Warwickshire County Council
North Warwickshire Borough Council

NWBC Local Plan

Strategic Transport Assessment
Modelling Analysis and Overview

October 2017

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1 EXECUTIVE SUMMARY

1.1 Vectos Microsim (VM) has been assisting North Warwickshire Borough Council (NWBC) and Warwickshire County Council (WCC) in the assessment of options pertaining to the delivery of the North Warwickshire Borough Local Plan. VM has worked with WCC, Highways England and Highways England Consultants (AECOM & Systra) to establish options for highway interventions which will facilitate the delivery of the NWBC Local Plan proposals.

1.2 The assessment has been completed through the use of a series of S-Paramics micro-simulation models developed to cover key areas of the Borough which have been identified as potential locations for development sites to be allocated through the Local Plan.

1.3 Work has been undertaken in consultation with Highways England

Objectives

1.4 The modelling assessment work has been underway since August 2016 and the primary objectives of the work are summarised as follows:

- To assess the likely impacts, on the highway network, of the various emerging strategies concerning the delivery of housing and employment through the North Warwickshire Borough Local Plan.
- To identify what, interventions may be deliverable which will minimise the residual impacts likely to occur as a result of the Local Plan proposals.
- To assess the impacts of key developments which are to be located on the periphery of Nuneaton town on HE Network, NWBC's highway network, most notably the A5 as well as Nuneaton and Bedworth Borough Councils transport network.
- To look in detail at development proposals in the Hartshill area to identify an appropriate mitigation strategy to accommodate the housing sites identified within that particular area.

Methodology

1.5 The objectives set out previously have been addressed through a series of different assessments each of which was defined in response to the emergence of the Local Plan proposals.

1.6 Prior to commencement the work was subject to detailed scoping with both North Warwickshire Borough Council (NWBC), Highways England (HE), Warwickshire County Council (WCC) and Staffordshire. The Atherstone/A5 model was subject to an extension and it was initially proposed that this would include a substantial element of Tamworth. Unfortunately Staffordshire County Council and Tamworth Borough Council were unable to commit additional resource to the model development and testing and so WCC advised the model extent presented within **Figure 1** later in this Report would be sufficient to account for key traffic assignment impacts within Tamworth. Committed developments within this model extent were fully accounted for whilst external growth (including demands associated with Tamworth growth) was based upon DfT TEMPRO local growth factors.

1.7 For the other key areas the models were already in existence and so no adjustments where required. In total, there have been three key stages of assessment work completed prior to the production of this report.

1.8 Each of the individual stages of assessment work that have been completed is described below:

Stage 1 – Atherstone/A5 Focussed Assessment

1.9 The first stage of the assessment made use of the Atherstone/A5 Paramics model to establish the likely impacts of allocating housing in the area surrounding Atherstone, the edge of Tamworth and north of the A5.

1.10 Focus has been placed on identifying the essential infrastructure requirements in the first 5 years of the plan and subsequently grading additional infrastructure requirements as the plan period progresses into the later years.

1.11 The four assessments completed focussed on establishing the incremental impacts associated with the delivery of development quantum, or in Stage 4 additional infrastructure

improvements, in key stages. In this case this has been based on 5 year intervals, 2021, 2026 and 2031.

1.12 The assessment stages were completed as follows:

- **Stage 1** – Assessed the likely impact on the network of allocating all of the developments identified by 2021 and sought to determine an infrastructure strategy capable of delivering the first 5 years of the local plan sites with minimal impacts.
- **Stage 2** – Repeated the initial assessment with additional development assumptions now forecast to 2026. Again the infrastructure was reviewed and additional measures added to improve the overall network operation. The purpose of this assessment is to establish the likely infrastructure strategy necessary to accommodate the housing and employment growth identified within the first ten years of the plan.
- **Stage 3** – Assessed the likely impact on the network of allocating all of the developments identified by the end of plan period 2031 and sought to determine a set of optimum mitigation proposals to ensure that any impacts associated with the delivery of the Local Plan could be minimised.
- **Stage 4** – Considered what further benefits could be offered by the inclusion of two enhanced capacity schemes, one focussed at the M42 junction 10 and the second considered inclusion of Enhanced A5 Proposals which comprised substantial dualling alongside an opportunity to bypass Grendon. These schemes were included incrementally on top of the final mitigation measured identified within Stage 3.

Stage 2 – Detailed Hartshill Assessment

1.13 The second stage of the assessment involved a detailed review of the infrastructure requirements likely to be required to support the allocation of a considerable number of houses in the Hartshill area.

1.14 This assessment made use of the Hartshill model to assess the likely localised impacts that would occur as a result of moving forward with the allocation strategy and outlined an initial set of mitigation proposals which would be likely to be required should the allocation of housing in the Hartshill area be promoted.

Stage 3 – Nuneaton/A5 Focussed Assessment

1.15 The schemes that were identified within the Hartshill Assessment, as well as the infrastructure proposals, were then carried forward into stage 3 which looked at the likely level of impact on the Nuneaton and Bedworth highway network which was likely to occur as a result of allocating additional housing in the Hartshill area alongside employment land in the area adjacent to the existing MIRA Local Enterprise Zone.

Mitigation Overview

1.16 A series of mitigation proposals have been identified as a result of the assessment work completed thus far. It is anticipated that these measures will, ultimately, comprise the Infrastructure Delivery Schedule which will be required to accompany the development proposals and ensure that the impacts of the Local Plan proposals can be mitigated.

1.17 The mitigation measures are defined as follows:

1.18 The mitigation measures have been classified based on the following two criteria:

- **Core Atherstone/A5 mitigation proposals** – the core proposals considered to be essential in enabling development to come forward within the Atherstone A5 area. The measures themselves will be brought forward in phases subject to the development strategy which is adopted as part of the Local Plan. These are the measures which have been identified within the testing to 2031 that are considered to be deliverable, within the plan period, albeit with challenges associated.
- **Atherstone/A5 Aspirational Package –** Stage 4 considered the network operation after significant enhancements were included. These enhancements are considerably larger and/or more significant than those tested within other stages

meaning that there will be significant challenges associated with delivery of these schemes such as land availability and significant costs of delivery.

- **Hartshill Mitigation Package** – The suite of proposals which have been identified as a result of an assessment focussing specifically on the Hartshill area. If all development identified within the Hartshill area comes forward then all measures will likely be required to ensure an acceptable level of localised network operation. If the development is brought forward in phases then the measures which are required to support the development strategy will largely be driven by the location of the development sites which are being promoted.
- **Northern Relief Road** – This is considered to be one of a number of measures which are available to assist in minimising the impacts of development around the North Nuneaton/A5 area. The scheme was introduced to enable the development in the North Nuneaton area to be included in full. The NRR was accompanied by the Hartshill Mitigation package and is considered to represent one possible opportunity for delivering the scale of intervention necessary to enable the housing and employment land identified by NWBC. It is likely that a similar effect could be achieved through significant upgrades of the A5 and enhancements of the Local Road network, particularly the A444 but also Woodford lane and the surrounding routes. It is likely a significant enhancement of these areas would negate the need for the capacity delivered by the NRR but, at this stage, the NRR has been tested as it is considered to be a quick and simple mechanism for testing enhanced capacity in this area. It is likely that the NRR or the A5 and local road network enhancements would need to be accompanied by additional focussed mitigation measures, as yet unidentified, in order that the overall level of impact can be satisfactorily mitigated.

1.19 It should also be noted that some impacts which require the delivery of focussed mitigation measures will be as a result of the change in traffic patterns induced by the NRR rather than solely arising as a result of the additional sites being tested.

1.20 An overview of the assumptions pertaining to each mitigation strategy is provided as follows:

Atherstone/A5 Core Mitigation

1.21 The measures identified as core infrastructure measures, alongside the identified year of delivery, is summarised within the following table:

Table 1: Atherstone/A5 Core Mitigation Proposals

ID	Scheme	Description	Year of Inclusion
1	Holly Lane	Dualling on eastbound approach to Holly Lane	2021
2	Tamworth Rd/Market St	Signals introduced at Polesworth junction	2021
3	B5000 Canal Bridge widening	Widening of the canal bridges to ensure two lanes of traffic can be accommodated side by side without issue. Initial feasibility review indicates that, should it not be possible to widen the bridge, similar enhancements could be achieved via the delivery of a parallel bridge, albeit at a greater cost.	2021
4	A5/B5000 Link Road	Link between B5000 and A5, delivered to a minimum 40mph design standard with suitable access junctions to serve development being delivered off the link (as opposed to development fronting)	2026
5	Enhanced A5 Proposals Phase 1	New bypass road between Dordon and Grendon which provided dualling for traffic travelling in the westbound direction	2026
6	Dordon Signals	Existing roundabout replaced by a fully signalised junction signalisation which can accommodate the Enhanced A5 Proposals Phase 1	2026
7	Holly Lane Widening Approaches	Widening on northern and southern entry arms and revised lane allocations	2026
8	Reconfiguration of M42 signal approaches and junction optimisation	Optimisation of existing signal approaches with signals at Trinity Road and Green lane approaches reconfigured.	2026
9	Grendon Roundabout	Widening of northbound approach to accommodate 3 lanes	2026
10	Birch Coppice Trinity Way Link	Upgrade of Lower House Lane/Gypsy Lane to provide a Link between Trinity Road and A5 Watling St allowing vehicles to circumvent M42 Junction 10.	2026
11	Mancetter Gyratory	Widening of the A5 eastbound approach to enable traffic to move across the primary movement.	2031
12	A5 Holly Lane	Junction widening on all approaches and circulating carriageway, likely to trigger the need for additional land outside of the existing highway boundary.	2031
13	B5000/Mercian Way	Widening of B5000 northbound approach and Mercian Way southbound approach as well as circulating carriageway to improve through put	2031

14	A5 - Dualling	Additional Dualling A5 on westbound approach to the Phase 1 bypass	**2031**
15	Bypass Roundabout	Southbound approach widening to three lanes	**2031**

Atherstone/A5 Aspirational Package

1.22 The aspirational proposals comprise two key measures as identified within the following table:

Table 2: Atherstone/A5 Aspirational Package

ID	Scheme	Description	Year of Inclusion
16	M42 Enhanced Capacity	Widening of the A5 eastbound approach and circulatory to four lanes. Widening of the southern circulatory bridge to 4 lanes. Signal optimisation.	**2031**
17	A5 Full Bypass	New A5 roundabout junction introduced to the east of Green Lane which will serve the new Grendon bypass and link back up with the A5/B5000 link road junction on the A5. The proposals also include the A5/Long St junction reduced to one-way in the NB direction between the A5 and Woodlands Close.	**2031**

Hartshill Mitigation Package

1.23 The measures identified and attributed to the delivery of the housing in the Hartshill areas are summarised as follows:

Table 3 Harsthill Mitigation Package

Scheme	Comments
Coleshill Road / Camp Hill Road / Victoria Road / Bucks Hill Road	Current priority arrangement converted to four-arm signalised junction with additional flare lanes on the approaches to Camp Hill Road, Victoria Road and Bucks Hill Road
Camp Hill Road / Craddock Drive	Current mini roundabout converted to three-arm T-junction with two lanes on the Camp Hill Road eastbound approach to allow for right-turn stacking
Nuneaton Road / Woodford Lane / Atherstone Road	Nuneaton Road and Atherstone Road junction converted to three-arm signalised junction. Give-way at Nuneaton Road / Woodford Lane switched to allow Woodford Lane priority
Western' Link Road	Link road between Ansley Common and Plough Hill Road (through development site south of Coleshill Road off Bretts Hall Estate)
Eastern' Link Road	Link Road connecting Church Road with B4111 Mancetter Road

Western' Link Road	Link road between Ansley Common and Plough Hill Road (through development site south of Coleshill Road off Bretts Hall Estate)

Northern Relief Road

1.24 The Northern Relief Road comprises a new link between the B4111 and the A444 which also connects in to the northern distributor link road across the north Nuneaton development sites. It is envisaged that, if the NRR is to be delivered, it would also be accompanied by a focussed mitigation strategy which seeks to deal with impacts arising from the change in traffic patterns induced as a result of the introduction of the NRR. It is also recognised that the principles that are achieved within the modelling, through the delivery of the NRR, are mirrored in the enhancement of the A5 and local road network which is considered to be a viable, and potentially more deliverable, alternative to the NRR. The NRR has been tested at this stage, partly because it is simpler to implement. However as more certainty around the plans come forward and additional funding opportunities are pursued, particularly concerning enhancements of the A5, then further investigations around which options are most appropriate to achieve these aims.

1.25 A series of scenarios were defined which combined the aforementioned mitigation strategies, alongside the various development proposals and, as a result of that testing, the following conclusions have been identified for each stage:

Stage 1 Assessment

1.26 The first stage of the assessment focussed on understanding the impacts associated with the delivery of all of the sites identified for delivery within the Atherstone/A5 study area and to identify an appropriate mitigation strategy to ensure the network can cope with the level of traffic growth predicted to occur as a result of the development sites identified.

1.27 Focus has been placed on identifying the essential infrastructure requirements in the first 5 years of the plan and subsequently grading additional infrastructure requirements as the plan period progresses into the later years.

Stage 1- Conclusions

1.28 Based on the outcome of the modelling assessments the following conclusions can been made:

- The initial mitigation schedule identified to enable the allocation of developments, as outlined within the NWBC Local Plan, will likely require at least 15 schemes within the Atherstone Study Area;
- An initial 3 schemes have been identified as priority schemes required during the first 5 years up until 2021;
- Further mitigation has been highlighted as necessary during the period between 2021 and 2026. These 7 schemes are focused at a number of key junctions along the A5 and include the introduction of the Enhanced A5 Proposals between Dordon and Grendon only;
- Finally, 5 more schemes have been identified to mitigate the impact highlighted in the 2031 assessment with the inclusion of the additional 5 years of Plan growth from 2026;
- Additional scheme testing has concluded that including the larger A5 proposals which bypass Grendon will provide the best network performance when the full allocation of local plan demands are included but some impacts remain during the PM period;
- There is likely to be scope for the impacts to be further reduced by additional optimisation and more detailed refinement of the proposed mitigation measures. The results presented in this report should therefore be considered as a worst case.

Stage 2 Assessment

1.29 The second stage of the assessment work, pertaining to the NWBC Local Plan allocations and the associated impacts, required an assessment to be completed within the Hartshill model to establish the level of impact and associated infrastructure strategy necessary to ensure the developments identified within this area could be brought forward.

1.30 The outcome from the Harsthill assessment was also subsequently input in to a wider assessment of the impacts in the North Nuneaton area using the Nuneaton and Bedworth.

1.31 The core objectives of the assessment were:

- To determine the likely cumulative impacts of allocating all of the development sites within the Hartshill area which have been identified.
- To identify an appropriate highway mitigation strategy to support the allocated site delivery through minimising the highway impacts.
- To undertake threshold testing to assess the incremental impacts of including the allocated sites in key phases.

Stage 2 - Conclusions

1.32 Completion of the Hartshill specific testing revealed the following conclusions:

- That, potentially, up to 800 dwellings could be delivered before the 'Western' Link Road is required but this may result in a residual impact which is still considered to be unacceptable
- That the link between Ansley Common and Plough Hill Road is essential infrastructure when considering the quantum of housing coming forward within the plan and will be a necessity to support development of any significant magnitude coming forward in this area
- The signals at Coleshill Road / Camp Hill Road / Victoria Road / Bucks Hill Road junction are necessary to reduce excessive queuing on Bucks Hill Road approach, however it is noted that there are perceived challenges to delivering signals at this location

Stage 3 Assessment

1.33 Having completed the Hartshill focussed assessment the next stage of the assessment involved feeding in the Hartshill development demands and the associated mitigation measures into the NBWA Paramics model inclusive of the NBBC Local Plan proposals.

1.34 In addition to the housing developments within the Harthshill area, as identified within the previous Chapter of this report, a significant amount of employment land had also been identified in an area of land which adjoins the A5 and is opposite the existing MIRA Local Enterprise Zone.

1.35 The second phase of work was intended to address the following objectives:

- To assess the impacts on the Nuneaton area as a result of the inclusion of additional housing in the Hartshill area and an initial 18 Ha employment extension in the area of the A5 adjacent to the existing MIRA Local Enterprise Zone.
- To assess the cumulative impacts of allocating the 18 Ha employment and the housing in Hartshill on the Nuneaton road network.
- To determine what, if any, additional mitigation proposals can be introduced to minimise the impacts of delivering the growth in the area.
- To undertake an additional sensitivity test to establish whether there is an opportunity for additional growth in the employment land of an additional 24 Ha (which is included in addition to the 18 Ha extension already identified) to occur without significant additional infrastructure requirements.

Stage 3 - Conclusions

1.36 The following conclusions have been identified as a result of the final stage of the NWBC STA work:

- That either the residential or employment land in isolation can be accommodated within the existing network configuration without inducing severe levels of instability. It is likely that further, focussed, mitigation strategies will be required to support both development
- When combining the sites and then assessing the impacts on network performance there are severe impacts on model stability which indicate that additional infrastructure is likely to be essential and some significant infrastructure measures will be required.

- Delivery of the Northern Relief Road delivers an improvement in network conditions when considering the performance of the scenarios inclusive of all NWBC development sites but there are still residual impacts which are predicted to occur, this is likely to be exacerbated by the change in traffic patterns induced by the NRR and not entirely related to the new development sites.
- Even with the NRR in place the network performance is particularly poor in the scenario which includes the 42Ha of employment land alongside the housing in the Hartshill area. It is considered that a significant amount of additional infrastructure would be required, alongside a comprehensive review of the development parameters before a mitigation strategy is likely to be determined which would enable the full employment allocation to come forward and, even then, there is little guarantee that, within the current scope of highway extent, a solution exists.

1.37 It is reasonable to conclude therefore that the Hartshill mitigation package is likely to be a prerequisite if development in that area comes forward whilst the employment land will trigger a need for improvements to be delivered along the A5 and also in the Higham Lane area.

1.38 If the sites are brought forward in combination then a more significant infrastructure strategy is likely to be required. The NRR which has been tested represents one such opportunity and the early indications are that it will significantly improve network stability as well as improving journey times. However, even with the NRR in place a more refined mitigation strategy is also likely to be required to deal with the change in traffic patterns that are induced by the presence of the NRR.

Recommendations

1.39 The following sets out a number of key recommendations which VM believe should be considered during subsequent stages of the local plan assessment work as the site location and development quantum gain more certainty:

1.40 It is recommended that any future assessment which seeks to build on the Stage 1 mitigation strategy must also look to address impacts which are likely to arise as a result of the proximity of the Hall End Farm junction to the proposed A5 dualling mitigation as well as

assessing in detail the potential impacts on M42 Junction 10 which may arise as a result of the significant changes to the network proposed by the mitigation strategy.

1.41 It is also recommended that a review of the Phase 3 mitigation proposals are undertaken, once the appropriate level of development is identified through the local plan, to establish the benefit, or otherwise, of delivering a signal strategy at some or all of the junctions along the A5 between Grendon and M42 Junction 10.

1.42 It is recommended that, as more certainty arises with regards the development strategy likely to be promoted in the North Nuneaton area, a further review of the mitigation proposals and, specifically the NRR, in undertaken to identify what, if any, additional mitigation measures can be delivered to further reduce the impacts that have been identified thus far.

1.43 In spite of the above recommendations it should be recognised that the work to date successfully demonstrates that, for each development area, it is possible to determine an appropriate mitigation strategy which will reduce the level of impacts likely to occur as a result of the adoption of the NWBC Local Plan proposals.

1.44 On that basis, VM consider that it would be not be essential for all of the recommendations to be addressed prior to submitting the Local Plan for Examination.

2 INTRODUCTION

2.1 Vectos Microsim (VM) has been assisting North Warwickshire Borough Council (NWBC), Warwickshire County Council (WCC) and Highways England (HE) in the assessment of options pertaining to the delivery of the North Warwickshire Borough Local Plan through the use of a series of S-Paramics micro-simulation models developed to cover key areas of the Borough which have been identified as potential locations for development sites to be allocated through the Local Plan.

2.2 The purpose of this Strategic Transport Assessment (STA) Report is to provide an overview of the work that has been completed to date as well as documenting the assumptions adopted at each key stage of the study and the findings therefrom.

Objectives

2.3 The modelling assessment work has been underway since August 2016 and the primary objectives of the work are summarised as follows:

- To assess the likely impacts, on the highway network, of the various emerging strategies concerning the delivery of housing and employment through the North Warwickshire Borough Local Plan.
- To identify what, if any, interventions may be deliverable which will minimise the residual impacts likely to occur as a result of the Local Plan proposals.
- To assess the impacts of key developments which are to be located on the periphery of Nuneaton town on HE Network, NWBC's highway network, most notably the A5 as well as Nuneaton and Bedworth Borough Councils transport network.
- To look in detail at development proposals in the Hartshill area to identify an appropriate mitigation strategy to accommodate the housing sites identified within that particular area.

Report Structure

2.4 The remainder of this report is set out as follows:

- **Section 3** – Outlines the background of the study and details the stages of development.
- **Section 4** – Documents the methodology of assessment and provides an overview of the assumptions pertaining to the development of the Draft Local Plan models.
- **Section 5** – Presents and discusses the modelling results and general findings from the Atherstone/A5 Focussed Assessments.
- **Section 6** – Presents and discusses the modelling results and general findings from the Hartshill Assessment.
- **Section 7** – Presents and discusses the modelling results and general findings from the North Nuneaton Area Assessment.
- **Section 8** – Presents a summary and conclusions from the modelling work and outlines any further considerations and recommendations for future assessments.

3 BACKGROUND

Study Area

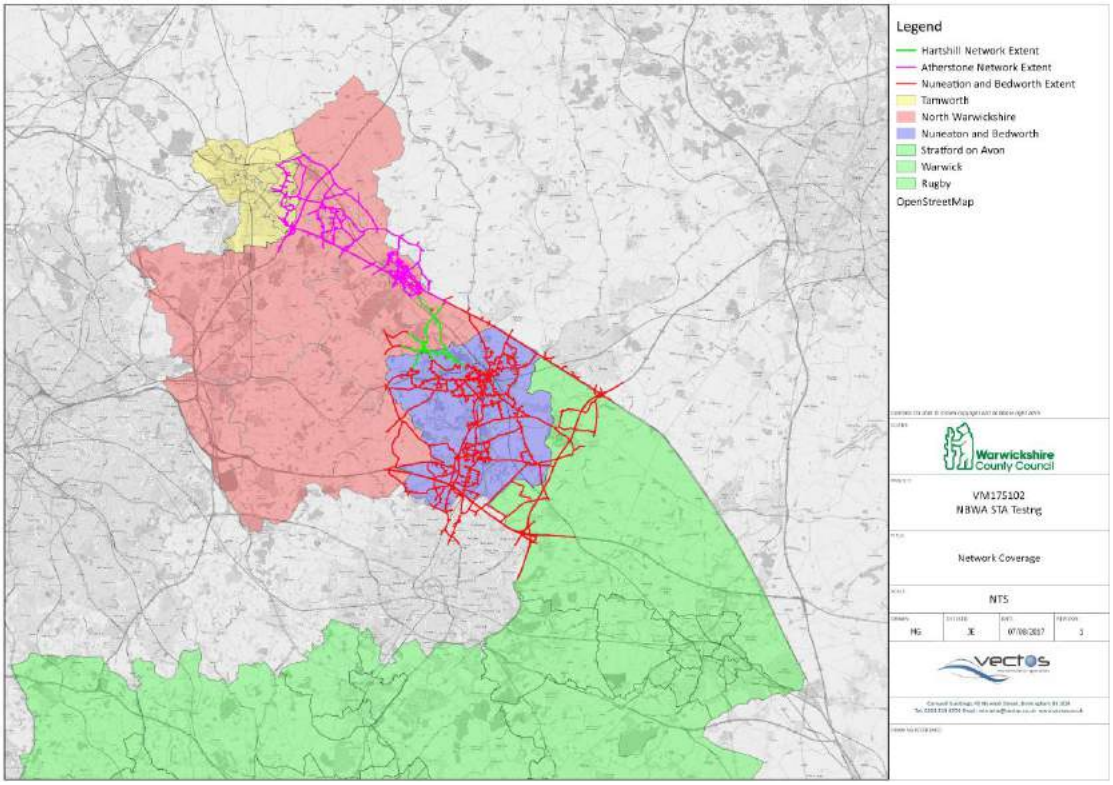
3.1 North Warwickshire Borough is located within the county of Warwickshire, it borders Staffordshire to the north west and Leicestershire to the north east. Nuneaton and Bedworth Borough located to the east and Tamworth Borough to the west have transport networks which interact closely with North Warwickshire's, and as such are included in the study area. The A5 forms part of Highways England SRN and also serves an important role in providing connectivity between these areas and the Local Plan development proposals, and as such is a focus of the study.

3.2 The following S-Paramics microsimulation models have been developed to reflect the study areas required to assess the impacts of the Draft Local Plan proposals:

- Atherstone and the A5
- Nuneaton and Bedworth
- Hartshill

3.3 The coverage of each of the models used to inform the assessment has been illustrated within the following **Figure 1**:

Figure 1 Paramics Model Coverage



3.4 The Atherstone/A5 Paramics model[1] was recently extended to include the area to the west of the model and was rebased using 2016 data. This extension was completed to ensure that the model could be used to inform the Local Plan assessment process.

3.5 The Nuneaton and Bedworth Wide Area (NBWA) model[2] was calibrated and validated in 2011 and was recently used to assess the impacts of delivering housing and employment through the Nuneaton and Bedworth Local Plan. It was the Local Plan model which was utilised to inform the assessment of NWBC allocated development impacts to ensure that the proposed growth within the Nuneaton and Bedworth wide area is considered within the NWBC focussed assessment since it is imperative that the network can be demonstrated to operate satisfactorily with all allocated sites included.

3.6 The Hartshill model[3] covers and area which is also included within the Nuneaton and Bedworth Wide Area (NBWA) Paramics model. It was developed to look specifically at

[1] Vectos Microsim, Atherstone A5 Model Local Model Validation Report, January 2016
[2] JMP Consultants, Nuneaton & Bedworth Local Model Validation Report, July 2011
[3] Vectos Microsim, Hartshill Local Model Validation Report, 2015

development proposals in this area and is considered a more appropriate tool due to the use of more recent data and higher degree of calibration

3.7 Further details on how this and the previous models were utilised has been provided within the subsequent chapter of this Report.

Stages of Assessment

3.8 The objectives set out in para 2.3 previously have been addressed through a series of different assessments each of which was defined in response to the emergence of the Local Plan proposals. In total, there have been three key stages of assessment work completed, these are described as follows:

Stage 1 – Atherstone/A5 Focussed Assessment

3.9 The first stage of the assessment made use of the Atherstone/A5 Paramics model to establish the likely impacts of allocating housing in the area surrounding Atherstone, the edge of Tamworth and north of the A5.

3.10 Focus has been placed on identifying the essential infrastructure requirements in the first 5 years of the plan and subsequently grading additional infrastructure requirements as the plan period progresses into the later years.

Stage 2 – Detailed Hartshill Assessment

3.11 The second stage of the assessment involved a detailed review of the infrastructure requirements likely to be required to support the allocation of a considerable number of houses in the Hartshill area.

3.12 This assessment made use of the Hartshill model to assess the likely localised impacts that would occur as a result of moving forward with the allocation strategy and outlined an initial set of mitigation proposals which would be likely to be required should the allocation of housing in the Hartshill area be promoted.

Stage 3 – Nuneaton/A5 Focussed Assessment

3.13 Stage 3 considered the likely impact on the Nuneaton and Bedworth highway network which occurs as a result of proposed housing allocations in Hartshill and employment allocations

adjacent to the MIRA Local Enterprise Zone. The schemes identified in the Stage 2 Hartshill assessment were carried forward to stage 3.

4 METHODOLOGY

S-Paramics Micro-simulation Modelling

4.1 The assessment has been completed using a series of S-Paramics micro-simulation models. Paramics is a micro-simulation traffic model that simulates the behaviour of each individual vehicle and presents its output as a real time visual display for traffic management and road network design.

4.2 Paramics allows a detailed representation of the highway network in the form of modelling a high level of detail, such as individual lanes, traffic signals, junctions, pedestrian crossings and bus stops as well as the events which occur on it. Each individual vehicle is separately represented and therefore the program can take an account of each individual driver's behaviour.

4.3 The output is a visual display which shows the changing position of individual vehicles and queues on the highway network in real time. The advantage of a visual display enables non-technical stakeholders to view the results of highway and development proposals in terms of traffic flows and congestion.

4.4 There are a number of advantages of using Paramics to inform the assessment as it allows a visual interrogation of the network to be completed alongside the empirical analysis. This, in turn, enables the identification of potential schemes to be completed within the same assessment and, unlike other approaches, does not require supplementary analysis to be completed using isolated junction modelling tools to support the overall analysis.

4.5 The S-Paramics models used for this assessment also operates under conditions of dynamic assignment which means that the reassignment of vehicles in response to congestion as a result of traffic growth or, alternatively, in response to the alleviation of congestion through schemes, can be considered within the assessment work.

4.6 In line with the standard approach to the development of traffic models, the models have all been developed for the AM and PM peak periods of 07:00 to 10:00 and 16:00 to 19:00 respectively. WebTAG guidance states that traffic models should be developed for the period when traffic flows are 'markedly' highest within the fully modelled area which, in most towns and cities, is encompassed within the hours identified.

4.7 Whilst it is acknowledged that there are additional impacts which occur during hours outside of the core modelled periods these traffic peaks are often localised and do not represent a step change in the overall traffic volumes when considered in the context of the entire study area which, in this case, includes the whole of Atherstone, Nuneaton and Bedworth as well as substantial sections of the A5.

Model History

4.8 As has been highlighted previously, the Paramics models have been developed at different stages over the last 5 years.

4.9 The Atherstone/A5 Paramics model was originally developed for a 2011 base year but the original area of coverage was considerably smaller than the area now contained within the model network. The model was extended to include the area to the West of the M42 in more detail and also the B5000 which runs parallel to the A5.

4.10 It was considered important to extend the model to include these areas since they are both considered to be areas which will be significantly impacted upon by the inclusion of additional development sites within the study area.

4.11 The updated 2016 Atherstone/A5 Paramics model was then subject to a forecasting procedure to produce forecast year scenarios which were reflective of the 2031 forecast year inclusive of all known committed developments and any associated infrastructure. The forecasting process was completed in consultation with all relevant authorities (NWBC, WCC and Highways England) and all committed developments were included within the assessment as well as some additional sites which Highways England identified as being highly likely to come forward and therefore, a material concern for consideration within the Local Plan assessment process.

4.12 The Hartshill Paramics model was developed using the most up-to-date count data available at the time to a 2015 Base year and was forecast forward to 2021 and 2026 via a combination of cordoning demands from the existing NBWA forecast models and finessing using growth factors derived from the TEMPRO database. No additional adjustments were considered necessary to enable the models to be considered appropriate for the Hartshill assessment since this stage was only intended to focus on the immediate impacts of the

development proposals and the wider impacts were assessed through the NBWA, described in the following paragraph, inclusive of all NBBC Local Plan proposals.

4.13 The NBWA model was calibrated and validated to a Base year of 2011 and then forecast forward to 2021 and 2031 using standard practices to create model representations of the network under future year conditions. The 2031 NBWA Reference Case was then further adapted as part of the NBWA Local Plan appraisal process to determine the appropriate infrastructure strategy necessary to support the NBBC Local Plan allocated development sites. It was this 2031 NBWA Local Plan Proffered Option that formed the starting point for the assessment of NWBC allocated sites.

Reference Case Scenarios

4.14 As a result of the Atherstone/A5 model development exercise, coupled with the historic assessments undertaken within the Nuneaton area, the following models were available to inform the assessment:

- **Atherstone/A5 Reference Case**[4] The extended 2016 Atherstone/A5 Model inclusive of all known committed developments as well as additional sites identified by Highways England as more than likely (namely Land at Holly Lane & Durnos Nurseries) developed for 2021, 2026 and 2031.
- **Hartshill 2026 Reference Case**[5] The Hartshill Paramics model forecast to 2026 via application of cordon demands extracted from the NBWA forecast model and interrogation of the TEMPRO database.
- **NBWA Local Plan 2031 Do Something**[6] The 2031 NBWA model inclusive of all development and infrastructure requirements identified through the NBBC Local Plan determination process. This model is currently being used within the Strategic Transport Assessment (STA) work associated with the NBBC Local Plan proposals.

4.15 The models and Reference Case Scenarios outlined previously were used as the starting point for the assessment of NWBA Local Plan proposals.

[4] Vectos Microsim, A5 Atherstone Forecast Report, March 2017
[5] Vectos Microsim, Hartshill Local Model Validation Report, 2015
[6] Vectos Microsim, Nuneation & Bedworth 2031 Reference Model Development Report, March 2015

4.16 The purpose of a Reference case scenario is to provide an indication of the likely network conditions before the Local Plan sites are considered but inclusive of all other development and infrastructure considerations, the network conditions within the Reference Case are considered as an appropriate point of comparison because they represent a set of conditions and the newly proposed developments identified within the local plan do not influence these conditions.

Scenario Forecasting

4.17 As there were three different model networks available to inform the assessment, the methodology for producing the assessment scenarios was tailored to each of the models but followed the same principles insofar as the following steps were adopted:

- All sites identified for inclusion within the testing were reviewed and a series of trip generation and distribution assumptions applied.
- This information was used to create a set of Local Plan specific vehicle demands for inclusion within the modelling.
- Where necessary, the TEMPRO database was interrogated to determine an appropriate overall growth level, following manual adjustments to account for the housing levels, and this was used to inform an overall level of growth for inclusion within the modelling.

Development Proposals

4.18 NWBC provided a list of all of the sites which were considered in the allocation strategy, these were then reviewed and assigned based on the assessment area. In some cases, the development area of influence was outside of the extent of the models that were being used to inform the assessment and, in these instances, the sites were discounted.

4.19 The resultant development list identified for inclusion within the various assessments, by area, is summarised within **Table 4, Table 5** and **Table 6**.

Table 4 Assessed Residential Sites by Area (Atherstone/A5)

Map ID	Site Description	Assessment Year		
		2021	2026	2031
R01	Former Polesworth High School	14	14	14
R02	Land west of Robey's Lane, Tamworth	0	1,191	1,191
R03	Land RO 5/7 Fairfields Hill, Polesworth	10	10	10
R04	Land west of Woodpark Farm, Polesworth	32	32	32
R05	Land east of Dordon & Polesworth	385	1,000	2,000
R06	Land at Whittington Farm, Atherstone	0	0	1,282
R07	Atherstone football ground, Sheepy Road, Atherstone	0	46	46
R08	Former Britannia Mill, Coleshill Road, Atherstone	54	54	54
R09	Former Sparrowdale School site, Spon Lane, Grendon	39	39	39
R10	Former recycling centre, Spon Lane, Grendon	5	5	5
R11	Land at Chapel House (Former) Dunns Lane, Dordon	7	7	7
R12	Land at Windy Ridge, Dunns Lane, Dordon	9	9	9
Total		555	2,407	4,689

Table 5: Assessed Employment Sites by Area (Atherstone/A5)

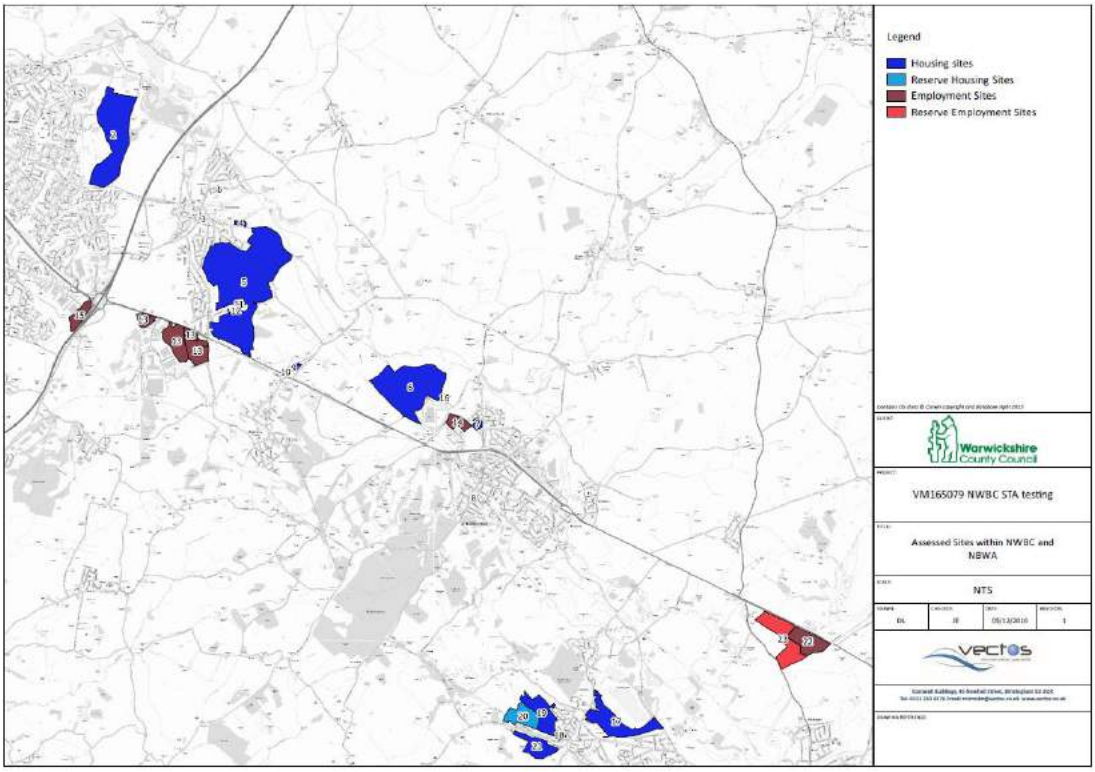
Map ID	Site Description	Assessment Year		
		2021	2026	2031
E01	Birch coppice all sites	10.9 Ha	24.6 Ha	38.3 Ha
E02	Land At Rowland Way	1.9 Ha	4.2 Ha	6.5 Ha
E03	Land East of Centurian Park	2.4 Ha	5.5 Ha	8.5 Ha
E04	Land North of Aldi Whittington Lane	0.4 Ha	1.0 Ha	1.5 Ha
Total		15.6 Ha	35.3 Ha	54.8 Ha

Table 6 Assessed Sites by Area (Hartshill/Nuneaton)

Map ID	Site Description	Resi /Emp	Dwellings/Coverage
17	Land between Church Road & Nuneaton Road Hartshill	Resi	400
18	Land off Coleshill Rd, Ansley Common.	Resi	38
19	Land north & south of Morwood Lane, Hartshill	Resi	355
20	Land at Common Farm, off Thorncliffe Way, Coleshill Road Ansley Common	Resi	281
21	Land south of Coleshill Road, off Bretts Hall Estate, Ansley Common	Resi	230
22	Land South of MIRA, A5 Caldecote	Emp	18.4 Ha
23	Land South of MIRA, A5 Caldecote	Emp	24 Ha

4.20 The location of all of the sites considered within the assessment is illustrated within **Figure 4**.

Figure 2 Site Allocations



4.1 This includes all of the sites identified earlier within **Table 4** and comprised delivery of an additional 4688 houses within the A5 study area and upto 1304 houses within the Hartshill area.

4.2 In total the housing numbers being considered across the North Warwickshire area including the sites outside of the modelled areas, completions and committed developments comprised:

- 6936 dwellings allocated through the Local Plan
- 1056 completions from approved sites to be delivered post 2016

4.3 Thus the overall additional NWBC housing number for consideration is 7992 dwellings. It was considered appropriate to use the NWBC growth as opposed to area specific on the basis that the majority of the housing was being considered within the Atherstone/A5 model which accounts for 4688 of the local plan targeted housing as well as almost all of the scheduled completions.

4.4 Analysis of the TEMPRO assumptions revealed that 2555 houses have been assumed for delivery within the same assessment period. Thus the TEMPRO factors were adjusted to reflect the revised housing numbers before being incorporated within the development scenario forecasting. Further details on the forecasting and TEMPRO adjustments are provided later within this chapter.

Trip Generation

4.5 In order that the demands for each site could be generated it was necessary to estimate a level of trip generation to be associated with each of the sites. To do this the WCC standard trip rates for residential and employment uses were combined with the development sites and/or number of dwellings to create an initial set of Local Plan demands for each model hour and each model area. At this stage, no additional adjustments were made to account for the mode shift or internalisation although subsequent sensitivity testing around this parameter may be desirable as more certainty around the targeted infrastructure strategy arises.

4.6 The use of standardised trip rates is considered acceptable at this stage on the basis that it ensures that each site is treated in a consistent manner at this early stage and it is expected that these assumptions will be revisited when the individual site impacts are being assessed during the planning application stage.

4.7 The trip rates are summarised within the following **Table 7**:

Table 7 WCC Standard Residential Trip Rate

Period	In	Out	Total
07:00 to 08:00	0.08	0.33	0.41
08:00 to 09:00	0.12	0.48	0.6
09:00 to 10:00	0.12	0.22	0.34
16:00 to 17:00	0.35	0.11	0.46
17:00 to 18:00	0.48	0.12	0.6
18:00 to 19:00	0.36	0.11	0.48

4.8 In addition to the residential trip rates, there was also a need to create suitable trip generation values for the employment sites within the assessment. A split of B1, B2 and B8 uses was assumed within the assessment (60/20/20) making use of the following trip rates (per Ha):

Table 8 B1 Employment Trip Rate (0.01 Ha)

Period	In	Out	Total
07:00 to 08:00	0.723	0.155	0.878
08:00 to 09:00	1.300	0.240	1.540
09:00 to 10:00	0.754	0.212	0.966
16:00 to 17:00	0.217	0.969	1.186
17:00 to 18:00	0.180	1.110	1.290
18:00 to 19:00	0.092	0.395	0.487

Table 9 B2 Employment Trip Rate (0.01 Ha)

Period	In	Out	Total
07:00 to 08:00	0.200	0.091	0.291
08:00 to 09:00	0.360	0.140	0.500
09:00 to 10:00	0.209	0.123	0.332
16:00 to 17:00	0.084	0.122	0.206
17:00 to 18:00	0.070	0.140	0.210
18:00 to 19:00	0.036	0.050	0.086

Table 10 B8 Employment Trip Rate (0.01 Ha)

Period	In	Out	Total
07:00 to 08:00	0.061	0.045	0.106
08:00 to 09:00	0.110	0.070	0.180
09:00 to 10:00	0.064	0.062	0.126
16:00 to 17:00	0.132	0.061	0.193
17:00 to 18:00	0.110	0.070	0.180
18:00 to 19:00	0.056	0.025	0.081

Trip Distribution

4.9 Trip distribution patterns where derived from the existing Census travel to work data whilst each major development was assigned to a zone within the Paramics model to enable the demands to be released on the model network.

TEMPRO Adjustment

4.10 The deterministic nature of S-Paramics models and the lack of an ability to apply the principles of variable demand or other demand elasticity response assumptions means that it is essential that any forecasting method adopted within the modelling seeks to account for the realism of the forecasts as part of the overall methodology.

4.11 Once the trip generation/distribution calculations have been completed, trip assignment totals will be available for all of the development sites identified for inclusion within the forecasting exercise. This applies to both committed developments and sites identified through the Local Plan.

4.12 The trip generation and distribution are combined to produce a series of Origin/Destination matrices which control the assignment of vehicle demands, associated with the development sites, onto the model network.

4.13 Assignment of the demands produces an overall level of traffic growth within the model network. It is important to establish that the growth levels which have been forecast are reasonable and, furthermore, that the model network can accommodate the growth, albeit acknowledging that additional mitigation measures are likely to be required to establish a position whereby the model can operate in a satisfactory manner.

4.14 It is recommended that the overall level of growth is controlled within the modelling by comparing the development quantum being assessed against the relevant TEMPRO projections for the same period. Manual adjustments can then be made to the TEMPRO factors to enable the growth forecasts within the model to better reflect the anticipated housing and employment levels being considered within the assessment.

4.15 Analysis of the assumptions within the TEMPRO database, with regards the development quantum delivered within the forecast period(s) should be undertaken and should be compared to the numbers that are predicted to occur if all sites identified come forward.

4.16 A high level summary of the forecasting approach is provided as follows:

- Trip generation and distribution assumptions for the committed development sites, as well as Local Plan sites, are derived and combined to produce development specific demand matrices for assignment within the model network.
- A review of the housing assumptions accounted for within the forecasting is undertaken against the trajectory assumed within the TEMPRO database for the same forecast period.
- The TEMPRO factors are adjusted to reflect the overall housing numbers now assumed to be delivered within the forecast period.

- The adjusted growth forecasts are used to inform the overall growth levels within the forecast models for each of the key stages.
- Internal growth, i.e. trips with at least one trip end within the core study area not related to an external zone, within the model are capped to the levels predicted through the adjusted TEMPRO factors, ensuring that the internal growth levels within the model do not exceed the adjusted TEMPRO levels predicted.
- As housing levels increase between each of the model forecast scenarios the adjusted TEMPRO factors can also increase to ensure that the level of growth within the modelling reflects the housing and employment numbers at each stage.

4.17 TAG guidance indicates that, when developing a Reference forecast the impact of both national and local changes should be accounted for. Critically, TAG guidance states that:

"Overall demand in the forecast should be constrained to the Department's projections… In order to maintain consistency with national projections, the core scenario should be based on trip end growth factors from the NTEM Dataset… In most cases, some adjustments to the NTEM dataset will be required at the local level" (TAG M4, para 7.3.2 to 7.3.4)

4.18 In the absence of available variable demand modelling, any forecasting method proposed must take cognisance of this fact when setting the overall growth levels within the model network.

4.19 The forecast growth levels within the Atherstone/A5 model scenarios were subsequently adjusted to account for the proposed housing allocation sites. A number of principles were adopted to inform the capping and redistribution procedure namely:

- That HGVs were excluded from the capping and the growth in these vehicle types was retained at a level consistent with the original forecasting methodology (i.e. growth in HGV traffic is continuous).
- The reduction in forecast demand levels was applied proportionally across all internal trip matrices including Committed Developments and existing Local Plan demands.

4.20 The travel pattern around the North Warwickshire area is considered to be relatively outward facing insofar as there are a high number of trips either travelling through the area

(through trips) or travelling out of the area for work (commuter trips). As such it was not considered realistic for all of the trips identified to occur in excess of the TEMPRO growth predictions to be adjusted out of the model.

4.21 In this case it was considered appropriate for 50% of the growth deemed to be in excess of the TEMPRO predictions to be subject to a redistribution procedure as described previously meaning that, in all model scenarios, the overall growth levels are higher than those predicted via the interrogation of the TEMPRO database even after being adjusted to account for the additional housing and employment sites being considered within the testing. i.e. At least 50% of the increase, over TEMPRO, assumed to occur as a result of the new developments being assessed is attributed to the network as a new trip. This is considered to reasonably reflect the fact that growth in the areas being assessed, which are likely to take the majority of the housing numbers, will occur at a faster rate than the rate of growth in traffic volumes in other areas within North Warwickshire.

4.22 Similarly, in order that the growth applied within the model could be considered to be robust and reflective of the transient nature of trips within the study area, the higher TEMPRO factor was adopted for the forecasting rather than an average of the inbound and outbound. This approach was adopted to manage the overall level of redistribution predicted within the modelling as applying an average of the two factors would, as a result of the large amount of development being considered, result in a substantial amount of development demand being assumed to divert from existing trip ends which was not considered to be realistic. This approach is in line with the approach adopted and accepted for the assessment of all Local Plans across Warwickshire including Stratford District and Warwick District Local Plans which are either approved or recommended for approval.

4.23 Further details on the precise composition of the demands and associated growth levels have been documented for each scenario tested within subsequent sections of this report.

Sustainable Transport

4.24 The mitigation schedule outlined previously has focussed on the highway network mitigation required in order to achieve an acceptable level of network performance when considering NWBC's Local Plan allocation proposals. The exercise has been based around modelling outcomes which primarily focus on car based trips. However, there are wider ranging sustainable transport issues which need to be considered in conjunction with this report

4.25 It is critical that sustainable transport improvements form part of the mitigation package to support the housing and employment growth proposals within North Warwickshire Borough. Such improvements will:

- Contribute towards the delivery of sustainable development within the Borough; and
- Maximise the number of journeys made by sustainable transport modes from trips generated as a result of new development; and
- Reduce the impact of car based travel on the local and strategic highway network;
- Deliver an integrated approach to transport provision to serve new development; and

4.26 Any sustainable transport strategy that is promoted would, ultimately, seek to reduce traffic levels compared to those reported within this report and, therefore, these impacts should therefore be considered as a 'worst case'.

4.27 There are a number of barriers to use of alternative modes of travel in the area, including:

- distance between employment and housing areas
- severance and non-pedestrian/cycle friendly environment in vicinity of A5

4.28 These issues present uncertainty over the likely modal shift achievable as a result of delivering improved sustainable transport infrastructure and public transport provision. It has therefore not been possible to attribute an appropriate level of sustainable travel discount factor to the trip generation figures adopted in this stage of the modelling assessment. At this stage, to retain an appropriate level of robustness within the assessment the mode shift adjustments have not yet been applied. This is a different approach to that which has been adopted elsewhere in the County and is considered reflective of the rural nature of the County. There is however, a lot of confidence that there will be possibilities for mode shift to be delivered, both for the existing and proposed development areas and, on that basis, this assumption is considered to be very robust at this stage.

4.29 However, the quantum of housing and employment developments proposed offers a real opportunity to provide the significant improvement in sustainable transport infrastructure and public transport provision needed to create a step change in travel behaviour. Details of improvements required to help facilitate this change are included in **Appendix A**.

Results Analysis

Overview

4.30 As has been discussed previously, the assessment work comprised a number of discrete stages undertaken across a series of models. At each stage, the results analysis that was completed was tailored to ensure that it was proportionate and provided the level of detail necessary with regards the decisions which were to be informed via the modelling.

4.31 In response to the differing needs for each stage of the assessment, a tiered approach to the results analysis was adopted which focussed largely on strategic level impacts. At this stage, it is considered that a high level analysis of the impacts is sufficient since any minor or more localised impacts associated with one or more of the sites being tested would be more than likely identified during any site specific assessment work undertaken as part of the planning application.

4.32 An overview of the measures adopted to inform the assessment are provided as follows:

Number of Runs

4.33 All analysis has been based, consistently, on a minimum of 10 and a maximum of 20 runs per scenario. In all cases 20 runs per period were undertaken and any 'failed' runs discounted. This is considered a sufficient number of runs at this stage due to the strategic nature of the analysis but it is considered that this assumption would be reviewed during subsequent, more detailed, assessment stages to establish that the amount of runs being processed is 'appropriate'.

Network Wide Statistics

4.34 A number of statistics used in the analysis have been obtained from assessing each individual trip that has occurred within the network. This information is collected within Paramics via the 'Trips-all' file and contains information specific to each individual trip completed within the model period. This information is aggregated and processed to provide the following comparative statistics:

- **Average Time (seconds)** – The average travel time of a completed trip during the model simulation period.

- **Average Speed (Km/h)** – The average speed travelled by all vehicles that completed a journey during the model simulation period.
- **Completed Trips (vehicles)** – The number of completed trips recorded during the model simulation.

4.35 The first two measurements are averages so can be used to compare between the various scenarios. The final measurement is an absolute and is dependent on congestion on the network (as this will prevent trips from completing) and the demand within the model (i.e. the number of trips actually trying to complete). As demand differs between scenarios, as well as small variations between runs of the same scenario, we cannot expect the number of completed trips to be the same. However, as the demands do not differ significantly it can still provide an indication of the relative congestion on each network.

Model Stability

4.36 Due to the deterministic nature of assignment within Paramics it is possible for vehicles to continue to attempt to enter a network even when congestion has reached such an extent that the network is effectively 'grid-locked'. In some cases the grid-lock can occur due to problems that will require mitigation, in other cases it can be something as simple as vehicles entering a mini-roundabout from all three approaches at exactly the same time.

4.37 When a model becomes grid-locked vehicles still continue to be assigned to the network and so delay begins to increase exponentially. It should be acknowledged that these issues may be occurring due to a need for mitigation in one or more areas of the model but, if the models do not lock up every time it can be concluded that the problem is not severe enough to cause the network to cease to function. Furthermore, the fact that some model runs are completed without issue indicates that a mitigation strategy can only provide additional improvements and should be deliverable. If it is model error causing the issues then these results should also be discounted due to the fact that they cannot be considered realistic.

4.38 It should also be acknowledged that experience gained elsewhere in the application of Paramics micro-simulation modelling, in projects of a similar size, has highlighted that the level of stability within the models frequently improves as development plans evolve and mitigation schemes are refined. This is also partly due to developments within the plan proceeding with applications which enables more localised impacts to be identified and

mitigated through the development specific transport assessment work. This level of detail cannot be achieved within a high level strategic assessment. All mitigation proposals will be subject to further detailed assessments, refinements and optimisation through the planning process and it is expected that improved network performance and stability will be realised as a result.

4.39 As has been mentioned previously, where model stability has been particularly poor, the propensity for a model to lock up (and thus to be considered to have failed) is assessed to allow the reliability of the model network across the various scenarios to be better understood.

Queue Lengths

4.40 A second, more detailed, level of analysis has been undertaken in the form of queue length analysis. Queue length analysis is intended to accompany the network wide analysis as it provides a more detailed picture of the impacts at specific junctions within the model network.

4.41 At this stage the analysis of queue lengths has been based on the average hourly maximum queue length. Results presented for each junction are based on the worst performing single approach. The hourly maximum for each individual model run has been calculated and then the average of all runs has been calculated for each hour. The maximum of these values, across all hours, is reported as the maximum periodic average maximum queue length. All queues are reported in numbers of vehicles.

4.42 The junctions for which average hourly maximum queue lengths have been calculated and compared are illustrated within **Figure 5** to **Figure 7.**

Figure 3 Atherstone/A5 Junction Queue Locations

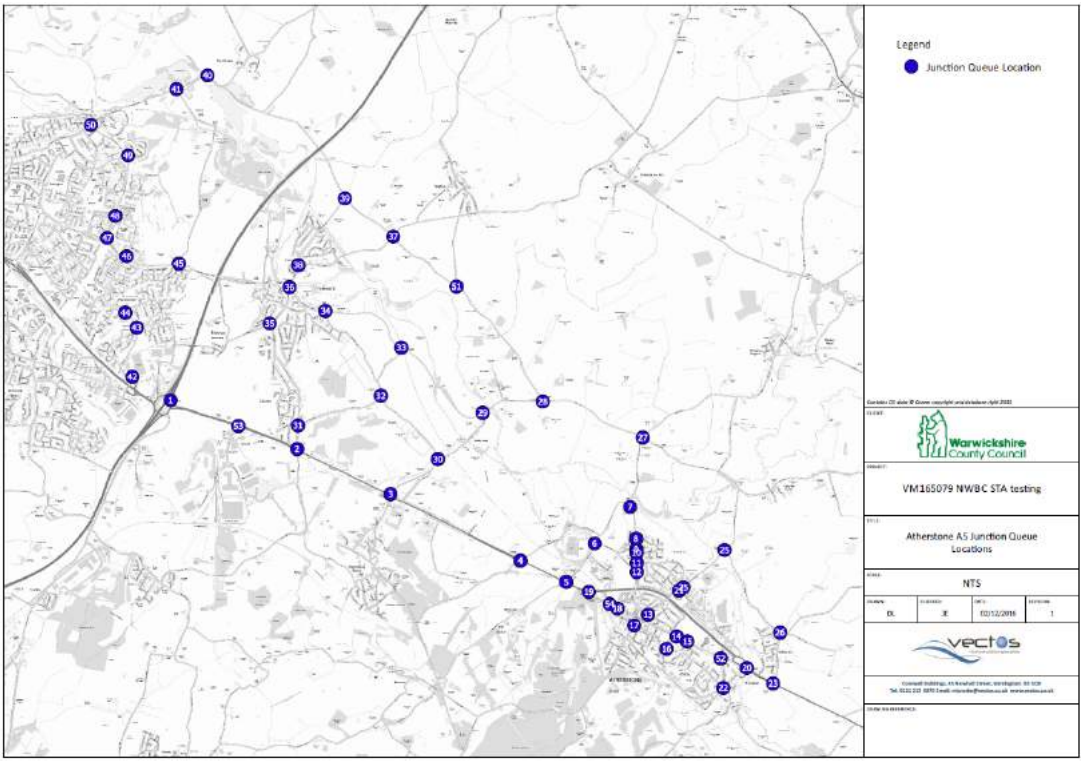


Figure 4 NBWA Junction Queue Locations

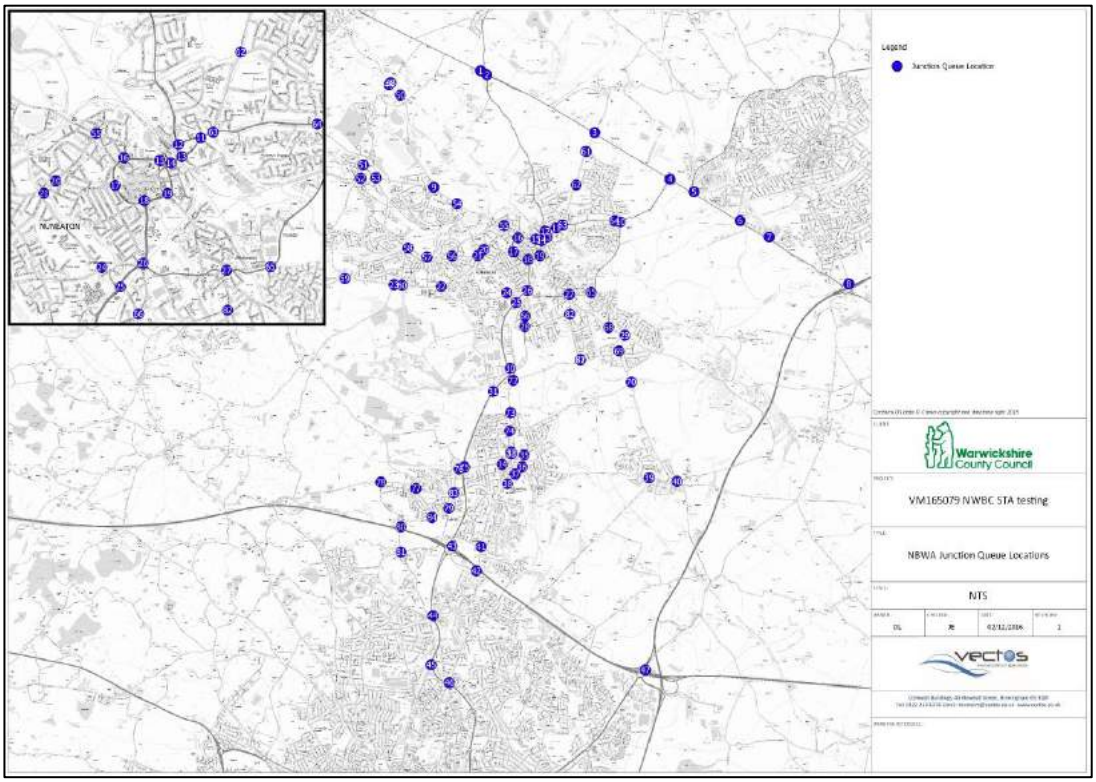
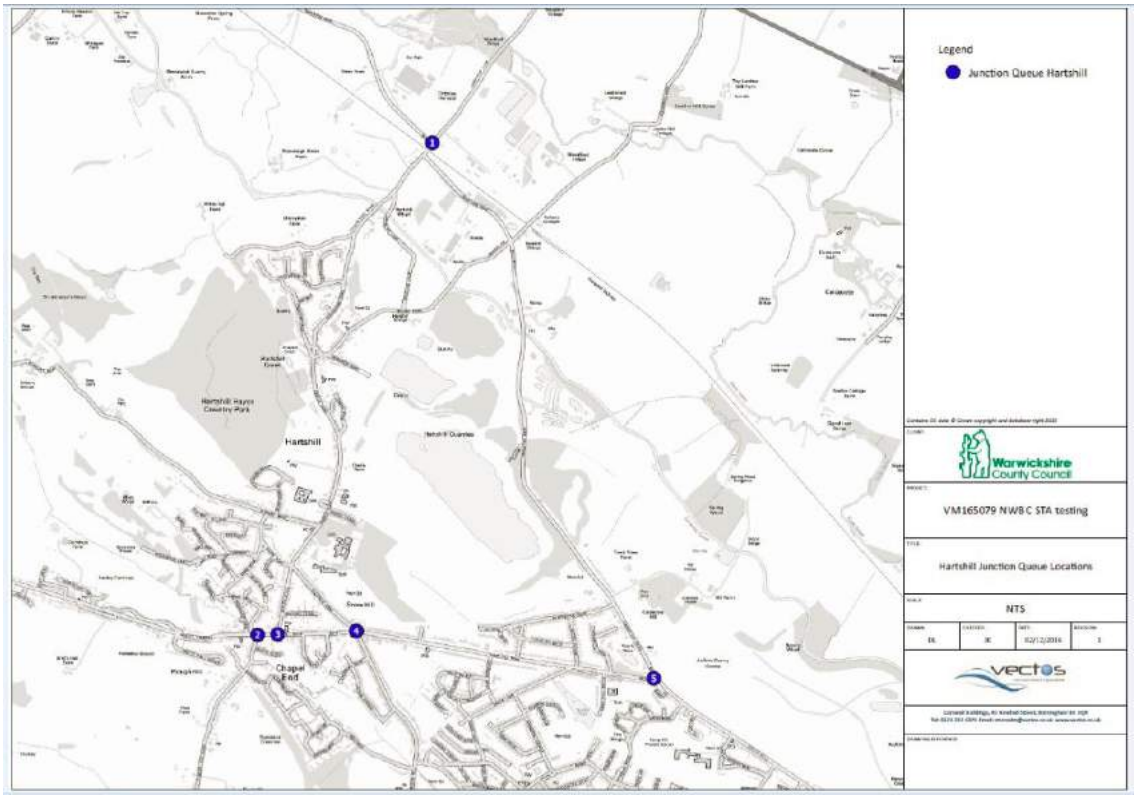


Figure 5 Hartshill Junction Queue Locations



4.43 Junctions where queue differences have not been presented on the maps simply represent junctions which did not trigger any of the assessment criteria across any one approach.

4.44 At this stage these results simply identify areas where further attention is required. A queue length increase of 50 vehicles does not necessarily mean that a scheme will not work, but it may indicate that further optimisation of the layout or any signal times are required. Furthermore it may not account for improvements on other arms of the same junction which, when investigated further, may contain additional capacity which could be unlocked to reduce the queue length on the offending approach.

4.45 The classifications for the queue length analysis are outlined as follows:

- **Queue Reduction** (a reduction in queue lengths of greater than 5 vehicles)
- **Moderate Increase** (an increase in queue lengths of between 15 and 30 vehicles)
- **Severe Increase** (an increase in queue lengths of between 30 and 50 vehicles)
- **Very Severe Increase** (an increase in queue length of over 50 vehicles)

5 STAGE 1 – ATHERSTONE/A5 FOCUSSED ASSESSMENT

Overview

5.1 This modelling review provides a focussed assessment of the NWBC Draft Local Plan 2016 allocations and seeks to highlight their impact across the Plan period. In doing so a primary objective has been to compile a schedule of network improvement schemes that are most likely required within the first 5 years of the Plan, and then in the subsequent years as the Plan progresses.

5.2 All assessments have made use of WCC's A5 Atherstone Paramics model under various network conditions and with the inclusion of different growth assumptions.

5.3 The conclusions are intended to assist consultation on the Plan and inform the proposed schemes to be presented within the Infrastructure Delivery Plan (IDP).

Objectives

5.4 The primary objectives to be completed as part of this study are summarised as follows:

- To establish a suitable 2021, 2026 and 2031 NWBC Reference Case model against which the impact of NWBC's Draft Local Plan 2016 can be compared;
- To construct the associated trip generation and distribution for the sites contained within the Draft Local Plan 2016 in each year of assessment;
- To ascertain the initial impacts of the allocation growth in terms of model stability and network statistics;
- To assess and identify, as far as is practicable, suitable mitigation measures required to facilitate the allocated growth;
- To review the relative impact of the mitigated network against the Reference Case/Do Minimum scenario.
- To determine at what stage the Enhanced A5 Proposals, identified within previous studies of this corridor are likely to be required.

Approach

5.5 The objectives set out above have been addressed through four key stages which are described as follows:

Stage 1 – 2021 Local Plan Assessment

5.6 The first stage assessed the implications of allocating the identified Local Plan housing and employment sites to be delivered up to 2021 (i.e. over the first 5 years). Using the resulting 2021 Local Plan model, the highway infrastructure mitigation schemes to be delivered by 2021 have been identified, in order to develop an initial phasing strategy up to 2021.

Stage 2 –2026 Local Plan Assessment

5.7 The second stage of the assessment built upon the Stage 1 assessment and focussed on the next 5 years of development (i.e. up to 2026). Through this assessment a second phase of infrastructure, required to accommodate the development between 2021 and 2026, could be identified.

5.8 The purpose of both Stage 1 and Stage 2 has been to identify an initial phasing strategy which enables the infrastructure to be graded (with infrastructure that is identified within Stages 1 and 2 being considered more critical than the measures identified within Stage 3).

Stage 3 – 2031 Local Plan Assessment

5.9 The third stage of the assessment considered the implications of the Local Plan with the primary objective being to identify what further infrastructure would be required to accommodate the final 5 years of growth.

Demands and Associated growth levels

5.10 Following the methodology outlined within section 4 of this report, further details are provided below regarding the composition of the assessment demands and the associated growth levels for each year assessed.

5.11 The Local Plan development trajectory has been provided by NWBC, which has been used to determine the build out of each of the specific sites in each of the 2 interim assessment years. The trip generation for 2021 and 2026 has therefore be calculated using the same trip rates but factored by the relevant quantum depending upon the assessment year being constructed. The following table details the 2031 local plan trip generation by site:

Table 11: 2031 Local Plan Trip Generation

	Type	Quantum	AM 3hr Period		PM 3hr Period	
			In	Out	In	Out
Former Polesworth High School	Resi	14 dwell	4	14	17	5
Land west of Robey's Lane, Tamworth	Resi	1191 dwell	382	1227	1421	421
Land RO 5/7 Fairfields Hill, Polesworth	Resi	9 dwell	3	9	11	3
Land west of Woodpark Farm, Polesworth	Resi	32 dwell	10	33	38	11
Land east of Dordon & Polesworth	Resi	2000 dwell	641	2060	2387	706
Land at Whittington Farm, Atherstone	Resi	1282 dwell	411	1321	1530	453
Atherstone football ground, Sheepy Road, Atherstone	Resi	46 dwell	15	47	55	16
Former Britannia Mill, Coleshill Road, Atherstone	Resi	54 dwell	17	56	64	19
Former Sparrowdale School site, Spon Lane, Grendon	Resi	39 dwell	12	40	47	14
Former recycling centre, Spon Lane, Grendon	Resi	5 dwell	2	5	6	2
Land at Chapel House (Former) Dunns Lane, Dordon	Resi	7 dwell	2	7	8	2
Land at Windy Ridge, Dunns Lane, Dordon	Resi	9 dwell	3	9	11	3
Resi. Trip Gen Total			***1,502***	***4,828***	***5,595***	***1,655***
Birch coppice all sites	Employ	38.3 Ha	715	180	150	604
Land At Rowland Way	Employ	6.5 Ha	121	31	25	103
Land East of Centurian Park	Employ	8.5 Ha	159	40	33	134
Land North of Aldi Whittington Lane	Employ	1.5 Ha	28	7	6	24
Employ. Trip Gen Total			1,023	258	214	865
TOTAL TRIP GENERATION			***2,525***	***5,086***	***5,809***	***2,520***

Trip Distribution

5.13 Trip distribution patterns for each site where derived from the existing 2011 Census travel to work data. Each site was then allocated a zone within the Paramics model to enable the demands (trip generation) to be released onto the model network based on this distribution.

5.14 At this stage, because of the development locale and rural nature of the sites, no additional adjustments were made to account for the mode shift or internalisation although subsequent sensitivity testing around this parameter may be desirable as more certainty around the targeted infrastructure strategy arises.

5.15 NWBC housing trajectory numbers have been used to inform the number of dwellings that plan to be delivered at each stage of the assessment. The number of jobs created by employment land use have been calculated using the following assumptions:

- B1 – 12 Jobs per m2
- B2 – 36 Jobs per m2
- B8 – 70 Jobs per m2

Each of the Local Plan employment sites has been categorised by the land use splits detailed within the following tables:

Table 12: 2031 Local Plan Employment Sites Land Use Split

	Use Split		
Local Plan Site	**B1**	**B2**	**B8**
Land West of Birch Coppice - Hodgetts	-	50%	50%
Land East of Birch Coppice - Hodgetts	-	50%	50%
Ciswo Land	60%	20%	20%
Gipsy Lane Dordon	-	50%	50%
Land At Rowland Way	60%	20%	20%
Land East of Centurian Park	-	50%	50%
Land North of Aldi Whittington Lane	60%	20%	20%

5.16 The resultant number of jobs created for each Local Plan employment site are provided within the following table:

Table 13: 2031 Local Plan Employment Number of Jobs Created

	Jobs Created		
Local Plan Site	**2021**	**2026**	**2031**
Land West of Birch Coppice - Hodgetts	123	276	429
Land East of Birch Coppice - Hodgetts	418	941	1,464
Ciswo Land	234	526	818
Gipsy Lane Dordon	296	665	1,035
Land At Rowland Way	434	976	1,519
Land East of Centurian Park	204	460	715
Land North of Aldi Whittington Lane	100	225	350
Total Jobs	1,808	4,069	6,330

5.17 The subsequent Tempro adjustments made to include the full allocation of Committed and Local Plan housing, including sites that fall outside the model extent, and employment assumptions for North Warwickshire are detailed within the following table:

Table 14: Tempro Committed and Local Plan Adjustments (North Warwickshire)

Year	Housing		Future Jobs	
	Current	Alternative	Current	Alternative
2021	27,744	29,939	43,437	45,245
2026	28,364	34,005	44,082	48,151
2031	29,251	37,220	44,624	50,954

5.18 The resultant adjusted North Warwickshire TEMPRO planning data for each year is detailed within the following table.

Table 15: Internal North Warwickshire TEMPRO Growth Factors

	AM			PM		
Year	Origin	Destination	Average	Origin	Destination	Average
2021	1.0986	1.0792	1.089	1.0821	1.0965	1.089
2026	1.2165	1.1748	1.196	1.1832	1.2127	1.198
2031	1.3116	1.2669	1.289	1.2772	1.3092	1.293

5.19 Analysis of the previous table reveals that the committed and allocated sites are predicted to result in an additional increase in traffic volumes of between 28.9% and 29.3% by the end of plan period.

5.20 The forecasting does not, at this stage, take account of growth in traffic volumes on the M42 mainline since those trips do not affect the operation of the network within the core study area.

5.21 A summary of the resulting net growth in each Local Plan assessment year is summarised in the following tables.

Demand Summary

5.22 A summary of the demands assigned to the model network in each assessment year as a result of the aforementioned Local Plan demand forecasting is presented within the following tables.

Table 16: 2021 Local Plan Demands

Matrix Level	07:00 – 08:00	08:00 – 09:00	09:00 – 10:00	16:00 – 17:00	17:00 – 18:00	18:00 – 19:00
Base - Total	15,232	18,036	13,734	17,809	19,672	16,079
Level 1 - Lights	13,710	15,962	12,044	16,324	18,070	14,787
Level 2 - Heavies	1,256	1,350	1,291	970	901	884
Level 3 - Growth	423	422	329	481	527	480
Level 4 – Com Dev	528	842	553	754	893	577
Level 5 – Local Plan	332	515	302	381	473	323
TOTAL	**16,249**	**19,091**	**14,519**	**18,909**	**20,864**	**17,051**
M42 Background	2,704	3,786	3,371	3,527	4,005	4,319
Growth excluding M42 Background	**7.71%**	**8.22%**	**7.84%**	**7.73%**	**7.91%**	**7.90%**

Table 17: 2026 Local Plan Demands

Matrix Level	07:00 – 08:00	08:00 – 09:00	09:00 – 10:00	16:00 – 17:00	17:00 – 18:00	18:00 – 19:00
Base - Total	15,232	18,036	13,734	17,809	19,672	16,079
Level 1 - Lights	13,764	15,791	12,032	16,360	18,010	14,761
Level 2 - Heavies	1,256	1,350	1,291	970	901	884
Level 3 - Growth	423	422	329	481	527	480
Level 4 – Com Dev	887	1,409	923	1,221	1,446	954
Level 5 – Local Plan	1,203	1,836	1,071	1,400	1,752	1,281
TOTAL	**17,533**	**20,808**	**15,646**	**20,431**	**22,635**	**18,359**
M42 Background	2,704	3,786	3,371	3,527	4,005	4,319
Growth excluding M42 Background	**18.13%**	**19.94%**	**18.56%**	**17.90%**	**18.54%**	**18.68%**

Table 18: 2031 Local Plan Demands

Matrix Level	07:00 – 08:00	08:00 – 09:00	09:00 – 10:00	16:00 – 17:00	17:00 – 18:00	18:00 – 19:00
Base - Total	15,232	18,036	13,734	17,809	19,672	16,079
Level 1 - Lights	13,679	15,454	11,931	16,233	17,786	14,613
Level 2 - Heavies	1,256	1,350	1,291	970	901	884
Level 3 - Growth	423	422	329	481	527	480
Level 4 – Com Dev	1,205	1,913	1,250	1,634	1,931	1,280
Level 5 – Local Plan	2,229	3,384	1,968	2,597	3,268	2,427
TOTAL	**18,792**	**22,523**	**16,769**	**21,915**	**24,413**	**19,684**
M42 Background	2,704	3,786	3,371	3,527	4,005	4,319
Growth excluding M42 Background	**28.45%**	**31.63%**	**29.43%**	**28.85%**	**30.37%**	**30.78%**

Mitigation Status

5.23 It should be noted that the mitigation proposals that are identified and included within the assessment are, in part, based on the impacts that have been identified as a result of the developments by year and also in part due to the overall impacts identified at the final year (with a number of mitigation measures being designed for the 2031 network conditions as a result).

5.24 It should be recognised that the mitigation strategy proposed through the testing described previously is not considered fixed and it is possible that an alternative strategy may be required with other measures being delivered sooner if the trajectory that is realised differs from the one tested. In such circumstances more proximate mitigation may be required if a site builds out quicker than has initially been identified through the testing. It is accepted that the strategy is one which aims to ensure an appropriate level of network operation by 2031 and so the primary goal must be to ensure that all schemes are delivered through the plan period, not necessarily in the order described in the following sections.

5.25 It should also be recognised that a number of schemes tested are based on relatively limited details and that it is highly likely that the benefits unlocked through scheme delivery will be increased as a result of the future optimisation and enhancements that will take place through the detailed design process.

5.26 Furthermore, at this stage the assessment takes no account of additional demand responses such as peak spreading (retiming journeys to avoid the busiest times) and mode shift (switching away from the car to alternative modes such as walking, cycling, rail, bus). These are responses which are becoming more prevalent within society today and will become even more so in the future. This is considered important as, by the end of the plan period, it is likely that some of these effects will occur and, as a result, impacts will be further negated through behavioural change.

Stage 4 – 2031 Enhanced Capacity Testing

5.27 The final phase of the assessment focussed on the delivery of potential capacity enhancement schemes atM42 junction 10 and the full Enhanced A5 Proposals. This test was intended to establish the likely impacts of releasing constrained trips onto the wider network.

5.28 Each of the aforementioned stages were carried out incrementally building on each previous stage throughout the assessment process. For Stage 4 all inclusions previously identified were included.

Mitigation Costs

5.29 Costs for the measures identified in the study thus far have been provided by both HE and WCC for each of the key assessments. The rationale for the year of identification for each of the measures is outlined in detail within subsequent sections of this report whilst the initial costs for the core schemes identified, alongside the subsequent schemes identified in the final stage of testing, have been summarised within the following Tables:

Table 19: Core A5 Scheme Costs and Delivery Years

ID	Scheme	Cost	Year of Inclusion
1	Holly Lane	£750,000	2021
2	Tamworth Rd/Market St	£750,000	2021
3	B5000 Canal Bridge widening	£3,000,000	2021
4	A5/B5000 Link Road	£7,500,000	2026
5	Enhanced A5 Proposals Phase 1	£28,750,000	2026
6	Dordon Signals	See 5.	2026
7	Holly Lane Widening Approaches	£9,200,000	2026
8	Reconfiguration of M42 signal approaches and junction optimisation	To be funded outwith the Local Plan	2026
9	Grendon Roundabout	See 5.	2026
10	Birch Coppice Trinity Way Link	To be funded outwith the Local Plan (ideally via M42 J10 enhancements)	2026
11	Mancetter Gyratory	£2,300,000	2031
12	A5 Holly Lane	See 7.	2031
13	B5000/Mercian Way	See 5.	2031
14	A5 - Dualling	See 5.	2031
15	Bypass Roundabout	See 5.	2031

Table 20: Enhanced Scheme Cost Estimates

ID	Scheme	Cost	Year of Inclusion
16	M42 Enhanced Capacity	To be funded outwith the Local Plan	2031
17	A5 Full Bypass	£57,500,00	2031

5.30 Therefore, the core infrastructure costs are estimated to be in the regions of **£52 Million** and these are essential to the delivery of the proposals identified within the Local Plan.

5.31 It is considered that the full bypass identified within the final phase of the assessment is likely to be critical in enabling the full housing and employment sites to be delivered which is estimated to be **£57.5 Million** and would be in addition to the core infrastructure costs. It should be noted that the delivery of the wider proposals would likely benefit both strategic and local trips equally and consideration should be given to how much of the infrastructure identified at this stage should be funded by the housing levels being promoted.

5.32 The following sections of this chapter present the assumptions and outcome from these four stages:

Stage 1 Assessment

5.33 The following section of this report presents the results obtained from detailed testing within the 2021 Paramics scenarios, and using the assessment criteria outlined in Chapter 4.

2021 Modelled Scenarios

5.34 The following scenarios have been assessed:

- ***2021 A5 Atherstone Reference Case***
  The 2021 Reference Case model as described within the forecasting report[7].
- ***2021 A5 Atherstone Local Plan 'Do Nothing' Scenario (DN)***
  The 2021 A5 Atherstone Reference Case model with revisions to the model demands to include the 2021 Local Plan growth (as described in Chapter 4) but with no further network improvement schemes.
- ***2021 A5 Atherstone Local Plan 'Do Something' Scenario (DS)***
  The same model demands as the 'Do Nothing' but with the addition of a set of focussed infrastructure improvement schemes.

2021 Mitigation Schemes

5.35 The schemes that have been highlighted as necessary during the first 5 years of the NWBC Plan period (i.e. by 2021) have emerged from an assessment of the 2021 Local Plan DN

[7] VM165067.R002 A5 Atherstone Forecast Report, Vectos Microsm, March 2017

scenario against the 2021 Reference Case. The schemes highlighted during the 2021 assessment, and therefore included in the 2021 DS scenario, are summarised in the following table and figure. In total 3 schemes have been identified as required by 2021. Further details of the mitigation schemes are provided within **Appendix C.**

Table 21: 2021 Mitigation Schedule

ID	Scheme	Description	Year of Inclusion
1	A5/Holly Lane Junction	Dualling on eastbound approach to Holly Lane	2021
2	Tamworth Rd/Market St	Signals introduced at Polesworth Tamworth Rd/Market St junction	2021
3a 3b	B5000 Canal Bridge widening	Widening of the canal bridges to ensure two lanes of traffic can be accommodated side by side without issue	2021

Figure 6: 2021 Mitigation Scheme Locations

2021 Results Analysis

Model Stability

5.36 An assessment of the level of model stability was undertaken by comparing the number of completed runs against the number of runs assumed to have failed, as outlined earlier within this report. The DN model reported stability levels as 85% and 80% for the AM and PM

respectively, while the DS model recorded similar stability levels at 80% for both the AM and PM time periods.

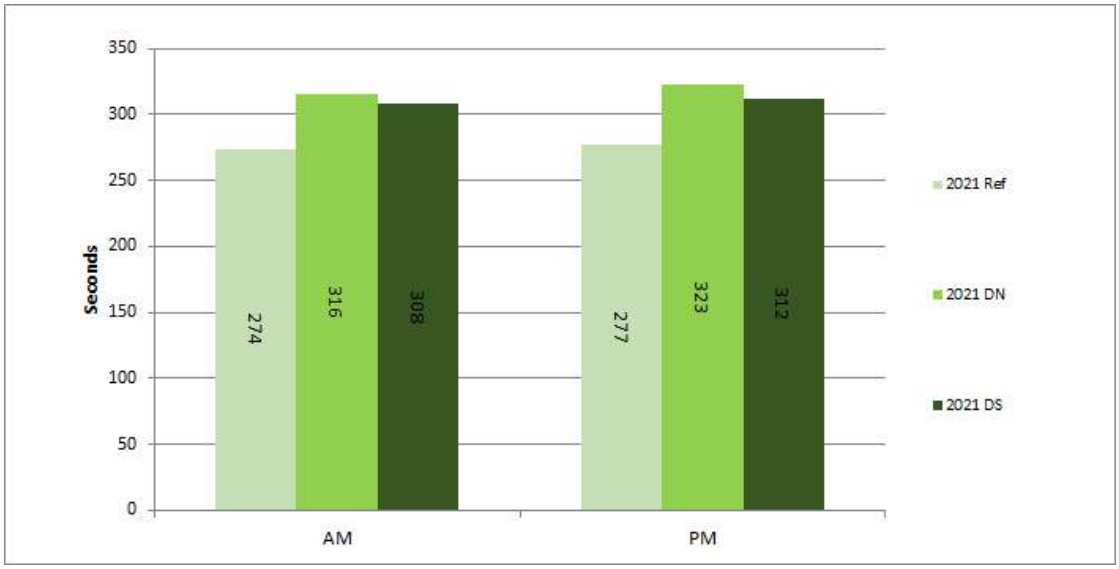
Network Wide Statistics

5.37 The following section presents a comparison between the average network wide statistics obtained from the successful runs of the 2021 assessment scenarios.

Average Journey Time

5.38 Analysis of the average journey time recorded in each scenario is presented in the following figure.

Figure 7: Average Journey Time (2021)



5.39 It can be seen that with the inclusion of the 2021 Local Plan growth that the journey times in both the AM and PM periods increase by approximately 40 seconds, and increase of 15% and 16% when comparing Ref to DN.

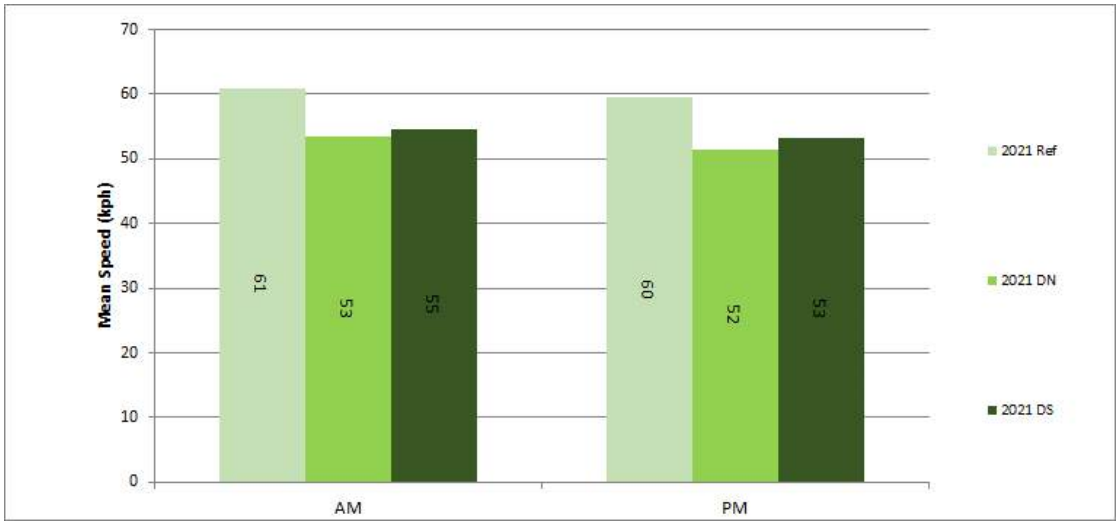
5.40 The inclusion of the proposed mitigation measures, with the Local Plan growth still included, results in a reduction in the average journey time when compared to the DN scenario.

5.41 It is reasonable to conclude that the introduction of the proposed 2021 mitigation measures does show a benefit in terms of journey times.

Average Journey Speed

5.42 Analysis of the average journey speed recorded in each 2021 scenarios is presented in the following figure.

Figure 8: Average Journey Speed (2021)



5.43 Analysis of the figure above reveals that the allocation of the NWBC sites and the associated 2021 level of demands has a negative impact on the average speeds experienced on the network. In both the AM and PM period the speeds drop by approximately 8 km/h.

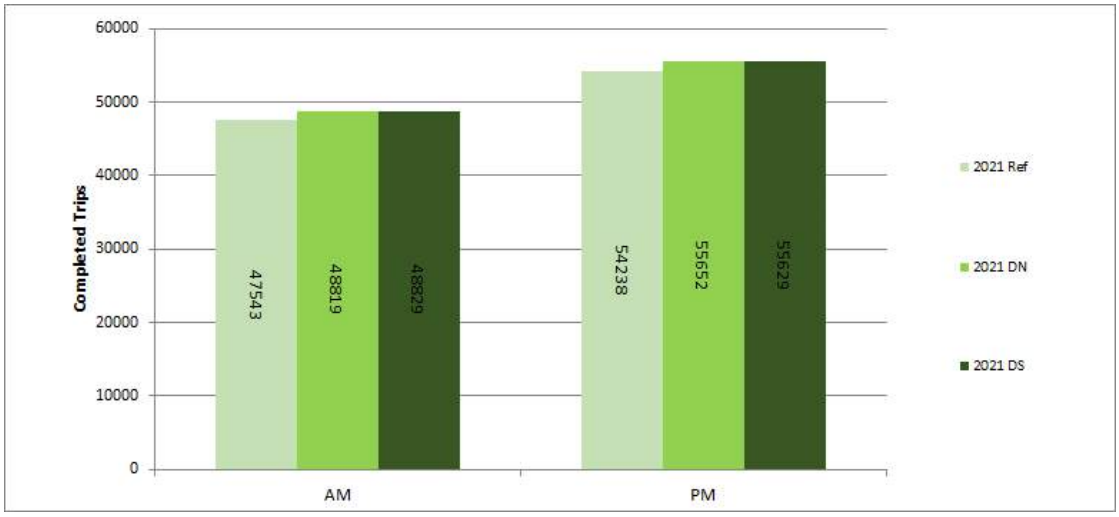
5.44 The introduction of the mitigation measures into the 2021 Local Plan DS scenario is shown to improve on the average speeds recorded within the DN network.

5.45 Overall the inclusion of the local plan demand has resulted in a reduction in speeds across both the DN and DS network. The proposed schemes mitigate some of the impact when the average speeds are used as an indicator.

Completed Trips

5.46 The number of completed trips recorded during the model simulation is presented in the following figure.

Figure 9: Completed Trips (2021)



5.47 The previous figure illustrates that the number of trips completed during the AM and PM period increases when compared against the Reference levels when the 2021 Local Plan demands are included and the network is left unchanged.

5.48 The inclusion of the focussed mitigation does not appear to have a significant impact on the number of completed trips which suggests that the network is not experiencing significant issues that result in major network congestion between the DN and DS scenarios.

5.49 The following conclusions can be drawn from the 2021 network wide statistics presented, and discussed, above:

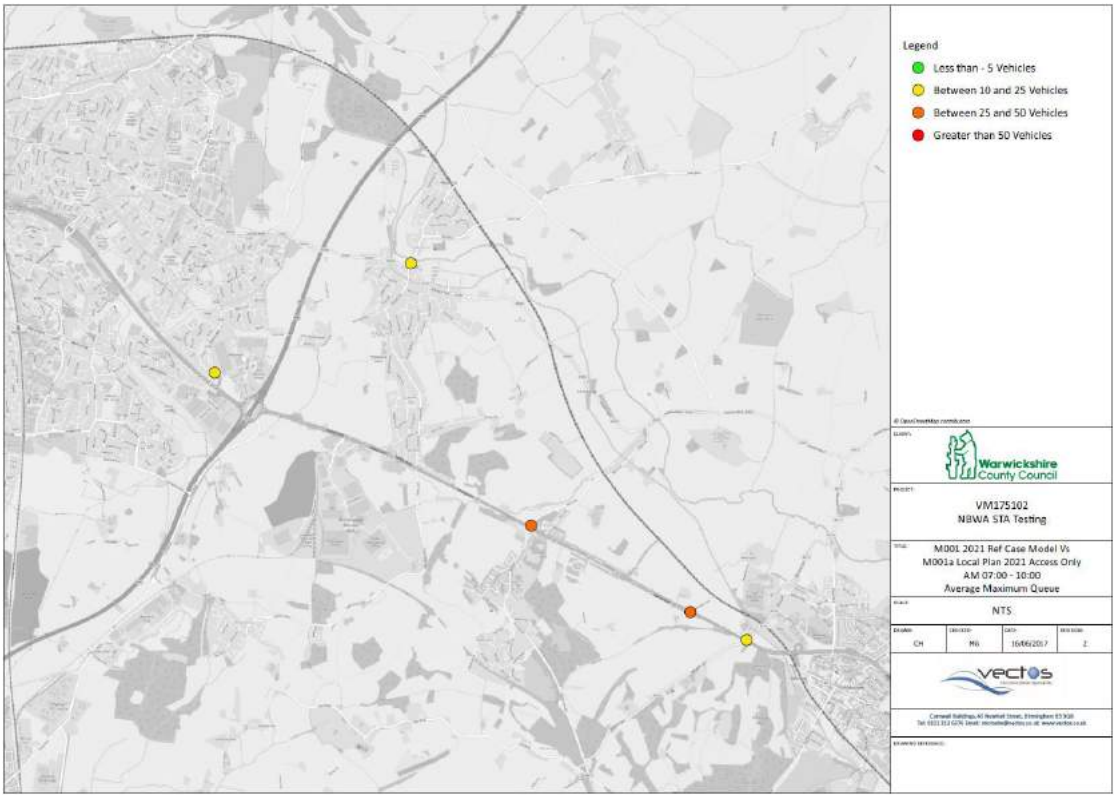
- The network wide statistics indicate that average journey times are likely to increase with the addition of the 2021 Local Plan demands and the network mean speed likely to reduce in both the AM and PM periods.
- The 'Do Something' mitigation measures provide minor journey time benefits and average journey speed when compared against the 'Do Nothing' scenario..
- The number of completed trips comparisons conclude that the 'Do Nothing' and 'Do Something' scenarios do not appear to experience significant issues that results in major network congestion affecting overall throughput of the network.

Maximum Queue Length Analysis – 2021 'Do Nothing' Scenario

5.50 The following section sets out some initial observations based on the maximum queue length analysis and the differences in queue lengths between the 2021 Reference Case (Ref) and the 2021 Local Plan 'Do Nothing' (DN) scenario.

5.51 The following figure details the impacts of the AM queueing levels between the between the Ref and the Local Plan DN scenario.

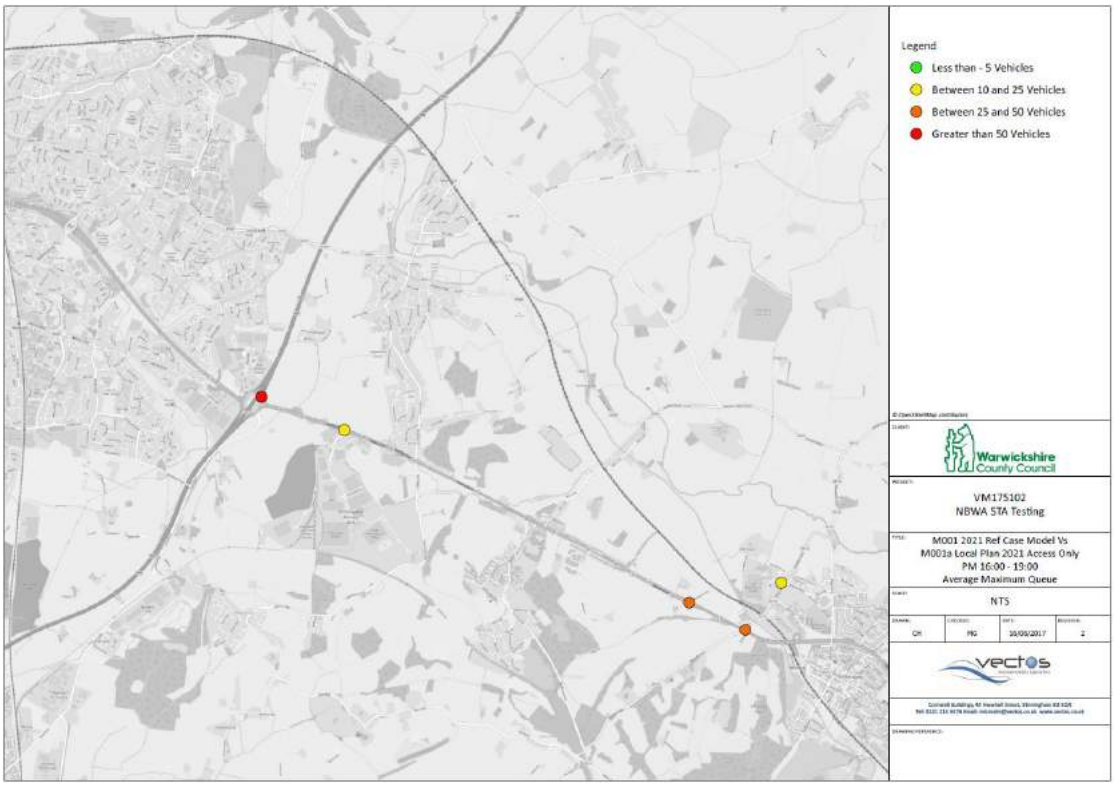
Figure 10: 2021 Reference Case vs 2021 Local Plan 'Do Nothing' AM Queue Comparisons



5.52 Analysis of the impacts illustrated within the preceding figure reveals the following:

- No junctions show a 'very severe' increase and only two junctions shows a 'severe' increase of between 25 to 50 vehicles;
- The junctions showing the 'severe' impacts are the A5 Watling Street/Holly Lane/B4116 and the A5 Watling Street/Spon Lane/Boot Hill junction; and
- Moderate increases are also noted within Polesworth at the Tamworth Road/Fairfields Hill junction.

Figure 11: 2021 Reference Case vs 2021 Local Plan 'Do Nothing' PM Queue Comparisons



5.53 Analysis of the impacts illustrated within the preceding figure reveals the following:

- One junction, M42 junction 10, shows a 'very severe' increase in queueing and two junctions shows a 'severe' increase of between 25 to 50 vehicles;
- The junctions showing the 'severe' impacts are the A5 Watling Street/Holly Lane/B4116 and the A5 Watling Street/Whittington Lane junction, however, queueing at the junctions is as a results of the queue extending back from the A5 Watling Street/Holly Lane/B4116 junction.
- Moderate increases are also noted within Dordon at the A5 Watling Street/Long Street/Gypsy Lane Junction.

5.54 The 2021 'Do Minimum' queue impact assessment demonstrates that the inclusion of the 2021 Local Plan results in a relatively moderate impact on queuing across the network with impacts being isolated to specific areas.

5.55 The junctions that have been highlighted as experiencing an increase in queues when compared to the 2021 Reference Case in both the AM and PM period appear around the A5/Holly Lane junction.

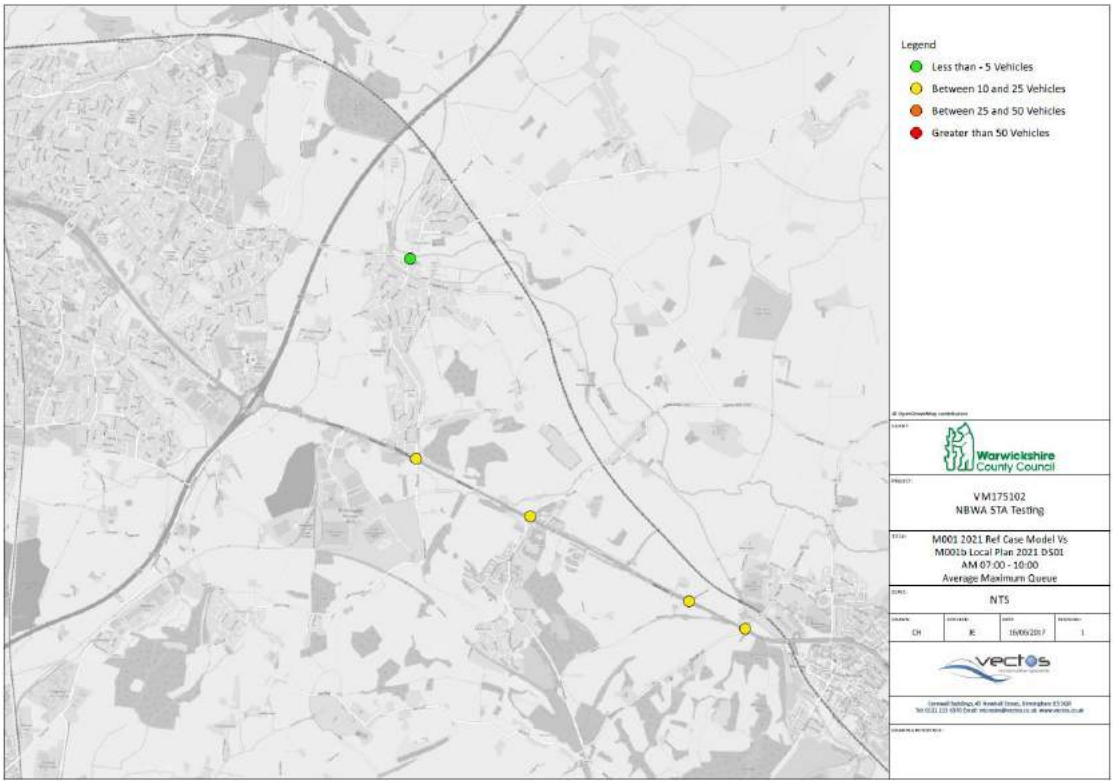
5.56 The DN model has been observed and the outputs reviewed in order to develop a set of proposed schemes that will assist in mitigating the issues noted at the A5/Holly Lane junction and the Tamworth Road and Market Street junction in Polesworth which were witnessed across the two periods. The resulting schemes, as outlined in **Table 11** have been developed and included in the 2021 Local Plan 'Do Something' scenario.

Maximum Queue Length Analysis – 2021 'Do Something' Scenario

5.57 The following section sets out some initial observations based on the maximum queue length analysis and the differences in queue lengths between the 2021 Reference Case (Ref) and the 2021 Local Plan 'Do Something' (DS) scenario. The DS model includes the 2021 Local Plan growth and the three schemes outlined in **Table 11**.

5.58 The following figure details the impacts of the AM queuing levels between the between the 2021 Ref and the 2021 Local Plan DS scenario.

Figure 12: 2021 Reference Case vs 2021 Local Plan 'Do Something' AM Queue Comparisons

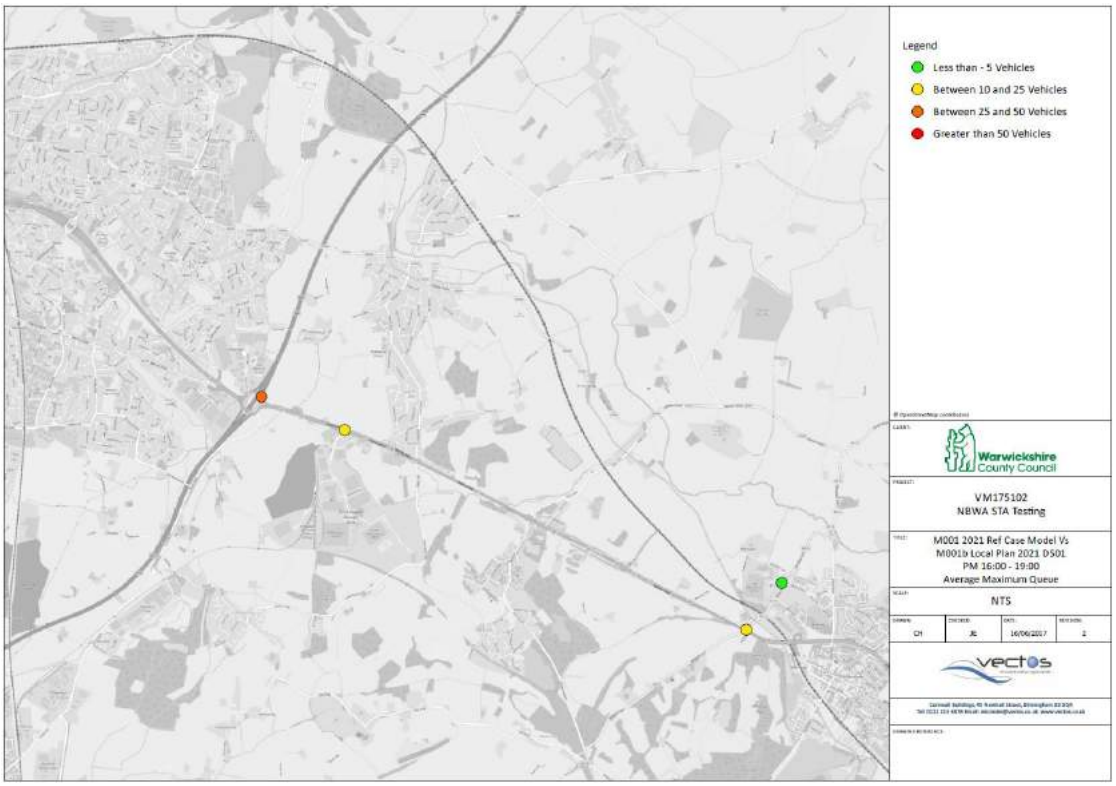


5.59 Analysis of the impacts illustrated within the preceding figure reveals the following:

- No junctions show a 'very severe' or 'severe' increase across the network within the AM.

- The mitigation included at the Polesworth Tamworth St/Market St junction has resulted in a decrease in queueing when compared to the reference case.
- Mitigation included at the A5/B4116 Holly Lane junction has resulted in the severity of the queue being reduced from 'severe' to 'moderate'

Figure 13: 2021 Reference Case vs 2021 Local Plan 'Do Something' PM Queue Comparisons



5.60 Analysis of the impacts illustrated within the preceding figure reveals the following:

- No junctions show a 'very severe' increase and only one junction shows a 'severe' increase of between 25 to 50 vehicles at the M42 Junction 10; and
- Mitigation included at the A5/B4116 Holly Lane junction has resulted in the severity of the queue being reduced from 'severe' to 'moderate' and the upstream junction with Whittington Lane is no longer reporting an increase in queueing.

5.61 As has been mentioned previously, it should be recognised that further enhancement through optioneering and design will likely improve the level of benefit unlocked by the identified schemes whilst demand responses such as peak spreading and mode shift, which are not currently adopted within the modelling, will serve to mitigate some of the residual impacts.

2021 Assessment Conclusions

5.62 Based on the outcome of the 2021 modelling assessment the following conclusions have been drawn:

- The analysis of the network wide statistics, when comparing the 2021 Local Plan DN scenario with the 2021 Reference Case, indicates moderate impacts on average journey times and speeds;
- The analysis of queue impacts, when comparing the 2021 Local Plan DN scenario with the 2021 Reference Case, indicates moderate impacts at a variety of junctions, with a concentration of increases in queues observed at the A5 Watling Street/B4116 Holly Lane Junction;
- Further analysis has been undertaken to identify mitigation measures to alleviate the pressures highlighted through the DN analysis. A total of three schemes have been identified. These schemes are considered to be required throughout the first 5 years of the Plan period;
- The analysis of the network wide statistics, when comparing the 2021 Local Plan DS scenario with the 2021 DN scenario, indicates Average Journey times will improve as a result of the mitigation included, however, journey times will still be higher than in the Reference Case.
- The introduction of the mitigation schemes are shown to improve the queue impact at the junctions where issues were highlighted in the DN scenario and also improve conditions at several junctions.

2021 Assessment Summary

5.63 The network performance of the 2021 Local Plan 'Do Nothing 'scenario confirms that the assignment of additional housing, will not require a significant amount of mitigation within the study area.

5.64 The assessment has highlighted increases in queueing are likely at the M42 J10, this is an area where queueing is observed throughout the assessment. However it has been recognised, through engagement with Highways England, that the driver for congestion in

this area is likely to be far greater than the NWBC Local Plan proposals and that, due to the strategic nature of the junction and the level of external trips that are accommodated in this area (trips travelling through the NWBC Local Plan study area), a wider scheme will be promoted by Highways England making use of alternative revenue sources to ensure that a scheme can be funded and delivered in this area.

5.65 As a result the following mitigation has been delivered in the 2021 Local Plan 'Do Something' scenario, which results in improved network conditions.

- Dualling on eastbound approach to the Holly Lane junction
- Signals introduced at Polesworth (Tamworth St/Market St) junction
- B5000 Canal Bridges widening, (Between Ensor Drive and Paddocks Close and north of the Royal Oak Pub)

5.66 This stage of the assessment has highlighted that the 2021 Local Plan scenario does not require the delivery of the Enhanced A5 Proposals or the A5/B500 link road detailed in chapter 4.

5.67 It is also noted that the widening identified on the eastbound approach to Holly Lane would not likely be delivered in isolation. As identified within the later stages of the assessment, further improvements are likely to be required at this junction and therefore the scheme implemented would also include the proposals identified during the later stages of this assessment to deliver a single set of enhancements at whatever point it was considered appropriate to do so.

Stage 2 Assessment

Overview

5.68 The following section of this report presents the results obtained from detailed testing within the 2026 Paramics scenarios outlined in Chapter 4, and using the assessment criteria outlined at the outset of this Chapter.

2026 Modelled Scenarios

5.69 The following scenarios have been assessed:

- ***2026 A5 Atherstone Reference Case***

  The 2026 Reference Case model as described within the forecasting report.
- ***2026 A5 Atherstone Local Plan 'Do Minimum' Scenario (DM)***

  The 2026 Reference model with the addition of the 2026 Local Plan demands and the 2021 'Do Something' proposed mitigation package.
- ***2026 A5 Atherstone Local Plan 'Do Something' Scenario (DS)***

  The 2026 Local Plan demands with the addition of a set of focussed infrastructure improvement schemes; including the schemes identified during the 2021 DS testing and a set of additional schemes identified as necessary between 2021 and 2026 through the 2026 DM assessment outlined in this chapter.

2026 Mitigation Schemes

5.70 The schemes that have been highlighted as necessary during the second 5 years of the NWBC Plan period (i.e. between 2021 and 2026) have emerged from an assessment of the 2026 Local Plan DM scenario against the 2026 Reference Case.

5.71 Following discussions with WCC it was identified that queueing levels at the Trinity Way approach, with the M42, was beginning to show signs of congestion as a result of right turning traffic, of which an element of this traffic was associated to the local plan development sites at Birch Coppice. It is likely that this issue would be addressed via capacity enhancements at the M42 Junction 10, however, for this assessment it has been identified that the existing route choice that occurs via Lower House Lane should be included within the modelling to offer an alternative route to the sites. It is noted that this option is considered unlikely in reality as the issues would be addressed via enhancements at the M42 Junction 10. For the purposes of this study the proposed link has been partially upgraded and is a scheme identified by ID 10 within the following table. It is recognised that such a scheme is unlikely to come forward in reality although this situation may change if it becomes clear that it is not possible to enhance M40 J10.

5.72 The schemes highlighted during the 2026 assessment, and therefore included in the 2026 DS scenario, are summarised in the following table and presented in following figure. In total 7 schemes have been identified as required by 2026. Further details of the mitigation schemes are provided within **Appendix C.**

Table 22: 2026 Mitigation Schedule

ID	Scheme	Description	Year of Inclusion
4	A5/B5000 Link Road	Link between B5000 and A5, delivered to a minimum 40mph design standard with suitable access junctions to serve development being delivered off the link (as opposed to development fronting)	**2026**
5	Enhanced A5 Proposals Phase 1	New bypass road between Dordon and Grendon which provided dualling for traffic travelling in the westbound direction	**2026**
6	Dordon Signals at A5/Long Street/Gypsy Lane	Existing roundabout replaced by a fully signalised junction signalisation which can accommodate the Enhanced A5 Proposals Phase 1	**2026**
7	A5/Holly Lane/Widening Approaches	Widening on northern and southern entry arms and revised lane allocations	**2026**
8	Reconfiguration of M42 signal approaches and junction optimisation	Optimisation of existing signal approaches with signals at Trinity Road and Green lane approaches reconfigured.	**2026**
9	A5/Spon Lane/Boot Hill Grendon Roundabout	Widening of northbound approach to accommodate 3 lanes	**2026**
10	Birch Coppice Trinity Way Link	Upgrade of Lower House Lane/Gypsy Lane to provide a Link between Trinity Road and A5 Watling St allowing vehicles to circumvent M42 Junction 10. This will likely be negated via enhancements to M42 J10 but is listed as a contingency at this stage.	**2026**

Figure 14: 2026 Mitigation Scheme Locations

2026 Results Analysis

Model Stability

5.73 An assessment of the level of model stability was undertaken by comparing the number of completed runs against the number of runs assumed to have failed, as outlined earlier within this report. The Local Plan DM model reported stability levels as 80% and 50% for the AM and PM respectively, while the DS model recorded improved stability levels at 85% for both the AM and PM time periods. The results from this assessment have been based on more than the minimum 10 runs for each scenario which ensure robust conclusions can be drawn. However, the results do show that the stability within the Local Plan DM model was significantly impacted by the inclusion of the 2026 Local Plan demands.

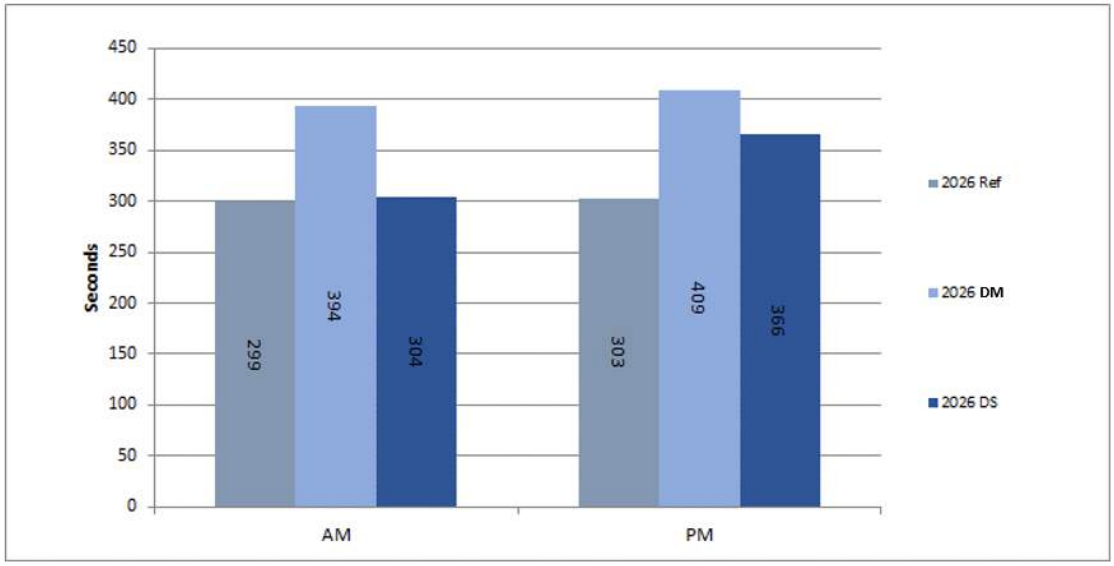
Network Wide Statistics

5.74 The following section presents a comparison between the average network wide statistics obtained from the successful runs of the 2026 assessment scenarios.

Average Journey Time

5.75 Analysis of the average journey time recorded in each scenario is presented in the following figure.

Figure 15: Average Journey Time (2026)



5.76 It can be seen that with the inclusion of the 2026 Local Plan growth that the journey times in both the AM and PM periods increase by approximately 100 seconds, and increase of 25%.

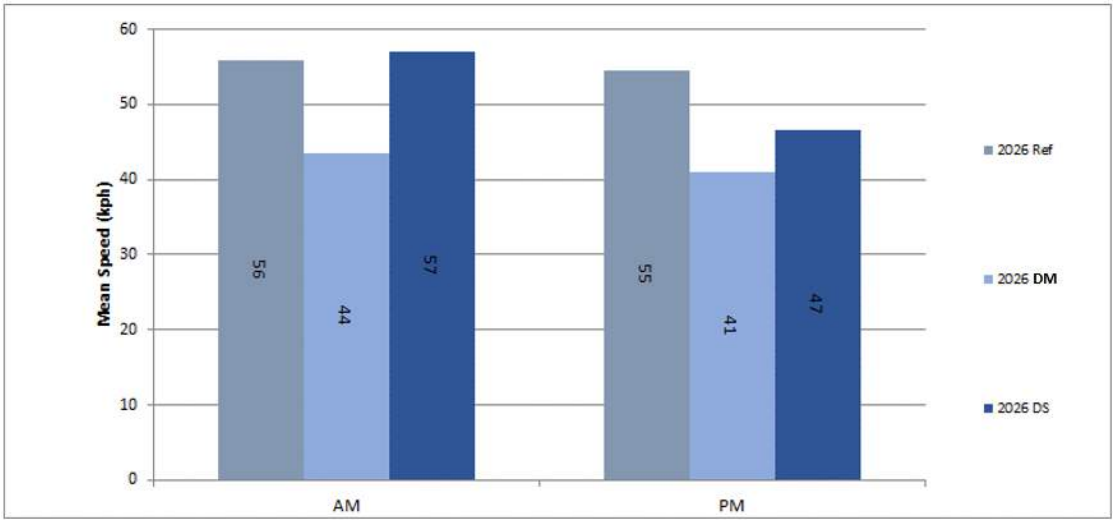
5.77 The inclusion of the proposed mitigation measures, with the Local Plan growth still included, results in a reduction in the average journey time back to the levels consistent with the Reference case in the AM period. The PM demonstrates a reduction of 43 seconds when compared to the DM scenario but still shows values higher than the Reference Case.

5.78 It is reasonable to conclude that the introduction of the proposed 2026 mitigation measures show a significant benefit in terms of network wide journey times.

Average Journey Speed

5.79 Analysis of the average journey speed recorded in each 2026 scenarios is presented in the following figure.

Figure 16: Average Journey Speed (2026)



5.80 Analysis of the figure above reveals that the allocation of the NWBC sites and the associated 2026 level of demands has a negative impact on the average speeds experienced across the network. In both the AM and PM period the speeds drop by approximately 12 km/h in the AM and 14 km/h in the PM period.

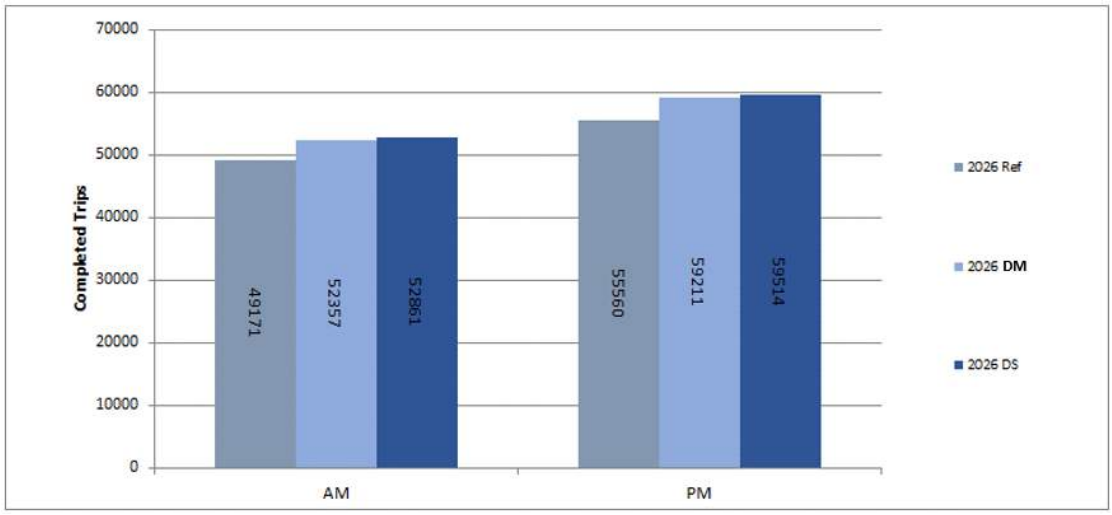
5.81 The introduction of the mitigation measures into the 2026 Local Plan DS scenario is shown to improve on the average speeds recorded within the DM network and in the AM period, reports slight betterment against the Reference Case.

5.82 Overall the inclusion of the Local Plan demand has resulted in a reduction in speeds across the DM network. The proposed schemes appear to mitigate the impact, particularly within the AM period while the PM reports a 6 km/h increase when compared against the DM average speed.

Completed Trips

5.83 The number of completed trips recorded during the model simulation is presented in the following figure.

Figure 17: Completed Trips (2026)



5.84 The figure above illustrates that the number of trips completed during the AM and PM period increases when the Reference levels are compared against the 2026 Local Plan scenarios. This is to be expected given the addition of the Local Plan sites.

5.85 Following the inclusion of the 2026 mitigation more trips are shown to complete. This indicated that the 2026 DM network is experiencing issues that have resulted in network congestion preventing trips to complete their journey during the simulation period. The introduction of the mitigation is alleviating this issue and therefore showing higher numbers completing their trip.

5.86 The following conclusions can be drawn from the 2026 network wide statistics presented, and discussed, above:

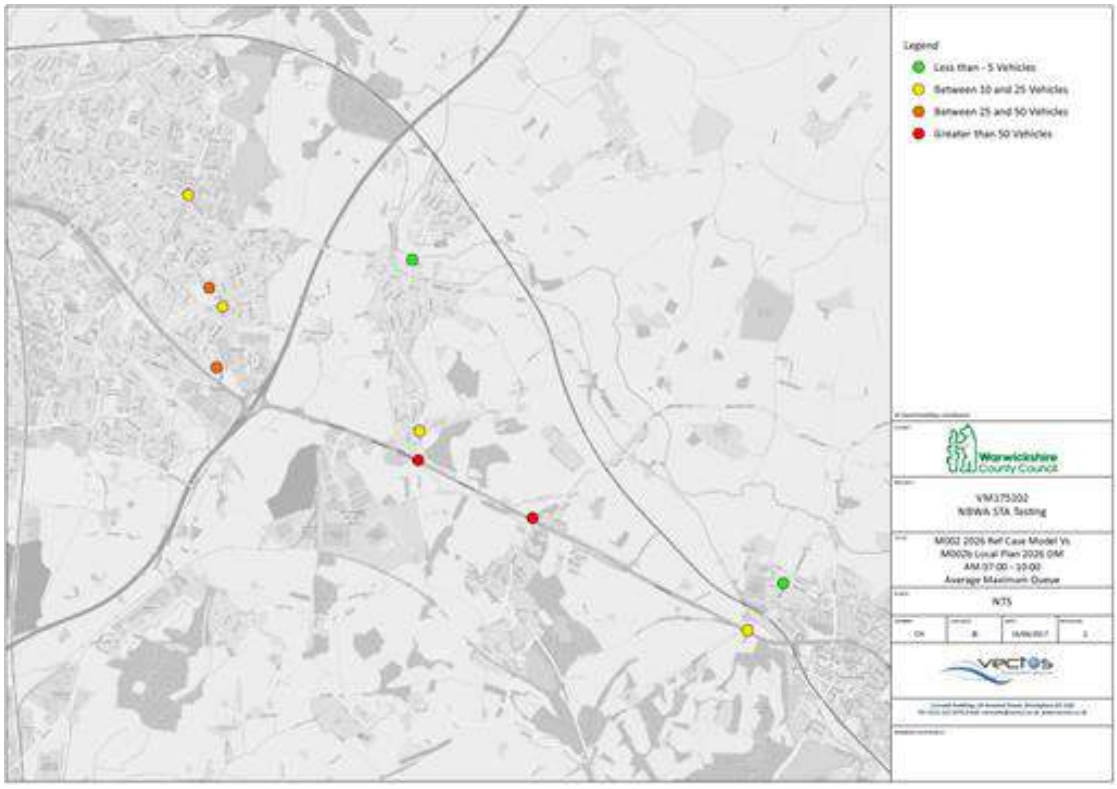
- The network wide statistics indicate that average journey times are likely to increase with the addition of the 2026 Local Plan demands with the network mean speed likely to reduce as a result in both the AM and PM periods.
- The 'Do Something' mitigation measures provides notable benefits across all network statistic measures when compared against the 'Do Minimum' scenario and in the AM period they are brought back into line with the Reference Case statistics.
- The number of completed trips comparisons conclude that the 'Do Minimum' network is beginning to show signs of congestion which is alleviated when the 2026 mitigation proposals are included.

Maximum Queue Length Analysis – 2026 'Do Minimum' Scenario

5.87 The following section sets out some initial observations based on the maximum queue length analysis and the differences in queue lengths between the 2026 Reference Case (Ref) and the 2026 Local Plan 'Do Minimum' (DM) scenario.

5.88 The following figure presents the impacts of the AM queueing levels when a comparison is drawn between the 2026 Ref and the 2026 Local Plan DM scenario.

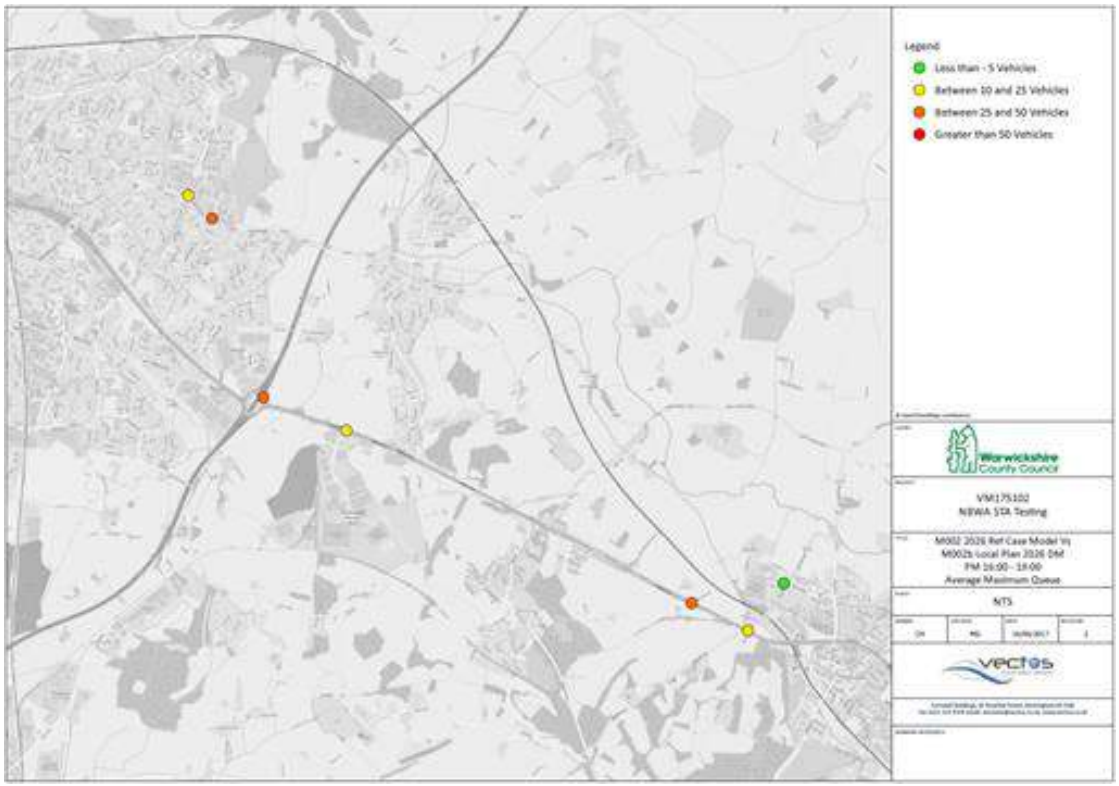
Figure 18: 2026 Reference Case vs 2026 Local Plan 'Do Minimum' AM Queue Comparisons



5.89 Analysis of the impacts illustrated within the preceding figure reveals the following:

- Two junctions show a 'very severe' increase at both A5/Long Street/Gypsy Lane and A5/Spon Lane/Boot Hill Junction and two junctions shows a 'severe' increase, to the west of the M42 of between 25 to 50 vehicles;
- Moderate increases are also noted at the A5 Watling Street/Holly Lane junction and along Pennine Way.

Figure 19: 2026 Reference Case vs 2026 Local Plan 'Do Minimum' PM Queue Comparisons



5.90 Analysis of the impacts illustrated within the preceding figure reveals the following:

- No junctions show a 'very severe' increase across the network within the PM with three junctions highlighted as showing a 'severe' increase; and
- The junctions showing the 'severe' impacts are the A5 Watling Street/B4116 Holly Lane, the M42 junction 10 and B5000/Mercian Way.

5.91 The 2026 'Do Minimum' queue impact assessment demonstrates that the inclusion of the 2026 Local Plan results in significant impacts on queuing across the network with impacts being most notable at junctions along the A5.

5.92 The junctions that have been highlighted as experiencing an increase in queues when compared to the 2026 Reference Case, particularly within the AM period, are the A5 Watling Street/Long Street/Gypsy Lane and the A5 Watling Street/Spon Lane/Boot Hill junction.

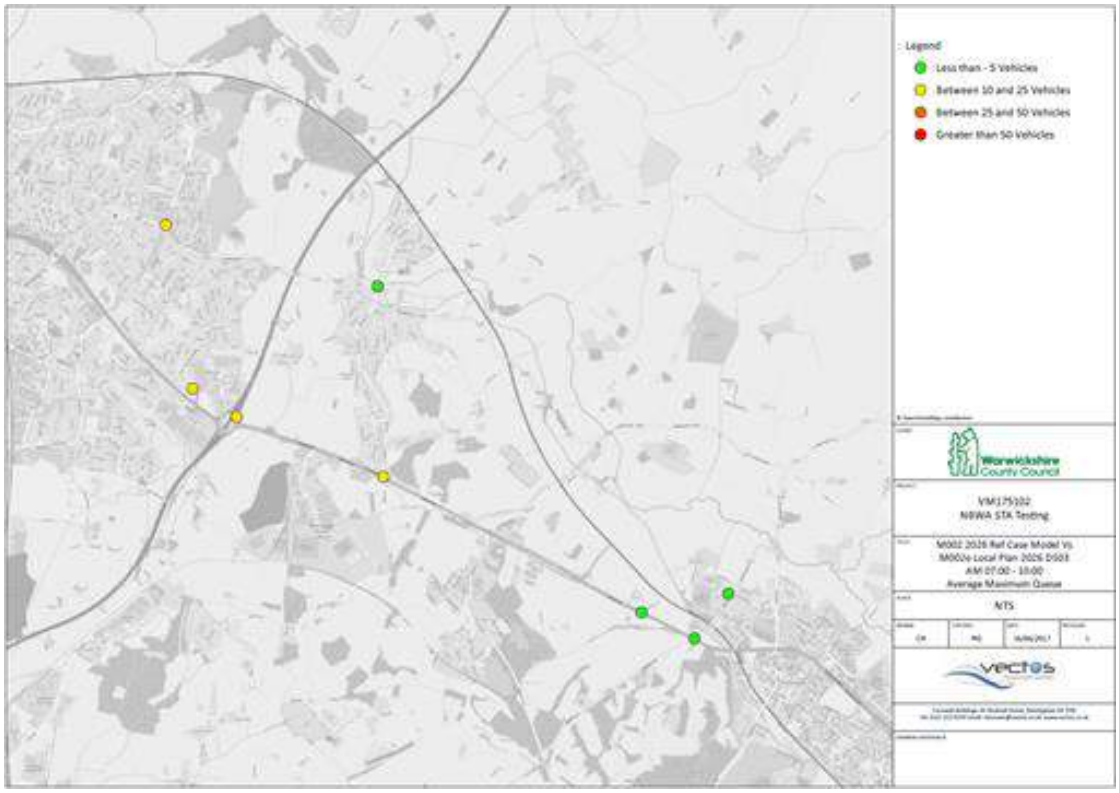
5.93 The DM model has been observed and the outputs reviewed in order to develop a set of proposed schemes that will assist in mitigating the issues witnessed across the two periods. The resulting schemes, as outlined in **Table 12** have been developed and included in the 2026 Local Plan 'Do Something' scenario.

Maximum Queue Length Analysis – 2026 'Do Something' Scenario

5.94 The following section sets out some initial observations based on the maximum queue length analysis and the differences in queue lengths between the 2026 Reference Case (Ref) and the 2026 Local Plan 'Do Something' (DS) scenario. The DS model includes the 2026 Local Plan growth and the seven additional schemes outlined in **Table 12**.

5.95 The following figure details the impacts of the AM queueing levels between the between the 2026 Reference Case (Ref) and the 2026 Local Plan 'Do Something' (DS) scenario.

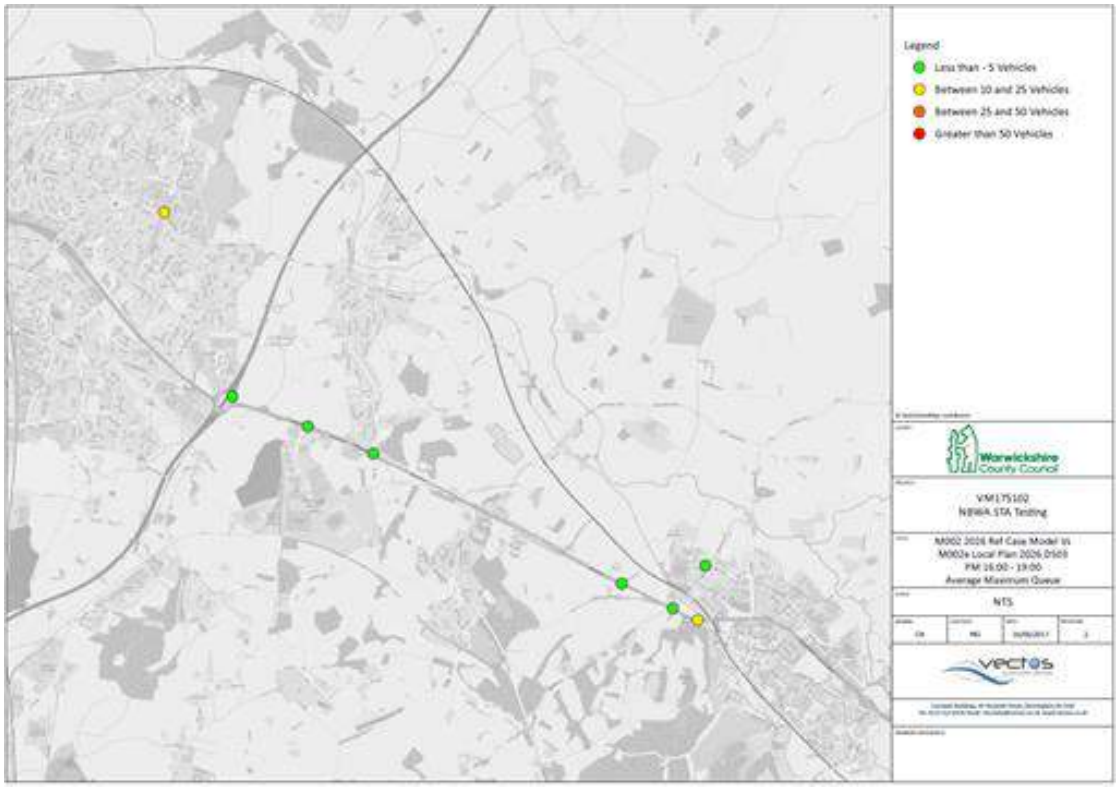
Figure 20: 2026 Reference Case vs 2026 Local Plan 'Do Something' AM Queue Comparisons



5.96 Analysis of the impacts illustrated within the preceding figure reveals the following:

- No junctions show a 'very severe' or 'severe' increase across the network within the AM;
- The mitigation included at the Dordon A5/Long Street/Gypsy Lane signals has resulted in the reduction in severity from 'very severe' to 'moderate'; and
- The additional mitigation included at the A5/B4116 Holly Lane junction has resulted in betterment when compared with the Reference Case.

Figure 21: 2026 Reference Case vs 2026 Local Plan 'Do Something' PM Queue Comparisons



5.97 Analysis of the impacts illustrated within the preceding figure reveals the following:

- No junctions show a 'very severe' or 'severe' increase across the network within the PM period.
- Only two junctions report 'moderate' queue level increases.
- Mitigation included at the A5/Holly Lane junction has resulted in betterment when compared with the Reference Case.
- The betterment shown at the M42 junction is as a result of the upgrading of the link Birch Coppice Trinity Way Link, reducing the level of queuing reported on this approach which enables traffic to reassign away from the Junction via alternative routes.

2026 Assessment Conclusions

5.98 Based on the outcome of the 2026 modelling assessment the following conclusions have been drawn:

- The analysis of the network wide statistics, when comparing the 2026 Local Plan DM scenario with the 2026 Reference Case, indicates significant impacts on average journey times and speeds;
- The analysis of queue impacts, when comparing the 2026 Local Plan DM scenario with the 2026 Reference Case, indicates significant impacts noted along the A5, particularly at junctions within the Dordon and Grendon area as well as at the A5 Watling Street/B4116 Holly Lane Junction;
- Further analysis has been undertaken to identify mitigation measures to alleviate the pressures highlighted through the DM analysis. A total of 7 schemes have been identified. These schemes are considered to be required between years 5 and 10 of the Plan period;
- The analysis of the network wide statistics, when comparing the 2026 Local Plan DS scenario with the 2026 DM scenario, indicates that all network statistic will improve as a result of the mitigation included, and in some cases comparable levels to the Reference Case are achieved.
- The introduction of the mitigation schemes are shown to improve the queue impact at the junctions where issues were highlighted in the DM scenario and also improve conditions at several junctions to a point that indicated betterment over the Reference case.

2026 Assessment Summary

5.99 The network performance of the 2026 Local Plan 'Do Minimum' scenario confirms that the Local Plan developments will trigger the need for a significant amount of mitigation within the study area by 2026.

5.100 The model analysis has revealed pressures on the network in the 2026 Local Plan 'Do Minimum' scenario is focused on the A5 by Dordon, Grendon and at Holly Lane.

5.101 As a result, a mitigation package has been delivered in the 2026 Local Plan 'Do Something' scenario, which results in network conditions comparable with the 2026 Reference Case and mitigates the issues along the A5 highlighted in the 'Do Minimum' assessment.

5.102 This stage of the assessment has highlighted that the 2026 Local Plan scenario requires the delivery of the A5/B5000 Dordon link road and the first part of the dualling between Grendon and Dordon as described within chapter 4 of this report to deliver the network operation modelled.

Stage 3 Assessment

Overview

5.103 The following section of this report presents the results obtained from detailed testing within the 2031 Paramics scenarios outlined in Chapter 4, and using the assessment criteria outlined in earlier in this Chapter 5.

2031 Modelled Scenarios

5.104 The following scenarios have been assessed:

- ***2031 A5 Atherstone Reference Case***
  The 2031 Reference Case model as described within the forecasting report.
- ***2031 A5 Atherstone Local Plan 'Do Minimum' Scenario (DM)***
  The 2031 Reference model with the addition of the 2031 Local Plan demands and the 2026 'Do Something' proposed mitigation package. (i.e. all schemes highlighted through the 2021 and 2026 assessments.)
- ***2031 A5 Atherstone Local Plan 'Do Something' Scenario (DS)***
  The 2031 Local Plan demands with the addition of a set of focussed infrastructure improvement schemes; including the schemes identified during the 2021 and 2026 DS testing and a set of additional schemes identified as necessary between 2026 and 2031 through the 2031 assessment outlined in this chapter.

2031 Mitigation Schemes

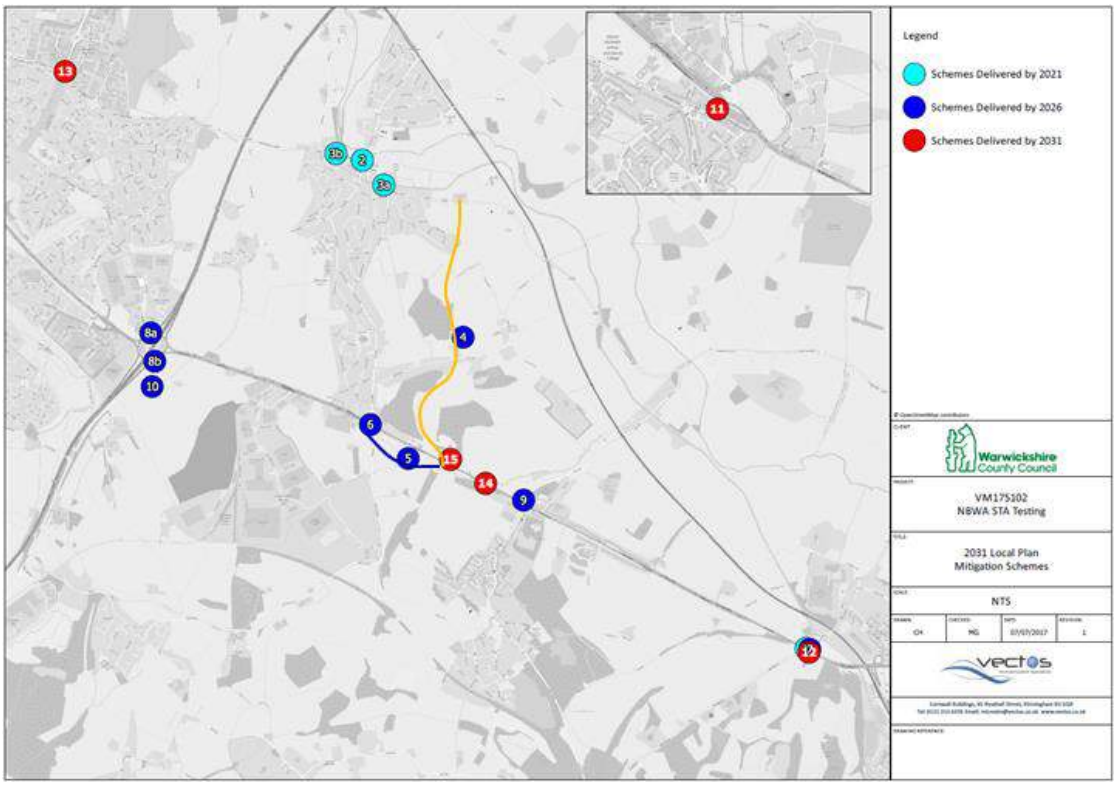
5.105 The schemes that have been highlighted as necessary by the end of plan NWBC period (i.e. by 2031) have emerged from an assessment of the 2031 Local Plan DM scenario against the 2031 Reference Case. The schemes highlighted during the 2031 assessment, and therefore included in the 2031 DS scenario, are summarised in the following table and presented in the following figure. Further details of the mitigation schemes are provided within **Appendix C.**

5.106 In total 5 further schemes have been identified as required by 2031.

Table 23: 2031 Mitigation Schedule

ID	Scheme	Description	Year of Inclusion
11	Mancetter Gyratory	Widening of the A5 eastbound approach to enable traffic to move across the primary movement.	2031
12	A5/ B4116 Holly Lane	Junction widening on all approaches and circulating carriageway, likely to trigger the need for additional land outside of the existing highway boundary.	2031
13	B5000/Mercian Way	Widening of B5000 northbound approach and Mercian Way southbound approach as well as circulating carriageway to improve through put	2031
14	A5 - Dualling	Additional Dualling A5 on westbound approach between Spon lane and A5/B5000 Link Road Junction	2031
15	Enhanced A5 Proposals Roundabout Southbound additional Widening	Widening of existing the 2026 B5000/A5 link road roundabout on the Southbound approach to three lanes	2031

Figure 22: 2031 Local Plan Mitigation Schemes



2031 Results Analysis

Model Stability

5.107 An assessment of the level of model stability was undertaken by comparing the number of completed runs against the number of runs assumed to have failed, as outlined earlier within this report. The Local Plan DM model reported stability levels as 55% and 90% for the AM and PM respectively, while the DS model recorded improved stability levels at 70% for both the AM and 90% PM time period.

5.108 These results show that the stability within the Local Plan DM model was significantly impacted by the inclusion of the 2031 Local Plan demands and that the mitigation included within the 2031 Local Plan DS scenarios has improved on the stability however it is noted that, at 70%, there are still issues associated with the performance of the AM network.

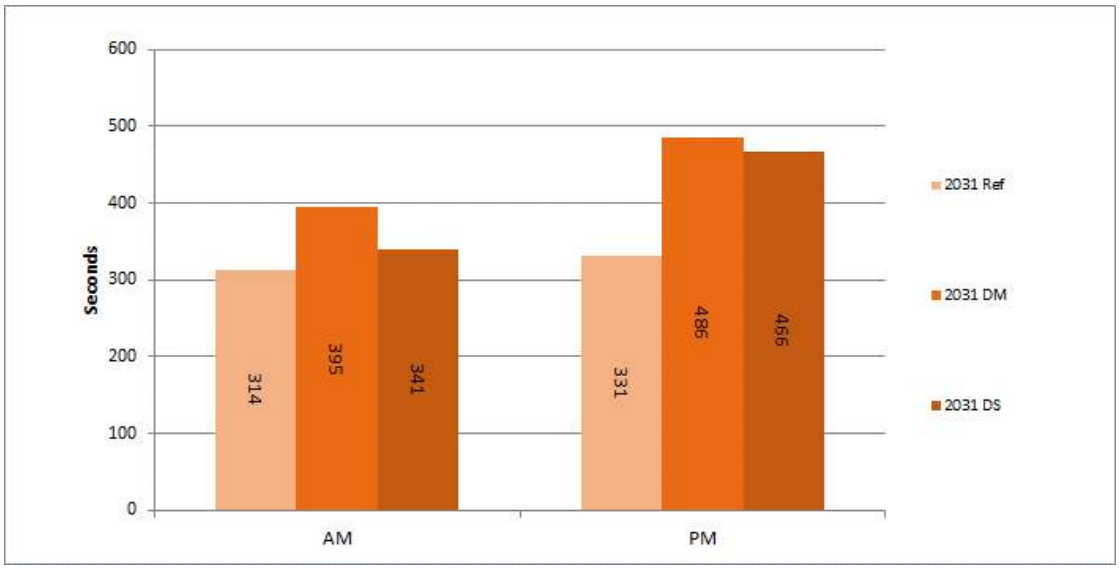
Network Wide Statistics

5.109 The following section presents a comparison between the average network wide statistics obtained from the successful runs of the 2031 assessment scenarios.

Average Journey Time

5.110 Analysis of the average journey time recorded in each scenario is presented in the following figure.

Figure 23: Average Journey Time (2031)



5.111 It can be seen that with the inclusion of the 2031 Local Plan growth that the journey times increase by approximately 80 seconds within the AM, and 155 seconds within the PM.

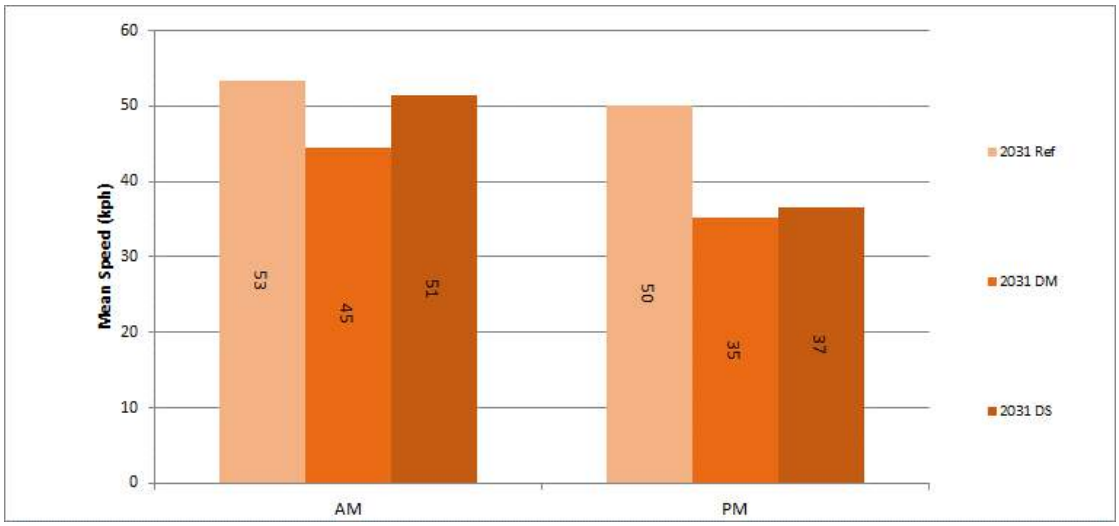
5.112 The inclusion of the proposed mitigation measures, with the Local Plan growth still included, results in a reduction in the average journey time to levels similar to those reported within the AM Reference Case. The PM demonstrates a reduction of 20 seconds when compared to the DM scenario but still shows significant higher journey times than in the Reference Case.

5.113 It is reasonable to conclude that the introduction of the proposed 2031 mitigation measures does show a benefit in terms of AM network wide journey times, however the PM still shows signs of congestion when compared against the Reference Case.

Average Journey Speed

5.114 Analysis of the average journey speed recorded in each 2031 scenarios is presented in the following figure.

Figure 24: Average Journey Speed (2031)



5.115 Analysis of the figure above reveals that the allocation of the NWBC sites has a negative impact on the average speeds experienced across the network. In both the AM and PM period the speeds are shown to reduce; by approximately 8 km/h in the AM and 15 km/h in the PM.

5.116 The introduction of the mitigation measures into the 2031 Local Plan DS scenario is shown to improve on the average speeds recorded within the DM network, particularly within the AM

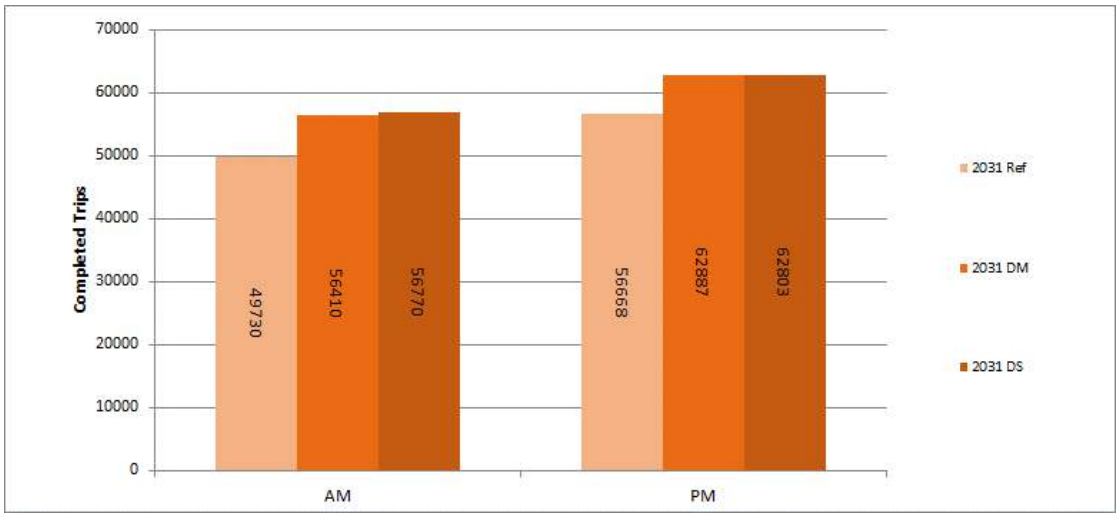
period. It is noted that average speeds remain similar between the DM and DS in the PM period.

5.117 Overall the inclusion of the Local Plan demand has resulted in a reduction in speeds across the DM network. The proposed schemes appear to mitigate some of the impact, particularly within the AM period.

Completed Trips

5.118 The number of completed trips recorded during the model simulation is presented in the following figure.

Figure 25: Completed Trips (2031)



5.119 The figure above illustrates that the number of trips completed during the AM and PM period increases when the Reference and DM levels are compared.

5.120 The inclusion of the 2031 focussed mitigation results in more trips completed within the AM period, suggesting that the 2031 DM network is experiencing issues that have resulted in network congestion. In the PM period there are signs of congestion that is unmitigated by the proposed schemes, which is highlighted by the limited change in completed trips between the DM and DS scenarios (unlike in the AM period).

5.121 The following conclusions can be drawn from the 2031 network wide statistics presented, and discussed, above:

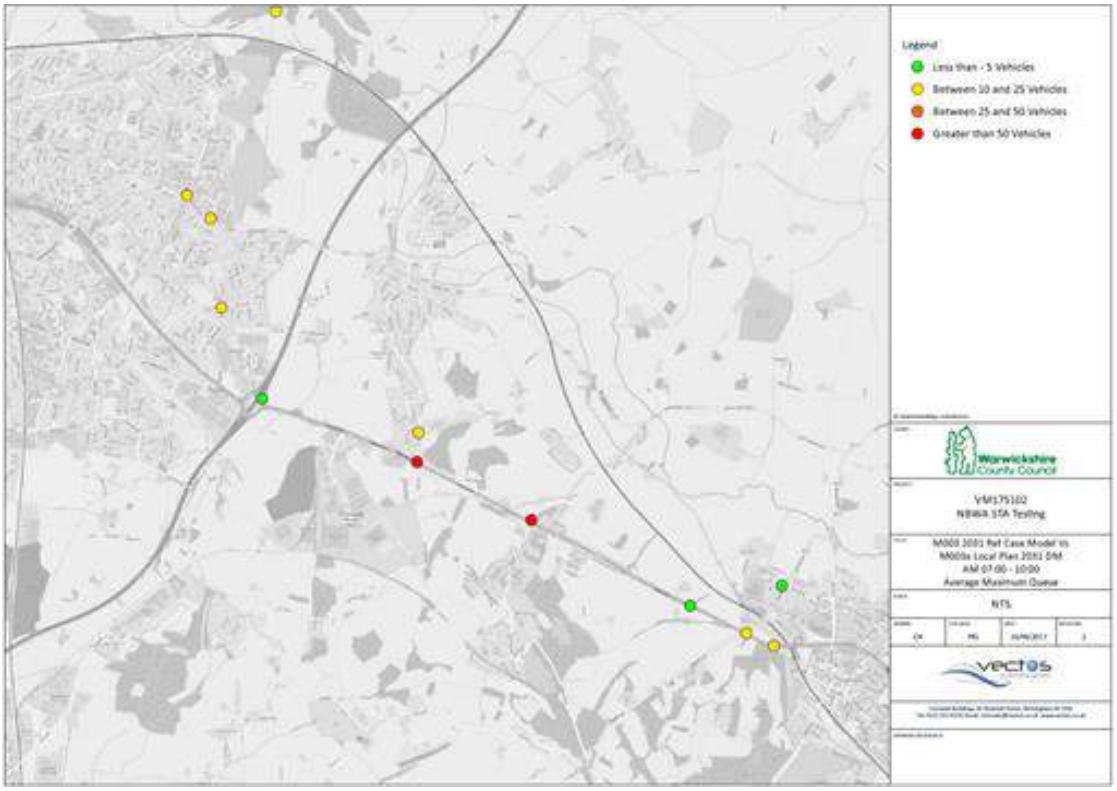
- The network wide statistics indicate that average journey times are likely to increase with the addition of the 2031 Local Plan demands and the network mean speeds likely to reduce.
- The 'Do Something' mitigation measures provide notable benefits across all network statistic measures, within the AM period, when compared against the 'Do Minimum' scenario, however, the PM results do not show a clear improvement over the DM results.
- The number of completed trips comparisons conclude that the 'Do Minimum' network is beginning to show signs of congestion which is alleviated when the 2031 mitigation proposals are included in the AM period. However, this is not the case in the PM period.

Maximum Queue Length Analysis – 2031 'Do Minimum' Scenario

5.122 The following section sets out some initial observations based on the maximum queue length analysis and the differences in queue lengths between the 2031 Reference Case (Ref) and the 2031 Local Plan 'Do Minimum' (DM) scenario.

5.123 The following figure details the impacts on the AM queuing levels when comparing the 2031 Reference Case (Ref) and the 2031 Local Plan 'Do Minimum' (DM) scenario.

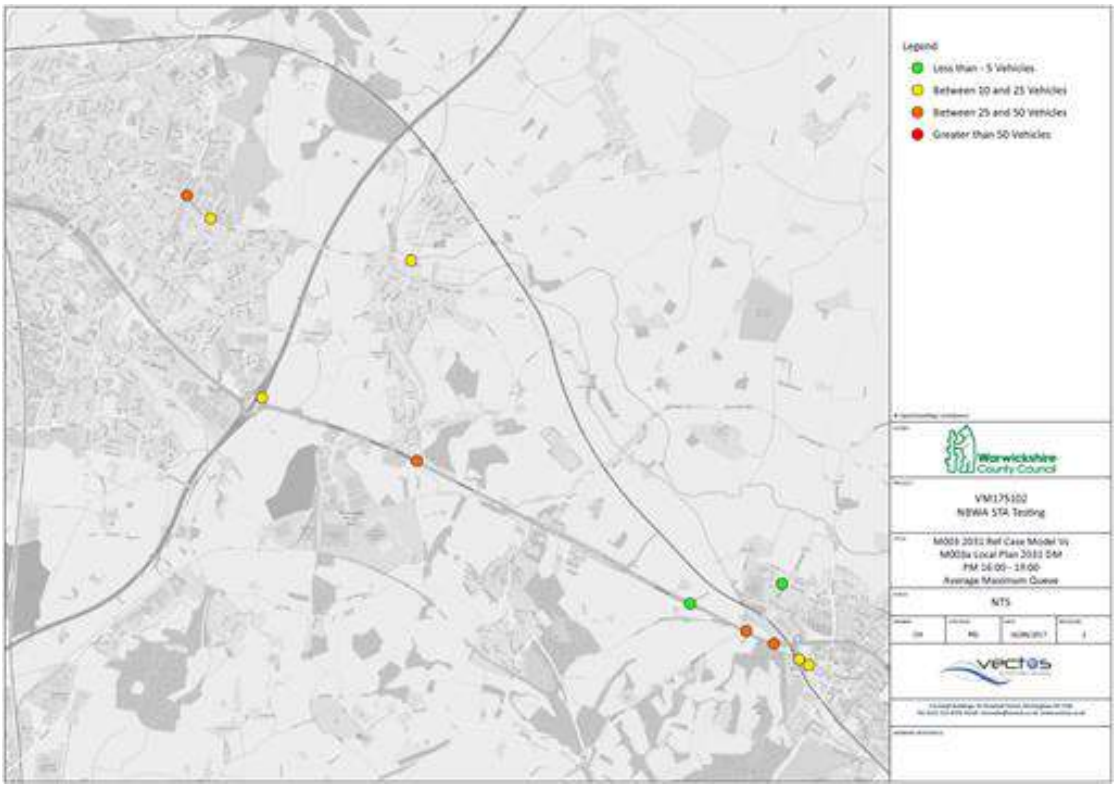
Figure 26: 2031 Reference Case vs 2031 Local Plan 'Do Minimum' AM Queue Comparisons



5.124 Analysis of the impacts illustrated within the preceding figure reveals the following:

- Two junctions on the A5 show a 'very severe' increase and no junctions have reported a 'severe' increase.
- The junctions showing the 'very severe' impacts are the A5 Watling Street/Long Street/Gypsy Lane and the A5 Watling Street/Spoon Lane/Boot Hill junction; and
- Moderate increases are also noted at a number of junctions across the model extent focussed around the east of Tamworth and on the A5 west of Atherstone.

Figure 27: 2031 Reference Case vs 2031 Local Plan 'Do Minimum' PM Queue Comparisons



5.125 Analysis of the impacts illustrated within the preceding figure reveals the following:

- No junctions show a 'very severe' increase across the network within the PM with four junctions highlighted as showing a 'severe' increase; and
- The junctions showing the 'severe' impacts are the A5 Watling Street/B4116 Holly Lane which is also propagating back to trigger the Whittington Lane junction, the A5 Watling Street/Long Street/Gypsy Lane and B5000/Mercian Way.

5.126 The 2031 'Do Minimum' queue impact assessment demonstrates that the inclusion of the 2031 Local Plan results in notable impacts on queuing across the network with impacts being focussed on a number of junctions along the A5.

5.127 The junctions that have been highlighted as experiencing an increase in queues when compared to the 2031 Reference Case, particularly within the AM period, are the A5 Watling Street/Long Street/Gypsy Lane and the A5 Watling Street/B4116 Holly Lane.

The DM model has been observed and the outputs reviewed in order to develop a set of proposed schemes that will assist in mitigating the issues witnessed across the two periods.

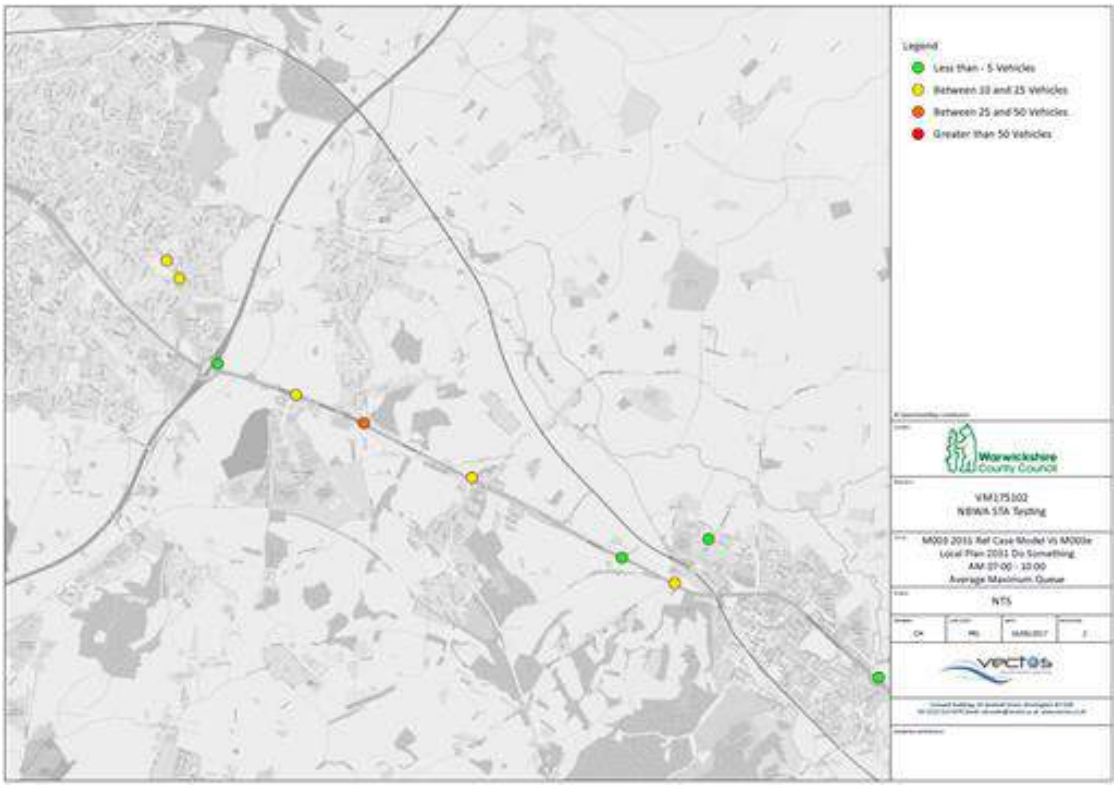
The resulting schemes, as outlined in **Table 13** have been developed and included in the 2031 Local Plan 'Do Something' scenario

Maximum Queue Length Analysis – 2031 'Do Something' Scenario

5.128 The following section sets out some initial observations based on the maximum queue length analysis and the differences in queue lengths between the 2031 Reference Case (Ref) and the 2031 Local Plan 'Do Something' (DS) scenario. The DS model includes the 2031 Local Plan growth and the additional 5 schemes outlined in **Table 13**.

5.129 The following figure details the impacts of the AM queueing levels between the between the 2031 Reference Case (Ref) and the 2031 Local Plan 'Do Something' (DS) scenario.

Figure 28: 2031 Reference Case vs 2031 Local Plan Do Something AM Queue Comparisons

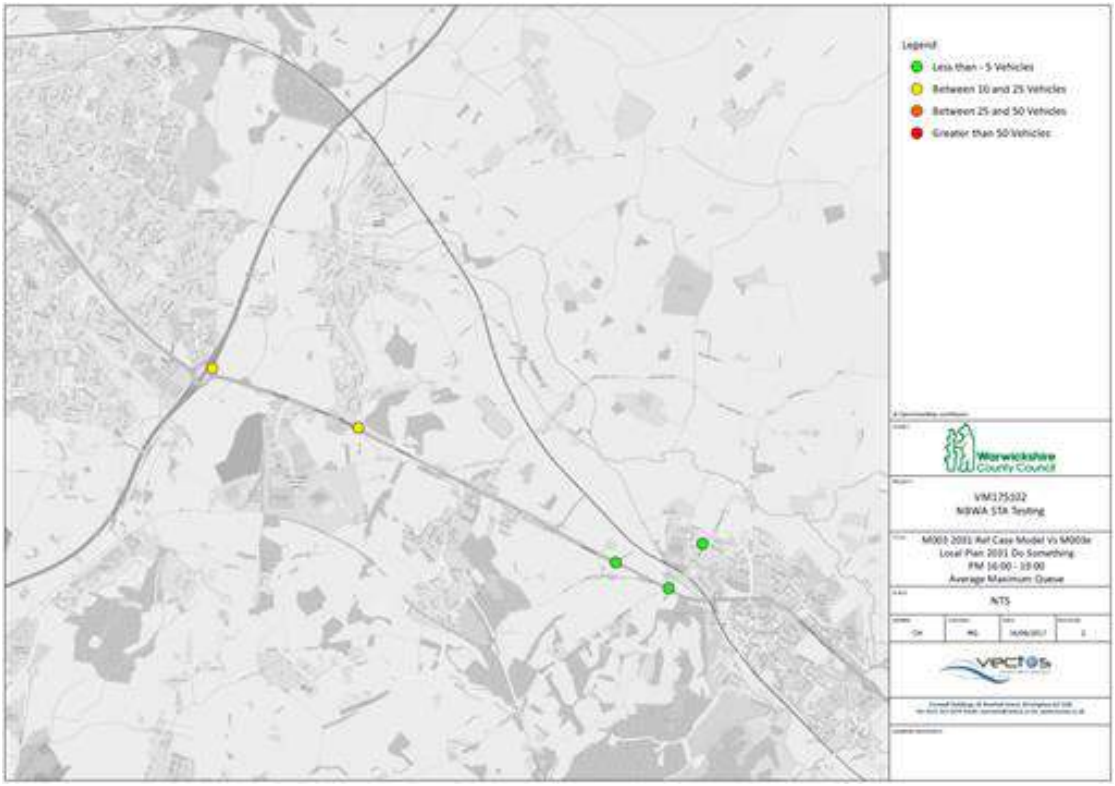


5.130 Analysis of the impacts illustrated within the preceding figure reveals the following:

- No junctions show a 'very severe' increase across the network within the AM only one junction (A5/Long St/Gypsy Ln) reports a 'severe' impact.
- The mitigation included at the Dordon signals has resulted in the reduction in severity when compared with the DM; and

- Mitigation included at the A5/B4116 Holly Lane junction has resulted in betterment at the upstream junction with Whittington Lane when compared with the Reference Case.

Figure 29: 2031 Reference Case vs 2031 Local Plan Do Something PM Queue Comparisons



5.131 Analysis of the impacts illustrated within the preceding figure reveals the following:

- No junctions show a 'very severe' or 'severe' increase across the network within the PM period.
- Only two junctions report 'moderate' queue level increases.
- Mitigation included at the A5/B4116 Holly Lane junction has resulted in betterment when compared with the reference case.

2031 Assessment Conclusions

5.132 Based on the outcome of the 2031 modelling assessment the following conclusions have been drawn:

- The analysis of the network wide statistics, when comparing the 2031 Local Plan DM scenario with the 2031 Reference Case, indicates significant impacts on average journey times and speeds;
- The analysis of queue impacts, when comparing the 2031 Local Plan DM scenario with the 2031 Reference Case, indicates significant impacts noted along the A5 , particularly at junctions within the Dordon and Grendon area as well as at the A5 Watling Street/Holly Lane Junction;
- Further analysis has been undertaken to identify mitigation measures to alleviate the pressures highlighted through the DM analysis. A total of 5 additional schemes have been identified. These schemes are considered to be required by the end of Plan period, between 2026 and 2031;
- The analysis of the network wide statistics, when comparing the 2031 Local Plan DS scenario with the 2031 DM scenario, indicates that all network statistic will improve as a result of the mitigation included, however, only moderate improvement is shown within the PM.
- The introduction of the mitigation schemes, detailed in **Table 1** on page 6, are shown to improve the queue impact at the junctions where issues were highlighted in the DM scenario and also improve conditions at several junctions to a point that indicated betterment over the Reference case.

2031 Assessment Summary

5.133 The network performance of the 2031 Local Plan 'Do Minimum' scenario confirms that the Local Plan allocations will require an additional amount of mitigation within the study area.

5.134 The model analysis has revealed pressures on the network in the 2031 Local Plan 'Do Minimum' scenario are focused predominantly on the A5 adjacent to Dordon, Grendon and Holly Lane.

5.135 As a result, a mitigation package has been delivered in the 2031 Local Plan 'Do Something' scenario, which results in improved network conditions when compared against the 'Do Minimum' network. However, it is clear from the network statistics that there are still likely to be a number of significant impacts retained on the network, particularly when considering the average journey times which are 30**%** higher within the 2031 Do Something model even after the schemes have been included.

Stage 4 Assessment

Overview

5.136 The following section of this report presents the results obtained from the assessment of A5 aspirational schemes that are outlined in the previous Chapter 4.

5.137 Having completed the initial testing to 2031, it was clear that the impacts were likely to be considered manageable within the 2026 network but, by 2031, there are likely to be some significant increases in journey times which are likely to be considered severe.

5.138 As a result of the findings from the 2031 testing it was considered necessary to assess what potential improvements in the overall network performance could be achieved if more substantial infrastructure was included within the assessment.

5.139 At this stage, the additional option considered where further enhancements at M42 Junction 10 and the introduction of dualling and diversion of the A5 as a means of bypassing Grendon.

5.140 It has been highlighted at a number of stages within this assessment that there are likely to be issues experienced at M42 Junction 10. However, given the strategic role that this junction serves within the region, coupled with the anticipated costs associated with delivering improvements at this junction, it is considered pertinent to assume that this area will be improved, based on advice provided by Highways England and their consultants (AECOM), through part of the Highways England network review and the various funding sources available to Highways England, most likely as part of the Road Investment Strategy. At this stage the impacts at the junction are not so severe as to impede the delivery of the proposed local plan developments and, furthermore, the delivery of the dualling between Dordon and Grendon is considered to be more directly linked towards the delivery of the housing and employment sites identified within the NWBC Local Plan proposals. Given the costs associated with the dualling and other measures identified it is not likely that the local

plan proposals would not be able to fund the enhancements at M42 J10 and, at this stage, they are not considered essential in that context.

5.141 The purpose of this test, however, is to establish the potential impact, on the network operation, of delivering enhanced schemes at M42 Junction 10 and also along the A5.

2031 Modelled Scenarios

5.142 The following scenarios have been assessed:

- **2031 A5 Atherstone Reference Case**
  The 2031 Reference Case model as described within the forecasting report.
- ***2031 A5 Atherstone 'Do Something'***
  The 2031 Do Something model from Stage 3 including the schemes identified during the 2021, 2026 and 2031 DS testing.
- ***2031 A5 Atherstone Local Plan 'Do Something M42 Enhanced Capacity' Scenario (DS EC)***
  The 2031 Local Plan demands with the addition the M42 Enhanced Capacity scheme; including the schemes identified during the 2021, 2026 and 2031 DS testing and the M42 Enhanced Capacity Scheme developed in collaboration with HE and their consultants AECOM to ensure that any proposals are deliverable and agreeable between all parties in achieving the goal or maintaining the safe and reliable operation of the network.
- ***2031 A5 Atherstone Local Plan 'Do Something Max' Scenario (DS Max)***
  The 2031 Do-Something M42 Enhanced Capacity scenario plus the full Enhanced A5 Proposals;

2031 Stage 4 Schemes

5.143 The schemes that have been tested within the 2031 Stage 4assessment scenarios are summarised in the following table. In total 2 schemes have been assessed within the 2031 Stage 4 testing.

Table 24: 2031 Stage 4 Mitigation Schedule

ID	Scheme	Description	Year of Inclusion
16	M42 Enhanced Capacity	Widening of the A5 eastbound approach and circulatory to four lanes. Widening of the southern circulatory bridge to 4 lanes. Signal optimisation.	**2031**
17	A5 Full Bypass	New A5 roundabout junction introduced to the east of Green Lane which will serve the new Grendon bypass and link back up with the A5/B5000 link road junction on the A5. The proposals also include the A5/Long St junction reduced to one-way in the NB direction between the A5 and Woodlands Close.	**2031**

2031 Stage 4 Results Analysis

Model Stability

5.144 An assessment of the level of model stability was undertaken by comparing the number of completed runs against the number of runs assumed to have failed, as outlined earlier within this report. In all cases a 100% success rate was achieved in both the 2031 DS EC and 2031 DS MAX scenarios which is a significant improvement when compared against the 2031 DS scenario. Furthermore, none of the scenarios within the previous the stages of testing have reported a 100% stability rate.

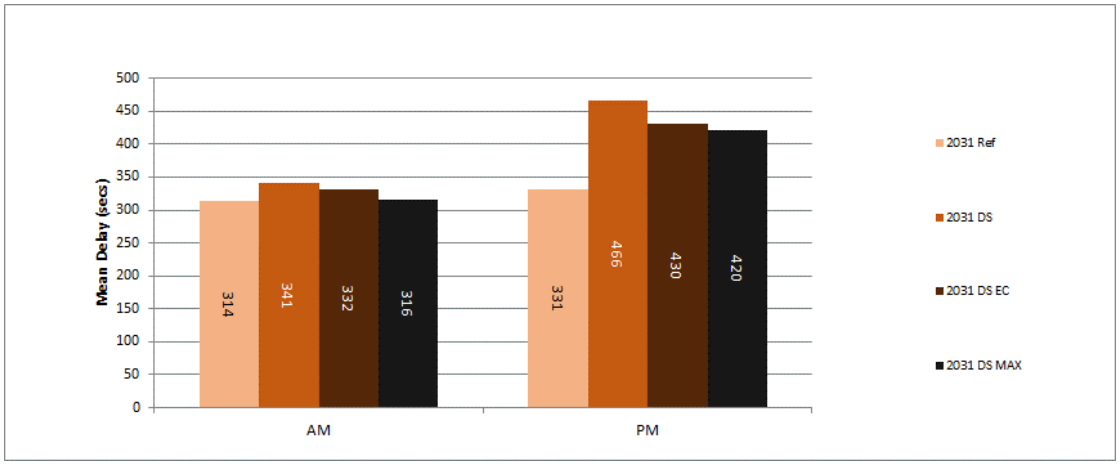
Network Wide Statistics

5.145 The following section presents a comparison between the average network wide statistics obtained from the successful runs of the 2031 assessment scenarios.

Average Journey Time

5.146 Analysis of the average journey time recorded in each scenario is presented in the following figure.

Figure 30: Average Journey Time (2031)



5.147 It can be seen that with the inclusion of the M42 enhanced capacity scheme that the journey times in both the AM and PM periods improve by approximately 10 seconds within the AM, and 30 seconds within the PM when compared against the stage 3 'Do Something' model.

5.148 The inclusion of the Enhanced A5 Proposals within the DS Max model results in further reductions, with journey times reducing by 25 seconds in the AM and 46 seconds in the PM.

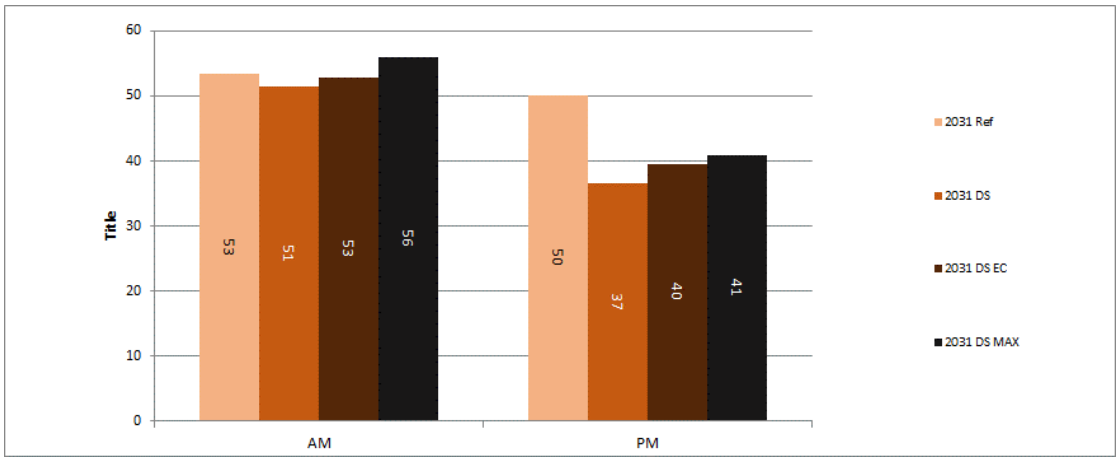
5.149 It is reasonable to conclude that the introduction of both the stage 4 schemes shows a benefit in terms of network wide journey times when compared against the DS model. However, at this stage journey times are still observed to be as much as 26% higher within the Do Something scenario after the A5 and M42 proposals are included within the PM network.

5.150 The introduction of the mitigation has released suppressed demand at a number of junctions along the A5 this has resulted in more pressure, in terms of arrival flow, at the A5 Watling Street/Long Street/Gypsy Lane junction in Dordon. Both the Eastbound and Westbound traffic is arriving sooner at the junction and as a result queueing levels have increased when compared to the DS model. This is further demonstrated within the queue comparisons detailed later within this section. Further signal optimisation and possible signal plans could help alleviate this issue. It should also be recognised that the issues in this area, and of this nature, are exacerbated by the high levels of external through trips which exist as a result of the strategic role of the A5 as well as the relationship between the A5 and the M42.

Average Journey Speed

5.151 Analysis of the average journey speed recorded in each 2031 scenarios is presented in the following figure.

Figure 31: Average Journey Speed (2031)

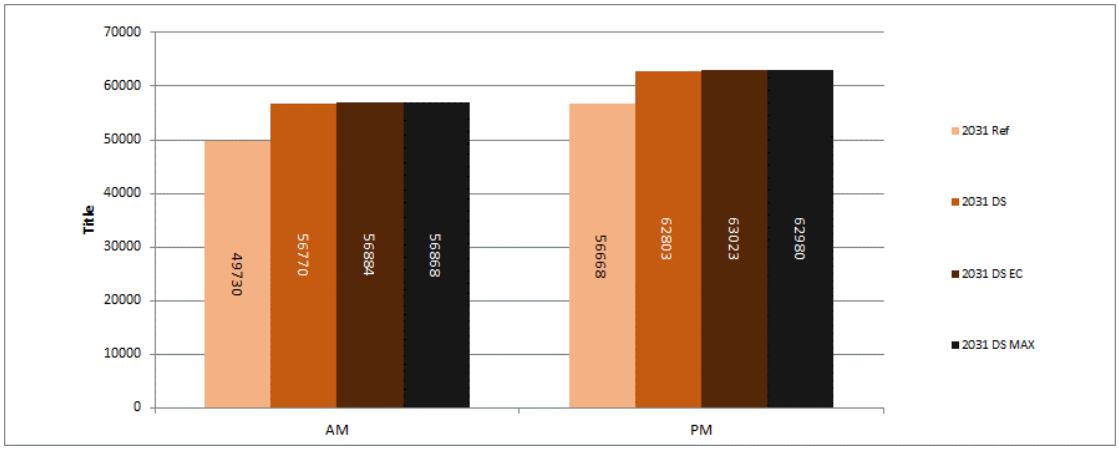


5.152 Analysis of the figure above reveals that the inclusion of both Stage 4 schemes have reported incremental benefits when the schemes are introduced. In the DS MAX scenario both the AM and PM period the speeds increase by approximately 5 km/h in the AM and 4 km/h in the PM. Furthermore, Speeds within the AM are reported to be higher than those recorded within the AM reference case model which indicates that betterment is achieved in this scenario as speeds go up in spite of a minor increase in average delays, thus the increase in delays must be as a result of longer journeys rather than increased congestion.

Completed Trips

5.153 The number of completed trips recorded during the model simulation is presented in the following figure.

Figure 32: Completed Trips (2031)



5.154 The figure above illustrates that the number of trips completed during the AM and PM period increases when compared against the DS between the DSEC and the DS Max scenarios.

5.155 The results report that there are slight increases in the number of completed trips between the DS scenario and the DS EC and DS MAX which suggests that the scheme proposals included within the two scenarios are resulting in an overall increase in model throughput and therefore relieving congestion beyond that already mitigated within the DS scenario.

5.156 The following conclusions can be drawn from the 2031 Stage 4 network wide statistics presented, and discussed, above:

- The network wide statistics indicate that average journey times are likely to improve with the addition of both the M42 Enhanced Capacity Scheme and the inclusion of the Full Enhanced A5 Proposals.
- The 'Stage 4' mitigation measures provides incremental benefits across all network statistic measures, within the AM and PM period, when compared against the 'Do Something' network.
- During the AM there is potential for betterment to occur whilst currently, within the PM, there are substantial residual impacts still affecting the modelled journey times as is demonstrated by the 26% increase in average delay within the PM compared to the Reference Case.

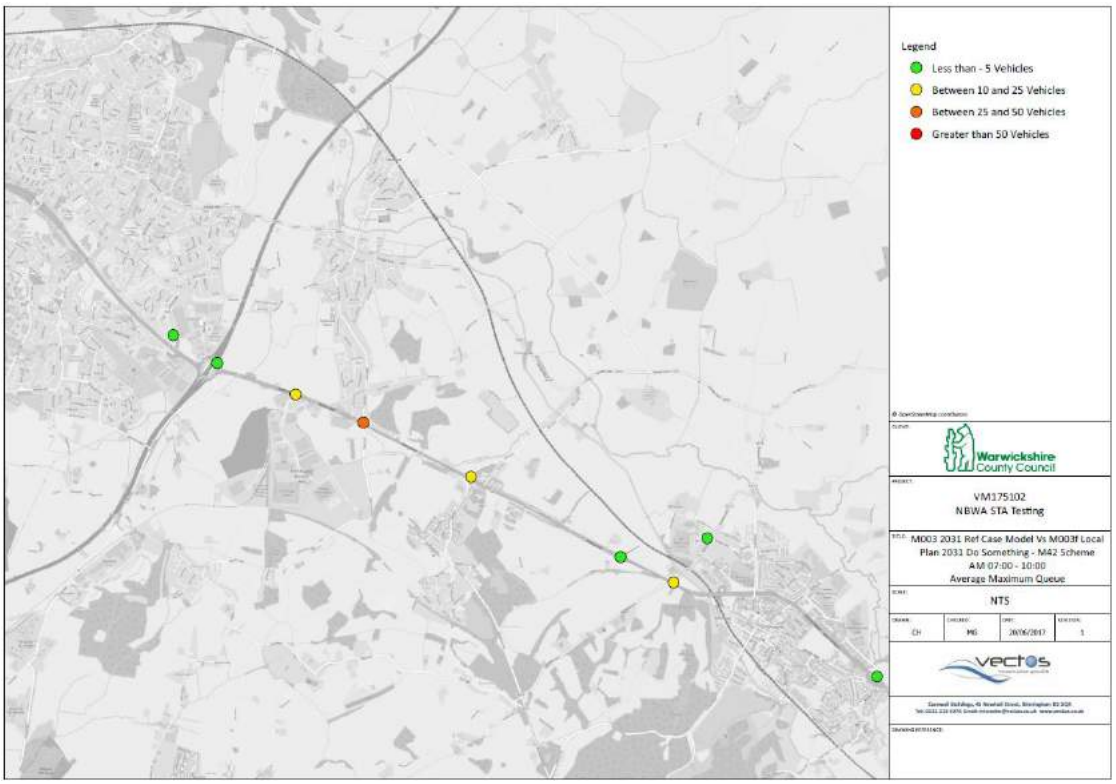
- The number of completed trips comparisons conclude that there is little variation between the three network assessed within Stage 4.

Maximum Queue Length Analysis – 2031 'Do Something Enhanced Capacity' Scenario

5.157 The following section sets out some initial observations based on the maximum queue length analysis and the differences in queue lengths between the 2031 Reference Case (Ref) and the 2031 Local Plan 'Do Something M42 Enhanced Capacity' (DS EC) scenario. The DS model includes the 2031 Local Plan growth and the M42 Enhanced Capacity scheme outlined in **Table 14**.

5.158 The following figure details the impacts of the AM queuing levels between the between the 2031 Reference Case (Ref) and the 2031 Local Plan 'Do Something M42 Enhanced Capacity'' (DS EC) scenario.

Figure 33: 2031 Reference Case vs 2031 Local Plan DS EC AM Queue Comparisons



5.159 Analysis of the impacts illustrated within the preceding figure reveals the following:

- Mitigation included at the M42 junction has resulted in queueing levels recorded at the Pennie Way southbound approach to reduce by less than 5 vehicles when compared against the reference case.
- Queue levels at the M42 Junction 10 are also shown to reduce by less than 5 vehicles, however visual observations of this junction conclude the junction preforms better than the Stage 3 2031 DS model.

Figure 34: 2031 Reference Case vs 2031 Local Plan DS EC PM Queue Comparisons

5.160 Analysis of the impacts illustrated within the preceding figure reveals the following:

- The inclusion of the M42 scheme appears to still demonstrate and increase in queuing at the Junction.
- Improvements are noted at all approaches to the junction with the exception of an increase on the A5 eastbound approach.
- This increase is caused by the junction signal optimisation, ensuring all queues are equally balanced.

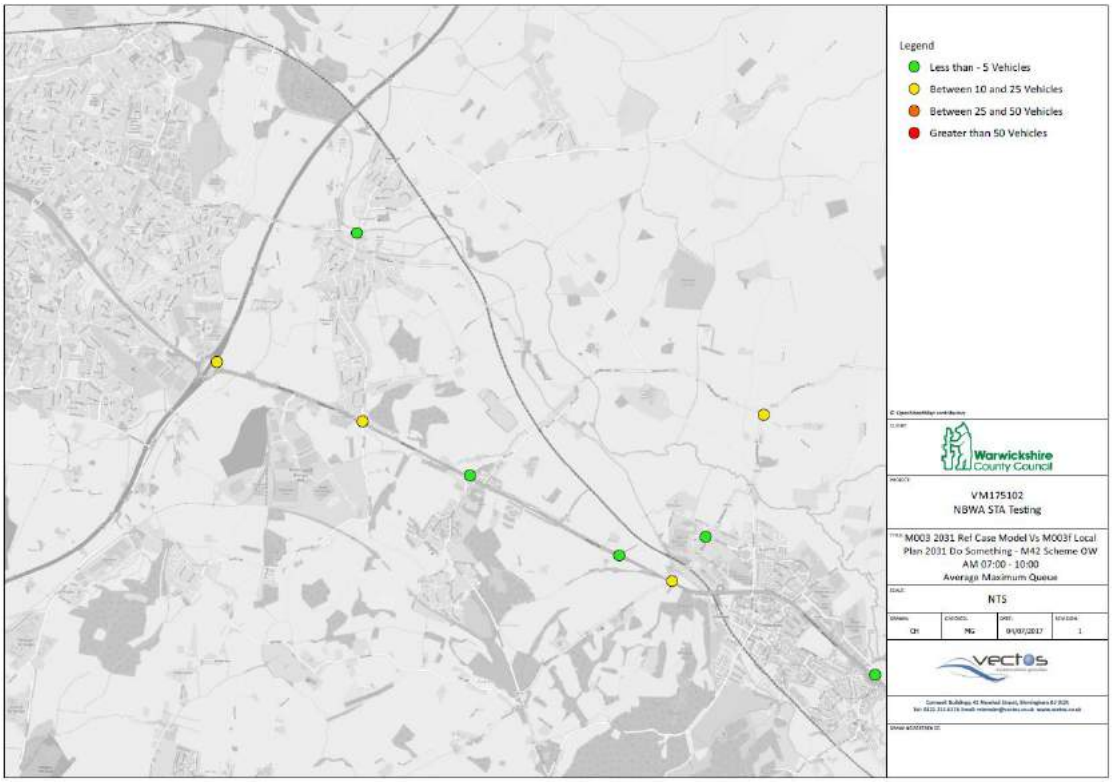
- Visual observations of this junction concluded that the junction performs well and significantly increases throughput which is highlighted by the additional pressure noted that has been put on the A5/Long Street/Gypsy Lane junction;
- It can therefore be concluded that, although the assessment highlights an increase at one arm of the M42 junction an overall improvement is demonstrated on the junction when taking all approaches into consideration

Maximum Queue Length Analysis – 2031 'Do Something Max' Scenario

5.161 The following section sets out some initial observations based on the maximum queue length analysis and the differences in queue lengths between the 2031 Reference Case (Ref) and the 2031 Local Plan 'Do Something Max' (DS MAX) scenario.

5.162 The following figure details the impacts of the AM queueing levels between the between the 2031 Reference Case (Ref) and the 2031 Local Plan 'Do Something Max' (DS MAX) scenario.

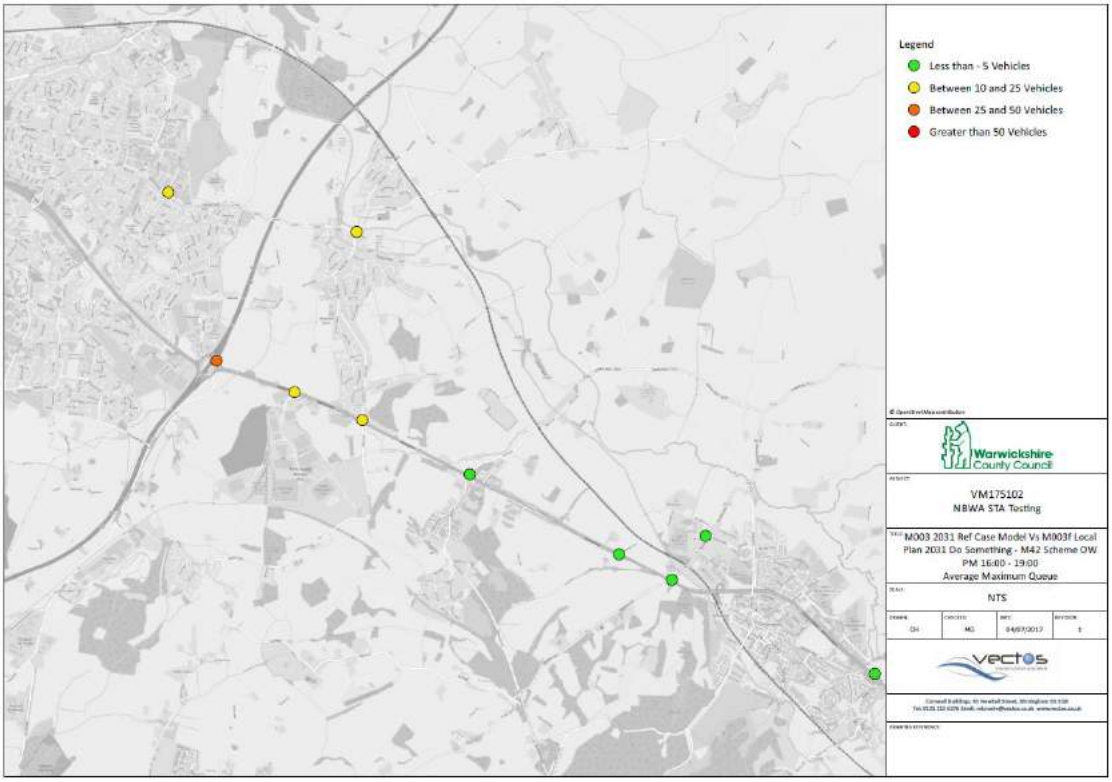
Figure 35: 2031 Reference Case vs 2031 Local Plan DS MAX AM Queue Comparisons



5.163 Analysis of the impacts illustrated within the preceding figure reveals the following:

- Mitigation included within this scenario has resulted in queuing levels recorded at the Dordon A5 Long Street junction reduce when compared to the DS results.
- Queue levels at the M42 Junction 10 are shown to increase as a result of improved throughput along the A5 which increases the arrival flow of trips at the A5 Westbound approach with the M42 Junction 10.

Figure 36: 2031 Reference Case vs 2031 Local Plan DS MAX PM Queue Comparisons



5.164 Analysis of the impacts illustrated within the preceding figure reveals the following:

- Similar to the results reported within the AM, the additional mitigation has resulted in queuing levels reducing at the Dordon A5 Long Street junction when compared to the DS results.
- Queue levels at the M42 Junction 10 are shown to increase as a result of improving the throughput along the A5 which increases the arrival flow of trips at the A5 Westbound approach with the M42 Junction 10.
- Overall the network is shown to report moderate queue increases a four junctions queuing in both the AM and PM periods with queue decreases at a number of junctions across the AM and PM periods.

2031 Stage 4 Assessment Summary

5.165 Based on the outcome of the 2031 DS EC and DS MAX modelling assessment the following points are summarised:

- When considering the performance of the DS Max network, notable improvements in average journey times and speeds are observed but there are still large increases in journey times within the PM period. The additional impacts are focused at the A5/Long Street/Gypsy Lane junction as the additional through put provided by both the Enhanced A5 Proposals and M42 proposals increase congestion in the area of this junction meaning additional work will be required to mitigate these impacts;
- It is reasonable to conclude that the introduction both M42 J10 enhancements and the larger A5 dualling around Grendon deliver a significant benefit in terms of network wide journey times when compared against the DS model.
- Both Stage 4 schemes have reported incremental benefits when the schemes are introduced in terms of network speeds when compared against the 2031 DS model. Furthermore, Speeds within the AM DS MAX model are reported to be higher than those recorded within the 2031 AM reference case model which is indicative of betterment within this scenario. The same conditions are not realised within the PM scenario and this is because of the increase and change in arrival profile at the A5/Long Street/Gypsy Lane.
- Analysis of queuing levels reveals that the Mitigation at the M42 junction 10 has resulted in the reduction in the known AM queuing levels that develop, particularly by 2031 at the Pennie Way southbound approach which reduces compared against the reference case.
- When M42 J10 enhancements are tested in isolation the analysis reveals an increase in queuing but this is as a result of optimisation of the signals which impacts upon M42 J10 and it is considered that the implementation of MOVA (Microprocessor Optimised Vehicle Actuation) and detailed optimisation in this area would likely reduce the impacts currently observed in this area.
- Visual observation of M42 J10 reveal that it operates within acceptable limits considering the level of demand being assessed and that consideration should be given to further investigation of the enhanced junction proposals to establish an optimum solution in this area.

- Within the DS MAX scenario the inclusion of the Full Enhanced A5 Proposals has resulted in queuing levels recorded at the Dordon A5 Long Street junction to reduce from 'severe' to moderate when compared to the DS results. It is also noted that the proposals have resulted in a 100 stability record while providing more throughput than the 2031 DS scenario.

2031 Stage 4 Assessment Conclusions

5.166 Stage 4 of the assessment focussed on establishing the level of impact likely to remain on the network if the Draft Local Plan developments identified within the model area are included alongside significant infrastructure over and above those identified thus far in the assessment (i.e. M42 J10 Capacity Enhancements and A5 dualling/Grendon Bypass).

5.167 The network performance of the 2031 Local Plan DS EC and DS MAX scenario confirms that the impacts associated with additional housing and employment sites identified, have been largely mitigated by the inclusion of the mitigation proposals but it has been identified that residual impacts are likely to occur as a result of the additional throughput the scheme provide.

5.168 The model analysis has revealed pressures on the network in the 2031 Local Plan Stage 4 scenarios which has resulted in only moderate queuing level being reported as a result of increasing and changing the arrival profile at some junctions along the A5.

5.169 As a result the mitigation package included within the DS MAX is likely to be able to provide sufficient capacity to accommodate the NWBC local Plan proposals but that additional improvements will be required, particularly at the A5/Long Street/Gypsy Lane junction within the PM period to ensure an acceptable level of network operation can be achieved.

6 STAGE 2 – HARTSHILL ASSESSMENT

6.1 The second stage of the assessment work, pertaining to the NWBC Local Plan allocations and the associated impacts, required an assessment to be completed within the Hartshill model to establish the level of impact and associated infrastructure strategy necessary to ensure the developments identified within this area could be brought forward.

6.2 The purpose of this assessment was to make use of the newer modelling data available for the immediate Hartshill area to undertake a focussed assessment of the potential development impacts in the area and determine and appropriate mitigation schedule therefore.

6.3 The outcome from the Harsthill assessment was also subsequently input in to a wider assessment of the impacts in the North Nuneaton area using the Nuneaton and Bedworth Wide Area (NBWA) model inclusive of the local plan proposals of NBBC.

6.4 As each key stage of the Hartshill analysis was completed, the findings were presented within an associated Technical Note. Three Technical Notes where produced in total and have been provided for information purposes within **Appendix B** of this report.

Objectives

6.5 The core objectives of the assessment were:

- To determine the likely cumulative impacts of allocating all of the development sites within the Hartshill area which have been identified.
- To identify an appropriate highway mitigation strategy to support the allocated site delivery through minimising the highway impacts.
- To undertake threshold testing to assess the incremental impacts of including the allocated sites in key phases.

Approach

6.6 The approach to undertaking the assessment and addressing the study objectives comprised three key stages.

6.7 The first stage assessed the impacts of including all sites identified within the area and then attributed a level of importance to each measure, as well as establishing the impacts if the reserve housing land (Site 104) did not come forward.

6.8 The mitigation measures included in this testing were as follows:

- (1) Coleshill Road / Camp Hill Road / Victoria Road / Bucks Hill Road – current priority arrangement converted to four-arm signalised junction with additional flare lanes on the approaches to Camp Hill Road, Victoria Road and Bucks Hill Road
- (2) Camp Hill Road / Craddock Drive – current mini roundabout converted to three-arm T-junction with two lanes on the Camp Hill Road eastbound approach to allow for right-turn stacking
- (3) Nuneaton Road / Woodford Lane / Atherstone Road – Nuneaton Road and Atherstone Road junction converted to three-arm signalised junction. Give-way at Nuneaton Road / Woodford Lane switched to allow Woodford Lane priority
- (4) 'Western' Link Road between Ansley Common and Plough Hill Road (through development site south of Coleshill Road off Bretts Hall Estate)

6.9 The developments included within the testing were as follows:

- Site 101: Land between Church Road & Nuneaton Road Hartshill (400 dwellings)
- Site 102: Land off Coleshill Rd, Ansley Common (38 dwellings)
- Site 103: Land north & south of Morwood Lane, Hartshill (355 dwellings)
- Site 105: Land south of Coleshill Road, off Bretts Hall Estate, Ansley Common (230 dwellings)
- Reserve Site 104: Land at Common Farm, off Thorncliffe Way, Coleshill Road Ansley Common (281 dwellings [*approximation based on known size of the developable land area*])

6.10 For the second stage, the scheme proposals in the first stage were then reviewed jointly by VM and WCC and further assessments undertaken to establish which elements were critical and whether any changes to the assumptions would materially influence the overall results.

6.11 The refinements / additional mitigation measures included:

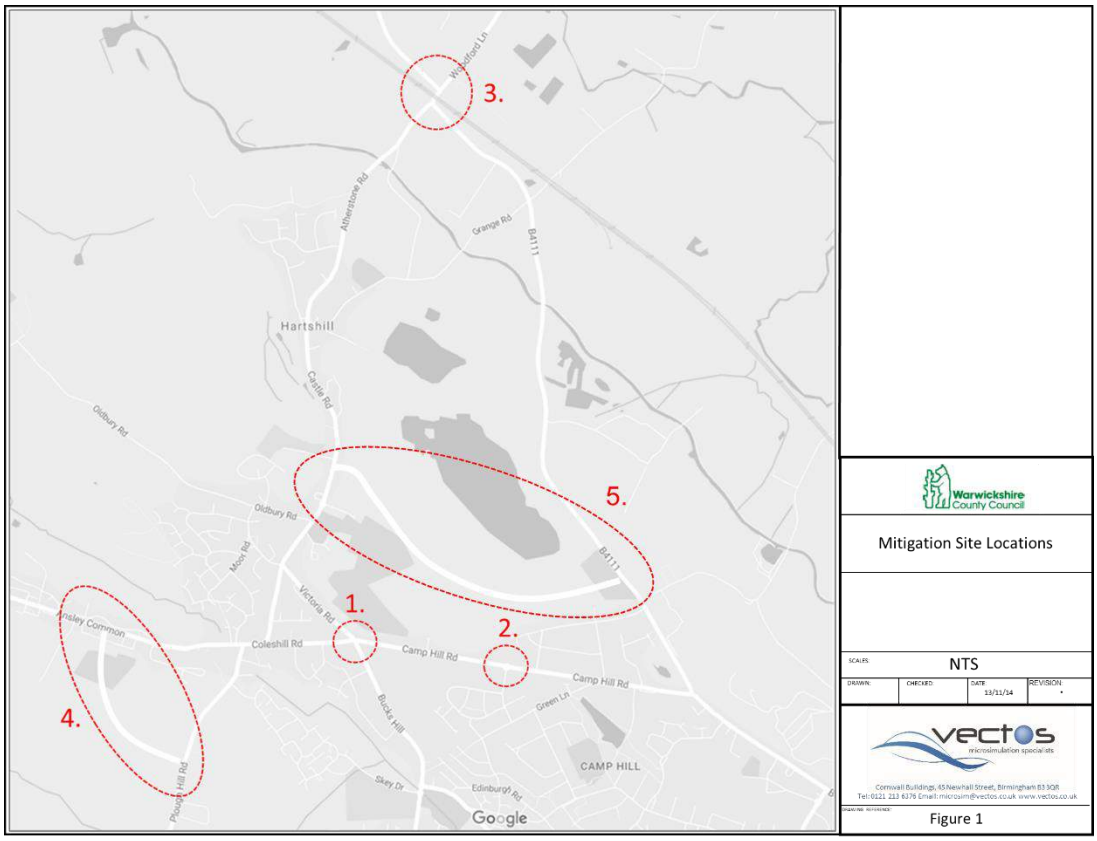
- (1 [revised]) Removal of the signal scheme at Coleshill Road / Camp Hill Road / Victoria Road / Bucks Hill Road junction
- (4 [revised]) Adjustment to the 'Western' Link Road arrangement to include a 2-lane section on the immediate approach to the give-way with Ansley Common
- (5) New 'Eastern' Link Road connecting Church Road with B4111 Mancetter Road

6.12 The scenarios contained within this round of testing included all development sites, with varying degrees of the above mitigation schemes included.

6.13 Finally a sensitivity test was undertaken to establish the impact of realigning the 'Eastern' Link Road between Church Road and B4111 Mancetter Road, and specifically whether there would be any benefit in linking into Camp Hill Road instead of the B4111.

6.14 Full details on the scenarios assessed and the assumptions therein is provided within the Technical Notes which are included within **Appendix B** of this report.

Figure 37 Hartshill Mitigation Measures



Stage 2 - Summary of Findings

6.15 Full details of the scenario assumptions and results therefrom are provided in the supporting technical notes within **Appendix B**.

6.16 The initial scheme testing results suggested that the impacts of including all of these developments could be partially offset by including mitigation schemes along the B4114. However extensive queues are still present on Coleshill Road during the AM, and Plough Hill Road in both AM and PM peak periods.

6.17 The proposed mitigation at the Nuneaton Road/Woodford Lane junction at the north of the model appeared to generally improve queuing conditions on both sides of the railway bridge. The predominant queue is however shifted from Woodford Lane to Nuneaton Road following the rearrangement of priorities and the wider implications of this on routing beyond the extent of this model should be considered.

6.18 The inclusion of a Link Road between Ansley Common and Plough Hill Road, through the proposed development Site 105, significantly reduces queuing along Coleshill Road as traffic is afforded an alternative route between here and Plough Hill Road, therefore drawing traffic away from the junction which is constrained by the restrictive highway boundaries and poor visibility.

6.19 It was accepted however that such a Link Road may be challenging to deliver. Therefore sensitivity testing was carried out to determine the level of additional traffic that can be delivered based on the outputs of the impact analysis completed thus far.

6.20 On this basis, the small-scale network improvements (no Link Road) can ensure that approximately 800 dwellings can be included with little detriment to the overall network statistics, when compared with the 2025 Reference Case that includes the current highway network and background growth only.

6.21 These conclusions however are informed through comparisons with the 2025 Reference Case and it was noted that queue lengths along Plough Hill Road may be considered in excess of acceptable limits in the Reference.

6.22 The results from Stage 2 of the testing focussed on the impacts of agreed refinements to the mitigation assuming all development sites are brought forward. The results suggested that

the refinement of the 'Western' Link Road reduced queues significantly on this new Link, while the addition of the 'Eastern' Link Road showed little benefit.

6.23 The final sensitivity test, which altered the alignment of the 'Eastern' Link Road, also showed few changes to benefits derived.

Conclusions

6.24 Completion of the Harsthill specific testing revealed the following conclusions:

- That, potentially, up to 800 dwellings could be delivered before the 'Western' Link Road is required but this may result in a residual impact which is still considered to be unacceptable
- That the link between Ansley Common and Plough Hill Road is essential infrastructure when considering the quantum of housing coming forward within the plan and will be a necessity to support development of any significant magnitude coming forward in this area
- The signals at Coleshill Road / Camp Hill Road / Victoria Road / Bucks Hill Road junction are necessary to reduce excessive queuing on Bucks Hill Road approach, however it is noted that there are perceived challenges to delivering signals at this location
- Inclusion of an Eastern Link Road does little to influence queuing levels at this or any other junction within the model extent

7 STAGE 3 – NORTH NUNEATON AREA ASSESSMENT

7.1 Having completed the Hartshill focussed assessment the next stage of the assessment involved feeding in the Hartshill development demands and the associated mitigation measures into the NBWA Paramics model inclusive of the NBBC Local Plan proposals.

7.2 In addition to the housing developments within the Harthshill area, as identified within the previous Chapter of this report, a significant amount of employment land had also been identified in an area of land which adjoins the A5 and is opposite the existing MIRA Local Enterprise Zone.

Objectives

7.3 The second phase of work was intended to address the following objectives:

- To assess the impacts on the Nuneaton area as a result of the inclusion of additional housing in the Hartshill area and 18 Ha employment in the area of the A5 adjacent to the existing MIRA Local Enterprise Zone.
- To assess the cumulative impacts of allocating the 18 Ha employment and the housing in Hartshill on the Nuneaton road network.
- To determine what, if any, additional mitigation proposals can be introduced to minimise the impacts of delivering the growth in the area.
- To undertake an additional sensitivity test to establish whether there is an opportunity for additional growth in the employment land of an additional 24 Ha to occur without significant additional infrastructure requirements.

Approach

7.4 The assessment was completed in conjunction with the assessment of the Nuneaton and Bedworth Local Plan proposals. At the time of writing this report, the assessment work pertaining to NBBC's local plan proposals was complete and this assessment made use of the most recent NBBC Local Plan Assessment meaning that the developments currently being consulted upon within NBBC Local Plan proposals are included within the assessment as standard.

7.5 The NBWA Local Plan Do something scenario formed the starting point for this assessment. The sites were then added separately and a review of the impacts completed before the sites were combined.

7.6 The Hartshill mitigation, identified previously, was included in full in each assessment since there previous assessment work has attributed a benefit to the delivery of all of the proposals identified.

7.7 Once the two allocation areas were combined within the model, a second review was undertaken to ascertain what the likely level of impact would be as a result of both sites coming forward and determine what, if any, mitigation strategy could be delivered to reduce the development impacts.

7.8 Finally, an additional sensitivity test was undertaken to ascertain whether the employment area could be extended by an additional 24Ha (42 Ha in total) using the identified infrastructure as mitigation strategy.

Scenarios

7.9 The assessment comprised 6 scenarios in total:

- **2031 NBWA Local Plan Do Something -** The NBWA model inclusive of all identified Local Plan sites and associated infrastructure.
- **2031 NBWA + Hartshill** – The NBWA model inclusive of an additional circa 1300 dwellings in the Hartshill area and associated mitigation strategy.
- **2031 NBWA + 18 Ha Employment** – The NBWA model inclusive of an additional 18Ha employment land adjacent to the A5 and opposite the existing MIRA LEZ site.
- **2031 NBWA + Combined** – The NBWA model inclusive of the two developments areas and the Hartshill mitigation strategy identified earlier.
- **2031 NBWA Combined + NRR** – The previous scenario inclusive of a Northern Relief Road (NRR) which connects the B4111 and the A444.
- **2031 NBWA Combined + NRR + 24Ha Employment** – The previous scenario inclusive of an additional 24Ha employment land adjacent to the existing 18Ha already assumed within the testing.

Mitigation Schedule

7.10 As has been highlighted previously, a series of interventions have already been identified for inclusion within the Hartshill area which will enable at least some of the development in that area to come forward as planned.

7.11 The Hartshill specific mitigation strategy was included in all scenarios which included the Hartshill development area.

7.12 When considering a wider mitigation strategy there were no immediately obvious opportunities to enhance the network as significant work has already been completed as part of the NBBC Local Plan assessment work. This does not mean that it is not possible to deliver additional mitigation to accommodate the developments or enhance the existing proposals but considerable work would be required to identify where the opportunities are likely to exist.

7.13 The analysis presented subsequently within this chapter highlights where these opportunities may exist and, at some point in the future, it may be considered appropriate to undertake further investigation in this regard. The level of assessment required and the detail proposed will be entirely dependent upon the level of development which is ultimately allocated within the area. Particularly when considering that, at the moment, the analysis indicates that it may not be possible to accommodate the full extent of the developments identified.

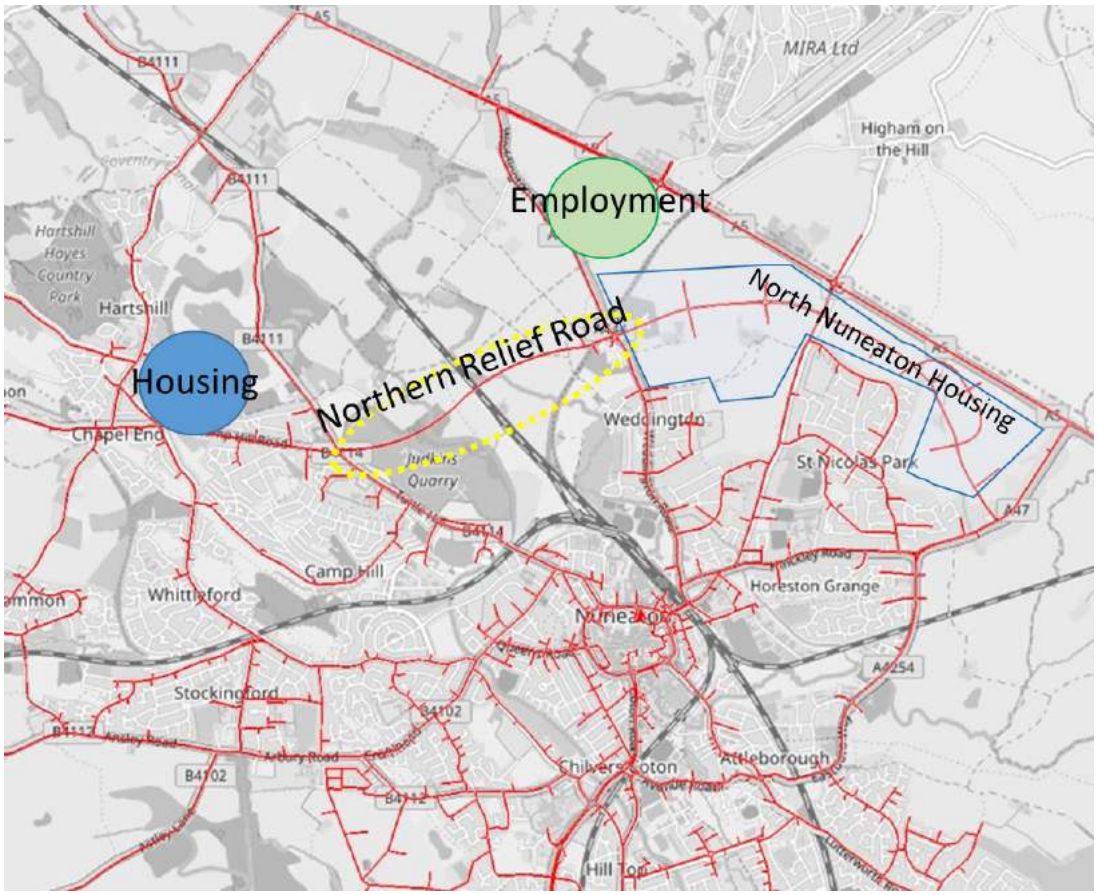
7.14 One potential opportunity is the delivery of a northern relief road connecting the B4111 and the A444 and, in turn, the northern distributor link which is expected to come forward to accompany the NBBC allocations to the North of Nuneaton.

7.15 The assessment and analysis work completed to date indicated that there is likely to be a potential benefit unlocked through the delivery of such a link road which serves to mitigate, at least in part, the impacts associated with the NWBC sites. Some of the benefits are through direct mitigation via the provision of additional highway capacity on routes which trips generated by the sites will wish to use, such as connecting the residential area of Hartshill to the A5 via a route which avoids Nuneaton Town Centre. Some benefits are likely to be indirect insofar as the additional capacity afforded by the delivery of the NRR will draw

traffic away from other more congested areas which will, in turn, provide space for the additional traffic generated by the development sites to be accommodated.

7.16 The alignment of the NRR in relation to the various development areas has been illustrated within the following **Figure 40**:

Figure 38 Northern Relief Road, Proposed Alignment



7.17 Whilst additional more detailed analysis of the development impacts is considered beneficial to enable a more localised and refined set of mitigation proposals to be identified, the extent of investigations will be largely dependent upon the quantum of development being promoted, the status of NBBC Local Plan allocations and identification of what level of residual impact will occur relative to both the Reference network conditions and the Local Plan scenarios, both with and without NWBC allocated sites.

7.18 On that basis, the only mitigation measures assumed are those identified within the Hartshill area as well as the Northern Relief Road. Additional commentary on the areas which would benefit from additional mitigation has been provided towards the end of this chapter.

Model Stability

7.19 The first stage of the NBWA network assessment was to review the network performance to establish whether it would be possible for the network to function without any significant infrastructure in place but inclusive of the developments. The model stability levels observed in each of the scenarios assessed has been presented within the following **Table 15**:

Table 25 NBWA Model Stability Assessment

	2031 NBWA LP DS	2031 NBWA LPDS + HH	2031 NBWA LPDS + EMP	2031 NBWALPDS + All Dev	2031 NBWA LPDS + All Dev + NRR	2031 NBWA LPDS + All Dev + NRR + Sens
AM	80%	90%	70%	50%	65%	0%
PM	90%	80%	80%	70%	100%	0%

7.20 Analysis of the model stability reveals that, of the isolated development tests it is the employment site which induces lower stability levels than the residential site inclusion. There is a notable drop in stability when the combined sites are included.

7.21 Stability improves significantly within the PM period when the NRR is included but, whilst there is also an improvement in the model stability within the AM period it is likely that further mitigation would also be required in addition to the NRR.

7.22 When assessing the performance of the model network inclusive of the additional 24 Ha employment land opposite the MIRA LEZ then the model fails to operate and stability levels drop down to 0%. Indicating that significant additional mitigation would be required to bring the full 42Ha of employment land forward in conjunction with the residential development in the Hartshill area. This is in spite of the inclusion of the Hartshill and NRR mitigation strategies.

Network Wide Statistics

7.23 The analysis of the model stability has also been supplemented by analysis of the Network wide statistics. The analysis of the difference in the network wide performance statistics has been presented for the AM and PM periods within **Table 16** and **Table 17** on the following page.

Table 26 Network Stats 2031 NBWA AM Analysis (07:00 to 10:00)

Scenario	Completed Trips (veh.)	Average Speed (KpH)	Average Delay (s)
2031 NBWA LP DS	131,815	45.0	652
2031 NBWA LPDS + HH	132,953	43.7	670
Diff	0.86%	-2.83%	2.78%
2031 NBWA LPDS + EMP	132,565	43.2	679
Diff	0.57%	-4.03%	4.26%
2031 NBWALPDS + All Dev	133,615	42.2	697
Diff	1.37%	-6.20%	6.96%
2031 NBWA LPDS + All Dev + NRR	134,018	42.8	687
Diff	1.67%	-4.80%	5.43%

Table 27 Network Stats 2031 NBWA PM Analysis (16:00 to 19:00)

Scenario	Completed Trips (veh.)	Average Speed (KpH)	Average Delay (s)
2031 NBWA LP DS	143,863	42.7	649
2031 NBWA LPDS + HH	144,462	40.4	691
Diff	0.42%	-5.50%	6.43%
2031 NBWA LPDS + EMP	144,637	41.4	671
Diff	0.54%	-3.06%	3.47%
2031 NBWALPDS + All Dev	145,286	39.6	705
Diff	0.99%	-7.41%	8.62%
2031 NBWA LPDS + All Dev + NRR	146,184	41.6	668
Diff	1.61%	-2.79%	2.99%

7.24 Analysis of the changes in network statistics presented within the following tables reveals that allocating the sites in combination results in the greatest level of impact whilst when considering the sites in isolation then the greatest impacts within the AM period are induced by the employment site whilst within the PM period it is the residential sites which induce the greatest level of impact.

7.25 When considering the performance of the link road, it is clear that there are benefits which occur as a result of the inclusion of the additional mitigation but the measures do not

mitigate the development impacts entirely. This further reinforces the earlier findings around the model stability levels which concluded that the NRR and Hartshill specific measures would be unlikely to sufficiently mitigate the impacts of both the employment and residential land being brought forward together meaning that more mitigation is likely to be required if the development impacts are considered to be sufficiently mitigated.

Maximum Queue Length Analysis

7.26 In addition to the network statistics and model stability analysis, a review of queuing impacts has also been undertaken across the key scenarios. In all cases the queuing levels are compared against the existing NBBC Local Plan do something and, therefore, present the level of change directly attributable to the development strategy being proposed by NWBC.

7.27 The current scenario comparisons have been made against the NBBC LP DS scenario since this demonstrates the magnitude of change likely to occur on the already mitigated NBWA network. It is recommended that, should these sites be brought forward by NWBC, more detailed assessment work is undertaken and the outputs from that work released at the same time as the NBBC Local Plan options are submitted for consultation. The average maximum queue length analysis of the 2031 NBWA LPDS + HH scenario, compared to the existing LP DS model is presented for the AM period within **Figure 41**:

Figure 39 AM Period Maximum Queue Length Comparisons (NBWA LP DS vs. NBWA LPDS + HH)

7.27.1 The average maximum queue length comparisons for the same scenarios during the PM period has been presented within **Figure 42** for the PM period:

Figure 40 PM Period Maximum Queue Length Comparisons (NBWA LP DS vs. NBWA LPDS + HH)

7.28 Analysis of the previous figures reveals that there are a number of areas when queuing levels increase when the Hartshill development is included within the model area.

7.29 The impacts appear to be widespread but this is most likely due to the fact that the Hartshill traffic is displacing other traffic and pushing it out of the town centre which has a knock on effect.

7.30 In the majority of cases the increases in queue lengths are modest and detailed analysis would most likely reveal that the impacts are either not significant or could be mitigated via a localised mitigation package or optimisation of schemes already identified.

7.31 Within the PM there are larger increases in queue lengths around the town centre area and it is these impacts which are likely to be most difficult to mitigate since the modelling already takes account of the delivery of a comprehensive town centre transport strategy which has been included in response to the impact of the NBBC Local Plan allocations.

7.32 Similar analysis has also been undertaken to assess the impacts of the employment land being allocated in an area opposite the existing MIRA LEZ. The outcome from the AM and PM queuing comparisons, undertaken against the NBBC Local Plan do Something scenario are presented, for the AM and PM periods, within **Figure 43** and **Figure 44** respectively.

Figure 41 AM Period Maximum Queue Length Comparisons (NBWA LP DS vs. NBWA LPDS + Emp)

Figure 42 PM Period Maximum Queue Length Comparisons (NBWA LP DS vs. NBWA LPDS + Emp)

7.33 Analysis of the previous figures reveals that, overall, the number of instances where queuing levels are affected reduces when compared to the Hartshill assessment and the impacts are predominantly along the A5 with a few modest increases in queuing levels around the town centre. Most likely the queuing impacts around the town centre occur as a result of displaced traffic rather than being all directly attributable to the employment sites.

7.34 Upon finalisation of the analysis pertaining to the two discrete development scenarios, subsequent analysis was then undertaken to ascertain the impacts of allocating both development areas in unison, relative to the existing NBBC Local Plan model area.

7.35 Comparisons of the AM and PM queuing levels within the 2031 NBWALPDS + All Dev scenario have been undertaken against the NBBC Local Plan do Something scenario and are presented, for the AM and PM periods, within **Figure 45** and **Figure 46** respectively.

Figure 43 AM Period Maximum Queue Length Comparisons (NBWA LP DS vs. NBWA LPDS + All Dev)

Figure 44 PM Period Maximum Queue Length Comparisons (NBWA LP DS vs. NBWA LPDS + All Dev)

7.36 Analysis of the previous figures reveals that the addition of both sites, unsurprisingly, induces a greater increase in queuing across the network. There are greater impacts on

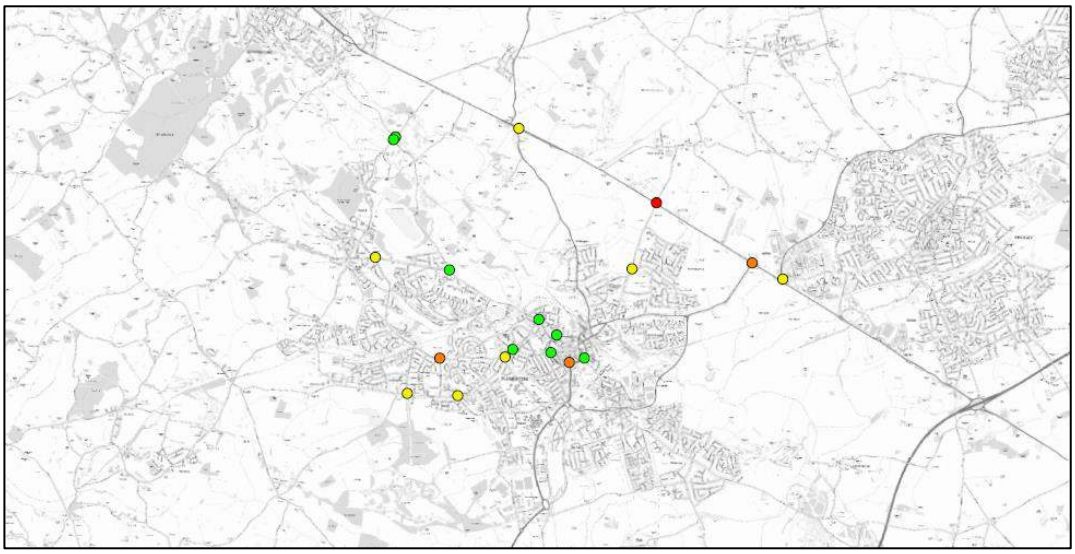
queue lengths along the A5, most likely caused by the interaction of traffic volumes and a number of areas within the town centre and areas adjacent to the town centre.

7.37 When reviewing the impacts along the A5 it should be recognised that these impacts have been identified in a network which already includes local plan infrastructure and committed schemes (such as those being delivered between the Long Shoot and Dodwells). Whilst there are likely to be some additional mitigation measures which are required to alleviate the impacts it may also be necessary to consider a more comprehensive mitigation strategy in order that the full extent of development impacts can be mitigated. At this point the mitigation strategy comprises delivery of the NRR, although this could be achieved through significant enhancements of the A5 and local road network instead. At some point more refined and localised infrastructure requirements will also likely need to be identified. It is possible that these measures could be identified through the site specific planning process since the impacts do not indicate that there would need to be significant mitigation measures delivered in one specific location, rather focussed, smaller scale, mitigation measures may be required to alleviate localised impacts on an ad hoc basis.

7.38 Comparisons of the AM and PM queuing levels within the 2031 NBWALPDS + All Dev + NRR scenario have been undertaken against the NBBC Local Plan do Something scenario and are presented, for the AM and PM periods, within **Figure 47** and **Figure 48** respectively.

Figure 45 AM Period Maximum Queue Length Comparisons (NBWA LP DS vs. NBWA LPDS + All Dev)

Figure 46 PM Period Maximum Queue Length Comparisons (NBWA LP DS vs. NBWA LPDS + All Dev)



7.39 The previous figures reveal that there is potential for a significant benefit to be unlocked as a result of the delivery of the NRR as assessed within the modelling. During both AM and PM periods queuing levels can be observed to reduce along the B4111 route into Nuneaton and this is most likely because traffic now avoids this route when travelling towards the A5 as the NRR provides a more convenient alternative.

7.40 There are clearly impacts along Higham Lane and along the A5 even when the NRR is in place and most likely some of these impacts will occur as a result of the changes in traffic patterns which are induced by the NRR as well as the additional development flows.

7.41 Therefore it is likely that additional, focussed mitigation, would be required to accompany the NRR to ensure that the impacts which occur as a result of the delivery of both the developments sites and the NRR can be appropriately managed.

Stage 3 – Summary and Conclusions

Summary

7.42 The final stage of the strategic transport assessment work reviewed the impacts of allocating key developments within the North Nuneaton area namely:

- Circa 1300 dwellings in the Hartshill area

- Between 18Ha and 42Ha employment in an area of land opposite the existing MIRA Local Enterprise Zone on the A5.

7.43 The testing considered the performance of a number of scenarios, namely:

- **2031 NBWA Local Plan Do Something -** The NBWA model inclusive of all identified Local Plan sites and associated infrastructure.
- **2031 NBWA + Hartshill** – The NBWA model inclusive of an additional circa 1300 dwellings in the Hartshill area and associated mitigation strategy.
- **2031 NBWA + 18 Ha Employment** – The NBWA model inclusive of an additional 18Ha employment land adjacent to the A5 and opposite the existing MIRA LEZ site.
- **2031 NBWA + Combined** – The NBWA model inclusive of the two developments areas and the Hartshill mitigation strategy identified earlier.
- **2031 NBWA Combined + NRR** – The previous scenario inclusive of a Northern Relief Road (NRR) which connects the B4111 and the A444.
- **2031 NBWA Combined + NRR + 24Ha Employment** – The previous scenario inclusive of an additional 24Ha employment land adjacent to the existing 18Ha already assumed within the testing.

7.44 Comparisons within the analysis have been drawn against the performance of the Nuneaton and Bedworth Wide Area Local Plan Do Something model, rather than the 2031 NBWA Reference Case. These comparisons are useful insofar as they demonstrate the likely level of additional impact which will occur if the sites identified by NWBC are delivered in addition to those which are likely to come forward through the NBBC Local Plan.

7.45 The scenarios which included development in Hartshill area were accompanied by the focussed mitigation identified within the previous chapter of this report.

7.46 Additionally, further mitigation was provided within the model network in the form of a Northern Relief Road (NRR) which connected the B4111 the A444 and the northern distributor link which, in turn, connects in to The Long Shoot.

7.47 The assessment and analysis work completed to date indicated that there is likely to be a potential benefit unlocked through the delivery of such a link road which serves to mitigate, at least in part, the impacts associated with the NWBC sites.

7.48 Some of the benefits are through direct mitigation via the provision of additional highway capacity on routes which trips generated by the sites will wish to use, such as connecting the residential area of Hartshill to the A5 via a route which avoids Nuneaton Town Centre. Some benefits are likely to be indirect insofar as the additional capacity afforded by the delivery of the NRR will draw traffic away from other more congested areas which will, in turn, provide space for the additional traffic generated by the development sites to be accommodated.

7.49 It is likely that a similar effect could be achieved through significant upgrades of the A5 and enhancements of the Local Road network, particularly the A444 but also Woodford lane and the surrounding routes. It is likely a significant enhancement of these areas would negate the need for the capacity delivered by the NRR but, at this stage, the NRR has been tested as it is considered to be a quick and simple mechanism for testing enhanced capacity in this area.

7.50 Whilst the results analysis thus far has focussed on a mitigation scenario which only includes the NRR and Hartshill measures as the primary means of mitigation it is considered likely that the NRR would form a suite of mitigation measures which would support the proposed sites.

7.51 It is highly likely that additional measures will be required along the A5 and along Higham lane which will, in part, be required to mitigate the impacts of a change in traffic patterns across the study area as a result of the NRR. Similarly further work will be required to ensure that the town centre transport strategy identified to support the NBBC Local Plan allocations is still valid and appropriate when the NWBC sites are included within the assessment.

7.52 It is not possible to do this in more detail until a conclusive approach to the allocation of development across both areas has been identified and, in the meantime, it is considered that the evidence presented previously is sufficient to conclude the following:

Conclusions

7.53 The following conclusions have been identified as a result of the final stage of the NWBC STA work:

- That either the residential or employment land in isolation can be accommodated within the existing network configuration without inducing severe levels of instability. Whilst it is likely that further, focussed, mitigation strategies will be required to support both development areas it is not likely to be the case that this mitigation cannot be determined.
- When combining the sites and then assessing the impacts on network performance there are severe impacts on model stability which indicate that additional infrastructure is likely to be essential and some significant infrastructure measures will be required.
- Delivery of the Northern Relief Road delivers an improvement in network conditions when considering the performance of the scenarios inclusive of all NWBC development sites but there are still residual impacts which are predicted to occur, this is likely to be exacerbated by the change in traffic patterns induced by the NRR and not entirely related to the new development sites.
- Even with the NRR in place the network performance is particularly poor in the scenario which includes the 42Ha of employment land alongside the housing in the Hartshill area. It is considered that a significant amount of additional infrastructure would be required, alongside a comprehensive review of the development parameters before a mitigation strategy is likely to be determined which would enable the full employment allocation to come forward and, even then, there is little guarantee that, within the current scope of highway extent, a solution exists.

7.54 It is reasonable to conclude therefore that the Hartshill mitigation package is likely to be a prerequisite if development in that area comes forward whilst the employment land will trigger a need for improvements to be delivered along the A5 and also in the Higham lane area.

7.55 If the sites are brought forward in combination then a more significant infrastructure strategy is likely to be required. The NRR which has been tested represents one such opportunity and the early indications are that it will significantly improve network stability as well as improving journey times. However, even with the NRR in place a more refined

mitigation strategy is also likely to be required to deal with the change in traffic patterns that are induced by the presence of the NRR.

8 SUMMARY AND CONCLUISONS

Summary

8.1 Vectos Microsim (VM) has been assisting North Warwickshire Borough Council (NWBC) and Warwickshire County Council (WCC) in the assessment of options pertaining to the delivery of the North Warwickshire Borough Local Plan through the use of a series of S-Paramics micro-simulation models developed to cover key areas of the Borough which have been identified as potential locations for development sites to be allocated through the Local Plan.

8.2 The modelling assessment work has been underway since August 2016 and the primary objectives of the work are summarised as follows:

- To assess the likely impacts, on the highway network, of the various emerging strategies concerning the delivery of housing and employment through the North Warwickshire Borough Local Plan.
- To identify what, if any, interventions may be deliverable which will minimise the residual impacts likely to occur as a result of the Local Plan proposals.
- To assess the impacts of key developments which are to be located on the periphery of Nuneaton town on both NWBC's highway network as well as Nuneaton and Bedworth Borough Councils transport network.
- To look in detail at development proposals in the Hartshill area to identify an appropriate mitigation strategy to accommodate the housing sites identified within that particular area.

8.3 The objectives set out previously have been addressed through a series of different assessments each of which was defined in response to the emergence of the Local Plan proposals. In total, there have been three key stages of assessment work completed prior to the production of this report. Each of the individual stages of assessment work that have been completed is described below:

Stage 1 – Atherstone/A5 Focussed Assessment

8.4 The first stage of the assessment made use of the Atherstone/A5 Paramics model to establish the likely impacts of allocating housing in the area surrounding Atherstone, the edge of Tamworth and north of the A5.

8.5 Focus has been placed on identifying the essential infrastructure requirements in the first 5 years of the plan and subsequently grading additional infrastructure requirements as the plan period progresses into the later years.

8.6 The four assessments completed focussed on establishing the incremental impacts associated with the delivery of development quantum, or in Stage 4 additional infrastructure improvements, in key stages. In this case this has been based on 5 year intervals, 2021, 2026 and 2031.

8.7 The assessment stages were completed as follows:

- **Stage 1** – Assessed the likely impact on the network of allocating all of the developments identified by 2021 and sought to determine an infrastructure strategy capable of delivering the first 5 years of the local plan sites with minimal impacts.
- **Stage 2** – repeated the initial assessment but with development assumptions now forecast to 2026. Again the infrastructure was reviewed and additional measures added to improve the overall network operation. The purpose of this tests is to establish the likely infrastructure strategy necessary to accommodate the housing and employment growth identified within the first ten years of the plan.
- **Stage 3** – Assessed the likely impact on the network of allocating all of the developments identified by the end of plan period 2031 and sought to determine a set of optimum mitigation proposals to ensure that any impacts associated with the delivery of the Local Plan could be minimised.
- **Stage 4** – Considered what further benefits could be offered by the inclusion of two enhanced capacity schemes, one focussed at the M42 junction 10 and the second considered inclusion of Enhanced A5 Proposals which comprised substantial dualling alongside an opportunity to bypass Grendon. These schemes were

included incrementally on top of the final mitigation measured identified within Stage 3.

Stage 2 – Detailed Hartshill Assessment

8.8 The second stage of the assessment involved a detailed review of the infrastructure requirements likely to be required to support the allocation of a considerable number of houses in the Hartshill area.

8.9 This assessment made use of the Hartshill model to assess the likely localised impacts that would occur as a result of moving forward with the allocation strategy and outlined an initial set of mitigation proposals which would be likely to be required should the allocation of housing in the Hartshill area be promoted.

Stage 3 – Nuneaton/A5 Focussed Assessment

8.10 The schemes that were identified within the Hartshill Assessment, as well as the infrastructure proposals, were then carried forward into stage 3 which looked at the likely level of impact on the Nuneaton and Bedworth highway network which was likely to occur as a result of allocating additional housing in the Hartshill area alongside employment land in the area adjacent to the existing MIRA Local Enterprise Zone.

Mitigation Overview

8.11 A series of mitigation proposals have been identified as a result of the assessment work completed thus far. It is anticipated that these measures will, ultimately, comprise the Infrastructure Delivery Schedule which will be required to accompany the development proposals and ensure that the impacts of the Local Plan proposals can be mitigated.

8.12 The mitigation measures are defined as follows:

- **Core Atherstone/A5 mitigation proposals** – the core proposals considered to be essential in enabling development to come forward within the Atherstone A5 area. The measures themselves will be brought forward in phases subject to the development strategy which is adopted as part of the Local Plan. These are the measures which have been identified within the testing to 2031 that are

considered to be deliverable, within the plan period, albeit with challenges associated.

- **Atherstone/A5 Aspirational Package** – Stage 4 considered the network operation after significant enhancements were included. These enhancements are considerably larger and/or more significant than those tested within other stages meaning that there will be significant challenges associated with delivery of these schemes such as land availability and significant costs of delivery.
- **Hartshill Mitigation Package** – The suite of proposals which have been identified as a result of an assessment focussing specifically on the Hartshill area. If all development identified within the Hartshill area comes forward then all measures will likely be required to ensure an acceptable level of localised network operation. If the development is brought forward in phases then the measures which are required to support the development strategy will largely be driven by the location of the development sites which are being promoted.
- **Northern Relief Road** – This measure was introduced to enable the development in the North Nuneaton area to be included in full. The NRR was accompanied by the Hartshill Mitigation package and is considered to represent one possible opportunity for delivering the scale of intervention necessary to enable the housing and employment land identified by NWBC. It is likely that the NRR would need to be accompanied by additional focussed mitigation measures, as yet unidentified, in order that the overall level of impact can be satisfactorily mitigated. It should also be noted that some impacts which require the delivery of focussed mitigation measures will be as a result of the change in traffic patterns induced by the NRR rather than solely arising as a result of the additional sites being tested.

8.13 An overview of the assumptions pertaining to each mitigation strategy is provided as follows:

Atherstone/A5 Core Mitigation

8.14 The measures identified as core infrastructure measures, alongside the identified year of delivery, is summarised within the following table:

Table 28: Atherstone/A5 Core Mitigation Proposals

ID	Scheme	Description	Year of Inclusion
1	Holly Lane	Dualling on eastbound approach to Holly Lane	2021
2	Tamworth Rd/Market St	Signals introduced at Polesworth junction	2021
3	B5000 Canal Bridge widening	Widening of the canal bridges to ensure two lanes of traffic can be accommodated side by side without issue	2021
4	A5/B5000 Link Road	Link between B5000 and A5, delivered to a minimum 40mph design standard with suitable access junctions to serve development being delivered off the link (as opposed to development fronting)	2026
5	Enhanced A5 Proposals Phase 1	New bypass road between Dordon and Grendon which provided dualling for traffic travelling in the westbound direction	2026
6	Dordon Signals	Existing roundabout replaced by a fully signalised junction signalisation which can accommodate the Enhanced A5 Proposals Phase 1	2026
7	Holly Lane Widening Approaches	Widening on northern and southern entry arms and revised lane allocations	2026
8	Reconfiguration of M42 signal approaches and junction optimisation	Optimisation of existing signal approaches with signals at Trinity Road and Green lane approaches reconfigured.	2026
9	Grendon Roundabout	Widening of northbound approach to accommodate 3 lanes	2026
10	Birch Coppice Trinity Way Link	Upgrade of Lower House Lane/Gypsy Lane to provide a Link between Trinity Road and A5 Watling St allowing vehicles to circumvent M42 Junction 10.	2026
11	Mancetter Gyratory	Widening of the A5 eastbound approach to enable traffic to move across the primary movement.	2031
12	A5 Holly Lane	Junction widening on all approaches and circulating carriageway, likely to trigger the need for additional land outside of the existing highway boundary.	2031
13	B5000/Mercian Way	Widening of B5000 northbound approach and Mercian Way southbound approach as well as circulating carriageway to improve through put	2031
14	A5 - Dualling	Additional Dualling A5 on westbound approach to the Phase 1 bypass	2031
15	Bypass Roundabout	Southbound approach widening to three lanes	2031

8.15 It should be noted that one of the canal bridges on the B5000 is a listed structure and it may not be possible to widen and, should this be the case, it is likely that another bridge would need to be delivered which would substantially increase costs associated with these proposals.

Atherstone/A5 Aspirational Package

8.16 The aspirational proposals comprise two key measures as identified within the following table:

Table 29: Atherstone/A5 Aspirational Package

ID	Scheme	Description	Year of Inclusion
16	M42 Enhanced Capacity	Widening of the A5 eastbound approach and circulatory to four lanes. Widening of the southern circulatory bridge to 4 lanes. Signal optimisation.	**2031**
17	A5 Full Bypass	New A5 roundabout junction introduced to the east of Green Lane which will serve the new Grendon bypass and link back up with the A5/B5000 link road junction on the A5. The proposals also include the A5/Long St junction reduced to one-way in the NB direction between the A5 and Woodlands Close.	**2031**

8.17 The current mitigation has been phased based on the current trajectory and in response to strategic level impacts that have been observed during the assessment. This delivery is considered suggestive and based primarily on the overall housing number coupled with the localised impacts emerging from the site delivery strategy. If the trajectory changes or, during the detailed planning application work pertaining to individual developments, additional impacts emerge, then it should be recognised that schemes identified within certain stages of the assessment may well need to be brought forward in order that the impacts can be minimised.

8.18 Although two different, lower capacity options were tested for the Dualling between Grendon and Dordon but only a single option will be delivered. At this stage it is envisaged that the A5 will be dualled in both directions via a link which lies just south of the existing alignment.

8.19 Costs of most schemes are cumulative insofar as they are all considered to be necessary to deliver the developments identified but that the funding for these schemes may be secured either through contributions or direct delivery and that this would be assessed on a site specific basis through the associated planning process. However, the overall scheme costs to 2026 should be seen as a minimum target contribution level for the housing being delivered to that point.

Hartshill Mitigation Package

8.20 The measures identified and attributed to the delivery of the housing in the Hartshill areas are summarised as follows:

Table 30 Harsthill Mitigation Package

Scheme	Comments
Coleshill Road / Camp Hill Road / Victoria Road / Bucks Hill Road	Current priority arrangement converted to four-arm signalised junction with additional flare lanes on the approaches to Camp Hill Road, Victoria Road and Bucks Hill Road
Camp Hill Road / Craddock Drive	Current mini roundabout converted to three-arm T-junction with two lanes on the Camp Hill Road eastbound approach to allow for right-turn stacking
Nuneaton Road / Woodford Lane / Atherstone Road	Nuneaton Road and Atherstone Road junction converted to three-arm signalised junction. Give-way at Nuneaton Road / Woodford Lane switched to allow Woodford Lane priority
Western' Link Road	Link road between Ansley Common and Plough Hill Road (through development site south of Coleshill Road off Bretts Hall Estate)
Eastern' Link Road	Link Road connecting Church Road with B4111 Mancetter Road
Western' Link Road	Link road between Ansley Common and Plough Hill Road (through development site south of Coleshill Road off Bretts Hall Estate)

E

Northern Relief Road

8.21 The Northern Relief Road comprises a new link between the B4111 and the A444 which also connects in to the northern distributor link road across the north Nuneaton development sites. It is envisaged that, if the NRR is to be delivered, it would also be accompanied by a focussed mitigation strategy which seeks to deal with impacts arising from the change in traffic patterns induced as a result of the introduction of the NRR.

8.22 A series of scenarios were defined which combined the aforementioned mitigation strategies, alongside the various development proposals and, as a result of that testing, the following conclusions have been identified for each stage:

Stage 1- Conclusions

8.23 Based on the outcome of the modelling assessments the following conclusions can been made:

- The initial mitigation schedule identified to enable the allocation of developments, as outlined within the NWBC Local Plan, will likely require at least 15 schemes within the Atherstone Study Area;
- An initial 3 schemes have been identified as priority schemes required during the first 5 years up until 2021;
- Further mitigation has been highlighted as necessary during the period between 2021 and 2026. These 7 schemes are focused at a number of key junctions along the A5 and include the introduction of the Enhanced A5 Proposals between Dordon and Grendon only;
- Finally, 5 more schemes have been identified to mitigate the impact highlighted in the 2031 assessment with the inclusion of the additional 5 years of Plan growth from 2026;
- Additional scheme testing has concluded that including the larger A5 proposals which bypass Grendon will provide the best network performance when the full allocation of local plan demands are included but some impacts remain during the PM period;
- There is likely to be scope for the impacts to be further reduced by additional optimisation and more detailed refinement of the proposed mitigation measures. The results presented in this report should therefore be considered as a worst case.

Stage 2 - Conclusions

8.24 Completion of the Hartshill specific testing revealed the following conclusions:

- That, potentially, up to 800 dwellings could be delivered before the 'Western' Link Road is required but this may result in a residual impact which is still considered to be unacceptable

- That the link between Ansley Common and Plough Hill Road is essential infrastructure when considering the quantum of housing coming forward within the plan and will be a necessity to support development of any significant magnitude coming forward in this area
- The signals at Coleshill Road / Camp Hill Road / Victoria Road / Bucks Hill Road junction are necessary to reduce excessive queuing on Bucks Hill Road approach, however it is noted that there are perceived challenges to delivering signals at this location

Stage 3 - Conclusions

8.25 The following conclusions have been identified as a result of the final stage of the NWBC STA work:

- That either the residential or employment land in isolation can be accommodated within the existing network configuration without inducing severe levels of instability. Whilst it is likely that further, focussed, mitigation strategies will be required to support both development areas it is not likely to be the case that this mitigation cannot be determined.
- When combining the sites and then assessing the impacts on network performance there are severe impacts on model stability which indicate that additional infrastructure is likely to be essential and some significant infrastructure measures will be required.
- Delivery of the Northern Relief Road delivers an improvement in network conditions when considering the performance of the scenarios inclusive of all NWBC development sites but there are still residual impacts which are predicted to occur, this is likely to be exacerbated by the change in traffic patterns induced by the NRR and not entirely related to the new development sites.

- Even with the NRR in place the network performance is particularly poor in the scenario which includes the 42Ha of employment land alongside the housing in the

Hartshill area. It is considered that a significant amount of additional infrastructure would be required, alongside a comprehensive review of the development parameters before a mitigation strategy is likely to be determined which would enable the full employment allocation to come forward and, even then, there is little guarantee that, within the current scope of highway extent, a solution exists.

- It is also recognised that the principles that are achieved within the modelling, through the delivery of the NRR, are mirrored in the enhancement of the A5 and local road network which is considered to be a viable, and potentially more deliverable, alternative to the NRR. The NRR has been tested at this stage, partly because it is simpler to implement. However as more certainty around the plans come forward and additional funding opportunities are pursued, particularly concerning enhancements of the A5, then further investigations around which options are most appropriate to achieve these aims.

8.26 It is reasonable to conclude therefore that the Hartshill mitigation package is likely to be a prerequisite if development in that area comes forward whilst the employment land will trigger a need for improvements to be delivered along the A5 and also in the Higham Lane area.

8.27 If the sites are brought forward in combination then a more significant infrastructure strategy is likely to be required. The NRR which has been tested represents one such opportunity and the early indications are that it will significantly improve network stability as well as improving journey times. However, even with the NRR in place a more refined mitigation strategy is also likely to be required to deal with the change in traffic patterns that are induced by the presence of the NRR.

Recommendations

8.28 The following sets out a number of key recommendations which VM believe should be considered during subsequent stages of the local plan assessment work as the site location and development quantum gain more certainty:

8.29 It is also recommended that a review of the mitigation proposals, identified as required to deliver the proposal by the end of plan testing, are undertaken once the appropriate level of

development is identified through the local plan, to establish the benefit, or otherwise, of delivering a signal strategy at some or all of the junctions along the A5 between Grendon and M42 Junction 10.

8.30 It is recommended that further measures are reviewed to support the expected growth at the land adjacent to the existing MIRA Enterprise Zone, As the level of network operation within 2031 has not reached acceptable levels by 2031 it has not been possible to include the employment proposals within the assessment.

8.31 It is recommended that, as more certainty arises with regards the development strategy likely to be promoted in the North Nuneaton area, a further review of the mitigation proposals and, specifically the NRR, in undertaken to identify what, if any, additional mitigation measures can be delivered to further reduce the impacts that have been identified thus far.

8.32 In spite of the above recommendations it should be recognised that the work to date successfully demonstrate that, for each development area, it is possible to determine an appropriate mitigation strategy which will reduce the level of impacts likely to occur as a result of the adoption of the NWBC Local Plan proposals.

8.33 On that basis, VM consider that it would be not be essential for all of the recommendations to be addressed prior to submitting the Local Plan for Examination.

APPENDIX A

Sustainable Transport Strategy

Project title	NWBC Strategic Transport Assessment Final Phase
Prepared by	WCC Transport Planning
Date	09/12/16
Subject	Sustainable Transport Overview

Introduction

It is critical that sustainable transport improvements form part of the overall mitigation package to support the housing and employment growth proposals within the Borough. Such improvements will:

- Contribute towards the delivery of sustainable development across the Borough;
- Maximise the number of journeys made by sustainable transport modes from trips generated as a result of new development;
- Reduce the impact of car based travel on the local and strategic highway network;
- Deliver an integrated approach to transport provision to serve new development; and

Sustainable transport is an umbrella term which includes provision of bus services, bus infrastructure, park and ride, access to rail services, walking, cycling and behavioural measures (Smarter Choices). This note sets out what sustainable transport improvements will be sought through the planning process to support development generally within the Borough.

Public Transport

Introduction

Public transport has an important role to play in supporting new development by providing genuine travel choice to residents and employees. This in turn can help mitigate the overall impact of development on the highway network by reducing the number of car trips generated as a result of growth.

Improvements to public transport can include service enhancements and investment in infrastructure. Further details of these are set out below.

Rail

North Warwickshire has relatively good rail provision, with key stations at Atherstone and Coleshill. Cross Country Trains and London Midland provide the rail services to and from these stations which offer connectivity to key destinations, as outlined below.

Coleshill Parkway, which opened in 2006, is purpose built Parkway station currently offers car parking facilities for up to 200 cars, key destinations served from this station include Birmingham New Street, Nuneaton, Leicester, Cambridge and Stanstead Airport. The station, and associated service, is important for commuters travelling from North Warwickshire to Birmingham and providing connectivity from Warwickshire to the East Midlands and beyond.

Atherstone station is well used and recently benefited from a marked increase (toa broadly hourly service) in the number of trains travelling to London Euston, the station also provides connectivity to more local destinations including Nuneaton, rugby and Crew.

Currently Polesworth Station offers a limited service which comprises of one Parliamentary northbound train per day, this limited service is challenging for customers to utilise.

The Rail Strategy for North Warwickshire

The rail network, and associated services should be used to support the level of growth outlined in the Local Plan; whilst the delivery of the level of growth set out in the plan is not dependent on the provision of improved rail services and connectivity it will act as an economic and social enabler, allowing local people to access employment and leisure opportunities. Therefore developers should be encouraged and contributions sought to support the delivery of improved access to the rail network in North Warwickshire.

Existing Station Improvements

Atherstone Station

The proposed level of development in the vicinity if Atherstone is likely to create additional demand at Atherstone Station, particularly due to the improved service to London Euston. The County Council wishes to see Atherstone Station upgraded to act as a 'Rail Hub' for North Warwickshire. This would include the provision of additional car parking, investigation as to the feasibility of providing a new footbridge, improved ticketing facilities and at station information. This is consistent with policy statement LP26 in the Local Plan. The County Council will continue to work with West Midlands Rail and the Train operating Company to secure improvements to Atherstone Station.

Coleshill Station

Coleshill Station will become a key interchange site for passengers arriving from across North Warwickshire and surrounding areas (by rail, bus and other sustainable modes) wishing to travel onwards to UKC zones (particularly the 'Hub' zone). Demand for car parking is likely to increase; therefore car parking provision at the site may have to expand in the future to accommodate likely growth. The County Council own additional land at the site and therefore this may be brought forward relatively easily.

Polesworth Station

The nature of Polesworth station means it is difficult to implement small scale upgrades to bring the station up to standard, a In order to enable passengers to access the southbound platform a new footbridge is required. In addition it is likely that platforms would need to be lengthened to accommodate the current stopping trains and a train operator would have to be willing to stop services at the station. The required

works will necessitate substantial expenditure in the region of £6-£8M. A positive business case for development would have to be made in order to bring forward development; depending on local growth this may be achievable. In addition, any development (and train calling pattern) should not have a detrimental impact on Atherstone station. Any improvements to Polesworth Station should be balanced against a new Strategic Polesworth Parkway Station coming forward in the future.

Potential New Stations

There are opportunities to improve access to the Rail Network in North Warwickshire and a number of new stations are proposed, whilst some of these may come forward independently e.g Kingsbury, others are dependent on local growth delivered through the local plan (e.g Daw Mill Station). It is not envisaged that all proposed new stations, as listed below will come forward;

Arley,
Daw Mill,
Kingsbury,
Polesworth Parkway.

The local plan has safeguarded land in the local plan for stations at Arley and Kingsbury (LP 26). A new station at Arley or Daw Mill is likely to require significant local growth in order to generate a positive business case. Developer funding would also be sought. Any improvements to rail services introduced by the new West Midlands Rail franchisee between Tamworth (and beyond) and Birmingham would further support the case for a new station at Kingsbury, which may come forward independently of growth proposed in the Local Plan.

The scale of development proposed in the vicinity of Polesworth (and beyond) is likely to create much greater demand for access to the rail network. Combined with the opening of HS2 and the resulting re-cast of services on the West Coast Mainline there is an opportunity to bring forward Polesworth Parkway. It is likely that if Polesworth Parkway came forward it would replace Polesworth Station, offering a strategic Park and Ride facility to enable easy access to the rail network to access key locations including London and Birmingham.

Service Improvements

The County Council will continue to work with West Midlands Rail and the Train Operating Company to deliver rail service improvements in North Warwickshire. This should include more local services via Coleshill to Birmingham and improved connectivity to the East Midlands.

Bus Services

Background

North Warwickshire Borough has a comprehensive, well-developed and well-utilised bus network which provides a solid foundation on which to build. A significant number of bus services across the Borough are provided on a commercial basis by Arriva Midlands, Central Buses, National Express West Midlands and Stagecoach Midlands. A number of other services are provided by these and other operators on either a partially or fully subsidised basis.

Existing Key Bus Services in North Warwickshire			
Service No	Route Description	Frequency	Operator
16	Tamworth – Kingsbury	30 mins	Central Buses
17 / 18	The Arleys – Ansley – Nuneaton	30 mins	Stagecoach

			Midlands
41	Birchley Heath – Ansley Common – Nuneaton	60 mins	Stagecoach Midlands
48	Atherstone - Hartshill – Nuneaton – Bedworth - Coventry	20 mins	Stagecoach Midlands
65	Tamworth – Polesworth – Grendon - Atherstone - MIRA - Nuneaton	60 mins	Arriva Midlands
70	Chelmsley Wood – Coleshill – Water Orton – Birmingham	30 mins	National Express West Midlands
75	Birmingham International – Coleshill – Water Orton – Sutton Coldfield Central Buses	60 mins	Central Buses
115	Tamworth – Kingsbury – Wood End – Hurley	60 mins	Arriva Midlands
766	Tamworth – Birch Coppice – Baddesley Ensor – Atherstone	60 mins	Stagecoach Midlands
785 / 786	Tamworth – Polesworth – Warton – Austrey – Newton Regis	60 mins	Arriva Midlands

The overall bus strategy to support the Borough Plan will be to secured anew and/or improved high quality public transport offer which:

- Strengthen strategic bus connectivity between North Warwickshire and urban centres such as Atherstone, Bedworth, Leicester, Nuneaton and Tamworth;
- Provide good access to key destinations such as railway stations, including the HS2 interchange, medical care facilities, education/training facilities and significant existing and proposed employment sites both within the Borough and near to it (e.g. MIRA, Birch Coppice and, UKC); and
- Improve links to adjacent towns and villages.

Developers will be encouraged to work with the County Council and local bus operators to prepare proposals which will meet these aspirations, and contribute towards the mode share targets for sustainable travel as part of an overall mitigation strategy for their development.

General Requirements

Developers will be required to provide financial contributions towards the provision of bus services or arrange to contract services directly with an operator as part of all significant new development within the Borough. This will generally take the form of either enhancement to existing bus services which fall within 400m walking distance of the site, or for larger sites the provision of new standalone bus services which deliver direct access to the development in question. Contributions will be sought for a minimum of five year period, net of fare box revenue. Alternatively, developers may wish to contract new or enhanced bus services directly with an operator rather than pay a contribution. Such requirements will be agreed as part of the planning process and conditioned accordingly.

New or enhanced bus services should provide a suitable frequency commensurate with the size of the development. In most cases the service should operate between the hours of 0700 – 1900 (Mondays to Saturdays) in accordance with larger developments of 1000+ dwellings. In addition, an evening and Sunday service should be provided. Developers will be required to either contribute towards a marketing budget or work with service providers to ensure new bus services are well publicised. The County Council will also encourage developers to consider ticketing offers/low fares when new bus services are introduced.

The concentration of large scale development proposed in certain areas of the Borough should facilitate the conditions required to support the introduction of new and/or enhanced services that stand a reasonable chance of becoming commercially viable over time. In certain circumstances, new infrastructure may be needed to help facilitate the conditions necessary to allow buses to move into and through new development sites so they are not forced to make complicated and unattractive diversions.

Build Rate

Bus services should be in place from the time of first occupation to ensure new residents perceive the service as a viable alternative to the private car, and so it becomes ingrained as part of the culture of the new development. If bus services are only introduced at a later point post-construction, it is highly likely that residents would have already developed travel patterns using alternative means of transport (typically the private car).

Type of Occupancy

In order to enable the potential for future commercial viability of any new bus service it is essential to ensure there is a mix of housing types across the development. Routes serving developments purely focused on high-end executive housing are unlikely to ever achieve commerciality.

Internal Road Network

Not only must this be suitable for the long term operation of bus services, it must enable penetration of the development from the outset. Where there is phased construction of the road network or there are temporary roads in place, consideration needs to be made to allow buses to traverse the development and turn around safely. It is not advisable for a local authority to tender a bus service that requires smaller vehicles for initial phases of the development, as the need of two different vehicle types would dramatically increase the costs. The positioning of any traffic calming measures must take into consideration the risk they pose to buses, and the additional road space buses require negotiating them. Therefore, it is essential that Developers factor in the dimensions of the vehicles to be used over the life of the service within their plans.

Connectivity between Individual Developments

In some areas, piecemeal construction by multiple different developers has resulted in a warren of side-streets and cul-de-sacs that are impenetrable to public transport. In order to avoid this it is advisable that the Local Planning Authority encourages a lead Developer to submit an outline planning application for a significant area, including details of the main highway infrastructure; this Developer would then work with others to submit individual applications detailing the reserved matters for different phases of the site.

Highway considerations in new developments to support bus services

In order to ensure that buses effectively penetrate all key development sites, it is strongly advised that the following highway infrastructure be considered for inclusion in any future highway development control related discussions between NWBC officers, WCC officers and respective developers:

1. The width of the main distributor road within the development site is sufficient to cater for two-way bus movement in order to allow effective penetration of the site.

2. The distributor road is provided within each separate development for the purpose of the following:

    - Ensuring that all households within the individual development are within 400 metres of a bus stop; and
    - Enable a highway link connecting all the separate developments to each other and also the adjoining local highway network.

3. The distributor road in each individual development has a minimum width of 6.75 metres and can effectively cater for bus turning movements in order to complement flexible bus routing options.

4. Highway links are in place providing connectivity between each individual development and nearby main road(s) on the strategic and/or local highway network.

5. '*Flexibility is key'*, not least in that it is difficult to predict how the overall development in this area will come forward given the numerous separate developments.

The County Council is aware that the Borough Council is working towards developing a Masterplan for all the Strategic Sites contained within the Borough Plan. With this in mind it is recommended that:

- Any Masterplans developed by the Borough Council associated with Strategic Sites consider the sustainable transport principles and proposals contained within this strategy; and
- The development of any Masterplans includes representatives from the County Council to help inform the key transport and access issues, including matters relating to sustainable travel.

Bus service provision considerations for new developments

Diversion of Existing Bus Services

Opportunities to divert existing bus services are dependent on the size and location of any new development, with the length (in terms of time as well as physical mileage) of any detour being a limiting factor. Bus operators will be reluctant to re-route profitable commercial services away from main corridors in order to serve new housing if there is a possibility of loss of patronage (thus revenue) from existing customers. Developers should be encouraged to seek feedback from bus operators prior to submitting planning applications, and this input should be reflected in their plans. Likewise, the Local Planning Authority should also seek the views of bus operators and Local Transport Authorities prior to granting of consent.

Enhancement of Existing Services and/or Creation of New Bus Services

1) Atherstone, Dordon, Grendon and Polesworth

There is a good core network of inter-urban and rural bus services operating in North Warwickshire. They are aimed at providing basic transport links for shopping, employment, leisure and education. Most of the services operate every hour and therefore do not offer a frequency designed to attract people away from the private car.

The proposed new developments in Atherstone, Dordon and Polesworth are situated close to the service 65 operated by Arriva giving links to both Nuneaton and Tamworth. There may be some scope to divert this service, but this is a key commercial inter-urban service and the bus company may not consider any further deviations to the route, unless the deviation and/or additional time taken are minimal, as this could deter existing customers from using the service. Developers will therefore need to consider the option of providing kick-start funding for a new stand-alone service, where properties are more than 400 yards from existing services.

2) Hartshill

Hartshill is served by a high quality bus service operating at a 20 minute frequency, i.e. Service 48: Atherstone - Hartshill – Nuneaton – Bedworth – Coventry operated by Stagecoach Midlands.

Providing development evolves around the existing local bus network it is unlikely that there will be a requirement for additional bus services. However, consideration should be granted towards providing excellent on-street bus stop infrastructure and supporting pedestrian connectivity facilities, e.g. footways and crossings.

3) Ansley Common and Ridge Lane

These settlements are currently served by Service 41 (Birchley Heath – Ansley Common – Nuneaton) operated by Stagecoach Midlands at an hourly frequency with financial support from the County Council.

Depending on the size and extent of the development, the County Council will be seeking funding to further develop the local bus service in terms of both frequency and choice of destination, e.g. extend route to serve Atherstone.

4) Alvecote

Alvecote is currently served by an infrequent local bus service, i.e. Service 785 / 786 (Tamworth – Polesworth – Warton – Austrey – Newton Regis) operated by Arriva Midlands at a two hourly frequency.

Any new development would need to direct resources at substantially improving local bus service provision. Depending on the layout of the site, there may be scope to extend existing Tamworth local bus services to serve the new development.

Any new development would also need to direct resources at improving connectivity to the local highway network, enhancements to on-street bus stop infrastructure and pedestrian facilities, e.g. footways and crossings.

5) Enhanced Access to Health Facilities and Major Employment Sites

It is generally regarded that there is poor public transport provision in most of North Warwickshire towns and villages to health facilities in Nuneaton. Therefore, consideration will also be granted towards improving links to George Eliot Hospital and Tamworth Hospital in conjunction with the delivery of new development in North Warwickshire.

There are also large industrial warehouse developments and major employment sites either directly in North Warwickshire or in close proximity to its boundary, e.g. Birch Coppice, Hams Hall Industrial Estate and MIRA Enterprise Zone. Therefore, consideration will also be granted towards improving local bus service links between new development, existing towns and villages and employment sites.

6) UK Central

UK Central in Solihull is the West Midlands' principal international gateway and strongest performing economy, supporting an estimated 100,000 jobs region-wide and contributing £5.1 billion to regional GDP.

When HS2 is constructed, UK Central will be brought within a 40-minute journey time of central London by 2026 via a Birmingham Interchange station located adjacent to the NEC.

The UK Central Masterplan showcases the development potential of the area up to 2040 and outlines proposals aimed at maximising potential of the gateway site. This includes the following:

- Early and bold investment in local connectivity, including new modes of rapid transit to create a genuinely connected network; and
- Delivering managed growth around four key locations, namely North Solihull, Solihull Town Centre, Blythe Valley Business Park and the Hub – the epicenter of UKC which includes Birmingham International Airport, the NEC, Birmingham Business Park and the proposed High Speed Rail station.

In respect to public transport connectivity to and from North Warwickshire, the aspiration is for high specification, high quality and high frequency public transport service to operate between Coleshill Parkway multi-modal interchange and UK Central. The County Council has aspirations to see a high quality service provided, this may take the form of a high quality bus route, however other options, including very Light Rail should also be considered. This link will complete the Public Transport offer to UKC for those arriving at Coleshill Parkway by rail or other modes.

Cost Profile

Staggered funding of new or existing bus services to serve a new development makes allowance for the initial cost of introducing or diverting bus services (e.g. capital expenditure on vehicles, increasing the number of vehicles operating on route and additional staff costs) as well as the initial low on-bus revenue. It is anticipated that the cost reduces over the life of construction (as occupancy, and potentially on-bus revenue increase), with the aim of achieving commerciality at a point in the future.

Vehicle Specification

It is important to ensure high quality of operation. On board Wi-Fi is fast becoming a feature across bus fleets, as is leather seats and audio-visual announcements. The County Council understands that bus operators would be pleased to offer this as an option for the new developments, where appropriate. The mention of low-floor buses as part of vehicle specification is superfluous, as all buses will be legally required to be of DDA compliant design prior to the suggested first phase of construction in 2018. If an initial contract specified new or nearly-new vehicles, then any subsequent extension.

Bus Infrastructure

The principal areas of infrastructure associated with bus service improvements are bus stops, flags, shelters, laybys, information and priority measures.

Bus Stops, Flags, Shelters, Laybys and Information

In relation to bus stops, the County Council would expect these to be well located in relation to the surrounding development (for example in terms of local service centres and schools), with a maximum walk distance of no more than 400m from any point within the development. In most cases bus stop poles with flags and timetable cases should be sufficient. The location of the bus stops should be agreed prior to the construction of each development site in order to ensure that potential occupiers are aware of their location. The bus stops should be provided with raised kerbs in order to complement the fleet of low floor buses operating in North Warwickshire, bus stop poles (with bus flag and timetable case attached) and also a bus stop clearway marking box.

At key bus stops, consideration should be given to providing a bus shelter. A commuted sum will be required for a period of five years to cover the maintenance costs of each shelter provided. The provision of bus stop laybys will also be considered, where appropriate, in order to prevent stationary buses from obstructing traffic flow whilst picking up and/or setting down passengers.

The County Council will not generally require Real Time Information (RTI) to be provided at bus stops and within bus shelters. However, liaison with site promoters will be undertaken to discuss the possible future-proofing provision of supporting underground infrastructure, should RTI be pursued later in time.

The advent of smartphone means that residents of these developments can enjoy the benefits of real time information through use of specific apps.

Consideration should be given towards promoting a borough-wide branding approach to bus flags in North Warwickshire Borough by allocating developer funding towards replacing certain bus flags around the borough in order to ensure a consistent and uniformed appearance.

The proposals for the bus corridor between Coleshill Parkway multi-modal interchange and UK Central include provision of an elongated modern bus fleet, lengthened bus platforms at bespoke and enhanced bus stops, provision of real-time information, audio information on buses, bus lanes, bus priority at key junctions and branding along the entire corridor.

Bus Priority/Connectivity Improvements

Development in North Warwickshire

As part of the proposals for housing and employment development in North Warwickshire, the County Council would consider putting forward proposals for dedicated bus provision/priority to improve connectivity for public transport, where appropriate, i.e. particularly at key junctions on important bus routes.

Nuneaton Town Centre

Local bus services to Nuneaton could benefit from a number of potential enhancements to the Ring Road in Nuneaton town centre. As part of these improvements, opportunities will be sought to make better provision for buses in terms of bus priority and access to the bus and rail stations. As part of these proposals (and possibly in conjunction with the proposed redevelopment of the bus station), further consideration will be given to the provision of a dedicated bus bridge onto Bond Gate.

B5000/A5 Link Road (Polesworth / Dordon Eastern Relief Road)

Initial work to look at this proposal was undertaken as part of the North Warwickshire Core Strategy. It is proposed that should development come forward, the highway commitments would include funding the proposed Link Road.

A5 Improvements

There are a number of improvements along the A5 in North Warwickshire which are in the early stages of concept and development, which are as follows:

- A5/Long Street/Gypsy Lane roundabout, Dordon;
- A5/Spon Lane/Boot Hill roundabout, Grendon; and
- A5/B4116 Merevale Lane/Holly Lane roundabout, Atherstone.

County Council officers are engaging with Highways England in order to ascertain whether these proposals can be taken forward to further development. These proposals are classified as interim improvement schemes in advance of more substantial future A5 corridor improvements to be delivered by Highways England.

Park and Ride

The aspirations in relation to UK Central include the Coleshill Parkway Multi-Modal Transport Interchange being the focus of a Park and Ride hub for access to a high quality and frequent public transport offer to UK Central in addition to the existing rail service to Birmingham, Nuneaton and Leicester.

If this offer takes the form of a new bus route, it is proposed that the bus service will be supported by bus priority measures at key junctions, which would enhance journey times and schedule adherence.

The development of Polesworth Parkway, as detailed above, will offer a strategic Park & Ride site with direct access to the Rail Network, enabling wider connectivity benefits.

It is suggested that further work is carried out to understand some of the more detailed aspects of the proposals for Park and Ride, such as demand forecasting (including parking charge sensitivity testing), likely construction and site operating costs, bus subsidy costs and consideration of operational issues.

Walking and Cycling

Introduction

It is important that high quality pedestrian and cycle routes are provided to and within all significant development sites which come forward across the Borough.

Pedestrian and cycle links should be provided, as appropriate, between major new residential settlements and local employment sites, town centres, educational facilities and public transport interchanges in order to avoid reliance on the car for local journeys. This includes provision of suitable crossing points over major roads, which can act as barriers to cycle and pedestrian movement.

For new employment sites, good pedestrian and cycle links to residential areas and public transport interchanges which are within cycling and walking distance should be provided, to encourage and enable journeys to work by alternative modes of transport to the car.

Internal provision for pedestrians and cyclists within development sites should deliver good access to local service centres, schools and open spaces/play areas. Streets should be designed to facilitate on-carriageway cycling, although cycle facilities which are segregated from traffic may be required on main spine roads. This provision should be complemented by traffic-free shared pedestrian/cycle routes where they provide attractive or more direct alternatives to the road network. Routes should also be provided as part of new 'green' corridors, with suitable links to them from within the development. Good connections to the external pedestrian and cycle network are also important.

In terms of other pedestrian and cycle infrastructure, crossing facilities should be considered where flows justify such provision. Toucan crossings may be required on key cycle routes. Pedestrian/cycle signage should also be considered, particularly in terms of links to important local facilities such as public transport interchanges and the National Cycle Network. The County Council would expect to see good quality cycle parking provided at local service centres, schools and open spaces/play areas within development sites.

Proposed improvements to walking and cycling facilities

The County Council is developing Cycle Network Development Plans for the larger settlements in North Warwickshire and it is anticipated that these will be completed by March 2017. The proposed Borough Plan housing and employment allocations will form a key input to this work.

The key routes and measures for improving cycle provision in the Borough will be identified through the Cycle Network Development Plans. At this stage, initial ideas for new cycle links in the Borough that will be investigated in more depth during the network planning work include:

- Tamworth – Dordon / Polesworth
- Tamworth – Birches Coppice
- Atherstone – Hartshill / Nuneaton
- Atherstone – Birch Coppice
- Polesworth / Dordon – Atherstone

This list will be further developed and refined once the cycle network review within the North Warwickshire area has been completed.

The County Council will seek contributions towards the new cycling infrastructure identified as part of the network planning work as a result of development across the Borough.

Smarter Choices

In order to reinforce the investment in public transport, walking and cycling described in this section of the report, the County Council would expect to see the parallel deployment of a range of behavioural measures (also known as Smarter Choices) as part of the growth proposals across the Borough.

Examples of such measures include:

- Workplace Travel Plans (in respect of sites generating in excess of 100 jobs);
- Sustainable Travel Packs for new residents;
- Personalised travel planning;
- Travel awareness campaigns;
- Public transport information and marketing;
- Car clubs;
- Car sharing schemes; and
- Teleworking, teleconferencing and home shopping.

WCC Transport Planning

APPENDIX B

Hartshill Assessment – Supplementary Technical Notes

NWBC STA Testing –
Hartshill Mitigation Option Testing

Project title	NWBC STA Testing	Job number	VM165079
cc	Warwickshire County Council	File reference	TN.001
Prepared by	AH	Date	19 September 2016

Introduction

1. Vectos Microsim (VM) has been asked by Warwickshire County Council (WCC) and North Warwickshire Borough Council (NWBC) to provide modelling assistance to assess the implications of allocating development through the approach identified within the emerging Local Plan.

Background

2. NWBC have provided VM and WCC with a list of all of the key development sites which are likely to come forward through the Local Plan for the purposes of testing within the existing suite of Paramics models.

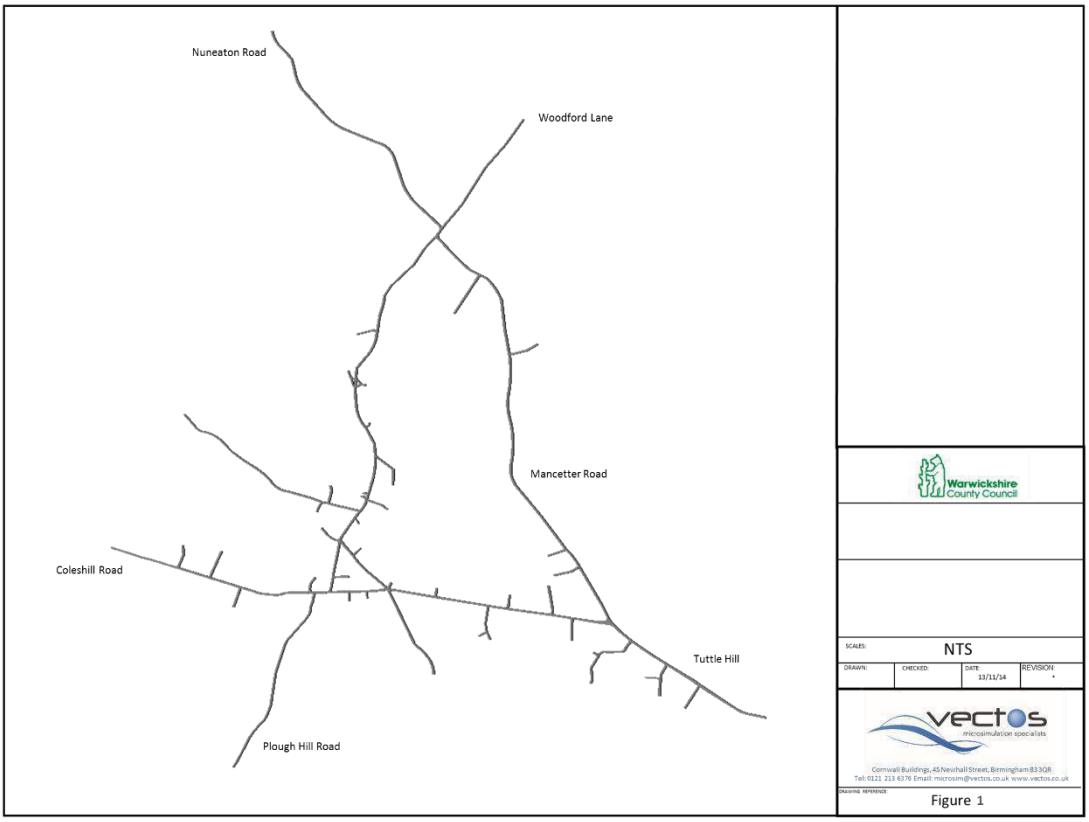
3. The majority of the sites that have been identified are in the area of the A5 and (Athersone, Dordon, Polesworth and adjacent to Tamworth) but NWBC have also indicated a desire to deliver at least some housing within the area of Hartshill.

4. It is not possible to assess the impacts of a development in Hartshill within the A5/Atherstone model due to coverage.

5. VM developed a 2015 Paramics model of the Hartshill area to assist with assessing development impacts in this area as it was considered that a higher degree of calibration was required than was reflected within the Nuneaton and Bedworth Wide Area model (NBWA) which included the Harsthill area.

6. The Hartshill model was developed to cover the area outlined within **Figure 1** below:

Figure 1: Model Extent



7. Given the volume of development that has potentially been identified for allocation within the Hartshill area it was considered prudent to assess the impacts and determine an appropriate mitigation strategy within the Hartshill model first before undertaking any more strategic level assessments which include the development considerations being put forward by Nuneaton and Bedworth Borough Council.

8. It is anticipated that the findings from this work will be fed into an assessment undertaken within the NBWA model to ensure that the development impacts are considered alongside those predicted to occur as a result of the NBBC Local Plan.

Objectives

9. The objectives of this assessment are as follows:

- To determine the likely cumulative impacts of allocating all of the development sites within the Hartshill area which have been identified.
- To identify an appropriate highway mitigation strategy to support the allocated site deliver through minimising the highway impacts.
- To undertake threshold testing to assess the incremental impacts of including the allocated sites in key phases.

10. In addition to the above, the existing 2025 Hartshill forecast model was updated to include a recently approved residential development off Plough Hill Lane.

Methodology

11. The objectives outlined previously were addressed via a number of key stages as follows:

- The 2025 Hartshill model was updated to account for any newly committed developments.
- The Local Plan sites were identified and converted into model inputs using Census distribution information and standard trip generation factors.
- The resultant demands were assigned to the model and the network performance was assessed to enable an outline infrastructure strategy to be determined.
- A sensitivity test was then undertaken whereby the development sites were reduced, alongside some key infrastructure, to identify a 'development threshold' which was the number of sites which could be accommodated within the model network before significant infrastructure measures were likely to be required.

12. The remainder of this note presents the assessment assumptions and results.

Forecasting Methodology

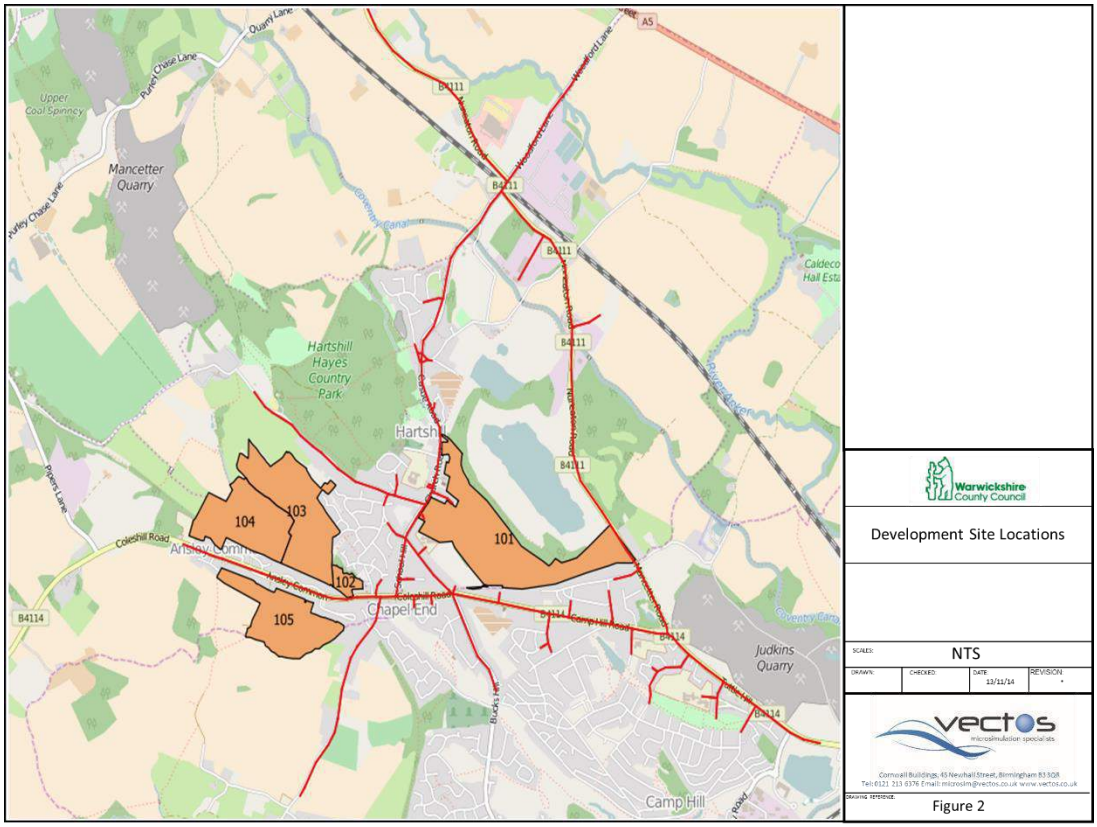
Background Growth

13. At WCC's request, the committed residential development site at Plough Hill Road has been included. The demands for this have been taken from the Planning Application model for the site which allows us to capture the in/out movements at the site access. These have then been distributed through the network using the same methodology as that which was used for the development sites as detailed below.

Development Trips

14. The location of each of the development sites included in the testing is illustrated in the following figure:

Figure 1: Development Site Locations



15. For each of these development sites the proposed dwelling numbers have been provided by WCC and are provided below:

Table 1: Development Size (dwelling numbers / hectares)

Site	Site Location	Area (Ha)	Dwelling No.s	Dwellings per HA
101	**Land between Church Road & Nuneaton Road**	30.4	400	13.2
102	**Land off Coleshill Rd, Ansley Common**	1.8	38	21.1
103	**Land north & south of Morwood Lane**	19.7	355	18.0
105	**Land south of Coleshill Road, off Bretts Hall Estate**	15.6	230	18.0
104	***Land at Common Farm, off Thorncliffe Way, Coleshill***	12.8	281*	18.0

16. Site 104 above is marked with a * because the dwelling numbers are currently unknown, and so the dwellings per hectare value of neighbouring site 103 was used to calculate the dwelling numbers based on the known size of the area.

17. These values have been multiplied by the WCC residential trip rates as tabulated below:

Table 2: WCC Residential Trip Rates

Period	In	Out	Total
0700 to 0800	0.08	0.33	0.41
0800 to 0900	0.12	0.48	0.6
0900 to 1000	0.12	0.22	0.34
0700 to 1000	0.32	1.03	1.35
1600 to 1700	0.35	0.11	0.46
1700 to 1800	0.48	0.12	0.6
1800 to 1900	0.36	0.11	0.47
1600 to 1900	1.19	0.34	1.53

18. The resultant In / Out peak hour development site demands are provided in the table below:

Table 3: Development Sites, 2025 Demands

Site	Site Location	AM		PM	
		From	To	From	To
101	**Land between Church Road & Nuneaton Road**	192	48	48	192
102	**Land off Coleshill Rd, Ansley Common**	18	5	5	18
103	**Land north & south of Morwood Lane**	170	43	43	170
105	**Land south of Coleshill Road, off Bretts Hall Estate**	135	34	34	135
104	***Land at Common Farm, off Thorncliffe Way, Coleshill Road Ansley Common (Reserve Site)***	*110*	*28*	*28*	*110*

19. Zone 104 is currently a Reserve site and so is considered as an expendable site in the testing.

20. The distribution of journeys across the model network has been informed via extraction of the likely destination of trips, using the 2011 Journey to Work (JTW) Census database. The application of this method using verified, national statistics enables a robust assessment of trip assignment exiting the developments.

21. Although Hartshill is contained within the middle super output area (MSOA) North Warwickshire 005, site distribution was calculated from two MSOA areas; Nuneaton and Bedworth 002 as well as Nuneaton and Bedworth 004. North Warwickshire 005 was subsequently discarded for distribution as the size of this MSOA includes settlements greater than 7km away. On the contrary, Nuneaton and Bedworth 002 and Nuneaton and Bedworth 004 are located south of the B4114 offering a closer geographical range and therefore provided a more accurate reflection of trip distribution. It should be noted that each site tested within this note follows the same distribution.

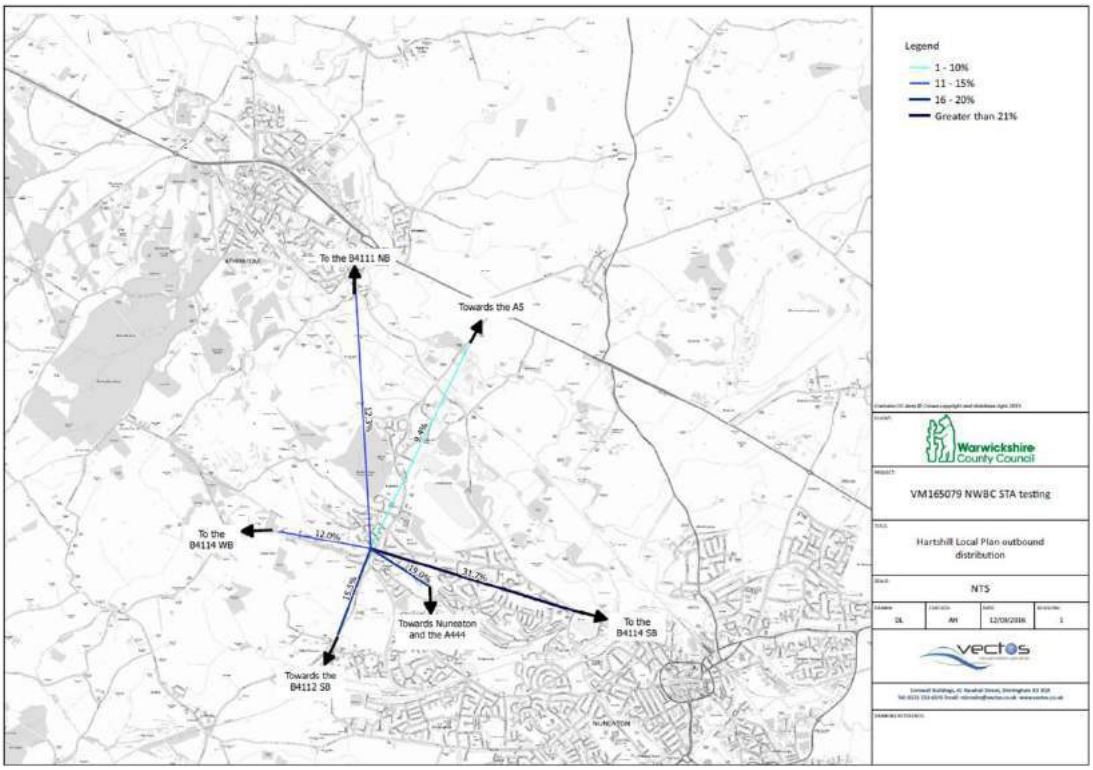
22. MSOAs with less than six trips were excluded from the final data set to refine the distributions to contain only predominant trip patterns. A summary of the distribution from Hartshill based on the MSOA names can be found in **Table 4** overleaf:

Table 4: Hartshill distribution based on 2011 JTW census disaggregated by MSOA name

MSOA name	Percentage
Nuneaton and Bedworth	41.8%
Coventry	17.7%
North Warwickshire	13.8%
Hinckley and Bosworth	7.8%
Solihull	3.1%
Warwick	3.1%
Harborough	2.9%
Rugby	2.9%
Birmingham	2.8%
Tamworth	1.2%
Daventry	0.8%
Stratford-on-Avon	0.6%
Blaby	0.5%
Lichfield	0.4%
Leicester	0.3%
North West Leicestershire	0.2%
East Staffordshire	0.1%

23. Trip route assignment into and out of the modelled area followed the most logical and cost effective route calculated by TOM TOM My Drive to the centroid of the destination MSOA. Routes were then assigned to the external Paramics zone at which the vehicle exits the model. The percentage distribution of trips through the Paramics zones can be found in **Figure 2** below:

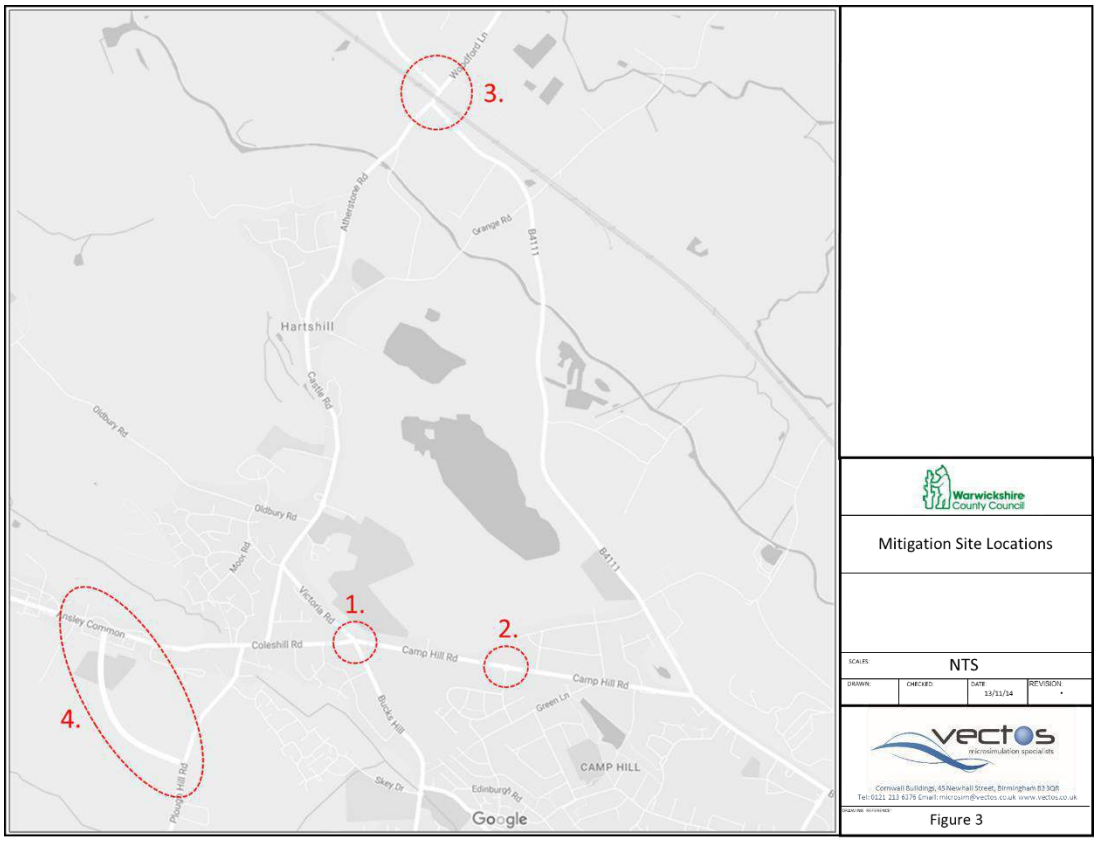
Figure 2: Hartshill Development Site Distribution



Mitigation Options

24. A series of mitigation measures have been developed for the study area, as illustrated in the Figure below:

Figure 3: Mitigation Measures



25. The measures include the following:

1. Coleshill Road / Camp Hill Road / Victoria Road / Bucks Hill Road – current priority arrangement converted to four-arm signalised junction with additional flare lanes on the approaches to Camp Hill Road, Victoria Road and Bucks Hill Road
2. Camp Hill Road / Craddock Drive – current mini roundabout converted to three-arm T-junction with two lanes on the Camp Hill Road eastbound approach to allow for right-turn stacking
3. Nuneaton Road / Woodford Lane / Atherstone Road – Nuneaton Road and Atherstone Road junction converted to three-arm signalised junction. Give-way at Nuneaton Road / Woodford Lane switched to allow Woodford Lane priority
4. Link Road between Ansley Common and Plough Hill Road (through development site south of Coleshill Road off Bretts Hall Estate)

26. A number of scenarios have been developed to test the impact of these mitigation measures.

Scenario List

27. All tests have been carried out for future year 2025, with varying degrees of mitigation and proposed development sites included. They are listed as follows:

    - 00. 2025 Reference Case Do-Nothing (DN) – current network with background growth only – no development sites included
    - 01. 2025 Reference Case Do-Minimum (DM) – current network with full allocation of development sites including the Reserve Site 104
    - 02. 2025 Partial Mitigation – mitigation measures 1, 2, and 3 included with full allocation of development sites including the Reserve site 104
    - 03. 2025 Full Mitigation – all mitigation measures included with full allocation of development sites including the Reserve Site 104

28. One of the primary reasons for testing is to identify the point at which the Link Road is necessary to allow of the build out of the various developments.

Results Analysis

29. The following provides a high level overview of the results extracted from the aforementioned model scenarios. For full comprehensive results, see spreadsheet "*VM165079.Sp01 - Scheme Test Results*"

Network Stats

30. The network statistics provide a number of Key Network Performance Indicator (KPI) comparisons.

31. In this instance, the comparisons have focussed on the average delay, in seconds, across the entire model period as well as average speeds. This information has been illustrated within **Figure 4** and **Figure 5** respectively:

Figure 4: Average Network Delay in Seconds (2025)

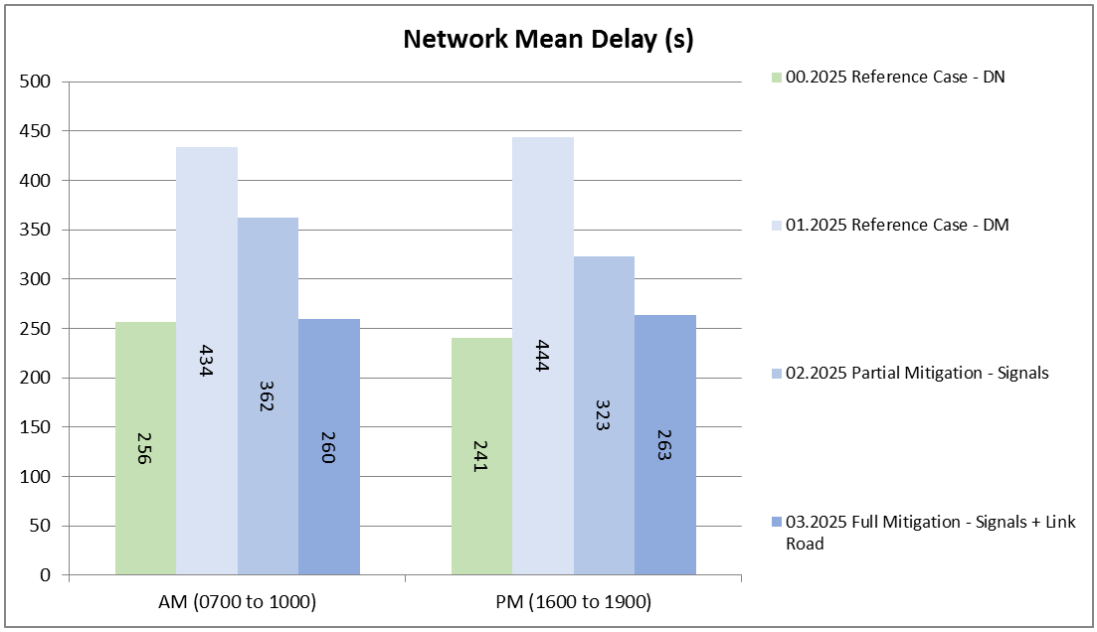
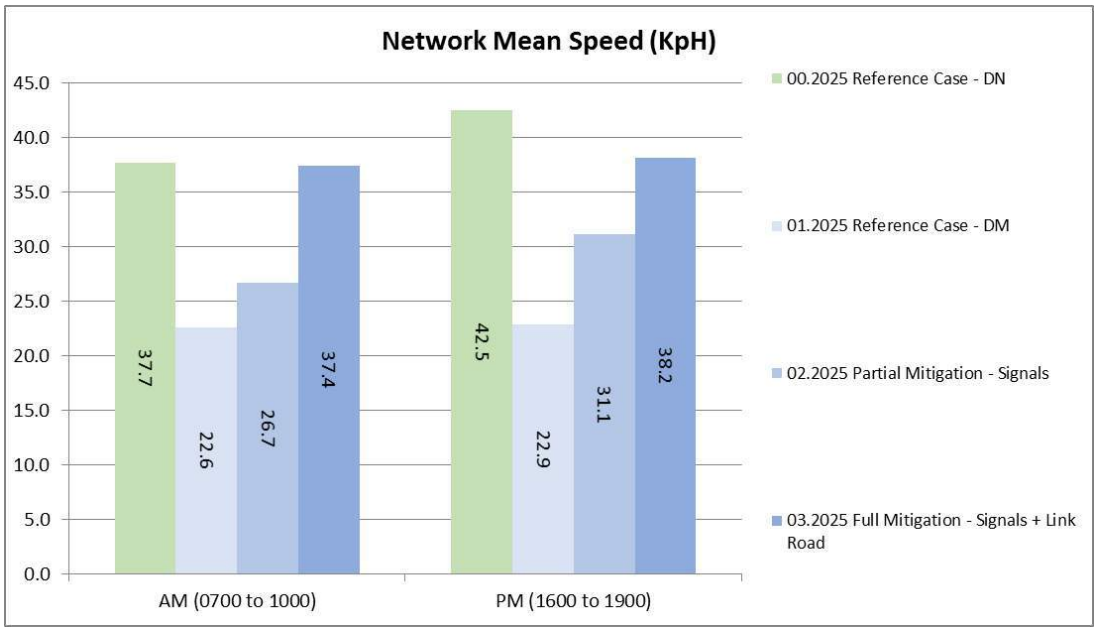


Figure 5: Average Network Speed in KpH (2025)



32. The results show the impact of the full development allocation on network delay compared with the 2025 DN scenario, where average network delay increases by 69% in the AM and 84% in the PM.

33. The Partial Mitigation scenario, which includes mitigation schemes 1, 2 and 3 in **Figure 3**, is shown to reduce delay but stills represents a large increase when compared with the DN.

34. The Full Mitigation scenario, which includes all mitigation schemes including the proposed Link between Ansley Common and Plough Hill Road, shows delay return to similar levels to the 2025 DN, before any development trips are added.

35. This suggests that in order to cater for the full allocation of developments, the Link Road will be necessary to achieve a position that is at, or at least close to nil detriment.

Queue Results

36. The Reference Case scenario suggests significant queuing is present on Plough Hill Road and Coleshill Road during both AM and PM peak periods.

37. The inclusion of the mitigation schemes along the B4114 helps to reduce queues at this junction; however queue lengths are still considered beyond acceptable levels in the Partial Mitigation scenario.

38. The inclusion of the Link Road through the Land south of Coleshill Road development site (Site 105) carries a number of vehicles away from this bottleneck which reduces queuing on the Plough Hill Road approach, however AM queues are still considered to be excessive. Due to the road layout at this junction and the associated narrow highway boundary, there is little opportunity to increase capacity.

39. The queues on Plough Hill Road during AM and PM periods across all scenarios is presented below:

Figure 6: AM Max Queue Length, Plough Hill Road (Vehicles)

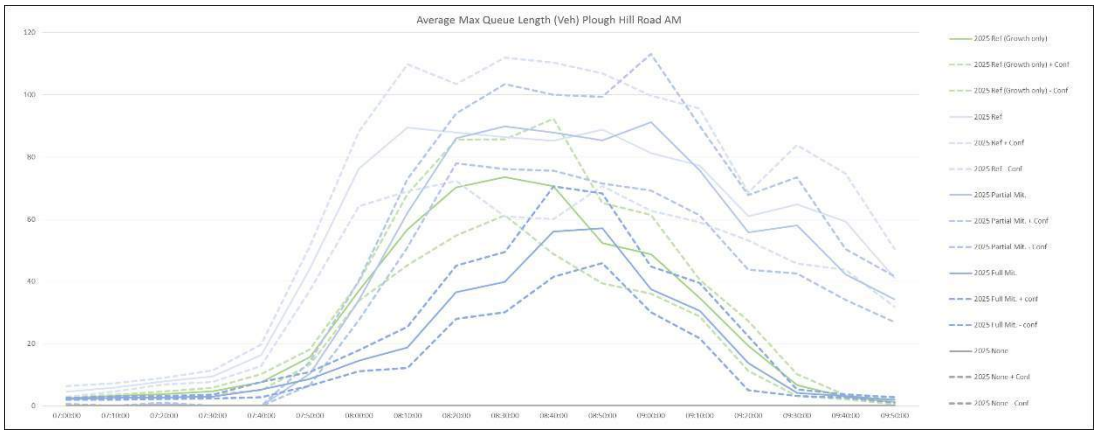
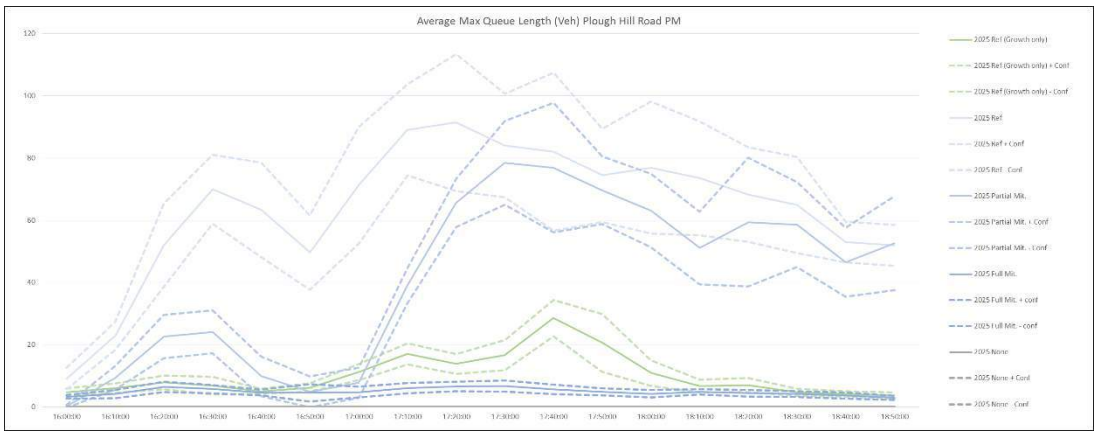


Figure 7: PM Max Queue Length, Plough Hill Road (Vehicles)



40. The Reference Case model also shows significant queuing on Bucks Hill during the AM peak period. The signalisation of the four-arm junction at Camp Hill Road appears to almost completely remove these queues. This improvement is maintained even when the Link Road is removed.

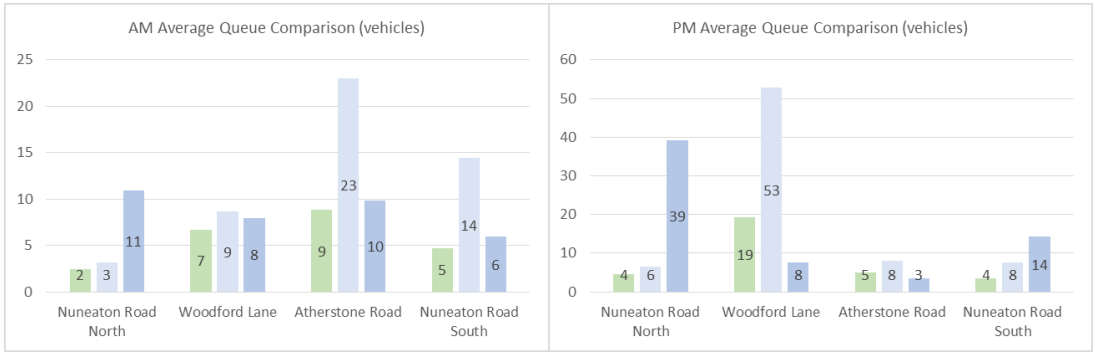
41. Queues around the Camp Hill / Mancetter Road roundabout remain relatively consistent across all scenarios due to the lack of mitigation included at this junction.

42. There are increases in queuing on the Mancetter Road southbound approach in the AM due to the greater number of conflicting traffic reaching this junction from the west. As queues around this location are localised and are not shown to impact on other junctions or cause significant issues across the network, these queues are considered acceptable.

43. The 2025 Reference Case DM scenario (i.e. inclusive of all development sites with an unchanged network), queues at the Nuneaton Road/Woodford Lane/Atherstone Road junction to the north appeared excessive. As a result a mitigation scheme was devised that signalised the Atherstone Road/Nuneaton Road junction on the south side of the railway bridge. To allow these signals to operate safely the priorities at the Nuneaton Road/Woodford Lane junction on the north side of the railway bridge had to be switched.

44. The graphs below provide an overview of the impact of these changes:

Figure 8: Queue Lengths at Nuneaton Road/Woodford Lane/Atherstone Road junction



45. The results show that in the DM, queues on Atherstone Road in the AM and Woodford Lane in the PM are excessive. The mitigation scheme controls queuing more effectively in the AM, reducing queues at 3 of the 4 approaches.

46. In the PM, the changing of priorities shifts the queue from Woodford Lane to Nuneaton Road North. Overall however queues at the junction are reduced.

Sensitivity Testing

47. Following completion of the above testing, it was considered appropriate to carry out sensitivity testing on the Partial Mitigation scenario to determine whether, and to what extent, the various developments can be delivered without the provision of the Link Road, due to concerns regarding the deliverability of such a scheme.

48. Therefore the following scenarios were developed, each time removing a development from the model demands:

- 04. 2025 Partial Mitigation – mitigation measures 1, 2, and 3 included with partial allocation of development sites (Reserve Site 104 **not** included)
- 05. 2025 Partial Mitigation – mitigation measures 1, 2, and 3 included with partial allocation of development sites (Reserve Site 104 and Site 105 **not** included)
- 06. 2025 Partial Mitigation – mitigation measures 1, 2, and 3 included with partial allocation of development sites (Reserve Site 104, Site 105 and Site 103 **not** included)
- 07. 2025 Partial Mitigation – mitigation measures 1, 2, and 3 included with partial allocation of development sites (Reserve Site 104, Site 105, Site 103 and Site 102 **not** included)

49. Site 104 is a strategic reserve and so not identified as necessary to support the delivery of the current plan period housing numbers. As such, it was considered pertinent to remove this site first on the basis that it would not impact on the overall housing delivery target if it was not included.

50. VM understand that Site 101 is currently being actively promoted and, as such, is considered to have a higher status than the alternative sites. Furthermore, its location and the ability for it to access the B4111 and Castle Road mean that, in transport impact terms, it is likely to be the most favourable of all of the sites. On that basis this site was retained in every test.

51. The gradual removal of the interim sites (102 to 105) was phased based on proximity to the existing built environment coupled with an initial review of accessibility. 104 was removed first since it lies furthest west and would be reliant upon 103 to link it in to the village.

52. Site 105 was then removed since, without the link road, all traffic from this site must access the network via Coleshill road whereas site 103 has a number of opportunities to disperse trips through the existing highway network.

53. Site 103 was removed as it is much larger than Site 102, and finally 102 was the last site to be removed.

54. This approach represents only a concept phasing and is intended to highlight the threshold for development before the link road becomes essential. In reality it is intended to serve as a guide for the development strategy but should not be considered definite.

Network Stats

55. The graphs below include results for all previous scenarios for context, along with the results for the sensitivity scenarios:

Figure 3: Average Network Delay in Seconds (2025)

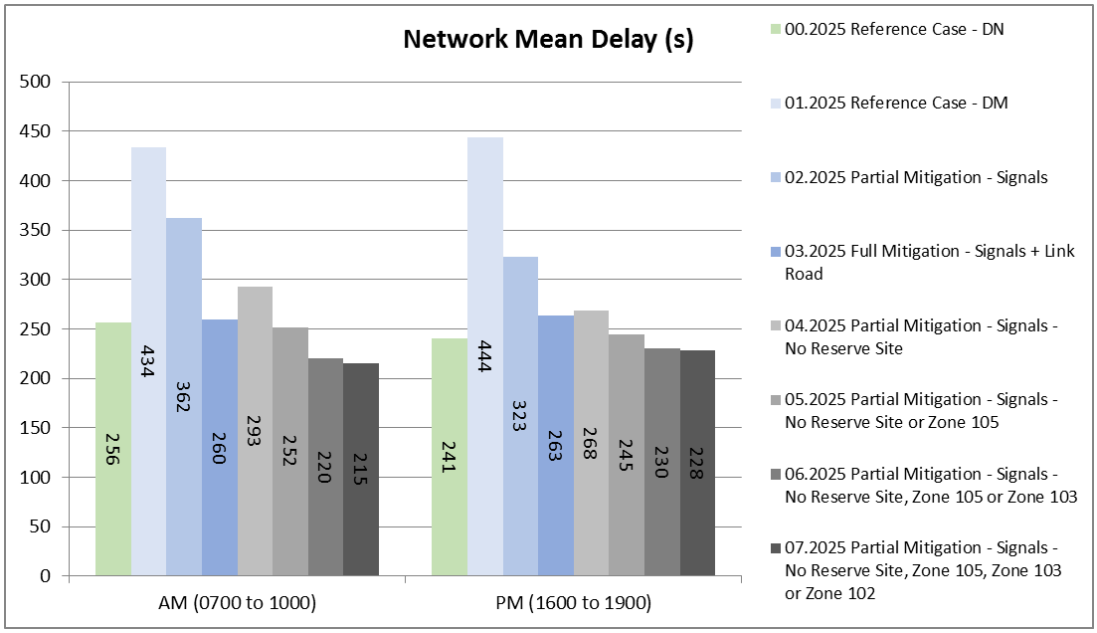
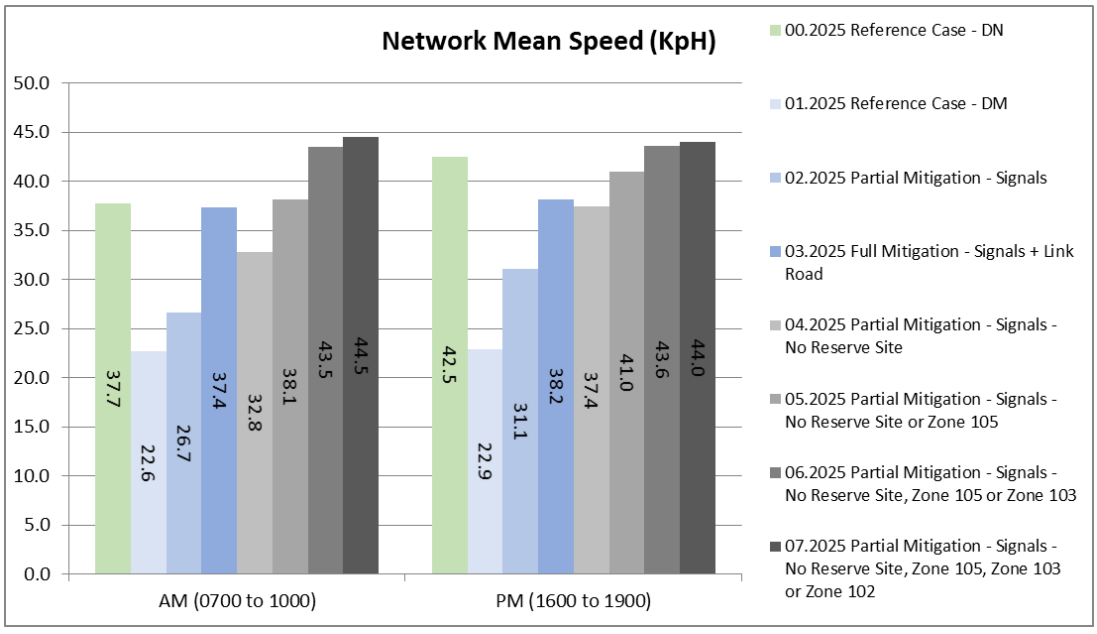


Figure 4: Average Network Speed in KpH (2025)



56. The results show the incremental reductions in delay as the development sites are removed from the scenarios.

57. By removing Reserve Site 104 and Site 105, average delay and speed return to levels present in the 2025 Reference Case DN scenario.

58. It is therefore suggested that the delivery of any further development sites over and above Sites 102 and 103 will necessitate further mitigation in the form of, or similar in magnitude to, the link road identified.

Queue Plots

59. For the purposes of this report queue outputs have been simplified into a series of queue plots that are provided in Appendix A. These plots indicate whether a particular junction shows an improvement or a worsening of queue conditions between the 2025 DN (i.e. Growth only) and each of the scenario tests (including sensitivity tests) listed above.

60. The results show the worsening of queue conditions following inclusion of development traffic at all junctions, most notably the Plough Hill Road/Coleshill Road and Nuneaton Road/Woodford Lane/Atherstone Road junctions.

61. These are improved slightly following inclusion of the Partial Mitigation scenario, however the Plough Hill Road/Coleshill Road junction still shows severe detriment in the PM peak.

62. The inclusion of the Link Road results in a reduction in queuing in both the AM and PM peak at this location. It should however be noted that whilst the queue comparisons show a favourable improvement, queue lengths on this approach in the AM are still considered excessive.

63. The queue plots for the sensitivity tests show that as developments are removed from the testing, more junctions show an improvement in queuing conditions.

Summary and Conclusions

64. Vectos Microsim (VM) have been asked by Warwickshire County Council (WCC) to test a series of mitigation options within Hartshill.

65. The scenarios include 5 proposed site options:

    i) Site 101: Land between Church Road & Nuneaton Road Hartshill

    ii) Site 102: Land off Coleshill Rd, Ansley Common

    iii) Site 103: Land north & south of Morwood Lane, Hartshill

    iv) Site 105: Land south of Coleshill Road, off Bretts Hall Estate, Ansley Common

    v) Site 104: Land at Common Farm, off Thorncliffe Way, Coleshill Road Ansley Common

66. The initial scheme testing results suggested that the impacts of including all of these developments could be partially offset by including mitigation schemes along the B4114. However extensive queues are still present on Coleshill Road during the AM, and Plough Hill Road in both AM and PM peak periods.

67. The proposed mitigation at the Nuneaton Road/Woodford Lane junction at the north of the model appears to generally improve queuing conditions on both sides of the railway bridge. The predominant queue is however shifted from Woodford Lane to Nuneaton Road following the rearrangement of priorities and the wider implications of this on routing beyond the extent of this model should be considered.

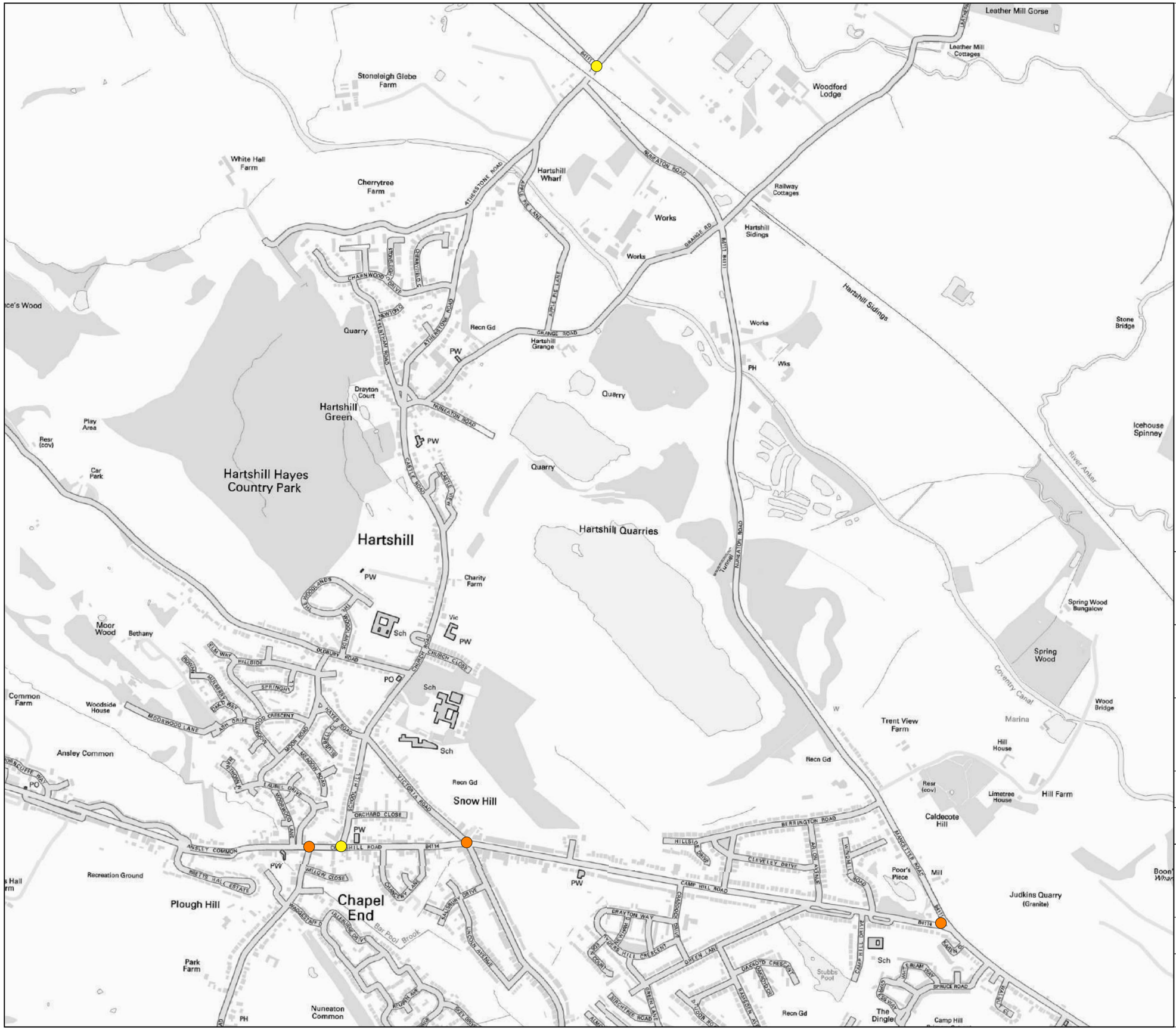
68. The inclusion of a Link Road between Ansley Common and Plough Hill Road, through the proposed development Site 105, significantly reduces queuing along Coleshill Road as traffic is afforded an alternative route between here and Plough Hill Road, therefore drawing traffic away from the junction which is constrained by the restrictive highway boundaries and poor visibility.

69. It is accepted however that such a Link Road may be challenging to deliver. Therefore sensitivity testing was carried out to determine the level of additional traffic that can be delivered based on the outputs of the impact analysis completed thus far.

70. On this basis, the small-scale network improvements (no Link Road) can ensure that Sites 101, 102 and 103 can be included with little detriment to the overall network statistics, when compared with the 2025 Reference Case that includes the current highway network and background growth only. This equates to a total estimated number of approx. 800 dwellings in and around Hartshill.

71. It should however be noted that the 2025 Reference Case exhibits queue lengths along Plough Hill Road that may be considered in excess of acceptable limits.

Appendix A



Legend

- Less than -5 Vehicles
- Between +15 and +30 Vehicles
- Between +30 and +50 Vehicles
- Greater than 50 Vehicles

CLIENT: Warwickshire County Council

PROJECT:

VM165079 NWBC
Strategic Transport Assessment

TITLE:

2025 Ref DN Vs 2025 Ref DM
AM 07:00 - 10:00
Average Maximum Queue
(Maximum)

SCALE: NTS

DRAWN:	CHECKED:	DATE:	REVISION:
TO	AH	15/09/2016	1

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Cornwall Buildings, 45 Newhall Street, Birmingham B3 3QR
Tel: 0121 213 6376 Email: microsim@vectos.co.uk www.vectos.co.uk

DRAWING REFERENCE:

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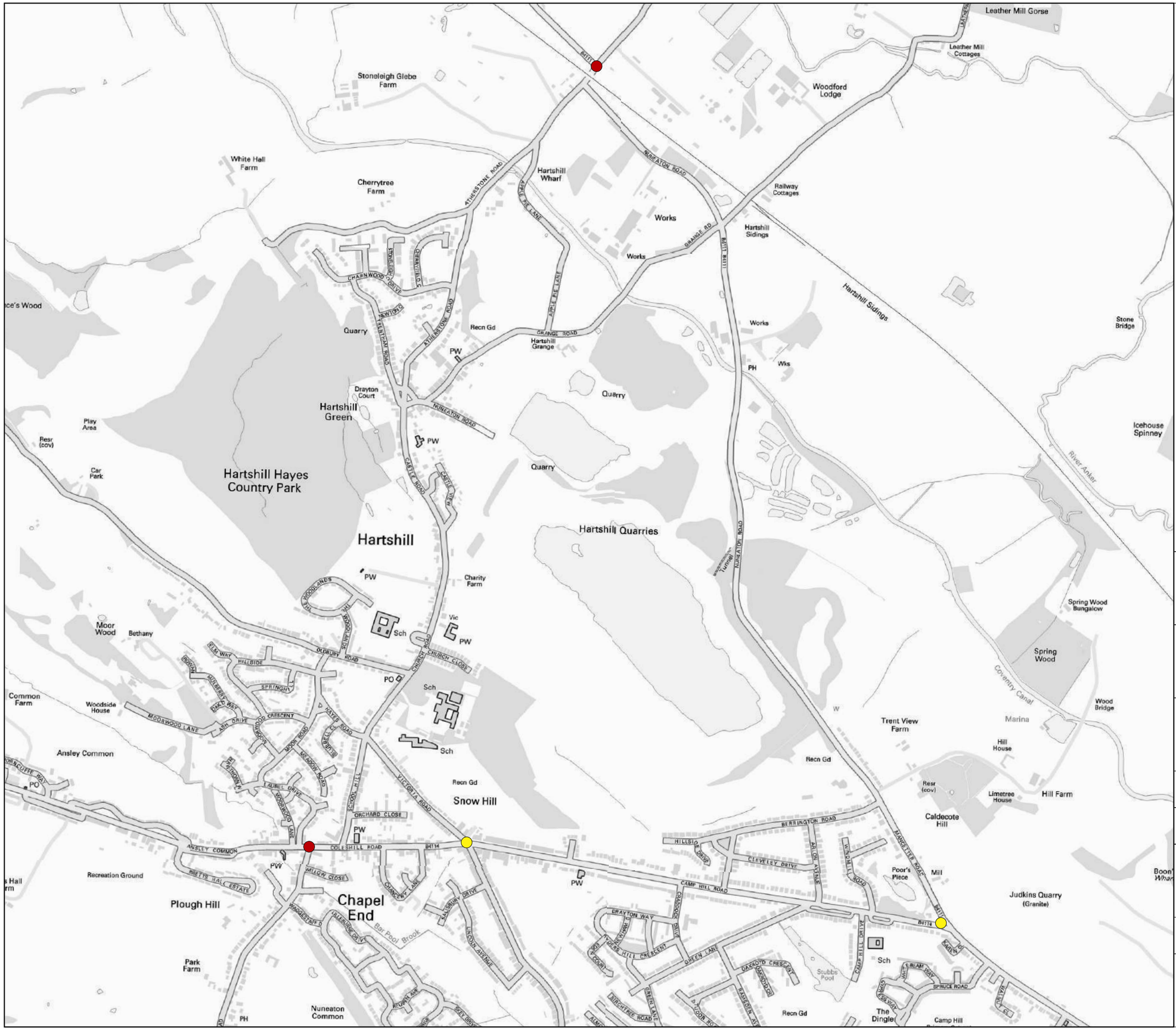

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- Greater than 50 Vehicles

CLIENT:

Warwickshire County Council

PROJECT:

VM165079 NWBC
Strategic Transport Assessment

TITLE:

2025 Ref DN Vs 2025 Ref DM
PM 16:00 - 19:00
Average Maximum Queue
(Maximum)

SCALE:

NTS

DRAWN:	CHECKED:	DATE:	REVISION:
TO	AH	15/09/2016	1

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MQ 002 MAX

Legend

- Less than -5 Vehicles
- Between +15 and +30 Vehicles
- Between +30 and +50 Vehicles
- Greater than 50 Vehicles

CLIENT: Warwickshire County Council

PROJECT:

VM165079 NWBC
Strategic Transport Assessment

TITLE:

2025 Ref DN Vs 2025 No Link Road
AM 07:00 - 10:00
Average Maximum Queue
(Maximum)

SCALE: NTS

DRAWN:	CHECKED:	DATE:	REVISION:
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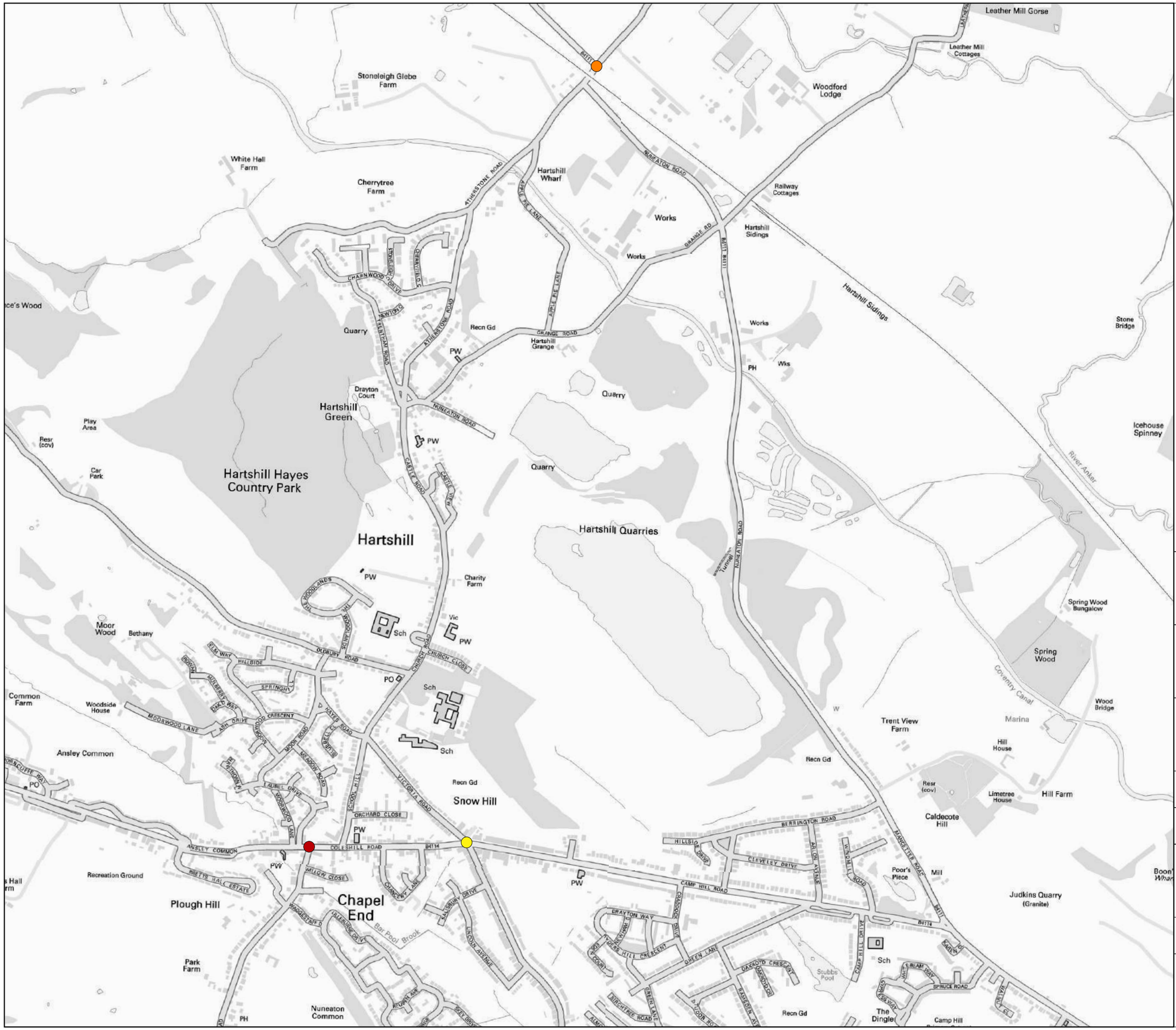

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- Between +15 and +30 Vehicles
- Between +30 and +50 Vehicles
- Greater than 50 Vehicles

CLIENT: Warwickshire County Council

PROJECT:

VM165079 NWBC
Strategic Transport Assessment

TITLE:

2025 Ref DN Vs 2025 No Link Road
PM 16:00 - 19:00
Average Maximum Queue
(Maximum)

SCALE: NTS

DRAWN:	CHECKED:	DATE:	REVISION:
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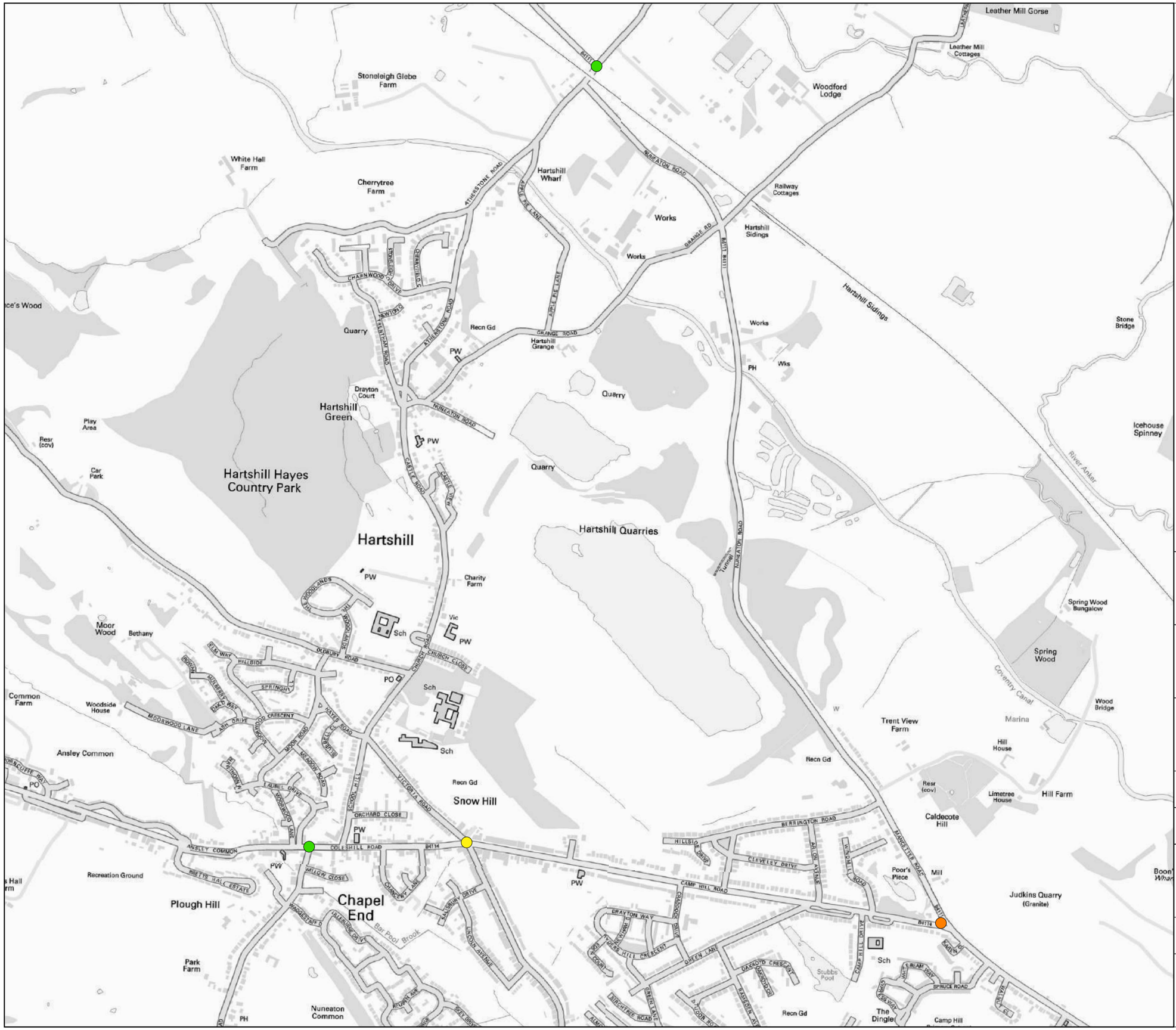

CLIENT:

Warwickshire County Council

PROJECT:

VM165079 NWBC
Strategic Transport Assessment

TITLE:

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AM 07:00 - 10:00
Average Maximum Queue
(Maximum)

SCALE:

NTS

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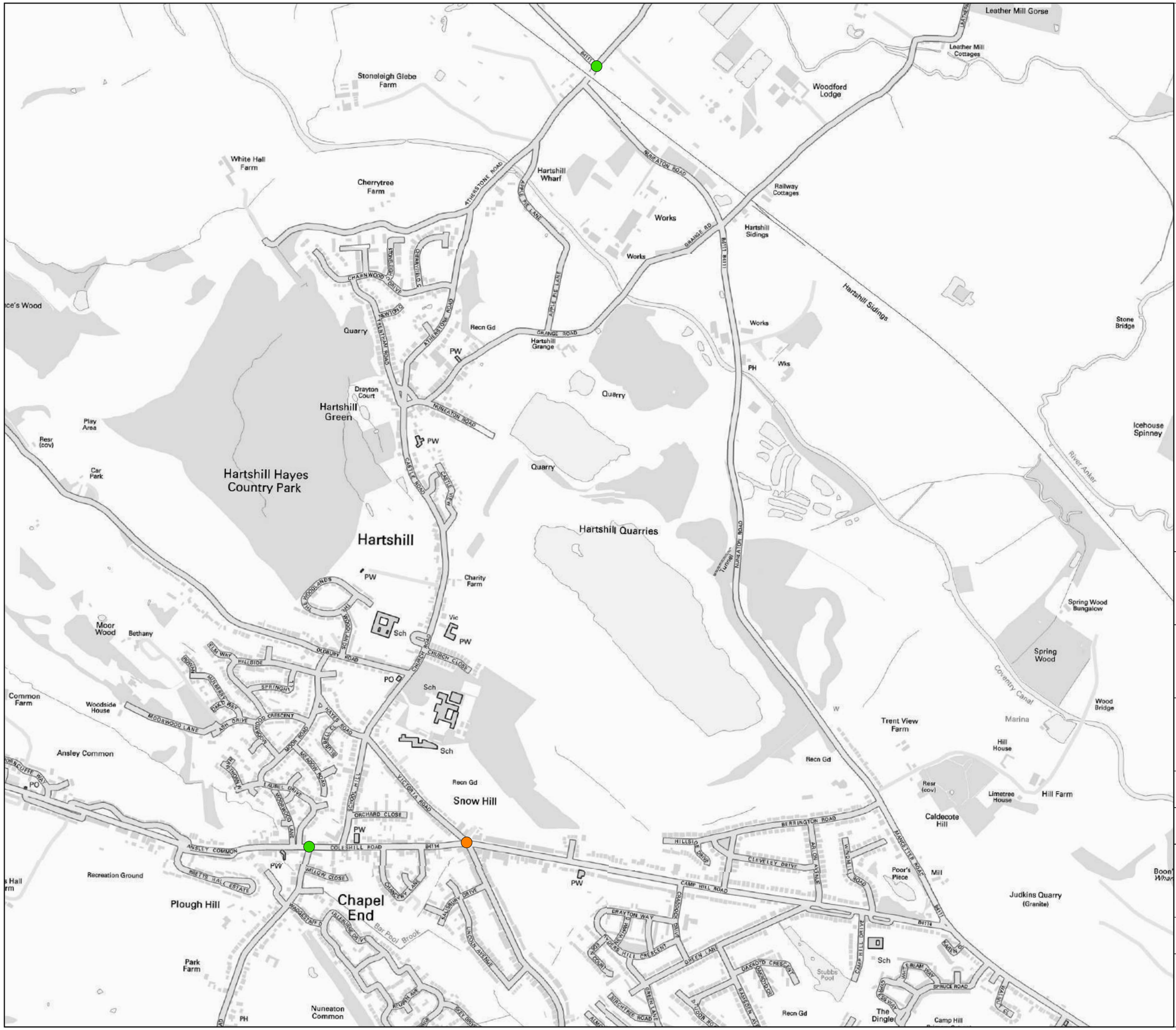

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- Between +15 and +30 Vehicles
- Between +30 and +50 Vehicles
- Greater than 50 Vehicles

CLIENT: Warwickshire County Council

PROJECT:

VM165079 NWBC
Strategic Transport Assessment

TITLE:

2025 Ref DN Vs 2025 DS
PM 16:00 - 19:00
Average Maximum Queue
(Maximum)

SCALE: NTS

DRAWN:	CHECKED:	DATE:	REVISION:
TO	AH	15/09/2016	1

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DRAWING REFERENCE:

MQ 006 MAX

Legend

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- Between +15 and +30 Vehicles
- Between +30 and +50 Vehicles
- Greater than 50 Vehicles

CLIENT: Warwickshire County Council

PROJECT:

VM165079 NWBC
Strategic Transport Assessment

TITLE:

2025 Ref DN Vs 2025 No Link Road
No Reserve
AM 07:00 - 10:00
Average Maximum Queue

SCALE: NTS

DRAWN:	CHECKED:	DATE:	REVISION:
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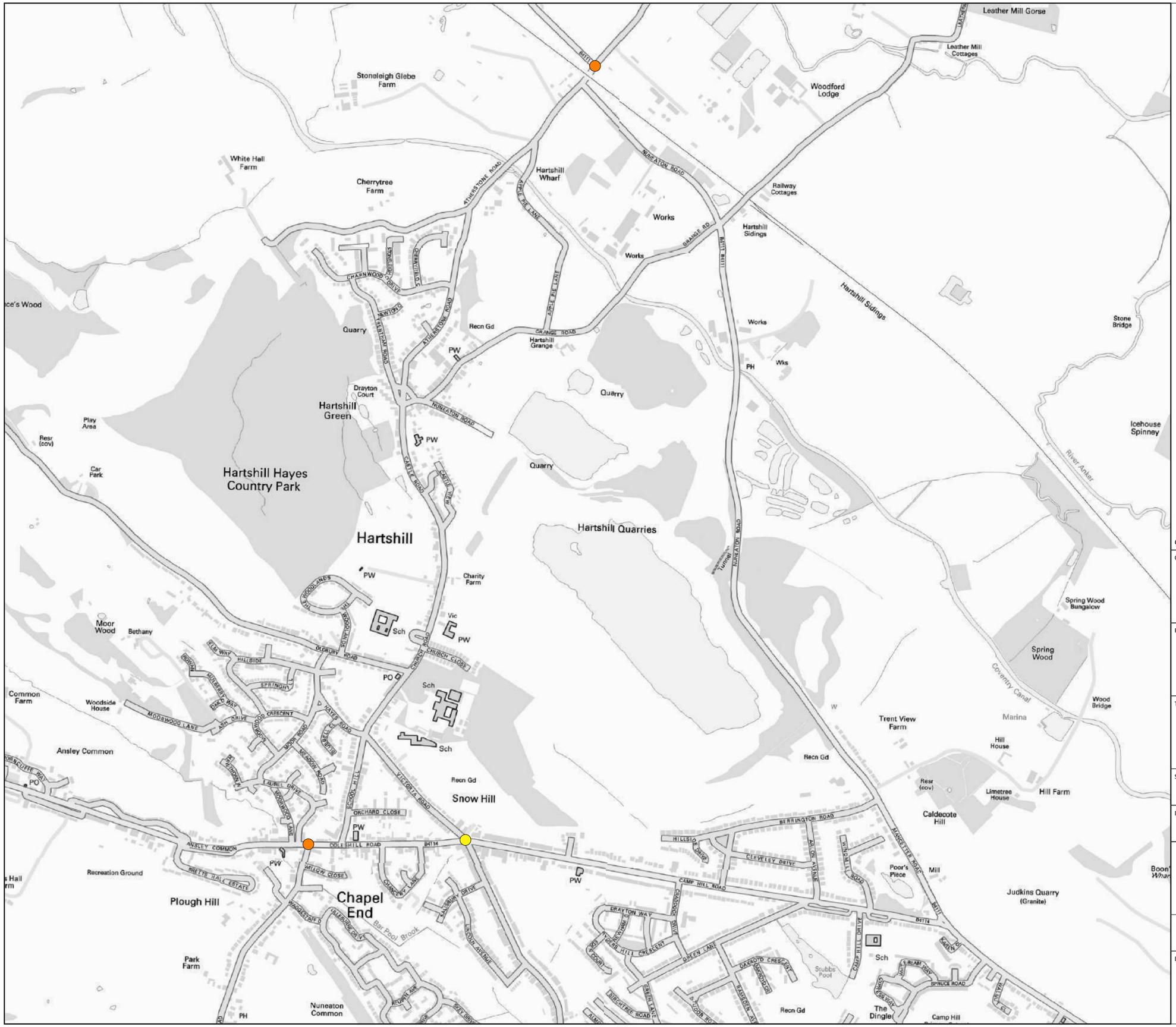

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- Between +15 and +30 Vehicles
- Between +30 and +50 Vehicles
- Greater than 50 Vehicles

CLIENT: Warwickshire County Council

PROJECT:

VM165079 NWBC
Strategic Transport Assessment

TITLE:

2025 Ref DN Vs 2025 No Link Road
No Reserve
PM 16:00 - 19:00
Average Maximum Queue

SCALE: NTS

DRAWN:	CHECKED:	DATE:	REVISION:
TO	AH	15/09/2016	1

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DRAWING REFERENCE:

MQ 008 MAX

Legend

- Less than -5 Vehicles
- Between +15 and +30 Vehicles
- Between +30 and +50 Vehicles
- Greater than 50 Vehicles

CLIENT:

Warwickshire County Council

PROJECT:

VM165079 NWBC
Strategic Transport Assessment

TITLE:

2025 Ref DN Vs 2025 No Link Road
No Reserve No.105
AM 07:00 - 10:00
Average Maximum Queue

SCALE:

NTS

DRAWN:	CHECKED:	DATE:	REVISION:
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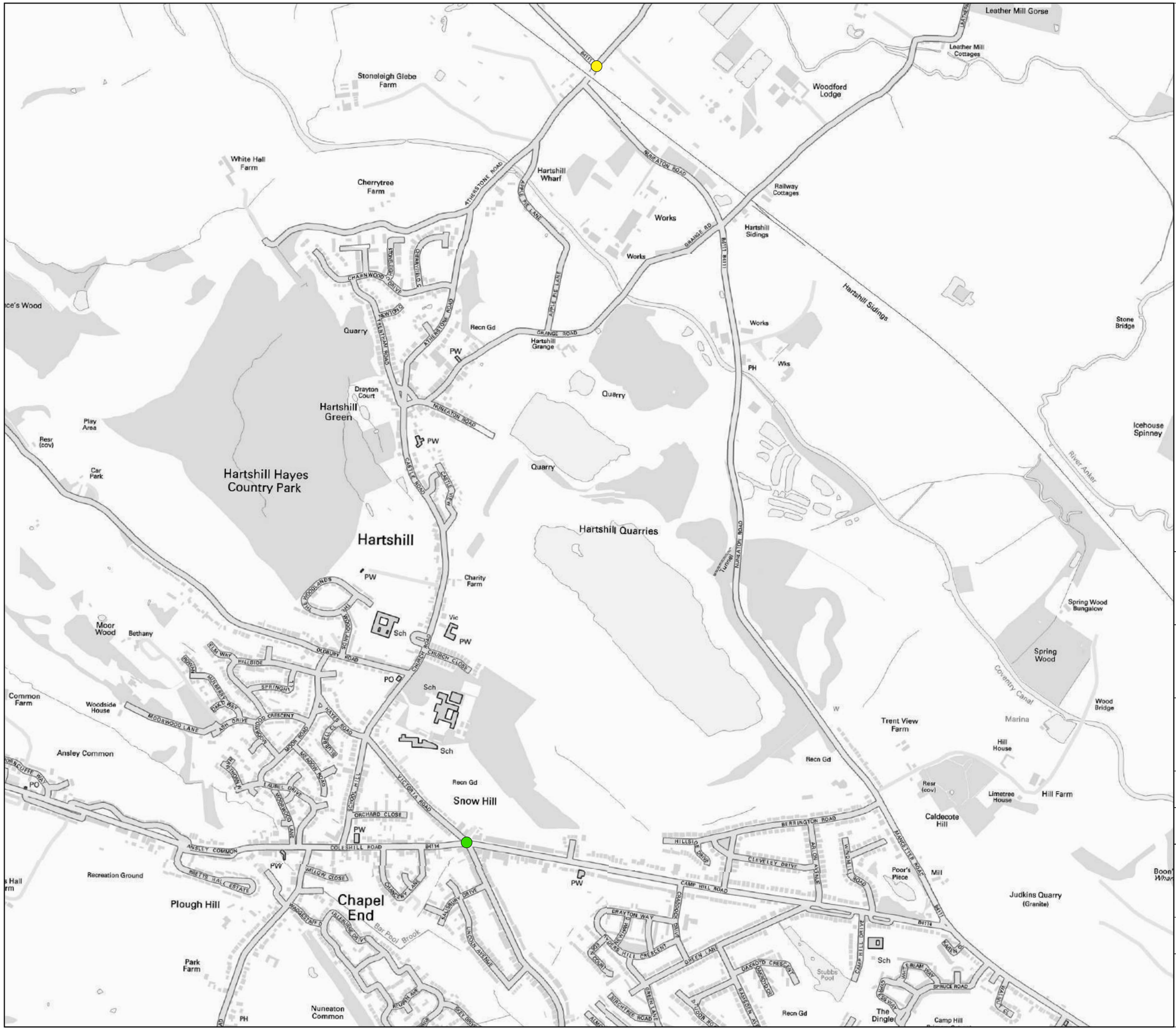

Legend

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- Between +15 and +30 Vehicles
- Between +30 and +50 Vehicles
- Greater than 50 Vehicles

CLIENT: Warwickshire County Council

PROJECT:

VM165079 NWBC
Strategic Transport Assessment

TITLE:

2025 Ref DN Vs 2025 No Link Road
No Reserve No.105
PM 16:00 - 19:00
Average Maximum Queue

SCALE: NTS

DRAWN:	CHECKED:	DATE:	REVISION:
TO	AH	15/09/2016	1

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DRAWING REFERENCE:

MQ 010 MAX

Legend

- Less than -5 Vehicles
- Between +15 and +30 Vehicles
- Between +30 and +50 Vehicles
- Greater than 50 Vehicles

CLIENT: Warwickshire County Council

PROJECT:

VM165079 NWBC
Strategic Transport Assessment

TITLE:

2025 Ref DN Vs 2025 No Link Road
No Reserve No.105,103
AM 07:00 - 10:00
Average Maximum Queue

SCALE: NTS

DRAWN:	CHECKED:	DATE:	REVISION:
TO	AH	15/09/2016	1

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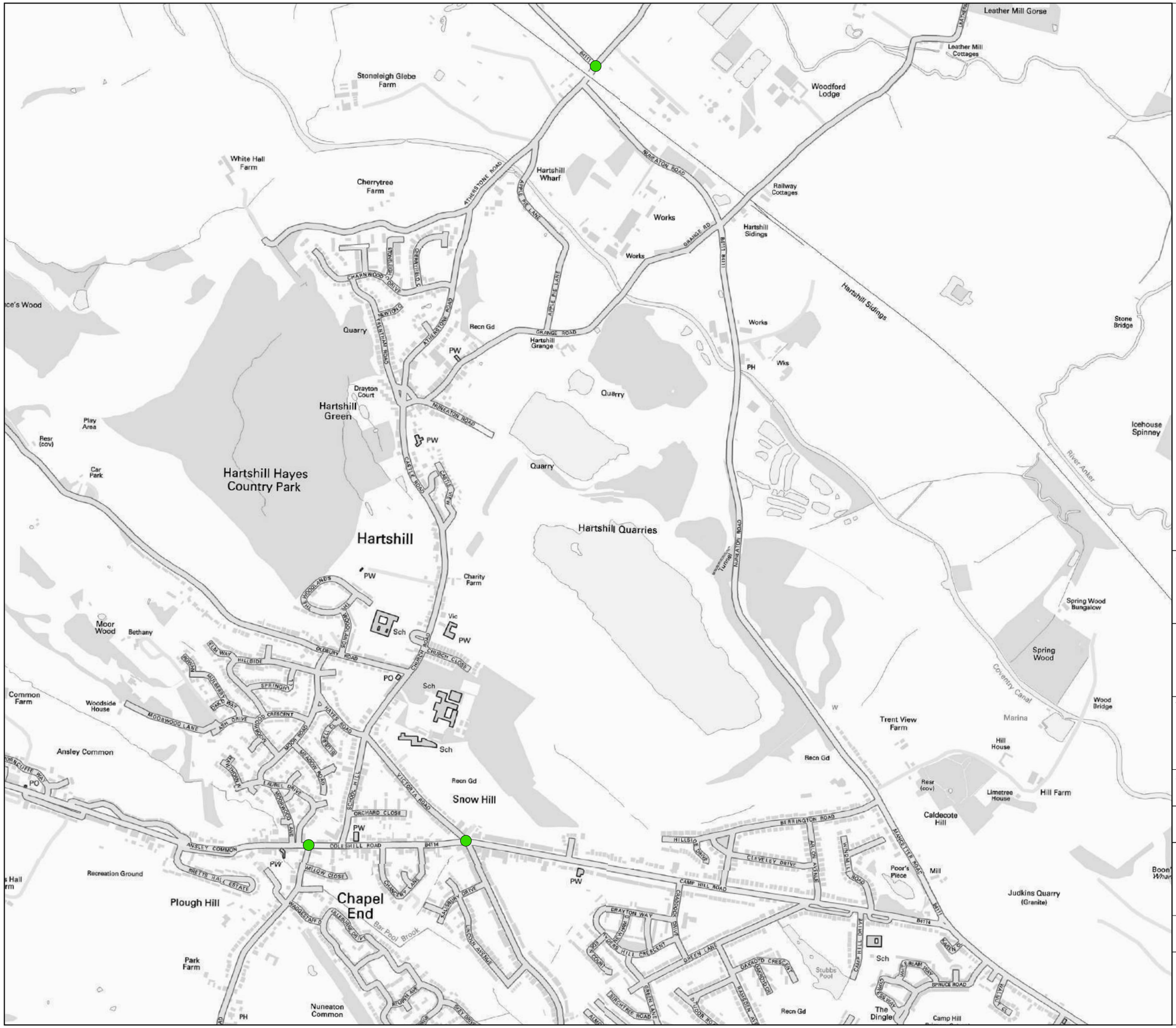

Legend

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- Between +15 and +30 Vehicles
- Between +30 and +50 Vehicles
- Greater than 50 Vehicles

CLIENT: Warwickshire County Council

PROJECT:

VM165079 NWBC
Strategic Transport Assessment

TITLE:

2025 Ref DN Vs 2025 No Link Road
No Reserve No.105,103
PM 16:00 - 19:00
Average Maximum Queue

SCALE: NTS

DRAWN:	CHECKED:	DATE:	REVISION:
TO	AH	15/09/2016	1

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DRAWING REFERENCE:

MQ 012 MAX

Legend

- Less than -5 Vehicles
- Between +15 and +30 Vehicles
- Between +30 and +50 Vehicles
- Greater than 50 Vehicles

CLIENT: Warwickshire County Council

PROJECT:

VM165079 NWBC
Strategic Transport Assessment

TITLE:

2025 Ref DN Vs 2025 No Link Road
No Reserve No.105,103,102
AM 07:00 - 10:00
Average Maximum Queue

SCALE: NTS

DRAWN:	CHECKED:	DATE:	REVISION:
TO	AH	15/09/2016	1

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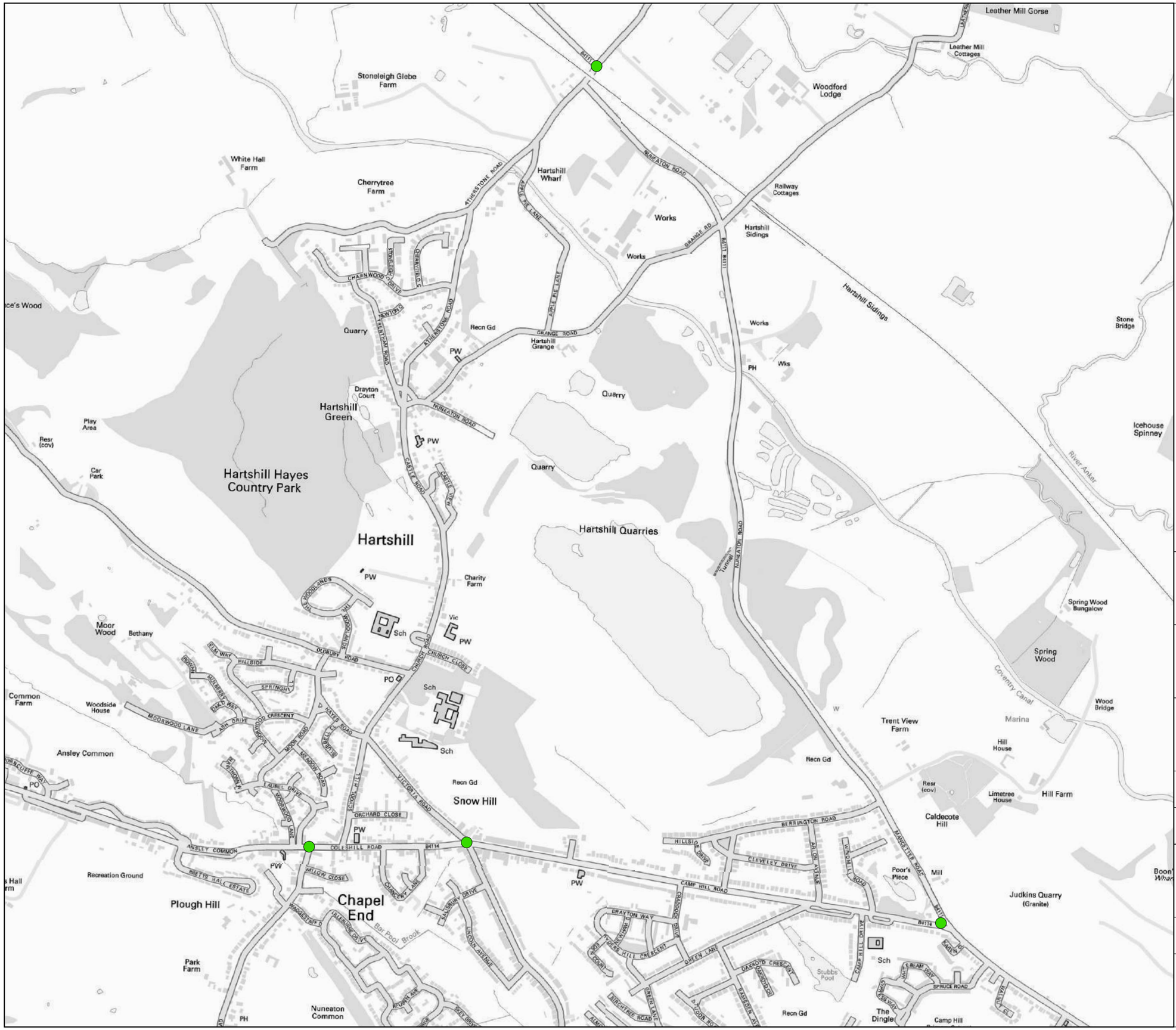

Legend

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- Between +15 and +30 Vehicles
- Between +30 and +50 Vehicles
- Greater than 50 Vehicles

CLIENT: Warwickshire County Council

PROJECT:

VM165079 NWBC
Strategic Transport Assessment

TITLE:

2025 Ref DN Vs 2025 No Link Road
No Reserve No.105,103,102
PM 16:00 - 19:00
Average Maximum Queue

SCALE: NTS

DRAWN:	CHECKED:	DATE:	REVISION:
TO	AH	15/09/2016	1

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Tel: 0121 213 6376 Email: microsim@vectos.co.uk www.vectos.co.uk

DRAWING REFERENCE:

MQ 014 MAX

NWBC STA Testing –
Hartshill Mitigation Scheme Refinement

Project title	NWBC STA Testing	Job number	VM165079
cc	Warwickshire County Council	File reference	TN.002
Prepared by	AH	Date	10 October 2016

Introduction

1. Vectos Microsim (VM) has been asked by Warwickshire County Council (WCC) and North Warwickshire Borough Council (NWBC) to provide modelling assistance to assess the implications of allocating development through the approach identified within the emerging Local Plan.

2. This document forms the second part of the scheme option testing and refinement process and should be read in conjunction with "*VM165079 TN1 - NWBC STA Testing Hartshill"* (known hereon as TN1).

Background

3. The first round of testing, as documented in TN1, sought to determine an appropriate mitigation strategy required as a result of including all allocated development sites around Hartshill.

4. Furthermore, sensitivity testing was carried out to determine whether a phased approach to the delivery of the identified mitigation schemes would enable the various development sites to come forward in a similarly phased manner. Ultimately the work sought to determine whether the smaller-scale mitigation identified (i.e. *not* including the Western Link Road) could help deliver some or all of the allocated development sites.

5. The work concluded that three of the development sites could be included with little detriment to the overall network statistics, when compared with the 2025 Reference Case that includes the current highway network and background growth only, equating to a total estimated number of approx. 800 dwellings in and around Hartshill. It was noted however that the 2025 Reference Case exhibited queue lengths along Plough Hill Road that may be considered in excess of acceptable limits.

6. This second stage of testing will look to further refine the mitigation proposals in light of initial feedback from WCC in terms of deliverability, preferred alignments and other alternative suggestions.

Objectives

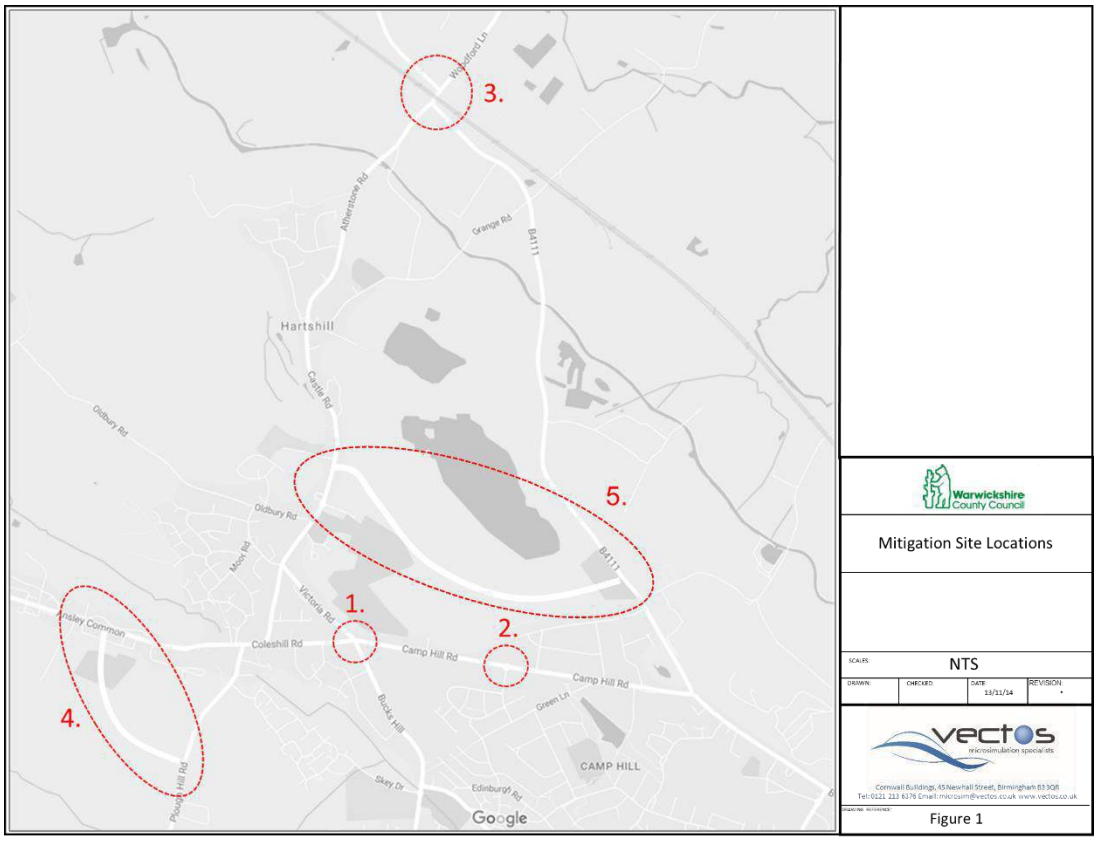
7. The objectives of this assessment are as follows:

- To further investigate the impacts of various packages of the mitigation options previously outlined and refinement of those options (including investigating the necessity of the signalisation crossroads scheme at Coleshill Road / Camp Hill Road / Victoria Road / Bucks Hill Road, and any improvements to the junction between the Western Link Road and Ansley Common)
- To investigate the effectiveness of an alternative Link Road linking Church Road to Mancetter Road

Mitigation Options

8. A series of mitigation measures were developed for the study area, as illustrated in the Figure below; this Figure also includes the additional Link Road between Church Road and Mancetter Road:

Figure 1: Mitigation Measures



9. The measures include the following:

    1. Coleshill Road / Camp Hill Road / Victoria Road / Bucks Hill Road – current priority arrangement converted to four-arm signalised junction with additional flare lanes on the approaches to Camp Hill Road, Victoria Road and Bucks Hill Road
    2. Camp Hill Road / Craddock Drive – current mini roundabout converted to three-arm T-junction with two lanes on the Camp Hill Road eastbound approach to allow for right-turn stacking
    3. Nuneaton Road / Woodford Lane / Atherstone Road – Nuneaton Road and Atherstone Road junction converted to three-arm signalised junction. Give-way at Nuneaton Road / Woodford Lane switched to allow Woodford Lane priority
    4. Link Road between Ansley Common and Plough Hill Road (through development site south of Coleshill Road off Bretts Hall Estate) (referred to as "Western Link Road") – following results presented in *VM165079.Sp02 - Scheme Test Results_v2,* the Link Road now includes a 2-lane section on the immediate approach to the give-way with Ansley Common
    5. Link Road between Church Road and Mancetter Road (hereon referred to as "Eastern Link Road")

10. The schemes at Camp Hill Road / Craddock Drive (2.) and Nuneaton Road / Woodford Lane / Atherstone Road (3.) are maintained throughout this additional testing due to their relatively low impact on cost / land-take etc, and due to the results of the initial round of testing which suggested they were of benefit to the network.

Scenario List

11. All tests have been carried out for future year 2025, with varying degrees of mitigation and with all development sites included. They are listed as follows:

    - 00. 2025 Reference Case Do-Nothing (DN) – current network with background growth only – no development sites included
    - 01. 2025 Reference Case Do-Minimum (DM) – current network with full allocation of development sites
    - 02. 2025 Partial Mitigation – mitigation measures 1, 2, and 3
    - 03. 2025 Partial Mitigation – mitigation measures 1, 2, 3, and 4
    - 08. 2025 Full Mitigation – mitigation measures 1, 2, 3, 4 and 5
    - 09. 2025 Partial Mitigation – mitigation measures 1, 2, 3 and 5
    - 10. 2025 Partial Mitigation – mitigation measures 2, 3, 4 and 5
    - 11. 2025 Partial Mitigation – mitigation measures 2, 3, and 5
    - 12. 2025 Partial Mitigation – mitigation measures 2, 3, and 4

12. The non-sequential numbers above are a result of this second round of testing leading on from the first, which includes scenario numbers 00-07. Scenarios 00-03 are brought forward to this testing for comparison purposes (although results for Scenario 03. will be slightly different compared with those presented in TN1 due to the update to the Link Road approach to, and junction with, Ansley Common, as highlighted in para.9)

13. The reasons for these tests are primarily that it is believed that available land space, geometry and prevalence of on-street parking around the Coleshill Road / Camp Hill Road / Victoria Road / Bucks Hill Road junction will make any signalisation scheme difficult to deliver. It was therefore felt necessary to explore other options, and combinations of options, to ensure a full robust assessment of the area.

14. Also VM understand that an Eastern Link Road has been mooted as a possible solution in the past; this study provides a useful platform upon which to include this proposed scheme.

Results Analysis

15. The following provides a high level overview of the results extracted from the aforementioned model scenarios. For full comprehensive results, see spreadsheet "*VM165079.Sp04 – Eastern Link Road Scheme Testing and Refinement Results*"

Network Stats

16. The network statistics provide a number of Key Network Performance Indicator (KPI) comparisons.

17. In this instance, the comparisons have focussed on the average delay, in seconds, across the entire model period as well as average speeds. This information has been illustrated within **Figure 2** and **Figure 3** respectively:

Figure 2: Average Network Delay in Seconds (2025)

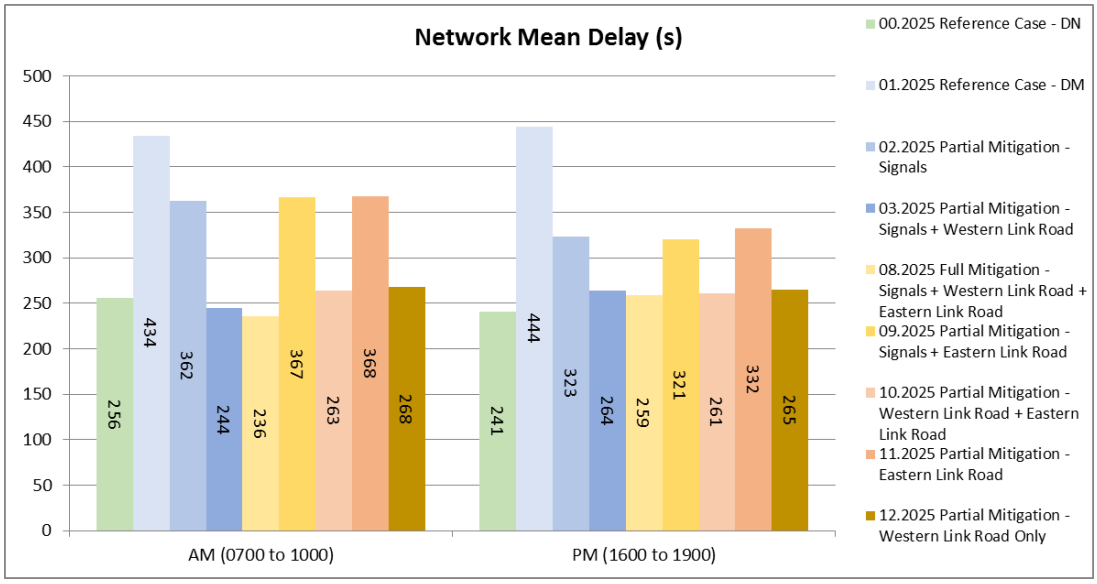
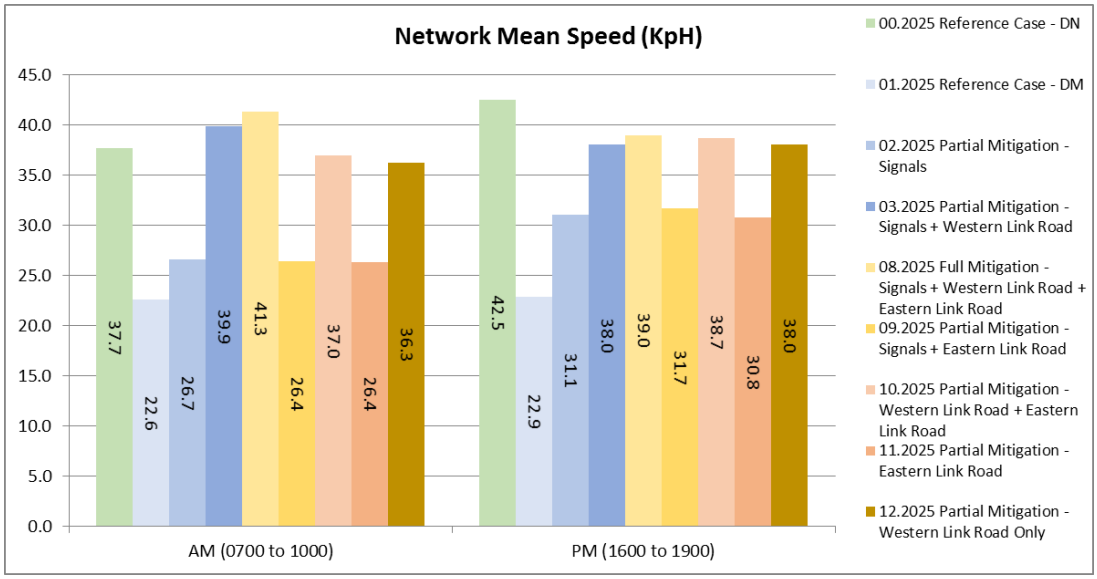


Figure 3: Average Network Speed in KpH (2025)



18. Results for Scenarios 00, 01 and 02 remain consistent with previous testing. Results for Scenario 03 demonstrate a reduction in network delay following inclusion of the 2-lane approach on the Western Link Road.

19. The results for Scenarios 08-12 show consistent patterns during both AM and PM peak periods that suggest:

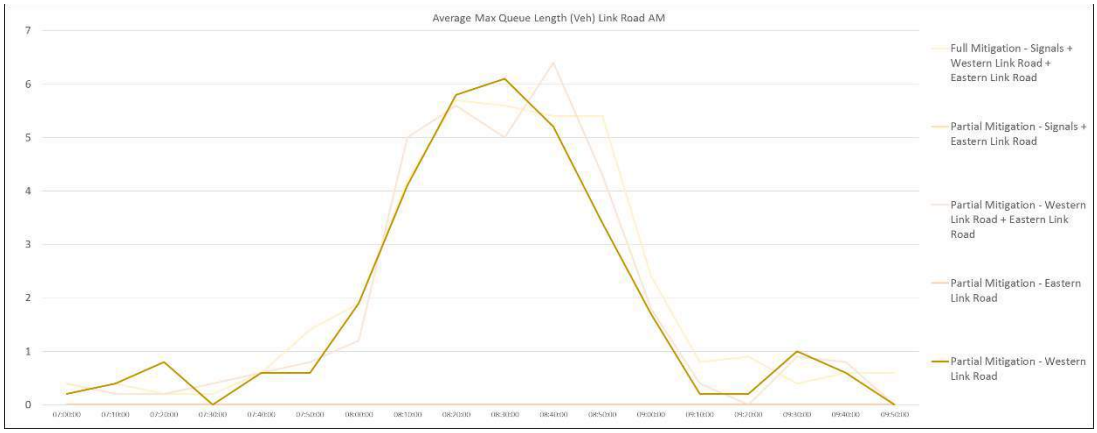
- Scenarios that do not include the Western Link Road (09 and 11) result in network delay levels that may be considered excessive. Analysis of the results spreadsheet suggests that much of this delay can be attributed to the capacity constraints at the Plough Hill Road/Coleshill Road junction
- The full package of mitigation measures present in Scenario 08 represent the most positive results set, with network delay at its lowest compared with all other scenarios
- Removal of the signals at the Victoria Road/Bucks Hill junction and reversion back to priority rules creates significant queuing on Bucks Hill northbound during the AM peak
- Removal of the Eastern Link Road results in marginally greater network delay values during the AM and PM peak. The Eastern Link Road carries a number of vehicles away from the Victoria Road approach and so in removing it, queues on this arm increase during the AM peak, therefore contributing to the slight increase in network delay.

Queue Results

20. The explanations from above can be elaborated upon by comparing specific queue lengths between each of these mitigation packages.

21. The graph below presents the AM results for queues along the Western Link Road:

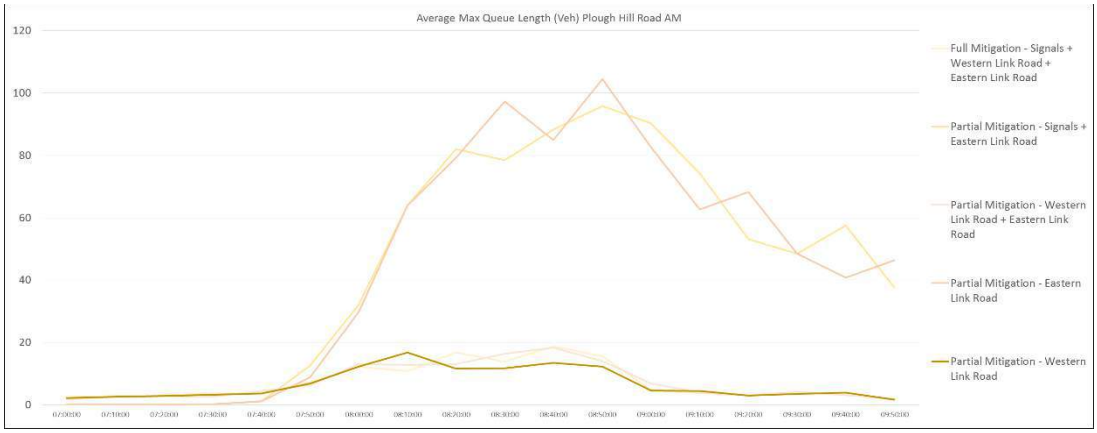
Figure 4: AM Average Max Queue Length, Western Link Road (Vehicles)



22. The queue lengths in Scenarios 09 and 11 (i.e. the only mitigation Scenarios which contain this link), show queue lengths peaking at approximately 6 vehicles. As provided in TN1 and spreadsheet "*VM165079.Sp02 - Scheme Test Results_v2"*, queue lengths on this arm were previously extended to approximately 60-70 vehicles. This demonstrates the effectiveness of the revision to incorporate a 2-lane approach.

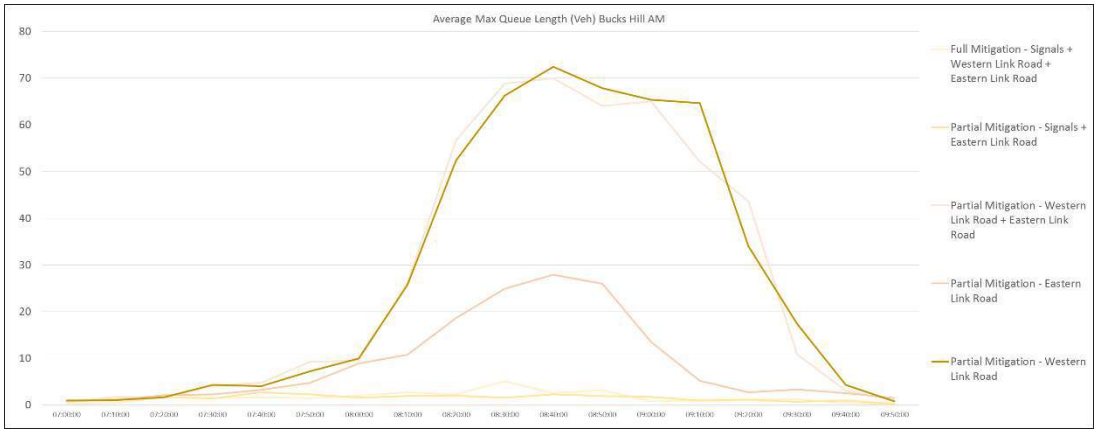
23. In addition, the below graph demonstrates the impact of the Western Link Road on queues along Plough Hill Road; scenarios which include this Link maintain queues at below 20 vehicles across the entire AM peak period, however when removed queues extend to approximately 80-100 vehicles in length:

Figure 5: AM Average Max Queue Length, Plough Hill Road (Vehicles)



24. The following graph presents the AM queue results on the Bucks Hill northbound approach across each Scenario:

Figure 6: AM Average Max Queue Length, Bucks Hill (AM)



25. The scenario containing only the Western Link Road creates significant queuing on this arm as priority is maintained for east-west traffic, and with no alternate route from the north in the form of the Eastern Link Road. Scenario 10, containing both Western and Eastern Link Roads, also exhibits significant queuing because despite the ability of the Eastern Link Road to divert traffic away, more traffic from the west is able to reach this junction creating more delay for vehicles on the minor arms.

26. It is interesting to note that the inclusion of the Western Link Road appears to remove any benefits of the Eastern Link Road on the operation of Bucks Hill in the AM because of this increased conflicting movement.

27. Scenario 11 (which includes the Eastern Link Road only), shows a betterment as a result of the Link's ability to divert traffic from the north away from the junction, therefore creating less conflict for traffic on this arm, whilst the lack of a Western Link Road means that more traffic is congested in the network to the west and therefore less able to traverse this junction.

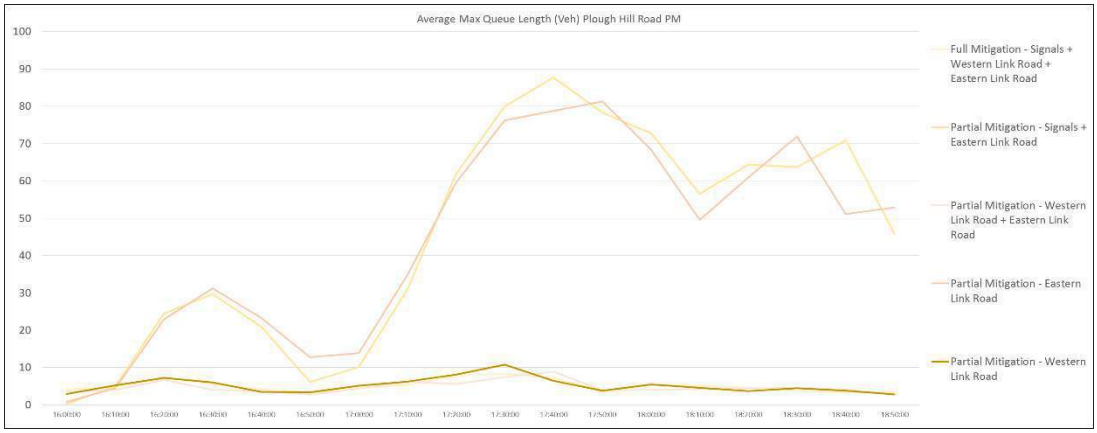
28. Finally, the two scenarios containing signals at the Coleshill Road / Camp Hill Road / Victoria Road / Bucks Hill Road junction demonstrate the lowest queue levels on Bucks Hill, as the signals are able to better balance the traffic to enable vehicles along this approach to enter onto the junction more frequently.

29. This similar pattern of results is exhibited in the Victoria Road queue profile comparisons.

30. PM queue comparison results appear to be more contained to the impact of the Western Link Road, with only a 2 and 6 second average delay increase when removing the signals and Eastern Link Road schemes respectively from the full mitigation Scenario.

31. The graph below shows a comparison of queues along Plough Hill Road, which follows a very similar pattern to those observed in the AM peak:

Figure 7: PM Average Max Queue Length, Plough Hill Road (AM)



Queue Plots

32. For the purposes of this report queue outputs have been simplified into a series of queue plots that are provided in **Appendix A**. These plots indicate whether a particular junction shows an improvement or a worsening of queue conditions between the 2025 DN (i.e. Growth only) and each of the scenario tests listed above.

33. The results show how the inclusion of different packages of mitigation measures can impact on the various junctions within the model extent.

34. These plots appear to correlate with the results interpretation provided in this document.

Summary and Conclusions

35. Vectos Microsim (VM) has been asked by Warwickshire County Council (WCC) and North Warwickshire Borough Council (NWBC) to provide modelling assistance to assess the implications of allocating development through the approach identified within the emerging Local Plan.

36. This document forms the second part of the scheme option testing and refinement process and should be read in conjunction with document "*VM165079 TN1 - NWBC STA Testing Hartshill*", and spreadsheet "*VM165079.Sp02 - Scheme Test Results_v2*". Results spreadsheet entitled "*VM165079.Sp04 - Eastern Link Road Scheme Testing and Refinement Results*" relates to the results from this second round of testing.

37. Whilst TN1 summarises a number of possible mitigation strategies, and what level of development can be brought forward following a staged approach to mitigation delivery, this testing further refines the original proposals with a greater lean towards which mitigation proposals are deliverable, and following feedback from WCC.

38. This further testing reinforces conclusions from TN1 insofar as a "Western Link Road" is an effective mitigation strategy to ease capacity issues at the Coleshill Road/Plough Hill Road junction. Due to a lack of available road space at this location, it is believed that creating an alternative route such as this Link Road may be required

39. Concerns have been raised about the ability to convert the Coleshill Road / Camp Hill Road / Victoria Road / Bucks Hill Road junction (currently priority controlled) to a signalised operation. Results from this testing suggest that in maintaining this arrangement, excessive queues can be expected on Bucks Hill during both peaks, but most notably the AM peak period.

40. The addition of an Eastern Link Road does not significantly improve queues on this arm; however some traffic from the north travelling towards Nuneaton to the east benefits from this alternative route and therefore queues are reduced moderately on Victoria Hill.

41. An Eastern Link Road would involve significant building works to deliver and, based on the results of this modelling test, the results suggest benefits would be limited.

42. This second stage of testing will look to further refine the mitigation proposals in light of initial feedback from WCC in terms of deliverability, preferred alignments and other alternative suggestions.

Appendix A

Legend

- Less than -5 Vehicles
- Between +15 and +30 Vehicles
- Between +30 and +50 Vehicles
- Greater than 50 Vehicles

CLIENT: Warwickshire County Council

PROJECT:

VM165079 NWBC
Eastern Link Testing

TITLE:

2025 Ref DN vs Partial Mitigation - Signals + Western Link Road_Rev
AM 07:00 - 10:00
Maximum Queue

SCALE: NTS

DRAWN:	CHECKED:	DATE:	REVISION:
TO	AH	05/10/2016	1

vectos microsimulation specialists

Cornwall Buildings, 45 Newhall Street, Birmingham B3 3QR
Tel: 0121 213 6376 Email: microsim@vectos.co.uk www.vectos.co.uk

DRAWING REFERENCE:

MQ 001 AVE

CLIENT: Warwickshire County Council

PROJECT:

VM165079 NWBC
Eastern Link Testing

TITLE:

2025 Ref DN vs Partial Mitigation - Signals + Western Link Road_Rev
PM 16:00 - 19:00
Maximum Queue

SCALE: NTS

DRAWN:	CHECKED:	DATE:	REVISION:
TO	AH	05/10/2016	1

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DRAWING REFERENCE:

MQ 002 AVE

Legend

- Less than -5 Vehicles
- Between +15 and +30 Vehicles
- Between +30 and +50 Vehicles
- Greater than 50 Vehicles

CLIENT: Warwickshire County Council

PROJECT:

VM165079 NWBC
Eastern Link Testing

TITLE:

2025 Ref DN vs Full Mitigation -
Signals + Western Link Road +
Eastern Link Road
AM 07:00 - 10:00

SCALE: NTS

DRAWN:	CHECKED:	DATE:	REVISION:
TO	AH	05/10/2016	1

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DRAWING REFERENCE:

MQ 003 AVE

CLIENT: Warwickshire County Council

PROJECT:

VM165079 NWBC
Eastern Link Testing

TITLE:

2025 Ref DN vs Full Mitigation -
Signals + Western Link Road +
Eastern Link Road
PM 16:00 - 19:00

SCALE: NTS

DRAWN:	CHECKED:	DATE:	REVISION:
TO	AH	05/10/2016	1

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DRAWING REFERENCE:

MQ 004 AVE

Legend

- Less than -5 Vehicles
- Between +15 and +30 Vehicles
- Between +30 and +50 Vehicles
- Greater than 50 Vehicles

CLIENT: Warwickshire County Council

PROJECT:

VM165079 NWBC
Eastern Link Testing

TITLE:

2025 Ref DN vs Partial Mitigation -
Signals + Eastern Link Road
AM 07:00 - 10:00
Maximum Queue

SCALE: NTS

DRAWN:	CHECKED:	DATE:	REVISION:
TO	AH	05/10/2016	1

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DRAWING REFERENCE:

MQ 005 AVE

CLIENT: Warwickshire County Council

PROJECT:

VM165079 NWBC
Eastern Link Testing

TITLE:

2025 Ref DN vs Partial Mitigation -
Signals + Eastern Link Road
PM 16:00 - 19:00
Maximum Queue

SCALE: NTS

DRAWN:	CHECKED:	DATE:	REVISION:
TO	AH	05/10/2016	1

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DRAWING REFERENCE:

MQ 006 AVE

Legend

- Less than -5 Vehicles
- Between +15 and +30 Vehicles
- Between +30 and +50 Vehicles
- Greater than 50 Vehicles

CLIENT: Warwickshire County Council

PROJECT:

VM165079 NWBC
Eastern Link Testing

TITLE:

2025 Ref DN vs Partial Mitigation - Western Link Road + Eastern Link Road
AM 07:00 - 10:00

SCALE: NTS

DRAWN:	CHECKED:	DATE:	REVISION:
TO	AH	05/10/2016	1

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DRAWING REFERENCE:

MQ 007 AVE

CLIENT: Warwickshire County Council

PROJECT:

VM165079 NWBC
Eastern Link Testing

TITLE:

2025 Ref DN vs Partial Mitigation - Western Link Road + Eastern Link Road
PM 16:00 - 19:00

SCALE: NTS

DRAWN:	CHECKED:	DATE:	REVISION:
TO	AH	05/10/2016	1

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DRAWING REFERENCE:

MQ 008 AVE

Legend

- Less than -5 Vehicles
- Between +15 and +30 Vehicles
- Between +30 and +50 Vehicles
- Greater than 50 Vehicles

CLIENT: Warwickshire County Council

PROJECT:

VM165079 NWBC
Eastern Link Testing

TITLE:

2025 Ref DN vs Partial Mitigation -
Eastern Link Road
AM 07:00 - 10:00
Maximum Queue

SCALE: NTS

DRAWN:	CHECKED:	DATE:	REVISION:
TO	AH	05/10/2016	1

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DRAWING REFERENCE:

MQ 009 AVE

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CLIENT: Warwickshire County Council

PROJECT:

VM165079 NWBC
Eastern Link Testing

TITLE:

2025 Ref DN vs Partial Mitigation -
Eastern Link Road
PM 16:00 - 19:00
Maximum Queue

SCALE: NTS

DRAWN:	CHECKED:	DATE:	REVISION:
TO	AH	05/10/2016	1

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DRAWING REFERENCE:

MQ 010 AVE

Legend

- Less than -5 Vehicles
- Between +15 and +30 Vehicles
- Between +30 and +50 Vehicles
- Greater than 50 Vehicles

CLIENT: Warwickshire County Council

PROJECT:

VM165079 NWBC
Eastern Link Testing

TITLE:

2025 Ref DN vs Partial Mitigation -
Western Link Road
AM 07:00 - 10:00
Maximum Queue

SCALE: NTS

DRAWN:	CHECKED:	DATE:	REVISION:
TO	AH	05/10/2016	1

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DRAWING REFERENCE:

MQ 011 AVE

CLIENT: Warwickshire County Council

PROJECT:

VM165079 NWBC
Eastern Link Testing

TITLE:

2025 Ref DN vs Partial Mitigation -
Western Link Road
PM 16:00 - 19:00
Maximum Queue

SCALE: NTS

DRAWN:	CHECKED:	DATE:	REVISION:
TO	AH	05/10/2016	1

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DRAWING REFERENCE:

MQ 012 AVE

NWBC STA Testing –
Hartshill Mitigation Scheme Refinement
ADDENDUM

Project title	NWBC STA Testing	Job number	VM165079
cc	Warwickshire County Council	File reference	TN.003
Prepared by	AH	Date	21 October 2016

Introduction

1. This Addendum provides details and results on further testing of the alignment of the Eastern Link Road to determine whether an adjustment to the route provides benefits to network performance.

Eastern Link Road Re-alignment

2. Previous testing provided a link between Church Road and Mancetter Road. This additional testing realigns the route such that it now ties into Camp Hill Road to the south, rather than extending eastwards. **Figure 1** overleaf presents the revised alignment (along with all other mitigation schemes for ease of reference), while **Figure 2** presents the associated banned turning movements to encourage use of the Link Road:

Figure 1: Mitigation Measures

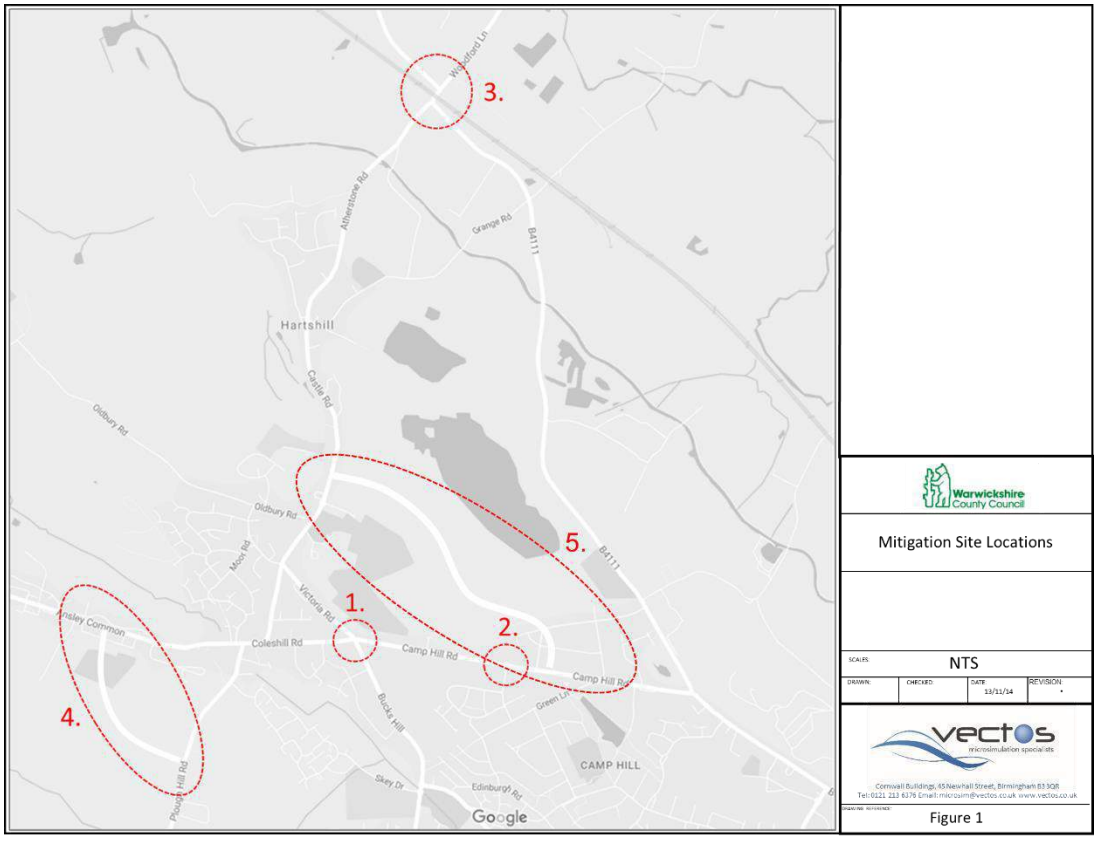
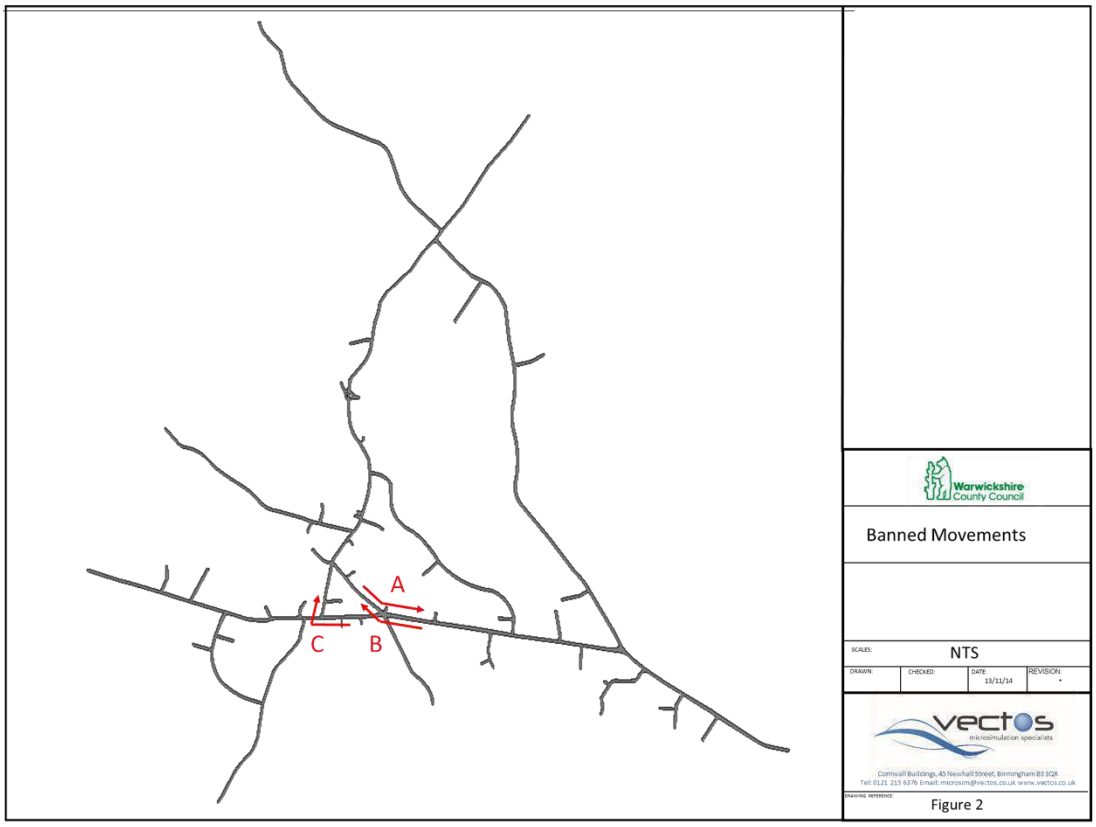


Figure 2: Mitigation Measures – Banned Movements



Scenario List

3. Four further tests have been carried out to assess the impact of re-alignment, along with some enforced bans to movements to encourage use of the link road and reduce delay created along Camp Hill Road and Coleshill Road. They are listed as follows:

    - 13. 2025 Full Mitigation – mitigation measures 1, 2, 3, 4 and 5, and banned movements A, B and C
    - 14. 2025 Full Mitigation – mitigation measures 1, 2, 3, 4 and 5, and banned movements A and B
    - 15. 2025 Partial Mitigation – mitigation measures 2, 3, 4 and 5, and banned movements A, B and C
    - 16. 2025 Partial Mitigation – mitigation measures 2, 3, and 5, and banned movements A and B

Results Analysis

4. The following provides a high level overview of the results extracted from the aforementioned model scenarios. For full comprehensive results, see spreadsheet "*VM165079.Sp07 – Eastern Link Road Realignment Results*"

5. For analysis, scenarios 08. and 10. have also been included for comparison purposes. These scenarios present the Full and Partial Mitigation measures as present in scenarios 13 and 15 above, but without the banned movements and with the original proposal for Eastern Link Road Alignment.

Network Stats

6. The network statistics provide a number of Key Network Performance Indicator (KPI) comparisons.

7. In this instance, the comparisons have focussed on the average delay, in seconds, across the entire model period as well as average speeds. This information has been illustrated within **Figure 3** and **Figure 4** respectively:

Figure 3: Average Network Delay in Seconds (2025)

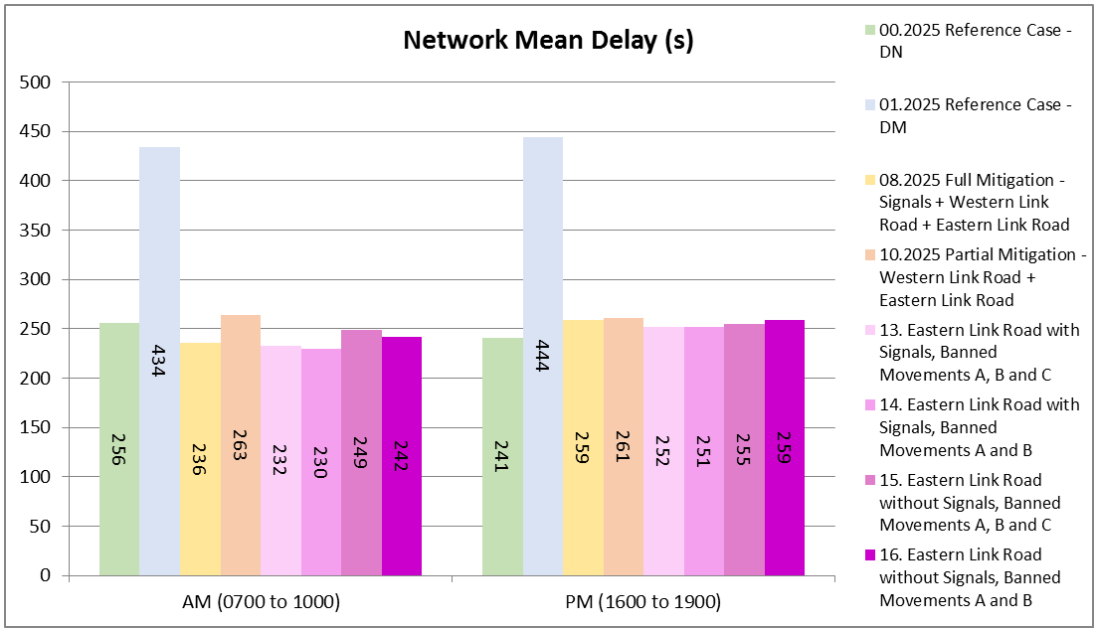
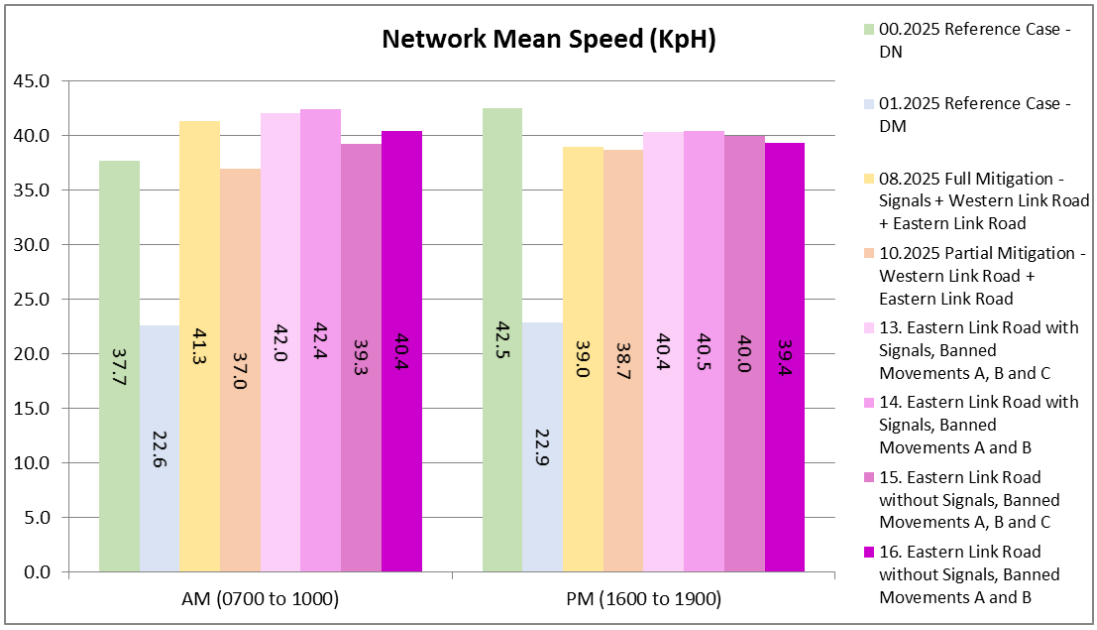


Figure 4: Average Network Speed in KpH (2025)



8. Comparisons should be focussed on Scenario 08 vs Scenario 13/14, and Scenario 10 vs Scenario 15/16 (as these remain consistent outside of the Eastern Link Road alignment and associated banned movements).

9. Results suggest the following:

- The precise alignment of the Eastern Link Road has a limited impact on overall network performance while signals are present at the Bucks Hill / Victoria Road junction. When signals are removed, there appears to be an improvement in network delay during the AM peak following re-alignment and banned movements. The PM period shows very little impact across all like-for-like scenarios.
- Inclusion of the signals at Bucks Hill / Victoria Road junction reduces overall network delay in both periods, but most notably the AM. This confirms conclusions drawn from previous rounds of testing and appears to be primarily a result of the reduction to queue lengths on Bucks Hill Road.

10. Queue graphs below present the results across all scenarios for the Bucks Hill approach:

Figure 5: AM Average Max Queue Length, Bucks Hill

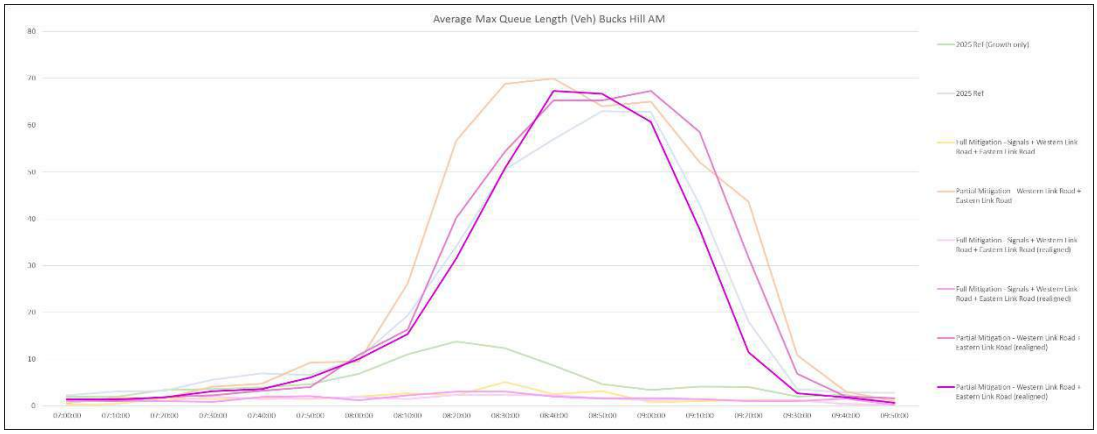
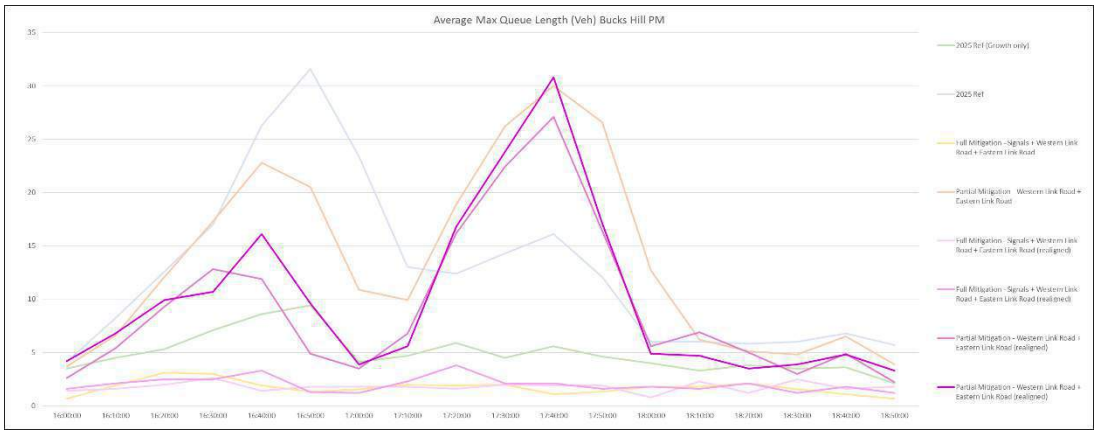


Figure 6: PM Average Max Queue Length, Bucks Hill



11. Results for both periods show a similar pattern insofar as queues are significantly reduced through the inclusion of signals at this junction. This appears to be the biggest driver of network delay reduction as presented in **Figure 3**. It should be noted that inclusion of the signals does increase queuing on Coleshill Road eastbound (as the no-signal arrangement allows free-flow for this movement), but there is a net reduction in delay following inclusion of the signals.

12. The inclusion of the Eastern Link Road does reduce queues slightly on Victoria Road, as vehicles from the north are afforded an alternative route to the east therefore taking traffic away from the crossroads; however this reduction has little impact on the queues on Bucks Hill.

APPENDIX C

A5 Atherstone Mitigation Package

Legend

Schemes Delivered by 2021

CLIENT: Warwickshire County Council

PROJECT:

VM175102
NBWA STA Testing

TITLE:

2021 Local Plan
Mitigation Schemes

SCALE: NTS

DRAWN:	CHECKED:	DATE:	REVISION:
CH	BN	24/03/2017	1

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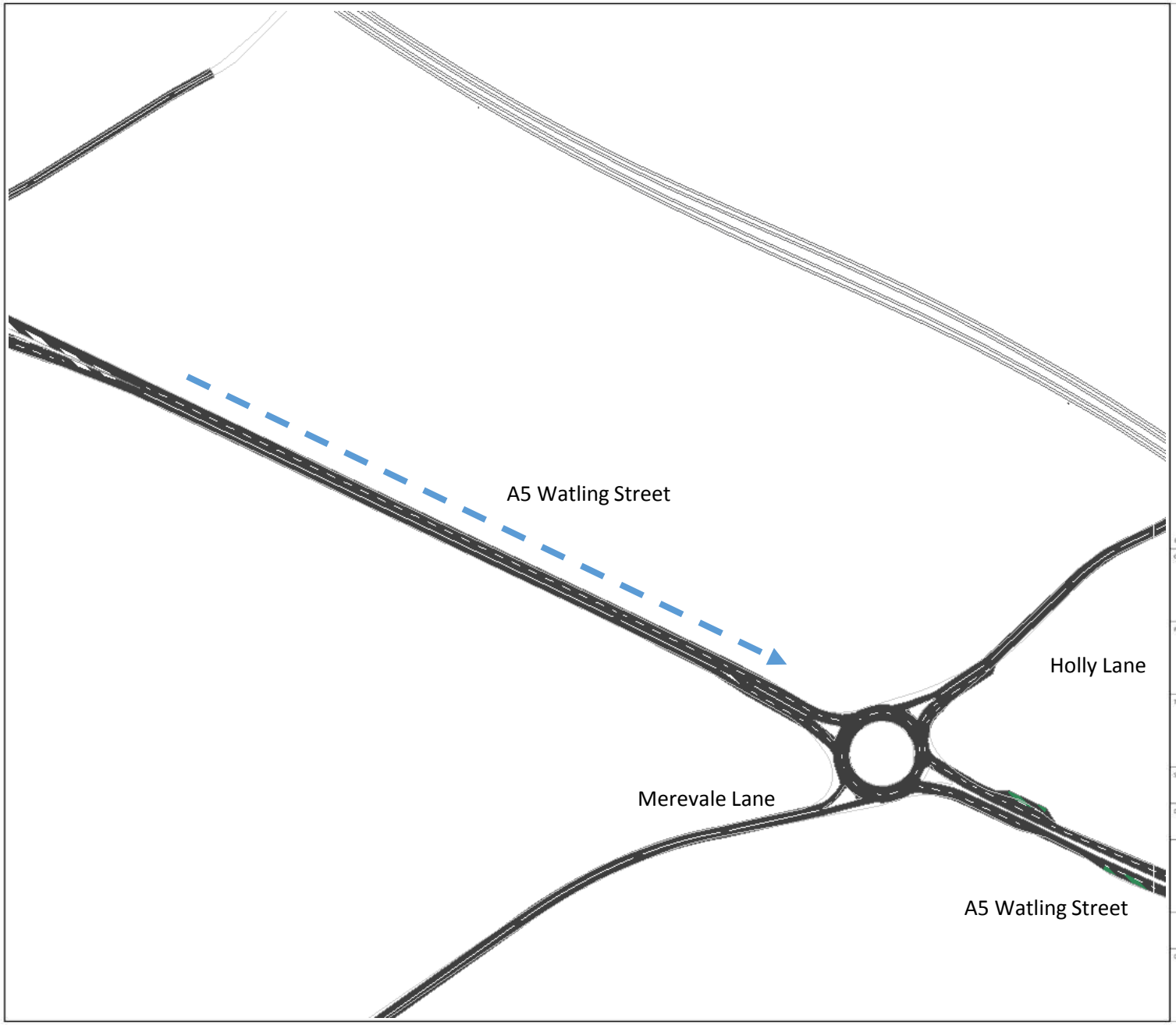

Widening on eastbound approach to Holly Lane

CLIENT: Warwickshire County Council

PROJECT: VM175102 NBWA STA Testing

TITLE: ID 1 - 2021 A5 / B4116 Holly Lane

SCALE: NTS

DRAWN:	CHECKED:	DATE:	REVISION:
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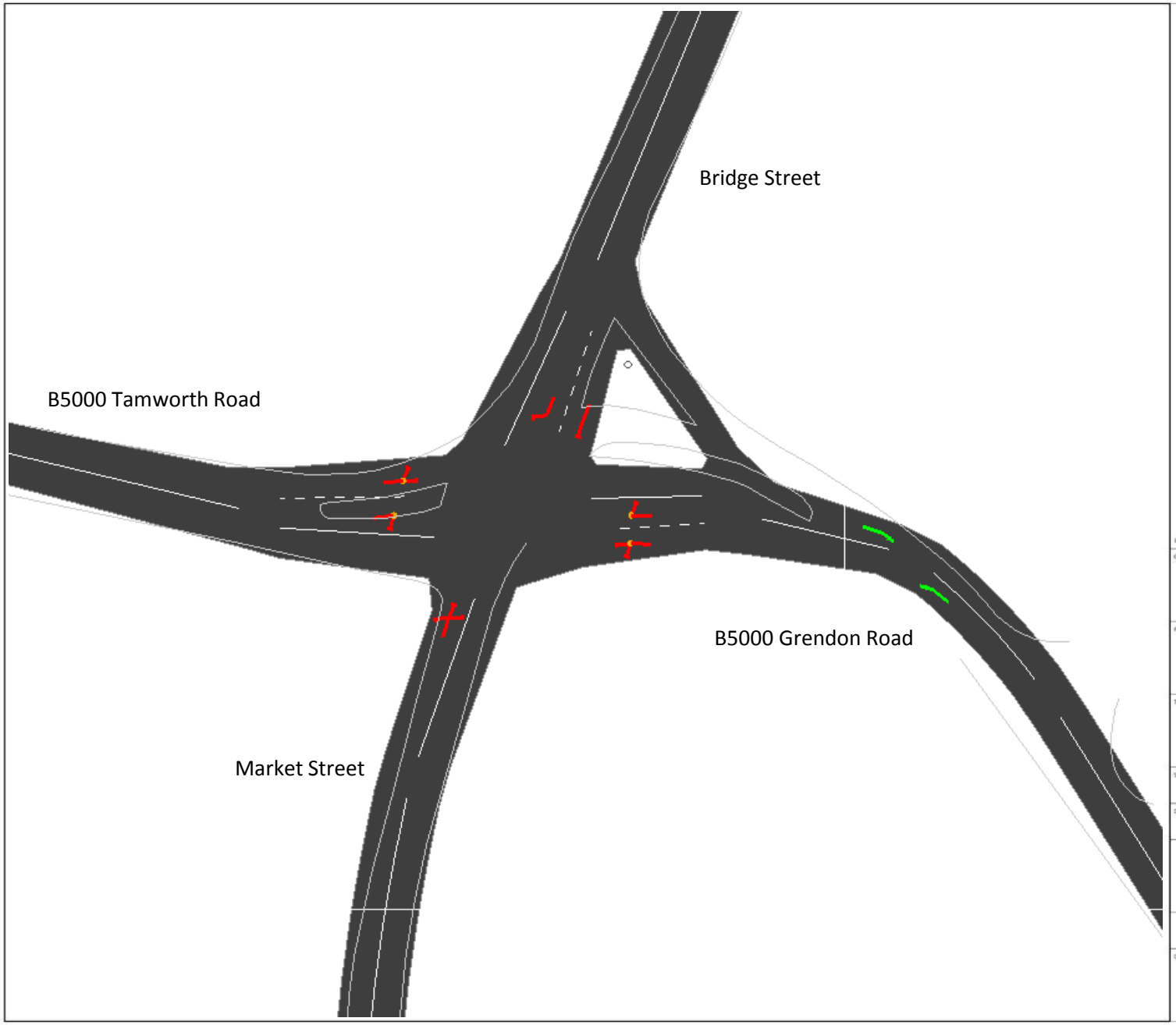

Signalisation of junction, approach widening

CLIENT: Warwickshire County Council

PROJECT:
VM175102
NBWA STA Testing

TITLE:
ID 2 - 2021
Tamworth Rd/Market St
Polesworth

SCALE: NTS

DRAWN:	CHECKED:	DATE:	REVISION:
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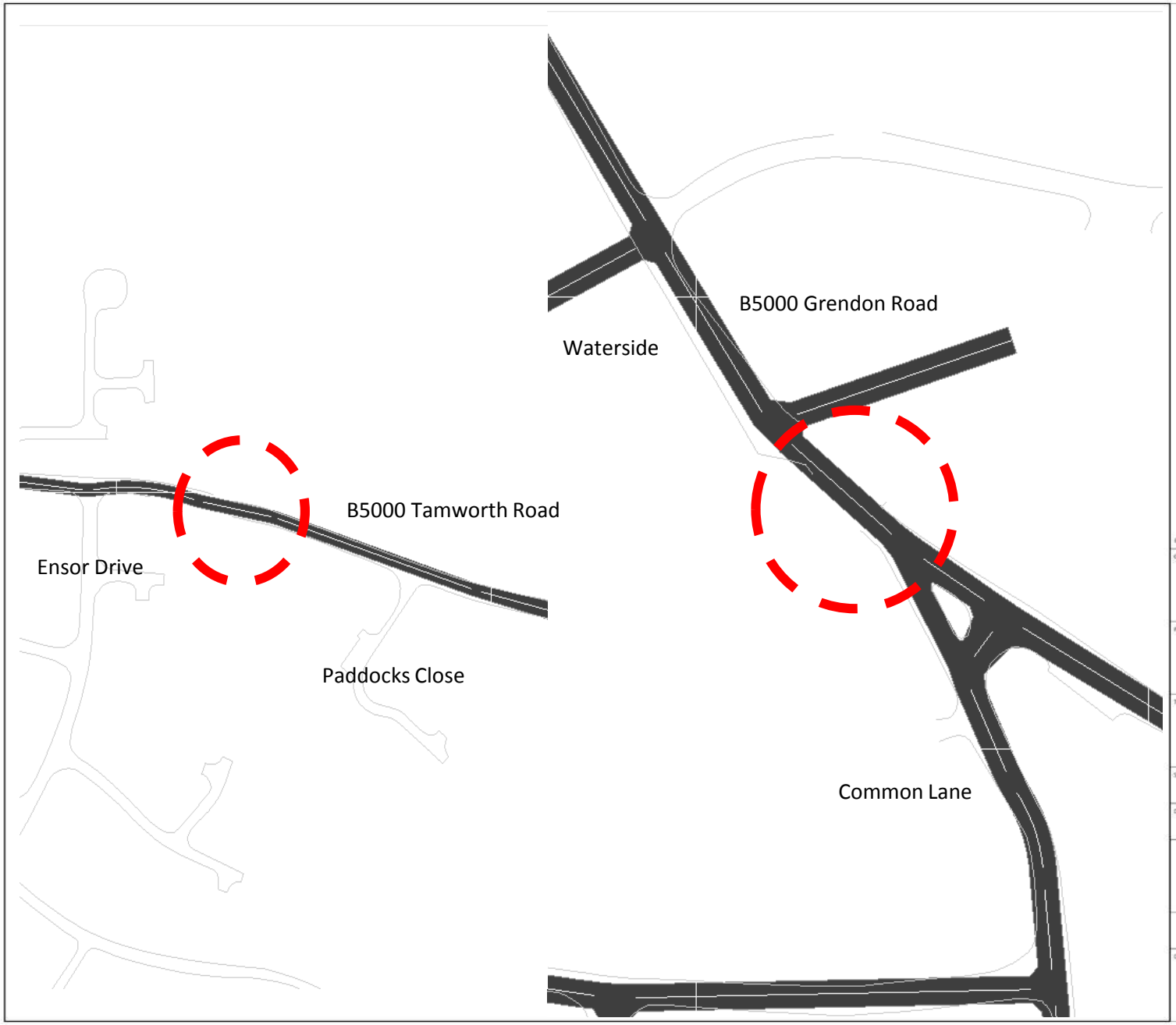
DRAWING REFERENCE:



Widening of the canal bridges to ensure two lanes of traffic can be accommodated side by side without issue

CLIENT: Warwickshire County Council

PROJECT: VM175102 NBWA STA Testing

TITLE: ID 3 - 2021 B5000 Canal Bridge widening

SCALE: NTS

DRAWN:	CHECKED:	DATE:	REVISION:
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DRAWING REFERENCE:

Legend

Schemes Delivered by 2021

Schemes Delivered by 2026

CLIENT: Warwickshire County Council

PROJECT:

VM175102
NBWA STA Testing

TITLE:

2026 Local Plan
Mitigation Schemes

SCALE: NTS

DRAWN:	CHECKED:	DATE:	REVISION:
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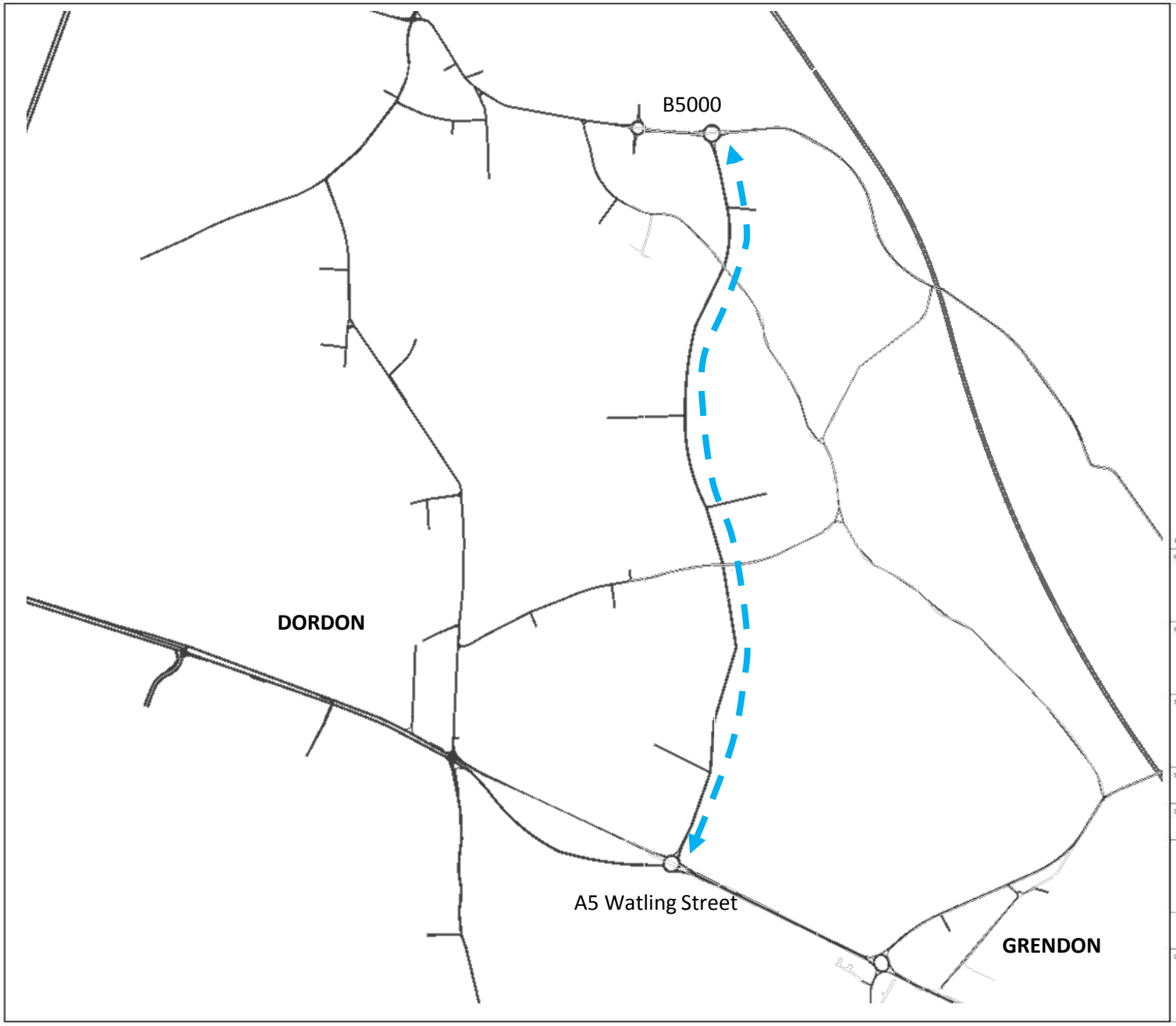

Link between B5000 and A5, delivered to a minimum 40mpg design standard with suitable access junctions to serve development being delivered off the link (as opposed to development fronting)

CLIENT: Warwickshire County Council

PROJECT: VM175102 NBWA STA Testing

TITLE: ID 4 – 2026 A5/B5000 Link Road

SCALE: NTS

DRAWN:	CHECKED:	DATE:	REVISION:
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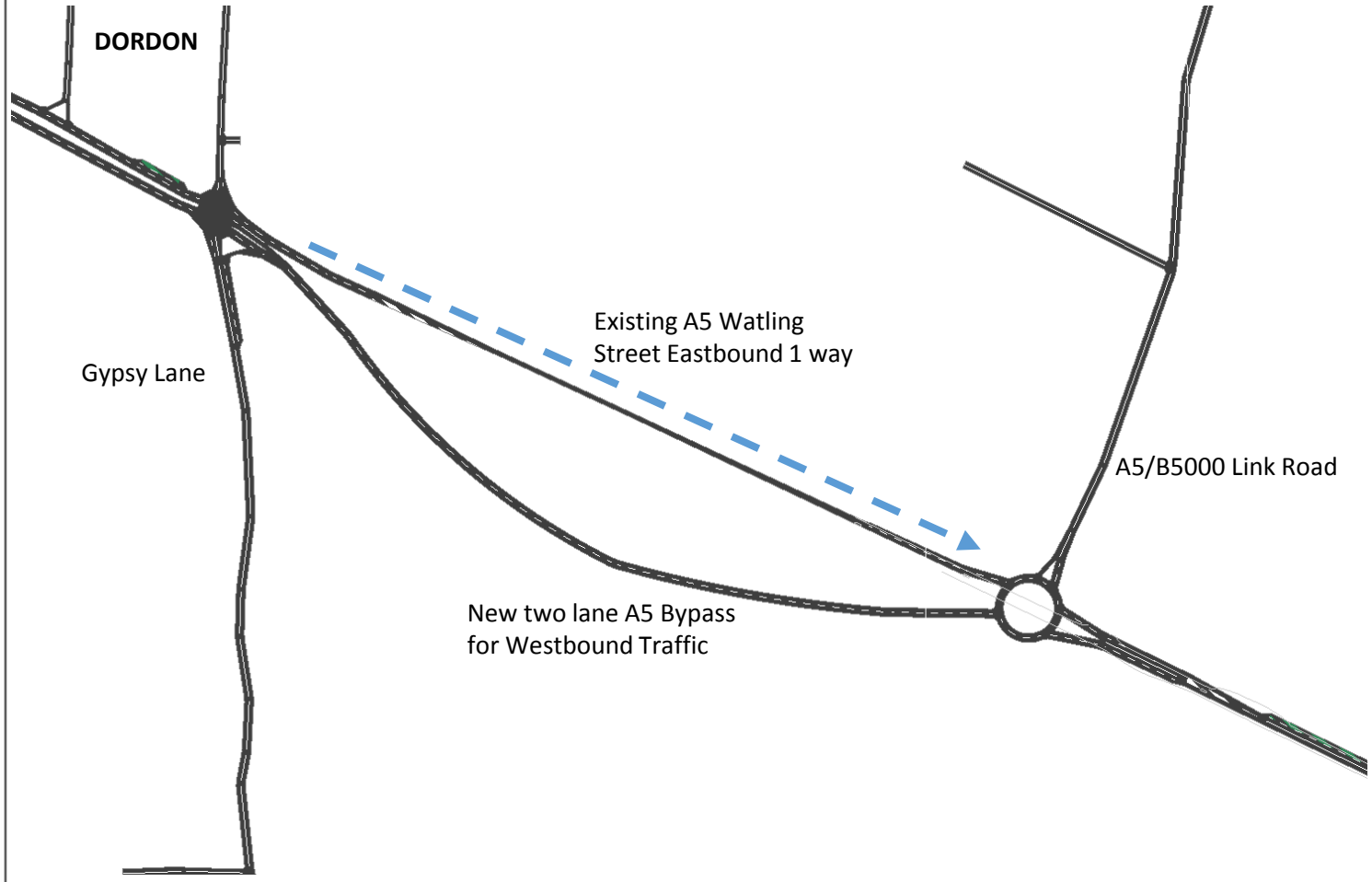
DRAWING REFERENCE:



New bypass road between Dordon and Grendon which provided dualling for traffic travelling in the westbound direction
)

CLIENT: Warwickshire County Council

PROJECT:
VM175102
NBWA STA Testing

TITLE:
ID 5 – 2026
A5 Bypass between Grendon and Dordon

SCALE: NTS

DRAWN:	CHECKED:	DATE:	REVISION:
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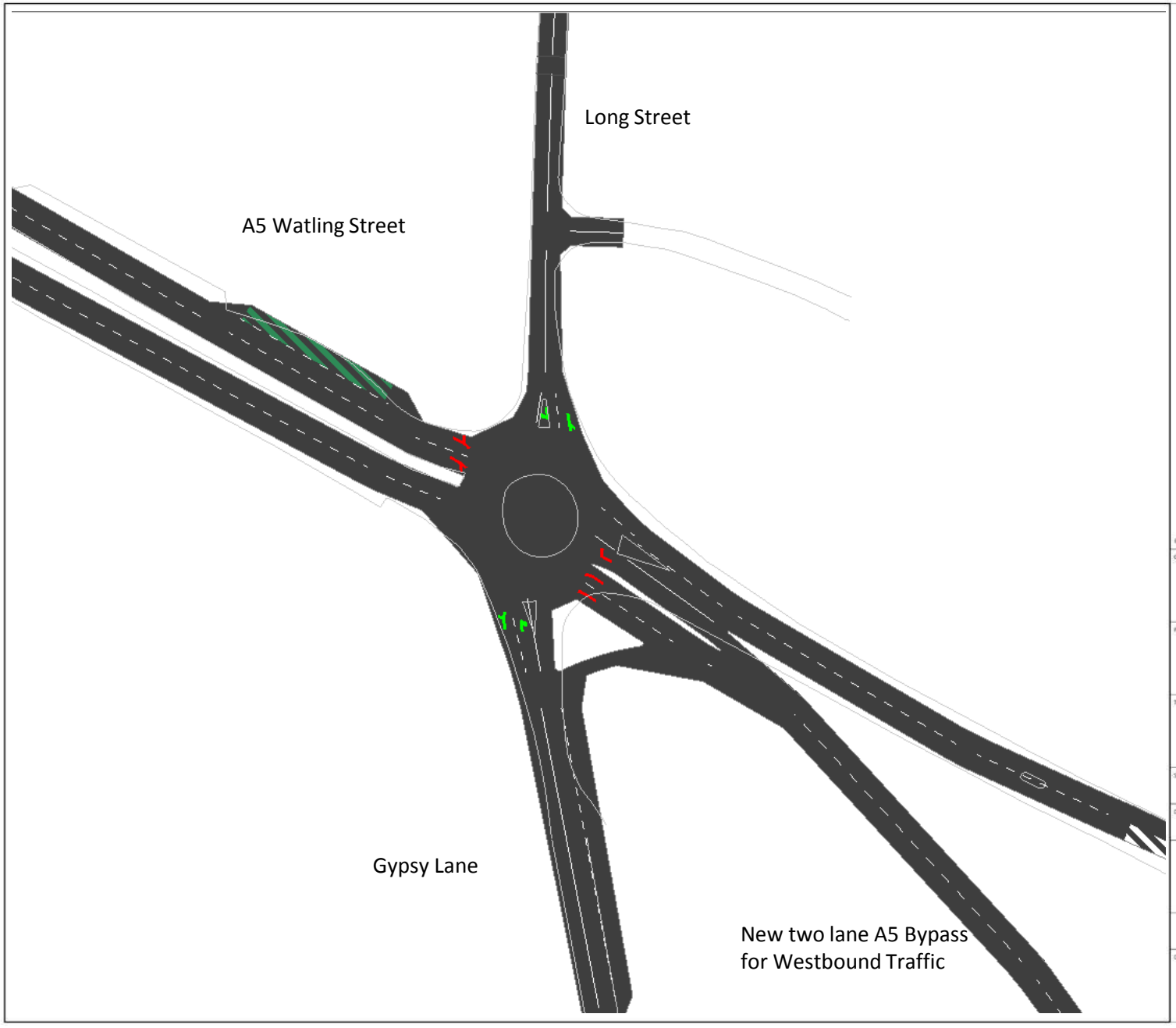
DRAWING REFERENCE:



Existing roundabout replaced by a fully signalised junction signalisation which can accommodate the A5 Bypass

CLIENT: Warwickshire County Council

PROJECT:
VM175102
NBWA STA Testing

TITLE:
ID 6 – 2026
Dordon Signals
Watling Street/Long Stret/Gypsy Lane

SCALE: NTS

DRAWN:	CHECKED:	DATE:	REVISION:
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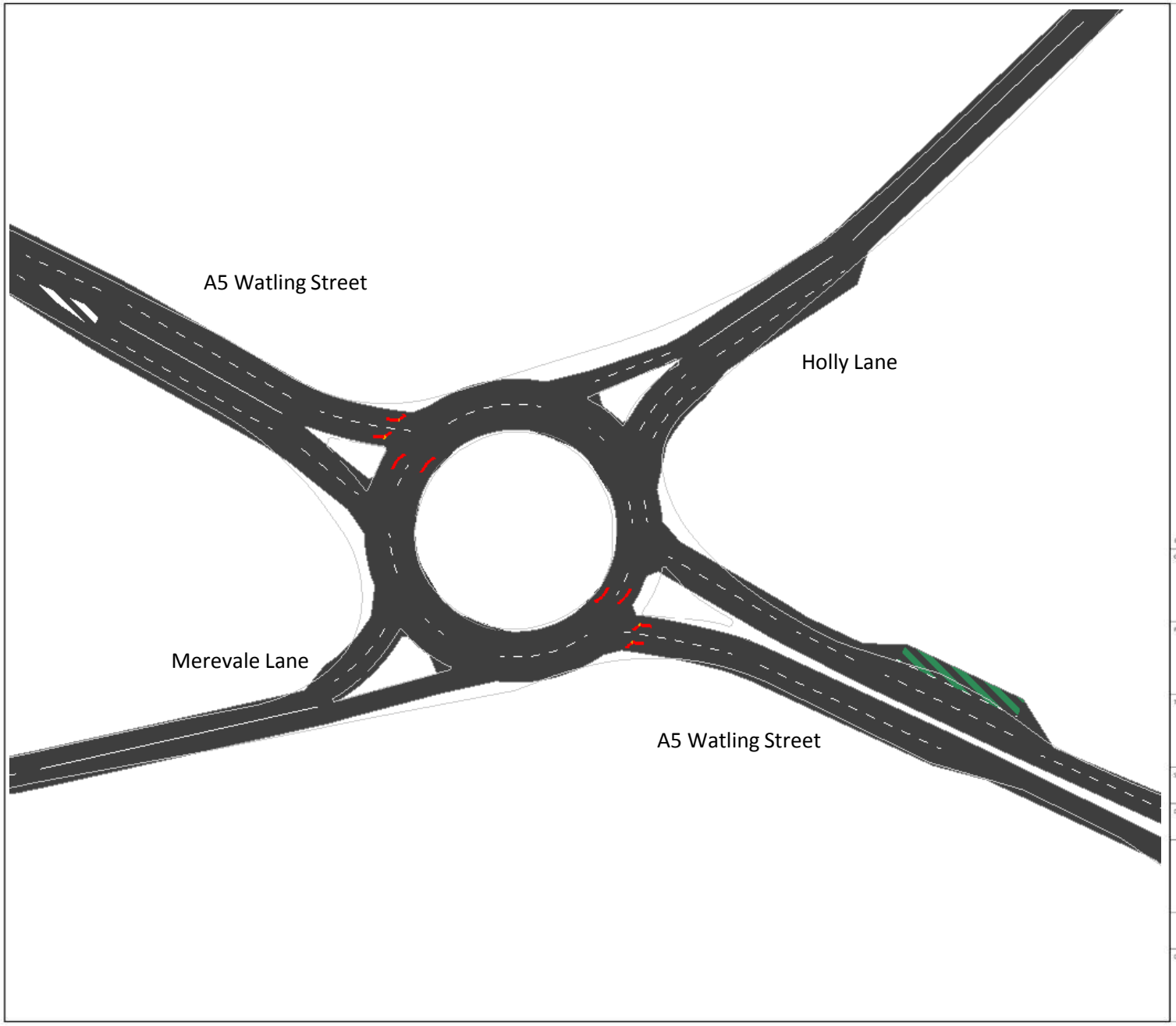
DRAWING REFERENCE:



A5 Eastbound and Westbound approach signalisation and Widening on northern and southern entry arms and revised lane allocations

CLIENT: Warwickshire County Council

PROJECT:
VM175102
NBWA STA Testing

TITLE:
ID 7 – 2026
Holly Lane Part Signalisation and Widening Approaches

SCALE: NTS

DRAWN:	CHECKED:	DATE:	REVISION:
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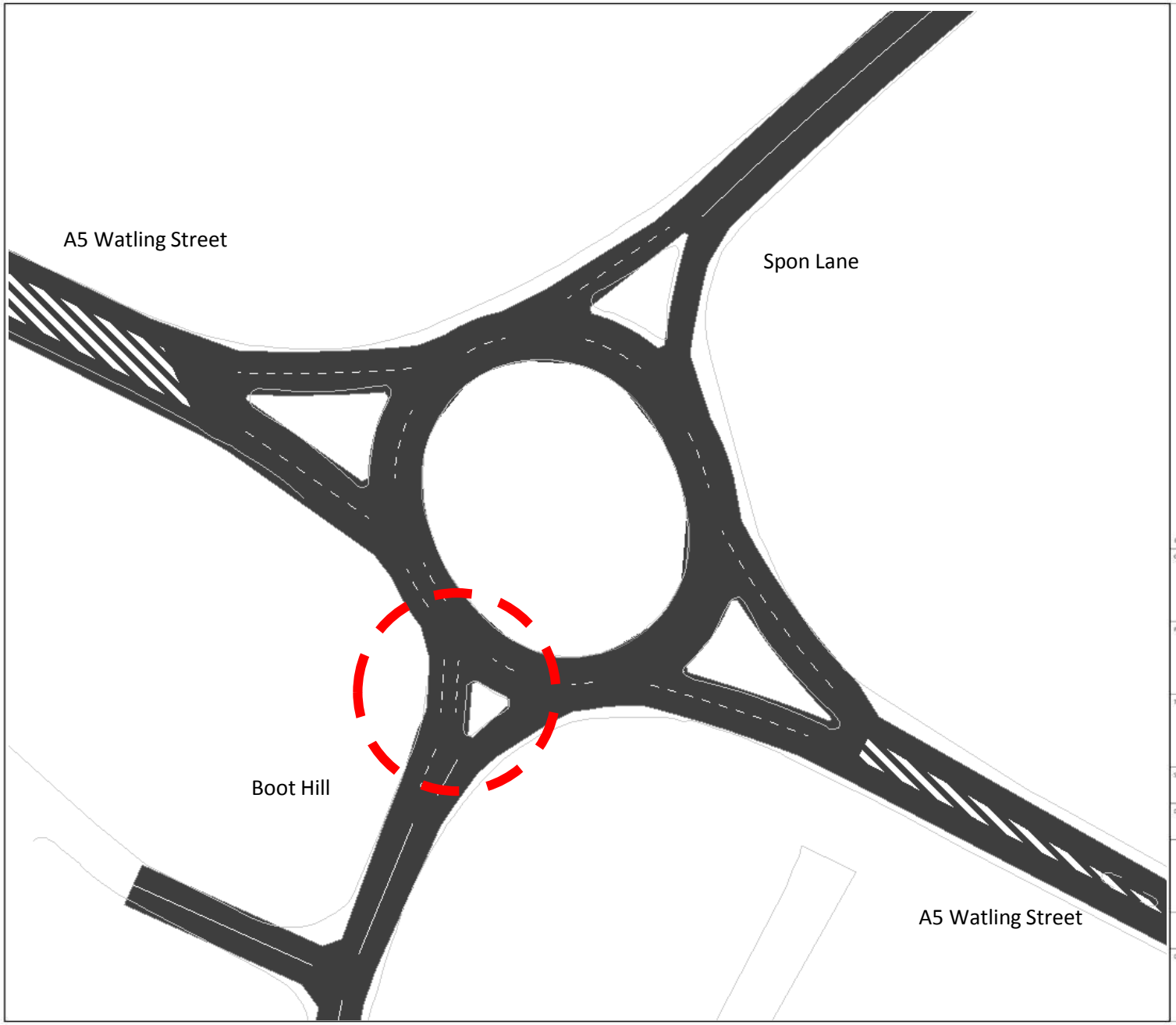

Widening of northbound approach to accommodate 3 lanes

CLIENT: Warwickshire County Council

PROJECT:
VM175102
NBWA STA Testing

TITLE:
ID 9 – 2026
Widening of Boot Hill Approach

SCALE: NTS

DRAWN:	CHECKED:	DATE:	REVISION:
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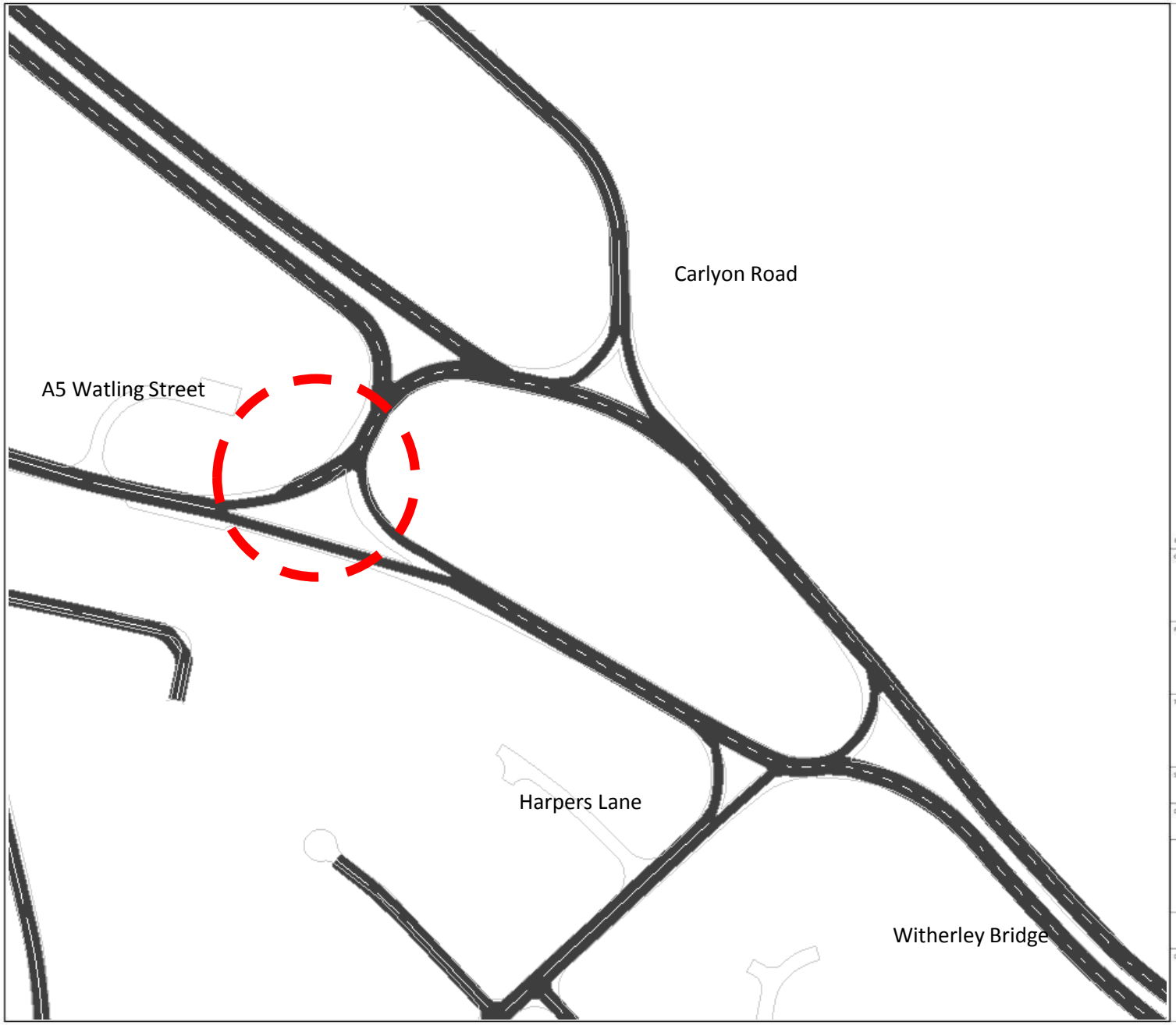
DRAWING REFERENCE:



Widening of the A5 eastbound approach to enable traffic to move across the primary movement.

CLIENT: Warwickshire County Council

PROJECT: VM175102 NBWA STA Testing

TITLE: ID 11 – 2031 Mancetter Gyratory

SCALE: NTS

DRAWN:	CHECKED:	DATE:	REVISION:
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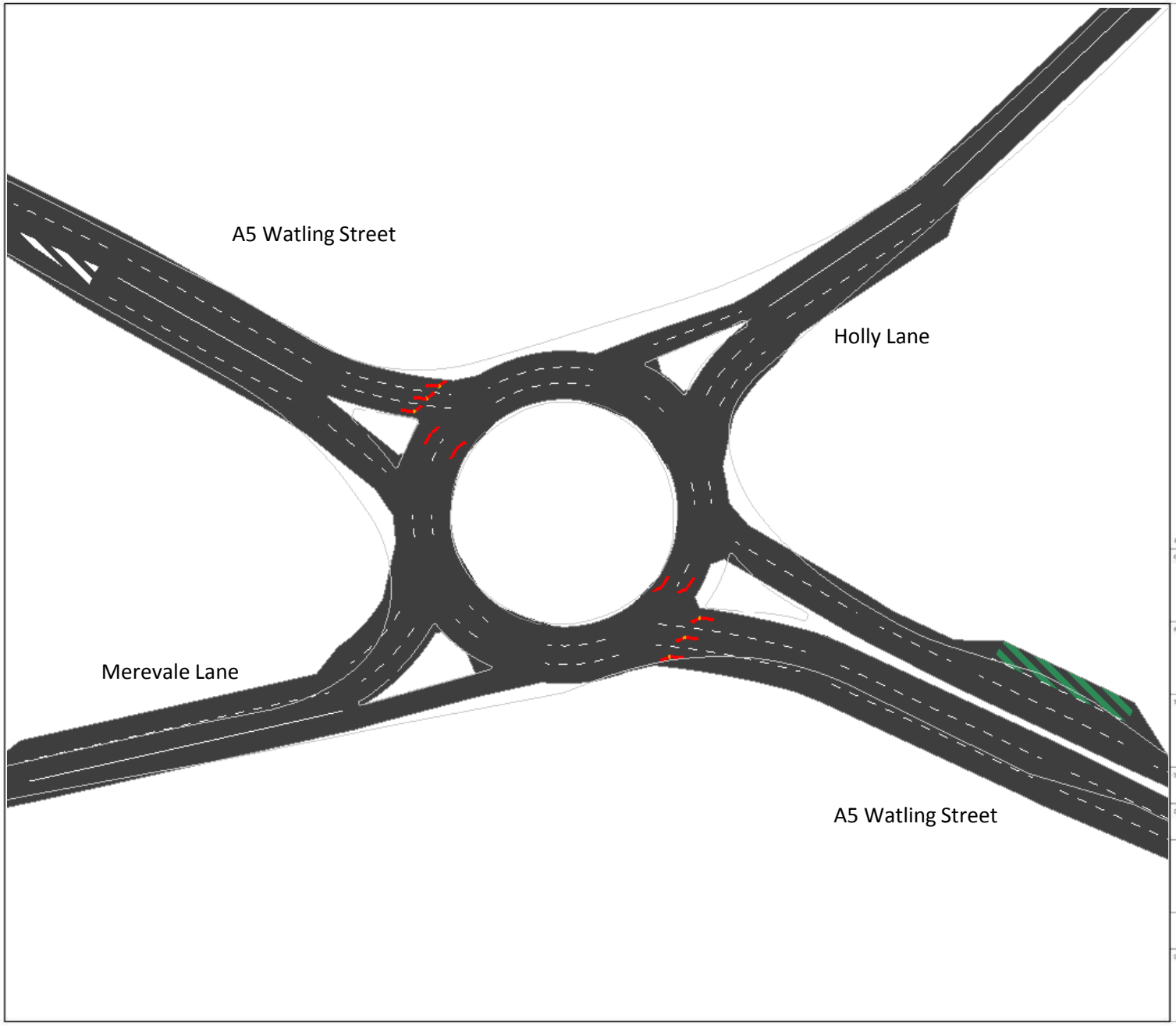

Junction widening on all approaches and circulating carriageway, likely to trigger the need for additional land outside of the existing highway boundary.

CLIENT: Warwickshire County Council

PROJECT: VM175102 NBWA STA Testing

TITLE: ID 12 – 2031 A5 Holly Lane Additional Wideneing

SCALE: NTS

DRAWN:	CHECKED:	DATE:	REVISION:
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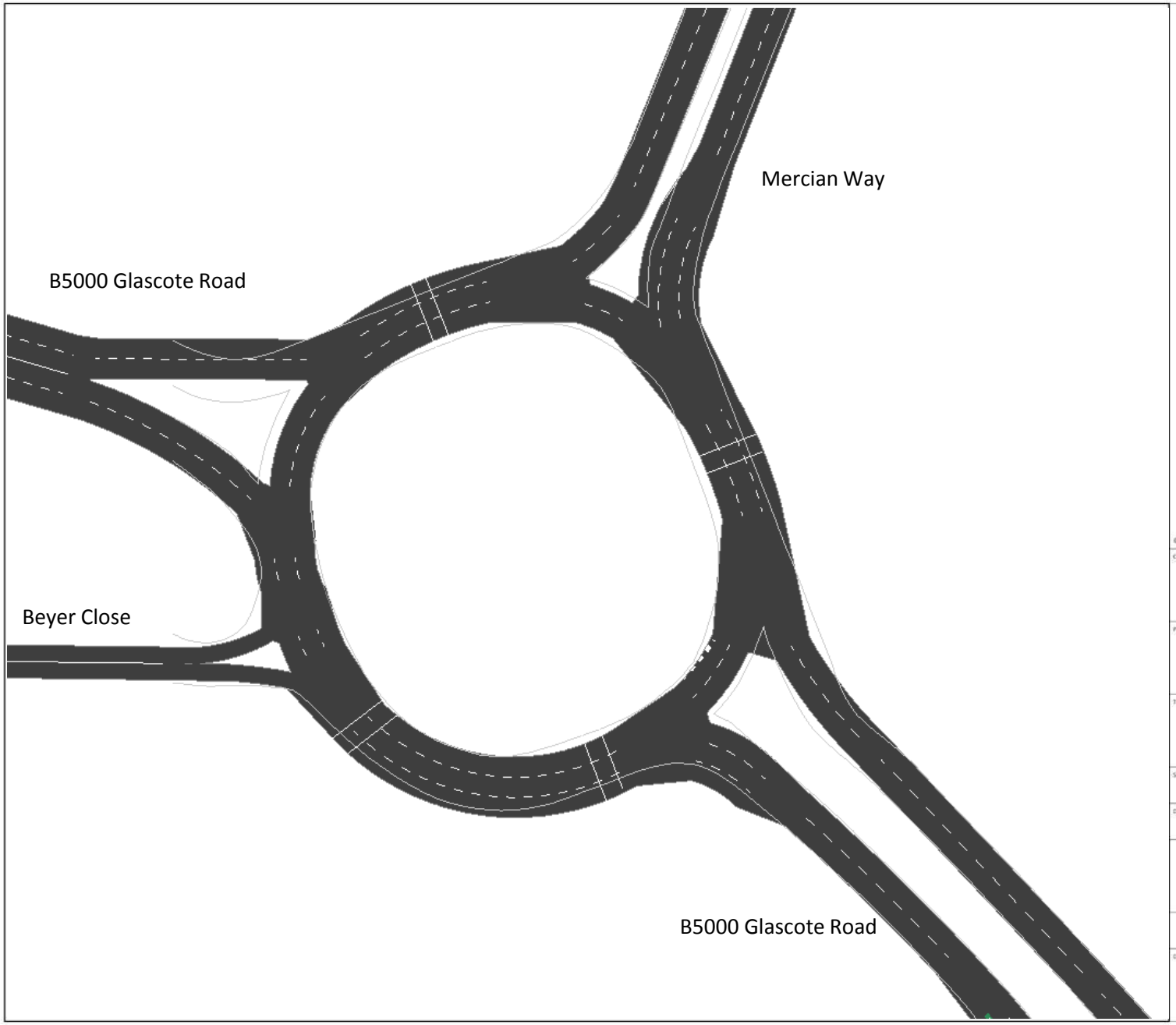

Widening of B5000 northbound approach and Mercian Way southbound approach as well as circulating carriageway to improve through put

CLIENT: Warwickshire County Council

PROJECT: VM175102 NBWA STA Testing

TITLE: ID 13 – 2031 B5000/Mercian Way

SCALE: NTS

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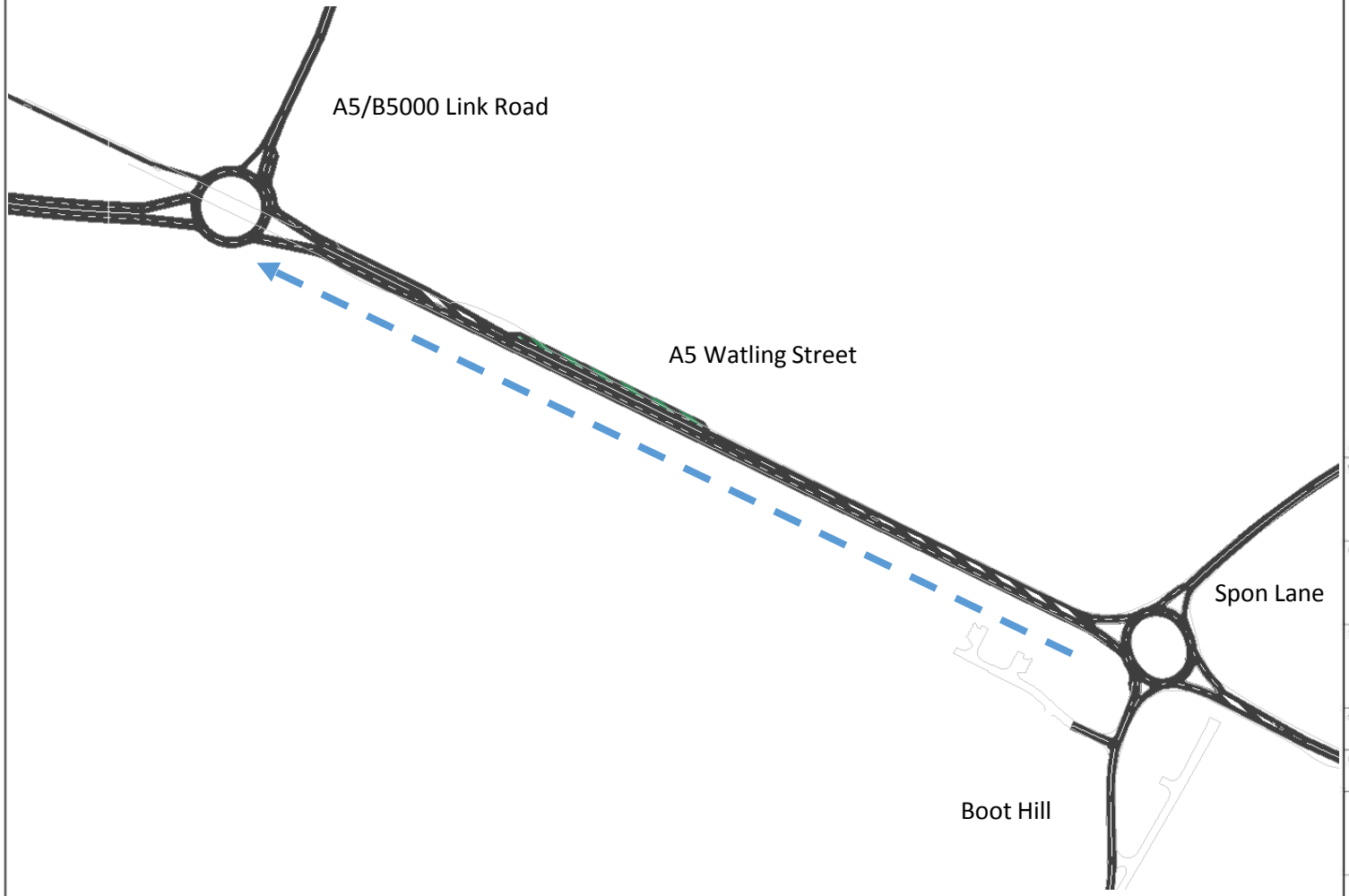
DRAWING REFERENCE:

Additional Duelling on A5 westbound approach to the A5/B5000 Link road



CLIENT: Warwickshire County Council

PROJECT: VM175102 NBWA STA Testing

TITLE: ID 14 – 2031 A5 - Widening

SCALE: NTS

DRAWN:	CHECKED:	DATE:	REVISION:
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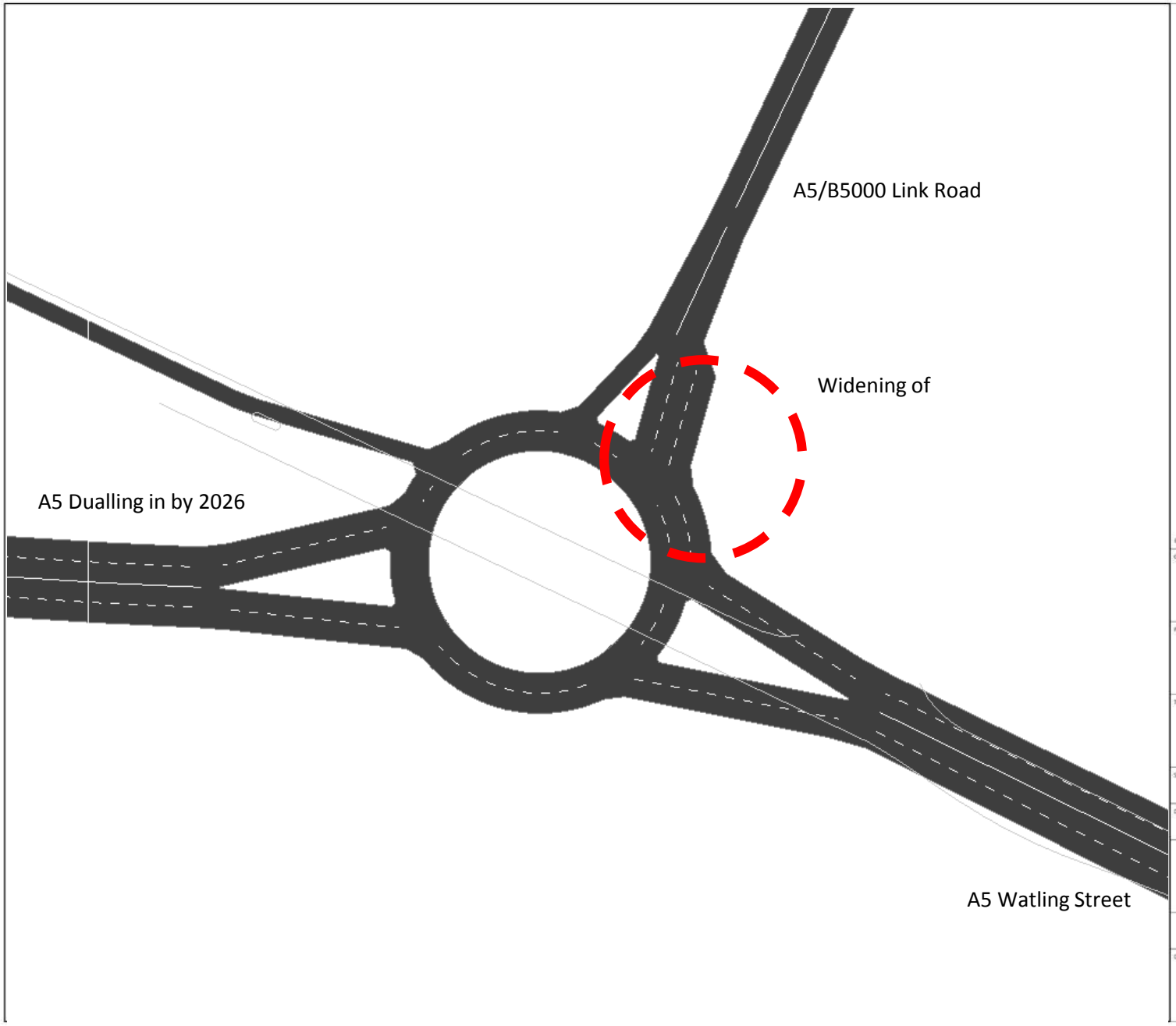
DRAWING REFERENCE:



Southbound approach
widening to three lanes

CLIENT: Warwickshire County Council

PROJECT:
VM175102
NBWA STA Testing

TITLE:
ID 15 – 2031
A5/B5000 Widening

SCALE: NTS

DRAWN:	CHECKED:	DATE:	REVISION:
CH	BN	24/03/2017	1

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