



VALP Modelling

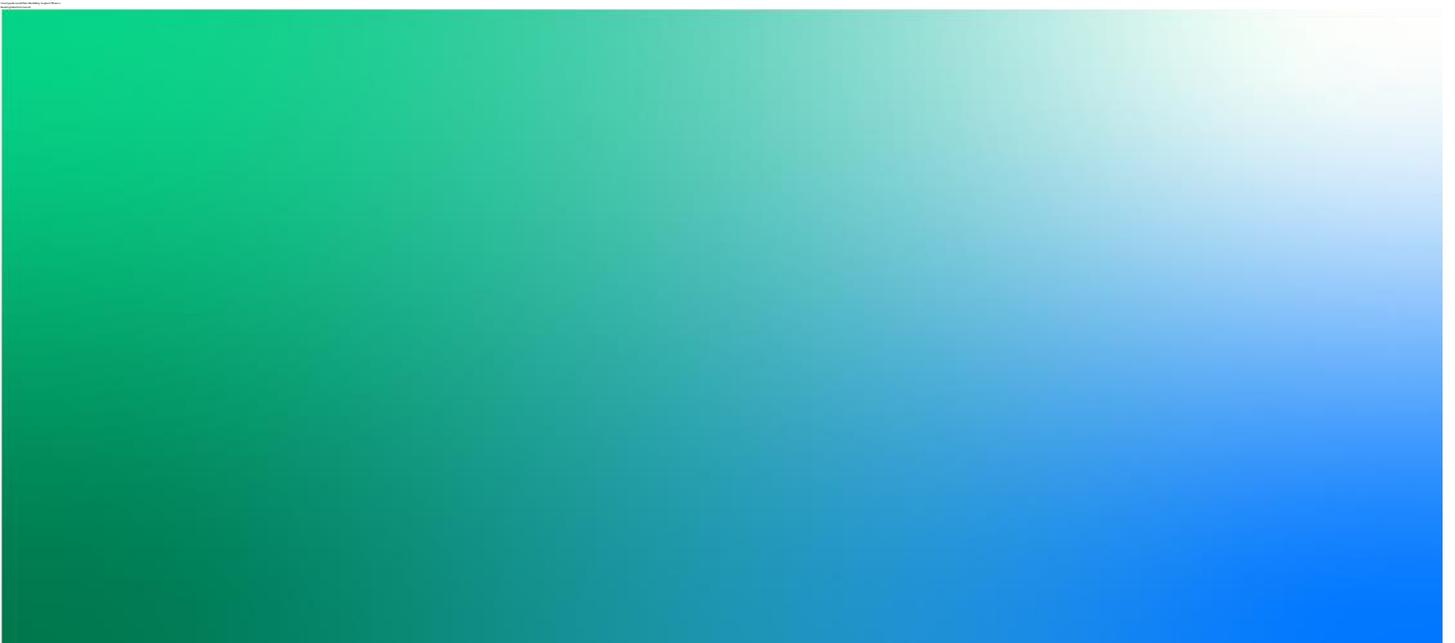
Countywide Local Plan Modelling Support Phase 4

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Buckinghamshire Council

BCC



VALP Modelling

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Executive Summary

As framework consultants to Buckinghamshire Council, Jacobs has assessed the transport impacts of the most recent emerging local plan proposals for Aylesbury Vale, via a further iteration of the Countywide Local Plan Modelling. The previous iteration of the modelling was known as “Phase 3”, and therefore the updated modelling to assess refreshed proposals in Aylesbury Vale is known as “Phase 4”. The revisions for phase 4 reflect updates within the (former) Aylesbury Vale district only, with all other areas of the model unchanged from Phase 3.

The strategic Countywide “Do Something” Model used in the previous Phase 3 was updated with revised Local Plan sites for Aylesbury Vale. The effect of the update was to reduce the number of dwellings in Aylesbury Vale in the new Do Something scenario by 284 compared to the Phase 3 Do Something, with no changes in other districts or outside of Buckinghamshire. The “Do Minimum” scenario from Phase 3 was retained as the basis for comparison. By comparison of the Phase 4 Do Something and the Phase 3 Do minimum, the modelling identified the impacts of these development proposals in terms of increased travel time and congestion. The analysis was focussed on Aylesbury and the area to the south-west of Milton Keynes.

As with previous phases, mitigation schemes were also modelled and assessed in terms of their potential to mitigate the impacts arising from the proposed local plan development. For Phase 4 the new mitigation run produced has been referred to as ‘Run 1a’. The mitigation measures included in run 1a comprised a partial completion of the orbital route around Aylesbury, amongst other schemes.

As modelled, the impacts on the highway network in Aylesbury due to Local Plan development alone (i.e. in the absence of any mitigation), were:

- Generally focused to the south and east of the town, with significant congestion and increase in travel time on:
 - The A41 Tring Road and adjoining roads,
 - The B4443 Lower Road and adjoining roads, extending to the Stoke-Mandeville Bypass
 - The A413 Wendover Road and adjoining roads

These confirm that local plan development in absence of the mitigatory schemes, such as various orbital link roads, would have significant adverse effects on the highway network in Aylesbury.

The impacts on the highway network to the south-west of Milton Keynes were not as great as those in Aylesbury but included:

- The A421 and some adjoining roads are subject to increased travel times and congestion resulting from an increase in demand on the A421 in comparison to the DM scenario.

Analysis of the Run 1a scenario (i.e. with the Local Plan development AND mitigatory schemes) showed that the effects in Aylesbury were:

- The mitigation measures were generally successful in mitigating the increased travel times resulting from the local plan developments.
- Compared to the Do Minimum (i.e. with no Local Plan or mitigations) the overall travel time situation was no worse in most areas, and improved in some areas, notably on the B4443 Lower Road and Broughton Lane.
- Small pockets of the town where the travel times increased.

The overall net effect was found to be positive, in that congestion as a whole was no worse than in (and arguably in some cases an improvement on) the Do Minimum scenario.

To the south-west of Milton Keynes the key results from the Run 1a scenario showed:

- The mitigation measures had relatively little effect on the highway network;
- There were marginal improvements on some side roads of the A421.
- The overall scale of change was very small such that moderate negative impacts (compared to the Do Minimum scenario) remained.

1. Introduction

1.1 Background

As framework consultants to Buckinghamshire Council (BC), Jacobs has assessed the transport impacts of the most recent emerging local plan proposals for Aylesbury Vale, via a further iteration of the Countywide Local Plan Modelling. The previous iteration of the modelling was known as “Phase 3”, and therefore the updated modelling to assess refreshed proposals in Aylesbury Vale is known as “Phase 4”. The revisions for phase 4 reflect updates within the (former) Aylesbury Vale district only, with all other areas of the model unchanged from Phase 3.

The previous three phases of modelling support work set out the impacts of the originally proposed local plan developments on the highway network in Buckinghamshire and identified a number of areas in which the model impacts were considered to be significant, in terms of increased travel time and congestion as a result of the previous local plan development proposals. As part of that work, a ‘do minimum’ (DM) scenario, with only committed development (some of which may form part of the local plan), and a ‘do something’ (DS) scenario, with additional non-committed local plan development, were assessed with a forecast year of 2033.

As part of the third phase of work, two sets of mitigation schemes were modelled in the DS scenario, and assessed in terms of their potential to mitigate the impacts arising from the proposed local plan development.

The fourth phase of modelling work, as set out in this report, modelled revisions to the development assumptions to use in an updated DS scenario and a revised set of mitigation options. Thus, two new scenarios, a DS and a ‘DS with mitigation’ were developed. The revisions were limited to developments and mitigation schemes within the Aylesbury Vale District.

Details of the forecast scenarios developed and mitigations tested for the previous phase(s) of work can be found in reports developed for each phase¹. Where relevant, this report will make reference to those previous phases of work, but will not simply repeat reporting from those phases.

1.2 Scope of study

The scope of the Phase 4 modelling work was to produce a new DS scenario reflecting revised local plan development assumptions with which to update the DS scenario from phase 3. The revised assumptions reflect changes in assumed local plan development in Aylesbury Vale District only; in all other areas of Buckinghamshire, and in areas outside of Buckinghamshire, the development assumptions are unchanged from those of phase 3. Further details of the forecast scenarios are provided in Table 2-A of this technical note.

In addition, a set of mitigation schemes were tested in a ‘DS with mitigation’ scenario to assess the extent to which proposed mitigations offset the development impacts; these schemes were added to the newly created phase 4 DS; this scenario is hereafter referred to as “DS run 1a”. Table 3-A sets out the mitigation measures included in each scenario. The mitigation scenario and the DS scenario were then compared against the DM scenario from phase 3 (which was itself unchanged from phase 2). The assessment was based on a comparison between the scenarios in terms of increased congestion and travel time. Again, the extent of changes to the mitigation assumptions from previous phases were limited to Aylesbury Vale District.

¹ Jacobs, 2017, Countywide Local Plan Transport Modelling Phase 3, available at https://www.aylesburyvaledc.gov.uk/sites/default/files/page_downloads/Countywide%20Local%20Plan%20Modelling%20Support%20Phase%2003%20Final%20160817_1.pdf

Jacobs, 2017, Countywide Local Plan Transport Modelling Phase 2, available at https://www.aylesburyvaledc.gov.uk/sites/default/files/page_downloads/Countywide%20Local%20Plan%20Modelling%20Support%20Phase%2002%20Final%2008_03_17.pdf

Jacobs, 2016, Countywide Local Plan Transport Modelling Phase 1, available at https://www.aylesburyvaledc.gov.uk/sites/default/files/page_downloads/Countywide%20Local%20Plan%20Modelling%20Support%20Phase%2002%20Final%2008_03_17.pdf

The geographic scope of the assessment was limited to Aylesbury, and the area of Buckinghamshire to the south-west of Milton Keynes; no other areas of Buckinghamshire have been reported upon.

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 note is only to assess cumulative impacts of development and identify areas where these could be considered significant in terms of travel time changes.

1.3 Structure of technical note

The remaining structure of the technical note is as follows:

- **Section 2:** Development scenarios- Summarises the land use changes between phase 3 and phase 4.
- **Section 3:** Mitigation options- Describes the mitigation options tested in this phase.
- **Section 4:** Results – Presents the results of modelling work for Aylesbury Value and Milton Keynes and for the DS scenario and DS with Mitigation scenario.
- **Section 5:** Summary and conclusion – Summarises the results of the phase 4 modelling work.

Reporting on previous phases of modelling work has included a description of the modelling methodology applied to produce the scenarios. The methodology has not changed from those previous phases and thus is not reported again in this report.

2. Development scenarios

2.1 Overview

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

2.2 Development summary

The DM scenario remains unchanged from the previous phase of work; however, at the request of BC the land use assumptions for the DS scenario have been revised.

The growth in Wycombe, Chiltern and South Bucks remains unchanged for phase 3.

Table 2-A provides a summary of the DM land use assumptions and the absolute differences between the phase 3 and phase 4 employment and housing figures for the DS scenario. Further details of the total housing and employment figures can be found in sections 2.2.1 and 2.2.3.

Future scenario (2033)	Summary details
Do Minimum (DM) 'No development'	<p>Unchanged from phase 3 and comprised of:</p> <ul style="list-style-type: none"> • 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. <p>Total: Increase from the base year of 14,171 houses and 31,895 jobs in Buckinghamshire due to 'committed' development.</p>
Do Something (DS)	<p>As phase 3 but;</p> <ul style="list-style-type: none"> • A reduction of 284 houses in Aylesbury Vale; <p>Total: Increase from the 2013 base year of 52,089 houses and 48,624 jobs in Buckinghamshire due to 'committed' development and non-committed Local Plan development.</p>

Table 2-A Revised forecast scenarios

Compared with phase 3, there is a reduction of 284 houses in the DS forecast scenario for Aylesbury Vale.

2.2.1 Do Something

Within the county, the DS scenario contains the DM land use quantum plus the revised local plan development scenario for phase 4. For all areas outside of Buckinghamshire, growth in employment and housing is consistent with NTEM levels of growth. Table 2-B provides a summary of the DS scenario.

Location	Totals
Aylesbury Vale District	DM commitment plus 19,923 houses and 6,069 jobs
Chiltern District	DM commitment plus 3,847 houses and 522 jobs
South Bucks District	DM commitment plus 4,324 houses and 6,578 jobs

Location	Totals
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 2-B Do Something 4 growth

2.2.2 Revised forecast traffic growth

Table 2-C provides a summary of the changes in total trips for cars for each district in the DS scenario between phase 3 and phase 4 as a percentage.

District	AM peak trip change		IP trip change		PM peak trip change	
	Origin (%)	Destination (%)	Origin (%)	Destination (%)	Origin (%)	Destination (%)
Aylesbury Vale	-0.21	-0.19	-0.24	-0.24	-0.20	-0.20
Chiltern	0	0	0	0	0	0
South Bucks	0	0	0	0	0	0
Wycombe	0	0	0	0	0	0

Table 2-C Change in Car total trip ends from phase 3 DS scenario to the phase 4 DS scenario

As a result of the revised land use information, the total trip generation has fallen only marginally in Aylesbury Vale and remained unchanged in other areas. This is consistent with the land use changes described in Table 2-A.

2.2.3 Comparison with NTEM

Table 2-D provides a summary of the total household and job growth for the 2033 forecast scenario. The table also includes NTEM growth figures for the period 2013 to 2033, from version 6.2 of the dataset (which was the current version at the time the forecasts were first undertaken), for comparative purposes.

Consistency with NTEM growth figures is a requirement for all TAG compliant models to be used for major scheme business cases. However, because the purpose of this modelling is for a local plan assessment rather than a business case, it is not necessary to constrain growth to NTEM (this constraint is only required for business case submissions²). Indeed, because the local plan growth is generally in excess of NTEM levels (particularly in South Bucks), it was decided that capping to NTEM growth would not be appropriate.

Nonetheless, a comparison of the model against NTEM is useful as it helps to identify the scale of difference between NTEM and the local plan assumptions, and thereby understand how the districts' local plan growth differs from the levels of growth mandated by the Department for Transport for use in transport scheme business cases. As can be seen from the below table, the level of growth in houses and jobs in the DS forecast scenario is higher than NTEM growth levels for the same period overall. However, NTEM provides a higher number of households for Aylesbury Vale, and higher number of jobs for Chiltern and Wycombe than the DS growth figures. The amount of jobs growth assumed as a whole for the DS scenario represents a 'worst case' for traffic impacts in that they represent the maximum possible amount of anticipated employment growth

² Department for Transport, (2019), TAG Unit M4- Forecasting and Uncertainty, paragraph 7.1.7, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/275637/webtag-tag-unit-m4-forecasting-and-uncertainty.pdf

District	NTEM		DM		DS	
	HH	Jobs	HH	Jobs	HH	Jobs
Aylesbury Vale	32,243	11,172	9,416	24,265	29,339	30,334
Chiltern	4,549	3,297	1,278	0	5,125	522
South Bucks	924	2,497	1,297	1,619	5,621	8,197
Wycombe	7,289	14,683	2,180	6,011	12,004	9,571
Total	45,004	31,649	14,171	31,895	52,089	48,624

Table 2-D 2033 modelled scenario growth and NTEM growth

3. Mitigation options

3.1 Overview

This section describes the mitigation schemes tested for phase 4. In phase 3 there were two mitigation runs; Run 1, and Run 2. However, for this phase there is a single scenario, known as Run 1a.

3.2 Run 1a options

Table 3-A outlines each mitigation option included within Aylesbury Vale for Run 1a for the phase 4 modelling.

District	Scheme name	Scheme description
	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.
	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.
	SEALR	This scheme seeks to extend the planned Stoke Mandeville bypass (A4010 realignment) with a new dual carriageway road to meet the Southern Link Road at the A413 Wendover Road.
	South Western Link Road	The South Western Link Road scheme will connect the A418 Oxford Road to the planned realigned A4010 (Stoke Mandeville bypass) with a new single carriageway road. It will include a new roundabout on the new Stoke Mandeville bypass and a new entry to the A418 roundabout.
	Severance of Worcester Street / Collington Avenue	The scheme tests a reduction in capacity on the Willows to encourage traffic to use the A41 at Berryfields.
	A41 Bicester Road PPTC (Including A41 Berryfields Junction)	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. Signal timing optimisation has been carried out to better accommodate demand at this junction.
	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.
	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.
	Stoke Road Signalised Junction	Signal timing optimisation has been carried out to better accommodate demand at this junction.
	Traffic calming between A418 and Stoke Mandeville	Traffic calming on Prebendal Avenue to reduce rat-running between A418 and Stoke Road.

District	Scheme name	Scheme description
	Aylesbury Town Centre Pedestrian Network Improvements	This improvement aims to increase safety and enhance the public realm in Aylesbury Town Centre.
	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.
	Buckingham Area Transport Strategy	Additional left turn slip at the A422 Stratford Rd/ A413 roundabout Route upgrade on the A421 and A413 to dual – 2 lane standard
	A421 Roundabout Capacity Improvements	Capacity improvements at the London Rd/ A421 Rbt and Gawcott Rd/ A421 Rbt to increase capacity.
	Shenley Park Link Road in Milton Keynes	This scheme will implement a new link road to the A421 adjacent to the V1 to discourage rat running through Whaddon.

Table 3-A List of options to include in the DS with mitigation forecast scenario

For Wycombe, Chiltern, and South Bucks districts, the mitigations assumed were the same as for Phase 3 mitigation scenario run 1.

4. Results

4.1 Overview

The purpose of this section of the technical note is to present the modelling outputs from the phase 4 forecast scenarios. As with the previous phases of work, a set of model outputs have been produced to illustrate the impacts of the DS forecast scenario compared with the DM (remaining unchanged from phase 3), as well as the DS with mitigation compared against both the DS and DM.

A summary is provided of the key impacts as a result of the DS land uses (in the absence of mitigation measures) and then a comparison is made against each 'with mitigation' scenario (where differences occur), to understand the extent to which the various mitigation schemes have improved the situation in the model.

The presentation of model outputs is limited to Aylesbury, and the area south-west of Milton Keynes.

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 areas 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.

4.2 Model outputs

4.2.1 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% higher than in the uncongested situation
Orange	2-4	Travel times are between 100% and 400% higher than in the uncongested situation
Red	>4	Travel times are more than 400% higher than in the uncongested situation

Table 4-A Congestion ratio criteria

Congestion ratio plots have been produced for the DS and DS with mitigation run 1a for all time periods.

4.2.2 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 DS 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 4-A). This 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 three combinations of scenarios for all time periods:

Adjusted Scenario	Comparison Scenario
DS without mitigation	DM
DS with mitigation run 1a	DM
DS with mitigation run 1a	DS

Table 4-B 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 4-C Change in travel time criteria

In addition, the actual percentage change is plotted adjacent to the link in question in most cases where there is sufficient space available on the plot.

4.3 Summary of impacts round Aylesbury and the south-west of Milton Keynes

To aid interpretation of the model outputs, a description of the impacts has been provided below for Aylesbury Vale and the area south-west of Milton Keynes. The congestion ratio and change in travel time plots for all time periods can be found in Appendices A to D.

4.3.1 Aylesbury

There are relatively large travel time increases to the south and east of Aylesbury in the DS scenario compared with the DM, this results from the local plan development. Travel time changes to the west and north of the town are less significant (with the exception of Bishopstone Road), and these areas of Aylesbury are relatively unaffected by the local plan developments. Out of the three time periods modelled, the AM peak observes the

greatest impact on travel time. It is also worth noting that the scale of impact in the DS for Phase 4 is generally very similar to that of Phase 3.

In the AM peak, the most significant travel time increases occur on the A41 Tring Road, between the A41/ Park Street/ Walton Road Roundabout and A41/ College Road North Roundabout and can be attributed to increases in demand flow on the A41, due to the additional development sites included in the DS. Side roads adjoining the A41, such as Park Street (southbound) and the A4157 (southbound) also show increases in travel times resulting from queuing and an increase in congestion

In addition to the A41, the Stoke Mandeville Bypass and A413 Wendover Road also experience large travel time increases in the DS compared with the DM, which is particularly noticeable in the AM peak, albeit the increases are not as extensive as those on the A41.

The travel time increases on the Stoke Mandeville Bypass arise as a result of increased traffic queuing back from the Walton Street Gyrotary and Stoke Road/ Mandeville Road signals. This reduces the capacity for traffic turning out onto the B4443 from the Stoke Mandeville Bypass, resulting in travel time increases on approach to the B4443. Essentially, the congestion which exists on Lower Road in the DM is exacerbated by the additional development (which in the DS scenario is not mitigated in any way). The travel time increases on the A413 Wendover Road arise as a result of the additional southbound and northbound traffic turning onto the Southern Link Road, at the A413/ Southern Link Road junction.

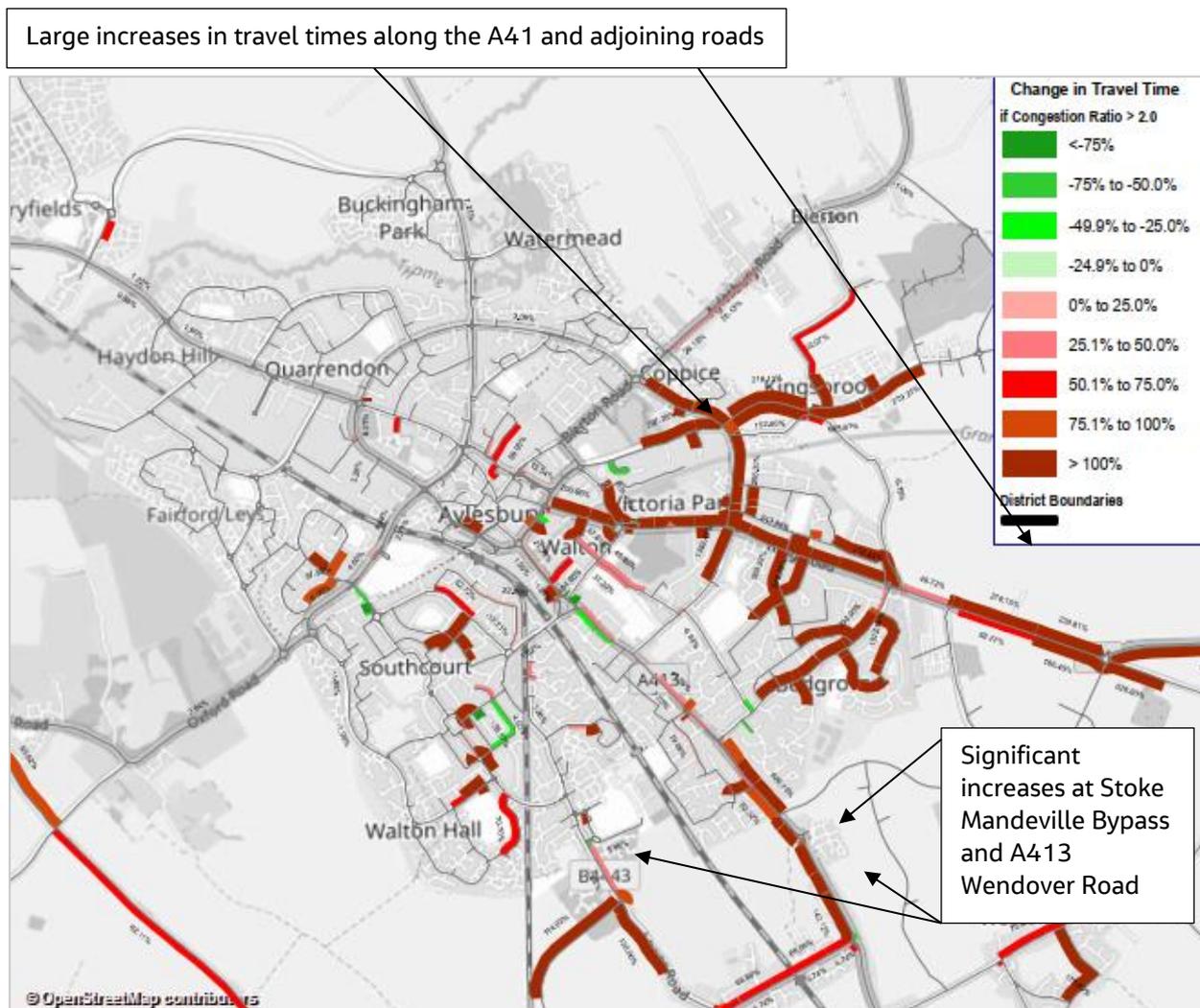


Figure 4-A Travel time changes from the DM to the DS scenario during the AM peak in Aylesbury

The DS AM congestion ratio plot also shows there to be some localised congestion on residential roads to the east of Southcourt which is not so evident from the travel time changes plot. This is shown in Figure 4-B.

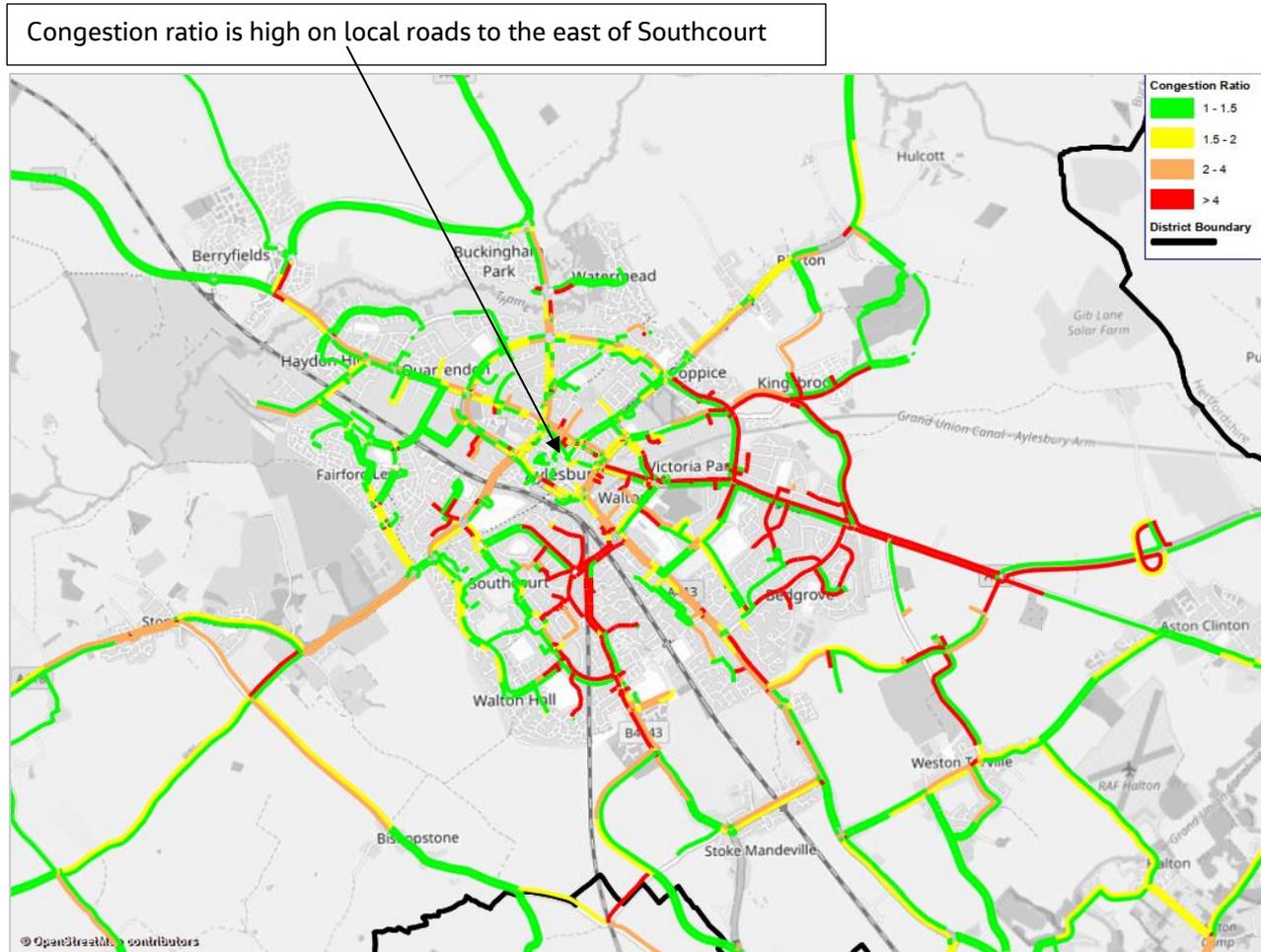


Figure 4-B DS AM Congestion Ratio in Aylesbury

Again, this congestion is caused by existing congestion on Lower Road being exacerbated by the presence of local plan development in the absence of mitigation schemes.

The mitigation scenario Run 1a, includes dualling the Southern Link Road, the addition of the southern section of the Eastern Link Road, Stoke Mandeville Bypass Extension, South-West link road, Stoke Road signal optimisation and traffic calming on Prebendal Avenue, as well as public transport improvements which slightly reduce the demand for car travel.

The inclusion of these mitigation schemes results in reductions in travel time on the A41 Tring Road itself and on the approach to the A41 from Oakfield Road as well as on Broughton Lane when comparing run 1 with the DS scenario. This occurs because traffic is now able to use the completed Eastern Link Road, instead of those existing roads. There are also significant reductions in travel time on the B4443 Lower Road, due to the addition of the South East and South West link roads, which provide new routes for traffic to use as an alternative to Lower Road and thereby provide large congestion reductions on existing routes. Figure 4-C illustrates the reduction in travel times as a result of the mitigation schemes, the largest benefits are seen to the south and east of Aylesbury.

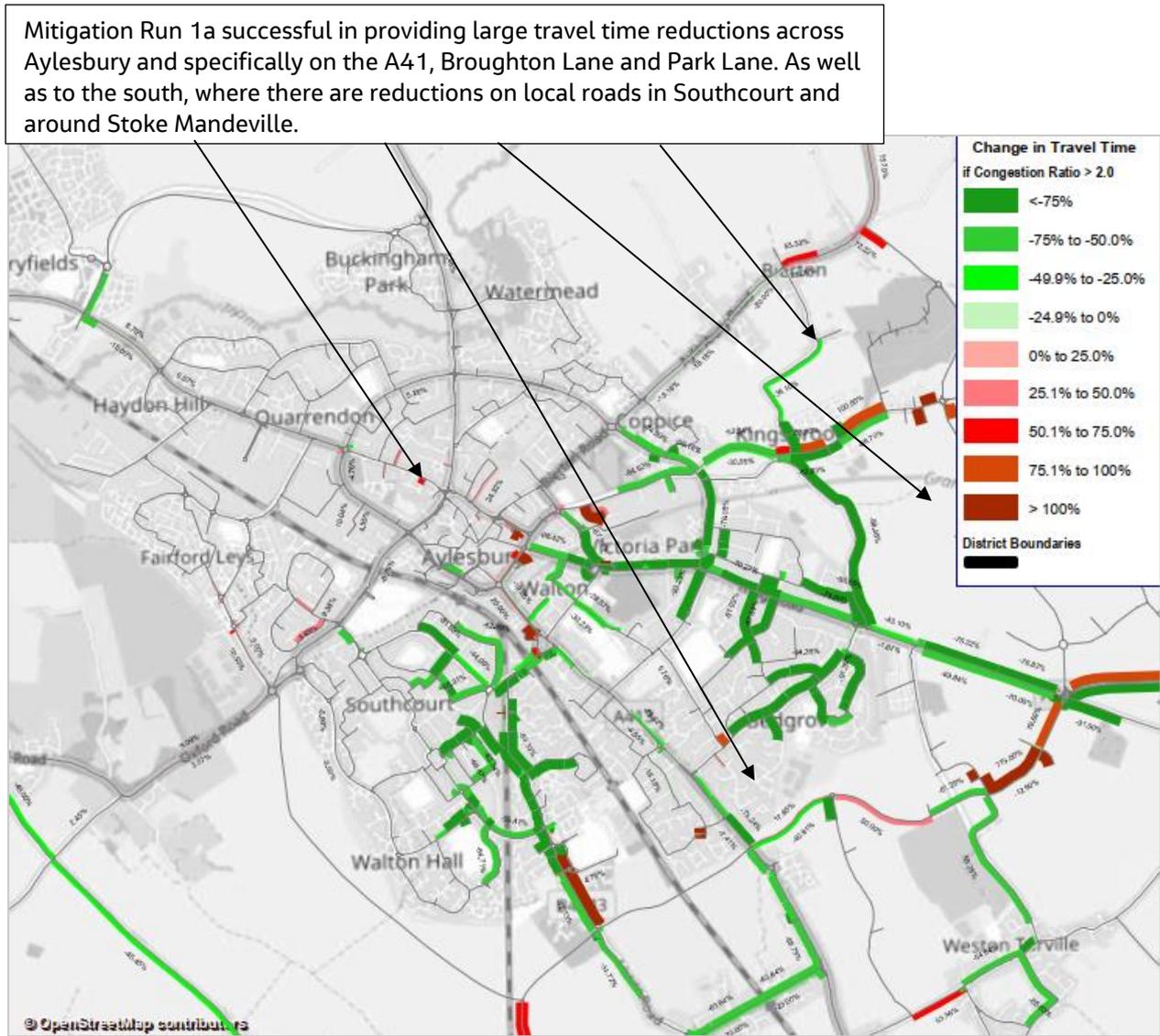


Figure 4-C Travel time changes from the DS to the DS mitigation scenario during the AM peak in Aylesbury

Finally, comparing the run 1 scenario with the DM provides an indication of the net effect of additional development and mitigation. This shows that the overall travel time situation is improved in most areas, notably on Lower Road and Broughton Lane, which suggests that the mitigation schemes more than offset the negative effects of additional trips on the network. However, there are small pockets where the travel times increase, such as on New Road and A13 Wendover Road; these occur because in the run 1a scenarios there are now junctions which were not present in the DM, and therefore traffic inevitably has lower travel times due to negotiating these new junctions. There is also a small increase in travel times on the Stocklake Urban link, caused by more traffic using that link due to reassignment from the A41 which is effected by the completion of the Eastern Link Road (South). Figure 4-D shows the travel time changes arising in the AM peak in run 1a of the mitigated scenarios compared with the DM.

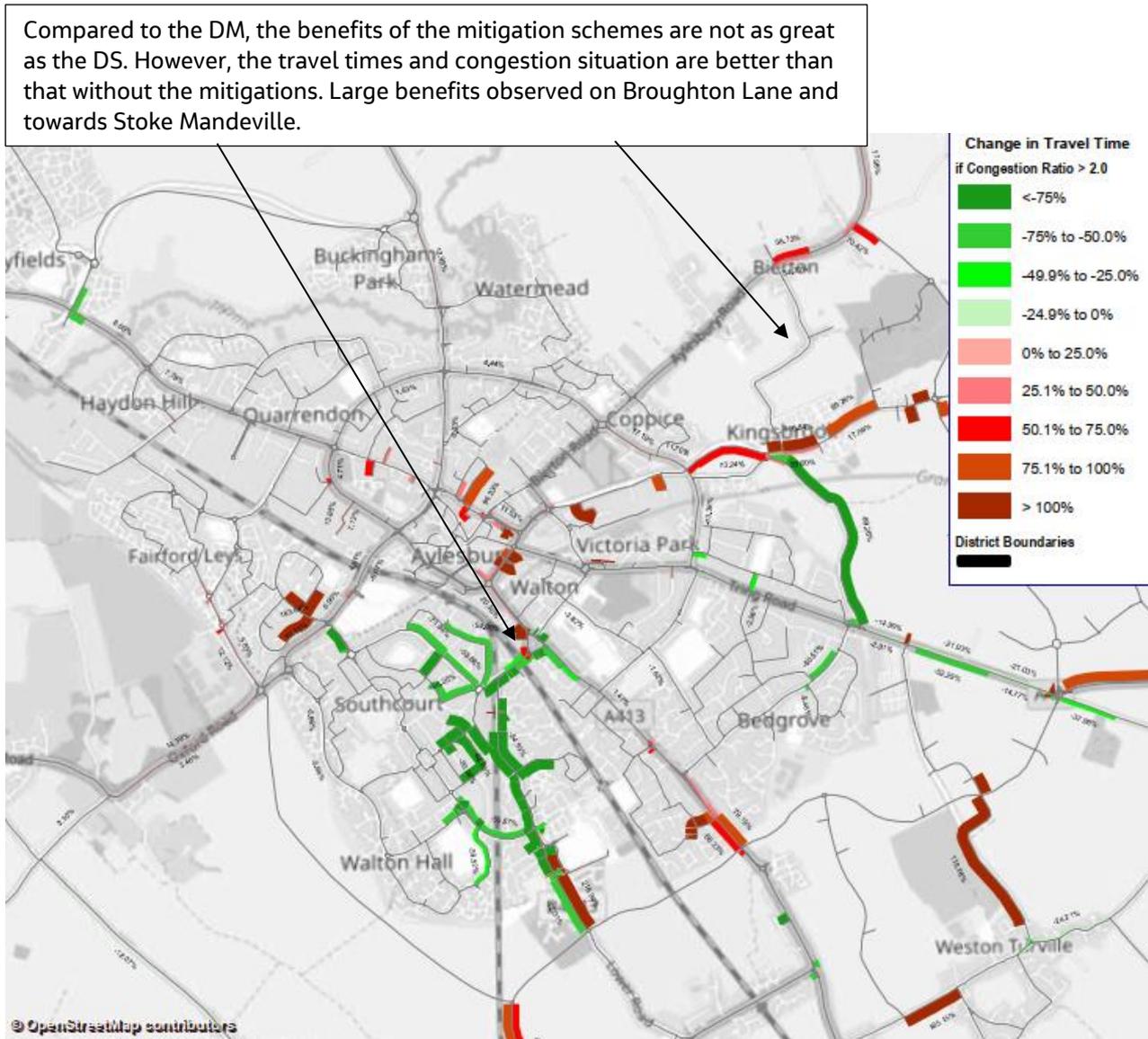


Figure 4-D Travel time changes from the DM to the DS mitigation scenario during the AM peak in Aylesbury

The impacts observed in the modelling for the PM peak are similar, and for the Interpeak, due to the lower levels of traffic generally, there is relatively less change between the scenarios.

4.3.2 Area south-west of Milton Keynes

Like the results from Phase 3, a comparison of the DS for Phase 4 against the DM shows relatively little difference in travel time in Milton Keynes. However, on the western edge of the town, close to the A421, some significant travel time increases are observed both on the A421 and connecting minor roads. The PM peak period has the largest change in travel times and is the focus of reporting here.

Travel time increases are relatively slight on the A421 within Buckinghamshire, compared to the DM, although the A421 immediately east of the county boundary experiences large travel time increases in the PM peak on the approach to the Coddimoor Lane/ Whaddon Road/ A421 roundabout. This occurs because westbound demand flow increases in the DS scenario compared with the DM, and the junction is already congested in the DM.

On roads adjoining the A421 there are moderate increases in travel time as a result of increases in demand flow on these links and the A421. These increases arise as a result of the additional development in the DS scenario. The increases in demand lead to additional queuing and congestion on the minor arms of junctions along the

A421 as both the capacity for traffic exiting the minor arm is reduced, and the demand flow increases. Notable travel time increases occur on Coddimoor Lane and Shucklow Hill in the AM peak and Whaddon Road in the PM peak. These impacts are illustrated in Figure 4-E below.

A421 Standing Way on the Buckinghamshire County border is impacted in terms of travel times resulting from the Local Plan developments. Adjoining roads such as Coddimoor Lane and Whaddon Road are also impacted by the increase in traffic on the A421

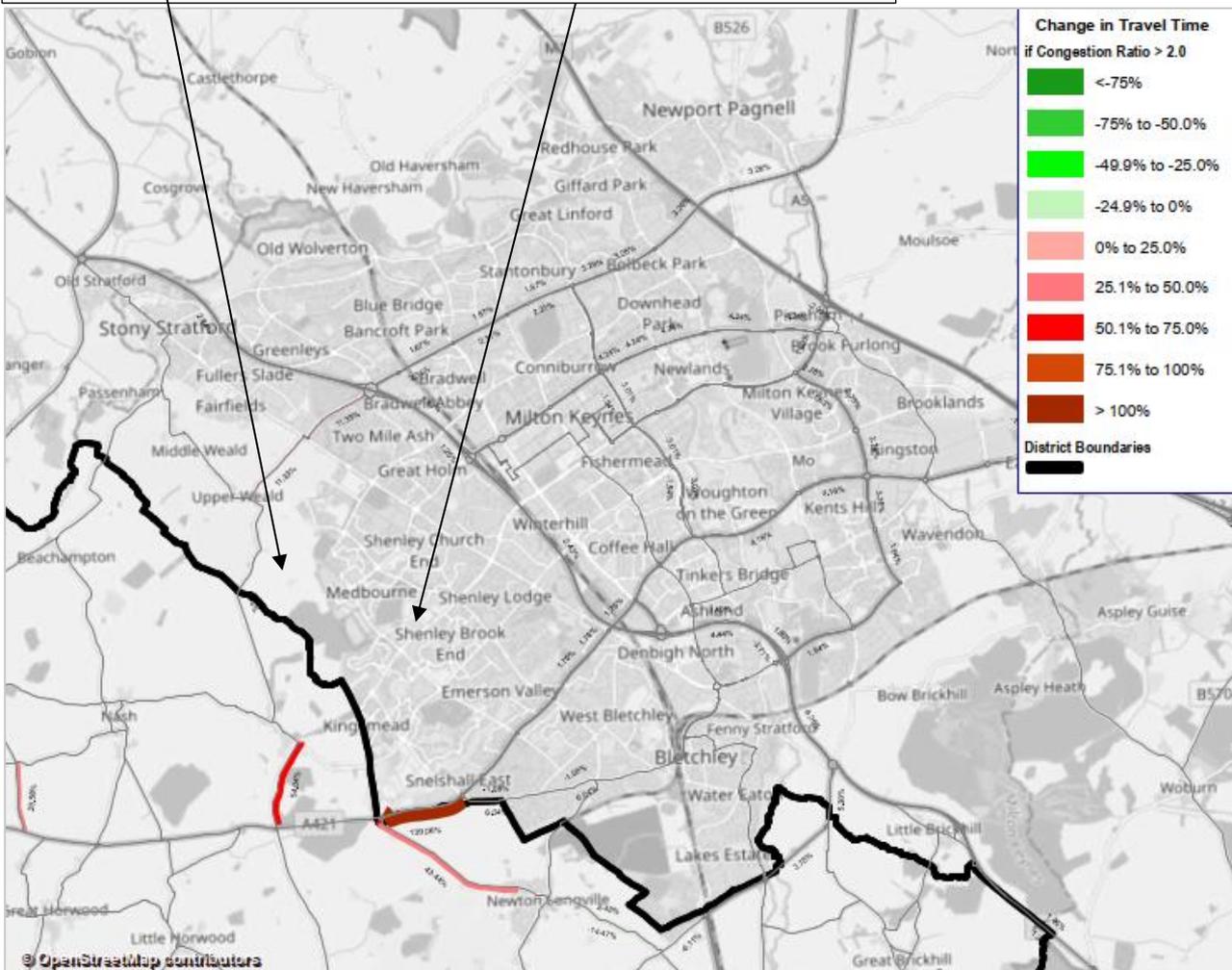


Figure 4-E Travel time changes from the DM to the DS scenario during the PM peak in the area south-west of Milton Keynes

The mitigated scenario includes Shenley Park Link Road but excludes dualling of the A421. A comparison of the travel times in the mitigated scenario against the DS, indicates some small travel time decreases on the A421; Figure 4-F shows the location of the roads where there are decreases in travel time.

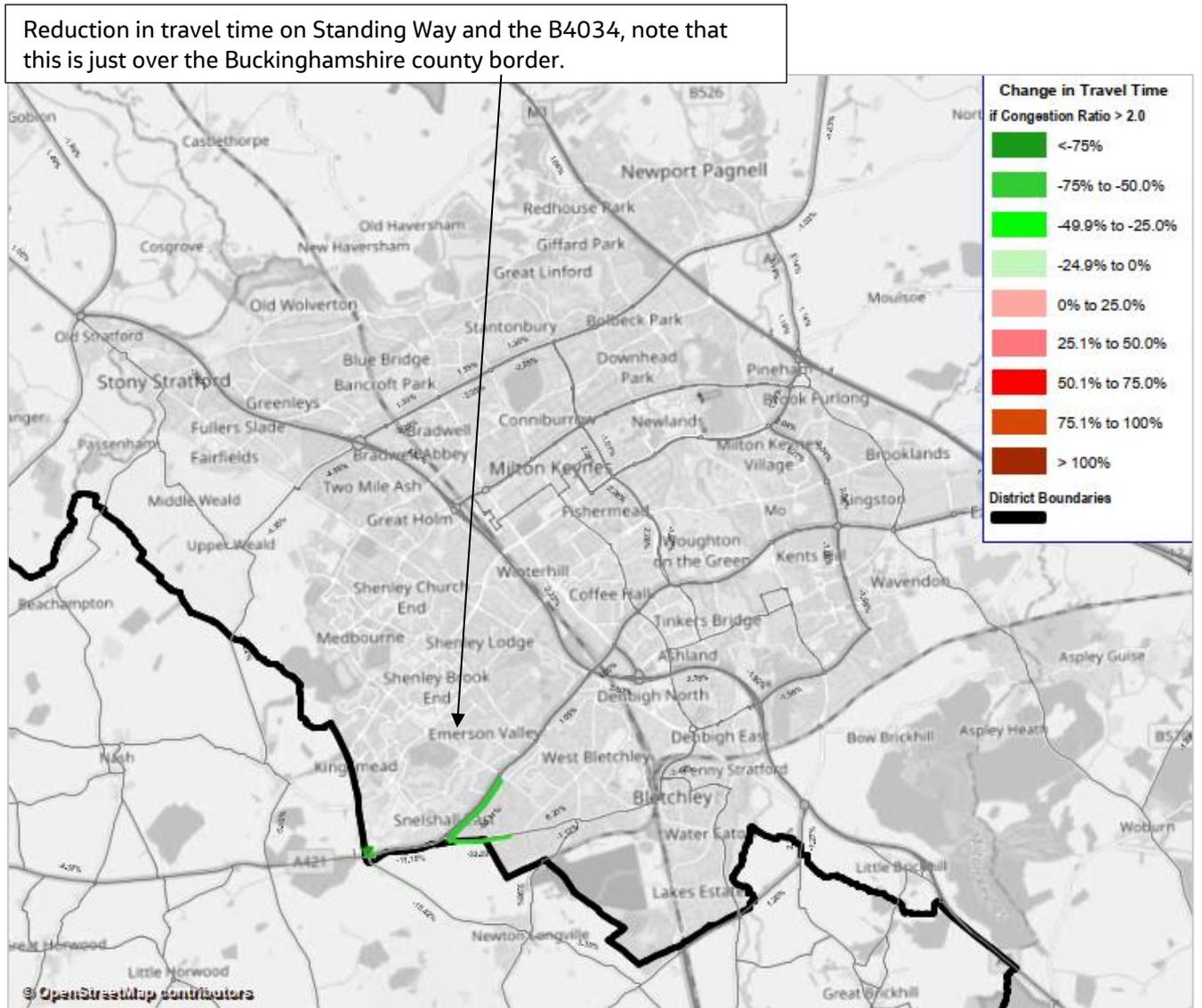


Figure 4-F Travel time changes from the DS with mitigation to the DS scenario during the PM peak in the area south-west Milton Keynes

However, when the mitigation scenario is compared to the DM it shows relatively little relief or improvement compared to the unmitigated scenario. Both Coddimore Lane and Whaddon Road have increased travel times in the with mitigation scenario compared to the without scenario, and this is due to the increased development in the area. The proposed mitigation scheme, which is a new link road facilitating access for the Shenley Park development, does not provide such relief as may have been anticipated as within the modelling it only serves the new development trips and therefore does not provide benefit existing trips. It should also be noted that in the model, there are large amounts of the highway network in Milton Keynes which are not included; this may result in higher levels of congestion on the A421 than would actually be the case. Figure 4-G illustrates the changes in travel time between the mitigation scenario and the Do Minimum.

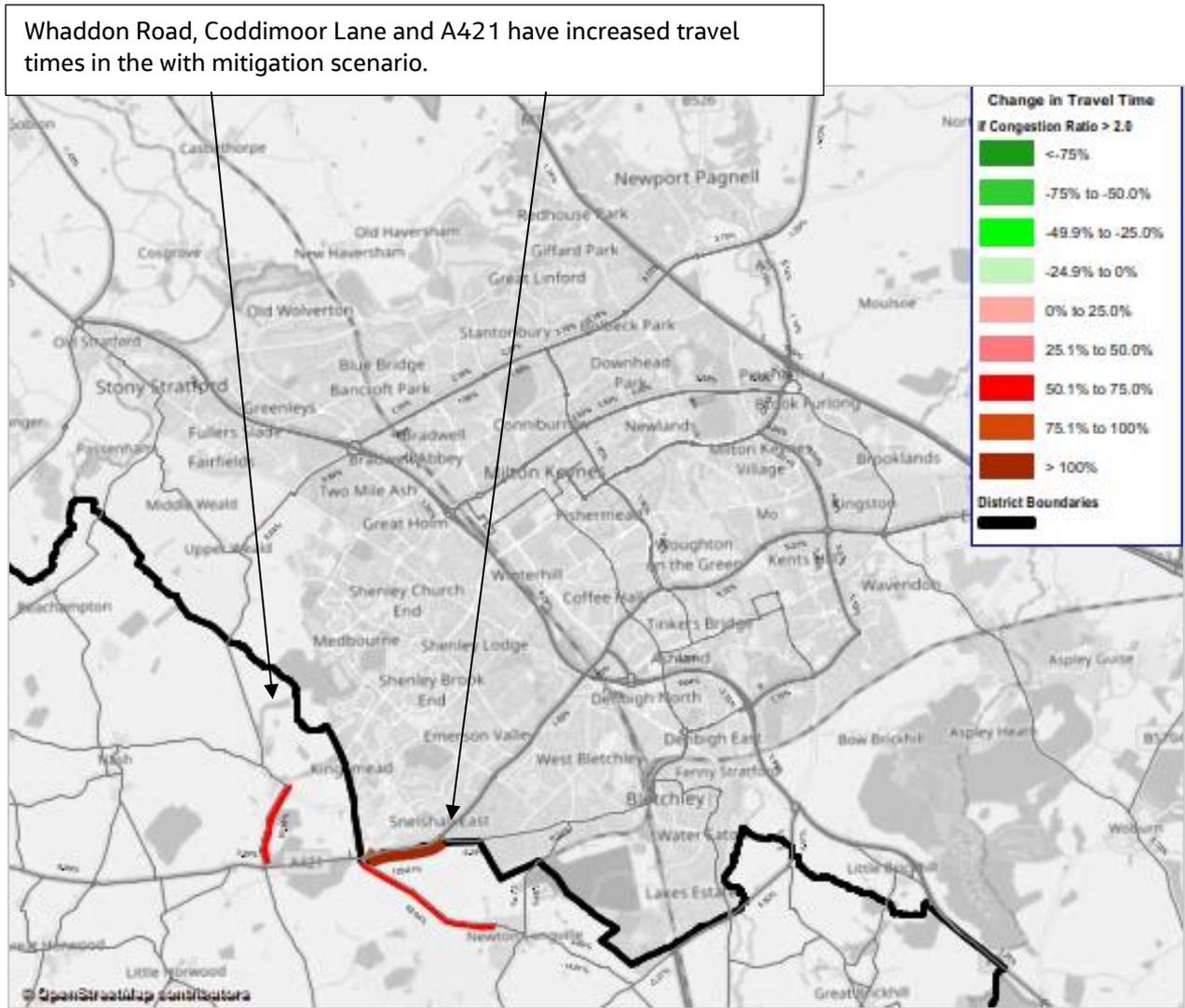


Figure 4-G Travel time changes from the DS with mitigation to the DM scenario during the PM peak in the area south-west Milton Keynes

4.3.3 Results

Table 4-E summarises the results of the modelling for the two areas. It is important to note that the table highlights the extent to which the local plan development impacts across the area in regards to travel time changes, as well as the extent to which mitigation has been successful at reducing the impacts observed in the DS scenario.

A RAG (red, amber or green) rating has been applied to each area based on a purely qualitative assessment of the overall impact of the DS scenario in terms of increased travel time; red represents a significant impact, amber a moderate impact and green a slight impact. A second RAG rating has also been applied based on a qualitative assessment of the overall improvement, if any, the DS with mitigation scenario provides.

It is worth noting that if an area is already congested in the DM and the additional development in the DS does not change this then the RAG rating will be green. This does not mean that there is no congestion present, just that the additional local plan development does not impact the situation.

Table 4-D outlines a broad definition of each qualitative category. This rating is based only on the outputs produced as part of this phase of modelling.

RAG rating	Description
	Overall significant impact in terms of travel time increases on a number of key routes through the area compared with DM
	Overall moderate impact in terms of travel time increases on a number of key routes through the area compared with DM
	Overall slight impact in terms of travel time increases on a number of key routes through the area compared with DM

Table 4-D RAG rating description

Model areas	DS RAG rating	Run 1a RAG rating	Comments
Aylesbury			<p>There are significant travel time increases in the DS scenario with the local plan development in place and the absence of mitigation scenarios, particularly to the east and south of the town.</p> <p>The inclusion of the mitigation schemes in run 1a results in improvements on the Lower Road and A41 corridors compared to the DM. There are some pockets where travel times are higher than in the DM however the net effect is that congestion levels overall are no worse than in the DM, and are arguably improved.</p>
Milton Keynes			<p>There are moderate travel time increases in the DS scenario on the A421 and adjoining minor roads like Coddimore Lane and Whaddon Road.</p> <p>The mitigation schemes offer only a marginal level of improvement such that the impact of the mitigation scenario compared to the DM is largely unchanged.</p>

Table 4-E Impact summary table

5. Summary

The Countywide Model has been used to indicate where the phase 4 proposed local plan development for Aylesbury Vale District are likely to result in negative impacts on the highway network around Aylesbury and to the south-west of Milton Keynes, in terms of increased journey times and congestion. The model has also been used to indicate the extent to which proposed transport improvement measures are likely to mitigate the impacts of the local plan development.

In Aylesbury, the mitigation measures are generally successful in mitigating the increased travel times resulting from the Local Plan developments. Notable benefits are observed to the south east of Aylesbury on the A41 corridor and on the Lower Road corridor where the addition of the orbital mitigation links allows reassignment away from the radial corridors to the extent that congestion levels on the corridors are reduced from their levels in the DM scenario. There are pockets of Aylesbury which have increased congestion in the mitigation scenario, most notably small sections on New Road, A413 Wendover Road and the Stocklake Urban link road, however, these are not extensive and considering Aylesbury as a whole, the net effect of the mitigation scenario on congestion is positive.

To the south-west of Milton Keynes local plan development has a moderate negative impact on congestion with travel time increases on the A421 and some adjoining roads. These impacts largely remain in the mitigation scenario.

It should be noted that when assessing impacts and the extent to which they are mitigated, there is no universal definition of how to define an impact, and what impacts are considered “acceptable” and “unacceptable”. It should also be noted that given the strategic nature of the Countywide model and the fact that it is an entirely synthetic model with variable levels of validation around the county, the impacts identified are appropriate for a qualitative assessment. The model has been used to provide a relatively high level indication of the potential impacts of the local plan and proposed mitigations, commensurate with the requirements of local plan evidence base. A RAG analysis of the potential impacts has been provided in different areas, which is appropriate given the nature of the strategic model, but the quantification of the scale of impact based on the model (beyond the terms slight, moderate and significant) should be avoided.

See separate document for appendices A-D