Crawley Transport Study

Transport Study of Strategic Development Options and Sustainable Transport Measures

Draft Crawley Local Plan 2021 - 2037

On behalf of **Crawley Borough Council**

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Executive Summary

This document reports on the findings of a transport study undertaken by Stantec on behalf of Crawley Borough Council (CBC) to inform the Draft Crawley Local Plan Review (LPR) for the Crawley Borough Area for the period up to 2037. The Draft Crawley Local Plan is a review of the adopted Local Plan Crawley 2030, extending of the term of the Plan to 2037 and therefore does not start from a fresh page. Developments have therefore already been identified up to 2030 along with transport mitigation required to deliver these. The Draft Crawley Local Plan is required to only mitigate the impacts of additional development quanta, included up to 2037.

This document reports on the transport modelling undertaken to inform the potential impacts of three Draft Crawley Local Plan Scenarios for Crawley Borough for the period 2020 to 2035. The Local Plan period has since been extended to 2037. It is considered that the modelling is sufficiently robust to be representative of impacts to 2037, the end of the draft Local Plan period. The quantum of development tested matches that proposed in the Local Plan period to 2037.

The Crawley SATURN Transport Model (CTM) which has a base year of 2015, has been used to undertake the transport modelling. The modelling has been conducted in accordance with standard industry practice and guidance. A fixed trip matrix approach has been used in which demands in the model respond to network costs and changes only through reassignment or change of route. A fixed assignment approach is a proportionate approach for the purposes of local plan testing. However, it is noted that this approach potentially overstates impacts in the peak hour as it does not take account of other behavioural changes to congestion by travellers besides change of route. Other potential traveller responses such as peak spreading to use the less congested peak hour shoulders, mode change, change in destination or not travelling (e.g., virtual mobility) are not represented, and these would work to curtail peak hour demands.

The impacts of the Local Plan have been assessed by considering the difference in network between the With Local Plan scenario against a Reference Case without the Local Plan.

The Reference Case has been defined to include the following development and infrastructure:

- Developments that have been completed between 2015 and 2020, as these are not represented within the base year model.
- Unbuilt consented development on allocated sites.
- Unbuilt consented development on other sites.
- Strategic consented development in neighbouring areas, such as remaining build out for Kilnwood Vale (Horsham District Council) and Land West of Copthorne (Mid Sussex District Council).
- Allocation sites in neighbouring planning authorities, such as Horley Business Park (Reigate & Banstead Borough Council).
- Committed highway schemes.

The Local Plan development for each scenario has been added on top of the Reference Case and the resultant demands assigned to a future Crawley network of Crawley that included committed schemes. By comparing the performance of the network with the Local Plan proposals in place against the Reference Case, overcapacity junctions potentially requiring mitigation were identified.

The emphasis has been to consider sustainable mitigation to support the Draft Crawley Local Plan rather than prioritise highway capacity mitigation. The Climate Change Committee's 6th Carbon budget makes assumptions about how surface transport will contribute towards the Balanced Net Zero Pathway. A major contribution towards meeting this Balanced Net Zero Pathway is travel behavioural change and reduction in travel demand. The Pathway assumes a reduction of 9% in total car miles by

2035 and 17% by 2050. In 2019, the UK passed laws to end its contribution to global warming by 2050. The target will require the UK to bring all greenhouse gas emissions to net zero by 2050. Crawley Borough has a duty to play its part towards tackling the Climate Change emergency and help the UK towards achieving its net zero target obligations.

The emphasis away from physical mitigation, marks a shift towards managing demand by prioritising sustainable travel including recognising the potential that virtual mobility will increasingly play alongside active modes, walking and cycling, public transport, rail and buses and car sharing and hence help in tackling the Climate Change emergency. It is recognised that public transport use has reduced during the COVID-19 pandemic although initiatives including by central government will or are being put in place to encourage people back to public transport post-pandemic such as for example through the DfT 'Bus Back Better – National Bus Strategy for England, 2021[1]'. The National Bus Strategy for example states on page 8 that '*Even before the pandemic started, the Government had committed £3bn of new money during the current Parliament to improve buses outside London. Armed with that transformational funding, this National Bus Strategy will build back better. Its central aim is to get more people travelling by bus- first, to get overall patronage back to its pre-COVID -19 level, and then exceed it. We will only achieve this if we can make buses a practical and attractive alternative to the car for more people.*"

Following conservative sustainable mitigation assumptions, an analysis of junctions has been undertaken to understand whether the unmet demand at overcapacity junctions can be addressed through additional sustainable measures, including mode shift to bus, walking and cycling and through virtual mobility. Only after a consideration of sustainable mitigation has the need for physical mitigation been considered.

Two junctions have been flagged up for potential consideration of physical mitigation where there are residual impacts in Scenarios 2 and 3. These are:

- Ifield Roundabout/Ifield Avenue/A23 Crawley Avenue roundabout – a local widening scheme to improve this junction has been drawn up as part of this study and has been shown to mitigate impacts for both Scenarios 2 and 3. The scheme is shown in Drawing 48559/5501/SK004. The junction is already overcapacity in the Reference Case, hence even small amounts of additional traffic exacerbate the performance of the junction. Scenario 2 puts much less traffic on the junction than Scenario 3. In the AM Peak, sustainable mitigation is able to achieve performance similar to that seen in the Reference Case. However, in the PM peak, this is not the case and physical mitigation has been necessary to mitigate the impacts of Scenarios 2 and 3 even if, Scenario 2 places much less additional demands on the junction than Scenario 3.

- A2011 Crawley Avenue/B2036 Balcombe Road – further consideration of signal optimisation tested as part of this work has concluded that signal optimisation is an adequate solution for this junction.

[1] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/969205/DfT-Bus-Back-Better-national-bus-strategy-for-England.pdf

1 Introduction

1.1 Introduction

1.1.1 Stantec has been commissioned by Crawley Borough Council (CBC) to undertake a transport study to inform the Draft Crawley Local Plan Review for the Crawley Borough Area.

1.1.2 Crawley Borough Council (CBC) adopted the Crawley Borough Local Plan 2015-2030 [2] in December 2015. In order to meet the government expectations of maintaining an up-to-date Local Plan, the council has reviewed their adopted Local Plan. The Draft Crawley Local Plan 2021-2037[3] sets out the spatial strategy and vision for the Borough, and the policies to achieve this for the 17-year period up to 2037. It identifies the overall amount of new development needed over this period of time and indicates the broad locations for new development, including the location of major sites.

1.1.3 The proposed developments identified and allocated in the adopted Local Plan, Crawley 2030, and which have not yet been delivered, remain in the Draft Crawley Local Plan, and included within the calculations of the housing and employment projections up to 2037. The level of consented and completed development included within the 2030 Plan, along with most of the mitigation proposals included within that Plan, are included within the Reference Case. The purpose of the Local Plan update is to identify the mitigation necessary to deliver the development, over and above that included in the Plan up to 2030.

1.1.4 This transport study is intended to inform the evidence base for the Draft Crawley Local Plan 2021-2037, meeting the requirements of the relevant national guidance. This transport study has been undertaken to cover the anticipated development levels created by the draft Local Plan within Crawley borough. However, it spans the period 2020 – 2035/36 the anticipated period of the draft Local Plan at commission of the study. 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 as noted. It is considered that the additional two-to-three-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).

1.1.5 Department for Transport (DfT) produced National Trip End Model (NTEM) growth (Dataset 7.2) indicates that growth in Crawley Borough is estimated at 16% car driver growth for the period 2015 to 2035 in both the AM and PM peaks. The growth for West Sussex county was of the same order of magnitude at 16%. The corresponding level of growth for the period 2015 to 2037 for the borough and county were of the order of 17% in both the AM and PM peaks. This further gives confidence that the modelled horizon to 2035 is robust enough to inform the extended local period to 2037.

1.1.6 The alternative assumptions facility within TEMPro (the software used to extract NTEM growth) indicated that car growth of about 18% is predicted for Crawley Borough. This growth takes into account the committed and other planned growth (dwellings and jobs) in the borough used to specifically derive the Reference Case matrices for this study for the period 2015 to 2035, which again gives confidence in the robustness of the forecasting approach to represent 2037 travel demands.

1.1.7 Amongst other objectives, the study is required to address the requirements of both West Sussex County Council (WSCC) as transport authority and National Highways, both of which aim for a sustainable approach to transport with a common objective of managing travel demand to minimise congestion, delays and adverse environmental/safety impacts.

[2] Crawley 2030: Crawley Borough Local Plan 2015 – 2030 (2015) CBC: www.crawley.gov.uk/crawley2030

[3] Submission Local Plan https://crawley.gov.uk/planning/planning-policy/local-plan/local-plan-review

1.1.8 It is increasingly recognised that sustainable mitigation will need to play an important role in mitigating the impacts of the Local Plan up to 2037, in order to reduce impact on the environment and improve health and wellbeing. It is generally accepted that a 'predict and provide' approach caters for an increase in car traffic demand and investment in more sustainable mitigation should increasingly take precedence, with increased highway capacity being considered as a last resort. The role of Virtual Mobility encompassing working from home and online shopping will increasingly play an important role in fulfilling some of the derived demand for travel, as will the need for people to travel by sustainable modes including walking and cycling (active travel), public transport and car share.

1.1.9 This study has therefore sought to consider potential sustainable mitigation measures as a priority over highway capacity mitigation. Given the long-term horizon of the Local Plan, there will always be uncertainty about the level of growth in travel that may materialise. The Climate Change Committee's 6th Carbon budget makes assumptions about how surface transport will contribute towards the Balanced Net Zero Pathway. A major contribution towards meeting this Balanced Net Zero Pathway is travel behavioural change and reduction in travel demand. The Pathway assumes a reduction of 9% in total car miles by 2035 and 17% by 2050. The fall is assumed to be driven by modal shift from cars to walking, cycling (including e-bikes) and public transport, an increase in average car occupancy and a reduction in travel from factors such as increased working from home. For vans, it assumed that demand is reduced by 3% by 2035 through measures such as increased use of urban consolidation centres and e-cargo bikes. Factors such as improved logistics are assumed to lead to 10% lower total HGV miles relative to baseline forecast by 2035. It is therefore evident that that sustainable mitigation is assumed to play a key role towards achieving the vision within the Balanced Net Zero Pathway and hence towards Crawley's obligations towards meeting Carbon Reduction targets and tackling the Climate Emergency.

1.1.10 We have seen some significant changes in travel behaviour alongside technology advances, and the COVID-19 pandemic has accelerated these changes with significantly more people working at home. While the long-term impacts on travel behaviour are unknown, it has been demonstrated during these challenges that the potential exists to undertake activities remotely without the need to travel, by working from home or shopping online. This change in travel behaviour has seen a reduction in both car use and public transport, and while both modes are likely to recover in the long term, the role of technology in enabling people to partake in activities such as work and shopping, without physically making a trip, is likely to increase beyond pre-pandemic uptake.

1.1.11 There is evidence that local authorities are considering ways to encourage some of the changes in travel behaviour seen during the pandemic such as working from home and active mode travel, while at the same time encouraging people to use buses again after the COVID-19 pandemic recedes. For example, an article in the publication TransportXtra published on 22 March 2021 reported that 'Government will throw its weight' and support an industry led 'Back to Bus' campaign to encourage people to use buses after the pandemic recedes. The campaign would include 'signposting people to apps and websites, targeted local promotions encouraging non-users to give buses a try, such as free day'.

1.1.12 An article in the same publication from 24th March 2021 reported that a survey undertaken by Transport for Greater Manchester (TfGM) revealed that almost half of respondents planned to carry on walking and cycling more often in Greater Manchester once the pandemic is over. An article in the same publication reported on 22 March 2021 that The West Midlands Combined Authority (WMCA) wants people to stay at home more after the pandemic in order to help fight climate change and assist towards set targets for reductions in commuting, shopping and personal trips with a view to setting the conurbation on the pathway to achieving its net zero emissions by 2041.

1.1.13 It is therefore evident that local planning authorities are increasingly looking at investing in sustainable means of enabling people to partake in activities rather than focus on highway capacity increasing approaches which encourage further car use. A publication by The

International Transport Forum (ITF)[4], an intergovernmental organisation which acts as a thinktank for transport policy, indicates that reallocating road space from cars to bikes and pedestrians can result in 'disappearing' traffic. It notes that there is evidence to suggest that 'a well-planned reduction of road space does not add to congestion' and that 'reallocation of road space and changes to road layouts that give more space to cyclists and pedestrians should be used as a strategy to manage car use'.

1.1.14 The Crawley Transport Strategy, New directions for Crawley – Transport and access for the 21st century, March 2020[5] (attached as Appendix A) has informed this study. The strategy has an emphasis on encouraging the use of public transport, cycling and walking in preference to increasing highway capacity. Sections 6.6, 6.7 and 6.8 explain the sustainable mitigation assumptions underpinning the transport modelling in this study.

1.1.15 It is expected that this Transport Strategy would form part of the Transport Evidence Base and sit alongside this Transport Assessment, with both informing the development of the Infrastructure Delivery Plan (IDP). Such an approach accords with the NPPF (chapter 4, paragraph 29 onwards). This study provides evidence to demonstrate that the transport investment could accommodate the planned growth.

1.1.16 In terms of highway capacity, the assessment looks at the impacts on local roads including the A23 north of Pease Pottage, A264, A2004, A2011, A2219 and A2220, as well as all roads within Crawley itself. National Highways concern is the Strategic Road Network (SRN) comprising of the M23 including Junction 9 to the north, Junction 10, Junction 10A and Junction 11 to the south. Any impacts on roads within Neighbouring Authorities, including Mid Sussex and Horsham in West Sussex and Reigate and Banstead, Mole Valley and Tandridge in Surrey have also been reviewed.

1.2 Local Context

1.2.1 Crawley is located in the north eastern part of the county of West Sussex. Horsham district abuts the town on the western side, Mid Sussex district is to the south and east and the county of Surrey lies to the north of the borough.

1.2.2 Travel to work patterns for Crawley show the strongest relationships with neighbouring areas of Mid Sussex and Horsham, followed by Reigate and Banstead, as well as having notable inflows from Croydon. The Crawley Travel to Work Area extends to include Horley, Redhill, Leatherhead and Dorking (essentially extending north to the M25) as well as the main settlements in both Horsham and Mid Sussex. These commuting patterns indicate the role Crawley plays across this wider area in providing employment for significant numbers of people.

1.2.3 Crawley is bounded by the M23 to the east and south, which links to the M25 approximately 10 miles north. To the south of Crawley, the M23 becomes the A23 to Brighton and the south coast. Gatwick Airport is located within the borough, directly to the north of Crawley.

1.2.4 The M23 accommodates strategic traffic movements, which bypass Crawley and also allows access to/from Crawley and Gatwick Airport via four junctions.

1.2.5 There are a number of A-Roads which provide connections to the local area. These include the A217 which links Crawley to Reigate in the north and the A264 which provide a link to East Grinstead, and Copthorne to the east, and Horsham to the south west. Areas to the south east and west/north west of Crawley are more rural in character, with B roads and minor roads from local villages such as Rusper, Charlwood and Balcombe.

[4] Reversing Car Dependency: Summary and Conclusions (itf-oecd.org)

[5] https://crawley.gov.uk/sites/default/files/2020-10/New%20Directions%20for%20Crawley%202020.pdf

1.2.6 Within Crawley itself, Crawley Avenue forms an inner ring road to the north and west, which is crossed by a number or arterial roads allowing access to the town centre. Manor Royal is a major employment area within Crawley covering an area of 240 hectares and home to approximately 500 businesses generating 30,000 jobs. This is located to the north of Crawley Avenue and south of Gatwick Airport.

1.2.7 There are some unique challenges/characteristics inherent in the Crawley network, not least the impact of Gatwick Airport. This includes:

- Parking choices for the general public and employees at Gatwick, which may influence route choice for example between Gatwick Road and London Road for traffic travelling from the south.
- The nature of day-to-day variability of route choice such as between the A264 Horsham Road, A2220 Horsham Road and A23 Brighton Road to access the town centre from the west and south. Access to Crawley from the west and south east is also characterised by the more minor routes such as Ifield Drive, Rusper Road, Turners Hill and Balcombe Road.
- The rail level crossings and traffic signal-controlled shuttle working under a narrow rail bridges (St Marys' Drive), the influence of signalised junctions in corridors such as Haslett Avenue/Worth Park Avenue all of which influence day to day basis variations in journey times and hence route choice.
- Given the proximity of Gatwick Airport, the National Highways network, namely the A23 Trunk Road and in particular the M23, plays a major role in enabling long distance traffic to bypass Crawley to access and egress Gatwick Airport and also connect to the M25 ten miles north of Crawley.

1.3 Approach to Study and Purpose of this Report

1.3.1 This transport study forms part of the evidence base for the Draft Crawley Local Plan 2021-2037. The report explains the traffic modelling undertaken on behalf of CBC to inform the cumulative impacts of the Draft Crawley Local Plan development.

1.3.2 The assessment is undertaken in line with Ministry of Communities and Local Government Guidance, Transport Evidence Bases in Plan Making and Decision Taking, March 2015[6]. The mitigation strategy will be required to mitigate the impact of the Draft Crawley Local Plan development, and as per the guidance, the emphasis on mitigation should be delivery of a sustainable transport strategy. This should enable growth, whilst also considering environmental impacts and climate change targets.

1.3.3 The study has been informed with the use of a Highway Model, the Crawley Transport Model, which is detailed further within Section 2. Whilst this provides outputs necessary to inform the transport study, there is a focus on the delivery of a sustainable transport mitigation to support the Draft Crawley Local Plan development. The modelling outputs have been used to inform the demand for travel overall and whether it could be realistically expected that, over the term of the Draft Crawley Local Plan, sustainable transport measures can realistically facilitate this additional demand or whether residual demand would still require some form of highway mitigation. Given uncertainties related to future travel, it would be expected that travel demands are monitored and the effects of more sustainable travel measures and changes in travel behaviour are reviewed to inform any further mitigation going forward.

1.3.4 The outcome of the study will be to demonstrate, in transport terms, that the Draft Crawley Local Plan is deliverable when supported by a mitigation package. This mitigation is informed by the Crawley Transport Strategy and has been tested to check that its effects are realistic.

[6] https://www.gov.uk/guidance/transport-evidence-bases-in-plan-making-and-decision-taking

The IDP and a commitment from CBC/WSCC are necessary to monitor impacts over the term of the Local Plan.

1.4 Report Structure

1.4.1 Following this introduction, this report is structured as follows:

- Section 2 discusses the Crawley Transport Model
- Section 3 details the Transport Forecasting Modelling approach
- Section 4 details the Local Plan development scenario assumptions
- Section 5 reports on the results of the Without Mitigation impacts
- Section 6 reports on Sustainable Mitigation assumptions
- Section 7 reports on With Mitigation Local Plan impacts
- Section 8 reports on the Strategic Road Network
- Section 9 reports on the Crawley Western Link Road (CWLR) Sensitivity Test
- Section 10 discusses Safety considerations
- Section 11 provides a Summary and Conclusions

2 Crawley Transport Model

2.1 Introduction

2.1.1 The transport modelling for this study has been undertaken using West Sussex County Council's (WSCC) SATURN Highway Assignment Model (HAM) for Crawley known as the Crawley Transport Model (CTM). This model was developed by Stantec (formerly PBA) and was calibrated and validated to a base year of 2015. SATURN is a widely used and industry respected software package for highway assignment modelling.

2.1.2 The base model was accepted as a robust tool upon which to develop future forecasts and was considered to adequately represent observed travel conditions in 2015. Further technical details of the development of the 2015 CTM model are included in the Crawley Transport Model, Highway Assignment Model – Local Model Validation Report (PBA, CTM 35981-R002-LMVR, August 2016) and in the Highway Assignment Model – Local Model Forecasting Report (PBA, CTM 35981-R003-LMFR, October 2016). These documents are provided with Appendix B and C respectively.

2.1.3 The methodology used to undertake the transport modelling for this Draft Crawley Local Plan study of strategic development options, is based on standard transport modelling practice for such studies and is drawn from the Department for Transport's Transport Analysis Guidance (TAG) and the Planning Practical Guidance document *'Transport evidence bases in plan making and decision taking'* DfT March 2015[7].

2.2 Overview of the Crawley Transport Model

Model Area

2.2.1 The area covered by the model is shown in Figure 2-1. The model includes the whole of the Crawley urban area and Gatwick Airport, in order for the model to be capable of assessing local access improvements to the airport, which is located in the Borough.

Model Time Periods

2.2.2 The CTM is a highway assignment model developed using the established SATURN software. The model consists of an AM peak hour model (08:00 to 09:00), an average Inter Peak hour model (10:00 to 16:00) and a PM peak hour model (17:00 to 18:00).

2.2.3 For this study, only the AM and PM peak hours have been considered as these are the time periods where demands are highest and congestion issues likely to be most pronounced.

Model Vehicle Types and Trip Purposes

2.2.4 The model consists of five user classes comprising car commute, car employer business, car other, Light Goods Vehicles (LGV) and Heavy Goods Vehicles.

Zoning System

2.2.5 The zoning system used for the Crawley model is based on 2011 census output areas. The benefit of using these as the zoning structure is ease of use and comparison with planning data, such as population and employment estimates in both the development of the base model and for model forecasting going forward.

[7] https://www.gov.uk/guidance/transport-evidence-bases-in-plan-making-and-decision-taking

2.2.6 The original zoning system comprised 292 zones in total of which the first 146 are internal zones representing the detailed Crawley Urban area. The rest of the zones are external zones, which represent the entire UK. These are more refined in the areas immediately outside the detailed modelled area and become coarser, further out. For this study, the zoning system has been expanded to include a further 29 zones to represent key strategic development sites within Crawley, culminating in an updated zoning system of 321 zones. The original zoning system is shown in Figure 2-2. Figure 2-3 shows the updated zoning system with additional zones to accommodate future development shown as numbered black dots. Details of these new zones are given in Appendix D.

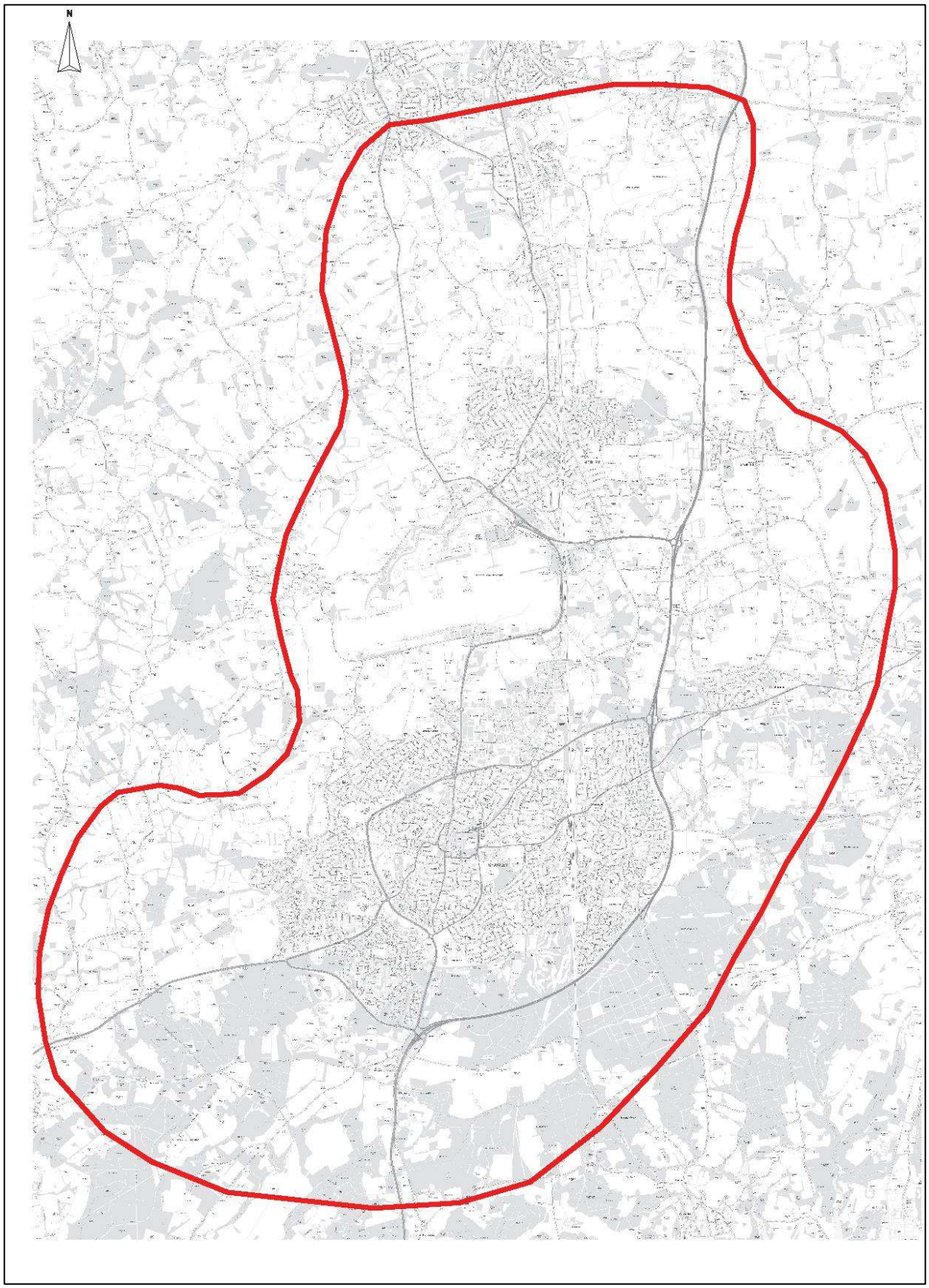


Figure 2-1: Crawley Transport Model Area

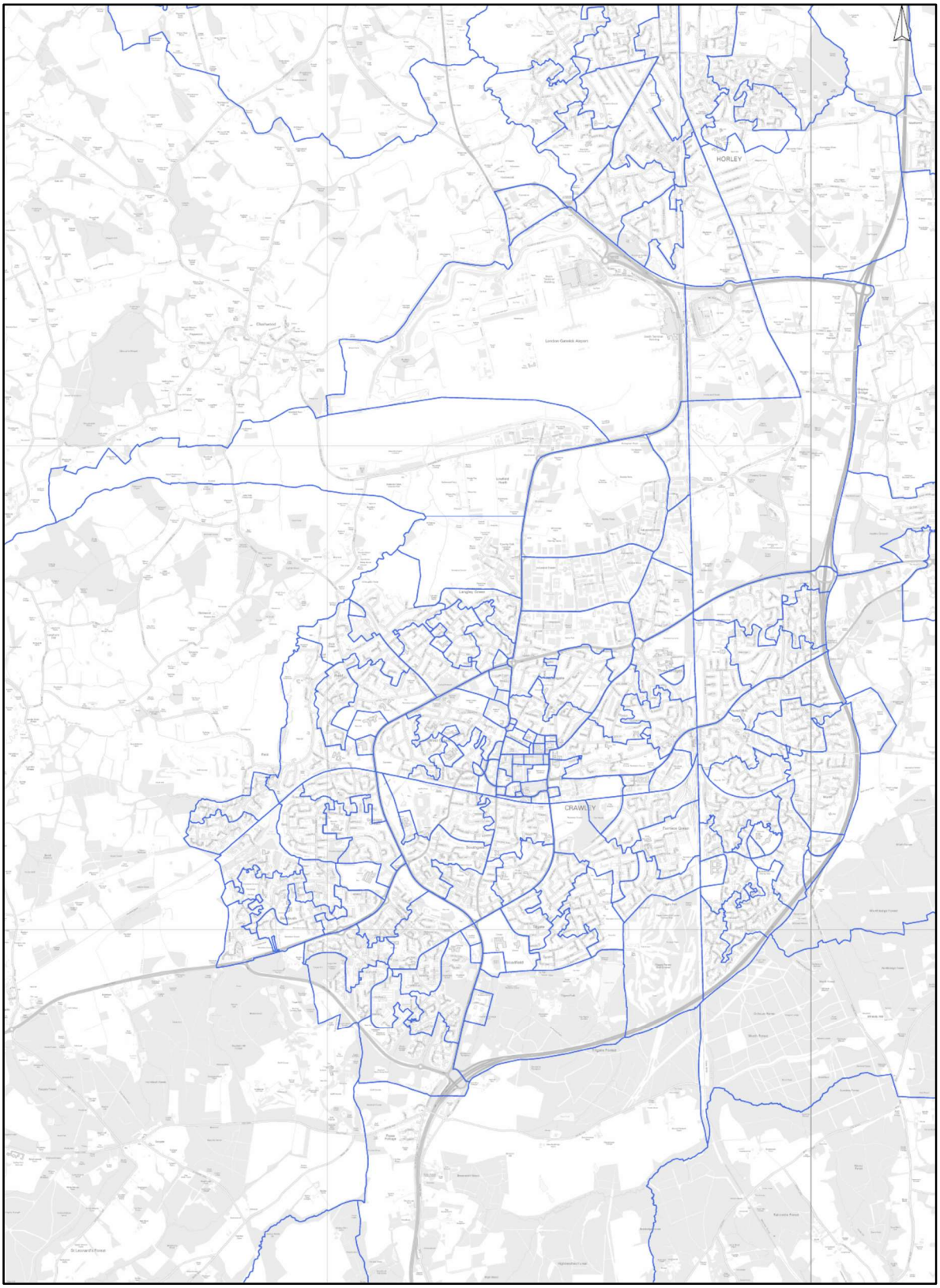


Figure 2-2: Crawley Transport Model Simulation Area Zones

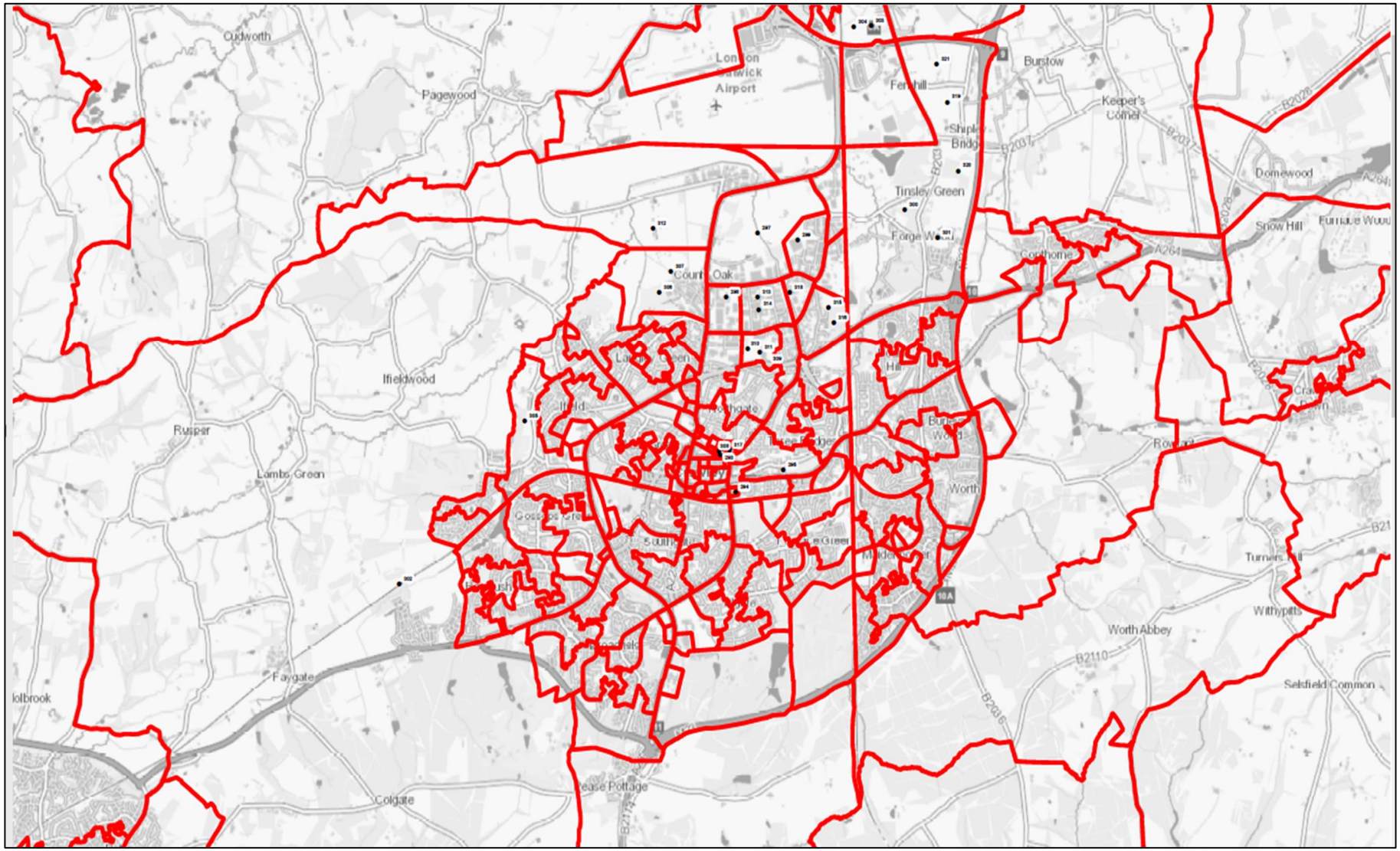


Figure 2-3: Updated Zone Plan Showing Additional Zones as Numbered Black Dots

3 Transport Forecasting Modelling Approach

3.1 Introduction

3.1.1 This section reports on the development assumptions that have informed the inputs for the Local Plan Review transport modelling. The Draft Crawley Local Plan is a review of the adopted Local Plan Crawley 2030, extending of the term of the Plan to 2037. Developments have therefore already been identified up to 2030 along with transport mitigation. The Draft Crawley Local Plan is required to only mitigate the impacts of additional development quanta.

3.1.2 Therefore, for the purpose of the transport modelling, it has been important to clearly define the development (and infrastructure) assumptions to be included in the Reference Case and those to be included in the Local Plan scenarios themselves. Three Draft Crawley Local Plan scenarios have been tested and are identified as Scenarios 1, 2 and 3 respectively. The three scenarios are as follows:

- Scenario 1 – 6,720 dwellings within Crawley Borough at 420 dwellings per annum and Employment Land Trajectory sites.
- Scenario 2 – As Scenario 1 plus Gatwick Green Employment Allocation.
- Scenario 3 – As Scenario 2 plus West of Ifield (3,750 Dwellings) and West of Kilnwood Vale (1,546 dwellings) and 50,000 square metres of employment leading to 12,016 dwellings at 751 dwellings per annum in this scenario.

3.1.3 Further detail on the scenarios is provided in Section 4.

3.2 Traffic Forecasting Modelling Methodology

3.2.1 Model forecasts have been created for a future year of 2035, the assumed end of the Local Plan period at the time of commencement of the transport modelling evidence study. As previously noted, it is considered that the modelled forecasts are robust and representative of 2037 travel conditions. Forecast models have been created for the AM (0800-0900) and PM (1700 – 1800) peak hours. The growth in demands is pivoted off the Base year 2015 Crawley Transport Model (CTM) which is a SATURN based highway assignment model.

3.2.2 The forecasting methodology follows standard Department for Transport (DfT) web-based Transport Analysis Guidance (TAG) particularly that contained in TAG Unit M4 (Forecasting and Uncertainty). At the heart of the approach is the National Trip End Model (NTEM) data version 7.2 accessed via DfT's TEMPro software version 2. NTEM indicates that growth in Crawley Borough is estimated at 16% car driver for the period 2015 to 2035 in both the AM and PM peaks. The growth for West Sussex county was of the same order of magnitude at 16%. The corresponding level of growth for the period 2015 to 2037 for the borough and county were of the order of 17% in both the AM and PM peaks. This further gives confidence that the modelled horizon to 2035 is robust enough to inform the extended local period to 2037.

3.2.3 The Draft Crawley Local Plan transport evidence base in principle, assesses or determines the impact of the Draft Crawley Local Plan on the transport network. In order to estimate the Draft Crawley Local Plan impacts, it is necessary to first define a future year Scenario without the Draft Crawley Local Plan, referred to as the Reference Case in this study. The Draft Crawley Local Plan development assumptions are then added on top of the Reference Case.

3.2.4 The first step was to create 2035 Reference Case demand forecasts or matrices. These are future demands without the Draft Crawley Local Plan scenarios. The Reference Case forecasts take into account the following housing and employment development:

- Completions between 2015 and 2020
- Committed development
- Consented development sites
- Background growth estimated using growth factors (for 2015 to 2035) estimated from NTEM using TEMPro software version 7.2.

3.2.5 The development information was requested from Crawley Borough Council (CBC) and from neighbouring Local Planning Authorities (LPA's) who were also contacted to provide their development information. The contacted neighbouring authorities are:

- Horsham District Council (HDC)
- Mid Sussex District Council (MSDC)
- Mole Valley District Council (MVDC)
- Reigate and Banstead Borough Council (RBBC)
- Tandridge District Council (TDC)

3.2.6 The development information received from each LPA was compiled into a list for input into the transport model to inform the Reference Case. Development sites located within the CTM model area were assigned to a zone within the Crawley model zoning system. The list of development compiled from development assumptions received from neighbouring authorities and used to inform the Reference Case is shown in Appendix E. The list also shows the zone to which a development site was allocated, the zone used to inform the distribution, as well as the development quanta for the development site.

3.3 Reference Case Definition for Crawley

3.3.1 As has been noted, the Draft Crawley Local Plan is a review of the adopted Local Plan Crawley 2030, extending of the term of the Plan. Developments have therefore already been identified up to 2030 along with transport mitigation. Therefore, the development quanta for some sites have been included in the Reference Case and the remainder in the Draft Crawley Local Plan Scenarios.

3.3.2 For modelling purposes, it was therefore necessary to define explicitly, what development (and infrastructure) to include in the Reference Case and in the Draft Crawley Local Plan Scenarios themselves. This was achieved through dialogue with both CBC and WSCC. The following assumptions were agreed and used to define the Reference Case and the Draft Crawley Local Plan Scenarios.

3.3.3 The Reference Case has been defined to include the following:

- Completions (2015 – 2020).
- Unbuilt consented development on allocated sites.
- Unbuilt consented development on other sites.
- Strategic consented development in neighbouring areas, such as remaining build out for Kilnwood Vale (Horsham District Council) and Land West of Copthorne (Mid Sussex District Council).

- Allocation sites in neighbouring planning authorities, such as Horley Business Park (Reigate & Banstead Borough Council)

3.4 Draft Crawley Local Plan Scenario Definition

3.4.1 Following the creation of the Reference Case models, three Draft Crawley Local Plan Scenarios for Crawley have been modelled. The Draft Crawley Local Plan scenarios development has been added on top of the Reference Case. The Draft Crawley Local Plan scenarios have been created by including:

- Allocated/adopted Crawley Local Plan sites not yet consented.
- Additional sites being considered for the Draft Crawley Local Plan.
- Intensification of homes/jobs on existing sites being considered for the Draft Crawley Local Plan.
- Windfall (anticipated not committed).

3.4.2 Further details of the development assumptions for each of the Draft Crawley Local Plan scenarios are included in Section 4.

Trip Generation

3.4.3 TRICS trip rates were used to estimate the vehicular trip generation of development sites. The trip rates were derived from the industry recognised TRICS software. Dialogue took place with WSCC, National Highways and CBC to agree the trip rates. The trip rates used in the study are shown in Table 3-1 with further detail of TRICS site selection and data provided in Appendix F.

Table 3-1: Assumed TRICS Trip Rates

Development Type	Unit Rate	Origin-Rate (AM)	Destination Rate (AM)	Total Rate (AM)	Origin Rate (PM)	Destination Rate (PM)	Total Rate (PM)
C3, Town Centre	**Dwelling**	0.183	0.054	0.238	0.069	0.146	0.215
C3, Suburban	**Dwelling**	0.315	0.106	0.421	0.150	0.328	0.478
C3, Students	**Unit**	0.001	0.004	0.005	0.006	0.001	0.007
A1, food	**per 100sqm GFA**	1.016	1.398	2.414	2.855	2.229	5.084
A1, non-food	**per 100sqm GFA**	0.536	0.781	1.317	1.791	1.765	3.556
A2, Financial/Professional Services	**per 100sqm GFA**	0.115	1.027	1.142	0.985	0.101	1.086
A3, Restaurants	**per 100sqm GFA**	0.571	0.571	1.142	0.122	1.056	1.178

Development Type	Unit Rate	Origin-Rate (AM)	Destination Rate (AM)	Total Rate (AM)	Origin Rate (PM)	Destination Rate (PM)	Total Rate (PM)
B1a, Offices	**per 100sqm GFA**	0.115	1.027	1.142	0.985	0.101	1.086
B1b, Business Park	**per 100sqm GFA**	0.160	1.761	1.921	1.393	0.110	1.503
B1c, Light Industry	**per 100sqm GFA**	0.029	0.224	0.253	0.230	0.028	0.258
B8, Parcel Distribution Centre	**per 100sqm GFA**	0.466	1.042	1.508	1.082	0.623	1.705
B8, Warehousing Commercial	**per 100sqm GFA**	0.049	0.121	0.170	0.076	0.017	0.093
B2, Industrial estate (02/D)	**per 100sqm GFA**	0.153	0.436	0.589	0.407	0.119	0.526
C1, Hotel	**per 100sqm GFA**	0.394	0.291	0.685	0.244	0.263	0.507
D2, Leisure Centre	**per 100sqm GFA**	0.287	0.431	0.718	0.825	0.878	1.703
B1a, Offices Town Centre	**per 100sqm GFA**	0.097	0.964	1.061	0.913	0.072	0.985
B1a, Offices Suburban	**per 100sqm GFA**	0.197	1.323	1.520	1.323	0.236	1.559
A1, Food Superstore	**per 100sqm GFA**	1.657	2.097	3.754	3.891	3.822	7.713
D1, College	**per 100sqm GFA**	0.121	0.600	0.721	0.375	0.155	0.530
A1, Convenience Store	**per 100sqm GFA**	5.115	6.394	11.509	6.564	6.394	12.958
C1, Bed	**Beds**	0.230	0.170	0.400	0.154	0.143	0.297

Trip Distribution

3.4.4 Trip distribution for development sites has utilised the distribution from zones within the model, with similar land use from within the CTM and as close as possible to the development sites. This is consistent with industry practice.

Constraining to NTEM Growth

3.4.5 After taking into account specific development sites/growth assumptions for neighbouring authorities, any shortfall in the 2035 forecast year when compared to NTEM data, was accounted for as additional background growth. This additional background growth was obtained from the Department for Transport National Trip End Model (NTEM) version 7.2 and extracted using the TEMPro v7.2 software. This provided growth factors based on predicted future housing and employment numbers and demographic information at a borough/district council level. The housing and employment numbers within NTEM were adjusted downwards to reflect any specific committed and Local and Neighbourhood Plan developments assumed and an adjusted growth factor applied to the neighbouring authority growth. It was essential that the NTEM factors were adjusted to avoid any double counting.

3.4.6 For Crawley Borough, growth included any development that has been delivered between 2015 and 2020, all committed developments and growth associated with the adopted 2030 Local Plan. Dialogue was undertaken with WSCC and CBC to agree development to be included in the Reference Case.

3.4.7 The core forecasting methodology has allowed for Gatwick Airport's estimated growth pre-covid to 53 million passengers per annum (mppa) by 2023, and up to 61mppa by 2032/33 in its current configuration as a single runway, two terminal airport. Gatwick currently estimate that, despite the large drop in demand since March 2020, their passenger growth will resume its previous demand trajectory by 2028.

3.4.8 No further background growth was assumed for Crawley Borough, as this growth is assumed to be included within the Local Plan extension. As noted, the NTEM alternative assumptions facility indicated that car growth of about 18% is predicted for Crawley Borough. This growth takes into account the committed and other planned growth (dwellings and jobs) in the borough used to specifically derive the Reference Case matrices for this study for the period 2015 to 2035. This analysis indicated that NTEM growth in households in Crawley Borough is 6,425 with employment growth of 6,893 jobs for 2015 to 2035. The equivalent figures for 2015 to 2037 are 6,904 households and 7,492 jobs. The growth assumed from the Uncertainty Log and used to inform the Reference Case forecasts are 7,317 households and 8,547 jobs. It is therefore evident that no further background growth was needed as the 'point loaded' growth within Crawley accounted for all the future growth within the borough.

LGV and HGV growth

3.4.9 Growth factors for LGV and HGV, were determined from the DfT NTM Road Traffic Forecasts 2018 (RTF18) and these were applied to the base year LGV and HGV trips. The factors were derived for the South East region of England assuming all road types based on Table 1 of Scenario 1 of RTF18. Scenario 1 of RTF represents the reference scenario of how LGV and HGV traffic may grow in future given the complexities of forecasting future traffic demand. RTF Scenario 1 is one of seven scenarios represented in RTF18 to try and capture and present uncertainty in a bid to make future policies more resilient and robust. RTF Scenario 1 assumes amongst other things, central projections of Gross Domestic Product (GDP), fuel

price and population and assumes that the number and types of trips per capita remain constant over time[8].

3.4.10 For context, the LGV growth in RTF18 ranges from as low as 10.2% (RTF Scenario 3 which assumes low GDP growth and high fuel cost projections) to as high as 52% (RTF Scenario 2 which assumes high GDP and low fuel cost assumptions). The range in HGV growth is narrower, ranging from 6.6% (RTF Scenario 3) to 11.8% (RTF Scenario 2). The growth factors assumed in this study are shown in Table 3-2 and represent 31.2% LGV growth and 9.1% HGV growth respectively. Given the wide range of potential growth in LGV and HGV, it is considered that the range assumed in this study is robust over the plan period to 2037.

Table 3-2: RTF18 LGV and HGV growth factors (RTF18 Scenario 1 Reference Scenario)

Development Type	LGV	HGV
2015 to 2035	1.312	1.091

Draft Crawley Local Plan Development Trips

3.4.11 Following the creation of Reference Case forecasts, the Draft Crawley Local Plan scenario development trips (extending the plan to 2037) were added in addition to the allocated sites included in the Reference Case (to 2030) to create with Draft Crawley Local Plan scenario demands for assignment in the traffic model. The TRICS database has been used to derive the trip generation of these developments. The distribution of these trips has been based upon land use zones already included within the Reference Case.

3.5 Reference Case Network Assumptions/Changes

3.5.1 The list of schemes included in the 2035 Reference Case networks was agreed with WSCC.

3.5.2 The list includes schemes delivered between 2015 and 2020 within the study area, as well as any committed highway schemes and any schemes which are part of an adopted or emerging Local Plan, based on the certainty or probability of these schemes being implemented by the forecast year 2035. The schemes would be incorporated by updating the base year model to include relevant future schemes.

3.5.3 WSCC advised that some schemes in the adopted Local Plan were not committed and therefore could not be included in the Reference Case. To expedite the coding process, WSCC already had future SATURN networks (2030) that included some of the future schemes to be included in the 2035 Reference Case networks. These networks had used the 2015 Base year model calibrated and validated by Stantec as a starting point and therefore provided a feasible starting point for adaptation to a 2035 Reference Case model networks.

3.5.4 A summary of the schemes included in the 2035 Reference Case models are listed below. Appendix G provides further details based on dialogue with WSCC. These have either been implemented since 2015 or are due to be delivered as an existing committed scheme.

- New link road joining A2011 Crawley Avenue with B2036 Balcombe Road (north)– to access North East Sector development; - this is a Committed scheme, partly built from development access, included in 2030 forecast networks.

[8] Department for Transport Road Traffic Forecasts 2018 Moving Britain Ahead (page 20) https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/873929/road-traffic-forecasts-2018-document.pdf

- B2036 Balcombe Road / Steers Lane – signalisation for NE Sector; Implemented by 2018 – Included in 2030 forecast based on application plan.
- B2036 Balcombe Road / B2037 Antlands Lane – roundabout capacity improvement for NE Sector; Committed scheme to be implemented by 2022.
- B2036 Balcombe Road / C206 Radford Road – signalisation for NE Sector - Committed scheme to be implemented by 2022.
- C206 Radford Road / Steers Lane – signalisation for NE Sector; Implemented by 2018.
- Gatwick Road / C206 Radford Road – roundabout capacity improvement for NE Sector; Committed scheme to be implemented by 2021 - included in 2030 forecast based on application plan.
- B2036 Balcombe Road / Crawley Avenue link – signalised junction for NE Sector; Committed scheme, due to start soon.
- New junction on Steers Lane – to access NE Sector development; Implemented prior to 2018 - included in 2030 forecast based on application plan – now proposed to expand to four arms to serve adjacent site.
- New junction on B2036 Balcombe Road – to access NE Sector development; Committed scheme, due to start soon - included in previous forecast based on application plan.
- C206 Radford Road – signalised shuttle arrangement at railway bridge for NE Sector; Committed scheme to be implemented by 2021 - included in previous forecast based on application plan.
- M23 Junction 10 roundabout – signalisation to accommodate North East Sector development; Committed scheme was due to be implemented 2021 but there are still some outstanding issues that need to be resolved with HE. Delivery through HE - included in 2030 forecast based on application plan.
- Kilnwood Vale access junction – new roundabout on A264 Crawley Road.
- M23 Junction 11 / A264 Pease Pottage – signalisation and approach widening from A264 west.
- A2220 Horsham Road / A23 Crawley Avenue – roundabout dedicated left turn slip from A2220 Horsham road to A23 northbound. Built 2019.
- The additional Pease Pottage schemes - These are on gyratory of M23 J11 and on Brighton Rd to Parish Lane junction (completed post 2015, so not in model base year).
- Ifield Avenue/Ifield Drive committed junction improvement scheme – traffic signals to replace the existing mini roundabout.
- A2011/A2004/Gatwick Road “Hazelwick junction” – committed improvement scheme.
- A2011/A23/London Road “Tushmore junction”.
- Northgate Avenue / Woodfield Road – junction signalisation.
- M23 Junction 9a – roundabout signalisation to accommodate Gatwick Junction development and Horley Business Park; National Highways was contacted and confirmed that scheme be included in the Reference Case.

- Fleming Way – bus lane eastbound from Faraday Road to London Road.
- A23 Crawley Avenue / A2219 London Road – northbound bus-only link through the junction to operate with a southbound existing bus-only link; Revised design committed.
- A2011 Crawley Avenue / A2004 Northgate Avenue / Hazelwick Avenue – junction improvement scheme.
- A2220 Station Way / A2004 Southgate Avenue – changes to lane allocations.
- A2011 Crawley Avenue / B2036 Balcombe Road – New junctions arrangement associated with North East Sector development.
- A2004 Southgate Avenue / Ashdown Drive signals – Additional flare on Ashdown Drive.
- A23 Crawley Avenue / A2004 Southgate Avenue roundabout – junction improvements (additional lanes).
- M23 SMART Motorway scheme from M25 to junction 10 (completed between 2015 model base year and 2020).
- Bus routes 26S and 26N – Route amended.

3.6 National Highways Schemes Dialogue

3.6.1 National Highways was contacted to confirm inclusion of the Horley Business Park and associated M23 J9a improvements in the transport modelling.

3.6.2 However, while HE agreed that these should be included, they requested that the entire National Highways M23 Smart Motorway Scheme be also included, as well as a number of other significant developments in neighbouring authorities as follows:

- Homes England's proposed Land West of Ifield development – this is not committed or included within an adopted plan but is included as part of Local Plan Scenario 3 tested in this study.
- Mayfields Market Town - long term developer aspiration in Horsham and Mid Sussex Districts, not committed or included within an adopted plan, therefore this site is not in Reference Case assumptions.
- Land at Redhill Aerodrome – understood not to be included in Reigate and Banstead's Borough Council's adopted Development Management Plan or Tandridge District Council's submitted Local Plan.
- Any other significant developments in the Horsham District Council, Mid Sussex District Council, Tandridge District Council, Reigate and Banstead and Mole Valley District Council Local Plans - development information provided by neighbouring authorities to inform Reference Case has been included.

3.7 Forecasting Uncertainty

3.7.1 After completion of initial reporting and analysis, an error in model network coding was found affecting one link representing Rusper Road between Ifield Golf Club and Ifield Wood (Lambs Green). An incorrect link length was present in one direction of travel following the addition of a dummy node at the point where a Crawley Western Link Road would cross Rusper Road.

3.7.2 This error has been corrected in the reference case and a comparison made of forecasted flows. This comparison has established that changes in flows are limited to the local area

between Rusper and Ifield, generally affecting the route choice between Rusper Road and connecting roads into Ifield versus Ifield Wood and Charlwood Road/Ifield Avenue/Ifield Green. These flow changes have not affected any conclusions about the mitigating infrastructure required for Local Plan development scenarios and may slightly improve performance of the proposed access junction for the West of Ifield development at Charlwood Road in Scenario 3, compared to the reported figures. Reference case forecasted flow changes from the correction to link length are not significant at other junctions proposed for mitigation on either the local or strategic road networks. It has not been considered necessary to re-run the Local Plan scenarios with the amendment to link length and update junction analyses.

4 Draft Crawley Local Plan Development Assumptions

4.1 Introduction

4.1.1 This section provides further details on the three Draft Crawley Local Plan Scenarios that have been modelled. These are termed Scenario 1 to Scenario 3 and progressively build on the former scenario. Scenario 1 has the least development quanta, followed by Scenario 2, with Scenario 3 having the most development. The section summarises the key development assumptions for each scenario over the period 2020 to 2035/36.

4.2 Overview of Modelled Draft Crawley Local Plan Scenarios

4.2.1 Table 4-1 shows in broad terms the Draft Crawley Local Plan Scenario development assumptions. These are summarised below as follows:

Scenario 1:

- This envisages 6,720 dwellings within Crawley Borough at 420 dwellings per annum. This is made up from Site Allocations and Housing Trajectory sites of 4,714 dwellings, equating to 295 dwellings per annum with the remaining 125 dwellings per annum or 2,000 dwellings being windfalls of which 60% would be within Crawley Town Centre and 40% spread across the rest of the borough within the residential neighbourhoods.

- In terms of Employment, this is made up from the Year 1 – 5 Sites (Sites A to N) on the Employment Land Trajectory (ELT) sites. These exclude those sites in land safeguarded for potential future Gatwick Airport runway expansion. It also excludes the Gatwick Green Strategic Employment Location covered in Scenario 2.

- For the remaining windfall element of employment, a 5% uplift on the existing sites has been applied. It is anticipated this may come forward in the form of offices within the Town Centre and offices and industrial within/on the edge of Manor Royal.

- For retail, no sites have been identified or allocated. The estimated growth figure of up to 10,000sqm convenience retail and 29,700sqm comparison retail Gross Floor Area (GFA) is anticipated to come forward as windfalls, 50% of which as high street format within Crawley Town Centre and 50% as retail warehouse format spread across the remainder of the borough. The retail figures are based on the uncapped Strategic Housing Market Assessment (SHMA) figure.

Scenario 2:

- As Scenario 1 but with the addition of an industrial-led Strategic Employment Location, Gatwick Green, located to the east of Gatwick Airport. Additional information was also provided in relation to this, from the landowner's consultant (Wilky) and was used to inform the transport modelling in respect of access arrangements to the wider network off Balcombe Road. Development quanta assumptions provided by CBC were used for the Gatwick Green site. The Gatwick Green assumptions comprise 77,500 square metres (SQM) (GFA) split into:

    - B8 Parcels Distribution (10%) or 7,750 SQM
    - B8 Commercial Warehousing (60%) or 46,500 SQM
    - B2 Industrial estate (30%) (30%) or 23,250 SQM

- 100 dwellings from the County Buildings site are also included within this Scenario 2 for completeness as they were not included in the initial modelling for Scenario 1. In practice these dwellings are likely to be covered in Scenario 1 by the (generous) windfall allowance for the town centre.

Scenario 3:

- As Scenario 2 with additional housing and employment that is being promoted in Horsham District to the west of Crawley. This has been assumed to be located in the two sites being considered by Horsham for their District Plan, namely West of Ifield and West of Kilnwood Vale sites. This scenario would equate to provision of 751 dwellings per annum (12,016 dwellings over the period 2020 – 2035/6)

Table 4-1: Overview of the three Local Plan Scenarios Development Assumptions

Option/ Scenario	Units	Location	Type of Development
1	420 dwellings per annum (6,720 dwellings over the period 2020 – 2035/6)	420 dwellings per annum within Crawley Borough made up from: 1. Site Allocations and Housing Trajectory sites (4,714 dwellings: equating to 295 dwellings per annum between 2020 and 2036). 2. Remaining 125 dwellings per annum (2,000 dwellings) as windfalls: 60% within Crawley Town Centre & 40% spread across the borough	Residential
	Up to 102,214sqm (based on 97,346sqm GFA identified on ELT and 5% buffer), comprising of: Offices B1a/b (Town Centre) 20,545sqm (+ 5% windfall of 1,027.25sqm) = 21,572.25sqm Offices B1a/b (rest of borough) 35,681sqm (+ 5% windfall of 1,784sqm) = 37,465sqm Industrial B1c/B2/B8 (Town Centre) zero sqm Industrial B1c/B2/B8 (rest of borough) 41,120sqm (+ 5% windfall of 2,056sqm) = 43,176sqm	97,346sqm on sites in the Employment Land Trajectory 5% additional as windfalls = 4,867.25sqm total. Divided up by location and sector in box to the left.	Employment
	Up to 10,000sqm convenience retail and 29,700sqm comparison retail GFA	There are no specific retail allocations, but retail is directed to the Town Centre as per sequential test. However, to take account of the larger physical size of out-of-town retail warehouses, the overall floorspace is recommended to be split as follows: 1. 50% in Crawley Town Centre (5,000sqm convenience retail and 14,850sqm comparison retail GFA). 2. 50% in the form of out-of-town retail warehouse, borough-wide (i.e., outside the Town Centre) (5,000sqm convenience retail and 14,850sqm comparison retail GFA).	Retail
2	420 dwellings per annum (6,720 dwellings over the period 2020 – 2035/6)	Site Allocations and Housing Trajectory sites with remaining spread across the borough (as in Scenario 1) 100 dwellings from the County Buildings site are also included within this Scenario 2 for completeness as they were not included in the initial modelling for Scenario 1. In practice these dwellings are likely to be covered in Scenario 1 by the (generous) windfall allowance for the town centre.	Residential
	As for Scenario 1 above, but also including the promoted Strategic Employment Site at Gatwick Green (details below)	97,346sqm on sites in the Employment Land Trajectory Assume 5% additional as windfalls = 4,867.25sqm total. Divided up by location and sector in Scenario 1.	Employment
	GFA Strategic Employment Site: 77,500 sqm GFA split into: - B8 Parcels Distribution (10%) or 7,750 SQM - B8 Commercial Warehousing (60%) or 46,500 SQM - B2 Industrial estate (30%) (30%) or 23,250 SQM	Strategic Employment Site Proposal (Gatwick Green)	Employment
	Up to 10,000sqm convenience retail and 29,700sqm comparison retail GFA	As per Scenario 1 above: 50% Crawley Town Centre; 50% remainder of the borough.	Retail
3	751 dwellings per annum (12,016 dwellings over the period 2020 – 2035/6)	420 dwellings per annum within Crawley Borough made up from: 1. Site Allocations and Housing Trajectory sites (equating to 295 dwellings per annum between 2020 and 2036). 2. Remaining 125 dwellings per annum as windfalls: 60% within Crawley Town Centre & 40% spread across the borough	Residential
		331 dwellings per annum (5,296 dwellings over the period 2020 – 2036) at the strategic locations immediately adjacent to the west of Crawley: 1. 3,750 dwellings total located West of Ifield 2. 1,546 dwellings total located West of Kilnwood Vale	Residential
	As Scenario 1 above:	97,346sqm on sites in the Employment Land Trajectory Assume 5% additional as windfalls = 4,867.25sqm total. Divided up by location and sector in Scenario 1.	Employment
	As Scenario 2 above: 77,500 sqm GFA split into: - B8 Parcels Distribution (10%) or 7,750 SQM - B8 Commercial Warehousing (60%) or 46,500 SQM - B2 Industrial estate (30%) (30%) or 23,250 SQM	Strategic Employment Site Proposal (Gatwick Green/Wilky)	Employment
	"At Crawley": Up to 50,000sqm GFA Employment (B1/B2/B8) NB: this would leave an outstanding need of 165,555sqm industrial which would likely be located outside of Crawley (and beyond "At Crawley") through Duty to Cooperate.	1. Neighbourhood Centre for West of Ifield 2. Business Park West of Kilnwood Vale	Employment
	Up to 10,000sqm convenience retail and 29,700sqm comparison retail GFA	As Scenario 1	Retail

4.3 Location of Key Development Sites

4.3.1 As previously noted, the Draft Crawley Local Plan is a review of the adopted Local Plan Crawley 2030, extending the term of the Plan to 2037. It draws from a number of planning documents including the 2014 Transport Modelling assumptions, Adopted Local Plan, Regulation 19 development considerations and associated SHLAA development assumptions.

Residential Sites

4.3.2 Figure 4-1 shows the general spatial housing sites as extracted from the SHLAA Regulation 19 document 2020. Most of the sites in the Local Plan scenarios have dwellings of up to 100 units, with a few sites exceeding 100 dwellings. This is particularly the case in Scenarios 1 and 2. The sites are dispersed within the Crawley built up area including Crawley Town Centre. This underlies the potential for these sites to be sustainable in transport terms as well as benefit from already existing amenities, local transport hubs such as Crawley railway station and Three Bridges railway station and existing bus services.

Employment Sites

4.3.3 The broad locations of employment sites are shown in Figure 4-2. The Gatwick Green employment site is the only difference between Scenario 1 and Scenario 2.

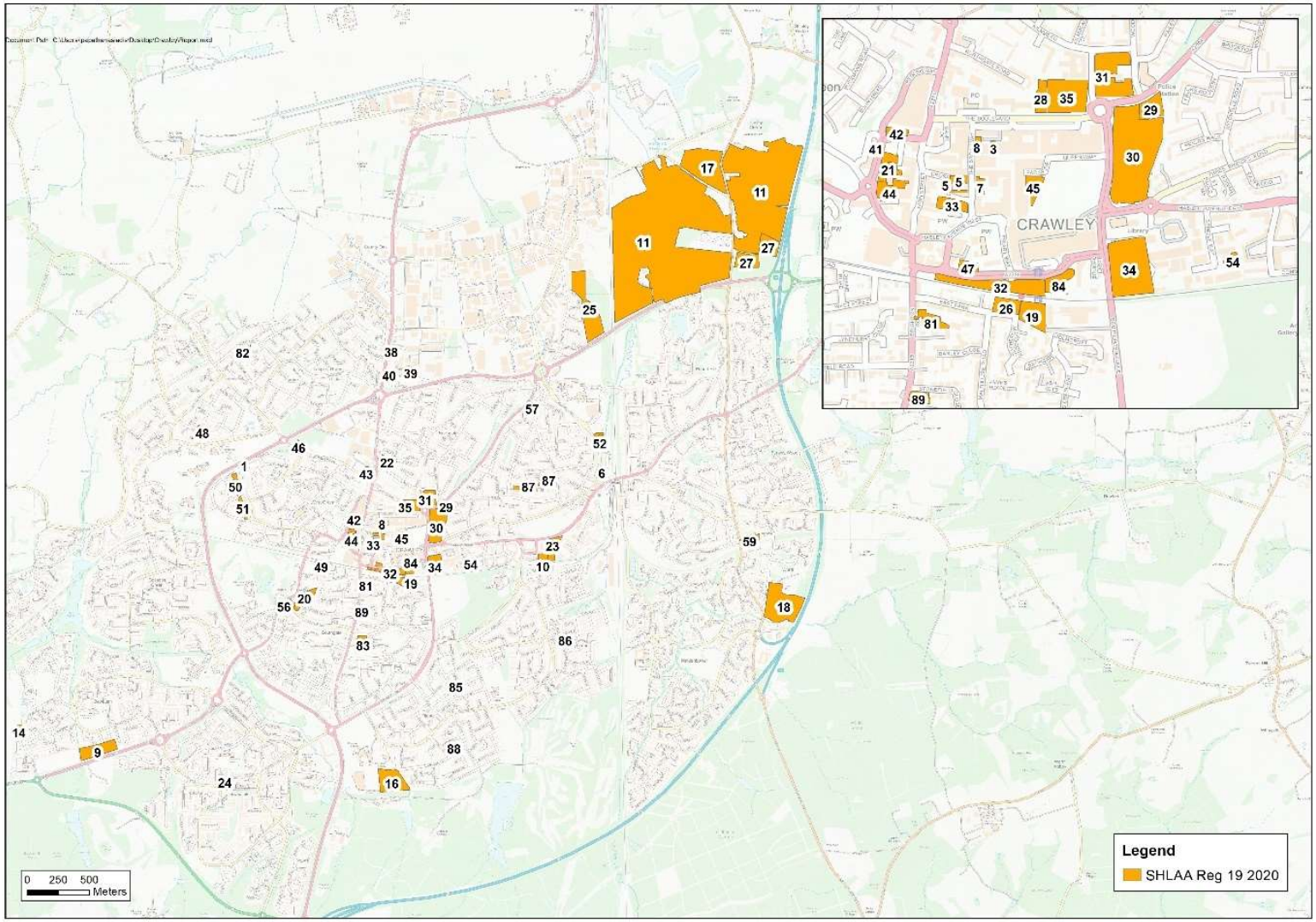


Figure 4-1: Local Plan Housing Trajectory Sites (from SHLAA Regulation 19 Housing Sites)

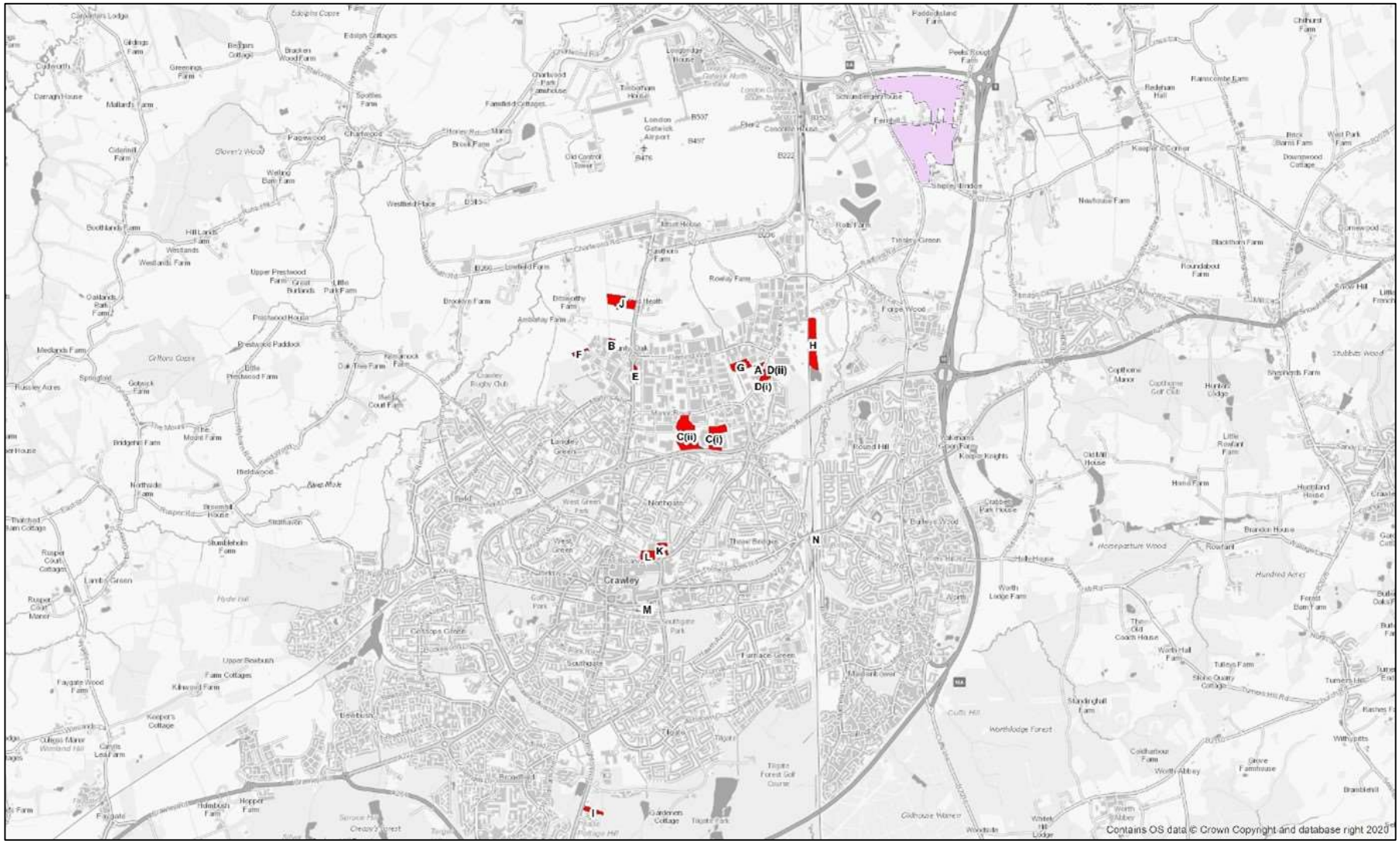


Figure 4-2: Key Employment Sites

4.4 Adopted and Draft Local Plan Modelling Development Details

4.4.1 For modelling purposes, it was necessary to translate the broad adopted and draft Local Plan development information into specific sites for inclusion in the model. Table 4-2 (Residential) and Table 4-3 (Employment) summarise the modelling development assumptions for Crawley Borough in both the Reference Case and Draft Crawley Local Plan scenarios. The tables aid understanding of the development assumptions between the Draft Crawley Local Plan scenarios tested and the Reference Case, especially in respect of sites that are in both the Reference Case and Draft Crawley Local Plan.

4.4.2 Tables 4-4 (Residential) and Table 4-5 (Employment) provide the development assumptions for the Reference Case and any additional development related to each of the three Draft Crawley Local Plan Scenarios (without the Reference Case development included). This is for ease of understanding of the differences and similarities between each of the Draft Crawley Local Plan scenarios against each other. Land North of the Boulevard has been modelled with 276 dwellings in Reference Case plus 182 dwellings in the Local Plan scenarios. The 182 dwellings have since gained outline consent (CR/2017/0997/OUT), notwithstanding the fact that these are treated as part of the Local Plan scenarios in the transport modelling. For the site 15-29 The Broadway, the additional 21 dwellings over and above the allocated 57 has planning permission (CR/2015/0609/FUL), notwithstanding that, the additional 21 are treated as part of the scenarios.

4.4.3 The County Buildings site is proposed for allocation with an indicative quantum of 100 dwellings (although an alternative employment e.g., office scheme may be acceptable). The 100 dwellings were not included in the modelling of Scenario 1 and are therefore included for completeness in Scenarios 2 and 3. In practice the 100 dwellings are likely to be covered in Scenario 1 by the (generous) windfall allowance for the town centre.

Table 4-2: Reference Case and Additional Local Plan Residential Dwellings

Item No./Site Ref	Development Name/Location	Type	TRICS Area assumptions	Reference Case	Scenario 1	Scenario 2	Scenario 3
1/11	Forge Wood, Pound Hill	Dwelling	C3, Suburban	1,900	0	0	0
2	Ifield Community College	Dwelling	C3, Suburban	193	0	0	0
3	Southern Counties, West Green	Dwelling	C3, Town Centre	218	0	0	0
4	Thomas Bennett/Land adjacent to Desmond Anderson, Tilgate	Dwelling	C3, Suburban	0	150	150	150
5	Fairfield House, West Green	Dwelling	C3, Suburban	93	0	0	0
6	Breezehurst Drive	Dwelling	C3, Suburban	112	0	0	0
7	Town Centre North/Land	Dwelling	C3, Town Centre	276	182	182	182

Item No./Site Ref	Development Name/Location	Type	TRICS Area assumptions	Reference Case	Scenario 1	Scenario 2	Scenario 3
	North of Boulevard						
8	Telford Place, Three Bridges	Dwelling	C3, Town Centre	0	300	300	300
9	North East Sector Residual Land, Pound Hill/Land to southeast Healthy Farm, Balcombe Road	Dwelling	C3, Suburban	0	150	150	150
10	North East Sector Residual Land, Pound Hill/Steers Lane	Dwelling	C3, Suburban	185	0	0	0
11	Kilnwood Vale	Dwelling	C3, Suburban	1,340	0	0	1,546
12	Three Bridges Housing Site, Tinsley Lane	Dwelling	C3, Suburban	0	120	120	120
13	Southgate Housing Site, Goffs Park Depot	Dwelling	C3, Suburban	44	0	0	0
14	Bewbush, Breezehurst Drive Playing Fields Housing and Open Space Site	Dwelling	C3, Suburban	0	65	65	65
15	15-29 Broadway Upper Floors	Dwelling	C3, Town Centre	57	21	21	21
16	Kilnmead Car Park, Northgate	Dwelling	C3, Town Centre	40	0	0	0
17	Zurich House, East Park, Southgate	Dwelling	C3, Town Centre	59	0	0	0
18	Former TSB Site, Russell Way, Three Bridges	Dwelling	C3, Suburban	0	90	90	90
19	Land adjacent Langley Green Primary School, Langley Green	Dwelling	C3, Suburban	30	0	0	0

Item No./Site Ref	Development Name/Location	Type	TRICS Area assumptions	Reference Case	Scenario 1	Scenario 2	Scenario 3
20	5-7 Brighton Road, Southgate	Dwelling	C3, Town Centre	48	0	0	0
21	Longley Building	Dwelling	C3, Town Centre	0	100	100	100
22	Crawley Station Car Park	Dwelling	C3, Town Centre	308	0	0	0
23	County Buildings	Dwelling	C3, Town Centre	0	0	100	100
24	Henty Close, Bewbush Housing and Open Space Sites	Dwelling	C3, Suburban	0	24	24	24
25	Land S/O & R/O 24 Brighton Road	Dwelling	C3, Town Centre	14	0	0	0
26	Belgrave House, Station Way	Dwelling	C3, Town Centre	28	0	0	0
27	Pacific House, Hazelwick Avenue	Dwelling	C3, Suburban	20	0	0	0
28	Energy House, Hazelwick Avenue	Dwelling	C3, Suburban	40	0	0	0
29	International Business Centre, Spindle Way	Dwelling	C3, Suburban	10	0	0	0
30	Ambulance Station, Ifield Avenue	Dwelling	C3, Suburban	0	16	16	16
31	2-12 Friston Walk	Dwelling	C3, Suburban	0	21	21	21
32	Rear Gardens, Dingle Close/Ifield Road	Dwelling	C3, Suburban	0	18	18	18
33	Rear Gardens, Snell Hatchfield Road	Dwelling	C3, Suburban	0	15	15	15
34	96-102 North Road	Dwelling	C3, Suburban	0	10	10	10
35	46-48 Goffs Park Road	Dwelling	C3, Suburban	0	10	10	10

Item No./Site Ref	Development Name/Location	Type	TRICS Area assumptions	Reference Case	Scenario 1	Scenario 2	Scenario 3
36	Land at Peterborough Road	Dwelling	C3, Suburban	0	12	12	12
37	Furnace Green Community Centre	Dwelling	C3, Suburban	0	20	20	20
38	Land at Gales Place and West Way	Dwelling	C3, Suburban	0	30	30	30
39	42 & 44 Brighton Road	Dwelling	C3, Town Centre	0	20	20	20
40	Land East Balcombe Road/Street Hill, Pound Hill Housing, Biodiversity and Heritage Site	Dwelling	C3, Suburban	0	15	15	15
41	Oakhurst Grange Housing for Older People	Dwelling	C3, Suburban	55	0	0	0
42	Town Centre Broad Location	Dwelling	C3, Town Centre	0	112	112	112
43	Land East of London Road, Northgate Broad Location	Dwelling	C3, Town Centre	0	99	99	99
44	Upper Floors, 7 – 13 The Broadway & 1 – 3 Queens Square, Northgate	Dwelling	C3, Town Centre	0	25	25	25
45	Stoner House, Kilnmead, Northgate	Dwelling	C3, Town Centre	138	0	0	0
46	Sutherland House, Russell Way, Three Bridges	Dwelling	C3, Suburban	136	30	30	30
47	EDF Building, Russell Way, Three Bridges	Dwelling	C3, Suburban	42	12	12	12
48	Shaw House, Pegler Way, West Green	Dwelling	C3, Town Centre	33	0	0	0

Item No./Site Ref	Development Name/Location	Type	TRICS Area assumptions	Reference Case	Scenario 1	Scenario 2	Scenario 3
49	The Imperial, Broadfield Barton	Dwelling	C3, Suburban	19	0	0	0
50	Central Sussex College (East of Tower)	Dwelling	C3, Suburban	98	0	0	0
51	Crawley College outstanding	Dwelling	C3, Suburban	0	400	400	400
52	Cross Keys	Dwelling	C3, Town Centre	0	20	20	20
53	MOKA	Dwelling	C3, Town Centre	152	0	0	0
54	Rushetts Road Play Area, Langley Green	Dwelling	C3, Suburban	0	14	14	14
55	St. Catherine's Hospice, Southgate	Dwelling	C3, Town Centre	0	60	60	60
56	West of Ifield	Dwelling	C3, Suburban	0	0	0	3,750
57	Copthorne	Dwelling	C3, Suburban	500	0	0	0
58	Pease Pottage	Dwelling	C3, Suburban	746	0	0	0
59	Rusper Road	Dwelling	C3, Suburban	131	0	0	0
60	Windfalls- Town Centre (assume 60% of total windfall amount of 2000 dwells	Dwelling	C3, Town Centre	0	1,200	1,200	1,200
61	Windfalls- Rest of Borough (assume 40% of total windfall amount of 2000 dwells)	Dwelling	C3, Suburban	0	800	800	800
	First Choice House London Road Langley Green Crawley	Dwelling	C3, Suburban	91	**0**	**0**	**0**
	Ashburn House, Broadfield Park, Brighton Road, RH11 9RT	Dwelling	C3, Suburban	92	**0**	**0**	**0**

Item No./Site Ref	Development Name/Location	Type	TRICS Area assumptions	Reference Case	Scenario 1	Scenario 2	Scenario 3
	Maplehurst House Broadfield Park, Brighton Road, Broadfield, Crawley	Dwelling	C3, Suburban	69	**0**	**0**	**0**
	Total dwellings by scenario	**Dwelling**	**Total dwellings by scenario**	**7,317**	**4,161**	**4,261**	**9,557**
	Total dwellings by scenario (Cumulative)	**Dwelling**	**Total dwellings by scenario**	**7,317**	**11,478**	**11,578**	**16,874**

Table 4-3: Reference Case and Local Plan Employment Development Assumptions

Item No./Site Ref	Development Name/Location	Type	Employment Type	Reference Case (SQM GFA)	Scenario 1	Scenario 2	Scenario 3
1/8	Manor Royal Opportunity Area, Welland Medical Site	Employment	B1c, Light Industrial	8,782	0	0	0
2	SECAMB, Faraday Road, Manor Royal	Employment	Sui generis	2,661	0	0	0
3	E2 Crawley Business Quarter	Employment	B1a	11,525	0	0	0
4	29a-35 High Street (St John's House)	Employment	B1a	1,022	0	0	0
5	5 Rutherford Way	Employment	B2, Industrial	5,232	0	0	0
6	Dualit Limited, County Oak Way (Side Extension)	Employment	B8, Warehouse	872	0	0	0
7	Café Express Carwash, Gales Place	Employment	B8, Warehouse	500	0	0	0
8	Unit 3 The Drive (Eezehaul)	Employment	B8, Warehouse	1,364	0	0	0
9	Astral Towers/The White House, Betts Way (marketed as Nova)	Employment	B8, Warehouse	8,401	0	0	0
10	Astral Towers/The White House,	Employment	B8, Warehouse	2,961	0	0	0

Item No./Site Ref	Development Name/Location	Type	Employment Type	Reference Case (SQM GFA)	Scenario 1	Scenario 2	Scenario 3
	Betts Way (marketed as Nova)						
11	Premiere House, Betts Way	Employment	B8	7,077	0	0	0
12	Premiere House, Betts Way	Employment	A1	2,481	0	0	0
13/24	Southways (planning permission)	Employment	B1a	3,241	0	0	0
14/23	Tilgate Forest Business Centre Vacant Plots	Employment	B1a	4,630	0	0	0
15/15	Forge Wood, North East Sector, Employment Land	Employment	B1	1,667	0	0	0
16/15	Forge Wood, North East Sector, Employment Land	Employment	B2	1,667	0	0	0
17/15	Forge Wood, North East Sector, Employment Land	Employment	B8	1,667	0	0	0
18/15	Forge Wood, North East Sector, Neighbourhood Centre	Employment	A1	2,500	0	0	0
19	Employment commitments in Horsham (Kilnwood Vale)	Employment	B1a	9,300	0	0	0
20	Town Centre North/Land North of Boulevard	Employment	B1a	0	14,695	14,695	14,695
21	Town Centre North/Land North of Boulevard	Employment	A1	0	123	123	123
22	Town Centre North/Land North of Boulevard	Employment	A2	0	123	123	123
23	Town Centre North/Land	Employment	A3	0	123	123	123

Item No./Site Ref	Development Name/Location	Type	Employment Type	Reference Case (SQM GFA)	Scenario 1	Scenario 2	Scenario 3
	North of Boulevard						
24/1	GlaxoSmithKline B1 business	Employment	B8, Data Storage	25,317	0	0	0
25/1	GlaxoSmithKline B1 business	Employment	B8, Data Storage	13,431	0	0	0
26/1	GlaxoSmithKline B1 business	Employment	B1a	1,521	0	0	0
27/1	GlaxoSmithKline B1 business	Employment	B8	19,391	0	0	0
28/1	GlaxoSmithKline B1 business	Employment	B1a	1,433	0	0	0
29/5	Segro West, London Road B1 business	Employment	B1a	16,173	0	0	0
30/2/3	Thales, Gatwick Road B1 business	Employment	B1a	4,282	0	0	0
31/2/3	Thales, Gatwick Road B1 business	Employment	B1c	2,785	0	0	0
32/2/3	Thales, Gatwick Road B1 business	Employment	B8	1,011	0	0	0
33/2/3	Thales, Gatwick Road B1 business	Employment	D1	3,279	0	0	0
34/2/3	Thales, Gatwick Road B1 business	Employment	Sui generis	2,945	0	0	0
35/2/3	Thales, Gatwick Road B1 business	Employment	B1a	3,360	0	0	0
36/2/3	Thales, Gatwick Road B1 business	Employment	Sui generis	3,361	0	0	0
37/2/3	Thales, Gatwick Road B1 business	Employment	B1	256	0	0	0
38/2/3	Thales, Gatwick Road B1 business	Employment	A1	256	0	0	0
39/2/3	Thales, Gatwick Road B1 business	Employment	A3	256	0	0	0

Item No./Site Ref	Development Name/Location	Type	Employment Type	Reference Case (SQM GFA)	Scenario 1	Scenario 2	Scenario 3
40/2/3	Thales, Gatwick Road B1 business	Employment	A5	256	0	0	0
41/4	BOC Edwards B1 business	Employment	B1c	1,467	0	0	0
42/4	BOC Edwards B1 business	Employment	Sui generis	4,051	0	0	0
43/4	BOC Edwards B1 business	Employment	B8	7,568	0	0	0
44/4	BOC Edwards B1 business	Employment	Sui generis	3,741	0	0	0
45/6	Betts Way	Employment	A1, Retail	3,722	0	0	0
46	Former Pasta Reale Site	Employment	Sui generis	3,171	0	0	0
47	Harwoods Jaguar and Land Rover, Crawley	Employment	Sui generis	1,206	0	0	0
48/14	Wingspan Club Residual Land	Employment	B8	2,787	0	0	0
49/18	Gatwick Park G1	Employment	B1a	0	10,960	10,960	10,960
50/19	Gatwick Park G2	Employment	B1a	0	6,637	6,637	6,637
51/25	County Buildings	Employment	B1a	0	5,200	5,200	5,200
52	2-14 Compton Way Complete	Employment	B8	4,920	0	0	0
53/21	Land at Jersey Farm (Site A)	Employment	B8	0	2,095	2,095	2,095
54/22	Units XA1 and XA2, Sussex Manor Business Park	Employment	B2, Industrial	0	1,688	1,688	1,688
55/27	MOKA	Employment	B1	0	130	130	130
56/27	MOKA	Employment	A1	0	130	130	130
57/27	MOKA	Employment	A3	0	130	130	130
58/27	MOKA	Employment	A4	0	130	130	130
59/27	MOKA	Employment	D1	0	130	130	130
60/28	Land at Station Hill, Pound Hill	Employment	B1a	0	414	414	414
61	Units 3B/C, 3D and 4B, County Oak	Employment	A1	0	700	700	700
62/9	Gatwick Green	Employment	B8 (Commercial Warehousing)	0	0	46,500	46,500

Item No./Site Ref	Development Name/Location	Type	Employment Type	Reference Case (SQM GFA)	Scenario 1	Scenario 2	Scenario 3
63/9	Gatwick Green	Employment	B8 (Parcels distribution)	0	0	7,750	7,750
64/9	Gatwick Green	Employment	B2	0	0	23,250	23,250
65/HOR	Horley Strategic Business Park (RBBC)	Employment	B1a	66,667	0	0	0
66/HOR9	Horley Strategic Business Park (RBBC)	Employment	B1b	66,667	0	0	0
67/HOR9	Horley Strategic Business Park (RBBC)	Employment	B1c	66,667	0	0	0
68/HOR9	Horley Strategic Business Park (RBBC)	Employment	A1	2,625	0	0	0
69/HOR9	Horley Strategic Business Park (RBBC)	Employment	A3	2,625	0	0	0
70/HOR9	Horley Strategic Business Park (RBBC)	Employment	D1	2,625	0	0	0
71/HOR9	Horley Strategic Business Park (RBBC)	Employment	D2	2,625	0	0	0
72	Crawley Town Centre (50%)	Employment	A1, Convenience Store	0	5,000	5,000	5,000
73	Rest of Borough (50%)	Employment	A1, Convenience Store	0	5,000	5,000	5,000
74	Crawley Town Centre (50%)	Employment	A1, Retail excluding food	0	14,850	14,850	14,850
75	Rest of Borough (50%)	Employment	A1, Retail excluding food	0	14,850	14,850	14,850
76	Neighbourhood Centre for West of Ifield	Employment	B1	0	0	0	8333
77	Neighbourhood Centre for West of Ifield	Employment	B2	0	0	0	8333
78	Neighbourhood Centre for West of Ifield	Employment	B8	0	0	0	8333
79	Business Park West of Kilnwood Vale	Employment	B1	0	0	0	8333
80	Business Park West of Kilnwood Vale	Employment	B2	0	0	0	8333

Item No./Site Ref	Development Name/Location	Type	Employment Type	Reference Case (SQM GFA)	Scenario 1	Scenario 2	Scenario 3
81	Business Park West of Kilnwood Vale	Employment	B8	0	0	0	8333
	Employment - Total in Square Metres GFA			**419,996**	**83,109**	**348,109**	**398,109**
	Employment - Total in Square Metres GFA - Cumulative			**419,996**	**503,105**	**768,105**	**818,105**

Table 4-4: Draft Crawley Local Plan Residential Dwellings

Item No./Site Ref	Development Name/Location	Type	TRICS Area assumptions	Scenario 1	Scenario 2	Scenario 3
1/16	Thomas Bennett/Land adjacent to Desmond Anderson, Tilgate	Dwelling	C3, Town Centre	150	150	150
2/28/35	Town Centre North/Land North of Boulevard	Dwelling	C3, Suburban	182	182	182
3/34	Telford Place, Three Bridges	Dwelling	C3, Suburban	300	300	300
4/73	North East Sector Residual Land, Pound Hill/Land to southeast Healthy Farm, Balcombe Road	Dwelling	C3, Town Centre	150	150	150
5/80	Three Bridges Housing Site, Tinsley Lane	Dwelling	C3, Town Centre	120	120	120
6/9	Bewbush, Breezehurst Drive	Dwelling	C3, Town Centre	65	65	65
7/7	15-29 Broadway Upper Floors	Dwelling	C3, Town Centre	21	21	21
8/12	Former TSB Site, Russell Way, Three Bridges	Dwelling	C3, Town Centre	90	90	90
9/19	Longley Building	Dwelling	C3, Town Centre	100	100	100
23	County Buildings	Dwelling	C3, Town Centre	0	100	100
10/14	Henty Close, Bewbush Housing and Open Space Sites	Dwelling	C3, Town Centre	24	24	24

Item No./Site Ref	Development Name/Location	Type	TRICS Area assumptions	Scenario 1	Scenario 2	Scenario 3
11/46	Ambulance Station, Ifield Avenue	Dwelling	C3, Town Centre	16	16	16
12/48	2-12 Friston Walk	Dwelling	C3, Town Centre	21	21	21
13/50	Rear Gardens, Dingle Close/Ifield Road	Dwelling	C3, Town Centre	18	18	18
14/51	Rear Gardens, Snell Hatchfield Road	Dwelling	C3, Town Centre	15	15	15
15/57	96-102 North Road	Dwelling	C3, Town Centre	10	10	10
16/56	46-48 Goffs Park Road	Dwelling	C3, Town Centre	10	10	10
17/88	Land at Peterborough Road	Dwelling	C3, Town Centre	12	12	12
18/86	Furnace Green Community Centre	Dwelling	C3, Town Centre	20	20	20
19/87	Land at Gales Place and West Way	Dwelling	C3, Town Centre	30	30	30
20/89	42 & 44 Brighton Road	Dwelling	C3, Town Centre	20	20	20
21/67	Land East Balcombe Road/Street Hill, Pound Hill Housing, Biodiversity and Heritage Site	Dwelling	C3, Town Centre	15	15	15
22	Town Centre Broad Location	Dwelling	C3, Town Centre	112	112	112
23	Land East of London Road, Northgate Broad Location	Dwelling	C3, Town Centre	99	99	99
24/8	Upper Floors, 7 – 13 The Broadway & 1 – 3 Queens Square, Northgate	Dwelling	C3, Town Centre	25	25	25
25/23	Sutherland House, Russell Way, Three Bridges	Dwelling	C3, Town Centre	30	30	30
26/10	EDF Building, Russell Way, Three Bridges	Dwelling	C3, Town Centre	12	12	12
27/29/30	Crawley College outstanding	Dwelling	C3, Suburban	400	400	400

Item No./Site Ref	Development Name/Location	Type	TRICS Area assumptions	Scenario 1	Scenario 2	Scenario 3
28/33	Cross Keys	Dwelling	C3, Town Centre	20	20	20
29/82	Rushetts Road Play Area, Langley Green	Dwelling	C3, Town Centre	14	14	14
30/83	St. Catherine's Hospice, Southgate	Dwelling	C3, Town Centre	60	60	60
31	Windfalls- Rest of Borough (assume 60% of total windfall amount of 2000 dwells) or 1,200 dwells spread in town centre zones	Dwelling	C3, Town Centre	1,200	1,200	1,200
32	Windfalls- Rest of Borough (assume 40% of total windfall amount of 2000 dwells) or 800 dwells spread in rest of borough zones 33, 46,131,68	Dwelling	C3, Suburban	800	800	800
33/72	West of Ifield	Dwelling	C3, Suburban	0	0	3,750
34	Kilnwood Vale	Dwelling	C3, Suburban	0	0	1,546
	Total dwellings by scenario	**Dwelling**		**4,161**	**4,261**	**9,457**

4.4.4 It is evident that the majority of the additional Draft Crawley Local Plan residential development sites, from those included in the Reference Case, are relatively small sites (up to 50 dwellings), which are dispersed within the borough's built-up area. Only a relatively small number of the sites are large sites with greater than 100 dwellings. As noted, Scenarios 1 and 2 have almost the same number of dwellings and locations, with just the addition of the 100 dwellings at the County Buildings site within Scenario 2. The major difference between these two Scenarios is the addition of the Gatwick Green employment site.

4.4.5 Scenario 3 when compared to Scenarios 1 and 2, additionally has the potential West of Ifield development site (3,750 new dwellings only modelled in Scenario 3) and the Kilnwood Vale development site (an additional 1,546 dwellings above the 1,340 dwellings already assumed in the Reference Case for the site). This gives an additional 5,296 dwellings in Scenario 3 above the 4,261 dwellings in Scenarios 2.

4.4.6 The Premiere House, Betts Way employment site (see Table 4-3), were originally office permissions but subsequently came forward as much smaller B8 and A1/B8 schemes. The modelling assumed the original assumptions which are a worst-case scenario and make for a more robust modelled scenario.

Table 4-5: Draft Crawley Local Plan Employment Development Assumptions (in SQM GFA)

Item No.	Development Name/Location	Type	Employment Type	Scenario 1	Scenario 2	Scenario 3
1	Town Centre North/Land North of Boulevard	**B1a, Offices Town Centre**	B1a, Offices Town Centre	14,695	14,695	14,695
2	Town Centre North/Land North of Boulevard	**A1, non-food**	A1, non-food	123	123	123
3	Town Centre North/Land North of Boulevard	**A2, Financial/Professional Services**	A2, Financial / Professional Services	123	123	123
4	Town Centre North/Land North of Boulevard	**A3, Restaurants**	A3, Restaurants	123	123	123
5	Gatwick Park G1	**B1a, Offices Suburban**	B1a, Offices Suburban	10,960	10,960	10,960
6	Gatwick Park G2	**B1a, Offices Suburban**	B1a, Offices Suburban	6,637	6,637	6,637
7	County Buildings	**B1a, Offices Suburban**	B1a, Offices Suburban	5,200	5,200	5,200
8	Land at Jersey Farm (Site A)	**B8, Warehousing Commercial**	B8, Warehousing Commercial	2,095	2,095	2,095
9	Units XA1 and XA2, Sussex Manor Business Park	**B1c, Light Industry**	B1c, Light Industry	1,688	1,688	1,688
10	MOKA	**B1a, Offices Town Centre**	B1a, Offices Town Centre	130	130	130
11	MOKA	**A1, non-food**	A1, non-food	130	130	130
12	MOKA	**A3, Restaurants**	A3, Restaurants	130	130	130
13	MOKA	**A3, Restaurants**	A3, Restaurants	130	130	130
14	MOKA	**D1, College**	D1, College	130	130	130
15	Land at Station Hill, Pound Hill	**B1a, Offices Town Centre**	B1a, Offices Town Centre	414	414	414
16	Units 3B/C, 3D and 4B, County Oak	**A1, non-food**	A1, non-food	700	700	700
17	Crawley Town Centre (50%)	**A1, Convenience Store**	A1, Convenience Store	5,000	5,000	5,000

Item No.	Development Name/Location	Type	Employment Type	Scenario 1	Scenario 2	Scenario 3
18	Rest of Borough (50%)	**A1, Convenience Store**	A1, Convenience Store	5,000	5,000	5,000
19	Crawley Town Centre (50%)	**A1, non-food**	A1, non-food	14,850	14,850	14,850
20	Rest of Borough (50%)	**A1, non-food**	A1, non-food	14,850	14,850	14,850
21	Gatwick Green	B8, Warehousing Commercial	B8, Warehousing Commercial		46,500	46,500
22	Gatwick Green	B8, Parcels Distribution	B8, Parcels Distribution		7,750	7,750
23	Gatwick Green	B2, Industrial Estate	B2, Industrial Estate		23,250	23,250
24	Neighbourhood Centre for West of Ifield	**B1a, Offices Suburban**	**B1a, Offices Suburban**			8,333
25	Neighbourhood Centre for West of Ifield	**B1c, Light Industry**	**B1c, Light Industry**			8,333
26	Neighbourhood Centre for West of Ifield	**B8, Warehousing Commercial**	**B8, Warehousing Commercial**			8,333
27	Business Park West of Kilnwood Vale	**B1a, Offices Suburban**	**B1a, Offices Suburban**			8,333
28	Business Park West of Kilnwood Vale	**B1c, Light Industry**	**B1c, Light Industry**			8,333
29	Business Park West of Kilnwood Vale	**B8, Warehousing Commercial**	**B8, Warehousing Commercial**			8,333
	Total Employment GFA SQM	**ALL**	**ALL**	**83,109**	348,109	398,109

4.4.7 Table 4-6 summarises the trip generation of each of the three Draft Crawley Local Plan scenarios in the AM peak hour, while Table 4-7 gives the trip generation for the PM peak hour. The trips are shown as residential and employment trips. This shows that Scenario 1 generates the least number of trips, followed by Scenarios 2 and 3 respectively. The small difference in residential trips between Scenario 1 and 2 relates to the additional 100 dwellings at County Buildings. Scenario 3 shows a bigger increase in residential trips compared to Scenarios 1 and 2 and this relates to the proposed west of Crawley developments in Scenario 3. As already noted, the 100 dwellings in County Buildings are, in practice, planned to be in all Local Plan scenarios including Scenario 1, hence the west of Crawley developments in Scenario 3 would account for the increase in residential trips in this scenario compared to Scenarios 1 and 2.

Table 4-6: Summary of Draft Crawley Local Plan Generated Trips – AM Peak hour

Development Type	TRICS Area assumptions	Scenario 1	Scenario 2	Scenario 3
Residential Trips	Departures (Origin)	1,028	1,047	2,715
	Arrivals (Destination)	330	335	897
	Sub/Total	**1,358**	**1,382**	**3,612**
Employment Trips	Departures (Origin)	64	158	204
	Arrivals (Destination)	449	688	966
	Sub/Total	**513**	**846**	**1,170**
All Trips	Departures (Origin)	1,092	1,205	2,919
	Arrivals (Destination)	779	1,023	1,862
	Totals	**1,872**	**2,228**	**4,782**

Table 4-7: Summary of Draft Crawley Local Plan Generated Trips – PM Peak hour

Development Type	TRICS Area assumptions	Scenario 1	Scenario 2	Scenario 3
Residential Trips	Departures (Origin)	451	458	1,252
	Arrivals (Destination)	976	990	2,727
	Sub/Total	**1,426**	**1,448**	**3,979**
Employment Trips	Departures (Origin)	446	660	931
	Arrivals (Destination)	79	163	210
	Sub/Total	**525**	**822**	**2,141**
All Trips	Departures (Origin)	897	1,117	2,183
	Arrivals (Destination)	1,054	1,153	2,937
	Totals	**1,951**	**2,270**	**5,120**

5 Draft Crawley Local Plan Impacts – Without Mitigation

5.1 Introduction

5.1.1 This section reports on the impacts of the three Draft Crawley Local Plan Scenarios tested, prior to any mitigation being considered. It identifies locations that are adversely impacted by the Draft Crawley Local Plan proposals. There are network locations that are already overcapacity in the Reference Case. Where these do not get worse with the Draft Crawley Local Plan in place, it is assumed that the Draft Crawley Local Plan has no impact and therefore mitigation, as a result of the Draft Crawley Local Plan proposals, is not required.

5.1.2 WSCC, as highway authority, has advised that where junctions are only a little over the volume to capacity threshold (within 1.5% difference in VC) when compared to the Reference Case, a further review should be undertaken with consideration of average delay per vehicle. WSCC suggested that any junction with turning movements where delay increased by 30 seconds or more to a value over 90 seconds on major routes (120 seconds on minor roads) was severely impacted. These delay values align with values set out in WSCC's Transport Assessment (TA) guidance. The results of volume to capacity ratio comparison against the Reference Case is discussed in Section 8.

5.1.3 The section discusses the flow changes between the Draft Crawley Local Plan scenarios when compared to the Reference Case. Following the flow changes considerations, the key locations considered for detailed analysis of local plan impacts are outlined. This includes identifying the key junctions that have been considered for analysis for impacts of the three Draft Crawley Local Plan scenarios tested.

5.1.4 The junction capacity analysis has formed the main basis for identification of the impact of the Draft Crawley Local Plan and to inform potential mitigation requirements at this stage of the study.

5.2 Traffic Flow Changes

5.2.1 Traffic flow comparisons between the Reference Case and each of the three scenario tests are provided within Appendix H. These show where large increases in flows are expected on the network, as a result of the Draft Crawley Local Plan Scenarios tested. The key flow changes are briefly outlined by Draft Crawley Local Plan Scenario and consider the modelled AM peak (08:00 – 09:00) and PM peak (17:00 – 18:00) hours.

5.2.2 In all three Scenarios tested, the PM peak appears to show the biggest flow increases for each scenario when compared to the Reference Case.

AM Flow Changes key observations

5.2.3 In the AM peak, all three scenarios show flow increases on the radial routes particularly within the 'inner ring road' Crawley Avenue. This includes on the A2220 Horsham Road, A2219 Brighton Road, A2219 London Road, A2004 Southgate Avenue, A2004 Northgate Avenue and Hazelwick Avenue.

5.2.4 There are also flow increases predicted on the A23 approaching M23 J11, A23 Brighton Road leading into Crawley Avenue and on the M23 between Junction 11 to the south and Junction 10 to the north.

5.2.5 Other notable increases are predicted on Manor Royal and on Fleming Way, reflecting the location of employment sites in this part of the network.

5.2.6 It is further noted in the AM peak that flow decreases are predicted in all three Draft Crawley Local Plan scenarios on Crawley Avenue between its junction with A2220 Horsham Road (Cheals Roundabout) and Hazelwick Roundabout although increases are predicted between Hazelwick Roundabout and M23 J10. The flow decreases on the stated sections of Crawley Avenue appear to be due to rat running to the 'western' back roads such as Rusper Road.

5.2.7 Scenario 2 further shows increase in the AM peak on B2036 Balcombe Road for most of its length both north and south of the B2037 Antlands Lane junction with Balcombe Road. This is explained by the inclusion of the Gatwick Green employment site in Scenario 2 when compared to Scenario 1.

5.2.8 In Scenario 3 flow increases are predicted on the minor roads to the west of Crawley, including Rusper Road, Ifield Green, Ifield Avenue and Ifield Drive, reflecting the proposed West of Ifield and Kilnwood Vale developments located in Horsham District. Capacity constraints on Crawley Avenue are likely explain the use of the minor roads. Increases in flows are also evident in Scenario 3 on Ifield Avenue on the approach to Crawley Avenue, mainly due to the proposed West of Ifield development. This would be expected to put pressure on junctions along Ifield Avenue particularly at its junction with Crawley Avenue. A sensitivity test that considers the potential network impacts of a Crawley Western Link Road (CWLR) as part of mitigation for Scenario 3, is reported in Section 9.

5.2.9 In all three scenarios, the M23 shows noticeable flow increases both north bound and southbound between M23 Junction 11 to north of M23 Junction 9.

PM Flow Changes key observations

5.2.10 In the PM peak, most of the above observations are also noted although the flow increases are predicted to be higher than in the AM peak. Crawley Avenue also generally exhibits flow increases along most of its length.

5.2.11 Flow increases are also predicted along most of the length of the B2036 Balcombe Road both north and south of the B2037 Antlands Lane junction with Balcombe Road. This may be explained by the employment trips due to the Gatwick Green employment site. The increases are highest on southern sections of Balcombe Road. The Gatwick Green site is estimated to generate 333 two-way trips in the AM peak and 298 two-way trips in the PM peak.

5.2.12 A significant proportion of these trips are freight/HGV traffic that cannot be replaced by active modes or public transport. The modelling has assumed that there will be an element of car trips for employees working at the site and these would respond to sustainable mitigation measures. Overall, the residual Gatwick Green trips assumed to impact the network are 312 two-way trips in the AM peak and 281 trips in the PM peak. Further discussion on the impacts of Gatwick Green is undertaken in Section 7.7.

5.2.13 In the PM peak, Scenario 3 shows the same trends as in the AM peak regarding flow increases on the minor roads to the west of Crawley, including Rusper Road, Ifield Green, Ifield Avenue and Ifield Drive, reflecting the West of Ifield and Kilnwood Vale developments located in Horsham District.

5.2.14 In all three scenarios, the M23 shows noticeable flow increases both northbound and southbound between M23 Junction 11 to north of M23 Junction 9.

5.3 Identification of Overcapacity Junctions

5.3.1 The study has examined junctions across the modelled network, in order to understand and identify capacity issues as a result of the Draft Crawley Local Plan development scenarios.

5.3.2 This study was also informed by the issues identified in the 2014 Transport Modelling Study. The following junctions/links have been identified for review:

i A264/A2220 roundabout at Bewbush, A2220/A23 “Cheals Roundabout” taking into consideration the committed highway improvements at these locations recently provided in association with the Kilnwood Vale residential / mixed use development and the potential stage 2 traffic signals improvement scheme, towards which contributions have been collected;
ii Haslett Avenue westbound and Southgate Avenue northbound, and with the A2220 (the Copthorne Roundabout);
iii A2011/A2004/Gatwick Road “Hazelwick junction” – committed improvement scheme;
iv A2011/A23/London Road “Tushmore junction”;
v A23 Crawley Avenue/Ifield Avenue and A2011/A23/London Road junctions;
vi The main junctions in Crawley Town Centre, with specific capacity issues along the A2220 and the London Road;
vii A23/A2004 junction;
viii M23 junctions 9, 10 and 11 circulating carriageways and connecting northbound and southbound slip roads, taking into consideration committed highway improvements at junction 10, provided by Forge Wood development, J11 to be provided in association with the Kilnwood Vale residential / mixed use development on top of the works currently being provided by the Pease Pottage development;
ix SRN links between M23 junctions 9 and 11, and links to the north and south; and
x B2036 Balcombe Road, north through Horley and south.

5.3.3 Figure 5-1 shows the junctions where at least one turning movement is overcapacity i.e., has a Volume to Capacity ratio (V/C %) greater than or equal to 100%. This means that the flow for at least one turn, is equal to or exceeds the capacity available for that turn at the junction. These junctions are likely to also exhibit queues and/or high delays. The junctions are also likely to be more susceptible to further stress brought on by potential demand from the Draft Crawley Local Plan scenarios being tested and help to focus analysis of Draft Crawley Local Plan impacts.

5.3.4 The analysis has been undertaken for the AM and PM peak hours separately. The location of the key junctions analysed is shown in Figure 5-1. These have been considered on a corridor-by-corridor basis as tabulated in Table 5-1 for the AM peak hour and Table 5-2 for the PM peak hour. For ease of analysis, the results have only tabulated the turning movement with the highest V/C ratio.

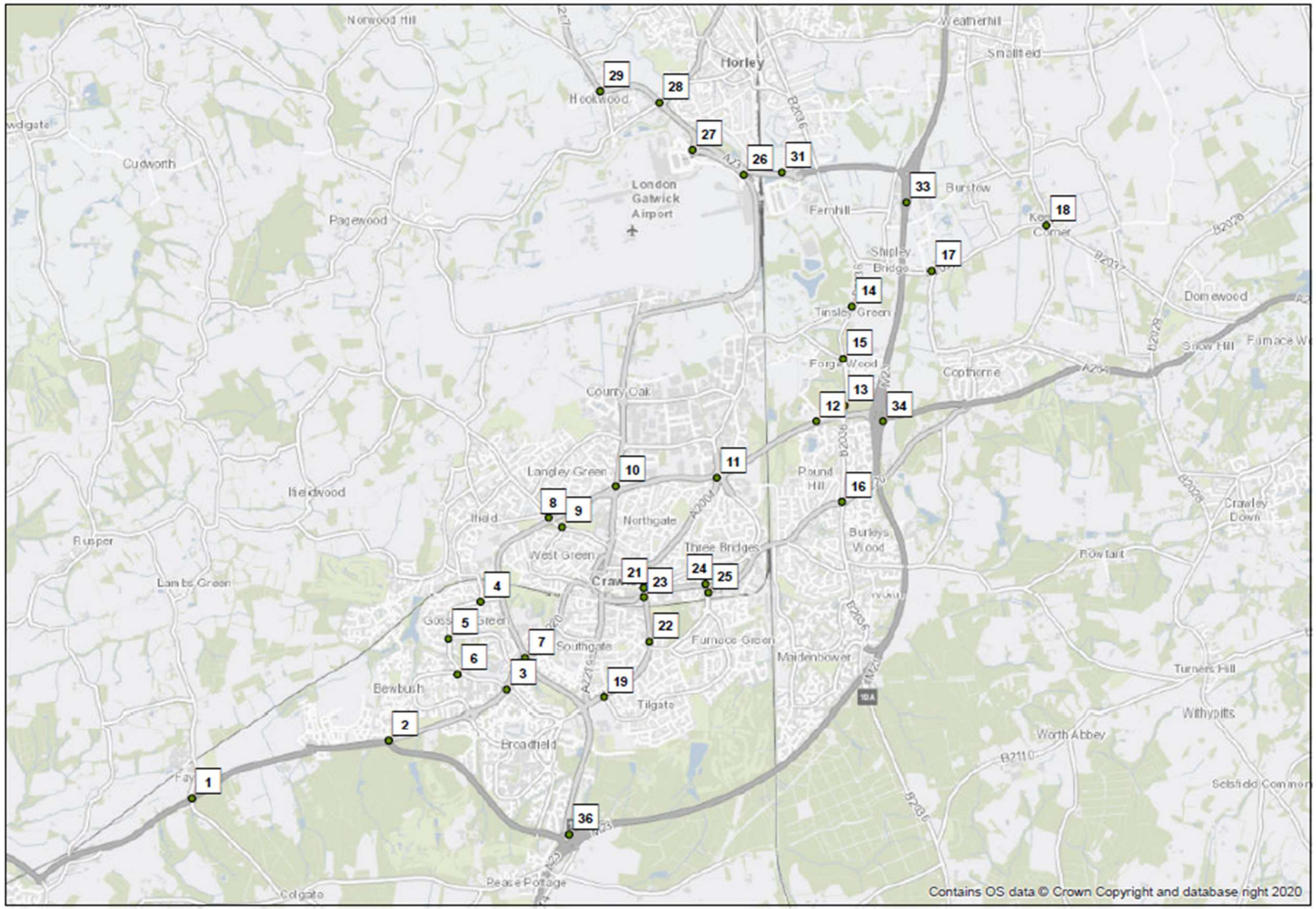


Figure 5-1: Key Junctions considered for overcapacity analysis

Table 5-1: Junctions Analysed for Potential Over-Capacity in AM Peak Hour

Key Route/ Corridor	Junction ID.	Junction Name	Type (in Reference Case)	Ref	Sc1	Sc2	Sc3
A264 Crawley Road/Horsham Road	1	A264 Crawley Road/Faygate Lane	4-arm roundabout	102.4	102.4	102.4	103.9
	2	Bewbush Manor Roundabout/A264/Sullivan Drive	4-arm roundabout	101.1	101.0	100.9	109.0
A2220 Horsham Road &corridor	3	Broadfield Roundabout/ A2220/Broadfield Drive	4-arm roundabout	98.8	99.1	99.1	99.4
	4	Gossops Drive/ Overdene Drive	3-arm roundabout	100.6	100.9	101.1	84.2
	5	Gossops Drive/Buckswood Drive	3-arm roundabout	64.7	63.1	63.5	56.2
	6	Bewbush Drive/Buckswood Drive	3-arm roundabout	45.9	45.0	45.3	43.3
A23 Crawley Avenue junctions/ Corridor	7	Cheals Roundabout/A2220 Horsham Road/Crawley Avenue	4-arm roundabout	100.0	100.0	100.0	100.0
	8	Ifield Roundabout/Ifield Avenue/A23 Crawley Avenue	4-arm roundabout	102.4	103.1	103.3	104.7
	9	Ifield Avenue/Ewhurst Road	priority	41.3	60.8	63.5	78.6
	10	Tushmore Gyratory/A23 London Road/A23 Crawley Avenue	Signal roundabout	65.5	66.5	66.8	76.9
	11	Hazelwick Roundabout	signal roundabout	65.8	71.2	74.0	79.6
	12	A2011 Crawley Avenue/B2036 Balcombe Road	signal node on Crawley Avenue	104.2	104.8	106.0	106.6
	13	A2011 Crawley Avenue/B2036 Balcombe Road	signal node on Balcombe Road	101.9	101.1	101.7	101.7
B2036 Balcombe Road	14	B2036/Radford Road	3-arm signal	105.0	104.3	106.2	106.5
	15	B2036/Steers Lane	3-arm signal	105.1	106.9	107.1	107.1
	16	B2036/A2220 Copthorne Road	4-arm roundabout	69.0	70.8	74.1	78.9
B2037 Antlands Lane	17	B2037/Shipley Bridge Lane	3-arm priority	22.6	23.0	27.8	31.2
	18	B2037/Redehall Road/Copthorne Bank	4-arm signal	107.1	107.2	107.6	108.3
Southgate Avenue/ Corridor	19	Southgate Avenue/Ashdown Drive	3-arm signal	100.8	101.4	101.5	101.7
	20	Southgate Avenue/ Hawth Avenue	3-arm signal	102.2	102.9	102.9	103.0
	21	Southgate Avenue/College Road/Haslett Avenue East	4-arm signal	94.5	100.9	101.1	101.6

Key Route/ Corridor	Junction ID.	Junction Name	Type (in Reference Case)	Ref	Sc1	Sc2	Sc3
	22	Southgate Avenue/ Southgate Drive	3-arm signal	91.4	101.0	101.2	101.5
	23	A2004 Southgate Avenue/ Station Way	3-arm signal	92.1	97.1	97.6	100.2
Haslett Avenue East/Corridor	24	Paymaster General's Roundabout – Haslett Avenue E (EB approach arm – signal node)	signal node	96.5	96.7	96.7	96.1
	25	Paymaster General's Roundabout – Hawth Avenue (NB approach node	priority node	104.1	105.1	105.3	106.2
A23 London Road/M23 'Spur' Corridor	26	A23 London Road/ Perimeter Road North	signal	79.7	78.5	77.6	75.8
	27	Airport Way/Northway Roundabout/ North Terminal Approach	roundabout	108.7	110.1	110.5	111.0
	28	A217/A23 London Road/Povey Cross Road	roundabout	52.8	53.6	54.6	59.1
	29	A217/Reigate Road	3-arm roundabout	104.9	105.0	105.2	106.3
	30	Airport Way/Ring Road/ M23 'spur' 'HOR9' Horley Business Park	signal node of roundabout/ gyratory	19.1	18.0	18.3	21.0
	31	Airport Way/Ring Road/ M23 'spur' 'HOR9' Horley Business Park	signal node of roundabout/ gyratory	81.8	82.4	82.9	85.7
M23 Junction J9	32	M23 J9 Roundabout	Signal Roundabout -signal node 2735	70.3	69.7	69.5	69.7
M23 J9 Roundabout	33	M23 J9 Roundabout	Priority southbound merge	66.8	68.0	68.3	70.3
M23 Junction J10	34	M23 J10 Roundabout	Signal Roundabout -signal node 1606	105.2	105.2	105.1	105.8
M23 Junction J11	36	M23 J11 Roundabout	Signal Roundabout -signal node 1611	93.1	94.1	93.6	94.1
M23 Junction J11	37	M23 J10 Roundabout	Signal Roundabout -signal node 1621	101.4	101.5	101.6	106.5
	38	Fleming Way Roundabout	Roundabout	83.6	88.1	88.5	100.4
A23 London Road	39	A23 London Road/Manor Royal	Signal	76.8	77.7	77.9	78.5

5.3.5 In both the AM and PM peaks, it is notable that a number of junctions are over capacity in the Reference Case, with the volume to capacity ratio being greater than 100%. It is also noted in that with the Draft Crawley Local Plan development in place, the volume to capacity ratio in a large number of these junctions does not increase significantly from the Reference Case

values, only increasing by no more than 2% values. This is more so in Scenario 1 where the Draft Crawley Local Plan development is least, rising through Scenarios 2 and 3 as more Draft Crawley Local Plan development, and proposals to the west of Crawley are included. An apparent anomaly is seen the AM peak Table 5-1 for Junction ID 4 where Scenario 3 sees a reduction in volume to capacity ratio to 84.2% when compared to the upward trend from the Reference Case to Scenario 2. This appears to be due to localised reassignment (rat-running) in the model at the higher Scenario 3 demand levels.

Table 5-2: Junctions Analysed for Potential Over-Capacity in PM Peak Hour

Key Route/ Corridor	Item No.	Junction Name	Type (Reference Case)	Ref	Sc1	Sc2	Sc3
A264 Crawley Road/Horsham Road	1	A264 Crawley Road/Faygate Lane	4-arm roundabout	104.7	105.0	105.1	106.3
	2	Bewbush Manor Roundabout/A264/Sullivan Drive	4-arm roundabout	101.1	101.5	101.8	106.3
A2220 Horsham Road &corridor	3	Broadfield Roundabout/ A2220/Broadfield Drive	4-arm roundabout	112.3	114.1	113.9	118.1
	4	Gossops Drive/ Overdene Drive	3-arm roundabout	94.5	97.2	97.8	96.5
	5	Gossops Drive/Buckswood Drive	3-arm roundabout	103.6	105.0	105.0	106.7
	6	Bewbush Drive/Buckswood Drive	3-arm roundabout	81.8	84.1	83.9	89.0
A23 Crawley Avenue junctions/ Corridor	7	Cheals Roundabout/A2220 Horsham Road/Crawley Avenue	4-arm roundabout	101.9	102.6	103.0	106.5
	8	Ifield Roundabout/Ifield Avenue/A23 Crawley Avenue	4-arm roundabout	101.5	103.6	104.1	113.6
	9	Ifield Avenue/Ewhurst Road	priority	43.7	59.3	62.7	100.4
	10	Tushmore Gyratory/A23 London Road/A23 Crawley Avenue	Signal roundabout	103.3	103.3	103.5	104.9
	11	Hazelwick Roundabout	signal roundabout	74.0	85.5	86.2	93.6
	12	A2011 Crawley Avenue/B2036 Balcombe Road	signal node on Crawley Avenue	111.9	114.3	114.8	118.9
	13	A2011 Crawley Avenue/B2036 Balcombe Road	signal node on Balcombe Road	100.3	100.5	101.7	101.1
B2036 Balcombe Road	14	B2036/Radford Road	3-arm signal	90.7	92.8	94.9	101.7
	15	B2036/Steers Lane	3-arm signal	104.1	102.5	102.0	101.7
	16	B2036/A2220 Copthorne Road	4-arm roundabout	100.7	101.5	101.5	102.0

Key Route/ Corridor	Item No.	Junction Name	Type (Reference Case)	Ref	Sc1	Sc2	Sc3
B2037 Antlands Lane	17	B2037/Shipley Bridge Lane	3-arm priority	63.2	65.5	65.3	64.8
	18	B2037/Redehall Road/Copthorne Bank	4-arm signal	112.2	112.2	112.3	106.4
Southgate Avenue/ Corridor	19	Southgate Avenue/Ashdown Drive	3-arm signal	104.0	106.3	106.8	111.4
	20	Southgate Avenue/ Hawth Avenue	3-arm signal	103.8	105.2	105.3	106.4
	21	Southgate Avenue/College Road/Haslett Avenue East	4-arm signal	87.6	100.3	100.5	101.5
	22	Southgate Avenue/ Southgate Drive	3-arm signal	103.6	104.7	104.8	106.1
	23	A2004 Southgate Avenue/ Station Way	3-arm signal	74.0	91.2	91.3	99.6
Haslett Avenue East/Corridor	24	Paymaster General's Roundabout – Haslett Avenue E (EB approach arm – signal node)	signal	101.9	102.8	102.9	103.5
	25	Paymaster General's Roundabout – Hawth Avenue (NB approach node	priority	87.2	89.2	89.4	93.7
A23 London Road/M23 'Spur' Corridor	26	A23 London Road/ Perimeter Road North	signal	82.3	81.7	81.2	75.5
	27	Airport Way/Northway Roundabout/ North Terminal Approach	roundabout	96.6	96.6	95.4	98.3
	28	A217/A23 London Road/Povey Cross Road	roundabout	95.1	97.9	97.5	100.6
	29	A217/Reigate Road	3-arm roundabout	103.3	102.7	102.3	103.0
	30	Airport Way/Ring Road/ M23 'spur' 'HOR9' Horley Business Park	signal node of roundabout/ gyratory	115.7	123.5	128.4	133.6
	31	Airport Way/Ring Road/ M23 'spur' 'HOR9' Horley Business Park	signal node of roundabout/ gyratory	101.5	101.5	101.6	101.5
M23 Junction J9	32	M23 J9 Roundabout	Signal Roundabout -signal node - southbound off slip	72.0	72.0	72.0	70.3
M23 J9 Roundabout	33	M23 J9 Roundabout	Priority southbound merge	66.4	67.0	66.9	68.4

Key Route/ Corridor	Item No.	Junction Name	Type (Reference Case)	Ref	Sc1	Sc2	Sc3
M23 Junction J10	34	M23 J10 Roundabout	Signal Roundabout -signal node A264 Copthorne Way arm	111.4	112.3	112.6	115.5
M23 Junction J11	36	M23 J11 Roundabout	Signal Roundabout -signal node -A23 Brighton Road arm	106.7	109.1	109.3	114.4
M23 Junction J11	37	M23 J10 Roundabout	Signal Roundabout -signal node – A23 northbound off slip	100.2	101.3	101.3	104.2
A23 London Road	38	Fleming Way Roundabout	Roundabout	60.7	59.9	61.6	70.2
	39	A23 London Road/Manor Royal	Signal	79.9	79.5	80.7	88.9

5.3.6 In summary, Table 5-3 shows the junctions that are adjudged to be overcapacity and significantly worse than in the Reference Case and require consideration of mitigation in Scenario 1. Thresholds for which a junction is considered significantly worse than the Reference Case were stated in paragraph 5.1.2. The corresponding junctions for Scenario 2 and Scenario 3 are shown in Table 5-4 and Table 5-5 respectively. It is evident that as demands increase from Scenarios 1 through to Scenario 3, there are progressively more junctions that are overcapacity and significantly worse than in the Reference Case as expected.

Table 5-3: Junctions Over-Capacity and Significantly Worse than Reference Case in Scenario 1

Junction ID.	Junction Name	AM	PM
3	Broadfield Roundabout/ A2220/Broadfield Drive	No	Yes
8	Ifield Roundabout/Ifield Avenue/A23 Crawley Avenue	No	Yes
12	A2011 Crawley Avenue/B2036 Balcombe Road	No	Yes
19	Southgate Avenue/Ashdown Drive	No	Yes
21	Southgate Avenue/College Road/Haslett Avenue East	Yes	No
22	Southgate Avenue/ Southgate Drive	Yes	No
30	Airport Way/Ring Road/ M23 ‘spur’ ‘HOR9’ Horley Business Park	No	Yes

Table 5-4: Junctions Over-Capacity and Significantly Worse than Reference Case in Scenario 2

Junction ID.	Junction Name	AM	PM
3	Broadfield Roundabout/ A2220/Broadfield Drive	No	Yes
8	Ifield Roundabout/Ifield Avenue/A23 Crawley Avenue	No	Yes
12	A2011 Crawley Avenue/B2036 Balcombe Road	Yes	Yes
13	A2011 Crawley Avenue/B2036 Balcombe Road	No	Yes
15	B2036/Steers Lane	Yes	No
19	Southgate Avenue/Ashdown Drive	No	Yes
20	Southgate Avenue/ Hawth Avenue	No	No
21	Southgate Avenue/College Road/Haslett Avenue East	Yes	Yes
22	Southgate Avenue/ Southgate Drive	Yes	No
27	Airport Way/Northway Roundabout/ North Terminal Approach	Yes	Yes
30	Airport Way/Ring Road/ M23 'spur' 'HOR9' Horley Business Park	No	Yes

Table 5-5: Junctions Over-Capacity and Significantly Worse than Reference Case in Scenario 3

Junction ID.	Junction Name	AM	PM
1	A264 Crawley Road/Faygate Lane	No	Yes
2	Bewbush Manor Roundabout/A264/Sullivan Drive	Yes	Yes
3	Broadfield Roundabout/ A2220/Broadfield Drive	No	Yes
5	Gossops Drive/Buckswood Drive	No	Yes
7	Cheals Roundabout/A2220 Horsham Road/Crawley Avenue	No	Yes
8	Ifield Roundabout/Ifield Avenue/A23 Crawley Avenue	Yes	Yes
9	Ifield Avenue/Ewhurst Road	No	Yes
10	Tushmore Gyratory/A23 London Road/A23 Crawley Avenue	No	Yes
12	A2011 Crawley Avenue/B2036 Balcombe Road	Yes	Yes
14	B2036/Radford Road	No	Yes
15	B2036/Steers Lane	Yes	No
19	Southgate Avenue/Ashdown Drive	No	Yes
20	Southgate Avenue/ Hawth Avenue	No	Yes
21	Southgate Avenue/College Road/Haslett Avenue East	Yes	Yes
22	Southgate Avenue/ Southgate Drive	Yes	Yes
23	A2004 Southgate Avenue/ Station Way	Yes	No
24	Paymaster General's Roundabout – Haslett Avenue E (EB approach arm – signal)	No	Yes
25	Paymaster General's Roundabout – Hawth Avenue (NB approach node	Yes	No
27	Airport Way/Northway Roundabout/ North Terminal Approach	Yes	No
28	A217/A23 London Road/Povey Cross Road	No	Yes
30	Airport Way/Ring Road/ M23 'spur' 'HOR9' Horley Business Park	No	Yes
32	M23 J9 Roundabout	No	Yes
34	M23 J10 Roundabout	No	Yes
37	M23 J10 Roundabout	Yes	No
38	Fleming Way Roundabout	Yes	No

6 Sustainable Mitigation Considerations

6.1 Introduction

6.1.1 As previously explained, the aspiration is to identify a mitigation strategy focussing on sustainable transport. Increasing investment in more sustainable means of travel, rather than highway infrastructure, is likely to encourage use of sustainable modes and reduce dependency on travel by car. Conversely, increasing capacity in highway will only make car travel more attractive, countering any investment in active travel and public transport.

6.1.2 This chapter provides an overview of the methodology for considering the impact of sustainable travel measures and strategies applied within the "With Mitigation" scenario testing for the three Draft Crawley Local Plan scenarios tested.

6.1.3 It is increasingly recognised that sustainable mitigation will need to play an important role in mitigating the impacts of the Local Plan, in order to reduce adverse impacts on the environment and improve health and wellbeing. It is generally accepted that a 'predict and provide' approach caters for an increase in car traffic demand and investment in more sustainable mitigation should increasingly take precedence, with increased highway capacity being considered as a last resort. The role of Virtual Mobility encompassing working from home and online shopping will increasingly play an important role in fulfilling some of the derived demand for travel, as will the need to for people to travel by sustainable modes including walking and cycling (active travel), public transport and car share.

6.1.4 Section 1.1 of this report discussed national commitments to tackle the climate change emergency. In 2019, the UK passed laws to end its contribution to global warming by 2050. The target will require the UK to bring all greenhouse gas emissions to net zero by 2050, compared with the previous target of at least 80% reduction from 1990 levels. This will require additional action to reduce emissions across the whole economy including transport. The Climate Change Committee's 6th Carbon budget makes assumptions about how surface transport will contribute towards the Balanced Net Zero Pathway. A major contribution towards meeting this Balanced Net Zero Pathway is travel behavioural change and reduction in travel demand. The Pathway assumes a reduction of 9% in total car miles by 2035 and 17% by 2050.

6.1.5 This study seeks to consider potential sustainable mitigation measures as a priority over highway capacity mitigation. Given the long-term horizon of the Local Plan, there will always be uncertainty about the level of growth in travel that may materialise. We have seen some significant changes in travel behaviour alongside technology advances, and the COVID-19 pandemic has accelerated these changes with significantly more people working at home. While the long-term impacts on travel behaviour are unknown, it has been demonstrated during these challenges that the potential exists to undertake activities remotely without the need to travel, by working from home or shopping online.

6.1.6 The **Crawley Transport Strategy, New directions for Crawley – Transport and access for the 21st century**, March 2020 (attached as Appendix A) has informed this study. The strategy has an emphasis on encouraging the use of public transport, cycling and walking in preference to increasing highway capacity. CBC has worked with WSCC in developing the countywide Local Cycling and Walking Infrastructure Plan (LCWIP) to create Crawley's own

LCWIP[9],[10]. LCWIPs [11] are a Department for Transport (DfT) initiative to make walking and cycling the natural choice for shorter journeys or as part of a longer journey. This is envisioned in the Government's first Cycling and Walking Investment Strategy (CWIS) published in 2017. LCWIPs are thus a new strategic approach to identifying cycling and walking improvements required at the local level and enable a long-term approach (ideally over a 10-year period) to developing local cycling and walking networks. They form a vital part of the Government's strategy to increase the number of trips made on foot or by cycle.

6.1.7 The Crawley Transport Strategy notes that Crawley's needs are also changing. The major challenges posed by the climate crisis, air quality, affordable homes and poor health related to inactivity have to be addressed. The document notes that old ways of dealing with congestion and other transport problems by 'planning for vehicles' are being challenged and that evidence shows that, 'planning for people and places' provides better long-term solutions for everyone. Adopting this new approach, alongside rapid advances in technology and the overriding need to deal with vehicle emissions, mean that the borough has to change the direction it is taking if it is to meet the demands of the 21st century.

6.1.8 Sustainable mitigation has therefore been considered first as a potential approach to mitigate the impacts of the Draft Crawley Local Plan scenarios with physical mitigation considered as a last resort.

6.2 Accessible Transportation Links

6.2.1 There are significant opportunities to improve sustainable transport in Crawley, with its current excellent accessible transport links to build upon.

6.2.2 The town is served by a rapid guided bus service: Fastway, and a network of green corridors, providing attractive pedestrian and cycle routes through the neighbourhoods and into the Town Centre and out into the countryside. The National Cycle Route 21, from Greenwich to Eastbourne and forming part of the "Avenue Verte" Greenway, linking London to Paris, also runs through the borough. There are four railway stations in Crawley: Three Bridges; Crawley; Ifield and Gatwick providing access to mainline linking London to the south coast, as well as Horsham, Haywards Heath. Crawley has good proximity to the M23 and the M25, and Gatwick Airport is located within the borough.

6.2.3 It is recognised that attractive and effective active travel links and public transport improvements are essential to facilitate and encourage a shift to sustainable modes of transport.

6.2.4 The identification and delivery of improved public transport needs to be focused on optimal routes which connect development, the higher density neighbourhoods to Crawley's three primary economic centres (Manor Royal, Crawley Town Centre and Gatwick Airport) and its two regional transport nodes: Three Bridges station and Gatwick Airport and its station. This will help to provide a viable, dependable and sustainable transport alternative.

6.2.5 Investment in walking and cycling infrastructure to access key destinations and public transport services, will lead to greater uptake in active travel, healthier lifestyles, reduced carbon emissions, improved air quality, and a reduction in traffic volumes.

[9] https://crawley.gov.uk/sites/default/files/2020-08/Local_Cycling_and_Walking_Infrastructure_Plan_0.pdf

[10] https://crawley.gov.uk/sites/default/files/2020-07/Crawley%20LCWIP%20Full%20report_0.pdf

[11] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/908535/cycling-walking-infrastructure-technical-guidance-document.pdf

6.2.6 It is envisioned that all new development will be planned to embrace opportunities of place-making to reduce the need to travel and enable all forms of sustainable transport. A key priority area for the Draft Crawley Local Plan period will be to build upon and improve the dependability, frequency, capacity and speed of the Fastway service in key areas of the borough, in order to encourage a viable and attractive alternative to car use, both for commuters, residents and visitors.

6.3 Sustainable Measures Considerations and Assessment

6.3.1 In order to assist the assessment in considering sustainable mitigation measures for the Draft Crawley Local Plan, CBC provided a list of potential options for testing. The options have at their heart, the ethos and vision expressed in the “New Directions for Crawley” as follows:

Aims of all measures:

- Significant shift in use of active modes for short journeys
- Greater uptake of public transport, including for multi-modal journeys
- Reduction in vehicular journeys leading to reduced congestion, lower carbon emissions, improved air quality, better health and wellbeing

Options:

- Impact of comprehensive cycle network – as detailed in Crawley’s Local Cycling and Walking Infrastructure Plan (LCWIP).
- Improvements in buses – Bus Rapid Transit (BRT).
- Low traffic neighbourhoods – based on Crawley’s 14 neighbourhoods, with local retail and community facilities, and schools, all accessible by active modes. Vehicular traffic ‘through’ journeys restricted, use of bus gates.
- School Streets – timed street closures.
- Speed limits – impact of 20mph on neighbourhood and urban routes.
- Managing Parking Demand – parking management zones, parking pricing (peak/off-peak).
- Workplace Parking Levy.
- Clean Air Zones.
- Demand Management – other technological solutions, e.g., pay-as-you-go road pricing.
- Mobility and E-mobility schemes – bikeshare, e-scooters.
- Personalised Travel Planning.

6.3.2 A number of these leverage mechanisms are aspirational and are in early stages of development or consideration and therefore unlikely to be delivered as part of this Local Plan. The following measures could potentially be delivered in the next five years and would help to accommodate the travel needs of the planned development:

- Cycle network improvements – in alignment with the LCWIP;

- School streets (timed closures / parking restrictions during school drop off and pick up times close to schools);
- Car park exclusion zones outside schools;
- Low traffic neighbourhoods;
- Public transport improvements (improved services and frequencies to be delivered in conjunction with commercial operators);
- Personalised Travel Planning delivered by developers.

6.3.3 Mechanisms such as workplace parking levy, road pricing mechanisms for example are aspirational over a long-term horizon and are not considered as part of feasible deliverable mechanisms of this Local Plan.

6.3.4 Given the relatively small sizes of individual development sites in the Local Plan Review and their dispersed nature, it is difficult to apportion impacts of the network in a meaningful way. Therefore, there will be a need to cost up deliverable sustainable transport measures with costs apportioned to developers based on the size of the development. The two key elements that will be required to achieve the relatively low levels of switch to sustainable transport required to mitigate the impacts of the Local Plan update are centred around travel planning and cycle and pedestrian improvements identified within the LCWIP. This approach is included within Strategic Policy ST1 (Development and Requirements for Sustainable Transport) of the emerging Local Plan. This requires that development which generates a significant demand for travel, and/or is likely to have other transport implications, contribute to improved sustainable transport infrastructure off-site, including, where appropriate, bus priority measures, enhanced passenger information, and routes identified in the council's LCWIP. The Crawley Local Plan Planning Obligations Annex identifies that developers will be expected to contribute to meeting the need for additional infrastructure generated by their development and ensuring that cumulative effects are effectively mitigated.

6.4 Assessment of Sustainable Mitigation Measures

6.4.1 Stantec has considered the above information from CBC and looked at how these measures may be represented in the model within the context of the study.

6.4.2 Stantec has formulated assessment methods to represent potential sustainable mitigation to help understand the potential mode shift that could be delivered and required to mitigate the Local Plan impacts. These are based around implementation of Travel Plans, and levers to enable a switch to active modes and public transport. Virtual mobility is also considered as increasingly important in reducing car traffic by not physically undertaking a trip such commuting and shopping trips by working from home and through online shopping. Travel Plan initiatives can be funded by developers as part of the conditions of gaining planning consent for specific development.

6.5 General Assessment Approach

6.5.1 The assessment has been undertaken at two levels. Some adjustments have been made within the model to reflect a shift to sustainable transport, by applying trip reduction factors, whilst a more subjective assessment has also been undertaken where direct modelling is not feasible.

6.5.2 In transport modelling terms, the focus has been to apply specific car trip reductions to the highway demands to reflect a mode shift for origin - destinations which would benefit from sustainable travel improvements by manipulating the origin to destination matrices (OD). The OD matrix defines the number of trips that wish to travel between locations. The car trip reductions represent the outcome of sustainable mitigation measures before any highway capacity mitigation is considered. In applying any car trip reductions, it has also been

important to apply car trip reductions that are justifiable. The approach applied in the transport modelling has followed a two-step process comprising:

- A distance-based car reduction approach to reflect the impact of behavioural change measures;
- An OD approach to car trip reduction informed by the DfT's funded propensity to cycle tool.

6.5.3 The application of trip reductions in the model have concentrated on measures which will influence short distance trips, as these should be the easiest to influence and target. The impact of this is that long distance trips, in particular those on the SRN have not been subject to any large reductions.

6.6 Distance based car trip reductions

6.6.1 As a first consideration, car trip reductions have been applied to the Draft Crawley Local Plan car development trips based on trip length or distance, based on the premise that site developers will be subject to delivery of travel planning measures. These reductions have only been applied to the sites included within the Local Plan update, as these are seen as site specific measures to benefit new residents. In reality there may also be some positive impacts seen by existing residents within Crawley and therefore this application is seen as conservative. The assumed trip length reductions are shown in Table 6-1 from the Sustainable Travel Towns study. Short distance trips are the most likely to switch from car to active modes and therefore this is reflected in this approach. Longer distance trips are more likely to switch to public transport (PT). These reductions would emanate from implementing Travel Plans and sustainable measures to achieve a mode shift from car use. The reductions have been applied to both the AM and PM matrices for Draft Crawley Local Plan Scenarios 1, 2 and 3.

Table 6-1: Trip Reductions Applied to Trips to/from the Draft Crawley Local Plan Sites

	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%

6.7 Propensity to Cycle Tool Car Trip Reductions

6.7.1 In addition to the distance-based car trip reductions above, a second tier of car reductions was estimated using the propensity to cycle tool. The Propensity to cycle tool is a tool funded by DfT and can be used to estimate the level of cycling that can be achieved at a geographic level such as Census Middle Layer Super Output Area (MSOA)[12]. It uses 2011 census travel to work data to estimate the baseline data. It includes a number of scenarios to aim for to increase cycling and reduce car trips. Again, given the dispersed nature of the development and the small size of the developments included within the Local Plan update, it is difficult to apportion impacts to specific developments. Therefore, schemes will need to be designed and costed and costs apportioned based on the number of dwellings or dwelling equivalents. Some design and costing work has been undertaken for the LCWIP and this should form the basis of the apportionment exercise. As already noted, these issues are considered within Strategic Policy ST1 and the Planning Obligations Annex.

6.7.2 For Crawley modelling, the Government target scenario has been assumed as being a realistic and justifiable target to aim for. The Government target aims to double cycling by 2025. This suggested that a 5% reduction in car commute trips was an achievable target. In the modelling, a 5% reduction has therefore been applied to car commute and car other trips

[12] Census geography - Office for National Statistics (ons.gov.uk)

for trips made within the borough i.e., trips with both an origin and destination within Crawley borough. The reductions were applied to both the AM and PM matrices for Draft Crawley Local Plan Scenarios 1, 2 and 3. The application of this reduction has been applied to all trips within Crawley and not just those associated with the Local Plan update.

6.7.3 This approach in particular recognises the extensive and comprehensive cycle routes identified in the Crawley LCWIP as shown in Appendix I. However, the trip reductions applied are considered to be based upon a conservative target and if the full proposals set out in the LCWIP were delivered within the Draft Crawley Local Plan period, alongside the increased use of e-bikes (if supported by the necessary infrastructure), more ambitious targets for increased cycling could be realistically achieved. The Government's vision for increased cycling and walking is further articulated in the Department for Transport's 'Gear Change A bold vision for cycling and walking, 2020[13]' white paper. The vision is for a transformation in England's transport system where 'England will be a great walking and cycling nation'. In the vision, cycling and walking will be the natural first choice for many journeys with half of all journeys in towns and cities being cycled or walked by 2030.

6.8 Kilnwood Vale and West of Ifield Developments Specific Car Trip Reductions

6.8.1 In terms of Draft Crawley Local Plan Scenario 3, this additionally assumes car trip reductions for the proposed West of Kilnwood Vale and West of Ifield developments located in Horsham district, travelling between these developments and Crawley Town Centre and Manor Royal, as well as trip internalisation.

6.8.2 The measures that would bring about the car reductions proposed, include a high-quality bus corridor that would be extended to serve these proposed developments, linking to key destinations including Crawley Town Centre and Manor Royal, as well as improvements to cycling and walking infrastructure. To reflect this, a 12% reduction in car trips was applied between these developments and zones in Crawley Town Centre and employment zones in Manor Royal. The 12% is seen as a proportionate estimate of mode shift away from the private car. The trip reduction is only applied to trips which are on the local network and therefore there will be no direct impact of these reductions on the SRN.

6.8.3 As these developments are strategic in nature, they are likely to provide facilities, such as schools, local retail and some employment within the developments which will reduce the need to travel by car. However, it is considered that the internalisation is already reflected within the trip rates, therefore no further reduction is required.

6.9 Model Assignments

6.9.1 Following the application of sustainable mitigation, model assignments were undertaken to understand the how the impacts of those sustainable travel measures that have been directly modelled impact on traffic conditions. These outputs have been used to inform whether additional sustainable travel measures not directly modelled would be sufficient to deal with demand for travel overall. The results are discussed in the next section.

6.10 Further Commentary of Sustainable Mitigation Measures

6.10.1 It is considered that the car trip reductions that have been assumed in the Draft Crawley Local Plan modelling are justified and proportionate. However, there is potential to achieve higher levels of reductions in future as people respond to a changing world and become more aware and accepting of the need to, for example, cut carbon emissions and tackle climate change. CBC has developed a transport strategy, which would help support this shift, if fully

13 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/904146/gear-change-a-bold-vision-for-cycling-and-walking.pdf

implemented during the timeline of the Draft Crawley Local Plan. This could translate, in future, to higher levels of sustainable travel using sustainable modes and cutting down on car use. This commentary looks at the potential for sustainable mitigation to play a bigger role in future and thus minimise or eliminate the need for extensive physical mitigation. The emphasis of the sustainable transport strategy should focus on cycle and walking infrastructure and this along with the travel planning and likely increase in home working is likely to be sufficient to negate any negative highway impacts. In light of the good public transport network that already exists in Crawley and the relatively small impact from the additional Local Plan developments, the emphasis here is on improving cycling and walking infrastructure. rather than bus priority which would be more difficult and costly to deliver in the short term. It is considered that further investment in bus priority in the longer term would be important but would likely need to be funded outside of the Local Plan.

6.10.2 The Crawley LCWIP was developed at the same time as the drafting of New Directions for Crawley, a Crawley Borough Council transport strategy initiation document addressing issues and options for shifting from a car-centred to a people-centred approach to mobility and access. The LCWIP will work within the action plan emerging from the New Directions for Crawley strategy on a likely 10-year time frame (to 2030). Additionally, in informing the emerging new Local Plan, the LCWIP will guide design and access elements of new developments as they arise, enabling direct progress in routes at development site locations or through S106 or CIL funding contributions. The Local Plan will run to 2037. It is expected that the LCWIP will develop during that time.

Crawley LCWIP and potential for increased cycling

6.10.3 In applying the propensity to cycle tool, this study has assumed the more conservative 'Government Target' scenario which indicated a potential 5% reduction in car trips in Crawley. The tool, however, also indicates that more ambitious reductions in car reduction can be envisioned in Crawley through cycling uptake assuming the 'Go Dutch' scenario which suggests potential car reduction targets of 25% or through the 'E-bikes' scenario which suggests a potential car reduction target of 30%. The Go Dutch scenario considers targets that could be achieved if people in England had the same likelihood to cycle commute trips as people do in The Netherlands. The E-bikes scenario assumes that people also consider using e-bikes for longer and hillier trips. Such ambitious targets would require substantive investment in cycle infrastructure.

6.10.4 Crawley's Local Cycling and Walking Infrastructure Plan (LCWIP) notes that Crawley could be a great town for cycling and walking, being relatively flat with leafy avenues, access to shopping, employment, education and leisure within a short distance of most homes. The Plan notes that Crawley is an average 30-minute cycle ride from end to end while recognising some of the things that Crawley residents have stated put them off cycling. The Crawley LCWIP notes that it presents a practical plan for a high-quality network of safe, convenient and attractive cycling and walking routes, which could realise the potential of Crawley to become a great town for cycling and walking in light of its relatively flat terrain and compact size. There is thus potential for increased uptake of cycling in Crawley as investment is made in the LCWIP,

6.10.5 Travel to work 2011 census data for the resident working population for Crawley, indicates that 16.6% of the resident population travelled less than 2 km and 28% were within 2km to less than 5 km of travel to work. This equates to 44.6% of the resident population being within the trip length bands amenable to walking and/or cycling and thus indicates a potential demand to cycle and walk with investment in suitable infrastructure such as is envisioned in the Crawley LCWIP. The equivalent percentages when considering the Workplace Population are 11.9% (less than 2 km), 21.2% (2 km and less than 5 km) or a total of 33.1%.

6.10.6 Looking further at the method of travel to work by distance travelled to work from the 2011 Census for the resident population, indicates that 9,240 (16.6%) were in the less than 2 km band of whom 4,066 (44%) drove a car or van to work with only 433 (4.6%) being a car/van passenger, 3,376 (37%) walked and 450 (4.9%) cycled. In the 2 km to less than 5 km band of the 15,581 (28%) resident population in this band, 9,829 (63%) travelled by car or van, 1,083

(7%) were a car/van passenger, 754 (4.8%) walked and 683 (4.4%) cycled. The lack of uptake in cycling is particularly evident in these short distance bands. The LCWIP indicates that some of the reasons given by Crawley residents for not cycling included:

- Unsafe streets dominated by cars with noise and air pollution
- Routes that are indirect and not joined up, with unsafe junctions
- Overgrown paths that are too narrow, with poor surfacing and obstacles
- Conflicting needs of people walking and cycling in shared space
- Lack of secure cycle parking.

6.10.7 The Crawley LCWIP notes that it presents a practical plan for a high-quality network of safe, convenient and attractive cycling and walking routes, which could realise the potential of Crawley to become a great town for cycling and walking in light of its relatively flat terrain and compact size. There is thus potential for increased uptake of cycling in Crawley as investment in the LCWIP comes forward and a high-quality cycle network is implemented.

6.10.8 The LCWIP gives a costed cycle network plan of preferred routes based on an assessment of where people want to travel to and from, identified using social and economic data, on-the-ground evaluation, local knowledge and discussion with residents and groups. Along with proposals for how the whole Plan can be implemented, the LCWIP informs the borough's Local Plan, tying with development programmes.

Virtual Mobility

6.10.9 The 2011 Census Travel to Work Resident Population data indicated that 6.6% of the population worked from home (WFH). The equivalent for the Workplace data was 4.6%. As technology continues to improve including faster internet/broadband capability, it is expected that uptake for working from home for suitable jobs or professions will continue with more people working from home for one or more days of the working week.

6.10.10 The global COVID-19 pandemic has inadvertently shed some light on the potential for increase in uptake of Virtual Mobility such as working from home, or shopping online. While the long-term impacts of COVID-19 on travel behaviour cannot be predicted with certainty, it is anticipated that the uptake in Virtual Mobility will likely be higher than pre-pandemic times. The pandemic has led to the increased use of technologies that make working from home a relatively simple task and for some industries i.e. those which are predominantly office based the indications are that levels of productivity are not greatly impacted, many employees have indicated that they have enjoyed the flexibility home working offers and for many they can see their work patterns change in the longer term, thus leading to less commuting, including by car and therefore reduced car trips at peak times.

6.10.11 Figure 6-1 shows the proportion of people who describe themselves as mainly working from home in the 2011 Census Journey to Work data across each industry (those people in work and live in Crawley Local Authority). This equated to about 7% across all industries. During COVID-19 the Office for National Statistics has undertaken surveys of those working from home, working at their places of work and those furloughed. The graph shows the latest survey data (19th October to 1st November 2020) displaying the proportion of people working from home. Whilst these two data sets are not directly comparable, these do give an indication of the pre-COVID-19 proportion of the population working at home and how this has changed during the pandemic. This could indicate how many people could potentially work at home. Across all industries this was reported to be 28% of people working from home, this was more prevalent in some industries compared to others but generally showed a large increase across all industries.

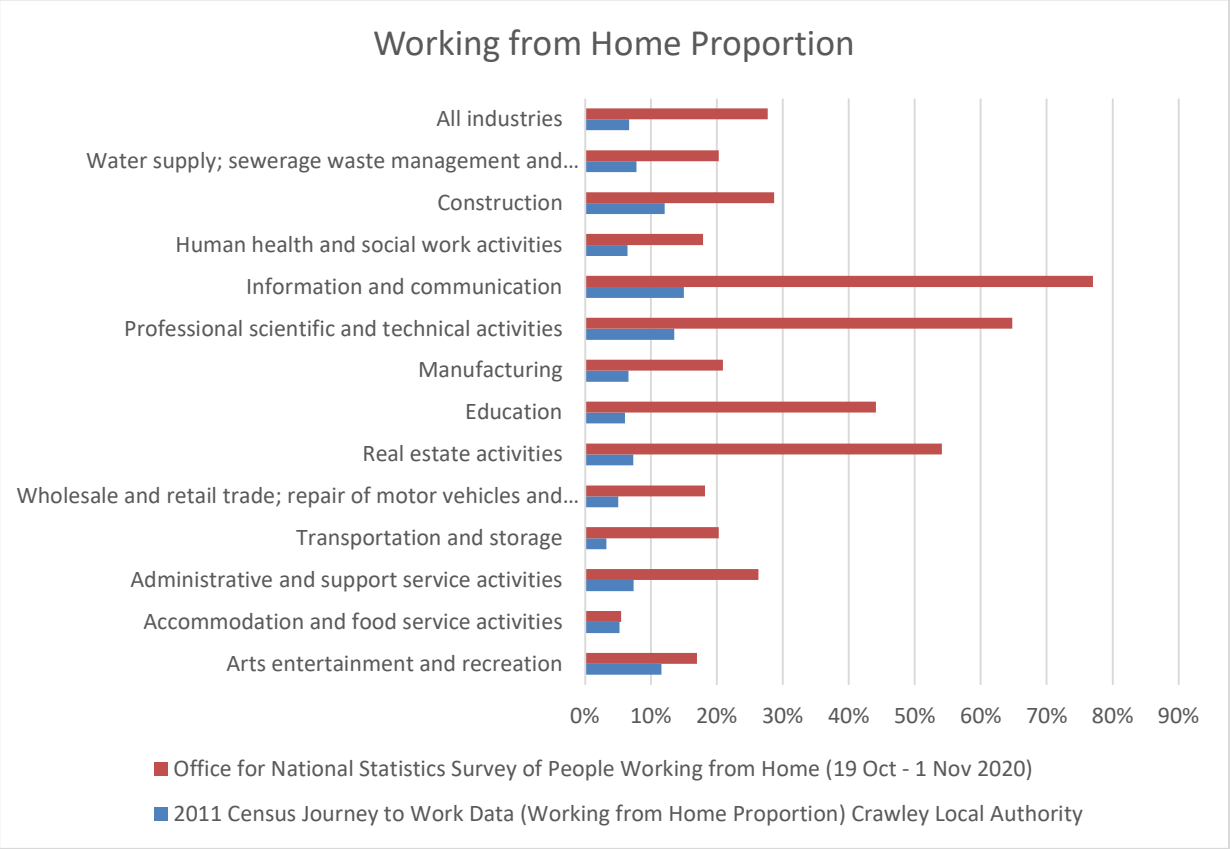


Figure 6-1: Working from Home Proportion

6.10.12 Further studies undertaken show that the proportion of people that can work from home is over 30%. It is noted that this varies across different professions. A full list of professions and the proportion which could realistically work from home is presented below where at least some could work from home[14]. For some professions it would not be possible to work from home.

- Managers — 52%
- Academics — 52%
- Technicians and associate professionals — 43%
- Clerical support workers — 67%
- Service and sales workers — 29%
- Craft and related trades workers — 21%

6.10.13 Applying the above percentages to those that work in the industries and professions and comparing it to 2011 Census data for Crawley, show that there is the potential for an increase of over 20% in the proportion of people who could/currently do work from home, if everyone worked from home every day. This equates to around an extra 12,000 people living in Crawley Borough who could work from home. It is noted that these will not all work from home in the long term, or not every day, although there is likelihood the uptake in working from home will exceed pre-pandemic times.

[14] What Percentage Of Workers Can Realistically Work From Home? New Data From Norway Offer Clues (forbes.com)

6.10.14 In terms of reducing car trips, 60% of people travel to work by car and therefore, this is over 7,000 people who could potentially work from home which previously travelled by car. Even if only half of them continue to work from home (or worked from home 2 to 3 days per week) this could be as much as 3,000 less people travelling to work by car. This currently only includes those that live in Crawley but there could be similar proportions applied to those that commute into Crawley from outside of the borough boundaries.

Potential from investment in bus priority measures

6.10.15 Crawley has a well-developed and extensive public transport bus service system. Metrobus provides a wide covering and high-quality bus service. Information taken from the Metrobus online site and provided in Appendix J, gives an indication of the bus services coverage. Public transport has the potential to play a pivotal role in Crawley's drive for sustainable transport and meet future travel needs without resorting to extensive car 'catering' physical mitigation to accommodate future travel demand. This will require continual improvements to travel conditions for buses, by addressing pinch points such as through provision of bus priority measures especially on key public transport corridors. This has not been assumed within the sustainable transport reductions used in the modelling. It would be additional to these. The Local Plan is not dependent on these measures for its delivery.

6.10.16 Given the good public transport network that already exists in Crawley and the relatively small impact from the additional Local Plan developments, the emphasis should be on improving cycling and walking infrastructure. rather than bus priority which would be more difficult and costly to deliver in the short term. However, further investment in bus priority in the longer term would be important but would likely need to be funded outside of the Local Plan.

6.10.17 Bus services will get stuck within general traffic at congested locations where bus priority is not provided. Figures 6-2 and 6-3 show the average travel speeds on links within Crawley for the AM peak and PM peak hours for Scenario 2.

6.10.18 Some locations are shown to suffer from congestion and also are on key bus routes and would therefore benefit from bus priority. This would make bus travel more attractive as a result of improved journey times and reliability and could lead to a further mode shift from the car. Any potential reductions have not been modelled directly, however, where these measures could potentially assist in mitigating the Local Plan impacts at any locations highlighted within Section 7, further commentary will be provided. This study has identified locations that could benefit from bus priority measures in future. However, it should be noted that these bus measures are not being relied upon for the delivery of the Local Plan mitigation but are instead complementary measures that will help achieve sustainable mode share in the longer term.

6.10.19 The locations in Table 6 -2 have been identified where bus priority could be delivered and assist in delivering further mode shift away from the private car. These locations generally align with locations of congestions and where bus priority would be beneficial for buses, however all these would need to be tested to understand the impact on the highway network. They are indicative potential schemes that would require further exploration as to their feasibility and prioritisation to take forward in future. This would include getting views from the current bus operator (Metrobus) about which of these would provide the greatest speed, reliability and/or efficiency benefits for their network, with a view to sifting and prioritising the schemes within the list.

Table 6-2: Potential Crawley Area Highway Bus Priority Measures List

Item No.	Potential Bus Priority Measure
1	London Road A23 Crawley between Gatwick Road roundabout/City Place and Betts Way/Manor Royal both ways (highest priority is Lowfield Heath towards City Place. (Converting nearside lane to bus).
2	Hazelwick Avenue Crawley southbound approaching Haslett Avenue East. Replace centre lane hatchings to provide space for a bus lane.
3	Crawley Avenue A23 eastbound approaching Ifield Avenue roundabout. Offside lane a bus lane to help buses turning right here.
4	Bus lane from Gatwick Road Roundabout southbound up London Road to Fleming Way (Betts Way) roundabout.
5	Bus lane on Fleming Way from Business Quarter (as the 100 turns left out of BQ towards Redhill) down to Fleming Way (Betts Way) roundabout.
6	Extend current Northbound bus lane on Gatwick A23 back to Gatwick Road roundabout. Bus lane currently starts as buses turn right out of City Place.
7	Alterations recommended to northbound current bus lane on Gatwick Road up to Radford Road roundabout as currently buses have to leave and join main traffic apart from Fastway where there is a Fastway guideway.
8	Bus priority lane from the current bus lane on Southgate Avenue/Haslett Avenue East (near Crawley Library) that brings buses towards Crawley Bus Station across from the bus lane (just before Town Centre East stop) into right hand turning lane. Currently buses towards the bus station coming from Haslett Avenue East have to use the main traffic lanes and only Fastway 20 can use the existing bus lane as this does not turn right towards the bus station but heads down Southgate Avenue.
9	Southbound bus lane on Hazelwick Avenue just after exiting Tesco roundabout towards Three Bridges up to traffic lights at Three Bridges where the 20 turns right out of Hazelwick Avenue.
10	Traffic lights fitted Northbound as buses leave Broadfield Stadium which are triggered and gives them priority over the roundabout traffic and buses able to cross the roundabout quicker.
11	Crawley Broadway outside NatWest - reduce the pavement width and extend bus stop lane to create two lanes (one for left turn to Morrison's and one for right towards Northgate Avenue. This will also stop the queues when buses have to pull out the stops and possibly lower congestion.
12	The existing bus lane on the Boulevard close to the Morrison's store to be made into a left turn and right turn (currently it is only a right turn). There should then be a separate traffic light sequence for the bus lane for buses only enabling a left or right turn. Currently buses turning left have to sit with the rest of the traffic.
13	Construct a contraflow bus lane for use near the Square-about meaning buses heading from Three Bridges towards Crawley do not have to go around the Square-about or a segregated bus lane on Haslett Avenue East near Holiday Inn Express heading Northbound towards Crawley.
14	Short bus lane on Ifield Avenue on approach to Ifield roundabout for buses towards Crawley. This is subject to considering the design and land availability for the proposed LCWIP route on the same corridor.
15	Extend current Southbound bus lane on Manor Royal back to the Business Quarter junction.

Item No.	Potential Bus Priority Measure
16	**Broadfield Barton** - redesigning the Broadfield Barton roundabout area to situate a bus only road and remove the roundabout and creation of a high-quality interchange. This stop suffers from major abuse with illegal parking (despite having a car park at the rear of the shops), regularly delaying the 32 buses an hour that serve it – (illustration of proposed solution is shown in Figure 6-2).
17	**Haslett Avenue East** - bus lane - nearside lane from just west of the railway bridge at Three Bridges station to Stephenson Way (follows successful bus lane trial within the EATF Tranche 1 project).
18	**Tushmore Roundabout** - bus lane provision on Langley Drive on to Tushmore Roundabout. Provision of segregated busway to allow buses from Langley Drive to enter the segregated busway in the centre of the roundabout.
19	**Horsham Road** - bus lane on Horsham Road from Downland Drive to Cheals Roundabout. Offside bus lane - buses go straight ahead at the roundabout. Carriageway widening required.
20	**A23 London Road to Perimeter Road North** - Left hand turn only from nearside lane from A23 London Road on to Perimeter Road North at Gatwick to avoid terminating buses having to wait at lights. Carriageway widening required to keep 2 lanes straight ahead.
21	**Northway on to Longbridge Way** - reinstate dedicated left turn lane from Northway on to Longbridge Way at Gatwick North Terminal Roundabout (Gatwick land).
22	**Tunnel Road on to Departures Road and Northway** – bus priority given to Tunnel Road. Reducing to single lane approaching from offside and swinging in to break straight descent across junction or may need to be signalised with bus priority on Tunnel Road (Gatwick land).
23	**Ifield Avenue** - bus lane on Ifield Avenue from Ewhurst Road to Crawley Avenue, A23.
24	**Contra-flow bus lane on Orchard Street and High Street, A2219 -** using one of the two lanes currently from Peglar Way to The Boulevard. Would save significant time for the 12 bph (buses per hour) currently having to go around the one-way system (Peglar Way and High Street).
25	**Peglar Way and Haslett Avenue West -** bus lane from Ifield Roundabout to bus station – no buses use this at present but West of Ifield bus route will use this route to access to town centre / bus station.
26	**Segregated Busway** – segregated busway (bi-directional) north of Overdene Drive from Ifield Drive to Crawley Avenue – south of Ifield Community College,
27	**Bus Priority Connection** – from Crawley Avenue (after busway) to Ifield Roundabout – using The Dingle, Goffs Lane and Ifield Road.

Figure 6-2: Illustration of Proposed Redesigning the Broadfield Barton Roundabout Area

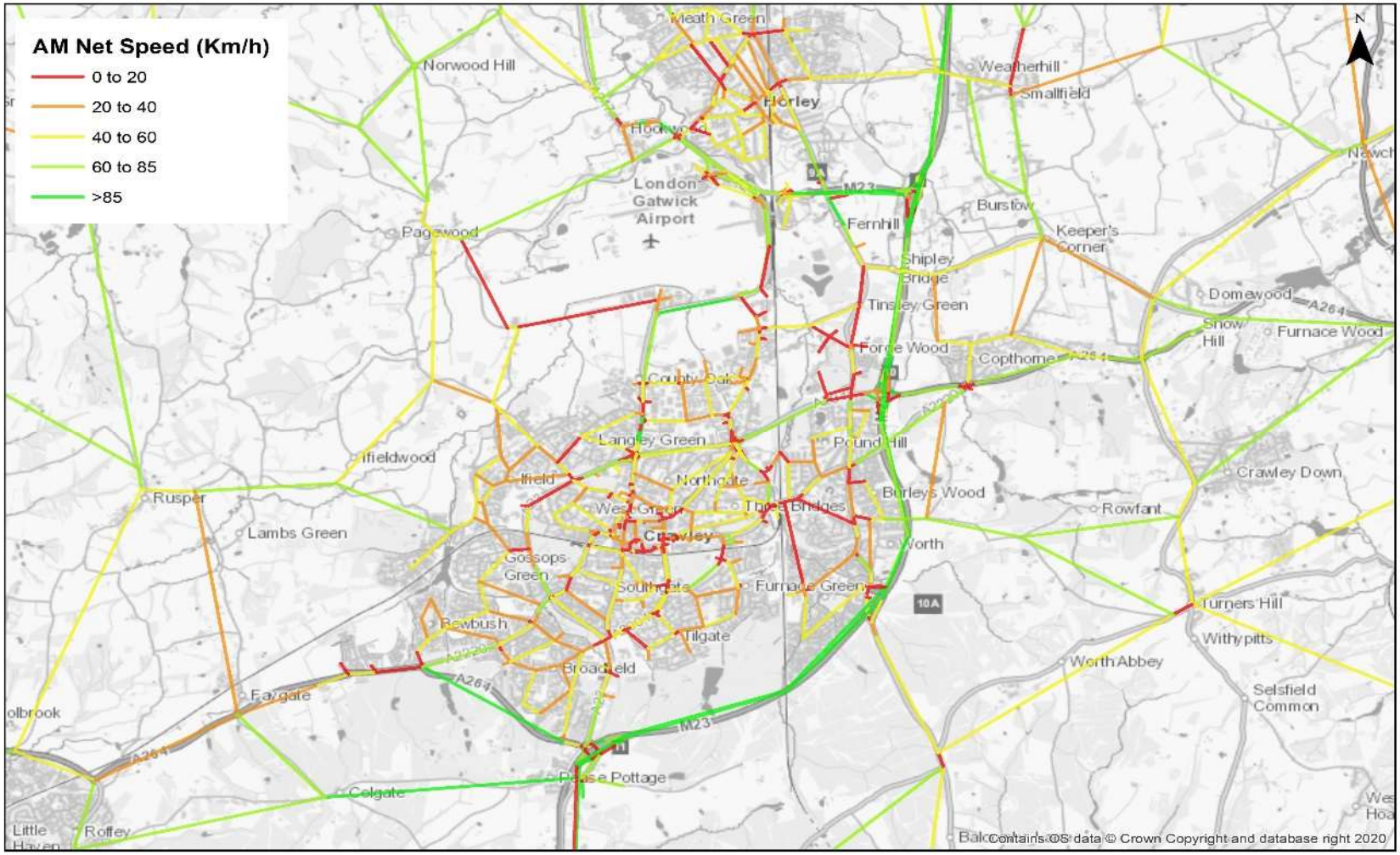


Figure 6-3: AM Peak – Average Speed (km/hour) - Local Plan Scenario 2

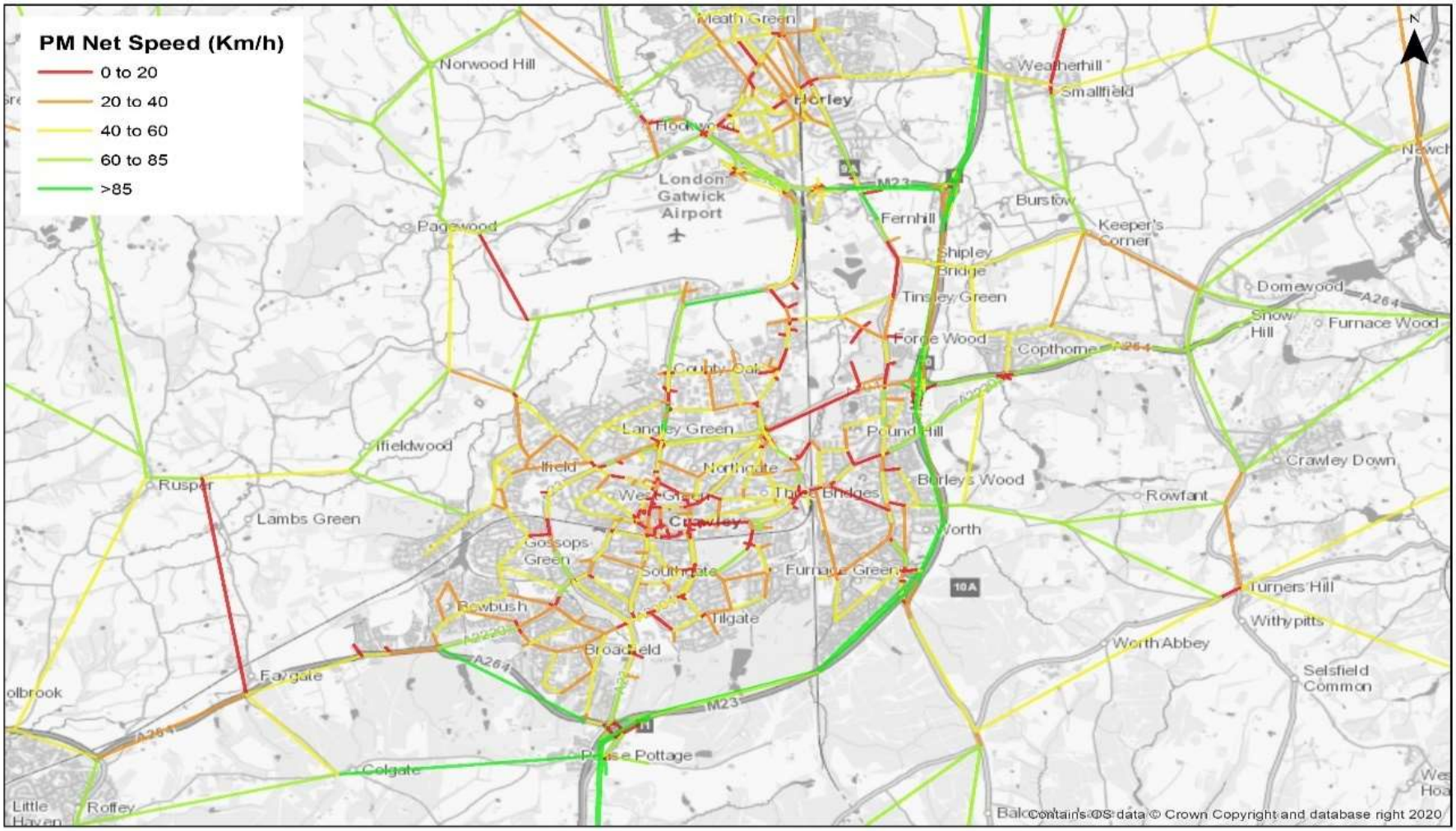


Figure 6-4: PM Peak – Average Speed (km/hour) - Local Plan Scenario 2

7 Draft Crawley Local Plan Impacts – With Sustainable Travel Mitigation

7.1 Introduction

7.1.1 This section reports the Draft Crawley Local Plan impacts on the West Sussex highway network and adjacent network with Surrey (Strategic Road Network is discussed in Section 8) following the application of the limited sustainable mitigation measure trip reductions (as discussed in Sections 6.6 and 6.7) within the context of what has been modelled directly. Any junctions forecast to still operate overcapacity following these limited adjustments are then identified for further mitigation considerations and whether further measures aligned with the Crawley Transport Strategy, but not explicitly modelled, could realistically accommodate the growth expected with the Draft Crawley Local Plan or whether residual impacts are likely to require some highway mitigation.

7.1.2 Again, it should be noted that physical highway mitigation that had already been included within the adopted Local Plan has been included within the modelling and therefore, the modelling only identifies those locations where there are issues, with the additional growth added.

7.1.3 The analysis has initially looked at flow changes, volume to capacity ratios and delays. The analysis has been undertaken for each of the three Draft Crawley Local Plan scenarios in turn. The findings are set out below.

7.1.4 It should be noted that any junction improvement mitigation measures set out in the report are recommended solutions at this point in time, and should development come forward at a later stage the mitigation may change in accordance with the best practice, and what is appropriate through any updated modelling, at that time.

7.2 Flow Changes

7.2.1 Traffic flow comparisons between the Reference Case and each of the three scenario tests with sustainable mitigation are provided within Appendix K. These show where increases in traffic flows are seen on the network, as a result of the Local Plan Scenarios tested when compared against the Reference Case and with proportionate trip reduction associated with the sustainable travel mitigation (discussed in Sections 6.6 and 6.7).

7.2.2 In all three Scenarios tested, the PM peak appears to show the biggest flow increases for each scenario when compared to the Reference Case.

7.2.3 In general, although the demands are slightly lower with sustainable mitigation in place for all three scenarios, the locations where increases in flow are forecast remain generally in the same locations as the Without Mitigation results discussed in Section 5.

7.3 Scenario 1 Overcapacity Junctions

7.3.1 Four (4) junctions have been identified as requiring further consideration of mitigation in Scenario 1 after the adjustments for sustainable travel mitigation discussed in Sections 6.6 and 6.7. These junctions are indicated in Figure 7-1 and are also shown in Table 7-1. They consist of junctions identified in either the AM peak, PM peak or both.

7.3.2 Three of these junctions are signal controlled, therefore signal optimisation may improve the operation. The signal timing included within the modelling have been maintained from models received by Stantec from WSCC and no optimisation was undertaken prior to consideration here. Signal optimisation is discussed further on a site-by-site basis, later in the Section.

Figure 7-1: Scenario 1 – Modelled Over Capacity Junctions after Sustainable Mitigation

Table 7-1: Scenario 1 – Modelled Over Capacity Junctions After Sustainable Mitigation

Item No.	Junction ID	Node No.	Location	Junction Type (in Reference Case)	Period	Ref V/C	Local Plan V/C
i	3	1860	Broadfield Roundabout	Roundabout	PM	112.3	114.1
ii	12	1690	A2011 Crawley Avenue/B2036 Balcombe Road	Signal	PM	111.9	114.3
iii	21	1010	Southgate Avenue/College Road/Haslett Avenue East	Signal	AM	94.5	100.5
iv	22	1750	Southgate Avenue/ Southgate Drive	Signal	AM	91.4	100.1

7.4 Scenario 2 Overcapacity Junctions

7.4.1 The junctions identified for further mitigation in Scenario 2 after the application of proportionate sustainable mitigation within the modelling are shown in Figure 7-2 and also shown in Table 7-2. Six junctions are identified, of which four (4) are signal junctions and can potentially be mitigated through signal optimisation. No other junctions beyond these, have been identified to have issues in Scenario 2.

Figure 7-2: Scenario 2 – Modelled Over Capacity Junctions After Sustainable Mitigation

Table 7-2: Scenario 2 – Modelled Overcapacity Junctions After Sustainable Mitigation

Item No.	Junction ID	Node No	Location	Junction type (in Reference Case)	Period	Ref V/C	Local Plan V/C
i	3	1860	Broadfield Roundabout	Roundabout	PM	112.3	114.1
ii	8	1660	Ifield Roundabout/Ifield Avenue/A23 Crawley Avenue roundabout	Roundabout	PM	101.5	103.1
iii	12	1690	A2011 Crawley Avenue/B2036 Balcombe Road	Signal	AM	104.2	105.7
					PM	111.9	114.5
vi	13	1691	A2011 Crawley Avenue/B2036 Balcombe Road	Signal	PM	100.3	101.7
v	21	1010	Southgate Avenue/College Road/Haslett Avenue East	Signal	AM	94.5	100.6
vi	22	1750	Southgate Avenue/ Southgate Drive	Signal	AM	91.4	100.2

7.5 Scenario 3 Overcapacity Junctions

7.5.1 The junctions identified as requiring mitigation in Scenario 3 after the adjustments for sustainable travel mitigation (discussed in Sections 6.6, 6,7 and 6.8) are indicated in Figure 7-3 and also shown in Table 7-3. They consist of junctions identified in either the AM peak, PM peak or both. Seventeen junctions are identified, of which nine (9) are signal junctions and could potentially be mitigated through signal optimisation.

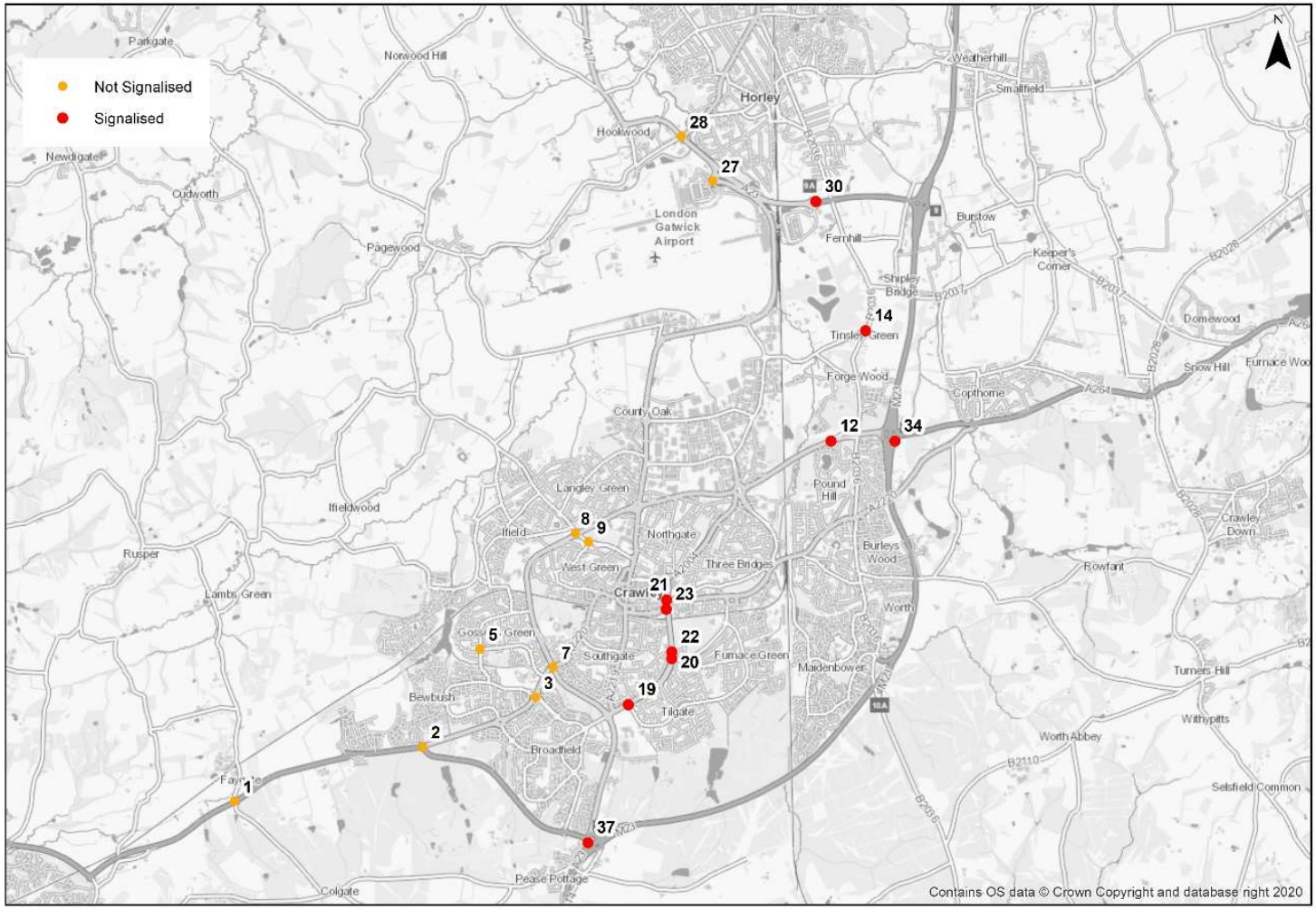


Figure 7-3: Scenario 3 – Modelled Over Capacity Junctions after Sustainable Mitigation

Table 7-3: Scenario 3 – Modelled Overcapacity Junctions after Sustainable Mitigation

Item No.	Junction ID	Node No	Location	Junction type (in Reference Case)	Period	Ref V/C	Local Plan V/C
i	1	7020	A264 Crawley Road/Faygate Lane roundabout	Roundabout	PM	104.7	106.4
ii	2	1880	Bewbush Manor Roundabout/A264/Sullivan Drive	Roundabout	AM	101.1	107.9
					PM	101.1	105.7
iii	3	1860	Broadfield Roundabout	Roundabout	PM	112.3	118.6
iv	5	9081	Gossops Drive/Buckswood Drive	Roundabout	PM	103.6	107.0
v	7	1640	Cheals Roundabout/A2220 Horsham Road/Crawley Avenue	Roundabout	PM	101.9	104.3
vi	8	1660	Ifield Roundabout/Ifield Avenue/A23 Crawley Avenue roundabout	Roundabout	PM	101.5	110.3
vii	12	1690	A2011 Crawley Avenue/B2036 Balcombe Road	Signal	AM	104.2	106.4
					PM	111.9	118.0
viii	14	1824	B2036/Radford Road	Signal	PM	90.7	101.0
ix	19	1790	Southgate Avenue/Ashdown Drive	Signal	PM	104.0	107.8
x	20	1760	Southgate Avenue/Hawth Avenue	Signal	PM	103.8	105.8
xi	21	1010	Southgate Avenue/College Road/Haslett Avenue East	Signal	AM	94.5	101.0
xii	22	1750	Southgate Avenue/ Southgate Drive	Signal	AM	91.4	101.0
					PM	103.6	105.7
xiii	23	1480	A2004 Southgate Avenue/ Station Way	Signal	PM	74.0	100.1
xiv	27	2005	Airport Way/Northway Roundabout/ North Terminal Approach	Roundabout	AM	108.7	110.4
xv	28	2040	A217/A23 London Road/Povey Cross Road	Roundabout	PM	95.1	100.2
xvi	30	8	Airport Way/Ring Road/ M23 'spur' 'HOR9' Horley Business Park	Signal	PM	115.7	123.0
xvii	34	1606	M23 J10 Roundabout NB off slip node	Signal	PM	111.4	114.9
xviii	37	1621	M23 J11 Roundabout circulatory NB off slip node	Signal	AM	101.4	105.5

7.5.2 A summary table of results showing the Reference Case and Draft Crawley Local Plan Scenarios for all junctions analysed as part of this study, are included in Appendix L. This includes results of Volume to Capacity Ratio (%) as well as results of changes in delays between the Draft Crawley Local Plan Scenarios compared to the Reference Case.

7.6 Consideration of Further Mitigation

7.6.1 The operation of the junctions identified above have been considered further to understand whether the capacity shortcomings could be addressed through further consideration of sustainable travel mitigation connected with the Crawley Transport Strategy and to minimise as far as possible the need for highway capacity mitigation. This is in line with the borough's aspiration for a mitigation that will encourage sustainable travel and Virtual Mobility rather than promote highway capacity mitigation that will encourage car use and undermine the uptake of sustainable modes of travel.

7.6.2 Given the long-term nature of the Draft Crawley Local Plan and inherent uncertainties thereof, it is considered that instead of planning for large highway infrastructure schemes, a Manage and Monitor approach is better adopted. Such an approach would involve continually reviewing the requirements for infrastructure and only consider building large highway mitigation when there is compelling evidence to do so.

7.6.3 The number of junctions reaching their theoretical operating capacity increases with each scenario, from Scenario 1 to Scenario 3, as expected, as the travel demand increases with each scenario and therefore the network performance deteriorates. This means that in most cases, the same junctions are generally over capacity with varying levels of underperformance. These are generally commonly known pinch points in the network, such as Crawley Avenue/Ifield Avenue roundabout and Crawley Avenue / Balcombe Road junction.

7.6.4 Further commentary and analysis for each junction is provided below for each Scenario in turn.

7.6.5 The models have been used to determine the Level of Service (LoS) of the junctions and comparing the LoS between the Reference Case and Draft Crawley Local Plan Scenario tests. This enables consideration of whether the Draft Crawley Local Plan impacts could realistically be mitigated through further sustainable travel mitigation above those already assumed and discussed in Section 6.6 to 6.8. The level of unmet demand at the junctions has been used to inform the LoS. This is the difference between the traffic that could accommodated through the junction (Actual Flow) in the hour tested and the traffic that would use the junction if there was sufficient capacity (Demand Flow). The aim is to transfer this excess demand to more sustainable means of travel, rather than create additional capacity in the highway network.

7.6.6 The analysis looks at the differences in unmet demand between the Reference and Draft Crawley Local Plan tests for all turning movements at each junction, to understand the total throughput within the peak hour and the change in unmet demand. If it is considered possible to provide for the unmet demand through sustainable travel measures, then physical highway mitigation is therefore not proposed. If unmet demand differences are high, then physical mitigation may be required.

Scenario 1

i. *Broadfield roundabout (ID 3)* – the A2220 Horsham Road arm towards Horsham is overcapacity in the PM peak. This is a two-lane approach on a dual carriageway. The rest of the arms are well within capacity. The unmet demand is low at 46 PCU's and is 2.5% of the 1,855 PCU's demand on this approach arm in the Reference Case. This unmet demand could be met through traveller behavioural response such as peak spreading. The fixed trip matrix nature of the transport model is not able to capture these likely driver behavioural responses and instead assumes that drivers will continue to use the peak, whereas in reality, an early driver response is to potentially travel in the pre-peak or post-

peak hour shoulders. Virtual mobility would also decrease demand in the PM peak. **No further mitigation.**

ii. A2011 Crawley Avenue/B2036Balcombe Road (ID 12) – This junction is an issue in PM peak in Scenario 1. This junction is a signalised junction, and the model outputs indicate that the high V/C values are seen only on the Crawley Avenue eastbound arm in the PM peak, with spare capacity on other signal stages. This indicates that changes to signal timings or cycle time is likely to mitigate the impacts seen within the modelling. In addition, the unmet demand is low at 33 PCU's or 1% of the 2,495 PCU's Reference demand flow, therefore the level of unmet demand could also be dealt with through virtual mobility, additional sustainable transport measures or peak spreading. **No further mitigation required.**

iii. Southgate Avenue/College Road/Haslett Avenue East (ID 21)- Signal junction predicted to be an issue in AM peak. Only the northbound is just overcapacity with capacity available on other arms within the modelled signal timings, with changes to signal timings or cycle time, likely to address the overcapacity issue. The unmet demand of 80 PCU's relative to Reference Case demand of 1,119 PCU's on the arm. Signalised corridor on major bus corridor with bus priority infrastructure. Potential for signal optimisation as spare capacity on three approach arms. **No further mitigation required**.

iv. Southgate Avenue/Southgate Drive (ID 22) – signal junction in Southgate Avenue bus corridor. Only the right turn from the southbound arm is overcapacity in the AM peak. Issues predicted in AM peak with unmet demand of 63 PCU's relative to Reference Case demand of 1,119 PCU's. Junction just above 100% threshold with potential to optimise and balance timings. **No further mitigation required**.

Scenario 2

i. Broadfield roundabout (ID 3) – the A2220 Horsham Road arm towards Horsham is overcapacity in the PM peak. This is a two-lane approach on a dual carriageway. The rest of the arms are well within capacity. The unmet demand is low at 54 PCU's and is 2.9% of the 1,855 PCU demand on this approach arm in the Reference Case. This unmet demand could be met through traveller behavioural response such as peak spreading as noted in Scenario 1. Virtual mobility would also decrease demand in the PM peak**.** **No further mitigation.**

ii. *Ifield Roundabout/Ifield Avenue/A23 Crawley Avenue roundabout (ID 8)* – this junction is predicted to be an issue in the PM peak in Scenario 2. The overcapacity arms are Crawley Avenue (East) and Ifield Avenue arm (South). Operationally, there are 109 more PCU's of unmet demand in the PM peak compared to the Reference Case and this could be catered for by improved bus services in the corridor**.** It is worth noting that this strategic junction is already overcapacity in the Reference Case in the PM peak (V/C 101.5%) and this increases to 103.1% in Scenario 2. Turn delays are 40 seconds higher than in the Reference Case for the Crawley Avenue westbound arm. It is considered given the strategic nature of this junction within the Crawley network that physical mitigation should be considered. This is discussed below in Section 7.6.

iii. A2011 Crawley Avenue/B2036Balcombe Road (ID 12) – In Scenario 2, this signalised junction is an issue in the AM and PM peaks. In the AM peak, the right turn from Crawley Avenue arm westbound is overcapacity (V/C 105.7%). In the PM peak, the main issue is the eastbound ahead movement (V/C 114.3%). It is considered that in both the AM and PM peaks, signal optimisation addresses the Local Plan impacts. In the PM peak, where the capacity issues are more pronounced, the green time for the eastbound Crawley Avenue traffic was increased. This resulted in traffic from Crawley Town Centre and Three Bridges using the Hazlewick Roundabout to then travel eastbound towards M23 junction 10, rather than use Worth Park Avenue and Balcombe Road, prior to the signal timing change. This resolved issues at the Balcombe Road signal, as well at the Crawley Avenue signal, with the reduction in traffic now wanting to turn left from Balcombe Road to

Crawley Avenue. It was also found that this drew additional traffic onto M23 Junction 10 northbound on-slip, however merge capacity assessments at M23 Junction 10 indicates that the current layout is still adequate with this increased flow. **It is considered that no further mitigation is required beyond changes to signal timings to make Crawley Avenue the more dominant link.**

iv. A2011 Crawley Avenue/B2036 Balcombe Road (ID13)– issues predicted in PM peak with unmet demand of 30 PCU's (4%) compared to Reference Case demand of 691 PCU's. The signal timing changes noted in iii above mitigated the impacts at this junction. **No further mitigation required.**

v. Southgate Avenue/College Road/Haslett Avenue East (ID 21)- Signal junction predicted to be an issue in AM peak. Only the northbound arm is just overcapacity (V/C 100.6%) with capacity available on other arms, making changes to signal timings or cycle times viable to address the overcapacity issue shown within the context of the modelling. The unmet demand of 82 PCU's relative to Reference Case demand of 1,119 PCU's. Signalised corridor on major bus corridor with bus priority infrastructure. Potential for changes in signal timings to give the northbound arm extra green time, as spare capacity on three approach arms. **No further mitigation required**.

vi. Southgate Avenue/Southgate Drive (ID 22) – signal junction in Southgate Avenue bus corridor. Issues predicted in AM peak on the southbound arm which is just overcapacity (V/C 100.2%). Additional sustainable transport measures are likely to resolve the issue at this junction. This is also a key bus corridor, therefore there is likely to be scope, through discussions with commercial bus operators to provide additional services in the longer term, to make this and even more viable alternative to the car. **No further mitigation required.**

Scenario 3

7.6.7 Scenario 3 adds predominantly residential associated trips attributed to West of Ifield and west of Kilnwood Vale sites with consequent increase in demands from/to the western side of Crawley. As a result, this scenario adds substantially more trips to the network than Scenarios 1 and 2. For context Scenario 1 with sustainable mitigation assigns 1,046 local plan trips onto the network in the AM and 1,353 in the PM, Scenario 2 about 1,378 trips (AM) (1,653 PM), while Scenario 3 assigns 3,559 (AM) (4,152 PM). The impacts in Scenario 3 are therefore attributable to the West of Ifield and west of Kilnwood Vale sites.

7.6.8 In both the AM and PM peaks, the scenario shows high flow increases on minor roads to the west such as on Rusper Road and Faygate Lane and on Ifield Avenue north of Crawley Avenue. Flow increases are also seen on roads through Bewbush, Gossops Green, Ifield West, Ifield and Langley Green residential areas in both peaks. This includes flow increases on Stagelands and Martyrs Avenue in Langley Green. Noticeable flow increases are also seen in the signalised Southgate Avenue bus corridor in both the AM and PM peak. Consequently, a number of signal junctions in this corridor go overcapacity in Scenario 3. The unmet demands for Scenario 3 are now discussed. A sensitivity test in which the Crawley West Link Road (CWLR) is in place has been undertaken and is discussed in Section 9.

i. *A264 Crawley Road/Faygate Lane roundabout (ID 1)* – Unmet demand of 110 PCU's in PM peak compared to Reference Case demand of 4,618 PCU or 2% shift or reduction in demand to maintain Reference Case Level of Service. The capacity issues present in the PM peak on the Faygate arm. The capacity issues at the junction are 'borderline' when compared to the Reference Case in that at a V/C of 104.7%, this is only 1.7% more than that in the Reference with delays being 24 seconds higher than those in the Reference Case. Behavioural responses such as peak spreading, virtual mobility should be able to contain the unmet demand. **No further mitigation required.**

ii. *Bewbush Manor Roundabout/A264/Sullivan Drive roundabout (ID 2)* – predicted to be an issue in both the AM and PM peaks. The unmet demand in the AM peak is 124 PCU's

(5.7%) and 85 CU's in the PM peak (3.9%) compared to the Reference Case. Behavioural responses such as peak spreading, virtual mobility and public transport can be expected to address the unmet demand. **No further mitigation required.**

iii. Broadfield roundabout (ID 3) – the A2220 Horsham Road arm towards Horsham is overcapacity in the PM peak. This is a two-lane approach on a dual carriageway. The rest of the arms are well within capacity. The unmet demand is low at 54 PCU's and is 2.9% of the 1,855 PCU demand on this approach arm in the Reference Case. This unmet demand could be met through traveller behavioural response such as peak spreading as noted in Scenario 1. Virtual mobility would also decrease demand in the PM peak. **No further mitigation.**

iv. *Gossops Drive/Buckswood Drive roundabout (ID5)* – Predicted issue in PM peak with unmet demand of 94 PCU's (8.7%) compared to Reference Case demand of 1,079 PCU's. This is within the residential area of Gossops Green where rat-runs have to be discouraged. The overcapacity arm is Gossops Drive southbound. **No further mitigation required.**

v. *Cheals Roundabout/A220 Horsham Road/Crawley Avenue (ID7)* – Predicted issue in AM peak on A2220 Horsham Road westbound approach. Unmet demand of 77 PCU's (6.8%) compared to Reference Case demand approach arm flow of 1,129 PCU's. The unmet demand can be accommodated through behavioural responses such as peak spreading, virtual mobility and public transport uptake. **No further mitigation required.**

vi. *Ifield Roundabout/Ifield Avenue/A23 Crawley Avenue roundabout (ID 8)– This junction is overcapacity in both the* AM and PM peaks. Unmet demand of 293 PCU's (6.9%) compared to AM Reference Case demand of 4,220 PCU's and unmet demand of 348 (7.4%) PCU's in PM peak compared to Reference Case demand of 4,680 PCU. The high unmet demands at the junction indicate the need for a scheme at the junction. In the PM peak in particular, the V/C ratio is 110.3% compared to 101.5% in the Reference Case with high delays of 170 seconds more than the Reference Case being seen. The mitigation scheme is discussed further in Section 7.6.

vii. *A2011 Crawley Avenue/B2036Balcombe Road (ID 12)* – As in Scenario 2, this signalised junction is an issue in the AM and PM peaks. In the AM peak, the right turn from Crawley Avenue arm westbound is overcapacity (V/C 106.4%). In the PM peak, the main issue is the eastbound ahead movement (V/C 118.3%) which is worse than in Scenario 2 as expected. It is considered that in both the AM and PM peaks, signal optimisation may address the Local Plan impacts. Modelling has been undertaken as per scenario 2 and the issues resolved with changes to the traffic signal timings to give Crawley Avenue greater priority. **It is considered that no further mitigation is required beyond signal optimisation.**

viii. *B2036/Radford Road (ID 14)– capacity issues are identified in the PM peak.* Southbound Balcombe Road approach is single lane and is just overcapacity at V/C ratio of 101%. Other two arms including single lane northbound Balcombe Road approach (V/C 77%) are within capacity. Potential to link to Gatwick Green transport strategy. Modest delay increase of 22 seconds on overcapacity arm compared to Reference Case. Unmet demand of 57 PCU's (or 7%) of Reference Case demand on Balcombe Road southbound, that can be met through peak spreading, virtual mobility and linking to Gatwick Green transport strategy. **No further mitigation.**

ix. *Southgate Avenue/Ashdown Drive (ID19)* - This is an issue in the PM peak where the A2004 Southgate Avenue westbound approach arm has V/C ratio of 108% compared to, 104% in the Reference Case. Unmet demand of 170 PCU's (9%) compared to Reference Case demand of 1,867 PCU's. This is a key bus corridor route with bus lanes on Southgate Avenue. Unmet demand can be addressed through a combination of signal optimisation, peak spreading, virtual mobility, active modes and shift to bus. **No further mitigation required.**

x. Southgate Avenue/Hawth Avenue (ID20) – Capacity issues in PM peak on Hawth Avenue (westbound), potential to optimise timings. High bus corridor with bus lanes on A2004 Southgate Avenue northbound and southbound. Unmet demand of 79 PCU's (3.2%) compared to Reference Case demand of 2,440 PCU's. This is also a key bus corridor, therefore there is likely to be scope, through discussions with commercial bus operators to provide additional services in the longer term, to make this and even more viable alternative to the car. **No further mitigation**

xi. Southgate Avenue/College Road/Haslett Avenue East (ID 21)- Signal junction predicted to be an issue in AM peak. Only the northbound arm is just overcapacity (V/C 101%) with capacity available on other arms. Changes to signal timing are a viable solution, providing the northern arm with more green time. The unmet demand of 101 PCU's relative to Reference Case demand of 1,119 PCU's. Signalised corridor on major bus corridor with bus priority infrastructure. This is also a key bus corridor, therefore there is likely to be scope, through discussions with commercial bus operators to provide additional services in the longer term, to make this and even more viable alternative to the car. **No further mitigation required.**

xii. Southgate Avenue/Southgate Drive (ID22) – Overcapacity AM and PM peaks. In AM peak, right turn only from southbound arm just overcapacity at V/C ratio 101%, potential for signal optimisation as other arms well below capacity. In PM peak right turn only also from southbound arm is overcapacity at V/C ratio 105.7% with potential for signal optimisation as other arms well below capacity; Low unmet demand 128 PCU (5%) compared to Reference Case demand of 2385 PCU's. This is also a key bus corridor, therefore there is likely to be scope, through discussions with commercial bus operators to provide additional services in the longer term, to make this and even more viable alternative to the car. **No further mitigation required.**

xiii. A2004 Southgate Avenue/Station Way (ID23) Northbound approach arm just overcapacity at V/C ratio of 100.1% in AM peak relatively low delay change (20 seconds) above Reference Case delays, potential to provide more green time to the northbound approach. This is also a key bus corridor, therefore there is likely to be scope, through discussions with commercial bus operators to provide additional services in the longer term, to make this and even more viable alternative to the car. **No further mitigation required.**

xiv. Airport Way/Northway roundabout/ North Terminal Approach roundabout (ID 27) – Only the Airport Way arm is overcapacity (westbound) in the AM peak, with unmet demand of 102 PCU's or 4.7% of Reference Demand of 2,139 PCU's on the arm. Behavioural responses such peak spreading and virtual mobility can address this low level of unmet demand. **No further mitigation required.**

xv. A217/A23 London Road/Povey Cross Road (Longbridge roundabout) (ID 28) – Junction is just overcapacity in PM peak at V/C ratio of 100.2% on northbound London Rod arm. Unmet demand of 96 PCU's (3.8%) compared to Reference Case demand of 2,542 PCU's. Behavioural responses such peak spreading and virtual mobility can address unmet demand. **No further mitigation required.**

xvi. Airport Way/Ring Road/M23 'spur HOR9' Horley Business Park (ID 30) – Junction is overcapacity in PM peak at V/C ratio of 123%. Unmet demand of 65 PCU's (4.4%) compared to Reference Case demand of 1,477 PCU's. Balancing the signal timings at this signalised node is able to resolve the capacity issues. **No further mitigation required.**

7.7 Crawley Avenue/Ifield Avenue Mitigation

7.7.1 ARCADY 10 Junctions 10 software testing has been used to test the proposed mitigation scheme at the Ifield Roundabout/Ifield Avenue/A23 Crawley Avenue roundabout (ID 8). The scheme is proposed in both Scenarios 2 and 3. The junction modelling demonstrates that the scheme shown in Drawing 48559/5501/SK004 would address the current highway capacity issues and mitigate Local Plan Scenario 2 in the AM and PM peak hours. Outputs of junction

modelling are provided in Appendix M. Indicative cost estimates have been prepared and can be found in Appendix N.

Mitigation Scheme Design

7.7.2 A local widening scheme to improve this junction has been drawn up as part of this study and is shown as Drawing 48559/5501/SK004. The scheme is required in Scenarios 2 and 3.

Junction Modelling

7.7.3 As noted, ARCADY 10 Junctions 10 software has been used to model the scheme, with turn flows taken from the SATURN model. This software is used to test and design roundabouts. In line with good practice, the junction testing involved developing a calibrated and validated 2015 Base model. Testing was then done using 2035 future flows for the Reference Case, Scenarios 2 and 3. The new design with Scenarios 2 and 3 demands was compared against the 2035 Reference Case with the existing layout. The results are summarised in Table 7-4 and demonstrate that the scheme mitigates the impacts of Scenarios 2 and 3 when compared to the Reference Case.

Table 7-4: ARCADY 10 Junctions 10 Summary Outputs

	AM Peak Hour 0800 - 0900			PM Peak Hour 1700 - 1800		
	Queue (Veh)	Delay (s)	RFC	Queue (Veh)	Delay (s)	RFC
2015 Base Year						
A23 Crawley Avenue East (A)	2.3	15.3	0.70	16.0	118.4	1.09
Ifield Avenue South (B)	2.5	9.1	0.72	5	17.6	0.93
A23 Crawley Avenue West (C)	25.8	90.5	1.0	2.2	12.6	0.73
Ifield Avenue North (D)	3.6	20.6	0.96	3.4	13.6	0.79
2035 Reference Case						
A23 Crawley Avenue East (A)	2.5	17.7	0.74	108.4	474.2	1.32
Ifield Avenue South (B)	2.7	9.8	0.75	5.4	18.3	0.97
A23 Crawley Avenue West (C)	69.9	230.3	1.17	2.6	19.6	0.86
Ifield Avenue North (D)	3.6	20.6	0.96	2.6	13.4	0.85
2035 Scenario 2 Mitigated						
A23 Crawley Avenue East (A)	1.7	14.7	0.67	25.8	89.0	1.15
Ifield Avenue South (B)	2.5	8.9	0.71	3.3	15.8	0.80
A23 Crawley Avenue West (C)	9.7	45.3	1.0	2.6	17.5	0.83
Ifield Avenue North (D)	3.0	13.4	0.89	1.9	8.1	0.71
2035 Scenario 3 Mitigated						
A23 Crawley Avenue East (A)	2.2	15.6	0.71	67.2	311.7	1.20
Ifield Avenue South (B)	3.3	10.6	0.80	4.9	22.1	0.93

A23 Crawley Avenue West (C)	10.0	50.3	1.03	4.2	26.1	0.87
Ifield Avenue North (D)	2.6	11.2	0.78	1.5	8.4	0.65

7.7.4 It should be noted that the scheme effectively retains the current provision of active mode facilities, i.e. the pedestrian bridge is retained in its current form allowing for pedestrians and cyclists (who have to dismount) to cross Crawley Avenue. The scheme therefore does not make active mode provision any worse than in the Reference Case.

7.7.5 It can also be seen from the results that on Ifield Avenue North, for example, the scheme is seen to reduce queues compared to the Reference Case and this would also benefit buses and indicates that a bus lane may not be required on this arm for the foreseeable future at least.

7.7.6 On Crawley Avenue eastbound, there is potential to provide an offside bus lane in future, that would assist buses to turn right. This could be coupled with a pre-signal on the approach to the stop line that would enable buses to 'jump' to the front of the queue although there would be a set-back length that allowed the full stop line width to be available to general traffic including those turning right.

High Level Scheme Costs

7.7.7 A summary of the high-level scheme costs is shown in Appendix N together with a list of exclusions. The scheme cost excluding optimism bias (OB) is estimated at £516,186. This increases to £743,308 assuming an OB uplift of 44%. The OB takes account of the tendency to underestimate scheme costs and construction times while potentially overestimating scheme benefits.

7.8 Further discussion of Gatwick Green Impacts

7.8.1 Gatwick Green is the main site proposed for employment in the Crawley Local Plan update. This development is the main addition between the modelled Scenario 2 when compared to Scenario 1. The development is estimated to generate 333 two-way trips in the AM peak and 298 two-way trips in the PM peak. Being 70% B8 land use and 30% B2, a significant proportion of these trips will be freight/HGV traffic and therefore cannot be shifted to active modes or public transport. It is assumed that a proportion of employees working at the site would use the sustainable mitigation measures. Subsequently, the residual Gatwick Green trips assumed to impact the network are 312 two-way trips (224 arrivals and 88 departures) in the AM peak and 281 trips in the PM pea (80 arrivals and 201 departures).

7.8.2 Select Link Analysis (SLA) has been undertaken to understand the impacts of these trips particularly on B2036 Balcombe Road, on its southern and northern sections. The northern sections of Balcombe Road lead into Surrey, and therefore any cross-boundary impacts have been reviewed. SLA makes it possible to identify the locations that the Gatwick Green trips are forecast to route on the road network.

AM Peak

- 224 trips are destined for Gatwick Green in the AM peak;
- Of these, 57 trips approach the site from Balcombe Road north of the site;
- The majority of the trips, 167 trips, approach the site on Balcombe Road from the south;
- Of the 88 trips originating from the site, 78 trips head out southwards on Balcombe Road, with 10 heading north on Balcombe Road;

- Therefore 67 two-way trips are predicted to use the northern sections of Balcombe Road through Horley and beyond, while 245 two-way trips are predicted to use the southern sections of Balcombe Road and beyond.

PM Peak

- 80 trips are destined for Gatwick Green in the PM peak;
- Of these, 24 trips approach the site from Balcombe Road north of the site;
- The majority of the trips, 56 trips, approach the site on Balcombe Road from the south;
- Of the 201 trips originating from the site, 160 trips head out southwards on Balcombe Road, with 41 trips heading north on Balcombe Road;
- Therefore 65 two-way trips are predicted to use the northern sections of Balcombe Road through Horley and beyond, while 216 two-way trips are predicted to use the southern sections of Balcombe Road and beyond.

7.8.3 It is noted that the majority of the traffic generated by Gatwick Green will be freight/HGV traffic. An HGV ban for traffic headed into Gatwick Green from the north on Balcombe Road is proposed at the access junctions into the site to prevent this traffic travelling through the built-up area in Horley. A right turn ban is also proposed for HGV traffic egressing the site, to prevent this traffic using the northern sections of Balcombe Road thus mitigating any potential adverse impacts from this HGV traffic such as noise and air pollution. These HGV management measures are proposed in both Scenarios 2 and 3. Additional journeys to/from the south will not have a significant additional impact on the junction performance so as to require further mitigation.

7.9 Summary

7.9.1 The assessment has indicated that the unmet demand at almost all junctions analysed can be addressed through sustainable mitigation measures. These measures would include:

- limited bus priority measures to increase uptake of bus ridership;
- the LCWIP to increased uptake in active modes walking and cycling; and
- through increased Virtual Mobility, particularly working from home which would lead to reduced car travel at peak times.

7.9.2 It is considered that the sustainable travel interventions could mitigate the impacts of the Draft Crawley Local Plan in Scenario 1, assuming that these deliver substantial improvement in active travel and public transport services and infrastructure. The study has assumed a conservative reduction in car use to represent modal shift as a result of the sustainable mitigation. In Scenario 2 and 3 there are some residual impacts where junction mitigation is likely to be required at the following junction:

- Ifield Roundabout/Ifield Avenue/A23 Crawley Avenue roundabout – local widening shown in Drawing 48559/5501/SK004 appears to be a solution for Scenarios 2 and 3. For Scenario 3, the modelling has been undertaken without the Crawley Western Link Road (CWLR). A sensitivity test has been undertaken of including the CWLR in Scenario 3 and the results of this test are reported in Section 9.

8 Impacts on the Strategic Road Network (SRN)

8.1 Introduction

8.1.1 This section reports on the potential impacts of the proposed Local Plan development on National Highways Strategic Road Network (SRN).

8.1.2 The potential impacts of the proposed Local Plan development on the SRN have been undertaken by examining the impacts of Local Plan development upon the slip road and merges and diverges with the main M23 carriageway. This is in addition to the analysis of junctions which has been undertaken in sections 5-7 of this study, where junctions on the SRN were considered alongside local highway authority junctions. The merge-diverge assessments have been undertaken for the following M23 junctions which are pertinent to Crawley:

(i) M23 Junction 9 (M23 J9)

(ii) M23 J10 (M23 J10)

(iii) M23 J10A (M23 J10A)

(iv) M23 J11 (M23 J11)

8.1.3 The merge and diverge assessments were undertaken in accordance with 'CD122 Geometric design of grade separated junctions, Revision 1, January 2020'. The approach has been to consider whether current merge and diverges at the aforementioned M23 junctions are able to accommodate future with and without Local Plan flows in their current configuration i.e. merge and/or diverge type or whether alternative configurations are required.

8.1.4 The input flows used to undertake the merge-diverge assessments have been obtained from the Crawley SATURN highway models used to inform the Local Plan transport evidence base. Flows have been extracted for each junction for the Without Local Plan (Reference Case) and for the With Local Plan scenarios. All flows have been converted from PCUs to vehicles. The flows used are shown in the following tables by junction. The flows also give an indication of the flow changes on the SRN as a result of the local plan when compared to the Reference Case. The flows generally look logical.

8.1.5 This chapter also reports on congested junctions on the SRN. Delays, volume to capacity ratios and queues are also discussed for Scenario 2 (with sustainable mitigation). SATURN plots of these outputs are presented in Appendix P.

8.2 Merge and Diverge Capacity Assessment

8.2.1 The results of the assessments are now summarised for each junction by direction and by particular merge and diverge assessed. Detailed results and outputs are in Appendix O.

8.3 M23 Junction 9

M23 J9 Southbound Diverge

8.3.1 Table 8-1 shows the flows in the AM and PM peak period for the M23 J9 Southbound Diverge.

Table 8-1: M23 J9 Southbound Diverge Assessment Flows

Scenario	Downstream Mainline		Diverge Flow	
	AM	PM	AM	PM
Reference Case	3,638	3,877	1,780	835
Local Plan 1	3,702	3,913	1,771	835
Local Plan 2	3,716	3,905	1,765	835
Local Plan 3	3,802	3,997	1,769	812

8.3.2 In general, the Local Plan has an increase of up to 150 vehicles compared to the reference case on the mainline in both the AM and PM peak. The merge flow has no increases in the AM or PM peak periods.

8.3.3 The results of the assessment for M23 J9 southbound diverge are summarised in Table 8-2.

Table 8-2: M23 J9 Southbound Diverge Assessment Summary

Scenario	Merge Layouts		Upstream mainline lanes	Downstream Mainline Lanes	Connector Road Lanes
	AM	PM			
Current Layout	D	D	4	3	2
Reference Case	D	A	4	3	2
Local Plan 1	D	A	4	3	2
Local Plan 2	D	A	4	3	2
Local Plan 3	D	A	4	3	2

8.3.4 The current layout for this diverge is type D.

8.3.5 In the AM peak, the layout is assessed to remain unchanged in the Reference Case and all three Local Plan scenarios.

8.3.6 In the PM peak the assessment indicates that diverge layout type A is required.

8.3.7 No further changes are required at this junction and the Local Plan flows can be accommodated.

M23 J9 Southbound Merge

8.3.8 Table 8-3 shows the flows in the AM and PM peak period for the M23 J9 Southbound merge.

Table 8-3: M23 J9 Southbound Merge Assessment Flows

Scenario	Upstream Mainline		Merge Flow	
	AM	PM	AM	PM
Reference Case	3,638	3,877	586	1,482
Local Plan 1	3,702	3,913	583	1,560
Local Plan 2	3,716	3,905	588	1,594
Local Plan 3	3,802	3,997	588	1,627

8.3.9 In general, the Local Plan has a potential increase of up to 150 vehicles compared to the reference case on the mainline in both the AM and PM peak. The merge flow has no significant increases in the AM but in the PM peak there are increases of up to 150 vehicles.

8.3.10 The results of the assessment for M23 J9 southbound merge are summarised in Table 8-4.

Table 8-4: M23 J9 Southbound Merge Assessment Summary

Scenario	Merge Layouts		Upstream mainline lanes	Downstream Mainline Lanes	Connector Road Lanes
	AM	PM			
Current Layout	E	E	3	4	2
Reference Case	D	E	3	3	2
Local Plan 1	D	E	3	4	2
Local Plan 2	D	E	3	4	2
Local Plan 3	D	E	3	4	2

8.3.11 The current layout for this merge is type E.

8.3.12 In the AM peak, the layout is assessed to be layout D for the Reference Case and all three Local Plan scenarios.

8.3.13 In the PM peak the assessment indicates that merge layout type remains as per the existing layout type E for the Reference Case and for all three Local Plan scenarios.

8.3.14 No further changes are required at this junction and the Local Plan flows can be accommodated.

M23 J9 Northbound Diverge

8.3.15 Table 8-5 shows the flows in the AM and PM peak period for the M23 J9 northbound diverge.

Table 8-5: M23 J9 Northbound Diverge Assessment Flows

Scenario	Downstream Mainline		Diverge Flow	
	AM	PM	AM	PM
Reference Case	3,651	3,200	1,246	667
Local Plan 1	3,715	3,242	1,276	686
Local Plan 2	3,719	3,239	1,299	689
Local Plan 3	3,686	3,191	1,297	702

8.3.16 In general, the Local Plan development has a potential increase of less than 70 vehicles compared to the reference case on the mainline in both the AM and PM peak. The diverge flow has increases of up to 50 vehicles in the AM and PM peak.

8.3.17 The results of the assessment for M23 J9 northbound diverge are summarised in Table 8-6.

Table 8-6: M23 J9 Northbound Diverge Assessment Summary

Scenario	Merge Layouts		Upstream mainline lanes	Downstream Mainline Lanes	Connector Road Lanes
	AM	PM			
Current Layout	D	D	3	3	2
Reference Case	A	C	3	3	1
Local Plan 1	A	C	3	3	1
Local Plan 2	A	C	3	3	1
Local Plan 3	A	C	3	3	1

8.3.18 The current layout for this diverge is type D.

8.3.19 In the AM peak, the layout is assessed to require layout type A in the Reference Case and all three Local Plan scenarios.

8.3.20 In the PM peak the assessment indicates that diverge layout type C is required in the Reference Case all for all three Local Plan scenarios.

8.3.21 No further changes are required at this junction and the Local Plan flows can be accommodated.

M23 J9 Northbound Merge

8.3.22 Table 8-7 shows the flows in the AM and PM peak period for the M23 J9 northbound merge.

Table 8-7: M23 J9 Northbound Merge Assessment Flows

Scenario	Upstream Mainline		Merge Flow	
	AM	PM	AM	PM
Reference Case	3,651	3,200	1,144	852
Local Plan 1	3,715	3,242	1,128	846
Local Plan 2	3,719	3,239	1,120	834
Local Plan 3	3,686	3,191	1,122	868

8.3.23 In general, the Local Plan has an increase of less than 70 vehicles compared to the reference case on the mainline in both the AM and PM peak. The merge flow has small changes in flow in the Local Plan compared to the reference case.

8.3.24 The results of the assessment for M23 J9 northbound merge are summarised in Table 8-8.

Table 8-8: M23 J9 Northbound Merge Assessment Summary

Scenario	Merge Layouts		Upstream mainline lanes	Downstream Mainline Lanes	Connector Road Lanes
	AM	PM			
Current Layout	E	E	3	4	2
Reference Case	A	D	3	3	1
Local Plan 1	A	D	3	3	1
Local Plan 2	A	D	3	3	1
Local Plan 3	A	D	3	3	1

8.3.25 The current layout for this merge is type E.

8.3.26 In the AM peak, the layout is assessed to be layout A for the Reference Case and all three Local Plan scenarios.

8.3.27 In the PM peak the assessment indicates that merge layout type D is required for the Reference Case and for all three Local Plan scenarios.

8.3.28 No further changes are required at this junction and the Local Plan flows can be accommodated.

8.4 M23 Junction 10

M23 J10 Southbound Diverge

8.4.1 Table 8-9 shows the flows in the AM and PM peak period for the M23 J10 southbound diverge. In general, the Local Plan has an increase of less than 40 vehicles compared to the reference case on the mainline in the AM peak and up to 200 vehicles in the PM peak. The diverge flow has flow changes of up to 150 and 60 vehicles in the AM and PM peak respectively.

Table 8-9: M23 J10 Southbound Diverge Assessment Flows

Scenario	Downstream Mainline		Diverge Flow	
	AM	PM	AM	PM
Reference Case	2,736	4,071	1,489	1,291
Local Plan 1	2,729	4,176	1,556	1,300
Local Plan 2	2,734	4,197	1,570	1,305
Local Plan 3	2,772	4,278	1,619	1,350

8.4.2 The results of the assessment for M23 J10 southbound diverge are summarised in Table 8-10.

Table 8-10: M23 J10 Southbound Diverge Assessment Summary

Scenario	Merge Layouts		Upstream mainline lanes	Downstream Mainline Lanes	Connector Road Lanes
	AM	PM			
Current Layout	D	D	4	3	2
Reference Case	D	A	3	3	2
Local Plan 1	D	C	4	3	2
Local Plan 2	D	C	4	3	2
Local Plan 3	D	C	4	3	2

8.4.3 The current layout for this diverge is type D.

8.4.4 In the AM peak, the layout is assessed to remain unchanged at type D for the Reference Case and for all three Local Plan scenarios.

8.4.5 In the PM peak the assessment indicates that diverge layout type A is required for the Reference Case while layout type C is required for all three Local Plan scenarios.

8.4.6 No further changes are required at this junction and the Local Plan flows can be accommodated.

M23 J10 Southbound Merge

8.4.7 Table 8-11 shows the flows in the AM and PM peak period for the M23 J10 southbound merge.

Table 8-11: M23 J10 Southbound Merge Assessment Flows

Scenario	Upstream Mainline		Merge Flow	
	AM	PM	AM	PM
Reference Case	2,736	4,071	819	1,375
Local Plan 1	2,729	4,176	865	1,324
Local Plan 2	2,734	4,197	873	1,326
Local Plan 3	2,772	4,278	914	1,343

8.4.8 In general, the Local Plan has an increase of less than 40 vehicles compared to the reference case on the mainline in the AM peak and up to 200 vehicles in the PM peak. The merge flow has flow changes of up to 100 vehicles in the AM peak and small reductions in the PM peak.

8.4.9 The results of the assessment for M23 J10 southbound merge are summarised in Table 8-12.

Table 8-12: M23 J10 Southbound Merge Assessment Summary

Scenario	Merge Layouts		Upstream mainline lanes	Downstream Mainline Lanes	Connector Road Lanes
	AM	PM			
Current Layout	A	A	3	3	2
Reference Case	B	E	3	4	2
Local Plan 1	B	D	3	4	2
Local Plan 2	B	D	3	4	2
Local Plan 3	B	D	3	4	2

8.4.10 The current layout for this merge is type A.

8.4.11 In the AM peak, the required layout is assessed to be layout B for the Reference Case and for all three Local Plan scenarios.

8.4.12 In the PM peak the assessment indicates that merge layout type E is required for the Reference Case and layout type D is required for all three Local Plan scenarios.

8.4.13 The Local Plan does not add any additional flows in the PM peak period where there is the need for an additional downstream lane. However, there is an increase in flow as a result of the Local Plan in all scenarios on the AM peak merge.

Proposed Mitigation

8.4.14 A mitigation scheme has been developed for this merge. Drawing 330610079/SK002 shows the existing layout and improvements proposed at Junction 10 southbound merge. The cost of these improvements has been estimated at £993,195 excluding optimism bias (OB). Details of the cost estimate and exclusions are shown in Appendix Q. Applying an OB of 44% gives a cost estimate of £1,430,201.

8.4.15 The mitigation scheme essentially replaces a single lane nearside merge with a parallel merge followed by an auxiliary lane, which in turn is followed by a taper to end the auxiliary lane. The scheme can be accommodated within the highway boundary with no significant earthworks or structures.

M23 J10 Northbound Diverge

8.4.16 Table 8-13 shows the flows in the AM and PM peak period for the M23 J10 northbound diverge.

Table 8-13: M23 J10 Northbound Diverge Assessment Flows

Scenario	Downstream Mainline		Diverge Flow	
	AM	PM	AM	PM
Reference Case	3,497	2,374	1,565	866
Local Plan 1	3,517	2,373	1,540	904
Local Plan 2	3,515	2,376	1,538	896
Local Plan 3	3,527	2,309	1,545	902

8.4.17 In general, the Local Plan development has potentially small or no increases in flow compared to the reference case in both peak periods. The diverge flow has minor changes in the AM peak and up to 30 vehicles in the PM peak.

8.4.18 The results of the assessment for M23 J10 southbound diverge are summarised in Table 8-14.

Table 8-14: M23 J10 Northbound Diverge Assessment Summary

Scenario	Merge Layouts		Upstream mainline lanes	Downstream Mainline Lanes	Connector Road Lanes
	AM	PM			
Current Layout4	B	B	3	3	2
Reference Case	D	A	3	2	2
Local Plan 1	D	A	3	2	2
Local Plan 2	D	A	3	2	2
Local Plan 3	D	A	3	2	2

8.4.19 The current layout for this diverge is type B. In the AM peak, the layout is assessed to require type D for the Reference Case and for all three Local Plan scenarios.

8.4.20 In the PM peak the assessment indicates that diverge layout type A is required for the Reference Case and for all three Local Plan scenarios.

8.4.21 No further changes are required at this junction as the Local Plan development traffic flows can be accommodated. The outputs indicate that two lanes would be sufficient on the downstream link.

M23 J10 Northbound Merge

8.4.22 Table 8-15 shows the flows in the AM and PM peak period for the M23 J10 northbound merge.

Table 8-15: M23 J10 Northbound Merge Assessment Flows

Scenario	Upstream Mainline		Merge Flow	
	AM	PM	AM	PM
Reference Case	3,497	2,374	1,400	1,493
Local Plan 1	3,517	2,373	1,474	1,555
Local Plan 2	3,515	2,376	1,504	1,550
Local Plan 3	3,527	2,309	1,457	1,581

8.4.23 In general, the Local Plan has small or no increases in flow compared to the reference case in both peak periods on the mainline. The merge flow has increases of up to 100 vehicles in the AM and PM peak.

8.4.24 The results of the assessment for M23 J10 northbound merge are summarised in Table 8-16.

Table 8-16: M23 J10 Northbound Merge Assessment Summary

Scenario	Merge Layouts		Upstream mainline lanes	Downstream Mainline Lanes	Connector Road Lanes
	AM	PM			
Current Layout	E	E	3	4	2
Reference Case	E	E	2	3	2
Local Plan 1	E	E	2	3	2
Local Plan 2	E	E	2	3	2
Local Plan 3	E	E	2	3	2

8.4.25 The current layout for this merge is type A.

8.4.26 In the AM peak, the required layout is assessed to remain unchanged at layout E for the Reference Case and for all three Local Plan scenarios.

8.4.27 In the PM peak the assessment indicates that merge layout type E remains adequate for the Reference Case for all three Local Plan scenarios.

8.4.28 It was noted in Section 7.5 under Scenario 2 item (iii) that signal optimisation of Junction ID 12 (A2011 Crawley Avenue/B2036 Balcombe Road (ID 12)) results in eastbound improvements that encourages traffic onto Crawley Road rather than rat-running on Balcombe Road. This consequently also draws more traffic northbound onto M23 J10 northbound merge. A check of the merge assessment indicated that the merge is still adequate to cope with this additional demand.

8.4.29 No further changes are required at this junction and the Local Plan flows can be accommodated.

8.5 M23 Junction 10A

M23 J10A Southbound Diverge

8.5.1 Table 8-17 shows the flows in the AM and PM peak period for the M23 J10A southbound diverge.

Table 8-17: M23 J10A Southbound Merge Assessment Flows

Scenario	Downstream Mainline		Diverge Flow	
	AM	PM	AM	PM
Reference Case	3,093	4,846	463	601
Local Plan 1	3,119	4,890	477	609
Local Plan 2	3,129	4,907	480	616
Local Plan 3	3,189	4,965	499	599

8.5.2 In general, the Local Plan has increases of approximately up to 100 vehicles compared to the reference case in both peak periods. The diverge flow has increases of up to 40 vehicles in the AM and no significant changes in the PM peak.

8.5.3 The results of the assessment for M23 J10A southbound diverge are summarised in Table 8-18.

Table 8-18: M23 J10A Southbound Diverge Assessment Summary

Scenario	Merge Layouts		Upstream mainline lanes	Downstream Mainline Lanes	Connector Road Lanes
	AM	PM			
Current Layout	B	B	3	3	2
Reference Case	C	C	4	3	1
Local Plan 1	C	C	4	3	1
Local Plan 2	C	C	4	3	1
Local Plan 3	C	C	4	3	1

8.5.4 The current layout for this diverge is type B.

8.5.5 In the AM peak, peak the assessment indicates that diverge layout type C is required for the Reference Case and for all three Local Plan scenarios.

8.5.6 In the PM peak the assessment also indicates that diverge layout type C is required for the Reference Case and for all three Local Plan scenarios.

8.5.7 The reference case indicates that there is a need for a fourth lane upstream of the diverge. However, the diverge is likely to have adequate capacity to facilitate the additional Local Plan traffic and therefore no mitigation is proposed.

M23 J10A Northbound Merge

8.5.8 Table 8-19 shows the flows in the AM and PM peak period for the M23 J10A northbound merge.

Table 8-19: M23 J10A Northbound Merge Assessment Flows

Scenario	Upstream Mainline		Merge Flow	
	AM	PM	AM	PM
Reference Case	4,443	2,821	620	419
Local Plan 1	4,492	2,834	564	442
Local Plan 2	4,503	2,833	550	439
Local Plan 3	4,505	2,812	439	399

8.5.9 In general, the Local Plan has minor changes in flow compared to the reference case in both peak periods. The merge flow has increases of up to 50 vehicles in the AM and up to 100 vehicles in the PM peak.

8.5.10 The results of the assessment for M23 J10A northbound merge are summarised in Table 8-20.

Table 8-20: M23 J10A Northbound Merge Assessment Summary

Scenario	Merge Layouts		Upstream mainline lanes	Downstream Mainline Lanes	Connector Road Lanes
	AM	PM			
Current Layout	C	C	3	3	2
Reference Case	A	A	3	3	1
Local Plan 1	A	A	3	3	1
Local Plan 2	A	A	3	3	1
Local Plan 3	A	A	3	3	1

8.5.11 The current layout for this merge is type C.

8.5.12 In the AM peak, peak the assessment indicates that merge layout type A is required for the Reference Case and for all three Local Plan scenarios.

8.5.13 In the PM peak the assessment indicates that merge layout type A is required for the Reference Case and all three Local Plan scenarios.

8.5.14 No further changes are required at this junction and the Local Plan flows can be accommodated.

8.6 M23 Junction 11

M23 J11 Southbound Diverge

8.6.1 Table 8-21 shows the flows in the AM and PM peak period for the M23 J11 southbound diverge.

Table 8-21: M23 J11 Southbound Diverge Assessment Flows

Scenario	Downstream Mainline		Diverge Flow	
	AM	PM	AM	PM
Reference Case	1,841	3,285	1,252	1,561
Local Plan 1	1,861	3,307	1,258	1,583
Local Plan 2	1,864	3,320	1,266	1,587
Local Plan 3	1,869	3,304	1,320	1,661

8.6.2 In general, the local plan has minor changes in flow compared to the reference case in both peak periods on the mainline. The diverge flow has increases of up to 70 vehicles in the AM and up to 100 vehicles in the PM peak.

8.6.3 The results of the assessment for M23 J11 southbound diverge are summarised in Table 8-22.

Table 8-22: M23 J11 Southbound Diverge Assessment Summary

Scenario	Merge Layouts		Upstream mainline lanes	Downstream Mainline Lanes	Connector Road Lanes
	AM	PM			
Current Layout	A	A	3	3	2
Reference Case	A	D	3	2	2
Local Plan 1	A	D	3	2	2
Local Plan 2	A	D	3	2	2
Local Plan 3	A	D	3	2	2

8.6.4 The current layout for this diverge is type A. I

8.6.5 n the AM peak, the layout is assessed to remain unchanged at layout type A for the Reference Case and for all three Local Plan scenarios

8.6.6 In the PM peak the assessment indicates that diverge layout type D is required for the Reference Case and for all three Local Plan scenarios.

8.6.7 The outputs indicate that two lanes would be sufficient on the downstream link. However, it is already 3 lanes and it does not seem reasonable to reduce this and the level of Local Plan flow increases are small and therefore, it is felt that the current junction layout is adequate.

M23 J11 Southbound Merge

8.6.8 Table 8-23 shows the flows in the AM and PM peak period for the M23 J11 southbound merge.

Table 8-23: M23 J11 Southbound Merge Assessment Flows

Scenario	Upstream Mainline		Merge Flow	
	AM	PM	AM	PM
Reference Case	1,841	3,285	1,252	1,561
Local Plan 1	1,861	3,307	1,258	1,583
Local Plan 2	1,864	3,320	1,266	1,587
Local Plan 3	1,869	3,304	1,320	1,661

8.6.9 In general, the Local Plan has minor changes in flow compared to the reference case in both peak periods on the upstream mainline. The merge flow has increases of up to 70 vehicles in the AM and up to 100 vehicles in the PM peak.

8.6.10 The results of the assessment for M23 J11 southbound merge are summarised in Table 8-16.

Table 8-24: M23 J11 Southbound Merge Assessment Summary

Scenario	Merge Layouts		Upstream mainline lanes	Downstream Mainline Lanes	Connector Road Lanes
	AM	PM			
Current Layout	A	A	3	3	2
Reference Case	B	E	2	3	2
Local Plan 1	B	E	2	3	2
Local Plan 2	B	E	2	3	2
Local Plan 3	B	E	2	3	2

8.6.11 The current layout for this merge is type A.

8.6.12 In the AM peak, the required layout is assessed to be layout B for the Reference Case and all three Local Plan scenarios.

8.6.13 In the PM peak, the required layout is assessed to be layout E for the Reference Case and for all three local plan scenarios.

8.6.14 The outputs indicate that two lanes would be sufficient on the upstream link. However, it is already 3 lanes and it does not seem reasonable to reduce this and the level of Local Plan flow increases are small and therefore, it is felt that the current junction layout is adequate.

M23 J11 Northbound Diverge

8.6.15 Table 8-25 shows the flows in the AM and PM peak period for the M23 J11 northbound diverge.

Table 8-25: M23 J11 Northbound Diverge Assessment Flows

Scenario	Downstream Mainline		Diverge Flow	
	AM	PM	AM	PM
Reference Case	3,052	1,598	1,446	1,201
Local Plan 1	3,089	1,602	1,443	1,287
Local Plan 2	3,119	1,600	1,442	1,293
Local Plan 3	3,126	1,635	1,453	1,402

8.6.16 In general, the Local Plan has increases of up to 70 vehicles reference case in the AM peak and minor flow changes in the PM peak. The diverge flow has increases of up to 70 vehicles in the AM and up to 200 vehicles in the PM peak.

8.6.17 The results of the assessment for M23 J11 northbound diverge are summarised in Table 8-26.

Table 8-26: M23 J11 Northbound Diverge Assessment Summary

Scenario	Merge Layouts		Upstream mainline lanes	Downstream Mainline Lanes	Connector Road Lanes
	AM	PM			
Current Layout	B	B	3	3	2
Reference Case	D	C	3	2	2
Local Plan 1	D	C	3	2	2
Local Plan 2	D	C	3	2	2
Local Plan 3	D	C	3	2	2

8.6.18 The current layout for this diverge is type B.

8.6.19 In the AM peak, the layout is assessed to require layout type D for the Reference Case and for all three Local Plan scenarios.

8.6.20 In the PM peak the assessment indicates that diverge layout type C is required for the Reference Case and for all three Local Plan scenarios.

8.6.21 The outputs indicate a requirement for a mitigation at this diverge. This has been combined with a mitigation for the northbound merge and discussed below.

M23 J11 Northbound Merge

8.6.22 Table 8-27 shows the flows in the AM and PM peak period for the M23 J11 northbound merge.

Table 8-27: M23 J11 Northbound Merge Assessment Flows

Scenario	Upstream Mainline		Merge Flow	
	AM	PM	AM	PM
Reference Case	3,052	1,598	1,391	1,222
Local Plan 1	3,089	1,602	1,403	1,230
Local Plan 2	3,119	1,600	1,384	1,231
Local Plan 3	3,126	1,635	1,379	1,173

8.6.23 In general, the Local Plan has increases of up to 70 vehicles compared to the reference case in the AM peak and only increases of up to 40 vehicles in the PM peak on the mainline. The merge flow has small flow increases and decreases compared to the reference case.

8.6.24 The results of the assessment for M23 J11 northbound merge are summarised in Table 8-28.

Table 8-28: M23 J11 Northbound Merge Assessment Summary

Scenario	Merge Layouts		Upstream mainline lanes	Downstream Mainline Lanes	Connector Road Lanes
	AM	PM			
Current Layout	A	A	3	3	2
Reference Case	E	D	2	3	2
Local Plan 1	E	D	2	3	2
Local Plan 2	E	D	2	3	2
Local Plan 3	E	D	2	3	2

8.6.25 The current layout for this merge is type A.

8.6.26 In the AM peak, the required layout is assessed to be layout E for the Reference Case and for all three Local Plan scenarios.

8.6.27 In the PM peak, the required layout is assessed to be layout D for the Reference Case and for all three Local Plan scenarios.

Proposed Mitigation

8.6.28 A mitigation is proposed for this merge and is combined with the northbound (upstream) diverge. The scheme involves a lane drop on the northbound diverge at M23 J11 and a lane gain on the northbound merge by reducing the mainline from three to two lanes northbound under the junction. All the proposed work is in the existing highway. There are two possible sign gantry structures required that have been included within the cost estimate. Without detailed topographical survey and completing the detailed design of the structure it is hard to quantify the volume of earthworks required. Outside of these two structure there is no earthworks expected within this design.

8.6.29 Drawing 330610079/SK001 shows the existing layout and proposed improvements at Junction 11 for the northbound diverge and northbound merge. The Junction 11 proposals have been estimated at £2,532,375 excluding optimism bias (OB). Details of the cost estimate and

exclusions are shown in Appendix R. Applying an OB of 44% gives a cost estimate of £3,646,620.

8.7 Over Capacity Junctions on the SRN Highlighted for Mitigation

8.7.1 This section discusses junctions on the SRN, which are currently or predicted to become overcapacity. Appendix O provides SATURN P1X (graphical) outputs showing delays in seconds, volume to capacity ratios (%) and queues in PCU's at the SRN M23 Junctions 9, 9A, 10 and 11. The information is shown for the AM and PM peaks for the Reference Case and corresponding Scenario 2 with sustainable mitigation. Scenario 2 is considered the preferred scenario. No junctions are overcapacity on the SRN in Scenario 2 or Scenario 1.

8.7.2 The modelling indicates that the following junctions are overcapacity on the SRN. Scenario 3 is the only Local Plan scenario which highlights junctions on the M23 where the Local Plan impacts are materially worse than in the Reference Case. Capacity issues are identified at M23 J10 roundabout and at M23 J11 roundabout. These are discussed further below with the overall conclusion that both these do not require further physical mitigation other than optimisation of signal timings.

8.7.3 M23 J10 Roundabout (ID 34) - this is an issue in the PM peak on the A264 Copthorne Way westbound signal node at the roundabout. There is scope to optimise and balance the signal timings as the circulatory approach to the node is well within capacity.

8.7.4 In the Reference Case, the left turning movement from the arm into the southbound merge slip road is already overcapacity at V/C ratio of 111.4%. This increases to 114.9% with Scenario 3 Local Plan. There is no blocking back at the junction.

8.7.5 The circulatory arm at the node is within capacity at V/C ratio of 52%.

8.7.6 Balancing the signal timings at the node to give more green time to the approach Copthorne Road approach brings the V/C ratio on the approach arm to levels better than or similar to that in the Reference Case while the circulatory arm V/C ratio remain within capacity.

8.7.7 This demonstrates that optimising and balancing the signal timings is adequate mitigation at the junction.

8.7.8 Alternatively, the issue is resolved by allowing the middle approach lane on the Copthorne approach arm westbound to be used both as an ahead and a left turn lane. This therefore then provides for two left turning movements from the Copthorne Road approach.

8.7.9 M23 J11 Roundabout (ID37) – this is an issue in the AM peak on the circulatory link of the northbound off-slip signal node. Only the circulatory approach is overcapacity, with the off-slip approach well within capacity with potential to optimise the signal node. The queue on the off-slip is contained within the slip road and does not block the main carriageway.

8.7.10 In the Reference Case, the circulatory arm at the node is just overcapacity at V/C ratio of 101% and this increase to 106%% with Scenario 3 Local Plan. There is no blocking back at the junction.

8.7.11 The northbound approach from the off-slip arm is within capacity at V/C ratio of 41%.

8.7.12 Balancing the signal timings at the node to give more green time to the circulatory movements at the node, brings the V/C ratio on the circulatory arm to levels better than or similar to that in the Reference Case while the slip road approach arm V/C ratio remain within capacity.

8.7.13 This demonstrates that optimising and balancing the signal timings is adequate mitigation at the junction.

8.8 M23 Junctions 10 and Junction 11 Junction Modelling

8.8.1 Junction capacity assessments have been undertaken at M23 Junctions 10 and 11 using TRANSYT. Models were built for each of the junctions for the 2015 Base, future reference case and for Local Plan Scenario 2 with sustainable mitigation, this being the local plan scenario representative of the preferred scenario. The assessments were undertaken for the AM and PM peak hours using turn flows from the SATURN modelling. The assessment provides outputs to demonstrate the impacts at the junction on local highway (WSCC) network, as well as the National Highways network.

Junction 10

8.8.2 A summary of the junction modelling outputs is shown in Table 8-29, with full TRANSYT outputs provided in Appendix S. With the Local Plan in place, the Reference Case scheme at M23 J10 has been 'tweaked'. This involved reviewing the lane markings of the Reference Case scheme to allow right turners on the northbound off slip to use the middle lane and Lane 3 and also use both lanes on the downstream circulatory at Crawley Avenue. Drawing Figure 8-1 shows the revised lane markings. This is the layout modelled in TRANSYT with the Local Plan.

8.8.3 The summary outputs tabulate the Mean Maximum Queues (MMQ)[15] and Degree of Saturation (DoS) as standard measurements of the performance of each arm within the junction. The DoS of an intersection (typically under traffic signal control) or a link measures the demand relative to the total capacity. A DoS value of 100% means that demand and capacity are equal and no further traffic is able to progress through the junction.

8.8.4 A cycle time (CT) of 60 seconds has been assumed in the modelling. The results in Table 8-29 also include those for a Sensitivity Test carried out in the AM peak to test sensitivity to the amount of right turning traffic from the Copthorne Way arm to M23 North. This is discussed further in paragraphs 8.8.6 to 8.8.9.

[15] Mean Maximum Queue Part 1: An explanation - TRL Software

Table 8-29: M23 Junction 10 – Modelling Results Summary

Arm	Lane							Fixed 60 seconds Cycle Time (CT)											Fixed 60 seconds Cycle Time (CT)					
		2015 Base						2035 Reference						2035 with LP (Scenario 2) (Improved Layout with lane marking changes)					2035 Reference Re-optimised for Sensitivity run (AM only)				2035 with LP (Scenario 2) Sensitivity (AM only) (with lane marking changes)	
		AM			PM			AM			PM			AM			PM			AM				AM	
		CT =60S			CT =60S			CT =60S			CT =60S			CT = 60S			CT = 60s			CT = 60S				CT = 60S	
		MMQ (PCU's)	DoS	Delay/ Pcu (S)	MMQ (PCU's)	DoS	Delay/Pcu (S)	MMQ (PCU's)	DoS	Delay/Pcu (S)	MMQ (PCU's)	DoS	Delay/ Pcu (S)	MMQ (PCU's)	DoS	Delay/ Pcu (S)	MMQ (PCU's)	DoS	Delay/ Pcu (S)	MMQ (PCU's)	DoS	Delay/ Pcu (S)	MMQ (PCU's)	DoS	Delay/ Pcu (S)
Crawley Avenue	1	6.22	51%	10.05	18.88	92%	32.84	5.31	51%	12.68	8.64	74%	23.01	8.18	55%	13.35	12.17	88%	34.69	5.31	51%	12.68	8.18	55%	13.35
	2	1.86	19%	7.19	14.25	84%	22.4	5.55	51%	12.75	8.97	74%	22.97	6.40	55%	13.39	13.08	88%	34.25	5.55	51%	12.75	6.40	55%	13.39
	3							3.46	34%	10.65	12.63	86%	30.68	4.08	40%	11.33	13.12	88%	34.44	3.46	34%	10.65	4.08	40%	11.33
Circulatory @ Crawley Avenue	1	6.18	56%	37.98	4.60	46%	13.48	8.33	81%	26.45	8.00	53%	20.99	10.44	76%	33.59	12.40	74%	19.59	6.94	55%	25.59	9.99	74%	32.73
	2	8.56	81%	13.88	3.62	45%	2.75	10.69	74%	15.35	10.87	64%	5.21	1.12	69%	6.45	0.59	40%	3.06	10.69	74%	15.35	1.12	69%	6.45
M23 SB Off slip	1	14.73	80%	19.33	5.49	49%	11.85	5.80	58%	16.13	12.12	93%	53.12	6.32	61%	18.26	9.51	84%	33.42	5.80	58%	16.13	6.32	61%	18.26
	2	5.15	45%	10.22	8.28	62%	14.36	9.98	72%	19.92	10.24	84%	34.49	11.68	79%	24.99	9.33	78%	27.47	9.98	72%	19.92	11.68	79%	24.99
	3							5.27	48%	14.35	5.09	55%	21.36	8.07	65%	19.28	5.09	52%	19.32	5.27	48%	14.35	8.07	65%	19.28
Circulatory @ M23 SB Off slip	1	15.58	96%	49.16	4.97	64%	12.78	4.31	31%	20.75	3.48	28%	14.92	0.14	6%	1.04	2.50	21%	2.43	4.31	31%	20.75	0.14	6%	1.04
	2	1.19	17%	14.23	19.42	96%	53.79	11.55	73%	20.17	18.78	88%	19.73	21.21	97%	43.03	21.53	96%	37.76	11.55	73%	20.17	21.21	97%	43.03
A264 Copthorne Way	1	71.47	109%	334.44	9.99	82%	31.6	5.77	60%	20.98	5.78	60%	21.01	7.25	74%	28.76	6.27	66%	23.4	5.71	59%	20.86	7.25	74%	28.76
	2	5.13	49%	16.59	9.52	80%	30.16	6.32	60%	20.91	6.32	60%	20.91	7.51	74%	28.33	6.82	66%	23.27	6.25	59%	20.75	7.51	74%	28.33
	3							17.25	86%	56.43	8.08	71%	24.12	122.09	134%	594.38	8.52	75%	26.97	6.27	60%	20.89	9.55	83%	34.82
Circulatory @ A264 Copthorne Way	1	8.93	71%	11.33	13.82	74%	12.97	3.33	17%	15.83	6.75	40%	1378	3.33	71%	15.73	6.73	36%	12.72	3.33	17%	15.83	3.33	71%	15.73
	2	7.72	56%	10.41	5.00	63%	13.45	7.66	83%	11.64	11.66	90%	23.44	8.36	79%	9.4	9.88	88%	16.73	7.66	83%	11.64	8.36	79%	9.4
	3							0.17	44%	1.34	0.29	34%	1.9	0.25	86%	1.56	0.20	35%	1.39	0.17	44%	1.34	0.25	86%	1.56
M23 NB Off slip	1	19.83	96%	66.72	1.69	21%	19.65	9.81	86%	36.02	1.48	16%	13.3	11.39	90%	43.61	3.10	38%	16.26	9.81	86%	36.02	11.39	90%	43.61
	2	1.70	22%	20.63	0.55	21%	48.88	10.41	86%	35.55	1.46	16%	13.27	10.46	90%	42.92	3.32	38%	16.22	10.41	86%	35.55	10.46	90%	42.92
	3	11.00	68%	25.35	11.31	75%	60.52	20.28	91%	76.94	11.81	86%	32.65	10.11	85%	34.45	5.58	58%	19.69	20.28	91%	76.94	10.11	85%	34.45
Circulatory @ M23 NB Off slip	1	6.67	75%	15.6	0.36	6%	2.93	15.79	88%	19.39	8.65	83%	12.87	15.67	94%	32.81	13.74	88%	29.94	9.49	77%	11.88	15.67	94%	32.81
	2	12.75	92%	25.68	18.87	92%	22.02	17.23	94%	32.8	12.67	83%	15.78	21.13	97%	38.54	12.56	84%	20.57	17.90	87%	20.18	17.15	95%	31.94

8.8.5 Analysis of the outputs for M23 Junction 10 indicates the following:

- M23 Southbound Off slip – this is indicated to operate within capacity in both the Reference Case and with Local Plan Scenario 2 with sustainable mitigation. When compared against the Reference Case, it is noted that the Local Plan has no adverse impact with queues contained well within the off slip.

- M23 Northbound Off slip – It is noted that the Local Plan has no impact when compared to the Reference Case. This is the case with the review of the lane markings of the Reference Case committed scheme to allow right turners on the northbound off slip to use the middle lane and Lane 3 and also use both lanes on the downstream circulatory at Crawley Avenue in the Local Plan Scenario 2 with sustainable mitigation.

- A264 Copthorne Way – queuing is present in both the Reference Case and Local Plan Scenario 2 with sustainable mitigation in the AM peak. When comparing the Local Plan against the Reference Case, it is noted that there is an impact on the arm in the AM peak on lane 3.

8.8.6 Overall, it is concluded that with the Local Plan in place, the Reference Case scheme at M23 J10 associated with the Forge Wood development, would require a slight amendment in terms of lane markings. This requires amending the lane markings of the Reference Case scheme to allow right turners on the northbound off slip to use the middle lane and Lane 3 and also use both lanes on the downstream circulatory at Crawley Avenue. This would not have any impact on the costs of the scheme.

8.8.7 There is an impact on the local network on the A264 Copthorne Way approach. The issues at Copthorne Way appear to be due to a heavy right turn flow from Copthorne Way for traffic heading north onto the M23. This traffic can only use one lane on the southern bridge to make this turn given the need for both lanes to be available to Crawley bound, M23 southbound off slip traffic. Therefore, balancing the Copthorne Way flows between Lanes 3 and 2 on the arm approach would appear not to be feasible. The bridge abutment finishes too close to the merge point with the northbound off slip for widening to three lanes on exit from the bridge to be a practical solution.

8.8.8 Analysis of the strategic model indicates that on Copthorne Way, there is a significant increase in westbound flows between the Base Year and Reference Case especially in the AM peak. It is noted that there is capacity increase on the M23 due to the Managed Motorway Scheme (MMS) which has been coded in the Reference Case.

8.8.9 Select Link Analysis (SLA) and routeing checks suggest that the model appears sensitive to the capacity of the MMS to and causes reassignment of trips that previously did not use the Copthorne Way to access M23 J10 and then head north on the M23 now do so instead of using the County roads such as the A281. Ultimately, these trips then head west on the M25 to access Surrey destinations via the A3. Analysis of counts on Copthorne Way Common just east of Copthorne Way for which WSCC provided counts, indicated that the MMS has not resulted in large flow increases on this part of the network.

8.8.10 The large flow increases on Copthorne Way between the Base and Reference Case appears to be due to model sensitivity rather than the reassignment effect of the MMS. The additional Local Plan trips tip this arm of the M23 J10 over although it is considered that this is a reflection of strategic model sensitivity rather than an indication of mitigation requirement. This issue is seen in the AM peak model.

8.8.11 The AM Sensitivity Test results reported in Table 8-29 address this issue. Analysis of the SATURN model, considered the movement from M23 North to Copthorne Way in the PM peak (return trip movement) and this showed increases from 445 pcu/hour to 523 Pcu/hr (about 20% growth say) from 2015 Base to 2035 Reference Case. A Sensitivity Test was carried out in TRANSYT for the AM peak in which the Copthorne Way to M23 North movement increases

by 20% from the 2015 Base to the 2035 Reference Case, with the Local Plan increase (85 Pcu/hr) then added to this adjusted Reference Case turn flow.

8.8.12 The AM right turn traffic from Copthorne Way to M23 North was thus adjusted to be consistent with the level of growth seen between the 2015 Base and 2035 Reference Case in the PM peak for the return movement M23 North to Copthorne Way. The traffic increase due to the Scenario 2 Local Plan was then added to the adjusted Reference Case in the AM Peak and the TRANSYT was run for this Sensitivity Test for both the 2035 Reference Case and 2035 Scenario 2 Local Plan.

8.8.13 The results show that Copthorne Way operates well within capacity and the SRN operation is such that there is no queuing back to the mainline from either the northbound or southbound off slips. The sensitivity test is considered to be representative of a more realistic change in demand patterns from base to reference case.

Summary

8.8.14 The modelling for junction 10 has been undertaken with the committed scheme associated with the Forge Wood development. This indicates that with the local plan traffic included, a slight amendment to this scheme would be required. This would only involve a change to lane markings, and this should then become the scheme proposed to be implemented. This would not have any impact on the costs of the scheme.

8.8.15 A mitigation scheme is also proposed on the southbound merge at M23 J10 as shown in Drawing 330610079/SK002. The mitigation scheme essentially replaces a single lane nearside merge with a parallel merge followed by an auxiliary lane, which in turn is followed by a taper to end the auxiliary lane.

Junction 11

8.8.16 A summary of the junction modelling outputs is shown in Table 8-30, with full TRANSYT outputs provided in Appendix T.

Table 8-30: M23 Junction 11 – Modelling Results Summary

		2015 Base						2035 Reference						2035 with LP (Scenario 2)					
		AM			PM			AM			PM			AM			PM		
		CT =60S			CT =60S			CT =60S			CT =60S			CT = 60s			CT = 60s		
		MMQ (PCU's)	DoS	Delay/Pcu (S)	MMQ (PCU's)	DoS	Delay/Pcu (S)	MMQ (PCU's)	DoS	Delay/Pcu (S)	MMQ (PCU's)	DoS	Delay/Pcu (S)	MMQ (PCU's)	DoS	Delay/Pcu (S)	MMQ (PCU's)	DoS	Delay/Pcu (S)
A264	1	3.79	42%	17	1.06	11%	9.25	3.5	37%	12.2	1.07	13%	14.4	3.27	34%	11.91	1.06	12%	12.32
	2	17.51	75%	23.58	15.24	59%	15.24	13.8	71%	20.1	7.79	68%	23.62	12.97	70%	17.71	7.48	62%	19.47
	3	13	74%	20.78	8.43	59%	15.47	11	71%	18.34	8.73	68%	13.76	11.25	70%	18.14	8.51	62%	19.59
Circulatory @ A264	1	4.33	74%	14.42	2.82	65%	9.28	4.45	75%	12.64	2.66	60%	5.95	4.59	77%	13.13	3.02	70%	7.95
	2	5.21	76%	15.88	2.9	63%	9.08	8.34	77%	13.97	5.51	67%	7.23	8.53	79%	14.52	6.01	77%	11.91
	3	1.16	8%	13.68	0.28	2%	15.15	4.71	35%	13.35	1.51	16%	2.11	4.71	35%	13.37	2.4	18%	10.08
A23 Brighton Road	1	6.07	63%	22.21	7.82	65%	17.17	6.17	63%	22.46	9.26	71%	17.92	6.56	67%	23.4	8.56	69%	19.24
	2	6.44	63%	21.95	8.3	65%	16.97	6.55	64%	22.19	9.83	71%	18.18	6.92	66%	23	9.05	69%	18.91
Circulatory @ A23 Brighton Road	1	2.14	74%	5.99	4.18	71%	7.46	1.91	69%	5.33	10.04	76%	14.1	1.86	68%	5.2	3.51	73%	11.28
	2	1.38	48%	4.02	1.36	46%	4.42	7.83	71%	11.76	6.68	61%	7.59	7.8	78%	11.6	3.46	59%	10.86
	3	0.05	26%	0.56	0.16	25%	1.79	0.02	16%	0.31	1.47	17%	3.01	0.01	16%	0.29	0.02	17%	0.39
M23 SB Off slip	1	3.49	39%	15	3.28	36%	14.73	5.2	48%	13.02	7.07	63%	17.8	5.2	48%	13.2	6.87	60%	16.56
	2	5.48	51%	17	8.12	67%	20.55	5.51	48%	13.11	7.84	63%	17.96	5.51	48%	13.11	7.6	60%	16.64
	3	5.42	51%	16.98	8.03	67%	20.54	5.44	48%	13.2	7.78	63%	17.97	5.47	48%	13.13	7.18	60%	16.67
Circulatory @ M23 SB Off slip	1	6.11	69%	10.35	5.88	76%	12.96	7.71	69%	12.79	7	83%	19.01	6.65	70%	12.53	8.04	85%	18.86
	2	6.09	69%	9.59	6.21	79%	12.65	9.22	71%	10.57	7.12	85%	18.4	4.53	73%	10.58	5.64	82%	14.66
B2114 Brighton Road	1	1.42	21%	23.08	0.35	9%	23.64	6.96	72%	26.76	17.64	94%	113.53	6.6	69%	25.63	9.42	90%	55.07
	2	0.06	1%	21.32	0.03	1%	23.02	0.22	3%	15.15	0.38	7%	19.12	0.22	3%	15.15	0.34	6%	19.08
	3	3.29	56%	29.55	1.6	36%	27.22	86.27	122%	512.9	181.61	179%	1582.74	96.95	126%	582.89	188.57	182%	1645.62
Circulatory @ B2114 Brighton Road	1	0.19	46%	1.14	0.21	47%	1.14	6.61	39%	5.13	3.27	19%	6.21	6.61	39%	5.08	2.2	24%	0.72
	2	0.16	42%	0.93	0.25	50%	1.2	8.47	46%	6.45	8.39	55%	5.75	9.43	47%	6.53	8.33	51%	2.55
	3	2.41	30%	5.88	3.57	38%	6.62	1.18	18%	5.53	1.65	26%	3.53	1.19	22%	5.69	2.36	31%	6.88
	4	2.52	37%	4.94	3.58	40%	6.15	2.74	48%	6.47	3.09	49%	1.36	2.7	48%	6.46	3.68	49%	6.96
M23 NB Off slip	1	2.37	29%	14.64	1.49	21%	16.53	5.42	59%	23.41	2.17	31%	18.44	4.63	56%	22.73	2.22	31%	18.53
	2	3.06	29%	14.71	2.03	21%	16.58	5.42	59%	23.43	2.3	30%	18.44	5.35	56%	22.69	2.36	31%	18.52
	3	6.32	54%	18.43	6.49	62%	23.29	6.96	69%	26.47	9.3	78%	30.78	7.86	71%	27.49	10.29	84%	36.35
	4	6.31	54%	18.4	6.48	61%	23.24	6.99	68%	26.36	9.28	77%	30.64	7.86	71%	27.42	10.25	84%	35.85
Circulatory @ M23 NB Off slip	1	4.93	44%	14.22	6.26	51%	3.45	1.28	20%	5.74	1.79	33%	6.44	1.54	24%	5.82	4.69	39%	3.86
	2	10.33	70%	8.22	7.46	60%	4.65	14.37	92%	21.63	13.79	88%	15.78	14.24	92%	21.25	16.79	87%	14.23

8.8.17 An analysis of the outputs indicates the following:

- Both the M23 Southbound Off slip and M23 Northbound Off slip are predicted to operate well within capacity and no Local Plan impacts are predicted.

- B2114 Brighton Road – Significant queuing in both the Reference Case and Local Plan Scenario 2 with sustainable mitigation. Queues are predicted to block back to the next junction. The impact is noted in lane 3 when comparing the with Local Plan scenario against the Reference Case. The B2114 is used as a rat-run, and it is not considered appropriate to include physical mitigation as this will only encourage rat-running.

8.8.18 Overall, it is concluded that there is no material impact on the SRN at M23 J11. There is an impact on the local network on the A264 approach and on the B2114 Brighton Road approach.

8.9 Summary of Strategic Road Network Impacts

8.9.1 The analysis has indicated that mitigation is required on the M23 Junction 10 southbound merge and Junction 11 northbound merge and diverge. Scheme designs and high-level cots have been provided.

8.9.2 At M23 Junction 10 southbound merge, the mitigation scheme essentially replaces a single lane nearside merge with a parallel merge followed by an auxiliary lane, which in turn is followed by a taper to end the auxiliary lane. The scheme can be accommodated within the highway boundary with no significant earthworks or structures.

8.9.3 At M23 Junction 11 northbound diverge and northbound merge, the scheme involves a lane drop on the northbound diverge and a lane gain on the northbound merge by reducing the mainline from three to two lanes northbound under the junction. The mitigation is all within the existing highway boundary and involves no major earthworks or structures.

8.9.4 Junction modelling for junction 10 indicates that with the Local Plan in place, a slight amendment to the committed scheme associated with the Forge Wood development be required in terms of a change to lane markings. This should then become the scheme proposed to be implemented. This would not have any impact on the costs of the scheme. Junction modelling for junction 11 indicates that no mitigation is required on the SRN.

8.9.5 However, there are impacts at junction 10, on the A264 Copthorne Way approach and on B2114 Brighton Road approach at junction 11, both of which are WSCC network. At junction 10, the impact on A264 Copthorne Way approach is significant both in terms of the Degree of Saturation (DoS) and queue length. In the AM peak there is an increase in queue length in Lane 3 of the A264 Copthorne Way approach of 17 PCUs (rounded) to 122 PCUs accompanied by an increase in DoS of 86% to 134%. High delay increases are also predicted. This may cause or worsen blocking back through the Worsell Drive roundabout serving the West of Copthorne development. The other two lanes work within capacity.

8.9.6 On analysis of the strategic model and local counts, it is considered that the impacts on Copthorne Way reflect more a case of model sensitivity than what is likely to arise in future as a result of the Local Plan. The model predicts a large increase in flows westbound on Copthorne Way between the Base and Reference Case in the AM Peak, seemingly because of the Managed Motorways Scheme (MMS) in the Reference Case. This growth is in the right turn movement from Copthorne Way to M23 North in the AM peak. The smaller increase in flows due to the Local Plan then tip the arm over predicting a capacity issue on the arm.

8.9.7 It is considered that the reassignment predicted by the model is unlikely to arise in future and is due to model sensitivity. A TRANSYT sensitivity test was undertaken in the AM peak and this indicated that the junction could accommodate flows on Copthorne Way in the AM peak consistent with the 20% growth seen in the PM for the returning traffic from M23 North to

Copthorne Way. It is concluded that mitigation is not required for the arm or for the junction itself.

8.9.8 The modelled impact at J11 is on the B2114 which is a more minor road but still involves queues of a length which could cause safety impacts and wider network effects. The model indicates a significant part of the flow on the B2114 northbound approach are due to traffic from the Horsham area using Forest Road/Horsham Road as a rat run, to access the M23 northbound and M23/A23 southbound at M23 Junction 11 via the B2114 northbound approach. This causes the seeming imbalance in flows on the approach lanes as the rat running traffic uses lane 1 to head south to the M23/A23 while the M23 northbound traffic uses lane 3, with little traffic using lane 2. This issue is predicted in both the AM and PM peaks and is already present in the Reference Case and continues with the Local Plan in palace, although the Local Plan impacts themselves are small.

9 Crawley Western Link Road Sensitivity Test

9.1 Introduction

9.1.1 This section reports on a sensitivity test considering the potential transport impacts of a Crawley West Link Road (CWLR). The CWLR is a proposed link road that may potentially be required to alleviate the impacts of the proposed West of Ifield development site, and potential further development west of Crawley which has not been modelled in this study. The sensitivity test has therefore been carried out on Local Plan Scenario 3. The assignments have assumed the Scenario 3 matrices with limited sustainable mitigation reductions described in Section 6.

9.2 Brief description of CWLR and Assumptions

9.2.1 The CWLR has been modelled as a 30 mile per hour (48 kph) road running from the A264 to the west to A23 London Road to the east with intermediate junctions on Rusper Road and Ifield Avenue in addition to access junctions for the West of Ifield development. It has a length of about 7.7 kilometres. In each direction, a bus lane and general traffic lane has been assumed. The bus lane will enable high quality bus provision on the CWLR. The vision is also for the link road to have segregated cycle ways and segregated footways, but only the bus lane and general traffic lanes have been coded into the SATURN highway assignment model. In association with the introduction of the CWLR, use of Ifield Wood by through traffic has been restricted in this test to prevent short cutting along an unsuitable rural route.

9.3 Flow Changes

9.3.1 In the AM peak the flows on the CWLR are of the order of 1493 PCU/hr northeast bound and 368 PCU/hr southwest bound indicating a two-way flow 1861 PCU/hr. The corresponding flows in the PM peak are 675 PCU/hr northeast bound, 1096 and 1771 PCU/hr respectively. There is an evident tidal flow pattern with more people travelling northeast bound in the AM peak and travelling southwest bound in the PM peak.

9.3.2 The flow changes for this scenario are included in Appendix U where SATURN P1X plots are provided. The plots compare the sustainable mitigation Scenario 3 with CWLR in place, against sustainable mitigation Scenario 3 without the CWLR. Sections of the network which have flow increases as a result of the CWLR are shown in green bandwidth while sections which experience a reduction in flow are shown in blue band width.

- In both peaks, large reductions in flows in both directions are forecast on Faygate Lane, on Rusper Road/Horsham Road between the A264 and Rusper and on East Street/Rusper Road between Rusper and Ifield;
- Large flow increases are forecast in both directions in AM and southbound in PM north of Rusper on High Street/Newdigate Road/Rusper Road north of East Street; in both directions on the A264 between the junction with Rusper Road and the new CWLR junction with the A264 east of Faygate Lane;
- Flow reductions are also noticeable on Stagelands and Martyrs Avenue through Langley Green in both AM and PM peaks. There are flow increases seen on the A23 London Road in both directions and both peaks north of the junction with the CWLR. There are also noticeable flow decreases on the A23 London Road between the CWLR and Crawley Avenue in both directions in AM and southbound in PM.
- Charlwood Road/Ifield Road north of the CWLR shows large flow reductions in both peaks, apart from a small increase in the AM peak only southbound from Charlwood to Ifield Wood;

- There are also noticeable flow increases on some minor roads towards or in Surrey to the north. However there are large reductions on Horley Road/Charlwood Road north of Gatwick Airport between Charlwood village and the A23/A217 at Hookwood in both directions in AM and westbound in PM. In AM only reductions continue at a lower level on the A23 from Horley towards Redhill. The network in the model is less detailed in these areas, hence the flow changes while indicative, have to be treated with some caution.

- Within Crawley urban area, noticeable flow decreases are predicted on Ifield Avenue southeast of A23 Crawley Avenue and on the A2219 Pegler Way, and A2219 London Road in the AM peak. In the PM peak decreases are limited to Ifield Avenue southeast of Ewhurst Rd along with A2004 Northgate Avenue.

- There is generally little change in flows on A23 Crawley Avenue. This may partly reflect the fact that the CWLR has a speed limit of 30 mph whereas A23 Crawley Avenue is a 50-mph dual carriageway, which remains an attractive option for strategic traffic. It may also reflect that any diverted traffic from Crawley Avenue as a result of the CWLR, is 'replaced' by traffic reassigning to use any capacity that becomes available. As noted, there are significant flow reductions on the A2219 London Road through Crawley which potentially diverts to A23 Crawley Avenue with the CWLR in place. This is more pronounced in the AM peak although similar trends are also seen in the PM peak. However, there is little change in flow on radial routes south or east of Crawley Town Centre, with the exception of Northgate Avenue in the PM. Without the CWLR, Crawley Avenue is already at capacity. With the CWLR, some traffic will reassign from Crawley Avenue to the CWLR, but by freeing up capacity on Crawley Avenue, traffic from other roads such as Brighton Road and residential roads in Ifield, is forecast to use Crawley Avenue, hence reductions seen on these other roads.

- At the Manor Royal employment area there are significant increases in flow on Fleming Way and Newton Road linking to the Hazelwick junction on A2011 via the eastern part of Manor Royal and the southern part of Gatwick Road. In AM these are all in both directions but in PM there are decreases southbound on Gatwick Road. These changes are associated with decreases on A23 London Road through the Tushmore gyratory and on A2011 Crawley Avenue to Hazelwick.

- South of Crawley there are reductions in both directions on A23 Brighton Road between the Southgate roundabout and M23 J11. There are also reductions westbound on Forest Road from Pease Pottage to Colgate and in both directions on Tower Road between Colgate and A264 Crawley Road, although these are small in PM peak.

- In the AM peak, flow decreases are seen on the M23 in both directions between M23 J9 and M23 J10. North of M23 J9 flow decreases are predicted southbound, while flow increase are predicted northbound. There is little change on M23 south of J10

- In the PM peak, small flow decreases are forecast on the M23 in northbound from M23 J10 into Surrey towards the M25.

9.4 Analysis of Volume to Capacity Ratios (VC%)

9.4.1 The Volume to Capacity results are shown alongside Scenario 3 results with sustainable mitigation. This enables a comparison of how the impacts of Scenario 3 with the CWLR compares to that without the CWLR.

9.4.2 In most cases, the results indicate that the CWLR is seen to reduce the V/C ratio at most similar locations compared to the scenario without the CWLR although the reductions are generally not sufficient to match or better the Reference Case values (purple coloured V/C values in table). Ifield Roundabout (Junction ID 8) is one such junction and is seen to improve with the CWLR in place although the V/C value does not reduce to the level seen in the Reference Case. At Junction ID 28, the CWLR reduces the V/C ratio to levels below those in the Reference Case or to levels below a V/C value of 100% (green coloured V/C values in

table). This suggests that the CWLR would provide sufficient mitigation at this location. At Junction ID 1 and ID 3 amongst others, the V/C ratios remain unchanged or become worse than without the CWLR (red coloured V/C values in table).

Table 9-1: Scenario 3 Sensitivity– Overcapacity Junctions after Sustainable Mitigation (V/C%)

Item No.	Junction ID	Node No	Location	Junction type	Time Period	Ref	Sc 3 V/C	Sc3 CWLR
i	1	7020	A264 Crawley Road/Faygate Lane roundabout	Roundabout	PM	104.7	106.4	111.1
ii	2	1880	Bewbush Manor Roundabout/A264/Sullivan Drive	Roundabout	AM	101.1	107.9	102.0
					PM	101.1	105.7	106.0
iii	3	1860	Broadfield Roundabout	Roundabout	PM	112.3	118.6	118.3
iv	5	9081	Gossops Drive/Buckswood Drive	Roundabout	PM	103.6	107.0	107.6
v	7	1640	Cheals Roundabout/A2220 Horsham Road/Crawley Avenue	Roundabout	PM	101.9	104.3	102.0
vi	8	1660	Ifield Roundabout/Ifield Avenue/A23 Crawley Avenue roundabout	Roundabout	PM	101.5	110.3	104.9
vii	12	1690	A2011 Crawley Avenue/B2036 Balcombe Road	Signal	AM	104.2	106.4	106.6
					PM	111.9	118.0	117.3
viii	14	1824	B2036/Radford Road	Signal	PM	90.7	101.0	100.5
ix	19	1790	Southgate Avenue/Ashdown Drive	Signal	PM	104.0	107.8	104.1
x	20	1760	Southgate Avenue/Hawth Avenue	Signal	PM	103.8	105.8	105.4
xi	21	1010	Southgate Avenue/College Road/Haslett Avenue East	Signal	AM	94.5	101.0	100.9
xii	22	1750	Southgate Avenue/ Southgate Drive	Signal	AM	91.4	101.0	100.8
					PM	103.6	105.7	105.0
xiii	23	1480	A2004 Southgate Avenue/ Station Way	Signal	PM	74.0	100.1	102.5
xiv	27	2005	Airport Way/Northway Roundabout/ North Terminal Approach	Roundabout	AM	108.7	110.4	109.6
xv	28	2040	A217/A23 London Road/Povey Cross Road	Roundabout	PM	95.1	100.2	81.2
xvi	30	81004	Airport Way/Ring Road/ M23 'spur' 'HOR9' Horley Business Park	Signal	PM	115.7	123	136.5
xvii	34	1606	M23 J10 Roundabout NB off slip node	Signal	PM	111.4	114.9	113.7
xviii	37	1621	M23 J11 Roundabout circulatory NB off slip node	Signal	AM	101.4	105.5	105.9

9.5 Summary and Conclusions

9.5.1 Overall, the main beneficiary of the CWLR appears to be the western minor roads, predominantly Faygate Lane and Rusper Road, with the flow changes within the Crawley urban network and the M23 being less pronounced.

9.5.2 In most cases, the results indicate that the CWLR is seen to reduce the V/C ratio at most similar locations compared to the scenario without the CWLR although the reductions are generally not sufficient to match or better the Reference Case values (purple coloured V/C values in table).

9.5.3 The overall conclusion is that the scheme provides relief to the minor roads to the west of Crawley such as Faygate Lane and Rusper Road, but it does not relieve traffic flows in Crawley sufficiently to mitigate the impacts of Scenario 3 Local Plan to levels similar to or better than the Reference Case. This likely reflects the fact that the CWLR has a speed limit of 30 mph whereas A23 Crawley Avenue is a 50-mph dual carriageway which remains an attractive option for strategic traffic. It may also reflect that any diverted traffic from Crawley Avenue as a result of the CWLR, is 'replaced' by traffic reassigning to use any capacity that becomes available. There are noticeable flow reductions on the A2219 London Road (AM only), A2004 Northgate Avenue (PM only) and Ifield Avenue (both peaks) to the north of Crawley town centre which potentially diverts to A23 Crawley Avenue as a 'competing' parallel route.

9.5.4 Flow changes are predicted on Ifield Avenue with the CWLR in place. In the AM peak, the flow increases are between Stagelands and Crawley Avenue in both the southbound and northbound directions, with other sections largely showing decreases. In the PM peak, there are large decreases in both directions north of Warren Drive, with smaller decreases southbound to Ifield Drive and approaching the town centre, punctuated by increases through the A23 roundabout between Ewhurst Rd and Ifield Drive. This underlies the complex flow changes predicted with the CWLR in place. A more detailed study is necessary to consider how the CWLR and its junctions may be designed in order to elicit the best attributes of the CWLR while minimising or eliminating any potential adverse impacts.

9.5.5 There is potential for more future development west of Crawley beyond the levels of development that have been assumed in Scenario 3 of this study. This would likely have greater impact on the network and hence the need for a CWLR to relieve these impacts may become more evident.

10 Safety Considerations

10.1 Introduction

10.1.1 This section provides a safety analysis by considering five year accident data for Crawley.

10.2 Crawley Borough Accident Analysis

10.2.1 Data shows that there has been a total of 1,458 accidents in Crawley Borough between 01/01/2015 and the 31/12/2019.

10.2.2 In the 5 year period there were 9 fatal accidents, 236 serious and 1,213 slight. These are summarised in Table 10-1.

Table 10-1: Total Accidents Crawley Borough Local Authority District

	Fatal	Serious	Slight	Total
Total Accidents	9	236	1213	1458

10.2.3 The main areas where there are 'clusters' of accidents appearing are at roundabouts. This is particularly prevalent along the Crawley Ring Road (A23/A2011). However, there are also areas around the Town Centre including around the Boulevard and some junctions which have small clusters of accidents. Furthermore, Junctions around Gatwick Airport including Lowfield Heath Roundabout and Airport Way Roundabout East have a cluster of accidents present within the last 5 years.

10.2.4 Key hotspots include are listed below and shown in Figure 10 -1. The five-year accident data is shown in Figure 10 -2:

1. Hazelwick Roundabout (western section of the roundabout) – This includes a fatal accident and a cluster of serious accidents.
2. Tushmore Gyratory – includes a fatal accident and some serious accidents.
3. Ifield Roundabout – Includes a cluster of slight and serious accidents
4. Ifield Road Roundabout – includes fatal accident and 2 serious accidents.
5. The Boulevard – cluster of slight accidents including 1 serious
6. Three Bridges (Haslet Ave East/Worth Road) – includes a cluster of slight accidents
7. Three Bridges includes a cluster of slight accidents
8. Bewbush Manor Roundabout
9. Lowfield Heath Roundabout – Includes a cluster of serious accidents.
10. Airport Way Roundabout East – Includes fatal accident.
11. Station Way/Southgate Ave – Cluster of slight and serious accidents
12. Cheals Roundabout – cluster of slight and serious accidents on the roundabout and approaching roads.

13. Southgate Roundabout – large cluster of slight accidents on eastern side of the roundabout

14. Southgate Avenue/Ashdown Drive – Cluster of slight accidents at the junction

15. Orchard Street/High Street Junction – cluster of slight and serious accidents on the bend

16. Gatwick Road/James Watts Way – cluster of slight and serious accidents on eastern section of the roundabout.

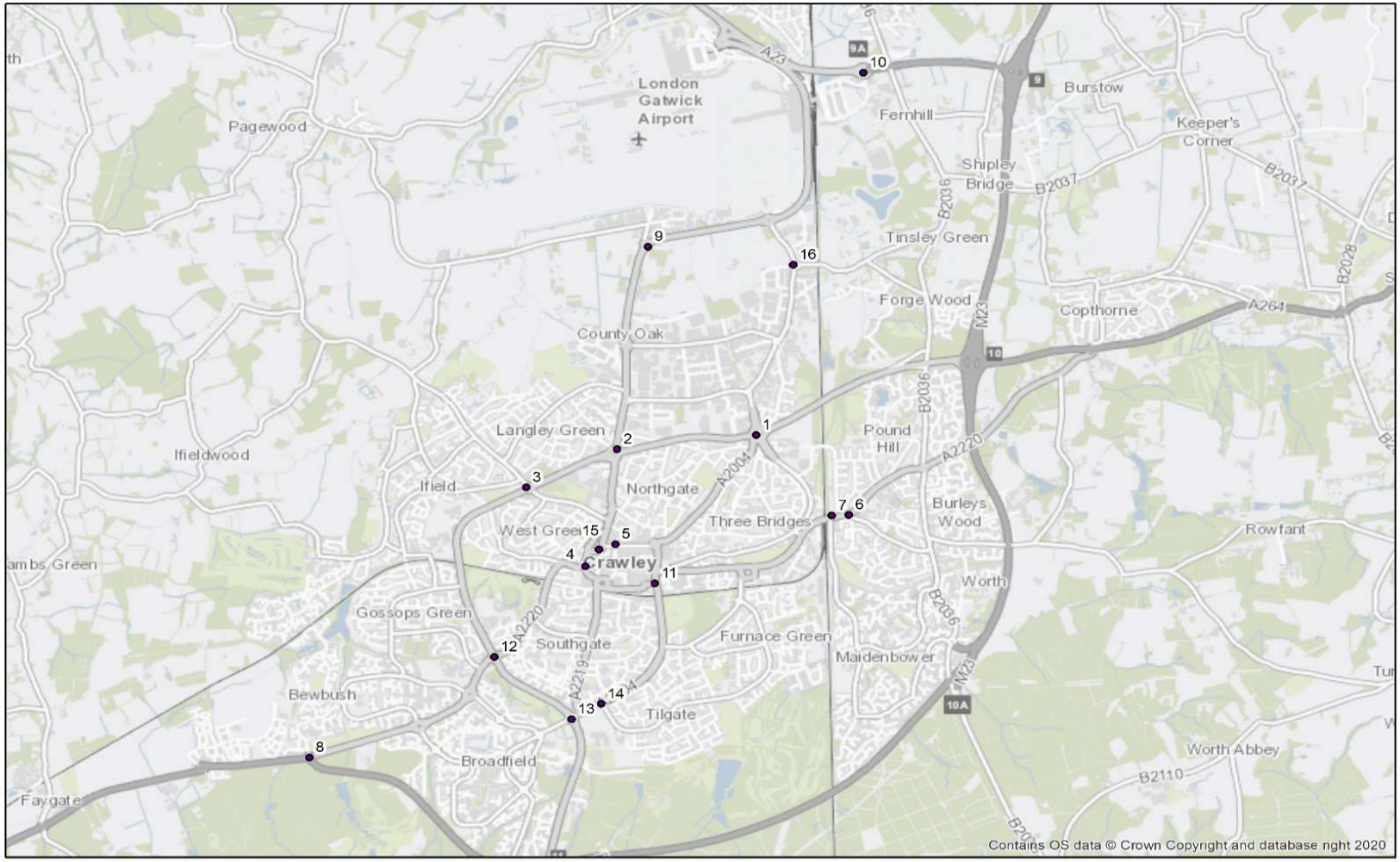


Figure 10-1: Junctions Exhibiting Accident Clusters

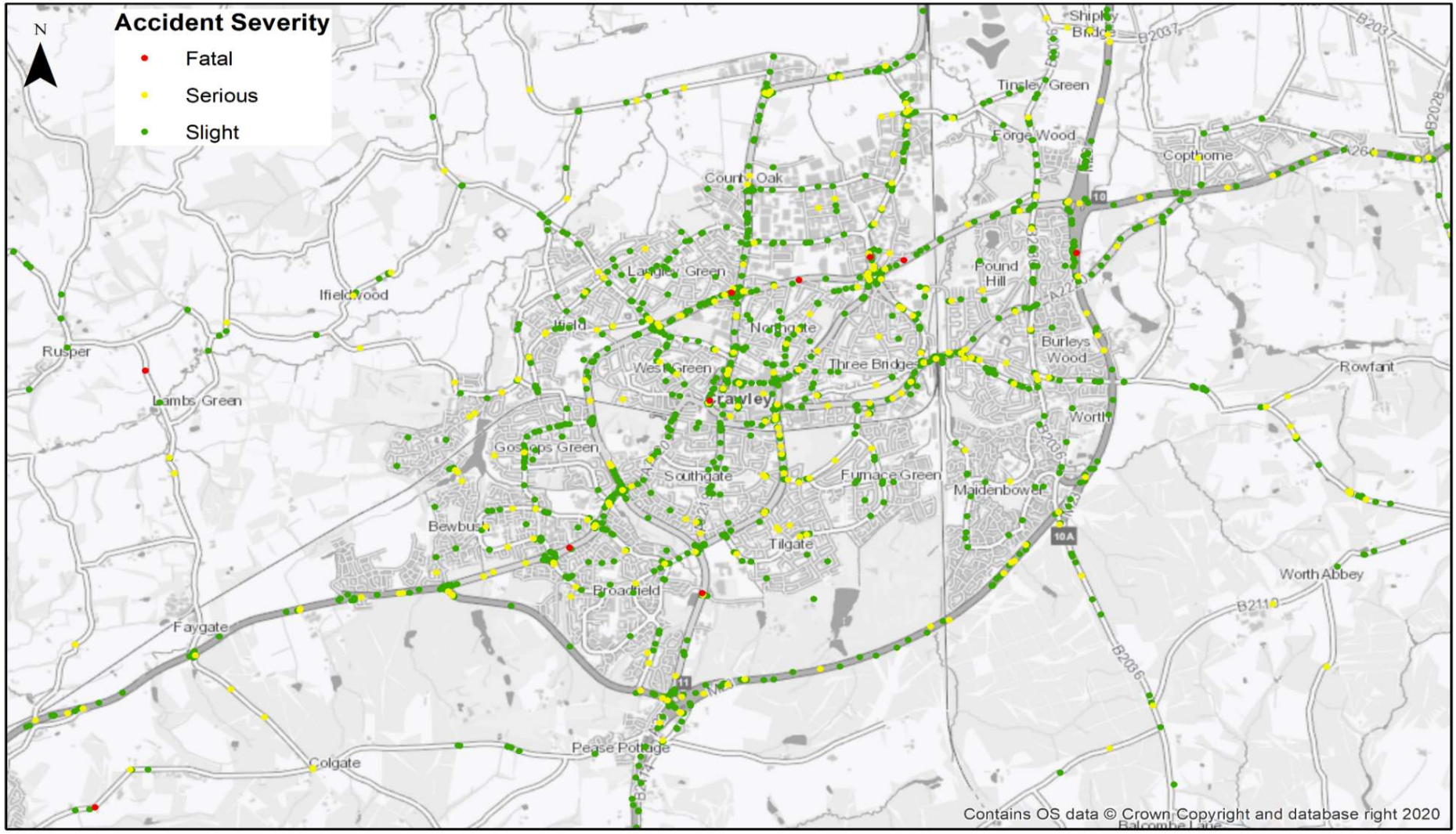


Figure 10-2: Accidents in the 5 years 2015 to 2019 by Severity

10.2.5 Table 10-2 shows the casualties by severity and type. This indicates that most of the casualties were travelling by car and most of the casualties were involved in accidents that were slight. However, there were a higher proportion of those casualties that were serious and fatal in the pedestrian, cyclist, and motorcycle casualties.

Table 10-2: Numbers of Casualties by Type and Severity

	Fatal	Serious	Slight	Total
Pedestrian	2	55	121	178
Cyclist	1	50	131	182
Motorcycle	2	20	63	85
Taxi	0	3	51	54
Car	4	91	1138	1233
Goods Vehicle	0	7	48	55

10.2.6 A review of the map (Figure 10-3) showing the pedestrian and cyclists casualties identified the following casualty hotspot locations.

- Hazelwick Roundabout (western section of the roundabout) – There are a cluster of cyclist casualties 6 in the past 5 years.
- Tushmore Gyratory – This has a mixed of pedestrian and cyclist casualties. 3 on the A23 eastbound approach to the gyratory.
- The Boulevard – This contains a cluster of pedestrian casualties.
- Orchard Street/High Street – A cluster of pedestrian casualties located at the junction.
- James Watt Way/Gatwick Road Roundabout – Cluster of cyclist casualties this includes 7 cyclist casualties.

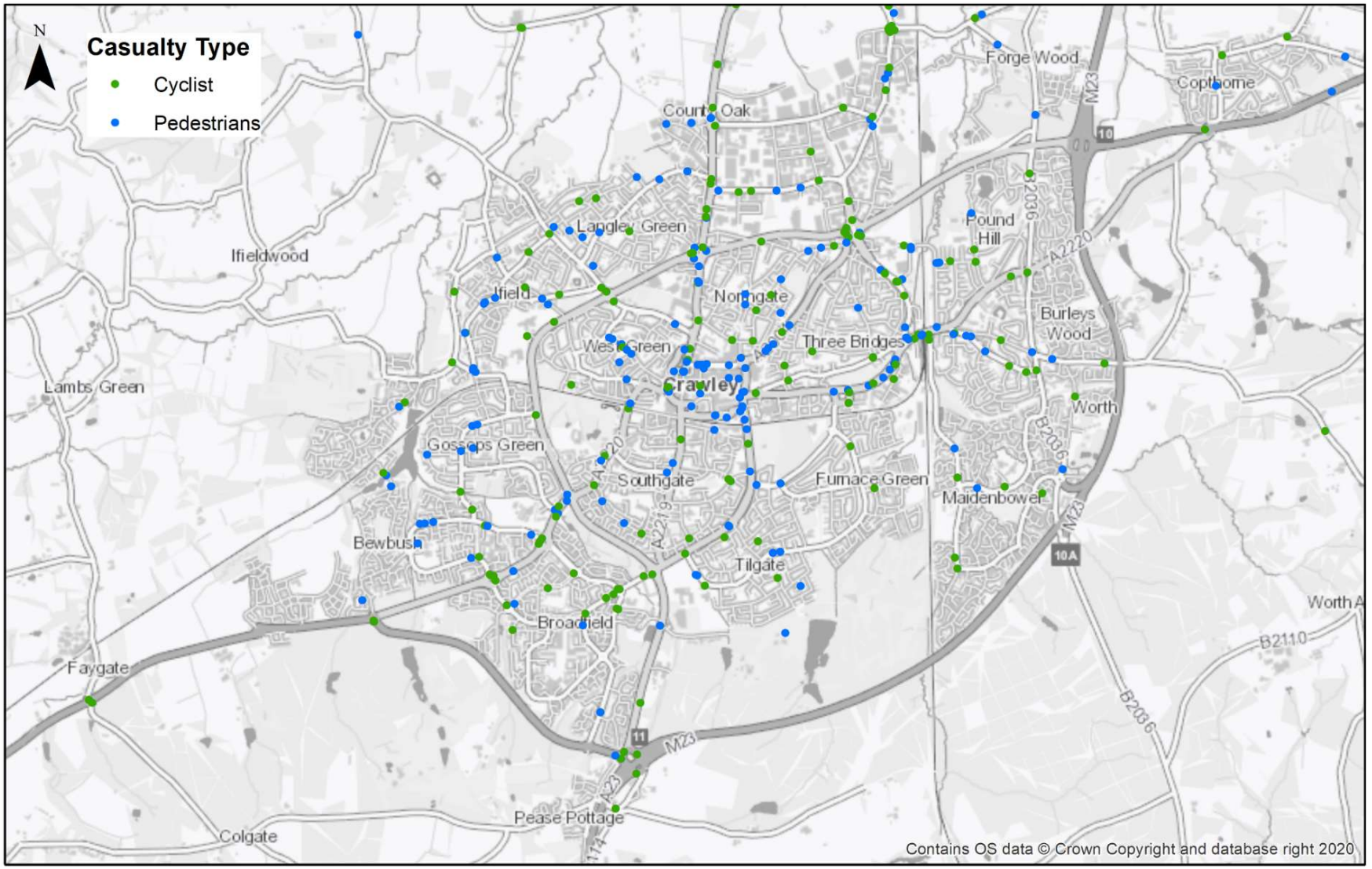


Figure 10-3: Pedestrian and Cyclist Casualties in the 5 Years from 2015 to 2019

Table 10-3: Accident Hotspot Locations and % Change in AADT

			AADT				Absolute Difference from Ref			% Change from Ref		
ID	Key Junction	Link	Ref	Sc 1	Sc 2	Sc 3	Sc 1	Sc 2	Sc 3	Sc 1	Sc 2	Sc 3
		Crawley Avenue West Approach Arm	21261	21240	21286	23611	-21	25	2350	0%	0%	11%
		A2004 Approach Arm	18814	21081	21350	24231	2267	2536	5417	12%	13%	29%
1	Hazelwick Roundabout	Crawley Avenue East Approach Arm	44038	46077	46307	48669	2039	2268	4630	5%	5%	11%
		Langley Drive Approach Arm	7076	7592	7601	8874	516	525	1799	7%	7%	25%
		London Road North Approach Arm	33202	33636	33789	35012	433	587	1810	1%	2%	5%
		Crawley Avenue East Approach Arm	21261	21240	21286	23611	-21	25	2349	0%	0%	11%
		London Road South Approach Arm	20074	21214	21381	22798	1141	1307	2725	6%	7%	14%
2	Tushmore Gyratory	Crawley Avenue West Approach Arm	24798	23984	23953	24546	-814	-845	-252	-3%	-3%	-1%
		Crawley Avenue East Approach Arm	27632	26892	26859	27455	-740	-773	-177	-3%	-3%	-1%
		Ifield Avenue South	22499	23856	24278	25000	1357	1779	2501	6%	8%	11%
		Crawley Avenue West Approach Arm	32550	32346	32324	32246	-204	-225	-304	-1%	-1%	-1%
3	Ifield Roundabout	Ifield Avenue North	22860	23728	23792	25361	868	932	2501	4%	4%	11%
		Pegler Way North	14429	15316	15648	17301	887	1219	2872	6%	8%	20%
		Pegler Way South	15109	16920	17209	17935	1811	2100	2825	12%	14%	19%
		West Green Drive	7079	8097	8183	7467	1018	1104	388	14%	16%	5%
4	Ifield Road Roundabout	Ifield Road	12323	12921	13051	13542	598	729	1220	5%	6%	10%
5	The Boulevard	The Boulevard	9075	9370	9520	10532	296	446	1458	3%	5%	16%
		North Rd	11010	12868	12750	12743	1858	1740	1733	17%	16%	16%
6	Haslett Ave Worth Rd Junc	Haslett Ave	19474	19199	19382	19836	-275	-92	362	-1%	0%	2%
7	Three Bridges Over Rail Line		40621	41851	41908	42461	1229	1287	1840	3%	3%	5%
		Sullivan Drive	8370	8743	8807	10562	373	438	2193	4%	5%	26%
		A264 South	21662	21657	21587	23012	-6	-75	1350	0%	0%	6%
		A264 West	49603	49681	49665	52037	77	61	2433	0%	0%	5%
8	Bewbush Manor Roundabout	Horsham Road	28840	29048	29146	28494	208	306	-346	1%	1%	-1%
		London Road South	30397	31119	31474	33129	722	1078	2733	2%	4%	9%
		London Road East	32565	32633	33098	33638	68	533	1073	0%	2%	3%
9	Lowfield Heath Roundabout	Old Brighton Road South	18720	18814	18855	19214	94	135	494	1%	1%	3%
		M23	28414	28632	28729	28597	218	315	183	1%	1%	1%
10	Airport Way Roundabout East	Airport Way	60332	60524	60795	61959	192	463	1627	0%	1%	3%
		Station Way	8166	9827	9917	10578	1661	1751	2412	20%	21%	30%
11	Station Way/Southgate Ave	College Road	22639	24861	24946	25775	2222	2308	3137	10%	10%	14%
		Horsham Road West	44395	44826	45033	44754	431	638	359	1%	1%	1%
		Crawley Ave North	32002	31890	32042	33154	-113	40	1152	0%	0%	4%
		Horsham Road East	24376	24828	24766	24950	452	390	574	2%	2%	2%
12	Cheals Roundabout	Crawley Ave South	18091	18758	18774	18283	666	683	192	4%	4%	1%
		Crawley Ave North	18091	18758	18774	18283	666	683	192	4%	4%	1%
13	Southgate Roundabout	Crawley Ave South	30242	31406	31543	32068	1164	1300	1826	4%	4%	6%
14	Ashdown Drive/Southgate Avenue	Ashdown Drive	6074	6457	6498	6785	383	424	711	6%	7%	12%
15	Orchard Street/High Street	Orchard Street East	9127	9714	9812	11269	586	685	2142	6%	8%	23%
		James Watt Way West	1848	2201	2131	2274	354	284	426	19%	15%	23%
		James Watt Way East	14419	14755	14840	14800	336	421	381	2%	3%	3%
		Gatwick Road South	19876	20048	20231	20253	173	355	377	1%	2%	2%
16	James Watts Way/Gatwick Road Roundabout	Gatwick Road North	24702	24470	24746	24643	-232	43	-59	-1%	0%	0%

10.2.7 Table 10 - 3 shows the accident hotspot locations and how the Annual Average Daily Traffic (AADT) changes as a result of the Draft Crawley Local Plan Scenarios, when compared to the Reference Case. Along the ring road there are clusters of accidents at the Hazelwick Roundabout and Tushmore Gyratory. Generally, there is less than 20% increase in traffic on the links into that junction in the Draft Crawley Local Plan Scenarios.

10.2.8 Ifield Road Roundabout has the main increases in traffic between the scenarios and reference case on the Pegler Way arms. These are between 10% and 30%.

10.2.9 Generally, Three Bridges, Bewbush Manor Roundabout, Lowfield Heath, Airport Way, Cheals Roundabout, Ashdown Drive and James Watts Way/Gatwick Road Roundabout have less than a 10% change in AADT between the reference case and scenarios.

10.2.10 The main increases in flow are for the accident hotspots located in the Town Centre of Crawley including Station Road/Southgate Avenue, Orchard Road/High Street junction and the Boulevard. These generally see c.10% to 30% increases in flows between the reference case and scenarios.

10.2.11 It is also noted that the Crawley Growth Programme Town Centre scheme will improve safety in the town centre. The Crawley Growth Programme is an investment package of infrastructure improvements and physical regeneration which is planned to support significant increases in new homes, business investment and employment growth. Eastern Gateway for example will improve public realm and connectivity between key opportunity sites and provide improved town centre facilities and reduce car dominance. The scheme will improve safety along The Boulevard/College Road.

10.2.12 WSCC has already identified the following local based safety schemes.

10.2.13 Phase 1 Schemes are:

- A23 Lowfield Heath roundabout
- A2011 Hazelwick roundabout
- A23 Ifield roundabout
- A264 Bewbush Manor roundabout

10.2.14 Phase 2 (design 2020/21, construction 2021/22) Schemes:

- A23 Crawley Avenue / A2004 Southgate Avenue
- A264 Bewbush Manor roundabout

10.2.15 Drawing 70043595-DD-100-001-P04 provided by WSCC shows the scheme at Bewbush Manor roundabout and is included in this report under Drawings.

10.2.16 Drawings AE0003/001, AE0003/002, AE0003/003 and AE0003/04 provided by WSCC illustrates the scheme at Lowfield Heath roundabout and is included in this report under Drawings.

10.2.17 The majority of above junctions have also been identified in the appraisal of accidents as currently having hotspots. As mentioned previously Hazelwick Roundabout, does see an increase in AADT in the Local Plan scenarios. Lowfield Heath, Bewbush Manor and Ifield Roundabout see some smaller increases in traffic on certain links. Therefore, the safety-based schemes already identified could have a beneficial impact on safety.

10.2.18 It is considered that for Scenarios 1 and 2, the changes in AADT flows are in the main relatively small and no further safety concerns are raised. In Scenario 3, there are some high

increases in AADT flows on some arms at a number of junctions, including at Hazelwick Roundabout, Tushmore Gyratory, and appropriate safety schemes will have to be considered and reviewed if and when the West of Ifield development is progressed.

11 Summary

11.1 Introduction

11.1.1 This document reports on the transport modelling undertaken to inform the potential impacts of three Draft Crawley Local Plan Scenarios for Crawley Borough for the period 2020 to 2035. As has been noted in the report, it is considered that the modelling is sufficiently robust to be representative of impacts to 2037, the end of the draft Local Plan period. The quantum of development tested matches that proposed in the Local Plan period to 2037. The Crawley SATURN Transport Model has used to undertake the transport modelling. The modelling has been conducted in accordance with standard industry practice and guidance. A fixed trip matrix approach has been used in which demands in the model respond to network costs and changes through reassignment. A fixed assignment approach is a proportionate approach for the purposes of local plan testing. However, it is noted that this approach may overstate impacts in the peak hour as it does not take account of other behavioural changes to congestion by travellers other than changing route. Potential traveller responses such as peak spreading to use the less congested shoulders, mode change, change in destination or not travelling (e.g. virtual mobility) are not represented, and these would work to curtail peak hour demands.

11.1.2 The Draft Crawley Local Plan is a review of the adopted Local Plan Crawley 2030, extending of the term of the Plan to 2037. Developments have therefore already been identified up to 2030 along with transport mitigation. The Draft Crawley Local Plan is required to only mitigate the impacts of additional development quanta, included up to 2037.

11.2 Approach to Analysis

11.2.1 The modelling has been used to assess three Draft Crawley Local Plan development scenarios. The approach focuses on mitigation through sustainable measures and informing any residual impacts where highway mitigation requires consideration.

- Scenarios 1 and 2 would provide dwellings of the order of 420 per annum (6,720 dwellings over the period 2020 – 2035/6).
- Scenario 2 also includes Gatwick Green employment site.
- Scenario 3 further builds on Scenario 2 through provision of dwellings at the West of Ifield site and at the west of Kilnwood Vale site in the neighbouring Horsham District. Scenario 3 would equate to provision of 751 dwellings per annum (12,016 dwellings over the period 2020 – 2035/6). It is noted that the additional development in Scenario 3 is outside the borough and outside the control of the Local Plan.

11.2.2 The modelled Local Plan development quanta is consistent with that planned to 2037, while the difference in NTEM growth for West Sussex has been shown to be small for the modelled period to 2035 compared to the end of Local Plan period to 2037. It is considered that the modelling is robust and representative of demands and network impacts covering the Local Plan period to 2037.

11.2.3 The study has assessed the impacts of the Draft Crawley Local Plan Scenarios by comparing the performance of the highway network within Crawley and immediate neighbouring area and comparing these with the Reference Case outputs.

11.2.4 Where the network is shown to perform worse than the Reference Case and junctions are over-capacity, further analysis is undertaken to inform a mitigation strategy. There are junctions within the network which are shown to be over-capacity in the Reference Case, these are only considered if the Draft Local Plan Scenarios demonstrate a significant increase in junction performance.

11.2.5 It is not the purpose of the Local Plan mitigation to resolve all issues within the network, if issues are shown to exist prior to adding in Draft Local Plan Growth and additional Draft Local Plan traffic growth has limited impact.

11.2.6 The Level of Service of each junction has been assessed and used to inform whether sustainable travel measures could feasibly and realistically mitigate the impacts of the Draft Local Plan and what additional physical highway mitigation may be required to deal with any residual impacts.

11.3 Sustainable Transport

11.3.1 The emphasis has been to consider sustainable mitigation to support the Draft Crawley Local Plan rather than prioritise highway capacity mitigation. This marks a shift towards managing demand by prioritising sustainable travel including recognising the potential that Virtual Mobility will increasingly play alongside active modes, walking and cycling, public transport, rail and buses and car sharing. Public transport use has reduced during the Covid-19 pandemic although initiatives including by central government will or are being put in place to encourage people back to public transport post-pandemic such as for example through the DfT 'Bus Back Better – National Bus Strategy for England, 2021[16]'. The National Bus Strategy for example states on page 8 that '*Even before the pandemic started, the Government had committed £3bn of new money during the current Parliament to improve buses outside London. Armed with that transformational funding, this National Bus Strategy will build back better. Its central aim is to get more people travelling by bus- first, to get overall patronage back to its pre-COVID -19 level, and then exceed it. We will only achieve this if we can make buses a practical and attractive alternative to the car for more people."*

11.3.2 Sustainable travel considerations link closely to the Crawley Transport Strategy. It has been noted that these reductions are a conservative estimate and given investment in cycle/walk facilities through the LCWIP, higher reduction targets may be possible. It is also noted that with Metrobus, Crawley is served by an ambitious bus service provider, and with close cooperation through provision of bus priority measures, the potential exists for increases in service frequencies and uptake in patronage as part of strategies to mitigate Local Plan impacts through sustainable means instead of a predict and provide type approach regarding highway mitigation. The potential for Virtual Mobility to manage down demand through working from home and online shopping also presents opportunities for a sustainable way of travel in future that is less reliant on the car.

11.3.3 The Local Plan modelling has explicitly tested trip length-based car trip reductions for Local Plan development as well as car trip reductions informed by the propensity to cycle tool. The trip length reductions were applied to Local Plan development car trips. The reductions (5%) informed by the propensity to cycle tool were applied to car commute and car other trips with an origin and destination within Crawley Borough and were therefore not limited to Local Plan trips. Additionally, for Local Plan Scenario 3, a 12% reduction has been applied to car trips travelling from the Kilnwood Vale and West of Ifield development sites to destinations in Crawley Town Centre and to employment zones in Manor Royal. This is assumed to represent car trip reductions that would arise from a high-quality bus corridor that would be extended to serve these proposed developments, linking to key destinations including Crawley Town Centre and Manor Royal, as well as improvements to cycling and walking infrastructure.

11.3.4 An analysis of the junctions has been undertaken to understand whether the unmet demand at overcapacity junctions could be addressed through sustainable travel measures, including mode shift to bus, walking and cycling and through Virtual Mobility. This was considered in detail in Section 7 and it was concluded that this was possible in the majority of cases.

[16] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/969205/DfT-Bus-Back-Better-national-bus-strategy-for-England.pdf

11.4 Highway Mitigation

11.4.1 Localised improvements can be addressed as part of the planning process of developments. A Manage and Monitor approach will assist in understanding demand changes by all modes and better inform infrastructure provision. It would be expected that the Crawley Transport Strategy would form supporting Transport Evidence to this Transport Assessment and inform the preparation of the Infrastructure Delivery Plan (IDP).

11.4.2 Only one junction has been identified for potential consideration of physical mitigation where there are residual impacts in Scenarios 2 and 3. This is:

- Ifield Roundabout/Ifield Avenue/A23 Crawley Avenue roundabout (Junction ID 8) – a widening scheme to improve this junction has been drawn up as part of this study and is shown as Drawing 48559/5501/SK004.

11.5 Conclusion

11.5.1 It is not considered that there is need for large strategic physical highway mitigation particularly in Scenarios 1 and 2, and that increased bus frequencies and improved and new active mode infrastructure as illustrated in the Crawley LCWIP present a more sustainable approach to addressing Crawley's future travel needs. This would be alongside potential increase in uptake of Virtual Mobility. Therefore, it is considered that sustainable travel measures will in the main, mitigate the impacts of the Local Plan development demands and only minor highway mitigation will be required.

11.5.2 The Gatwick Green employment site is the main difference between Scenarios 1 and 2. Being 70% B8 land use and 30% B2 land use the site will generate predominantly freight traffic, with the greatest impacts on Balcombe Road. Alongside the sustainable mitigation for the small proportion of employees, left turn in and right turn out bans for HGV's at Gatwick Green's access/egress junctions are proposed in order to mitigate any potential adverse impacts of freight traffic on the northern section of Balcombe Road in Scenario 2.

11.5.3 Scenario 3, which includes West of Ifield and Kilnwood Vale developments, results in higher level of traffic on the network than Scenarios 1 and 2. The analysis suggests that although the V/C's are higher at many more junctions as a result, in most cases the unmet demand could potentially be addressed without substantial physical highway mitigation. Within the modelling of this scenario, an additional 12% reduction in car trips from these sites to and from destinations in Crawley Town Centre and Manor Royal employment sites was applied, to represent potential shift to public transport through the introduction of high quality bus services, to link the developments directly to the key destinations for work and leisure (outside of any facilities provided on site). It is considered that the developments would work closely with commercial bus operators to facilitate appropriate infrastructure (bus lanes) and more frequent buses for specific measures associated with West of Ifield and Kilnwood Vale.

11.5.4 A sensitivity test has indicated mixed results about the potential benefits of the CWLR to further mitigate the impacts of West of Ifield and Kilnwood Vale sites when compared to the no CWLR scenario. Minor Roads to the west i.e. Faygate Lane and Rusper Road are forecast to benefit from reduction/relief in flows, but there are very little flow reductions on the rest of the network including Crawley Avenue. In most cases the CWLR improves junction performance compared to the scenario without the CWLR, however the improvements do not go so far as to match or better Reference Case performance. In relation to Ifield Avenue, flow increases are predicted on Ifield Avenue in both directions with the CWLR in place. This is the case in the AM and PM peaks.

Appendix A Crawley Transport Strategy

Appendix B Crawley Model Local Model Validation Report

Appendix C Crawley Model Forecast Report

Appendix D New Model Zones

NEW CTM Zones for Local Plan Study

Zone name/Location	Zone	Development Type	Landuse Assumptions
Town Centre North/Land North of Boulevard	293	Dwellings	C3, Suburban
Telford Place, Three Bridges	294	Dwellings	C3, Suburban
North East Sector Residual Land, Pound Hill/Land to southeast Healthy Farm, Balcombe Road	300	Dwellings	C3, Town Centre
Kilnwood Vale	302	Dwellings	C3, Suburban
Crawley College outstanding	295	Dwellings	C3, Suburban
West of Ifield	305	Dwellings	C3, Suburban
Pease Pottage	296	Dwellings	C3, Suburban
Manor Royal Opportunity Area, Welland Medical Site	297	Employment	B1c, Light Industry
E2 Crawley Business Quarter	298	Employment	B1a, Offices Town Centre
5 Rutherford Way	299	Employment	B1c, Light Industry
Astral Towers/The White House, Betts Way (marketed as Nova)	306	Employment	B8, Warehousing Commercial
Premiere House, Betts Way	307	Employment	B8, Warehousing Commercial
Forge Wood, North East Sector, Employment Land	301	Employment	B1a, Offices Town Centre
Forge Wood, North East Sector, Employment Land	301	Employment	B1c, Light Industry
Forge Wood, North East Sector, Employment Land	301	Employment	B8, Warehousing Commercial
Forge Wood, North East Sector, Neighbourhood Centre	301	Employment	A1, non-food
Employment commitments in Horsham (Kilnwood Vale)	302	Employment	B1a, Offices Suburban
Town Centre North A1 retail	308	Employment	B1a, Offices Suburban
GlaxoSmithKline B1 business	309	Employment	B8, Warehousing Commercial
GlaxoSmithKline B1 business	310	Employment	B8, Warehousing Commercial
GlaxoSmithKline B1 business	311	Employment	B8, Warehousing Commercial
Segro West, London Road B1 business	312	Employment	B1a, Offices Suburban
BOC Edwards B1 business	313	Employment	B1a, Offices Town Centre
BOC Edwards B1 business	314	Employment	B8, Warehousing Commercial
Gatwick Park G1	315	Employment	B1a, Offices Suburban
Gatwick Park G2	316	Employment	B1a, Offices Suburban
County Buildings	317	Employment	B1a, Offices Suburban
Units XA1 and XA2, Sussex Manor Business Park	318	Employment	B1c, Light Industry
Gatwick Green	319	Employment	B8, Warehousing Commercial
Gatwick Green	320	Employment	B1a, Offices Suburban
Gatwick Green	321	Employment	C1, Hotel
Horley Strategic Business Park (RBBC)	304	Employment	B1a, Offices Suburban
Horley Strategic Business Park (RBBC)	304	Employment	B1b, Business Park
Horley Strategic Business Park (RBBC)	304	Employment	B1c, Light Industry
Horley Strategic Business Park (RBBC)	303	Employment	A1, non-food
Horley Strategic Business Park (RBBC)	303	Employment	A3, Restaurants
Horley Strategic Business Park (RBBC)	303	Employment	D1, College
Horley Strategic Business Park (RBBC)	303	Employment	D2, Leisure Centre
Neighbourhood Centre for West of Ifield	305	Employment	B1a, Offices Town Centre
Neighbourhood Centre for West of Ifield	305	Employment	B1c, Light Industry
Neighbourhood Centre for West of Ifield	305	Employment	B8, Warehousing Commercial
Business Park West of Kilnwood Vale	302	Employment	B1a, Offices Suburban
Business Park West of Kilnwood Vale	302	Employment	B1c, Light Industry
Business Park West of Kilnwood Vale	302	Employment	B8, Warehousing Commercial

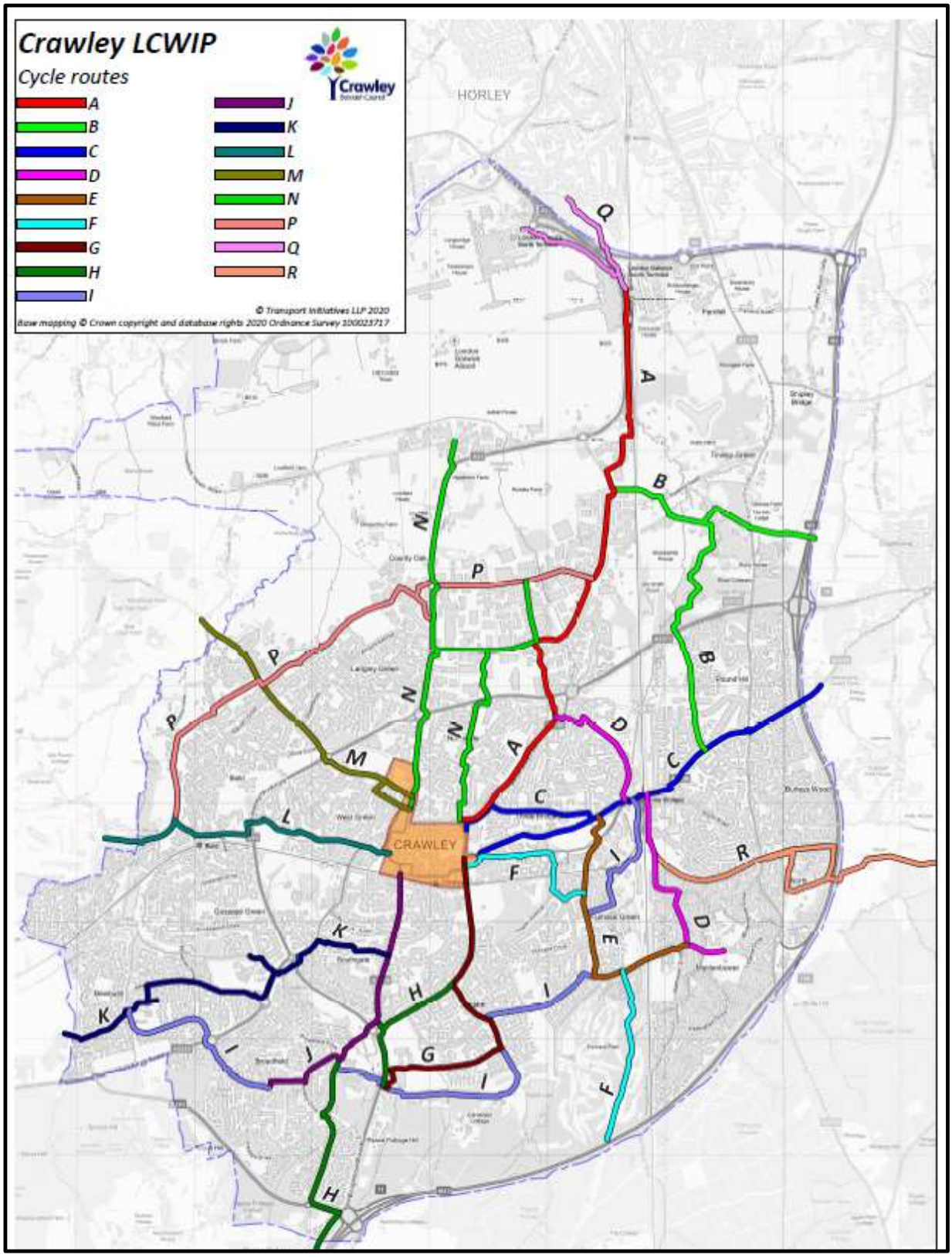
Appendix E Reference Case Development Assumptions (Uncertainty Log)

Appendix F Trip Rates

Appendix G Reference Case Schemes

Appendix H Without Mitigation Flow Changes

Appendix I LCWIP Figure


Crawley LCWIP
Cycle routes
A
B
C
D
E
F
G
H
I
J
K
L
M
N
P
Q
R
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HORLEY
CRAWLEY

Appendix J Crawley Bus Services Routes - METROBUS


METROBUS
in Crawley & Horley
Meath Green
Langshott
Horley
Hookwood
Povey Cross
North Terminal
Gatwick Airport
South Terminal
Charlwood
Lowfield Heath
Crawley
Town Centre
Manor Royal Business District
Forge Wood
County Oak
Ifield Green
Langley Green
Northgate
Pound Hill
Crabbet Park
Three Bridges
Worth
Ifield
Ifield West
Gossops Green
Southgate
Furnace Green
Kilnwood Vale
Bewbush
Tilgate
Maidenbower
Broadfield
Pease Pottage
Copthorne
Map key:
metrobus.co.uk

Appendix K With Sustainable Mitigation Flow Changes

Appendix L Volume to Capacity and Delay Changes outputs

Appendix M Junction Modelling Outputs

Appendix N Crawley Avenue/Ifield Avenue Junction Mitigation Cost Estimate

Appendix O SRN Merge and Diverge Assessments

Appendix P SRN Junction Plots Queue, Delay and Volume to Capacity

Appendix Q M23 J10 Southbound Merge Cost Estimate

Appendix R M23 J11 Northbound Diverge/Merge Cost Estimate

Appendix S TRANSYT Outputs M23 J10

Appendix T TRANSYT Outputs M23 J11

Appendix U With Scenario 3 with CWLR and Sustainable Mitigation Flow Changes

Drawings