Melton Mowbray Distributor Road FBC:
Interim TUBA Assessment

Quality Information

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Revision History

Revision	Revision date	Details	Authorised	Name	Position
v1.0	2019-03-18	Draft for issue	Yes	Mark Dazeley	Regional Director

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Section 1 – Overview

1.1 Introduction

1.1.1 In September 2017, AECOM completed the preparation of the transport forecasts and economic appraisal for the Melton Mowbray Distributor Road (MMDR), using LLITM. These were used to inform and underpin the Outline Business Case (OBC) submission to the DfT, submitted in December 2017.

1.1.2 It is anticipated that the MMDR Full Business Case (FBC) will be prepared throughout 2019. Acknowledging that there have been some changes to LLITM and the model input assumptions since September 2017, it was felt prudent to understand what the impact of these may be on the economic appraisal of the MMDR. Of particular interest was the impact of using the revised growth in freight demand from the latest Road Traffic Forecasts (RTF18).

1.1.3 This technical note sets out the approach taken to assess the impact of the above, and the results of this assessment in terms of changes in forecast highway flows and estimation of user benefits.

1.2 Report Structure

1.2.1 The remainder of this technical note is sets out as below.

1.2.2 Section 2 outlines the main assumptions made for the appraisal, and explains the difference between the two sets of tests; Series A and Series B.

1.2.3 Section 3 shows the differences in vehicle flows and delay times between; the Series B test and the previous business case, Series A and Series B, and comparing Series A and Series B with and without scheme.

1.2.4 Section 4 summarises the economic benefits of both Series A and Series B after both tests have been run through TUBA.

1.2.5 Section 5 discusses the potential reasons for the difference in results, compared with the previous business case as reported in 2017.

Section 2 – Forecasting Assumptions

2.1 Introduction

2.1.1 The approach used was to adopt the latest version of LLITM including the latest input assumptions to assess the MMDR scheme, i.e. as if we were doing the assessment today for the first time. These tests are called '**Series A**'.

2.1.2 As a benchmark, to identify the impact of the recent WebTAG and RTF updates, the 'Series A' tests were rerun, using the latest version of LLITM but with the WebTAG and RTF input assumptions as used for the MMDR OBC modelling. These tests are called '**Series B**'.

2.1.3 Following preparation of inputs for these tests, 12 LLITM models were run, prior to use in the economic assessment:

- Series A, Core Scenario, 2021/2036/2041;
- Series A, With MMDR, 2021/2036/2041;
- Series B, Core Scenario, 2021/2036/2041; and
- Series B, With MMDR, 2021/2036/2041.

2.1.4 Assumptions on planning data, WebTAG parameters, RTF inputs, and TUBA input assumptions for both Series A and B tests are set out below in more detail.

2.1.5 Apart from these, all other methodological steps and assumptions remained identical to those used in the original MMDR assessment, undertaken in 2017.

2.2 Core Scenario assumptions: Series A

2.2.1 The original MMDR OBC assessment used "jn" planning data assumptions. As part of the modelling for the Transport Assessment (TA) and Environmental Impact Assessment (EIA), undertaken in Spring 2018, the assumed scale and phasing of the Melton Mowbray northern and southern SUEs have been revised.

2.2.2 Since this time, the planning data in Melton Borough and some other Leicestershire districts have been updated to reflect the latest Local Plan assumptions, including the Melton Local Plan, which was adopted on 10th of October 2018. This revised planning data set (known provisionally as "LLITM Standard") has been used for this assessment.

2.2.3 Regarding the WebTAG parameters, the November 2018 WebTAG inputs have been used for this test in the demand and highway models. These inputs include both the economic parameters for the demand model and the highway model routeing parameters (ppm/ppk parameters values) within the SATURN networks.

2.2.4 Furthermore, for the Series A tests, the Road Traffic Forecasts 18 (RTF18), produced for the latest version of LLITM, have been used. Both the freight growth parameters and the buffer network speed changes are included in the RTF18 inputs. The latter are coming from the latest version of LLITM, which has a revised methodology for applying freight growth, following some inconsistencies in outcomes using the previous methodology.

2.2.5 Finally, for the Series A tests, the existing scheme files are used, along with updated economic files from the new version of TUBA (i.e. TUBA version 1.9.12). This version reflects the latest WebTAG parameters, using the November 2018 data book.

2.3 Core Scenario assumptions: Series B

2.3.1 Series B has identical assumptions to Series A, except for the following :

- March 2017 WebTAG economic parameters;
- TUBA version 1.9.9, reflecting the March 2017 economic parameters; and
- RTF15 parameters and assumptions.

2.3.2 These inputs are consistent with the ones used in the original 2017 MMDR assessment. Thus, Series B tests are comparable with the 2017 MMDR Outline Business Case in terms of RTF and WebTAG parameters and assumptions; however, they use different versions of the LLITM model.

Section 3 – Forecast Vehicle Flow and Delay Changes

3.1 Core Scenario Forecasts – Series B vs. Original OBC

3.1.1 Figure 1 and Figure 2 present the flow differences between Core Scenario forecasts for Series B and original OBC for 2041 forecast year in AM and PM Peak, respectively, across all user classes.

3.1.2 In both figures it is observed that there is a decrease in traffic in Melton Mowbray in the most recent version of the LLITM Core Scenario forecasts. This reduction is mainly driven by various changes to the LLITM model (including recalibration of the highway model) compared with the version used for the original OBC assessment, and the input changes between Series B and the original OBC.

3.1.3 It should be noted that this pattern is observed in all future year forecast scenarios (i.e. 2021, 2036, and 2041). Results are shown for 2041 forecasts only as an example.

3.1.4 As a result of the flow reduction in Melton Mowbray, link delays are reduced in the Series B Core Scenario forecasts, comparing with the Core forecasts in the original OBC. This is observed both in AM and PM Peak forecasts, as Figure 3 and Figure 4 indicate.

3.2 Core Scenario Forecasts – Series A vs. Series B

3.2.1 Figure 5 and Figure 6 show the forecast flow differences between Core Scenario forecasts for Series A and Series B tests for 2041 forecast year in AM and PM Peak, respectively, across all user classes.

3.2.2 As the figures show, there is a small reduction in forecast flows in Series A tests compared with Series B, which mainly reflect different assumptions on freight growth within RTF18.

3.2.3 Along with the flow changes, Figure 7 and Figure 8 depict the link delays for the same comparison. The key message from these figures is that there are no substantial differences in the Core Scenario forecast flows in Melton Mowbray between Series A and Series B, both in terms of flow and delay changes.

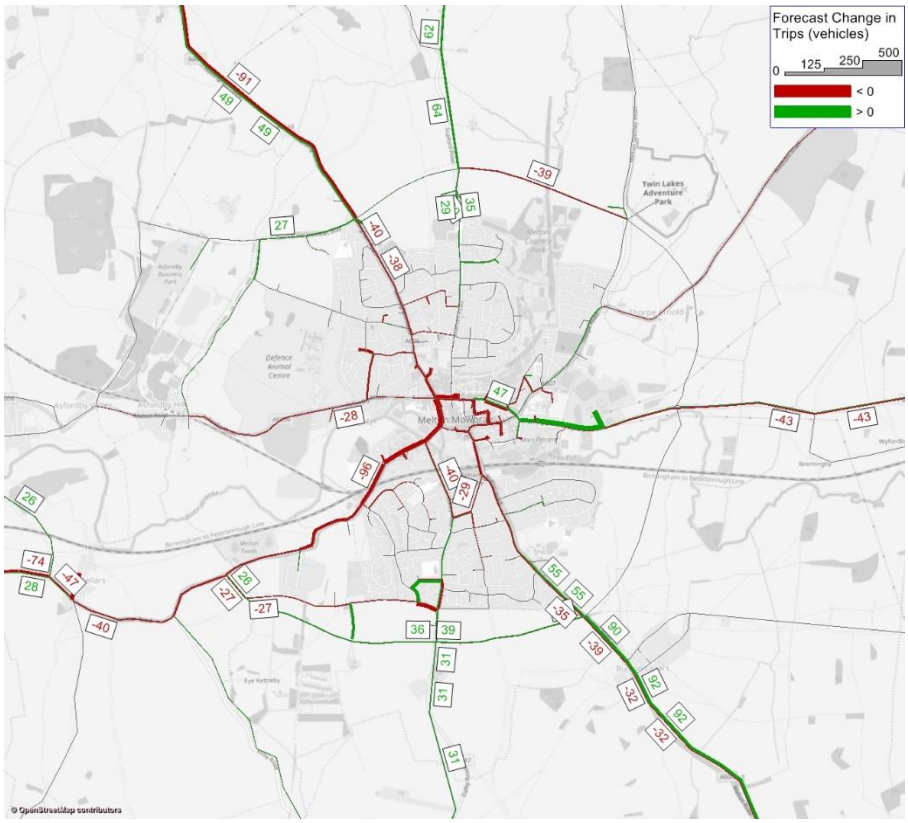

Figure 1: Series B vs Original OBC – Flow difference in AM Peak, 2041

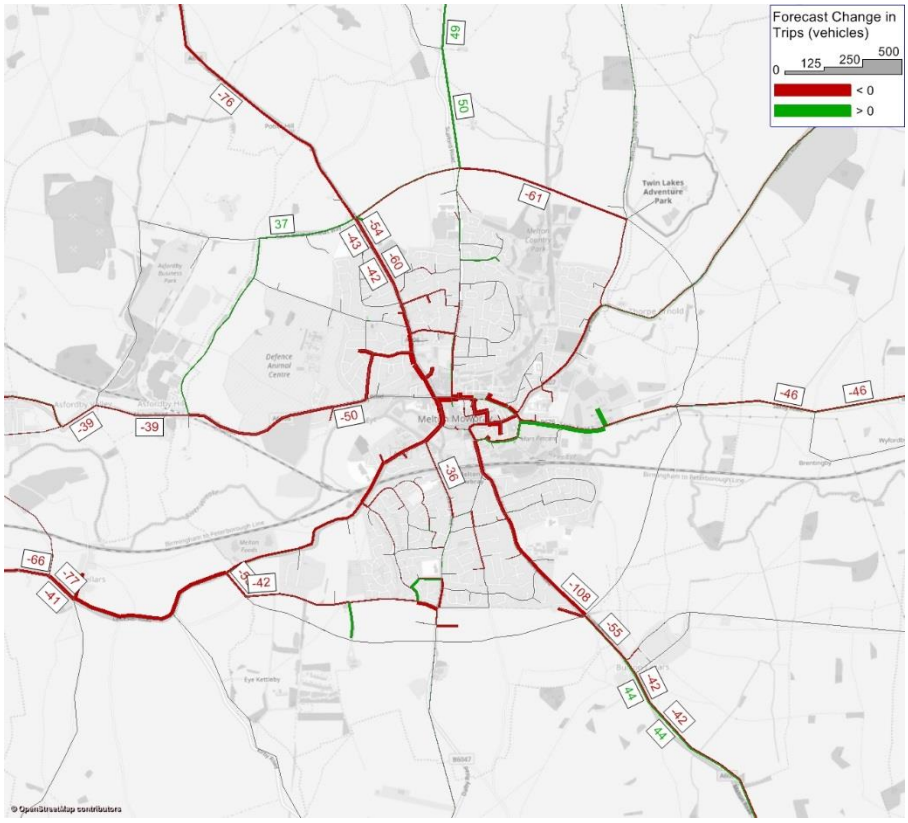

Figure 2: Series B vs Original OBC – Flow difference in PM Peak, 2041

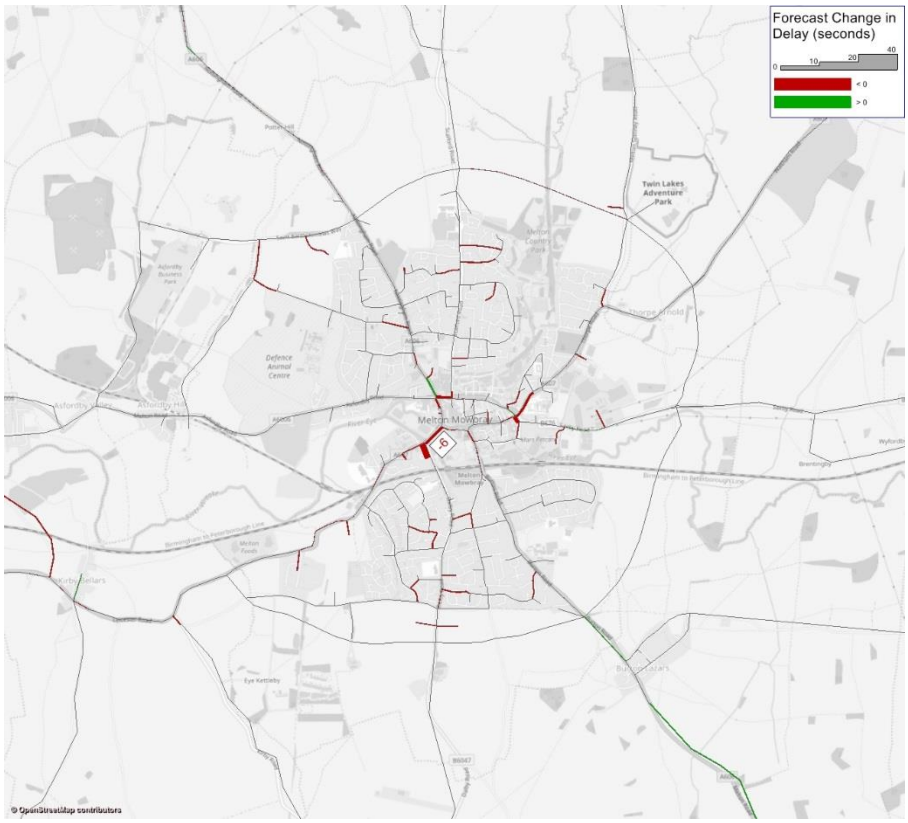

Figure 3: Series B vs Original OBC – Delay time difference, AM Peak, 2041

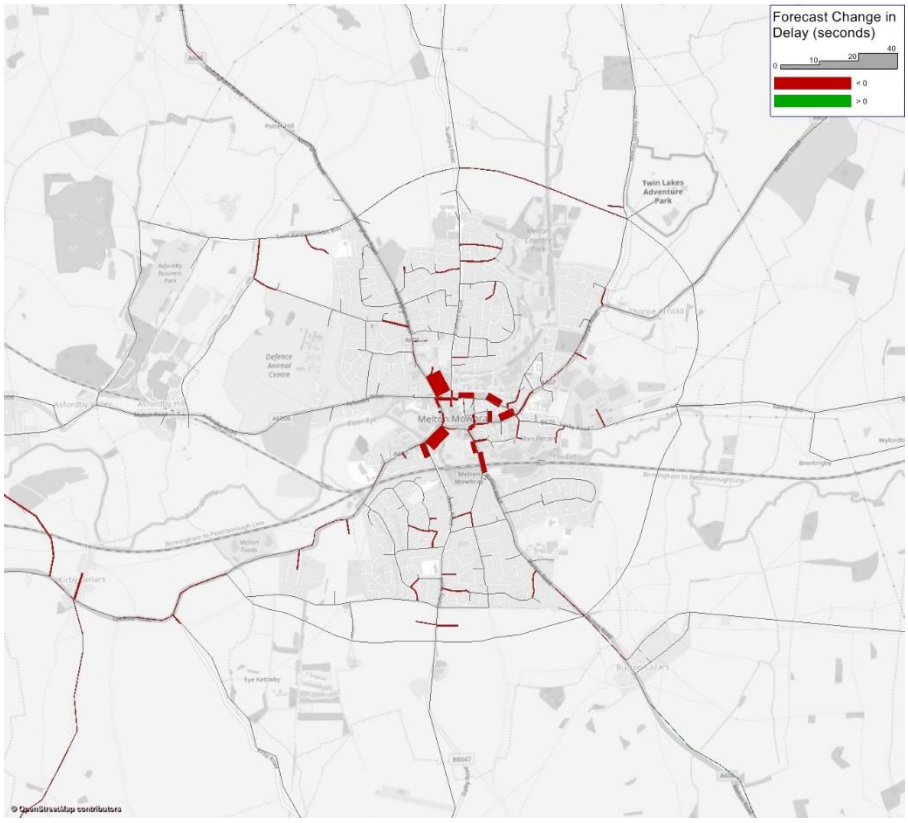

Figure 4: Series B vs Original OBC – Delay time difference, PM Peak, 2041

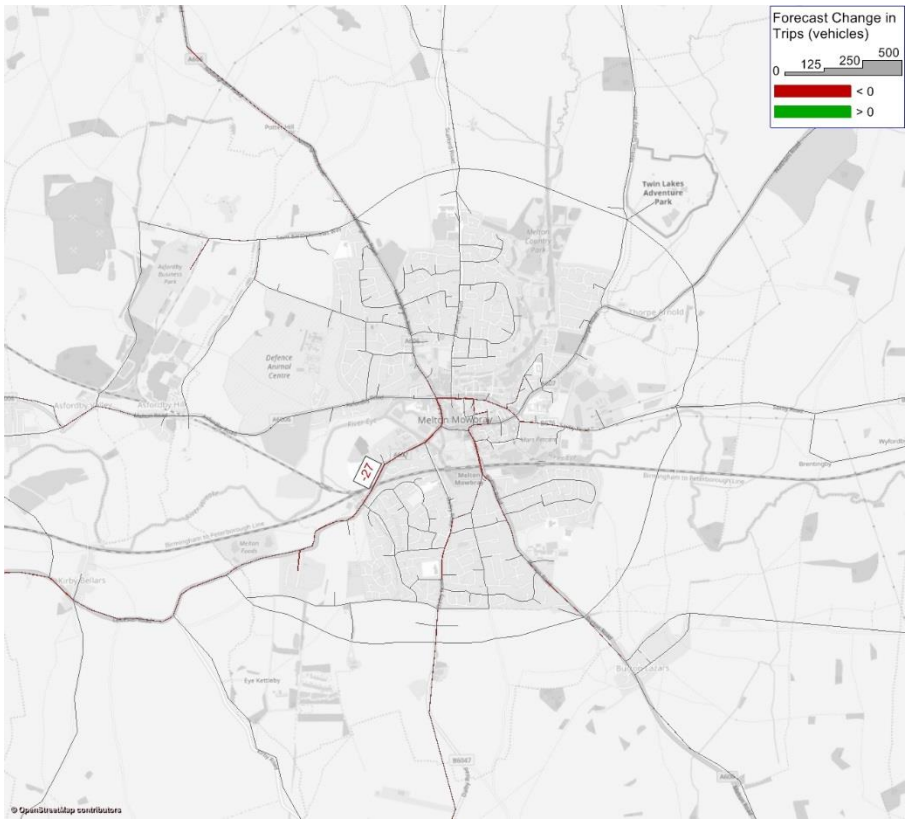

Figure 5: Series A vs Series B – Flow difference in AM Peak, 2041

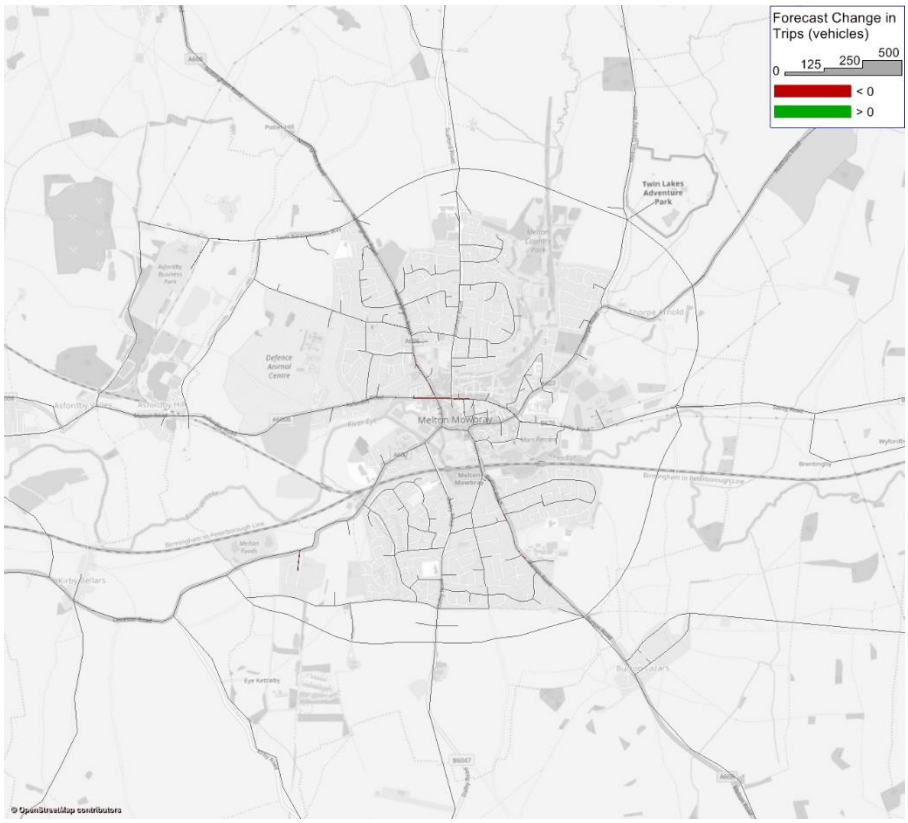

Figure 6: Series A vs Series B – Flow difference in PM Peak, 2041

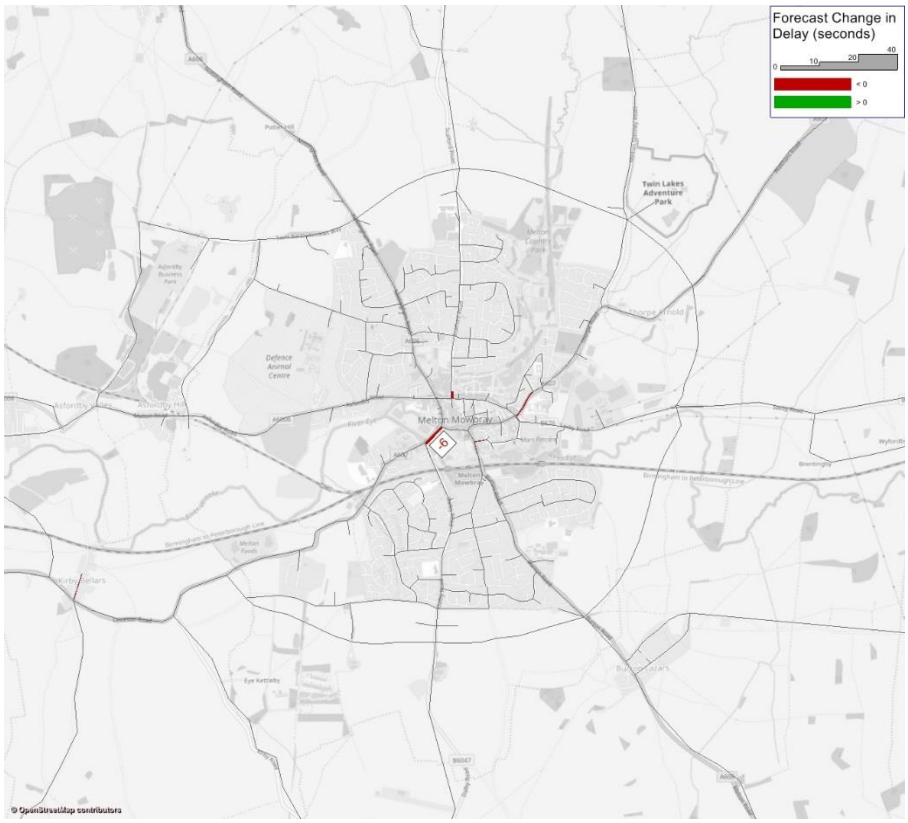

Figure 7: Series A vs Series B – Delay time difference, AM Peak, 2041

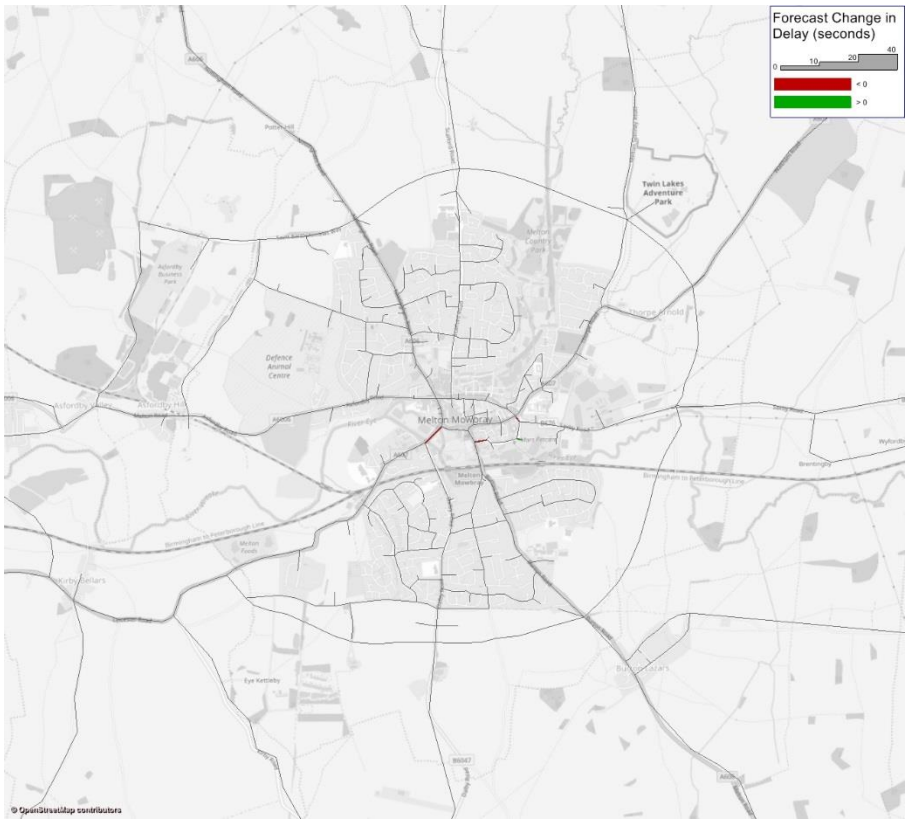

Figure 8: Series A vs Series B – Delay time difference, PM Peak, 2041

3.3 Series A – With Scheme Scenario Forecast

3.3.1 Figure 9 and Figure 10 show the forecast flow changes in Melton Mowbray in Series A tests for AM and PM Peak, respectively, resulting from the introduction of the proposed distributor road. In the figures, the green colour indicates an increase in flows and the red shows a decrease in flows.

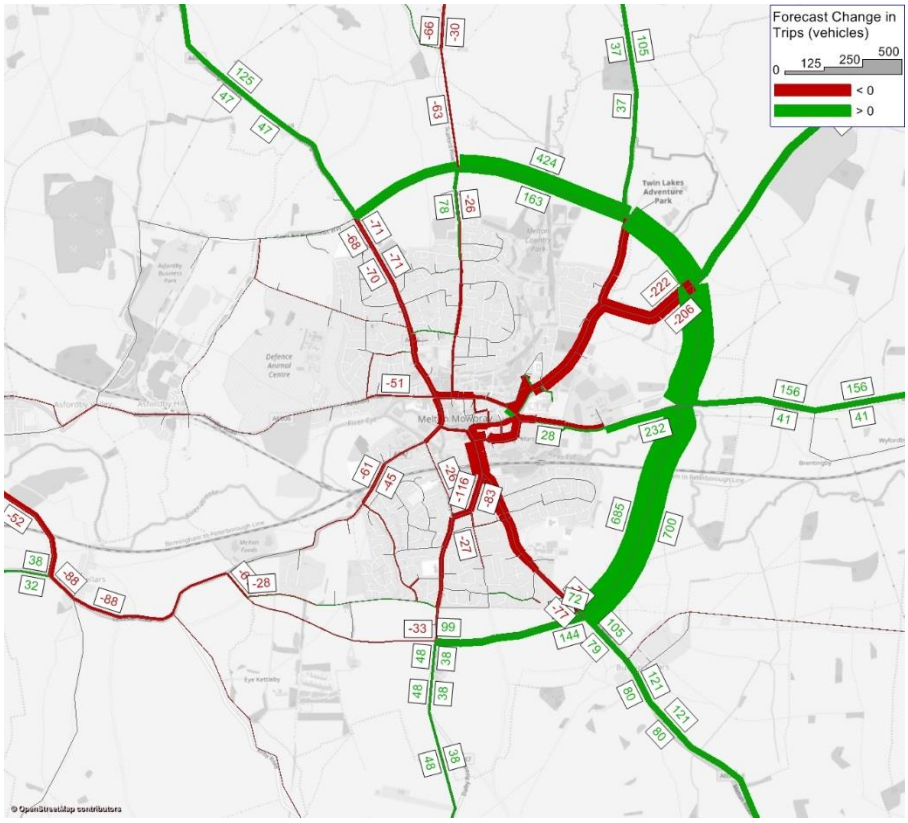

Figure 9: Series A – Flow difference in AM Peak, 2041

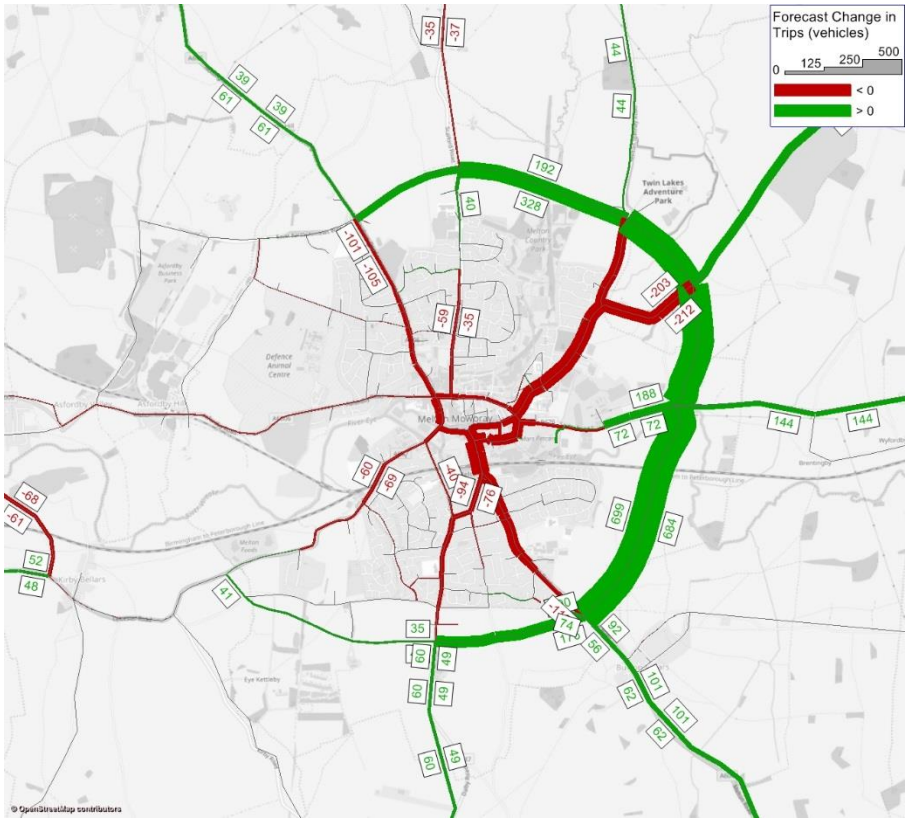

Figure 10: Series A – Flow difference in PM Peak, 2041

3.3.2 As expected, both figures show a reduction of traffic flow through Melton Mowbray, with a traffic rerouting onto the proposed distributor road. This increase in flows around the town is contributes to the reduction of delay within the town, as observed in Figure 11 and Figure 12.

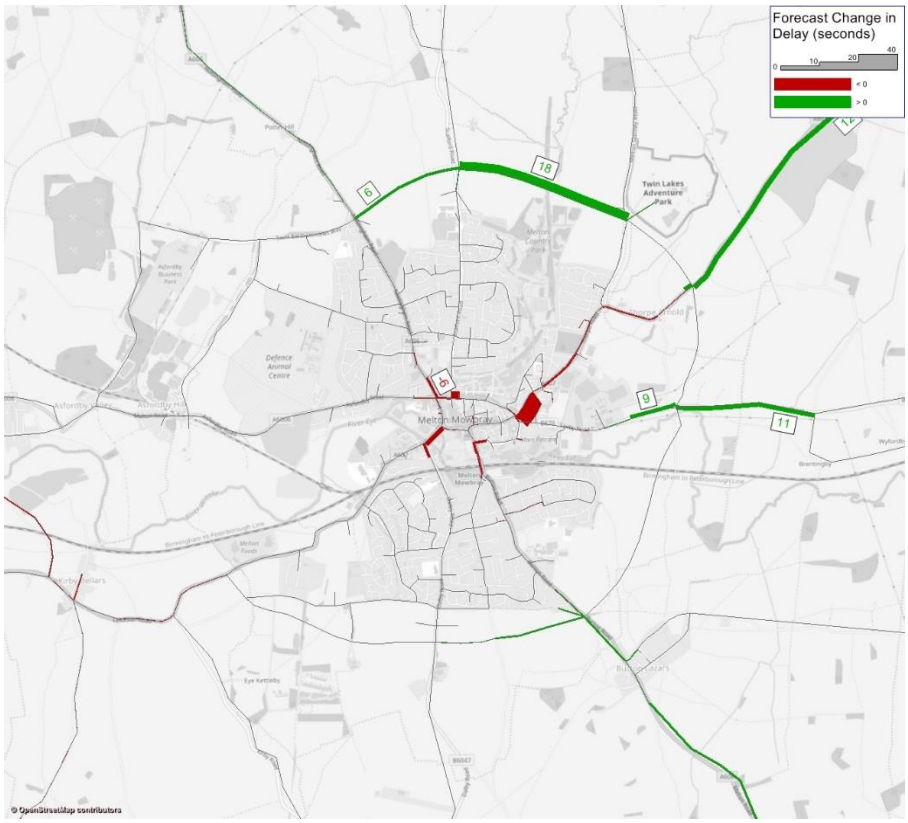

Figure 11: Series A – Delay time difference, AM Peak, 2041

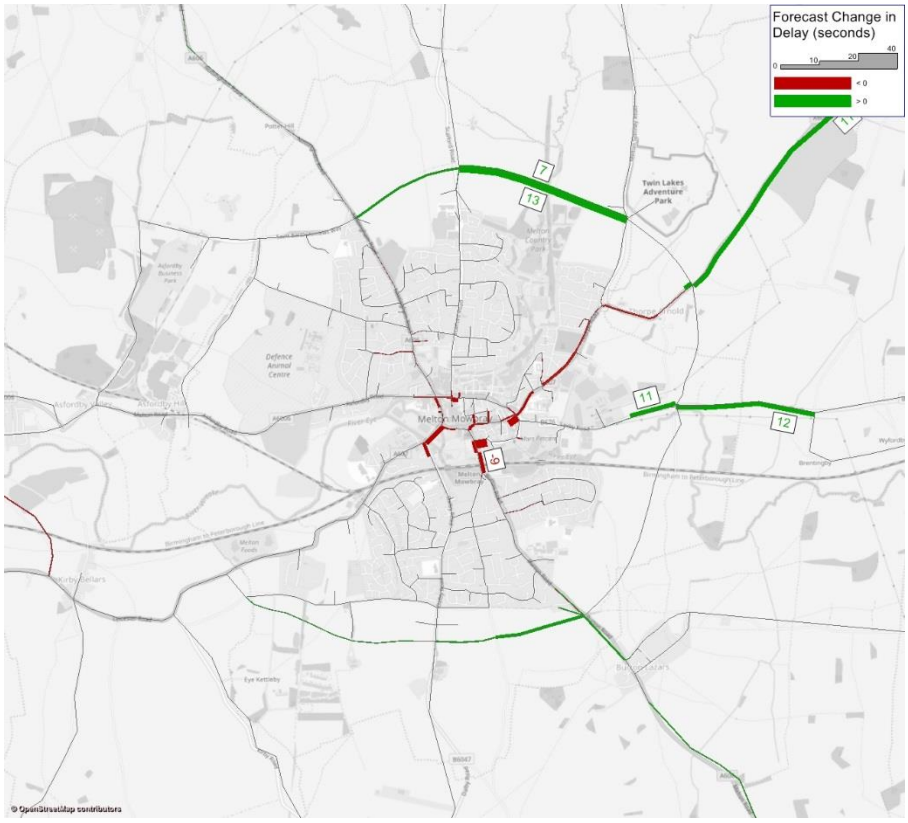

Figure 12: Series A – Delay time differences, PM Peak, 2041

3.4 Series B – With Scheme Forecast

3.4.1 Figure 13 and Figure 14 present the forecast flow changes observed in Melton Mowbray in Series B tests for AM and PM Peak, respectively, due to the introduction of the proposed distributor road.

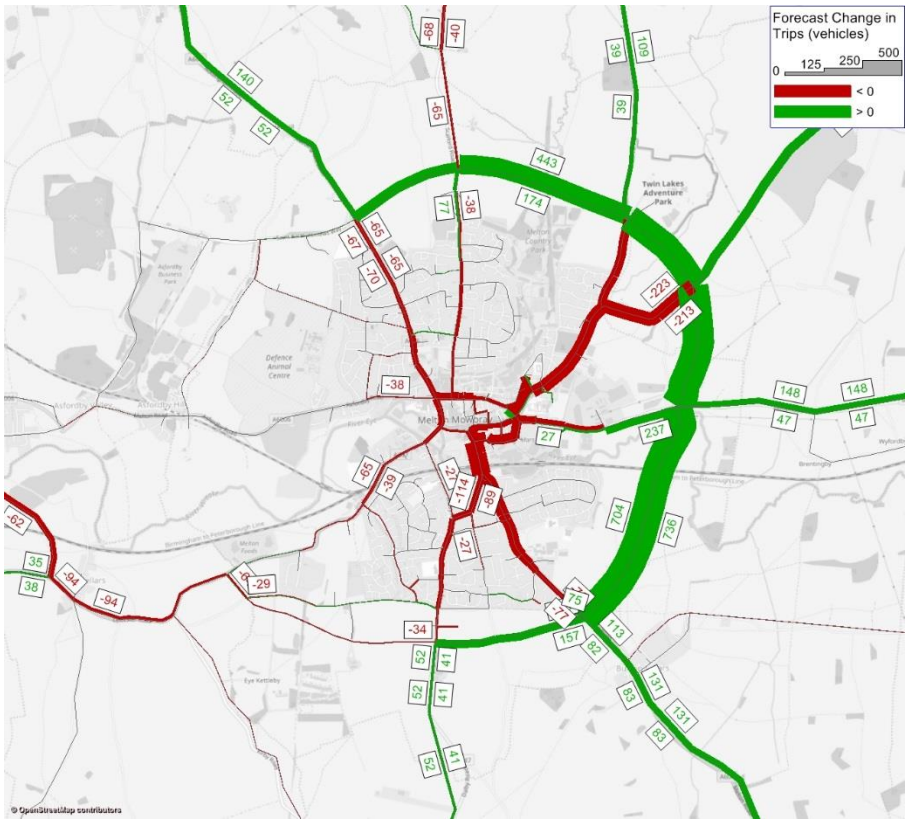

Figure 13: Series B – Flow difference in AM Peak, 2041

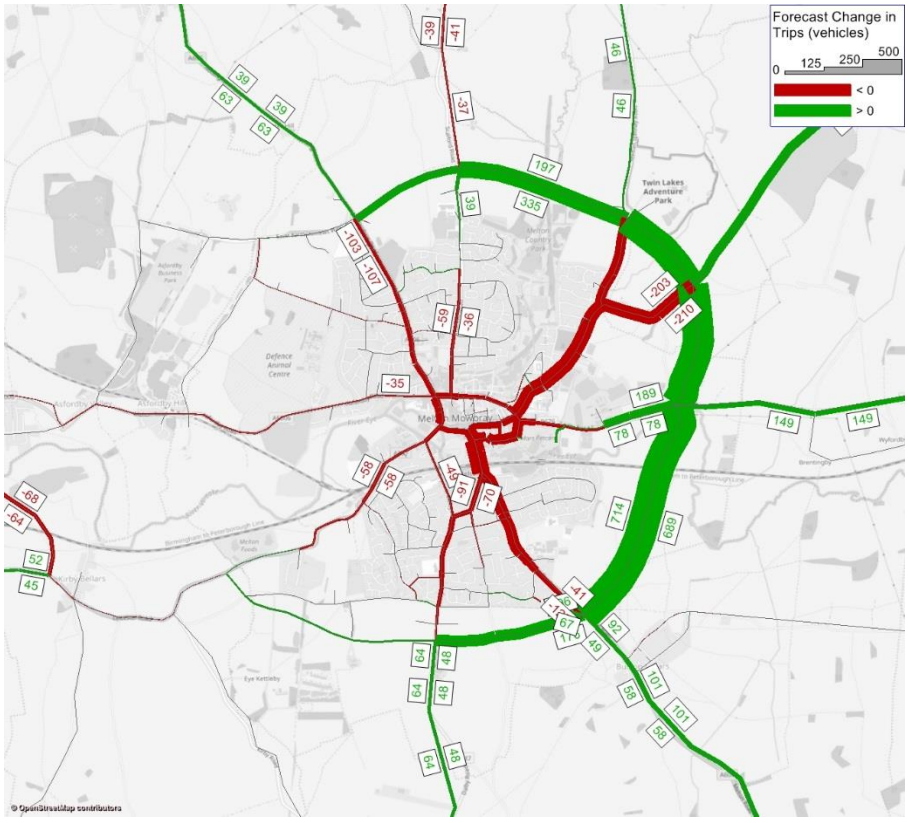

Figure 14: Series B – Flow difference in PM Peak, 2041

3.4.2 As with the Series A results reported in Section 3.3, both figures show a reduction in forecast traffic flow through Melton Mowbray, with traffic rerouteing onto the proposed distributor road. Again, the flow reduction is also reflected in the link delay, as Figure 15 and Figure 16 show a reduction on the delay time within Melton Mowbray.

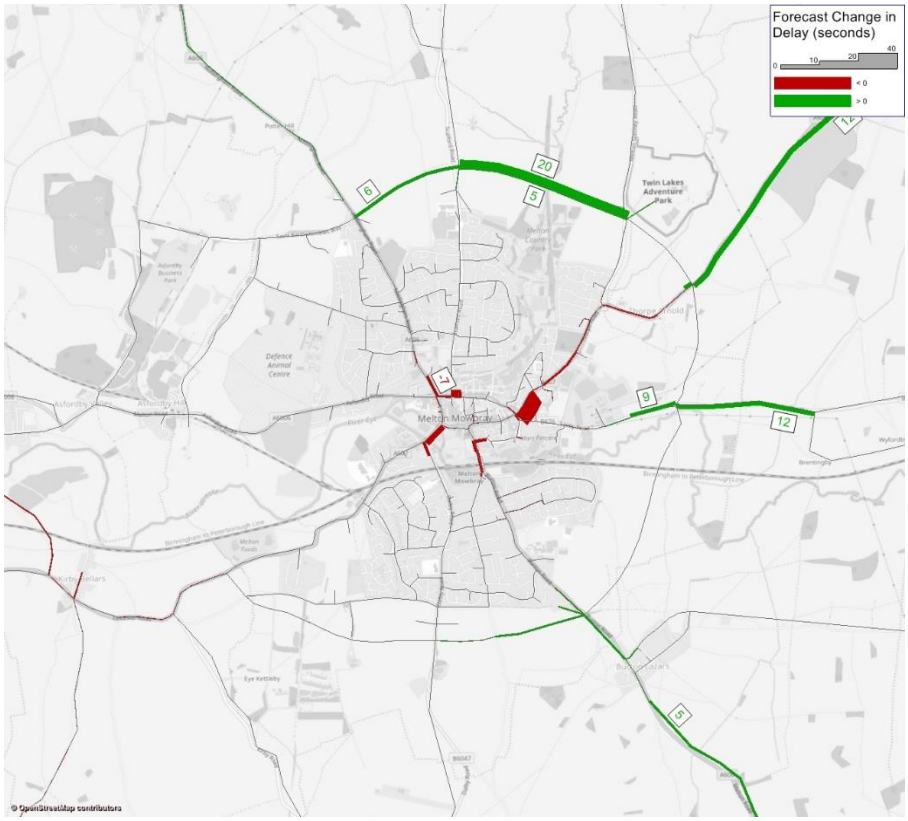

Figure 15: Series B – Delay time difference, AM Peak, 2041

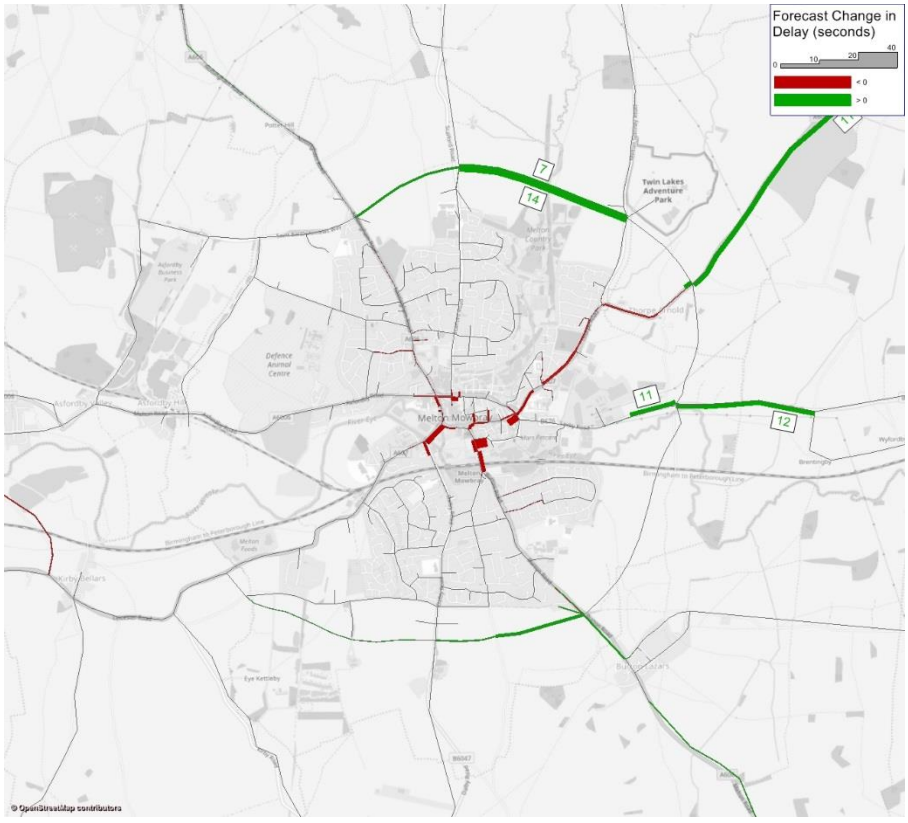

Figure 16: Series B – Delay time difference, PM Peak, 2041

Section 4 – Summary of TUBA forecasts

4.1 Series A

4.1.1 Table 4.1 summarises the TUBA scheme benefits for the Series A tests, i.e. including model forecasts for 2021 (scheme opening year), 2036 (scheme opening year plus 15 years), and 2041 (scheme horizon year).

4.1.2 The table also provides a breakdown of the scheme benefits by trip purpose, split by travel time savings and changes in vehicle operating costs, and for indirect tax revenues and greenhouse gases, as required within the WebTAG Transport Economic Efficiency (TEE) table.

4.1.3 As observed from the table, for the Central Case the estimated present value of benefits from the TUBA assessment is around £90m over the 60-year appraisal period. This includes forecasts of around £90m in travel time benefits, £6m of vehicle operating cost disbenefits, £10m increase in indirect tax revenues and £4.5m of greenhouse gas disbenefits.

Table 4.1: Summary of Discounted TUBA Benefits – Series A test, 2010 prices and values

	Travel Time	Vehicle Operating Costs	Total
Non-Business: Commuting	£23,235,000	-£2,163,000	£21,072,000
Non-Business: Other	£31,966,000	-£5,844,000	£26,122,000
Business (Freight)	£21,053,000	-£143,000	£20,910,000
Business (Personal)	£14,136,000	£2,124,000	£16,260,000
Total	*£90,390,000*	*-£6,026,000*	***£84,364,000***

Indirect Tax Revenues	£10,192,000
Greenhouse Gases	-£4,487,000
Present Value of Benefits	***£90,069,000***

4.1.4 The following analysis, shown in Table 4.2 provides further detail on these forecast scheme benefits, providing a summary of the forecast scheme benefits in Series A tests by modelled year, indicating that the monetised forecast scheme benefits increase over time until the 2036 forecast year.

Table 4.2: Summary of Discounted TUBA Benefits (excluding greenhouse gasses) by Modelled Year – Series A test, 2010 prices and values

User Class	Benefit
2021	£2,003,000
2036	£2,031,000
2041	£1,734,000
2051	-
60 year total	***£94,458,000***

Note figures may not match those presented in Table 4.1 due to rounding within the TUBA output files

4.1.5 Table 4.3 provides a summary of the forecast scheme benefits by the user classes defined within the LLITM highway model. For non-business car user classes, which are segmented by income, the user benefits increase with income. Car business and LGV user classes provide the highest forecast benefits based on the user classes defined within LLITM.

4.1.6 Considering the results in more detail, non-business user classes combined are forecast to constitute around 55% of total benefits, of which around 24% is from commuting demand and 31% from 'other' demand. LGV and car business travel are forecast to contribute around 20% and 19% respectively to overall benefits, with HGV demand forecast to account for around 6% of benefits.

Table 4.3: Summary of Discounted TUBA Benefits (excluding greenhouse gasses) by User Class – Series A test, 2010 prices and values

User Class	Benefit
HGV	£6,100,000
LGV	£19,168,000
Emp. Bus.	£17,624,000
Other Low Income	£8,674,000
Other Medium Income	£9,691,000
Other High Income	£10,878,000
Commute Low Income	£4,326,000
Commute Medium Income	£8,010,000
Commute High Income	£9,987,000
60 year total	***£94,458,000***

Note figures may not match those presented in Table 4.1 due to rounding within the TUBA output files

4.1.7 Table 4.4 provides a breakdown in the forecast scheme benefits by the eight time periods included within the TUBA assessment. The eight time periods are: AM Peak Early (07:00 to 07:30); AM Peak (07:30 to 09:00); Interpeak (09:00 to 16:00); PM Peak Early (16:00 to 17:00); PM Peak (17:00 to 18:00); PM Peak Late (18:00 to 19:00); weekday off-peak (19:00 to 07:00); and weekends.

4.1.8 Results show that around 34% of benefits are forecast to occur within the interpeak period, around 28% of benefits occur during the weekends, around 7% in the PM Peak time periods combined, around 18% in the AM Peak time periods combined, and around 13% in the off-peak.

Table 4.4: Summary of Discounted TUBA Benefits (excluding greenhouse gasses) by Time Period – Series A test, 2010 prices and values

Time Period	Benefits
AM Peak Early	£2,221,000
AM Peak	£14,398,000
Interpeak	£32,188,000
PM Peak Early	£2,039,000
PM Peak	£718,000
PM Peak Late	£4,215,000
Off-Peak	£12,022,000
Weekends	£26,656,000
60 year total	***£94,458,000***

Note figures may not match those presented in Table 4.1 due to rounding within the TUBA output files

4.2 Series B

4.2.1 Table 4.5 summarises the TUBA scheme benefits for the Series B tests, i.e. including model forecasts for 2021 (scheme opening year), 2036 (scheme opening year plus 15 years), and 2041 (scheme horizon year).

4.2.2 The table shows that for the Central Case the estimated present value of benefits from the TUBA assessment is around £106m over the 60 year appraisal period. This includes forecasts of around £107m in travel time benefits, £6.5m of vehicle operating cost disbenefits, £11.5m increase in indirect tax revenues and £5m of greenhouse gas disbenefits.

Table 4.5: Summary of Discounted TUBA Benefits – Series B test, 2010 prices and values

	Travel Time	Vehicle Operating Costs	Total
Non-Business: Commuting	£25,986,000	-£2,464,000	£23,522,000
Non-Business: Other	£36,438,000	-£6,484,000	£29,954,000
Business (Freight)	£28,022,000	£12,000	£28,034,000
Business (Personal)	£16,314,000	£2,351,000	£18,665,000
Total	*£106,760,000*	*-£6,585,000*	***£100,175,000***
Indirect Tax Revenues			£11,568,000
Greenhouse Gases			-£5,263,000
Present Value of Benefits			***£106,480,000***

4.2.3 Table 4.6 provides a summary of the forecast scheme benefits in Series B tests by modelled year.

Table 4.6: Summary of Discounted TUBA Benefits (excluding greenhouse gasses) by Modelled Year – Series B test, 2010 prices and values

User Class	Benefit
2021	£2,123,000
2036	£2,056,000
2041	£2,160,000
2051	-
60 year total	***£111,728,000***

Note figures may not match those presented in Table 4.5 due to rounding within the TUBA output files

4.2.4 Table 4.7 provides a summary of the forecast scheme benefits by the user classes defined within the LLITM highway model. As with Series A, for non-business car user classes, which are segmented by income, the user benefits increase with income. Car business and LGV user classes provide the highest forecast benefits based on the user classes defined within LLITM.

4.2.5 Considering the results in more detail, non-business user classes combined are forecast to constitute around 52% of total benefits, of which around 22% is commuting demand and 30% is 'other' demand. LGV and car business travel are forecast to contribute around 22% and 18% respectively to overall benefits, with HGV travel forecast to account for around 8% of benefits.

Table 4.7: Summary of Discounted TUBA Benefits (excluding greenhouse gasses) by User Class – Series B test, 2010 prices and values

User Class	Benefit
HGV	£8,722,000
LGV	£25,006,000
Emp. Bus.	£19,956,000
Other Low Income	£9,721,000
Other Medium Income	£11,026,000
Other High Income	£12,374,000
Commute Low Income	£4,749,000
Commute Medium Income	£8,925,000
Commute High Income	£11,251,000
60 year total	***£111,730,000***

Note figures may not match those presented in Table 4.5 due to rounding within the TUBA output files

4.2.6 Table 4.8 provides a breakdown in the forecast scheme benefits by the eight time periods included within the TUBA assessment. These eight time periods are: AM Peak Early (07:00 to 07:30); AM Peak (07:30 to 09:00); Interpeak (09:00 to 16:00); PM Peak Early (16:00 to 17:00); PM Peak (17:00 to 18:00); PM Peak Late (18:00 to 19:00); weekday off-peak (19:00 to 07:00); and weekends.

4.2.7 This table indicates that around 31% of benefits are forecast to occur within the interpeak period, around 26% of benefits occur during the weekends, around 18% in the PM Peak time periods combined, around 13% in the AM Peak time periods combined, and around 12% in the off-peak.

4.2.8 This analysis is, in part, influenced by the assumed annualisation factors, which are higher for the interpeak and weekend time periods.

Table 4.8: Summary of Discounted TUBA Benefits (excluding greenhouse gasses) by Time Period – Series B test, 2010 prices and values

Time Period	Benefits
AM Peak Early	£2,398,000
AM Peak	£11,836,000
Interpeak	£35,141,000
PM Peak Early	£7,933,000
PM Peak	£7,727,000
PM Peak Late	£4,549,000
Off-Peak	£13,126,000
Weekends	£29,020,000
60 year total	***£111,730,000***

Note figures may not match those presented in Table 4.5 due to rounding within the TUBA output files

Section 5 – Discussion

5.1 Introduction

5.1.1 For reference, Table 5.1 reproduces the results from the original TUBA assessment as part of the OBC assessment undertaken in 2017. As shown in this table, the present value of the scheme benefits for the central case was estimated to be £117.17m.

Table 5.1: Summary of Discounted TUBA Benefits in original OBC assessment (2017) – 2010 prices and values

	Travel Time	Vehicle Operating Costs	Total
Non-Business: Commuting	£29,726,000	-£2,832,000	£26,894,000
Non-Business: Other	£42,970,000	-£8,464,000	£34,506,000
Business (Freight)	£25,288,000	£928,000	£26,215,000
Business (Personal)	£19,552,000	£2,157,000	£21,709,000
Total	*£117,536,000*	*-£8,211,000*	*£109,324,000*
Indirect Tax Revenues			£14,688,000
Greenhouse Gases			-£6,839,000
Present Value of Benefits			***£117,173,000***

5.1.2 It is clear from the results presented in Section 4 that the estimated benefits using the updated model and input assumptions are consistently lower, when the same assumptions are used on preparing the inputs for TUBA assessment (i.e. masking TUBA forecast and cleaning process). The benefits are 23% and 9% lower in Series A and Series B, respectively, compared with the original OBC assessment, as summarised in Table 5.2.

Table 5.2: Comparison of estimated benefits with original OBC

Test	Present Value of Benefits	% Change from the original OBC
Original OBC – Central Case	*£117,173,000*	
Series A Test	*£90,069,000*	**-23%**
Series B Test	*£106,480,000*	**-9%**

5.1.3 Another key observation is the significant difference in benefits between Series A and Series B tests; the only difference between these two tests are new RTF assumptions (i.e. freight growth and buffer network speeds) and WebTAG economic parameters.

5.1.4 Comparison of Table 4.1 and Table 4.5 suggests a reduction of about £7m in Business (Freight) benefits, largely due to the revised RTF freight growth assumptions, but also a reduction of £8.6m in car user benefits in Series A compared with Series B, which is beyond what could be explained by using different economic parameters.

5.1.5 A series of investigations were undertaken to understand possible factors contributing to the change in benefits; these are discussed below.

5.2 Changes in Highway Demand

5.2.1 The main difference between Series B tests and original OBC was the LLITM version used for the Core and “With Scheme” model runs. The model has been updated in terms of demand matrix, network enhancements, and planning data inputs, i.e. population and employment data. For Series B

tests “LLITM Standard” planning data have been used, while in the original OBC “jn” planning data were used.

5.2.2 It is worth mentioning that the WebTAG economic parameters and the RTF inputs are the same between these two tests.

5.2.3 Therefore, it was important to identify the main changes in the Core Scenario model between Series B and original OBC, to assess the impact of the updated LLITM model. Table 5.3 and Table 5.4 present the modelled flows crossing a cordon surrounding Melton Mowbray in the AM Peak and PM Peak, respectively. It is observed that the updated LLITM model results in a decrease in trips (both in terms of travel demand and travel flows) in Melton Mowbray.

5.2.4 Highway demand significantly contributes to the user benefits in the economic assessment by the introduction of the proposed distributor road. Lower demand in the Core Scenario forecast years in Series B implies that fewer users benefit from the proposed scheme, resulting in a decrease in the total PVB.

Table 5.3: Trip totals crossing a cordon surrounding Melton Mowbray, AM Peak, 2041

2041, AM Peak	Series B Test	Original 2017 OBC	% Change in Demand
Total trips	12,041	12,552	**-4%**
Total car trips	9,750	10,217	**-5%**

Table 5.4: Trip totals crossing a cordon surrounding Melton Mowbray, PM Peak, 2041

2041, PM Peak	Series B Test	Original 2017 OBC	% Change in Demand
Total trips	12,360	13,406	**-8%**
Total car trips	10,605	11,581	**-8%**

5.2.5 It is assumed that the reduction in demand in the new model largely explains the 9% reduction in user benefits in Series B compared with the original OBC central case. It should be noted that the underlying demand in the Core Scenarios is almost the same in Series A and B tests (identical in the base year), therefore a similar impact on Series A results is expected.

5.3 Impact of TUBA Masking

5.3.1 With any assignment model with the scale of LLITM, between any two assignments there can be ‘noise’ in the assignment results. This can manifest itself as changes in assigned volumes and / or travel costs between the “without scheme” and “with scheme” scenarios in areas of the model not thought to be impacted by the proposed scheme.

5.3.2 To remove this assignment noise from the economic assessment of the scheme, a sectoring system was defined (largely based on districts within Leicestershire and counties surrounding Leicestershire) in the original OBC TUBA assessment, with benefits / disbenefits between sectors which are not expected to be directly affected by the scheme removed from the assessment.

5.3.3 In the Series A and B tests undertaken above, the same sectoring system was used to calculate user benefits. A series of investigations were undertaken to review these definitions and identify whether calculated benefits may have been adversely impacted by the assignment noise in the new model, which did not exist in the model forecasts used to calculate user benefits for the original OBC.

5.3.4 Figure 17 presents the modelled delay difference between “With Scheme” and “Without Scheme” for PM Peak in the forecast year of 2041 in the original OBC model runs. Figure 18 and Figure 19 illustrate the same comparison for the Series B and Series A tests, respectively.

5.3.5 These figures suggest that the updated LLITM model includes assignment noise, shown as delay changes not influenced by the scheme, in particular Bingham and Keyworth in the vicinity of Nottingham. This is in-line with the results from TUBA assessment where significant disbenefits are calculated for trips to / from Nottingham. This is particularly the case for Series A tests where the assignment noise is found to be substantially greater than that in Series B tests.

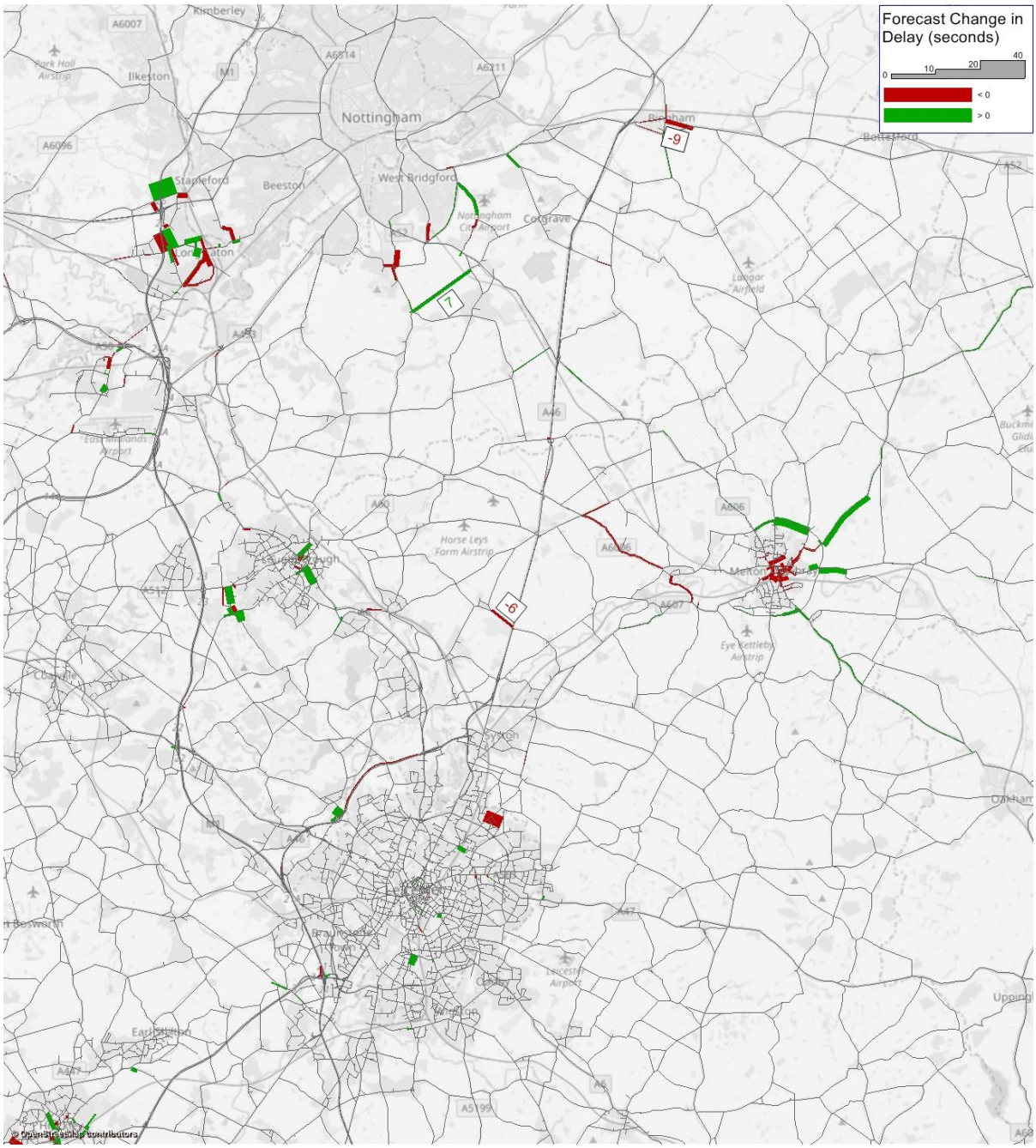

Figure 17: Original OBC - Delay time difference between 'With Scheme' and 'Without Scheme', PM Peak, 2041, Simulation Area

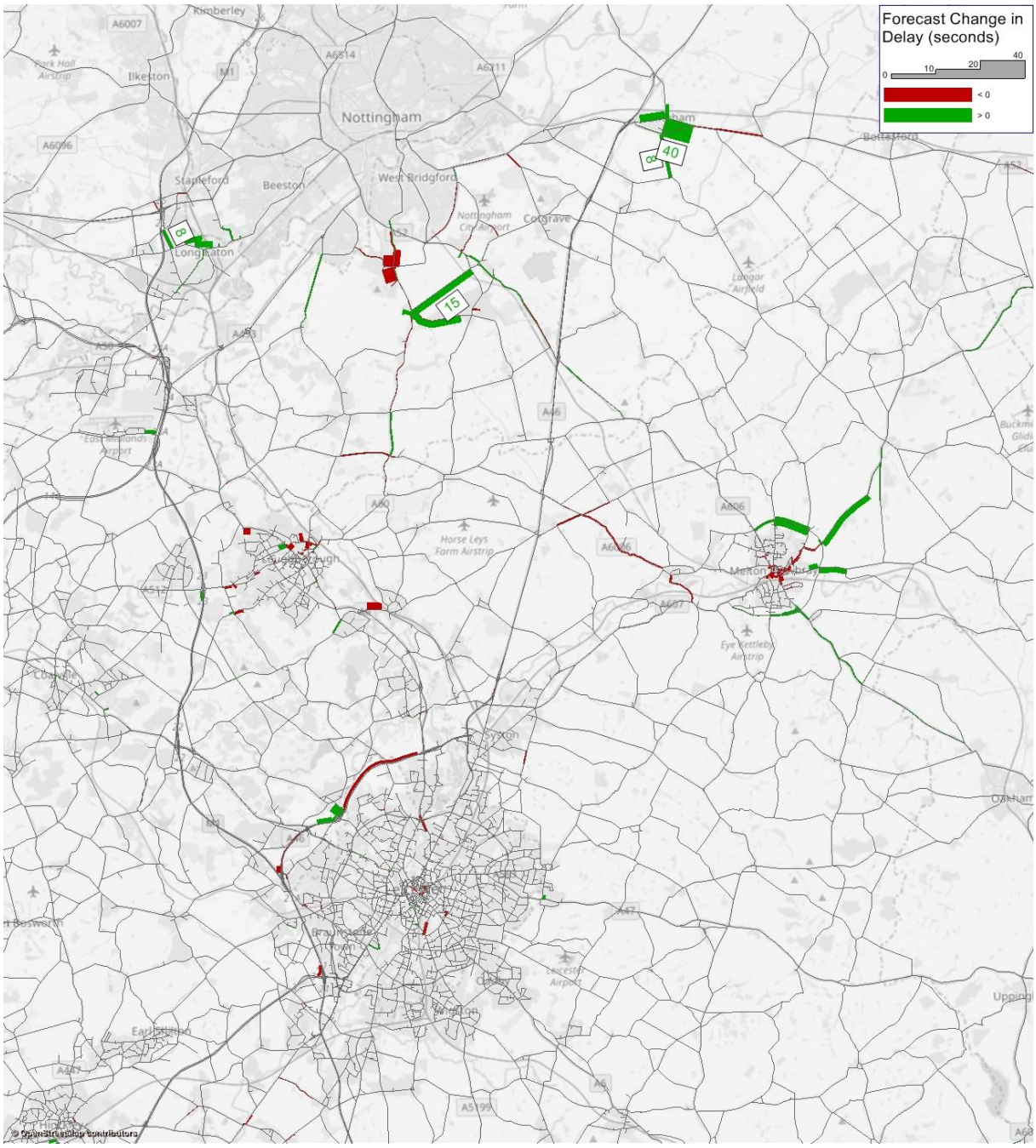

Figure 18: Series B - Delay time difference between 'With Scheme' and 'Without Scheme', PM Peak, 2041, Simulation Area

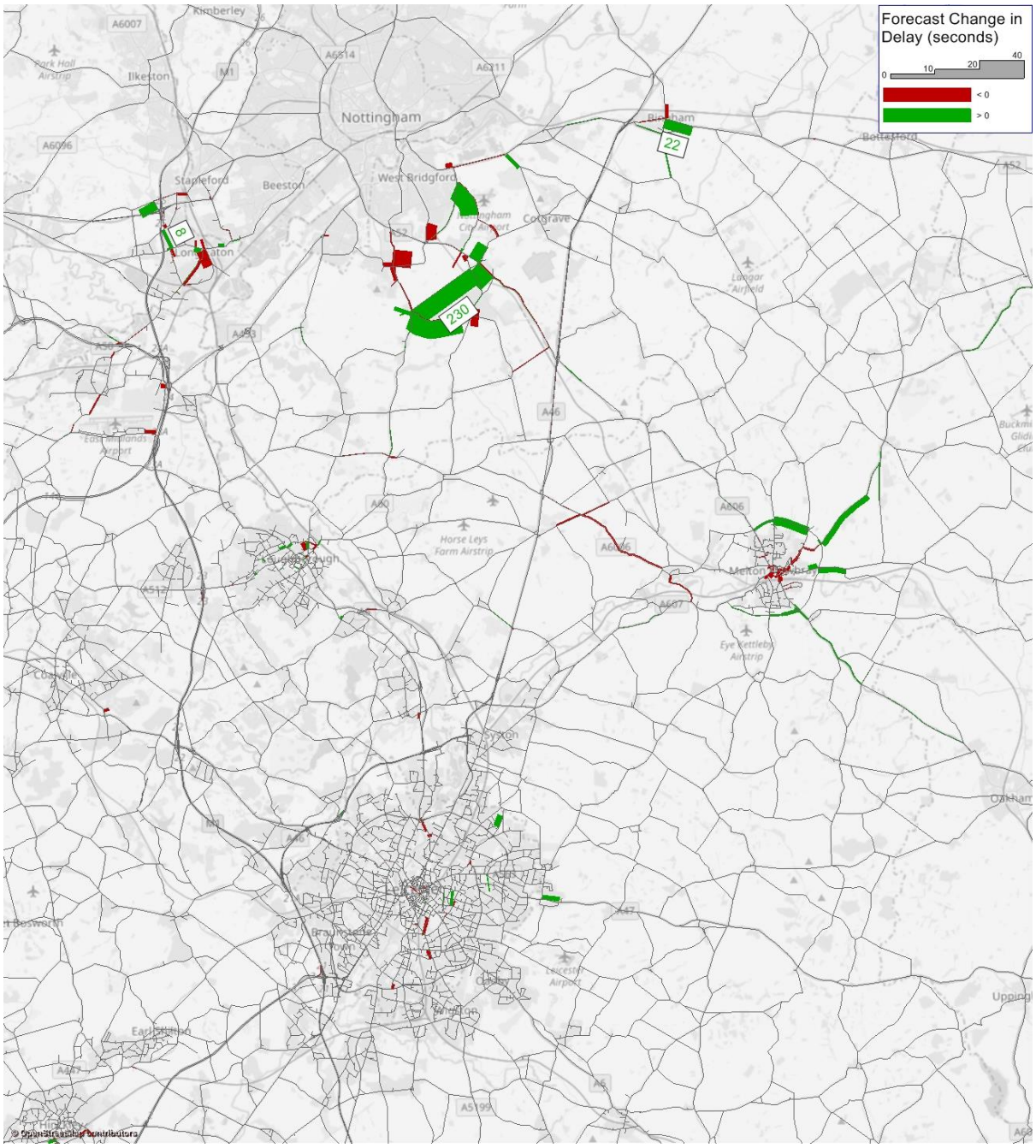

Figure 19: Series A - Delay time difference between 'With Scheme' and 'Without Scheme', PM Peak, 2041, Simulation Area

5.3.6 Examining the definition of masking used to calculate user benefits and the TUBA outputs, it was noticed that benefits from the Nottingham to Charnwood and NW Leicestershire and Leicester sectors have decreased significantly, and changed to disbenefits, most of which are attributed to assignment noise in the model.

5.4 Indicative Impact of Assignment Noise on User Benefits

5.4.1 Outside the scope of this commission, a fuller investigation is needed to understand the underlying factors contributing to the introduced assignment noise affecting the results and to address them. However, for the purposes of this commission, in order to understand the indicative impact of these on the calculated user benefits, TUBA runs were repeated, excluding from the masking process four sector-to-sector movements largely affected by the issue illustrated in Figure 18 and Figure 19.

5.4.2 Table 5.5 and Table 5.6 present the summary results of TUBA scheme benefits for Series A and Series B tests respectively, with this updated masking.

Table 5.5: Summary of Discounted TUBA Benefits – Series A test, 2010 prices and values – Updated masking

Segment	Travel Time	Vehicle Operating Costs	Total
Non-Business: Commuting	£24,520,000	-£2,136,000	£22,384,000
Non-Business: Other	£33,739,000	-£5,812,000	£27,927,000
Business (Freight)	£22,323,000	£113,000	£22,436,000
Business (Personal)	£15,634,000	£2,263,000	£17,897,000
Total	£96,216,000	-£5,572,000	£90,644,000

Indirect Tax Revenues	£10,154,000
Greenhouse Gases	-£4,452,000
Present Value of Benefits	**£96,346,000**

Table 5.6: Summary of Discounted TUBA Benefits – Series B test, 2010 prices and values – Updated masking

Segment	Travel Time	Vehicle Operating Costs	Total
Non-Business: Commuting	£26,147,000	-£2,389,000	£23,758,000
Non-Business: Other	£36,733,000	-£6,481,000	£30,252,000
Business (Freight)	£28,252,000	£67,000	£28,319,000
Business (Personal)	£16,483,000	£2,403,000	£18,886,000
Total	£107,615,000	-£6,400,000	£101,215,000

Indirect Tax Revenues	£11,647,000
Greenhouse Gases	-£5,320,000
Present Value of Benefits	**£107,542,000**

5.4.3 As observed in these tables, the total PVB in Series A is increased compared with the ones from the original Series A results (see Table 4.1). This suggests that the exclusion of the four sector-to-sector movements, which are considered as areas largely affected by the assignment noise, resulted in a decrease of disbenefits in the model.

5.4.4 On the other hand, the updated masking has a negligible impact on the benefits for Series B tests (see Table 4.5 and Table 5.4). These results are in-line with the observations from Figure 18, where no substantial increase in delay time is observed in the vicinity of Nottingham.

5.4.5 Considering the updated masking process, Table 5.7 compares the calculated user benefits for Series A and B tests with those from the original OBC TUBA assessment.

Table 5.7: Comparison of estimated benefits, using updated masking, with original OBC

Test	Present Value of Benefits	% Change from the original OBC
Original OBC – Central Case	£117,173,000	
Series A Test	£96,346,000	-18%
Series B Test	£107,542,000	-8%

5.4.6 It should be noted that the benefits from the excluded sector-to-sector movements were significant in the original OBC TUBA runs. This suggests that a potential improvement of the problematic area

around Nottingham, removing the modelling noise in the area, is expected to result in a further increase of benefits (both in Series A and Series B runs).

5.4.7 Therefore, a combination of reduction in underlying demand in the updated LLITM base year in Melton as well as assignment noise in model forecast runs are expected to explain most reductions in user benefits, and a thorough investigation is required to understand the reasons for these, and potentially address them, before a full business case can be undertaken.

5.5 Conclusions

5.5.1 Based on the analysis discussed in this document, the findings can be summarised as follows:

- To identify the impact of LLITM model updates and changes in RTF and WebTAG assumptions, the MMDR OBC TUBA assessment has been rerun with the latest LLITM model and assumptions (Series A) and the latest LLITM model and assumptions but using the OBC RTF15 and WebTAG economic assumptions (Series B).
- The combined impact of adopting the latest model and latest RTF and WebTAG assumptions is to reduce the PVB by approximately 18%. Breaking this down:
  - the impact of various model updates (but excluding the effect of revised RTF and WebTAG assumptions) is to reduce the PVB by approximately 8%; and
  - the combined impact of just adopting the latest RTF and WebTAG assumptions is to reduce the PVB by approximately 10%
- The above impacts, taken from the comparison shown in Table 5.7, may be overstated as the calculated benefits in this table for Series A and B tests do not include user benefits for four sector-to-sector movements which, according to the original OBC assessment, do benefit from the scheme; these are excluded from the calculations to remove the effect of assignment noise on PVB.
- In preparing for a MMDR FBC, the following is a non-exhaustive list of areas in the model that should be checked and adjusted if/as appropriate:
  - The local model calibration in Melton Mowbray should be reviewed. Not discussed in this document, though summarised in Table 5.8 and Table 5.9 below, the link flow and journey time calibration, whilst generally passing WebTAG criteria, are on balance, likely to underestimate scheme benefits, noting that:
    - the modelled link flows are generally slightly low, which can be expected to lead to an underestimate of congestion, and hence scheme benefits; and
    - the modelled journey times for some routes are fast in the model relative to observed data; these should be examined in more detail to ensure that the modelled journey times are as accurate as possible.
  - Any material localised convergence issues in the forecast scenarios should also be identified, understood and resolved as appropriate. By its nature, this task needs time, and so should be programmed such that it is off the critical path of the MMDR FBC programme.
  -

Table 5.8: Latest LLITM Link Flow Validation in Melton Borough

	AM Peak			Interpeak			PM Peak		
	Observed	Modelled	%	Observed	Modelled	%	Observed	Modelled	%
Melton Mowbray Cordon Inbound	3,235	3,193	-1.3%	2,125	2,139	0.7%	3,184	3,133	-1.6%
Melton Mowbray Cordon Outbound	3,054	2,965	-2.9%	2,200	2,205	0.2%	2,920	2,894	-0.9%
Melton Mowbray North-South Screenline (Nottingham Rd) Eastbound	1,044	1,223	17.2%	930	1,041	11.9%	1,266	1,320	4.2%
Melton Mowbray North-South Screenline (Nottingham Rd) Westbound	1,430	1,438	0.5%	1,231	1,237	0.5%	1,556	1,655	6.4%
Melton Mowbray North-South Screenline (Dalby Rd) Eastbound	1,107	1,109	0.1%	756	751	-0.7%	1,054	1,033	-2.0%
Melton Mowbray North-South Screenline (Dalby Rd) Westbound	944	958	1.5%	792	790	-0.3%	1,049	1,051	0.2%
Melton Mowbray East-West Screenline (River) Northbound	1,554	1,668	7.4%	1,192	1,223	2.6%	1,526	1,514	-0.8%
Melton Mowbray East-West Screenline (River) Southbound	1,494	1,482	-0.8%	1,301	1,328	2.1%	1,686	1,754	4.1%
Melton Mowbray East-West Screenline (South) Northbound	1,846	1,749	-5.3%	1,277	1,218	-4.6%	1,830	1,791	-2.1%
Melton Mowbray East-West Screenline (South) Southbound	1,716	1,699	-1.0%	1,333	1,317	-1.2%	1,788	1,712	-4.2%
Melton Mowbray East-West Screenline (North) Northbound	1,031	1,026	-0.5%	1,138	1,128	-0.9%	1,728	1,705	-1.3%
Melton Mowbray East-West Screenline (North) Southbound	1,759	1,739	-1.1%	1,092	1,086	-0.5%	1,451	1,443	-0.5%
Melton Borough A606 Screenline North-Eastbound	1,280	1,186	-7.3%	808	807	-0.1%	1,107	1,085	-2.0%
Melton Borough A606 Screenline South-Westbound	1,180	1,172	-0.7%	799	795	-0.5%	1,248	1,205	-3.4%
Melton-Charnwood North-South Screenline Eastbound	4,335	4,130	-4.7%	2,720	2,664	-2.1%	4,899	4,636	-5.4%
Melton-Charnwood North-South Screenline Eastbound (exc SRN counts)	*2,989*	*2,764*	*-7.5%*	*1,798*	*1,725*	*-4.1%*	*2,994*	*2,726*	*-9.0%*
Melton-Charnwood North-South Screenline Westbound	4,788	4,453	-7.0%	2,737	2,712	-0.9%	4,351	4,251	-2.3%
Melton-Charnwood North-South Screenline Westbound (exc SRN counts)	*2,900*	*2,665*	*-8.1%*	*1,860*	*1,807*	*-2.9%*	*2,950*	*2,757*	*-6.6%*

Table 5.9: Latest LLITM Journey Time Validation in Melton Mowbray

	AM Peak					Interpeak					PM Peak				
Route	Observed	Modelled	Abs.	%	Pass	Observed	Modelled	Abs.	%	Pass	Observed	Modelled	Abs.	%	Pass
A606 Nottingham Road / Burton Road Northbound	09:04	08:44	-00:20	-3.7%	✓	08:30	08:21	-00:09	-1.7%	✓	09:52	08:57	-00:55	-9.3%	✓
A606 Nottingham Road / Burton Road Southbound	11:05	11:57	00:52	7.9%	✓	10:28	11:10	00:42	6.7%	✓	11:24	11:30	00:07	1.0%	✓
A607 Leicester Road / Thorpe Road Northbound	11:02	10:42	-00:19	-2.9%	✓	10:13	10:44	00:30	5.0%	✓	11:04	11:33	00:30	4.5%	✓
A607 Leicester Road / Thorpe Road Southbound	10:31	09:16	-01:15	-11.9%	✓	09:08	08:45	-00:23	-4.3%	✓	09:50	09:08	-00:43	-7.2%	✓
A6006 to Saxby Road (via Ankle Hill) Eastbound	14:53	13:38	-01:15	-8.4%	✓	12:51	13:21	00:31	4.0%	✓	14:43	13:40	-01:04	-7.2%	✓
A6006 to Saxby Road (via Ankle Hill) Westbound	13:37	12:56	-00:41	-5.0%	✓	12:42	12:45	00:03	0.4%	✓	14:11	13:03	-01:08	-8.0%	✓
Dalby Road / Scalford Road Northbound	09:41	08:52	-00:49	-8.4%	✓	07:50	08:40	00:50	10.6%	✓	09:25	09:18	-00:07	-1.2%	✓
Dalby Road / Scalford Road Southbound	07:44	08:08	00:24	5.2%	✓	06:52	07:57	01:06	16.0%	✗	06:56	08:27	01:32	22.0%	✗
Kirby Lane Eastbound	05:10	05:32	00:21	6.8%	✓	04:57	05:30	00:33	11.2%	✓	05:07	05:32	00:24	7.9%	✓
Kirby Lane Westbound	04:58	05:33	00:36	12.0%	✓	04:53	05:32	00:39	13.4%	✓	05:08	05:33	00:26	8.4%	✓
A607 (A46 to Melton Mowbray) Northbound	11:09	10:46	-00:24	-3.5%	✓	10:27	10:17	-00:09	-1.5%	✓	10:39	10:43	00:04	0.6%	✓
A607 (A46 to Melton Mowbray) Southbound	11:04	10:51	-00:13	-2.0%	✓	10:37	10:18	-00:19	-3.0%	✓	10:32	10:37	00:06	0.9%	✓

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