

Job Name: Horsham Transport Study and Crawley Transport Study
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Subject: **Horsham – Crawley Joint Note – Development Assumptions (Including West of Ifield)**

1. Introduction

- 1.1. This note provides an overview of the input assumptions and outputs for each common Strategic Sites input within the Crawley Strategic Development Options Transport Study and the Horsham Local Plan Transport Assessment.
- 1.2. The note aims to provide a high-level overview of the forecasting methodology for both models, setting out the general forecasting methodology of both models and highlighting any variance in the overall modelling methodology. This will be followed by outlining the strategic site assumptions including internalisation assumption and sustainable transport assumptions resulting in the reduction of the car trip rates.
- 1.3. Due to the proximity of the neighbouring local planning authorities, the strategic local plan development site of West of Ifield has been implemented within both transport studies 'Local Plan' scenarios. The impacts and forecasting methodology of this site will be set out in detail as well as analysing the cumulative impacts.
- 1.4. Further considerations outlined within this report include a comparison of Trip Generation (i.e. number of vehicle trips to/from each site after internalisation has been considered), and key impacts on the network – setting out links and junctions where impacts are seen. A high level indication of the development sites which have the greatest impact at these locations will be provided.

2. Forecasting Methodology - Overview

- 2.1. The following section sets out the key overall forecasting methodology parameters used to underpin both the Crawley Strategic Development Options Transport Study and the Horsham Local Plan Transport Assessment.

Future Forecasting

- 2.2. The Horsham base model has been validated to 2019 data whilst the Crawley model is set to 2015.
- 2.3. The forecast year for the Horsham Local Plan Transport Assessment was set to 2036 and covers the end of the Local Plan period, whilst the Crawley Transport Study forecasting year has been set to 2035. This was consistent with the end of the Crawley Local Plan at the start of the study. The horizon year of the Crawley Local Plan now extends to 2037. The horizon year of the Horsham Local Plan now extends to 2038.

- 2.4. It was considered that the additional one-to-two-year background growth attributable to neighbouring authorities, would be within the uncertainties inherent in forecasting over long periods usually covered by Local Plans (i.e. 15 to 20 years). Therefore, it is considered that the transport model is, to all intents and purposes, robust and adequate in its representation of prospective 2037 and 2038 travel demand and associated predicted transport network conditions.

Reference Case Forecast Modelling Overview

- 2.5. A Reference Case forecast model has been developed to represent future traffic conditions at the end of the plan period (2036), without the consideration of the Local Plan development. For both the Horsham and Crawley model the same reference case forecast methodology has been applied, in accordance with DfT guidance.
- 2.6. For both models, the reference case includes all committed development within the respective study area district, including development within the adopted Local Plan, as well as any committed development within neighbouring authorities.
- 2.7. For neighbouring authorities only, a further level of growth is added in order to more accurately represent expected development growth up to the respective forecast year. This growth is derived from the Department for Transport National Trip End Model (NTEM) which includes housing, jobs and geodemographic predictions for all planning authorities.
- 2.8. For each of the neighbouring authorities, the housing and job numbers within NTEM are adjusted downwards, based on the authorities committed development information, which avoids any double counting. This results in the combination of the adjusted NTEM growth and the specific committed developments within the neighbouring authorities matching expected NTEM growth. Further information on this is found in the respective full transport assessment reports.
- 2.9. It is noted that in the Horsham model, the treatment of Crawley followed the standard forecasting process of including committed development information provided and then capping growth in Crawley to NTEM, as set out in DfT Guidance. However, in the Crawley model, the development growth assumptions for the borough were more complex. CBC provided far more detail on future growth projections, including committed development, which are higher than NTEM development growth assumptions. These locally based projections have been used rather than revert to NTEM in the case of the Crawley model and this is the appropriate approach in the case of modelling impacts of Crawley's Local Plan update.

Horsham Reference Case Model

- 2.10. For the Horsham Reference Case Forecast, the following table summarises the total level of development within Horsham and Crawley, noting the growth within Crawley is set to NTEM level, whilst the total growth within Horsham is attributed to committed development only. Any additional growth associated with Local Plan sites is added within the Local Plan development scenarios.

Table 2-1: Horsham Model Reference Case Forecast Development Growth

Authority	Households Growth (2019-2036)	Employment Growth - Jobs (2019 -2036)
Crawley (NTEM + Committed Developments)	4,677	4,657
Horsham (Committed Developments Only)	6,026	10,392

Crawley Reference Case Model

- 2.11. For the Crawley Reference Case scenario, the same methodology has been developed, with NTEM growth being applied on top of committed developments in neighbouring authorities, including Horsham, such that the neighbouring authorities match NTEM growth levels. Whilst within Crawley only committed development growth is being applied within the Reference Case forecasts.
- 2.12. The following table summarises the total level of development growth within the reference case scenario within Horsham and Crawley, noting the growth within Horsham is set to NTEM level, whilst the total growth within Crawley is attributed to committed development only and additional growth associated with Local Plan sites is added within the Local Plan development scenarios.

Table 2-2: Crawley Model Reference Case Forecast Development Growth

Authority	Households Growth (2015-2035)	Employment Growth - Jobs (2015 -2035)
Crawley (Committed Developments Only)	7,317	8,547
Horsham (NTEM + Committed Developments)	16,431	5,064

Reference Forecast Model Variance

- 2.13. The reference case forecast variance in growth between the models stems from a combination of the following issues:
- For the Horsham Model, the Crawley household and employment growth was capped to NTEM level (for the Crawley borough area), with the addition of only high level committed development information. Whilst within the Crawley model study a more detailed level of development information was provided by CBC, which resulted in more committed developments than the National Trip End Model forecasts.
 - For the Crawley Model, Horsham household growth was capped to NTEM level, whilst for the Horsham model committed household developments within Horsham are low due to a large majority of household development growth expected to be covered by the Local Plan sites.
 - For the Crawley Model, the Horsham employment growth was capped to NTEM level (for the Horsham district area), with the addition of only high level committed development information. Whilst within the Horsham model study a more detailed level of employment development information was provided by HDC, which resulted in more employment site committed developments than the National Trip End Model forecasts.
 - Accounting for the 4-year variance in committed development and NTEM growth projections also adds to the growth variance.

LGV and HGV Growth Assumptions

- 2.14. LGV and HGV growth has been derived from the DfT Road Traffic Forecasts (RTF18) in the same manner for both the Horsham and Crawley forecasts. The variance of growth stems from the Crawley Model having more years of growth due to the earlier model base year of 2015.
- 2.15. The following table provides LGV and HGV Growth rates for the two models scenario years, within the respective model areas.

Table 2-3: LGV and HGV Growth

Model	LGV Growth	HGV Growth
Crawley Model (2015-2035)	31.2%	9.1%
Horsham Model (2019-2036)	25.1%	8.8%

3. Strategic Development Site Assumptions

Trip Rates

- 3.1. The following section identifies the variance of TRICS trip rate assumptions and the impacts of sustainable travel proposals, and the resulting trips displaced into person trips using public transport, cycling and walking.

TRICS Trip Rate – Pre-Sustainable Mitigation

- 3.2. Table 3-1 and 3-2 highlight vehicle trip rates for the reference case committed developments of the Horsham and Crawley models (before sustainable mitigation). Variances in reference case trip rates between the two studies are due to differing locational characteristics between developments in the two areas.

Table 3-1: Horsham Reference Case Trip Rates

Land use	AM			PM		
	Departure	Arrivals	Total	Departure	Arrivals	Total
B1a, Offices (per 100 SQM)	0.159	1.534	1.693	1.296	0.168	1.464
B1c, Light Industry (per 100 SQM)	0.191	0.507	0.698	0.487	0.102	0.589
B8, Warehousing (per 100 SQM)	0.059	0.074	0.133	0.092	0.044	0.136
C3, Suburban per unit	0.405	0.172	0.577	0.155	0.355	0.51

Table 3-2: Crawley Reference Case Trip Rates

Land use	AM			PM		
	Departure	Arrivals	Total	Departure	Arrivals	Total
B1a, Offices (per 100 SQM)	0.115	1.027	1.142	0.985	0.101	1.086
B1c, Light Industry (per 100 SQM)	0.029	0.224	0.253	0.23	0.028	0.258
B8, Warehousing (per 100 SQM)	0.049	0.121	0.170	0.076	0.017	0.093
C3, Town Centre per unit	0.183	0.054	0.238	0.069	0.146	0.215
C3, Suburban per unit	0.315	0.106	0.421	0.15	0.328	0.478

Strategic Site Internalisation

- 3.1. Within Horsham Model, for both residential and employment-based trips, further internalisation rates have been applied to development sites classified as having mixed land use. This assumption is based on the assumed increased level of active mode within the developments due to the close proximity of commuting and other journey types from dwelling within the site to employment land use within the site. For Crawley, internalisation has not been applied for West of Ifield as lower suburban residential trip rates have been used on the assumption that these already capture the internalisation.

- 3.2. This internalisation car trip reduction in Horsham was calculated at 12%. The internalisation factor has been derived from local census information, calculating the percentage of active mode trips taken within a select census output area.

Sustainable Transport Measures

- 3.3. Through the implementation of sustainable travel plans and sustainable travel measures a further distance-based reduction factor has been applied to strategic sites within the Crawley and Horsham models.
- 3.4. The distance-based reduction has been derived using empirical evidence from the DfT Sustainable Travel Towns study. As such the same distance-based reduction factors have been applied to both the Horsham and Crawley Models.

Table 3-3: Sustainable Measure Trip Reductions

	Up to 1km	1.1 – 3km	3.1 – 5km	5.1 – 10km	10.1 – 50km	Over 50km	Total
Car Trip Reduction	-22%	-14%	-10%	-6%	-3%	0%	-9%

Site Specific Sustainable Transport Measures

- 3.5. In addition to the soft sustainable transport measures outlined above, further physical site-specific mitigation measures have been applied to Local Plan developments within both models, including West of Ifield.
- 3.6. Within both models, for West of Ifield, a proposed high-quality bus corridor between the site and Crawley Town Centre are assumed to provide a 12% reduction in car trips between the development and zones classified as being within Crawley Town Centre and employment zones in Manor Royal.
- 3.7. For completeness the following site-specific sustainable mitigation have been applied to all sites within Horsham.

Table 3-4: Horsham Sustainable Mitigation – Site Specific Car Trip Reduction

Development Type	Estimated % car trip reduction	End Destination Reduction
Adjacent to larger village, fewer opportunities to access town facilities	Low % car trip reduction < 4%	Horsham Town Centre
Adjacent to larger village or town, moderate access to town facilities	Medium % car trip reduction - Overall 5% to 7%	Horsham Town Centre, Crawley Town Centre
New settlement with built-in opportunities for active & sustainable travel	Medium / high % car trip reduction – 7% to 10%	Horsham Town Centre
Adjacent to larger village or town, good access to town facilities	Medium / high % car trip reduction – 7% to 10%	Horsham Town Centre & Worthing
Good access to larger built-up area	High % car trip reduction – 10% to 12% up to 12% to 15%*	Horsham Town Centre, Crawley Town Centre
Adjacent to larger built-up area	Very high % car trip reduction – 12% to 15%	Crawley Town Centre and Manor Royal employment zones

- 3.8. Further sustainable mitigation and car trip reductions based on the propensity to cycle tool was applied solely to the potential Kilnwood Vale and West of Ifield developments within the Crawley model, which were included in Crawley model Scenario 3. A 5% reduction was applied to car commute and car other trips for trips made within Crawley Borough in addition to the 12% reduction rate and the distance-based reduction mentioned above.

4. West of Ifield

Development Mix Quantum Assumptions

- 4.1. The following tables provide the development mix assumptions between the Crawley Study and the Horsham Local Plan Transport Assessment for the West of Ifield Development. Assumptions for development to the west of Ifield is only included in Development Scenario 3 in the Crawley Local Plan Transport Modelling.

Table 4-1: West of Ifield Development Quantum

Horsham 2036 (Local Plan Preferred Scenario)		Crawley 2035 (Development Scenario 3)	
Dwellings	Employment (GFA sqm)	Dwellings	Employment (GFA sqm)
2,800	33,750	3,750	25,000

- 4.2. With regard to the employment split, the following highlights the specific breakdown of employment land use type within both models. In the Crawley model, the 25,000 sqm employment assumed for West of Ifield, was split equally into B1, B2 and B3 land uses.
- 4.3. For the Horsham model, the employment GFA quantum was based on the quantum provided by HDC, which provided B1 and B2/B8 totals, it has been assumed that the B2/B8 split was equal.

Table 4-2: West of Ifield Employment Land Use Type

Horsham 2036 (Local Plan Preferred Scenario)			Crawley 2035 (Development Scenario 3)		
B1	B2	B8	B1	B2	B8
10,000	11,875	11,875	8,333	8,333	8,333

West of Ifield Modelling Outputs

- 4.4. With the application of the above-mentioned trip rates and sustainable measure trip rate reductions, the following table shows the finalised modelling trip generation outputs from both the Crawley and the Horsham models.

Table 4-3: West of Ifield Modelled Trip Rates (pre-trip reduction)

	Horsham 2036 (Local Plan Preferred Scenario)		Crawley 2035 (Development Scenario 3)	
	Total Trips OUT	Total Trips IN	Total Trips OUT	Total Trips IN
AM Peak	1,079	593	1,204	537
PM Peak	732	1,214	698	1,253

Table 4-4: West of Ifield Modelled Trip Rates (post-trip reduction)

	Horsham 2036 (Local Plan Preferred Scenario)		Crawley 2035 (Development Scenario 3)	
	Total Trips OUT	Total Trips IN	Total Trips OUT	Total Trips IN
AM Peak	1,001	556	1,025	413
PM Peak	687	1047	619	897

- 4.5. Appendix A provides flow plots of flows with origins and destination within the West of Ifield, highlighting the variance between the two models.

Key Impacts on Network

- 4.6. The following section outlines the key impacts from the preferred final scenarios within the Crawley Town Area, for both models, before any junction specific Local Plan physical mitigation proposals. The tables below highlight the Volume over Capacity (V/C) changes at junctions earmarked as congestion hotpots.
- 4.7. V/C of 100% indicates that an arm at a junction is at capacity and over 100% that it is operating over capacity and therefore will experience excessive delays. The colour coding is as follows:
- White – V/C < 85% - The junction is operating well within capacity.
 - Amber – V/C between 85% and 100% - The junction is performing close to, but within capacity.
 - Red – V/C between 100% and 110% - At least one arm of the junction is over capacity.
 - Purple – V/C >110% - At least one arm of the junction is well over capacity.
- 4.8. As both models combine the impacts of all local plan developments, the impacts cannot be solely attributed to West of Ifield, however due to the size and proportion of Local Plan impacts stemming from West of Ifield, it can be assumed that the majority of Impacts stem as a result of the West of Ifield site. It should be noted that in the Crawley model, the West of Ifield site is only modelled in Scenario 3 (Local Plan Scenario 3 in Table 4-6 and Table 4-7). It should be noted that the results that are presented do not include the Crawley Western Link Road (CWLR) which was tested as a sensitivity test.

Table 4-5: Horsham Model Crawley Junction V/C Hotspots AM

Label	Junction Name	Reference Case	Preferred Scenario
C6	Ifield Avenue/ Stagelands		
C8	Ifield Roundabout, Ifield Ave SB approach		
C9	Bewbush Drive/Mowbray Drive		

Table 4-6 Horsham Model Crawley Junction V/C Hotspots PM

Label	Junction Name	Reference Case	Preferred Scenario
C1	A264/A2220 Bewbush Manor roundabout		

Label	Junction Name	Reference Case	Preferred Scenario
C2	A2220/A264 Horsham Road Roundabout		
C3	Cheals Roundabout, Horsham Rd WB approach		
C4	Ifield Roundabout, A23 EB Approach		
C5	Cheals Roundabout, Crawley Ave NB approach		
C6	Ifield Avenue/ Stagelands		
C7	Ifield Avenue / Warren Drive		
C8	Ifield Roundabout, Ifield Ave SB approach		

Table 4-7: Crawley Model Junction V/C Hotspots AM

Label	Junction Name	Reference Case	Development Scenario 3
2	Bewbush Manor Roundabout/A264/Sullivan Drive		
12	A2011 Crawley Avenue/B2036 Balcombe Road		
21	Southgate Avenue/College Road/Haslett Avenue East		
22	Southgate Avenue/Southgate Drive		
27	Airport Way/Northway Roundabout/ North Terminal Approach		
37	M23 J11 Roundabout circulatory NB off slip node		

Table 4-8: Crawley Model Junction V/C Hotspots PM

Label	Junction Name	Reference Case	Development Scenario 3
1	A264 Crawley Road/Faygate Lane roundabout		
2	Bewbush Manor Roundabout/A264/Sullivan Drive		
3	Broadfield Roundabout		
5	Gossops Drive/Buckswood Drive		
7	Cheals Roundabout/A2220 Horsham Road/Crawley Avenue		
8	Ifield Roundabout/Ifield Avenue/A23 Crawley Avenue roundabout		
12	A2011 Crawley Avenue/B2036 Balcombe Road		
14	B2036/Radford Road		
19	Southgate Avenue/Ashdown Drive		
20	Southgate Avenue/Hawth Avenue		
22	Southgate Avenue/Southgate Drive		
23	A2004 Southgate Avenue/Station Way		
28	A217/A23 London Road/Povey Cross Road		
34	M23 J10 Roundabout NB off slip node		

4.9. The variance of results between the models is attributed to the following.

- Variance in Background growth highlighted within Table 2.1 and Table 2.2
- Base model network calibration – Crawley Town area within the Crawley Model refined and calibrated to greater level of detail, trip and journey information from the mobile phone network data calibrated internally within Crawley to observed junction turning counts and road traffic flows. Whilst within the Horsham model this calibration process was not refined to the same level of detail.
- Loading of trips to the network – Within the Crawley model zones and therefore trips loading onto the network are far more granular than the Horsham model, therefore localised trip loading can be represented more accurately. Whilst within the Horsham model the coarse nature of the zone structure within Crawley results in a wider specific area of Crawley loading onto a few select specific points onto the network.

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