Luton Rising

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December 2023

London Luton Airport Expansion

Planning Inspectorate Scheme Ref: TR020001

Volume 8 Additional Submissions (Examination)

8.148 Applicant's Response to Issue Specific Hearing 7 Action 2 - Accounting for Covid-19 in Transport Modelling Final Report

Infrastructure Planning (Examination Procedure) Rules 2010

Application Document Ref: TR020001/APP/8.148

The Planning Act 2008

The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009

London Luton Airport Expansion Development Consent Order 202x

8.148 Applicant's Response to Issue Specific Hearing 7 Action 2 - Accounting for Covid-19 in Transport Modelling Final Report

Deadline:	n/a – Additional Submission (in response to Rule 9 letter)
Planning Inspectorate Scheme Reference:	TR020001
Document Reference:	TR020001/APP/8.148
Author:	Luton Rising

Version	**Date**	**Status of Version**
Issue 1	December 2023	Additional Submission (in response to Rule 9 letter)

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1 INTRODUCTION

1.1.1 London Luton Airport Limited is preparing to secure the necessary consents through a Development Consent Order (DCO) to allow the airport to grow to 32 million passengers per annum (mppa) by 2043.

1.1.2 In February 2023, a **Transport Assessment [APP-200, AS-123 and APP-203 to APP-206]** was published in support of the DCO proposals for the expansion of London Luton Airport. The report assessed the traffic-related impacts of the airport expansion in three Assessment Phases:

a. 2027: Assessment Phase 1, 21.5 mppa
b. 2039: Assessment Phase 2a, 27 mppa
c. 2043: Assessment Phase 2b, 32 mppa

1.1.3 The assessment has been undertaken in accordance with the Modelling Methodology as set out in Section 9 of the **Transport Assessment [APP-205]** which was developed through on-going engagement with the relevant highway authorities.

1.1.4 Two main transport models have been used to appraise transport impacts of the Proposed Development. These are:

a. **Central Bedfordshire and Luton Transport Model - Luton Airport Model (CBLTM-LTN):** Assesses strategic impacts, supplemented by local junction modelling where necessary.
b. **Vissim Model:** Evaluates impacts on the road network local to the airport.

1.1.5 The futures year forecasts that were developed by the transport models in support of the application for development consent are hereafter referred to as Original runs/forecasts/models.

1.1.6 As a part of the Luton Airport DCO application, the Examining Authority (ExA) made a procedural decision via a Rule 9 Letter to the Applicant to take account of the potential impacts of COVID-19 on the traffic modelling.

1.1.7 Luton Rising (the Applicant) has responded to the ExA through the Rule 9 Response letter dated 27 June 2023 **[AS-064]** with a proposed methodology and timescales to undertake the work. The proposed methodology was cognisant of the timeframe of the Examination and developed to enable to matter to be considered within the available time. The proposed methodology was based on the Department for Transport's (DfT) recently updated guidance, Transport Appraisal Guidance (TAG) Unit M4 – Forecasting and Uncertainty, May 2023 (Ref 1). A copy of the relevant section of the Response letter is shown in Appendix A and a copy of the relevant section of the DfT guidance is shown in Appendix B.

[1] TAG Unit M4: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1161977/tag-unit-m4-forecasting-and-uncertainty.pdf

1.1.8 At Issue Specific Hearing 4 (ISH4) on 28 September 2023, the ExA requested *"the Applicant to submit Technical Notes (TN) 1 and 2 in relation to the ongoing work undertaken to update the transport modelling in line with Department for Transport guidance"*.

1.1.9 The TNs **[REP4-086 and REP4-106]** have reported on several tasks. The initial tasks as set out in the Rule 9 response letter involved collating recent data to cover the pre- and post-COVID-19 period and included the analysis of road traffic between 2016 (the Luton Airport DCO strategic transport model base year) and 2023 (most recent available data) to help understand the impacts that the COVID-19 pandemic has had on travel characteristics and volumes. In parallel, growth projection analysis between the DfT's National Trip End Model (NTEM) 7.2 and NTEM 8 was also undertaken.

1.1.10 The results of these tasks are reported in Chapter 3 of this report**.**

1.1.11 Based on the findings of the Trends Analysis (of travel demands over the COVID-19 period), a follow up task concerning the updates of the Future Year (FY) forecasting assumptions has been undertaken to assess the impact on the modelled forecast traffic volumes. This was then utilised to determine any FY risks and potential need for further adjustment to the future year forecasts. In parallel, a separate analysis was also undertaken to produce a 2023 model and produce a comparison with the available 2023 traffic counts.

1.1.12 Both analyses are concluded and reported in Chapter 4 of this report.

1.1.13 This report provides additional details in support of the previously submitted **Applicant's Response to Issue Specific Hearing 4 Action 2: COVID-19 Additional Modelling Technical Note 1 (TN1) Trends Analysis [REP4-086]** and **Applicant's Response to Issue Specific Hearing 4 Action 2: COVID-19 Additional Modelling Technical Note 2 (TN2) Risk Assessment [REP4-106]**.

1.1.14 The report also refers to the model runs that support the application for development consent as "Without" and "With" Expansion (i.e. the proposed development) throughout. It also refers to the model runs reported in the Strategic Modelling Forecasting Report **7.02 Transport Assessment Appendices – Part 2 of 3, Appendix F Strategic Modelling Forecasting Report [APP-201]** as Original runs and model runs accounting for the Rule 9 Modelling as Updated runs.

1.1.15 This report also provides the results of the associated operation junction modelling including the Vissim micro-simulation modelling. It should be noted that whilst the Original modelling was developed through on-going discussion with the highway authorities over a number of years, due to changing circumstances the authorities raised a number of matters in relation to the Original modelling including:

a. Assumption on infrastructure improvements and in particular mainline capacity upgrades on the M1 motorway and Vauxhall Way improvements; and

b. Consistency in the forecast approach for the strategic and micro-simulation modelling.

1.1.16 The Updated modelling presented in this report has addressed the above concerns as follows:

a. **M1 mainline capacity:** The 2043 future baseline “Without” and “With” Expansion scenarios of the Original models considered a capacity upgrade of the M1 corridor between J9 and J10 in the form of a Smart Motorway upgrade (hard shoulder running scheme). However, in January 2022, the Government announced a pause in the rollout of new all lane running smart motorway schemes until five years of safety data is available. Consequently, no capacity upgrade has been considered in the future baseline and with development scenarios of the Updated modelling.

b. **Vauxhall Way:** The Original strategic and Vissim models included upgrades to the Vauxhall Way corridor and its associated junction in the future baseline, which were assumed to be completed by 2027. However, since submission of DCO, Luton Borough Council (LBC) LBC has indicated that there is a likelihood that the upgrades to the Vauxhall Way corridor and its associated junctions may not be completed by 2027 but would expect to be completed soon after as LBC remain committed to delivery of the improvements. Therefore, in the Update modelling, no improvements are included on the Vauxhall Way corridor and its associated junctions in the future baseline in Assessment Phase 1. Vauxhall Way corridor improvements are included in the future baseline for Assessment Phase 2a and Assessment Phase 2b.

c. **Demand Forecasts:** The trip demand for baseline and forecast year cordon matrices have been extracted from the strategic model and the growth has been applied to the baseline micro-simulation models.

1.2 Structure of the Report

1.2.1 Following this introduction, this report contains the following sections:

a. **Section 2** – Accounting for COVID-19 in transport modelling: this section provides an overview of the methodology development process to account for the COVID-19 impact for the Rule 9 modelling updates according to TAG guidance.

b. **Section 3** – TN1 - Trends Analysis: this section provides details of the traffic data trend analysis along with the NTEM 8 growth projections comparison analysis as reported in **Applicant’s Response to Issue Specific Hearing 4 Action 2: COVID-19 Additional Modelling Technical Note 1 (TN1) Trends Analysis [REP4-086]**.

c. **Section 4** – TN2 - Risk Assessment: this section details the process of NTEM 8 growth projections application to the Luton Airport version of the Central Bedfordshire and Luton Transport Model (CBLTM-LTN) strategic model as well as the 2023 model comparison against observed data for the purpose of identifying associated risks as reported in **Applicant’s Response to Issue Specific Hearing 4 Action 2: COVID-19 Additional Modelling Technical Note 2 (TN2) Risk Assessment [REP4-106].**

d. **Section 5** – Highway Capacity Assessment Operational Modelling

e. **Section 6** – Environmental Update

f. **Section 7** – Summary and Conclusion

1.2.2 In addition to the above sections, this Report contains several appendices (Appendix A to Appendix H providing additional detail and supporting evidence on the forecasts detailed in this report. The appendices are:

a. **Appendix A – Rule 9 Response Letter**
b. **Appendix B - TAG Unit M4 – Appendix B: Adapting the Core Scenario to Large Scale Changes**
c. **Appendix C - Trends on Strategic Road Network by Vehicle Type**
d. **Appendix D – Uncertainty Log**
e. **Appendix E – Highway Flow Difference Plots**
f. **Appendix F – Link Based Volume to Capacity Plots**
g. **Appendix G - Public Transport Forecast Demand Difference Plots**
h. **Appendix H - Updated Micro-Simulation Modelling**

2 RULE 9 – ACCOUNTING FOR COVID-19 IN TRANSPORT MODELLING

2.1 Rule 9 Letter & Response

2.1.1 The COVID-19 pandemic has significantly affected travel patterns and volumes, with official statistics[2] from the DfT indicating a noticeable suppression in travel demand compared to pre-pandemic levels.

2.1.2 On 31 May 2023, the DfT issued its full advice regarding the treatment of the COVID-19 pandemic in transport modelling as set out in the updated TAG Unit M4: Forecasting and Uncertainty.

2.1.3 In the letter of 13 June, the ExA stated it '*has made a Procedural Decision to request that the Applicant reviews its transport modelling considering the recently published guidance. The ExA also requests that the Applicant engages with stakeholders, including National Highways and the Local Highway Authorities, at the earliest possible opportunity with a view to gaining agreement as to the appropriate methodology if the model is not re-based.' The ExA has further requested that detail be added to the timetable provided in the Applicant's letter of 31 May 2023 to 'describe each stage of the process in sufficient depth to allow the ExA to understand how the requirements of the guidance will be addressed, including how any significant changes would be accommodated in the work programme and when the appropriate stakeholders will be engaged. This should be provided by 27 June 2023*.'

2.1.4 The Rule 9 response letter, dated 27 June 2023 [**AS-064**], sets out an overall approach and methodology involving 22 tasks with reporting in December 2023.

2.1.5 Both the CBLTM-LTN strategic model and Luton Airport micro-simulation model were calibrated to pre-pandemic conditions, respectively with 2016 and 2017 base years. The Rule 9 response letter proposed a proportionate assessment of the extent of divergence in travel patterns from pre-COVID-19 projections and potentially adjusting trip demands to reflect post-COVID-19 projections if required.

2.2 TAG Unit M4

2.2.1 The DfT's TAG Unit M4: Forecasting and Uncertainty provides information and guidance on the analysis of forecasting and uncertainty in transport appraisal.

2.2.2 The TAG guidance was first published on 31 May 2019 and was most recently updated on 31 May 2023. The recent update includes a section entitled **Appendix B: Adapting the core scenario to large scale changes**, and it includes, within this section, **B.3 Proportionate accounting for COVID-19 in prior-calibrated models**.

2.2.3 For previously calibrated models like the CBLTM-LTN strategic model and Luton Airport Vissim micro-simulation model, the guidance recommends referring to the

[2] DfT official statistics: https://www.gov.uk/government/statistics/transport-use-during-the-coronavirus-covid-19-pandemic

Proportionate Update Process[3] to determine the need and extent of model updates relative to the required decisions and associated risks.

2.2.4 The advice provides three examples as follows:

1. 'Create a forecast to the present day by applying adjustments to include a COVID-19 impact, based on observed data. This forecast can be used as a "new base year" as a substitute basis for scheme forecast.'

2. 'Apply adjustments to a forecast year model to produce a new scheme opening year forecast, or the first required forecast year, that include a COVID-19 impact to that point. This will be the new pivot off which further forecast years are based.'

3. 'Apply the adjustment globally to model results as a post-model adjustment.'

2.2.5 The first example is not considered proportionate, practical and feasible within a reasonable timescale due to the large amounts of required data, the need for validation checks and the time required to do so, which would extend beyond the anticipated period of the DCO examination. The second example would also not be considered proportionate, practical and feasible within a reasonable time scale because it requires adjustment to the NTEM growth projections to take account of COVID-19.

2.2.6 It is understood that in the short-term, the DfT does not intend on updating the NTEM to accord with the latest guidance and therefore the Applicant would effectively have to 'predict' the impact of COVID-19 on trip making behaviour and apply this to the NTEM data.

2.2.7 The third approach is, however, considered proportionate, practical and can be undertaken within a reasonable timescale.

2.2.8 Having reviewed the guidance, the Rule 9 response letter proposed a proportionate approach, based on the third example, to accounting for the COVID-19 pandemic, which takes into account the size and complexity of the multi-modal strategic transport model and the timescale for the DCO examination.

2.2.9 The proposed approach includes:

a. analysis of recent local and national trends in travel demands;
b. updating the FY forecasts using the latest DfT projections Core scenario;
c. assessment of the risks associated with the updated forecasts; and
d. determination of any necessary adjustment factors that may arise from the analysis of the recent trends.

[3] TAG proportionate update process: https://www.gov.uk/government/publications/webtag-tag-proportionate-update-process

2.2.10 While the approach does not include rebasing of the strategic model (due to the large amounts of data, substantial costs and timescale over several months needed to reach suitable levels of model calibration / validation), it does include the analysis of recent trends in travel between the 2016 base year and current year, which will be dependent upon what 'historic' data can be collated over this period.

2.2.11 TAG Unit M4 B.3.5 states 'A judgment should be made on the most appropriate action relative to the risks to be mitigated.'

2.2.12 In the case of the Luton Airport Expansion DCO, the risks relate to the measures that have been proposed to mitigate the impact of the increase in airport surface access travel demands. The measures are predominantly the capacity improvements to off-site highway junctions and the associated Transport Related Impacts Monitoring and Mitigation Approach (TRIMMA), Framework Travel Plan and Green Controlled Growth Framework.

2.3 Engagement

2.3.1 Rule 9 modelling updates were discussed in meetings with National Highways and the local highway authorities of Central Bedfordshire Council (CBC), Hertfordshire County Council (HCC) and Luton Borough Council (LBC).

2.3.2 The Applicant has met with NH and the LHAs (CBC, HCC, LBC) to discuss the work as follows:

a. 18 July 2023 – with NH - overall approach, methodology, tasks and timescales;

b. 20 July 2023 – with LHAs - overall approach, methodology, tasks and timescales;

c. 14 September 2023 – with NH/LHAs - trends analysis;

d. 12 October 2023 – with NH/LHAs - risk assessment; and

e. 6 December 2023 – with NH/LHAs – comments on TN1 & TN2, micro-simulation modelling and proposed final reporting.

3 TECHNICAL NOTE 1 - TRENDS ANALYSIS

3.1 Background

3.1.1 The ExA made a procedural decision via a Rule 9 Letter to the Applicant to take account of the potential impacts of COVID-19 on the traffic modelling. Luton Rising (the Applicant) responded to the ExA with a proposed methodology and timescales to undertake the work. The proposed methodology was based on the DfT's recently updated guidance, TAG Unit M4 – Forecasting and Uncertainty, May 2023.[4]

3.1.2 At ISH4 on 28 September 2023, the ExA requested "the Applicant submit TN 1 and 2 in relation to the ongoing work undertaken to update the transport modelling in line with Department for Transport guidance". This is identified as Action Point 2 in the **Action Points from ISH4 [EV9-006]**.

3.1.3 The proposed work, as set out in the Rule 9 Response letter dated 27 June 2023 **[AS-064]**, listed several tasks.

3.1.4 This TN covers the following tasks referenced in the letter:

a. Task 1: Stakeholder Meetings 1 – Scope;

b. Task 2: Collate available 2016 to 2023 Strategic Road Network (SRN) traffic count data and other national travel data (on-line);

c. Task 3: Request 2016 to 2023 Local Road Network (LRN) traffic count data from LHAs;

d. Task 4: Review of DfT Rail COVID-19 Scenarios;

e. Task 5: Analyse traffic count, rail patronage and travel characteristics data to determine national and local trends since 2016; and

f. Task 6: Technical Note 1 on 2016 to 2023 trends.

3.1.5 The initial task was to collate recent data to cover the pre- and post-COVID-19 period and includes the analysis of road traffic between 2016 (the London Luton Airport DCO strategic transport model base year) and 2023 (most recent available data) to help understand the impacts that the COVID-19 pandemic has had on travel characteristics and volumes.

3.1.6 A parallel task was to update the FY forecasting assumptions. The projected growth in background (non-airport) traffic within the strategic modelling that has informed the DCO application was based on the DfT's NTEM 7.2 (which was current at the time of undertaking the model runs). In August 2022, a new version of NTEM 8 was published by the DfT and updated goods vehicles projections were published in December 2022, via the National Road Traffic Projections 2022

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4 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1161977/tag-unit-m4-forecasting-and-uncertainty.pdf

(NRTP22), which replaced the Road Traffic Forecasts 2018 (RTF18) and informed the strategic modelling.

3.1.7 This chapter consists of information as reported in the **Applicant's Response to Issue Specific Hearing 4 Action 2: COVID-19 Additional Modelling Technical Note 1 (TN1) Trends Analysis [REP4-086]** with additional complementary data.

3.2 Tracking COVID-19 Impact on Road Network

Introduction

3.2.1 In order to track the impacts of COVID-19 on recent traffic volumes and patterns, a set of 'historical' data were collated on both the SRN and LRN within the strategic traffic model extent.

Strategic Road Network

3.2.2 Locations were identified on the SRN which include:

a. M1 mainline sections between J8 and J12;
b. A1081 between M1 J10 and J10a;
c. A414 east of M1 J8 (south of St Albans);
d. M25 west and east of J21 & 21a (with M1);
e. A1 north and south J8; and
f. A5183 (west of M1 and Slip End).

3.2.3 Selection criteria were set to include, ideally, October (base model data collection month) from 2016 to 2022, September (to capture the trends of post COVID-19 – first assumed month of post-COVID-19 is September 2022) from 2016 to 2022 and April (most recent available data on WebTRIS[5]) from 2016 to 2023. Data were processed to analyse:

a. AM peak hour (08:00 - 09:00);
b. Interpeak hour (average 10:00 – 16:00);
c. PM peak hour (17:00 – 18:00); and
d. Daily in the form of Annual Average Daily Traffic (AADT).

3.2.4 The data, where available, were split by vehicle type, i.e. Cars, Light Goods Vehicles (LGVs) and Heavy Goods Vehicles (HGVs).

3.2.5 With all selection criteria applied, the list has been reduced to:

a. M1 mainline sections between J8 and J12;
b. A1081 between M1 J10 and J10a; and
c. M25 west and east of J21&21a.

Analysis

3.2.6 Historic data for the M1, M25 and A1081 were downloaded from National Highways' WebTris dataset after identifying the count locations with the most available traffic data for the months of April, September, and October. The

[5] https://webtris.highwaysengland.co.uk/

directional data were then merged to obtain the two-way 'historic' traffic data, so the overall trends could be understood.

3.2.7 Bank holidays, school holidays and other unique days such as rail-strikes (in 2022 and 2023) were excluded from the analysis. The dataset was then further analysed by daily, weekday morning AM peak, PM evening peak, and inter-peak periods to compare the 2016 and 2023 traffic flows and to understand the COVID-19 impacts from 2020 onwards. It was assumed the COVID-19 period commenced in March 2020 and extended through to August 2022.

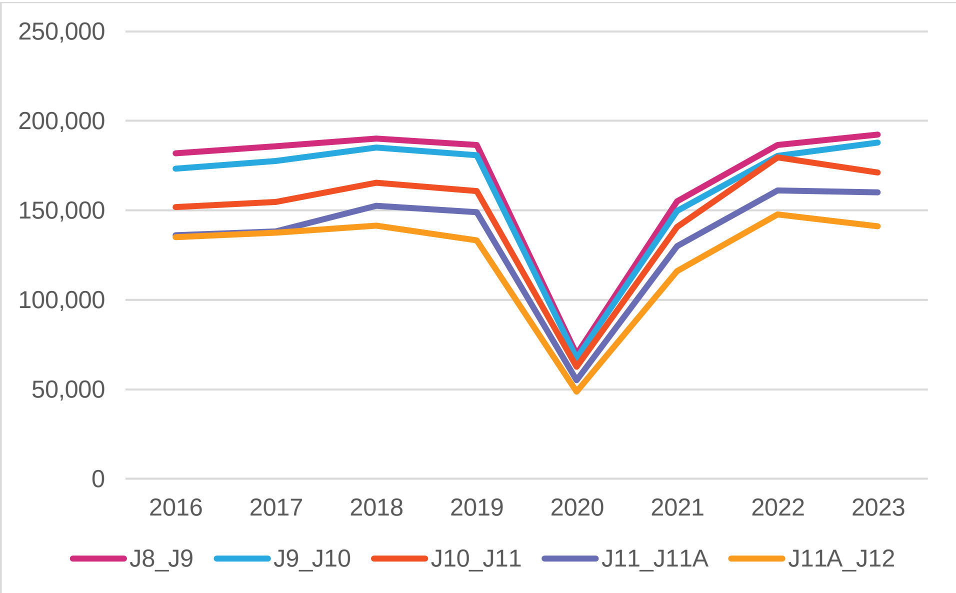
3.2.8 The following sections will discuss the April 2016 to April 2023 data only, as this is the month that shows the full trends between 2016 and 2023. April was selected as it was (at the time of collating) the most recent month for which 2023 data were available.

M1 mainline between J8 and J12

3.2.9 Between Junctions 8 and 12 along the M1 the two-way daily traffic (AADT) shows an increase between 2016 and 2023 with the highest increase occurring between Junctions 11 and 11A.

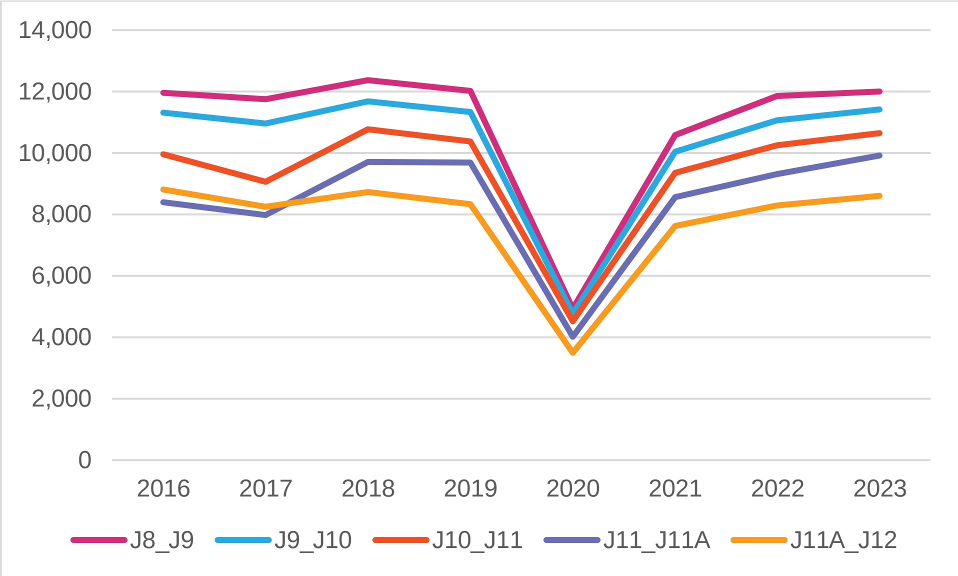
3.2.10 **Figure 3-1** shows the two-way daily traffic flows between April 2016 and 2023 per section.

Figure 3-1 M1 Two-Way Daily Traffic Flow (AADT) April 2016 – April 2023



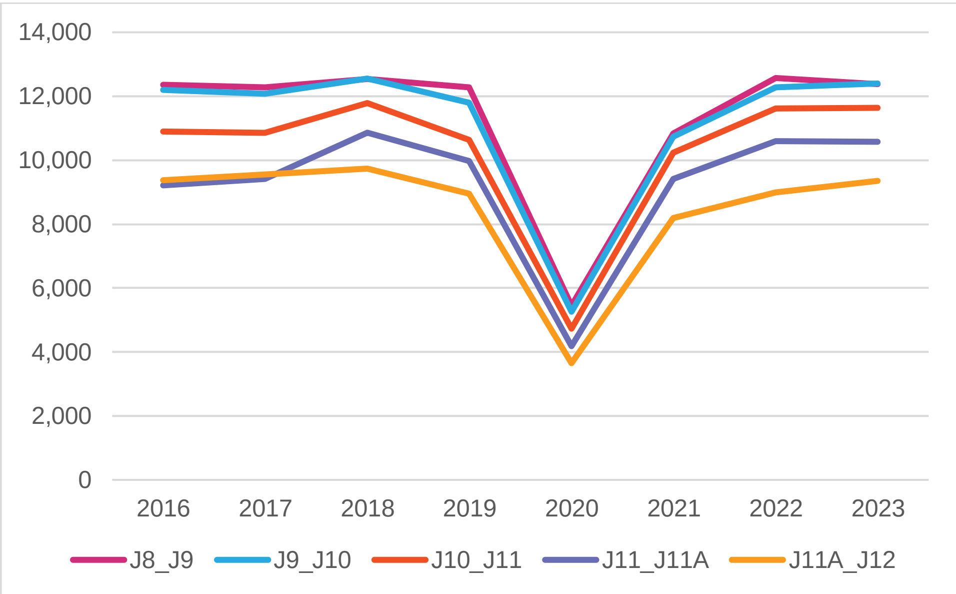
3.2.11 Between Junctions 8 and 12 along the M1, the AM peak hour shows an average of around 5% increase between 2016 and 2023 with the highest increase occurring between Junctions 11 and 11A. **Figure 3-2** shows the two-way AM peak hour traffic flows between April 2016 and 2023.

Figure 3-2 M1 Two-Way AM Peak Hour Traffic Flow April 2016 – April 2023



3.2.12 Between Junctions 8 and 12 along the M1, the PM peak hour also shows an average of around 5% increase between 2016 and 2023 with the highest increase occurring between Junctions 11 and 11A. **Figure 3-3** shows the two-way PM peak hour traffic flows between April 2016 and 2023.

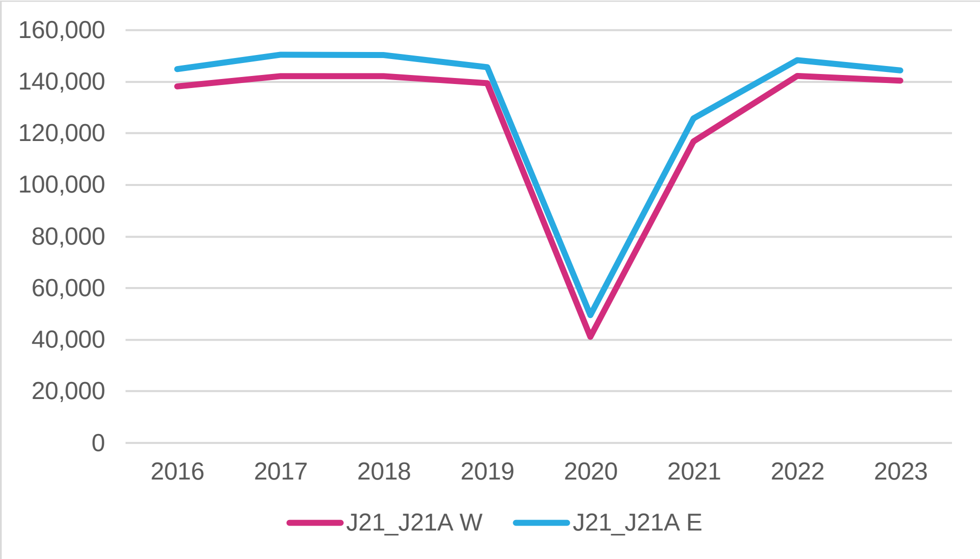
Figure 3-3 M1 Two-Way PM Peak Hour Traffic Flow April 2016 – April 2023



M25 west and east of J21 and 21a

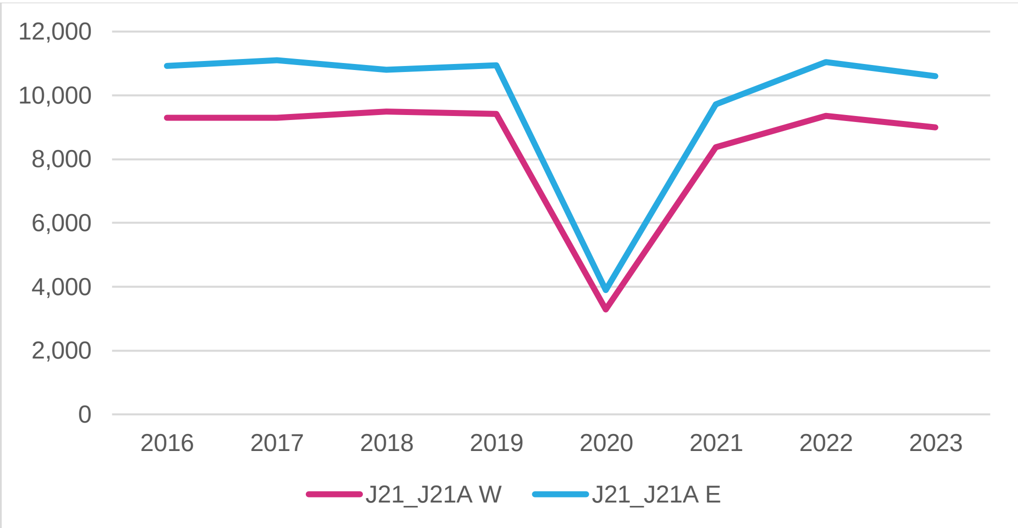
3.2.13 Between the east and west of Junctions 21 and 21a of the M25, the two-way daily traffic (AADT) shows similar levels of traffic flows between 2016 and 2023. **Figure 3-4** shows the two-way daily traffic flows between April 2016 and 2023.

Figure 3-4 M25 Two-Way Daily Traffic Flow (AADT) April 2016 – April 2023



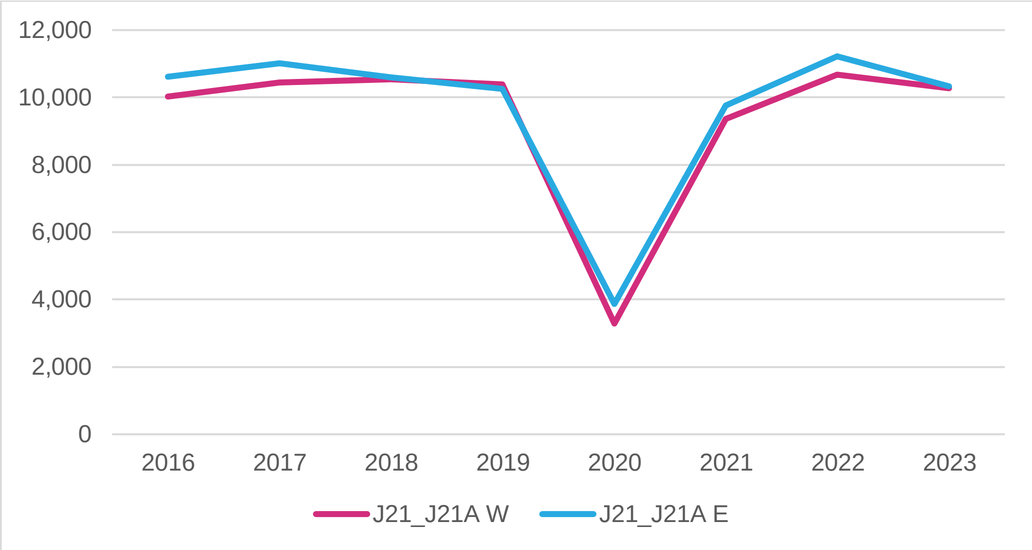
3.2.14 Between the east and west of Junctions 21 and 21a of the M25, the two-way AM peak traffic shows similar level of traffic flows between 2016 and 2023, although the 2023 volume is slightly lower by around 3% on the eastern side, while higher by 1.5% on the western side. **Figure 3-5** shows the two-way AM peak hour traffic flows between April 2016 and 2023.

Figure 3-5 M25 Two-Way AM Peak Hour Traffic Flow April 2016 – April 2023



3.2.15 Between the east and west of Junctions 21 and 21a of the M25, the two-way PM peak traffic also shows similar level of traffic flows between 2016 and 2023. **Figure 3-6** shows the two-way PM peak hour traffic flows between April 2016 and 2023.

Figure 3-6 M1 Two-Way PM Peak Hour Traffic Flow April 2016 – April 2023

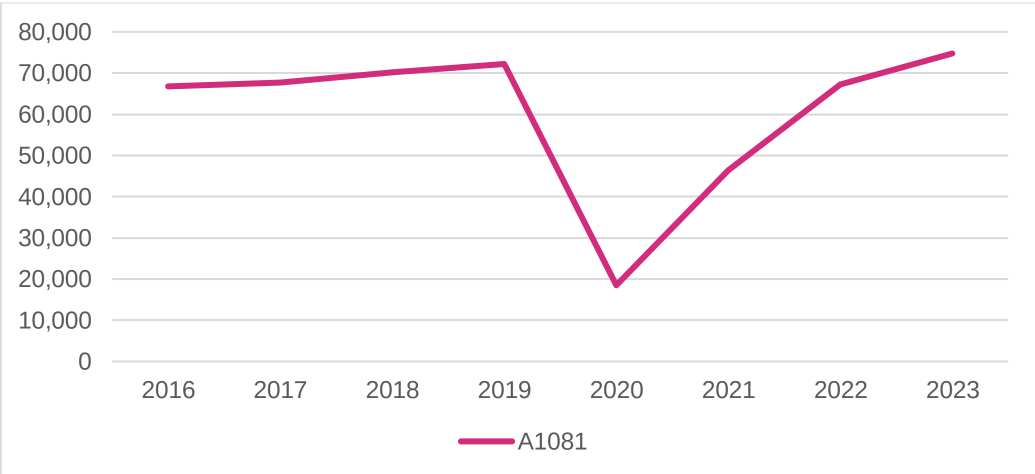


A1081 between M1 J10 and J10a

3.2.16 Between Junctions 10 and 10a along the A1081, the two-way daily traffic shows a 12% increase between 2016 and 2023.

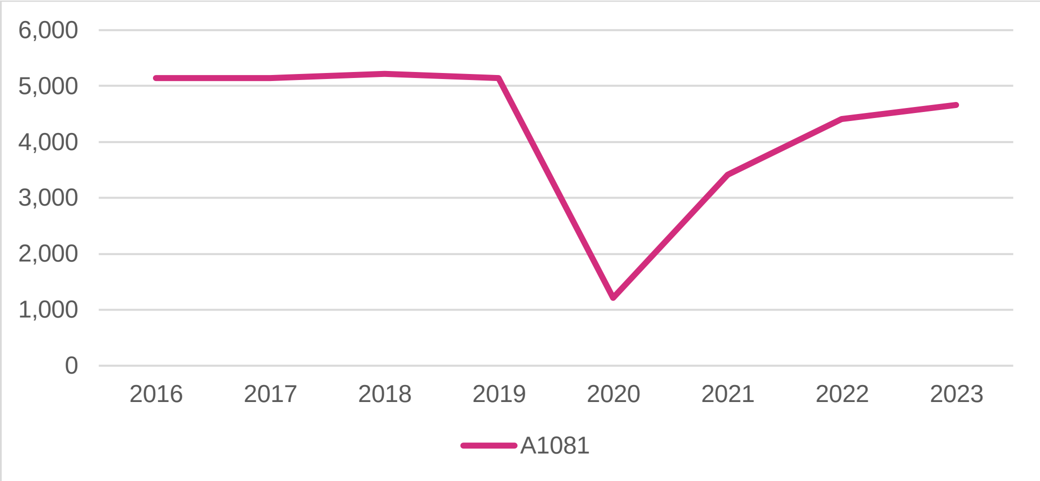
3.2.17 **Figure 3-7** shows the two-way daily traffic flows between April 2016 and 2023. It is worth noting that this increase is mainly driven with the inter-peak period, as the AM peak hour shows a decrease in traffic between 2016 and 2023, whereas the PM peak hour shows similar levels of traffic between the two years.

Figure 3-7 A1081 Two-Way Daily Traffic (AADT) Flow April 2016 – April 2023



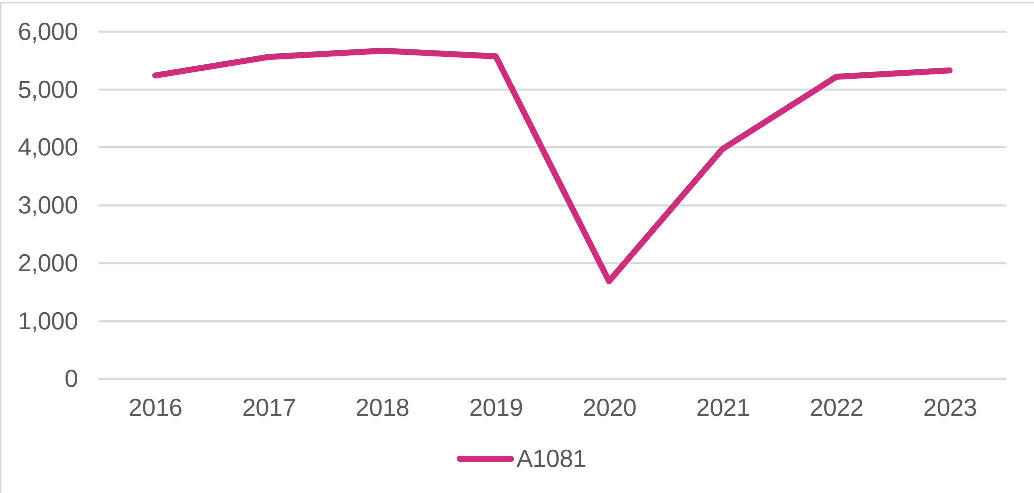
3.2.18 Between Junctions 10 and 10a along the A1081, the two-way AM peak hour traffic shows a 9% decrease between 2016 and 2023 as shown in **Figure 3-8** shows the two-way AM peak hour traffic flows between April 2016 and 2023.

Figure 3-8 A1081 Two-Way AM Peak Hour Traffic Flow April 2016 – April 2023



3.2.19 Between Junctions 10 and 10a along the A1081, the two-way PM peak hour traffic shows similar level of traffic flows between 2016 and 2023. **Figure 3-9** shows the two-way PM peak hour traffic flows between April 2016 and 2023.

Figure 3-9 A1081 Two-Way PM Peak Hour Traffic Flow April 2016 – April 2023



3.2.20 Additional information on trends by vehicle type on the SRN is provided in Appendix C**.**

Local Road Network

3.2.21 Counts have been obtained from HCC, CBC and LBC. Each set of counts have been assessed individually by council area. **Figure 3-10** shows the locations of each of the count sites. The site IDs and the locations they correspond to are detailed in each of the following subsections.

Figure 3-10 Count Locations

Hertfordshire County Council

3.2.22 Counts were received from HCC for three locations:

a. A5183 east of Markyate and west of M1 J9 (Site 128);
b. A505 west of Hitchin (Site 232); and
c. B653 between Bower Heath and East Hyde (Site 371).

3.2.23 The data were provided for the three sites with varying levels of information and monthly availability. **Table 3-1** provides a summary of the data availability.

Table 3-1 Hertfordshire County Council Count Data Availability

Site		2016	2017	2018	2019	2020	2021	2022	2023
128	Not Classified	Apr, Sept	Apr, Sept, Oct	Apr, Oct	Sept, Oct	Apr, Sept, Oct	Apr, Sept, Oct	Sept, Oct	×
	Classified	Nov	Nov	Nov	Nov	Nov	Nov	Nov	×
232	Not Classified	×	×	×	×	×	×	×	×
	Classified	×	×	×	×	×	×	×	Apr
371	Not Classified	×	×	×	×	×	×	×	×
	Classified	Apr, Sept, Oct	Apr, Sept, Oct	Sept, Oct	Apr	Sept, Oct	Apr, Sept, Oct	Apr, Sept, Oct	Apr

3.2.24 Data were processed to analyse:

a. AM peak hour (08:00 - 09:00);
b. Interpeak hour (average 10:00 – 16:00);

c. PM peak hour (17:00 – 18:00); and
d. Daily in the form of AADT.

3.2.25 The data, where available, were analysed by vehicle type, i.e. Cars, LGVs and HGVs.

Analysis

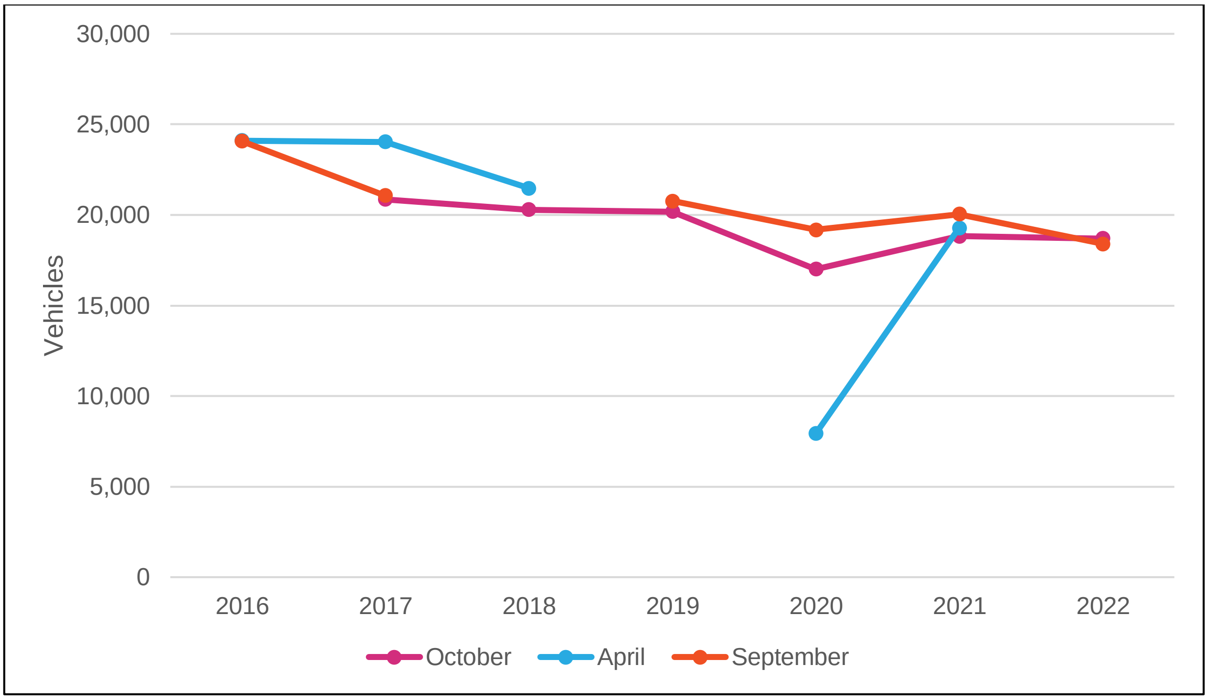
Site 128 (A5183 East of Markyate)

3.2.26 The A5183 east of Markyate is a single carriageway road which connects Markyate to the M1 Junction 9. The data have been analysed for the years where data were available to provide the set of figures below. **Figure 3-11** shows two-way flows showing a reduction of vehicles overall, with the AADT traffic reducing by 11% from October 2017 to October 2022.

3.2.27 The other months (April and September) show similar trends, with April 2016 to April 2021 reducing by 20% and September 2016 reducing by 24% to September 2022. These decreases equate to between a 2% and 4% decrease in traffic volumes per year.

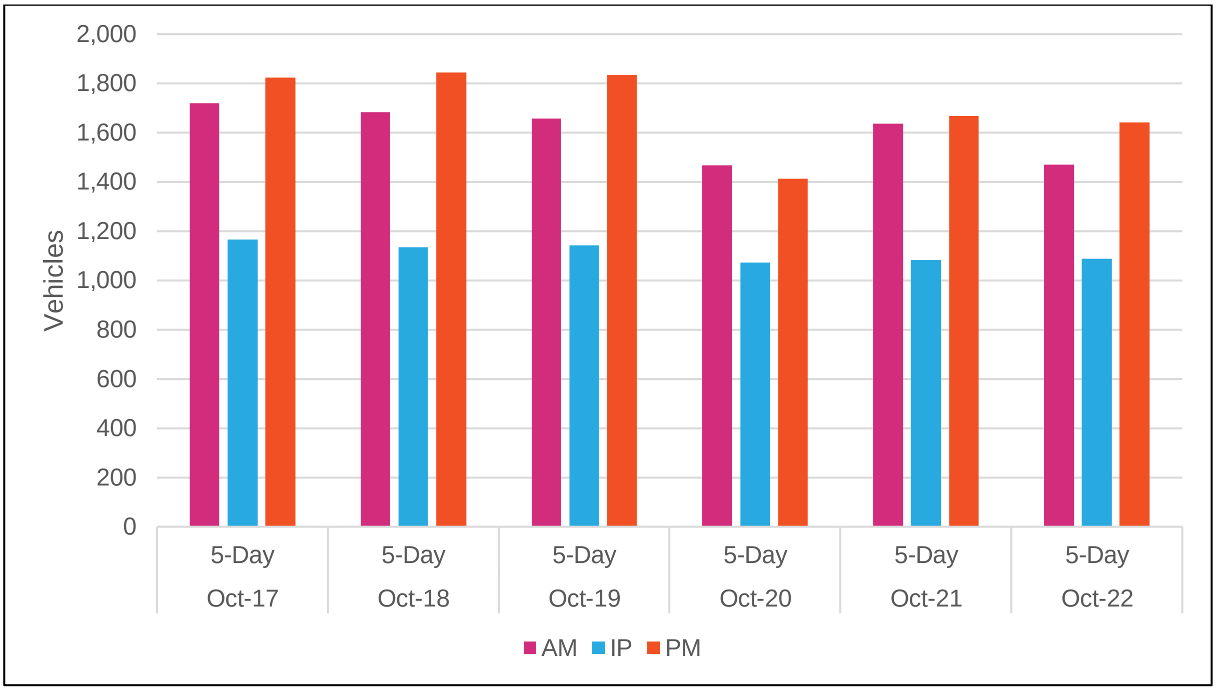
3.2.28 The gaps in the graphs correspond to the gaps in the data, specifically April 2019 and 2022 and September 2018. Due to the gaps in these months, the October month has been added below (in **Figure 3-12**) but the analysis for April and September can be seen in the Appendices.

Figure 3-11 Site 128 Two-Way 2016-2022 AADT



3.2.29 In addition to the analysis over time, the data has been analysed for six consecutive years from October 2017 to October 2022 by peak hour as shown in **Figure 3-12**. This analysis highlights that aside from a discrepancy in 2020, traffic has generally decreased per peak year-on-year.

Figure 3-12 October Site 128 2017-2022 Two-Way Weekday Peak Counts



3.2.30 When analysing the traffic by direction, these trends have changed since 2018, likely due to the completion of the A5 connection to the M1 via J11A north of Markyate and Dunstable.

3.2.31 An example of this is provided in **Figure 3-13** and **Figure 3-14**, which shows that prior to 2018, the traffic was higher in the AM on the eastbound movement, but since then, is higher in the PM. Volumes are also lower in October 2022, post COVID-19, than in October 2019, pre-COVID-19.

3.2.32 **Figure 3-15** tracks the proportions of vehicle types with a slight increase in cars and slight decrease in HGVs.

Figure 3-13 October Site 128 Eastbound 2016-2022 Weekday Peak Counts

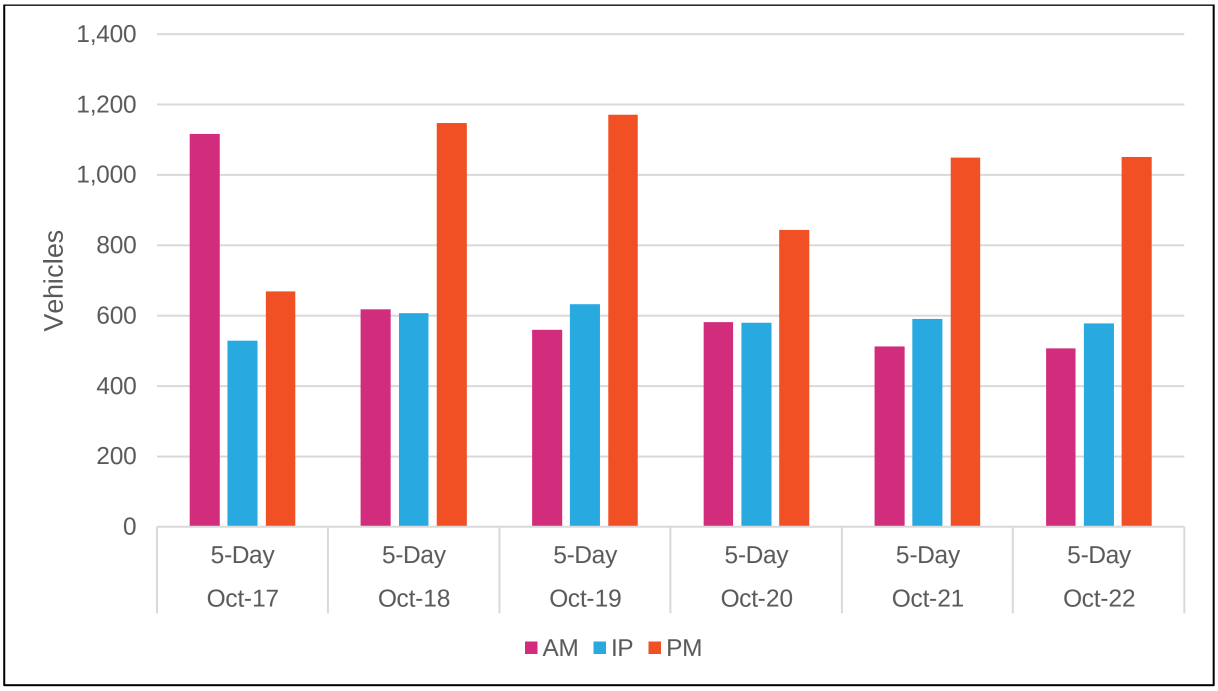


Figure 3-14 October Site 128 Westbound 2016-2022 Weekday Peak Counts

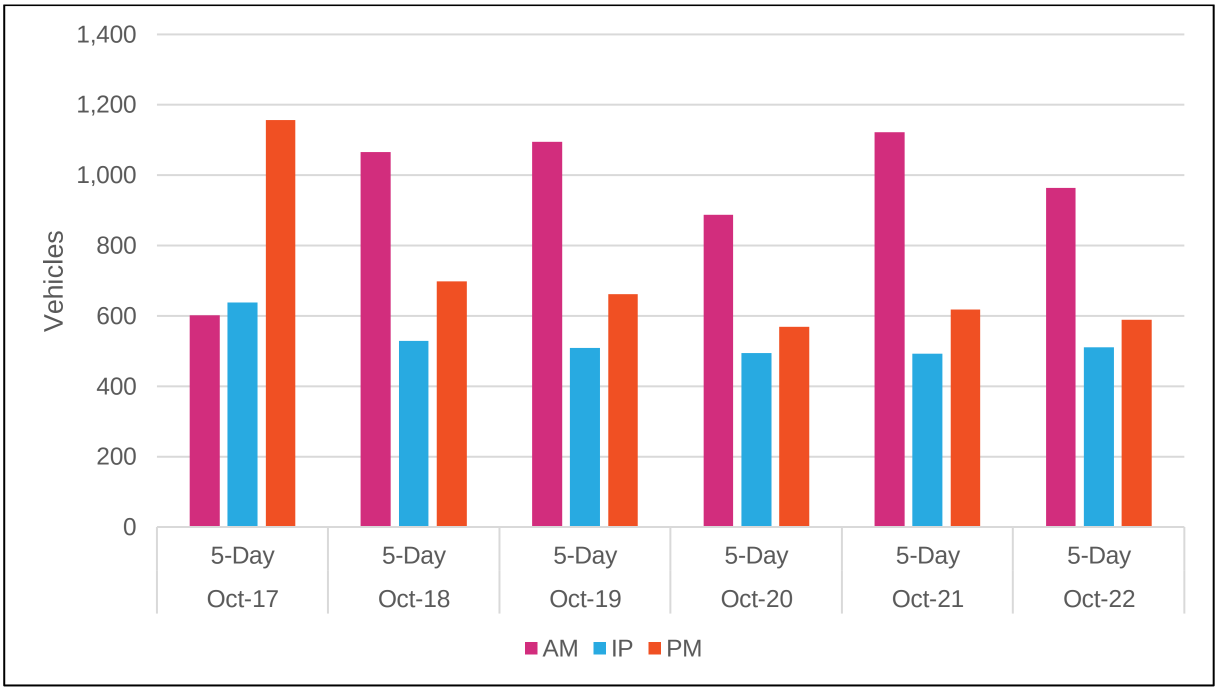
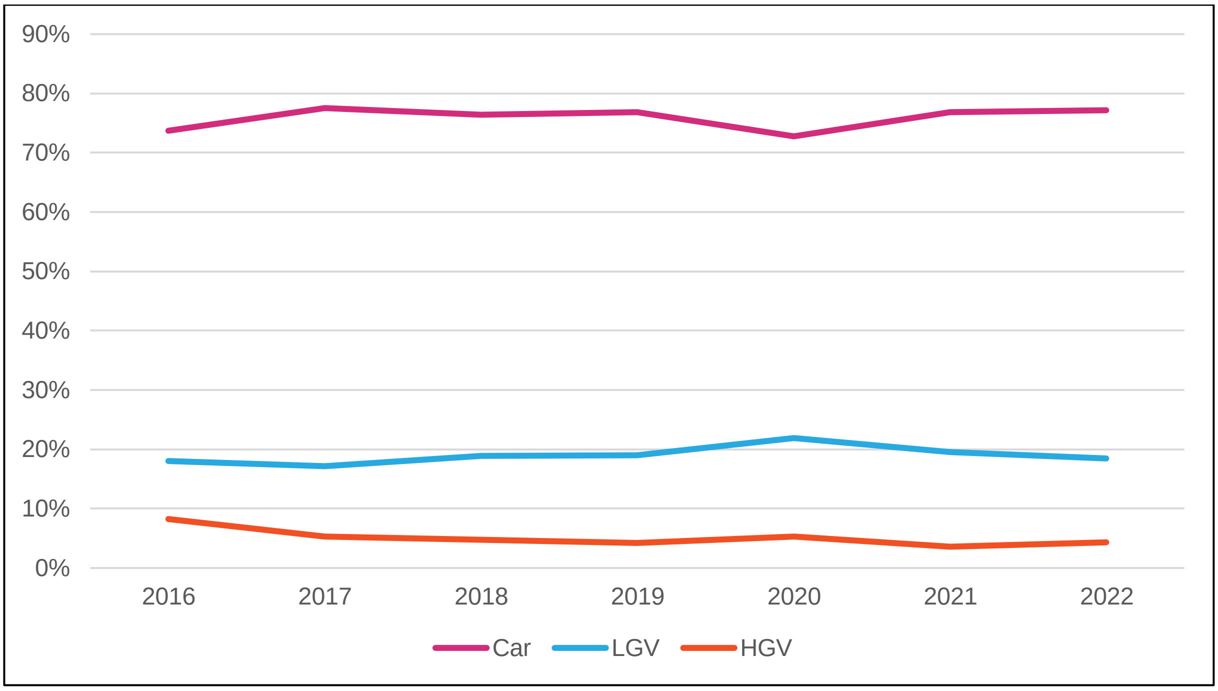


Figure 3-15 Site 128 Classified Counts – Vehicle Split



Site 232 (A505 West of Hitchin)

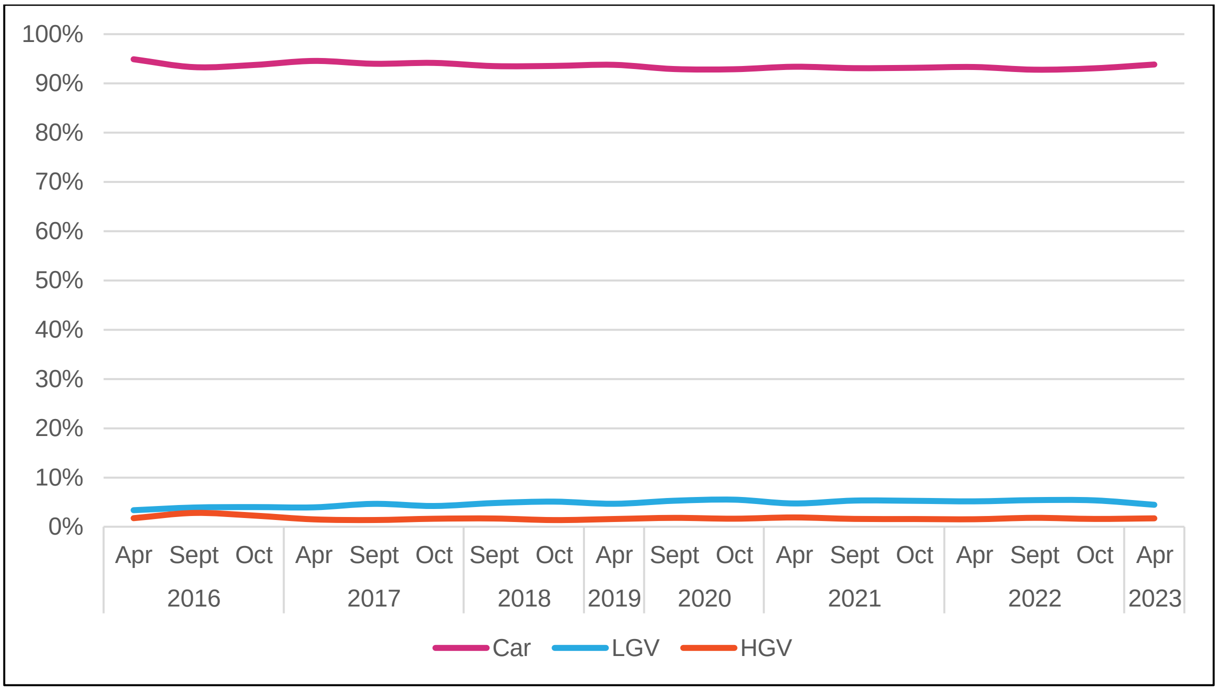
3.2.33 The A505 connects Hitchin to Luton. The data available for the location only covers one week in April 2023. Whilst the data cannot provide information on changes in traffic volume over time, analysis can be made on the vehicle split proportions and the peak traffic flows, which can be seen in the appendices. Cars make up 91% of the road users on the road and the peaks have low variability throughout the week.

Site 371 (B653 between Bower Heath and East Hyde)

3.2.34 The B653 connects Bower Heath to East Hyde. It is a single carriageway road. Classified data have been analysed from 2016 to 2023. Firstly, the vehicle split per count period was compared, which showed that the splits have remained consistent over time, with the average split being 93% Car, 5% LGV and 2% HGV. This is shown in **Figure 3-16**.

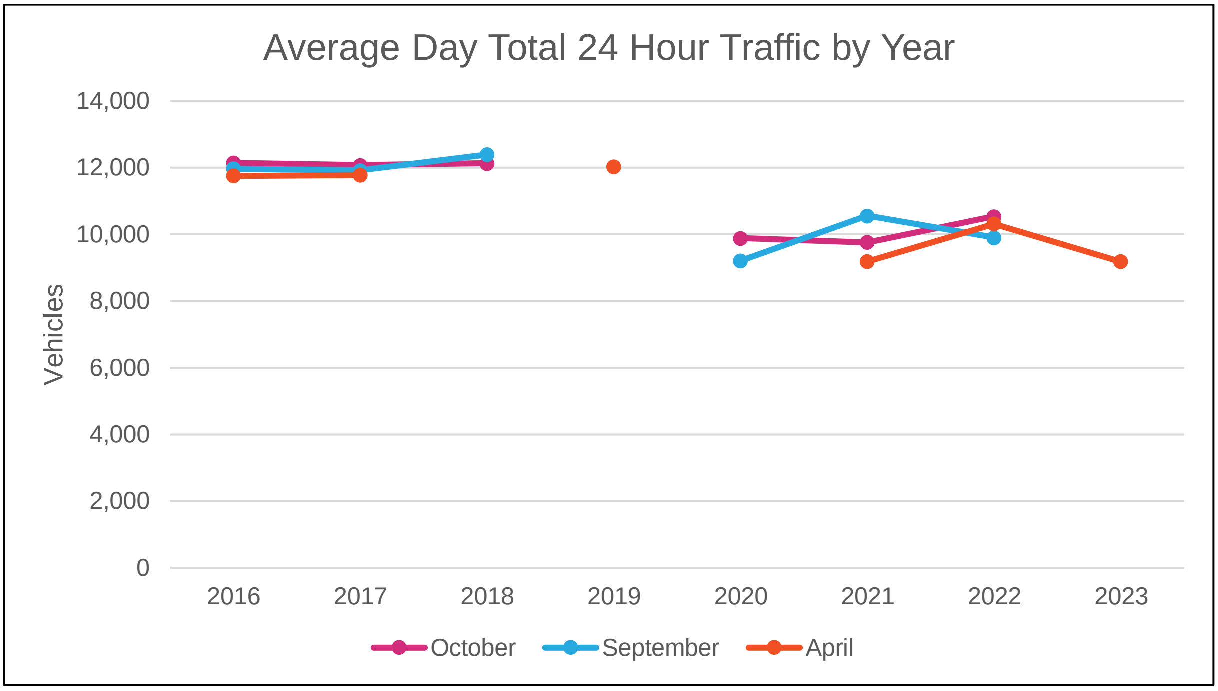
3.2.35 In terms of AADT trends, each month of data shows that pre-COVID-19 traffic levels were higher than post-COVID-19 levels. From October 2016 to October 2022, AADT levels have reduced by 13%. From September 2016 to September 2022, flows have reduced by 17%. From April 2016 to April 2022, flows have reduced by 12% and further decreased by 22% in 2023.

Figure 3-16 Site 371 Vehicle Split Variability over time



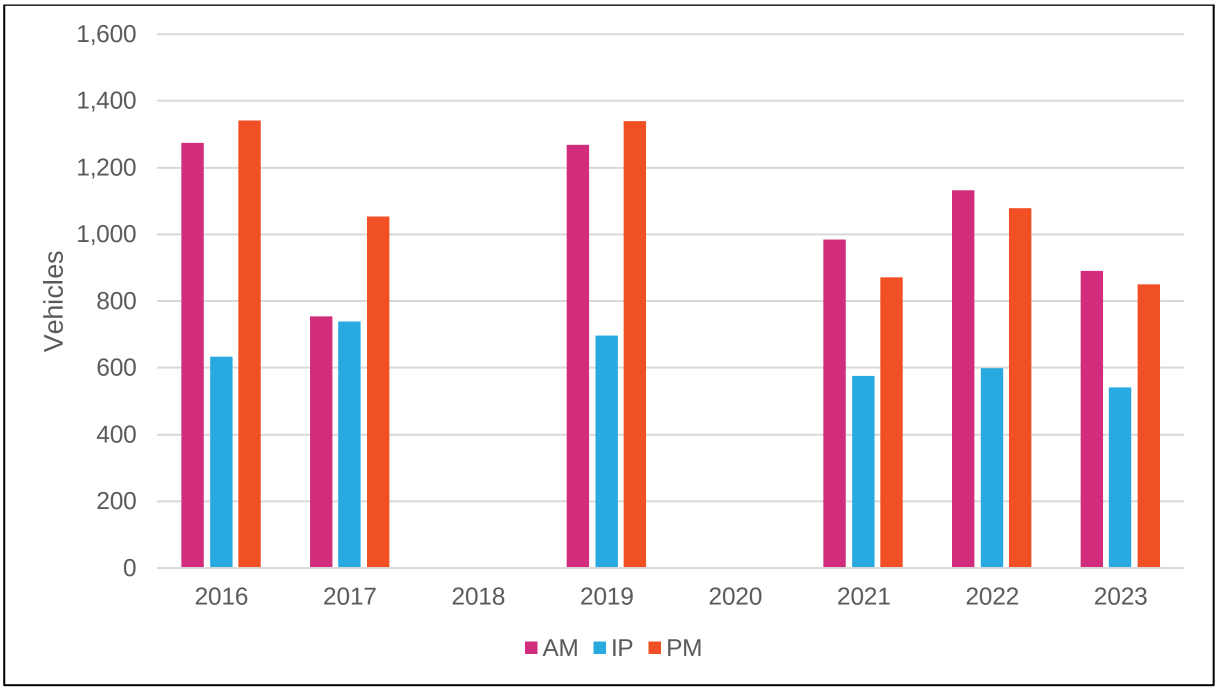
3.2.36 Figure 3-17 shows the decrease in traffic over time by month and year. The gaps in the figures are where the data were unavailable. Due to April containing data for 2016 and 2023, this month has been analysed further below, with the other months shown in the Appendices.

Figure 3-17 Site 371 AADT Two-Way levels per Month and Year



3.2.37 Finally, each peak has been analysed separately with the breakdown by peak for AM, IP and PM respectively as shown in **Figure 3-18**. Each peak decreases over time, from April 2016 to April 2023, where the AM decreases by 30%, IP by 15% and PM by 37%. The decreases of over 30% in the morning and evening peaks is higher than the decrease in AADT, indicating the peaks are impacted more than other time periods.

Figure 3-18 April Site 371 2016-2023 Weekday Two-Way Peak Counts



Central Bedfordshire Council

3.2.38 Counts were received from CBC for two locations on the LRN:

a. Lower Harpenden Road (Site 40); and
b. B540 Church Road (Site 57).

3.2.39 The data were provided for the two sites over a period of two weeks for the years of 2016 and 2023. The counts are classified by vehicle class. Data were processed to analyse:

a. AM peak hour (08:00 – 09:00);
b. Interpeak hour (average 10:00 – 16:00);
c. PM peak hour (17:00 – 18:00); and
d. Daily in the form of AADT.

3.2.40 The data was split by vehicle type, i.e. Cars, LGVs and HGVs.

Analysis

Site 40 (Lower Harpenden Road)

3.2.41 Lower Harpenden Road runs south of London Luton Airport connecting the A1081 to New Mill End and East Hyde. The surveys show that traffic has reduced, with AADT decreasing from 2016 to 2023 by 19% as shown in **Figure 3-19**. Cars make up a large proportion of traffic using the road, making up 94% of the vehicles in 2016 and 90% of the vehicles in 2023.

3.2.42 The traffic in the peak hours reduces in each peak in 2023, with AM and PM falling by over 25% and IP falling by 15% as shown in **Figure 3-20.**

Figure 3-19 Site 40 Two-Way AADT 2016 and 2023

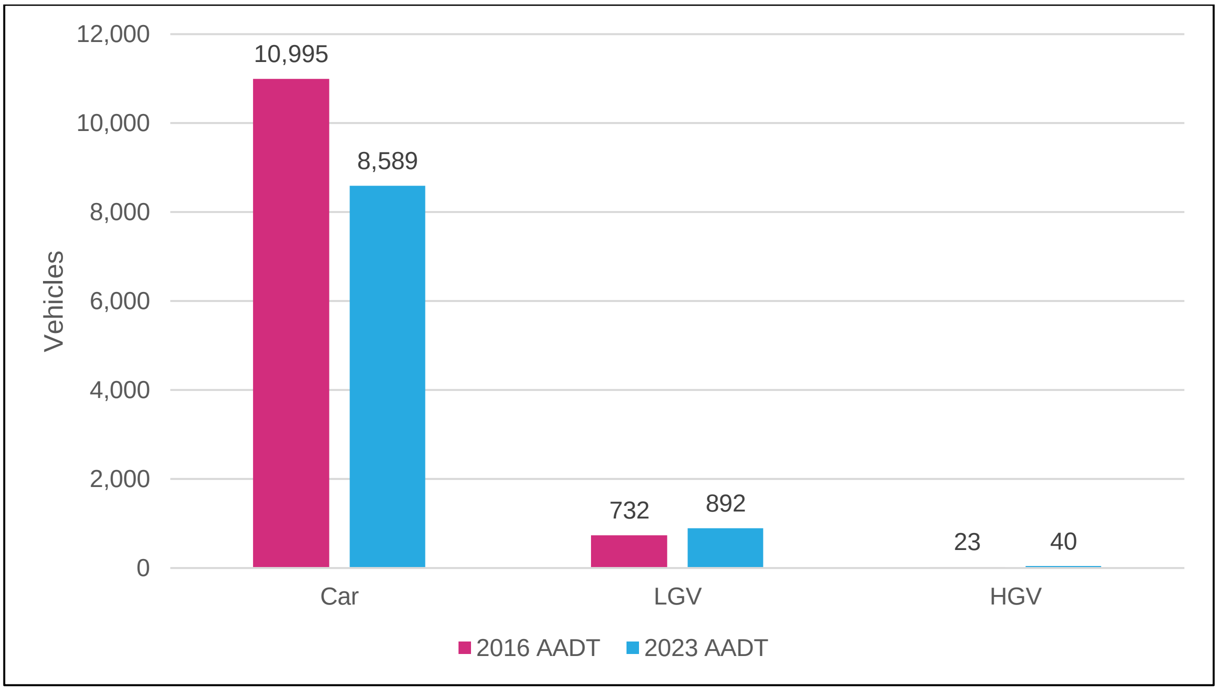
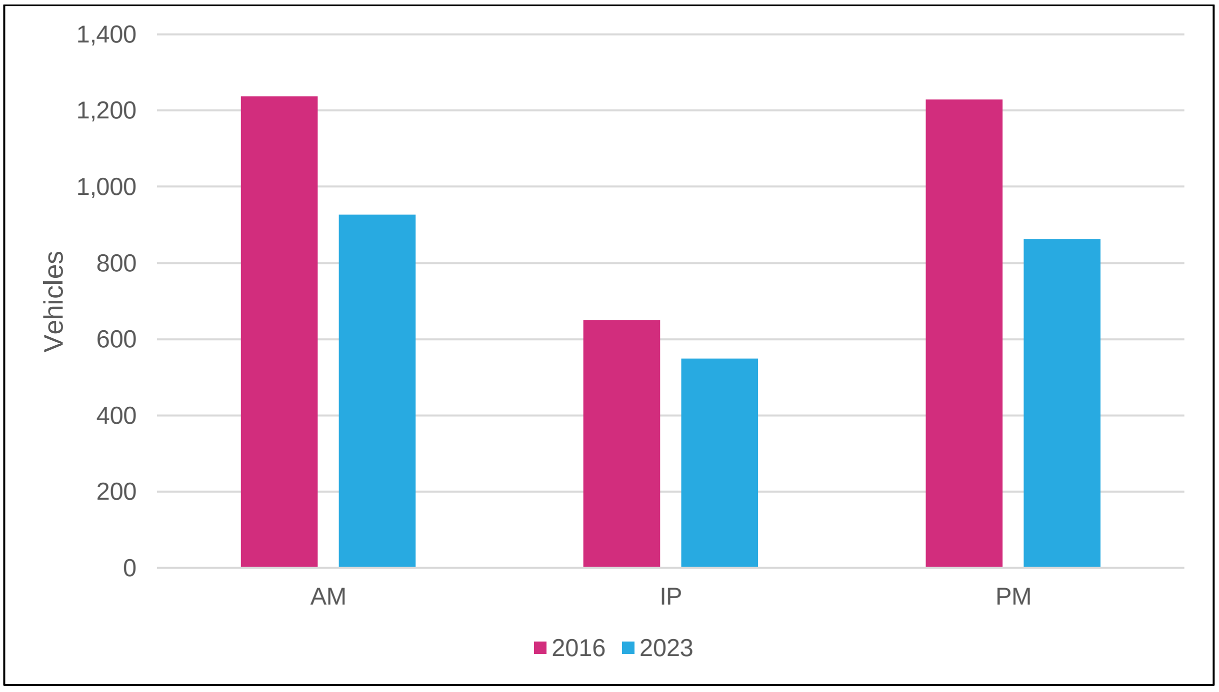


Figure 3-20 Site 40 Two-Way Traffic by Peak



Site 57 (B540 Church Road)

3.2.43 The B540 Church Road runs perpendicular to the M1 just north of Junction 10, connecting Slip End to Newlands Road. The surveys show that traffic has reduced, with AADT reducing from 2016 to 2023 by 23% as shown in **Figure 3-21**. Cars make up a large proportion of traffic using the road, making up 91% of the vehicles in 2016 and 90% of the vehicles in 2023.

3.2.44 The traffic in the peak hours reduces in each peak in 2023, with AM falling by 23%, PM falling by 32% and IP falling by 20% as shown in **Figure 3-22**.

Figure 3-21 Site 57 Two-Way AADT 2016 and 2023

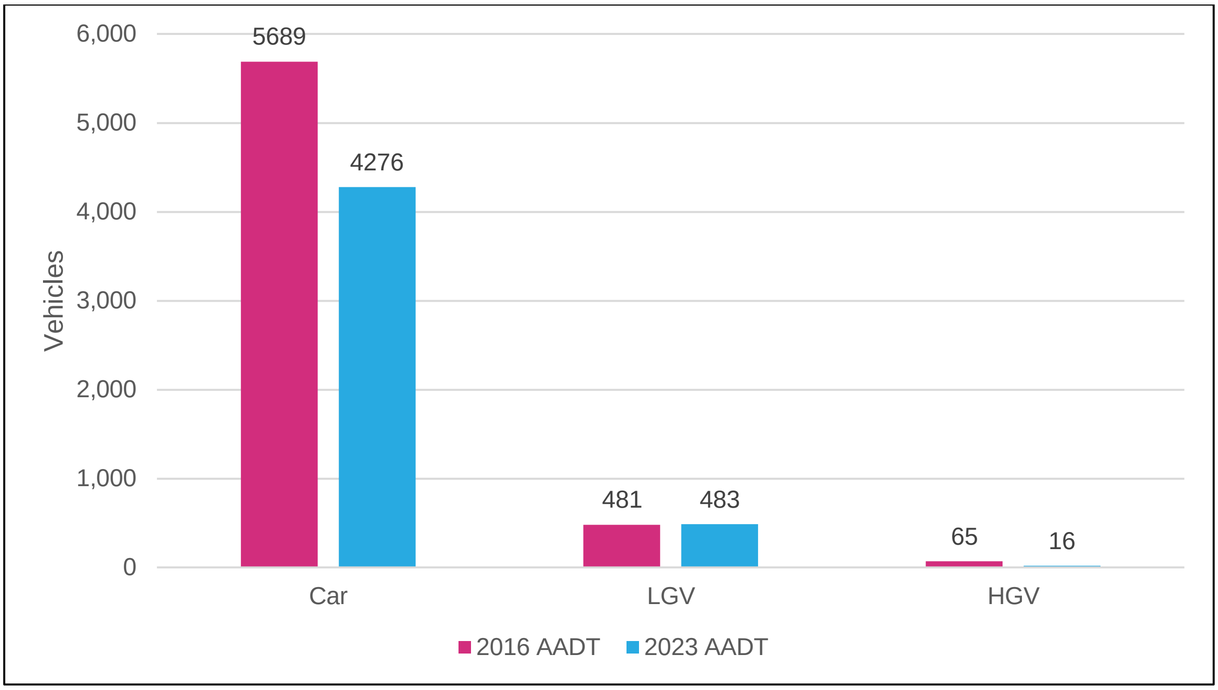
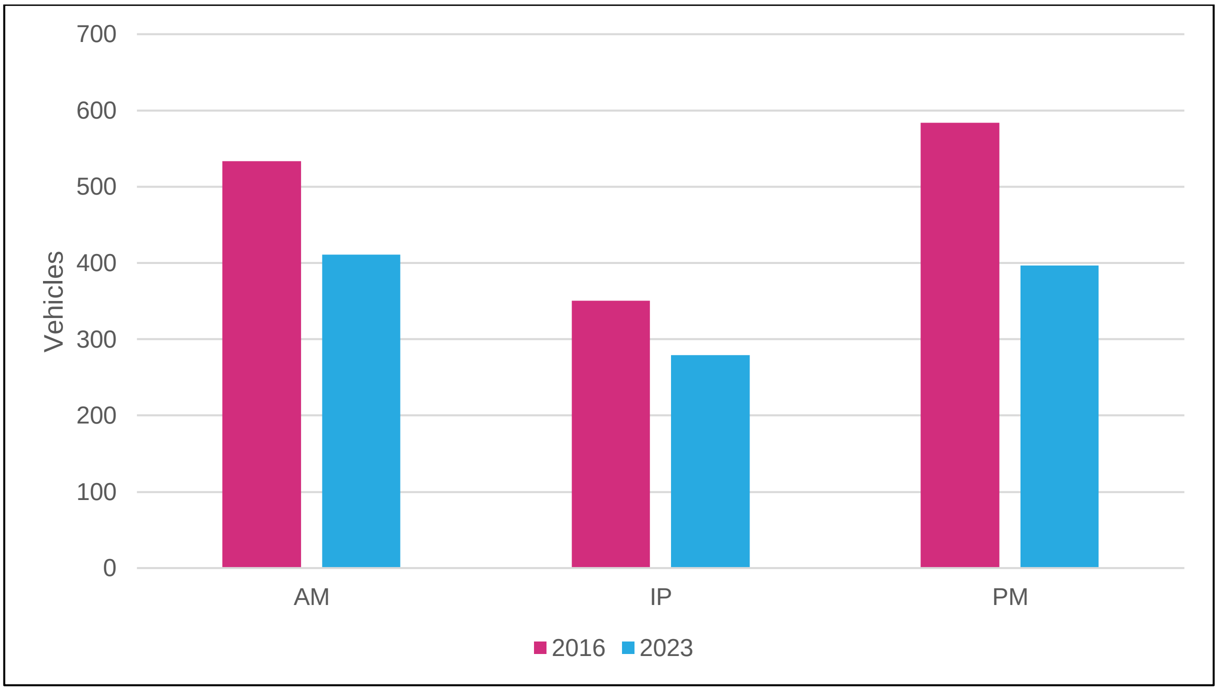


Figure 3-22 Site 57 Two-Way Traffic by Peak



Luton Borough Council

3.2.45 Counts were received from LBC for four locations around Luton:

a. Hatters Way;
b. A1081 New Airport Way;

c. Vauxhall Way / Hitching Rd / A505 Stopsley Way junction; and
d. A5228 Stockingstone Rd.

3.2.46 The data were provided for the four sites between the years of 2021 and 2023 only. For the A1081 New Airport Way flow data were also provided for 2019 and 2020. The counts were classified by vehicle type. However, the A1081 New Airport Way data were deemed to be unusable as the analysis showed unrealistically low volumes, hence this site was subsequently omitted from the analysis.

3.2.47 To obtain the 2016 traffic flows for the above sites, traffic data from the previously prepared ‘Strategic Modelling: Data Collection Report’ and the ‘Strategic Modelling: Highway Local Model Validation Report’ were used. A review of the traffic survey locations used in the reports was undertaken to find suitable count points that can be used to compare with the count data received from LBC. Of the four count sites, two were in the immediate vicinity (after omitting the A1081 New Airport Way) of the previously undertaken traffic count locations. However, there was no 2016 data available for the A5228 Stockingstone Rd site.

Analysis

Hatters Way

3.2.48 Hatters Way runs in an east-west direction between Junction 11 of the M1 and the A505 Telford Way. The surveys show that traffic volumes have reduced, with AADT decreasing overall from 2016 to 2023 by 14%. Cars make up a large proportion of traffic using the road, at 88% of the total in 2016 and 97% in 2023 as shown in **Figure 3-23**.

3.2.49 The traffic in the peak hours reduces in each peak in 2023, with the AM decreasing by 19%, PM by 13% and IP by 12% as shown in **Figure 3-24**.

Figure 3-23 Hatters Way AADT 2016 and 2023

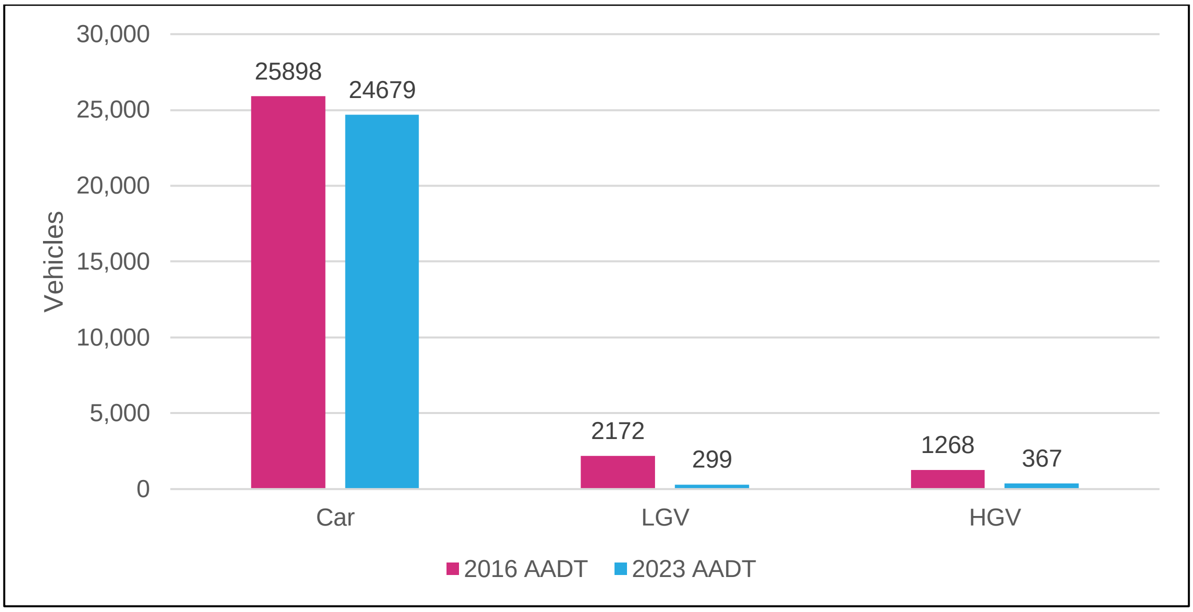
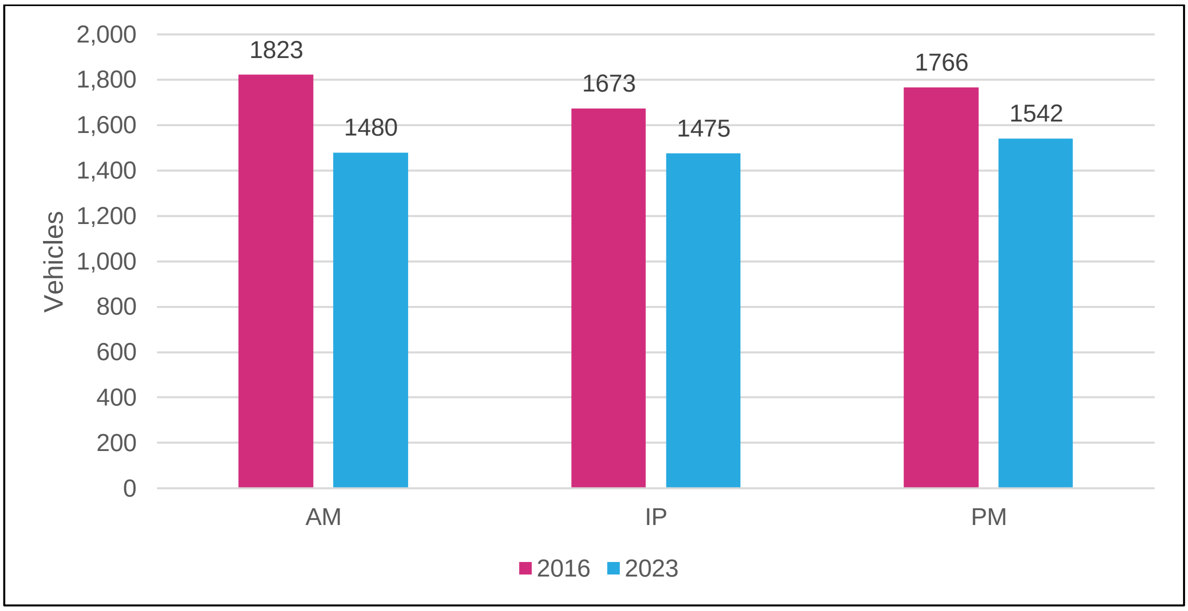


Figure 3-24 Hatters Way Traffic by Pea



Vauxhall Way Northbound

3.2.50 Vauxhall Way runs in a north-south direction connecting A1081 New Airport Way with Hitchin Rd / Stopsley Way / Vauxhall Way junction, which is also the location of the received LBC traffic counts. The only available data that could be compared with the 2016 flows from this location was the Vauxhall Way northbound direction.

3.2.51 The surveys show that traffic has reduced, with AADT decreasing from 2016 to 2023 by 18% in the northbound direction. Cars make up a large proportion of traffic using the road, at 90% of the total in 2016 and 92% in 2023.

3.2.52 The traffic in the 2023 peaks also reduces, with the AM peak traffic decreasing by 8%, the PM by 24% and IP by 19%.

Figure 3-25 Vauxhall Way Northbound AADT 2016 and 2023

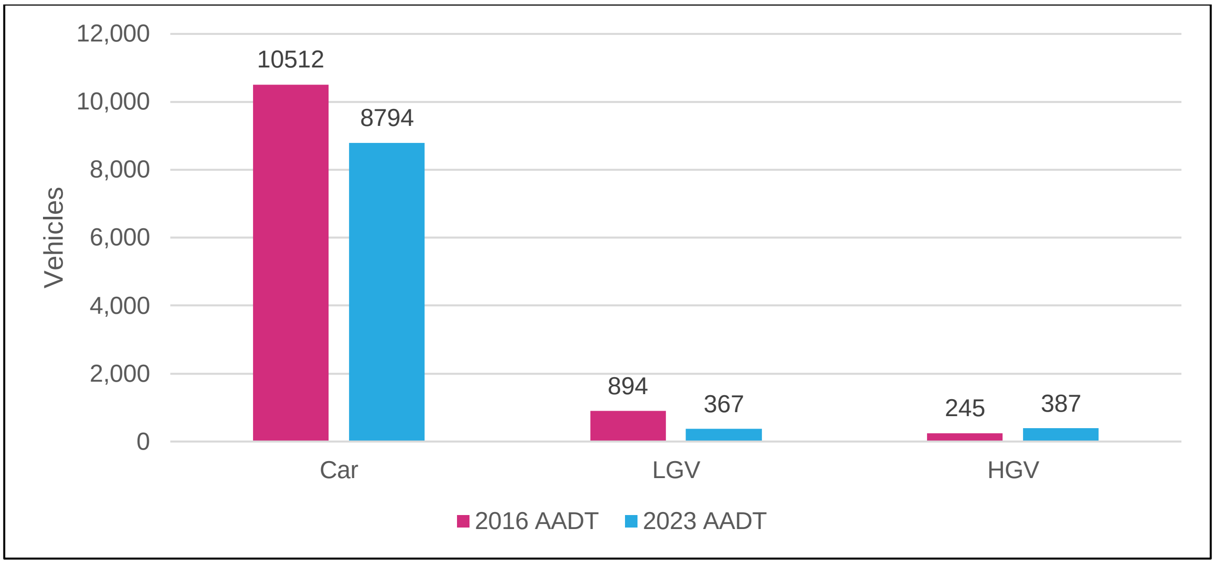
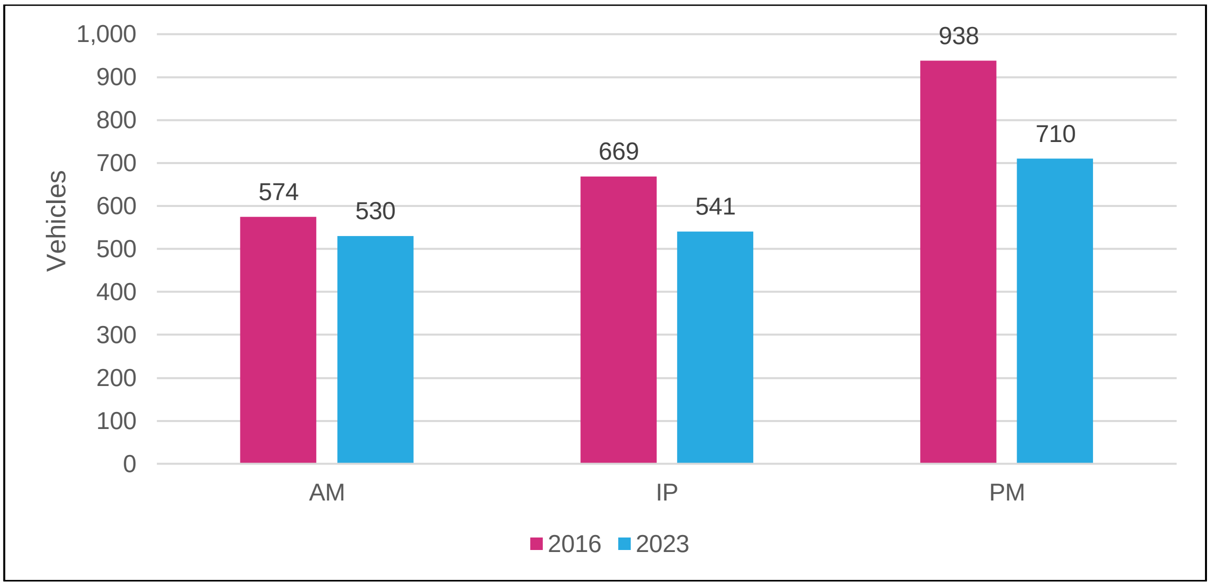


Figure 3-26 Vauxhall Way Northbound Traffic by Peak



3.3 Rail Trends

Introduction

3.3.1 The COVID-19 pandemic had a dramatic impact on rail demand when consecutive Lockdowns were put in place in 2020. At the end of the first lockdown (June 2020), less than one in every six pre-COVID-19 rail journeys were being made. For a couple of years, 2020-22, the long-term impacts of COVID-19 were unforeseen due to the unprecedented nature of the event.

3.3.2 In order to deal with the uncertainty around future rail demand and revenue forecasting, the DfT released a series of guidelines for producing rail demand forecasts reflecting long-term post-pandemic impacts. These guidelines have been regularly revised since the first release, with updates reflecting latest available evidence on rail demand recovery post-COVID-19, economic outlook (exogenous and inflation forecasts), passenger behavioural changes (more people working from home, less business travel, changes to leisure travel, etc.).

3.3.3 By early 2022, all COVID-19-related Lockdown restrictions had been lifted by the UK Government. Rail demand has been slowly stabilizing ever since. The latest available release of the DfT's COVID-19 guidance[6] provides the most up-to-date guidance for generating rail demand forecasts based on pre-COVID-19 rail demand levels. Although leisure demand is forecast to likely recover (and surpass) pre-2020 levels, business and commuting travel are likely to fall short of pre-pandemic demand levels.

3.3.4 The DfT's guidelines for demand forecasting and appraisal of rail schemes advocate the usage of the 'COVID-medium recovery' scenario as the central case. As such, a downward adjustment for rail demand applied post-model runs is recommended, aligning with the DfT's recommendations for forecasts using pre-COVID-19 bases.

Rail and Bus Annual Usage Estimates

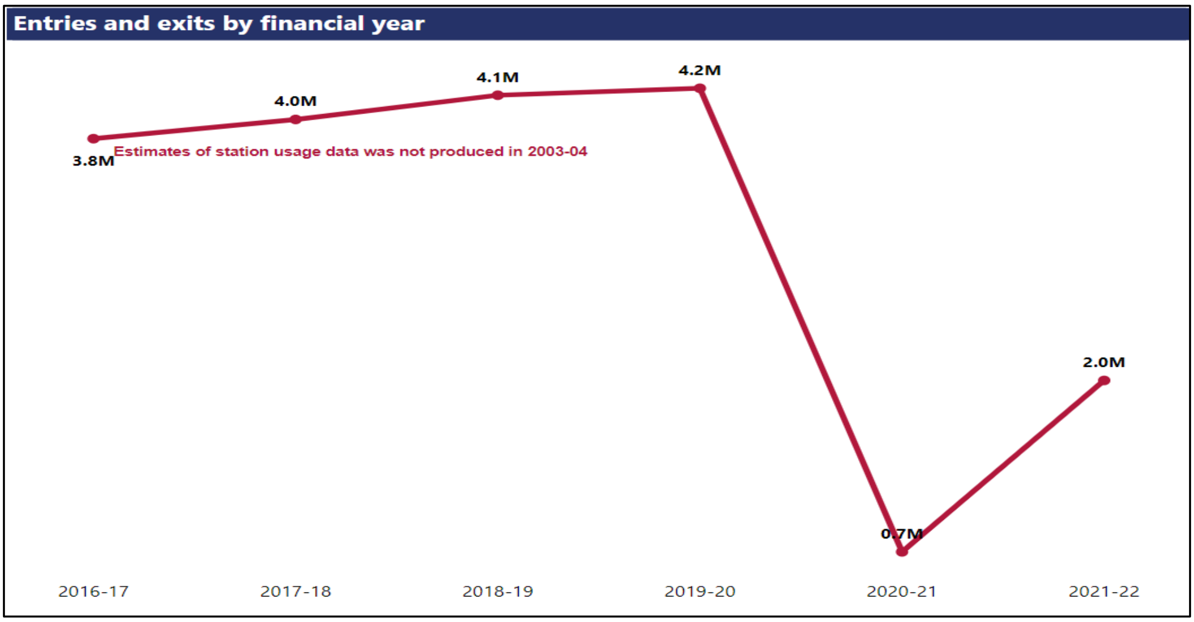
3.3.5 Annual estimates of rail usage are sourced from the Office of Rail and Road (ORR) website[7] with rail usage data presented originating from Table 1410 and 1415.

3.3.6 The site provides annual usage trends based primarily on ticket sales with the most recent data published on 24th November 2022 and the 2023 data is scheduled to be published in December 2023.

[6] Rail Demand Forecasting During Covid v19.4 (May 2023)
[7] ORR Estimates of Station Usage: https://dataportal.orr.gov.uk/statistics/usage/estimates-of-station-usage

3.3.7 **Figure** 3-27 shows annual rail usage trend between 2016 and 2022 for Luton Airport Parkway station as the main station which serves the study area. The plot indicates that in 2022 the rail usage is 53% lower than 2019 and 48% lower than 2016.

Figure 3-27: Annual Rail Usage between 2016 and 2022



Source: Figure extracted directly from ORR Estimates of Station Usage

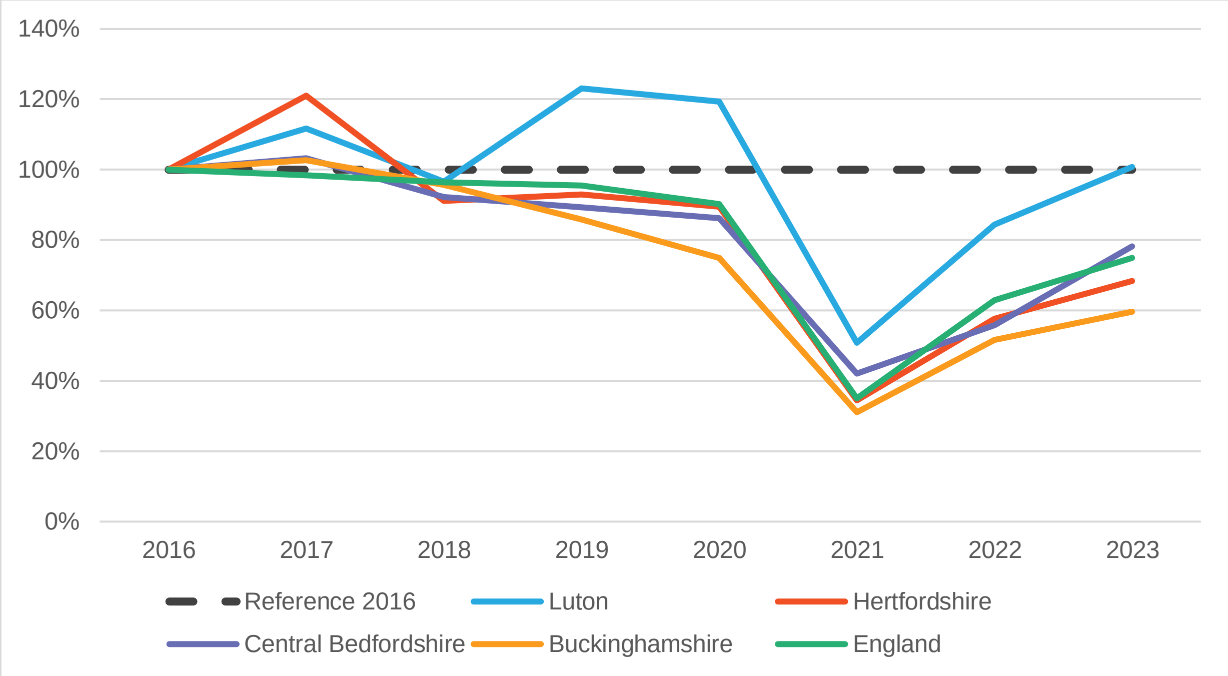
3.3.8 Local bus service annual usage is sourced from official statistics[8] from DfT site, table BUS01e.

3.3.9 Percentage changes of passenger journeys on local bus services is provided in **Figure 3-28** for each of the local authorities, relative to the model base year 2016.

3.3.10 The plot indicates within the study area, local bus service usage in Luton has recovered to the same level as the base year 2016.

[8] DfT official statistics: https://www.gov.uk/government/statistics/annual-bus-statistics-year-ending-march-2023

Figure 3-28: Annual passenger journeys on local bus services by local authority - change from 2016



Source: Local bus service annual usage is sourced from official statistics from DfT site, table BUS01e.

3.4 DfT National Trends

3.4.1 The DfT National Travel Survey 2022 was published in July 2023 and updated in August 2023. In an article dated 7th September 2023 Local Transport Today summarized the key findings as follows:

3.4.2 *"Average trips made by people living in England increased by 14% in 2022 compared to 2021, but trip rates remain lower than in the pre-pandemic period, being 10% down on 2019, with 862 trips made on average in 2022, the newly released National Travel Survey reveals.*

3.4.3 *There were increases in trip rates amongst all transport modes compared to 2021, apart from cycling and London Underground trips which remained broadly similar. The rates for all modes were however still lower than 2019."*

3.4.4 The DfT National statistics – Provisional Road Traffic Estimates, Great Britain: July 2022 to June 2023, was published in September 2023 and the headline figures state:

3.4.5 *"Overall traffic levels in the year ending June 2023 were higher than in year ending June 2022 and below pre-pandemic levels."*

3.4.6 *"These provisional estimates are based on traffic data collected continuously from a network of around 300 automatic traffic counters. Final annual figures also incorporate manual traffic count data."*

3.4.7 The findings from the analysis of SRN and LRN count data reported within this note, and the DfT guidance on rail trends, are therefore in-line with the recent published national trends.

3.5 Planning Data Forecasts

Introduction

3.5.1 The strategic modelling suite is a multi-modal tool which is informed by planning data inputs, such as households, population and employment numbers. Land-use proposals and local plans are also used to inform the forecasting assumptions.

3.5.2 As was reported in the DCO Transport Assessment, the future projections were constrained to DfT projections as per TAG. The strategic modelling captures the land-use information and constrains the growth in traffic for the five local authority areas which represent the core modelling area. These are:

a. Luton;
b. Central Bedfordshire;
c. North Hertfordshire;
d. Decorum; and
e. St Albans.

3.5.3 As mentioned above, the DCO modelling was undertaken based on the NTEM 7.2, whereas the most recent DfT projections are captured in NTEM 8. The following section summaries the FY assumptions between the two versions.

NTEM 7.2 vs NTEM 8

3.5.4 A comparison of the planning data was made between NTEM 7.2 and NTEM 8 for the five internal districts for households, population, and employment. Comparisons have also been made at a national level, as the SRN will be carrying some longer distance external to external traffic beyond the extent of internal districts and detailed model area.

3.5.5 **Tables 3-2 to 3-10** show the growth from 2016 to the future forecast years. Overall, the forecast household and population growth rates were higher in NTEM 7.2 for all five districts, for all forecasting years of 2027, 2039 and 2043.

3.5.6 The household growth rates for the total internal area for the three forecast years range from 11% to 22% in NTEM 7.2 and 5% to 12% in NTEM 8.

Table 3-2. Forecast Household by District, 2027 – NTEM 7.2 vs NTEM 8

District	2016	2027		Absolute Difference		Percentage Difference	
		NTEM 7.2	NTEM 8	NTEM 7.2	NTEM 8	NTEM 7.2	NTEM 8
Luton	76,848	80,696	78,351	3,848	1,503	5%	2%
Central Bedfordshire	113,707	132,913	124,609	19,206	10,902	17%	10%
North Hertfordshire	56,092	66,521	58,524	10,429	2,432	19%	4%
St Albans	59,153	61,819	61,778	2,666	2,625	5%	4%
Dacorum	63,209	69,174	65,862	5,965	2,653	9%	4%
Total Internal Area	**369,008**	**411,122**	**389,125**	**42,114**	**20,116**	**11%**	**5%**

Table 3-3. Forecast Household by District, 2039 – NTEM 7.2 vs NTEM 8

District	2016	2039		Absolute Difference		Percentage Difference	
		NTEM 7.2	NTEM 8	NTEM 7.2	NTEM 8	NTEM 7.2	NTEM 8
Luton	76,848	82,053	78,561	5,205	1,713	7%	2%
Central Bedfordshire	113,707	147,113	135,779	33,407	22,072	29%	19%
North Hertfordshire	56,092	74,905	61,241	18,813	5,149	34%	9%
St Albans	59,153	63,475	64,167	4,321	5,013	7%	8%
Dacorum	63,209	73,866	68,708	10,657	5,499	17%	9%
Total Internal Area	**369,008**	**441,412**	**408,456**	**72,403**	**39,447**	**20%**	**11%**

Table 3-4. Forecast Household by District, 2043 – NTEM 7.2 vs NTEM 8

District	2016	2043		Absolute Difference		Percentage Difference	
		NTEM 7.2	NTEM 8	NTEM 7.2	NTEM 8	NTEM 7.2	NTEM 8
Luton	76,848	82,508	78,679	5,660	1,831	7%	2%
Central Bedfordshire	113,707	151,774	138,911	38,068	25,204	33%	22%
North Hertfordshire	56,092	77,708	62,043	21,616	5,951	39%	11%
St Albans	59,153	63,962	64,838	4,809	5,684	8%	10%
Dacorum	63,209	75,409	69,586	12,201	6,377	19%	10%
Total Internal Area	**369,008**	**451,362**	**414,056**	**82,354**	**45,048**	**22%**	**12%**

3.5.7 NTEM 8 shows negative growth in population in Luton from 2033, and for the modelled forecast years the population is forecast to reduce by -2% from 2016 to 2039 and 2043. The population growth from 2016 to 2039 and 2043 for the total internal area in NTEM 8 is less than half the growth of NTEM 7.2, at 7% in NTEM 8 compared with 16% in NTEM 7.2 by 2043. This aligns with the national trends stated in the 'NTEM 8 Short-Term Update, Atkins & Jacobs, April 2022' report[9].

Table 3-5. Forecast Population by District, 2027 – NTEM 7.2 vs NTEM 8

District	2016	2027		Absolute Difference		Percentage Difference	
		NTEM 7.2	NTEM 8	NTEM 7.2	NTEM 8	NTEM 7.2	NTEM 8
Luton	204,374	212,860	207,525	8,486	3,151	4%	2%
Central Bedfordshire	270,440	306,245	294,613	35,805	24,173	13%	9%
North Hertfordshire	129,763	150,098	135,180	20,335	5,417	16%	4%
St Albans	143,971	148,370	149,817	4,399	5,845	3%	4%
Dacorum	148,538	159,476	154,886	10,938	6,348	7%	4%
Total Internal Area	**897,086**	**977,049**	**942,021**	**79,963**	**44,935**	**9%**	**5%**

[9] The Report is released with the NTEM/TEMPRO documentation package. Available at: Trip End Model Presentation Program (TEMPro) download - GOV.UK (www.gov.uk)

Table 3-6. Forecast Population by District, 2039 – NTEM 7.2 vs NTEM 8

District	2016	2039		Absolute Difference		Percentage Difference	
		NTEM 7.2	NTEM 8	NTEM 7.2	NTEM 8	NTEM 7.2	NTEM 8
Luton	204,374	218,383	200,811	14,009	-3,563	7%	-2%
Central Bedfordshire	270,440	328,180	309,310	57,740	38,870	21%	14%
North Hertfordshire	129,763	163,165	136,736	33,403	6,974	26%	5%
St Albans	143,971	152,302	149,704	8,331	5,733	6%	4%
Dacorum	148,538	167,567	156,774	19,029	8,236	13%	6%
Total Internal Area	**897,086**	**1,029,598**	**953,336**	**132,512**	**56,250**	**15%**	**6%**

Table 3-7. Forecast Population by District, 2043– NTEM 7.2 vs NTEM 8

District	2016	2043		Absolute Difference		Percentage Difference	
		NTEM 7.2	NTEM 8	NTEM 7.2	NTEM 8	NTEM 7.2	NTEM 8
Luton	204,374	219,495	199,267	15,121	-5,107	7%	-2%
Central Bedfordshire	270,440	333,603	313,347	63,162	42,907	23%	16%
North Hertfordshire	129,763	166,394	137,268	36,631	7,505	28%	6%
St Albans	143,971	153,073	149,717	9,101	5,745	6%	4%
Dacorum	148,538	169,481	157,474	20,943	8,936	14%	6%
Total Internal Area	**897,086**	**1,042,046**	**957,072**	**144,959**	**59,986**	**16%**	**7%**

3.5.8 The growth rates in employment are forecast to be slightly higher in NTEM8 in 2027 and 2039, and then the same by 2043.

Table 3-8. Forecast Employment by District, 2027 – NTEM 7.2 vs NTEM 8

District	2016	2027		Absolute Difference		Percentage Difference	
		NTEM 7.2	NTEM 8	NTEM 7.2	NTEM 8	NTEM 7.2	NTEM 8
Luton	101,182	105,744	108,349	4,562	7,167	5%	7%
Central Bedfordshire	111,070	116,172	118,682	5,102	7,612	5%	7%
North Hertfordshire	58,657	61,578	62,915	2,921	4,259	5%	7%
St Albans	69,080	72,171	74,498	3,091	5,418	4%	8%
Dacorum	73,624	76,688	79,024	3,064	5,400	4%	7%
Total Internal Area	**413,613**	**432,353**	**443,469**	**18,740**	**29,856**	**5%**	**7%**

Table 3-9. Forecast Employment by District, 2039 – NTEM 7.2 vs NTEM 8

District	2016	2039		Absolute Difference		Percentage Difference	
		NTEM 7.2	NTEM 8	NTEM 7.2	NTEM 8	NTEM 7.2	NTEM 8
Luton	101,182	109,381	110,973	8,200	9,791	8%	10%
Central Bedfordshire	111,070	120,169	121,556	9,099	10,487	8%	9%
North Hertfordshire	58,657	63,696	64,439	5,040	5,782	9%	10%
St Albans	69,080	74,654	76,303	5,574	7,222	8%	10%
Dacorum	73,624	79,327	80,938	5,702	7,314	8%	10%
Total Internal Area	**413,613**	**447,228**	**454,209**	**33,615**	**40,596**	**8%**	**10%**

Table 3-10. Forecast Employment by District, 2043 – NTEM 7.2 vs NTEM 8

District	2016	2043		Absolute Difference		Percentage Difference	
		NTEM 7.2	NTEM 8	NTEM 7.2	NTEM 8	NTEM 7.2	NTEM 8
Luton	101,182	110,811	111,152	9,629	9,970	10%	10%
Central Bedfordshire	111,070	121,739	121,752	10,669	10,682	10%	10%
North Hertfordshire	58,657	64,528	64,543	5,872	5,886	10%	10%
St Albans	69,080	75,630	76,425	6,550	7,345	9%	11%
Dacorum	73,624	80,363	81,068	6,739	7,444	9%	10%
Total Internal Area	**413,613**	**453,071**	**454,940**	**39,458**	**41,327**	**10%**	**10%**

3.5.9 **Figure 3-29** and **Figure 3-30** summarise the forecast growth from 2016 in households and employment respectively. Central Bedfordshire and North Hertfordshire have the highest growth, and Luton and St Albans have the lowest growth in households in both NTEM 7.2 and NTEM 8. The household growth rates for Luton range from 5% to 7% in NTEM 7.2, however, NTEM 8 shows a growth of 2% from 2016 to all three forecast years.

3.5.10 In terms of employment, as shown in **Figure 3-30**, the planning data from NTEM 7.2 and NTEM 8 show less variation in growth rates between the five districts than the forecast for household growth.

Figure 3-29 Forecast Household Growth from 2016 by District

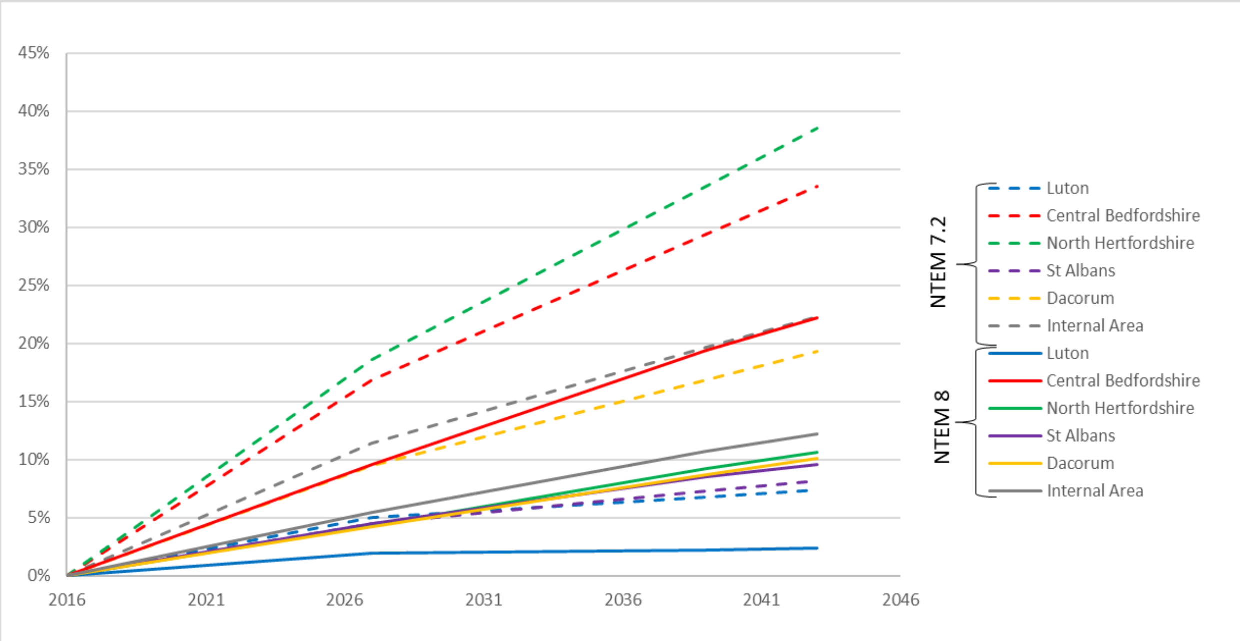
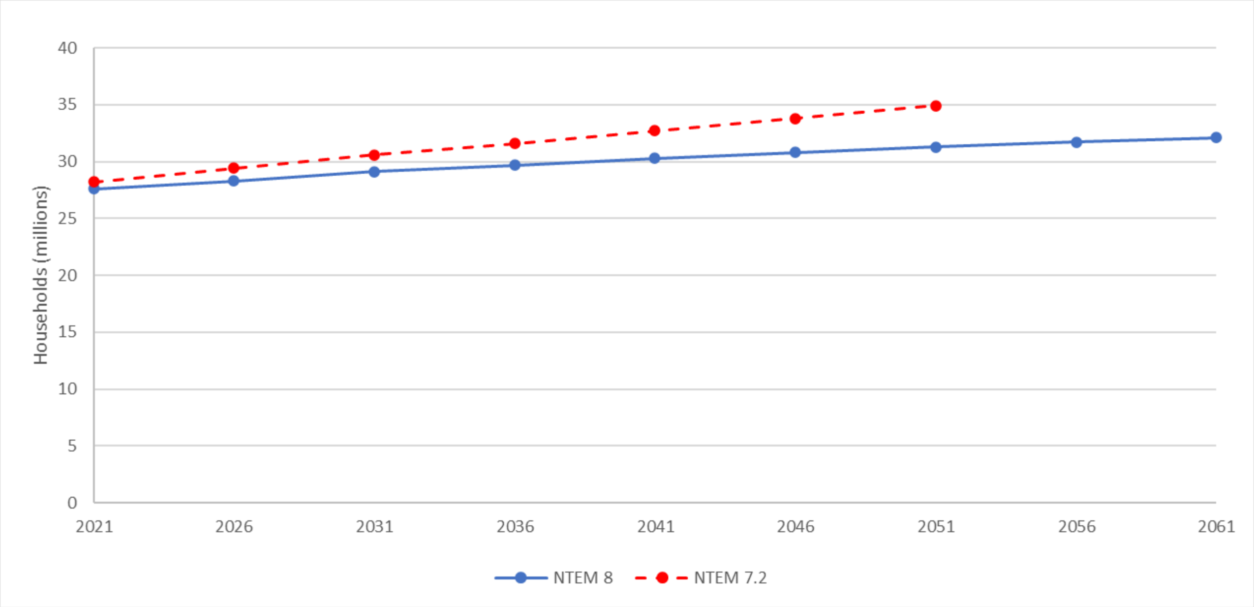


Figure 3-30 Forecast Employment Growth from 2016 by District

National Household Changes from NTEM 7.2

3.5.11 **Figure 3-31** shows the input assumptions for households in NTEM 8.0 compared with NTEM 7.2, extending to the respective ‘horizon’ years of 2061 and 2051. In 2021 the number of households is 2.4% lower than the projections in NTEM 7.2. As population growth is lower, household growth is also lower, with 10.2% fewer households in 2051.

Figure 3-31 Comparison of input projections of households in Great Britain (millions)

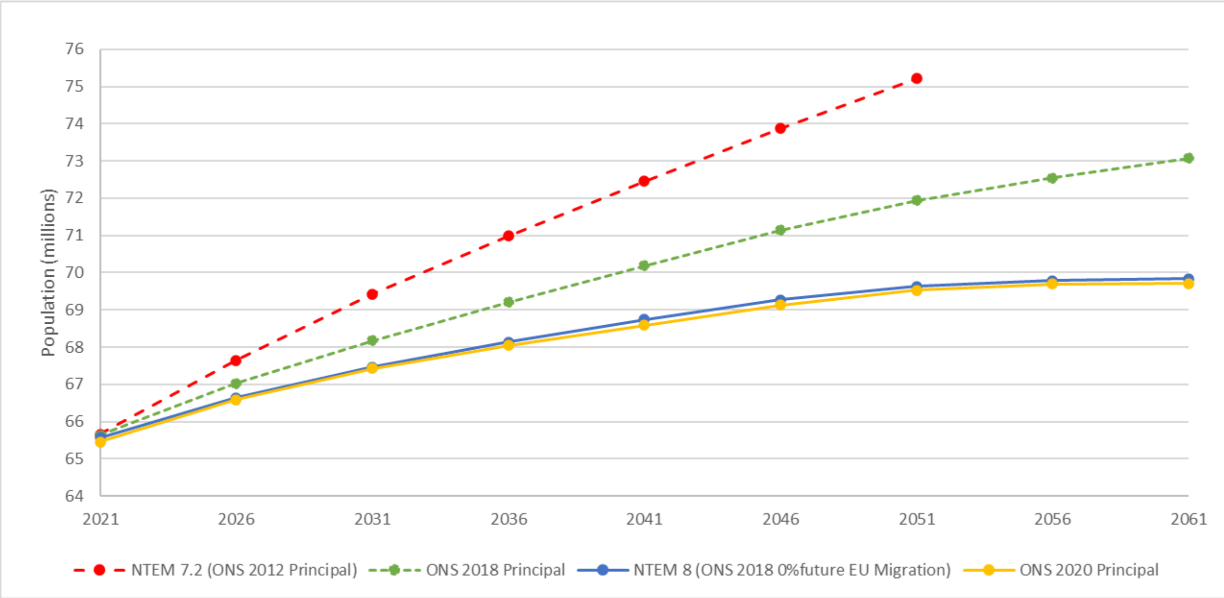


Source: Work Order T0115 - NTEM Short-Term Update Data Report

National Population Projections Change from NTEM 7.2

3.5.12 It is stated in the 'NTEM Short-Term Update Data' report that 2018-based population projections have similar numbers of people in 2021 as the 2012-based projections from which NTEM 7.2 forecasts were derived. The more recent 2018-based projections, however, have a much lower level of population growth over time. **Figure 3-32** shows the population levels in four alternative Office for National Statistics (ONS) projection datasets. The population growth from 2021 to 2051 in NTEM 8 is 6.2% compared with 14.6% growth in NTEM 7.2.

Figure 3-32 GB population projections: NTEM 8.0 vs NTEM 7.2

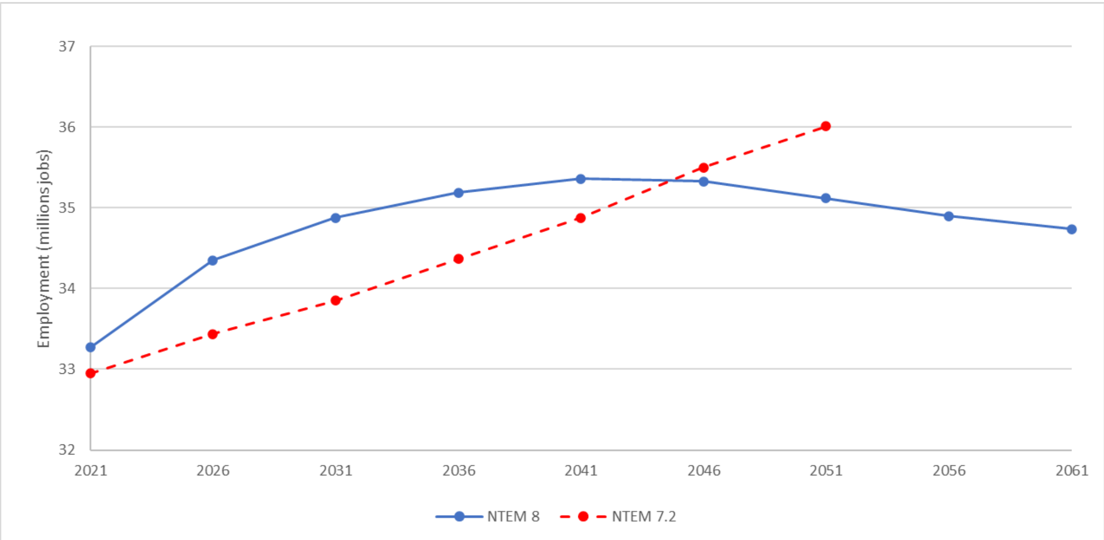


Source: Work Order T0115 - NTEM Short-Term Update Data Report

National Employment Changes from NTEM 7.2

3.5.13 **Figure 3-33** shows the comparison of employment forecasts for Great Britain between NTEM 7.2 and NTEM 8 which is taken from the ‘NTEM Short-Term Update data Report’. NTEM 8 forecasts higher levels of growth than NTEM 7.2 in the short term, however, the growth levels in the long term are projected to fall slightly from 2043. In summary, the employment growth rates are higher in NTEM 8 until 2045, and then lower than NTEM 7.2.

Figure 3-33 NTEM 8.0 Core Employment forecasts for GB compared with NTEM 7.2

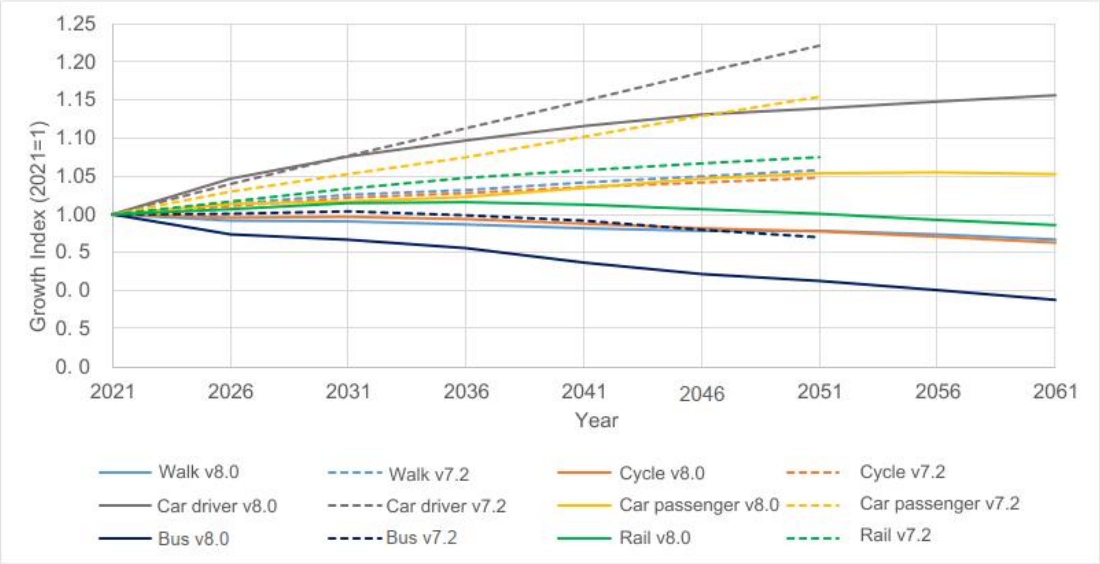


Source: Work Order T0115 - NTEM Short-Term Update Data Report

Trips by Mode

3.5.14 **Figure 3-34** shows the growth in total trip productions by mode through time in both NTEM 7.2 and NTEM 8. As shown in the figure below, the growth rate is lower for all modes in NTEM 8. Car driver trips remain the main mode of travel in both versions of the NTEM.

Figure 3-34 Growth in trip productions by mode in NTEM 8 and NTEM 7.2

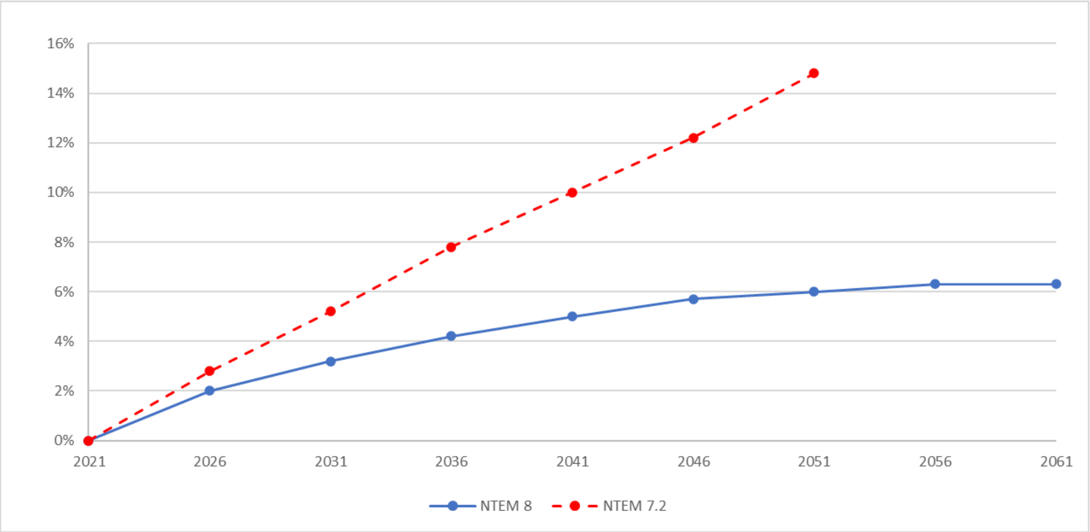


Source: Work Order T0115 - NTEM Short-Term Update Data Report

Trip Ends by Purpose

3.5.15 As shown in **Figure 3-35** total trip productions grow by 6% from 2021 to 2051 in NTEM 8 compared with 15% growth in NTEM 7.2 over the same period. The growth from 2021 to 2051 in NTEM 8 is similar to the growth to 2033 in NTEM 7.2.

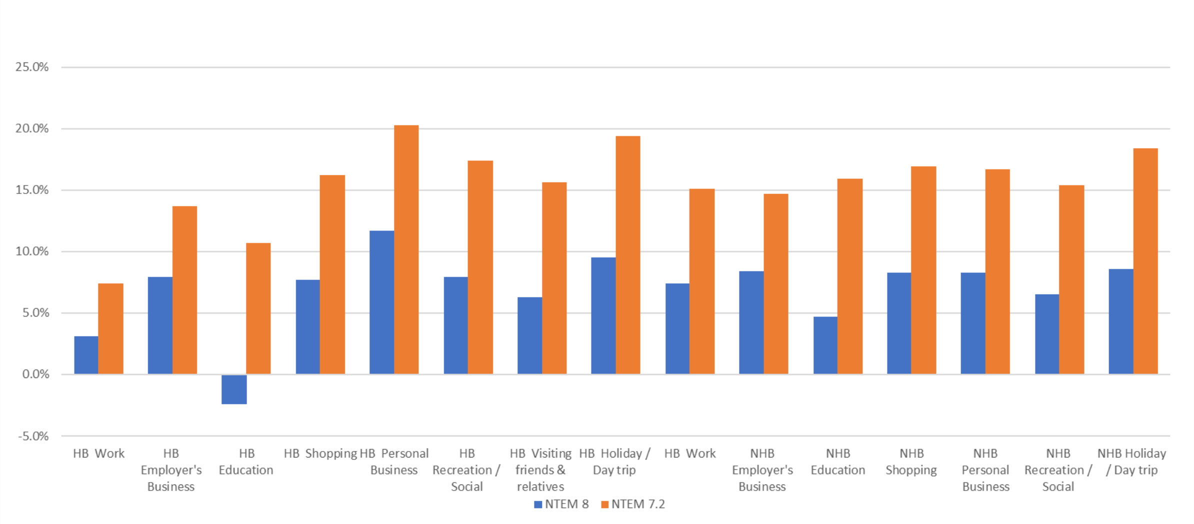
Figure 3-35 Growth in trip productions through time NTEM 7.2 and NTEM 8



Source: Work Order T0115 - NTEM Short-Term Update Data Report

3.5.16 As shown in **Figure 3-36** there is variation in trip productions growth by trip purpose. Productions for all trip purposes have a lower level of growth in NTEM 8 than in NTEM 7.2. Home-based personal business trips have the highest growth in both NTEM 7.2 and NTEM 8. Home-based education trips decrease through time in NTEM 8.

Figure 3-36 Trip productions by purpose - % change from 2021 to 2051 in NTEM 7.2 and NTEM 8.0

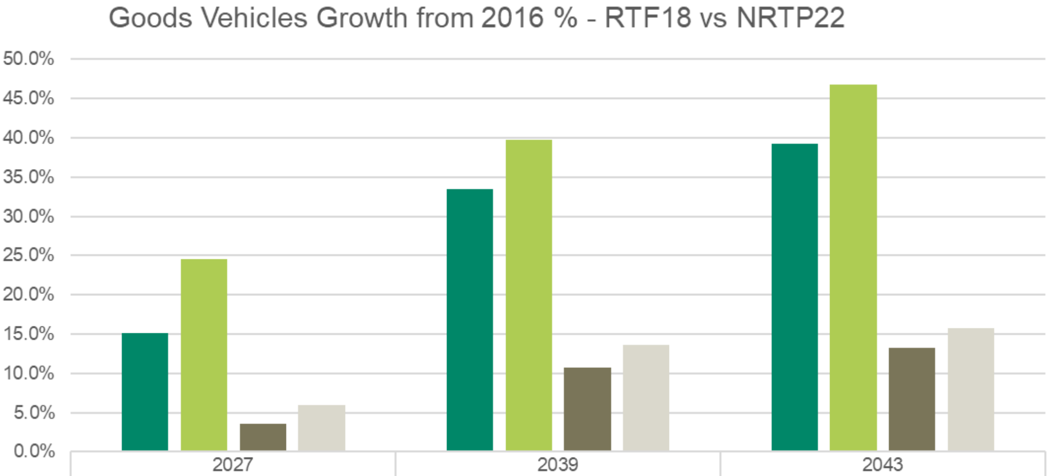


Source: Work Order T0115 - NTEM Short-Term Update Data Report

Goods Vehicles Growth Comparison

3.5.17 A comparison between the RTF18 and the NRTP22 has been conducted to understand the level of differences in projections for the relevant years. This shows that both LGVs and HGVs are forecast to have slightly higher growth in NRTP22 when compared with the growth in RTF18.

Figure 3-37 Goods Vehicles Growth from 2016 % (Eastern England)



	2027	2039	2043
LGVs RTF18	15.1%	33.5%	39.3%
LGVs NRTP22	24.6%	39.7%	46.8%
HGVs RTF18	3.6%	10.7%	13.3%
HGVs NRTP22	6.0%	13.6%	15.7%

3.5.18 While the percentage changes between the two sets of data show increases, it is worth noting that both LGVs and HGVs represent the smaller proportions of the overall traffic, i.e. compared with Cars in particular on local road network. Hence these goods vehicle specific increases would not be likely to result in significant increases on the overall traffic volumes.

3.6 Key Findings

Tracking COVID-19 Impacts on Existing Travel Patterns

3.6.1 The available SRN data show that traffic volumes in 2023 data have not picked up to the same level of 2016 nor 2019 (pre-COVID-19) in all locations. The M1 shows, on average, that the 2023 traffic levels have recovered to above 2016 (and 2019) levels, both daily and peak traffic, although the level varies by section. Whereas the M25 2023 traffic levels show similar levels to the 2016, on both daily and peak traffic.

3.6.2 The A1081 shows that on a daily basis, the 2023 traffic levels have increased above 2016 levels, but it is noted that this is driven by the inter-peak traffic, as the AM morning peak shows lower traffic in 2023 compared with 2016 and 2019, while the PM evening peak shows similar levels.

3.6.3 The analysis of the data that was available for the LRN shows that for all sites traffic volumes in 2023 have not picked up to the same level as 2016 and 2019. Therefore, and despite the limitations of the data, the analysis clearly suggests that the traffic volumes on local roads have not reached pre-COVID-19 levels.

3.6.4 The DfT analysis for rail demands indicate that the demands have not picked up to pre-COVID-19 levels, and the DfT guidance recommends a downward adjustment for rail demand forecasts post model runs.

3.6.5 The DfT analysis for local bus demands indicate in comparison to 2016, within the surrounding local authority in 2023, Luton is the only one that has reached the level similar as 2016.

3.6.6 The findings from the analysis of SRN and LRN count data, and the DfT guidance on rail trends, are in-line with the recent published national trends.

DfT Growth Projections

3.6.7 The NTEM 8 projections show significantly lower levels of growth for both population and households, and the employment projections show slightly higher growth, when compared with NTEM 7.2. Overall, the trip productions in NTEM 8 show significant reductions. This would indicate that with the modelling updates being undertaken to incorporate NTEM 8, it is likely that the overall growth in traffic will be lower than the previous modelling, which was based on NTEM 7.2.

4 TECHNICAL NOTE 2 - RISK ASSESSMENT

4.1 Background

4.1.1 As a part of the London Luton Airport DCO application, the ExA made a procedural decision via a Rule 9 Letter to the Applicant to take account of the potential impacts of COVID-19 on the traffic modelling. Luton Rising (the Applicant) responded to the ExA with a proposed methodology and timescales to undertake the work. The proposed methodology was based on the DfT's recently updated guidance, TAG Unit M4 – Forecasting and Uncertainty, May 2023 (Ref 1).

4.1.2 At ISH4 on 28 September 2023, the ExA requested "the Applicant submit technical notes 1 and 2 in relation to the ongoing work undertaken to update the transport modelling in line with Department for Transport guidance". This is Action Point 2 from the ISH.

4.1.3 The proposed work, as set out in the Rule 9 Response letter, listed several tasks. The initial tasks involve collating recent data to cover the pre- and post-COVID-19 period and includes the analysis of road traffic between 2016 (the Luton Airport DCO strategic transport model base year) and 2023 (most recent available data) to help understand the impacts that the COVID-19 pandemic has had on travel characteristics and volumes. The results of these tasks are reported in Chapter 3.

4.1.4 The proposed work, as set out in the Rule 9 Response letter dated 27 June 2023 [AS-064], listed several tasks.

4.1.5 This TN covers the following tasks referenced in the letter:

a. Task 8: Update FY Uncertainty Log (UL) for development and infrastructure.
b. Task 9: Update FY travel demands for UL, NTEM 8 & NRTP22 - 2027, 2039, 2043.
c. Task 10: Produce transport demands for new additional year 2023.
d. Task 11: Run highway and public transport models - 2023, 2027, 2039, 2043 (via the Demand Model).
e. Task 12: Compare 2023 forecasts with 2023 counts and 2016 modelled base year.
f. Task 13: Determine FY risks and need (if any) for adjustment factors.
g. Task 14: Technical Note 2 Risk Assessment.

4.1.6 The COVID-19 impact assessment as described in Chapter 3 indicates the findings as summarised below, which are in-line with the recent published national trends:

a. Within the SRN daily and peak traffic volumes in 2023 have 'recovered' to levels that are equal or exceed those recorded in 2016 and 2019 (pre-COVID-19) in the majority of the locations. There is a slight exception for the A1081 where traffic levels have not fully recovered.

b. Within the LRN traffic volumes in 2023 have not recovered to the same level as 2016 and 2019.

4.1.7 The projected growth in background (non-airport) traffic within the strategic transport modelling that has informed the DCO application has been based on the DfT's NTEM 7.2 (which was current at the time of undertaking the model runs). In August 2022, a new version of NTEM 8 was published by the DfT and updated goods vehicles projections were published in December 2022, via the NRTP22, which replaced the RTF18, which informed the strategic modelling. This has prompted the DfT growth projections assessment which has also been undertaken as described in Chapter 3 to provide a comparison between the two projections.

4.1.8 The NTEM 8 projections show significantly lower levels of growth for both population and households, although the employment projections show slightly higher growth when compared with NTEM 7.2. Overall, the trip productions in NTEM 8 show a significant reduction in rates.

4.1.9 Based on the findings as described in Chapter 3, a parallel task concerning the updates of the FY forecasting assumptions has been undertaken to assess the impact on the modelled forecast traffic volumes. This would then be utilised to determine any FY risks and potential need for further adjustment to the forecast year models.

4.1.10 In addition, a separate analysis was also undertaken to produce a 2023 model, and to carry out a comparison with the 2023 traffic counts.

4.1.11 The analysis above would then be concluded in this chapter and will assist in the decision of whether an adjustment to the forecasts is required, based on a risk assessment.

4.1.12 This chapter consists of information as reported in the **Applicant's Response to Issue Specific Hearing 4 Action 2: COVID-19 Additional Modelling Technical Note 1 (TN1) Trends Analysis [REP4-086]** with additional complementary data.

4.2 Rule 9 Modelling Updates

Introduction

4.2.1 All core scenarios have been updated, which can be described as follows:

a. TAG-based "Without" Expansion forecasts for 2027, 2039 and 2043; and
b. TAG-based "With" Expansion forecasts for 2027, 2039 and 2043.

4.2.2 Modelled periods remained unchanged as follows:

a. AM Peak Hour (08:00-09:00);
b. Interpeak Hour (average between 10:00-16:00); and
c. PM Peak Hour (17:00-18:00).

Update

4.2.3 In addition to projected growth, other aspects (airport demand, UL and future model network) were also considered as explained below.

Airport Demand

4.2.4 Airport passenger and staff demand trips are assumed to remain unchanged as the Original runs for all forecast years (2027 at 21.5 mppa, 2039 at 27 mppa and 2043 at 32 mppa).

4.2.5 Although the COVID-19 pandemic has impacted demand levels and mode choice, the updates to the modelling do not include any allowance for changes in baseline mode choice as a result of COVID-19. The FY mode choice assumptions for the 2027, 2039 and 2043 assessment years have not been changed as they accord with the minimum targets (for surface access via public transport, plus walking and cycling) as set out in the **Framework Travel Plan [AS-131]**, the proposals for car parking, the **Outline TRIMMA [REP5-041]** and what has been set out in the respective stakeholder Statement of Common Grounds (SOCGs) and **Green Controlled Growth Framework (GCG) [REP5-022]**. It is anticipated that any short-term impact on mode choice and traffic levels, as a result of COVID-19, will have dissipated as the airport's passenger demand returns to pre-pandemic levels and then continues to grow.

4.2.6 However, for the 2023 new model year, the airport demands were adjusted to reflect the existing level of passengers in reference to the latest Luton Airport Passenger Statistics. This was carried out by factoring the 18 mppa demand matrices down by a factor of 0.85. The factor was a result of comparing the latest applicable passenger numbers, 15.23 mppa (Ref 2) to the 18 mppa. (15.23/18 = 0.85).

Uncertainty Log updates

4.2.7 The UL has been updated in August/September 2023 to reflect any certainty changes to the proposed housing and employment development sites included within the log since it was last updated in June 2021.

4.2.8 This latest update focused on sites that would have over 250 dwellings or would create over 100 jobs. The update included a review of the individual Local Authorities' Planning Portals, updated Local Plans and news articles about potential future developments.

4.2.9 Since producing the previous version (in 2021) there have been several changes and these have been updated accordingly in terms of uncertainty (i.e. 'near certain', 'more than likely', 'reasonably foreseeable' and 'hypothetical'), quantum (e.g. households and jobs), anticipated year of completion and phasing.

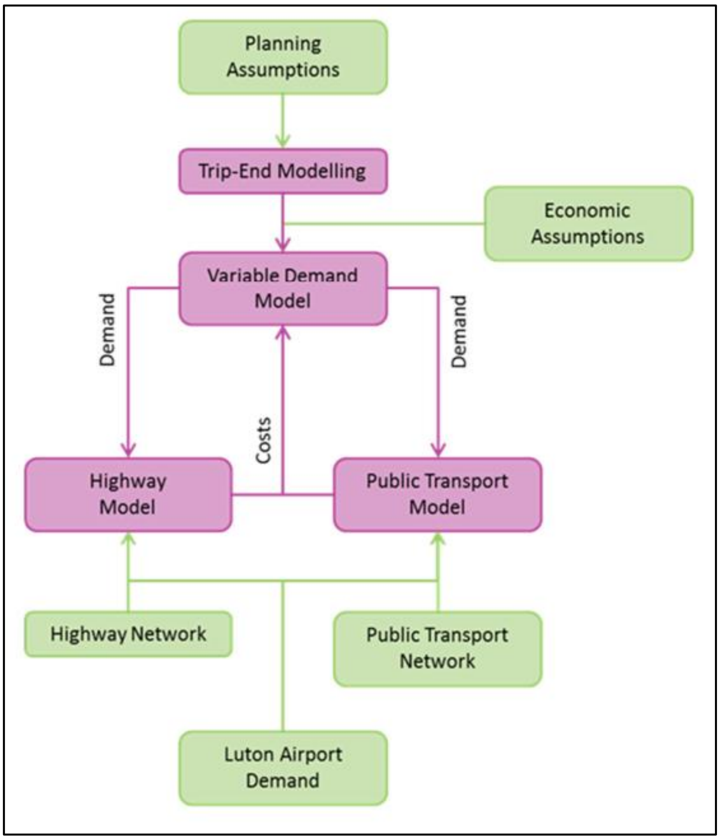
4.2.10 Among the changes, East and North of Luton developments, along with Newlands Park, have changed in terms of certainty level and land quantum which would have a notable direct impact on traffic levels within the study area.

4.2.11 The updated UL was shared in August/September 2023 with National Highways and local highway authorities and can also be found in Appendix D.

Background Growth Forecast

4.2.12 The forecasting method followed the methodology as reported in the **Strategic Modelling Forecasting report (Appendix F** of the **Transport Assessment [APP-201])** as summarised below:

Figure 4-1 Overview of CBLTM-LTN Forecasting Process



4.2.13 The updated UL planning data, NTEM 8 and NRTP22 parameters were utilised in this updated modelling, with the growth in traffic being constrained at a district level from NTEM 8, i.e., following the same methodology reported in the **Strategic Modelling Forecasting Report [APP-201]**.

Model Network Update

Model Assumptions

4.2.14 Strategic model runs have been undertaken for the forecast years 2027, 2039 and 2043 for “Without” and “With” Expansion. Runs have also been undertaken for a new model year of 2023.

4.2.15 In terms of future year transport infrastructure, the following updates have been assumed:

a. M1 – in 2043 no smart motorway improvement between J9-J10;

b. A1(M) – no smart motorway scheme J6 to J8 in all FY (Ref 3); and

c. Vauxhall Way – in 2027 no dualling and junction improvements and therefore reflecting the existing situation.

4.3 Model Results

Introduction

4.3.1 The results of the Updated models were checked, analysed and interpreted, in particular in comparison with the Original modelling that was submitted as a part of the application for development consent.

4.3.2 The main purpose of the analysis is to establish the impact of the Rule 9 model updates, in comparison with the previous modelling and assess whether there is a risk on the traffic forecasts.

Highway Model Flow Analysis

4.3.3 Traffic flow plot analysis has been undertaken to compare traffic assignment patterns between the Updated and Original runs for both “Without” and “With” Expansion.

4.3.4 Appendix E includes additional wider view flow plots with numerical values. These flow plots have been produced in high resolution which allows for numerical flow observation when zoomed in. Flow difference of ± 10 vehicles are considered as no change.

4.3.5 It is worth noting that the Original 2043 model used in this comparison represents the without M1 All Lane Running (ALR) scenario.

4.3.6 The comparison as shown in Figure 4-2 to Figure 4-7 show flow reductions on most of the links, except for the area east of M1 J11A and East Luton which can be attributed to the change in UL development assumptions as mentioned in Section 2.4.

4.3.7 In comparing the impact of Updated vs Original, a mix of flow increases and reductions can be observed in the 2027 forecast year, whilst the 2039 and 2043 forecast years generally show reductions. This is due to, firstly, higher spare highway capacity available in 2027 and, secondly, the changes in the NTEM version which are more prevalent in 2039 and 2043 compared to 2027.

4.3.8 Airport expansion impacts have also been compared between the Updated and Original runs to identify the level of pattern consistency.

4.3.9 Figure 4-8 to Figure 4-13 show similar patterns overall, with minor differences in a few locations which can be attributed to a change in the UL. These differences also occurred within the Updated vs Original comparison without the airport expansion, which indicates that these differences were caused by a change in background (non-airport) traffic rather than the impact of airport expansion.

4.3.10 Some extremely large flow changes can be seen in the figures, in particular the J10a roundabouts, M1 J10 (e.g. northbound off slip) and A602 at Hitchin, which are attributed to the difference in configuration of link structure within the strategic model network and not an actual flow increase. This also applies to the figures in Appendix E.

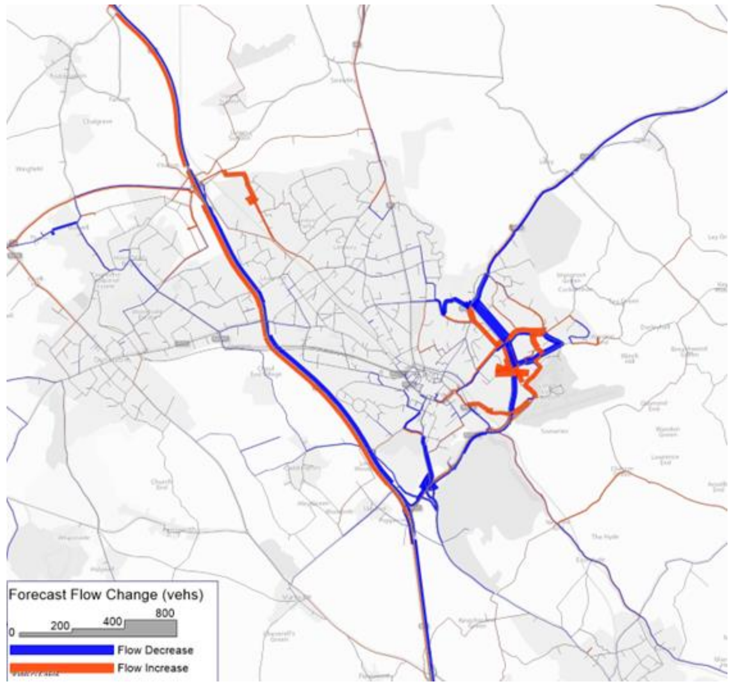
4.3.11 The comparison of results outlined above are relatively consistent between “Without” and “With” Expansion and ties in with the DfT growth projections assessment results, as described in Chapter 3.

4.3.12 Importantly, the impact of the airport expansion seems to follow similar patterns when compared with the previous modelling, although with lower overall traffic generally.

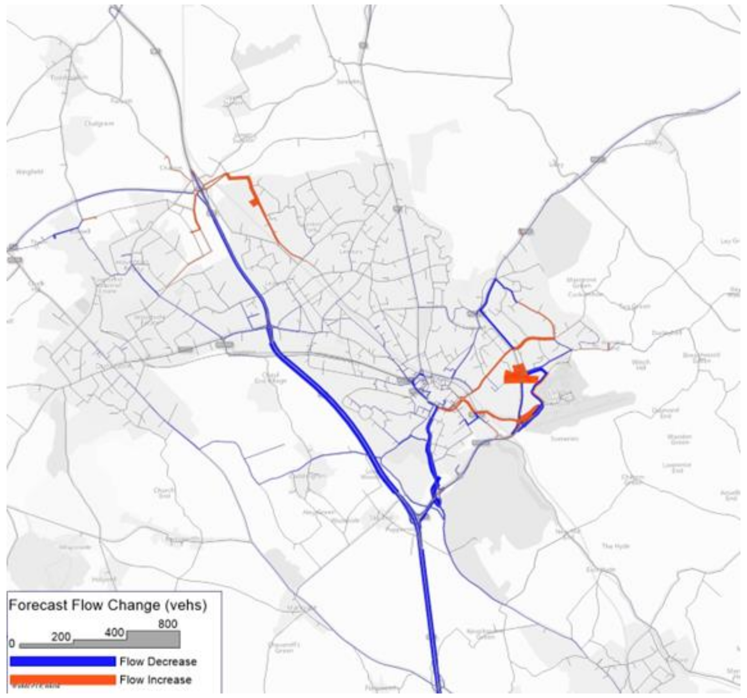
4.3.13 Further numerical link flow comparisons and analysis are provided in Section 4.4.

Figure 4-2 2027 “Without” Expansion – Updated vs Original runs

AM Peak



Inter Peak



PM Peak

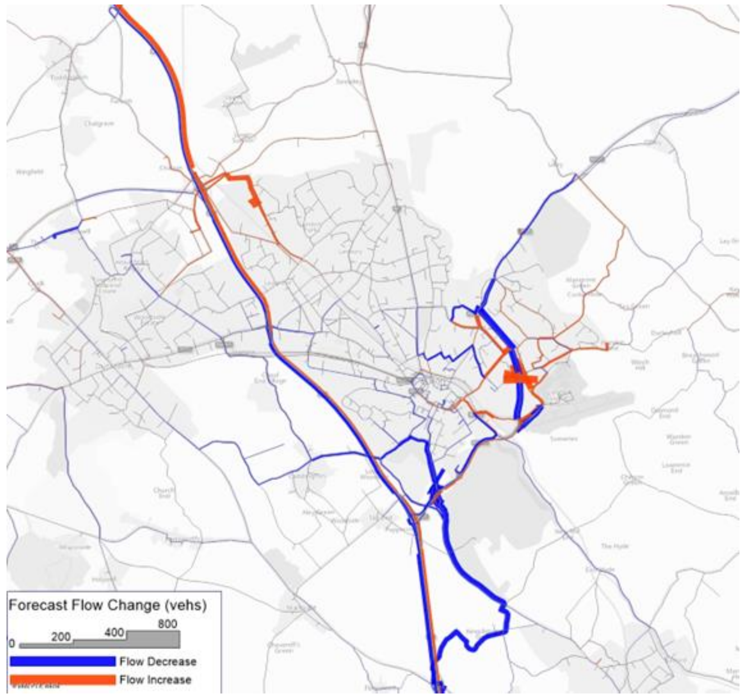
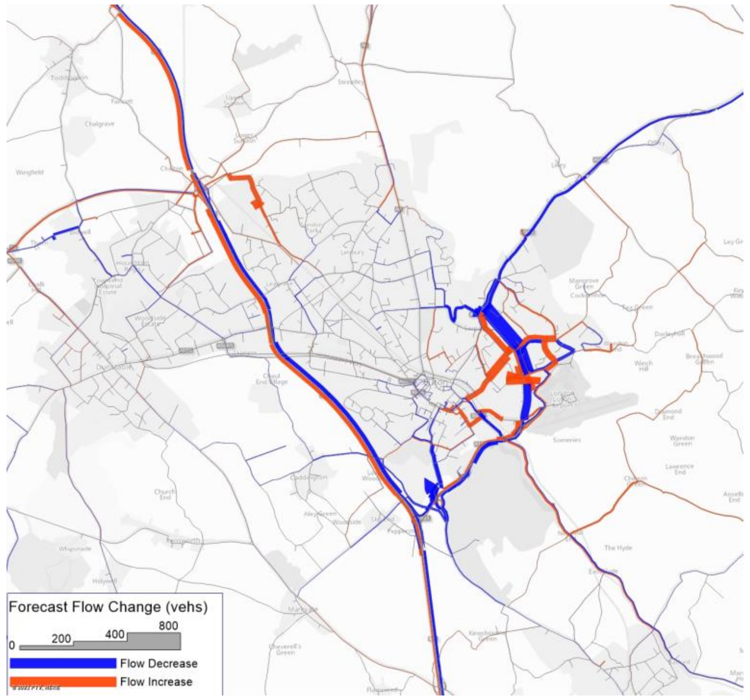
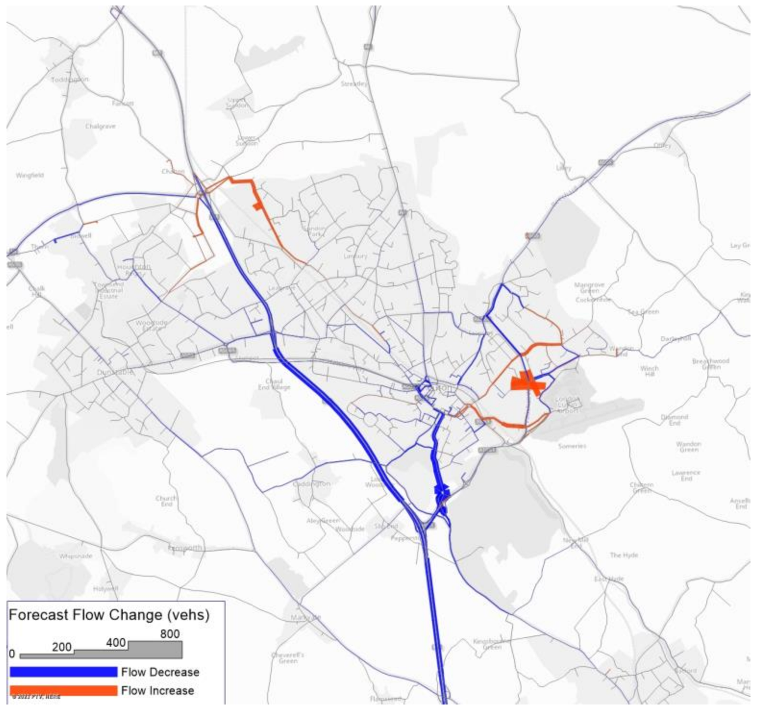


Figure 4-3 2027 “With” Expansion – Updated vs Original runs

AM Peak



Inter Peak



PM Peak

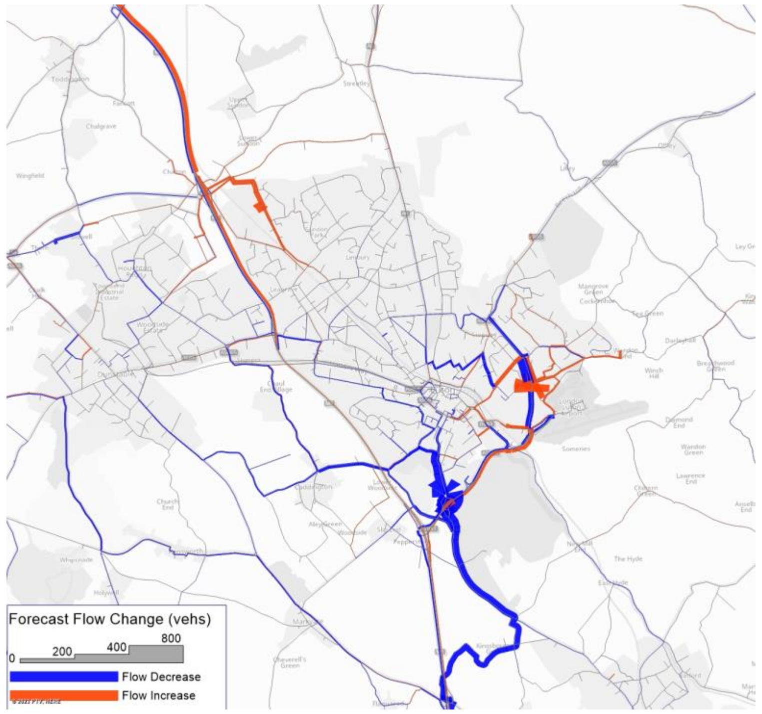
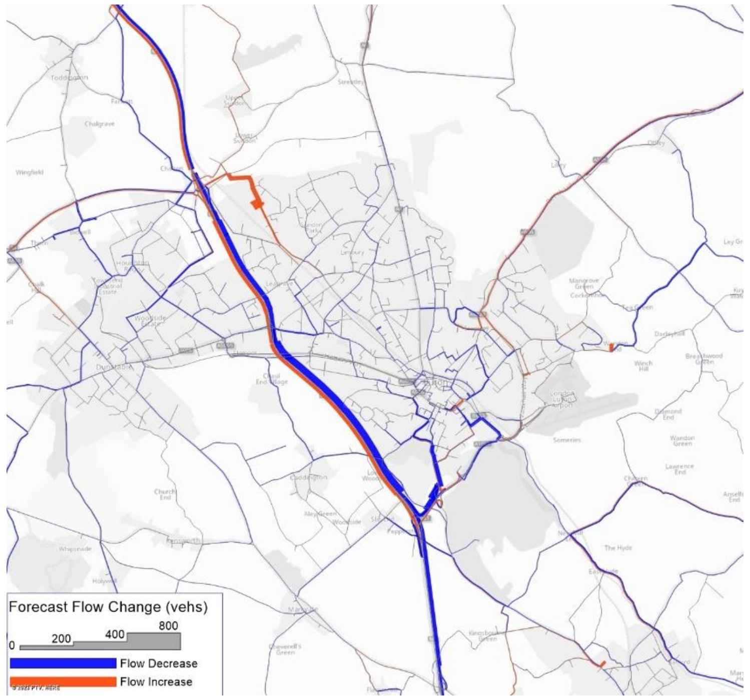
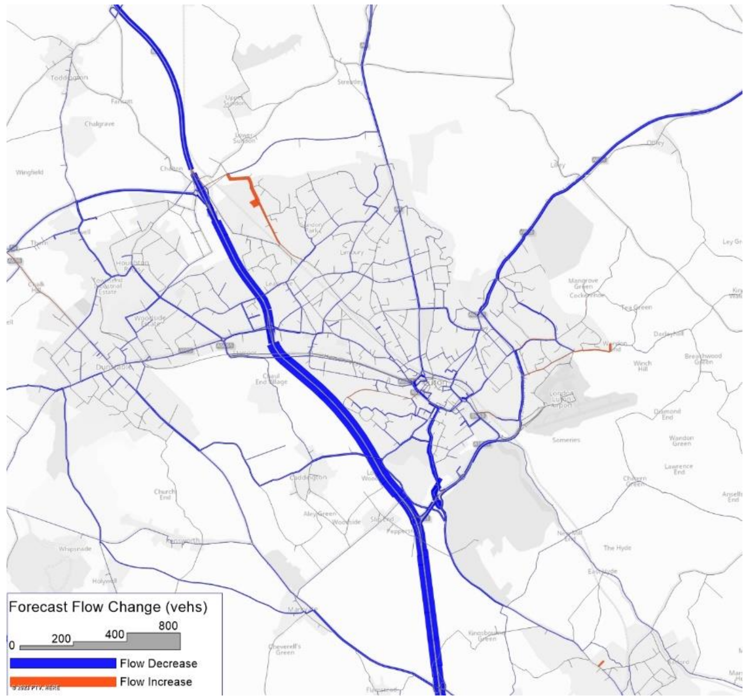


Figure 4-4 2039 "Without" Expansion – Updated vs Original runs

AM Peak



Inter Peak



PM Peak

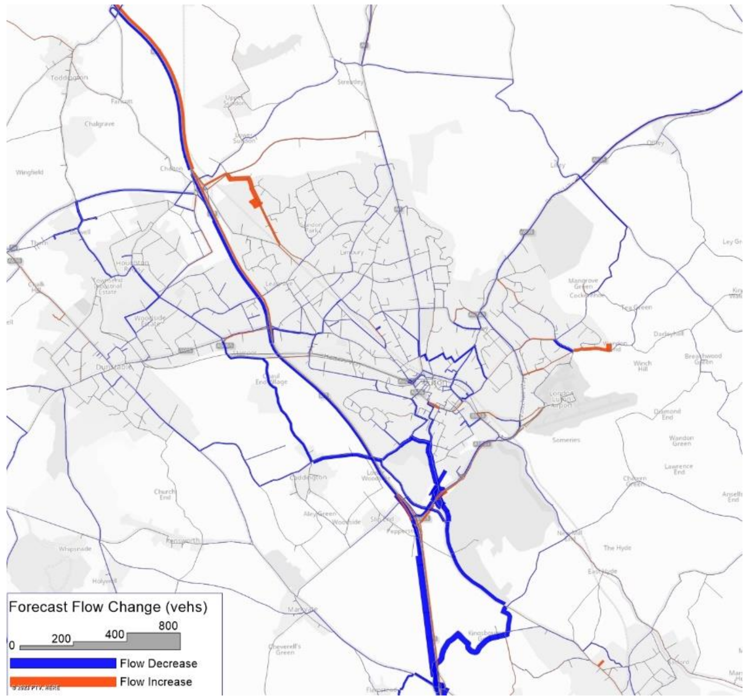
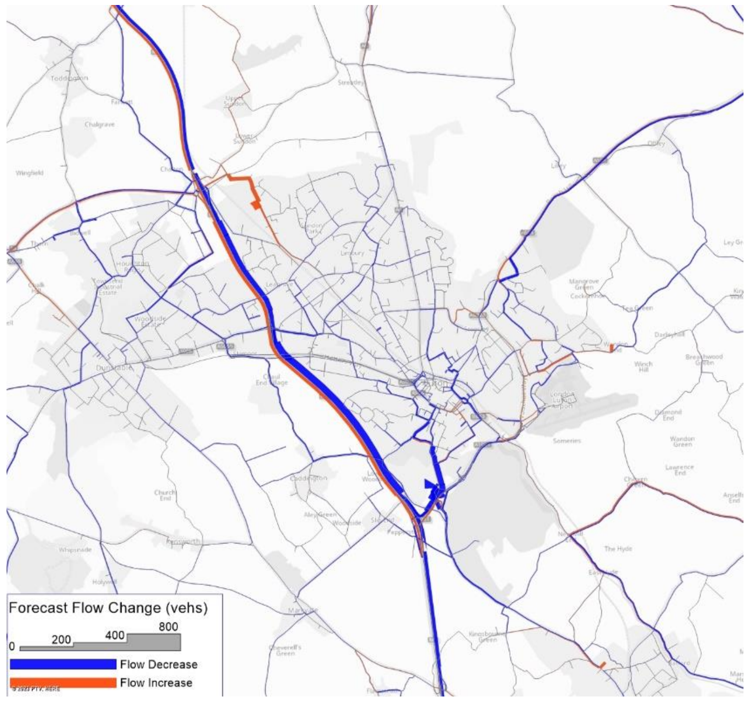
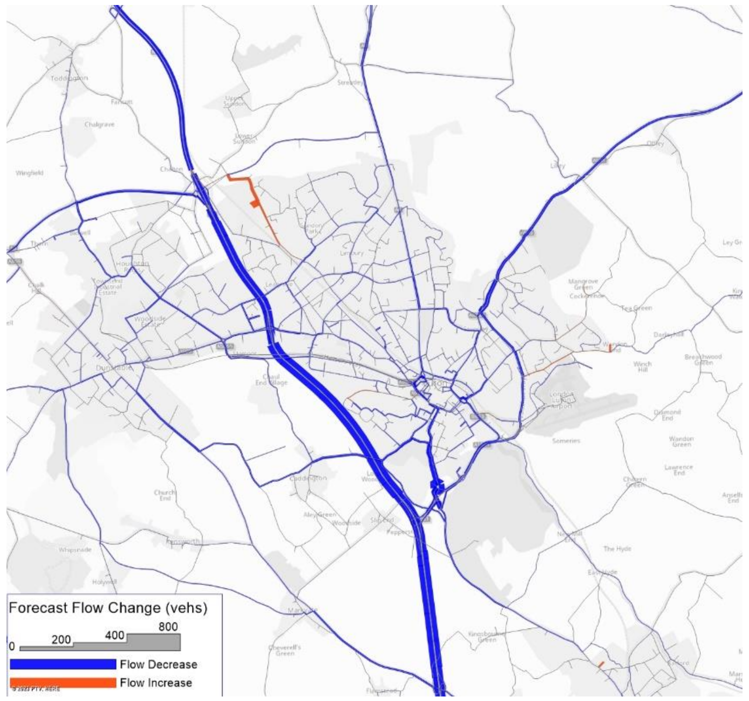


Figure 4-5 2039 "With" Expansion – Updated vs Original runs

AM Peak



Inter Peak



PM Peak

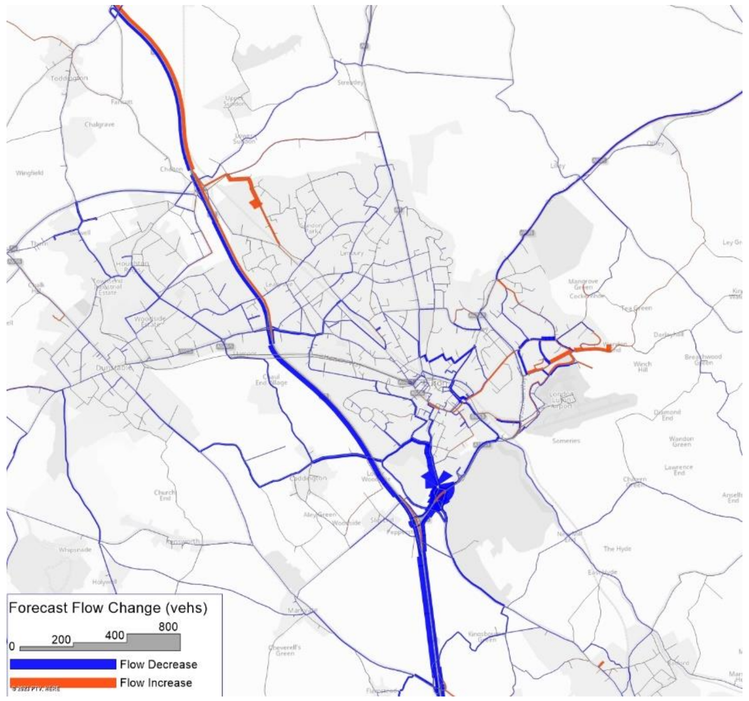


Figure 4-6 2043 “Without” Expansion – Updated vs Original runs

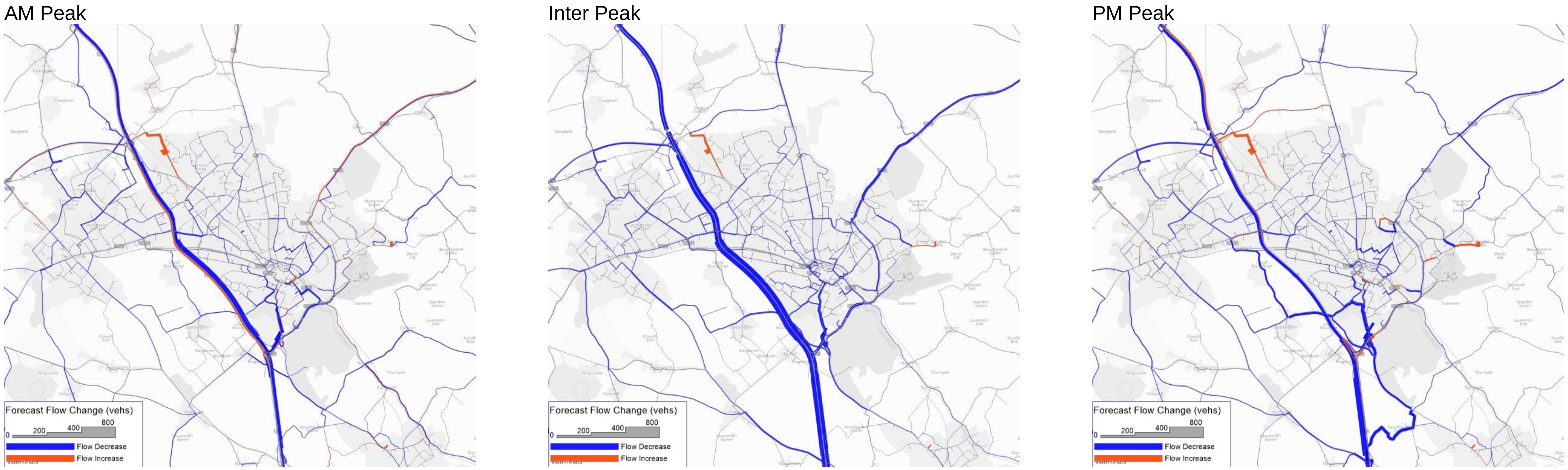


Figure 4-7 2043 “With” Expansion – Updated vs Original runs

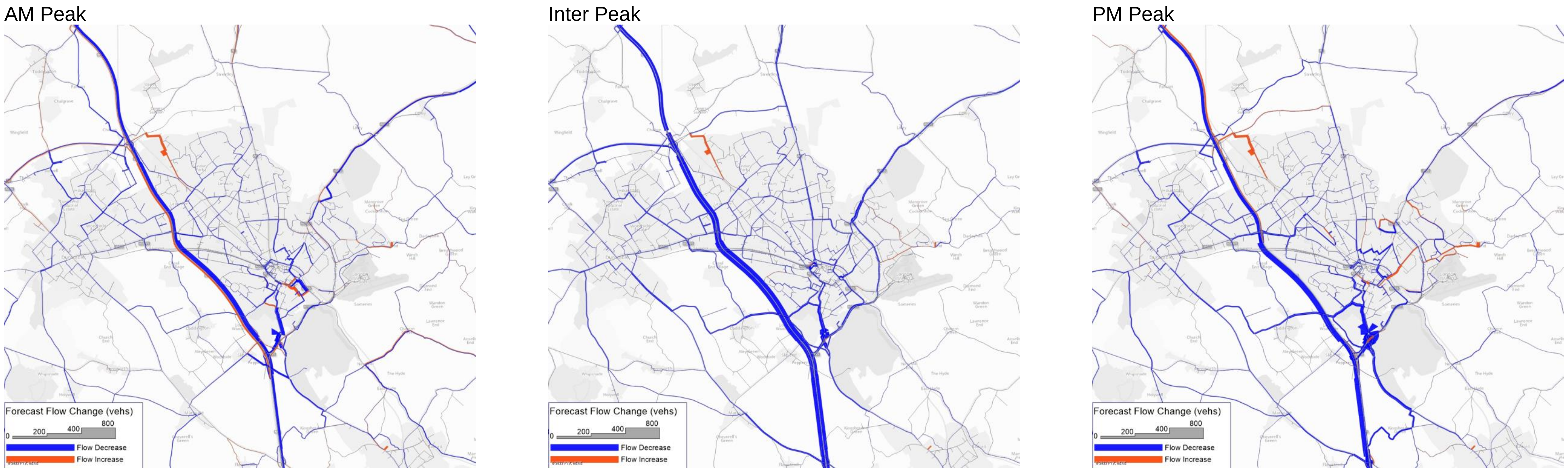
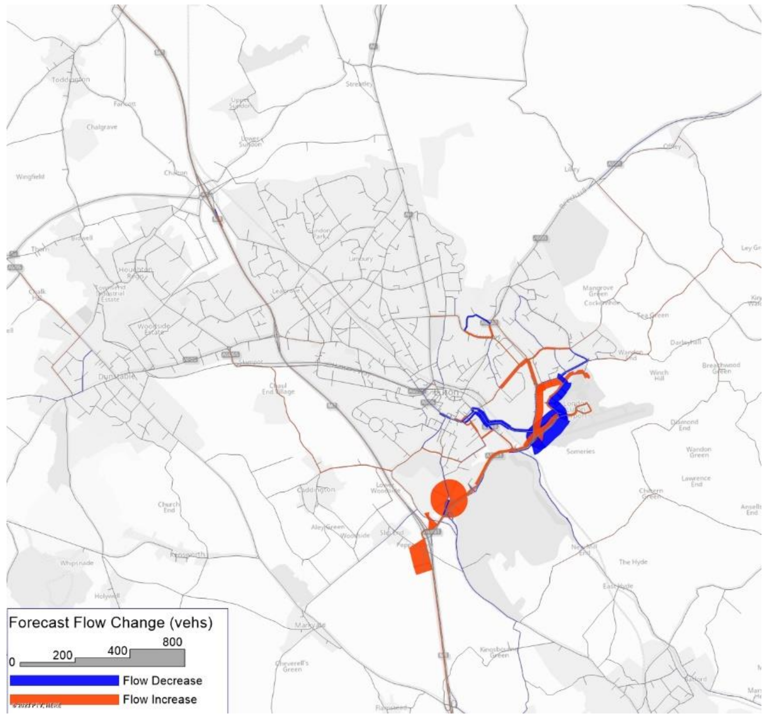
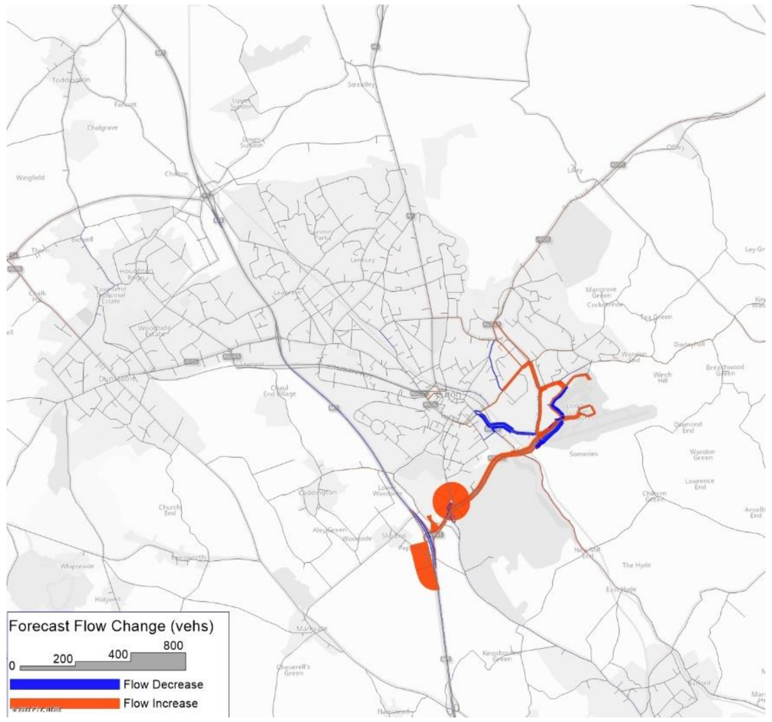


Figure 4-8 2027 Original runs – “With” vs “Without” Expansion

AM Peak



Inter Peak



PM Peak

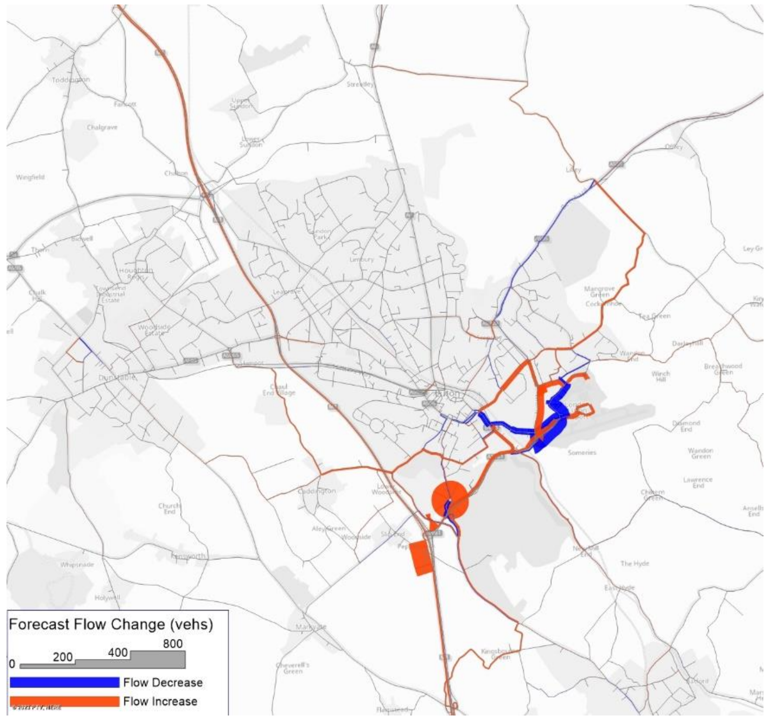
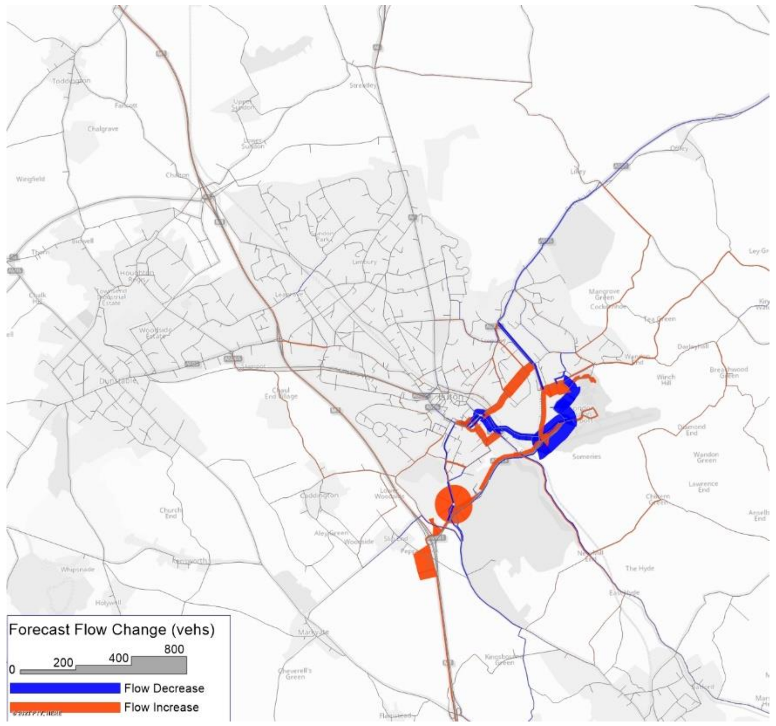
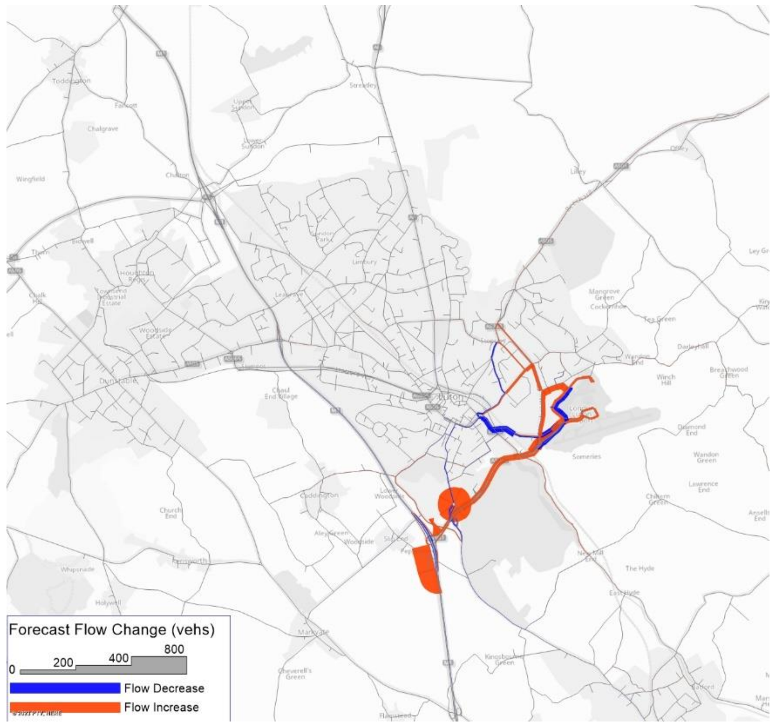


Figure 4-9 2027 Updated runs – “With” vs “Without” Expansion

AM Peak



Inter Peak



PM Peak

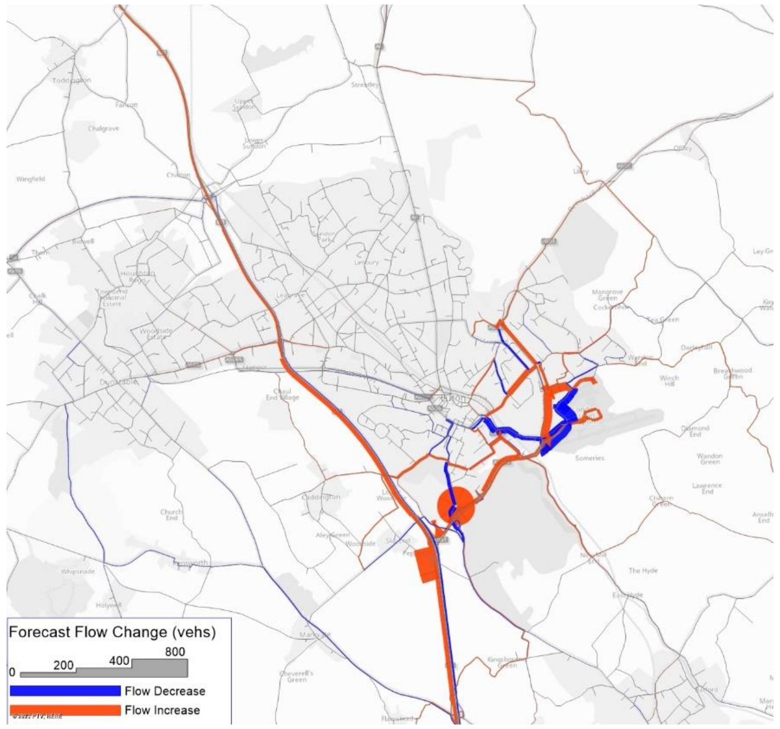
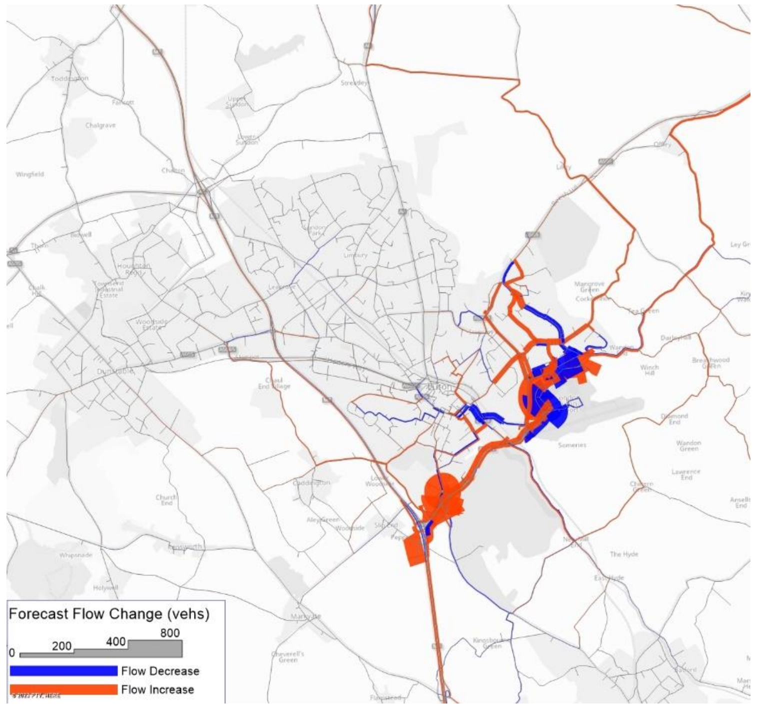
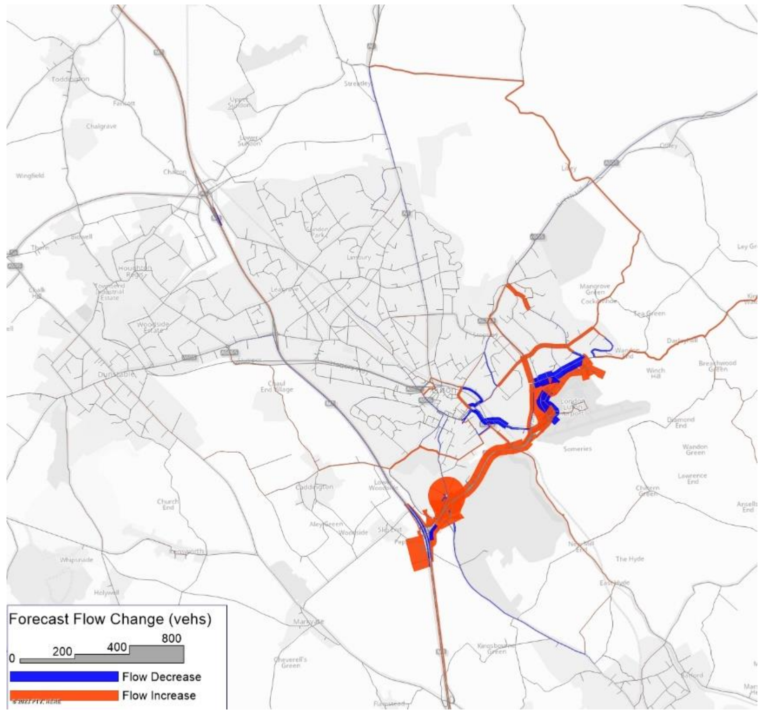


Figure 4-10 2039 Original runs – "With" vs "Without" Expansion

AM Peak



Inter Peak



PM Peak

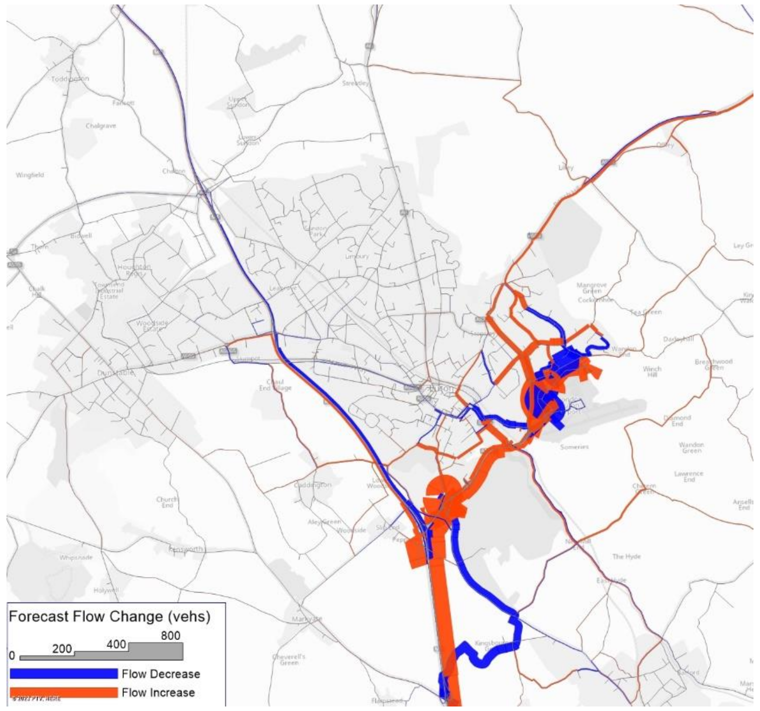
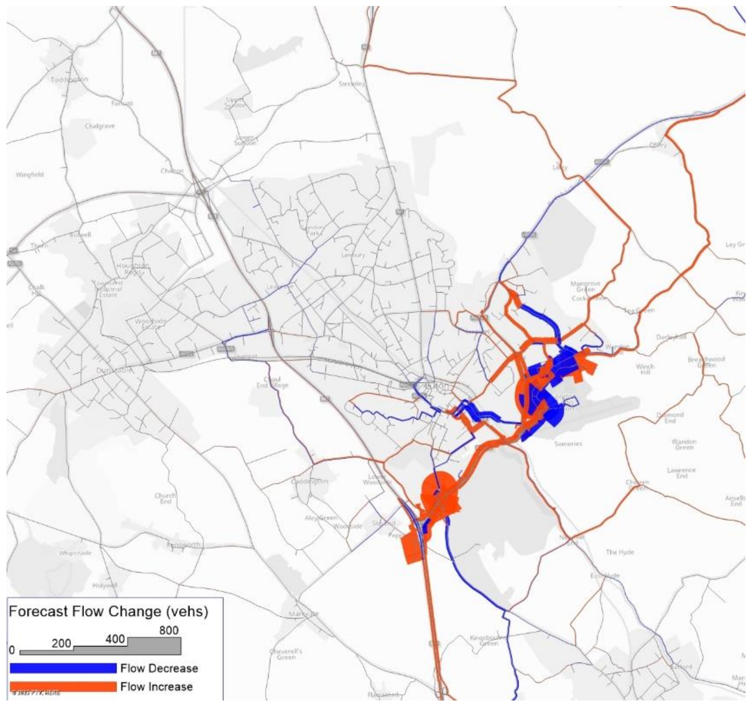
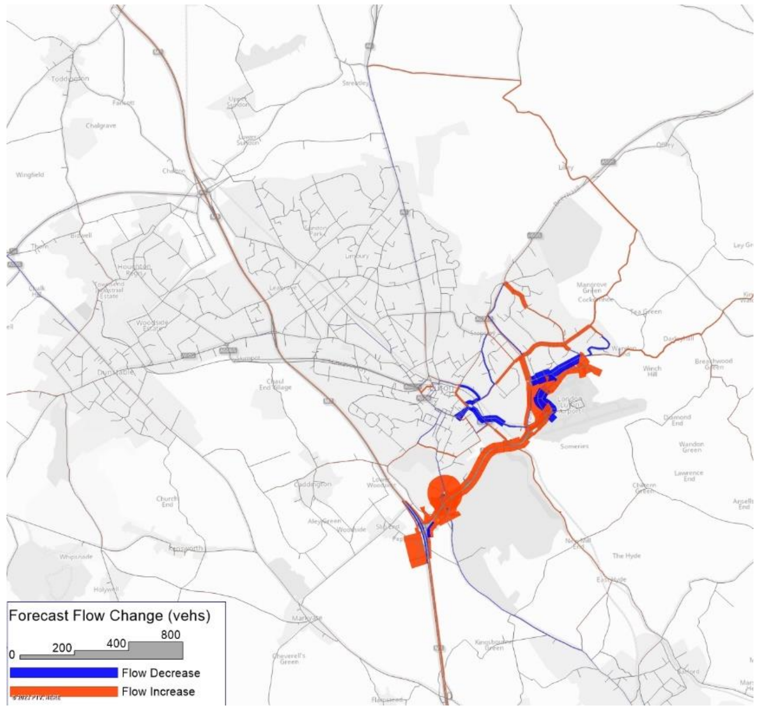


Figure 4-11 2039 Updated runs – "With" vs "Without" Expansion

AM Peak



Inter Peak



PM Peak

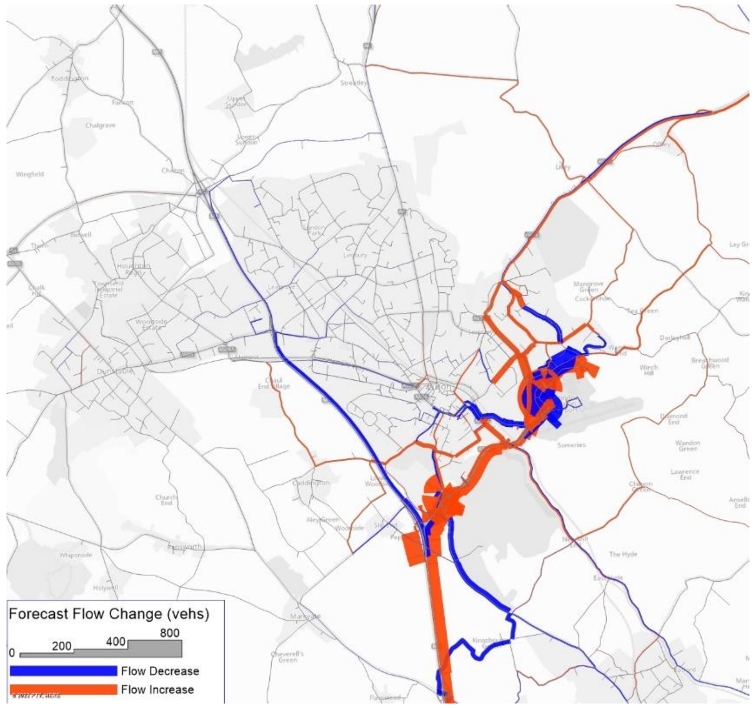
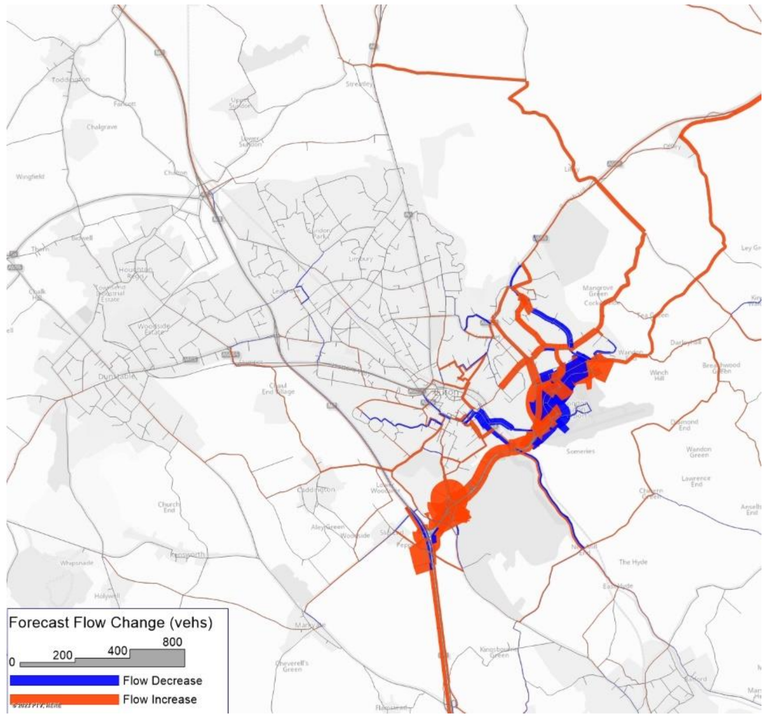
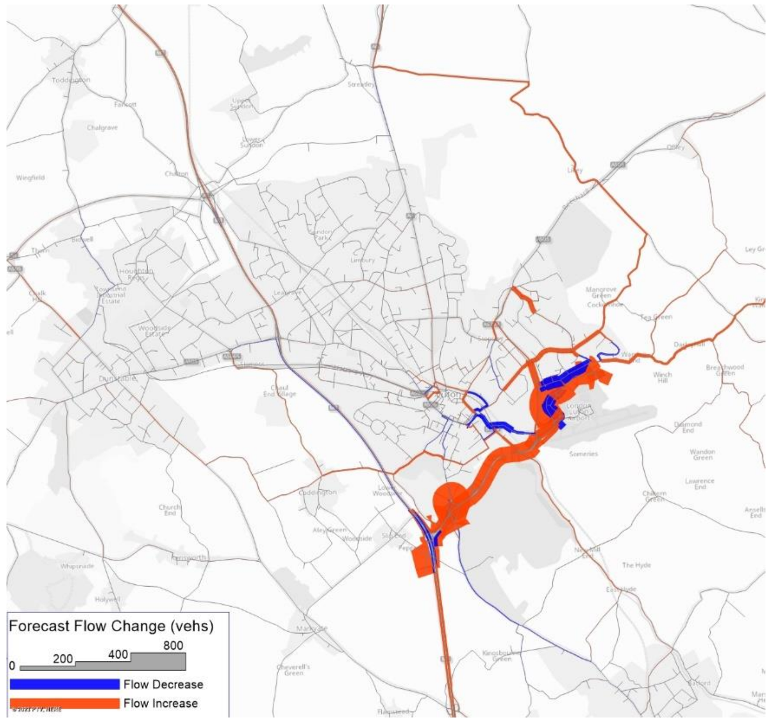


Figure 4-12 2043 Original runs – “With” vs “Without” Expansion

AM Peak



Inter Peak



PM Peak

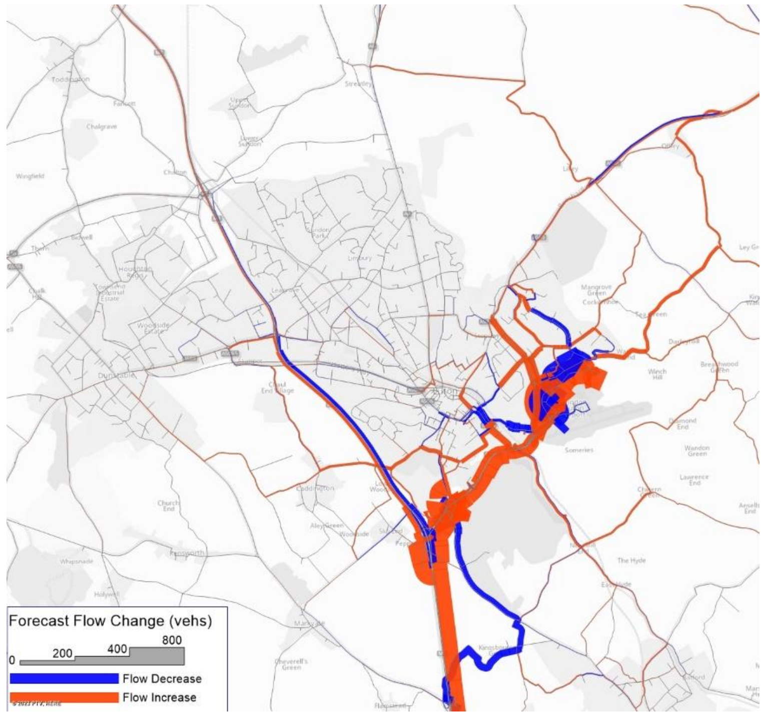
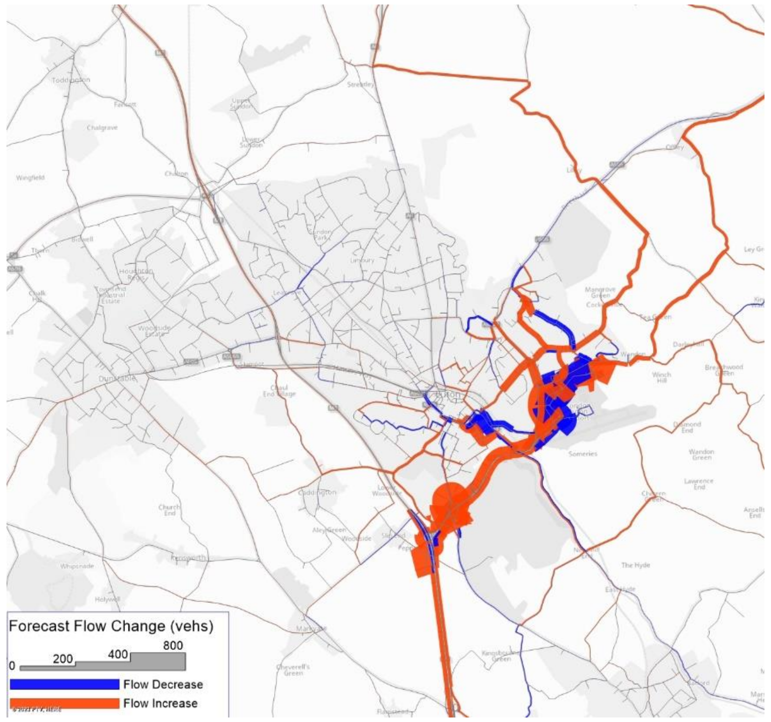
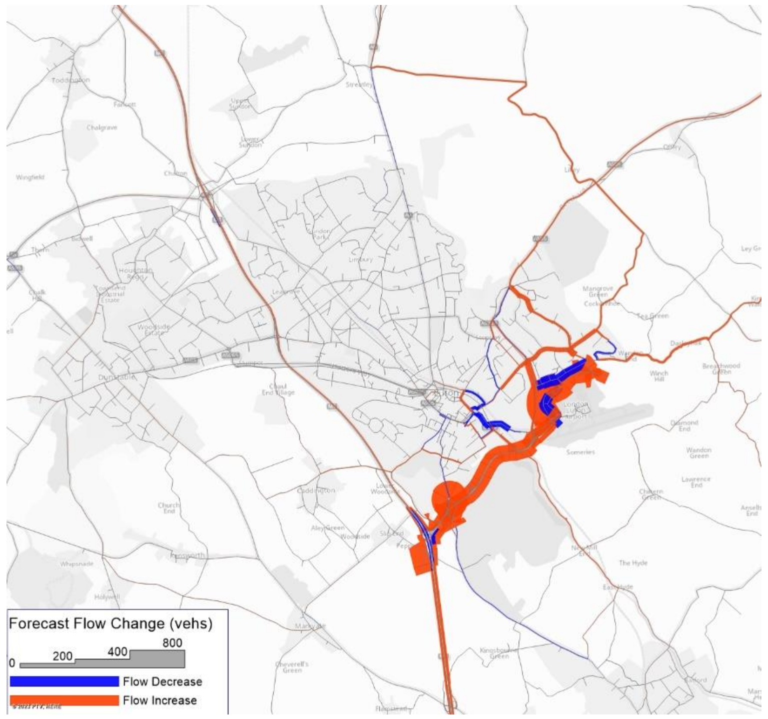


Figure 4-13 2043 Updated runs – “With” vs “Without” Expansion

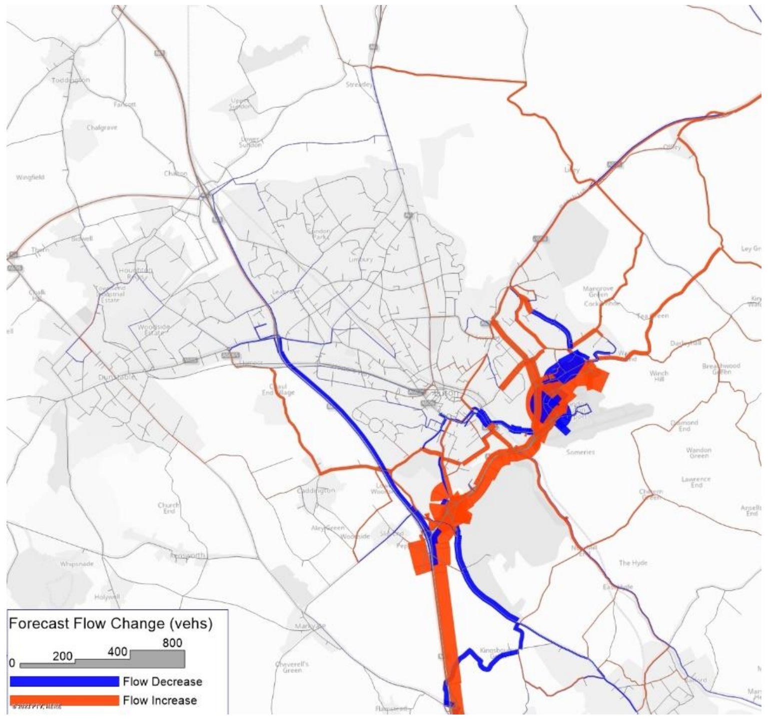
AM Peak



Inter Peak



PM Peak



Highway Model Motorway Junctions Capacity Assessment

4.3.14 Additional information regarding traffic flows and volume to capacity (VC) ratio, extracted from the CBLTM-LTN strategic model for each approach of three key motorway junctions (M1 J9, M1 J10 and M1 J11) within the study area is provided in **Table 4-1** to **Table 4-12** to provide indication of the junction operational performance.

4.3.15 VC is an indicator of the volume of traffic relative to the amount of traffic the road /junction approach was designed to accommodate within a certain period of time

4.3.16 Capacity assessment on M1 Junction 9 is provided for M1 J9 east and west roundabout separately.

4.3.17 Observation on M1 J9 (east) operation indicates in 2027, approximately 50% reduction in flows and VC can be observed from the North approach in the PM peak. Other approaches show only marginal change in both flows and VC. The flow reduction pattern on the North approach persists throughout 2039 and 2043 with a lower scale as the volume of traffic increases.

4.3.18 M1 J9 (west) and M1 J11 indicate only marginal changes throughout all FY on all approaches.

4.3.19 M1 J10 shows consistent pattern between Original and Updated runs with marginal changes to the flows and VC for all approaches.

4.3.20 Broadly similar traffic patterns can be observed between the Original runs and Updated runs.

4.3.21 Overall, compared to the Original runs, the Updated runs has resulted in reductions in flows.

Table 4-1: M1 Junction 9 (east) Flows and VC ratio - 2027

Peak	Approach	"Without" Expansion Original		"With" Expansion Original		"Without" Expansion Updated		"With" Expansion Updated	
		Flow	V/C	Flow	V/C	Flow	V/C	Flow	V/C
AM	North	372	23	374	23	385	23	394	24
	East	917	43	929	44	909	43	919	43
	South	503	24	509	24	530	25	537	25
	West	1,640	100	1,640	100	1,640	100	1,640	100
PM	North	534	33	593	36	307	19	345	21
	East	1,005	50	1,008	50	994	49	1,000	50
	South	837	42	840	42	819	41	775	39
	West	857	52	866	53	844	51	890	54

Table 4-2: M1 Junction 9 (west) Flows and VC ratio - 2027

Peak	Approach	"Without" Expansion Original		"With" Expansion Original		"Without" Expansion Updated		"With" Expansion Updated	
		Flow	V/C	Flow	V/C	Flow	V/C	Flow	V/C
AM	North	665	49	654	48	666	49	654	48
	East	1,074	65	1,082	66	1,070	65	1,085	66
	West	319	16	317	16	333	17	324	16
PM	North	745	51	749	51	751	51	731	50
	East	1,054	64	1,053	64	1,048	64	1,054	64
	West	203	10	201	10	203	10	209	10

Table 4-3: M1 Junction 10 Flows and VC ratio - 2027

Peak	Approach	"Without" Expansion Original		"With" Expansion Original		"Without" Expansion Updated		"With" Expansion Updated	
		Flow	V/C	Flow	V/C	Flow	V/C	Flow	V/C
AM	North LT - FF	1,708	85	1,732	87	1,621	81	1,655	83
	North LT - Gyratory	0	0	0	0	0	0	0	0
	East RT	1,081	27	1,105	28	1,123	29	1,138	29
	East LT-FF	1,278	68	1,275	68	1,277	68	1,280	68
	East LT - Gyratory	233	32	243	34	229	32	230	32
	South RT	1,604	65	1,657	45	1,520	62	1,590	43
PM	North LT - FF	1,189	59	1,207	60	1,167	58	1,218	61
	North LT - Gyratory	0	0	0	0	0	0	0	0
	East RT	1,751	44	1,760	45	1,727	44	1,768	45
	East LT-FF	1,387	76	1,395	76	1,435	79	1,440	79
	East LT - Gyratory	286	47	276	46	301	53	299	53
	South RT	1,501	75	1,537	51	1,405	70	1,447	48

Table 4-4: M1 Junction 11 Flows and VC ratio - 2027

Peak	Approach	"Without" Expansion Original		"With" Expansion Original		"Without" Expansion Updated		"With" Expansion Updated	
		Flow	V/C	Flow	V/C	Flow	V/C	Flow	V/C
AM	North	741	36	750	37	692	35	715	35
	East	1,422	31	1,441	32	1,405	31	1,449	32
	South	1,072	43	1,065	43	1,081	43	1,084	43
	West	969	24	975	25	948	24	957	24
PM	North	612	33	621	33	636	34	639	34
	East	1,161	50	1,182	51	1,108	48	1,103	47
	South	1,506	48	1,509	48	1,437	47	1,526	48
	West	1,093	37	1,096	38	1,062	36	1,051	36

Table 4-5: M1 Junction 9 (east) Flows and VC ratio - 2039

Peak	Approach	"Without" Expansion Original		"With" Expansion Original		"Without" Expansion Updated		"With" Expansion Updated	
		Flow	V/C	Flow	V/C	Flow	V/C	Flow	V/C
AM	North	444	27	425	26	435	27	433	26
	East	901	43	907	43	900	43	921	44
	South	625	30	623	30	641	30	632	30
	West	1,640	100	1,640	100	1,640	100	1,640	100
PM	North	593	36	298	18	345	21	246	15
	East	1,008	50	1,006	52	1,000	50	994	50
	South	840	42	920	47	775	39	912	46
	West	866	53	1,066	65	890	54	968	59

Table 4-6: M1 Junction 9 (west) Flows and VC ratio - 2039

Peak	Approach	"Without" Expansion Original		"With" Expansion Original		"Without" Expansion Updated		"With" Expansion Updated	
		Flow	V/C	Flow	V/C	Flow	V/C	Flow	V/C
AM	North	717	50	747	52	664	47	720	51
	East	1,052	64	1,055	64	1,061	65	1,076	66
	West	249	13	247	13	275	14	271	14
PM	North	749	51	744	50	731	50	791	54
	East	1,053	64	1,014	62	1,054	64	1,018	62
	West	201	10	194	9	209	10	196	10

Table 4-7: M1 Junction 10 Flows and VC ratio - 2039

Peak	Approach	"Without" Expansion Original		"With" Expansion Original		"Without" Expansion Updated		"With" Expansion Updated	
		Flow	V/C	Flow	V/C	Flow	V/C	Flow	V/C
AM	North LT - FF	1,897	95	1,921	96	1,756	88	1,793	90
	North LT - Gyratory	0	0	0	0	0	0	0	0
	East RT	1,186	30	1,049	26	1,240	31	1,103	28
	East LT-FF	1,284	69	1,632	41	1,291	69	1,669	42
	East LT - Gyratory	238	33	0	0	239	34	0	0
	South RT	1,765	72	1,875	68	1,652	74	1,798	65
PM	North LT - FF	1,207	60	1,377	69	1,218	61	1,333	67
	North LT - Gyratory	0	0	0	0	0	0	0	0
	East RT	1,760	45	1,693	42	1,768	45	1,641	41
	East LT-FF	1,395	76	2,601	65	1,440	79	2,413	60
	East LT - Gyratory	276	46	0	0	299	53	0	0
	South RT	1,537	51	1,567	82	1,447	48	1,486	78

Table 4-8: M1 Junction 11 Flows and VC ratio - 2039

Peak	Approach	"Without" Expansion Original		"With" Expansion Original		"Without" Expansion Updated		"With" Expansion Updated	
		Flow	V/C	Flow	V/C	Flow	V/C	Flow	V/C
AM	North	807	39	820	40	780	38	786	38
	East	1,523	34	1,549	34	1,461	32	1,480	33
	South	1,139	44	1,156	45	1,171	45	1,159	45
	West	1,020	26	997	25	985	25	946	24
PM	North	621	33	697	35	639	34	701	36
	East	1,182	51	1,231	53	1,103	47	1,144	49
	South	1,509	48	1,565	49	1,526	48	1,478	47
	West	1,096	38	1,121	38	1,051	36	1,087	37

Table 4-9: M1 Junction 9 (east) Flows and VC ratio - 2043

Peak	Approach	"Without" Expansion Original		"With" Expansion Original		"Without" Expansion Updated		"With" Expansion Updated	
		Flow	V/C	Flow	V/C	Flow	V/C	Flow	V/C
AM	North	470	29	471	29	439	27	434	26
	East	900	43	902	43	893	42	907	43
	South	646	31	638	31	671	32	658	31
	West	1,640	100	1,640	100	1,640	100	1,640	100
PM	North	731	45	403	25	508	31	290	18
	East	980	51	985	52	939	48	992	50
	South	1,001	50	990	50	926	47	913	46
	West	1,118	68	1,098	67	1,015	62	1,008	61

Table 4-10: M1 Junction 9 (west) Flows and VC ratio - 2043

Peak	Approach	"Without" Expansion Original		"With" Expansion Original		"Without" Expansion Updated		"With" Expansion Updated	
		Flow	V/C	Flow	V/C	Flow	V/C	Flow	V/C
AM	North	751	51	798	55	683	48	768	54
	East	1,044	64	1,040	63	1,050	64	1,056	64
	West	211	11	207	11	260	13	258	13
PM	North	696	48	708	48	719	49	769	52
	East	1,046	64	1,031	63	1,033	63	1,015	62
	West	217	11	206	10	189	9	184	9

Table 4-11: M1 Junction 10 Flows and VC ratio - 2043

Peak	Approach	“Without” Expansion Original		“With” Expansion Original		“Without” Expansion Updated		“With” Expansion Updated	
		Flow	V/C	Flow	V/C	Flow	V/C	Flow	V/C
AM	North LT - FF	1,934	97	1,971	99	1,807	90	1,873	94
	North LT - Gyratory	0	0	1	0	0	0	0	0
	East RT	1,213	31	1,146	29	1,264	32	1,166	29
	East LT-FF	1,285	69	1,666	42	1,296	70	1,735	43
	East LT – Gyratory	238	33	0	0	243	34	0	0
	South RT	1,786	73	2,070	75	1,686	76	1,984	72
PM	North LT – FF	1,330	66	1,398	70	1,292	65	1,360	68
	North LT – Gyratory	0	0	0	0	0	0	0	0
	East RT	1,797	45	1,774	44	1,951	49	1,672	42
	East LT-FF	1,416	77	2,608	65	1,415	77	2,541	64
	East LT – Gyratory	277	47	0	0	289	49	0	0
	South RT	1,500	75	1,610	84	1,415	83	1,547	81

Table 4-12: M1 Junction 11 Flows and VC ratio – 2043

Peak	Approach	"Without" Expansion Original		"With" Expansion Original		"Without" Expansion Updated		"With" Expansion Updated	
		Flow	V/C	Flow	V/C	Flow	V/C	Flow	V/C
AM	North	827	40	839	41	792	39	809	40
	East	1,569	35	1,590	35	1,471	33	1,506	33
	South	1,144	45	1,173	45	1,177	46	1,184	46
	West	1,039	26	1,027	26	993	25	981	25
PM	North	702	36	729	37	708	36	716	36
	East	1,288	55	1,255	54	1,219	52	1,176	50
	South	1,493	47	1,584	50	1,486	47	1,427	45
	West	1,169	40	1,124	39	1,135	39	1,084	37

Highway Model Volume to Capacity (VC) Analysis

4.3.46 Link based VC plot is a way to measure the volume of traffic, travelling on a road, relative to the amount of traffic the road was designed to accommodate within a certain period of time.

4.3.47 The VC plots indicate that the majority of the network is unaffected by the Rule 9 modelling updates. The Updated runs, which represent the modelling undertaken using NTEM 8, have reduced overall flow compared to the Original runs using NTEM 7.2; therefore the Updated runs in general are lower than the Original runs where there have been no infrastructure changes.

4.3.48 The largest differences are seen on the A1(M) where the smart motorway scheme has been removed from the Updated modelling and hence the VC ratios increase along the route.

4.3.49 Additionally, in 2027, the removal of improvement schemes and dualling on Vauxhall Way creates more pressure in the Updated modelling.

4.3.50 There are also minor differences visible on the M1, particularly near junction 10, where overall reduction in traffic flows on the SRN relieves pressure on the network.

4.3.51 The LRN south of the airport, east of the airport and west of the M1 all show similar levels of VC ratios between the Original and Updated modelling.

4.3.52 VC plots comparison between the Original runs and Updated runs are provided within Appendix F.

4.4 Link Flow Comparison

Updated vs original runs

4.4.1 Link flow comparisons between the Updated runs and Original runs were undertaken along the M1 between Junction 9 and 11, including the mainline and slip roads in both directions.

4.4.2 The GEH statistic, which is a form of the Chi-squared statistic, has been utilised as a statistical indicator for the comparison. It is a standard method, within TAG, of comparing two sets of traffic numbers to determine the level of agreement or discrepancy (the change significance) between the two sets of data.

$$GEH = \sqrt{\frac{(M-C)^2}{(M+C)/2}}$$

where: GEH is the GEH statistic

M is the modelled flow

C is the observed flow

4.4.3 When the GEH is less than five, this indicates a good match between two sets of traffic data.

4.4.4 Base and FY comparisons are provided in The SRN links comparison shows the Updated flows in all forecast years as either lower than the Original flows or higher than the Original flows but with a GEH less than 5, which is considered to be less significant change. It should be noted that that the SRN link flows show a step change in demand on the M1 southbound on-slip at Junction 10 in 2039 and 2043 with the Proposed Development in place. Whilst this increase occurs as a consequence of the improvements made to the M1 southbound on-slip in 2039 to support the Proposed Development, it should be noted that whilst the improvement addresses the demand associated with the Proposed Development, over 70% of the additional demand is associated with background traffic which also benefits from the scheme improvements.

4.4.5 A consistent pattern of links comparison can be seen on both the “With” and “Without” Expansion comparison, which shows that the majority of the LRN links have Updated flows either lower than the Original flows or higher than the Original flows but with a GEH less than 5.

4.4.6 Several increases in the Updated flows within the LRN compared to the Original flows on Eaton Green, east of Wigmore Lane can be attributed to re-routing traffic and the update on UL developments, namely the East of Luton development.

4.4.7 Increases on the Kimpton Road daily flows and Vauxhall Way AM peak flows can be attributed to the non-inclusion of Vauxhall Way dualling and its associated junctions in 2027. In 2039 and 2043 with the inclusion of the Vauxhall Way dualling and its associated junctions, there is no longer a difference between the Updated and Original flows.

4.4.9 Table 4-13 to **Table 4-16** show the Updated flows in AM, inter and PM peak hour vehicles, and daily vehicles. These numbers have been rounded into the nearest 100, followed by the proportional difference between the Updated and Original link flows within the brackets. For numbers less than 50, these have been rounded up to 50 to better represent the level of traffic (rather than 0).

$$GEH = \sqrt{\frac{(M-C)^2}{(M+C)/2}}$$

where: GEH is the GEH statistic

M is the modelled flow

C is the observed flow

4.4.10 A colour coded method has been adopted to allow for easier visual comparison of each link flow comparison:

a. Links with Updated flow < Original flow are marked as green;

g. Links with Updated flow > Original flow and GEH values less than five are marked as green as the changes are deemed to be less significant; and

h. Links with Updated flow > Original flow and GEH values higher than five are marked as red.

4.4.11 The SRN links comparison shows the Updated flows in all forecast years as either lower than the Original flows or higher than the Original flows but with a GEH less than 5, which is considered to be less significant change. It should be noted that that the SRN link flows show a step change in demand on the M1 southbound on-slip at Junction 10 in 2039 and 2043 with the Proposed Development in place. Whilst this increase occurs as a consequence of the improvements made to the M1 southbound on-slip in 2039 to support the Proposed Development, it should be noted that whilst the improvement addresses the demand associated with the Proposed Development, over 70% of the additional demand is associated with background traffic which also benefits from the scheme improvements.

4.4.12 A consistent pattern of links comparison can be seen on both the “With” and “Without” Expansion comparison, which shows that the majority of the LRN links have Updated flows either lower than the Original flows or higher than the Original flows but with a GEH less than 5.

4.4.13 Several increases in the Updated flows within the LRN compared to the Original flows on Eaton Green, east of Wigmore Lane can be attributed to re-routing traffic and the update on UL developments, namely the East of Luton development.

4.4.14 Increases on the Kimpton Road daily flows and Vauxhall Way AM peak flows can be attributed to the non-inclusion of Vauxhall Way dualling and its associated junctions in 2027. In 2039 and 2043 with the inclusion of the Vauxhall Way dualling and its associated junctions, there is no longer a difference between the Updated and Original flows.

Table 4-13: SRN Link Flows Comparison – "Without" Expansion (vehicles/hour)

Without Expansion						
Location	**Direction**	**Year**	**AM**	**IP**	**PM**	**AADT**
M1 Jn9 to 10	Northbound	2016	5,300	4,400	6,200	70,000
		2027	6,200 (1%)	5,300 (-2%)	6,800 (-3%)	81,400 (-1%)
		2039	6,800 (0%)	5,800 (-4%)	7,000 (-4%)	88,200 (-3%)
		2043	6,900 (1%)	5,900 (-4%)	7,100 (-5%)	89,600 (-4%)
M1 Jn9 to 10	Southbound	2016	5,500	4,300	5,900	69,600
		2027	6,200 (-2%)	5,100 (-2%)	6,600 (2%)	79,800 (-1%)
		2039	6,500 (-3%)	5,600 (-4%)	6,900 (1%)	86,200 (-3%)
		2043	6,600 (-3%)	5,700 (-4%)	7,000 (1%)	87,400 (-3%)
M1 within Jn10	Northbound	2016	4,100	3,600	4,800	56,000
		2027	4,800 (3%)	4,300 (-2%)	5,400 (-2%)	66,100 (-1%)
		2039	5,200 (2%)	4,800 (-4%)	5,600 (-3%)	71,900 (-3%)
		2043	5,300 (1%)	4,900 (-5%)	5,700 (-5%)	73,100 (-4%)
M1 within Jn10	Southbound	2016	4,200	3,400	4,200	53,200
		2027	4,900 (-2%)	4,000 (-2%)	4,800 (2%)	61,900 (-1%)
		2039	5,100 (-3%)	4,400 (-5%)	5,200 (1%)	67,500 (-3%)
		2043	5,200 (-4%)	4,500 (-5%)	5,300 (1%)	68,500 (-3%)
M1 Jn10 to 11	Northbound	2016	4,600	4,200	5,700	65,400
		2027	5,600 (3%)	5,100 (-3%)	6,700 (-2%)	78,600 (-1%)
		2039	6,100 (3%)	5,600 (-5%)	7,100 (-2%)	85,700 (-2%)
		2043	6,200 (2%)	5,700 (-5%)	7,200 (-3%)	87,100 (-3%)
M1 Jn10 to 11	Southbound	2016	5,300	3,900	4,900	63,100
		2027	6,400 (-3%)	4,700 (-2%)	5,900 (1%)	75,200 (-1%)
		2039	6,800 (-5%)	5,200 (-5%)	6,300 (0%)	81,800 (-3%)
		2043	6,900 (-4%)	5,300 (-5%)	6,400 (0%)	83,100 (-4%)
M1 Jn10 Off-Slip	Northbound	2016	1,300	800	1,400	14,000
		2027	1,400 (-6%)	900 (-1%)	1,400 (-7%)	15,200 (-3%)
		2039	1,600 (-7%)	1,000 (-3%)	1,400 (-8%)	16,300 (-4%)
		2043	1,600 (-2%)	1,000 (0%)	1,400 (-3%)	16,500 (-4%)
M1 Jn10 On-Slip	Northbound	2016	500	600	900	9,300
		2027	800 (5%)	800 (-7%)	1,300 (-5%)	12,500 (-4%)
		2039	900 (6%)	900 (-6%)	1,500 (6%)	13,800 (-1%)
		2043	900 (4%)	900 (-3%)	1,500 (10%)	14,000 (-1%)
M1 Jn10 Off-Slip	Southbound	2016	1,000	600	700	9,900
		2027	1,500 (-6%)	800 (-4%)	1,000 (-3%)	13,300 (-4%)

Without Expansion						
Location	**Direction**	**Year**	**AM**	**IP**	**PM**	**AADT**
		2039	1,700 (-8%)	800 (-6%)	1,100 (-3%)	14,300 (-6%)
		2043	1,700 (-5%)	900 (-4%)	1,100 (-1%)	14,600 (-6%)
M1 Jn10 On-Slip	Southbound	2016	1,300	1,000	1,700	16,400
		2027	1,400 (-1%)	1,100 (-3%)	1,700 (0%)	18,000 (-2%)
		2039	1,400 (0%)	1,200 (-3%)	1,700 (0%)	18,800 (-2%)
		2043	1,400 (-1%)	1,200 (-1%)	1,700 (0%)	19,000 (-1%)

Table 4-14: SRN Link Flows Comparison – “With” Expansion (vehicles/hour)

With Expansion						
Location	**Direction**	**Year**	**AM**	**IP**	**PM**	**AADT**
M1 Jn9 to 10	Northbound	2016	5,300	4,400	6,200	70,000
		2027	6,300 (1%)	5,300 (-2%)	7,000 (-1%)	82,100 (-1%)
		2039	6,900 (0%)	5,800 (-4%)	7,000 (-3%)	88,900 (-3%)
		2043	7,100 (3%)	6,000 (-4%)	7,100 (-4%)	91,300 (-3%)
M1 Jn9 to 10	Southbound	2016	5,500	4,300	5,900	69,600
		2027	6,200 (-2%)	5,100 (-2%)	6,500 (1%)	79,600 (-1%)
		2039	6,600 (-2%)	5,700 (-4%)	7,400 (-2%)	88,300 (-3%)
		2043	6,700 (-3%)	5,800 (-4%)	7,600 (1%)	90,600 (-3%)
M1 within Jn10	Northbound	2016	4,100	3,600	4,800	56,000
		2027	4,800 (3%)	4,300 (-2%)	5,500 (1%)	66,200 (0%)
		2039	5,200 (2%)	4,700 (-5%)	5,600 (-3%)	71,100 (-3%)
		2043	5,200 (1%)	4,800 (-5%)	5,600 (-4%)	72,100 (-3%)
M1 within Jn10	Southbound	2016	4,200	3,400	4,200	53,200
		2027	4,900 (-2%)	3,900 (-2%)	4,800 (1%)	61,200 (-1%)
		2039	5,100 (-4%)	4,300 (-5%)	5,000 (1%)	66,300 (-3%)
		2043	5,100 (-3%)	4,400 (-5%)	5,000 (1%)	67,100 (-3%)
M1 Jn10 to 11	Northbound	2016	4,600	4,200	5,700	65,400
		2027	5,600 (3%)	5,100 (-3%)	6,900 (0%)	79,100 (-1%)
		2039	6,100 (2%)	5,600 (-5%)	7,100 (-3%)	85,700 (-3%)
		2043	6,200 (1%)	5,700 (-4%)	7,100 (-4%)	87,200 (-3%)
M1 Jn10 to 11	Southbound	2016	5,300	3,900	4,900	63,100
		2027	6,400 (-3%)	4,700 (-2%)	5,800 (0%)	75,200 (-1%)
		2039	6,800 (-5%)	5,200 (-5%)	6,200 (0%)	81,800 (-3%)
		2043	6,900 (-3%)	5,400 (-5%)	6,200 (0%)	83,200 (-4%)
M1 Jn10 Off-Slip	Northbound	2016	1,300	800	1,400	14,000
		2027	1,500 (-5%)	1,000 (-1%)	1,400 (-6%)	15,900 (-3%)
		2039	1,700 (-5%)	1,100 (-2%)	1,500 (-6%)	17,900 (-3%)
		2043	1,900 (7%)	1,200 (1%)	1,500 (-1%)	19,300 (-3%)
M1 Jn10 On-Slip	Northbound	2016	500	600	900	9,300
		2027	800 (5%)	800 (-6%)	1,300 (-2%)	12,900 (-3%)
		2039	1,000 (6%)	900 (-4%)	1,500 (-4%)	14,700 (-3%)
		2043	1,000 (2%)	900 (-2%)	1,500 (-3%)	15,200 (-4%)
M1 Jn10 Off-Slip	Southbound	2016	1,000	600	700	9,900
		2027	1,600 (-5%)	800 (-4%)	1,100 (0%)	14,000 (-3%)
		2039	1,700 (-7%)	900 (-5%)	1,200 (-4%)	15,400 (-5%)

With Expansion						
Location	**Direction**	**Year**	**AM**	**IP**	**PM**	**AADT**
		2043	1,800 (-3%)	1,000 (-3%)	1,200 (-2%)	16,100 (-5%)
M1 Jn10 On-Slip	Southbound	2016	1,300	1,000	1,700	16,400
		2027	1,400 (-1%)	1,200 (-3%)	1,700 (1%)	18,400 (-2%)
		2039	1,500 (2%)	1,300 (-3%)	2,400 (-8%)	22,000 (-3%)
		2043	1,600 (0%)	1,400 (1%)	2,500 (2%)	23,500 (-1%)

Table 4-15: LRN Link Flows Comparison – "Without" Expansion (vehicles/hour)

Without Expansion						
Location	**Direction**	**Year**	**AM**	**IP**	**PM**	**AADT**
A1081, between Capability Green and B653	Eastbound	2016	2000	1400	2300	22900
		2027	2,500 (1%)	1,700 (-1%)	2,400 (-4%)	27,000 (-1%)
		2039	2,600 (0%)	1,800 (-3%)	2,600 (-2%)	28,600 (-2%)
		2043	2,600 (-1%)	1,800 (-3%)	2,600 (-1%)	29,000 (-3%)
A1081, between Capability Green and B653	Westbound	2016	2400	1500	2300	24500
		2027	2,600 (-5%)	1,800 (-2%)	2,600 (2%)	28,300 (-1%)
		2039	2,800 (-3%)	1,900 (-4%)	2,700 (1%)	29,900 (-2%)
		2043	2,800 (-2%)	1,900 (-3%)	2,700 (1%)	30,200 (-3%)
Kimpton Road, between Vauxhall Way and Vauxhall Road	Eastbound	2016	300	400	500	5600
		2027	600 (4%)	700 (-2%)	900 (1%)	9,700 (0%)
		2039	700 (-5%)	900 (-4%)	1,100 (1%)	11,900 (-3%)
		2043	700 (-6%)	900 (-6%)	1,100 (-2%)	12,200 (-6%)
Kimpton Road, between Vauxhall Way and Vauxhall Road	Westbound	2016	600	500	400	6300
		2027	1,100 (16%)	800 (13%)	600 (7%)	11,000 (13%)
		2039	1,300 (1%)	900 (-2%)	700 (-5%)	12,500 (-2%)
		2043	1,300 (-1%)	900 (-3%)	700 (-9%)	12,600 (-4%)
Vauxhall Way, between Eaton Green Road and Crawley Green Road	Northbound	2016	1000	800	1200	12800
		2027	1,000 (21%)	900 (0%)	1,100 (-17%)	13,500 (-1%)
		2039	900 (-1%)	1,000 (-5%)	1,400 (-2%)	14,300 (-4%)
		2043	900 (-1%)	1,000 (-6%)	1,400 (-1%)	14,900 (-4%)
Vauxhall Way, between Eaton Green Road and Crawley Green Road	Southbound	2016	1200	800	1100	12600
		2027	1,200 (-21%)	1,000 (-1%)	1,100 (-7%)	14,200 (-6%)
		2039	1,700 (1%)	1,100 (-6%)	1,200 (-1%)	16,500 (-4%)
		2043	1,700 (-1%)	1,100 (-2%)	1,200 (-2%)	16,500 (-2%)
A505, west of Lilley	Eastbound	2016	900	700	1200	11000
		2027	1,000 (3%)	800 (-1%)	1,300 (-5%)	12,200 (-1%)
		2039	1,000 (5%)	800 (-7%)	1,500 (-3%)	13,500 (-4%)
		2043	1,000 (6%)	900 (-10%)	1,500 (-3%)	13,800 (-6%)
A505, west of Lilley	Westbound	2016	1300	700	1000	11200
		2027	1,400 (-7%)	700 (-3%)	1,000 (-2%)	12,300 (-4%)
		2039	1,600 (-1%)	900 (-8%)	1,100 (1%)	14,200 (-5%)
		2043	1,700 (-2%)	900 (-8%)	1,100 (0%)	14,400 (-5%)
Eaton Green Road, east of Wigmore	Eastbound	2016	200	100	200	1500
		2027	200 (8%)	100 (6%)	300 (27%)	2,100 (13%)
		2039	200 (-3%)	100 (25%)	400 (50%)	2,600 (26%)
		2043	300 (-1%)	100 (23%)	400 (54%)	2,700 (24%)
Eaton Green Road, east of Wigmore	Westbound	2016	200	100	200	1400
		2027	300 (23%)	100 (24%)	200 (19%)	2,000 (23%)
		2039	300 (9%)	100 (53%)	200 (14%)	2,300 (28%)
		2043	400 (11%)	100 (57%)	200 (15%)	2,400 (29%)

Without Expansion						
Location	**Direction**	**Year**	**AM**	**IP**	**PM**	**AADT**
Lower Harpenden Road, south of A1081	Northbound	2016	600	400	800	6600
		2027	800 (6%)	400 (2%)	800 (-3%)	7,300 (1%)
		2039	800 (1%)	400 (-4%)	800 (-3%)	7,700 (-3%)
		2043	800 (4%)	400 (-3%)	800 (-2%)	7,900 (-2%)
Lower Harpenden Road, south of A1081	Southbound	2016	600	300	500	5600
		2027	700 (-3%)	400 (1%)	700 (-1%)	6,800 (-1%)
		2039	800 (-3%)	400 (-2%)	800 (-2%)	7,700 (-2%)
		2043	800 (-5%)	500 (-1%)	800 (1%)	8,000 (-2%)
A1081 London Road, between Half Moon Ln and West Hyde Rd	Northbound	2016	800	600	700	8600
		2027	900 (0%)	700 (-5%)	900 (-5%)	10,200 (-4%)
		2039	1,100 (3%)	700 (-7%)	1,000 (0%)	11,200 (-4%)
		2043	1,100 (4%)	700 (-5%)	1,000 (-1%)	11,500 (-4%)
A1081 London Road, between Half Moon Ln and West Hyde Rd	Southbound	2016	800	500	800	8200
		2027	900 (-4%)	500 (-2%)	1,000 (-18%)	9,300 (-7%)
		2039	1,000 (-5%)	600 (-5%)	1,200 (-12%)	10,300 (-7%)
		2043	1,100 (-7%)	600 (-5%)	1,300 (-4%)	10,700 (-7%)

Table 4-16: LRN Link Flows Comparison – "With" Expansion (vehicles/hour)

With Expansion						
Location	**Direction**	**Year**	**AM**	**IP**	**PM**	**AADT**
A1081, between Capability Green and B653	Eastbound	2016	2000	1400	2300	22900
		2027	2,600 (3%)	1,800 (-1%)	2,600 (-3%)	29,100 (-1%)
		2039	2,900 (-1%)	2,000 (-3%)	2,700 (-3%)	31,900 (-3%)
		2043	3,000 (3%)	2,200 (-2%)	2,800 (-1%)	34,000 (-3%)
A1081, between Capability Green and B653	Westbound	2016	2400	1500	2300	24500
		2027	2,600 (-7%)	1,900 (0%)	2,700 (5%)	29,800 (0%)
		2039	2,900 (-2%)	2,100 (-3%)	3,100 (-1%)	33,700 (-2%)
		2043	3,000 (-2%)	2,300 (0%)	3,300 (3%)	35,900 (-2%)
Kimpton Road, between Vauxhall Way and Vauxhall Road	Eastbound	2016	300	400	500	5600
		2027	500 (1%)	700 (14%)	900 (19%)	9,800 (14%)
		2039	600 (-9%)	800 (-2%)	900 (4%)	10,900 (-2%)
		2043	600 (-4%)	900 (1%)	900 (5%)	11,200 (0%)
Kimpton Road, between Vauxhall Way and Vauxhall Road	Westbound	2016	600	500	400	6300
		2027	900 (0%)	700 (15%)	500 (2%)	9,700 (10%)
		2039	1,300 (1%)	800 (-3%)	600 (-13%)	11,600 (-3%)
		2043	1,300 (3%)	900 (1%)	600 (-6%)	12,100 (-3%)
Vauxhall Way, between Eaton Green Road and Crawley Green Road	Northbound	2016	1000	800	1200	12800
		2027	1,000 (12%)	1,100 (1%)	1,100 (-24%)	14,700 (-4%)
		2039	1,100 (1%)	1,200 (-4%)	1,500 (-2%)	17,100 (-3%)
		2043	1,100 (1%)	1,200 (-2%)	1,600 (4%)	17,700 (-2%)
Vauxhall Way, between Eaton Green Road and Crawley Green Road	Southbound	2016	1200	800	1100	12600
		2027	1,100 (-31%)	1,000 (-5%)	1,100 (-8%)	14,300 (-11%)
		2039	1,800 (0%)	1,200 (-6%)	1,500 (-1%)	18,000 (-4%)
		2043	1,800 (1%)	1,200 (-3%)	1,500 (-2%)	18,600 (-3%)
A505, west of Lilley	Eastbound	2016	900	700	1200	11000
		2027	900 (-1%)	800 (-1%)	1,300 (-1%)	12,300 (-1%)
		2039	1,000 (3%)	900 (-7%)	1,400 (-5%)	13,500 (-5%)
		2043	1,000 (2%)	900 (-5%)	1,500 (-2%)	14,100 (-4%)
A505, west of Lilley	Westbound	2016	1300	700	1000	11200
		2027	1,400 (-8%)	800 (-3%)	1,000 (1%)	12,300 (-3%)
		2039	1,600 (-5%)	900 (-7%)	1,200 (1%)	14,300 (-5%)
		2043	1,600 (-6%)	900 (-5%)	1,200 (-2%)	14,900 (-5%)
Eaton Green Road, east of Wigmore	Eastbound	2016	200	100	200	1500
		2027	300 (16%)	100 (1%)	300 (25%)	2,400 (11%)
		2039	200 (-4%)	200 (8%)	400 (52%)	2,900 (18%)
		2043	300 (-5%)	200 (1%)	500 (47%)	3,700 (1%)
Eaton Green Road, east of Wigmore	Westbound	2016	200	100	200	1400
		2027	300 (23%)	100 (29%)	200 (13%)	1,900 (23%)
		2039	400 (8%)	100 (17%)	200 (1%)	2,600 (11%)

With Expansion						
Location	**Direction**	**Year**	**AM**	**IP**	**PM**	**AADT**
		2043	500 (26%)	200 (22%)	200 (8%)	3,200 (12%)
Lower Harpenden Road, south of A1081	Northbound	2016	600	400	800	6600
		2027	800 (12%)	400 (1%)	800 (-2%)	7,800 (2%)
		2039	900 (2%)	500 (-4%)	900 (-3%)	8,400 (-3%)
		2043	900 (3%)	500 (-2%)	1,000 (-2%)	8,700 (-2%)
Lower Harpenden Road, south of A1081	Southbound	2016	600	300	500	5600
		2027	700 (-5%)	400 (1%)	700 (-1%)	6,700 (-1%)
		2039	800 (-1%)	500 (-2%)	700 (-2%)	7,600 (-2%)
		2043	800 (-5%)	500 (0%)	800 (7%)	7,900 (-1%)
A1081 London Road, between Half Moon Ln and West Hyde Rd	Northbound	2016	800	600	700	8600
		2027	900 (-1%)	700 (-6%)	800 (-7%)	9,900 (-5%)
		2039	1,000 (-2%)	700 (-6%)	900 (-2%)	10,800 (-4%)
		2043	1,000 (6%)	700 (-5%)	900 (-7%)	11,000 (-6%)
A1081 London Road, between Half Moon Ln and West Hyde Rd	Southbound	2016	800	500	800	8200
		2027	900 (-4%)	500 (-3%)	1,100 (-19%)	9,300 (-8%)
		2039	1,000 (-6%)	600 (-6%)	1,000 (-8%)	9,600 (-6%)
		2043	1,100 (-6%)	600 (-5%)	1,100 (1%)	10,000 (-8%)

4.4.15 Following continuous engagements with National Highways and the local highway authorities of CBC, HCC and LBC, selected additional links within Lilly Bottom, Harpenden, Slip End, Caddington and Ivinghoe were added to provide additional information in **Table 4-17** and **Table 4-18**.

4.4.1 These additional locations are largely unaffected by the Updated modelling, with the majority of links maintaining very similar levels of traffic and no forecast years expecting any links to be impacted significantly enough to have a GEH larger than 5.

Table 4-17: Additional LRN Link Flows Comparison – "Without" Expansion (vehicles/hour)

Without Expansion						
Location	**Direction**	**Year**	**AM**	**IP**	**PM**	**AADT**
A1081 London Rd, north of Half Moon Ln	Northbound	2016	800	500	600	7700
		2027	900 (-1%)	600 (-6%)	800 (-6%)	9,300 (-5%)
		2039	1,000 (-2%)	700 (-8%)	900 (0%)	10,200 (-5%)
		2043	1,000 (3%)	700 (-6%)	900 (-2%)	10,600 (-5%)
A1081 London Rd, north of Half Moon Ln	Southbound	2016	700	400	700	7100
		2027	700 (-5%)	500 (-3%)	900 (-19%)	8,100 (-9%)
		2039	900 (0%)	500 (-5%)	1,100 (-13%)	9,100 (-7%)
		2043	900 (-4%)	500 (-5%)	1,200 (-4%)	9,500 (-7%)
A1081 Luton Road, between West Hyde Rd and The Common	Northbound	2016	600	500	600	7200
		2027	600 (0%)	500 (-3%)	600 (-3%)	7,600 (-3%)
		2039	600 (-3%)	600 (-4%)	600 (-1%)	7,900 (-3%)
		2043	700 (2%)	600 (-3%)	600 (0%)	8,000 (-3%)
A1081 Luton Road, between West Hyde Rd and The Common	Southbound	2016	500	400	600	6500
		2027	500 (-5%)	500 (-2%)	600 (0%)	7,100 (-2%)
		2039	600 (-5%)	500 (-4%)	700 (2%)	7,300 (-3%)
		2043	600 (-7%)	500 (-4%)	700 (1%)	7,400 (-4%)
West Hyde Rd, between A1081 Luton Rd and Lower Harpenden Rd	Northbound	2016	200	50*	100	900
		2027	200 (7%)	50 (-2%)	100 (11%)	1,000 (5%)
		2039	200 (-4%)	100 (-5%)	100 (2%)	1,300 (-3%)
		2043	300 (-10%)	100 (-4%)	100 (-4%)	1,400 (-6%)
West Hyde Rd, between A1081 Luton Rd and Lower Harpenden Rd	Southbound	2016	100	50*	100	700
		2027	200 (2%)	100 (-13%)	100 (-3%)	1,400 (-7%)
		2039	300 (-13%)	100 (-11%)	200 (-15%)	1,900 (-12%)
		2043	300 (-10%)	100 (-12%)	200 (-13%)	2,000 (-13%)
Chapel Rd, between Baileys Ln and Oxford Rd	Northbound	2016	50*	50*	100	900
		2027	100 (15%)	100 (6%)	100 (-11%)	1,100 (1%)
		2039	100 (9%)	100 (-4%)	200 (-9%)	1,300 (-4%)
		2043	100 (9%)	100 (-6%)	200 (-15%)	1,300 (-8%)
Chapel Rd, between Baileys Ln and Oxford Rd	Southbound	2016	100	50*	100	900
		2027	200 (7%)	100 (-5%)	100 (3%)	1,100 (0%)
		2039	200 (-9%)	100 (-6%)	100 (5%)	1,400 (-5%)
		2043	200 (-11%)	100 (-12%)	100 (4%)	1,400 (-11%)
Chapel Rd, between Oxford Rd and Darley Rd	Northbound	2016	100	100	100	1000
		2027	100 (11%)	100 (-7%)	100 (-12%)	1,100 (-6%)
		2039	100 (7%)	100 (-4%)	200 (-9%)	1,300 (-4%)
		2043	100 (7%)	100 (-4%)	200 (-14%)	1,300 (-7%)
Chapel Rd, between	Southbound	2016	100	100	100	1100
		2027	200 (9%)	100 (-15%)	100 (2%)	1,200 (-5%)
		2039	200 (-7%)	100 (-7%)	200 (2%)	1,500 (-5%)

Without Expansion						
Location	**Direction**	**Year**	**AM**	**IP**	**PM**	**AADT**
Oxford Rd and Darley Rd		2043	200 (-9%)	100 (-11%)	200 (1%)	1,500 (-10%)
Lilley Bottom, between Luton White Hill and Hollybush Hill	Northbound	2016	100	50*	200	900
		2027	100 (7%)	50 (1%)	300 (16%)	1,200 (9%)
		2039	100 (18%)	100 (11%)	300 (-18%)	1,600 (-4%)
		2043	100 (17%)	100 (11%)	300 (-21%)	1,600 (-6%)
Lilley Bottom, between Luton White Hill and Hollybush Hill	Southbound	2016	200	50*	100	800
		2027	200 (4%)	50* (5%)	100 (9%)	1,100 (5%)
		2039	300 (-6%)	100 (3%)	100 (10%)	1,300 (0%)
		2043	300 (-3%)	100 (5%)	100 (9%)	1,400 (1%)
Lilley Bottom Rd, west of Bendish Ln	Westbound	2016	100	50*	100	600
		2027	100 (-3%)	50* (-2%)	100 (9%)	700 (1%)
		2039	100 (1%)	50* (-20%)	100 (-7%)	900 (-9%)
		2043	100 (-5%)	50* (-21%)	100 (-4%)	900 (-11%)
Lilley Bottom Rd, west of Bendish Ln	Eastbound	2016	100	50*	100	600
		2027	100 (-3%)	50* (-4%)	100 (0%)	700 (-3%)
		2039	100 (-15%)	50* (-10%)	100 (-4%)	800 (-10%)
		2043	100 (-12%)	50* (-10%)	100 (-3%)	900 (-9%)
Annables Ln, west of Kinsbourne Green Ln	Westbound	2016	400	100	200	2100
		2027	400 (3%)	100 (1%)	300 (-41%)	2,600 (-17%)
		2039	500 (-2%)	100 (-3%)	500 (-36%)	3,200 (-18%)
		2043	500 (-5%)	100 (0%)	500 (-18%)	3,400 (-15%)
Annables Ln, west of Kinsbourne Green Ln	Eastbound	2016	200	100	200	1900
		2027	300 (0%)	100 (0%)	200 (-3%)	2,000 (-1%)
		2039	300 (1%)	100 (-1%)	200 (1%)	2,300 (0%)
		2043	300 (-4%)	100 (1%)	200 (0%)	2,400 (-1%)
A1081 Luton Road, south of The Common	Northbound	2016	800	600	700	8700
		2027	900 (1%)	600 (-3%)	800 (-2%)	9,400 (-2%)
		2039	900 (1%)	700 (-4%)	800 (-3%)	9,900 (-3%)
		2043	1,000 (2%)	700 (-3%)	800 (-3%)	10,100 (-2%)
A1081 Luton Road, south of The Common	Southbound	2016	700	500	700	7800
		2027	700 (-3%)	600 (-2%)	800 (1%)	8,400 (-1%)
		2039	800 (-3%)	600 (-4%)	800 (2%)	8,800 (-2%)
		2043	800 (-7%)	600 (-4%)	800 (1%)	9,000 (-3%)
Newlands Rd, between A1081 London Rd and B4540	Westbound	2016	400	300	600	4800
		2027	400 (-6%)	300 (-9%)	600 (-3%)	4,900 (-7%)
		2039	500 (-2%)	300 (-13%)	700 (-13%)	5,600 (-11%)
		2043	500 (-4%)	300 (-9%)	700 (-12%)	5,700 (-11%)
Newlands Rd, between A1081 London Rd and B4540	Eastbound	2016	700	300	400	4900
		2027	700 (-9%)	300 (-10%)	400 (-14%)	5,200 (-11%)
		2039	800 (-2%)	300 (-12%)	500 (-8%)	5,800 (-8%)
		2043	700 (-1%)	300 (-9%)	500 (-6%)	5,900 (-9%)

Without Expansion						
Location	**Direction**	**Year**	**AM**	**IP**	**PM**	**AADT**
Newlands Rd, between B4540 and Luton Rd	Westbound	2016	300	200	500	4000
		2027	300 (-1%)	200 (-9%)	500 (-2%)	4,000 (-6%)
		2039	300 (2%)	300 (-14%)	600 (-11%)	4,600 (-11%)
		2043	400 (-1%)	300 (-11%)	600 (-12%)	4,800 (-11%)
Newlands Rd, between B4540 and Luton Rd	Eastbound	2016	500	200	300	3000
		2027	500 (-9%)	200 (-13%)	300 (-15%)	3,100 (-12%)
		2039	500 (-6%)	200 (-16%)	300 (-8%)	3,600 (-12%)
		2043	500 (-3%)	200 (-14%)	400 (-6%)	3,600 (-13%)
Luton Rd between east of Chaul End Rd	Westbound	2016	400	400	800	6300
		2027	500 (0%)	400 (-7%)	800 (-10%)	6,700 (-7%)
		2039	500 (1%)	500 (-11%)	900 (-14%)	7,700 (-10%)
		2043	500 (-4%)	500 (-9%)	900 (-11%)	8,000 (-11%)
Luton Rd between east of Chaul End Rd	Eastbound	2016	800	400	600	6700
		2027	900 (-5%)	400 (-6%)	600 (-4%)	6,700 (-5%)
		2039	900 (-5%)	400 (-9%)	600 (-5%)	7,400 (-7%)
		2043	1,000 (-4%)	400 (-9%)	600 (-4%)	7,600 (-9%)
Chaul End Rd south of Hatters Way	Northbound	2016	300	200	300	2700
		2027	300 (1%)	200 (-1%)	300 (-11%)	3,300 (-3%)
		2039	400 (2%)	200 (-7%)	400 (-25%)	3,800 (-10%)
		2043	400 (-2%)	200 (-7%)	400 (-22%)	4,000 (-11%)
Chaul End Rd south of Hatters Way	Southbound	2016	300	200	300	3100
		2027	400 (-6%)	200 (0%)	300 (6%)	3,300 (0%)
		2039	400 (-10%)	200 (-5%)	400 (1%)	3,800 (-5%)
		2043	400 (-9%)	200 (-6%)	400 (-1%)	4,000 (-6%)
Half Moon Ln, between A1081 London Rd and Pepsal End Rd	Northbound	2016	100	100	100	1300
		2027	100 (-7%)	100 (-3%)	100 (-5%)	1,400 (-4%)
		2039	100 (-1%)	100 (-5%)	100 (-2%)	1,500 (-4%)
		2043	100 (0%)	100 (-4%)	100 (-4%)	1,500 (-4%)
Half Moon Ln, between A1081 London Rd and Pepsal End Rd	Southbound	2016	200	100	100	1500
		2027	200 (-7%)	100 (-3%)	100 (-6%)	1,600 (-5%)
		2039	300 (-19%)	100 (-6%)	100 (-4%)	1,800 (-10%)
		2043	300 (-15%)	100 (-4%)	100 (-5%)	1,800 (-12%)
B4540, between Newlands Rd and Front St	Northbound	2016	300	100	200	2600
		2027	400 (-6%)	200 (-5%)	200 (-9%)	2,900 (-6%)
		2039	300 (6%)	200 (-5%)	200 (-5%)	3,000 (-2%)
		2043	300 (3%)	200 (-2%)	200 (-5%)	3,000 (-2%)
B4540, between Newlands Rd and Front St	Southbound	2016	200	100	100	1500
		2027	200 (-10%)	100 (-4%)	200 (-4%)	1,600 (-5%)
		2039	200 (-6%)	100 (-3%)	200 (-14%)	1,700 (-6%)
		2043	200 (-6%)	100 (0%)	200 (-8%)	1,600 (-6%)
B489, between B488 and	Eastbound	2016	500	300	700	6000
		2027	600 (1%)	400 (-1%)	700 (0%)	6,500 (0%)

Without Expansion						
Location	**Direction**	**Year**	**AM**	**IP**	**PM**	**AADT**
Leighton Rd/B440		2039	700 (3%)	400 (-3%)	700 (-3%)	7,200 (-2%)
		2043	700 (2%)	400 (-3%)	800 (-2%)	7,400 (-2%)
B489, between B488 and Leighton Rd/B440	Westbound	2016	600	300	500	5400
		2027	600 (1%)	400 (0%)	500 (0%)	5,900 (0%)
		2039	600 (-3%)	400 (-3%)	600 (0%)	6,500 (-2%)
		2043	600 (-5%)	400 (-3%)	600 (3%)	6,700 (-2%)
B488, between B489 and Tringford Rd	Northbound	2016	500	300	500	5500
		2027	600 (3%)	400 (-1%)	600 (-4%)	6,200 (-1%)
		2039	600 (2%)	400 (-6%)	600 (-4%)	6,900 (-4%)
		2043	600 (1%)	500 (-6%)	600 (-3%)	7,100 (-5%)
B488, between B489 and Tringford Rd	Southbound	2016	600	300	600	6000
		2027	700 (-1%)	400 (-2%)	700 (2%)	6,600 (-1%)
		2039	700 (-1%)	400 (-7%)	800 (2%)	7,400 (-4%)
		2043	700 (-3%)	500 (-7%)	800 (1%)	7,700 (-5%)
B488, between B489 and Station Rd	Northbound	2016	300	200	300	3000
		2027	300 (5%)	200 (-1%)	400 (-7%)	3,500 (-2%)
		2039	400 (6%)	300 (-9%)	400 (-12%)	4,100 (-7%)
		2043	400 (4%)	300 (-10%)	400 (-12%)	4,300 (-8%)
B488, between B489 and Station Rd	Southbound	2016	300	200	200	2800
		2027	400 (-2%)	200 (-2%)	300 (3%)	3,300 (-1%)
		2039	400 (-9%)	200 (-11%)	400 (3%)	3,900 (-8%)
		2043	400 (-13%)	300 (-11%)	400 (2%)	4,200 (-9%)

Table 4-18: Additional LRN Link Flows Comparison – "With" Expansion (vehicles/hour)

With Expansion						
Location	**Direction**	**Year**	**AM**	**IP**	**PM**	**AADT**
A1081 London Rd, north of Half Moon Ln	Northbound	2016	800	500	600	7700
		2027	900 (-3%)	600 (-7%)	700 (-7%)	9,000 (-6%)
		2039	1,000 (-4%)	600 (-7%)	800 (-3%)	9,800 (-5%)
		2043	1,000 (5%)	600 (-5%)	800 (-8%)	10,000 (-7%)
A1081 London Rd, north of Half Moon Ln	Southbound	2016	700	400	700	7100
		2027	700 (-5%)	500 (-3%)	1,000 (-21%)	8,200 (-10%)
		2039	800 (-4%)	500 (-7%)	900 (-6%)	8,500 (-6%)
		2043	800 (-6%)	500 (-5%)	1,000 (1%)	8,800 (-7%)
A1081 Luton Road, between West Hyde Rd and The Common	Northbound	2016	600	500	600	7200
		2027	600 (-2%)	500 (-3%)	600 (-4%)	7,500 (-3%)
		2039	600 (-1%)	500 (-4%)	600 (1%)	7,600 (-3%)
		2043	700 (3%)	500 (-3%)	600 (-5%)	7,600 (-4%)
A1081 Luton Road, between West Hyde Rd and The Common	Southbound	2016	500	400	600	6500
		2027	500 (-3%)	500 (-2%)	600 (-1%)	7,100 (-2%)
		2039	600 (-6%)	500 (-5%)	600 (-4%)	7,100 (-5%)
		2043	600 (-7%)	500 (-4%)	600 (1%)	7,200 (-5%)
West Hyde Rd, between A1081 Luton Rd and Lower Harpenden Rd	Northbound	2016	200	50*	100	900
		2027	200 (5%)	50* (-2%)	100 (5%)	1,000 (3%)
		2039	300 (-2%)	100 (-5%)	200 (-4%)	1,500 (-4%)
		2043	300 (0%)	100 (-5%)	200 (-3%)	1,600 (-4%)
West Hyde Rd, between A1081 Luton Rd and Lower Harpenden Rd	Southbound	2016	100	50*	100	700
		2027	200 (7%)	100 (-20%)	100 (-5%)	1,300 (-9%)
		2039	200 (-13%)	100 (-13%)	200 (-10%)	1,800 (-12%)
		2043	300 (-6%)	100 (-12%)	200 (4%)	2,100 (-12%)
Chapel Rd, between Baileys Ln and Oxford Rd	Northbound	2016	50*	50*	100	900
		2027	100 (26%)	100 (-2%)	100 (-15%)	1,100 (-3%)
		2039	200 (8%)	100 (-3%)	200 (-13%)	1,600 (-5%)
		2043	200 (28%)	100 (1%)	200 (-12%)	1,700 (-4%)
Chapel Rd, between Baileys Ln and Oxford Rd	Southbound	2016	100	50*	100	900
		2027	200 (21%)	100 (1%)	200 (16%)	1,400 (10%)
		2039	200 (-9%)	100 (-3%)	200 (1%)	1,700 (-4%)
		2043	200 (-8%)	100 (-2%)	200 (8%)	1,900 (-9%)
Chapel Rd, between Oxford Rd and Darley Rd	Northbound	2016	100	100	100	1000
		2027	100 (18%)	100 (-1%)	100 (-15%)	1,100 (-3%)
		2039	200 (7%)	100 (-2%)	200 (-12%)	1,500 (-4%)
		2043	200 (26%)	100 (1%)	200 (-13%)	1,600 (-4%)
Chapel Rd, between Oxford Rd and Darley Rd	Southbound	2016	100	100	100	1100
		2027	200 (24%)	100 (1%)	200 (13%)	1,500 (10%)
		2039	200 (-7%)	100 (-3%)	200 (0%)	1,700 (-3%)
		2043	200 (-6%)	100 (-4%)	200 (6%)	1,800 (-10%)

With Expansion						
Location	**Direction**	**Year**	**AM**	**IP**	**PM**	**AADT**
Lilley Bottom, between Luton White Hill and Hollybush Hill	Northbound	2016	100	50*	200	900
		2027	100 (36%)	50* (1%)	300 (-4%)	1,400 (3%)
		2039	200 (10%)	100 (4%)	300 (-11%)	2,100 (-2%)
		2043	200 (10%)	100 (6%)	400 (-3%)	2,500 (-1%)
Lilley Bottom, between Luton White Hill and Hollybush Hill	Southbound	2016	200	50*	100	800
		2027	200 (4%)	50* (7%)	100 (9%)	1,100 (6%)
		2039	400 (-2%)	100 (3%)	100 (7%)	1,700 (2%)
		2043	400 (13%)	100 (3%)	100 (8%)	2,000 (-2%)
Lilley Bottom Rd, west of Bendish Ln	Westbound	2016	100	50*	100	600
		2027	100 (0%)	50* (-3%)	100 (-3%)	700 (-2%)
		2039	100 (-1%)	50* (-10%)	100 (-7%)	1,000 (-7%)
		2043	200 (5%)	50* (-6%)	200 (-6%)	1,200 (-5%)
Lilley Bottom Rd, west of Bendish Ln	Eastbound	2016	100	50*	100	600
		2027	100 (6%)	50* (-31%)	100 (-17%)	800 (-21%)
		2039	100 (-11%)	50* (-8%)	100 (-1%)	900 (-7%)
		2043	200 (-20%)	50* (-7%)	100 (16%)	1,100 (-13%)
Annables Ln, west of Kinsbourne Green Ln	Westbound	2016	400	100	200	2100
		2027	400 (5%)	100 (2%)	400 (-41%)	2,800 (-17%)
		2039	500 (1%)	100 (-3%)	300 (-16%)	2,700 (-5%)
		2043	500 (-1%)	100 (0%)	300 (-1%)	2,900 (-11%)
Annables Ln, west of Kinsbourne Green Ln	Eastbound	2016	200	100	200	1900
		2027	300 (1%)	100 (0%)	200 (-9%)	2,000 (-2%)
		2039	300 (0%)	100 (0%)	200 (2%)	2,300 (1%)
		2043	300 (-6%)	100 (0%)	200 (1%)	2,300 (-2%)
A1081 Luton Road, south of The Common	Northbound	2016	800	600	700	8700
		2027	900 (1%)	600 (-2%)	800 (-3%)	9,300 (-2%)
		2039	900 (2%)	600 (-4%)	800 (-3%)	9,600 (-3%)
		2043	1,000 (4%)	600 (-3%)	800 (-5%)	9,700 (-3%)
A1081 Luton Road, south of The Common	Southbound	2016	700	500	700	7800
		2027	700 (-1%)	600 (-2%)	700 (-2%)	8,400 (-2%)
		2039	800 (-4%)	600 (-4%)	800 (-3%)	8,600 (-4%)
		2043	800 (-8%)	600 (-3%)	800 (1%)	8,800 (-4%)
Newlands Rd, between A1081 London Rd and B4540	Westbound	2016	400	300	600	4800
		2027	400 (-11%)	300 (2%)	600 (-8%)	5,200 (-3%)
		2039	500 (-2%)	300 (-7%)	700 (-7%)	5,600 (-6%)
		2043	500 (-2%)	300 (-6%)	700 (2%)	6,100 (-6%)
Newlands Rd, between A1081 London Rd and B4540	Eastbound	2016	700	300	400	4900
		2027	800 (-8%)	300 (-14%)	400 (-18%)	5,100 (-13%)
		2039	800 (-4%)	300 (-14%)	500 (-11%)	5,900 (-10%)
		2043	800 (-1%)	300 (-10%)	500 (-6%)	6,000 (-10%)
	Westbound	2016	300	200	500	4000
		2027	300 (-1%)	300 (3%)	600 (-8%)	4,400 (-1%)

With Expansion						
Location	**Direction**	**Year**	**AM**	**IP**	**PM**	**AADT**
Newlands Rd, between B4540 and Luton Rd		2039	400 (2%)	300 (-7%)	600 (-4%)	4,800 (-5%)
		2043	400 (3%)	300 (-8%)	700 (2%)	5,200 (-5%)
Newlands Rd, between B4540 and Luton Rd	Eastbound	2016	500	200	300	3000
		2027	500 (-10%)	200 (-16%)	300 (-13%)	3,200 (-13%)
		2039	500 (-8%)	200 (-20%)	400 (-12%)	3,700 (-15%)
		2043	600 (-3%)	200 (-16%)	400 (-6%)	3,800 (-16%)
Luton Rd between east of Chaul End Rd	Westbound	2016	400	400	800	6300
		2027	500 (-3%)	400 (-7%)	900 (-14%)	6,900 (-9%)
		2039	500 (-6%)	500 (-13%)	900 (-10%)	7,900 (-11%)
		2043	500 (-5%)	500 (-9%)	1,000 (-1%)	8,500 (-11%)
Luton Rd between east of Chaul End Rd	Eastbound	2016	800	400	600	6700
		2027	900 (-5%)	400 (-5%)	600 (-4%)	6,800 (-5%)
		2039	1,000 (-5%)	400 (-9%)	700 (-7%)	7,700 (-8%)
		2043	1,000 (-3%)	400 (-10%)	700 (-5%)	8,000 (-9%)
Chaul End Rd south of Hatters Way	Northbound	2016	300	200	300	2700
		2027	300 (-2%)	200 (-1%)	300 (-18%)	3,400 (-6%)
		2039	300 (-5%)	200 (-11%)	400 (-12%)	3,900 (-10%)
		2043	400 (-1%)	300 (-8%)	500 (-3%)	4,300 (-10%)
Chaul End Rd south of Hatters Way	Southbound	2016	300	200	300	3100
		2027	400 (-5%)	200 (0%)	300 (7%)	3,500 (0%)
		2039	500 (-10%)	200 (-4%)	400 (-2%)	4,000 (-5%)
		2043	500 (-7%)	200 (-7%)	400 (-2%)	4,200 (-7%)
Half Moon Ln, between A1081 London Rd and Pepsal End Rd	Northbound	2016	100	100	100	1300
		2027	100 (-5%)	100 (-3%)	100 (-10%)	1,400 (-5%)
		2039	100 (-4%)	100 (-5%)	100 (-4%)	1,500 (-5%)
		2043	100 (0%)	100 (-4%)	200 (-1%)	1,600 (-2%)
Half Moon Ln, between A1081 London Rd and Pepsal End Rd	Southbound	2016	200	100	100	1500
		2027	200 (-6%)	100 (-3%)	100 (-6%)	1,600 (-5%)
		2039	300 (-13%)	100 (-6%)	100 (-25%)	1,700 (-12%)
		2043	300 (-8%)	100 (-4%)	100 (2%)	1,900 (-17%)
B4540, between Newlands Rd and Front St	Northbound	2016	300	100	200	2600
		2027	400 (-1%)	200 (-9%)	200 (-21%)	2,700 (-9%)
		2039	300 (5%)	200 (-3%)	200 (-5%)	2,900 (-2%)
		2043	300 (3%)	200 (-2%)	200 (-5%)	2,900 (0%)
B4540, between Newlands Rd and Front St	Southbound	2016	200	100	100	1500
		2027	200 (-21%)	100 (-2%)	200 (-6%)	1,500 (-7%)
		2039	200 (-6%)	100 (-2%)	100 (-14%)	1,600 (-6%)
		2043	200 (-9%)	100 (4%)	100 (0%)	1,600 (-8%)
B489, between B488 and Leighton Rd/B440	Eastbound	2016	500	300	700	6000
		2027	600 (1%)	400 (-1%)	700 (1%)	6,600 (0%)
		2039	700 (1%)	400 (-3%)	800 (-3%)	7,300 (-2%)
		2043	700 (2%)	400 (-3%)	800 (-2%)	7,500 (-2%)

With Expansion						
Location	**Direction**	**Year**	**AM**	**IP**	**PM**	**AADT**
B489, between B488 and Leighton Rd/B440	Westbound	2016	600	300	500	5400
		2027	600 (1%)	400 (0%)	500 (0%)	6,000 (0%)
		2039	600 (-3%)	400 (-3%)	600 (-1%)	6,600 (-3%)
		2043	700 (-4%)	400 (-3%)	600 (2%)	6,800 (-3%)
B488, between B489 and Tringford Rd	Northbound	2016	500	300	500	5500
		2027	600 (3%)	400 (-1%)	600 (-5%)	6,200 (-1%)
		2039	600 (3%)	500 (-5%)	600 (-5%)	7,000 (-4%)
		2043	600 (2%)	500 (-5%)	600 (-4%)	7,300 (-5%)
B488, between B489 and Tringford Rd	Southbound	2016	600	300	600	6000
		2027	700 (-1%)	400 (-1%)	700 (3%)	6,700 (0%)
		2039	700 (-2%)	400 (-7%)	800 (2%)	7,500 (-4%)
		2043	700 (-3%)	500 (-8%)	800 (1%)	7,900 (-5%)
B488, between B489 and Station Rd	Northbound	2016	300	200	300	3000
		2027	300 (5%)	200 (-1%)	400 (-7%)	3,500 (-2%)
		2039	400 (5%)	300 (-7%)	400 (-12%)	4,200 (-6%)
		2043	400 (4%)	300 (-8%)	400 (-11%)	4,400 (-8%)
B488, between B489 and Station Rd	Southbound	2016	300	200	200	2800
		2027	400 (-3%)	200 (-2%)	300 (5%)	3,400 (-1%)
		2039	400 (-9%)	200 (-10%)	400 (2%)	4,000 (-7%)
		2043	400 (-13%)	300 (-12%)	400 (1%)	4,200 (-10%)

4.4.2 **Table 4-19** and **Table 4-20** show the comparison of average 2-way link flows for the M1 and average 1-way link flows for both the SRN and LRN and demonstrate that overall, the Updated flows are either lower than the Original flows or when higher than the Original flows they are with a GEH of less than 5. Following the provision of additional links, both tables have been updated to consider the additional links.

Table 4-19: SRN and LRN Average Link Flow Comparison – “Without” Expansion (vehicle/hour)

Without Expansion						
Location	**Direction**	**Year**	**AM**	**IP**	**PM**	**AADT**
M1 Average	2-Way	2016	9,600	8,000	10,600	125,800
		2027	11,400 (0%)	9,500 (-2%)	12,000 (0%)	147,700 (-1%)
		2039	12,200 (-1%)	10,500 (-5%)	12,700 (-1%)	160,400 (-3%)
		2043	12,400 (-1%)	10,600 (-5%)	12,800 (-2%)	162,900 (-3%)
Average Local Road	1-way	2016	500	300	500	5300
		2027	600 (-1%)	400 (-2%)	600 (-5%)	6,200 (-2%)
		2039	700 (-1%)	400 (-5%)	600 (-4%)	6,800 (-4%)
		2043	700 (-2%)	400 (-5%)	700 (-3%)	7,000 (-5%)

Table 4-20: SRN and LRN Average Link Flow Comparison – "With" Expansion (vehicle/hour)

With Expansion						
Location	**Direction**	**Year**	**AM**	**IP**	**PM**	**AADT**
M1 Average	2-Way	2016	9,600	8,000	10,600	125,800
		2027	11,400 (0%)	9,500 (-2%)	12,100 (0%)	147,800 (-1%)
		2039	12,200 (-1%)	10,500 (-4%)	12,700 (-2%)	160,700 (-3%)
		2043	12,400 (-1%)	10,700 (-4%)	12,900 (-2%)	163,800 (-3%)
Average Local Road	1-way	2016	500	300	500	5300
		2027	600 (-2%)	400 (-1%)	600 (-6%)	6,300 (-2%)
		2039	700 (-2%)	400 (-5%)	700 (-3%)	7,100 (-4%)
		2043	700 (-1%)	500 (-3%)	700 (0%)	7,400 (-5%)

With vs without airport expansion

4.4.3 Comparisons between the "With" and "Without" Expansion for the Updated runs and Original runs were also undertaken along the M1 to identify the level of pattern consistency in relation to the impact of airport expansion.

4.4.4 **Table 4-21** to **Table 4-24** provides "With" Expansion flows in AM, inter and PM peak hour vehicles, and daily vehicles, rounded into the nearest 100, followed by the proportional difference between the "With" and "Without" Expansion link flows within the brackets. Links with less than 50 vehicles have been rounded up to 50, to better represent the flow on the route.

4.4.5 A colour code method has been adopted for this comparison with green indicating reduction in flows as a result of airport expansion (i.e. compared to "Without" Expansion), and vice versa for the links marked red.

4.4.6 As shown in Table 4-21 to **Table 4-24**, the majority of both the SRN and LRN links show consistent patterns of flow assignment again as a result of airport expansion. There are a few minor changes in the link flow assignment comparisons such as around A1081, A505, west of Lilley, Eaton Green Road, east of Wigmore, Vauxhall Way and Kimpton Road, which can be attributed to a combination of changes in traffic growth projections, traffic re-routing and changes in the UL.

Table 4-21: SRN Link Flows Comparison – Original Runs (vehicles/hour)

Original						
Location	**Direction**	**Year**	**AM**	**IP**	**PM**	**AADT**
M1 Jn9 to 10	Northbound	2016	5,300	4,400	6,200	70,000
		2027	6,200 (1%)	5,400 (0%)	7,000 (1%)	82,800 (0%)
		2039	6,900 (1%)	6,100 (1%)	7,300 (0%)	91,500 (1%)
		2043	6,900 (1%)	6,200 (1%)	7,400 (0%)	94,400 (1%)
M1 Jn9 to 10	Southbound	2016	5,500	4,300	5,900	69,600
		2027	6,400 (0%)	5,200 (0%)	6,400 (0%)	80,600 (0%)
		2039	6,800 (1%)	5,900 (1%)	7,500 (10%)	91,000 (3%)
		2043	6,900 (2%)	6,000 (1%)	7,500 (8%)	93,000 (3%)
M1 within Jn10	Northbound	2016	4,100	3,600	4,800	56,000
		2027	4,600 (0%)	4,400 (-1%)	5,500 (1%)	66,500 (0%)
		2039	5,100 (-1%)	4,900 (-1%)	5,700 (-1%)	73,100 (-1%)
		2043	5,200 (-2%)	5,000 (-2%)	5,900 (-2%)	74,600 (-2%)
M1 within Jn10	Southbound	2016	4,200	3,400	4,200	53,200
		2027	5,000 (0%)	4,000 (-1%)	4,700 (0%)	61,800 (-1%)
		2039	5,300 (-1%)	4,500 (-1%)	4,900 (-4%)	68,300 (-2%)
		2043	5,300 (-1%)	4,600 (-2%)	5,000 (-4%)	69,300 (-2%)
M1 Jn10 to 11	Northbound	2016	4,600	4,200	5,700	65,400
		2027	5,400 (0%)	5,300 (0%)	6,900 (1%)	79,800 (0%)
		2039	6,000 (1%)	5,900 (0%)	7,300 (1%)	88,100 (0%)
		2043	6,200 (1%)	6,000 (0%)	7,400 (1%)	90,400 (0%)
M1 Jn10 to 11	Southbound	2016	5,300	3,900	4,900	63,100
		2027	6,600 (0%)	4,800 (0%)	5,800 (0%)	76,300 (0%)
		2039	7,100 (0%)	5,500 (0%)	6,200 (-2%)	84,500 (0%)
		2043	7,100 (-1%)	5,600 (0%)	6,200 (-2%)	86,300 (0%)
M1 Jn10 Off-Slip	Northbound	2016	1,300	800	1,400	14,000
		2027	1,600 (3%)	1,000 (4%)	1,500 (2%)	16,400 (4%)
		2039	1,800 (7%)	1,100 (9%)	1,500 (4%)	18,500 (8%)
		2043	1,800 (9%)	1,200 (15%)	1,500 (7%)	19,800 (15%)
M1 Jn10 On-Slip	Northbound	2016	500	600	900	9,300
		2027	800 (1%)	900 (3%)	1,400 (0%)	13,400 (2%)
		2039	900 (11%)	1,000 (4%)	1,600 (13%)	15,100 (8%)
		2043	1,000 (16%)	1,000 (7%)	1,500 (14%)	15,700 (11%)
M1 Jn10 Off-Slip	Southbound	2016	1,000	600	700	9,900
		2027	1,600 (1%)	900 (5%)	1,100 (1%)	14,500 (4%)
		2039	1,800 (1%)	1,000 (10%)	1,200 (6%)	16,200 (7%)

Original						
Location	**Direction**	**Year**	**AM**	**IP**	**PM**	**AADT**
		2043	1,800 (2%)	1,000 (12%)	1,200 (7%)	17,000 (9%)
M1 Jn10 On-Slip	Southbound	2016	1,300	1,000	1,700	16,400
		2027	1,400 (0%)	1,200 (3%)	1,700 (-1%)	18,700 (3%)
		2039	1,500 (8%)	1,400 (9%)	2,600 (53%)	22,700 (19%)
		2043	1,600 (13%)	1,400 (13%)	2,500 (46%)	23,700 (23%)

Table 4-22: SRN Link Flows Comparison – Updated Runs (vehicles/hour)

Updated						
Location	**Direction**	**Year**	**AM**	**IP**	**PM**	**AADT**
M1 Jn9 to 10	Northbound	2016	5,300	4,400	6,200	70,000
		2027	6,300 (1%)	5,300 (0%)	7,000 (3%)	82,100 (1%)
		2039	6,900 (1%)	5,800 (1%)	7,000 (1%)	88,900 (1%)
		2043	7,100 (3%)	6,000 (2%)	7,100 (1%)	91,300 (2%)
M1 Jn9 to 10	Southbound	2016	5,500	4,300	5,900	69,600
		2027	6,200 (0%)	5,100 (0%)	6,500 (-1%)	79,600 (0%)
		2039	6,600 (1%)	5,700 (1%)	7,400 (7%)	88,300 (2%)
		2043	6,700 (2%)	5,800 (2%)	7,600 (9%)	90,600 (4%)
M1 within Jn10	Northbound	2016	4,100	3,600	4,800	56,000
		2027	4,800 (0%)	4,300 (-1%)	5,500 (3%)	66,200 (0%)
		2039	5,200 (-1%)	4,700 (-1%)	5,600 (-1%)	71,100 (-1%)
		2043	5,200 (-2%)	4,800 (-1%)	5,600 (-1%)	72,100 (-1%)
M1 within Jn10	Southbound	2016	4,200	3,400	4,200	53,200
		2027	4,900 (0%)	3,900 (-1%)	4,800 (-2%)	61,200 (-1%)
		2039	5,100 (-1%)	4,300 (-1%)	5,000 (-4%)	66,300 (-2%)
		2043	5,100 (-1%)	4,400 (-2%)	5,000 (-4%)	67,100 (-2%)
M1 Jn10 to 11	Northbound	2016	4,600	4,200	5,700	65,400
		2027	5,600 (0%)	5,100 (0%)	6,900 (3%)	79,100 (1%)
		2039	6,100 (0%)	5,600 (0%)	7,100 (0%)	85,700 (0%)
		2043	6,200 (0%)	5,700 (0%)	7,100 (-1%)	87,200 (0%)
M1 Jn10 to 11	Southbound	2016	5,300	3,900	4,900	63,100
		2027	6,400 (0%)	4,700 (0%)	5,800 (-1%)	75,200 (0%)
		2039	6,800 (0%)	5,200 (1%)	6,200 (-2%)	81,800 (0%)
		2043	6,900 (0%)	5,400 (1%)	6,200 (-3%)	83,200 (0%)
M1 Jn10 Off-Slip	Northbound	2016	1,300	800	1,400	14,000
		2027	1,500 (5%)	1,000 (4%)	1,400 (3%)	15,900 (4%)
		2039	1,700 (9%)	1,100 (9%)	1,500 (6%)	17,900 (10%)
		2043	1,900 (19%)	1,200 (16%)	1,500 (9%)	19,300 (17%)
M1 Jn10 On-Slip	Northbound	2016	500	600	900	9,300
		2027	800 (0%)	800 (3%)	1,300 (3%)	12,900 (3%)
		2039	1,000 (10%)	900 (6%)	1,500 (2%)	14,700 (6%)
		2043	1,000 (14%)	900 (8%)	1,500 (1%)	15,200 (8%)
M1 Jn10 Off-Slip	Southbound	2016	1,000	600	700	9,900
		2027	1,600 (2%)	800 (5%)	1,100 (4%)	14,000 (5%)
		2039	1,700 (2%)	900 (11%)	1,200 (5%)	15,400 (8%)

Updated						
Location	**Direction**	**Year**	**AM**	**IP**	**PM**	**AADT**
		2043	1,800 (3%)	1,000 (14%)	1,200 (5%)	16,100 (10%)
M1 Jn10 On-Slip	Southbound	2016	1,300	1,000	1,700	16,400
		2027	1,400 (0%)	1,200 (3%)	1,700 (0%)	18,400 (3%)
		2039	1,500 (10%)	1,300 (9%)	2,400 (41%)	22,000 (17%)
		2043	1,600 (14%)	1,400 (16%)	2,500 (49%)	23,500 (24%)

Table 4-23: LRN Link Flow Comparison – Original Runs (vehicles/hour)

Original						
Location	**Direction**	**Year**	**AM**	**IP**	**PM**	**AADT**
A1081, between Capability Green and B653	Eastbound	2016	2,000	1,400	2,300	22,900
A1081, between Capability Green and B653	Eastbound	2027	2,600 (5%)	1,800 (7%)	2,700 (6%)	29,300 (7%)
A1081, between Capability Green and B653	Eastbound	2039	2,900 (9%)	2,100 (14%)	2,800 (6%)	32,700 (12%)
A1081, between Capability Green and B653	Eastbound	2043	2,900 (10%)	2,200 (19%)	2,800 (8%)	35,000 (17%)
A1081, between Capability Green and B653	Westbound	2016	2,400	1,500	2,300	24,500
A1081, between Capability Green and B653	Westbound	2027	2,800 (0%)	1,900 (6%)	2,600 (1%)	29,900 (4%)
A1081, between Capability Green and B653	Westbound	2039	3,000 (4%)	2,200 (12%)	3,200 (17%)	34,400 (12%)
A1081, between Capability Green and B653	Westbound	2043	3,100 (8%)	2,300 (17%)	3,200 (17%)	36,600 (17%)
Kimpton Road, between Vauxhall Way and Vauxhall Road	Eastbound	2016	300	400	500	5,600
Kimpton Road, between Vauxhall Way and Vauxhall Road	Eastbound	2027	500 (-16%)	600 (-9%)	700 (-20%)	8,600 (-12%)
Kimpton Road, between Vauxhall Way and Vauxhall Road	Eastbound	2039	600 (-11%)	900 (-6%)	800 (-24%)	11,100 (-10%)
Kimpton Road, between Vauxhall Way and Vauxhall Road	Eastbound	2043	600 (-17%)	800 (-9%)	900 (-26%)	11,300 (-13%)
Kimpton Road, between Vauxhall Way and Vauxhall Road	Westbound	2016	600	500	400	6,300
Kimpton Road, between Vauxhall Way and Vauxhall Road	Westbound	2027	900 (-5%)	600 (-10%)	500 (-18%)	8,800 (-10%)
Kimpton Road, between Vauxhall Way and Vauxhall Road	Westbound	2039	1,300 (0%)	900 (-6%)	700 (-11%)	12,000 (-6%)
Kimpton Road, between Vauxhall Way and Vauxhall Road	Westbound	2043	1,300 (-3%)	900 (-7%)	700 (-18%)	12,400 (-6%)
Vauxhall Way, between Eaton Green Road and Crawley Green Road	Northbound	2016	1,000	800	1,200	12,800
Vauxhall Way, between Eaton Green Road and Crawley Green Road	Northbound	2027	900 (10%)	1,100 (13%)	1,400 (8%)	15,300 (11%)
Vauxhall Way, between Eaton Green Road and Crawley Green Road	Northbound	2039	1,100 (19%)	1,200 (20%)	1,600 (12%)	17,500 (18%)
Vauxhall Way, between Eaton Green Road and Crawley Green Road	Northbound	2043	1,100 (18%)	1,300 (15%)	1,500 (9%)	18,100 (16%)
Vauxhall Way, between Eaton Green Road and Crawley Green Road	Southbound	2016	1,200	800	1,100	12,600
Vauxhall Way, between Eaton Green Road and Crawley Green Road	Southbound	2027	1,700 (5%)	1,000 (7%)	1,200 (5%)	16,100 (6%)
Vauxhall Way, between Eaton Green Road and Crawley Green Road	Southbound	2039	1,700 (3%)	1,200 (6%)	1,500 (23%)	18,700 (9%)
Vauxhall Way, between Eaton Green Road and Crawley Green Road	Southbound	2043	1,800 (5%)	1,200 (11%)	1,500 (27%)	19,200 (13%)
A505, west of Lilley	Eastbound	2016	900	700	1,200	11,000
A505, west of Lilley	Eastbound	2027	900 (0%)	800 (2%)	1,400 (-2%)	12,400 (1%)
A505, west of Lilley	Eastbound	2039	1,000 (0%)	900 (2%)	1,500 (0%)	14,300 (1%)
A505, west of Lilley	Eastbound	2043	1,000 (2%)	1,000 (0%)	1,500 (-2%)	14,700 (0%)
A505, west of Lilley	Westbound	2016	1,300	700	1,000	11,200
A505, west of Lilley	Westbound	2027	1,500 (0%)	800 (0%)	1,000 (-2%)	12,700 (0%)
A505, west of Lilley	Westbound	2039	1,700 (2%)	900 (-2%)	1,200 (9%)	15,100 (1%)
A505, west of Lilley	Westbound	2043	1,800 (4%)	1,000 (1%)	1,300 (9%)	15,600 (2%)
Eaton Green Road, east of Wigmore	Eastbound	2016	200	100	200	1,500
Eaton Green Road, east of Wigmore	Eastbound	2027	300 (13%)	100 (20%)	300 (14%)	2,200 (17%)
Eaton Green Road, east of Wigmore	Eastbound	2039	200 (-14%)	100 (44%)	300 (14%)	2,500 (21%)
Eaton Green Road, east of Wigmore	Eastbound	2043	300 (0%)	200 (76%)	400 (50%)	3,600 (65%)
Eaton Green Road, east of Wigmore	Westbound	2016	200	100	200	1,400
Eaton Green Road, east of Wigmore	Westbound	2027	200 (-2%)	100 (-5%)	200 (2%)	1,600 (-2%)
Eaton Green Road, east of Wigmore	Westbound	2039	400 (34%)	100 (45%)	200 (6%)	2,400 (31%)
Eaton Green Road, east of Wigmore	Westbound	2043	400 (33%)	100 (70%)	200 (1%)	2,800 (48%)

Original						
Location	**Direction**	**Year**	**AM**	**IP**	**PM**	**AADT**
Lower Harpenden Road, south of A1081	Northbound	2016	600	400	800	6,600
		2027	700 (0%)	400 (8%)	900 (5%)	7,600 (6%)
		2039	900 (8%)	500 (9%)	900 (9%)	8,600 (9%)
		2043	900 (8%)	500 (9%)	1,000 (14%)	8,800 (9%)
Lower Harpenden Road, south of A1081	Southbound	2016	600	300	500	5,600
		2027	700 (-4%)	400 (-2%)	700 (-2%)	6,700 (-3%)
		2039	800 (-4%)	500 (1%)	800 (-6%)	7,700 (-2%)
		2043	800 (-7%)	500 (0%)	700 (-9%)	8,000 (-3%)
A1081 London Road, between Half Moon Ln and West Hyde Rd	Northbound	2016	800	600	700	8,600
		2027	900 (-2%)	700 (-1%)	900 (-3%)	10,400 (-2%)
		2039	1,000 (-3%)	700 (-4%)	1,000 (-4%)	11,300 (-4%)
		2043	1,000 (-5%)	800 (-4%)	1,000 (-3%)	11,700 (-3%)
A1081 London Road, between Half Moon Ln and West Hyde Rd	Southbound	2016	800	500	800	8,200
		2027	1,000 (1%)	500 (0%)	1,300 (5%)	10,200 (2%)
		2039	1,100 (-1%)	600 (-1%)	1,100 (-21%)	10,300 (-7%)
		2043	1,100 (-1%)	600 (-2%)	1,100 (-21%)	10,900 (-5%)

Table 4-24: LRN Link Flow Comparison – Updated Runs (vehicles/hour)

Updated						
Location	**Direction**	**Year**	**AM**	**IP**	**PM**	**AADT**
A1081, between Capability Green and B653	Eastbound	2016	2,000	1,400	2,300	22,900
		2027	2,600 (7%)	1,800 (8%)	2,600 (8%)	29,100 (8%)
		2039	2,900 (9%)	2,000 (14%)	2,700 (5%)	31,900 (11%)
		2043	3,000 (15%)	2,200 (20%)	2,800 (8%)	34,000 (17%)
A1081, between Capability Green and B653	Westbound	2016	2,400	1,500	2,300	24,500
		2027	2,600 (-2%)	1,900 (8%)	2,700 (3%)	29,800 (5%)
		2039	2,900 (5%)	2,100 (14%)	3,100 (15%)	33,700 (13%)
		2043	3,000 (8%)	2,300 (21%)	3,300 (20%)	35,900 (19%)
Kimpton Road, between Vauxhall Way and Vauxhall Road	Eastbound	2016	300	400	500	5,600
		2027	500 (-19%)	700 (6%)	900 (-6%)	9,800 (0%)
		2039	600 (-15%)	800 (-3%)	900 (-22%)	10,900 (-8%)
		2043	600 (-15%)	900 (-3%)	900 (-21%)	11,200 (-8%)
Kimpton Road, between Vauxhall Way and Vauxhall Road	Westbound	2016	600	500	400	6,300
		2027	900 (-18%)	700 (-8%)	500 (-21%)	9,700 (-12%)
		2039	1,300 (0%)	800 (-6%)	600 (-18%)	11,600 (-7%)
		2043	1,300 (1%)	900 (-3%)	600 (-15%)	12,100 (-4%)
Vauxhall Way, between Eaton Green Road and Crawley Green Road	Northbound	2016	1,000	800	1,200	12,800
		2027	1,000 (2%)	1,100 (14%)	1,100 (-2%)	14,700 (9%)
		2039	1,100 (21%)	1,200 (21%)	1,500 (12%)	17,100 (19%)
		2043	1,100 (20%)	1,200 (20%)	1,600 (14%)	17,700 (19%)
Vauxhall Way, between Eaton Green Road and Crawley Green Road	Southbound	2016	1,200	800	1,100	12,600
		2027	1,100 (-8%)	1,000 (2%)	1,100 (3%)	14,300 (1%)
		2039	1,800 (3%)	1,200 (7%)	1,500 (23%)	18,000 (9%)
		2043	1,800 (8%)	1,200 (10%)	1,500 (26%)	18,600 (12%)
A505, west of Lilley	Eastbound	2016	900	700	1,200	11,000
		2027	900 (-4%)	800 (2%)	1,300 (2%)	12,300 (1%)
		2039	1,000 (-2%)	900 (1%)	1,400 (-2%)	13,500 (0%)
		2043	1,000 (-2%)	900 (5%)	1,500 (-1%)	14,100 (2%)
A505, west of Lilley	Westbound	2016	1,300	700	1,000	11,200
		2027	1,400 (-2%)	800 (1%)	1,000 (1%)	12,300 (0%)
		2039	1,600 (-2%)	900 (-1%)	1,200 (9%)	14,300 (1%)
		2043	1,600 (0%)	900 (3%)	1,200 (7%)	14,900 (3%)
Eaton Green Road, east of Wigmore	Eastbound	2016	200	100	200	1,500
		2027	300 (21%)	100 (13%)	300 (12%)	2,400 (15%)
		2039	200 (-16%)	200 (24%)	400 (15%)	2,900 (13%)
		2043	300 (-4%)	200 (45%)	500 (43%)	3,700 (35%)
Eaton Green Road, east of Wigmore	Westbound	2016	200	100	200	1,400
		2027	300 (-2%)	100 (-2%)	200 (-3%)	1,900 (-2%)
		2039	400 (34%)	100 (11%)	200 (-6%)	2,600 (14%)
		2043	500 (51%)	200 (32%)	200 (-5%)	3,200 (30%)

Updated						
Location	**Direction**	**Year**	**AM**	**IP**	**PM**	**AADT**
Lower Harpenden Road, south of A1081	Northbound	2016	600	400	800	6,600
		2027	800 (6%)	400 (7%)	800 (6%)	7,800 (6%)
		2039	900 (9%)	500 (9%)	900 (8%)	8,400 (9%)
		2043	900 (7%)	500 (10%)	1,000 (13%)	8,700 (10%)
Lower Harpenden Road, south of A1081	Southbound	2016	600	300	500	5,600
		2027	700 (-6%)	400 (-2%)	700 (-2%)	6,700 (-3%)
		2039	800 (-2%)	500 (1%)	700 (-6%)	7,600 (-2%)
		2043	800 (-7%)	500 (1%)	800 (-3%)	7,900 (-2%)
A1081 London Road, between Half Moon Ln and West Hyde Rd	Northbound	2016	800	600	700	8,600
		2027	900 (-4%)	700 (-3%)	800 (-4%)	9,900 (-3%)
		2039	1,000 (-8%)	700 (-3%)	900 (-6%)	10,800 (-4%)
		2043	1,000 (-3%)	700 (-4%)	900 (-8%)	11,000 (-5%)
A1081 London Road, between Half Moon Ln and West Hyde Rd	Southbound	2016	800	500	800	8,200
		2027	900 (1%)	500 (0%)	1,100 (3%)	9,300 (1%)
		2039	1,000 (-3%)	600 (-2%)	1,000 (-17%)	9,600 (-7%)
		2043	1,100 (0%)	600 (-2%)	1,100 (-17%)	10,000 (-6%)

4.4.7 Consistent with the Updated vs Original runs comparison, selected additional links within Lilly Bottom, Harpenden, Slip End, Caddington and Ivinghoe were added to provide additional information for the “With” and “Without” Expansion comparisons.

4.4.8 The majority of the LRN links added to this analysis, such as south of A1081 New Airport Way, west and south of the M1 have very similar levels of impact as a result of the airport expansion and Updated modelling. The results for the Original runs and Updated runs are similar, both indicating minimal impact to these locations.

4.4.9 The overall average local road AADT in 2043 increases by 5% as a result of the expansion in the original runs, which increases to 6% in the Updated runs, indicating little overall change between runs.

4.4.10 Traffic flows on many sections of the LRN have low overall numbers, so small increases and decreases in traffic, with average AADT being less than 8,000 in both the original and Updated runs, which is less than 10% of the average levels on the M1.

Table 4-25: Additional LRN Link Flow Comparison – Original Runs (vehicles/hour)

Original						
Location	**Direction**	**Year**	**AM**	**IP**	**PM**	**AADT**
A1081 London Rd, north of Half Moon Ln	Northbound	2016	800	500	600	7,700
		2027	900 (-3%)	600 (-2%)	800 (-3%)	9,600 (-2%)
		2039	1,000 (-3%)	700 (-4%)	900 (-5%)	10,400 (-4%)
		2043	1,000 (-5%)	700 (-5%)	900 (-4%)	10,800 (-3%)
A1081 London Rd, north of Half Moon Ln	Southbound	2016	700	400	700	7,100
		2027	800 (1%)	500 (0%)	1,200 (5%)	9,100 (2%)
		2039	800 (0%)	500 (-2%)	1,000 (-23%)	9,100 (-8%)
		2043	900 (-1%)	500 (-3%)	1,000 (-22%)	9,500 (-7%)
A1081 Luton Road, between West Hyde Rd and The Common	Northbound	2016	600	500	600	7,200
		2027	600 (-1%)	500 (-2%)	600 (-1%)	7,700 (-2%)
		2039	700 (-2%)	600 (-5%)	600 (-5%)	7,900 (-4%)
		2043	600 (-2%)	600 (-5%)	600 (-3%)	8,000 (-4%)
A1081 Luton Road, between West Hyde Rd and The Common	Southbound	2016	500	400	600	6,500
		2027	600 (0%)	500 (0%)	700 (2%)	7,200 (0%)
		2039	600 (1%)	500 (-2%)	700 (0%)	7,400 (-1%)
		2043	600 (1%)	500 (-2%)	600 (-6%)	7,600 (-1%)
West Hyde Rd, between A1081 Luton Rd and Lower Harpenden Rd	Northbound	2016	200	50*	100	900
		2027	200 (6%)	50* (0%)	100 (5%)	1,000 (4%)
		2039	300 (11%)	100 (2%)	200 (28%)	1,500 (12%)
		2043	300 (10%)	100 (3%)	200 (21%)	1,700 (13%)
West Hyde Rd, between A1081 Luton Rd and Lower Harpenden Rd	Southbound	2016	100	50*	100	700
		2027	200 (2%)	100 (-6%)	100 (1%)	1,500 (-3%)
		2039	300 (-7%)	100 (2%)	200 (-16%)	2,100 (-5%)
		2043	300 (-7%)	100 (4%)	200 (-17%)	2,300 (0%)
Chapel Rd, between Baileys Ln and Oxford Rd	Northbound	2016	50*	50*	100	900
		2027	100 (0%)	100 (8%)	200 (4%)	1,100 (5%)
		2039	100 (43%)	100 (25%)	200 (24%)	1,700 (28%)
		2043	100 (44%)	100 (29%)	200 (4%)	1,800 (29%)
Chapel Rd, between Baileys Ln and Oxford Rd	Southbound	2016	100	50*	100	900
		2027	200 (9%)	100 (17%)	100 (21%)	1,300 (16%)
		2039	200 (18%)	100 (25%)	200 (22%)	1,800 (23%)
		2043	200 (18%)	100 (25%)	200 (35%)	2,100 (32%)
Chapel Rd, between Oxford Rd and Darley Rd	Northbound	2016	100	100	100	1,000
		2027	100 (-1%)	100 (-6%)	200 (2%)	1,100 (-3%)
		2039	200 (33%)	100 (11%)	200 (19%)	1,600 (18%)
		2043	200 (35%)	100 (18%)	200 (-2%)	1,700 (20%)
Chapel Rd, between Oxford	Southbound	2016	100	100	100	1,100
		2027	200 (10%)	100 (1%)	200 (15%)	1,400 (7%)
		2039	200 (17%)	100 (13%)	200 (11%)	1,700 (13%)

Rd and Darley Rd		2043	200 (18%)	100 (14%)	200 (21%)	2,000 (24%)
Lilley Bottom, between Luton White Hill and Hollybush Hill	Northbound	2016	100	50*	200	900
		2027	100 (11%)	50* (1%)	300 (37%)	1,400 (20%)
		2039	100 (37%)	100 (75%)	400 (3%)	2,100 (31%)
		2043	200 (52%)	100 (94%)	400 (3%)	2,500 (44%)
Lilley Bottom, between Luton White Hill and Hollybush Hill	Southbound	2016	200	50*	100	800
		2027	200 (7%)	50* (2%)	100 (6%)	1,100 (5%)
		2039	400 (24%)	100 (44%)	100 (12%)	1,700 (29%)
		2043	400 (24%)	100 (55%)	100 (14%)	2,000 (45%)
Lilley Bottom Rd, west of Bendish Ln	Westbound	2016	100	50*	100	600
		2027	100 (1%)	50* (3%)	100 (1%)	700 (2%)
		2039	100 (17%)	50* (18%)	200 (0%)	1,100 (11%)
		2043	200 (20%)	100 (30%)	200 (10%)	1,300 (22%)
Lilley Bottom Rd, west of Bendish Ln	Eastbound	2016	100	50*	100	600
		2027	100 (3%)	100 (47%)	100 (25%)	1,000 (31%)
		2039	100 (5%)	50* (6%)	100 (-5%)	900 (3%)
		2043	200 (17%)	100 (24%)	100 (2%)	1,200 (25%)
Annables Ln, west of Kinsbourne Green Ln	Westbound	2016	400	100	200	2,100
		2027	400 (0%)	100 (0%)	600 (11%)	3,300 (5%)
		2039	500 (-4%)	100 (0%)	300 (-57%)	2,900 (-27%)
		2043	500 (-5%)	100 (0%)	300 (-52%)	3,200 (-20%)
Annables Ln, west of Kinsbourne Green Ln	Eastbound	2016	200	100	200	1,900
		2027	300 (1%)	100 (0%)	200 (2%)	2,000 (1%)
		2039	300 (1%)	100 (0%)	200 (-2%)	2,300 (0%)
		2043	300 (2%)	100 (0%)	200 (-1%)	2,400 (0%)
A1081 Luton Road, south of The Common	Northbound	2016	800	600	700	8,700
		2027	900 (0%)	600 (-2%)	800 (-1%)	9,500 (-1%)
		2039	900 (-2%)	700 (-4%)	800 (-4%)	9,900 (-4%)
		2043	900 (-3%)	700 (-5%)	800 (-3%)	10,100 (-3%)
A1081 Luton Road, south of The Common	Southbound	2016	700	500	700	7,800
		2027	700 (0%)	600 (0%)	800 (2%)	8,600 (0%)
		2039	800 (1%)	600 (-2%)	800 (-1%)	8,900 (-1%)
		2043	900 (1%)	600 (-2%)	800 (-5%)	9,200 (-1%)
Newlands Rd, between A1081 London Rd and B4540	Westbound	2016	400	300	600	4,800
		2027	400 (-4%)	300 (0%)	700 (8%)	5,400 (2%)
		2039	500 (-1%)	400 (-4%)	700 (-7%)	6,000 (-4%)
		2043	500 (-1%)	400 (3%)	700 (-6%)	6,400 (1%)
Newlands Rd, between A1081 London Rd and B4540	Eastbound	2016	700	300	400	4,900
		2027	800 (1%)	300 (2%)	500 (-6%)	5,900 (0%)
		2039	800 (8%)	400 (1%)	600 (0%)	6,500 (3%)
		2043	800 (9%)	400 (3%)	500 (-6%)	6,700 (3%)
Newlands Rd, between B4540 and Luton Rd	Westbound	2016	300	200	500	4,000
		2027	300 (0%)	300 (1%)	600 (9%)	4,400 (4%)
		2039	300 (4%)	300 (-4%)	600 (-5%)	5,000 (-3%)
		2043	400 (5%)	300 (3%)	700 (-3%)	5,500 (2%)

Newlands Rd, between B4540 and Luton Rd	Eastbound	2016	500	200	300	3,000
		2027	600 (4%)	200 (5%)	300 (-3%)	3,700 (3%)
		2039	600 (10%)	200 (5%)	400 (8%)	4,300 (7%)
		2043	600 (12%)	200 (4%)	400 (4%)	4,500 (8%)
Luton Rd between east of Chaul End Rd	Westbound	2016	400	400	800	6,300
		2027	500 (3%)	400 (2%)	1,000 (8%)	7,500 (4%)
		2039	500 (2%)	600 (6%)	1,000 (0%)	8,900 (4%)
		2043	600 (1%)	600 (6%)	1,000 (-1%)	9,500 (7%)
Luton Rd between east of Chaul End Rd	Eastbound	2016	800	400	600	6,700
		2027	900 (3%)	400 (2%)	600 (2%)	7,200 (2%)
		2039	1,000 (6%)	500 (2%)	700 (9%)	8,300 (5%)
		2043	1,100 (7%)	500 (4%)	700 (10%)	8,800 (6%)
Chaul End Rd south of Hatters Way	Northbound	2016	300	200	300	2,700
		2027	300 (4%)	200 (1%)	400 (13%)	3,600 (5%)
		2039	400 (-1%)	300 (9%)	500 (-5%)	4,400 (3%)
		2043	400 (-3%)	300 (6%)	500 (-3%)	4,700 (6%)
Chaul End Rd south of Hatters Way	Southbound	2016	300	200	300	3,100
		2027	400 (6%)	200 (3%)	300 (3%)	3,400 (4%)
		2039	500 (9%)	200 (1%)	400 (12%)	4,200 (6%)
		2043	500 (8%)	200 (3%)	500 (13%)	4,500 (7%)
Half Moon Ln, between A1081 London Rd and Pepsal End Rd	Northbound	2016	100	100	100	1,300
		2027	100 (5%)	100 (0%)	100 (2%)	1,500 (1%)
		2039	100 (1%)	100 (1%)	200 (17%)	1,600 (5%)
		2043	100 (2%)	100 (0%)	200 (17%)	1,700 (2%)
Half Moon Ln, between A1081 London Rd and Pepsal End Rd	Southbound	2016	200	100	100	1,500
		2027	300 (-1%)	100 (0%)	100 (1%)	1,700 (0%)
		2039	300 (-1%)	100 (0%)	200 (11%)	2,000 (1%)
		2043	300 (-2%)	100 (0%)	100 (-2%)	2,200 (9%)
B4540, between Newlands Rd and Front St	Northbound	2016	300	100	200	2,600
		2027	400 (-3%)	200 (-2%)	200 (-8%)	2,900 (-3%)
		2039	300 (3%)	200 (-2%)	200 (-12%)	3,000 (-3%)
		2043	300 (2%)	200 (2%)	200 (-19%)	2,900 (-4%)
B4540, between Newlands Rd and Front St	Southbound	2016	200	100	100	1,500
		2027	200 (-7%)	100 (-2%)	200 (1%)	1,700 (-2%)
		2039	200 (-7%)	100 (-2%)	200 (-12%)	1,700 (-6%)
		2043	200 (-10%)	100 (0%)	100 (-15%)	1,700 (-1%)
B489, between B488 and Leighton Rd/B440	Eastbound	2016	500	300	700	6,000
		2027	600 (0%)	400 (0%)	700 (1%)	6,600 (0%)
		2039	700 (2%)	400 (1%)	800 (1%)	7,400 (1%)
		2043	700 (2%)	500 (2%)	800 (1%)	7,700 (2%)
B489, between B488 and Leighton Rd/B440	Westbound	2016	600	300	500	5,400
		2027	600 (0%)	400 (1%)	500 (1%)	6,000 (1%)
		2039	700 (1%)	400 (2%)	600 (-1%)	6,700 (1%)
		2043	700 (1%)	400 (2%)	600 (1%)	7,000 (2%)
	Northbound	2016	500	300	500	5,500
		2027	600 (0%)	400 (1%)	600 (1%)	6,300 (1%)

B488, between B489 and Tringford Rd		2039	600 (1%)	500 (1%)	600 (-1%)	7,300 (1%)
		2043	600 (1%)	500 (2%)	700 (0%)	7,600 (2%)
B488, between B489 and Tringford Rd	Southbound	2016	600	300	600	6,000
		2027	700 (0%)	400 (0%)	700 (1%)	6,700 (0%)
		2039	700 (1%)	500 (0%)	800 (2%)	7,800 (1%)
		2043	800 (2%)	500 (3%)	800 (2%)	8,300 (3%)
B488, between B489 and Station Rd	Northbound	2016	300	200	300	3,000
		2027	300 (0%)	200 (0%)	400 (1%)	3,600 (0%)
		2039	400 (2%)	300 (1%)	400 (0%)	4,500 (1%)
		2043	400 (1%)	300 (1%)	500 (-1%)	4,800 (1%)
B488, between B489 and Station Rd	Southbound	2016	300	200	200	2,800
		2027	400 (0%)	200 (0%)	300 (0%)	3,400 (0%)
		2039	500 (1%)	300 (0%)	400 (3%)	4,300 (1%)
		2043	500 (2%)	300 (3%)	400 (3%)	4,700 (3%)

Table 4-26: Additional LRN Link Flow Comparison – Updated Runs (vehicles/hour)

Updated						
Location	**Direction**	**Year**	**AM**	**IP**	**PM**	**AADT**
A1081 London Rd, north of Half Moon Ln	Northbound	2016	800	500	600	7,700
		2027	900 (-5%)	600 (-3%)	700 (-4%)	9,000 (-4%)
		2039	1,000 (-5%)	600 (-3%)	800 (-7%)	9,800 (-4%)
		2043	1,000 (-3%)	600 (-5%)	800 (-10%)	10,000 (-5%)
A1081 London Rd, north of Half Moon Ln	Southbound	2016	700	400	700	7,100
		2027	700 (1%)	500 (0%)	1,000 (4%)	8,200 (1%)
		2039	800 (-4%)	500 (-3%)	900 (-16%)	8,500 (-7%)
		2043	800 (-2%)	500 (-2%)	1,000 (-17%)	8,800 (-7%)
A1081 Luton Road, between West Hyde Rd and The Common	Northbound	2016	600	500	600	7,200
		2027	600 (-2%)	500 (-2%)	600 (-2%)	7,500 (-2%)
		2039	600 (0%)	500 (-5%)	600 (-4%)	7,600 (-4%)
		2043	700 (-1%)	500 (-5%)	600 (-8%)	7,600 (-5%)
A1081 Luton Road, between West Hyde Rd and The Common	Southbound	2016	500	400	600	6,500
		2027	500 (2%)	500 (-1%)	600 (0%)	7,100 (0%)
		2039	600 (0%)	500 (-3%)	600 (-6%)	7,100 (-3%)
		2043	600 (1%)	500 (-2%)	600 (-6%)	7,200 (-2%)
West Hyde Rd, between A1081 Luton Rd and Lower Harpenden Rd	Northbound	2016	200	50	100	900
		2027	200 (4%)	50* (1%)	100 (0%)	1,000 (2%)
		2039	300 (13%)	100 (3%)	200 (20%)	1,500 (11%)
		2043	300 (22%)	100 (2%)	200 (23%)	1,600 (15%)
West Hyde Rd, between A1081 Luton Rd and Lower Harpenden Rd	Southbound	2016	100	50	100	700
		2027	200 (6%)	100 (-13%)	100 (-1%)	1,300 (-5%)
		2039	200 (-7%)	100 (0%)	200 (-10%)	1,800 (-5%)
		2043	300 (-3%)	100 (5%)	200 (0%)	2,100 (1%)
Chapel Rd, between Baileys Ln and Oxford Rd	Northbound	2016	50	50	100	900
		2027	100 (9%)	100 (0%)	100 (-1%)	1,100 (1%)
		2039	200 (42%)	100 (26%)	200 (19%)	1,600 (27%)
		2043	200 (69%)	100 (39%)	200 (7%)	1,700 (34%)
Chapel Rd, between Baileys Ln and Oxford Rd	Southbound	2016	100	50	100	900
		2027	200 (24%)	100 (24%)	200 (36%)	1,400 (27%)
		2039	200 (18%)	100 (29%)	200 (18%)	1,700 (24%)
		2043	200 (21%)	100 (38%)	200 (41%)	1,900 (35%)
Chapel Rd, between Oxford Rd and Darley Rd	Northbound	2016	100	100	100	1,000
		2027	100 (5%)	100 (0%)	100 (-2%)	1,100 (0%)
		2039	200 (33%)	100 (14%)	200 (14%)	1,500 (18%)
		2043	200 (60%)	100 (24%)	200 (0%)	1,600 (24%)
Chapel Rd, between Oxford Rd and Darley Rd	Southbound	2016	100	100	100	1,100
		2027	200 (25%)	100 (20%)	200 (28%)	1,500 (23%)
		2039	200 (17%)	100 (17%)	200 (8%)	1,700 (15%)
		2043	200 (21%)	100 (24%)	200 (27%)	1,800 (24%)

Lilley Bottom, between Luton White Hill and Hollybush Hill	Northbound	2016	100	50*	200	900
		2027	100 (41%)	50* (1%)	300 (14%)	1,400 (13%)
		2039	200 (27%)	100 (63%)	300 (12%)	2,100 (33%)
		2043	200 (43%)	100 (87%)	400 (27%)	2,500 (52%)
Lilley Bottom, between Luton White Hill and Hollybush Hill	Southbound	2016	200	50*	100	800
		2027	200 (7%)	50* (3%)	100 (6%)	1,100 (5%)
		2039	400 (29%)	100 (44%)	100 (9%)	1,700 (31%)
		2043	400 (44%)	100 (52%)	100 (13%)	2,000 (42%)
Lilley Bottom Rd, west of Bendish Ln	Westbound	2016	100	50*	100	600
		2027	100 (4%)	50* (2%)	100 (-10%)	700 (-2%)
		2039	100 (15%)	50* (32%)	100 (-1%)	1,000 (15%)
		2043	200 (32%)	50* (53%)	200 (8%)	1,200 (30%)
Lilley Bottom Rd, west of Bendish Ln	Eastbound	2016	100	50*	100	600
		2027	100 (12%)	50* (6%)	100 (3%)	800 (7%)
		2039	100 (10%)	50* (9%)	100 (-3%)	900 (6%)
		2043	200 (7%)	50* (27%)	100 (22%)	1,100 (20%)
Annables Ln, west of Kinsbourne Green Ln	Westbound	2016	400	100	200	2,100
		2027	400 (2%)	100 (1%)	400 (12%)	2,800 (5%)
		2039	500 (-1%)	100 (0%)	300 (-43%)	2,700 (-16%)
		2043	500 (-1%)	100 (0%)	300 (-41%)	2,900 (-16%)
Annables Ln, west of Kinsbourne Green Ln	Eastbound	2016	200	100	200	1,900
		2027	300 (2%)	100 (0%)	200 (-4%)	2,000 (0%)
		2039	300 (0%)	100 (0%)	200 (-1%)	2,300 (0%)
		2043	300 (0%)	100 (-1%)	200 (0%)	2,300 (-1%)
A1081 Luton Road, south of The Common	Northbound	2016	800	600	700	8,700
		2027	900 (-1%)	600 (-1%)	800 (-1%)	9,300 (-1%)
		2039	900 (0%)	600 (-4%)	800 (-4%)	9,600 (-3%)
		2043	1,000 (-1%)	600 (-5%)	800 (-5%)	9,700 (-4%)
A1081 Luton Road, south of The Common	Southbound	2016	700	500	700	7,800
		2027	700 (1%)	600 (0%)	700 (0%)	8,400 (0%)
		2039	800 (0%)	600 (-2%)	800 (-5%)	8,600 (-3%)
		2043	800 (0%)	600 (-2%)	800 (-5%)	8,800 (-2%)
Newlands Rd, between A1081 London Rd and B4540	Westbound	2016	400	300	600	4,800
		2027	400 (-9%)	300 (12%)	600 (2%)	5,200 (6%)
		2039	500 (-1%)	300 (3%)	700 (-1%)	5,600 (1%)
		2043	500 (1%)	300 (7%)	700 (10%)	6,100 (7%)
Newlands Rd, between A1081 London Rd and B4540	Eastbound	2016	700	300	400	4,900
		2027	800 (3%)	300 (-2%)	400 (-10%)	5,100 (-2%)
		2039	800 (6%)	300 (-1%)	500 (-4%)	5,900 (0%)
		2043	800 (9%)	300 (2%)	500 (-6%)	6,000 (2%)
Newlands Rd, between B4540 and Luton Rd	Westbound	2016	300	200	500	4,000
		2027	300 (0%)	300 (15%)	600 (3%)	4,400 (9%)
		2039	400 (4%)	300 (4%)	600 (3%)	4,800 (4%)
		2043	400 (10%)	300 (7%)	700 (13%)	5,200 (10%)
	Eastbound	2016	500	200	300	3,000
		2027	500 (3%)	200 (2%)	300 (0%)	3,200 (2%)

Newlands Rd, between B4540 and Luton Rd		2039	500 (8%)	200 (0%)	400 (4%)	3,700 (3%)
		2043	600 (12%)	200 (2%)	400 (4%)	3,800 (5%)
Luton Rd between east of Chaul End Rd	Westbound	2016	400	400	800	6,300
		2027	500 (0%)	400 (3%)	900 (3%)	6,900 (3%)
		2039	500 (-5%)	500 (4%)	900 (4%)	7,900 (3%)
		2043	500 (0%)	500 (6%)	1,000 (10%)	8,500 (6%)
Luton Rd between east of Chaul End Rd	Eastbound	2016	800	400	600	6,700
		2027	900 (3%)	400 (2%)	600 (3%)	6,800 (3%)
		2039	1,000 (6%)	400 (2%)	700 (6%)	7,700 (4%)
		2043	1,000 (7%)	400 (3%)	700 (9%)	8,000 (5%)
Chaul End Rd south of Hatters Way	Northbound	2016	300	200	300	2,700
		2027	300 (1%)	200 (1%)	300 (4%)	3,400 (2%)
		2039	300 (-8%)	200 (4%)	400 (12%)	3,900 (3%)
		2043	400 (-2%)	300 (5%)	500 (21%)	4,300 (8%)
Chaul End Rd south of Hatters Way	Southbound	2016	300	200	300	3,100
		2027	400 (8%)	200 (3%)	300 (4%)	3,500 (5%)
		2039	500 (9%)	200 (2%)	400 (8%)	4,000 (5%)
		2043	500 (10%)	200 (2%)	400 (12%)	4,200 (6%)
Half Moon Ln, between A1081 London Rd and Pepsal End Rd	Northbound	2016	100	100	100	1,300
		2027	100 (7%)	100 (0%)	100 (-4%)	1,400 (0%)
		2039	100 (-1%)	100 (1%)	100 (15%)	1,500 (3%)
		2043	100 (2%)	100 (0%)	200 (21%)	1,600 (5%)
Half Moon Ln, between A1081 London Rd and Pepsal End Rd	Southbound	2016	200	100	100	1,500
		2027	200 (1%)	100 (0%)	100 (0%)	1,600 (0%)
		2039	300 (5%)	100 (0%)	100 (-13%)	1,700 (-1%)
		2043	300 (6%)	100 (0%)	100 (5%)	1,900 (3%)
B4540, between Newlands Rd and Front St	Northbound	2016	300	100	200	2,600
		2027	400 (2%)	200 (-5%)	200 (-20%)	2,700 (-6%)
		2039	300 (2%)	200 (-1%)	200 (-13%)	2,900 (-3%)
		2043	300 (2%)	200 (2%)	200 (-19%)	2,900 (-2%)
B4540, between Newlands Rd and Front St	Southbound	2016	200	100	100	1,500
		2027	200 (-18%)	100 (0%)	200 (0%)	1,500 (-4%)
		2039	200 (-8%)	100 (-1%)	100 (-13%)	1,600 (-5%)
		2043	200 (-13%)	100 (3%)	100 (-7%)	1,600 (-4%)
B489, between B488 and Leighton Rd/B440	Eastbound	2016	500	300	700	6,000
		2027	600 (0%)	400 (1%)	700 (1%)	6,600 (1%)
		2039	700 (0%)	400 (1%)	800 (0%)	7,300 (1%)
		2043	700 (1%)	400 (2%)	800 (1%)	7,500 (2%)
B489, between B488 and Leighton Rd/B440	Westbound	2016	600	300	500	5,400
		2027	600 (0%)	400 (1%)	500 (1%)	6,000 (1%)
		2039	600 (1%)	400 (2%)	600 (-2%)	6,600 (1%)
		2043	700 (2%)	400 (2%)	600 (0%)	6,800 (2%)
B488, between B489 and Tringford Rd	Northbound	2016	500	300	500	5,500
		2027	600 (0%)	400 (1%)	600 (0%)	6,200 (1%)
		2039	600 (1%)	500 (3%)	600 (-1%)	7,000 (1%)

		2043	600 (2%)	500 (3%)	600 (-1%)	7,300 (2%)
B488, between B489 and Tringford Rd	Southbound	2016	600	300	600	6,000
		2027	700 (0%)	400 (1%)	700 (2%)	6,700 (1%)
		2039	700 (1%)	400 (1%)	800 (1%)	7,500 (1%)
		2043	700 (1%)	500 (2%)	800 (1%)	7,900 (2%)
B488, between B489 and Station Rd	Northbound	2016	300	200	300	3,000
		2027	300 (0%)	200 (0%)	400 (0%)	3,500 (0%)
		2039	400 (1%)	300 (3%)	400 (0%)	4,200 (2%)
		2043	400 (1%)	300 (3%)	400 (0%)	4,400 (2%)
B488, between B489 and Station Rd	Southbound	2016	300	200	200	2,800
		2027	400 (0%)	200 (0%)	300 (3%)	3,400 (1%)
		2039	400 (1%)	200 (1%)	400 (2%)	4,000 (1%)
		2043	400 (2%)	300 (1%)	400 (1%)	4,200 (1%)

4.5 Rail and Bus Forecast Comparison

Updated vs Original runs

4.5.1 Comparisons of the rail forecasts have been undertaken for the FY 2043 “Without” Expansion between the Updated runs and Original runs as shown in Figure 4-14 and Figure 4-15.

Figure 4-14 AM Peak “Without” Expansion rail forecast comparison – Updated vs Original

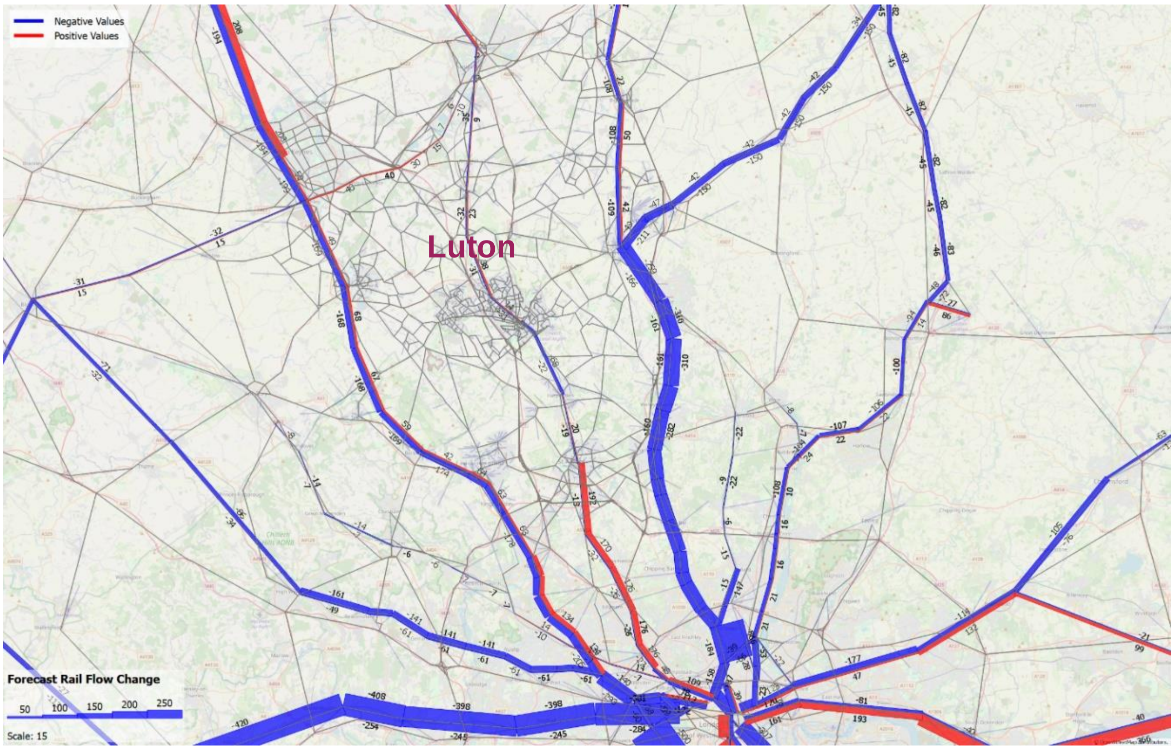
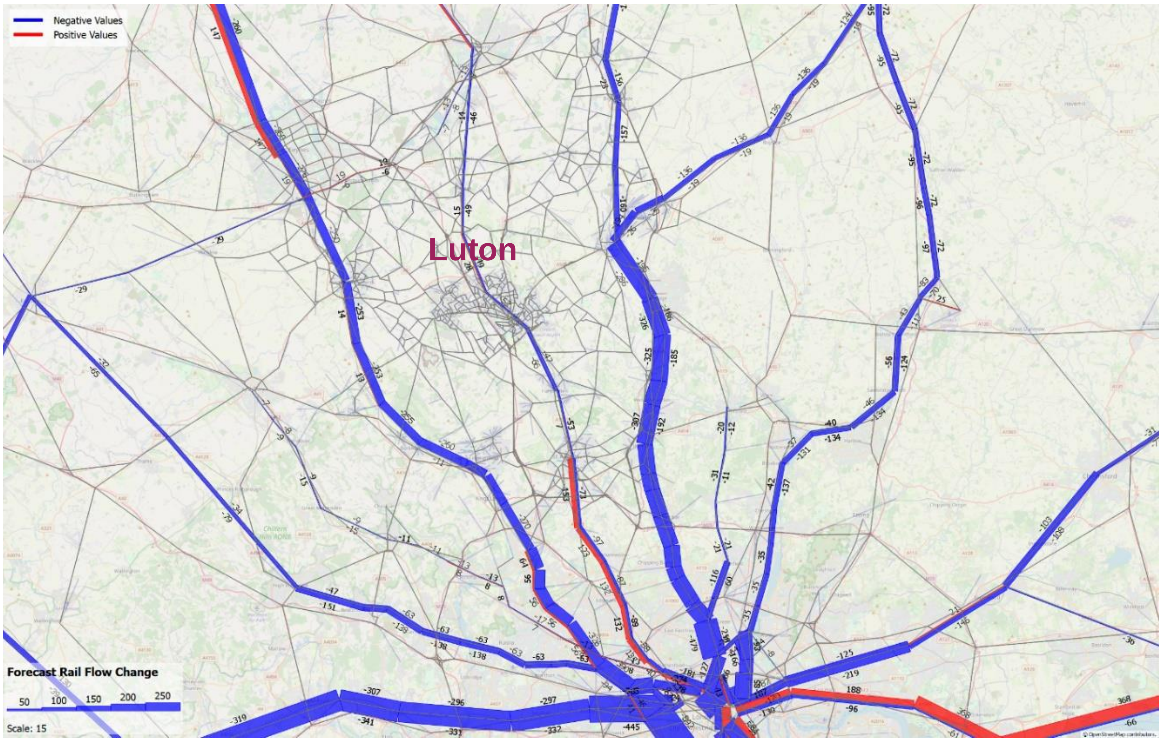


Figure 4-15 PM Peak “Without” Expansion rail forecast comparison – Updated vs Original



4.5.2 The flow plot comparisons show the change in background forecast which indicates that the change is relatively minor on London-Luton rail line. The forecast change in flows on the London-Luton rail line are up to 200 passengers per hour by direction and therefore relatively small. Larger changes, predominantly reductions, can be observed elsewhere.

4.5.3 Additional comparison plots of the public transport in the form of rail and bus forecasts are provided for 2027, 2039 and 2043 forecast years for both “With” and “Without” Expansion scenarios and both Original and Updated runs for each modelled peak hour in Appendix G.

4.6 Forecast Year 2023 Modelled / Observed Comparison

4.6.1 A new forecast year 2023 model has been developed to provide a comparison with 2023 observed traffic count data to gain an understanding of how the forecast model reflects the actual situation, given its 2016 pre-COVID-19 base year and the recent impact of the COVID-19 pandemic.

4.6.2 Flow validation criteria and guidelines based on TAG Unit M3.1 – Highway Assignment Modelling, May 2020 have been used to gauge the comparison between the two flow sets with criteria described as follows.

Flow Validation criteria:

a. Individual flows within 100 veh/h of counts for flows less than 700 veh/h;
b. Individual flows within 15% of counts for flows from 700 to 2,700 veh/h; and
c. Individual flows within 400 veh/h of counts for flows more than 2,700 veh/h.

GEH Validation criteria: GEH < 5 for individual flows.

4.6.3 Comparisons of the 2023 modelled and observed flows are provided in Table 4-27 to **Table 4-32**.

Table 4-27: AM Peak SRN Link Flow Comparison – Modelled vs Observed

Count Location	Direction	2023 Observed (veh)	2023 Modelled (veh)	Diff	%Diff	GEH	Low/High	Flow Validation	GEH Validation	Validation
M1 between J8-J9	NB	5,284	5,343	59	1%	0.8	High	Pass	Pass	Pass
M1 between J8-J9	SB	6,719	6,960	241	4%	2.9	High	Pass	Pass	Pass
M1 between J9-J10	NB	5,411	5,686	274	5%	3.7	High	Pass	Pass	Pass
M1 between J9-J10	SB	6,004	5,860	-144	-2%	1.9	Low	Pass	Pass	Pass
M1 between J10-J11	NB	4,941	5,107	166	3%	2.3	High	Pass	Pass	Pass
M1 between J10-J11	SB	5,706	5,847	141	2%	1.9	High	Pass	Pass	Pass
M1 between J11-J11a	NB	4,851	4,817	-34	-1%	0.5	Low	Pass	Pass	Pass
M1 between J11-J11a	SB	5,066	5,236	170	3%	2.4	High	Pass	Pass	Pass
M1 between J11a-J12	NB	4,302	4,078	-224	-5%	3.5	Low	Pass	Pass	Pass
M1 between J11a-J12	SB	4,308	4,095	-213	-5%	3.3	Low	Pass	Pass	Pass
A1081 W of M1 and Slip End	EB	2,474	2,531	56	2%	1.1	High	Pass	Pass	Pass
A1081 W of M1 and Slip End	WB	2,193	1,965	-228	-10%	5.0	Low	Pass	Fail	Pass

Table 4-28: AM Peak LRN Link Flow Comparison – Modelled vs Observed

Authority	Count Location	Direction	2023 Observed (veh)	2023 Modelled (veh)	Diff	%Diff	GEH	Low/High	Flow Validation	GEH Validation	Validation
HCC	A5183 East of Markyate	EB	506	1,403	896	177%	29.0	High	Fail	Fail	Fail
HCC	A5183 East of Markyate	WB	964	349	-615	-64%	24.0	Low	Fail	Fail	Fail
HCC	A505 West of Hitchin	EB	370	1,052	682	184%	25.6	High	Fail	Fail	Fail
HCC	A505 West of Hitchin	WB	1,181	957	-224	-19%	6.9	Low	Fail	Fail	Fail
HCC	B653 Lower Luton Road	SB	567	726	159	28%	6.2	High	Fail	Fail	Fail
HCC	B653 Lower Luton Road	NB	330	723	394	119%	17.1	High	Fail	Fail	Fail
CBC	Lower Harpenden Road	NB	353	675	322	91%	14.2	High	Fail	Fail	Fail
CBC	Lower Harpenden Road	SB	575	704	129	22%	5.1	High	Fail	Fail	Near
CBC	B540 Church Road	EB	211	346	135	64%	8.1	High	Fail	Fail	Fail
CBC	B540 Church Road	WB	197	177	-20	-10%	1.5	Low	Pass	Pass	Pass
LBC	Hatters Way	EB	743	978	235	32%	8.0	High	Fail	Fail	Fail
LBC	Hatters Way	WB	737	931	194	26%	6.7	High	Fail	Fail	Fail
LBC	Vauxhall Way	NB	530	579	49	9%	2.1	High	Pass	Pass	Pass
LBC	A5228 Stockingstone Rd	EB	658	1,335	677	103%	21.4	High	Fail	Fail	Fail
LBC	A5228 Stockingstone Rd	WB	763	847	84	11%	3.0	High	Pass	Pass	Pass

Table 4-29: Inter Peak SRN Link Flow Comparison – Modelled vs Observed

Count Location	Direction	2023 Observed (veh)	2023 Modelled (veh)	Diff	%Diff	GEH	Low/High	Flow Validation	GEH Validation	Validation
M1 between J8-J9	NB	5,379	5,206	-173	-3%	2.4	Low	Pass	Pass	Pass
M1 between J8-J9	SB	4,872	5,015	143	3%	2.0	High	Pass	Pass	Pass
M1 between J9-J10	NB	5,264	5,079	-185	-4%	2.6	Low	Pass	Pass	Pass
M1 between J9-J10	SB	4,836	4,938	102	2%	1.5	High	Pass	Pass	Pass
M1 between J10-J11	NB	4,930	4,923	-7	0%	0.1	Low	Pass	Pass	Pass
M1 between J10-J11	SB	4,584	4,579	-5	0%	0.1	Low	Pass	Pass	Pass
M1 between J11-J11a	NB	4,691	4,570	-121	-3%	1.8	Low	Pass	Pass	Pass
M1 between J11-J11a	SB	4,262	4,217	-45	-1%	0.7	Low	Pass	Pass	Pass
M1 between J11a-J12	NB	4,189	3,742	-446	-11%	7.1	Low	Fail	Fail	Fail
M1 between J11a-J12	SB	3,699	3,712	13	0%	0.2	High	Pass	Pass	Pass
A1081 W of M1 and Slip End	EB	1,783	1,539	-244	-14%	6.0	Low	Pass	Fail	Pass
A1081 W of M1 and Slip End	WB	1,814	1,742	-73	-4%	1.7	Low	Pass	Pass	Pass

Table 4-30: Inter Peak LRN Link Flow Comparison – Modelled vs Observed

Authority	Count Location	Direction	2023 Observed (veh)	2023 Modelled (veh)	Diff	%Diff	GEH	Low/High	Flow Validation	GEH Validation	Validation
HCC	A5183 East of Markyate	EB	578	488	-90	-16%	3.9	Low	Pass	Pass	Pass
HCC	A5183 East of Markyate	WB	510	603	93	18%	3.9	High	Pass	Pass	Pass
HCC	A505 West of Hitchin	EB	220	679	459	209%	21.6	High	Fail	Fail	Fail
HCC	A505 West of Hitchin	WB	1,097	670	-426	-39%	14.3	Low	Fail	Fail	Fail
HCC	B653 Lower Luton Road	SB	255	346	91	36%	5.2	High	Pass	Fail	Pass
HCC	B653 Lower Luton Road	NB	289	369	80	28%	4.4	High	Pass	Pass	Pass
CBC	Lower Harpenden Road	NB	283	359	77	27%	4.3	High	Pass	Pass	Pass
CBC	Lower Harpenden Road	SB	267	398	130	49%	7.1	High	Fail	Fail	Fail
CBC	B540 Church Road	EB	136	143	8	6%	0.7	High	Pass	Pass	Pass
CBC	B540 Church Road	WB	132	75	-56	-43%	5.6	Low	Pass	Fail	Pass
LBC	Hatters Way	EB	815	765	-50	-6%	1.8	Low	Pass	Pass	Pass
LBC	Hatters Way	WB	660	936	277	42%	9.8	High	Fail	Fail	Fail
LBC	Vauxhall Way	NB	541	648	107	20%	4.4	High	Fail	Pass	Pass
LBC	A5228 Stockingstone Rd	EB	644	757	113	18%	4.3	High	Fail	Pass	Pass
LBC	A5228 Stockingstone Rd	WB	686	795	109	16%	4.0	High	Fail	Pass	Pass

Table 4-31: PM Peak SRN Link Flow Comparison – Modelled vs Observed

Count Location	Direction	2023 Observed (veh)	2023 Modelled (veh)	Diff	%Diff	GEH	Low/High	Flow Validation	GEH Validation	Validation
M1 between J8-J9	NB	6,548	6,265	-284	-4%	3.5	Low	Pass	Pass	Pass
M1 between J8-J9	SB	5,823	6,216	393	7%	5.1	High	Pass	Fail	Pass
M1 between J9-J10	NB	6,530	6,299	-231	-4%	2.9	Low	Pass	Pass	Pass
M1 between J9-J10	SB	5,874	6,274	400	7%	5.1	High	Pass	Fail	Pass
M1 between J10-J11	NB	6,173	6,134	-39	-1%	0.5	Low	Pass	Pass	Pass
M1 between J10-J11	SB	5,473	5,480	7	0%	0.1	High	Pass	Pass	Pass
M1 between J11-J11a	NB	5,678	5,381	-297	-5%	4.0	Low	Pass	Pass	Pass
M1 between J11-J11a	SB	4,904	5,028	124	3%	1.8	High	Pass	Pass	Pass
M1 between J11a-J12	NB	4,886	4,389	-497	-10%	7.3	Low	Fail	Fail	Fail
M1 between J11a-J12	SB	4,462	4,637	175	4%	2.6	High	Pass	Pass	Pass
A1081 W of M1 and Slip End	EB	2,587	2,151	-435	-17%	8.9	Low	Fail	Fail	Fail
A1081 W of M1 and Slip End	WB	2,741	2,812	71	3%	1.4	High	Pass	Pass	Pass

Table 4-32: PM Peak LRN Link Flow Comparison – Modelled vs Observed

Authority	Count Location	Direction	2023 Observed (veh)	2023 Modelled (veh)	Diff	%Diff	GEH	Low/High	Flow Validation	GEH Validation	Validation
HCC	A5183 East of Markyate	EB	1,052	612	-439	-42%	15.2	Low	Fail	Fail	Fail
HCC	A5183 East of Markyate	WB	589	948	359	61%	13.0	High	Fail	Fail	Fail
HCC	A505 West of Hitchin	EB	294	982	688	234%	27.2	High	Fail	Fail	Fail
HCC	A505 West of Hitchin	WB	1,277	1,154	-124	-10%	3.5	Low	Pass	Pass	Pass
HCC	B653 Lower Luton Road	SB	316	612	295	93%	13.7	High	Fail	Fail	Fail
HCC	B653 Lower Luton Road	NB	536	697	161	30%	6.5	High	Fail	Fail	Fail
CBC	Lower Harpenden Road	NB	522	611	89	17%	3.7	High	Pass	Pass	Pass
CBC	Lower Harpenden Road	SB	340	750	410	121%	17.6	High	Fail	Fail	Fail
CBC	B540 Church Road	EB	178	213	35	20%	2.5	High	Pass	Pass	Pass
CBC	B540 Church Road	WB	204	140	-64	-31%	4.9	Low	Pass	Pass	Pass
LBC	Hatters Way	EB	885	821	-64	-7%	2.2	Low	Pass	Pass	Pass
LBC	Hatters Way	WB	657	1,032	376	57%	12.9	High	Fail	Fail	Fail
LBC	Vauxhall Way	NB	710	1,039	329	46%	11.1	High	Fail	Fail	Fail
LBC	A5228 Stockingstone Rd	EB	678	1,051	372	55%	12.7	High	Fail	Fail	Fail
LBC	A5228 Stockingstone Rd	WB	828	1,026	198	24%	6.5	High	Fail	Fail	Fail

4.6.4 Overall, the tables show relatively close comparisons on the SRN. Whereas the LRN show poor comparisons, which is to be expected considering the findings as described in Chapter 3 that showed the LRN links have failed to ‘recover’ to the traffic levels of pre-COVID-19.

4.6.5 Nevertheless, the modelled flows are mainly higher compared to the observed which implies a potential downward adjustment could be applied to the LRN.

4.7 Key Findings

4.7.1 Results from the Rule 9 modelling updates indicate that the overall forecast traffic volumes are slightly lower than the Original flows that were reported in the previous modelling, which informed the application for development consent.

4.7.2 Comparison between 2023 modelled and observed flows shows relatively good comparison on the SRN but considerably higher modelled than observed flows for the LRN. This result ties in with the findings on the trends analysis as described in Chapter 3.

4.7.3 As described in Chapter 3, the trends analysis also indicated a potential for a slight downward adjustment to the forecasts, although noting the limitations on the available observed data to support this.

4.7.4 Impacts from COVID-19 are expected to be short-term and would be likely to dissipate as overall travel demands return to the pre-pandemic level.

4.7.5 Traffic volumes on the SRN have largely 'recovered' to pre-pandemic levels and, although volumes on the LRN have been increasing, they are still behind the pre-pandemic levels. Considering the length of time to reach the assessment years of 2027, 2039 and 2043 traffic is anticipated to return to the expected level within the assessment years.

4.7.6 It was proposed and discussed at an October 2023 meeting on the Rule 9 work with National Highways and local highway authorities (CBC, LBC and HCC) not to make adjustments to the base and FY models (apart from the recent Updated changes) in order to continue to make a 'robust' assessment of overall FY traffic volumes.

4.7.7 The recent TAG Unit M4 – Forecasting and Uncertainty Appendix B.3 Proportionate accounting for COVID-19 in prior-calibrated models (May 2023) (Ref 1) highlights the need for a proportionate update process, highlighting the importance of identifying the level of risk associated with the forecast model followed subsequently by the decision to select the most appropriate adjustment option. TAG Unit M4 Paragraph B.3.5 states *'A judgment should be made on the most appropriate action relative to the risks to be mitigated*.'

4.7.8 Following completion of the Rule 9 modelling updates, the overall forecast risk assessment is considered to be 'very low' due to the slightly reduced traffic flows and the potential of further downward adjustments resulting from the trends analysis.

4.7.9 This indicates that the proposed highway mitigation measures for the airport expansion can be considered 'robust' and does not undermine the work that has been done to support the application for development consent, due to having been developed with traffic flows slightly higher than the recent update, and the provision of the TRIMMA which will trigger measures on a 'need/impact' basis.

5 HIGHWAY CAPACITY ASSESSMENT OPERATIONAL MODELLING

5.1 Overview

5.1.1 This section of the report considers the operational impacts of the Proposed Development and compares the Future Baseline without the Proposed Development with the Future Baseline with the Proposed Development and associated mitigation included for each Assessment Phase of development.

5.1.2 A comparison has been conducted between the Updated modelling and Original modelling to illustrate the impact of the revised network demand and distribution, along with the road infrastructure updates integrated into the post-Rule 9 modelling.

5.2 Demand Matrices

5.2.1 A comparison has been conducted between the total travel demand considered in the Original models and the Updated models for future baseline and scenarios with proposed development, as presented in **Table 5-1**.

Table 5-1: Total network demand in future baseline and proposed development scenarios in Original and Updated models

	AM Peak		PM Peak	
	Original Models (Veh/hr)	Updated Model (Veh/hr)	Original Models (Veh/hr)	Updated Model (Veh/hr)
2017 Base Year				
Baseline	24,710	24,710	26,598	26,598
2027 Future Year				
Future Baseline	28,278	27,386 (-3.2%)	30,442	28,444 (-6.6%)
With Assessment Phase 1	28,637	27,598 (-3.6%)	30,940	28,789 (-7.0%)
2039 Future Year				
Future Baseline	29,039	29,101 (0.2%)	31,295	29,928 (-4.4%)
With Assessment Phase 2a	30,257	29,919 (-1.1%)	32,398	30,473 (-5.9%)

	AM Peak		PM Peak	
	Original Models (Veh/hr)	Updated Model (Veh/hr)	Original Models (Veh/hr)	Updated Model (Veh/hr)
2043 Future Year				
Future Baseline	29,302	29,398 (0.3%)	31,590	30,259 (-4.2%)
With Assessment Phase 2b	31,606	31,278 (-1.0%)	33,581	31,460 (-6.3%)

5.2.2 The numbers indicate the demand has fallen by around 1% in the AM peak hour but that there is a more notable reduction in the PM peak hour of up to 6.3%. Given that the Transport Assessment generally showed that operational conditions were more sensitive in the PM peak hour, this reduction is likely to provide a marked benefit to the performance of the network when compared to the Original Models.

5.3 M1 Junction 10 Demand

5.3.1 Concerns have been raised by National Highways regarding the capacity of M1 junction 10 and in particular the operation of the south facing slips. As such, consideration has also been given to the demand on the strategic network on the approaches to Junction 10 and the demand at Junction 10 itself.

5.3.2 **Table 5-2** summarises the demand flows on both the M1 mainline and for Junction 10 for the AM peak hour.

Table 5-2: M1 and Junction 10 demand flows AM Peak hour in Original and Updated models

	Original Model Demand (Veh/hr)		Updated Demand (Veh/hr)	
2027 Future Year	**Future Baseline**	**Assessment Phase 1**	**Future Baseline**	**Assessment Phase 1**
From M1 South	6,834	6,946	6,686 (-2.2%)	6,720 (-3.3%)
To M1 South	6,105	6,195	6,398 (4.8%)	6,390 (3.1%)
J10 Demand	**6,480**	**6,713**	**5,672 (-12.5%)**	**5,673 (-15.5%)**

	Original Model Demand (Veh/hr)		Updated Demand (Veh/hr)	
From M1 North	6,379	6,403	6,673 (4.6%)	6,674 (4.2%)
To M1 North	5,576	5,583	6,159 (10.5%)	6,147 (10.1%)
2039 Future Year	**Future Baseline**	**Assessment Phase 2a**	**Future Baseline**	**Assessment Phase 2a**
From M1 South	7,143	7,436	7,262 (1.7%)	7,348 (-1.2%)
To M1 South	6,412	6,617	6,763 (5.5%)	6,870 (3.8%)
J10 Demand	**6,556**	**7,264**	**6,030 (-8.0%)**	**6,437 (-11.4%)**
From M1 North	6,684	6,822	7,113 (6.4%)	7,121 (4.4%)
To M1 North	5,867	5,939	6,746 (15.0%)	6,782 (14.2%)
2043 Future Year	**Future Baseline**	**Assessment Phase 2b**	**Future Baseline**	**Assessment Phase 2b**
From M1 South	7,249	7,782	7,387 (1.9%)	7,566 (-2.8%)
To M1 South	6,519	6,879	6,781 (4.0%)	6,997 (1.7%)
J10 Demand	**6,582**	**7,922**	**6,146 (-6.6%)**	**7,047 (-11.0%)**
From M1 North	6,790	7,084	7,167 (5.6%)	7,293 (3.0%)
To M1 North	5,968	6,121	6,855 (14.9%)	6,903 (12.8%)

5.3.3 Comparing the Original models with the Updated models shows a general increase in mainline traffic flow in the AM peak particularly to the north of Junction 10. This increase is largely related to mainline movements through the junction and not traffic destined for or originating at Junction 10. It is noted that there is a substantial reduction on demand through Junction 10 itself in both the future baseline and with development scenarios for all assessment phases. This should be beneficial to the operation of the junction and the interfaces of the junction with the mainline.

5.3.4 **Table 5-3** summarises the demand flows on both the M1 mainline and for Junction 10 for the PM peak hour.

Table 5-3: M1 and Junction 10 Demand during PM Peak hour in Original and Updated models

	Original Model Demand (Veh/hr)		Updated Demand (Veh/hr)	
2027 Future Year	**Future Baseline**	**Assessment Phase 1**	**Future Baseline**	**Assessment Phase 1**
From M1 South	7,367	7,498	7,112 (-3.5%)	7,268 (-3.1%)
To M1 South	7,317	7,464	6,899 (-5.7%)	6,824 (-8.6%)
J10 Demand	**7,723**	**8,076**	**6,635 (-14.1%)**	**6,632 (-17.9%)**
From M1 North	6,438	6,470	6,511 (1.1%)	6,487 (0.3%)
To M1 North	7,323	7,366	7,161 (-2.2%)	7,369 (0.0%)
2039 Future Year	**Future Baseline**	**Assessment Phase 2a**	**Future Baseline**	**Assessment Phase 2a**
From M1 South	7,723	7,911	7,354 (-4.8%)	7,380 (-6.7%)
To M1 South	7,657	7,917	7,233 (-5.5%)	7,743 (-2.2%)
J10 Demand	**7,819**	**8,450**	**6,914 (-11.6%)**	**7,541 (-10.8%)**
From M1 North	6,770	6,835	6,993 (3.3%)	6,802 (-0.5%)
To M1 North	7,669	7,787	7,572 (-1.3%)	7,466 (-4.1%)
2043 Future Year	**Future Baseline**	**Assessment Phase 2b**	**Future Baseline**	**Assessment Phase 2b**
From M1 South	7,845	8,149	7,431 (-5.3%)	7,496 (-8.0%)
To M1 South	7,775	8,232	7,306 (-6.0%)	7,914 (-3.9%)
J10 Demand	**7,852**	**8,982**	**6,975 (-11.2%)**	**7,905 (-12.0%)**
From M1 North	6,885	7,007	7,096 (3.1%)	6,885 (-1.7%)
To M1 North	7,789	8,036	7,662 (-1.6%)	7,518 (-6.4%)

5.3.5 As with the total demand matrix, and consistent with the AM peak pattern, there is an overall reduction in flows on M1 Junction 10 flows when compared to the Original Models. It is also noted that there is a marked decrease in traffic on the M1 south of the junction. The reduction in junction demand and mainline demand south of Junction 10 is likely to be beneficial when considering the impacts on the south facing slips of the junction.

5.3.6 The following section of the report provides the results of the Vissim modelling for the Updated models.

5.4 Assessment Phase 1 (2027)

Network performance

5.4.1 **Table 5-4** summarises the network performance statistics for the AM peak in Assessment Phase 1 for the future baseline and with the Proposed Development.

Table 5-4: 2027 AM Peak network statistics Assessment Phase 1 (future baseline and with the Proposed Development in Original and Updated models)

	Original Models		Updated Models	
Parameter	**Future Baseline**	**with Assessment Phase 1**	**Future Baseline**	**with Assessment Phase 1**
Average Delay Time per Vehicle (seconds). All Vehicle Types	140	157	121	110
Average Number of Stops per Vehicles. All Vehicle Types	7	7	6	5
Average Speed (mph). All Vehicle Types	23	22	24	25
Average Stopped Delay per Vehicle (seconds). All Vehicle Types	49	60	38	37
Number of Unreleased Vehicles	298	559	472	340

5.4.2 **Table 5-4** shows that, in the Updated modelling for Assessment Phase 1, the implementation of mitigation measures results in an improved performance during the AM peak. There is an improvement in network delay and vehicle speeds. This improvement can be attributed to the reduced overall demand in the Updated modelling.

5.4.3 **Table 5-5** summarises the network performance statistics for the PM peak in Assessment Phase 1 for the future baseline and with the Proposed Development.

Table 5-5: 2027 PM Peak network statistics Assessment Phase 1 (future baseline and with the Proposed Development in Original and Updated models)

	Original Models		Updated Models	
Parameter	**Future Baseline**	**with Assessment Phase 1**	**Future Baseline**	**with Assessment Phase 1**
Average Delay Time per Vehicle (seconds). All Vehicle Types	838	100	105	93
Average Number of Stops per Vehicles. All Vehicle Types	9	4	4	4
Average Speed (mph). All Vehicle Types	7	29	28	29
Average Stopped Delay per Vehicle (seconds). All Vehicle Types	757	37	50	42
Number of Unreleased Vehicles	12,536	1,015	586	500

5.4.4 **Table 5-5** shows that in Assessment Phase 1, the Updated model future baseline is expected to operate significantly better than in the Original assessment. The is attributed to the lower demand in model taken from the Updated strategic modelling (around 7% lower in total). The with Proposed Development of Updated modelling continues to show that the network performs better with the development and the associated mitigation.

Journey times

5.4.5 The following section compares the forecast journey times in the future baseline and with development scenario Assessment Phase 1 scenario.

5.4.6 **Table 5-6** summarises the modelled journey times for the AM peak in Assessment Phase 1 for the future baseline and with the Proposed Development.

Table 5-6: 2027 AM Peak journey times in seconds in Assessment Phase 1 (future baseline and with the Proposed Development in Original and Updated models)

	Original Models		Updated Models	
Route	Future Baseline	with Assessment Phase 1	Future Baseline	with Assessment Phase 1
Luton Town Centre (G) to Existing Terminal Area (I)	354	422	364	404
Existing Terminal Area (I) to Luton Town Centre (G)	457	489	722	414
Vauxhall Way north of Crawley Green Road (H) to Existing Terminal Area (I)	261	376	412	540
Existing Terminal Area (I) to Vauxhall Way north of Crawley Green Road (H)	277	339	269	303
B653 Lower Harpenden Road (F) south of the A1081 New Airport Way to Existing Terminal Area (I)	178	208	174	199
Existing Terminal Area (I) to B653 Lower Harpenden Road (F) south of the A1081 New Airport Way	523	481	791	452
A1081 London Road (E) close to Beech Tree Drive to Existing Terminal Area (I)	517	505	407	404
Existing Terminal Area (I) to A1081 London Road (E) close to Beech Tree Drive	427	462	381	341
M1 Junction 10 North off slip (B) to Existing Terminal Area (I)	293	297	278	287

	Original Models		Updated Models	
Route	Future Baseline	with Assessment Phase 1	Future Baseline	with Assessment Phase 1
Existing Terminal Area (I) to M1 Junction 10 North on slip (A)	529	531	437	358
M1 Junction 10 South off slip (C) to Existing Terminal Area (I)	355	358	334	341
Existing Terminal Area (I) to M1 Junction 10 South on slip (D)	760	781	593	559

5.4.7 **Table 5-6** shows that during the AM peak hour, the patterns of change in the Updated models are broadly similar to those in the Original assessment. There is only a slight increase in the journey times for journeys along Vauxhall Way, which is expected given the single-lane carriageway for the Vauxhall Way corridor considered in Assessment Phase 1 in the Rule 9 update. The change is not significant and this is partly due to the reduced demand in the matrices.

5.4.8 **Table 5-7** summarises the modelled journey times for the PM peak in Assessment Phase 1 for the future baseline and with the Proposed Development.

Table 5-7: 2027 PM Peak journey times in seconds in Assessment Phase 1 (future baseline and with the Proposed Development in Original and Updated models)

	Original Models		Updated Models	
Route	Future Baseline	with Assessment Phase 1	Future Baseline	with Assessment Phase 1
Luton Town Centre (G) to Existing Terminal Area (I)	369	435	309	437
Existing Terminal Area (I) to Luton Town Centre (G)	685	459	343	399
Vauxhall Way north of Crawley Green Road (H) to Existing Terminal Area (I)	366	341	264	347

	Original Models		Updated Models	
Route	Future Baseline	with Assessment Phase 1	Future Baseline	with Assessment Phase 1
Existing Terminal Area (I) to Vauxhall Way north of Crawley Green Road (H)	441	360	477	639
B653 Lower Harpenden Road (F) south of the A1081 New Airport Way to Existing Terminal Area (I)	370	224	214	248
Existing Terminal Area (I) to B653 Lower Harpenden Road (F) south of the A1081 New Airport Way	689	454	361	378
A1081 London Road (E) close to Beech Tree Drive to Existing Terminal Area (I)	528	437	663	458
Existing Terminal Area (I) to A1081 London Road (E) close to Beech Tree Drive	1,108	372	336	330
M1 Junction 10 North off slip (B) to Existing Terminal Area (I)	661	307	487	370
Existing Terminal Area (I) to M1 Junction 10 North on slip (A)	1,321	376	459	314
M1 Junction 10 South off slip (C) to Existing Terminal Area (I)	667	384	570	420
Existing Terminal Area (I) to M1 Junction 10 South on slip (D)	1,187	406	312	287

5.4.9 **Table 5-7** indicates that no significant detrimental impact on journey times is anticipated due to the proposed development. Journey times are projected to either decrease or experience only marginal increases in the with development scenario. When compared to the Original modelling, shorter journey times are expected in the Updated Models, which is attributed to the reduced overall travel demand in the Rule 9 update. As observed during the AM peak, there is an increase in journey times from the terminal to Vauxhall Way north of Crawley Green Road of around 2-3 minutes which is not considered material in the context of overall journey times and given that the network performance in the PM peak hour continues to be acceptable in overall terms.

M1 Junction 10 Journey Times

5.4.10 Given National Highways observations around the performance of the south facing slips at M1 Junction 10 a detailed comparison of journey times has been conducted for trips passing through M1 Junction 10. This has included a comparison of journey times for vehicles using the M1 mainline (through traffic) and for vehicles leaving or joining the M1 mainline from the A1081. Journey times have been compared for the average journey times and the 95% confidence intervals which considers the variability in journey times across the various modelling random seeds. Generally, where there is an overlap in the upper and lower limits of the alternative scenarios, it can generally be concluded that on balance, there is no material difference in journey time variability and reliability. This analysis has only been undertaken for the Updated models and the findings are summarised below.

5.4.11 **Figure 5-1** and Figure **5-2** show the journey time variability for the M1 mainline and also for traffic leaving and joining the M1 from the A1081 to the M1 south and M1 north for the AM and PM peak hours respectively for Assessment Phase 1.

Figure 5-1: Journey times variability for journeys made using M1 J10- 2027 AM Peak

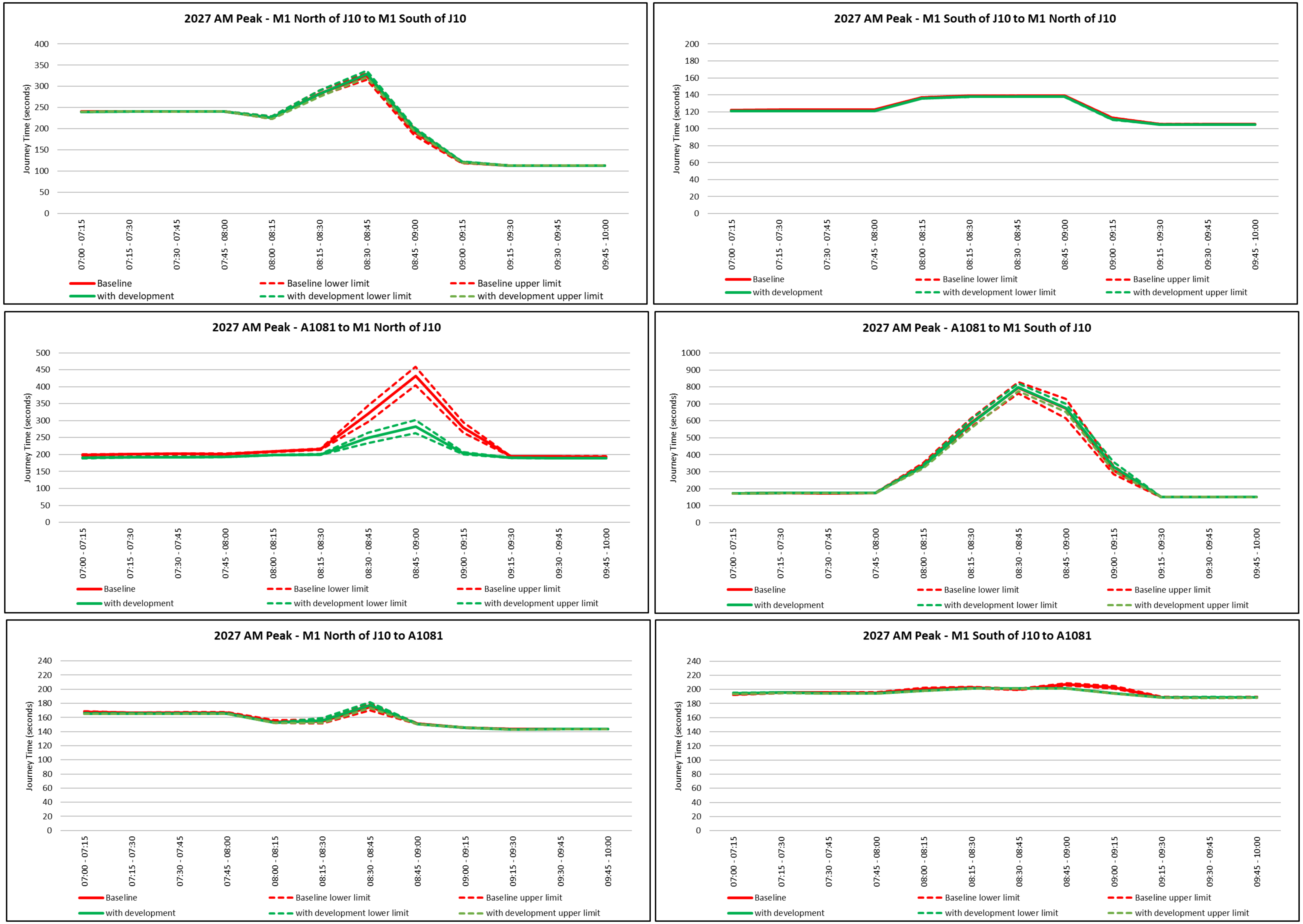
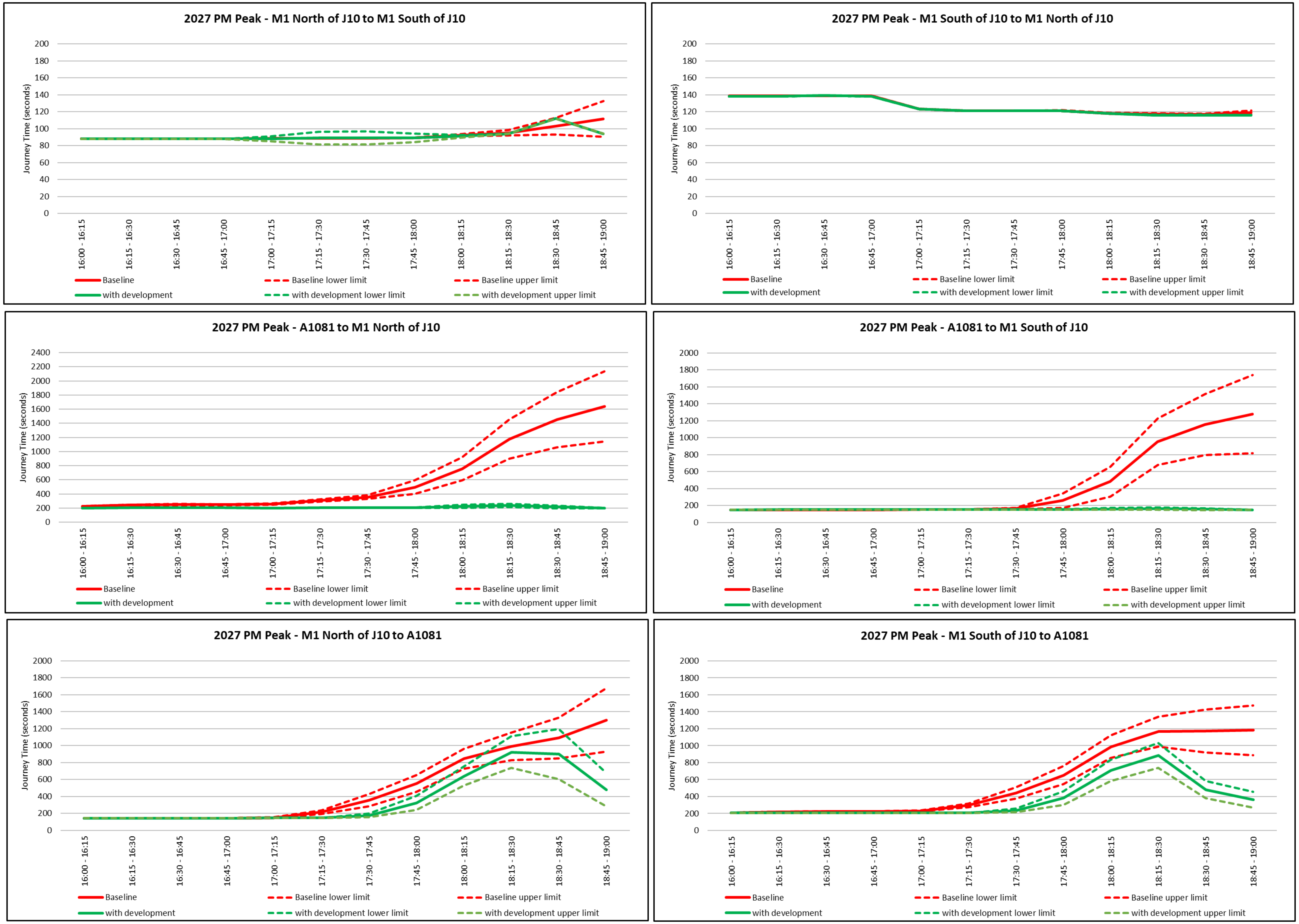


Figure 5-2: Journey times variability for journeys made using M1 J10- 2027 PM Peak



5.4.12 **Figure 5-1** shows that in the future baseline, journey times for vehicles joining the M1 north from the A1081 or leaving the M1 south to the A1081 become more variable to the later part of the peak hour. This is related to the capacity of the existing signal-controlled node of the northbound off-slip with the southern circulatory at M1 Junction 10. As part of the Proposed Development, additional capacity is provided at this node and as a consequence, journey times become shorter and more reliable. Journey times on the mainline do not differ between the future baseline and Assessment Phase 1.

5.4.13 **Figure** 5-2 shows that in the future baseline, journey times for vehicles joining the M1 north and M1 south from the A1081 or leaving the M1 north or M1 south to the A1081 become more variable to the later part of the peak hour. This again is related to the existing capacity of the junction and in particular the existing signal-controlled node of the northbound off-slip with the southern circulatory at M1 Junction 10 which results in flow breakdown and greater journey times and journey time variability. As part of the Proposed Development, additional capacity is provided at this node and as a consequence, journey times become shorter and more reliable. Journey times on the mainline do not differ between the future baseline and Assessment Phase 1.

5.4.14 The figures above indicate that, overall, the operation of M1 Junction 10 or the M1 mainline are not impacted by the proposed development and that the proposed mitigation improves the performance of the junction.

Junction modelling

5.4.15 Junction modelling results for the Original assessment were set out in detail in Section 10 of the published **Transport Assessment (Chapters 9-10) [APP-205]**. Updated junction modelling results for the Updated models are included within **Appendix H** of this report.

5.4.16 **Table 5-8** provides a summary of the level of service for each of the junctions in the future baseline and with the Proposed Development in the AM and PM peak hours in Assessment Phase 1. The table provides a comparison of the results for the Original modelling with the Updated modelling.

Table 5-8: 2027 junction performance summary Assessment Phase 1 (future baseline and with the Proposed Development in Original and Updated models)

Junction	Original Models				Updated Models			
	AM Peak		PM Peak		AM Peak		PM Peak	
	Future Baseline	with Phase 1	Future Baseline	with Phase 1	Future Baseline	with Phase 1	Future Baseline	with Phase 1
M1 Junction 10 (1)	D	C	D	B	C	C	C	A
A1081 New Airport Way / London Road (north) roundabout (2)	E	D	F	C	C	B	A	B
A1081 New Airport Way / A1081 London Road (south) roundabout (3)	E	F	F	C	D	C	A	A
A1081 New Airport Way / B653 / Gipsy Lane junctions (4)	C	C	F	C	B	B	C	D
Kimpton Road / A505 Vauxhall Way (5)	C	C	E	C	A	A	B	D
A1081 New Airport Way / Percival Way signalised junction (7)	A	D	F	C	A	D	A	D
Percival Way / Frank Lester Way / President Way roundabout (8)	A	A	A	A	B	C	A	A
A505 Vauxhall Way / Eaton Green Road roundabout (10)	A	D	A	C	C	C	C	D

Junction	Original Models				Updated Models			
	AM Peak		PM Peak		AM Peak		PM Peak	
	Future Baseline	with Phase 1	Future Baseline	with Phase 1	Future Baseline	with Phase 1	Future Baseline	with Phase 1
Eaton Green Road / Frank Lester Way roundabout (11)	A	B	A	C	B	B	A	A
Eaton Green Road / Wigmore Road roundabout (12)	A	A	A	A	A	A	A	A
Vauxhall Way / Crawley Green Road junction (13)	D	D	E	D	D	C	D	E
Crawley Green Road / Wigmore Lane roundabout (14)	A	A	A	A	A	A	A	A
Windmill Road / Kimpton Road signalised junction (15)	C	C	C	B	C	C	C	A
Eaton Green Road / Lalleford Road signalised junction (16)	C	C	A	C	D	D	A	B
Wigmore Lane / Raynham Way roundabout (17)	A	A	A	A	A	A	A	A
Wigmore Lane / Asda access roundabout (18)	A	A	A	A	A	A	A	A

Junction	Original Models				Updated Models			
	AM Peak		PM Peak		AM Peak		PM Peak	
	Future Baseline	with Phase 1	Future Baseline	with Phase 1	Future Baseline	with Phase 1	Future Baseline	with Phase 1
Windmill Road / St Mary's Road / Crawley Green Road roundabout (19)	D	D	E	E	F	D	E	E
Crawley Green Road / Lalleford Road roundabout (20)	A	A	A	A	A	A	A	A
Notes: LoS (A): free flow; (B): Stable flow. slight delays; (C): stable flow. acceptable delays; (D): approaching unstable flow. tolerable delays; (E): unstable flow. intolerable delay and long queues; (F): congested. long delays and queues fail to clear.								

5.4.17 **Table 5-8** shows the conditions during the AM peak would generally be similar in the future baseline and with Assessment Phase 1. Where the level of service is increasing, conditions are still considered to be within the range of 'tolerable'. Similarly, during the PM peak, the junctions would generally operate within the range of 'tolerable' conditions. It is noted that the Vauxhall Way/Crawley Green Road junction is forecast to operate as a LoS E however the average delay only increases by 4 seconds (increasing from 33 seconds in the future baseline to 37 seconds) indicating that the change in performance of the junction would be minimal and this is reflected in the detailed junction performance set out in **Appendix 0**.

5.4.18 Additional information regarding the performance of individual junctions, including flow, queue, and average delay, can also be found in **Appendix 0**

5.4.19 Overall, the Proposed Development in Assessment Phase 1, along with the associated junction mitigations, is not deemed to have a significant adverse impact on the operation of the highway network.

5.5 Assessment Phase 2a (2039)

Network performance

5.5.1 **Table 5-9** summarises the network performance statistics for the AM peak in Assessment Phase 2a for the future baseline and with the Proposed Development.

Table 5-9: 2039 AM Peak network statistics Assessment Phase 2a (future baseline and with the Proposed Development in Original and Updated models)

	Original Models		Updated Models	
Parameter	**Future Baseline**	**with Assessment Phase 2a**	**Future Baseline**	**with Assessment Phase 2a**
Average Delay Time per Vehicle (seconds). All Vehicle Types	156	197	123	120
Average Number of Stops per Vehicles. All Vehicle Types	7	9	5	6
Average Speed (mph). All Vehicle Types	22	20	24	25
Average Stopped Delay per Vehicle (seconds). All Vehicle Types	52	79	38	35
Number of Unreleased Vehicles	860	1,826	265	567

5.5.2 **Table 5-9** shows that, in the Updated modelling for Assessment Phase 2a, the implementation of mitigation measures results in an improved performance during the AM peak.

5.5.3 **Table** 5-10 summarises the network performance statistics for the PM in Assessment Phase 2a for the future baseline and with the Proposed Development.

Table 5-10: 2039 PM Peak network statistics Assessment Phase 2a (future baseline and with the Proposed Development in Original and Updated models)

	Original Models		Updated Models	
Parameter	Future Baseline	with Assessment Phase 2a	Future Baseline	with Assessment Phase 2a
Average Delay Time per Vehicle (seconds). All Vehicle Types	942	217	176	73
Average Number of Stops per Vehicles. All Vehicle Types	9	9	6	2
Average Speed (mph). All Vehicle Types	6	21	23	31
Average Stopped Delay per Vehicle (seconds). All Vehicle Types	860	114	101	31
Number of Unreleased Vehicles	14,625	2,680	895	71

5.5.4 **Table** 5-10 demonstrates a notable improvement in network performance during the PM peak hour. This improvement is attributed to the implementation of additional mitigation measures implemented in Assessment Phase 2a, building upon those introduced in Assessment Phase 1. These measures contribute to enhancing the overall performance of the network, particularly around M1 Junction 10.

5.5.5 It is also noted that there is a substantial improvement in performance in the Updated Models when compared with the Original modelling as result of the reduction in network demand.

Journey times

5.5.6 **Table** 5-11 summarises the modelled journey times for the AM peak in Assessment Phase 2a for the future baseline and with the Proposed Development. The table also incorporates the new journey times for routes to and from the new terminal (no data is provided on these routes in the future baselines as the new terminal does not exist in the future baseline scenarios).

Table 5-11: 2039 AM Peak journey times in seconds Assessment Phase 2a (future baseline and with the Proposed Development in Original and Updated models)

	Original Models		Updated Models	
Route	**Future Baseline**	**with Assessment Phase 2a**	**Future Baseline**	**with Assessment Phase 2a**
Luton Town Centre (G) to Existing Terminal Area (I)	356	364	356	388
Existing Terminal Area (I) to Luton Town Centre (G)	429	423	440	406
Vauxhall Way north of Crawley Green Road (H) to Existing Terminal Area (I)	286	319	282	273
Existing Terminal Area (I) to Vauxhall Way north of Crawley Green Road (H)	276	368	273	324
B653 Lower Harpenden Road (F) south of the A1081 New Airport Way to Existing Terminal Area (I)	181	248	170	203
Existing Terminal Area (I) to B653 Lower Harpenden	499	495	482	461

Route	Original Models		Updated Models	
	Future Baseline	with Assessment Phase 2a	Future Baseline	with Assessment Phase 2a
Road (F) south of the A1081 New Airport Way				
A1081 London Road (E) close to Beech Tree Drive to Existing Terminal Area (I)	509	411	488	404
Existing Terminal Area (I) to A1081 London Road (E) close to Beech Tree Drive	427	553	386	349
M1 Junction 10 North off slip (B) to Existing Terminal Area (I)	286	303	273	292
Existing Terminal Area (I) to M1 Junction 10 North on slip (A)	519	560	487	331
M1 Junction 10 South off slip (C) to Existing Terminal Area (I)	348	366	332	354
Existing Terminal Area (I) to M1 Junction 10 South on slip (D)	773	958	695	457
Luton Town Centre (G) to Proposed New Terminal Area (J)	-	444	-	434
Proposed New Terminal Area (J) to Luton Town Centre (G)	-	483	-	425
Vauxhall Way north of Crawley Green Road (H) to Proposed New Terminal Area (J)	-	321	-	331

	Original Models		Updated Models	
Route	Future Baseline	with Assessment Phase 2a	Future Baseline	with Assessment Phase 2a
Proposed New Terminal Area (J) to Vauxhall Way north of Crawley Green Road (H)	-	279	-	294
B653 Lower Harpenden Road (F) south of the A1081 New Airport Way to Proposed New Terminal Area (J)	-	429	-	380
Proposed New Terminal Area (J) to B653 Lower Harpenden Road (F) south of the A1081 New Airport Way	-	639	-	624
A1081 London Road (E) close to Beech Tree Drive to Proposed New Terminal Area (J)	-	607	-	590
Proposed New Terminal Area (J) to A1081 London Road (E) close to Beech Tree Drive	-	782	-	537
M1 Junction 10 North off slip (B) to Proposed New Terminal Area (J)	-	479	-	461
Proposed New Terminal Area (J) to M1 Junction 10 North on slip (A)	-	754	-	532
M1 Junction 10 South off slip (C) to Proposed New Terminal Area (J)	-	554	-	520

	Original Models		Updated Models	
Route	**Future Baseline**	**with Assessment Phase 2a**	**Future Baseline**	**with Assessment Phase 2a**
Proposed New Terminal Area (J) to M1 Junction 10 South on slip (D)	-	1,146	-	656

5.5.7 **Table** 5-11 shows that the Updated models continue to show that the development traffic would have no adverse impact on the AM peak hour journey times in Assessment Phase 2a. When compared to journey times in Original modelling, there is a considerable improvement in journey times for journeys originating from Existing and the Proposed New Terminal to rest of the network.

5.5.8 **Table 5-12** summarises the modelled journey times for the PM peak in Assessment Phase 2a for the future baseline and with the Proposed Development.

Table 5-12: 2039 PM Peak journey times in seconds Assessment Phase 2a (future baseline and with the Proposed Development in Original and Updated models)

	Original Models		Updated Models	
Route	**Future Baseline**	**with Assessment Phase 2a**	**Future Baseline**	**with Assessment Phase 2a**
Luton Town Centre (G) to Existing Terminal Area (I)	359	435	316	385
Existing Terminal Area (I) to Luton Town Centre (G)	560	455	548	439
Vauxhall Way north of Crawley Green Road (H) to Existing Terminal Area (I)	330	491	301	248
Existing Terminal Area (I) to Vauxhall Way north of Crawley Green Road (H)	757	345	411	323

	Original Models		Updated Models	
Route	Future Baseline	with Assessment Phase 2a	Future Baseline	with Assessment Phase 2a
B653 Lower Harpenden Road (F) south of the A1081 New Airport Way to Existing Terminal Area (I)	520	396	216	219
Existing Terminal Area (I) to B653 Lower Harpenden Road (F) south of the A1081 New Airport Way	613	745	598	491
A1081 London Road (E) close to Beech Tree Drive to Existing Terminal Area (I)	472	737	901	419
Existing Terminal Area (I) to A1081 London Road (E) close to Beech Tree Drive	1154	784	709	347
M1 Junction 10 North off slip (B) to Existing Terminal Area (I)	640	327	598	296
Existing Terminal Area (I) to M1 Junction 10 North on slip (A)	1330	770	926	368
M1 Junction 10 South off slip (C) to Existing Terminal Area (I)	651	394	699	362
Existing Terminal Area (I) to M1 Junction 10 South on slip (D)	1175	1093	746	313
Luton Town Centre (G) to Proposed New Terminal Area (J)	-	480	-	451

	Original Models		Updated Models	
Route	Future Baseline	with Assessment Phase 2a	Future Baseline	with Assessment Phase 2a
Proposed New Terminal Area (J) to Luton Town Centre (G)	-	494	-	464
Vauxhall Way north of Crawley Green Road (H) to Proposed New Terminal Area (J)	-	350	-	311
Proposed New Terminal Area (J) to Vauxhall Way north of Crawley Green Road (H)	-	304	-	261
B653 Lower Harpenden Road (F) south of the A1081 New Airport Way to Proposed New Terminal Area (J)	-	591	-	377
Proposed New Terminal Area (J) to B653 Lower Harpenden Road (F) south of the A1081 New Airport Way	-	812	-	520
A1081 London Road (E) close to Beech Tree Drive to Proposed New Terminal Area (J)	-	890	-	593
Proposed New Terminal Area (J) to A1081 London Road (E) close to Beech Tree Drive	-	931	-	515
M1 Junction 10 North off slip (B) to Proposed New Terminal Area (J)	-	501	-	473

	Original Models		Updated Models	
Route	Future Baseline	with Assessment Phase 2a	Future Baseline	with Assessment Phase 2a
Proposed New Terminal Area (J) to M1 Junction 10 North on slip (A)	-	970	-	530
M1 Junction 10 South off slip (C) to Proposed New Terminal Area (J)	-	569	-	538
Proposed New Terminal Area (J) to M1 Junction 10 South on slip (D)	-	1,038	-	476

5.5.9 As with the AM peak, **Table 5-12** shows that in Assessment Phase 2a there would be a significant improvement journey times in the PM peak hour in the Updated Models. The improvement is a result of mitigation measures implemented in Assessment Phase 2a as seen in the Original modelling.

M1 Junction 10 Journey times

5.5.10 **Figure 5-3** and **Figure 5-4** show the journey time variability for the M1 mainline and also for traffic leaving and joining the M1 from the A1081 to the M1 south and M1 north for the AM and PM peak hours respectively for Assessment Phase 2a.

5.5.11 During the AM peak (refer **Figure 5-3)**, there is an overall improvement in the journey times on the M1 mainline in both directions, indicating no adverse impact from the additional development traffic. There is a notable improvement in journey times for traffic leaving and joining A1081. While there is a minor increase in peak hour journey times for southbound traffic on the M1 mainline (less than one minute), this effect is temporary, as post-peak hours shows a return to pre-peak levels, suggesting no significant impact. The slight increase is attributed to the higher volume of traffic that is able to merge from A1081 onto the southbound M1 mainline in the development scenario, in contrast to the Future Baseline. Despite the increased throughput with the development, there is a positive change in journey times between A1081 and M1 south compared to the future baseline, demonstrating the effectiveness of the mitigation measures implemented at M1 Junction 10 and in particular the improvements proposed on the M1 southbound merge.

5.5.12 In the PM peak (refer **Figure 5-4)**, there is a substantial improvement in the journey time reliability for journeys along the M1 mainline in both direction as well as journeys between M1 and A1081. The mitigation measures implemented in Assessment Phase 2a ensure a smooth merge and diverge of traffic to and from the M1 mainline, even with additional development traffic, and without impacting mainline journeys throughout the three-hour peak period. Furthermore, the mitigation measures significantly improve average journey times and journey time reliability for traffic departing and merging onto A1081. In the Future Baseline, the journey times increase dramatically due to breakdown in flow in the existing network.

5.5.13 Overall, the development has no adverse impact on the operation at Junction 10. The mitigation measures incorporated in Assessment Phase 2a substantially improve the operation.

Figure 5-3: Journey times variability for journeys made using M1 J10- 2039 AM Peak

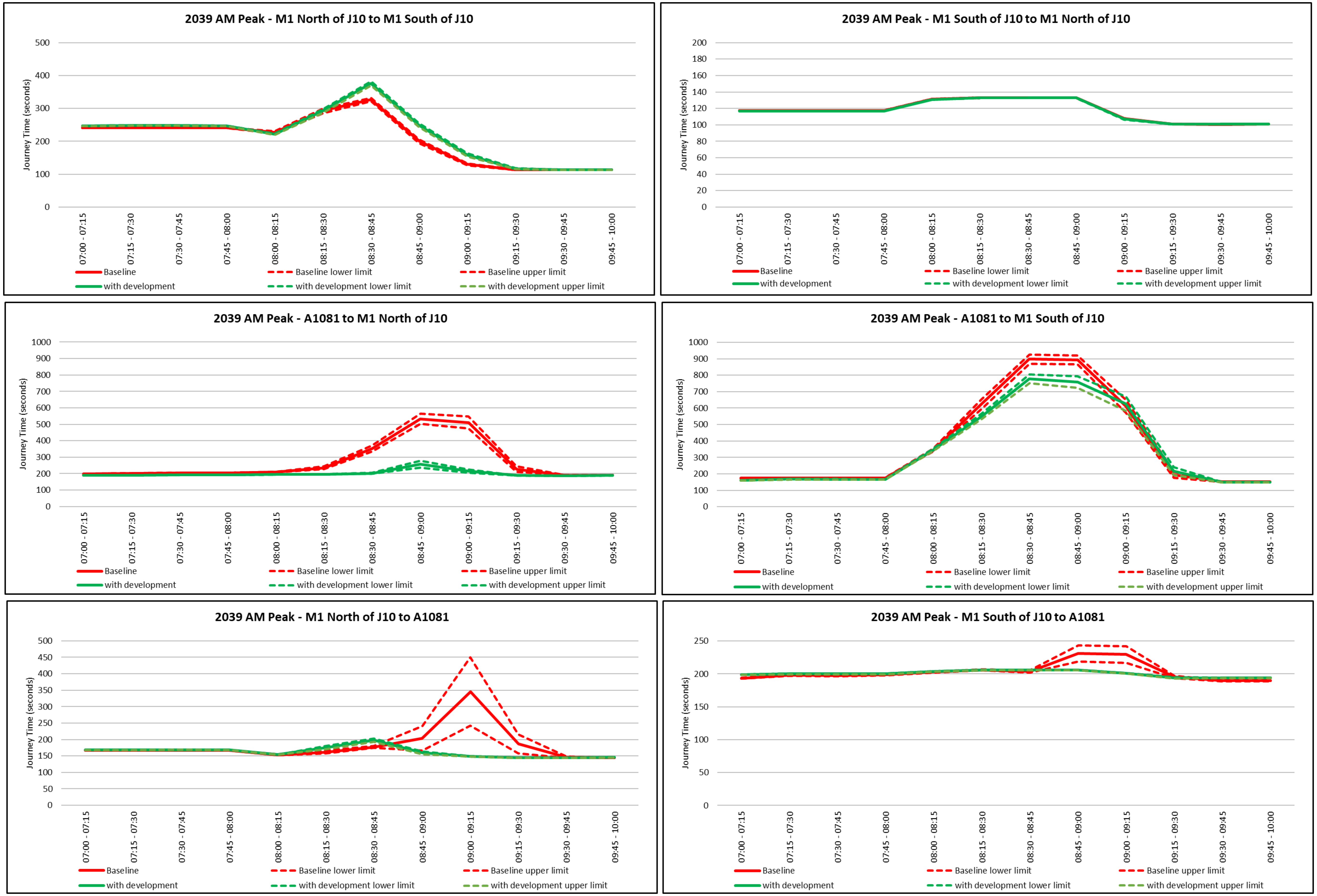


Figure 5-4: Journey times variability for journeys made using M1 J10- 2039 PM Peak

Junction modelling

5.5.14 **Table 5-13** summarises the future baseline and the Proposed Development in Assessment Phase 2a junction performance.

Table 5-13: 2039 junction performance summary Assessment Phase 2a (future baseline and with the Proposed Development in Original and Updated models)

Junction	Original Models				Update Models			
	AM Peak		PM Peak		AM Peak		PM Peak	
	Future Baseline	with Phase 2a	Future Baseline	with Phase 2a	Future Baseline	with Phase 2a	Future Baseline	with Phase 2a
M1 Junction 10 (1)	D	D	C	C	D	C	D	B
A1081 New Airport Way / London Road (north) roundabout (2)	E	E	F	E	E	B	A	C
A1081 New Airport Way / A1081 London Road (south) roundabout (3)	E	E	F	F	D	A	B	A
A1081 New Airport Way / B653 / Gipsy Lane junctions (4)	C	D	F	F	C	B	E	C
Kimpton Road / A505 Vauxhall Way signalised junction (5)	C	D	E	E	C	C	D	C
A1081 New Airport Way / AAR signalised junction (6)	-	C	-	B	-	B	-	B

Junction	Original Models				Update Models			
	AM Peak		PM Peak		AM Peak		PM Peak	
	Future Baseline	with Phase 2a	Future Baseline	with Phase 2a	Future Baseline	with Phase 2a	Future Baseline	with Phase 2a
A1081 New Airport Way / Percival Way signalised junction (7)	A	B	D	A	A	A	C	A
Percival Way / Frank Lester Way / President Way signalised junction (8)	A	B	A	C	B	B	A	A
Eaton Green Road Link / AAR signalised junction (9)	-	C	-	C	-	C	-	C
A505 Vauxhall Way / Eaton Green Road revised roundabout (10)	A	C	D	D	A	B	A	B
Eaton Green Road / Frank Lester Way signalised junction (11)	A	B	A	D	B	A	B	B
Eaton Green Road / Wigmore Road signalised junction (12)	A	C	A	D	A	C	A	D
Vauxhall Way / Crawley Green Road signalised junction (13)	C	D	F	D	C	D	D	C

Junction	Original Models				Update Models			
	AM Peak		PM Peak		AM Peak		PM Peak	
	Future Baseline	with Phase 2a	Future Baseline	with Phase 2a	Future Baseline	with Phase 2a	Future Baseline	with Phase 2a
Crawley Green Road / Wigmore Lane signalised junction (14)	A	B	A	B	A	C	A	B
Windmill Road / Kimpton Road signalised junction (15)	C	C	C	C	C	B	A	B
Eaton Green Road / Lalleford Road signalised junction (16)	D	C	A	B	D	C	A	B
Wigmore Lane / Raynham Way signalised junction (17)	A	A	A	A	A	B	A	B
Wigmore Lane / Asda access signalised junction (18)	A	B	A	B	A	B	A	C
Windmill Road / St Mary's Road / Crawley Green Road roundabout (19)	D	C	E	E	E	C	E	D
Crawley Green Road / Lalleford Road signalised junction (20)	A	B	A	C	A	B	A	C

Junction	Original Models				Update Models			
	AM Peak		PM Peak		AM Peak		PM Peak	
	Future Baseline	with Phase 2a	Future Baseline	with Phase 2a	Future Baseline	with Phase 2a	Future Baseline	with Phase 2a
Provost Way / AAR roundabout (21)	-	A	-	A	-	A	-	B
Provost Way / Percival Way roundabout (22)	-	A	-	A	-	A	-	A
President Way / AAR roundabout (23)	-	A	-	A	-	A	-	A
Terminal 2 access roundabout (24)	-	A	-	A	-	A	-	A
Notes: LoS (A): free flow; (B): Stable flow. slight delays; (C): stable flow. acceptable delays; (D): approaching unstable flow. tolerable delays; (E): unstable flow. intolerable delay and long queues; (F): congested. long delays and queues fail to clear.								

5.5.15 **Table 5-13** shows that in both the AM and PM peaks the network is anticipated to operate with free flow or stable conditions and relatively better than performance expected in the future baseline. In general, an improvement in the LoS is anticipated across multiple junctions including M1 Junction 10, as a result of the implemented mitigation measures in with development scenarios. Even at junction where there LoS remains unchanged or increases, there is an improvement in the queue lengths and average delay, particularly during the PM peak, as indicated by the individual junction performance results presented in **Appendix 0** .

5.6 Assessment Phase 2b (2043)

Network performance

5.6.1 **Table 5-14** summarises the network performance statistics for the AM peak in Assessment Phase 2b for the future baseline and with the Proposed Development.

Table 5-14: 2043 AM Peak network statistics Assessment Phase 2b (future baseline and with the Proposed Development in Original and Updated models)

	Original Models		Updated Models	
Parameter	**Future Baseline**	**with Assessment Phase 2b**	**Future Baseline**	**with Assessment Phase 2b**
Average Delay Time per Vehicle (seconds). All Vehicle Types	73	90	139	146
Average Number of Stops per Vehicles. All Vehicle Types	3	3	6	7
Average Speed (mph). All Vehicle Types	35	33	23	23
Average Stopped Delay per Vehicle (seconds). All Vehicle Types	29	40	52	46
Number of Unreleased Vehicles	82	97	520	1,380

5.6.2 **Table 5-14** shows that in Assessment Phase 2b with the Proposed Development there would be a small increase in average delays but that this would not affect average speeds in the AM peak hour. It is noted that the 2043 models showed a better performance in terms of both average delays and average speeds and this is related to the Original assumption that the capacity of the M1 mainline would be upgraded. Nevertheless, the pattern of change between the Original Models and Updated Models is broadly the same.

5.6.3 **Table 5-15** summarises the network performance statistics for the PM in Assessment Phase 2b for the future baseline and with the Proposed Development.

Table 5-15: 2043 PM Peak network statistics Assessment Phase 2b (future baseline and with the Proposed Development in Original and Updated Models)

	Original Models		Updated Models	
Parameter	**Future Baseline**	**with Assessment Phase 2b**	**Future Baseline**	**with Assessment Phase 2b**
Average Delay Time per Vehicle (seconds). All Vehicle Types	102	70	197	103
Average Number of Stops per Vehicles. All Vehicle Types	4	2	7	4
Average Speed (mph). All Vehicle Types	32	36	22	29
Average Stopped Delay per Vehicle (seconds). All Vehicle Types	49	31	113	46
Number of Unreleased Vehicles	843	529	906	155

5.6.4 **Table 5-15** shows that in Assessment Phase 2b with the Proposed Development there would be a significant improvement in the network performance in the PM peak hour. This is a consequence of the additional mitigation measures included in Assessment Phase 2b which build upon the Assessment Phase 1 and Phase 2a measures, and which improve the function of the network particularly around M1 Junction 10. As with the AM peak, the Rule 9 update reflects , the network demonstrates comparatively worse average delays and lower speeds than the Original Models which again is attributed to M1 mainline capacity upgrade assumption, as discussed in **Section** Error! Reference source not found.. Notwithstanding the absence of any upgrade to the M1 mainline capacity, no detrimental impacts on journey times or individual junction performance have been observed, as evidenced by the results presented in the subsequent sections.

Journey times

5.6.5 **Table 5-16** summarises the modelled journey times for the AM peak in Assessment Phase 2b for the future baseline and with the Proposed Development.

Table 5-16: 2043 AM Peak journey times in seconds Assessment Phase 2b (future baseline and with the Proposed Development in Original and Updated models)

	Original Models		Updated Models	
Route	Future Baseline	with Assessment Phase 2b	Future Baseline	with Assessment Phase 2b
Luton Town Centre (G) to Existing Terminal Area (I)	338	369	380	394
Existing Terminal Area (I) to Luton Town Centre (G)	475	439	534	430
Vauxhall Way north of Crawley Green Road (H) to Existing Terminal Area (I)	264	299	285	327
Existing Terminal Area (I) to Vauxhall Way north of Crawley Green Road (H)	284	298	297	333
B653 Lower Harpenden Road (F) south of the A1081 New Airport Way to Existing Terminal Area (I)	188	271	179	225
Existing Terminal Area (I) to B653 Lower Harpenden Road (F) south of the A1081 New Airport Way	506	490	581	484
A1081 London Road (E) close to Beech Tree Drive to Existing Terminal Area (I)	643	485	412	415

	Original Models		Updated Models	
Route	Future Baseline	with Assessment Phase 2b	Future Baseline	with Assessment Phase 2b
Existing Terminal Area (I) to A1081 London Road (E) close to Beech Tree Drive	372	374	448	351
M1 Junction 10 North off slip (B) to Existing Terminal Area (I)	340	408	300	298
Existing Terminal Area (I) to M1 Junction 10 North on slip (A)	341	356	527	341
M1 Junction 10 South off slip (C) to Existing Terminal Area (I)	362	432	342	354
Existing Terminal Area (I) to M1 Junction 10 South on slip (D)	318	312	736	432
Luton Town Centre (G) to Proposed New Terminal Area (J)	-	467	-	620
Proposed New Terminal Area (J) to Luton Town Centre (G)	-	586	-	572
Vauxhall Way north of Crawley Green Road (H) to Proposed New Terminal Area (J)	-	342	-	439
Proposed New Terminal Area (J) to Vauxhall Way north of Crawley Green Road (H)	-	353	-	332
B653 Lower Harpenden Road (F) south of the	-	415	-	431

Route	Original Models		Updated Models	
	Future Baseline	with Assessment Phase 2b	Future Baseline	with Assessment Phase 2b
A1081 New Airport Way to Proposed New Terminal Area (J)				
Proposed New Terminal Area (J) to B653 Lower Harpenden Road (F) south of the A1081 New Airport Way	-	695	-	713
A1081 London Road (E) close to Beech Tree Drive to Proposed New Terminal Area (J)	-	629	-	602
Proposed New Terminal Area (J) to A1081 London Road (E) close to Beech Tree Drive	-	550	-	544
M1 Junction 10 North off slip (B) to Proposed New Terminal Area (J)	-	552	-	508
Proposed New Terminal Area (J) to M1 Junction 10 North on slip (A)	-	531	-	550
M1 Junction 10 South off slip (C) to Proposed New Terminal Area (J)	-	573	-	513
Proposed New Terminal Area (J) to M1 Junction 10 South on slip (D)	-	499	-	629

5.6.6 **Table 5-16** shows that AM peak hour journey times to the existing terminal area in Assessment Phase 2b are broadly in line with the future baseline and where journey times increase the change is less than one minute and therefore not considered significant. The overall pattern of change in the Updated Models is similar to that observed in the Original Models.

5.6.7 **Table 5-17** summarises the modelled journey times for the PM peak in Assessment Phase 2b for the future baseline and with the Proposed Development.

Table 5-17: 2043 PM Peak journey times in seconds Assessment Phase 2b (future baseline and with the Proposed Development in Original and Updated models)

	Original Models		Updated Models	
Route	Future Baseline	with Assessment Phase 2b	Future Baseline	with Assessment Phase 2b
Luton Town Centre (G) to Existing Terminal Area (I)	304	345	370	370
Existing Terminal Area (I) to Luton Town Centre (G)	401	386	426	499
Vauxhall Way north of Crawley Green Road (H) to Existing Terminal Area (I)	316	271	332	268
Existing Terminal Area (I) to Vauxhall Way north of Crawley Green Road (H)	326	301	362	333
B653 Lower Harpenden Road (F) south of the A1081 New Airport Way to Existing Terminal Area (I)	199	226	221	214
Existing Terminal Area (I) to B653 Lower Harpenden Road (F) south of the A1081 New Airport Way	380	411	462	540
A1081 London Road (E) close to Beech Tree Drive to Existing Terminal Area (I)	667	476	917	434

Route	Original Models		Updated Models	
	Future Baseline	with Assessment Phase 2b	Future Baseline	with Assessment Phase 2b
Existing Terminal Area (I) to A1081 London Road (E) close to Beech Tree Drive	338	380	817	422
M1 Junction 10 North off slip (B) to Existing Terminal Area (I)	594	341	663	306
Existing Terminal Area (I) to M1 Junction 10 North on slip (A)	331	364	1,042	462
M1 Junction 10 South off slip (C) to Existing Terminal Area (I)	620	374	780	370
Existing Terminal Area (I) to M1 Junction 10 South on slip (D)	294	332	846	397
Luton Town Centre (G) to Proposed New Terminal Area (J)	-	516	-	567
Proposed New Terminal Area (J) to Luton Town Centre (G)	-	520	-	430
Vauxhall Way north of Crawley Green Road (H) to Proposed New Terminal Area (J)	-	331	-	427
Proposed New Terminal Area (J) to Vauxhall Way north of Crawley Green Road (H)	-	317	-	438
B653 Lower Harpenden Road (F) south of the	-	373	-	353

	Original Models		Updated Models	
Route	Future Baseline	with Assessment Phase 2b	Future Baseline	with Assessment Phase 2b
A1081 New Airport Way to Proposed New Terminal Area (J)				
Proposed New Terminal Area (J) to B653 Lower Harpenden Road (F) south of the A1081 New Airport Way	-	604	-	738
A1081 London Road (E) close to Beech Tree Drive to Proposed New Terminal Area (J)	-	610	-	597
Proposed New Terminal Area (J) to A1081 London Road (E) close to Beech Tree Drive	-	547	-	595
M1 Junction 10 North off slip (B) to Proposed New Terminal Area (J)	-	484	-	502
Proposed New Terminal Area (J) to M1 Junction 10 North on slip (A)	-	520	-	664
M1 Junction 10 South off slip (C) to Proposed New Terminal Area (J)	-	518	-	573
Proposed New Terminal Area (J) to M1 Junction 10 South on slip (D)	-	487	-	604

5.6.8 **Table 5-17** shows that with the Updated Models for Proposed Development in Assessment Phase 2b there would be a significant improvement journey times along a number of the major routes in the PM peak hour. This is as a consequence of the benefits of the mitigation measures included in Assessment

Phase 2b. Where there are increases in journey times these are broadly in line with those seen in the Original Models.

M1 Junction 10 Journey times

5.6.9 **Figure 5-5** and **Figure 5-6** shows the journey times for the M1 mainline and also for traffic leaving and joining the M1 from the A1081 to the M1 south and M1 north for the AM and PM peak hours respectively for Assessment Phase 2b.

5.6.10 During the AM peak (refer **Figure 5-5)**, journey times on the M1 mainline and for traffic joining and leaving A1081 will not be significantly impacted by the additional development-related traffic. In the northbound direction of the M1 mainline, the figure clearly illustrates a substantial overlap in average and upper and lower limit journey times, indicating no discernible effect on journey time reliability. In the southbound direction of the M1 mainline, a slight increase (less than one minute) is anticipated in the peak hour journey times however this is not considered significant in overall journey times and journey times revert to pre-peak hour levels or better after the peak hour, suggesting no residual impact. This marginal increase is attributed to a higher volume of traffic able to merge from A1081 onto the southbound M1 mainline in the with development scenario due to the improvements put on to the M1 southbound on slip in Assessment Phase 2a. It is noted that in contrast, the Future Baseline shows a significant breakdown in flow and associated increased journey times for traffic leaving and merging onto A1081.

5.6.11 In the PM peak (refer **Figure 5-6)**, there is a substantial improvement in journey time reliability for travel along the M1 mainline in both directions and between M1 and A1081. The implementation of mitigation measures in Assessment Phase 2a ensures an improved merging of traffic to the M1 mainline even with the additional development traffic, without adversely affecting mainline journeys throughout the three-hour peak period. Furthermore, the mitigation measures substantially improve average journey times and journey time reliability for traffic departing and merging onto A1081. In the Future Baseline, significant increases in journey times occur due to a breakdown in flow.

5.6.12 Overall, the development has no adverse impact on the operation at Junction 10. Instead, the mitigation measures incorporated as part of the development, in conjunction with the overall lower demand in the Updated models ensures that the impact of the Proposed Development on M1 Junction 10 and the M1 mainline is mitigated.

Figure 5-5: Journey times variability for journeys made using M1 J10- 2043 AM Peak

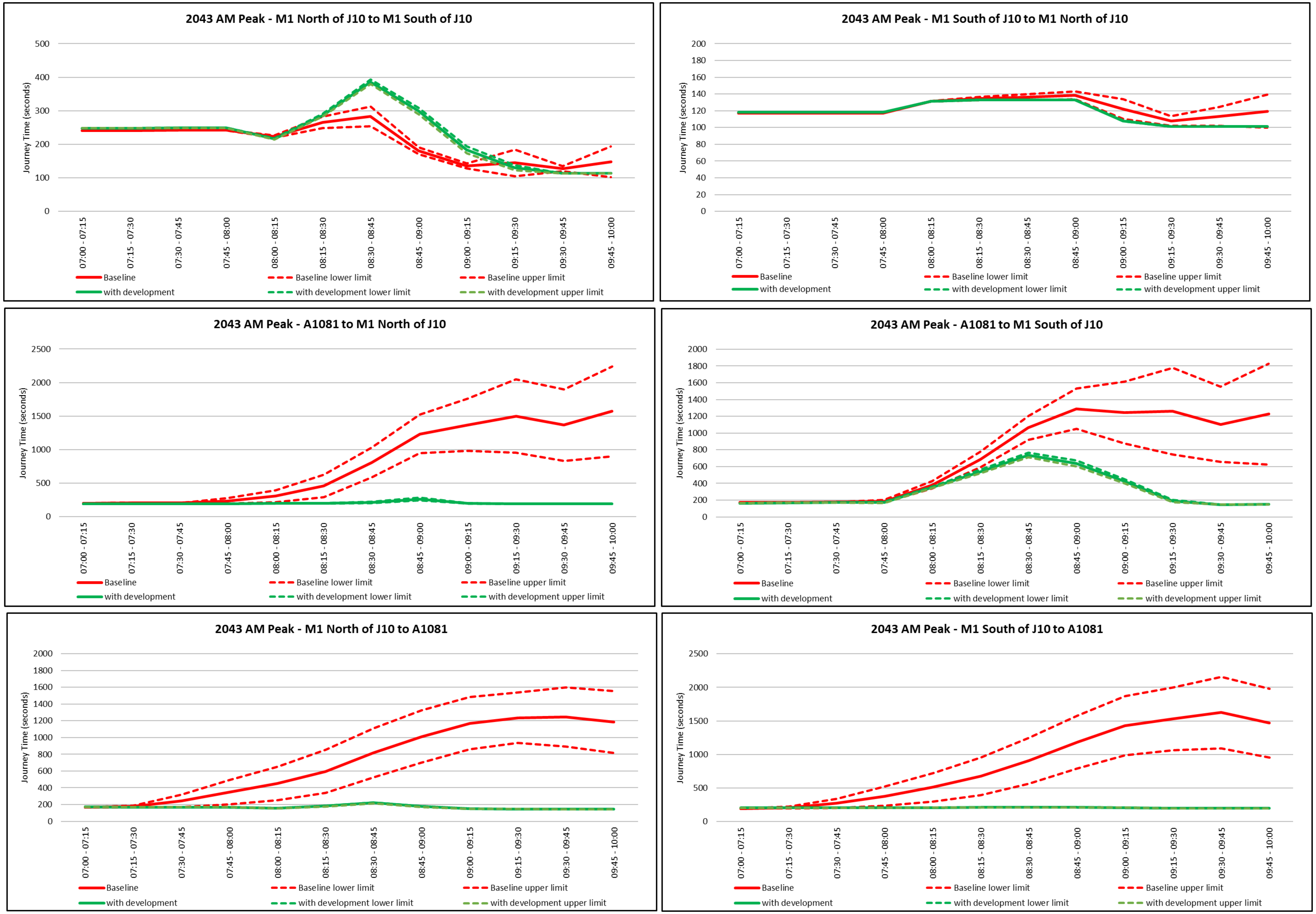
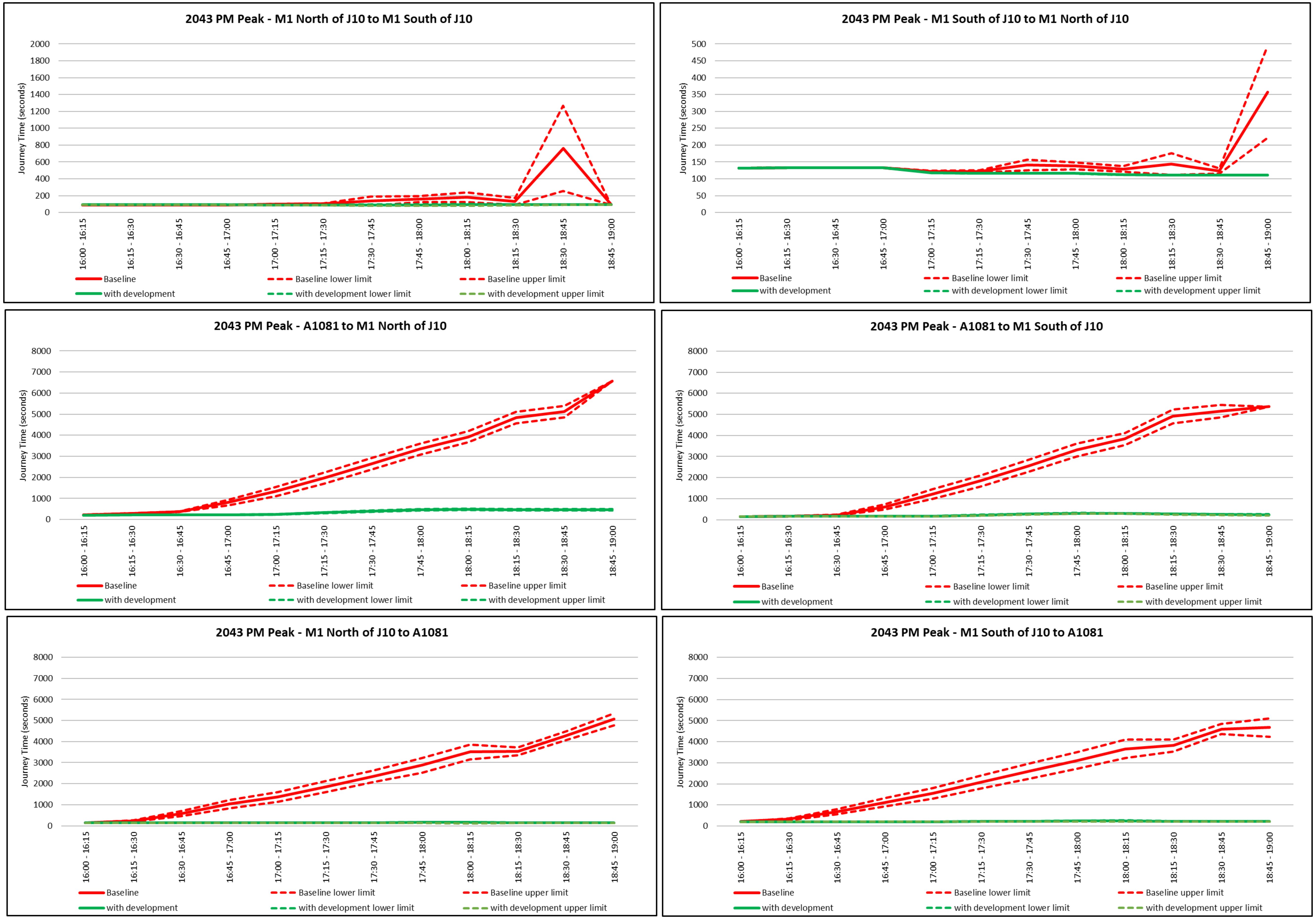


Figure 5-6: Journey times variability for journeys made using M1 J10- 2043 PM Peak



Junction modelling

5.6.13 **Table 5-18** summarises the future baseline and the Proposed Development in Assessment Phase 2b junction performance.

Table 5-18: 2043 junction performance summary Assessment Phase 2b (future baseline and with the Proposed Development in Original and Updated models)

Junction	Original Models				Updated Models			
	AM Peak		PM Peak		AM Peak		PM Peak	
	Future Baseline	with Phase 2b	Future Baseline	with Phase 2b	Future Baseline	with Phase 2b	Future Baseline	with Phase 2b
M1 Junction 10 (1)	A	B	B	A	D	C	D	B
A1081 New Airport Way / London Road (north) roundabout (2)	C	C	B	C	C	B	B	C
A1081 New Airport Way / A1081 London Road (south) roundabout (3)	D	A	B	A	C	A	C	A
A1081 New Airport Way / B653 / Gipsy Lane junctions (4)	C	C	C	C	C	C	E	C
Kimpton Road / A505 Vauxhall Way signalised junction (5)	C	C	C	C	D	C	E	D
A1081 New Airport Way / AAR signalised junction (6)	-	B	-	B	-	B	-	B

Junction	Original Models				Updated Models			
	AM Peak		PM Peak		AM Peak		PM Peak	
	Future Baseline	with Phase 2b	Future Baseline	with Phase 2b	Future Baseline	with Phase 2b	Future Baseline	with Phase 2b
A1081 New Airport Way / Percival Way signalised junction (7)	A	A	A	A	A	A	C	A
Percival Way / Frank Lester Way / President Way signalised junction (8)	B	B	A	B	B	B	A	B
Eaton Green Road Link / AAR signalised junction (9)	-	C	-	C	-	C	-	D
A505 Vauxhall Way / Eaton Green Road revised roundabout (10)	A	B	A	B	A	C	A	B
Eaton Green Road / Frank Lester Way signalised junction (11)	A	B	A	B	B	B	A	C
Eaton Green Road / Wigmore Road signalised junction (12)	A	C	A	D	A	D	A	D
Vauxhall Way / Crawley Green Road signalised junction (13)	C	D	C	D	C	D	D	C

Junction	Original Models				Updated Models			
	AM Peak		PM Peak		AM Peak		PM Peak	
	Future Baseline	with Phase 2b	Future Baseline	with Phase 2b	Future Baseline	with Phase 2b	Future Baseline	with Phase 2b
Crawley Green Road / Wigmore Lane signalised junction (14)	A	C	A	B	A	C	A	B
Windmill Road / Kimpton Road signalised junction (15)	C	B	C	B	C	C	A	B
Eaton Green Road / Lalleford Road signalised junction (16)	D	C	B	B	C	D	A	B
Wigmore Lane / Raynham Way signalised junction (17)	A	A	A	A	A	B	A	B
Wigmore Lane / Asda access signalised junction (18)	A	B	A	C	A	B	A	C
Windmill Road / St Mary's Road / Crawley Green Road roundabout (19)	D	C	E	D	E	D	E	D
Crawley Green Road / Lalleford Road signalised junction (20)	A	B	A	C	A	C	A	C

Junction	Original Models				Updated Models			
	AM Peak		PM Peak		AM Peak		PM Peak	
	Future Baseline	with Phase 2b	Future Baseline	with Phase 2b	Future Baseline	with Phase 2b	Future Baseline	with Phase 2b
Provost Way / AAR signalised junction (21)	-	B	-	B	-	B	-	B
Provost Way / Percival Way signalised junction (22)	-	A	-	A	-	A	-	A
President Way / AAR roundabout (23)	-	A	-	A	-	A	-	A
Terminal 2 access roundabout (24)	-	A	-	A	-	A	-	A
Notes: LoS (A): free flow; (B): Stable flow. slight delays; (C): stable flow. acceptable delays; (D): approaching unstable flow. tolerable delays; (E): unstable flow. intolerable delay and long queues; (F): congested. long delays and queues fail to clear.								

5.6.14 **Table 5-18** shows in the AM and PM peak hours for the Updated Models, the network would generally operate with acceptable conditions at peak times. Overall, the situation is anticipated to improve from some junctions showing congested and/or unstable flow (with LoS E or F), to a stable flow across multiple junctions including M1 Junction 10, A1081 New Airport Way/ Gipsy Lane Junction, Kimpton Road/ A505 Vauxhall Way junction and Windmill Road/St Mary's Road/ Crawley Green Road junction. This is result of the implemented mitigation measures in with development scenarios. Even at junctions where there LoS remains unchanged or increases, there is a general improvement in the queue lengths and average delay, particularly during the PM peak, as indicated by the individual junction performance results presented in **Appendix 0** .

5.7 Local Junction Modelling

5.7.1 The Updated strategic modelling and operational Vissim modelling have shown that the Proposed Development and associated off-site mitigation would have limited impact in either the LBC area or beyond and that the mitigation strategy continues to be effective.

5.7.2 Chapter 10 of the **Transport Assessment [APP-205]** summarised the impacts on a number of other junctions that were identified through on-going discussions with HCC and CBC. This section provides an update to the assessment based on the Rule 9 work undertaken in the CBLTM-LTN model. The operational performance of these junctions has been modelled using local junction modelling including ARCADY for roundabouts and PICADY for the priority junctions.

5.7.3 Junction model runs were carried out for the weekday AM (08:00–09:00) and PM (17:00–18:00) peak hour and the analysis is summarised below.

Hitchin

5.7.4 The A505 forms the main east-west route connecting Luton to Hitchin, Letchworth Garden City, Baldock and via the A602, Stevenage. The following junctions are the first points of impact as the A505 enters Hitchin and connects to the A602 and have been identified through discussions with HCC for further consideration:

a. A602 Park Way/A602 Stevenage Road/B656 Hitchin Hill/B656 London Road/Gosmore Road roundabout.
b. A505 Upper Tilehouse Street/A505 Paynes Park/A602 Park Way roundabout; and
c. A505 Offley Road/Pirton Road/A505 Upper Tilehouse Street/Wratten Road West mini roundabout.

Assessment Phase 1

5.7.5 **Table 5-19** summarises the future baseline and the Proposed Development in Assessment Phase 1 junction performance for the A602 Park Way/A602 Stevenage Road/B656 Hitchin Hill/B656 London Road/Gosmore Road roundabout junction.

Table 5-19: A602 Park Way/A602 Stevenage Road/B656 Hitchin Hill/B656 London Road/Gosmore Road roundabout – junction performance 2027 Assessment Phase 1 (future baseline and with the Proposed Development in Original and Updated models)

Arm	Original Models						Updated Models					
	Existing Junction (Future Baseline)			Existing Junction (with Assessment Phase 1)			Existing Junction (Future Baseline)			Existing Junction (with Assessment Phase 1)		
	Demand (PCUs)	RFC	Queue (PCUs)	Demand (PCUs)	RFC	Queue (PCUs)	Demand (PCUs)	RFC	Queue (PCUs)	Demand (PCUs)	RFC	Queue (PCUs)
AM Peak												
A602 Park Way	1,376	-	299	1,375	-	281	1,371	-	282	1,364	-	276
Hitchin Hill	446	-	4	437	-	4	450	-	5	455	-	4
A602 Stevenage Road	1,096	-	245	1,087	-	251	1,088	-	228	1,078	-	214
B656 London Road	206	-	1	204	-	0	242	-	1	242	-	1
Gosmore Road	108	-	0	108	-	0	103	-	0	103	-	0
Average junction delay (seconds)	701			692			657			630		
PM Peak												
A602 Park Way	1,180	-	130	1,189	-	141	1,213	-	167	1,218	-	166

Arm	Original Models						Updated Models					
	Existing Junction (Future Baseline)			Existing Junction (with Assessment Phase 1)			Existing Junction (Future Baseline)			Existing Junction (with Assessment Phase 1)		
	Demand (PCUs)	RFC	Queue (PCUs)	Demand (PCUs)	RFC	Queue (PCUs)	Demand (PCUs)	RFC	Queue (PCUs)	Demand (PCUs)	RFC	Queue (PCUs)
Hitchin Hill	634	-	24	611	-	20	605	-	13	596	-	13
A602 Stevenage Road	1,082	-	274	1,084	-	270	1,117	-	301	1,116	-	303
B656 London Road	284	-	1	287	-	1	287	-	1	290	-	1
Gosmore Road	71	-	0	71	-	0	70	-	0	69	-	0
Average junction delay (seconds)	532			544			610			604		

5.7.6 **Table 5-19** shows that in the AM peak hour, the relative performance of the junction is marginally better in the Updated Models than in the Original Models and, the Proposed Development has minimal impact on the overall performance of the junction in Assessment Phase 1. In the AM peak hour, the relative performance of the junction is marginally worse in the Updated Models than in the Original Models although the Proposed Development has minimal impact on the junction operation.

5.7.7 **Table 5-20** summarises the future baseline and Proposed Development junction performance for the A505 Upper Tilehouse Street/A505 Paynes Park/A602 Park Way roundabout junction in the AM and PM peak hours in Assessment Phase 1.

Table 5-20: A505 Upper Tilehouse Street/A505 Paynes Park/A602 Park Way roundabout - junction performance 2027 Assessment Phase 1 (future baseline and with the Proposed Development in Original and Updated models)

Arm	Original Models						Updated Models					
	Existing Junction (Future Baseline)			Existing Junction (with Assessment Phase 1)			Existing Junction (Future Baseline)			Existing Junction (with Assessment Phase 1)		
	Demand (PCUs)	RFC	Queue (PCUs)	Demand (PCUs)	RFC	Queue (PCUs)	Demand (PCUs)	RFC	Queue (PCUs)	Demand (PCUs)	RFC	Queue (PCUs)
AM Peak												
Upper Tilehouse Street	1,118	0.78	4	1,136	0.80	4	1,115	0.78	4	1,087	0.76	3
Paynes Park	955	0.43	1	949	0.43	1	975	0.44	1	972	0.43	1
A602 Park Way	643	0.46	1	645	0.46	1	654	0.46	1	650	0.46	1
Average junction delay (seconds)	7			7			7			6		
PM Peak												
Upper Tilehouse Street	972	0.74	3	983	0.75	3	978	0.74	3	987	0.75	3
Paynes Park	1,021	0.43	1	1,024	0.43	1	1,010	0.43	1	1,012	0.43	1

Arm	Original Models						Updated Models					
	Existing Junction (Future Baseline)			Existing Junction (with Assessment Phase 1)			Existing Junction (Future Baseline)			Existing Junction (with Assessment Phase 1)		
	Demand (PCUs)	RFC	Queue (PCUs)	Demand (PCUs)	RFC	Queue (PCUs)	Demand (PCUs)	RFC	Queue (PCUs)	Demand (PCUs)	RFC	Queue (PCUs)
A602 Park Way	795	0.59	2	792	0.59	1	784	0.58	1	779	0.57	1
Average junction delay (seconds)	6			6			6			6		

5.7.8 **Table 5-20** shows that in both the AM and PM peak hours, the relative performance of the junction is similar in the Updated Models as in the Original Models. The junction would operate within its theoretical capacity threshold in the AM and PM peak hour with Assessment Phase 1 of the Proposed Development having minimal impact on the operation of the junction.

5.7.9 **Table 5-21** summarises the future baseline and Proposed Development junction performance for the existing A505 Offley Road/Pirton Road/A505 Upper Tilehouse Street/Wratten Road West mini-roundabout junction in the AM and PM peak hours in Assessment Phase 1.

Table 5-21: A505 Offley Road/Pirton Road/A505 Upper Tilehouse Street/Wratten Road West mini-roundabout - junction performance 2027 Assessment Phase 1 (future baseline and with the Proposed Development in Original and Updated models)

Arm	Original Models						Updated Models					
	Existing Junction (Future Baseline)			Existing Junction (with Assessment Phase 1)			Existing Junction (Future Baseline)			Existing Junction (with Assessment Phase 1)		
	Demand (PCUs)	RFC	Queue (PCUs)	Demand (PCUs)	RFC	Queue (PCUs)	Demand (PCUs)	RFC	Queue (PCUs)	Demand (PCUs)	RFC	Queue (PCUs)
AM Peak												
A505 Offley Road	564	0.90	7	581	0.93	9	579	0.92	8	542	0.86	5
Pirton Road	517	0.95	10	518	0.97	12	502	0.94	9	510	0.92	8
Upper Tilehouse Street	706	0.75	3	694	0.73	3	700	0.74	3	696	0.73	3
Wratten Road West	15	0.04	0	15	0.04	0	15	0.04	0	15	0.04	0
Average junction delay (seconds)	40			46			40			31		
PM Peak												
A505 Offley Road	544	0.93	9	554	0.94	10	526	0.89	7	534	0.90	8

Arm	Original Models						Updated Models					
	Existing Junction (Future Baseline)			Existing Junction (with Assessment Phase 1)			Existing Junction (Future Baseline)			Existing Junction (with Assessment Phase 1)		
	Demand (PCUs)	RFC	Queue (PCUs)	Demand (PCUs)	RFC	Queue (PCUs)	Demand (PCUs)	RFC	Queue (PCUs)	Demand (PCUs)	RFC	Queue (PCUs)
Pirton Road	396	0.71	2	398	0.72	2	421	0.74	3	422	0.75	3
Upper Tilehouse Street	757	0.80	4	752	0.79	4	746	0.79	4	743	0.78	4
Wratten Road West	15	0.04	0	15	0.01	0	15	0.04	0	15	0.04	0
Average junction delay (seconds)	31			33			27			28		

5.7.10 **Table 5-21** shows that in both the AM and PM peak hours, the impact of the Proposed Development at Assessment Phase 1 is reduced in the Updated Models when compared to the Original Models such that the junction operates better or no worse than the future baseline.

2039 Assessment Phase 2a

5.7.11 **Table 5-22** summarises the future baseline and Proposed Development, (including the junction upgrade) junction performance for the A602 Park Way/A602 Stevenage Road/B656 Hitchin Hill/B656 London Road/Gosmore Road roundabout junction in the AM and PM peak hours in Assessment Phase 2a.

Table 5-22: A602 Park Way/A602 Stevenage Road/B656 Hitchin Hill/B656 London Road/Gosmore Road roundabout – junction performance 2039 Assessment Phase 2a (future baseline and with the Proposed Development in Original and Updated models)

Arm	Original Models						Updated Models					
	Existing Junction (Future Baseline)			Improved Junction (with Assessment Phase 2a)			Existing Junction (Future Baseline)			Improved Junction (with Assessment Phase 2a)		
	Demand (PCUs)	RFC	Queue (PCUs)	Demand (PCUs)	RFC	Queue (PCUs)	Demand (PCUs)	RFC	Queue (PCUs)	Demand (PCUs)	RFC	Queue (PCUs)
AM Peak												
A602 Park Way	1,398	-	340	1,343	-	114	1,396	-	307	1,329	-	100
Hitchin Hill	423	-	4	468	-	3	431	-	5	489	-	5
A602 Stevenage Road	1,114	-	287	1,119	-	120	1,092	-	288	1,085	-	110
B656 London Road	259	-	1	263	-	1	289	-	1	271	-	1
Gosmore Road	115	-	0	115	-	0	102	-	0	102	-	0
Average junction delay (seconds)	795			263			759			228		

Arm	Original Models						Updated Models					
	Existing Junction (Future Baseline)			Improved Junction (with Assessment Phase 2a)			Existing Junction (Future Baseline)			Improved Junction (with Assessment Phase 2a)		
	Demand (PCUs)	RFC	Queue (PCUs)	Demand (PCUs)	RFC	Queue (PCUs)	Demand (PCUs)	RFC	Queue (PCUs)	Demand (PCUs)	RFC	Queue (PCUs)
PM Peak												
A602 Park Way	1,241	-	159	1,281	-	63	1,251	-	189	1,302	-	82
Hitchin Hill	578	-	15	549	-	5	570	-	10	529	-	4
A602 Stevenage Road	1,090	-	290	1,156	-	236	1,117	-	317	1,174	-	250
B656 London Road	337	-	1	319	-	1	319	-	1	313	-	1
Gosmore Road	75	-	0	77	-	0	70	-	0	71	-	0
Average junction delay (seconds)	572			349			643			380		

* This junction has been modelled in lane simulation mode to better represent lane usage. ARCADY does not report RFC values when using lane simulation.

5.7.12 **Table 5-22** shows that in the AM peak hour, the Updated Models have a reduction in average delays in both the future baseline and with Assessment Phase 2a but that the relative performance of the junction is similar in the Updated Models and the Original Models. In the PM peak hour, the Updated Models have an increase in average delays in both the future baseline and with Assessment Phase 2a but again the relative performance of the junction is similar in the Updated Models and the Original Models. In overall terms, the mitigation works continue to provide significant benefits to the operation of the junction.

5.7.13 **Table 5-23** summarises the future baseline and Proposed Development (including the junction upgrade) junction performance for the A505 Upper Tilehouse Street/A505 Paynes Park/A602 Park Way roundabout junction in the AM and PM peak hours in Assessment Phase 2a.

Table 5-23: A505 Upper Tilehouse Street/A505 Paynes Park/A602 Park Way roundabout – junction performance 2039 Assessment Phase 2a (future baseline and with the Proposed Development in Original and Updated models)

Arm	Original Models						Updated Models					
	Existing Junction (Future Baseline)			Improved Junction (with Assessment Phase 2a)			Existing Junction (Future Baseline)			Improved Junction (with Assessment Phase 2a)		
	Demand (PCUs)	RFC	Queue (PCUs)	Demand (PCUs)	RFC	Queue (PCUs)	Demand (PCUs)	RFC	Queue (PCUs)	Demand (PCUs)	RFC	Queue (PCUs)
AM Peak												
Upper Tilehouse Street	1,345	0.95	15	1,219	0.87	7	1,331	0.94	13	1,183	0.85	6
Paynes Park	895	0.44	1	1,379	0.59	2	894	0.43	1	1,401	0.59	2
A602 Park Way	670	0.48	1	560	0.45	1	678	0.48	1	552	0.45	1
Average delay (seconds)	20			10			18			9		
PM Peak												
Upper Tilehouse Street	1,159	0.85	6	1,186	0.93	11	1,094	0.80	4	1,112	0.86	6
Paynes Park	1,006	0.43	1	1,410	0.60	2	1,002	0.43	1	1,405	0.60	2
A602 Park Way	761	0.56	1	726	0.59	1	755	0.56	1	707	0.57	1

Arm	Original Models						Updated Models					
	Existing Junction (Future Baseline)			Improved Junction (with Assessment Phase 2a)			Existing Junction (Future Baseline)			Improved Junction (with Assessment Phase 2a)		
	Demand (PCUs)	RFC	Queue (PCUs)	Demand (PCUs)	RFC	Queue (PCUs)	Demand (PCUs)	RFC	Queue (PCUs)	Demand (PCUs)	RFC	Queue (PCUs)
Average junction delay (seconds)	9			14			7			9		

5.7.14 **Table 5-23** shows that in both the AM and PM peak hours, the Updated Models have a similar impact as in the Original Models. The mitigation works to the junction continue to provide similar benefits as in the Original Models.

5.7.15 summarises the future baseline and Proposed Development (including the junction upgrade) junction performance for the A505 Offley Road/Pirton Road/A505 Upper Tilehouse Street/Wratten Road West mini-roundabout junction in the AM and PM peak hours in Assessment Phase 2a.

Table 5-24: A505 Offley Road/Pirton Road/A505 Upper Tilehouse Street/Wratten Road West mini-roundabout - junction performance 2039 Assessment Phase 2a (future baseline and with the Proposed Development in Original and Updated models)

Arm	Original Models						Updated Models					
	Existing Junction (Future Baseline)			Improved Junction (with Assessment Phase 2a)			Existing Junction (Future Baseline)			Improved Junction (with Assessment Phase 2a)		
	Demand (PCUs)	RFC	Queue (PCUs)	Demand (PCUs)	RFC	Queue (PCUs)	Demand (PCUs)	RFC	Queue (PCUs)	Demand (PCUs)	RFC	Queue (PCUs)
AM Peak												
A505 Offley Road	837	1.33	139	579	0.87	6	803	1.29	114	588	0.90	8
Pirton Road	475	0.95	11	600	1.12	43	497	0.99	15	561	1.06	27
Upper Tilehouse Street	730	0.77	3	975	0.79	4	711	0.75	3	968	0.79	4
Wratten Road West	15	0.04	0	15	0.06	0	15	0.04	0	15	0.06	0
Average junction delay (seconds)	296			76			253			58		
PM Peak												
A505 Offley Road	664	1.18	62	681	1.16	60	595	1.04	25	606	1.03	23
Pirton Road	462	0.85	5	471	0.89	7	468	0.86	5	474	0.89	6

Arm	Original Models						Updated Models					
	Existing Junction (Future Baseline)			Improved Junction (with Assessment Phase 2a)			Existing Junction (Future Baseline)			Improved Junction (with Assessment Phase 2a)		
	Demand (PCUs)	RFC	Queue (PCUs)	Demand (PCUs)	RFC	Queue (PCUs)	Demand (PCUs)	RFC	Queue (PCUs)	Demand (PCUs)	RFC	Queue (PCUs)
Upper Tilehouse Street	795	0.84	5	949	0.77	3	788	0.83	5	946	0.77	3
Wratten Road West	15	0.04	0	15	0.06	0	15	0.04	0	15	0.05	0
Average junction delay (seconds)	120			103			61			53		

5.7.16 shows that in both the AM and PM peak hours, the relative performance of the junction is similar in the Updated Models as in the Original Models. The proposed mitigation works continue to effectively mitigate the impacts of the Proposed Development in Assessment Phase 2a with reduced average delays in both the AM and PM peak hours.

2043 Assessment Phase 2b

5.7.17 Table 5-25 summarises the future baseline and Proposed Development (including the junction upgrade) junction performance for the A602 Park Way/A602 Stevenage Road/B656 Hitchin Hill/B656 London Road/Gosmore Road roundabout junction in the AM and PM peak hours in Assessment Phase 2b.

Table 5-25: A602 Park Way/A602 Stevenage Road/B656 Hitchin Hill/B656 London Road / Gosmore Road roundabout – junction performance 2043 Assessment Phase 2b (future baseline and with the Proposed Development in Original and Updated models)

Arm	Original Models						Updated Models					
	Existing Junction (Future Baseline)			Improved Junction (with Assessment Phase 2b)			Existing Junction (Future Baseline)			Improved Junction (with Assessment Phase 2b)		
	Demand (PCUs)	RFC	Queue (PCUs)	Demand (PCUs)	RFC	Queue (PCUs)	Demand (PCUs)	RFC	Queue (PCUs)	Demand (PCUs)	RFC	Queue (PCUs)
AM Peak												
A602 Park Way	1,397	-	345	1,359	-	137	1,393	-	325	1,348	-	108
Hitchin Hill	433	-	5	462	-	3	436	-	4	471	-	4
A602 Stevenage Road	1,126	-	292	1,150	-	157	1,106	-	301	1,114	-	139
B656 London Road	283	-	1	307	-	1	291	-	1	288	-	1
Gosmore Road	119	-	0	120	-	0	102	-	0	103	-	0
Average junction delay (seconds)	807			342			797			287		
PM Peak												
A602 Park Way	1,249	-	184	1,312	-	73	1,258	-	202	1,338	-	96

Arm	Original Models						Updated Models					
	Existing Junction (Future Baseline)			Improved Junction (with Assessment Phase 2b)			Existing Junction (Future Baseline)			Improved Junction (with Assessment Phase 2b)		
	Demand (PCUs)	RFC	Queue (PCUs)	Demand (PCUs)	RFC	Queue (PCUs)	Demand (PCUs)	RFC	Queue (PCUs)	Demand (PCUs)	RFC	Queue (PCUs)
Hitchin Hill	578	-	13	527	-	4	553	-	8	497	-	3
A602 Stevenage Road	1,114	-	300	1,160	-	233	1,144	-	339	1,211	-	284
B656 London Road	303	-	1	334	-	1	321	-	1	323	-	1
Gosmore Road	78	-	0	78	-	0	71	-	0	71	-	0
Average junction delay (seconds)	617			347			679			438		

* This junction has been modelled in lane simulation mode to better represent lane usage. ARCADY does not report RFC values when using lane simulation.

5.7.18 **Table 5-25** shows that in both the AM and PM peak hours, the relative performance of the junction is similar in the Updated Models as in the Original Models. The proposed mitigation works continue to effectively mitigate the impacts of the Proposed Development in Assessment Phase 2b with reduced queues and average delays in both the AM and PM peak hours.

5.7.19 **Table 5-26** summarises the future baseline and Proposed Development (including the junction upgrade) junction performance for the A505 Upper Tilehouse Street/A505 Paynes Park/A602 Park Way roundabout junction in the AM and PM peak hours in Assessment Phase 2b.

Table 5-26: A505 Upper Tilehouse Street/A505 Paynes Park/A602 Park Way roundabout - junction performance 2043 Assessment Phase 2b (future baseline and with the Proposed Development in Original and Updated models)

Arm	Original Models						Updated Models					
	Existing Junction (Future Baseline)			Improved Junction (with Assessment Phase 2b)			Existing Junction (Future Baseline)			Improved Junction (with Assessment Phase 2b)		
	Demand (PCUs)	RFC	Queue (PCUs)	Demand (PCUs)	RFC	Queue (PCUs)	Demand (PCUs)	RFC	Queue (PCUs)	Demand (PCUs)	RFC	Queue (PCUs)
AM Peak												
Upper Tilehouse Street	1,360	0.97	18	1,290	0.92	10	1,347	0.96	16	1,227	0.88	7
Paynes Park	898	0.44	1	1,315	0.58	2	887	0.43	1	1,364	0.59	2
A602 Park Way	675	0.49	1	589	0.47	1	683	0.49	1	566	0.46	1
Average junction delay (seconds)	23			13			21			11		
PM Peak												
Upper Tilehouse Street	1,200	0.87	6	1,271	0.96	16	1,136	0.83	5	1,228	0.92	10
Paynes Park	1,001	0.43	1	1,389	0.60	2	993	0.43	1	1,339	0.59	2
A602 Park Way	742	0.56	1	711	0.56	1	746	0.55	1	710	0.55	1

Arm	Original Models						Updated Models					
	Existing Junction (Future Baseline)			Improved Junction (with Assessment Phase 2b)			Existing Junction (Future Baseline)			Improved Junction (with Assessment Phase 2b)		
	Demand (PCUs)	RFC	Queue (PCUs)	Demand (PCUs)	RFC	Queue (PCUs)	Demand (PCUs)	RFC	Queue (PCUs)	Demand (PCUs)	RFC	Queue (PCUs)
Average junction delay (seconds)	10			20			8			13		

5.7.20 **Table 5-26** shows that in both the AM and PM peak hours, the relative performance of the junction is similar in the Updated Models as in the Original Models. The proposed mitigation works continue to effectively mitigate the impacts of the Proposed Development in Assessment Phase 2b in the AM peak and whilst there is an increase in delay and queues in the PM peak this is not considered to materially impact the operation of the junction and when balanced with the benefits in the AM peak hour, the overall mitigation continues to be effective.

5.7.21 **Table 5-27** summarises the future baseline and Proposed Development (including the junction upgrade) junction performance for the A505 Offley Road/Pirton Road/A505 Upper Tilehouse Street/Wratten Road West mini-roundabout junction in the AM and PM peak hours in Assessment Phase 2b.

Table 5-27: A505 Offley Road/Pirton Road/A505 Upper Tilehouse Street/Wratten Road West mini-roundabout - junction performance 2043 Assessment Phase 2b (future baseline and with the Proposed Development in Original and Updated models)

Arm	Original Models						Updated Models					
	Existing Junction (Future Baseline)			Improved Junction (with Assessment Phase 2b)			Existing Junction (Future Baseline)			Improved Junction (with Assessment Phase 2b)		
	Demand (PCUs)	RFC	Queue (PCUs)	Demand (PCUs)	RFC	Queue (PCUs)	Demand (PCUs)	RFC	Queue (PCUs)	Demand (PCUs)	RFC	Queue (PCUs)
AM Peak												
A505 Offley Road	894	1.41	189	603	0.91	8	869	1.39	172	710	1.22	78
Pirton Road	436	0.88	6	646	1.24	75	450	0.90	7	486	0.92	8
Upper Tilehouse Street	748	0.79	4	997	0.81	4	724	0.76	3	942	0.76	3
Wratten Road West	15	0.04	0	15	0.06	0	15	0.04	0	15	0.05	0
Average junction delay (seconds)	389			131			360			143		
PM Peak												
A505 Offley Road	678	1.20	70	752	1.29	104	618	1.08	35	716	1.24	86
Pirton Road	489	0.90	7	486	0.92	8	486	0.90	7	490	0.92	8

Arm	Original Models						Updated Models					
	Existing Junction (Future Baseline)			Improved Junction (with Assessment Phase 2b)			Existing Junction (Future Baseline)			Improved Junction (with Assessment Phase 2b)		
	Demand (PCUs)	RFC	Queue (PCUs)	Demand (PCUs)	RFC	Queue (PCUs)	Demand (PCUs)	RFC	Queue (PCUs)	Demand (PCUs)	RFC	Queue (PCUs)
Upper Tilehouse Street	834	0.88	7	960	0.78	3	792	0.84	5	969	0.79	4
Wratten Road West	15	0.04	0	15	0.06	0	15	0.04	0	15	0.06	0
Average junction delay (seconds)	140			198			78			156		

5.7.22 **Table 5-27** shows that in both the AM and PM peak hours, the relative performance of the junction is similar in the Updated Models as in the Original Models. The proposed mitigation works continue to provide significant benefits in the AM peak hour in reduced queues and delays. Whilst there is an increase in the queues and delays in the PM peak hour, overall queues and delays remain well below those in the Original Models. When the increased impact in the PM peak hour is balanced against the improvement in the AM peak hour, the overall impact is not considered to materially worsen the performance of the junction in Assessment Phase 2b and on balance, the mitigation is considered to continue to provide benefits to the operation of the junction.

Caddington

5.7.23 Chapter 10 of the **Transport Assessment [APP-205]** set out the impact on junctions identified through discussions with CBC for further consideration. These included:

a. A1081 London Road/Newlands Road priority junction.

b. B4540 Church Road/Newlands Road priority junction.

c. Newlands Road/Luton Road/Farley Hill priority junction.

d. Luton Road/Chaul End Road priority junction; and

e. Chaul End Road/Hatters Way signalised junction.

5.7.24 Assessment was undertaken for Assessment Phase 2b which reflected the full development impact at the above locations.

5.7.25 **Table 5-28** provides a comparison of the traffic impact at each of the above junctions taken form the CBLTM-LTN model for the Original Models and Updated Models.

Table 5-28: Caddington junctions – 2043 traffic impact in Original and Updated models

Junction	Original Models					Updated Models				
	Peak period	2043 Total Traffic Volume (PCUs)		Traffic Volume change (PCUs)	Percent change	Peak period	2043 Total Traffic Volume (PCUs)		Traffic Volume change (PCUs)	Percent change
		Future Baseline	With Development				Future Baseline	With Development		
A1081 London Road/Newlands Road	AM	2,696	2,656	-40	-1%	AM	2,428	2,356	-72	-3%
	PM	2,641	2,591	-50	-2%	PM	2,510	2,229	-281	-11%
B4540 Church Road/Newlands Road	AM	1,351	1,364	13	1%	AM	1,340	1,411	71	5%
	PM	1,368	1,424	56	4%	PM	1,294	1,329	35	3%
Newlands Road/Luton Road/Farley Hill	AM	2,082	2,122	40	2%	AM	1,955	2,130	175	9%
	PM	2,239	2,493	254	11%	PM	2,070	2,281	211	10%
Luton Road/Chaul End Road	AM	1,899	1,960	61	3%	AM	1,850	1,918	68	4%
	PM	2,084	2,252	168	8%	PM	1,900	2,045	145	8%
Chaul End Road/Hatters Way	AM	2,892	2,935	43	1%	AM	2,876	2,922	46	2%
	PM	2,712	2,785	73	3%	PM	2,609	2,686	77	3%

5.7.26 **Table 5-28** shows that traffic flows in the Updated Models are generally lower in both the future baseline and with the Proposed Development when compared with the Original Models. As with the Original modelling, the main impacts remain on the Newlands Road/Luton Road/Farley Hill junction (10% in the PM peak hour) and at the Luton Road/Chaul End Road junction (8% in the PM peak hour). The impact on the remaining junctions would generally be small and well within daily variations and not therefore material. This is consistent with the findings of the Original Models. Given the low traffic impact, detailed junction modelling has been undertaken for the following junctions:

a. Newlands Road/Luton Road/Farley Hill priority junction; and
b. Luton Road/Chaul End Road priority junction.

Assessment Phase 2b

5.7.27 **Table 5-29** summarises the future baseline and Proposed Development junction performance for the Newlands Road/Luton Road/Farley Hill priority junction in the AM and PM peak hours in Assessment Phase 2b.

Table 5-29: Newlands Road/Luton Road/Farley Hill priority junction - junction performance 2043 Assessment Phase 2b (future baseline and with the Proposed Development in Original and Updated models)

Arm	Original Models						Updated Models					
	Future Baseline			With Assessment Phase 2b			Future Baseline			With Assessment Phase 2b		
	Demand (PCUs)	RFC	Queue (PCUs)	Demand (PCUs)	RFC	Queue (PCUs)	Demand (PCUs)	RFC	Queue (PCUs)	Demand (PCUs)	RFC	Queue (PCUs)
AM Peak												
Newlands Road (Left Turn)	167	0.94	5	171	0.96	6	172	0.47	1	174	1.00	9
Newlands Road (Right Turn)	182	0.92	6	199	0.93	7	183	0.72	2	215	1.02	11
Luton Road (Right Turn)	523	0.95	19	451	0.84	7	424	0.76	4	469	0.87	8
Average junction delay (seconds)	36			26			10			39		
PM Peak												
Newlands Road (Left Turn)	394	1.28	50	436	1.55	99	389	1.08	23	448	1.34	64
Newlands Road (Right Turn)	223	1.26	29	236	1.53	54	208	1.05	13	226	1.32	33

Arm	Original Models						Updated Models					
	Future Baseline			With Assessment Phase 2b			Future Baseline			With Assessment Phase 2b		
	Demand (PCUs)	RFC	Queue (PCUs)	Demand (PCUs)	RFC	Queue (PCUs)	Demand (PCUs)	RFC	Queue (PCUs)	Demand (PCUs)	RFC	Queue (PCUs)
Luton Road (Right Turn)	261	0.55	1	289	0.64	2	193	0.39	1	220	0.46	1
Average junction delay (seconds)	116			259			56			156		

5.7.28 **Table 5-29** shows that in the Updated Models, in the AM peak there would be a reduction in the turning traffic in the future baseline at the junction, particularly on the right turn from Luton Road which improves the operation of this approach and results in a reduction in average junction delay. Whilst the impacts of the development are broadly similar to the Original Models and queues and delays are not considered significant. In the PM peak, the largest increase in traffic is on Newlands Road which was already over capacity in the Future Baseline and as a consequence the junction operation is worsened. Whilst there is still a detriment to PM peak junction performance in the Updated modelling 'with development' scenario, the impact is significantly reduced when compared to the Original Model outputs.

5.7.29 **Table 5-30** summarises the future baseline and Proposed Development junction performance for the Luton Road/Chaul End Road priority junction in the AM and PM peak hours in Assessment Phase 2b.

Table 5-30: Luton Road/Chaul End Road priority junction - junction performance 2043 without and with Phase 2b (future baseline and with the Proposed Development in Original and Updated models)

Arm	Original Models						Updated Models					
	Future Baseline (without Phase 2b)			With Assessment Phase 2b			Future Baseline (without Phase 2b)			With Assessment Phase 2b		
	Demand (PCUs)	RFC	Queue (PCUs)	Demand (PCUs)	RFC	Queue (PCUs)	Demand (PCUs)	RFC	Queue (PCUs)	Demand (PCUs)	RFC	Queue (PCUs)
AM Peak												
Chaul End Road (Left Turn)	319	1.39	53	356	1.47	69	315	1.26	40	359	1.37	58
Chaul End Road (Right Turn)	206	1.38	35	201	1.46	40	182	1.24	23	182	1.36	30
Luton Road (Ahead and Right)	544	0.69	3	565	0.71	3	550	0.69	3	551	0.69	3
Dunstable Road (Ahead and Left)	830	0.55	1	838	0.55	1	803	0.53	1	826	0.55	1
Average junction delay (seconds)	171			221			116			172		
PM Peak												
Chaul End Road (Left Turn)	289	1.65	59	350	3.63	167	253	1.09	17	299	1.60	57

Arm	Original Models						Updated Models					
	Future Baseline (without Phase 2b)			With Assessment Phase 2b			Future Baseline (without Phase 2b)			With Assessment Phase 2b		
	Demand (PCUs)	RFC	Queue (PCUs)	Demand (PCUs)	RFC	Queue (PCUs)	Demand (PCUs)	RFC	Queue (PCUs)	Demand (PCUs)	RFC	Queue (PCUs)
Chaul End Road (Right Turn)	178	1.63	37	177	3.58	85	175	1.08	13	176	1.58	34
Luton Road (Ahead and Right)	1015	1.11	69	1111	1.25	141	931	0.92	14	1025	1.12	74
Dunstable Road (Ahead and Left)	602	0.36	1	614	0.40	1	541	0.32	1	545	0.35	1
Average junction delay (seconds)	263			939			67			270		

5.7.30 **Table 5-30** shows that the junction would operate above its theoretical capacity threshold in the AM and PM peak hour, as in the Future Baseline. In the AM peak, there is a relatively small increase in total traffic at the junction (4%), but the impact is more noticeable because the junction is operating well above its capacity on Chaul End Road in the Future Baseline. In the PM peak, the total traffic at the junction increases by 8% and this had a substantial impact on the operation of the junction in the Original Models. There is however a significant reduction in 'with development' junction detriment in the Updated PM peak when compared to the Original Model, with queuing on Chaul End Road and Luton Road roughly halved from the previously reported figures albeit it is noted that queues and delays would worsen with the Proposed Development in Assessment Phase 2b.

5.7.31 The Applicant continues to work with CBC to discourage the use of the local network for additional Airport related traffic. Caddington already has traffic management in place and this could be supplemented to further discourage use of the local network. The Applicant is in discussions with CBC with regard to how this could be delivered through the TRIMMA.

5.8 Overall traffic modelling summary

5.8.1 A comprehensive impact assessment of the Proposed Development has been conducted, incorporating updated demand and adjustments to infrastructure assumptions in response to the Rule 9 requirement outlined in the ExA letter addressing Rule 9 considerations in transport modelling.

5.8.2 The demand for Vissim modelling is guided by strategic modelling, ensuring a consistent approach that considers both growth and broader redistribution effects. The operational impacts of the proposed development have been evaluated, taking into consideration concerns raised by National Highways about the capacity of M1 Junction 10 to handle additional airport traffic. Performance comparisons between the Updated model and the Original model have been undertaken to illustrate the effects of the post-Covid projection and distribution.

5.8.3 Overall, an improvement in the network's performance is anticipated in Assessment Phases 1, 2a, and 2b when compared with the Future Baseline performance. The development traffic is not expected to adversely affect journey times within Luton or between Luton and the M1 motorway.

5.8.4 Assessment of average journey times and journey time variability for trips on the M1 mainline and between M1 and A1081 shows no significant adverse impact on junction operation. Moreover, proposed mitigation measures enhance junction operation beyond the anticipated Future Baseline performance. These measures ensure smooth traffic merging and diverging from the M1 mainline to the slip lanes, sustaining mainline performance throughout the assessed period.

5.8.5 Individual junction performance results indicate that both the M1 and the local road network within Luton would generally experience stable flow conditions. Mitigation measures at local junctions outside of the Vissim model continue to be effective.

5.8.6 In summary, the modelling demonstrates that the impacts of the Proposed Development, along with the included mitigations in Assessment Phases 1, 2a, and 2b (full development), would not significantly adversely affect the operation of the highway network in the local or wider area.

6 ENVIRONMENTAL UPDATE

6.1.1 It was initially envisioned that, as the likely outcome of the update of the traffic modelling would be an overall reduction in traffic growth, the updated traffic data could be reviewed by the relevant environmental assessment teams and standard screening criteria would rule out the need for further modelling and assessment as no new or different likely significant effects would result.

6.1.2 On review of the updated traffic data the redistribution of traffic across the network was more nuanced and changes on some links could not be readily screened out of requiring further assessment. Therefore, both noise and air quality modelling has been required to confirm any potential changes to the conclusions of the Environmental Statement; this is underway but the results are not yet available. These modelling results can then be used by other relevant environmental aspects such as biodiversity and health, and the outcome of the environmental review reported in a separate document to be submitted at Deadline 7.

7 SUMMARY AND CONCLUSIONS

7.1.1 In response to the DfT updated modelling guidance (Transport Appraisal Guidance (TAG) Unit M4 – Forecasting and Uncertainty, May 2023 (Ref 10) which was issued after the submission of the DCO, the ExA issued a Rule 9 Letter to the Applicant to take account of the potential impacts of COVID-19 on the traffic modelling.

7.1.2 In response to the Rule 9 letter, the Applicant set out a methodology to address the requirements of the Rule 9 letter cognisant of the timeframe of the Examination to enable to matter to be considered within the available time.

7.1.3 The methodology set out was considered to be consistent with TAG Unit M4 and provided a considered proportionate, practical and can be undertaken within a reasonable timescale which enabled the risks to be mitigated.

7.1.4 In the case of the Luton Airport DCO, the key risks relate to the measures that have been proposed to mitigate the impact of the increase in airport surface access travel demands - capacity improvements to off-site highway junctions.

7.1.5 The proposed approach included analysis of recent local and national trends in travel demands, updating the FY forecasts using the latest DfT projections Core scenario, assessment of the risks associated with the updated forecasts and determination of any necessary adjustment factors that may arise from the analysis of the recent trends.

7.1.6 The Applicant also addressed in the Rule 9 modelling the concerns raised by highway authorities with regard to the inclusion of a capacity upgrade on the M1 mainline in the original modelling and the linkage between the strategic and micro-simulation modelling. Both of these matters were addressed within the updated modelling – no M1 motorway capacity upgrade has been assumed in the future baselines and the strategic model provides the inputs for the micro-simulation model.

7.1.7 The Applicant has subsequently updated the traffic modelling and at key milestones engaged with stakeholders setting out the emerging findings, which have been reported in technical notes submitted to the ExA. The findings of technical notes have been set out in detail in Chapter 3 and Chapter 4 of this report and can be summarised as follows:

a. Results from the Rule 9 modelling updates indicate that the overall forecast traffic volumes are slightly lower than the Original flows that informed the application for development consent.

b. Comparison between 2023 modelled and observed flows shows relatively good comparison on the SRN but considerably higher modelled than observed flows for the LRN.

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[10] TAG Unit M4: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1161977/tag-unit-m4-forecasting-and-uncertainty.pdf

c. The trends analysis also indicated a potential for a slight downward adjustment to the forecasts, although noting the limitations on the available observed data to support this. The impacts from COVID-19 are expected to be short-term and would likely dissipate as overall travel demands return to the pre-pandemic level (as has been seen on the SRN).

d. Traffic volumes on the SRN have largely 'recovered' to pre-pandemic levels and, although volumes on the LRN have been increasing, they are still behind the pre-pandemic levels. Considering the length of time to reach the assessment years of 2027, 2039 and 2043 traffic is anticipated to return to the expected level within the assessment years.

e. As discussed with National Highways and local highway authorities no adjustments were made to the base and FY models (apart from the recent Updated changes) in order to continue to make a 'robust' assessment of overall FY traffic volumes and given the likelihood that traffic levels would eventually recover (as per the SRN).

f. Following completion of the Rule 9 strategic modelling updates, the overall forecast risk assessment is considered to be 'very low' due to the slightly reduced traffic flows and the potential of further downward adjustments resulting from the trends analysis.

7.1.8 The Applicant has also updated the micro-simulation and local modelling. This work has shown that the forecast demand in the Vissim micro-simulation model, now informed by the strategic modelling, is up to 7% lower than in the Original models. The work has also shown that the reduction is demand is even greater at M1 Junction 10 where the forecast demand falls by up to 18%. It is noted that the most significant reductions occur in the PM peak hour, which as shown in the Transport Assessment generally was the more sensitive time period in respect of Junction 10 in the Original Models.

7.1.9 Chapter 5 has set out the Updated modelling and in doing so considered in further detail the operation of M1 Junction 10 particularly with regard to the impact of traffic joining and leaving the motorway on journey times. The Updated modelling can be summarised as follows:

a. Overall, an improvement in the network's performance is anticipated in Assessment Phases 1, 2a, and 2b when contrasted with the Future Baseline performance.

b. The development traffic is not expected to adversely affect journey times within Luton or between Luton and the M1 motorway.

c. Assessment of average journey times and journey time variability for trips on the M1 mainline and between M1 and A1081 shows no significant adverse impact on junction operation including the interface between the junction and the M1 mainline.

d. Individual junction performance results indicate that both the M1 and the local road network within Luton would generally experience stable flow conditions.

e. Mitigation measures at junctions outside of the micro-simulation model continue to be effective.

7.1.10 In conclusion, this report has demonstrated that proposed highway mitigation measures for the airport expansion can be considered ‘robust’ and continue to be effective even with the updated modelling assumptions. The modelling demonstrates that the impacts of the Proposed Development, along with the included mitigations in Assessment Phases 1, 2a, and 2b (full development), would not significantly adversely affect the operation of the highway network in the local or wider area.

REFERENCES

Ref 1 Department for Transport (2023) TAG Unit M4 Forecasting and Uncertainty
Ref 2 Luton Airport Passengers Statistics, June 2023.
Ref 3 National Highways (2020) A1(M) junction 6 to junction 8 smart motorway

APPENDIX A: RULE 9 RESPONSE LETTER

Appendix A - Accounting for COVID-19 in transport modelling (in response to Rule 9 Procedural Decision dated 13 June 2023)

On 16 May 2023 the ExA requested that the Applicant reviews its transport modelling in light of new Department for Transport (DfT) interim advice, dated April 2023, regarding the treatment of the COVID-19 pandemic in transport modelling.

The Applicant's response of 31 May 2023 described how it proposes to address the interim advice and provided an indicative timescale.

On 31 May 2023, the DfT also issued its full advice regarding the treatment of the COVID-19 pandemic in transport modelling as set out in the updated TAG Unit M4: Forecasting and Uncertainty.

In the letter of 13 June, the ExA stated it *'has made a Procedural Decision to request that the Applicant reviews its transport modelling considering the recently published guidance. The ExA also requests that the Applicant engages with stakeholders, including National Highways and the Local Highway Authorities, at the earliest possible opportunity with a view to gaining agreement as to the appropriate methodology if the model is not re-based*.' The ExA has further requested that detail be added to the timetable provided in the Applicant's letter of 31 May 2023 to '*describe each stage of the process in sufficient depth to allow the ExA to understand how the requirements of the guidance will be addressed, including how any significant changes would be accommodated in the work programme and when the appropriate stakeholders will be engaged. This should be provided by 27 June 2023*.'

The DfT's full advice on accounting for COVID-19 contains the following key statements:

- '*Rebasing of models takes time and resources; the Proportionate Update Process in TAG allows judgments of proportionality to be made when considering to what extent models need to be updated relative to the scope of decisions required and the surrounding risks*.' [extract from Para B.3.1]
- '*The summary recommendation is, where model rebasing is judged not to be practical, for analysts to assess the extent of the divergence of travel patterns and volumes from pre-pandemic projections, using the best available data and evidence*.' [extract from Para B.3.2]
- '*There are several options as to how appropriate adjustments to transport models may be accomplished. There are examples of possible approaches set out below. It should be noted that other approaches may be acceptable, based on the best judgement and careful consideration of the analyst. Either way, it is important to clearly set out the assumptions and evidence used for any approach*.' [extract from Para B.3.4]
- '*A judgment should be made on the most appropriate action relative to the risks to be mitigated*.' [Para B.3.5]

The full advice provides three examples as follows:

1. *'Create a forecast to the present day by applying adjustments to include a COVID-19 impact, based on observed data. This forecast can be used as a "new base year" as a substitute basis for scheme forecast.'*
2. *'Apply adjustments to a forecast year model to produce a new scheme opening year forecast, or the first required forecast year, that include a COVID-19 impact to that point. This will be the new pivot off which further forecast years are based.'*
3. *'Apply the adjustment globally to model results as a post-model adjustment.'* [extract from Para B.3.4]

The first example is not considered proportionate, practical and feasible within a reasonable timescale due to the large amounts of required data, the need for validation checks and the time required to do so, which would extend beyond the anticipated period of the DCO examination. The second example would also not be considered proportionate, practical and feasible within a reasonable time scale because it requires adjustment to the National Trip End Model (NTEM) growth projections to take account of COVID-19.

It is understood that in the short-term, the DfT does not intend updating the NTEM to accord with the latest guidance and therefore we would effectively have to 'predict' the impact of COVID-19 on trip making behaviour and apply this to the NTEM data.

The third approach is, however, considered proportionate, practical and can be undertaken within a reasonable timescale.

Having reviewed the full advice including the above key statements and examples, we propose a proportionate approach, based on the third example, to accounting for the COVID-19 pandemic, which takes into account the size and complexity of the multi-modal strategic transport model (as previously described in the letter of 31 May 2023) and the timescale for the DCO examination.

The proposed approach includes the analysis of recent local and national trends in travel demands, updating the future year forecasts using the latest DfT projections Core scenario, assessment of the risks associated with the updated forecasts and determination of any necessary adjustment factors that may arise from the analysis of the recent trends. While the approach does not include rebasing of the strategic model (due to the large amounts of data, substantial costs and timescale over several months needed to reach suitable levels of model calibration / validation), it does include the analysis of recent trends in travel between the 2016 base year and current year, which will be dependent upon what 'historic' data can be collated over this period.

The proposed programme, with indicative timings, is set out on page 33 of this cover letter. The programme shows various technical, stakeholder engagement and reporting tasks set over several weeks, commencing in July and concluding by December 2023.

The proposed approach is:

Task 1: Stakeholder Meetings 1 – Scope. Virtual meetings will be held with each stakeholder to discuss the proposed approach. The meetings will be with National Highways and the local highway authorities (LHA) of Central Bedfordshire Council, Hertfordshire County Council and Luton Borough Council, and will form a continuation of the regular consultation with these organisations that has taken place throughout the preparation of the DCO documents. The proposed approach, which is described below in subsequent tasks, will be discussed and it is therefore possible that the approach may then be refined following these meetings.

Task 2: Collate available 2016 to 2023 Strategic Road Network (SRN) traffic count data and other national travel data (on-line). On-line data will be collated for national trends and the SRN to cover the period from the 2016 base year strategic transport model to the 2023. Specifically, data will be collated for sections of the M1, M25, A1(M) and A5/A5183. The Applicant will draw on several sources which for example may include (amongst others):

- National Highways WebTRIS data - https://webtris.highwaysengland.co.uk/
- DfT MCC data – https://roadtraffic.dft.gov.uk/#6/55.254/-6.053/basemap-regions-countpoints
- Transport use during the coronavirus (COVID-19) pandemic - DfT statistics on transport use by mode since 1st March 2020
- Travel behaviour, attitudes and social impact of COVID-19 - a study into the travel behaviour of people during and following the COVID-19 pandemic (also known as 'All Change')
- National Travel Survey (NTS) - a household survey that collects information on how, why, when and where people travel as well as factors affecting travel

The data will be sourced and reviewed to identify trends in travel characteristics and volumes that have occurred since the base year strategic models were developed for the year 2016 and the present day (depending on the availability of up-to-date data).

Task 3: Request 2016 to 2023 Local Road Network (LRN) traffic count data from LHAs. The LHAs will be asked to supply traffic count data for key local roads over the 2016 to 2023 period. Ideally these data will largely include sites which are used for monitoring but may by necessity also include some ad hoc 'historic' survey data.

Task 4: Review of DfT Rail COVID-19 Scenarios. The DfT's latest Rail COVID Scenarios v.19.4, sourced from the Latest Earning Networked Nationally Overnight (LENNON) ticketing and revenue database, will be reviewed to assess how adjustments factors may be applied to the rail forecasts.

Task 5: Analyse traffic count, rail patronage and travel characteristics data to determine national and local trends since 2016. In particular, the collated SRN, LRN and rail patronage data will be analysed over the period 2016 to 2023 to assess the broad impact of Covid-19 on volumes. The other national data on travel characteristics will be used to help understand possible changes in trip purpose, mode choice, working-from-home, etc.

Task 6: Technical Note 1 on 2016 to 2023 trends. A technical note will be prepared on the analysis of recent trends in travel characteristics and demands, and how they relate to the strategic transport model.

Task 7: Stakeholder Meetings 2 - Recent trends. The findings of the technical note will be discussed with stakeholders.

Task 8: Update future years (FY) Uncertainty Log (UL) for development and infrastructure. The UL information for future year land use developments and future transport infrastructure will be updated. The UL was last updated in mid-2021 and shared with the stakeholders. Through previous stakeholder meetings, we are already aware of certain developments and infrastructure that have changed, plus new developments/schemes, which need to be taken into account. The update will include a thorough review of planning applications and local plans, and be undertaken in liaison with the stakeholders, as has been done previously.

Task 9: Update FY travel demands for UL, NTEM8 & NRTP22 - 2027, 2039, 2043. The strategic transport model's travel demands are currently controlled to the DfT's NTEM7.2 and Road Traffic Forecast 2018 growth projections. The forecasts will be updated according to the updated UL and controlled to the DfT's latest NTEM8 for cars and public transport passengers, and National Road Traffic Projections (NRTP) 2022 for LGV and HGV growth projections. Future demands will be produced for the three key airport expansion years of 2027, 2039 and 2043.

Task 10: Produce transport demands for new additional year 2023. The updates of UL and NTEM8/NRTP22 will also be used to prepare transport demands for a new forecast year of 2023. This will be used for comparative purposes with the data collated (in earlier Tasks) over the 2016 to 2023 period.

Task 11: Run highway and public transport models - 2023, 2027, 2039, 2043 (via the Demand Model). The highway and public transport assignment models will be run and checked for the three key airport expansion future forecast years, plus the additional year of 2023. The airport expansion years will be run for both the Do Minimum without expansion and Do Something with expansion, whereas 2023 will be run for the Do Minimum only.

Task 12: Compare 2023 forecasts with 2023 counts and 2016 modelled base year. The 2023 forecasts will be compared with 2023 road traffic and rail patronage count data.

Task 13: **Determine future year risks and need (if any) for adjustment factors.** The 2023 modelled flows and observed count data will be compared, as will the trends over the 2016 to 2023 period. A view will then be taken into whether there are significant differences, if sufficient trend analysis data has been collated and if any difference may lead to risks in the forecasts in general, the Transport Assessment of the airport expansion, trigger points and levels of mitigation that have been proposed to accommodate the proposed airport expansion.

Task 14: Technical Note 2 Risk Assessment. A technical note on the risk assessment will be prepared setting out the need, if any, to consider adjustment factors to the future year forecasts. In particular, the technical note will pay attention to the TAG Unit M4 statement that 'A judgment should be made on the most appropriate action relative to the risks to be mitigated.' [Para B.3.5]

Task 15: Stakeholder Meetings 3 - Risk Assessment. The finding of the technical note will be discussed with the stakeholders.

Task 16: Produce adjusted FY road and rail forecasts (if required and subject to TN2). If required, a set of adjustments factors will be prepared for subsequent application to the future year model forecasts.

Task 17: Change and risk assessment. The adjustment factors will be applied to the forecasts, if and where appropriate. The adjusted forecasts will then be assessed to see if any previous conclusions and recommendations with the Transport Assessment may be affected by the change.

Task 18: Growth factors for VISSIM micro-simulation model. The updated forecast growth in traffic within the strategic transport model will be extracted for use in the local VISSIM micro-simulation model. The method for deriving growth will be via the production of cordon matrices by vehicle type for the smaller VISSIM area, for the base year and four future years for both the AM and PM peak period models.

Task 19: Traffic data for environmental assessment. Traffic data will be prepared for the airport expansion years of 2027, 2039 and 2043 both without and with airport expansion, using procedures that have already been set up and used for the previous forecasting, Transport Assessment and Environmental Assessment. The primary use of these data is for Air Quality and Noise assessment if determined as necessary by the subject matter experts. The traffic data outputs described above will be reviewed by each specialist assessment team and implications considered and confirmed. At this stage, however, it is anticipated that likely changes would not result in material changes to the overall assessment of significant effects in the ES. If confirmed, a qualitative commentary on the implications for the relevant environmental assessments can be provided in the reporting task below prepared within the programme described here. The potential implications of this review and new guidance on each of those aspects is summarised as:

- **Noise** – The traffic data used for noise modelling is the annual average weekday traffic (AAWT). The assessment of significant effects due to road traffic noise considers absolute noise levels in the Do Something scenario, as well as the change in noise levels between the Do Minimum and Do Something scenarios. Substantial changes in road traffic noise levels require a relatively large relative changes in traffic volume, for example, an increase in road traffic volume of approximately 25% is required to result in an increase in noise of 1dB (all else being equal). As the potential relative changes in road traffic volume when considering the new guidance are anticipated to be substantially less than this, it is expected that there would be no new or materially different significant effects than those reported in the ES.

- **Air quality** – The traffic data used for the air quality dispersion modelling is annual average daily traffic (AADT) for each link within the affected road network (ARN) (defined in the ES). The Covid-19 impacts may affect the traffic at a link level. However, criteria in relevant guidance can be used to determine if the link level AADT changes, as a result of accounting for Covid-19, can be considered insignificant, without requiring detailed dispersion modelling. It is likely that accounting for Covid-19 will reduce the AADT of non-airport related traffic, which would result in exposure to lower total concentrations of pollutants. Therefore, the assessment in the ES assesses a more conservative scenario. Due to the significance criteria methodology used (as described in the ES), the possible effect to the assessment of significance is that conclusions will remain unchanged, or the effects will be less than those reported in the ES. This will be as a result of reducing total pollutant concentrations. Therefore, it is unlikely that new traffic data accounting for Covid-19 will significantly change the conclusions reported in the ES.

- **Traffic and Transport** – Traffic flow data extracted from traffic modelling is used to determine the likely significant environmental effects across a range of traffic and transport criteria. It is not considered likely that the change in traffic levels as a result of the change in growth assumptions from COVID-19 will change the outcomes reported in the ES or the level of mitigation proposed.

- **Greenhouse Gasses** (GHG) - The traffic data used in the GHG assessment only considers airport related traffic for Do Minimum and Do Something scenarios, rather than the wider background traffic that will be affected by Covid-19 impacts. There could be some minor changes in distance travelled due to rerouting of airport related traffic, as a result of reduced non-airport related demand elsewhere on the road network, however, from evidence to date the variance between model runs has always been negligible.

- **Health** – With regards to the air quality related health impacts, similar to the air quality implication, it is likely that accounting for Covid-19 will reduce the AADT of non-airport related traffic, which would result in the population being exposed to lower total concentrations of pollutants than those reported in the ES. Therefore, the assessment in the ES assesses a more conservative scenario. The possible effect to the conclusions will remain unchanged, or the effects will be less than those reported in the ES, as a result of air quality.

- **Biodiversity** - With regards to the air quality related impacts on ecological receptors, similar to the air quality implication, it is likely that accounting for Covid-19 will reduce the AADT of non-airport related traffic, which would result in exposure to lower total concentrations of relevant pollutants. Therefore, the assessment in the ES assesses a more conservative scenario. The possible effect to the conclusions will remain unchanged, or the effects will be less than those reported in the ES, as a result of air quality.

Task 20: Reporting. The outcome of the accounting for COVID-19 in transport modelling work will be documented in a standalone report.

Task 21: Stakeholder Meetings 4 – Reporting. The key findings will be presented and discussed with the stakeholders.

Task 22: Submission to Planning Inspectorate. A final report will be issued to the Planning Inspectorate.

It is possible that should Tasks 14 and 15 conclude the forecasting risks to be small and there is no need to make adjustments, Task 16 may not then be required, and the programme may then be shortened.

Luton Airport DCO - Proportionate accounting for COVID-19 in Transport Modelling

Task	Activity	Week Beginning																									
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
		12/06/2023	19/06/2023	26/06/2023	03/07/2023	10/07/2023	17/07/2023	24/07/2023	31/07/2023	07/08/2023	14/08/2023	21/08/2023	28/08/2023	04/09/2023	11/09/2023	18/09/2023	25/09/2023	02/10/2023	09/10/2023	16/10/2023	23/10/2023	30/10/2023	06/11/2023	13/11/2023	20/11/2023	27/11/2023	04/12/2023
0	**Scoping and Responding to 13 June 2023 Letter**																										
1	**Stakeholder Meetings 1 - Scope**																										
2	Collate available 2016 to 2023 SRN traffic count data (on-line)																										
3	Request 2016 to 2023 LRN traffic count data from LHAs																										
4	Review of DfT Rail COVID-19 Scenarios																										
5	Analyse traffic count and patronage data to determine trends since 2016																										
6	**Technical Note 1 on 2016 to 2023 trends**																										
7	**Stakeholder Meetings 2 - Recent trends**																										
8	Update future years (FY) Uncertainty Log (UL) for development and infrastructure																										
9	Update (FY) travel demands for UL, NTEM8 & NRTP22 - 2027, 2039, 2043																										
10	Produce transport demands for new additional year 2023																										
11	Run highway and public transport models - 2023, 2027, 2039, 2043																										
12	Compare 2023 forecasts with 2023 counts and 2016 modelled base year																										
13	Determine future year risks and need (if any) for adjustment factors																										
14	**Technical Note 2 Risk Assessment**																										
15	**Stakeholder Meetings 3 - Risk Assessment**																										
16	Produce adjusted FY road and rail forecasts (if required and subject to TN2)																										
17	Change and risk assessment																										
18	Growth factors for VISSIM micro-simulation model																										
19	Traffic data for environmental assessment																										
20	**Reporting**																										
21	**Stakeholder Meetings 4 - Reporting**																										
22	**Submission to planning inspectorate**																										

APPENDIX B: TAG M4 – APPENDIX B ADAPTING THE CORE SCENARIO TO LARGE SCALE CHANGES

Appendix B: Adapting the core scenario to large scale changes

B.1 Background

B.1.1 The COVID-19 pandemic has had a significant impact on the pattern and volume of travel, with overall volumes for most modes still below pre-pandemic levels, as can be seen in DfT official statistics, and importantly below pre-pandemic projected demand levels. There are a multitude of drivers of behaviour and demand; it is difficult to isolate the individual impact of COVID-19 and the extent to which impacts will be sustained long term is unclear. However, it is the Department's view and recommendation that this evident suppression of travel demand relative to a pre-pandemic projection of demand at this time should be appropriately represented in transport analysis. This is important particularly in appraisal and analysis supporting transport investment decisions.

B.2 The TAG approach

B.2.1 The principles of establishing transport models and calibrating/validating them to observations is clearly set out in the modelling units of TAG. TAG Unit M2.2 – Base Year Matrix Development, Section 4.4, provides guidance for analysts considering using models with base years established in the past and assessing their validity for future forecasting. Analysts are advised to assess the validity of the trip matrices developed in the past against present day observations. Where there are significant changes from when the matrix was developed and the present day, the model should ideally be rebased. More proportionate approaches may be acceptable if sufficient evidence is provided that these appropriately cover most of the risks of not rebasing.

B.2.2 The COVID-19 pandemic has led to marked changes in travel demand relative to pre-pandemic projected demand, even if there is uncertainty over the long-term impacts. In transport modelling terms, therefore, the guidance in TAG Unit M2.2 applies. That is, this is an event of a significant change in trip patterns. To account for COVID-19 related changes, trip matrices based before the beginning of the pandemic should ideally be rebased, or if this is not possible, an appropriate adjustment applied to model inputs or outputs in a proportionate way (see section B.3.4 for potential options).

B.2.3 The implication of this advice is that for analysts creating new or future models, basing their models to 2023 onwards, do not need to apply any further adjustment to account for COVID-19. The impact of COVID-19 on trip-making will in general be internalised into the base year trip matrix and vehicle/passenger flows. Sensitivity tests or scenarios will remain important and prudent to test the further potential for change, in particular the potential long-term impacts of COVID-19, for example potential recovery versus permanent changes in behaviour. This is in line with the DfT's Uncertainty Toolkit. This may be particularly relevant for certain modes.

B.2.4 The Department continues to monitor and collect statistics of travel demand since the start of the pandemic. We will also undertake further research to understand the full extent of the impacts of the pandemic, which we will use to inform further evidence-based guidance in the future. This may include considering modelling parameters recommended in TAG for demand forecasting, and whether these have substantially changed. This essentially involves the established past evidence of sensitivities of different groups and trip purposes to aspects of generalised travel cost changes.

B.2.5 Therefore, the Department continues to recommend the forecasting methods described in TAG Unit M4 – Forecasting and Uncertainty as a basis for analysts to create future year trip matrices. In summary, analysts should continue to use the growth factors from the National Trip End Model data set (NTEM) to grow demand from their base year. The main drivers of trip end growth in NTEM are demographic and economic. Whilst we acknowledge that household trip rates in NTEM 8.0 may have changed due to COVID-19, the growth rates should remain robust, since they remain in-line with official socio-economic projections.

B.2.6 In addition, the guidance in section 2 of TAG Unit M4 recommends how to record uncertainty and assumptions. Further details on understanding uncertainty can be found in the DfT's Uncertainty Toolkit. The guidance in this document should also be followed to understand modelling sensitivities.

B.2.7 Schemes modelling rail demand should continue to use the guidance released with the Demand Driver Generator (DDG), as well as Section 8 of TAG Unit M4.

B.3 Proportionate accounting for COVID-19 in prior-calibrated models

B.3.1 The Department recognises that in the near future, the large majority of transport models used to provide evidence for schemes appraisals will be based on years prior to the pandemic. Rebasing of models takes time and resources; the Proportionate Update Process in TAG allows judgments of proportionality to be made when considering to what extent models need to be updated relative to the scope of decisions required and the surrounding risks. Indeed, it is very plausible that travel patterns at the current time are in themselves subject to some change in following years (such changes being outside of the direct scope and functionality of the model). Therefore the Department accepts that, in many circumstances, the practical course of action is to make proportionate and transparent adjustments at this time.

B.3.2 The summary recommendation is, where model rebasing is judged not to be practical, for analysts to assess the extent of the divergence of travel patterns and volumes from pre-pandemic projections, using the best available data and evidence. If it is clear COVID-19 has had an impact on travel, this should be represented using an appropriate change in travel demand across the trip matrix, considering trip purpose and patterns as appropriate, and apply this to produce an updated core forecast.

B.3.3 The analyst should aim to adjust their model to appropriately forecast travel demand and traffic and/or passenger kilometres to a high-level proportionate adjustment observed from national statistics. Alternatively, where appropriate, use of more specific local data is recommended. The analyst should carefully consider scheme specific adjustments, including adjustments specific to trip purpose, customer segmentation, mode of transport, and locally-led COVID-19 recovery. For example, observed data shows that freight travel patterns have changed in a different way to personal travel.

B.3.4 There are several options as to how appropriate adjustments to transport models may be accomplished. There are examples of possible approaches set out below. It should be noted that other approaches may be acceptable, based on the best judgement and careful consideration of the analyst. Either way, it is important to clearly set out the assumptions and evidence used for any approach. If the analyst is unsure, they may wish to discuss with their scheme sponsor.

1. **Create a forecast to the present day by applying adjustments to include a COVID-19 impact, based on observed data. This forecast can be used as a "new base year" as a substitute basis for scheme forecast.**

   This effectively provides a "new base year" where the costs and demand are maintained in the initial base year. This allows analysts the potential for a check of travel patterns and/or traffic flow against current observations or statistics in their modelled area. Validation checks can be undertaken to provide greater assurance that their present-day forecast model is a suitable basis for future forecasting, and a revision to the adjustment made if needed. Some judgment will be required here; whilst it may not necessarily be expected to fully align with validation standards set out in TAG, some evidence of suitability is required. This approach may also be required if it is of importance to obtain appraisal results during the 2020-2022 period, although the profile across this time should be handled with due care and transparency.

2. **Apply adjustments to a forecast year model to produce a new scheme opening year forecast, or the first required forecast year, that include a COVID-19 impact to that point. This will be the new pivot off which further forecast years are based.**

   This approach removes the need to produce a present-day forecast model (as a new/reset base year). Analysts should make use of any official statistics or observed data after the model base year where possible and account for changes after that point up to the opening year, such as the use of NTEM growth factors. However, it comes with the significant disadvantage that there will be no existing observed data (trips and traffic) to ensure validity of the opening year forecast. Analysts should ensure that the model assumptions made are sufficiently transparent and tested and that the arising uncertainty is explored and clearly presented in an appraisal.

3. **Apply the adjustment globally to model results as a post-model adjustment.**

This method is the simplest way of applying adjustment. However, as well as including all the issues with the previous method(s), it also presents the most risk to the model results and appraisal. This is because applying adjustments to model results means that the model has effectively not used the change in travel patterns, reflecting the changed conditions. Care should also be taken that adjustments are made consistently across the model results so as not to distort the appraisal (e.g. demand and costs). It will be expected in these cases that assumptions made are extremely clear and that a series of sensitivity tests will be undertaken to mitigate the risks around potentially unreliable model results. This method should only therefore be considered if quick, proportionate decisions need to be taken, so long as the risks to analytical assurance are explicitly highlighted. There may be situations where a simpler approach is appropriate, for example when looking at short-term projections that are likely to be updated regularly.

B.3.5 A judgment should be made on the most appropriate action relative to the risks to be mitigated.

B.3.6 Any adjustment made, or any decision to not apply an adjustment, must be supported by evidence and appropriately explained in an uncertainty log and the relevant modelling reports that support the business case (i.e. the local model validation report and the data collection report where relevant).

B.3.7 Analysts should consider the potential for further changes in future trip patterns in their area of interest when considering the most appropriate and proportionate action (for example, further potential of 'recovery' towards pre-pandemic trip rates). Regardless of the approach adopted, this is an issue that is relevant to all transport model forecasting. It may be prudent to accommodate potential scenarios to test different assumptions in post- pandemic trip-making relevant to the case in hand. TAG Unit M4 and the Uncertainty Toolkit both provide advice on defining alternative scenarios and sensitivity tests.

B.4 Recommended data sources

- Transport use during the coronavirus (COVID-19) pandemic - DfT statistics on transport use by mode since 1st March 2020

- Travel behaviour, attitudes and social impact of COVID-19 - a study into the travel behaviour of people during and following the COVID-19 pandemic (also known as 'All Change')

- National Travel Survey (NTS) - a household survey that collects information on how, why, when and where people travel as well as factors affecting travel

- National Travel Attitudes Study (NTAS) - a study of attitudes towards different aspects of travel including safety, the environment and congestion.

B.5 Example of applying a COVID-19 adjustment

B.5.1 Example: Applying a post-model adjustment in the National Road Traffic Projections 2022

B.5.2 The analysis for NRTP 22 was undertaken in March 2022, using the National Transport Model with a base year of 2015. Trip rates were calculated at 2016 levels, then compared to 2019 to confirm they were still valid. Analysts then applied an adjustment to the projections after they had been produced in the NTM.

B.5.3 This approach was based on the best evidence at the time (March 2022), and was to produce national modelling, rather than scheme specific appraisal. The Common Analytical Scenarios were also analysed in line with advice on uncertainty. It is included here as an example of a case where the Core has been adjusted to account for COVID-19 impacts.

B.5.4 Analysts considered data collected over the pandemic. Multiple sources were considered, including DfT Statistics on Transport use during the Pandemic, the National Travel Attitudes Study, the ‘All Change’ study and the National Travel Survey. The observed levels of travel were compared to a counter factual expected level of travel, had the pandemic not occurred. This was calculated by taking the February 2020 observed demand and applying an expected increase of 3% over two years, based on historical expected growth. The observed travel was compared to this counterfactual and the difference is assumed to be the impact of the pandemic.

B.5.5 The observed data was considered over mode and travel purpose. These figures were considered carefully and with contextual knowledge about the restrictions on transport and current attitudes to travel. The tables in the NRTP document show the results.

B.5.6 Careful consideration and consultation with stakeholders led analysts to conclude that a reduction of 5%, applied post model, to car traffic was an appropriate adjustment to the model outputs, in line with option 3 above. This reflected the reductions observed for commuting trips (6%), business trips (9%) and other trips (4%). Therefore, if needed, we could have applied these separate reductions to trips based on purpose.

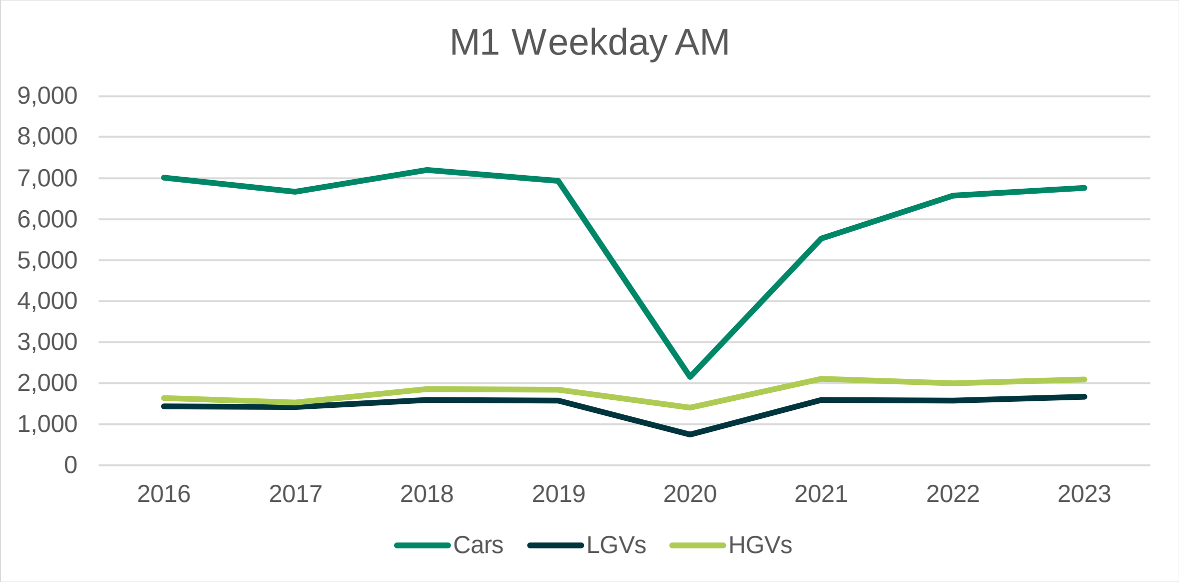
B.5.7 For full details, please refer to Annex C of National road traffic projections 2022 (publishing.service.gov.uk).

APPENDIX C: TRENDS ON STRATEGIC ROAD NETWORK BY VEHICLE TYPE

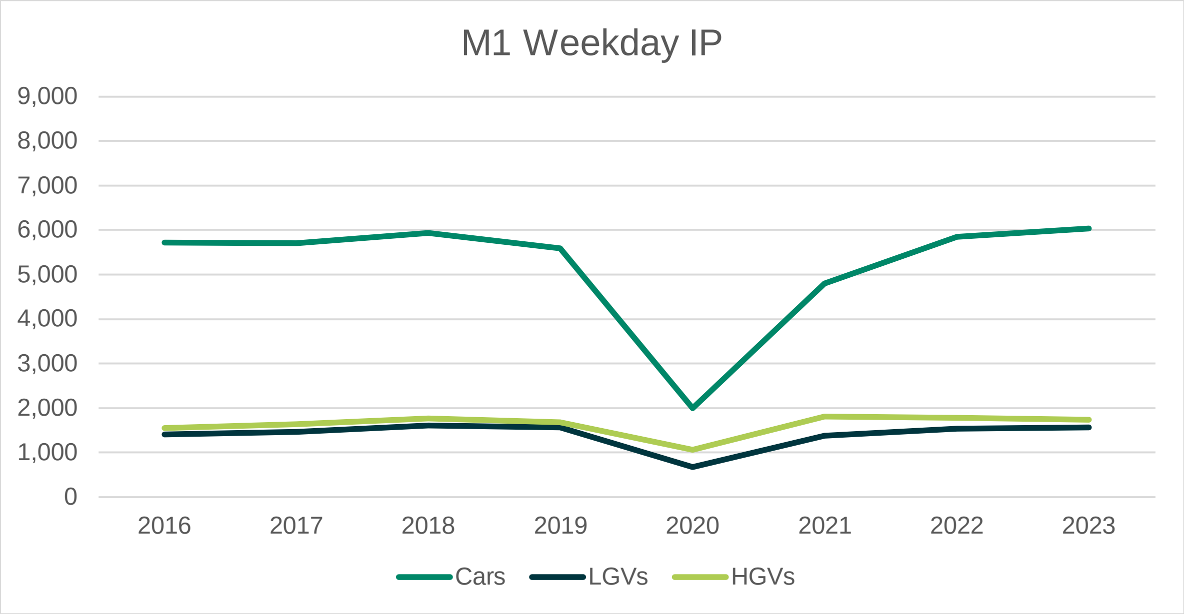
M1 Mainline Between J8 and J12

April (2016-2023) Two-Way Traffic Flow

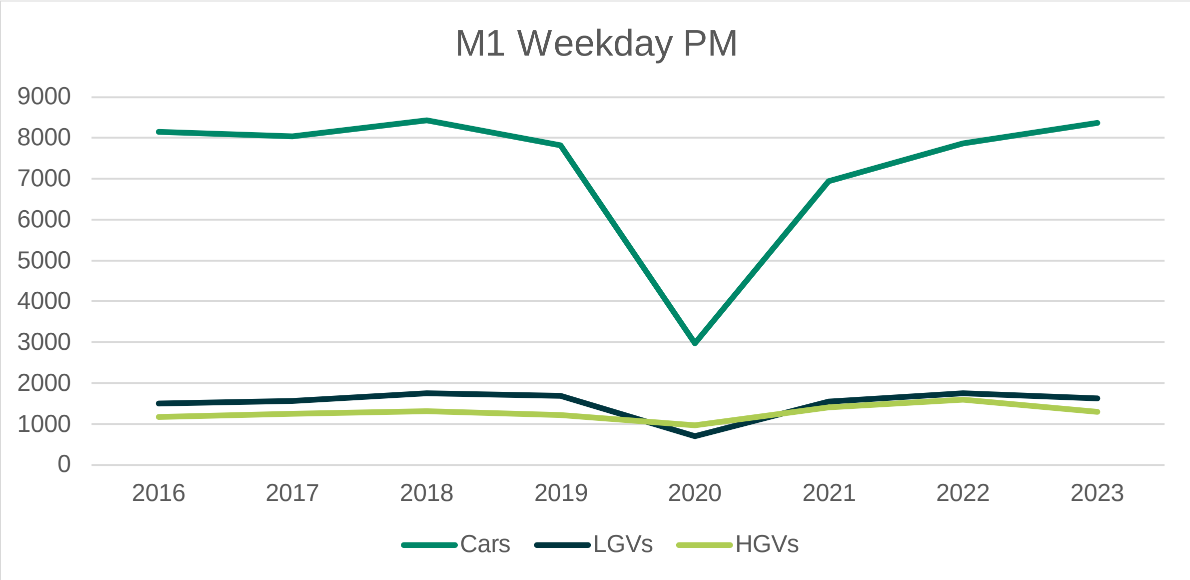
M1 Two-Way AM Peak Traffic Flow April 2016 – April 2023 (by Vehicle Type) – (vph)



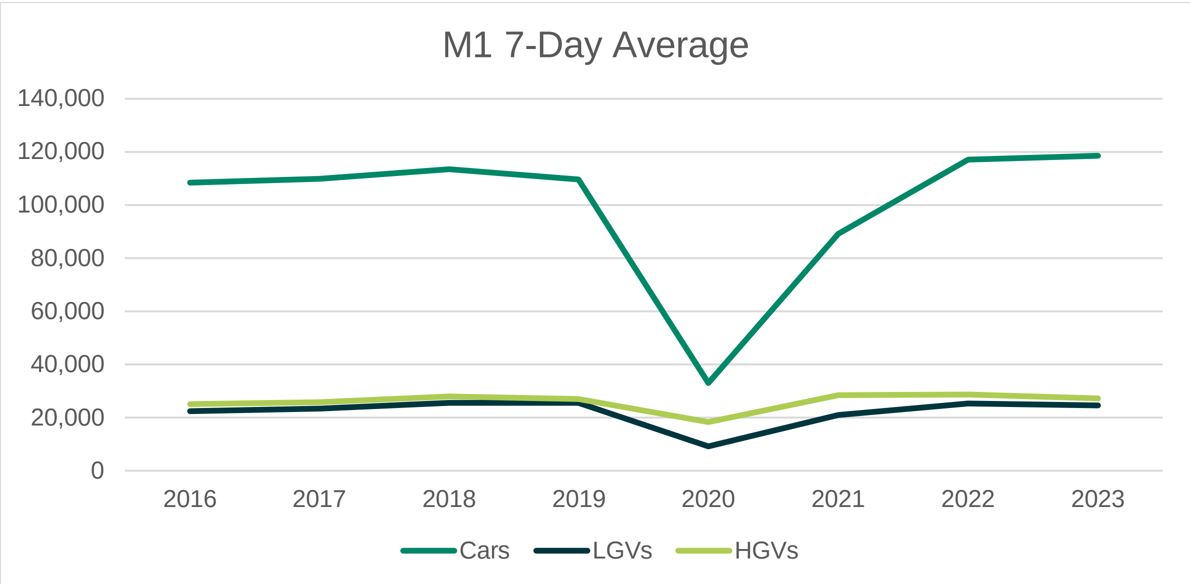
M1 Two-Way IP Traffic Flow April 2016 – April 2023 (by Vehicle Type) – (vph)



M1 Two-Way PM Peak Traffic Flow April 2016 – April 2023 (by Vehicle Type) – (vph)



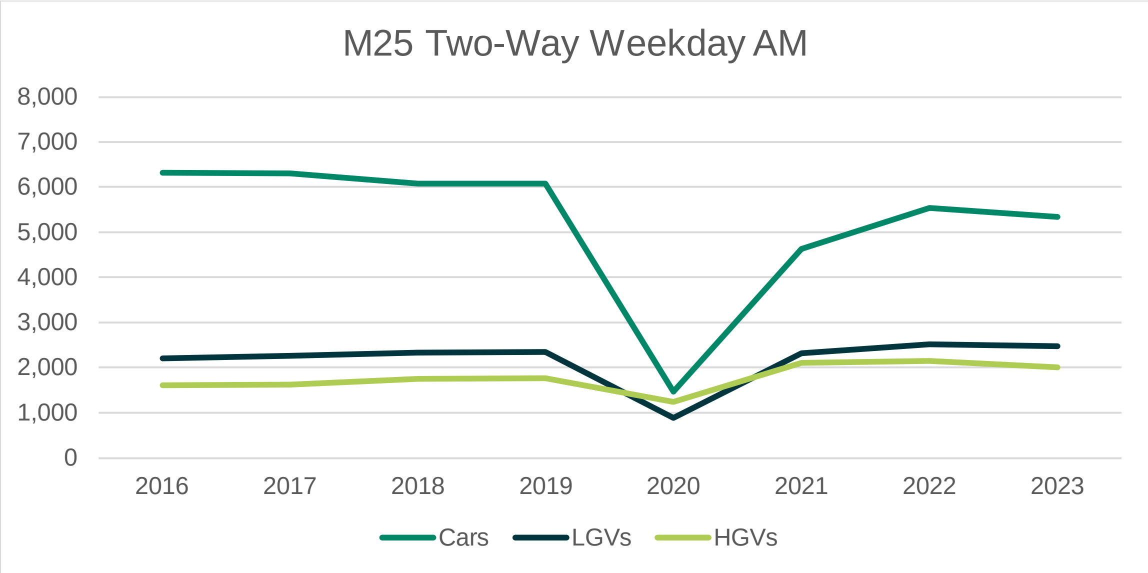
M1 Two-Way Daily Traffic Flow April 2016 – April 2023 (by Vehicle Type) – (vph)



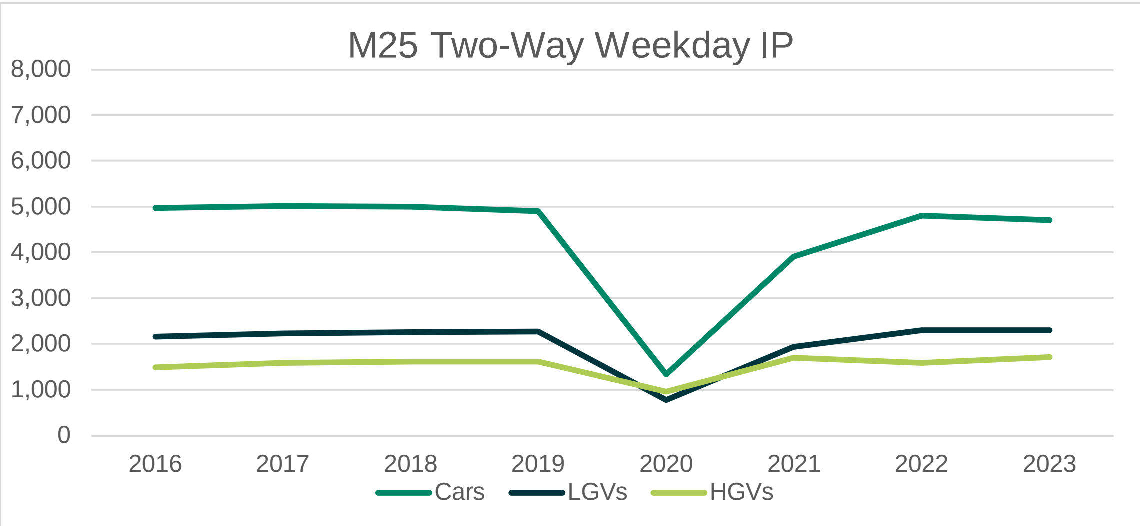
M25 West and East of J21&21a

April (2016-2023) Two-Way Traffic Flow

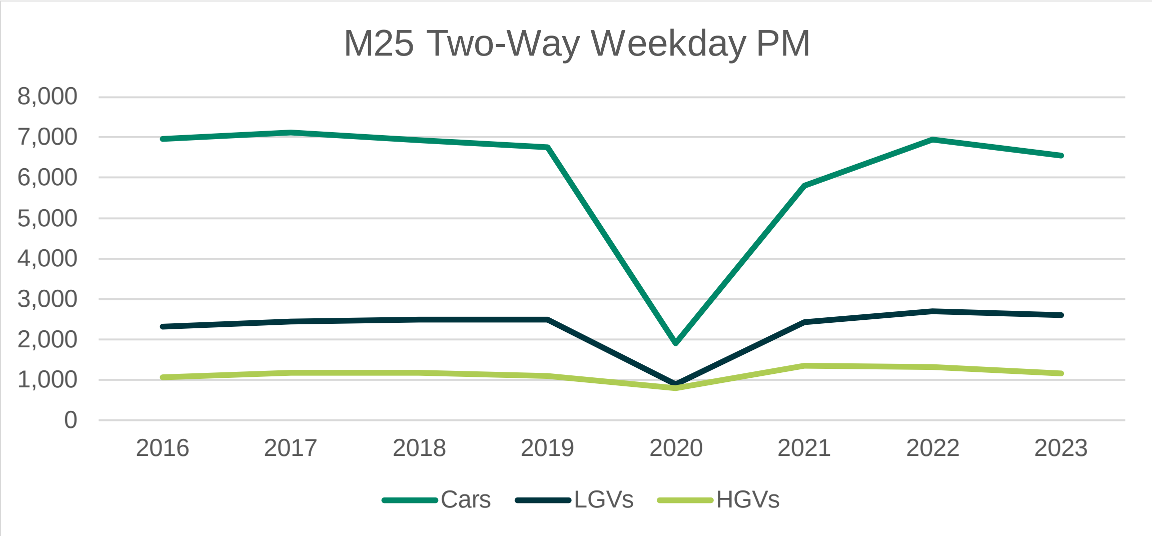
M25 Two-Way AM Peak Traffic Flow April 2016 – April 2023 (by Vehicle Type) – (vph)



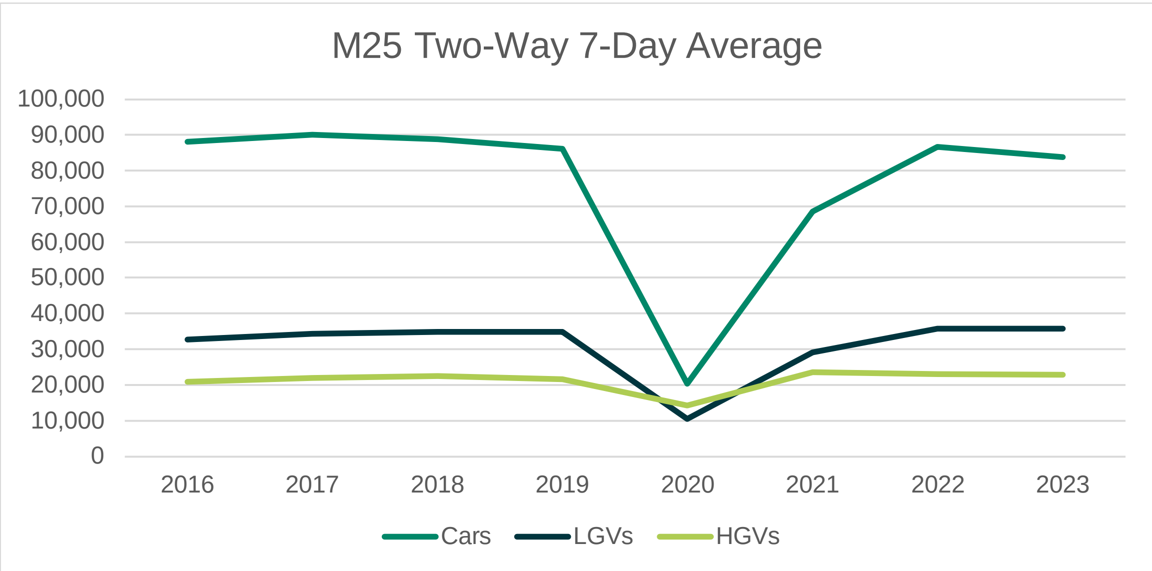
M25 Two-Way IP Traffic Flow April 2016 – April 2023 (by Vehicle Type) – (vph)



M25 Two-Way PM Peak Traffic Flow April 2016 – April 2023 (by Vehicle Type) – (vph)



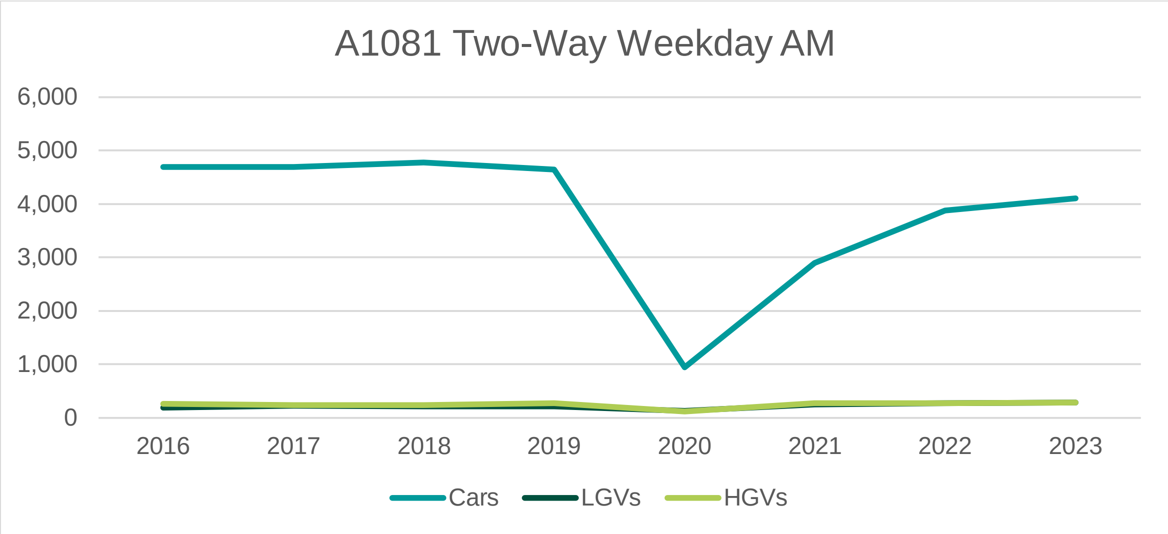
M25 Two-Way Daily Traffic Flow April 2016 – April 2023 (by Vehicle Type) – (vph)



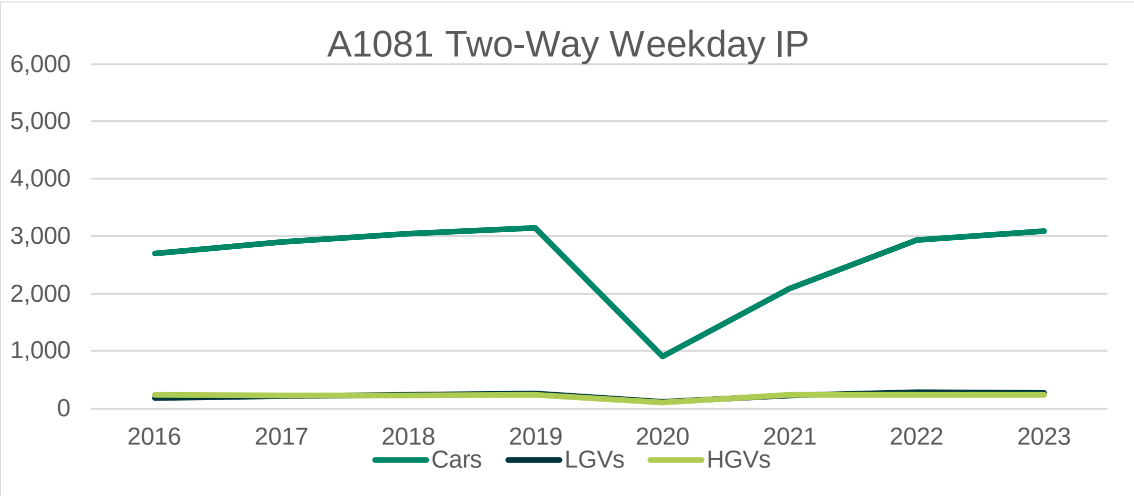
A1081 (West of M1 and Slip End)

April (2016-2023) Two-Way Traffic Flow

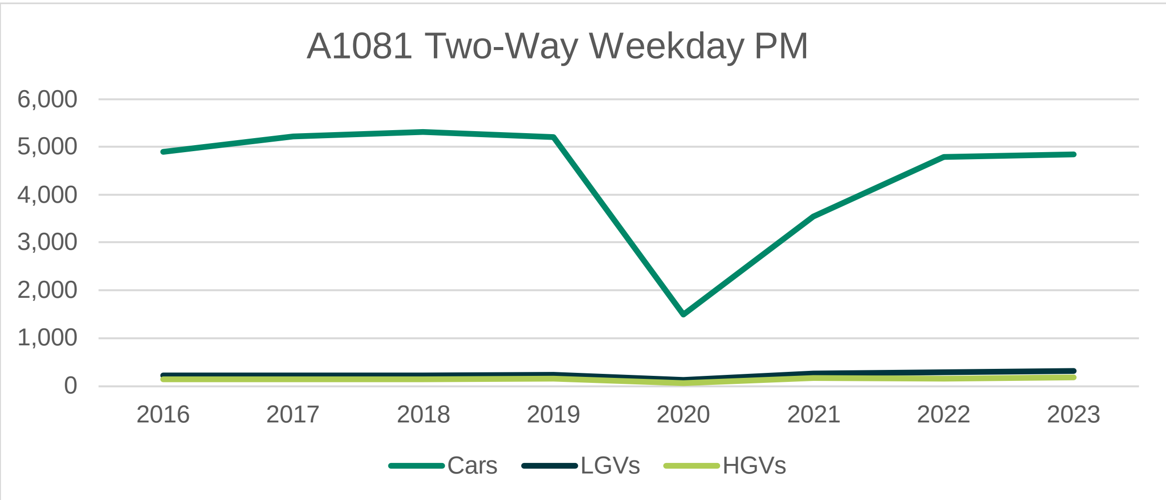
A1081 Two-Way AM Peak Traffic Flow April 2016 – April 2023 (by Vehicle Type) – (vph)



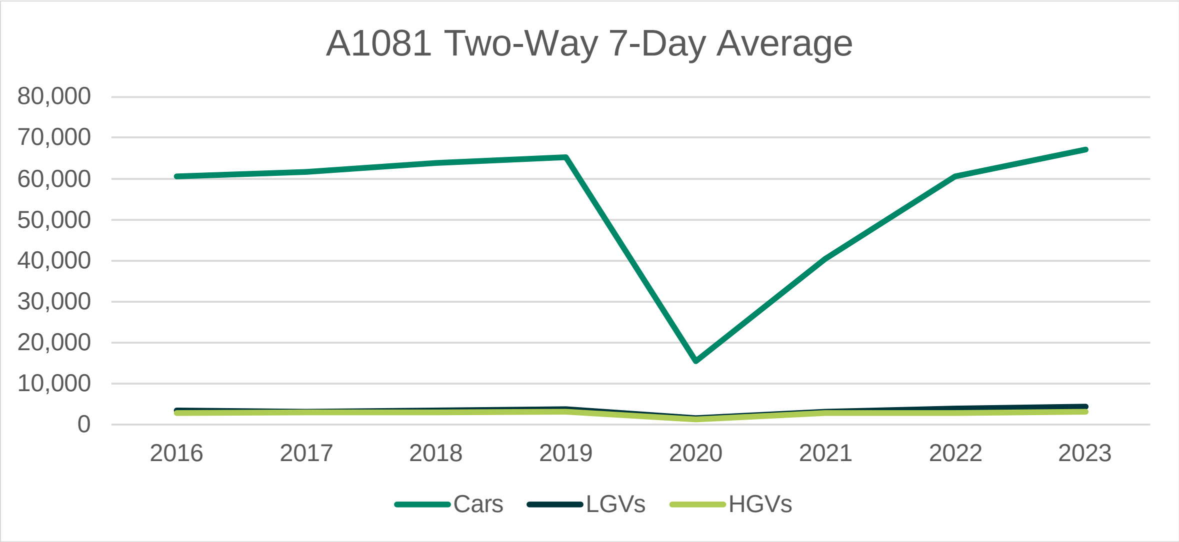
A1081 Two-Way IP Traffic Flow April 2016 – April 2023 (by Vehicle Type) – (vph)



A1081 Two-Way PM Peak Traffic Flow April 2016 – April 2023 (by Vehicle Type) – (vph)



A1081 Two-Way Daily Traffic Flow April 2016 – April 2023 (by Vehicle Type) – (vph)



APPENDIX D: UNCERTAINTY LOG

INFRASTRUCTURE

Forecast Infrastructure Assumptions

Location	Development	Certainty	Included from	Comment
Luton	Access arrangements for Terminal 2	Scheme to be tested		Includes access road to Terminal 2 and reallocation of car parking
Luton	DART	Near certain	2027	Intermediate station at mid-stay car park. Five minutes journey time to terminal. Headway assumed to be four minutes. Removal of existing shuttle bus service, with associated changes to bus-only infrastructure along route. https://www.llal.org.uk/LLAL-MPT.html.
Luton	Century Park Link	See comment		This has been transferred to AAR.
Luton	Luton Airport Access Road (AAR)	Scheme to be tested	2039	Dualling of airport access road between Percival Way and the terminal, and associated junction improvements. Funding in place and included in latest LBC infrastructure plan. 2039 for phase 1 and 2043 for full phase.
Luton	Hitchin Road / Ramridge Road / Stockingstone Road	Near certain	2027	Junction improvements: Option 1 - Signalise Hitchin Road and Stockingstone Road junctions and convert Ramridge Road / Stockingstone Road junction to priority Option 2 - Signalise Hitchin Road & Stockingstone Road and Ramridge Road & Stockingham Road & link both sets of signals. Funding in place and included in latest LBC infrastructure plan.
Luton	Hitchin Road / Vauxhall Way Roundabout	Complete	2023	Junction converted to three-arm signalised junction.
Luton	Vauxhall Way / Crawley Green Road Roundabout	Near certain	2039	Signalising this junction was initially considered as a result of improvements required to increase capacity to cater for increased traffic to airport but rejected in favour of localised widening at the roundabout. Vacant highway land on Vauxhall Way approaches may provide opportunities for this localised widening. See Arup ID in Mitigation Drawing Log. Funding in place and included in latest LBC infrastructure plan.
Luton	Vauxhall Way / Kimpton Road Roundabout	Near certain	2039	Lengthen flares on Vauxhall Way and Eaton Green Road. Funding in place and included in latest LBC infrastructure plan.
Luton	Airport Way to Gypsy Lane Signals	Near certain	2027	Junction improvements. Funding in place and included in latest LBC infrastructure plan.
Luton	Wigmore Lane / Eaton Green Road Roundabout	Near certain	2027	Junction improvements. Funding in place and included in latest LBC infrastructure plan.
Luton	Luton Northern Bypass: M1 to A6	Near certain	2027	https://www.centralbedfordshire.gov.uk/info/55/transport_roads_and_parking/581/m1-a6_link_road/6. Planning application granted Dec 2020.
Luton	A5-M1 Link Road	Complete	2023	New link road to north of Dunstable, including new Junction 11a on M1, Poynters Road scheme and connection to Woodside Link from Parkside Drive. Scheme complete.

Location	Development	Certainty	Included from	Comment
Luton	Dunstable Road	Complete	2023	Widening to 3 lanes south-eastbound and 2 lanes north-westbound between Telford Way and Cardiff Road. Scheme complete.
Luton	Hitchin Road / Ramridge Road	Near Certain	2027	See Arup ID in Mitigation Drawing Log
Luton	Wigmore Lane / Crawley Green Road	Near Certain	2027	See Arup ID in Mitigation Drawing Log
Luton	A1081 / London Road (North)	Near Certain	2027	See Arup ID in Mitigation Drawing Log
Luton	Windmill Road / Kimpton Road	Near Certain	2027	See Arup ID in Mitigation Drawing Log
Luton	Windmill Rd / Manor Rd / St. Mary's Rd	Near Certain	2027	See Arup ID in Mitigation Drawing Log
Luton	A505 Vauxhall Way / Eaton Green Road	Near Certain	2027	See Arup ID in Mitigation Drawing Log
Luton	Eaton Green Road / Lalleford Road	Near Certain	2027	See Arup ID in Mitigation Drawing Log
Luton	Eaton Green Road / Frank Lester Way	Near certain	2027	See Arup ID in Mitigation Drawing Log
C.Beds	A421 Dualling (including between Eagle Farm and M1)	Near Certain	2027	Signalised roundabout where A421 crosses M1, coded as dual carriageway with speed limit of 70mph. Approved planning status.
C.Beds	Houghton Regis North Site 1 development access	Near Certain	2027	20mph dual carriageway link connecting Sundon Road and Woodside Link. Intermediate roundabouts connect the new access to Woodside Link.
C.Beds	Houghton Regis North Development 2 distributor road	More than likely	2027	20 - 40mph dual carriageway link running across the north of the development between the B5120 and Woodside Link. Bus priority measures west of the Woodside Link Road. Junction with Woodside Link Road is a 3 arm roundabout.
C.Beds	Billington Rd traffic calming (Leighton Buzzard)	More than likely	2027	Assumed 15mph speed limit and restricted capacity
C.Beds	A505 / Billington Rd / Stanbridge Rd roundabout (Leighton Buzzard)	More than likely	2027	Assumed to be mini roundabout
C.Beds	East Leighton Distributor Road (Leighton Buzzard)	More than likely	2027	40mph dual carriageway connecting Leighton Road and Heath Road in eastern Leighton buzzard. Junction with A4012 and Vandyke Road signalised. Alignment of Vandyke Road amended.
C.Beds	Marston Vale New Villages	More than likely	2027	Assess arrangements for development
C.Beds	North of Houghton Regis (Site 1)	Near certain	2027	Assess arrangements for development
C.Beds	East of Arlesey	More than likely	2027	Assess arrangements for development

Location	Development	Certainty	Included from	Comment
C.Beds	North of Houghton Regis (Site 2 - Land West of Bidwell)	Near certain	2027	Assess arrangements for development
C.Beds	Wixams	Near certain	2027	Assess arrangements for development
C.Beds	East of Leighton Linslade (Clipstone Park)	Near certain	2027	Assess arrangements for development
C.Beds	Land South of The Wixams	More than likely	2027	Assess arrangements for development
C.Beds	Wixams Southern Extension (Wixams Park)	Near certain	2027	Associated with A5-M1 Link. Coded as two 3 lane roundabouts of the A5 joining to the M1. Scheme complete.
HE	M1 J11a Dumbbell Junction	Complete	2023	Upgraded into Dumbbell roundabout.
HE	M1 J11a Dumbbell Junction with capacity-increase measures and access to M1-A6 link	More than likely	2027	Assumed additional lane with speed limit reduction in peak hours.
HE	A428 Black Cat to Caxton Gibbet	Near Certain	2027	
NR	East West Rail – Western Section	Near Certain	2027	Three additional hourly services i.e., Bedford to Oxford (in 61 minutes), Milton Keynes to Oxford (in 41 minutes) and Milton Keynes to Aylesbury (in 33 minutes). This translates to 2 services per hour on the Marston Valley line (between Bletchley and Bedford). https://www.eastwestrail.org.uk/train-services/
Dacorum	Signalisation of Kings Road/Kingshill Way/Shootersway, Berkhamstead	Complete	2023	Funding in place within Dacorum Infrastructure Delivery Plan
Dacorum	Improve High St/Kings Road junction, Berkhamstead	More than likely	2027	Funding in place within Dacorum Infrastructure Delivery Plan
Dacorum	Traffic calming & 20mph zone - Castle St, Berkhamstead	Near certain	2027	Funding not in place for scheme
Dacorum	Traffic calming & 20mph zone - Gravel Path - Berkhamstead	Near certain	2027	Funding not in place for scheme
StAlbans	Additional bus routes to new development locations (housing/employment) with particular emphasis on connecting bus routes to new schools	More than likely	2043	Linked to development proposals within St Albans, so expected to be delivered in line with additional housing / employment
C.Beds	Wixams Western Access – B530 Roundabout	Complete	2023	New roundabout introduced as part of the development.
C.Beds	Marston Valley – C94/Western Access	More than likely	2027	Condition of approved planning permission
C.Beds	Marston Valley – C94/Eastern Access	More than likely	2027	Condition of approved planning permission
C.Beds	Marston Valley – Northern Access/Station Lane	More than likely	2027	Condition of approved planning permission

Location	Development	Certainty	Included from	Comment
C.Beds	Marston Valley – C94/Woburn Road Junction Upgrade	More than likely	2027	Condition of approved planning permission
C.Beds	Marston Valley – C94 Rbt and minor access	More than likely	2027	Condition of approved planning permission
C.Beds	Marston Valley – Section of Station Road closure – Downgrade to cycleway	More than likely	2027	Condition of approved planning permission
C.Beds	Marston Valley – Marston Road Access	More than likely	2027	Condition of approved planning permission
C.Beds	M1 J13 Junction Improvements	More than likely	2027	Part of pending planning application
C.Beds	M1 J13 Junction Improvements - Bypass lane at North-Western Rbt	More than likely	2027	
C.Beds	A1 Biggleswade North Roundabout Capacity improvements	More than likely	2043	
C.Beds	Land E of Biggleswade - Accesses	Near certain	2027	Approved planning status
C.Beds	Land E of Biggleswade - A1/London Rd Rbt	Near certain	2027	Approved planning status
C.Beds	Land E of Biggleswade - A1/Hill Lane Rbt	Near certain	2027	Approved planning status
C.Beds	M1 junction 11a	More than likely	2027	Construction of a new single and dual carriageway 2.75 miles (4.4km) road linking the M1 and the A6 between the M1 junction 11a and the A6 Barton Road. Comprising intermediate junctions, overbridges, underbridges, cycle paths, revisions to the Public Rights of Way network, drainage and landscaping. Approved planning.
HE	M1 J13-J16 SMP	Near Certain	2027	Completion is due in 2023.
C.Beds	PT - East West Rail Western Section	Near certain	2027	Approved planning status. https://www.networkrail.co.uk/running-the-railway/railway-upgrade-plan/key-projects/east-west-rail/east-west-rail-western-section/. Rail scheme linking Bicester to Bedford - EWR TWAO website.
C.Beds	Biggleswade Eastern Relief Road	Complete	2023	
C.Beds	East of Leighton Link Road	More than likely	2027	Part of planning application ref 02827, 04444,01937
C.Beds	Woodside Link Road	Complete	2023	
NorthHerts	Southern link road connection B656/A607, Baldock	Near certain	2027	Funded
Milton Keynes	M1 J14, and associated development infrastructure	More than likely		Application submitted - allocated site

Forecast Infrastructure Assumptions: Luton Junction Scheme

Location	Description	Included from…
M1 Junction 10	Widening of junction gyratory and Northbound off-slip	2027 “With” Expansion
	Widening of dedicated left-turn from the A1081 to M1 South to two-lanes	2039 “With” Expansion
A505 Vauxhall Way Corridor	Widening of Vauxhall Way to dual carriageway, plus the following junction improvements:	2039 onwards “With” and “Without” Expansion
A505 Vauxhall Way / Kimpton Road	Junction converted to four-arm signalised junction and widening of northbound Vauxhall Way approach to junction	2039 “With” Expansion onwards
A505 Vauxhall Way / Eaton Green Road	Roundabout with partial signalisation in peak hours only	2039 “With” Expansion only
A505 Vauxhall Way / Crawley Green Road	Junction converted to four-arm signalised junction	2039 onwards “With” and “Without” Expansion
A505 Vauxhall Way / Stopsley Way	Junction converted to three-arm signalised junction	2023 onwards “With” and “Without” Expansion
Airport Access Road (AAR)	London Luton Airport Roundabout replaced with signalised junction	2027 “With” Expansion only
	Modification to London Luton Airport Roundabout to sever direct connection with Percival Way, connection through Spittlesea Rd is kept. Construction of western AAR corridor with a new junction connecting AAR on both ends to A1081 and Percival Way to the west of Frank Lester Way. Construction of eastern AAR corridor with new junctions connecting AAR to Terminal 2, Long Stay car park and Eaton Green.	2039 “With” Expansion only
	Connecting both western and eastern corridor of AAR	2043 “With” Expansion only
A1081 New Airport Way / B653 / Gipsy Lane	Two-lane approach on Gipsy Lane, east to north movement from A1081 closed for all traffic and widening of left-turn flare on approach to A1081.	2027 onwards “With” and “Without” Expansion
	Widening on A1081 from two to three-lanes on both directions	2027 onwards “With” Expansion
A1081 / London Road (north)	Part signalisation and widening of London Road entry and exit	2027 onwards “With” Expansion
A1081 / London Road (south)	Part signalisation of the roundabout	2039 onwards “With” Expansion
Hitchin Road / Ramridge Road	Reconfiguration of junction from roundabout to four-arm signalised junction	2027 onwards “With” and “Without” Expansion

RESIDENTIAL

Forecast Residential Developments (greater than 250 dwellings)

Location	Scheme Name	Certainty	Dwellings	Included from	Comment
Luton	Kimpton Road (Napier Park), Former Vauxhall Motors Site	Near certain	1,474	2019-2028	Under construction
Luton	Power Court	Near certain	1,200	2026-2029	Planning application approved
Luton	Hayward Tyler 1 Kimpton Road Luton LU1 3LD	More than likely	1,000	2022	Outline application submitted
Luton	Land Adjacent to Caddington Road & Newlands Road	Near certain	340	2024-2024	Planning Permission granted
Luton	Station Quarter Bute Street Shoppers Car Park, Church Street, LU1 2EY	More than likely	400	2025-2027	new flexible community / leisure space
Luton	Imperial Square, Land opposite Whitbread House, Flowers Way	Near certain	380	2025-2025	Planning application granted
Central Bedfordshire	Marston Vale New Villages Land between Brogborough, Lidlington and Marston Moretaine	More than likely	5,000	2026-2039	Outline Application (awaiting decision as of July 2023) Land allocated within Local Plan
Central Bedfordshire	North of Luton (Town Extension) (SA1)	Reasonably foreseeable	3,100	2023-2034	Land allocated within Local Plan Linked with M1-A6 link road
Central Bedfordshire	North of Houghton Regis (Site 1) Land on the northern edge of Houghton Regis	Near certain	5,150	2024-2049	Planning application granted
Central Bedfordshire	East of Arlesey (Town Extension) between Arlesey in the east, the A507 road and Fairfield in the west	Reasonably foreseeable	2,000	2024-2037	Land allocated within Local Plan
Central Bedfordshire	North of Houghton Regis (Site 2 - Land West of Bidwell) (SC1)	Near certain	1,842	2020-2030	Outline planning permission
Central Bedfordshire	Wixams Land and Buildings at Elstow Storage Depot, Houghton Conquest	Near certain	1,290	2022-2032	Outline planning permission
Central Bedfordshire	East of Biggleswade (New Village)	Near certain	1,500	2024-2034	Land allocated within Local Plan
Central Bedfordshire	East of Leighton Linslade (Clipstone Park)	Near certain	1,280	2020-2028	Planning application registered
Central Bedfordshire	Land at Chase Farm & Land West/NE of High Street (East)	Near certain	1,030	2024-2033	Outline planning permission
Central Bedfordshire	Land South of The Wixams Little Thickthorn Farm, Thickthorn Lane, Houghton Conquest, Bedford, MK45 3NQ	More than likely	1,200	2024-2035	Land allocated within Local Plan Landowner intent to develop. Planning application submitted (Awaiting decision as of July 2023)
Central Bedfordshire	East of Leighton Linslade (Chamberlains Barn) Chamberlains Barn Quarry, Heath Road, Leighton Buzzard	Near certain	950	2020-2026	Planning granted Outline application submitted
Central Bedfordshire	Wixams Southern Extension (Wixams Park)	Near certain	650	2019-2030	Land allocated within Local Plan Landowner intent to develop

Location	Scheme Name	Certainty	Dwellings	Included from	Comment
Central Bedfordshire	Land to the East of Barton le Clay	More than likely	500	2024-2030	Awaiting decision as of July 2023 Land allocated within Local Plan Landowner intent to develop
Central Bedfordshire	Land to the west of Midland Mainline Railway, Harlington	Near certain	400	2025-2031	Planning Permission Granted in December 2022 'for up to 400 dwellings' Land allocated within Local Plan Landowner intent to develop
Central Bedfordshire	Land North of Biggleswade	More than likely	416	2023-2028	Land allocated within Local Plan Landowner intent to develop. Application submitted, awaiting decision.
Central Bedfordshire	Land to the East of Houghton Regis	Reasonably foreseeable	355	2025-2030	Land allocated within Local Plan Landowner intent to develop
Central Bedfordshire	East of Leighton Linslade (Stearn Land)	Near certain	270	2024-2028	Planning permission granted
Central Bedfordshire	Land at Moreteyne Farm	Near certain	365	2018-2021	Reserved matters granted
Central Bedfordshire	Warren Farm Land off Flitwick Road	Near certain	259	2018-2020	Reserved matters granted
Central Bedfordshire	Land at Steppingley Road & Froghall Road	Near certain	400	2018-2019	Reserved matters granted
Central Bedfordshire	Dukeminster Estate	Near certain	270	2019-2020	screening application CB/16/01281/SCN for up to 330 units. approved application CB/16/02972/Full for 270 dwellings
Central Bedfordshire	Land East of Biggleswade (Blocks 1-7, 46-48a, 50, 51a)	Near certain	288	2018-2018	Reserved matters granted
Central Bedfordshire	Land at Potton Road Biggleswade SG18 0EJ	Near certain	301	2018	Planning permission granted
Dacorum	Marchmonth Farm	More than likely	350	2024-2027	Land identified in Local Plan Currently undertaking consultation Application is with planning case officer as of July 2023
Dacorum	West Hemel (Phase One)	Near certain	350	2021-2021	Planning application granted (December 2021) Planning application submitted
Dacorum	West Hemel (Phase Two)	Near certain	750	2024-2027	Land identified in Local Plan Planning application granted (December 2021)
Dacorum	Town Centre	Reasonably foreseeable	1,200	2018-2031	Development identified in Local Plan
Dacorum	East Hemel	Near certain	600	2019-2031	Development identified in Local Plan
Dacorum	Rest of Hemel	Reasonably foreseeable	2,770	2018-2031	Development identified in Local Plan
Dacorum	Rest of Berkhampstead	Reasonably foreseeable	564	2018-2031	Development identified in Local Plan
Dacorum	Dacorum Countryside	Reasonably foreseeable	252	2018-2031	Development identified in Local Plan
Dacorum	Kier Park, Maylands Avenue, Hemel Hempstead	Reasonably foreseeable	268	2021	Planning application registered but then refused Jun 2019

Location	Scheme Name	Certainty	Dwellings	Included from	Comment
Dacorum	Land between Three Cherry Tree Lane and Cherry Tree Lane, Hemel Hempstead	Near certain	600	2021-2023	Planning application granted April 2020
North Hertfordshire	Land north of Baldock	Reasonably foreseeable	2,800	2023-2031	Strategic site in Local Plan Planning application registered Withdrawn March 2023
North Hertfordshire	East of Luton	More than likely	2,060	2025-2031	Awaiting decision Strategic site in Local Plan
North Hertfordshire	Land North of Stevenage	More than likely	900	2023-2031	Strategic site in Local Plan Planning application submitted It says 'decided' but status unknown as of July 2023
North Hertfordshire	Land north of Letchworth (Garden City)	Reasonably foreseeable	900	2023-2031	Strategic site in Local Plan. Application expected 2021.
North Hertfordshire	Highover Farm, Hitchin	More than likely	700	2023-2031	Strategic site in Local Plan Planning application registered
North Hertfordshire	Land north east of Great Ashby	More than likely	650	2023-2031	Scoping Opinion submitted and decided June 2023 Strategic site in Local Plan
North Hertfordshire	Royston	Near certain	332	2018-2021	Completions / Permissions
North Hertfordshire	Roundwood, Great Ashby	More than likely	330	2023-2031	Screening opinion submitted; decision made Feb 2023 Land allocated within Local Plan
North Hertfordshire	Land north of Newmarket Road, Royston	Near certain	330	2023-2031	Land allocated within Local Plan Conditional permission dec 2016.
North Hertfordshire	Rest of Hitchin	Near certain	319	2018-2021	Completions / Permissions
North Hertfordshire	Land south of Newmarket Road, Royston	Near certain	325	2023-2031	Application No got conditional Permission in Feb 2020 Land allocated within Local Plan
North Hertfordshire	Land south of Little Wymondley, Wymondley	More than likely	300	2023-2031	Outline application received Apr 2022 Land allocated within Local Plan
North Hertfordshire	Rest of Letchworth	Near certain	297	2018-2021	Completions / Permissions
North Hertfordshire	Land west of Ivy Farm, Baldock Road, Royston	Near certain	279	2023-2031	Land allocated within Local Plan Planning application conditional permission feb 2019
North Hertfordshire	Land West of A1M Stevenage	More than likely	1,500	2022-2030	Planning application submitted
St. Albans	East Hemel Hempstead (north)	Reasonably foreseeable	600	2023-2031	Land allocated within Local Plan (Local Plan 2018 withdrawn)
St. Albans	East Hemel Hempstead (south)	More than likely	2,452	2023-2031	Land allocated within Local Plan
St. Albans	North Hemel Hempstead	Reasonably foreseeable	1,500	2035-2041	Land allocated within Local Plan

Location	Scheme Name	Certainty	Dwellings	Included from	Comment
St. Albans	East St Albans	Reasonably foreseeable	900	2023-2027	Land allocated within Local Plan
St. Albans	East St Albans	Near certain	348	2021-2021	Extant planning permission
St. Albans	North St Albans	Reasonably foreseeable	1,100	2022-2035	Land allocated within Local Plan
St. Albans	North East Harpenden	Reasonably foreseeable	760	2022-2035	Land allocated within Local Plan
St. Albans	North West Harpenden	More than likely	550	2022-2035	Land allocated within Local Plan
St. Albans	West of London Colney	Reasonably foreseeable	440	2022-2035	Land allocated within Local Plan
St. Albans	West of Chiswell Green	More than likely	391	2022-2035	Land allocated within Local Plan
St. Albans	Park Street Garden Village	Reasonably foreseeable	2,300	2029-2039	Land allocated within Local Plan
Central Bedfordshire	Parcels 6A and 6B, Land West of Bidwell	Near certain	625	2021-2025	Planning granted
Central Bedfordshire	Parcel 5A and 5B, Land West of Bidwell	Near certain	336	2022-2028	Approved planning permission
Central Bedfordshire	Land to West of Houghton Regis, Watling Street (Parcel 7), Land West of Bidwell	Near certain	255	2021-2025	
Central Bedfordshire	Parcel 3&4 (Phase 7, 7a, and 7b) Land at Thorn Road, North of Houghton Regis (HRN2)	Near certain	264	2020-2026	
Luton	4-11 Burr Street Luton	More than likely	272	2022	Awaiting decision - application recieved Mar 2021
North Hertfordshire	Land Off Barkway Road and North Of Flint Hall, Barkway Road, Royston, Hertfordshire	More than likely	280	2022	Outline application registered March 2021
North Hertfordshire	East of Luton	Reasonably foreseeable	700	2023 - 2031	Connected to NorthHerts-Res2
Dacorum	Marsworth Airfield Lukes Lane Gubblecote Tring Hertfordshire HP23 4QH	More than likely	320	2025 - 2031	Planning submitted, no decision yet
St. Albans	Oaklands College Smallford Campus Hatfield Road St Albans Hertfordshire Al4 0Ja	Near certain	348	2026 - 2031	Planning submitted, no decision yet

EMPLOYMENT

Forecast Employment Developments (greater than 100 jobs)

Location	Development	Uncertainty	Total jobs	Timescale	Comment
Luton	London Luton Airport Airport Way Luton, Bedfordshire LU2 9LY		5100	2023-2039	Scheme to be tested
Luton	Butterfield Hitchin Road Luton, Bedfordshire	More than likely	1090	2020-2030	Application permitted July 2022 Submitted Planning Application - Approved 2005. Application for extension of time limits set in 2005 refused in July 2019.
Luton	Wigmore Employment Area (Century Park) Eaton Green Road	Near certain	3200	2020-2024	Application submitted, awaiting decision Application permitted June 2021
Luton	Power Court	Near certain	839	2026	Recent discharge of conditions 22/01205/doc application approved May 23 for continuation of car parking for 18 months Application approved (Sept 2019)
Luton	Napier Park	Near certain	2700	2020-2030	Application Permitted
Luton	Newlands Park	Near certain	1809	2025	Application permitted (sept 2019)
Luton	Hart House Business Centre, Kimpton Road, Luton, LU2 0LA (Bartlett Square)	Near certain	165	2021-2025	Planning application permitted Jan 2020
Luton	The Poynt Dunstable Road Luton, Bedfordshire	Complete	104	2018	
Luton	Unit 1 PC World Madford Retail Park 540 Dunstable Road Luton, Bedfordshire	Complete	106	2018	
Luton	Cargo 10 Airport Way Luton, Bedfordshire	Complete	114	2018	
Luton	University Of Bedfordshire - Block K (Fairview House) 65 Park Street Luton, Bedfordshire	Complete	160	2018	
Luton	Stopsley High School and Community College St Thomas's Road Luton, Bedfordshire	Complete	283	2018	
Luton	Drop Off Zone London Luton Airport Airport Way Luton, Bedfordshire	Complete	614	2018	
Central Bedfordshire	North Luton	Reasonably foreseeable	1000	2018-2025	Linked with M1-A6 link road

Location	Development	Uncertainty	Total jobs	Timescale	Comment
Central Bedfordshire	Stratton Farm	Reasonably foreseeable	1941	2018-2030	Development identified, but no planning application
Central Bedfordshire	Wixams Southern Extension	Reasonably foreseeable	441	2018-2030	Land allocated within Local Plan Landowner intent to develop
Central Bedfordshire	Houghton Regis North 1	Complete	1417	2018-2031	Planning application granted
Central Bedfordshire	Houghton Regis North 2	Near certain	393	2018-2021	Outline planning permission
Central Bedfordshire	East Leighton Buzzard	More than likely	2171	2018-2031	Planning application registered
Central Bedfordshire	Thorn Turn	Complete	187	2018-2021	
Central Bedfordshire	Sundon RFI	Reasonably foreseeable	2000	2018-2025	Linked with M1-A6 link road
Central Bedfordshire	RAF Henlow	Reasonably foreseeable	2000	2018-2035	Identified in Local Plan Land yet to be purchased from MoD
Central Bedfordshire	West of A1 Biggleswade	Reasonably foreseeable	2000	2018-2025	Pre-application Advice Released (Dec 2020)
Central Bedfordshire	Marston Gate	Near certain	2207	2019-2026	Identified in Local Plan
St. Albans	Industrial site & new business/tech park - East Hemel Hempstead	More than likely	10000	2018-2035	-
St. Albans	2 new primary schools - East Hemel Hempstead (south)	Near certain	100	2018-2035	Linked with residential developments
St. Albans	2 new primary schools - Park Street Garden Village	Reasonably foreseeable	100	2018-2035	Linked with residential developments
Dacorum	Growth of app. 10,000 jobs over plan period, spread across district based on base year employment	Reasonably foreseeable	6025	2018-2031	Included in current Local Plan No specific proposals - use TEMPro growth
Dacorum	Maylands Gateway, Hemel Hempstead - comprehensive redevelopment of site	Near certain	975	2020-2020	Planning Granted
Dacorum	Spencers Park, Cherry Tree Lane, Hemel Hempstead	Near certain	127	2021-2034	Part of Herts LEZ, no planning specific proposals
Dacorum	Prologis Park, Wood Lane End, Hemel Hempstead	Near certain	700	2019-2020	Planning permission granted
Dacorum	499 London Road, Hemel Hempstead - 3 floors of offices	Near certain	150	2020	Planning permission granted
North Hertfordshire	Royston Road, Baldock	Near certain	1307	2018-2031	Strategic site in Local Plan Planning application Agreed
North Hertfordshire	Wilbury Way, Hitchin	Reasonably foreseeable	2593	2018-2031	Land allocated within Local Plan
North Hertfordshire	Burymead Road, Hitchin	Reasonably foreseeable	473	2018-2031	Land allocated within Local Plan
North Hertfordshire	Former power station, Works Road, Letchworth	Near certain	100	2018-2031	Land allocated within Local Plan

Location	Development	Uncertainty	Total jobs	Timescale	Comment
North Hertfordshire	Land north of York Way, Royston	Reasonably foreseeable	713	2018-2031	Land allocated within Local Plan
Central Bedfordshire	Non-B jobs (dispersed according to household growth throughout the unitary authority - split across housing sites with 100+ dwellings (55 sites))	More than likely	12785	2018-2031	Linked with residential developments
Central Bedfordshire	Land at Phase 6 Stratton Business Park, East of Pegasus, Biggleswade	Near certain	756	2021	Planning application submitted. Reserved Matters Granted in March 2019
Central Bedfordshire	Land To the North and East of Houghton Regis, Sundon Road, Houghton Regis	Near certain	833	2022	Most recent application CB/23/01482/NMA Planning application submitted. Reserved Matters Granted in March 2020
Central Bedfordshire	Land to the South East of Prologis Park Marston Gate	More than likely	1587	2026-2028	New Outline Application No: CB/22/02213/OUT (Awaiting decision) CB/18/04600/OUT Application was withdrawn. Planning application submitted.
Luton	Land Adj to Progress Way Vauxhall Aftersales Warehouse Luton LU4 9TR	Near certain	1500		Application permitted Oct 2022
Dacorum	Land At Green Lane Hemel Hempstead Hertfordshire	Near certain	550		Granted permission Jun 2023.
Luton	Prologis Park 60 Windmill Road LU13XL	More than likely	405	2025	Application Permitted Oct 2022

APPENDIX E: HIGHWAY FLOW DIFFERENCE PLOTS

E1: 2027 UPDATED VS ORIGINAL

2027 "Without" Expansion – Updated vs Original runs – AM Peak

2027 "Without" Expansion – Updated vs Original runs – Interpeak

2027 "Without" Expansion – Updated vs Original runs – PM Peak

2027 "With" Expansion – Updated vs Original runs – AM Peak

2027 "With" Expansion – Updated vs Original runs – Interpeak

2027 "With" Expansion – Updated vs Original runs – PM Peak

E2: 2039 UPDATED VS ORIGINAL

2039 "Without" Expansion – Updated vs Original runs – AM Peak

2039 "Without" Expansion – Updated vs Original runs – Interpeak

2039 "Without" Expansion – Updated vs Original runs – PM Peak

2039 "With" Expansion – Updated vs Original runs – AM Peak

2039 "With" Expansion – Updated vs Original runs – Interpeak

2039 "With" Expansion – Updated vs Original runs – PM Peak

E3: 2043 UPDATED VS ORIGINAL

2043 "Without" Expansion – Updated vs Original runs – AM Peak

2043 "Without" Expansion – Updated vs Original runs – Interpeak

2043 "Without" Expansion – Updated vs Original runs – PM Peak

2043 "With" Expansion – Updated vs Original runs – AM Peak

2043 "With" Expansion – Updated vs Original runs – Interpeak

2043 "With" Expansion – Updated vs Original runs – PM Peak

E4: 2027 WITH VS WITHOUT AIRPORT EXPANSION

2027 Original runs – "With" vs "Without" Expansion – AM Peak

2027 Original runs – "With" vs "Without" Expansion – Interpeak

2027 Original runs – "With" vs "Without" Expansion – PM Peak

2027 Updated runs – "With" vs "Without" Expansion – AM Peak

2027 Updated runs – "With" vs "Without" Expansion – Interpeak

2027 Updated runs – "With" vs "Without" Expansion – PM Peak

E5: 2039 WITH VS WITHOUT AIRPORT EXPANSION

2039 Original runs – "With" vs "Without" Expansion – AM Peak

2039 Original runs – "With" vs "Without" Expansion – Interpeak

2039 Original runs – "With" vs "Without" Expansion – PM Peak

2039 Updated runs – "With" vs "Without" Expansion – AM Peak

2039 Updated runs – "With" vs "Without" Expansion – Interpeak

2039 Updated runs – "With" vs "Without" Expansion – PM Peak

E6: 2043 WITH VS WITHOUT AIRPORT EXPANSION

2043 Original runs – "With" vs "Without" Expansion – AM Peak

2043 Original runs – "With" vs "Without" Expansion – Interpeak

2043 Original runs – "With" vs "Without" Expansion – PM Peak

2043 Updated runs – "With" vs "Without" Expansion – AM Peak

2043 Updated runs – "With" vs "Without" Expansion – Interpeak

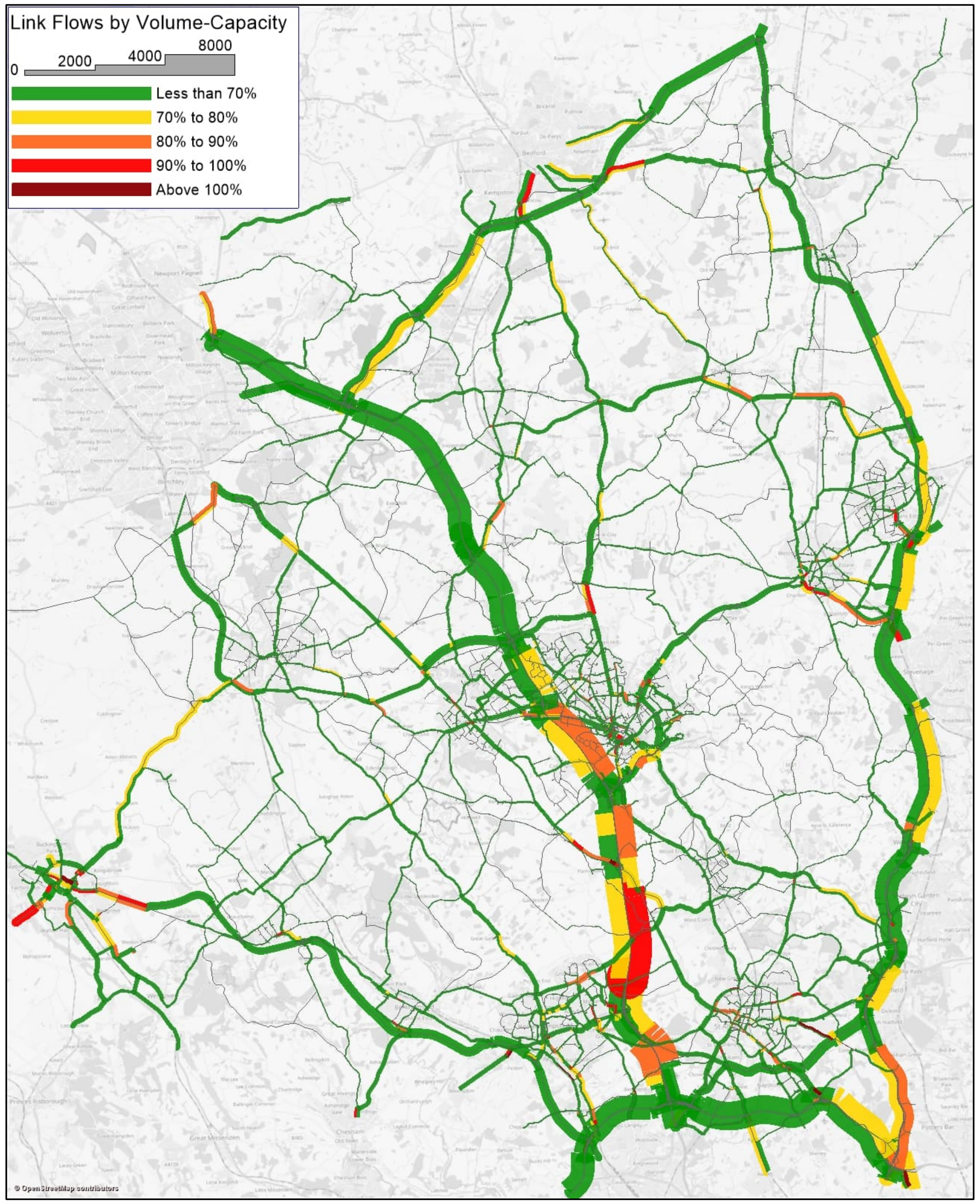
2043 Updated runs – "With" vs "Without" Expansion – PM Peak

APPENDIX F: LINK BASED VOLUME TO CAPACITY (VC) PLOTS

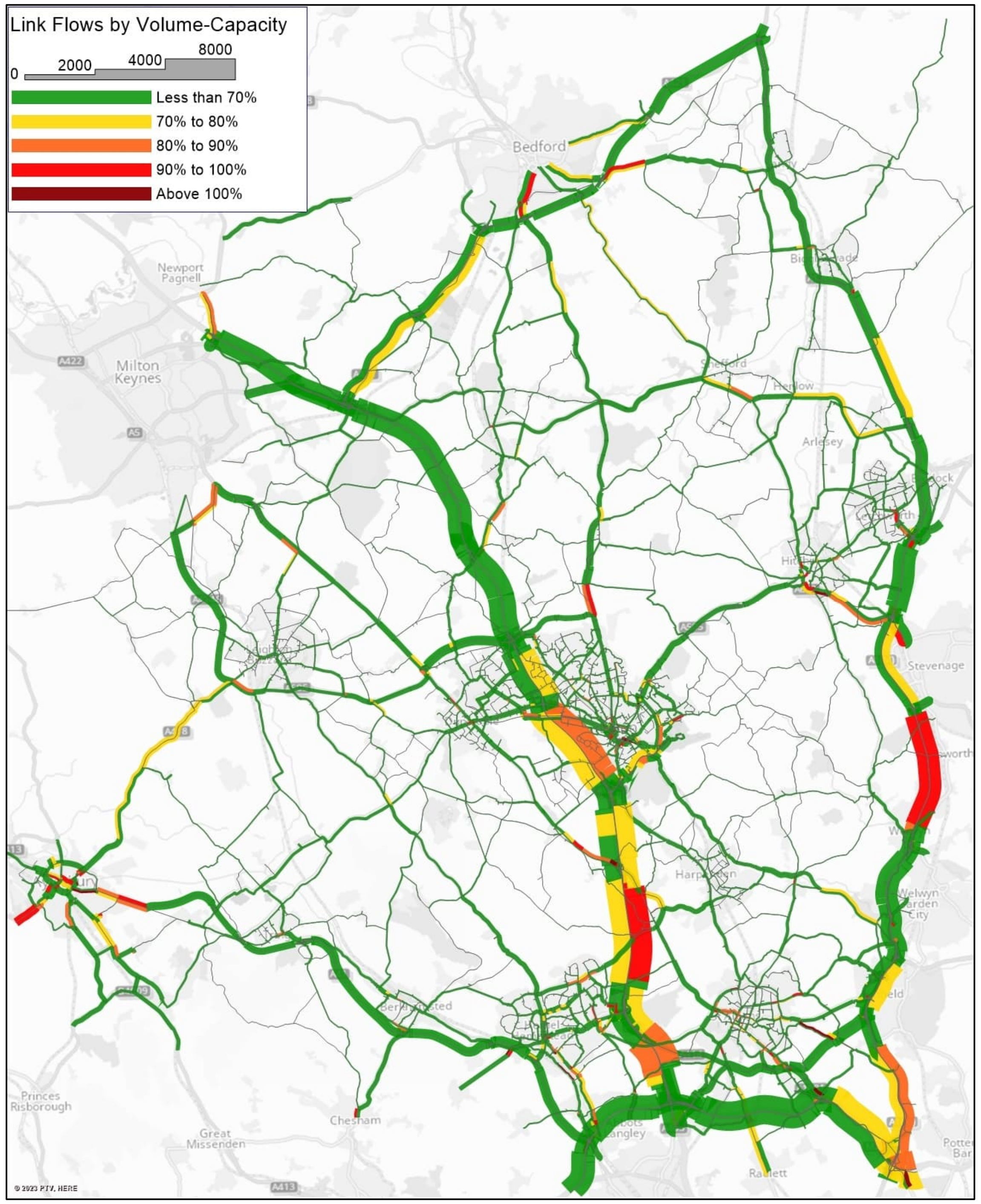
Forecast Link-based V/C, 2027 Forecast Year, “Without” Expansion, Simulation Network

AM Peak Hour
(08:00 – 09:00)

Original Run

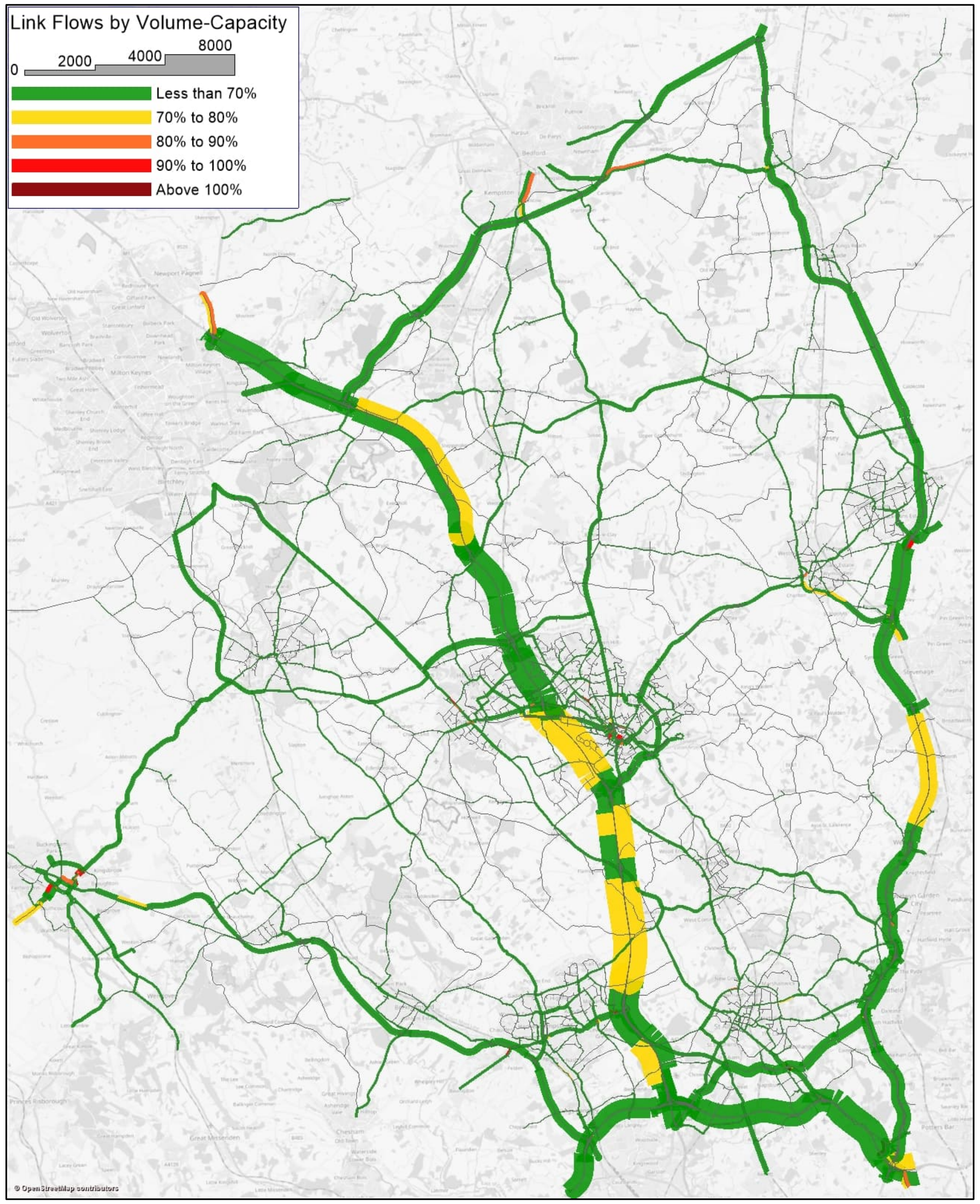


Updated Run

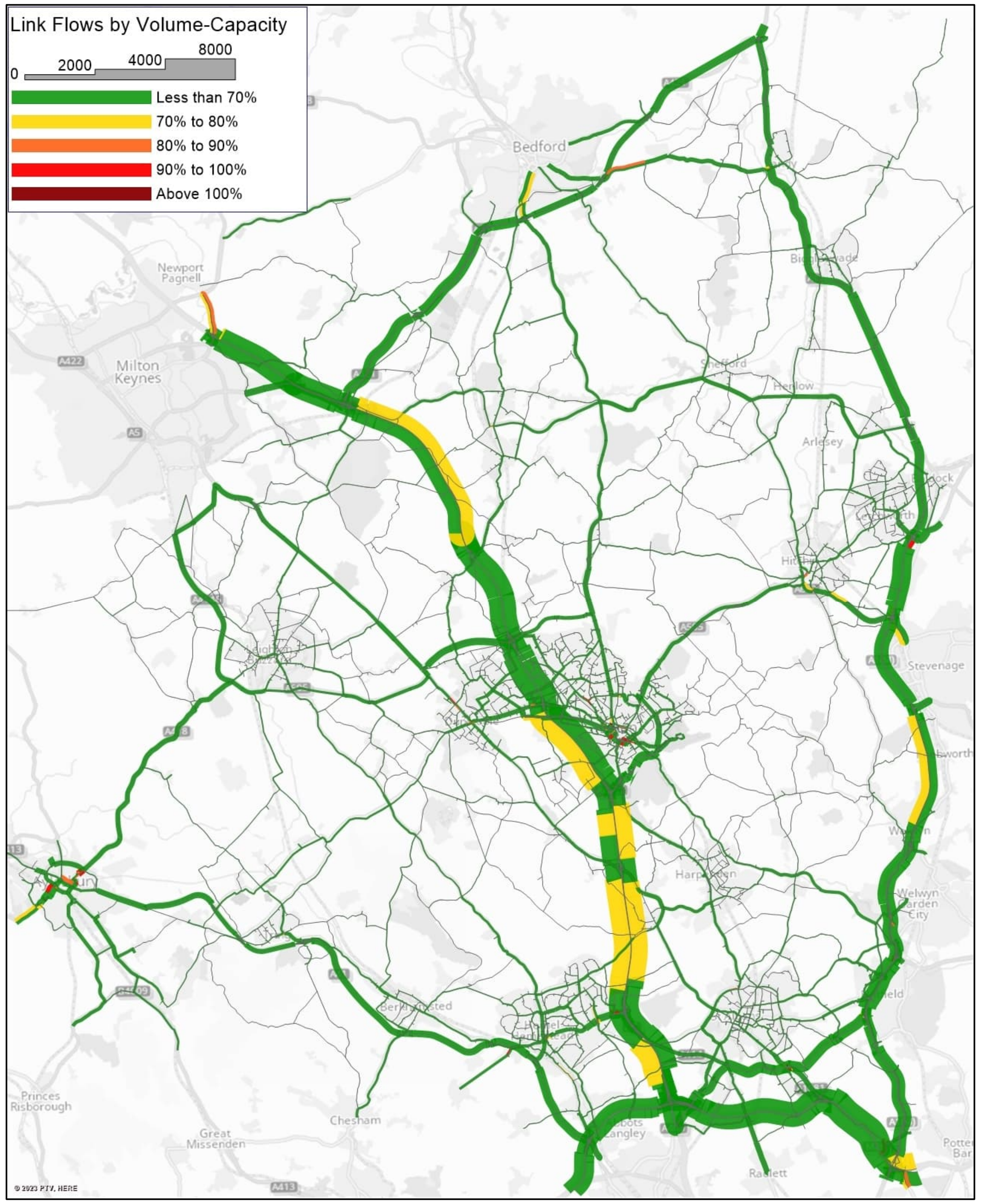


Interpeak
(between 10:00 to 16:00)

Original Run

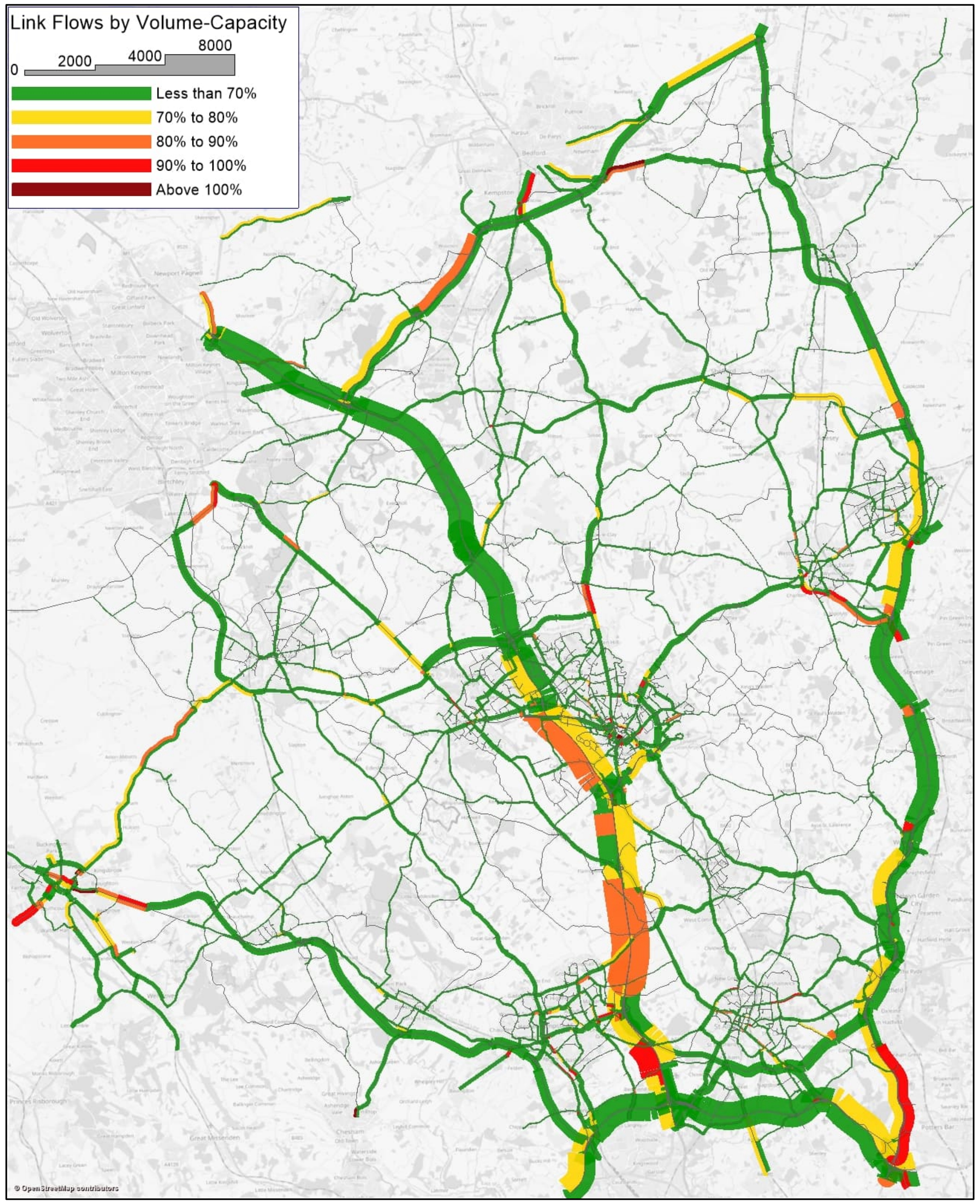


Updated Run

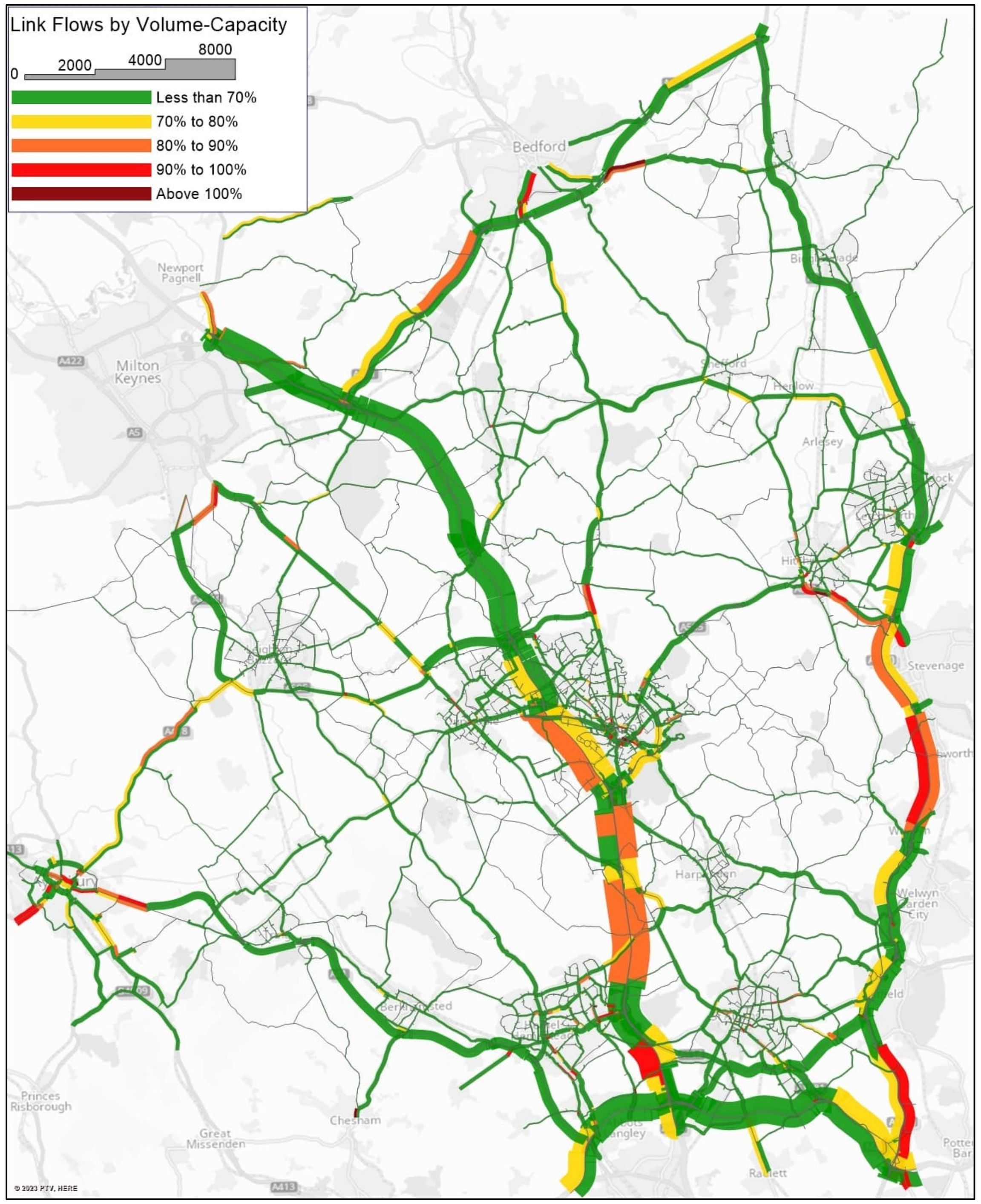


PM Peak Hour
(17:00 to 18:00)

Original Run



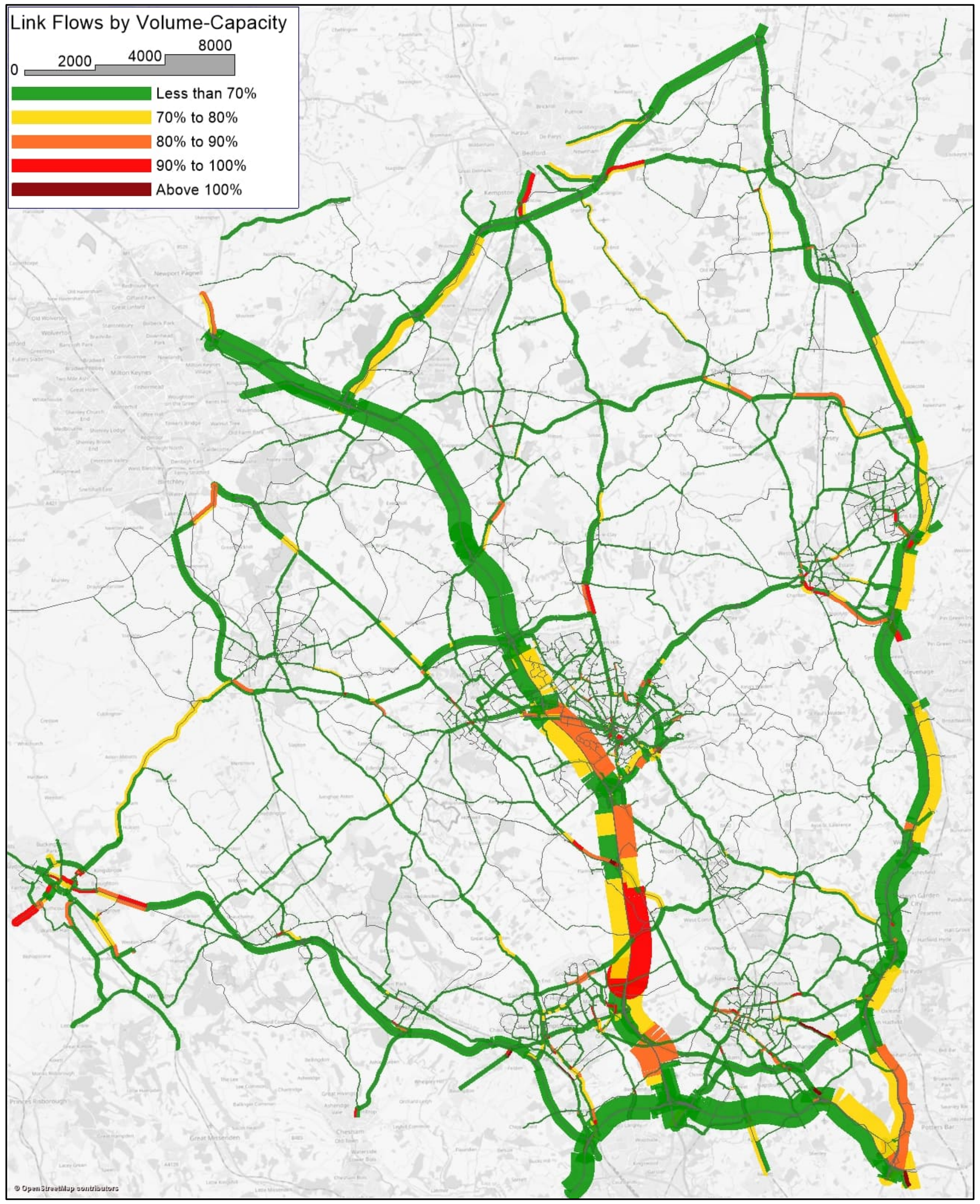
Updated Run



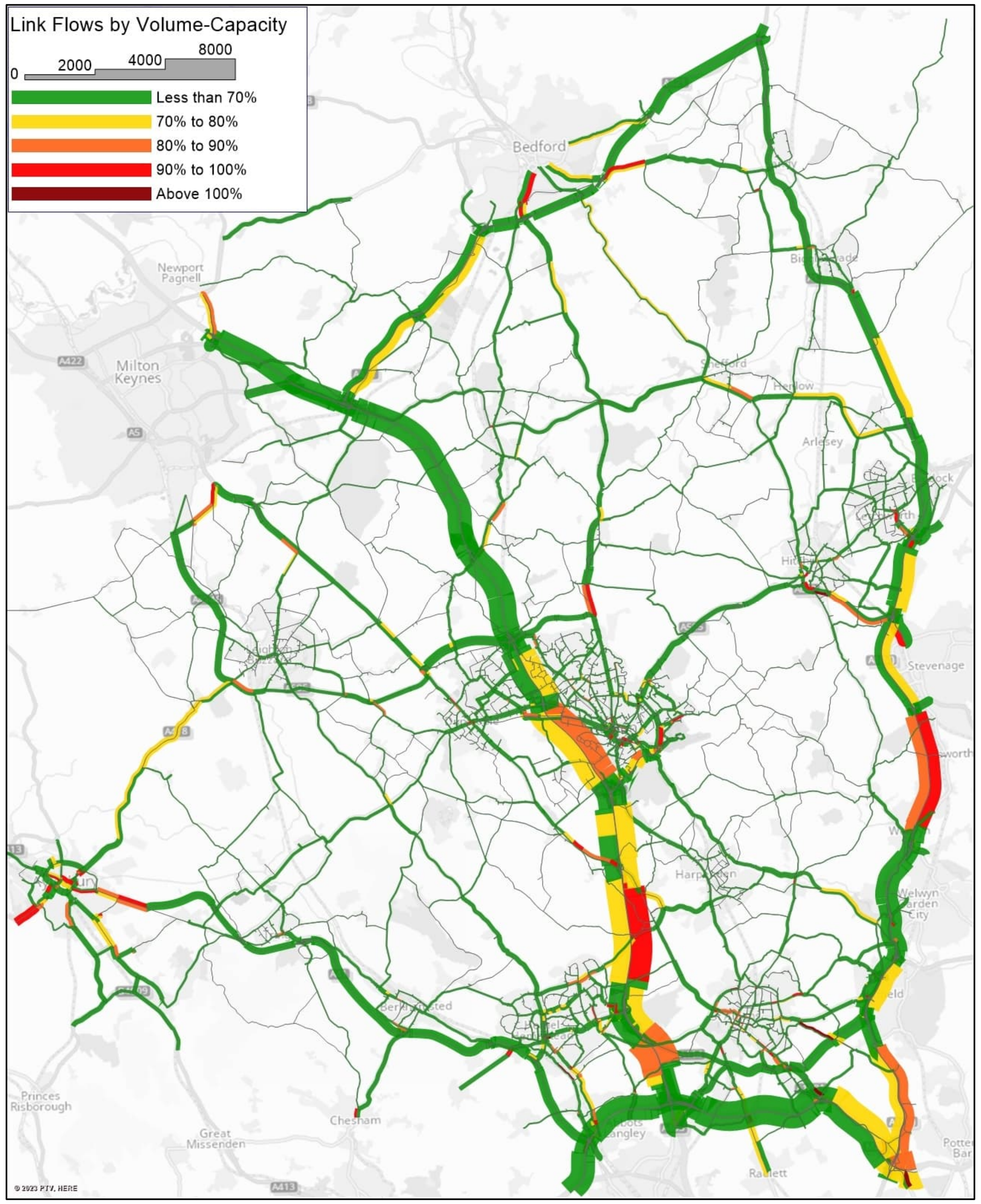
Forecast Link-based V/C, 2027 Forecast Year, “With” Expansion, Simulation Network

AM Peak Hour
(08:00 – 09:00)

Original Run

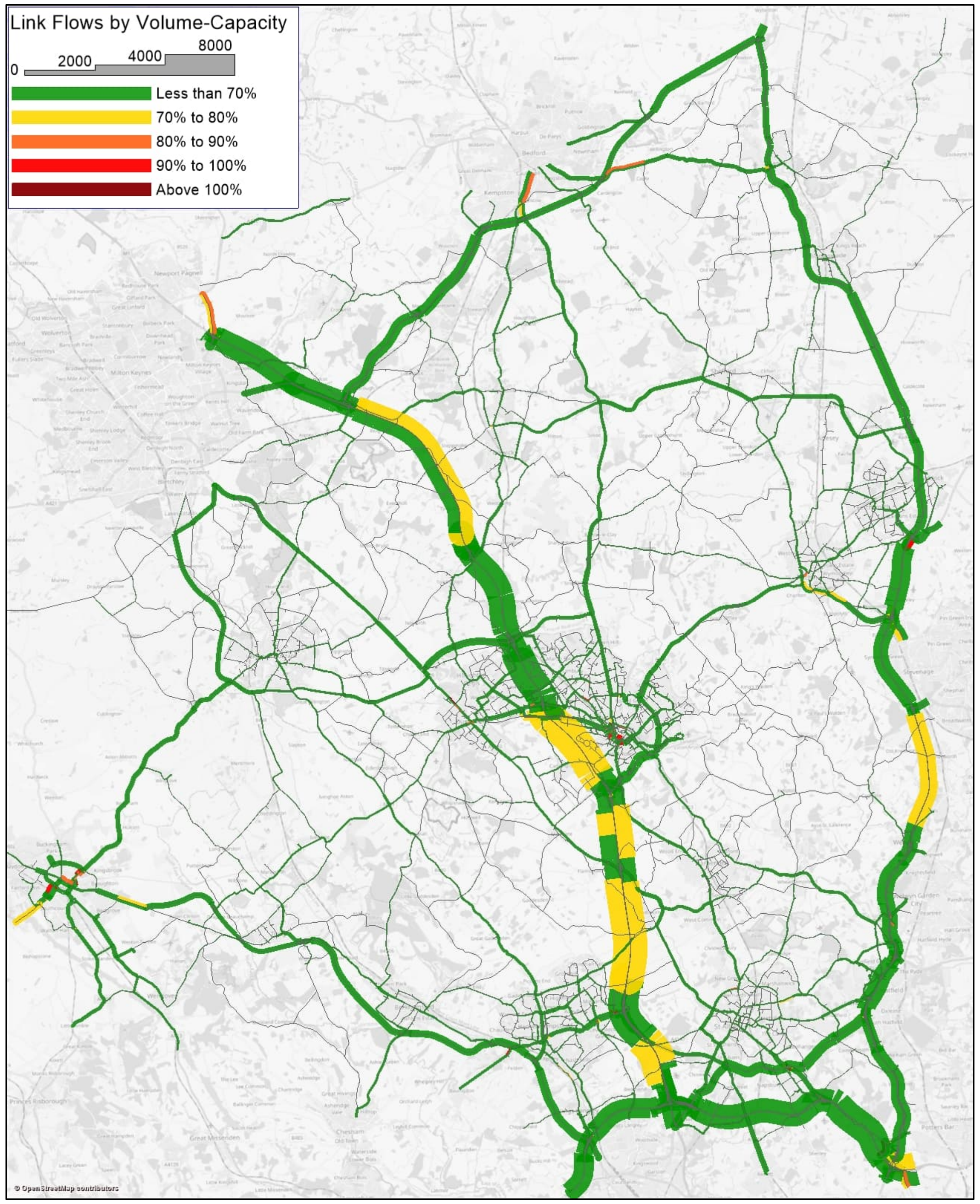


Updated Run

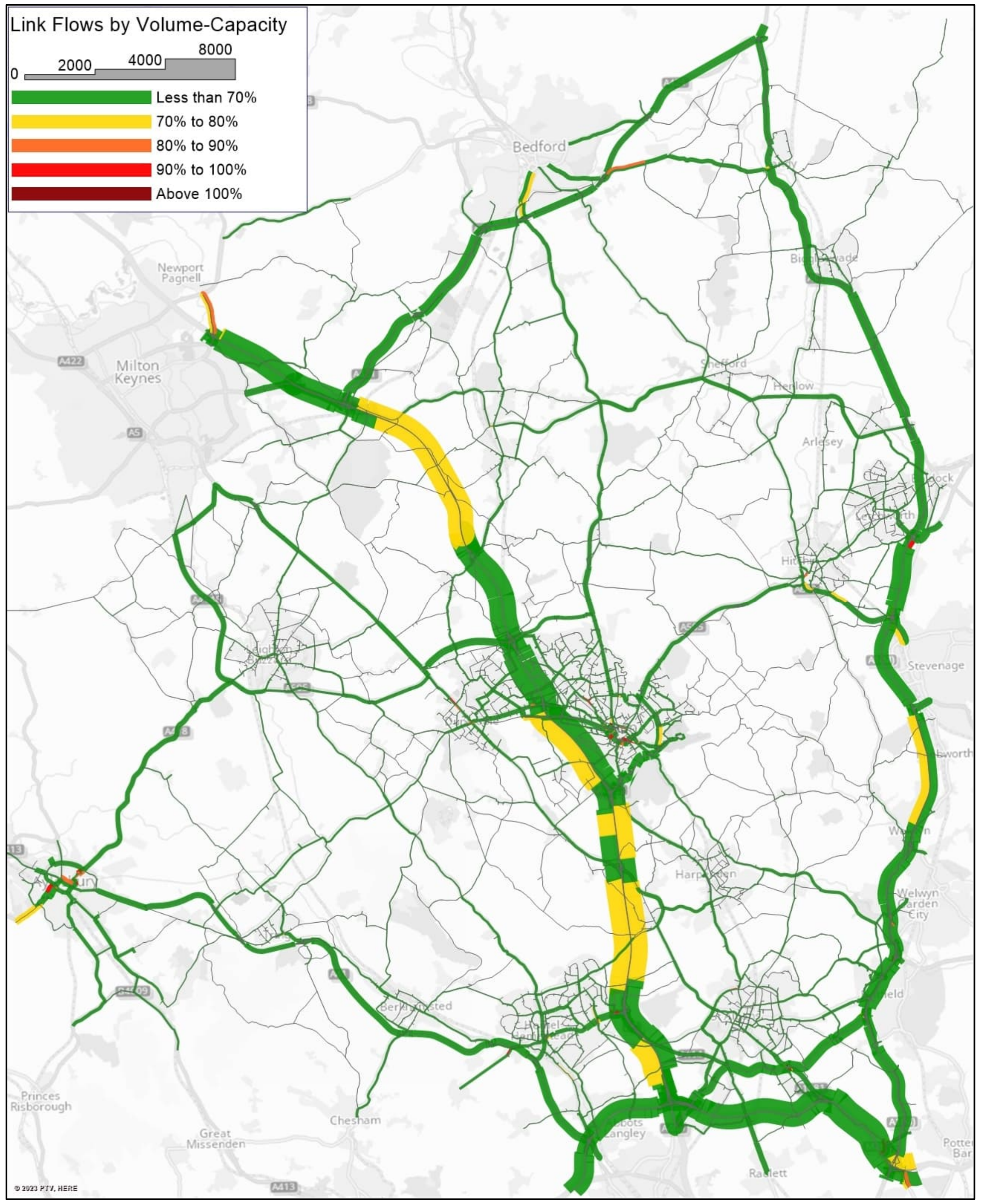


Interpeak
(between 10:00 to 16:00)

Original Run

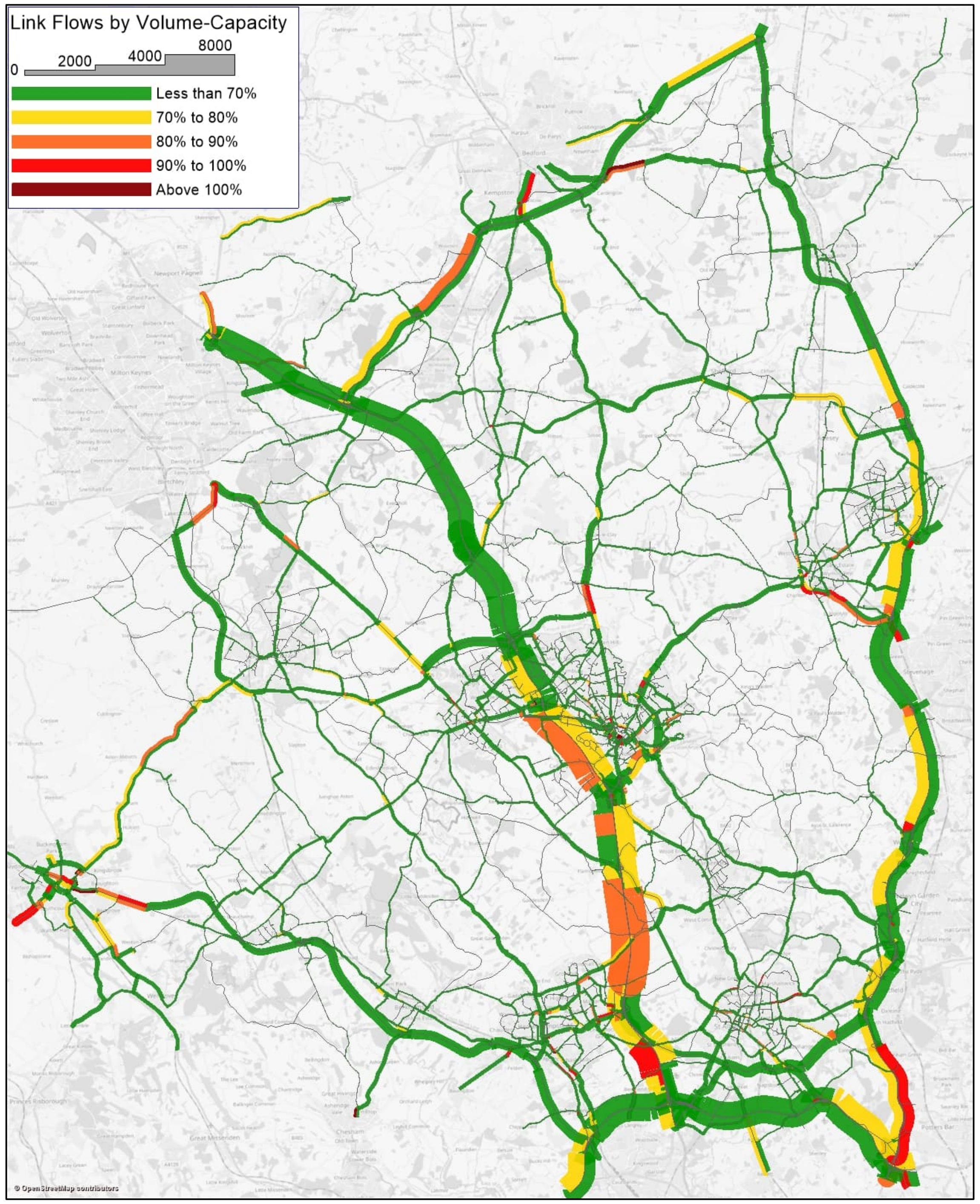


Updated Run

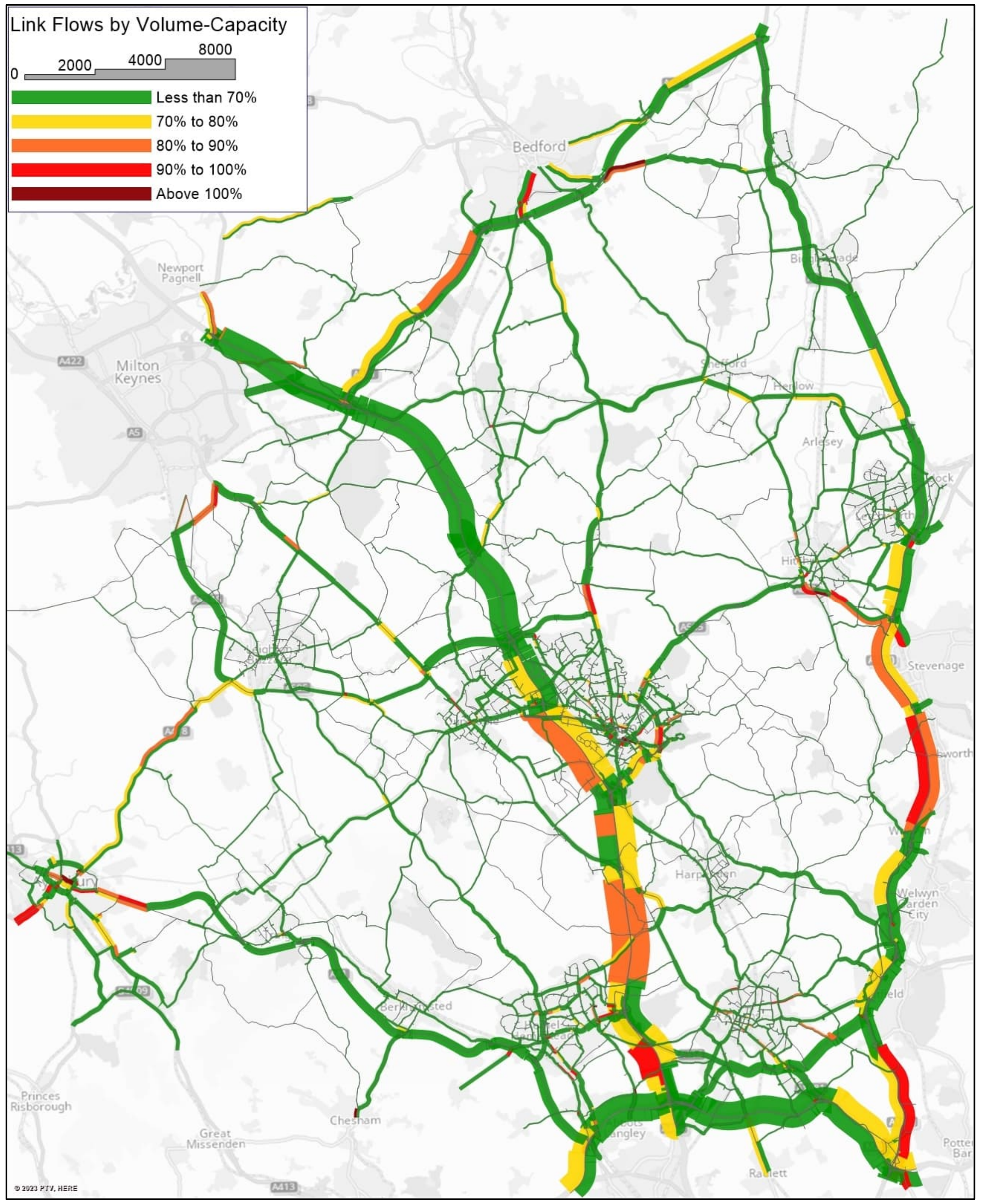


PM Peak Hour
(17:00 to 18:00)

Original Run



Updated Run

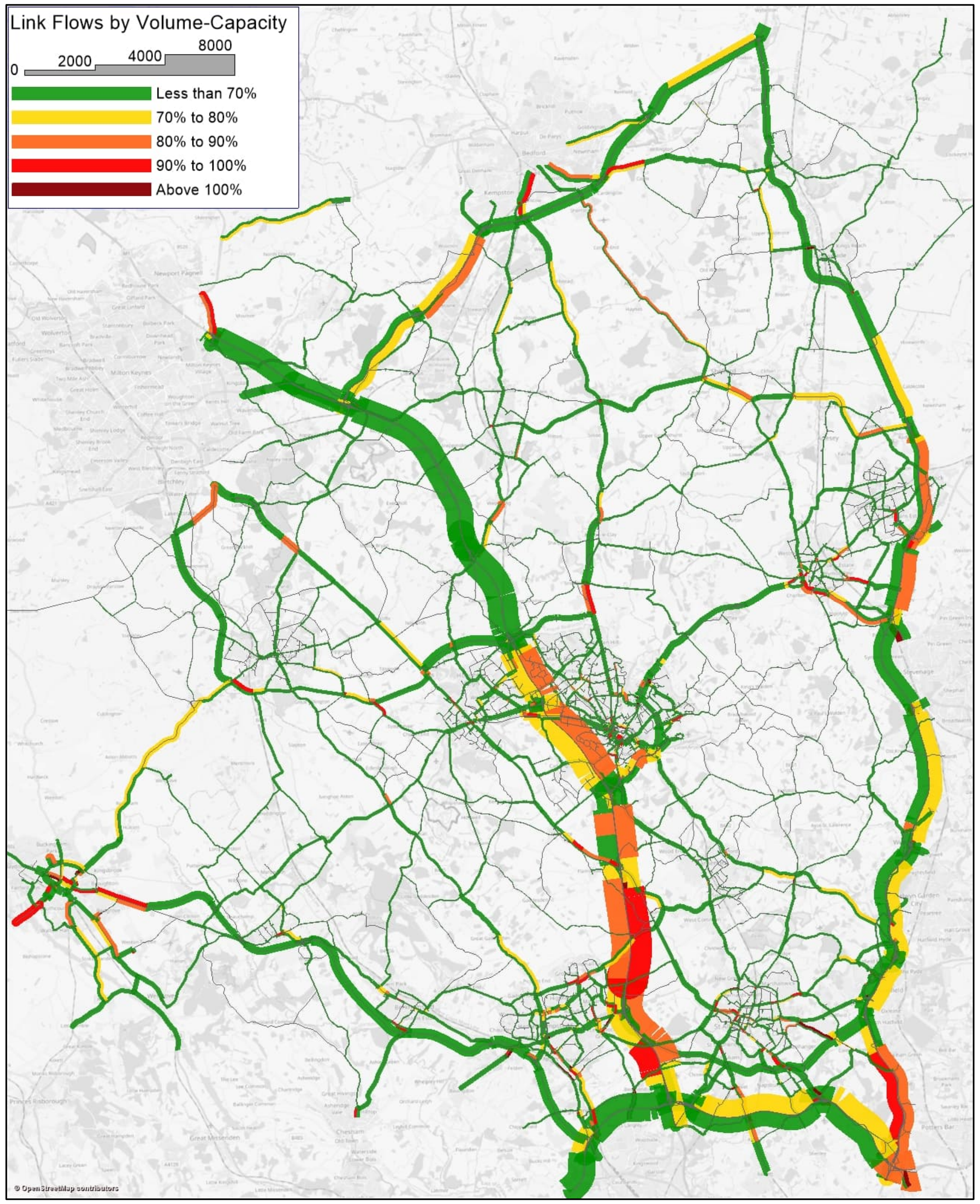


Forecast Link-based V/C, 2039 Forecast Year, “Without” Expansion, Simulation Network

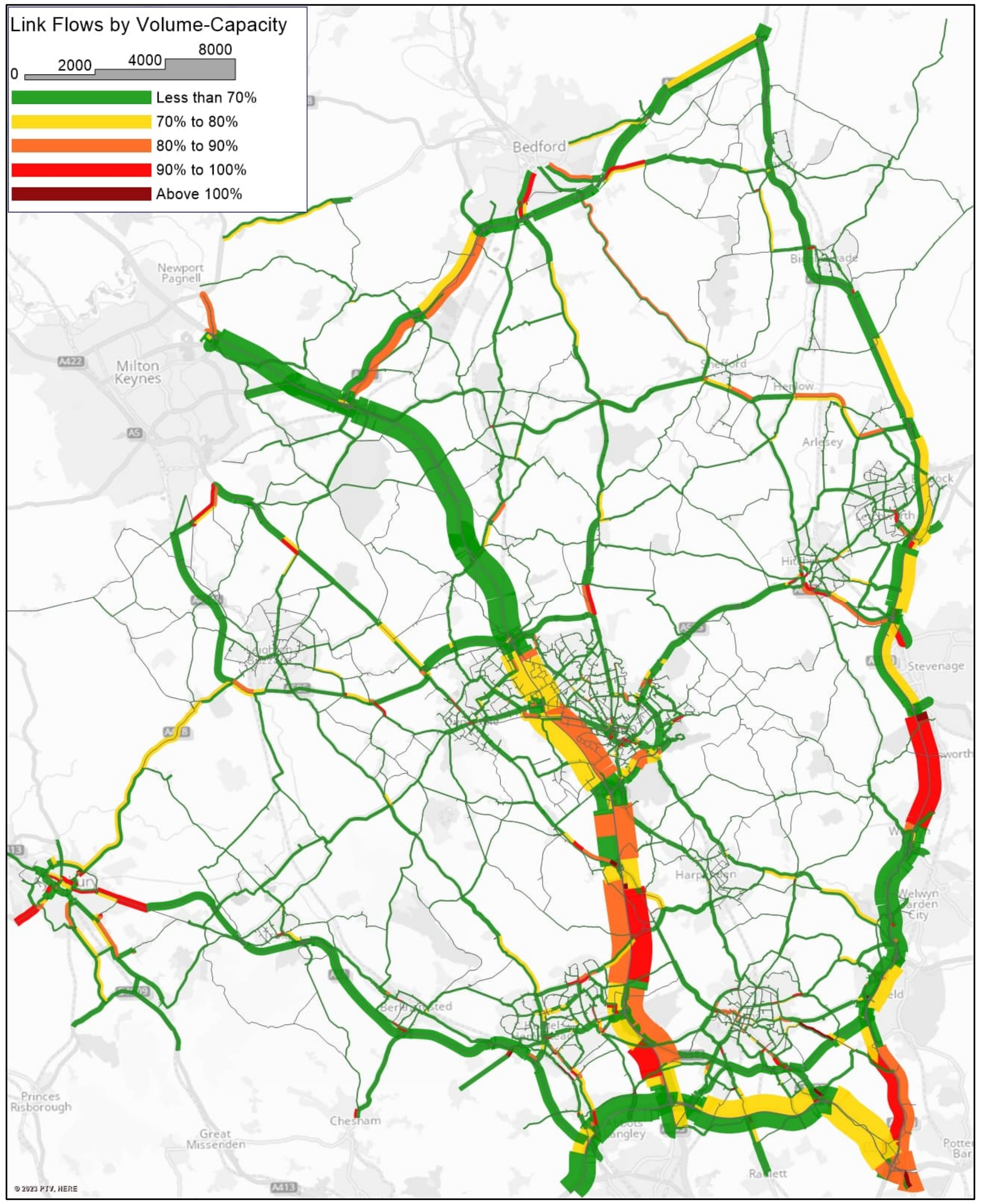
AM Peak Hour

(08:00 – 09:00)

Original Run

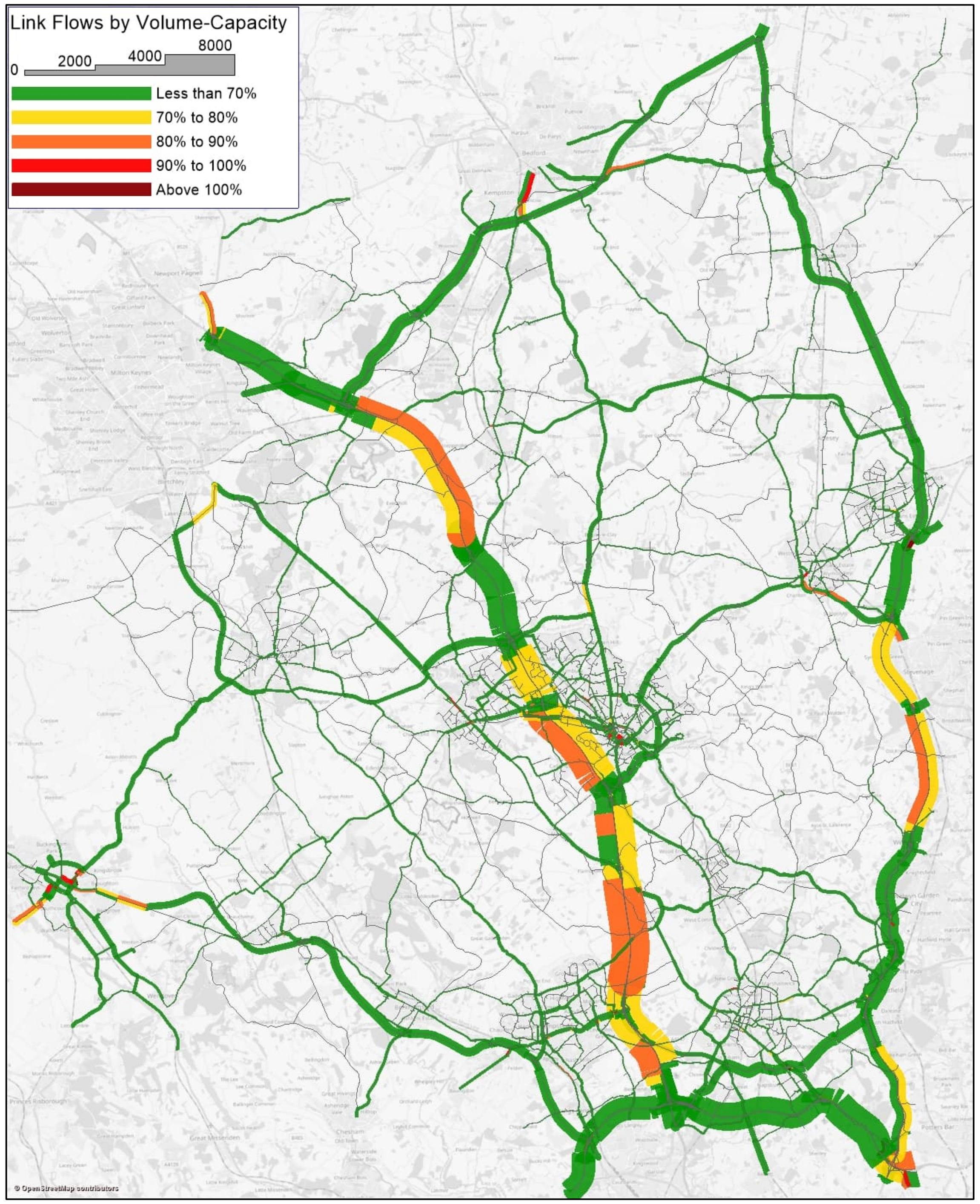


Updated Run

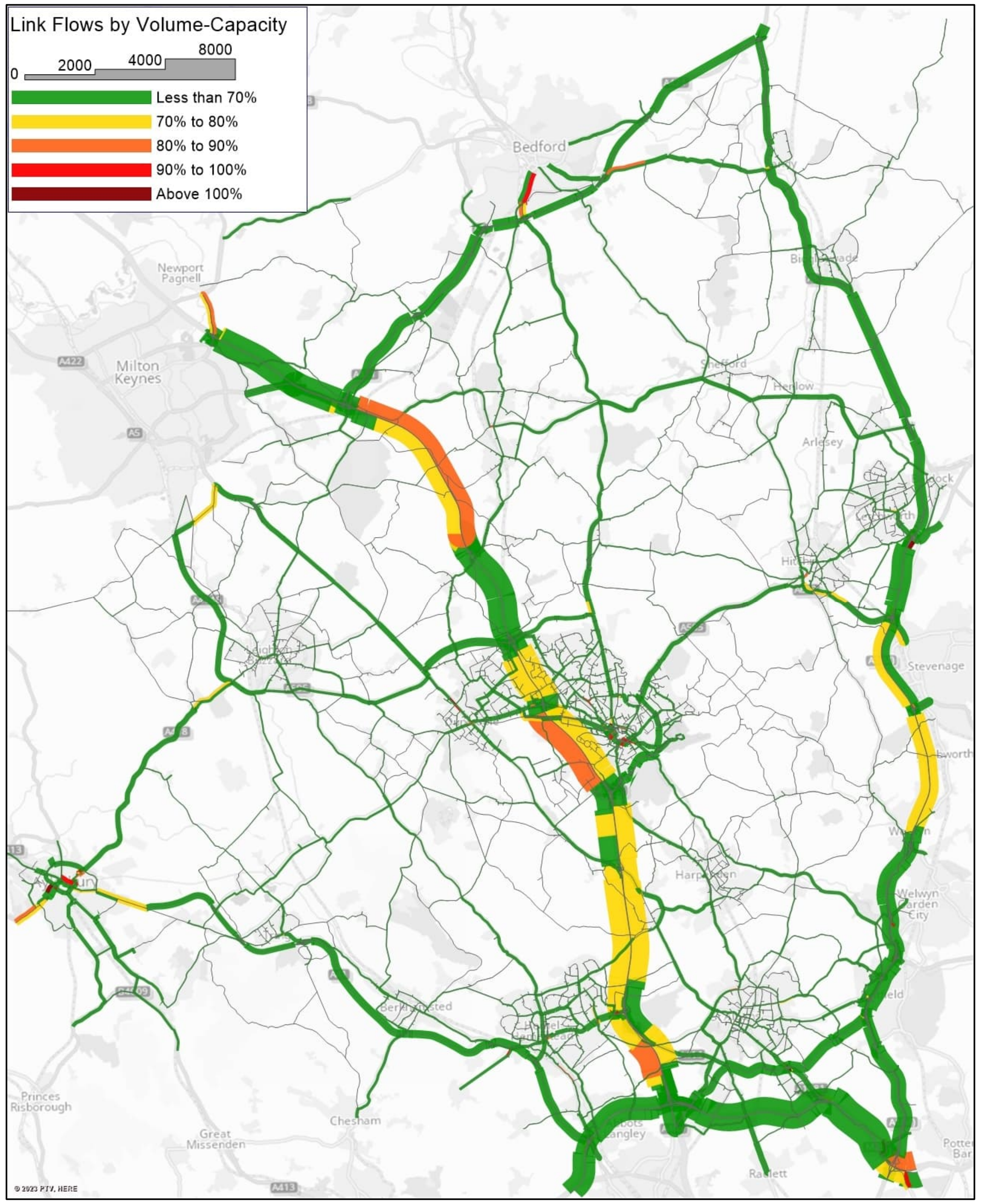


Interpeak
(between 10:00 to 16:00)

Original Run

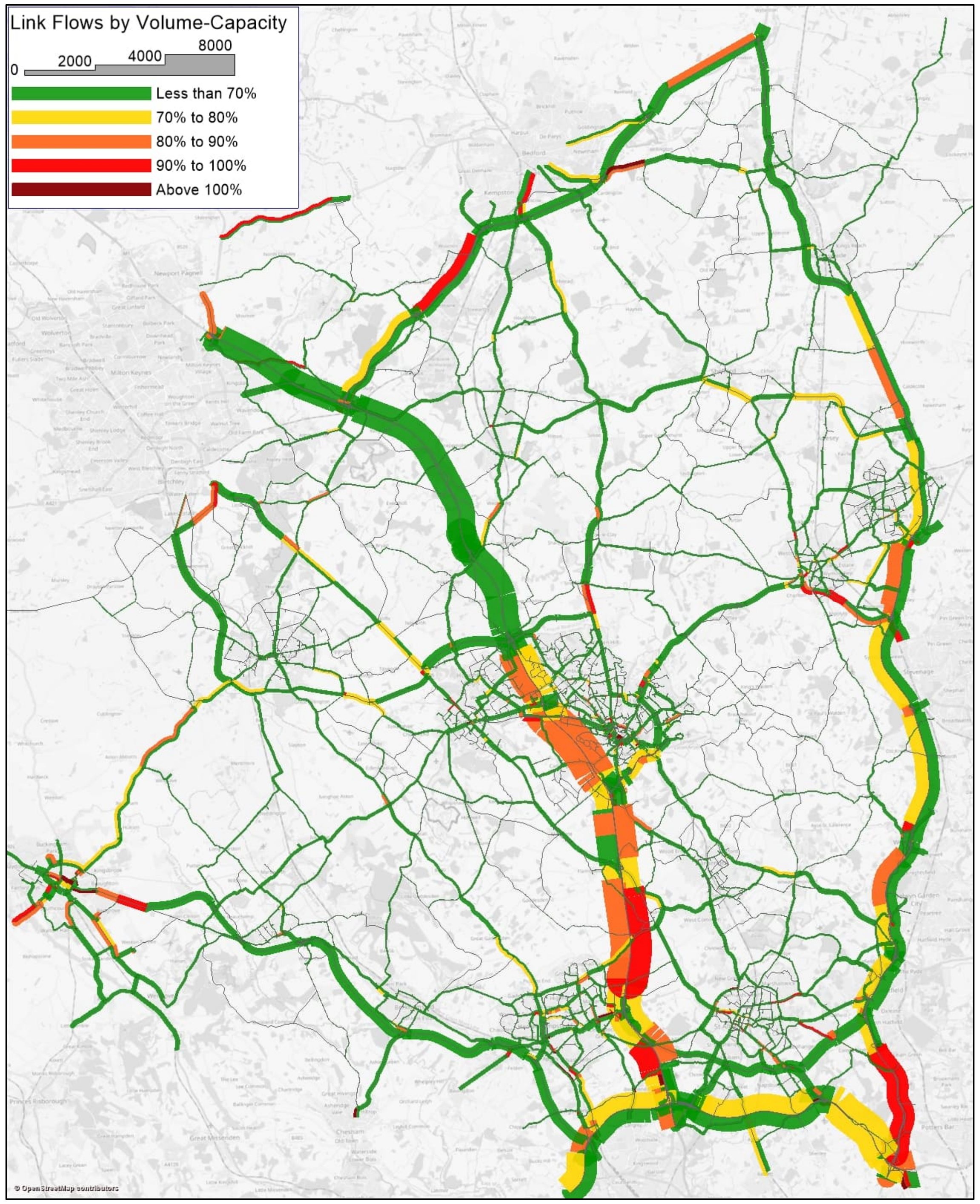


Updated Run

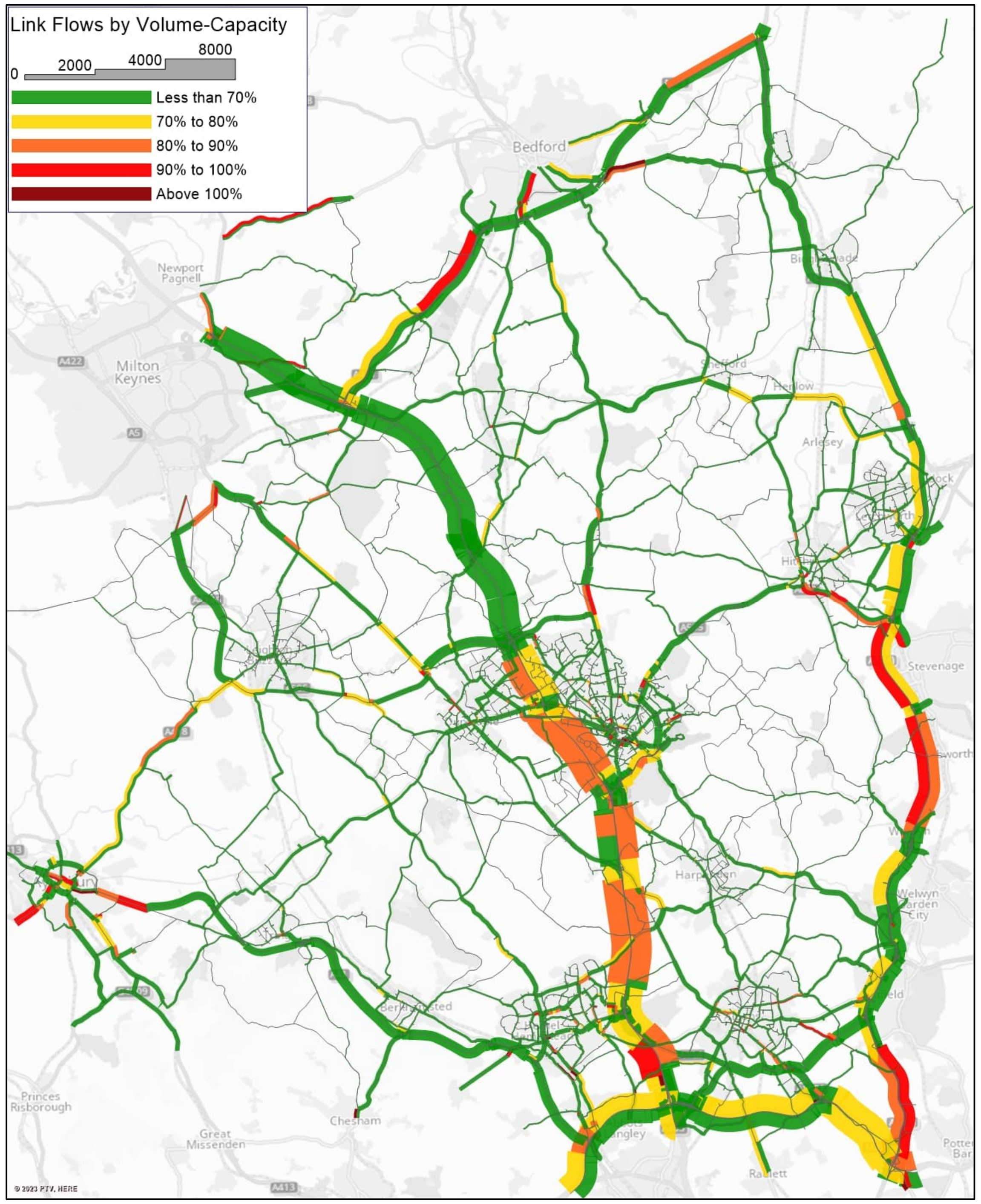


PM Peak Hour
(17:00 to 18:00)

Original Run



Updated Run

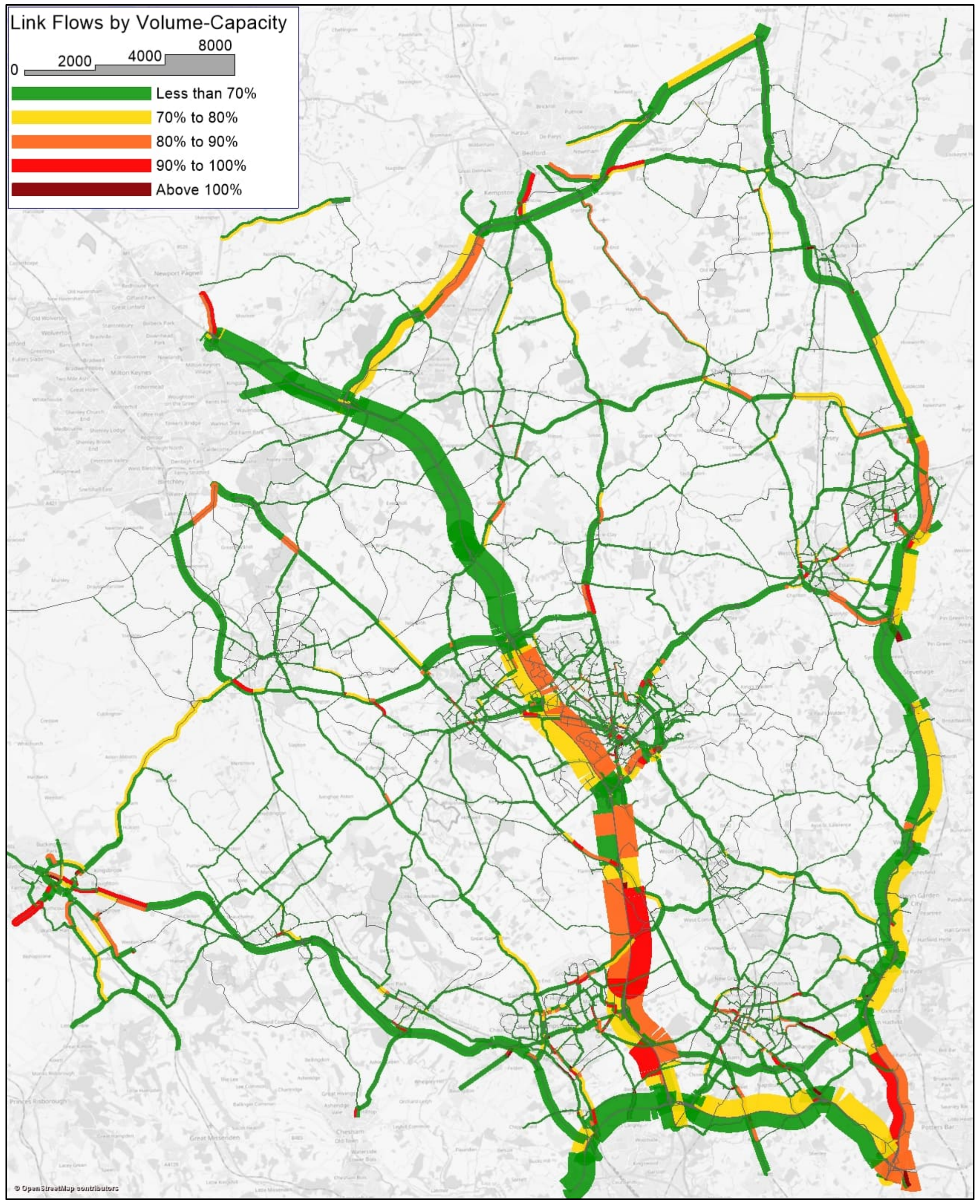


Forecast Link-based V/C, 2039 Forecast Year, “With” Expansion, Simulation Network

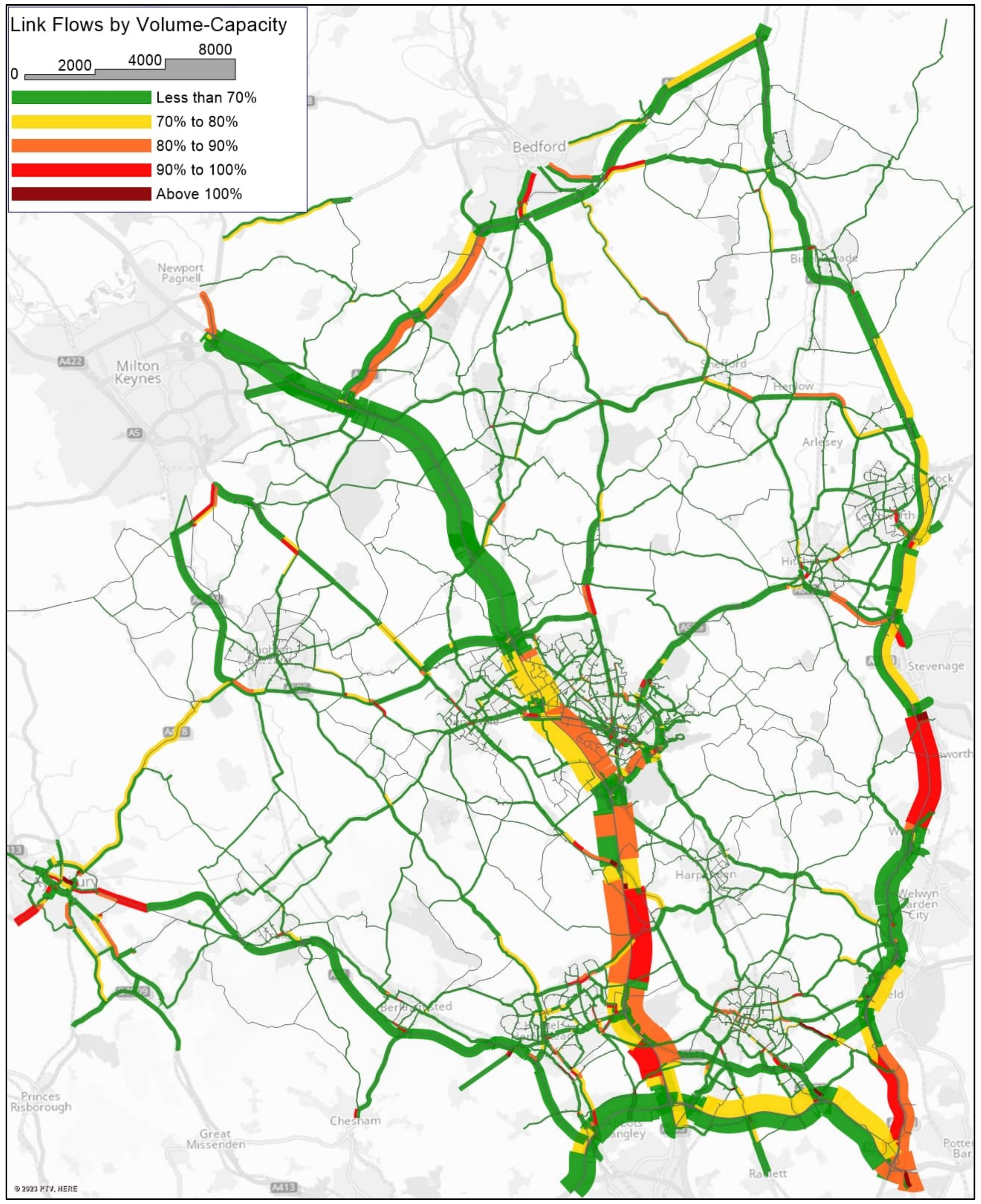
AM Peak Hour

(08:00 – 09:00)

Original Run

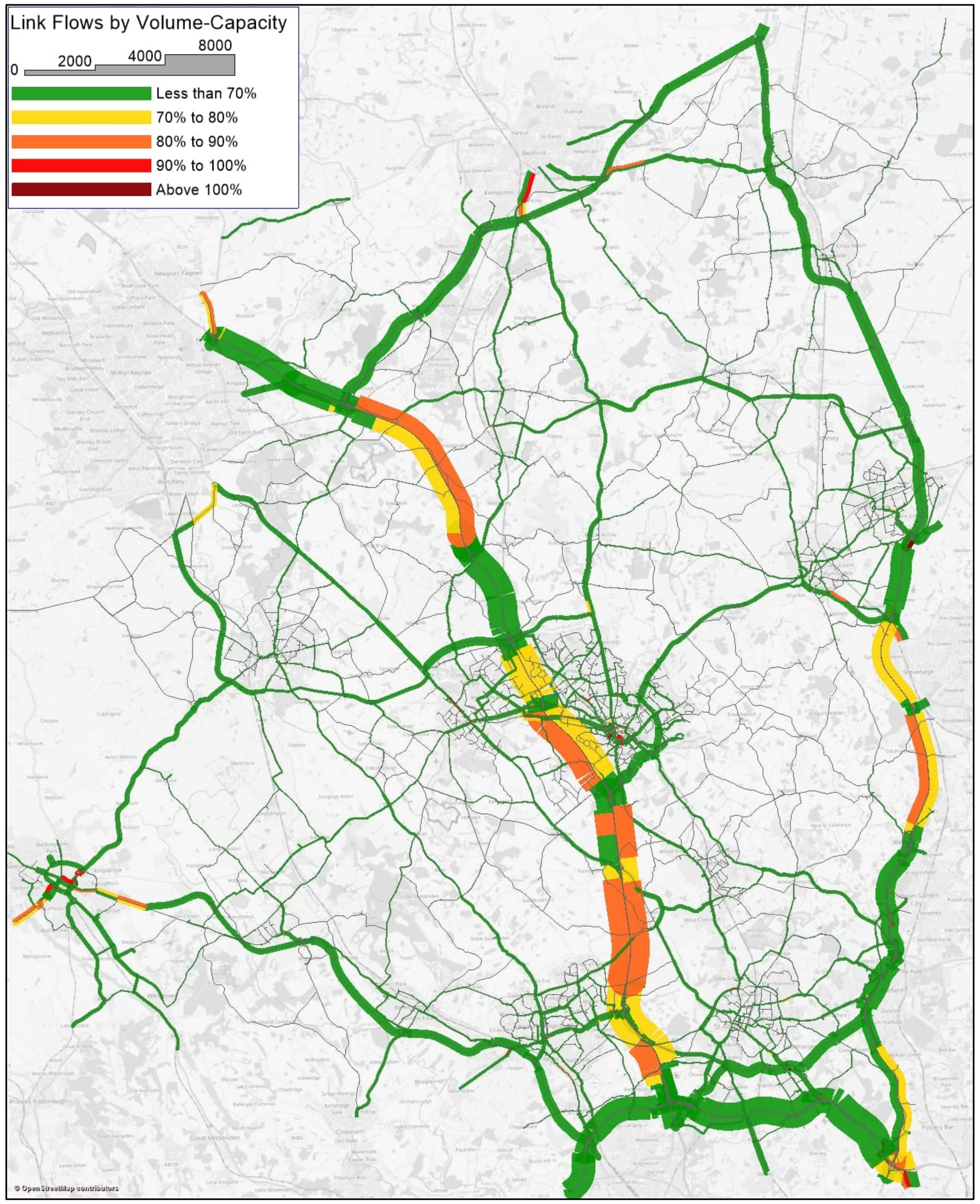


Updated Run

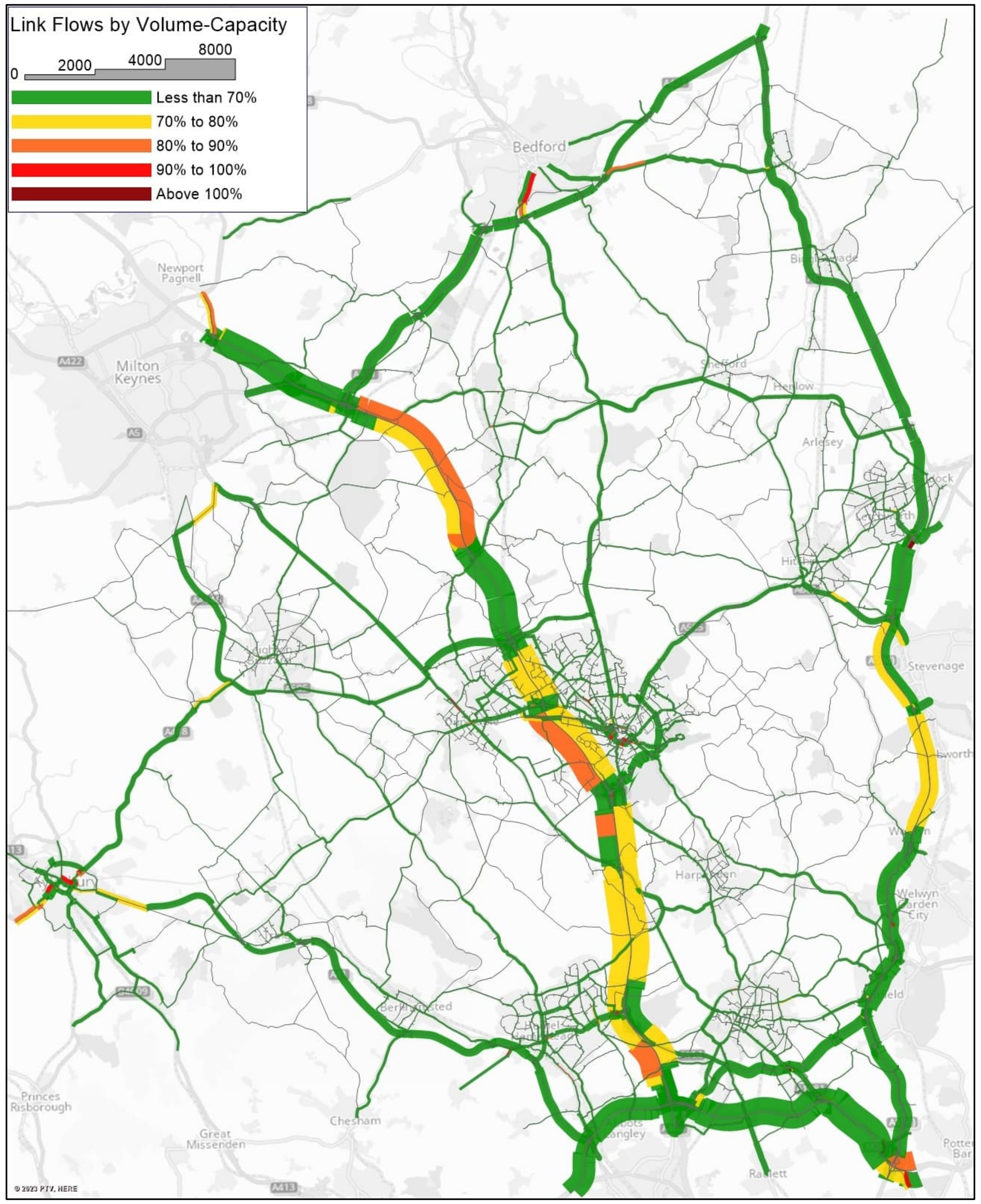


Interpeak
(between 10:00 to 16:00)

Original Run

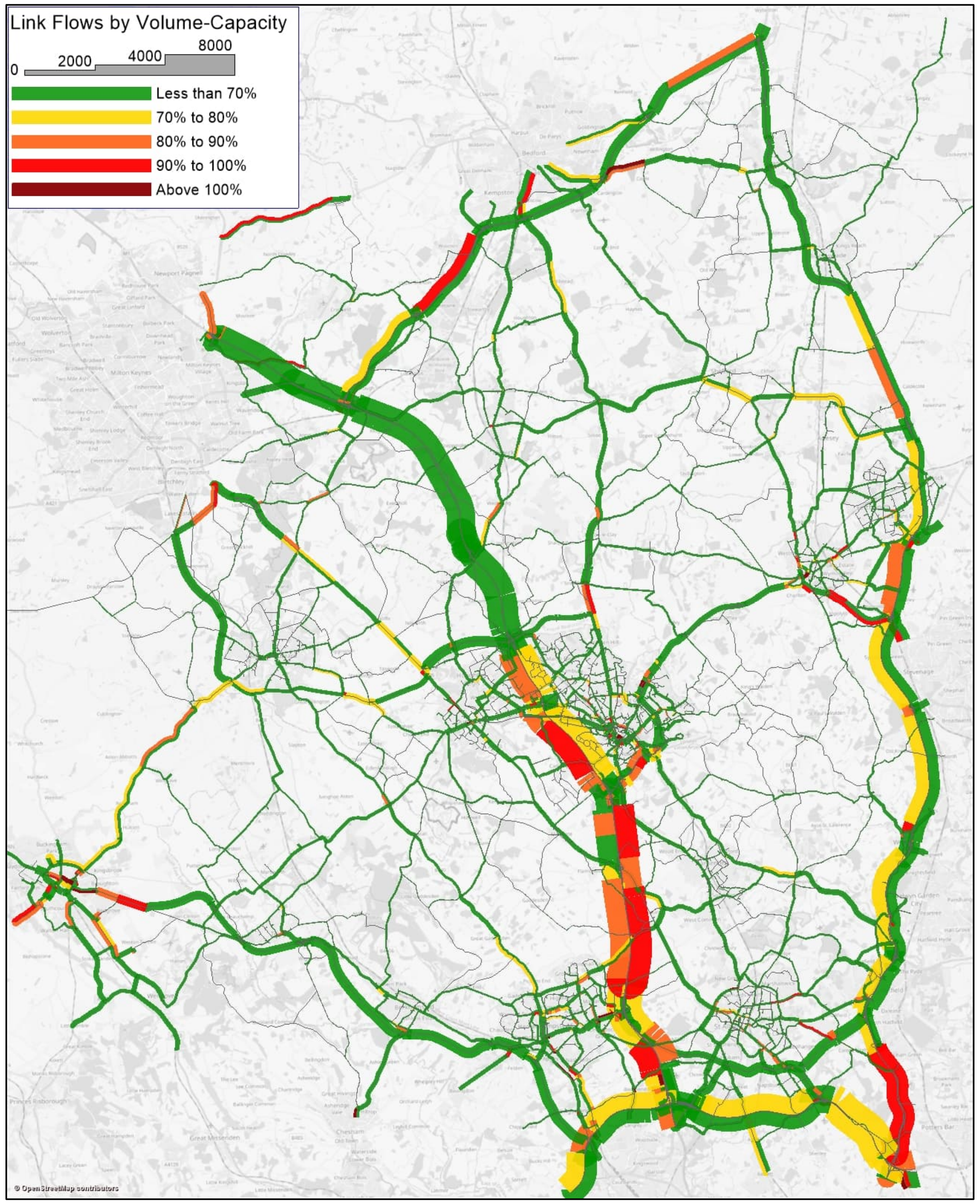


Updated Run

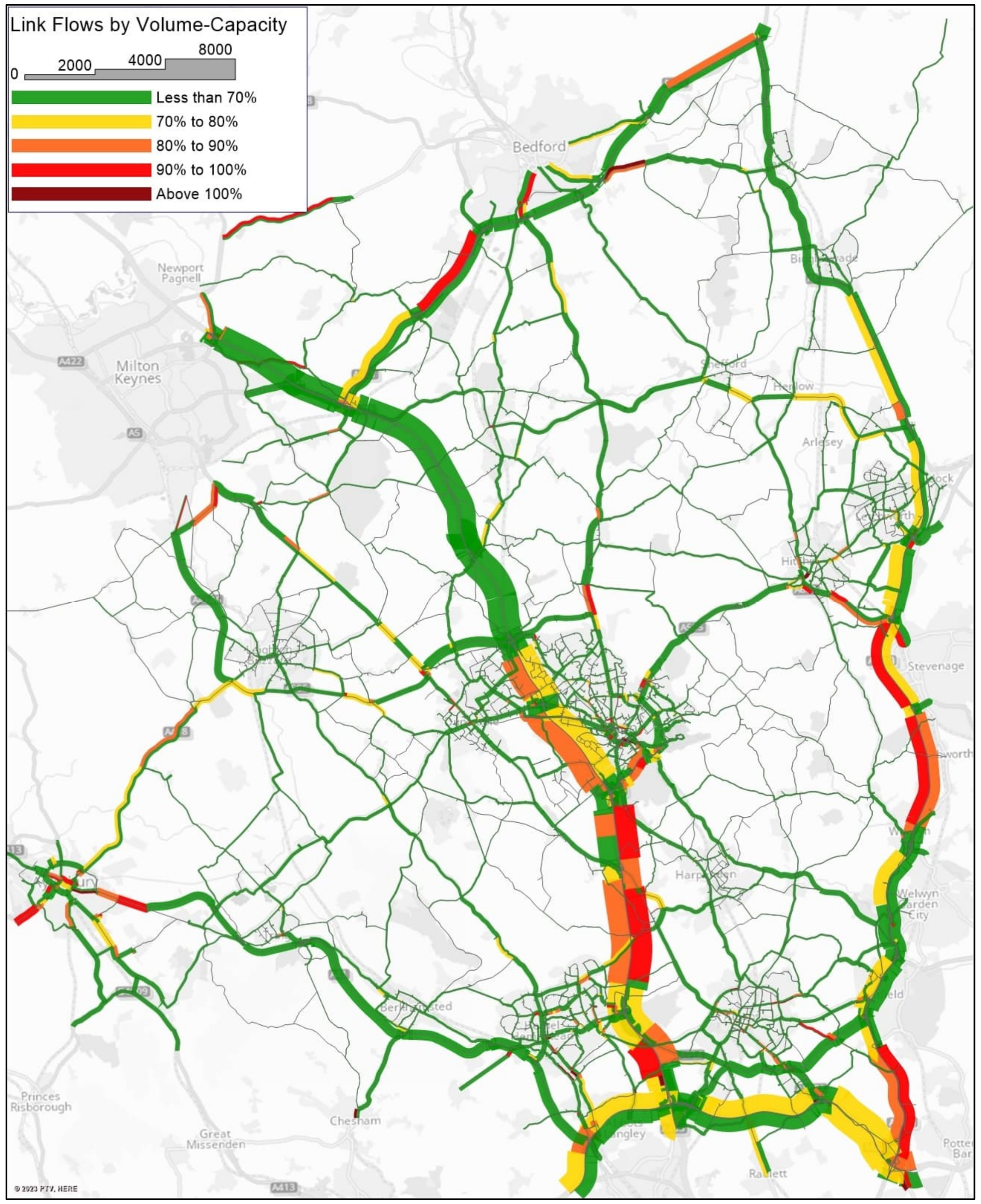


PM Peak Hour
(17:00 to 18:00)

Original Run



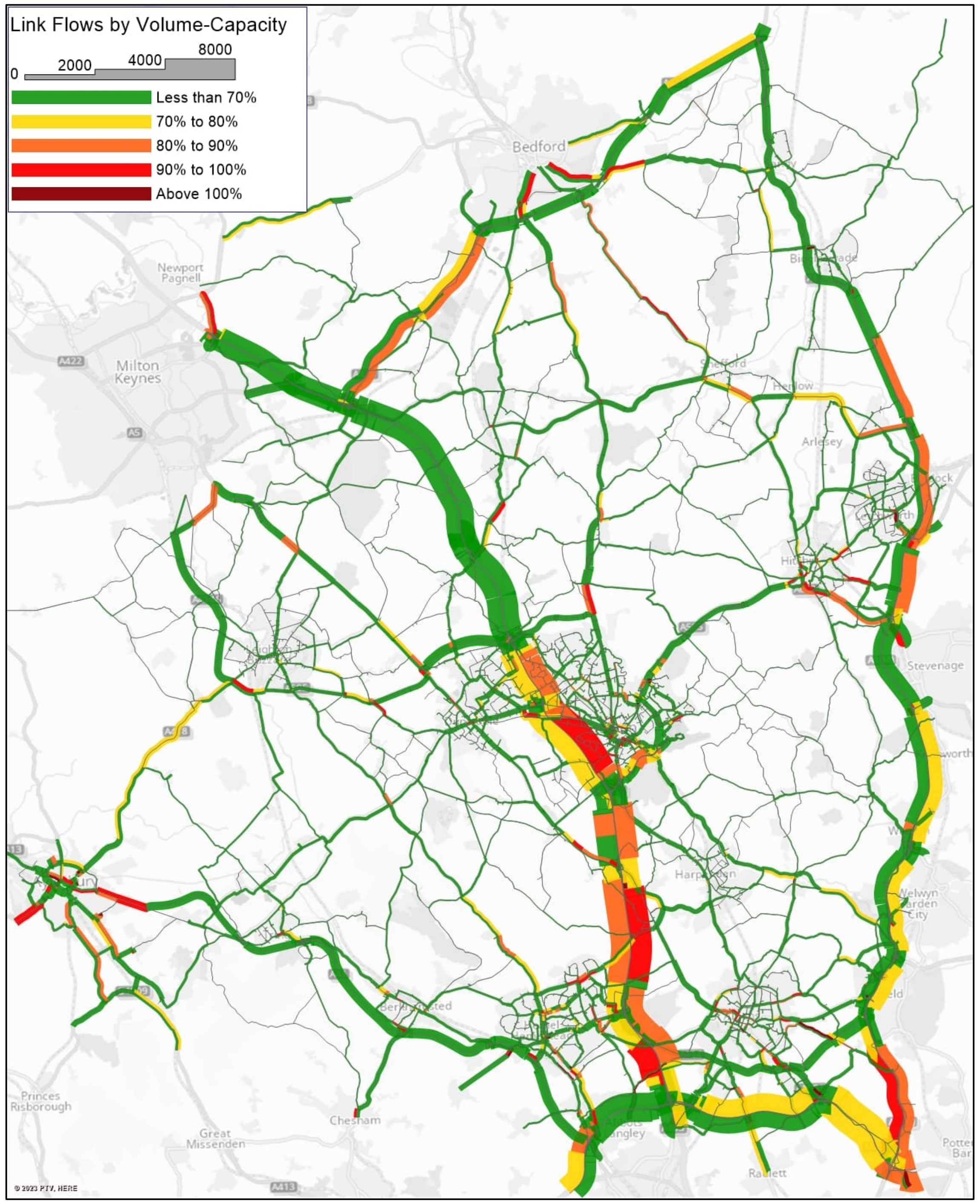
Updated Run



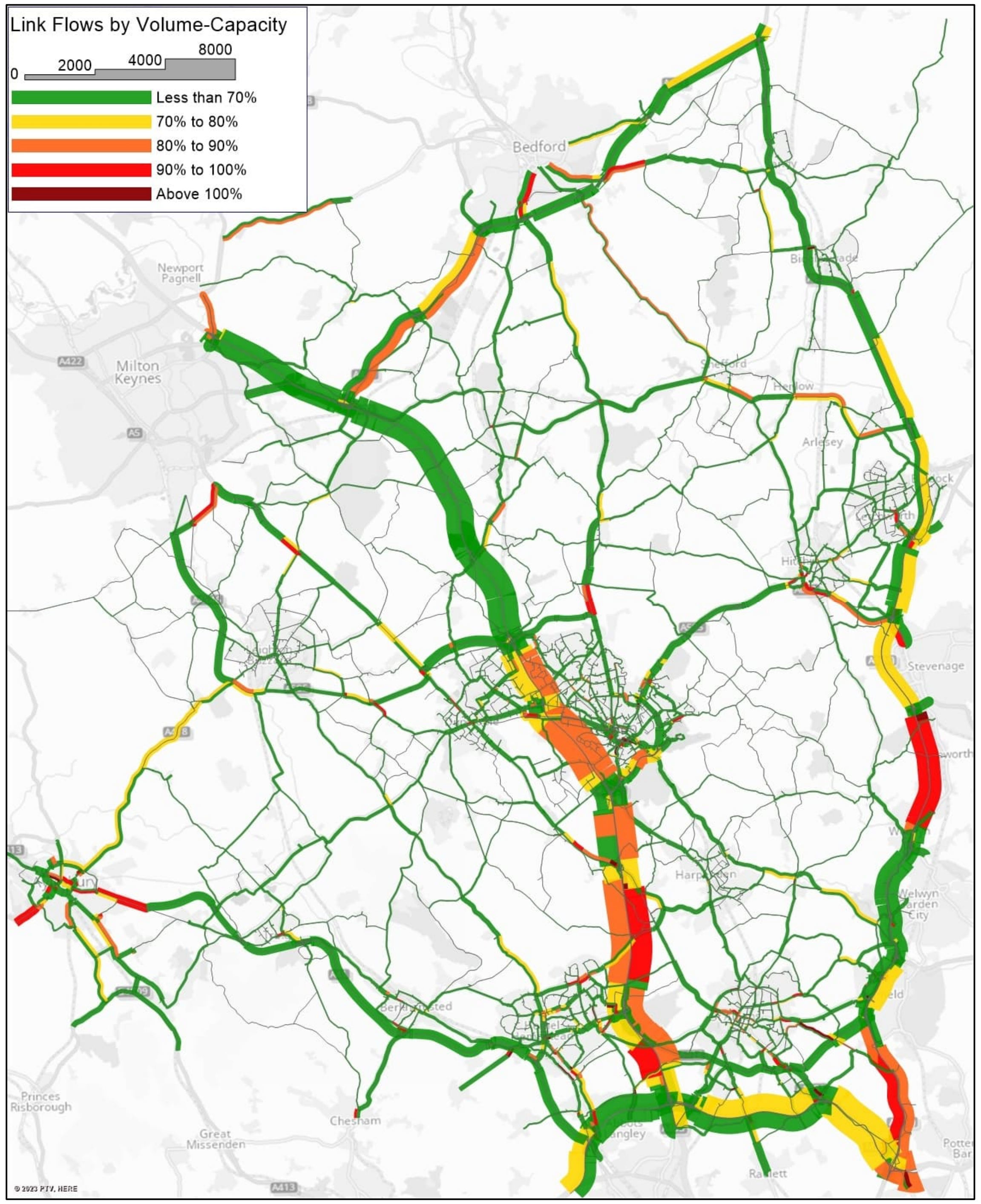
Forecast Link-based V/C, 2043 Forecast Year, “Without” Expansion, Simulation Network

AM Peak Hour
(08:00 – 09:00)

Original Run

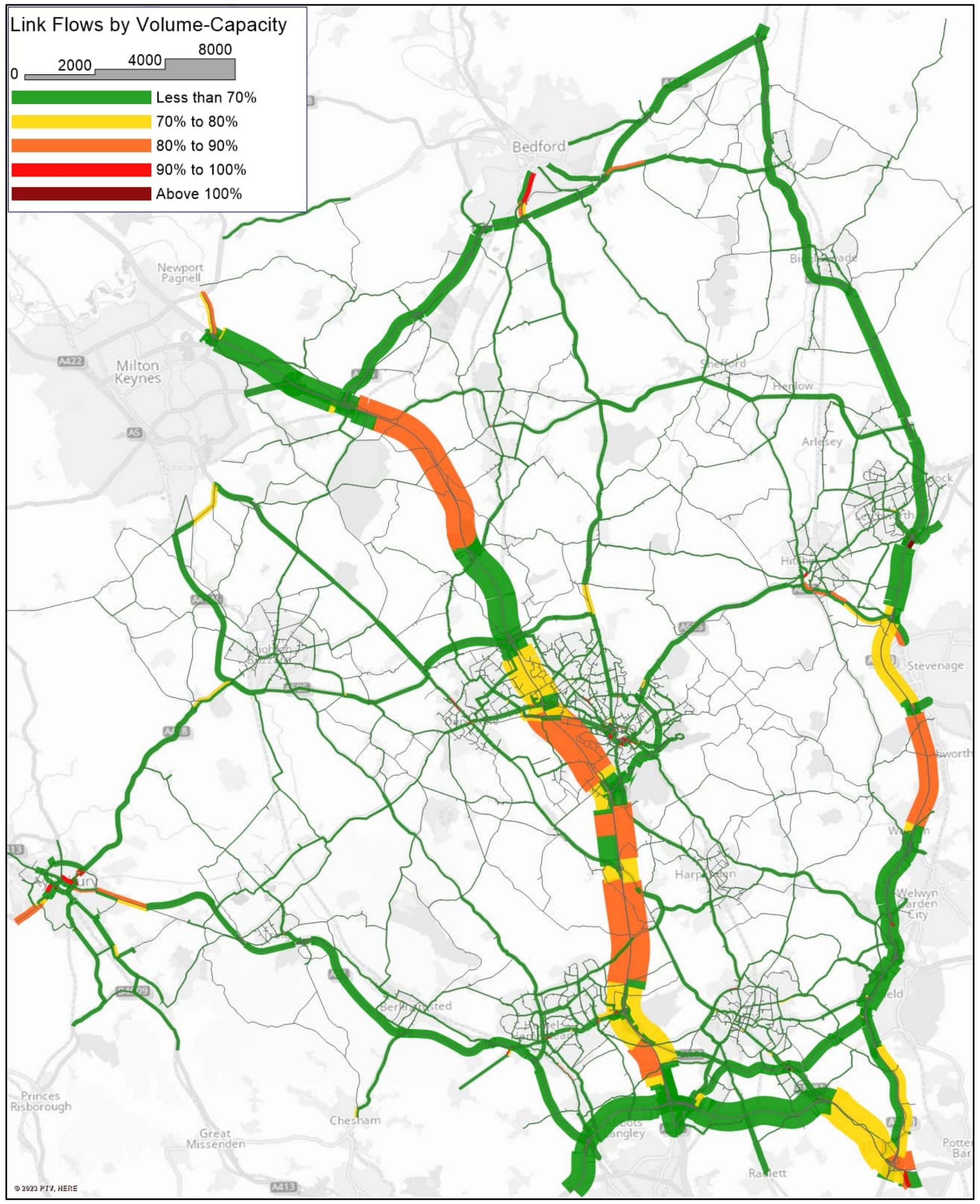


Updated Run

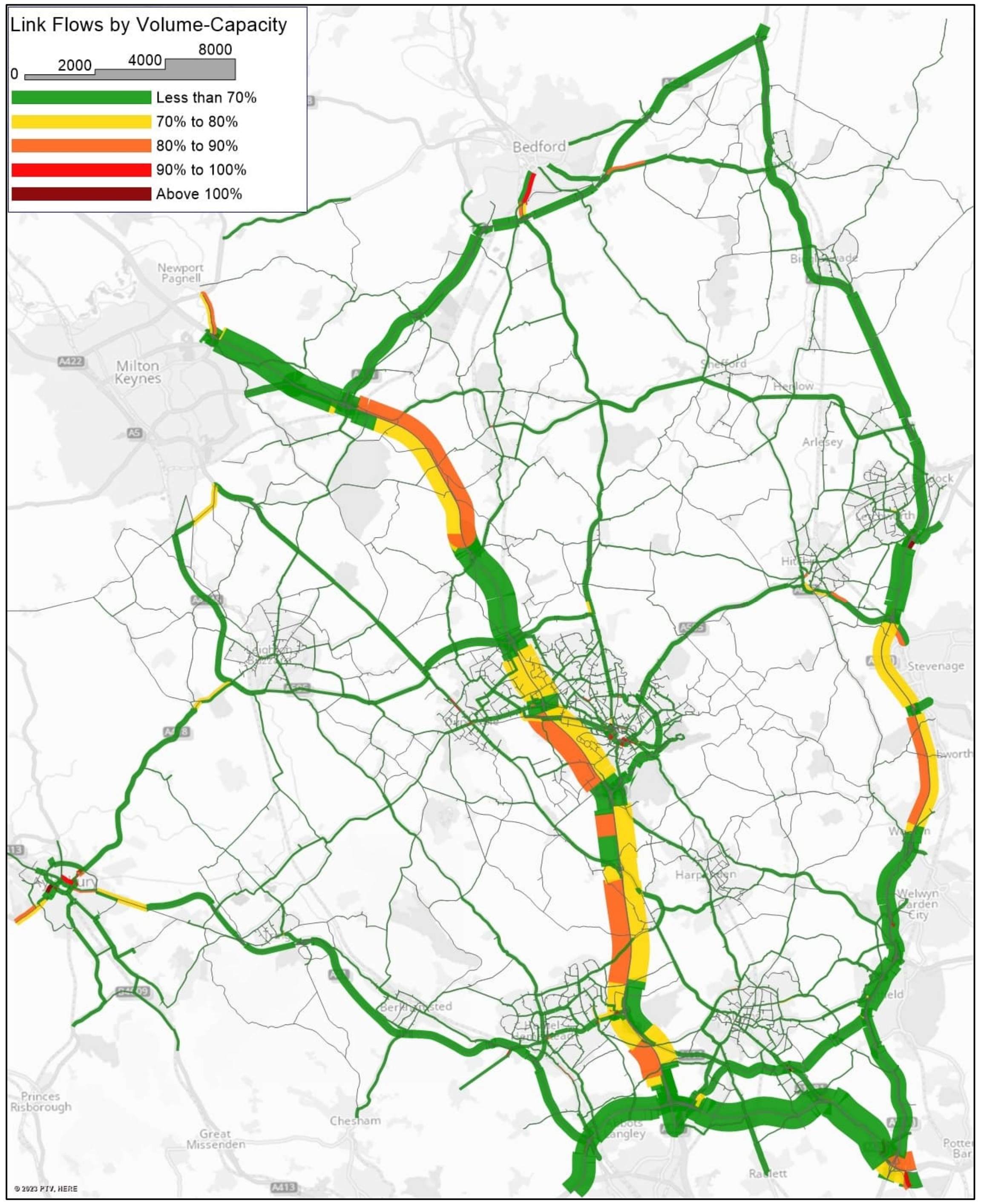


Interpeak
(between 10:00 to 16:00)

Original Run

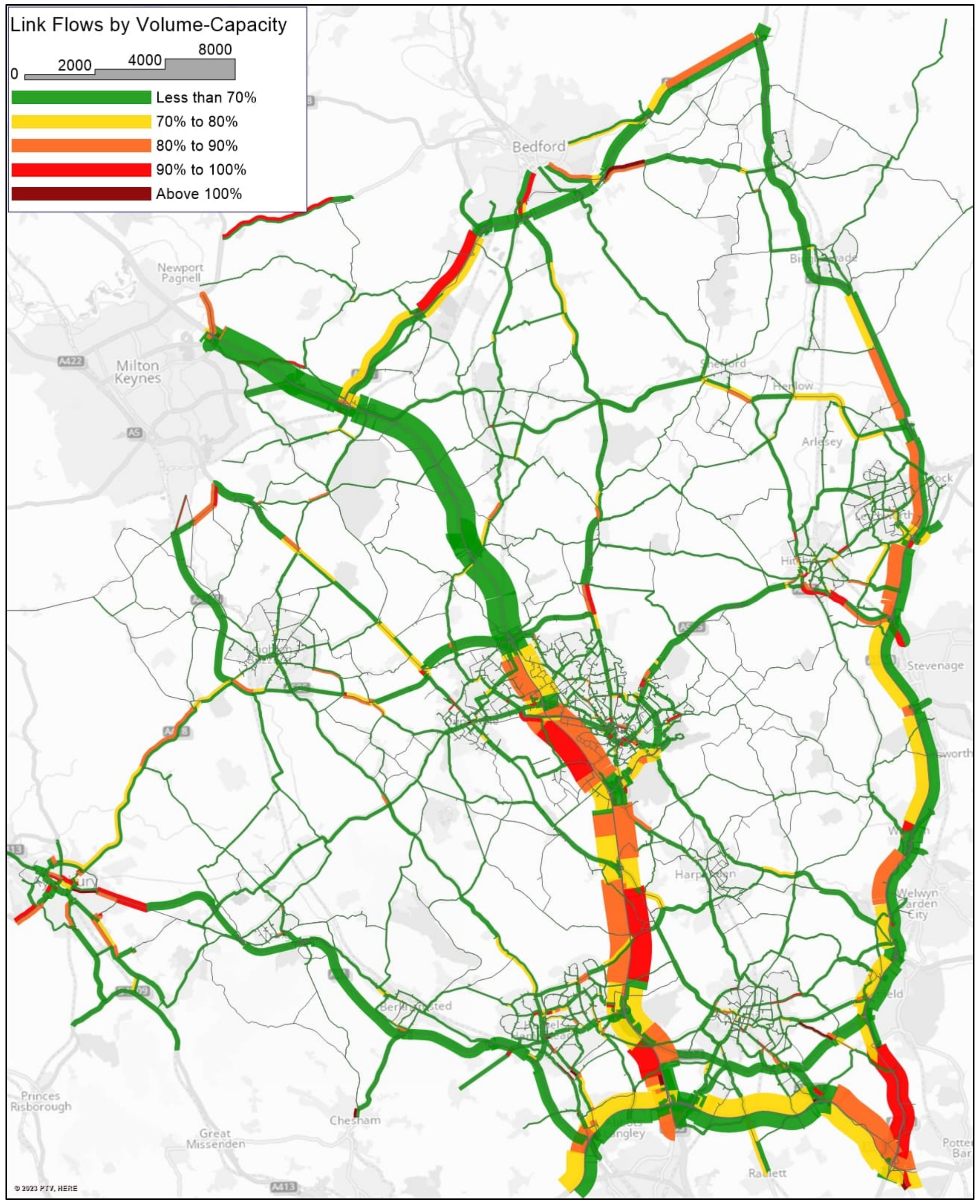


Updated Run

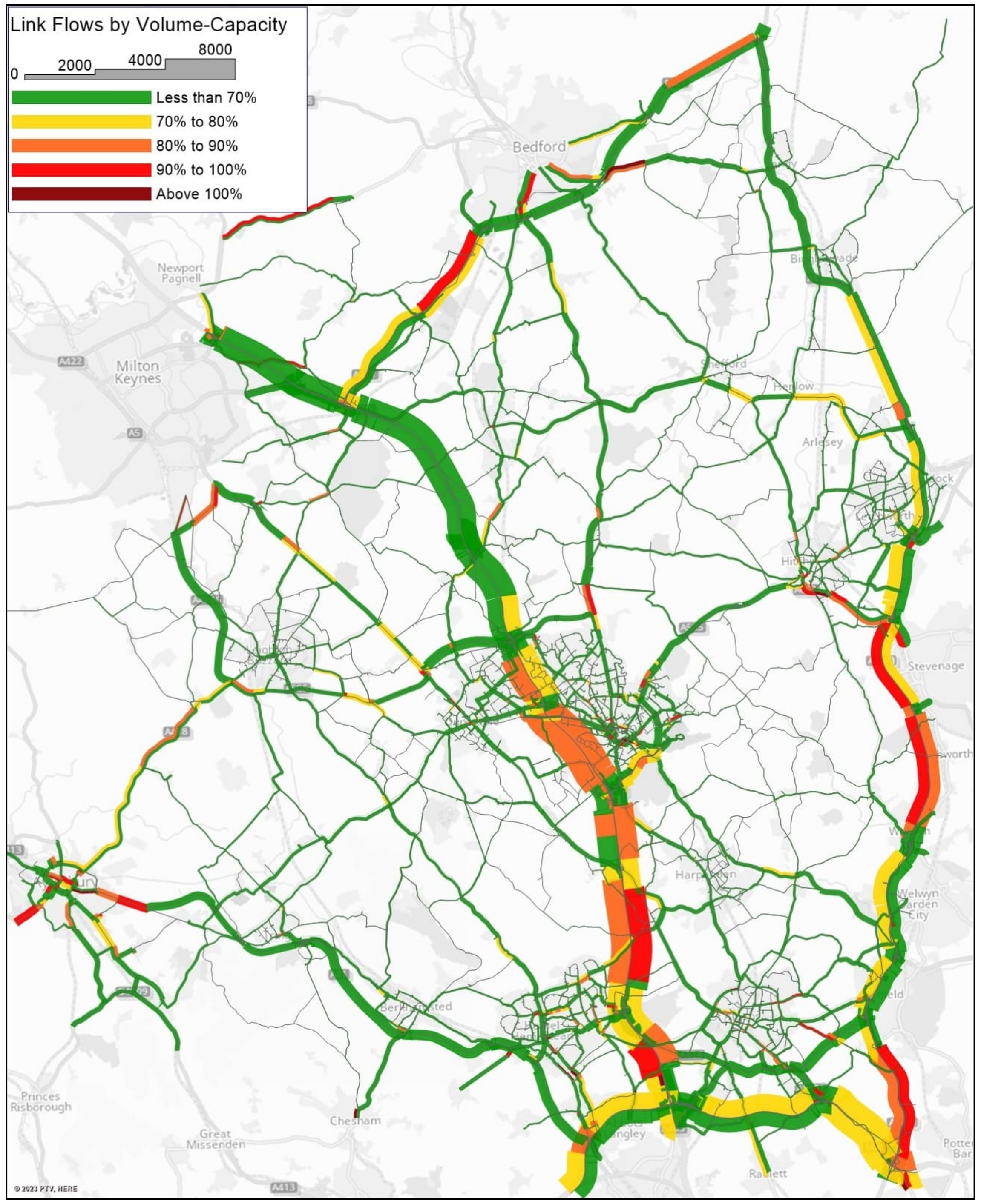


PM Peak Hour
(17:00 to 18:00)

Original Run



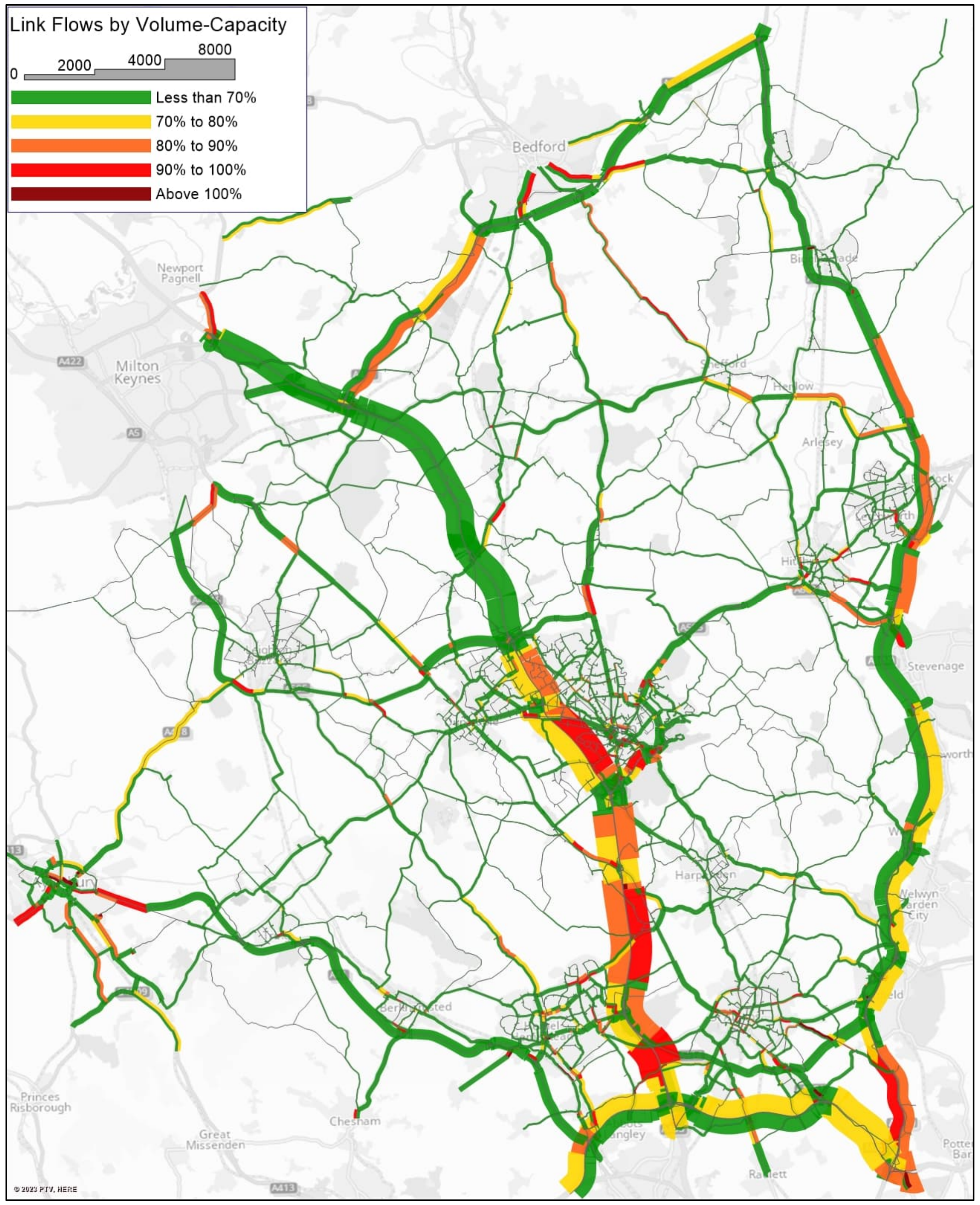
Updated Run



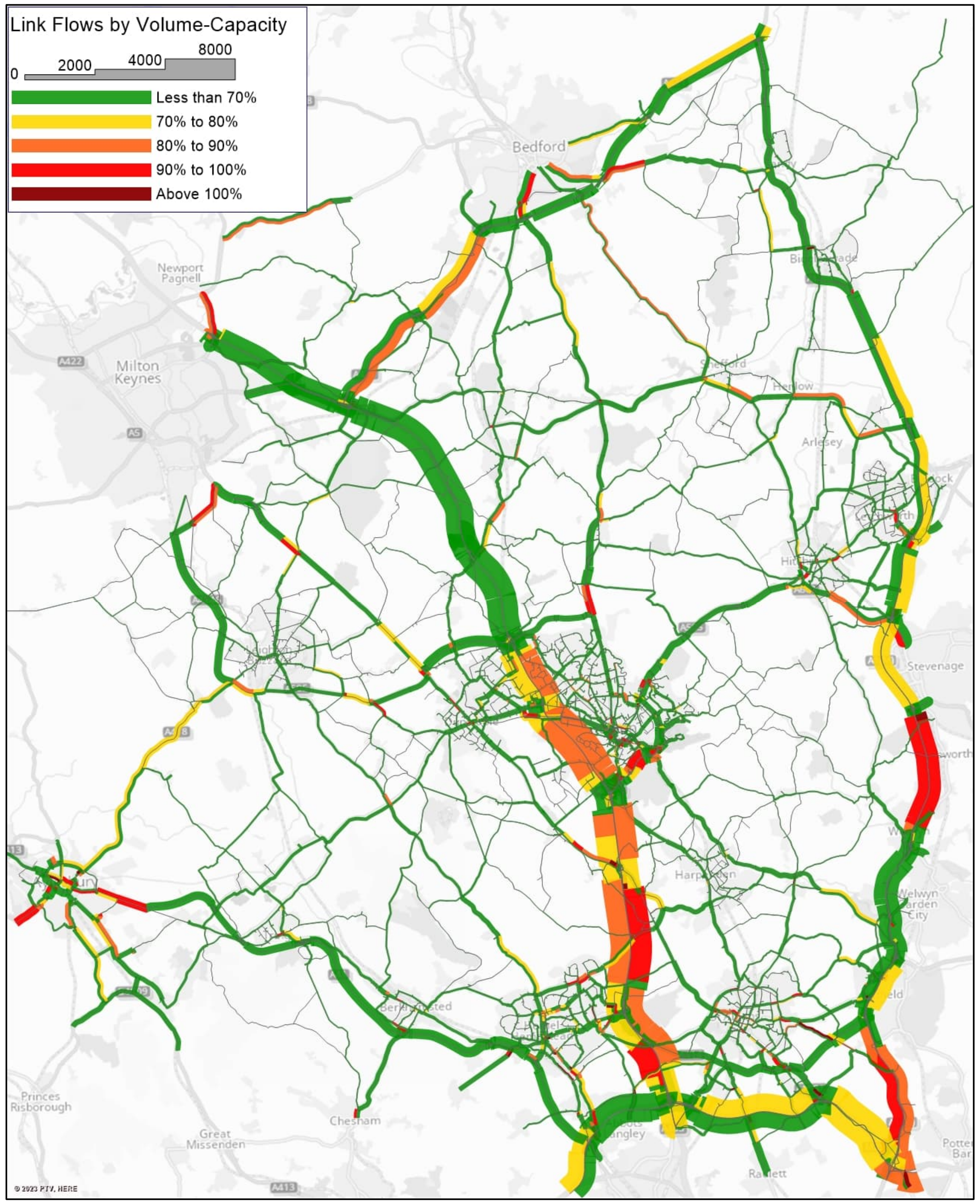
Forecast Link-based V/C, 2043 Forecast Year, “With” Expansion, Simulation Network

AM Peak Hour
(08:00 – 09:00)

Original Run



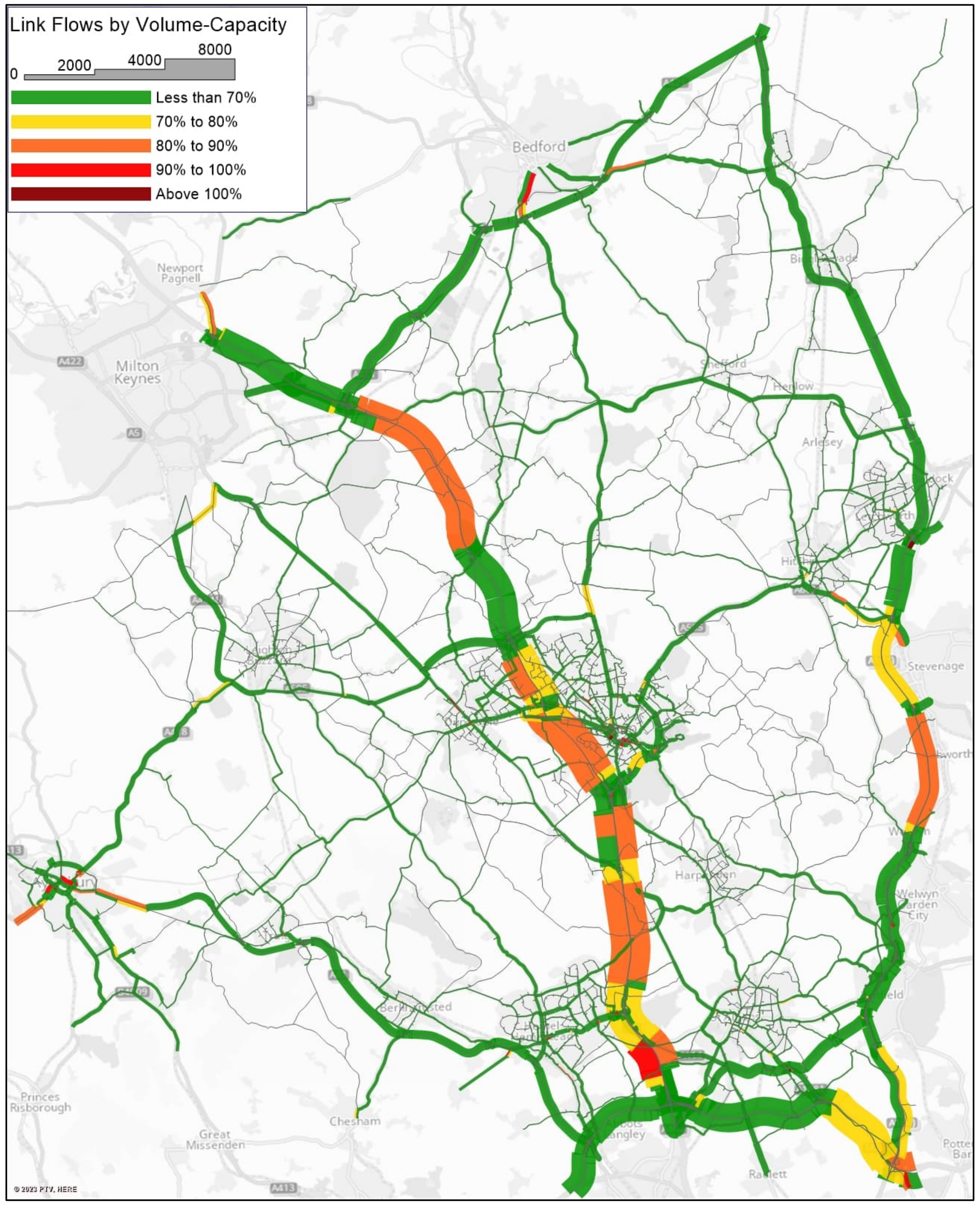
Updated Run

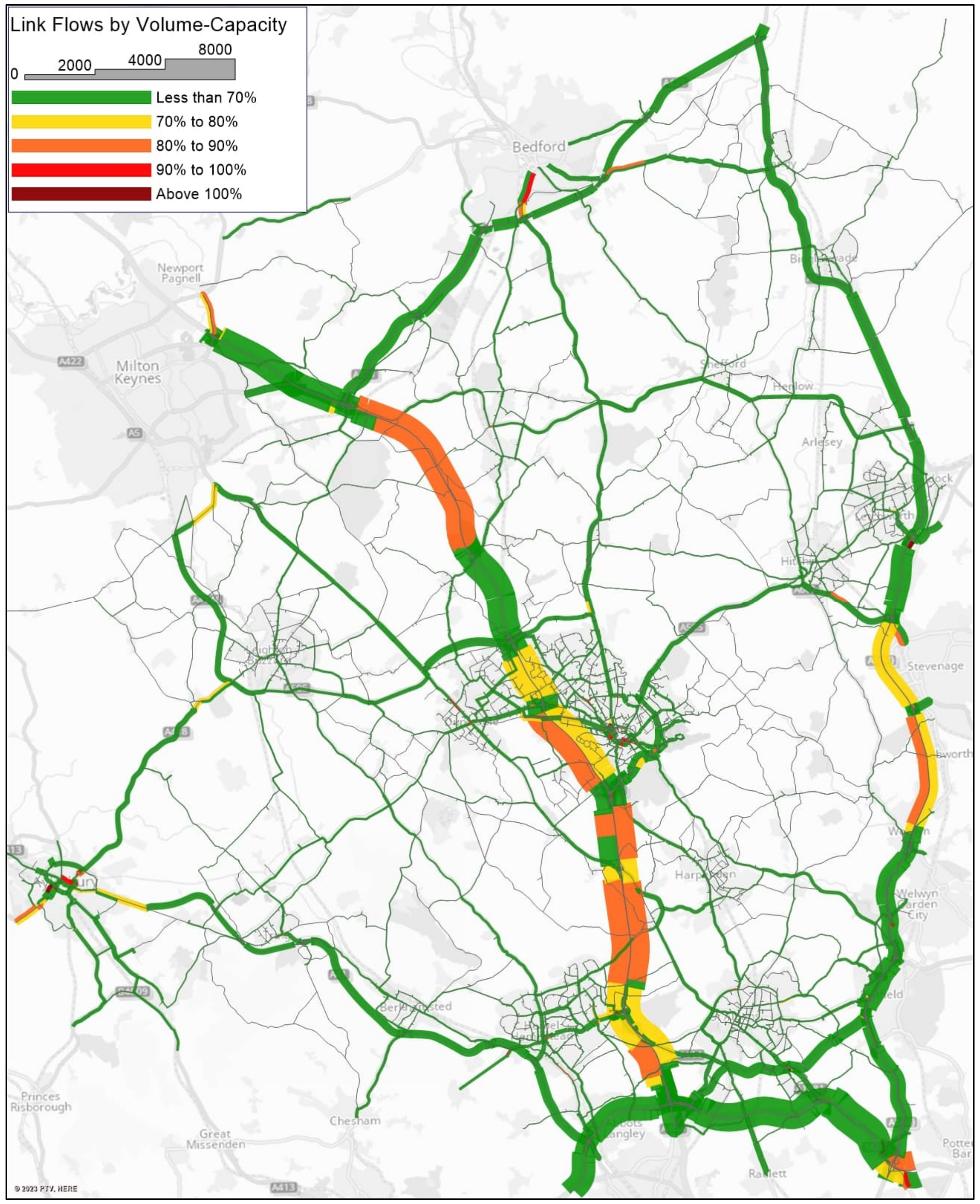


Original Run

Updated Run

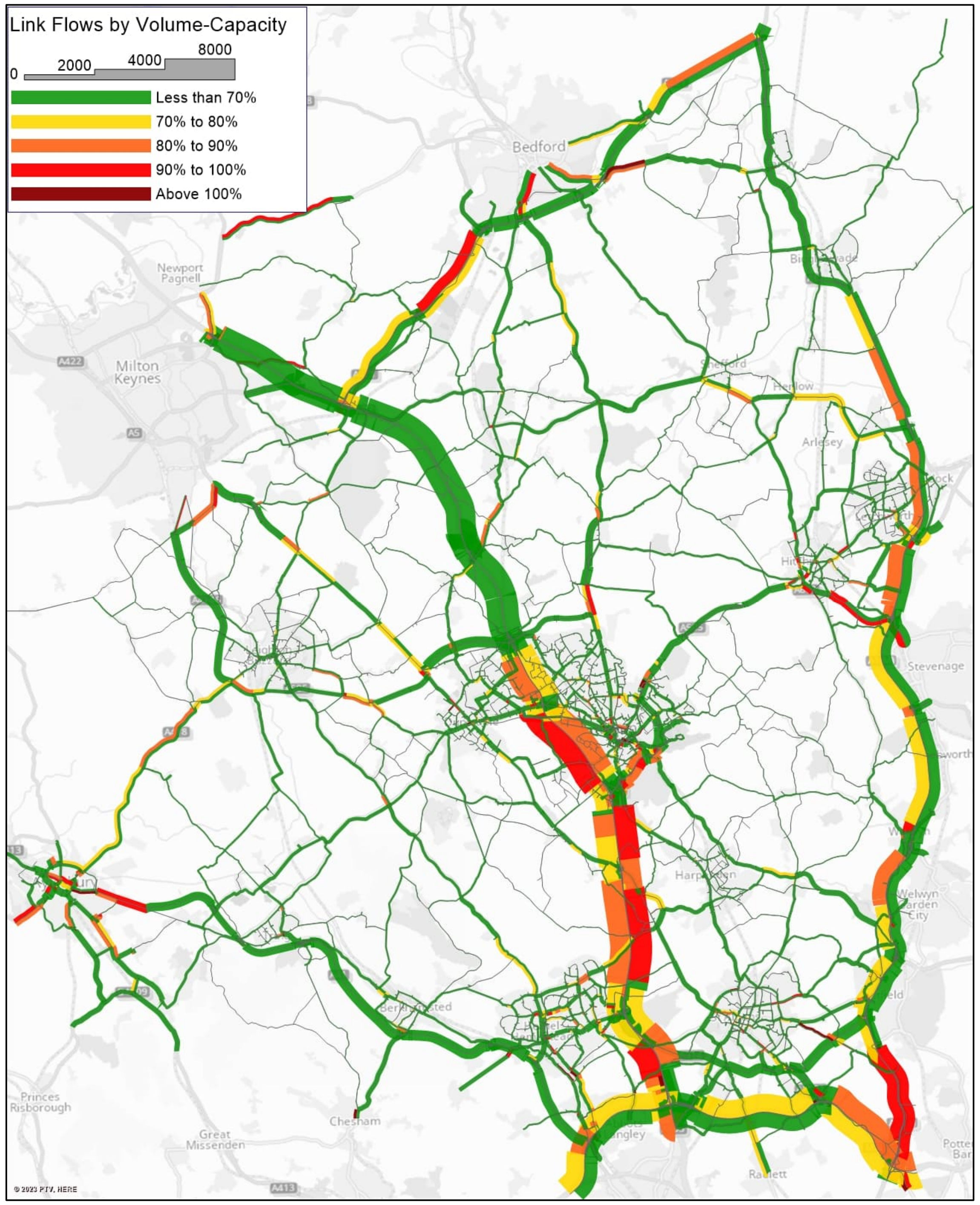
Interpeak
(between 10:00 to 16:00)



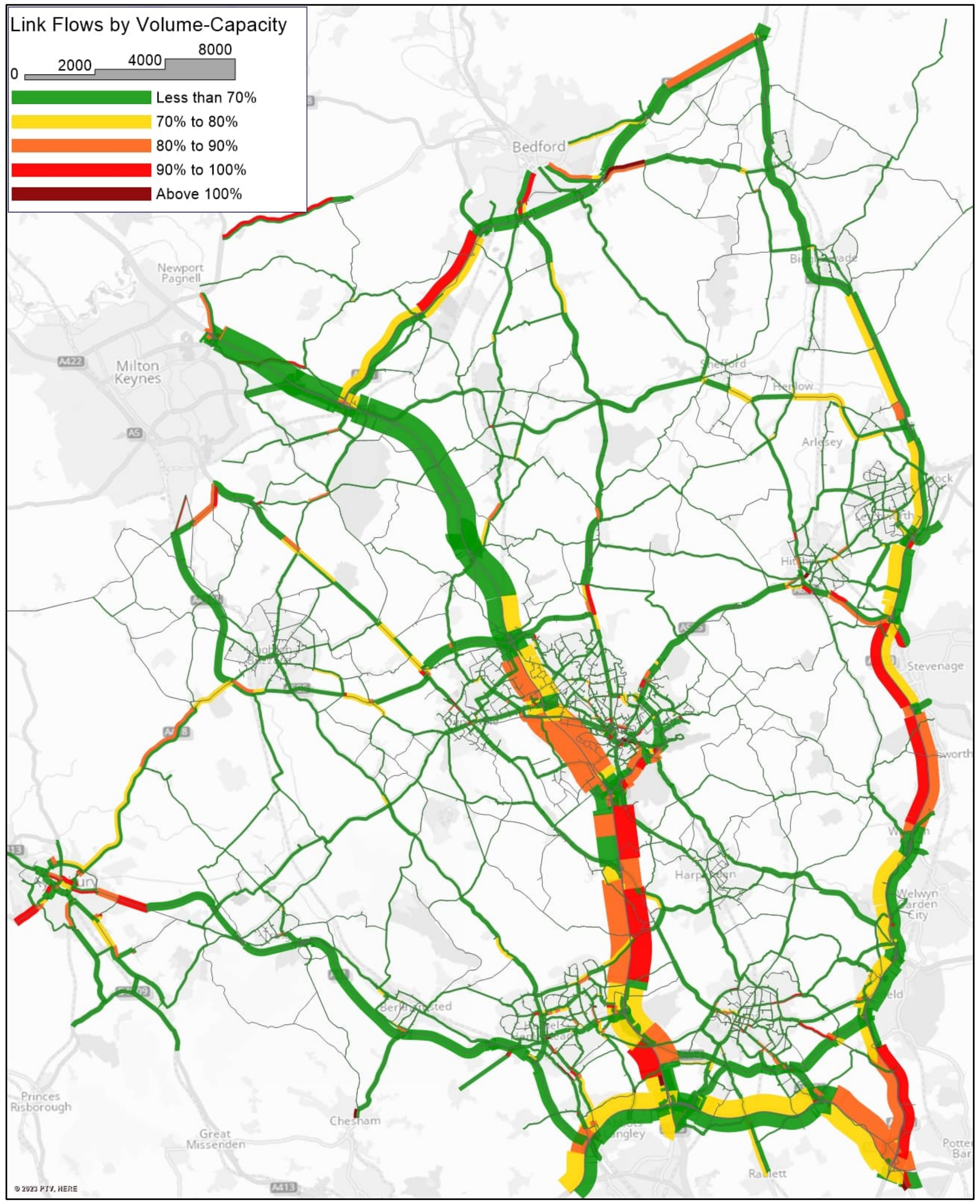


PM Peak Hour
(17:00 to 18:00)

Original Run



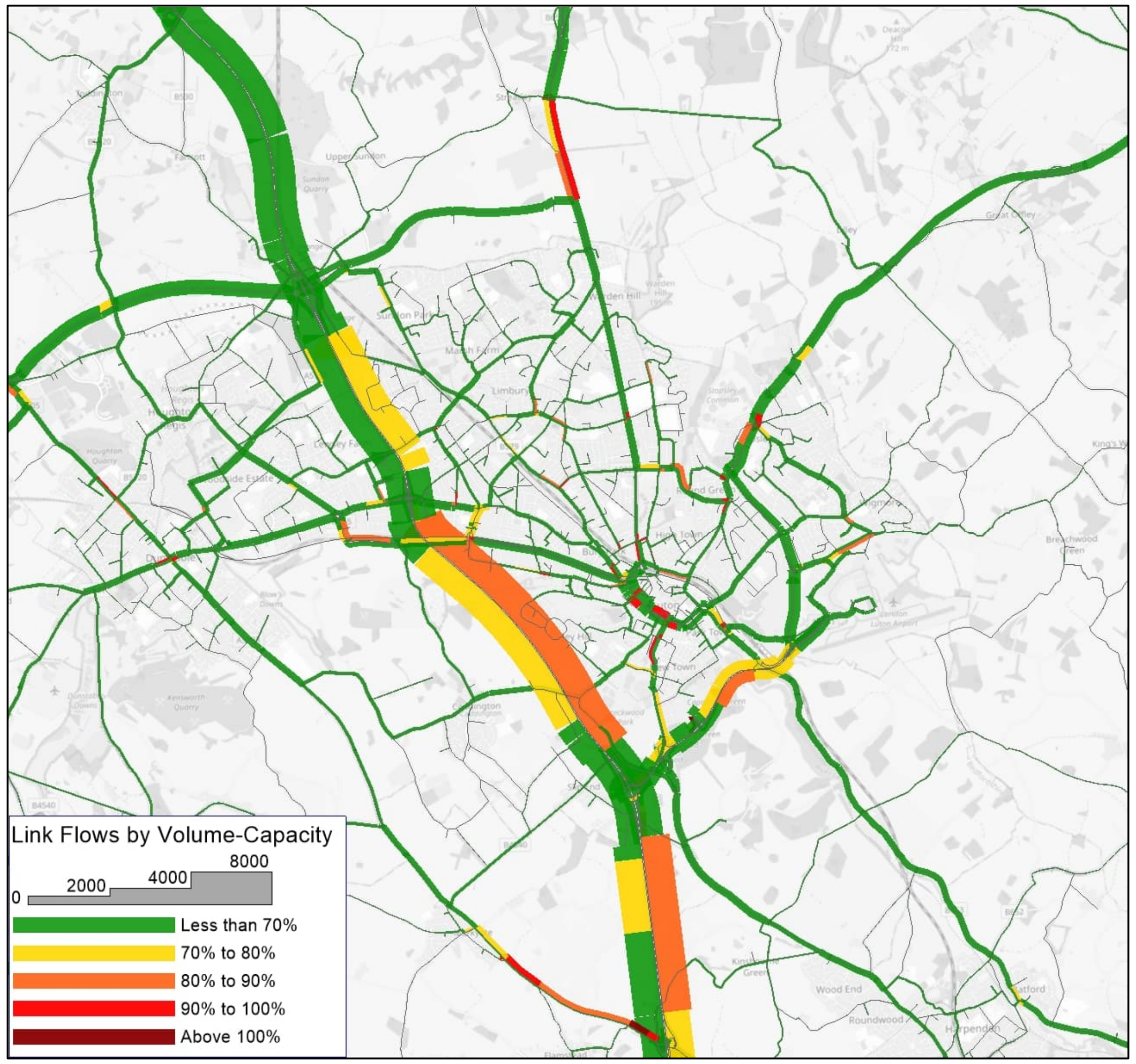
Updated Run



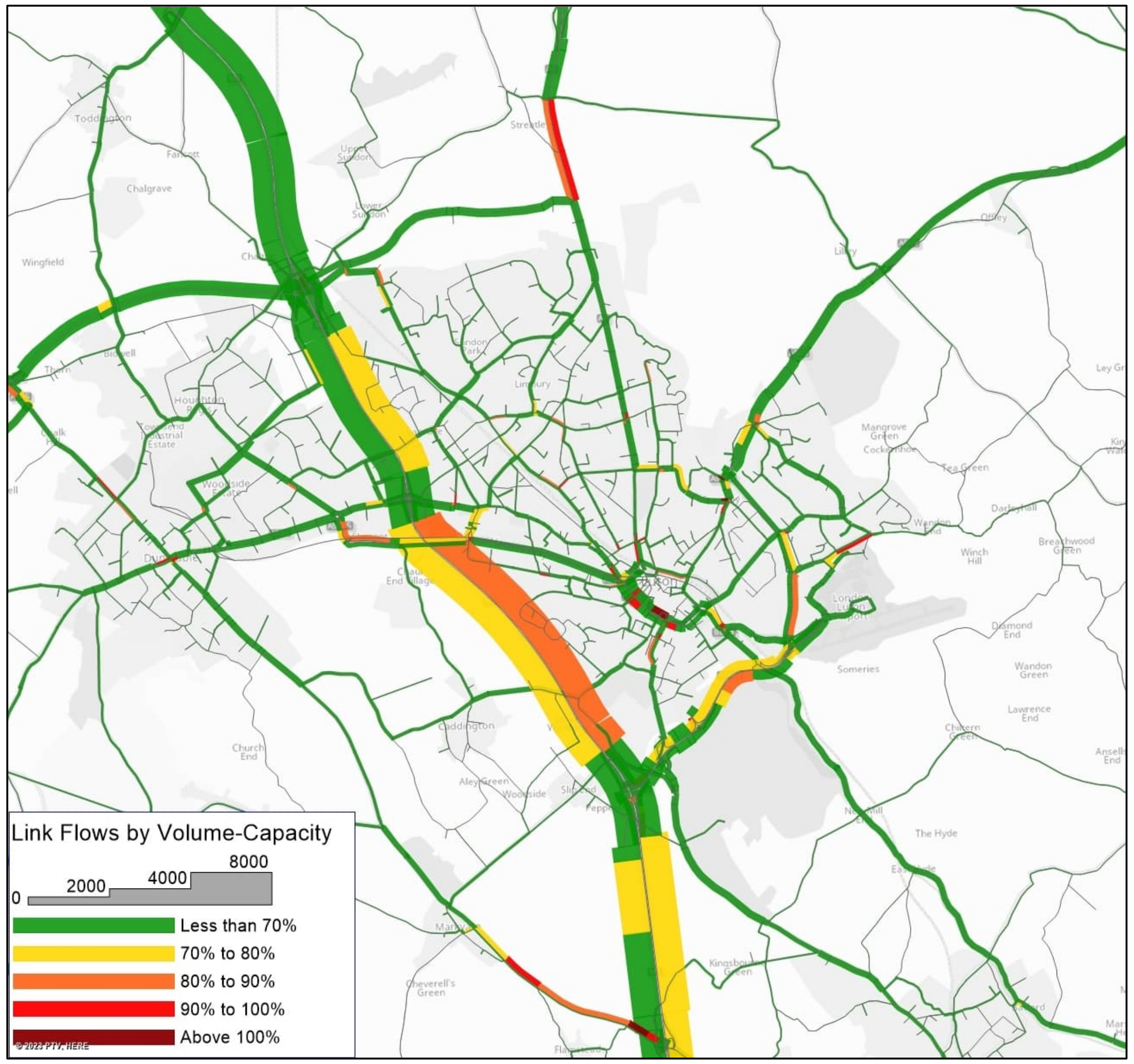
Forecast Link-based V/C, 2027 Forecast Year, “Without” Expansion, Simulation Network

AM Peak Hour (08:00 – 09:00)

Original Run

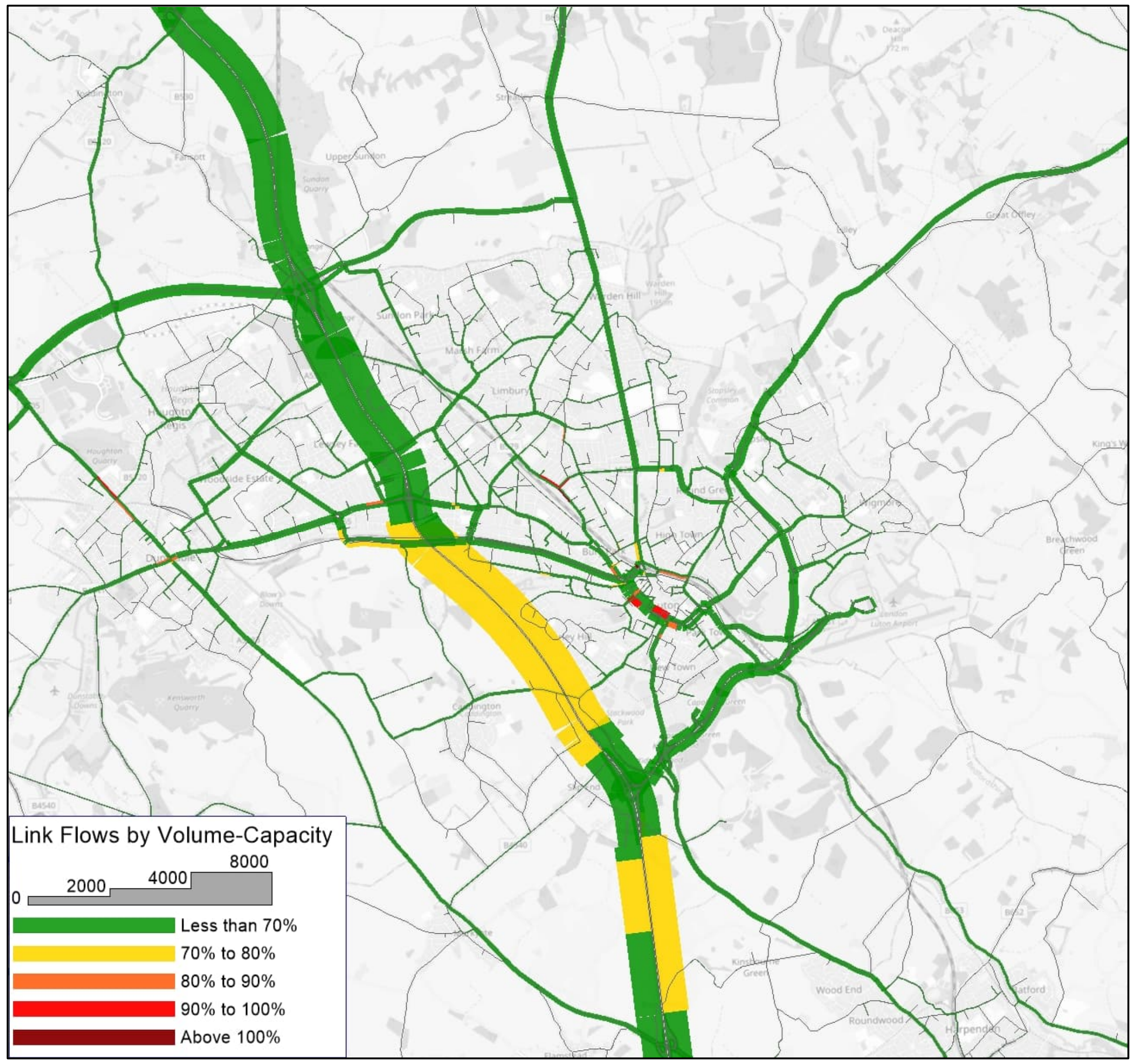


Updated Run

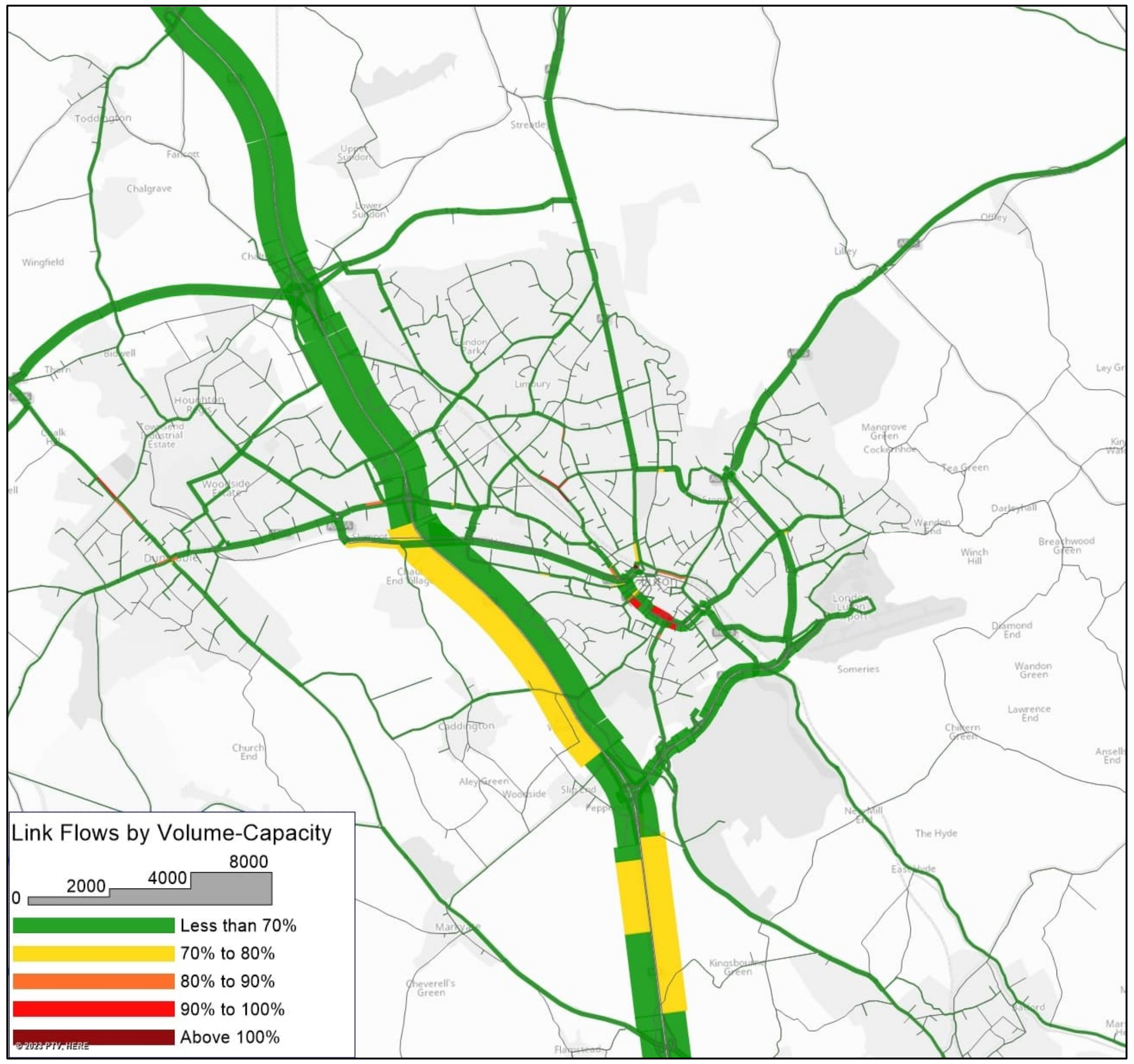


Interpeak
(between 10:00 to 16:00)

Original Run

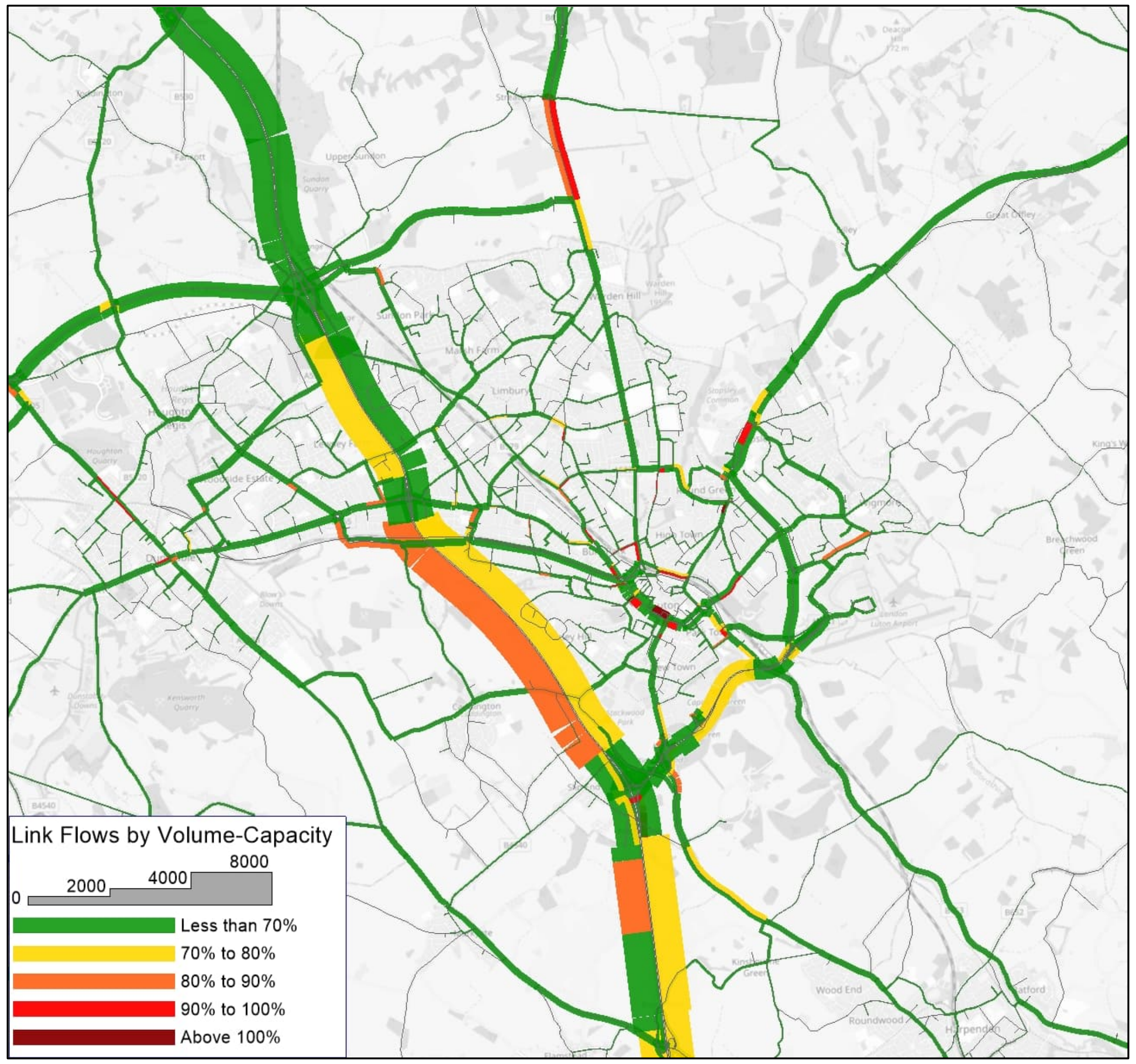


Updated Run

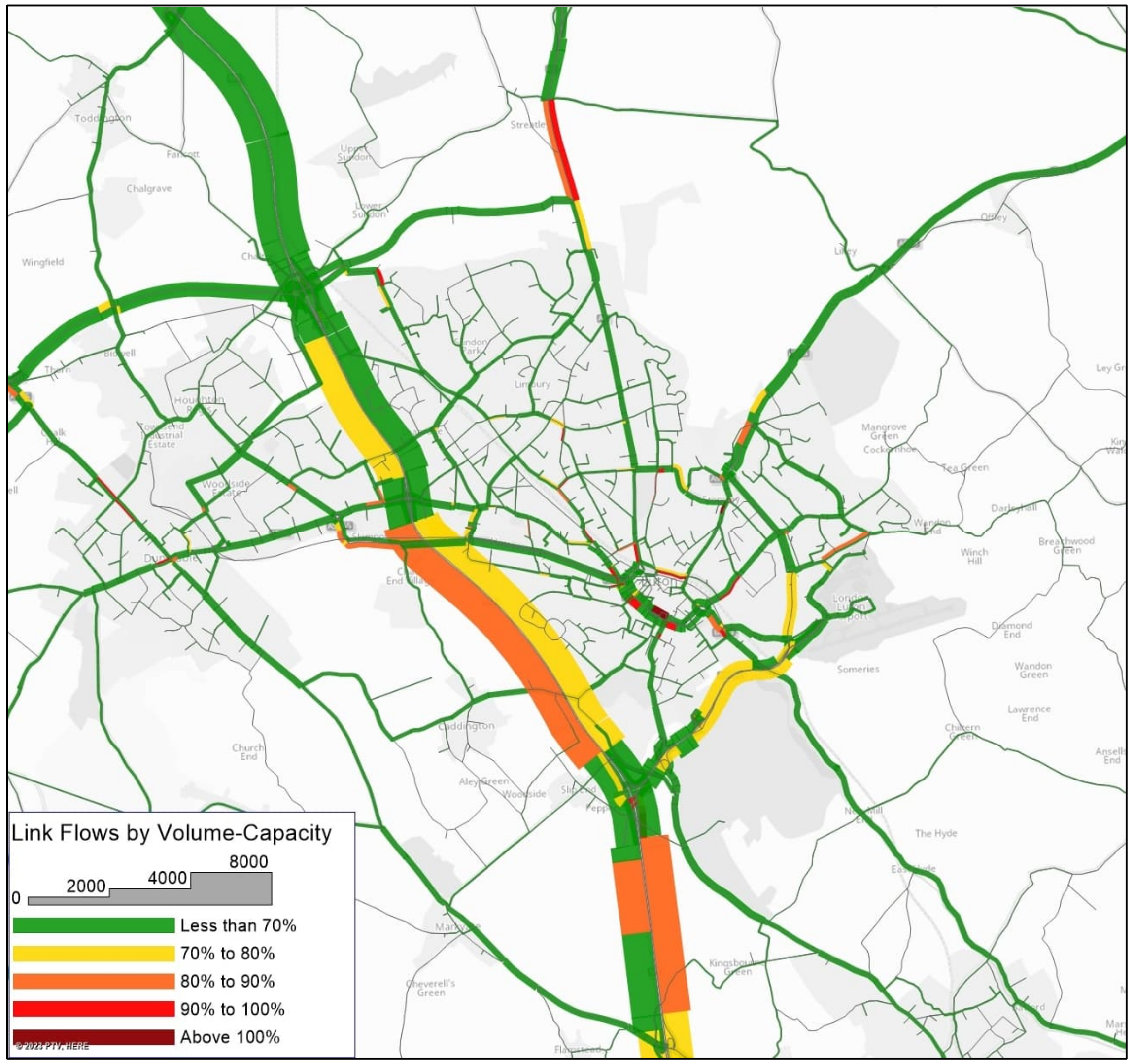


PM Peak Hour
(17:00 to 18:00)

Original Run



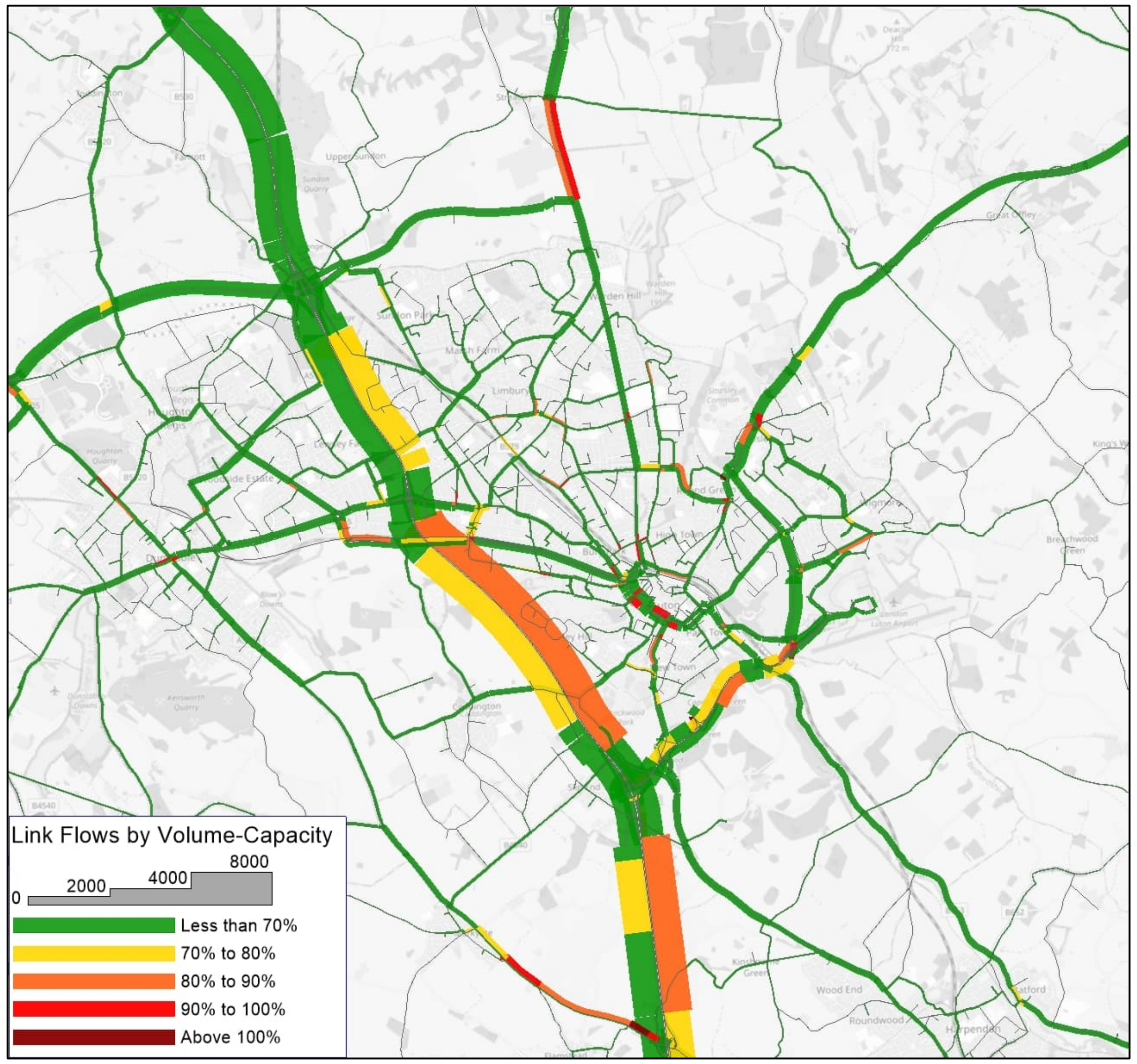
Updated Run



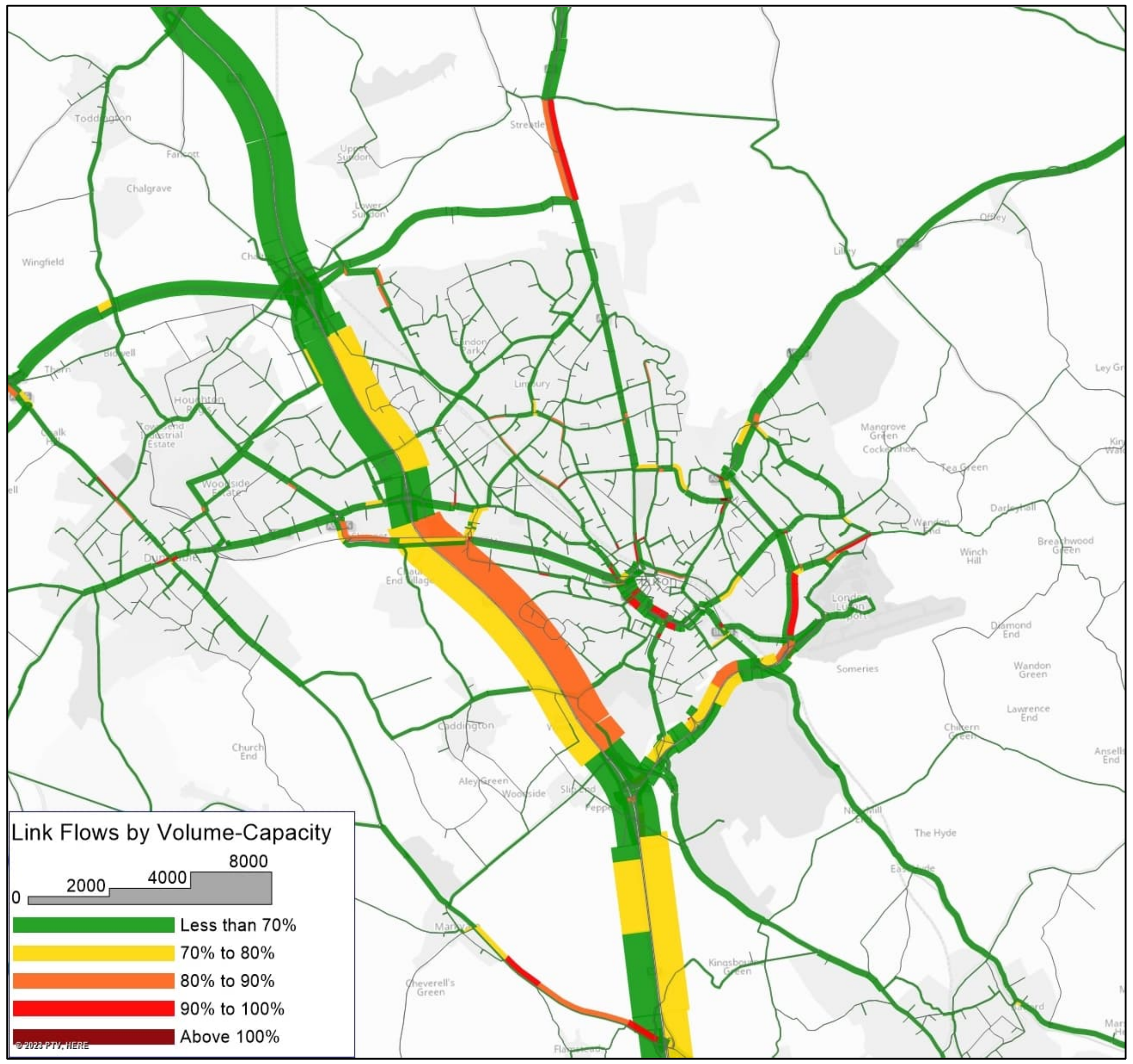
Forecast Link-based V/C, 2027 Forecast Year, “With” Expansion, Simulation Network

AM Peak Hour
(08:00 – 09:00)

Original Run

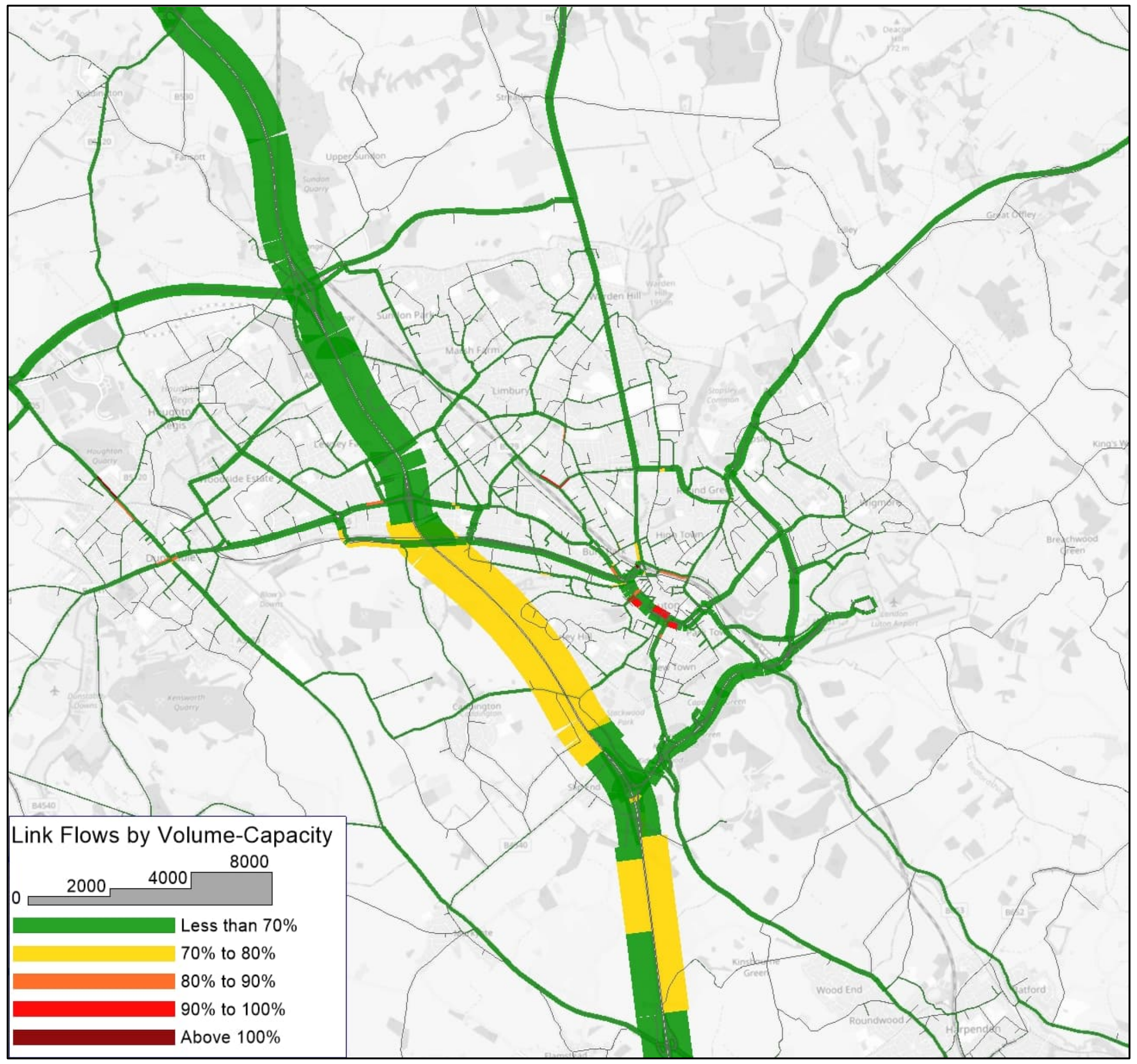


Updated Run

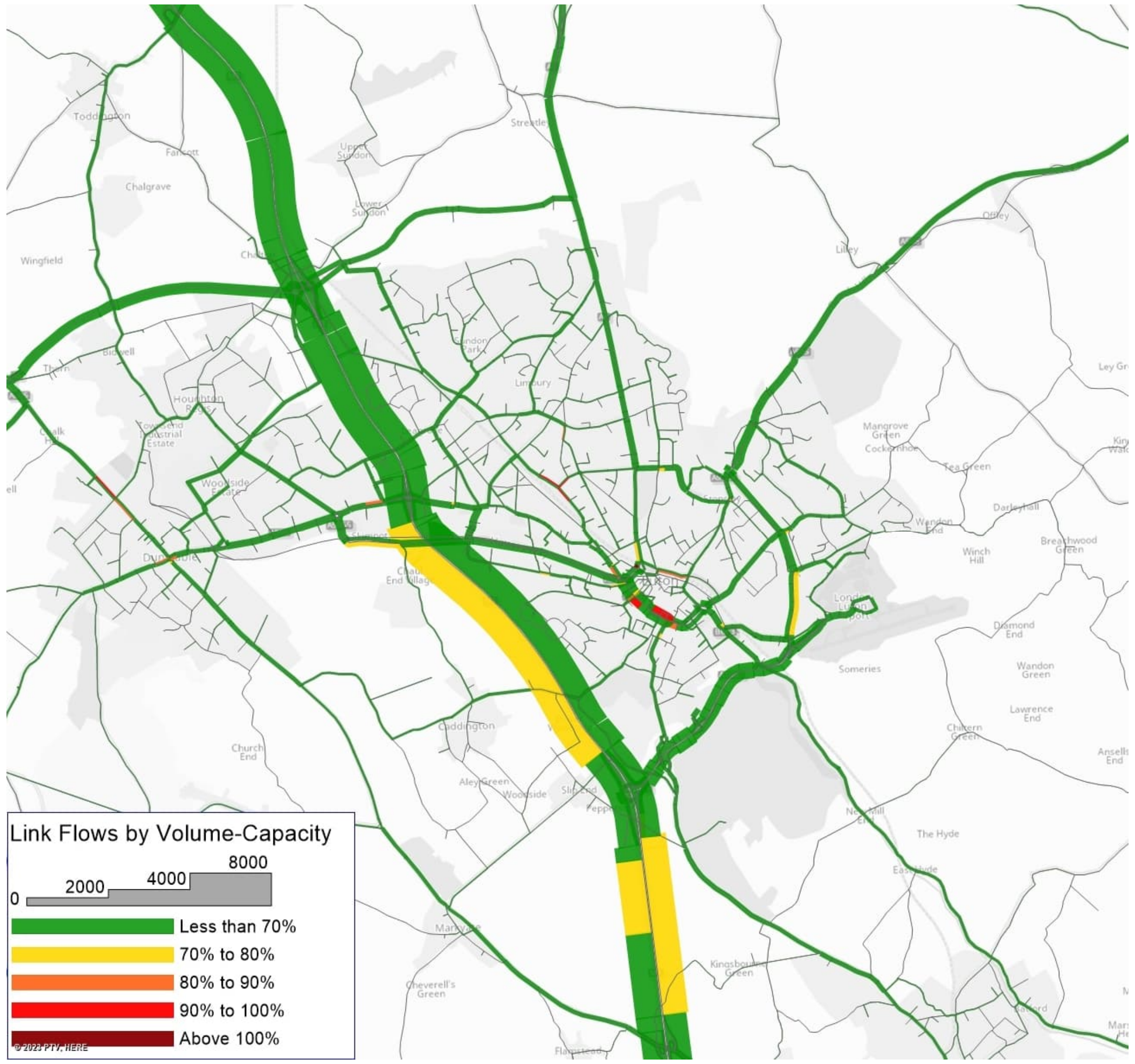


Interpeak
(between 10:00 to 16:00)

Original Run

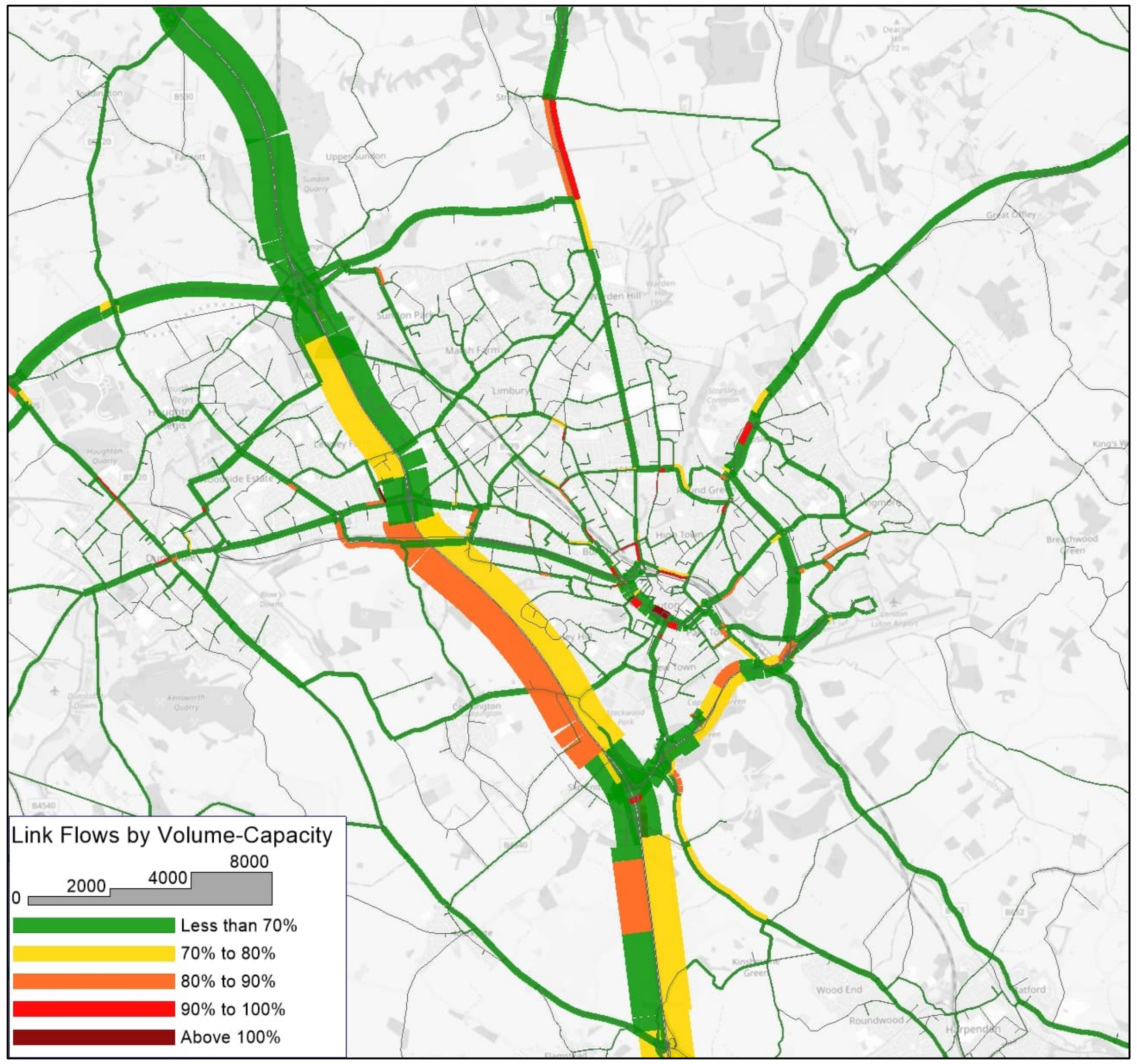


Updated Run

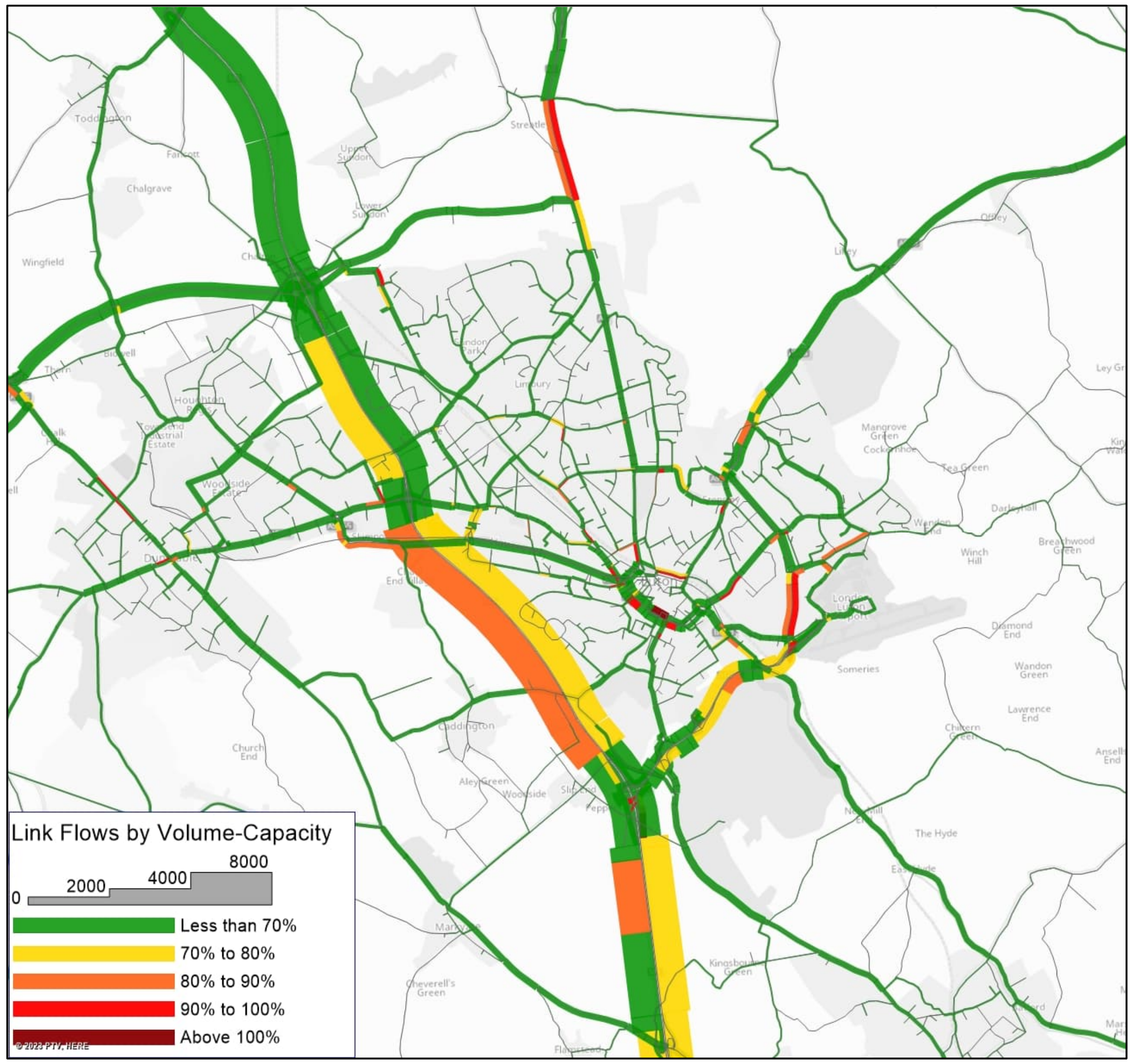


PM Peak Hour (17:00 to 18:00)

Original Run



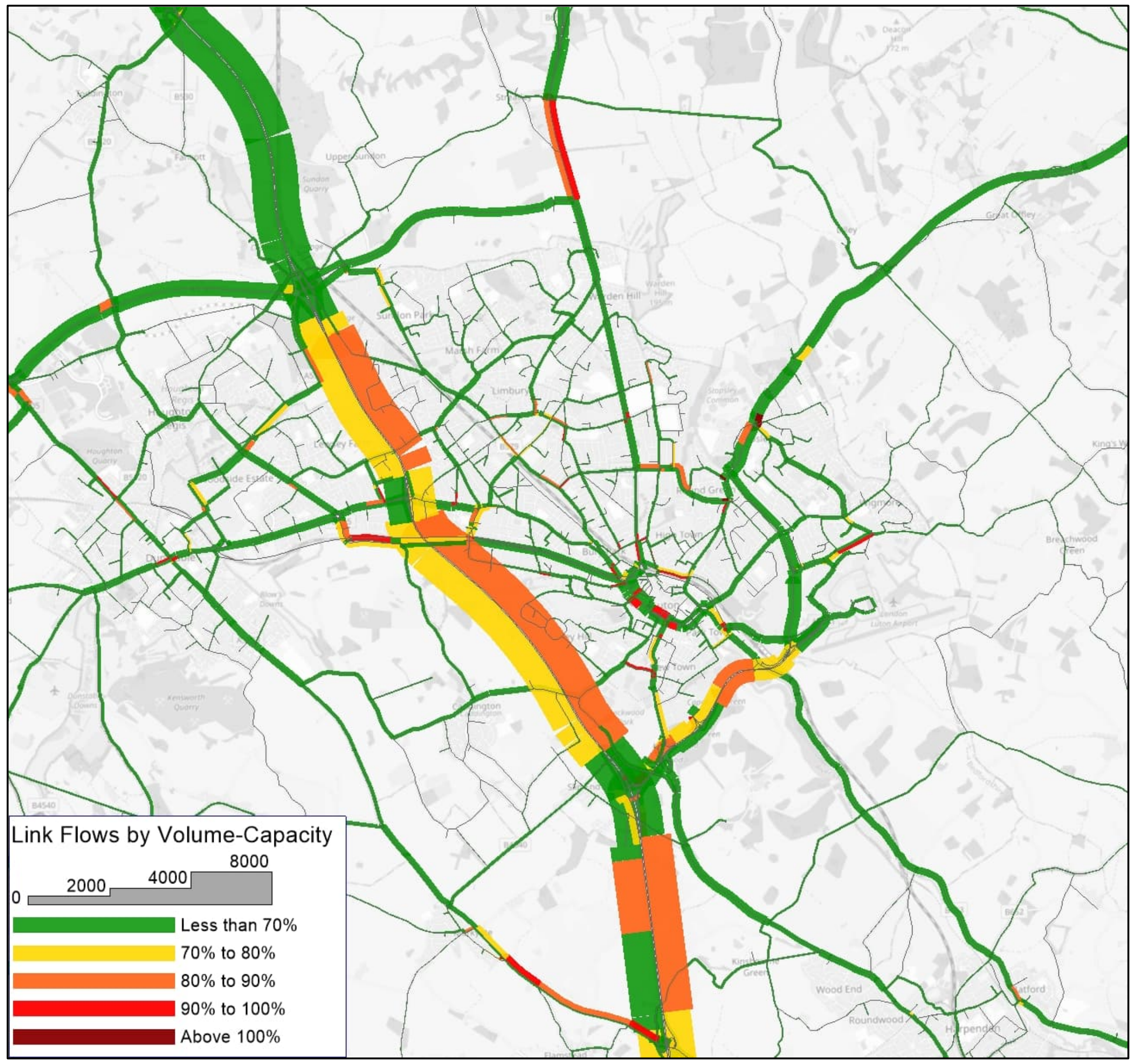
Updated Run



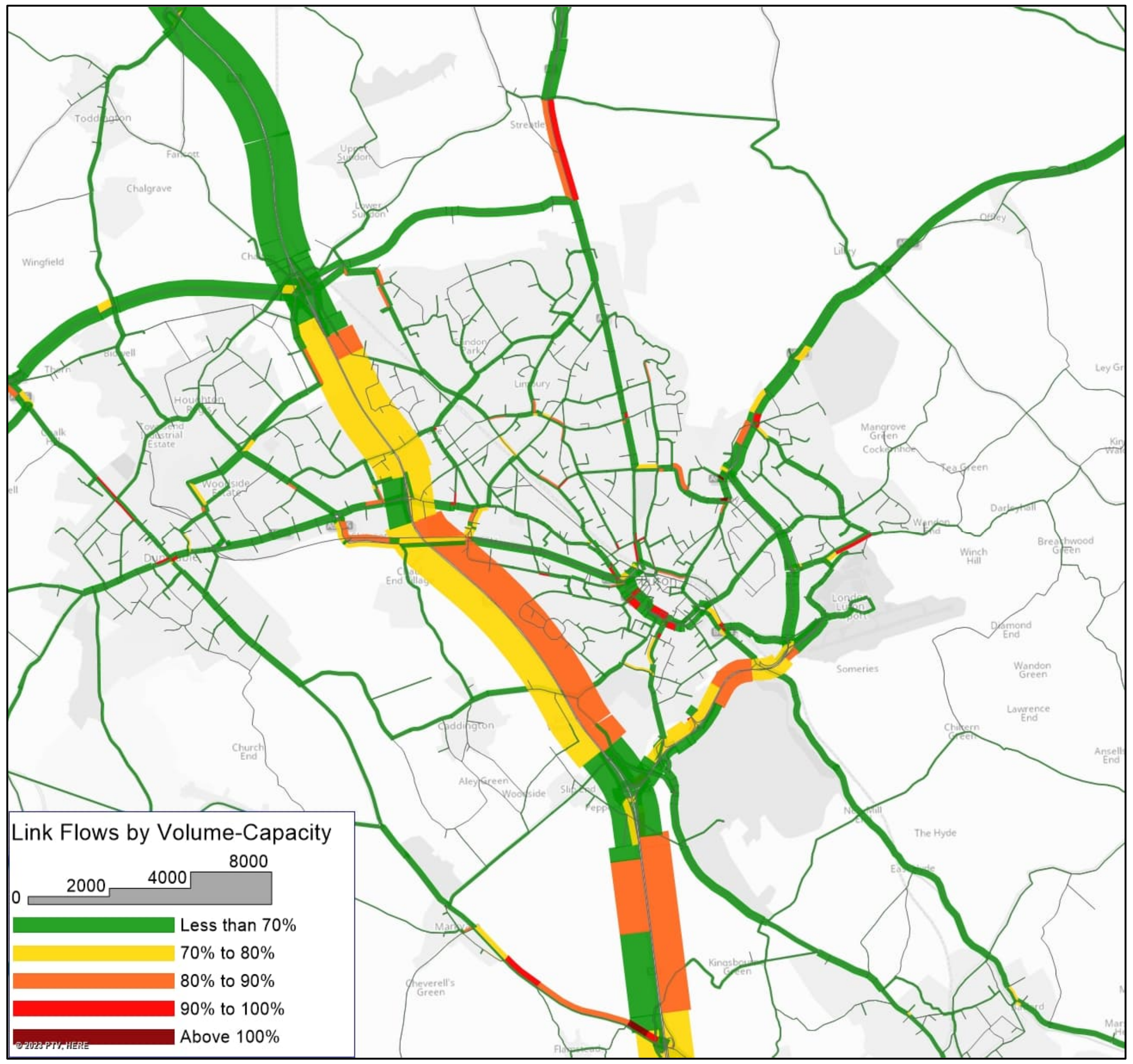
Forecast Link-based V/C, 2039 Forecast Year, "Without" Expansion, Simulation Network

AM Peak Hour
(08:00 – 09:00)

Original Run

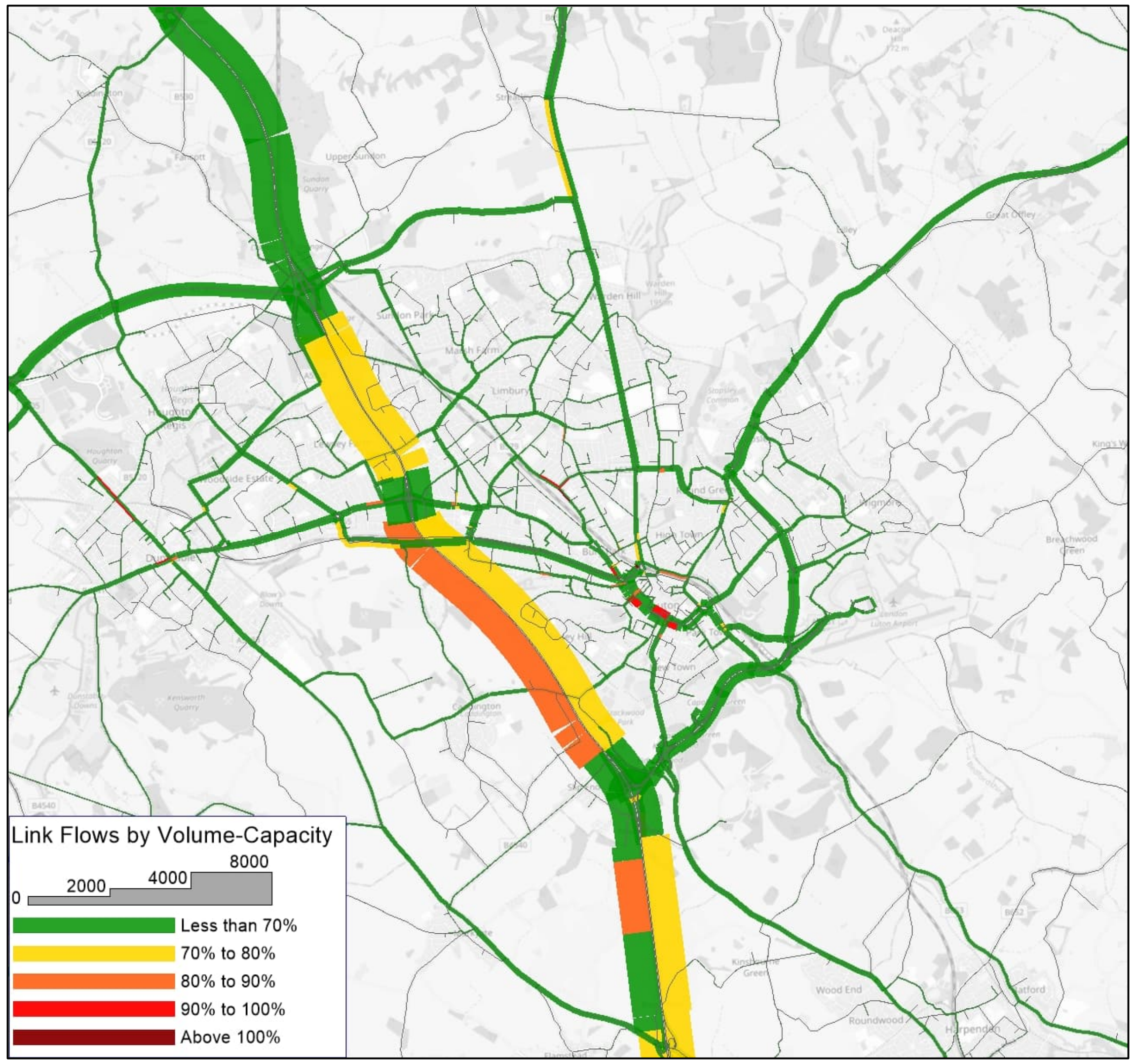


Updated Run

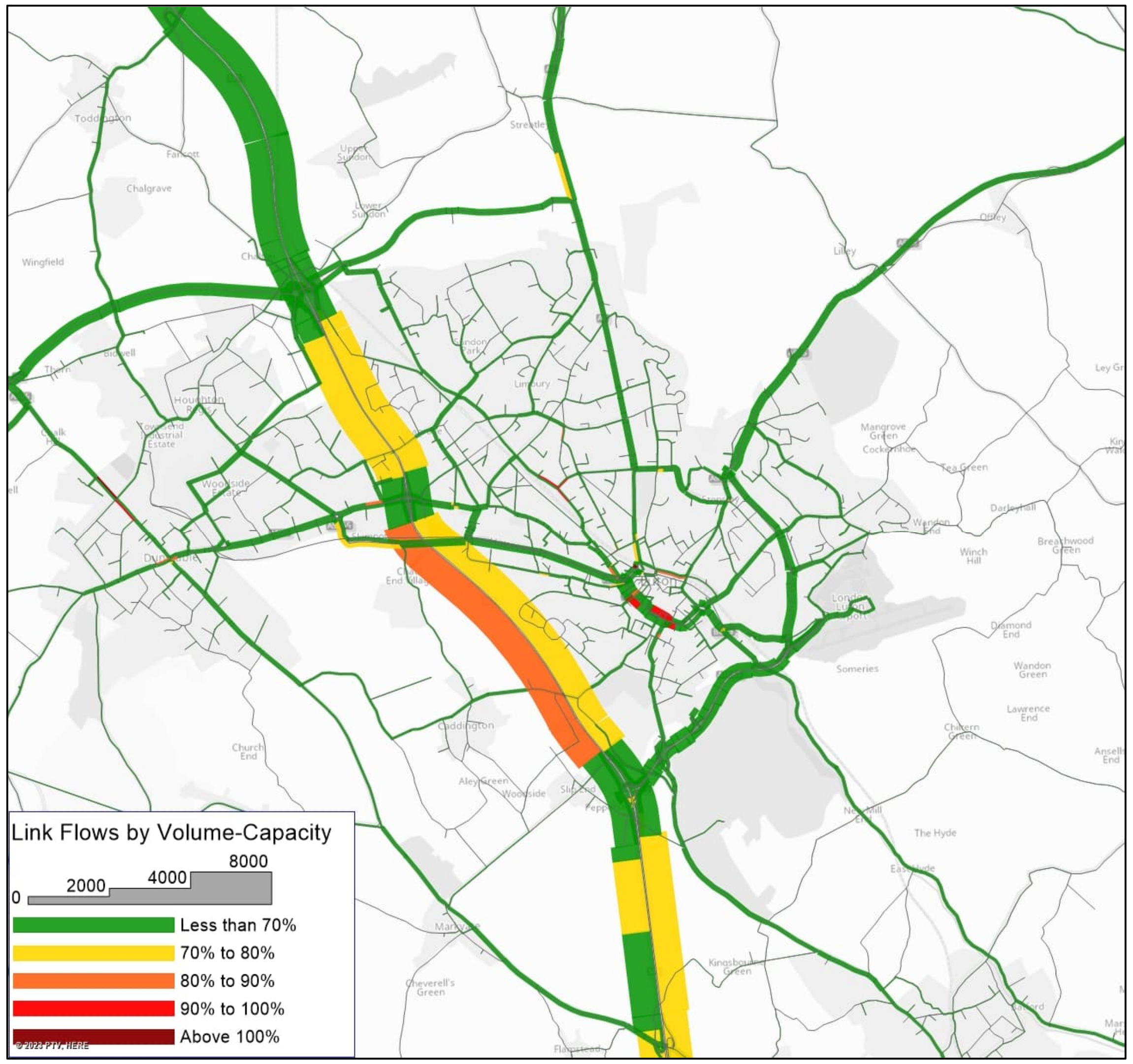


Interpeak
(between 10:00 to 16:00)

Original Run



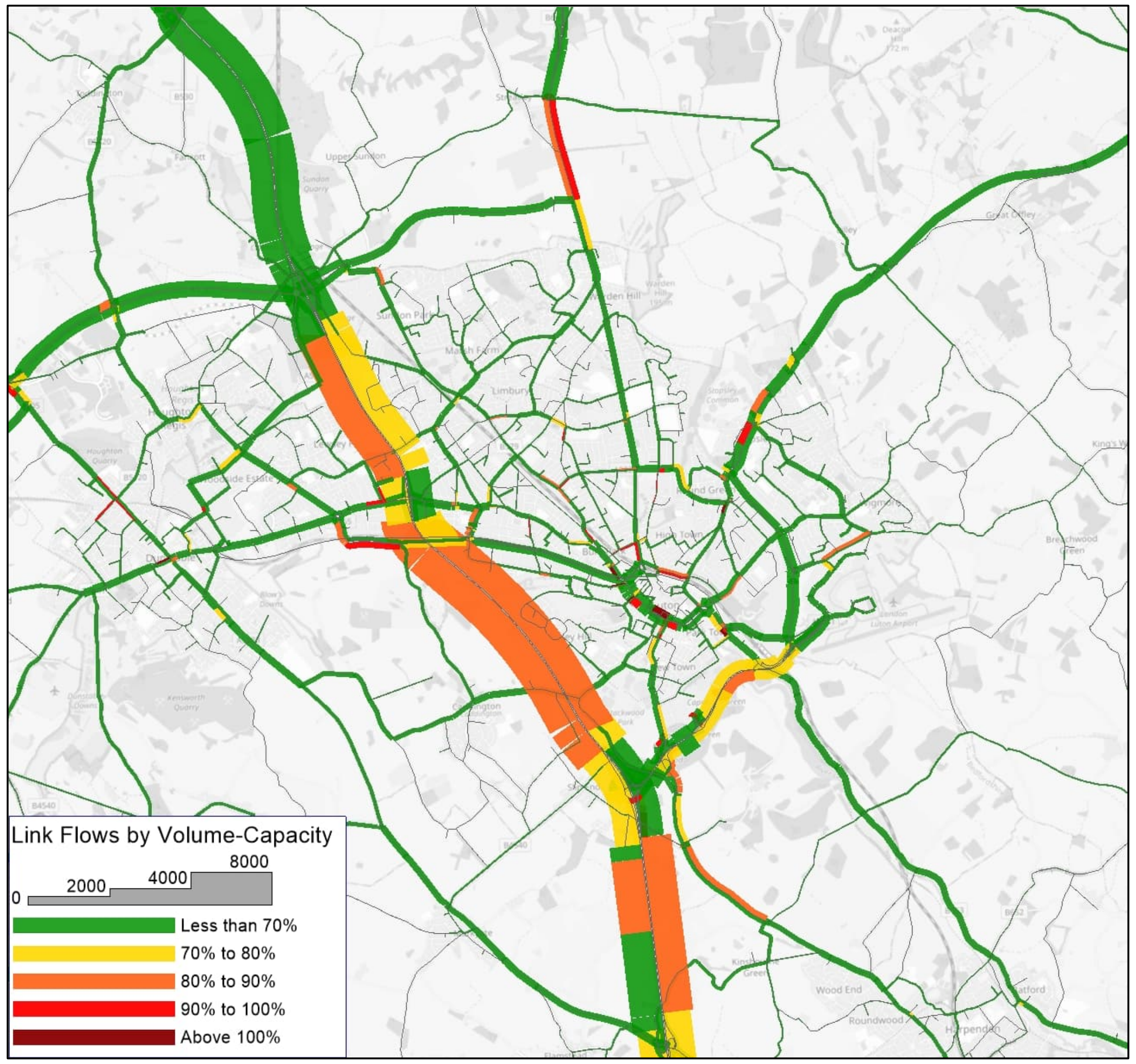
Updated Run



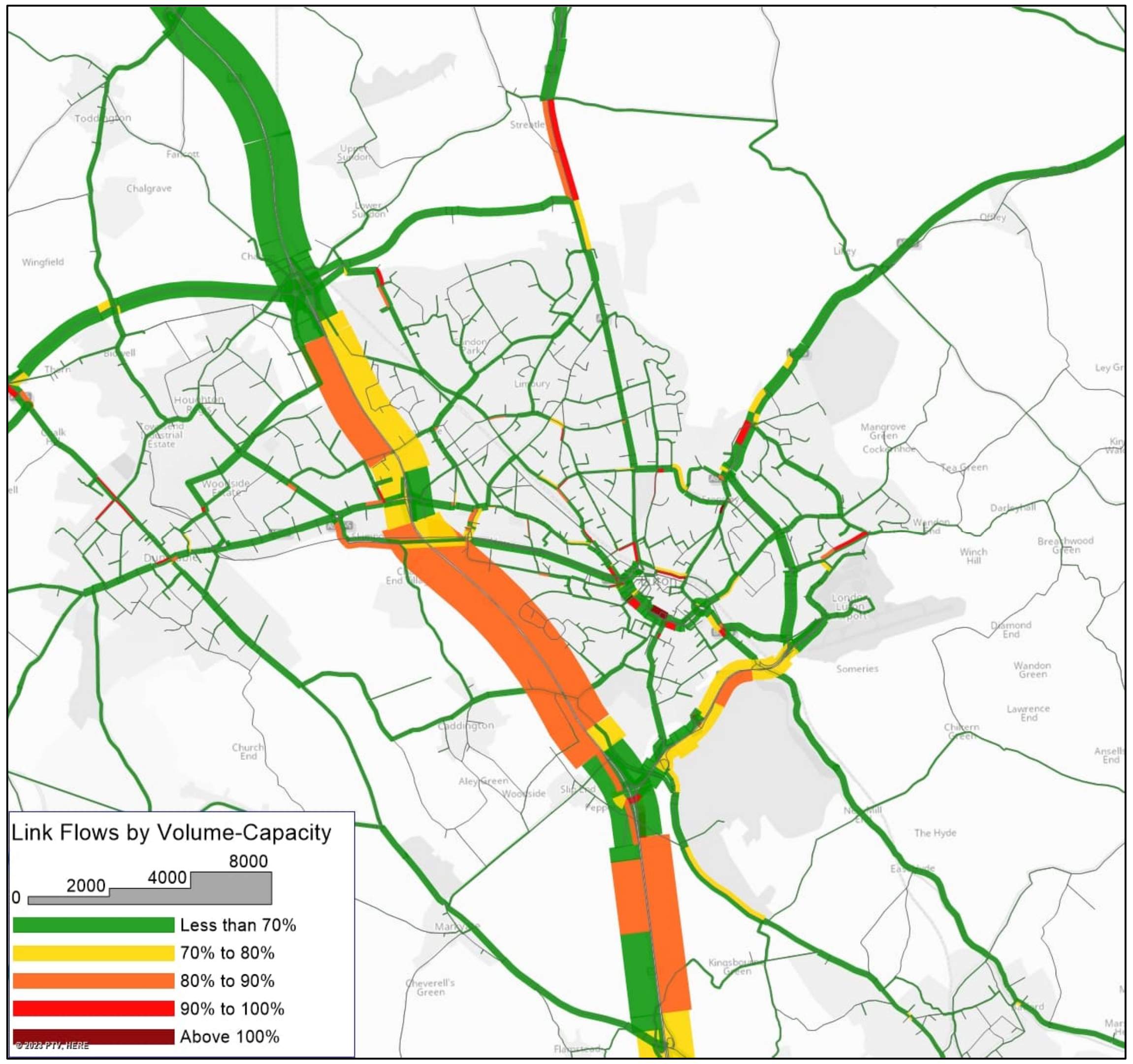
PM Peak Hour

(17:00 to 18:00)

Original Run



Updated Run

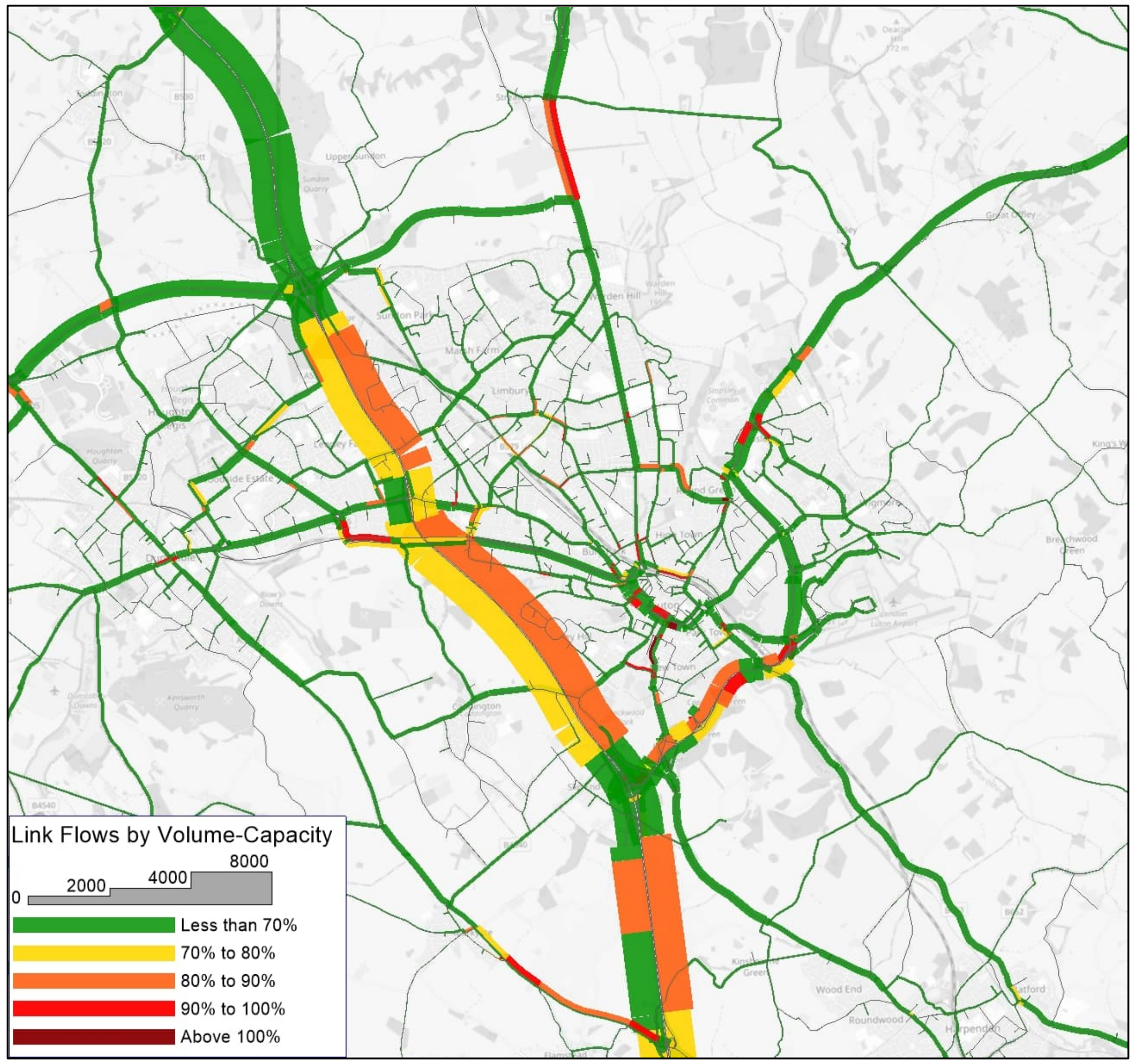


Forecast Link-based V/C, 2039 Forecast Year, “With” Expansion, Simulation Network

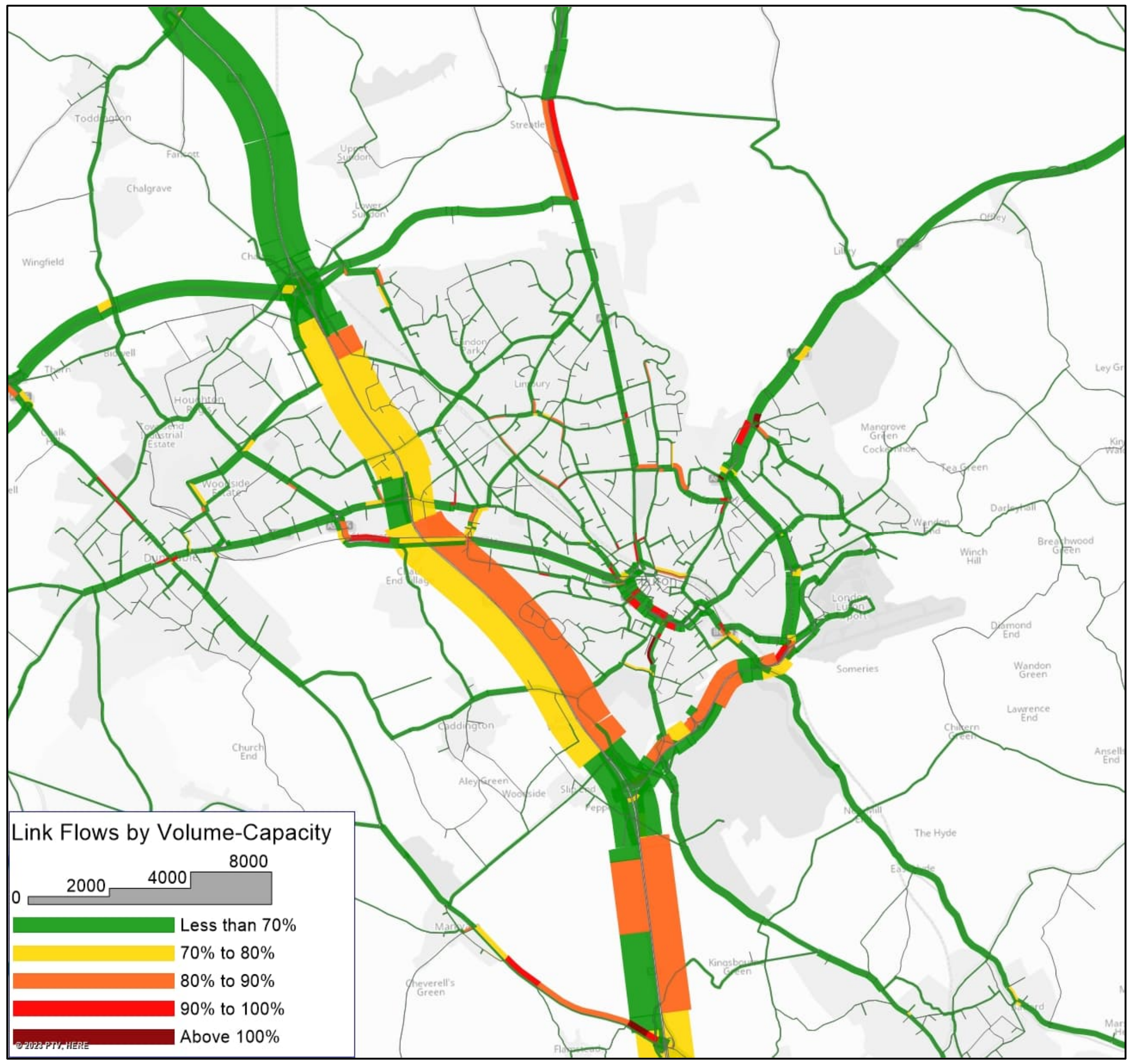
AM Peak Hour

(08:00 – 09:00)

Original Run

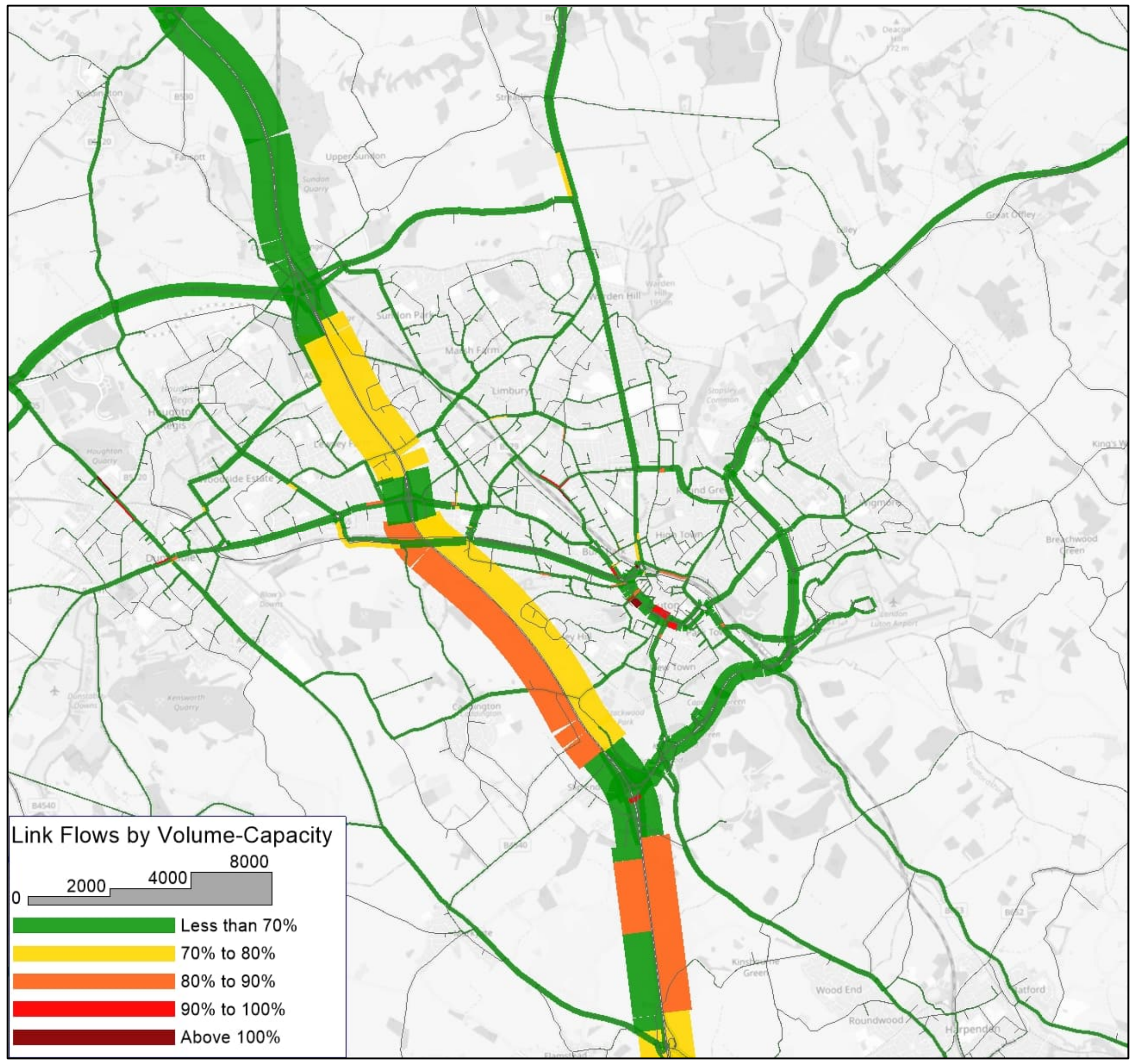


Updated Run

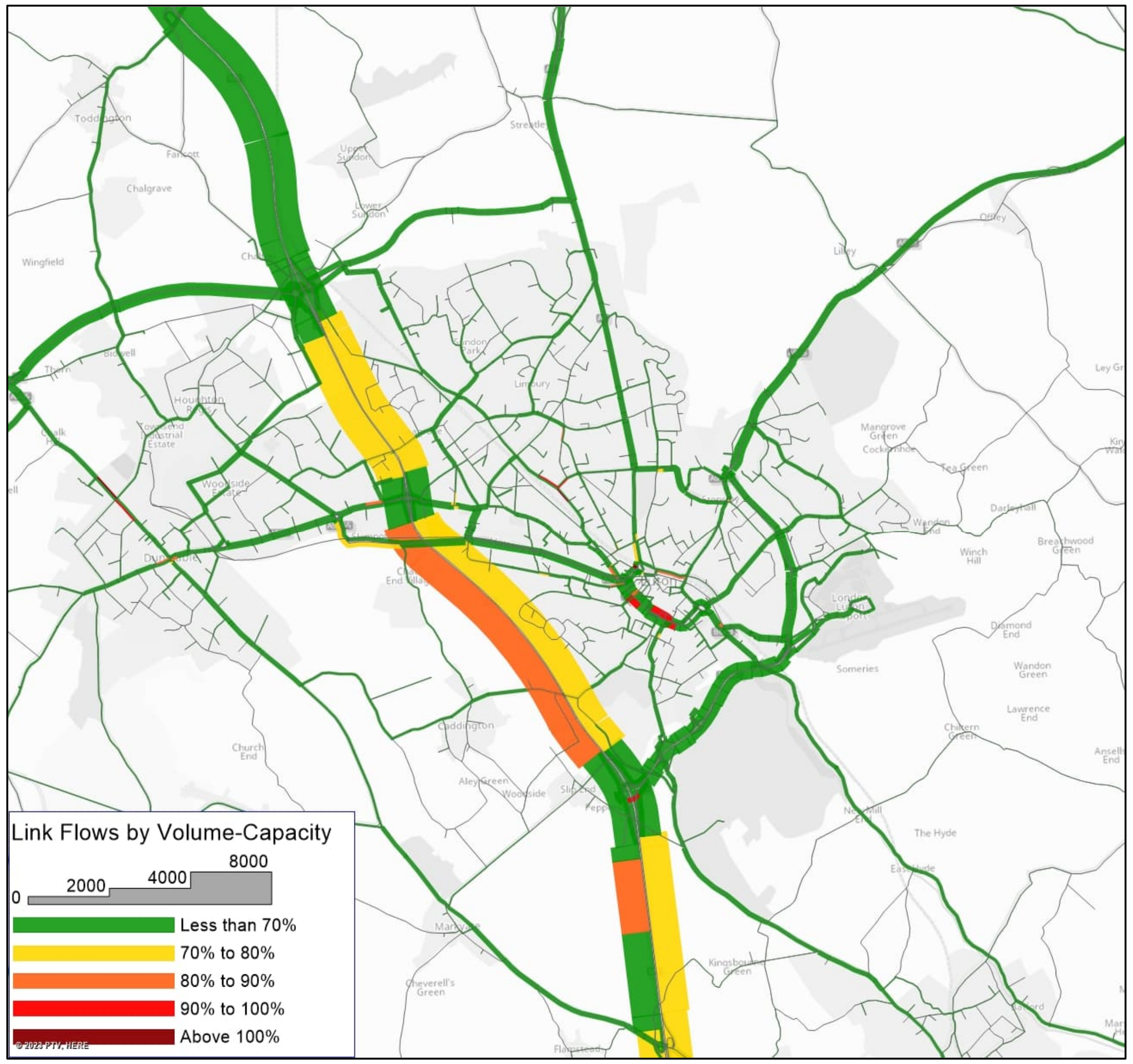


Interpeak
(between 10:00 to 16:00)

Original Run

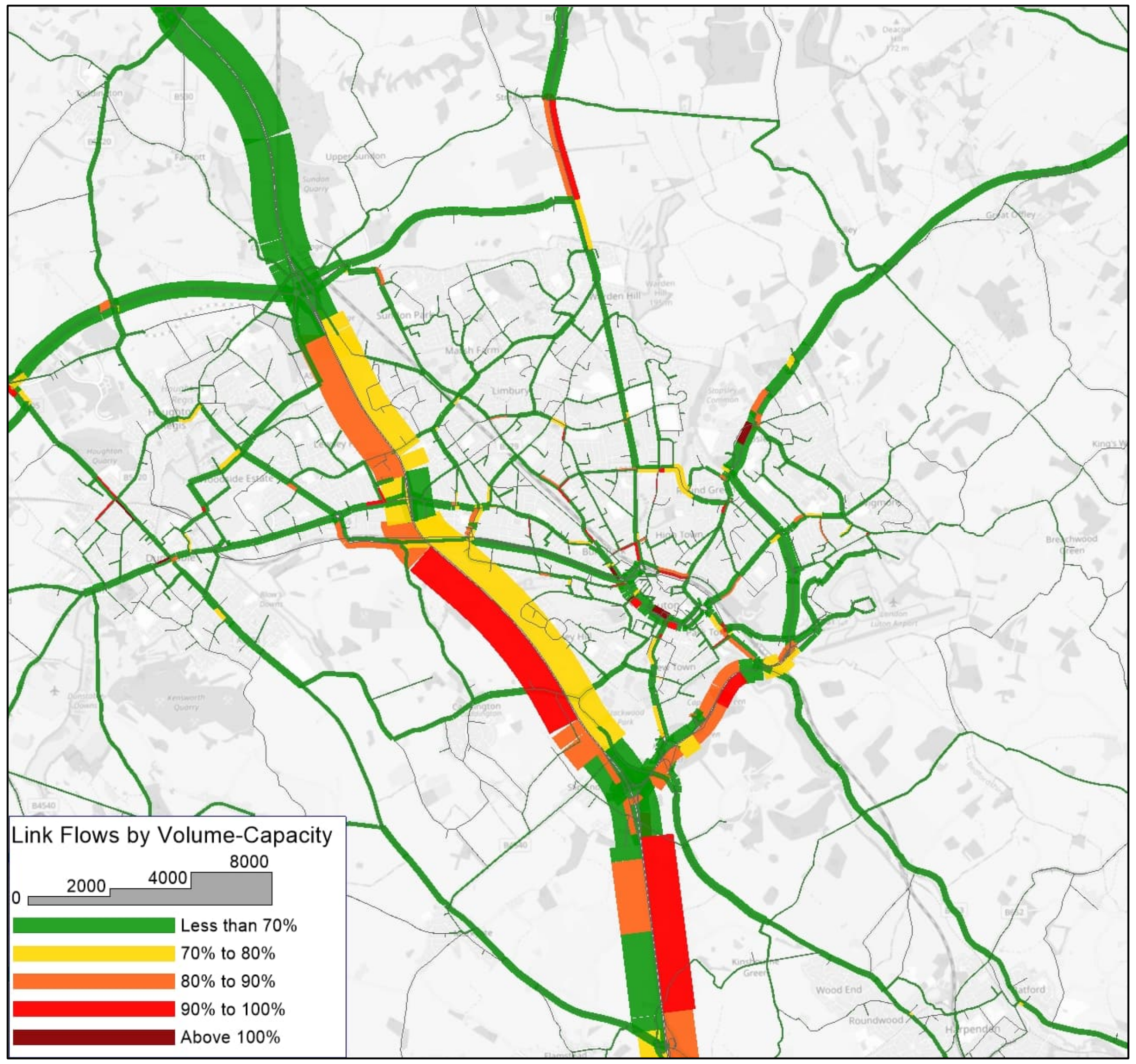


Updated Run

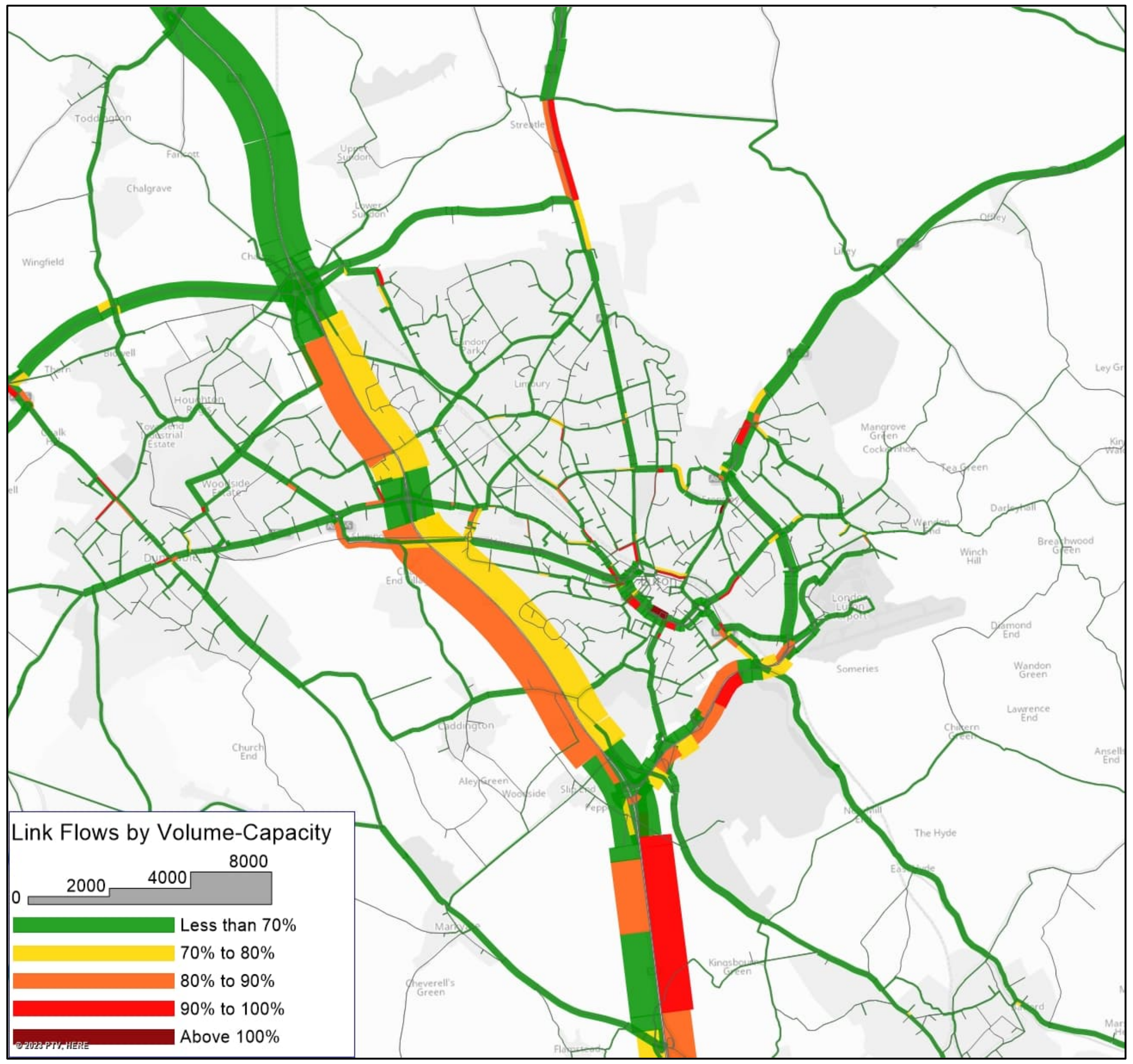


PM Peak Hour
(17:00 to 18:00)

Original Run



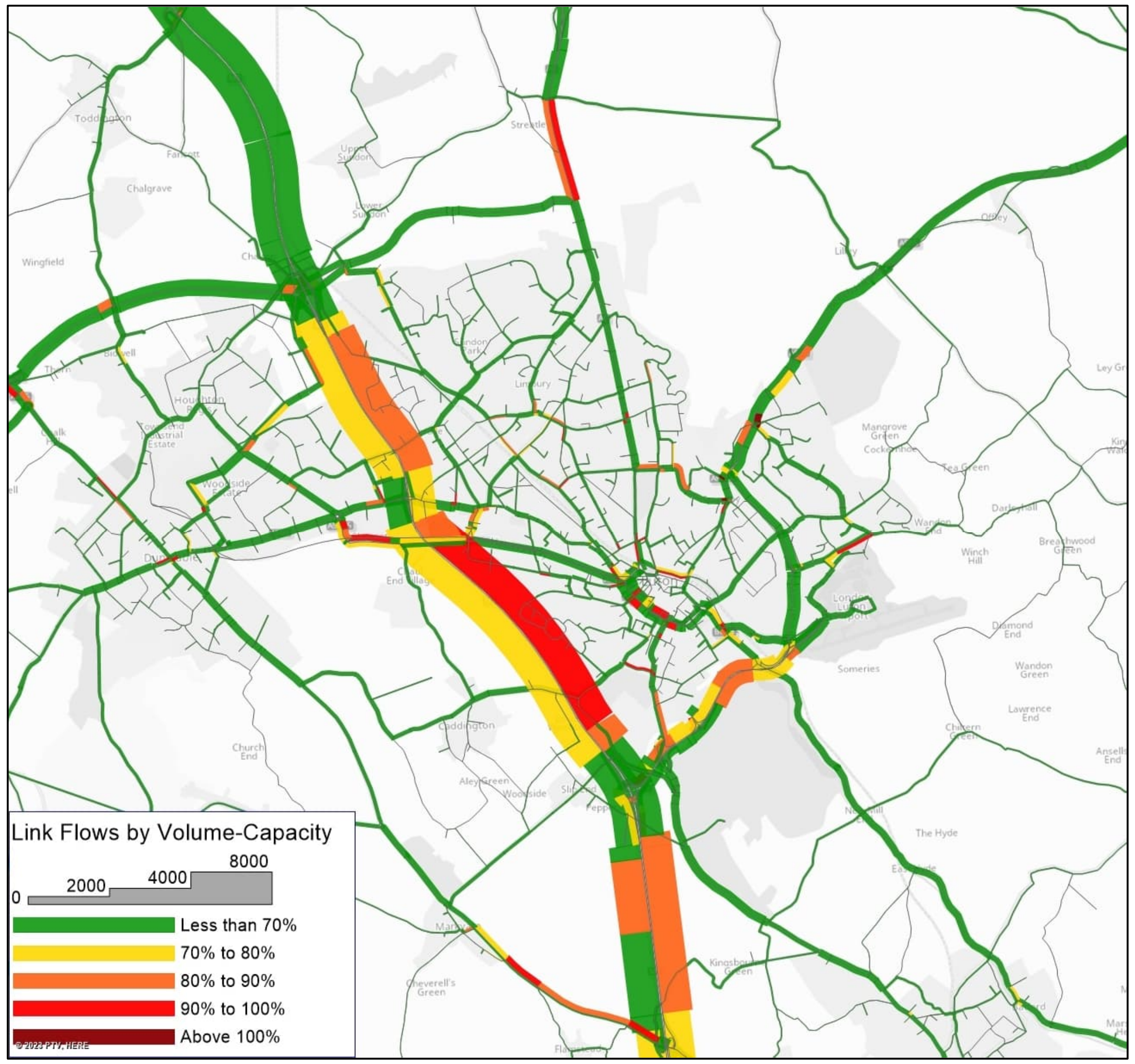
Updated Run



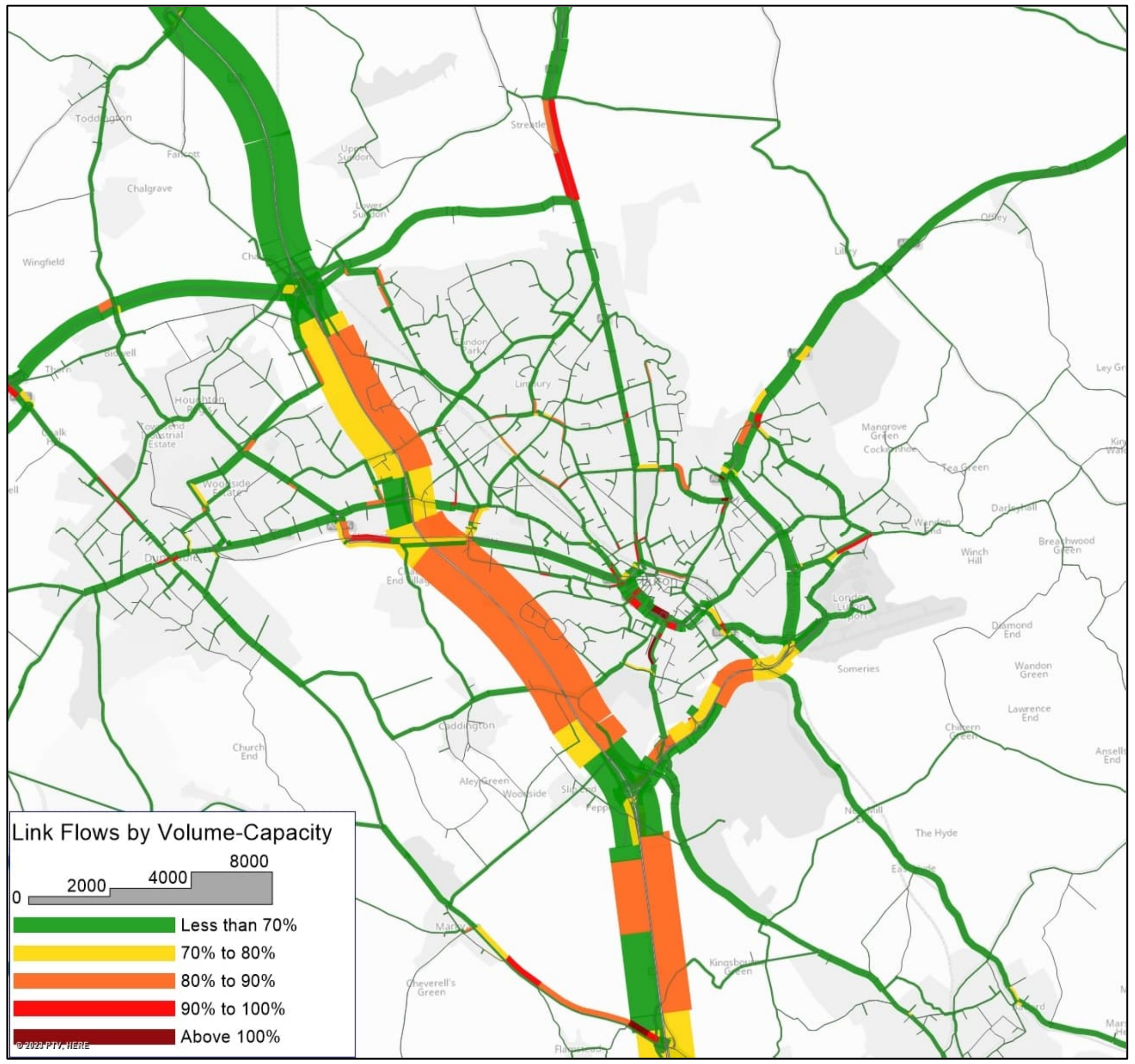
Forecast Link-based V/C, 2043 Forecast Year, “Without” Expansion, Simulation Network

AM Peak Hour
(08:00 – 09:00)

Original Run

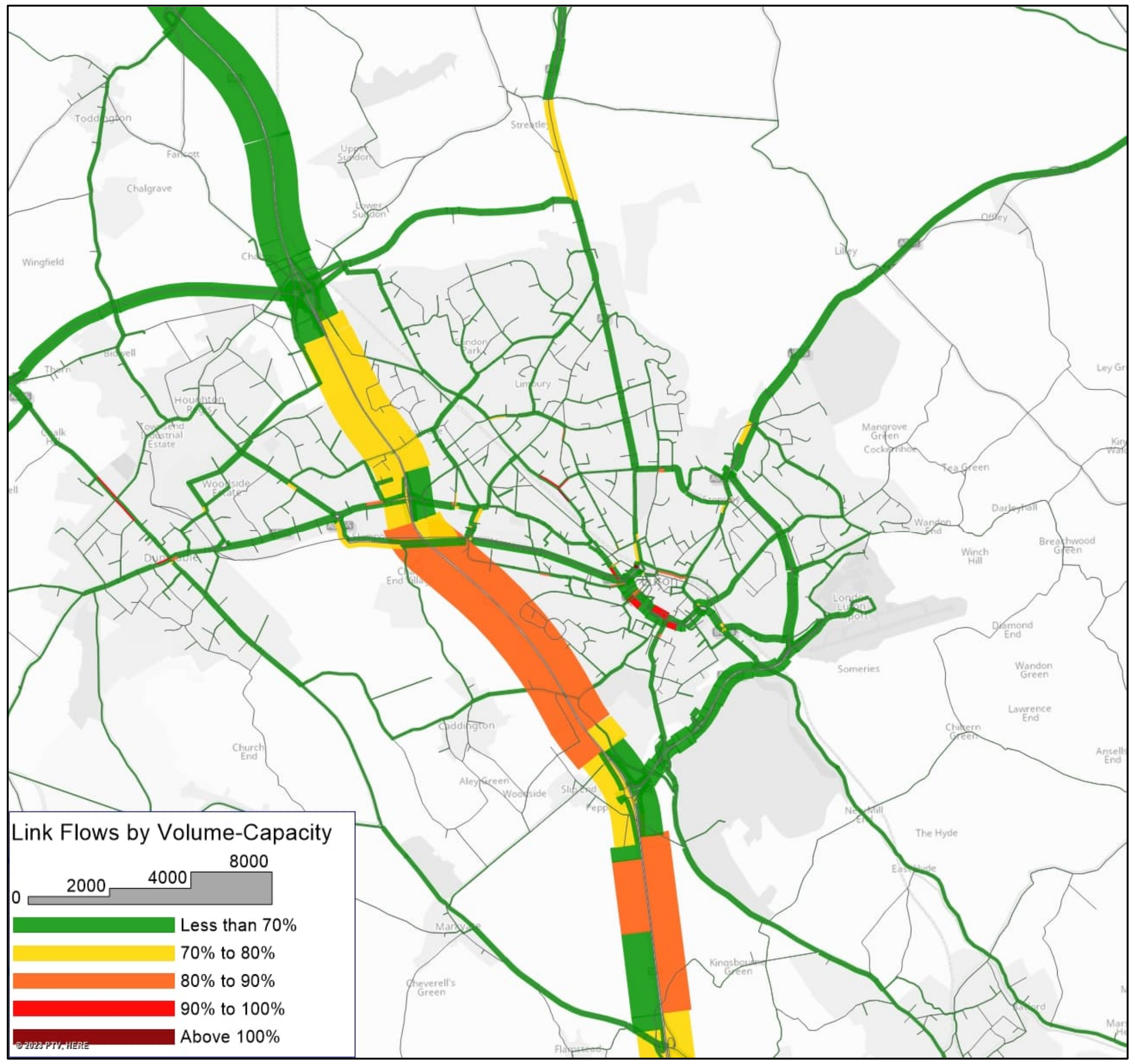


Updated Run

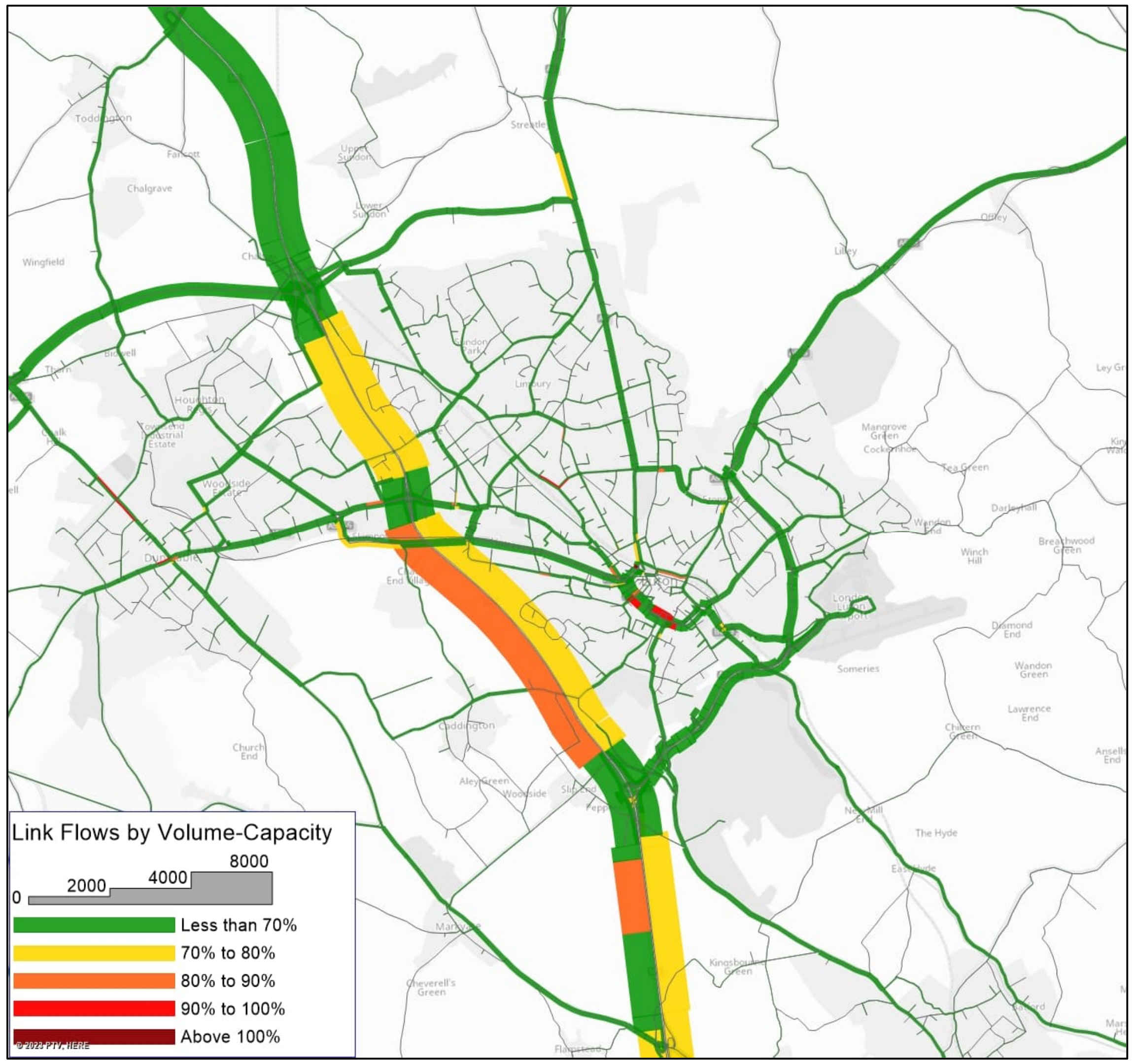


Interpeak
(between 10:00 to 16:00)

Original Run



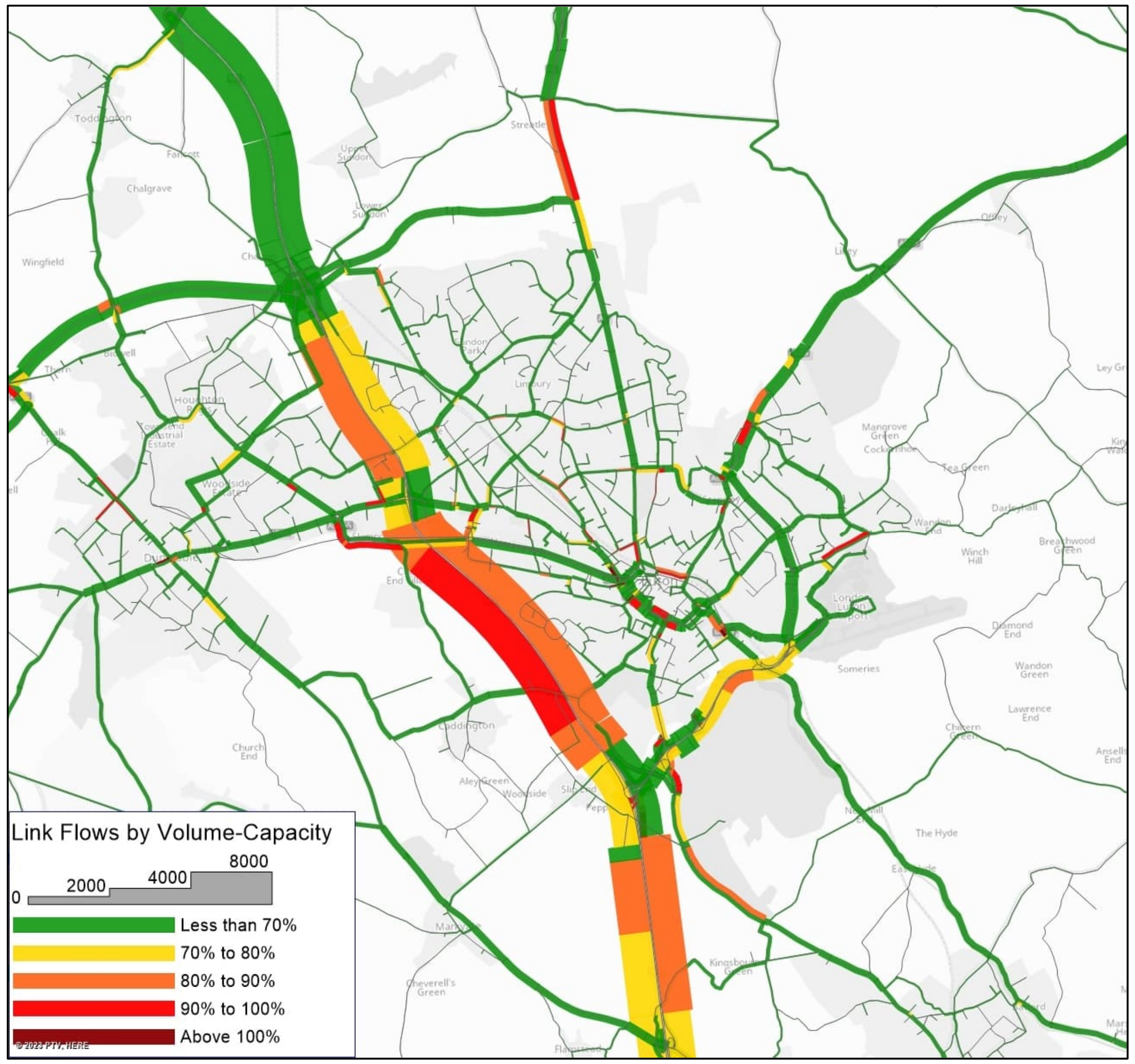
Updated Run



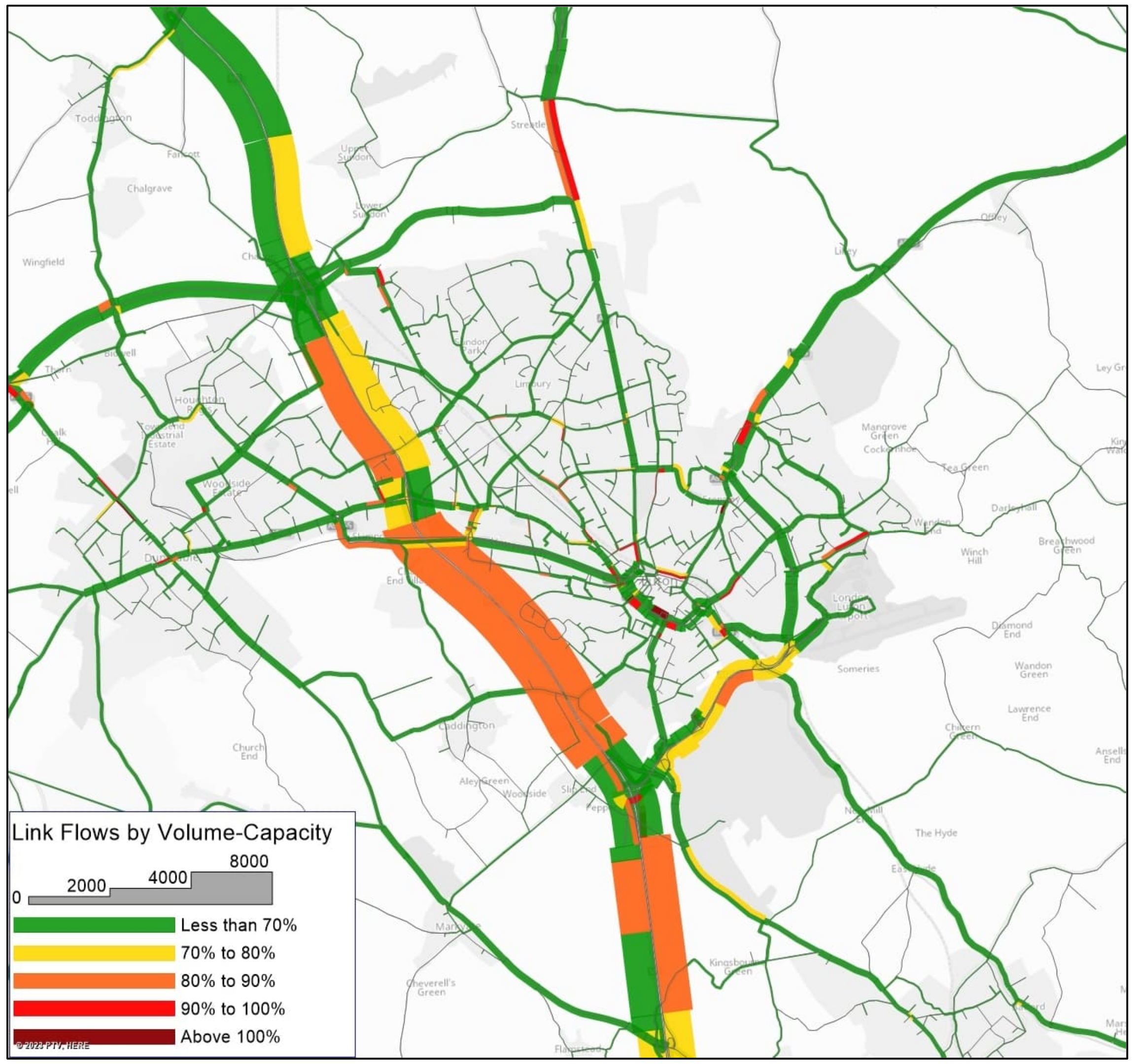
PM Peak Hour

(17:00 to 18:00)

Original Run



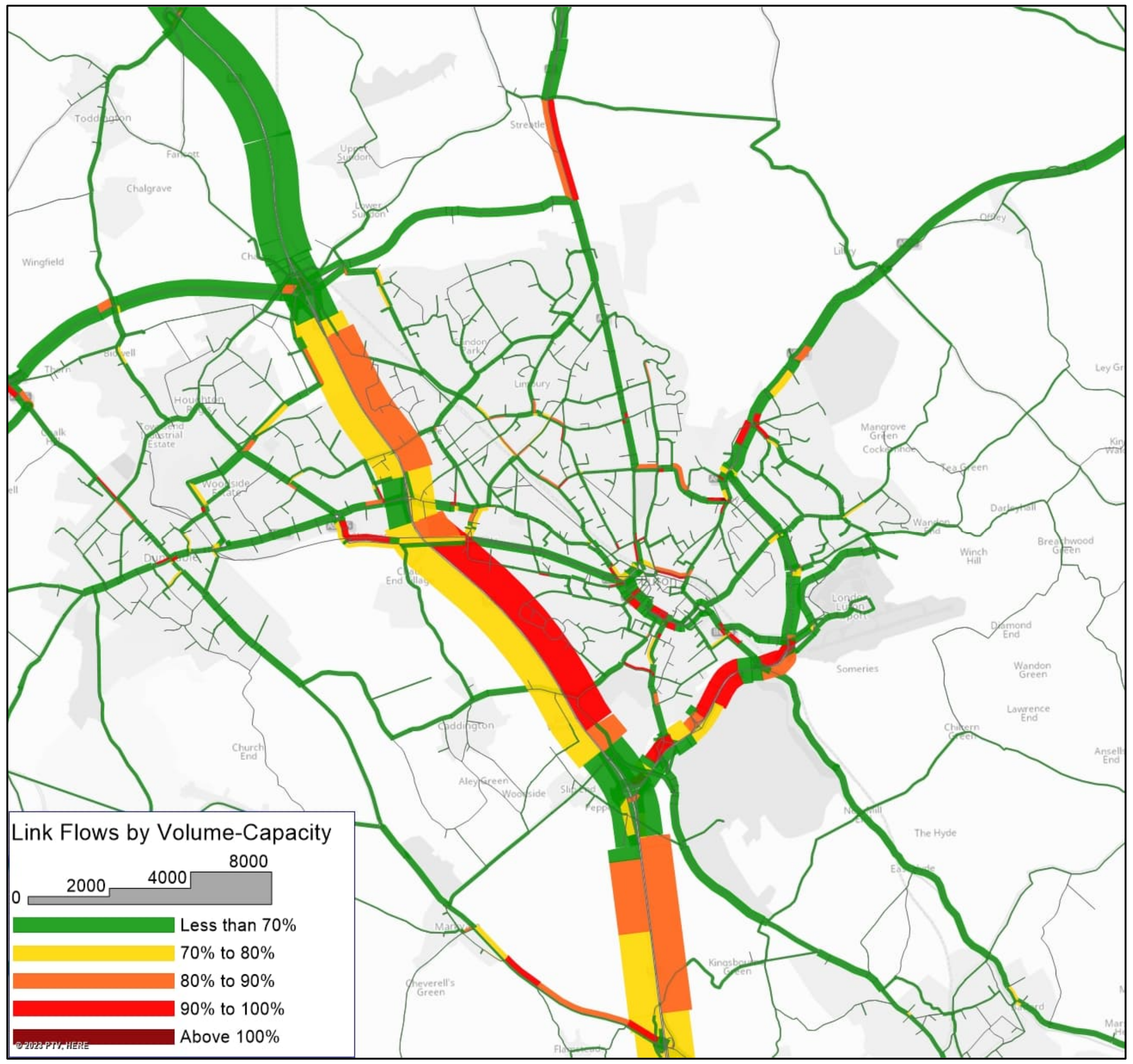
Updated Run



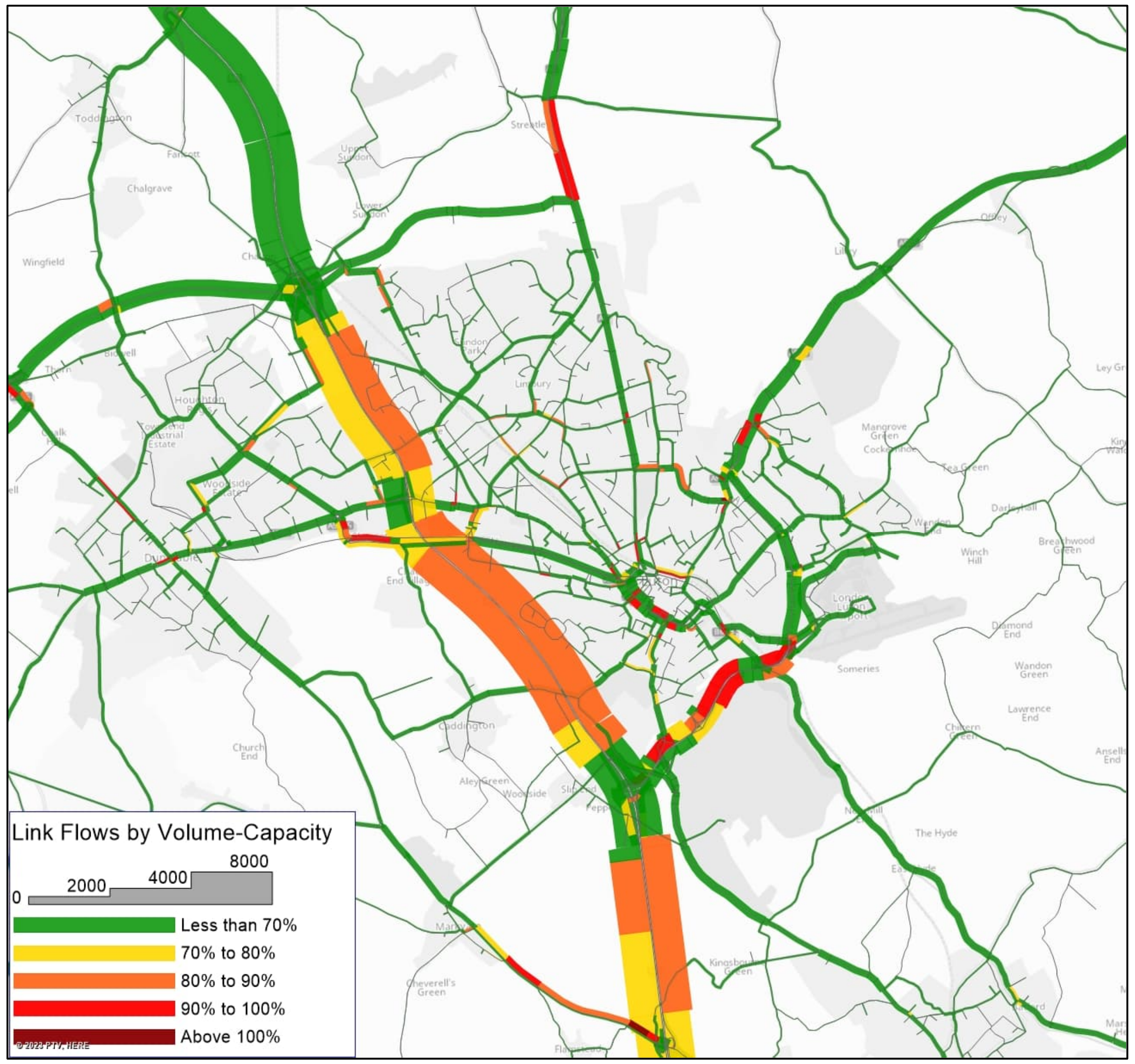
Forecast Link-based V/C, 2043 Forecast Year, “With” Expansion, Simulation Network

AM Peak Hour
(08:00 – 09:00)

Original Run

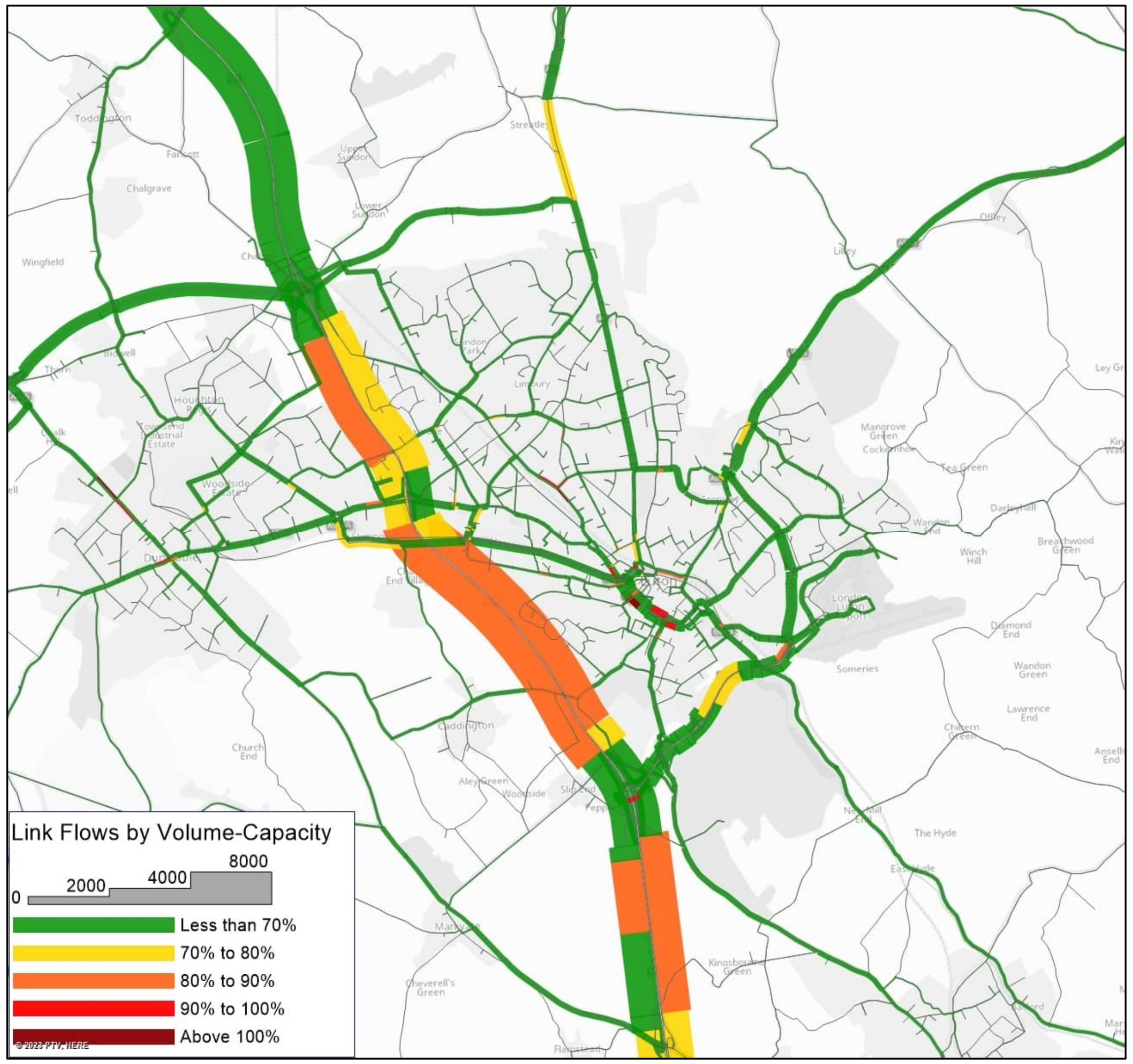


Updated Run

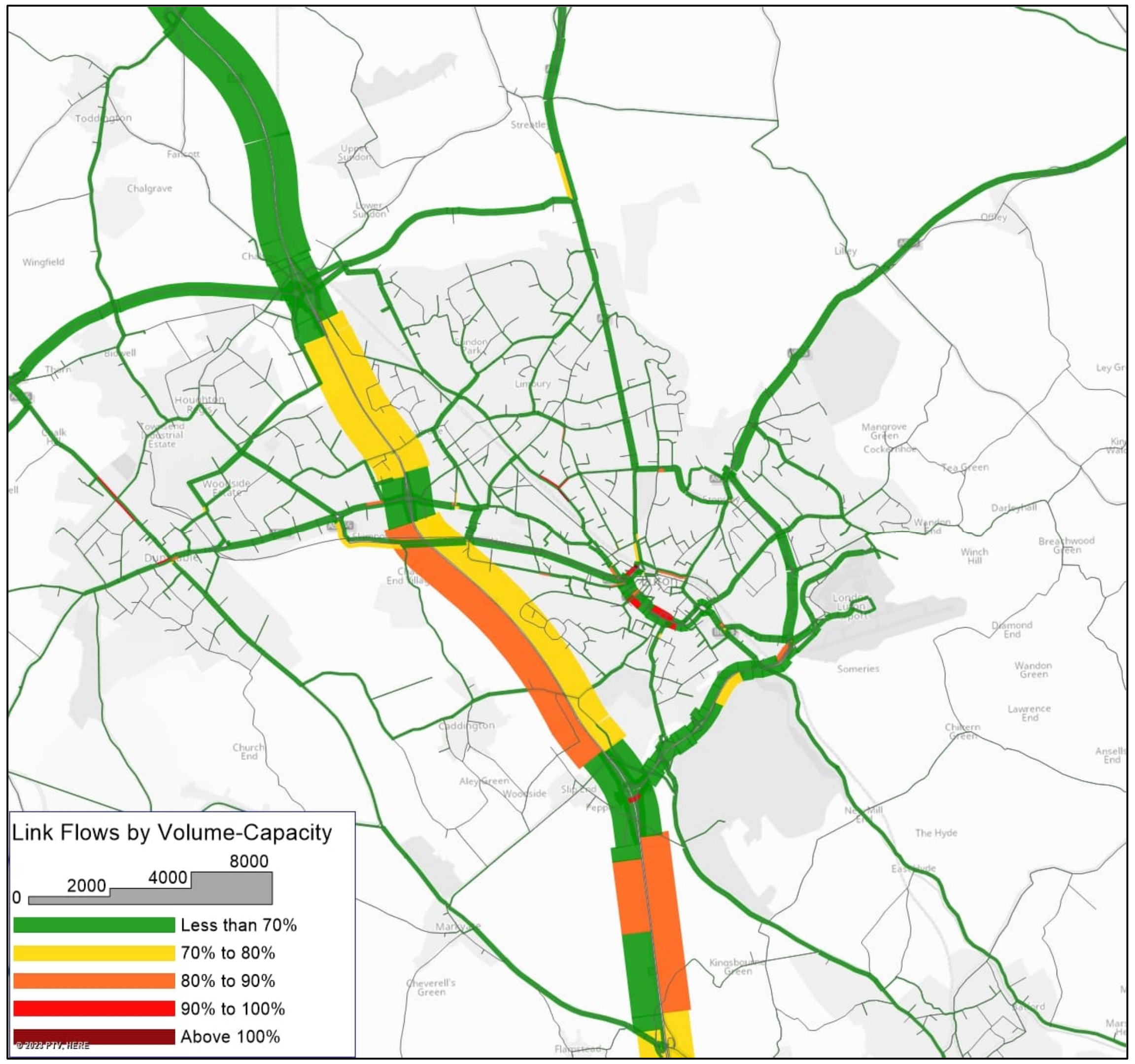


Interpeak
(between 10:00 to 16:00)

Original Run

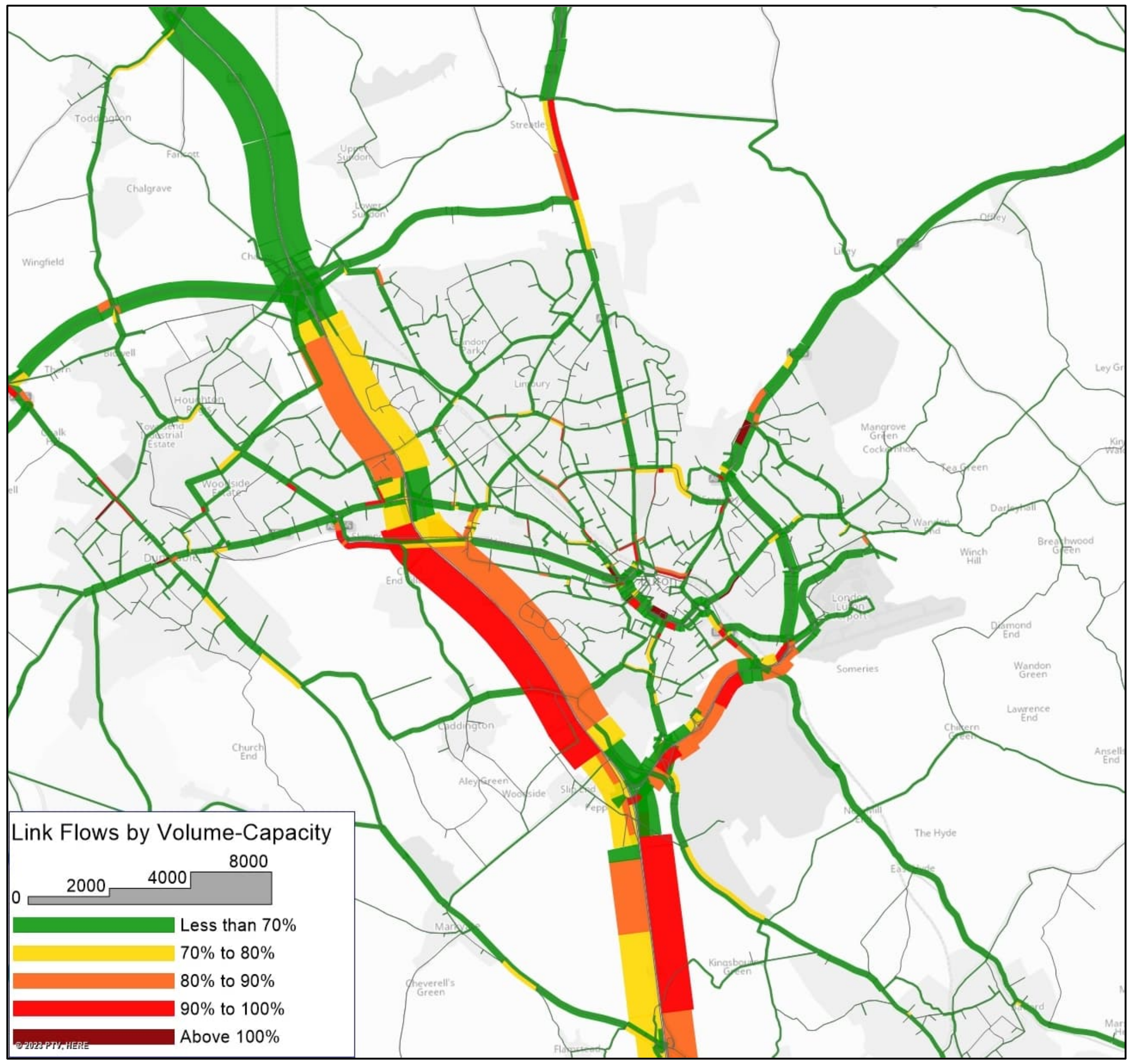


Updated Run

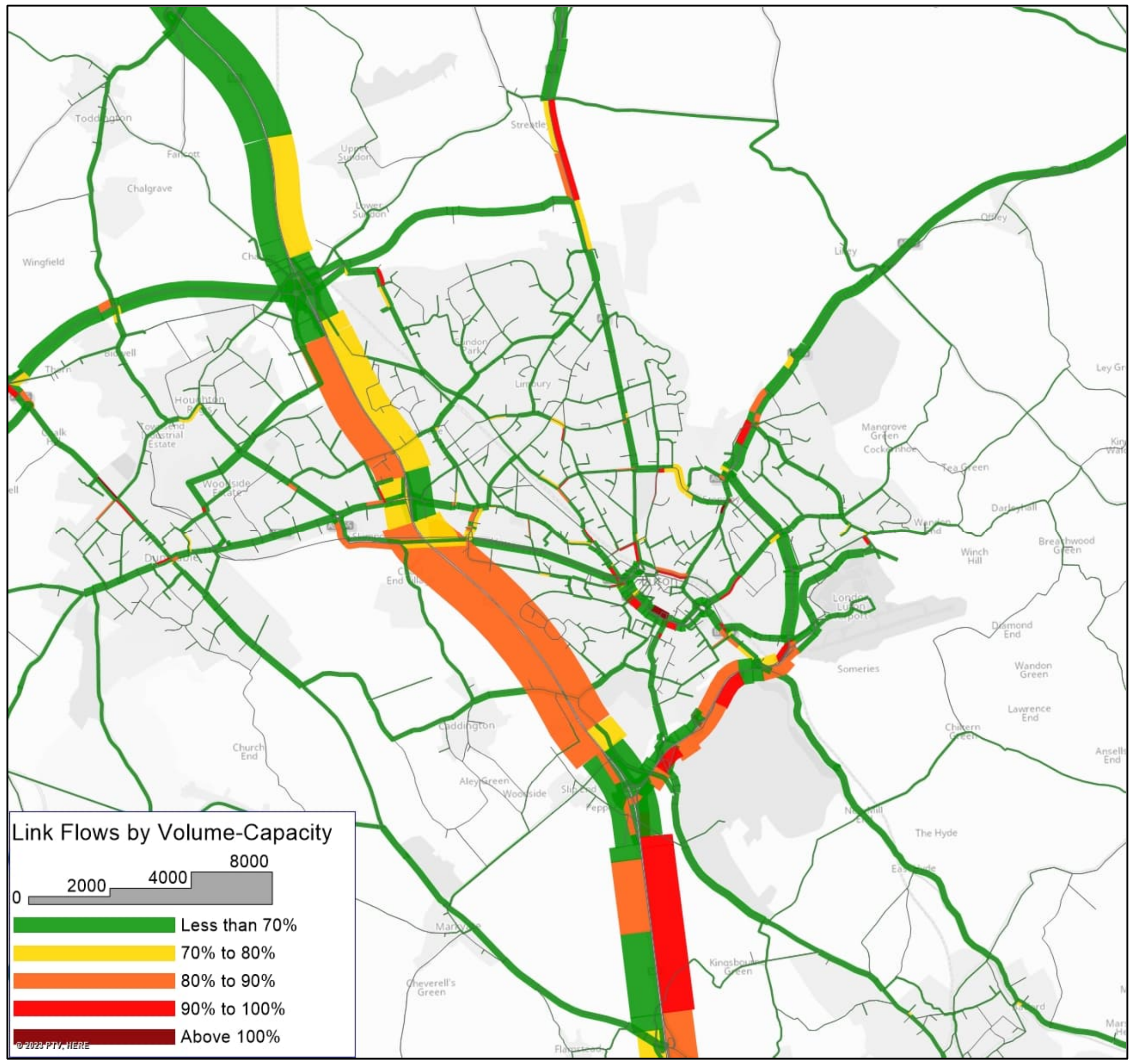


PM Peak Hour
(17:00 to 18:00)

Original Run



Updated Run



APPENDIX G: PUBLIC TRANSPORT FORECAST DEMAND DIFFERENCE PLOTS

2027 AM Peak Original Run “With” vs “Without” Expansion Rail forecast comparison (passenger per hour)

2027 AM Peak Updated Run "With" vs "Without" Expansion Rail forecast comparison (passenger per hour)

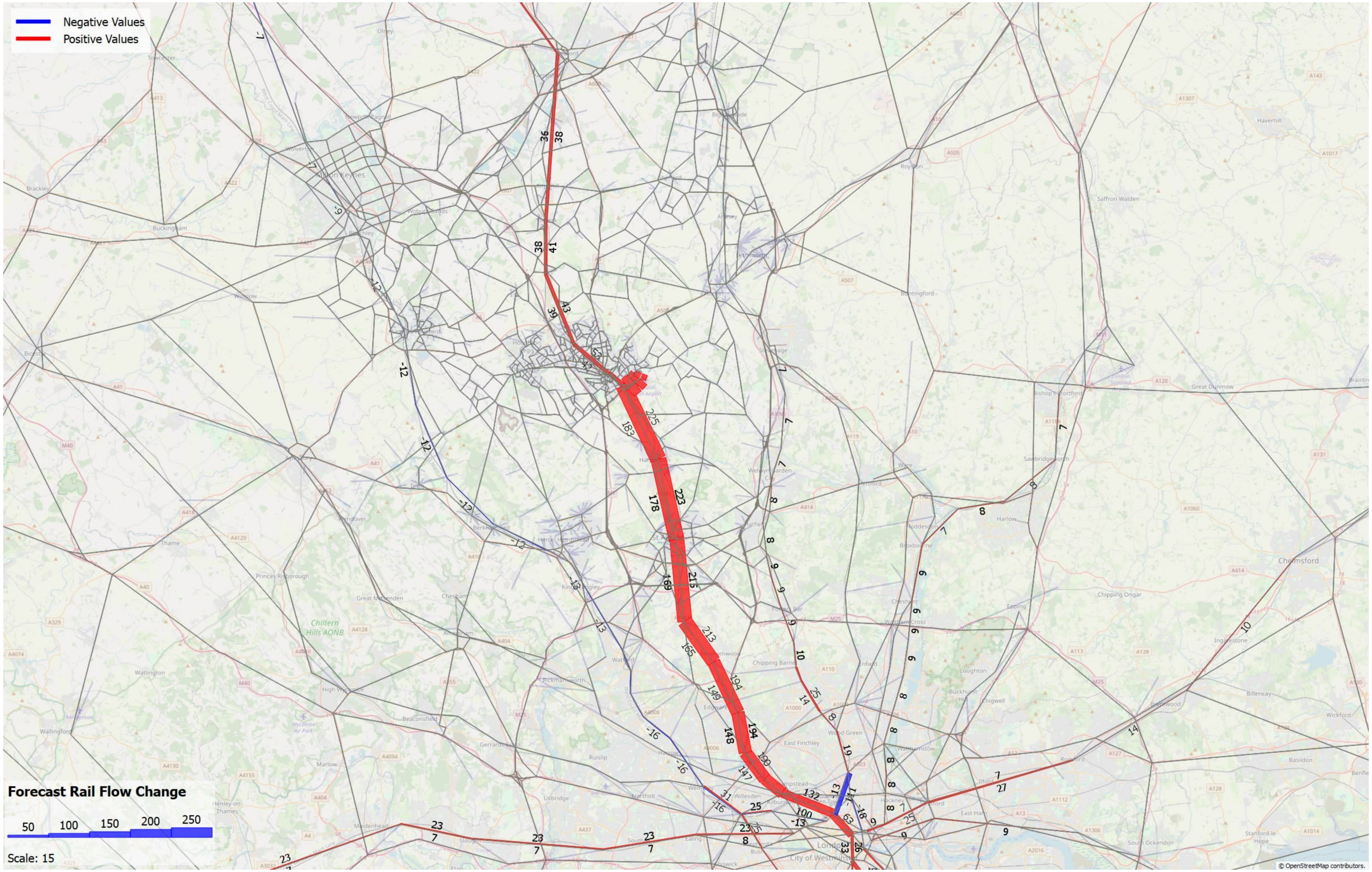
2027 Inter Peak Original Run “With” vs “Without” Expansion Rail forecast comparison (passenger per hour)

2027 Inter Peak Updated Run “With” vs “Without” Expansion Rail forecast comparison (passenger per hour)

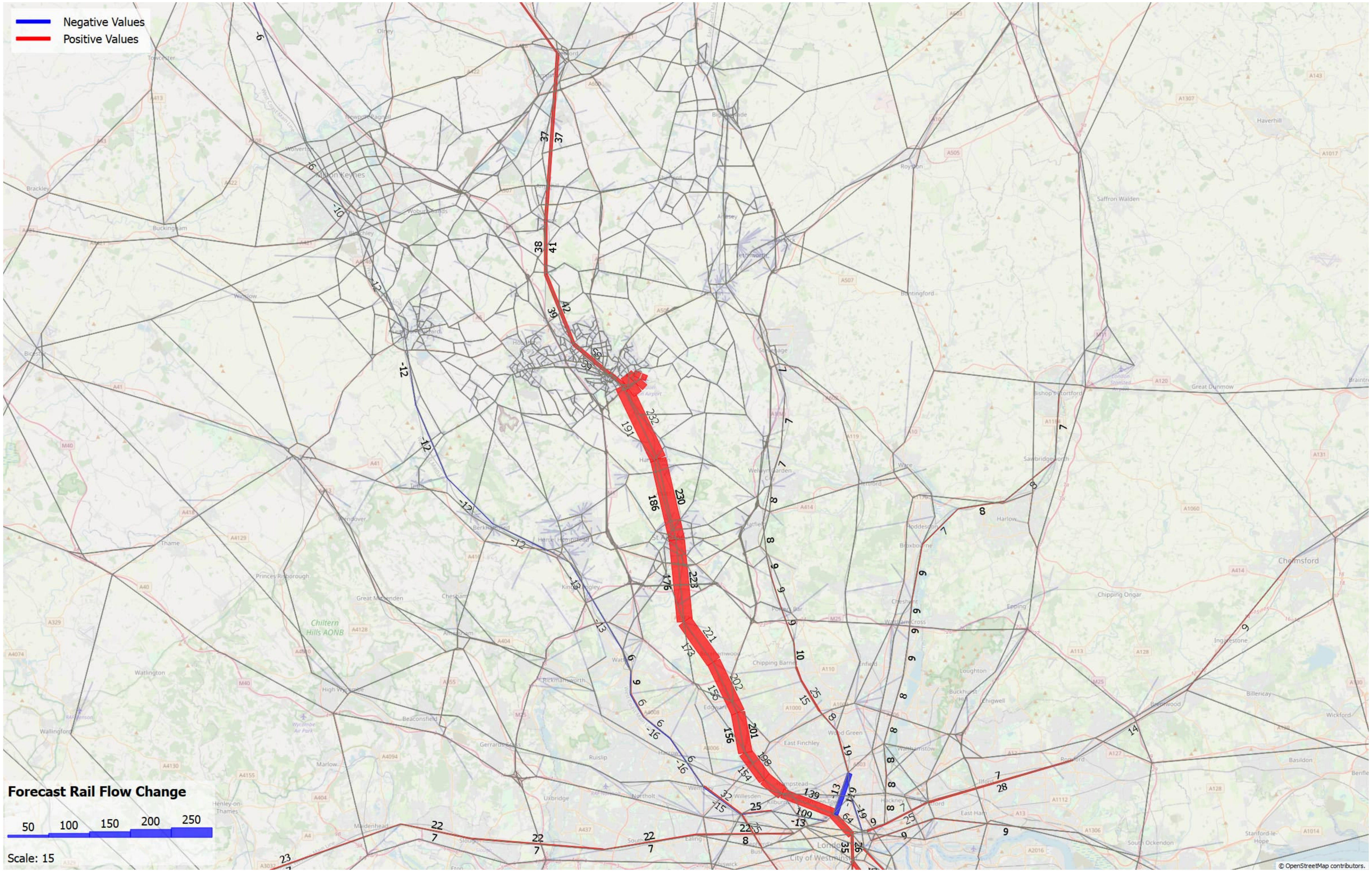
2027 PM Peak Original Run “With” vs “Without” Expansion Rail forecast comparison (passenger per hour)

2027 PM Peak Updated Run “With” vs “Without” Expansion Rail forecast comparison (passenger per hour)

2039 AM Peak Original Run “With” vs “Without” Expansion Rail forecast comparison (passenger per hour)



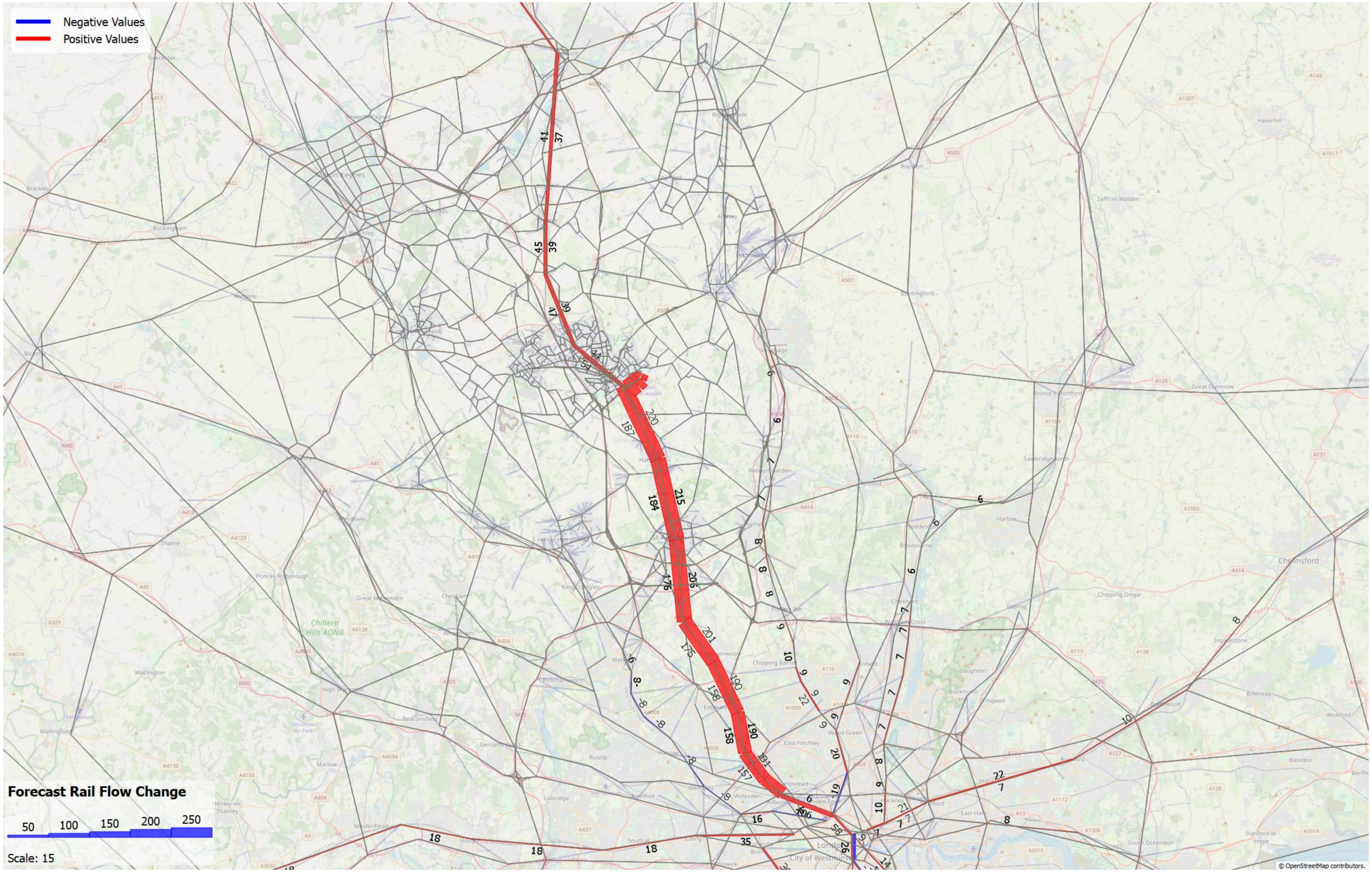
2039 AM Peak Updated Run “With” vs “Without” Expansion Rail forecast comparison (passenger per hour)



2039 Inter Peak Original Run “With” vs “Without” Expansion Rail forecast comparison (passenger per hour)

2039 Inter Peak Updated Run “With” vs “Without” Expansion Rail forecast comparison (passenger per hour)

2039 PM Peak Original Run "With" vs "Without" Expansion Rail forecast comparison (passenger per hour)



2039 PM Peak Updated Run “With” vs “Without” Expansion Rail forecast comparison (passenger per hour)

2043 AM Peak Original Run “With” vs “Without” Expansion Rail forecast comparison (passenger per hour)

2043 AM Peak Updated Run “With” vs “Without” Expansion Rail forecast comparison (passenger per hour)

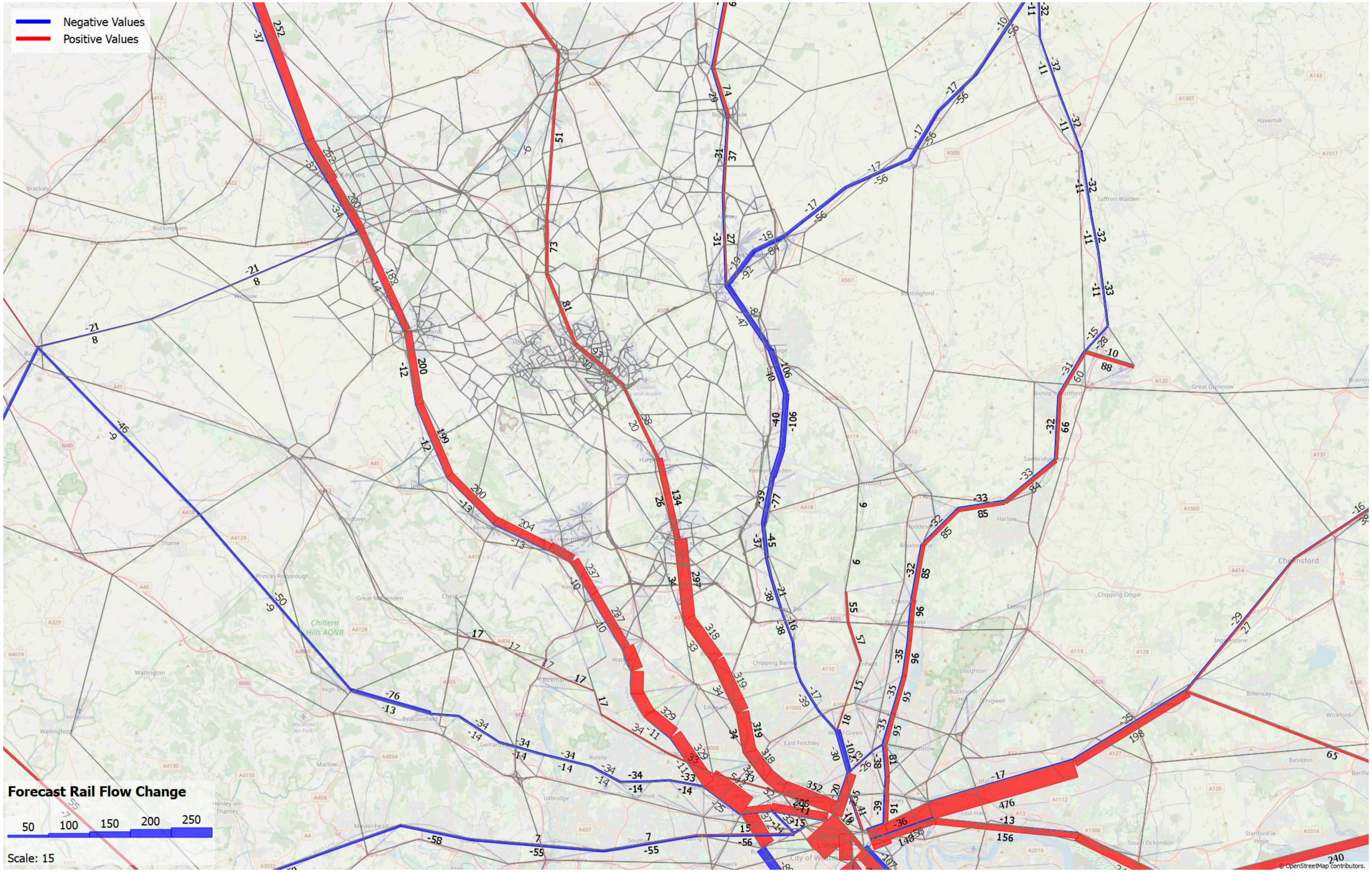
2043 Inter Peak Original Run “With” vs “Without” Expansion Rail forecast comparison (passenger per hour)

2043 Inter Peak Updated Run “With” vs “Without” Expansion Rail forecast comparison (passenger per hour)

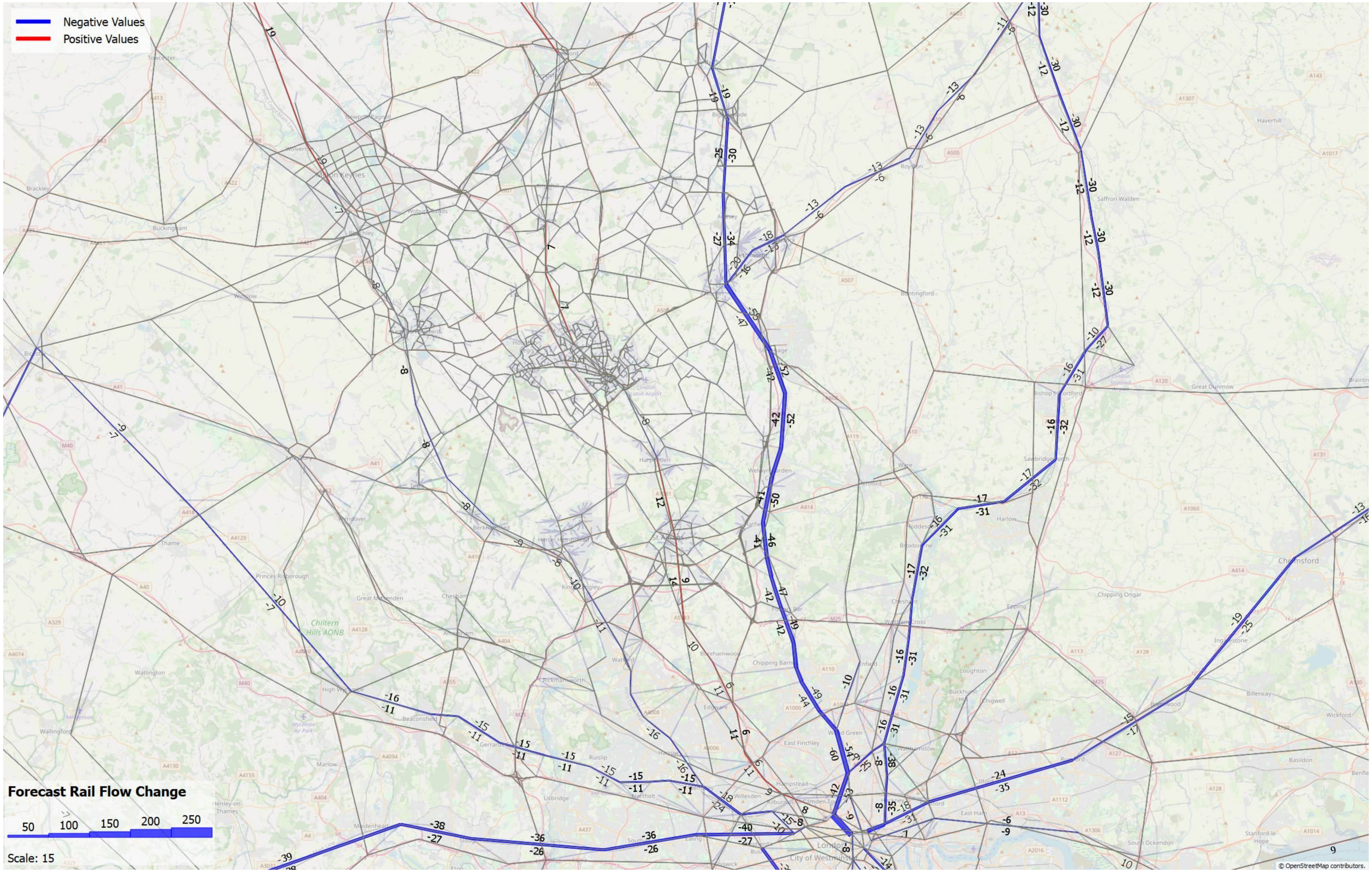
2043 PM Peak Original Run “With” vs “Without” Expansion Rail forecast comparison (passenger per hour)

2043 PM Peak Updated Run “With” vs “Without” Expansion Rail forecast comparison (passenger per hour)

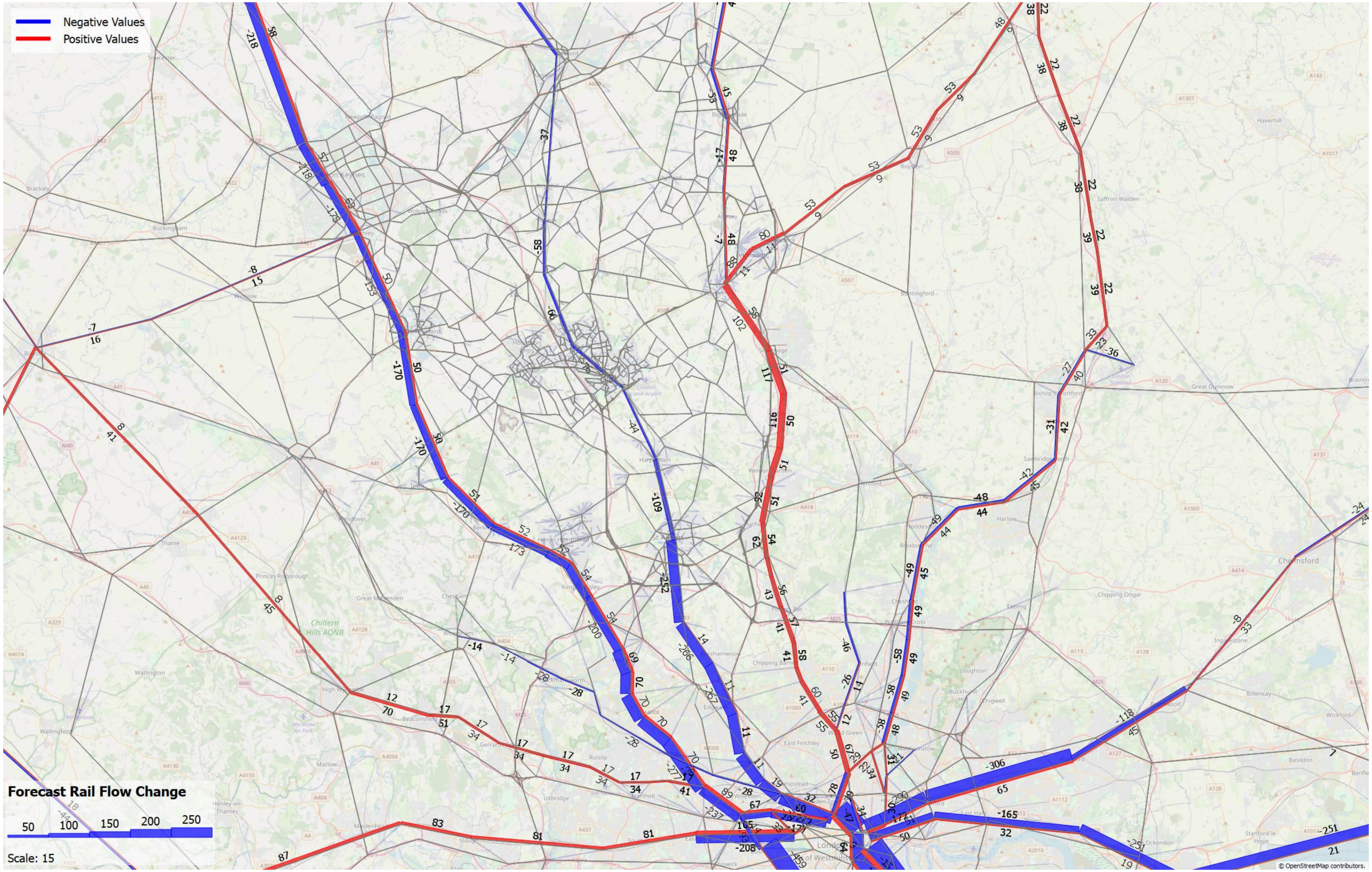
2027 AM Peak “Without” Expansion (Updated vs Original) Rail forecast comparison (passenger per hour)



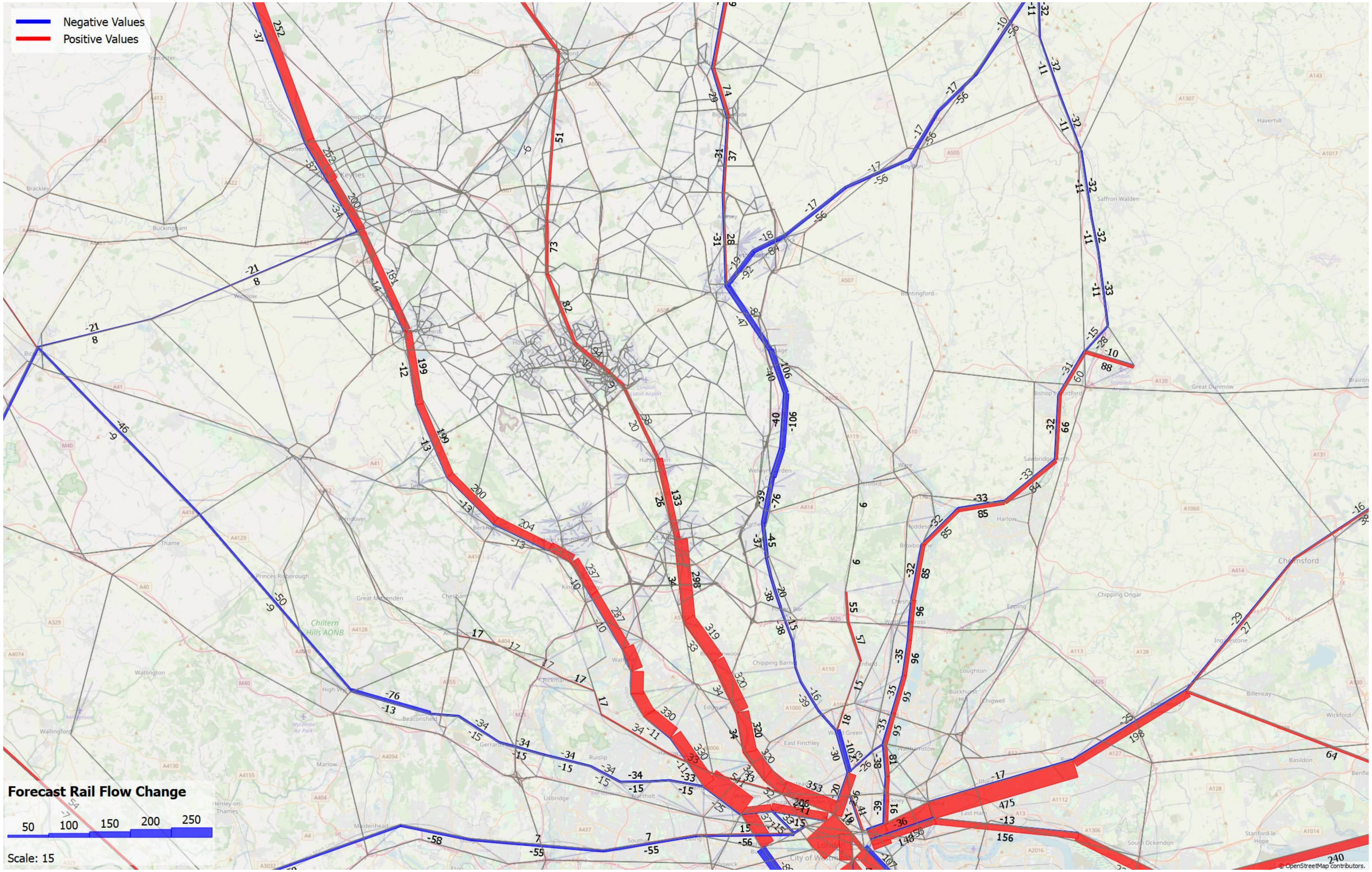
2027 Inter Peak "Without" Expansion (Updated vs Original) Rail forecast comparison (passenger per hour)



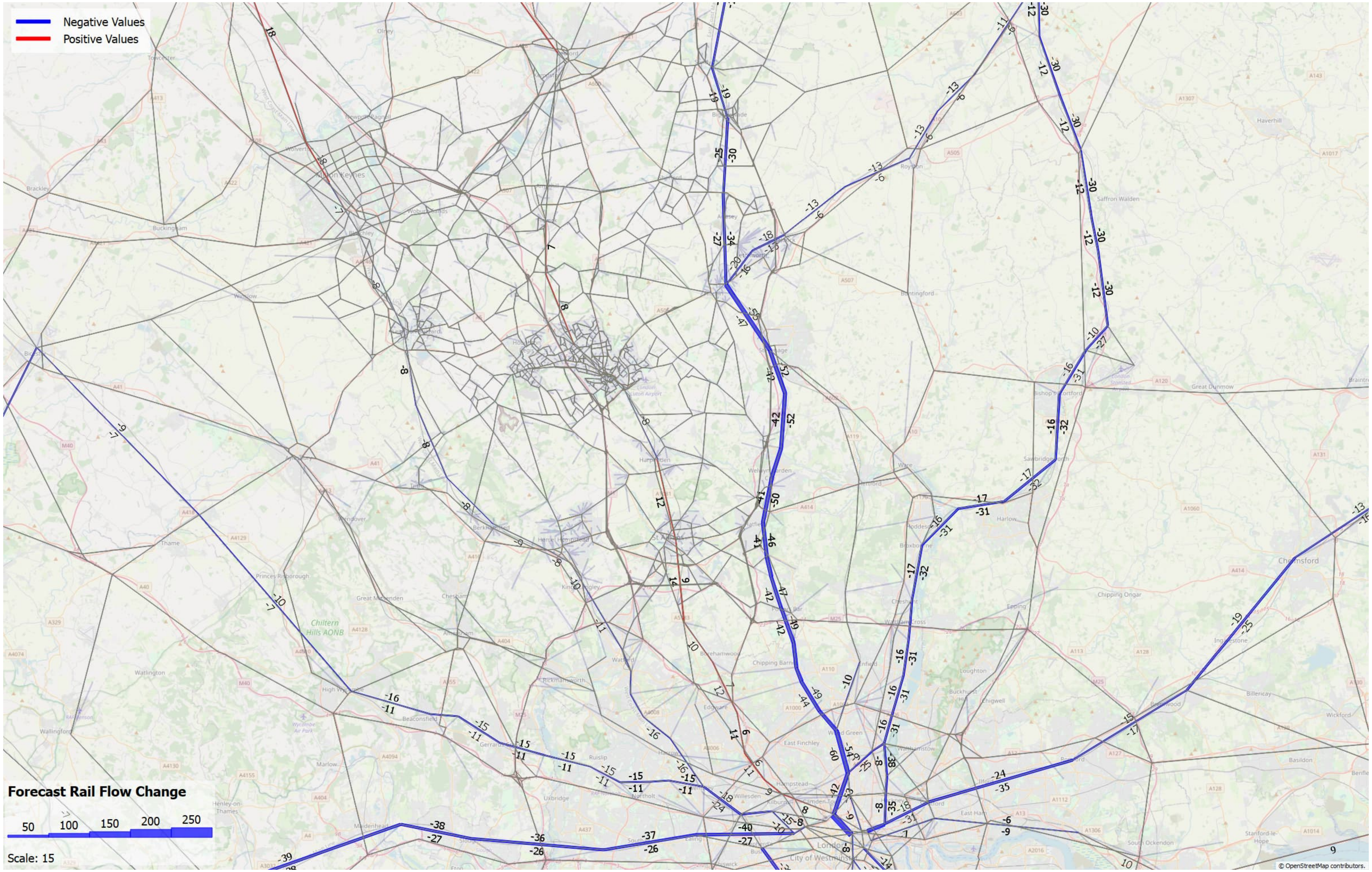
2027 PM Peak “Without” Expansion (Updated vs Original) Rail forecast comparison (passenger per hour)



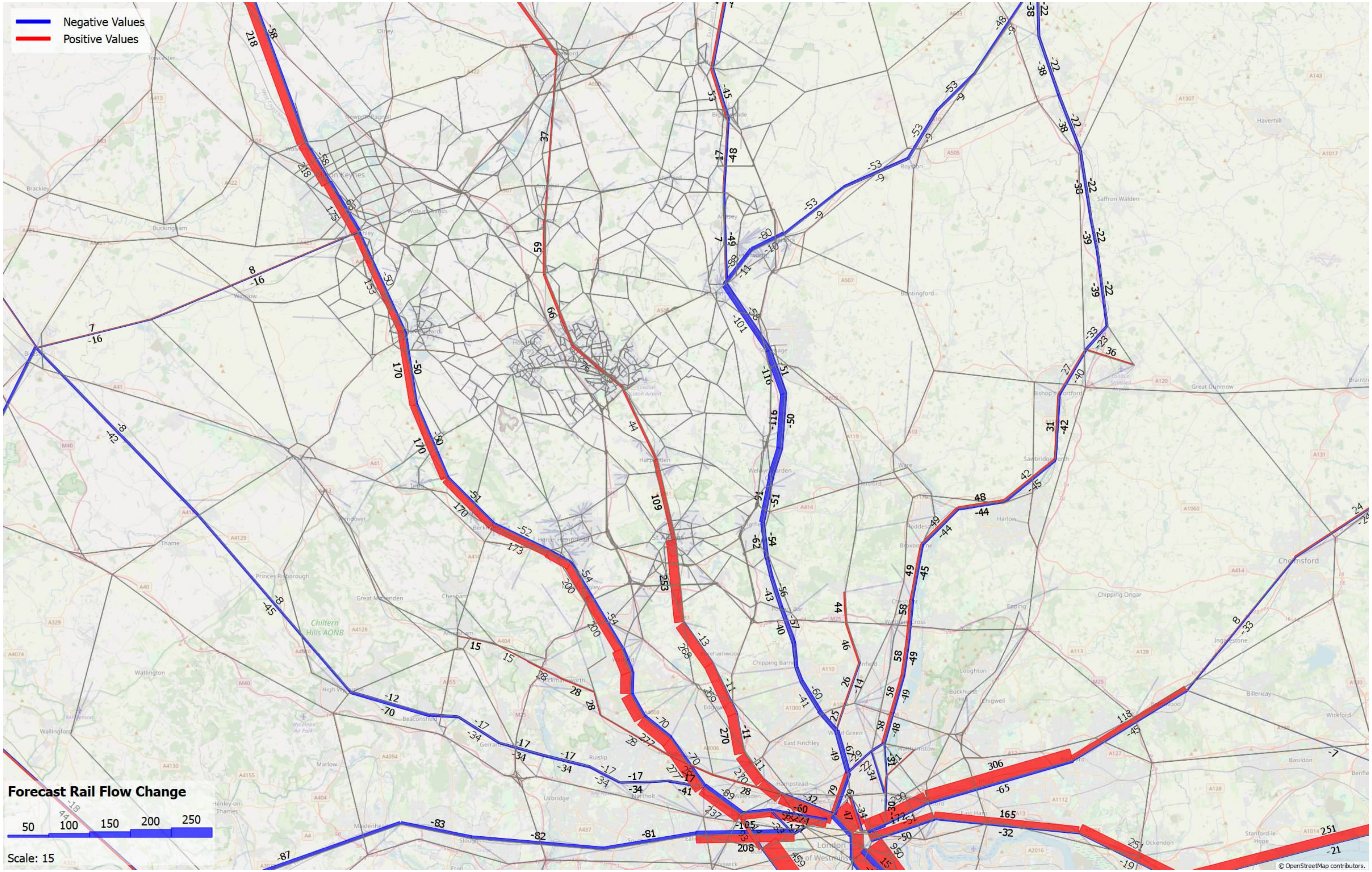
2027 AM Peak “With” Expansion (Updated vs Original) Rail forecast comparison (passenger per hour)



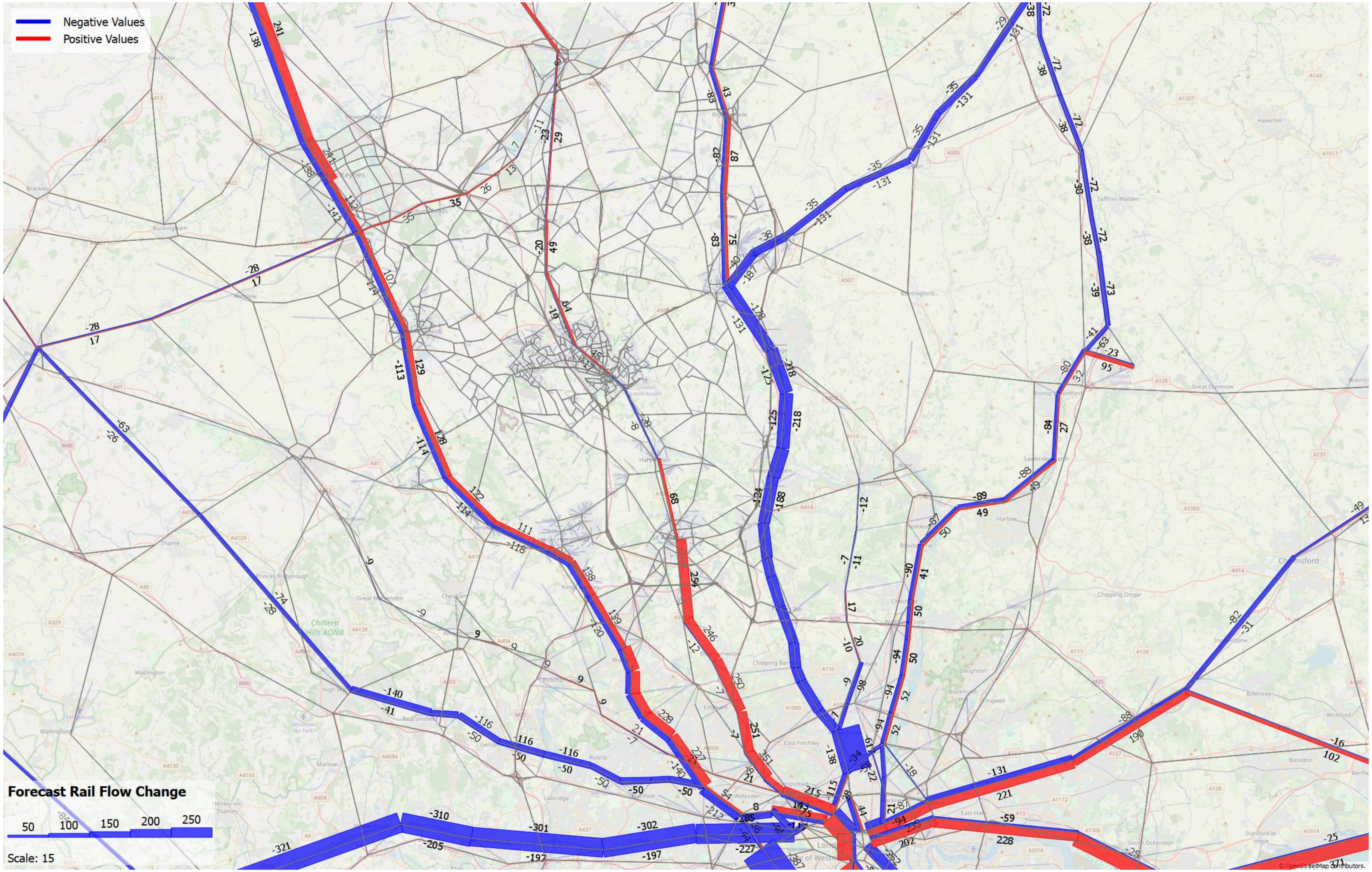
2027 Inter Peak “With” Expansion (Updated vs Original) Rail forecast comparison (passenger per hour)



2027 PM Peak “With” Expansion (Updated vs Original) Rail forecast comparison (passenger per hour)

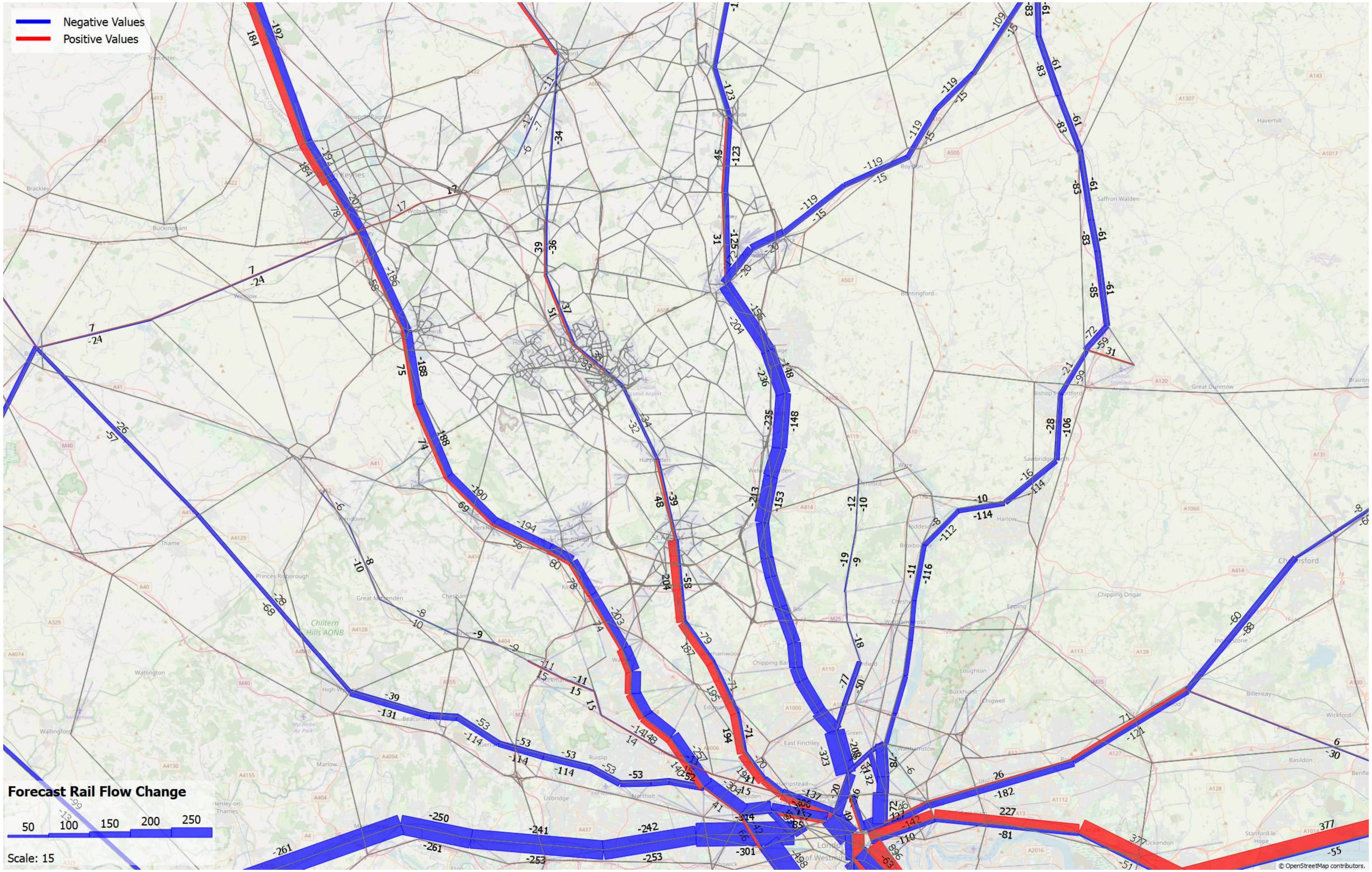


2039 AM Peak “Without” Expansion (Updated vs Original) Rail forecast comparison (passenger per hour)

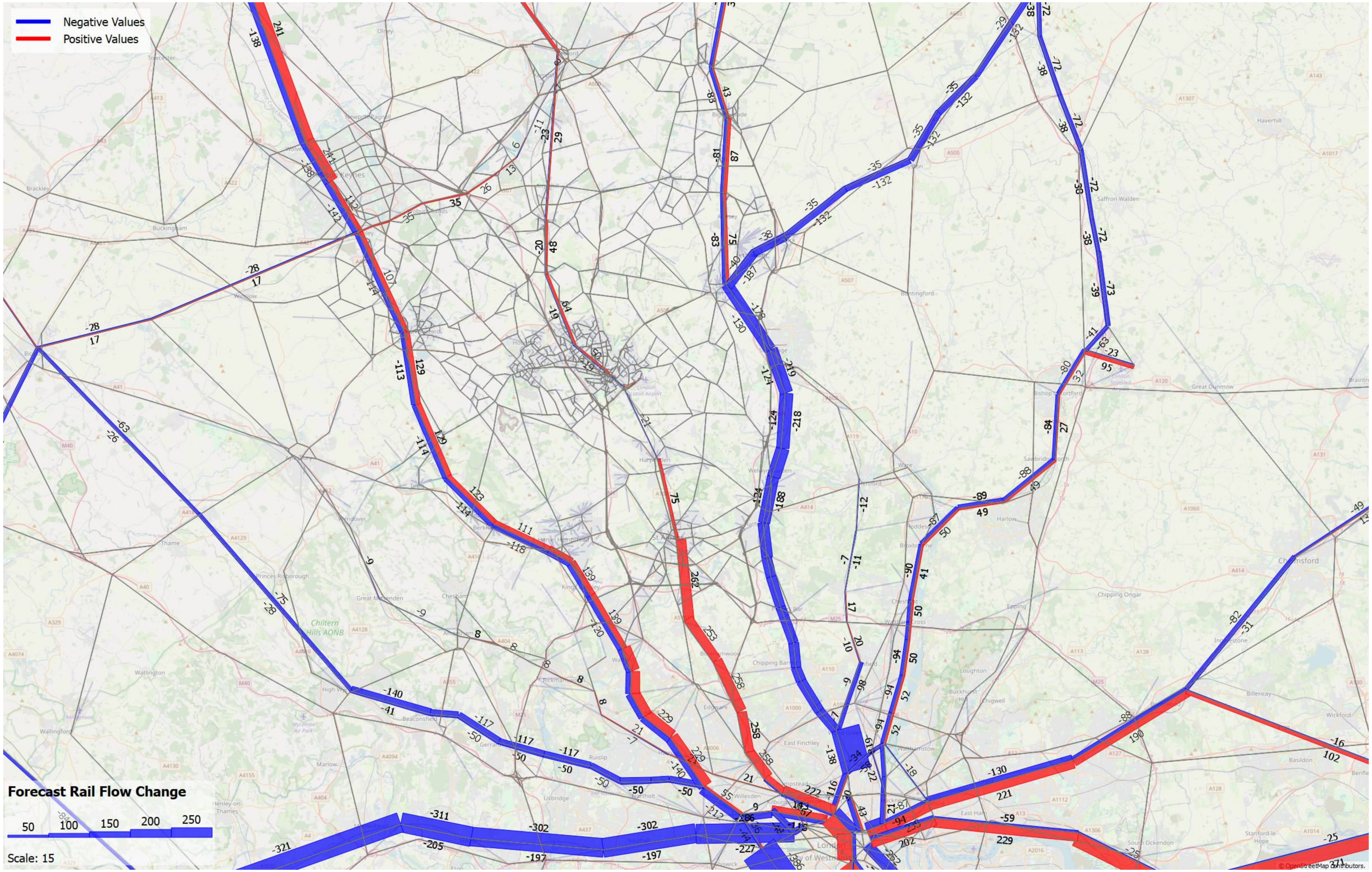


2039 Inter Peak "Without" Expansion (Updated vs Original) Rail forecast comparison (passenger per hour)

2039 PM Peak "Without" Expansion (Updated vs Original) Rail forecast comparison (passenger per hour)

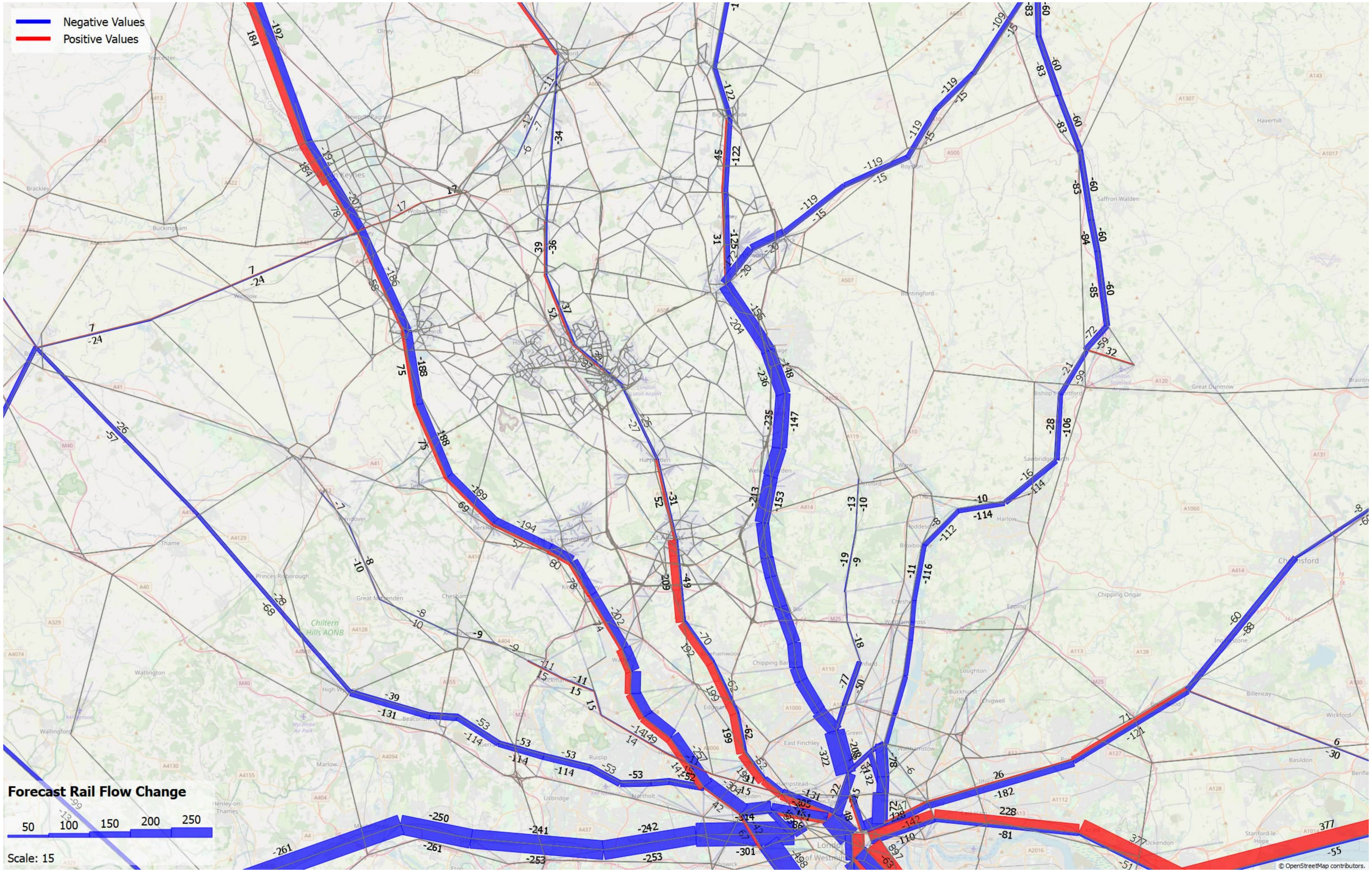


2039 AM Peak “With” Expansion (Updated vs Original) Rail forecast comparison (passenger per hour)



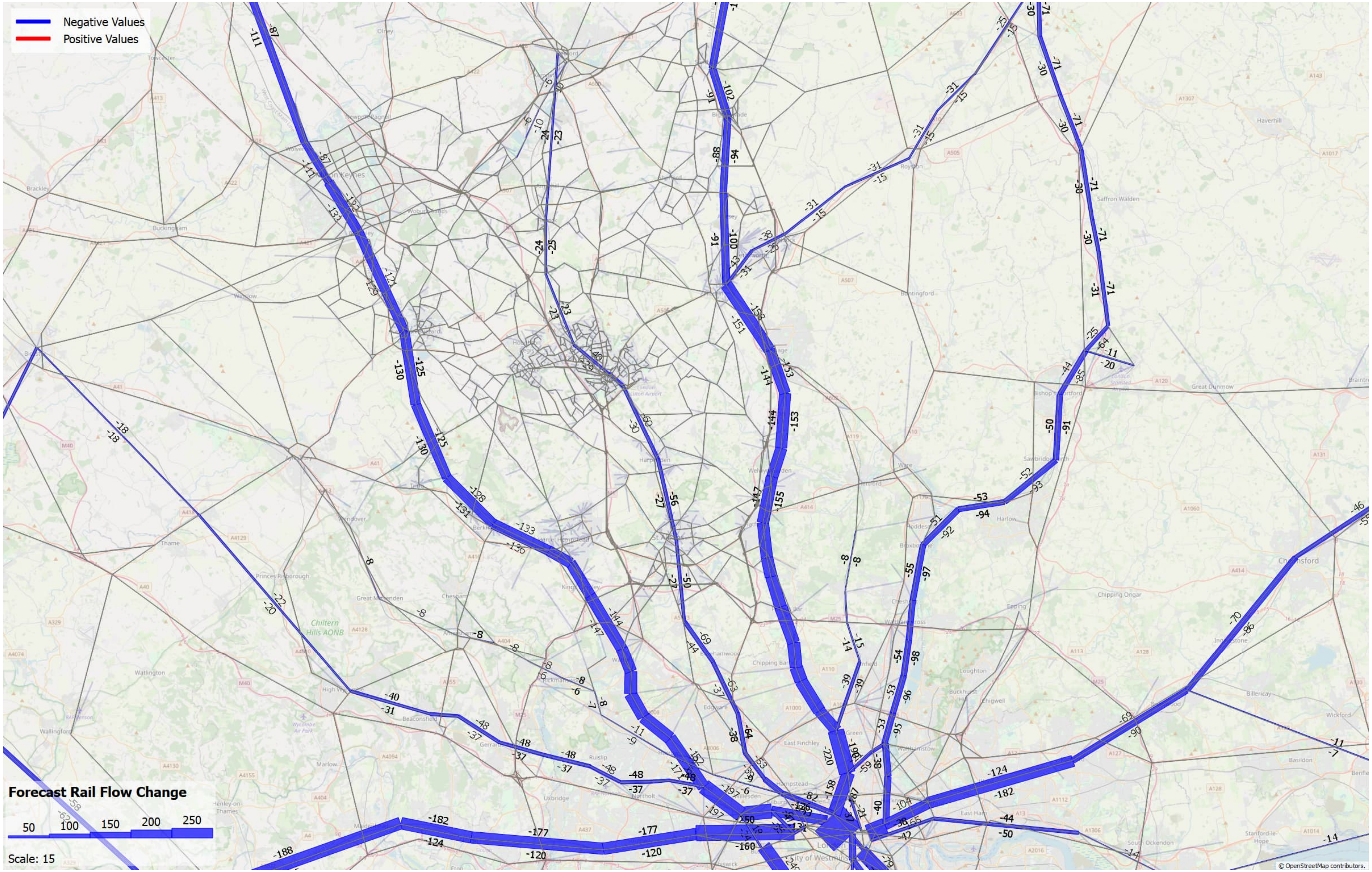
2039 Inter Peak “With” Expansion (Updated vs Original) Rail forecast comparison (passenger per hour)

2039 PM Peak "With" Expansion (Updated vs Original) Rail forecast comparison (passenger per hour)

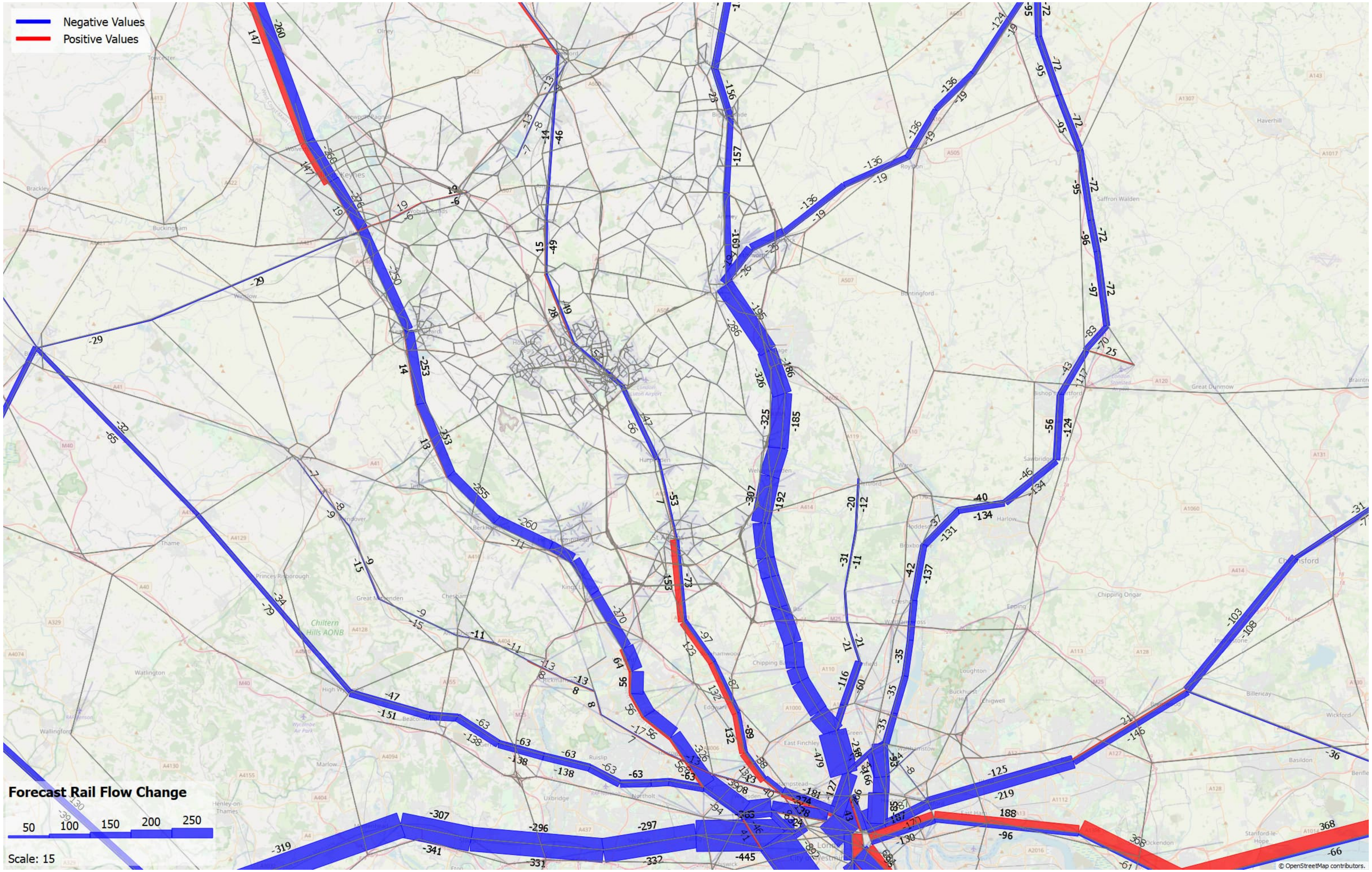


2043 AM Peak "Without" Expansion (Updated vs Original) Rail forecast comparison (passenger per hour)

2043 Inter Peak “Without” Expansion (Updated vs Original) Rail forecast comparison (passenger per hour)

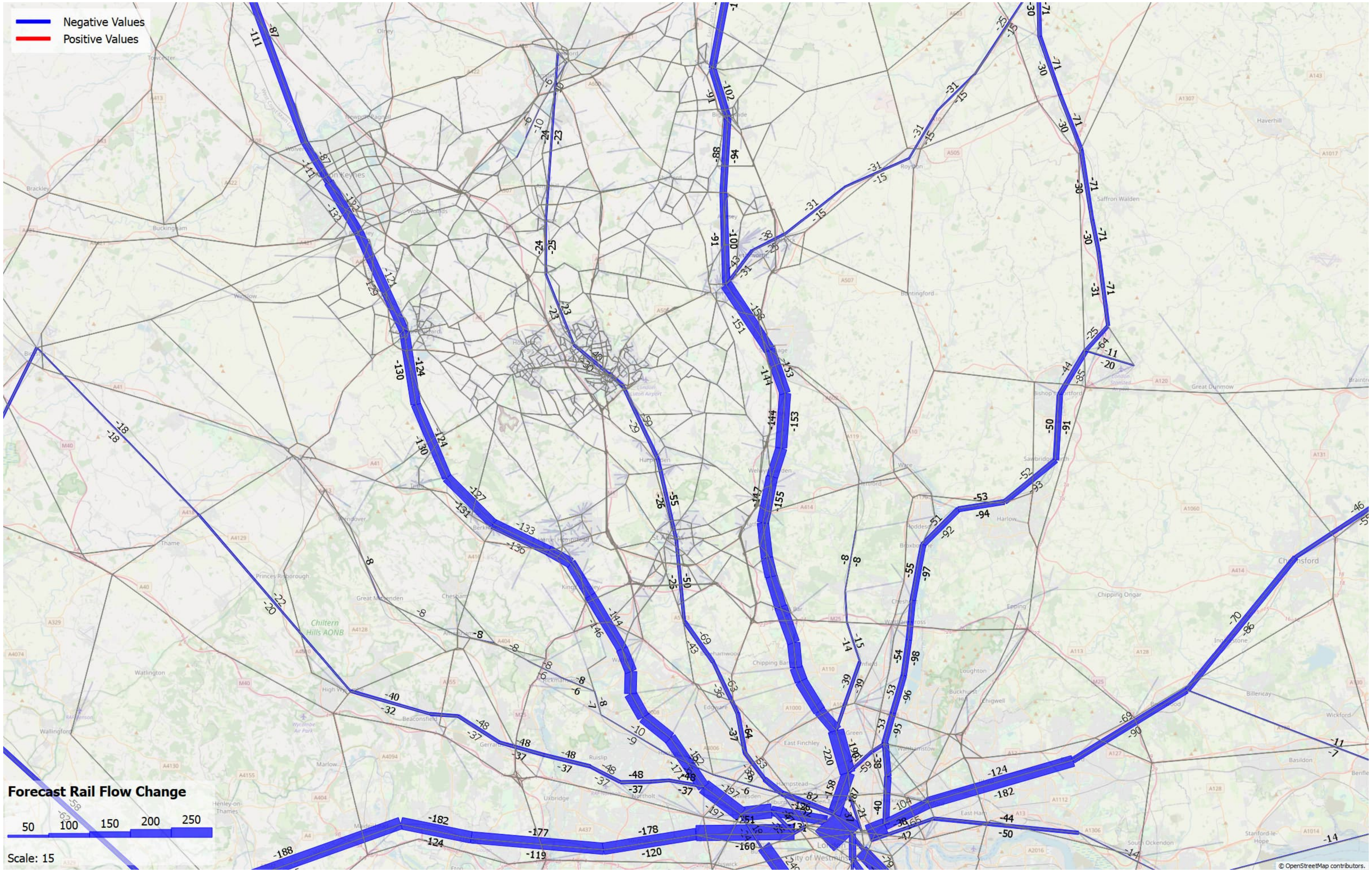


2043 PM Peak “Without” Expansion (Updated vs Original) Rail forecast comparison (passenger per hour)

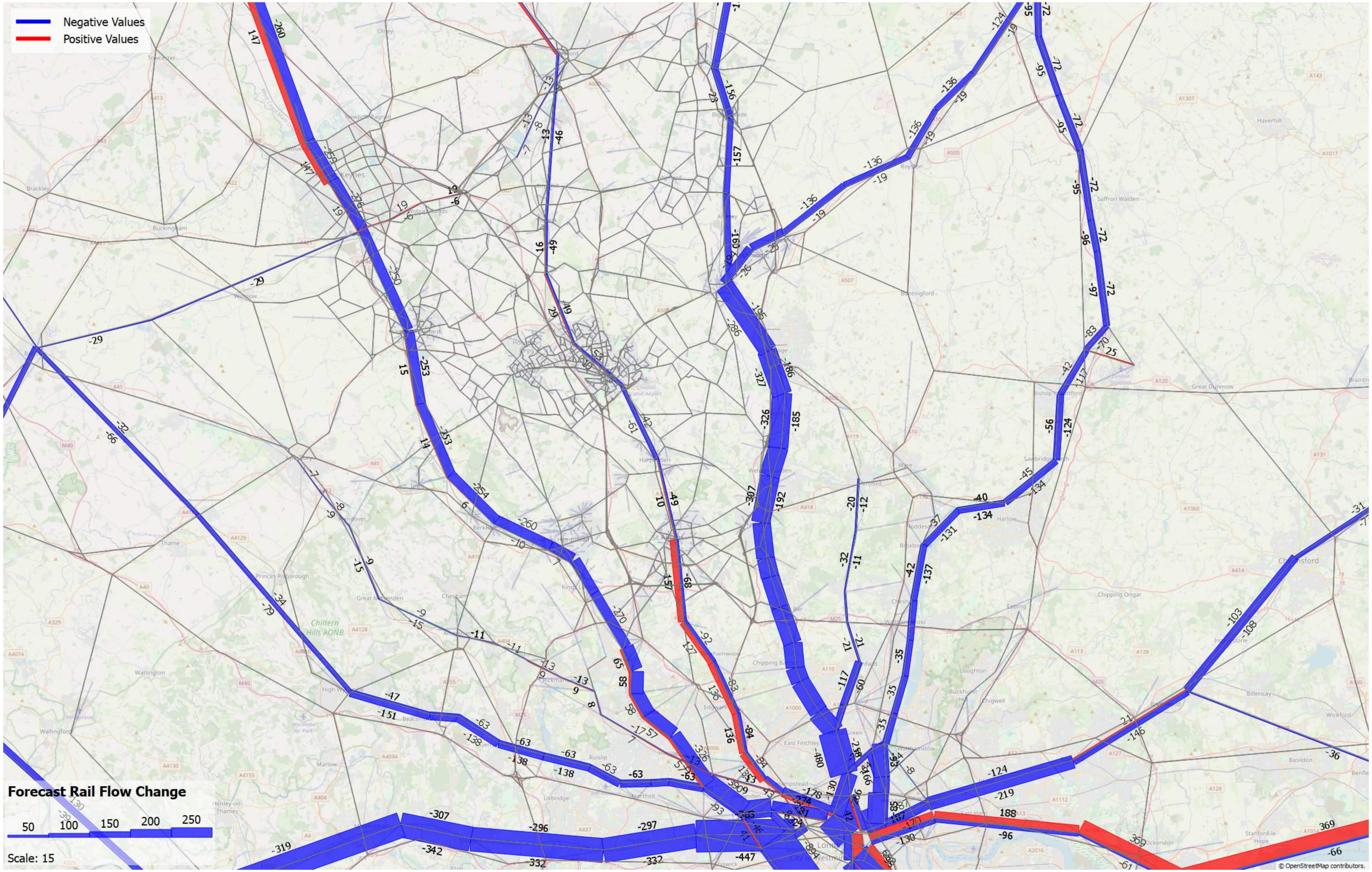


2043 AM Peak “With” Expansion (Updated vs Original) Rail forecast comparison (passenger per hour)

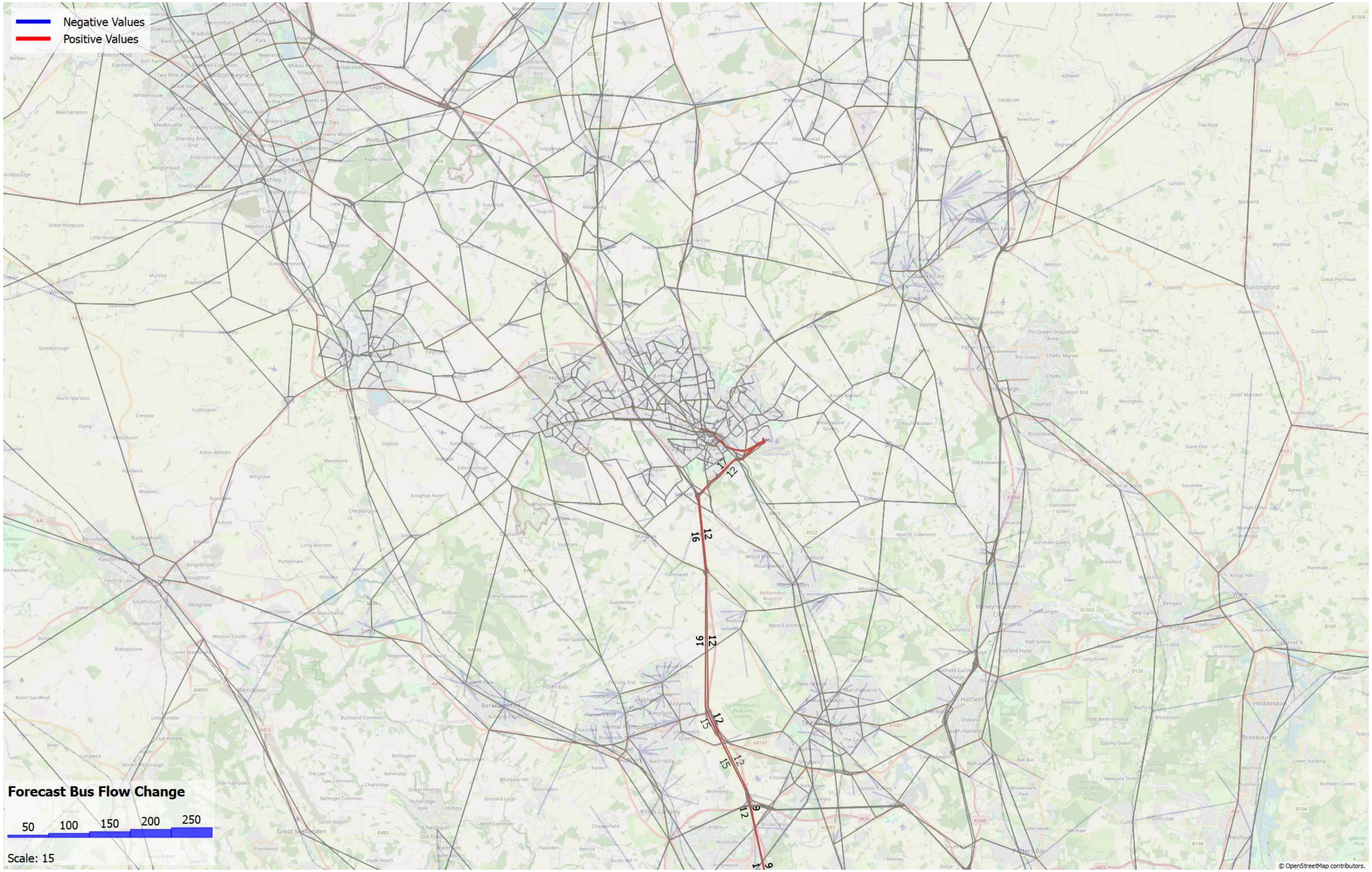
2043 Inter Peak “With” Expansion (Updated vs Original) Rail forecast comparison (passenger per hour)



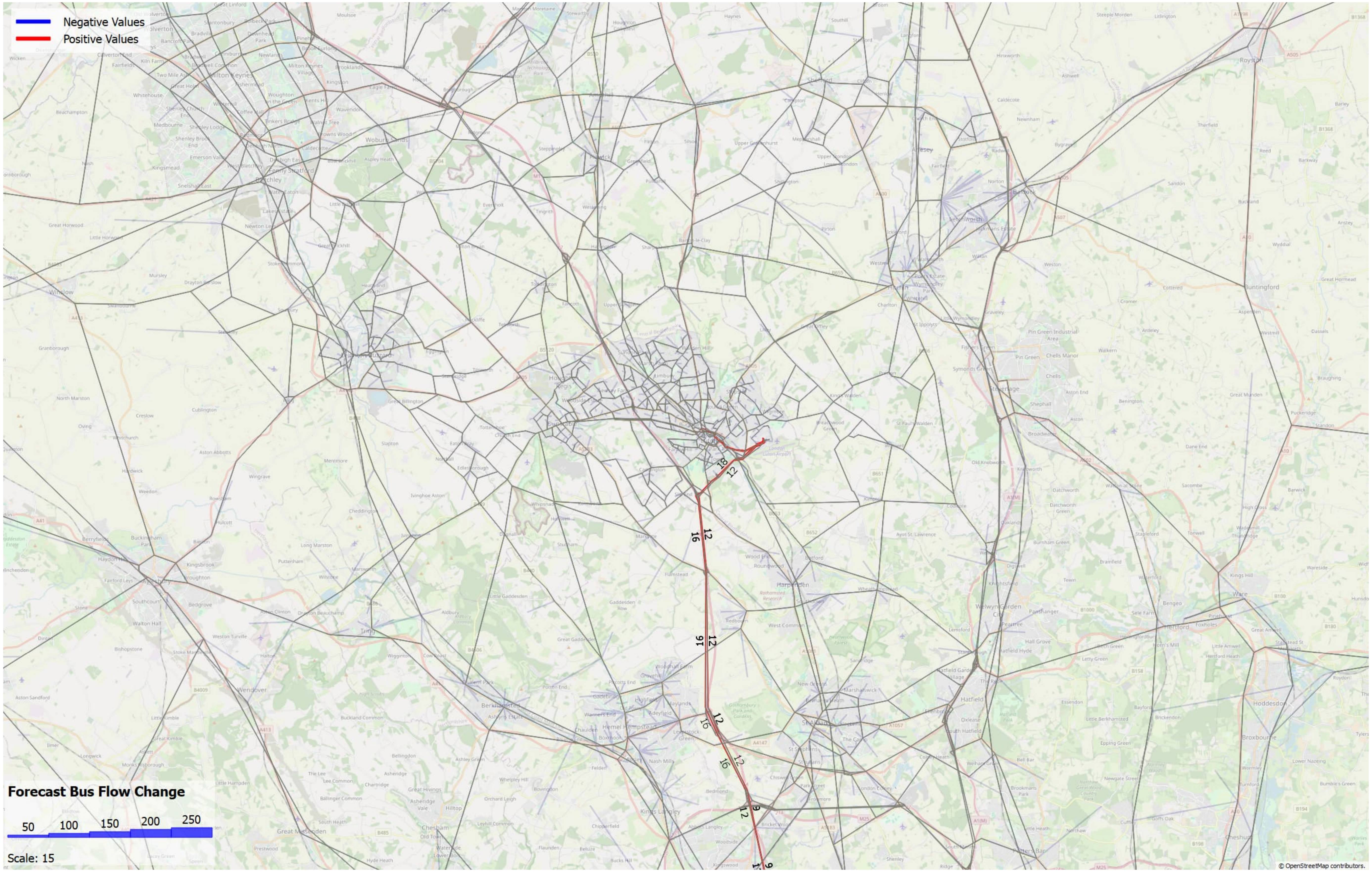
2043 PM Peak "With" Expansion (Updated vs Original) Rail forecast comparison (passenger per hour)



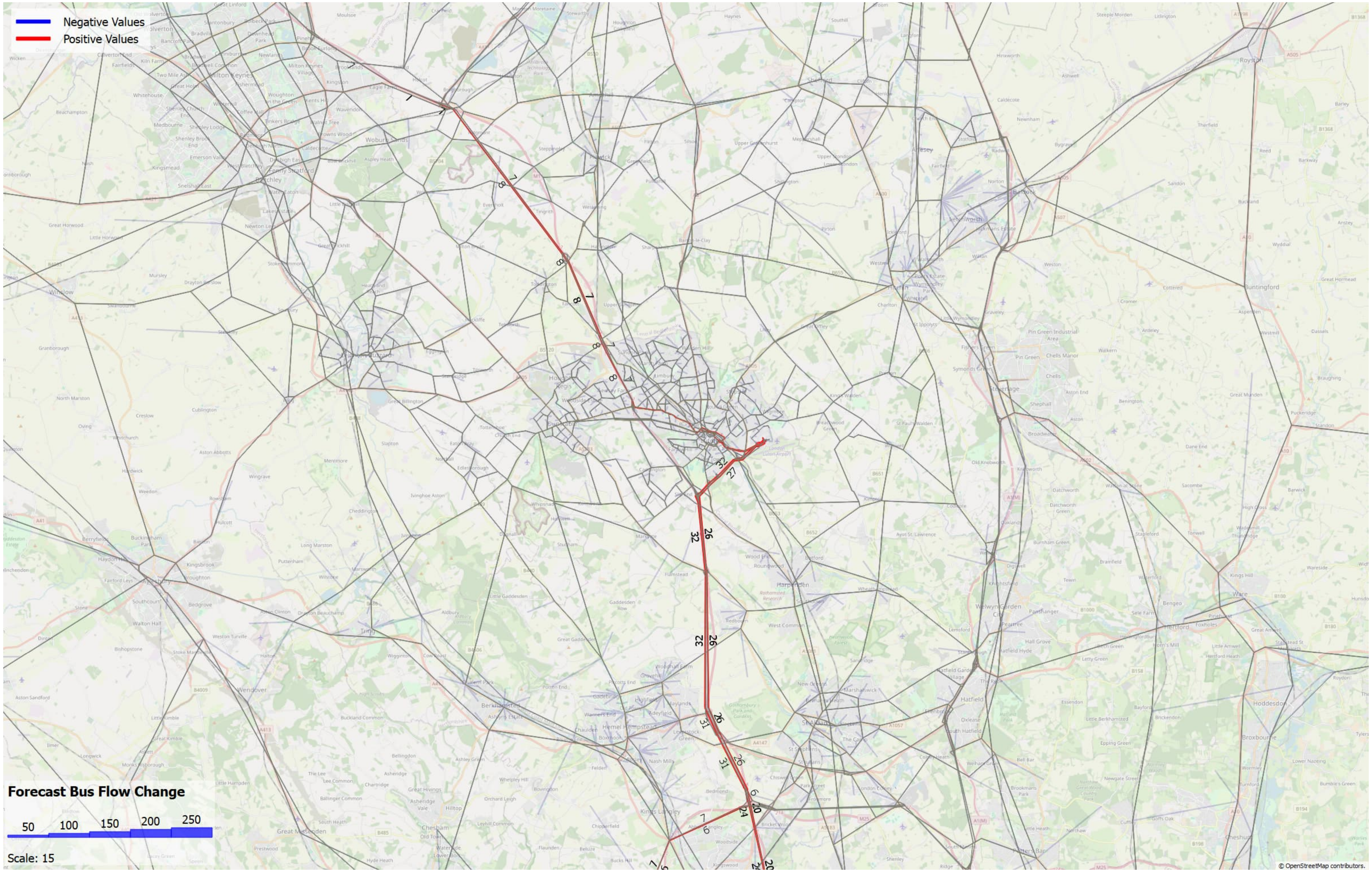
2027 AM Peak Original Run “With” vs “Without” Expansion Bus forecast comparison (passenger per hour)



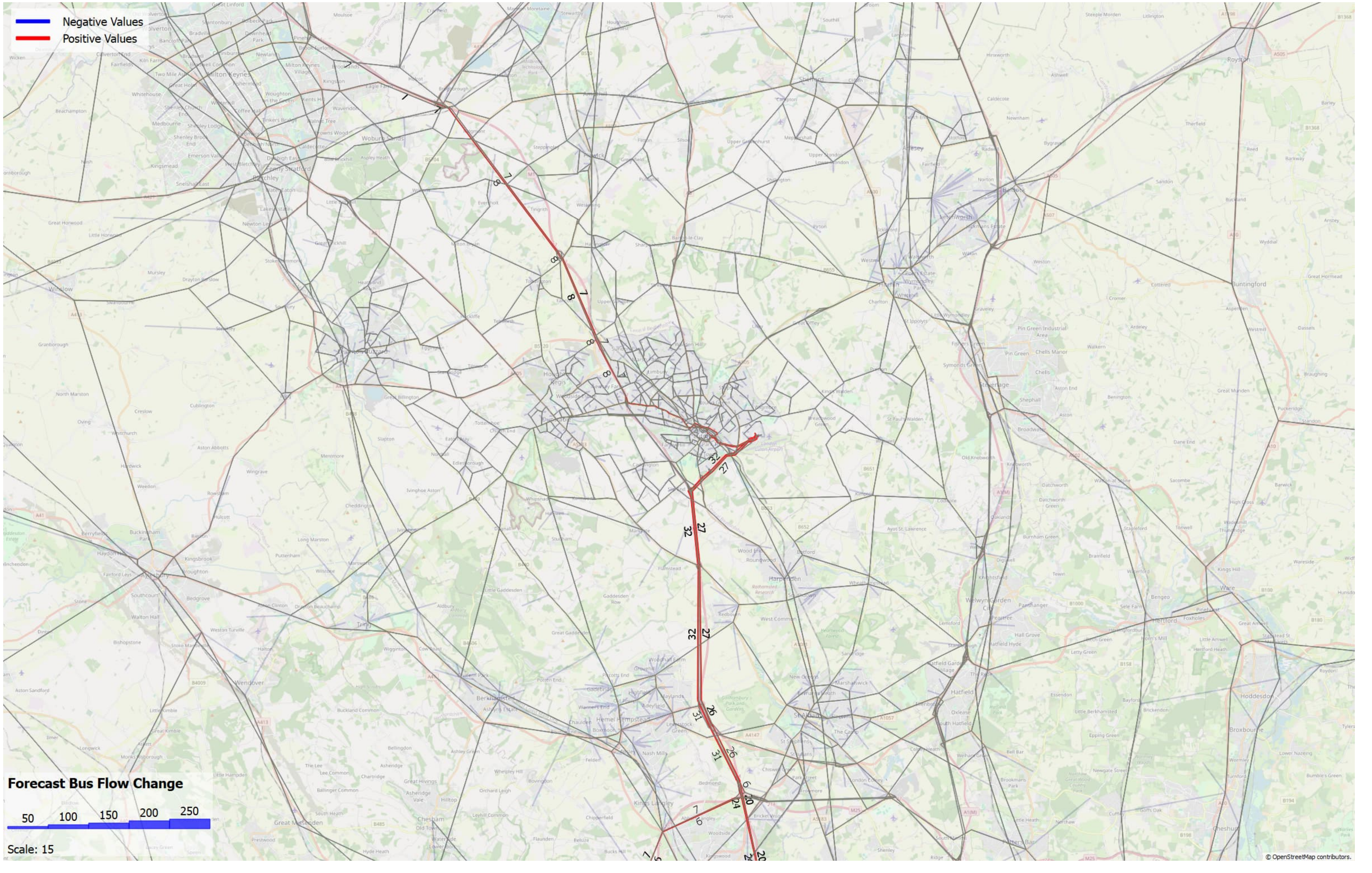
2027 AM Peak Updated Run “With” vs “Without” Expansion Bus forecast comparison (passenger per hour)



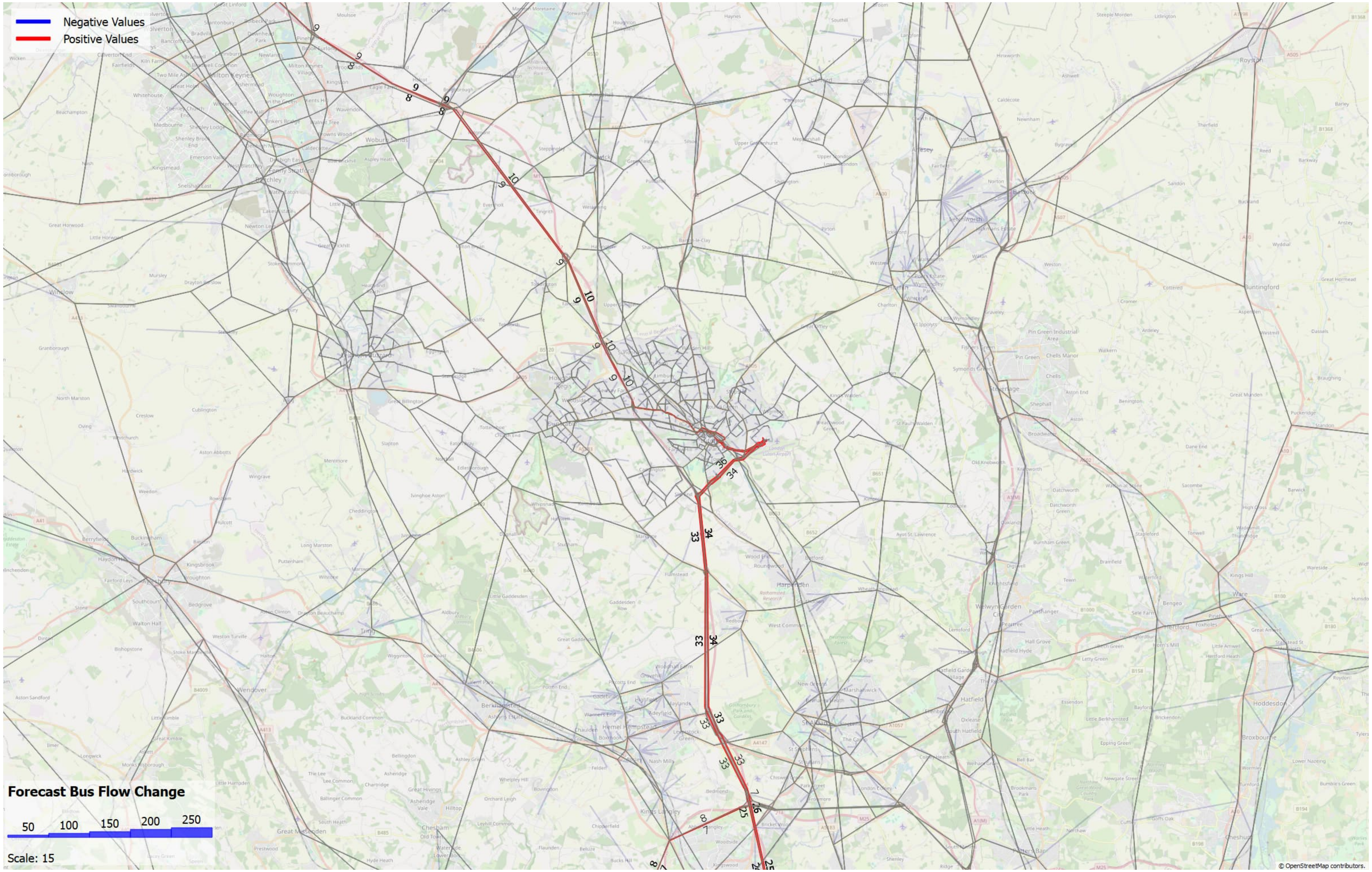
2027 Inter Peak Original Run “With” vs “Without” Expansion Bus forecast comparison (passenger per hour)



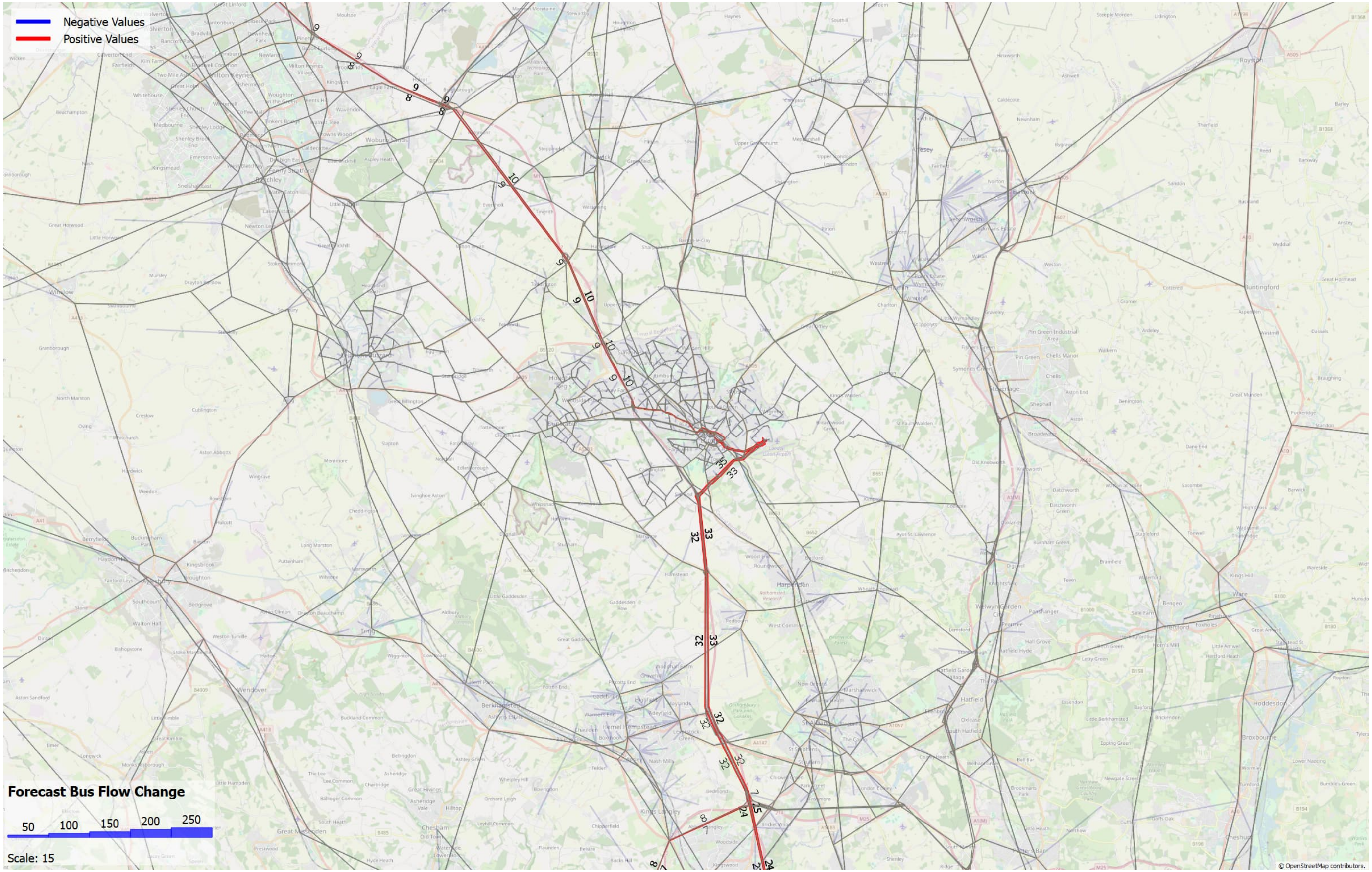
2027 Inter Peak Updated Run "With" vs "Without" Expansion Bus forecast comparison (passenger per hour)



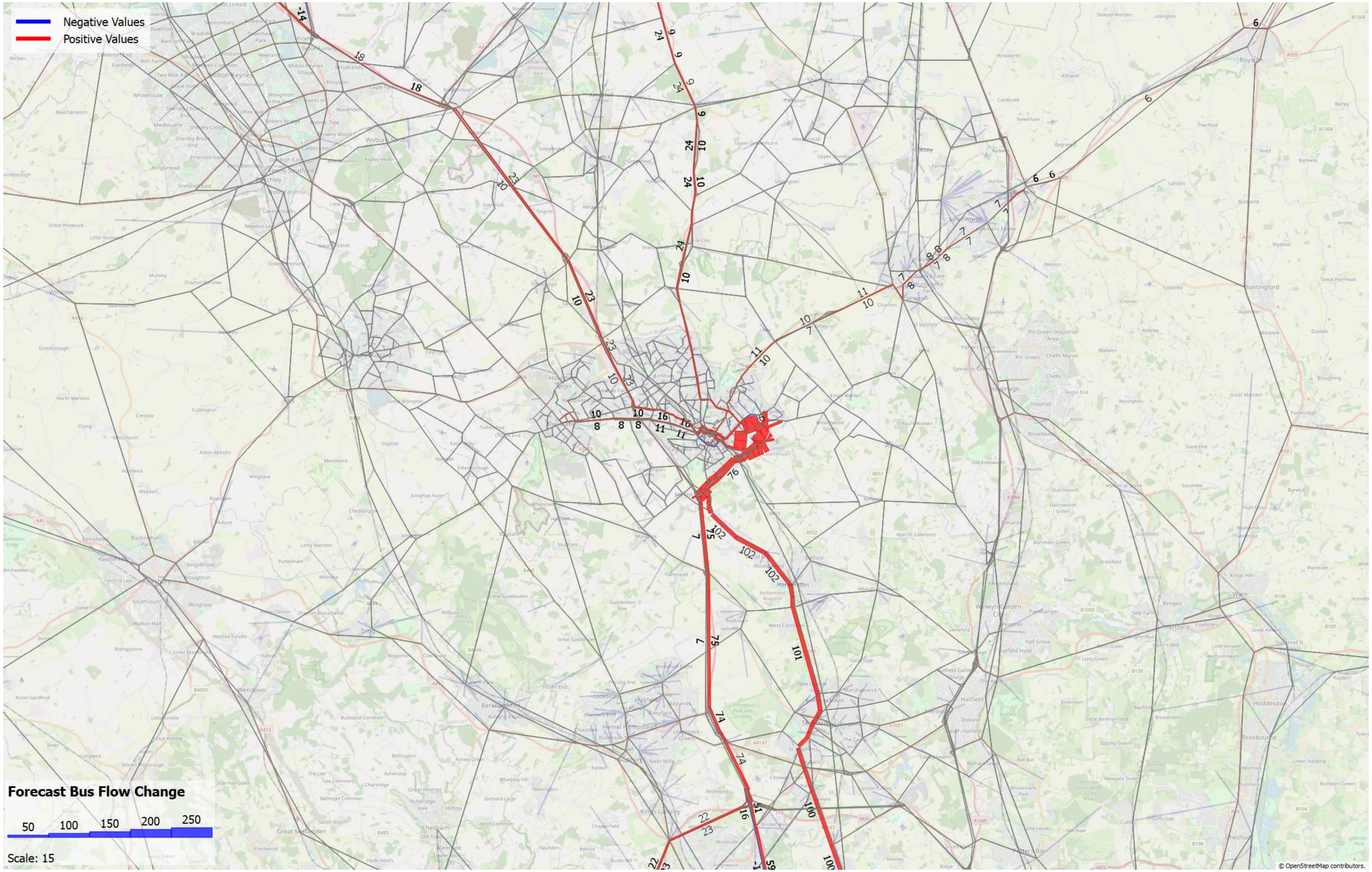
2027 PM Peak Original Run “With” vs “Without” Expansion Bus forecast comparison (passenger per hour)



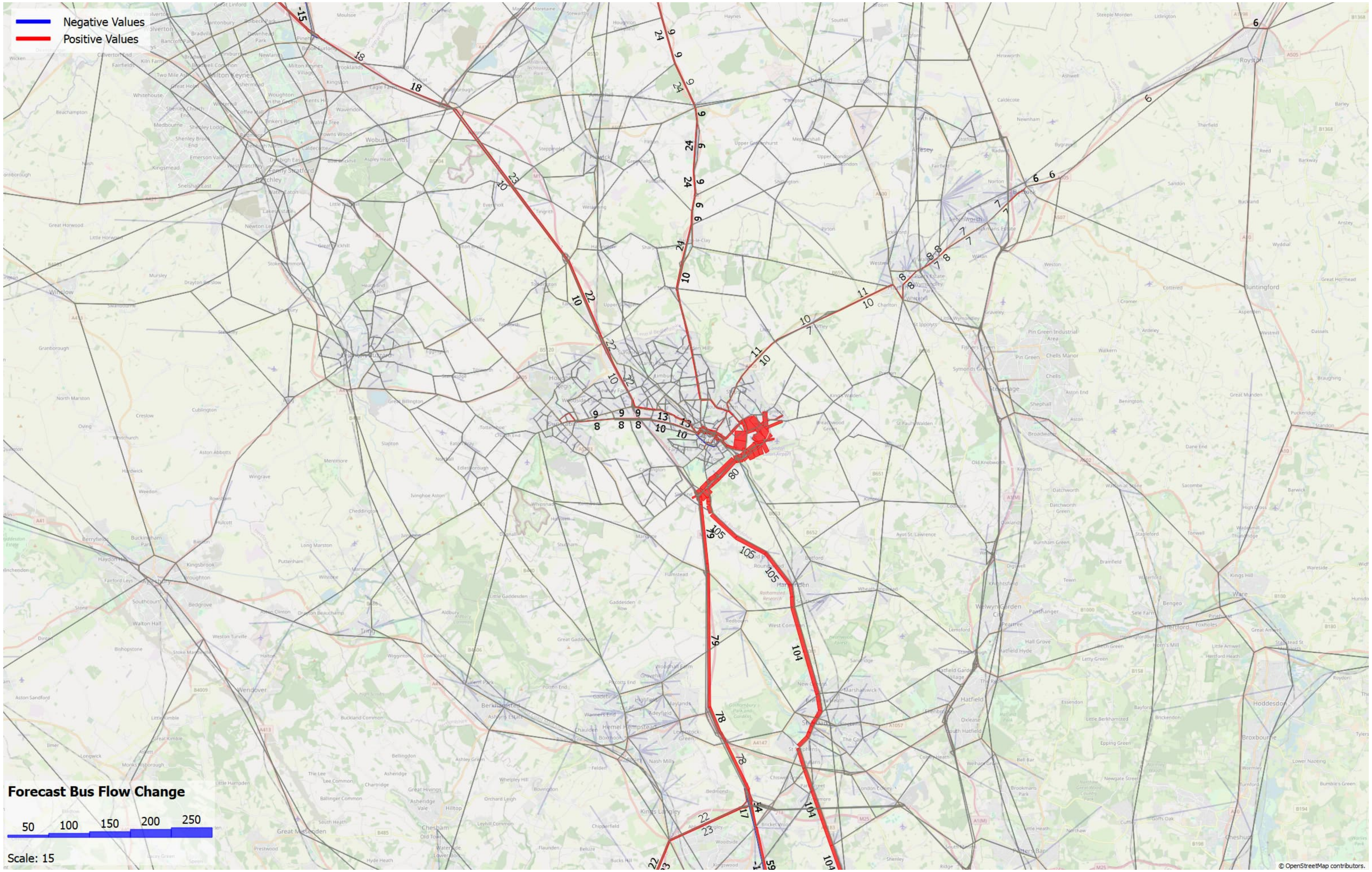
2027 PM Peak Updated Run “With” vs “Without” Expansion Bus forecast comparison (passenger per hour)



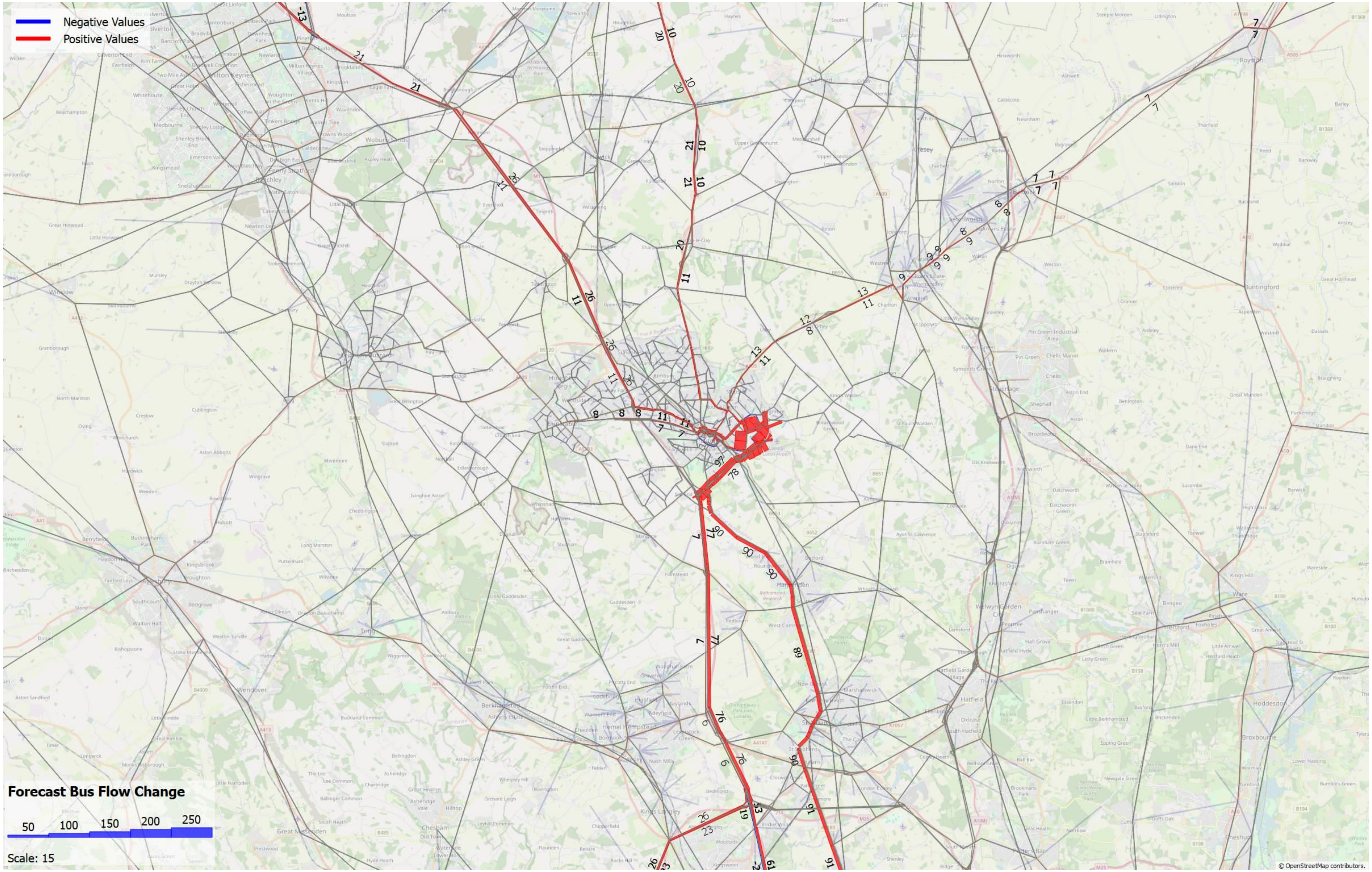
2039 AM Peak Original Run “With” vs “Without” Expansion Bus forecast comparison (passenger per hour)



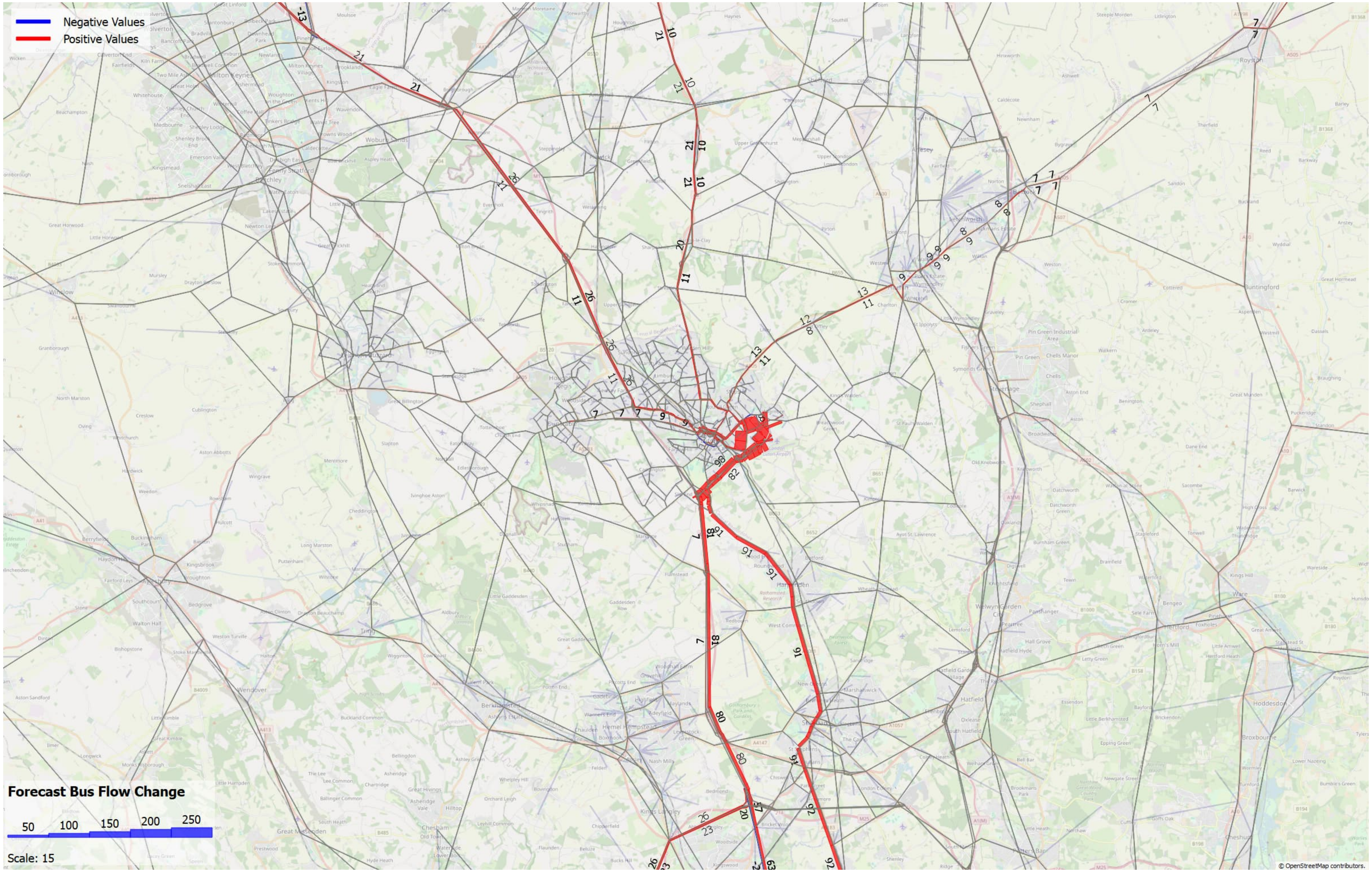
2039 AM Peak Updated Run “With” vs “Without” Expansion Bus forecast comparison (passenger per hour)



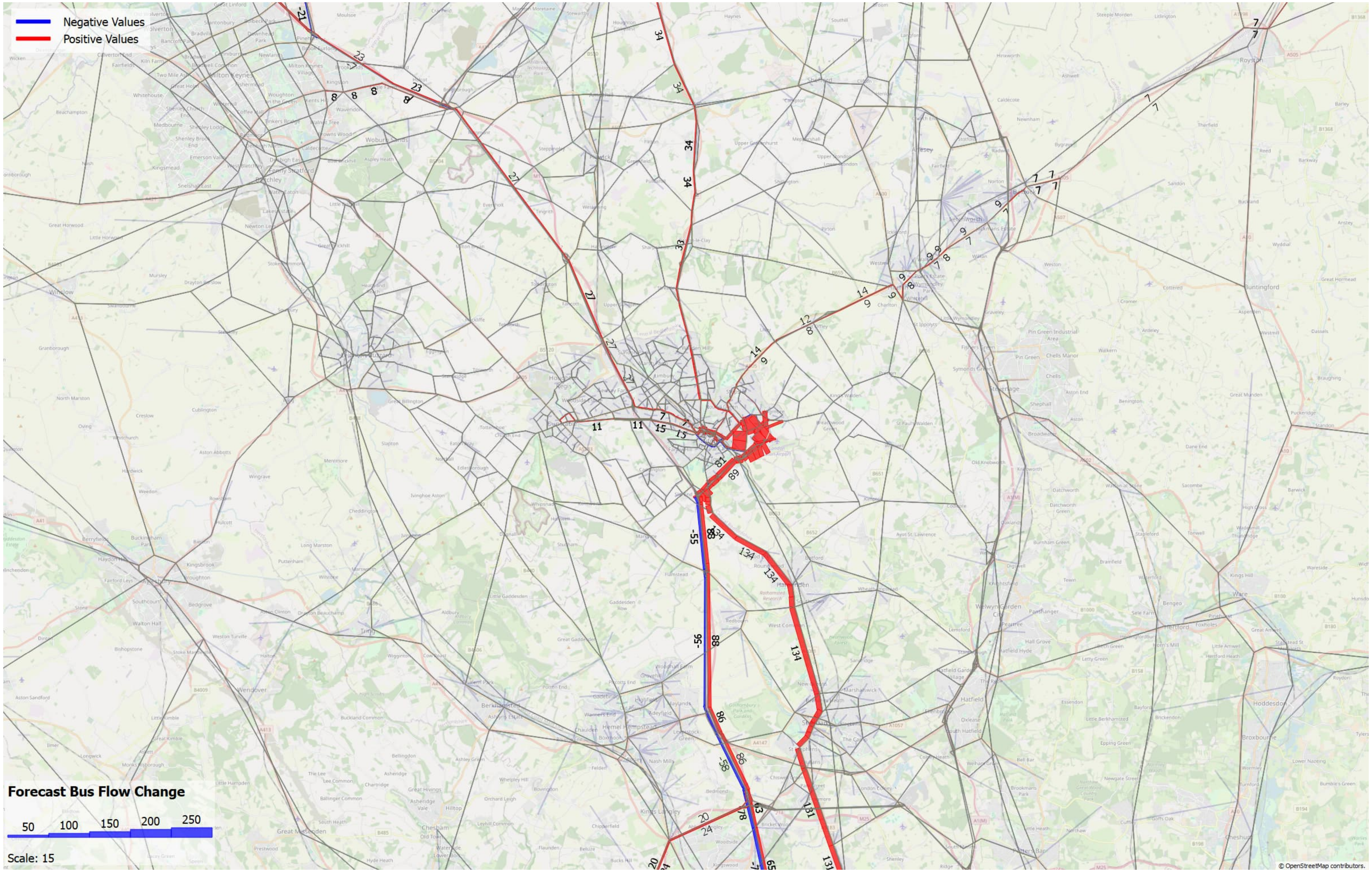
2039 Inter Peak Original Run “With” vs “Without” Expansion Bus forecast comparison (passenger per hour)



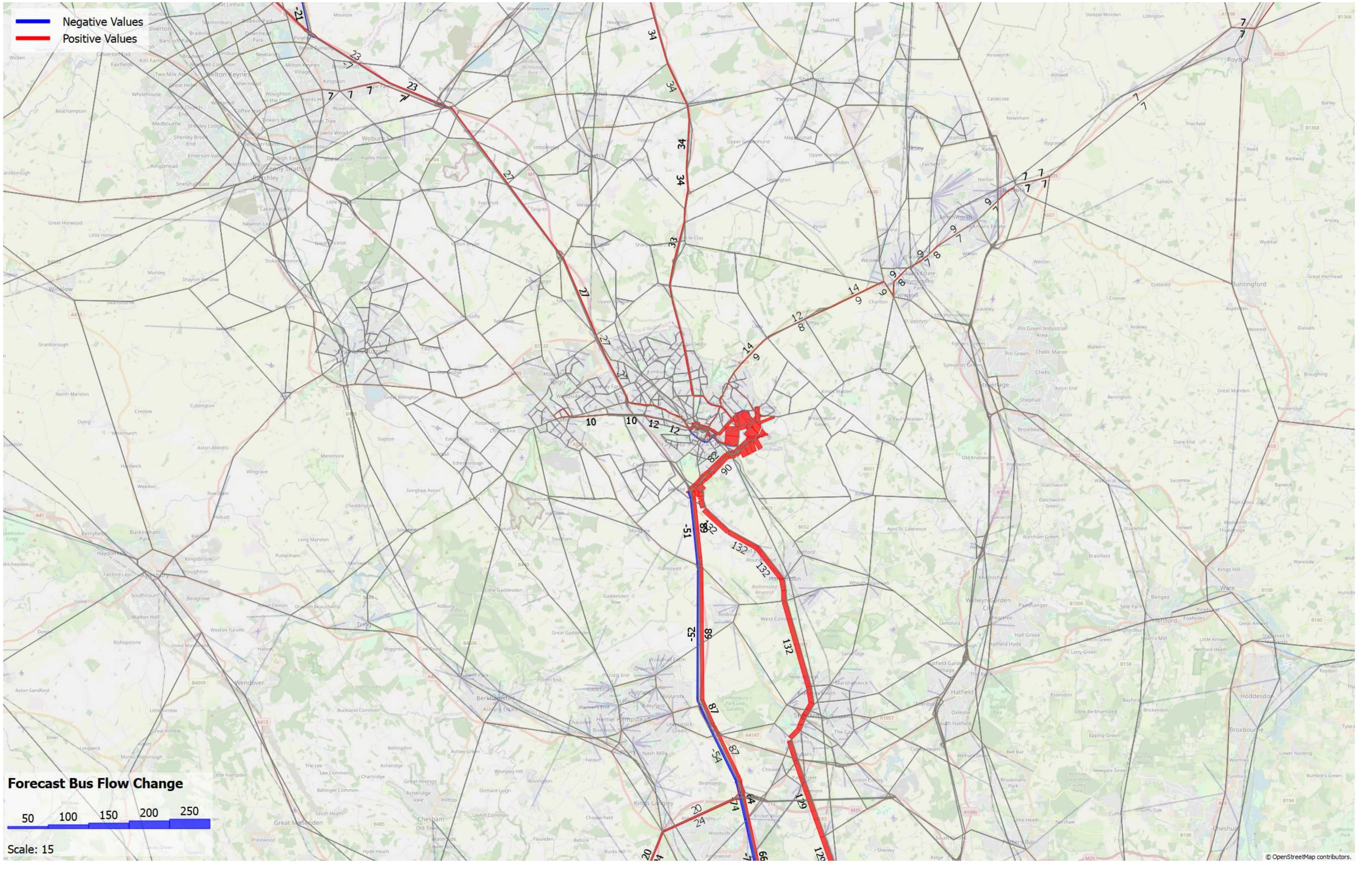
2039 Inter Peak Updated Run “With” vs “Without” Expansion Bus forecast comparison (passenger per hour)



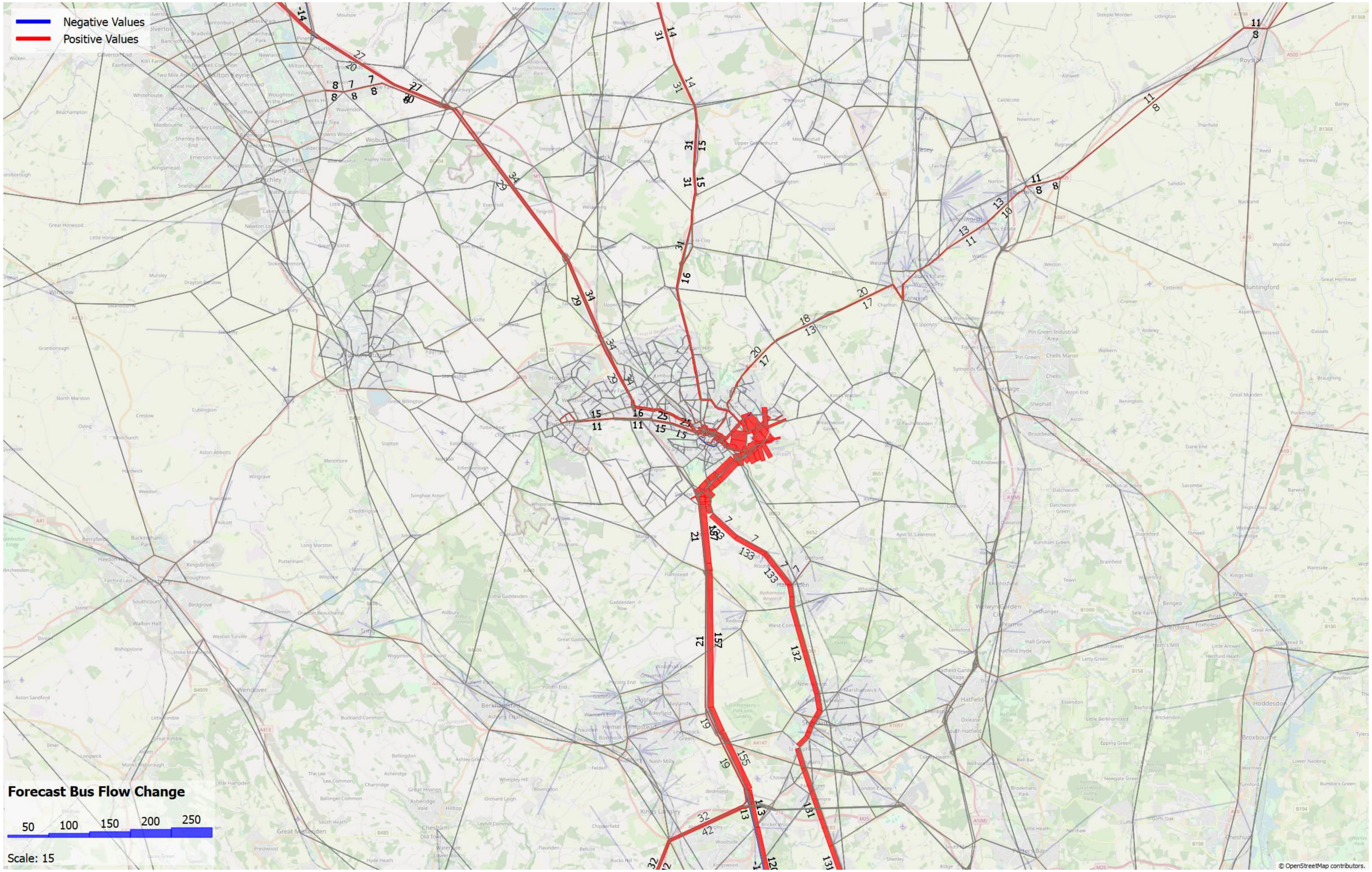
2039 PM Peak Original Run “With” vs “Without” Expansion Bus forecast comparison (passenger per hour)



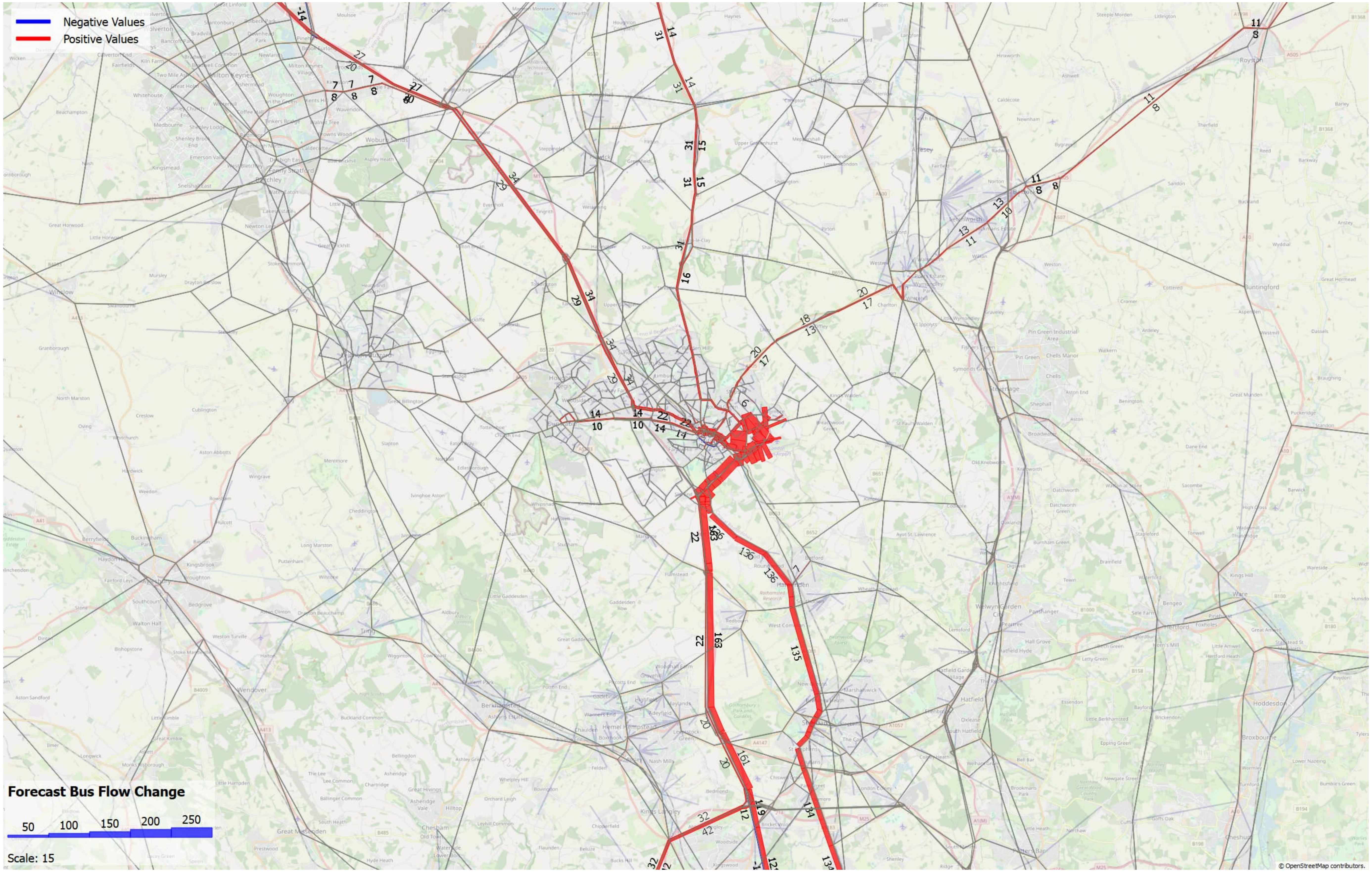
2039 PM Peak Updated Run “With” vs “Without” Expansion Bus forecast comparison (passenger per hour)



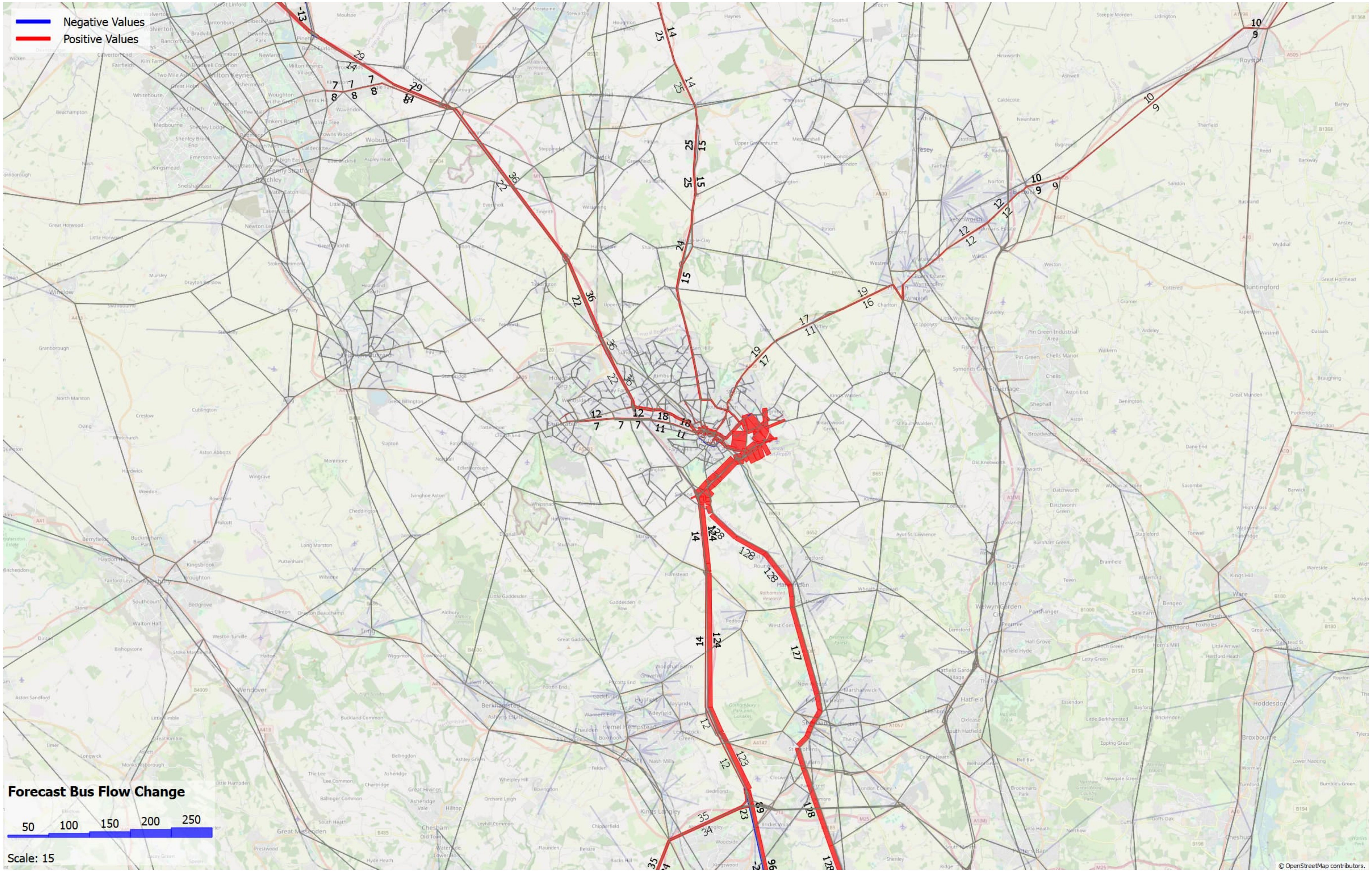
2043 AM Peak Original Run “With” vs “Without” Expansion Bus forecast comparison (passenger per hour)



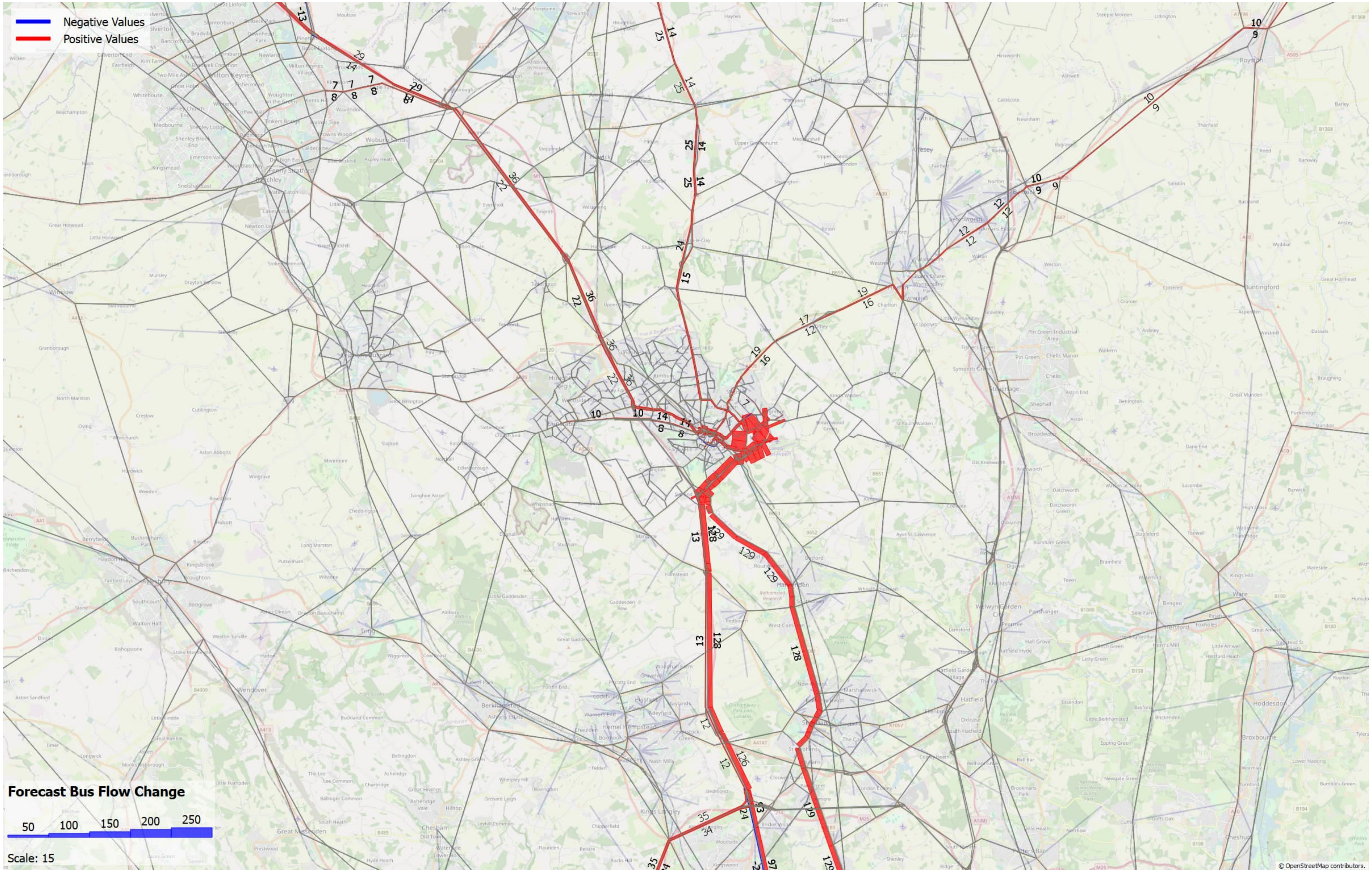
2043 AM Peak Updated Run “With” vs “Without” Expansion Bus forecast comparison (passenger per hour)



2043 Inter Peak Original Run “With” vs “Without” Expansion Bus forecast comparison (passenger per hour)



2043 Inter Peak Updated Run "With" vs "Without" Expansion Bus forecast comparison (passenger per hour)



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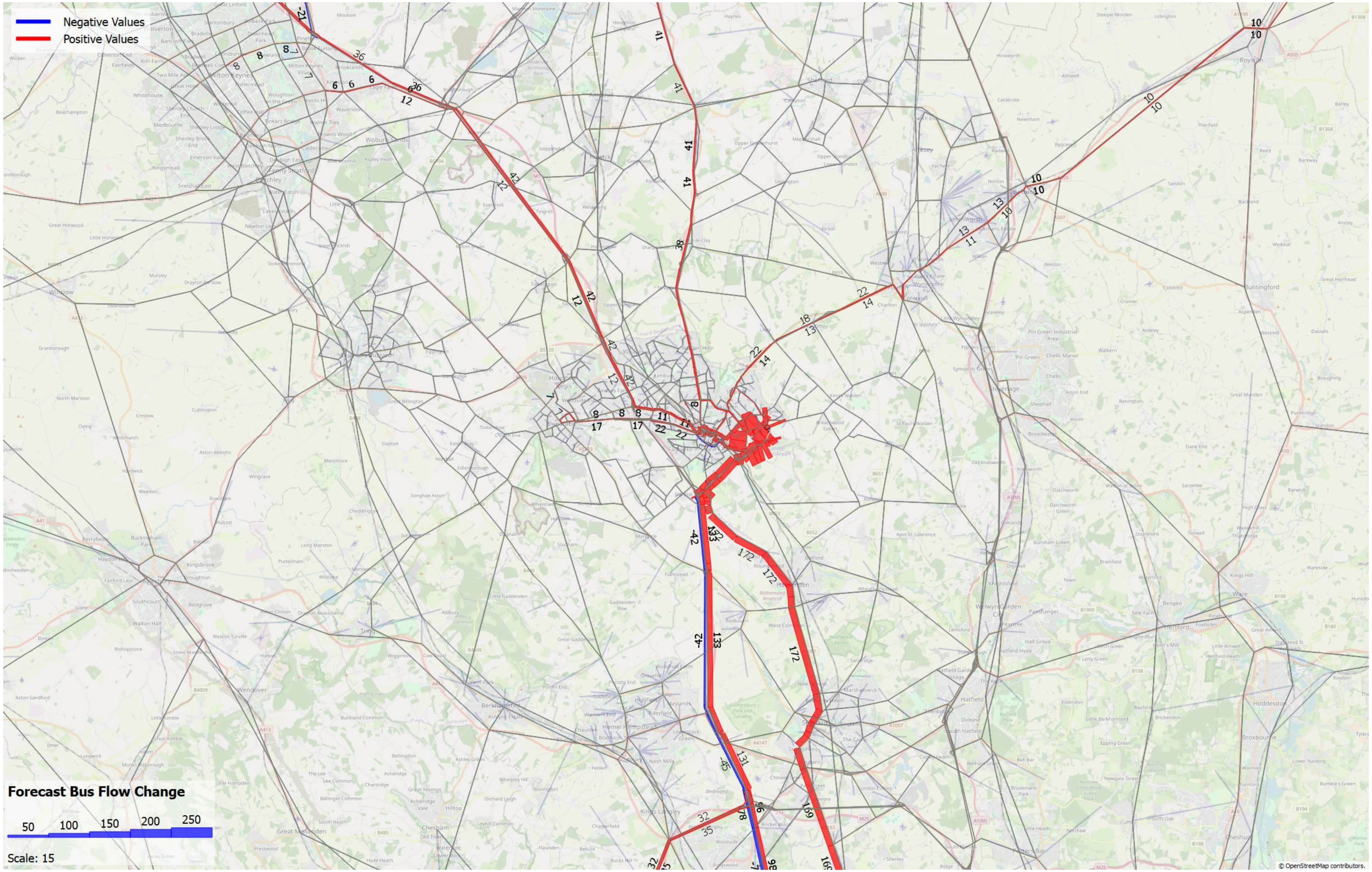
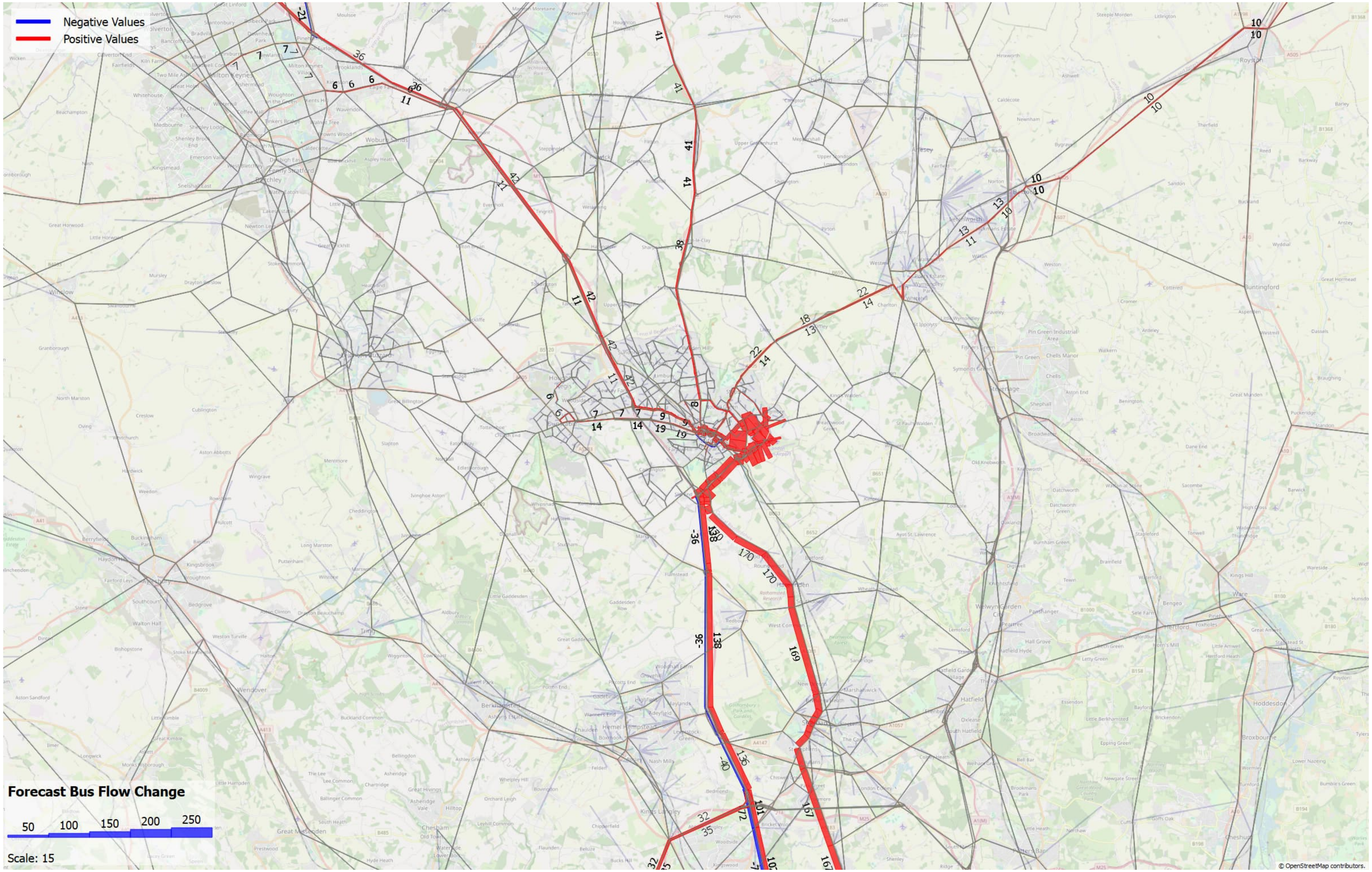
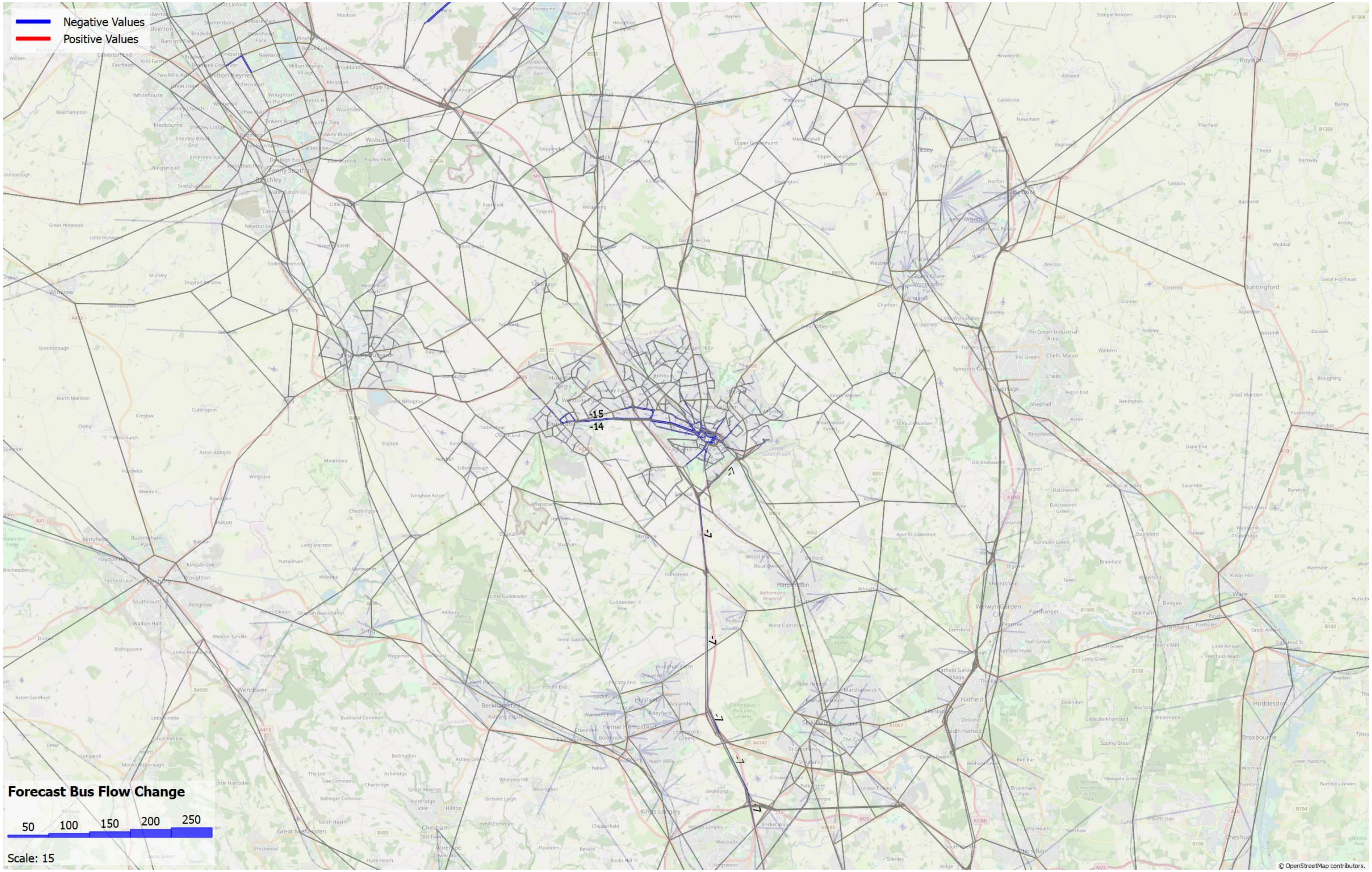


2043 PM Peak Updated Run “With” vs “Without” Expansion Bus forecast comparison (passenger per hour)

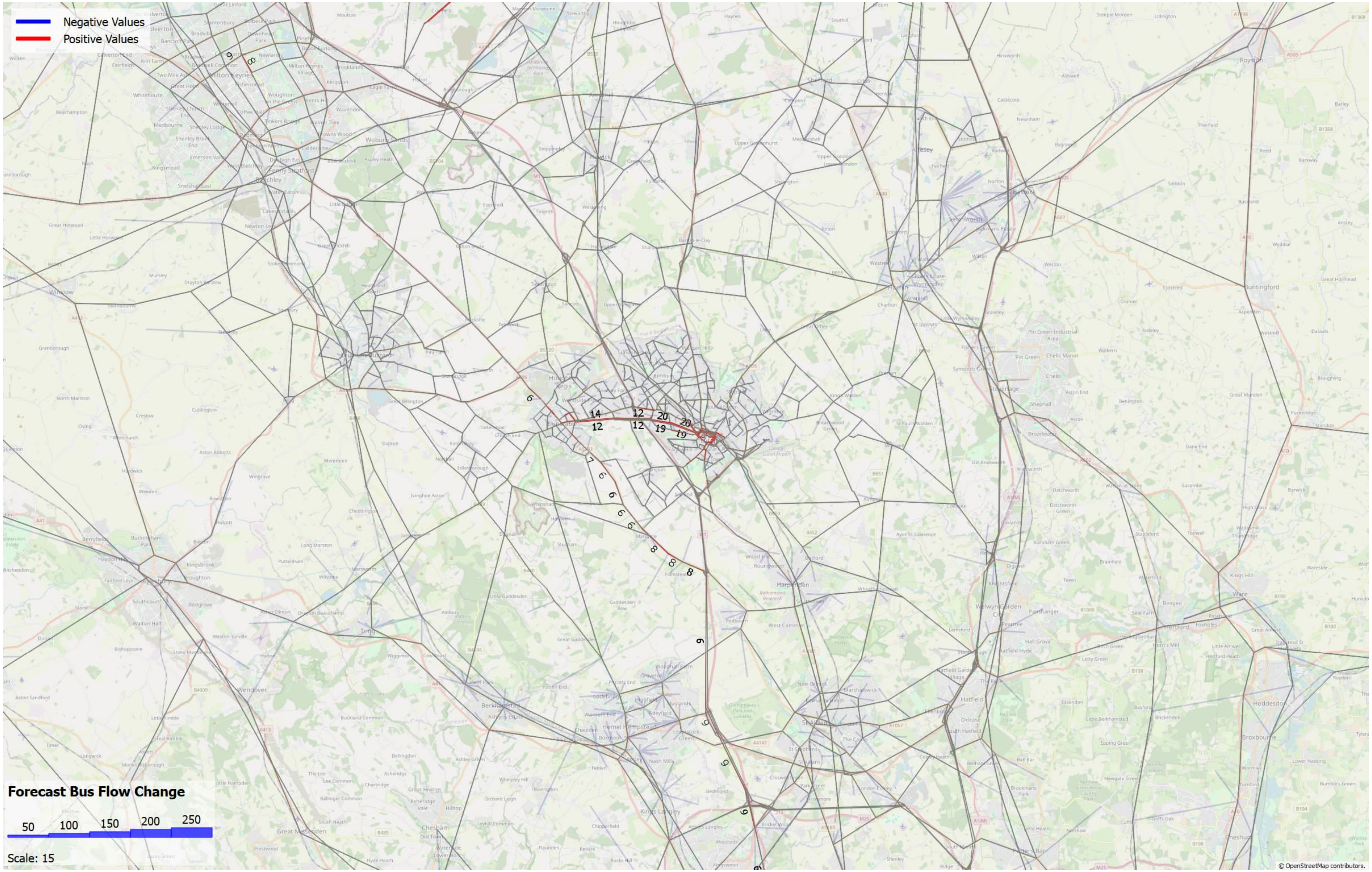


2027 AM Peak “Without” Expansion (Updated vs Original) Bus forecast comparison (passenger per hour)

2027 Inter Peak “Without” Expansion (Updated vs Original) Bus forecast comparison (passenger per hour)

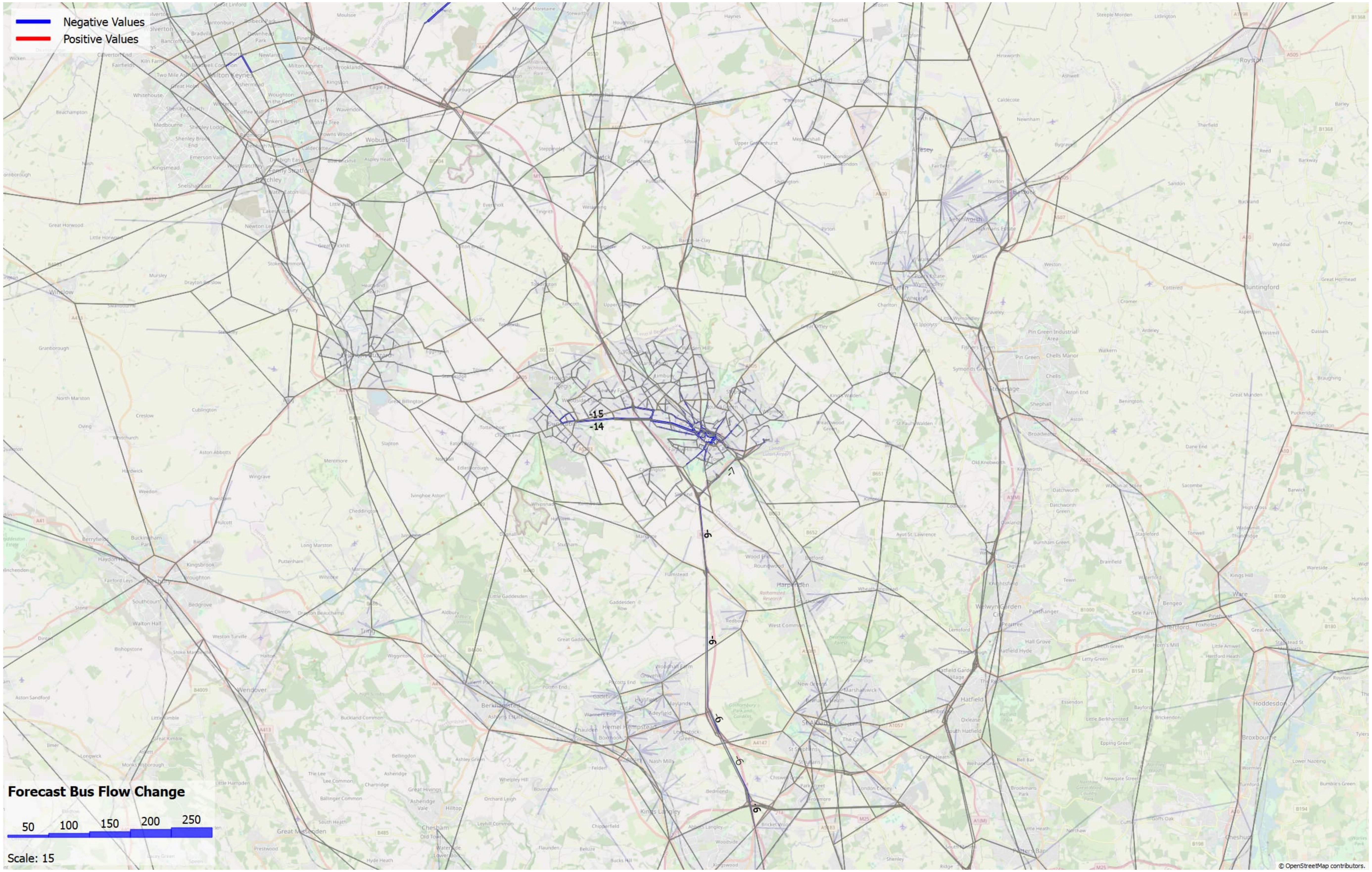


2027 PM Peak “Without” Expansion (Updated vs Original) Bus forecast comparison (passenger per hour)



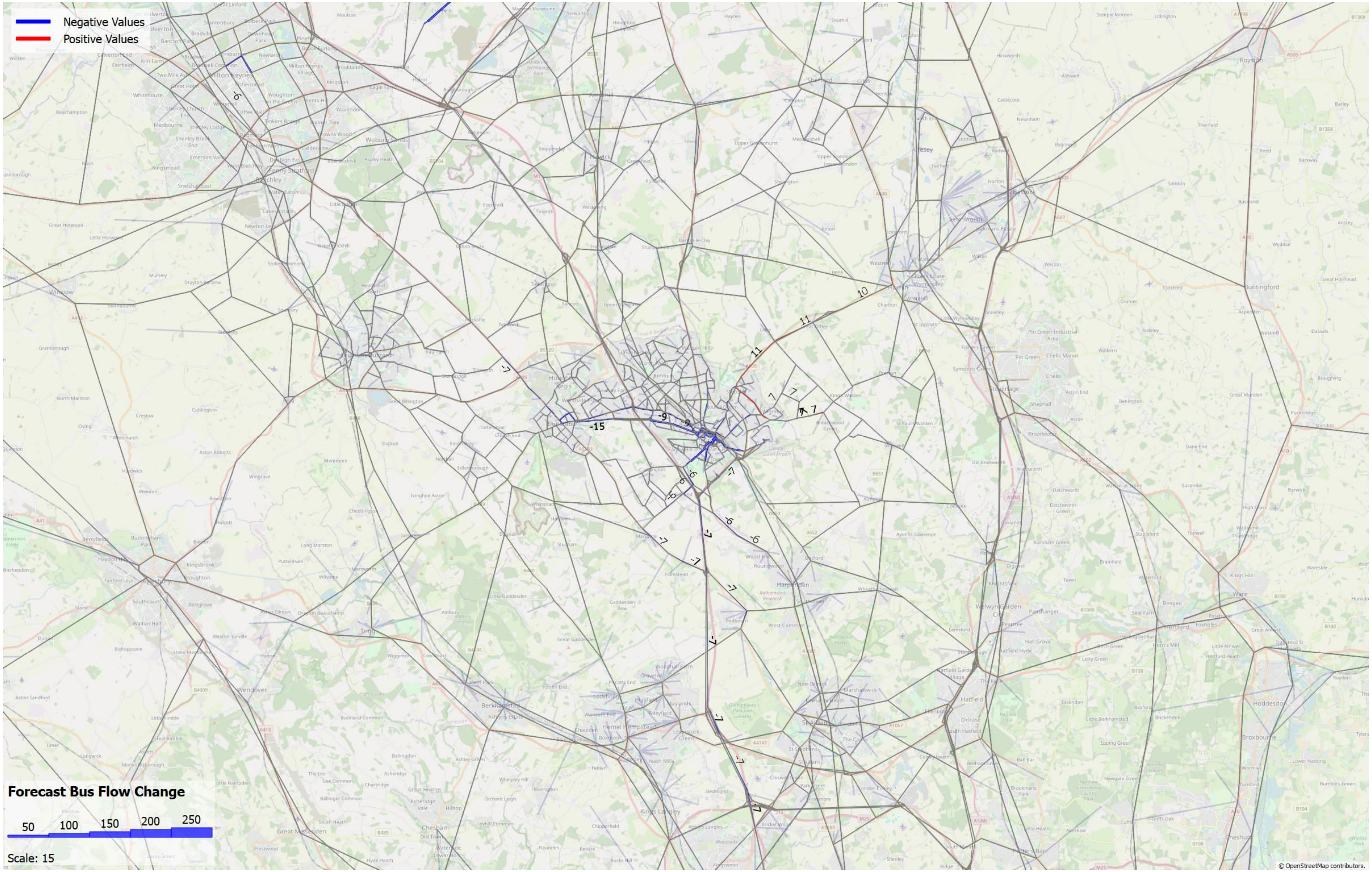
2027 AM Peak “With” Expansion (Updated vs Original) Bus forecast comparison (passenger per hour)

2027 Inter Peak “With” Expansion (Updated vs Original) Bus forecast comparison (passenger per hour)

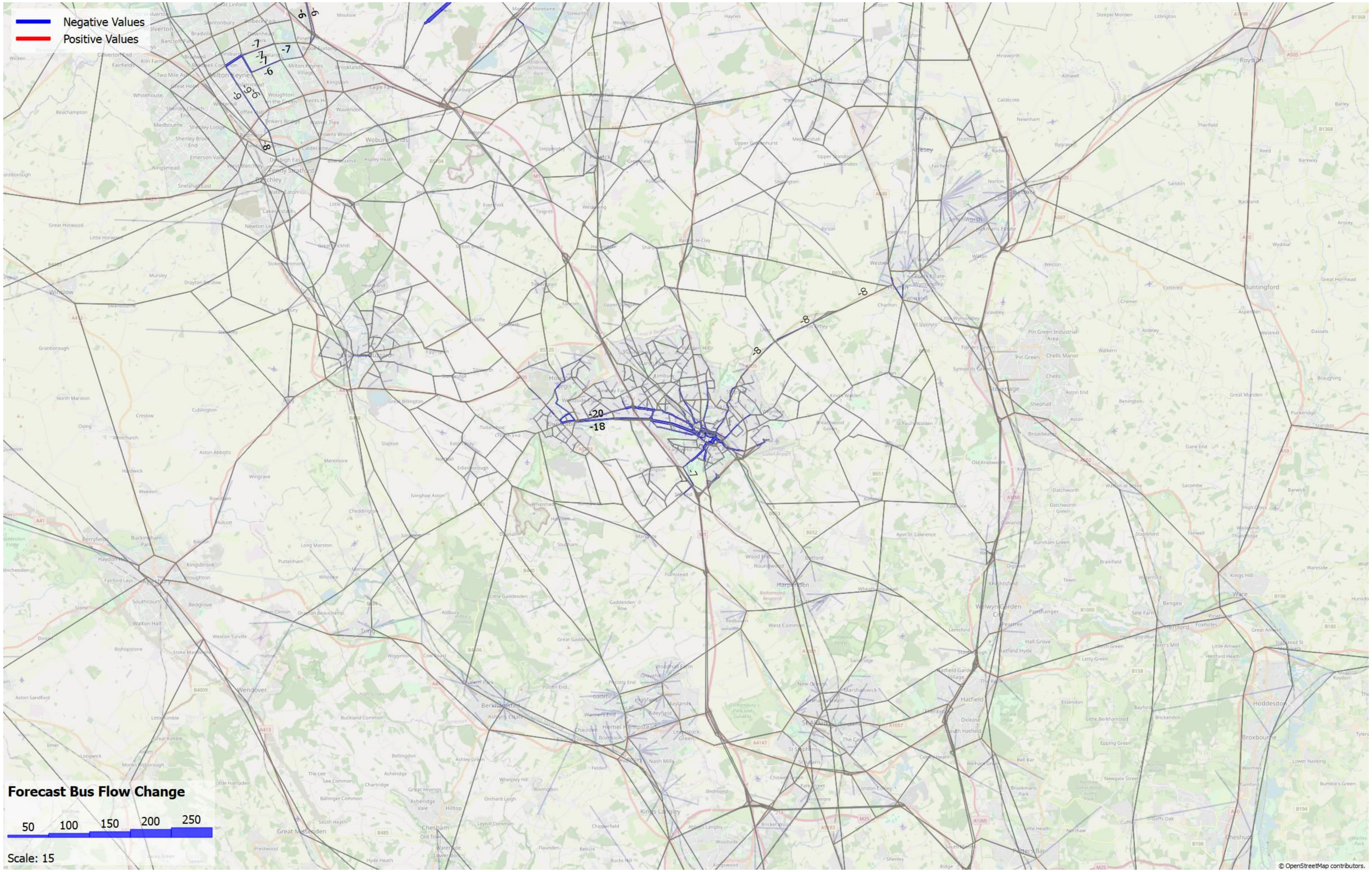


2027 PM Peak “With” Expansion (Updated vs Original) Bus forecast comparison (passenger per hour)

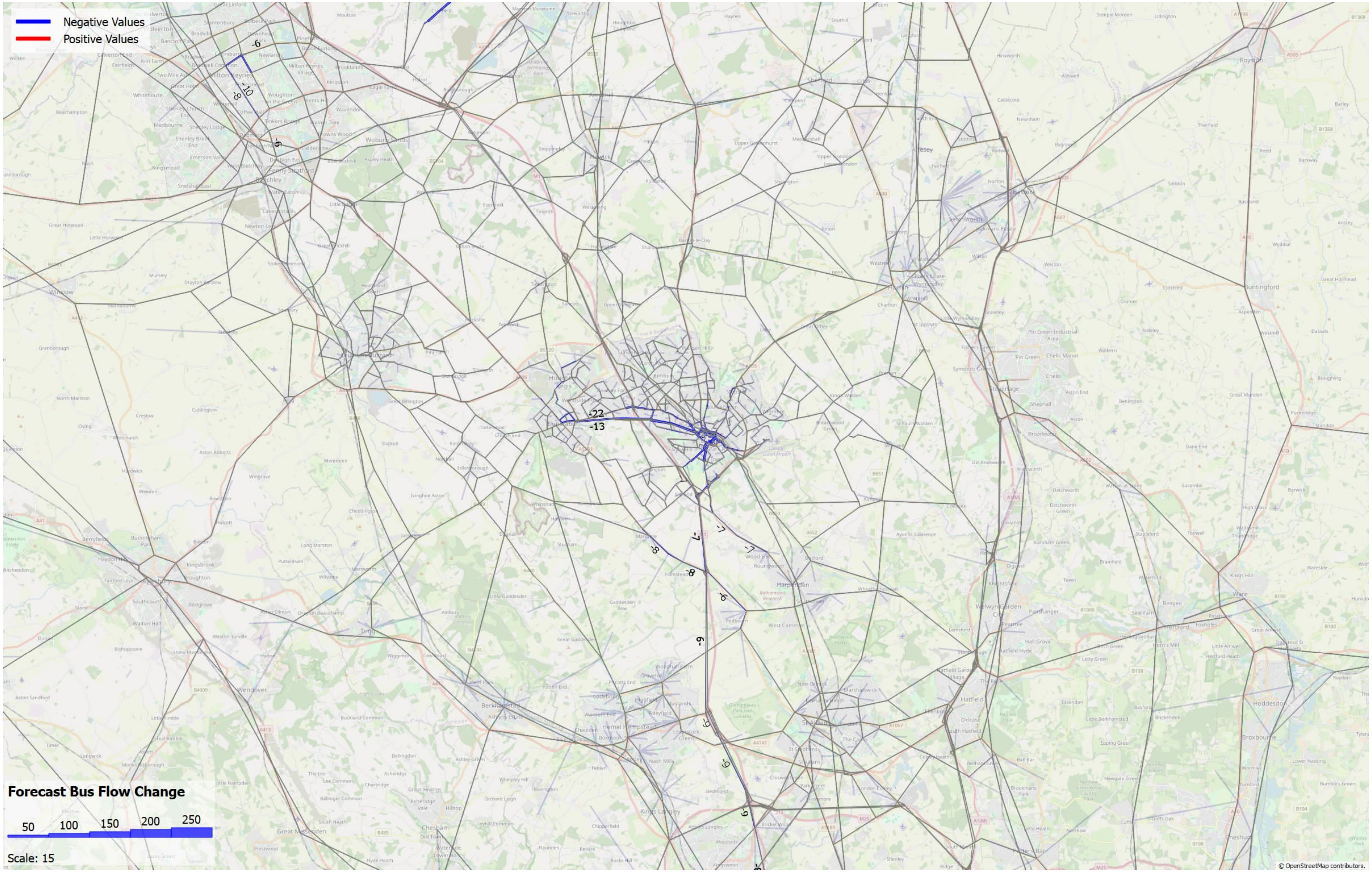
2039 AM Peak “Without” Expansion (Updated vs Original) Bus forecast comparison (passenger per hour)



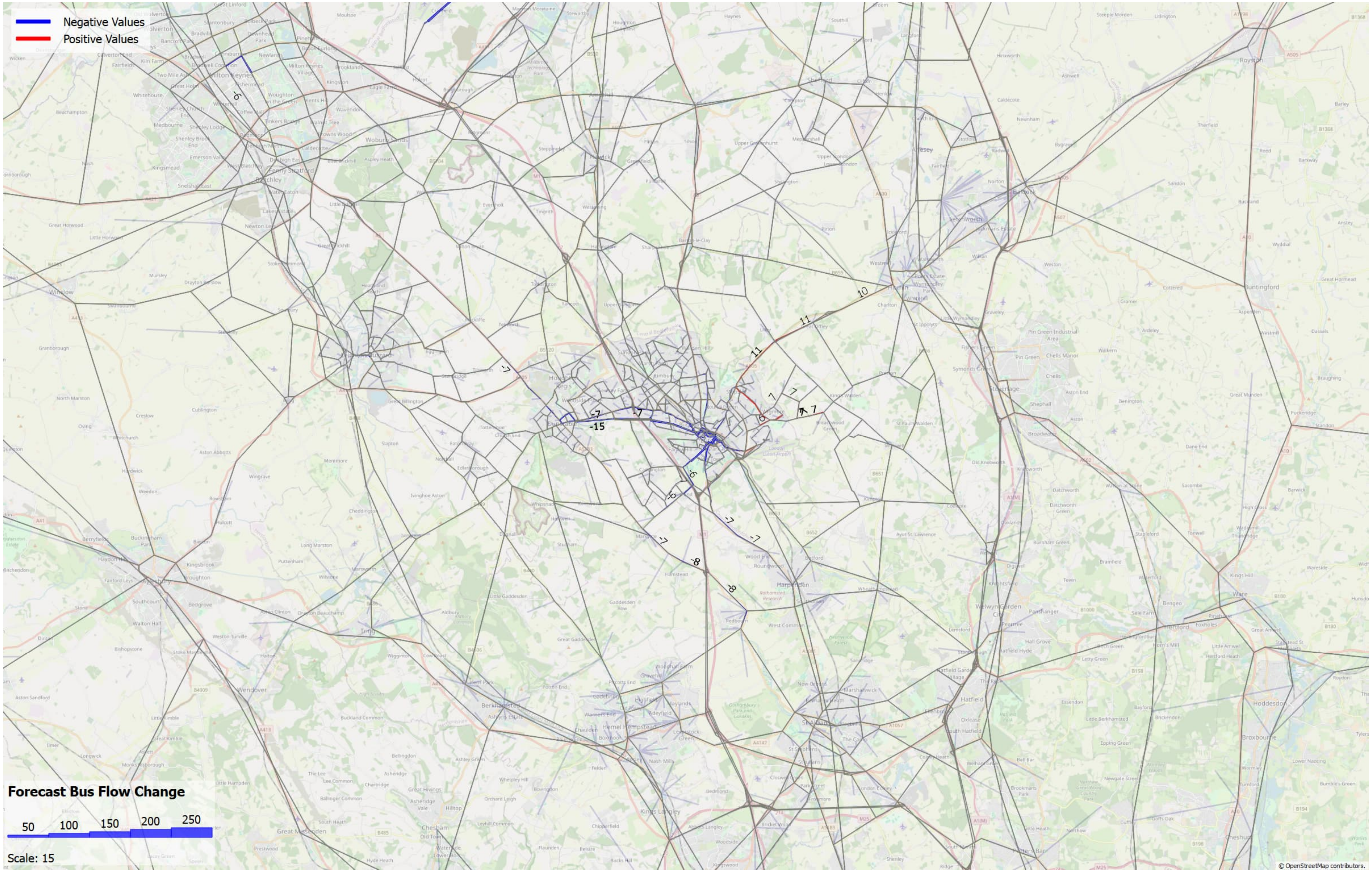
2039 Inter Peak “Without” Expansion (Updated vs Original) Bus forecast comparison (passenger per hour)



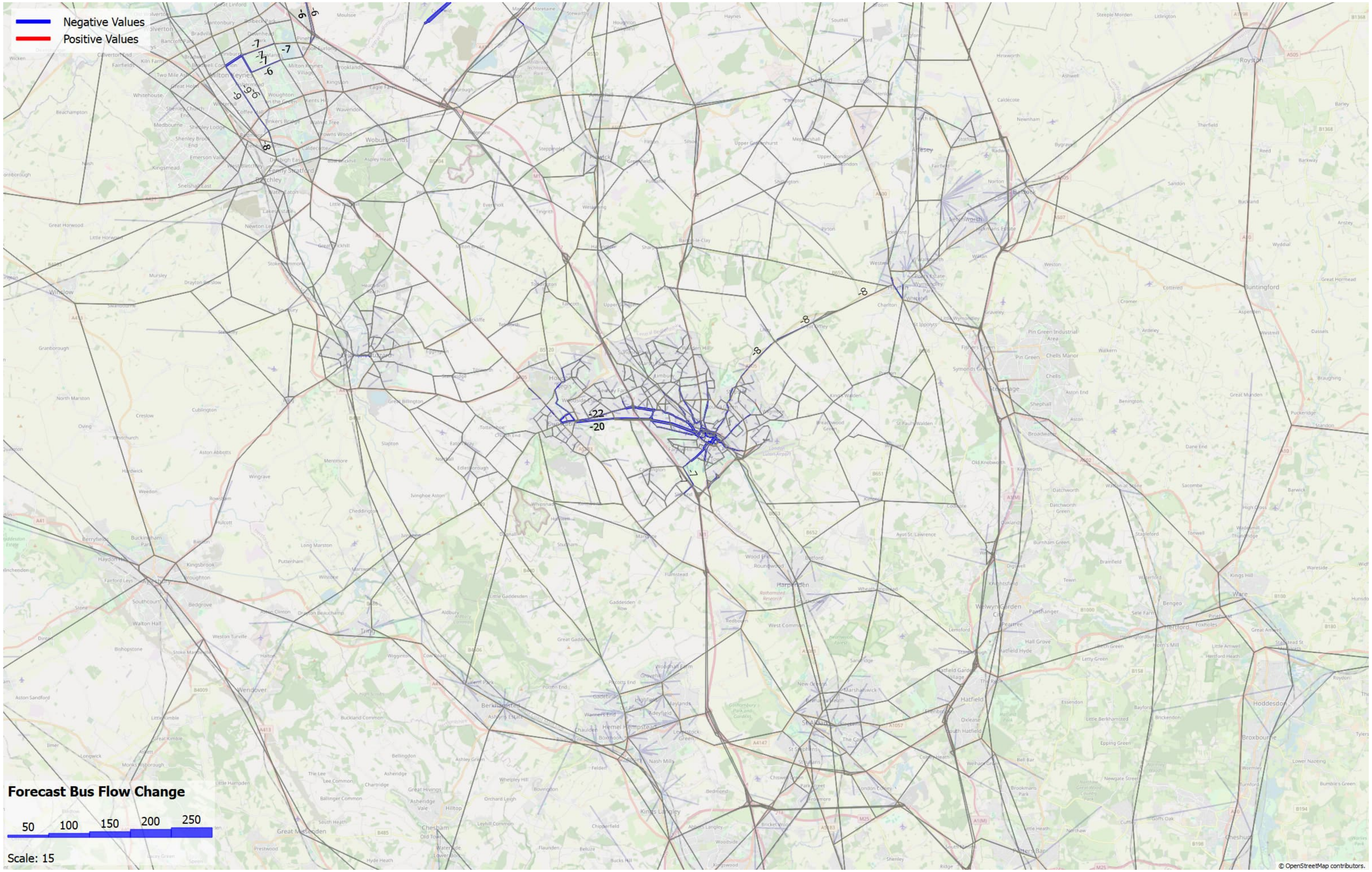
2039 PM Peak “Without” Expansion (Updated vs Original) Bus forecast comparison (passenger per hour)



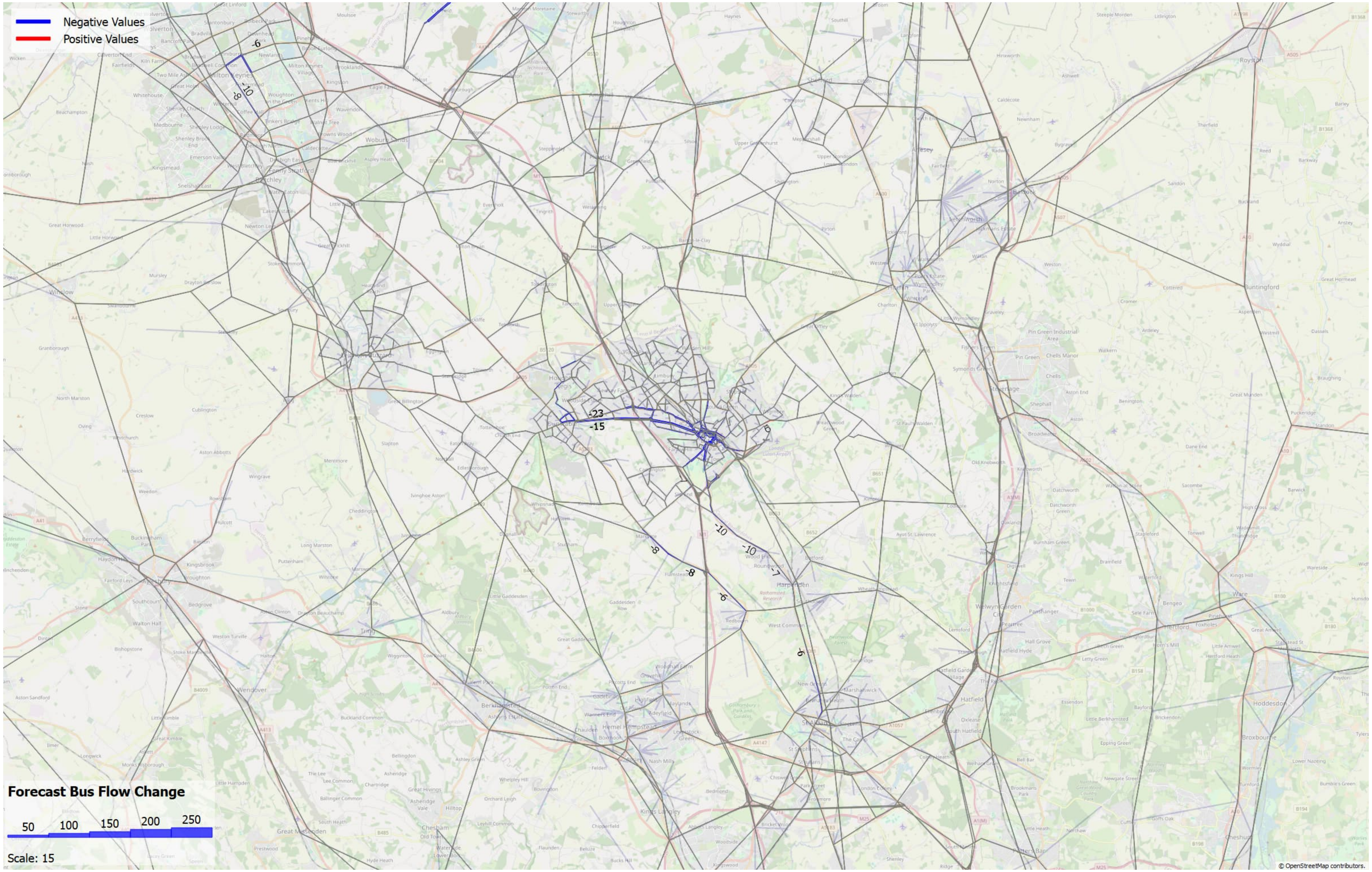
2039 AM Peak “With” Expansion (Updated vs Original) Bus forecast comparison (passenger per hour)



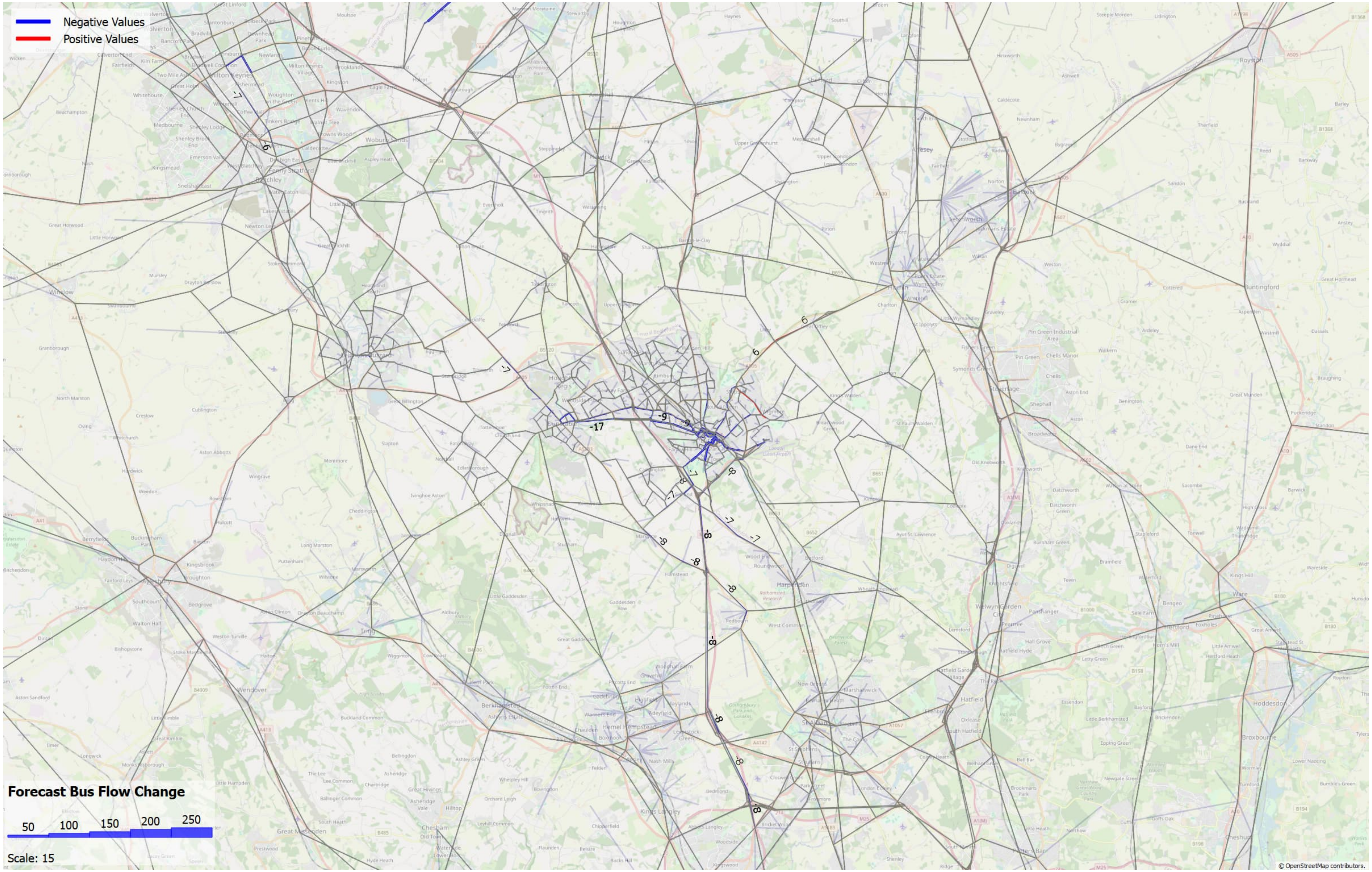
2039 Inter Peak "With" Expansion (Updated vs Original) Bus forecast comparison (passenger per hour)



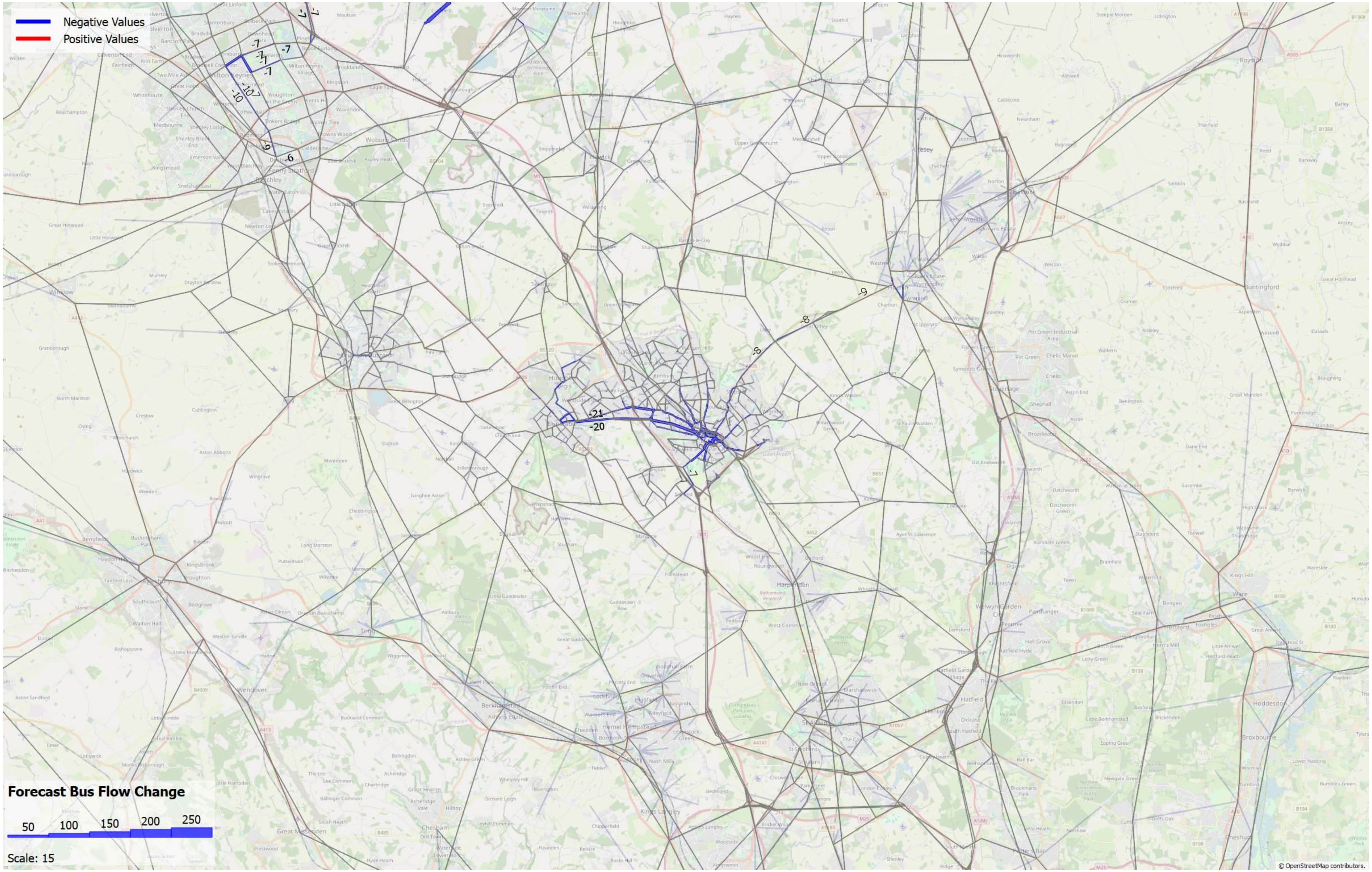
2039 PM Peak “With” Expansion (Updated vs Original) Bus forecast comparison (passenger per hour)



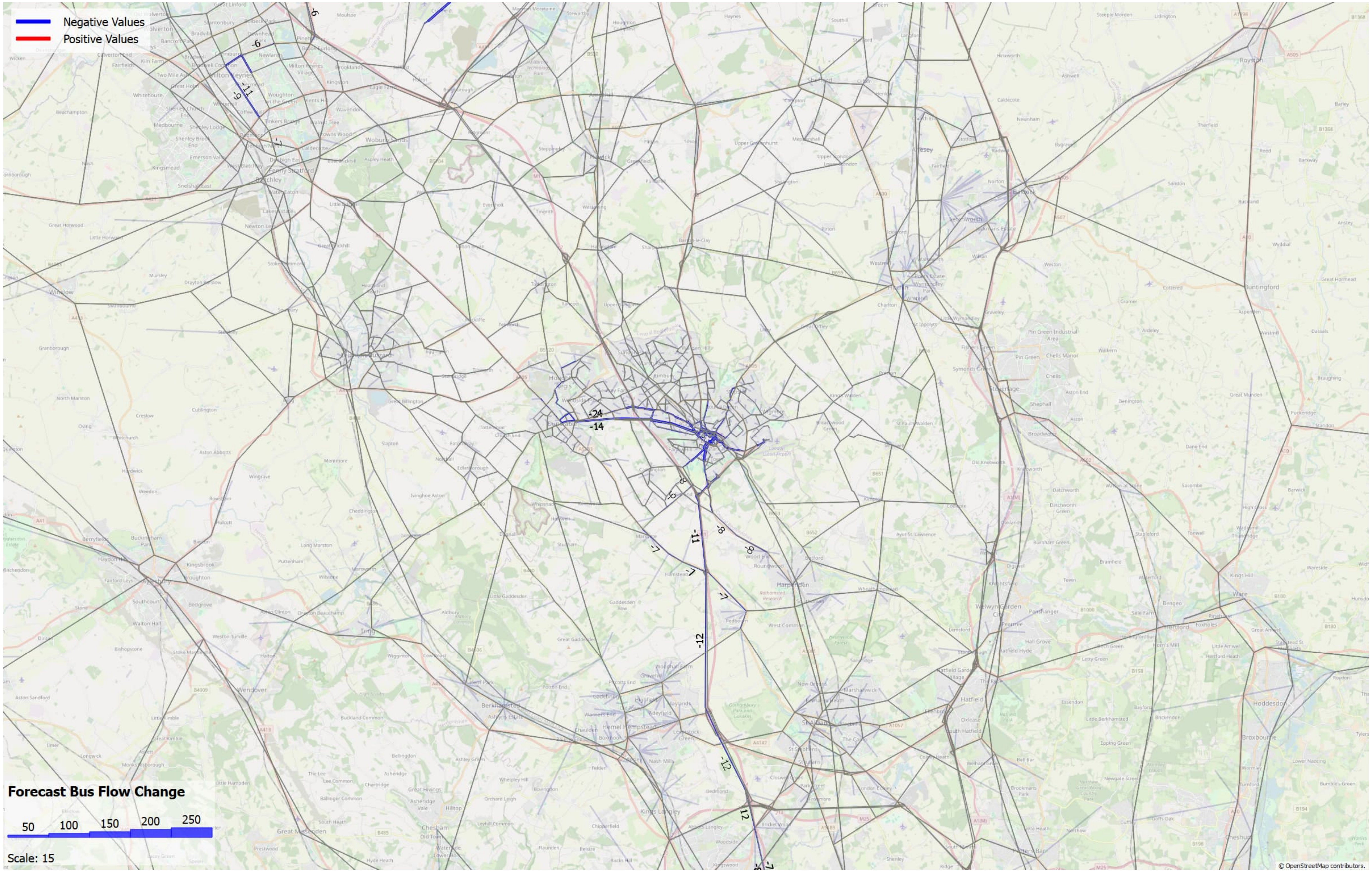
2043 AM Peak “Without” Expansion (Updated vs Original) Bus forecast comparison (passenger per hour)



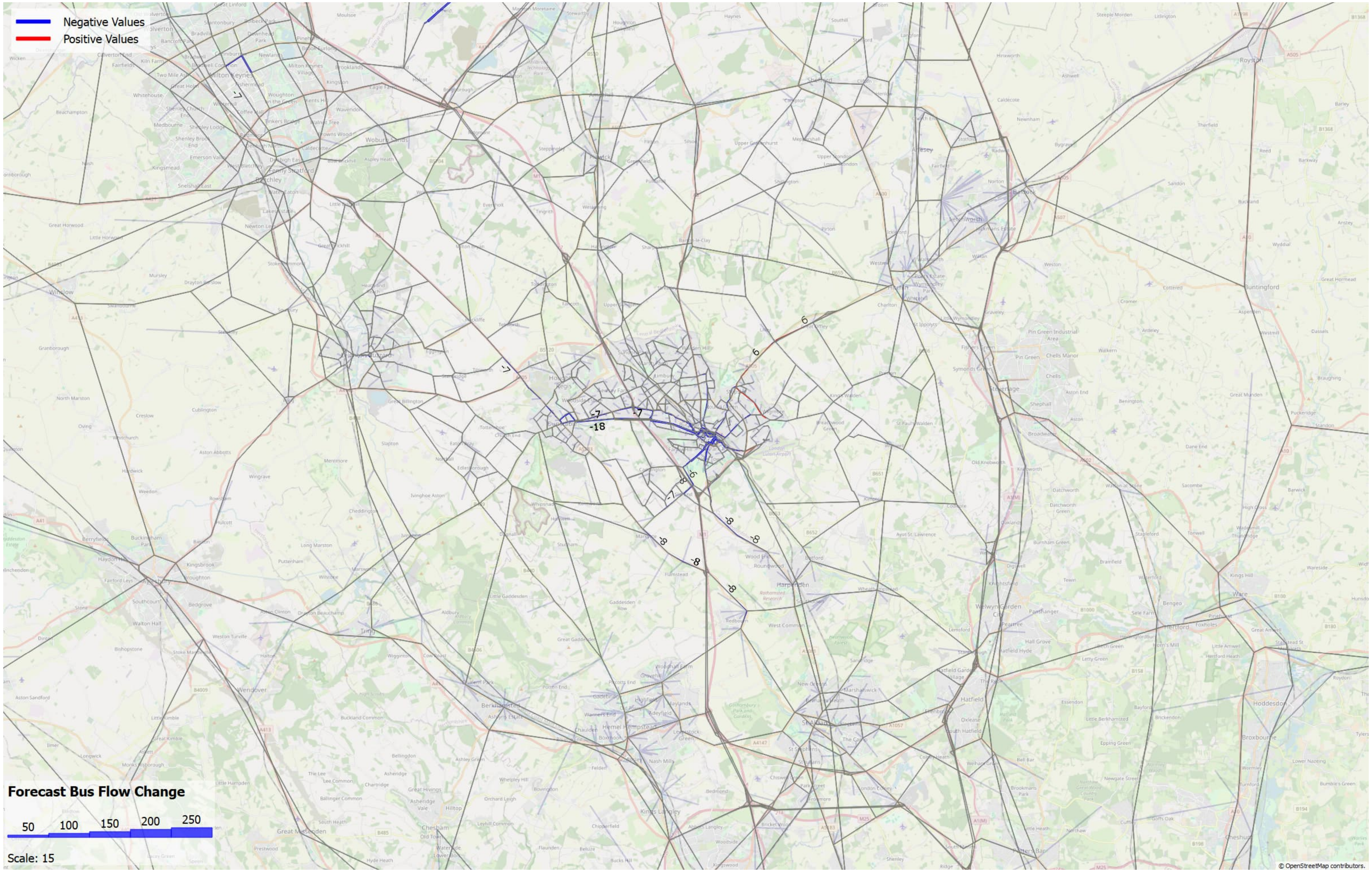
2043 Inter Peak “Without” Expansion (Updated vs Original) Bus forecast comparison (passenger per hour)



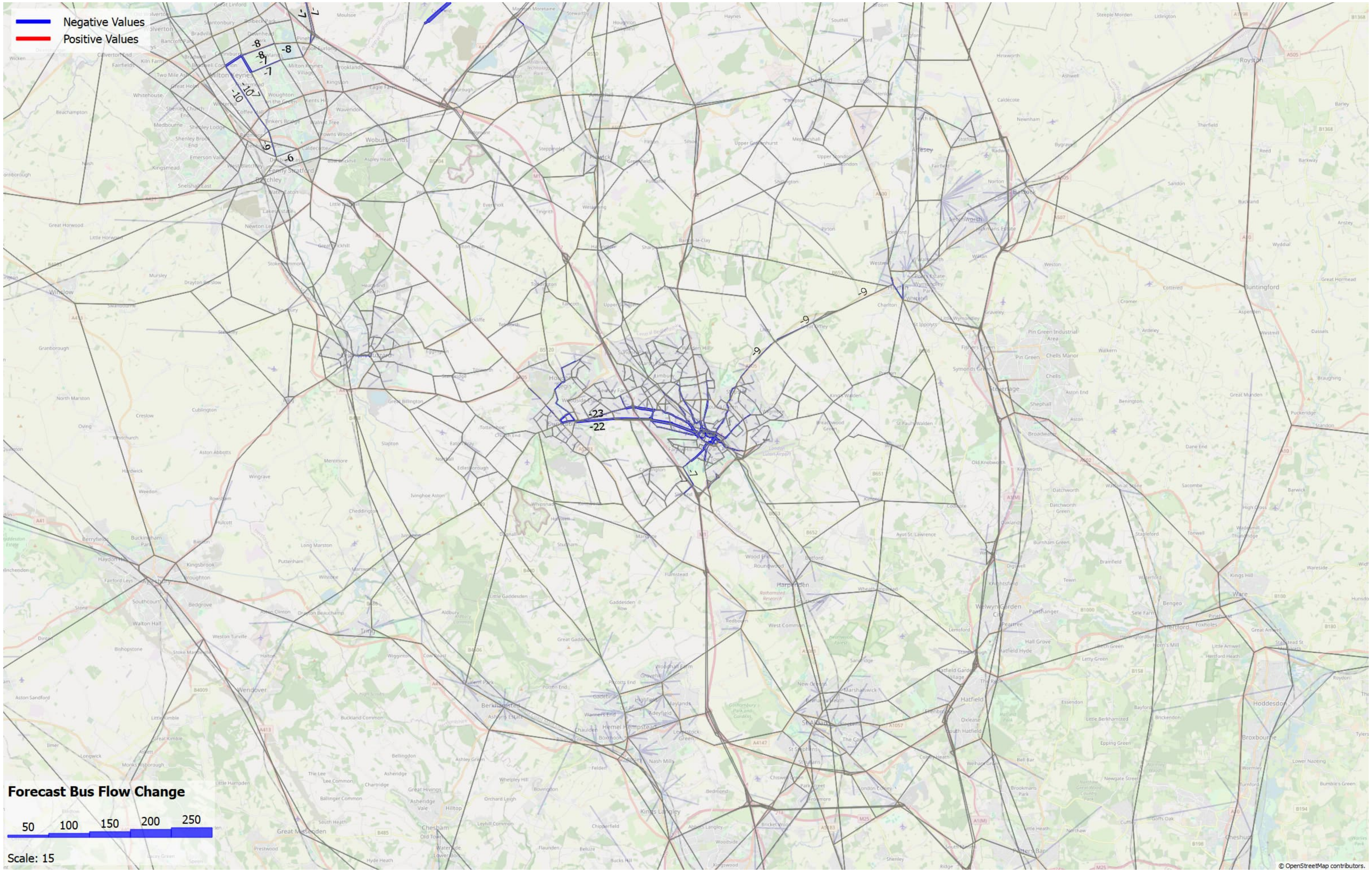
2043 PM Peak “Without” Expansion (Updated vs Original) Bus forecast comparison (passenger per hour)



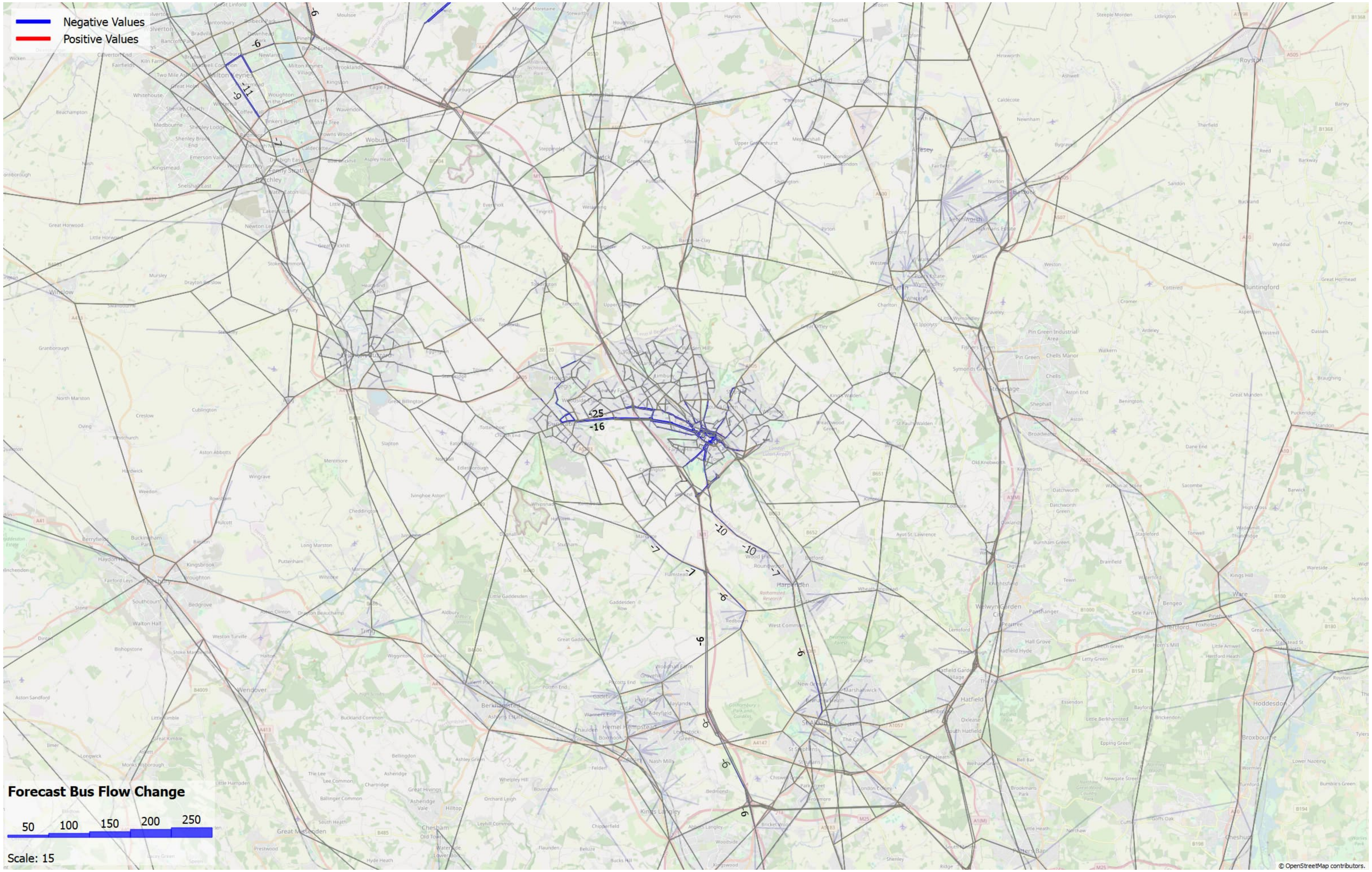
2043 AM Peak “With” Expansion (Updated vs Original) Bus forecast comparison (passenger per hour)



2043 Inter Peak “With” Expansion (Updated vs Original) Bus forecast comparison (passenger per hour)



2043 PM Peak “With” Expansion (Updated vs Original) Bus forecast comparison (passenger per hour)



APPENDIX H: UPDATED MIRCO-SIMULATION MODELLING

H1: ASSESSMENT PHASE 1 (2027)

The subsequent tables summarise the performance of key junctions in the 2027 Future Baseline and with the Proposed Development scenario.

2027 M1 Junction 10 junction performance Assessment Phase 1 (future baseline and with the Proposed Development)

Arm	Future Baseline			with Assessment Phase 1		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
AM Peak						
M1 southbound off-slip	1,577	-	19	1,569	2	58
A1081 New Airport Way	2,102	107	478	2,124	158	684
M1 northbound off-slip	1,628	33	193	1,662	19	84
Average delay (seconds)	31			33		
Level of Service (LoS)	C			C		
PM Peak						
M1 southbound off-slip	1,299	20	332	1,313	10	193
A1081 New Airport Way	3,139	230	915	3,343	1	46
M1 northbound off-slip	1,563	139	624	1,603	26	98
Average delay (seconds)	22			5		
Level of Service (LoS)	C			A		

2027 A1081 New Airport Way / London Road (north) roundabout (2) junction performance Assessment Phase 1 (future baseline and with the Proposed Development)

Arm	Future Baseline			with Assessment Phase 1		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
AM Peak						
London Road (north)	708	28	173	746	8	84
A1081 New Airport Way	609	23	182	548	4	48
London Road (south)	777	3	101	782	1	51
Newlands Park Access	53	-	14	54	2	19
Average delay (seconds)	23			20		
Level of Service	C			B		
PM Peak						
London Road (north)	688	4	89	713	-	19
A1081 New Airport Way	843	6	152	747	19	128
London Road (south)	666	2	62	599	2	42
Newlands Park Access	85	1	21	87	3	25
Average delay (seconds)	7			18		
Level of Service	A			B		

2027 A1081 New Airport Way/A1081 London Road (south) roundabout (3) junction performance Assessment Phase 1 (future baseline and with the Proposed Development)

Arm	Future Baseline			with Assessment Phase 1		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
AM Peak						
London Road (north)	783	131	600	782	98	492
A1081 New Airport Way	614	17	210	622	4	85
London Road (south)	868	-	4	849	1	28
Average delay (seconds)	26			23		
Level of Service	D			C		
PM Peak						
London Road (north)	944	13	164	909	1	45
A1081 New Airport Way	652	1	49	682	2	57
London Road (south)	810	-	27	725	-	11
Average delay (seconds)	5			4		
Level of Service	A			A		

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2027 A1081 New Airport Way/B653/Gipsy Lane junctions (4) junction performance Assessment Phase 1 (future baseline and with the Proposed Development)

Arm	Future Baseline			with Assessment Phase 1		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Avg Queue (m)	Max Queue (m)
AM Peak						
Gipsy Lane	1,016	8	97	1,153	15	163
Parkway Road	95	-	19	96	-	20
B653 Lower Harpenden Road	736	2	59	789	4	88
A1081 New Airport Way (east)	2,139	53	271	2,021	21	153
A1081 New Airport Way (west)	2,292	17	249	2,438	6	110
Average delay (seconds)	20			19		
Level of Service	B			B		
PM Peak						
Gipsy Lane	991	10	131	1,065	14	160
Parkway Road	210	2	37	206	4	52
B653 Lower Harpenden Road	753	21	154	767	37	172
A1081 New Airport Way (east)	1,702	34	227	1,708	17	117
A1081 New Airport Way (west)	2,319	634	1,101	2,571	254	1,064
Average delay (seconds)	33			41		
Level of Service	C			D		

2027 Kimpton Road/A505 Vauxhall Way signalised junction (5) junction performance Assessment Phase 1 (future baseline and with the Proposed Development)

Arm	Future Baseline			with Assessment Phase 1		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
AM Peak						
A505 Vauxhall Way (north)	1,095	2	81	1,221	23	355
Airport Way (east)	747	25	183	228	2	49
A505 Vauxhall Way (south)	1,037	1	47	1,181	2	74
Kimpton Way (west)	463	1	34	466	1	39
Average delay (seconds)	9			8		
Level of Service (LoS)	A			A		
PM Peak						
A505 Vauxhall Way (north)	843	13	192	1,187	2	84
Airport Way (east)	968	6	74	391	4	65
A505 Vauxhall Way (south)	1,474	28	382	1,130	76	447
Kimpton Way (west)	392	23	114	112	35	126
Average delay (seconds)	19			37		
Level of Service (LoS)	B			D		

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2027 A1081 New Airport Way/Percival Way signalised junction (7) junction performance Assessment Phase 1 (future baseline and with the Proposed Development)

Arm	Future Baseline			with Assessment Phase 1		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
AM Peak						
Percival Way	888	5	135	611	491	899
Airport Way (east)	893	9	90	966	15	85
A1081 New Airport Way	894	6	66	929	24	118
Airport Way (west)	214	-	20	380	8	64
Average delay (seconds)	10			40		
Level of Service (LoS)	A			D		
PM Peak						
Percival Way	804	2	79	476	152	405
Airport Way (east)	770	6	83	925	16	85
A1081 New Airport Way	620	7	61	1,043	35	170
Airport Way (west)	578	1	35	260	6	40
Average delay (seconds)	9			41		
Level of Service (LoS)	A			D		

2027 Percival Way/Frank Lester Way/President Way roundabout (8) junction performance Assessment Phase 1 (future baseline and with the Proposed Development)

Arm	Future Baseline			with Assessment Phase 1		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
AM Peak						
Frank Lester Way	1,147	23	167	947	52	195
President Way	252	1	21	299	1	27
Airport Approach Road	30	-	10	33	-	11
Percival Way	545	1	67	817	15	193
Average delay (seconds)	11			19		
Level of Service (LoS)	B			C		
PM Peak						
Frank Lester Way	389	1	32	368	2	35
President Way	624	1	33	727	1	37
Airport Approach Road	57	-	9	58	-	11
Percival Way	674	3	91	705	14	167
Average delay (seconds)	5			7		
Level of Service (LoS)	A			A		

2027 A505 Vauxhall Way/Eaton Green Road revised roundabout (10) junction performance Assessment Phase 1 (future baseline and with the Proposed Development)

Arm	Future Baseline			with Assessment Phase 1		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
AM Peak						
A505 Vauxhall Way (north)	640	250	638	533	226	588
Eaton Green Road	670	-	28	922	1	50
A505 Vauxhall Way (south)	1,212	-	22	1,159	4	140
Harrowden Road	121	228	564	120	20	201
Average delay (seconds)	22			27		
Level of Service (LoS)	C			C		
PM Peak						
A505 Vauxhall Way (north)	468	3	64	669	38	247
Eaton Green Road	775	-	20	1,062	10	212
A505 Vauxhall Way (south)	1,271	233	868	1,105	575	1,065
Harrowden Road	32	135	595	31	573	1,043
Average delay (seconds)	18			38		
Level of Service (LoS)	C			D		

2027 Eaton Green Road/Frank Lester Way roundabout (11) junction performance Assessment Phase 1 (future baseline and with the Proposed Development)

Arm	Future Baseline			with Assessment Phase 1		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
AM Peak						
Eaton Green Rd (west)	667	1	54	599	3	66
Eaton Green Rd (east)	1,202	62	219	1,166	36	220
Frank Lester Way	319	1	29	477	1	51
Average delay (seconds)	15			13		
Level of Service (LoS)	B			B		
PM Peak						
Eaton Green Rd (west)	737	20	207	746	15	190
Eaton Green Rd (east)	701	3	94	573	4	116
Frank Lester Way	673	4	87	1,011	6	152
Average delay (seconds)	10			10		
Level of Service (LoS)	A			A		

2027 Eaton Green Road/Wigmore Road roundabout (12) junction performance Assessment Phase 1 (future baseline and with the Proposed Development)

Arm	Future Baseline			with Assessment Phase 1		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
AM Peak						
Wigmore Lane	489	2	54	660	4	94
Wigmore Place	56	-	13	54	-	11
Eaton Green Road (east)	362	14	123	354	1	38
Eaton Green Road (west)	392	1	54	425	2	72
Average delay (seconds)	10			6		
Level of Service (LoS)	A			A		
PM Peak						
Wigmore Lane	523	2	55	461	2	52
Wigmore Place	195	2	37	195	1	35
Eaton Green Road (east)	247	1	26	235	-	26
Eaton Green Road (west)	754	8	135	749	13	168
Average delay (seconds)	8			9		
Level of Service (LoS)	A			A		

2027 A505 Vauxhall Way/Crawley Green Road signalised junction (13) junction performance Assessment Phase 1 (future baseline and with the Proposed Development)

Arm	Future Baseline			with Assessment Phase 1		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
AM Peak						
A505 Vauxhall Way (north)	711	106	362	658	34	226
Crawley Green Road (east)	655	39	218	603	19	145
A505 Vauxhall Way (south)	653	7	83	636	9	124
Crawley Green Road (west)	854	17	192	935	11	174
Saywell Road	-	-	-	-	-	-
Average delay (seconds)	26			17		
Level of Service (LoS)	D			C		
PM Peak						
A505 Vauxhall Way (north)	756	7	122	892	21	215
Crawley Green Road (east)	667	44	233	719	146	385
A505 Vauxhall Way (south)	733	383	619	719	493	615
Crawley Green Road (west)	766	9	128	899	5	110
Saywell Road	-	-	-	3	3	110
Average delay (seconds)	33			37		
Level of Service (LoS)	D			E		

2027 Crawley Green Road/Wigmore Lane roundabout (14) junction performance Assessment Phase 1 (future baseline and with the Proposed Development)

Arm	Future Baseline			with Assessment Phase 1		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
AM Peak						
Wigmore Lane (north)	942	2	95	921	4	118
Crawley Green Lane (east)	390	10	95	390	12	107
Wigmore Lane (south)	328	2	47	260	1	30
Crawley Green Lane (west)	518	-	26	569	-	31
Average delay (seconds)	8			9		
Level of Service (LoS)	A			A		
PM Peak						
Wigmore Lane (north)	588	1	41	580	1	35
Crawley Green Lane (east)	258	1	28	245	1	24
Wigmore Lane (south)	707	2	69	817	3	93
Crawley Green Lane (west)	751	2	81	789	3	103
Average delay (seconds)	5			6		
Level of Service (LoS)	A			A		

2027 Windmill Road/Kimpton Road signalised junction (15) junction performance Assessment Phase 1 (future baseline and with the Proposed Development)

Arm	Future Baseline			with Assessment Phase 1		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
AM Peak						
Windmill Road (north)	1.112	368	578	1.019	318	564
Kimpton Road	630	56	72	793	51	100
Windmill Road (south)	566	2	40	535	10	88
Average delay (seconds)	18			21		
Level of Service (LoS)	C			C		
PM Peak						
Windmill Road (north)	1.012	9	196	935	53	344
Kimpton Road	924	23	70	1,015	39	95
Windmill Road (south)	811	69	194	949	19	174
Average delay (seconds)	16			10		
Level of Service (LoS)	C			A		

2027 Eaton Green Road/Lalleford Road signalised junction (16) junction performance Assessment Phase 1 (future baseline and with the Proposed Development)

Arm	Future Baseline			with Assessment Phase 1		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
AM Peak						
Lalleford Road	817	43	280	603	194	452
Eaton Green Road (east)	448	242	569	639	104	391
Eaton Green Road (west)	435	4	80	478	13	105
Average delay (seconds)	31			42		
Level of Service (LoS)	D			D		
PM Peak						
Lalleford Road	217	1	28	168	39	148
Eaton Green Road (east)	627	2	93	515	30	233
Eaton Green Road (west)	1,145	18	222	1,094	-	-
Average delay (seconds)	8			18		
Level of Service (LoS)	A			B		

2027 Wigmore Lane/Raynham Way roundabout (17) junction performance Assessment Phase 1 (future baseline and with the Proposed Development)

Arm	Future Baseline			with Assessment Phase 1		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
AM Peak						
Wigmore Lane (north)	661	2	78	789	7	132
Twyford Drive	118	1	23	118	1	32
Wigmore Lane (south)	250	-	22	209	-	25
Raynham Way	136	-	14	137	-	14
Average delay (seconds)	4			6		
Level of Service (LoS)	A			A		
PM Peak						
Wigmore Lane (north)	582	3	79	607	4	76
Twyford Drive	89	-	19	86	-	16
Wigmore Lane (south)	677	2	65	782	3	77
Raynham Way	163	-	23	159	1	25
Average delay (seconds)	4			5		
Level of Service (LoS)	A			A		

2027 Wigmore Lane/Asda access roundabout (18) junction performance Assessment Phase 1 (future baseline and with the Proposed Development)

Arm	Future Baseline			with Assessment Phase 1		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
AM Peak						
Wigmore Lane (north)	606	3	77	761	6	100
Asda Access	265	1	34	266	1	38
Wigmore Lane (south)	285	-	17	283	-	19
Average delay (seconds)	4			5		
Level of Service (LoS)	A			a		
PM Peak						
Wigmore Lane (north)	567	10	109	577	8	102
Asda Access	651	4	42	653	4	43
Wigmore Lane (south)	606	8	98	628	16	133
Average delay (seconds)	8			9		
Level of Service (LoS)	A			A		

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2027 Windmill Road/St Mary's Road/Crawley Green Road roundabout (19) junction performance Assessment Phase 1 (future baseline and with the Proposed Development)

Arm	Future Baseline			with Assessment Phase 1		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
AM Peak						
St Mary's Road	443	94	198	433	20	119
Crawley Green Road	844	71	104	872	68	105
Windmill Road	747	64	313	698	38	203
A505 Park Viaduct	834	289	471	864	21	124
Average delay (seconds)	85			49		
Level of Service (LoS)	F			D		
PM Peak						
St Mary's Road	474	18	123	466	18	110
Crawley Green Road	716	19	93	701	16	87
Windmill Road	1.164	146	401	1,226	68	353
A505 Park Viaduct	849	456	472	832	457	473
Average delay (seconds)	60			65		
Level of Service (LoS)	E			E		

2027 Crawley Green Road/Lalleford Road roundabout (20) junction performance Assessment Phase 1 (future baseline and with the Proposed Development)

Arm	Future Baseline			with Assessment Phase 1		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
AM Peak						
Crawley Green Road (east)	852	2	55	659	3	57
Lalleford Road	145	-	16	128	-	14
Crawley Green Road (west)	839	1	32	875	2	48
Average delay (seconds)	4			4		
Level of Service (LoS)	A			A		
PM Peak						
Crawley Green Road (east)	496	1	41	567	1	43
Lalleford Road	600	4	89	553	5	94
Crawley Green Road (west)	611	-	21	651	-	21
Average delay (seconds)	4			4		
Level of Service (LoS)	A			A		

H2: ASSESSMENT PHASE 2A (2039)

The subsequent tables summarise the future baseline and the Proposed Development junction performance for key junctions in the AM and PM peak hours in Assessment Phase 2a.

2039 M1 Junction 10 (1) junction performance Assessment Phase 2a (future baseline and with the Proposed Development)

Arm	Future Baseline			with Assessment Phase 2a		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
AM Peak						
M1 southbound off-slip	1,600	10	340	1,644	1	76
A1081 New Airport Way	2,110	480	1,213	2,550	293	961
M1 northbound off-slip	1,703	45	258	1,821	24	93
Average delay (seconds)	39			33		
Level of Service (LoS)	D			C		
PM Peak						
M1 southbound off-slip	1,284	92	1,286	1,451	-	-
A1081 New Airport Way	2,570	1,024	1,219	4,067	23	289
M1 northbound off-slip	1,522	156	644	1,750	30	121
Average delay (seconds)	36			11		
Level of Service (LoS)	D			B		

2039 A1081 New Airport Way/London Road (north) roundabout (2) junction performance Assessment Phase 2a (future baseline and with the Proposed Development)

Arm	Future Baseline			with Assessment Phase 2a		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
AM Peak						
London Road (north)	691	60	204	833	1	47
A1081 New Airport Way	636	155	855	606	17	95
London Road (south)	789	9	143	746	2	56
Newlands Park Access	54	1	20	54	3	25
Average delay (seconds)	49			16		
Level of Service	E			B		
PM Peak						
London Road (north)	747	5	118	876	1	36
A1081 New Airport Way	818	9	138	835	23	142
London Road (south)	653	2	65	620	3	53
Newlands Park Access	87	-	20	88	3	23
Average delay (seconds)	7			21		
Level of Service	A			C		

2039 A1081 New Airport Way/A1081 London Road (south) roundabout (3) junction performance Assessment Phase 2a (future baseline and with the Proposed Development)

Arm	Future Baseline			with Assessment Phase 2a		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
AM Peak						
London Road (north)	772	230	654	860	3	72
A1081 New Airport Way	715	7	159	698	4	93
London Road (south)	930	1	41	883	-	5
Average delay (seconds)	29			5		
Level of Service	D			A		
PM Peak						
London Road (north)	970	57	408	1,080	10	103
A1081 New Airport Way	575	2	63	699	2	53
London Road (south)	845	-	15	875	-	19
Average delay (seconds)	14			6		
Level of Service	B			A		

2039 A1081 New Airport Way/B653/Gipsy Lane junctions (4) junction performance Assessment Phase 2a (future baseline and with the Proposed Development)

Arm	Future Baseline			with Assessment Phase 2a		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
AM Peak						
Gipsy Lane	971	10	121	1,085	38	268
Parkway Road	95	-	22	131	1	19
B653 Lower Harpenden Road	747	2	66	837	6	129
A1081 New Airport Way (east)	2,427	224	551	2,647	25	205
A1081 New Airport Way (west)	2,308	16	235	2,595	6	112
Average delay (seconds)	23			19		
Level of Service	C			B		
PM Peak						
Gipsy Lane	938	52	271	938	6	89
Parkway Road	193	11	115	363	2	47
B653 Lower Harpenden Road	632	62	177	896	46	169
A1081 New Airport Way (east)	1,289	241	554	2,275	20	167
A1081 New Airport Way (west)	2,415	949	1,117	3,068	23	236
Average delay (seconds)	58			24		
Level of Service	E			C		

2039 Kimpton Road/A505 Vauxhall Way signalised junction (5) junction performance Assessment Phase 2a (future baseline and with the Proposed Development)

Arm	Future Baseline			with Assessment Phase 2a		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
AM Peak						
A505 Vauxhall Way (north)	1,484	31	234	1,893	46	380
Airport Way (east)	279	9	40	476	28	144
A505 Vauxhall Way (south)	1,027	18	100	981	14	84
Kimpton Way (west)	513	5	40	534	19	70
Average delay (seconds)	26			29		
Level of Service (LoS)	C			C		
PM Peak						
A505 Vauxhall Way (north)	903	56	342	1,414	13	102
Airport Way (east)	576	383	730	457	25	116
A505 Vauxhall Way (south)	1,371	40	229	1,174	21	107
Kimpton Way (west)	617	30	114	680	51	166
Average delay (seconds)	55			32		
Level of Service (LoS)	D			C		

2039 A1081 New Airport Way/Percival Way revised signalised junction (7) junction performance Assessment Phase 2a (future baseline and with the Proposed Development)

Arm	Future Baseline			with Assessment Phase 2a		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
AM Peak						
Percival Way	873	4	106	-	-	-
Airport Way (east)	892	5	72	851	5	67
A1081 New Airport Way	936	1	32	735	2	25
Airport Way (west)	213	1	23	429	3	30
Average delay (seconds)	7			8		
Level of Service (LoS)	A			A		
PM Peak						
Percival Way	741	24	376	-	-	-
Airport Way (east)	676	25	173	766	5	58
A1081 New Airport Way	598	41	283	588	1	15
Airport Way (west)	482	2	45	279	2	24
Average delay (seconds)	16			7		
Level of Service (LoS)	C			A		

2039 Percival Way/Frank Lester Way/President Way signalised junction (8) junction performance Assessment Phase 2a (future baseline and with the Proposed Development)

Arm	Future Baseline			with Assessment Phase 2a		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
AM Peak						
Frank Lester Way	1,077	31	193	-	-	-
President Way	251	1	22	1,008	16	137
Airport Approach Road	29	-	11	39	1	21
Percival Way	626	3	97	916	10	85
Average delay (seconds)	13			11		
Level of Service (LoS)	B			B		
PM Peak						
Frank Lester Way	496	2	37	-	-	-
President Way	622	1	40	1,079	6	87
Airport Approach Road	58	-	11	59	2	26
Percival Way	685	7	156	1,085	18	189
Average delay (seconds)	5			9		
Level of Service (LoS)	A			A		

2039 A505 Vauxhall Way/Eaton Green Road revised roundabout (10) junction performance Assessment Phase 2a (future baseline and with the Proposed Development)

Arm	Future Baseline			with Assessment Phase 2a		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
AM Peak						
A505 Vauxhall Way (north)	1,246	13	109	1,267	29	201
Eaton Green Road	684	2	40	1,027	11	202
A505 Vauxhall Way (south)	1,212	7	117	1,117	7	104
Harrowden Road	124	1	20	123	1	18
Average delay (seconds)	9			14		
Level of Service (LoS)	A			B		
PM Peak						
A505 Vauxhall Way (north)	770	6	66	915	12	82
Eaton Green Road	910	1	42	1,181	3	62
A505 Vauxhall Way (south)	1,506	17	146	1,539	19	139
Harrowden Road	36	-	12	35	-	12
Average delay (seconds)	9			11		
Level of Service (LoS)	A			A		

2039 Eaton Green Road/Frank Lester Way signalised junction (11) junction performance Assessment Phase 2a (future baseline and with the Proposed Development)

Arm	Future Baseline			with Assessment Phase 2a		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
AM Peak						
Eaton Green Rd (west)	737	2	77	480	10	110
Eaton Green Rd (east)	1,160	63	221	643	6	100
Frank Lester Way	288	1	33	479	8	80
Average delay (seconds)	15			10		
Level of Service (LoS)	B			A		
PM Peak						
Eaton Green Rd (west)	742	41	275	576	33	168
Eaton Green Rd (east)	768	4	104	301	7	70
Frank Lester Way	832	7	133	1,079	17	126
Average delay (seconds)	13			17		
Level of Service (LoS)	B			B		

2039 Eaton Green Road/Wigmore Road signalised junction (12) junction performance Assessment Phase 2a (future baseline and with the Proposed Development)

Arm	Future Baseline			with Assessment Phase 2a		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
AM Peak						
Wigmore Lane	532	4	82	781	31	134
Wigmore Place	53	-	13	55	2	25
Eaton Green Road (east)	416	12	101	529	18	99
Eaton Green Road (west)	464	2	75	648	18	145
AAR Link	-	-	-	237	14	55
Average delay (seconds)	9			35		
Level of Service (LoS)	A			C		
PM Peak						
Wigmore Lane	587	6	91	428	13	79
Wigmore Place	194	3	42	196	3	42
Eaton Green Road (east)	274	1	30	228	10	49
Eaton Green Road (west)	794	10	140	596	26	154
AAR Link	-	-	-	402	14	61
Average delay (seconds)	10			37		
Level of Service (LoS)	A			D		

2039 A505 Vauxhall Way/Crawley Green Road signalised junction (13) junction performance Phase 2a (future baseline and with the Proposed Development)

Arm	Future Baseline			with Assessment Phase 2a		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
AM Peak						
A505 Vauxhall Way (north)	1,263	29	134	1,263	36	153
Crawley Green Road (east)	812	42	182	835	154	334
A505 Vauxhall Way (south)	753	18	61	902	22	72
Crawley Green Road (west)	724	15	149	798	19	182
Saywell Road	-	-	-	-	-	-
Average delay (seconds)	28			41		
Level of Service (LoS)	C			D		
PM Peak						
A505 Vauxhall Way (north)	1,021	63	171	1,116	30	111
Crawley Green Road (east)	626	28	171	877	43	217
A505 Vauxhall Way (south)	1,196	79	261	1,399	20	89
Crawley Green Road (west)	639	12	114	690	25	166
Saywell Road	-	-	-	-	-	-
Average delay (seconds)	48			24		
Level of Service (LoS)	D			C		

2039 Crawley Green Road/Wigmore Lane signalised junction (14) junction performance Assessment Phase 2a (future baseline and with the Proposed Development)

Arm	Future Baseline			with Assessment Phase 2a		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
AM Peak						
Wigmore Lane (north)	956	2	96	807	17	122
Crawley Green Lane (east)	408	9	92	467	20	152
Wigmore Lane (south)	290	2	47	363	2	37
Crawley Green Lane (west)	485	-	27	754	24	130
Average delay (seconds)	8			22		
Level of Service (LoS)	A			C		
PM Peak						
Wigmore Lane (north)	615	2	51	506	14	60
Crawley Green Lane (east)	270	1	33	310	4	55
Wigmore Lane (south)	699	2	74	831	7	79
Crawley Green Lane (west)	766	2	80	903	3	38
Average delay (seconds)	6			12		
Level of Service (LoS)	A			B		

2039 A1081 New Airport Way/AAR signalised junction (6) junction performance Assessment Phase 2a (with the Proposed Development)

Arm	AM Peak			PM Peak		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
with Assessment Phase 2a						
AAR	547	6	50	453	9	51
A1081 Airport Way (east)	874	6	52	714	5	49
A1081 Airport Way (west)	1,274	7	36	1,545	6	40
Average delay (seconds)	14			15		
Level of Service (LoS)	B			B		

2039 Eaton Green Road Link/AAR signalised junction (9) junction performance Assessment Phase 2a (with the Proposed Development)

Arm	AM Peak			PM Peak		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
with Assessment Phase 2a						
Eaton Green Road Link	1,151	23	101	462	10	56
AAR (east)	105	3	23	122	3	26
Terminal 2 Link	238	5	34	239	4	27
AAR (west)	240	2	14	411	1	6
Average delay (seconds)	28			24		
Level of Service (LoS)	C			C		

2039 Windmill Road/Kimpton Road signalised junction (15) junction performance Assessment Phase 2a (future baseline and with the Proposed Development)

Arm	Future Baseline			with Assessment Phase 2a		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
AM Peak						
Windmill Road (north)	1,048	223	575	1,057	255	517
Kimpton Road	689	43	71	764	40	69
Windmill Road (south)	585	18	113	495	8	77
Average delay (seconds)	20			20		
Level of Service (LoS)	C			B		
PM Peak						
Windmill Road (north)	939	49	420	1,149	278	561
Kimpton Road	837	36	72	587	46	70
Windmill Road (south)	903	9	149	992	27	165
Average delay (seconds)	10			18		
Level of Service (LoS)	A			B		

2039 Eaton Green Road/Lalleford Road signalised junction (16) junction performance Assessment Phase 2a (future baseline and with the Proposed Development)

Arm	Future Baseline			with Assessment Phase 2a		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
AM Peak						
Lalleford Road	703	22	204	517	69	226
Eaton Green Road (east)	554	209	499	290	4	69
Eaton Green Road (west)	503	6	91	627	11	115
Average delay (seconds)	27			25		
Level of Service (LoS)	D			C		
PM Peak						
Lalleford Road	203	1	29	146	6	48
Eaton Green Road (east)	683	3	99	246	3	57
Eaton Green Road (west)	1,151	25	243	1,003	30	203
Average delay (seconds)	8			14		
Level of Service (LoS)	A			B		

2039 Wigmore Lane/Raynham Way signalised junction (17) junction performance Assessment Phase 2a (future baseline and with the Proposed Development)

Arm	Future Baseline			with Assessment Phase 2a		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
AM Peak						
Wigmore Lane (north)	654	4	88	968	16	164
Twyford Drive	119	1	24	116	4	37
Wigmore Lane (south)	271	-	26	321	1	23
Raynham Way	142	-	18	138	6	42
Average delay (seconds)	4			11		
Level of Service (LoS)	A			B		
PM Peak						
Wigmore Lane (north)	645	5	87	658	9	87
Twyford Drive	95	-	20	92	3	33
Wigmore Lane (south)	658	2	56	799	5	43
Raynham Way	174	1	27	168	8	53
Average delay (seconds)	5			11		
Level of Service (LoS)	A			B		

2039 Wigmore Lane/Asda access signalised junction (18) junction performance Assessment Phase 2a (future baseline and with the Proposed Development)

Arm	Future Baseline			with Assessment Phase 2a		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
AM Peak						
Wigmore Lane (north)	646	5	83	913	15	64
Asda Access	272	1	35	273	4	38
Wigmore Lane (south)	332	-	23	354	5	49
Average delay (seconds)	4			16		
Level of Service (LoS)	A			B		
PM Peak						
Wigmore Lane (north)	625	13	141	638	9	52
Asda Access	654	5	43	649	14	61
Wigmore Lane (south)	600	4	75	603	32	148
Average delay (seconds)	8			21		
Level of Service (LoS)	A			C		

2039 Windmill Road/St Mary's Road/Crawley Green Road roundabout (19) junction performance Assessment Phase 2a (future baseline and with the Proposed Development)

Arm	Future Baseline			with Assessment Phase 2a		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
AM Peak						
St Mary's Road	444	42	179	482	7	49
Crawley Green Road	837	42	102	890	42	101
Windmill Road	784	154	383	657	13	123
A505 Park Viaduct	947	100	331	979	14	99
Average delay (seconds)	61			33		
Level of Service (LoS)	E			C		
PM Peak						
St Mary's Road	483	23	144	524	11	71
Crawley Green Road	654	17	83	763	39	98
Windmill Road	962	56	344	982	15	152
A505 Park Viaduct	934	455	473	1,088	202	416
Average delay (seconds)	63			53		
Level of Service (LoS)	E			D		

2039 Crawley Green Road/Lalleford Road signalised junction (20) junction performance Assessment Phase 2a (future baseline and with the Proposed Development)

Arm	Future Baseline			with Assessment Phase 2a		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
AM Peak						
Crawley Green Road (east)	839	1	43	743	15	106
Lalleford Road	214	-	23	215	9	60
Crawley Green Road (west)	622	-	25	742	12	123
Average delay (seconds)	3			16		
Level of Service (LoS)	A			B		
PM Peak						
Crawley Green Road (east)	475	1	31	636	27	134
Lalleford Road	568	2	64	520	16	111
Crawley Green Road (west)	636	-	22	670	25	179
Average delay (seconds)	3			22		
Level of Service (LoS)	A			C		

2039 Provost Way/AAR roundabout (21) junction performance Assessment Phase 2a (with the Proposed Development)

Arm	AM Peak			PM Peak		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
with Assessment Phase 2a						
Provost Way (north)	283	4	49	126	-	16
AAR Provost Way (south)	354	-	16	469	-	8
AAR (west)	910	-	37	1,180	1	47
Average delay (seconds)	4			4		
Level of Service (LoS)	A			A		

2039 Provost Way/Percival Way roundabout (22) junction performance Assessment Phase 2a (with the Proposed Development)

Arm	AM Peak			PM Peak		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
with Assessment Phase 2a						
Provost Way (north)	928	3	109	1,054	12	120
Percival Way (east)	727	1	90	637	1	63
Percival Way (west)	103	1	26	285	2	45
Average delay (seconds)	3			5		
Level of Service (LoS)	A			A		

2039 President Way/AAR roundabout (23) Assessment Phase 2a

Arm	AM Peak			PM Peak		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
with Assessment Phase 2a						
Car park access	127	-	24	366	1	42
AAR (east)	1,055	10	96	527	2	40
President Way	51	-	14	132	1	28
AAR (west)	689	2	60	490	-	22
Average delay (seconds)	7			3		
Level of Service (LoS)	A			A		

2039 Terminal 2 access roundabout (24) Assessment Phase 2a

Arm	AM Peak			PM Peak		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
with Assessment Phase 2a						
AAR Link Road (north)	297	-	-	216	-	-
Terminal 2 Short Stay Access (South)	211	-	10	190	-	5
Terminal 2 Drop Off Access (South)	-	-	-	-	-	-
President Way (west)	28	-	5	49	-	6
Average delay (seconds)	1			1		
Level of Service (LoS)	A			A		

H3: ASSESSMENT PHASE 2B (2043)

The subsequent tables summarise the future baseline and the Proposed Development junction performance for key junctions in the AM and PM peak hours in Assessment Phase 2b.

2043 M1 Junction 10 (1) junction performance Assessment Phase 2b (future baseline and with the Proposed Development)

Arm	Future Baseline			with Assessment Phase 2b		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
AM Peak						
M1 southbound off-slip	1,692	3	104	1,722	14	342
A1081 New Airport Way	2,071	530	1.200	2,828	237	1.010
M1 northbound off-slip	1.723	50	294	1,983	27	103
Average delay (seconds)	39			34		
Level of Service (LoS)	D			C		
PM Peak						
M1 southbound off-slip	1,228	375	1,863	1,464	-	-
A1081 New Airport Way	2,498	1,077	1,219	3,974	82	549
M1 northbound off-slip	1,521	226	794	1,787	41	167
Average delay (seconds)	42			19		
Level of Service (LoS)	D			B		

2043 A1081 New Airport Way/London Road (north) roundabout (2) junction performance Assessment Phase 2b (future baseline and with the Proposed Development)

Arm	Future Baseline			with Assessment Phase 2b		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
AM Peak						
London Road (north)	799	31	186	878	2	44
A1081 New Airport Way	715	39	285	646	20	111
London Road (south)	781	5	124	810	3	72
Newlands Park Access	55	-	16	55	3	24
Average delay (seconds)	21			17		
Level of Service	C			B		
PM Peak						
London Road (north)	744	12	133	924	1	41
A1081 New Airport Way	784	31	350	786	18	124
London Road (south)	639	2	58	584	3	49
Newlands Park Access	88	-	19	88	3	22
Average delay (seconds)	12			23		
Level of Service	B			C		

2043 A1081 New Airport Way/A1081 London Road (south) roundabout (3) junction performance Assessment Phase 2b (future baseline and with the Proposed Development)

Arm	Future Baseline			with Assessment Phase 2b		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
AM Peak						
London Road (north)	909	125	514	882	6	107
A1081 New Airport Way	666	5	99	728	3	81
London Road (south)	913	-	4	917	-	6
Average delay (seconds)	18			5		
Level of Service	C			A		
PM Peak						
London Road (north)	941	105	534	1,106	11	156
A1081 New Airport Way	554	2	56	713	2	63
London Road (south)	845	-	21	800	-	9
Average delay (seconds)	17			5		
Level of Service	C			A		

2043 A1081 New Airport Way/B653/Gipsy Lane junctions (4) junction performance Assessment Phase 2b (future baseline and with the Proposed Development)

Arm	Future Baseline			with Assessment Phase 2b		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
AM Peak						
Gipsy Lane	979	14	152	1,187	43	276
Parkway Road	92	1	24	127	-	20
B653 Lower Harpenden Road	781	6	68	859	19	161
A1081 New Airport Way (east)	2,242	233	539	2,702	36	296
A1081 New Airport Way (west)	2,280	50	406	2,827	8	138
Average delay (seconds)	27			30		
Level of Service	C			C		
PM Peak						
Gipsy Lane	860	55	375	986	14	145
Parkway Road	191	12	109	339	4	57
B653 Lower Harpenden Road	698	41	175	869	64	172
A1081 New Airport Way (east)	1,222	342	554	2,312	71	442
A1081 New Airport Way (west)	2,401	862	1,105	3,084	91	538
Average delay (seconds)	61			28		
Level of Service	E			C		

2043 Kimpton Road/A505 Vauxhall Way signalised junction (5) junction performance Assessment Phase 2b (future baseline and with the Proposed Development)

Arm	Future Baseline			with Assessment Phase 2b		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
AM Peak						
A505 Vauxhall Way (north)	1,360	41	283	1,769	37	343
Airport Way (east)	460	48	232	535	55	235
A505 Vauxhall Way (south)	1,258	25	123	969	15	85
Kimpton Way (west)	480	20	67	498	18	63
Average delay (seconds)	36			30		
Level of Service (LoS)	D			C		
PM Peak						
A505 Vauxhall Way (north)	825	82	430	1,254	47	256
Airport Way (east)	534	97	346	689	127	416
A505 Vauxhall Way (south)	1,478	47	315	1,206	22	112
Kimpton Way (west)	457	105	226	580	26	100
Average delay (seconds)	61			41		
Level of Service (LoS)	E			D		

2043 A1081 New Airport Way / Percival Way revised signalised junction (7) junction performance Assessment Phase 2b (future baseline and with the Proposed Development)

Arm	Future Baseline			with Assessment Phase 2b		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
AM Peak						
Percival Way	854	5	125	-	-	-
Airport Way (east)	881	9	88	886	5	67
A1081 New Airport Way	645	2	37	868	4	32
Airport Way (west)	490	2	33	455	4	34
Average delay (seconds)	8			9		
Level of Service (LoS)	A			A		
PM Peak						
Percival Way	684	52	540	-	-	-
Airport Way (east)	652	29	174	762	4	58
A1081 New Airport Way	746	1	45	829	1	30
Airport Way (west)	239	1	27	399	4	38
Average delay (seconds)	17			8		
Level of Service (LoS)	C			A		

2043 Percival Way/Frank Lester Way/President Way revised signalised junction (8) junction performance Assessment Phase 2b (future baseline and with the Proposed Development)

Arm	Future Baseline			with Assessment Phase 2b		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
AM Peak						
Frank Lester Way	1,159	25	176	2,527	10	128
President Way	245	9	48	1,230	6	70
Airport Approach Road	31	1	17	42	1	24
Percival Way	534	25	114	1,256	26	128
Average delay (seconds)	11			16		
Level of Service (LoS)	B			B		
PM Peak						
Frank Lester Way	548	2	48	2,525	10	152
President Way	619	2	71	1,248	4	51
Airport Approach Road	57	-	12	59	3	29
Percival Way	482	1	66	1,218	27	150
Average delay (seconds)	4			13		
Level of Service (LoS)	A			B		

2043 A505 Vauxhall Way/Eaton Green Road revised roundabout (10) junction performance Assessment Phase 2b (future baseline and with the Proposed Development)

Arm	Future Baseline			with Assessment Phase 2b		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
AM Peak						
A505 Vauxhall Way (north)	1,224	30	163	1,179	91	441
Eaton Green Road	668	2	36	1,072	23	318
A505 Vauxhall Way (south)	1,196	34	177	1,067	15	144
Harrowden Road	121	4	24	124	1	22
Average delay (seconds)	10			25		
Level of Service (LoS)	A			C		
PM Peak						
A505 Vauxhall Way (north)	586	5	53	856	12	98
Eaton Green Road	862	1	23	1,148	2	40
A505 Vauxhall Way (south)	1,738	23	184	1,492	30	196
Harrowden Road	34	-	12	35	1	16
Average delay (seconds)	10			14		
Level of Service (LoS)	A			B		

2043 Eaton Green Road/Frank Lester Way signalised junction (11) junction performance Assessment Phase 2b (future baseline and with the Proposed Development)

Arm	Future Baseline			with Assessment Phase 2b		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
AM Peak						
Eaton Green Rd (west)	825	25	187	617	33	236
Eaton Green Rd (east)	1,116	50	217	545	5	104
Frank Lester Way	383	7	46	548	27	117
Average delay (seconds)	14			18		
Level of Service (LoS)	B			B		
PM Peak						
Eaton Green Rd (west)	749	7	129	605	96	314
Eaton Green Rd (east)	802	5	112	462	16	91
Frank Lester Way	661	2	70	874	10	94
Average delay (seconds)	8			24		
Level of Service (LoS)	A			C		

2043 Eaton Green Road/Wigmore Road signalised junction (12) junction performance Assessment Phase 2b (future baseline and with the Proposed Development)

Arm	Future Baseline			with Assessment Phase 2b		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
AM Peak						
Wigmore Lane	483	5	58	846	43	138
Wigmore Place	54	1	12	55	2	26
Eaton Green Road (east)	428	9	57	598	62	238
Eaton Green Road (west)	485	2	67	818	179	474
AAR Link	-	-	-	313	9	49
Average delay (seconds)	5			52		
Level of Service (LoS)	A			D		
PM Peak						
Wigmore Lane	559	5	98	506	24	115
Wigmore Place	195	3	40	187	3	42
Eaton Green Road (east)	285	1	32	222	11	67
Eaton Green Road (west)	737	7	123	704	128	363
AAR Link	-	-	-	833	62	179
Average delay (seconds)	38			33		
Level of Service (LoS)	D			C		

2043 A505 Vauxhall Way/Crawley Green Road signalised junction (13) junction performance Assessment Phase 2b (future baseline and with the Proposed Development)

Arm	Future Baseline			with Assessment Phase 2b		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
AM Peak						
A505 Vauxhall Way (north)	1,216	41	152	1.259	55	202
Crawley Green Road (east)	789	46	190	760	184	391
A505 Vauxhall Way (south)	768	23	66	792	15	64
Crawley Green Road (west)	686	20	157	929	36	222
Saywell Road	-	-	-	-	-	-
Average delay (seconds)	30			47		
Level of Service (LoS)	C			D		
PM Peak						
A505 Vauxhall Way (north)	1,024	116	291	1,094	37	140
Crawley Green Road (east)	666	32	181	898	46	240
A505 Vauxhall Way (south)	1,283	31	95	1,392	42	167
Crawley Green Road (west)	640	22	155	687	35	183
Saywell Road	-	-	-	-	-	-
Average delay (seconds)	38			30		
Level of Service (LoS)	D			C		

2043 Crawley Green Road/Wigmore Lane signalised junction (14) junction performance Assessment Phase 2b (future baseline and with the Proposed Development)

Arm	Future Baseline			with Assessment Phase 2b		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
AM Peak						
Wigmore Lane (north)	940	11	109	777	24	148
Crawley Green Lane (east)	409	21	122	542	70	307
Wigmore Lane (south)	315	8	65	415	5	48
Crawley Green Lane (west)	426	-	24	711	36	161
Average delay (seconds)	9			32		
Level of Service (LoS)	A			C		
PM Peak						
Wigmore Lane (north)	631	2	48	456	16	74
Crawley Green Lane (east)	274	1	37	312	11	73
Wigmore Lane (south)	674	2	78	891	15	114
Crawley Green Lane (west)	816	3	99	813	3	45
Average delay (seconds)	6			12		
Level of Service (LoS)	A			B		

2043 A1081 New Airport Way/AAR signalised junction (6) junction performance Assessment Phase 2b (with the Proposed Development)

Arm	AM Peak			PM Peak		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
with Assessment Phase 2b						
AAR	732	8	72	646	5	56
A1081 Airport Way (east)	957	7	57	881	9	64
A1081 Airport Way (west)	1,575	6	32	1,569	6	32
Average delay (seconds)	13			17		
Level of Service (LoS)	B			B		

2043 Eaton Green Road Link/AAR signalised junction (9) junction performance Assessment Phase 2b (with the Proposed Development)

Arm	AM Peak			PM Peak		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
with Assessment Phase 2b						
Eaton Green Road Link	1,508	17	88	574	16	71
AAR (east)	233	11	58	692	49	167
Terminal 2 Link	413	15	66	330	16	73
AAR (west)	694	17	92	654	2	16
Average delay (seconds)	28			39		
Level of Service (LoS)	C			D		

2043 Windmill Road/Kimpton Road signalised junction (15) junction performance Assessment Phase 2b (future baseline and with the Proposed Development)

Arm	Future Baseline			with Assessment Phase 2b		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
AM Peak						
Windmill Road (north)	1,035	338	580	1,041	250	504
Kimpton Road	655	51	71	773	40	70
Windmill Road (south)	584	26	128	393	7	58
Average delay (seconds)	22			21		
Level of Service (LoS)	C			C		
PM Peak						
Windmill Road (north)	1,013	31	352	1,102	236	559
Kimpton Road	801	18	68	599	48	68
Windmill Road (south)	738	15	129	930	25	175
Average delay (seconds)	10			18		
Level of Service (LoS)	A			B		

2043 Eaton Green Road/Lalleford Road signalised junction (16) junction performance Assessment Phase 2b (future baseline and with the Proposed Development)

Arm	Future Baseline			with Assessment Phase 2b		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
AM Peak						
Lalleford Road	703	41	215	528	167	254
Eaton Green Road (east)	509	136	387	227	3	55
Eaton Green Road (west)	533	15	109	739	30	194
Average delay (seconds)	22			38		
Level of Service (LoS)	C			D		
PM Peak						
Lalleford Road	276	1	36	205	7	56
Eaton Green Road (east)	670	4	98	495	14	120
Eaton Green Road (west)	1,006	12	196	997	46	212
Average delay (seconds)	7			15		
Level of Service (LoS)	A			B		

2043 Wigmore Lane/Raynham Way signalised junction (17) junction performance Assessment Phase 2b (future baseline and with the Proposed Development)

Arm	Future Baseline			with Assessment Phase 2b		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
AM Peak						
Wigmore Lane (north)	580	3	66	1,026	21	170
Twyford Drive	117	2	27	120	5	37
Wigmore Lane (south)	291	-	25	390	3	31
Raynham Way	140	2	22	137	7	47
Average delay (seconds)	4			12		
Level of Service (LoS)	A			B		
PM Peak						
Wigmore Lane (north)	665	6	108	674	11	117
Twyford Drive	96	1	20	94	4	35
Wigmore Lane (south)	636	2	59	864	7	58
Raynham Way	179	-	26	162	9	56
Average delay (seconds)	5			11		
Level of Service (LoS)	A			B		

2043 Wigmore Lane/Asda access signalised junction (18) junction performance Assessment Phase 2b (future baseline and with the Proposed Development)

Arm	Future Baseline			with Assessment Phase 2b		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
AM Peak						
Wigmore Lane (north)	566	8	87	978	22	99
Asda Access	269	2	32	279	4	38
Wigmore Lane (south)	363	-	22	405	5	47
Average delay (seconds)	4			19		
Level of Service (LoS)	A			B		
PM Peak						
Wigmore Lane (north)	657	9	109	659	21	91
Asda Access	656	5	43	625	17	62
Wigmore Lane (south)	529	3	60	730	31	131
Average delay (seconds)	7			27		
Level of Service (LoS)	A			C		

2043 Windmill Road/St Mary's Road/Crawley Green Road roundabout (19) junction performance Assessment Phase 2b (future baseline and with the Proposed Development)

Arm	Future Baseline			with Assessment Phase 2b		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
AM Peak						
St Mary's Road	429	59	185	533	10	72
Crawley Green Road	825	66	104	843	39	101
Windmill Road	763	176	403	561	10	98
A505 Park Viaduct	873	212	438	1,017	21	126
Average delay (seconds)	77			36		
Level of Service (LoS)	E			D		
PM Peak						
St Mary's Road	493	25	150	527	13	85
Crawley Green Road	708	22	93	778	35	101
Windmill Road	973	86	377	930	16	133
A505 Park Viaduct	966	455	473	1,042	252	449
Average delay (seconds)	64			53		
Level of Service (LoS)	E			D		

2043 Crawley Green Road/Lalleford Road signalised junction (20) junction performance Assessment Phase 2b (future baseline and with the Proposed Development)

Arm	Future Baseline			with Assessment Phase 2b		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
AM Peak						
Crawley Green Road (east)	877	13	68	742	22	137
Lalleford Road	195	-	20	189	11	73
Crawley Green Road (west)	585	8	39	851	72	294
Average delay (seconds)	3			28		
Level of Service (LoS)	A			C		
PM Peak						
Crawley Green Road (east)	513	2	46	579	29	154
Lalleford Road	466	2	58	526	31	152
Crawley Green Road (west)	800	1	32	726	74	280
Average delay (seconds)	3			33		
Level of Service (LoS)	A			C		

2043 Provost Way/AAR signalised junction (21) junction performance Assessment Phase 2b (with the Proposed Development)

Arm	AM Peak			PM Peak		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
with Assessment Phase 2b						
Provost Way (north)	287	7	59	123	4	32
AAR (east)	894	13	91	1,006	21	115
AAR Provost Way (south)	118	3	41	280	10	70
AAR (west)	1,217	11	93	1,291	21	148
Average delay (seconds)	14			17		
Level of Service (LoS)	B			B		

2043 Provost Way Link Road/Percival Way signalised junction (22) junction performance Assessment Phase 2b (with the Proposed Development)

Arm	AM Peak			PM Peak		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
with Assessment Phase 2b						
Provost Way Link Road	454	-	-	577	-	-
Percival Way (east)	-	-	-	-	-	-
Percival Way (west)	118	-	-	281	1	17
Average delay (seconds)	1			1		
Level of Service (LoS)	A			A		

2043 President Way/AAR roundabout (23) with the Proposed Development

Arm	AM Peak			PM Peak		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
with Assessment Phase 2b						
Car park access	130	1	34	358	1	55
AAR (east)	1,347	8	93	902	4	56
President Way	11	-	16	62	1	20
AAR (west)	1,008	9	94	626	1	46
Average delay (seconds)	8			5		
Level of Service (LoS)	A			A		

2043 Terminal 2 access roundabout (24) with the Proposed Development

Arm	AM Peak			PM Peak		
	Demand (Veh)	Average Queue (m)	Max Queue (m)	Demand (Veh)	Average Queue (m)	Max Queue (m)
with Assessment Phase 2b						
AAR Link Road (north)	386	-	-	329	-	-
Terminal 2 Short Stay Access (South)	42	-	-	19	-	-
Terminal 2 Drop Off Access (South)	365	-	7	311	-	6
President Way (west)	8	-	4	4	-	2
Average delay (seconds)	1			1		
Level of Service (LoS)	A			A		