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VALP Modelling

BCC

NE Bucks Local Plan Tests -Technical Report

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BCC

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Contents

1. Introduction

1.1 Background

Jacobs is framework consultant to the Transport for Buckinghamshire Alliance (TfB) between Ringway Jacobs and Buckinghamshire County Council (BCC). Under the terms of this contract, Jacobs is commissioned to undertake transport planning, modelling and appraisal projects on behalf of BCC.

Jacobs has previously been commissioned to undertake transport modelling assessments of the impacts of Local Plan developments in Buckinghamshire. Work on the first, second and third phase of the Countywide Local Plan Modelling project, which used a strategic transport model of Buckinghamshire, was undertaken and completed as part of that commission. Further details of this work can be found in the Phase One Forecast Modelling Report[1], the Phase Two Forecast Modelling Report[2] and the Phase 3 Technical Note[3].

Following the Vale of Aylesbury Local Plan (VALP) Examination in Public (EiP), Buckinghamshire County Council (BCC) and Aylesbury Vale District Council (AVDC) have asked Jacobs to undertake further modelling using updated Aylesbury and Countywide strategic models, as well as local junction models of Buckingham, in order to assess the impacts of the Local Plan in more detail.

This report will build on previous Countywide modelling as AVDC have requested an assessment of new sites around Milton Keynes through the use of new forecast scenarios tested through the Countywide model. The additional sites for assessment are at Eaton Leys and Salden Chase Extension with a revision in development quantum at the previously assessed Shenley Park site.

The Phase 3 countywide 'Do something' (DS) scenario will be retained as a comparator for the purpose of this modelling, and five further DS scenarios will be developed.

1.2 Scope of study

The most recent Countywide modelling undertaken was the Phase 3 work, in which 'Do minimum', 'Do something', and 'Do something with mitigation' scenarios were developed. To test the impact of new combinations of development in North East Buckinghamshire, adjacent to Milton Keynes, five new 'Do something' (DS) scenarios have been developed (further detail of the scenarios is provided in section 1.3 and section 3).

For each of the above scenarios, a 'with mitigation' version was also produced which includes the list of mitigations as per the Phase 3 run 1 mitigation scenario.

This study does not supersede or replace any detailed modelling work that has been done or will be required in future in assessment of the impacts of individual developments. The purpose of this report is only to assess cumulative impacts of the changes in development proposals and identify areas where these could be considered significant in terms of travel time differences.

1.3 Development scenarios

For the Countywide model, three forecast scenarios were developed during the first and second phases of work, in cooperation with BCC and AVDC. These comprised of a 2033 DM scenario which included the projected planning completions to 2033 across Buckinghamshire, as well as committed development (some of which may form part of the local plan proposals), and two DS scenarios which included DM development plus additional non-committed local plan developments across the county.

[1] Jacobs. 2016. Countywide Local Plan Modelling: Forecast Modelling Report Phase 1.
[2] Jacobs. 2017. Countywide Local Plan Modelling: Forecast Modelling Report Phase 2.
[3] Jacobs 2017. Countywide Local Plan Modelling: Forecast Modelling Technical Note 3

For Phase 3, the DM development scenario remained unchanged, and the DS scenario was updated to reflect the revised local plan growth for Aylesbury Vale.

For this VALP work, the model had two additional zones created (for the new development sites) and five further DS scenarios developed. The DS scenarios were created following the same methodologies and assumptions as for the Countywide Phase 3 modelling, which are detailed in Appendix A

Further details of the forecast scenarios are provided in section 3 of this report. The revised DS scenario will then be used to develop the DS with mitigation scenarios.

1.4 Mitigation options

For Phase 3 of the Countywide modelling two separate mitigation schemes were developed, referred to as Phase 3 run 1 and Phase 3 run 2. For the purposes of this VALP Modelling report a 'with mitigation' version has been produced for each new DS scenario which includes the list of mitigations as per the Phase 3 run 1 mitigation scenario.

As part of the current iteration of VALP modelling work, an additional sensitivity test has been developed, with the aim of reviewing the impacts on the road network if Bletchley Bypass is not implemented as part of the package of mitigation schemes. The assumptions for this sensitivity test are the same as those made for the Phase 3 run 1 scenario, apart from the exclusion of Bletchley Bypass from the forecast network. Throughout the report, this sensitivity test will be referred to as the Bletchley Bypass removal sensitivity test.

Table 4.1 in section 4 sets out the mitigation measures included in Phase 3 run 1 and the Bletchley Bypass removal sensitivity test.

1.5 Structure of report

The structure of this report is as follows:

- Section 1: Introduction – Outlines the background and scope of the report.
- Section 2: Modelling methodology – Describes the development of the forecast scenarios.
- Section 3: Development scenarios – Summarises the land use changes
- Section 4: Mitigation options – Summarises the option sifting process and mitigation options taken forward for testing and appraisal.
- Section 5: Results – Presents the results of modelling work for each model area and scenario assessed.
- Section 6: Summary and conclusion – Summarises the results of the modelling work.

2. Modelling Methodology

2.1 Overview

This section sets out the modelling methodology adopted to develop the forecast scenarios. Five VALP DS scenarios will be developed which reflect development sites around Milton Keynes. The development sites are included as separate model 'zones', with their approximate locations shown in the figure below.

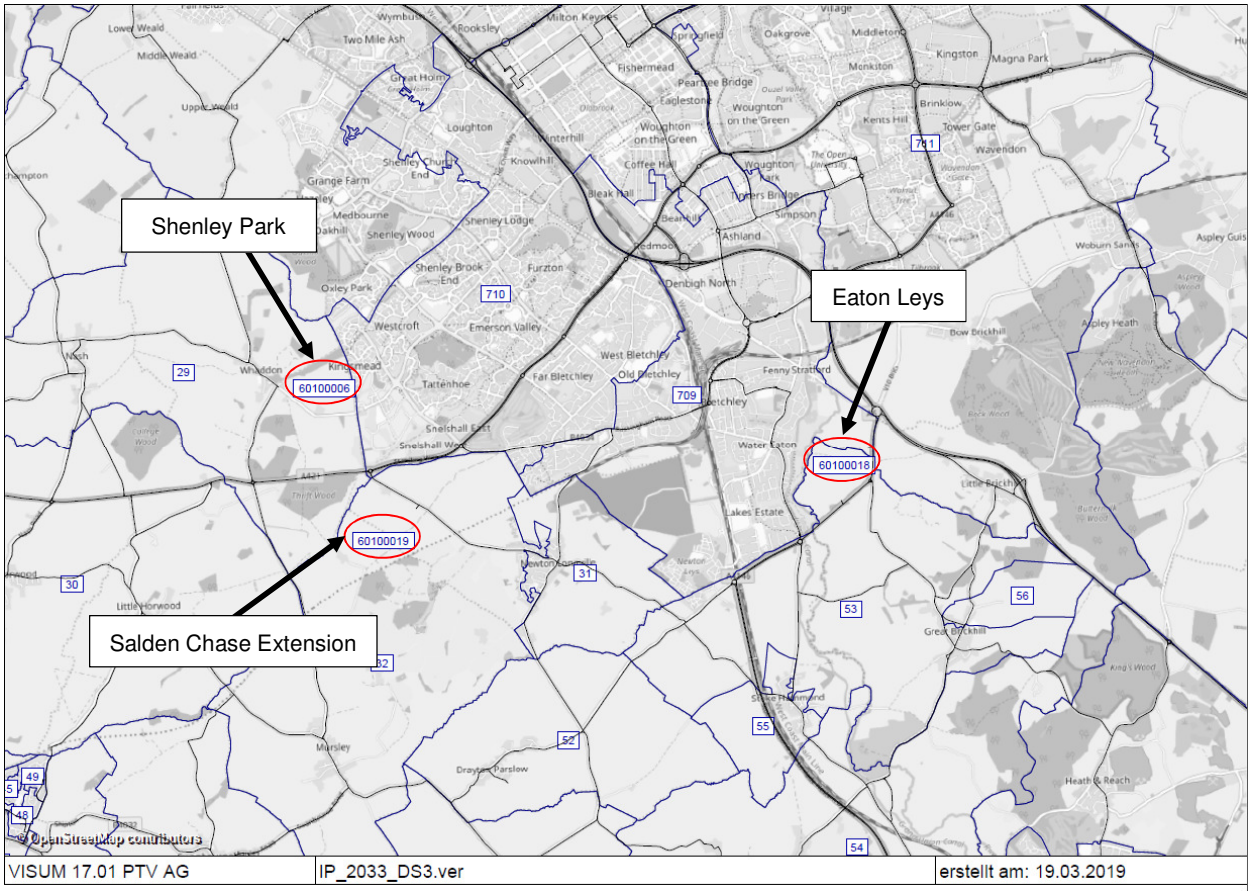

Figure 2.1 Development zone location

The new VALP DS scenarios are as follows:

- DS1 – the same as the existing 'Do something' from Phase 3, but with Shenley Park included at 1,800 dwellings instead of 1,600 dwellings as in the existing Phase 3 DS. This also includes any relevant transport infrastructure for the development
- DS2 – as per DS1 above, but with the 1,400 dwellings at Shenley Park and the addition of 1,200 dwellings at Eaton Leys
- DS3 – the same as DS1 above but with 1,200 dwellings at Shenley Park and the addition of 1,100 dwellings at Salden Chase Extension
- DS4 – the same as the previous Countywide Phase 3 'Do something' but with Shenley Park removed and the addition of 1,200 dwellings at Eaton Leys
- DS5 - the same as the previous Countywide Phase 3 'Do something' but with Shenley Park removed and the addition of 1,100 dwellings at Salden Chase Extension

For each of the above scenarios, a 'with mitigation' version will also be produced which includes the list of mitigations as per the Phase 3 run 1 mitigation scenario. The Bletchley Bypass removal sensitivity test, which is the same as the run 1 mitigation scenario but with Bletchley Bypass removed, will also be produced for each of the above scenarios.

In all other respects, the development of the forecast scenarios is consistent with the methodologies followed in Phase 3. The detail of those methodologies is provided in Appendix A.

3. Development Scenarios

3.1 Overview

This section sets out the revisions made to the DS forecast scenario, in line with the updated land use information provided by BCC. For each development scenario, forecast housing and employment growth has been added to the existing 2013 base land use information to generate a new development quantum.

3.2 Development summary

Table 3.1 provides a summary of the Countywide Model Phase Three DS land use assumptions and the absolute differences between the employment and housing figures for the new VALP DS scenarios.

Future scenario (2033)	Summary details
Do Minimum (DM) 'No development'	Unchanged from phase three and comprised of: • 9,416 houses and 24,265 jobs in Aylesbury Vale; • 1,278 houses and 0 jobs in Chiltern; • 1,297 houses and 1,619 jobs in South Bucks; and • 2,180 houses and 6,011 jobs in Wycombe. Total: 14,171 houses and 31,895 jobs.
Countywide Phase 3 Do Something (DS)	As Phase 2 but; • A reduction of 2,143 houses in Aylesbury Vale (including 1,600 houses at Shenley Park) • An additional 522 jobs in Chiltern; • An additional 2,199 jobs in South Bucks; and • An additional 1,360 houses and 1,070 jobs in Wycombe district. Total: 52,373 houses and 48,624 jobs.
VALP Do Something 1 (DS1)	As Phase 3 DS with: • Addition of 200 houses at Shenley Park. Total: 52,573 houses and 48,624 jobs
VALP Do Something 2 (DS2)	As Phase 3 DS but with: • Addition of 1,200 houses at Eaton Leys; • Reduction of 200 houses at Shenley Park. Total: 53,373 houses and 48,624 jobs
VALP Do Something 3 (DS3)	As Phase 3 DS but with: • Reduction of 400 houses at Shenley Park; • Addition of 1,100 houses at Salden Chase Extension. Total: 53,073 houses and 48,624 jobs
VALP Do Something 4 (DS4)	As Phase 3 DS with: • Addition of 1,200 houses at Eaton Leys; • Reduction of 1,600 houses at Shenley Park. Total: 51,973 houses and 48,624 jobs
VALP Do Something 5 (DS5)	As Phase 3 DS with: • Addition of 1,100 houses at Salden Chase Extension;

Future scenario (2033)	Summary details
	• Reduction of 1,600 houses at Shenley Park. Total: 51,873 houses and 48,624 jobs

Table 3.1 Revised forecast scenarios

Compared with the Phase 3 DS scenario figures, DS4 and DS5 show an overall decrease in housing numbers whereas DS1, DS2 and DS3 show an increase.

3.2.1 Do Something

Within the county, the DS scenarios contains the DM land use quantum plus the revised local plan development scenario for Phase 3 and the new quantum at the development sites. For all areas outside of Buckinghamshire, growth in employment and housing is consistent with NTEM levels of growth. Table 3.2 provides a summary of the DS scenarios.

Location	Totals
Aylesbury Vale District	• DM commitment plus 20,207 houses and 6,069 jobs, including 1,600 houses at Shenley Park and no houses at either Eaton Leys or Salden Chase Extension (DS) • DM commitment plus 20,407 houses and 6,069 jobs, including 1,800 houses at Shenley Park and no houses at either Eaton Leys or Salden Chase Extension (DS1) • DM commitment plus 21,207 houses and 6,069 jobs, including 1,400 houses at Shenley Park, 1,200 houses at Eaton Leys and no houses at Salden Chase Extension (DS2) • DM commitment plus 20,907 houses and 6,069 jobs, including 1,200 houses at Shenley Park, 1,100 houses at Salden Chase Extension and no houses at Eaton Leys (DS3) • DM commitment plus 19,807 houses and 6,069 jobs, including 1,200 houses at Eaton Leys and no houses at either Salden Chase Extension or Shenley Park (DS4) • DM commitment plus 19,707 houses and 6,069 jobs, including 1,100 houses at Salden Chase Extension and no houses at either Shenley Park or Eaton Leys (DS5)
Chiltern District	• DM commitment plus 3,847 houses and 522 jobs
South Bucks District	• DM commitment plus 4,324 houses and 6,578 jobs
Wycombe District	• DM commitment plus 9,824 houses and 3,560 jobs
Outside of Buckinghamshire	• Capped to NTEM growth levels
Total within Buckinghamshire	• DM commitment plus 38,202 houses and 16,728 jobs

Table 3.2 Do Something growth

4. Mitigation options

4.1 Overview

This section describes the development of the mitigation scenarios and the selection of the schemes tested. Table 3.2 presents the final mitigation options included in each run of the mitigation model.

4.2 Option generation

As part of the Countywide modelling, a long list of schemes was put together by BCC in collaboration with the districts. This included a variety of highway improvements (upgraded roads, junction improvements, relief roads etc.) and an assortment of public transport schemes with the aim of encouraging a mode shift from car to sustainable transport (upgraded bus and rail facilities, improvements to the cycling network, public transport initiatives etc.).

The options were designed to address strategic issues identified in the Countywide modelling, as well as concerns of a more localised nature, tackling areas and facilities that could be enhanced and developed in order to reduce congestion and delay arising from the additional housing and employment developments across the county.

The same scheme mitigation options (run 1) that were used in the Countywide Phase 3 modelling are being used in this work. The Bletchley Bypass removal sensitivity test includes the same schemes as the run 1 mitigation scenario, only with Bletchley Bypass removed.

4.3 Options for appraisal

Table 4.1 outlines each mitigation option taken forward for appraisal in Aylesbury vale after the sifting process was completed. The table also includes a separate column for the schemes included in the Bletchley Bypass removal sensitivity test.

District	Scheme name	Scheme description	Run 1	Bletchley Bypass removal sensitivity test
Aylesbury Vale	Eastern Link Road (South)	The southern section of the Eastern Link Road will complete a new north-south, single carriageway road between the A418 Aylesbury Road and A41 Aston Clinton Road, to the east of Aylesbury. The scheme will provide access to the Woodlands Development and will include an upgraded A41 Roundabout.	**Yes**	**Yes**
	Southern Link Road (upgrade)	The Southern Link Road between the A41 Aston Clinton Road and A413 Wendover Road is already included in the without mitigation scenarios. However, as a mitigation option, this scheme was upgraded to dual carriageway standard, and includes a new roundabout and left-in left-out access junction.	**Yes**	**Yes**
	Stoke Mandeville Bypass Extension	This scheme seeks to extend the planned Stoke Mandeville bypass (A4010 realignment) with a new single carriageway road to meet the Southern Link Road at the A413 Wendover Road.	**Yes**	**Yes**

District	Scheme name	Scheme description	Run 1	Bletchley Bypass removal sensitivity test
	A41 Bicester Road PPTC	The scheme includes implementing bus priority measures (e.g. bus lanes and priority at traffic lights). The improvement will aim to significantly improve journey time reliability and increase the public transport mode share.	**Yes**	**Yes**
	A41 Tring Road PPTC Improvements	The scheme includes implementing bus priority measures (e.g. bus lanes and priority at traffic lights). The improvement will aim to significantly improve journey time reliability and increase the public transport mode share.	**Yes**	**Yes**
	Stoke Road Signalised Junction	Signal timing optimisation has been carried out to better accommodate demand at this junction.	**Yes**	**Yes**
	Traffic calming between A418 and Stoke Mandeville	Traffic calming on Prebendal Avenue to reduce rat-running between A418 and Stoke Road.	**Yes**	**Yes**
	Aylesbury Town Centre Pedestrian Network Improvements	This improvement aims to increase safety and enhance the public realm in Aylesbury Town Centre.	**Yes**	**Yes**
	Grand Union Triangle	This scheme is designed to provide cost-effective off-road walking and cycling routes in an area of major growth. The project includes improving existing towpaths, the upgrade of a public footpath to a bridleway and then implementation of connecting routes and some small-scale improvements.	**Yes**	**Yes**
	A421 Roundabout Capacity Improvements	Capacity improvements at the London Rd/ A421 Rbt and Gawcott Rd/ A421 Rbt to increase capacity.	**Yes**	**Yes**
	New Grid Road in Milton Keynes	This scheme will implement a new grid road to the A421 adjacent to the V1 to discourage rat running through Whaddon.	**Yes**	**Yes**
	Bletchley By-Pass	This scheme consists of a new single-carriageway road joining the A421 and A4146 South West of Bletchley.	**Yes**	**No**

Table 4.1 Run 1 Mitigation and Bletchley Bypass removal sensitivity test options for Aylesbury Vale

5. Results

5.1 Overview

The purpose of this section of the report is to present the modelling outputs from the new DS modelling forecast scenarios in so far as they affect the area of Buckinghamshire in the vicinity of the updated developments, i.e. around Milton Keynes and the A421 corridor. As with the previous phases of work, a set of model outputs have been produced to illustrate the impacts of the DS forecast scenarios compared with the Phase 3 DM as well as the DS with mitigation compared against the respective (non-mitigation) DS scenario.

It is important to note that the DS development scenario (with and without mitigation) models the cumulative impact of the revised local plan development scenario across the model, whilst the mitigated scenario also gives an indication of the overall impact of the included mitigation. As such, the narrative below focuses on the area as a whole in terms of travel time and congestion changes and does not distinguish between or attribute impacts to individual developments and mitigation schemes.

The majority of the commentary in this section is based on the model output from the updated DS scenarios (derived from revisions to the Phase 3 Countywide Model scenarios); however wherever necessary information has been supplemented with evidence from other modelling work and local knowledge. All the model outputs produced for this phase of work can be found in Appendix B and Appendix C of this note. A detailed description of the different types of output can be found below.

5.1.1 Congestion ratio

The congestion ratio plots show the ratio of the congested travel time to the free flow travel time on each modelled link. An increase in the congested travel time on a link is not only affected by increases in flow, but also by delays at the downstream junction. As a result, it is possible, where junctions are constrained, to see congestion on a particular link, without any significant increase in demand flow.

Links are plotted according to the following criteria:

Colour of the band	Congestion ratio	Interpretation
Transparent	1	Link experiences free flow conditions
Green	1-1.5	Travel times are up to 50% greater than in the uncongested situation
Yellow	1.5-2	Travel times are between 50% and 100% (i.e. two times) higher than in the uncongested situation
Orange	2-4	Travel times are between 100% and 400% (i.e. two to four times) higher than in the uncongested situation
Red	>4	Travel times are more than 400% (i.e. more than four times) higher than in the uncongested situation

Table 5.1 Congestion ratio criteria

5.1.2 Change in travel time

Plots of the change in travel time show the difference in congested link travel times between an altered and comparison scenario (for example DS1 and DM) as a percentage. The change is only shown for those links on which the congested travel is more than twice the free flow time in either scenario, i.e. for those links for which the congestion ratio is greater than 2 (and thereby marked with an orange or red band as described in Table 5.3 ensures that only those areas which experience relatively high levels of congestion are shown.

The congested link travel time is the same as that used for the congestion ratio. It is worth noting that where an area is already congested in the comparison model, travel times will be more sensitive to smaller increases in trips.

Plots have been produced for the following 10 combinations of scenarios for all time periods:

Adjusted Scenario	Comparison Scenario
DS1	DM
DS1 with mitigation	DS1 (without mitigation)
DS2	DM
DS2 with mitigation	DS2 (without mitigation)
DS3	DM
DS3 with mitigation	DS3 (without mitigation)
DS4	DM
DS4 with mitigation	DS4 (without mitigation)
DS5	DM
DS5 with mitigation	DS5 (without mitigation)
DS1 Bletchley Bypass removal sensitivity test	DS1 (without mitigation)
DS2 Bletchley Bypass removal sensitivity test	DS2 (without mitigation)
DS3 Bletchley Bypass removal sensitivity test	DS3 (without mitigation)
DS4 Bletchley Bypass removal sensitivity test	DS4 (without mitigation)
DS5 Bletchley Bypass removal sensitivity test	DS5 (without mitigation)

Table 5.2 Adjusted-comparison scenario pairings for which change in travel time plots have been produced

Links have been plotted according to the following criteria:

Colour of the band	Interpretation	Notes
Transparent	Either travel time on the link is the same in both scenarios, or the change in travel time does not lead to congested conditions (in which the congested travel time is at least twice the uncongested time).	n/a
Green	Travel time in the scenario is less than in the comparison scenario (for the scenario without mitigation this is often as a result of reassignment away from congested links. For the scenario with mitigation this is usually as a result of mitigation scheme mitigating the impacts)	The greater the decrease the thicker and darker the band
Red	Travel time in the scenario is greater than in the comparator.	The greater the increase the thicker and darker the band

Table 5.3 Change in travel time criteria

In addition, the percentage change in travel time is plotted adjacent to the relevant links.

5.2 Summary of impacts

Congestion ratio and change in travel time plots have been produced for scenarios DS1 to DS5 for all time periods. Both AM and PM peak congestion ratio plots have been analysed and these findings have been presented in the main body of the report. For the change in travel time plots, only the analysis of the PM plots is presented in the main body of the report as there are relatively few changes to report for the AM peak. All remaining plots for other time periods can be found in Appendix B and C.

5.2.1 DM Scenario

For reference, the relevant DM congestion ratio plots are included below:

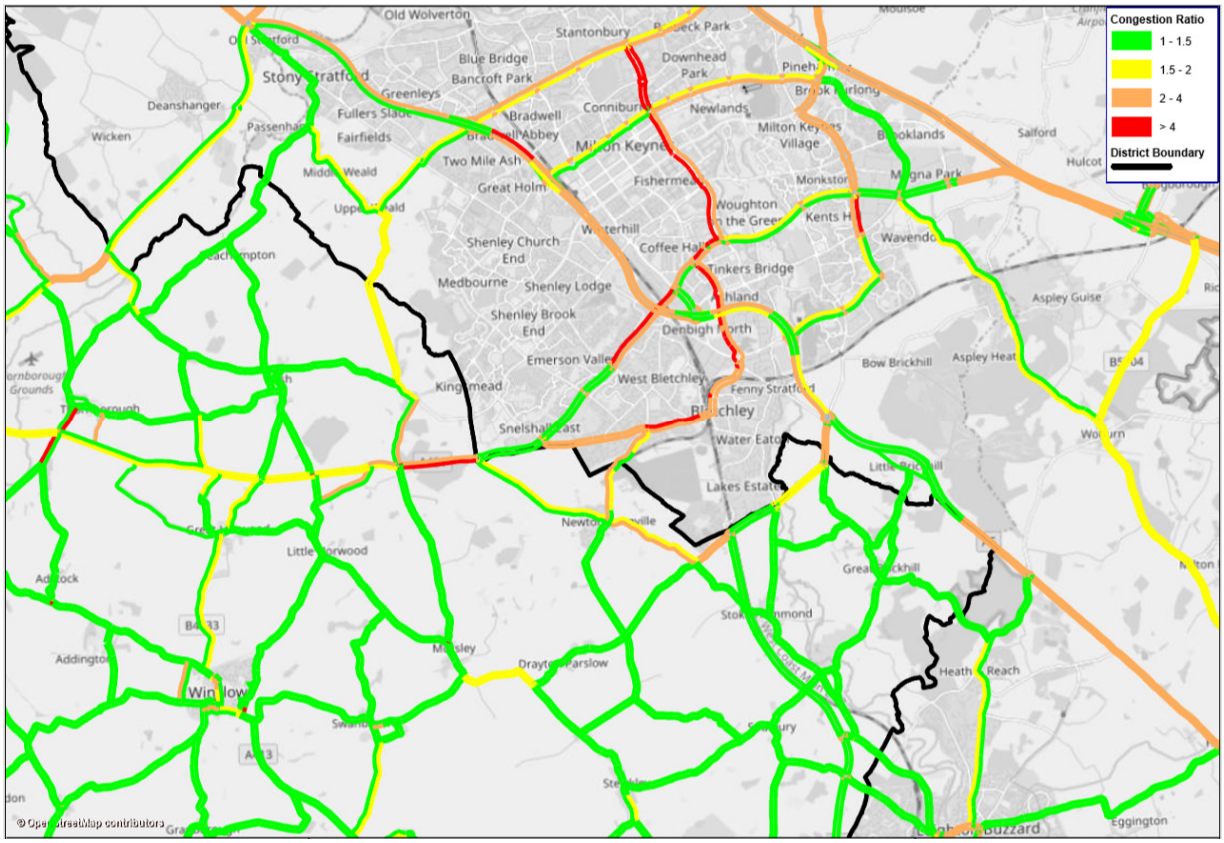

Figure 5.1 AM Peak DM Countywide Phase 3 Congestion Ratio Plot

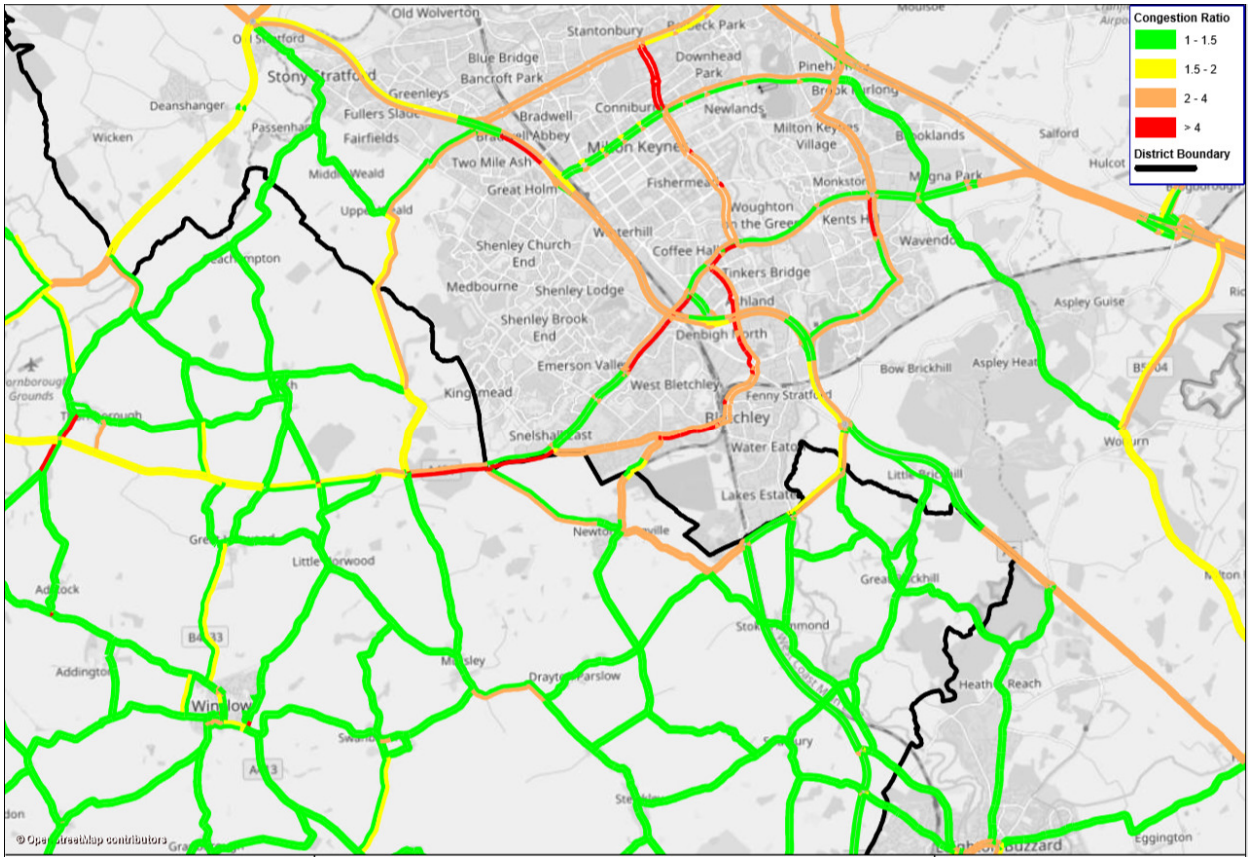

Figure 5.2 PM Peak DM Countywide Phase 3 Congestion Ratio Plot

With the committed development in the DM scenario, there is a large part of the congestion occurring along parts of the A421 and adjoining roads through the centre of Milton Keynes.

5.2.2 DS scenario

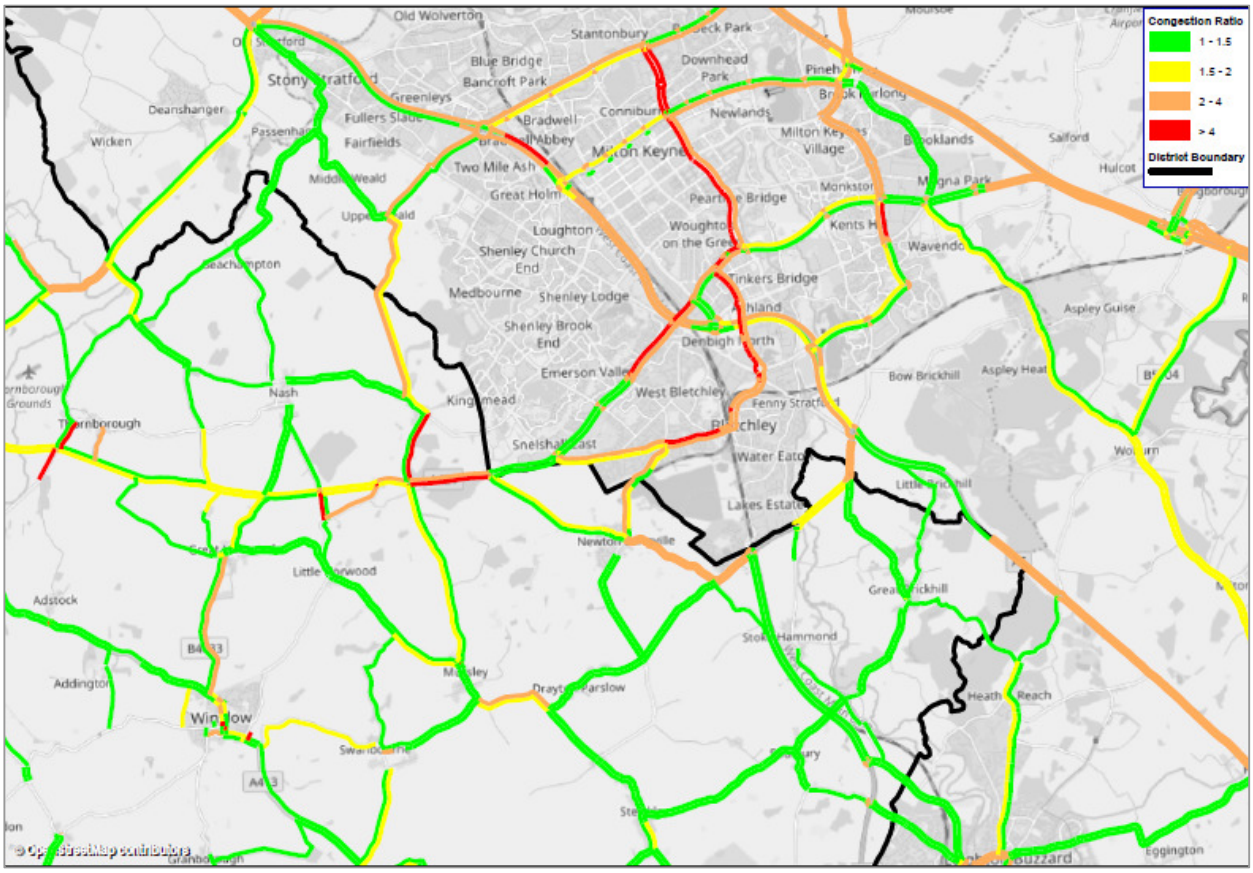

Figure 5.3 AM Peak DS Countywide Phase 3 Congestion Ratio Plot

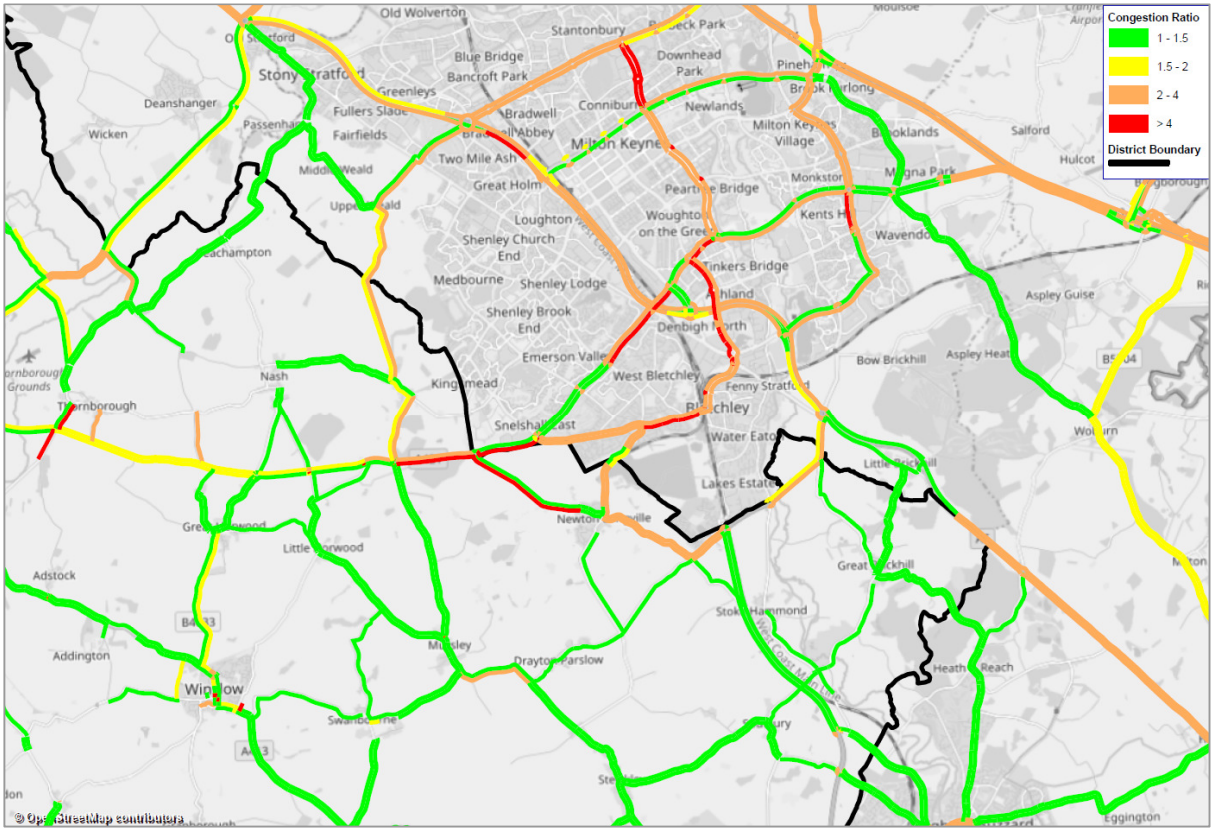

Figure 5.4 PM Peak DS Countywide Phase 3 Congestion Ratio Plot

Figure 5.3 and Figure 5.4 show the congestion ratio for the Phase 3 DS model in the AM peak and PM peak periods respectively. With the committed development and Local Plan developments of that scenario, there are varying levels of congestion across the Aylesbury Vale and Milton Keynes Districts. Similar to DM, a large part of the congestion occurs along parts of the A421 and adjoining roads through to the centre of Milton Keynes.

5.2.3 DS1 scenario

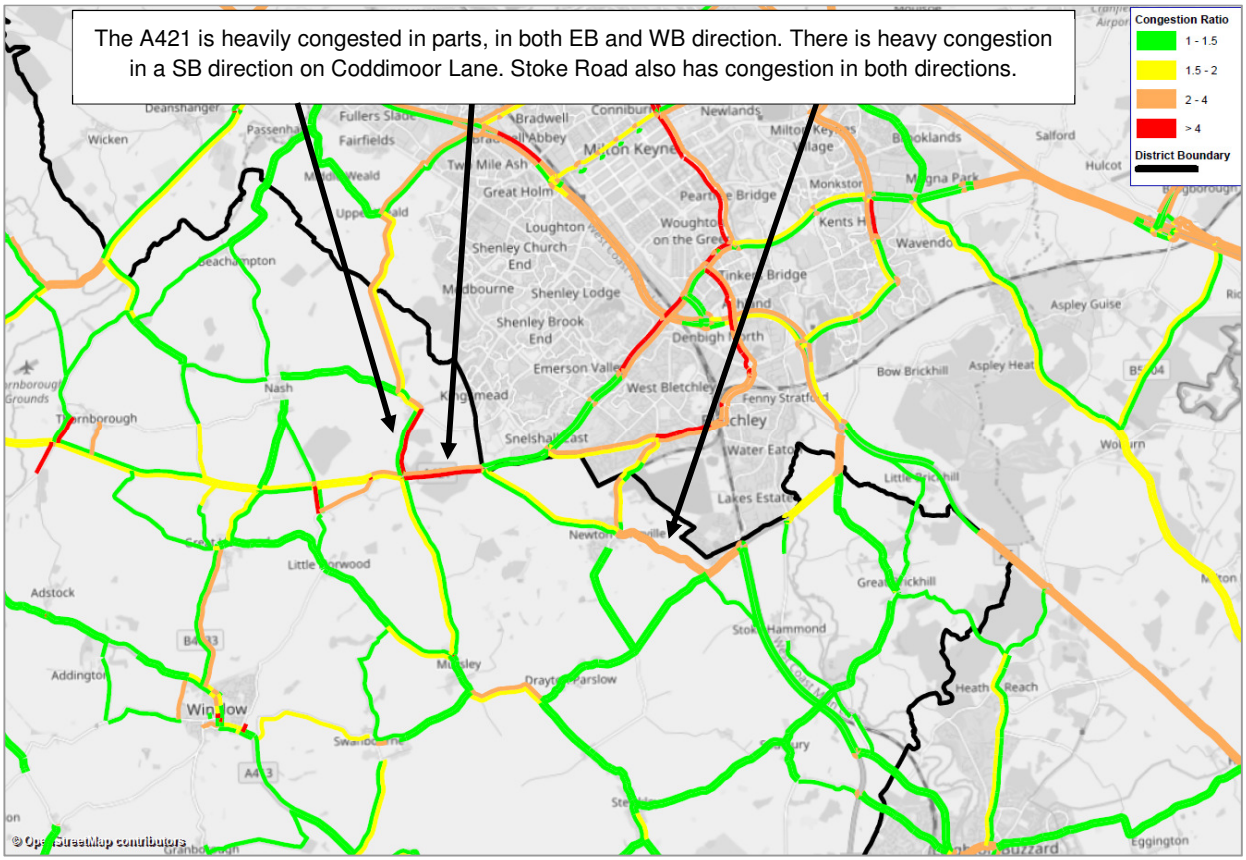

Figure 5.5 AM Peak DS1 Congestion Ratio Plot

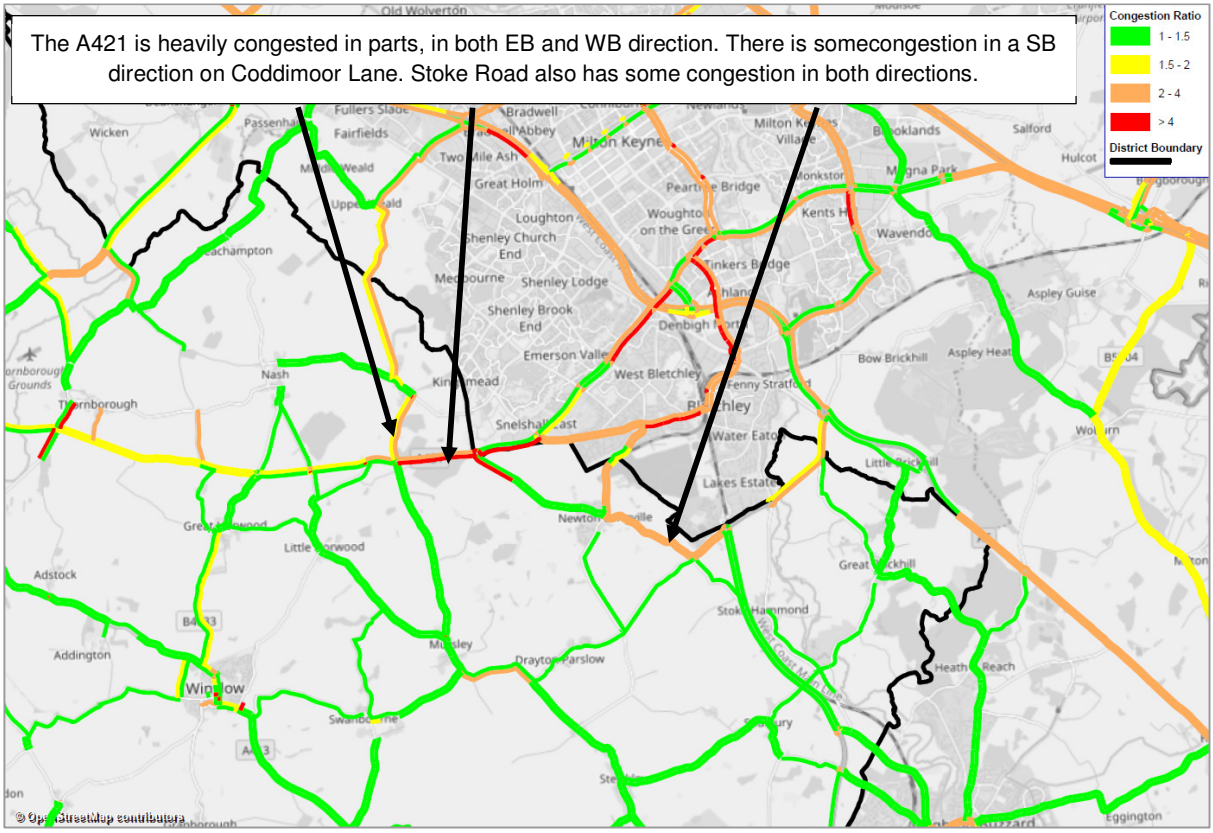

Figure 5.6 PM Peak DS1 Congestion Ratio Plot

The DS1 AM peak congestion ratio plot (Figure 5.5) shows little change in comparison to the Phase 3 DS plot. There continues to be heavy congestion on parts of the A421, Standing Way and the B4034. Heavy congestion is also observed on Coddimoor Lane in a southbound direction, which is where the access is for the Shenley Park development. However, despite some of the development traffic leaving the site and heading north on Coddimoor Lane, there is little congestion in a northbound direction. Likewise, the DS1 PM peak congestion ratio plot (Figure 5.5) shows little change in comparison to the Phase 3 DS plot. There continues to be congestion along Coddimoor Lane, Stoke Road and parts of the A421. The difference in travel time between this scenario and the DM is illustrated below.

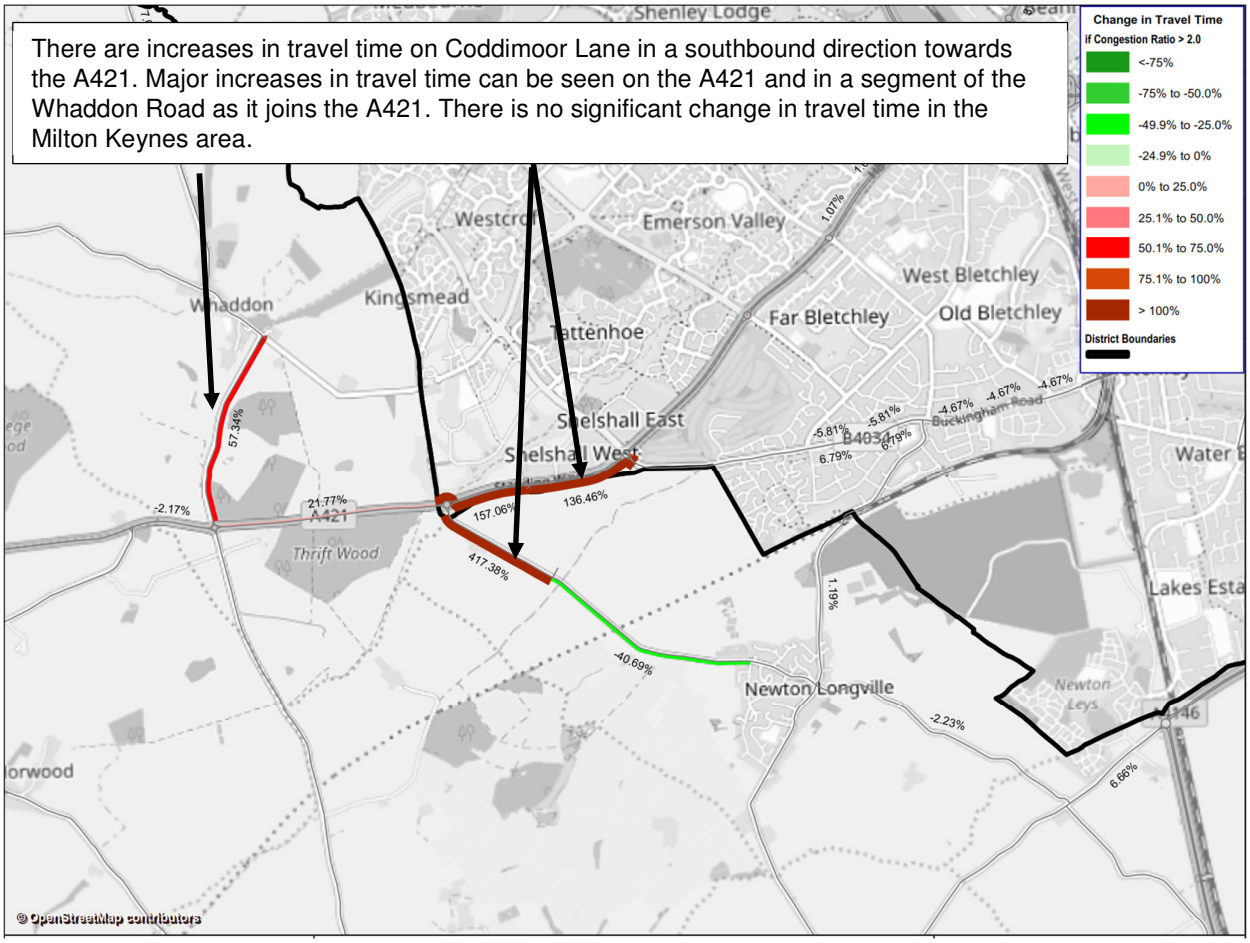

Figure 5.7 PM Peak DS1-DM Change in Travel Time Plot

There is an increase in travel time on Coddimoor Lane which is where the access is for the Shenley Park development. The increase in traffic could be a result of development traffic, which leaves the site and heads south towards the A421.

There are increases in traffic on the A421 between the Bottle Dump Roundabout and the Standing Way/V1 Snelshall St/B4034 roundabout. This increase is also observed on Whaddon Road between the A412/Standing Way/Whaddon Road roundabout and Weasel Lane.

The effects of the run 1 mitigations are shown below.

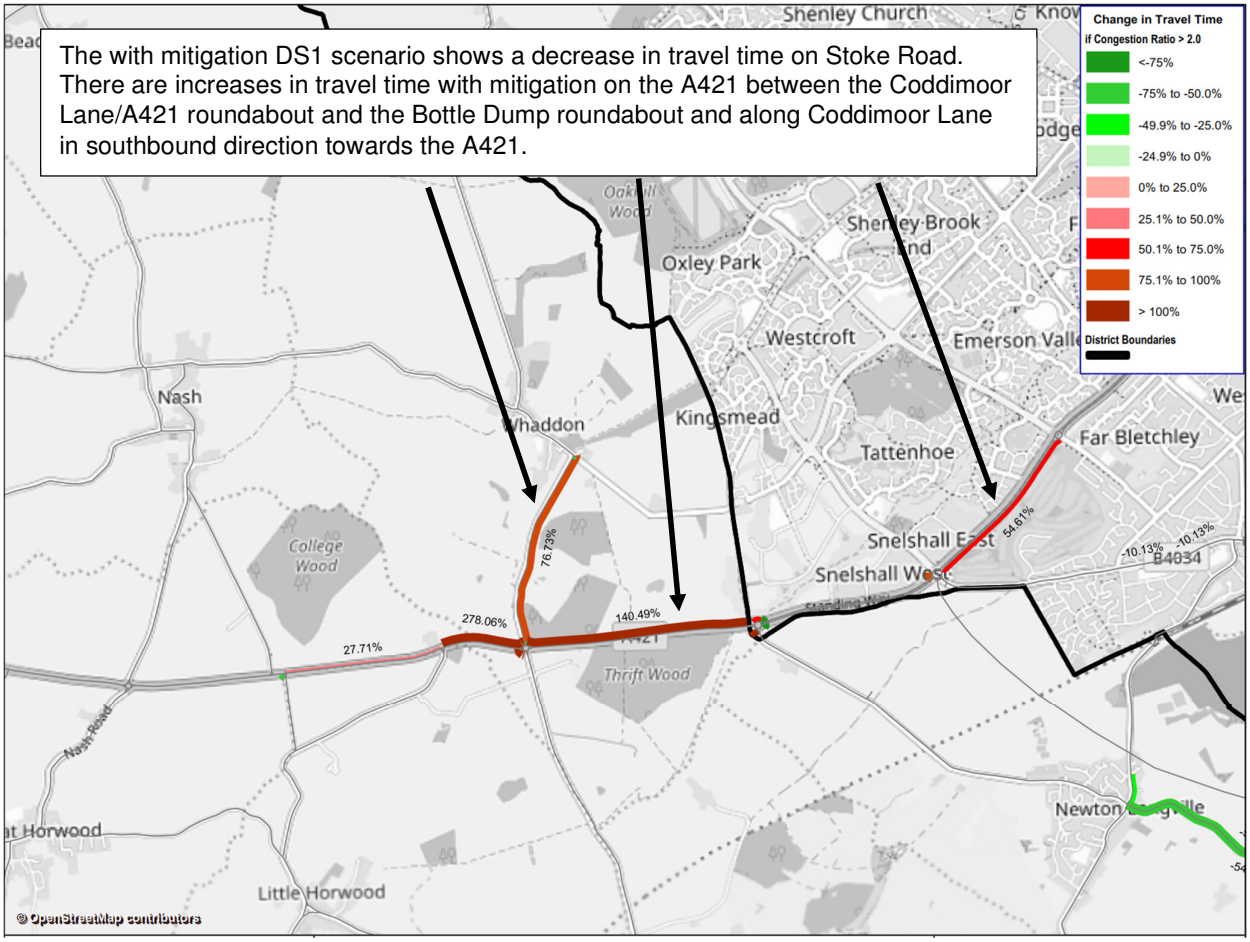

Figure 5.8 PM Peak DS1 Mitigation Run 1-DS1 Change in Travel Time Plot

The PM peak with mitigation scenarios show the biggest change in travel time. The same changes are observed in all the DS scenarios (1-5) with mitigation scenarios. The mitigation causes decreased travel times along Stoke Road and increases along on the A421 between the Coddimoor Lane/A421 roundabout and the Bottle Dump roundabout and on Coddimoor Lane. The mitigation scenario includes the Bletchley Bypass and a new grid road in Milton Keynes which connects to the Tattenhoe Roundabout. The purpose of the new grid road is to remove some of the traffic from the A421 in Milton Keynes, immediately east of the County boundary and reduce rat-running through Whaddon. However, the presence of Bletchley Bypass increases demand flows on the A421 to the west and consequently, increases travel times. This was noted in the Phase 3 work and remains in the updated scenarios.

5.2.4 DS2 Scenario

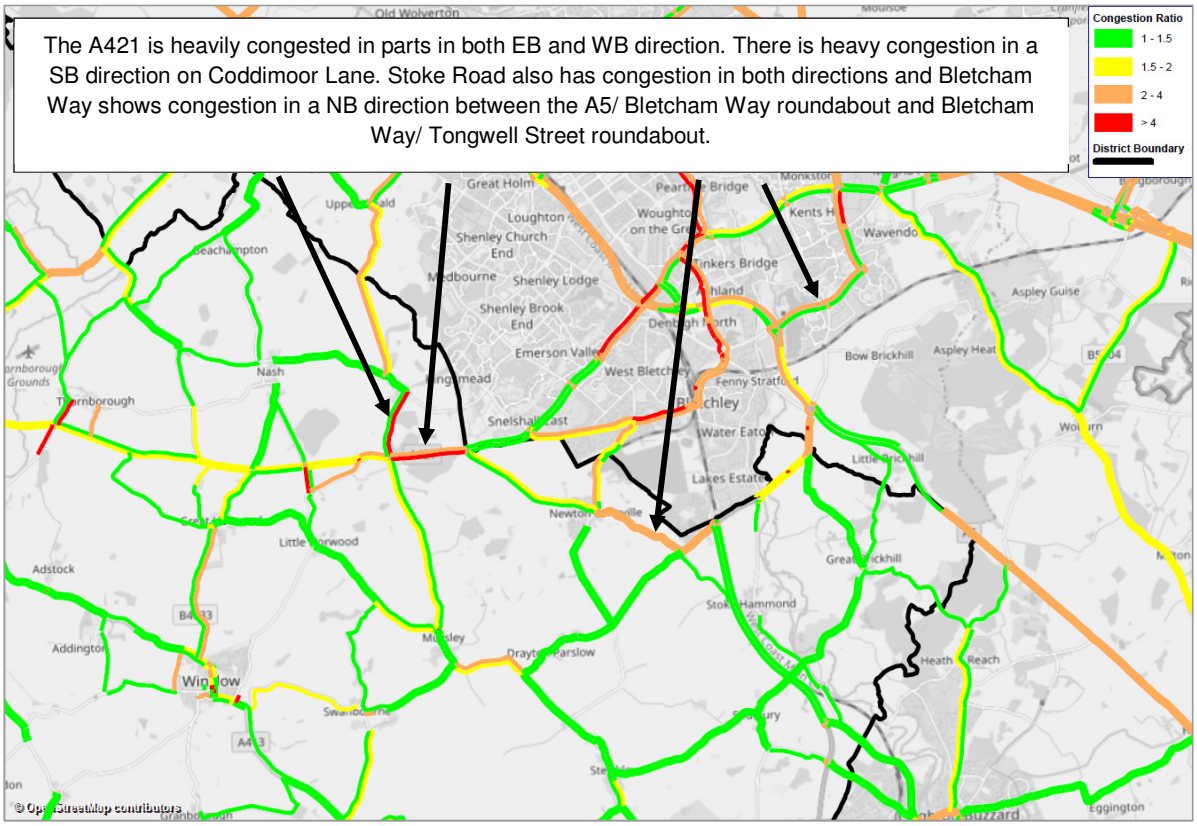

Figure 5.9 AM Peak DS2 Congestion Ratio Plot

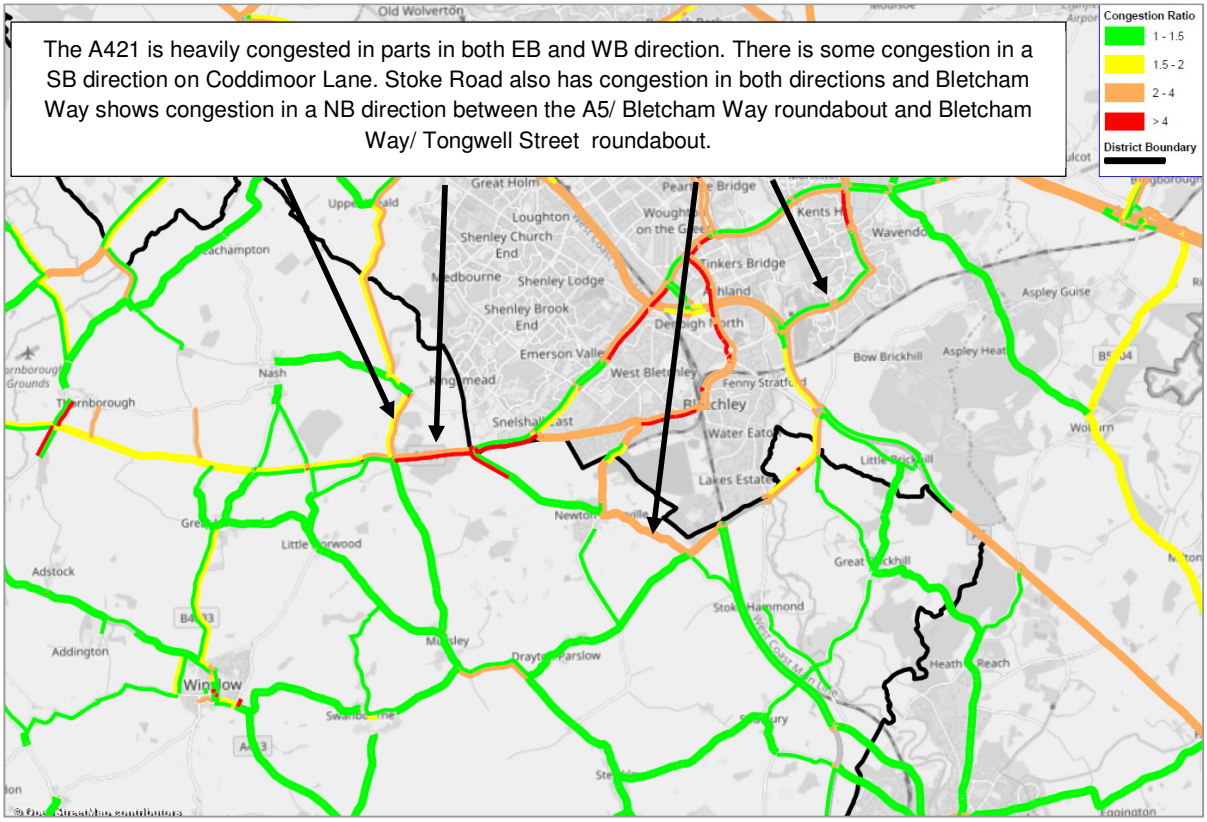

Figure 5.10: PM Peak DS2 Congestion Ratio Plot

DS2 shows an increase in congestion northbound between the A5/Bletcham Way roundabout and Bletcham Way/Tongwell Street roundabout within Milton Keynes in the AM peak which was not seen in the Phase 3 modelling. Across both peaks, the scenario also shows the same pattern of congestion as the DS1 and the Phase 3 DS in which there is congestion on Coddimoor Lane and on the A421 which is where both the Shenley Park and Eaton Leys developments access the network. The changes in travel time compared to the DM scenario are detailed below.

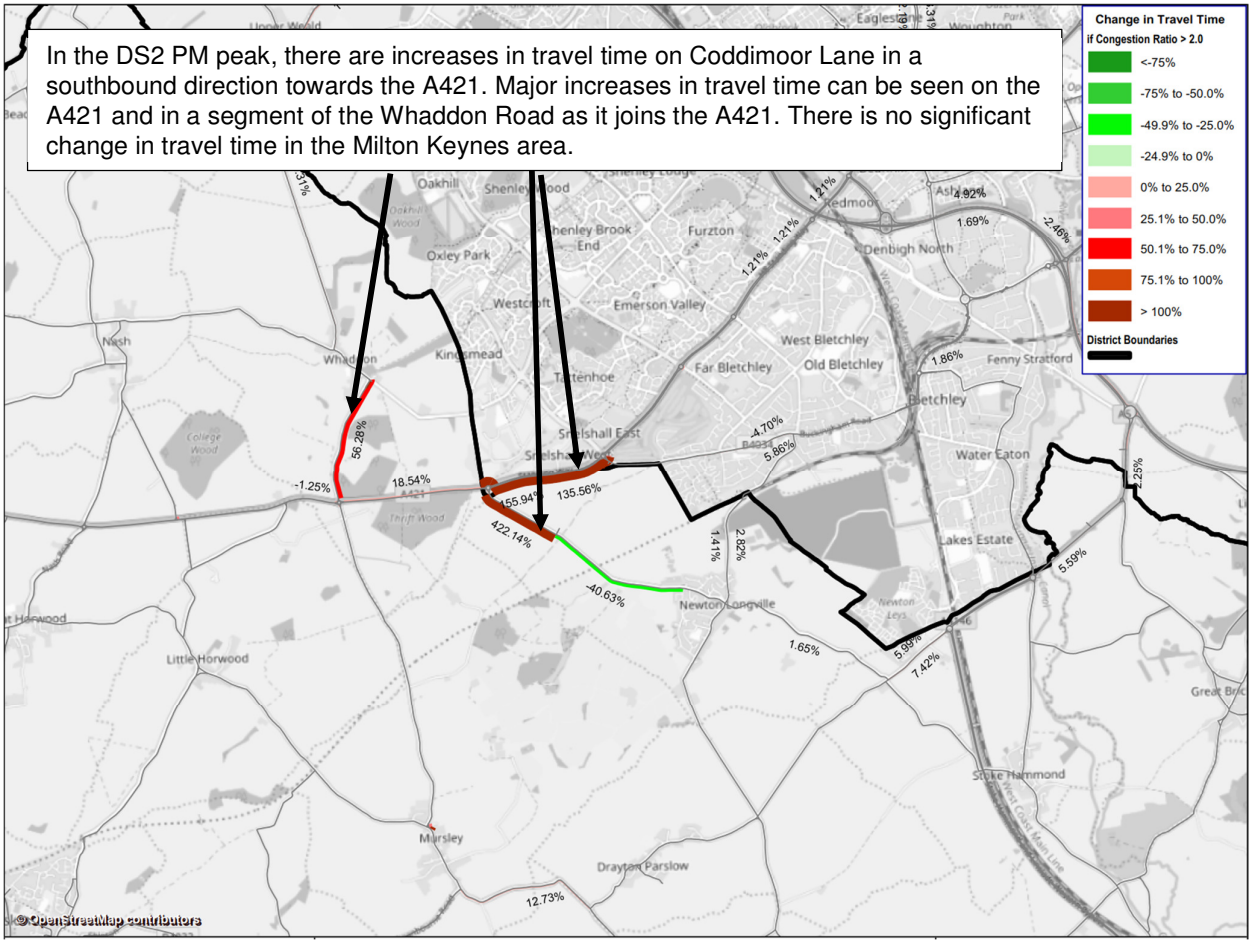

Figure 5.11 PM Peak DS2-DM Change in Travel

DS2 shows the same changes in travel time as the DS1. There are increases in traffic on the A421 between the Bottle Dump roundabout and the Standingway/V1 Snelshall St/B4034 roundabout. This increase is also observed on Whaddon Road between the A421/Standing Way/Whaddon Road roundabout and Weasel Lane. The changes in travel time as a result of the mitigation measures are shown below.

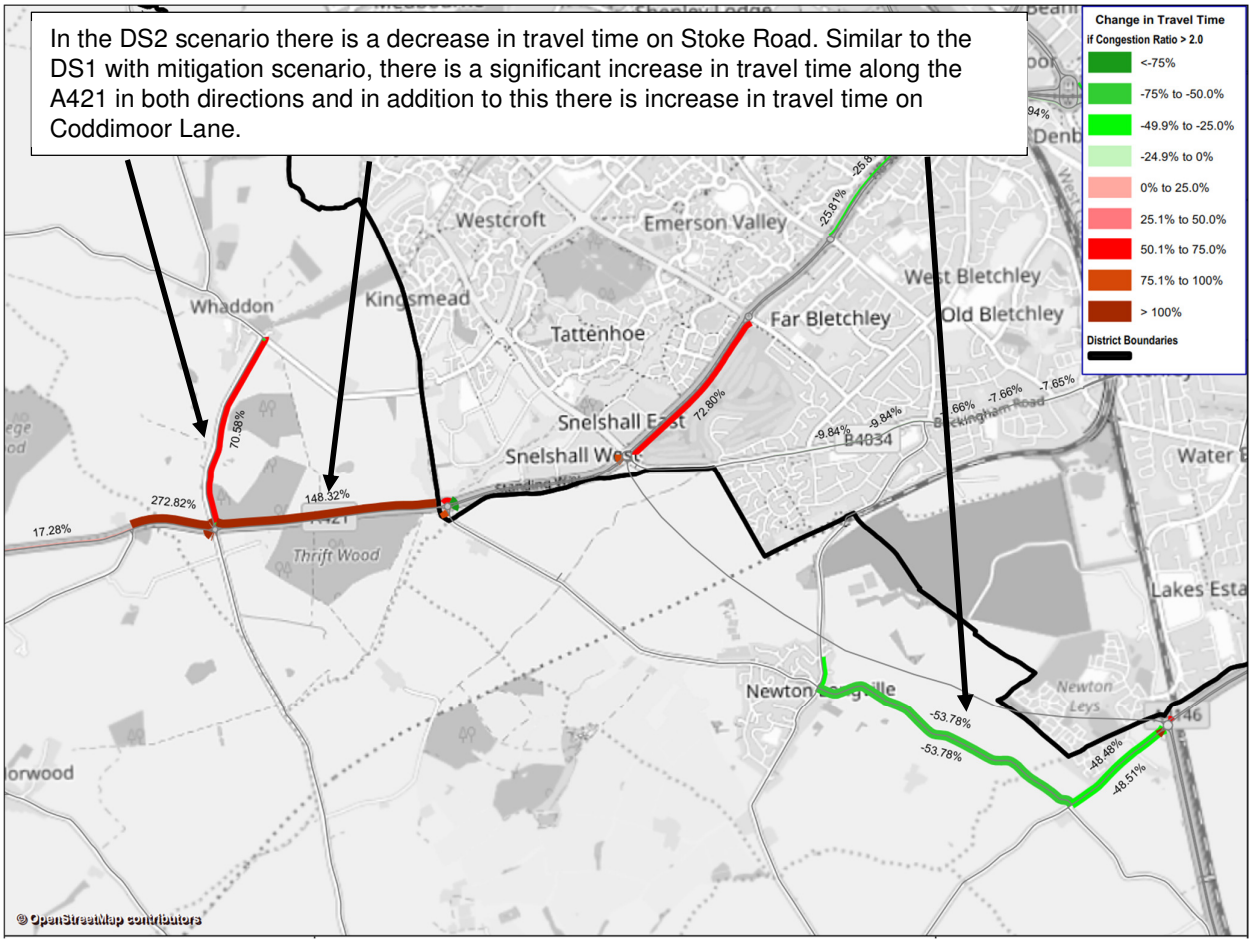

Figure 5.12 PM Peak DS2 Mitigation Run 1-DS2 Change in Travel Time Plot

With the addition of mitigation run 1 in the DS2 scenario there is the same changes in travel time as that of DS1, for the same reasons.

5.2.5 DS3 Scenario

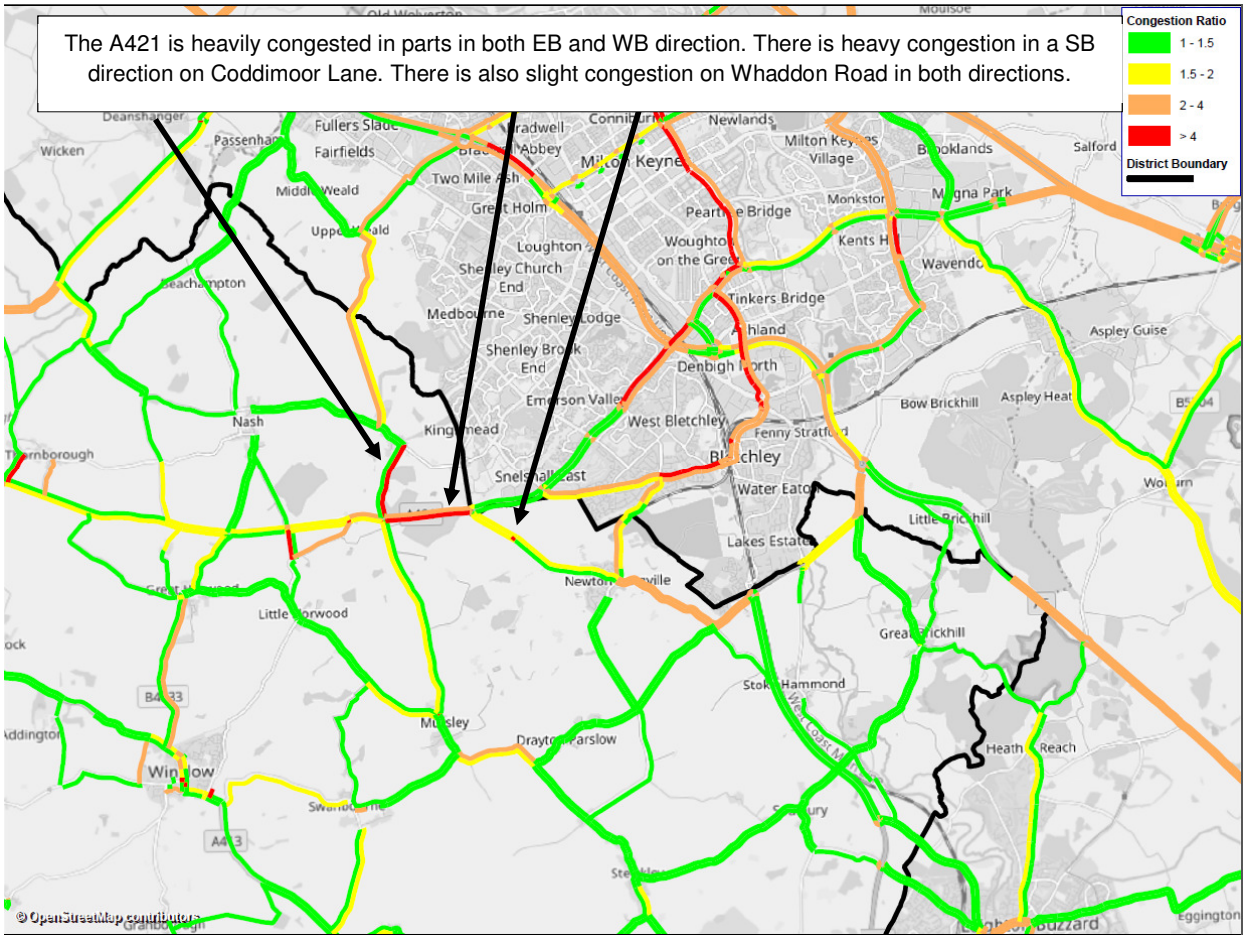

Figure 5.13 AM Peak DS3 Congestion Ratio Plot

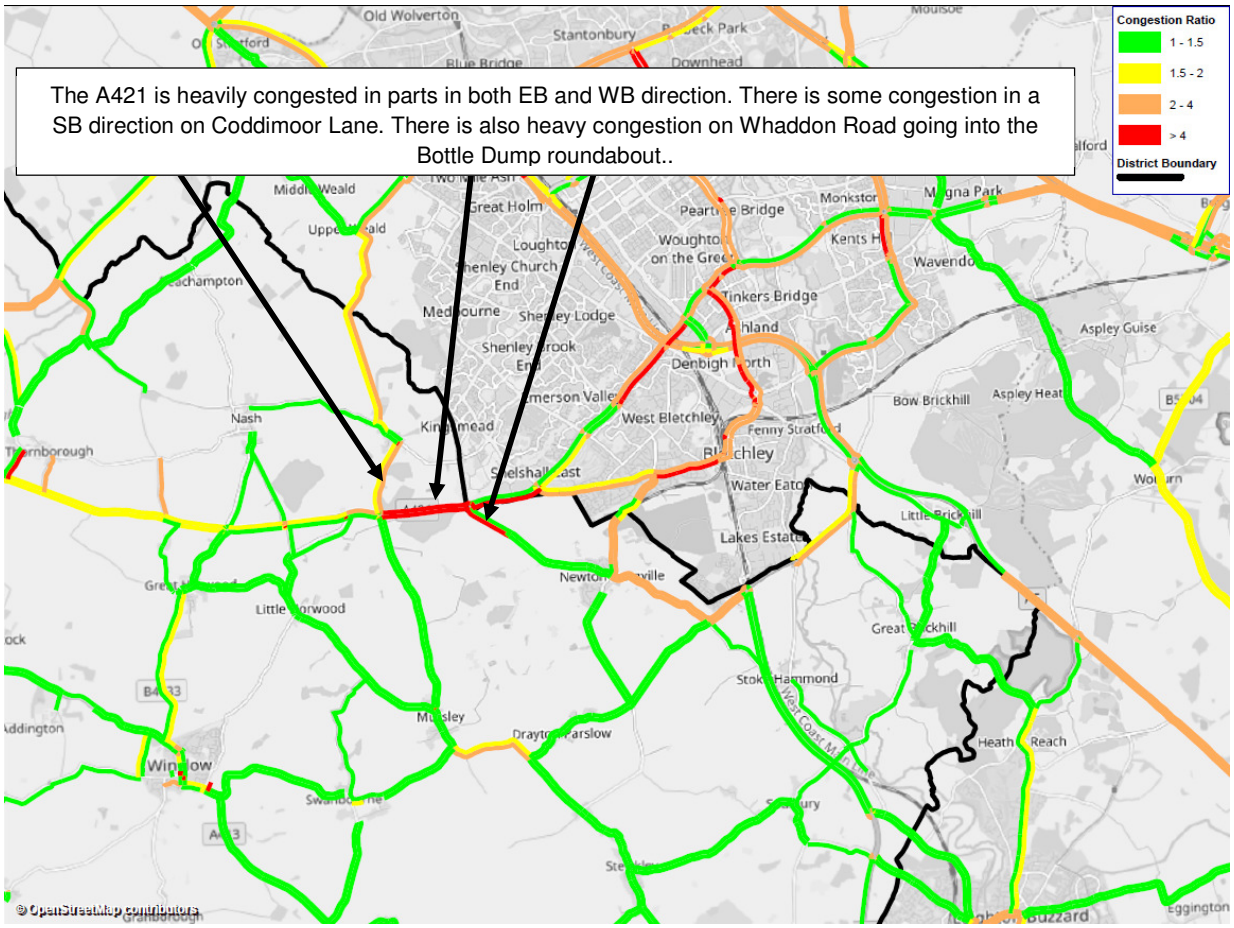

Figure 5.14: PM Peak DS3 Congestion Ratio Plot

In the AM peak, DS3 shows some additional congestion on Whaddon Road in a northbound direction that is not seen in the DS, DS1 or DS2. The additional congestion can be attributed to the additional development sites in this scenario that are not in the DS, where development traffic from these sites use Whaddon Road and Coddimoor Lane. This is expected due to the access for these sites located on the aforementioned roads. The change in travel time is illustrated below.

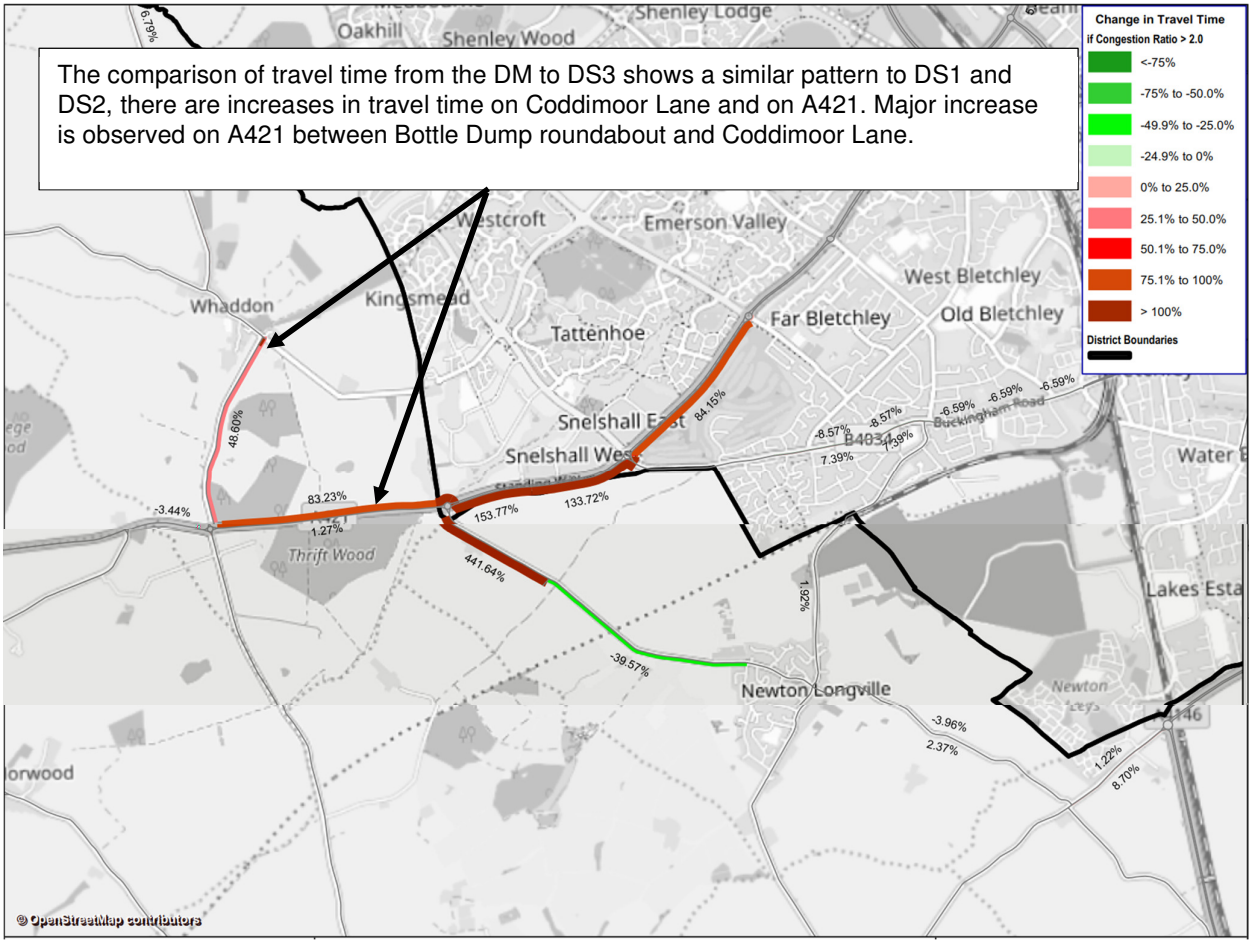

Figure 5.15 PM Peak DS3-DM Change in Travel Time Plot

The DS3 scenario shows the same increases in travel time on Coddimoor Lane where the Shenley Park development access is. Further to this, in the DS3 scenario, the A421 has a slight increase in travel time on the western approach to the Bottle Dump roundabout, which could be a result of increased traffic looking to access the Salden Chase Extension development. The increased travel time on this arm is not seen in the DS, DS1 and DS2 scenarios. The increases in travel time on Whaddon Road and the A421 eastern approach to the Bottle Dump roundabout are in line with other scenarios.

The travel time changes effected by the mitigation measures are illustrated below.

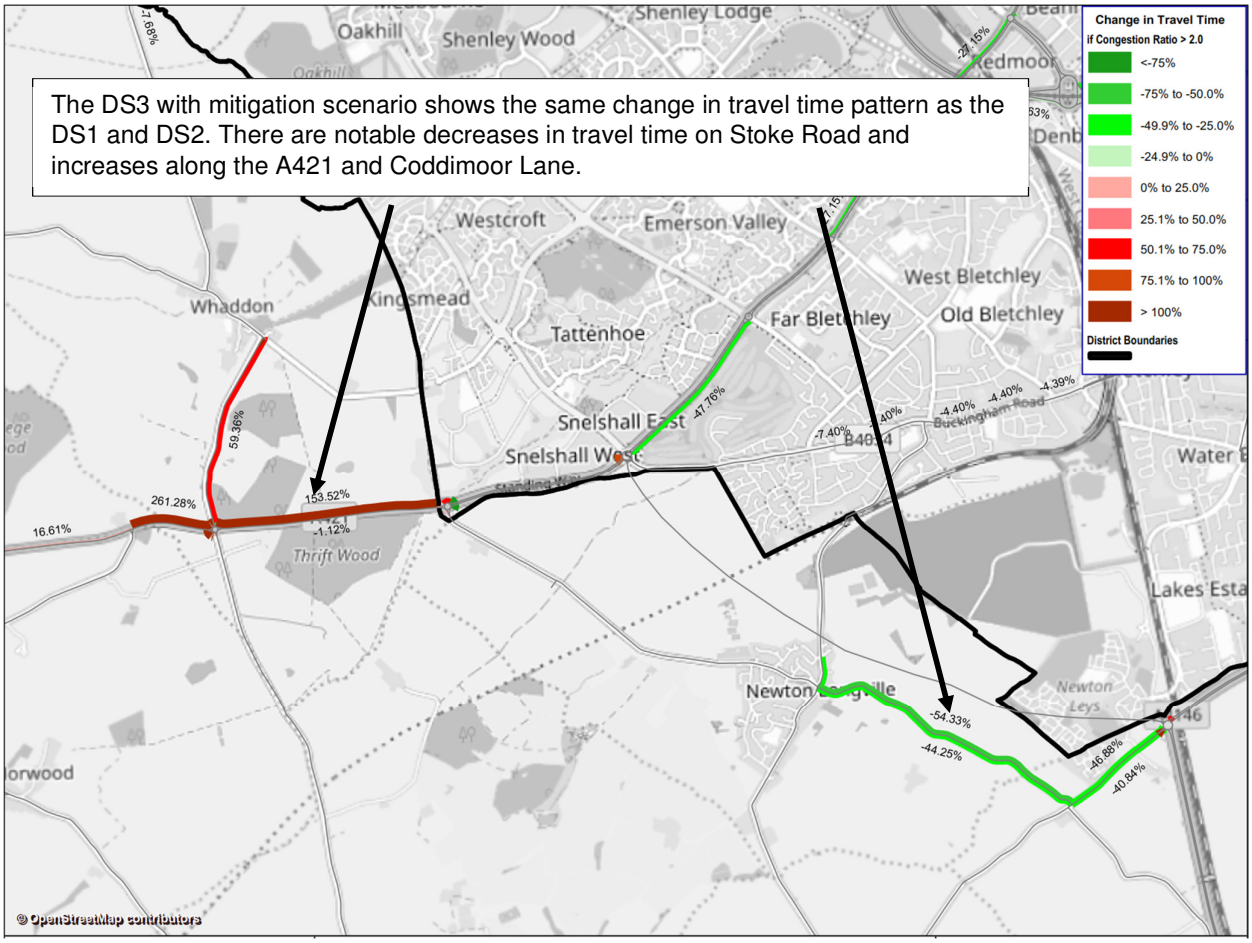

Figure 5.16 PM Peak DS3 Mitigation Run 1-DS3 Change in Travel Time Plot

The DS3 with mitigation shows the same changes in travel time in NE Aylesbury Vale as the DS2 and DS1.

5.2.6 DS4 Scenario

Figure 5.17 AM Peak DS4 Congestion Ratio Plot

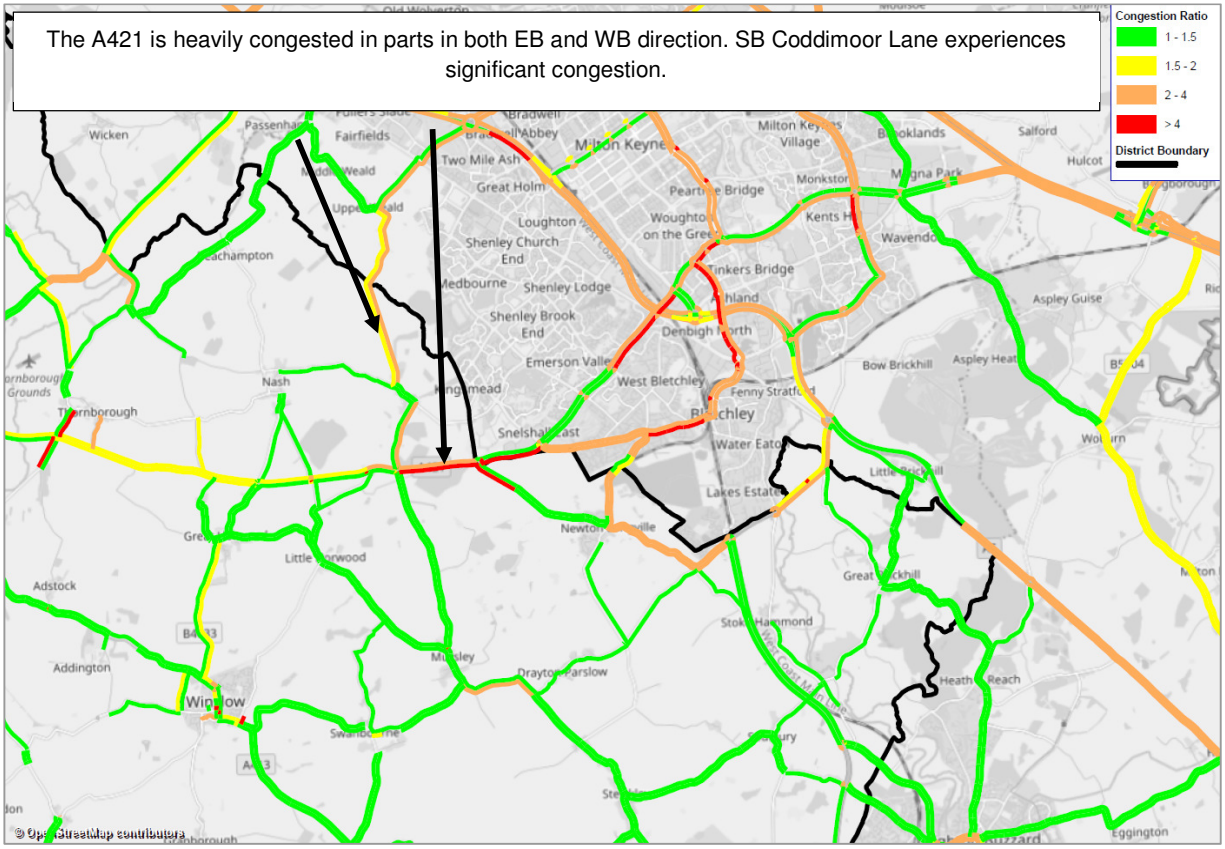

Figure 5.18 PM Peak DS4 Congestion Ratio Plot

In the DS4 scenario, the A421 is still congested in parts, despite a reduction in traffic due to the removal of the Shenley Park development. This is due to traffic to and from Eaton Leys using the A421 to travel to Buckingham. The travel time change from the DM is illustrated below.

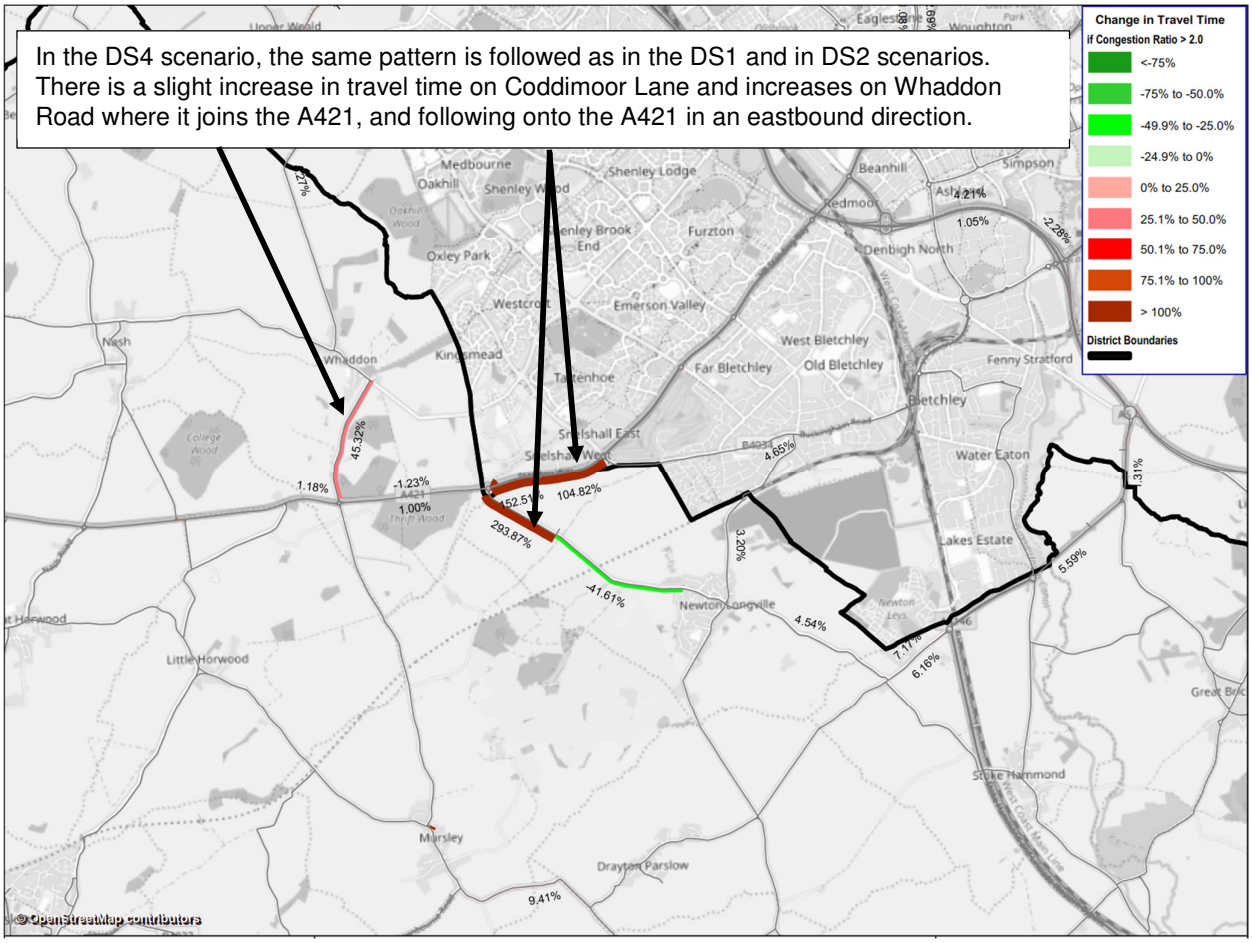

Figure 5.19 PM Peak DS4-DM Change in Travel Time Plot

There are increases in traffic on the A421 between the Bottle Dump roundabout and the Standing Way/V1 Snelshall St/B4034 roundabout. The same pattern is followed on Whaddon Road between the Bottle Dump roundabout and Weasel Lane. There is also a slight increase in travel time on Coddimoor Lane. A decrease in travel time is observed on Stoke Road.

The effects of the mitigation measures on travel time are illustrated below.

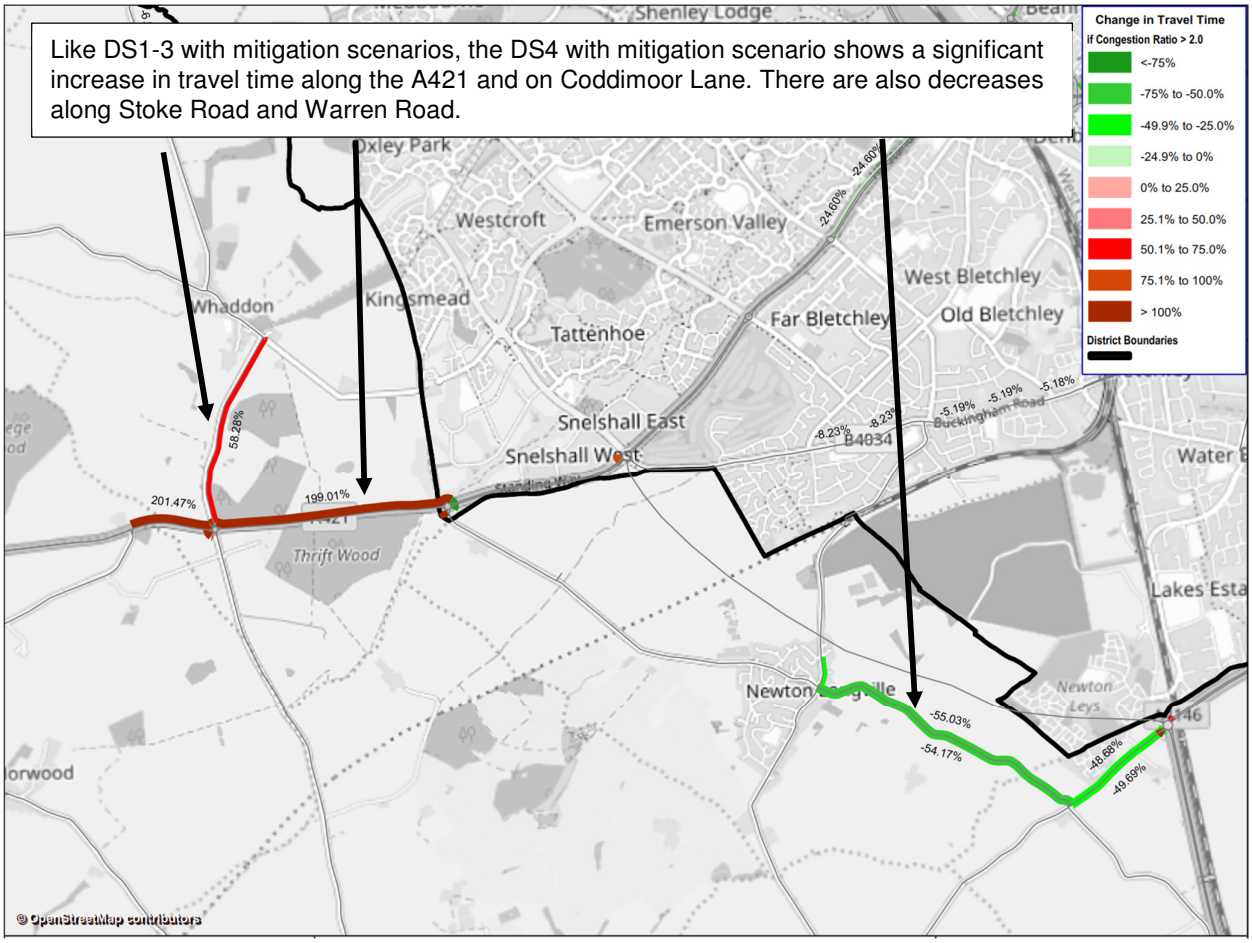

Figure 5.20 PM Peak DS4 Mitigation Run 1-DS4 Change in Travel Time Plot

The impacts of the mitigation measures in the DS4 scenario are similar as for the DS1-DS3 scenarios, for similar reasons.

5.2.7 DS5 Scenario

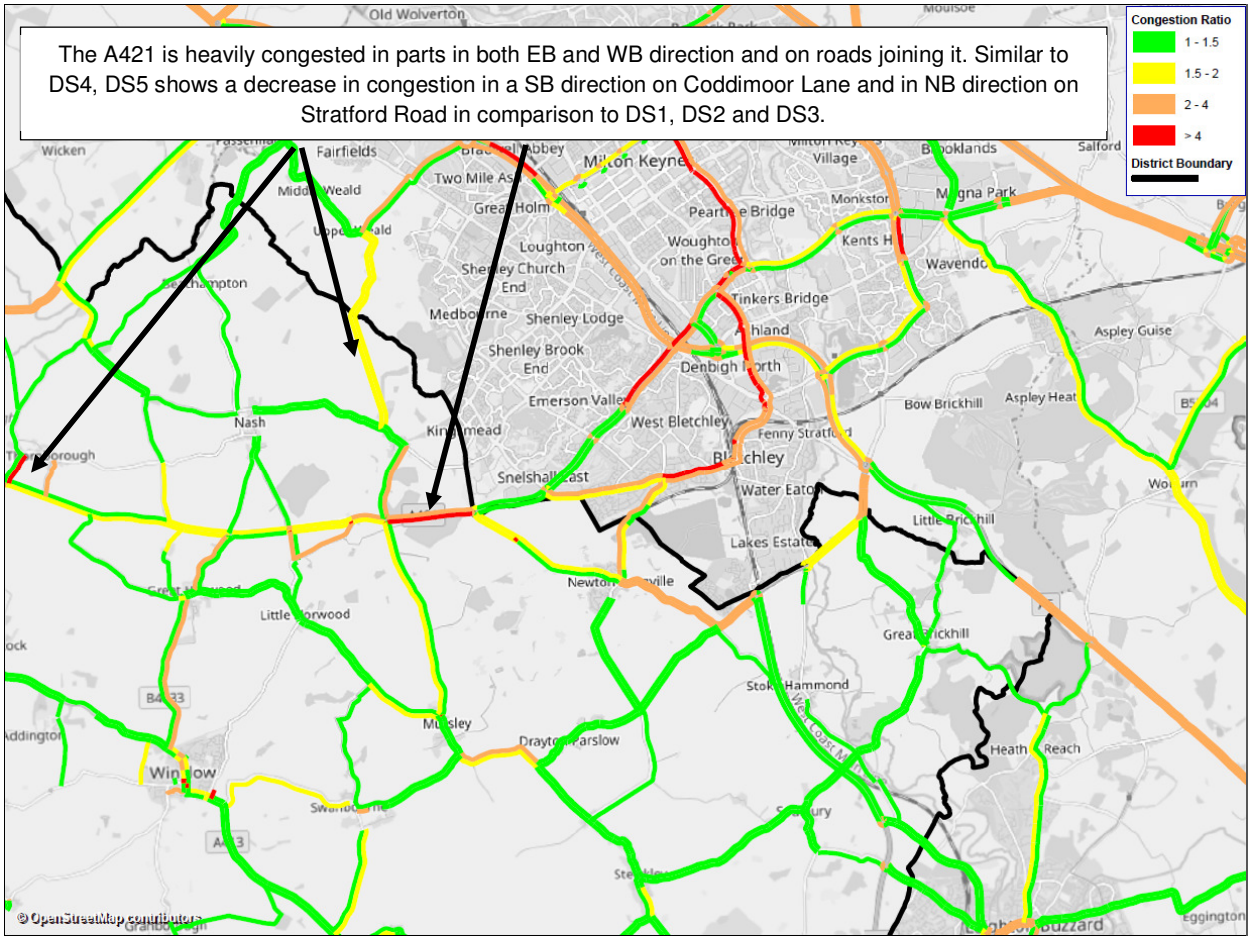

Figure 5.21 AM Peak DS5 Congestion Ratio Plot

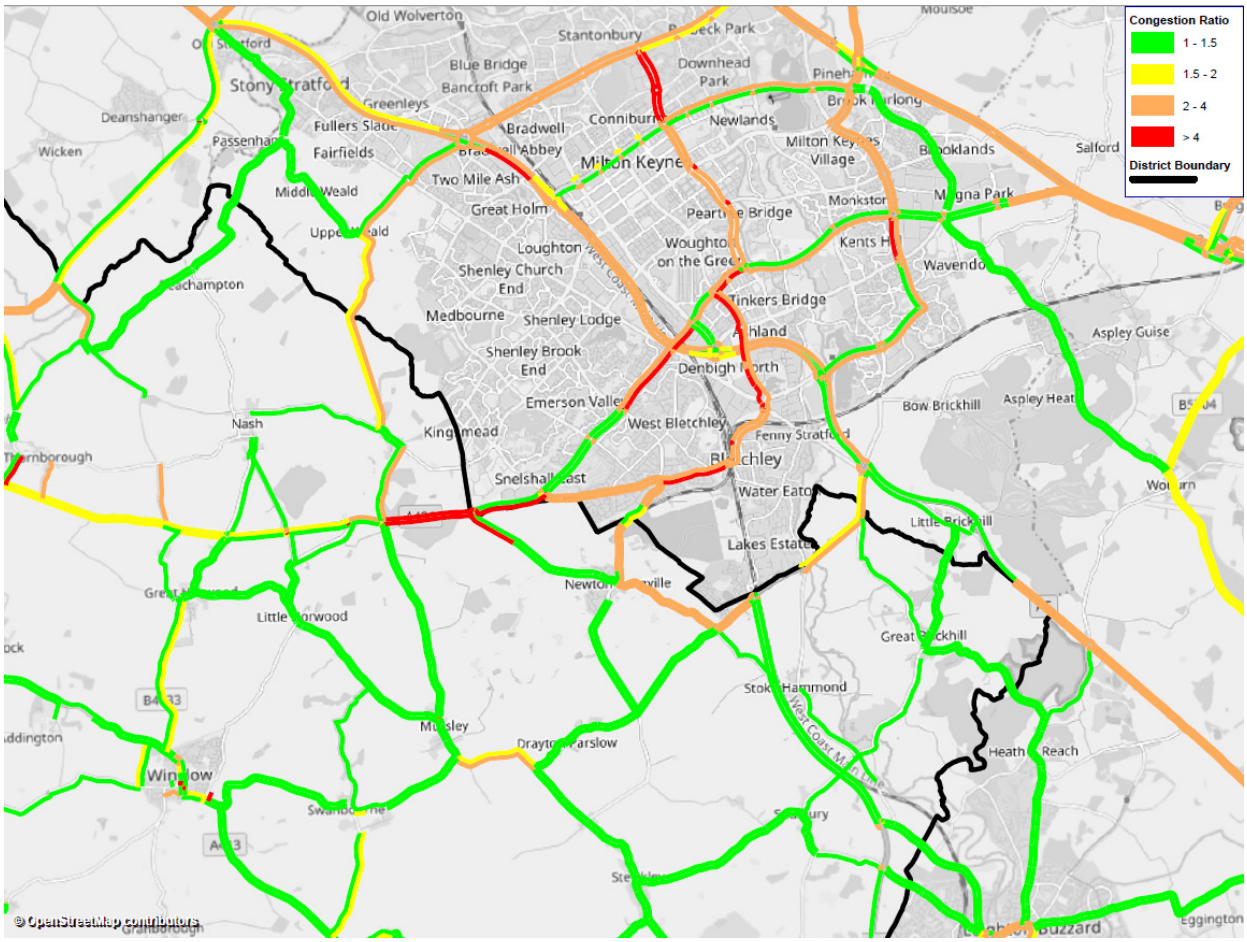

Figure 5.22 PM Peak DS5 Congestion Ratio Plot

Figure 5.21 and Figure 5.22 generally shows where there is slight to heavy congestion which can be linked to the Salden Chase Extension development. Both origin and destination traffic for the development site use the A421 to travel to Buckingham and also Standing Way for travel to Milton Keynes. The effects on travel time in comparison to the DM scenario are illustrated below.

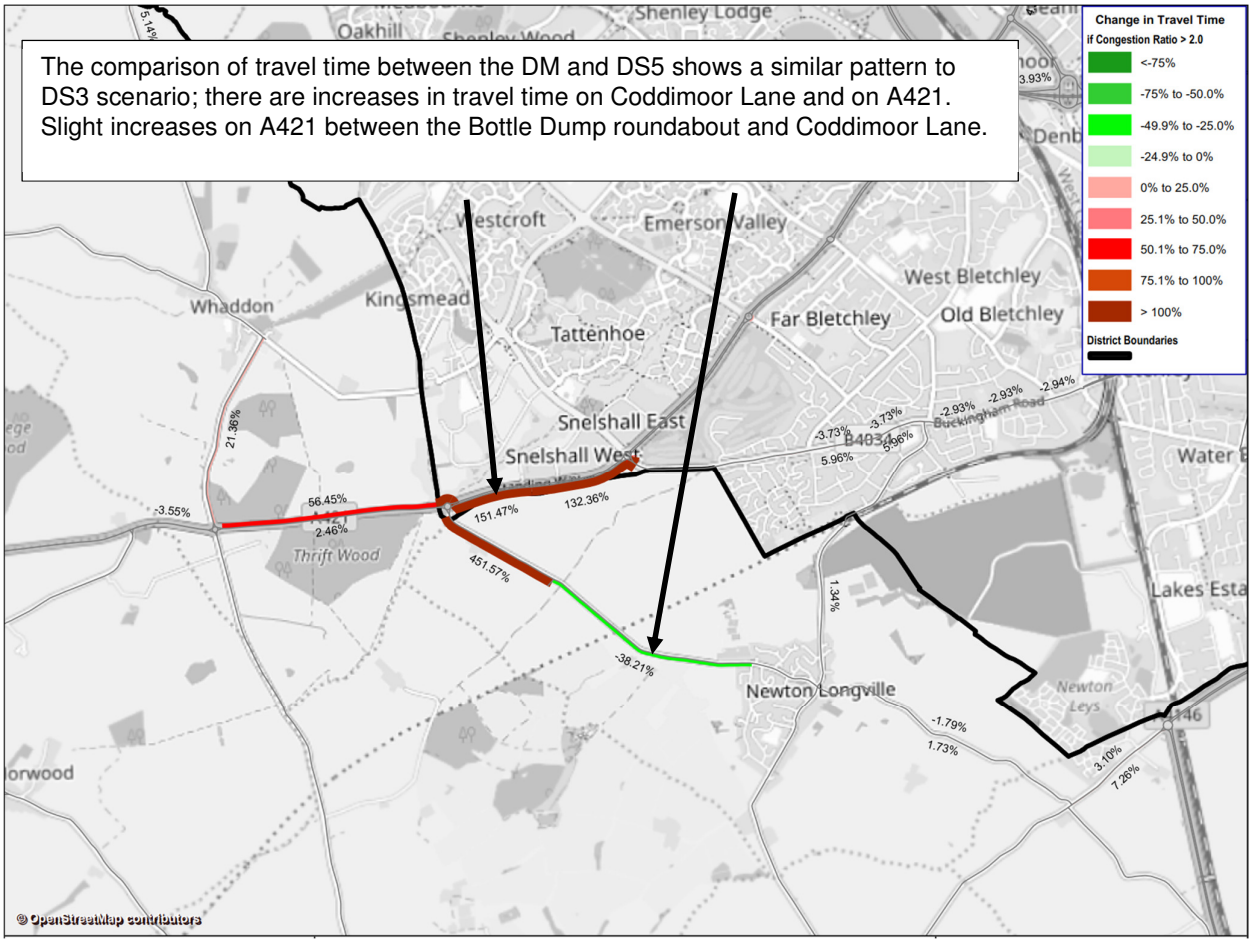

Figure 5.23 PM Peak DS5-DM Change in Travel Time Plot

In DS5, the same pattern as in DS3 is followed with the travel time increases on the western approach to the Bottle Dump roundabout. There are increases in traffic on the A421 between the Bottle Dump roundabout and the Standing Way/V1 Snelshall St/B4034 roundabout. The same pattern is followed on Whaddon Road between the Bottle Dump roundabout and Weasel Lane. Note that Coddimoor Lane shows relatively less change in travel time in this scenario, compared to all the previous scenarios.

The effect on travel time of the mitigation scenarios is illustrated below:

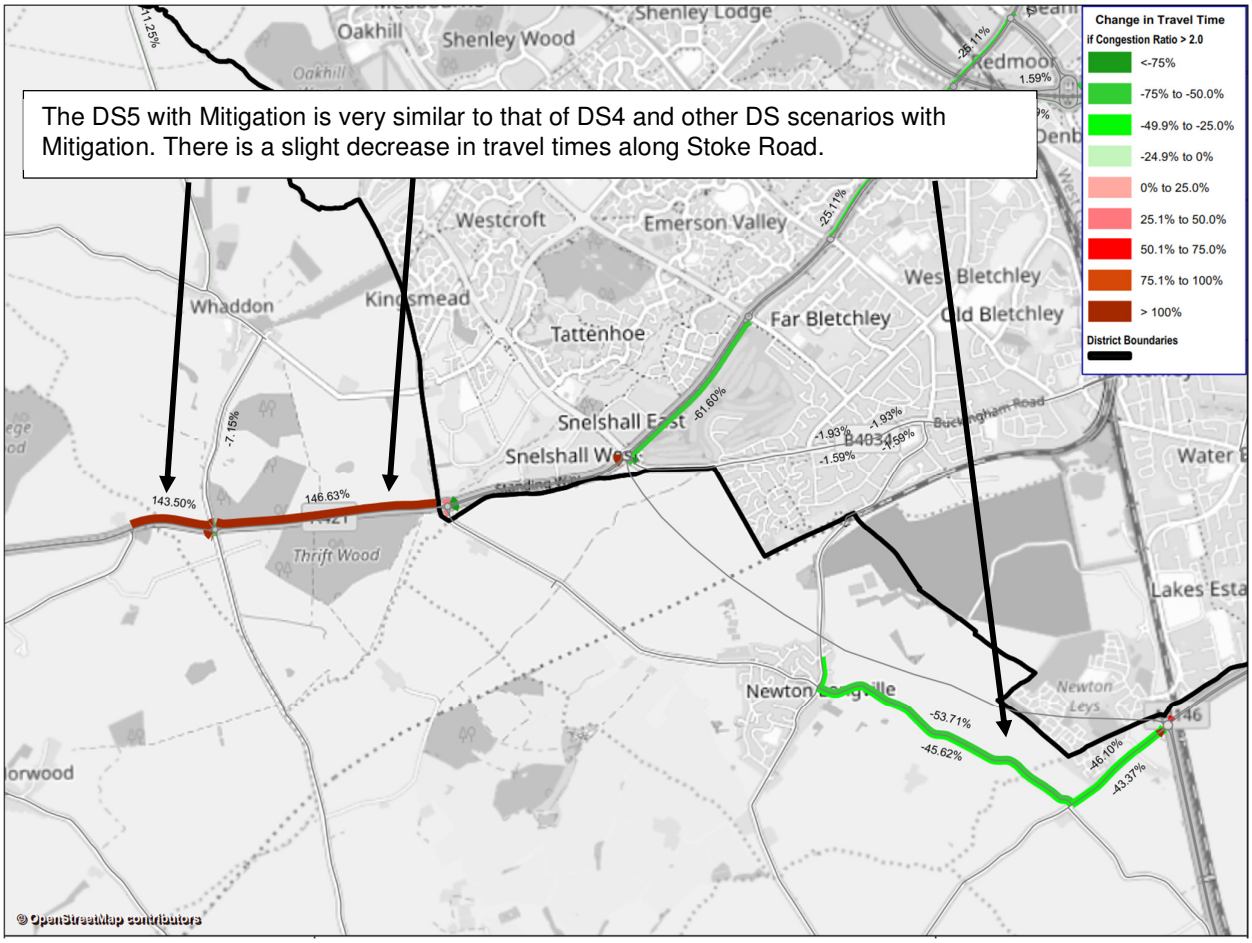

Figure 5.24 PM Peak DS5 Mitigation Run 1-DS5 Change in Travel Time Plot

As with scenarios DS1-DS4, the changes in travel time resulting from the mitigation scenarios show increases on the A421 due to additional traffic using the road via the new infrastructure introduced as part of the mitigation package.

5.3 Bletchley Bypass Removal Sensitivity Test

A further assessment of the impact of the Bletchley Bypass removal has been undertaken. Congestion ratio plots have been produced for scenarios DS1 to DS5 for all time periods for this assessment. Both AM and PM peak plots have been presented below. The plots for the other time periods can be found in Appendix A and B.

5.3.1 DS Scenario Bletchley Bypass Removal

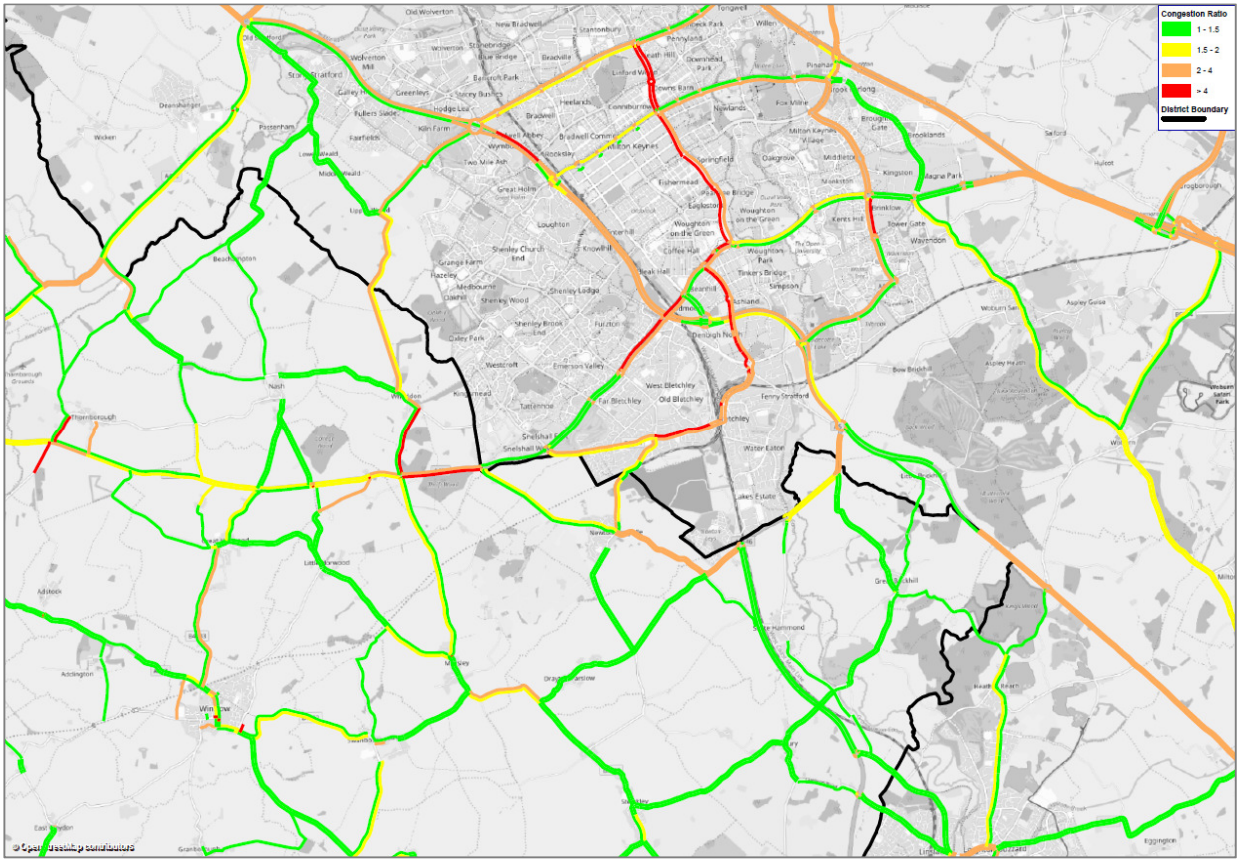

Figure 5.25 AM Peak DS Bletchley Bypass Removal Congestion Ratio Plot

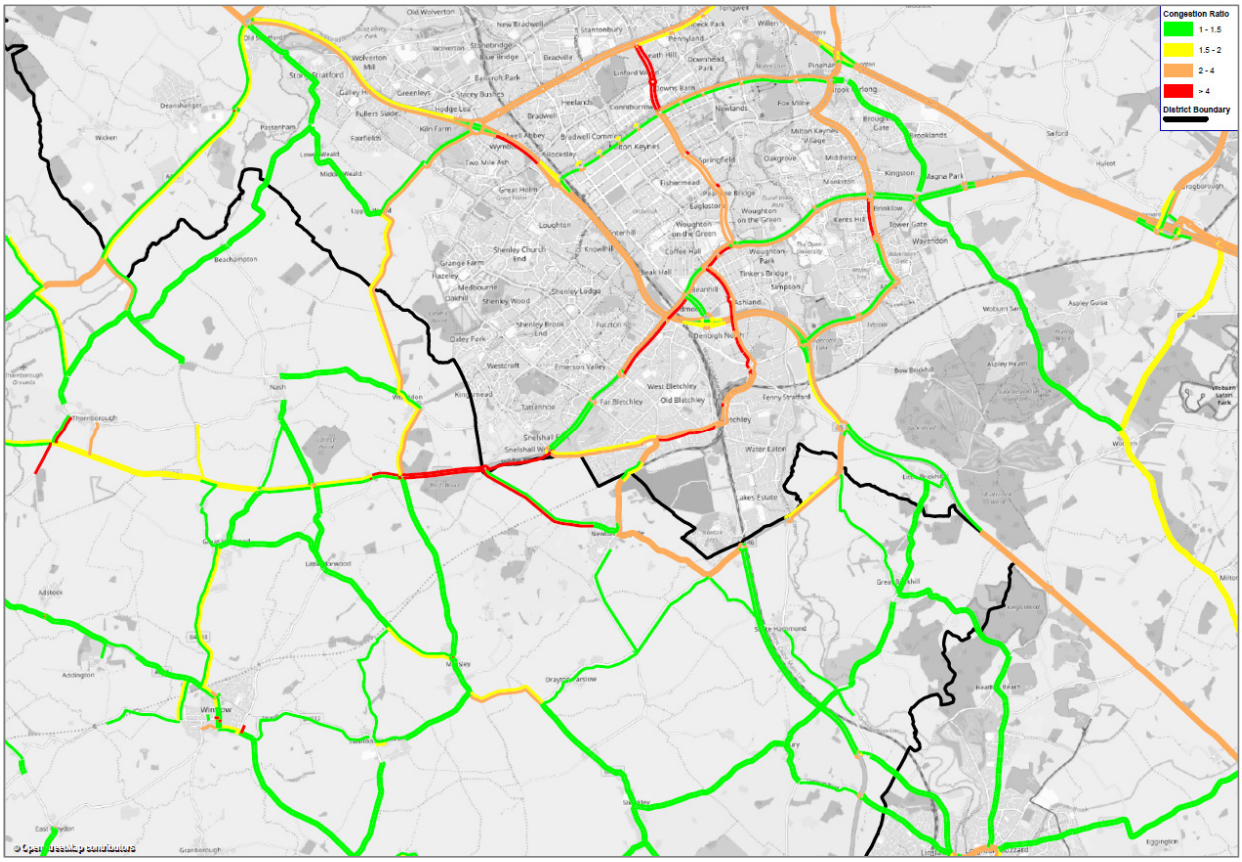

Figure 5.26 PM Peak DS Bletchley Bypass Removal Congestion Ratio Plot

5.3.2 DS1 Scenario Bletchley Bypass Removal

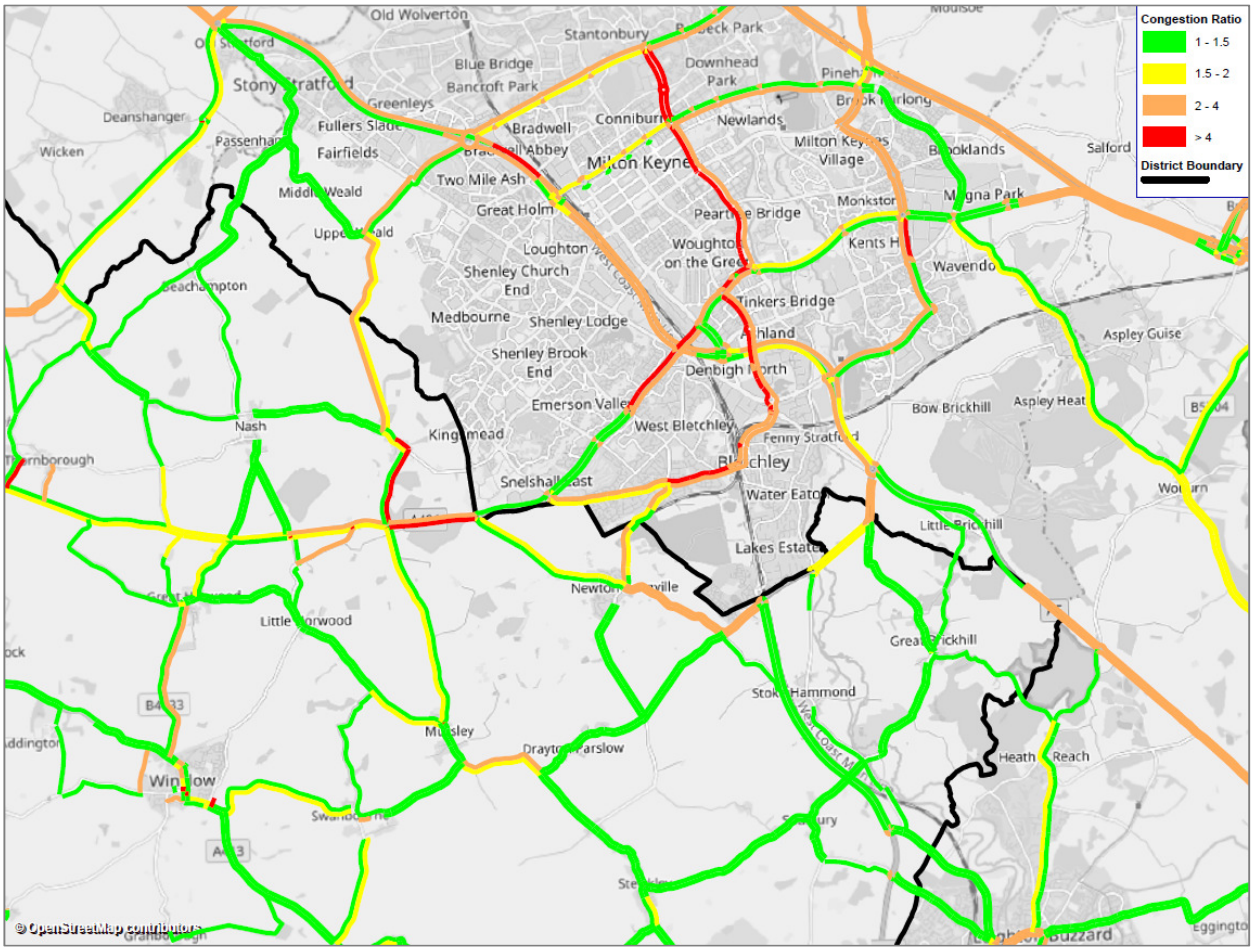

Figure 5.27 AM Peak DS1 Bletchley Bypass Removal Congestion Ratio Plot

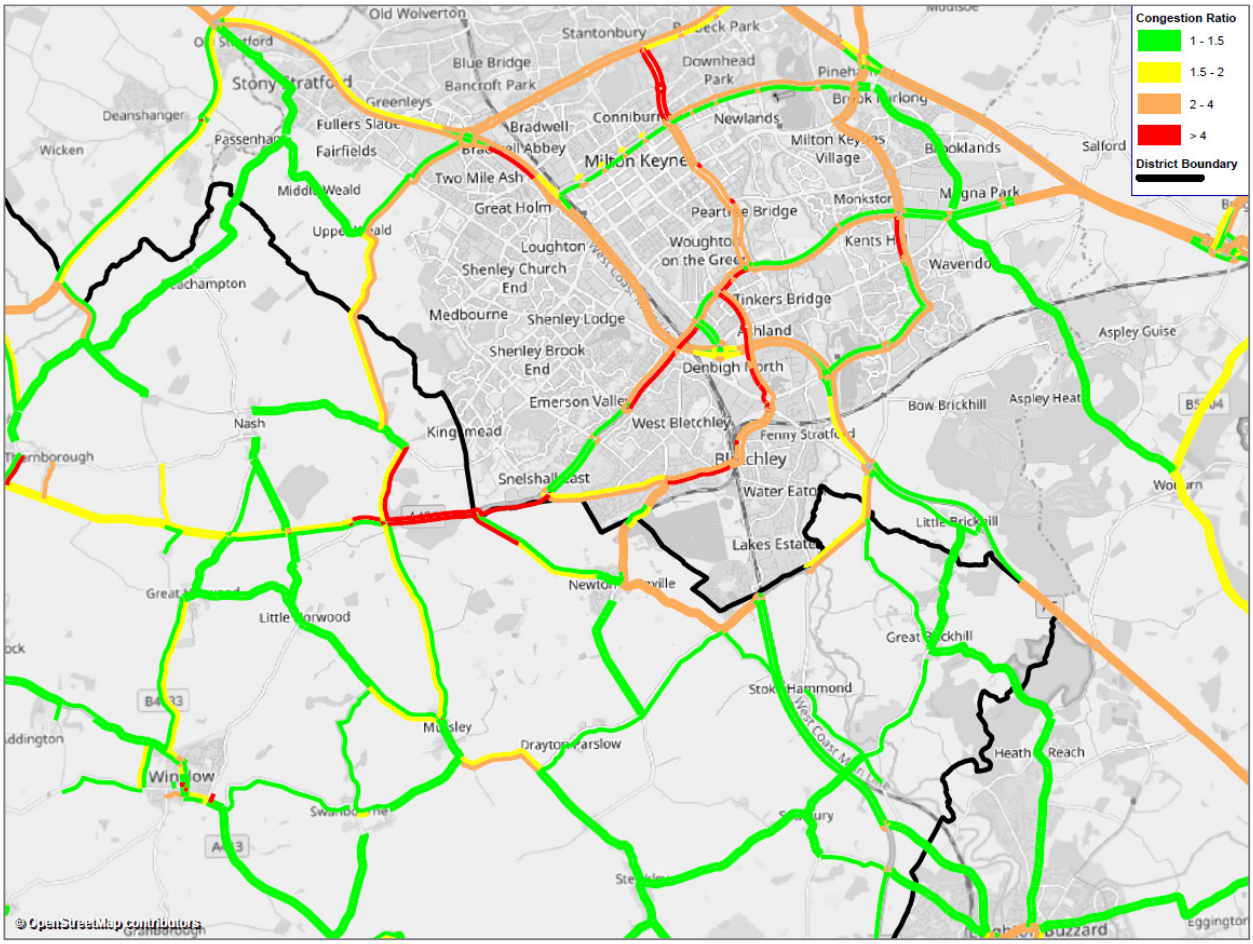

Figure 5.28 PM Peak DS1 Bletchley Bypass Removal Congestion Ratio Plot

5.3.3 DS2 Scenario Bletchley Bypass Removal

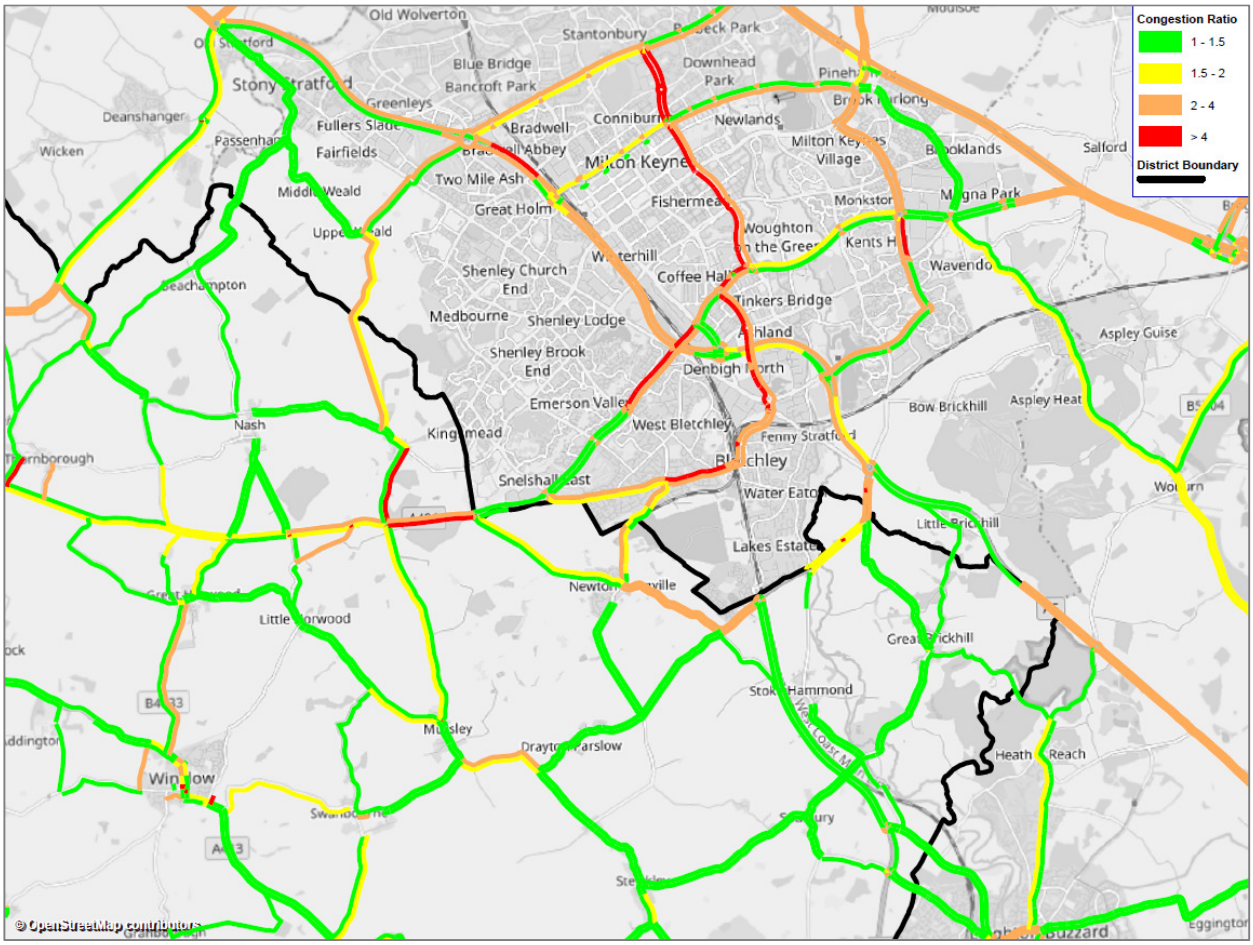

Figure 5.29 AM Peak DS2 Bletchley Bypass Removal Congestion Ratio Plot

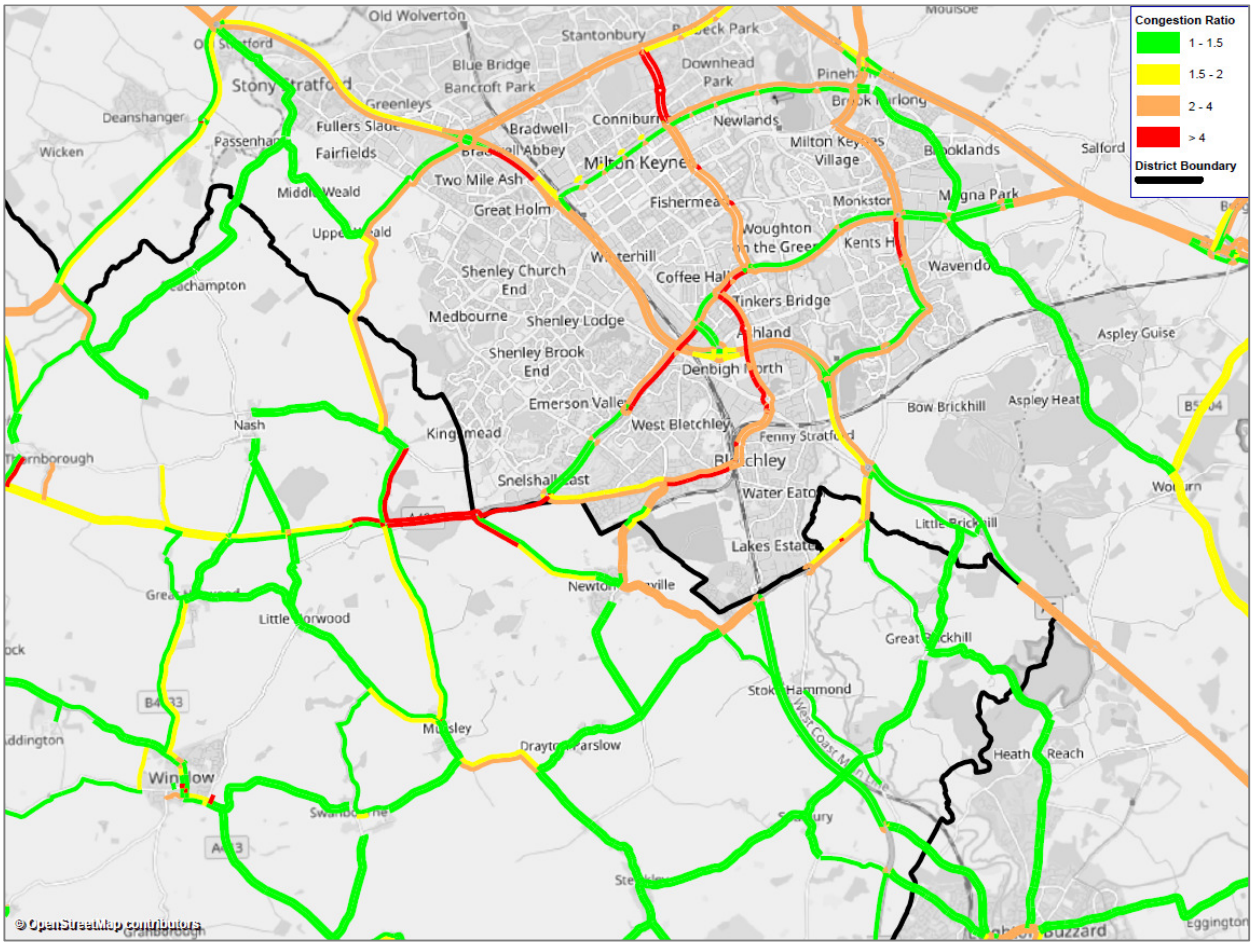

Figure 5.30 PM Peak DS2 Bletchley Bypass Removal Congestion Ratio Plot

5.3.4 DS3 Scenario Bletchley Bypass Removal

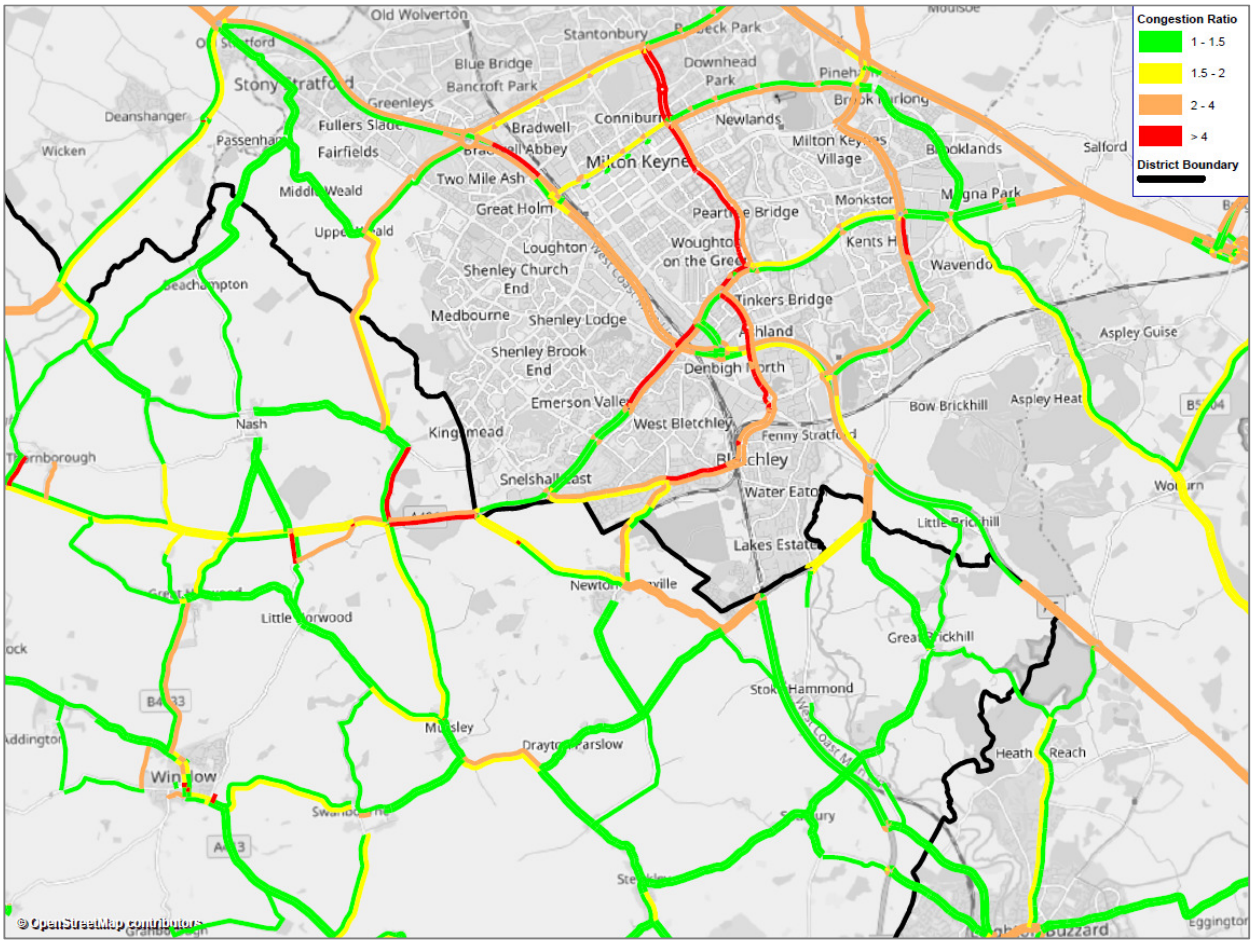

Figure 5.31 AM Peak DS3 Bletchley Bypass Removal Congestion Ratio Plot

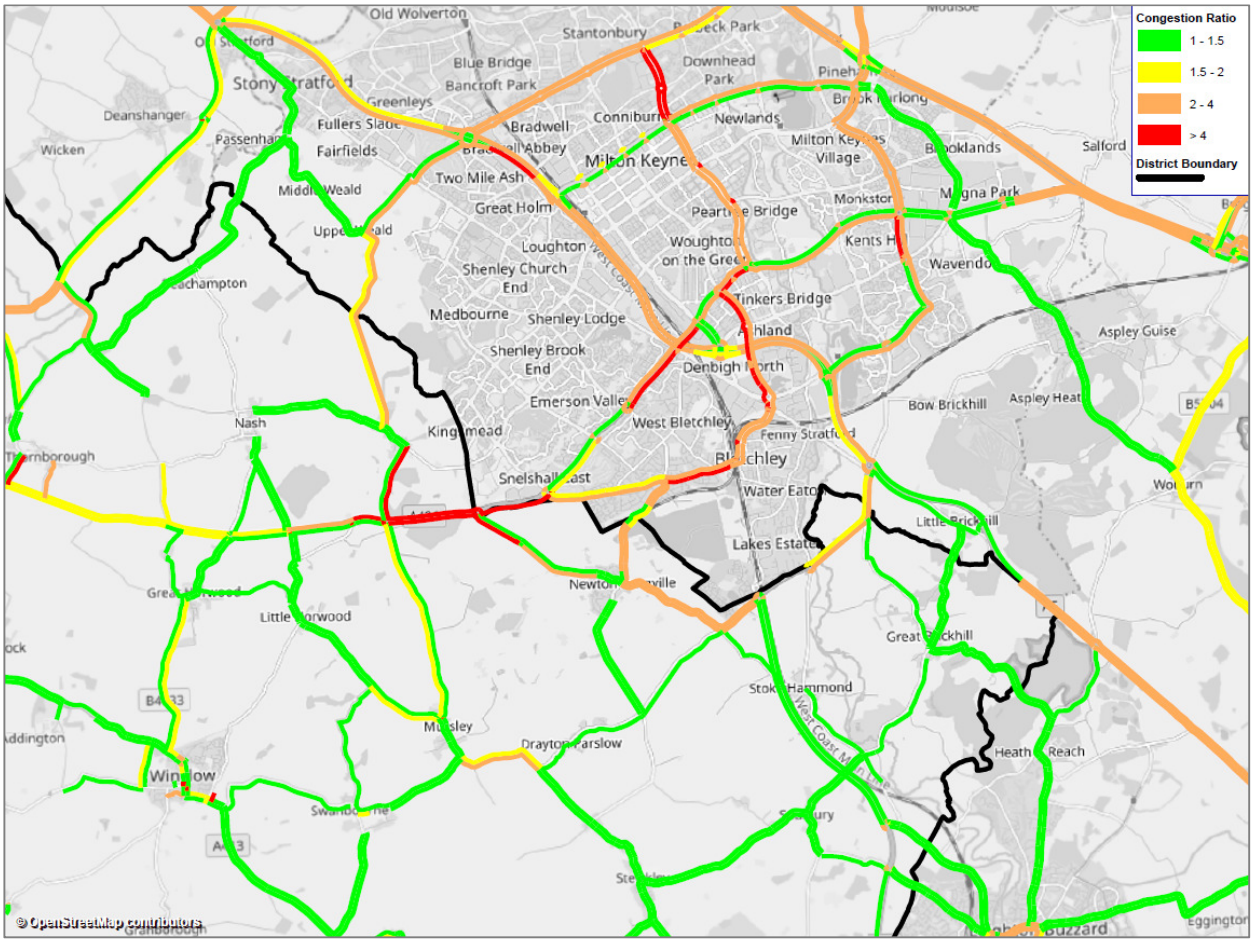

Figure 5.32 PM Peak DS3 Bletchley Bypass Removal Congestion Ratio Plot

5.3.5 DS4 Scenario Bletchley Bypass Removal

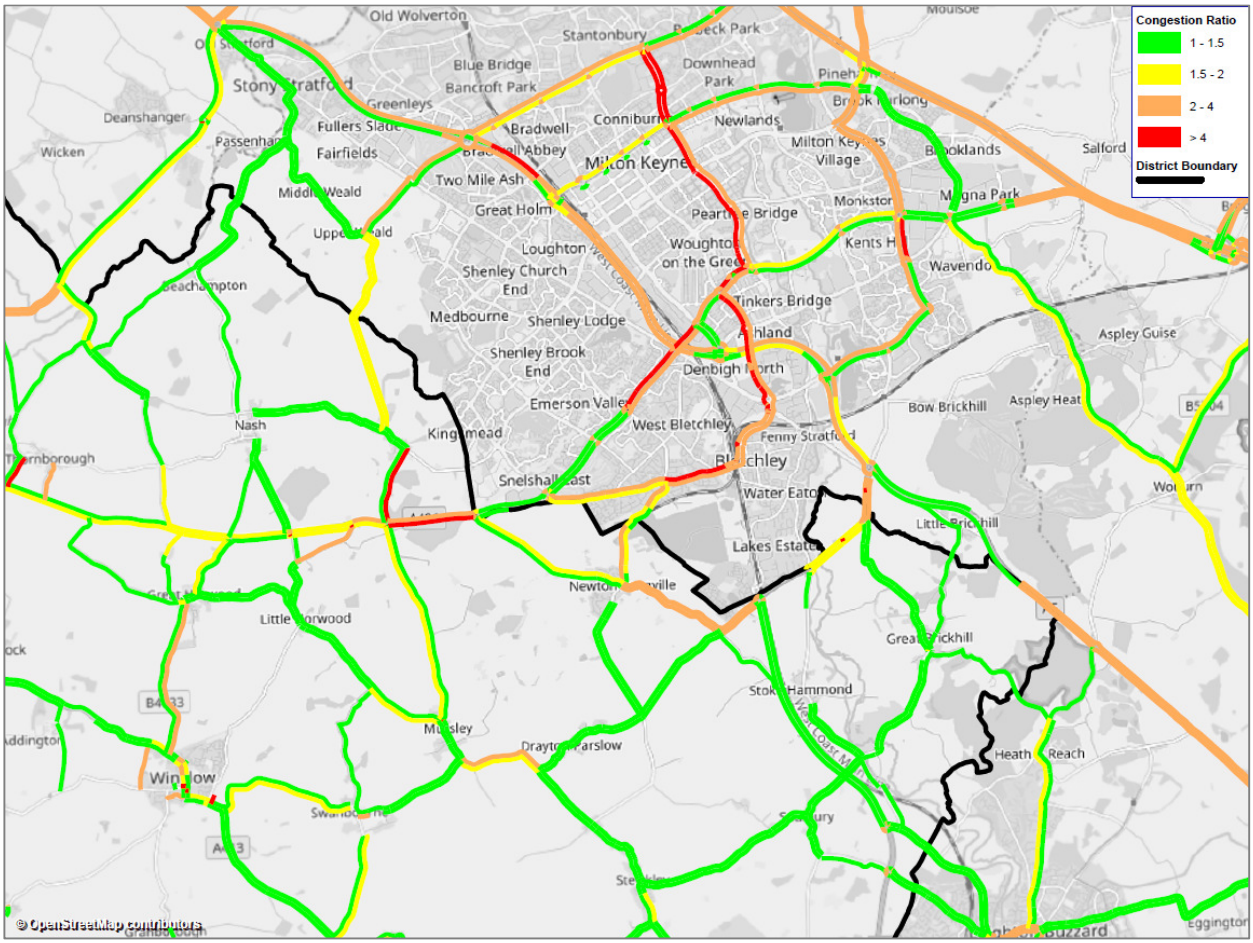

Figure 5.33 AM Peak DS4 Bletchley Bypass Removal Congestion Ratio Plot

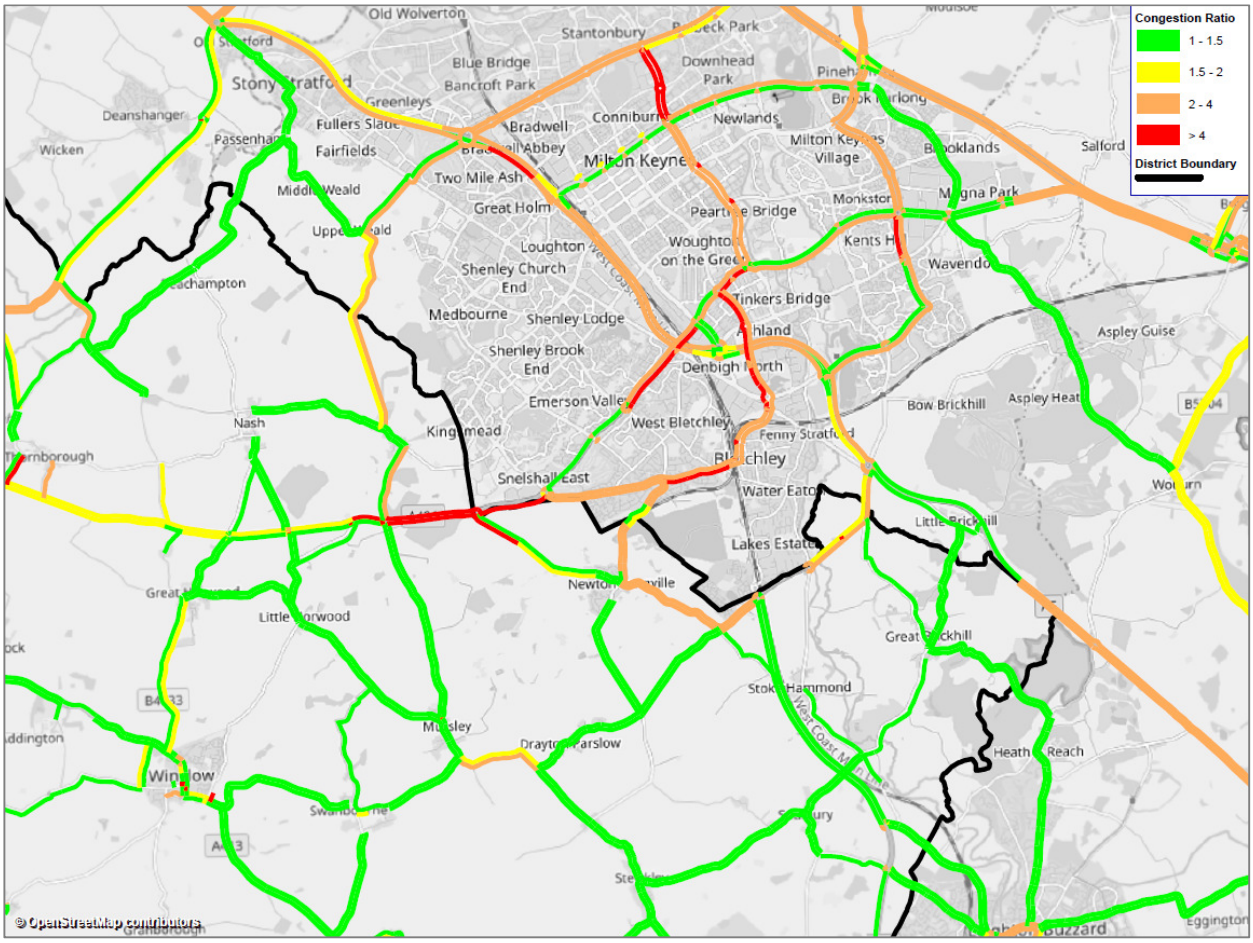

Figure 5.34 PM Peak DS4 Bletchley Bypass Removal Congestion Ratio Plot

5.3.6 DS5 Scenario Bletchley Bypass Removal

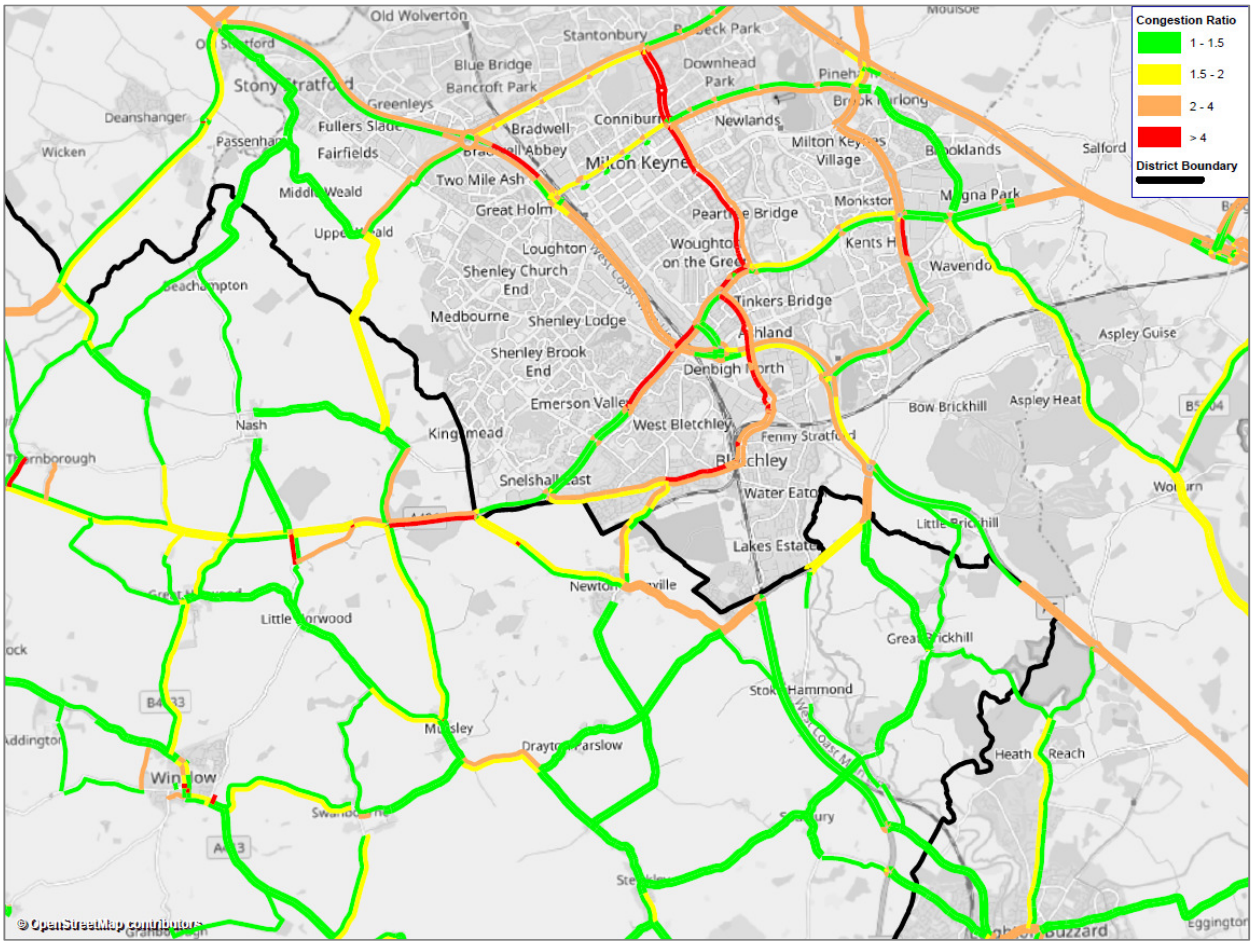

Figure 5.35 AM Peak DS5 Bletchley Bypass Removal Congestion Ratio Plot

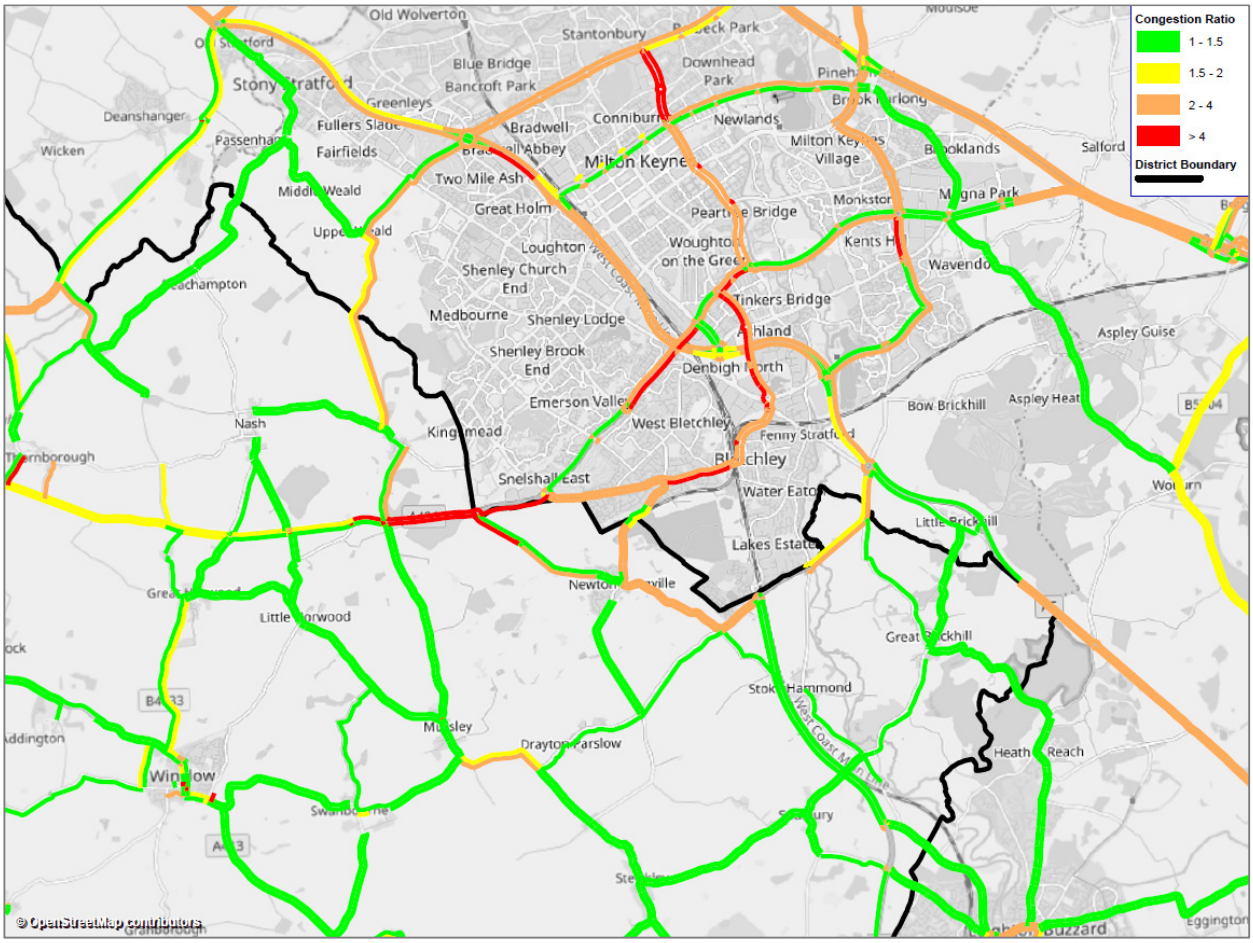

Figure 5.36 PM Peak DS5 Bletchley Bypass Removal Congestion Ratio Plot

The results of the removal of the Bletchley Bypass show that there is an increase in congestion on roads in close proximity to where the proposed Bypass would join the existing infrastructure, such as Stoke Road.