Veh Hrs)				13.1%
Total Junction Delay (Veh Hrs)				18.7%
Total Network Travel Time (Veh Hrs)				13.7%
Average Speed (Km/hr)				-2.0%

Table 5.2: Non Trunk Road Summary Statistics

5.1.3 *Table 5.3* presents the trunk road based summary statistics for the Borough of Waverley for 2026. It compares key outputs from the base (2005), the 2026 Do-Minimum and the 2026 forecast Scenarios A and B. The table includes trunk road slip roads and refers only to the A3, as this is the only trunk road in the Borough. It is important to note that the 2026 statistics include the Highways Agency Hindhead Improvement Scheme.

Key Statistics	2005	2026		
		Do-Minimum	Scenario A (Do-Min as reference case)	Scenario B (Scenario A as reference case)
Total Vehicle Kilometrage (Veh Kms)	23,189	33,678	34,999	38,147
Total Link Travel Time (Veh Hrs)	268	367	382	419
Average Speed (Km/hr)	83.4	87.3	87.0	86.4
Difference Between Scenario and 2026 Do-Minimum				
Total Vehicle Kilometrage (Veh Kms)			1,321	4,469
Total Link Travel Time (Veh Hrs)			15	52
Average Speed (Km/hr)			-0.3	-0.9
Percentage Difference Between Scenario and 2026 Do-Minimum				
Total Vehicle Kilometrage (Veh Kms)			3.9%	13.3%
Total Link Travel Time (Veh Hrs)			4.2%	14.1%
Average Speed (Km/hr)			-0.3%	-1.0%
Difference Between Scenarios A and B				
Total Vehicle Kilometrage (Veh Kms)				3,148
Total Link Travel Time (Veh Hrs)				36
Average Speed (Km/hr)				-0.6
Percentage Difference Between Scenarios A and B				
Total Vehicle Kilometrage (Veh Kms)				9.0%
Total Link Travel Time (Veh Hrs)				9.5%
Average Speed (Km/hr)				-0.7%

Table 5.3: Trunk Road Summary Statistics

5.1.4 It must be noted that any increase in delay in the future is not just due to growth within Waverley but also attributed to traffic growth across Great Britain. This is shown from the comparison between the Do-Minimum and the 2005 base results.

5.1.5 The A3 between the Milford Junction and the Hindhead Junction passes through the middle of Waverley. All 2026 statistics for the non trunk road and trunk road statistics are based on a network that includes the Highways Agency Hindhead Improvement Scheme. Therefore, when comparing results between the 2005 base and 2026 scenarios this is an important effect to take into account.

5.1.6 The model suggests the following for the forecast year of 2026:

5.1.7 An increase in non trunk road vehicle kilometres travelled in Waverley of approximately 10,100vkm in 2026 Scenario A compared to the Do-Minimum and 36,400vkm in 2026 Scenario B compared with Scenario A. This results in an approximate 10.4% (Scenario A compared to the Do-Minimum) and 18.7% (Scenario B compared to Scenario A) increase in total junction delay and a decrease in average speed of 0.6% and 2% respectively.

5.1.8 At a borough level, the summary statistics show that there is a relative amount of difference between Scenarios A and B in the 2026 forecasts. Scenario B presents higher impacts.

5.1.9 *Table 5.2* shows a decrease in junction delay between the 2005 Base and 2026 Do-Minimum. Junction Delay for the whole of Waverley in 2005 is 903 Veh Hrs and

779 Veh Hrs in 2026 Do-Minimum; a reduction of 124 Veh Hrs. The majority of this reduction in junction delay can be attributed to the Hindhead Improvement Scheme and one junction in particular, the Hindhead Crossroads. In the 2005 network this junction is modelled as signals but in the 2026 network it becomes a roundabout. For more detail refer to *Table 5.9*.

5.1.10 Considering traffic flow along the trunk road network, the model shows that total vehicle kilometres travelled is predicted to increase by approximately 1,300vkm in 2026 Scenario A compared to the Do-Minimum. Whereas Scenario B shows an approximate estimated increase of 3,100vkm compared to Scenario A.

5.1.11 Comparing the trunk road network between Scenarios A and B in 2026, Scenario B has greater flow and travel time than Scenario A. However, this difference is of a minimal amount. For example, the difference between total vehicle kilometrage is 9% and a decrease in average speed of 0.7%.

5.1.12 *Table 5.3* shows that the average speed for trunk links in 2005 is much lower than all 2026 future scenarios. This can be explained by the Hindhead Improvement Scheme being present in the 2026 network but not in the 2005 network. By converting a section of the A3 from single to dual carriageway and removing the bottleneck caused by the Hindhead signals, an increase in free-flowing conditions is apparent. Thus allowing an increase in average speed for trunk roads as a whole in the borough.

5.2 Largest Increases in Additional Trips

5.2.1 Using the source data as shown previously in *Tables 3.3* and *3.4* the zones which experience the highest increases in additional departure (origin) trips, for all vehicle types are shown in *Table 5.4* and *5.5*.

Zone No.	Zone Name	Additional Trips	Percentage of Additional Trips
331	Wrecclesham	67.2	9.3%
328	Haslemere	64.7	9.0%
329	Hindhead	62.1	8.6%
327	Haslemere - Shottermill	41.6	5.8%
333	Cranleigh East	39.3	5.5%

Table 5.4: Zones with the greatest increase in additional departure (origin) trips, 2026 Scenario A

Zone No.	Zone Name	Additional Trips	Percentage of Additional Trips
127	Farnham Town Centre	123.4	12.8%
327	Haslemere - Shottermill	50.1	5.2%
300	Farnham - Weydon Ln & Shortheath	49.2	5.1%
336	Farnham - Weybourne West	47.8	5.0%
340	Farncombe	45.6	4.7%

Table 5.5 Zones with the greatest increase in additional departure (origin) trips, 2026 Scenario B

5.2.2 Within Waverley, the largest amount of additional departure trips generated by the proposed developments are within zones that cover part of the boroughs four main urban settlements: Farnham, Godalming, Cranleigh and Haslemere.

5.2.3 In Scenario A it can be seen that the largest increase in trips is covered in three of these four urban areas: Farnham (Wrecclesham), Haslemere/Hindhead and Cranleigh. This is also the case for Scenario B, but the three out of the four areas differ to be, Farnham, Haslemere and Godalming (Farncombe).

5.2.4 Scenario B generates the largest amount and proportion of additional departure trips in these areas of the borough when compared to Scenario A. The area with the largest amount of additional development in terms of departures (origins) trips is Farnham.

5.2.5 Using the source data as shown previously in *Tables 3.4* and *3.5* the zones that experience the largest amount of additional arrival (destination) trips, for all vehicle types, is shown below in *Tables 5.6* and *5.7*

Zone No.	Zone Name	Additional Trips	Percentage of Additional Trips
328	Haslemere	28.3	13.0%
331	Wrecclesham	16.7	7.7%
329	Hindhead	16.6	7.6%
333	Cranleigh East	14.2	6.5%
327	Haslemere - Shottermill	10.9	5.0%

Table 5.6: Zones with the greatest increase in additional arrival (destination) trips, 2026 Scenario A

Zone No.	Zone Name	Additional Trips	Percentage of Additional Trips
327	Haslemere - Shottermill	162.8	6.9%
339	Godalming - Charterhouse	161.9	6.9%
340	Farncombe	154.3	6.5%
337	Godalming - Busbridge	151.6	6.4%
333	Cranleigh East	127.5	5.4%

Table 5.7: Zones with the greatest increase in additional arrival (destination) trips, 2026 Scenario B

5.2.6 The additional arrival trips follow a similar pattern to the additional departure trips. The largest amounts of additional arrival trips generated by the proposed developments are within zones that cover part of the four main urban settlements in the borough.

5.2.7 In Scenario A it can be seen that the largest increase in arrival trips is in three of the four main urban settlements: Farnham (Wrecclesham), Haslemere and Cranleigh. This is also the case for Scenario B, although the three out of four areas differ to be Godalming, Cranleigh and Haslemere.

5.2.8 Comparison of *Tables 5.4* to *5.7* clearly shows that Scenario B has a greater amount of additional trips (both departures and arrivals) generated by the proposed developments than Scenario A. The area that contains the largest amount of additional arrival (destination) trips is Haslemere (zones 327 and 328).

5.3 Traffic Impacts

5.3.1 *Table 5.8* lists the roads within Waverley that experience the greatest increase in traffic delay during the AM peak hour in 2026 compared with each scenarios reference case. The links that experience the greatest amount of changes in flow are within the town of Farnham. These areas correlate with information shown in *Tables 5.4* to *5.7*, as receiving largest proportions of additional trips from the proposed developments. The general trend displayed is that flow will increase on all stated links between the 2005 Base and 2026 Scenario B.

5.3.2 While the smaller (local) roads have not been modelled, it should be remembered that only inter-zonal trips (trips made between zones) are actually modelled and therefore the detail of the road network has to be balanced against the size of the zone system to obtain a realistic result.

Link No.	Direction	Description	Location	Nominal Capacity	Flow – All Vehicles (Absolute Values)				Absolute Differences*		
					2005	2026 Do-Min	2026 Scenario A	2026 Scenario B	2026 Do-Min - 2005	Scenario A - Do-Min	Scenario B - Scenario A
11783	2 (W)	A31 Hogs Back	Farnham	3,500	1,031	1,311	1,343	1,695	280 (27%)	32 (2%)	352 (26%)
11143	2 (S)	C19 St. Georges Road	Farnham	1,200	1,252	1,826	1,834	2,131	574 (46%)	8 (0%)	297 (16%)
8392	2 (N)	A287 Folly Hill	Farnham	1,200	1,899	2,143	2,194	2,485	244 (13%)	51 (2%)	291 (13%)
8401	2 (N)	A287 Castle Hill	Farnham	800	1,382	1,576	1,615	1,892	194 (14%)	39 (2%)	277 (17%)
10598	2 (N)	Castle Street	Farnham	800	1,382	1,576	1,615	1,892	194 (14%)	39 (2%)	277 (17%)
8398	2 (N)	A287 Folly Hill	Farnham	1,200	1,436	1,637	1,677	1,954	201 (14%)	40 (2%)	277 (17%)
8378	2 (W)	Guildford Road	Farnham	1,200	610	1,029	1,030	1,283	419 (69%)	1 (0%)	253 (25%)
15889	2 (E)	C23 Hurtmore Road	Farncombe	1,200	758	600	665	891	-158 (-21%)	66 (11%)	226 (34%)
8510	2 (W)	C29 Thursley Road	Thursley	1,700	446	375	409	630	-71 (-16%)	33 (9%)	221 (54%)
11772	1 (S)	C121 St. Georges Road	Farnham	1,200	968	1,253	1,258	1,469	284 (29%)	5 (0%)	211 (17%)

Table 5.8: Links that display the largest increase in flow resulting from scenarios when compared with their relevant reference cases.

Nominal capacity is the flow at which queuing is likely to start at.

* The values shown in brackets are the percentage differences

Node No.	Description	Junction Type	Location	Junction Delay Veh Hrs (Absolute Values)				Absolute Difference Veh Hrs*		
				2005	2026 Do-Min	2026 Scenario A	2026 Scenario B	2026 Do-Min - 2005	2026 Scenario A - 2026 Do-Min	2026 Scenario B - 2026 Scenario A
40977	A287 Tilford Rd, A3 London Rd, A287 Hindhead Rd	Signal / Roundabout	Hindhead	204.8	40.2	60.4	102.5	-164.6 (-80%)	20.2 (50%)	42.2 (70%)
45391	A31 Farnham Bypass, Shepherd & Flock	Signal	Farnham	22.7	19.5	25.2	66.4	-3.2 (-14%)	5.6 (29%)	41.2 (164%)
40910	A283 Guildford Rd, A3001 Portsmouth Rd	Signal	Milford	14.4	32.9	51.6	92.4	18.5 (128%)	18.8 (57%)	40.7 (79%)
99024	A287 Firgrove Hill, B3384 Echo Barn Ln, A287 Frensham Rd, Great Austins	Signal	Farnham	19.8	8.2	21.1	47.0	-11.6 (-59%)	12.9 (158%)	25.9 (122%)
99603	A3100 Ockford Rd, A3100 Flambard Way, B2130 Brighton Rd	Signal	Godalming	92.3	108.3	112.6	134.2	16.0 (17%)	4.2 (4%)	21.7 (19%)
40870	A31 Farnham Bypass, A287 South St, B3001 Station Hill (Hickleys Corner)	Signal	Farnham	312.5	311.3	320.3	332.8	-1.2 (0%)	9.0 (3%)	12.5 (4%)
45543	A325 Guildford Rd, Shepherd & Flock	Priority	Farnham	30.0	25.2	25.6	31.1	-4.9 (-16%)	0.4 (2%)	5.5 (22%)
43124	A31 Hogs Back, Guildford Rd	Priority	Farnham	31.0	30.8	32.0	35.2	-0.2 (-1%)	1.2 (4%)	3.2 (10%)
45392	A325 Hale Rd, Shepherd & Flock	Priority	Farnham	27.6	47.0	51.2	54.1	19.4 (70%)	4.2 (9%)	3.0 (6%)
45669	Station Approach Rd, B3001 Station Hill	Priority	Farnham	4.2	3.9	3.5	6.2	-0.3 (-7%)	-0.4 (-10%)	2.7 (76%)

Table 5.9: Junctions that display the largest increase in junction delay between Scenario A and Scenario B.

*The values shown in brackets are the percentage differences.

N.B. Two different junction types are given for Node 40997. This is because this junction was included in the Hindhead Improvement Scheme. In the 2005 network the junction is signalised and in the 2026 network the junction changes to a roundabout.

5.3.3 It should be noted that junction modelling represented in a strategic model produces outputs that are approximate projections, like other outputs. This is due to the level of detail that can be included and represented in a strategic model, and can therefore inhibit some accuracy of the modelled junction's outputs. It is important to note that junction delay increases exponentially, thus referring to how junction delay can increase considerably once passing a certain threshold. For instance flow breakdown and queuing can cause junction delay to increase rapidly for a single junction, and can also have continued effects of junction delay at other nearby junctions.

5.3.4 *Table 5.9* highlights the locations of junctions that are likely to be impacted by additional increases in traffic flow and hence junction delay. Due to the strategic nature of the modelling process, the values of junction delay shown in *Table 5.9* should only be used as guide rather than actual values.

5.3.5 *Table 5.9* displays the largest increases in junction delay between Scenario A and Scenario B. However, values for the base and 2026 Do-Minimum are also shown. The trend displayed for changes in junction delay relates to the trend shown in *Table 5.8* for flow. The majority of links that experience the largest increase in flow are in Farnham and this is also the case for junction delay.

5.3.6 *Table 5.9* indicates that clusters of junctions that are in close proximity all experience the effects of junction delay increases, in a progressive state. The greatest example of this is junctions within the area of Farnham i.e. a number of junctions on the A31 corridor appear in *Table 5.9*. The main corridor is from the A31 Guildford Road junction to the Shepherd & Flock Roundabout and finally Hickleys Corner. This would suggest that the main area of increased flow and junction delay is along the A31 corridor in Waverley, instead of at one isolated junction or link.

5.3.7 *Table 5.9* displays a large reduction (80%) in junction delay between the 2026 Do-Minimum (40.2 Veh Hrs of junction delay) and 2005 Base (204.8 Veh Hrs of junction delay) at the junction of the A3 Portsmouth Road, A287 Tilford Road and A287 Hindhead Road. It should be noted that this junction is involved within the Hindhead Improvement Scheme and the junction is intended to be converted from signals to a roundabout, and has been modelled as such. This impact relates to *Table 5.2* and can be associated as the junction contributing most to a total decrease in junction delay for the borough. An explanation for the large decrease between the 2026 Do-Minimum and the 2005 Base is that the dualling of the A3 and re-distribution effects of the traffic flow, will ease the junction delay significantly at this location coinciding with one of the main aims of the Hindhead Improvement Scheme.

5.3.8 Not only does the Hindhead Improvement Scheme have impacts at the local area of Hindhead, it is also projected to attract more traffic on the section of the A3 in Waverley as the result of reduced travel costs (comparison of *Figures 5.1* and *5.2* display this). This projected increase in flow on the A3 therefore has implications for increased flow on upstream and downstream junctions. An example of this is the junction of the A283 Guildford Road and A3001 Portsmouth Road (node

40910) in Milford which experiences steady increases in junction delay between the 2026 Do-Minimum and Scenario B.

5.3.9 The locations of junctions shown in *Table 5.9* also correlates with the locations and zones that have the largest amount of additional trips, namely Farnham and Godalming, shown in Tables *5.4* to *5.7.*

5.4 Borough Bandwidth Plots

5.4.1 Both the volume of traffic and the level of congestion prevalent in the base year and subsequent forecast years can be visualised using a coloured bandwidth plot on the road network. These are shown for the entire Borough of Waverley in *Figures 5.1* to *5.4*.

5.4.2 The width of the band is proportionate to the flow. The browner the green colour, the closer the link is to a VCR (volume/capacity ratio) of 0.85, when the colour of the link changes to pale orange/brown.

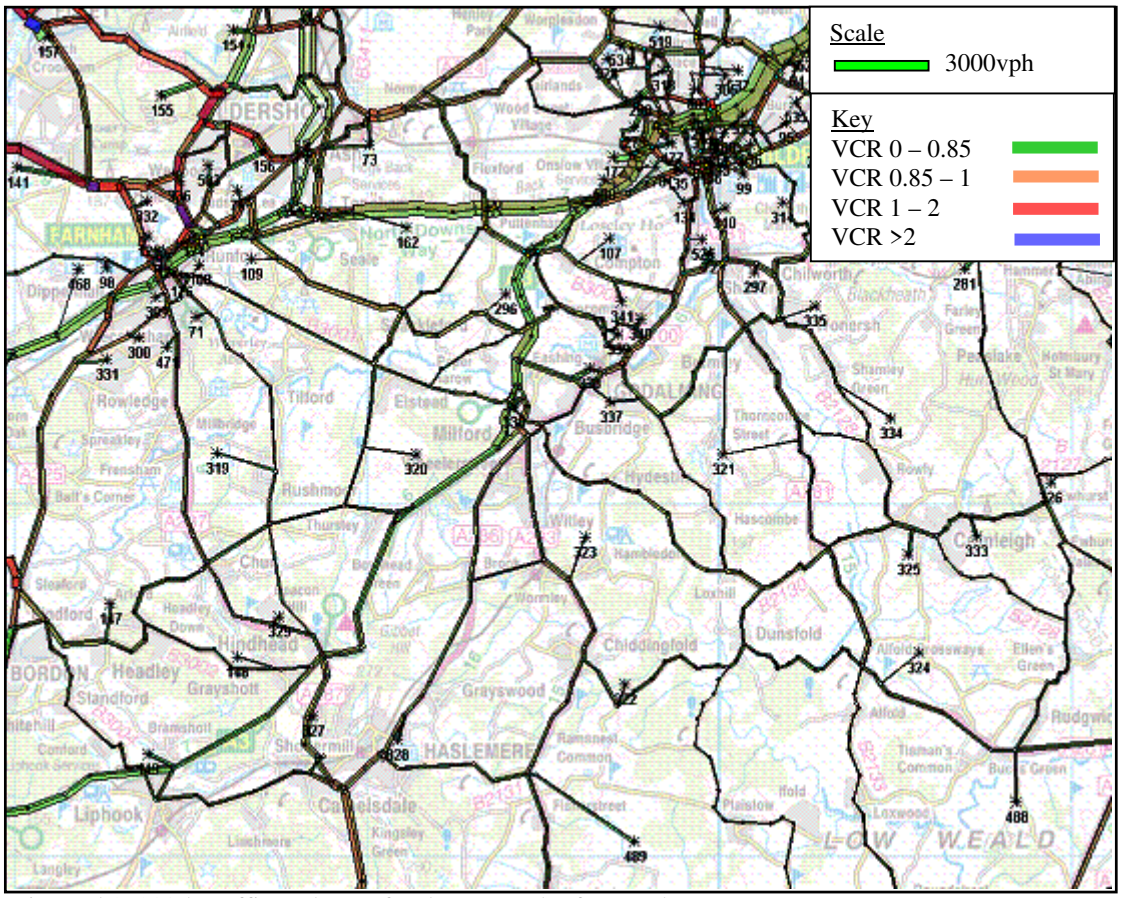


Figure 5.1: 2005 Traffic Volumes for the Borough of Waverley

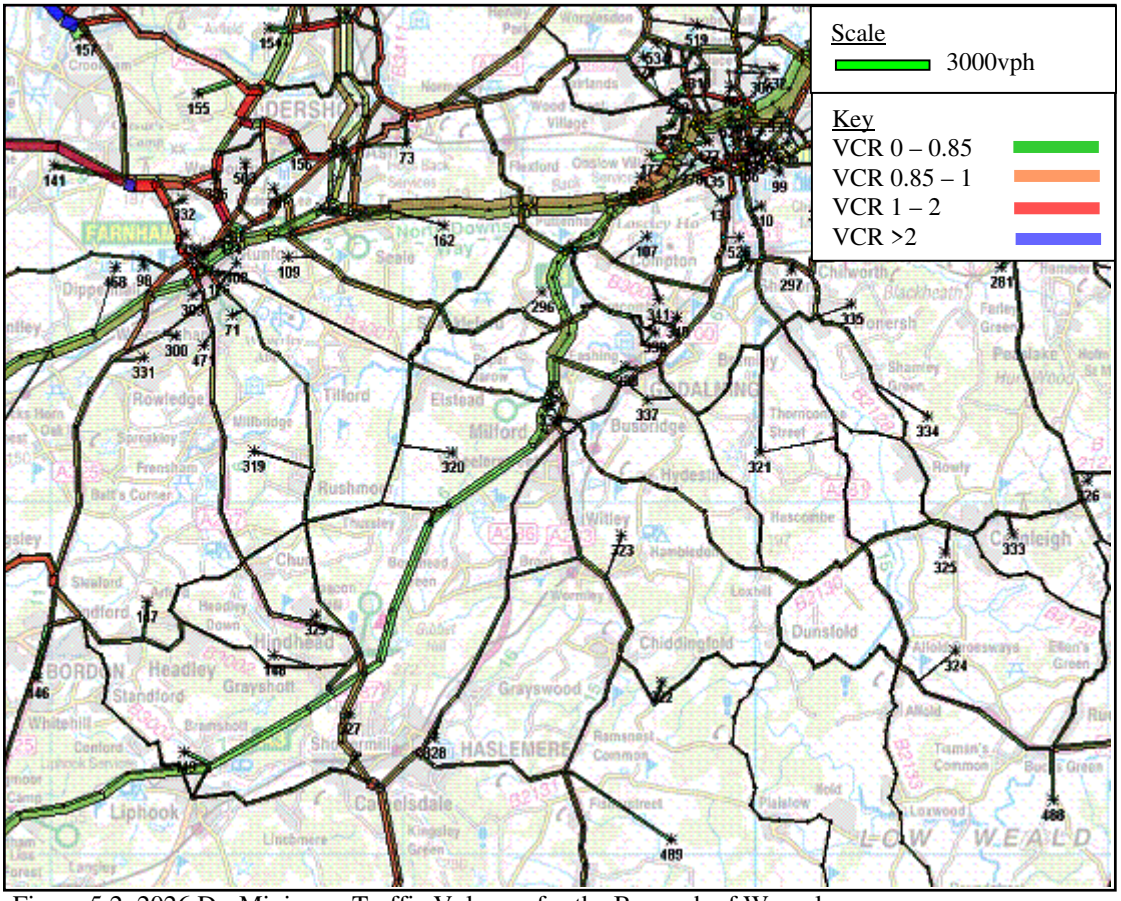


Figure 5.2: 2026 Do-Minimum Traffic Volumes for the Borough of Waverley

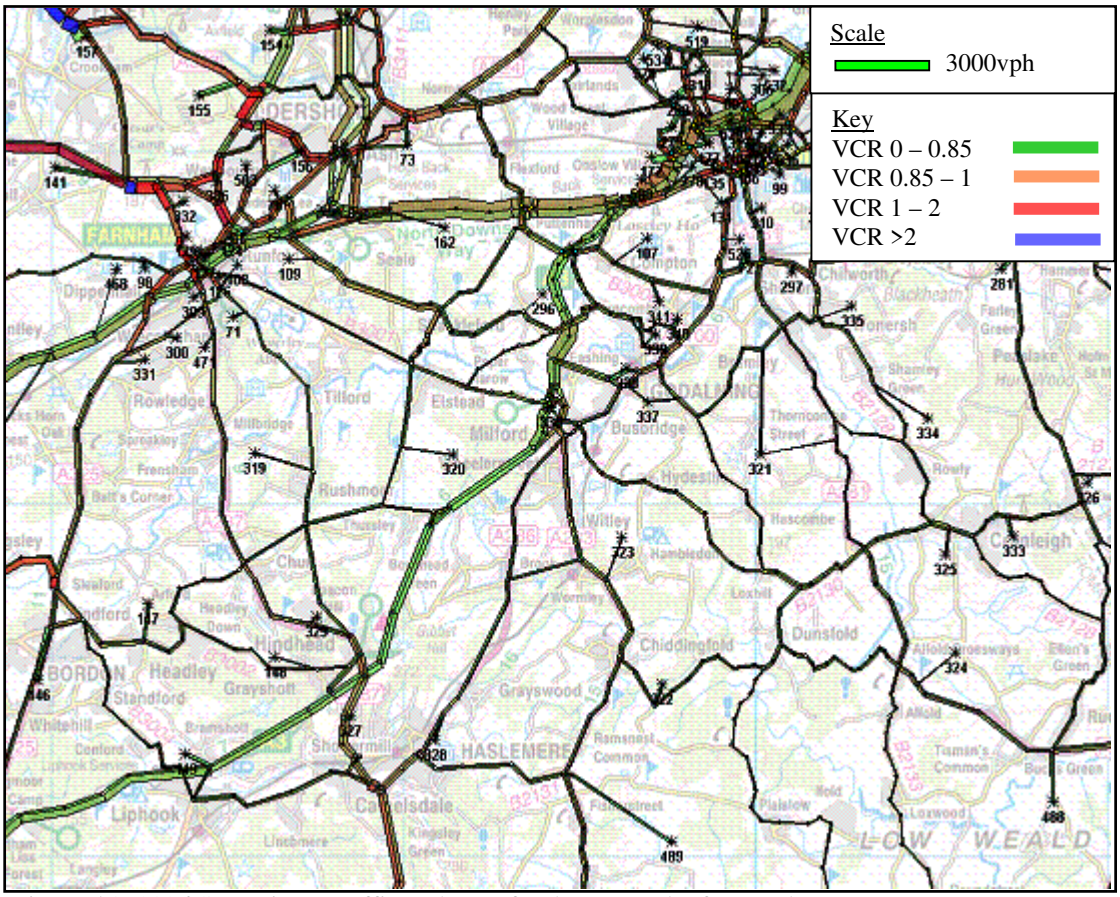


Figure 5.3: 2026 Scenario A Traffic Volumes for the Borough of Waverley

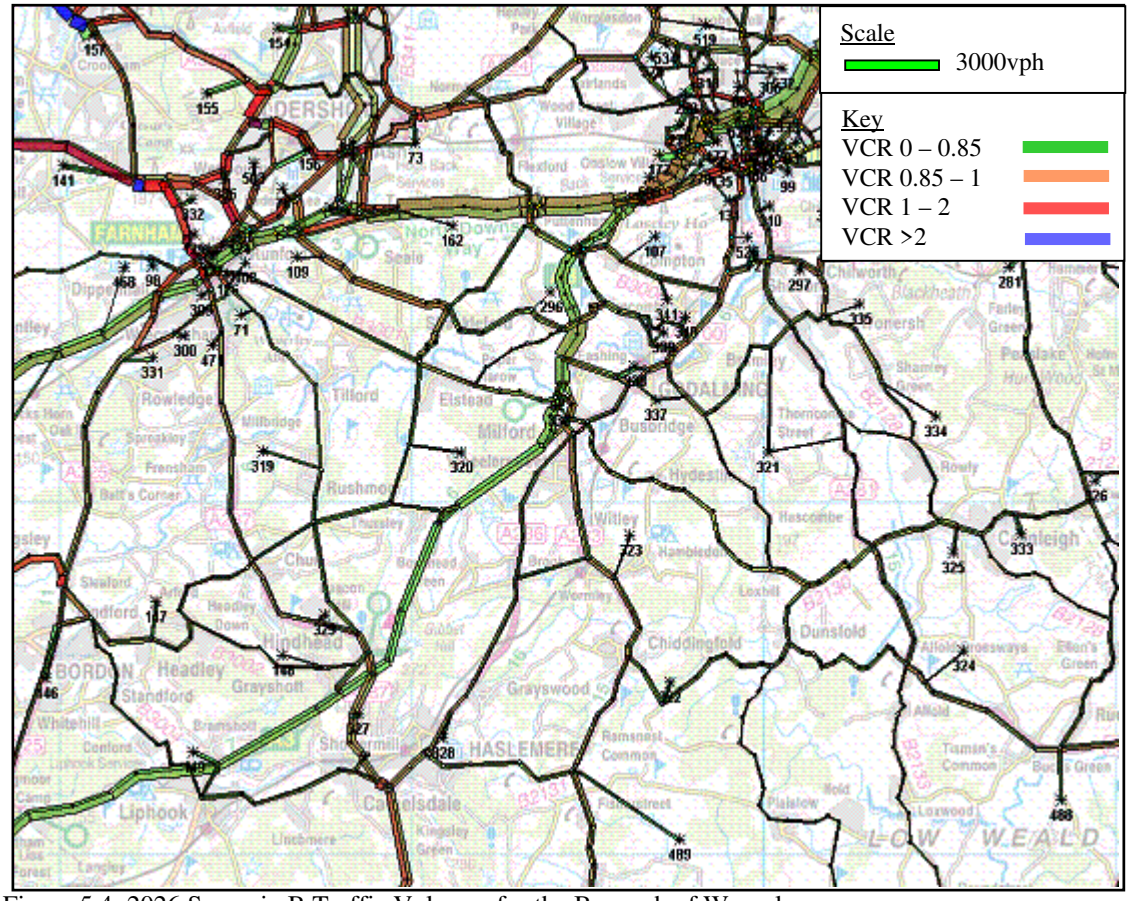


Figure 5.4: 2026 Scenario B Traffic Volumes for the Borough of Waverley

5.4.3 *Figures 5.5* to *5.8* show the bandwidth plots of the volume capacity ratio focused in the area of Farnham for the base and forecast scenarios.

Figure 5.5: 2005 Traffic Volumes – Farnham

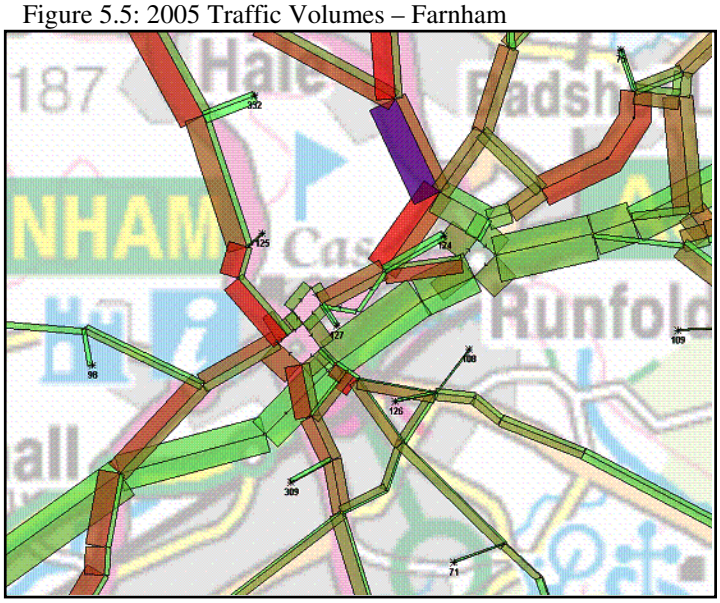
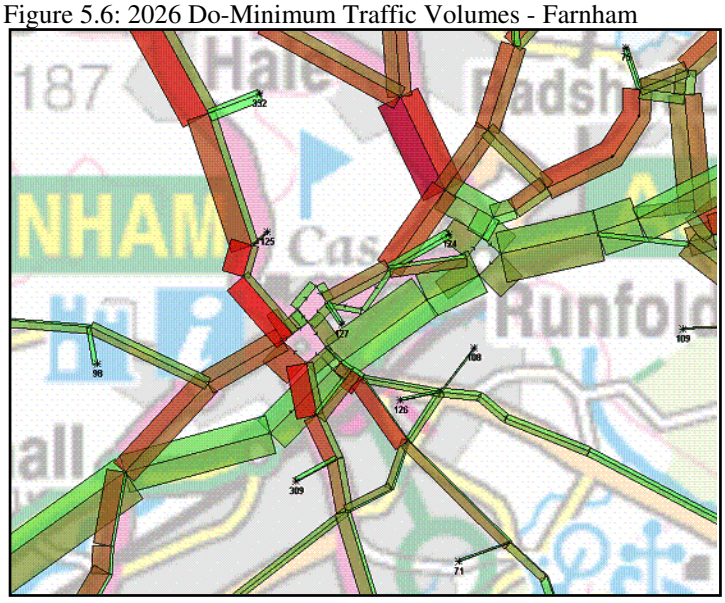


Figure 5.6: 2026 Do-Minimum Traffic Volumes - Farnham



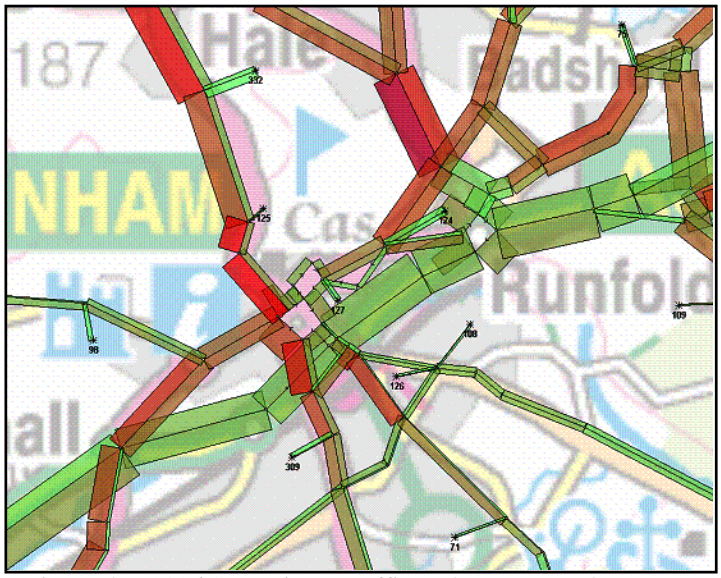


Figure 5.7: 2026 Scenario A Traffic Volumes – Farnham

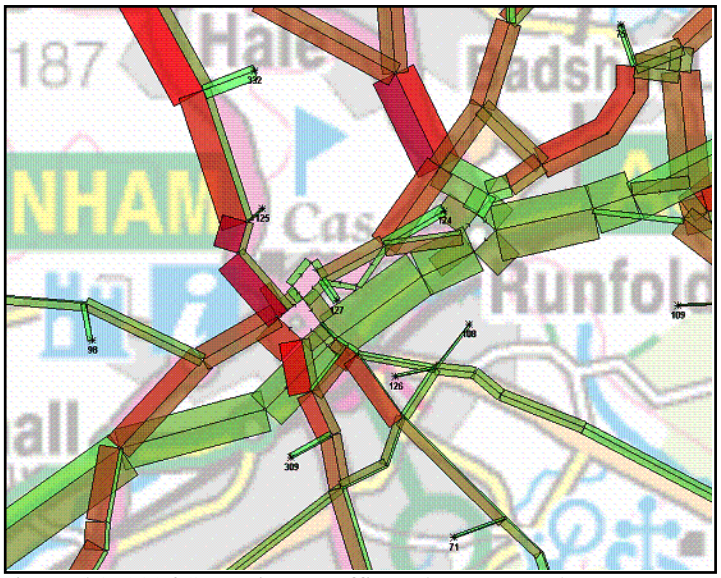
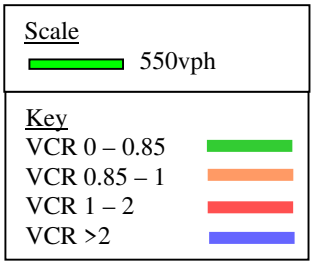


Figure 5.8: 2026 Scenario B Traffic Volumes - Farnham



5.4.4 *Figures 5.9* to *5.12* show the bandwidth plots of the volume/capacity ratio focused in the area of Wrecclesham for the base and forecast scenarios.

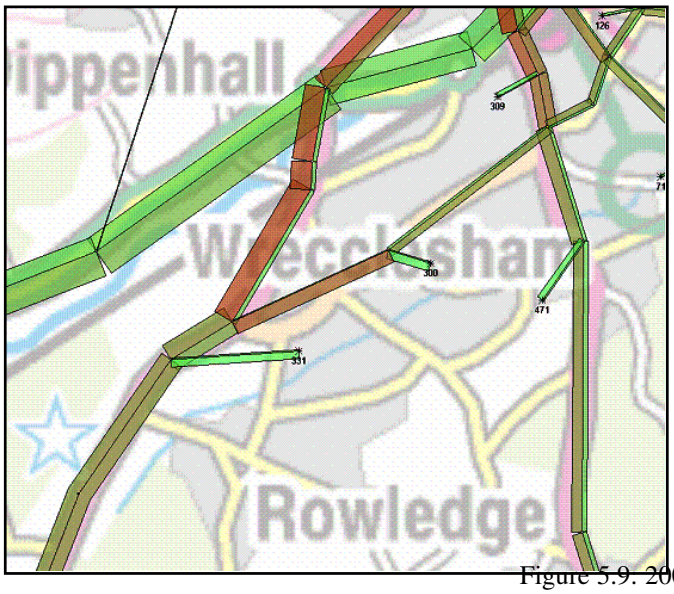


Figure 5.9. 2005 Traffic Volumes – Wrecclesham

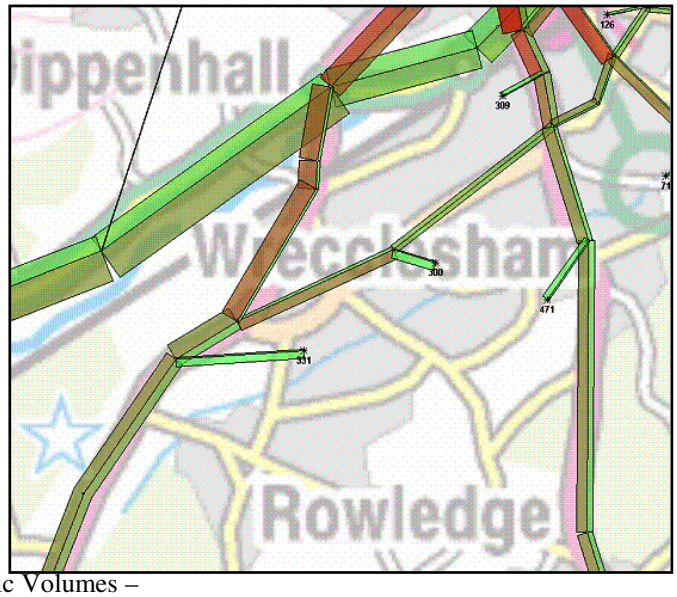


Figure 5.10: 2026 Do-Minimum Traffic Volumes - Wrecclesham

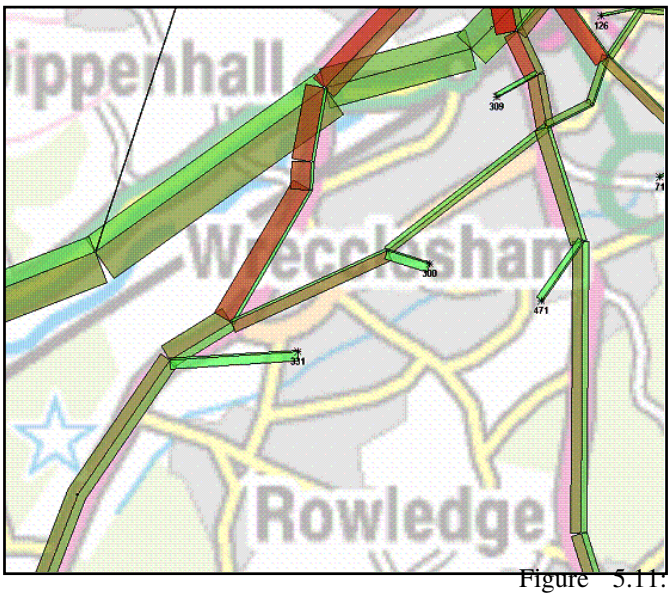


Figure 5.11: 2026 Scenario A Traffic Volumes – Wrecclesham

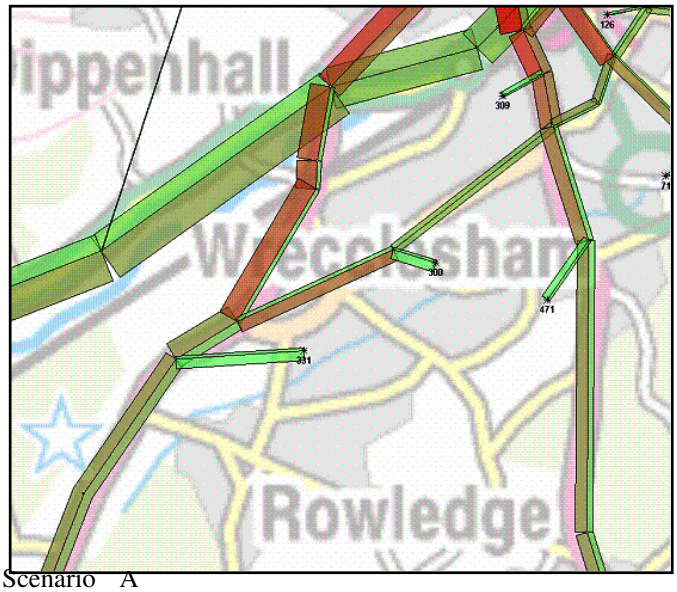
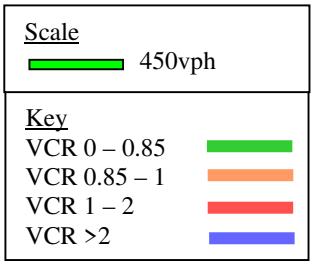


Figure 5.12: 2026 Scenario B Traffic Volumes - Wrecclesham



5.4.5 *Figures 5.13* to *5.16* show the bandwidth plots of the volume capacity ratio focused in the area of Godalming for the base and forecast scenarios.

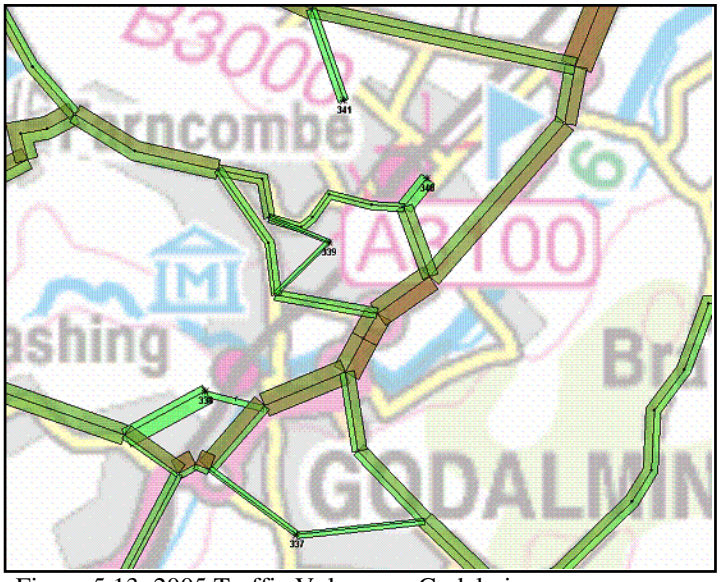


Figure 5.13: 2005 Traffic Volumes – Godalming

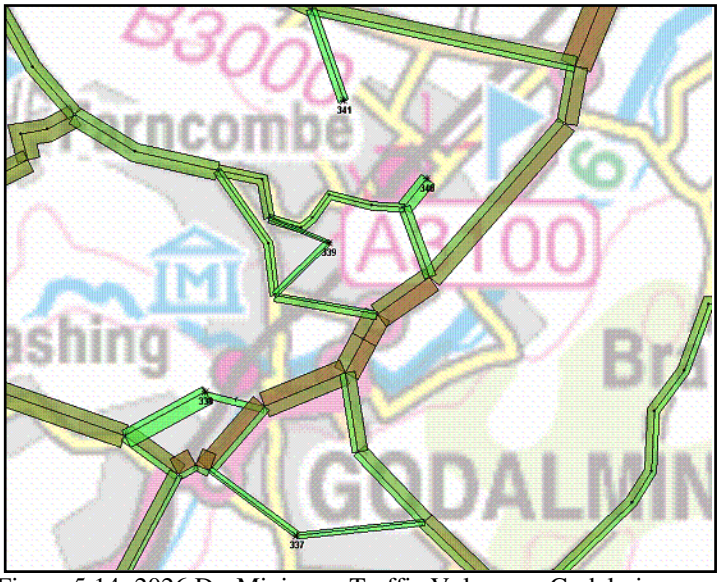


Figure 5.14: 2026 Do-Minimum Traffic Volumes - Godalming

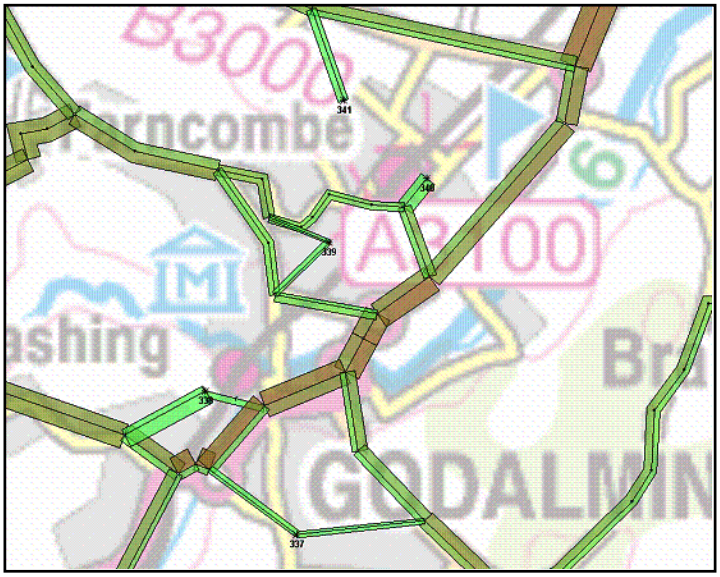


Figure 5.15: 2026 Scenario A Traffic Volumes – Godalming

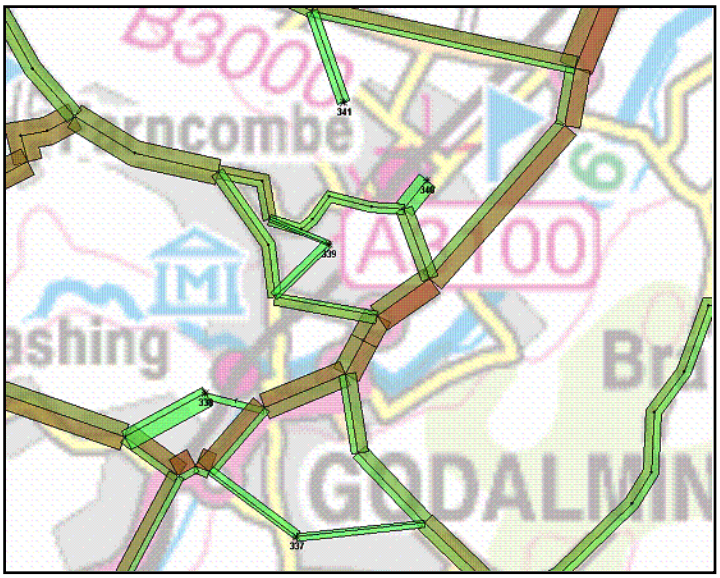
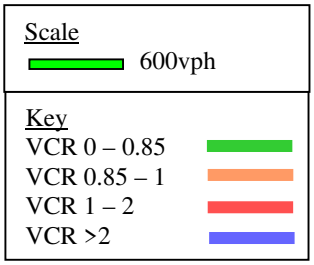


Figure 5.16: 2026 Scenario B Traffic Volumes - Godalming



5.4.6 *Figures 5.17* to *5.20* show the bandwidth plots of the volume capacity ratio focused in the area of Haslemere for the base and forecast scenarios.

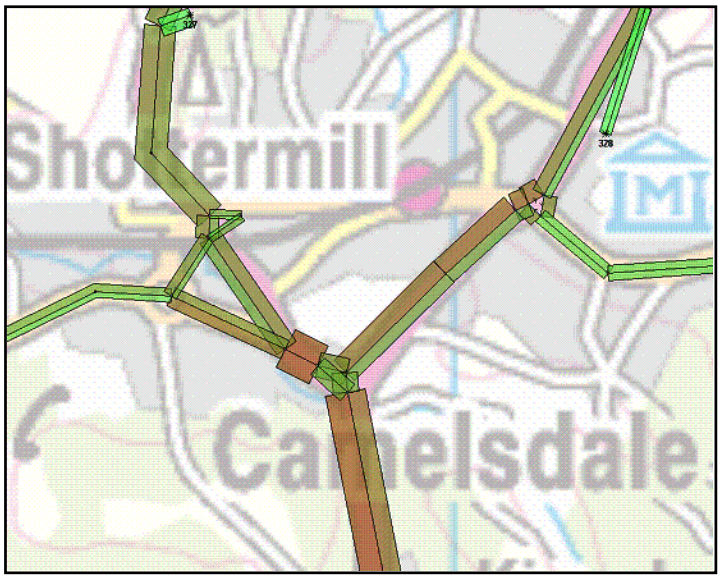


Figure 5.17: 2005 Traffic Volumes – Haslemere

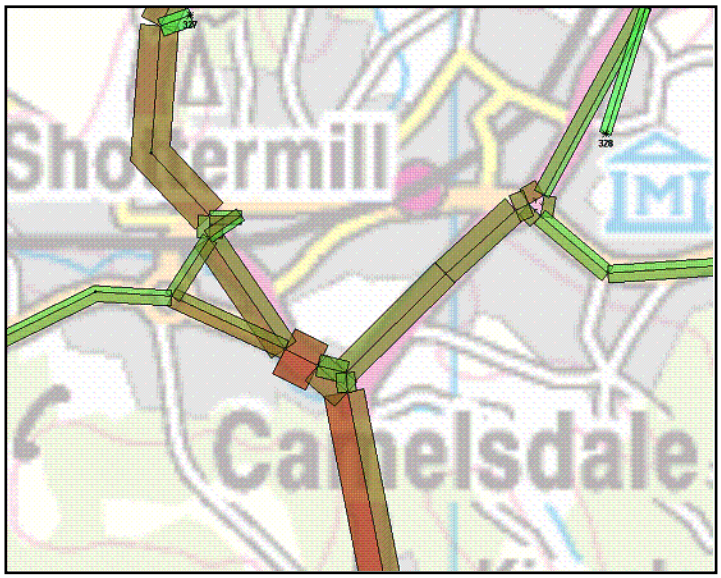


Figure 5.18: 2026 Do-Minimum Traffic Volumes - Haslemere

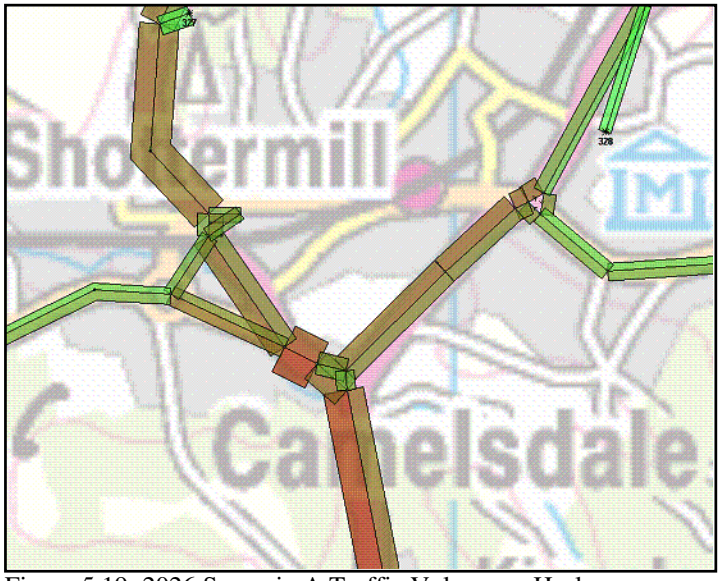


Figure 5.19: 2026 Scenario A Traffic Volumes – Haslemere

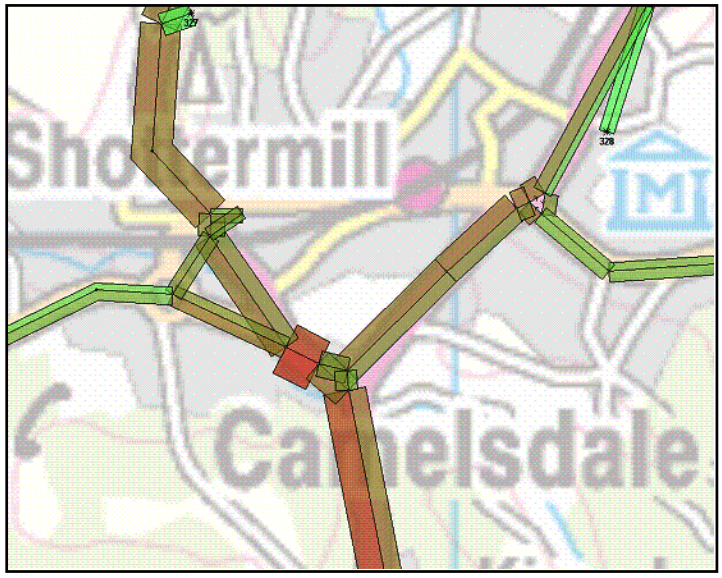
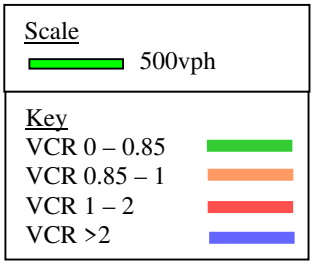


Figure 5.20 2026 Scenario B Traffic Volumes – Haslemere



5.4.7 *Figures 5.21* to *5.24* show the bandwidth plots of the volume capacity ratio focused in the area of Cranleigh for the base and forecast scenarios.

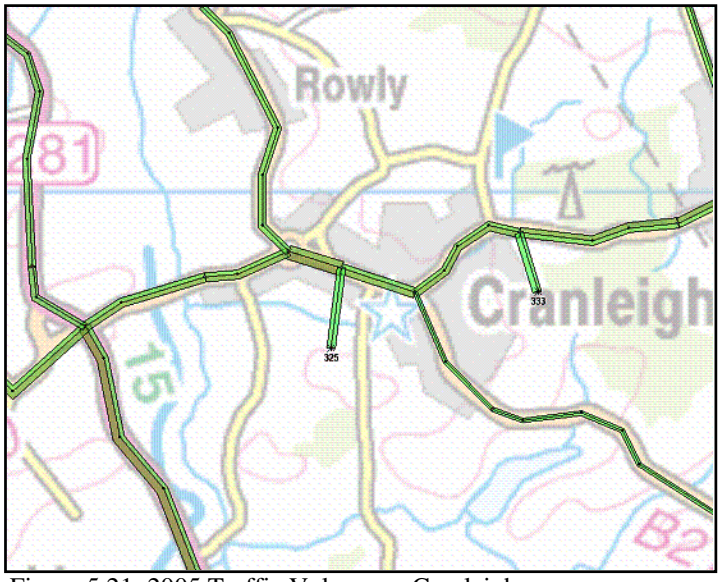


Figure 5.21: 2005 Traffic Volumes – Cranleigh

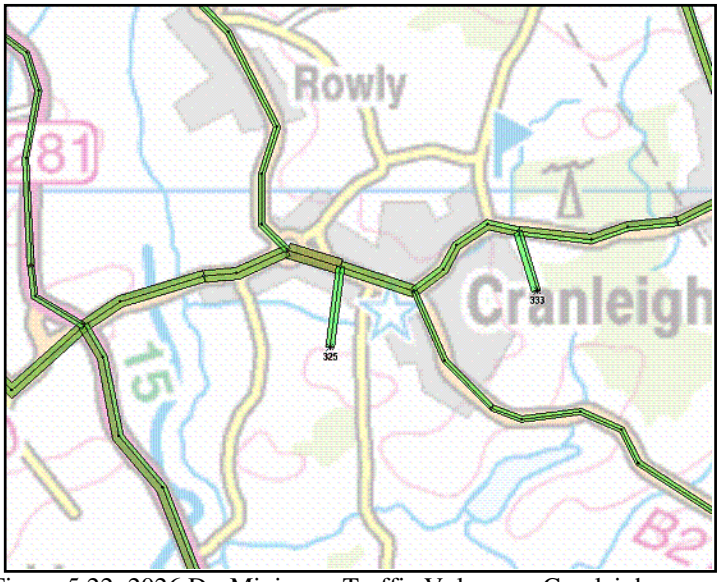


Figure 5.22: 2026 Do-Minimum Traffic Volumes - Cranleigh

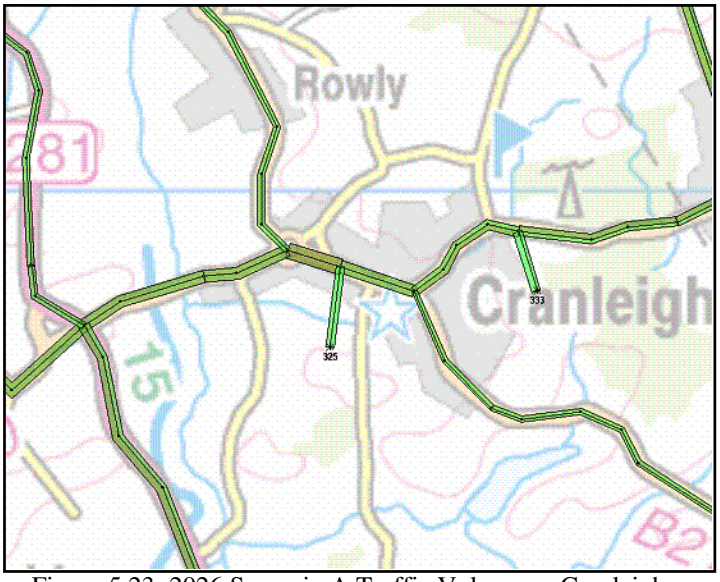


Figure 5.23: 2026 Scenario A Traffic Volumes – Cranleigh

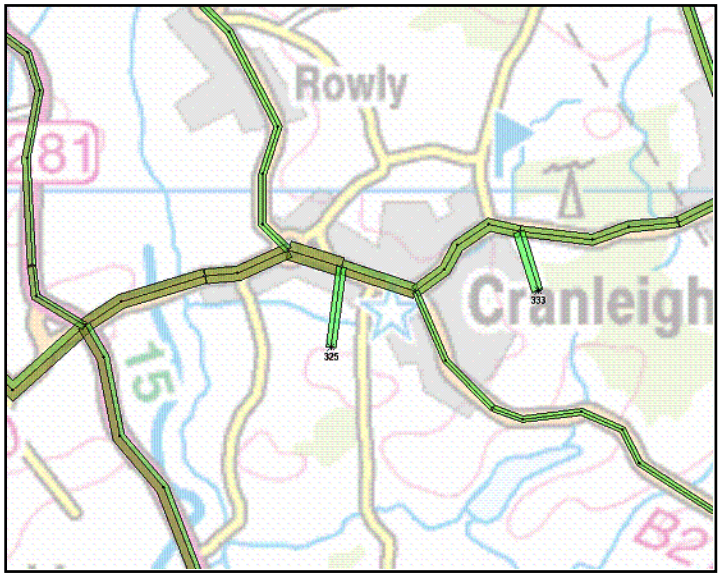
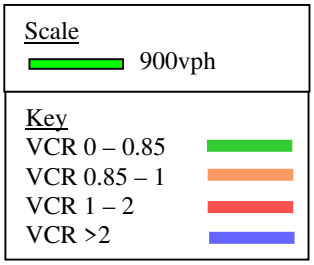


Figure 5.24: 2026 Scenario B Traffic Volumes - Cranleigh



5.4.8 Changes in the levels of traffic are shown using a bandwidth plot on the road network with comparison to the relevant reference cases. *Figures 5.25* to *5.27* show the differences in traffic flow between the 2005 base year and the 2026 Do-Minimum, 2026 Do-Minimum and 2026 Scenario A and finally the 2026 Scenario A and Scenario B. By comparing each scenario with their relevant reference case it is possible to visualise the increase/decrease in traffic flows on individual links at a borough scale. Where links are coloured blue, this indicates an increase in flow whereas links coloured yellow represent a decrease in traffic flow between the two scenarios in question.

5.4.9 The differences between the two test scenarios are very small and would not cause any significant impacts on the road network. The scale is greatly exaggerated for visual purposes.

5.4.10 For reference, *Figures 5.25* to *5.27* show the disposition of allocated growth by development type (commercial and residential) represented by the pie charts. These plots are very similar to those produced in *Figures 3.1* to *3.4*, although the plots shown below represent all trips (origins and destinations summed). The allocated growth for commercial is shown in red and residential in grey.

5.4.11 *Figures 5.25* to *5.27* indicate that all 2026 forecast scenarios experience a general increase in traffic flows. *Figure 5.25* shows that the largest increases and decrease in traffic flow is on the A3, surrounding Hindhead. Such changes in flow can be attributed to the Hindhead Improvement Scheme reducing traffic congestion on the former single carriageway section, encouraging traffic to shift from local county roads to the strategic road network (shown by links in the Hindhead area displaying a yellow link colour).

5.4.12 *Figures 5.25* to *5.27* indicate that the links expected to incur the largest increase in traffic flows are the A3 and the A31, mainly in the 2026 Do-Minimum and Scenario B forecasts. These links are arguably the two links that carry the largest amount of long distance travel within, and through the borough of Waverley. The A31 runs east to west and the A3 north to south. The Hindhead Improvement Scheme will cause more trips to use the southern section of the A3 in the future, as the delay experienced at the former Hindhead crossroads should be significantly decreased (see *Table 5.9*), making travel along the Waverley section of the A3 more cost effective.

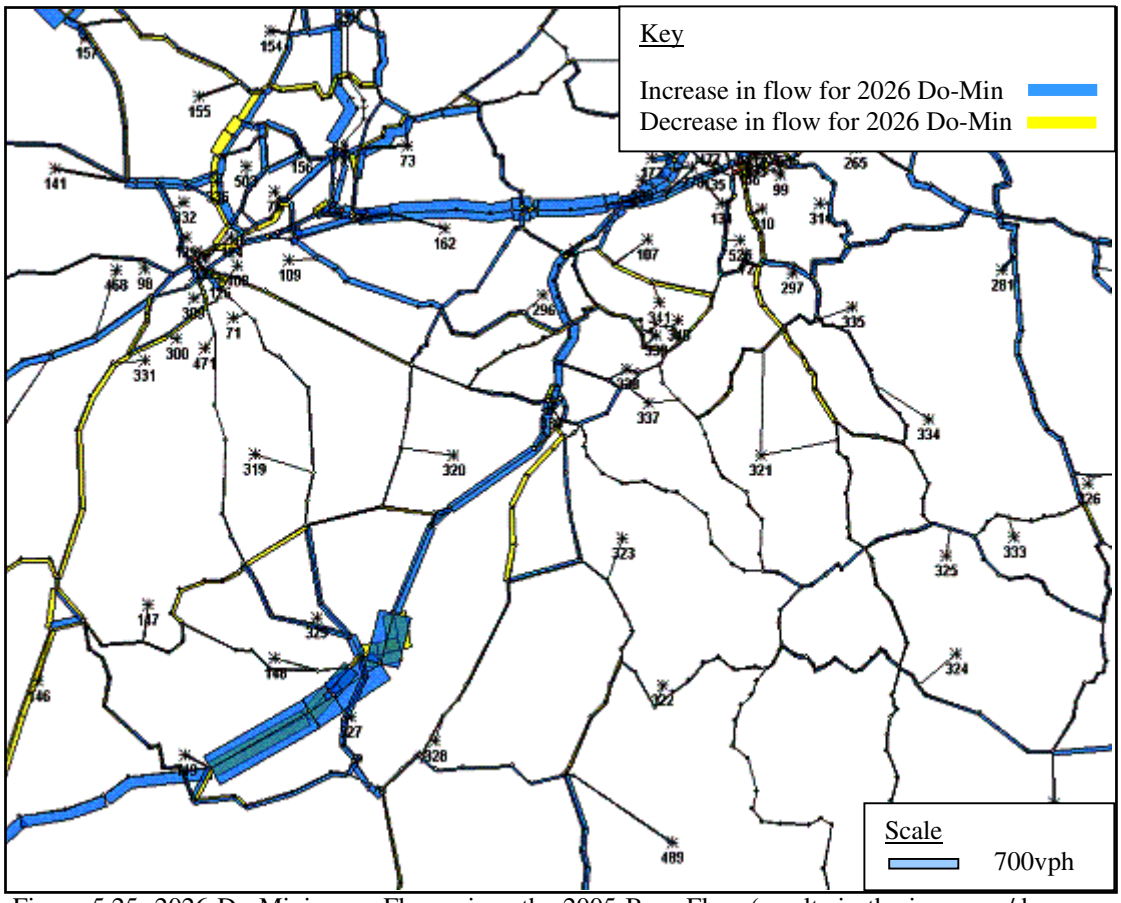


Figure 5.25: 2026 Do-Minimum Flow minus the 2005 Base Flow (results in the increases/decreases in flow between 2005 Base and 2026 Do-Minimum being displayed)

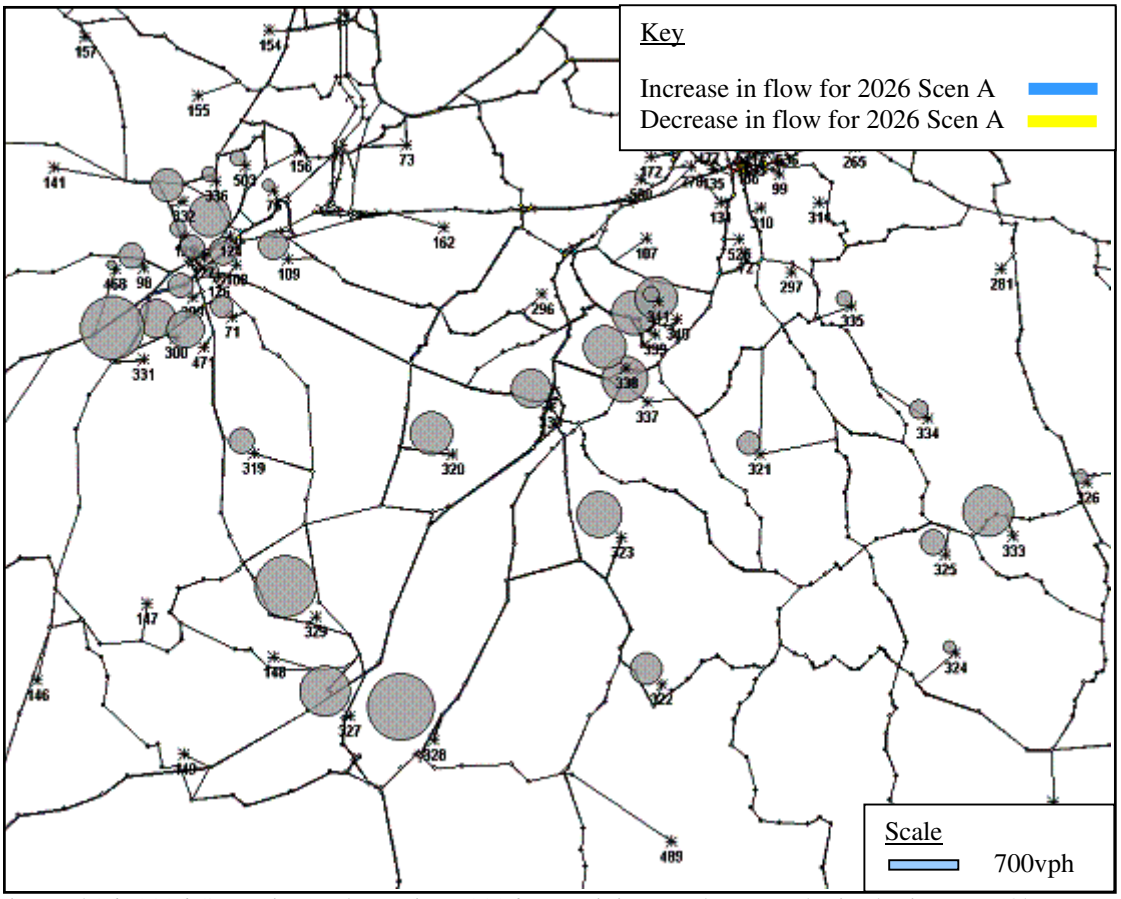


Figure 5.26: 2026 Scenario A Flow minus 2026 Do-Minimum Flow (results in the increases/decreases in flow between 2026 Do-Minimum and 2026 Scenario A being displayed)

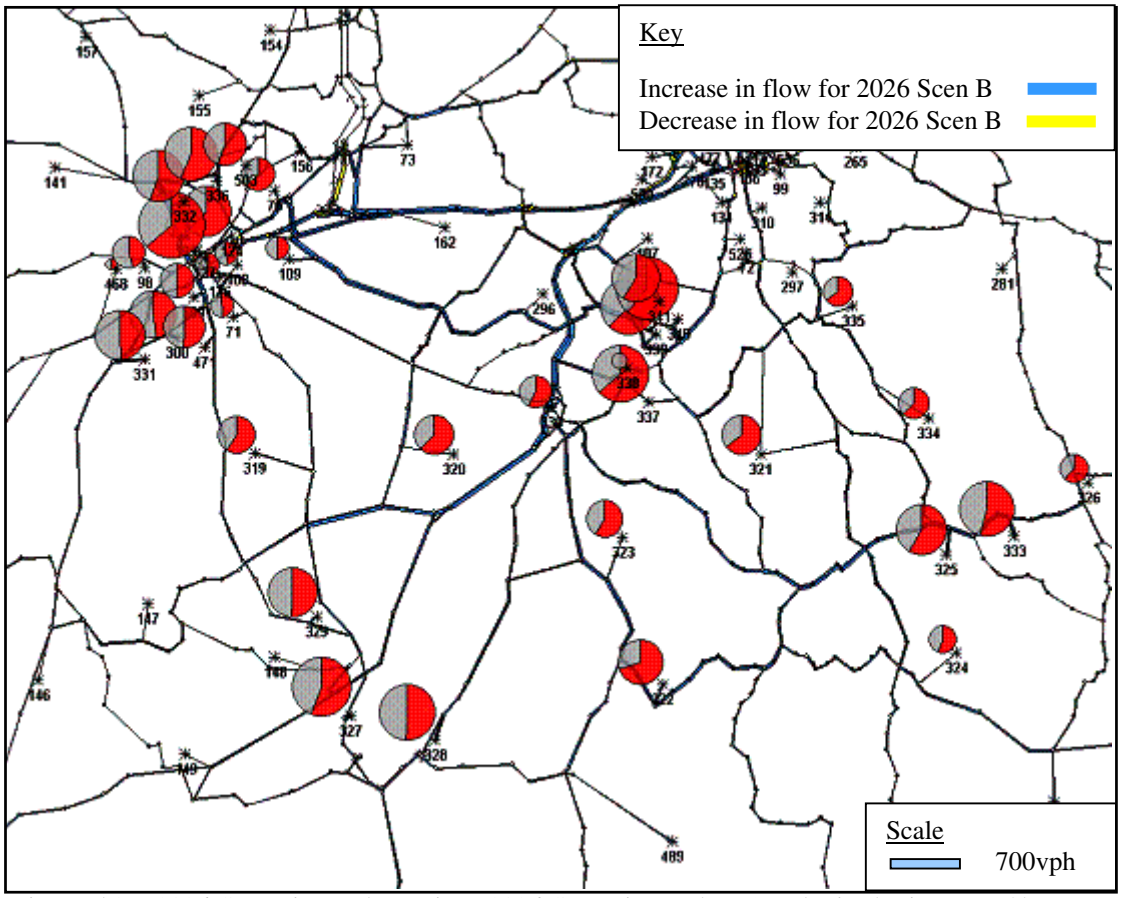


Figure 5.27: 2026 Scenario B Flow minus 2026 Scenario A Flow (results in the increases/decreases in flow between 2026 Scenario A and 2026 Scenario B being displayed)

5.4.13 Enlarged plots showing the difference in flow for the key settlement areas within the borough of Waverley are shown below in *Figures 5.28* to *5.42*. These plots are exactly the same as *Figures 5.25* to *5.27* but at a localised scale.

Farnham – Difference in Flow Plots

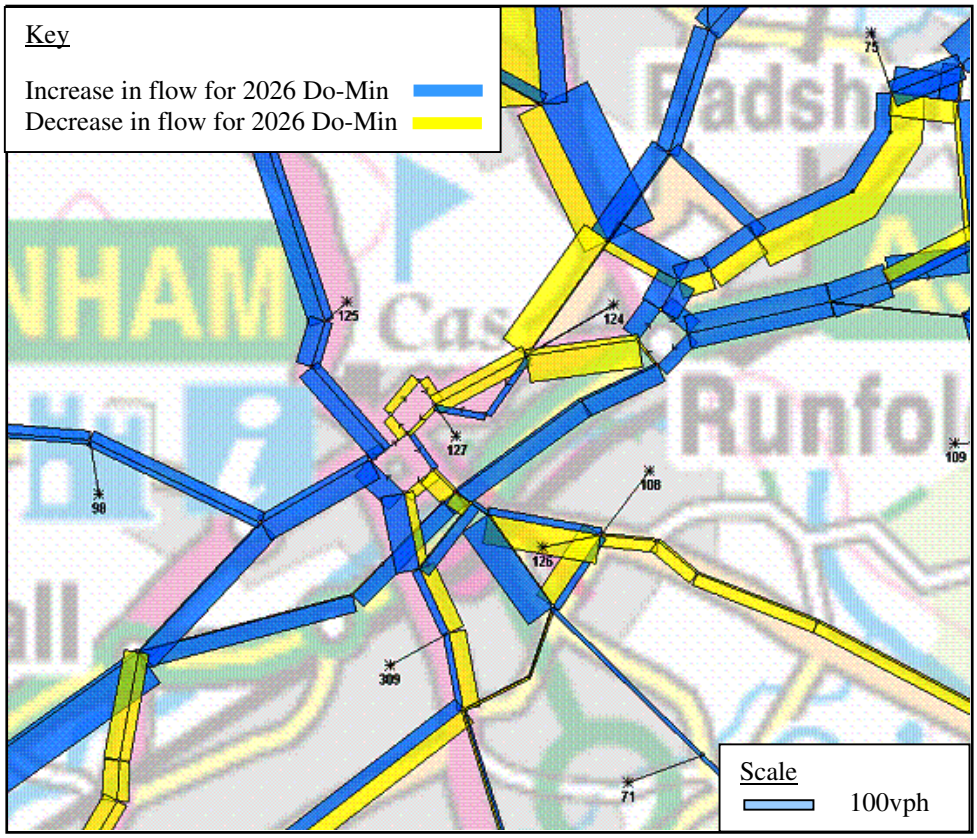


Figure 5.28: 2026 Do-Minimum Flow minus 2005 Base Flow (results in the increases/decreases in flow between 2005 Base and 2026 Do-Minimum being displayed)

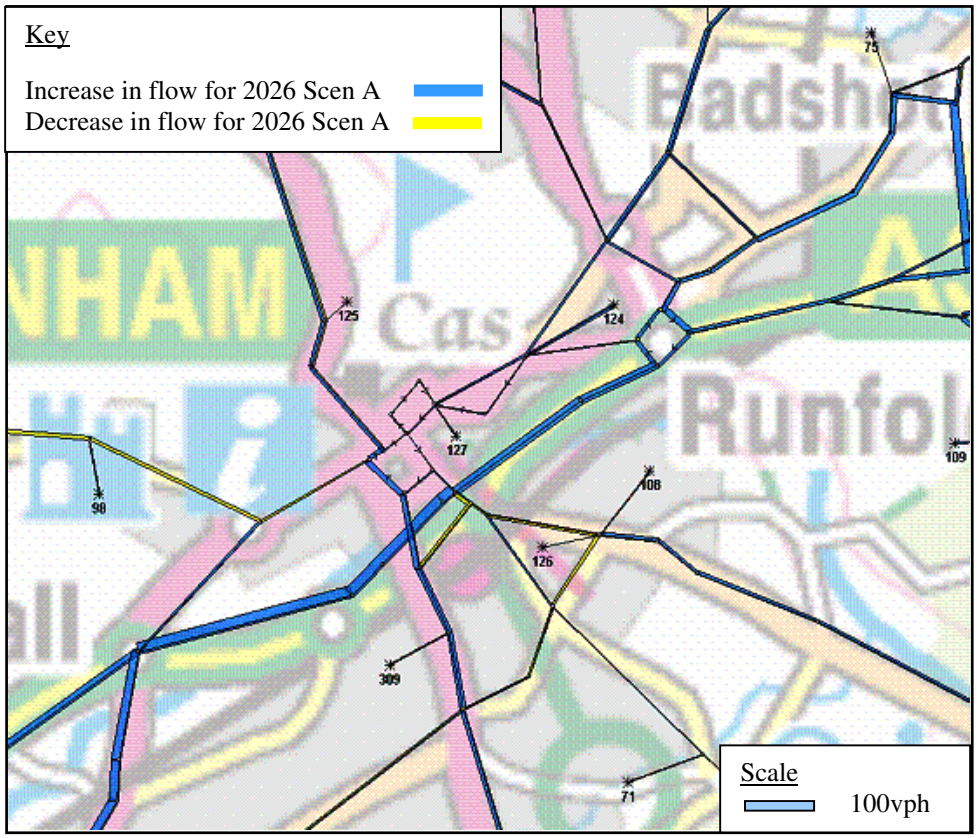


Figure 5.29: 2026 Scenario A Flow minus 2026 Do-Minimum Flow (results in the increases/decreases in flow between 2026 Do-Minimum and 2026 Scenario A being displayed)

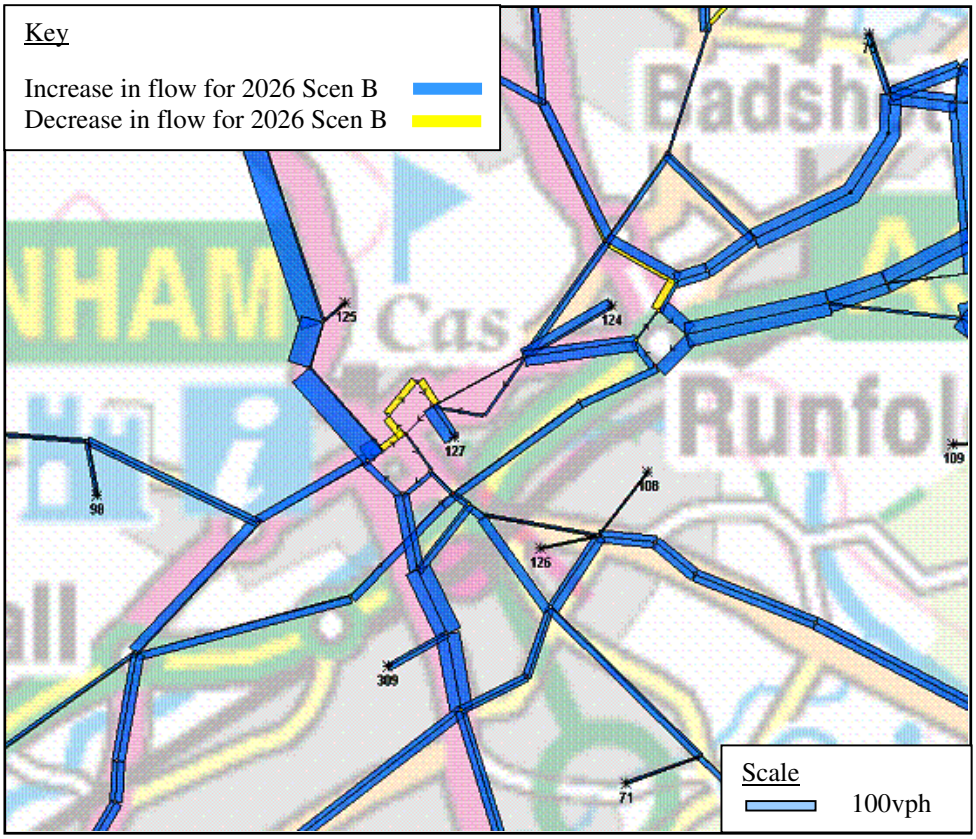


Figure 5.30: 2026 Scenario B Flow minus 2026 Scenario A Flow (results in the increases/decreases in flow between 2026 Scenario A and 2026 Scenario B being displayed)

Wrecclesham – Difference in Flow Plots

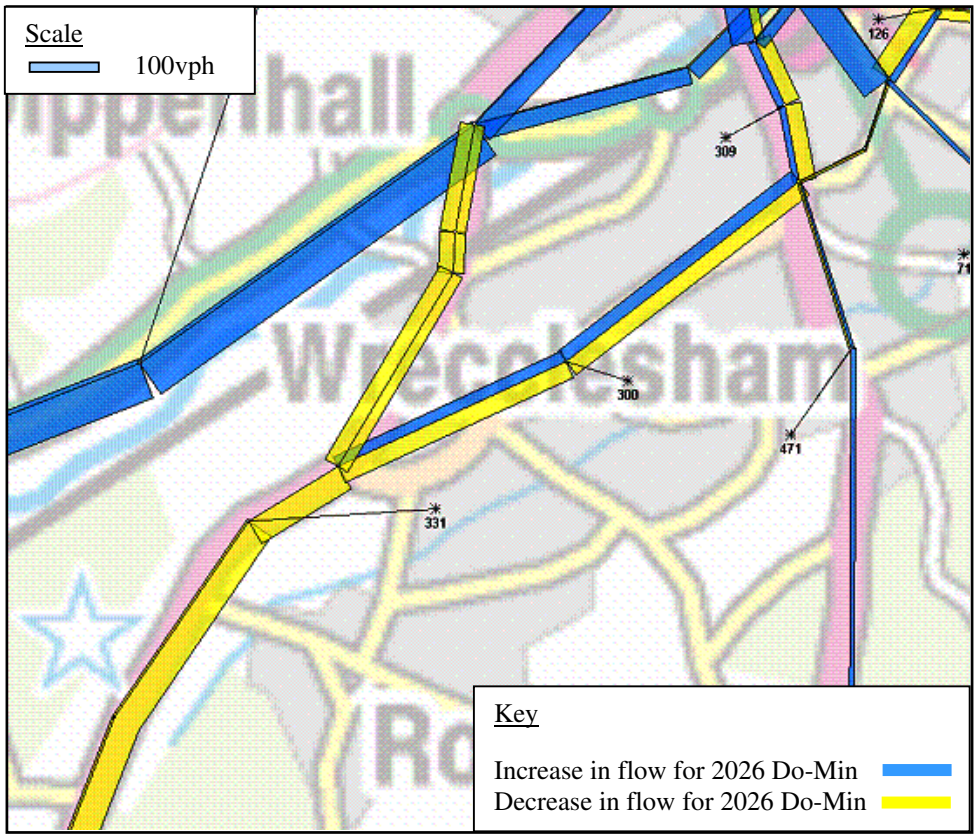


Figure 5.31: 2026 Do-Minimum Flow minus 2005 Base Flow (results in the increases/decreases in flow between 2005 Base and 2026 Do-Minimum being displayed)

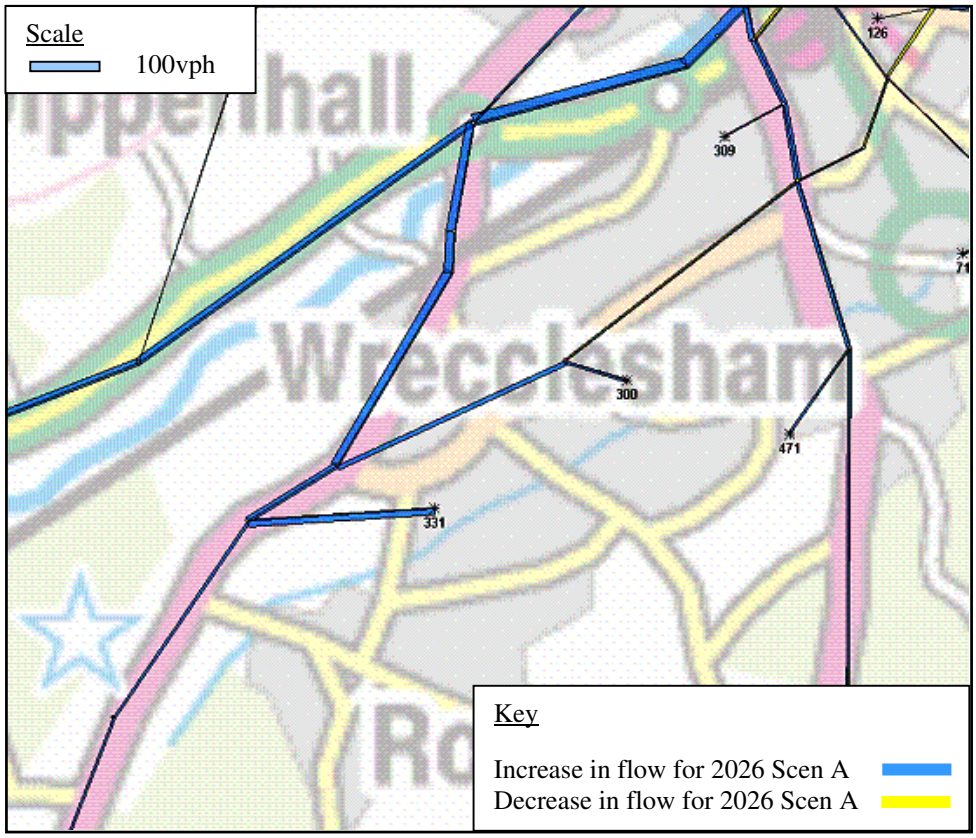


Figure 5.32: 2026 Scenario A Flow minus 2026 Do-Minimum Flow (results in the increases/decreases in flow between 2026 Do-Minimum and 2026 Scenario A being displayed)

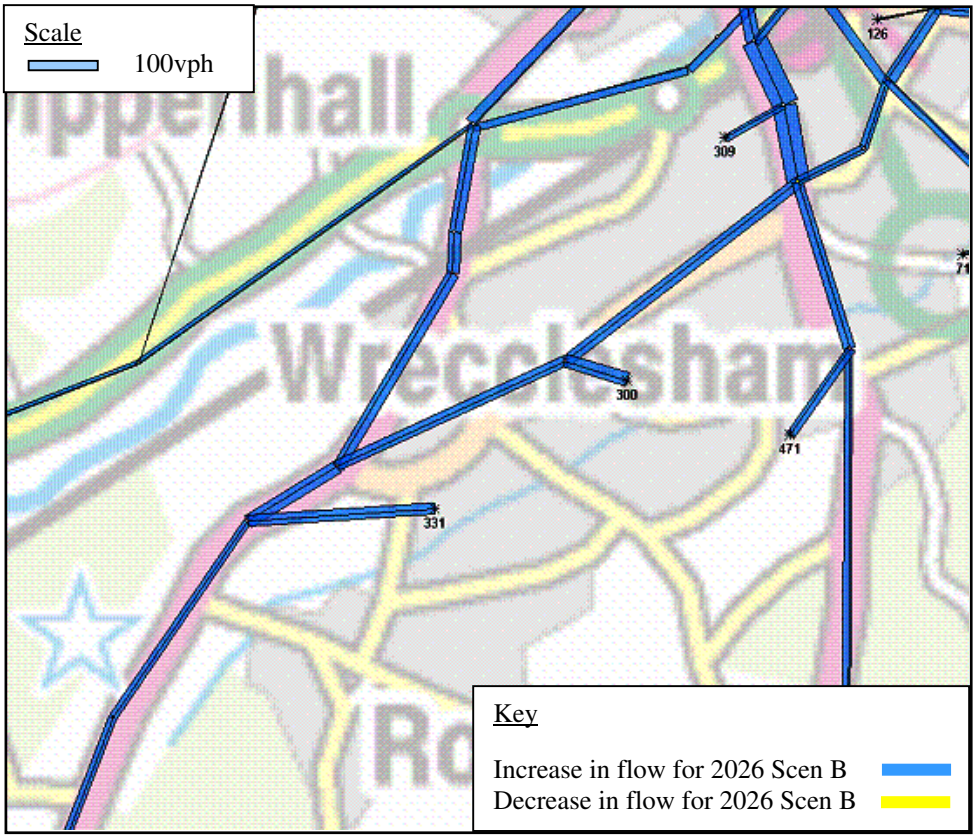


Figure 5.33: 2026 Scenario B Flow minus 2026 Scenario A Flow (results in the increases/decreases in flow between 2026 Scenario A and 2026 Scenario B being displayed)

Godalming – Difference in Flow Plots

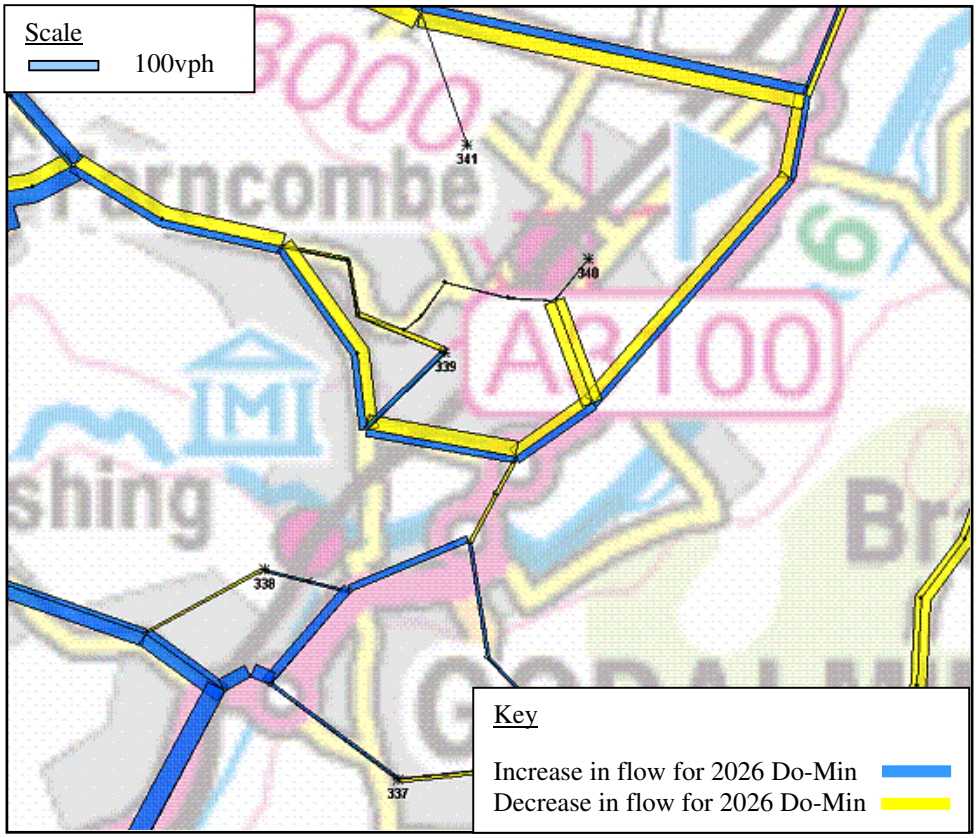


Figure 5.34: 2026 Do-Minimum Flow minus 2005 Base Flow (results in the increases/decreases in flow between 2005 Base and 2026 Do-Minimum being displayed)

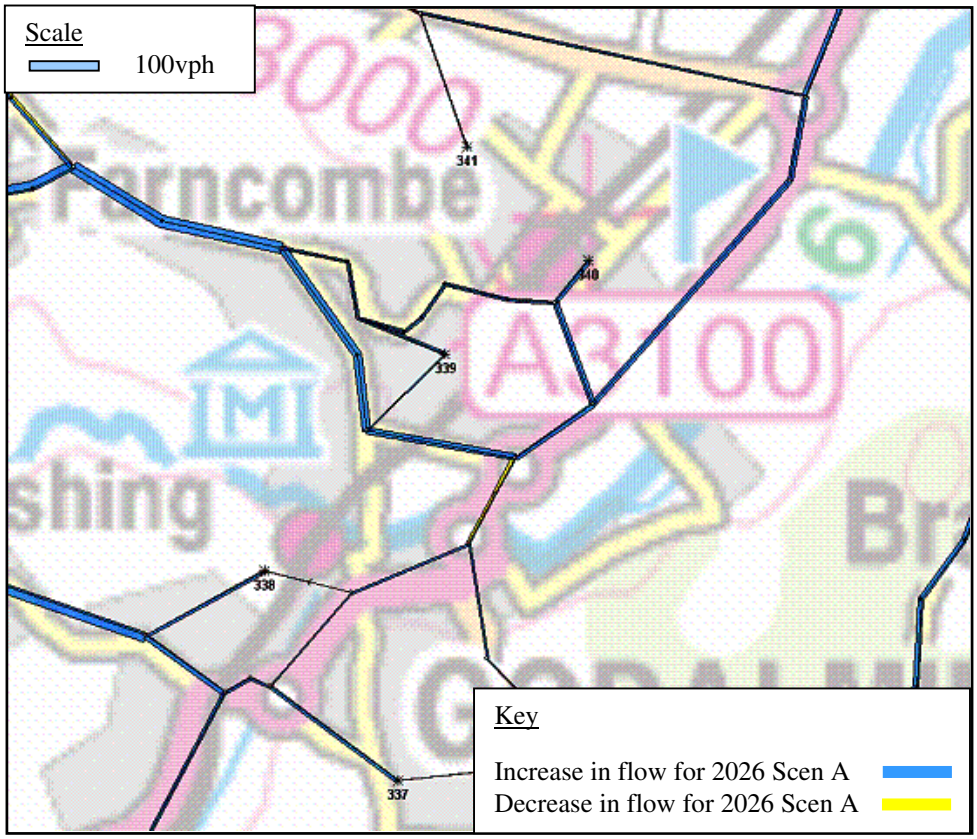


Figure 5.35: 2026 Scenario A Flow minus 2026 Do-Minimum Flow (results in the increases/decreases in flow between 2026 Do-Minimum and 2026 Scenario A being displayed)

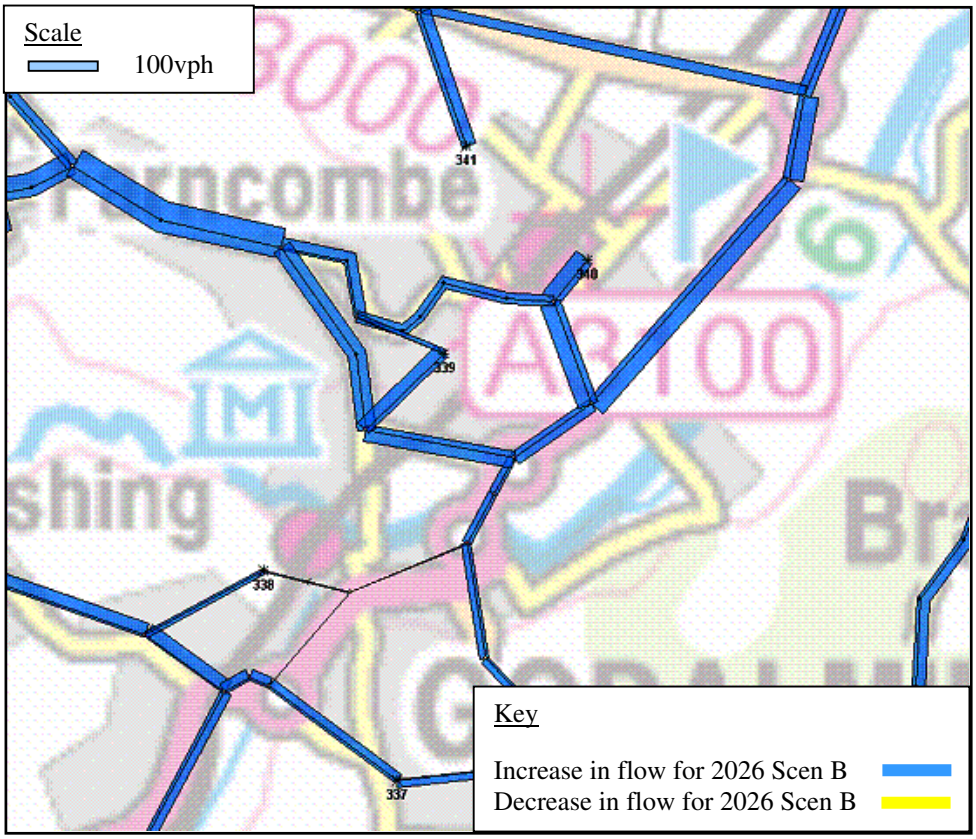


Figure 5.36: 2026 Scenario B Flow minus 2026 Scenario A Flow (results in the increases/decreases in flow between 2026 Scenario A and 2026 Scenario B being displayed)

Haslemere – Difference in Flow Plots

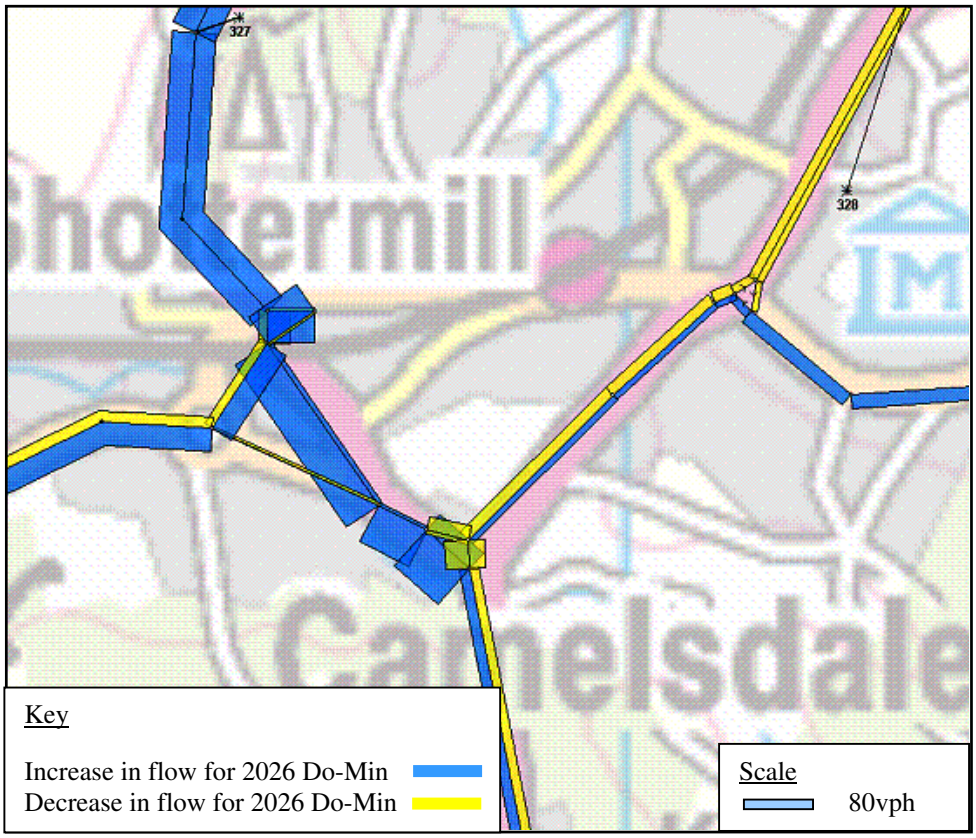


Figure 5.37: 2026 Do-Minimum Flow minus 2005 Base Flow (results in the increases/decreases in flow between 2005 Base and 2026 Do-Minimum being displayed)

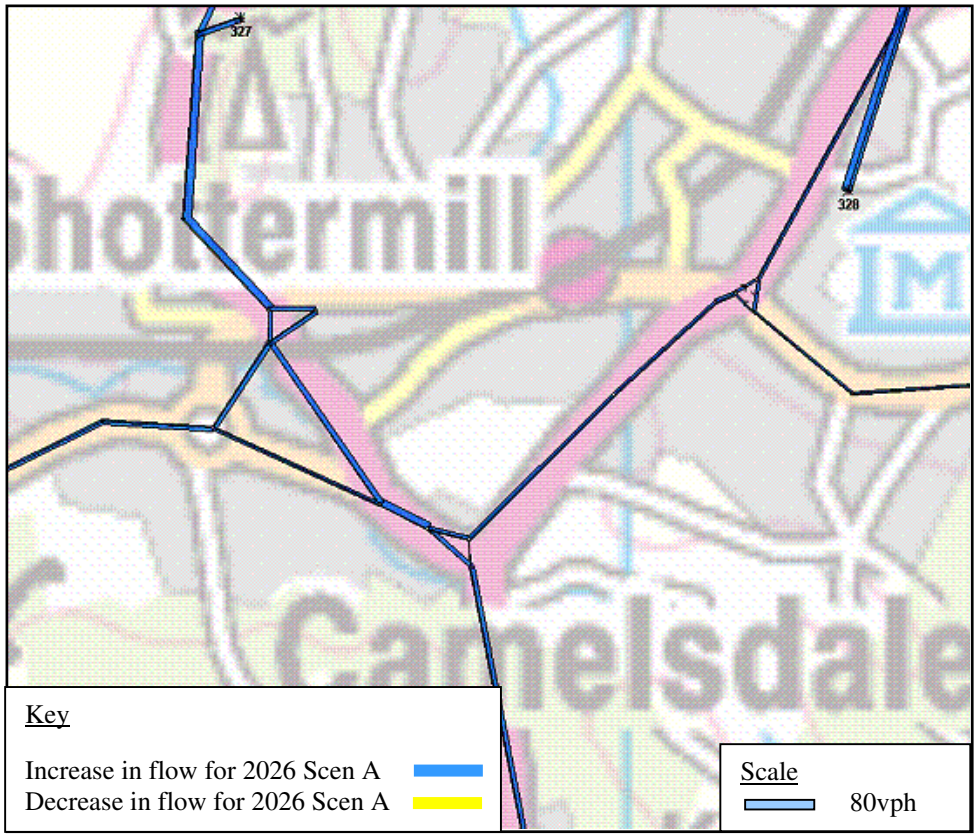


Figure 5.38: 2026 Scenario A Flow minus 2026 Do-Minimum Flow (results in the increases/decreases in flow between 2026 Do-Minimum and 2026 Scenario A being displayed)

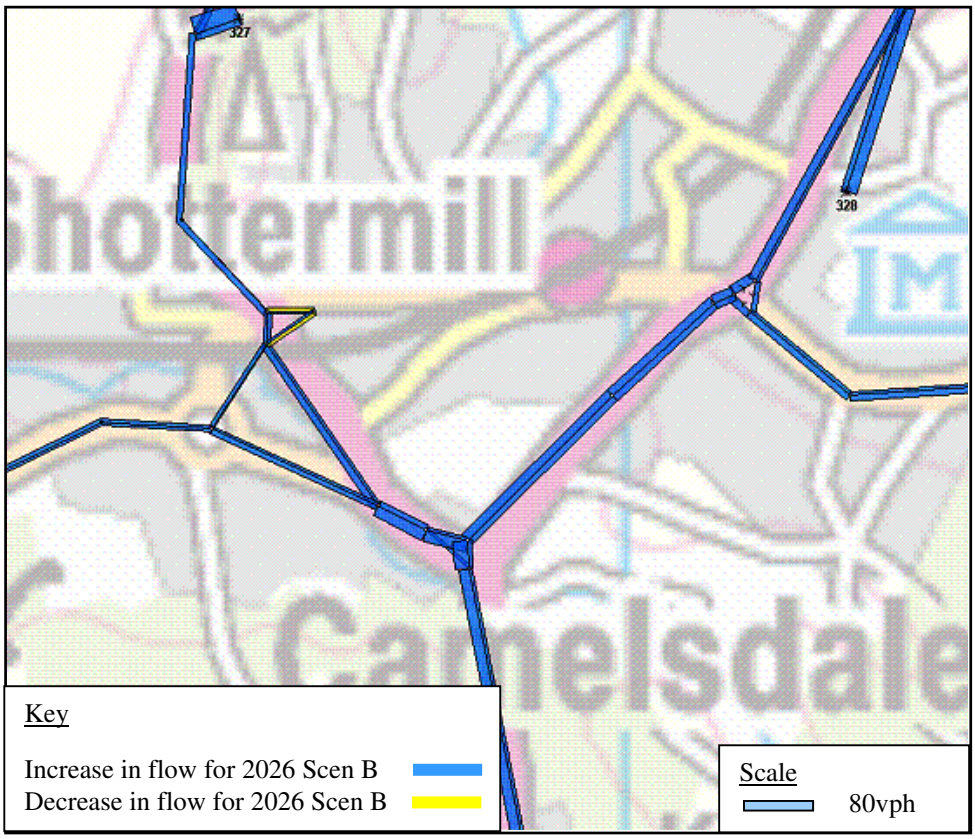


Figure 5.39: 2026 Scenario B Flow minus 2026 Scenario A Flow (results in the increases/decreases in flow between 2026 Scenario A and 2026 Scenario B being displayed)

Cranleigh – Difference in Flow Plots

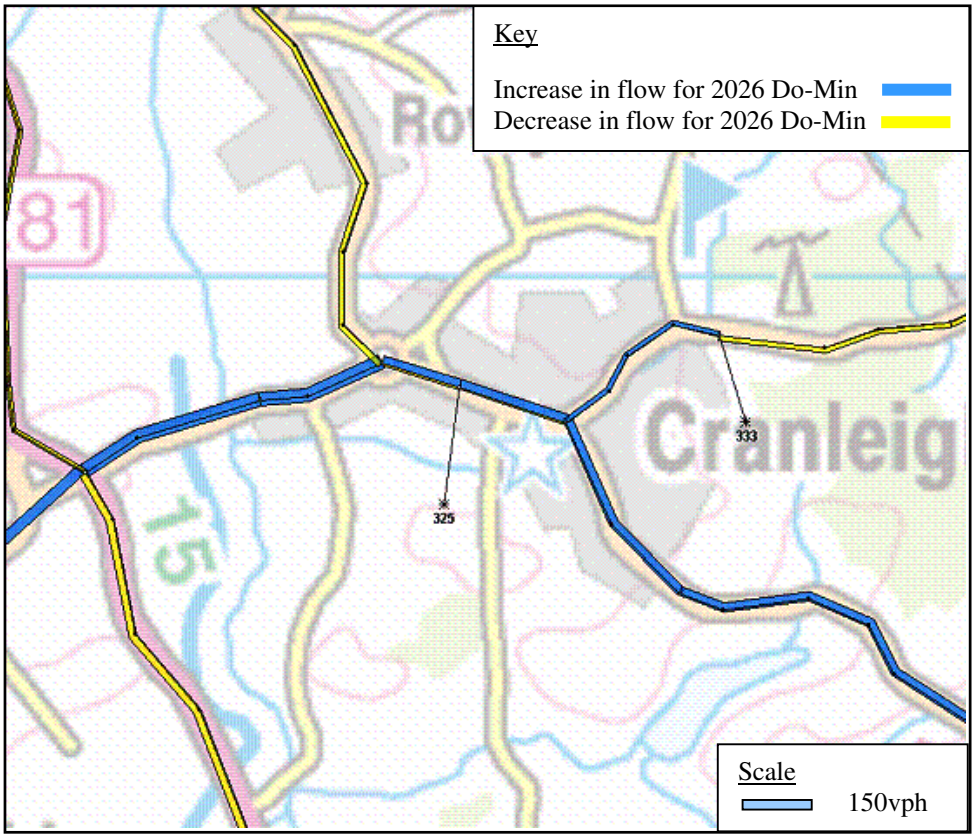


Figure 5.40: 2026 Do-Minimum Flow minus 2005 Base Flow (results in the increases/decreases in flow between 2005 Base and 2026 Do-Minimum being displayed)

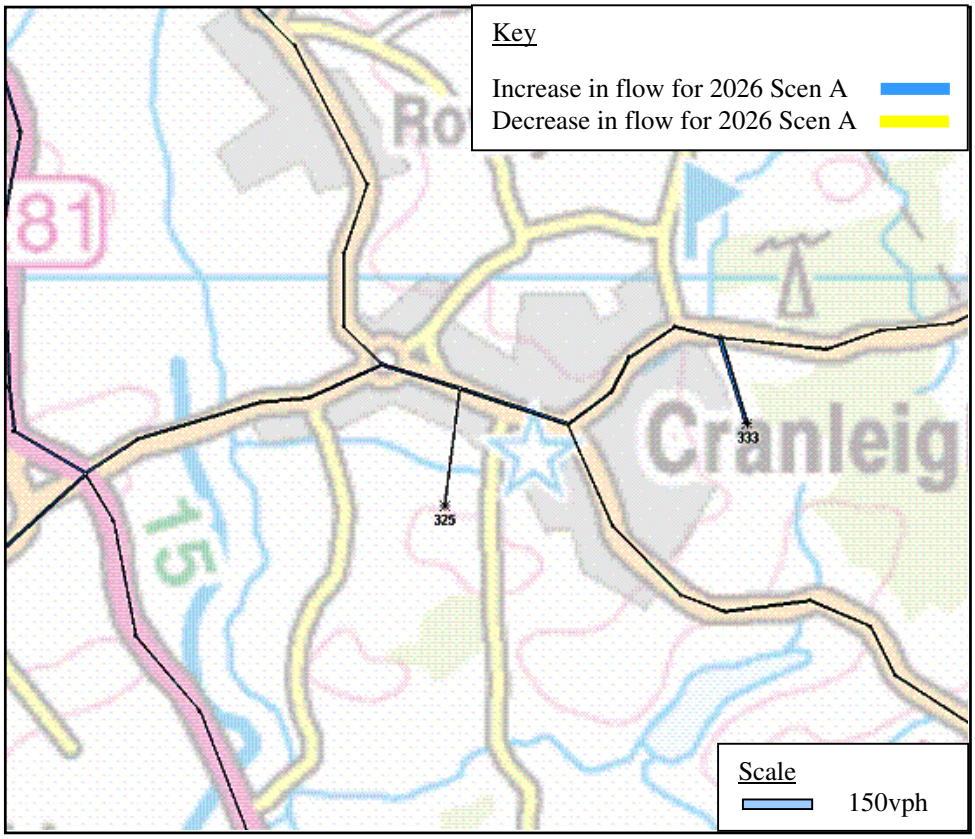


Figure 5.41: 2026 Scenario A Flow minus 2026 Do-Minimum Flow (results in the increases/decreases in flow between 2026 Do-Minimum and 2026 Scenario A being displayed)

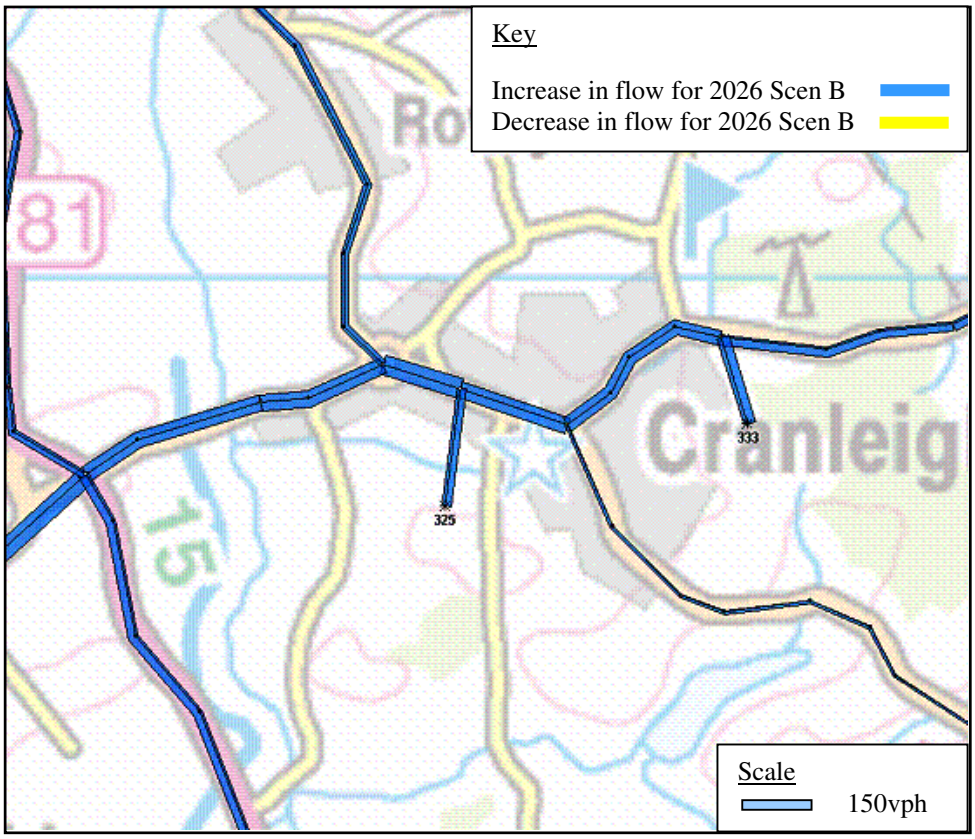


Figure 5.42: 2026 Scenario B Flow minus 2026 Scenario A Flow (results in the increases/decreases in flow between 2026 Scenario A and 2026 Scenario B being displayed)

6 AIR QUALITY MANAGEMENT AREAS (AQMA)

6.1 Overview of Areas

6.1.1 WBC requested SCC to specifically assess the potential impacts that the proposed commercial and residential developments could have on AQMA sites in the Borough.

6.1.2 WBC informed SCC that the Borough of Waverley has three identified AQMA sites. These are:

- Farnham: A325 The Borough, A287 Castle Street, A287 Downing Street, Upper Church Lane, A325 West Street, A287 Long Bridge, A287 Union Road, Victoria Road, A287 South Street, Brightwells Road, A325 East Street, A325 Woolmead Road, Bear Lane.

- Godalming: A3100 Ockford Road and A3100 Flambard Way.

- Hindhead: A287 Tilford Road, A3 London Road, A287 Hindhead Road, A3 Portsmouth Road (Hindhead Crossroads).

6.1.3 The site locations of all AQMA's are shown in *Appendices E* to *G*.

6.2 AQMA Summary Statistics

6.2.1 Summary statistics have been produced for each of the AQMA sites in *Tables 6.1* to *6.3*. The statistics have been produced for each direction of a link (i.e. northbound and southbound). However, for the Farnham and Hindhead AQMA sites, the statistics have been separated by an inbound and outbound direction.

6.2.2 The Farnham AQMA statistics are presented for inbound and outbound directions of the town centre. The one-way system in Farnham (A325 The Borough, A287 South Street, A287 Union Road and A287 Downing Street) was included within the inbound direction.

6.2.3 The Hindhead statistics are also presented in an inbound and outbound direction, in relation to the direction of travel to the centre of the Hindhead crossroads. Hence inbound flows equal outbound flows but are different when comparing scenarios.

6.2.4 Due to the nature of a strategic traffic model not all links within the Farnham AQMA are modelled with SINTRAM. This refers to minor roads such as Victoria Road and Upper Church Lane. As many links as possible within the Farnham AQMA were included in the AQMA summary statistics.

6.2.5 In summary it can be seen that 2026 Scenario B presents the largest impacts on the local traffic for all three AQMA sites in Waverley.

6.2.6 In *Tables 6.1* to *6.3* the 2026 Do-Minimum was used as a reference case for Scenario A and Scenario A was used as a reference case for Scenario B.

Farnham AQMA Site

Key Statistics	Inbound				Outbound			
	2005	2026			2005	2026		
		Do-Minimum	Scenario A	Scenario B		Do-Minimum	Scenario A	Scenario B
Total Flow (All Vehicles)	11,288	11,878	12,045	12,523	5,715	5,560	5,663	5,740
Percentage of HGVS from Total Flow	6.6%	6.8%	6.7%	7.0%	6.2%	6.2%	6.0%	6.4%
Total Vehicle Kilometrage (Veh Kms)	2,927	3,144	3,175	3,321	2,172	2,270	2,310	2,446
Total Link Travel Time (Veh Hrs)	165	184	187	199	112	129	132	146
Average Speed (Km/hr)	21.0	21.1	21.1	21.0	23.7	24.0	23.8	23.9
Total Link Length (Km)	3.0				2.5			
Difference between Scenario and 2026 Do-Minimum								
Total Flow (All Vehicles)			167	645			103	180
Percentage of HGVS from Total Flow			-0.1%	0.2%			-0.1%	0.2%
Total Vehicle Kilometrage (Veh Kms)			31	178			40	176
Total Link Travel Time (Veh Hrs)			3	14			3	16
Average Speed (Km/hr)			0.0	-0.1			-0.2	0.0
Percentage Difference between Scenario and 2026 Do-Minimum								
Total Flow (All Vehicles)			1.4%	5.4%			1.9%	3.2%
Total Vehicle Kilometrage (Veh Kms)			1.0%	5.6%			1.9%	7.8%
Total Link Travel Time (Veh Hrs)			1.4%	7.7%			2.5%	12.5%
Average Speed (Km/hr)			0.0%	-0.4%			-0.7%	0.0%
Difference between Scenarios A and B								
Total Flow (All Vehicles)				478				77
Percentage of HGVS from Total Flow				0.3%				0.4%
Total Vehicle Kilometrage (Veh Kms)				147				136
Total Link Travel Time (Veh Hrs)				12				13
Average Speed (Km/hr)				-0.1				0.2
Percentage Difference between Scenarios A and B								
Total Flow (All Vehicles)				4.0%				1.4%
Total Vehicle Kilometrage (Veh Kms)				4.6%				5.9%
Total Link Travel Time (Veh Hrs)				6.3%				10.1%
Average Speed (Km/hr)				-0.4%				0.7%

Table 6.1: Summary Statistics for Farnham AQMA site.

Godalming AQMA Site

Key Statistics	Inbound				Outbound			
	2005	2026			2005	2026		
		Do-Minimum	Scenario A	Scenario B		Do-Minimum	Scenario A	Scenario B
Total Flow (All Vehicles)	1,842	2,029	2,023	2,025	1,212	1,218	1,262	1,262
Percentage of HGVS from Total Flow	5.1%	5.2%	5.1%	5.3%	5.8%	6.0%	5.9%	6.1%
Total Vehicle Kilometrage (Veh Kms)	1,095	1,206	1,203	1,204	725	728	755	755
Total Link Travel Time (Veh Hrs)	32	37	36	37	19	19	20	20
Average Speed (Km/hr)	34.4	32.9	33.0	33.0	39.4	39.4	39.0	39.0
Total Link Length (Km)	1.2				1.2			
Difference between Scenario and 2026 Do-Minimum								
Total Flow (All Vehicles)			-5	-4			44	44
Percentage of HGVS from Total Flow			-0.1%	0.1%			-0.1%	0.1%
Total Vehicle Kilometrage (Veh Kms)			-3	-2			26	26
Total Link Travel Time (Veh Hrs)			0	0			1	1
Average Speed (Km/hr)			0.0	0.0			-0.3	-0.4
Percentage Difference between Scenario and 2026 Do-Minimum								
Total Flow (All Vehicles)			-0.3%	-0.2%			3.6%	3.5%
Total Vehicle Kilometrage (Veh Kms)			-0.3%	-0.2%			3.6%	3.6%
Total Link Travel Time (Veh Hrs)			-0.4%	-0.3%			4.6%	4.7%
Average Speed (Km/hr)			0.1%	0.1%			-0.9%	-0.9%
Difference between Scenarios A and B								
Total Flow (All Vehicles)				2				0
Percentage of HGVS from Total Flow				0.2%				0.2%
Total Vehicle Kilometrage (Veh Kms)				1				0
Total Link Travel Time (Veh Hrs)				0				0
Average Speed (Km/hr)				0.0				0.0
Percentage Difference between Scenarios A and B								
Total Flow (All Vehicles)				0.1%				0.0%
Total Vehicle Kilometrage (Veh Kms)				0.1%				0.0%
Total Link Travel Time (Veh Hrs)				0.1%				0.1%
Average Speed (Km/hr)				0.0%				0.0%

Table 6.2: Summary Statistics for Godalming AQMA site.

Hindhead AQMA Site

Key Statistics	Inbound				Outbound			
	2005	2026			2005	2026		
		Do-Minimum	Scenario A	Scenario B		Do-Minimum	Scenario A	Scenario B
Total Flow (All Vehicles)	3,911	2,659	2,743	2,876	3,916	2,659	2,743	2,876
Percentage of HGVS from Total Flow	5.6%	5.3%	5.2%	5.6%	5.2%	5.3%	5.2%	5.6%
Total Vehicle Kilometrage (Veh Kms)	2,254	1,576	1,623	1,705	2,252	1,568	1,616	1,696
Total Link Travel Time (Veh Hrs)	44	44	45	48	42	43	44	48
Average Speed (Km/hr)	59.0	47.8	47.3	46.7	59.0	47.6	47.2	46.4
Total Link Length (Km)	2.9	1.7			2.9	1.7		
Difference between Scenario and 2026 Do-Minimum								
Total Flow (All Vehicles)			85	217			85	217
Percentage of HGVS from Total Flow			-0.2%	0.3%			-0.2%	0.3%
Total Vehicle Kilometrage (Veh Kms)			47	129			49	128
Total Link Travel Time (Veh Hrs)			1	5			2	5
Average Speed (Km/hr)			-0.5	-1.1			-0.5	-1.2
Percentage Difference between Scenario and 2026 Do-Minimum								
Total Flow (All Vehicles)			3.2%	7.9%			3.2%	7.9%
Total Vehicle Kilometrage (Veh Kms)			3.0%	7.9%			2.2%	8.2%
Total Link Travel Time (Veh Hrs)			3.2%	10.1%			4.0%	11.8%
Average Speed (Km/hr)			-1.0%	-2.3%			-0.8%	-2.5%
Difference between Scenarios A and B								
Total Flow (All Vehicles)				132				132
Percentage of HGVS from Total Flow				0.4%				0.4%
Total Vehicle Kilometrage (Veh Kms)				82				79
Total Link Travel Time (Veh Hrs)				3				3
Average Speed (Km/hr)				-0.6				-0.7
Percentage Difference between Scenarios A and B								
Total Flow (All Vehicles)				4.8%				4.8%
Total Vehicle Kilometrage (Veh Kms)				5.0%				4.9%
Total Link Travel Time (Veh Hrs)				7.0%				7.6%
Average Speed (Km/hr)				-1.3%				-1.5%

Table 6.3: Summary Statistics for Hindhead AQMA site

6.2.7 It is important to note that two networks were used in the assessment of the AQMA's summary statistics, like the main results of the report. A 2005 network representing the network in its current state and a 2026 network including the HA's Hindhead Improvement Scheme.

6.2.8 *Table 6.1* displays the summary statistics for the Farnham AQMA site. There is a larger flow in an inbound direction to the town centre, in the AM peak hour (0800 – 0900), than in an outbound direction. This is to be expected as this trend in flow is portraying normal commuting patterns to a town centre in the morning peak hour. When comparing the statistics for the different directions, there is a difference in total link length assessed. The inbound direction contains 0.5km more link length than the outbound direction (2.5km), this is because the inbound direction contains the one-way system of Farnham. In both directions, Scenario B has the largest impacts on the local road network of the Farnham AQMA. For example Scenario B, in both directions, has a larger proportion of HGVs than Scenario A: 0.3% increase for inbound direction and 0.4% increase for outbound direction. In addition Scenario B has a greater amount of vehicle kilometres travelled in comparison to Scenario A: 147vkm (4.6% increase) in an inbound direction and 136vkm (5.9% increase) in an outbound direction.

6.2.9 The summary statistics for the Godalming AQMA site are presented in *Table 6.2*. The summary statistics indicate that the flow in a northbound direction is much larger than the southbound direction, in the 2005 base and all forecast scenarios. However, the impacts presented by Scenario A and B on the Godalming AQMA are minimal. For instance in a northbound directions the test scenarios present minimally smaller impacts than the 2026 Do-Minimum; a 0.3% (Scenario A) and a 0.2% (Scenario B) reduction in vehicle kilometres compared tot the 2026 Do-Minimum. The difference between the impacts presented by Scenarios A and B are minor, for example, in both directions the largest difference in any of the statistics is 0.1%.

6.2.10 The Hindhead AQMA site is positioned in a key area that will be affected by changes in the road network related to the HA's Hindhead Improvement Scheme, Hindhead Crossroads. In 2005 the following links are present in the AQMA site: A287 Tilford Road; A3 London Road; A287 Hindhead Road; and A3 Portsmouth Road. However, in the 2026 network the A3 London Road arm of the junction will no longer exist. This provides an explanation as to why the link length displayed in *Table 6.3* differs between the 2005 base (2.9 km) and the 2026 forecasts (1.7 km). This reduction in the size of links in the Hindhead AQMA in 2026, explains the large reduction in summary statistics between the 2005 base and 2026 Do-Minimum e.g. reduction in flow of 1,252 vehicles in an inbound direction and reduction of 1,257 vehicles in an outbound direction. Scenario B presents larger traffic impacts than Scenario A. For instance in an inbound direction vehicle kilometres are 5% more in Scenario B and an average speed reduction of 1.3% when compared to Scenario A. In an outbound direction vehicle kilometres increase by 4.9% and average speed reduces by 1.5% in Scenario B, when compared with Scenario A.

7 CONCLUSIONS

7.1 Summary

7.1.1 The aim of this study was to provide WBC with an initial assessment, in transport terms, of their LDF Core Strategy by considering the impact the proposed additional residential and commercial development would have on the highway network at a strategic level.

7.1.2 The main objectives of the evaluation were to:

- Identify the locations and estimates of two scenarios (Scenario A and Scenario B) of additional residential and commercial development in the borough for the forecast year of 2026;
- Compare the traffic impacts for these developments by developing traffic models for the forecast year and for the current situation (taken as 2005);
- To develop specific forecasts for: 2026 Do-Minimum
  2026 Scenario A
  2026 Scenario B
- To provide comparisons between the forecast scenarios and their relevant reference cases.

7.1.3 2026 trip generation forecasts within the Borough of Waverley were derived from planning data obtained from WBC, use of the TRICS database and TEMPRO growth factors. These were used to develop 2026 forecast matrices to input into the SINTRAM strategic traffic model.

7.1.4 The 2026 forecast scenarios were based on a network that included the Hindhead Improvement Scheme. Therefore two networks were used in the modelling process, a 2005 network representing the network in its current state and a 2026 network that included the 2026 Highways Agency Hindhead Improvement Scheme, which incorporates dualling the remaining single carriageway section of the A3.

7.1.5 The modelling of these forecast scenarios enabled broad comparisons to be made between forecast and base years, together with differences between the scenarios themselves.

7.2 Traffic Impacts of Development

7.2.1 The Scenario A and B planning data differ only by their definition of approved and non-approved development by planning permission. Scenario A represents development that has been approved by planning permission only. Whereas Scenario B represents all development, irrespective of whether it has been approved by planning permission or not. Therefore Scenario B consists of approved and non-approved development.

7.2.2 The travel matrix forecasts illustrating growth in traffic is shown below in *Table 7.1*.

AM Vehicle Trips	2005 Base	2026 Do-Minimum	2026 Scenario A	2026 Scenario B
Waverley Intra Borough Trips	1,232	1,129	1,223	1,684
External to Borough Trips	6,515	6,550	6,743	8,674
Borough to External Trips	11,174	11,277	11,925	12,782

Table 7.1: Summary Trip Matrix, AM Peak Hour

7.2.3 The model suggests that total non-trunk road traffic flow within Waverley during the AM peak hour would increase by approximately 10,100vkm (3.2%) in 2026 Scenario A when compared with the 2026 Do-Minimum. In 2026 Scenario B traffic flow would increase by approximately 36,400vkm (11%) when compared with 2026 Scenario A.

7.2.4 The model suggests that total trunk road (A3) traffic flow generated within Waverley during the AM peak hour would increase by approximately 1,300vkm (3.9%) in 2026 Scenario A when compared to 2026 Do-Minimum. In 2026 Scenario B, trunk road traffic flow would increase approximately by 3,100vkm (9%) when compared to 2026 Scenario A.

7.2.5 By comparing summary statistics and plots of traffic flows it is apparent that out of the two scenarios, 2026 Scenario B has the greatest impacts on local traffic flows in Waverley. 2026 Scenario B will increase traffic flow and reduce average speed on the local road network more than Scenario A. However, it should be noted that the differences between Scenarios A and B are small (under 19% increase in all summary statistics) and any increases displayed in Scenario B are not significant to cause any large disruption to the road network in Waverley or nearby areas.

7.2.6 It is unsurprising that Scenario B has the largest impacts, as this is the scenario that represents the largest amount of additional trips generated by WBC planning data. Scenario B (approved and non-approved development) represents a worst-case scenario within the context of this evaluation.

7.2.7 The distinct areas in the Borough of Waverley which will be affected most by the additional trips generated from the proposed residential and commercial developments are the four main urban settlements: Farnham, Godalming, Cranleigh and Haslemere. Specifically Farnham and surrounding areas that are in close proximity to the A31 corridor, between the Runfold Junction and the Hickleys Corner, are to feel the highest impacts in increased traffic flow. This area could potentially be impacted by a general increase in link and junction delay.

7.2.8 Further measures may be thought necessary to implement in parts of the borough i.e. the A31 corridor, although greater investigation would be needed to confirm this. However, it is suggested that if any improvement plans were implemented then it would be beneficial to do this using a holistic approach.

7.2.9 From investigating the potential affects on the three AQMA sites in Waverley it is clear that all will be impacted by the new trips, generated by the proposed commercial and residential developments in 2026. Scenario A has the least impacts on the AQMA sites whereas Scenario B has the greatest impacts. However, these traffic impacts are minimal within the AQMA sites and are not thought to cause any major detrimental affects.

APPENDIX A – Residential Planning Data, Completions

Ward Code	Ward Name	Houses/Bungalows							Flats/Maisonettes							TOTAL						Total Gross Dwelling Completed
		1	2	3	4	5+	Unknown	TOTAL	1	2	3	4	5+	Unknown	TOTAL	1	2	3	4	5+	Unknown	
43ULGF	Alfold Cranleigh Rural and Ellens Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
43ULGG	Blackheath and Wonersh Ward	0	0	1	2	0	1	4	0	1	0	0	0	0	1	0	1	1	2	0	1	5
43ULGH	Bramley, Busbridge and Hascombe Ward	1	1	3	2	0	1	8	2	6	0	1	0	0	9	3	7	3	3	0	1	17
43ULGJ	Chiddingfold and Dunsfold Ward	0	7	4	10	0	0	21	1	1	0	0	0	0	2	1	8	4	10	0	0	23
43ULGK	Cranleigh East Ward	0	36	31	4	5	1	77	4	24	0	0	0	0	28	4	60	31	4	5	1	105
43ULGL	Cranleigh West Ward	0	1	4	4	2	1	12	1	2	0	0	0	0	3	1	3	4	4	2	1	15
43ULGM	Elstead and Thursley Ward	0	23	19	6	2	0	50	0	0	0	0	0	0	0	0	23	19	6	2	0	50
43ULGN	Ewhurst Ward	0	0	0	1	0	0	1	0	0	1	0	0	0	1	0	0	1	1	0	0	2
43ULGP	Farnham Bourne Ward	0	0	2	11	5	0	18	0	13	0	0	0	1	14	0	13	2	11	5	1	32
43ULGQ	Farnham Castle Ward	0	10	7	0	0	0	17	33	12	2	0	0	0	47	33	22	9	0	0	0	64
43ULGR	Farnham Firgrove Ward	0	3	5	5	2	0	15	0	5	5	1	0	0	11	0	8	10	6	2	0	26
43ULGS	Farnham Hale and Heath End Ward	0	2	2	2	0	0	6	0	0	0	0	0	0	0	0	2	2	2	0	0	6
43ULGT	Farnham Moor Park Ward	0	10	22	18	4	0	54	15	63	0	0	0	0	78	15	73	22	18	4	0	132
43ULGU	Farnham Shortheath and Boundstone Ward	2	2	11	5	1	0	21	0	9	0	0	0	0	9	2	11	11	5	1	0	30
43ULGW	Farnham Upper Hale Ward	4	15	7	7	2	0	35	2	3	0	0	0	0	5	6	18	7	7	2	0	40
43ULGX	Farnham Weybourne and Badshot Lea Ward	0	5	1	0	0	0	6	1	6	0	0	0	0	7	1	11	1	0	0	0	13
43ULGY	Farnham Wrecclesham and Rowledge Ward	5	34	24	9	3	1	76	2	4	0	0	0	0	6	7	38	24	9	3	1	82
43ULGZ	Frensham, Dockenfield and Tilford Ward	0	0	2	3	1	1	7	3	3	1	1	0	0	8	3	3	3	4	1	1	15
43ULHA	Godalming Binscombe Ward	0	0	1	1	0	0	2	7	0	0	0	0	0	7	7	0	1	1	0	0	9
43ULHB	Godalming Central and Ockford Ward	0	2	1	3	0	0	6	24	58	18	0	0	0	100	24	60	19	3	0	0	106
43ULHC	Godalming Charterhouse Ward	0	1	4	1	3	0	9	2	22	0	0	0	0	24	2	23	4	1	3	0	33
43ULHD	Godalming Farncombe and Catteshall Ward	2	15	7	3	0	0	27	14	23	2	0	0	0	39	16	38	9	3	0	0	66
43ULHE	Godalming Holloway Ward	0	17	31	5	1	0	54	9	6	0	0	0	0	15	9	23	31	5	1	0	69
43ULHF	Haslemere Critchmere and Shottermill Ward	0	1	1	5	3	0	10	8	30	7	4	0	0	49	8	31	8	9	3	0	59
43ULHG	Haslemere East and Grayswood Ward	5	37	41	8	7	0	98	14	30	7	0	0	0	51	19	67	48	8	7	0	149
43ULHH	Hindhead Ward	1	16	14	1	0	0	32	12	62	17	0	0	0	91	13	78	31	1	0	0	123
43ULHJ	Milford Ward	0	9	6	7	0	0	22	13	14	0	0	0	0	27	13	23	6	7	0	0	49
43ULHK	Shamley Green and Cranleigh North	0	2	0	0	0	0	2	0	0	0	0	0	0	0	0	2	0	0	0	0	2
43ULHL	Witley and Hambledon Ward	0	21	3	3	0	1	28	18	43	5	5	0	0	71	18	64	8	8	0	1	99
	TOTAL FOR THE BOROUGH	**20**	**270**	**254**	**126**	**41**	**7**	**718**	**185**	**440**	**65**	**12**	**0**	**1**	**703**	**205**	**710**	**319**	**138**	**41**	**8**	**1421**

APPENDIX B – Residential Planning Data, Outstanding Permissions

Ward Code	Ward Name	HOUSES						FLATS						Total Dwellings					Total Dwellings Outstanding (Gross)
		1	2	3	4	Unknown	TOTAL	1	2	3	4	Unknown	TOTAL	1	2	3	4	Unknown	
43ULGF	Alfold Cranleigh Rural and Ellens Green	0	2	2	1	1	6	0	0	0	0	0	0	0	2	2	1	1	6
43ULGG	Blackheath and Wonersh Ward	0	0	4	1	1	6	0	0	0	0	0	0	0	0	4	1	1	6
43ULGH	Bramley, Busbridge and Hascombe Ward	0	4	1	1	0	6	0	1	0	0	0	1	0	5	1	1	0	7
43ULGJ	Chiddingfold and Dunsfold Ward	0	3	5	0	0	8	2	11	1	0	0	14	2	14	6	0	0	22
43ULGK	Cranleigh East Ward	0	0	3	4	2	9	0	0	0	0	0	0	0	0	3	4	2	9
43ULGL	Cranleigh West Ward	0	0	3	5	0	8	2	8	0	0	0	10	2	8	3	5	0	18
43ULGM	Elstead and Thursley Ward	0	5	1	7	0	13	0	0	0	0	0	0	0	5	1	7	0	13
43ULGN	Ewhurst Ward	0	0	2	1	0	3	0	0	0	0	0	0	0	0	2	1	0	3
43ULGP	Farnham Bourne Ward	1	0	4	12	3	20	1	0	3	1	1	6	2	0	7	13	4	26
43ULGQ	Farnham Castle Ward	0	3	10	3	1	17	4	10	0	0	0	14	4	13	10	3	1	31
43ULGR	Farnham Firgrove Ward	0	0	2	2	0	4	0	10	0	0	0	10	0	10	2	2	0	14
43ULGS	Farnham Hale and Heath End Ward	0	0	1	0	0	1	0	0	0	0	0	0	0	0	1	0	0	1
43ULGT	Farnham Moor Park Ward	0	4	16	10	1	31	2	53	0	0	0	55	2	57	16	10	1	86
43ULGU	Farnham Shortheath and Boundstone Ward	0	1	3	4	0	8	1	2	0	0	0	3	1	3	3	4	0	11
43ULGW	Farnham Upper Hale Ward	0	3	1	0	0	4	0	0	0	0	0	0	0	3	1	0	0	4
43ULGX	Farnham Weybourne and Badshot Lea Ward	0	0	3	0	0	3	0	0	0	0	0	0	0	0	3	0	0	3
43ULGY	Farnham Wrecclesham and Rowledge Ward	6	37	31	5	1	80	0	0	0	0	0	0	6	37	31	5	1	80
43ULGZ	Frensham, Dockenfield and Tilford Ward	1	2	2	2	0	7	3	1	0	0	0	4	4	3	2	2	0	11
43ULHA	Godalming Binscombe Ward	0	0	0	1	0	1	0	2	0	0	0	2	0	2	0	1	0	3
43ULHB	Godalming Central and Ockford Ward	0	7	11	2	0	20	19	40	0	0	0	59	19	47	11	2	0	79
43ULHC	Godalming Charterhouse Ward	0	4	2	11	0	17	0	18	0	0	0	18	0	22	2	11	0	35
43ULHD	Godalming Farncombe and Catteshall Ward	1	4	0	0	0	5	3	12	0	0	0	15	4	16	0	0	0	20
43ULHE	Godalming Holloway Ward	0	2	0	2	0	4	8	9	0	0	0	17	8	11	0	2	0	21
43ULHF	Haslemere Critchmere and Shottermill Ward	1	7	2	9	2	21	2	11	0	0	0	13	3	18	2	9	2	34
43ULHG	Haslemere East and Grayswood Ward	1	19	12	23	4	59	18	10	4	0	0	32	19	29	16	23	4	91
43ULHH	Hindhead Ward	0	17	4	9	3	33	8	8	3	0	0	19	8	25	7	9	3	52
43ULHJ	Milford Ward	1	5	0	2	0	8	5	11	0	0	0	16	6	16	0	2	0	24
43ULHK	Shamley Green and Cranleigh North	0	1	4	3	1	9	0	0	0	0	1	1	0	1	4	3	2	10
43ULHL	Witley and Hambledon Ward	1	5	1	1	0	8	0	0	0	0	0	0	1	5	1	1	0	8
	TOTAL FOR THE BOROUGH	**13**	**135**	**130**	**121**	**20**	**419**	**78**	**217**	**11**	**1**	**2**	**309**	**91**	**352**	**141**	**122**	**22**	**728**

APPENDIX C – Email Correspondence Regarding Scenarios

Hi Sarah,

I have spoken to Will today about the issues you raised.

We would endeavor to accommodate the completion of this work to your timescales as much as possible. However, we are aware that other LA's are also anticipating receiving support with their LDF and are currently completing our pro-forma, although the are no firm timescale commitments at the moment.

If you were to delay the work at this stage then that's fine, but on the understanding that if we were to have another request before you are ready to recommence then we would have to try to accommodate both LAs as best as possible.

Secondly, you stated that you have been considering other options to be tested and to exclude windfalls. I understand your reasons for suggesting the four scenarios, as it would be a way of experimenting with your distribution. However, we are slightly concerned by the number of scenarios as this would involve a lot more preparatory work i.e. proportioning by population in each zone. I think I have already mentioned that we suggest that you use scenarios that keep the developments which have been approved and non-approved by planning permission separate (such as the scenarios we suggested to you). If we were to incorporate this into the four scenarios, which you have suggested then it, would create a much larger amount of work, scenarios and complication. By undertaking the work with so many scenarios it would be a case of us undertaking more work than is normally offered as support from Surrey County Council.

Furthermore, from the four scenarios you suggested we doubt that there would be a significant amount of difference reported in the outputs from the model, specifically concerning your proposed Scenarios B to D. We will be using a strategic model for the assessment and this is unlikely to report small differences in distribution, particularly in a Borough similar to Waverley.

We are presuming that you may wish to exclude windfalls, as you are worried about you annual average trend being an overestimate. I know you said you are looking into how other LAs calculate windfalls, but it may be wiser to not use the annual trend but instead make general projection e.g 1000 units. This is just an example but it may avoid the issue of overestimation.

We are aware that you are still working on parts of the data, so if you would like another meeting to discuss things then please feel free to request one. We could also possibly offer the attendance of a member of Surrey County Council's Transport and Development Control Team if needed.

Emma Brundle

sarah.nash@waverley.gov.uk

26/08/09 15:18

Thanks for getting back to me Emma - I do have some further queries that you may be able to assist with...

I have been chatting again to Graham about these options, and we are considering the option of excluding windfalls. As past trends show we have such a high windfall figure it may not be representative of what we would be providing.

In this case we may look to testing a few scenarios based on distribution for example:

Scenario A: Completions, outstanding permissions and identified sites

Scenario B: As above and distributing the residual allocation over the four main urban areas (Farnham, Godalming, Haslemere & Cranleigh).
Scenario C: As above, distributing to the four main urban areas plus the five largest villages (Elstead, Milford, Witley, Bramley & Chiddingfold)

Scenario D: As above, distributing to the four urban areas, five largest villages and all other Rural Settlements as defined in the local Plan (Alfold, Alfold Crossways, Churt, Dockenfield, Dunsfold, Grayswood, Hascombe, Rowly, Shamley Green, Thursley, Tilford)

This isn't definite at this stage; I just wanted to find out whether it is possible in terms of your modeling?

Thanks

Sarah Nash

APPENDIX D

TRICS Location Definitions (December 2008)
(Taken from TRICS 2009(b)).

Town Centre
Within the central core area of the heart of the town/city (e.g. the primary shopping area), as defined in the local development plan (if appropriate).

Edge of Town Centre
For retail, a location within easy walking distance (i.e. up to 300 metres) of the central primary shopping area, often providing parking facilities that serve the centre as well as the site, thus enabling one trip to serve several purposes. For other uses, the edge-of-centre radius from the town/city may be more extensive, based on how far people would be prepared to walk. For offices this may be outside the town centre but in the urban area within 500m of a public transport interchange. Local topography and barriers will affect pedestrians' perceptions of easy walking distance. Examples of barriers include crossing major roads and car parks. The perceived safety of the route and strength of the attraction of the town centre are also relevant.

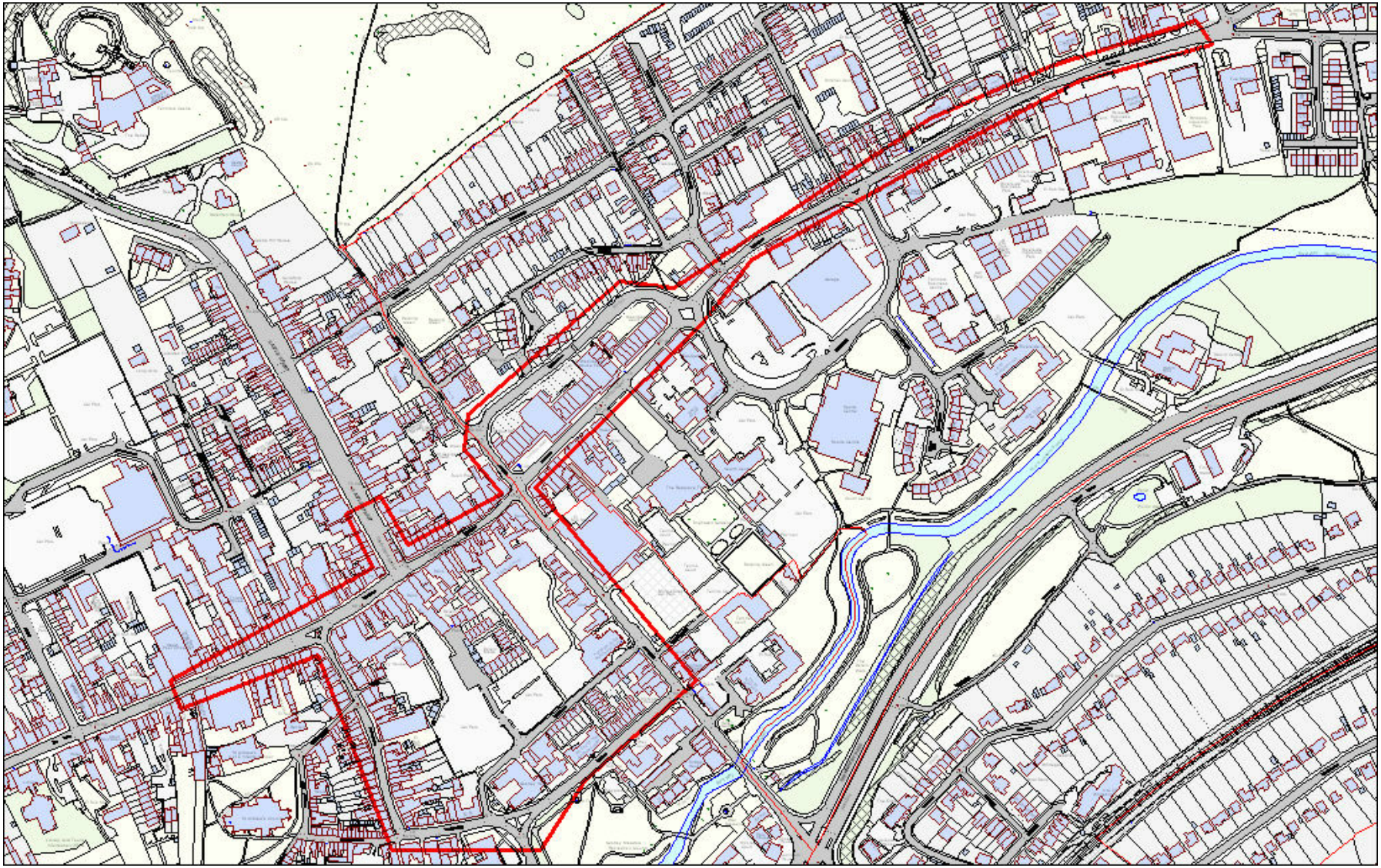
Neighbourhood Centre
Predominantly residential area, but with additional amenities like local shops, schools etc. Could be described as a small "district" or "village" within the town/city itself. Would also apply to actual villages. The local shops serve a small catchment. These may include a general grocery store, a newsagent, a sub-post office and a pharmacy, as well as others. These centres provide accessible shopping for people's day-to-day needs.

Suburban Area (Out of Centre)
An area outside the edge of the town/city centre, but not at the town/city's physical edge. This can encompass a wide range of physical locations within a town/city. Suburban Area sites can range from busy built-up areas near the centre of town (but outside the Edge of Town Centre radius), to leafy suburbs far from the centre.

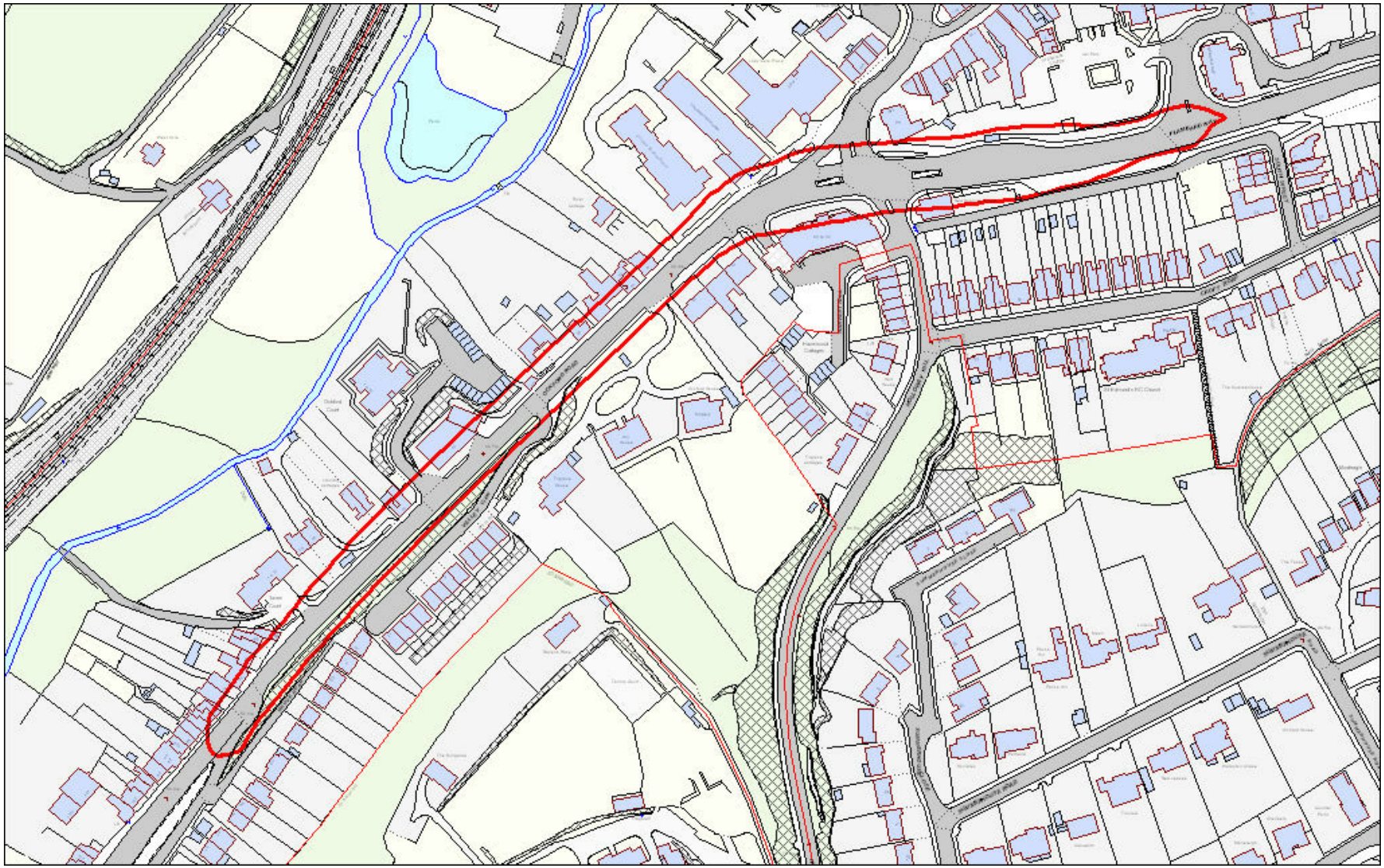
Edge of Town
At the physical edge of the town/city, where the town/city meets the countryside. The actual physical distance from the site to the beginning of the countryside can vary proportionately to the size of the town/city.

Free Standing (Out of Town)
Just beyond the physical edge of the nearest town/city, or in an isolated rural location (sites in villages are within the Neighbourhood Centre category). The distance from the edge of the town/city, which qualifies a site as Free Standing, is not set, and is instead judged on a site-by-site basis, proportional to the size of the town/city.

APPENDIX E – Farnham AQMA



APPENDIX F – Godalming AQMA



APPENDIX G – Hindhead AQMA