OXFORDSHIRE
STRATEGIC RAIL FREIGHT INTERCHANGE

DCO Submission

Environmental Statement

Chapter 3: Transport
Appendix 3.1: Transport Assessment Part 10 of 11 – Appendices 35 to 43

Document 6.3A.10
Rev v3

On behalf of
Oxfordshire Railfreight Limited

Prepared by ADC Infrastructure Ltd
October 2026

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Date	October 2026
Revision	V3

APPENDIX 35

M40 J9 HIGHWAY DESIGN REVIEW

M40 JUNCTION 9 HIGHWAY DESIGN REVIEW
OXFORDSHIRE SRFI

Project	**Oxfordshire Strategic Rail Freight Interchange (OxSRFI)**		
Document Number	OxSRFI-BWB-GEN-XX-RP-CH-0015	**BWB Ref**	NTH2479
Author	[redacted]	**Status**	S3
Checked	[redacted]	**Revision**	P01
Approved	[redacted]	**Date**	24.03.2026

1 INTRODUCTION

1.1 The highway works for OxSRFI include improvements at M40 J9 improvements to increase the capacity for A34 northbound to M40 northbound traffic.

1.2 AECOM, on behalf of National Highways, provided on 23/02/2026 a list of comments and questions on the design proposals in response to the 1:2,500 general arrangement plan for the junction presented at statutory consultation. This is found at **Appendix A**.

1.3 The purpose of this technical note is to provide responses to the questions raised and to demonstrate compliance of the proposed improvements with the Design Manual for Roads and Bridges (DMRB),

2 RESPONSES TO COMMENTS RAISED

2.1 The following table provides a response to each of the comments raised by AECOM in Amber or Red in their technical note.

AECOM report ref	AECOM comment	BWB response
2.3	AECOM recommends that the updated signage strategy should be provided before the review of the proposed scheme can be completed.	The signage strategy for the scheme has been updated to include for the signage on the A34 approach to M40 J9. This is found at **Transport Assessment (TA) Appendix 40**.
3.2	The scheme is shown at scale 1:2500 on an inset to a larger drawing with no dimensions provided. A larger scale plan, annotated with key dimensions and their compliance with DMRB, and a CAD drawing of the scheme, should be provided, to facilitate AECOM's review.	The following larger scale plans showing the works, including assessment of compliance with DMRB, are found at **Appendix B** to this technical note: OxSRFI-BWB-HGN-27-DR-CH-0105 OxSRFI-BWB-HGN-28-DR-CH-0105 In addition the cross-sections are shown on **DCO Document 2.7M**
3.3	The roundabout, and the A34 approach, are both significantly above the natural level of the ground. This will require earthworks, the removal of a significant amount of vegetation, and the relocation of the current vehicle restraint system (VRS), traffic signal poles and street lighting columns into the new highway verge.	This is understood and sufficient land has been included within the scheme beyond the existing highway boundary to allow for the required earthworks. At the top of the slope a verge width of 5m has been allowed for to provide space for the required assets. We note this is considerably wider than the approximately existing 2m, wide verge. The cross-sections are shown on **DCO Document 2.7M**

AECOM report ref	AECOM comment	BWB response
3.4	Earthworks are shown on the drawing, but the extent and adequacy of these cannot be determined without a 3-dimensional layout. The extent of vegetation clearance is not shown. The positions of the relocated VRS, traffic signal poles and street lighting columns are also not shown. These should be provided, at least indicatively, so as to confirm the adequacy of the verge proposed.	See above response in terms of earthworks and verge width for assets. Traffic signal locations are indicated on drawing OxSRFI-BWB-HGN-27-DR-CH-0105 found at **Appendix B**.
3.6	Since the signage strategy is to be updated, the location of any additional signs proposed on the A34 approach (or elsewhere) should be shown, at least indicatively, and it should be confirmed that the proposed earthworks are sufficient to accommodate them. The impact of any such signs on visibility spays should be considered, as should the need for additional vegetation clearance to achieve such splays.	The signage strategy (as above) proposes an additional dedicated lane sign, the location of which is shown on drawing OxSRFI-BWB-GEN-XX-SK-CH-SK058 (**TA Appendix 40**) with the visibility splay to this sign is also indicated on OxSRFI-BWB-HGN-27-DR-CH-0105 (**Appendix B**).
3.7	There appears to be an existing Public Right of Way (PRoW) on the nearside of the A34 approach close to the junction entry. A 'Public Footpath' sign and a handrail to a set of steps is visible on street view imagery. However, the condition of the vegetation in this vicinity appears to show little evidence that this PRoW is regularly used. This PRoW should be acknowledged in the proposed scheme and should either be provided for, or, alternatively, steps should be taken to divert or extinguish it. A Walking Cycling and Horse-riding Assessment and Review (WCHAR) may be necessary to support this process.	This PRoW was effectively severed by the construction of the M40 with users currently expected to climb over the VRS, cross multiple lanes of traffic, cross the M40 over one of the bridges and cross further lanes of traffic. Clearly this exiting situation is far from desirable. We have undertaken consultation with OCC's PRoW officer and agreed that the most appropriate situation is to truncate the PRoW at the point where it turns through 90 degrees (close to the start of the M40 slip road). The Access and Rights of Way plan **DCO Document 2.3H** shows the proposed length of PRoW to be stopped up.
3.8	Visibility splays on the A34 approach and M40 slip road exit should be illustrated on the drawing. These should include: • Visibility from the A34 approach into the additional nearside lane; • Visibility to signal heads; • Visibility onto the circulatory carriageway of the roundabout; • Exit visibility into the M40 slip road to CD116 para 3.56 and Note; and Visibility around the left-hand bend on the slip road.	All of these visibility splays are shown on drawings OxSRFI-BWB-HGN-27-DR-CH-0105 and OxSRFI-BWB-HGN-28-DR-CH-0105 found at **Appendix B**.

AECOM report ref	AECOM comment	BWB response
3.9	Lane widths on the approach, through the widened section of carriageway, and into the M40 slip road exit, should be illustrated on the drawing. The lane widths at entry should comply with CD116 para 3.14.2. All lane widths should be supported by heavy vehicle swept path plots for all potentially conflicting movements.	The lane widths are shown on drawings OxSRFI-BWB-HGN-27-DR-CH-0105 and OxSRFI-BWB-HGN-28-DR-CH-0105 found at **Appendix B**. Vehicle tracking / swept paths are shown on drawing OxSRFI-BWB-GEN-XX-DR-CH-0009 found at **Appendix C**.
3.10	The proposed subsidiary island on the A34 approach is of some concern because of the risk that vehicles making late lane-changes might strike it. Measures should be proposed to maximise the conspicuity of this island so as to minimise this risk.	Subsidiary islands such as this are commonplace on multi lane approaches and allow for (a) better placing of traffic signals and (b) segregation of traffic flows into the roundabout which reduces the potential for lane changing on the roundabout. Whilst we agree and understand the concern about the potential for vehicle strikes, we consider this is a matter to be addressed during detailed design, measures can include larger diameter traffic bollard at the start of the island and coloured surfacing within the hatching. In saying this we note that the junction is and will remain lit throughout the hours of darkness.
3.11	Paragraph 5.4 of the ADC report states that this island will be used to accommodate traffic signal poles and heads. These are not shown on the drawing. Consideration should be given to the size of island required to accommodate these, including the following matters:	*Each detailed point is reviewed in turn below*
3.11 (1)	Adequate clearance should be provided between the bodies of high sided vehicles and signal heads, and this should be demonstrated using the swept path plots to be provided;	Drawing OxSRFI-BWB-HGN-27-DR-CH-0105 found at **Appendix B** shows the proposed signal locations and along with the swept path drawing found at **Appendix C** demonstrates that there is sufficient clearance to the signals.
3.11 (2)	High mast signals are currently provided to the nearside and offside of this roundabout entry. These are protected by the VRS. If the proposed signals on the subsidiary island are also to be high mast, consideration should be given to whether they also need to be protected by VRS and, if so, adequate space should be provided on the island to accommodate the VRS required;	The use of tall signal poles is a matter for detailed design but we note that 6m passively safe poles are readily available including raise/lower poles. As such no VRS is required on the island.
3.11 (3)	Once the lanes on this approach are split into two separate traffic streams, consideration should be given to the possibility that the signals for the left turn lanes may not always be fully synchronised with those for the main roundabout approach. If this were to occur, twin signal heads would be required on the subsidiary island, requiring additional width	Drawing OxSRFI-BWB-HGN-27-DR-CH-0105 found at **Appendix B** shows the proposed signal locations and this allows for separate signals for traffic passing either side of the island.

AECOM report ref	AECOM comment	BWB response
3.11 (4)	Should the PRoW referred to above be retained within the design, the possibility that pedestrians may wish to use the subsidiary island as a refuge should be considered, and, if necessary, adequate space should be allocated to them. Some of the issues listed above may appear to be details not normally considered at this stage. However, the concern is that, in combination, they may lead to a requirement for a larger island than is currently proposed. If this is significant, it could affect other aspects of the proposed layout.	See response above regarding the PRoW and as a result there is no requirement to accommodate a pedestrian crossing within this island.
3.13	The taper by which the third lane is lost on the M40 slip road starts downstream of the bend approximately 40-50m into the slip road. This is to be welcomed. The adequacy of the taper length proposed should be confirmed by reference to CD 116 Figures 3.14b and 3.14j and para 3.19 (which in turn refers to TSM ch5 Table 7-4).	The lane reduction taper is shown in detail on drawing OxSRFI-BWB-HGN-28-DR-CH-0105 found at **Appendix B**. This is compliant with CD 127 Table 2.28.

3 DMRB COMPLIANCE

3.1 In addition to the queries raised by AECOM above, drawings OxSRFI-BWB-HGN-27-DR-CH-0105 and OxSRFI-BWB-HGN-28-DR-CH-0105 found at **Appendix B** demonstrates compliance with the following requirements of the DMRB:

- Desirable minimum SSD is achieved on the immediate approach as defined by CD 109 based on a design speed of 120kph for the A34; and
- Desirable minimum SSD is achieved for at least one primary signal associated with its particular movement as defined by CD 123 based on a design speed of 120kph for the A34.

3.2 The 1:2,500 Highway Plan showing the general arrangement of the works at a smaller scale is found at **DCO Document 2.7D**. A long-section through the area of the works is found at **DCO Document 2.7V**.

APPENDIX A

AECOM Briefing Note 09 (M40 J9)

Briefing Note 09

Project:	**National Highways Spatial Planning Contract 2021 – 2026**	Job No:	**60712760 / DO003.017**
Subject:	**Oxfordshire Strategic Rail Freight Interchange – Initial High-Level DMRB Review of M40 Junction 9 proposals**		
Prepared by:	[redacted]	Date:	**11th February 2026**
Checked by:	[redacted]	Date:	**12th February 2026**
Verified by:	[redacted]	Date:	**12th February 2026**
Approved by:	[redacted]	Date:	**13th February 2026**

1. Introduction

1.1. AECOM has prepared this Briefing Note (BN09) to review the mitigation proposals at M40 J9 as part of the OxSRFI proposals.

1.2. The background to and layout of the proposed improvement is described and illustrated in:

- ADC report 'M40 Junction 9' dated 19/12/2025; and
- ADC drawing OxSRFI-BWB-LSI-04-DR-CH-0104 S3-For Comment rev P02 dated 15/09/2025.

1.3. M40 Junction 9 provides an interchange with the A34 and A41. The A34 is part of the SRN and the A41 is part of the local road network. The junction currently provides a signal controlled four lane approach from the A34, and a two-lane exit into the M40 northbound on-slip road.

1.4. The scheme would provide a short taper into a fifth lane on the A34 approach, leading into a three-lane exit into the M40 northbound on-slip, tapered out to two lanes on the slip road itself. At the A34 roundabout entry, three lanes would be provided for the A34 to M40 traffic, and two lanes for traffic continuing on to the roundabout; with these two streams of traffic separated by a subsidiary traffic island at the roundabout entry.

1.5. Previous work using the Bicester Transport Model (BTM) showed significant PM peak congestion on the A34 approach to M40 Junction 9, leading to rat running on the local road network. This scheme is intended to address that issue and to effectively mitigate the impact of the proposed development on this arm.

1.6. For ease of reference, AECOM's main comments and recommendations are presented in bold and underlined text throughout the note. Recommendations regarded as critical to the acceptability of this DCO application are coloured **red**. Recommendations that are regarded as important but not critical to the acceptability of this DCO application are highlighted in **amber**.

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2. Background

2.1. Paragraph 1.10 of ADC report 'M40 Junction 9' states that National Highways' response to the Stage 2 DCO consultation raised a number of points in respect of this proposal, including:

- Road safety concerns on the A34 approach;
- The fact that there had previously been a free-flow left turn scheme implemented at this location that was removed following the occurrence of a series of collisions at this location;
- Issues raised in the interim Road Safety Audit; and
- The need to ensure that the scheme meets the needs of this and other developments and that it is appropriate and safe.

2.2. Paragraph 2.1 of the ADC report states that the developer's response to this is that the scheme providing a third lane for A34 to M40(N) traffic responds to both the traffic capacity and road safety issue. The previous unsuccessful scheme is no longer relevant, because the roundabout has been signalised since then.

2.3. Paragraph 5.3 of the ADC report states that the Road Safety Audit's concern was a lack of sufficient lane destination signage. In response to this, the signage strategy is to be updated "in the coming weeks". **AECOM recommends that the updated signage strategy should be provided before the review of the proposed scheme can be completed.**

3. DMRB Review

3.1. Until the requirements for a mitigation scheme at this location are determined and agreed through the ongoing modelling process it has been agreed that a high-level review of the mitigation proposals against the requirements held within the DMRB is undertaken at this stage. If required, a full review will be undertaken in due course. Responses to the recommendations raised below will aid any further reviews.

3.2. The scheme is shown at scale 1:2500 on an inset to a larger drawing with no dimensions provided. **A larger scale plan, annotated with key dimensions and their compliance with DMRB, and a CAD drawing of the scheme, should be provided, to facilitate AECOM's review.**

3.3. The roundabout, and the A34 approach, are both significantly above the natural level of the ground. **This will require earthworks, the removal of a significant amount of vegetation, and the relocation of the current vehicle restraint system (VRS), traffic signal poles and street lighting columns into the new highway verge.**

3.4. Earthworks are shown on the drawing, but the extent and adequacy of these cannot be determined without a 3-dimensional layout. The extent of vegetation clearance is not shown. The positions of the relocated VRS, traffic signal poles and street lighting columns are also not shown. **These should be provided, at least indicatively, so as to confirm the adequacy of the verge proposed.**

3.5. The gantry sign on the A34 approach is to be retained in situ. AECOM assume that the vegetation, VRS and lighting columns upstream of this point are to be retained in situ.

3.6. Since the signage strategy is to be updated, **the location of any additional signs proposed on the A34 approach (or elsewhere) should be shown, at least indicatively, and it should be confirmed that the proposed earthworks are sufficient to accommodate them. The impact of any such signs on visibility spays should be considered, as should the need for additional vegetation clearance to achieve such splays.**

3.7. There appears to be an existing Public Right of Way (PRoW) on the nearside of the A34 approach close to the junction entry. A 'Public Footpath' sign and a handrail to a set of steps is visible on street view imagery. However, the condition of the vegetation in this vicinity appears to show little evidence that this PRoW is regularly used. **This PRoW should be acknowledged in the proposed scheme and should either be provided for, or, alternatively, steps should be taken to divert or extinguish it. A Walking Cycling and Horse-riding Assessment and Review (WCHAR) may be necessary to support this process.**

3.8. **Visibility splays on the A34 approach and M40 slip road exit should be illustrated on the drawing.** These should include:

- Visibility from the A34 approach into the additional nearside lane;
- Visibility to signal heads;
- Visibility onto the circulatory carriageway of the roundabout;
- Exit visibility into the M40 slip road to CD116 para 3.56 and Note; and
- Visibility around the left-hand bend on the slip road.

3.9. **Lane widths on the approach, through the widened section of carriageway, and into the M40 slip road exit, should be illustrated on the drawing. The lane widths at entry should comply with CD116 para 3.14.2. All lane widths should be supported by heavy vehicle swept path plots for all potentially conflicting movements.**

3.10. The proposed subsidiary island on the A34 approach is of some concern because of the risk that vehicles making late lane-changes might strike it. **Measures should be proposed to maximise the conspicuity of this island so as to minimise this risk.**

3.11. Paragraph 5.4 of the ADC report states that this island will be used to accommodate traffic signal poles and heads. These are not shown on the drawing. **Consideration should be given to the size of island required to accommodate these, including the following matters:**

- Adequate clearance should be provided between the bodies of high sided vehicles and signal heads, and this should be demonstrated using the swept path plots to be provided;
- High mast signals are currently provided to the nearside and offside of this roundabout entry. These are protected by the VRS. If the proposed signals on the subsidiary island are also to be high mast, consideration should be given to whether they also need to be protected by VRS and, if so, adequate space should be provided on the island to accommodate the VRS required;
- Once the lanes on this approach are split into two separate traffic streams, consideration should be given to the possibility that the signals for the left turn lanes may not always be fully synchronised with those for the main roundabout approach. If this were to occur, twin signal heads would be required on the subsidiary island, requiring additional width; and
- Should the PRoW referred to above be retained within the design, the possibility that pedestrians may wish to use the subsidiary island as a refuge should be considered, and, if necessary, adequate space should be allocated to them.

3.12. Some of the issues listed above may appear to be details not normally considered at this stage. However, the concern is that, in combination, they may lead to a requirement for a larger island than is currently proposed. If this is significant, it could affect other aspects of the proposed layout.

3.13. The taper by which the third lane is lost on the M40 slip road starts downstream of the bend approximately 40-50m into the slip road. This is to be welcomed. **The adequacy of the taper length proposed should be confirmed by reference to CD116 Figures 3.14b and 3.14j and para 3.19 (which in turn refers to TSM ch5 Table 7-4).**

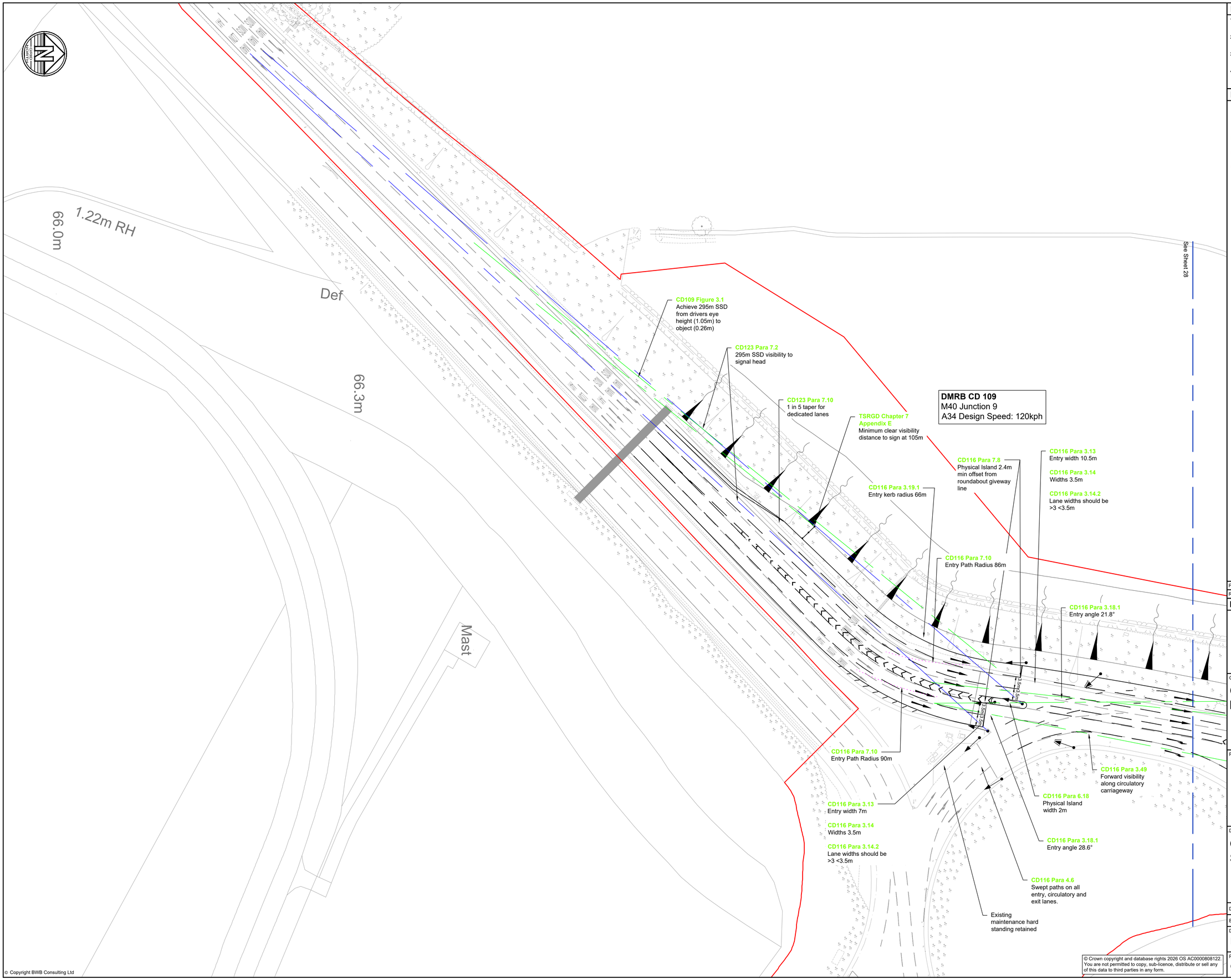
4. Conclusion

4.1. AECOM has prepared this Briefing Note to document an initial high-level DMRB compliance review of the proposed changes to M40 Junction 9 as described in a document titled “M40 Junction 9”, dated 19th December 2025, and a drawing titled “OxSRFI-BWB-LSI-04-DR-CH-0104 S3-For Comment rev P02”, dated 15th September 2025, both prepared by ADC in support of the proposed Oxfordshire Strategic Rail Freight Interchange development.

4.2. AECOM’s recommendations regarding these concerns are highlighted by the use of bold underlined text throughout this document. Recommendations regarded as critical to the acceptability of this proposal are highlighted **red**. Recommendations that are regarded as important but not critical to the acceptability of this proposal are highlighted in **amber**.

APPENDIX B

Drawings OxSRFI-BWB-HGN-27-DR-CH-0105 and OxSRFI-BWB-HGN-28-DR-CH-0105 Geometrical Layout Sheets



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Notes

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2. This drawing is to be read in conjunction with all relevant architects, engineers and specialists drawings and specifications.
3. All dimensions in metres unless noted otherwise. All levels in metres unless noted otherwise.
4. Any discrepancies noted on site are to be reported to the engineer immediately.

Legend

- Order Limits
- OCC / OxSRFI boundary
- CDxxx — Adheres to standard
- CDxxx — Relaxation or acceptable deviation from standard
- **CDxxx** — Deviation that requires a departure from standard
- Junction visibility
- Forward visibility
- Visibility Splay with Relaxation
- Visibility Splay with Departure
- STr — Alignment - Straight
- R=xxxm — Alignment - Radius
- TL=xx.xm (q=0.x) — Alignment - Transition
- Traffic signal equipment

Rev	Date	Details of issue / revision	Drw	Rev
P01	16.03.26	First Issue	JFP	SRH

Issues & Revisions

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Client

OXFORDSHIRE RAILFREIGHT LTD.

Project Title

OxSRFI
OXFORDSHIRE
STRATEGIC RAIL FREIGHT INTERCHANGE

Drawing Title

GEOMETRICAL LAYOUT SHEET 27

Drawn:	J.Palmer	Reviewed:	S.Hilditch
BWB Ref:	NTH2479	Date: 16.03.26	Scale@A1: 1:1000

Drawing Status

PRELIMINARY

Project - Originator - Zone - Level - Type - Role - Number	Status	Rev
OxSFI-BWB-HGN-27-DR-CH-0105	**S2**	**P01**

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Legend

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- Traffic signal equipment

Rev	Date	Details of issue / revision	Drw	Rev
P01	16.03.26	First Issue	JFP	SRH

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Client

OXFORDSHIRE RAILFREIGHT LTD.

Project Title

OxSRFI OXFORDSHIRE STRATEGIC RAIL FREIGHT INTERCHANGE

Drawing Title

GEOMETRICAL LAYOUT SHEET 28

Drawn:	J.Palmer		Reviewed:	S.Hilditch	
BWB Ref:	NTH2479	Date:	16.03.26	Scale@A1:	1:1000

Drawing Status

PRELIMINARY

Project - Originator - Zone - Level - Type - Role - Number	Status	Rev
OxSFI-BWB-HGN-28-DR-CH-0105	**S2**	**P01**

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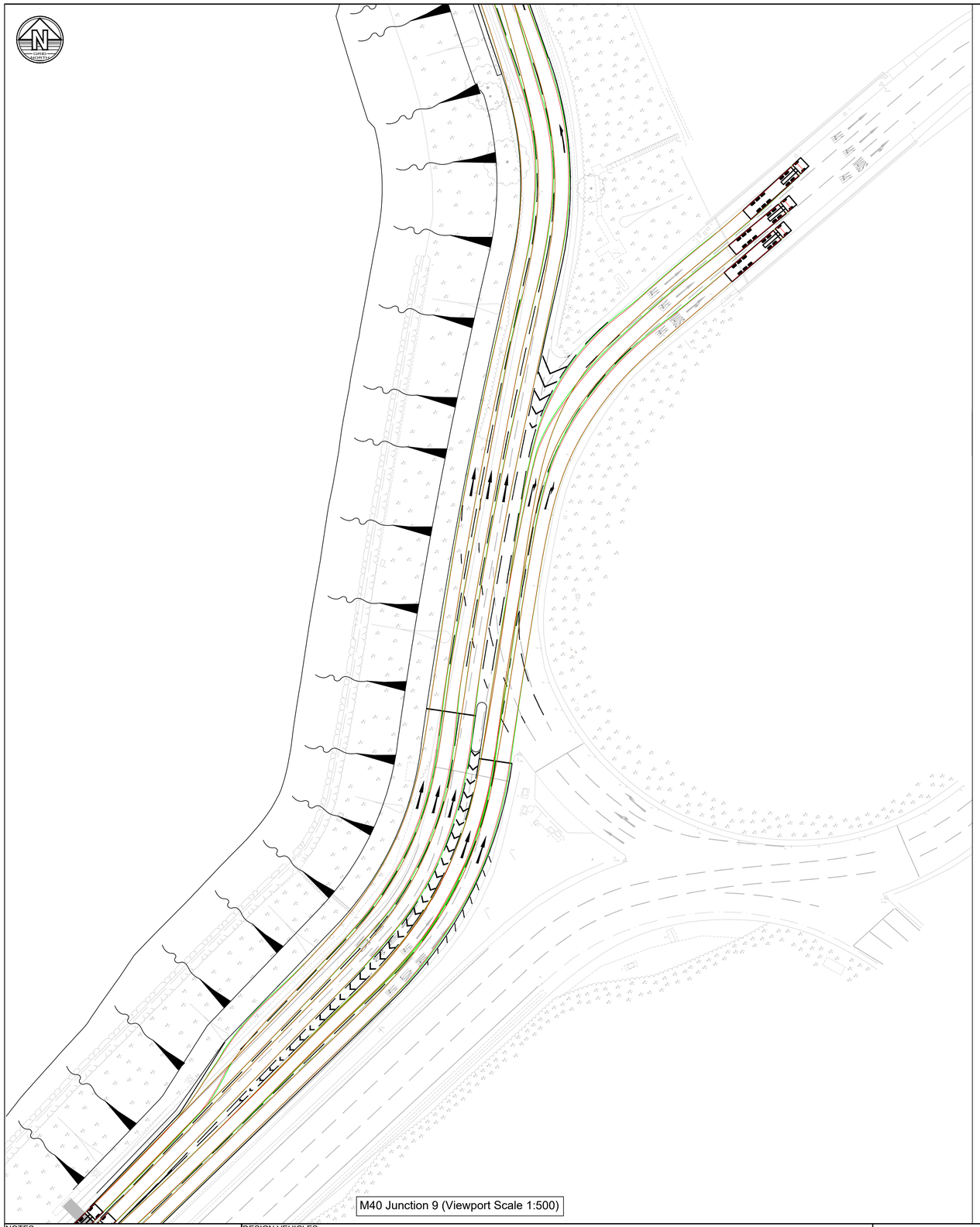
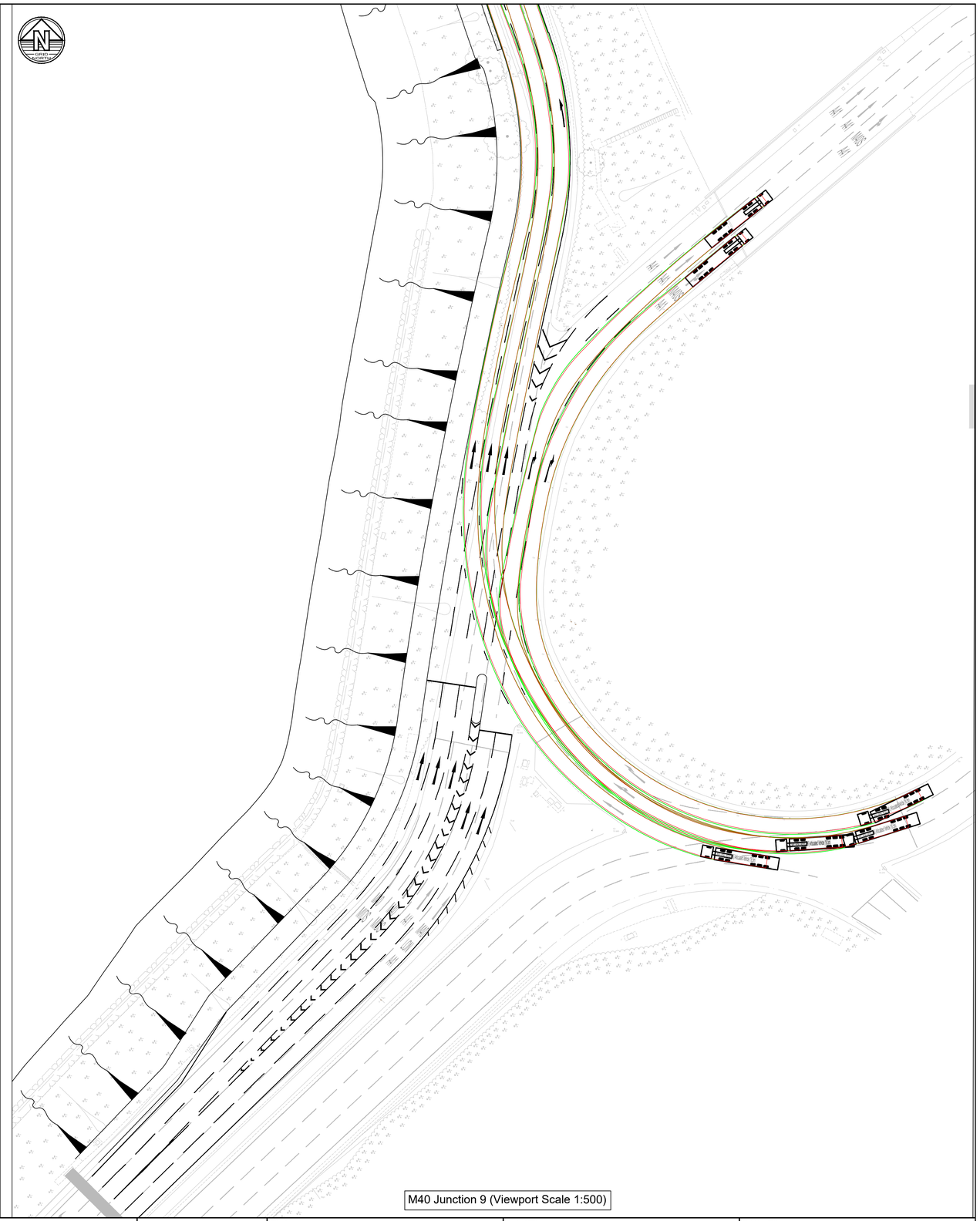
APPENDIX C

Drawing OxSRFI-BWB-GEN-XX-DR-CH-0009 Highway Plans Swept Paths





NOTES

1. Do not scale this drawing. All dimensions must be checked/ verified on site. If in doubt ask.
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3. All dimensions in metres unless noted otherwise. All levels in metres unless noted otherwise.
4. Any discrepancies noted on site are to be reported to the engineer immediately.

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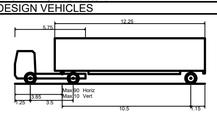
DESIGN VEHICLES



Articulated Combination	
Overall Length	15.500m
Overall Width	2.550m
Overall Body Height	3.713m
Min Body Ground Clearance	0.436m
Track Width	2.550m
Lock to lock time	4.00s
Kerb to Kerb Turning Radius	7.500m

ISSUES & REVISIONS

Rev	Date	Details of issue / revision	Drw	Rev
P01	06.03.26	Issued for information	JFP	SRH

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Client
OXFORDSHIRE RAILFREIGHT LTD.

Project Title
OxSRFI OXFORDSHIRE STRATEGIC RAIL FREIGHT INTERCHANGE

Drawing Title
HIGHWAY PLANS SWEPT PATHS

Drawn:	J. Palmer	Reviewed:	S. Hilditch		
BWB Ref:	NTH2479	Date:	06.03.26	Scale@A1:	1:500

Drawing Status
FOR INFORMATION

Project - Originator - Zone - Level - Type - Role - Number
OxSRFI-BWB-GEN-XX-DR-CH-0009

Status: **S2** Rev: **P01**

APPENDIX 36

INTERIM ROAD SAFETY AUDIT AND RESPONSE REPORT

A CAF GROUP COMPANY

TRANSPORT AND INFRASTUCTURE PLANNING

OxSRFI Ltd

Oxfordshire Strategic Rail Freight Interchange

Ardley, Oxfordshire

Interim Stage 1 Road Safety Audit

TRANSPORT AND INFRASTUCTURE PLANNING

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May 2025

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Prepared By:	BWB Consulting
On Behalf Of:	National Highways

Revision	Date of Issue	Status	Author:	Checked:	Approved:
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2	6 June 2025	Issued to Designer			

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4. AUDIT TEAM STATEMENT 28

FIGURES

FIGURE 1: Location of problems identified in this audit

APPENDICES

APPENDIX 1: List of documents supplied to the Audit Team

1. INTRODUCTION

1.1 This report comprises an Interim Stage 1 Road Safety Audit (RSA) undertaken on the works associated with the proposed highway infrastructure local highway network to provide access to the proposed Oxfordshire Strategic Rail Freight Interchange. There are several elements of the works, some of which are on the Strategic Road Network (SRN) covered by National Highways (NH) and some that are on the Local Highway Authority (LHA) network covered by Oxfordshire County Council (OCC). The works are broken down further in the ensuing paragraphs. This report focuses on all elements of the proposed highway works.

1.2 The Audit Team members are listed in Section 3.0. The audit took place at the Nottingham office of BWB Consulting Limited between 23rd April and 30th May 2025.

1.3 The Audit comprised an examination of the drawings, documents and information provided by the Design Team, who have prepared the outline design drawings for the project. The information received by the Audit Team is listed in **Appendix A**.

1.4 A daylight examination of the site was undertaken by the Audit Team between 13:30 and 15:30 hours on 23rd April 2025. During the site visit the weather was fine and dry. Traffic flows on routes, were moderate. Some pedestrian and cyclist movements were observed during the site visit conducted on the OCC elements of the proposals.

1.5 The terms of reference of the audit are as described in GG 119. The Audit Team has examined and reported only on the road safety implications of the scheme as presented and has not examined or verified the compliance of the designs to any other criteria. All comments and recommendations refer to the highway proposal drawings and the locations have been indicated on **Figure 1**.

1.6 The proposals are detailed in **Table 1**.

Departures from Standard

1.7 To date the following departures from geometry standards have been identified for the scheme. These are yet to be submitted and approved:

Component	Departures from geometry standards identified at this design stage
A43/B4100 Baynard's Green	Entry path curvature greater than 100m
A43 corridor from Baynard's Green to Ardley junction	None envisaged
M40 Junction 10 slip roads	New NB diverge: hard shoulder discontinuity under existing bridge; reduced SSD into the new diverge due to the bridge; retention of woodland within low-radius loop; use of crest K 17 over the M40 bridge at the end of the loop SB merge: hard shoulder discontinuity under existing bridge
B430 Ardley Bypass	None envisaged
B430 OxSRFI principal access	None envisaged
B430 corridor south of the principal access	None envisaged
Heyford Park Link Road	None envisaged
Middleton Stoney Relief Road	None envisaged
Middleton Stoney crossroads	Traffic signal intervisibility not compliant due to existing buildings and property boundaries
Middleton Road	None
M40 Junction 9	None
Quarry cottages	None

Table 1: Proposed Highway works within the Overall Scheme

Location	Description of Works	Overseeing Organisation
A43/B4100 Baynard's Green	Capacity improvement and signalisation including provision of walking and cycling facilities	NH (A43 and junction) OCC (B4100)
A43 corridor from Baynard's Green to Ardley junction	On-line widening Padbury junction reconfiguration Cherwell junction capacity improvement Ardley junction capacity improvement and signalisation Provision of walking and cycling facilities	NH except B430 south of Ardley junction which is OCC
M40 Junction 10 slip roads	SB diverge widening (to Padbury junction) SB merge widening and extension NB diverge realignment New NB diverge and direct link to Padbury junction NB merge relocation	NH
B430 Ardley Bypass	Construction of bypass to Ardley (single 2+1 cross-section) Realignment of Ardley Road Provision of walking and cycling facilities	OCC
B430 OxSRFI principal access	Partially signalised roundabout access junction into OxSRFI Provision of walking and cycling facilities	OCC
B430 corridor south of the principal access	Provision of walking and cycling facilities Closure of Camp Road junction Toucan crossing	OCC
Heyford Park Link Road	Priority junction at Camp Road / Chilgrove Drive including a Pegasus crossing New link road to replace Camp Road Signalised junction with the B430 Secondary access into OxSRFI Provision of walking and cycling facilities	OCC
Middleton Stoney Relief Road	New link road around the northeastern quadrant of Middleton Stoney Signalised junction with B430 Roundabout junction with the B4030 Provision of walking and cycling facilities	OCC
Middleton Stoney crossroads	Provision of pedestrian crossing facilities within the junction	OCC
Middleton Road	Provision of a facility for walking, cycling and horse-riding across the M40 on Middleton Road, connecting two existing bridleways	OCC NH (M40 bridge)
M40 Junction 9	Capacity increase to provide an extra lane from the A34 to M40 NB through the junction	NH
Quarry cottages	Stopping up of the southern end of the road and provision of a turning head Provision of walking and cycling facilities	OCC

2. ITEMS RAISED AT THIS INTERIM STAGE 1 AUDIT – STRATEGIC ROAD NETWORK (NH)

Problem

2.1 Location: General to the scheme.

Summary: Risk of Non-Motorised Users (NMUs) falling over the parapet.

There is a number of locations where over bridges are proposed with NMU facilities provided on them. It is unclear from the design as to what height the proposed parapets are. It is important that the parapet heights are suitable for intended users, to reduce the risk of users falling over the parapet.

In addition, it should be noted that the minimum effective width of the cycle tracks proposed across the bridges reduces where the parapet is provided immediately adjacent to it. If the forecast level of use is expected to be high, additional width should be provided at the facility to avoid conflicts between cyclists on the facility.

Recommendation

Ensure the design of the structures makes allowance for intended users and anticipated flows.

Problem

2.2 Location: B430 Corridor and General to the scheme.

Summary: Potential for collision between pedestrians/cyclists and vehicles due to confusion and hesitation.

The proposals include new pedestrian, cycle and equestian routes route across the scheme. The changes to the junctions at the M40 J10 and other changes along the A43 corridor, result in compex junctions for non-motorised users (NMUs) to negotiate and some of the routes may not be clear to users particularly where existing Public Rights of Way (PRoWs) have been diverted. The complexity of the junctions could lead to confusion resulting in collisions with other users, or, in some cases, lead to NMUs continuing along the carriageway and potentially being hit by passing vehicles.

Recommendation

Wayfinding signs should be provided for pedestrians and cyclists to ensure it is clear where they need to go and which routes they should be following to reach certain destinations.

M40 Junction 9

Problem

2.3 Location: M40 Junction 9 - General to the scheme.

Summary: Risk of collisions resulting from inappropriate parking during maintenance operations.

There is a number of locations where traffic signals or traffic signal controlled crossings are proposed. The design does not appear to include any provision for maintenance accesses or parking in close proximity to the signals. If maintenance operatives are not provided with suitable safe parking areas, there is a risk that their vehicles could be parked so as to impede forward visibility or in areas where they block the carriageway and obstruct passing vehicles which could lead to collisions.

Recommendation

Ensure the design incorporates safe access for maintenance operatives in the form of laybys or hardstanding areas off the carriageway.

Problem

2.4 Location: M40 Junction 9 - A34 northbound roundabout approach.

Summary: Risk of collisions resulting from lane changes and hesitation due to the complexity of the junction.

The introduction of additional lanes on the northbound A34 roundabout approach and circulatory, as shown on OxSRFI-BWB-GEN-XX-SK-CH-SK053, creates a complex junction for drivers to navigate. This is likely to result in significant weaving and lane changes. Additionally, due to this being part of the strategic road network, it is likely that a number of users will be unfamiliar with the junction, in turn increasing the likelihood of uncertainaty and hesitation and in particular the possibility of late lane changes. This could result in collisions such as side swipes or shunts.

Recommendation

Provide sufficient advance and lane destination signing, supplemented by clear lane destintation markings alongside the arrows.

Problem

2.5 Location: M40 Junction 9 - exit from roundabout to M40.

Summary: Risk of increased severity collisions in the event of loss of control and errant vehicles colliding with road side furniture.

Highway profile drawings were not supplied for the M40 junction 9. As such the proposed levels around the junction are not clear. Additionally, any proposals for road restraint systems have not been shared with the RSA team. As such in the event of significant level differences between the proposed finished road levels and the adjacent land, there is a risk of serious injury in the event of an errant vehicle leaving the carriageway.

Recommendation

Undertake RRRAP assessments, particularly to the west the junction, to identify areas of risk and address through mitigation or redesign.

M40 Junction 10

Problem

2.6 Location: M40 Junction 10 – General to the scheme.

Summary: Risk of collisions resulting from lane changes and hesitation due to the complexity of the junction.

The proposed changes at the roundabout make this already complex junction even more challenging to navigate. This is likely to result in significant weaving and lane changes. Additionally, due to this being part of the strategic road network, it is likely that a number of users will be unfamiliar with the junction in turn increasing the likelihood of uncertainaty and hesitation and in particular the possibility of late lane changes. This could result in collisions such as side swipes or shunts.

Recommendation

Provide sufficient advance and lane destination signing, supplemented by clear lane destintation markings alongside the arrows.

Problem

2.7 Location: M40 Junction 10 – General to the scheme.

Summary: Risk of increased severity collisions in the event of loss of control and errant vehicles colliding with road side furniture.

Highway profile drawings were not supplied for the M40 junction 10. As such the proposed levels around the junction are not clear. Additionally, proposals for road restraint systems have not been shared with the RSA team. As such in the event of significant level differences between the proposed finished road levels and the adjacent land, there is a risk of serious injury in the event of an errant vehicle leaving the carriageway.

Recommendation

Undertake RRRAP assessments, particularly to the west the junction, to identify areas of risk and address through mitigation or redesign.

Problem

2.8 Location: M40 Junction 10 – Ardley Roundabout.

Summary: Potential for ongoing maintenance issues and loss of control collisions resulting from kerb overrun.

Swept paths have been provided to the RSA team for the Cherwell and Ardley Roundabout junctions. There is a number of locations where the swept paths of large vehicles are shown to be very close to the kerb line or adjacent lanes within the carriageway.

There is a risk that if carriageway widths are insufficient for the anticipated use, that larger vehicles could overrun areas of verge adjacent to the carriageway. Kerb overrun leads to maintenance issues and potential for mud and detritus being brought into the carriageway which could result in a hazard, particularly for powered two wheelers, leading to loss of control collisions.

There is also a risk of side swipe collisions if there is insufficient space for two large vehicles to travel abreast, as they are more likely to encroach into the adjacent lanes.

Recommendation

Review the tracking of all relevant vehicles at all junctions, to ensure kerb lines are designed and the appropriate carriageway widths are provide.

Problem

2.9 Location: M40 Junction 10 – Ardley Roundabout – B430 South.

Summary: Potential collisions between vehicles entering the roundabout and vehicles on the circulatory.

The proposals show a two lane entry from the B430 south arm onto the roundabout circulartory. It appears that there may be insufficient defelction for vehicles entering from the south, as the layout indicates that vehicles in lane one will be guided into lane 2 on the circulatory. Insufficent deflection can result in higher entry speeds and subsequent loss of control.

In addition, if vehicles entering the circulatory from the B430 south are guided into lane two, there is a risk of side swipe collisions with other vehicles on the circulatory.

Recommendation

Review the proposed deflection and review the proposed lining to ensure vehicles are lead into the correct lane to encourage improved lane discipline on the circulatory.

Problem

2.10 Location: M40 Junction 10 – M40 northbound merge.

Summary: Potential collisions resulting from loss of control or elevated speed.

The proposed M40 northbound merge is long and straight. While it is acknowledged that the design speed is 85kph due to the straight horizontal alignment, this is likely to result in elevated vehicular speeds on the northbound merge, which in turn, increases the risk of loss of control where the horizontal alignment changes to a tight right hand bend.

Recommendation

Consider the inclusion of higher friction psv surfacing on the approach to the curve as well as considering some kind of trafffic calming features in the form of markings and signage to make drivers aware of the approaching bend and to keep speeds low at this point.

Baynard's Green Roundabout and Padbury Link Road

Problem

2.11 Location: Baynard's Green Roundabout

Summary: Potential for ongoing maintenance issues and loss of control collisions resulting from kerb overrun.

Swept paths have not been provided to the RSA team for Baynard's Green Roundabout. There is a number of locations where the swept paths of large vehicles are showing to be very close to the kerb line or adjacent lanes within the carriageway.

There is a risk that if carriageway widths are insufficient for the anticipated use, that larger vehicles could overrun areas of verge adjacent to the carriageway. Kerb overrun leads to maintenance issues and potential for mud and detritus being brought into the carriageway which could result in a hazard particularly for powered two wheelers, leading to loss of control collisions.

There is also a risk of side swipe collisions if there is insufficient space for two large vehicles to travel abreast, as they are more likely to encroach into the adjacent lanes.

Recommendation

Review the tracking of all relevant vehicles at the junction, to ensure kerb lines are designed and the appropriate carriageway widths are provide.

Problem

2.12 Location: Baynard's Green Roundabout.

Summary: Potential for NMUs to step into the live carriageway into the path of an approaching vehicle.

Controlled crossings are shown on OxSRFI-BWB-GEN-XX-SK-CH-SK094 at the junction, which appear to have a reverse stagger in the central splitter islands. If NMUs have their back to approaching traffic there is an increased risk of them stepping into the carriageway into the path of an approaching vehicle, resulting in collisions.

Recommendation

Review the provision of the reverse stagger at the crossings and, ideally, replace with a stagger that faces approaching traffic.

Problem

2.13 Location: Baynard's Green Roundabout.

Summary: Risk of lane changes, hesitation and subsequent side swipe or shunt type collisions.

The proposed changes at the roundabout make this junction more challenging to navigate and as such, this is likely to result in significant weaving and lane changes. Additionally, due to this being part of the strategic road network, it is likely that a number of users will be unfamiliar with the junction in turn increasing the likelihood of uncertainaty and hesitation and in particular the possibility of late lane changes. This could result in collisions such as side swipes or shunts.

Recommendation

Provide sufficient advance and lane destination signing, supplemented by clear lane destintation markings alongside the arrows.

Problem

2.14 Location: Baynard's Green Roundabout – B4100.

Summary: Risk of higher exit speeds and side swipe collisions as vehicles merge.

The B4100 will be widened to provide two exit lanes from the junction. The two lanes will continue for a significant distance before merging into one lane. Traffic flows at the arm are unknown, but it is anticipated that they would be lower compared to those on the A43. It is also anticipated that most traffic will use the nearside lane, leaving the outside lane under used, providing some drivers with the opportunity to increase their speeds on the exit in an attempt to overtake slower moving traffic. This could result in loss of control or higher severity side swipe collisions as vehicles attempt to merge.

Recommendation

Review the proposed distance of the two lanes and reduce the length of the two lanes. Consider providing hatching the offside should it be decided that the two lanes will be required in the future.

Problem

2.15 Location: Padbury Link.

Summary: Risk of vegetation encroachment affecting forward visibility resulting in conflicts on the shared use facility.

A shared use facility is proposed parallel to the east side of the Padbury Link Road. There is currently a significant amount of vegetation in this area, which if not managed correctly will restablish and encroach into the shared use facility. This could also impede forward visibility leading to collisions between users, but also reduce the usable width of the cycleway which is likely to force cyclists towards the kerbed edge of the facility, leaving them more exposed to side winds created by passing high sided vehicles which could knock them off balance and result in them falling off their bikes.

Recommendation

Ensure that extensive site clearance is undertaken and that future restablishment is prevented.

Problem

2.16 Location: Cherwell Link.

Summary: Risk of lane changes, hesitation and subsequent side swipe or shunt type collisions.

The proposals will result in four southbound lanes on approach to the Cherwell Roundabout, with only one lane in the nearside leading to the services in the east. It is likely that there will be significant amount of traffic travelling from the M40 East Diverge with the intention of using the services which is likely to result in significant weaving and lane changes.

Additionally, due to this being part of the strategic road network, it is likely that a number of users will be unfamiliar with the junction in turn increasing the likelihood of uncertainaty and hesitation and in particular the possibility of late lane changes. This could result in collisions such as side swipes or shunts.

Recommendation

Provide sufficient advance and lane destination signing, supplemented by clear lane destintation markings alongside the arrows. Ensure that there is sufficient space within the verge areas to provide signs which accommodate the appropriate x-heights.

3. ITEMS RAISED AT THIS INTERIM STAGE 1 AUDIT – LOCAL HIGHWAY NETWORK

Problem

3.1 Location: General to the scheme.

Summary: Potential for ongoing maintenance issues and loss of control collisions resulting from kerb overrun.

Swept paths have not been provided to the RSA team for all junctions within the scheme extents. There is a risk that if carriageway widths are insufficient for the anticipated use, that larger vehicles could overrun areas of verge adjacent to the carriageway. Kerb overrun leads to maintenance issues and potential for mud and detritus being brought into the carriageway which could result in a hazard particularly for powered two wheelers, leading to loss of control collisions.

Recommendation

Review the tracking of all relevant vehicles at all junctions, to ensure kerb lines are designed and the appropriate carriageway widths are provide.

Problem

3.2 Location: General to the scheme.

Summary: Risk of NMUs falling over the parapet.

There is a number of locations where over bridges are proposed with NMU facilities provided on them. It is unclear from the design as to what height the proposed parapets are. It is important that the parapet heights are suitable for intended use to reduce the risk of users falling over the parapet.

In addition, it should be noted that the minimum effective width of cycle tracks across bridges reduces where the parapet is immediately adjacent to it. If the forecast level of use is expected to be high, additional width should be provided at the facility to avoid conflicts between cyclists on the facility.

Recommendation

Ensure the design of the structures makes allowance for intended use and anticipated NMU flows.

Problem

3.3 Location: General to the scheme.

Summary: Risk of collisions resulting from inappropriate parking during maintenance operations.

There are a number of locations where traffic signals or traffic signal controlled crossings are proposed. The design does not appear to include any provision for maintenance accesses or packing in close proximity to the signals. If maintenance operatives are not provided with suitable safe parking areas, there is a risk that their vehicles could be parked so as to impede forward visibility or in areas where they block the carriageway which could lead to collisions.

Recommendation

Ensure the design incorporates safe access for maintenance operatives in the form of laybys or hardstanding areas off the carriageway.

Problem

3.4 Location: B430 Corridor and General to the scheme.

Summary: Potential for collision between pedestrians/cyclists and vehicles.

As shown on OxSRFI-BWB-GEN-ZZ-SK-CH-SK103 the proposals include new pedestrian, cycle and equestian routes route across the scheme. The changes along the B430 corridor, and at junctions such as the principal OxSRFI access result in compex junctions for non-motorised users (NMUs) to negotiate and some of the routes may not be clear to users, especially where existing PRoWs have been diverted. The complexity of the junctions could lead to confusion resulting in collisions with other users, or, in some cases, lead to NMUs continuing along the carriageway and potentially being hit by passing vehicles.

Recommendation

Wayfinding signs should be provided for pedestrians and cyclists to ensure it is clear where they need to go and which routes they should be following to reach certain destinations.

Problem

3.5 Location: B430 Corridor.

Summary: Risk of side swipe collisions resulting from underuse of the off carriageway cycle facilty.

As shown on OxSRFI-BWB-GEN-ZZ-SK-CH-SK103 the proposed shared use cycle track is set back significantly from the carriageway. As this could be a main link to the proposed OxSRFI for commuters from the south, the facility should be designed to be as attractive to potential users as possible. It is unclear at this stage what the lighting proposals are for the facility, for the adjacent carriageway and also for reasons of personal security, there is a risk of the set back making the facility less attriactive to use, particularly during the hours of darkness or during periods of low light. This could lead to underuse or encourage cyclists to use the carriageway where there is greater risk of them being struck by passing vheicles.

Recommendation

Review the proposals for the shared use cycle facility adjacent to the B430 to ensure that it is attractive and safe for use at all hours of the day.

Problem

3.6 Location: B430 Corridor.

Summary: Collisions resulting from loss of control or overtaking due to higher vehicular speeds.

As shown on OxSRFI-BWB-GEN-ZZ-SK-CH-SK103 the B430 is a characterised by straight horizontal alignment. Once the MSRR is constructed it is likely that the B430 will experience lower traffic flows, which in turn could increase higher traffic speeds which could lead to an increase in high severity loss of control collisions. In addition, the removal of the junction with Camp Road could also encourage high speed overtaking manouevres increasing the risk of loss of control or head on collisions.

Recommendation

Ideally some sort of rraffic calming scheme should be introduced to the B430 such as central isalnds and hatching. A reduced speed limit may also help to encourage lower speeds.

Problem

3.7 Location: B430 Corridor proposed Toucan Crossing.

Summary: Risk of NMUs being struck while using the crossing due to impeded visibility.

As shown on OxSRFI-BWB-GEN-ZZ-SK-CH-SK103 a field access will be provided immediately north of the proposed toucan crossing point. It is unclear as to how frequently the field access will be used by large machinery and tractors which could block forward visibility to the nearside signals and / or waiting NMUs leading to vehicles travelling southbound potentially overshooting the crossing and colliding with users.

Recommendation

Relocate the access away from the crossing point so that vehicles using it are outside of the visibility splay. Consider the provision of higher psv carriageway surfacing on the approaches to the crossing.

Problem

3.8 Location: B430 Corridor proposed Toucan Crossing.

Summary: Conflicts between users of the crossing and the farm traffic accessing or exiting from the field access.

The proposed Toucan crossing appears to incorporate a central island. It is likely that large machinery which could be pulling trailers, could need to access or egress that field access which is located immediately north of the crossing point. No tracking has been provided to the RSA team, and as such it is unclear as to whether vehicles or machinery can safely turn into or out of the access without colliding with the central island. There is also a risk that machinery waiting to turn right into the access could block the crossing point.

Recommendation

Review the tracking of appropriate vehicles expected to use the access and either relocate the access away from the crossing point or remove the central island from the proposed crossing.

The boundary treatment for the access should also be considered; if a gate will be provided it should be set back sufficiently to allow a vehicle to safely pull off the carriageway to prevent the crossing or carriageway from being blocked.

Problem

3.9 Location: B430 Corridor proposed Toucan Crossing.

Summary: Risk of cyclists entering the carriageway into the path of an approaching vehicle.

It is unclear as to the proposals for the area between the B430 carriageway and the proposed shared use cycle way footway on the west side of the corridor. At present, there are at least two trees noted on the topographical survey and should they remain in situ, there is a risk of them and other established vegetation impedeing visibility between users and approaching vehicles.

Recommendation

Vegetation clearance should be sufficient to satisfy intervisibility requirements for all users.

Problem

3.10 Location: OxSRFI Principle Access Junction.

Summary: Potential overshoot of the crossing point resulting in collisions with NMUs.

A dedicated left turn lane is proposed from the access of the OxSRFI as shown on OxSRFI-BWB-GEN-ZZ-SK-CH-SK018, which includes a signal controlled crossing. As vehicles exiting the site do not need to slow down to negotiate the junction, their approach speeds may be elevated which could lead to vehicles overshooting the stop line at the crossing and subsequent collisions with NMUs on the crossing.

Recommendation

The provision of higher psv carriageway surfacing and advanced warning signs on the approaches to the crossing should be included in the design.

Problem

3.11 Location: OxSRFI Principle Access Junction.

Summary: Risk of shunt type or loss of control collisions due to impeded visibility.

Visibility splays are not shown on OxSRFI-BWB-GEN-ZZ-SK-CH-SK018. If forward visibility and visibility envelopes are substandard there is an increased risk of collisions as a result of vehicles being unable to stop in time to avoid various types of hazard such as waiting or turning traffic or obstructions in the road.

Recommendation

Review the visibility requirements for all junction arms to ensure users can safely use the junction.

Problem

3.12 Location: OxSRFI Principle Access Junction.

Summary: Risk of increased severity of collisions in the event of loss of control collisions.

Highway profile drawings were not supplied for the Ardley bypass and OxSRFI Pincipal access as such the proposed levels around the junction are not clear. Additionally, proposals for road restraint systems have not been shared with the RSA team. As such in the event of significant level differences between the proposed finished road levels and the adjacent land, there is a risk of serious injury in the event of an errant vehicle leaving the carriageway.

Recommendation

Undertake RRRAP assessments, particularly to the west end of the proposed Ardley Bypass, to identify areas of risk and address through mitigation or redesign.

Problem

3.13 Location: Northeast quadrant of OxSRFI Principal access roundabout.

Summary: Risk of loss of control for cyclists due to elevated speeds.

A cycle track is proposed between the existing bridge and east arm of the access roundabout. Proposed levels are unclear, as are the design speeds for this cycle track. In the event that the cycle track is on a gradient this could encourage elevated speeds, in turn increasing the risk of loss of control collisions. The cycle track is also characterised by a tight bend which, in the event of elevated speeds could also increase the likelihood of loss of control and cyclists falling.

Recommendation

Ensure the proposed gradients and radii of the proposed cycle tracks are in accordance with relevant design guidance, such as LTN 1/20. If elevated speeds are anticipated consider the introduction of speed reduction measures such as staggered guardrail at the base of the gradient.

Problem

3.14 Location: Heyford Park Link Road West.

Summary: Increased risk of collisions resulting from reduced forward visibility such as shunt type collisions.

As shown on OxSRFI-BWB-GEN-ZZ-SK-CH-SK023 the visibility splay for vehicles travelling northwest is achieved across land adjacent to the proposed highway, part of which is established woodland.

It is not clear if this will remain as third party land or if the land within the visibility splay will be adopted. Either way, it is important that this area remains free of obstructions to prevent impeded visibility and associate collisions such as shunt type or loss of control.

Recommendation

Ensure the removal of the woodland is permanent through use of eco plugs or similar, and ensure the remainder of the splay is kept obstruction free. Thought should also be given to the type and height of boundary treatment along the edge of the splay.

Problem

3.15 Location: Heyford Park Link Road West.

Summary: Risk of cyclists colliding due to impeded visibility.

As shown on OxSRFI-BWB-GEN-ZZ-SK-CH-SK023 a two way cycle track is proposed along the north side of Heyford Park Link Road West. The design speeds for this cycle track are unclear. It is proposed that the cycle track will continue into the secondary OxSRFI access. It is important that intervisibility is achieved and maintained for users of this facility, around the inside of the radius of the junction to reduce the likelihood of collisions between cyclists using the facility.

Recommendation

Ensure the proposed radii of the proposed cycle tracks are in accordance with relevant design guidance, such as LTN 1/20 and ensure the required visibility envelope is achieved and maintained. Boundary treatments within the splay should be carefully thought about in terms of type and height.

Problem

3.16 Location: B430 junction with Heyford Park Link Road.

Summary: Risk of shunt type or loss of control collisions due to impeded visibility.

Visibility splays are not shown on OxSRFI-BWB-GEN-ZZ-SK-CH-SK026. If forward visibility and visibility envelopes are substandard there is an increased risk of collisions as a result of vehicles being unable to stop in time to avoid various types of hazard such as waiting or turning traffic or obstructions in the road.

Recommendation

Review the visibility requirements at the junction of the B430 and Heyford Park Link Road, to ensure users can safely use the junction.

Problem

3.17 Location: Heyford Park Link Road north arm.

Summary: Risk of equestrian users falling from their horse in the event of inappropriate provision at proposed crossing points.

It is unclear as to what kind of crossing is proposed at the junction, as shown on OxSRFI-BWB-GEN-ZZ-SK-CH-SK026. The crossing is directly adjacent to a proposed link into a bridleway on west side of the link road and a cycle way to the east. As it links into the bridleway, and the crossing could result in equestrian use, sufficient space should be provided which is set back from the link road, to allow an equestrian user to wait safely away from passing traffic and to reduce the risk associated with riders being thrown from their horses.

Recommendation

Ensure the correct provision is included in the design for the intended users of the crossing.

Problem

3.18 Location: B430 south arm of junction with MSRR.

Summary: Risk of equestrian users falling from their horse in the event of inappropriate provision at proposed crossing points.

As shown on OxSRFI-BWB-HGT-HW-DR-CH-0650, a bridleway is proposed running parallel with the MRSS on its south side. A Pegasus crossing is also proposed at the B430 south arm. As the crossing is intended for equestrian use, sufficient space should be provided which is set back from the link road, to allow an equestrian user to wait safely away from passing traffic and to reduce the risk associated with riders being thrown from their horses.

Recommendation

Ensure the correct provision is included in the design for the intended users of the crossing.

Problem

3.19 Location: MSRR - Gagle Brook water crossing.

Summary: Risk of increased severity of collisions in the event of loss of control collisions.

Proposals for road restraint systems have not been shared with the RSA team. As such in the event of an errant vehicle losing control, leaving the carriageway and encountering an unprotected hazard, there is an increased risk of serious injury.

Recommendation

Undertake RRRAP assessments, in the vicinity of the Gagle Brook water crossing, to identify areas of risk and address through mitigation or redesign.

Problem

3.20 Location: MSRR Bridleway underpass.

Summary: Potential conflicts between farm machinery and NMUs on the PRoWs.

As shown on OxSRFI-BWB-HGT-HW-DR-CH-0650 there is a field access at the south side of the MSRR however it is unclear as to how the farmer will access the field. There is a number of public rights of way (PRoWs) that link in to the vicinity of the field access and therefore there is a risk of farm machinery conflicting with NMUs.

Recommendation

Provide a clearly marked and segregated access to the field to avoid conflicts between users.

Problem

3.21 Location: Eastern section of MRSS.

Summary: Inadquate drainage could lead to excessive surface water and loss of control collisions.

There is a section of the MRSS which seems to be in a cutting, in that the carriageway on the north side are at the bottom of an embankment slope. Drainage proposals have not been shared with the RSA team. There is likely to be surface water runoff down the embankment slope which could drain on to the carriageway. If the surface water is not managed and it collects on the surface of the carriageway there is a risk of loss of control collisions resulting from a lack of traction.

Recommendation

Ensure that the run off is intersected at the bottom of the batter slope by appropriate drainage to prevent the carriageway being subject to significant amounts of surface water entering the wheel tracked area of the carriageway.

Problem

3.22 Location: Heyford Park Link Road West.

Summary: Risk of increased severity of collisions in the event of loss of control collisions.

Proposals for road restraint systems have not been shared with the RSA team. As such in the event of an errant vehicle losing control and encountering an unprotected hazard, there is a risk of serious injury.

Recommendation

Undertake RRRAP assessments, particularly in the vicinity of the watercourse, to identify areas of risk and address through mitigation or redesign.

Problem

3.23 Location: Ardley Bypass.

Summary: Inadquate drainage could lead to excessive surface water and loss of control collisions.

OxSRFI-BWB-HGT-HW-DR-CH-0652 shows that Ardley Bypass appears to be generally in a cutting, with embankment slope on the north side of the west side of the bypass. Drainage proposals have not been shared with the RSA team. There is likely to be surface water runoff down the embankment slope which could drain on to the carriageway. If the surface water is not managed and it collects on the surface of the carriageway there is a risk of loss of control collisions resulting from a lack of traction.

Recommendation

Ensure that the run off is intersected at the toe of the batter slope by appropriate drainage to prevent the carriageway being subject to significant amounts of surface water entering the wheel tracked area of the carriageway.

4. AUDIT TEAM STATEMENT

4.1 We certify that this audit has been undertaken in accordance with GG 119.

AUDIT TEAM LEADER

[redacted]

Highways England approved Certificate of Competency
Associate Director
BWB Consulting Ltd
5th Floor
Waterfront House
Station Street
Nottingham
NG2 3DQ

Signed: [redacted]
Date:

AUDIT TEAM MEMBER

[redacted]

Highways England approved Certificate of Competency
Associate Director
BWB Consulting

Signed: [redacted]
Date: 30th May 2025

APPENDICES

APPENDIX 1: List of documents supplied to the Audit Team

Document / Drawing / Model	Title	Revision
OxSRFI-BWB-GEN-XX-SK-CH-SK102	Highway Works overview for RSA1 brief	P01
OxSRFI-BWB-GEN-XX-SK-CH-SK018	OxSRFI principal access junction GA	P06
OxSRFI-BWB-GEN-XX-SK-CH-SK023	Heyford Park Link Road West GA	P04
OxSRFI-BWB-GEN-XX-SK-CH-SK026	Heyford Park Link Road East and B430 Junction GA	P02
OxSRFI-BWB-GEN-XX-SK-CH-SK053	M40 J9 GA	P02
OxSRFI-BWB-GEN-XX-SK-CH-SK061	Chilgrove Drive Camp Road GA	P02
OxSRFI-BWB-GEN-XX-SK-CH-SK094	M40 J10 General Arrangement Option 28	P04
OxSRFI-BWB-GEN-XX-SK-CH-SK098	Ardley Swept Paths Option 28	P01
OxSRFI-BWB-GEN-XX-SK-CH-SK099	Cherwell Swept Paths Option 28	P01
OxSRFI-BWB-GEN-XX-SK-CH-SK103	B430 corridor general arrangement	P01
OxSRFI-BWB-HGT-HW-DR-CH-0650	Middleton Stoney Relief Highway Profile	P01
OxSRFI-BWB-HGT-HW-DR-CH-0651	Heyford Park Link Road Highway Profile	P01
OxSRFI-BWB-HGT-HW-DR-CH-0652	Ardley Roads Highway Profiles	P01
Model file - LinSig	250107 Option 28	
Model file - LinSig	220913 Site Access Gyratory	
Model file – PICADY output	230124 Camp Road Changed Priority	
Model file - LinSig	230330 B430 – HRLP_MSRR network model	
Model file – ARCADY output	210909 MSRR South Roundabout – BWB design model	
Model file - LinSig	221103 Middleton Stoney proposed scheme	
Model file - LinSig	230411 M40 Junction 9 - mitigation	
Document - ADC1794-RP-F-v2	WCHAR Assessment Report (draft)	

Identified problems that are considered General to the Scheme are:
Problem 2.1, Problem 2.2, Problem 2.3, Problem 2.6, Problem 2.7
Problem 3.1, Problem 3.2, Problem 3.3, Problem 3.4

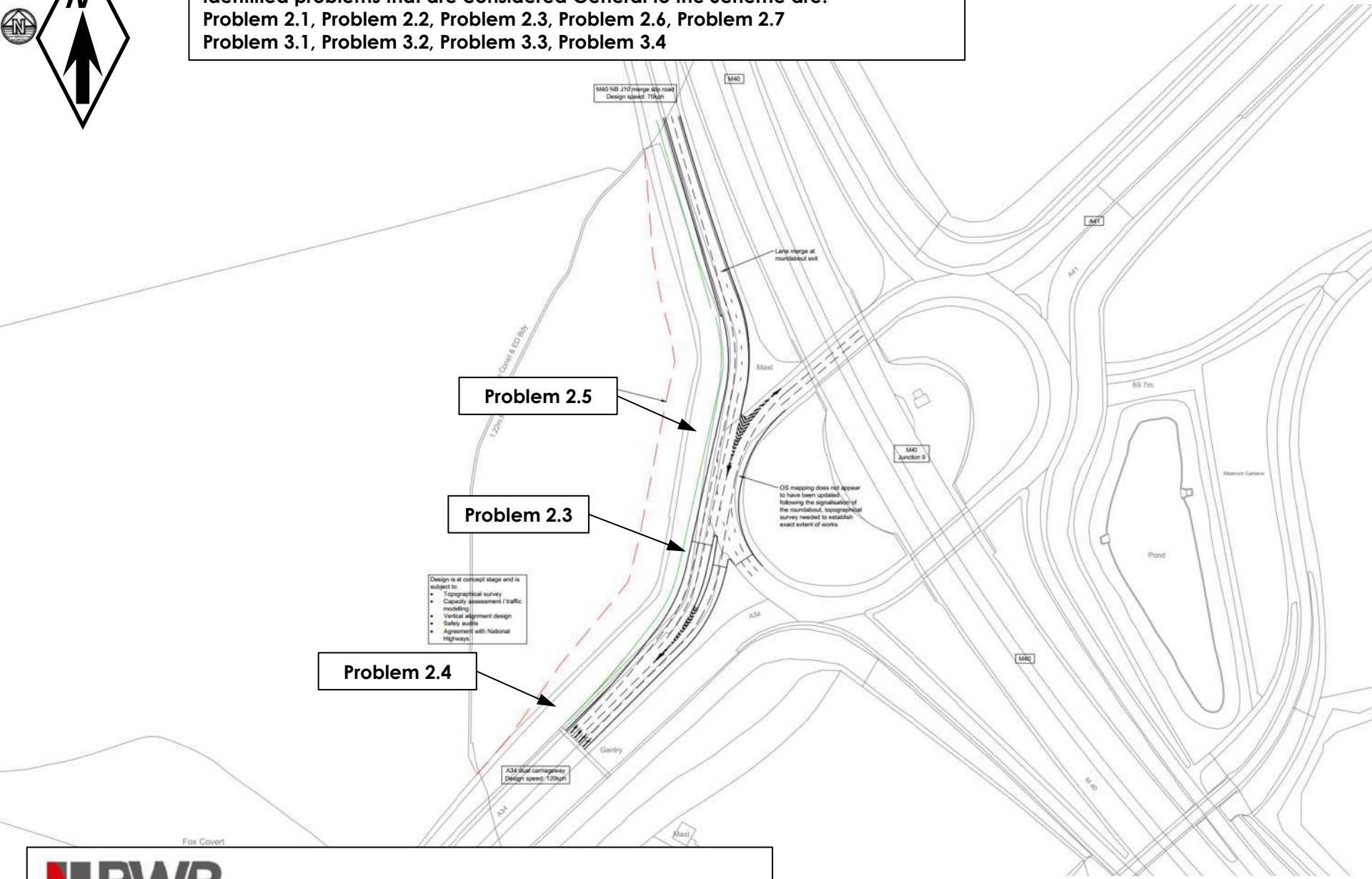

FIGURE 1 – Location of problems identified in this audit

Identified problems that are considered General to the Scheme are:
Problem 2.1, Problem 2.2, Problem 2.3, Problem 2.6, Problem 2.7
Problem 3.1, Problem 3.2, Problem 3.3, Problem 3.4

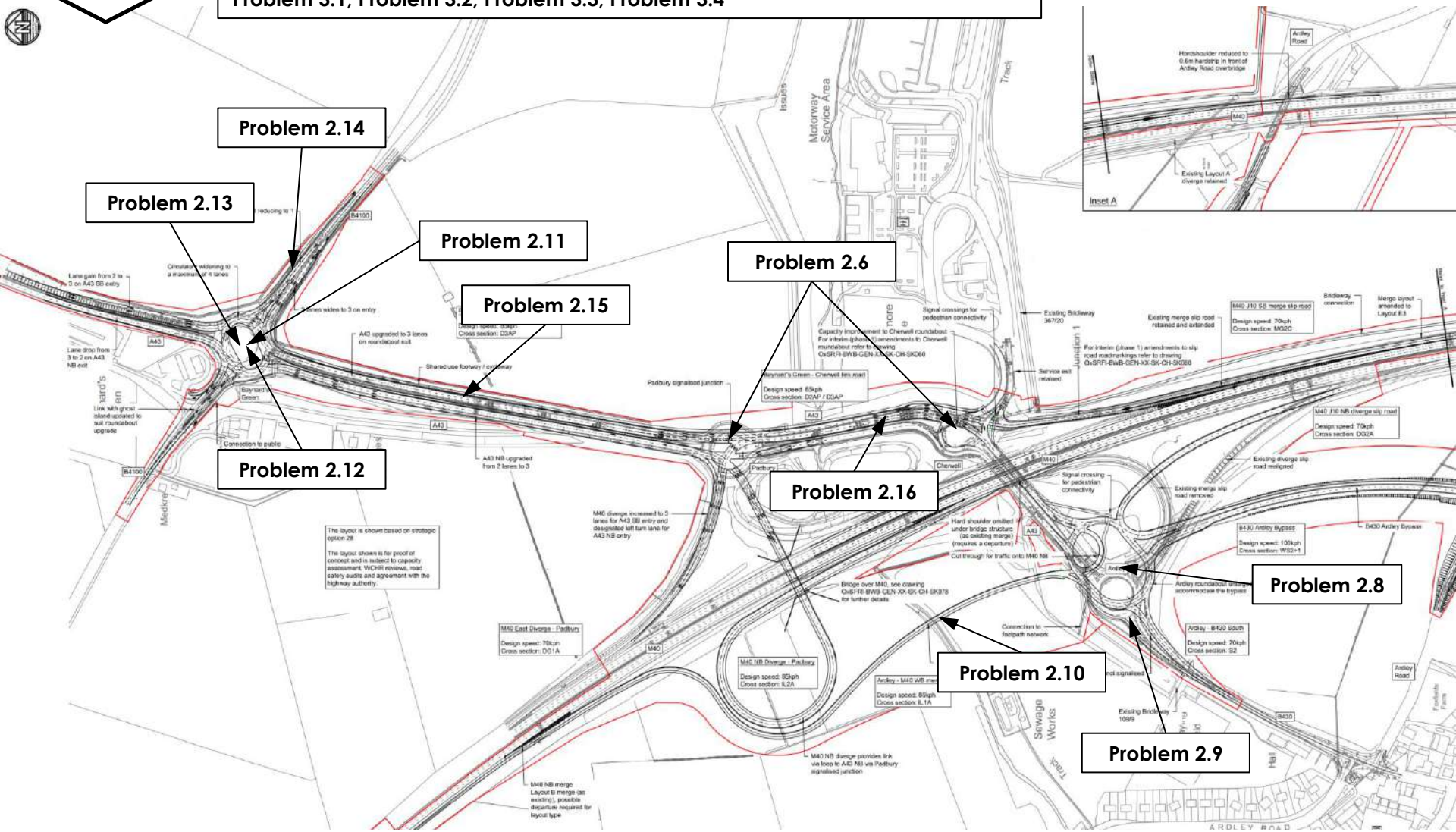

FIGURE 1 – Location of problems identified in this audit

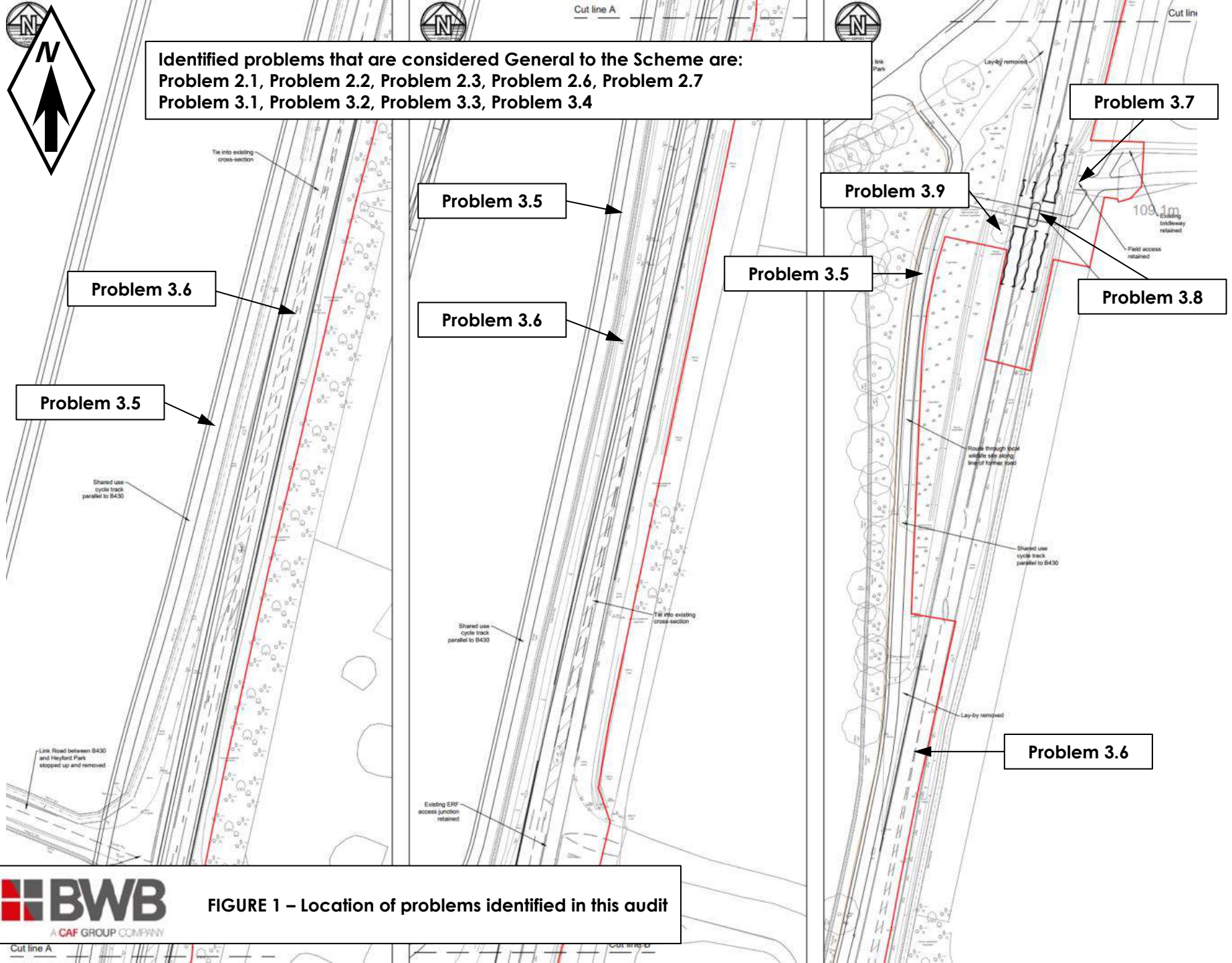

FIGURE 1 – Location of problems identified in this audit

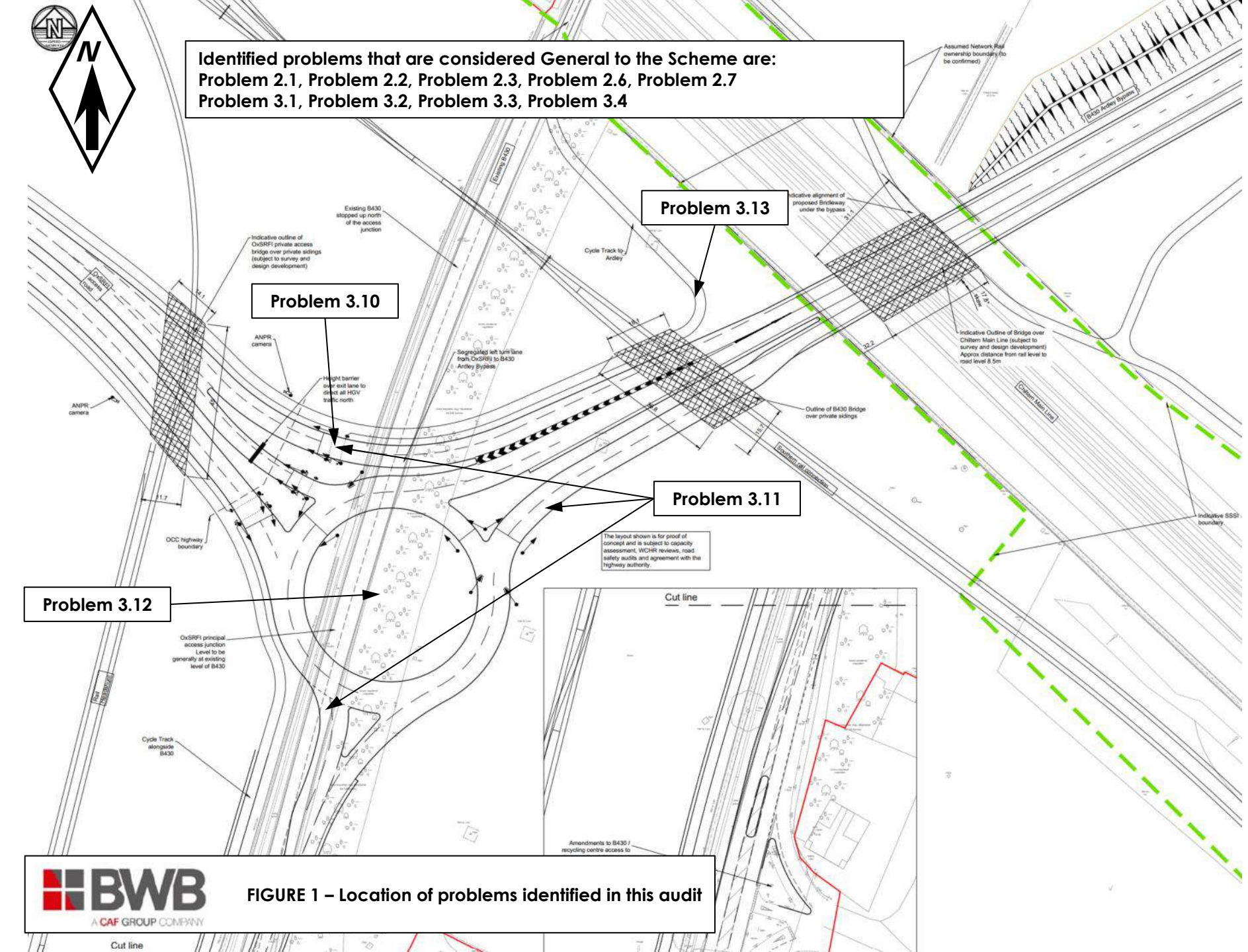

FIGURE 1 – Location of problems identified in this audit

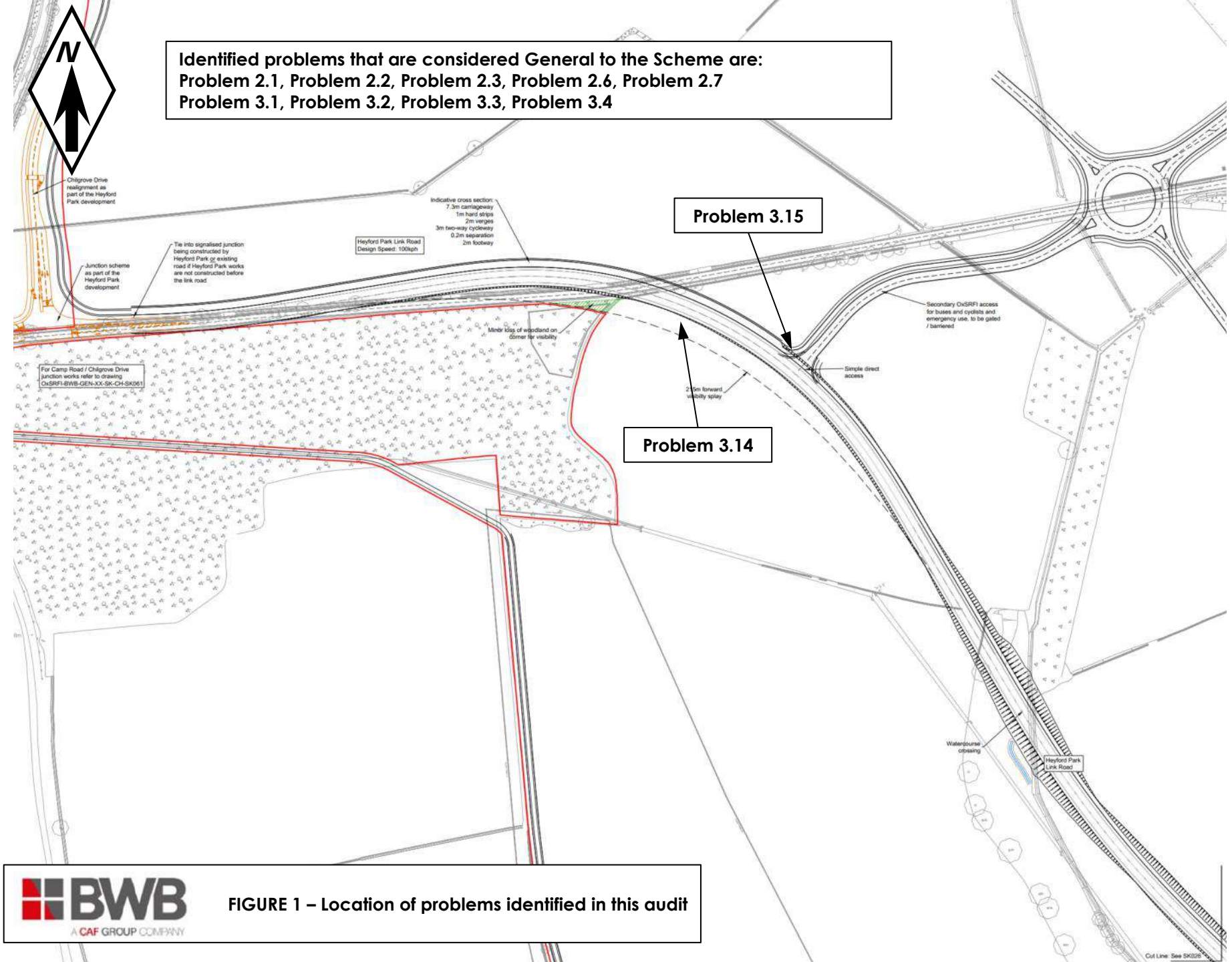

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FIGURE 1 – Location of problems identified in this audit

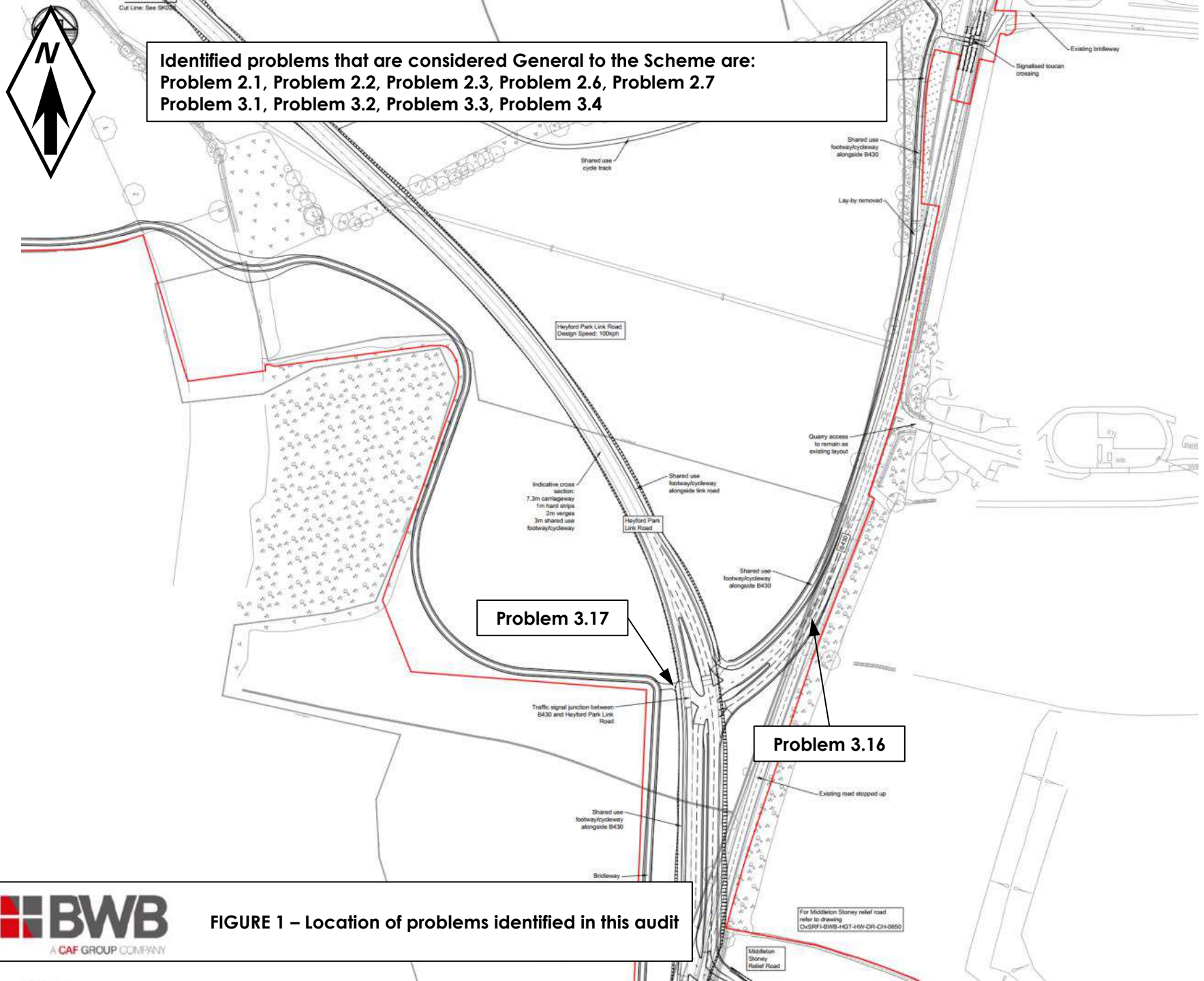

FIGURE 1 – Location of problems identified in this audit

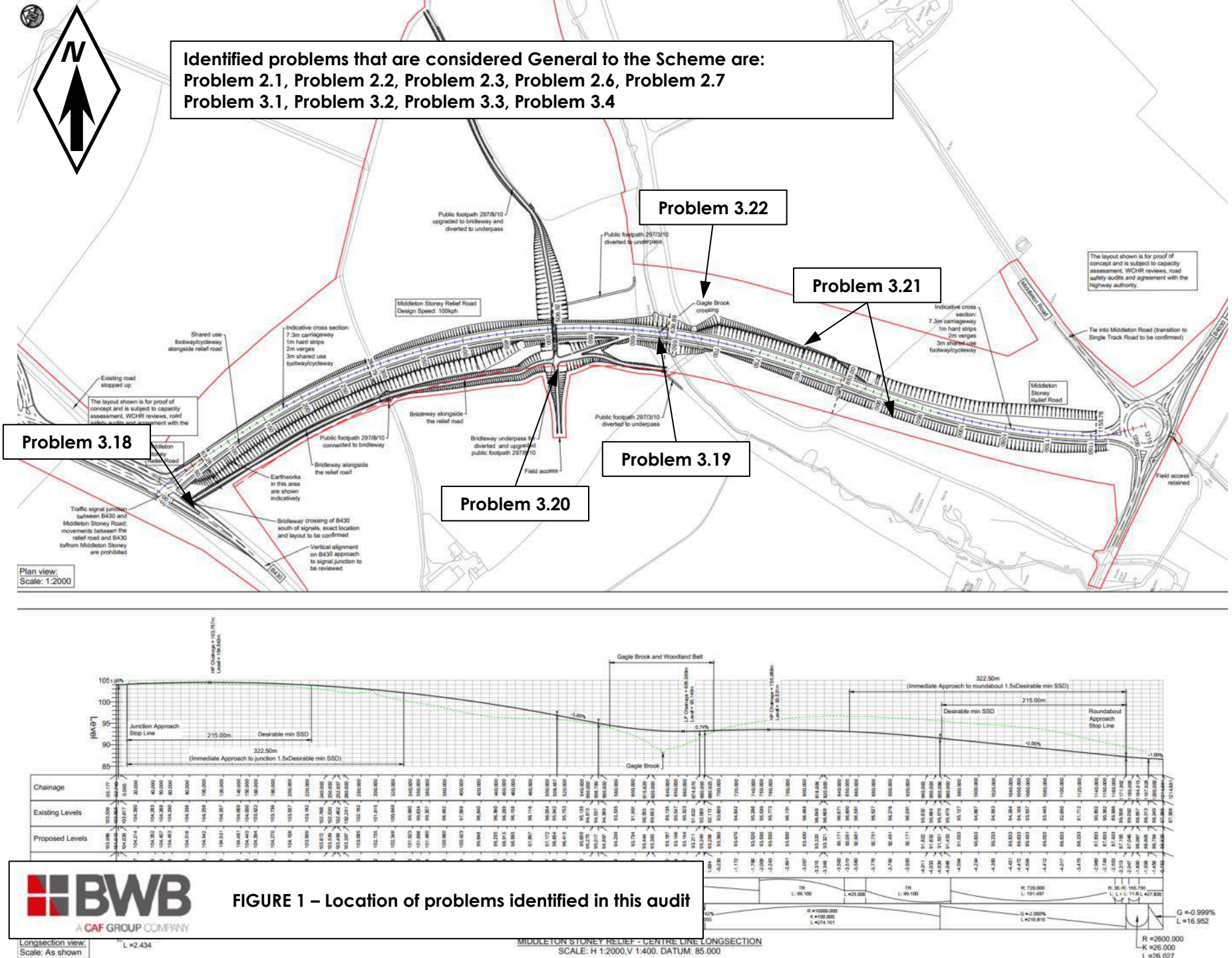

FIGURE 1 – Location of problems identified in this audit

Identified problems that are considered General to the Scheme are:
Problem 2.1, Problem 2.2, Problem 2.3, Problem 2.6, Problem 2.7
Problem 3.1, Problem 3.2, Problem 3.3, Problem 3.4

Problem 3.23

ARDLEY ROAD LONGSECTION
SCALE: H 1:2500,V 1:500. DATUM: 115.000

SCALE: H 1:2500,V 1:500. DATUM: 110.000

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FIGURE 1 – Location of problems identified in this audit

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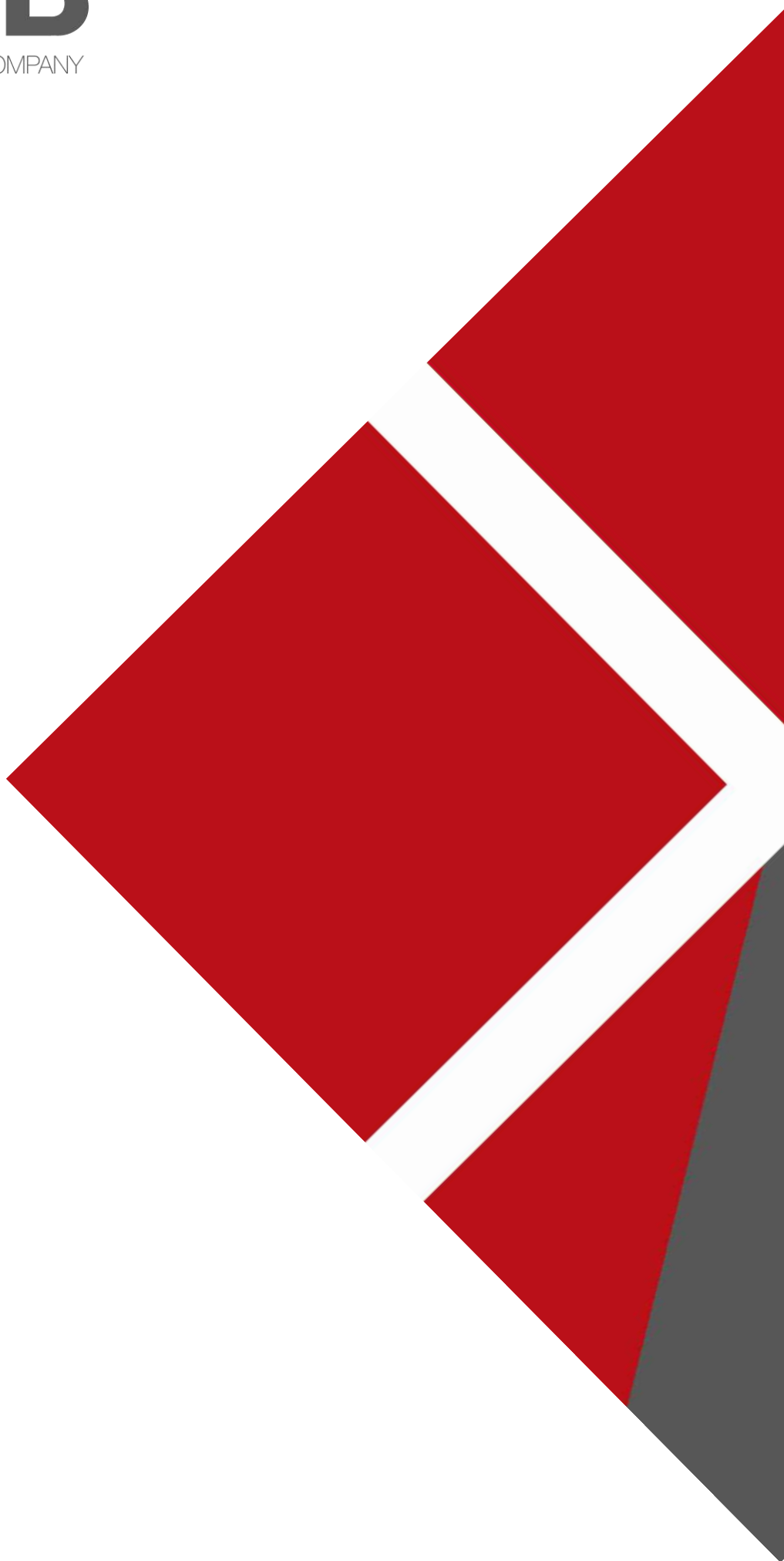

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BWB Road Safety Audit Log
DMRB CD 119

Scheme details				
Scheme name	OxSRFI	Last updated	25.03.2026
Job Number	NTH2479	Prepared By	[redacted]
RSA Stage	Interim 1	Checked By	[redacted]

Scheme section	ID	Location	Summary	Problem	Recommendation	Design response - agree?	Design organisation response	Overseeing Organisation	Overseeing organisation - agree with design response?	Overseeing organisation response	Agreed RSA action	Scheme stage for action	Action completed?
Strategic road network (NH)	2.1	General to the scheme	Risk of Non-Motorised Users (NMUs) falling over the parapet.	There is a number of locations where over bridges are proposed with NMU facilities provided on them. It is unclear from the design as to what height the proposed parapets are. It is important that the parapet heights are suitable for intended users, to reduce the risk of users falling over the parapet. In addition, it should be noted that the minimum effective width of the cycle tracks proposed across the bridges reduces where the parapet is provided immediately adjacent to it. If the forecast level of use is expected to be high, additional width should be provided at the facility to avoid conflicts between cyclists on the facility.	Ensure the design of the structures makes allowance for intended users and anticipated flows.	In part	This is agreed for new (or extended) structures. For the existing M40 J10 bridge this is not possible due to the existing hard paved width. At detailed design stage it will be reviewed to see if the parapet should be replaced or if cyclist dismount signs should be provided. For Middleton Road the parapet is to be replaced as following reallocation of road space there is sufficient width for all NMUs.	National Highways			Review M40 J10 bridge at detailed design stage	Detailed Design	No
Strategic road network (NH)	2.2	B430 Corridor and General to the scheme	Potential for collision between pedestrians/cyclists and vehicles due to confusion and hesitation	The proposals include new pedestrian, cycle and equestrian routes route across the scheme. The changes to the junctions at the M40 J10 and other changes along the A43 corridor, result in complex junctions for non-motorised users (NMUs) to negotiate and some of the routes may not be clear to users particularly where existing Public Rights of Way (PRoWs) have been diverted. The complexity of the junctions could lead to confusion resulting in collisions with other users, or, in some cases, lead to NMUs continuing along the carriageway and potentially being hit by passing vehicles.	Wayfinding signs should be provided for pedestrians and cyclists to ensure it is clear where they need to go and which routes they should be following to reach certain destinations.	Yes	We agree that wayfinding should be provided and the details will be developed at the detailed design stage	National Highways			Provide signage design at detailed design stage	Detailed Design	No
Strategic road network (NH)	2.3	M40 Junction 9 - General to the scheme	Risk of collisions resulting from inappropriate parking during maintenance operations	There is a number of locations where traffic signals or traffic signal controlled crossings are proposed. The design does not appear to include any provision for maintenance accesses or parking in close proximity to the signals. If maintenance operatives are not provided with suitable safe parking areas, there is a risk that their vehicles could be parked so as to impede forward visibility or in areas where they block the carriageway and obstruct passing vehicles which could lead to collisions.	Ensure the design incorporates safe access for maintenance operatives in the form of laybys or hardstanding areas off the carriageway.	Yes	There is an existing maintenance hardstanding area (within the splitter island at the A34) which is unaffected by the works and will be retained	National Highways			Identify location of maintenance hard standing on plan	Preliminary Design	Yes
Strategic road network (NH)	2.4	M40 Junction 9 - A34 northbound roundabout approach	Risk of collisions resulting from lane changes and hesitation due to the complexity of the junction	The introduction of additional lanes on the northbound A34 roundabout approach and circulatory, as shown on OxSRFI-BWB-GEN-XX-SK-CH-SK053, creates a complex junction for drivers to navigate. This is likely to result in significant weaving and lane changes. Additionally, due to this being part of the strategic road network, it is likely that a number of users will be unfamiliar with the junction, in turn increasing the likelihood of uncertainty and hesitation and in particular the possibility of late lane changes. This could result in collisions such as side swipes or shunts.	Provide sufficient advance and lane destination signing, supplemented by clear lane destination markings alongside the arrows.	Yes	We agree that signage and markings need to be provided for the revised layout. The signage strategy will be updated to show this and this will be further developed at the detailed design stage.	National Highways			Update signage strategy	Preliminary Design	Yes
Strategic road network (NH)	2.5	M40 Junction 9 - exit from roundabout to M40	Risk of increased severity collisions in the event of loss of control and errant vehicles colliding with road side furniture.	Highway profile drawings were not supplied for the M40 junction 9. As such the proposed levels around the junction are not clear. Additionally, any proposals for road restraint systems have not been shared with the RSA team. As such in the event of significant level differences between the proposed finished road levels and the adjacent land, there is a risk of serious injury in the event of an errant vehicle leaving the carriageway.	Undertake RRRAP assessments, particularly to the west the junction, to identify areas of risk and address through mitigation or redesign.	Yes	We agree that RRRAP assessments need to be undertaken and these will be done at the detailed design stage	National Highways			Undertake RRRAP assessments at detailed design	Detailed Design	No
Strategic road network (NH)	2.6	M40 Junction 10 – General to the scheme	Risk of collisions resulting from lane changes and hesitation due to the complexity of the junction	The proposed changes at the roundabout make this already complex junction even more challenging to navigate. This is likely to result in significant weaving and lane changes. Additionally, due to this being part of the strategic road network, it is likely that a number of users will be unfamiliar with the junction in turn increasing the likelihood of uncertainty and hesitation and in particular the possibility of late lane changes. This could result in collisions such as side swipes or shunts	Provide sufficient advance and lane destination signing, supplemented by clear lane destination markings alongside the arrows	Yes	We agree with the recommendation; signage information is already shown in outline and will be confirmed at detailed design. Furthermore, whilst not a specific recommendation but it will address the wider concern, we are proposing a 40mph speed limit within the core junction area.	National Highways			Update signage strategy for preliminary design and then review further at detailed design	Detailed Design	In part
Strategic road network (NH)	2.7	M40 Junction 10 – General to the scheme	Risk of increased severity collisions in the event of loss of control and errant vehicles colliding with road side furniture	Highway profile drawings were not supplied for the M40 junction 10. As such the proposed levels around the junction are not clear. Additionally, proposals for road restraint systems have not been shared with the RSA team. As such in the event of significant level differences between the proposed finished road levels and the adjacent land, there is a risk of serious injury in the event of an errant vehicle leaving the carriageway	Undertake RRRAP assessments, particularly to the west the junction, to identify areas of risk and address through mitigation or redesign	Yes	RRRAP assessments and VRS will be confirmed at detailed design stage. At preliminary design the verges are designed to allow for VRS if needed.	National Highways			Undertake RRRAP assessments at detailed design	Detailed Design	No
Strategic road network (NH)	2.8	M40 Junction 10 – Ardley Roundabout	Potential for ongoing maintenance issues and loss of control collisions resulting from kerb overrun	Swept paths have been provided to the RSA team for the Cherwell and Ardley Roundabout junctions. There is a number of locations where the swept paths of large vehicles are shown to be very close to the kerb line or adjacent lanes within the carriageway. There is a risk that if carriageway widths are insufficient for the anticipated use, that larger vehicles could overrun areas of verge adjacent to the carriageway. Kerb overrun leads to maintenance issues and potential for mud and detritus being brought into the carriageway which could result in a hazard, particularly for powered two wheelers, leading to loss of control collisions. There is also a risk of side swipe collisions if there is insufficient space for two large vehicles to travel abreast, as they are more likely to encroach into the adjacent lanes	Review the tracking of all relevant vehicles at all junctions, to ensure kerb lines are designed and the appropriate carriageway widths are provide	Yes	Confirmation that kerb lines are designed and carriageway widths are acceptable without the risk of overrunning are evidenced in the swept paths that have been assessed for Ardley roundabout, Cherwell roundabout, Padbury roundabout, Baynard's Green roundabout, M40 J9, Middleton Stoney roundabout, Heyford Park Link Road and the SRFI Principal access.	National Highways			Provide swept paths for major junctions across the scheme	Preliminary Design	Yes

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Scheme details				
	Scheme name	OxSRFI	Last updated	25.03.2026
	Job Number	NTH2479	Prepared By	[redacted]
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Scheme section	ID	Location	Summary	Problem	Recommendation	Design response - agree?	Design organisation response	Overseeing Organisation	Overseeing organisation - agree with design response?	Overseeing organisation response	Agreed RSA action	Scheme stage for action	Action completed?
Strategic road network (NH)	2.9	M40 Junction 10 – Ardley Roundabout – B430 South	Potential collisions between vehicles entering the roundabout and vehicles on the circulatory	The proposals show a two lane entry from the B430 south arm onto the roundabout circulatory. It appears that there may be insufficient deflection for vehicles entering from the south, as the layout indicates that vehicles in lane one will be guided into lane 2 on the circulatory. Insufficient deflection can result in higher entry speeds and subsequent loss of control. In addition, if vehicles entering the circulatory from the B430 south are guided into lane two, there is a risk of side swipe collisions with other vehicles on the circulatory	Review the proposed deflection and review the proposed lining to ensure vehicles are lead into the correct lane to encourage improved lane discipline on the circulatory.	Yes	The alignment of the approach has been amended to achieve an entry path radius of less than 100m.	National Highways			Revise geometry layout to remove the need for this departure	Preliminary Design	Yes
Strategic road network (NH)	2.10	M40 Junction 10 – M40 northbound merge	Potential collisions resulting from loss of control or elevated speed	The proposed M40 northbound merge is long and straight. While it is acknowledged that the design speed is 85kph due to the straight horizontal alignment, this is likely to result in elevated vehicular speeds on the northbound merge, which in turn, increases the risk of loss of control where the horizontal alignment changes to a tight right hand bend	Consider the inclusion of higher friction psv surfacing on the approach to the curve as well as considering some kind of traffic calming features in the form of markings and signage to make drivers aware of the approaching bend and to keep speeds low at this point	Yes	The alignment is designed as a low radius loop which complies with standards. Low radius loops are proven to be safe but need clear signage and this will be provided. In addition there will be a 40mph speed limit in place.	National Highways			Provide signage design at detailed design stage	Detailed Design	No
Strategic road network (NH)	2.11	Baynard's Green Roundabout	Potential for ongoing maintenance issues and loss of control collisions resulting from kerb overrun	Swept paths have not been provided to the RSA team for Baynard's Green Roundabout. There is a number of locations where the swept paths of large vehicles are showing to be very close to the kerb line or adjacent lanes within the carriageway. There is a risk that if carriageway widths are insufficient for the anticipated use, that larger vehicles could overrun areas of verge adjacent to the carriageway. Kerb overrun leads to maintenance issues and potential for mud and detritus being brought into the carriageway which could result in a hazard particularly for powered two wheelers, leading to loss of control collisions. There is also a risk of side swipe collisions if there is insufficient space for two large vehicles to travel abreast, as they are more likely to encroach into the adjacent lanes	Review the tracking of all relevant vehicles at the junction, to ensure kerb lines are designed and the appropriate carriageway widths are provide	Yes	Confirmation that kerb lines are designed and carriageway widths are acceptable without the risk of overrunning are evidenced in the swept paths that have been assessed for Ardley roundabout, Cherwell roundabout, Padbury roundabout, Baynard's Green roundabout, M40 J9, Middleton Stoney roundabout, Heyford Park Link Road and the SRFI Principal access.	National Highways			Provide swept paths for major junctions across the scheme	Preliminary Design	Yes
Strategic road network (NH)	2.12	Baynard's Green Roundabout	Potential for NMUs to step into the live carriageway into the path of an approaching vehicle	Controlled crossings are shown on OxSRFI-BWB-GEN-XX-SK-CH-SK094 at the junction, which appear to have a reverse stagger in the central splitter islands. If NMUs have their back to approaching traffic there is an increased risk of them stepping into the carriageway into the path of an approaching vehicle, resulting in collisions	Review the provision of the reverse stagger at the crossings and, ideally, replace with a stagger that faces approaching traffic	In part	A review of the stagger arrangement confirms that queuing capacity on the entry arms would be reduced due to the stop line being pushed back in a reversed arrangement. Additionally, the stop lines for the exits would be pushed closer to the circulatory increasing the likelihood of stacking on the circulatory. It is therefore recommended to retain the stagger arrangement as is.	National Highways			Stagger of crossings at Baynard's Green reviewed, no further action	Preliminary Design	Yes
Strategic road network (NH)	2.13	Baynard's Green Roundabout	Risk of lane changes, hesitation and subsequent side swipe or shunt type collisions	The proposed changes at the roundabout make this junction more challenging to navigate and as such, this is likely to result in significant weaving and lane changes. Additionally, due to this being part of the strategic road network, it is likely that a number of users will be unfamiliar with the junction in turn increasing the likelihood of uncertainty and hesitation and in particular the possibility of late lane changes. This could result in collisions such as side swipes or shunts	Provide sufficient advance and lane destination signing, supplemented by clear lane destination markings alongside the arrows	Yes	We agree with the recommendation; signage information is already shown in outline and will be confirmed at detailed design.	National Highways			Provide signage design at detailed design stage	Detailed Design	No
Strategic road network (NH)	2.14	Baynard's Green Roundabout – B4100	Risk of higher exit speeds and side swipe collisions as vehicles merge	The B4100 will be widened to provide two exit lanes from the junction. The two lanes will continue for a significant distance before merging into one lane. Traffic flows at the arm are unknown, but it is anticipated that they would be lower compared to those on the A43. It is also anticipated that most traffic will use the nearside lane, leaving the outside lane under used, providing some drivers with the opportunity to increase their speeds on the exit in an attempt to overtake slower moving traffic. This could result in loss of control or higher severity side swipe collisions as vehicles attempt to merge.	Review the proposed distance of the two lanes and reduce the length of the two lanes. Consider providing hatching the offside should it be decided that the two lanes will be required in the future	Yes	We will amend the layout to show lane 2 merging earlier, using a 100m taper beyond the signalised crossing.	Oxfordshire County Council			Amend the layout to show lane 2 merging earlier, using a 100m taper beyond the signalised crossing.	Preliminary Design	Yes
Strategic road network (NH)	2.15	Padbury Link	Risk of vegetation encroachment affecting forward visibility resulting in conflicts on the shared use facility	A shared use facility is proposed parallel to the east side of the Padbury Link Road. There is currently a significant amount of vegetation in this area, which if not managed correctly will reestablish and encroach into the shared use facility. This could also impede forward visibility leading to collisions between users, but also reduce the usable width of the cycleway which is likely to force cyclists towards the kerbed edge of the facility, leaving them more exposed to side winds created by passing high sided vehicles which could knock them off balance and result in them falling off their bikes	Ensure that extensive site clearance is undertaken and that future reestablishment is prevented	Yes	We agree with the recommendation and this will be addressed at the detailed design stage	National Highways			Confirm site clearance at detailed design stage	Detailed Design	No

BWB Road Safety Audit Log
DMRB CD 119

Scheme details				
Scheme name	OxSRFI	Last updated	25.03.2026	
Job Number	NTH2479	Prepared By	[redacted]	
RSA Stage	Interim 1	Checked By	[redacted]	

Scheme section	ID	Location	Summary	Problem	Recommendation	Design response - agree?	Design organisation response	Overseeing Organisation	Overseeing organisation - agree with design response?	Overseeing organisation response	Agreed RSA action	Scheme stage for action	Action completed?
Strategic road network (NH)	2.16	Cherwell Link	Risk of lane changes, hesitation and subsequent side swipe or shunt type collisions	The proposals will result in four southbound lanes on approach to the Cherwell Roundabout, with only one lane in the nearside leading to the services in the east. It is likely that there will be significant amount of traffic travelling from the M40 East Diverge with the intention of using the services which is likely to result in significant weaving and lane changes. Additionally, due to this being part of the strategic road network, it is likely that a number of users will be unfamiliar with the junction in turn increasing the likelihood of uncertainty and hesitation and in particular the possibility of late lane changes. This could result in collisions such as side swipes or shunts	Provide sufficient advance and lane destination signing, supplemented by clear lane destination markings alongside the arrows. Ensure that there is sufficient space within the verge areas to provide signs which accommodate the appropriate x-heights	Yes	We agree with the recommendation; signage information is already shown in outline and will be confirmed at detailed design. This includes for a gantry sign. Furthermore, whilst not a specific recommendation but it will address the wider concern, we are proposing a 40mph speed limit within the core junction area.	National Highways			Update signage strategy for preliminary design and then review further at detailed design	Detailed Design	In part
Local highway network (OCC)	3.1	General to the scheme	Potential for ongoing maintenance issues and loss of control collisions resulting from kerb overrun	Swept paths have not been provided to the RSA team for all junctions within the scheme extents. There is a risk that if carriageway widths are insufficient for the anticipated use, that larger vehicles could overrun areas of verge adjacent to the carriageway. Kerb overrun leads to maintenance issues and potential for mud and detritus being brought into the carriageway which could result in a hazard particularly for powered two wheelers, leading to loss of control collisions	Review the tracking of all relevant vehicles at all junctions, to ensure kerb lines are designed and the appropriate carriageway widths are provide	Yes	Confirmation that kerb lines are designed and carriageway widths are acceptable without the risk of overrunning are evidenced in the swept paths that have been assessed for Ardley roundabout, Cherwell roundabout, Padbury roundabout, Baynard's Green roundabout, M40 J9, Middleton Stoney roundabout, Heyford Park Link Road and the SRFI Principal access.	Oxfordshire County Council			Provide swept paths for major junctions across the scheme	Preliminary Design	Yes
Local highway network (OCC)	3.2	General to the scheme	Risk of NMUs falling over the parapet	There is a number of locations where over bridges are proposed with NMU facilities provided on them. It is unclear from the design as to what height the proposed parapets are. It is important that the parapet heights are suitable for intended use to reduce the risk of users falling over the parapet. In addition, it should be noted that the minimum effective width of cycle tracks across bridges reduces where the parapet is immediately adjacent to it. If the forecast level of use is expected to be high, additional width should be provided at the facility to avoid conflicts between cyclists on the facility	Ensure the design of the structures makes allowance for intended use and anticipated NMU flows	Yes	We agree with the recommendation and at all locations the preliminary design bridge plans indicate where changes to parapets are required. The detailed design of these works will be developed at the relevant stage and the parapet heights will comply with relevant standards based on the proposed use.	Oxfordshire County Council			Review parapet heights at detailed design stage	Detailed Design	No
Local highway network (OCC)	3.3	General to the scheme	Risk of collisions resulting from inappropriate parking during maintenance operations	There are a number of locations where traffic signals or traffic signal controlled crossings are proposed. The design does not appear to include any provision for maintenance accesses or packing in close proximity to the signals. If maintenance operatives are not provided with suitable safe parking areas, there is a risk that their vehicles could be parked so as to impede forward visibility or in areas where they block the carriageway which could lead to collisions	Ensure the design incorporates safe access for maintenance operatives in the form of laybys or hardstanding areas off the carriageway	Yes	We will propose locations for suitable maintenance hard standings on the highway plans for the preliminary design stage	Oxfordshire County Council			Identify location of maintenance hard standing on plan	Preliminary Design	Yes
Local highway network (OCC)	3.4	B430 Corridor and General to the scheme	Potential for collision between pedestrians/ cyclists and vehicles	As shown on OxSRFI-BWB-GEN-ZZ-SK-CH-SK103 the proposals include new pedestrian, cycle and equestrian routes route across the scheme. The changes along the B430 corridor, and at junctions such as the principal OxSRFI access result in complex junctions for non-motorised users (NMUs) to negotiate and some of the routes may not be clear to users, especially where existing PRoWs have been diverted. The complexity of the junctions could lead to confusion resulting in collisions with other users, or, in some cases, lead to NMUs continuing along the carriageway and potentially being hit by passing vehicles.	Wayfinding signs should be provided for pedestrians and cyclists to ensure it is clear where they need to go and which routes they should be following to reach certain destinations	Yes	We agree that wayfinding should be provided and the details will be developed at the detailed design stage	Oxfordshire County Council			Provide signage design at detailed design stage	Detailed Design	No
Local highway network (OCC)	3.5	B430 Corridor	Risk of side swipe collisions resulting from underuse of the off carriageway cycle facility	As shown on OxSRFI-BWB-GEN-ZZ-SK-CH-SK103 the proposed shared use cycle track is set back significantly from the carriageway. As this could be a main link to the proposed OxSRFI for commuters from the south, the facility should be designed to be as attractive to potential users as possible. It is unclear at this stage what the lighting proposals are for the facility, for the adjacent carriageway and also for reasons of personal security, there is a risk of the set back making the facility less attractive to use, particularly during the hours of darkness or during periods of low light. This could lead to underuse or encourage cyclists to use the carriageway where there is greater risk of them being struck by passing vehicles	Review the proposals for the shared use cycle facility adjacent to the B430 to ensure that it is attractive and safe for use at all hours of the day		The lighting of cycle tracks has been discussed with OCC and it has been agreed that solar road studs are to be provided at suitable intervals along the edges of the cycle track to aid navigation	Oxfordshire County Council			Indicate solar lighting on the lighting strategy	Preliminary Design	Yes
Local highway network (OCC)	3.6	B430 Corridor	Collisions resulting from loss of control or overtaking due to higher vehicular speeds	As shown on OxSRFI-BWB-GEN-ZZ-SK-CH-SK103 the B430 is a characterised by straight horizontal alignment. Once the MSRR is constructed it is likely that the B430 will experience lower traffic flows, which in turn could increase higher traffic speeds which could lead to an increase in high severity loss of control collisions. In addition, the removal of the junction with Camp Road could also encourage high speed overtaking manoeuvres increasing the risk of loss of control or head on collisions	Ideally some sort of traffic calming scheme should be introduced to the B430 such as central islands and hatching. A reduced speed limit may also help to encourage lower speeds	No	The B430 between the OxSRFI principal access junction and HPLR/MSRR junction is straight and generally complies with DMRB for 100kph design speed. Contrary to the commentary due to the provision of the MSRR (connecting to Bicester) flows on the B430 are predicted to increase. For these reasons we do not believe further measures are needed but we will consider reduced speed limits on the approaches to the junctions at either end of this link.	Oxfordshire County Council			None		No action

BWB Road Safety Audit Log
DMRB CD 119

Scheme details				
Scheme name	OxSRFI	Last updated	25.03.2026
Job Number	NTH2479	Prepared By	[redacted]
RSA Stage	Interim 1	Checked By	[redacted]

Scheme section	ID	Location	Summary	Problem	Recommendation	Design response - agree?	Design organisation response	Overseeing Organisation	Overseeing organisation - agree with design response?	Overseeing organisation response	Agreed RSA action	Scheme stage for action	Action completed?
Local highway network (OCC)	3.7	B430 Corridor proposed Toucan Crossing	Risk of NMUs being struck while using the crossing due to impeded visibility	As shown on OxSRFI-BWB-GEN-ZZ-SK-CH-SK103 a field access will be provided immediately north of the proposed toucan crossing point. It is unclear as to how frequently the field access will be used by large machinery and tractors which could block forward visibility to the nearside signals and / or waiting NMUs leading to vehicles travelling southbound potentially overshooting the crossing and colliding with users	Relocate the access away from the crossing point so that vehicles using it are outside of the visibility splay. Consider the provision of higher psv carriageway surfacing on the approaches to the crossing	In part	The access is lightly used as it is to access the perimeter of the quarry. We propose to provide a give way line on the access set back so vehicles would not block signals and users. Higher PSV will be provided.	Oxfordshire County Council			Higher PSV will be provided at detailed design	Detailed Design	No
Local highway network (OCC)	3.8	B430 Corridor proposed Toucan Crossing	Conflicts between users of the crossing and the farm traffic accessing or exiting from the field access	The proposed Toucan crossing appears to incorporate a central island. It is likely that large machinery which could be pulling trailers, could need to access or egress that field access which is located immediately north of the crossing point. No tracking has been provided to the RSA team, and as such it is unclear as to whether vehicles or machinery can safely turn into or out of the access without colliding with the central island. There is also a risk that machinery waiting to turn right into the access could block the crossing point	Review the tracking of appropriate vehicles expected to use the access and either relocate the access away from the crossing point or remove the central island from the proposed crossing. The boundary treatment for the access should also be considered; if a gate will be provided it should be set back sufficiently to allow a vehicle to safely pull off the carriageway to prevent the crossing or carriageway from being blocked	Yes	The gate is already set well back from the carriageway. Swept paths have been reviewed using a combination of 7.5 tonne rigid vehicles and tractors to confirm there is space for manoeuvrability without conflicting with the Toucan crossing.	Oxfordshire County Council			Provide swept paths for the field access	Preliminary Design	Yes
Local highway network (OCC)	3.9	B430 Corridor proposed Toucan Crossing	Risk of cyclists entering the carriageway into the path of an approaching vehicle	It is unclear as to the proposals for the area between the B430 carriageway and the proposed shared use cycle way footway on the west side of the corridor. At present, there are at least two trees noted on the topographical survey and should they remain in situ, there is a risk of them and other established vegetation impeding visibility between users and approaching vehicles	Vegetation clearance should be sufficient to satisfy intervisibility requirements for all users	Yes	We agree with the recommendation and this will be addressed at the detailed design stage	Oxfordshire County Council			Confirm site clearance at detailed design stage	Detailed Design	No
Local highway network (OCC)	3.10	OxSRFI Principal Access Junction	Potential overshoot of the crossing point resulting in collisions with NMUs	A dedicated left turn lane is proposed from the access of the OxSRFI as shown on OxSRFI-BWB-GEN-ZZ-SK-CH-SK018, which includes a signal controlled crossing. As vehicles exiting the site do not need to slow down to negotiate the junction, their approach speeds may be elevated which could lead to vehicles overshooting the stop line at the crossing and subsequent collisions with NMUs on the crossing	The provision of higher psv carriageway surfacing and advanced warning signs on the approaches to the crossing should be included in the design	Yes	We agree with the recommendation and this will be addressed at the detailed design stage	Oxfordshire County Council			Confirm pavement design at detailed design stage	Detailed Design	No
Local highway network (OCC)	3.11	OxSRFI Principal Access Junction	Risk of shunt type or loss of control collisions due to impeded visibility	Visibility splays are not shown on OxSRFI-BWB-GEN-ZZ-SK-CH-SK018. If forward visibility and visibility envelopes are substandard there is an increased risk of collisions as a result of vehicles being unable to stop in time to avoid various types of hazard such as waiting or turning traffic or obstructions in the road	Review the visibility requirements for all junction arms to ensure users can safely use the junction.	Yes	The visibility requirements have been assessed and are shown to be compliant with DMRB except at the immediate exit to B430 southbound which will be assessed via a departure from standard	Oxfordshire County Council			Provide geometrical layout showing the visibility splays in accordance with CD 109. Submit departure from standard for non-compliancy	Preliminary Design	In part
Local highway network (OCC)	3.12	OxSRFI Principal Access Junction	Risk of increased severity of collisions in the event of loss of control collisions	Highway profile drawings were not supplied for the Ardley bypass and OxSRFI Principal access as such the proposed levels around the junction are not clear. Additionally, proposals for road restraint systems have not been shared with the RSA team. As such in the event of significant level differences between the proposed finished road levels and the adjacent land, there is a risk of serious injury in the event of an errant vehicle leaving the carriageway	Vegetation clearance should be sufficient to satisfy intervisibility requirements for all users	Yes	RRRAP assessments and VRS will be confirmed at detailed design stage. At preliminary design the verges are designed to allow for VRS if needed.	Oxfordshire County Council			Undertake RRRAP assessments at detailed design	Detailed Design	No
Local highway network (OCC)	3.13	Northeast quadrant of OxSRFI Principal access roundabout	Risk of loss of control for cyclists due to elevated speeds	A cycle track is proposed between the existing bridge and east arm of the access roundabout. Proposed levels are unclear, as are the design speeds for this cycle track. In the event that the cycle track is on a gradient this could encourage elevated speeds, in turn increasing the risk of loss of control collisions. The cycle track is also characterised by a tight bend which, in the event of elevated speeds could also increase the likelihood of loss of control and cyclists falling	Ensure the proposed gradients and radii of the proposed cycle tracks are in accordance with relevant design guidance, such as LTN 1/20. If elevated speeds are anticipated consider the introduction of speed reduction measures such as staggered guardrail at the base of the gradient	Yes	The cycle track design speed will be as dictated by LTN1/20. There are no significant gradients as the new access roundabout is at a similar level to the existing bridge.	Oxfordshire County Council			None		No action
Local highway network (OCC)	3.14	Heyford Park Link Road West	Increased risk of collisions resulting from reduced forward visibility such as shunt type collisions	As shown on OxSRFI-BWB-GEN-ZZ-SK-CH-SK023 the visibility splay for vehicles travelling northwest is achieved across land adjacent to the proposed highway, part of which is established woodland. It is not clear if this will remain as third party land or if the land within the visibility splay will be adopted. Either way, it is important that this area remains free of obstructions to prevent impeded visibility and associate collisions such as shunt type or loss of control	Ensure the removal of the woodland is permanent through use of eco plugs or similar, and ensure the remainder of the splay is kept obstruction free. Thought should also be given to the type and height of boundary treatment along the edge of the splay	Yes	We agree with the recommendation and this will be addressed at the detailed design stage	Oxfordshire County Council			Undertake review of vegetation clearance at detailed design	Detailed Design	No

BWB Road Safety Audit Log
DMRB CD 119

Scheme details				
Scheme name	OxSRFI	Last updated	25.03.2026	
Job Number	NTH2479	Prepared By	[redacted]	
RSA Stage	Interim 1	Checked By	[redacted]	

Scheme section	ID	Location	Summary	Problem	Recommendation	Design response - agree?	Design organisation response	Overseeing Organisation	Overseeing organisation - agree with design response?	Overseeing organisation response	Agreed RSA action	Scheme stage for action	Action completed?
Local highway network (OCC)	3.15	Heyford Park Link Road West	Risk of cyclists colliding due to impeded visibility	As shown on OxSRFI-BWB-GEN-ZZ-SK-CH-SK023 a two way cycle track is proposed along the north side of Heyford Park Link Road West. The design speeds for this cycle track are unclear. It is proposed that the cycle track will continue into the secondary OxSRFI access. It is important that intervisibility is achieved and maintained for users of this facility, around the inside of the radius of the junction to reduce the likelihood of collisions between cyclists using the facility	Ensure the proposed radii of the proposed cycle tracks are in accordance with relevant design guidance, such as LTN 1/20 and ensure the required visibility envelope is achieved and maintained. Boundary treatments within the splay should be carefully thought about in terms of type and height	Yes	The cycle track design speed will be as dictated by LTN1/20. There are no significant gradients anticipated and visibility splays have been assessed in accordance with LTN1/20 Table 5-5 around the inside radius of the junction.	Oxfordshire County Council			Provide geometrical layout showing the visibility around inside radius of the junction	Preliminary Design	Yes
Local highway network (OCC)	3.16	B430 junction with Heyford Park Link Road	Risk of shunt type or loss of control collisions due to impeded visibility	Visibility splays are not shown on OxSRFI-BWB-GEN-ZZ-SK-CH-SK026. If forward visibility and visibility envelopes are substandard there is an increased risk of collisions as a result of vehicles being unable to stop in time to avoid various types of hazard such as waiting or turning traffic or obstructions in the road	Review the visibility requirements at the junction of the B430 and Heyford Park Link Road, to ensure users can safely use the junction	Yes	The visibility requirements have been assessed and are shown to be compliant with DMRB except at the approach from the B430 northbound which will be assessed via a departure from standard	Oxfordshire County Council			Provide geometrical layout showing the visibility splays in accordance with CD 109. Submit departure from standard for non-compliancy	Preliminary Design	In part
Local highway network (OCC)	3.17	Heyford Park Link Road north arm	Heyford Park Link Road north arm	It is unclear as to what kind of crossing is proposed at the junction, as shown on OxSRFI-BWB-GEN-ZZ-SK-CH-SK026. The crossing is directly adjacent to a proposed link into a bridleway on west side of the link road and a cycle way to the east. As it links into the bridleway, and the crossing could result in equestrian use, sufficient space should be provided which is set back from the link road, to allow an equestrian user to wait safely away from passing traffic and to reduce the risk associated with riders being thrown from their horses	Ensure the correct provision is included in the design for the intended users of the crossing	Yes	The crossing at this location is for pedestrians and cyclists and has been designed accordingly.	Oxfordshire County Council			None		No action
Local highway network (OCC)	3.18	B430 south arm of junction with MSRR	Risk of equestrian users falling from their horse in the event of inappropriate provision at proposed crossing points	As shown on OxSRFI-BWB-HGT-HW-DR-CH-0650, a bridleway is proposed running parallel with the MRSS on its south side. A Pegasus crossing is also proposed at the B430 south arm. As the crossing is intended for equestrian use, sufficient space should be provided which is set back from the link road, to allow an equestrian user to wait safely away from passing traffic and to reduce the risk associated with riders being thrown from their horses	Ensure the correct provision is included in the design for the intended users of the crossing.	Yes	The design has been updated to show a pegasus crossing with holding areas for equestrians in accordance with standards	Oxfordshire County Council			Provide updated design with Pegasus crossing	Preliminary Design	Yes
Local highway network (OCC)	3.19	MSRR - Gagle Brook water crossing	Risk of increased severity of collisions in the event of loss of control collisions.	Proposals for road restraint systems have not been shared with the RSA team. As such in the event of an errant vehicle losing control, leaving the carriageway and encountering an unprotected hazard, there is an increased risk of serious injury	Undertake RRRAP assessments, in the vicinity of the Gagle Brook water crossing, to identify areas of risk and address through mitigation or redesign	Yes	We agree that RRRAP assessments need to be undertaken and these will be done at the detailed design stage	Oxfordshire County Council			Undertake RRRAP assessments at detailed design	Detailed Design	No
Local highway network (OCC)	3.20	MSRR Bridleway underpass	Potential conflicts between farm machinery and NMUs on the PRoWs.	As shown on OxSRFI-BWB-HGT-HW-DR-CH-0650 there is a field access at the south side of the MSRR however it is unclear as to how the farmer will access the field. There is a number of public rights of way (PRoWs) that link in to the vicinity of the field access and therefore there is a risk of farm machinery conflicting with NMUs	Provide a clearly marked and segregated access to the field to avoid conflicts between users.	No	It is commonplace in rural areas for farm tracks to be shared with public rights of way.	Oxfordshire County Council			None		No action
Local highway network (OCC)	3.21	Eastern section of MRSS	Inadequate drainage could lead to excessive surface water and loss of control collisions	There is a section of the MRSS which seems to be in a cutting, in that the carriageway on the north side are at the bottom of an embankment slope. Drainage proposals have not been shared with the RSA team. There is likely to be surface water runoff down the embankment slope which could drain on to the carriageway. If the surface water is not managed and it collects on the surface of the carriageway there is a risk of loss of control collisions resulting from a lack of traction	Ensure that the run off is intersected at the bottom of the batter slope by appropriate drainage to prevent the carriageway being subject to significant amounts of surface water entering the wheel tracked area of the carriageway	Yes	We agree with the recommendation and this will be addressed at the detailed design stage	Oxfordshire County Council			Undertake detailed drainage assessments at detailed design	Detailed Design	No
Local highway network (OCC)	3.22	Heyford Park Link Road West	Risk of increased severity of collisions in the event of loss of control collisions	Proposals for road restraint systems have not been shared with the RSA team. As such in the event of an errant vehicle losing control and encountering an unprotected hazard, there is a risk of serious injury	Undertake RRRAP assessments, particularly in the vicinity of the watercourse, to identify areas of risk and address through mitigation or redesign	Yes	We agree that RRRAP assessments need to be undertaken and these will be done at the detailed design stage	Oxfordshire County Council			Undertake RRRAP assessments at detailed design	Detailed Design	No
Local highway network (OCC)	3.23	Ardley Bypass	Inadequate drainage could lead to excessive surface water and loss of control collisions	OxSRFI-BWB-HGT-HW-DR-CH-0652 shows that Ardley Bypass appears to be generally in a cutting, with embankment slope on the north side of the west side of the bypass. Drainage proposals have not been shared with the RSA team. There is likely to be surface water runoff down the embankment slope which could drain on to the carriageway. If the surface water is not managed and it collects on the surface of the carriageway there is a risk of loss of control collisions resulting from a lack of traction	Ensure that the run off is intersected at the toe of the batter slope by appropriate drainage to prevent the carriageway being subject to significant amounts of surface water entering the wheel tracked area of the carriageway	Yes	We agree with the recommendation and this will be addressed at the detailed design stage	Oxfordshire County Council			Undertake detailed drainage assessments at detailed design	Detailed Design	No

APPENDIX 37

CALCULATION OF CONSTRUCTION TRAFFIC

CALCULATION OF CONSTRUCTION TRAFFIC

OXFORDSHIRE SRFI

DOCUMENT CONTROL

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2	12/08/2025			first issue to the client team
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1.0 INTRODUCTION

1.1 ADC Infrastructure Limited are commissioned by Oxfordshire Railfreight Limited (the Applicant) to assess the transport and infrastructure requirements of a proposed Strategic Rail Freight Interchange (SRFI) in Oxfordshire; the subject of a Development Consent Order (DCO) application for a Nationally Significant Infrastructure Project (NSIP), to be known as OxSRFI. A plan showing the Order Limits is presented at **Figure 1.**

1.2 The proposals also include various highway improvements, including alterations to Junction 10 of the M40 motorway and to the A43, both of which meet thresholds for nationally significant highway works and the application will therefore also include two highway NSIPs as part of the DCO.

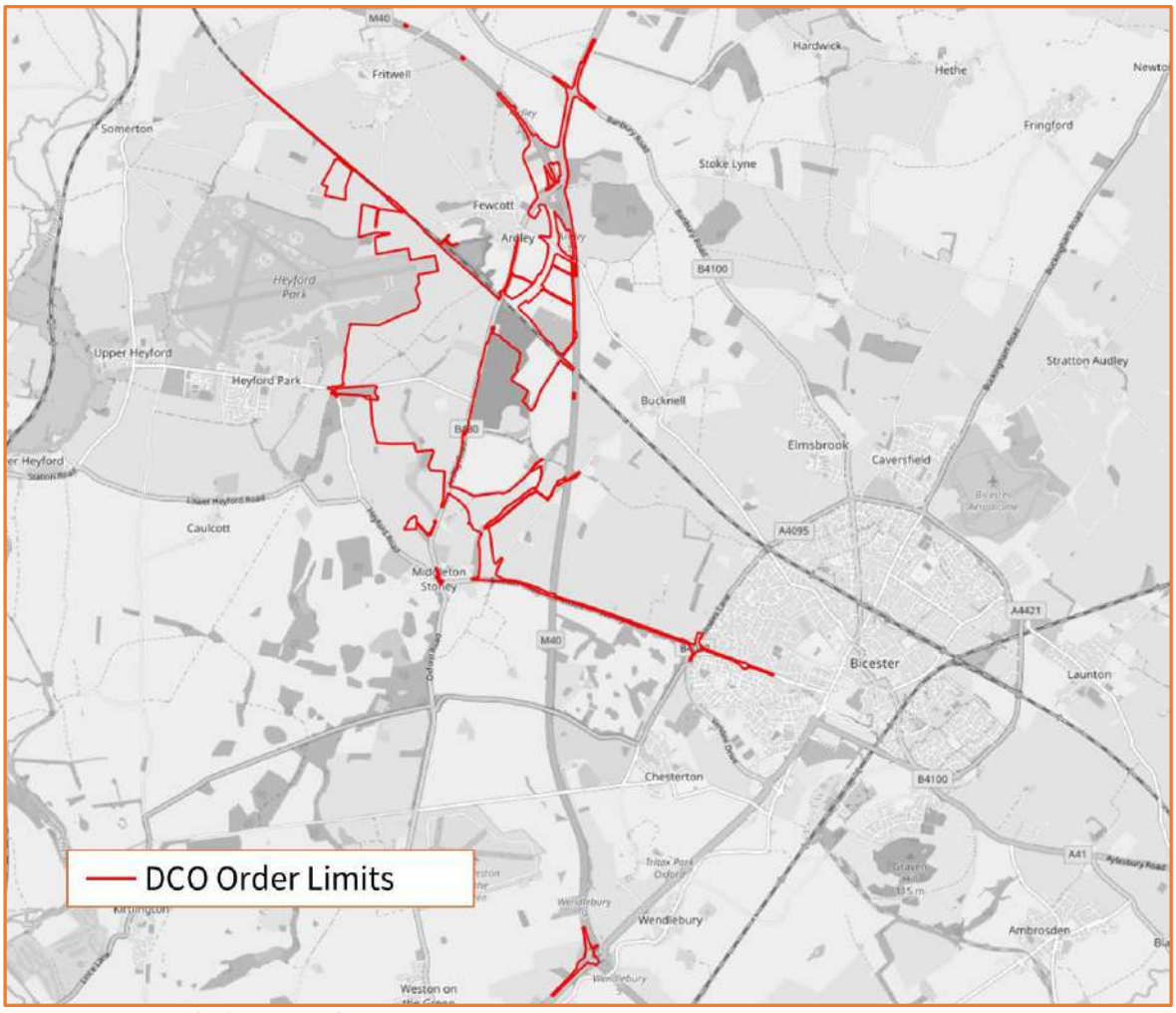

Figure 1: OxSRFI draft DCO Order Limits

1.3 This Technical Note has been produced sets out the calculation of the traffic flows associated with the construction of OxSRFI and the associated Highway Works.

2.0 CONSTRUCTION TRAFFIC ESTIMATES

Construction schedule

2.1 The Construction Employment Management Plan (CEMP) includes the indicative master programme and phasing plan for the construction of the development, and the associated highway works. The main construction activities are summarised below:

Year 1 – 2028

- construction of the Main Site construction compound
- Main Site earthworks and landscaping begins along with the construction of the Main Site roads.

Year 2 – 2029

- construction of the off-site construction compound
- work starts at M40 Junction 10 and the Cherwell roundabout
- works starts at the Baynard's Green Roundabout and the Ardley Roundabout
- works starts at the Ardley Bypass and the principal site access
- works starts on Phase 1 of the Heyford Park Link Road
- bridge work starts
- Main Site earthworks and landscaping continues
- Main Site road construction continues
- construction begins on the first Main Site building
- construction starts on the Rail Terminal.

Year 3 – 2030

- M40 Junction 10 works continue
- the Ardley Bypass and principal site access works are completed
- works start at the Camp Road junction and B4030 junction
- the Heyford Park Link Road Phase 1 works are completed and Phase 2 commences
- works starts on the Middleton Stoney Relief Road
- work starts at M40 Junction 9
- bridge work continues
- Main Site earthworks and landscaping continues
- Main Site road works are completed
- erection of the Main Site buildings continues
- the Rail Terminal is completed
- railway track works take place.

Year 4 – 2031

- M40 Junction 10 works continue
- the Heyford Park Link Road Phase 2 works are completed
- Middleton Stoney Relief Road works continue
- M40 Junction 9 works are completed
- A43 widening works begin
- bridge work continues
- Main Site earthworks and landscaping is completed
- erection of the Main Site buildings continues.

Year 5 – 2032

- M40 Junction 10 works are completed
- A43 widening works are completed
- bridge works are completed
- work on the Main Site buildings continues.

Year 6 – 2033

- work on the Main Site buildings continues.

Year 7 – 2034

- work on the Main Site buildings are completed.

Construction traffic trip rates and traffic generation

2.2 To provide a basis for the quantum of trips generated by the construction phases reference has been made to the number of vehicles recorded during the construction of the East Midlands Gateway Strategic Rail Freight Interchange (EMG SRFI).

2.3 The study of the EMG SRFI construction traffic provided a breakdown of the likely number of construction vehicles (sorted by type) based on each construction element. The resulting trip rates for the construction traffic is set out in the table below.

type of construction	units	trip rate (one-way)				
		HGV	LGV	car	vans	total
off-site roads	sqm	0.5	0.1	0.3	0.3	1.2
on-site roads	sqm	0.5	0.1	1	0.75	2.35
bridges/culvert	item	800	320	1500	1500	4120
earthworks	sqm	0.001	0.0005	0.002	0.0075	0.011
buildings	sq ft	0.015	0.003	0.0075	0.01	0.011
landscaping	sq ft	0.0001	0.0004	0.0002	0.0004	0.0011
railway tracks	m	0.075	0.0375	0.05	0.1	0.2625
railway terminal	sqm	0.15	0.03	0.03	0.045	0.255

2.4 The trip rates identified above have been applied to each construction activity to give an estimated number of construction vehicles throughout the construction period. The calculations are provided at **Appendix A**.

2.5 As set out in the CEMP, construction work will be controlled and confined to the following:

- 07:00 -19:00 hours Monday to Friday
- 07:00 -16:00 hours Saturday.

2.6 No works will be undertaken on Sundays or public holidays, save in exceptional circumstances only and with prior notification.

2.7 The average construction traffic movements per day have been calculated on the principle of 260 working days a year (5 days x 52 weeks). This is a robust assessment as it excludes Saturday working, the inclusion of which would reduce the overall daily traffic movements.

2.8 The table below shows the average two-way daily HGV and light construction vehicle movements for 2028 to 2034. The table also provides construction traffic estimates for pre and post the opening of the Ardley bypass in year 3.

construction year	average daily traffic flows	
	HGV	light vehicles
year 1 2028	19	161
year 2 2029	395	797
year 3 2030 pre Ardley Bypass	369	697
year 3 2030 post Ardley Bypass	419	783
year 4 2031	396	632
year 5 2032	173	252
year 6 2033	136	188
year 7 2034	136	188

Construction compounds

2.9 Construction compounds for the development and the associated highway works will be split between two main locations, with construction compounds at the Main Site and at M40 Junction 10. The table below summarises the activities and Highway Works that are likely to take place from the construction compounds.

works	construction compound	
	Main Site	off-site
All Main Site activities and works	✓	
Heyford Park Link Road highway works	✓	
Middleton Stoney Relief Road highway works	✓	
Principal Site Access highway works	✓	
Ardley Bypass highway works	✓	✓
M40 Junction 10 highway works		✓
A43 Baynard's Green roundabout highway works		✓
A43 Widening		✓
M40 Junction 9*		✓

* M40 Junction 9 is likely to have its own compound near the junction.

2.10 On the basis of the above, the construction traffic has been split between the Main Site and off-site compounds as set out in the tables below.

main site construction compound*		
construction year	average daily traffic flows	
	HGV	light vehicles
year 1 2028	19	161
year 2 2029	250	574
year 3 2030 pre Ardley Bypass	299	579
year 3 2030 post Ardley Bypass	324	630
year 4 2031	239	392
year 5 2032	140	201
year 6 2033	136	188
year 7 2034	136	188

*All Ardley Bypass construction activities assessed as being from the Main Site compound as this provides a 'worst case' for construction traffic impacts on the B430 through Ardley in advance of the bypass being complete. Whereas this may take place from the off-site compound south of Junction 10, or activities may be split between them.

off-site construction compound		
construction year	average daily traffic flows	
	HGV	light vehicles
year 1 2028	0	0
year 2 2029	145	225
year 3 2030 pre Ardley Bypass	70	120
year 3 2030 post Ardley Bypass	95	155
year 4 2031	158	243
year 5 2032	33	52
year 6 2033	0	0
year 7 2034	0	0

3.0 CONSTRUCTION TRAFFIC DISTRIBUTION

HGV traffic

3.1 ADC Infrastructure Technical Note 4: HGV Trip Distribution details the methodology used to determine the distribution of the OxSRFI HGV traffic. The resulting distribution is summarised in the table below.

route	distribution
M40 north	21.8%
A43	26.7%
(of which A43)	20.0%
(of which A421)	6.7%
M40 south	51.5%
(of which M40 south)	29.7%
(of which A34)	17.3%
(of which A41)	4.6%
B430	-
total	100%

3.2 Local to the site it is reasonable to assume similar routing pattern for HGV construction traffic to the general HGV traffic at OxSRFI as this distribution is based on the location of the site in relation to the strategic road network. The above distribution pattern has therefore been adopted for the construction traffic HGVs. This distribution pattern conforms with the HGV routeing restrictions set out the Construction Traffic Management Plan (CTMP) included within the CEMP, as the construction and operational HGV traffic at OxSRFI will be subject to the same restrictions.

Light vehicle traffic

3.3 To determine an appropriate distribution pattern for the light vehicle construction traffic, reference has been made to the Workforce Mobility and Skills in the UK Construction Sector 2022[1] report.

3.4 This report identifies that *"The average (mean) distance from workers' current residence (taking into account temporary residences) to their current site is 17 miles, continuing the downward trend since the survey began (18 miles in 2018/19, 22 miles in 2015 and 28 miles in 2012)".*

3.5 This travel behaviour is similar to that of the perspective employees at the OxSRFI development. Hence, it is considered reasonable to adopt the light vehicle distribution pattern as identified through the runs of the Bicester Traffic Model. The approximate distribution is summarised in the table below.

[1] Workforce Mobility and Skills in the UK Construction Sector 2022, Construction Industry Training Board, May 2023

route	distribution
M40 north	11%
A43	24%
M40 south	2%
B4100 east	4%
B4100 west	0%
Ardley Road west	3%
Ardley Road east	5%
Somerton Road	4%
Camp Road	11%
B430 south	9%
B4030 (Bicester)	26%
total	100%

Construction traffic assignment

3.6 All HGV traffic will be required to access the Main Site via M40 Junction 10, as set out in the CTMP that is appended to the CEMP.

3.7 For light vehicle traffic associated with construction workers, the primary considerations for the routing strategy include using the shortest route, with use of the Strategic Road Network (SRN) and 'A' roads as a first priority, then 'B' roads then 'C' roads and then 'unclassified roads', and avoid settlements and sensitive receptors to minimise impact on villages and towns and sensitive road users. Construction workers (light vehicles) are likely to travel to the site from nearby residential areas. Access for construction workers to the Main Site and off-site construction compound (located to the south of J10) will be from the B430, with workers permitted to arrive and depart both north and south.

3.8 The assignment of the construction traffic to the highway network has therefore been calculated based on the above distribution patterns and the split of trips between the Main Site and off-site construction compounds, and in accordance with the HGV restrictions. The resulting number of construction vehicles on each route during each of the construction years is summarised in the table overleaf.

3.9 The table shows that the total construction traffic flows are the highest on the B430 in year 2. The highest total traffic flows on the other routes occurs in year 3 post the opening of the Ardley Bypass.

3.10 The greatest number of HGVs on the B430 between the Main Site and M40 J10 occurs in year 3 prior to the opening of the Ardley Bypass. The HGV numbers then increase on all routes during year 3 post the opening of the bypass. Once the bypass is opened the number of construction HGVs on the B430 reduces to zero as they would instead route along the bypass.

construction year	average daily traffic flows (two-way)			
	route	LDV	HDV	total
year 1	B430 north (to/from J10)	87	19	106
	B430 south	74	0	74
	A43 to A421	39	5	44
	M40 J10 to J9	4	10	14
	M40 South J9	4	6	10
year 2	B430 north (to/from J10)	441	250	691
	B430 south	366	0	366
	A43 to A421	194	105	299
	M40 J10 to J9	18	203	221
	M40 South J9	18	117	135
year 3 pre Ardley Bypass	B430 north (to/from J10)	383	299	682
	B430 south	320	0	320
	A43 to A421	170	99	269
	M40 J10 to J9	16	190	206
	M40 South J9	16	110	126
year 3 post Ardley Bypass	B430 north (to/from J10)	93	0	93
	B430 south	360	0	360
	Ardley Bypass	431	324	755
	A43 to A421	191	112	303
	M40 J10 to J9	18	216	234
	M40 South J9	18	124	142
year 4	B430 north (to/from J10)	75	0	75
	B430 south	290	0	290
	Ardley Bypass	352	239	591
	A43 to A421	154	106	260
	M40 J10 to J9	15	204	219
	M40 South J9	15	118	133
year 5	B430 north (to/from J10)	30	0	30
	B430 south	116	0	116
	Ardley Bypass	139	140	279
	A43 to A421	61	46	107
	M40 J10 to J9	6	89	95
	M40 South J9	6	51	57
year 6	B430 north (to/from J10)	22	0	22
	B430 south	86	0	86
	Ardley Bypass	102	136	238
	A43 to A421	46	36	82
	M40 J10 to J9	4	70	74
	M40 South J9	4	40	44
year 7	B430 north (to/from J10)	22	0	22
	B430 south	86	0	86
	Ardley Bypass	102	136	238
	A43 to A421	46	36	82
	M40 J10 to J9	4	70	74
	M40 South J9	4	40	44

APPENDIX A
Construction Traffic Calculations

Total construction traffic

Trip rates from Northampton Gateway DCO
Duration and construction programme based on 'Summary Programme Oxford SRFI (10.09.2025).

Component	Input Unit	Trip rates					Quantity	Construction Totals					Duration		Average movements per day (one-way)					
		HGV	LGV	Car	Vans	Total		HGV	LGV	Car	Van	Total	Yrs.	Days	HGV	LGV	Car	Van	Lights	Total
M40 J 10 Works	m2	0.5	0.1	0.3	0.3	1.2	51,500	25750	5150	15450	15450	61,800	3.18	827	31	6	19	19	44	75
Ardley Bypass and Principal Site Access	m2	0.5	0.1	0.3	0.3	1.2	28,200	14100	2820	8460	8460	33,840	1.05	273	52	10	31	31	72	124
A43 Baynards Green Roundabout	m2	0.5	0.1	0.3	0.3	1.2	16,100	8050	1610	4830	4830	19,320	0.66	172	47	9	28	28	65	112
Cherwell Roundabout	m2	0.5	0.1	0.3	0.3	1.2	3,200	1600	320	960	960	3,840	0.25	65	25	5	15	15	35	60
Camp Road Junction and B430 crossing	m2	0.5	0.1	0.3	0.3	1.2	1,000	500	100	300	300	1,200	0.41	107	5	1	3	3	7	12
Heyford Park Link Road Phase 1	m2	0.5	0.1	0.3	0.3	1.2	4,400	2200	440	1320	1320	5,280	1.45	377	6	1	4	4	9	15
Heyford Park Link Road Phase 2	m2	0.5	0.1	0.3	0.3	1.2	21,500	10750	2150	6450	6450	25,800	0.64	166	65	13	39	39	91	156
Middleton Stoney Relief Road	m2	0.5	0.1	0.3	0.3	1.2	16,400	8200	1640	4920	4920	19,680	1.18	307	27	5	16	16	37	64
M40 J9 works	m2	0.5	0.1	0.3	0.3	1.2	6,500	3250	650	1950	1950	7,800	0.5	130	25	5	15	15	35	60
A43 widening	m2	0.5	0.1	0.3	0.3	1.2	24,900	12450	2490	7470	7470	29,880	0.95	247	50	10	30	30	70	120
On-site roads	m2	0.5	0.1	1	0.75	2.35	22,800	11400	2280	22800	17100	53,580	2.11	549	21	4	42	31	77	98
Bridges/culvert (new)	item	800	320	1500	1500	4120	11	8800	3520	16500	16500	45,320	3.2	832	11	4	20	20	44	55
Earthworks Phase 1	m3	0.001	0.0005	0.002	0.0075	0.011	3,132,000	3132	1566	6264	23490	34,452	1.32	343	9	5	18	68	91	100
Earthworks Phase 2	m3	0.001	0.0005	0.002	0.0075	0.011	804,000	804	402	1608	6030	8,844	1.54	400	2	1	4	15	20	22
Earthworks Phase 3	m3	0.001	0.0005	0.002	0.0075	0.011	250,000	250	125	500	1875	2,750	0.81	211	1	1	2	9	12	13
Buildings	ft2	0.015	0.003	0.0075	0.01	0.0355	6,500,000	97,500	19,500	48,750	65,000	230,750	5.5	1430	68	14	34	45	93	161
Landscaping Phase 1	ft2	0.0001	0.0004	0.0002	0.0004	0.0011	1,734,822	173	694	347	694	1,908	1	260	1	3	1	3	7	8
Landscaping Phase 2	ft2	0.0001	0.0004	0.0002	0.0004	0.0011	1,181,561	118	473	236	473	1,300	1.4	364	0	1	1	1	3	3
Landscaping Phase 3	ft2	0.0001	0.0004	0.0002	0.0004	0.0011	376,749	38	151	75	151	415	0.5	130	0	1	1	1	3	3
Railway Tracks	m	0.075	0.0375	0.05	0.1	0.2625	5,850	439	219	293	585	1,536	0.5	130	3	2	2	5	9	12
Railway Terminal	m2	0.15	0.03	0.03	0.045	0.255	34,979	5247	1049	1049	1574	8,919	1.11	289	18	4	4	5	13	31
Total arrivals															467	105	329	403	837	1304
Total departures															467	105	329	403	837	1304
Two-way															**934**	**210**	**658**	**806**	**1674**	**2608**

Start of construction 2028

Component	2028				2029				2030				2031				2032				2033				2034			
	Construction Programme																											
	Year 1				Year 2				Year 3				Year 4				Year 5				Year 6				Year 7			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
M40 J 10 Works	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	0.72	0	0	0	0	0	0	0	0	0	0	0
Ardley Bypass and Principal Site Access	0	0	0	0	0	1	1	1	1	0.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A43 Baynards Green Roundabout	0	0	0	0	0	1	1	0.64	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cherwell Roundabout	0	0	0	0	0	0.5	0.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Camp Road Junction and B430 crossing	0	0	0	0	0	0	0	0	1	0.6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heyford Park Link Road Phase 1	0	0	0	0	0	1	1	1	1	1	0.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heyford Park Link Road Phase 2	0	0	0	0	0	0	0	0	0	0	0.56	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Middleton Stoney Relief Road	0	0	0	0	0	0	0	0	0	0	0	0.72	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
M40 J9 works	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A43 widening	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0.8	0	0	0	0	0	0	0	0	0	0	0
On-site roads	0	0	0	0.44	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bridges/culvert (new)	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0
Earthworks Phase 1	0	1	1	1	1	1	0.28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Earthworks Phase 2	0	0	0	0	0	0	0.72	1	1	1	1	1	0.44	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Earthworks Phase 3	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0.24	0	0	0	0	0	0	0	0	0	0	0	0
Buildings	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Landscaping Phase 1	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Landscaping Phase 2	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0.6	0	0	0	0	0	0	0	0	0	0	0	0	0
Landscaping Phase 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0
Railway Tracks	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Railway Terminal	0	0	0	0	0.44	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	**0**	**1**	**2**	**2.44**	**5.44**	**9.5**	**9.5**	**8.64**	**9**	**8.8**	**8.36**	**8.72**	**8.44**	**7**	**6.6**	**5.24**	**3.52**	**1**	**1**	**1**	**1**	**1**	**1**	**2**	**2**	**1**	**1**	**1**

Component	Daily Movements - Year 1																			
	Quarter 1					Quarter 2					Quarter 3					Quarter 4				
	HGV	LGV	Car	Van	Total	HGV	LGV	Car	Van	Total	HGV	LGV	Car	Van	Total	HGV	LGV	Car	Van	Total
M40 J 10 Works	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ardley Bypass and Principal Site Access	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A43 Baynards Green Roundabout	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cherwell Roundabout	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Camp Road Junction and B430 crossing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heyford Park Link Road Phase 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heyford Park Link Road Phase 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Middleton Stoney Relief Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
M40 J9 works	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A43 widening	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
On-site roads	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	2	18	14	43
Bridges/culvert (new)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Earthworks Phase 1	0	0	0	0	0	9	5	18	68	100	9	5	18	68	100	9	5	18	68	100
Earthworks Phase 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Earthworks Phase 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Buildings	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Landscaping Phase 1	0	0	0	0	0	0	0	0	0	0	1	3	1	3	8	1	3	1	3	8
Landscaping Phase 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Landscaping Phase 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Railway Tracks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Railway Terminal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Development Total	**0**	**0**	**0**	**0**	**0**	**9**	**5**	**18**	**68**	**100**	**10**	**8**	**19**	**71**	**108**	**19**	**10**	**37**	**85**	**151**
Two-way	**0**	**0**	**0**	**0**	**0**	**18**	**10**	**36**	**136**	**200**	**20**	**16**	**38**	**142**	**216**	**38**	**20**	**74**	**170**	**302**
Hourly HGV/LGV (assuming 10 hour day)	**0**	**0**	**0**	**0**	**0**	**2**	**1**	**4**	**14**	**20**	**2**	**2**	**4**	**14**	**22**	**4**	**2**	**7**	**17**	**30**

Component	Daily Movements - Year 2																			
	Quarter 1					Quarter 2					Quarter 3					Quarter 4				
	HGV	LGV	Car	Van	Total	HGV	LGV	Car	Van	Total	HGV	LGV	Car	Van	Total	HGV	LGV	Car	Van	Total
M40 J 10 Works	31	6	19	19	75	31	6	19	19	75	31	6	19	19	75	31	6	19	19	75
Ardley Bypass and Principal Site Access	0	0	0	0	0	52	10	31	31	124	52	10	31	31	124	52	10	31	31	124
A43 Baynards Green Roundabout	0	0	0	0	0	47	9	28	28	112	47	9	28	28	112	30	6	18	18	72
Cherwell Roundabout	0	0	0	0	0	13	3	8	8	32	13	3	8	8	32	0	0	0	0	0
Camp Road Junction and B430 crossing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heyford Park Link Road Phase 1	0	0	0	0	0	6	1	4	4	15	6	1	4	4	15	6	1	4	4	15
Heyford Park Link Road Phase 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Middleton Stoney Relief Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
M40 J9 works	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A43 widening	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
On-site roads	21	4	42	31	98	21	4	42	31	98	21	4	42	31	98	21	4	42	31	98
Bridges/culvert (new)	11	4	20	20	55	11	4	20	20	55	11	4	20	20	55	11	4	20	20	55
Earthworks Phase 1	9	5	18	68	100	9	5	18	68	100	3	1	5	19	28	0	0	0	0	0
Earthworks Phase 2	0	0	0	0	0	0	0	0	0	0	1	1	3	11	16	2	1	4	15	22
Earthworks Phase 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Buildings	0	0	0	0	0	0	0	0	0	0	68	14	34	45	161	68	14	34	45	161
Landscaping Phase 1	1	3	1	3	8	1	3	1	3	8	0	0	0	0	0	0	0	0	0	0
Landscaping Phase 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Landscaping Phase 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Railway Tracks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Railway Terminal	8	2	2	2	14	8	2	2	2	14	18	4	4	5	31	18	4	4	5	31
Development Total	**81**	**24**	**102**	**143**	**350**	**199**	**47**	**173**	**214**	**633**	**271**	**57**	**198**	**221**	**747**	**239**	**50**	**176**	**188**	**653**
Two-way	**162**	**48**	**204**	**286**	**700**	**398**	**94**	**346**	**428**	**1266**	**542**	**114**	**396**	**442**	**1494**	**478**	**100**	**352**	**376**	**1306**
Hourly HGV/LGV (assuming 10 hour day)	**16**	**5**	**20**	**29**	**70**	**40**	**9**	**35**	**43**	**127**	**54**	**11**	**40**	**44**	**149**	**48**	**10**	**35**	**38**	**131**

Component	Daily Movements - Year 3																			
	Quarter 1					Quarter 2					Quarter 3					Quarter 4				
	HGV	LGV	Car	Van	Total	HGV	LGV	Car	Van	Total	HGV	LGV	Car	Van	Total	HGV	LGV	Car	Van	Total
M40 J 10 Works	31	6	19	19	75	31	6	19	19	75	31	6	19	19	75	31	6	19	19	75
Ardley Bypass and Principal Site Access	52	10	31	31	124	10	2	6	6	24	0	0	0	0	0	0	0	0	0	0
A43 Baynards Green Roundabout	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cherwell Roundabout	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Camp Road Junction and B430 crossing	5	1	3	3	12	3	1	2	2	8	0	0	0	0	0	0	0	0	0	0
Heyford Park Link Road Phase 1	6	1	4	4	15	6	1	4	4	15	5	1	3	3	12	0	0	0	0	0
Heyford Park Link Road Phase 2	0	0	0	0	0	0	0	0	0	0	36	7	22	22	87	65	13	39	39	156
Middleton Stoney Relief Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19	4	12	12	47
M40 J9 works	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25	5	15	15	60
A43 widening	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
On-site roads	21	4	42	31	98	21	4	42	31	98	21	4	42	31	98	21	4	42	31	98
Bridges/culvert (new)	11	4	20	20	55	11	4	20	20	55	11	4	20	20	55	11	4	20	20	55
Earthworks Phase 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Earthworks Phase 2	2	1	4	15	22	2	1	4	15	22	2	1	4	15	22	2	1	4	15	22
Earthworks Phase 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Buildings	68	14	34	45	161	68	14	34	45	161	68	14	34	45	161	68	14	34	45	161
Landscaping Phase 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Landscaping Phase 2	0	0	0	0	0	0	1	1	1	3	0	1	1	1	3	0	1	1	1	3
Landscaping Phase 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Railway Tracks	0	0	0	0	0	3	2	2	5	12	3	2	2	5	12	0	0	0	0	0
Railway Terminal	18	4	4	5	31	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Development Total	**214**	**45**	**161**	**173**	**593**	**155**	**36**	**134**	**148**	**473**	**177**	**40**	**147**	**161**	**525**	**242**	**52**	**186**	**197**	**677**
Two-way	**428**	**90**	**322**	**346**	**1186**	**310**	**72**	**268**	**296**	**946**	**354**	**80**	**294**	**322**	**1050**	**484**	**104**	**372**	**394**	**1354**
Hourly HGV/LGV (assuming 10 hour day)	**43**	**9**	**32**	**35**	**119**	**31**	**7**	**27**	**30**	**95**	**35**	**8**	**29**	**32**	**105**	**48**	**10**	**37**	**39**	**135**

Component	Daily Movements - Year 4																			
	Quarter 1					Quarter 2					Quarter 3					Quarter 4				
	HGV	LGV	Car	Van	Total	HGV	LGV	Car	Van	Total	HGV	LGV	Car	Van	Total	HGV	LGV	Car	Van	Total
M40 J 10 Works	31	6	19	19	75	31	6	19	19	75	31	6	19	19	75	31	6	19	19	75
Ardley Bypass and Principal Site Access	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A43 Baynards Green Roundabout	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cherwell Roundabout	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Camp Road Junction and B430 crossing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heyford Park Link Road Phase 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heyford Park Link Road Phase 2	65	13	39	39	156	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Middleton Stoney Relief Road	27	5	16	16	64	27	5	16	16	64	27	5	16	16	64	27	5	16	16	64
M40 J9 works	25	5	15	15	60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A43 widening	0	0	0	0	0	50	10	30	30	120	50	10	30	30	120	50	10	30	30	120
On-site roads	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bridges/culvert (new)	11	4	20	20	55	11	4	20	20	55	11	4	20	20	55	11	4	20	20	55
Earthworks Phase 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Earthworks Phase 2	1	0	2	7	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Earthworks Phase 3	1	1	2	9	13	1	1	2	9	13	1	1	2	9	13	0	0	0	2	2
Buildings	68	14	34	45	161	68	14	34	45	161	68	14	34	45	161	68	14	34	45	161
Landscaping Phase 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Landscaping Phase 2	0	1	1	1	3	0	1	1	1	3	0	1	1	1	3	0	0	0	0	0
Landscaping Phase 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Railway Tracks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Railway Terminal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Development Total	**229**	**49**	**148**	**171**	**597**	**188**	**41**	**122**	**140**	**491**	**188**	**41**	**122**	**140**	**491**	**187**	**39**	**119**	**132**	**477**
Two-way	**458**	**98**	**296**	**342**	**1194**	**376**	**82**	**244**	**280**	**982**	**376**	**82**	**244**	**280**	**982**	**374**	**78**	**238**	**264**	**954**
Hourly HGV/LGV (assuming 10 hour day)	**46**	**10**	**30**	**34**	**119**	**38**	**8**	**24**	**28**	**98**	**38**	**8**	**24**	**28**	**98**	**37**	**8**	**24**	**26**	**95**

Component	Daily Movements - Year 5																			
	Quarter 1					Quarter 2					Quarter 3					Quarter 4				
	HGV	LGV	Car	Van	Total	HGV	LGV	Car	Van	Total	HGV	LGV	Car	Van	Total	HGV	LGV	Car	Van	Total
M40 J 10 Works	22	4	14	14	54	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ardley Bypass and Principal Site Access	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A43 Baynards Green Roundabout	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cherwell Roundabout	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Camp Road Junction and B430 crossing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heyford Park Link Road Phase 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heyford Park Link Road Phase 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Middleton Stoney Relief Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
M40 J9 works	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A43 widening	40	8	24	24	96	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
On-site roads	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bridges/culvert (new)	11	4	20	20	55	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Earthworks Phase 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Earthworks Phase 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Earthworks Phase 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Buildings	68	14	34	45	161	68	14	34	45	161	68	14	34	45	161	68	14	34	45	161
Landscaping Phase 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Landscaping Phase 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Landscaping Phase 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Railway Tracks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Railway Terminal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Development Total	**141**	**30**	**92**	**103**	**366**	**68**	**14**	**34**	**45**	**161**	**68**	**14**	**34**	**45**	**161**	**68**	**14**	**34**	**45**	**161**
Two-way	**282**	**60**	**184**	**206**	**732**	**136**	**28**	**68**	**90**	**322**	**136**	**28**	**68**	**90**	**322**	**136**	**28**	**68**	**90**	**322**
Hourly HGV/LGV (assuming 10 hour day)	**28**	**6**	**18**	**21**	**73**	**14**	**3**	**7**	**9**	**32**	**14**	**3**	**7**	**9**	**32**	**14**	**3**	**7**	**9**	**32**

Component	Daily Movements - Year 6																			
	Quarter 1					Quarter 2					Quarter 3					Quarter 4				
	HGV	LGV	Car	Van	Total	HGV	LGV	Car	Van	Total	HGV	LGV	Car	Van	Total	HGV	LGV	Car	Van	Total
M40 J 10 Works	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ardley Bypass and Principal Site Access	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A43 Baynards Green Roundabout	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cherwell Roundabout	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Camp Road Junction and B430 crossing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heyford Park Link Road Phase 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heyford Park Link Road Phase 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Middleton Stoney Relief Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
M40 J9 works	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A43 widening	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
On-site roads	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bridges/culvert (new)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Earthworks Phase 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Earthworks Phase 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Earthworks Phase 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Buildings	68	14	34	45	161	68	14	34	45	161	68	14	34	45	161	68	14	34	45	161
Landscaping Phase 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Landscaping Phase 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Landscaping Phase 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	3
Railway Tracks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Railway Terminal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Development Total	**68**	**14**	**34**	**45**	**161**	**68**	**14**	**34**	**45**	**161**	**68**	**14**	**34**	**45**	**161**	**68**	**15**	**35**	**46**	**164**
Two-way	**136**	**28**	**68**	**90**	**322**	**136**	**28**	**68**	**90**	**322**	**136**	**28**	**68**	**90**	**322**	**136**	**30**	**70**	**92**	**328**
Hourly HGV/LGV (assuming 10 hour day)	**14**	**3**	**7**	**9**	**32**	**14**	**3**	**7**	**9**	**32**	**14**	**3**	**7**	**9**	**32**	**14**	**3**	**7**	**9**	**33**

Component	Daily Movements - Year 7																			
	Quarter 1					Quarter 2					Quarter 3					Quarter 4				
	HGV	LGV	Car	Van	Total	HGV	LGV	Car	Van	Total	HGV	LGV	Car	Van	Total	HGV	LGV	Car	Van	Total
M40 J 10 Works	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ardley Bypass and Principal Site Access	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A43 Baynards Green Roundabout	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cherwell Roundabout	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Camp Road Junction and B430 crossing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heyford Park Link Road Phase 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heyford Park Link Road Phase 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Middleton Stoney Relief Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
M40 J9 works	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A43 widening	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
On-site roads	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bridges/culvert (new)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Earthworks Phase 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Earthworks Phase 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Earthworks Phase 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Buildings	68	14	34	45	161	68	14	34	45	161	68	14	34	45	161	68	14	34	45	161
Landscaping Phase 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Landscaping Phase 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Landscaping Phase 3	0	1	1	1	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Railway Tracks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Railway Terminal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Development Total	**68**	**15**	**35**	**46**	**164**	**68**	**14**	**34**	**45**	**161**	**68**	**14**	**34**	**45**	**161**	**68**	**14**	**34**	**45**	**161**
Two-way	**136**	**30**	**70**	**92**	**328**	**136**	**28**	**68**	**90**	**322**	**136**	**28**	**68**	**90**	**322**	**136**	**28**	**68**	**90**	**322**
Hourly HGV/LGV (assuming 10 hour day)	**14**	**3**	**7**	**9**	**33**	**14**	**3**	**7**	**9**	**32**	**14**	**3**	**7**	**9**	**32**	**14**	**3**	**7**	**9**	**32**

Summary (two-way)

	Average daily flows					Total	
	HGV	LGV	Car	Van	Total	HGV	Light
Year 1 2028	19	12	37	112	180	19	161
Year 2 2029	395	89	325	383	1192	395	797
Year 3 2030 pre Ardley Bypass	369	81	295	321	1066	369	697
Year 3 2030 post Ardley Bypass	419	92	333	358	1202	419	783
Year 4 2031	396	85	256	292	1028	396	632
Year 5 2032	173	36	97	119	425	173	252
Year 6 2033	136	29	69	91	324	136	188
Year 7 2034	136	29	69	91	324	136	188

Main Site compound construction traffic

Trip rates from Northampton Gateway DCO
Duration and construction programme based on 'Summary Programme Oxford SRFI (10.09.2025).

Component	Input Unit	Trip rates					Quantity	Construction Totals					Duration		Average movements per day (one-way)					
		HGV	LGV	Car	Vans	Total		HGV	LGV	Car	Van	Total	Yrs.	Days	HGV	LGV	Car	Van	Lights	Total
M40 J 10 Works	m2	0.5	0.1	0.3	0.3	1.2	0	0	0	0	0	0	3.18	827	0	0	0	0	0	0
Ardley Bypass and Principal Site Access	m2	0.5	0.1	0.3	0.3	1.2	28,200	14100	2820	8460	8460	33,840	1.05	273	52	10	31	31	72	124
A43 Baynards Green Roundabout	m2	0.5	0.1	0.3	0.3	1.2	0	0	0	0	0	0	0.66	172	0	0	0	0	0	0
Cherwell Roundabout	m2	0.5	0.1	0.3	0.3	1.2	0	0	0	0	0	0	0.25	65	0	0	0	0	0	0
Camp Road Junction and B430 crossing	m2	0.5	0.1	0.3	0.3	1.2	1,000	500	100	300	300	1,200	0.41	107	5	1	3	3	7	12
Heyford Park Link Road Phase 1	m2	0.5	0.1	0.3	0.3	1.2	4,400	2200	440	1320	1320	5,280	1.45	377	6	1	4	4	9	15
Heyford Park Link Road Phase 2	m2	0.5	0.1	0.3	0.3	1.2	21,500	10750	2150	6450	6450	25,800	0.64	166	65	13	39	39	91	156
Middleton Stoney Relief Road	m2	0.5	0.1	0.3	0.3	1.2	16,400	8200	1640	4920	4920	19,680	1.18	307	27	5	16	16	37	64
M40 J9 works	m2	0.5	0.1	0.3	0.3	1.2	0	0	0	0	0	0	0.5	130	0	0	0	0	0	0
A43 widening	m2	0.5	0.1	0.3	0.3	1.2	0	0	0	0	0	0	0.95	247	0	0	0	0	0	0
On-site roads	m2	0.5	0.1	1	0.75	2.35	22,800	11400	2280	22800	17100	53,580	2.11	549	21	4	42	31	77	98
Bridges/culvert (new)	item	800	320	1500	1500	4120	7	5600	2240	10500	10500	28,840	3.2	832	7	3	13	13	29	36
Earthworks Phase 1	m3	0.001	0.0005	0.002	0.0075	0.011	3,132,000	3132	1566	6264	23490	34,452	1.32	343	9	5	18	68	91	100
Earthworks Phase 2	m3	0.001	0.0005	0.002	0.0075	0.011	804,000	804	402	1608	6030	8,844	1.54	400	2	1	4	15	20	22
Earthworks Phase 3	m3	0.001	0.0005	0.002	0.0075	0.011	250,000	250	125	500	1875	2,750	0.81	211	1	1	2	9	12	13
Buildings	ft2	0.015	0.003	0.0075	0.01	0.0355	6,500,000	97,500	19,500	48,750	65,000	230,750	5.5	1430	68	14	34	45	93	161
Landscaping Phase 1	ft2	0.0001	0.0004	0.0002	0.0004	0.0011	1,734,822	173	694	347	694	1,908	1	260	1	3	1	3	7	8
Landscaping Phase 2	ft2	0.0001	0.0004	0.0002	0.0004	0.0011	1,181,561	118	473	236	473	1,300	1.4	364	0	1	1	1	3	3
Landscaping Phase 3	ft2	0.0001	0.0004	0.0002	0.0004	0.0011	376,749	38	151	75	151	415	0.5	130	0	1	1	1	3	3
Railway Tracks	m	0.075	0.0375	0.05	0.1	0.2625	5,850	439	219	293	585	1,536	0.5	130	3	2	2	5	9	12
Railway Terminal	m2	0.15	0.03	0.03	0.045	0.255	34,979	5247	1049	1049	1574	8,919	1.11	289	18	4	4	5	13	31
Total arrivals															285	69	215	289	573	858
Total departures															285	69	215	289	573	858
Two-way															**570**	**138**	**430**	**578**	**1146**	**1716**

Start of construction 2028

	2028				2029				2030				2031				2032				2033				2034			
Component	Construction Programme																											
	Year 1				Year 2				Year 3				Year 4				Year 5				Year 6				Year 7			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
M40 J 10 Works	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	0.72	0	0	0	0	0	0	0	0	0	0	0
Ardley Bypass and Principal Site Access	0	0	0	0	0	1	1	1	1	0.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A43 Baynards Green Roundabout	0	0	0	0	0	1	1	0.64	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cherwell Roundabout	0	0	0	0	0	0.5	0.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Camp Road Junction and B430 crossing	0	0	0	0	0	0	0	0	1	0.6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heyford Park Link Road Phase 1	0	0	0	0	0	1	1	1	1	1	0.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heyford Park Link Road Phase 2	0	0	0	0	0	0	0	0	0	0	0.56	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Middleton Stoney Relief Road	0	0	0	0	0	0	0	0	0	0	0	0.72	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
M40 J9 works	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A43 widening	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0.8	0	0	0	0	0	0	0	0	0	0	0
On-site roads	0	0	0	0.44	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bridges/culvert (new)	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0
Earthworks Phase 1	0	1	1	1	1	1	0.28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Earthworks Phase 2	0	0	0	0	0	0	0.72	1	1	1	1	1	0.44	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Earthworks Phase 3	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0.24	0	0	0	0	0	0	0	0	0	0	0	0
Buildings	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Landscaping Phase 1	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Landscaping Phase 2	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0.6	0	0	0	0	0	0	0	0	0	0	0	0	0
Landscaping Phase 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0
Railway Tracks	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Railway Terminal	0	0	0	0	0.44	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	**0**	**1**	**2**	**2.44**	**5.44**	**9.5**	**9.5**	**8.64**	**9**	**8.8**	**8.36**	**8.72**	**8.44**	**7**	**6.6**	**5.24**	**3.52**	**1**	**1**	**1**	**1**	**1**	**1**	**2**	**2**	**1**	**1**	**1**

Component	Daily Movements - Year 1																			
	Quarter 1					Quarter 2					Quarter 3					Quarter 4				
	HGV	LGV	Car	Van	Total	HGV	LGV	Car	Van	Total	HGV	LGV	Car	Van	Total	HGV	LGV	Car	Van	Total
M40 J 10 Works	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ardley Bypass and Principal Site Access	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A43 Baynards Green Roundabout	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cherwell Roundabout	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Camp Road Junction and B430 crossing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heyford Park Link Road Phase 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heyford Park Link Road Phase 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Middleton Stoney Relief Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
M40 J9 works	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A43 widening	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
On-site roads	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	2	18	14	43
Bridges/culvert (new)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Earthworks Phase 1	0	0	0	0	0	9	5	18	68	100	9	5	18	68	100	9	5	18	68	100
Earthworks Phase 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Earthworks Phase 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Buildings	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Landscaping Phase 1	0	0	0	0	0	0	0	0	0	0	1	3	1	3	8	1	3	1	3	8
Landscaping Phase 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Landscaping Phase 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Railway Tracks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Railway Terminal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Development Total	**0**	**0**	**0**	**0**	**0**	**9**	**5**	**18**	**68**	**100**	**10**	**8**	**19**	**71**	**108**	**19**	**10**	**37**	**85**	**151**
Two-way	**0**	**0**	**0**	**0**	**0**	**18**	**10**	**36**	**136**	**200**	**20**	**16**	**38**	**142**	**216**	**38**	**20**	**74**	**170**	**302**
Hourly HGV/LGV (assuming 10 hour day)	**0**	**0**	**0**	**0**	**0**	**2**	**1**	**4**	**14**	**20**	**2**	**2**	**4**	**14**	**22**	**4**	**2**	**7**	**17**	**30**

Component	Daily Movements - Year 2																			
	Quarter 1					Quarter 2					Quarter 3					Quarter 4				
	HGV	LGV	Car	Van	Total	HGV	LGV	Car	Van	Total	HGV	LGV	Car	Van	Total	HGV	LGV	Car	Van	Total
M40 J 10 Works	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ardley Bypass and Principal Site Access	0	0	0	0	0	52	10	31	31	124	52	10	31	31	124	52	10	31	31	124
A43 Baynards Green Roundabout	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cherwell Roundabout	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Camp Road Junction and B430 crossing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heyford Park Link Road Phase 1	0	0	0	0	0	6	1	4	4	15	6	1	4	4	15	6	1	4	4	15
Heyford Park Link Road Phase 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Middleton Stoney Relief Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
M40 J9 works	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A43 widening	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
On-site roads	21	4	42	31	98	21	4	42	31	98	21	4	42	31	98	21	4	42	31	98
Bridges/culvert (new)	7	3	13	13	36	7	3	13	13	36	7	3	13	13	36	7	3	13	13	36
Earthworks Phase 1	9	5	18	68	100	9	5	18	68	100	3	1	5	19	28	0	0	0	0	0
Earthworks Phase 2	0	0	0	0	0	0	0	0	0	0	1	1	3	11	16	2	1	4	15	22
Earthworks Phase 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Buildings	0	0	0	0	0	0	0	0	0	0	68	14	34	45	161	68	14	34	45	161
Landscaping Phase 1	1	3	1	3	8	1	3	1	3	8	0	0	0	0	0	0	0	0	0	0
Landscaping Phase 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Landscaping Phase 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Railway Tracks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Railway Terminal	8	2	2	2	14	8	2	2	2	14	18	4	4	5	31	18	4	4	5	31
Development Total	**46**	**17**	**76**	**117**	**256**	**104**	**28**	**111**	**152**	**395**	**176**	**38**	**136**	**159**	**509**	**174**	**37**	**132**	**144**	**487**
Two-way	**92**	**34**	**152**	**234**	**512**	**208**	**56**	**222**	**304**	**790**	**352**	**76**	**272**	**318**	**1018**	**348**	**74**	**264**	**288**	**974**
Hourly HGV/LGV (assuming 10 hour day)	**9**	**3**	**15**	**23**	**51**	**21**	**6**	**22**	**30**	**79**	**35**	**8**	**27**	**32**	**102**	**35**	**7**	**26**	**29**	**97**

Component	Daily Movements - Year 3																			
	Quarter 1					Quarter 2					Quarter 3					Quarter 4				
	HGV	LGV	Car	Van	Total	HGV	LGV	Car	Van	Total	HGV	LGV	Car	Van	Total	HGV	LGV	Car	Van	Total
M40 J 10 Works	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ardley Bypass and Principal Site Access	52	10	31	31	124	10	2	6	6	24	0	0	0	0	0	0	0	0	0	0
A43 Baynards Green Roundabout	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cherwell Roundabout	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Camp Road Junction and B430 crossing	5	1	3	3	12	3	1	2	2	8	0	0	0	0	0	0	0	0	0	0
Heyford Park Link Road Phase 1	6	1	4	4	15	6	1	4	4	15	5	1	3	3	12	0	0	0	0	0
Heyford Park Link Road Phase 2	0	0	0	0	0	0	0	0	0	0	36	7	22	22	87	65	13	39	39	156
Middleton Stoney Relief Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19	4	12	12	47
M40 J9 works	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A43 widening	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
On-site roads	21	4	42	31	98	21	4	42	31	98	21	4	42	31	98	21	4	42	31	98
Bridges/culvert (new)	7	3	13	13	36	7	3	13	13	36	7	3	13	13	36	7	3	13	13	36
Earthworks Phase 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Earthworks Phase 2	2	1	4	15	22	2	1	4	15	22	2	1	4	15	22	2	1	4	15	22
Earthworks Phase 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Buildings	68	14	34	45	161	68	14	34	45	161	68	14	34	45	161	68	14	34	45	161
Landscaping Phase 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Landscaping Phase 2	0	0	0	0	0	0	1	1	1	3	0	1	1	1	3	0	1	1	1	3
Landscaping Phase 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Railway Tracks	0	0	0	0	0	3	2	2	5	12	3	2	2	5	12	0	0	0	0	0
Railway Terminal	18	4	4	5	31	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Development Total	**179**	**38**	**135**	**147**	**499**	**120**	**29**	**108**	**122**	**379**	**142**	**33**	**121**	**135**	**431**	**182**	**40**	**145**	**156**	**523**
Two-way	**358**	**76**	**270**	**294**	**998**	**240**	**58**	**216**	**244**	**758**	**284**	**66**	**242**	**270**	**862**	**364**	**80**	**290**	**312**	**1046**
Hourly HGV/LGV (assuming 10 hour day)	**36**	**8**	**27**	**29**	**100**	**24**	**6**	**22**	**24**	**76**	**28**	**7**	**24**	**27**	**86**	**36**	**8**	**29**	**31**	**105**

Component	Daily Movements - Year 4																			
	Quarter 1					Quarter 2					Quarter 3					Quarter 4				
	HGV	LGV	Car	Van	Total	HGV	LGV	Car	Van	Total	HGV	LGV	Car	Van	Total	HGV	LGV	Car	Van	Total
M40 J 10 Works	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ardley Bypass and Principal Site Access	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A43 Baynards Green Roundabout	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cherwell Roundabout	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Camp Road Junction and B430 crossing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heyford Park Link Road Phase 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heyford Park Link Road Phase 2	65	13	39	39	156	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Middleton Stoney Relief Road	27	5	16	16	64	27	5	16	16	64	27	5	16	16	64	27	5	16	16	64
M40 J9 works	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A43 widening	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
On-site roads	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bridges/culvert (new)	7	3	13	13	36	7	3	13	13	36	7	3	13	13	36	7	3	13	13	36
Earthworks Phase 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Earthworks Phase 2	1	0	2	7	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Earthworks Phase 3	1	1	2	9	13	1	1	2	9	13	1	1	2	9	13	0	0	0	2	2
Buildings	68	14	34	45	161	68	14	34	45	161	68	14	34	45	161	68	14	34	45	161
Landscaping Phase 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Landscaping Phase 2	0	1	1	1	3	0	1	1	1	3	0	1	1	1	3	0	0	0	0	0
Landscaping Phase 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Railway Tracks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Railway Terminal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Development Total	**169**	**37**	**107**	**130**	**443**	**103**	**24**	**66**	**84**	**277**	**103**	**24**	**66**	**84**	**277**	**102**	**22**	**63**	**76**	**263**
Two-way	**338**	**74**	**214**	**260**	**886**	**206**	**48**	**132**	**168**	**554**	**206**	**48**	**132**	**168**	**554**	**204**	**44**	**126**	**152**	**526**
Hourly HGV/LGV (assuming 10 hour day)	**34**	**7**	**21**	**26**	**89**	**21**	**5**	**13**	**17**	**55**	**21**	**5**	**13**	**17**	**55**	**20**	**4**	**13**	**15**	**53**

Component	Daily Movements - Year 5																			
	Quarter 1					Quarter 2					Quarter 3					Quarter 4				
	HGV	LGV	Car	Van	Total	HGV	LGV	Car	Van	Total	HGV	LGV	Car	Van	Total	HGV	LGV	Car	Van	Total
M40 J 10 Works	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ardley Bypass and Principal Site Access	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A43 Baynards Green Roundabout	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cherwell Roundabout	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Camp Road Junction and B430 crossing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heyford Park Link Road Phase 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heyford Park Link Road Phase 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Middleton Stoney Relief Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
M40 J9 works	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A43 widening	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
On-site roads	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bridges/culvert (new)	7	3	13	13	36	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Earthworks Phase 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Earthworks Phase 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Earthworks Phase 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Buildings	68	14	34	45	161	68	14	34	45	161	68	14	34	45	161	68	14	34	45	161
Landscaping Phase 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Landscaping Phase 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Landscaping Phase 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Railway Tracks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Railway Terminal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Development Total	**75**	**17**	**47**	**58**	**197**	**68**	**14**	**34**	**45**	**161**	**68**	**14**	**34**	**45**	**161**	**68**	**14**	**34**	**45**	**161**
Two-way	**150**	**34**	**94**	**116**	**394**	**136**	**28**	**68**	**90**	**322**	**136**	**28**	**68**	**90**	**322**	**136**	**28**	**68**	**90**	**322**
Hourly HGV/LGV (assuming 10 hour day)	**15**	**3**	**9**	**12**	**39**	**14**	**3**	**7**	**9**	**32**	**14**	**3**	**7**	**9**	**32**	**14**	**3**	**7**	**9**	**32**

Component	Daily Movements - Year 6																			
	Quarter 1					Quarter 2					Quarter 3					Quarter 4				
	HGV	LGV	Car	Van	Total	HGV	LGV	Car	Van	Total	HGV	LGV	Car	Van	Total	HGV	LGV	Car	Van	Total
M40 J 10 Works	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ardley Bypass and Principal Site Access	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A43 Baynards Green Roundabout	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cherwell Roundabout	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Camp Road Junction and B430 crossing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heyford Park Link Road Phase 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heyford Park Link Road Phase 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Middleton Stoney Relief Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
M40 J9 works	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A43 widening	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
On-site roads	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bridges/culvert (new)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Earthworks Phase 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Earthworks Phase 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Earthworks Phase 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Buildings	68	14	34	45	161	68	14	34	45	161	68	14	34	45	161	68	14	34	45	161
Landscaping Phase 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Landscaping Phase 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Landscaping Phase 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	3
Railway Tracks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Railway Terminal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Development Total	**68**	**14**	**34**	**45**	**161**	**68**	**14**	**34**	**45**	**161**	**68**	**14**	**34**	**45**	**161**	**68**	**15**	**35**	**46**	**164**
Two-way	**136**	**28**	**68**	**90**	**322**	**136**	**28**	**68**	**90**	**322**	**136**	**28**	**68**	**90**	**322**	**136**	**30**	**70**	**92**	**328**
Hourly HGV/LGV (assuming 10 hour day)	**14**	**3**	**7**	**9**	**32**	**14**	**3**	**7**	**9**	**32**	**14**	**3**	**7**	**9**	**32**	**14**	**3**	**7**	**9**	**33**

Component	Daily Movements - Year 7																			
	Quarter 1					Quarter 2					Quarter 3					Quarter 4				
	HGV	LGV	Car	Van	Total	HGV	LGV	Car	Van	Total	HGV	LGV	Car	Van	Total	HGV	LGV	Car	Van	Total
M40 J 10 Works	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ardley Bypass and Principal Site Access	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A43 Baynards Green Roundabout	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cherwell Roundabout	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Camp Road Junction and B430 crossing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heyford Park Link Road Phase 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heyford Park Link Road Phase 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Middleton Stoney Relief Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
M40 J9 works	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A43 widening	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
On-site roads	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bridges/culvert (new)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Earthworks Phase 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Earthworks Phase 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Earthworks Phase 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Buildings	68	14	34	45	161	68	14	34	45	161	68	14	34	45	161	68	14	34	45	161
Landscaping Phase 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Landscaping Phase 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Landscaping Phase 3	0	1	1	1	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Railway Tracks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Railway Terminal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Development Total	**68**	**15**	**35**	**46**	**164**	**68**	**14**	**34**	**45**	**161**	**68**	**14**	**34**	**45**	**161**	**68**	**14**	**34**	**45**	**161**
Two-way	**136**	**30**	**70**	**92**	**328**	**136**	**28**	**68**	**90**	**322**	**136**	**28**	**68**	**90**	**322**	**136**	**28**	**68**	**90**	**322**
Hourly HGV/LGV (assuming 10 hour day)	**14**	**3**	**7**	**9**	**33**	**14**	**3**	**7**	**9**	**32**	**14**	**3**	**7**	**9**	**32**	**14**	**3**	**7**	**9**	**32**

Summary (two-way)

	Average daily flows					Total	
	HGV	LGV	Car	Van	Total	HGV	Light
Year 1 2028	19	12	37	112	180	19	161
Year 2 2029	250	60	228	286	824	250	574
Year 3 2030 pre Ardley Bypass	299	67	243	269	878	299	579
Year 3 2030 post Ardley Bypass	324	73	266	291	954	324	630
Year 4 2031	239	54	151	187	630	239	392
Year 5 2032	140	30	75	97	340	140	201
Year 6 2033	136	29	69	91	324	136	188
Year 7 2034	136	29	69	91	324	136	188

M40 J10 compound construction traffic

Trip rates from Northampton Gateway DCO
Duration and construction programme based on 'Summary Programme Oxford SRFI (10.09.2025).

Component	Input Unit	Trip rates					Quantity	Construction Totals					Duration		Average movements per day (one-way)					
		HGV	LGV	Car	Vans	Total		HGV	LGV	Car	Van	Total	Yrs.	Days	HGV	LGV	Car	Van	Lights	Total
M40 J 10 Works	m2	0.5	0.1	0.3	0.3	1.2	51,500	25750	5150	15450	15450	61,800	3.18	827	31	6	19	19	44	75
Ardley Bypass and Principal Site Access	m2	0.5	0.1	0.3	0.3	1.2	0	0	0	0	0	0	1.05	273	0	0	0	0	0	0
A43 Baynards Green Roundabout	m2	0.5	0.1	0.3	0.3	1.2	16,100	8050	1610	4830	4830	19,320	0.66	172	47	9	28	28	65	112
Cherwell Roundabout	m2	0.5	0.1	0.3	0.3	1.2	3,200	1600	320	960	960	3,840	0.25	65	25	5	15	15	35	60
Camp Road Junction and B430 crossing	m2	0.5	0.1	0.3	0.3	1.2	0	0	0	0	0	0	0.41	107	0	0	0	0	0	0
Heyford Park Link Road Phase 1	m2	0.5	0.1	0.3	0.3	1.2	0	0	0	0	0	0	1.45	377	0	0	0	0	0	0
Heyford Park Link Road Phase 2	m2	0.5	0.1	0.3	0.3	1.2	0	0	0	0	0	0	0.64	166	0	0	0	0	0	0
Middleton Stoney Relief Road	m2	0.5	0.1	0.3	0.3	1.2	0	0	0	0	0	0	1.18	307	0	0	0	0	0	0
M40 J9 works	m2	0.5	0.1	0.3	0.3	1.2	0	0	0	0	0	0	0.5	130	0	0	0	0	0	0
A43 widening	m2	0.5	0.1	0.3	0.3	1.2	24,900	12450	2490	7470	7470	29,880	0.95	247	50	10	30	30	70	120
On-site roads	m2	0.5	0.1	1	0.75	2.35	0	0	0	0	0	0	2.11	549	0	0	0	0	0	0
Bridges/culvert (new)	item	800	320	1500	1500	4120	4	3200	1280	6000	6000	16,480	3.2	832	4	2	7	7	16	20
Earthworks Phase 1	m3	0.001	0.0005	0.002	0.0075	0.011	0	0	0	0	0	0	1.32	343	0	0	0	0	0	0
Earthworks Phase 2	m3	0.001	0.0005	0.002	0.0075	0.011	0	0	0	0	0	0	1.54	400	0	0	0	0	0	0
Earthworks Phase 3	m3	0.001	0.0005	0.002	0.0075	0.011	0	0	0	0	0	0	0.81	211	0	0	0	0	0	0
Buildings	ft2	0.015	0.003	0.0075	0.01	0.0355	0	0	0	0	0	0	5.5	1430	0	0	0	0	0	0
Landscaping Phase 1	ft2	0.0001	0.0004	0.0002	0.0004	0.0011	0	0	0	0	0	0	1	260	0	0	0	0	0	0
Landscaping Phase 2	ft2	0.0001	0.0004	0.0002	0.0004	0.0011	0	0	0	0	0	0	1.4	364	0	0	0	0	0	0
Landscaping Phase 3	ft2	0.0001	0.0004	0.0002	0.0004	0.0011	0	0	0	0	0	0	0.5	130	0	0	0	0	0	0
Railway Tracks	m	0.075	0.0375	0.05	0.1	0.2625	0	0	0	0	0	0	0.5	130	0	0	0	0	0	0
Railway Terminal	m2	0.15	0.03	0.03	0.045	0.255	0	0	0	0	0	0	1.11	289	0	0	0	0	0	0
Total arrivals															157	32	99	99	230	387
Total departures															157	32	99	99	230	387
Two-way															**314**	**64**	**198**	**198**	**460**	**774**

Start of construction 2028

	2028				2029				2030				2031				2032				2033				2034			
Component	Construction Programme																											
	Year 1				Year 2				Year 3				Year 4				Year 5				Year 6				Year 7			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
M40 J 10 Works	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0.72	0	0	0	0	0	0	0	0	0	0	0	0
Ardley Bypass and Principal Site Access	0	0	0	0	0	1	1	1	1	0.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A43 Baynards Green Roundabout	0	0	0	0	0	1	1	0.64	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cherwell Roundabout	0	0	0	0	0	0.5	0.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Camp Road Junction and B430 crossing	0	0	0	0	0	0	0	0	1	0.6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heyford Park Link Road Phase 1	0	0	0	0	0	1	1	1	1	1	0.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heyford Park Link Road Phase 2	0	0	0	0	0	0	0	0	0	0	0.56	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Middleton Stoney Relief Road	0	0	0	0	0	0	0	0	0	0	0	0.72	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
M40 J9 works	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A43 widening	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0.8	0	0	0	0	0	0	0	0	0	0	0
On-site roads	0	0	0	0.44	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bridges/culvert (new)	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0
Earthworks Phase 1	0	1	1	1	1	1	0.28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Earthworks Phase 2	0	0	0	0	0	0	0.72	1	1	1	1	1	0.44	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Earthworks Phase 3	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0.24	0	0	0	0	0	0	0	0	0	0	0	0
Buildings	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Landscaping Phase 1	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Landscaping Phase 2	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0.6	0	0	0	0	0	0	0	0	0	0	0	0	0
Landscaping Phase 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0
Railway Tracks	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Railway Terminal	0	0	0	0	0.44	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	**0**	**1**	**2**	**2.44**	**5.44**	**9.5**	**9.5**	**8.64**	**9**	**8.8**	**8.36**	**8.72**	**8.44**	**7**	**6.6**	**5.24**	**3.52**	**1**	**1**	**1**	**1**	**1**	**1**	**2**	**2**	**1**	**1**	**1**

Component	Daily Movements - Year 1																			
	Quarter 1					Quarter 2					Quarter 3					Quarter 4				
	HGV	LGV	Car	Van	Total	HGV	LGV	Car	Van	Total	HGV	LGV	Car	Van	Total	HGV	LGV	Car	Van	Total
M40 J 10 Works	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ardley Bypass and Principal Site Access	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A43 Baynards Green Roundabout	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cherwell Roundabout	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Camp Road Junction and B430 crossing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heyford Park Link Road Phase 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heyford Park Link Road Phase 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Middleton Stoney Relief Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
M40 J9 works	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A43 widening	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
On-site roads	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bridges/culvert (new)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Earthworks Phase 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Earthworks Phase 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Earthworks Phase 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Buildings	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Landscaping Phase 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Landscaping Phase 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Landscaping Phase 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Railway Tracks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Railway Terminal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Development Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Two-way	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Hourly HGV/LGV (assuming 10 hour day)	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Component	Daily Movements - Year 2																			
	Quarter 1					Quarter 2					Quarter 3					Quarter 4				
	HGV	LGV	Car	Van	Total	HGV	LGV	Car	Van	Total	HGV	LGV	Car	Van	Total	HGV	LGV	Car	Van	Total
M40 J 10 Works	31	6	19	19	75	31	6	19	19	75	31	6	19	19	75	31	6	19	19	75
Ardley Bypass and Principal Site Access	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A43 Baynards Green Roundabout	0	0	0	0	0	47	9	28	28	112	47	9	28	28	112	30	6	18	18	72
Cherwell Roundabout	0	0	0	0	0	13	3	8	8	32	13	3	8	8	32	0	0	0	0	0
Camp Road Junction and B430 crossing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heyford Park Link Road Phase 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heyford Park Link Road Phase 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Middleton Stoney Relief Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
M40 J9 works	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A43 widening	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
On-site roads	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bridges/culvert (new)	4	2	7	7	20	4	2	7	7	20	4	2	7	7	20	4	2	7	7	20
Earthworks Phase 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Earthworks Phase 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Earthworks Phase 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Buildings	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Landscaping Phase 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Landscaping Phase 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Landscaping Phase 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Railway Tracks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Railway Terminal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Development Total	**35**	**8**	**26**	**26**	**95**	**95**	**20**	**62**	**62**	**239**	**95**	**20**	**62**	**62**	**239**	**65**	**14**	**44**	**44**	**167**
Two-way	**70**	**16**	**52**	**52**	**190**	**190**	**40**	**124**	**124**	**478**	**190**	**40**	**124**	**124**	**478**	**130**	**28**	**88**	**88**	**334**
Hourly HGV/LGV (assuming 10 hour day)	**7**	**2**	**5**	**5**	**19**	**19**	**4**	**12**	**12**	**48**	**19**	**4**	**12**	**12**	**48**	**13**	**3**	**9**	**9**	**33**

Component	Daily Movements - Year 3																			
	Quarter 1					Quarter 2					Quarter 3					Quarter 4				
	HGV	LGV	Car	Van	Total	HGV	LGV	Car	Van	Total	HGV	LGV	Car	Van	Total	HGV	LGV	Car	Van	Total
M40 J 10 Works	31	6	19	19	75	31	6	19	19	75	31	6	19	19	75	31	6	19	19	75
Ardley Bypass and Principal Site Access	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A43 Baynards Green Roundabout	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cherwell Roundabout	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Camp Road Junction and B430 crossing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heyford Park Link Road Phase 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heyford Park Link Road Phase 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Middleton Stoney Relief Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
M40 J9 works	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A43 widening	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
On-site roads	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bridges/culvert (new)	4	2	7	7	20	4	2	7	7	20	4	2	7	7	20	4	2	7	7	20
Earthworks Phase 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Earthworks Phase 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Earthworks Phase 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Buildings	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Landscaping Phase 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Landscaping Phase 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Landscaping Phase 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Railway Tracks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Railway Terminal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Development Total	**35**	**8**	**26**	**26**	**95**	**35**	**8**	**26**	**26**	**95**	**35**	**8**	**26**	**26**	**95**	**35**	**8**	**26**	**26**	**95**
Two-way	**70**	**16**	**52**	**52**	**190**	**70**	**16**	**52**	**52**	**190**	**70**	**16**	**52**	**52**	**190**	**70**	**16**	**52**	**52**	**190**
Hourly HGV/LGV (assuming 10 hour day)	**7**	**2**	**5**	**5**	**19**	**7**	**2**	**5**	**5**	**19**	**7**	**2**	**5**	**5**	**19**	**7**	**2**	**5**	**5**	**19**

Component	Daily Movements - Year 4																			
	Quarter 1					Quarter 2					Quarter 3					Quarter 4				
	HGV	LGV	Car	Van	Total	HGV	LGV	Car	Van	Total	HGV	LGV	Car	Van	Total	HGV	LGV	Car	Van	Total
M40 J 10 Works	31	6	19	19	75	31	6	19	19	75	31	6	19	19	75	31	6	19	19	75
Ardley Bypass and Principal Site Access	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A43 Baynards Green Roundabout	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cherwell Roundabout	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Camp Road Junction and B430 crossing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heyford Park Link Road Phase 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heyford Park Link Road Phase 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Middleton Stoney Relief Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
M40 J9 works	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A43 widening	0	0	0	0	0	50	10	30	30	120	50	10	30	30	120	50	10	30	30	120
On-site roads	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bridges/culvert (new)	4	2	7	7	20	4	2	7	7	20	4	2	7	7	20	4	2	7	7	20
Earthworks Phase 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Earthworks Phase 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Earthworks Phase 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Buildings	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Landscaping Phase 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Landscaping Phase 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Landscaping Phase 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Railway Tracks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Railway Terminal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Development Total	**35**	**8**	**26**	**26**	**95**	**85**	**18**	**56**	**56**	**215**	**85**	**18**	**56**	**56**	**215**	**85**	**18**	**56**	**56**	**215**
Two-way	**70**	**16**	**52**	**52**	**190**	**170**	**36**	**112**	**112**	**430**	**170**	**36**	**112**	**112**	**430**	**170**	**36**	**112**	**112**	**430**
Hourly HGV/LGV (assuming 10 hour day)	**7**	**2**	**5**	**5**	**19**	**17**	**4**	**11**	**11**	**43**	**17**	**4**	**11**	**11**	**43**	**17**	**4**	**11**	**11**	**43**

Component	Daily Movements - Year 5																			
	Quarter 1					Quarter 2					Quarter 3					Quarter 4				
	HGV	LGV	Car	Van	Total	HGV	LGV	Car	Van	Total	HGV	LGV	Car	Van	Total	HGV	LGV	Car	Van	Total
M40 J 10 Works	22	4	14	14	54	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ardley Bypass and Principal Site Access	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A43 Baynards Green Roundabout	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cherwell Roundabout	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Camp Road Junction and B430 crossing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heyford Park Link Road Phase 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heyford Park Link Road Phase 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Middleton Stoney Relief Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
M40 J9 works	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A43 widening	40	8	24	24	96	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
On-site roads	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bridges/culvert (new)	4	2	7	7	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Earthworks Phase 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Earthworks Phase 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Earthworks Phase 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Buildings	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Landscaping Phase 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Landscaping Phase 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Landscaping Phase 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Railway Tracks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Railway Terminal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Development Total	**66**	**14**	**45**	**45**	**170**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Two-way	**132**	**28**	**90**	**90**	**340**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Hourly HGV/LGV (assuming 10 hour day)	**13**	**3**	**9**	**9**	**34**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Component	Daily Movements - Year 6																			
	Quarter 1					Quarter 2					Quarter 3					Quarter 4				
	HGV	LGV	Car	Van	Total	HGV	LGV	Car	Van	Total	HGV	LGV	Car	Van	Total	HGV	LGV	Car	Van	Total
M40 J 10 Works	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ardley Bypass and Principal Site Access	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A43 Baynards Green Roundabout	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cherwell Roundabout	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Camp Road Junction and B430 crossing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heyford Park Link Road Phase 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heyford Park Link Road Phase 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Middleton Stoney Relief Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
M40 J9 works	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A43 widening	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
On-site roads	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bridges/culvert (new)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Earthworks Phase 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Earthworks Phase 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Earthworks Phase 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Buildings	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Landscaping Phase 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Landscaping Phase 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Landscaping Phase 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Railway Tracks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Railway Terminal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Development Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Two-way	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Hourly HGV/LGV (assuming 10 hour day)	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Component	Daily Movements - Year 7																			
	Quarter 1					Quarter 2					Quarter 3					Quarter 4				
	HGV	LGV	Car	Van	Total	HGV	LGV	Car	Van	Total	HGV	LGV	Car	Van	Total	HGV	LGV	Car	Van	Total
M40 J 10 Works	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ardley Bypass and Principal Site Access	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A43 Baynards Green Roundabout	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cherwell Roundabout	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Camp Road Junction and B430 crossing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heyford Park Link Road Phase 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heyford Park Link Road Phase 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Middleton Stoney Relief Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
M40 J9 works	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A43 widening	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
On-site roads	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bridges/culvert (new)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Earthworks Phase 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Earthworks Phase 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Earthworks Phase 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Buildings	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Landscaping Phase 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Landscaping Phase 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Landscaping Phase 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Railway Tracks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Railway Terminal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Development Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Two-way	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Hourly HGV/LGV (assuming 10 hour day)	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Summary (two-way)

	Average daily flows					Total	
	HGV	LGV	Car	Van	Total	HGV	Light
Year 1 2028	0	0	0	0	0	0	0
Year 2 2029	145	31	97	97	370	145	225
Year 3 2030 pre Ardley Bypass	70	16	52	52	190	70	120
Year 3 2030 post Ardley Bypass	70	16	52	52	190	70	120
Year 4 2031	145	31	97	97	370	145	225
Year 5 2032	33	7	23	23	85	33	52
Year 6 2033	0	0	0	0	0	0	0
Year 7 2034	0	0	0	0	0	0	0

APPENDIX 38

CONSTRUCTION TRAFFIC MANAGEMENT PLAN

CONSTRUCTION TRAFFIC MANAGEMENT PLAN

OXFORDSHIRE SRFI

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DOCUMENT CONTROL

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version	date	author	reviewer	comments
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3	09/03/2026			third draft
4	18/03/2026			submission version
5	12/06/2026			updated to incorporate OCC comments

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FIGURES

Figure 1 HGV construction traffic routeing requirement prior to opening of Ardley Bypass
Figure 2 HGV construction traffic routeing requirement after opening of Ardley Bypass

1.0 INTRODUCTION

1.1 Oxfordshire Railfreight Ltd (the Applicant) are promoting a Nationally Significant Infrastructure Project (NSIP), to be known as Oxfordshire Strategic Rail Freight Interchange (OxSRFI).

1.2 A Development Consent Order (DCO) application for the OxSRFI is to be submitted in quarter one of 2026, with approval anticipated in 2027. The OxSRFI is then expected to have a seven-year build plan, with construction starting in 2028, first occupation in 2031, and completion in 2034.

1.3 A description of the development, including the Main Site infrastructure and off-site Highway Works are described in detail in the reports accompanying the DCO.

1.4 The potential environmental effects of the construction work are assessed in the technical chapters of the Environmental Impact Assessment (EIA). The environmental effects, and the measures proposed to protect the environment and local amenity during construction, are also detailed in the Construction Environmental Management Plan (CEMP) that is appended to the Environmental Statement (ES). The CEMP refers to separate CEMPs that will be provided for phases and components of the development, referred to as P-CEMPs.

1.5 This document forms the Construction Traffic Management Plan (CTMP) for the OxSRFI. It presents the general principles for construction traffic management during the construction phase - extending from the ground clearance works to completion of the new development construction.

1.6 As a framework document, it will be updated with specific measures, methodologies and procedures for each phase of development, following the appointment of a Principal Contractor, i.e. a similar approach to the CEMP, and agreed with Cherwell District Council (CDC), Oxfordshire County Council (OCC) and National Highways (NH) as necessary.

1.7 The document is structured as follows:

- Section 2 summarises the site location and development proposals.
- Section 3 presents the construction programme, key personnel and construction traffic estimates.
- Section 4 details the permitted and prohibited construction traffic routes.
- Section 5 presents the construction management measures.
- Section 6 summarises the monitoring and enforcement measures for the CTMP.

2.0 PROPOSED DEVELOPMENT

2.1 The location of the Main Site, and the Proposed Development are described in detail in documents accompanying the DCO application.

2.2 The construction programme includes the earthworks and landscaping, construction of the Main Site rail freight terminal and warehousing buildings with associated infrastructure, as well as off-site Highway Works and active travel infrastructure. Chapter 2 of the ES includes a description of the development, the Highway Works Overview Plan, and the Footway/Cycleway/Public Rights of Way Strategy Overview.

3.0 CONSTRUCTION PROGRAMME AND VEHICULAR MOVEMENTS

Construction schedule

3.1 The CEMP includes the indicative master programme and phasing plans for the construction of the development, and the associated Highway Works.

Key personnel

Project Manager

3.2 The Project Manager be responsible for the site-wide co-ordination and implementation of the CEMP.

Principal Contractor

3.3 A Principal Contractor is appointed to coordinate the construction phase of a project where it involves more than one contractor/sub-contractor. They are required to plan, manage, monitor and coordinate health and safety in the construction phase of a project. This includes:

- Liaising with the client and Principal Designer;
- Preparing the construction phase plan;
- Organising cooperation between contractors and coordinating their work;
- Ensuring suitable site inductions are provided;
- Ensuring reasonable steps are taken to prevent unauthorised access;
- Ensuring workers are consulted and engaged in securing their health and safety; and
- Provision of welfare facilities.

3.4 The Principal Contractor will play a key role in the implementation and monitoring of the CTMP.

Contractor/sub-contractors

3.5 A Contractor carries out the actual construction work. Contractors can be an individual or a company. A Contractor is required to plan, manage and monitor construction work under their control so it is carried out without risks to health and safety. For projects involving more than one contractor, they must coordinate their activities with others in the project team - in particular, comply with directions given to them by the Principal Contractor.

Workers

3.6 Workers are persons working for or under the control of contractors on a construction site. The number of construction staff on site will vary with the various phases of the construction schedule.

Vehicle trip generation during the construction phase

3.7 Estimates of the likely construction traffic have been made based on the master construction programme, phasing plans, construction activities, and construction volumes, and using trip rates from construction of another similar SRFI site[1]. The table below shows the forecast average two-way daily HGV and light construction vehicle movements for 2028 to 2034. Once the Ardley Bypass is open to traffic, all construction traffic travelling to and from M40 Junction 10 and the

[1] 'Construction Traffic' Technical Note – doc ref ADC1794-RP-AM v4, Appendix 37 of the Transport Assessment.

Main Site will use the bypass. The table therefore also provides construction traffic estimates for pre and post the opening of the Ardley Bypass in year 3.

construction year	average daily traffic flows (two-way)	
	HGV	light vehicles
year 1 2028	19	161
year 2 2029	395	797
year 3 2030 pre Ardley Bypass	369	697
year 3 2030 post Ardley Bypass	419	783
year 4 2031	396	632
year 5 2032	173	252
year 6 2033	136	188
year 7 2034	136	188

Construction compounds

3.8 Construction compounds for the development and the associated Highway Works will be split between two main locations, with construction compounds at the Main Site and at M40 Junction 10. The table below summarises the activities and Highways Works that are likely to take place from the construction compounds.

works	construction compound	
	Main Site	off-site
All Main Site activities and works	✓	
Heyford Park Link Road highway works	✓	
Middleton Stoney Relief Road highway works	✓	
Principal Site Access highway works	✓	
Ardley Bypass highway works	✓	✓
M40 Junction 10 highway works		✓
A43 Baynard's Green roundabout highway works		✓
A43 Widening		✓
M40 Junction 9*		✓

* M40 Junction 9 is likely to have its own compound near the junction.

3.9 Based on the above, the ES assesses the effects of the construction traffic split between the Main Site and off-site compounds as set out in the tables below.

Main Site construction compound*		
construction year	average daily traffic flows	
	HGV	light vehicles
year 1 2028	19	161
year 2 2029	250	574
year 3 2030 pre Ardley Bypass	299	579
year 3 2030 post Ardley Bypass	324	630
year 4 2031	239	392
year 5 2032	140	201
year 6 2033	136	188
year 7 2034	136	188

*All Ardley Bypass construction activities assessed as being from the Main Site compound as this provides a 'worst case' for construction traffic impacts on the B430 through Ardley in advance of the bypass being complete. Whereas this may take place from the off-site compound south of Junction 10, or activities may be split between them.

off-site construction compound(s)		
construction year	average daily traffic flows	
	HGV	light vehicles
year 1 2028	0	0
year 2 2029	145	225
year 3 2030 pre Ardley Bypass	70	120
year 3 2030 post Ardley Bypass	95	155
year 4 2031	158	243
year 5 2032	33	52
year 6 2033	0	0
year 7 2034	0	0

4.0 CONSTRUCTION TRAFFIC ROUTES

4.1 Details of the routing of construction traffic will be set out in the P-CEMP for each phase, and agreed with the Project Manager, Principal Contractor, OCC and NH. All contractors will then comply with the routing strategy

Construction workers (light vehicles)

4.2 For light vehicle traffic associated with construction workers, the primary considerations for the routing strategy include using the shortest route, with use of the Strategic Road Network (SRN) and 'A' roads as a first priority, then 'B' roads then 'C' roads and then 'unclassified roads', and avoid settlements and sensitive receptors to minimise impact on villages and towns and sensitive road users. Construction workers (light vehicles) are likely to travel to the site from nearby residential areas. Access for construction workers to the Main Site and off-site construction compound (located to the south of J10) will be from the B430, with workers permitted to arrive and depart both north and south.

HGV construction traffic

4.3 As detailed in the CEMP, as a minimum, the following routes will be prohibited for use by heavy construction vehicles:

- All existing routes that have environmental weight restrictions (for example Ardley Road between Ardley and Bucknell);
- Somerton Road, Church Road and Ardley Road (west of the B430) within Ardley;
- The B430 south of the Main Site, other than in connection with Work Numbers 23, 24, 27A and 27B, 31, 32, 33, 35, and 39, as defined on the Components of Development Plan; and
- Following the opening of the Ardley Bypass, routes that will be covered by environmental weight limits pursuant to Article 20 and Part 4 of Schedule 9 of the DCO.

4.4 The permitted routes for HGV construction traffic prior to the opening of the Ardley Bypass are shown in **Figure 1** and the permitted routes for HGV construction traffic following the construction of the Ardley Bypass are shown in **Figure 2**. As, shown, and in accordance with the restrictions set out in the CEMP, HGV construction traffic will be required route to M40 Junction 10 via the B430 and the Ardley Bypass once open, and either onto the M40 northbound or southbound, or the A43. HGV traffic will not be permitted to route via the B4100 north-west of the A43.

4.5 OCC require that HGV construction traffic using the B4100 south-east of the A43, and travelling around Bicester, do so using the eastern side of the town. These HGV construction traffic routeing restrictions are shown on **Figure 3**.

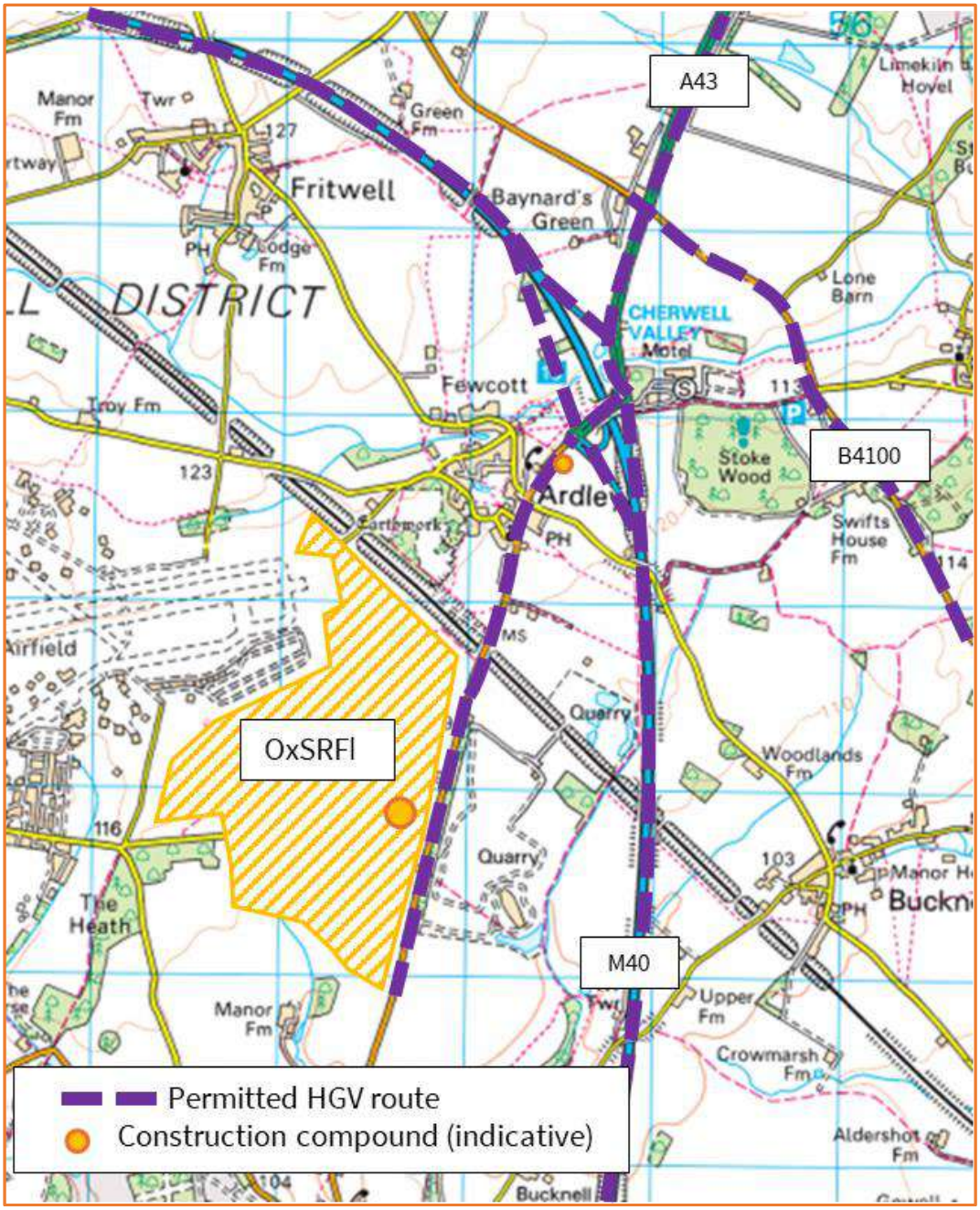

Figure 1: HGV construction traffic routeing requirement prior to opening of Ardley Bypass

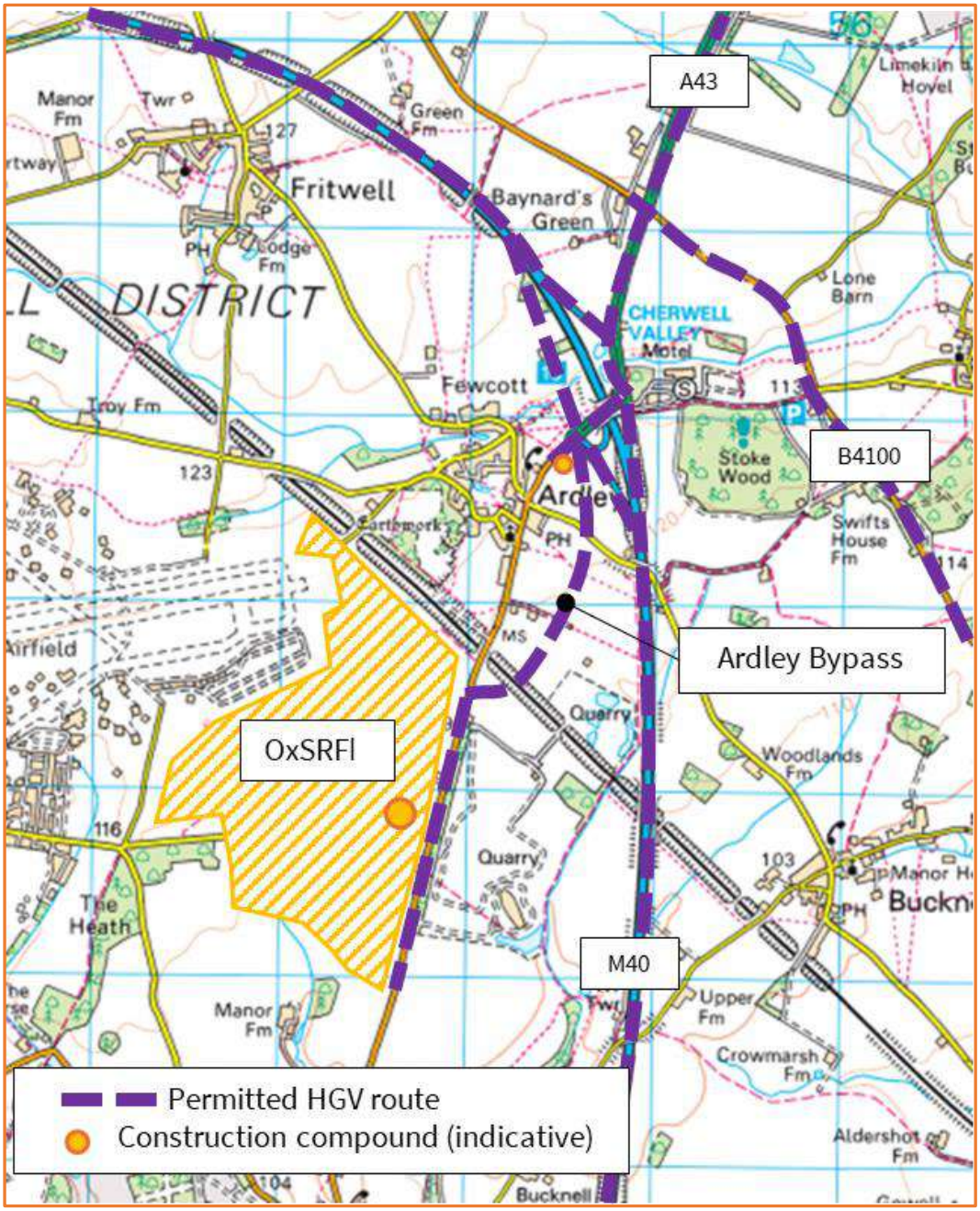

Figure 2: HGV construction traffic routeing requirement after opening of Ardley Bypass



Figure 3: HGV construction traffic routeing requirements around Bicester

Abnormal loads

4.6 Notification of abnormal loads will be submitted via the Department for Transport website Electronic Service Delivery for Abnormal Loads (ESDAL) system, and these movements agreed with the relevant highway authorities and NH at the requisite time once details of the origin and dates of the deliveries are known.

4.7 With the potential exception of the bridge beams for the M40 bridge, Abnormal Indivisible Loads (AIL) are not expected to be required during the construction of proposed development. It is recognised that NH follows a government Water Preferred Policy, which means NH would expect AIL to arrive via the nearest suitable port of entry. Should AIL be required, then this would be discussed with NH before a decision is made on the proposed route.

5.0 CONSTRUCTION TRAFFIC MANAGEMENT

5.1 This section sets out measures to manage the construction traffic, and reduce the potential impacts of the construction traffic on the highway network, communities and environment.

5.2 As detailed in Section 1, this CTMP presents the general principles for construction traffic management, during the construction phase. As a framework document, it will be updated with specific measures, methodologies and procedures for each component of development, following the appointment of a Principal Contractor. Where appropriate, this will include details of traffic management supported by appropriate assessment and/or phased model identifying the impact at each junction combing the construction traffic to the site and the construction of the highway mitigation works.

Route signage

5.3 The signage strategy for the construction traffic will be agreed with NH and OCC and in advance of commencement of construction. This will include appropriate signage provided along the highway network and at M40 Junction 10 to direct construction traffic to and from the site. It will include signs where OxSRFI HGVs are not permitted, for example on the B4100 north-west of the A43, and on the A34 at the B430 junction directing construction traffic to M40 Junction 9. The signage will be regularly reviewed with each construction phase, and amended as necessary. All advisory signage will be erected before work commences.

5.4 The Principal Contractor shall provide details of the preferred and prohibited routes to all suppliers, contractors and workers (see below).

Working hours

5.5 Detailed arrangements for managing and controlling construction vehicle deliveries to the development site will be determined following the appointment of the Principal Contractor.

5.6 The CEMP sets out the construction working hours.

Timings of deliveries

5.7 Deliveries to the site will be timed, where possible avoiding highway network peak operational times.

Efficient loading

5.8 Vehicles used to transport materials, equipment and waste will be loaded to full capacity wherever possible to minimise the number of journeys associated with the transport of these items.

Efficient procurement

5.9 The Contractor will explore in the procurement stage sourcing local suppliers to contribute to the local economy. The Contractor will also explore opportunities to source materials from the same supplier(s) as other developers with sites underway in close proximity to this site.

Collaboration

5.10 Collaboration amongst other construction sites in the area will be undertaken by the Principal Contractor where possible to minimise deliveries.

Plant and material storage

5.11 It is anticipated that where feasible, large plant machinery will remain on-site or at the construction compounds throughout the construction of the development. This will assist in minimising unnecessary local trips made by large and heavy vehicles travelling to and from the site each day. As such, the plant machinery would arrive at the beginning of the construction period and depart at the end of the construction period.

5.12 All plant and construction materials will be stored within the site compound. Deliveries of building materials will be phased throughout the construction period to ensure there is sufficient storage space available for direct offloading and storage on the site. The arrangements for the storage of plant and construction materials will be provided within a Compound Setup drawing.

5.13 All plant and construction materials shall be stored in accordance with the manufacturer's recommendations. All plant maintenance shall be carried out in the service area indicated on the Compound Setup drawing.

Vehicle accesses

5.14 The proposed temporary access points to the construction compounds and access to the works areas are shown on the Construction Access Strategy Plan that is included within the CEMP. The temporary accesses will be agreed with OCC. Banksmen will be utilised where necessary to direct vehicle movements. Wheel washing facilities will be provided for exiting vehicles as appropriate.

5.15 All banksmen directing vehicle movements (signallers) will be trained and authorised to do so. On the rare occasions when reversing is required, in addition to a competent Banksman directing vehicle movements consistent with HSE guidance, consideration will be given to:

- Aids for drivers - mirrors, CCTV cameras or reversing alarms that can help drivers see movement all-round the vehicle;
- Lighting - so that drivers and pedestrians on shared routes can see each other easily. Lighting may be needed after sunset or in bad weather; and
- Clothing - pedestrians on site should wear appropriate high-visibility clothing.

5.16 The site entrance(s) will be kept clear, appropriately signed to avoid congestion or queuing onto the highway. Advanced warning signs will be provided informing existing vehicle traffic of HGVs manoeuvring /turning at the site access / egress.

Traffic management

5.17 The contractor's arrangements shall ensure that all vehicles are clearly directed to the contractor's site and suitable arrangements are in place on that site to receive and manage the delivery.

5.18 The development shall be carried out in such a manner so as to ensure that emergency vehicles visiting the development, or adjacent properties are unhindered at all times and provided with free flow passage as far as is practicable.

5.19 All works on the SRN maintained by National Highways shall be carried out in accordance with the traffic management arrangements agreed with National Highways pursuant to Part 2 of Schedule 14 of the DCO.

5.20 All works on the local road network maintained by OCC shall be carried out in accordance with the traffic management arrangements agreed with OCC pursuant to Part 3 of Schedule 14 of the DCO.

5.21 The traffic management measures will include the below, to mitigate the potential increased risk of impact to the B430 Ardley Station Bridge parapets and through Ardley village due to the additional HGV traffic using the B430 during the initial years of the OxSRFI construction:

- A temporary 30mph speed limit will be put in place from commencement of any of the works on the Main Site or works on the B430 itself, between Ardley village and a point south of the junction with the household recycling centre. This temporary speed limit is secured in the DCO and will remain in place until the Ardley Bypass is opened to traffic which is when vehicles will cease to use the existing railway bridge.

- Alongside the temporary speed limit, signage is proposed to warn drivers that oncoming vehicles may be in the middle of the road at Ardley Station Bridge, and the centreline road marking will be removed over the bridge.

- A temporary 20mph speed limit will be put in place on the B430 through Ardley village from commencement of any of the works on the Main Site or works on the B430 itself. This temporary speed limit is secured in the DCO and will remain in place until the Ardley Bypass is opened to traffic (at which point the proposed permanent 20mph speed limit through Ardley village will in place) and HGV construction traffic will use the bypass.

5.22 The effect of the temporary speed limit at Ardley Station Bridge would be to reduce the opposing speeds to enable opposing HGV drivers to more accurately assess the likelihood of meeting on the bridge and to adjust their speed accordingly so that they do not meet on the bridge.

5.23 The P-CEMP shall set out details of the relevant temporary speed limits that shall be provided in accordance with Requirement 10 of Schedule 2 of the DCO.

Construction worker travel

5.24 Construction workers will be encouraged to travel by sustainable modes where possible. This will primarily be via car sharing and/or minibuses organised by their employers.

5.25 All car parking will be accommodated on-site, and no parking will be permitted along the local highway network or the development roads.

6.0 MONITORING AND ENFORCEMENT OF CONSTRUCTION TRAFFIC MANAGEMENT PLAN

Recording and continuous improvement

6.1 The Principal Contractor, in association with Oxfordshire Railfreight Ltd and OCC/NH will ensure that construction traffic operators adhere to this CTMP through the development process.

6.2 The CTMP will also be reviewed as necessary, to evaluate the operation of the CTMP and what improvements or corrective actions are required.

6.3 The continual improvement process will:

- Determine the root cause or causes of non-conformances and deficiencies.
- Develop and implement a plan of corrective and preventative action to address non-conformances and deficiencies; and
- Verify the effectiveness of the corrective and preventative actions.

6.4 Outcomes of these reviews shall be documented and retained for the duration of the project.

Route monitoring and compliance

6.5 The Principal Contractor will ensure a recording and monitoring system will be implemented around the development site on key routes with regards construction HGV routeing. At this stage the mechanism is unknown, but could include traffic surveys on key routes, GPS tracking, or other similar methods to allow monitoring and control. This system will be implemented prior to the commencement of construction. Any proposals for monitoring equipment/measure on the SRN or local road network will be agreed with NH and/or OCC.

6.6 Warning letters will be issued by the Principal Contractor to sub-contractors outlining the record of any breach, and what action would be taken in the event of any further breach. This could include replacing drivers who persistently breach the HGV routes or arrival times.

Community information

6.7 Information about the construction of the site will be available on the development site website and this will be updated throughout the construction period. If visitors to the website are unable to find the answer to their question on the web pages, an email address will be provided to contact the Principal Contractor who will aim to provide a prompt response.

6.8 Oxfordshire Railfreight Ltd are happy to respond to enquiries from members of the public regarding construction. If members of the public do experience any problems Oxfordshire Railfreight Ltd will encourage people to contact them so that they can reach solutions together.

APPENDIX 39

B430 ARDLEY STATION BRIDGE AND CONSTRUCTION TRAFFIC

B430 ARDLEY STATION BRIDGE AND CONSTRUCTION TRAFFIC

OXFORDSHIRE SRFI

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DOCUMENT CONTROL

project number: ADC1794			report reference: ADC1794-RP-AU	
version	date	author	reviewer	comments
1	22/01/2026	Stuart Dunhill	S Hilditch (BWB)	working draft
2	26/01/2026	Stuart Dunhill	S Hilditch (BWB)	second draft
3	17/03/2026	Stuart Dunhill	S Hilditch (BWB)	submission version

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EXISTING CONDITIONS 6
FUTURE BASELINE CONDITIONS 6
3.0 MITIGATION MEASURES AT ARDLEY STATION BRIDGE 8

1.0 INTRODUCTION

1.1 ADC Infrastructure Limited are commissioned by Oxfordshire Railfreight Limited to assess the transport and infrastructure requirements of a proposed Strategic Rail Freight Interchange (SRFI) in Oxfordshire; the subject of a Development Consent Order (DCO) application for a Nationally Significant Infrastructure Project (NSIP), to be known as OxSRFI.

1.2 A comprehensive package of Highway Works is embedded into the OxSRFI scheme. Those highway works include a bypass of Ardley village, including a new bridge over the Chiltern Main line railway. The Ardley Bypass would become the new route for B430 traffic to access M40 Junction 10 with the new railway bridge replacing the existing Ardley Station Bridge on the B430 (**Figure 1**). The B430 Station Road to the north of the Principal Site access to OxSRFI would be stopped up for vehicular traffic, with a high-quality pedestrian and cycle link created between OxSRFI and Station Road. All through traffic on the B430 would be removed from the village and transferred to the bypass.

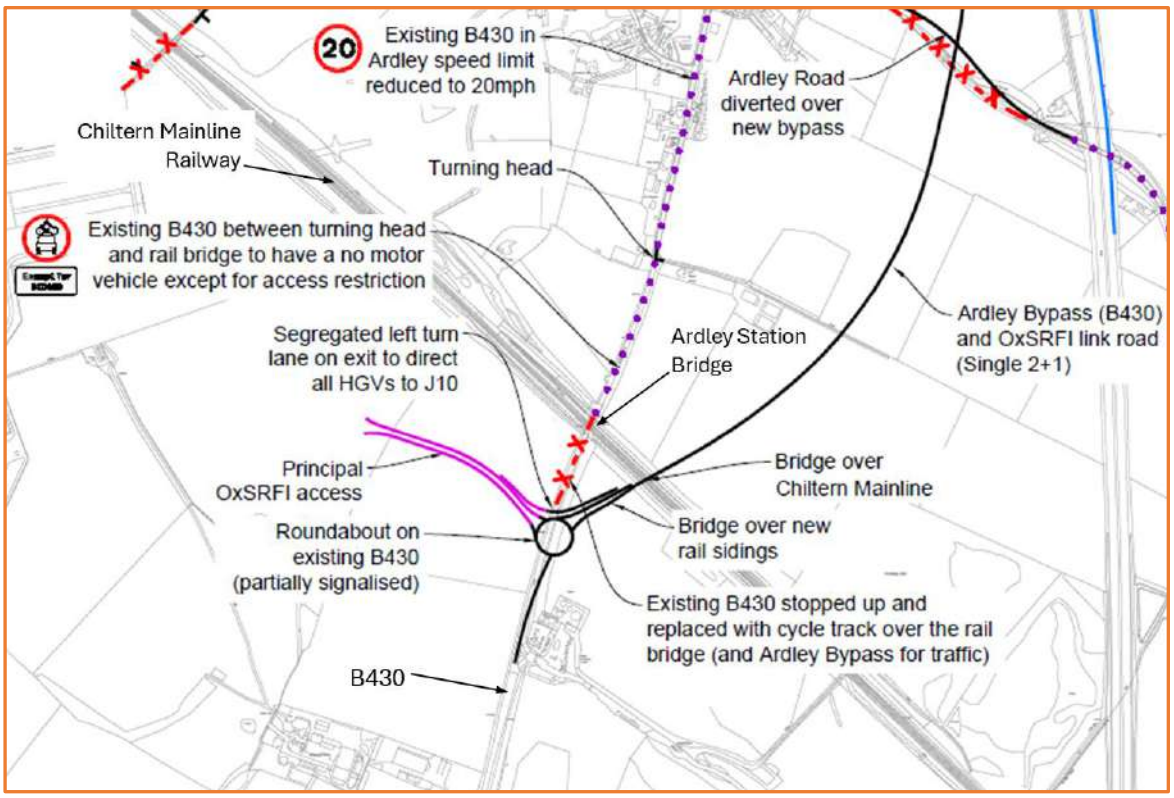


Figure 1: extract of highway overview plan showing the location of the Ardley Station Bridge and the proposed OxSRFI Principal Site access and Ardley Bypass

1.3 The draft Construction Environmental Management Plan (CEMP) prepared as part of the Preliminary Environmental Information Report (PEIR) submitted for the Stage 2 statutory consultation, provides the indicative construction programme for OxSRFI. The Ardley Bypass is scheduled for completion halfway through construction year 3. Once open, all construction traffic would use the bypass. Until that point the OxSRFI construction traffic associated with the Main Site would use the existing B430 to access the highway network at M40 Junction 10.

1.4 Oxfordshire County Council (OCC) have identified a risk of damage to the Ardley Station Bridge parapets due to vehicle strikes, linked to the existing narrow carriageway width at the bridge. OCC have advised that with the required absolute minimum clearances from the edge of the carriageway to the bridge parapets, there is less than the required 5.5m minimum carriageway width at the bridge for HGVs to pass one another. Although no personal injury collision has been

reported at the bridge within the last five years, OCC have advised that recent vehicle impacts have occurred to the bridge parapets, for which the existing road layout is likely to be a significant contributory factor.

1.5 OCC have advised that incidents are expected to occur infrequently, but they could have high severity, due to the narrow road and substantially substandard clearances from it to the parapets, and the brickwork parapets being unable to resist any significant vehicular impacts and the risk of debris falling onto the railway below.

1.6 OCC raised concerns with the Applicant that during the construction period in advance of the Ardley Bypass being open, HGV construction traffic associated with the construction of OxSRFI and associated Highway Works could lead to an increase in the risk associated with two-way HGV traffic passing at the Ardley Station Bridge, and that this would require mitigation.

1.7 The Applicant discussed this concern with OCC at a meeting held on 14 January 2026. It was agreed and recognised at that meeting that the proposed Ardley Bypass and new bridge over the Chiltern Main line railway, will provide a permanent solution that completely removes the risk associated with the narrow carriageway width at Ardley Station Bridge, as the existing bridge would be closed to vehicular traffic. This is a beneficial effect of the proposed OxSRFI Highway Works, particularly given the B430's function as a diversion route for the M40.

1.8 The volumes of HGV construction traffic associated with the OxSRFI Main Site, including construction of the Ardley Bypass and associated works were discussed during the call. Whilst the increase in traffic on the B430 north of the Main Site associated with the construction activities during year 1 will be small, the increases in HGV movements in construction year 2, and for the first part of year 3 prior to the opening of the Ardley Bypass, are forecast to be greater and could materially increase the risk of two HGVs meeting on the bridge. On that basis, it is agreed that OxSRFI would provide appropriate mitigation measures to reduce the level of risk in the period between the start of construction and the opening of the Ardley Bypass. Potential measures were discussed during the meeting, and it was agreed that the Applicant would set these out for formal agreement by OCC.

1.9 The transport chapter of the PEIR included an assessment of the environmental effects on Ardley village associated with the construction traffic in relation to community severance, driver and non-motorised user (NMU) delay, NMU amenity, fear and intimidation, and road user and pedestrian safety. The assessment concluded that the resultant effects would be temporary and would not be significant in environmental terms.

1.10 During the meeting on 14 January 2026, OCC requested a summary of the assessment of the environmental effects on Ardley village associated with the construction traffic as they relate to air quality, noise and vibration. Assessment of these effects will form part of the assessment submitted with the DCO application.

1.11 This technical note has therefore been prepared to capture the discussion and agreements regarding the proposed mitigation measures at Ardley Station Bridge between the start of construction and the opening of the Ardley Bypass.

2.0 EXISTING AND FUTURE BASELINE CONDITIONS

EXISTING CONDITIONS

2.1 The B430 at the Ardley Station Bridge is subject to the national speed limit. Over the bridge the B430 carriageway narrows and provides 5.4m between the carriageway edge lines. Therefore, lane widths are approximately 2.7m over the bridge, which is too tight for two HGVs to pass each other. **Figure 2** is a view of the bridge looking south.



Figure 2: B430 Ardley Station Bridge looking south (extract from Google Street View, August 2023)

2.2 Chapter 3 of the PEIR submitted for the Stage 2 statutory consultation provides 24-hour annual average daily traffic (AADT) flows for the B430 in the 2024 base year, extracted from the Bicester Transport Model (BTM). These are repeated at the table below.

Road	24 hour AADT (two-way)	
	Total Vehicles	HGVs
B430	10,088	648

2.3 Prior to the M40 being constructed, the B430 was part of the A43 trunk road. It remains the diversion route when the M40 is closed.

FUTURE BASELINE CONDITIONS

2.4 It is important to note that the environment around the bridge will change as OxSRFI construction works commence northeast, southeast and southwest of the bridge. Notably the construction of the Main Site Principal Access commences at the start of the second year of the construction programme, and this will require traffic management on the B430 immediately south of the bridge. Prior to that, the Main Site construction access will be located near the Principal Site access, and similarly, will be subject to traffic management. **Figure 3** shows the embedded highway works near and adjacent to the Ardley Station Bridge.

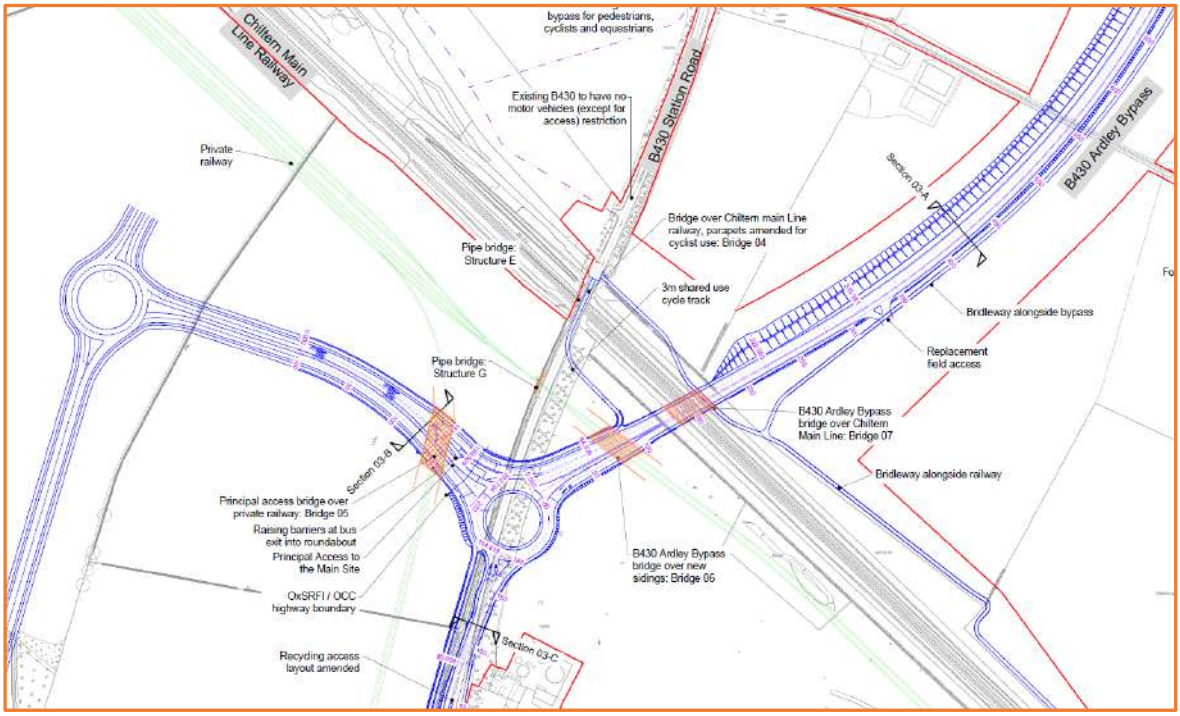


Figure 3: Highway Works near and adjacent to Ardley Station Bridge

2.5 Chapter 3 of the PEIR prepared for the Stage 2 statutory consultation provides a summary of the OxSRFI construction traffic using the B430 to access the Main Site. The construction traffic is shown at the table below for the period between the start of construction and the opening of the Ardley Bypass. Also provided in the table is the percentage increase in traffic compared to the 2024 baseline flow given above.

Construction year	Average daily OxSRFI construction traffic using B430 at Ardley Station bridge		% change compared to 2024 baseline	
	Lights	HGV	Lights	HGVs
Year 1	87	19	0.9%	2.9%
Year 2	441	250	4.7%	38.6%
Year 3 pre Ardley Bypass	383	299	4.1%	46.1%
Year 3 post Ardley Bypass	0	0	all traffic removed	

2.6 The above changes in traffic flow were discussed with OCC during the meeting on 14 January 2026. It was agreed that the increase in traffic on the B430 associated with the construction activities during year 1 is negligible, and unlikely to materially increase the risks of parapet strikes at the Ardley Station Bridge. However, the increases in HGV movements in construction year 2, and for the first part of year 3 prior to the opening of the Ardley Bypass, are forecast to be greater and could materially increase the risk of two HGVs meeting on the bridge. On that basis, it is agreed that OxSRFI provide appropriate mitigation measures to reduce the level of risk in the period between the start of construction and the opening of the Ardley Bypass. The mitigation measures are set out in the next section of this technical note.

3.0 MITIGATION MEASURES AT ARDLEY STATION BRIDGE

3.1 To mitigate the potential increased risk of impact to the bridge parapets due to the additional HGV traffic during the initial years of the OxSRFI construction, the following measures are proposed:

- A temporary 30mph speed limit will be put in place from commencement of any of the works on the Main Site or works on the B430 itself, between Ardley village and a point south of the junction with the household recycling centre. This temporary speed limit is secured in the DCO and will remain in place until the Ardley Bypass is opened to traffic which is when vehicles will cease to use the existing railway bridge.

- Alongside the temporary speed limit, signage is proposed to warn drivers that oncoming vehicles may be in the middle of the road, and the centreline road marking will be removed over the bridge.

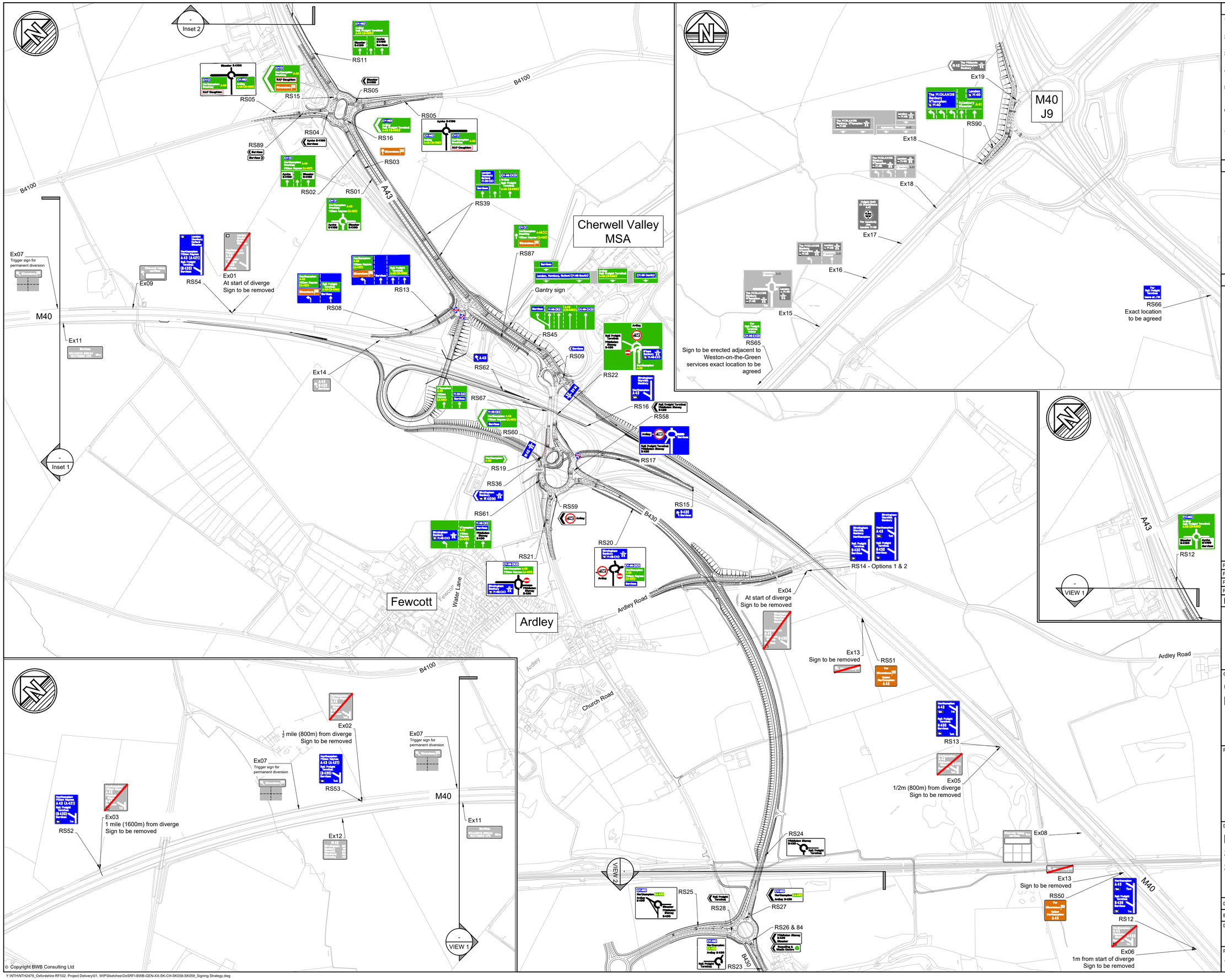
3.2 The effect of the temporary speed limit would be to reduce the opposing speeds to enable opposing HGV drivers to more accurately assess the likelihood of meeting on the bridge and to adjust their speed accordingly so that they do not meet on the bridge.

3.3 Due to the traffic management measures that will be in place on the B430 south of the bridge from year 2 onwards it is considered that the risk of non-compliance to the 30mph limit is low.

3.4 With these measures in place, it is considered that the likelihood of HGV drivers impacting the Ardley Station Bridge parapets will be reduced to or below the existing situation and, the damage caused by an impact if it does occur is likely to be reduced due to the reduction in vehicle speed.

APPENDIX 40

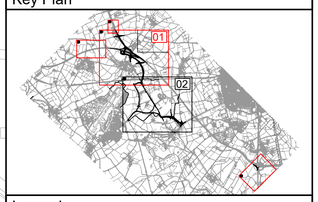
DIRECTIONAL SIGNING STRATEGY



Notes

1. Do not scale this drawing. All dimensions must be checked/ verified on site. If in doubt ask.
2. This drawing is to be read in conjunction with all relevant architects, engineers and specialists drawings and specifications.
3. All dimensions in millimetres unless noted otherwise. All levels in metres unless noted otherwise.
4. Any discrepancies noted on site are to be reported to the engineer immediately.
5. The sign face layout and locations are for proof of concept and are subject to road safety audit, agreement with 3rd party stakeholders and local & national highway authorities.
6. Permanent diversion symbols omitted. Clarification required from National Highways and adjacent local highway authorities of signing requirements.
7. The proposed signing of Ministry of Defence facilities reflect current situation. Clarification required of the signe requirements and operation status of the local Ministry of Defence establishments. DLO Caversfield has been removed from all signage

Key Plan



Legend

- Existing vertical road sign to remain
- Existing vertical road to be taken down
- Proposed vertical road sign

P03	06.03.26	Updated following NH comments	RP	SH
P02	11.07.25	Issued for information	DF	SH
P01	28.04.23	DRAFT	MJT	SH
Rev	Date	Details of issue / revision	Drw	Rev

Issues & Revisions

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Client

OXFORDSHIRE RAILFREIGHT LTD.

Project Title

OxSRFI
OXFORDSHIRE
STRATEGIC RAIL FREIGHT INTERCHANGE

Drawing Title

DIRECTIONAL SIGNING STRATEGY SHEET 1 OF 2

Drawn:	M.Truman		Reviewed:	S. Hilditch	
BWB Ref:	NTH2479	Date:	28.04.23	Scale@A1:	1:5000

Drawing Status: **FOR INFORMATION**

Project - Originator - Zone - Level - Type - Role - Number	Status	Rev
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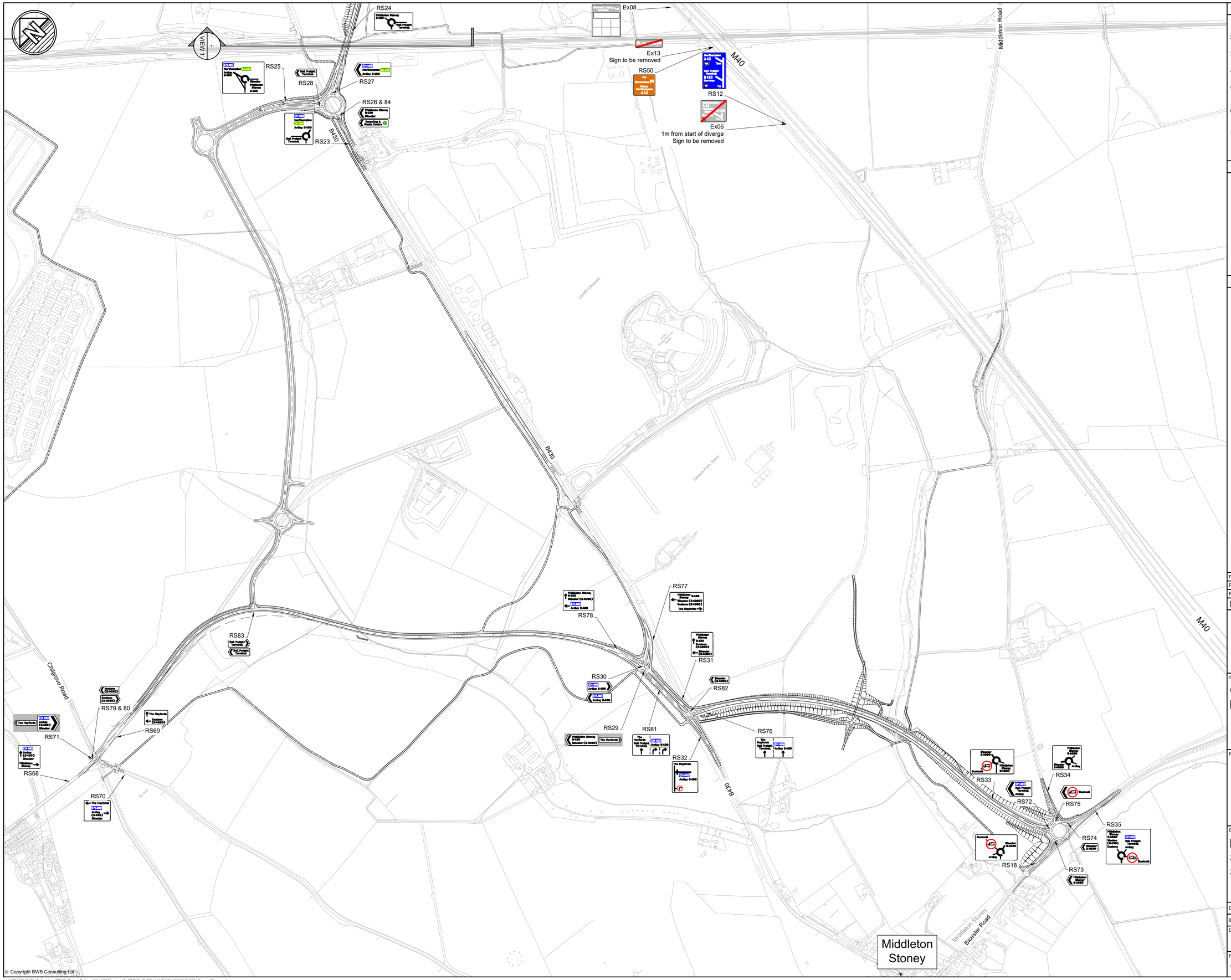
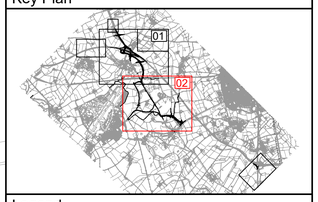


Notes

1. Do not scale this drawing. All dimensions must be checked/ verified on site. If in doubt ask.
2. This drawing is to be read in conjunction with all relevant architects, engineers and specialists drawings and specifications.
3. All dimensions in millimetres unless noted otherwise. All levels in metres unless noted otherwise.
4. Any discrepancies noted on site are to be reported to the engineer immediately.
5. The sign face layout and locations are for proof of concept and are subject to road safety audit, agreement with 3rd party stakeholders and local & national highway authorities.
6. Permanent diversion symbols omitted. Clarification required from National Highways and adjacent local highway authorities of signing requirements.
7. The proposed signing of Ministry of Defence facilities reflect current situation. Clarification required of the signe requirements and operation status of the local Ministry of Defence establishments. DLO Caversfield has been removed from all signage

Key Plan



Legend

Existing vertical road sign to remain

Existing vertical road to be taken down

Proposed vertical road sign

P02	05.03.26	Updated following NH comments	RP / SRH
P01	28.04.23	Preliminary Issue	MJT / SH
Rev	Date	Details of issue / revision	Drw / Rev

Issues & Revisions

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Project Title

OxSRFI
OXFORDSHIRE
STRATEGIC RAIL FREIGHT INTERCHANGE

Drawing Title

DIRECTIONAL SIGNING STRATEGY SHEET 2 OF 2

Drawn:	M.Truman		Reviewed:	S. Hilditch	
BWB Ref:	NTH2479	Date:	28.04.23	Scale@A1:	1:5000

Drawing Status

FOR INFORMATION

Project - Originator - Zone - Level - Type - Role - Number	Status	Rev
OxSRFI-BWB-GEN-XX-SK-CH-SK059	**S2**	**P02**

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APPENDIX 41

M40 JUNCTION MOTORWAY TECHNOLOGY STRATEGY

See inset below

Existing strategic MS3 VMS
200m before relocated J10 SB ½ mile secondary ADS
Compliant location

M40 SB no existing secondary VMS between strategic VMS and secondary ADS
Existing departure unaffected by scheme proposals and is outside scope of scheme to amend

886m before J10 exit datum (¼ mile + 10%)

J10 SB ½ mile secondary ADS
845m before exit datum
Compliant location
Sign face to be replaced

805m before J10 exit datum (¼ mile)

785m before J10 exit datum (¼ mile - 20m)

J10 NB Route confirmatory sign (RCS)

VMS visibility check
J10 NB First to J10-11 NB First Intermediate
Distance = 1008m
¼ distance = 672m
Actual visibility = 395m
Departure **S4**

ERT
MP 107/7B+40
>400m before exit datum
Existing departure from TD 131 unaffected by scheme

ERT
MP 107/7A+40
369m after J10 entry datum point
Compliant location

M40 mainline:
Northbound "A" carriageway
Southbound "B" carriageway

M40

J10 NB first VMS
115m downstream of entry datum point
Departure from standard required as <200m
Departure **S1**

J10 NB entry datum

J10 SB final DS
22m before exit datum
Compliant location
Sign face to be replaced

CCTV
MP 107/2B+58

J10 SB exit datum
As existing location

Existing strategic secondary MS3 VMS
(Existing strategic Primary MS3 VMS 1.5km upstream of secondary, not shown)

A43

B4100

Baynard's Green

Padbury roundabout

VMS visibility check
J10A NB Final to J10 NB First
Distance = 907m
¼ distance = 604m
Actual visibility = 437m
Departure **S3**

J10 SB final VMS
As close as practicable to back of diverge nose
Compliant location

J10 SB confirmatory DS
205m beyond back of nose
Existing is in non-compliant location (should be up to 30m), unaffected by scheme

J10 SB diverge (exit) slip road "L" carriageway

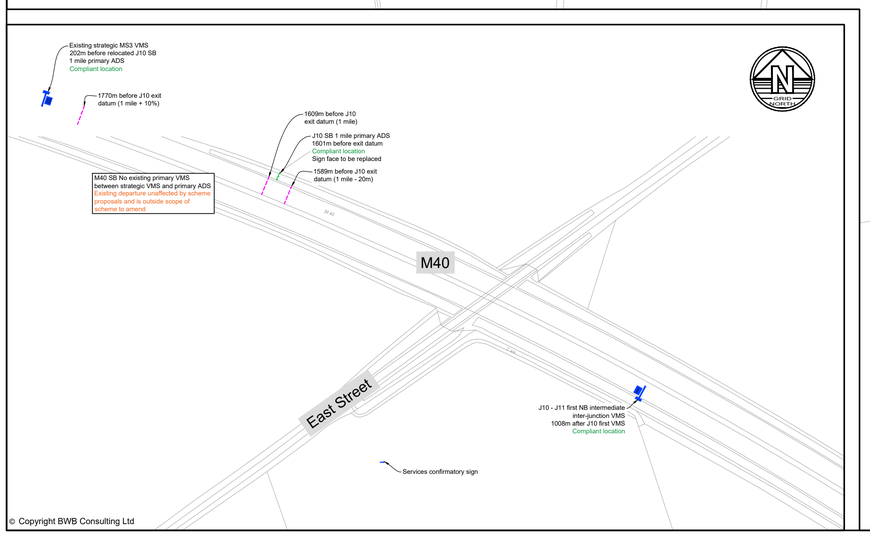
J10A NB diverge (exit) slip road "J" carriageway

Proposed CCTV (indicative location)

ERT
MP 106/6A-20
177m downstream of back of

ERT
MP 106/6B-20
419m downstream of

See SK066



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Legend

	Existing retained	Existing removed	Proposed
Gantry			
MS3 VMS	MS3		
MS4 VMS	MS4	MS4	MS4
CCTV			
ERT			
ESS (MS1)			
ADS			
MHS			
Access path			

Rev	Date	Details of issue / revision	Drw	Rev
P03	24.03.25	Updated to scheme option 28	SRH	SRH
P02	30.03.23	Issued to NH	SRH	SRH
P01	06.03.23	Preliminary Issue	SRH	SRH

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Drawing Title

M40 JUNCTION 10 TECHNOLOGY STRATEGY (NORTH)

Drawn:	S. Hilditch		Reviewed:	S. Hilditch	
BWB Ref:	NTH2479	Date:	06.03.23	Scale@A1:	1:2,500

Drawing Status

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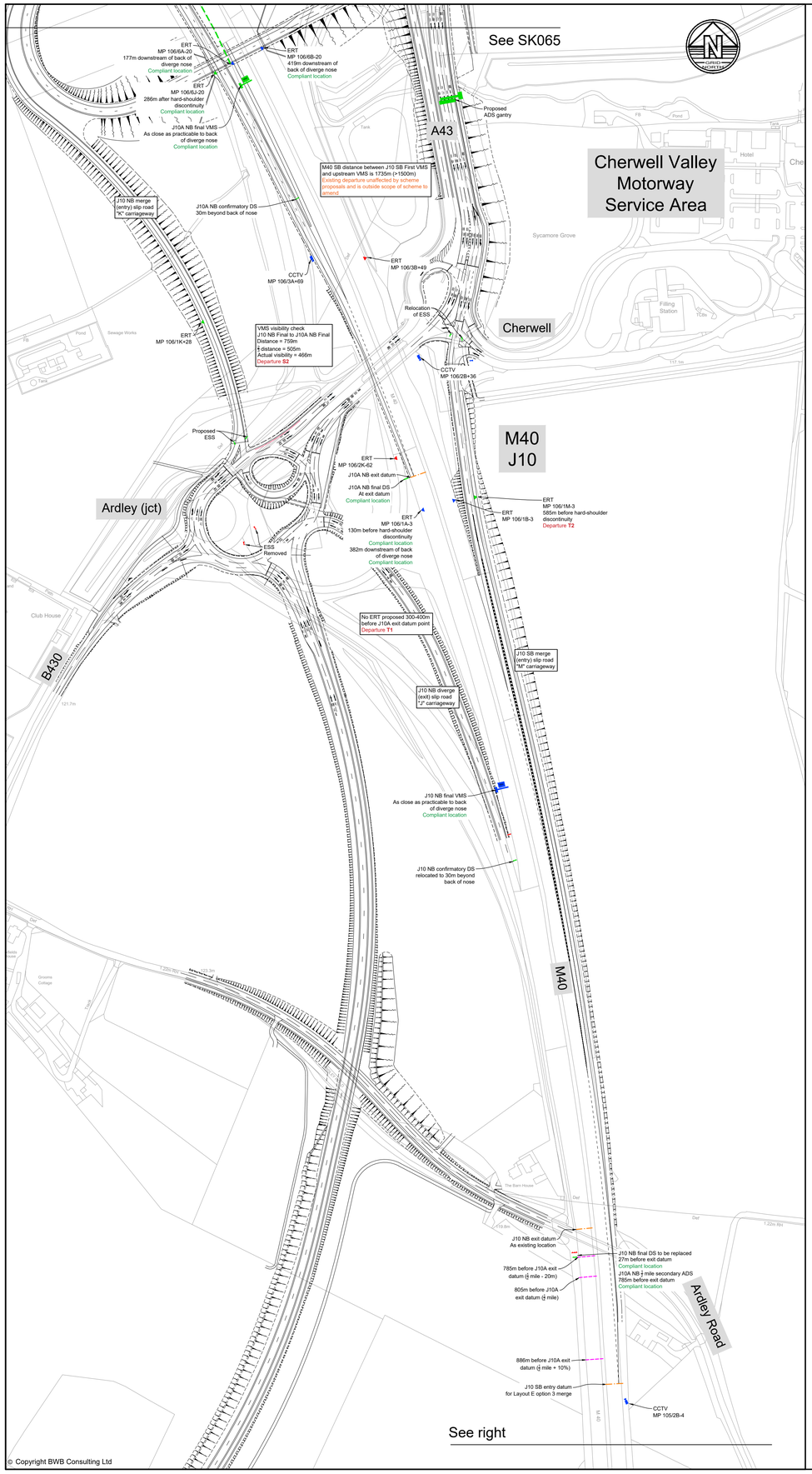
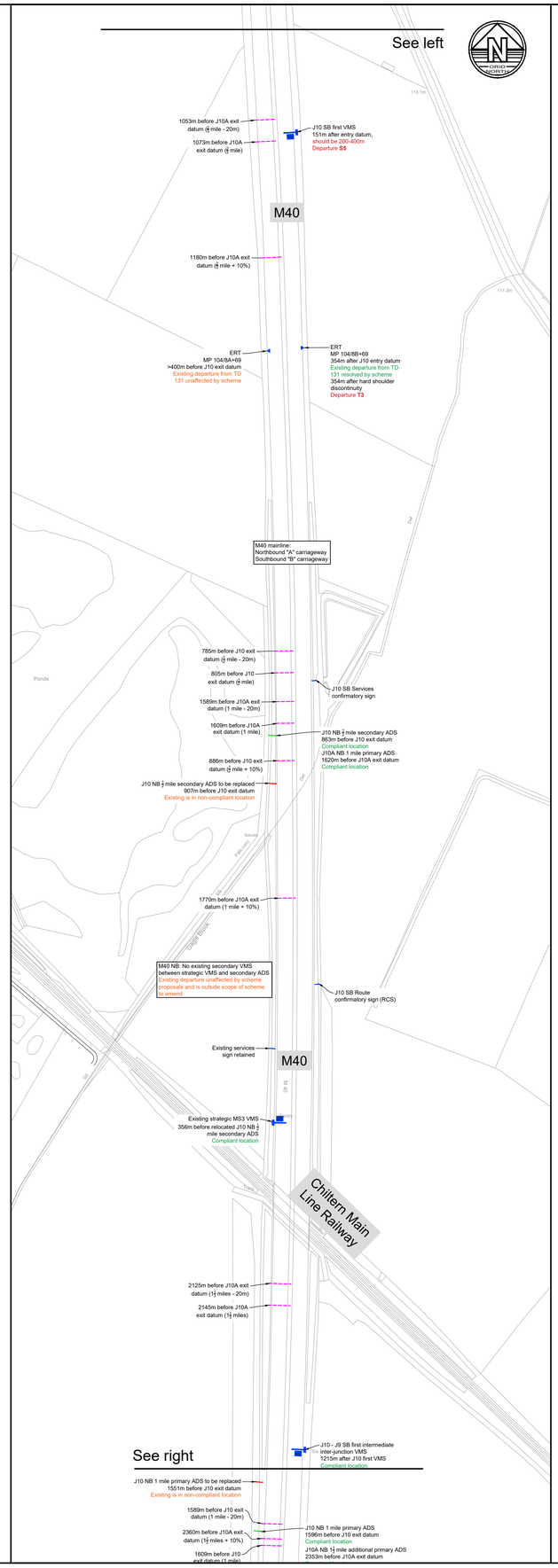
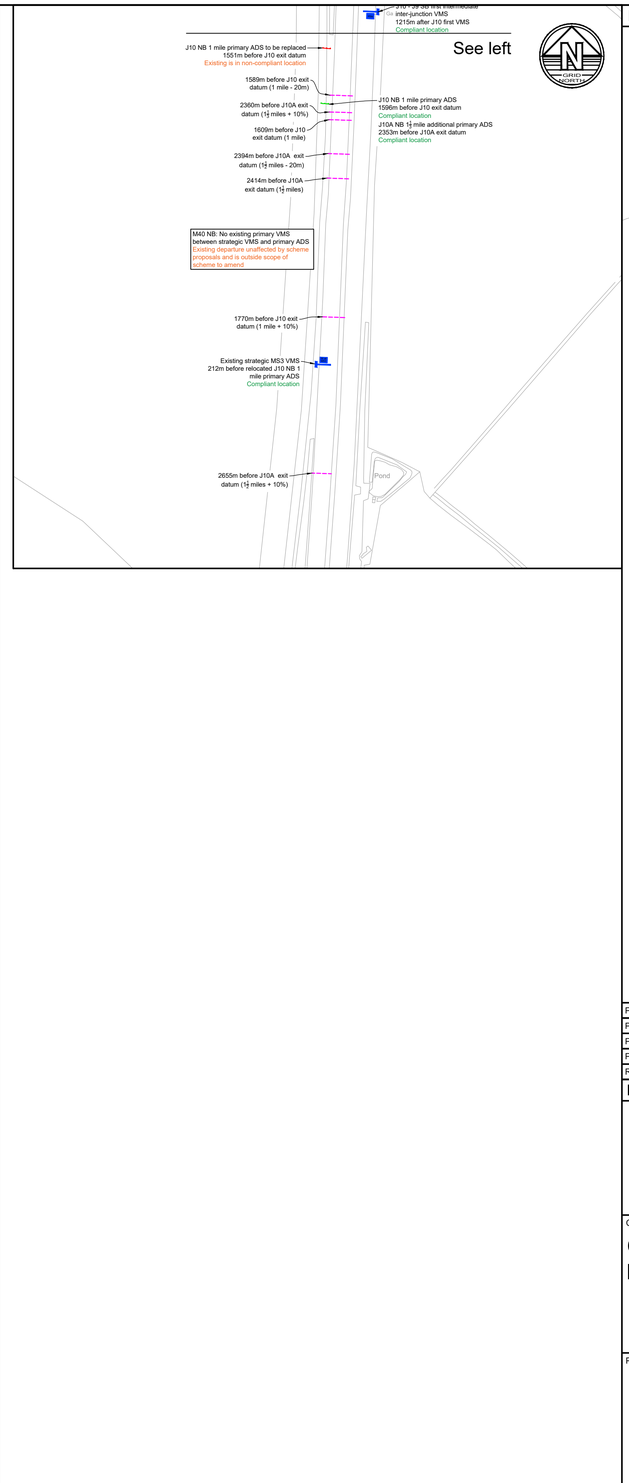
Project - Originator - Zone - Level - Type - Role - Number	Status	Rev
OxSRFI-BWB-GEN-ZZ-SK-CH-SK065	**S3**	**P03**







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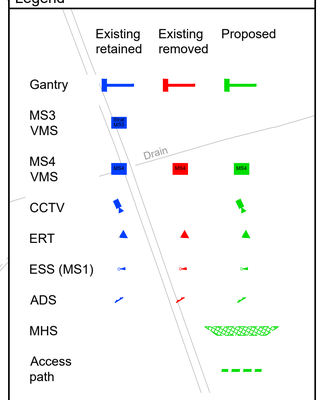

Rev	Date	Details of issue / revision	Drw	Rev
P04	26.03.26	M40 SB ERTs amended	SRH	SRH
P03	24.03.25	Updated to scheme option 28	SRH	SRH
P02	30.03.23	Issued to NH	SRH	SRH
P01	06.03.23	Preliminary Issue	SRH	SRH

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Project Title

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Drawing Title

M40 JUNCTION 10 TECHNOLOGY STRATEGY (SOUTH)

Drawn:	S. Hilditch		Reviewed:	S. Hilditch	
BWB Ref:	NTH2479	Date:	06.03.23	Scale@A1:	1:2,500

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Project - Originator - Zone - Level - Type - Role - Number	Status	Rev
OxSRFI-BWB-GEN-ZZ-SK-CH-SK066	S3	P04

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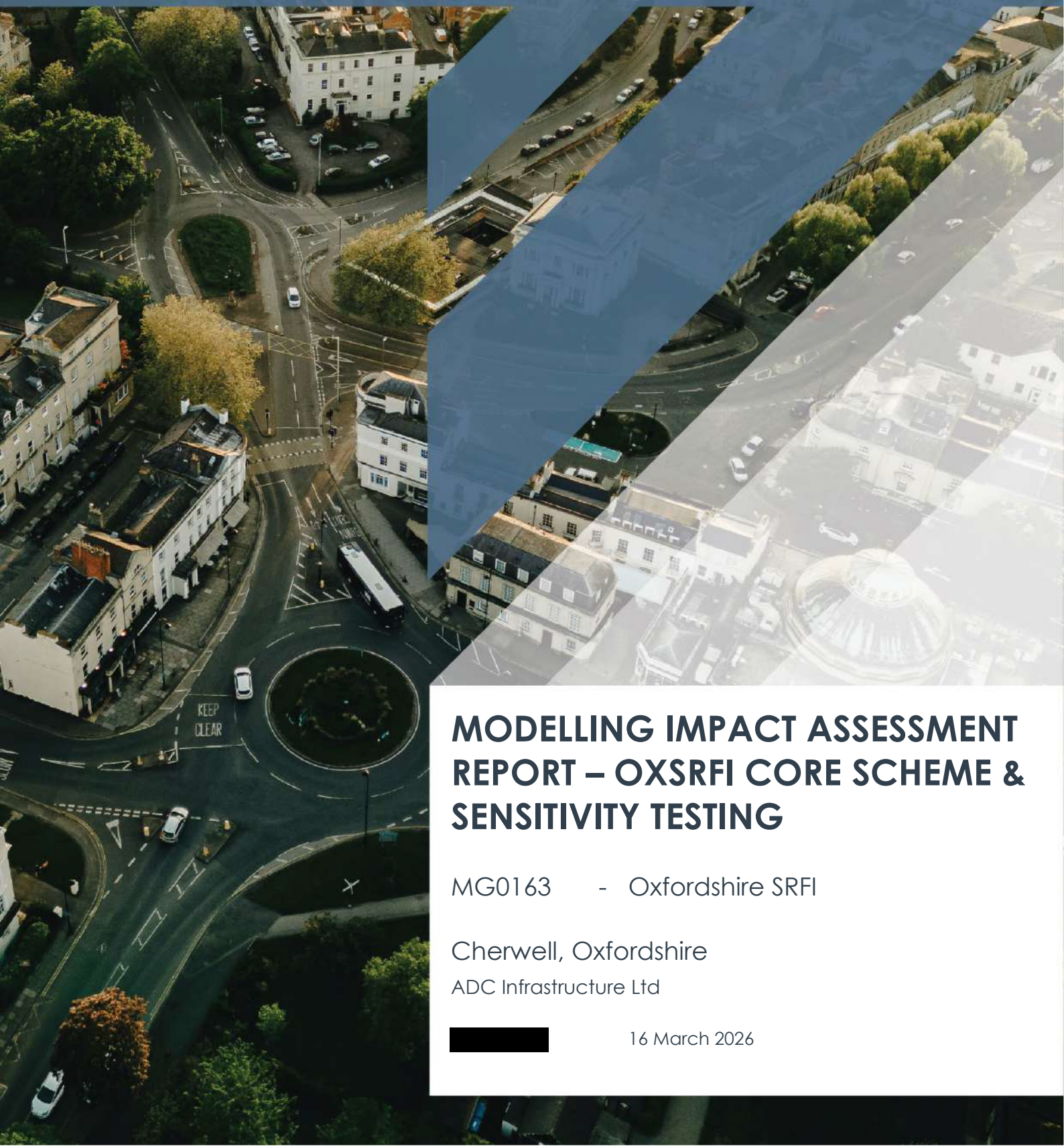
APPENDIX 42

VISSIM MODELLING IMPACT ASSESSMENT REPORT - OXSRFI CORE SCHEME AND SENSITIVITY TESTING

MODELLING GROUP



MODELLING IMPACT ASSESSMENT REPORT – OXSRFI CORE SCHEME & SENSITIVITY TESTING

MG0163 - Oxfordshire SRFI

Cherwell, Oxfordshire

ADC Infrastructure Ltd

[redacted] 16 March 2026

DOCUMENT CONTROL ISSUE SHEET

Project & document details

Project name	Oxford SRFI
Project number	MG0163
Document title	Modelling Impact Assessment Report – Sensitivity Testing
Document reference	05_Technical\04_Reports & Notes\02_Future Year Testing

Document history

Issue	Status	Reason for issue	Issued to
A	Final	Client issue	ADC Infrastructure Ltd

Issue control

Issue	Date	Author	Contributors	Approved	Date
A	11/03/2026	[redacted]		Luke Best	16/03/2026

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APPENDIX B: 2034 REFERENCE CASE TN

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APPENDIX E: 2031 RC1&DS1 ROUTE PERFORMANCE– O-D JOURNEY TIME RESULTS

APPENDIX F: 2031 RC1-SENS TEST & DS1-SENS TEST ROUTE PERFORMANCE– O-D JOURNEY TIME RESULTS

1 EXECUTIVE SUMMARY

1.1 Strategic Context and Infrastructure Imperative

1.1.1 Modelling Group, commissioned by ADC Infrastructure Ltd, has undertaken comprehensive VISSIM microsimulation modelling to assess the highway impacts of the proposed Oxfordshire Strategic Rail Freight Interchange (OxSRFI) adjacent to M40 Junction 10 in Cherwell, Oxfordshire. This assessment supports the Development Consent Order (DCO) application to the Planning Inspectorate for this Nationally Significant Infrastructure Project (NSIP).

1.1.2 The assessment has tested two methodologies for adopting the strategic Bicester Transport Model (BTM) flows into the VISSIM model, in response to a sensitivity testing request from National Highways. Both flow scenarios reach the same overall conclusions: the proposed development, together with its comprehensive mitigation package, delivers substantial operational improvements compared to the existing network configuration. Network-wide average vehicle delays reduce from 92–95 seconds to 48–52 seconds in the AM peak, whilst enabling over 1,100–1,600 additional vehicles to successfully traverse the network that are unable to do so under Reference Case conditions.

1.1.3 The assessments presented in this report consider the Reference Case without the Albion Land scheme and its highway improvements at the A43 Baynard's Green junction. Accordingly, the Do-Something scenarios presented in this report consider the OxSRFI 'core scheme' at the A43 Baynard's Green roundabout. The OxSRFI core scheme is the junction improvement at Baynard's Green that would be provided by the OxSRFI scheme in the absence of the Albion Land development.

1.2 Project Context

1.2.1 The modelling builds upon the 2031 and 2034 scenario testing detailed in the supporting Modelling Impact Assessment Report (MG0163_OxfordSRFI_R_01-D_Final_MIAR, dated 12th March 2026). This in turn builds upon the validated 2016 base year VISSIM model originally developed by AECOM on behalf of National Highways. The model was updated to VISSIM 2021 and revalidated by Modelling Group in July 2021, with approval from National Highways, as documented in the Local Model Validation Report (LMVR[1], approved 14th July 2021).

[1] Document Reference: MG0163_M40 J10 Model Update_LMVR_R-01B

1.2.2 The 2031 DfT Circular 01/2022 compliant scenario testing has been developed using two approaches for adopting the BTM flows into the VISSIM model. The primary methodology applies the BTM outputs in their original form, whilst the Sensitivity Testing applies an alternative methodology proposed by AECOM as part of their ongoing audit of the modelling on behalf of National Highways. This alternative approach calculates the absolute differences between the base and future year BTM flows and applies these to the base VISSIM flows. The assessment compares future baseline Reference Case scenarios (definition of committed development as per DfT Circular 01/2022) against Do-Something scenarios (Reference Case plus OxSRFI development and mitigation).

1.3 Key Findings

Network Performance Without Proposed Mitigation

1.3.1 Assessment of the existing network configuration in the Reference Case scenarios reveals significant capacity constraints at Baynard's Green roundabout in both peak periods. In the AM peak, queues on the A43 North, B4100 East and B4100 West approaches all extend to the start of their respective entry points (distances of approximately 770m, 520m and 430m respectively), resulting in 1,100–1,600 vehicles unable to enter the network. In the PM peak, the B4100 East and West approaches are most affected, with queues on the B4100 East reaching the start of the entry point (approximately 520 metres) and queues on the B4100 West extending to approximately 430 metres, resulting in 400–870 vehicles unable to enter. This latent demand must be considered when interpreting results at junctions south of Baynard's Green, where the true operational impacts in the Reference Case are masked by vehicles unable to enter the network.

Impact of Proposed Mitigation

1.3.2 Compared to the Reference Case, the proposed OxSRFI highway works package delivers substantial operational improvements across both flow profiles. Network-wide average vehicle delays reduce from 92–95 seconds to 48–52 seconds in the AM peak, whilst enabling over 1,100–1,600 additional vehicles to successfully traverse the network that are unable to do so under Reference Case conditions. In the PM peak, delay reductions from 60–73 seconds to 48–52 seconds, together with 400–870 additional vehicles able to enter the network, demonstrate the operational advantages of the mitigation package.

1.3.3 Network-wide performance metrics further demonstrate the positive impacts. Journey times from the A43 North (AM peak), B4100 East (AM and PM peak) and

B4100 West (AM and PM peak) show significant reductions, with savings in the range of 2 minutes 9 seconds to 8 minutes 27 seconds to other zones in the network across both flow profiles. These savings highlight the substantial benefits delivered by the junction improvements at Baynard's Green.

Localised Impacts and Balanced Assessment

1.3.4 Whilst the strategic network benefits are evident, the assessment identifies localised impacts requiring acknowledgment. Across both flow scenarios, the most notable finding is the substantially reduced queuing at Baynard's Green roundabout on the B4100 East and West approaches following the introduction of the proposed OxSRFI development. In the AM peak, queues are reduced by 83–85% and 77–84% on the B4100 East and West approaches respectively, with reductions of 84–86% and 89–92% in the PM peak. These reduced queues result in journey time savings from these approaches to other parts of the network in the range of 2–8½ minutes across both peak periods.

1.3.5 Other notable observations with the introduction of the proposed OxSRFI development when compared to the Reference Case include:

- Increased journey times from Cherwell Services travelling northbound to A43 North/B4100 East/B4100 West (101–144 seconds (AM), 35–86 seconds (PM)), resulting from the removal of the direct right-turn lane and the requirement to turn right at Ardley, thereby increasing travel distance.
- Increased journey times from Cherwell Services to the M40 North (68–72 seconds (AM), 60–65 seconds (PM)), attributable to the increased number of signalised stop-lines to traverse.
- Increased journey times from Ardley village northbound (42–107 seconds (AM), 50–151 seconds (PM)), resulting from reductions to speed limits in this area of the network.
- Increased queuing at Padbury, Cherwell and Ardley in both peaks, attributable to the network accommodating additional traffic now able to enter from the A43 North, B4100 East and B4100 West entry points (that are not able to do so in the Reference Case) in combination with the proposed OxSRFI development traffic.

1.3.6 These localised effects represent typical trade-offs associated with strategic infrastructure provision and do not constitute severe or unacceptable impacts. The mitigation addresses capacity constraints at Baynard's Green whilst accommodating the additional traffic associated with the OxSRFI development.

1.4 Technical Robustness

1.4.1 As detailed in the supporting Modelling Impact Assessment Report (MIAR[2], dated 12th March 2026), the assessment's technical credibility is underpinned by the validated base year model. This achieved exemplary calibration and validation performance against DfT TAG Unit 3.1 acceptance criteria. As documented in the approved LMVR:

- Entry flow calibration: 100% compliance (9 of 9 entries within 5%, all achieving GEH <3)
- Junction turning count validation: 100% GEH <5 compliance (43 of 43 movements), with 93% achieving GEH <3
- Journey time validation: 95% compliance with TAG Unit 3.1 criteria (21 of 22 routes within 15% in AM peak, 19 of 22 in PM peak)
- Exit flow validation: 100% compliance (9 of 9 exits within TAG criteria, all GEH <5)
- 1.4.2 This validation performance significantly exceeds the DfT TAG Unit 3.1 minimum requirement of 85% compliance and was formally approved by National Highways in July 2021.

1.4.2 Future year convergence was achieved following industry-standard dynamic assignment procedures, with all performance results representing full demand operational conditions averaged over 20 random seed runs.

1.5 Assessment Conclusions

1.5.1 Across both flow profiles tested, the proposed OxSRFI development delivers substantial operational improvements compared to the existing network configuration, particularly at Baynard's Green roundabout. The mitigation package produces reduced delays across the network, improved travel times and additional network capacity in both the AM and PM peak periods.

1.5.2 There are localised effects, with some movements experiencing improvements and others experiencing modest increases in journey times or queue lengths. The majority of journey time changes remain within ±120 seconds, and queue lengths remain within approach capacities throughout the network.

1.5.3 The consistency of findings across both BTM flow conversion methodologies provides additional confidence in the assessment conclusions. The modelling findings provide empirical evidence suitable for supporting the DCO application,

[2]Document Reference: MG0163_OxfordSRFI_R_01-D_Final_MIAR

demonstrating that the proposed development, with its comprehensive highway mitigation package, can be accommodated within the highway network whilst providing improved operational performance.

2 INTRODUCTION

2.1 Project Background

Introduction

2.1.1 Modelling Group has been commissioned by ADC Infrastructure Ltd to undertake VISSIM microsimulation modelling and analysis for the proposed Oxfordshire Strategic Rail Freight Interchange (OxSRFI) on land east of the former Heyford Air Base and southwest of M40 Junction 10 in Cherwell, Oxfordshire.

2.1.2 The modelling is required to support a Development Consent Order (DCO) application to the Planning Inspectorate as the development is classified as a Nationally Significant Infrastructure Project (NSIP).

2.1.3 The location of the proposed site is shown in **Figure 2.1**, taken from OxSRFI website[3].

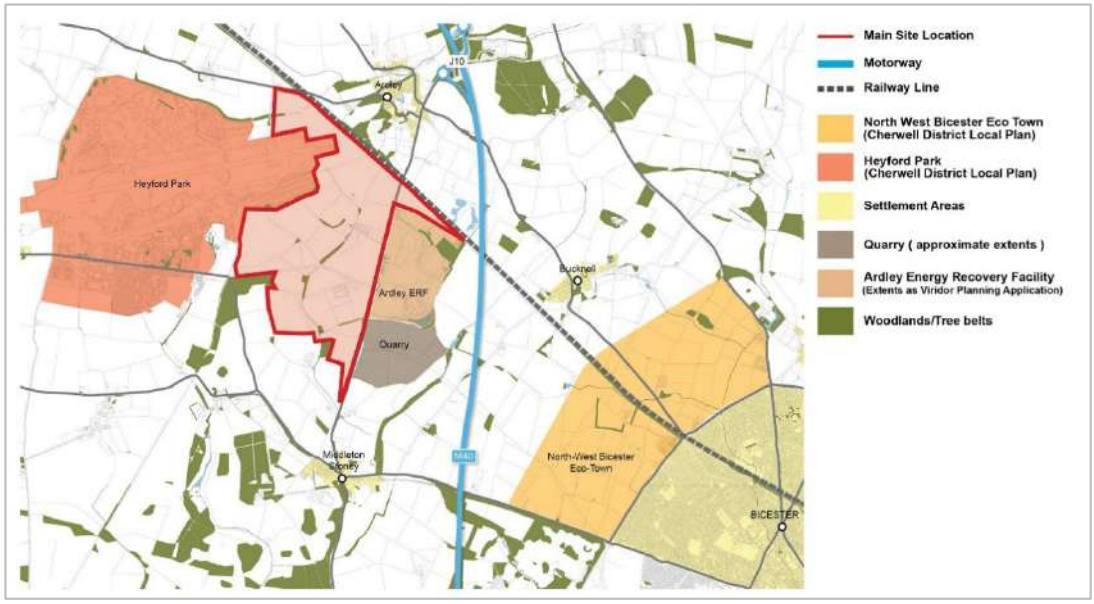

FIGURE 2.1: PROPOSED SITE LOCATION

Modelling History & Current Status

2.1.4 A full description of the modelling history and current status is provided in the supporting Modelling Impact Assessment Report (MG0163_OxfordSRFI_R_01-D_Final_MIAR, dated 12th March 2026). That report includes details of updates to the modelling following comments from National Highways (through their term consultant, AECOM). The approach to address those comments was agreed with National Highways and the modelling updated accordingly. A log of that process is provided at Appendix C of the supporting Modelling Impact Assessment Report.

[3] *https://oxsrfi.co.uk/location-2/*

2.1.5 The supporting report also provides full details of the modelling methodology and model development process and reference to that report should be made for those details.

2.1.6 The Modelling Impact Assessment Report considers a number of future year assessment scenarios, which – for the reasons explained in that report - are based on a modelling methodology that includes in the Reference Case the Albion Land development and its associated highway improvements at the A43 Baynard's Green junction. All Do-something scenarios presented in that report therefore consider the OxSRFI 'alternative scheme' at the Baynard's Green junction. The alternative scheme enhances (builds upon) the Albion Land highway works at the junction.

2.1.7 The Albion Land development was refused planning permission in January 2026. Therefore, whilst the Albion Land applicant has submitted an appeal, that scheme does have planning permission at this time. Therefore, the assessments presented in this report consider the Reference Case without the Albion Land scheme and its highway improvements at the A43 Baynard's Green junction. Accordingly, the Do-Something scenarios presented in this report consider the OxSRFI 'core scheme' at the Baynard's Green. The OxSRFI core scheme is the junction improvement that would be provided by the OxSRFI scheme in the absence of the Albion Land scheme.

National Highways Audit & Sensitivity Test Request

2.1.8 As noted above, recent discussions with National Highways and AECOM (who are reviewing the modelling for impacts on the Strategic Road Network), have led to a request for Sensitivity Testing of the worst-case Reference Case and Do-Something scenarios. This involves applying an alternative methodology proposed by AECOM to adjust the traffic flows from the Bicester Transport Model (BTM), accounting for differences in the origin-destination (O-D) flows between the 2016 base BTM and VISSIM flows.

2.1.9 This adjustment methodology would use the absolute differences from the Reference Case or Do-Something BTM flows against the Base BTM flows, which would then be applied to the base VISSIM flows.

2.1.10 The 'worst case' Reference Case is the future baseline scenario with the existing highway network configuration, i.e. without any third-party highway improvements at the A43 Baynard's Green Roundabout.

Scenario Testing

2.1.11 To assess the 'worst case' and (as explained above) as a result of the Albion Land development not having approved planning status, the modelling and assessment undertaken within this report assume that the Albion Land development (and its associated mitigation measures) will not be forthcoming, and instead the focus is solely on the impacts related to the proposed OxSRFI development.

2.1.12 Two different variants of the 2031 DfT Circular 01/2022 compliant scenario are modelled, one utilising the BTM outputs in their 'pure' form (i.e. with no adjustments) and the second with adjustments to the BTM flows based on the methodology proposed by AECOM. The impacts of each comparison are then analysed to highlight similar trends and identify any areas where there are notable differences between the two BTM flow output conversion methodologies.

2.2 Report Purpose

2.2.1 This report is a companion to the supporting Modelling Impact Assessment Report (MG0163_OxfordSRFI_R_01-D_Final_MIAR, dated 12th March 2026), which details the full modelling history, current status and updated analysis for future year testing undertaken in a 2031 and 2034 forecast year across a range of scenarios.

2.2.2 This report focuses on the 2031 DfT Circular 01/2022 compliant scenario tests, comparing Reference Case conditions (without the development) against Do-Something conditions (with the development and its associated mitigation package). The report summarises the future year VISSIM modelling process, analyses the comparative performance, identifies the improvements achieved through the mitigation proposals, and details the impacts resulting from the proposed OxSRFI development.

2.3 Report Structure

2.3.1 This report is structured as follows:

- **Section 3: Modelling Methodology** – Details of the model development process and all scenarios tested
- **Section 4: Model Convergence** – Convergence results demonstrating model stability for all future year scenarios
- **Section 5: Model Performance Analysis** – Comprehensive comparative assessment including journey times, queue lengths, junction performance, and network-wide statistics

- **Section 6 Sensitivity and Limitations** – Discussion of demand sensitivity, design sensitivity, and model limitations
- **Section 7: Modelling Summary and Recommendations** – Overall conclusions and recommendations for stakeholder engagement

3 MODELLING METHODOLOGY

3.1 Overview

3.1.1 The VISSIM model focuses on the area around M40 Junction 10 and includes the following junctions:

- J1: A43/B4100 (Baynard's Green Roundabout)
- J2: M40 Off-Slip/A43 (Padbury Roundabout)
- J3: M40 On-Slip/A43/Services (Cherwell Junction)
- J4: M40 Off-Slip/A43/B430 (Ardley Roundabout)
- J5: B430/Ardley Road

3.1.2 The model extents are shown in **Figure 3.1**.

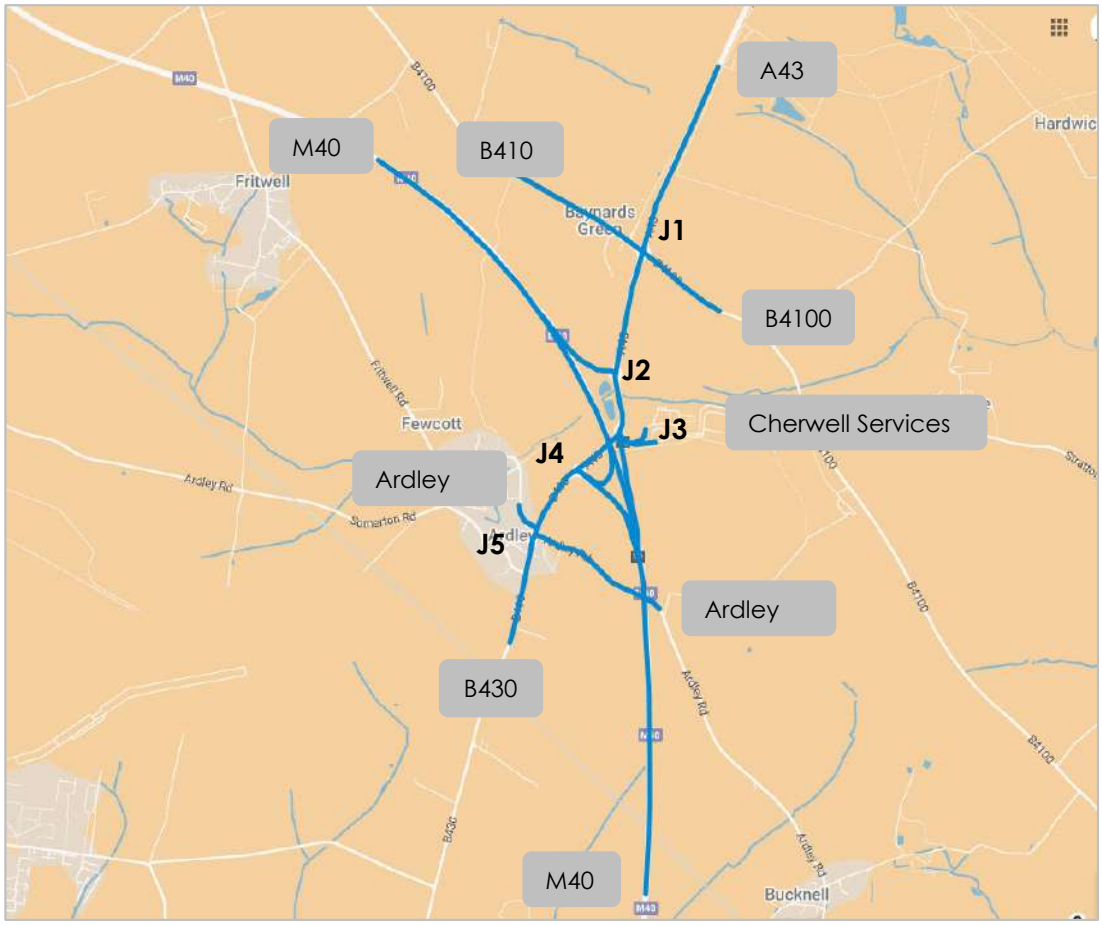

FIGURE 3.1: MODEL EXTENTS

3.1.3 The future year VISSIM models have been developed using the specification detailed in **Table 3.1**.

No.	Model Element	Details
1	VISSIM Version	Version 2021 (Service Pack 07)
2	Base Model Year	2016
3	Model Time Periods	AM Peak • Warm Up Period = 06:45-07:45 • Peak Period = 07:45-08:45 • Cool Down Period = 08:45-09:15 PM Peak • Warm Up Period = 15:30-16:30 • Peak Period = 16:30-17:30 • Cool Down Period = 17:30-18:00
4	Model Units	Length: • Kilometres • Metres Speed: • Miles per hour (mph) Acceleration: • Metres/second squared (m/s²)
5	Vehicle Types Used	• Cars • Light Goods Vehicles (LGVs) • Heavy Goods Vehicles (HGVs) • Buses/Coaches (modelled as public transport routes)

TABLE 3.1: MODEL SPECIFICATION

3.2 Scenarios Tested

3.2.1 The scenarios tested within the future year models are detailed in **Table 3.2**.

No.	Scenario Name	Elements Included
1	2031 Reference Case [RC1 SRN] – DfT Circular Compliant Scenario	Committed and allocated development and infrastructure (as per definition given in Footnote 21 of DfT Circular 01/2022.
2	2031 Do-Something [DS1 SRN] – DfT Circular Compliant Scenario	As SC1, but with the addition of the OxSRFI development and highway mitigation. This includes the proposed OxSRFI 'core' mitigation scheme at Baynard's Green roundabout
3	2031 Reference Case [RC1 SRN – SENS TEST] – DfT Circular	As SC1, but with the BTM outputs adjusted to account for the recommended methodology to

No.	Scenario Name	Elements Included
	Compliant Scenario [SENSITIVITY TEST]	apply the absolute BTM differences to the base VISSIM flows.
4	2031 Do-Something [DS1 SRN – SENS TEST] – DfT Circular Compliant Scenario [SENSITIVITY TEST]	As SC2, but with the BTM outputs adjusted to account for the recommended methodology to apply the absolute BTM differences to the base VISSIM flows.

TABLE 3.2: MODELLED SCENARIOS

3.3 Future Year Flows

Background, Committed & Proposed Flows

3.3.1 The Reference Case and Do-Something flows for all scenarios are based on outputs from the BTM. These flows were reviewed and approved by ADC Infrastructure Ltd before being provided to Modelling Group.

Flow Methodology 1: 'Pure' BTM Outputs

3.3.2 For scenarios 1 and 2, on receipt of the strategic flows, the peak hour flows for light and heavy vehicles have been converted into 15-minute origin-destination (O-D) matrices for the warm-up, peak and cool-down periods, based on the same proportional demands as the 2016 base model. For these scenarios, no adjustments have been made to the BTM flows before the conversion into VISSIM format.

3.3.3 Further details of the flow conversion can be found in **Appendix A**.

Flow Methodology 2: Adjusted BTM Outputs

3.3.4 For scenarios 3 and 4, before the conversion into 15-minute flows into VISSIM, the BTM flows have been adjusted to calculate the absolute differences the base and Reference Case/Do-Something scenarios, before being added to the base VISSIM flows.

3.3.5 Further details of the flow conversion can be found in **Appendix A**.

3.4 Network Development – Reference Case Scenario

3.4.1 The development of the Reference Case network was originally detailed in a Technical Note produced by Modelling Group back in March 2023 (provided in **Appendix B**).

3.4.2 The only difference in the network structure compared to the 2016 base network is the addition of the committed scheme to signalise Padbury junction. As a recap, the junction layouts at Baynard's Green, Padbury, Cherwell and Ardley are shown in **Figure 3.2**, **Figure 3.3**. **Figure 3.4** and **Figure 3.5** respectively.

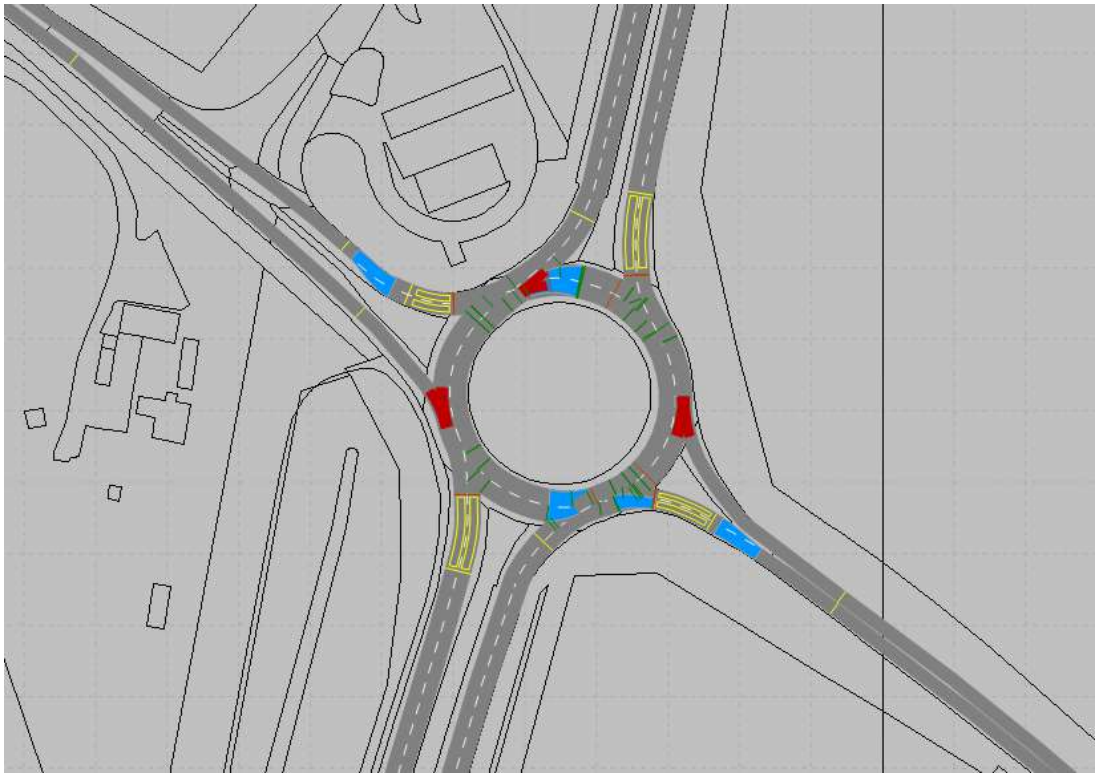

FIGURE 3.2: BAYNARD'S GREEN – EXISTING LAYOUT



FIGURE 3.3: PADBURY – EXISTING LAYOUT

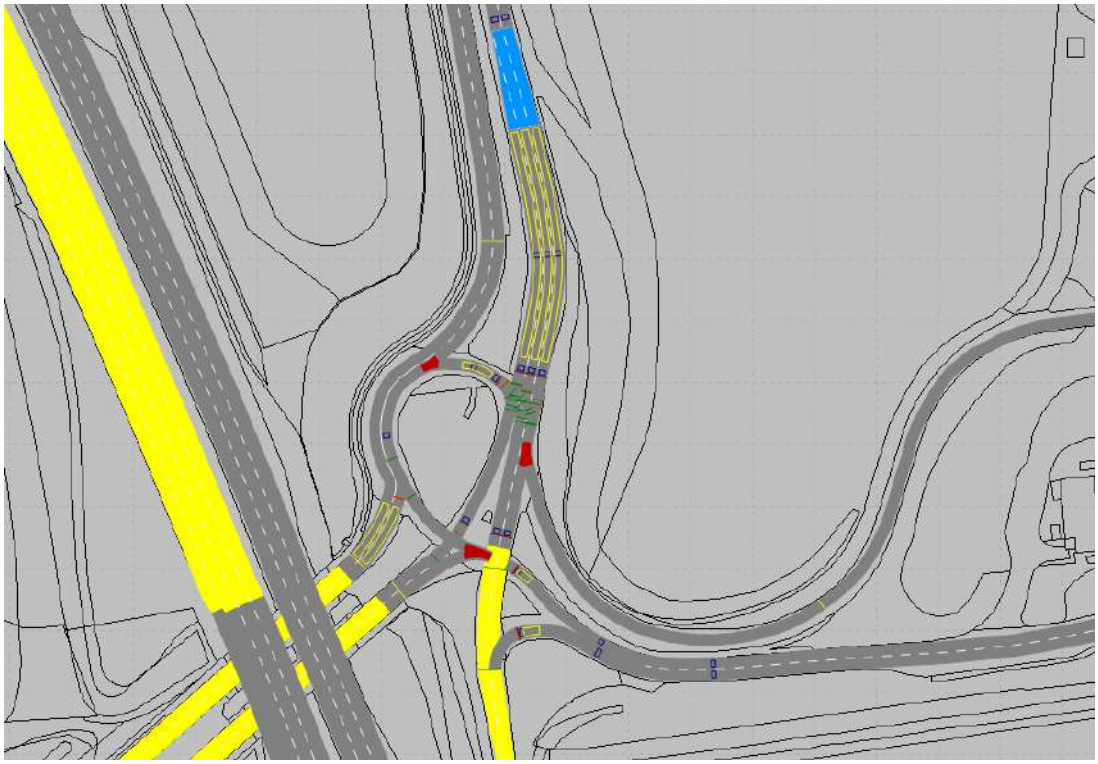

FIGURE 3.4: CHERWELL – EXISTING LAYOUT

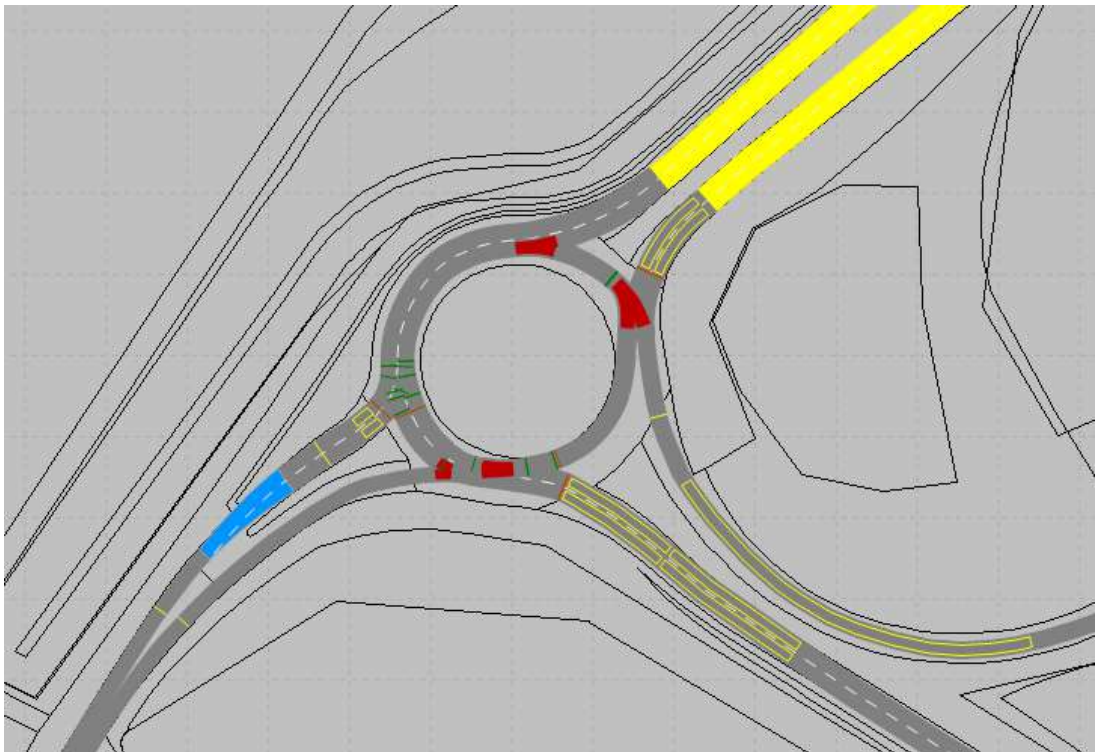

FIGURE 3.5: ARDLEY – EXISTING LAYOUT

3.5 Network Development – Do-Something Scenario

Proposed Development Mitigation Scheme:

Baynard's Green Roundabout

3.5.1 The Baynard's Green roundabout has been updated based on the OxSRFI proposed 'core' mitigation scheme. This includes a reconfiguration of the junction layout, forming a more 'lozenge' style shape to allow more queue storage for right-turning vehicles to all exits. The other changes include:

- Increased number of lanes on the A43 North, B4100 East and A43 South approaches.
- An increase in the number of exit lanes to the A43 North, B4100 East and A43 South.
- Increased numbers of lanes on the eastern and western circulatory sections.
- Pedestrian crossing facilities included across the B4100 East, A43 South and B4100 West arms.

Model Layout

3.5.2 The model layout showing the network elements to code in this scheme are shown in **Figure 3.6,** with the proposed OxSRFI mitigation drawing provided in **Appendix C**.

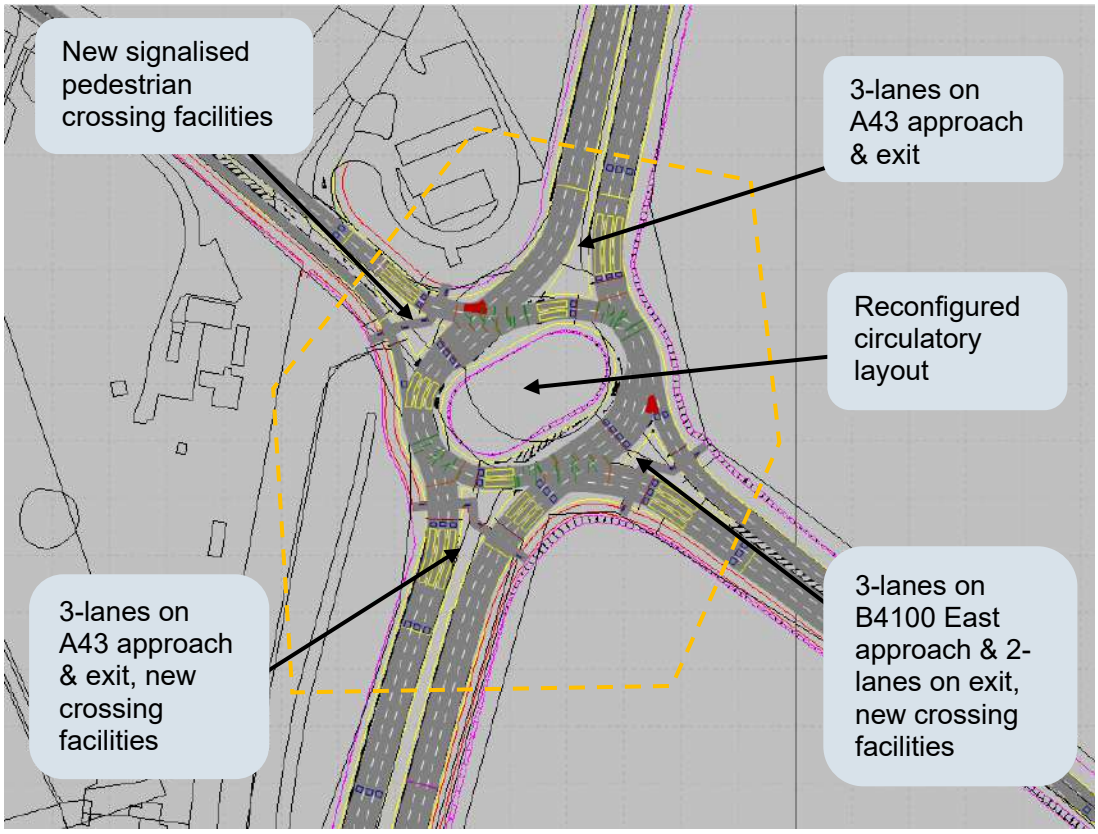

FIGURE 3.6: BAYNARD'S GREEN – OXSRFI LAYOUT

Signal Control

3.5.3 The signal control at Baynard's Green, initially configured as multiple streams across each node, was amended to a single stream junction control. This allows improved coordination of signal stages, more closely representing the likely on-street operation.

3.5.4 This signal operation is considered more representative of what would be achieved in the signal controller through hard linking and more bespoke special conditioning.

3.5.5 Following the change to a single stream configuration, the signal operation was reviewed and the MOVA dataset optimised. Additional queue functions were included to manage queuing on the A43 South (most notably in the PM peak) and to provide more flexible timings on the internal stop-lines during periods of heavy right-turning traffic.

Padbury, Cherwell, Ardley Junctions & M40 NB Off-Slip Link

3.5.6 The layouts at the Padbury, Cherwell and Ardley junctions, along with the new M40 northbound off-slip link and OxSRFI site access junction, are detailed in Section 3.5 of the supporting Modelling Impact Assessment Report.

3.5.7 No changes have been made to the layouts and configurations at any of these junctions as part of the assessments presented in this report.

3.6 Traffic Compositions

3.6.1 The same vehicle types, classes and compositions have been used as per the 2016 base model for the future year assessments.

4 MODEL CONVERGENCE

4.1 Overview

4.1.1 As the future year scenario models were developed using the dynamic assignment module, convergence testing was essential to ensure model stability before extracting performance results.

4.1.2 After initial batch runs to build up path (*.WEG) and cost (*.BEW) files for the AM and PM peaks, the various scenario models were tested for convergence.

4.1.3 The individual WEG files were extracted and analysed, together with total travel time from the network performance evaluation file, to verify convergence levels. This involved the following checks:

- **Travel Times Check 1** – Calculating the share of paths that met the convergence criteria as set out in TAG Unit 3.1 (95% within 20% for four consecutive runs)
- **Travel Times Check 2** – Using the WEG file from VISSIM, an additional check identifying whether the internal VISSIM convergence criteria were met for all paths
- **Volume Difference** – Using the New and Old path volumes to check that the convergence criteria were met as set out in TAG (95% within 5 vehicles for a minimum of four consecutive runs)
- **Total Travel Time Difference** – Using the Network Performance evaluation outputs to check the percentage differences between runs and determine whether this met TAG criteria (within 1% for four consecutive runs)

4.2 Convergence Results

2031 RC1 Results

4.2.1 The convergence results for the 2031 Reference Case AM and PM peaks are provided in **Appendix D**. The AM peak converged after 10 runs and the PM peak converged after 10 runs.

4.2.2 The model was converged using 80% of total demand, in accordance with guidance provided by PTV, which states that for congested networks, running models with lower traffic demands to achieve convergence can produce the same paths and distribution[4] (see quoted section). This methodological choice is

[4] https://support.ptvgroup.com/en-us/knowledgebase/article/KA-04706)

discussed further in Section 6 (Sensitivity and Limitations), where the implications for assessment robustness are examined in detail.

> "Heavily overloaded networks typically never converge. Therefore, it may be reasonable to assume that the paths and distribution achieved from convergence runs at 70% traffic volume is similar to those at 100% traffic volume. Rather than assigning 100% demand and never achieving convergence in a congested network, the paths could be developed using incremental increases in demand up to e.g. 70%. At this point, the demand could be fixed at 70% for convergence runs. Assuming that convergence is achieved and the paths are reviewed for suitability, the demand could be increased back to 100% for evaluation runs."

2031 DS1 Results

4.2.3 The convergence results for the Do-Something AM and PM peaks are provided in **Appendix D**. The AM peak converged after 19 runs and the PM peak converged after 9 runs. Both the AM and PM peaks were run with 80% of the total demand.

4.2.4 For the volume difference criterion, the results stabilised at 85–86% and did not increase further. The model's complex link/connector structure produces a significant number of edges and possible paths, including multiple route options for certain origin-destination pairs. Under the strict TAG criterion (0–5 vehicle difference), paths with low flows can oscillate between alternative routes without achieving mathematical convergence. The consistent stabilisation of this metric at 85–86% in both peak models confirms that the model is stable from a path volume perspective.

2031 RC1 – SENS TEST Results

4.2.5 The convergence results for the 2031 Reference Case Sensitivity Test AM and PM peaks are provided in **Appendix D**. Both peaks converged after 10 runs, with both tested with 80% of the total demand.

2031 DS1 – SENS TEST Results

4.2.6 The convergence results for the 2031 Do-Something Sensitivity Test AM and PM peaks are provided in **Appendix D**. The AM peak converged against the Path Journey Times and Network Performance criteria after 27 runs, with the PM peak also converging after 15 runs. Both scenarios were tested with 80% of the total demand, consistent with the other scenarios.

4.2.7 As with the 2031 Do-Something scenario, the volume difference results stabilised at 85-86% and did not increase further, for the same structural reasons described

in para 4.2.4. The consistent stabilisation of this metric confirms that the model is stable from a path volume perspective.

5 MODEL PERFORMANCE ANALYSIS

5.1 Overview

5.1.1 The impact of the development on the local network in all future year scenario tests has been assessed using the following model outputs:

- Journey Times
- Queue Lengths
- Junction Performance – Average Vehicle Delays
- Network Performance
  - Average Vehicle Delay
  - Average Speed
  - Latent Demand

5.1.2 Further details on the specific configurations for each of the modelled outputs can be found in Section 5 of the supporting report[5].

5.2 Random Seeds

5.2.1 The results for each modelled scenario have been averaged over 20-seeds (starting seed 42, increment of 10) to reflect daily fluctuations in overall network operation.

[5] MG0163_OxfordSRFI_R_01-D_Final_MIAR (dated 12th March 2026)

5.3 Scenario Comparison Analysis – 2031 RC1 & 2031 DS1

Overview

5.3.1 The first comparative analysis is of the 2031 Do-Something (DS1) scenario against the 2031 Reference Case (RC1) scenario. Journey Time Results – AECOM TN Comparisons

5.3.2 The journey time comparisons for the routes associated with Set 1 can be seen in **Table 5.1** and **Table 5.2**.

AM Peak

5.3.3 The most notable finding from the AM peak analysis is that the mitigation scheme delivers significant benefits to vehicles travelling southbound on the A43 North through Baynard's Green roundabout. Journey times on this strategic movement reduce from 3 minutes 43 seconds (Reference Case) to 45 seconds (Do-Something) – a reduction of 2 minutes 58 seconds, an 80% improvement. This improvement resolves the operational issues identified in the Reference Case, where there were 785 vehicles unable to enter the network from the A43 North approach as a result of queuing back from the Baynard's Green roundabout.

5.3.4 The 785-vehicle latent demand is eliminated entirely with the Baynard's Green improvements in place, as a result of two mitigation elements. Firstly, the reconfiguration of the junction to provide additional lanes for vehicles to use, complemented by the full signalisation of the roundabout. These interventions eliminate the capacity constraint that creates the Reference Case queuing.

5.3.5 The Ardley roundabout to Cherwell junction movement shows a 30 second increase in journey time, but this is experienced by a greatly reduced number of vehicles (656 vehicles against 1,312 vehicles in the Reference Case). The introduction of the new M40 northbound off-slip that joins at Padbury junction transfers 656 vehicles to the new slip road, that would otherwise have to travel through Ardley and Cherwell junctions. This frees up capacity on the A43 northbound link between Ardley and Cherwell for additional right-turning traffic to Cherwell Services and the M40 South, which still has to queue at the signalised node with the A43 North and the heavy southbound movement.

5.3.6 . It is important to note that this comparison is made against a Reference Case in which over 1,100 vehicles are unable to enter the network due to queuing at Baynard's Green. The absence of these vehicles masks the true operational

impacts at the junctions south of Baynard's Green, and this context should be considered when interpreting the Reference Case results.

5.3.7 All other movements in the AM peak have journey time differences of ±1-10s, which are unlikely to be noticed when driving these routes.

PM Peak

5.3.8 As in the AM peak, the most important element to consider when comparing the PM peak results is that the Reference Case includes nearly 400 vehicles unable to enter the model as a result of severe queuing at Baynard's Green. This will subsequently mask the true impacts on the performance at Padbury, Cherwell, Ardley and Ardley Crossroads.

5.3.9 The most notable journey time change in the Do-Something scenario is a 40s increase from Ardley to Cherwell. However, as in the AM peak, this needs to be considered in the context of 840 trips being diverted to the new M40 northbound off-slip that joins Padbury junction. This frees up capacity on the A43 northbound link for additional traffic to turn right towards Cherwell Services and the M40 South, albeit through a signalised node that conflicts with the heavy A43 southbound movement.

5.3.10 There is an improvement in journey time between Padbury and Baynard's Green with the OxSRFI development of 21 seconds, which is the result of the Baynard's Green roundabout improvements. The larger junction and introduction of signals help to improve the flow of traffic around this junction.

5.3.11 All other movements in the PM peak have journey time differences of ±1-14s, which are unlikely to be noticed when driving these routes.

ALL VEHICLES									
No.	Route			2031 RC1		2031 DS1		Difference (JTs)	
	From	To	Dist.	Avg.	Trips	Avg.	Trips	No.	%
1	SB1 - A43 North	SB1 - Baynards Green	424m	00:03:43	1503	00:00:45	2579	-00:02:58	▼ 80%
2	SB2 - Baynards Green	SB2 - Padbury	718m	00:00:49	1323	00:00:55	1534	00:00:06	▲ 11%
3	SB3 - Padbury	SB3 - Cherwell	347m	00:00:37	1583	00:00:46	1637	00:00:09	▲ 24%
4	SB4 - Cherwell	SB4 - M40 On-Slip	154m	00:00:15	1078	00:00:16	1579	00:00:01	▲ 5%
5	SB5 - M40 On-Slip	SB5 - M40	862m	00:00:41	1296	00:00:43	1973	00:00:02	▲ 6%
6	NB1 - M40	NB1 - Ardley	858m	00:00:50	1332	00:00:54	786	00:00:04	▲ 9%
7	NB2 - Ardley	NB2 - Cherwell	376m	00:00:29	1312	00:00:58	656	00:00:30	▲ 104%
8	NB3 - Cherwell	NB3 - Padbury	373m	00:00:31	1336	00:00:41	680	00:00:10	▲ 34%
9	NB4 - Padbury	NB4 - Baynards Green	664m	00:00:49	1401	00:00:51	681	00:00:02	▲ 5%
10	NB5 - Baynards Green	NB5 - A43 North	521m	00:00:27	1351	00:00:34	1278	00:00:07	▲ 25%

TABLE 5.1: JOURNEY TIME COMPARISONS (SET 1) – 2031 RC1&DS1 – AM

ALL VEHICLES									
No.	Route			2031 RC1		2031 DS1		Difference (JTs)	
	From	To	Dist.	Avg.	Trips	Avg.	Trips	No.	%
1	SB1 - A43 North	SB1 - Baynards Green	424m	00:00:44	1827	00:00:40	1873	-00:00:04	▼ 9%
2	SB2 - Baynards Green	SB2 - Padbury	718m	00:00:48	1494	00:00:52	1333	00:00:04	▲ 9%
3	SB3 - Padbury	SB3 - Cherwell	347m	00:00:38	1693	00:00:39	1378	00:00:01	▲ 3%
4	SB4 - Cherwell	SB4 - M40 On-Slip	154m	00:00:16	1264	00:00:15	1271	-00:00:01	▼ 5%
5	SB5 - M40 On-Slip	SB5 - M40	862m	00:00:40	1547	00:00:41	1655	00:00:01	▲ 3%
6	NB1 - M40	NB1 - Ardley	858m	00:00:47	1825	00:00:45	1037	-00:00:03	▼ 6%
7	NB2 - Ardley	NB2 - Cherwell	376m	00:00:31	1748	00:01:10	908	00:00:40	▲ 129%
8	NB3 - Cherwell	NB3 - Padbury	373m	00:00:32	1690	00:00:45	1341	00:00:14	▲ 44%
9	NB4 - Padbury	NB4 - Baynards Green	664m	00:01:20	1755	00:00:59	1347	-00:00:21	▼ 26%
10	NB5 - Baynards Green	NB5 - A43 North	521m	00:00:27	1746	00:00:37	2305	00:00:10	▲ 36%

TABLE 5.2: JOURNEY TIME COMPARISONS (SET 1) – 2031 RC1&DS1 – PM

Journey Time Results – O-D Pair Comparisons

5.3.12 Where journey time comparisons can be made for the routes associated with Set 2, these are shown in **Table 5.3** and **Table 5.4**, with the full suite of O-D pair results shown in **Appendix E.**

AM Peak

5.3.13 The O-D pair journey time comparisons highlight significant improvements from the A43 North, B4100 East and B4100 West. Journey time savings in the range of 3 minutes 21 seconds to nearly 6 minutes (33%-80% time reductions) from the A43 North, B4100 East and B4100 West to other zones in the network highlight the major benefits that are provided by the Baynard's Green junction improvements. The introduction of the signals in particular provides more opportunities for vehicles on all arms to progress around the junction (and therefore continue on their journeys quicker). This is compared to the existing priority control set-up, where vehicles (most notably on the B4100 East and West approaches) have to queue and wait for gaps on the busy A43 movements to continue on their routes.

5.3.14 There are only two movements where there is a journey increase above 1 minute. This is for routes from Cherwell Services to the A43 North and the M40 North. On these routes, the journey times are increased by increases of 1 minute 41 seconds and 1 minute 8 seconds respectively. The increase from Cherwell Services to the A43 North is a result of the closure of the right-turn lane at Cherwell to travel north, with the requirement to now turn right at Ardley roundabout and then travel northbound on the A43, thereby increasing the distance travelled. The increase from the Cherwell Services to the M40 North is a result of the requirement to negotiate through two new signalised stop-lines (A43 North approach and Cut-Through stop-line at Ardley roundabout), therefore increasing time spent delayed at signalised stop-lines.

5.3.15 Elsewhere, journey time changes are all within ±60s, indicating similar performance to the Reference Case. However, this comparison must be considered in the context of over 1,100 vehicles being unable to enter the network in the Reference Case, which masks the true impacts at junctions south of Baynard's Green in the Reference Case.

PM Peak

5.3.16 In the PM peak, there are significant journey time benefits (as in the AM peak) from the B4100 East and B4100 East entry points, where savings range from 3 minutes 49 seconds to 5 minutes 15 seconds (36%-78% time reductions). The

improvements are again attributed to the improvements at Baynard's Green and the introduction of the signals, providing better opportunities for vehicles to progress on their journeys around the junction. This is opposed to having to wait for gaps, particularly on the B4100 approaches for the busy A43 movements in the Reference Case.

5.3.17 As in the AM peak, there are increases in journey times from Cherwell Services to the A43 North and M40 North in the Do-Something scenario, with increases of 1 minute 26 seconds and 1 minute respectively. As discussed, this is a result of the closure of the right-turn lane at Cherwell to travel north to the A43, along with the additional signalised stop-lines to travel through to access the M40 North.

5.3.18 The only other journey time difference of note is from the Ardley Road East to the M40 North, where there is an increase in the Do-Something scenario of 1 minute 6 seconds. This is attributed to the reduction in the speed limit on the B430 to 40mph and then 20mph through Ardley village (which was previously a national speed limit and 30mph through the village).

5.3.19 All other journey time changes are within ±60s. As in the AM peak, this must be considered in the context of nearly 400 vehicles being unable to enter the network in the Reference Case, which masks the true impacts at junctions south of Baynard's Green in the Reference Case.

ALL VEHICLES									
No.	Route			2031 RC1		2031 DS1		Difference (JTs)	
	From	To	Dist.	Avg.	Trips	Avg.	Trips	No.	%
2	A43 North	B4100 East	1220 m	00:06:34	171	00:01:23	363	-00:05:11	▼ 79%
3	A43 North	Cherwell Services	2045 m	00:07:57	48	00:03:00	59	-00:04:57	▼ 62%
4	A43 North	M40 South	5269 m	00:09:56	998	00:05:09	1491	-00:04:47	▼ 48%
7	A43 North	B4100 West	1216 m	00:06:39	11	00:01:55	34	-00:04:44	▼ 71%
13	B4100 East	A43 North	1298 m	00:05:41	217	00:01:57	232	-00:03:43	▼ 66%
18	B4100 East	M40 North	7047 m	00:10:05	161	00:06:44	39	-00:03:21	▼ 33%
19	B4100 East	B4100 West	915 m	00:05:40	231	00:01:44	255	-00:03:57	▼ 70%
25	Cherwell Services	A43 North	2062 m	00:02:45	62	00:04:27	63	00:01:41	▲ 61%
28	Cherwell Services	M40 South	3597 m	00:03:02	213	00:03:35	278	00:00:33	▲ 18%
30	Cherwell Services	M40 North	5726 m	00:04:25	148	00:05:33	149	00:01:08	▲ 26%
37	M40 South	A43 North	5550 m	00:04:45	1079	00:05:16	1052	00:00:31	▲ 11%
39	M40 South	Cherwell Services	4071 m	00:03:40	225	00:04:33	226	00:00:53	▲ 24%
41	M40 South	B430	5013m	00:04:10	2	00:04:44	1	00:00:35	▲ 14%
42	M40 South	M40 North	8281 m	00:04:43	2987	00:04:44	2924	00:00:01	▲ 0%
43	M40 South	B4100 West	5167 m	00:04:29	8	00:04:55	4	00:00:26	▲ 10%
44	M40 South	Ardley Rd West	3927 m	00:03:06	14	00:03:22	12	00:00:16	▲ 9%
57	B430	Ardley Rd East	2045 m	00:01:50	92	00:02:27	19	00:00:36	▲ 33%
62	M40 North	B4100 East	5836 m	00:04:29	305	00:05:15	205	00:00:46	▲ 17%
63	M40 North	Cherwell Services	5231 m	00:04:20	189	00:04:38	191	00:00:18	▲ 7%
64	M40 North	M40 South	8295 m	00:04:54	3586	00:04:57	3457	00:00:04	▲ 1%
67	M40 North	B4100 West	5635m	00:04:09	30	00:04:28	4	00:00:19	▲ 8%
68	M40 North	Ardley Rd West	5905 m	00:05:03	12	00:05:39	12	00:00:36	▲ 12%
69	M40 North	Ardley Rd East	6561 m	00:05:27	59	00:06:18	18	00:00:51	▲ 16%
73	B4100 West	A43 North	1116 m	00:07:25	53	00:01:29	71	-00:05:55	▼ 80%
74	B4100 West	B4100 East	934 m	00:07:34	293	00:01:35	298	-00:05:59	▼ 79%
76	B4100 West	M40 South	4983 m	00:10:36	81	00:05:11	93	-00:05:24	▼ 51%
85	Ardley Rd West	A43 North	2697 m	00:03:02	4	00:03:47	4	00:00:45	▲ 25%
88	Ardley Rd West	M40 South	4442 m	00:04:15	2	00:04:49	22	00:00:34	▲ 13%

ALL VEHICLES									
No.	Route			2031 RC1		2031 DS1		Difference (JTs)	
	From	To	Dist.	Avg.	Trips	Avg.	Trips	No.	%
90	Ardley Rd West	M40 North	5887 m	00:03:59	10	00:04:40	10	00:00:42	▲ 17%
93	Ardley Rd West	Ardley Rd East	1011 m	00:01:05	43	00:01:24	12	00:00:19	▲ 30%
101	Ardley Rd East	B430	2030 m	00:01:55	162	00:02:32	5	00:00:38	▲ 33%
102	Ardley Rd East	M40 North	6579 m	00:04:29	118	00:05:26	150	00:00:57	▲ 21%
104	Ardley Rd East	Ardley Rd West	1014 m	00:00:57	12	00:01:17	8	00:00:21	▲ 37%

TABLE 5.3: JOURNEY TIME COMPARISONS (SET 2) – 2031 RC1&DS1 – AM

ALL VEHICLES									
No.	Route			2031 RC1		2031 DS1		Difference (JTs)	
	From	To	Dist.	Avg.	Trips	Avg.	Trips	No.	%
2	A43 North	B4100 East	1220 m	00:01:27	266	00:01:30	253	00:00:03	▲ 4%
3	A43 North	Cherwell Services	2045 m	00:02:50	105	00:02:40	106	-00:00:10	▼ 6%
4	A43 North	M40 South	5269 m	00:04:46	1217	00:04:43	1218	-00:00:03	▼ 1%
7	A43 North	B4100 West	1216 m	00:01:30	68	00:02:14	44	00:00:45	▲ 50%
13	B4100 East	A43 North	1298 m	00:06:21	254	00:02:36	316	-00:03:45	▼ 59%
16	B4100 East	M40 South	4968 m	00:09:38	3	00:05:12	8	-00:04:26	▼ 46%
18	B4100 East	M40 North	7047 m	00:10:49	148	00:07:14	44	-00:03:34	▼ 33%
19	B4100 East	B4100 West	915 m	00:06:21	173	00:02:30	266	-00:03:50	▼ 60%
20	B4100 East	Ardley Rd West	2417 m	00:08:21	3	00:04:24	4	-00:03:57	▼ 47%
25	Cherwell Services	A43 North	2062 m	00:03:22	87	00:04:22	88	00:00:59	▲ 29%
28	Cherwell Services	M40 South	3597 m	00:03:00	262	00:03:01	262	00:00:02	▲ 1%
30	Cherwell Services	M40 North	5726 m	00:04:29	176	00:05:06	177	00:00:37	▲ 14%
37	M40 South	A43 North	5550 m	00:05:25	1516	00:05:33	1686	00:00:08	▲ 3%
38	M40 South	B4100 East	5368 m	00:05:32	4	00:06:28	8	00:00:56	▲ 17%
39	M40 South	Cherwell Services	4071 m	00:03:59	213	00:04:21	213	00:00:22	▲ 9%
41	M40 South	B430	5013 m	00:04:02	8	00:03:52	2	-00:00:10	▼ 4%
42	M40 South	M40 North	8281 m	00:04:53	3959	00:04:56	3835	00:00:03	▲ 1%
44	M40 South	Ardley Rd West	3927 m	00:03:07	69	00:03:18	41	00:00:11	▲ 6%
62	M40 North	B4100 East	5836 m	00:05:01	167	00:05:55	221	00:00:53	▲ 18%
63	M40 North	Cherwell Services	5231 m	00:04:19	196	00:04:34	197	00:00:14	▲ 5%
64	M40 North	M40 South	8295 m	00:04:46	3365	00:04:47	3349	00:00:02	▲ 1%
68	M40 North	Ardley Rd West	5905 m	00:04:56	16	00:05:25	16	00:00:29	▲ 10%
69	M40 North	Ardley Rd East	6561 m	00:05:23	41	00:05:49	12	00:00:26	▲ 8%
73	B4100 West	A43 North	1116 m	00:06:44	56	00:01:51	44	-00:04:53	▼ 73%
74	B4100 West	B4100 East	934 m	00:06:51	219	00:02:09	142	-00:04:42	▼ 69%
76	B4100 West	M40 South	4983 m	00:09:24	44	00:05:15	34	-00:04:09	▼ 44%

ALL VEHICLES									
No.	Route			2031 RC1		2031 DS1		Difference (JTs)	
	From	To	Dist.	Avg.	Trips	Avg.	Trips	No.	%
85	Ardley Rd West	A43 North	2697 m	00:03:43	8	00:04:04	8	00:00:21	▲ 9%
90	Ardley Rd West	M40 North	5887 m	00:04:13	8	00:04:41	8	00:00:28	▲ 11%
93	Ardley Rd West	Ardley Rd East	1011 m	00:01:03	24	00:01:01	12	-00:00:01	▼ 2%
101	Ardley Rd East	B430	2030 m	00:01:49	8	00:01:33	4	-00:00:16	▼ 15%
102	Ardley Rd East	M40 North	6579 m	00:04:40	81	00:05:07	132	00:00:27	▲ 10%
104	Ardley Rd East	Ardley Rd West	1014 m	00:00:55	32	00:00:54	8	-00:00:02	▼ 3%

TABLE 5.4: JOURNEY TIME COMPARISONS (SET 2) – 2031 RC1&DS1 – PM

Queue Length Results

5.3.20 The mean-maximum queue lengths at Baynard's Green, Padbury, Cherwell, Ardley, Ardley Crossroads and the new Ardley Bypass junction are shown in **Figure 5.1-5.6** for the AM peak and **Figure 5.7-5.12** for the PM peak.

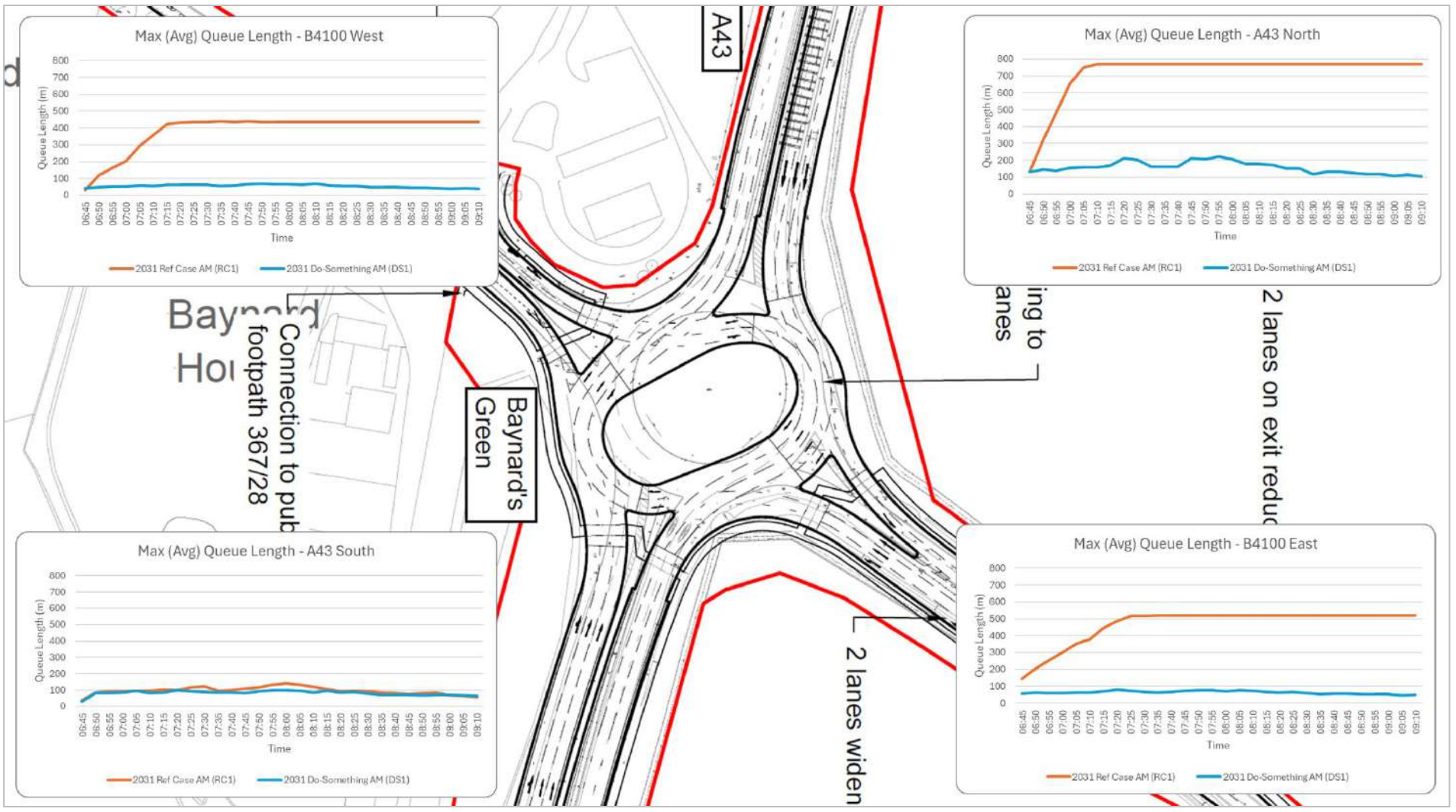

FIGURE 5.1: MAXIMUM (AVERAGE) QUEUE LENGTHS – 2031 RC1&DS1 – AM – BAYNARD'S GREEN



FIGURE 5.2: MAXIMUM (AVERAGE) QUEUE LENGTHS – 2031 RC1&DS1 – AM – PADBURY

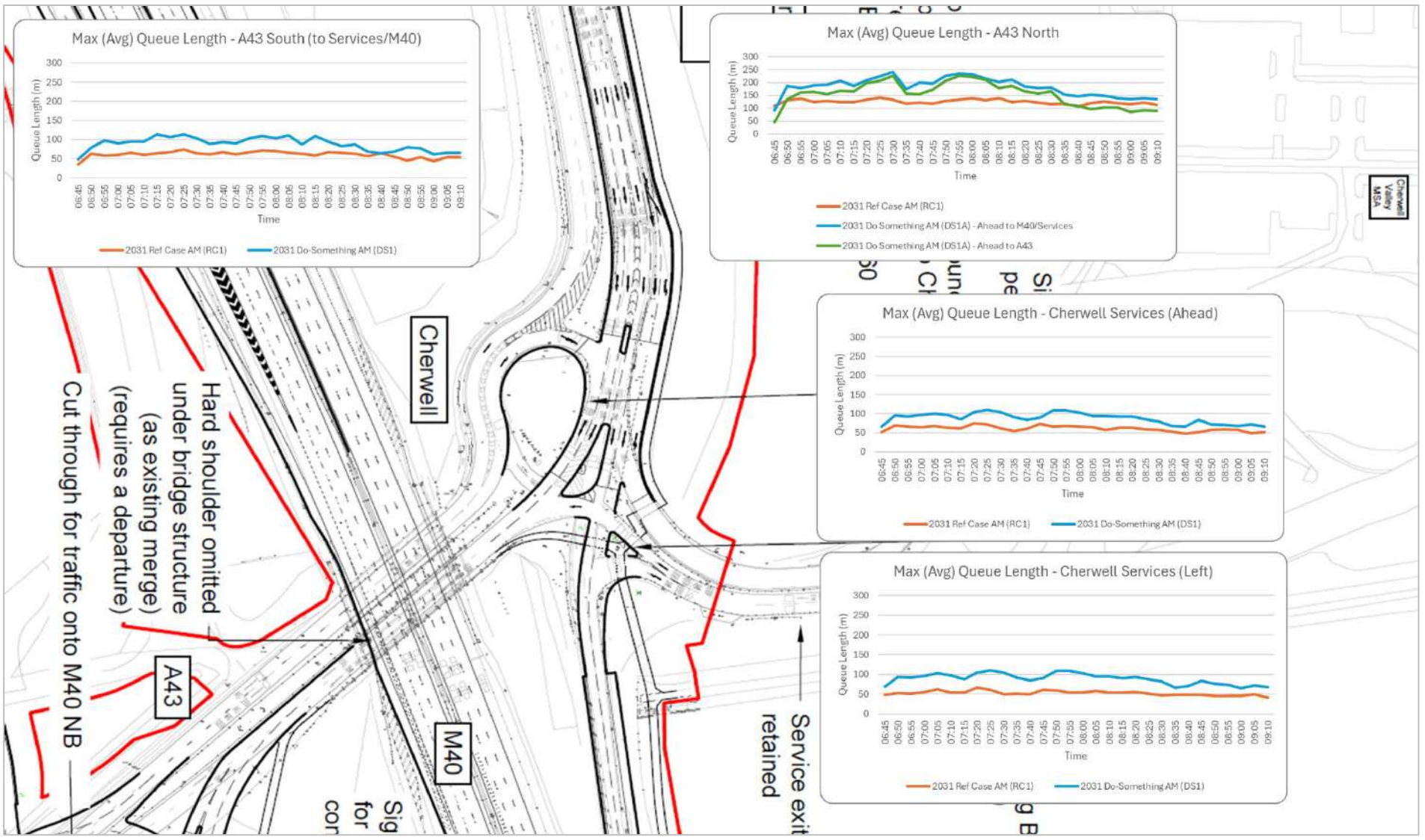

FIGURE 5.3: MAXIMUM (AVERAGE) QUEUE LENGTHS – 2031 RC1&DS1 – AM – CHERWELL

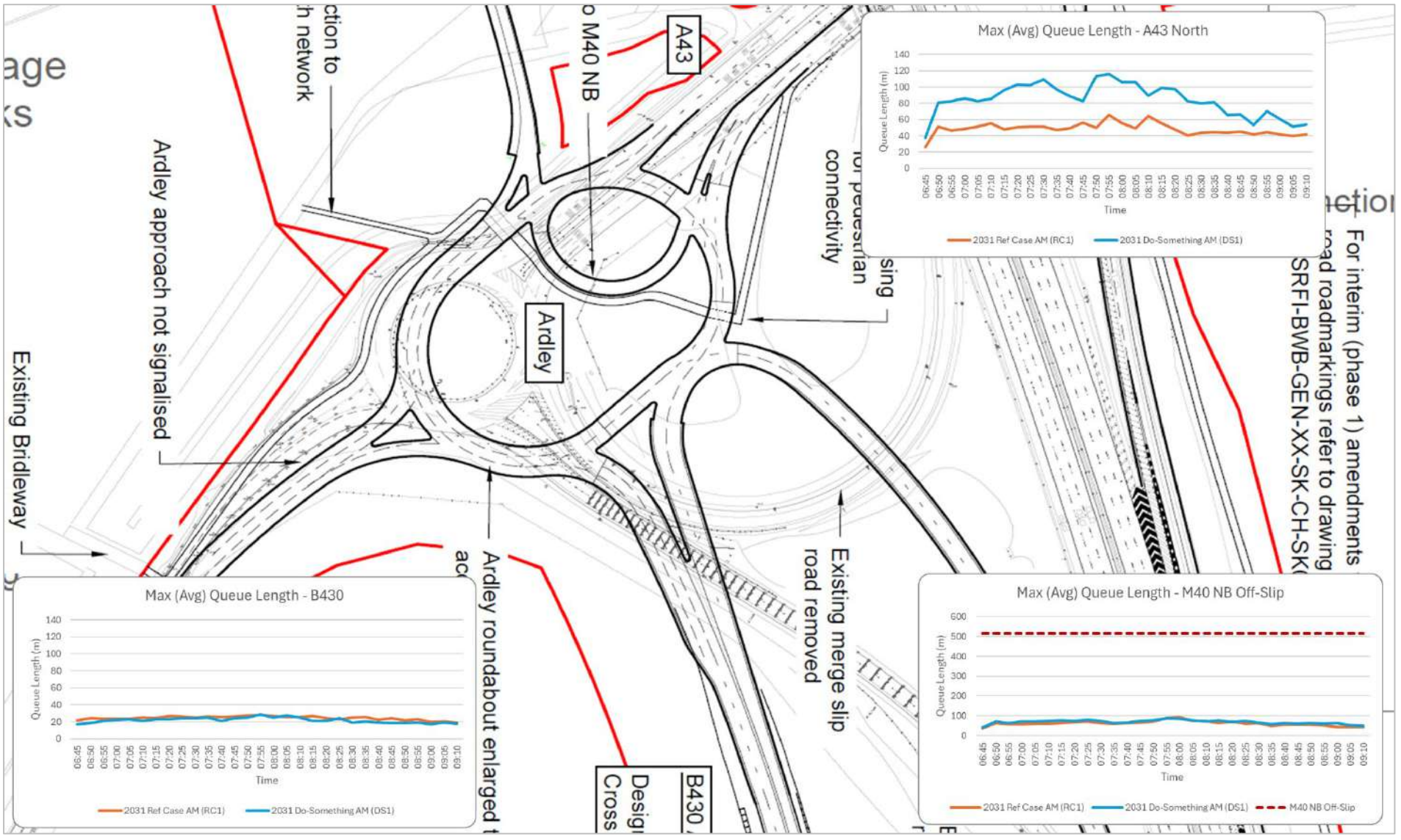

FIGURE 5.4: MAXIMUM (AVERAGE) QUEUE LENGTHS – 2031 RC1&DS1 – AM – ARDLEY

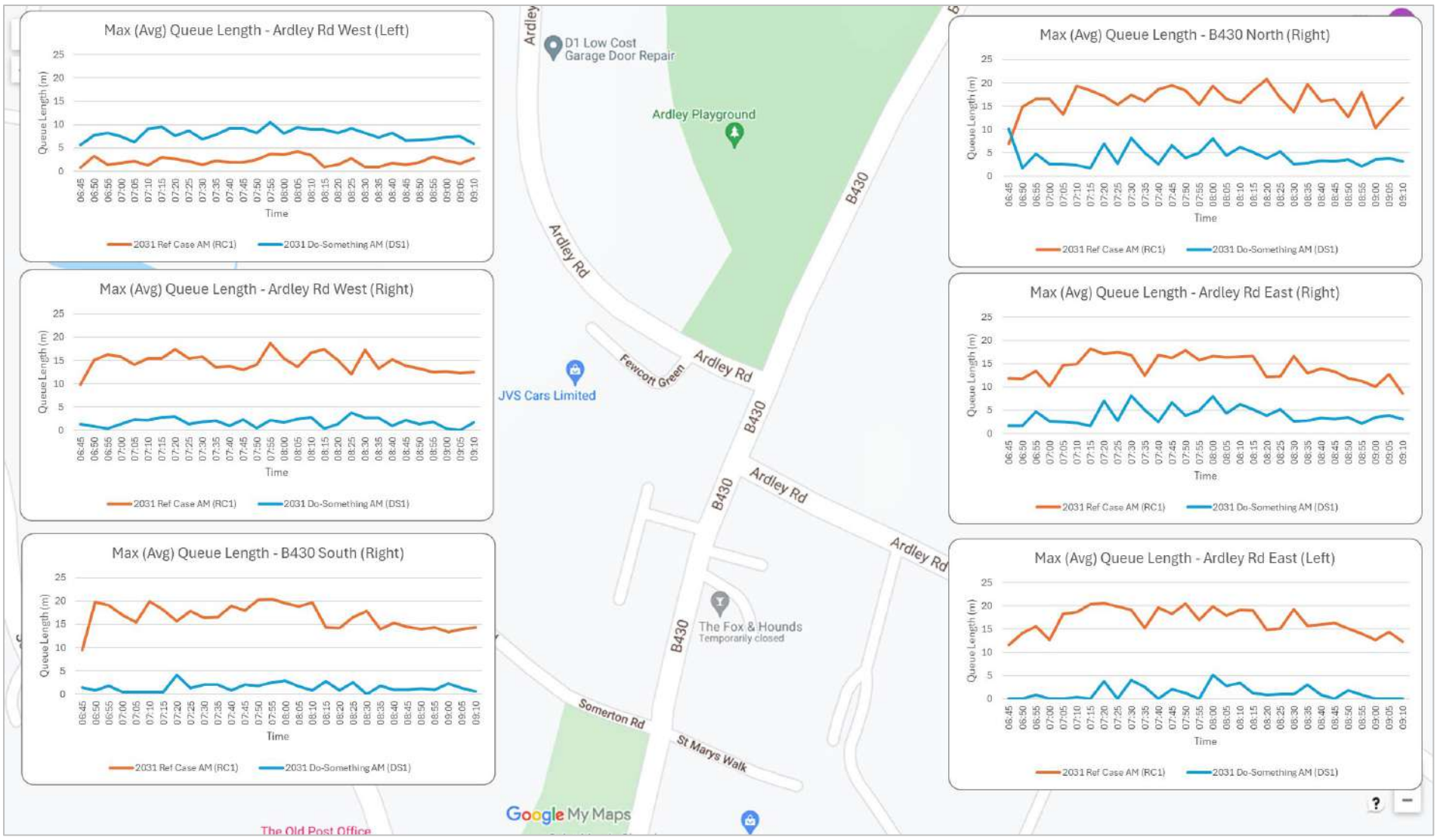

FIGURE 5.5: MAXIMUM (AVERAGE) QUEUE LENGTHS – 2031 RC1&DS1 – AM – ARDLEY CROSSROADS

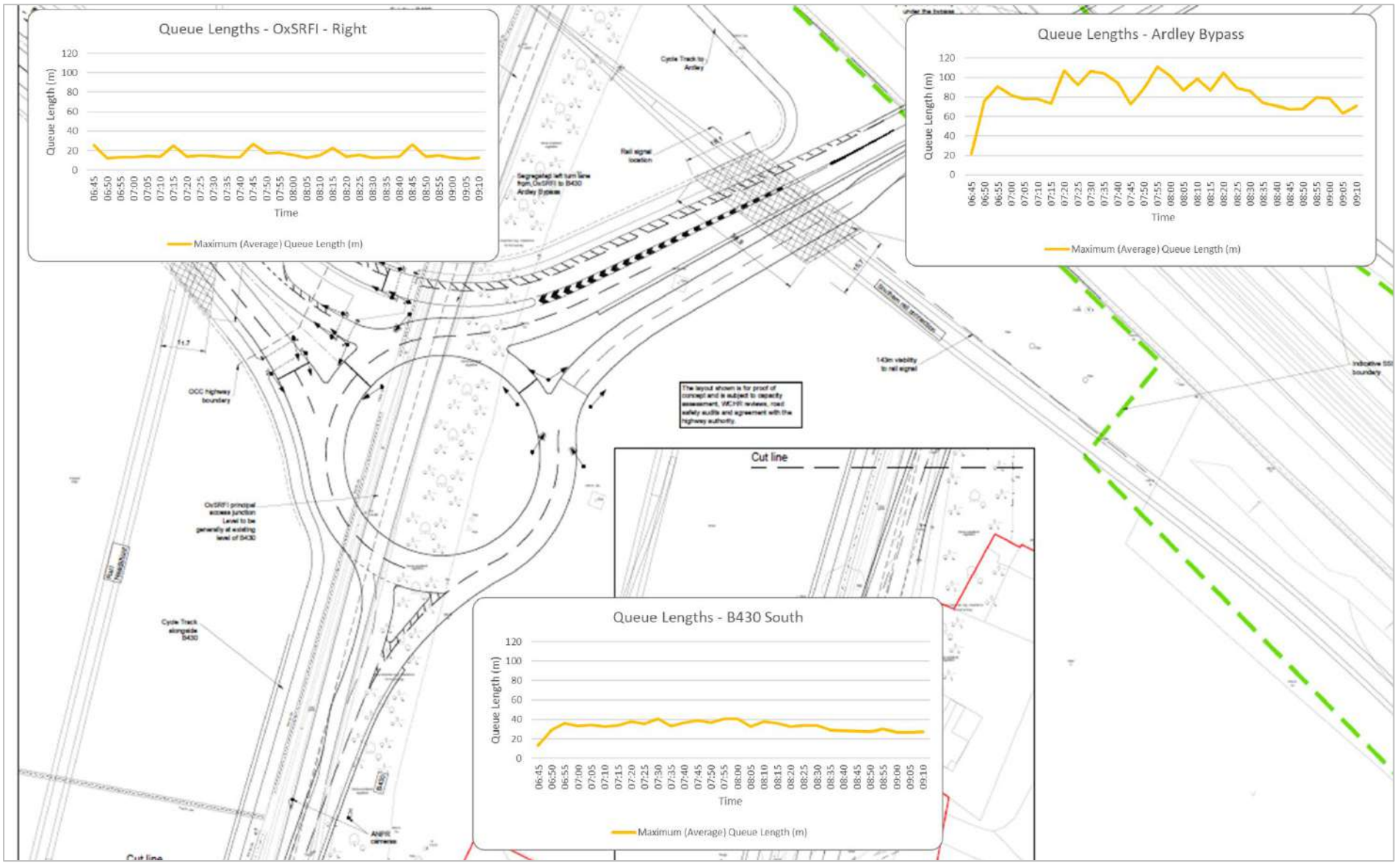

FIGURE 5.6: MAXIMUM (AVERAGE) QUEUE LENGTHS – 2031 DS1 – AM – OXSRFI/ARDLEY BYPASS

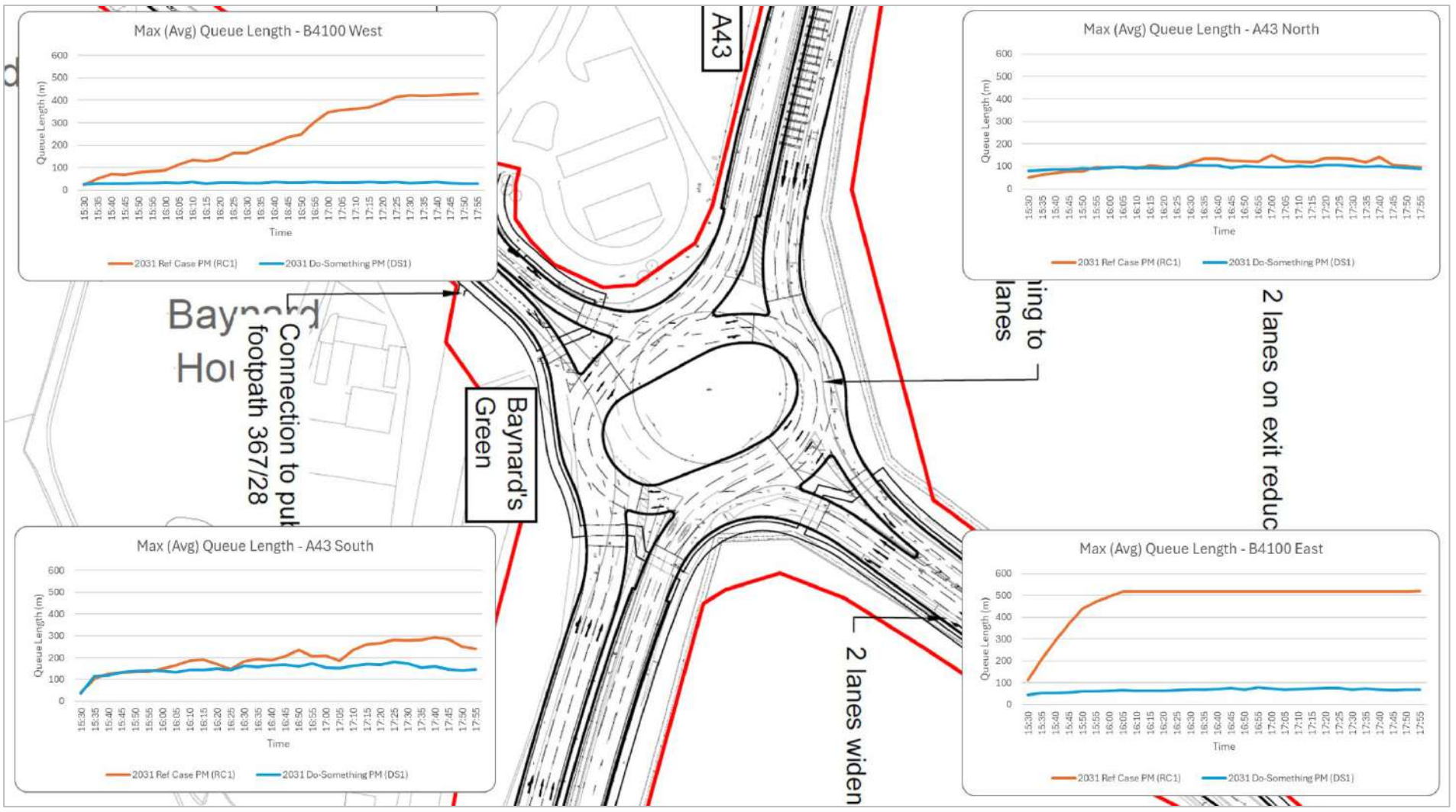

FIGURE 5.7: MAXIMUM (AVERAGE) QUEUE LENGTHS – 2031 RC1&DS1 – PM – BAYNARD'S GREEN

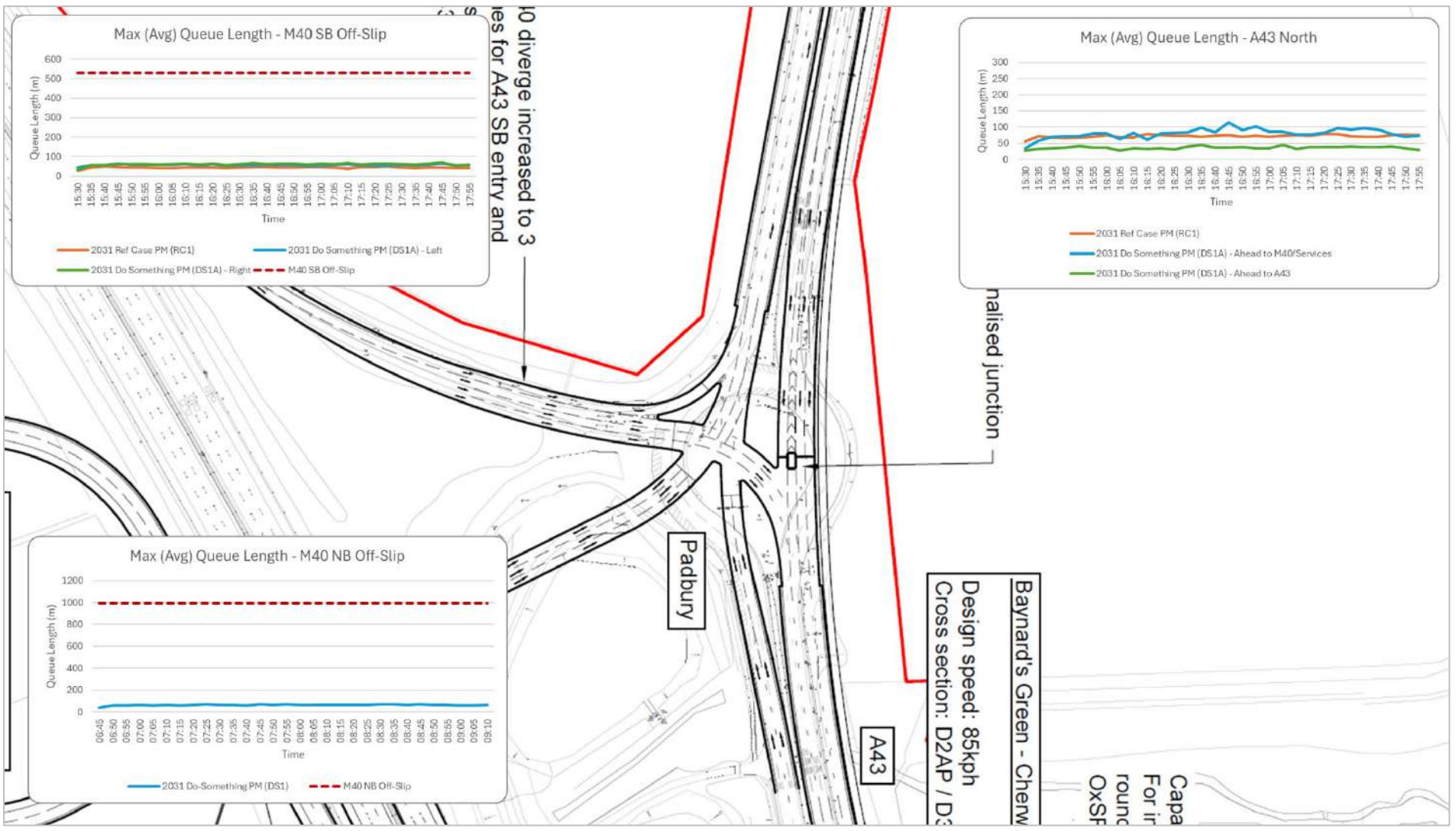

FIGURE 5.8: MAXIMUM (AVERAGE) QUEUE LENGTHS – 2031 RC1&DS1 – PM – PADBURY

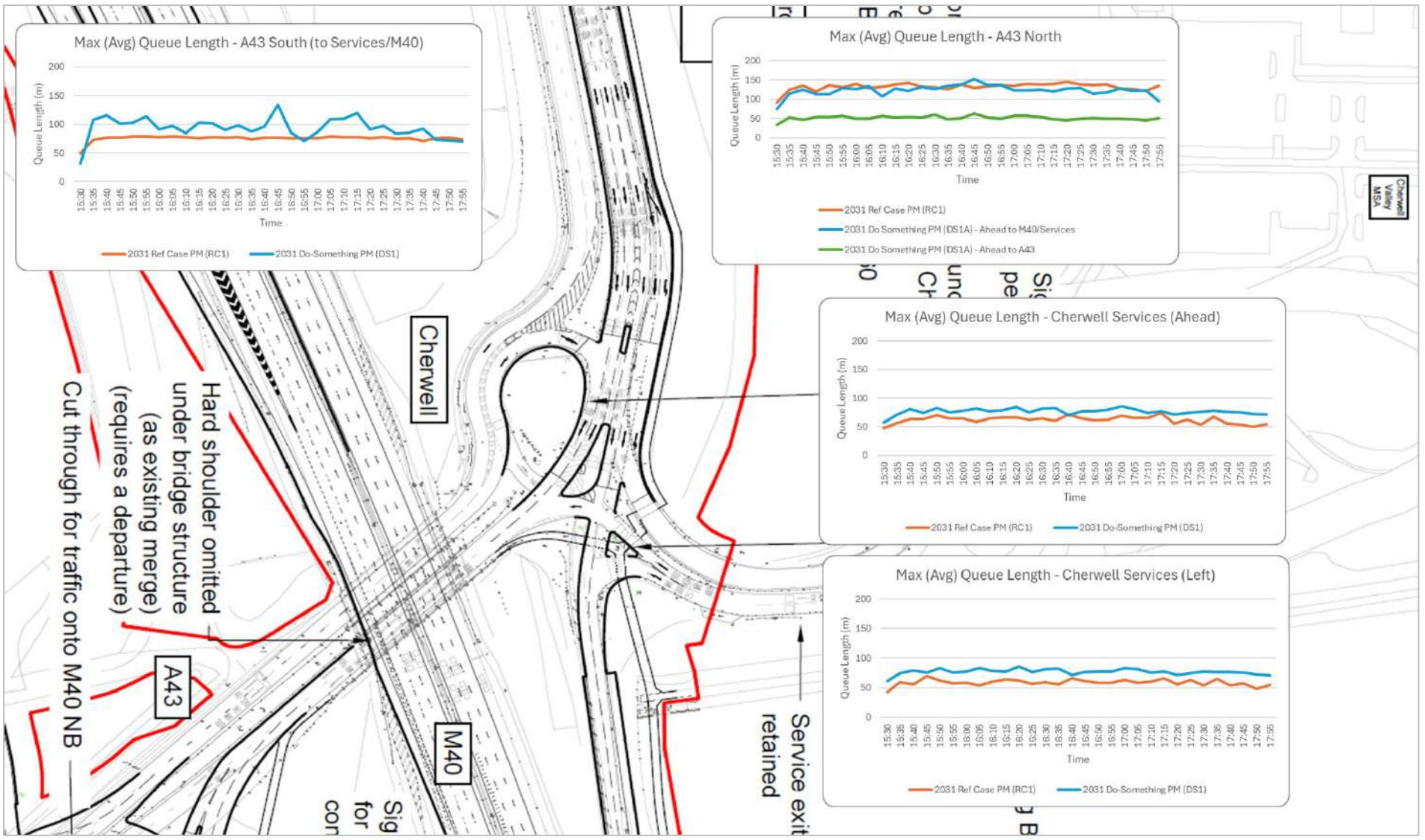

FIGURE 5.9: MAXIMUM (AVERAGE) QUEUE LENGTHS – 2031 RC1&DS1 – PM – CHERWELL

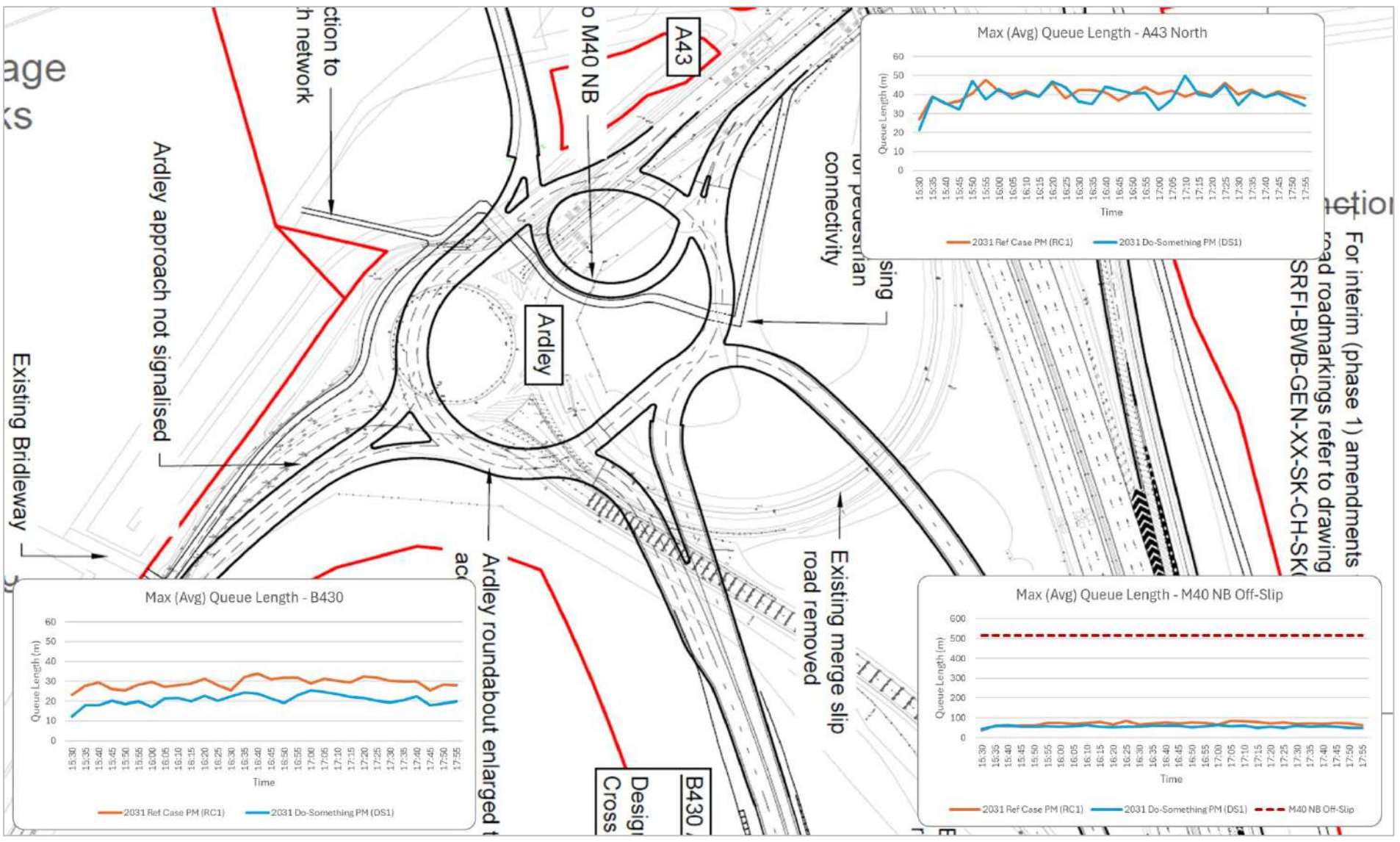

FIGURE 5.10: MAXIMUM (AVERAGE) QUEUE LENGTHS – 2031 RC1&DS1 – PM – ARDLEY

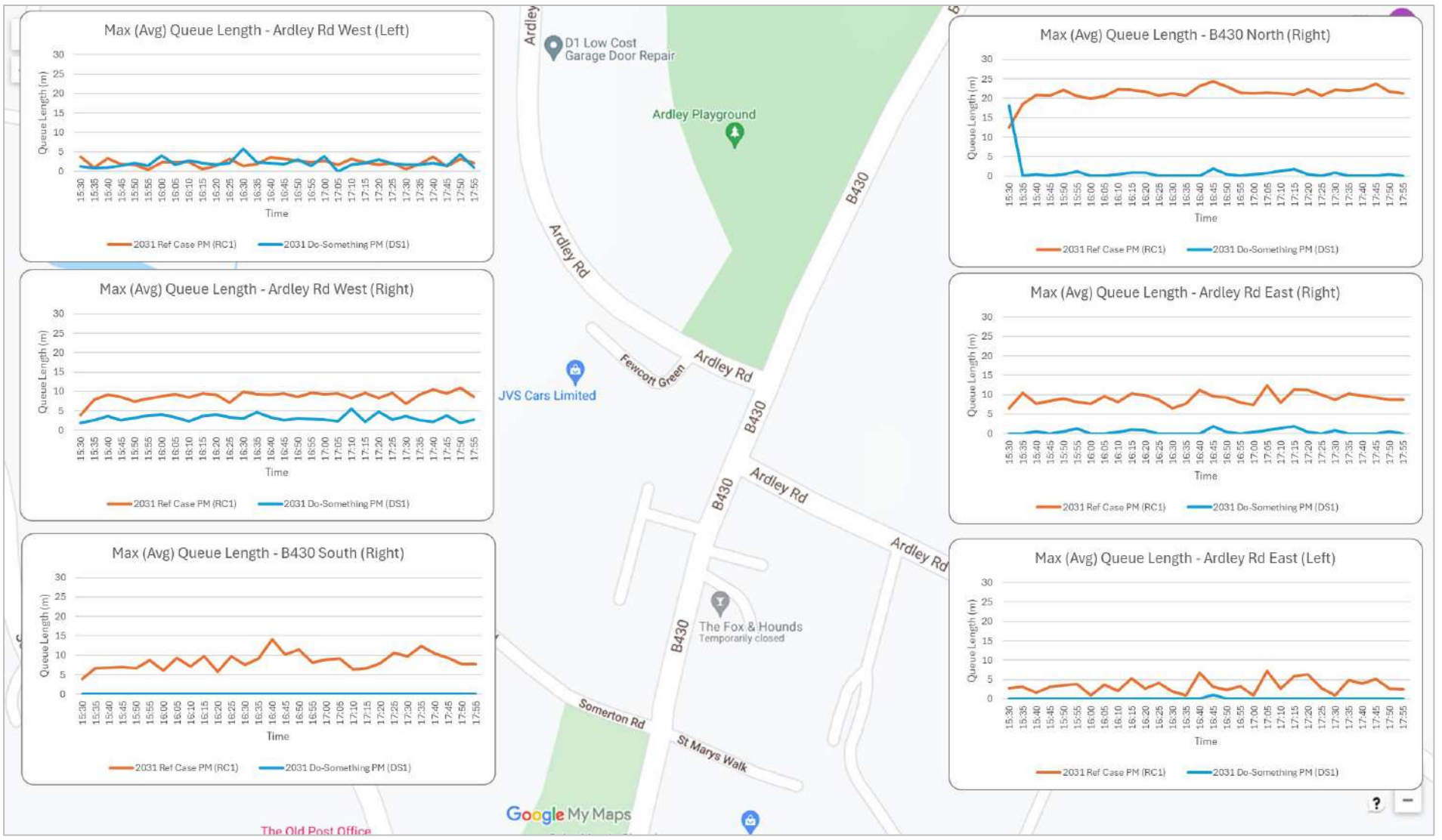

FIGURE 5.11: MAXIMUM (AVERAGE) QUEUE LENGTHS – 2031 RC1&DS1 – PM – ARDLEY CROSSROADS

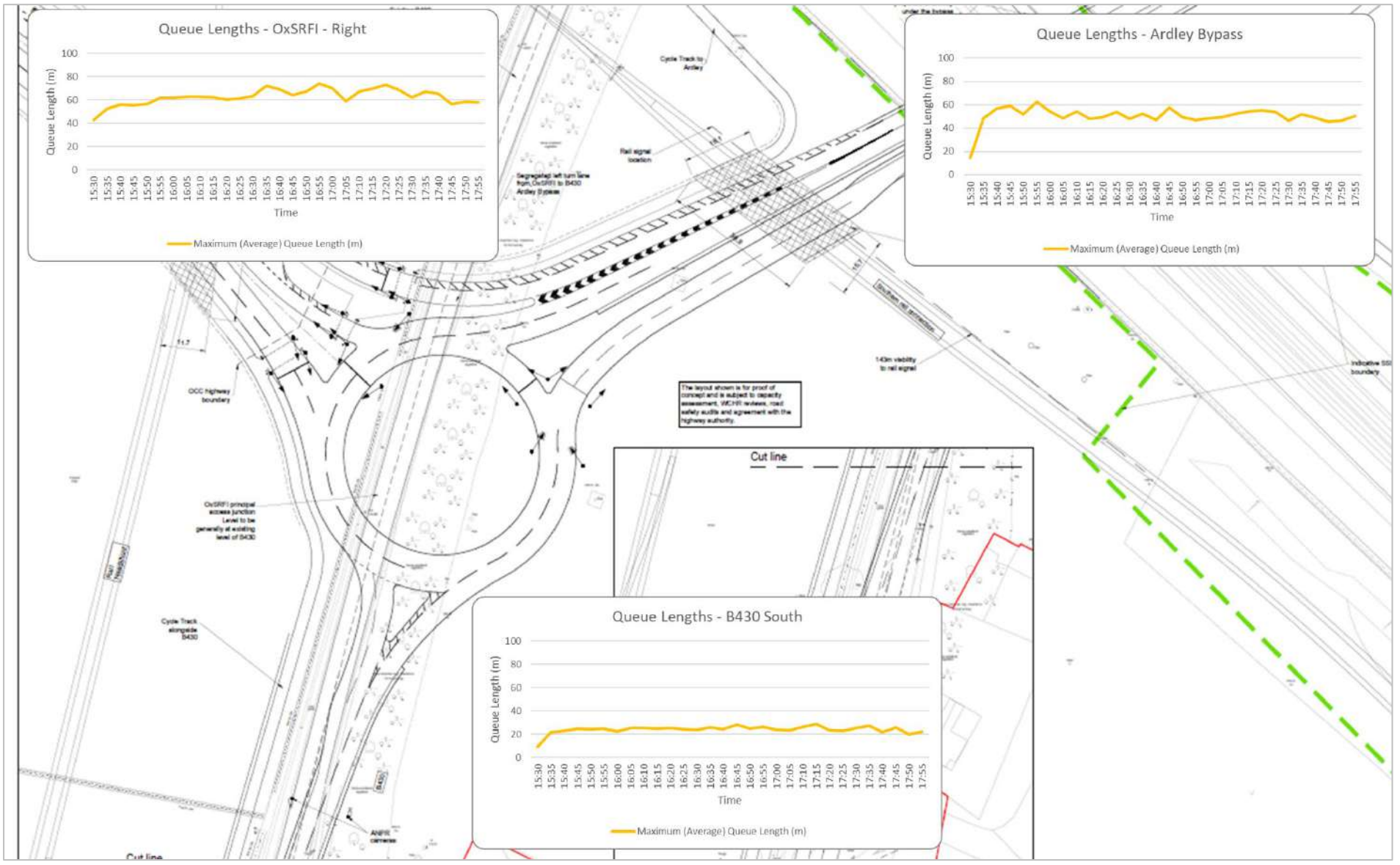

FIGURE 5.12: MAXIMUM (AVERAGE) QUEUE LENGTHS – 2031 DS1 – PM – OXSRFI/ARDLEY BYPASS

AM Peak Queue Analysis

Baynard's Green Roundabout

5.3.21 At Baynard's Green roundabout, the positive impacts as a result of the OxSRFI mitigation schemes are very evident. In the Reference Case, the queues on the A43 North, B4100 East and B4100 West approaches all extend back to the start of their entry points (distances of ~770m, ~520m and ~430m respectively). However, with the inclusion of the junction improvements, these queues are reduced to lengths of up to ~220m (-71%), ~80m (-85%) and ~70m (-84%) for the A43 North, B4100 East and B4100 West approaches respectively. It is clearly demonstrated that the larger junction and signal strategy proposed have a substantially positive impact on the operation of the network at the junction.

5.3.22 For the A43 South approach, the queues in both scenarios are similar, with a length of approximately 100 metres. These queues are well within the link length on the A43 back to Padbury junction and indicate that the signal strategy successfully balances competing demands whilst providing acceptable (or significantly improved) operation across all approaches.

Padbury Junction

5.3.23 At Padbury junction, the Do-Something scenario results in increased queuing on the A43 North, reaching up to 150 metres compared to 90 metres in the Reference Case. A key consideration when interpreting these queue comparisons — which applies throughout the analysis at Padbury, Cherwell and Ardley junctions — is that the Do-Something queuing levels reflect the additional traffic able to enter the network from the A43 North, B4100 East and B4100 West entry points as a result of the improved performance at Baynard's Green, together with the proposed OxSRFI development traffic. In the Reference Case, queue lengths at these downstream junctions are lower because substantial numbers of vehicles are held at the Baynard's Green entry points and are unable to reach the junctions further south. The Reference Case queue lengths therefore do not represent the true operational demand at these locations.

5.3.24 On the M40 southbound off-slip, queue lengths are comparable between the two scenarios. Most importantly, all queuing is contained on the slip road and does not extend to the M40 mainline – confirming acceptable strategic network operation.

5.3.25 For the new M40 northbound off-slip in the Do-Something scenario, maximum queues reach approximately 50 metres, well within the slip road length and

confirming no mainline interaction risk. This validates the design adequacy of the new infrastructure.

Cherwell Junction

5.3.26 At Cherwell junction and similar to Padbury junction, the Do-Something scenario results in increased queues on the A43 North approach compared to the Reference Case. These queues increase from approximately 140 metres in the Reference Case to approximately 240 metres in the Do-Something scenario.

5.3.27 On the A43 South approach (turning towards Cherwell Services and M40 southbound), queues in the Do-Something scenario extend to approximately 115 metres compared to 75 metres in the Reference Case. In the Do-Something scenario, this approach is reconfigured such that the off-side lane is now a dedicated lane for traffic turning right at Cherwell junction (i.e. towards Cherwell Services or the M40 South). The nearside lane continues to serve A43 northbound traffic, but the traffic flow is significantly reduced for this movement, as M40 to A43 northbound traffic uses the new M40 off-slip that joins Padbury junction in the Do-Something scenario. This is part of the highway mitigation strategy to accommodate the additional OxSRFI traffic (travelling to the M40 southbound), with the proposed highway layout designed to accommodate this increased demand and queue.

5.3.28 Queues from the Cherwell Services arm are also increased in the Do-Something scenario, reaching up to approximately 110 metres compared to 75 metres in the Reference Case.

5.3.29 As discussed in para **5.3.22**, these increased queue levels must be interpreted in the context of the Reference Case latent demand, which prevents over 1,100 vehicles from reaching the junctions south of Baynard's Green.

Ardley Roundabout

5.3.30 At Ardley roundabout, and consistent with the patterns observed at Padbury and Cherwell junctions, the Do-Something scenario results in increased queues on the A43 North approach compared to the Reference Case. These queues are increased from 65 metres in the Reference Case to approximately 115 metres in the Do-Something scenario. As discussed in para **5.3.22**, the Do-Something queue levels reflect the additional traffic released into the network from the improved Baynard's Green junction, together with the OxSRFI development traffic.

5.3.31 For the M40 northbound off-slip, the queueing levels are similar, reaching up to approximately 90 metres in both scenarios. These lengths are well within the capacity of the slip road and will have no impact on the M40 mainline.

5.3.32 On the B430, the queues are also similar, reaching up to approximately 30 metres in both scenarios.

Ardley Village Crossroads

5.3.33 At the Ardley crossroads within Ardley village, queues remain similar (within 5 metres, or 1 vehicle length) or improved in the Do-Something scenario.

OxSRFI Access/Ardley Bypass Roundabout

5.3.34 Whilst no direct comparison with the Reference Case can be made (this junction exists only in the Do-Something scenario), the queuing levels at the OxSRFI site access and Ardley bypass roundabout are presented to demonstrate acceptable operation of this new infrastructure.

5.3.35 Maximum queues of approximately 110 metres occur on the Ardley Bypass approach, slightly exceeding the two-lane section length. However, this queue length remains acceptable given the rural location and absence of upstream junctions. Queues on the B430 South approach reach approximately 40 metres, with the OxSRFI access arm experiencing maximum queues of approximately 25 metres. These queue levels indicate no severe capacity constraints at this junction and confirm that the signalised roundabout operates acceptably under AM peak demand conditions.

PM Peak Queue Analysis

Baynard's Green Roundabout

5.3.36 In the PM peak at Baynard's Green roundabout and similar to the AM peak, there are significant reductions in the queuing levels. In the PM peak, this focuses on the B4100 East and B4100 West approaches.

5.3.37 On B4100 East, the queues reach back to the start of the entry point in the Reference Case (approximately 520 metres in length), compared to approximately 75m in the Do-Something scenario. This represents an 86% reduction in queue length (as well as the ability for all vehicles to enter the network from this entry point). On the B4100 West, queue lengths in the Reference Case reach approximately 430m, compared to 35 metres in the Do-Something scenario (a 92% reduction). This clearly demonstrates the significant benefits of the improvements, with the full signalisation of the roundabout proving effective in reducing queues on the local road network.

5.3.38 On the A43 North and South approaches, there are some reductions in the queue lengths, but these are more modest compared to the B4100 East and West approaches. On the A43 North, the queues reduce to approximately 100 metres compared to approximately 150 metres in the Reference Case (-33%). On the A43 South approach, queues reach up to approximately 170 metres in the Do-Something scenario, compared to up to 290 metres in the Reference Case (a 41% reduction in queue length). This again emphasises the benefits of the junction improvements and the effectiveness of the proposed signal strategy.

Padbury Junction

5.3.39 PM peak queue lengths at Padbury are similar between scenarios on the M40 southbound off-slip approach, with crucially no queuing back to the M40 mainline from the slip road. This confirms acceptable strategic network operation in both scenarios.

5.3.40 Queues on the A43 North are increased in the Do-Something scenario, reaching up to 115 metres compared to 80m in the Reference Case. As discussed in paragraph **5.3.22**, these queue comparisons must be interpreted in the context of the Reference Case latent demand. In the PM peak, the improved Baynard's Green junction releases all traffic from the B4100 East and B4100 West into the network, in addition to accommodating the OxSRFI development traffic.

5.3.41 The new M40 northbound off-slip in the Do-Something scenario shows maximum queues of approximately 70 metres, well contained within the slip road length and confirming adequate capacity provision.

Cherwell Junction

5.3.42 Queue behaviour at Cherwell in the PM peak demonstrates comparable levels on the A43 North approach, with both scenarios reaching up to approximately 150m. This indicates that the additional lanes on the A43 southbound link provide sufficient additional queuing capacity to accommodate the additional traffic flows released into the network (that was otherwise held outside the network in the Reference Case).

5.3.43 On the A43 South approach (turning to Cherwell Services/M40), queues increase from approximately 80 metres to 135 metres in the Do-Something scenario. As in the AM peak analysis, this results from improved accessibility from Ardley roundabout and increased flows as a result of the proposed OxSRFI development. However, as in the AM peak, this approach is reconfigured in the Do-Something scenario such that the off-side lane is now a dedicated lane for traffic turning right at the Cherwell junction (i.e. towards Cherwell Services or the M40 South).

The nearside lane continues to serve A43 northbound traffic, but the traffic flow is significantly reduced for this movement, as M40 to A43 northbound traffic uses the new M40 off-slip that joins Padbury junction This is part of the highway mitigation strategy to accommodate the additional OxSRFI traffic (travelling to the M40 southbound), with the proposed highway layout designed to accommodate this increased demand and queue.

5.3.44 Queues from the Cherwell Services arm are higher in the Do-Something scenario, reaching up to approximately 85 metres compared to 75 metres in the Reference Case. This increase is the result of additional green time needing to be assigned to the heavier southbound flows.

Ardley Roundabout

5.3.45 The PM peak queuing levels are similar on the M40 northbound off-slip and A43 North between both scenarios at Ardley roundabout.

5.3.46 M40 northbound off-slip queuing reaches approximately 90 metres (Reference Case), which is well within the slip road length and will have no impact on the M40 mainline.

5.3.47 Queues on the A43 North approach reach up to approximately 50 metres in both scenarios, indicating the mitigation measures are successful at accommodating the additional traffic released into the network (compared to the latent demand in the Reference Case), in addition to the OxSRFI development traffic.

5.3.48 On the B430, the queues are slightly lower in the Do-Something scenario, reaching up to 25m compared to 35m in the Reference Case (a 29% reduction).

Ardley Village Crossroads

5.3.49 Ardley village crossroads queuing remains similar or reduces in the Do-Something scenario. This confirms local amenity benefits from traffic reassignment to the Ardley bypass, reducing vehicle movements through the village residential area.

OxSRFI Access/Ardley Bypass Roundabout

5.3.50 At the OxSRFI site access roundabout in the PM peak, maximum queues reach approximately 70 metres on the OxSRFI access arm and 65 metres on the Ardley Bypass arm, with B430 South queues of approximately 30 metres. These queue levels indicate acceptable junction operation with no severe capacity constraints.

5.3.51 The junction successfully manages site access traffic alongside through-traffic on the bypass link.

Network Performance Results

5.3.52 The network performance comparisons for the AM and PM peaks are shown in **Table 5.5** and **Table 5.6**.

All Vehicles			
2031 AM			
Scenario	Average Delay per Vehicle (s)	Average Speed (mph)	Latent Demand
2031 Reference Case (RC1)	95	44	1143
2031 Do-Something (DS1)	48	49	0

TABLE 5.5: NETWORK PERFORMANCE – 2031 RC1&DS1 – AM

5.3.53 The AM peak results show that the proposed OxSRFI development and the package of improvement schemes will result in a significantly improved performance compared to the Reference Case (existing network configuration). The average delay per vehicle reduced by 47 seconds (-50%) and the average network speed increases by 5mph (+12%). These increased speeds are achieved against the inclusion of reduced speed limits within the network, further demonstrating the positive impacts of the mitigation schemes.

5.3.54 The network improvements also result in the latent demand (vehicles not able to enter the network) reducing completely in the Do-Something, with an additional 1,143 vehicles able to enter the network (785 vehicles from the A43 North, 126 vehicles from the B4100 East and 232 vehicles from the B4100 West).

All Vehicles			
2031 PM			
Scenario	Average Delay per Vehicle (s)	Average Speed (mph)	Latent Demand
2031 Reference Case (RC1)	60	50	398
2031 Do-Something (DS1)	48	50	1

TABLE 5.6: NETWORK PERFORMANCE – 2031 RC1&DS1 – PM

5.3.55 In the PM peak, the introduction of the proposed OxSRFI development also led to an improvement in the average delay per vehicle (-12s/-20%), whilst maintaining an average network speed of 50mph. As in the AM peak, the similar network speeds are achieved against the inclusion of reduced speed limits within the network, further evidencing the positive impacts of the improvements. These network performance results demonstrates that the package of improvements proposed by the OxSRFI development will be effective in both peak periods.

5.3.56 The PM peak also shows a significant reduction in the latent demand figures, with all but 1 vehicle unable to access the network compared to 398 in the Reference Case (390 from the B4100 East, 7 from the B4100 West and 1 from the M40 South).

The single vehicle from the M40 South entry is consistent across both scenarios and is attributable to the stochastic nature of flow input into the model. This has no material impact on the assessment conclusions

Summary of 2031 Model Performance Analysis

5.3.57 Reference Case and Do-Something scenarios were developed for the 2031 DfT Circular compliant scenario, using strategic traffic flows provided by ADC Infrastructure Ltd from the Bicester Transport Model (BTM). Comprehensive performance metrics were extracted, including journey times, queue lengths, junction performance, and network-wide operational statistics.

Network-Wide Performance

5.3.58 Network performance metrics demonstrate that the Do-Something scenario delivers operational improvements compared to the Reference Case baseline, whilst accommodating additional OxSRFI development traffic:

- AM Peak: Average vehicle delay reduces from 95 seconds to 48 seconds, with average network speed increased from 44mph to 49 mph
- PM Peak: Average vehicle delay reduces from 60 seconds to 48 seconds, with average network speed maintained at 50 mph.

5.3.59 The improvements in network performance are attributable to the comprehensive junction improvement package, particularly at Baynard's Green The significant enhancement to Baynard's Green junction operation enables over 1,100 additional vehicles to enter the network in the AM peak, and nearly 400 additional vehicles to enter the network in the PM peak that were previously unable to do so in the Reference Case, in addition to accommodating trips associated with the proposed OxSRFI development.

Localised Effects

5.3.60 The assessment identifies the following localised effects:

- Substantially reduced queuing at Baynard's Green roundabout (A43 North, B4100 East and B4100 West approaches experience reductions of 71%, 85% and 84% respectively in the AM peak), similar or reduced queuing levels within Ardley village (reflecting traffic reassignment to the Ardley bypass), and effective queue management at the new OxSRFI site access roundabout (maximum queues 25-110 metres, no capacity constraints).
- Increased journey times from Cherwell Services to A43 North (101/86 seconds AM/PM peak – resulting from the removal of the direct right-turn lane, necessitating a right turn at Ardley and hence longer travel distance),

increased journey times from Cherwell Services to the M40 North (68/60 seconds AM/PM peaks – attributable to an increased number of signalised stop-lines to traverse), increased journey times from Ardley Road East to M40 North (57/76s AM/PM peaks – the result of reduced speed limits in this area of the network), and increased queuing at Padbury, Cherwell and Ardley in both peaks (attributable to the network accommodating additional traffic that is now able to enter from the A43 North, B4100 East and B4100 West entry points (that were unable to do so in the Reference Case), in combination with the proposed OxSRFI development traffic.

Assessment of Localised Effects

5.3.61 The localised effects do not constitute severe or unacceptable impacts. Journey time changes (where not significantly reduced) remain within ±60 seconds, whilst accommodating all traffic demand, which is not the case in the Reference Case. This indicates that driver experience across the wider network would be improved. Queue increases remain contained within approach capacities and create no network blocking risks.

5.3.62 The findings support the conclusion that the mitigation package delivers improved network performance, can accommodate the latent demand from the Reference Case, whilst accommodating the strategic infrastructure requirements and additional traffic from the OxSRFI development.

5.4 Scenario Comparison Analysis – 2031 RC1-SENS TEST & 2031 DS1-SENS TEST

Overview

5.4.1 The second comparative analysis is of the 2031 Do-Something Sensitivity Test (DS1-SENS TEST) scenario against the 2031 Reference Case Sensitivity Test (RC1-SENS TEST) scenario.

5.4.2 As a recap, the Sensitivity Test incorporates a different methodology for adopting the BTM flows in the VISSIM models, taking the absolute differences between future year and base BTM flows and applying these to the base VISSIM flows.

Journey Time Results – AECOM TN Comparisons

5.4.3 The journey time comparisons for the routes associated with Set 1 can be seen in **Table 5.7** and **Table 5.8**.

AM Peak

5.4.4 The main conclusion from the Sensitivity Testing remains as in the primary scenario testing in that the mitigation associated with the OxSRFI development will bring substantial benefits to vehicles travelling southbound on the A43 North through Baynard's Green roundabout. The journey times are reduced from 3 minutes 39 seconds in the Reference Case to 47 seconds in the Do-Something scenario (a 78% reduction). The Baynard's Green improvements address the operational issues identified in the Reference Case, with all 785 vehicles held back outside the network able to complete their journeys in the Do-Something scenario (as was the case in the primary scenario testing).

5.4.5 The Ardley roundabout to Cherwell junction movement continues to be the most notable in terms of increased journey times, where there is a 34-second increase in comparison to the Reference Case. However, this is experienced by a greatly reduced number of vehicles (621 vehicles against 1,265 vehicles in the Reference Case). The introduction of the new M40 northbound off-slip that joins at Padbury junction transfers 644 vehicles to the new slip road, that would otherwise have to travel through Ardley and Cherwell junctions. This frees up capacity on the A43 northbound link between Ardley and Cherwell for additional right-turning traffic to Cherwell Services and the M40 South, which still has to queue at the signalised node with the A43 North and the heavy southbound movement.

5.4.6 All other movements in the AM peak have journey time differences of ±1-12s, which are unlikely to be noticed when driving these routes. This is similar to the primary scenario testing (where the differences were ±1-10s).

PM Peak

5.4.7 In the PM peak, and like the AM peak, the most important element to consider is that the mitigation schemes proposed as part of the OxSRFI development will result in 869 additional vehicles being able to complete their journeys around the network compared to the Reference Case.

5.4.8 Furthermore, a notable difference in the Sensitivity Testing compared to the primary scenario testing is the greater journey time improvement travelling northbound between Padbury and Baynard's Green. This improvement is 1 minute 8 seconds (53%) in the Sensitivity Testing, compared to 21 seconds (26%) in the primary testing. The differing flow profile further demonstrates that the improvements proposed at Baynard's Green deliver considerable operational benefits.

5.4.9 There continues to be an impact on the movement northbound between Ardley roundabout and Cherwell junction, with a 40-second increase in the Do-Something scenario compared to the Reference Case. As discussed for the AM peak results, this needs to be considered in the context of 835 trips being diverted to the new M40 northbound off-slip that joins Padbury junction. This frees up capacity on the A43 northbound link for additional traffic to turn right towards Cherwell Services and the M40 South, albeit through a signalised node that conflicts with the heavy A43 southbound movement.

5.4.10 All other movements in the PM peak have journey time differences which are unlikely to be noticed, with a range of ±1-11s similar to the ±1-14s difference in the primary scenario testing.

ALL VEHICLES									
No.	Route			2031 RC1-SENS TEST		2031 DS1-SENS TEST		Difference (JTs)	
	From	To	Dist.	Avg.	Trips	Avg.	Trips	No.	%
1	SB1 - A43 North	SB1 - Baynards Green	424m	00:03:39	1472	00:00:47	2720	-00:02:52	▼ 78%
2	SB2 - Baynards Green	SB2 - Padbury	718m	00:00:49	1322	00:00:58	1604	00:00:09	▲ 18%
3	SB3 - Padbury	SB3 - Cherwell	347m	00:00:37	1658	00:00:49	1769	00:00:12	▲ 32%
4	SB4 - Cherwell	SB4 - M40 On-Slip	154m	00:00:16	1105	00:00:16	1679	00:00:00	▲ 2%
5	SB5 - M40 On-Slip	SB5 - M40	862m	00:00:41	1388	00:00:43	2135	00:00:03	▲ 6%
6	NB1 - M40	NB1 - Ardley	858m	00:00:48	1320	00:00:56	785	00:00:09	▲ 18%
7	NB2 - Ardley	NB2 - Cherwell	376m	00:00:29	1265	00:01:03	621	00:00:34	▲ 117%
8	NB3 - Cherwell	NB3 - Padbury	373m	00:00:31	1338	00:00:41	743	00:00:11	▲ 34%
9	NB4 - Padbury	NB4 - Baynards Green	664m	00:00:44	1407	00:00:52	747	00:00:08	▲ 17%
10	NB5 - Baynards Green	NB5 - A43 North	521m	00:00:27	1332	00:00:34	1287	00:00:07	▲ 25%

TABLE 5.7: JOURNEY TIME COMPARISONS (SET 1) – 2031 RC1-SENS TEST & DS1-SENS TEST – AM

ALL VEHICLES									
No.	Route			2031 RC1-SENS TEST		2031 DS1-SENS TEST		Difference (JTs)	
	From	To	Dist.	Avg.	Trips	Avg.	Trips	No.	%
1	SB1 - A43 North	SB1 - Baynards Green	424m	00:00:34	1828	00:00:41	1881	00:00:07	▲ 20%
2	SB2 - Baynards Green	SB2 - Padbury	718m	00:00:47	1489	00:00:52	1231	00:00:05	▲ 10%
3	SB3 - Padbury	SB3 - Cherwell	347m	00:00:38	1693	00:00:38	1304	-00:00:00	▼ 1%
4	SB4 - Cherwell	SB4 - M40 On-Slip	154m	00:00:16	1181	00:00:15	1197	-00:00:01	▼ 6%
5	SB5 - M40 On-Slip	SB5 - M40	862m	00:00:40	1509	00:00:41	1624	00:00:01	▲ 3%
6	NB1 - M40	NB1 - Ardley	858m	00:00:48	1843	00:00:45	1063	-00:00:03	▼ 6%
7	NB2 - Ardley	NB2 - Cherwell	376m	00:00:37	1731	00:01:17	896	00:00:40	▲ 110%
8	NB3 - Cherwell	NB3 - Padbury	373m	00:00:35	1780	00:00:46	1477	00:00:11	▲ 33%
9	NB4 - Padbury	NB4 - Baynards Green	664m	00:02:10	1851	00:01:01	1472	-00:01:08	▼ 53%
10	NB5 - Baynards Green	NB5 - A43 North	521m	00:00:27	1834	00:00:38	2413	00:00:11	▲ 40%

TABLE 5.8: JOURNEY TIME COMPARISONS (SET 1) – 2031 RC1-SENS TEST & DS1-SENS TEST – PM

Journey Time Results – O-D Pair Comparisons

5.4.11 Where journey time comparisons can be made for the routes associated with Set 2, these are shown in **Table 5.9** and **Table 5.10**, with the full suite of O-D pair results shown in **Appendix F.**

AM Peak

5.4.12 The O-D pair journey time comparisons confirm significant journey time savings for routes from the A43 North, B4100 East and B4100 West. The reductions range from 2 minutes 9 seconds to 5 minutes 3 seconds (25-78%) depending on the route. This highlights the major benefits that are provided by the Baynard's Green junction improvements, with the bigger junction and new signalised nodes providing more opportunities for vehicles on all arms to progress around the junction. This is in comparison to the Reference Case, which contains significant numbers of vehicles unable to enter the network due to the existing priority control set up and high demand conflicting traffic movements.

5.4.13 Consistent with the primary scenario testing, the most notable journey time increases are for northbound routes from Cherwell Services (to A43 North, B4100 East and M40 North). The journey time increases are 1 minute 47 seconds, 2 minutes 24 seconds and 1 minute 12 seconds respectively for these routes. For the movements to the A43 North and B4100 East, the same contributing factors arise whereby the closure of the right-turn lane at Cherwell to travel north now requires vehicles to turn right at Ardley roundabout before continuing northbound on the A43, thereby increasing the distance travelled. For the M40 North destination, the need to navigate the larger Ardley roundabout and two new signalised nodes add delays.

5.4.14 Other notable journey time changes that were not apparent in the primary scenario testing is that journey times from the B430 to the A43 North and B4100 East have increased journey times of 1 minute 36 seconds and seconds to 1 minute 47 seconds. This is attributed to two main factors – firstly the need to negotiate through additional signalised stop-lines that cause delays at red signals and secondly, the change in the speed limits on the B430 between Ardley roundabout and Ardley village.

5.4.15 Elsewhere, journey time changes are all within ±90s, indicating that the proposed OxSRFI development and its associated mitigation package will deliver network performance similar to the Reference Case. However, this comparison must be considered in the context of over 1,600 vehicles being unable to enter the

network in the Reference Case, which masks the true impacts at junctions south of Baynard's Green in the Reference Case.

PM Peak

5.4.16 In the PM peak, there are again significant journey time benefits (as in the AM peak and primary scenario testing) from the B4100 East and B4100 East entry points, where savings range from 3 minutes 49 seconds to 8 minutes 27 seconds (36%-85% time reductions). The improvements are again attributed to the improvements at Baynard's Green and the introduction of the signals, providing better opportunities for vehicles to progress on their journeys around the junction. This is opposed to having to wait for gaps, particularly on the B4100 approaches for the busy A43 movements in the Reference Case.

5.4.17 In a difference to the primary scenario testing, the most notable journey time increases in the Sensitivity Testing are from the B430, Ardley Road East and Ardley Road West origins that are required to travel beyond Ardley village. For these routes, journey time increases are up to 2 minutes 31 seconds from the B430. As previously alluded to, the increased number of signalised stop-lines to negotiate and change in speed limits in this section of the network are attributed to these increases, along with increased queuing on the B430 approach at Ardley roundabout.

5.4.18 The movement from Cherwell Services to the M40 North also has an increased journey time in the PM peak (like the AM peak), with a 1-minute 5-second increase. As discussed, this needs to be considered in the context of 835 trips being diverted to the new M40 northbound off-slip that joins Padbury junction. This frees up capacity on the A43 northbound link for additional traffic to turn right towards Cherwell Services and the M40 South, albeit through a signalised node that conflicts with the heavy A43 southbound movement.

5.4.19 All other journey time changes are within ±90s, consistent with the primary scenario testing. However, this must be considered in the context of nearly 870 vehicles being unable to enter the network in the Reference Case, which masks the true impacts at junctions south of Baynard's Green.

ALL VEHICLES									
No.	Route			2031 RC1-SENS TEST		2031 DS1-SENS TEST		Difference (JTs)	
	From	To	Dist.	Avg.	Trips	Avg.	Trips	No.	%
2	A43 North	B4100 East	1220 m	00:06:29	130	00:01:27	318	-00:05:03	▼ 78%
3	A43 North	Cherwell Services	2045 m	00:07:56	64	00:03:14	83	-00:04:42	▼ 59%
4	A43 North	M40 South	5269 m	00:09:54	969	00:05:20	1531	-00:04:34	▼ 46%
5	A43 North	B430	3805 m	00:09:43	211	00:06:03	23	-00:03:40	▼ 38%
6	A43 North	M40 North	7348 m	00:11:00	46	00:07:02	65	-00:03:58	▼ 36%
7	A43 North	B4100 West	1216 m	00:06:39	21	00:02:06	51	-00:04:33	▼ 68%
8	A43 North	Ardley Rd West	2718 m	00:08:42	7	00:04:27	9	-00:04:14	▼ 49%
13	B4100 East	A43 North	1298 m	00:06:38	145	00:02:01	192	-00:04:38	▼ 70%
15	B4100 East	Cherwell Services	1744 m	00:07:51	4	00:03:19	6	-00:04:32	▼ 58%
16	B4100 East	M40 South	4968 m	00:09:57	4	00:05:13	8	-00:04:44	▼ 48%
18	B4100 East	M40 North	7047 m	00:11:01	174	00:07:02	106	-00:03:59	▼ 36%
19	B4100 East	B4100 West	915 m	00:06:39	206	00:01:48	285	-00:04:50	▼ 73%
25	Cherwell Services	A43 North	2062 m	00:02:42	64	00:04:29	64	00:01:47	▲ 66%
26	Cherwell Services	B4100 East	1880 m	00:02:42	2	00:05:05	2	00:02:24	▲ 89%
28	Cherwell Services	M40 South	3597 m	00:03:01	220	00:03:44	288	00:00:43	▲ 24%
30	Cherwell Services	M40 North	5726 m	00:04:17	114	00:05:29	116	00:01:12	▲ 28%
37	M40 South	A43 North	5550 m	00:04:38	994	00:05:18	965	00:00:41	▲ 15%
38	M40 South	B4100 East	5368 m	00:04:37	5	00:05:44	4	00:01:07	▲ 24%
39	M40 South	Cherwell Services	4071 m	00:03:45	174	00:04:53	175	00:01:08	▲ 30%
40	M40 South	M40 South	7295 m	00:05:51	29	00:06:51	29	00:01:00	▲ 17%
41	M40 South	B430	5013 m	00:04:03	38	00:04:46	39	00:00:43	▲ 18%
42	M40 South	M40 North	8281 m	00:04:41	2882	00:04:42	2817	00:00:01	▲ 0%
43	M40 South	B4100 West	5167 m	00:04:24	70	00:05:05	69	00:00:41	▲ 16%
44	M40 South	Ardley Rd West	3927 m	00:03:00	14	00:03:27	12	00:00:26	▲ 15%
49	B430	A43 North	3806 m	00:03:56	171	00:05:32	4	00:01:36	▲ 41%
50	B430	B4100 East	3624 m	00:04:02	18	00:05:49	6	00:01:47	▲ 44%
51	B430	Cherwell Services	2327 m	00:03:04	12	00:04:26	12	00:01:22	▲ 44%
52	B430	M40 South	5551 m	00:05:20	24	00:06:36	27	00:01:16	▲ 24%

ALL VEHICLES									
No.	Route			2031 RC1-SENS TEST		2031 DS1-SENS TEST		Difference (JTs)	
	From	To	Dist.	Avg.	Trips	Avg.	Trips	No.	%
54	B430	M40 North	6997 m	00:04:57	157	00:05:59	62	00:01:02	▲ 21%
55	B430	B4100 West	3423 m	00:03:55	17	00:05:17	9	00:01:23	▲ 35%
56	B430	Ardley Rd West	1431 m	00:01:25	26	00:01:54	8	00:00:28	▲ 33%
57	B430	Ardley Rd East	2045 m	00:01:52	119	00:02:32	47	00:00:41	▲ 37%
61	M40 North	A43 North	6018 m	00:04:20	52	00:04:47	53	00:00:27	▲ 10%
62	M40 North	B4100 East	5836 m	00:04:22	212	00:05:16	111	00:00:55	▲ 21%
63	M40 North	Cherwell Services	5231 m	00:04:16	171	00:04:42	171	00:00:26	▲ 10%
64	M40 North	M40 South	8295 m	00:04:52	3462	00:04:57	3339	00:00:05	▲ 2%
65	M40 North	B430	6991 m	00:06:03	160	00:07:23	20	00:01:20	▲ 22%
66	M40 North	M40 North	10535 m	00:07:15	12	00:08:24	11	00:01:08	▲ 16%
67	M40 North	B4100 West	5635 m	00:04:11	16	00:05:00	4	00:00:49	▲ 20%
68	M40 North	Ardley Rd West	5905 m	00:05:03	7	00:05:51	8	00:00:48	▲ 16%
73	B4100 West	A43 North	1116 m	00:05:17	82	00:01:41	100	-00:03:36	▼ 68%
74	B4100 West	B4100 East	934 m	00:05:23	327	00:01:46	303	-00:03:37	▼ 67%
76	B4100 West	M40 South	4983 m	00:08:33	133	00:05:36	149	-00:02:57	▼ 34%
77	B4100 West	B430	3519 m	00:08:27	8	00:06:18	10	-00:02:09	▼ 25%
85	Ardley Rd West	A43 North	2697 m	00:02:58	11	00:03:53	8	00:00:55	▲ 31%
89	Ardley Rd West	B430	1441 m	00:01:38	84	00:02:00	37	00:00:22	▲ 23%
90	Ardley Rd West	M40 North	5887 m	00:03:57	14	00:04:43	13	00:00:46	▲ 20%
93	Ardley Rd West	Ardley Rd East	1011 m	00:01:06	70	00:01:26	39	00:00:20	▲ 31%
97	Ardley Rd East	A43 North	3389 m	00:03:27	40	00:04:39	34	00:01:11	▲ 34%
98	Ardley Rd East	B4100 East	3207 m	00:03:35	4	00:05:05	4	00:01:30	▲ 42%
99	Ardley Rd East	Cherwell Services	1910 m	00:02:35	4	00:03:56	4	00:01:20	▲ 52%
100	Ardley Rd East	M40 South	5134 m	00:04:44	8	00:05:55	8	00:01:11	▲ 25%
101	Ardley Rd East	B430	2030 m	00:01:56	196	00:02:32	39	00:00:36	▲ 31%
103	Ardley Rd East	B4100 West	3006 m	00:03:16	12	00:04:20	4	00:01:04	▲ 33%
104	Ardley Rd East	Ardley Rd West	1014 m	00:00:58	31	00:01:19	26	00:00:22	▲ 38%

TABLE 5.9: JOURNEY TIME COMPARISONS (SET 2) – 2031 RC1-SENS TEST & DS1-SENS TEST – AM

ALL VEHICLES									
No.	Route			2031 RC1-SENS TEST		2031 DS1-SENS TEST		Difference (JTs)	
	From	To	Dist.	Avg.	Trips	Avg.	Trips	No.	%
2	A43 North	B4100 East	1220 m	00:01:15	283	00:01:20	297	00:00:05	▲ 6%
3	A43 North	Cherwell Services	2045 m	00:02:38	94	00:02:48	94	00:00:09	▲ 6%
4	A43 North	M40 South	5269 m	00:04:35	1130	00:04:46	1130	00:00:11	▲ 4%
5	A43 North	B430	3805 m	00:04:19	145	00:05:42	8	00:01:23	▲ 32%
6	A43 North	M40 North	7348 m	00:05:49	70	00:06:51	68	00:01:02	▲ 18%
7	A43 North	B4100 West	1216 m	00:01:19	54	00:02:00	31	00:00:41	▲ 51%
8	A43 North	Ardley Rd West	2718 m	00:03:23	12	00:04:10	8	00:00:47	▲ 23%
9	A43 North	Ardley Rd East	3374 m	00:03:48	36	00:04:45	16	00:00:57	▲ 25%
13	B4100 East	A43 North	1298 m	00:06:29	232	00:02:07	360	-00:04:21	▼ 67%
15	B4100 East	Cherwell Services	1744 m	00:07:48	7	00:02:52	11	-00:04:56	▼ 63%
16	B4100 East	M40 South	4968 m	00:09:43	2	00:04:45	9	-00:04:58	▼ 51%
17	B4100 East	B430	3504 m	00:09:37	5	00:05:49	6	-00:03:47	▼ 39%
18	B4100 East	M40 North	7047 m	00:10:56	142	00:07:00	137	-00:03:56	▼ 36%
19	B4100 East	B4100 West	915 m	00:06:32	176	00:01:54	335	-00:04:38	▼ 71%
25	Cherwell Services	A43 North	2062 m	00:04:11	97	00:04:54	97	00:00:43	▲ 17%
26	Cherwell Services	B4100 East	1880 m	00:04:13	2	00:05:08	2	00:00:55	▲ 22%
28	Cherwell Services	M40 South	3597 m	00:03:00	229	00:03:09	228	00:00:09	▲ 5%
29	Cherwell Services	B430	2182 m	00:02:48	4	00:03:56	4	00:01:09	▲ 41%
30	Cherwell Services	M40 North	5726 m	00:04:26	145	00:05:31	144	00:01:05	▲ 25%
31	Cherwell Services	B4100 West	1679 m	00:03:56	8	00:04:31	8	00:00:35	▲ 15%
37	M40 South	A43 North	5550 m	00:06:17	1406	00:05:44	1598	-00:00:33	▼ 9%
38	M40 South	B4100 East	5368 m	00:06:30	6	00:06:05	10	-00:00:25	▼ 6%
39	M40 South	Cherwell Services	4071 m	00:04:15	185	00:04:34	183	00:00:20	▲ 8%
40	M40 South	M40 South	7295 m	00:06:15	58	00:06:24	59	00:00:09	▲ 2%
41	M40 South	B430	5013 m	00:04:04	34	00:04:45	28	00:00:41	▲ 17%
42	M40 South	M40 North	8281 m	00:04:53	3906	00:04:55	3784	00:00:02	▲ 1%
43	M40 South	B4100 West	5167 m	00:06:05	43	00:05:23	76	-00:00:42	▼ 12%
44	M40 South	Ardley Rd West	3927 m	00:03:08	64	00:03:24	39	00:00:16	▲ 9%

ALL VEHICLES									
No.	Route			2031 RC1-SENS TEST		2031 DS1-SENS TEST		Difference (JTs)	
	From	To	Dist.	Avg.	Trips	Avg.	Trips	No.	%
45	M40 South	Ardley Rd East	4583 m	00:03:32	8	00:04:08	8	00:00:36	▲ 17%
49	B430	A43 North	3806 m	00:05:44	255	00:07:47	118	00:02:03	▲ 36%
51	B430	Cherwell Services	2327 m	00:03:42	10	00:06:13	11	00:02:31	▲ 68%
52	B430	M40 South	5551 m	00:06:01	40	00:08:06	18	00:02:05	▲ 35%
54	B430	M40 North	6997 m	00:05:21	188	00:06:43	68	00:01:22	▲ 26%
55	B430	B4100 West	3423 m	00:05:29	15	00:07:24	17	00:01:54	▲ 35%
57	B430	Ardley Rd East	2045 m	00:01:50	87	00:02:32	26	00:00:42	▲ 38%
61	M40 North	A43 North	6018 m	00:05:42	61	00:05:02	64	-00:00:40	▼ 12%
62	M40 North	B4100 East	5836 m	00:05:47	79	00:05:22	128	-00:00:25	▼ 7%
63	M40 North	Cherwell Services	5231 m	00:04:19	164	00:04:34	165	00:00:15	▲ 6%
64	M40 North	M40 South	8295 m	00:04:45	3334	00:04:46	3318	00:00:02	▲ 1%
66	M40 North	M40 North	10535 m	00:07:21	9	00:08:25	9	00:01:05	▲ 15%
67	M40 North	B4100 West	5635 m	00:05:26	23	00:04:40	24	-00:00:47	▼ 14%
68	M40 North	Ardley Rd West	5905 m	00:04:57	12	00:05:46	12	00:00:49	▲ 16%
73	B4100 West	A43 North	1116 m	00:09:54	58	00:01:33	66	-00:08:22	▼ 84%
74	B4100 West	B4100 East	934 m	00:10:00	213	00:01:33	196	-00:08:27	▼ 85%
76	B4100 West	M40 South	4983 m	00:12:44	49	00:04:58	52	-00:07:45	▼ 61%
85	Ardley Rd West	A43 North	2697 m	00:04:44	4	00:06:16	4	00:01:32	▲ 33%
89	Ardley Rd West	B430	1441 m	00:01:32	26	00:02:09	2	00:00:37	▲ 40%
90	Ardley Rd West	M40 North	5887 m	00:04:21	4	00:05:19	4	00:00:58	▲ 22%
93	Ardley Rd West	Ardley Rd East	1011 m	00:01:04	32	00:01:28	20	00:00:23	▲ 36%
97	Ardley Rd East	A43 North	3389 m	00:05:13	12	00:07:07	16	00:01:54	▲ 36%
101	Ardley Rd East	B430	2030 m	00:01:50	36	00:02:32	30	00:00:43	▲ 39%
104	Ardley Rd East	Ardley Rd West	1014 m	00:00:57	58	00:01:19	33	00:00:22	▲ 38%

TABLE 5.10: JOURNEY TIME COMPARISONS (SET 2) – 2031 RC1-SENS TEST & DS1-SENS TEST – PM

Queue Length Results

5.4.20 The mean-maximum queue lengths at Baynard's Green, Padbury, Cherwell, Ardley, Ardley Crossroads and the new Ardley Bypass junction are shown in **Figure 5.13-5.18** for the AM peak and **Figure 5.19-5.24** for the PM peak.

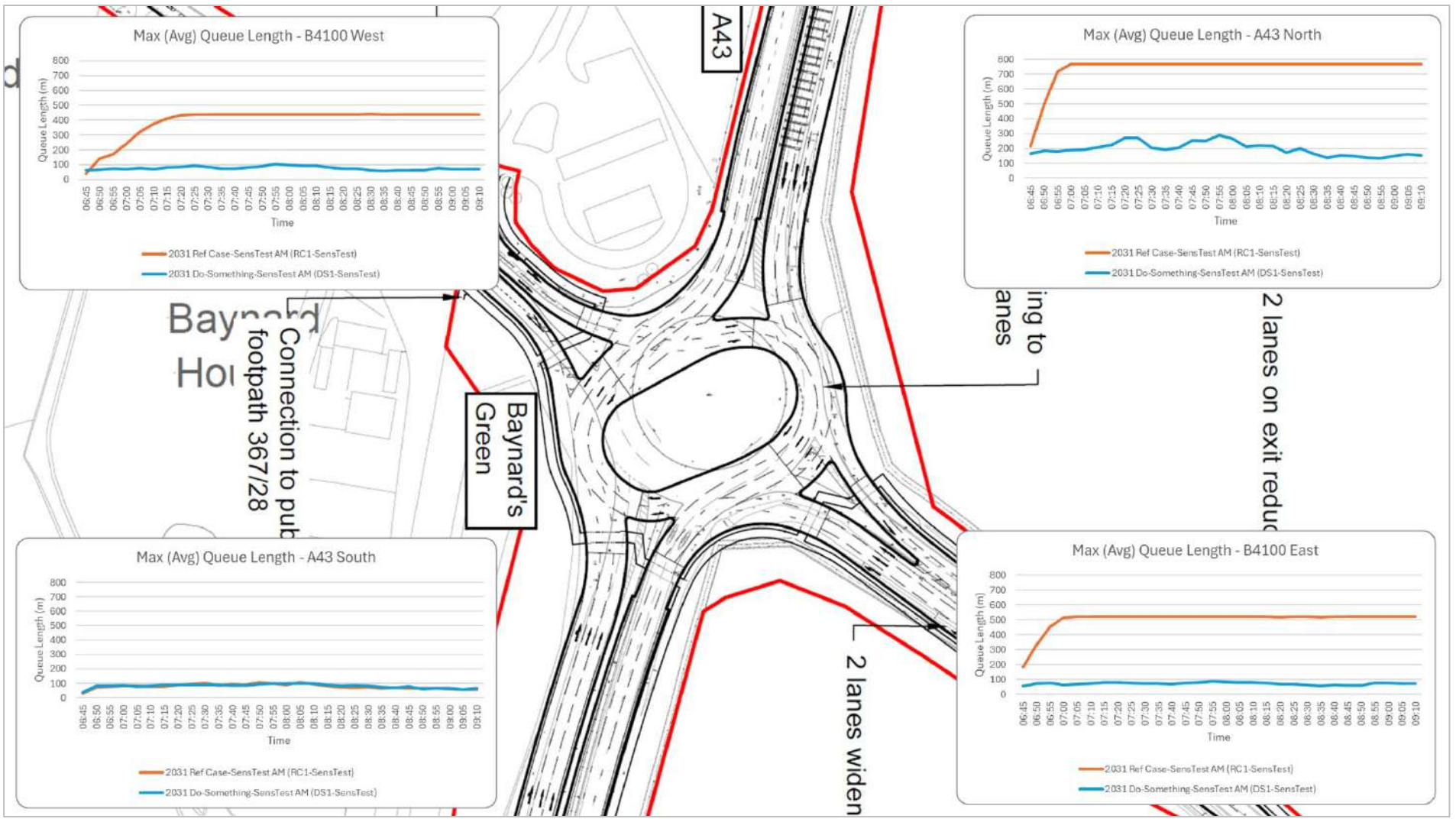

FIGURE 5.13: MAXIMUM (AVERAGE) QUEUE LENGTHS – 2031 RC1-SENS TEST & DS1-SENS TEST – AM – BAYNARD'S GREEN

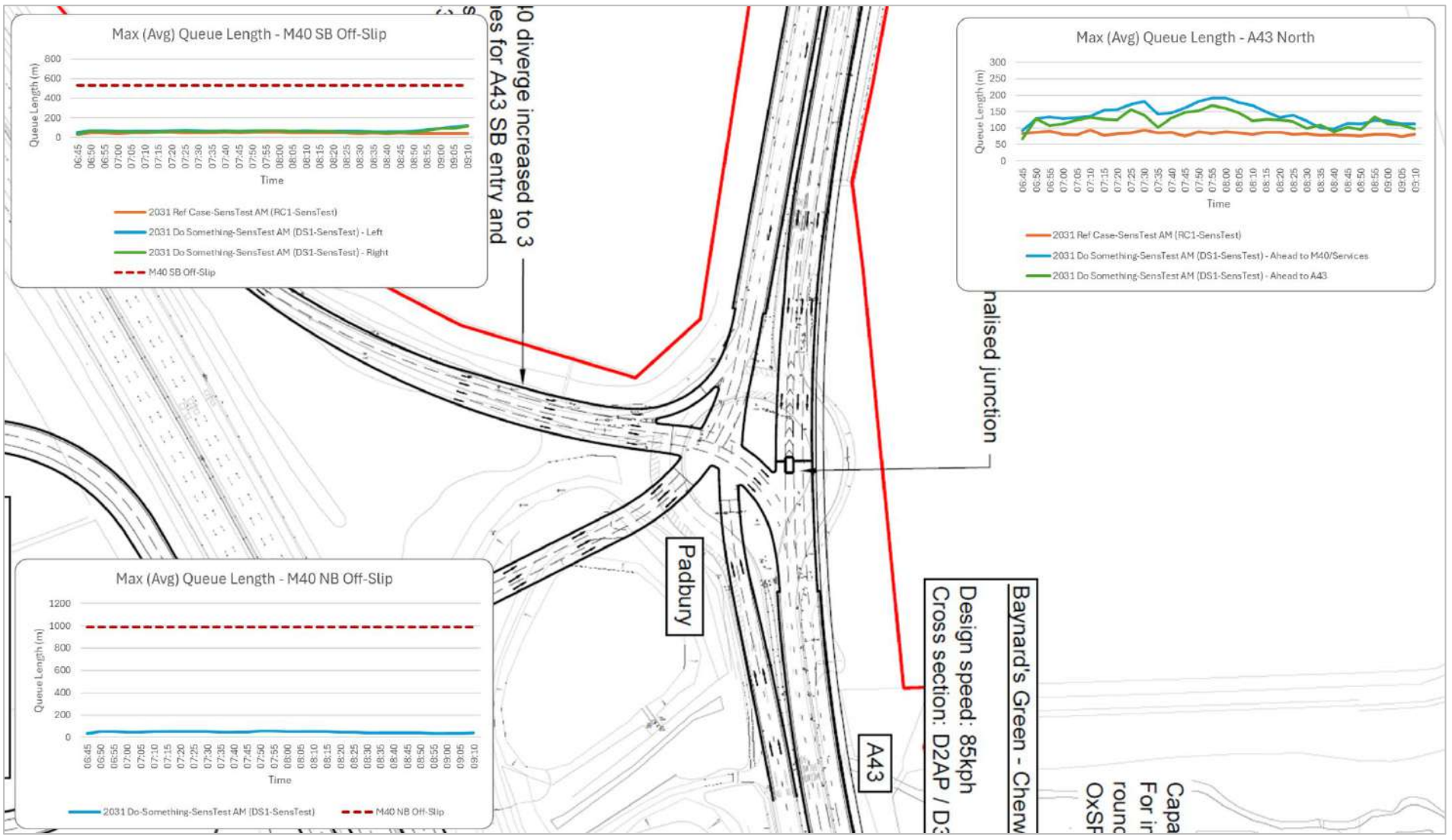

FIGURE 5.14: MAXIMUM (AVERAGE) QUEUE LENGTHS – 2031 2031 RC1-SENS TEST & DS1-SENS TEST – AM – PADBURY

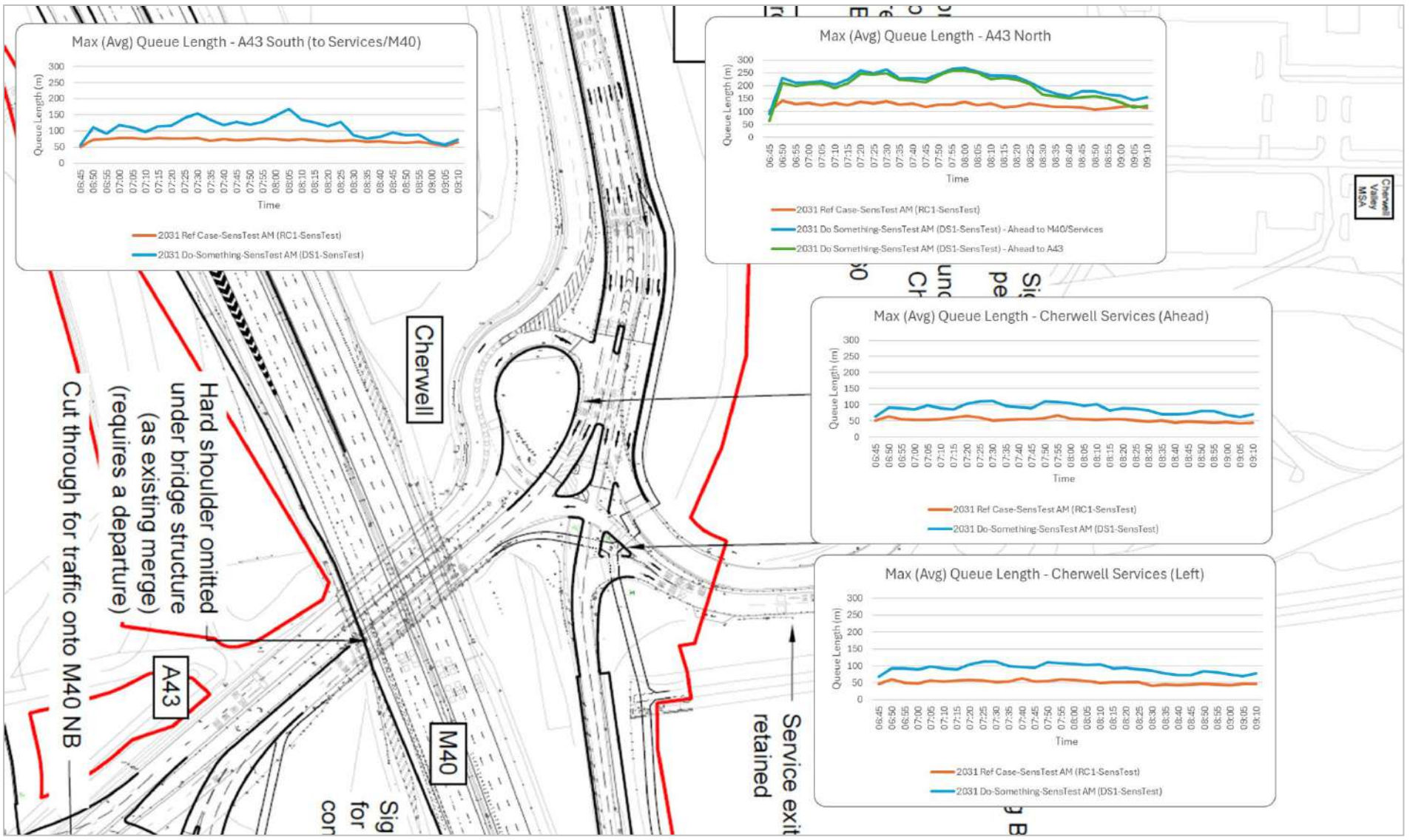

FIGURE 5.15: MAXIMUM (AVERAGE) QUEUE LENGTHS – 2031 RC1-SENS TEST & DS1-SENS TEST – AM – CHERWELL

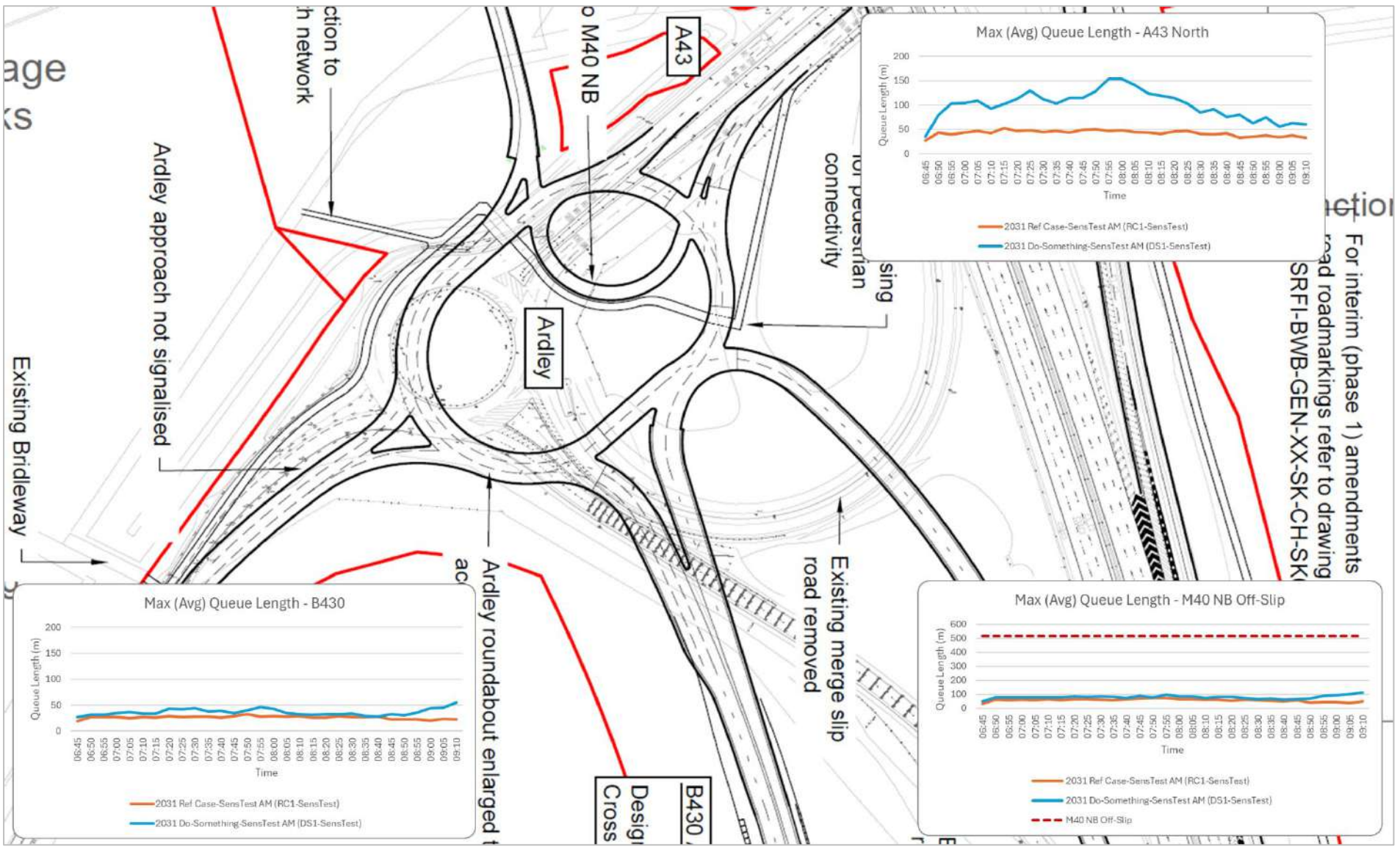

FIGURE 5.16: MAXIMUM (AVERAGE) QUEUE LENGTHS – 2031 RC1-SENS TEST & DS1-SENS TEST – AM – ARDLEY

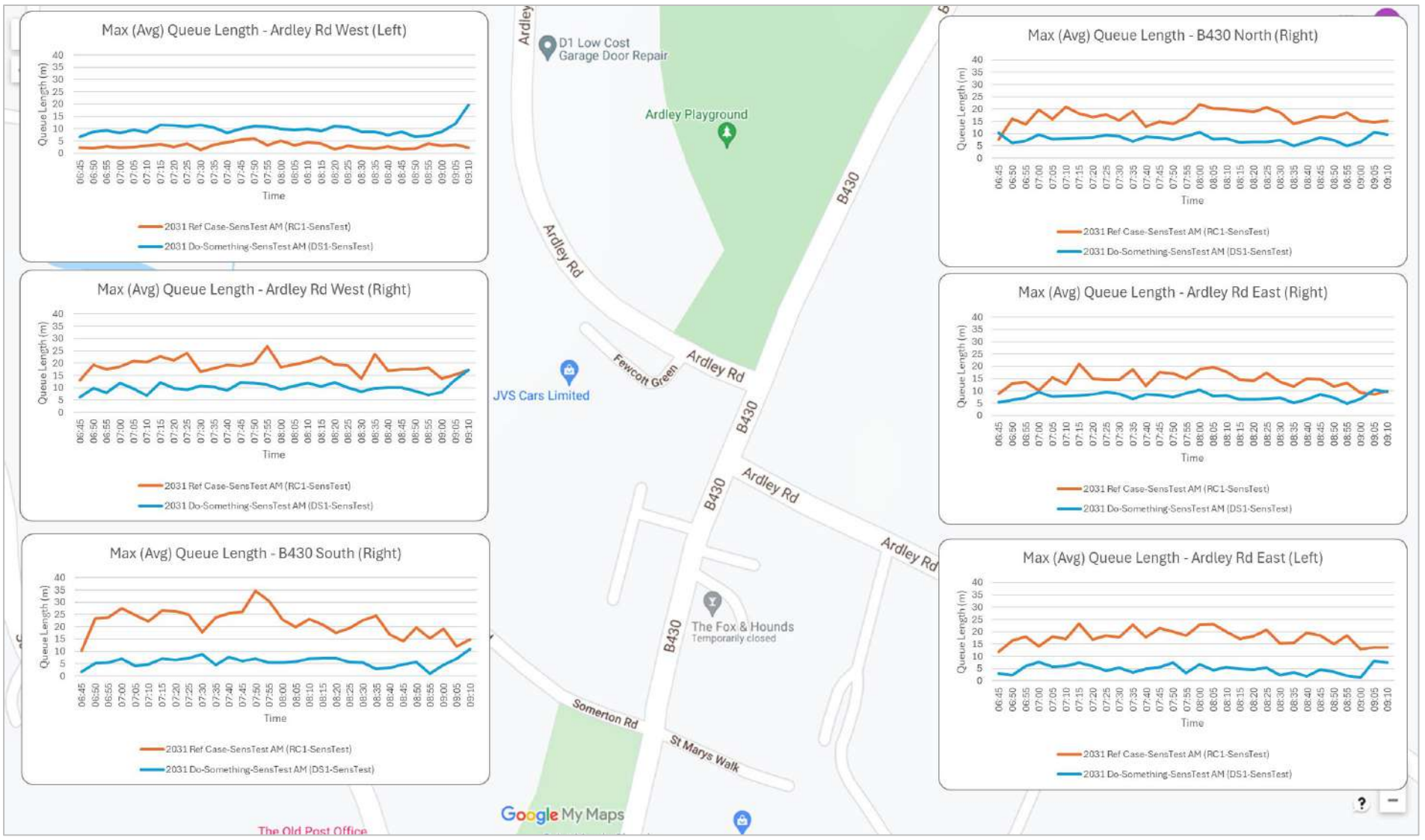

FIGURE 5.17: MAXIMUM (AVERAGE) QUEUE LENGTHS – 2031 RC1-SENS TEST & DS1-SENS TEST – AM – ARDLEY CROSSROADS

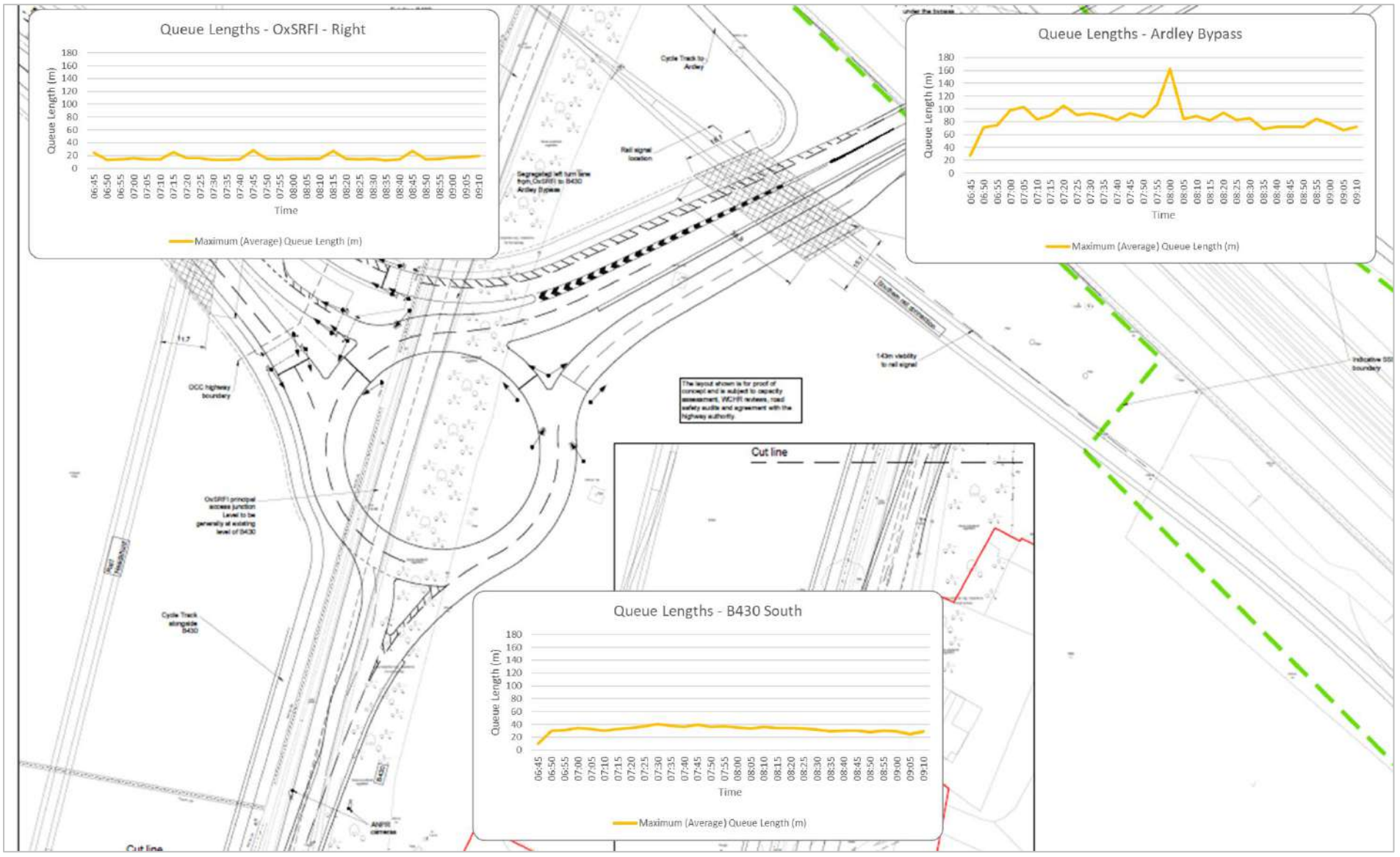

FIGURE 5.18: MAXIMUM (AVERAGE) QUEUE LENGTHS – 2031 RC1-SENS TEST & DS1-SENS TEST – AM – OXSRFI/ARDLEY BYPASS

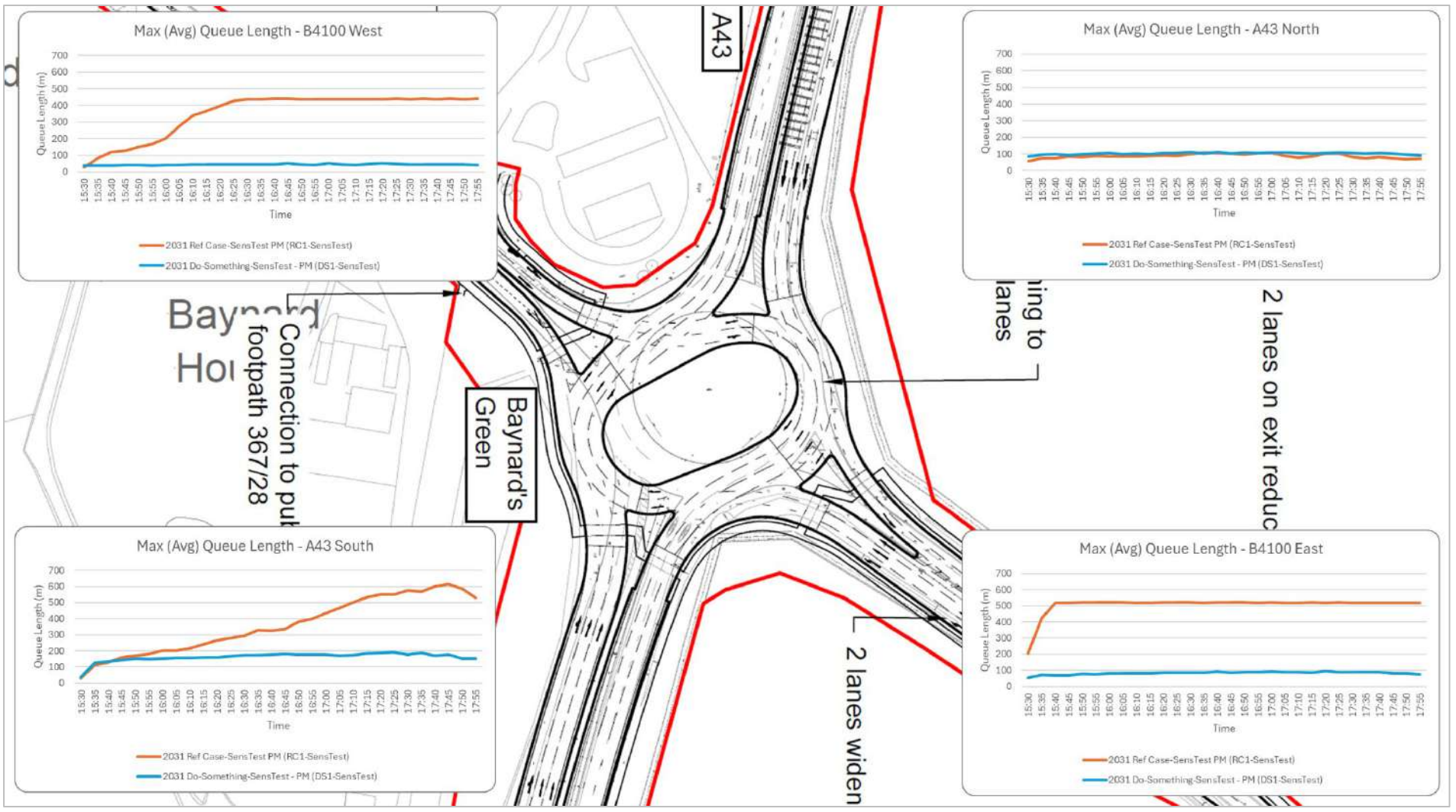

FIGURE 5.19: MAXIMUM (AVERAGE) QUEUE LENGTHS – 2031 RC1-SENS TEST & DS1-SENS TEST – PM – BAYNARD'S GREEN

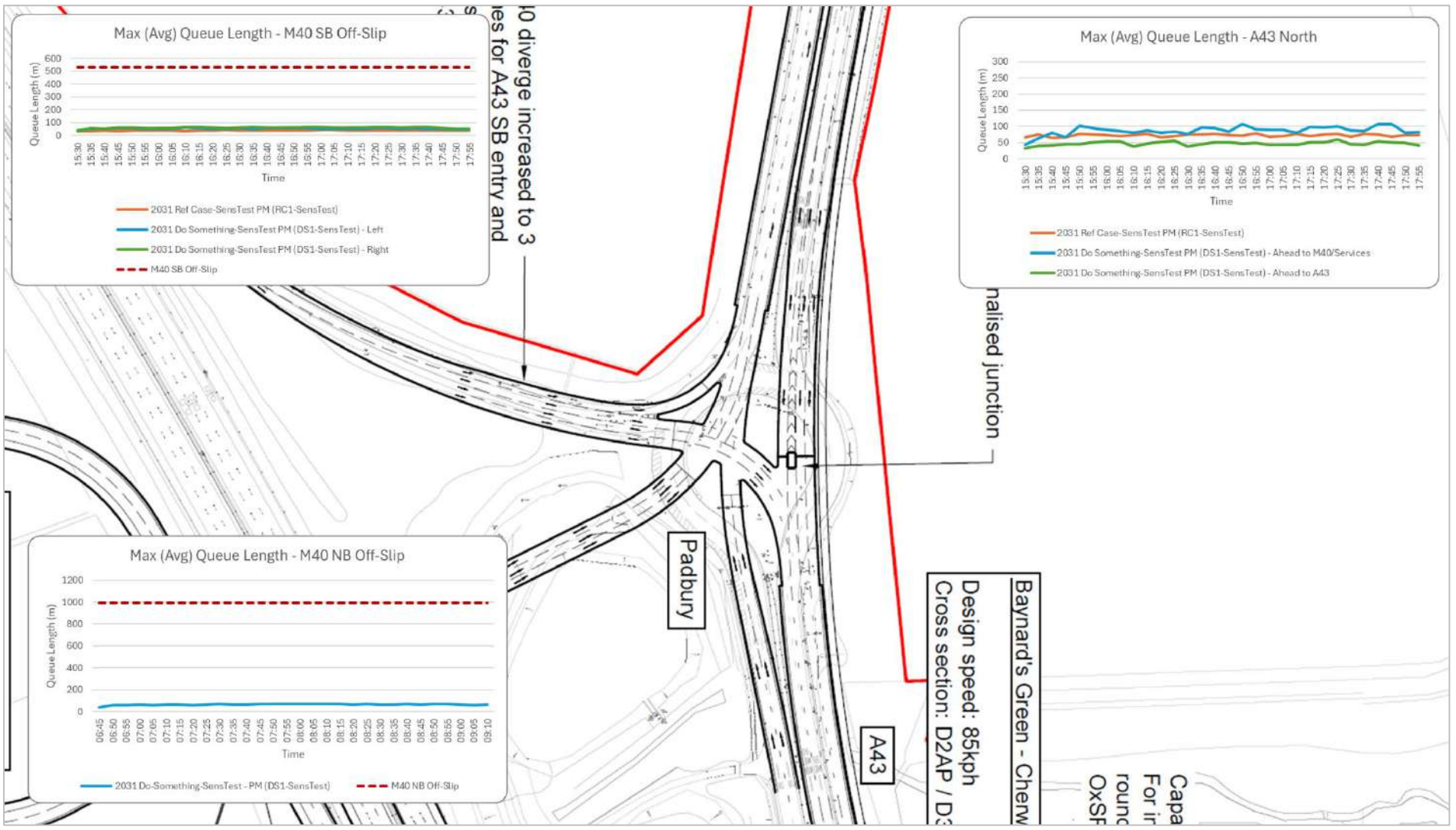

FIGURE 5.20: MAXIMUM (AVERAGE) QUEUE LENGTHS – 2031 RC1-SENS TEST & DS1-SENS TEST – PM – PADBURY

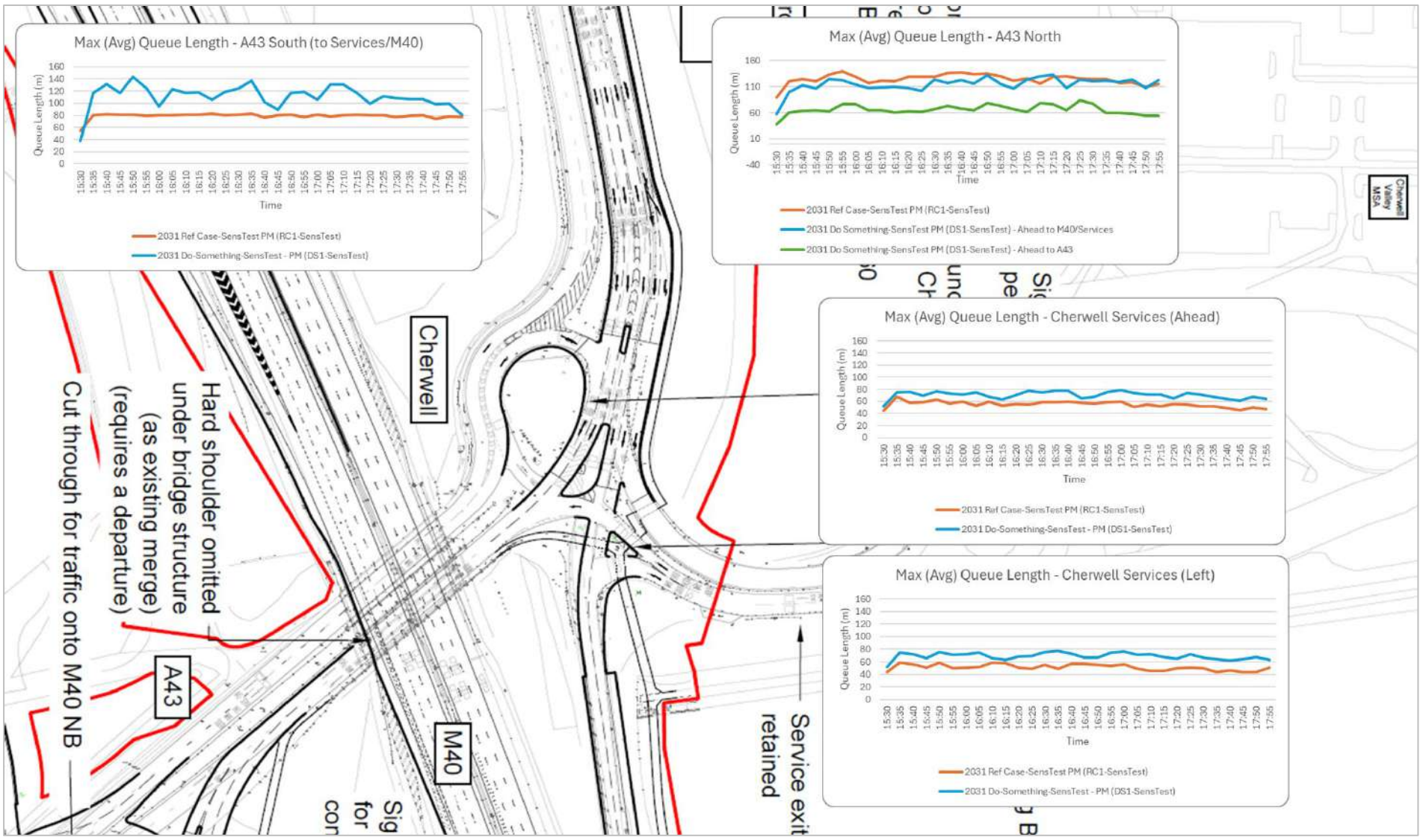

FIGURE 5.21: MAXIMUM (AVERAGE) QUEUE LENGTHS – 2031 RC1-SENS TEST & DS1-SENS TEST – PM – CHERWELL

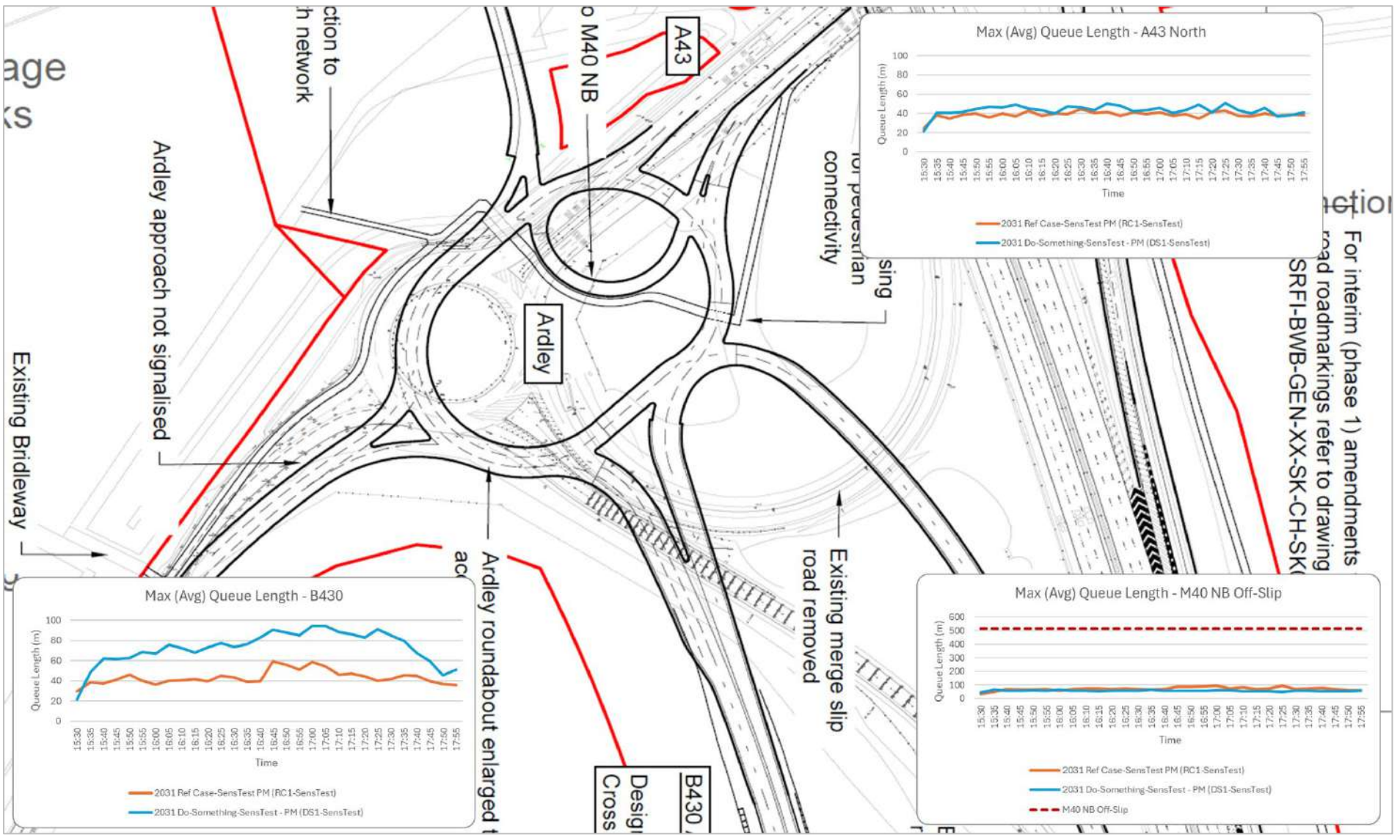

FIGURE 5.22: MAXIMUM (AVERAGE) QUEUE LENGTHS – 2031 RC1-SENS TEST & DS1-SENS TEST – PM – ARDLEY

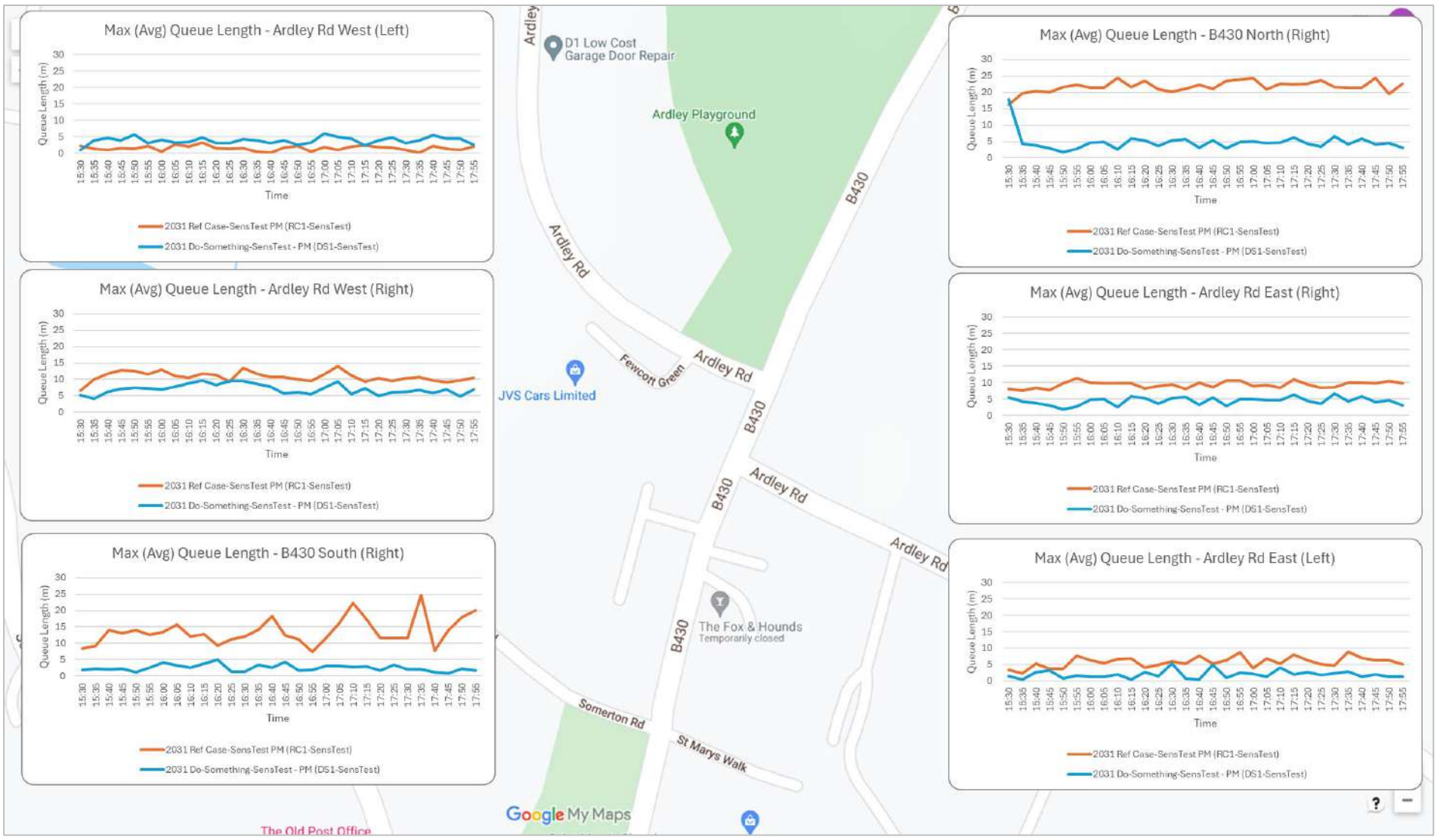

FIGURE 5.23: MAXIMUM (AVERAGE) QUEUE LENGTHS – 2031 RC1-SENS TEST & DS1-SENS TEST – PM – ARDLEY CROSSROADS

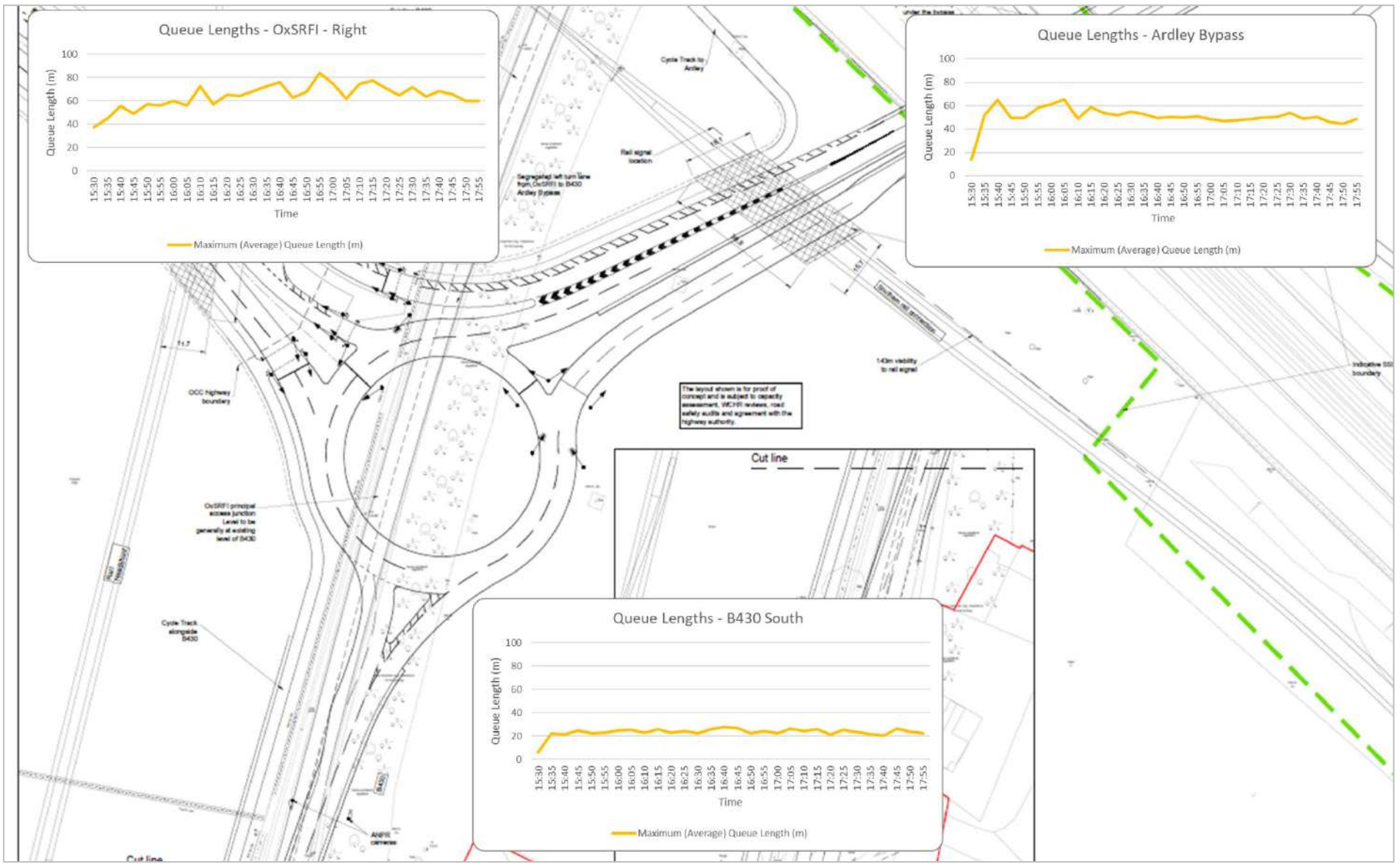

FIGURE 5.24: MAXIMUM (AVERAGE) QUEUE LENGTHS – 2031 RC1-SENS TEST & DS1-SENS TEST – PM – OXSRFI/ARDLEY BYPASS

AM Peak Queue Analysis

Baynard's Green Roundabout

5.4.21 The Sensitivity Test results show the same positive impacts of the OxSRFI development mitigation scheme at Baynard's Green roundabout as in the primary scenario testing, with significant queue reductions on the A43 North, B4100 East and B4100 West compared to the Reference Case. Queues on the A43 North, B4100 East and B4100 West all reach back to the start of their entry points, distances of 770 metres, 520 metres and 430 metres respectively. With the junction improvements in place, these queues reduce to approximately 270 metres (-65%) on the A43 North, 90 metres (-83%) on the B4100 East and 100 metres (-77%) on the B4100 West. As alluded to in the other scenario testing analysis, the larger junction and signal have a substantial positive impact on the operation of the network at the junction.

5.4.22 The A43 South queuing is also consistent with the primary scenario testing, where queues in the Sensitivity Testing are similar between the Reference Case and Do-Something scenarios, reaching approximately 100 metres. These queues indicate that the signal strategy successfully balances competing demands whilst providing acceptable (or significantly improved) operation across all approaches.

Padbury Junction

5.4.23 At Padbury junction, and like the primary scenario testing, the Do-Something scenario shows an increased queue on the A43 North. This reaches up to approximately 190 metres (compared to ~150 metres in the other scenario testing), compared to approximately 90 metres in the Reference Case. As discussed in paragraph **5.3.22**, the Do-Something queue levels must be interpreted in the context of the 1,636 vehicles unable to enter the network in the Reference Case. The improved Baynard's Green junction releases this latent demand into the network, in addition to accommodating the OxSRFI development traffic.

5.4.24 On the M40 southbound off-slip, the queues in both scenarios are contained within the slip road length and not impact on the M40 mainline. This confirms acceptable strategic road network operation and is consistent with the primary scenario testing analysis.

5.4.25 For the new M40 northbound off-slip in the Do-Something scenario, maximum queues reach approximately 50 metres (identical to the primary scenario testing), well within the slip road length and confirming no mainline interaction risk. This validates the design adequacy of the new infrastructure.

Cherwell Junction

5.4.26 At Cherwell junction, the queuing trends follow the same pattern as the primary scenario testing, albeit with some larger queues in the Do-Something scenario for the A43 North and A43 South (due to the differing queue profiles).

5.4.27 On the A43 North, the queues in the Do-Something scenario reach up to 260 metres, compared to 140 metres in the Reference Case.

5.4.28 On the A43 South (turning towards Cherwell Services and M40 southbound), the queues in the Do-Something reached approximately 165 metres, compared to 75 metres in the Reference Case.

5.4.29 At the Cherwell Services, the Do-Something scenario queue lengths are approximately 115 metres (the same as the primary scenario testing), with Reference Case queues reaching approximately 65 metres.

5.4.30 As discussed in paragraph **5.3.22**, these queue comparisons must be interpreted in the context of the Reference Case latent demand, which prevents over 1,600 vehicles from reaching junctions south of Baynard's Green.

Ardley Roundabout

5.4.31 The Do-Something scenario results in increased queues on the A43 North approach compared to the Reference Case. These queues are increased from 50 metres in the Reference Case to approximately 155 metres in the Do-Something scenario and is consistent with increases at Padbury and Cherwell junctions for the A43 southbound movement. As discussed in paragraph **5.3.22**, the Do-Something queue levels reflect the additional traffic released into the network from the improved Baynard's Green junction, together with the OxSRFI development traffic.

5.4.32 For the M40 northbound off-slip, the queueing levels are similar, reaching up to approximately 90 metres in both scenarios (and consistent with the primary scenario testing). These lengths are well within the capacity of the slip road and will have no impact on the M40 mainline.

5.4.33 On the B430, the Do-Something scenario shows queue lengths of up to 55 metres, compared to 40 metres in the Reference Case. This is attributed to increased

traffic flows around Ardley, due to the combination of the larger junction and the signalisation of the other arms. Whilst this results in drivers on the B430 having additional waiting time to enter the roundabout, the intergreen times from the signals provide more defined gaps for drivers to progress (in comparison to the Reference Case).

Ardley Village Crossroads

5.4.34 At the Ardley crossroads within Ardley village, queues either remain similar or reduce in the Do-Something scenario. This improvement results from two factors: reduced traffic using the village itself, and the stopping up of B430 south of Ardley village, which diverts through-traffic to the new Ardley bypass link. This delivers a local amenity benefit by reducing traffic impacts within the village residential area.

OxSRFI Access/Ardley Bypass Roundabout

5.4.35 Whilst no direct comparison with the Reference Case can be made (this junction exists only in the Do-Something scenario), the queuing levels at the OxSRFI site access and Ardley bypass roundabout are presented to demonstrate acceptable operation of this new infrastructure.

5.4.36 Maximum queues of approximately 165 metres occur on the Ardley Bypass approach, exceeding the two-lane section length. These queues are longer than the primary scenario testing as a result of the differing flow profiles used. However, the queue length remains acceptable given the rural location and absence of any nearby upstream junctions.

5.4.37 Queues on the B430 South approach reach approximately 40 metres, with the OxSRFI access arm experiencing maximum queues of approximately 25 metres. These queue levels indicate no severe capacity constraints at this junction and confirm that the signalised roundabout operates acceptably under AM peak demand conditions.

PM Peak Queue Analysis

Baynard's Green Roundabout

5.4.38 The Sensitivity Testing results show the same positive impacts as the primary scenario testing, with significant queue reductions on the B4100 East and B4100 West as a result of the proposed OxSRFI junction improvements.

5.4.39 Queues on the B4100 East and B4100 West reach back to the start of their respective entry points, at lengths of 520 metres and 430 metres. This is in contrast

to the Do-Something scenario, where queues reach approximately 85 metres on the B4100 East (an 84% reduction) and 50 metres on the B4100 West (an 89% reduction).

5.4.40 One notable difference to the primary scenario testing is that on the A43 South, the Sensitivity Testing shows a significant improvement in queuing levels. These are reduced to 190 metres from 610 metres in the Reference Case (a 69% reduction). This is linked to the differing flow profiles used.

5.4.41 The A43 North approach has similar queues between the two scenarios, reaching up to approximately 110 metres in length.

5.4.42 These results clearly demonstrate the significant benefits of the junction improvements, with the full signalisation of the roundabout proving effective in reducing queues on the local road network and the heavier A43 northbound movement in the PM peak.

Padbury Junction

5.4.43 The PM peak queue lengths at Padbury are similar between scenarios on the M40 southbound off-slip approach, with crucially no queuing back to the M40 mainline from the slip road. This confirms acceptable strategic network operation in both scenarios and is consistent with the findings from the primary scenario testing.

5.4.44 Queues on the A43 North are slightly increased in the Do-Something scenario, reaching up to 110 metres compared to 95m in the Reference Case. As discussed in paragraph **5.3.22**, these queue comparisons must be interpreted in the context of the Reference Case latent demand. In the PM peak Sensitivity Test, the improved Baynard's Green junction enables 869 additional vehicles from the B4100 East and B4100 West to enter the network, in addition to the OxSRFI development traffic.

5.4.45 The new M40 northbound off-slip in the Do-Something scenario shows maximum queues of approximately 70 metres (the same as in the primary scenario testing), well contained within the slip road length and confirming adequate capacity provision.

Cherwell Junction

5.4.46 Queue behaviour at Cherwell in the PM peak shows similar levels on the A43 North approach, with both scenarios reaching up to 135-140m. This indicates that the mitigation scheme to include additional lanes on the A43 southbound provide

sufficient queuing capacity to accommodate the additional traffic flows released into the network (that was otherwise held outside the network in the Reference Case).

5.4.47 On the A43 South approach (turning to Cherwell Services/M40), queues increase from approximately 80 metres to 145 metres in the Do-Something scenario. As in the AM peak analysis, this results from improved accessibility from Ardley roundabout due to the junction improvements, an increase in the A43 southbound traffic from the Baynard's Green junction improvements (release of 869 vehicles), and increased flows as a result of the proposed OxSRFI development. However, as in the AM peak, this approach is reconfigured in the Do-Something scenario such that the off-side lane is now a dedicated lane for traffic turning right at the Cherwell junction. The nearside lane continues to serve A43 northbound traffic, but the traffic flow is significantly reduced for this movement, as M40 to A43 northbound traffic uses the new M40 off-slip joining Padbury junction. This is part of the highway mitigation strategy to accommodate the additional OxSRFI traffic (travelling to the M40 southbound), with the proposed highway layout designed to accommodate this increased demand and queue.

5.4.48 Queues from the Cherwell Services arm are slightly higher in the Do-Something scenario, reaching up to approximately 85 metres compared to 75 metres in the Reference Case. This increase is the result of additional green time needing to be assigned to the heavier southbound flows, which reduces the green time available for traffic to exit the services.

Ardley Roundabout

5.4.49 The PM peak queuing levels are similar on the M40 northbound off-slip and A43 North between both scenarios at Ardley roundabout. This is consistent with the primary scenario testing.

5.4.50 M40 northbound off-slip queuing reaches approximately 90 metres in both scenarios, which is well within the slip road length and will have no impact on the M40 mainline.

5.4.51 Queues on the A43 North approach reach up to approximately 50 metres in both scenarios, indicating the mitigation measures are successful at accommodating the additional traffic released into the network (compared to the latent demand in the Reference Case), in addition to the OxSRFI development traffic.

5.4.52 On the B430, there is a difference in the Sensitivity Testing compared to the primary scenario testing, with the Sensitivity Test comparisons showing higher queues in the Do-Something scenario. These queues reach up to approximately 95 metres, compared to 60 metres in the Reference Case. These differences are attributed to the different flow profiles used, along with the junction improvement at Ardley. The combination of the larger junction and other signalised nodes results in increased waiting times on the B430 approach. However, the intergreen times from the signals provide more defined gaps for drivers to progress (in comparison to the Reference Case, where it is harder for drivers to judge suitable gaps to pull out into.,

Ardley Village Crossroads

5.4.53 Ardley village crossroads queuing remains similar or reduces in the Do-Something scenario (consistent with AM peak findings). This confirms local amenity benefits from traffic reassignment to the Ardley bypass, reducing vehicle movements through the village residential area.

OxSRFI Access/Ardley Bypass Roundabout

5.4.54 At the OxSRFI site access roundabout in the PM peak, maximum queues reach approximately 85 metres on the OxSRFI access arm and 65 metres on the Ardley Bypass arm, with B430 South queues of approximately 30 metres. These queue levels indicate acceptable junction operation with no severe capacity constraints. The junction successfully manages site access traffic alongside through-traffic on the bypass link (similar to the findings in the primary scenario testing).

Network Performance Results

5.4.55 The network performance comparisons for the AM and PM peaks are shown in **Table 5.11** and **Table 5.12**.

All Vehicles			
2031 AM			
Scenario	Average Delay per Vehicle (s)	Average Speed (mph)	Latent Demand
2031 Reference Case (RC1-SENS TEST)	92	44	1636
2031 Do-Something (DS1-SENS TEST)	52	48	0

TABLE 5.11: NETWORK PERFORMANCE – 2031 RC1-SENS TEST & DS1-SENS TEST – AM

5.4.56 The Sensitivity Test results show a consistency in the network performance impacts, further evidencing that the mitigation schemes proposed by the OxSRFI

development will result in a significantly improved network performance. Compared to the Reference Case, the average delay per vehicle reduces by 40 seconds (-43%) and average network speeds increase by 4mph (+8%). The average speed increases are achieved against the inclusion of reduced speed limits within the network, further demonstrating the positive impacts of the mitigation schemes.

5.4.57 The network improvements also result in the complete removal of latent demand (vehicles not able to enter the network) in the network. This allows an additional 1,636 vehicles able to enter the network compared to the Reference Case (1,045 vehicles from the A43 North, 394 vehicles from the B4100 East and 198 vehicles from the B4100 West).

All Vehicles			
2031 PM			
Scenario	Average Delay per Vehicle (s)	Average Speed (mph)	Latent Demand
2031 Reference Case (RC1-SENS TEST)	73	48	869
2031 Do-Something (DS1-SENS TEST)	52	49	1

TABLE 5.12: NETWORK PERFORMANCE – 2031 RC1-SENS TEST & DS1-SENS TEST –PM

5.4.58 In the PM peak, the introduction of the proposed OxSRFI development led to an improvement in the average delay per vehicle (-21s/-29%), whilst maintaining an average network speed of 48-49mph (further demonstrating the effectiveness of the mitigation schemes when considering the inclusion of reduced speed limits in the network). This demonstrates that the package of improvements proposed by the OxSRFI development will be effective in both peak periods (as concluded in the primary scenario testing).

5.4.59 The PM peak also shows a significant reduction in the latent demand figures, with all but 1 vehicle unable to access the network compared to 869 in the Reference Case (731 from the B4100 East and 137 from the B4100 West). The single vehicle from the M40 South entry in the Do-Something scenario is attributed to the stochastic nature of how the flows are input into the model. This effect is negligible and will not have any impact on the conclusions drawn from the modelled results obtained.

Summary of 2031 [Sensitivity Test] Model Performance Analysis

5.4.60 Reference Case and Do-Something scenarios were developed for the 2031 DfT Circular 01/2022 compliant scenario, using strategic traffic flows provided by ADC

Infrastructure Ltd from the Bicester Transport Model (BTM), which were adjusted using a methodology proposed by AECOM to account for differences in the base BTM and VISSIM flows. Journey times, queue lengths, and network performance metrics were extracted to understand operational performance.

Consistent Strategic Benefits in the DfT Circular 01/2022 Compliant Scenario

5.4.61 The primary finding is that the OxSRFI development mitigation package continues to deliver operational improvements to the A43 southbound corridor and B4100 links, addressing the capacity constraints evident in the Reference Case.

5.4.62 In the AM peak, significant queue reductions on the A43 North (-65%), B4100 East (-83%) and B4100 West arms (-77%) were the result of the larger Baynard's Green roundabout and full signalisation of the junction. Journey time reductions in the region of 2 minutes 9 seconds to 5 minutes 3 seconds were observed, further evidencing the benefits of the mitigation scheme.

5.4.63 The PM peak performance was equally improved on the B4100 East and West arms, with queue reductions of 84% and 89% respectively. Journey time savings of 3 minutes 47 seconds to 8 minutes 27 seconds from these local road arms further highlight the significant benefits of the signal strategy at the Baynard's Green roundabout An additional improvement notable within the Sensitivity Testing was a greater reduction in queuing on the A43 South (-69%), providing further evidence of the improved performance of Baynard's Green roundabout with the proposed OxSRFI mitigation scheme in place.

5.4.64 These findings demonstrate that the mitigation delivers operational improvements across the 2031 (DfT Circular 01/2022 compliant scenario tests undertaken, accounting for different methodologies of applying the BTM flows to the VISSIM network.

Network Performance Improvements Remains Comparable

5.4.65 Network -wide performance metrics for the Sensitivity Testing continues to show that the Do-Something scenario delivers considerable operational improvements to the Reference Case, whilst also accommodating the proposed OxSRFI development traffic.

- AM Peak: Average vehicle delay reduces from 92 seconds to 52 seconds, with average network speed increased from 44mph to 48 mph
- PM Peak: Average vehicle delay reduces from 73 seconds to 52 seconds, with average network speed maintained at 48-49 mph.

5.4.66 The improved network performance is the result of comprehensive junction improvement package proposed by the OxSRFI development, particularly at Baynard's Green The significant Baynard's Green enhancements enable over 1,600 additional vehicles to enter the network in the AM peak, and nearly 870 additional vehicles to enter the network in the PM peak that were previously unable to do so in the Reference Case, in addition to accommodating trips associated with the proposed OxSRFI development.

Consistent Localised Effects

5.4.67 The localised effects in the Sensitivity Testing include significantly reduced queuing at Baynard's Green (as discussed above), reduced queuing at Ardley village crossroads (traffic reassignment to bypass), and effective queue management at the new OxSRFI site access junction (maximum queues of 25-165m, no capacity constraints).

5.4.68 Other localised effects include increased journey times from Cherwell Services travelling northbound to A43 North/B4100 East/B4100 West (107-144 seconds (AM), 35-55 seconds (PM) – resulting from the removal of the direct right-turn lane, necessitating a right turn at Ardley and hence longer travel distance), increased journey times from Cherwell Services to the M40 North (72/65 seconds AM/PM peaks – attributable to an increased number of signalised stop-lines to traverse), increased journey times from Ardley village northbound (55-107 seconds (AM), 58-151 seconds (PM) – the result of the need to travel through an increased number of signalised nodes, and a change in speed limits in this area of the network), and increased queuing at Padbury, Cherwell and Ardley in both peaks (attributable to the network accommodating additional traffic that is now able to enter from the A43 North, B4100 East and B4100 West entry points, in combination with the proposed OxSRFI development traffic.

5.4.69 These localised effects, whilst variable in magnitude to the 2031 DfT Circular 01/2022 compliant scenario without any BTM flow adjustments, highlight a consistency in the locations across the different flow profiles assessed.

Consistency Across Differing Flow Profiles

5.4.70 The consistency of findings between 2031 DfT Circular 01/2022 compliant scenario with and without BTM flow adjustments provides confidence in the assessment. Both flow profiles demonstrate:

- Significantly improved network-wide performance and accommodation of latent demand from the Reference Case.
- Localised effects that are modest in scale and do not constitute severe effects.
- Journey time changes for the majority of movements within ±120 seconds.

5.4.71 This consistency confirms that the mitigation package delivers robust benefits that are evident across the different demand levels.

6 SENSITIVITY AND LIMITATIONS

6.1 Convergence Methodology

6.1.1 Dynamic assignment models require convergence testing to ensure stable path distributions before extracting performance results. The convergence process establishes equilibrium route choice patterns that represent realistic driver behaviour through the network. Achieving robust convergence is fundamental to the credibility of any subsequent performance analysis.

6.1.2 For the M40 Junction 10 future year models, convergence was achieved following industry-standard methodology for complex networks with dynamic assignment. As detailed in Section 4, convergence runs were undertaken using 80% of total demand, in accordance with PTV guidance for congested networks. This guidance recognises that heavily overloaded networks may not achieve mathematical convergence at full demand, and that path distributions developed at reduced demand levels are representative of those that would occur at full demand. This is an established and accepted approach within the industry for networks exhibiting the level of congestion observed in the Reference Case scenarios.

6.1.3 Following convergence of path distributions, all performance results reported in Section 5 were extracted using full demand conditions. The journey times, queue lengths, delays and network performance statistics therefore represent operational performance under 100% of the tested demand levels. The convergence process determines route choice only; the reported metrics reflect the complete demand profile.

6.1.4 For the Do-Something scenarios, the volume difference criterion stabilised at 85–86% rather than reaching the strict TAG threshold of 95%. This is attributable to the model's complex link/connector structure, which produces a significant number of edges and possible paths, including multiple route options for certain origin-destination pairs. Under the strict TAG criterion of 0–5 vehicles, paths with low flows can oscillate between alternative routes without achieving mathematical convergence. The consistent stabilisation of this metric across all Do-Something scenarios, in both the primary and Sensitivity Test flow profiles, confirms that the models are stable from a path volume perspective.

6.1.5 This methodology aligns with established industry practice for dynamic assignment modelling and DfT TAG Unit 3.1 convergence requirements. The consistency of the convergence behaviour across all four modelled scenarios provides additional confidence in the robustness of the approach.

6.2 Model Scope and Assumptions

Temporal Scope

6.2.1 The VISSIM model represents AM peak (07:45–08:45) and PM peak (16:30–17:30) conditions, calibrated and validated against observed survey data. Peak periods represent the most critical test of junction capacity and network performance, providing the appropriate basis for impact assessment. Acceptable operation during peak periods provides confidence in off-peak performance, given the lower traffic volumes during inter-peak and off-peak periods.

Pedestrian Activity

6.2.2 Pedestrian crossing facilities are included at Baynard's Green roundabout, Cherwell junction, Ardley roundabout and the OxSRFI site access junction, reflecting the proposed designs. No pedestrian demands have been modelled in either peak period, consistent with the rural location and limited pedestrian trip generators in the study area. The signal-controlled crossings will accommodate pedestrian activity on demand, and the absence of modelled pedestrian flows represents a minor simplification that does not materially affect the assessment of vehicular operational performance.

Strategic Network Context

6.2.3 The model includes the M40 mainline through Junction 10 with extended approach arms to capture queuing behaviour. The assessment assumes normal M40 mainline operation without significant incidents or planned closures. Strategic network interactions beyond the study area — including M40 mainline flow variations and the wider A43 corridor — are outside the model scope. These external factors are not anticipated to fundamentally alter the comparative findings between Reference Case and Do-Something scenarios, as both scenarios are subject to the same strategic network conditions.

Stochastic Variation

6.2.4 Results are averaged over 20 random seed runs (starting seed 42, increment of 10), providing robust representation of typical operational conditions. This

exceeds industry-standard practice and provides appropriate statistical confidence for the assessment. Individual days may experience variations outside these averaged values due to stochastic factors inherent in microsimulation modelling; however, the 20-seed averaging ensures that reported results represent expected conditions rather than outlier events.

Model Demand

6.2.5 The future year flow inputs are derived from the strategic Bicester Transport Model (BTM), reflecting committed and allocated development in accordance with Cherwell Local Plan 2042 consultation and DfT Circular 01/2022 definitions. Strategic model forecasts carry inherent uncertainty regarding development timing, trip generation rates and background traffic growth. This uncertainty is common to all transport assessments that rely on strategic model outputs and is not specific to this assessment.

6.2.6 The scenarios tested represent appropriate planning scenario boundaries defined in accordance with established policy frameworks. The assessment provides evidence for these defined scenarios; actual future conditions will depend on development delivery and traffic trend evolution.

6.3 Flow Methodology Sensitivity

6.3.1 A central purpose of this report is to test the sensitivity of the assessment conclusions to the methodology used for converting BTM flows into VISSIM format. Two approaches have been tested: the direct application of BTM outputs, and an alternative methodology proposed by AECOM that applies the absolute differences between base and future year BTM flows to the base VISSIM flows.

6.3.2 The two methodologies produce different demand levels at certain entry points, most notably resulting in higher latent demand in the Sensitivity Test Reference Case (1,636 vehicles in the AM peak compared to 1,143 in the primary methodology). Despite these differences in absolute demand, both approaches yield consistent conclusions regarding the operational benefits of the mitigation package and the nature and location of localised effects. This consistency provides confidence that the assessment findings are robust to reasonable variations in the flow conversion methodology.

6.4 Assessment Scope

6.4.1 This modelling assessment evaluates highway operational performance using VISSIM microsimulation. Other impact categories — including air quality, noise, severance and road safety — are outside the modelling scope and are addressed through separate DCO assessment workstreams.

6.4.2 The assessment focuses on vehicular traffic operation. Public transport, cycling and pedestrian impacts are not comprehensively assessed within the microsimulation modelling, though pedestrian crossing provision is included in junction designs where appropriate and the assessment of active travel impacts is covered elsewhere within the DCO application. For the M40 Junction 10 future year models, convergence was achieved following industry-standard methodology for complex networks with dynamic assignment. As detailed in Section 4, convergence runs were undertaken using an approach aligned with PTV guidance for networks with multiple route options and high edge counts.

7 MODELLING SUMMARY & RECOMMENDATIONS

7.1 Overview

7.1.1 Modelling Group, commissioned by ADC Infrastructure Ltd, has undertaken comprehensive VISSIM microsimulation modelling to provide robust empirical evidence of the comparative highway impacts associated with the proposed Oxfordshire Strategic Rail Freight Interchange (OxSRFI) on land east of the former Heyford Air Base and southwest of M40 Junction 10 in Cherwell, Oxfordshire.

7.1.2 The assessment has evaluated the 2031 DfT Circular 01/2022 compliant scenario using two flow profiles, with the Sensitivity Testing based on an alternative flow conversion methodology proposed by AECOM to account for differences between the base BTM and VISSIM flows. The modelled scenarios compared Reference Case conditions (committed development in accordance with DfT Circular 01/2022) against Do-Something conditions (Reference Case plus OxSRFI development and associated highway mitigation package).

7.2 Proposed Development against Reference Case

Baynard's Green Improved Performance

7.2.1 The most significant finding across both flow profiles is the substantial improvement in operational performance at Baynard's Green roundabout delivered by the proposed OxSRFI mitigation scheme.

7.2.2 In the Reference Case scenarios, queues on the A43 North, B4100 East and B4100 West approaches all extend to the start of their respective entry points (distances of approximately 770m, 520m and 430m). With the junction improvements in place, these queues reduce to approximately 220–270m (65–71% reduction) on the A43 North, 80–90m (83–85% reduction) on the B4100 East, and 100–130m (70–77% reduction) on the B4100 West. The larger junction configuration and signal strategy have a substantial positive impact on junction operation.

7.2.3 In the PM peak, queues on the B4100 East reduce from approximately 520 metres in the Reference Case to 85–100m in the Do-Something scenario (81–84% reduction), whilst on the B4100 West, queues reduce from approximately 430m to 50–60m (86–89% reduction). The Sensitivity Testing also highlights a notable reduction on the A43 South, with queues reducing from 610 metres to 190 metres

(69% reduction). These results demonstrate the effectiveness of the signal strategy in reducing queues on the local road network.

Network-Wide Performance

7.2.4 Network performance metrics across both flow profiles demonstrate that the Do-Something scenario delivers operational improvements compared to the Reference Case, whilst accommodating the additional OxSRFI development traffic:

- AM Peak: Average vehicle delay reduces from 92–95 seconds to 48–52 seconds, with average network speed increasing from 44mph to 48–49mph.
- PM Peak: Average vehicle delay reduces from 60–73 seconds to 48–52 seconds, with average network speed comparable at 48–50mph.

7.2.5 These improvements are attributable to the comprehensive junction improvement package, particularly at Baynard's Green. The enhancements enable over 1,100–1,600 additional vehicles to successfully enter and traverse the network in the AM peak and 400–870 vehicles in the PM peak — vehicles that would otherwise be unable to do so — whilst also accommodating the proposed development traffic.

Localised Effects Profile

7.2.6 Journey time comparisons across the full origin-destination matrix highlight significant reductions from the A43 North (AM peak), B4100 East (AM and PM peak) and B4100 West (AM and PM peak), with savings in the range of 2 minutes 9 seconds to 8 minutes 27 seconds across both flow profiles. These savings reflect the substantial benefits delivered by the junction improvements at Baynard's Green.

7.2.7 The assessment also identifies localised effects associated with the mitigation package. These include increased journey times from Cherwell Services for northbound movements (resulting from the removal of the direct right-turn lane and the requirement to route via Ardley), increased journey times through the reconfigured Ardley roundabout (attributable to the larger junction and additional signalised nodes), increased journey times from Ardley village (resulting from an increased number of signalised nodes to traverse and changes to speed limits), and increased queuing at Padbury, Cherwell and Ardley (attributable to the network accommodating additional traffic released from Baynard's Green, in combination with the OxSRFI development traffic).

7.2.8 These localised effects do not constitute severe or unacceptable impacts. The majority of journey time changes, where not significantly reduced, remain within ±120 seconds across both flow profiles. This is whilst accommodating all traffic demand — which is not the case in the Reference Case, where substantial numbers of vehicles are unable to enter the network. Queue increases remain contained within approach capacities and create no network blocking risks.

7.3 Technical Basis

7.3.1 As detailed in the supporting Modelling Impact Assessment Report (MG0163_OxfordSRFI_R_01-D_Final_MIAR, dated 12th March 2026), the assessment is underpinned by the validated 2016 base year model, which achieved exemplary performance against DfT TAG Unit 3.1 acceptance criteria:

- Entry flows: 100% within 5%, all achieving GEH <3
- Junction turning counts: 100% achieving GEH <5, with 93% achieving GEH <3
- Journey times: 95% within 15% of observed (exceeding TAG 85% requirement)
- Exit flows: 100% within TAG criteria

7.3.2 This validation performance significantly exceeds minimum requirements and was approved by National Highways in July 2021 (LMVR Document Reference: MG0163_M40 J10 Model Update_LMVR_R-01B, Issue 2).

7.3.3 Future year convergence was achieved following industry-standard dynamic assignment procedures in accordance with DfT TAG Unit 3.1 guidance. All performance results represent full demand operational conditions, providing a robust assessment under the tested future year scenarios.

7.3.4 The scenarios tested are defined in accordance with DfT Circular 01/2022 committed development definitions, providing appropriate planning scenario boundaries for DCO assessment purposes. Results are averaged over 20 random seed runs, exceeding industry-standard practice and providing robust statistical representation of typical operational conditions.

7.4 Conclusions

7.4.1 The assessment across both flow conversion methodologies has reached consistent overall conclusions. The improvements at Baynard's Green roundabout deliver substantial operational improvements compared to the existing network configuration, with significantly reduced queuing, improved journey times from the A43 North, B4100 East and B4100 West approaches, and the accommodation

of additional vehicles that would otherwise be unable to traverse the network under Reference Case conditions.

7.4.2 There are localised effects, with some movements experiencing improvements and others experiencing modest increases in journey times or queue lengths. The majority of journey time changes remain within ±120 seconds, and queue lengths remain within approach capacities throughout the network. However, this comparison must be considered in the context significant numbers of vehicles being unable to enter the network in the Reference Case, which masks the true impacts at junctions south of Baynard's Green in the Reference Case.

7.4.3 The consistency of these findings across two independent flow conversion methodologies — one applying BTM outputs directly and one applying the absolute difference methodology proposed by AECOM — provides additional confidence in the robustness of the assessment conclusions.

7.4.4 The modelling findings are suitable for supporting the DCO application, providing empirical evidence of operational performance under future year demand scenarios that accommodates the proposed development whilst maintaining acceptable network operation.

7.5 Recommendations

7.5.1 Based on the modelling findings, the following recommendations are made:

7.5.2 **Stakeholder Engagement**: These modelling findings should be discussed with National Highways, Oxfordshire County Council (as Local Highway Authority), Cherwell District Council (as Planning Authority) and other interested parties to support the DCO application process. The modelling provides robust empirical evidence that the proposed development, with its associated mitigation package, delivers acceptable highway network operational performance.

7.5.3 **Modelling Findings for DCO Application** - The assessment demonstrates that:

- Both flow conversion methodologies tested yield consistent conclusions regarding the operational benefits of the mitigation package.
- Compared to the existing network configuration, the proposed highway works package delivers substantial operational improvements whilst accommodating significant lantent demand and the development traffic.
- Localised impacts are modest in scale, with the majority of journey time changes within ±120 seconds and queue lengths remaining within approach capacities.

7.5.4 The assessment provides empirical evidence that the proposed development, with its comprehensive highway mitigation package, can be accommodated within the highway network whilst providing improvement operational performance across both flow profiles tested.

APPENDIX A:
BTM FLOW CONVERSION CALCS

2031 RC1 CALCULATIONS - AM PEAK

STEP 1 - FLOWS FROM BTM

Lights

AM PEAK	1	2	3	4	5	6	7	8	9	Total
1	0	227	60	1070	331	0	14	1	35	1738
2	233	0	0	2	13	185	254	0	0	687
3	51	0	0	157	73	104	0	0	0	385
4	938	2	208	0	2	2608	7	14	5	3784
5	193	13	0	0	0	93	17	18	90	424
6	0	285	128	3005	139	0	30	11	57	3655
7	73	389	0	112	0	0	0	0	2	577
8	5	1	0	2	41	10	0	0	43	102
9	10	0	4	0	59	117	8	13	0	306
Total	1503	916	396	4347	759	3117	330	58	232	11657

HGVs

	1	2	3	4	5	6	7	8	9	Total
1	0	0	2	240	5	0	0	0	0	247
2	39	0	0	0	0	0	12	0	0	28
3	12	0	0	0	96	0	45	0	0	153
4	137	0	16	0	0	352	0	0	0	505
5	0	0	0	1	0	1	0	0	0	2
6	0	16	59	546	0	0	0	0	0	621
7	0	7	0	0	0	0	0	0	0	7
8	0	0	0	0	0	8	0	0	0	8
9	0	0	0	0	0	4	0	0	0	4
Total	186	23	77	843	17	397	12	0	0	1535

Total

	1	2	3	4	5	6	7	8	9	Total
1	0	227	62	1310	336	0	14	1	35	1985
2	249	0	0	2	13	185	266	0	0	715
3	63	0	0	213	73	148	0	0	0	498
4	1075	2	224	0	2	2960	7	14	5	4289
5	193	13	0	1	0	94	17	18	90	426
6	0	301	186	3550	139	0	30	11	57	4276
7	73	397	0	112	0	0	0	0	2	584
8	5	1	0	2	49	10	0	0	43	110
9	10	0	4	0	63	117	8	13	0	310
Total	1668	939	473	5190	776	3514	342	58	232	13192

STEP 2 - CONVERT TO 15 MIN MATRICES USING 2016 BASE PROPORTIONS

LIGHTS

Time Period	Total	Overall Total	Proportion
0645-0700	2121	9302	23%
0700-0715	2217	9302	24%
0715-0730	2383	9302	26%
0730-0745	2271	9302	24%
			97%

HEAVIES

Time Period	Total	Overall Total	Proportion
0645-0700	451	1397	32%
0700-0715	406	1397	29%
0715-0730	418	1397	30%
0730-0745	377	1397	27%
			118%

LIGHTS

Time Period	Total	Overall Total	Proportion
0745-0800	2548	9302	27%
0800-0815	2432	9302	26%
0815-0830	2226	9302	24%
0830-0845	2096	9302	23%
			100%

HEAVIES

Time Period	Total	Overall Total	Proportion
0745-0800	372	1397	27%
0800-0815	348	1397	25%
0815-0830	364	1397	26%
0830-0845	313	1397	22%
			100%

LIGHTS

Time Period	Total	Overall Total	Proportion
0845-0900	1978	9302	21%
0900-0915	1825	9302	20%
			41%

Used peak total to determine proportions for warm-up and cool down periods

HEAVIES

Time Period	Total	Overall Total	Proportion
0845-0900	345	1397	25%
0900-0915	345	1397	25%
			49%

Used peak total to determine proportions for cool down period

LIGHTS

0645-0700

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	52	14	244	76	0	3	0	8	396
2	53	0	0	0	3	42	58	0	0	157
3	12	0	0	36	17	24	0	0	0	88
4	214	0	47	0	0	595	2	3	1	863
5	44	3	0	0	0	21	4	4	21	97
6	0	65	29	685	32	0	7	3	13	833
7	17	89	0	25	0	0	0	0	0	131
8	1	0	0	0	9	2	0	0	10	23
9	2	0	0	0	36	27	2	3	0	79
TOTAL	343	209	90	991	173	711	75	13	53	2658

0700-0715

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	54	14	255	79	0	3	0	8	414
2	56	0	0	0	3	44	60	0	0	164
3	12	0	0	38	17	25	0	0	0	92
4	223	1	50	0	0	622	2	3	1	902
5	46	3	0	0	0	22	4	4	21	101
6	0	68	30	716	33	0	7	3	14	871
7	17	93	0	27	0	0	0	0	1	137
8	1	0	0	0	10	2	0	0	10	24
9	2	0	0	0	38	28	2	3	0	73
TOTAL	358	218	94	1036	181	743	79	14	55	2778

0715-0730

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	58	15	274	85	0	4	0	9	445
2	60	0	0	0	3	47	65	0	0	176
3	13	0	0	40	19	27	0	0	0	99
4	240	1	53	0	1	668	2	4	1	969
5	50	3	0	0	0	24	4	5	23	109
6	0	73	33	770	36	0	8	3	15	936
7	19	100	0	29	0	0	0	1	146	
8	1	0	0	1	11	3	0	0	11	26
9	2	0	0	0	41	30	2	3	0	78
TOTAL	385	235	101	1114	194	799	85	15	59	2986

0730-0745

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	55	15	261	81	0	3	0	8	424
2	57	0	0	0	3	45	62	0	0	168
3	12	0	0	38	18	25	0	0	0	94
4	229	1	51	0	0	637	2	3	1	924
5	47	3	0	0	0	23	4	4	22	104
6	0	79	31	734	34	0	7	3	14	902
7	18	95	0	27	0	0	0	0	1	141
8	1	0	0	0	10	3	0	0	10	26
9	2	0	0	0	39	29	2	3	0	75
TOTAL	367	224	97	1061	185	791	81	14	57	2846

11268

0745-0800

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	62	16	293	95	0	4	0	10	476
2	64	0	0	0	4	51	69	0	0	188
3	13	0	0	43	20	28	0	0	0	105
4	257	1	57	0	1	714	2	4	1	1036
5	53	3	0	0	0	25	5	5	25	116
6	0	78	35	823	38	0	8	3	16	1001
7	20	107	0	31	0	0	0	0	1	158
8	1	0	0	1	11	3	0	0	12	28
9	3	0	0	0	43	32	2	3	0	84
TOTAL	412	251	108	1191	208	854	90	16	63	3193

0800-0815

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	59	16	280	87	0	4	0	9	454
2	61	0	0	0	3	46	66	0	0	180
3	13	0	0	41	19	27	0	0	0	101
4	245	1	54	0	1	682	2	4	1	989
5	51	3	0	0	0	24	4	5	24	111
6	0	74	33	786	36	0	8	3	15	956
7	19	102	0	29	0	0	0	0	1	151
8	1	0	0	1	11	3	0	0	11	27
9	3	0	0	0	41	31	2	3	0	80
TOTAL	393	239	104	1136	198	815	86	15	61	3048

0815-0830

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	54	14	256	79	0	3	0	8	416
2	56	0	0	0	3	44	61	0	0	164
3	12	0	0	38	18	25	0	0	0	92
4	224	1	50	0	0	624	2	3	1	906
5	46	3	0	0	0	22	4	4	22	102
6	0	68	31	719	33	0	7	3	14	875
7	18	93	0	27	0	0	0	0	1	138
8	1	0	0	0	10	2	0	0	10	24
9	2	0	0	0	38	28	2	3	0	73
TOTAL	360	219	95	1040	182	746	79	14	55	2790

0830-0845

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	51	14	241	75	0	3	0	8	392
2	53	0	0	0	3	42	57	0	0	155
3	11	0	0	35	16	23	0	0	0	87
4	211	0	47	0	0	588	2	3	1	853
5	44	3	0	0	0	21	4	4	20	96
6	0	64	29	677	31	0	7	3	13	824
7	17	88	0	25	0	0	0	0	0	130
8	1	0	0	0	9	2	0	0	10	23
9	2	0	0	0	36	26	2	3	0	69
TOTAL	339	206	89	979	171	702	74	13	52	2627

11657 Y

0845-0900

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	48	13	227	70	0	3	0	7	369
2	50	0	0	0	3	39	54	0	0	146
3	11	0	0	33	16	22	0	0	0	82
4	199	0	44	0	0	555	2	3	1	805
5	41	3	0	0	0	20	4	4	19	90
6	0	61	27	639	30	0	6	2	12	777
7	16	83	0	24	0	0	0	0	0	123
8	1	0	0	0	9	2	0	0	9	22
9	2	0	0	0	34	25	2	3	0	65
TOTAL	319	195	84	924	161	663	70	12	49	2479

0900-0915

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	44	12	210	65	0	3	0	7	341
2	46	0	0	0	3	36	50	0	0	135
3	10	0	0	0	14	20	0	0	0	75
4	184	0	41	0	0	512	1	3	1	742
5	38	2	0	0	0	18	3	4	18	83
6	0	56	25	589	27	0	6	2	11	717
7	14	76	0	22	0	0	0	0	0	113
8	1	0	0	0	8	2	0	0	8	20
9	2	0	0	0	31	23	2	2	0	60
TOTAL	295	180	78	853	149	612	65	11	45	2287

4766

HEAVIES

0645-0700

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	0	1	78	2	0	0	0	0	80
2	5	0	0	0	0	0	4	0	0	9
3	4	0	0	18	0	14	0	0	0	36
4	44	0	5	0	0	114	0	0	0	163
5	0	0	0	0	0	0	0	0	0	1
6	0	5	19	176	0	0	0	0	0	200
7	0	2	0	0	0	0	0	0	0	2
8	0	0	0	0	3	0	0	0	0	3
9	0	0	0	0	1	0	0	0	0	1
TOTAL	53	8	25	272	5	128	4	0	0	496

0700-0715

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	0	1	70	1	0	0	0	0	72
2	5	0	0	0	0	0	4	0	0	8
3	4	0	0	16	0	13	0	0	0	33
4	40	0	5	0	0	102	0	0	0	147
5	0	0	0	0	0	0	0	0	0	1
6	0	5	17	159	0	0	0	0	0	180
7	0	2	0	0	0	0	0	0	0	2
8	0	0	0	0	2	0	0	0	0	2
9	0	0	0	0	1	0	0	0	0	1
TOTAL	48	7	22	245	5	115	4	0	0	446

0715-0730

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	0	1	72	1	0	0	0	0	74
2	5	0	0	0	0	0	4	0	0	8
3	4	0	0	17	0	13	0	0	0	34
4	41	0	5	0	0	105	0	0	0	151
5	0	0	0	0	0	0	0	0	0	1
6	0	5	18	163	0	0	0	0	0	186
7	0	2	0	0	0	0	0	0	0	2
8	0	0	0	0	2	0	0	0	0	2
9	0	0	0	0	1	0	0	0	0	1
TOTAL	50	7	23	252	5	119	4	0	0	459

0730-0745

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	0	1	65	1	0	0	0	0	67
2	4	0	0	0	0	0	3	0	0	8
3	3	0	0	15	0	12	0	0	0	30
4	37	0	4	0	0	99	0	0	0	136
5	0	0	0	0	0	0	0	0	0	1
6	0	4	16	147	0	0	0	0	0	167
7	0	2	0	0	0	0	0	0	0	2
8	0	0	0	0	2	0	0	0	0	2
9	0	0	0	0	1	0	0	0	0	1
TOTAL	45	6	21	227	5	107	3	0	0	414

1815

0745-0800

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	0	1	64	1	0	0	0	0	66
2	4	0	0	0	0	0	3	0	0	8
3	3	0	0	15	0	12	0	0	0	30
4	37	0	4	0	0	94	0	0	0	134
5	0	0	0	0	0	0	0	0	0	1
6	0	4	16	145	0	0	0	0	0	165
7	0	2	0	0	0	0	0	0	0	2
8	0	0	0	0	2	0	0	0	0	2
9	0	0	0	0	1	0	0	0	0	1
TOTAL	44	6	21	224	4	106	3	0	0	409

0800-0815

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	0	1	60	1	0	0	0	0	62
2	4	0	0	0	0	0	3	0	0	7
3	3	0	0	14	0	11	0	0	0	28
4	34	0	4	0	0	86	0	0	0	126
5	0	0	0	0	0	0	0	0	0	1
6	0	4	15	136	0	0	0	0	0	155
7	0	2	0	0	0	0	0	0	0	2
8	0	0	0	0	2	0	0	0	0	2
9	0	0	0	0	1	0	0	0	0	1
TOTAL	41	6	19	210	4	99	3	0	0	382

0815-0830

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	0	1	63	1	0	0	0	0	64
2	4	0	0	0	0	0	3	0	0	7
3	3	0	0	15	0	12	0	0	0	29
4	36	0	4	0	0	92	0	0	0	132
5	0	0	0	0	0	0	0	0	0	1
6	0	4	15	142	0	0	0	0	0	162
7	0	2	0	0	0	0	0	0	0	2
8	0	0	0	0	2	0	0	0	0	2
9	0	0	0	0	1	0	0	0	0	1
TOTAL	43	6	20	220	4	103	3	0	0	400

0830-0845

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	0	0	54	1	0	0	0	0	55
2	4	0	0	0	0	0	3	0	0	6
3	3	0	0	12	0	10	0	0	0	25
4	31	0	4	0	0	79	0	0	0	113
5	0	0	0	0	0	0	0	0	0	0
6	0	4	13	122	0	0	0	0	0	139
7	0	2	0	0	0	0	0	0	0	2
8	0	0	0	0	2	0	0	0	0	2
9	0	0	0	0	1	0	0	0	0	1
TOTAL	37	5	17	189	4	89	3	0	0	344

1535 Y

0845-0900

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	0	1	59	1	0	0	0	0	61
2	4	0	0	0	0	3	0	0	0	7
3	3	0	0	14	0	11	0	0	0	28
4	34	0	4	0	0	87	0	0	0	125
5	0	0	0	0	0	0	0	0	0	1
6	0	4	15	135	0	0	0	0	0	153
7	0	2	0	0	0	0	0	0	0	2
8	0	0	0	0	2	0	0	0	0	2
9	0	0	0	0	1	0	0	0	0	1
TOTAL	41	6	19	208	4	98	3	0	0	379

0900-0915

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	0	1	59	1	0	0	0	0	61
2	4	0	0	0	0	3	0	0	0	7
3	3	0	0	14	0	11	0	0	0	28
4	34	0	4	0	0	87	0	0	0	125
5	0	0	0	0	0	0	0	0	0	1
6	0	4	15	135	0	0	0	0	0	153
7	0	2	0	0	0	0	0	0	0	2
8	0	0	0	0	2	0	0	0	0	2
9	0	0	0	0	1	0	0	0	0	1
TOTAL	41	6	19	208	4	98	3	0	0	379

756

2031 RC1 CALCULATIONS - PM PEAK

STEP 1 - FLOWS FROM BTM

Lights

AM PEAK	1	2	3	4	5	6	7	8	9	Total
1	0	257	105	1126	146	0	68	3	20	1726
2	394	0	0	4	5	220	261	4	0	879
3	74	0	0	213	0	140	0	0	0	427
4	1409	3	169	0	9	3559	1	67	0	5218
5	140	3	0	0	0	119	0	71	61	394
6	0	169	143	3044	100	0	0	15	41	3512
7	62	247	0	50	1	0	0	0	0	360
8	8	0	0	2	31	9	0	0	24	73
9	0	0	0	0	0	8	93	0	31	132
Total	2077	678	416	4440	301	4130	330	592	146	12708

HGVs

	1	2	3	4	5	6	7	8	9	Total
1	0	10	2	99	0	0	0	0	0	110
2	0	0	0	0	0	4	0	0	0	5
3	13	0	0	0	48	0	38	0	0	99
4	128	0	45	0	0	419	0	0	0	592
5	0	0	0	22	0	0	1	0	0	23
6	0	0	52	327	0	0	0	0	0	379
7	0	5	0	0	0	0	0	0	0	5
8	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0
Total	141	15	99	495	0	462	0	1	0	1213

Total

	1	2	3	4	5	6	7	8	9	Total
1	0	266	107	1225	146	0	68	3	20	1836
2	394	0	0	4	5	224	261	4	0	883
3	87	0	0	213	0	179	0	0	0	527
4	1537	3	214	0	9	3978	1	67	0	5810
5	140	3	0	22	0	119	0	72	61	417
6	0	169	195	3371	100	0	0	15	41	3890
7	62	252	0	50	1	0	0	0	0	365
8	8	0	0	2	31	9	0	0	24	73
9	0	0	0	0	0	8	93	0	31	132
Total	2218	692	555	4835	301	4491	330	593	146	13921

STEP 2 - CONVERT TO 15 MIN MATRICES USING 2016 BASE PROPORTIONS

LIGHTS

Time Period	Total	Overall Total	Proportion
1530-1545	2300	10763	21%
1545-1600	2375	10763	22%
1600-1615	2515	10763	23%
1615-1630	2578	10763	24%
			91%

HEAVIES

Time Period	Total	Overall Total	Proportion
1530-1545	387	1092	35%
1545-1600	370	1092	34%
1600-1615	326	1092	30%
1615-1630	302	1092	28%
			127%

LIGHTS

Time Period	Total	Overall Total	Proportion
1630-1645	2655	10763	25%
1645-1700	2709	10763	25%
1700-1715	2640	10763	25%
1715-1730	2759	10763	26%
			100%

HEAVIES

Time Period	Total	Overall Total	Proportion
1630-1645	292	1092	27%
1645-1700	269	1092	25%
1700-1715	286	1092	26%
1715-1730	245	1092	22%
			100%

LIGHTS

Time Period	Total	Overall Total	Proportion
1730-1745	2662	10763	25%
1745-1800	2520	10763	23%
			48%

Used peak total to determine proportions for cool down period

HEAVIES

Time Period	Total	Overall Total	Proportion
1730-1745	243	1092	22%
1745-1800	247	1092	23%
			45%

Used peak total to determine proportions for cool down period

LIGHTS

1530-1545

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	55	22	241	31	0	14	1	4	369
2	82	0	0	1	1	47	56	1	0	188
3	16	0	0	46	0	30	0	0	0	91
4	301	1	36	0	2	760	0	14	0	1114
5	30	1	0	0	0	25	0	15	13	84
6	0	36	30	651	21	0	0	3	9	750
7	13	53	0	11	0	0	0	0	0	77
8	2	0	0	0	7	2	0	0	5	16
9	0	0	0	0	0	18	0	7	0	26
TOTAL	444	145	89	949	64	882	70	41	31	2716

1545-1600

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	57	23	249	32	0	15	1	4	381
2	85	0	0	1	1	49	58	1	0	194
3	16	0	0	47	0	31	0	0	0	94
4	311	1	37	0	2	785	0	15	0	1151
5	31	1	0	0	0	26	0	16	13	87
6	0	37	31	672	22	0	0	3	9	775
7	14	55	0	11	0	0	0	0	0	79
8	2	0	0	0	7	2	0	0	5	16
9	0	0	0	0	2	18	0	7	0	27
TOTAL	458	149	92	980	66	911	73	42	32	2804

1600-1615

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	60	25	263	34	0	16	1	5	403
2	90	0	0	1	1	51	61	1	0	205
3	17	0	0	50	0	33	0	0	0	100
4	329	1	39	0	2	832	0	16	0	1219
5	33	1	0	0	0	28	0	17	14	92
6	0	39	33	711	23	0	0	4	10	821
7	14	58	0	12	0	0	0	0	0	84
8	2	0	0	0	7	2	0	0	6	17
9	0	0	0	0	2	19	0	7	0	28
TOTAL	485	158	97	1037	70	965	77	45	34	2969

1615-1630

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	61	25	270	35	0	16	1	5	413
2	92	0	0	1	1	53	62	1	0	210
3	18	0	0	51	0	34	0	0	0	102
4	337	1	40	0	2	852	0	16	0	1249
5	34	1	0	0	0	29	0	17	15	94
6	0	40	34	729	24	0	0	4	10	841
7	15	59	0	12	0	0	0	0	0	86
8	2	0	0	0	8	2	0	0	6	17
9	0	0	0	0	0	2	20	0	7	29
TOTAL	497	162	100	1063	72	989	79	40	35	3044	11533

1630-1645

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	63	26	278	36	0	17	1	5	426
2	95	0	0	1	1	54	64	1	0	217
3	18	0	0	53	0	35	0	0	0	106
4	348	1	42	0	2	878	0	17	0	1287
5	35	1	0	0	0	29	0	17	15	97
6	0	42	35	751	25	0	0	4	10	866
7	15	61	0	12	0	0	0	0	0	89
8	2	0	0	0	8	2	0	0	6	18
9	0	0	0	0	2	20	0	8	0	30
TOTAL	512	167	103	1095	74	1019	81	47	36	3135

1645-1700

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	65	26	284	37	0	17	1	5	434
2	97	0	0	1	1	55	66	1	0	221
3	19	0	0	54	0	35	0	0	0	108
4	355	1	42	0	2	896	0	17	0	1313
5	35	1	0	0	0	30	0	18	15	99
6	0	42	36	766	25	0	0	4	10	884
7	16	62	0	13	0	0	0	0	0	91
8	2	0	0	0	8	2	0	0	6	18
9	0	0	0	0	2	21	0	8	0	31
TOTAL	523	171	105	1117	76	1039	83	48	37	3199

1700-1715

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	63	26	276	36	0	17	1	5	423
2	94	0	0	1	1	54	64	1	0	216
3	18	0	0	52	0	34	0	0	0	105
4	346	1	41	0	2	873	0	17	0	1279
5	34	1	0	0	0	29	0	17	15	97
6	0	41	35	747	25	0	0	4	10	861
7	15	61	0	12	0	0	0	0	0	88
8	2	0	0	0	8	2	0	0	6	18
9	0	0	0	0	2	20	0	8	0	30
TOTAL	509	166	102	1089	74	1013	81	47	36	3117

1715-1730

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	66	27	289	37	0	17	1	5	442
2	98	0	0	1	1	56	67	1	0	225
3	19	0	0	55	0	36	0	0	0	110
4	361	1	43	0	2	912	0	17	0	1337
5	36	1	0	0	0	31	0	18	16	101
6	0	43	37	780	26	0	0	4	11	900
7	16	63	0	13	0	0	0	0	0	92
8	2	0	0	0	8	2	0	0	6	19
9	0	0	0	0	2	21	0	8	0	31
TOTAL	532	174	107	1138	77	1059	84	49	38	3258	12708	Y

1730-1745

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	63	26	279	36	0	17	1	5	427
2	95	0	0	1	1	54	65	1	0	217
3	18	0	0	53	0	35	0	0	0	106
4	348	1	42	0	2	880	0	17	0	1290
5	35	1	0	0	0	30	0	18	15	97
6	0	42	35	753	25	0	0	4	10	868
7	15	61	0	12	0	0	0	0	0	89
8	2	0	0	0	8	2	0	0	6	18
9	0	0	0	0	2	20	0	8	0	30
TOTAL	514	168	103	1098	74	1021	81	47	36	3143

1745-1800

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	60	25	264	34	0	16	1	5	404
2	90	0	0	1	1	52	61	1	0	206
3	17	0	0	50	0	33	0	0	0	100
4	330	1	39	0	2	833	0	16	0	1221
5	33	1	0	0	0	29	0	17	14	92
6	0	39	33	713	23	0	0	4	10	822
7	14	58	0	12	0	0	0	0	0	84
8	2	0	0	0	7	2	0	0	6	17
9	0	0	0	0	2	19	0	7	0	28
TOTAL	486	159	97	1040	70	967	77	45	34	2975

6118

HEAVIES

1530-1545

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	3	1	35	0	0	0	0	0	39
2	0	0	0	0	0	2	0	0	0	2
3	5	0	0	17	0	14	0	0	0	35
4	45	0	16	0	0	149	0	0	0	210
5	0	0	0	8	0	0	0	0	0	8
6	0	0	16	116	0	0	0	0	0	134
7	0	2	0	0	0	0	0	0	0	2
8	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0
TOTAL	50	5	35	176	0	164	0	0	0	430

1545-1600

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	3	1	33	0	0	0	0	0	37
2	0	0	0	0	0	1	0	0	0	2
3	4	0	0	16	0	13	0	0	0	34
4	43	0	15	0	0	142	0	0	0	200
5	0	0	0	7	0	0	0	0	0	8
6	0	0	16	111	0	0	0	0	0	128
7	0	2	0	0	0	0	0	0	0	2
8	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0
TOTAL	48	5	33	168	0	156	0	0	0	411

1600-1615

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	3	0	29	0	0	0	0	0	33
2	0	0	0	0	0	1	0	0	0	1
3	0	0	0	14	0	11	0	0	0	30
4	38	0	14	0	0	125	0	0	0	177
5	0	0	0	6	0	0	0	0	0	7
6	0	0	16	96	0	0	0	0	0	113
7	0	2	0	0	0	0	0	0	0	2
8	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0
TOTAL	42	4	30	148	0	138	0	0	0	362

1615-1630

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	3	0	27	0	0	0	0	0	30
2	0	0	0	0	0	1	0	0	0	1
3	4	0	0	13	0	11	0	0	0	27
4	35	0	13	0	0	116	0	0	0	164
5	0	0	0	6	0	0	0	0	0	6
6	0	0	14	90	0	0	0	0	0	105
7	0	1	0	0	0	0	0	0	0	1
8	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0
TOTAL	39	4	27	137	0	128	0	0	0	335	1538

1630-1645

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	3	0	26	0	0	0	0	0	29
2	0	0	0	0	0	1	0	0	0	1
3	4	0	0	13	0	10	0	0	0	27
4	34	0	12	0	0	112	0	0	0	158
5	0	0	0	6	0	0	0	0	0	6
6	0	0	14	87	0	0	0	0	0	101
7	0	1	0	0	0	0	0	0	0	1
8	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0
TOTAL	38	4	26	132	0	124	0	0	0	324

1645-1700

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	2	0	24	0	0	0	0	0	27
2	0	0	0	0	0	1	0	0	0	1
3	3	0	0	12	0	9	0	0	0	24
4	31	0	11	0	0	103	0	0	0	146
5	0	0	0	5	0	0	0	0	0	6
6	0	0	13	80	0	0	0	0	0	93
7	0	1	0	0	0	0	0	0	0	1
8	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0
TOTAL	35	4	24	122	0	114	0	0	0	299

1700-1715

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	3	0	26	0	0	0	0	0	29
2	0	0	0	0	0	1	0	0	0	1
3	3	0	0	12	0	10	0	0	0	26
4	33	0	12	0	0	110	0	0	0	155
5	0	0	0	6	0	0	0	0	0	6
6	0	0	14	86	0	0	0	0	0	99
7	0	1	0	0	0	0	0	0	0	1
8	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0
TOTAL	37	4	26	130	0	121	0	0	0	318

1715-1730

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	2	0	22	0	0	0	0	0	25
2	0	0	0	0	0	1	0	0	0	1
3	3	0	0	11	0	9	0	0	0	24
4	29	0	10	0	0	94	0	0	0	133
5	0	0	0	5	0	0	0	0	0	5
6	0	0	12	73	0	0	0	0	0	85
7	0	1	0	0	0	0	0	0	0	1
8	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0
TOTAL	32	3	22	111	0	104	0	0	0	272	1213	Y

1730-1745

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	2	0	22	0	0	0	0	0	24
2	0	0	0	0	0	1	0	0	0	1
3	3	0	0	11	0	9	0	0	0	22
4	28	0	10	0	0	93	0	0	0	132
5	0	0	0	5	0	0	0	0	0	5
6	0	0	12	73	0	0	0	0	0	84
7	0	1	0	0	0	0	0	0	0	1
8	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0
TOTAL	31	3	22	110	0	103	0	0	0	270

1745-1800

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	2	0	22	0	0	0	0	0	25
2	0	0	0	0	0	1	0	0	0	1
3	3	0	0	11	0	9	0	0	0	22
4	29	0	10	0	0	95	0	0	0	134
5	0	0	0	5	0	0	0	0	0	5
6	0	0	12	74	0	0	0	0	0	86
7	0	1	0	0	0	0	0	0	0	1
8	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0
TOTAL	32	3	22	112	0	104	0	0	0	274

544

2031 DS1 CALCULATIONS - AM PEAK

STEP 1 - FLOWS FROM BTM

AM PEAK

Lights

	1	2	3	4	5	6	7	8	9	10	11	Total
1	0	366	56	1252	0	0	34	1	1	403	237	2340
2	213	0	0	4	0	39	241	0	0	7	62	564
3	51	0	0	223	0	104	0	0	0	8	0	385
4	925	1	208	0	2	2571	5	12	0	0	22	3746
5	0	0	0	4	0	0	0	0	0	39	0	82
6	0	188	128	2877	0	0	3	11	18	309	101	3635
7	73	298	0	91	0	0	0	2	0	26	36	491
8	3	1	0	21	0	10	0	0	13	58	28	133
9	5	1	0	0	0	18	0	0	0	0	0	24
10	112	2	0	4	0	152	22	17	0	0	384	693
11	13	2	0	1	2	5	2	2	11	58	0	97
Total	1388	847	392	4472	14	3028	307	52	62	868	880	12311

12311 Y

HGVs

	1	2	3	4	5	6	7	8	9	10	11	Total
1	0	0	2	224	0	0	0	0	0	5	15	246
2	16	0	0	0	0	0	12	0	0	0	4	31
3	13	0	0	56	0	45	0	0	0	0	0	113
4	122	0	16	0	0	329	0	0	0	0	94	560
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	15	59	546	0	0	0	0	0	1	56	676
7	0	7	0	1	0	0	0	0	0	0	1	8
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	33	0	0	0	0	0	22	0	0	0	0	38
11	16	3	0	87	0	51	1	0	0	0	0	158
Total	181	25	77	913	0	447	13	0	0	13	170	1839

1839 Y

Total

	1	2	3	4	5	6	7	8	9	10	11	Total
1	0	366	58	1476	0	0	34	1	1	407	243	2586
2	228	0	0	4	0	39	253	0	0	7	65	596
3	63	0	0	278	0	148	0	0	0	8	0	498
4	1046	1	224	0	2	2900	5	12	0	0	116	4306
5	0	0	0	4	0	0	0	0	0	39	0	82
6	0	203	186	3423	0	0	3	11	18	309	157	4312
7	73	305	0	91	0	0	0	2	0	26	37	499
8	3	1	0	21	0	10	0	0	13	65	28	141
9	5	1	0	0	0	18	0	0	0	0	0	24
10	137	2	0	4	0	174	22	17	0	0	384	740
11	29	5	0	88	2	57	3	2	11	58	0	255
Total	1569	872	469	5385	14	3475	321	52	62	881	1050	14149

STEP 2 - CONVERT TO 15 MIN MATRICES USING 2016 BASE PROPORTIONS

LIGHTS

Time Period	Total	Overall Total	Proportion
0645-0700	2131	9302	23%
0700-0715	2217	9302	24%
0715-0730	2383	9302	26%
0730-0745	2271	9302	24%
			97%

HEAVIES

Time Period	Total	Overall Total	Proportion
0645-0700	451	1397	32%
0700-0715	406	1397	29%
0715-0730	418	1397	30%
0730-0745	377	1397	27%
			118%

LIGHTS

Time Period	Total	Overall Total	Proportion
0745-0800	2548	9302	27%
0800-0815	2432	9302	26%
0815-0830	2226	9302	24%
0830-0845	2096	9302	23%
			100%

HEAVIES

Time Period	Total	Overall Total	Proportion
0745-0800	372	1397	27%
0800-0815	348	1397	25%
0815-0830	364	1397	26%
0830-0845	313	1397	22%
			100%

LIGHTS

Time Period	Total	Overall Total	Proportion
0845-0900	1978	9302	21%
0900-0915	1825	9302	20%
			41%

Used peak total to determine proportions for warm up and cool down periods

HEAVIES

Time Period	Total	Overall Total	Proportion
0845-0900	345	1397	25%
0900-0915	345	1397	25%
			49%

Used peak total to determine proportions for cool down period

LIGHTS

0645-0700

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	0	83	13	285	0	0	8	0	0	92	52	533
2	48	0	0	1	0	9	55	0	0	0	2	14	129
3	12	0	0	0	51	0	24	0	0	0	2	0	88
4	211	0	47	0	0	586	1	3	0	0	0	5	854
5	0	0	0	0	0	0	0	0	0	0	9	0	9
6	0	0	42	29	656	0	0	4	0	0	74	29	834
7	16	66	0	21	0	0	0	0	0	0	6	7	117
8	1	0	0	0	5	0	0	0	0	0	3	6	30
9	0	0	0	0	1	34	0	0	2	0	0	0	38
10	25	0	0	0	0	35	5	4	0	0	0	88	158
11	3	0	0	0	0	1	0	1	1	3	13	0	22
TOTAL	317	193	89	1020	3	690	70	12	14	198	201	2807	

0700-0715

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	87	13	298	0	0	8	0	0	96	54	558
2	51	0	0	1	0	9	57	0	0	2	15	135
3	12	0	0	0	53	0	25	0	0	2	0	92
4	220	0	50	0	0	613	1	3	0	0	5	893
5	0	0	0	0	0	0	0	0	0	0	9	9
6	0	0	45	30	686	0	0	1	0	4	74	24	864
7	17	69	0	22	0	0	0	0	0	0	6	7	121
8	1	0	0	0	5	0	2	0	0	0	3	6	23
9	0	0	0	0	1	35	0	0	2	0	0	0	38
10	27	0	0	0	0	36	5	4	0	0	0	92	165
11	3	0	0	0	0	1	0	1	1	3	14	0	23
TOTAL	331	202	93	1066	3	722	73	12	15	207	210	2954	

0715-0730

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	94	14	321	0	0	9	0	0	103	58	599
2	54	0	0	1	0	10	62	0	0	2	16	145
3	13	0	0	0	57	0	27	0	0	2	0	99
4	237	0	53	0	0	659	1	3	0	0	6	960
5	0	0	0	0	0	0	0	0	0	0	10	10
6	0	0	48	33	737	0	0	1	0	5	79	26	931
7	18	74	0	23	0	0	0	0	0	0	7	8	130
8	1	0	0	0	5	0	3	0	0	0	3	7	34
9	0	0	0	0	1	38	0	0	2	0	0	0	42
10	29	0	0	0	0	39	6	4	0	0	0	96	177
11	3	0	0	0	0	1	0	1	1	3	15	0	25
TOTAL	356	217	100	1146	4	776	79	13	16	222	225	3154	

0730-0745

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	89	14	306	0	0	9	0	0	98	55	571
2	52	0	0	1	0	9	59	0	0	2	15	138
3	12	0	0	0	54	0	25	0	0	2	0	94
4	226	0	51	0	0	628	1	3	0	0	5	914
5	0	0	0	0	0	0	0	0	0	0	10	10
6	0	0	46	31	702	0	0	1	0	5	75	25	885
7	17	70	0	22	0	0	0	0	0	0	6	7	122
8	1	0	0	0	5	0	3	0	0	0	3	6	30
9	0	0	0	0	1	36	0	0	2	0	0	0	40
10	27	0	0	0	0	37	5	4	0	0	0	94	169
11	3	0	0	0	0	1	0	1	1	3	14	0	24
TOTAL	339	207	96	1092	3	739	75	13	15	212	215	3005	11899

0745-0800

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	102	19	341	0	0	9	0	0	130	62	643
2	58	0	0	1	0	11	66	0	0	2	17	155
3	14	0	0	0	61	0	28	0	0	2	0	105
4	253	0	57	0	1	704	1	3	0	0	6	1026
5	0	0	0	0	1	0	0	0	0	0	11	17
6	0	52	35	788	0	0	1	3	5	85	28	996
7	19	79	0	25	0	0	0	0	0	7	4	135
8	1	0	0	6	0	3	0	0	3	16	8	36
9	0	0	0	2	0	41	0	0	2	0	0	45
10	31	0	0	0	0	1	42	6	5	0	101	190
11	4	0	0	0	0	1	3	1	1	3	16	29
TOTAL	380	232	107	1225	4	829	84	14	17	238	241	3372

0800-0815

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	99	15	327	0	0	9	0	0	105	59	612
2	56	0	0	1	0	10	63	0	0	2	16	148
3	13	0	0	0	58	0	27	0	0	2	0	101
4	242	0	54	0	0	672	1	3	0	0	6	979
5	0	0	0	0	1	0	0	0	0	0	10	16
6	0	49	33	752	0	0	1	3	5	81	26	950
7	18	75	0	24	0	0	0	0	0	7	4	128
8	1	0	0	6	0	3	0	0	3	15	7	35
9	0	0	0	2	0	39	0	0	2	0	0	43
10	29	0	0	0	0	40	6	4	0	0	100	181
11	3	0	0	0	0	1	0	1	1	3	15	25
TOTAL	363	221	102	1169	4	792	80	14	16	227	230	3218

0815-0830

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	89	13	300	0	0	9	0	0	96	54	560
2	55	0	0	1	0	9	58	0	0	2	16	135
3	12	0	0	0	53	0	25	0	0	2	0	92
4	221	0	50	0	0	615	1	3	0	0	5	897
5	0	0	0	0	1	0	0	0	0	0	9	15
6	0	45	31	689	0	0	1	3	4	74	24	870
7	17	69	0	22	0	0	0	0	0	6	4	118
8	1	0	0	5	0	2	0	0	3	14	7	32
9	0	0	0	0	1	35	0	0	2	0	0	39
10	27	0	0	0	0	36	5	4	0	0	92	164
11	3	0	0	0	0	1	0	1	1	3	14	23
TOTAL	332	203	94	1070	3	725	74	12	15	208	211	2946

0830-0845

	1	2	3	4	5	6	7	8	9	10	12	TOTAL
1	0	82	13	282	0	0	9	0	0	93	51	527
2	48	0	0	1	0	9	54	0	0	2	14	127
3	11	0	0	0	50	0	23	0	0	2	0	87
4	208	0	47	0	0	579	1	3	0	0	5	844
5	0	0	0	0	1	0	0	0	0	0	9	14
6	0	42	29	648	0	0	1	3	4	70	23	819
7	16	65	0	21	0	0	0	0	0	6	4	111
8	1	0	0	5	0	2	0	0	3	13	6	30
9	0	0	0	1	33	2	0	0	2	0	0	37
10	25	0	0	0	0	1	34	5	4	0	87	156
11	3	0	0	0	0	1	0	1	1	3	13	22
TOTAL	313	191	88	1008	3	682	69	12	14	195	198	2774	12311 Y

0845-0900

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	78	12	266	0	0	7	0	0	86	48	497
2	45	0	0	1	0	8	51	0	0	0	13	120
3	11	0	0	47	0	22	0	0	0	2	0	82
4	107	0	44	0	0	547	1	3	0	0	5	706
5	0	0	0	1	0	0	0	0	4	0	8	13
6	0	40	27	612	0	0	1	2	4	66	22	774
7	15	61	0	19	0	0	0	0	0	5	3	104
8	1	0	0	5	0	2	0	0	3	12	6	28
9	0	0	0	0	0	31	0	0	2	0	0	35
10	24	0	0	0	0	32	5	4	0	0	40	147
11	3	0	0	0	0	1	0	1	1	3	12	21
TOTAL	295	180	83	951	3	644	65	11	13	184	187	2618

0900-0915

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	72	11	246	0	0	7	0	0	79	45	459
2	42	0	0	1	0	8	47	0	0	1	13	111
3	10	0	0	0	44	0	20	0	0	2	0	75
4	181	0	41	0	0	504	1	2	0	0	4	735
5	0	0	0	0	1	0	0	0	4	0	8	12
6	0	37	25	564	0	0	1	2	4	61	20	713
7	14	57	0	18	0	0	0	0	0	5	3	96
8	1	0	0	4	0	2	0	0	2	11	5	25
9	0	0	0	0	0	29	0	0	2	0	0	31
10	21	0	0	0	0	30	4	3	0	0	37	95
11	4	0	0	0	0	1	0	1	1	3	9	19
TOTAL	272	166	77	877	3	594	60	10	12	170	173	2415

5033

HEAVIES

0645-0700

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	0	1	72	0	0	0	0	1	5	0	79
2	5	0	0	0	0	0	4	0	0	1	1	10
3	4	0	0	0	14	0	0	0	0	0	0	18
4	39	0	5	0	0	106	0	0	0	0	0	150
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	5	19	176	0	0	0	0	0	18	218
7	0	2	0	0	0	0	0	0	0	0	0	3
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	12
11	5	1	0	28	0	17	0	0	0	0	0	51
TOTAL	58	8	25	295	0	144	4	0	0	4	55	594

0700-0715

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	0	1	65	0	0	0	0	1	4	0	72
2	5	0	0	0	0	0	4	0	0	0	1	9
3	4	0	0	0	16	0	0	0	0	0	0	20
4	35	0	5	0	0	96	0	0	0	0	0	136
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	4	17	159	0	0	0	0	0	0	16	197
7	0	2	0	0	0	0	0	0	0	0	0	2
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	4	0	0	0	0	6	0	0	0	0	0	10
11	5	1	0	25	0	15	0	0	0	0	0	46
TOTAL	53	7	22	265	0	130	4	0	0	4	49	534

0715-0730

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	0	1	67	0	0	0	0	1	5	0	74
2	5	0	0	0	0	0	4	0	0	0	1	9
3	4	0	0	0	17	0	13	0	0	0	0	34
4	36	0	5	0	0	98	0	0	0	0	28	168
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	5	18	163	0	0	0	0	0	0	17	202
7	0	2	0	0	0	0	0	0	0	0	0	2
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	5	0	0	0	0	7	0	0	0	0	0	12
11	5	1	0	26	0	15	0	0	0	0	0	47
TOTAL	54	8	23	273	0	134	4	0	0	4	51	550

0730-0745

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	0	1	60	0	0	0	0	1	4	0	66
2	4	0	0	0	0	0	3	0	0	0	1	8
3	3	0	0	0	15	0	12	0	0	0	0	30
4	33	0	4	0	0	89	0	0	0	0	28	154
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	4	16	147	0	0	0	0	0	0	15	182
7	0	2	0	0	0	0	0	0	0	0	0	2
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	4	0	0	0	0	6	0	0	0	0	0	10
11	4	1	0	24	0	14	0	0	0	0	0	43
TOTAL	49	7	21	246	0	121	4	0	0	3	46	476	2174

0745-0800

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	0	1	60	0	0	0	0	1	4	0	66
2	4	0	0	0	0	0	3	0	0	0	1	8
3	3	0	0	15	0	12	0	0	0	0	0	30
4	32	0	4	0	0	88	0	0	0	0	25	149
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	4	16	145	0	0	0	0	0	0	15	180
7	0	2	0	0	0	0	0	0	0	0	0	2
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	4	0	0	0	0	6	0	0	0	0	0	10
11	4	1	0	23	0	14	0	0	0	0	0	42
TOTAL	48	7	20	243	0	119	4	0	0	3	45	490

0800-0815

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	0	1	56	0	0	0	0	1	4	0	61
2	4	0	0	0	0	0	3	0	0	0	1	8
3	3	0	0	0	14	0	11	0	0	0	0	28
4	30	0	4	0	0	82	0	0	0	0	23	140
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	4	15	136	0	0	0	0	0	0	14	169
7	0	2	0	0	0	0	0	0	0	0	0	2
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	4	0	0	0	0	6	0	0	0	0	0	9
11	4	1	0	22	0	13	0	0	0	0	0	39
TOTAL	45	6	19	227	0	111	3	0	0	3	42	458

0815-0830

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	0	1	58	0	0	0	0	1	4	0	64
2	4	0	0	0	0	0	3	0	0	0	1	8
3	3	0	0	15	0	12	0	0	0	0	0	29
4	32	0	4	0	0	86	0	0	0	0	24	146
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	4	15	142	0	0	0	0	0	0	15	176
7	0	2	0	0	0	0	0	0	0	0	0	2
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	4	0	0	0	0	6	0	0	0	0	0	10
11	4	1	0	23	0	13	0	0	0	0	0	41
TOTAL	47	7	20	238	0	117	3	0	0	3	44	479

0830-0845

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	0	0	50	0	0	0	0	1	3	1	55
2	4	0	0	0	0	0	3	0	0	0	1

2031 DS1 CALCULATIONS - PM PEAK

STEP 1 - FLOWS FROM BTM

AM PEAK

Lights

	1	2	3	4	5	6	7	8	9	10	11	Total
1	0	274	105	1133	0	0	44	2	1	126	72	1757
2	326	0	0	10	0	97	277	4	0	1	25	740
3	74	0	0	213	0	140	0	0	0	0	0	428
4	1570	8	169	0	2	3469	35	42	0	0	3	5298
5	0	0	0	1	0	0	0	0	1	0	11	13
6	0	217	143	3024	0	0	1	15	10	133	24	3567
7	46	149	0	34	0	0	0	0	0	21	1	251
8	5	0	0	22	0	0	0	12	9	3	43	94
9	0	0	0	0	0	107	0	0	0	0	0	107
10	216	1	0	0	0	270	0	68	0	0	151	706
11	288	27	0	27	50	120	0	54	54	419	0	1038
Total	2533	672	417	4464	53	4213	357	190	78	710	295	13982

13982 Y

HGVs

	1	2	3	4	5	6	7	8	9	10	11	Total
1	0	10	2	99	0	0	0	0	0	0	16	126
2	0	0	0	0	0	0	3	0	0	0	4	7
3	13	0	0	43	0	38	0	0	0	0	0	99
4	126	0	45	0	0	386	0	0	0	0	85	641
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	52	327	0	0	0	0	0	0	51	429
7	0	0	0	0	0	0	0	0	0	0	1	1
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	29	0	0	0	0	0	29
10	0	0	0	0	0	0	29	0	1	0	0	30
11	35	2	0	78	0	46	1	0	0	0	0	142
Total	154	17	98	551	0	503	1	1	1	0	156	1481

1481 Y

Total

	1	2	3	4	5	6	7	8	9	10	11	Total
1	0	284	107	1232	0	0	44	2	1	126	88	1883
2	326	0	0	10	0	100	278	4	0	1	29	747
3	87	0	0	261	0	179	0	0	0	0	0	527
4	1696	8	214	0	2	3855	35	42	0	0	88	5939
5	0	0	0	1	0	0	0	0	1	0	11	13
6	0	217	195	3350	0	0	1	15	10	133	75	3997
7	46	149	0	34	0	0	0	0	0	21	1	251
8	5	0	0	22	0	0	0	12	9	3	43	94
9	0	0	0	0	0	107	0	0	0	0	0	107
10	216	1	0	0	0	299	0	69	0	0	151	737
11	303	29	0	104	50	166	1	54	54	419	0	1180
Total	2688	689	515	5015	53	4715	359	192	78	710	451	15463

STEP 2 - CONVERT TO 15 MIN MATRICES USING 2016 BASE PROPORTIONS

LIGHTS

Time Period	Total	Overall Total	Proportion
1530-1545	2390	10763	21%
1545-1600	2375	10763	22%
1600-1615	2515	10763	23%
1615-1630	2578	10763	24%
			91%

HEAVIES

Time Period	Total	Overall Total	Proportion
1530-1545	387	1092	35%
1545-1600	370	1092	34%
1600-1615	326	1092	30%
1615-1630	302	1092	28%
			127%

LIGHTS

Time Period	Total	Overall Total	Proportion
1630-1645	2655	10763	25%
1645-1700	2709	10763	25%
1700-1715	2640	10763	25%
1715-1730	2759	10763	26%
			100%

HEAVIES

Time Period	Total	Overall Total	Proportion
1630-1645	292	1092	27%
1645-1700	269	1092	25%
1700-1715	286	1092	26%
1715-1730	245	1092	22%
			100%

LIGHTS

Time Period	Total	Overall Total	Proportion
1730-1745	2662	10763	25%
1745-1800	2520	10763	23%
			48%

Used peak total to determine proportions for cool down period

HEAVIES

Time Period	Total	Overall Total	Proportion
1730-1745	243	1092	22%
1745-1800	247	1092	23%
			45%

Used peak total to determine proportions for cool down period

LIGHTS

1530-1545

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	59	23	242	0	0	9	0	0	27	15	375
2	70	0	0	2	0	21	59	1	0	0	5	158
3	16	0	0	46	0	30	0	0	0	0	0	91
4	335	2	36	0	0	741	7	9	0	0	1	1132
5	0	0	0	0	0	0	0	0	0	0	2	2
6	0	46	30	646	0	0	0	0	0	28	5	755
7	10	31	0	7	0	0	0	0	0	0	6	54
8	2	0	0	5	0	0	0	0	0	3	2	12
9	1	0	0	0	0	23	0	1	0	0	0	26
10	46	0	0	0	0	58	0	15	0	0	32	151
11	62	6	0	4	11	26	0	11	11	89	0	222
TOTAL	541	144	89	954	11	900	76	41	17	152	63	2988

1545-1600

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	60	23	250	0	0	10	0	0	28	16	388
2	72	0	0	2	0	21	61	1	0	0	6	163
3	16	0	0	47	0	31	0	0	0	0	0	94
4	346	2	37	0	0	765	8	9	0	0	1	1169
5	0	0	0	0	0	0	0	0	0	0	3	3
6	0	48	31	667	0	0	0	0	0	29	5	780
7	10	32	0	7	0	0	0	0	0	0	6	55
8	2	0	0	5	0	0	0	0	0	3	2	12
9	1	0	0	0	0	24	0	1	0	0	0	27
10	48	0	0	0	0	60	0	15	0	0	33	156
11	64	6	0	4	6	11	27	0	12	12	92	0	229
TOTAL	559	148	92	985	12	929	79	42	17	157	65	3085

1600-1615

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	64	25	265	0	0	10	0	0	29	17	411
2	76	0	0	2	0	23	65	1	0	0	6	173
3	17	0	0	50	0	33	0	0	0	0	0	100
4	367	2	39	0	0	811	8	10	0	0	1	1238
5	0	0	0	0	0	0	0	0	0	0	3	3
6	0	51	33	707	0	0	0	0	0	31	5	828
7	11	34	0	8	0	0	0	0	0	0	6	59
8	2	0	0	5	0	2	0	0	0	3	2	14
9	1	0	0	0	0	25	0	1	0	0	0	28
10	50	0	0	0	0	63	0	16	0	0	35	165
11	67	6	0	4	6	12	28	0	13	13	98	0	243
TOTAL	592	157	97	1043	12	984	84	45	18	166	69	3257

1615-1630

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	66	25	271	0	0	11	0	0	30	17	421
2	78	0	0	2	0	23	66	1	0	0	6	177
3	18	0	0	51	0	34	0	0	0	0	0	102
4	376	2	40	0	0	831	8	10	0	0	1	1269
5	0	0	0	0	0	0	0	0	0	0	3	3
6	0	52	34	724	0	0	0	0	0	32	5	847
7	11	34	0	8	0	0	0	0	0	0	6	59
8	2	0	0	5	0	2	0	0	0	3	2	14
9	1	0	0	0	0	26	0	1	0	0	0	28
10	52	0	0	0	0	65	0	16	0	0	36	169
11	69	6	0	4	6	12	29	0	13	13	100	0	249
TOTAL	607	161	100	1069	13	1009	86	46	19	179	71	3349	12688

1630-1645

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	66	26	279	0	0	11	0	0	31	18	431
2	80	0	0	2	0	24	68	1	0	0	6	181
3	18	0	0	53	0	35	0	0	0	0	0	106
4	387	2	42	0	0	856	9	10	0	0	1	1307
5	0	0	0	0	0	0	0	0	0	0	3	3
6	0	54	35	746	0	0	0	0	4	3	33	6	880
7	11	36	0	8	0	0	0	0	0	0	6	62
8	2	0	0	5	0	2	0	0	0	3	2	14	15
9	1	0	0	0	0	26	0	1	0	0	0	30
10	53	0	0	0	0	67	0	17	0	0	37	174
11	71	7	0	4	12	30	0	13	13	103	0	256
TOTAL	625	166	103	1101	13	1039	88	47	19	175	73	3449

1645-1700

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	69	27	287	0	0	11	0	0	32	18	442
2	82	0	0	2	0	24	70	1	0	0	6	186
3	19	0	0	54	0	35	0	0	0	0	0	108
4	395	2	43	0	0	873	9	11	0	0	1	1333
5	0	0	0	0	0	0	0	0	0	0	3	3
6	0	55	36	761	0	0	0	0	4	3	34	6	898
7	12	36	0	9	0	0	0	0	0	0	5	63
8	2	0	0	5	0	2	0	0	0	3	2	14	16
9	1	0	0	0	0	27	0	1	0	0	0	31
10	54	0	0	0	0	68	0	17	0	0	38	178
11	72	7	0	4	7	13	30	0	14	14	105	0	261
TOTAL	638	169	105	1123	13	1060	90	48	20	179	74	3519

1700-1715

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	67	26	278	0	0	11	0	0	31	18	431
2	80	0	0	2	0	24	68	1	0	0	6	182
3	18	0	0	52	0	34	0	0	0	0	0	105
4	385	2	41	0	0	851	8	10	0	0	1	1300
5	0	0	0	0	0	0	0	0	0	0	3	3
6	0	53	35	742	0	0	0	0	4	3	33	6	875
7	11	35	0	8	0	0	0	0	0	0	5	61
8	2	0	0	5	0	2	0	0	0	3	2	14	15
9	1	0	0	0	0	26	0	1	0	0	0	30
10	53	0	0	0	0	66	0	17	0	0	37	173
11	71	7	0	4	7	12	29	0	13	13	103	0	255
TOTAL	621	165	102	1095	13	1033	88	47	19	174	72	3430

1715-1730

	1	2	3	4	5	6	7	8	9	10	12	TOTAL
1	0	70	27	290	0	0	11	0	0	32	18	450
2	84	0	0	2	0	25	71	1	0	0	6	190
3	19	0	0	55	0	36	0	0	0	0	0	110
4	402	2	43	0	0	889	9	11	0	0	1	1358
5	0	0	0	0	0	0	0	0	0	0	3	3
6	0	56	37	775	0	0	0	0	4	3	34	6	914
7	12	37	0	9	0	0	0	0	0	0	5	64
8	2	0	0	6	0	2	0	0	0	3	2	16
9	1	0	0	0	0	28	0	2	0	0	0	31
10	55	0	0	0	0	69	0	17	0	0	39	181
11	74	7	0	4	7	13	30	0	14	14	107	0	266
TOTAL	649	172	107	1144	14	1080	92	49	20	182	76	3584	13982 Y

1730-1745

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	68	26	280	0	0	11	0	0	31	18	435
2	81	0	0	2	0	24	69	1	0	0	6	183
3	18	0	0	53	0	35	0	0	0	0	0	106
4	388	2	42	0	0	858	9	10	0	0	1	1310
5	0	0	0	0	0	0	0	0	0	0	3	3
6	0	54	35	746	0	0	0	0	4	3	33	6	882
7	11	36	0	9	0	0	0	0	0	0	5	61
8	2	0	0	5	0	2	0	0	0	3	2	14	15
9	1	0	0	0	0	27	0	1	0	0	0	30
10	53	0	0	0	0	67	0	17	0	0	37	174
11	73	7	0	4	12	30	0	13	13	104	0	256
TOTAL	627	166	103	1104	13	1042	88	47	19	175	73	3458

1745-1800

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	64	25	265	0	0	10	0	0	29	17	411
2	76	0	0	2	0	23	65	1	0	0	6	173
3	17	0	0	50	0	33	0	0	0	0	0	100
4	368	2	40	0	0	812	8	10	0	0	1	1240
5	0	0	0	0	0	0	0	0	0	0	2	2
6	0	51	33	708	0	0	0	0	3	2	31	6	835
7	11	34	0	8	0	0	0	0	0	0	5	1	59
8	2	0	0	5	0	2	0	0	0	3	2	1	15
9	1	0	0	0	0	25	0	1	0	0	0	0	28
10	50	0	0	0	0	63	0	16	0	0	36	0	165
11	67	6	0	4	6	12	28	0	13	13	98	0	245
TOTAL	593	157	98	1045	12	986	84	45	18	166	89	3274

6732

HEAVIES

1530-1545

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	3	1	35	0	0	0	0	0	0	6	45
2	0	0	0	0	0	1	0	0	0	0	1	2
3	1	0	0	17	0	14	0	0	0	0	3	35
4	45	0	16	0	0	137	0	0	0	0	30	227
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	18	116	0	0	0	0	0	18	152
7	0	0	0	0	1	0	0	0	0	0	0	1
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	10	0	0	0	0	0	1	11
11	5	1	0	28	0	16	0	0	0	0	0	50
TOTAL	55	6	35	195	0	178	0	0	0	0	0	525

1545-1600

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	3	1	33	0	0	0	0	0	0	5	43
2	0	0	0	0	0	1	0	0	0	0	1	2
3	4	0	0	16	0	13	0	0	0	0	3	36
4	43	0	15	0	0	131	0	0	0	0	29	217
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	18	111	0	0	0	0	0	17	145
7	0	0	2	0	0	0	0	0	0	0	0	2
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	10	0	0	0	0	0	0	10
11	5	1	0	26	0	16	0	0	0	0	0	48
TOTAL	52	6	33	187	0	170	0	0	0	0	53	501

1600-1615

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	3	0	30	0	0	0	0	0	0	5	38
2	0	0	0	0	0	1	0	0	0	0	1	2
3	4	0	0	14	0	11	0	0	0	0	3	32
4	38	0	0	13	0	115	0	0	0	0	25	191
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	16	98	0	0	0	0	0	15	128
7	0	2	0	0	0	0	0	0	0	0	0	2
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	9	0	0	0	0	0	0	9
11	4	1	0	23	0	14	0	0	0	0	0	42
TOTAL	46	5	29	164	0	150	0	0	0	0	47	442

1615-1630

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	3	0	27	0	0	0	0	0	0	4	35
2	0	0	0	0	0	1	0	0	0	0	1	2
3	3	0	0	11	0	9	0	0	0	0	3	27
4	35	0	0	12	0	107	0	0	0	0	23	177
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	14	90	0	0	0	0	0	14	119
7	0	1	0	0	0	0	0	0	0	0	0	1
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	8	0	0	0	0	0	1	9
11	4	1	0	21	0	13	0	0	0	0	0	39
TOTAL	43	5	27	152	0	139	0	0	0	0	43	410	1879

1630-1645

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	3	0	26	0	0	0	0	0	0	4	34
2	0	0	0	0	0	1	0	0	0	0	1	2
3	4	0	0	13	0	10	0	0	0	0	0	27
4	34	0	12	0	0	103	0	0	0	0	23	171
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	14	87	0	0	0	0	0	14	115
7	0	1	0	0	0	0	0	0	0	0	0	2
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	8	0	0	0	0	0	0	8
11	4	1	0	21	0	12	0	0	0	0	0	38
TOTAL	41	5	26	167	0	134	0	0	0	0	42	396

1645-1700

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	2	0	24	0	0	1	0	0	0	4	31
2	0	0	0	0	0	1	0	0	0	0	1	2
3	3	0	0	12	0	9	0	0	0	0	0	24
4	31	0	11	0	0	95	0	0	0	0	21	158
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	13	80	0	0	0	0	0	0	12	106
7	0	1	0	0	0	0	0	0	0	0	0	1
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	7	0	0	0	0	0	8
11	4	1	0	19	0	11	0	0	0	0	0	35
TOTAL	38	4	24	136	0	124	0	0	0	0	38	365

1700-1715

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	3	0	26	0	0	0	0	0	0	4	33
2	0	0	0	0	0	1	0	0	0	0	1	2
3	3	0	0	12	0	10	0	0	0	0	0	25
4	33	0	12	0	0	101	0	0	0	0	22	168
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	14	86	0	0	0	0	0	0	13	112
7	0	1	0	0	0	0	0	0	0	0	0	2
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	8	0	0	0	0	0	8
11	4	1	0	20	0	12	0	0	0	0	0	37
TOTAL	40	4	26	144	0	132	0	0	0	0	41	388

1715-1730

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	2	0	22	0	0	0	0	0	0	4	28
2	0	0	0	0	0	1	0	0	0	0	1	3
3	3	0	0

BTM FLOW ADJUSTMENTS - AM PEAK

STEP 1 - CALCULATE ABSOLUTE DIFFERENCES BETWEEN BTM FUTURE YEAR AND BTM BASE FLOWS

AM PEAK — Lights

	1	2	3	4	5	6	7	8	9	Total
1	0	-47	15	248	-23	0	-36	-1	29	186
2	18	0	0	1	8	160	59	0	0	245
3	8	0	0	18	43	8	0	0	0	77
4	149	2	31	0	0	415	2	13	5	616
5	80	11	0	-2	0	26	-6	-2	67	175
6	0	82	17	625	0	0	-1	1	-32	692
7	7	125	0	21	0	0	0	0	2	154
8	0	0	0	-10	8	-3	0	0	17	12
9	8	0	0	0	143	-51	6	0	0	105
Total	269	173	64	901	178	554	25	10	88	2262

HGVs

	1	2	3	4	5	6	7	8	9	Total
1	0	0	0	68	-4	0	0	0	0	64
2	2	0	0	0	0	0	1	0	0	3
3	1	0	0	-2	0	1	0	0	0	0
4	38	0	3	0	0	54	0	0	0	96
5	-12	0	0	1	0	-8	0	0	0	-18
6	0	-6	6	102	0	0	0	0	0	102
7	0	1	0	0	0	0	0	0	0	1
8	0	0	0	0	1	0	0	0	0	1
9	0	0	0	0	4	0	0	0	0	4
Total	29	-5	10	169	1	48	1	0	0	252

Total

	1	2	3	4	5	6	7	8	9	Total
1	0	-47	16	316	-27	0	-36	-1	29	251
2	20	0	0	1	8	160	61	0	0	248
3	9	0	0	16	43	9	0	0	0	77
4	187	2	34	0	0	469	2	13	5	711
5	69	11	0	-1	0	18	-6	-2	67	156
6	0	76	23	727	0	0	-1	1	-32	794
7	7	126	0	21	0	0	0	0	2	155
8	0	0	0	-10	9	-3	0	0	17	12
9	8	0	0	0	147	-51	6	0	0	109
Total	298	167	73	1070	179	601	27	10	88	2514

STEP 2 - SPECIFY VISSIM 2016 BASE FLOWS

AM PEAK — Lights

	1	2	3	4	5	6	7	8	9	Total
1	0	207	49	837	292	59	54	10	6	1515
2	177	0	6	5	5	83	224	0	0	500
3	39	2	0	155	27	89	1	1	1	314
4	697	4	116	27	35	2120	63	1	1	3063
5	85	7	12	18	0	128	14	25	49	338
6	44	117	117	2288	151	11	12	6	3	2749
7	83	254	1	134	10	1	5	0	0	489
8	11	1	2	2	70	17	2	0	48	152
9	33	3	5	7	46	51	5	31	0	182
Total	1169	595	307	3474	636	2559	380	75	108	9302

HGVs

	1	2	3	4	5	6	7	8	9	Total
1	0	22	24	201	31	6	12	0	0	297
2	14	0	0	0	0	7	9	0	0	30
3	16	0	0	49	1	16	1	0	0	83
4	102	0	23	2	5	264	5	0	0	402
5	16	0	0	7	0	7	9	4	2	45
6	7	15	29	416	9	0	5	1	1	482
7	11	22	0	11	0	0	0	0	0	44
8	1	0	0	0	5	0	0	0	3	9
9	1	0	0	0	2	1	1	1	0	5
Total	167	59	76	686	54	301	42	6	6	1397

Total

	1	2	3	4	5	6	7	8	9	Total
1	0	229	73	1038	323	65	66	11	6	1811
2	191	0	6	5	5	90	233	0	0	530
3	55	2	0	204	28	105	2	1	1	397
4	799	4	139	29	40	2384	68	1	1	3465
5	101	7	12	25	0	134	24	29	51	383
6	51	132	146	2704	160	11	17	6	4	3231
7	94	276	1	145	10	1	5	0	0	533
8	11	1	2	3	75	17	2	0	51	161
9	34	3	5	8	48	52	6	32	0	187
Total	1336	654	383	4160	690	2860	422	81	114	10699

STEP 3 - APPLY ABSOLUTE BTM DIFFERENCES TO BASE VISSIM FLOWS

AM PEAK — Lights

	1	2	3	4	5	6	7	8	9	Total
1	0	160	64	1085	270	59	18	10	35	1701
2	195	0	6	6	12	243	283	0	0	745
3	47	2	0	173	70	97	1	1	1	391
4	846	6	147	27	35	2535	65	14	5	3679
5	165	19	12	16	0	154	8	23	116	513
6	44	199	134	2913	151	11	11	7	-29	3441
7	90	379	1	155	10	1	5	0	2	643
8	10	1	2	-8	78	14	2	0	65	164
9	41	3	5	7	189	0	11	31	0	287
Total	1438	768	371	4375	814	3113	405	85	196	11565

HGVs

	1	2	3	4	5	6	7	8	9	Total
1	0	22	24	269	27	6	12	0	0	361
2	16	0	0	0	0	7	10	0	0	33
3	17	0	0	47	1	17	1	0	0	83
4	140	0	26	2	5	318	5	0	0	497
5	5	0	0	8	0	-2	9	4	2	27
6	7	9	35	518	9	0	5	1	1	584
7	11	23	0	11	0	0	0	0	0	45
8	1	0	0	0	6	0	0	0	3	10
9	1	0	0	0	6	1	1	1	0	9
Total	196	54	86	855	55	348	43	6	6	1649

Total

	1	2	3	4	5	6	7	8	9	Total
1	0	182	89	1354	297	65	30	10	35	2062
2	211	0	6	6	12	250	294	0	0	778
3	64	2	0	220	71	114	2	1	1	474
4	986	6	173	29	40	2853	70	14	5	4177
5	170	19	12	24	0	153	18	27	118	539
6	51	208	169	3431	160	11	16	7	-28	4025
7	101	402	1	166	10	1	5	0	2	688
8	11	1	2	-7	84	14	2	0	68	173
9	42	3	5	8	195	1	12	32	0	296
Total	1635	821	456	5230	869	3461	449	91	202	13214

STEP 4 - ADJUST ANY NEGATIVE FLOWS TO ZERO VALUES

AM PEAK — Lights

	1	2	3	4	5	6	7	8	9	Total
1	0	160	64	1085	270	59	18	10	35	1701
2	195	0	6	6	12	243	283	0	0	745
3	47	2	0	173	70	97	1	1	1	391
4	846	6	147	27	35	2535	65	14	5	3679
5	165	19	12	16	0	154	8	23	116	513
6	44	199	134	2913	151	11	11	7	0	3470
7	90	379	1	155	10	1	5	0	2	643
8	10	1	2	0	78	14	2	0	65	171
9	41	3	5	7	189	0	11	31	0	287
Total	1438	768	371	4382	814	3113	405	85	225	11601

HGVs

	1	2	3	4	5	6	7	8	9	Total
1	0	22	24	269	27	6	12	0	0	361
2	16	0	0	0	0	7	10	0	0	33
3	17	0	0	47	1	17	1	0	0	83
4	140	0	26	2	5	318	5	0	0	497
5	5	0	0	8	0	0	9	4	2	28
6	7	9	35	518	9	0	5	1	1	584
7	11	23	0	11	0	0	0	0	0	45
8	1	0	0	0	6	0	0	0	3	10
9	1	0	0	0	6	1	1	1	0	9
Total	196	54	86	855	55	350	43	6	6	1651

Total

	1	2	3	4	5	6	7	8	9	Total
1	0	182	89	1354	297	65	30	10	35	2062
2	211	0	6	6	12	250	294	0	0	778
3	64	2	0	220	71	114	2	1	1	474
4	986	6	173	29	40	2853	70	14	5	4177
5	170	19	12	24	0	154	18	27	118	541
6	51	208	169	3431	160	11	16	7	1	4054
7	101	402	1	166	10	1	5	0	2	688
8	11	1	2	0	84	14	2	0	68	181
9	42	3	5	8	195	1	12	32	0	296
Total	1635	821	456	5237	869	3463	449	91	231	13252

Negative values converted to 0 value

BTM FLOW ADJUSTMENTS - PM PEAK

STEP 1 - CALCULATE ABSOLUTE DIFFERENCES BETWEEN BTM FUTURE YEAR AND BTM BASE FLOWS

AM PEAK

Lights

	1	2	3	4	5	6	7	8	9	Total
1	0	25	21	209	51	0	5	-1	13	323
2	101	0	0	-1	-2	180	38	0	0	317
3	11	0	0	32	0	21	0	0	0	65
4	238	1	29	0	7	618	-9	61	0	945
5	-97	-1	-4	-1	0	20	0	-2	50	-34
6	0	-1	18	467	23	0	-2	0	-36	467
7	26	60	0	17	-12	0	0	0	-10	81
8	-4	0	0	0	4	0	0	0	8	9
9	-9	0	0	0	-2	-66	0	19	0	-58
Total	266	85	64	724	68	773	31	77	24	2113

HGVs

	1	2	3	4	5	6	7	8	9	Total
1	0	1	0	19	-2	0	0	0	0	18
2	0	0	0	0	0	0	0	0	0	0
3	1	0	0	5	0	4	0	0	0	11
4	30	0	5	0	0	57	0	0	0	92
5	-5	0	0	22	0	0	0	0	0	17
6	0	0	7	35	-1	0	0	0	0	40
7	0	1	0	-4	0	0	0	0	0	-3
8	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0
Total	26	2	12	77	-3	61	0	0	0	175

Total

	1	2	3	4	5	6	7	8	9	Total
1	0	26	21	228	48	0	5	-1	13	340
2	101	0	0	-1	-2	181	38	0	0	317
3	12	0	0	37	0	25	0	0	0	75
4	267	1	35	0	7	675	-9	61	0	1037
5	-102	-1	-4	21	0	20	0	-2	50	-18
6	0	-1	24	502	21	0	-2	0	-36	508
7	26	61	0	13	-12	0	0	0	-10	78
8	-4	0	0	0	4	0	0	0	8	9
9	-9	0	0	0	-2	-66	0	19	0	-58
Total	292	86	76	801	65	834	31	77	24	2288

STEP 2 - SPECIFY VISSIM 2016 BASE FLOWS

AM PEAK

Lights

	1	2	3	4	5	6	7	8	9	Total
1	2	249	66	815	88	66	38	12	24	1360
2	312	0	12	5	3	77	277	0	1	687
3	74	2	0	151	4	95	8	1	1	336
4	1072	1	114	59	23	2899	48	3	7	4226
5	353	5	13	12	0	165	15	72	35	669
6	59	78	113	2565	79	10	25	13	27	2969
7	52	229	1	47	7	0	9	1	3	349
8	7	0	0	0	21	3	0	0	23	55
9	21	0	1	1	39	10	1	39	0	112
Total	1952	564	320	3655	265	3325	421	141	120	10763

HGVs

	1	2	3	4	5	6	7	8	9	Total
1	0	9	6	90	9	5	11	0	0	130
2	9	0	0	0	6	4	2	0	0	21
3	12	0	0	39	2	24	0	0	0	77
4	107	2	36	0	3	350	4	0	0	502
5	8	0	2	6	0	3	0	1	2	22
6	4	5	26	274	1	1	1	0	1	313
7	5	9	0	7	1	0	0	0	0	22
8	0	0	0	0	2	1	0	0	0	3
9	1	0	0	0	1	0	0	0	0	2
Total	146	25	70	416	25	388	18	1	3	1092

Total

	1	2	3	4	5	6	7	8	9	Total
1	2	258	72	905	97	71	49	12	24	1490
2	321	0	12	5	9	81	279	0	1	708
3	86	2	0	190	6	119	8	1	1	413
4	1179	3	150	59	26	3249	52	3	7	4728
5	360	5	15	18	0	168	15	73	37	691
6	63	83	139	2839	81	11	26	13	28	3282
7	57	238	1	54	8	0	9	1	3	371
8	7	0	0	0	23	3	0	0	23	58
9	22	0	1	1	40	10	1	39	0	114
Total	2098	589	390	4071	290	3713	439	142	123	11855

STEP 3 - APPLY ABSOLUTE BTM DIFFERENCES TO BASE VISSIM FLOWS

AM PEAK

Lights

	1	2	3	4	5	6	7	8	9	Total
1	2	274	87	1024	139	66	43	11	37	1683
2	413	0	12	4	1	257	315	1	1	1003
3	85	2	0	183	4	116	8	1	1	401
4	1310	2	143	59	31	3517	39	64	7	5171
5	256	4	9	11	0	185	15	70	85	635
6	59	77	131	3032	102	10	23	13	-9	3437
7	78	289	1	64	-5	0	9	1	-7	430
8	3	0	0	1	25	3	0	0	31	64
9	12	0	1	1	37	-56	1	58	0	54
Total	2218	649	384	4379	333	4098	452	218	144	12876

HGVs

	1	2	3	4	5	6	7	8	9	Total
1	0	10	6	109	7	5	11	0	0	148
2	9	0	0	0	6	4	2	0	0	21
3	13	0	0	44	2	28	0	0	0	88
4	137	2	41	0	3	407	4	0	0	594
5	3	0	2	28	0	3	0	1	2	39
6	4	5	33	309	0	1	1	0	1	353
7	5	10	0	3	1	0	0	0	0	19
8	0	0	0	0	2	1	0	0	0	3
9	1	0	0	0	1	0	0	0	0	2
Total	172	27	82	493	22	449	18	1	3	1267

Total

	1	2	3	4	5	6	7	8	9	Total
1	2	284	93	1133	145	71	54	11	37	1830
2	422	0	12	4	7	262	317	1	1	1025
3	98	2	0	227	6	144	8	1	1	488
4	1446	4	185	59	34	3924	43	64	7	5765
5	259	4	11	39	0	188	15	71	87	673
6	63	82	163	3341	102	11	24	13	-9	3790
7	83	299	1	67	-4	0	9	1	-7	449
8	4	0	0	1	27	4	0	0	31	67
9	13	0	1	1	38	-56	1	58	0	56
Total	2390	675	466	4872	355	4547	470	220	147	14143

STEP 4 - ADJUST ANY NEGATIVE FLOWS TO ZERO VALUES

AM PEAK

Lights

	1	2	3	4	5	6	7	8	9	Total
1	2	274	87	1024	139	66	43	11	37	1683
2	413	0	12	4	1	257	315	1	1	1003
3	85	2	0	183	4	116	8	1	1	401
4	1310	2	143	59	31	3517	39	64	7	5171
5	256	4	9	11	0	185	15	70	85	635
6	59	77	131	3032	102	10	23	13	0	3446
7	78	289	1	64	0	0	9	1	0	442
8	3	0	0	1	25	3	0	0	31	64
9	12	0	1	1	37	0	1	58	0	110
Total	2218	649	384	4379	338	4154	452	218	161	12955

HGVs

	1	2	3	4	5	6	7	8	9	Total
1	0	10	6	109	7	5	11	0	0	148
2	9	0	0	0	6	4	2	0	0	21
3	13	0	0	44	2	28	0	0	0	88
4	137	2	41	0	3	407	4	0	0	594
5	3	0	2	28	0	3	0	1	2	39
6	4	5	33	309	0	1	1	0	1	353
7	5	10	0	3	1	0	0	0	0	19
8	0	0	0	0	2	1	0	0	0	3
9	1	0	0	0	1	0	0	0	0	2
Total	172	27	82	493	22	449	18	1	3	1267

Total

	1	2	3	4	5	6	7	8	9	Total
1	2	284	93	1133	145	71	54	11	37	1830
2	422	0	12	4	7	262	317	1	1	1025
3	98	2	0	227	6	144	8	1	1	488
4	1446	4	185	59	34	3924	43	64	7	5765
5	259	4	11	39	0	188	15	71	87	673
6	63	82	163	3341	102	11	24	13	1	3799
7	83	299	1	67	1	0	9	1	0	461
8	4	0	0	1	27	4	0	0	31	67
9	13	0	1	1	38	0	1	58	0	112
Total	2390	675	466	4872	360	4604	470	220	164	14221

Negative values converted to 0 value

2031 RC1 CALCULATIONS - AM PEAK

STEP 1 - ADJUSTED FLOWS FROM BTM

AM PEAK

Lights

	1	2	3	4	5	6	7	8	9	Total
1	0	160	64	1085	270	59	18	10	35	1701
2	199	0	6	8	12	243	283	0	0	745
3	47	2	0	173	70	97	1	1	1	391
4	846	6	147	27	35	2535	65	14	5	3679
5	165	19	12	16	0	154	8	23	116	513
6	44	199	134	2913	151	11	11	7	0	3479
7	90	379	1	155	10	1	5	0	2	643
8	10	1	2	0	78	14	2	0	65	171
9	41	3	7	199	9	11	31	0	0	297
Total	1438	768	371	4382	834	3133	405	85	225	15603

HGVs

	1	2	3	4	5	6	7	8	9	Total
1	0	22	24	269	27	6	12	0	0	361
2	19	0	0	0	0	7	10	0	0	33
3	17	0	0	0	47	1	17	1	0	83
4	140	0	26	2	5	318	5	0	0	497
5	5	0	0	0	8	0	0	9	4	28
6	7	9	35	518	9	0	5	1	1	584
7	11	23	0	0	11	0	0	0	0	45
8	1	0	0	0	0	6	0	0	3	10
9	1	0	0	0	0	6	1	1	0	9
Total	196	54	86	855	55	350	43	6	6	1655

Total

	1	2	3	4	5	6	7	8	9	Total
1	0	182	89	1354	297	65	30	10	35	2062
2	211	0	6	8	12	250	294	0	0	778
3	64	2	0	220	71	114	2	1	1	474
4	986	6	173	29	40	2853	70	14	5	4177
5	170	19	12	24	0	154	16	27	118	541
6	51	208	169	3431	160	11	16	7	1	4064
7	101	402	1	166	10	1	5	0	2	688
8	11	1	2	0	84	14	2	0	68	181
9	42	3	7	199	9	11	32	0	0	296
Total	1635	821	456	5237	869	3463	469	91	231	13252

STEP 2 - CONVERT TO 15 MIN MATRICES USING 2016 BASE PROPORTIONS

LIGHTS

Time Period	Total	Overall Total	Proportion
0645-0700	2121	9302	23%
0700-0715	2217	9302	24%
0715-0730	2383	9302	26%
0730-0745	2271	9302	24%
			97%

HEAVIES

Time Period	Total	Overall Total	Proportion
0645-0700	451	1397	32%
0700-0715	406	1397	29%
0715-0730	418	1397	30%
0730-0745	377	1397	27%
			118%

LIGHTS

Time Period	Total	Overall Total	Proportion
0745-0800	2548	9302	27%
0800-0815	2432	9302	26%
0815-0830	2226	9302	24%
0830-0845	2096	9302	23%
			100%

HEAVIES

Time Period	Total	Overall Total	Proportion
0745-0800	372	1397	27%
0800-0815	348	1397	25%
0815-0830	364	1397	26%
0830-0845	313	1397	22%
			100%

LIGHTS

Time Period	Total	Overall Total	Proportion
0845-0900	1978	9302	21%
0900-0915	1825	9302	20%
			41%

Used peak total to determine proportions for warm-up and cool down periods

HEAVIES

Time Period	Total	Overall Total	Proportion
0845-0900	345	1397	25%
0900-0915	345	1397	25%
			49%

Used peak total to determine proportions for cool down period

LIGHTS

0645-0700

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	36	15	247	62	13	4	2	8	388
2	44	0	1	1	3	55	65	0	0	170
3	11	0	0	39	16	22	0	0	0	89
4	193	1	34	6	8	578	15	3	1	839
5	38	4	3	4	0	35	2	5	26	117
6	10	45	31	664	34	3	3	1	0	791
7	20	86	0	35	2	0	1	0	1	147
8	2	0	0	0	18	3	0	0	15	39
9	9	1	1	2	43	0	3	7	0	65
TOTAL	328	175	84	999	186	710	92	19	51	2645

0700-0715

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	38	15	259	64	14	4	2	8	405
2	46	0	1	1	3	56	67	0	0	178
3	11	0	0	0	41	17	23	0	0	93
4	202	1	35	6	8	604	16	3	1	877
5	39	4	3	4	0	37	2	5	28	122
6	10	47	32	694	36	3	3	2	0	827
7	21	90	0	37	2	0	1	0	1	153
8	2	0	0	0	19	3	0	0	16	41
9	10	1	1	2	45	0	3	7	0	68
TOTAL	343	183	88	1044	194	742	97	20	54	2765

0715-0730

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	41	16	278	69	15	5	2	9	436
2	50	0	2	1	3	62	73	0	0	191
3	13	1	0	44	18	25	0	0	0	100
4	217	1	38	7	9	649	17	3	1	942
5	42	5	3	4	0	40	2	6	30	131
6	11	51	34	746	39	3	3	2	0	889
7	23	97	0	40	3	0	1	0	1	165
8	3	0	0	0	20	3	0	0	17	44
9	11	1	1	2	48	0	3	8	0	74
TOTAL	368	197	95	1123	209	797	104	22	58	2972

0730-0745

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	39	16	265	66	14	4	2	9	415
2	48	0	1	1	3	59	69	0	0	182
3	11	0	0	42	17	24	0	0	0	95
4	207	1	36	7	8	619	16	3	1	898
5	40	5	3	4	0	38	2	6	28	125
6	11	49	33	711	37	3	3	2	0	847
7	22	93	0	38	2	0	1	0	1	157
8	3	0	0	0	19	3	0	0	16	42
9	10	1	1	2	46	0	3	8	0	70
TOTAL	351	187	90	1070	199	760	99	21	55	2832

11214

0745-0800

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	44	18	297	74	16	5	3	10	466
2	53	0	2	2	3	67	78	0	0	204
3	13	1	0	47	19	26	0	0	0	107
4	232	2	40	7	9	694	18	4	1	1008
5	45	5	3	4	0	42	2	6	32	141
6	12	56	37	798	41	3	3	2	0	951
7	25	104	0	42	3	0	1	0	1	176
8	3	0	0	0	21	4	0	0	18	47
9	11	1	1	2	52	3	3	9	0	79
TOTAL	394	210	101	1200	223	853	111	23	62	3178

0800-0815

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	42	17	284	71	15	5	2	9	445
2	51	0	2	1	3	64	74	0	0	195
3	12	1	0	45	18	25	0	0	0	102
4	221	1	38	7	9	663	17	4	1	962
5	42	5	3	4	0	40	2	6	30	134
6	12	52	35	762	39	3	3	2	0	907
7	23	99	0	40	3	0	1	0	1	168
8	3	0	0	0	20	4	0	0	17	45
9	11	1	1	2	48	0	3	8	0	75
TOTAL	376	201	97	1146	213	814	106	22	59	3033

0815-0830

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	38	15	260	65	14	4	2	8	407
2	47	0	1	1	3	58	68	0	0	178
3	11	0	0	41	17	23	0	0	0	94
4	203	1	35	6	8	607	16	3	1	881
5	40	4	3	4	0	37	2	5	28	123
6	11	48	32	697	36	3	3	2	0	831
7	21	91	0	37	2	0	1	0	1	154
8	2	0	0	0	19	3	0	0	16	41
9	10	1	1	2	45	0	3	7	0	69
TOTAL	344	184	89	1049	195	745	97	20	54	2777

0830-0845

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	36	15	245	61	13	4	2	8	383
2	44	0	1	1	3	55	64	0	0	168
3	11	0	0	39	16	22	0	0	0	88
4	191	1	33	6	8	571	15	3	1	829
5	37	4	3	4	0	35	2	5	26	116
6	10	45	30	656	34	2	3	1	0	782
7	20	85	0	35	2	0	1	0	1	145
8	2	0	0	0	18	3	0	0	15	39
9	9	1	1	2	43	0	3	7	0	65
TOTAL	324	173	83	987	183	701	91	19	51	2614

15601 Y

0845-0900

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	34	14	231	57	13	4	2	7	362
2	41	0	1	1	3	52	60	0	0	158
3	10	0	0	37	15	21	0	0	0	83
4	180	1	31	6	7	539	14	3	1	782
5	35	4	3	3	0	30	2	5	25	109
6	9	42	29	619	32	2	2	1	0	738
7	19	81	0	33	2	0	1	0	1	137
8	2	0	0	0	17	3	0	0	14	36
9	9	1	1	2	40	0	2	7	0	61
TOTAL	306	163	79	932	173	662	86	18	48	2467

0900-0915

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	31	13	213	53	12	4	2	7	334
2	38	0	1	1	2	48	56	0	0	146
3	9	0	0	34	14	19	0	0	0	77
4	166	1	29	5	7	497	13	3	1	722
5	32	4	2	3	0	30	2	4	23	101
6	9	39	26	572	30	2	2	1	0	681
7	18	74	0	30	2	0	1	0	0	126
8	2	0	0	0	15	3	0	0	13	34
9	8	1	1	1	37	0	2	6	0	56
TOTAL	282	151	73	860	160	611	79	17	44	2276

4743

HEAVIES

0645-0700

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	7	8	87	9	2	4	0	0	117
2	5	0	0	0	0	2	3	0	0	11
3	6	0	0	15	0	0	0	0	0	27
4	45	0	8	1	2	103	2	0	0	161
5	1	0	0	3	0	0	3	1	1	9
6	2	3	11	167	3	0	2	0	0	189
7	4	7	0	4	0	0	0	0	0	14
8	0	0	0	0	2	0	0	0	1	3
9	0	0	0	0	2	0	0	0	0	3
TOTAL	63	17	28	276	18	113	14	2	2	533

0700-0715

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	6	7	78	8	2	3	0	0	105
2	5	0	0	0	0	2	3	0	0	10
3	5	0	0	14	0	0	0	0	0	24
4	32	4	2	3	0	30	2	4	23	101
5	1	0	0	2	0	0	3	1	1	8
6	2	2	9	128	2	0	1	0	0	144
7	3	7	0	3	0	0	0	0	0	13
8	0	0	0	0	2	0	0	0	1	3
9	0	0	0	0	2	0	0	0	0	2
TOTAL	57	16	25	249	16	102	13	2	2	480

0715-0730

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	7	7	81	8	2	4	0	0	108
2	5	0	0	0	0	2	3	0	0	10
3	5	0	0	14	0	5	0	0	0	25
4	42	0	8	1	2	95	1	0	0	149
5	1	0	0	2	0	0	3	1	1	8
6	2	3	11	155	3	0	1	0	0	175
7	3	7	0	3	0	0	0	0	0	13
8	0	0	0	0	2	0	0	0	1	3
9	0	0	0	0	2	0	0	0	0	3
TOTAL	59	16	26	256	16	105	13	2	2	494

0730-0745

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	6	7	73	7	2	3	0	0	97
2	4	0	0	0	0	2	3	0	0	9
3	5	0	0	13	0	5	0	0	0	23
4	36	0	7	1	1	86	1	0	0	134
5	1	0	0	2	0	0	3	1	1	8
6	2	2	9	140	3	0	1	0	0	158
7	3	6	0	3	0	0	0	0	0	12
8	0	0	0	0	2	0	0	0	1	3
9	0	0	0	0	2	0	0	0	0	2
TOTAL	53	14	23	231	15	94	12	2	2	446

1952

0745-0800

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	6	6	72	7	2	3	0	0	96
2	4	0	0	0	0	2	3	0	0	9
3	5	0	0	12	0	5	0	0	0	22
4	37	0	7	1	1	85	1	0	0	132
5	1	0	0	2	0	0	3	1	1	7
6	2	2	9	136	2	0	1	0	0	155
7	3	6	0	3	0	0	0	0	0	12
8	0	0	0	0	2	0	0	0	1	3
9	0	0	0	0	2	0	0	0	0	2
TOTAL	52	14	23	228	15	93	12	2	2	440

0800-0815

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	5	6	67	7	1	3	0	0	90
2	4	0	0	0	0	2	3	0	0	8
3	4	0	0	12	0	4	0	0	0	21
4	35	0	7	1	1	79	1	0	0	124
5	1	0	0	2	0	0	2	1	0	7
6	2	2	9	129	2	0	1	0	0	145
7	3	6	0	3	0	0	0	0	0	11
8	0	0	0	0	2	0	0	0	0	2
9	0	0	0	0	2	0	0	0	0	2
TOTAL	49	13	21	213	14	87	11	2	2	411

0815-0830

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	6	6	70	7	2	3	0	0	94
2	4	0	0	0	0	2	3	0	0	9
3	4	0	0	52	0	5	0	0	0	22
4	36	0	7	1	1	83	1	0	0	130
5	1	0	0	2	0	0	2	1	1	7
6	2	2	9	105	2	0	1	0	0	152
7	3	6	0	3	0	0	0	0	0	12
8	0	0	0	0	2	0	0	0	1	3
9	0	0	0	0	2	0	0	0	0	2
TOTAL	51	14	22	223	14	91	11	2	2	430

0830-0845

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	5	5	60	6	1	3	0	0	81
2	4	0	0	0	0	2	2	0	0	7
3	4	0	0	11	0	4	0	0	0	19
4	31	0	6	0	1	71	1	0	0	111
5	1	0	0	2	0	0	2	1	0	6
6	2	2	8	116	2	0	1	0	0	131
7	2	5	0	2	0	0	0	0	0	10
8	0	0	0	0	1	0	0	0	1	2
9	0	0	0	0	1	0	0	0	0	2
TOTAL	44	12	19	192	12	78	10	1	1	370

1651 Y

0845-0900

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	5	6	66	7	1	3	0	0	89
2	4	0	0	0	0	2	3	0	0	8
3	4	0	0	12	0	4	0	0	0	21
4	35	0	6	0	1	79	1	0	0	123
5	1	0	0	2	0	0	2	1	0	7
6	2	2	9	128	2	0	1	0	0	144
7	3	6	0	3	0	0	0	0	0	11
8	0	0	0	0	1	0	0	0	1	2
9	0	0	0	0	2	0	0	0	0	2
TOTAL	49	13	21	211	14	86	11	2	2	408

0900-0915

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	5	6	66	7	1	3	0	0	89
2	4	0	0	0	0	2	3	0	0	8
3	4	0	0	12	0	4	0	0	0	21
4	35	0	6	0	1	79	1	0	0	123
5	1	0	0	2	0	0	2	1	0	7
6	2	2	9	128	2	0	1	0	0	144
7	3	6	0	3	0	0	0	0	0	11
8	0	0	0	0	1	0	0	0	1	2
9	0	0	0	0	2	0	0	0	0	2
TOTAL	49	13	21	211	14	86	11	2	2	408

815

2031 RC1 CALCULATIONS - PM PEAK

STEP 1 - FLOWS FROM BTM

AM PEAK

Lights

	1	2	3	4	5	6	7	8	9	Total
1	2	274	67	1024	139	66	43	11	37	1683
2	413	0	12	4	1	257	315	1	1	1003
3	85	2	0	183	4	116	4	1	1	401
4	1310	2	143	59	31	3517	39	64	7	5171
5	256	4	9	11	0	185	15	70	85	635
6	59	77	131	3032	102	10	23	13	0	3446
7	79	289	1	64	0	0	9	1	0	442
8	3	0	0	1	25	3	0	0	31	64
9	12	0	1	37	0	1	56	0	0	110
Total	2218	649	384	4379	338	4154	452	218	161	12955

HGVs

	1	2	3	4	5	6	7	8	9	Total
1	0	16	6	109	7	5	11	0	0	148
2	9	0	0	0	6	4	2	0	0	21
3	13	0	0	44	2	28	0	0	0	88
4	137	2	41	0	3	407	4	0	0	594
5	3	0	2	28	0	3	0	1	2	39
6	4	5	33	309	0	1	1	0	1	353
7	5	10	0	3	1	0	0	0	0	19
8	0	0	0	0	0	2	1	0	0	3
9	1	0	0	0	1	0	0	0	0	2
Total	172	27	82	493	22	449	18	1	3	1267

Total

	1	2	3	4	5	6	7	8	9	Total
1	2	284	93	1133	145	71	54	11	37	1830
2	422	0	12	4	7	262	317	1	1	1025
3	98	2	0	227	6	144	8	1	1	488
4	1446	4	184	59	34	3924	43	64	7	5765
5	259	4	11	39	0	188	15	71	87	673
6	63	82	163	3341	102	11	24	13	1	3799
7	83	299	1	67	1	0	9	1	0	461
8	4	0	0	1	27	4	0	0	31	67
9	13	0	1	1	38	0	1	56	0	112
Total	2390	675	466	4872	360	4604	470	220	164	14221

STEP 2 - CONVERT TO 15 MIN MATRICES USING 2016 BASE PROPORTIONS

LIGHTS

Time Period	Total	Overall Total	Proportion
1530-1545	2300	10763	21%
1545-1600	2375	10763	22%
1600-1615	2515	10763	23%
1615-1630	2578	10763	24%
			91%

HEAVIES

Time Period	Total	Overall Total	Proportion
1530-1545	387	1092	35%
1545-1600	370	1092	34%
1600-1615	326	1092	30%
1615-1630	302	1092	28%
			127%

LIGHTS

Time Period	Total	Overall Total	Proportion
1630-1645	2655	10763	25%
1645-1700	2709	10763	25%
1700-1715	2640	10763	25%
1715-1730	2759	10763	26%
			100%

HEAVIES

Time Period	Total	Overall Total	Proportion
1630-1645	292	1092	27%
1645-1700	269	1092	25%
1700-1715	286	1092	26%
1715-1730	245	1092	22%
			100%

LIGHTS

Time Period	Total	Overall Total	Proportion
1730-1745	2662	10763	25%
1745-1800	2520	10763	23%
			48%

Used peak total to determine proportions for cool down period

HEAVIES

Time Period	Total	Overall Total	Proportion
1730-1745	243	1092	22%
1745-1800	247	1092	23%
			45%

Used peak total to determine proportions for cool down period

LIGHTS

1530-1545

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	59	19	239	30	14	9	2	8	360
2	86	0	3	1	0	55	67	0	0	214
3	16	0	0	39	1	25	2	0	0	98
4	280	1	31	13	7	751	8	14	1	1105
5	55	1	2	2	0	39	3	15	18	136
6	13	16	28	648	22	2	5	3	0	736
7	17	62	0	14	0	0	2	0	0	95
8	1	0	0	0	5	1	0	0	7	14
9	3	0	0	0	8	0	0	12	0	23
TOTAL	474	139	82	936	72	888	97	47	34	2788

1545-1600

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	61	19	226	31	15	9	2	8	371
2	91	0	3	1	0	57	70	0	0	221
3	19	0	0	40	1	26	2	0	0	88
4	289	1	32	13	7	776	9	14	1	1141
5	56	1	2	3	0	41	3	15	19	140
6	13	17	29	669	22	2	5	3	0	760
7	17	64	0	14	0	0	2	0	0	98
8	1	0	0	0	6	1	0	0	7	14
9	3	0	0	0	8	0	0	13	0	24
TOTAL	489	143	85	966	75	916	100	48	36	3858

1600-1615

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	64	20	239	32	15	10	3	9	393
2	96	0	3	1	0	60	74	0	0	234
3	20	0	0	43	1	27	2	0	0	94
4	306	1	34	14	7	822	9	15	2	1206
5	60	1	2	3	0	43	3	16	20	148
6	14	18	31	708	24	2	5	3	0	805
7	18	68	0	15	0	0	2	0	0	103
8	1	0	0	0	6	1	0	0	7	15
9	3	0	0	0	9	0	0	14	0	26
TOTAL	518	152	90	1023	79	971	106	51	38	3027

1615-1630

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	66	21	245	33	16	10	3	9	403
2	99	0	3	1	0	62	75	0	0	240
3	20	0	0	44	1	28	2	0	0	96
4	314	1	34	14	7	842	9	15	2	1239
5	61	1	2	3	0	44	4	17	20	152
6	14	18	31	726	24	2	5	3	0	825
7	19	69	0	15	0	0	2	0	0	106
8	1	0	0	0	6	1	0	0	7	15
9	3	0	0	0	9	0	0	14	0	26
TOTAL	531	155	92	1049	81	995	108	52	39	3103

11756

1630-1645

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	68	22	253	34	16	11	3	9	415
2	102	0	3	1	0	63	78	0	0	248
3	21	0	0	45	1	29	2	0	0	99
4	323	1	35	15	8	868	10	16	2	1276
5	63	1	2	3	0	46	4	17	21	157
6	15	19	32	748	25	2	6	3	0	850
7	19	71	0	16	0	0	2	0	0	109
8	1	0	0	0	6	1	0	0	8	16
9	3	0	0	0	9	0	0	14	0	27
TOTAL	547	160	95	1080	83	1025	112	54	40	3196

1645-1700

	1	2	3	4	5	6	7	8	9	TOTAL
1	1	69	22	258	35	17	11	3	9	424
2	104	0	3	1	0	65	79	0	0	253
3	21	1	0	46	1	29	2	0	0	101
4	330	1	36	15	8	885	10	16	2	1302
5	64	1	2	3	0	46	4	18	21	160
6	15	19	33	763	26	3	6	3	0	867
7	20	73	0	16	0	0	2	0	0	111
8	1	0	0	0	6	1	0	0	8	16
9	3	0	0	0	9	0	0	15	0	28
TOTAL	558	163	97	1102	85	1046	114	55	41	3261

1700-1715

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	67	21	251	34	16	10	3	9	413
2	101	0	3	1	0	63	77	0	0	246
3	21	0	0	45	1	29	2	0	0	98
4	321	1	35	14	7	863	10	16	2	1269
5	63	1	2	3	0	45	4	17	21	156
6	14	19	32	744	25	2	6	3	0	845
7	19	71	0	16	0	0	2	0	0	108
8	1	0	0	0	6	1	0	0	8	16
9	3	0	0	0	9	0	0	14	0	27
TOTAL	544	159	94	1074	83	1019	111	54	40	3178

1715-1730

	1	2	3	4	5	6	7	8	9	TOTAL
1	1	70	22	263	36	17	11	3	9	431
2	106	0	3	1	0	66	81	0	0	257
3	22	1	0	47	1	30	2	0	0	103
4	336	1	37	15	8	901	10	16	2	1326
5	66	1	2	3	0	47	4	18	22	163
6	15	20	33	777	26	3	6	3	0	883
7	20	74	0	16	0	0	2	0	0	113
8	1	0	0	0	6	1	0	0	8	16
9	3	0	0	0	9	0	0	15	0	28
TOTAL	568	166	99	1123	87	1065	116	56	41	3321

12955 Y

1730-1745

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	68	22	253	34	16	11	3	9	416
2	102	0	3	1	0	64	78	0	0	248
3	21	0	0	45	1	29	2	0	0	99
4	324	1	35	15	8	870	10	16	2	1279
5	63	1	2	3	0	46	4	17	21	157
6	15	19	32	750	25	2	6	3	0	852
7	19	71	0	16	0	0	2	0	0	109
8	1	0	0	0	6	1	0	0	8	16
9	3	0	0	0	9	0	0	14	0	27
TOTAL	540	160	95	1083	84	1027	112	54	40	3204

1745-1800

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	64	20	240	32	15	10	3	9	394
2	97	0	3	1	0	60	74	0	0	235
3	20	0	0	43	1	27	2	0	0	94
4	307	1	34	14	7	823	9	15	2	1211
5	60	1	2	3	0	43	3	16	20	149
6	14	18	31	710	24	2	5	3	0	807
7	18	68	0	15	0	0	2	0	0	104
8	1	0	0	0	6	1	0	0	7	15
9	3	0	0	0	8	0	0	13	0	24
TOTAL	519	152	90	1025	79	973	106	51	38	3033

6237

HEAVIES

1530-1545

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	4	2	39	2	2	4	0	0	52
2	3	0	0	0	2	2	1	0	0	8
3	5	0	0	16	1	10	0	0	0	31
4	46	1	15	0	1	144	1	0	0	211
5	1	0	1	10	0	1	0	0	1	14
6	1	2	12	110	0	0	0	0	0	125
7	2	3	0	1	0	0	0	0	0	7
8	0	0	0	0	1	0	0	0	0	1
9	0	0	0	0	0	0	0	0	1	1
TOTAL	61	9	29	175	8	159	6	0	1	449

1545-1600

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	3	2	37	2	2	4	0	0	50
2	3	0	0	0	2	1	1	0	0	7
3	5	0	0	15	1	10	0	0	0	30
4	60	1	2	3	0	43	3	16	20	148
5	1	0	1	9	0	1	0	0	1	13
6	1	2	11	105	0	0	0	0	0	120
7	2	3	0	1	0	0	0	0	0	6
8	0	0	0	0	1	0	0	0	0	1
9	0	0	0	0	0	0	0	0	1	1
TOTAL	56	9	28	167	7	152	6	0	1	429

1600-1615

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	3	2	32	2	1	3	0	0	44
2	3	0	0	0	2	1	1	0	0	6
3	4	0	0	13	0	8	0	0	0	26
4	41	1	12	0	1	121	1	0	0	177
5	1	0	1	8	0	1	0	0	1	12
6	1	1	10	92	0	0	0	0	0	105
7	1	3	0	1	0	0	0	0	0	6
8	0	0	0	0	1	0	0	0	0	1
9	0	0	0	0	0	0	0	0	1	1
TOTAL	51	8	24	147	6	134	5	0	1	378

1615-1630

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	3	2	30	2	1	3	0	0	41
2	2	0	0	0	2	1	1	0	0	6
3	4	0	0	12	0	8	0	0	0	24
4	36	1	11	0	1	113	1	0	0	164
5	1	0	1	8	0	1	0	0	1	11
6	1	1	9	65	0	0	0	0	0	98
7	1	3	0	1	0	0	0	0	0	5
8	0	0	0	0	1	0	0	0	0	1
9	0	0	0	0	0	0	0	0	0	0
TOTAL	48	7	23	136	6	124	5	0	1	350

1606

1630-1645

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	3	2	29	2	1	3	0	0	39
2	2	0	0	0	2	1	1	0	0	6
3	4	0	0	12	0	6	0	0	0	23
4	37	1	11	0	1	100	1	0	0	151
5	1	0	1	7	0	1	0	0	1	10
6	1	1	9	83	0	0	0	0	0	94
7	1	3	0	1	0	0	0	0	0	5
8	0	0	0	0	1	0	0	0	0	1
9	0	0	0	0	0	0	0	0	1	1
TOTAL	46	7	22	132	6	109	5	0	1	339

1645-1700

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	2	2	27	2	1	3	0	0	36
2	2	0	0	0	1	1	0	0	0	5
3	3	0	0	11	0	7	0	0	0	22
4	34	0	10	0	1	100	1	0	0	146
5	1	0	0	7	0	1	0	0	0	10
6	1	1	8	76	0	0	0	0	0	87
7	1	2	0	1	0	0	0	0	0	5
8	0	0	0	0	0	0	0	0	1	1
9	0	0	0	0	0	0	0	0	0	0
TOTAL	42	7	20	121	5	111	4	0	1	312

1700-1715

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	3	2	28	2	1	3	0	0	39
2	2	0	0	0	2	1	1	0	0	6
3	4	0	0	12	0	7	0	0	0	23
4	36	1	11	0	1	107	1	0	0	156
5	1	0	1	7	0	1	0	0	1	10
6	1	1	9	81	0	0	0	0	0	93
7	1	2	0	1	0	0	0	0	0	5
8	0	0	0	0	1	0	0	0	1	1
9	0	0	0	0	0	0	0	0	1	1
TOTAL	45	7	21	129	6	118	5	0	1	332

1715-1730

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	2	1	24	2	1	2	0	0	33
2	2	0	0	0	1	1	0	0	0	5
3	3	0	0	10	0	6	0	0	0	20
4	31	0	9	0	1	91	1	0	0	134
5	1	0	0	6	0	1	0	0	0	9
6	1	1	7	69	0	0	0	0	0	79
7	1	2	0	1	0	0	0	0	0	4
8	0	0	0	0	0	0	0	0	1	1
9	0	0	0	0	0	0	0	0	0	0
TOTAL	39	6	19	111	5	102	4	0	1	286

1267 Y

1730-1745

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	2	1	24	2	1	2	0	0	33
2	2	0	0	0	1	1	0	0	0	5
3	3	0	0	10	0	6	0	0	0	20
4	30	0	9	0	1	91	1	0	0	132
5	1	0	0	6	0	1	0	0	0	9
6	1	1	7	69	0	0	0	0	0	79
7	1	2	0	1	0	0	0	0	0	4
8	0	0	0	0	0	0	0	0	1	1
9	0	0	0	0	0	0	0	0	0	0
TOTAL	38	6	18	110	5	100	4	0	1	282

1745-1800

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	2	1	25	2	1	2	0	0	33
2	2	0	0	0	1	1	0	0	0	5
3	3	0	0	10	0	6	0	0	0	20
4	31	0	9	0	1	92	1	0	0	134
5	1	0	0	6	0	1	0	0	0	9
6	1	1	7	70	0	0	0	0	0	80
7	1	2	0	1	0	0	0	0	0	4
8	0	0	0	0	0	0	0	0	1	1
9	0	0	0	0	0	0	0	0	0	0
TOTAL	39	6	19	111	5	102	4	0	1	286

568

BTM FLOW ADJUSTMENTS - AM PEAK

STEP 1 - CALCULATE ABSOLUTE DIFFERENCES BETWEEN BTM FUTURE YEAR AND BTM BASE FLOWS

AM PEAK

Lights

	1	2	3	4	5	6	7	8	9	10	11	Total
1	0	92	11	430	-354	0	-15	-1	-5	403	227	788
2	-2	0	0	3	-6	13	46	0	0	7	62	123
3	8	0	0	84	-30	8	0	0	0	8	0	77
4	136	0	31	0	0	377	1	11	0	0	22	578
5	-113	-1	0	1	0	-66	-23	-20	-4	0	39	-187
6	0	-15	17	498	-139	0	-28	1	-71	309	101	672
7	4	24	0	0	0	0	0	0	0	26	16	69
8	-2	0	0	10	-34	-4	0	0	-13	58	28	43
9	-1	0	0	0	-10	-21	-2	-4	0	0	1	-36
10	112	2	0	0	4	152	22	17	0	0	384	693
11	13	2	0	1	2	5	2	2	11	58	0	97
Total	155	103	59	1026	-567	465	3	5	-81	868	880	2916

HGVs

	1	2	3	4	5	6	7	8	9	10	11	Total
1	0	0	0	52	-9	0	0	0	0	5	15	63
2	2	0	0	0	0	0	1	0	0	0	4	6
3	1	0	0	-2	0	1	0	0	0	0	0	0
4	22	0	3	0	0	32	0	0	0	0	94	151
5	-12	0	0	0	0	-9	0	0	0	0	0	-21
6	0	-7	6	102	0	0	0	0	0	1	56	157
7	0	1	0	0	0	0	0	0	0	0	1	2
8	0	0	0	0	-7	0	0	0	0	8	0	1
9	0	0	0	0	0	0	0	0	0	0	0	0
10	15	0	0	0	0	22	0	0	0	0	0	38
11	16	3	0	87	0	51	1	0	0	0	0	158
Total	44	-3	9	239	-16	98	2	0	0	13	170	556

Total

	1	2	3	4	5	6	7	8	9	10	11	Total
1	0	92	11	482	-363	0	-15	-1	-5	407	243	852
2	-1	0	0	3	-6	13	48	0	0	7	65	129
3	9	0	0	82	-30	9	0	0	0	8	0	77
4	159	0	34	0	0	409	1	11	0	0	116	729
5	-125	-1	0	1	0	-75	-23	-20	-4	0	39	-208
6	0	-21	23	599	-139	0	-28	1	-71	309	157	830
7	4	25	0	0	0	0	0	0	0	26	17	70
8	-2	0	0	10	-40	-4	0	0	-13	65	28	43
9	-1	0	0	0	-10	-21	-2	-4	0	0	1	-36
10	127	2	0	0	4	174	22	17	0	0	384	730
11	29	5	0	88	2	57	3	2	11	58	0	255
Total	200	100	69	1264	-582	563	5	5	-81	881	1050	3472

No flow adjustment - new zones in future year scenario

STEP 2 - SPECIFY VISSIM 2016 BASE FLOWS

AM PEAK

Lights

	1	2	3	4	5	6	7	8	9	10	11	Total
1	0	207	49	837	292	59	54	10	6			1515
2	177	0	6	5	5	83	224	0	0			500
3	39	2	0	155	27	89	1	1	1			314
4	697	4	116	27	35	2120	63	1	1			3063
5	85	7	12	18	0	128	14	25	49			338
6	44	117	117	2288	151	11	12	6	3			2749
7	83	254	1	134	10	1	5	0	0			489
8	11	1	2	2	70	17	2	0	48			152
9	33	3	5	7	46	51	5	31	0			182
10												0
11												0
Total	1169	595	307	3474	636	2559	380	75	108	0	0	9302

HGVs

	1	2	3	4	5	6	7	8	9			Total
1	0	22	24	201	31	6	12	0	0			297
2	14	0	0	0	0	7	9	0	0			30
3	16	0	0	49	1	16	1	0	0			83
4	102	0	23	2	5	264	5	0	0			402
5	16	0	0	7	0	7	9	4	2			45
6	7	15	29	416	9	0	5	1	1			482
7	11	22	0	11	0	0	0	0	0			44
8	1	0	0	0	5	0	0	0	3			9
9	1	0	0	0	2	1	1	1	0			5
												0
												0
Total	167	59	76	686	54	301	42	6	6	0	0	1397

Total

	1	2	3	4	5	6	7	8	9			Total
1	0	229	73	1038	323	65	66	11	6			1811
2	191	0	6	5	5	90	233	0	0			530
3	55	2	0	204	28	105	2	1	1			397
4	799	4	139	29	40	2384	68	1	1			3465
5	101	7	12	25	0	134	24	29	51			383
6	51	132	146	2704	160	11	17	6	4			3231
7	94	276	1	145	10	1	5	0	0			533
8	11	1	2	3	75	17	2	0	51			161
9	34	3	5	8	48	52	6	32	0			187
												0
												0
Total	1336	654	383	4160	690	2860	422	81	114	0	0	10699

STEP 3 - APPLY ABSOLUTE BTM DIFFERENCES TO BASE VISSIM FLOWS

AM PEAK

Lights

	1	2	3	4	5	6	7	8	9	10	11	Total
1	0	299	60	1267	-62	59	39	9	1	403	227	2303
2	175	0	6	8	-1	96	270	0	0	7	62	623
3	47	2	0	239	-4	97	1	1	1	8	0	391
4	833	4	147	27	34	2497	64	12	1	0	22	3641
5	-28	6	12	19	0	61	-9	5	45	0	39	151
6	44	102	134	2786	12	11	-16	6	-68	309	101	3421
7	87	278	1	134	10	1	5	0	0	26	16	558
8	9	1	2	12	36	13	2	0	35	58	28	195
9	33	3	5	7	36	31	3	27	0	0	1	146
10	112	2	0	0	4	152	22	17	0	0	384	693
11	13	2	0	1	2	5	2	2	11	58	0	97
Total	1324	698	366	4500	69	3024	383	80	26	868	880	12218

HGVs

	1	2	3	4	5	6	7	8	9	10	11	Total
1	0	22	24	253	22	6	12	0	0	5	15	360
2	16	0	0	0	0	7	10	0	0	0	4	36
3	17	0	0	47	1	17	1	0	0	0	0	83
4	124	0	26	2	5	296	5	0	0	0	94	553
5	5	0	0	7	0	-2	9	4	2	0	0	24
6	7	8	35	518	9	0	5	1	1	1	56	640
7	11	23	0	11	0	0	0	0	0	0	1	46
8	1	0	0	0	-2	0	0	0	3	8	0	10
9	1	0	0	0	2	1	1	1	0	0	0	5
10	15	0	0	0	0	22	0	0	0	0	0	38
11	16	3	0	87	0	51	1	0	0	0	0	158
Total	212	56	85	925	38	398	44	6	6	13	170	1953

Total

	1	2	3	4	5	6	7	8	9	10	11	Total
1	0	321	84	1520	-40	65	51	10	1	407	243	2663
2	190	0	6	8	-1	103	281	0	0	7	65	659
3	64	2	0	286	-3	114	2	1	1	8	0	474
4	958	4	173	29	40	2793	69	12	1	0	116	4194
5	-24	6	12	26	0	59	0	9	47	0	39	175
6	51	111	169	3303	21	11	-11	7	-68	309	157	4061
7	98	301	1	145	10	1	5	0	0	26	17	604
8	9	1	2	12	35	13	2	0	38	65	28	204
9	33	3	5	8	38	32	4	28	0	0	1	151
10	127	2	0	0	4	174	22	17	0	0	384	730
11	29	5	0	88	2	57	3	2	11	58	0	255
Total	1536	754	452	5425	107	3422	427	86	32	881	1050	14171

STEP 4 - ADJUST ANY NEGATIVE FLOWS TO ZERO VALUES

AM PEAK

Lights

	1	2	3	4	5	6	7	8	9	10	11	Total
1	0	299	60	1267	0	59	39	9	1	403	227	2365
2	175	0	6	8	0	96	270	0	0	7	62	624
3	47	2	0	239	0	97	1	1	1	8	0	395
4	833	4	147	27	34	2497	64	12	1	0	22	3641
5	0	6	12	19	0	61	0	5	45	0	39	188
6	44	102	134	2786	12	11	0	6	0	309	101	3505
7	87	278	1	134	10	1	5	0	0	26	16	558
8	9	1	2	12	36	13	2	0	35	58	28	195
9	33	3	5	7	36	31	3	27	0	0	1	146
10	112	2	0	0	4	152	22	17	0	0	384	693
11	13	2	0	1	2	5	2	2	11	58	0	97
Total	1353	698	366	4500	135	3024	407	80	94	868	880	12405

HGVs

	1	2	3	4	5	6	7	8	9	10	11	Total
1	0	22	24	253	22	6	12	0	0	5	15	360
2	16	0	0	0	0	7	10	0	0	0	4	36
3	17	0	0	47	1	17	1	0	0	0	0	83
4	124	0	26	2	5	296	5	0	0	0	94	553
5	5	0	0	7	0	0	9	4	2	0	0	27
6	7	8	35	518	9	0	5	1	1	1	56	640
7	11	23	0	11	0	0	0	0	0	0	1	46
8	1	0	0	0	0	0	0	0	3	8	0	12
9	1	0	0	0	2	1	1	1	0	0	0	5
10	15	0	0	0	0	22	0	0	0	0	0	38
11	16	3	0	87	0	51	1	0	0	0	0	158
Total	212	56	85	925	40	401	44	6	6	13	170	1957

Total

	1	2	3	4	5	6	7	8	9	10	11	Total
1	0	321	84	1520	22	65	51	10	1	407	243	2725
2	190	0	6	8	0	103	281	0	0	7	65	660
3	64	2	0	286	1	114	2	1	1	8	0	478
4	958	4	173	29	40	2793	69	12	1	0	116	4194
5	5	6	12	26	0	61	9	9	47	0	39	215
6	51	111	169	3303	21	11	5	7	1	309	157	4145
7	98	301	1	145	10	1	5	0	0	26	17	604
8	9	1	2	12	36	13	2	0	38	65	28	206
9	33	3	5	8	38	32	4	28	0	0	1	151
10	127	2	0	0	4	174	22	17	0	0	384	730
11	29	5	0	88	2	57	3	2	11	58	0	255
Total	1564	754	452	5425	175	3424	452	86	100	881	1050	14362

Negative values converted to 0 value

BTM FLOW ADJUSTMENTS - PM PEAK

STEP 1 - CALCULATE ABSOLUTE DIFFERENCES BETWEEN BTM FUTURE YEAR AND BTM BASE FLOWS

AM PEAK

Lights

	1	2	3	4	5	6	7	8	9	10	11	Total
1	0	43	22	216	-95	0	-19	-3	-7	126	72	354
2	42	0	0	5	-7	57	54	0	0	1	25	178
3	11	0	0	32	0	21	0	0	0	0	0	65
4	399	7	30	0	0	529	25	35	0	0	3	1027
5	-237	-3	-4	1	0	-100	0	-73	-10	0	11	-415
6	0	47	18	446	-78	0	-1	0	-67	133	24	523
7	10	-43	0	1	-13	0	0	0	-10	21	5	-29
8	-3	0	0	20	-27	0	0	0	-4	9	3	-2
9	-4	0	0	0	-9	-41	0	-6	0	0	1	-59
10	216	1	0	0	0	270	0	68	0	0	151	706
11	288	27	0	27	50	120	0	54	54	419	0	1038
Total	722	79	65	748	-179	856	59	76	-44	710	295	3387

HGVs

	1	2	3	4	5	6	7	8	9	10	11	Total
1	0	1	0	19	-2	0	0	0	0	0	16	34
2	0	0	0	0	0	-1	0	0	0	0	4	2
3	1	0	0	5	0	4	0	0	0	0	0	11
4	28	0	5	0	0	24	0	0	0	0	85	141
5	-5	0	0	0	0	0	0	-1	0	0	0	-6
6	0	0	7	35	-1	0	0	0	0	0	51	91
7	0	1	0	-4	0	0	0	0	0	0	1	-2
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	29	0	1	0	0	0	30
11	15	2	0	78	0	46	1	0	0	0	0	142
Total	40	4	11	133	-3	102	1	0	0	0	156	443

Total

	1	2	3	4	5	6	7	8	9	10	11	Total
1	0	44	22	235	-98	0	-19	-3	-7	126	88	388
2	42	0	0	5	-7	56	55	0	0	1	29	181
3	12	0	0	37	0	25	0	0	0	0	0	75
4	427	7	34	0	0	552	25	35	0	0	88	1168
5	-242	-3	-4	1	0	-100	0	-74	-10	0	11	-421
6	0	47	24	481	-79	0	-1	0	-67	133	75	614
7	10	-43	0	-2	-13	0	0	0	-10	21	6	-31
8	-3	0	0	20	-27	0	0	0	-4	9	3	-2
9	-4	0	0	0	-9	-41	0	-6	0	0	1	-59
10	216	1	0	0	0	299	0	69	0	0	151	737
11	303	29	0	104	50	166	1	54	54	419	0	1180
Total	762	82	76	881	-182	958	60	76	-44	710	451	3830

No flow adjustment - new zones in future year scenario

STEP 2 - SPECIFY VISSIM 2016 BASE FLOWS

AM PEAK

Lights

	1	2	3	4	5	6	7	8	9	10	11	Total
1	2	249	66	815	88	66	38	12	24			1360
2	312	0	12	5	3	77	277	0	1			687
3	74	2	0	151	4	95	8	1	1			336
4	1072	1	114	59	23	2899	48	3	7			4226
5	353	5	13	12	0	165	15	72	35			669
6	59	78	113	2565	79	10	25	13	27			2969
7	52	229	1	47	7	0	9	1	3			349
8	7	0	0	0	21	3	0	0	23			55
9	21	0	1	1	39	10	1	39	0			112
10												0
11												0
Total	1952	564	320	3655	265	3325	421	141	120	0	0	10763

HGVs

	1	2	3	4	5	6	7	8	9			Total
1	0	9	6	90	9	5	11	0	0			130
2	9	0	0	0	6	4	2	0	0			21
3	12	0	0	39	2	24	0	0	0			77
4	107	2	36	0	3	350	4	0	0			502
5	8	0	2	6	0	3	0	1	2			22
6	4	5	26	274	1	1	1	0	1			313
7	5	9	0	7	1	0	0	0	0			22
8	0	0	0	0	2	1	0	0	0			3
9	1	0	0	0	1	0	0	0	0			2
												0
												0
Total	146	25	70	416	25	388	18	1	3	0	0	1092

Total

	1	2	3	4	5	6	7	8	9			Total
1	2	258	72	905	97	71	49	12	24			1490
2	321	0	12	5	9	81	279	0	1			708
3	86	2	0	190	6	119	8	1	1			413
4	1179	3	150	59	26	3249	52	3	7			4728
5	360	5	15	18	0	168	15	73	37			691
6	63	83	139	2839	81	11	26	13	28			3282
7	57	238	1	54	8	0	9	1	3			371
8	7	0	0	0	23	3	0	0	23			58
9	22	0	1	1	40	10	1	39	0			114
												0
												0
Total	2098	589	390	4071	290	3713	439	142	123	0	0	11855

STEP 3 - APPLY ABSOLUTE BTM DIFFERENCES TO BASE VISSIM FLOWS

AM PEAK

Lights

	1	2	3	4	5	6	7	8	9	10	11	Total
1	2	292	88	1031	-7	66	19	9	17	126	72	1714
2	354	0	12	10	-4	134	331	1	1	1	25	865
3	85	2	0	183	4	116	8	1	1	0	0	401
4	1471	8	144	59	24	3428	73	39	7	0	3	5254
5	116	1	9	13	0	65	15	-1	25	0	11	254
6	59	125	131	3011	2	10	24	13	-40	133	24	3492
7	62	186	1	48	-6	0	9	1	-8	21	5	320
8	4	0	0	21	-6	3	0	0	19	9	3	53
9	18	0	1	1	30	-31	1	33	0	0	1	53
10	216	1	0	0	0	270	0	68	0	0	151	706
11	288	27	0	27	50	120	0	54	54	419	0	1038
Total	2674	643	385	4403	86	4181	480	217	76	710	295	14150

HGVs

	1	2	3	4	5	6	7	8	9	10	11	Total
1	0	10	6	109	7	5	11	0	0	0	16	164
2	9	0	0	0	6	3	2	0	0	0	4	23
3	13	0	0	44	2	28	0	0	0	0	0	88
4	135	2	41	0	3	374	4	0	0	0	85	643
5	3	0	2	6	0	3	0	0	2	0	0	16
6	4	5	33	309	0	1	1	0	1	0	51	404
7	5	10	0	3	1	0	0	0	0	0	1	20
8	0	0	0	0	2	1	0	0	0	0	0	3
9	1	0	0	0	1	0	0	0	0	0	0	2
10	0	0	0	0	0	29	0	1	0	0	0	30
11	15	2	0	78	0	46	1	0	0	0	0	142
Total	185	29	81	549	22	490	19	1	3	0	156	1535

Total

	1	2	3	4	5	6	7	8	9	10	11	Total
1	2	302	94	1140	-1	71	30	9	17	126	88	1878
2	363	0	12	10	2	137	334	1	1	1	29	888
3	98	2	0	227	6	144	8	1	1	0	0	488
4	1606	10	184	59	27	3801	77	39	7	0	88	5897
5	119	1	11	19	0	69	15	-1	27	0	11	270
6	63	130	163	3320	2	11	25	13	-39	133	75	3896
7	67	195	1	52	-5	0	9	1	-8	21	6	340
8	4	0	0	21	-4	3	0	0	19	9	3	56
9	18	0	1	1	31	-31	1	33	0	0	1	55
10	216	1	0	0	0	299	0	69	0	0	151	737
11	303	29	0	104	50	166	1	54	54	419	0	1180
Total	2860	671	466	4952	107	4670	499	219	79	710	451	15685

STEP 4 - ADJUST ANY NEGATIVE FLOWS TO ZERO VALUES

AM PEAK

Lights

	1	2	3	4	5	6	7	8	9	10	11	Total
1	2	292	88	1031	0	66	19	9	17	126	72	1722
2	354	0	12	10	0	134	331	1	1	1	25	869
3	85	2	0	183	4	116	8	1	1	0	0	401
4	1471	8	144	59	24	3428	73	39	7	0	3	5254
5	116	1	9	13	0	65	15	0	25	0	11	255
6	59	125	131	3011	2	10	24	13	0	133	24	3532
7	62	186	1	48	0	0	9	1	0	21	5	334
8	4	0	0	21	0	3	0	0	19	9	3	59
9	18	0	1	1	30	0	1	33	0	0	1	85
10	216	1	0	0	0	270	0	68	0	0	151	706
11	288	27	0	27	50	120	0	54	54	419	0	1038
Total	2674	643	385	4403	110	4212	480	218	124	710	295	14254

HGVs

	1	2	3	4	5	6	7	8	9	10	11	Total
1	0	10	6	109	7	5	11	0	0	0	16	164
2	9	0	0	0	6	3	2	0	0	0	4	23
3	13	0	0	44	2	28	0	0	0	0	0	88
4	135	2	41	0	3	374	4	0	0	0	85	643
5	3	0	2	6	0	3	0	0	2	0	0	16
6	4	5	33	309	0	1	1	0	1	0	51	404
7	5	10	0	3	1	0	0	0	0	0	1	20
8	0	0	0	0	2	1	0	0	0	0	0	3
9	1	0	0	0	1	0	0	0	0	0	0	2
10	0	0	0	0	0	29	0	1	0	0	0	30
11	15	2	0	78	0	46	1	0	0	0	0	142
Total	185	29	81	549	22	490	19	1	3	0	156	1535

Total

	1	2	3	4	5	6	7	8	9	10	11	Total
1	2	302	94	1140	7	71	30	9	17	126	88	1885
2	363	0	12	10	6	137	334	1	1	1	29	893
3	98	2	0	227	6	144	8	1	1	0	0	488
4	1606	10	184	59	27	3801	77	39	7	0	88	5897
5	119	1	11	19	0	69	15	0	27	0	11	271
6	63	130	163	3320	2	11	25	13	1	133	75	3936
7	67	195	1	52	1	0	9	1	0	21	6	354
8	4	0	0	21	2	3	0	0	19	9	3	62
9	18	0	1	1	31	0	1	33	0	0	1	87
10	216	1	0	0	0	299	0	69	0	0	151	737
11	303	29	0	104	50	166	1	54	54	419	0	1180
Total	2860	672	466	4952	131	4702	499	220	127	710	451	15789

Negative values converted to 0 value

2031 DS1 CALCULATIONS - AM PEAK

STEP 1 - FLOWS FROM BTM

AM PEAK

Lights

	1	2	3	4	5	6	7	8	9	10	11	Total
1	0	299	60	1267	0	59	20	8	1	403	227	2345
2	175	0	6	8	0	96	270	0	0	7	62	624
3	47	2	0	239	0	97	1	1	1	8	9	395
4	833	4	147	27	34	2497	64	12	1	0	22	3641
5	9	6	12	19	0	61	0	5	45	0	30	188
6	44	102	134	2786	12	11	0	6	0	309	101	3505
7	87	278	1	134	10	1	5	0	0	16	16	548
8	9	3	5	12	36	31	3	27	0	0	9	135
9	39	3	5	37	36	31	3	27	0	0	9	195
10	112	3	0	4	532	32	17	0	0	0	384	1083
11	11	2	0	5	2	3	2	11	16	0	0	97
Total	1353	698	366	4505	133	3024	407	80	64	868	880	12405

HGVs

	1	2	3	4	5	6	7	8	9	10	11	Total
1	0	22	24	253	22	6	12	0	0	5	11	360
2	16	0	0	0	0	0	7	10	0	0	0	36
3	17	0	0	0	0	47	1	17	1	0	0	83
4	124	0	0	26	2	5	296	5	0	0	0	94
5	1	0	0	0	7	0	0	9	4	2	0	27
6	7	8	35	118	9	0	0	5	1	1	56	640
7	11	23	0	0	11	0	0	0	0	1	0	46
8	1	0	0	0	0	2	1	1	1	0	0	12
9	1	0	0	0	0	2	1	1	1	0	0	12
10	25	0	0	0	4	0	22	0	0	0	0	38
11	15	5	0	0	0	87	0	51	0	0	0	158
Total	212	56	85	925	40	401	44	6	6	13	170	1957

Total

	1	2	3	4	5	6	7	8	9	10	11	Total
1	0	321	84	1520	22	65	33	8	1	408	238	2725
2	190	0	6	8	0	103	281	0	0	7	65	660
3	64	2	0	286	1	114	2	1	1	8	9	478
4	958	4	173	29	40	2751	69	12	1	0	116	4194
5	9	6	12	19	0	61	9	9	9	47	0	331
6	51	111	169	3303	21	11	5	7	1	309	157	4145
7	98	301	1	134	21	1	5	0	0	26	17	605
8	10	3	5	12	36	33	4	28	0	0	9	140
9	40	3	5	37	36	33	4	28	0	0	9	195
10	137	3	0	4	536	32	17	0	0	0	384	1113
11	26	7	0	5	2	90	2	62	16	0	0	255
Total	1564	754	452	5425	175	3424	432	86	100	881	1050	14362

STEP 2 - CONVERT TO 15 MIN MATRICES USING 2016 BASE PROPORTIONS

LIGHTS

Time Period	Total	Overall Total	Proportion
0645-0700	2111	9302	23%
0700-0715	2217	9302	24%
0715-0730	2383	9302	26%
0730-0745	2271	9302	24%
			97%

HEAVIES

Time Period	Total	Overall Total	Proportion
0645-0700	451	1397	32%
0700-0715	406	1397	29%
0715-0730	418	1397	30%
0730-0745	377	1397	27%
			118%

LIGHTS

Time Period	Total	Overall Total	Proportion
0745-0800	2548	9302	27%
0800-0815	2432	9302	26%
0815-0830	2226	9302	24%
0830-0845	2096	9302	23%
			100%

HEAVIES

Time Period	Total	Overall Total	Proportion
0745-0800	372	1397	27%
0800-0815	348	1397	25%
0815-0830	364	1397	26%
0830-0845	313	1397	22%
			100%

LIGHTS

Time Period	Total	Overall Total	Proportion
0845-0900	1978	9302	21%
0900-0915	1825	9302	20%
			41%

Used peak total to determine proportions for warm up and cool down periods

HEAVIES

Time Period	Total	Overall Total	Proportion
0845-0900	345	1397	25%
0900-0915	345	1397	25%
			49%

Used peak total to determine proportions for cool down period

LIGHTS

0645-0700

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	68	14	289	0	13	9	2	0	92	52	**539**
2	40	0	1	2	0	22	62	0	0	2	14	**142**
3	11	0	0	55	0	22	0	0	0	2	0	**90**
4	190	1	33	6	8	569	14	3	0	0	0	**830**
5	2	1	3	4	0	14	0	1	10	0	0	**35**
6	10	23	31	635	3	3	0	0	0	70	29	**799**
7	20	63	0	31	2	0	1	0	0	4	6	**127**
8	2	0	0	1	8	3	0	0	0	8	13	**44**
9	7	1	1	2	8	7	1	0	0	0	0	**33**
10	25	0	0	35	5	4	0	0	0	0	88	**158**
11	3	0	0	0	0	1	0	1	3	13	0	**22**
TOTAL	**308**	**159**	**83**	**1026**	**35**	**689**	**93**	**18**	**21**	**198**	**201**	**2828**

0700-0715

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	71	14	302	0	14	9	2	0	96	54	**564**
2	42	0	1	2	0	23	64	0	0	2	15	**149**
3	11	0	0	57	0	23	0	0	0	2	0	**96**
4	199	1	35	6	8	595	15	3	0	0	5	**868**
5	0	0	3	5	0	15	0	1	11	0	0	**35**
6	10	24	30	664	3	3	0	0	0	74	24	**835**
7	20	63	0	32	2	0	1	0	0	4	6	**128**
8	2	0	0	1	9	3	0	0	0	8	14	**46**
9	8	1	1	2	9	7	1	0	0	0	0	**35**
10	27	0	0	36	5	4	0	0	0	0	92	**165**
11	3	0	0	0	0	1	0	1	3	14	0	**23**
TOTAL	**322**	**166**	**87**	**1072**	**32**	**721**	**97**	**19**	**22**	**207**	**210**	**2956**

0715-0730

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	77	15	325	0	15	10	2	0	103	58	**606**
2	45	0	2	2	0	25	69	0	0	2	16	**160**
3	12	1	0	61	0	25	0	0	0	2	0	**101**
4	213	1	38	7	9	640	16	3	0	0	6	**933**
5	0	0	3	6	0	16	0	1	12	0	0	**38**
6	11	25	32	714	3	3	0	0	0	79	26	**893**
7	21	68	0	34	2	0	1	0	0	4	6	**136**
8	2	0	0	1	9	3	0	0	0	9	15	**50**
9	8	1	1	2	9	8	1	0	0	0	0	**37**
10	29	0	0	39	5	4	0	0	0	0	96	**177**
11	3	0	0	0	0	1	0	1	3	15	0	**25**
TOTAL	**347**	**179**	**94**	**1153**	**35**	**775**	**104**	**20**	**24**	**222**	**225**	**3178**

0730-0745

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	73	15	309	0	14	9	2	0	98	55	**577**
2	43	0	1	2	0	24	66	0	0	2	15	**152**
3	11	0	0	58	0	24	0	0	0	2	0	**96**
4	203	1	36	7	8	610	16	3	0	0	5	**889**
5	0	0	3	6	0	15	0	1	10	0	0	**36**
6	11	23	33	680	3	3	0	0	0	75	25	**856**
7	21	65	0	33	2	0	1	0	0	4	6	**132**
8	2	0	0	1	9	3	0	0	0	9	14	**48**
9	8	1	1	2	9	8	1	0	0	0	0	**36**
10	27	0	0	37	5	4	0	0	0	0	94	**169**
11	3	0	0	0	0	1	0	1	3	14	0	**24**
TOTAL	**330**	**171**	**89**	**1098**	**33**	**738**	**99**	**19**	**23**	**212**	**215**	**3029**

0745-0800

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	82	16	347	0	16	11	3	0	110	62	**646**
2	48	0	2	3	0	26	74	0	0	3	16	**171**
3	13	1	0	65	0	26	0	0	0	2	0	**108**
4	228	1	40	7	9	684	17	3	0	0	6	**997**
5	2	1	3	5	0	17	0	1	12	0	0	**52**
6	12	28	37	761	3	3	0	2	0	85	28	**960**
7	24	76	0	37	3	0	1	0	0	7	4	**153**
8	2	0	0	3	10	4	0	0	10	16	8	**53**
9	9	1	1	2	10	8	1	0	0	0	0	**40**
10	31	0	0	0	0	1	42	6	5	0	105	**190**
11	4	0	0	0	0	1	0	1	3	16	0	**27**
TOTAL	**370**	**191**	**100**	**1232**	**37**	**828**	**112**	**22**	**26**	**238**	**241**	**3398**

0800-0815

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	79	16	357	0	15	10	3	0	105	59	**618**
2	46	0	2	3	0	25	73	0	0	3	16	**163**
3	12	1	0	62	0	25	0	0	0	2	0	**103**
4	218	1	38	7	9	653	17	3	0	0	6	**962**
5	0	0	3	5	0	16	0	1	12	0	0	**49**
6	12	27	35	738	3	3	0	2	0	81	26	**916**
7	23	73	0	35	3	0	1	0	0	7	4	**146**
8	2	0	0	3	10	3	0	0	9	15	7	**51**
9	9	1	1	2	9	8	1	0	0	0	0	**38**
10	29	0	0	0	0	1	40	6	4	0	100	**181**
11	3	0	0	0	0	1	0	1	3	15	0	**25**
TOTAL	**354**	**183**	**96**	**1176**	**35**	**791**	**107**	**21**	**25**	**227**	**230**	**3243**

0815-0830

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	72	14	303	0	14	9	3	0	98	54	**566**
2	42	0	2	3	0	23	65	0	0	3	16	**149**
3	11	0	0	57	0	23	0	0	0	2	0	**94**
4	199	1	35	6	8	598	15	3	0	0	5	**871**
5	0	1	3	5	0	15	0	1	11	0	0	**45**
6	11	25	32	667	3	3	0	2	0	74	24	**839**
7	21	66	0	32	2	0	1	0	0	6	4	**134**
8	2	0	0	3	9	3	0	0	8	14	7	**47**
9	8	1	1	2	9	7	1	0	0	0	0	**35**
10	27	0	0	0	0	1	36	5	4	0	92	**166**
11	3	0	0	0	0	1	0	1	3	14	0	**23**
TOTAL	**324**	**167**	**88**	**1077**	**32**	**724**	**98**	**19**	**23**	**208**	**211**	**2969**

0830-0845

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	67	14	295	0	13	9	2	0	93	51	**533**
2	39	0	1	2	0	22	61	0	0	2	14	**141**
3	11	0	0	54	0	22	0	0	0	2	0	**89**
4	188	1	33	6	8	563	16	3	0	0	5	**820**
5	0	1	3	4	0	14	0	1	10	0	0	**42**
6	10	23	30	628	3	2	0	1	0	70	23	**790**
7	20	63	0	30	2	0	1	0	0	4	6	**126**
8	2	0	0	3	8	3	0	0	8	13	6	**44**
9	7	1	1	2	8	7	1	0	0	0	0	**33**
10	25	0	0	0	0	1	34	5	4	0	87	**156**
11	3	0	0	0	0	1	0	1	3	13	0	**22**
TOTAL	**305**	**157**	**82**	**1014**	**31**	**681**	**92**	**18**	**21**	**195**	**198**	**2795**

0845-0900

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	64	13	269	0	13	8	2	0	86	48	**503**
2	37	0	1	2	0	21	58	0	0	2	12	**133**
3	10	0	0	51	0	21	0	0	0	2	0	**84**
4	177	1	31	6	7	531	14	3	0	0	5	**774**
5	0	1	3	4	0	13	0	1	10	0	0	**40**
6	9	22	29	592	2	2	0	0	0	66	22	**745**
7	18	59	0	28	2	0	1	0	0	5	3	**119**
8	2	0	0	3	8	3	0	0	8	12	6	**41**
9	7	1	1	2	8	7	1	0	0	0	0	**31**
10	24	0	0	0	0	1	42	6	5	0	102	**180**
11	3	0	0	0	0	1	0	1	3	12	0	**20**
TOTAL	**288**	**149**	**78**	**957**	**29**	**643**	**87**	**17**	**26**	**184**	**197**	**2638**

0900-0915

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	59	12	249	0	12	8	2	0	79	45	**464**
2	34	0	0	1	2	0	19	53	0	0	13	**122**
3	9	0	0	0	0	47	0	19	0	0	2	0	**77**
4	164	1	29	5	7	490	12	2	0	0	4	**714**
5	0	1	2	4	0	12	0	1	9	0	8	**37**
6	9	20	26	547	2	2	0	1	0	61	20	**688**
7	17	54	0	26	2	0	1	0	0	5	3	**109**
8	2	0	0	2	7	3	0	0	7	11	5	**38**
9	6	1	1	1	7	6	1	0	0	0	0	**29**
10	23	0	0	0	0	1	30	5	4	0	82	**146**
11	3	0	0	0	0	1	0	1	3	12	0	**19**
TOTAL	**265**	**137**	**72**	**883**	**27**	**593**	**80**	**16**	**18**	**170**	**173**	**2434**

5072

HEAVIES

0645-0700

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	7	8	82	7	2	4	0	0	1	5	**116**
2	5	0	0	0	0	2	3	0	0	0	1	**12**
3	6	0	0	15	0	4	0	0	0	0	0	**27**
4	40	0	8	1	2	95	2	0	0	0	30	**178**
5	1	0	0	2	0	0	1	0	0	0	0	**9**
6	2	3	11	167	3	0	2	0	0	0	18	**207**
7	3	6	0	3	0	0	0	0	0	0	0	**15**
8	0	0	0	0	0	0	0	1	2	0	0	**4**
9	0	0	0	0	0	0	0	1	2	0	0	**4**
10	5	1	0	28	0	17	0	0	0	0	0	**51**
11	1	1	0	0	0	0	0	0	0	0	0	**2**
TOTAL	**68**	**18**	**28**	**299**	**13**	**129**	**14**	**2**	**2**	**1**	**54**	**632**

0700-0715

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	6	7	74	6	2	3	0	0	1	4	**105**
2	5	0	0	0	0	2	3	0	0	0	1	**11**
3	5	0	0	14	0	5	0	0	0	0	0	**24**
4	36	0	8	1	2	86	1	0	0	0	27	**161**
5	1	0	0	2	0	0	1	0	0	0	0	**8**
6	2	2	10	150	3	0	1	0	0	0	16	**186**
7	3	7	0	3	0	0	0	0	0	0	0	**13**
8	0	0	0	0	0	0	0	1	2	0	0	**3**
9	0	0	0	0	0	0	0	1	2	0	0	**3**
10	4	0	0	25	0	15	0	0	0	0	0	**44**
11	1	1	0	0	0	0	0	0	0	0	0	**2**
TOTAL	**61**	**16**	**25**	**269**	**12**	**116**	**13**	**2**	**2**	**1**	**49**	**569**

0715-0730

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	7	7	76	7	2	3	0	0	1	5	**108**
2	5	0	0	0	0	2	3	0	0	0	1	**11**
3	5	0	0	14	0	5	0	0	0	0	0	**25**
4	37	0	8	1	2	88	1	0	0	0	28	**165**
5	1	0	0	2	0	0	1	0	0	0	0	**8**
6	2	2	11	155	3	0	1	0	0	0	17	**191**
7	3	7	0	3	0	0	0	0	0	0	0	**14**
8	0	0	0	0	0	0	0	1	2	0	0	**3**
9	0	0	0	0	0	0	0	1	2	0	0	**3**
10	4	0	0	26	0	15	0	0	0	0	0	**45**
11	1	1	0	0	0	0	0	0	0	0	0	**2**
TOTAL	**63**	**17**	**26**	**277**	**12**	**120**	**13**	**2**	**2**	**1**	**51**	**586**

0730-0745

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	6	7	68	6	2	3	0	0	1	4	**97**
2	4	0	0	0	0	2	3	0	0	0	1	**10**
3	5	0	0	13	0	5	0	0	0	0	0	**25**
4	34	0	7	1	1	80	1	0	0	0	25	**149**
5	1	0	0	2	0	0	1	0	0	0	0	**6**
6	2	2	9	140	3	0	1	0	0	0	15	**173**
7	3	6	0	3	0	0	0	0	0	0	0	**12**
8	0	0	0	0	0	0	0	1	2	0	0	**3**
9	0	0	0	0	0	0	0	1	2	0	0	**3**
10	4	0	0	24	0	14	0	0	0	0	0	**42**
11	1	1	0	0	0	0	0	0	0	0	0	**2**
TOTAL	**57**	**15**	**23**	**250**	**11**	**108**	**12**	**2**	**2**	**3**	**46**	**528**

0745-0800

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	6	6	67	6	2	3	0	0	1	4	**96**
2	4	0	0	0	0	2	3	0	0	0	1	**10**
3	5	0	0	12	0	5	0	0	0	0	0	**22**
4	33	0	7	1	1	79	1	0	0	0	25	**147**
5	1	0	0	2	0	0	1	0	0	0	0	**7**
6	2	2	9	138	2	0	1	0	0	0	15	**170**
7	3	6	0	3	0	0	0	0	0	0	0	**12**
8	0	0	0	0	0	0	0	1	2	0	0	**3**
9	0	0	0	0	0	0	0	1	2	0	0	**3**
10	4	0	0	0	0	6	0	0	0	0	0	**10**
11	1	1	0	23	0	14	0	0	0	0	0	**42**
TOTAL	**56**	**15**	**23**	**246**	**11**	**107**	**12**	**2**	**2**	**3**	**45**	**521**

0800-0815

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	5	6	63	5	1	3	0	0	1	4	**90**
2	4	0	0	0	0	2	3	0	0	0	1	**9**
3	4	0	0	12	0	4	0	0	0	0	0	**21**
4	31	0	6	0	1	73	1	0	0	0	23	**138**
5	1	0	0	2	0	0	1	0	0	0	0	**7**
6	2	2	9	128	2	0	1	0	0	0	14	**158**
7	3	6	0	3	0	0	0	0	0	0	0	**11**
8	0	0	0	0	0	0	0	1	2	0	0	**3**
9	0	0	0	0	0	0	0	1	2	0	0	**3**
10	4	1	0	22	0	13	0	0	0	0	0	**39**
11	1	1	0	0	0	0	0	0	0	0	0	**2**
TOTAL	**53**	**14**	**21**	**230**	**10**	**100**	**11**	**2**	**2**	**3**	**42**	**488**

0815-0830

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	6	6	66	6	2	3	0	0	1	4	**94**
2	4	0	0	0	0	2	3	0	0	0	1	**9**
3	4	0	0	12	0	5	0	0	0	0	0	**22**
4	32	0	7	1	1	77	1	0	0	0	24	**144**
5	1	0	0	2	0	0	1	0	0	0	0	**7**
6	2	2	9	135	2	0	1	0	0	0	15	**167**
7	3	6	0	3	0	0	0	0	0	0	0	**12**
8	0	0	0	0	0	0	0	1	2	0	0	**3**
9	0	0	0	0	0	0	0	1	2	0	0	**3**
10	4	0	0	0	0	6	0	0	0	0	0	**10**
11	1	1	0	23	0	13	0	0	0	0	0	**41**
TOTAL	**55**	**15**	**22**	**241**	**10**	**104**	**12**	**2**	**2**	**3**	**44**	**510**

0830-0845

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	5	5	57	5	1	3	0	0	1	3	**81**
2	3	0	0	0	0	2	3	0	0	0	1	**8**
3	4	0	0	11	0	4	0	0	0	0	0	**19**
4	28	0	6	0	1	66	1	0	0	0	21

2031 DS1 CALCULATIONS - PM PEAK

STEP 1 - FLOWS FROM BTM

AM PEAK

Lights

	1	2	3	4	5	6	7	8	9	10	11	Total
1	2	292	88	1031	0	66	19	9	17	126	72	1722
2	354	0	12	10	0	134	331	1	1	1	25	869
3	85	2	0	183	4	116	8	1	1	0	0	401
4	1471	8	144	59	24	3428	73	39	7	0	3	5254
5	116	1	9	13	0	65	15	0	25	0	11	255
6	59	125	131	3011	2	10	24	13	0	133	24	3532
7	62	186	1	46	0	0	9	1	0	21	5	318
8	1	0	21	0	0	0	0	0	0	0	0	22
9	18	0	1	21	30	0	1	33	0	0	1	105
10	216	1	0	0	370	0	0	68	0	0	161	816
11	286	27	0	27	50	120	0	54	54	419	0	1038
Total	2674	643	385	4403	110	4212	480	218	124	719	295	14254

HGVs

	1	2	3	4	5	6	7	8	9	10	11	Total
1	2	60	6	599	7	5	11	0	0	16	16	164
2	9	0	0	0	6	3	2	0	0	0	4	23
3	13	0	0	44	2	28	0	0	0	0	0	88
4	135	2	41	0	3	374	4	0	0	0	85	643
5	3	0	2	6	0	3	0	0	0	2	0	16
6	4	5	33	309	0	1	1	0	0	1	51	404
7	5	10	0	3	1	5	1	0	0	0	1	26
8	0	0	0	0	0	0	0	0	0	0	0	0
9	1	0	0	0	1	0	0	0	0	0	0	2
10	3	0	0	0	0	0	0	29	0	1	0	30
11	15	2	0	76	0	0	46	1	0	0	0	142
Total	189	29	81	549	22	490	19	1	1	3	156	1535

Total

	1	2	3	4	5	6	7	8	9	10	11	Total
1	2	352	94	1340	7	71	30	9	17	126	88	1885
2	363	0	12	10	6	137	334	1	1	1	29	893
3	98	2	0	227	6	144	8	1	1	0	0	488
4	1606	10	184	59	27	3801	77	39	7	0	88	5897
5	119	1	11	19	0	69	15	0	27	0	11	272
6	63	130	163	3320	2	11	25	13	1	133	75	3936
7	67	196	1	49	1	5	10	1	0	21	6	357
8	1	0	21	0	0	0	0	0	0	0	0	22
9	18	0	1	21	31	0	1	33	0	0	1	107
10	216	1	0	0	370	0	0	68	0	0	161	816
11	301	29	0	103	50	120	0	54	54	419	0	1180
Total	2860	672	466	4952	131	4752	499	220	117	719	451	15789

STEP 2 : CONVERT TO 15 MIN MATRICES USING 2016 BASE PROPORTIONS

LIGHTS

Time Period	Total	Overall Total	Proportion
1530-1545	2306	10763	21%
1545-1600	2375	10763	22%
1600-1615	2515	10763	23%
1615-1630	2578	10763	24%
			91%

HEAVIES

Time Period	Total	Overall Total	Proportion
1530-1545	387	1092	35%
1545-1600	370	1092	34%
1600-1615	326	1092	30%
1615-1630	302	1092	28%
			127%

LIGHTS

Time Period	Total	Overall Total	Proportion
1630-1645	2655	10763	25%
1645-1700	2709	10763	25%
1700-1715	2640	10763	25%
1715-1730	2759	10763	26%
			100%

HEAVIES

Time Period	Total	Overall Total	Proportion
1630-1645	292	1092	27%
1645-1700	269	1092	25%
1700-1715	286	1092	26%
1715-1730	245	1092	22%
			100%

LIGHTS

Time Period	Total	Overall Total	Proportion
1730-1745	2662	10763	25%
1745-1800	2520	10763	23%
			48%

Used peak total to determine proportions for cool down period

HEAVIES

Time Period	Total	Overall Total	Proportion
1730-1745	243	1092	22%
1745-1800	247	1092	23%
			45%

Used peak total to determine proportions for cool down period

LIGHTS

1530-1545

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	62	19	220	0	14	4	2	4	27	15	368
2	76	0	3	2	0	29	71	0	0	0	5	186
3	18	0	0	39	1	25	2	0	0	0	1	86
4	314	2	31	13	5	732	16	8	1	0	1	1123
5	25	0	2	3	0	14	3	0	5	0	2	54
6	13	27	28	643	0	2	5	3	0	28	5	755
7	13	40	0	10	0	0	2	0	0	4	1	70
8	1	0	0	4	0	1	0	0	4	2	1	13
9	4	0	0	0	6	0	0	7	0	0	0	18
10	46	0	0	0	58	0	0	15	0	0	32	151
11	62	6	0	4	11	26	0	11	11	89	0	222
TOTAL	571	137	82	941	23	900	103	47	26	152	63	3046

1545-1600

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	64	19	227	0	15	4	2	4	28	16	380
2	78	0	3	2	0	30	73	0	0	0	6	192
3	19	0	0	40	1	26	2	0	0	0	0	88
4	324	2	32	13	5	756	16	9	1	0	1	1159
5	26	0	2	3	0	14	3	0	5	0	2	56
6	13	28	29	664	0	2	5	3	0	29	5	779
7	14	41	0	11	0	0	2	0	0	4	1	73
8	1	0	0	4	0	1	0	0	4	2	1	13
9	4	0	0	0	6	0	0	7	0	0	0	19
10	48	0	0	0	60	0	0	16	0	0	33	156
11	64	6	0	4	6	11	27	0	12	12	92	0	229
TOTAL	590	142	85	971	24	909	106	48	27	157	65	3145

1600-1615

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	68	20	241	0	15	4	2	4	29	17	402
2	83	0	3	2	0	31	77	0	0	0	6	203
3	20	0	0	43	1	27	2	0	0	0	0	94
4	344	2	34	14	5	801	17	9	2	0	1	1226
5	27	0	2	3	0	15	4	0	5	0	2	60
6	14	29	31	704	0	2	6	3	0	31	5	825
7	14	43	0	11	0	0	2	0	0	4	1	76
8	1	0	0	5	0	1	0	0	4	2	1	14
9	4	0	0	0	7	0	0	8	0	0	0	20
10	50	0	0	0	63	0	0	16	0	0	35	165
11	67	6	0	4	6	12	28	0	13	13	98	0	243
TOTAL	625	150	90	1029	26	984	112	51	29	166	69	3331

1615-1630

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	70	21	247	0	16	5	2	4	30	17	412
2	85	0	3	2	0	32	79	0	0	0	6	208
3	20	0	0	44	1	28	2	0	0	0	0	96
4	352	2	34	14	6	821	17	9	2	0	1	1258
5	28	0	2	3	0	15	4	0	5	0	2	61
6	14	30	31	721	0	2	6	3	0	31	5	844
7	14	44	0	11	0	0	2	0	0	4	1	78
8	1	0	0	5	0	1	0	0	4	2	1	14
9	4	0	0	0	7	0	0	8	0	0	0	20
10	52	0	0	0	65	0	0	16	0	0	36	169
11	69	6	0	4	6	12	29	0	13	13	100	0	249
TOTAL	641	154	92	1055	35	1009	115	52	30	179	71	3414	12936

1630-1645

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	72	22	254	0	16	5	2	4	31	18	425
2	87	0	3	2	0	33	82	0	0	0	6	214
3	21	0	0	45	1	29	2	0	0	0	0	99
4	363	2	35	15	6	845	18	10	2	0	1	1296
5	29	0	2	3	0	16	4	0	6	0	3	63
6	15	31	32	743	0	2	6	3	0	33	6	871
7	15	46	0	12	0	0	2	0	0	5	1	82
8	1	0	0	5	0	1	0	0	5	2	1	15
9	5	0	0	0	7	0	0	8	0	0	0	21
10	53	0	0	0	67	0	0	17	0	0	37	174
11	71	7	0	4	7	12	30	0	13	13	103	0	256
TOTAL	660	159	95	1086	27	1039	118	54	31	175	73	3516

1645-1700

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	1	73	22	257	0	17	5	2	4	32	18	431
2	89	1	3	2	0	34	83	0	0	0	6	219
3	21	0	0	46	1	29	2	0	0	0	0	101
4	370	2	36	15	6	863	18	10	2	0	1	1322
5	29	0	2	3	0	16	4	0	6	0	3	64
6	15	32	33	758	0	3	6	3	0	34	6	889
7	16	47	0	12	0	0	2	0	0	5	1	84
8	1	0	0	5	0	1	0	0	5	2	1	15
9	4	0	0	0	8	0	0	8	0	0	0	21
10	54	0	0	0	68	0	0	17	0	0	38	178
11	72	7	0	4	7	13	30	0	14	14	105	0	261
TOTAL	673	162	97	1108	28	1060	121	55	31	179	74	3588

1700-1715

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	72	21	253	0	16	5	2	4	31	18	422
2	87	0	3	2	0	33	81	0	0	0	6	213
3	21	0	0	45	1	29	2	0	0	0	0	98
4	361	2	35	14	6	841	18	9	2	0	1	1289
5	28	0	2	3	0	16	4	0	6	0	3	62
6	14	31	32	739	0	2	6	3	0	33	6	867
7	15	46	0	12	0	0	2	0	0	5	1	82
8	1	0	0	5	0	1	0	0	5	2	1	15
9	4	0	0	0	7	0	0	8	0	0	0	21
10	53	0	0	0	66	0	0	17	0	0	37	173
11	71	7	0	4	7	12	29	0	13	13	103	0	255
TOTAL	656	158	94	1080	27	1033	118	54	30	174	72	3497

1715-1730

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	1	75	22	264	0	17	5	2	4	32	18	441
2	91	1	3	2	0	34	85	0	0	0	6	223
3	22	1	0	47	1	30	2	0	0	0	0	103
4	377	2	37	15	6	879	19	10	2	0	1	1347
5	30	0	2	3	0	17	4	0	6	0	3	65
6	15	32	33	772	0	3	6	3	0	34	6	906
7	16	48	0	12	0	0	2	0	0	5	1	86
8	1	0	0	5	0	1	0	0	5	2	1	15
9	5	0	0	0	8	0	0	9	0	0	0	22
10	55	0	0	0	69	0	0	17	0	0	39	181
11	74	7	0	4	7	13	31	0	14	14	107	0	266
TOTAL	685	165	99	1129	28	1080	123	56	32	182	76	3654	14254 Y

1730-1745

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	72	22	255	0	16	5	2	4	31	18	426
2	88	0	3	2	0	33	82	0	0	0	6	215
3	21	0	0	45	1	29	2	0	0	0	0	99
4	364	2	36	15	6	848	18	10	2	0	1	1299
5	29	0	2	3	0	16	4	0	6	0	3	63
6	15	31	32	745	0	2	6	3	0	33	6	874
7	15	46	0	12	0	0	2	0	0	5	1	83
8	1	0	0	5	0	1	0	0	5	2	1	15
9	4	0	0	0	7	0	0	8	0	0	0	21
10	53	0	0	0	67	0	0	17	0	0	37	174
11	71	7	0	4	7	12	30	0	13	13	103	0	256
TOTAL	661	159	95	1089	27	1042	119	54	31	175	73	3525

1745-1800

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	68	21	241	0	15	4	2	4	29	17	403
2	83	0	3	2	0	31	78	0	0	0	6	204
3	20	0	0	43	1	27	2	0	0	0	0	94
4	344	2	34	14	6	802	17	9	2	0	1	1230
5	27	0	2	3	0	15	3	0	6	0	2	60
6	14	29	31	705	0	2	6	3	0	31	6	827
7	15	44	0	11	0	0	2	0	0	5	1	78
8	1	0	0	5	0	1	0	0	5	2	1	14
9	4	0	0	0	7	0	0	8	0	0	0	20
10	51	0	0	0	63	0	0	16	0	0	35	165
11	68	6	0	4	6	12	28	0	13	13	98	0	243
TOTAL	626	151	91	1033	26	986	112	51	29	166	69	3337

6863

HEAVIES

1530-1545

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	4	2	39	2	2	4	0	0	0	6	58
2	3	0	0	0	2	1	1	0	0	0	1	8
3	1	0	0	16	1	10	0	0	0	0	0	31
4	48	1	14	0	1	133	1	0	0	0	0	228
5	1	0	1	2	0	1	0	0	0	1	0	6
6	1	2	12	109	0	0	1	0	0	18	0	143
7	2	3	0	1	0	0	0	0	0	1	0	7
8	0	0	0	0	0	1	0	0	0	0	0	1
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	1	1	0	28	0	16	0	0	0	0	0	46
TOTAL	66	10	29	195	8	174	7	0	1	0	0	544

1545-1600

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	0	3	2	37	2	2	0	0	0	5	56
2	3	0	0	0	2	1	1	0	0	0	1	8
3	1	0	0	15	1	10	0	0	0	0	0	30
4	46	1	14	0	1	127	1	0	0	0	0	218
5	1	1	1	2	0	1	0	0	0	0	0	5
6	1	2	11	105	0	0	1	0	0	17	0	137
7	2	3	0	1	0	0	0	0	0	1	0	7
8	0	0	0	0	0	1	0	0	0	0	0	1
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	1	1	0	26	0	16	0	0	0	0	0	44
TOTAL	63	10	28	186	7	166	6	0	1	0	0	520

1600-1615

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	0	3	2	32	2	1	1	0	0	5	49
2	3	0	0	0	2	1	1	0	0	0	1	7
3	4	0	0	0	13	0	1	0	0	0	0	26
4	40	1	12	0	1	112	1	0	0	0	0	192
5	1	1	1	2	0	1	0	0	0	0	0	5
6	1	1	10	92	0	0	1	0	0	0	0	105
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	1	0	0	0	0	0	1
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	1	1	0	23	0	14	0	0	0	0	0	39
TOTAL	55	9	24	164	6	146	6	0	1	0	0	410

1615-1630

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	0	3	2	30	2	1	1	0	0	4	45
2	2	0	0	0	2	1	1	0	0	0	1	6
3	3	0	0	0	10	0	1	0	0	0	0	24
4	37	1	11	0	1	103	1	0	0	0	0	178
5	1	1	1	2	0	1	0	0	0	0	0	4
6	1	1	9	85	0	0	1	0	0	14	0	112
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	1	0	0	0	0	0	1
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	1	1	0	21	0	13	0	0	0	0	0	36
TOTAL	51	8	23	152	6	135	5	0	1	0	0	421	1947

1630-1645

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	3	2	29	2	1	3	0	0	0	4	44
2	2	0	0	0	2	1	1	0	0	0	1	6
3	4	0	0	12	0	8	0	0	0	0	0	23
4	36	1	11	0	1	100	1	0	0	0	0	150
5	1	1	1	2	0	1	0	0	0	0	0	6
6	1	1	9	83	0	0	0	0	0	14	0	108
7	1	3	0	1	0	0	0	0	0	0	0	5
8	0	0	0	0	1	0	0	0	0	0	0	1
9	0	0	0	0	0	0	0	0	0	0	0	1
10	0	0	0	0	0	0	0	0	0	0	0	0
11	4	1	0	21	0	12	0	0	0	0	0	38
TOTAL	50	8	22	147	6	131	5	0	1	0	42	410

1645-1700

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	2	2	27	2	1	3	0	0	0	4	40
2	2	0	0	0	1	1	1	0	0	0	1	6
3	3	0	0	11	0	7	0	0	0	0	0	22
4	33	0	10	0	1	92	1	0	0	0	0	137
5	1	0	0	1	0	1	0	0	0	0	0	3
6	1	1	8	76	0	0	0	0	0	12	0	99
7	1	2	0	1	0	0	0	0	0	0	0	5
8	0	0	0	0	0	0	0	0	0	0	0	1
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	4	1	0	19	0	11	0	0	0	0	0	35
TOTAL	46	7	20	135	5	121	5	0	1	0	38	378

1700-1715

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	3	2	29	2	1	3	0	0	0	4	43
2	2	0	0	0	2	1	1	0	0	0	1	6
3	4	0	0	12	0	7	0	0	0	0	0	23
4	35	1	11	0	1	98	1	0	0	0	0	147
5	1	0	1	2	0	1	0	0	1	0	0	6
6	1	1	9	81	0	0	0	0	0	0	0	92
7	1	2	0	1	0	0	0	0	0	0	0	4
8	0	0	0	0	1	0	0	0	0	0	0	1
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	4	1	0	20	0	12	0	0	0	0	0	37
TOTAL	49	8	21	144	6	128	5	0	1	0	41	402

1715-1730

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	2	1	24	2	1	2	0	0	0	4	37
2	2	0	0	0	1	1	1	0	0	0	1	5
3	3	0	0	10	0	6	0	0	0	0	0	20
4	30	0	9	0

APPENDIX B:

2034 REFERENCE CASE TN

Prepared by:	[redacted]	Reviewed by:	[redacted]
Client:	ADC Infrastructure Ltd	Date:	01 March 2023

MG0163 – Oxford SRFI – Summary VISSIM Model Changes – Reference Case_v2

1 INTRODUCTION

1.1 This Technical Note (TN) summarises the key changes made to the approved M40 J10 base VISSIM model to create the 2031 Reference Case models for the proposed Strategic Rail Freight Interchange (SRFI) known as Oxford SRFI.

1.2 The original Reference Case model was approved by National Highways (NH) in May 2022. However, since then, the previously committed scheme at Baynards Green Roundabout has been withdrawn by Oxfordshire County Council (OCC). This was included in the original Reference Case model. As a result, a revised Reference Case model was required to be developed, that excluded any proposed works at the Baynards Green Roundabout.

1.3 The flows in the Reference Case model have also been updated, which have now been based on the Bicester Transport Model (BTM). The strategic BTM allows for a more informed flow-set to be used in the VISSIM model, accounting for any reassignment and/or re-routing as a result of the proposed schemes.

1.4 This document has therefore been produced to detail the new change made to the model for auditing purposes. For details of the previous changes, Modelling Group's original changes TN can be found in **Appendix A**.

1.5 It should be noted that the VISSIM model file includes a 2026 opening year traffic flow-set, in additional to the 2031 flow-set. However, the opening year has been recently revised to 2028 and subsequently, the 2026 flows will be updated in due course. As such, the focus of the audit should be on the 2031 Reference Case scenario only.

2 KEY CHANGES MADE

2.1 The following headings provide details on the key changes made from the 2017 base model to create the 2031 Reference Case VISSIM models.

2.2 The main difference from the base model is the addition of committed improvements proposed by OCC at the Padbury Roundabout.

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2.3 As the base model had previously been approved by National Highways, it was felt that it was more appropriate (and an easier process) to go back to the base model and add in Padbury, rather than remove the Baynards Green improvement from the previous Reference Case modelling.

2.4 A full breakdown of the changes made to the updated Reference Case model can be found in **Appendix B**.

Scenario Management

Modification Files

2.5 Modification File No. 6 ('Committed Infrastructure') has been created to code in the committed improvement at the Padbury Roundabout.

2.6 Modification File No's 7 & 8 ('2031 AM/PM Ref Case Flows') have been created to update the origin-destination (O-D) matrices to account for the 2031 future year.

2.7 Modification Files 9 & 10 ('SC3/4 DynAssignEdits') have been created for internal modelling purposes and allow the dynamic assignment parameters to be changed and saved, without a '*<generated automatically>*' modification being created when making changes within a scenario itself.

Scenarios

2.8 Scenario No's 3 & 4 have been created to model the 2031 AM/PM Reference Cases.

Backgrounds

2.9 The following DWG file has been used to code in NH's committed improvements at the Padbury Roundabout:

- HE604237-KIER-GEN-M40_JN10_Z-DR-Z-0100_04.dwg

OD-Matrices

2.10 The modelled 2031 Reference Case flows have been taken from the following spreadsheet:

- 230224 BTM Flows - 2031 REF CASE – VISSIM

2.11 The flows are now based on outputs from the BTM and the spreadsheet translates these outputs into 15-minute O-D matrices for the warm-up, peak-hour and cool-down periods (based on the same proportional demands as the 2017 base model).

2.12 Further details on the calculations of the 2031 Reference Case flows are provided in **Appendix C**.

Motorcycles – Ardley Road Junction

2.13 The motorbike vehicle class has been added to the reduced speed areas at the Ardley Road Junction, which was corrected following an external audit of the original Reference Case model.

Signal Controllers – Padbury

Signal Controllers

2.14 To replicate the new Padbury signals in the Reference Case models, new signal controllers (No's 2 & 3) have been added to the 'Base Network' for the two streams.

2.15 Two new dummy links have also been added, with the relevant detectors added on each of the links for the appropriate signal controller (see **Figure 2.1**).

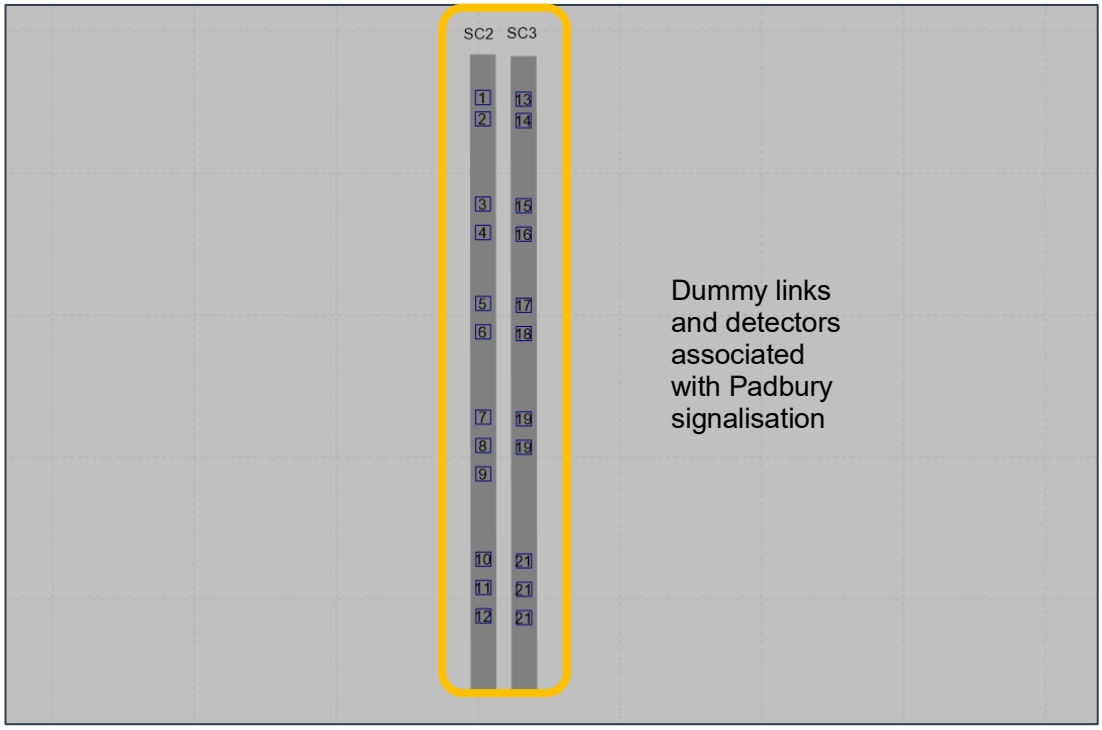

FIGURE 2.1: BASE NETWORK – DUMMY LINK & DETECTOR LAYOUT

2.16 This approach has been taken as if you add or amend a PC MOVA controlled signalised junction in a modification file (for loading into a scenario), the changes do not show up when creating or editing a PC MOVA Connection file. This is because PC MOVA can only read the INP/INPX file (or 'Base Network' in Scenario Management) and not any associated Scenario or Modification files.

PC MOVA Connection File – Cherwell Phase Delays

2.17 Following discussions with National Highways, it was mentioned that the original modelling undertaken by AECOM as part of their M40 J10 study included phase delays at the Cherwell Junction.

2.18 A review of the previously agreed Reference Case model found that these had not been included.

2.19 Therefore, to rectify this issue, the following phase delays were added to the updated Reference Case model, to match those previously included in the AECOM modelling (see **Figure 2.2**).

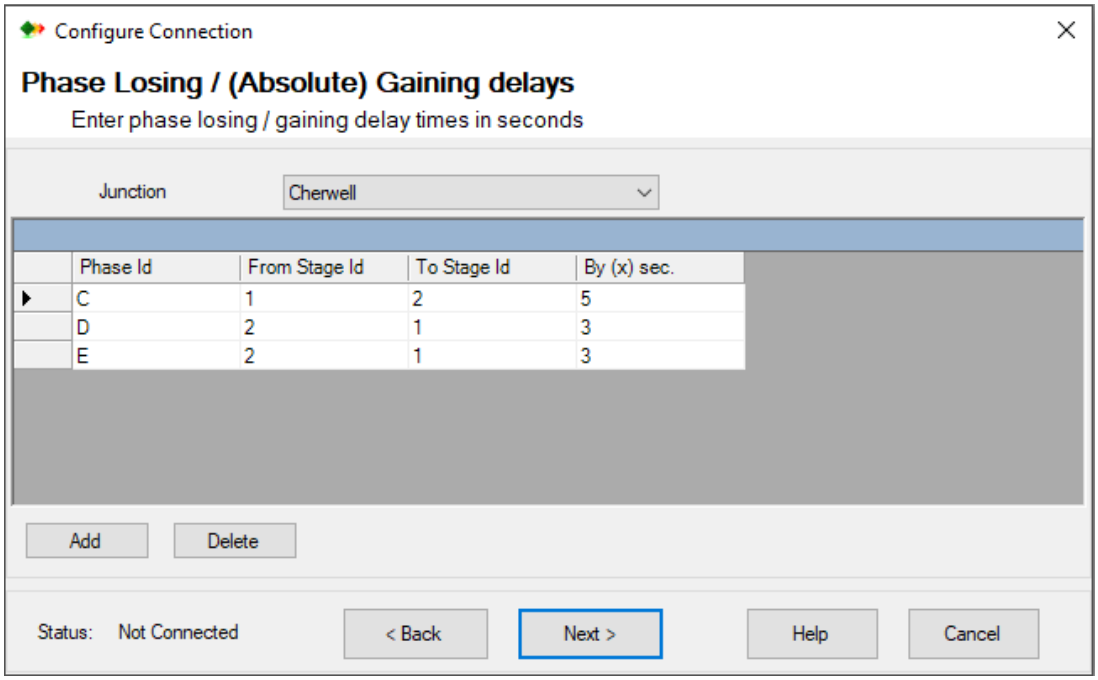

FIGURE 2.2: CHERWELL JUNCTION – PHASE DELAYS

Local Changes – Padbury

Links/Connectors

2.20 As before, the roundabout has been subject to significant changes to the link/behaviour structure. The only difference in this submission is that some of the link/connector numbers are different.

2.21 In the updated model, Links/Connectors 10156, 139, 10157, 140, 10158, 141, 10159, 142, 10160 & 143 have had their behaviour changed from 'Left-Side Rule' to 'Urban (motorised)', whilst the following connectors have different emergency stop values (**Table 2.1**).

No.	Location	Emergency Stop	Lane Change
10061	M40 SB Off-Slip – Left	30m	200m
10062	M40 SB Off-Slip - Right	20m	200m

TABLE 2.1: NOTABLE CONNECTOR CHANGES

Priority Rules

2.22 As before, priority rules have been included to reduce overlapping vehicles. In this model, numbers 135-152 have been included around the junction, which feature a mix of gap times and headways.

Signal Heads & Detectors

2.23 New signal heads (No's 10-18) have been added at the locations of the proposed signalised stop-lines.

Local Changes – Cherwell

Signal Heads & Detectors

2.24 The 'IN' MOVA detectors have been relocated to the two-lane section further upstream (see **Figure 2.3**) and the Cherwell MOVA dataset has been updated to reflect the new detector distances from the stop-line. This was corrected following an external audit of the original Reference Case model.

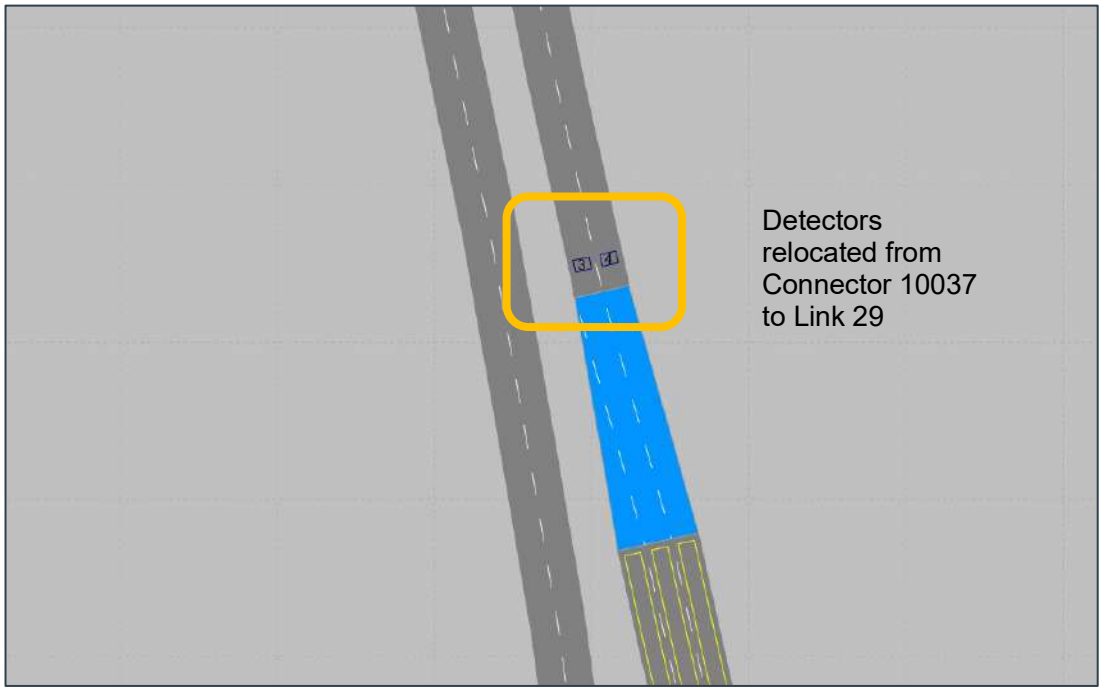

FIGURE 2.3: CHERWELL – A43 NORTH – UPDATED MOVA 'IN' DETECTOR LOCATIONS

Local Changes – Ardley

Priority Rules

2.25 Priority Rule No's 154 & 155 have been added to the M40 NB Off-Slip to reduce instances of overlapping between vehicles entering the roundabout and vehicles exiting to the B430.

2.26 Priority Rule No's 7,8,49 & 50 have been updated to include headway markers on the circulatory. This has been done to reduce the number of overlapping vehicles in congested conditions.

2.27 Priority Rule No's 162, 164 & 165 have been added to the circulatory to reduce the number of overlapping vehicles in congested conditions.

Local Changes – Baynards Green

Priority Rules

2.28 Priority Rule No's 166-178 have been added to the approaches and various circulatory sections at Baynards Green. This has been done to reduce the number of overlapping vehicles in congested conditions.

3 SUMMARY

3.1 This Technical Note (TN) summarises the key changes made to the approved M40 J10 base VISSIM model to create the 2031 Reference Case models for the proposed Strategic Rail Freight Interchange (SRFI) known as Oxford SRFI.

3.2 The original Reference Case model was approved by National Highways (NH) in May 2022. However, since then, the previously committed scheme at Baynards Green Roundabout has been withdrawn by Oxfordshire County Council (OCC). This was included in the original Reference Case model. As a result, a revised Reference Case model was required to be developed, that excluded any proposed works at the Baynards Green Roundabout.

3.3 All parameters and network elements amended have been listed, detailed and explained for auditing purposes.

APPENDIX A – PREVIOUS MODELLING GROUP CHANGES TN

Prepared by:	[redacted]	Reviewed by:	[redacted]
Client:	ADC Infrastructure Ltd	Date:	29 November 2021

MG0163 – Oxford SRFI – Summary VISSIM Model Changes – Reference Case

1 INTRODUCTION

1.1 This Technical Note (TN) summarises the key changes made to the approved M40 J10 base VISSIM model to create the 2031 Reference Case models for the proposed Strategic Rail Freight Interchange (SRFI) known as Oxford SRFI.

1.2 This document has been produced for auditing purposes, to allow the Reference Case VISSIM model development to be understood.

2 KEY CHANGES MADE

2.1 The following headings provide details on the key changes made to create the 2031 Reference Case VISSIM models.

2.2 The main difference from the base model is the addition of committed improvements proposed by National Highways (NH) at the Baynard's Green and Padbury roundabouts.

2.3 A full breakdown of the changes made to the Reference Case models can be found in **Appendix A**.

Scenario Management

Modification Files

2.4 Modification File No. 6 ('Committed Infrastructure') has been created to code in the NH improvements at the Baynard's Green and Padbury roundabouts.

2.5 Modification File No's 7 & 8 ('2026 AM/PM Ref Case Flows') have been created to update the origin-destination (O-D) matrices to account for the 2026 future year.

2.6 Modification File No's 11 & 12 ('2031 AM/PM Ref Case Flows') have been created to update the origin-destination (O-D) matrices to account for the 2031 future year.

2.7 Modification Files 9, 10, 13 and 14 ('SC3/4/5/6 DynAssignEdits') have been created for internal modelling purposes and allow the dynamic assignment parameters to be changed and saved, without a '*<generated automatically>*' modification being created when making changes within a scenario itself.

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Scenarios

2.8 Scenario No's 3, 4, 5 & 6 have been created to model the 2026 AM/PM and 2031 AM/PM Reference Cases.

2.9 It should be noted that whilst the 2026 AM and PM Reference Case scenarios have been created in VISSIM, these have not been tested at this time as there is not an equivalent 2026 flow-set in the previous modelling for comparing outputs results.

Backgrounds

2.10 The following DWG files have been used to code in NH's committed improvements at the Baynard's Green and Padbury roundabouts (see **Appendix B**):

- HE604237-KIER-GEN-M40_JN10_Z-DR-Z-0100_02 – 03.dwg
- HE604237-KIER-GEN-M40_JN10_Z-DR-Z-0100_04.dwg

O-D Matrices

2.11 The modelled 2031 Reference Case scenario flows have been taken from the following spreadsheets:

- 210705 ADC Flows - 2031 REF CASE - VISSIM CONVERSION

2.12 This spreadsheet translates the warm-up and peak hour flow matrices into 15-minute O-D matrices, as well as the creation of two cool-down 15-minute matrices (derived from the same proportional demand as in the 2017 base model).

2.13 Further details on the calculation of the 2031 Reference Case flows are provided in **Appendix C**.

Signal Controllers & MOVA Datasets – Baynard's Green

2.14 The signal set-up for the Baynard's Green roundabout has been based on the set-up as in AECOM's Do-Something 3 VISSIM models. These signals are proposed to be MOVA controlled on site and to mimic this in the model, the signals have been modelled using PC MOVA.

2.15 To ensure consistency, the Reference Case model signals are also modelled using PC MOVA and the same MOVA datasets and detector layout has been used as in AECOM's Do-Something 3 models.

Signal Controllers

2.16 To replicate the new Baynard's Green signals in the Reference Case models, new signal controllers (No's 2, 3, 4 & 5) have been added to the 'Base Network' for the four streams.

2.17 Four new dummy links have also been added, with the relevant detectors added on each of the links for the appropriate signal controller (see **Figure 2.1**).

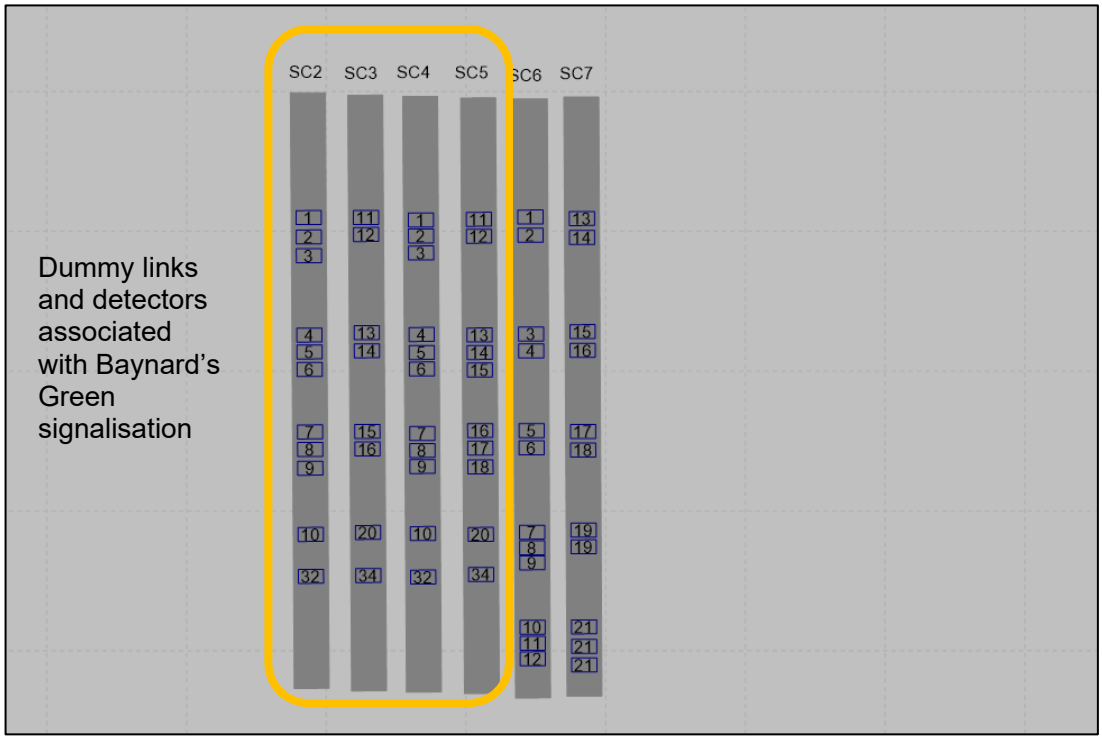


FIGURE 2.1: BASE NETWORK – DUMMY LINK & DETECTOR LAYOUT

2.18 This approach has been taken as if you add or amend a PC MOVA controlled signalised junction in a modification file (for loading into a scenario), the changes do not show up when creating or editing a PC MOVA Connection file. This is because PC MOVA can only read the INP/INPX file (or 'Base Network' in Scenario Management) and not any associated Scenario or Modification files.

2.19 Modelling Group have prepared a note on the use of PC MOVA and Scenario Management, which can be found in **Appendix D**.

MOVA Datasets

2.20 The MOVA datasets used for the NH VISSIM modelling study at M40 J10 have been reviewed and the following changes have been made.

Baynard's Green – Node 1

- Renamed from 'NRBTC1ST1' to 'Bay_NB_St1'
- In MOVA Tools:
  - Set dataset name *to 'Bay_NB_St1'*
  - Updated Design Diagram to suit link/lane layout (see **Figure 2.2**).

Baynard's Green – Node 2

- Renamed 'NRBTC1ST2' as 'Bay_NB_St2'
- In MOVA Tools:
  - Set dataset name to 'Bay_NB_St2'
  - Updated Design Diagram (see **Figure 2.2**).
  - Detectors – Main Detectors – re-numbered the X and Stop-line detectors to follow on from the numbering of the IN detectors.

Baynard's Green – Node 3

- Renamed 'NRBTC2ST1' as 'Bay_SB_St1'
- In MOVA Tools:
  - Set dataset name to 'Bay_SB_St1'
  - Updated Design Diagram (see **Figure 2.2**).
  - Lanes – Lanes: Main – Lane 1 set as 'Short' lane. This has been updated to a 'Normal' lane based on CAD drawing received.
  - Detectors – Main Detectors – to account for Lane 1 now being a 'Normal' lane, added IN Det 1 to this lane and subsequently updated the rest of the detector numbering to follow-on.
  - E/P – Emergency/Priority: Links – updated EP1 detector number from 9 to 10

Baynard's Green – Node 4

- Renamed 'NRBTC2ST2' as 'Bay_SB_St2'
- In MOVA Tools:
  - Set dataset name to 'Bay_SB_St2'
  - Updated Design Diagram (see **Figure 2.2**).
  - Signals
    - Phases – Added a new Phase to account for new Link
    - Stages – Updated to include Phase C in Stage 2 (out of Stage 1) and added Phase F to Stage 1
  - Links – Links: Main
    - Added a new Link 1 to account for 3 lane approach, based on updated drawing
    - Updated Phases to suit additional lane
  - Lanes – Lanes: Main
    - Set Lane 1 to 'Short' lane, with a distance of 87m, based on updated drawing.

- Lanes 2 and 3 – set Lane Weighting factor to 6 instead of 1 (similar to Pad_St1)

- Detectors – Main Detectors
  - Lanes 2 and 3 – Det no's 11 & 12 – updated distance from 100m to 94m
  - Lane 1
    - Removed ALT-UP Detector No. 11 being configured (short lane)
    - Updated X and Stop-line detector numbers (to no's 13 and 16 respectively)
- SD Codes – Set to 1 for Links 4-6 in Stage 1 and 1-3 in Stage 2
  - to account for Lane 1 now being a 'Normal' lane, added IN Det 1 to this lane and subsequently updated the rest of the detector numbering to follow-on.
- E/P – Emergency/Priority: Links – updated EP1 detector number from 9 to 10

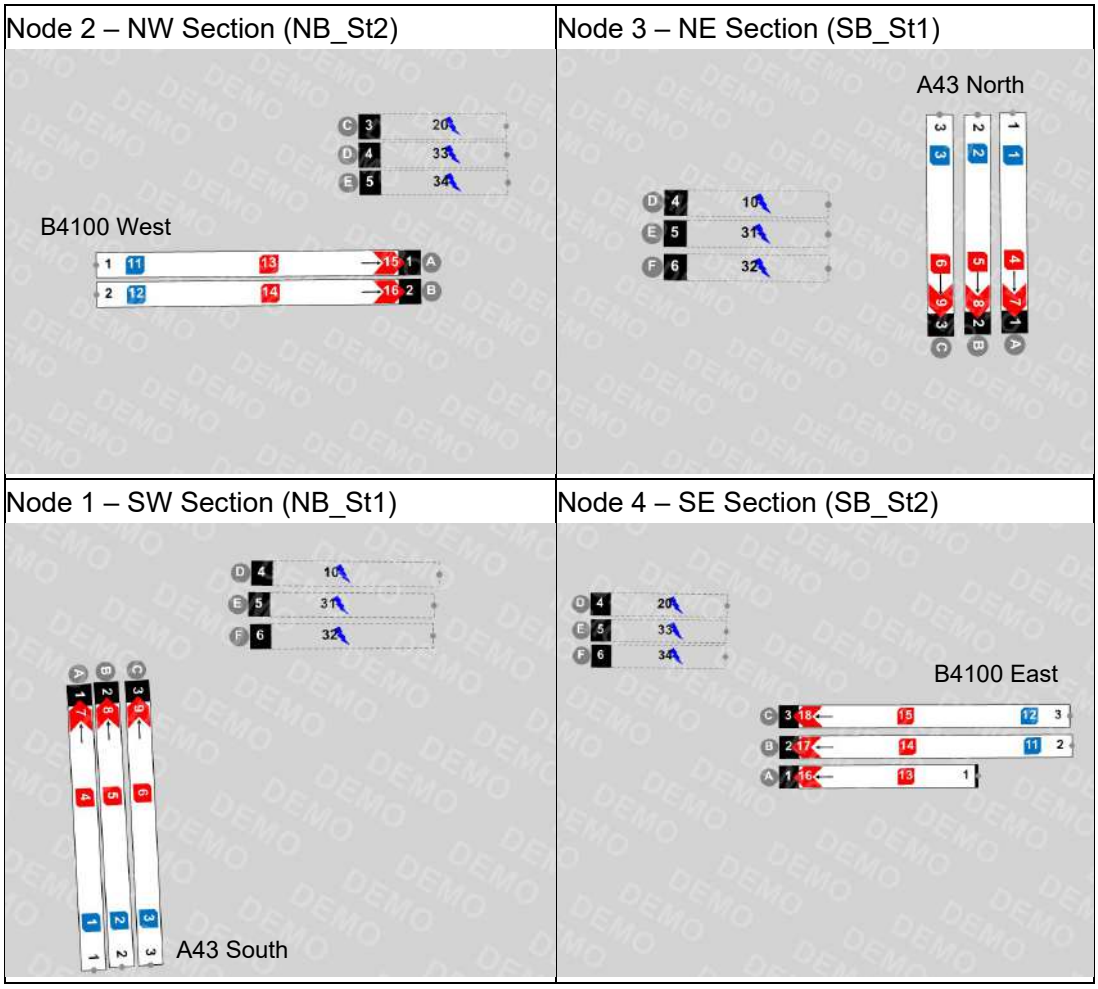


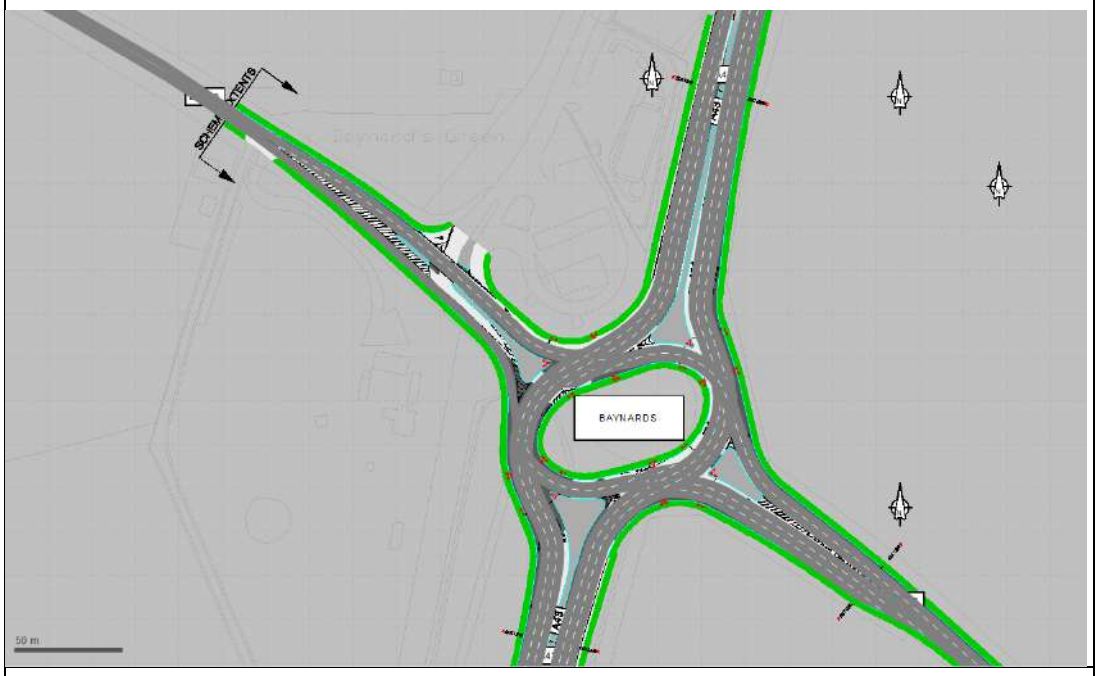
FIGURE 2.2: NODE 1-4 – UPDATED MOVA TOOLS DESIGN DIAGRAMS

Local Changes – Baynard's Green

Links/Connectors

2.21 The roundabout has been subject to significant changes to the link/connector structure, as a result of the number of lanes and anticipated routing around the junction as shown by the lane markings. The new link structure in shown in **Figure 2.3**.

Normal Link View



Wireframe Link View



FIGURE 2.3: BAYNARD'S GREEN – NEW LINK/CONNECTOR STRUCTURE

2.22 As a result of the new link/connector structure, Links 138 & 14 have had their behaviour changed from 'Left-Side Rule' to 'Urban (motorised)'.

2.23 Whilst the majority of the connectors have been kept as the default values for the lane change and emergency stop distances, there are some differences, as detailed in **Table 2.1**.

No.	Location	Emergency Stop	Lane Change
10160	A43 North - Exit	5m	130m
10164	A43 South - Exit	5m	150m
10011	Circulatory – Exit to B4100 East	50m	400m
10172	Circulatory – Exit to B4100 West	50m	400m
10169	Circulatory – South Section	5m	250m
10176	Circulatory – North Section	5m	300m
10170	B4100 East – Left	60m	200m
10171	B4100 East – Ahead	60m	200m
10179	B4100 West – Left	35m	200m

TABLE 2.1: NOTABLE CONNECTOR CHANGES

Desired Speeds & Reduced Speed Areas

2.24 On all four approaches, new desired speed decision markers have been included to account for the additional lanes on the approaches. The positions have been matched to NH's Do-Something 3 model and the speed on the approaches have been amended from 30mph to 40mph to match the NH model.

2.25 On all four approaches, the positions of the reduced speed areas (RSAs) have been adjusted to sit behind the signalised stop-lines. On the A43 North, B4100 East and A43 South approaches, additional RSAs have been added to account for the additional lanes.

Priority Rules & Conflict Areas

2.26 Following a visual assessment of the model with the future year traffic in place, it became quickly apparent that priority rules (PRs) were required to reduce instances of overlapping vehicles and to stop the roundabout locking up during busy periods. As a result, a large number of PRs have been included (No's 136-159, 181-201) around the junction, which feature a mix of gap times and headways, to produce an operation that would be representative of congested conditions.

2.27 Conflict Area No's 497, 476, 454 & 456 have been activated to reduce instances of overlapping vehicles.

Signal Heads & Detectors

2.28 New signal heads (No's 10-30) have been added at the locations of the proposed signalised stop-lines.

2.29 The detectors have been modified to match NH's Do-Something 3 model, as well as the updated MOVA Dataset (MDS) files (see **Figure 2.4**).



FIGURE 2.4: BAYNARD'S GREEN – DETECTOR LAYOUT

2.30 As a result of the changes made to some of the MOVA Datasets (see Section 2.19), the following changes to the detectors have also been made:

SC2 – Bay_NB_St1

- For Detector No. 10 – increased distance from stop-line from 14m to 20m (to account for different design and longer circulatory section)

SC3 – Bay_NB_St2

- Re-numbered detectors to suit updated MDS file
- For Detector No. 20, decreased length from stop-line from 20m to 17m (to account for different design and shorter circulatory section)

SC4 – Bay_SB_St1

- For Detector No's 1-9, updated these to be 1-10 to account for 'normal' traffic link (based on length of lanes shown on updated drawings)
- For Detector No. 10, increased length from stop-line from 9m to 18m (to account for different design and longer circulatory section)

SC5 – Bay_SB_St2

- Added Detector No's 13 and 16 to account for additional lane on approach

Vehicle Inputs, Routes & Parking Lots

2.31 No changes from previously validated base model.

Nodes

2.32 Node No. 1 has been re-sized to account for the increased number of lanes and length of flaring on the approaches. An Edge Selection exercise has also been undertaken to close off all unrealistic movements and U-turns.

Evaluation Markers

2.33 The queue markers have been updated to match the stop-lines on each approach

2.34 The travel time markers have been updated to match the base model as closely as possible.

Signal Controllers & MOVA Datasets – Padbury

Signal Controllers

2.35 To replicate the new Padbury signals in the Reference Case models, new signal controllers (No's 6 & 7) have been added to the 'Base Network' for the two streams.

2.36 Two new dummy links have also been added, with the relevant detectors added on each of the links for the appropriate signal controller (see **Figure 2.5**).

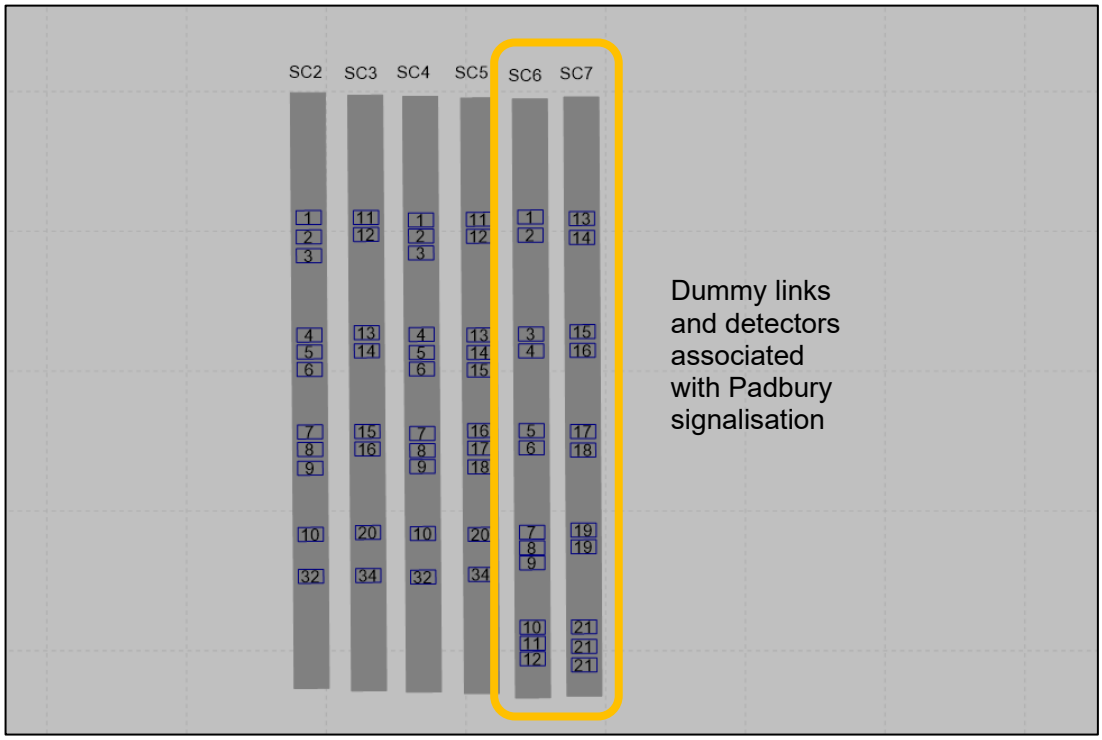


FIGURE 2.5: BASE NETWORK – DUMMY LINK & DETECTOR LAYOUT

2.37 As with the Baynard's Green signalisation, this approach has been taken as if you add or amend a PC MOVA controlled signalised junction in a modification file (for loading into a scenario), the changes do not show up when creating or editing a PC MOVA Connection file. This is because PC MOVA can only read the INP/INPX file (or 'Base Network' in Scenario Management) and not any associated Scenario or Modification files.

2.38 Modelling Group have prepared a note on the use of PC MOVA and Scenario Management, which can be found in **Appendix D**.

MOVA Datasets

2.39 The MOVA datasets used for the NH VISSIM modelling study at M40 J10 have been reviewed and the following changes have been made.

Padbury – Node 1

- Renamed 'M40J10SBslipST1' as 'Pad_S1'
- In MOVA Tools:
  - Set dataset name to 'Pad_S1'
  - Updated Design Diagram (see **Figure 2.6**)
  - Lanes – Lanes: Main – Lane 3 – updated short lane distance from 50m to 62m based on CAD drawing

Padbury – Node 2

- Renamed 'M40J10SBslipST2' as 'Pad_S2'
- In MOVA Tools:
  - Set dataset name to 'Pad_S2'
  - Updated Design Diagram (see **Figure 2.6**)

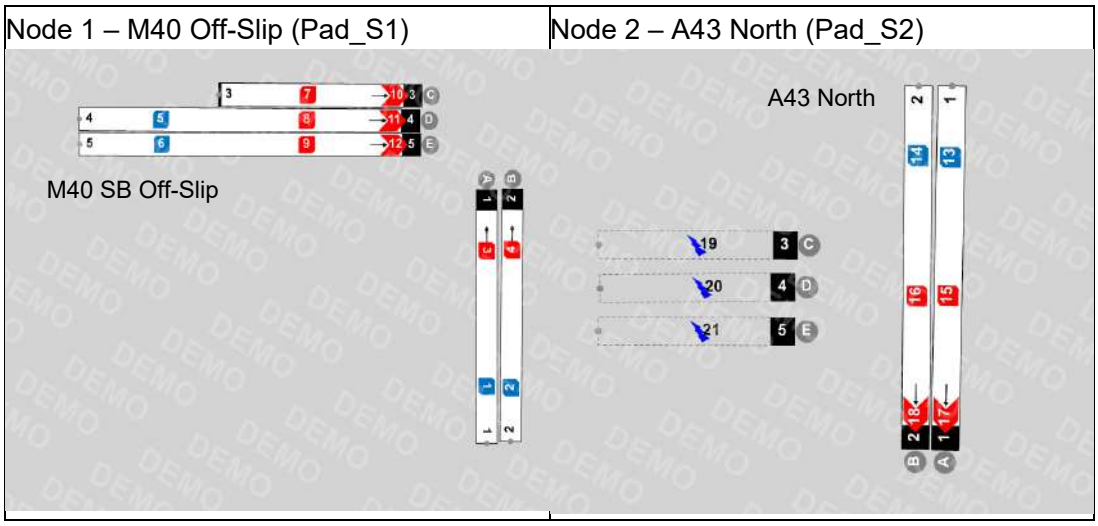


FIGURE 2.6: NODE 1 & 2 – UPDATED MOVA TOOLS DESIGN DIAGRAMS

Local Changes – Padbury

Links/Connectors

2.40 The roundabout has been subject to significant changes to the link/connector structure, as a result of the number of lanes and anticipated routing around the junction as shown by the lane markings. The new link structure in shown in **Figure 2.7**.

Normal Link View



Wireframe Link View

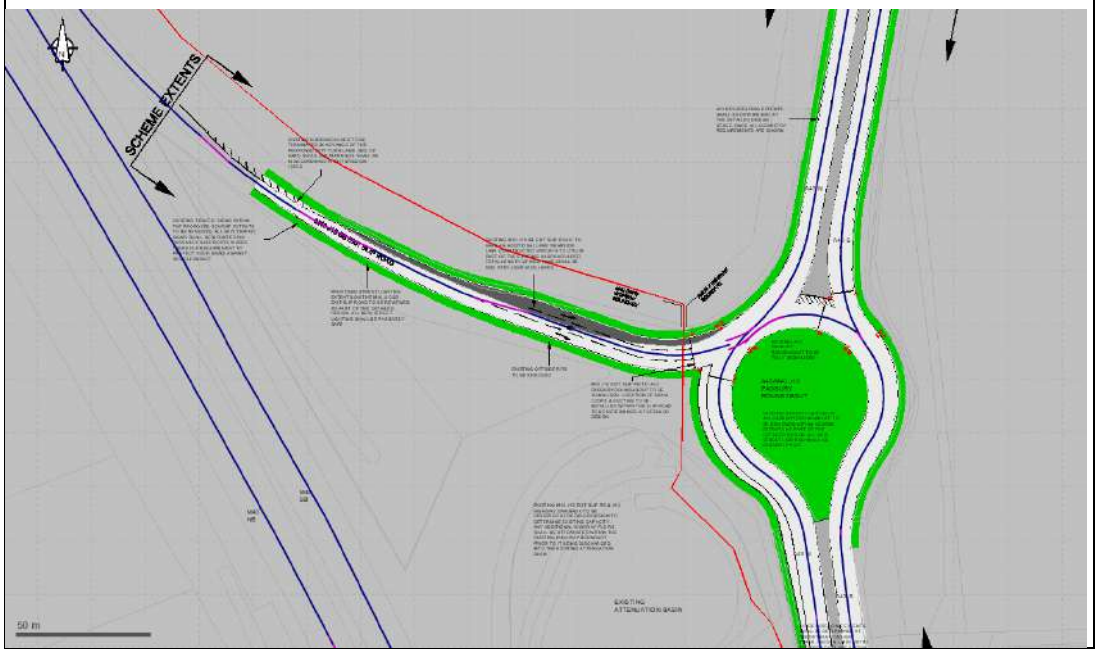


FIGURE 2.7: PADBURY – NEW LINK/CONNECTOR STRUCTURE

2.41 As a result of the new link/connector structure, Links/Connectors 10189, 158, 10190, 159, 10187, 156, 10191, 121 & 1033 have had their behaviour changed from 'Left-Side Rule' to 'Urban (motorised)'.

2.42 Whilst the majority of the connectors have been kept as the default values for the lane change and emergency stop distances, there are some differences, as detailed in **Table 2.2**.

No.	Location	Emergency Stop	Lane Change
10034	M40 SB Off-Slip – Left	30m	200m
10096	M40 SB Off-Slip - Right	20m	200m

TABLE 2.2: NOTABLE CONNECTOR CHANGES

Desired Speeds & Reduced Speed Areas

2.43 On the M40 SB Off-Slip and A43 North approaches, the desired speed decision markers have been repositioned to account for the signalised approaches and on the off-slip, the additional flaring. The positions have been matched to NH's Do-Something 3 model and the speed on the approaches have been amended from 30mph to 40mph to match the NH model.

2.44 On the M40 SB Off-Slip and A43 North approaches, the positions of the reduced speed areas (RSAs) have been adjusted to sit behind the signalised stop-lines. On the M40 SB Off-Slip, an additional RSA has been added for the additional lane. On the North circulatory section, RSA No. 115 has been reduced in length from 20m to 10m, repositioned to sit behind the stop-line and No. 137 has been added to Lane 2.

Priority Rules & Conflict Areas

2.45 Following a visual assessment of the model with the future year traffic in place, it became quickly apparent that priority rules (PRs) were required to reduce instances of overlapping vehicles. As a result, a large number of PRs have been included (No's 160-177) around the junction, which feature a mix of gap times and headways, to produce an operation that would be representative of congested conditions.

2.46 No Conflict Areas have been required to be activated, as the PRs are enough to reduce the instances of overlapping vehicles.

Signal Heads & Detectors

2.47 New signal heads (No's 31-39) have been added at the locations of the proposed signalised stop-lines.

2.48 The detectors have been modified to match NH's Do-Something 3 model (see **Figure 2.8**).

2.49



FIGURE 2.8: PADBURY – DETECTOR LAYOUT

Vehicle Inputs, Routes & Parking Lots

2.50 No changes from previously validated base model.

Nodes

2.51 Node No. 2 has been re-sized to account for the increased number of lanes and length of flaring on the approaches. An Edge Selection exercise has also been undertaken to close off all unrealistic movements and U-turns.

Evaluation Markers

2.52 The queue markers have been updated to match the stop-lines on each approach

Signal Controllers & MOVA Datasets – Cherwell

Signal Controllers

2.53 No changes have been made from the previously validated base model.

MOVA Datasets

2.54 The Cherwell MOVA Dataset (MDS), previously titled 'M40J10.mds' has been renamed 'Cherwell.mds' to distinguish between the other MDS files.

NH Do-Something 3 Set-Up

2.55 It was noted that in NH's Do-Something 3 model, the detector set-up had been changed from the previously validated base model. This also led to a different MDS file being used for the Cherwell junction.

2.56 It was noted in the Do-Something 3 model that there were two sets of detectors overlapping each other on the nearside lane on the A43 North approach. The corresponding MDS file also has four links and lanes for the A43 North approach. It is not clear why this has been done and there is no mention of this change in AECOM's '*M40 Junction 10 TN11 – VISSIM Forecasting Modelling*' note from March 2020. For this testing, the MDS file has been updated to include three links/lanes on the A43 North approach and the number of detectors has been amended to only have one set of detectors in the nearside lane. Further details on the differences can be found in **Appendix E**.

2.57 The new configuration was tested in the Reference Case model, but it became quickly apparent that this set-up was not suitable, as 20 minutes into the AM model warm up period, the queuing northbound from Cherwell had already extended back to the M40 NB Off-Slip approach (**Figure 2.9**) and by 0728hrs, this had extended back to the M40 mainline and was causing long queues on the B430 (**Figure 2.10**).

2.58 As such, the signal set-up for Cherwell has been kept as the validated base model set-up.

2.59



FIGURE 2.9: NORTHBOUND QUEUING – 20 MINUTES INTO AM WARM UP PERIOD

2.60



FIGURE 2.10: NORTHBOUND QUEUING – ~45 MINUTES INTO AM WARM UP PERIOD

Local Changes – Cherwell

Priority Rules

2.61 Priority Rule No. 178 has been added to reduce instances of overlapping between vehicles leaving Cherwell Services and vehicles queuing over the bridge to travel southbound.

Local Changes – Ardley

Priority Rules

2.62 Priority Rule No's 179 & 180 has been added to the M40 NB Off-Slip to reduce instances of overlapping between vehicles entering the roundabout and vehicles exiting to the B430.

Evaluation Markers

2.63 Two new sets of travel time markers have also been included in the model, along with the existing markers from the validated base model.

2.64 One set (No's 1001-1010) which correlates with the markers in AECOM's M40 J10 Study (for comparison) (see **Figure 2.11**) and one set (No's 2001-2081) which are from each O-D pair to allow the various scenario outputs to be compared (see **Figure 2.12**).

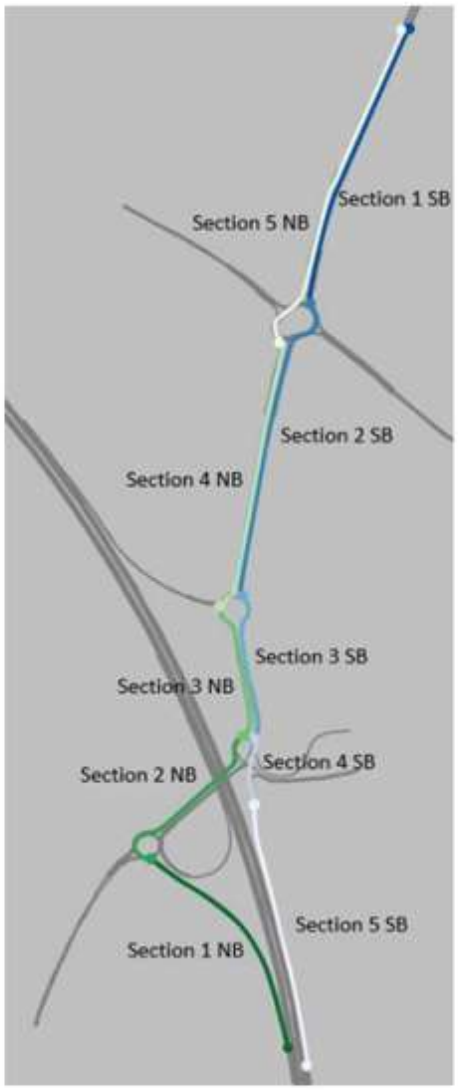


Figure 6. Locations of journey time route sections.

2.65

FIGURE 2.11: JOURNEY TIME SECTIONS – SET 1 – BASED ON AECOM TN

2.66

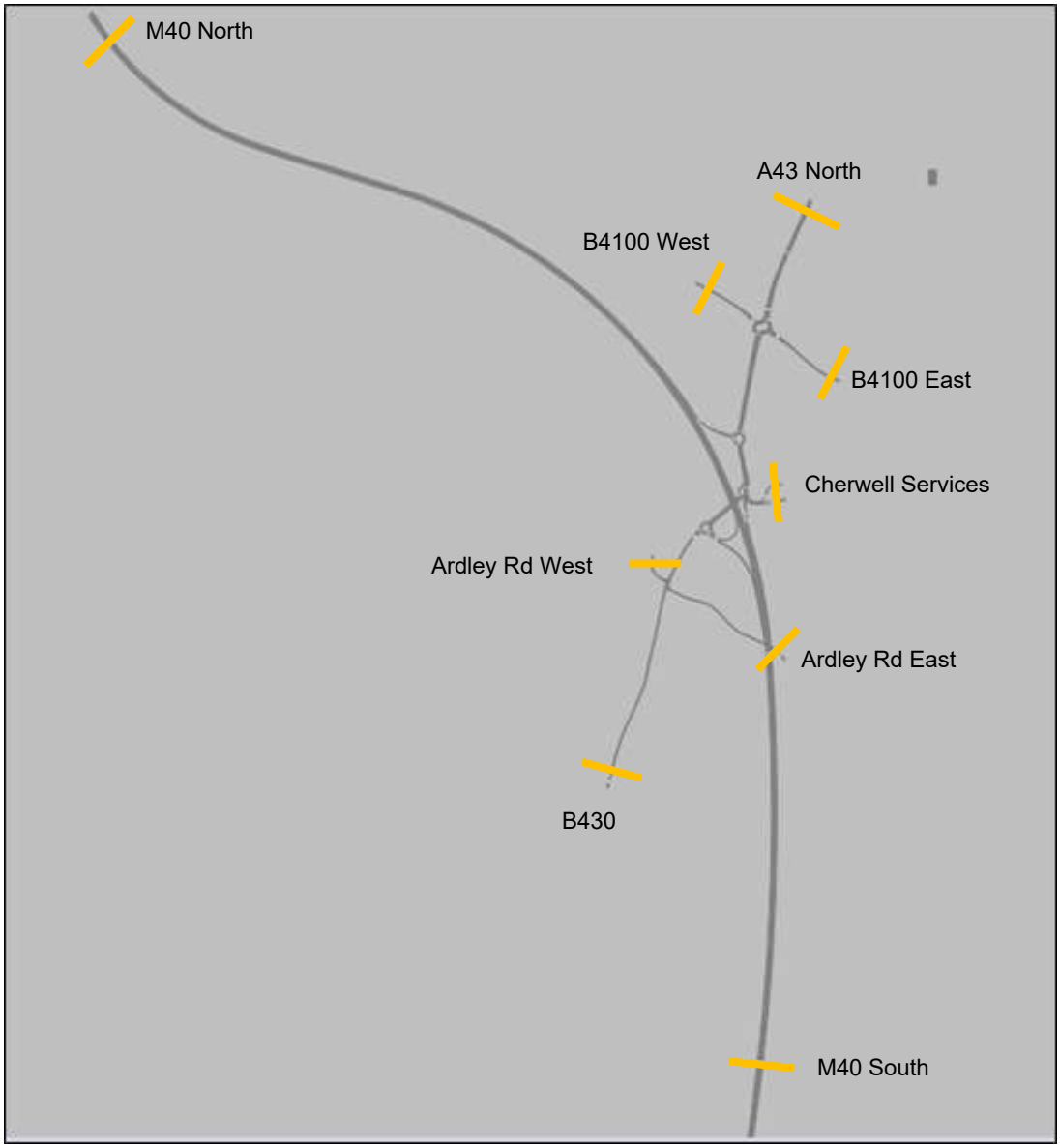


FIGURE 2.12: JOURNEY TIME SECTIONS – SET 2 – ZONE TO ZONE MARKERS

PC MOVA Connection File

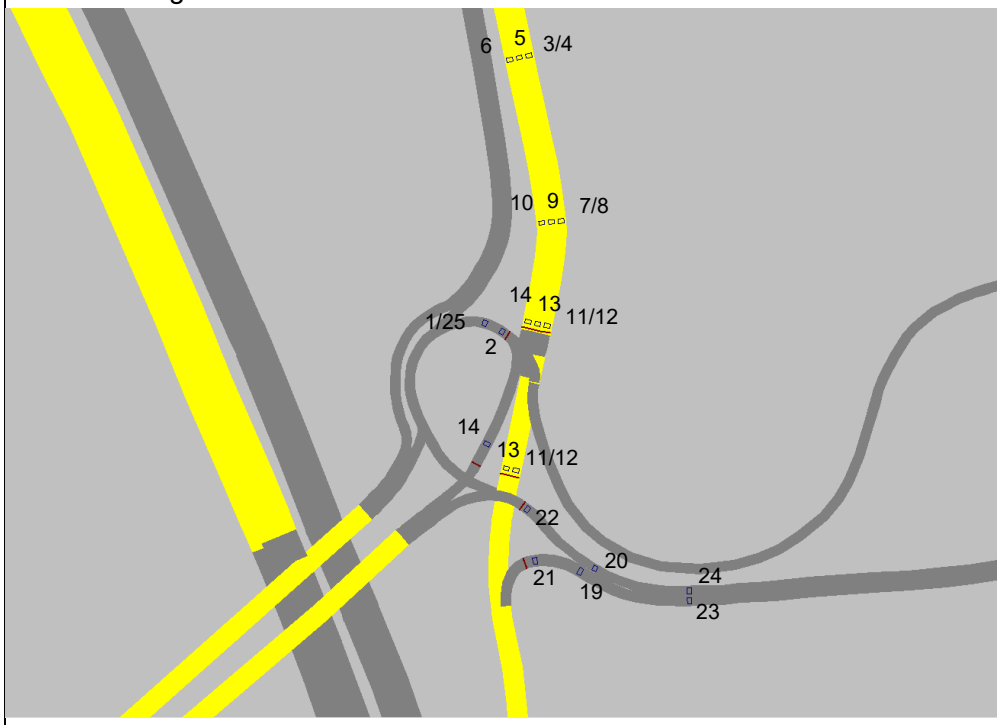
2.67 A new PC MOVA Connection File titled 'M40J10_RefCase.mvml' has been created, which accounts for the new signals at Baynard's Green and Padbury roundabouts.

2.68 As stated in paragraph 2.54, there were differences in the detector set up at the Cherwell junction between the validated base model and the Do-Something 3 model. However, the base model set-up has been retained as this did not cause the same immediate queuing issues northbound (**Figures 2.10 & 2.11**).

2.69 This has led to a slight difference in the PC MOVA Connection File set-up for the Cherwell junction.

2.70 The Detector Mapping differences are shown in **Figure 2.13 and 2.14,** whilst the Queue Detection differences are shown in **Figure 2.15**.

Do-Something 3 Model



Reference Case Model

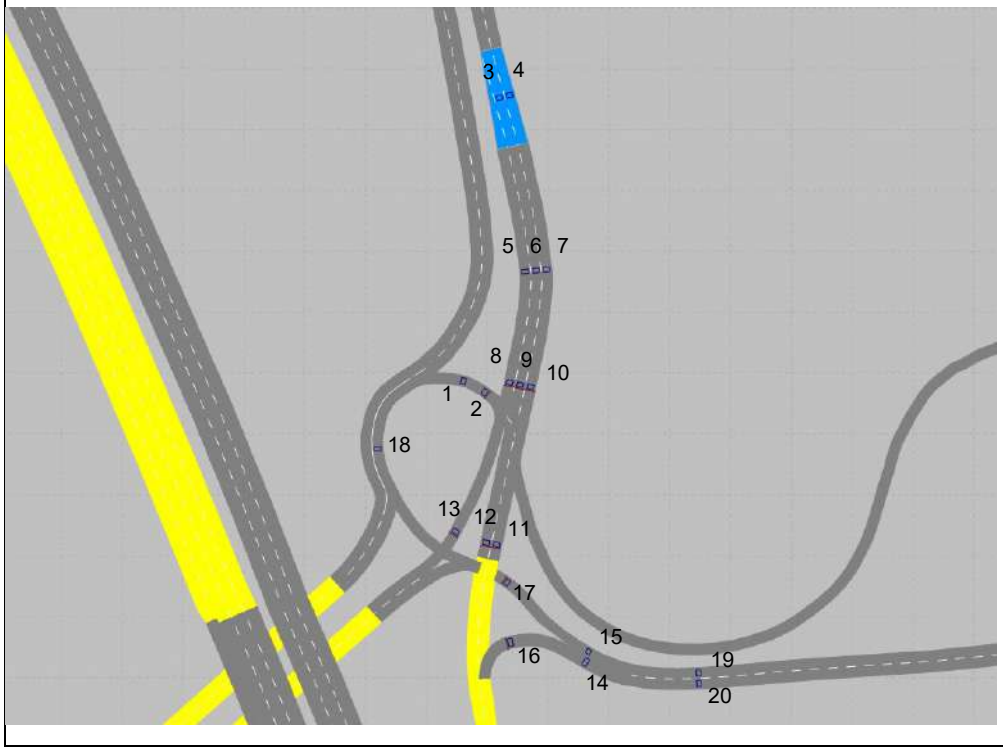
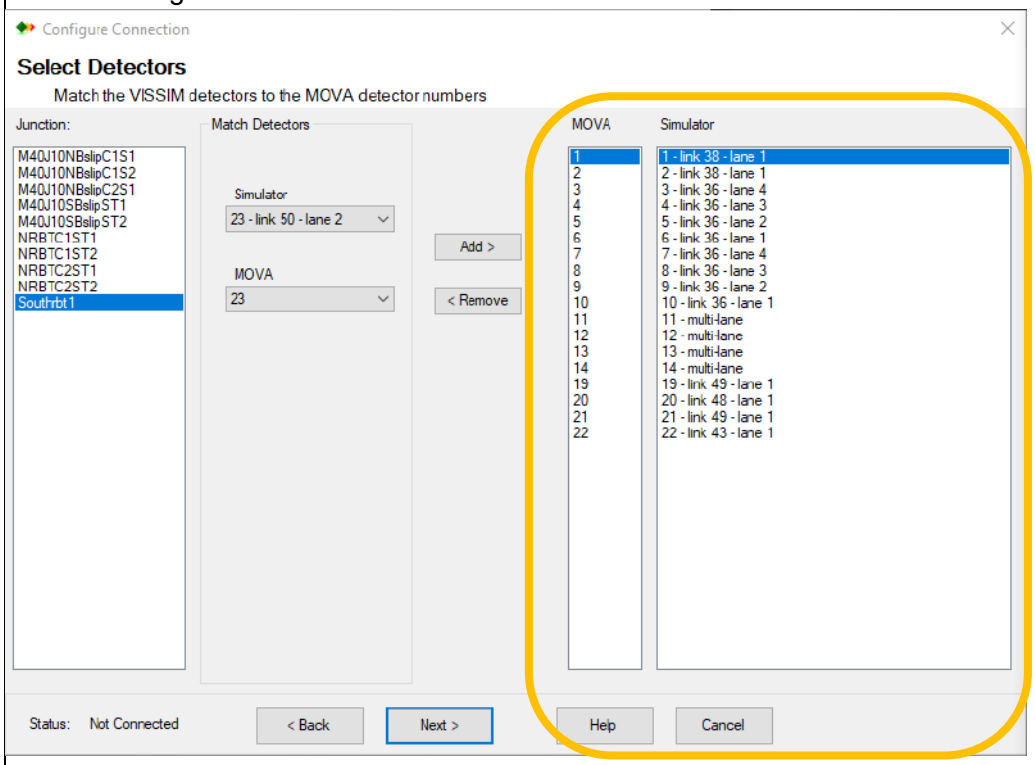


FIGURE 2.13: VISSIM MODELS – DETECTOR MAPPING DIFFERENCES

Do-Something 3 Model



Reference Case Model

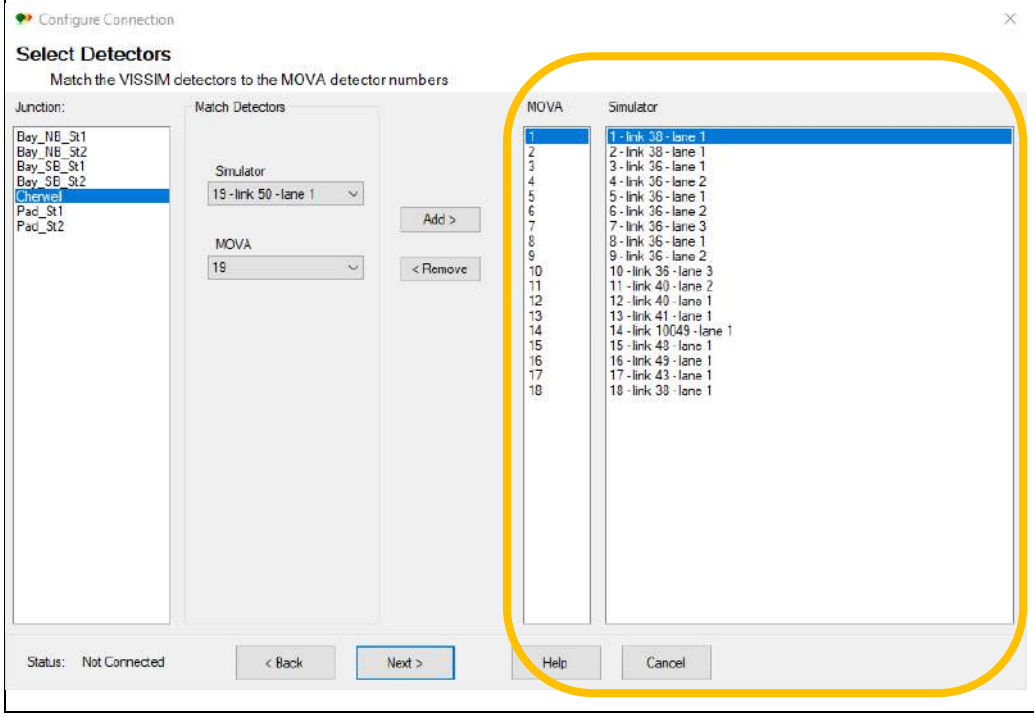
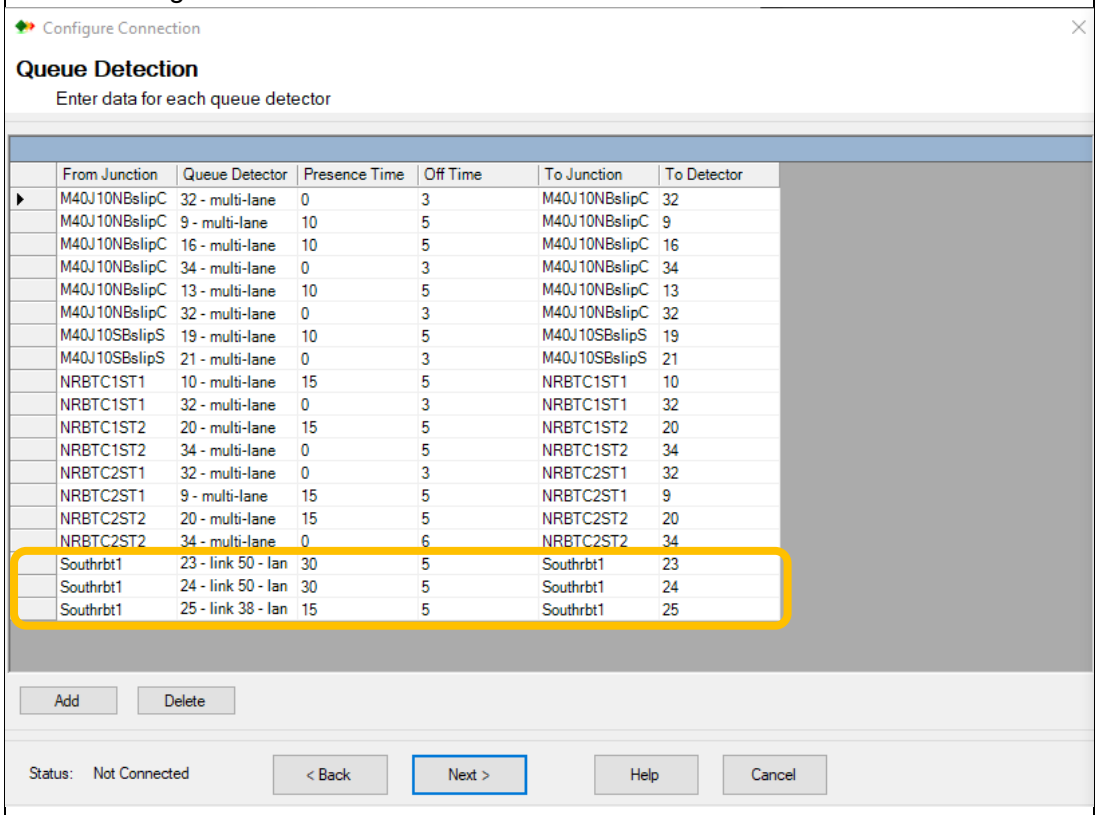


FIGURE 2.14: PC MOVA CONNECTION FILE – DETECTOR MAPPING DIFFERENCES

Do-Something 3 Model



Reference Case Model

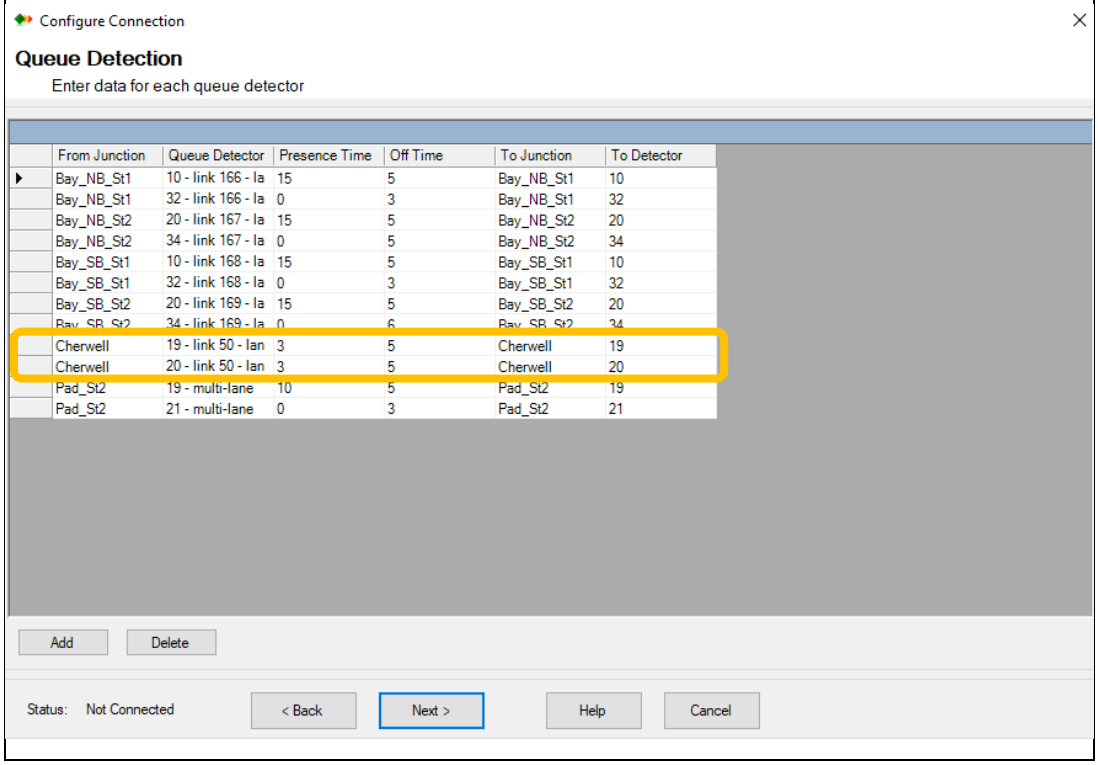


FIGURE 2.15: PC MOVA CONNECTION FILE – QUEUE DETECTION DIFFERENCES

2.71 **Figures 2.13** and **2.14** show the detector numbing in the models and also the mapping applied in the PC MOVA Connection File. The main difference between the two appears to be on the internal section from the A43 South, where Detector No. 18 in the Reference Case is grouped within the main detectors, whereas the Do-Something 3 model has Detector No. 25, which is classed as a queue detector.

2.72 As detailed in paragraph 2.65, the Do-Something 3 model also has two sets of detectors overlapping each other on the nearside lane on the A43 North approach. It is not clear why this has been done, but this explains for the additional detector numbers in comparison to the Reference Case model.

2.73 For the Queue Detection parameters (**Figure 2.15**), the main differences are:

- The presence times for the Cherwell Services detectors (No's 23 & 24 in the Do-Something 3 model and No's 19 & 20 in the Reference Case model). In the Reference Case model, the presence time has been kept as 3s, rather than 30s in the Do-Something model. It was felt that the smaller presence time was more beneficial as it gave the Services phases (and internal signal phase from the A43 South) more opportunity to be called and flush through more traffic travelling northbound (and accessing the Services).
- The only other difference was that the Do-Something 3 model had a queue detector for the internal link from the A43 South, whereas this was not included in the Reference Case model. However, the reduced presence time in the Reference Case model meant that this stage was called more often and mitigated against the lack of a queue detector.

3 SUMMARY

3.1 This Technical Note (TN) summarises the key changes made to the approved M40 J10 base VISSIM model to create the 2031 Reference Case models for the proposed Strategic Rail Freight Interchange (SRFI) known as Oxford SRFI.

3.2 All parameters and network elements amended have been listed, detailed and explained for auditing purposes.

4 APPENDIX A – REFERENCE CASE LOG

VISSIM Log – Oxford SRFI

17/05/21

Committed Infrastructure

Project Explorer

- Created new modification file – 'Committed Infrastructure' to add in committed schemes at Baynard's Green & Padbury roundabouts
- Created two new scenarios – '2026 Ref Case AM' and '2026 Ref Case PM', with Modification File 6 included.

MOVA Datasets – Baynard's Green

- Renamed 'NRBTC1ST1' as 'Bay_NB_St1'
- In MOVA Tools:
    - Set dataset name to 'Bay_NB_St1'
    - Updated Design Diagram

- Renamed 'NRBTC1ST2' as 'Bay_NB_St2'
- In MOVA Tools:
    - Set dataset name to 'Bay_NB_St2'
    - Updated Design Diagram
    - Detectors – Main Detectors – re-numbered the X and Stopline detectors to follow on from numbering of IN detectors.

- Renamed 'NRBTC2ST1' as 'Bay_SB_St1'
- In MOVA Tools:
    - Set dataset name to 'Bay_SB_St1'
    - Updated Design Diagram
    - Lanes – Lanes: Main – Lane 1 set at 'Short' lane. This has been updated to 'Normal' based on updated drawing.
    - Detectors – Main Detectors – to account for Lane 1 now being a 'Normal' lane, added IN Det 1 to this lane and subsequently updated the rest of the detector numbering to follow-on.
    - E/P – Emergency/Priority: Links – updated EP1 detector number from 9 to 10

- Renamed 'NRBTC2ST2' as 'Bay_SB_St2'
- In MOVA Tools:
    - Set dataset name to 'Bay_SB_St2'
    - Updated Design Diagram
    - Signals
        - Phases – Added a new Phase to account for new Link
        - Stages – Updated to include Phase C in Stage 2 (out of Stage 1) and added Phase F to Stage 1
    - Links – Links: Main
        - Added a new Link 1 to account for 3 lane approach, based on updated drawing

        - Updated Phases to suit additional lane
    - Lanes – Lanes: Main
        - Set Lane 1 to 'Short' lane, with a distance of 87m, based on updated drawing.
        - Lanes 2 and 3 – set Lane Weighting factor to 6 instead of 1 (similar to Pad_St1)
    - Detectors – Main Detectors
        - Lanes 2 and 3 – Det no's 11 & 12 – updated distance from 100m to 94m
        - Lane 1
            - removed ALT-UP Detector No. 11 being configured (short lane)
            - Updated X and Stopline detector numbers (to no's 13 and 16 respectively)
    - SD Codes – Set to 1 for Links 4-6 in Stage 1 and 1-3 in Stage 2
        - – to account for Lane 1 now being a 'Normal' lane, added IN Det 1 to this lane and subsequently updated the rest of the detector numbering to follow-on.
    - E/P – Emergency/Priority: Links – updated EP1 detector number from 9 to 10

<u>MOVA Datasets - Padbury</u>

- Renamed 'M40J10SBslipST1' as 'Pad_S1'
- In MOVA Tools:
    - Set dataset name to 'Pad_S1'
    - Updated Design Diagram
    - Lanes – Lanes: Main – Lane 3 – updated short lane distance from 50m to 62m based on CAD drawing

- Renamed 'M40J10SBslipST2' as 'Pad_S2'
- In MOVA Tools:
    - Set dataset name to 'Pad_S2'
    - Updated Design Diagram

<u>MOVA Dataset – Cherwell</u>

- Renamed 'M40J10' mds file to 'Cherwell' to distinguish between other mds files

<u>Base Network</u>

Signal Controllers

- Created No's 2, 3, 4, & 5 to model the four streams at Baynard's Green roundabout
- Created No's 6 & 7 to model the two streams at Padbury roundabout

Dummy Link & Detectors

- Set up 6 dummy links to include all of the detectors associated with SC 2-7. This is to allow the detectors to be mapped in PC MOVA from VISSIM.

Modification 6

Background Images

- Added *'HE604237-KIER-GEN-M40_JN10_Z-DR-Z-0100_02 - 03.dwg'* and repositioned to suit model location

Baynard's Green Roundabout

Links/Connectors

- Updated link/connector structure to suit drawing. Deleted a lot of the connectors and created new ones as a result of the changes to link lengths and positions.
- Links 138, 14 – changed behaviour from 'Left Side Rule' to 'Urban (motorised)'.
- Connector 10160 – adjusted lane change from 200m to 130m
- Connector 10158 – adjusted lane change from 200m to 180m
- Connector 10164 – adjusted lane change from 200m to 150m

Desired Speed Decisions

A43 North

- No's 20 & 21 – repositioned further back from stopline as a result of 3 lane, signalised approach. Created new marker for Lane 3 (No. 133). Adjusted speeds from 30mph to 40mph to match HE model.
- For exit, created new marker for Lane 3 (No. 135).

B4100 East

- No's 24 & 88 – repositioned & created new marker for Lane 3 (No. 134). Adjusted speeds from 30mph to 40mph to match HE model.
- No. 91 – repositioned as close to original position as possible, added new markers for Lanes 2 and 3 (No's 136 & 137).
- No. 46 – repositioned as close to original position as possible, added new marker for Lane 2 (No 138).

A43 South

- No's 25 & 26 – repositioned further back from stopline as a result of 3 lane, signalised approach. Created new marker for Lane 3 (No. 139). Adjusted speeds from 30mph to 40mph to match HE model.
- For exit, created new marker for Lane 3 (No. 140).

B4100 West

- No's 22 & 23 – repositioned. Adjusted speeds from 30mph to 40mph to match HE model.
- No. 47 – repositioned as close to original position as possible
- No. 90 – repositioned as close to original position as possible, added new marker for Lane 2 (No 141).

Reduced Speed Areas

- Adjusted RSAs on approaches – kept lengths the same, but adjusted positions to sit behind signal stopline. Added additional RSAs on A43 North, B4100 East & A43 South due to increased no. of lanes (No's 133, 134, 135)

Conflict Areas

- Deactivated all conflict areas – will review need for activating once future year flows are added and model is running

Priority Rules

- Deleted all PRs around Baynards as junction is now signalised – will review need for PRs once future year flows are added and model is running

Signal Heads

- Added No's 10-30 to model signal heads at Baynard's Green

Detectors

- Added detector mapping to match HE model and MDS files (det no's 21-73). Where difference between model and MDS file, used MDS file distances.
- SC2 – Bay_NB_St1
    - For detector no's 10 – increased distance from stop-line from 14m to 20m (to account for different design and longer circulatory section)
- SC3 – Bay_NB_St2
    - Re-numbered detectors to suit updated MDS file
    - for detector no. 20, decreased length from stop-line from 20m to 17m (to account for different design and shorter circulatory section)
- SC4 – Bay_SB_St1
    - For detector no's 1-9, updated these to be 1-10 to account for 'normal' traffic link (based on length of lanes shown on updated drawings)
    - For detector no 10, increased length from stop-line from 9m to 18m (to account for different design and longer circulatory section)
- SC5 – Bay_SB_St2
    - Added detector no's 13 and 16 to account for additional lane on approach

Nodes

- Adjusted position of Node 1 to account for increased number of lanes and length of flaring on approaches
- Undertook Edge Selection to close all unrealistic turns

Vehicle Travel Times

- Updated to match existing model as close as possible

Queue Counters

- Updated to match stop-line locations on each approach

Padbury Roundabout

Links/Connectors

- Updated link/connector structure to suit drawing. Deleted a lot of the connectors and created new ones as a result of the changes to link lengths and positions.
- On M40 SB off-slip, adjusted behaviour on approach from 'Left Side Rule' to 'Urban (motorised)' for links/connectors 10189, 158, 10190, 159, 10187, 156, 10191, 121 &10033.

Desired Speed Decisions

A43 North

- No's 27 & 28 – repositioned further back from stopline as a result of signalised approach.

M40 SB Off-Slip

- No. 87 – repositioned 40mph slightly further back to account for additional flaring on approach.
- No's 33 & 142 – tried to retain in position of base model

Reduced Speed Areas

- On A43 approach, kept length the same, but adjusted positions to sit behind signal stopline.
- On A43 South, kept RSAs as base model
- On M40 SB off-slip, kept length the same, but adjusted positions to sit behind signal stopline, added No. 136 for Lane 3
- On North circulatory, reduced length from 20m to 10m, adjusted positions to sit behind signal stopline, added No. 137 for Lane 2.

Conflict Areas

- Deactivated all conflict areas – will review need for activating once future year flows are added and model is running

Priority Rules

- Deleted all PRs around Padbury as junction is now signalised – will review need for PRs once future year flows are added and model is running

Signal Heads

- Added No's 31-39 to model signal heads at Padbury

Detectors

- Added detector mapping to match HE model (det no's 74-96)

Nodes

- Adjusted position of Node 2 to account for increased number of lanes and length of flaring on approaches
- Undertook Edge Selection to close all unrealistic turns and U-turns

Queue Counters

- Updated to match stop-line locations on each approach

PC MOVA Connection File

Created new connection file to account for committed schemes at Baynards Green and Padbury.

For Cherwell junction, some differences between Base & DS3 in terms of detector numbering and queue detection parameters. For now, kept as existing base model, but can review when model is running. Main difference is Presence Time (3s vs. 30s) for Dets 19/20 (23/24) and no queue detection for No. 18 in Base (but parameters for No. 25 in DS3)

19/05/21

2026 Reference Case Flows

Project Explorer

- Created two new modification files (No's 7 & 8) – '2026 AM Ref Case Flows' and '2026 PM Ref Case Flows'
- Created two new scenarios – 'SC3 - 2026 Ref Case AM' and 'SC4 - 2026 Ref Case PM', with Modification Files 6, 7 and 6, 8 included.

01/06/21

Modification 6

Links/Connectors

- Connector 10011 (Bay Green – Exit to B4100 East)
    - increased lane change distance from 200m to 400m
    - increased emergency stop from 5m to 50m
-
- Connector 10158 (Bay Green – B4100 East Exit) – adjusted lane change from 180m to 200m
- Connector 10172 (Bay Green – Exit to B4100 West)
    - adjusted lane change from 200m to 400m
    - increased emergency stop from 5m to 50m
- Connector 10169 (Bay Green – South Circ) – increased lane change distance from 200m to 250m
- Connector 10176 (Bay Green – North Circ) – increased lane change distance from 200m to 250m

Priority Rules

- Added No. 135

Conflict Areas

- Activated conflict areas 418, 429, 476, 481 & 541

06/07/21

Changes following 2031 Ref Case Visual Assessment

Modification 6

Priority Rules

- Added No's 136-180, 181-201
- Updated No's 49, 50, 7, 8

Conflict Areas

- Activated No's 456, 454
- De-activated No's 429, 541, 481, 418

Links/Connectors

- No. 10170 (Bay Green – B4100 East approach – Left Turn) – emergency stop changed from 5m to 60m
- No. 10171 (Bay Green – B4100 East approach – Ahead) – emergency stop changed from 5m to 60m
- No. 10179 (Bay Green – B4100 West approach – Left Turn) – emergency stop changed from 5m to 35m
- No. 10034 (Pad – M40 SB off-slip – Left) – emergency stop changed from 5m to 30m
- No. 10096 (Pad – M40 SB off-slip – Right) – emergency stop changed from 20m to 30m

Cherwell Junction – DS3 MOVA Set-Up

Introduction

Produced separate version of Ref Case with signal set-up at Cherwell as per DS3 model. The changes of this are detailed below.

MOVA Datasets – Cherwell

- Took copy of 'Southrbt1' from DS3 folder and renamed as 'Cherwell_v2'
- In MOVA Tools:
    - Set dataset name to 'Cherwell_v2'
    - Updated Design Diagram
    - Deleted Lane/Link No. 2 – unclear as to why 4 lanes modelled on A43 North, when have 3 lanes in model/on drawings – see 'Cherwell - MDS Changes - Ref Case' doc.
    - Re-numbered Links and Lanes to remove error of needing consecutive numbering.

Cherwell

Detectors

Adjusted detector mapping to suit new layout in 'Design Diagram' in updated MDS file.

Base Network

Signal Controllers

- Created SC8 – 'Cherwell – FY Ref Case' and added dummy link with detectors for linking to new PC MOVA connection file.

PC MOVA Connection File

- Created new connection file to account for committed schemes at Baynards Green and Padbury.
- For Cherwell junction, used set-up as provided in DS3 model. This takes into account removal of previous Link/Lane 2.

Modification 6

Signal Controllers

- For SC1 – made this 'inactive' so that PC MOVA would not cause an error when starting up

Signal Heads & Detectors

- For signal heads and detectors previously assigned to SC1, these have now been assigned to SC8.

Conclusions

Signal operation improved for southbound movement, but this is counteracted with queues quickly reaching mainline on northbound off-slip. This appears to be due to set-up not being responsive enough. Have reverted back to Base set-up for initial model convergence and results runs.



09/07/21

Journey Time Markers

- Added No's 1001-1010 to match HE JT routes from reporting TN
- Added No's 2001-2081 to cover all O-D pairs (in case needed for wider assessment)

Priority Rules

- Added No's 181-201

Conflict Areas

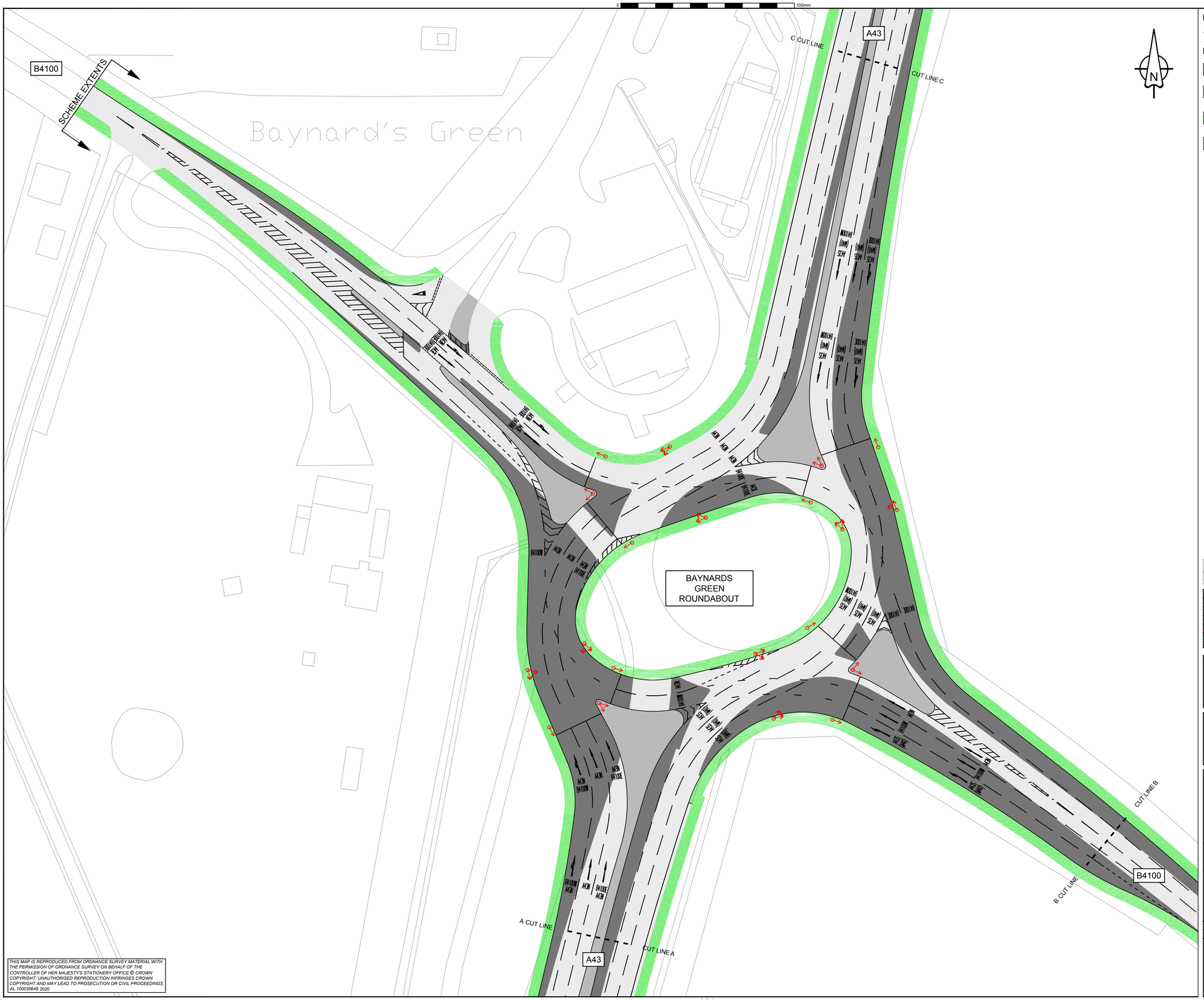
- De-activated No's 429, 541, 481, 418

Links/Connectors

- No. 10176 (Bay Green – North Circ) – lane change increased from 250m to 300m

5 APPENDIX B – BAYNARD'S GREEN & PADBURY ROUNDABOUT IMPROVEMENTS

0 100mm



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NOTES:

1. ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE STATED.

KEY:

- PROPOSED CARRIAGEWAY WIDENING WORKS.
- PROPOSED SPLITTER ISLANDS AND HARDSTANDING AREAS.
- VERGE.
- EXISTING CARRIAGEWAY, AREA TO REMAIN WITHIN EXTENTS OF WIDENING WORKS.
- PROPOSED TRAFFIC SIGNALS

REV	DETAILS	CHKD	APPD	DATE

DRAWN : ADB		DRAWING STATUS:	
DESIGN : ADB		WORK IN PROGRESS	✓
CHKD :		PRELIMINARY DRAWING	
APPD :		EXTERNAL ISSUE	
DATE :		AS-BUILT	
SUITABILITY : S0		NOT FOR ISSUE	

CLIENT:

highways england

AGENT

KIER

SCHEME NAME

M40 J10 IMPROVEMENT SCHEME

DRAWING TITLE

BAYNARDS GREEN ROUNDABOUT
GENERAL ARRANGEMENT
SHEET 1 OF 2

ORIG DRAWING SIZE : A1	DIMENSIONS : m
COPYRIGHT © KIER	SCALE : 1:500

DRAWING NUMBER

PROJECT	ORIGINATOR	VOLUME	SCHEME REFERENCE No.
HE604237	KIER	GEN	2170038

LOCATION	TYPE	ROLE	NUMBER	REVISION
M40_JN10_Z	DR	CH	0100_02	-

File ref - n:\s278 schemes\604237 - s278 m40 j10 baynards green\03 drawings\01 - live drawings\gen\ga.dwg Plotted 31.03.2020 by Antbenne

0 100mm

N

SCHEME EXTENTS

SCHEME EXTENTS

EXISTING HARDSHOULDER TO BE TERMINATED IN ADVANCE OF THE PROPOSED LEFT TURN LANE. END OF HARD SHOULDER MARKINGS SHALL BE IN ACCORDANCE WITH TSRGD DIA 1040.5

EXISTING TRAFFIC SIGNS WITHIN THE PROPOSED SCHEME EXTENTS TO BE REMOVED. ALL NEW TRAFFIC SIGNS SHALL BE MOUNTED ON PASSIVELY SAFE POSTS WHERE THERE IS A REQUIREMENT TO PROTECT SUCH SIGNS AGAINST VEHICLE IMPACT

M40 J10 SB EXIT SLIP ROAD

PROPOSED STREET LIGHTING EXTENTS ON THE M40 J10 SB EXIT SLIP ROAD TO BE REVIEWED AS PART OF THE DETAILED DESIGN. ALL NEW STREET LIGHTING SHALL BE PASSIVELY SAFE

EXISTING M40 J10 SB EXIT SLIP ROAD TO HAVE AN ADDITIONAL LANE NEARSIDE LANE CONSTRUCTED WHICH IS TO UTILISE PART OF THE EXISTING HARDSHOULDER. TOTAL LENGTH OF NEW LANE SHALL BE 80M, WITH 3.65M WIDE LANES

M40 DBFO HIGHWAY BOUNDARY

AREE 7 HIGHWAY BOUNDARY

EXISTING OFFSIDE RRS TO BE REMOVED

M40 J10 EXIT SLIP RD TO A43 PADBURY ROUNDABOUT TO BE SIGNALISED. LOCATION OF MOVA LOOPS & DUCTING TO BE INSTALLED WITHIN THE SLIP ROAD TO BE DETERMINED AT DETAILED DESIGN

A43 RESURFACING EXTENTS SHALL BE DETERMINED AT THE DETAILED DESIGN STAGE, ONCE ALL GEOMETRY REQUIREMENTS ARE KNOWN

A43 N

A43 S

EXISTING A43 PADBURY ROUNDABOUT TO BE FULLY SIGNALISED

A43/M40 J10 PADBURY ROUNDABOUT

EXISTING STREET LIGHTING AT A43 PADBURY ROUNDABOUT TO BE REVIEWED WITHIN SCHEME EXTENTS AS PART OF THE DETAILED DESIGN. ALL NEW STREET LIGHTING SHALL BE PASSIVELY SAFE

M40 SB

M40 NB

EXISTING M40 J10 EXIT SLIP RD & A43 HIGHWAY DRAINAGE TO BE REVIEWED AT DETAILED DESIGN TO DETERMINE EXISTING CAPACITY. ANY ADDITIONAL HIGHWAY FLOWS SHALL BE ATTENUATED WITHIN THE EXISTING HIGHWAY BOUNDARY PRIOR TO IT BEING DISCHARGED INTO THE EXISTING ATTENUATION BASIN

EXISTING ATTENUATION BASIN

A43 N

A43 S

A43 RESURFACING EXTENTS SHALL BE DETERMINED AT THE DETAILED DESIGN STAGE, ONCE ALL GEOMETRY REQUIREMENTS ARE KNOWN

SCHEME EXTENTS

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NOTES:

1. ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE STATED.

KEY:

- PROPOSED CARRIAGEWAY WIDENING WORKS.
- PROPOSED SPLITTER ISLANDS AND HARDSTANDING AREAS.
- EXISTING VERGE.
- EXISTING CARRIAGEWAY, AREA TO REMAIN WITHIN EXTENTS OF WIDENING WORKS.
- PROPOSED TRAFFIC SIGNALS
- HIGHWAYS ENGLAND MAINTENANCE BOUNDARY

REV	DETAILS	CHKD	APPD	DATE

DRAWN : JSL		DRAWING STATUS:	
DESIGN : ADB		WORK IN PROGRESS	✓
CHKD :		PRELIMINARY DRAWING	
APPD :		EXTERNAL ISSUE	
DATE :		AS-BUILT	
SUITABILITY: S0		NOT FOR ISSUE	

CLIENT: highways england

AGENT: KIER

SCHEME NAME
M40 J10 IMPROVEMENT SCHEME

DRAWING TITLE
PADBURY ROUNDABOUT
GENERAL ARRANGEMENT

ORIG DRAWING SIZE : A1	DIMENSIONS : m
COPYRIGHT © KIER	SCALE : 1:500

DRAWING NUMBER

PROJECT	ORIGINATOR	VOLUME	SCHEME REFERENCE No.
HE604237	KIER	GEN	2170038

LOCATION	TYPE	ROLE	NUMBER	REVISION
M40_JN10_Z	DR	CH	0100_04	-

6 APPENDIX C – 2031 FLOW CALCULATIONS

2031 REFERENCE CASE CALCULATIONS - AM PEAK

STEP 1 - TRANSLATE ADC FLOWS TO VISSIM ZONES (MOVE Z10 to Z5)

0645-0745

Lights

	1	2	3	4	5	6	7	8	9	Total
1	0	416	55	1092	570	33	44	11	90	2311
2	350	0	0	6	27	149	210	1	4	747
3	32	22	0	164	52	64	9	1	8	352
4	699	6	173	40	30	2576	34	1	7	3566
5	122	0	16	38	48	247	12	48	151	650
6	39	241	145	3212	178	14	11	3	28	3871
7	36	180	1	68	11	1	0	0	2	299
8	12	1	1	4	26	20	1	0	189	254
9	28	3	4	8	10	48	3	17	0	121
Total	1318	885	395	4632	904	3152	324	82	479	12173

HGVs

	1	2	3	4	5	6	7	8	9	Total
1	0	13	13	215	11	7	5	0	0	264
2	13	0	0	3	0	4	12	0	0	33
3	10	0	0	55	0	24	2	0	0	91
4	150	0	28	4	9	400	8	0	0	599
5	28	0	3	6	0	7	3	1	0	48
6	12	12	37	671	5	1	0	0	0	738
7	8	8	0	13	0	0	1	0	0	30
8	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0
Total	221	33	81	967	25	443	31	1	0	1802

Total

	1	2	3	4	5	6	7	8	9	Total
1	0	429	68	1307	581	40	49	11	90	2575
2	363	0	0	9	27	153	223	1	4	779
3	42	22	0	219	52	88	11	1	8	443
4	849	6	201	44	39	2976	42	1	7	4165
5	150	16	19	44	0	254	15	49	151	698
6	51	253	182	3883	183	15	11	3	28	4609
7	44	188	1	81	11	1	1	0	2	329
8	12	1	1	4	26	20	1	0	189	254
9	28	3	4	8	10	48	3	17	0	121
Total	1539	918	476	5599	929	3595	355	83	479	13973

0745-0845

Lights

	1	2	3	4	5	6	7	8	9	Total
1	0	402	64	1083	436	76	46	9	77	2193
2	318	0	11	10	14	161	288	0	2	804
3	46	4	0	195	46	113	1	1	8	414
4	856	8	157	36	41	2784	53	1	8	3944
5	141	19	22	33	0	232	16	48	151	662
6	51	238	151	2844	235	13	10	6	42	3570
7	50	252	1	88	9	1	1	0	2	404
8	12	2	2	3	26	19	1	0	189	254
9	10	4	4	7	10	45	4	17	0	121
Total	1504	909	412	4299	817	3444	420	82	479	12366

HGVs

	1	2	3	4	5	6	7	8	9	Total
1	0	424	84	1284	466	82	58	9	77	2478
2	334	0	11	10	14	168	297	0	2	836
3	62	4	0	245	47	129	2	1	8	498
4	977	8	184	38	49	3091	58	1	8	4414
5	162	19	22	42	0	243	25	49	151	713
6	59	234	185	3318	245	13	15	6	42	4117
7	61	274	1	99	9	1	1	0	2	448
8	12	2	2	3	26	19	1	0	189	254
9	10	4	4	7	10	45	4	17	0	121
Total	1697	969	497	5046	866	3791	461	83	479	13879

STEP 2 - CONVERT TO 15 MIN MATRICES USING 2016 BASE PROPORTIONS

LIGHTS

Time Period	Total	Overall Total	Proportion
0645-0700	2121	8892	24%
0700-0715	2217	8892	25%
0715-0730	2383	8892	27%
0730-0745	2271	8892	25%
			100%

HEAVIES

Time Period	Total	Overall Total	Proportion
0645-0700	2548	9302	27%
0700-0715	2432	9302	26%
0715-0730	2236	9302	24%
0730-0745	2096	9302	23%
			100%

LIGHTS

Time Period	Total	Overall Total	Proportion
0745-0800	2548	9302	27%
0800-0815	2432	9302	26%
0815-0830	2226	9302	24%
0830-0845	2096	9302	23%
			100%

HEAVIES

Time Period	Total	Overall Total	Proportion
0745-0800	372	1397	27%
0800-0815	348	1397	25%
0815-0830	364	1397	26%
0830-0845	313	1397	22%
			100%

LIGHTS

Time Period	Total	Overall Total	Proportion
0845-0900	1978	9302	21%
0900-0915	1825	9302	20%
			41%

Used peak total to determine proportions for cool down period

HEAVIES

Time Period	Total	Overall Total	Proportion
0845-0900	345	1397	25%
0900-0915	345	1397	25%
			49%

Used peak total to determine proportions for cool down period

LIGHTS

0645-0700

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	98	13	258	134	8	10	3	21	**545**
2	83	0	0	1	6	35	50	0	1	**176**
3	8	5	0	39	12	15	2	0	2	**83**
4	165	1	41	9	7	608	8	0	2	**841**
5	29	4	4	9	0	58	3	11	36	**153**
6	9	57	34	758	42	3	3	1	7	**913**
7	8	42	0	16	3	0	0	0	0	**71**
8	3	0	0	1	6	5	0	0	45	**60**
9	7	1	1	2	2	11	1	4	0	**29**
TOTAL		**311**	**209**	**93**	**1093**	**213**	**743**	**76**	**19**	**113**	**2871**

0700-0715

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	103	14	269	141	8	11	3	22	**570**
2	86	0	0	1	7	37	52	0	1	**184**
3	8	5	0	40	13	16	2	0	2	**87**
4	172	1	43	10	7	635	8	0	2	**879**
5	30	4	4	9	0	61	3	12	37	**160**
6	10	59	36	792	44	3	3	1	7	**954**
7	9	44	0	17	3	0	0	0	0	**74**
8	3	0	0	1	6	5	0	0	47	**63**
9	7	1	1	2	2	12	1	4	0	**30**
TOTAL		**325**	**218**	**97**	**1142**	**223**	**777**	**80**	**20**	**118**	**3001**

0715-0730

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	110	15	289	151	9	12	3	24	**612**
2	93	0	0	2	7	39	56	0	1	**198**
3	8	6	0	43	14	17	2	0	2	**93**
4	185	2	46	11	8	683	9	0	2	**945**
5	32	4	4	10	0	65	3	13	40	**172**
6	10	64	38	851	47	4	3	1	7	**1026**
7	10	48	0	18	3	0	0	0	1	**79**
8	3	0	0	1	7	5	0	0	50	**67**
9	7	1	1	2	3	13	1	5	0	**32**
TOTAL		**349**	**235**	**105**	**1228**	**240**	**835**	**86**	**22**	**127**	**3226**

0730-0745

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	105	14	276	144	8	11	3	23	**584**
2	88	0	0	2	7	38	53	0	1	**189**
3	8	6	0	41	13	16	2	0	2	**89**
4	177	2	44	10	8	651	9	0	2	**901**
5	31	4	4	10	0	62	3	12	38	**164**
6	10	61	37	811	45	4	3	1	7	**978**
7	9	45	0	17	3	0	0	0	1	**76**
8	3	0	0	1	7	5	0	0	48	**64**
9	7	1	1	2	3	12	1	4	0	**31**
TOTAL		**333**	**224**	**100**	**1170**	**228**	**796**	**82**	**25**	**121**	**3074**	**12171**	Y

0745-0800

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	110	18	297	119	21	13	2	21	**601**
2	87	0	3	3	4	44	79	0	1	**220**
3	13	1	0	53	13	31	0	0	2	**113**
4	234	2	43	10	11	763	15	0	2	**1080**
5	39	5	6	9	0	64	4	13	41	**181**
6	14	60	41	779	64	4	3	2	12	**978**
7	14	68	0	24	2	0	0	0	1	**111**
8	3	1	1	1	7	5	0	0	52	**70**
9	8	1	1	2	3	12	1	5	0	**33**
TOTAL		**412**	**249**	**113**	**1178**	**224**	**943**	**115**	**22**	**131**	**3337**

0800-0815

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	105	17	283	114	20	12	2	20	**573**
2	83	0	3	3	4	42	75	0	1	**210**
3	12	1	0	51	12	30	0	0	2	**108**
4	224	2	41	9	11	728	14	0	2	**1031**
5	37	5	6	9	0	61	4	13	39	**173**
6	13	57	39	744	61	3	3	2	11	**933**
7	13	66	0	23	2	0	0	0	1	**106**
8	3	1	1	1	7	5	0	0	49	**66**
9	8	1	1	2	3	12	1	4	0	**32**
TOTAL		**393**	**238**	**108**	**1124**	**214**	**900**	**110**	**21**	**125**	**3233**

0815-0830

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	96	15	259	104	18	11	2	18	**525**
2	76	0	3	2	3	39	69	0	0	**192**
3	11	1	0	47	11	27	0	0	2	**99**
4	205	2	38	9	10	666	13	0	2	**944**
5	34	5	5	8	0	56	4	11	36	**158**
6	12	52	36	681	56	3	2	1	10	**854**
7	12	60	0	21	2	0	0	0	0	**97**
8	3	1	0	1	6	5	0	0	45	**61**
9	7	1	1	2	2	11	1	4	0	**29**
TOTAL		**360**	**218**	**99**	**1029**	**196**	**824**	**101**	**20**	**115**	**2960**

0830-0845

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	91	14	244	98	17	10	2	17	**494**
2	72	0	2	2	3	36	65	0	0	**181**
3	10	1	0	44	10	25	0	0	2	**93**
4	193	2	35	8	9	627	12	0	2	**889**
5	32	4	5	7	0	52	4	11	34	**149**
6	11	49	34	641	53	3	2	1	9	**804**
7	11	57	0	20	2	0	0	0	0	**91**
8	3	0	0	1	6	4	0	0	43	**57**
9	7	1	1	2	2	10	1	4	0	**27**
TOTAL		**339**	**205**	**93**	**969**	**184**	**776**	**95**	**18**	**108**	**2786**	**12366**	Y

0845-0900

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	85	14	230	93	16	10	2	16	**466**
2	68	0	2	2	3	34	61	0	0	**171**
3	10	1	0	41	10	24	0	0	2	**88**
4	182	2	33	8	9	592	11	0	2	**839**
5	30	4	5	7	0	49	3	10	32	**141**
6	11	46	32	605	50	3	2	1	9	**759**
7	11	54	0	19	2	0	0	0	0	**86**
8	3	0	0	1	6	4	0	0	40	**54**
9	6	1	1	1	2	10	1	4	0	**26**
TOTAL		**320**	**193**	**88**	**914**	**174**	**732**	**89**	**17**	**102**	**2629**

0900-0915

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	79	13	212	86	15	9	2	15	**430**
2	62	0	2	2	3	32	57	0	0	**158**
3	9	1	0	38	9	22	0	0	2	**81**
4	168	2	31	7	8	546	10	0	2	**774**
5	28	4	4	6	0	46	3	9	30	**130**
6	10	43	30	558	46	3	2	1	8	**700**
7	10	49	0	17	2	0	0	0	0	**79**
8	2	0	0	1	5	4	0	0	37	**50**
9	6	1	1	1	2	9	1	3	0	**24**
TOTAL		**295**	**178**	**81**	**843**	**160**	**676**	**82**	**16**	**94**	**2426**	**5055.42573**	5055.425728

HEAVIES

0645-0700

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	4	4	59	3	2	1	0	0	**72**
2	4	0	0	1	0	1	3	0	0	**9**
3	3	0	0	15	0	7	1	0	0	**25**
4	41	0	8	1	2	110	2	0	0	**164**
5	8	0	1	2	0	2	1	0	0	**13**
6	3	3	10	184	1	0	0	0	0	**202**
7	2	2	0	4	0	0	0	0	0	**8**
8	0	0	0	0	0	0	0	0	0	**0**
9	0	0	0	0	0	0	0	0	0	**0**
TOTAL		**61**	**9**	**22**	**265**	**7**	**121**	**8**	**0**	**0**	**494**

0700-0715

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	3	3	56	3	2	1	0	0	**69**
2	3	0	0	1	0	1	3	0	0	**8**
3	3	0	0	14	0	6	1	0	0	**24**
4	39	0	7	1	2	105	2	0	0	**157**
5	7	0	1	2	0	2	1	0	0	**13**
6	3	3	10	175	1	0	0	0	0	**193**
7	2	2	0	3	0	0	0	0	0	**8**
8	0	0	0	0	0	0	0	0	0	**0**
9	0	0	0	0	0	0	0	0	0	**0**
TOTAL		**58**	**9**	**21**	**253**	**7**	**116**	**8**	**0**	**0**	**471**

0715-0730

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	3	3	51	3	2	1	0	0	**63**
2	3	0	0	1	0	1	3	0	0	**8**
3	2	0	0	13	0	6	0	0	0	**22**
4	36	0	7	1	2	96	2	0	0	**143**
5	7	0	1	1	0	2	1	0	0	**11**
6	3	3	9	161	1	0	0	0	0	**177**
7	2	2	0	3	0	0	0	0	0	**7**
8	0	0	0	0	0	0	0	0	0	**0**
9	0	0	0	0	0	0	0	0	0	**0**
TOTAL		**53**	**8**	**19**	**231**	**6**	**106**	**7**	**0**	**0**	**431**

0730-0745

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	3	3	48	2	2	1	0	0	**59**
2	3	0	0	1	0	1	3	0	0	**7**
3	2	0	0	12	0	5	0	0	0	**21**
4	34	0	6	1	2	90	2	0	0	**135**
5	6	0	1	1	0	2	1	0	0	**11**
6	3	3	8	151	1	0	0	0	0	**166**
7	2	2	0	3	0	0	0	0	0	**7**
8	0	0	0	0	0	0	0	0	0	**0**
9	0	0	0	0	0	0	0	0	0	**0**
TOTAL		**50**	**7**	**18**	**218**	**6**	**100**	**7**	**0**	**0**	**406**	**1802**	Y

0745-0800

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	6	6	54	5	2	3	0	0	**76**
2	4	0	0	0	0	2	2	0	0	**9**
3	4	0	0	13	0	4	0	0	0	**22**
4	32	0	7	1	2	82	1	0	0	**125**
5	6	0	0	2	0	3	2	0	0	**14**
6	2	4	9	126	3	1	1	0	0	**146**
7	3	6	0	3	0	0	0	0	0	**12**
8	0	0	0	0	0	0	0	0	0	**0**
9	0	0	0	0	0	0	0	0	0	**0**
TOTAL		**51**	**16**	**23**	**199**	**10**	**92**	**11**	**0**	**0**	**403**

0800-0815

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	5	6	50	5	1	3	0	0	**71**
2	4	0	0	0	0	2	2	0	0	**8**
3	4	0	0	12	0	4	0	0	0	**21**
4	30	0	7	0	2	76	1	0	0	**117**
5	5	0	0	2	0	3	2	0	0	**13**
6	2	4	8	118	2	0	1	0	0	**136**
7	3	5	0	3	0	0	0	0	0	**11**
8	0	0	0	0	0	0	0	0	0	**0**
9	0	0	0	0	0	0	0	0	0	**0**
TOTAL		**48**	**15**	**21**	**186**	**10**	**86**	**10**	**0**	**0**	**377**

0815-0830

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	6	6	52	5	2	3	0	0	**74**
2	4	0	0	0	0	2	2	0	0	**8**
3	4	0	0	13	0	4	0	0	0	**22**
4	32	0	7	1	2	80	1	0	0	**122**
5	5	0	0	2	0	3	2	0	0	**13**
6	2	4	9	124	3	0	1	0	0	**143**
7	3	6	0	3	0	0	0	0	0	**11**
8	0	0	0	0	0	0	0	0	0	**0**
9	0	0	0	0	0	0	0	0	0	**0**
TOTAL		**50**	**16**	**22**	**195**	**10**	**90**	**11**	**0**	**0**	**394**

0830-0845

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	5	5	45	4	1	3	0	0	**64**
2	4	0	0	0	0	2	2	0	0	**7**
3	4	0	0	11	0	4	0	0	0	**19**
4	27	0	6	0	2	69	1	0	0	**105**
5	5	0	0	2	0	2	2	0	0	**11**
6	2	4	8	106	2	0	1	0	0	**123**
7	2	5	0	2	0	0	0	0	0	**10**
8	0	0	0	0	0	0	0	0	0	**0**
9	0	0	0	0	0	0	0	0	0	**0**
TOTAL		**43**	**13**	**19**	**167**	**9**	**78**	**9**	**0**	**0**	**339**	**1513**	Y

0845-0900

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	5	6	50	5	1	3	0	0	**70**
2	4	0	0	0	0	2	2	0	0	**8**
3	4	0	0	12	0	4	0	0	0	**21**
4	30	0	7	0	2	76	1	0	0	**116**
5	5	0	0	2	0	3	2	0	0	**13**
6	2	4	8	117	2	0	1	0	0	**135**
7	3	5	0	3	0	0	0	0	0	**11**
8	0	0	0	0	0	0	0	0	0	**0**
9	0	0	0	0	0	0	0	0	0	**0**
TOTAL		**48**	**15**	**21**	**184**	**10**	**86**	**10**	**0**	**0**	**374**

0900-0915

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	5	6	50	5	1	3	0	0	**70**
2	4	0	0	0	0	2	2	0	0	**8**
3	4	0	0	12	0	4	0	0	0	**21**
4	30	0	7	0	2	76	1	0	0	**116**
5	5	0	0	2	0	3	2	0	0	**13**
6	2	4	8	117	2	0	1	0	0	**135**
7	3	5	0	3	0	0	0	0	0	**11**
8	0	0	0	0	0	0	0	0	0	**0**
9	0	0	0	0	0	0	0	0	0	**0**
TOTAL		**48**	**15**	**21**	**184**	**10**	**86**	**10**	**0**	**0**	**374**	**747.29420**	747.2942019

2031 REFERENCE CASE CALCULATIONS - PM PEAK

STEP 1 - TRANSLATE ADC FLOWS TO VISSIM ZONES (MOVE Z10 to Z5)

1530-1630

Lights

	1	2	3	4	5	6	7	8	9	Total
1	0	287	73	659	152	62	18	12	24	1327
2	464	0	24	8	16	170	300	1	2	985
3	7	21	5	0	214	21	154	0	1	3	475
4	1147	6	172	38	49	4017	49	3	6	5487
5	186	0	10	8	0	124	7	111	136	590
6	50	154	183	3058	148	7	14	10	19	3643
7	10	205	0	23	6	1	1	0	1	247
8	12	1	1	3	123	7	1	0	50	196
9	48	3	2	4	18	30	2	20	0	197
Total	2014	671	463	4013	643	4572	392	158	241	13167

HGVs

	1	2	3	4	5	6	7	8	9	Total
1	0	12	24	99	5	6	8	0	0	154
2	10	0	0	2	1	9	12	0	0	34
3	29	2	0	46	4	15	0	0	0	96
4	217	0	35	6	5	580	5	0	0	848
5	11	2	0	7	0	4	1	1	0	26
6	6	4	38	350	6	2	4	0	0	410
7	5	24	0	4	0	0	3	0	0	36
8	0	0	0	0	2	0	0	0	0	2
9	0	0	0	0	0	0	0	0	0	0
Total	278	44	97	514	23	616	33	1	0	1606

Total

	1	2	3	4	5	6	7	8	9	Total
1	0	299	97	758	157	68	26	12	24	1481
2	474	0	24	10	17	179	312	1	2	1019
3	106	7	0	260	25	169	0	1	3	571
4	1364	6	207	44	54	4597	54	3	6	6335
5	197	12	0	15	0	128	8	112	136	616
6	56	158	221	3408	154	9	18	10	19	4053
7	15	229	0	27	6	1	4	0	1	303
8	12	1	1	3	125	7	1	0	50	198
9	48	3	2	4	18	30	2	20	0	197
Total	2292	715	560	4527	666	5188	425	159	241	14773

1630-1730

Lights

	1	2	3	4	5	6	7	8	9	Total
1	2	441	69	734	179	75	25	10	20	1555
2	617	0	25	10	11	178	368	1	1	1211
3	91	4	0	172	11	136	6	1	1	432
4	1333	2	154	67	60	4244	40	3	7	5910
5	308	8	11	9	0	170	9	111	136	762
6	79	189	165	3174	220	16	22	12	24	3901
7	27	220	1	23	8	0	3	0	1	283
8	14	0	1	1	123	7	0	0	50	196
9	53	1	2	3	88	29	1	20	0	197
Total	2524	865	428	4193	700	4853	474	158	240	14437

HGVs

	1	2	3	4	5	6	7	8	9	Total
1	0	13	6	80	7	5	10	0	0	121
2	10	0	0	0	3	4	2	0	0	19
3	14	0	0	43	2	30	0	0	0	89
4	132	4	47	0	3	447	5	0	0	638
5	10	0	3	4	0	4	0	1	0	22
6	4	9	32	301	1	1	1	0	0	340
7	5	12	0	6	1	0	0	0	0	24
8	0	0	0	0	2	0	0	0	0	2
9	0	0	0	0	0	0	0	0	0	0
Total	175	38	88	434	19	491	18	1	0	1264

Total

	1	2	3	4	5	6	7	8	9	Total
1	2	454	75	814	186	80	35	10	20	1676
2	627	0	25	10	14	182	370	1	1	1230
3	105	4	0	215	13	166	6	1	1	513
4	1465	6	201	67	63	4691	45	3	7	6548
5	318	8	14	13	0	174	9	112	136	784
6	83	198	197	3475	221	17	23	12	24	4250
7	32	232	1	29	9	0	3	0	1	307
8	14	0	1	1	125	7	0	0	50	198
9	53	1	2	3	88	29	1	20	0	197
Total	2699	903	516	4627	719	5146	492	159	240	15703

STEP 2 - CONVERT TO 15 MIN MATRICES USING 2016 BASE PROPORTIONS

LIGHTS

Time Period	Total	Overall Total	Proportion
1530-1545	2300	9768	24%
1545-1600	2375	9768	24%
1600-1615	2515	9768	26%
1615-1630	2578	9768	26%
			100%

HEAVIES

Time Period	Total	Overall Total	Proportion
1530-1545	387	1385	28%
1545-1600	370	1385	27%
1600-1615	326	1385	24%
1615-1630	302	1385	22%
			100%

LIGHTS

Time Period	Total	Overall Total	Proportion
1630-1645	2655	10763	25%
1645-1700	2709	10763	25%
1700-1715	2640	10763	25%
1715-1730	2759	10763	26%
			100%

HEAVIES

Time Period	Total	Overall Total	Proportion
1630-1645	292	1092	27%
1645-1700	269	1092	25%
1700-1715	286	1092	26%
1715-1730	245	1092	22%
			100%

LIGHTS

Time Period	Total	Overall Total	Proportion
1730-1745	2662	10763	25%
1745-1800	2520	10763	23%
			48%

HEAVIES

Time Period	Total	Overall Total	Proportion
1730-1745	243	1092	22%
1745-1800	247	1092	23%
			45%

Used peak total to determine proportions for cool down period

Used peak total to determine proportions for cool down period

LIGHTS

1530-1545

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	68	17	155	45	15	4	3	6	**312**
2	109	0	6	2	4	40	71	0	0	**232**
3	18	1	0	50	5	36	0	0	1	**112**
4	270	1	41	9	12	946	12	1	1	**1292**
5	44	2	2	0	0	29	2	26	32	**139**
6	12	36	43	720	35	2	3	2	4	**858**
7	7	48	0	5	1	0	0	0	0	**63**
8	3	0	0	0	0	29	2	0	12	**46**
9	11	1	0	1	21	7	0	5	0	**46**
TOTAL		**474**	**158**	**109**	**945**	**151**	**1077**	**92**	**37**	**57**	**3100**

1545-1600

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	70	18	160	47	15	4	3	6	**323**
2	113	0	6	2	4	41	73	0	0	**239**
3	19	1	0	52	5	37	0	0	1	**115**
4	279	1	42	9	12	977	12	1	1	**1334**
5	45	2	2	2	0	30	2	27	33	**143**
6	12	37	44	743	36	2	3	2	5	**886**
7	7	50	0	6	1	0	0	0	0	**65**
8	3	0	0	0	0	30	2	0	12	**48**
9	12	1	0	1	21	7	0	5	0	**48**
TOTAL		**490**	**163**	**113**	**976**	**156**	**1111**	**95**	**38**	**59**	**3201**

1600-1615

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	74	19	170	49	16	5	3	6	**342**
2	119	0	6	2	4	44	77	0	1	**254**
3	20	1	0	55	5	40	0	0	1	**122**
4	295	2	44	10	13	1034	13	1	2	**1413**
5	48	3	2	2	0	32	2	29	35	**152**
6	13	40	47	787	38	2	4	3	5	**938**
7	8	53	0	6	2	0	0	0	0	**69**
8	3	0	0	0	0	32	2	0	13	**50**
9	12	1	1	1	23	8	1	5	0	**51**
TOTAL		**519**	**173**	**119**	**1033**	**166**	**1177**	**101**	**41**	**62**	**3390**

1615-1630

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	76	19	174	51	16	5	3	6	**350**
2	122	0	6	2	4	45	79	0	1	**260**
3	20	1	0	56	6	41	0	0	1	**125**
4	303	2	45	10	13	1060	13	1	2	**1448**
5	49	3	2	2	0	33	2	29	36	**156**
6	13	41	48	807	39	2	4	3	5	**962**
7	8	54	0	6	2	0	0	0	0	**70**
8	3	0	0	0	32	2	0	0	13	**52**
9	13	1	1	1	23	8	1	5	0	**52**
TOTAL		**532**	**177**	**122**	**1059**	**170**	**1207**	**103**	**42**	**64**	**3475**	**13167** Y

1630-1645

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	109	17	181	44	19	6	2	5	**384**
2	152	0	6	2	3	44	91	0	0	**299**
3	22	1	0	42	3	34	1	0	0	**104**
4	329	0	38	17	15	1047	10	1	2	**1458**
5	76	2	3	2	0	42	2	27	34	**188**
6	19	47	41	783	54	4	5	3	6	**962**
7	7	54	0	6	2	0	1	0	0	**70**
8	3	0	0	0	30	2	0	0	12	**48**
9	13	0	0	1	22	7	0	5	0	**49**
TOTAL		**623**	**213**	**106**	**1034**	**173**	**1198**	**117**	**39**	**59**	**3541**

1645-1700

	1	2	3	4	5	6	7	8	9	TOTAL
1	1	111	17	185	45	19	6	3	5	**391**
2	155	0	6	3	3	45	93	0	0	**305**
3	23	1	0	43	3	34	2	0	0	**106**
4	336	1	39	17	15	1068	10	1	2	**1487**
5	78	2	3	2	0	43	2	26	34	**192**
6	20	48	42	799	55	4	6	3	6	**982**
7	7	55	0	6	2	0	1	0	0	**71**
8	4	0	0	0	0	31	2	0	0	**49**
9	13	0	0	1	1	22	7	0	5	**50**
TOTAL		**635**	**218**	**108**	**1055**	**176**	**1222**	**119**	**40**	**60**	**3634**

1700-1715

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	108	17	180	44	18	6	2	5	**381**
2	151	0	6	2	3	44	90	0	0	**297**
3	22	1	0	42	3	33	1	0	0	**104**
4	327	0	38	16	15	1041	10	1	2	**1450**
5	76	2	3	2	0	42	2	27	33	**187**
6	19	46	40	779	54	4	5	3	6	**957**
7	7	54	0	6	2	0	1	0	0	**69**
8	3	0	0	0	30	2	0	0	12	**48**
9	13	0	0	1	22	7	0	5	0	**48**
TOTAL		**619**	**212**	**105**	**1029**	**172**	**1191**	**116**	**39**	**59**	**3541**

1715-1730

	1	2	3	4	5	6	7	8	9	TOTAL
1	1	113	18	188	46	19	6	3	5	**399**
2	158	0	6	3	3	46	94	0	0	**310**
3	23	1	0	44	3	35	2	0	0	**108**
4	342	1	39	17	15	1088	10	1	2	**1515**
5	79	2	3	2	0	44	2	28	35	**195**
6	20	48	42	814	56	4	6	3	6	**1000**
7	7	56	0	6	2	0	1	0	0	**73**
8	4	0	0	0	32	2	0	0	13	**50**
9	14	0	1	1	23	7	0	5	0	**50**
TOTAL		**647**	**222**	**110**	**1075**	**179**	**1245**	**122**	**41**	**62**	**3701**	**14437** Y

1730-1745

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	109	17	182	44	19	6	2	5	**385**
2	153	0	6	2	3	44	91	0	0	**300**
3	23	1	0	43	3	34	1	0	0	**104**
4	330	0	38	17	15	1050	10	1	2	**1462**
5	76	2	3	2	0	42	2	27	34	**188**
6	20	47	41	785	54	4	5	3	6	**965**
7	7	54	0	6	2	0	1	0	0	**70**
8	3	0	0	0	30	2	0	0	12	**48**
9	13	0	0	1	22	7	0	5	0	**49**
TOTAL		**624**	**214**	**106**	**1037**	**173**	**1201**	**117**	**39**	**59**	**3571**

1745-1800

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	103	16	172	42	18	6	2	5	**364**
2	144	0	6	2	3	42	86	0	0	**284**
3	21	1	0	40	3	32	1	0	0	**99**
4	312	0	36	16	14	994	9	1	2	**1384**
5	72	2	3	2	0	40	2	26	32	**178**
6	18	44	39	743	52	4	5	3	6	**913**
7	6	52	0	5	2	0	1	0	0	**66**
8	3	0	0	0	29	2	0	0	12	**46**
9	12	0	0	1	21	7	0	5	0	**46**
TOTAL		**591**	**203**	**100**	**982**	**164**	**1137**	**111**	**37**	**56**	**3380**	**6950.75045**	6950.750455

HEAVIES

1530-1545

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	3	7	28	1	2	2	0	0	**43**
2	3	0	0	1	0	3	3	0	0	**10**
3	8	1	0	13	1	4	0	0	0	**27**
4	61	0	10	2	1	162	1	0	0	**237**
5	3	1	0	2	0	1	0	0	0	**7**
6	2	1	11	98	2	1	1	0	0	**115**
7	1	7	0	1	0	0	1	0	0	**10**
8	0	0	0	0	1	0	0	0	0	**1**
9	0	0	0	0	0	0	0	0	0	**0**
TOTAL		**78**	**12**	**27**	**144**	**6**	**172**	**9**	**0**	**0**	**449**

1545-1600

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	3	6	26	1	2	2	0	0	**41**
2	3	0	0	1	0	2	3	0	0	**9**
3	8	1	0	12	1	4	0	0	0	**26**
4	58	0	9	2	1	155	1	0	0	**226**
5	3	1	0	2	0	1	0	0	0	**7**
6	2	1	10	93	2	1	1	0	0	**109**
7	1	6	0	1	0	0	1	0	0	**10**
8	0	0	0	0	1	0	0	0	0	**1**
9	0	0	0	0	0	0	0	0	0	**0**
TOTAL		**74**	**12**	**26**	**137**	**6**	**164**	**9**	**0**	**0**	**429**

1600-1615

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	3	6	23	1	1	2	0	0	**36**
2	2	0	0	0	0	2	3	0	0	**8**
3	7	0	0	11	1	4	0	0	0	**23**
4	51	0	8	1	1	137	1	0	0	**200**
5	3	0	0	2	0	1	0	0	0	**6**
6	1	1	9	82	1	0	1	0	0	**97**
7	1	6	0	1	0	0	1	0	0	**8**
8	0	0	0	0	0	0	0	0	0	**0**
9	0	0	0	0	0	0	0	0	0	**0**
TOTAL		**65**	**10**	**23**	**121**	**5**	**145**	**8**	**0**	**0**	**378**

1615-1630

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	3	5	22	1	1	2	0	0	**34**
2	2	0	0	0	0	2	3	0	0	**7**
3	6	0	0	10	1	3	0	0	0	**21**
4	47	0	8	1	1	126	1	0	0	**185**
5	2	0	0	2	0	1	0	0	0	**6**
6	1	1	8	76	1	0	1	0	0	**89**
7	1	5	0	1	0	0	1	0	0	**8**
8	0	0	0	0	0	0	0	0	0	**0**
9	0	0	0	0	0	0	0	0	0	**0**
TOTAL		**61**	**10**	**21**	**112**	**5**	**134**	**7**	**0**	**0**	**350**	**1606** Y

1630-1645

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	3	2	21	2	1	3	0	0	**32**
2	3	0	0	0	1	1	1	0	0	**5**
3	4	0	0	11	1	8	0	0	0	**24**
4	35	1	13	0	1	120	1	0	0	**171**
5	3	0	1	1	0	1	0	0	0	**6**
6	1	2	9	80	0	0	0	0	0	**93**
7	1	3	0	2	0	0	0	0	0	**6**
8	0	0	0	0	1	0	0	0	0	**1**
9	0	0	0	0	0	0	0	0	0	**0**
TOTAL		**47**	**10**	**24**	**116**	**5**	**131**	**5**	**0**	**0**	**338**

1645-1700

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	3	1	20	2	1	2	0	0	**30**
2	2	0	0	1	0	1	0	0	0	**5**
3	3	0	0	11	0	7	0	0	0	**22**
4	33	1	12	0	1	110	1	0	0	**157**
5	2	0	1	1	0	1	0	0	0	**5**
6	1	2	8	74	0	0	0	0	0	**86**
7	1	3	0	1	0	0	0	0	0	**6**
8	0	0	0	0	0	0	0	0	0	**0**
9	0	0	0	0	0	0	0	0	0	**0**
TOTAL		**43**	**9**	**22**	**107**	**5**	**121**	**4**	**0**	**0**	**311**

1700-1715

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	3	2	21	2	1	3	0	0	**32**
2	3	0	0	0	1	1	1	0	0	**5**
3	4	0	0	11	1	8	0	0	0	**23**
4	35	1	12	0	1	117	1	0	0	**167**
5	3	0	1	1	0	1	0	0	0	**6**
6	1	2	8	79	0	0	0	0	0	**91**
7	1	3	0	2	0	0	0	0	0	**6**
8	0	0	0	0	1	0	0	0	0	**1**
9	0	0	0	0	0	0	0	0	0	**0**
TOTAL		**46**	**10**	**23**	**114**	**5**	**129**	**5**	**0**	**0**	**331**

1715-1730

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	3	1	18	2	1	2	0	0	**27**
2	2	0	0	0	1	1	0	0	0	**4**
3	3	0	0	10	0	7	0	0	0	**20**
4	30	1	11	0	1	100	1	0	0	**143**
5	2	0	1	1	0	1	0	0	0	**5**
6	1	2	7	68	0	0	0	0	0	**78**
7	1	3	0	1	0	0	0	0	0	**5**
8	0	0	0	0	0	0	0	0	0	**0**
9	0	0	0	0	0	0	0	0	0	**0**
TOTAL		**39**	**9**	**20**	**97**	**4**	**110**	**4**	**0**	**0**	**284**	**1264** Y

1730-1745

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	3	1	18	2	1	2	0	0	**27**
2	2	0	0	0	1	1	0	0	0	**4**
3	3	0	0	10	0	7	0	0	0	**20**
4	29	1	10	0	1	99	1	0	0	**142**
5	2	0	1	1	0	1	0	0	0	**5**
6	1	2	7	67	0	0	0	0	0	**78**
7	1	3	0	1	0	0	0	0	0	**5**
8	0	0	0	0	0	0	0	0	0	**0**
9	0	0	0	0	0	0	0	0	0	**0**
TOTAL		**39**	**8**	**20**	**97**	**4**	**109**	**4**	**0**	**0**	**281**

1745-1800

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	3	1	18	2	1	2	0	0	**27**
2	2	0	0	0	1	1	0	0	0	**4**
3	3	0	0	10	0	7	0	0	0	**20**
4	30	1	11	0	1	101	1	0	0	**144**
5	2	0	1	1	0	1	0	0	0	**5**
6	1	2	7	68	0	0	0	0	0	**79**
7	1	3	0	1	0	0	0	0	0	**5**
8	0	0	0	0	0	0	0	0	0	**0**
9	0	0	0	0	0	0	0	0	0	**0**
TOTAL		**40**	**9**	**20**	**98**	**4**	**111**	**4**	**0**	**0**	**286**	**567.17949**	567.1794872

7 APPENDIX D – PC MOVA & SCENARIO MANAGEMENT TN

Prepared by:	[redacted]	Reviewed by:	[redacted]
Client:	Internal	Date:	23 August 2021

PC MOVA & Scenario Management

1 INTRODUCTION

1.1 At Modelling Group, we undertake many projects which require the use of TRL's external signal controller programme, PC MOVA, for replicating MOVA signals in a VISSIM environment.

1.2 This note focuses on the interaction between PC MOVA & Scenario Management and details how both features are used in VISSIM.

2 BACKGROUND

2.1 The traditional way to configure MOVA signals in VISSIM is to create a PC MOVA Connection file and map the detectors in the MOVA dataset to those loaded from the INP/INPX file in VISSIM. An example of this is shown in **Figure 2.1**.

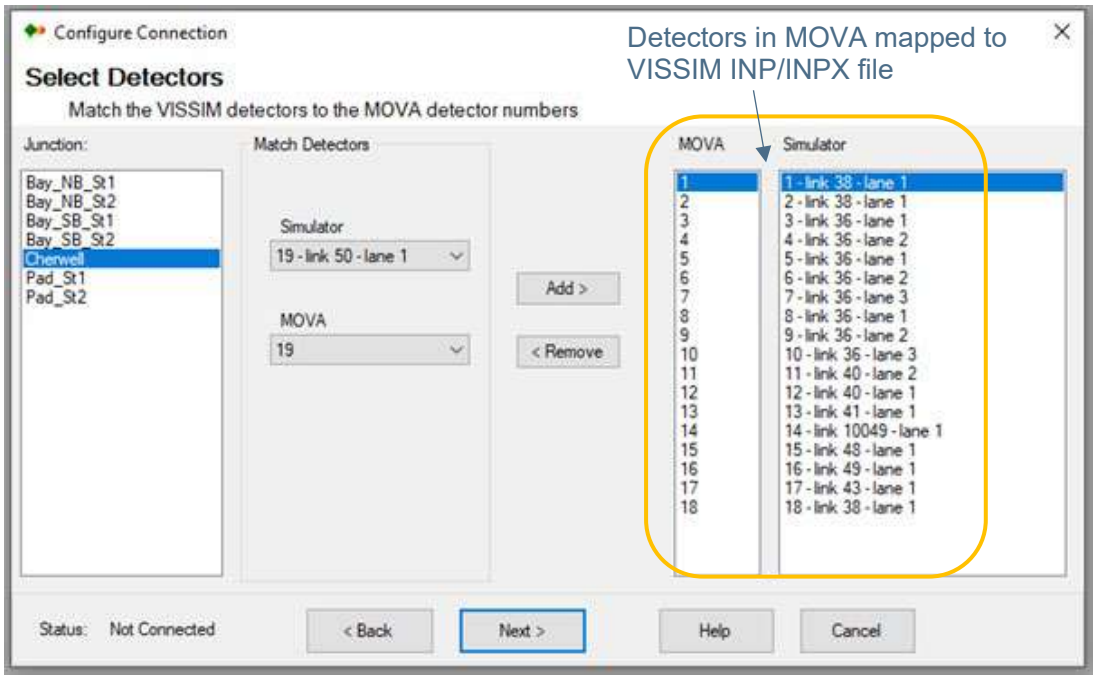


FIGURE 2.1: EXAMPLE OF TRADITIONAL DETECTOR MAPPING

Mobile [redacted]
[redacted]
Registered Office Crosby Court, 28 George St, Birmingham B3 1QG

PC MOVA & Scenario Management

2.2 However, since the introduction of Scenario Management in VISSIM 8, there is an issue whereby if a PC MOVA controlled signalised junction is added or amended in a modification file (for loading into a scenario), the changes do not show up when creating or editing a PC MOVA Connection file. This is because PC MOVA can only read the INP/INPX file (or 'Base Network' in Scenario Management) and not any associated Scenario or Modification files.

2.3 To get around this issue, there are a couple of options available:

Option 1

2.4 For the scenario which features the new/updated signalised junction changes, export the scenario using 'Project Explorer' to create an INP/INPX file (see **Figure 2.2**). This will then allow the detectors to be mapped as in **Figure 2.1**.

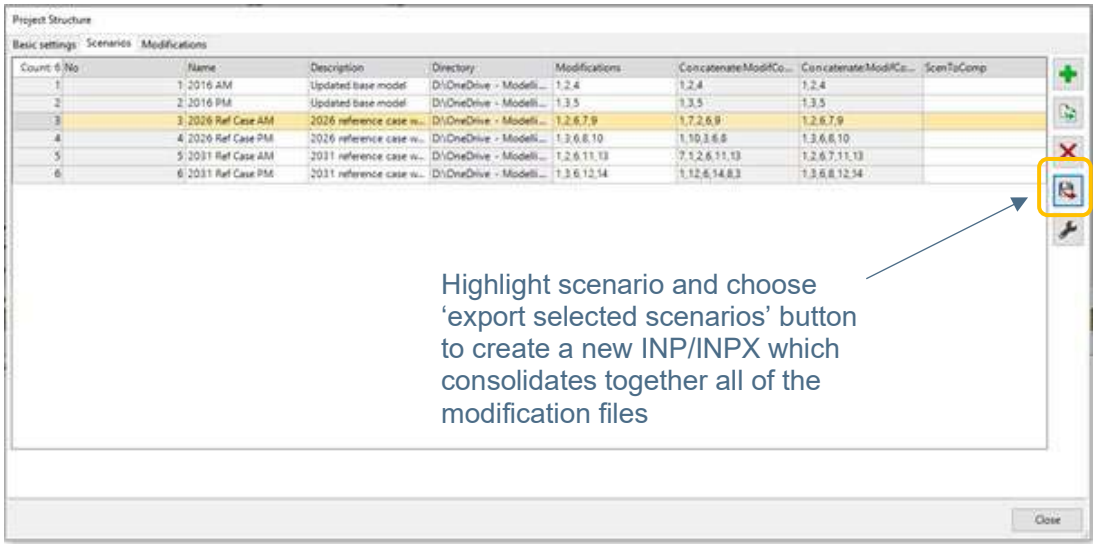


FIGURE 2.2: EXAMPLE OF EXPORTING SCENARIO FOR INP/INPX

Option 2

2.5 Within the 'Base Network', create a dummy link which includes of the new/amended detectors and link these to a new/existing signal controller. An example of this is shown in **Figure 2.3**.

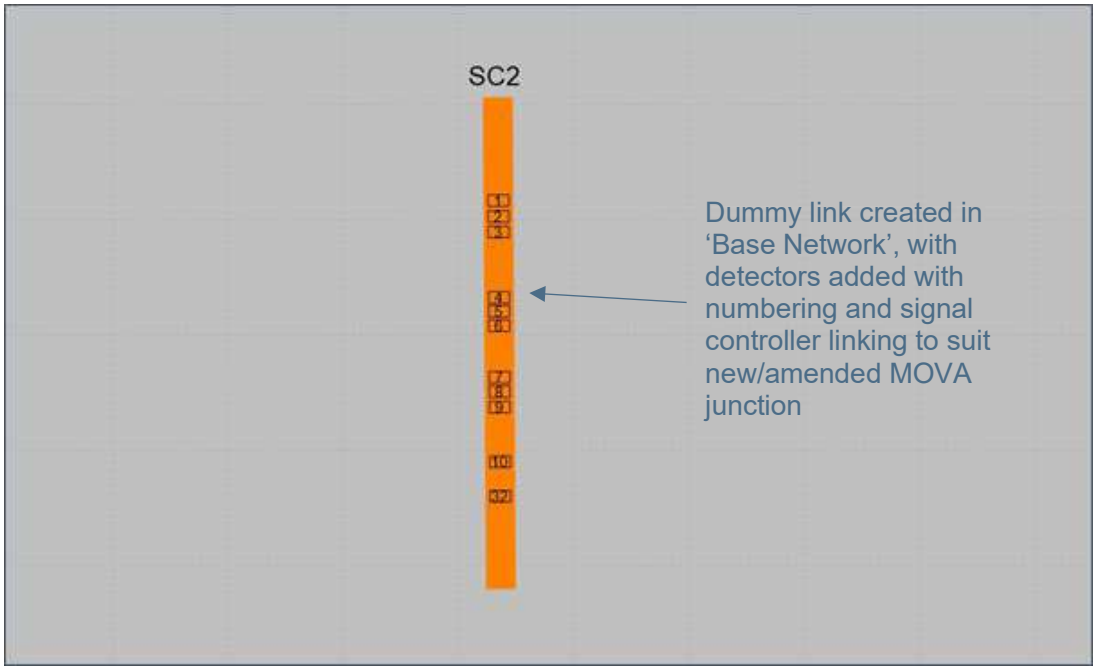


FIGURE 2.3: EXAMPLE OF DUMMY LINK & DETECTORS IN BASE MODEL

2.6 The second option provides more flexibility in being able to continue working in Scenario Manager and not have to export each scenario into separate INP/INPX files.

2.7 The PC MOVA Connection file can be created as normal by mapping the detectors and then, when a Scenario is loaded and played, PC MOVA responds to the demands on the detectors and operates the signals accordingly.

2.8 This approach suggests that the PC MOVA Connection file only needs to link the MOVA dataset to the correct VISSIM detector number, regardless of what the link number is that the detector is on.

3 WORKING EXAMPLE

3.1 To demonstrate that the use of the modification file and detector mapping (Method 2) produces the same performance as exporting to an INP/INPX file (Method 1), a working example has been developed.

3.2 This has used a single junction model which features an improvement that includes MOVA signals. The model has been coded using static assignment, with fictitious flows, turning proportions and vehicle compositions used to populate the model.

3.3 The junction modelled and detector mapping are shown in **Figure 3.1**.

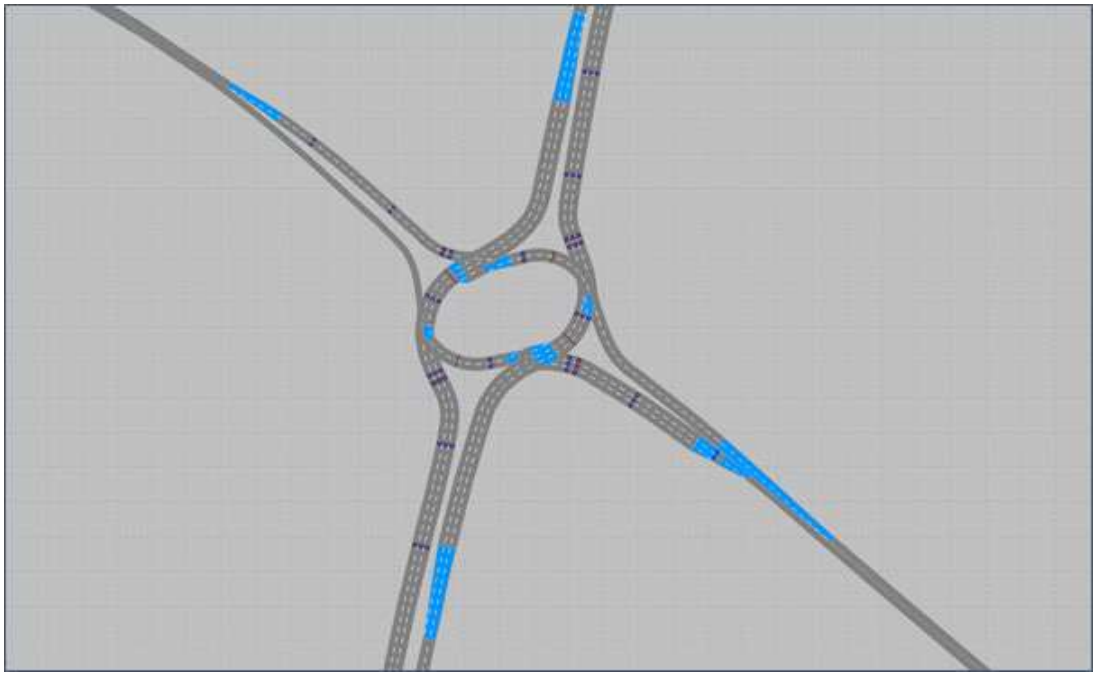


FIGURE 3.1: WORKING EXAMPLE MODEL LAYOUT

3.4 Both models have been run for results, with junction flows, queue lengths and journey times obtained from the average of 5 random seed runs.

3.5 The results of the comparisons of junction flows, average queue lengths and journey times are shown in **Figure 3.2-3.4**.

From	To	No. of Vehs (All Vehs)		Difference	
		Method 1	Method 2	No.	%
North	East	490	490	0	0%
	South	1420	1420	0	0%
	West	101	101	0	0%
East	North	392	392	0	0%
	South	413	413	0	0%
	West	194	194	0	0%
South	North	1402	1402	0	0%
	East	103	103	0	0%
	West	502	502	0	0%
West	North	400	400	0	0%
	East	196	196	0	0%
	South	407	407	0	0%

FIGURE 3.2: JUNCTION FLOW COMPARISONS



FIGURE 3.3: QUEUE LENGTH COMPARISONS

From	To	Avg Journey Time (s)		Difference	
		Method 1	Method 2	No.	%
North	East	89	89	0	0%
	South	96	96	0	0%
	West	108	108	0	0%
East	North	103	103	0	0%
	South	72	72	0	0%
	West	83	83	0	0%
South	North	91	91	0	0%
	East	108	108	0	0%
	West	79	79	0	0%
West	North	81	81	0	0%
	East	93	93	0	0%
	South	112	112	0	0%

FIGURE 3.4: JOURNEY TIME COMPARISONS

3.6 From the results collated, it can be seen that both methods produce the same network performance in terms of flows, queue lengths and journey times.

3.7 This gives confidence that the use of modification files and detector mapping is a suitable alternative to exporting to an INP/INPX file, allowing the use of scenario manager for VISSIM modelling studies if this is a preferred method of working.

4 SUMMARY

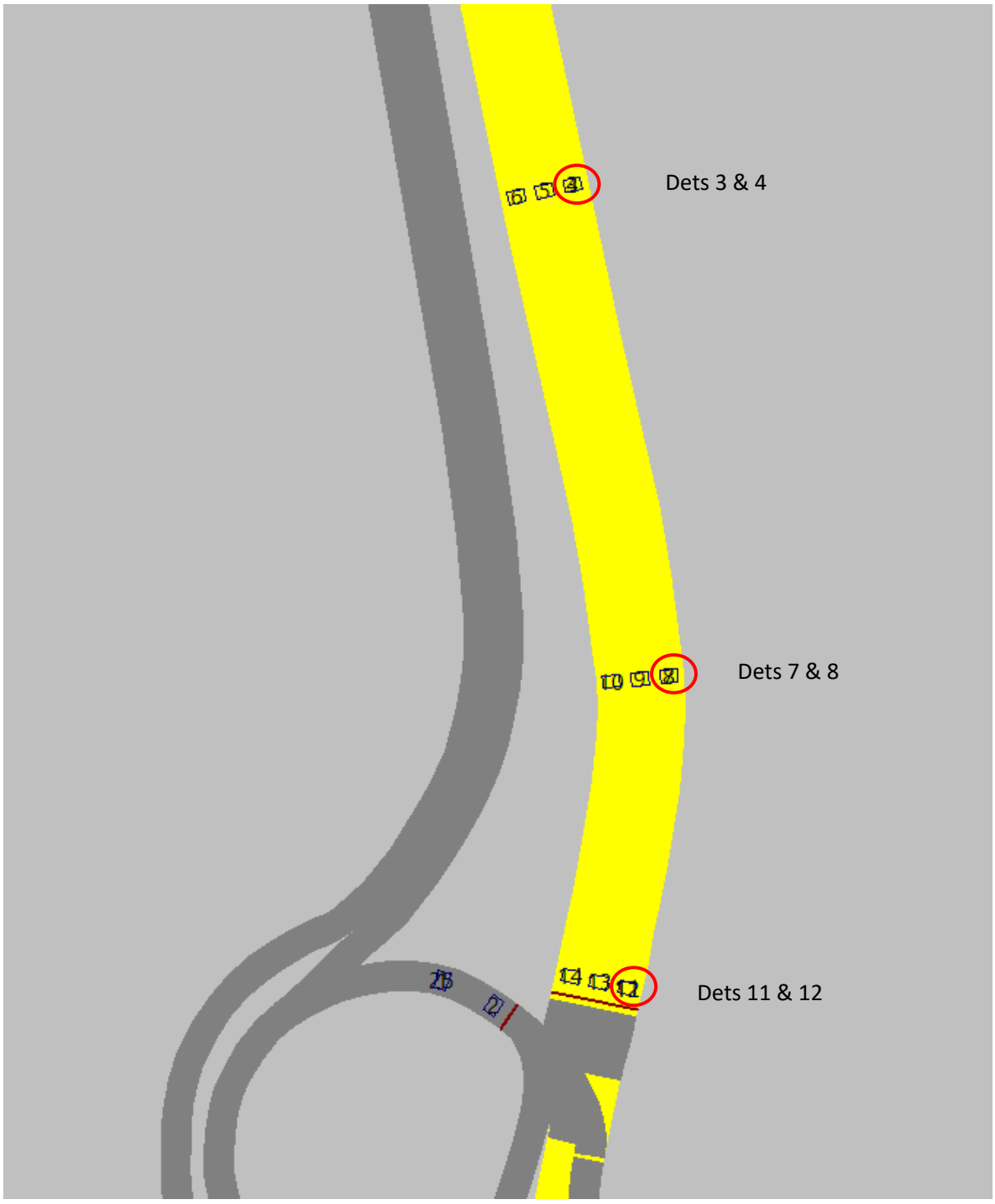
4.1 This note focuses on the interaction between PC MOVA & Scenario Management and details how both features are used in VISSIM.

4.2 Based on the working example provided, it has been demonstrated that using Scenario Management and Dummy Links with Detectors within the Base Network for a new or amended PC MOVA controlled junction provides the same modelled results as exporting the changes into a new INP/INPX file.

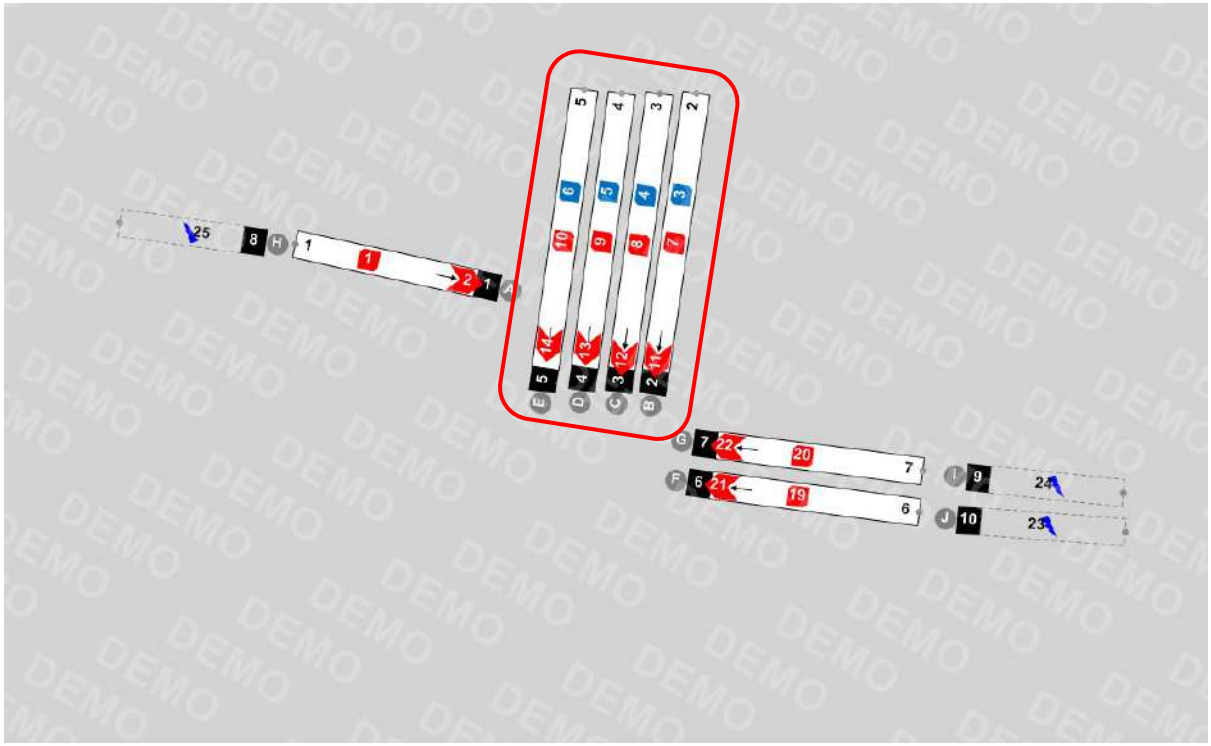
8 APPENDIX E – CHERWELL DIFFERENCES

Cherwell Set-Up

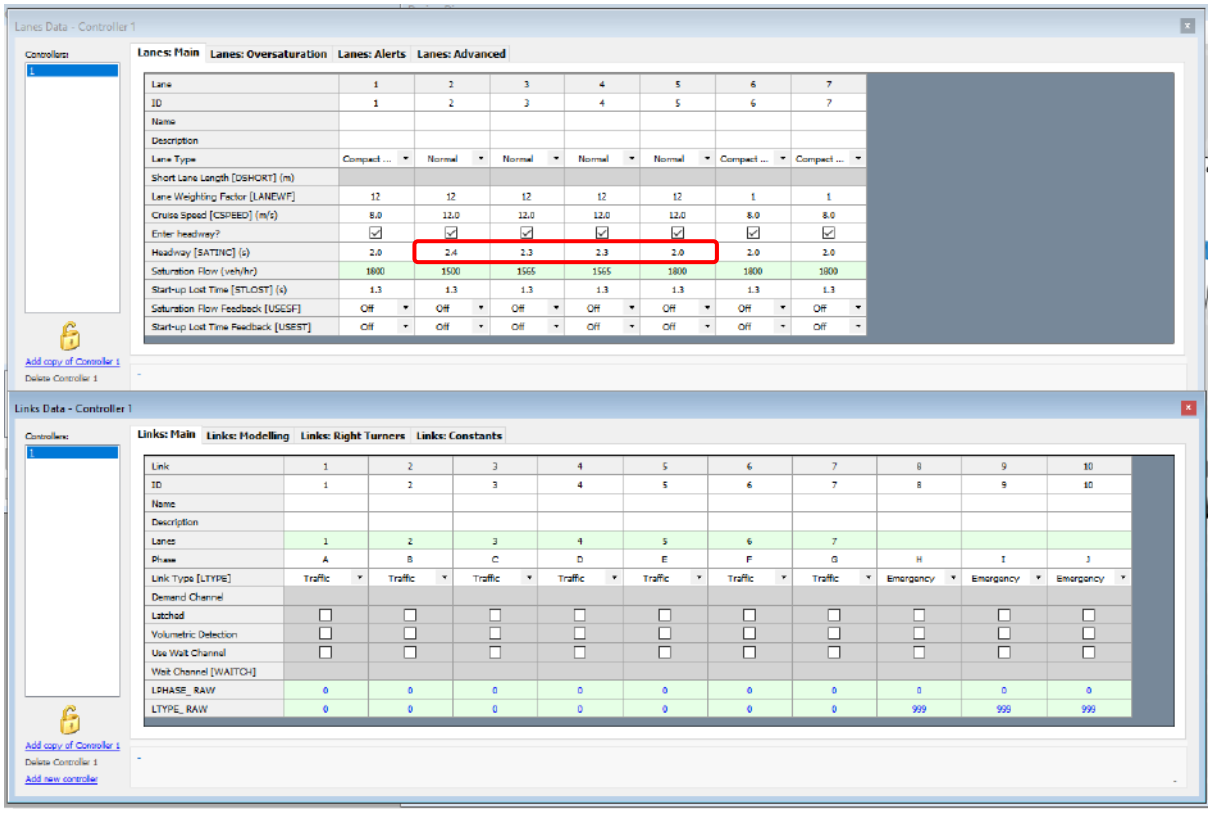
DS3 Model – Detectors overlapping each other on A43 North approach



MOVA Dataset (Southrbt1) shows 4 lanes on A43 North approach, but only 3 lanes in design drawings and in model



Lanes and Links settings show similar settings between No's 2-5, with only 'Headway [SATINC] (s)' being different



Way Forward

Given settings are almost identical, removing Lane 2 to only have 3 lanes/links on A43 North in updated MOVA Dataset (Cherwell_v2)

APPENDIX B – NEW VISSIM LOG

VISSIM Log – M40 J10 – Updated Reference Case Model

Committed Infrastructure

Project Explorer

- Created new modification file – 'Committed Infrastructure' to add in committed scheme at Padbury roundabout.
- Created two new scenarios – '2031 Ref Case AM' and '2031 Ref Case PM', with Modification File 6 included.

MOVA Datasets - Padbury

- Renamed 'M40J10SBslipST1' as 'Pad_S1'
- In MOVA Tools:
    - Set dataset name to 'Pad_S1'
    - Updated Design Diagram
    - Lanes – Lanes: Main – Lane 3 – updated short lane distance from 50m to 62m based on CAD drawing

- Renamed 'M40J10SBslipST2' as 'Pad_S2'
- In MOVA Tools:
    - Set dataset name to 'Pad_S2'
    - Updated Design Diagram

MOVA Dataset – Cherwell

- Renamed 'M40J10' mds file to 'Cherwell' to distinguish between other mds files

Base Network

Signal Controllers

- Created No's 2 & 3 to model the two streams at Padbury roundabout

Dummy Link & Detectors

- Set up 2 dummy links to include all of the detectors associated with SC 2&3. This is to allow the detectors to be mapped in PC MOVA from VISSIM.

Modification 1

Background Images

Deleted and re-added the background '160516 M40 J10 OS Mapping.dxf' and repositioned the network to match the background location (better practice and ensures model is in the same place for further background additions).

Modification 6

Padbury Roundabout

Background Images

- Added *'HE604237-KIER-GEN-M40_JN10_Z-DR-Z-0100_04.dwg'* and repositioned network to suit drawing location

Links/Connectors

- Updated link/connector structure to suit drawing. Deleted a lot of the connectors and created new ones as a result of the changes to link lengths and positions.
- On M40 SB off-slip, adjusted behaviour on approach from 'Left Side Rule' to 'Urban (motorised)' for links/connectors 10156, 139, 10157, 140, 10158, 141, 10159, 142, 10160 & 143.
- No. 10061 (Pad – M40 SB off-slip – Left) – emergency stop changed from 5m to 30m
- No. 10062 (Pad – M40 SB off-slip – Right) – emergency stop changed from 20m to 30m

Desired Speed Decisions

A43 North

- No's 27 & 28 – repositioned further back from stopline as a result of signalised approach.

M40 SB Off-Slip

- No. 87 – repositioned 40mph slightly further back to account for additional flaring on approach.
- No's 33 & 142 – tried to retain in position of base model

Reduced Speed Areas

- On A43 approach, kept length the same, but adjusted positions to sit behind signal stopline.
- On A43 South, kept RSAs as base model
- On M40 SB off-slip, kept length the same, but adjusted positions to sit behind signal stopline, added No. 136 for Lane 3
- On North circulatory, reduced length from 20m to 10m, adjusted positions to sit behind signal stopline, added No. 137 for Lane 2.

Priority Rules

- Added no's 135-152

Signal Heads

- Added No's 10-18 to model signal heads at Padbury

Detectors

- Added detector mapping to match HE model (det no's 45-67)

Nodes

- Adjusted position of Node 2 to account for increased number of lanes and length of flaring on approaches
- Undertook Edge Selection to close all unrealistic turns and U-turns

Queue Counters

- Updated to match stop-line locations on each approach

Cherwell Roundabout

Priority Rules

- Added no. 153

Detectors

- SC1 – Dets 3 & 4 (BIN3 & BIN4) – relocated from conn 10037 (pos. 15.255m) to link 29 (pos. 134m)

MOVA Dataset – Cherwell

- Amended Detector spacing for BIN3 and BIN4 from 100m to 118m to suit relocated detectors.
- Named the dataset filename 'Cherwell' to avoid errors when exporting the dataset.

Ardley Roundabout

Priority Rules

- Added no's 154 & 155

Ardley Road Staggered Junction

Reduced Speed Areas

- No's 124, 126, 127, 128, 129, 130, 131 & 132 – applied 20mph speed profiles to Motorbikes vehicle class to be consistent with the other RSAs in the network.

Journey Time Markers

- Added No's 1001-1010 to match HE JT routes from reporting TN
- Added No's 2001-2081 to cover all O-D pairs (in case needed for wider assessment)

<u>PC MOVA Connection File</u>

Created new connection file to account for committed schemes at Padbury.

For Cherwell junction, some differences between Base & DS3 in terms of detector numbering and queue detection parameters. For now, kept as existing base model, but can review when model is running. Main difference is Presence Time (3s vs. 30s) for Dets 19/20 (23/24) and no queue detection for No. 18 in Base (but parameters for No. 25 in DS3)

Network Edits following Visual Assessment

Cherwell

Links/Connectors

Connector 10099 – increased emergency stop distance from 5m to 50m

Conflict Areas

Deactivated CA's 19, 47, 4 & 7 – vehicles being too cautious when signal is green on circulatory section. In reality, would go and block A43 North approach.

Priority Rules

Added PRs 156, 157, 158, 159, 160 & 161 (to give more realistic driver behaviour in give-way and congested conditions)

Adjusted PR 86 – moved conflict marker so that it only applied to main road, not looking at vehs on the connector. Reduced length from 12m to 8m.

Ardley

Priority Rules

No's 154 & 155 – adjusted conflict marker locations

No's 7,8,49 & 50 – added headway markers

Added PR 162 – reduce overlapping vehs

Added PRs 164 & 165 – reduce overlapping vehs

Baynard's Green

Priority Rules

Added PRs 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178 – added to reduce instances of overlapping vehicles and provide suitable behaviour around roundabout at congested times.

07/12/22 – Updated following receipt of BTM Flows – 2026 Ref Case

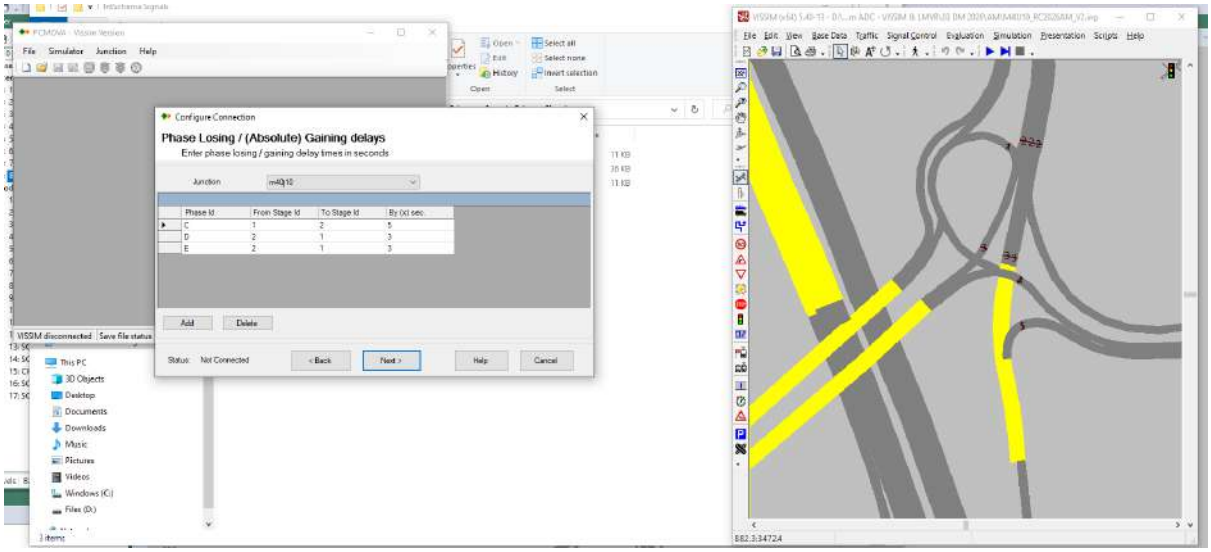
Project Explorer

- Created new modification files – '2026 AM Ref Case Flows' and '2026 PM Ref Case Flows' to add in 2026 flows from the BTM (strategic transport model – provided by ADC).
- Created new modification files – 'SC5 - DynAssignEdits' and 'SC5 - DynAssignEdits' to pick up dynamic assignment changes when running the model for paths, costs, convergence and results.
- Created two new scenarios – '2026 Ref Case AM' and '2026 Ref Case PM', with the new modification files added.

14/02/23 – Updated to account for signal changes – 2026 Ref Case

PC MOVA Connection File

Added the following phase delays, based on what was previously included in AECOM's previous M40 J10 testing.



Modification 6

Static Route Closure

Added a route closure for M40 southbound traffic – to stop vehicles turning off and then re-joining the M40 mainline (which wasn't picked up through edge closures).

24/02/23 – Updated following receipt of BTM Flows – 2031 Ref Case

Modification 7

Matrices

Updated matrices to account for updated 2031 BTM flows

Modification 8

Matrices

Updated matrices to account for updated 2031 BTM flows

APPENDIX C – 2031 REFERENCE CASE FLOW CALCULATIONS

2031 REFERENCE CASE CALCULATIONS - AM PEAK

STEP 1 - FLOWS FROM RTM

AM PEAK

LIGHTS

	1	2	3	4	5	6	7	8	9	Total
1	0	295	59	1515	809	0	25	5	25	2734
2	153	0	0	2	90	149	319	0	0	803
3	52	0	0	1	243	79	169	0	0	543
4	928	8	216	0	2	2615	5	13	4	3812
5	130	15	0	0	0	0	92	15	51	303
6	0	281	130	6103	167	0	23	11	63	3725
7	5	55	386	0	312	17	0	0	5	779
8	4	1	0	2	28	10	0	0	61	84
9	127	8	0	0	0	169	53	0	0	357
Total	1276	970	651	6669	797	3059	396	72	211	13082

HGVs

	1	2	3	4	5	6	7	8	9	Total
1	0	0	0	0	256	0	0	0	0	256
2	54	0	0	0	0	0	45	0	0	99
3	22	0	0	0	59	0	73	0	0	155
4	72	0	28	0	0	512	0	0	0	612
5	0	0	0	0	0	0	0	0	13	13
6	0	63	102	838	0	0	0	0	24	1027
7	0	12	0	0	0	0	0	0	0	12
8	0	0	0	0	0	0	0	0	18	18
9	0	0	0	0	0	0	0	0	0	0
Total	146	94	130	1129	0	589	45	0	68	2186

Total

	1	2	3	4	5	6	7	8	9	Total
1	0	295	59	1515	1065	0	25	5	25	2990
2	208	0	0	2	90	149	364	0	0	902
3	74	0	0	1	302	79	242	0	0	698
4	999	8	244	0	2	3127	5	13	4	4423
5	130	15	0	0	0	0	92	15	51	303
6	0	344	232	6941	167	0	23	11	88	7751
7	5	67	386	0	312	17	0	0	5	791
8	4	1	0	2	28	10	0	0	61	102
9	127	8	0	0	0	169	53	0	0	357
Total	1621	1036	920	8461	1965	3552	804	44	233	18517

STEP 2 - CONVERT TO 15 MIN MATRICES USING 2016 BASE PROPORTIONS

LIGHTS

Time Period	Total	Overall Total	Proportion
0645-0700	2121	9302	23%
0700-0715	2217	9302	24%
0715-0730	2381	9302	26%
0730-0745	2271	9302	24%
			97%

HEAVIES

Time Period	Total	Overall Total	Proportion
0645-0700	451	1397	32%
0700-0715	406	1397	29%
0715-0730	418	1397	30%
0730-0745	377	1397	27%
			118%

LIGHTS

Time Period	Total	Overall Total	Proportion
0745-0800	2568	9302	27%
0800-0815	2432	9302	26%
0815-0830	2336	9302	24%
0830-0845	2096	9302	23%
			100%

HEAVIES

Time Period	Total	Overall Total	Proportion
0745-0800	372	1397	27%
0800-0815	348	1397	25%
0815-0830	366	1397	26%
0830-0845	313	1397	22%
			100%

LIGHTS

Time Period	Total	Overall Total	Proportion
0815-0900	1978	9302	21%
0900-0915	1825	9302	20%
			41%

HEAVIES

Time Period	Total	Overall Total	Proportion
0815-0900	343	1397	25%
0900-0915	344	1397	25%
			49%

Used week total to determine proportions for warm-up and cool-down periods

Used week total to determine proportions for cool down period

LIGHTS

0645-0700

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	60	19	305	68	0	5	0	0	453
2	29	0	0	0	6	34	73	0	0	138
3	12	0	0	37	56	18	0	0	0	89
4	212	1	49	0	0	602	1	3	1	869
5	25	3	0	1	0	21	3	7	23	84
6	0	64	30	1407	38	0	5	3	10	655
7	13	90	0	23	0	0	0	0	1	131
8	1	0	0	0	6	2	0	0	7	16
9	0	0	0	0	0	38	22	2	3	67
TOTAL	291	221	92	1869	175	755	93	16	48	2705

0700-0715

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	69	14	319	75	0	5	0	0	474
2	27	0	0	0	5	35	79	0	0	146
3	12	0	0	99	17	25	0	0	0	93
4	221	1	51	0	0	629	1	3	1	908
5	26	3	0	1	0	22	3	7	23	88
6	0	69	31	740	35	0	5	3	10	894
7	13	96	0	24	0	0	0	0	1	137
8	1	0	0	0	6	2	0	0	7	20
9	0	0	0	0	0	38	22	2	3	79
TOTAL	304	231	96	1118	183	757	94	17	50	2839

0715-0730

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	68	15	337	77	0	6	0	7	509
2	29	0	0	0	5	38	83	0	0	155
3	13	0	0	62	18	27	0	0	0	100
4	238	1	55	0	1	676	2	3	1	976
5	28	4	0	1	0	24	4	8	26	96
6	0	75	33	795	38	0	6	3	11	960
7	14	101	0	26	0	0	0	0	1	167
8	1	0	0	0	6	2	0	0	8	21
9	0	0	0	0	0	42	24	2	4	76
TOTAL	327	249	103	1231	154	752	121	16	56	3059

0730-0745

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	65	16	321	73	0	5	0	6	486
2	28	0	0	0	5	36	78	0	0	147
3	13	0	0	60	17	26	0	0	0	95
4	227	1	52	0	0	645	1	3	1	931
5	27	4	0	1	0	22	4	7	25	90
6	0	71	32	758	36	0	6	3	10	915
7	13	97	0	25	0	0	0	0	1	140
8	1	0	0	0	6	2	0	0	8	20
9	0	0	0	0	0	40	23	2	4	72
TOTAL	311	237	99	1165	185	755	96	16	52	2897

0745-0800

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	73	16	360	82	0	6	0	7	545
2	31	0	0	1	5	41	87	0	0	165
3	14	0	0	65	19	29	0	0	0	107
4	256	1	59	0	1	723	2	4	1	1046
5	30	4	0	1	0	25	4	8	29	101
6	0	80	36	850	40	0	6	3	12	1027
7	15	108	0	28	0	0	0	0	1	157
8	1	0	0	0	6	2	0	0	8	23
9	0	0	0	0	0	44	25	2	4	84
TOTAL	348	266	111	1286	207	867	108	20	58	3256

0800-0815

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	69	15	346	78	0	6	0	7	522
2	30	0	0	0	5	39	83	0	0	158
3	14	0	0	69	18	28	0	0	0	132
4	263	1	56	0	1	690	2	4	1	997
5	29	4	0	1	0	24	4	8	27	96
6	0	76	34	811	38	0	6	3	11	982
7	14	103	0	27	0	0	0	0	1	150
8	1	0	0	0	6	2	0	0	8	22
9	0	0	0	0	0	42	24	2	4	77
TOTAL	353	254	106	1226	196	868	103	19	59	3112

0815-0830

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	63	14	315	72	0	5	0	6	474
2	27	0	0	0	5	36	76	0	0	144
3	12	0	0	59	17	25	0	0	0	94
4	242	1	51	0	0	632	1	3	1	912
5	26	4	0	1	0	22	4	7	24	88
6	0	70	31	743	35	0	6	3	10	897
7	13	95	0	24	0	0	0	0	1	132
8	1	0	0	0	6	2	0	0	7	22
9	0	0	0	0	0	40	23	2	4	71
TOTAL	325	233	97	1122	181	780	96	17	51	2840

0830-0845

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	60	13	296	68	0	5	0	6	448
2	26	0	0	0	4	33	72	0	0	136
3	12	0	0	57	16	24	0	0	0	89
4	209	1	48	0	0	595	1	3	1	859
5	25	3	0	1	0	21	3	7	23	83
6	0	66	29	699	33	0	5	3	10	845
7	12	89	0	23	0	0	0	0	1	125
8	1	0	0	0	6	2	0	0	7	19
9	0	0	0	0	0	37	21	2	4	67
TOTAL	287	219	91	1057	171	687	88	16	48	2670

0645-0800

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	60	19	305	68	0	5	0	6	453
2	29	0	0	0	6	34	73	0	0	138
3	12	0	0	37	56	18	0	0	0	89
4	212	1	49	0	0	602	1	3	1	869
5	25	3	0	1	0	21	3	7	23	84
6	0	64	30	1407	38	0	5	3	10	655
7	13	90	0	23	0	0	0	0	1	131
8	1	0	0	0	6	2	0	0	7	16
9	0	0	0	0	0	38	22	2	3	67
TOTAL	291	221	92	1869	175	755	93	16	48	2705

0700-0715

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	69	14	319	75	0	5	0	6	474
2	27	0	0	0	5	35	79	0	0	146
3	12	0	0	99	17	25	0	0	0	93
4	221	1	51	0	0	629	1	3	1	908
5	26	4	0	1	0	22	4	7	23	88
6	0	69	31	740	35	0	5	3	10	894
7	13	96	0	24	0	0	0	0	1	137
8	1	0	0	0	6	2	0	0	7	20
9	0	0	0	0	0	38	22	2	3	79
TOTAL	304	231	96	1118	183	757	94	17	50	2839

0715-0730

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	68	15	337	77	0	6	0	7	509
2	29	0	0	0	5	38	83	0	0	155
3	13	0	0	62	18	27	0	0	0	100
4	238	1	55	0	1	676	2	3	1	976
5	28	4	0	1	0	24	4	8	26	96
6	0	75	33	795	38	0	6	3	11	960
7	14	101	0	26	0	0	0	0	1	167
8	1	0	0	0	6	2	0	0	8	21
9	0	0	0	0	0	42	24	2	4	76
TOTAL	327	249	103	1231	154	752	121	16	56	3059

0730-0745

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	65	16	321	73	0	5	0	6	486
2	28	0	0	0	5	36	78	0	0	147
3	13	0	0	60	17	26	0	0	0	95
4	227	1	52	0	0	645	1	3	1	931
5	27	4	0	1	0	22	4	7	25	90
6	0	71	32	758	36	0	6	3	10	915
7	13	97	0	25	0	0	0	0	1	140
8	1	0	0	0	6	2	0	0	8	20
9	0	0	0	0	0	40	23	2	4	72
TOTAL	311	237	99	1165	185	755	96	16	52	2897

0745-0800

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	73	16	360	82	0	6	0	7	545
2	31	0	0	1	5	41	87	0	0	165
3	14	0	0	65	19	29	0	0	0	107
4	256	1	59	0	1	723	2	4	1	1046
5	30	4	0	1	0	25	4	8	29	101
6	0	80	36	850	40	0	6	3	12	1027
7	15	108	0	28	0	0	0	0	1	157
8	1	0	0	0	6	2	0	0	8	23
9	0	0	0	0	0	44	25	2	4	84
TOTAL	348	266	111	1286	207	867	108	20	58	3256

0800-0815

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	69	15	346	78	0	6	0	7	522
2	30	0	0	0	5	39	83	0	0	158
3	14	0	0	69	18	28	0	0	0	132
4	263	1	56	0	1	690	2	4	1	997
5	29	4	0	1	0	24	4	8	27	96
6	0	76	34	811	38	0	6	3	11	982
7	14	103	0	27	0	0	0	0	1	150
8	1	0	0	0	6	2	0	0	8	22
9	0	0	0	0	0	42	24	2	4	77
TOTAL	353	254	106	1226	196	868	103	19	59	3112

0815-0830

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	63	14	315	72	0	5	0	6	474
2	27	0	0	0	5	36	76	0	0	144
3	12	0	0	59	17	25	0	0	0	94
4	242	1	51	0	0	632	1	3	1	912
5	26	4	0	1	0	22	4	7	24	88
6	0	70	31	743	35	0	6	3	10	897
7	13	95	0	24	0	0	0	0	1	132
8	1	0	0	0	6	2	0	0	7	22
9	0	0	0	0	0	40	23	2	4	71
TOTAL	325	263	97	1122	181	780	96	17	51	2840

0830-0845

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	60	13	296	68	0	5	0	6	448
2	26	0	0	0	4	33	72	0	0	136
3	12	0	0	57	16	24	0	0	0	89
4	209	1	48	0	0	595	1	3	1	859
5	25	3	0	1	0	21	3	7	23	83
6	0	66	29	699	33	0	5	3	10	845
7	12	89	0	23	0	0	0	0	1	125
8	1	0	0	0	6	2	0	0	7	19
9	0	0	0	0	0	37	21	2	4	67
TOTAL	287	219	91	1057	171	687	88	16	48	2670

0645-0900

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	94	13	280	64	0	5	0	6	623
2	24	0	0	0	4	32	68	0	0	128
3	11	0	0	35	15	23	0	0	0	84
4	197	1	45	0	0	562	1	3	1	810
5	23	3	0	1	0	20	3	7	22	79
6	0	62	28	660	31	0	5	2	9	797
7	12	84	0	22	4	0	0	0	1	123
8	1	0	0	0	6	2	0	0	7	16
9	0	0	0	0	0	33	20	2	3	58
TOTAL	271	206	86	997	161	668	86	11	45	2523

0700-0715

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	92	12	258	58	0	4	0	5	390
2	22	0	0	0	4	29	64	0	0	118
3	10	0	0	82	14	21	0	0	0	77
4	182	1	42	0	0	518	1	3	1	748
5	21	3	0	1	0	18	3	6	20	73
6	0	57	26	605	29	0	5	2	8	736
7	11	78	0	20	3	0	0	0	1	113
8	1	0	0	0	7	2	0	0	9	19
9	2	0	0	0	0	32	19	2	3	58
TOTAL	250	190	79	920	168	667	77	14	41	2328

0715-0730

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	0	1	57	0	0	0	0	0	58
2	24	0	0	0	0	0	33	0	0	57
3	10	0	0	82	14	21	0	0	0	77
4	182	1	42	0	0	518	1	3	1	748
5	21	3	0	1	0	18	3	6	20	73
6	0	57	26	605	29	0	5	2	8	736
7	11	78	0	20	3	0	0	0	1	113
8	1	0	0	0	7	2	0	0	9	19
9	2	0	0	0	0	32	19	2	3	58
TOTAL	250	190	79	920	168	607	77	14	41	2328

0730-0745

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	0	1	52	0	0	0	0	0	53
2	26	0	0	0	0	0	0	0	0	26
3	12	0	0	0	0	0	0	0	0	12
4	169	1	39	0	0	480	1	3	1	693
5	19	3	0	1	0	17	3	6	19	68
6	0	53	24	560	27	0	5	2	7	678
7	10	72	0	19	3	0	0	0	1	105
8	1	0	0	0	6	2	0	0	8	17
9	0	0	0	0	0	30	18	2	3	53
TOTAL	233	176	73	832	156	529	67	13	39	2126

0745-0800

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	0	1	52	0	0	0	0	0	53
2	26	0	0	0	0	0	0	0	0	26
3	12	0	0	0	0	0	0	0	0	12
4	169	1	39	0	0	480	1	3	1	693
5	19	3	0	1	0	17	3	6	19	68
6	0	53	24	560	27	0	5	2	7	678
7	10	72	0	19	3	0	0	0	1	105
8	1	0	0	0	6	2	0	0	8	17
9	0	0	0	0	0	30	18	2	3	53
TOTAL	233	176	73	832	156	529	67	13	39	2126

0800-0815

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	0	1	48	0	0	0	0	0	49
2	14	0	0	0	0	11	0	0	0	25
3	5	0	0	24	0	0	0	0	0	29
4	18	0	0	7	0	0	127	0	0	152
5	3	0	0	0	0	0	0	0	0	3
6	0	11	25	209	0	0	0	0	6	251
7	1	0	0	0	0	0	0	0	0	1
8	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0
TOTAL	86	14	33	281	0	147	11	0	12	535

0815-0830

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	0	1	51	0	0	0	0	0	52
2	14	0	0	0	0	12	0	0	0	26
3	6	0	0	25	0	20	0	0	0	51
4	18	0	0	7	0	0	103	0	0	129
5	3	0	0	0	0	0	0	0	0	3
6	0	11	27	216	0	0	0	0	6	262
7	1	0	0	0	0	0	0	0	0	1
8	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0
TOTAL	86	16	35	296	0	155	12	0	12	559

0830-0845

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	0	1	44	0	0	0	0	0	44
2	12	0	0	0	0	10	0	0	0	22
3	5	0	0	22	0	17	0	0	0	44
4	16	0	0	6	0	0	115	0	0	137
5	3	0	0	0	0	0	0	0	0	3
6	0	10	23	185	0	0	0	0	5	226
7	1	0	0	0	0	0	0	0	0	1
8	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0
TOTAL	33	12	30	253	0	122	10	0	11	681

0645-0900

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	0	1	68	0	0	0	0	0	69
2	13	0	0	0	0	11	0	0	0	25
3	5	0	0	24	0	19	0	0	0	48
4	17	0	0	7	0	126	0	0	0	151
5	0	0	0	0	0	0	0	0	0	0
6	0	14	33	203	0	0	0	0	5	255
7	1	0	0	0	0	0	0	0	0	1
8	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0
TOTAL	36	14	33	279	0	165	11	0	12	550

0700-0

2031 REFERENCE CASE CALCULATIONS - PM PEAK

STEP 1 - TRANSLATE ADC FLOWS TO MIN M ZONES (MOVEM10 to 20)

LIGHTS

	1	2	3	4	5	6	7	8	9	Total
1	0	213	105	1116	102	0	16	0	15	1467
2	322	0	0	8	7	247	319	6	0	909
3	76	0	0	0	219	0	169	0	0	464
4	1535	4	179	0	7	1669	11	17	0	3453
5	137	0	0	0	0	0	166	0	126	67	496
6	0	213	105	6083	65	0	0	11	67	6546
7	7	22	322	0	47	15	0	0	5	353
8	0	0	0	0	2	17	0	0	15	49
9	0	0	0	0	0	0	0	0	0	0
Total	2132	714	693	6492	451	4296	886	191	346	19604

HGVs

	1	2	3	4	5	6	7	8	9	Total
1	0	17	0	214	0	0	0	0	0	175
2	0	0	0	0	0	0	0	0	0	0
3	23	0	0	0	82	0	0	0	0	105
4	101	0	80	0	0	670	0	0	0	855
5	0	0	0	0	0	0	0	0	0	0
6	0	0	89	532	0	0	0	0	0	621
7	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0
Total	124	17	169	746	82	670	0	0	0	1756

Total

	1	2	3	4	5	6	7	8	9	Total
1	0	230	105	1330	102	0	16	0	15	1642
2	322	0	0	8	7	247	319	6	0	909
3	99	0	0	0	301	0	169	0	0	569
4	1636	4	259	0	7	2339	11	17	0	4308
5	137	0	0	0	0	0	166	0	126	75	496
6	0	213	194	6615	65	0	0	11	67	7167
7	7	22	322	0	47	15	0	0	5	418
8	0	0	0	0	2	17	0	0	15	49
9	0	0	0	0	0	0	0	0	0	0
Total	2259	780	886	5221	551	5087	688	191	550	14896

STEP 2 - CONVERT TO 15 MIN MATRICES USING 2016 AM8 PROPORTIONS

LIGHTS

Time Period	Total	Overall Total	Proportion
1530-1545	2300	10763	21%
1545-1600	2375	10763	22%
1600-1615	2533	10763	23%
1615-1630	2578	10763	24%
			91%

HEAVIES

Time Period	Total	Overall Total	Proportion
1530-1545	387	1092	35%
1545-1600	370	1092	34%
1600-1615	328	1092	30%
1615-1630	302	1092	28%
			127%

LIGHTS

Time Period	Total	Overall Total	Proportion
1630-1645	2655	10763	25%
1645-1700	2709	10763	25%
1700-1715	2640	10763	25%
1715-1730	2759	10763	26%
			100%

HEAVIES

Time Period	Total	Overall Total	Proportion
1630-1645	292	1092	27%
1645-1700	269	1092	25%
1700-1715	286	1092	26%
1715-1730	245	1092	22%
			100%

LIGHTS

Time Period	Total	Overall Total	Proportion
1730-1745	2662	10763	25%
1745-1800	2520	10763	23%
			48%

Used peak total to determine proportions for cool down period

HEAVIES

Time Period	Total	Overall Total	Proportion
1730-1745	243	1092	22%
1745-1800	247	1092	23%
			45%

Used peak total to determine proportions for cool down period

LIGHTS

1530-1545

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	54	29	242	22	0	12	1	2	356
2	69	0	0	2	2	53	69	1	0	196
3	16	0	0	67	0	31	0	0	0	94
4	333	1	38	0	1	356	2	4	0	1145
5	29	1	0	0	0	29	0	27	14	100
6	0	45	21	1319	14	0	0	3	13	766
7	5	52	0	10	3	0	0	0	1	71
8	2	0	0	0	6	2	0	0	0	10
9	0	0	0	0	0	2	17	0	5	24
TOTAL	455	153	92	960	56	918	82	41	31	2757

1545-1600

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	54	29	250	22	0	12	1	0	368
2	71	0	0	1	2	53	70	1	0	199
3	17	0	0	68	0	32	0	0	0	97
4	341	1	40	0	1	414	2	4	0	1202
5	30	1	0	0	0	30	0	28	15	103
6	0	47	22	680	15	0	0	3	13	791
7	5	53	0	10	3	0	0	0	1	77
8	2	0	0	0	6	2	0	0	0	10
9	0	0	0	0	0	2	17	0	6	25
TOTAL	470	158	95	981	55	968	85	42	32	2877

1600-1615

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	58	25	265	23	0	13	1	0	390
2	75	0	0	2	2	57	75	1	0	211
3	18	0	0	73	0	34	0	0	0	103
4	361	1	42	0	1	442	2	4	0	1274
5	32	1	0	0	0	31	0	30	16	110
6	0	50	24	720	16	0	0	4	14	838
7	10	57	0	11	3	0	0	0	1	82
8	2	0	0	0	6	2	0	0	0	14
9	0	0	0	0	0	2	18	0	6	26
TOTAL	498	167	101	1068	59	1004	98	45	36	3047

1615-1630

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	60	26	272	24	0	13	1	0	399
2	77	0	0	2	2	58	76	1	0	216
3	18	0	0	52	0	35	0	0	0	105
4	370	1	43	0	2	454	2	4	0	1356
5	33	1	0	0	0	32	0	30	16	112
6	0	51	25	748	20	0	0	4	11	859
7	10	58	0	11	4	0	0	0	1	84
8	2	0	0	0	6	2	0	0	0	14
9	0	0	0	0	0	2	19	0	6	27
TOTAL	511	171	106	1079	60	1029	92	46	35	3126	11835

1630-1645

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	62	27	280	25	0	14	1	0	411
2	79	0	0	2	2	66	79	1	0	229
3	19	0	0	54	0	36	0	0	0	108
4	381	1	44	0	2	933	3	4	0	1165
5	34	1	0	0	0	33	0	31	17	116
6	0	52	39	760	21	0	0	4	12	885
7	10	60	0	12	4	0	0	0	1	86
8	2	0	0	0	7	2	0	0	0	15
9	0	0	0	0	0	2	19	0	6	28
TOTAL	526	176	107	1108	62	1060	95	47	36	3217

1645-1700

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	64	27	285	24	0	14	1	0	420
2	81	0	0	2	2	61	80	1	0	227
3	19	0	0	55	0	36	0	0	0	111
4	389	1	45	0	2	929	3	4	0	1373
5	35	1	0	0	0	34	0	32	17	119
6	0	54	36	776	21	0	0	4	12	903
7	11	61	0	12	4	0	0	0	1	89
8	2	0	0	0	7	2	0	0	0	15
9	0	0	0	0	0	2	18	0	6	26
TOTAL	556	180	109	1131	65	1065	97	43	37	3302

1700-1715

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	62	27	278	25	0	14	1	0	428
2	79	0	0	2	2	59	78	1	0	221
3	19	0	0	54	0	35	0	0	0	108
4	379	1	44	0	2	905	3	4	0	1338
5	34	1	0	0	0	33	0	31	17	115
6	0	52	38	756	21	0	0	4	12	883
7	10	59	0	11	4	0	0	0	1	86
8	2	0	0	0	7	2	0	0	0	15
9	0	0	0	0	0	2	18	0	6	28
TOTAL	523	175	106	1102	61	1054	95	47	36	3199

1715-1730

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	65	28	291	26	0	14	1	0	427
2	83	0	0	2	2	62	82	1	0	231
3	20	0	0	56	0	37	0	0	0	113
4	396	1	46	0	2	946	3	4	0	1398
5	35	1	0	0	0	34	0	32	17	120
6	0	54	67	792	22	0	0	4	12	919
7	11	62	0	12	4	0	0	0	1	90
8	2	0	0	0	7	2	0	0	0	15
9	0	0	0	0	0	2	19	0	6	28
TOTAL	546	183	111	1152	64	1121	99	43	37	3365	13041	Y

1730-1745

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	62	27	280	25	0	14	1	0	412
2	80	0	0	2	2	60	79	1	0	223
3	19	0	0	54	0	36	0	0	0	109
4	382	1	44	0	2	912	3	4	0	1148
5	34	1	0	0	0	33	0	31	17	116
6	0	53	36	762	21	0	0	4	12	887
7	10	60	0	12	4	0	0	0	1	87
8	2	0	0	0	7	2	0	0	0	15
9	0	0	0	0	0	2	18	0	6	26
TOTAL	527	177	107	1111	62	1063	95	47	36	3125

1745-1800

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	59	25	266	24	0	13	1	0	392
2	75	0	0	2	2	57	75	1	0	211
3	18	0	0	51	0	34	0	0	0	103
4	362	1	42	0	1	865	3	4	0	1278
5	32	1	0	0	0	31	0	30	16	109
6	0	50	24	722	20	0	0	4	11	882
7	10	57	0	11	3	0	0	0	1	82
8	2	0	0	0	6	2	0	0	0	14
9	0	0	0	0	0	2	18	0	6	26
TOTAL	499	167	101	1092	59	1006	90	45	34	3093	6279

HEAVIES

1530-1545

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	6	1	40	0	0	0	0	0	47
2	0	0	0	0	0	0	1	0	0	1
3	0	0	0	0	0	0	0	0	0	0
4	67	0	28	0	0	238	2	0	0	335
5	0	0	0	0	0	0	0	0	0	0
6	0	3	0	32	189	0	0	0	0	221
7	0	3	0	0	0	0	0	0	0	3
8	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	1	0	0	0	20
TOTAL	67	9	29	72	189	239	3	0	0	628

1545-1600

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	6	1	38	0	0	0	0	0	45
2	0	0	0	0	0	0	1	0	0	1
3	0	0	0	0	0	0	0	0	0	0
4	64	0	27	0	0	227	2	0	0	320
5	0	0	0	0	0	0	0	0	0	0
6	0	3	0	30	181	0	0	0	0	211
7	0	3	0	0	0	0	0	0	0	3
8	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	1	0	0	0	19
TOTAL	64	9	28	68	181	228	3	0	0	629

1600-1615

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	5	1	34	0	0	0	0	0	39
2	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0
4	51	0	24	0	0	200	2	0	0	276
5	0	0	0	0	0	0	0	0	0	0
6	0	3	0	27	159	0	0	0	0	186
7	0	3	0	0	0	0	0	0	0	3
8	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	17
TOTAL	51	8	25	61	159	200	2	0	0	526

1615-1630

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	5	1	33	0	0	0	0	0	39
2	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0
4	29	0	12	0	0	165	2	0	0	208
5	0	0	0	0	0	0	0	0	0	0
6	0	3	0	25	132	0	0	0	0	172
7	0	2	0	0	0	0	0	0	0	2
8	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	16
TOTAL	29	6	13	58	132	165	2	0	0	419

1700-1715

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	5	1	29	0	0	0	0	0	34
2	0	0	0	0	0	0	1	0	0	1
3	0	0	0	0	0	0	0	0	0	0
4	27	0	11	0	0	176	2	0	0	216
5	0	0	0	0	0	0	0	0	0	0
6	0	3	0	23	140	0	0	0	0	163
7	0	2	0	0	0	0	0	0	0	2
8	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	14
TOTAL	33	7	11	52	140	176	3	0	0	431

1715-1730

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	5	1	33	0	0	0	0	0	39
2	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0
4	24	0	10	0	0	150	2	0	0	192
5	0	0	0	0	0	0	0	0	0	0
6	0	3	0	20	120	0	0	0	0	142
7	0	2	0	0	0	0	0	0	0	2
8	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	14
TOTAL	29	6	10	53	120	150	2	0	0	389	1655	Y

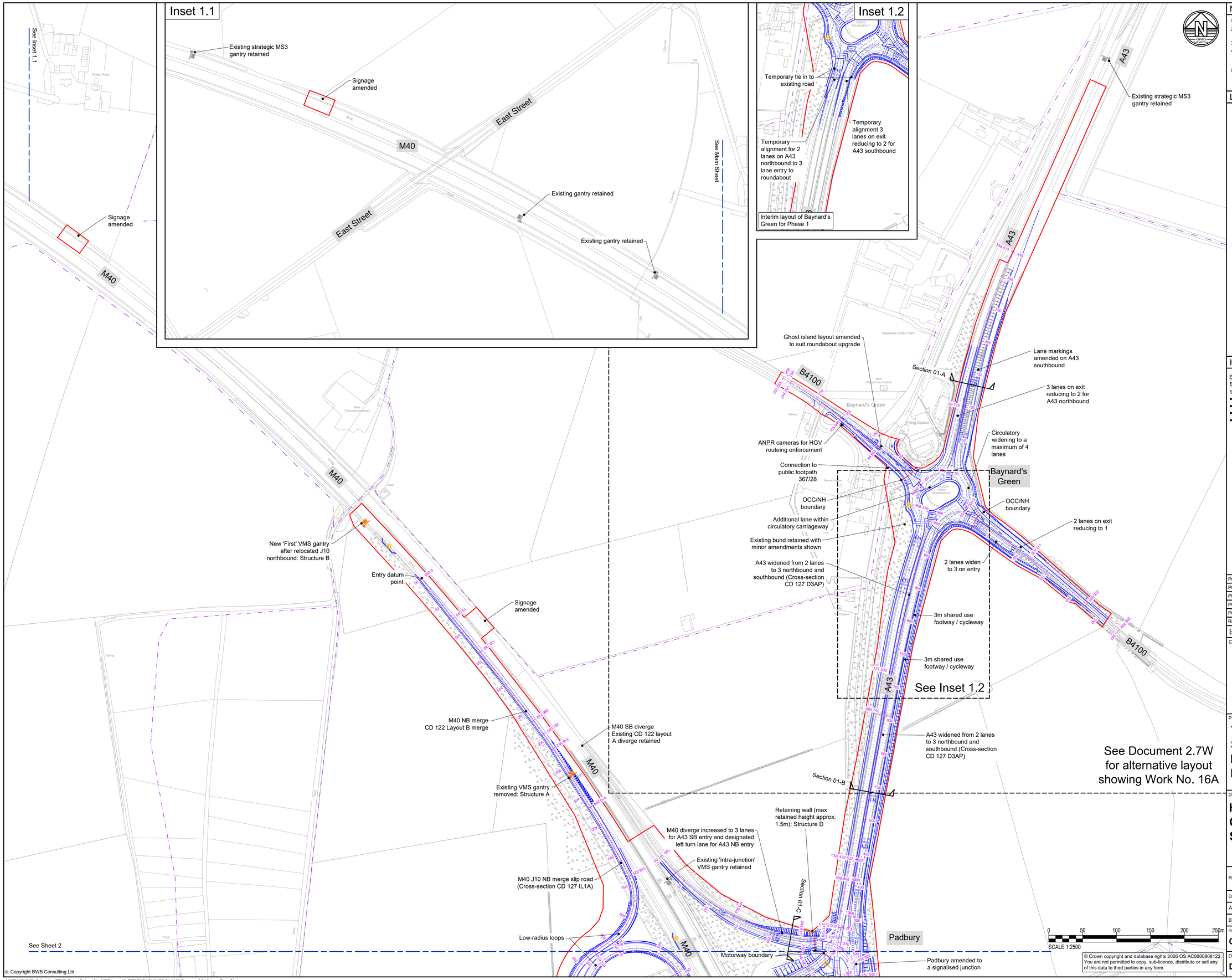
1730-1745

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	6	1	25	0	0	0	0	0	29
2	0	0	0	0	0	0	0	0	0	0
3	5	0	0	0	0	0	0	0	0	0
4	23	0	10	0	0	169	2	0	0	192
5	0	0	0	0	0	0	0	0	0	0
6	0	3	0	119	0	0	0	0	0	122
7	0	2	0	0	0	0	0	0	0	2
8	0	0	0	0	0	0	0	0	0	0
9	0	0	0	12	0	0	0	0	0	14
TOTAL	28	6	11	156	0	169	2	0	0	360

1745-1800

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	6	1	25	0	0	0	0	0	32
2	0	0	0	0	0	0	0	0	0	0
3	5	0	0	0	0	0	0	0	0	5
4	24	0	10	0	0	152	2	0	0	192
5	0	0	0	0	0	0	0	0	0	0	0
6	0	3	0	19	0	0	0	0	0	22
7	0	2	0	0	0	0	0	0	0	2
8	0	0	0	0	0	0	0	0	0	0
9	0	0	0	12	0	0	0	0	0	14
TOTAL	29	6	11	56	0	152	2	0	0	369	832

APPENDIX C:
PROPOSED SCHEME DRAWING



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Y:\NTH\NTH2479_Oxfordshire RFI\02. Project Delivery\01. WIP\Drawings\OxSRFI-BWB-LSI-XX-DR-CH-0100_Document 2.7_Highway Plans GA.dwg

Notes

1. All dimensions in metres unless noted otherwise.
2. The height of proposed bridges, embankments and depths of cuttings are indicative subject to the limits of deviation referred to in the order.
3. All structure positions and sizes shown are indicative only.
4. The proposed works including their specific alignment will be subject to detailed design within the limits of deviation identified on the works plans.
5. Horizontal and vertical deviation of the highway alignments are permitted in accordance with Article 4 of the Development Consent Order.

Legend

- Order Limits
- Highway Works
- Cross-section locations
- 250 Chainage
- New, amended or removed structures (various types as annotated) - refer to Bridge Plans (Document 2.12)
- Existing public right of way retained (shown for reference only)
- 3rd party scheme as annotated (indicative and shown for reference only)
- Private railway (shown for reference only, refer to Rail Plans, Document 2.11)
- Highway boundary/interface as described
- Highway Drainage Outfall
- Maintenance Hardstanding Area

The legend is identical on all sheets of the highway plans and therefore not all items detailed in the legend are represented on each sheet

Highway Works

By reference to the Works Plans (Document 2.2) and Schedule 1 of the Development Consent Order this plan shows the following Highway Works:

- Work Nos. 14A (part) & 14B (part)
- Work No. 15B (part)
- Work No. 16
- Work No. 17

Highway Plans Cross Sections
Refer to Document 2.7F for:
- Sections 01-A, 01-B & 01-C

Highway Plans Long Sections
Refer to Documents 2.7N and 2.7O for:
- A43 North
- B4100 West
- B4100 East
- A43 Mainline
- M40 SB Diverge

Highway Bridge Plans
Refer to Document 2.12I for:
- Structure B

Rev	Date	Details of issue / revision	Drw	Ch'd	Apv
P05	27.02.26	DCO Submission	RP	SRH	SRH
P04	02.02.26	Updated following consultation	RP	SRH	SRH
P03	15.09.25	Issued for consultation	SRH	SRH	SRH
P02	01.09.25	General updates	SB	SRH	SRH
P01	31.07.25	Preliminary Issue	RP	SRH	SRH

Issues & Revisions

Client

OxSRFI
OXFORDSHIRE
STRATEGIC RAIL FREIGHT INTERCHANGE

Project Title

THE OXFORDSHIRE STRATEGIC RAIL FREIGHT INTERCHANGE AND HIGHWAYS ORDER 202X

Drawing Title

HIGHWAY PLANS GENERAL ARRANGEMENT SHEET 01

Regulation:	6(2)	Document:	2.7A
Drawn:	R.Picknell	Checked:	S.Hilditch
Approved:	S.Hilditch	Date:	31.07.25
BWB Ref:	NTH2479	Scale@A1:	1:2500

Project - Originator - Functional Breakdown - Spatial Breakdown - Form - Discipline - Number

OxSRFI-BWB-LSI-01-DR-CH-0101

Drawing Status	Rev
DCO SUBMISSION	P05

APPENDIX D:
CONVERGENCE RESULTS

CONVERGENCE- 2031 RC1

AM

Run #	Paths			Network Performance	
	Travel Times (0-20%)	Travel Times (0-20%)	Vol.Difference		
	Check - ShrConvPathTT	Check - Paths List - Converged = Yes	(0-5%)	Total Travel Time (s)	Diff from prev. run
1	39%	59%	39%	3285885.83	-
2	100%	100%	100%	3285885.83	0.0%
3	100%	100%	100%	3285885.83	0.0%
4	100%	100%	100%	3285885.83	0.0%
5	100%	100%	100%	3285885.83	0.0%
6	100%	100%	100%	3285885.83	0.0%
7	100%	100%	100%	3285885.83	0.0%
8	100%	100%	100%	3285885.83	0.0%
9	100%	100%	100%	3285885.83	0.0%
10	100%	100%	100%	3285885.83	0.0%

Most suitable run - BEW and WEG used for results reporting - demand reduced to 80% for suitable convergence levels

PM

Run #	Paths			Network Performance	
	Travel Times (0-20%)	Travel Times (0-20%)	Vol.Difference		
	Check - ShrConvPathTT	Check - Paths List - Converged = Yes	(0-5%)	Total Travel Time (s)	Diff from prev. run
1	36%	60%	43%	2959508	-
2	100%	100%	100%	2959508	0.0%
3	100%	100%	100%	2959508	0.0%
4	100%	100%	100%	2959508	0.0%
5	100%	100%	100%	2959508	0.0%
6	100%	100%	100%	2959508	0.0%
7	100%	100%	100%	2959508	0.0%
8	100%	100%	100%	2959508	0.0%
9	100%	100%	100%	2959508	0.0%
10	100%	100%	100%	2959508	0.0%

Most suitable run - BEW and WEG used for results reporting - demand reduced to 80% for suitable convergence levels

CONVERGENCE- 2031 DS1

AM

Run #	Paths			Network Performance	
	Travel Times (0-20%)	Travel Times (0-20%)	Vol.Difference		
	Check - ShrConvPathTT	Check - Paths List - Converged = Yes	(0-5%)	Total Travel Time (s)	Diff from prev. run
1	90%	91%	51%	3202942	-
2	89%	89%	85%	3203139.5	0.0%
3	93%	92%	86%	3202025	0.0%
4	96%	95%	85%	3196262.83	-0.2%
5	89%	91%	86%	3199657.5	0.1%
6	91%	93%	86%	3204928.33	0.2%
7	94%	94%	86%	3205810.5	0.0%
8	96%	96%	85%	3203930.83	-0.1%
9	95%	94%	84%	3198337.5	-0.2%
10	99%	96%	86%	3197996.17	0.0%
11	98%	95%	86%	3197174.5	0.0%
12	100%	97%	86%	3199860.67	0.1%
13	95%	96%	86%	3202271.83	0.1%
14	98%	97%	86%	3189836.67	-0.4%
15	96%	96%	86%	3203147.83	0.4%
16	96%	97%	86%	3204272.5	0.0%
17	96%	97%	86%	3202452.67	-0.1%
18	96%	98%	86%	3202900.5	0.0%
19	100%	98%	86%	3197985.67	-0.2%
20	99%	96%	86%	3195860.33	-0.1%

Most suitable run - BEW and WEG used for results reporting - demand reduced to 80% for suitable convergence levels

PM

Run #	Paths			Network Performance	
	Travel Times (0-20%)	Travel Times (0-20%)	Vol.Difference		
	Check - ShrConvPathTT	Check - Paths List - Converged = Yes	(0-5%)	Total Travel Time (s)	Diff from prev. run
1	95%	95%	51%	3512007.67	-
2	100%	98%	86%	3512059	0.0%
3	94%	95%	86%	3511811.83	0.0%
4	95%	96%	86%	3509628.83	-0.1%
5	99%	97%	86%	3508878.33	0.0%
6	99%	97%	86%	3507819.67	0.0%
7	98%	98%	86%	3514284.33	0.2%
8	100%	98%	86%	3510285	-0.1%
9	100%	99%	85%	3511115	0.0%
10	98%	97%	86%	3509353.5	-0.1%

Most suitable run - BEW and WEG used for results reporting - demand reduced to 80% for suitable convergence levels

CONVERGENCE- 2031 RC1 [ADJUSTED BTM FLOWS]

AM

Run #	Paths			Network Performance	
	Travel Times (0-20%)	Travel Times (0-20%)	Vol.Difference		
	Check - ShrConvPathTT	Check - Paths List - Converged = Yes	(0-5%)	Total Travel Time (s)	Diff from prev. run
1	25%	40%	20%	3442264.5	-
2	100%	100%	100%	3442264.5	0.0%
3	100%	100%	100%	3442264.5	0.0%
4	100%	100%	100%	3442264.5	0.0%
5	100%	100%	100%	3442264.5	0.0%
6	100%	100%	100%	3442264.5	0.0%
7	100%	100%	100%	3442264.5	0.0%
8	100%	100%	100%	3442264.5	0.0%
9	100%	100%	100%	3442264.5	0.0%
10	100%	100%	100%	3442264.5	0.0%

Most suitable run - BEW and WEG used for results reporting - demand reduced to 80% for suitable convergence levels

PM

Run #	Paths			Network Performance	
	Travel Times (0-20%)	Travel Times (0-20%)	Vol.Difference		
	Check - ShrConvPathTT	Check - Paths List - Converged = Yes	(0-5%)	Total Travel Time (s)	Diff from prev. run
1	31%	45%	28%	3143102.5	-
2	100%	100%	100%	3143102.5	0.0%
3	100%	100%	100%	3143102.5	0.0%
4	100%	100%	100%	3143102.5	0.0%
5	100%	100%	100%	3143102.5	0.0%
6	100%	100%	100%	3143102.5	0.0%
7	100%	100%	100%	3143102.5	0.0%
8	100%	100%	100%	3143102.5	0.0%
9	100%	100%	100%	3143102.5	0.0%
10	100%	100%	100%	3143102.5	0.0%

Most suitable run - BEW and WEG used for results reporting - demand reduced to 80% for suitable convergence levels

CONVERGENCE- 2031 DS1 [ADJUSTED BTM FLOWS]

AM

Run #	Paths			Network Performance	
	Travel Times (0-20%)	Travel Times (0-20%)	Vol.Difference		
	Check - ShrConvPathTT	Check - Paths List - Converged = Yes	(0-5%)	Total Travel Time (s)	Diff from prev. run
1	62%	73%	37%	3236961.33	-
2	85%	83%	85%	3245992	0.3%
3	87%	87%	84%	3236254.83	-0.3%
4	87%	87%	86%	3241085.17	0.1%
5	86%	87%	85%	3240977.83	0.0%
6	88%	87%	85%	3241386.33	0.0%
7	92%	89%	86%	3239381.67	-0.1%
8	91%	90%	85%	3232916.67	-0.2%
9	94%	91%	86%	3255053.5	0.7%
10	91%	91%	86%	3239806.17	-0.5%
11	95%	92%	86%	3239197.83	0.0%
12	94%	93%	86%	3244373	0.2%
13	98%	93%	86%	3245557.17	0.0%
14	99%	95%	85%	3248714.5	0.1%
15	95%	94%	86%	3243740.33	-0.2%
16	98%	96%	86%	3240369.33	-0.1%
17	96%	95%	86%	3238120.67	-0.1%
18	94%	94%	86%	3238029.33	0.0%
19	96%	95%	85%	3242009.5	0.1%
20	97%	96%	86%	3237951.33	-0.1%
21	98%	96%	86%	3240590.33	0.1%
22	96%	96%	85%	3243189.33	0.1%
23	99%	96%	86%	3240062.83	-0.1%
24	97%	98%	85%	3246522.5	0.2%
25	97%	96%	85%	3250401.5	0.1%
26	97%	97%	85%	3247407	-0.1%
27	99%	98%	86%	3245802	0.0%
28	98%	98%	84%	3243818.67	-0.1%
29	98%	98%	83%	3243224.83	0.0%
30	97%	96%	85%	3249681	0.2%

Most suitable run - BEW and WEG used for results reporting - demand reduced to 80% for suitable convergence levels

PM

Run #	Paths			Network Performance	
	Travel Times (0-20%)	Travel Times (0-20%)	Vol.Difference		
	Check - ShrConvPathTT	Check - Paths List - Converged = Yes	(0-5%)	Total Travel Time (s)	Diff from prev. run
1	73%	83%	39%	3580686.17	-
2	94%	95%	84%	3578805.17	-0.1%
3	96%	95%	86%	3582264.83	0.1%
4	94%	95%	86%	3586792.83	0.1%
5	93%	95%	86%	3587418	0.0%
6	94%	94%	86%	3583552.17	-0.1%
7	97%	97%	85%	3584319	0.0%
8	97%	96%	86%	3585602	0.0%
9	98%	98%	86%	3584427.83	0.0%
10	95%	96%	86%	3584580.5	0.0%
11	97%	98%	86%	3578557.33	-0.2%
12	95%	96%	86%	3585301.67	0.2%
13	97%	97%	85%	3584468.5	0.0%
14	99%	98%	86%	3588727.83	0.1%
15	100%	99%	86%	3588207.67	0.0%

Most suitable run - BEW and WEG used for results reporting - demand reduced to 80% for suitable convergence levels

APPENDIX E:

2031 RC1&DS1 ROUTE PERFORMANCE– O-D JOURNEY TIME RESULTS

MG MARKERS - FULL ORIGIN-DESTINATION MARKERS (PARKING LOT TO PARKING LOT)

ALL VEHICLES - AM PEAK

Marker	Route			2031 RC1		2031 DS1		Difference (JTs)	
No.	From	To	Dist.	Avg.	Trips	Avg.	Trips	No.	%
1	A43 North	A43 North	1600 m	-	0	-	0	-	-
2	A43 North	B4100 East	1220 m	00:06:34	171	00:01:23	363	-00:05:11	▼ 79%
3	A43 North	Cherwell Services	2045 m	00:07:57	48	00:03:00	59	-00:04:57	▼ 62%
4	A43 North	M40 South	5269 m	00:09:56	998	00:05:09	1491	-00:04:47	▼ 48%
5	A43 North	B430	3805 m	00:09:46	256	-	0	-	-
6	A43 North	M40 North	7348 m	-	0	-	0	-	-
7	A43 North	B4100 West	1216 m	00:06:39	11	00:01:55	34	-00:04:44	▼ 71%
8	A43 North	Ardley Rd West	2718 m	-	0	-	0	-	-
9	A43 North	Ardley Rd East	3374 m	00:09:07	27	-	0	-	-
10	A43 North	B430 (New)	1298 m	-	0	00:05:18	412	-	-
11	A43 North	OxSRFI (South)	1116 m	-	0	00:06:19	122	-	-
12	A43 North	OxSRFI (North)	1744 m	-	0	00:06:09	119	-	-
13	B4100 East	A43 North	1298 m	00:05:41	217	00:01:57	232	-00:03:43	▼ 66%
14	B4100 East	B4100 East	1116 m	-	0	-	0	-	-
15	B4100 East	Cherwell Services	1744 m	-	0	-	0	-	-
16	B4100 East	M40 South	4968 m	-	0	00:05:08	4	-	-
17	B4100 East	B430	3504 m	00:08:47	11	-	0	-	-
18	B4100 East	M40 North	7047 m	00:10:05	161	00:06:44	39	-00:03:21	▼ 33%
19	B4100 East	B4100 West	915 m	00:05:40	231	00:01:44	255	-00:03:57	▼ 70%
20	B4100 East	Ardley Rd West	2417 m	-	0	-	0	-	-
21	B4100 East	Ardley Rd East	3073 m	-	0	-	0	-	-
22	B4100 East	B430 (New)	3597 m	-	0	00:05:24	8	-	-
23	B4100 East	OxSRFI (South)	2182 m	-	0	00:06:19	32	-	-
24	B4100 East	OxSRFI (North)	5726 m	-	0	00:06:10	34	-	-
25	Cherwell Services	A43 North	2062 m	00:02:45	62	00:04:27	63	00:01:41	▲ 61%
26	Cherwell Services	B4100 East	1880 m	-	0	-	0	-	-
27	Cherwell Services	Cherwell Services	583 m	-	0	-	0	-	-
28	Cherwell Services	M40 South	3597 m	00:03:02	213	00:03:35	278	00:00:33	▲ 18%
29	Cherwell Services	B430	2182 m	00:02:53	73	-	0	-	-
30	Cherwell Services	M40 North	5726 m	00:04:25	148	00:05:33	149	00:01:08	▲ 26%
31	Cherwell Services	B4100 West	1679 m	-	0	-	0	-	-
32	Cherwell Services	Ardley Rd West	1096 m	-	0	-	0	-	-
33	Cherwell Services	Ardley Rd East	1752 m	-	0	-	0	-	-
34	Cherwell Services	B430 (New)	5167 m	-	0	00:03:48	8	-	-
35	Cherwell Services	OxSRFI (South)	3927 m	-	0	-	0	-	-
36	Cherwell Services	OxSRFI (North)	4583 m	-	0	-	0	-	-
37	M40 South	A43 North	5550 m	00:04:45	1079	00:05:56	1052	00:00:31	▲ 11%
38	M40 South	B4100 East	5368 m	00:04:49	3	-	0	-	-
39	M40 South	Cherwell Services	4071 m	00:03:40	225	00:04:33	226	00:00:53	▲ 24%
40	M40 South	M40 South	7295 m	-	0	-	0	-	-
41	M40 South	B430	5013 m	00:04:10	2	00:04:44	1	00:00:35	▲ 14%
42	M40 South	M40 North	8281 m	00:04:43	2987	00:04:44	2924	00:00:01	▲ 0%
43	M40 South	B4100 West	5167 m	00:04:29	8	00:04:55	4	00:00:26	▲ 10%
44	M40 South	Ardley Rd West	3927 m	00:03:06	14	00:03:22	12	00:00:16	▲ 9%
45	M40 South	Ardley Rd East	4583 m	00:03:28	4	-	0	-	-
46	M40 South	B430 (New)	6018 m	-	0	-	0	-	-
47	M40 South	OxSRFI (South)	5836 m	-	0	00:05:46	59	-	-
48	M40 South	OxSRFI (North)	5231 m	-	0	00:05:36	58	-	-
49	B430	A43 Nor h	3806 m	00:03:58	197	-	0	-	-
50	B430	B4100 East	3624 m	00:04:03	12	-	0	-	-
51	B430	Cherwell Services	2327 m	-	0	-	0	-	-
52	B430	M40 South	5551 m	-	0	00:05:57	4	-	-
53	B430	B430	3450 m	0	-	-	0	-	-
54	B430	M40 North	6997 m	00:04:55	92	-	0	-	-
55	B430	B4100 West	3423 m	00:03:46	17	-	0	-	-
56	B430	Ardley Rd West	1431 m	00:01:23	18	-	0	-	-
57	B430	Ardley Rd East	2045 m	00:01:50	92	00:02:27	19	00:00:36	▲ 33%
58	B430	B430 (New)	4983 m	-	0	-	0	-	-
59	B430	OxSRFI (South)	3519 m	-	0	00:06:13	21	-	-
60	B430	OxSRFI (North)	7062 m	-	0	00:06:06	18	-	-
61	M40 North	A43 Nor h	6018 m	-	0	-	0	-	-
62	M40 North	B4100 East	5836 m	00:04:29	305	00:05:15	205	00:00:46	▲ 17%
63	M40 North	Cherwell Services	5231 m	00:04:20	189	00:04:38	191	00:00:18	▲ 7%
64	M40 North	M40 South	8295 m	00:04:54	3586	00:04:57	3457	00:00:04	▲ 1%
65	M40 North	B430	6991 m	00:06:03	140	-	0	-	-
66	M40 North	M40 North	10535 m	-	0	-	0	-	-
67	M40 North	B4100 West	5635 m	00:04:09	30	00:04:28	4	00:00:19	▲ 8%
68	M40 North	Ardley Rd West	5905 m	00:05:03	12	00:05:39	12	00:00:36	▲ 12%
69	M40 North	Ardley Rd East	6561 m	00:05:27	59	00:06:18	18	00:00:51	▲ 16%
70	M40 North	B430 (New)	2314 m	-	0	00:06:47	314	-	-
71	M40 North	OxSRFI (South)	1254 m	-	0	00:07:56	82	-	-
72	M40 North	OxSRFI (North)	1011 m	-	0	00:07:47	79	-	-
73	B4100 West	A43 Nor h	1116 m	00:07:25	53	00:01:29	71	-00:05:55	▼ 80%
74	B4100 West	B4100 East	934 m	00:07:34	293	00:01:35	298	-00:05:59	▼ 79%
75	B4100 West	Cherwell Services	1759 m	-	0	-	0	-	-
76	B4100 West	M40 South	4983 m	00:10:36	81	00:05:11	93	-00:05:24	▼ 51%
77	B4100 West	B430	3519 m	-	0	-	0	-	-
78	B4100 West	M40 North	7062 m	-	0	-	0	-	-
79	B4100 West	B4100 West	931 m	-	0	-	0	-	-
80	B4100 West	Ardley Rd West	2432 m	-	0	-	0	-	-
81	B4100 West	Ardley Rd East	3089 m	00:09:52	3	-	0	-	-
82	B4100 West	B430 (New)	2603 m	-	0	00:05:33	26	-	-
83	B4100 West	OxSRFI (South)	2604 m	-	0	00:06:32	8	-	-
84	B4100 West	OxSRFI (North)	2605 m	-	0	00:06:23	8	-	-
85	Ardley Rd West	A43 Nor h	2697 m	00:03:02	4	00:03:47	4	00:00:45	▲ 25%
86	Ardley Rd West	B4100 East	2515 m	-	0	-	0	-	-
87	Ardley Rd West	Cherwell Services	1218 m	-	0	-	0	-	-
88	Ardley Rd West	M40 South	4442 m	00:04:15	2	00:04:49	22	00:00:34	▲ 13%
89	Ardley Rd West	B430	1441 m	00:01:37	50	-	0	-	-
90	Ardley Rd West	M40 North	5887 m	00:03:59	10	00:04:40	10	00:00:42	▲ 17%
91	Ardley Rd West	B4100 West	2314 m	-	0	-	0	-	-
92	Ardley Rd West	Ardley Rd West	1254 m	-	0	-	0	-	-
93	Ardley Rd West	Ardley Rd East	1011 m	00:01:05	43	00:01:24	12	00:00:19	▲ 30%
94	Ardley Rd West	B430 (New)	2615 m	-	0	00:04:01	66	-	-
95	Ardley Rd West	OxSRFI (South)	2616 m	-	0	00:04:59	14	-	-
96	Ardley Rd West	OxSRFI (North)	2617 m	-	0	00:04:50	14	-	-
97	Ardley Rd East	A43 Nor h	3389 m	00:03:32	10	-	0	-	-
98	Ardley Rd East	B4100 East	3207 m	-	0	-	0	-	-
99	Ardley Rd East	Cherwell Services	1910 m	-	0	-	0	-	-
100	Ardley Rd East	M40 South	5134 m	-	0	-	0	-	-
101	Ardley Rd East	B430	2030 m	00:01:55	162	00:02:32	5	00:00:38	▲ 33%
102	Ardley Rd East	M40 North	6579 m	00:04:29	118	00:05:26	150	00:00:57	▲ 21%
103	Ardley Rd East	B4100 West	3006 m	00:03:20	8	-	0	-	-
104	Ardley Rd East	Ardley Rd West	1014 m	00:00:57	12	00:01:17	8	00:00:21	▲ 37%
105	Ardley Rd East	Ardley Rd East	2602 m	-	0	-	0	-	-
106	Ardley Rd East	B430 (New)	2627 m	-	0	-	0	-	-
107	Ardley Rd East	OxSRFI (South)	2628 m	-	0	-	0	-	-
108	Ardley Rd East	OxSRFI (North)	2629 m	-	0	-	0	-	-
109	B430 (New)	A43 Nor h	2630 m	-	0	00:05:04	128	-	-
110	B430 (New)	B4100 East	2631 m	-	0	-	0	-	-
111	B430 (New)	Cherwell Services	2632 m	-	0	-	0	-	-
112	B430 (New)	M40 South	2633 m	-	0	-	0	-	-
113	B430 (New)	B430	2634 m	-	0	00:04:06	4	-	-
114	B430 (New)	M40 Nor h	2635 m	-	0	00:06:01	176	-	-
115	B430 (New)	B4100 West	2636 m	-	0	00:04:44	23	-	-
116	B430 (New)	Ardley Rd West	2637 m	-	0	00:02:49	17	-	-
117	B430 (New)	Ardley Rd East	2638 m	-	0	-	0	-	-
118	B430 (New)	B430 (New)	2639 m	-	0	-	0	-	-
119	B430 (New)	OxSRFI (South)	2640 m	-	0	00:01:24	195	-	-
120	B430 (New)	OxSRFI (North)	2641 m	-	0	00:01:15	192	-	-
121	OxSRFI (South)	A43 Nor h	2642 m	-	0	00:06:04	26	-	-
122	OxSRFI (South)	B4100 East	2643 m	-	0	00:06:35	3	-	-
123	OxSRFI (South)	Cherwell Services	2644 m	-	0	-	0	-	-
124	OxSRFI (South)	M40 Sou h	2645 m	-	0	00:07:19	82	-	-
125	OxSRFI (South)	B430	2646 m	-	0	00:04:53	3	-	-
126	OxSRFI (South)	M40 Nor h	2647 m	-	0	00:07:23	51	-	-
127	OxSRFI (South)	B4100 West	2648 m	-	0	-	0	-	-
128	OxSRFI (South)	Ardley Rd West	2649 m	-	0	00:03:34	3	-	-
129	OxSRFI (South)	Ardley Rd East	2650 m	-	0	00:04:16	11	-	-
130	OxSRFI (South)	B430 (New)	2651 m	-	0	00:01:58	55	-	-
131	OxSRFI (South)	OxSRFI (South)	2652 m	-	0	-	0	-	-
132	OxSRFI (South)	OxSRFI (North)	2653 m	-	0	-	0	-	-
133	OxSRFI (North)	A43 North	2654 m	-	0	00:05:38	3	-	-
134	OxSRFI (North)	B4100 East	2655 m	-	0	00:06:30	1	-	-
135	OxSRFI (North)	Cherwell Services	2656 m	-	0	-	0	-	-
136	OxSRFI (North)	M40 Sou h	2657 m	-	0	00:06:45	9	-	-
137	OxSRFI (North)	B430	2658 m	-	0	00:04:25	0	-	-
138	OxSRFI (North)	M40 North	2659 m	-	0	00:06:55	5	-	-
139	OxSRFI (North)	B4100 West	2660 m	-	0	-	0	-	-
140	OxSRFI (North)	Ardley Rd West	2661 m	-	0	00:03:12	1	-	-
141	OxSRFI (North)	Ardley Rd East	2662 m	-	0	00:03:48	1	-	-
142	OxSRFI (North)	B430 (New)	2663 m	-	0	00:01:37	5	-	-
143	OxSRFI (North)	OxSRFI (South)	2664 m	-	0	-	0	-	-
144	OxSRFI (North)	OxSRFI (North)	2665 m	-	0	-	0	-	-

MG MARKERS - FULL ORIGIN-DESTINATION MARKERS (PARKING LOT TO PARKING LOT)

LIGHT VEHICLES - AM PEAK

JT Marker	Route			2031 RC1		2031 DS1		Difference (JTs)	
No.	From	To	Dist.	Avg.	Trips	Avg.	Trips	No.	%
1	A43 North	A43 North	1600 m	-	0	-	0	-	-
2	A43 North	B4100 East	1220 m	00:06:34	171	00:01:23	363	-00:05:11	▼ 79%
3	A43 North	Cherwell Services	2045 m	00:07:57	46	00:02:59	56	-00:04:58	▼ 62%
4	A43 North	M40 South	5269 m	00:09:51	811	00:05:05	1262	-00:04:46	▼ 48%
5	A43 North	B430	3805 m	00:09:46	253	-	0	-	-
6	A43 North	M40 North	7348 m	-	0	-	0	-	-
7	A43 North	B4100 West	1216 m	00:06:39	11	00:01:55	34	-00:04:44	▼ 71%
8	A43 North	Ardley Rd West	2718 m	-	0	-	0	-	-
9	A43 North	Ardley Rd East	3374 m	00:09:07	27	-	0	-	-
10	A43 North	B430 (New)	1298 m	-	0	00:05:18	408	-	-
11	A43 North	OxSRFI (South)	1116 m	-	0	00:06:19	114	-	-
12	A43 North	OxSRFI (North)	1744 m	-	0	00:06:08	112	-	-
13	B4100 East	A43 North	1298 m	00:05:40	203	00:01:56	216	-00:03:43	▼ 66%
14	B4100 East	B4100 East	1116 m	-	0	-	0	-	-
15	B4100 East	Cherwell Services	1744 m	-	0	-	0	-	-
16	B4100 East	M40 South	4968 m	-	0	00:05:08	4	-	-
17	B4100 East	B430	3504 m	00:08:47	11	-	0	-	-
18	B4100 East	M40 North	7047 m	00:10:05	161	00:06:44	39	-00:03:21	▼ 33%
19	B4100 East	B4100 West	915 m	00:05:40	221	00:01:43	243	-00:03:57	▼ 70%
20	B4100 East	Ardley Rd West	2417 m	-	0	-	0	-	-
21	B4100 East	Ardley Rd East	3073 m	-	0	-	0	-	-
22	B4100 East	B430 (New)	3597 m	-	0	00:05:24	8	-	-
23	B4100 East	OxSRFI (Sou h)	2182 m	-	0	00:06:17	30	-	-
24	B4100 East	OxSRFI (North)	5726 m	-	0	00:06:09	32	-	-
25	Cherwell Services	A43 North	2062 m	00:02:42	49	00:04:24	51	00:01:42	▲ 63%
26	Cherwell Services	B4100 East	1880 m	-	0	-	0	-	-
27	Cherwell Services	Cherwell Services	583 m	-	0	-	0	-	-
28	Cherwell Services	M40 South	3597 m	00:02:58	157	00:03:32	222	00:00:34	▲ 19%
29	Cherwell Services	B430	2182 m	00:02:53	73	-	0	-	-
30	Cherwell Services	M40 North	5726 m	00:04:15	103	00:05:22	103	00:01:07	▲ 27%
31	Cherwell Services	B4100 West	1679 m	-	0	-	0	-	-
32	Cherwell Services	Ardley Rd West	1096 m	-	0	-	0	-	-
33	Cherwell Services	Ardley Rd East	1752 m	-	0	-	0	-	-
34	Cherwell Services	B430 (New)	5167 m	-	0	00:03:48	8	-	-
35	Cherwell Services	OxSRFI (South)	3927 m	-	0	-	0	-	-
36	Cherwell Services	OxSRFI (North)	4583 m	-	0	-	0	-	-
37	M40 South	A43 North	5550 m	00:04:41	940	00:05:12	928	00:00:31	▲ 11%
38	M40 South	B4100 East	5368 m	00:04:49	3	-	0	-	-
39	M40 South	Cherwell Services	4071 m	00:03:39	209	00:04:31	210	00:00:53	▲ 24%
40	M40 South	M40 South	7295 m	-	0	-	0	-	-
41	M40 South	B430	5013 m	00:04:10	2	00:04:44	1	00:00:35	▲ 14%
42	M40 South	M40 North	8281 m	00:04:38	2626	00:04:39	2589	00:00:01	▲ 1%
43	M40 South	B4100 West	5167 m	00:04:29	8	00:04:55	4	00:00:26	▲ 10%
44	M40 South	Ardley Rd West	3927 m	00:03:06	14	00:03:22	12	00:00:16	▲ 9%
45	M40 South	Ardley Rd East	4583 m	00:03:28	4	-	0	-	-
46	M40 South	B430 (New)	6018 m	-	0	-	0	-	-
47	M40 South	OxSRFI (South)	5836 m	-	0	00:05:25	11	-	-
48	M40 South	OxSRFI (North)	5231 m	-	0	00:05:15	12	-	-
49	B430	A43 North	3806 m	00:03:58	197	-	0	-	-
50	B430	B4100 East	3624 m	00:04:03	12	-	0	-	-
51	B430	Cherwell Services	2327 m	-	0	-	0	-	-
52	B430	M40 South	5551 m	-	0	00:05:57	4	-	-
53	B430	B430	3450 m	0	-	-	0	-	-
54	B430	M40 North	6997 m	00:04:55	92	-	0	-	-
55	B430	B4100 West	3423 m	00:03:46	17	-	0	-	-
56	B430	Ardley Rd West	1431 m	00:01:23	18	-	0	-	-
57	B430	Ardley Rd East	2045 m	00:01:50	92	00:02:27	19	00:00:36	▲ 33%
58	B430	B430 (New)	4983 m	-	0	-	0	-	-
59	B430	OxSRFI (South)	3519 m	-	0	00:06:13	21	-	-
60	B430	OxSRFI (North)	7062 m	-	0	00:06:06	18	-	-
61	M40 North	A43 North	6018 m	-	0	-	0	-	-
62	M40 North	B4100 East	5836 m	00:04:28	289	00:05:13	189	00:00:45	▲ 17%
63	M40 North	Cherwell Services	5231 m	00:04:13	129	00:04:31	129	00:00:19	▲ 7%
64	M40 North	M40 South	8295 m	00:04:48	3031	00:04:52	2902	00:00:04	▲ 1%
65	M40 North	B430	6991 m	00:06:03	140	-	0	-	-
66	M40 North	M40 North	10535 m	-	0	-	0	-	-
67	M40 North	B4100 West	5635 m	00:04:09	30	00:04:28	4	00:00:19	▲ 8%
68	M40 North	Ardley Rd West	5905 m	00:05:03	12	00:05:39	12	00:00:36	▲ 12%
69	M40 North	Ardley Rd East	6561 m	00:05:27	59	00:06:18	18	00:00:51	▲ 16%
70	M40 North	B430 (New)	2314 m	-	0	00:06:47	314	-	-
71	M40 North	OxSRFI (South)	1254 m	-	0	00:07:44	52	-	-
72	M40 North	OxSRFI (North)	1011 m	-	0	00:07:35	51	-	-
73	B4100 West	A43 North	1116 m	00:07:25	53	00:01:29	71	-00:05:55	▼ 80%
74	B4100 West	B4100 East	934 m	00:07:34	288	00:01:35	290	-00:05:59	▼ 79%
75	B4100 West	Cherwell Services	1759 m	-	0	-	0	-	-
76	B4100 West	M40 South	4983 m	00:10:36	81	00:05:11	93	-00:05:24	▼ 51%
77	B4100 West	B430	3519 m	-	0	-	0	-	-
78	B4100 West	M40 North	7062 m	-	0	-	0	-	-
79	B4100 West	B4100 West	931 m	-	0	-	0	-	-
80	B4100 West	Ardley Rd West	2432 m	-	0	-	0	-	-
81	B4100 West	Ardley Rd East	3089 m	00:09:52	3	-	0	-	-
82	B4100 West	B430 (New)	2603 m	-	0	00:05:33	26	-	-
83	B4100 West	OxSRFI (South)	2604 m	-	0	00:06:32	8	-	-
84	B4100 West	OxSRFI (North)	2605 m	-	0	00:06:23	8	-	-
85	Ardley Rd West	A43 North	2697 m	00:03:02	4	00:03:47	4	00:00:45	▲ 25%
86	Ardley Rd West	B4100 East	2515 m	-	0	-	0	-	-
87	Ardley Rd West	Cherwell Services	1218 m	-	0	-	0	-	-
88	Ardley Rd West	M40 South	4442 m	00:04:15	2	00:04:49	22	00:00:34	▲ 13%
89	Ardley Rd West	B430	1441 m	00:01:35	41	-	0	-	-
90	Ardley Rd West	M40 North	5887 m	00:03:59	10	00:04:40	10	00:00:42	▲ 17%
91	Ardley Rd West	B4100 West	2314 m	-	0	-	0	-	-
92	Ardley Rd West	Ardley Rd West	1254 m	-	0	-	0	-	-
93	Ardley Rd West	Ardley Rd East	1011 m	00:01:05	43	00:01:24	12	00:00:19	▲ 30%
94	Ardley Rd West	B430 (New)	2615 m	-	0	00:01:59	58	-	-
95	Ardley Rd West	OxSRFI (South)	2616 m	-	0	00:04:59	14	-	-
96	Ardley Rd West	OxSRFI (North)	2617 m	-	0	00:04:50	14	-	-
97	Ardley Rd East	A43 North	3389 m	00:03:32	10	-	0	-	-
98	Ardley Rd East	B4100 East	3207 m	-	0	-	0	-	-
99	Ardley Rd East	Cherwell Services	1910 m	-	0	-	0	-	-
100	Ardley Rd East	M40 South	5134 m	-	0	-	0	-	-
101	Ardley Rd East	B430	2030 m	00:01:54	158	00:02:32	5	00:00:38	▲ 33%
102	Ardley Rd East	M40 North	6579 m	00:04:29	118	00:05:26	150	00:00:57	▲ 21%
103	Ardley Rd East	B4100 West	3006 m	00:03:20	8	-	0	-	-
104	Ardley Rd East	Ardley Rd West	1014 m	00:00:57	12	00:01:17	8	00:00:21	▲ 37%
105	Ardley Rd East	Ardley Rd East	2602 m	-	0	-	0	-	-
106	Ardley Rd East	B430 (New)	2627 m	-	0	-	0	-	-
107	Ardley Rd East	OxSRFI (South)	2628 m	-	0	-	0	-	-
108	Ardley Rd East	OxSRFI (North)	2629 m	-	0	-	0	-	-
109	B430 (New)	A43 North	2630 m	-	0	00:05:01	113	-	-
110	B430 (New)	B4100 East	2631 m	-	0	-	0	-	-
111	B430 (New)	Cherwell Services	2632 m	-	0	-	0	-	-
112	B430 (New)	M40 South	2633 m	-	0	-	0	-	-
113	B430 (New)	B430	2634 m	-	0	00:04:06	4	-	-
114	B430 (New)	M40 North	2635 m	-	0	00:05:55	153	-	-
115	B430 (New)	B4100 West	2636 m	-	0	00:04:44	23	-	-
116	B430 (New)	Ardley Rd West	2637 m	-	0	00:02:49	17	-	-
117	B430 (New)	Ardley Rd East	2638 m	-	0	-	0	-	-
118	B430 (New)	B430 (New)	2639 m	-	0	-	0	-	-
119	B430 (New)	OxSRFI (South)	2640 m	-	0	00:01:24	193	-	-
120	B430 (New)	OxSRFI (North)	2641 m	-	0	00:01:15	192	-	-
121	OxSRFI (South)	A43 North	2642 m	-	0	00:05:47	12	-	-
122	OxSRFI (South)	B4100 East	2643 m	-	0	-	0	-	-
123	OxSRFI (South)	Cherwell Services	2644 m	-	0	-	0	-	-
124	OxSRFI (South)	M40 South	2645 m	-	0	-	0	-	-
125	OxSRFI (South)	B430	2646 m	-	0	00:04:53	3	-	-
126	OxSRFI (South)	M40 North	2647 m	-	0	00:06:39	4	-	-
127	OxSRFI (South)	B4100 West	2648 m	-	0	-	0	-	-
128	OxSRFI (South)	Ardley Rd West	2649 m	-	0	00:03:34	3	-	-
129	OxSRFI (South)	Ardley Rd East	2650 m	-	0	00:04:16	11	-	-
130	OxSRFI (South)	B430 (New)	2651 m	-	0	00:01:58	53	-	-
131	OxSRFI (South)	OxSRFI (South)	2652 m	-	0	-	0	-	-
132	OxSRFI (South)	OxSRFI (North)	2653 m	-	0	-	0	-	-
133	OxSRFI (North)	A43 North	2654 m	-	0	00:05:22	1	-	-
134	OxSRFI (North)	B4100 East	2655 m	-	0	-	0	-	-
135	OxSRFI (North)	Cherwell Services	2656 m	-	0	-	0	-	-
136	OxSRFI (North)	M40 South	2657 m	-	0	-	0	-	-
137	OxSRFI (North)	B430	2658 m	-	0	00:04:25	0	-	-
138	OxSRFI (North)	M40 North	2659 m	-	0	00:06:25	0	-	-
139	OxSRFI (North)	B4100 West	2660 m	-	0	-	0	-	-
140	OxSRFI (North)	Ardley Rd West	2661 m	-	0	00:03:12	1	-	-
141	OxSRFI (North)	Ardley Rd East	2662 m	-	0	00:03:48	1	-	-
142	OxSRFI (North)	B430 (New)	2663 m	-	0	00:01:37	5	-	-
143	OxSRFI (North)	OxSRFI (South)	2664 m	-	0	-	0	-	-
144	OxSRFI (North)	OxSRFI (North)	2665 m	-	0	-	0	-	-

MG MARKERS - FULL ORIGIN-DESTINATION MARKERS (PARKING LOT TO PARKING LOT)

HEAVY VEHICLES - AM PEAK

Marker	Route			2031 RC1		2031 DS1		Difference (JTs)	
No.	From	To	Dist.	Avg.	Trips	Avg.	Trips	No.	%
1	A43 North	A43 North	1600 m	-	0	-	0	-	-
2	A43 North	B4100 East	1220 m	-	0	-	0	-	-
3	A43 North	Cherwell Services	2045 m	00:07:58	3	00:03:18	3	-00:04:39	▼ 58%
4	A43 North	M40 South	5269 m	00:10:15	187	00:05:50	229	-00:04:45	▼ 46%
5	A43 North	B430	3805 m	00:10:07	3	-	0	-	-
6	A43 North	M40 North	7348 m	-	0	-	0	-	-
7	A43 North	B4100 West	1216 m	-	0	-	0	-	-
8	A43 North	Ardley Rd West	2718 m	-	0	-	0	-	-
9	A43 North	Ardley Rd East	3374 m	-	0	-	0	-	-
10	A43 North	B430 (New)	1298 m	-	0	00:05:37	4	-	-
11	A43 North	OxSRFI (South)	1116 m	-	0	00:06:35	8	-	-
12	A43 North	OxSRFI (North)	1744 m	-	0	00:06:28	7	-	-
13	B4100 East	A43 North	1298 m	00:05:55	14	00:02:09	16	-00:03:46	▼ 64%
14	B4100 East	B4100 East	1116 m	-	0	-	0	-	-
15	B4100 East	Cherwell Services	1744 m	-	0	-	0	-	-
16	B4100 East	M40 South	4968 m	-	0	-	0	-	-
17	B4100 East	B430	3504 m	-	0	-	0	-	-
18	B4100 East	M40 North	7047 m	-	0	-	0	-	-
19	B4100 East	B4100 West	915 m	00:05:47	10	00:01:48	12	-00:03:59	▼ 69%
20	B4100 East	Ardley Rd West	2417 m	-	0	-	0	-	-
21	B4100 East	Ardley Rd East	3073 m	-	0	-	0	-	-
22	B4100 East	B430 (New)	3597 m	-	0	-	0	-	-
23	B4100 East	OxSRFI (Sou h)	2182 m	-	0	00:06:50	2	-	-
24	B4100 East	O

MG MARKERS - FULL ORIGIN-DESTINATION MARKERS (PARKING LOT TO PARKING LOT)

ALL VEHICLES - PM PEAK

Marker	Route			2031 RC1		2031 DS1		Difference (JTs)	
No.	From	To	Dist.	Avg.	Trips	Avg.	Trips	No.	%
1	A43 North	A43 North	1600 m	-	0	-	0	-	-
2	A43 North	B4100 East	1220 m	00:01:24	266	00:01:19	280	-00:00:06	▼ 7%
3	A43 North	Cherwell Services	2045 m	00:02:47	104	00:02:47	106	00:00:01	▲ 0%
4	A43 North	M40 South	5269 m	00:04:43	1216	00:04:46	1224	00:00:02	▲ 1%
5	A43 North	B430	3805 m	00:04:27	145	-	0	-	-
6	A43 North	M40 North	7348 m	-	0	-	0	-	-
7	A43 North	B4100 West	1216 m	00:01:27	68	00:01:50	44	00:00:23	▲ 26%
8	A43 North	Ardley Rd West	2718 m	00:03:32	4	-	0	-	-
9	A43 North	Ardley Rd East	3374 m	00:03:54	20	-	0	-	-
10	A43 North	B430 (New)	1298 m	-	0	00:04:48	126	-	-
11	A43 North	OxSRFI (South)	1116 m	-	0	00:05:46	46	-	-
12	A43 North	OxSRFI (North)	1744 m	-	0	00:05:40	43	-	-
13	B4100 East	A43 North	1298 m	00:06:13	260	00:01:58	325	-00:04:15	▼ 68%
14	B4100 East	B4100 East	1116 m	-	0	-	0	-	-
15	B4100 East	Cherwell Services	1744 m	-	0	-	0	-	-
16	B4100 East	M40 South	4968 m	00:09:26	3	00:04:53	8	-00:04:33	▼ 48%
17	B4100 East	B430	3504 m	00:09:06	3	-	0	-	-
18	B4100 East	M40 North	7047 m	00:10:43	151	00:06:54	100	-00:03:49	▼ 36%
19	B4100 East	B4100 West	915 m	00:06:13	177	00:01:44	277	-00:04:29	▼ 72%
20	B4100 East	Ardley Rd West	2417 m	00:08:10	3	00:04:11	4	-00:03:59	▼ 49%
21	B4100 East	Ardley Rd East	3073 m	-	0	-	0	-	-
22	B4100 East	B430 (New)	3597 m	-	0	-	0	-	-
23	B4100 East	OxSRFI (South)	2182 m	-	0	00:05:53	14	-	-
24	B4100 East	OxSRFI (North)	5726 m	-	0	00:05:56	14	-	-
25	Cherwell Services	A43 North	2062 m	00:03:18	86	00:04:43	87	00:01:26	▲ 43%
26	Cherwell Services	B4100 East	1880 m	-	0	-	0	-	-
27	Cherwell Services	Cherwell Services	583 m	-	0	-	0	-	-
28	Cherwell Services	M40 South	3597 m	00:03:01	262	00:03:11	260	00:00:10	▲ 6%
29	Cherwell Services	B430	2182 m	-	0	-	0	-	-
30	Cherwell Services	M40 North	5726 m	00:04:29	176	00:05:28	179	00:01:00	▲ 22%
31	Cherwell Services	B4100 West	1679 m	-	0	-	0	-	-
32	Cherwell Services	Ardley Rd West	1096 m	-	0	-	0	-	-
33	Cherwell Services	Ardley Rd East	1752 m	-	0	-	0	-	-
34	Cherwell Services	B430 (New)	5167 m	-	0	-	0	-	-
35	Cherwell Services	OxSRFI (South)	3927 m	-	0	-	0	-	-
36	Cherwell Services	OxSRFI (North)	4583 m	-	0	-	0	-	-
37	M40 South	A43 North	5550 m	00:05:19	1513	00:05:36	1686	00:00:17	▲ 5%
38	M40 South	B4100 East	5368 m	00:05:23	4	00:05:48	8	00:00:25	▲ 8%
39	M40 South	Cherwell Services	4071 m	00:03:57	213	00:04:30	214	00:00:33	▲ 14%
40	M40 South	M40 South	7295 m	-	0	-	0	-	-
41	M40 South	B430	5013 m	00:04:01	8	-	0	-	-
42	M40 South	M40 North	8281 m	00:04:54	3962	00:04:56	3836	00:00:03	▲ 1%
43	M40 South	B4100 West	5167 m	-	0	00:05:15	35	-	-
44	M40 South	Ardley Rd West	3927 m	00:03:06	68	00:03:23	42	00:00:16	▲ 9%
45	M40 South	Ardley Rd East	4583 m	-	0	-	0	-	-
46	M40 South	B430 (New)	6018 m	-	0	-	0	-	-
47	M40 South	OxSRFI (South)	5836 m	-	0	00:05:31	45	-	-
48	M40 South	OxSRFI (North)	5231 m	-	0	00:05:23	45	-	-
49	B430	A43 North	3806 m	00:04:36	139	-	0	-	-
50	B430	B4100 East	3624 m	00:04:46	4	-	0	-	-
51	B430	Cherwell Services	2327 m	-	0	-	0	-	-
52	B430	M40 South	5551 m	00:05:49	22	-	0	-	-
53	B430	B430	3450 m	-	0	-	0	-	-
54	B430	M40 North	6997 m	00:05:09	119	-	0	-	-
55	B430	B4100 West	3423 m	-	0	-	0	-	-
56	B430	Ardley Rd West	1431 m	00:01:23	70	-	0	-	-
57	B430	Ardley Rd East	2045 m	00:01:48	61	-	0	-	-
58	B430	B430 (New)	4983 m	-	0	-	0	-	-
59	B430	OxSRFI (South)	3519 m	-	0	00:06:06	6	-	-
60	B430	OxSRFI (North)	7062 m	-	0	00:05:59	6	-	-
61	M40 North	A43 Nor h	6018 m	-	0	-	0	-	-
62	M40 North	B4100 East	5836 m	00:04:56	167	00:05:18	215	00:00:22	▲ 7%
63	M40 North	Cherwell Services	5231 m	00:04:20	195	00:04:36	196	00:00:16	▲ 6%
64	M40 North	M40 South	8295 m	00:04:46	3365	00:04:47	3348	00:00:01	▲ 0%
65	M40 North	B430	6991 m	00:05:55	99	-	0	-	-
66	M40 North	M40 North	10535 m	-	0	-	0	-	-
67	M40 North	B4100 West	5635 m	-	0	-	0	-	-
68	M40 North	Ardley Rd West	5905 m	00:04:55	16	00:05:34	16	00:00:39	▲ 13%
69	M40 North	Ardley Rd East	6561 m	00:05:23	41	00:06:18	12	00:00:54	▲ 17%
70	M40 North	B430 (New)	2314 m	-	0	00:06:24	133	-	-
71	M40 North	OxSRFI (South)	1254 m	-	0	00:07:49	37	-	-
72	M40 North	OxSRFI (North)	1011 m	-	0	00:07:43	37	-	-
73	B4100 West	A43 Nor h	1116 m	00:06:36	56	00:01:28	46	-00:05:09	▼ 78%
74	B4100 West	B4100 East	934 m	00:06:44	219	00:01:29	148	-00:05:15	▼ 78%
75	B4100 West	Cherwell Services	1759 m	-	0	-	0	-	-
76	B4100 West	M40 South	4983 m	00:09:08	44	00:04:54	34	-00:04:14	▼ 46%
77	B4100 West	B430	3519 m	-	0	-	0	-	-
78	B4100 West	M40 North	7062 m	-	0	-	0	-	-
79	B4100 West	B4100 West	931 m	-	0	-	0	-	-
80	B4100 West	Ardley Rd West	2432 m	-	0	-	0	-	-
81	B4100 West	Ardley Rd East	3089 m	-	0	-	0	-	-
82	B4100 West	B430 (New)	2603 m	-	0	00:05:07	19	-	-
83	B4100 West	OxSRFI (South)	2604 m	-	0	00:06:10	2	-	-
84	B4100 West	OxSRFI (North)	2605 m	-	0	00:05:55	2	-	-
85	Ardley Rd West	A43 Nor h	2697 m	00:03:37	8	00:04:30	8	00:00:53	▲ 24%
86	Ardley Rd West	B4100 East	2515 m	-	0	-	0	-	-
87	Ardley Rd West	Cherwell Services	1218 m	-	0	-	0	-	-
88	Ardley Rd West	M40 South	4442 m	-	0	00:04:48	21	-	-
89	Ardley Rd West	B430	1441 m	00:01:29	32	-	0	-	-
90	Ardley Rd West	M40 North	5887 m	00:04:12	8	00:05:02	8	00:00:50	▲ 20%
91	Ardley Rd West	B4100 West	2314 m	-	0	-	0	-	-
92	Ardley Rd West	Ardley Rd West	1254 m	-	0	-	0	-	-
93	Ardley Rd West	Ardley Rd East	1011 m	00:01:03	24	00:01:25	12	00:00:22	▲ 36%
94	Ardley Rd West	B430 (New)	2615 m	-	0	00:03:56	8	-	-
95	Ardley Rd West	OxSRFI (South)	2616 m	-	0	00:05:02	2	-	-
96	Ardley Rd West	OxSRFI (North)	2617 m	-	0	00:05:05	2	-	-
97	Ardley Rd East	A43 Nor h	3389 m	-	0	00:05:06	4	-	-
98	Ardley Rd East	B4100 East	3207 m	-	0	-	0	-	-
99	Ardley Rd East	Cherwell Services	1910 m	-	0	-	0	-	-
100	Ardley Rd East	M40 South	5134 m	-	0	-	0	-	-
101	Ardley Rd East	B430	2030 m	00:01:49	8	-	0	-	-
102	Ardley Rd East	M40 North	6579 m	00:04:41	81	00:05:47	107	00:01:06	▲ 23%
103	Ardley Rd East	B4100 West	3006 m	-	0	-	0	-	-
104	Ardley Rd East	Ardley Rd West	1014 m	00:00:55	32	00:01:18	5	00:00:23	▲ 41%
105	Ardley Rd East	Ardley Rd East	2602 m	-	0	-	0	-	-
106	Ardley Rd East	B430 (New)	2627 m	-	0	-	0	-	-
107	Ardley Rd East	OxSRFI (South)	2628 m	-	0	-	0	-	-
108	Ardley Rd East	OxSRFI (North)	2629 m	-	0	-	0	-	-
109	B430 (New)	A43 Nor h	2630 m	-	0	00:05:33	216	-	-
110	B430 (New)	B4100 East	2631 m	-	0	-	0	-	-
111	B430 (New)	Cherwell Services	2632 m	-	0	-	0	-	-
112	B430 (New)	M40 South	2633 m	-	0	-	0	-	-
113	B430 (New)	B430	2634 m	-	0	-	0	-	-
114	B430 (New)	M40 Nor h	2635 m	-	0	00:06:15	299	-	-
115	B430 (New)	B4100 West	2636 m	-	0	-	0	-	-
116	B430 (New)	Ardley Rd West	2637 m	-	0	00:02:56	68	-	-
117	B430 (New)	Ardley Rd East	2638 m	-	0	-	0	-	-
118	B430 (New)	B430 (New)	2639 m	-	0	-	0	-	-
119	B430 (New)	OxSRFI (South)	2640 m	-	0	00:01:19	78	-	-
120	B430 (New)	OxSRFI (North)	2641 m	-	0	00:01:12	76	-	-
121	OxSRFI (South)	A43 North	2642 m	-	0	00:06:22	262	-	-
122	OxSRFI (South)	B4100 East	2643 m	-	0	00:06:42	28	-	-
123	OxSRFI (South)	Cherwell Services	2644 m	-	0	-	0	-	-
124	OxSRFI (South)	M40 Sou h	2645 m	-	0	00:07:07	92	-	-
125	OxSRFI (South)	B430	2646 m	-	0	00:05:03	42	-	-
126	OxSRFI (South)	M40 Nor h	2647 m	-	0	00:07:11	141	-	-
127	OxSRFI (South)	B4100 West	2648 m	-	0	-	0	-	-
128	OxSRFI (South)	Ardley Rd West	2649 m	-	0	00:03:45	47	-	-
129	OxSRFI (South)	Ardley Rd East	2650 m	-	0	00:04:25	48	-	-
130	OxSRFI (South)	B430 (New)	2651 m	-	0	00:02:03	359	-	-
131	OxSRFI (South)	OxSRFI (South)	2652 m	-	0	-	0	-	-
132	OxSRFI (South)	OxSRFI (North)	2653 m	-	0	-	0	-	-
133	OxSRFI (North)	A43 North	2654 m	-	0	00:05:57	41	-	-
134	OxSRFI (North)	B4100 East	2655 m	-	0	00:06:15	4	-	-
135	OxSRFI (North)	Cherwell Services	2656 m	-	0	-	0	-	-
136	OxSRFI (North)	M40 Sou h	2657 m	-	0	00:06:38	14	-	-
137	OxSRFI (North)	B430	2658 m	-	0	00:04:38	7	-	-
138	OxSRFI (North)	M40 North	2659 m	-	0	00:06:43	25	-	-
139	OxSRFI (North)	B4100 West	2660 m	-	0	-	0	-	-
140	OxSRFI (North)	Ardley Rd West	2661 m	-	0	00:03:19	8	-	-
141	OxSRFI (North)	Ardley Rd East	2662 m	-	0	00:03:55	7	-	-
142	OxSRFI (North)	B430 (New)	2663 m	-	0	00:01:38	58	-	-
143	OxSRFI (North)	OxSRFI (South)	2664 m	-	0	-	0	-	-
144	OxSRFI (North)	OxSRFI (North)	2665 m	-	0	-	0	-	-

MG MARKERS - FULL ORIGIN-DESTINATION MARKERS (PARKING LOT TO PARKING LOT)

LIGHT VEHICLES - PM PEAK

Marker	Route			2031 RC1		2031 DS1		Difference (JTs)	
No.	From	To	Dist.	Avg.	Trips	Avg.	Trips	No.	%
1	A43 North	A43 North	1600 m	-	0	-	0	-	-
2	A43 North	B4100 East	1220 m	00:01:24	256	00:01:19	270	-00:00:06	▼ 7%
3	A43 North	Cherwell Services	2045 m	00:02:47	104	00:02:47	106	00:00:01	▲ 0%
4	A43 North	M40 South	5269 m	00:04:41	1116	00:04:43	1125	00:00:02	▲ 1%
5	A43 North	B430	3805 m	00:04:27	145	-	0	-	-
6	A43 North	M40 North	7348 m	-	0	-	0	-	-
7	A43 North	B4100 West	1216 m	00:01:27	68	00:01:50	44	00:00:23	▲ 26%
8	A43 North	Ardley Rd West	2718 m	00:03:32	4	-	0	-	-
9	A43 North	Ardley Rd East	3374 m	00:03:54	20	-	0	-	-
10	A43 North	B430 (New)	1298 m	-	0	00:04:48	126	-	-
11	A43 North	OxSRFI (South)	1116 m	-	0	00:05:41	37	-	-
12	A43 North	OxSRFI (North)	1744 m	-	0	00:05:36	36	-	-
13	B4100 East	A43 North	1298 m	00:06:13	260	00:01:58	325	-00:04:15	▼ 68%
14	B4100 East	B4100 East	1116 m	-	0	-	0	-	-
15	B4100 East	Cherwell Services	1744 m	-	0	-	0	-	-
16	B4100 East	M40 South	4968 m	00:09:26	3	00:04:53	8	-00:04:33	▼ 48%
17	B4100 East	B430	3504 m	00:09:06	3	-	0	-	-
18	B4100 East	M40 North	7047 m	00:10:42	148	00:06:53	96	-00:03:50	▼ 36%
19	B4100 East	B4100 West	915 m	00:06:13	177	00:01:44	277	-00:04:29	▼ 72%
20	B4100 East	Ardley Rd West	2417 m	00:08:10	3	00:04:11	4	-00:03:59	▼ 49%
21	B4100 East	Ardley Rd East	3073 m	-	0	-	0	-	-
22	B4100 East	B430 (New)	3597 m	-	0	-	0	-	-
23	B4100 East	OxSRFI (South)	2182 m	-	0	00:05:51	12	-	-
24	B4100 East	OxSRFI (North)	5726 m	-	0	00:05:50	12	-	-
25	Cherwell Services	A43 North	2062 m	00:03:15	73	00:04:40	73	00:01:25	▲ 43%
26	Cherwell Services	B4100 East	1880 m	-	0	-	0	-	-
27	Cherwell Services	Cherwell Services	583 m	-	0	-	0	-	-
28	Cherwell Services	M40 South	3597 m	00:02:58	214	00:03:08	211	00:00:10	▲ 6%
29	Cherwell Services	B430	2182 m	-	0	-	0	-	-
30	Cherwell Services	M40 North	5726 m	00:04:22	139	00:05:22	140	00:01:00	▲ 23%
31	Cherwell Services	B4100 West	1679 m	-	0	-	0	-	-
32	Cherwell Services	Ardley Rd West	1096 m	-	0	-	0	-	-
33	Cherwell Services	Ardley Rd East	1752 m	-	0	-	0	-	-
34	Cherwell Services	B430 (New)	5167 m	-	0	-	0	-	-
35	Cherwell Services	OxSRFI (South)	3927 m	-	0	-	0	-	-
36	Cherwell Services	OxSRFI (North)	4583 m	-	0	-	0	-	-
37	M40 South	A43 North	5550 m	00:05:17	1383	00:05:34	1557	00:00:17	▲ 5%
38	M40 South	B4100 East	5368 m	00:05:23	4	00:05:48	8	00:00:25	▲ 8%
39	M40 South	Cherwell Services	4071 m	00:03:54	167	00:04:27	169	00:00:33	▲ 14%
40	M40 South	M40 South	7295 m	-	0	-	0	-	-
41	M40 South	B430	5013 m	00:04:01	8	-	0	-	-
42	M40 South	M40 North	8281 m	00:04:50	3535	00:04:53	3443	00:00:03	▲ 1%
43	M40 South	B4100 West	5167 m	-	0	00:05:15	35	-	-
44	M40 South	Ardley Rd West	3927 m	00:03:06	68	00:03:23	42	00:00:16	▲ 9%
45	M40 South	Ardley Rd East	4583 m	-	0	-	0	-	-
46	M40 South	B430 (New)	6018 m	-	0	-	0	-	-
47	M40 South	OxSRFI (South)	5836 m	-	0	00:05:09	2	-	-
48	M40 South	OxSRFI (North)	5231 m	-	0	00:05:06	2	-	-
49	B430	A43 North	3806 m	00:04:36	139	-	0	-	-
50	B430	B4100 East	3624 m	00:04:46	4	-	0	-	-
51	B430	Cherwell Services	2327 m	-	0	-	0	-	-
52	B430	M40 South	5551 m	-	0	-	0	-	-
53	B430	B430	3450 m	-	0	-	0	-	-
54	B430	M40 North	6997 m	00:05:09	119	-	0	-	-
55	B430	B4100 West	3423 m	-	0	-	0	-	-
56	B430	Ardley Rd West	1431 m	00:01:23	70	-	0	-	-
57	B430	Ardley Rd East	2045 m	00:01:48	61	-	0	-	-
58	B430	B430 (New)	4983 m	-	0	-	0	-	-
59	B430	OxSRFI (South)	3519 m	-	0	00:06:06	6	-	-
60	B430	OxSRFI (North)	7062 m	-	0	00:05:59	6	-	-
61	M40 North	A43 Nor h	6018 m	-	0	-	0	-	-
62	M40 North	B4100 East	5836 m	00:04:56	167	00:05:18	215	00:00:22	▲ 7%
63	M40 North	Cherwell Services	5231 m	00:04:13	142	00:04:29	142	00:00:17	▲ 7%
64	M40 North	M40 South	8295 m	00:04:42	3032	00:04:43	3015	00:00:01	▲ 1%
65	M40 North	B430	6991 m	00:05:55	99	-	0	-	-
66	M40 North	M40 North	10535 m	-	0	-	0	-	-
67	M40 North	B4100 West	5635 m	-	0	-	0	-	-
68	M40 North	Ardley Rd West	5905 m	00:04:55	16	00:05:34	16	00:00:39	▲ 13%
69	M40 North	Ardley Rd East	6561 m	00:05:23	41	00:06:18	12	00:00:54	▲ 17%
70	M40 North	B430 (New)	2314 m	-	0	00:06:24	133	-	-
71	M40 North	OxSRFI (South)	1254 m	-	0	00:07:22	12	-	-
72	M40 North	OxSRFI (North)	1011 m	-	0	00:07:15	11	-	-
73	B4100 West	A43 North	1116 m	00:06:36	56	00:01:28	46	-00:05:09	▼ 78%
74	B4100 West	B4100 East	934 m	00:06:44	215	00:01:29	144	-00:05:15	▼ 78%
75	B4100 West	Cherwell Services	1759 m	-	0	-	0	-	-
76	B4100 West	M40 South	4983 m	00:09:08	44	00:04:54	34	-00:04:14	▼ 46%
77	B4100 West	B430	3519 m	-	0	-	0	-	-
78	B4100 West	M40 North	7062 m	-	0	-	0	-	-
79	B4100 West	B4100 West	931 m	-	0	-	0	-	-
80	B4100 West	Ardley Rd West	2432 m	-	0	-	0	-	-
81	B4100 West	Ardley Rd East	3089 m	-	0	-	0	-	-
82	B4100 West	B430 (New)	2603 m	-	0	00:05:07	19	-	-
83	B4100 West	OxSRFI (South)	2604 m	-	0	00:06:10	2	-	-
84	B4100 West	OxSRFI (North)	2605 m	-	0	00:05:55	2	-	-
85	Ardley Rd West	A43 Nor h	2697 m	00:03:37	8	00:04:30	8	00:00:53	▲ 24%
86	Ardley Rd West	B4100 East	2515 m	-	0	-	0	-	-
87	Ardley Rd West	Cherwell Services	1218 m	-	0	-	0	-	-
88	Ardley Rd West	M40 South	4442 m	-	0	00:04:48	21	-	-
89	Ardley Rd West	B430	1441 m	00:01:29	32	-	0	-	-
90	Ardley Rd West	M40 North	5887 m	00:04:12	8	00:05:02	8	00:00:50	▲ 20%
91	Ardley Rd West	B4100 West	2314 m	-	0	-	0	-	-
92	Ardley Rd West	Ardley Rd West	1254 m	-	0	-	0	-	-
93	Ardley Rd West	Ardley Rd East	1011 m	00:01:03	24	00:01:25	12	00:00:22	▲ 36%
94	Ardley Rd West	B430 (New)	2615 m	-	0	00:03:56	8	-	-
95	Ardley Rd West	OxSRFI (South)	2616 m	-	0	00:05:02	2	-	-
96	Ardley Rd West	OxSRFI (North)	2617 m	-	0	00:05:05	2	-	-
97	Ardley Rd East	A43 Nor h	3389 m	-	0	00:05:06	4	-	-
98	Ardley Rd East	B4100 East	3207 m	-	0	-	0	-	-
99	Ardley Rd East	Cherwell Services	1910 m	-	0	-	0	-	-
100	Ardley Rd East	M40 South	5134 m	-	0	-	0	-	-
101	Ardley Rd East	B430	2030 m	00:01:49	8	-	0	-	-
102	Ardley Rd East	M40 North	6579 m	00:04:41	81	00:05:47	107	00:01:06	▲ 23%
103	Ardley Rd East	B4100 West	3006 m	-	0	-	0	-	-
104	Ardley Rd East	Ardley Rd West	1014 m	00:00:55	32	00:01:18	5	00:00:23	▲ 41%
105	Ardley Rd East	Ardley Rd East	2602 m	-	0	-	0	-	-
106	Ardley Rd East	B430 (New)	2627 m	-	0	-	0	-	-
107	Ardley Rd East	OxSRFI (South)	2628 m	-	0	-	0	-	-
108	Ardley Rd East	OxSRFI (North)	2629 m	-	0	-	0	-	-
109	B430 (New)	A43 Nor h	2630 m	-	0	00:05:33	216	-	-
110	B430 (New)	B4100 East	2631 m	-	0	-	0	-	-
111	B430 (New)	Cherwell Services	2632 m	-	0	-	0	-	-
112	B430 (New)	M40 South	2633 m	-	0	-	0	-	-
113	B430 (New)	B430	2634 m	-	0	-	0	-	-
114	B430 (New)	M40 North	2635 m	-	0	00:06:11	268	-	-
115	B430 (New)	B4100 West	2636 m	-	0	-	0	-	-
116	B430 (New)	Ardley Rd West	2637 m	-	0	00:02:56	68	-	-
117	B430 (New)	Ardley Rd East	2638 m	-	0	-	0	-	-
118	B430 (New)	B430 (New)	2639 m	-	0	-	0	-	-
119	B430 (New)	OxSRFI (South)	2640 m	-	0	00:01:18	76	-	-
120	B430 (New)	OxSRFI (North)	2641 m	-	0	00:01:12	76	-	-
121	OxSRFI (South)	A43 North	2642 m	-	0	00:06:21	249	-	-
122	OxSRFI (South)	B4100 East	2643 m	-	0	00:06:38	25	-	-
123	OxSRFI (South)	Cherwell Services	2644 m	-	0	-	0	-	-
124	OxSRFI (South)	M40 Sou h	2645 m	-	0	00:06:42	24	-	-
125	OxSRFI (South)	B430	2646 m	-	0	00:05:03	42	-	-
126	OxSRFI (South)	M40 Nor h	2647 m	-	0	00:06:59	101	-	-
127	OxSRFI (South)	B4100 West	2648 m	-	0	-	0	-	-
128	OxSRFI (South)	Ardley Rd West	2649 m	-	0	00:03:45	47	-	-
129	OxSRFI (South)	Ardley Rd East	2650 m	-	0	00:04:25	48	-	-
130	OxSRFI (South)	B430 (New)	2651 m	-	0	00:02:03	357	-	-
131	OxSRFI (South)	OxSRFI (South)	2652 m	-	0	-	0	-	-
132	OxSRFI (South)	OxSRFI (North)	2653 m	-	0	-	0	-	-
133	OxSRFI (North)	A43 North	2654 m	-	0	00:05:55	39	-	-
134	OxSRFI (North)	B4100 East	2655 m	-	0	00:06:11	3	-	-
135	OxSRFI (North)	Cherwell Services	2656 m	-	0	-	0	-	-
136	OxSRFI (North)	M40 Sou h	2657 m	-	0	00:06:23	4	-	-
137	OxSRFI (North)	B430	2658 m	-	0	00:04:38	7	-	-
138	OxSRFI (North)	M40 North	2659 m	-	0	00:06:31	18	-	-
139	OxSRFI (North)	B4100 West	2660 m	-	0	-	0	-	-
140	OxSRFI (North)	Ardley Rd West	2661 m	-	0	00:03:19	8	-	-
141	OxSRFI (North)	Ardley Rd East	2662 m	-	0	00:03:55	7	-	-
142	OxSRFI (North)	B430 (New)	2663 m	-	0	00:01:38	58	-	-
143	OxSRFI (North)	OxSRFI (South)	2664 m	-	0	-	0	-	-
144	OxSRFI (North)	OxSRFI (North)	2665 m	-	0	-	0	-	-

MG MARKERS - FULL ORIGIN-DESTINATION MARKERS (PARKING LOT TO PARKING LOT)

HEAVY VEHICLES - PM PEAK

Marker	Route			2031 RC1		2031 DS1		Difference (JTs)	
No.	From	To	Dist.	Avg.	Trips	Avg.	Trips	No.	%
1	A43 North	A43 North	1600 m	-	0	-	0	-	-
2	A43 North	B4100 East	1220 m	00:01:32	10	00:01:26	10	-00:00:06	▼ 6%
3	A43 North	Cherwell Services	2045 m	-	0	-	0	-	-
4	A43 North	M40 South	5269 m	00:05:09	100	00:05:12	100	00:00:03	▲ 1%
5	A43 North	B430	3805 m	-	0	-	0	-	-
6	A43 North	M40 North	7348 m	-	0	-	0	-	-
7	A43 North	B4100 West	1216 m	-	0	-	0	-	-
8	A43 North	Ardley Rd West	2718 m	-	0	-	0	-	-
9	A43 North	Ardley Rd East	3374 m	-	0	-	0	-	-
10	A43 North	B430 (New)	1298 m	-	0	-	0	-	-
11	A43 North	OxSRFI (South)	1116 m	-	0	00:06:10	8	-	-
12	A43 North	OxSRFI (North)	1744 m	-	0	00:06:00	8	-	-
13	B4100 East	A43 North	1298 m	-	0	-	0	-	-
14	B4100 East	B4100 East	1116 m	-	0	-	0	-	-
15	B4100 East	Cherwell Services	1744 m	-	0	-	0	-	-
16	B4100 East	M40 South	4968 m	-	0	-	0	-	-
17	B4100 East	B430	3504 m	-	0	-	0	-	-
18	B4100 East	M40 North	7047 m	00:11:19	3	00:07:22	4	-00:03:57	▼ 35%
19	B4100 East	B4100 West	915 m	-	0	-	0	-	-
20	B4100 East	Ardley Rd West	2417 m	-	0	-	0	-	-
21	B4100 East	Ardley Rd East	3073 m	-	0	-	0	-	-
22	B4100 East	B430 (New)	3597 m	-	0	-	0	-	-
23	B4100 East	OxSRFI (South)	2182 m	-	0	00:06:13	2	-	-
24	B4100 East	OxSRFI (North)	5726 m	-	0	00:06:27	2	-	-
25	Cherwell Services	A43 North	2062 m	00:03:31	13	00:05:00	13	00:01:29	▲ 42%
26	Cherwell Services	B4100 East	1880 m	-	0	-	0	-	-
27	Cherwell Services	Cherwell Services	583 m	-	0	-	0	-	-
28	Cherwell Services	M40 South	3597 m

APPENDIX F:

2031 RC1-SENS TEST & DS1-SENS TEST ROUTE PERFORMANCE– O-D JOURNEY TIME RESULTS

MG MARKERS - FULL ORIGIN-DESTINATION MARKERS (PARKING LOT TO PARKING LOT)

ALL VEHICLES - AM PEAK

Marker	Route			2031 RC1-SensTest		2031 DS1-SensTest		Difference (JTs)	
No.	From	To	Dist.	Avg.	Trips	Avg.	Trips	No.	%
1	A43 North	A43 North	1600 m	-	0	-	0	-	-
2	A43 North	B4100 East	1220 m	00:06:29	130	00:01:27	318	-00:05:03	▼ 78%
3	A43 North	Cherwell Services	2045 m	00:07:56	64	00:03:14	83	-00:04:42	▼ 59%
4	A43 North	M40 South	5269 m	00:09:54	969	00:05:20	1531	-00:04:34	▼ 46%
5	A43 North	B430	3805 m	00:09:43	211	00:06:03	23	-00:03:40	▼ 38%
6	A43 North	M40 North	7348 m	00:11:00	46	00:07:02	65	-00:03:58	▼ 36%
7	A43 North	B4100 West	1216 m	00:06:39	21	00:02:06	51	-00:04:33	▼ 68%
8	A43 North	Ardley Rd West	2718 m	00:08:42	7	00:04:27	9	-00:04:14	▼ 49%
9	A43 North	Ardley Rd East	3374 m	00:09:04	26	-	0	-	-
10	A43 North	B430 (New)	1298 m	-	0	00:05:31	412	-	-
11	A43 North	OxSRFI (South)	1116 m	-	0	00:06:28	121	-	-
12	A43 North	OxSRFI (North)	1744 m	-	0	00:06:21	123	-	-
13	B4100 East	A43 North	1298 m	00:06:38	145	00:02:01	192	-00:04:38	▼ 70%
14	B4100 East	B4100 East	1116 m	-	0	-	0	-	-
15	B4100 East	Cherwell Services	1744 m	00:07:51	4	00:03:19	6	-00:04:32	▼ 58%
16	B4100 East	M40 South	4968 m	00:09:57	4	00:05:13	8	-00:04:44	▼ 48%
17	B4100 East	B430	3504 m	00:09:46	8	-	0	-	-
18	B4100 East	M40 North	7047 m	00:11:01	174	00:07:02	106	-00:03:59	▼ 36%
19	B4100 East	B4100 West	915 m	00:06:39	206	00:01:48	285	-00:04:50	▼ 73%
20	B4100 East	Ardley Rd West	2417 m	-	0	-	0	-	-
21	B4100 East	Ardley Rd East	3073 m	-	0	-	0	-	-
22	B4100 East	B430 (New)	3597 m	-	0	00:05:31	8	-	-
23	B4100 East	OxSRFI (South)	2182 m	-	0	00:06:31	33	-	-
24	B4100 East	OxSRFI (North)	5726 m	-	0	00:06:25	34	-	-
25	Cherwell Services	A43 North	2062 m	00:02:42	64	00:04:29	64	00:01:47	▲ 66%
26	Cherwell Services	B4100 East	1880 m	00:02:42	2	00:05:05	2	00:02:24	▲ 89%
27	Cherwell Services	Cherwell Services	583 m	-	0	-	0	-	-
28	Cherwell Services	M40 South	3597 m	00:03:01	220	00:03:44	288	00:00:43	▲ 24%
29	Cherwell Services	B430	2182 m	00:02:52	70	-	0	-	-
30	Cherwell Services	M40 North	5726 m	00:04:17	114	00:05:29	116	00:01:12	▲ 28%
31	Cherwell Services	B4100 West	1679 m	-	0	-	0	-	-
32	Cherwell Services	Ardley Rd West	1096 m	-	0	-	0	-	-
33	Cherwell Services	Ardley Rd East	1752 m	-	0	-	0	-	-
34	Cherwell Services	B430 (New)	5167 m	-	0	00:03:52	8	-	-
35	Cherwell Services	OxSRFI (South)	3927 m	-	0	-	0	-	-
36	Cherwell Services	OxSRFI (North)	4583 m	-	0	-	0	-	-
37	M40 South	A43 North	5550 m	00:04:38	994	00:05:18	965	00:00:41	▲ 15%
38	M40 South	B4100 East	5368 m	00:04:37	5	00:05:44	4	00:01:07	▲ 24%
39	M40 South	Cherwell Services	4071 m	00:03:45	174	00:04:53	175	00:01:08	▲ 30%
40	M40 South	M40 South	7295 m	00:05:51	29	00:08:51	29	00:03:00	▲ 51%
41	M40 South	B430	5013 m	00:04:03	38	00:04:46	39	00:00:43	▲ 18%
42	M40 South	M40 North	8281 m	00:04:41	2882	00:04:42	2817	00:00:01	▲ 0%
43	M40 South	B4100 West	5167 m	00:04:24	70	00:05:05	69	00:00:41	▲ 16%
44	M40 South	Ardley Rd West	3927 m	00:03:00	14	00:03:27	12	00:00:26	▲ 15%
45	M40 South	Ardley Rd East	4583 m	00:03:24	4	-	0	-	-
46	M40 South	B430 (New)	6018 m	-	0	-	0	-	-
47	M40 South	OxSRFI (South)	5836 m	-	0	00:05:47	58	-	-
48	M40 South	OxSRFI (North)	5231 m	-	0	00:05:39	59	-	-
49	B430	A43 Nor h	3806 m	00:03:56	171	00:05:32	4	00:01:36	▲ 41%
50	B430	B4100 East	3624 m	00:04:02	18	00:05:49	6	00:01:47	▲ 44%
51	B430	Cherwell Services	2327 m	00:03:04	12	00:04:26	12	00:01:22	▲ 44%
52	B430	M40 South	5551 m	00:05:20	24	00:06:36	27	00:01:16	▲ 24%
53	B430	B430	3450 m	-	0	-	0	-	-
54	B430	M40 North	6997 m	00:04:57	157	00:05:59	62	00:01:02	▲ 21%
55	B430	B4100 West	3423 m	00:03:55	17	00:05:17	9	00:01:23	▲ 35%
56	B430	Ardley Rd West	1431 m	00:01:25	26	00:01:54	8	00:00:28	▲ 33%
57	B430	Ardley Rd East	2045 m	00:01:52	119	00:02:32	47	00:00:41	▲ 37%
58	B430	B430 (New)	4983 m	-	0	-	0	-	-
59	B430	OxSRFI (South)	3519 m	-	0	00:06:24	20	-	-
60	B430	OxSRFI (North)	7062 m	-	0	00:06:15	20	-	-
61	M40 North	A43 Nor h	6018 m	00:04:20	52	00:04:47	53	00:00:27	▲ 10%
62	M40 North	B4100 East	5836 m	00:04:22	212	00:05:16	111	00:00:55	▲ 21%
63	M40 North	Cherwell Services	5231 m	00:04:16	171	00:04:42	171	00:00:26	▲ 10%
64	M40 North	M40 South	8295 m	00:04:52	3462	00:04:57	3339	00:00:05	▲ 2%
65	M40 North	B430	6991 m	00:06:03	160	00:07:23	20	00:01:20	▲ 22%
66	M40 North	M40 North	10535 m	00:07:15	12	00:08:24	11	00:01:08	▲ 16%
67	M40 North	B4100 West	5635 m	00:04:11	16	00:05:00	4	00:00:49	▲ 20%
68	M40 North	Ardley Rd West	5905 m	00:05:03	7	00:05:51	8	00:00:48	▲ 16%
69	M40 North	Ardley Rd East	6561 m	-	0	-	0	-	-
70	M40 North	B430 (New)	2314 m	-	0	00:06:54	315	-	-
71	M40 North	OxSRFI (South)	1254 m	-	0	00:08:02	81	-	-
72	M40 North	OxSRFI (North)	1011 m	-	0	00:07:55	80	-	-
73	B4100 West	A43 Nor h	1116 m	00:05:17	82	00:01:41	100	-00:03:36	▼ 68%
74	B4100 West	B4100 East	934 m	00:05:23	327	00:01:46	303	-00:03:37	▼ 67%
75	B4100 West	Cherwell Services	1759 m	-	0	-	0	-	-
76	B4100 West	M40 South	4983 m	00:08:33	133	00:05:36	149	-00:02:57	▼ 34%
77	B4100 West	B430	3519 m	00:08:27	8	00:06:18	10	-00:02:09	▼ 25%
78	B4100 West	M40 North	7062 m	-	0	-	0	-	-
79	B4100 West	B4100 West	931 m	-	0	00:06:18	4	-	-
80	B4100 West	Ardley Rd West	2432 m	-	0	-	0	-	-
81	B4100 West	Ardley Rd East	3089 m	00:07:48	3	-	0	-	-
82	B4100 West	B430 (New)	2603 m	-	11	00:05:56	26	-	-
83	B4100 West	OxSRFI (South)	2604 m	-	0	00:06:56	8	-	-
84	B4100 West	OxSRFI (North)	2605 m	-	0	00:06:38	8	-	-
85	Ardley Rd West	A43 Nor h	2697 m	00:02:58	11	00:03:53	8	00:00:55	▲ 31%
86	Ardley Rd West	B4100 East	2515 m	-	0	-	0	-	-
87	Ardley Rd West	Cherwell Services	1218 m	-	0	-	0	-	-
88	Ardley Rd West	M40 South	4442 m	-	0	00:05:04	12	-	-
89	Ardley Rd West	B430	1441 m	00:01:38	84	00:02:00	37	00:00:22	▲ 23%
90	Ardley Rd West	M40 North	5887 m	00:03:57	14	00:04:43	13	00:00:46	▲ 20%
91	Ardley Rd West	B4100 West	2314 m	-	0	-	0	-	-
92	Ardley Rd West	Ardley Rd West	1254 m	-	0	-	0	-	-
93	Ardley Rd West	Ardley Rd East	1011 m	00:01:06	70	00:01:26	39	00:00:20	▲ 31%
94	Ardley Rd West	B430 (New)	2615 m	-	40	00:04:08	66	-	-
95	Ardley Rd West	OxSRFI (South)	2616 m	-	0	00:05:04	15	-	-
96	Ardley Rd West	OxSRFI (North)	2617 m	-	0	00:05:00	14	-	-
97	Ardley Rd East	A43 Nor h	3389 m	00:03:27	40	00:04:39	34	00:01:11	▲ 34%
98	Ardley Rd East	B4100 East	3207 m	00:03:35	4	00:05:05	4	00:01:30	▲ 42%
99	Ardley Rd East	Cherwell Services	1910 m	00:02:35	4	00:03:56	4	00:01:20	▲ 52%
100	Ardley Rd East	M40 South	5134 m	00:04:44	8	00:05:55	8	00:01:11	▲ 25%
101	Ardley Rd East	B430	2030 m	00:01:56	196	00:02:32	39	00:00:36	▲ 31%
102	Ardley Rd East	M40 Nor h	6579 m	-	0	00:05:24	31	-	-
103	Ardley Rd East	B4100 West	3006 m	00:03:16	12	00:04:20	4	00:01:04	▲ 33%
104	Ardley Rd East	Ardley Rd West	1014 m	00:00:58	31	00:01:19	26	00:00:22	▲ 38%
105	Ardley Rd East	Ardley Rd East	2602 m	-	0	-	0	-	-
106	Ardley Rd East	B430 (New)	2627 m	-	0	-	0	-	-
107	Ardley Rd East	OxSRFI (South)	2628 m	-	0	-	0	-	-
108	Ardley Rd East	OxSRFI (North)	2629 m	-	0	-	0	-	-
109	B430 (New)	A43 Nor h	2630 m	-	0	00:05:07	130	-	-
110	B430 (New)	B4100 East	2631 m	-	0	-	0	-	-
111	B430 (New)	Cherwell Services	2632 m	-	0	-	0	-	-
112	B430 (New)	M40 South	2633 m	-	0	-	0	-	-
113	B430 (New)	B430	2634 m	-	0	00:04:10	4	-	-
114	B430 (New)	M40 Nor h	2635 m	-	0	00:06:02	177	-	-
115	B430 (New)	B4100 West	2636 m	-	0	00:04:51	22	-	-
116	B430 (New)	Ardley Rd West	2637 m	-	0	00:02:51	17	-	-
117	B430 (New)	Ardley Rd East	2638 m	-	0	-	0	-	-
118	B430 (New)	B430 (New)	2639 m	-	0	-	0	-	-
119	B430 (New)	OxSRFI (South)	2640 m	-	0	00:01:23	195	-	-
120	B430 (New)	OxSRFI (North)	2641 m	-	0	00:01:15	191	-	-
121	OxSRFI (South)	A43 Nor h	2642 m	-	0	00:06:06	26	-	-
122	OxSRFI (South)	B4100 East	2643 m	-	0	00:06:42	4	-	-
123	OxSRFI (South)	Cherwell Services	2644 m	-	0	-	0	-	-
124	OxSRFI (South)	M40 Sou h	2645 m	-	0	00:07:33	81	-	-
125	OxSRFI (South)	B430	2646 m	-	0	00:04:54	3	-	-
126	OxSRFI (South)	M40 Nor h	2647 m	-	0	00:07:26	51	-	-
127	OxSRFI (South)	B4100 West	2648 m	-	0	-	0	-	-
128	OxSRFI (South)	Ardley Rd West	2649 m	-	0	00:03:34	4	-	-
129	OxSRFI (South)	Ardley Rd East	2650 m	-	0	00:04:19	11	-	-
130	OxSRFI (South)	B430 (New)	2651 m	-	0	00:01:59	55	-	-
131	OxSRFI (South)	OxSRFI (South)	2652 m	-	0	-	0	-	-
132	OxSRFI (South)	OxSRFI (North)	2653 m	-	0	-	0	-	-
133	OxSRFI (North)	A43 North	2654 m	-	0	00:05:35	3	-	-
134	OxSRFI (North)	B4100 East	2655 m	-	0	00:06:11	0	-	-
135	OxSRFI (North)	Cherwell Services	2656 m	-	0	-	0	-	-
136	OxSRFI (North)	M40 Sou h	2657 m	-	0	00:07:05	9	-	-
137	OxSRFI (North)	B430	2658 m	-	0	00:04:30	0	-	-
138	OxSRFI (North)	M40 North	2659 m	-	0	00:06:58	6	-	-
139	OxSRFI (North)	B4100 West	2660 m	-	0	-	0	-	-
140	OxSRFI (North)	Ardley Rd West	2661 m	-	0	00:03:19	0	-	-
141	OxSRFI (North)	Ardley Rd East	2662 m	-	0	00:03:41	1	-	-
142	OxSRFI (North)	B430 (New)	2663 m	-	0	00:01:31	5	-	-
143	OxSRFI (North)	OxSRFI (South)	2664 m	-	0	-	0	-	-
144	OxSRFI (North)	OxSRFI (North)	2665 m	-	0	-	0	-	-

MG MARKERS - FULL ORIGIN-DESTINATION MARKERS (PARKING LOT TO PARKING LOT)

LIGHT VEHICLES - AM PEAK

JT Marker	Route			2031 RC1-SensTest		2031 DS1-SensTest		Difference (JTs)	
No.	From	To	Dist.	Avg.	Trips	Avg.	Trips	No.	%
1	A43 North	A43 North	1600 m	-	0	-	0	-	-
2	A43 North	B4100 East	1220 m	00:06:29	114	00:01:26	296	-00:05:03	▼ 78%
3	A43 North	Cherwell Services	2045 m	00:07:54	47	00:03:11	60	-00:04:43	▼ 60%
4	A43 North	M40 South	5269 m	00:09:49	770	00:05:16	1274	-00:04:34	▼ 46%
5	A43 North	B430	3805 m	00:09:42	192	-	0	-	-
6	A43 North	M40 North	7348 m	00:10:56	41	00:06:58	59	-00:03:58	▼ 36%
7	A43 North	B4100 West	1216 m	00:06:38	13	00:02:04	39	-00:04:34	▼ 69%
8	A43 North	Ardley Rd West	2718 m	00:08:42	7	00:04:27	9	-00:04:14	▼ 49%
9	A43 North	Ardley Rd East	3374 m	00:09:04	26	-	0	-	-
10	A43 North	B430 (New)	1298 m	-	0	00:05:30	408	-	-
11	A43 North	OxSRFI (South)	1116 m	-	0	00:06:28	114	-	-
12	A43 North	OxSRFI (North)	1744 m	-	0	00:06:20	115	-	-
13	B4100 East	A43 North	1298 m	00:06:37	134	00:01:59	177	-00:04:38	▼ 70%
14	B4100 East	B4100 East	1116 m	-	0	-	0	-	-
15	B4100 East	Cherwell Services	1744 m	00:07:51	4	00:03:19	6	-00:04:32	▼ 58%
16	B4100 East	M40 South	4968 m	00:09:57	4	00:05:13	8	-00:04:44	▼ 48%
17	B4100 East	B430	3504 m	00:09:46	8	-	0	-	-
18	B4100 East	M40 North	7047 m	00:11:00	169	00:07:00	98	-00:04:00	▼ 36%
19	B4100 East	B4100 West	915 m	00:06:39	198	00:01:48	273	-00:04:51	▼ 73%
20	B4100 East	Ardley Rd West	2417 m	-	0	-	0	-	-
21	B4100 East	Ardley Rd East	3073 m	-	0	-	0	-	-
22	B4100 East	B430 (New)	3597 m	-	0	00:05:31	8	-	-
23	B4100 East	OxSRFI (Sou h)	2182 m	-	0	00:06:30	31	-	-
24	B4100 East	OxSRFI (North)	5726 m	-	0	00:06:24	32	-	-
25	Cherwell Services	A43 North	2062 m	00:02:37	47	00:04:24	47	00:01:47	▲ 68%
26	Cherwell Services	B4100 East	1880 m	00:02:42	2	00:05:05	2	00:02:24	▲ 89%
27	Cherwell Services	Cherwell Services	583 m	-	0	-	0	-	-
28	Cherwell Services	M40 South	3597 m	00:02:58	172	00:03:42	240	00:00:44	▲ 25%
29	Cherwell Services	B430	2182 m	00:02:52	70	-	0	-	-
30	Cherwell Services	M40 North	5726 m	00:04:11	96	00:05:24	97	00:01:13	▲ 29%
31	Cherwell Services	B4100 West	1679 m	-	0	-	0	-	-
32	Cherwell Services	Ardley Rd West	1096 m	-	0	-	0	-	-
33	Cherwell Services	Ardley Rd East	1752 m	-	0	-	0	-	-
34	Cherwell Services	B430 (New)	5167 m	-	0	00:03:52	8	-	-
35	Cherwell Services	OxSRFI (South)	3927 m	-	0	-	0	-	-
36	Cherwell Services	OxSRFI (North)	4583 m	-	0	-	0	-	-
37	M40 South	A43 North	5550 m	00:04:33	852	00:05:14	839	00:00:41	▲ 15%
38	M40 South	B4100 East	5368 m	00:04:37	5	00:05:44	4	00:01:07	▲ 24%
39	M40 South	Cherwell Services	4071 m	00:03:42	146	00:04:50	147	00:01:08	▲ 31%
40	M40 South	M40 South	7295 m	00:05:49	27	00:07:49	27	00:02:00	▲ 34%
41	M40 South	B430	5013 m	00:04:01	34	00:04:44	35	00:00:43	▲ 18%
42	M40 South	M40 North	8281 m	00:04:36	2559	00:04:38	2515	00:00:02	▲ 1%
43	M40 South	B4100 West	5167 m	00:04:23	66	00:05:04	64	00:00:41	▲ 16%
44	M40 South	Ardley Rd West	3927 m	00:03:00	14	00:03:27	12	00:00:26	▲ 15%
45	M40 South	Ardley Rd East	4583 m	00:03:24	4	-	0	-	-
46	M40 South	B430 (New)	6018 m	-	0	-	0	-	-
47	M40 South	OxSRFI (South)	5836 m	-	0	00:05:29	12	-	-
48	M40 South	OxSRFI (North)	5231 m	-	0	00:05:22	10	-	-
49	B430	A43 North	3806 m	00:03:56	167	-	0	-	-
50	B430	B4100 East	3624 m	00:04:02	18	00:05:49	6	00:01:47	▲ 44%
51	B430	Cherwell Services	2327 m	00:03:04	12	00:04:26	12	00:01:22	▲ 44%
52	B430	M40 South	5551 m	00:05:12	16	00:06:30	20	00:01:18	▲ 25%
53	B430	B430	3450 m	-	0	-	0	-	-
54	B430	M40 North	6997 m	00:04:57	157	00:05:59	62	00:01:02	▲ 21%
55	B430	B4100 West	3423 m	00:03:46	8	-	0	-	-
56	B430	Ardley Rd West	1431 m	00:01:25	22	00:01:52	4	00:00:27	▲ 32%
57	B430	Ardley Rd East	2045 m	00:01:51	117	00:02:32	45	00:00:41	▲ 37%
58	B430	B430 (New)	4983 m	-	0	-	0	-	-
59	B430	OxSRFI (South)	3519 m	-	0	00:06:24	20	-	-
60	B430	OxSRFI (North)	7062 m	-	0	00:06:15	20	-	-
61	M40 North	A43 North	6018 m	00:04:15	45	00:04:42	45	00:00:28	▲ 11%
62	M40 North	B4100 East	5836 m	00:04:20	204	00:05:14	104	00:00:53	▲ 21%
63	M40 North	Cherwell Services	5231 m	00:04:11	135	00:04:37	136	00:00:27	▲ 11%
64	M40 North	M40 South	8295 m	00:04:46	2935	00:04:51	2811	00:00:05	▲ 2%
65	M40 North	B430	6991 m	00:06:02	152	00:07:11	12	00:01:09	▲ 19%
66	M40 North	M40 North	10535 m	00:07:15	12	00:08:24	11	00:01:08	▲ 16%
67	M40 North	B4100 West	5635 m	00:04:04	12	-	0	-	-
68	M40 North	Ardley Rd West	5905 m	00:05:03	7	00:05:51	8	00:00:48	▲ 16%
69	M40 North	Ardley Rd East	6561 m	-	0	-	0	-	-
70	M40 North	B430 (New)	2314 m	-	0	00:06:54	315	-	-
71	M40 North	OxSRFI (South)	1254 m	-	0	00:07:50	53	-	-
72	M40 North	OxSRFI (North)	1011 m	-	0	00:07:42	51	-	-
73	B4100 West	A43 Nor h	1116 m	00:05:15	72	00:01:40	89	-00:03:36	▼ 68%
74	B4100 West	B4100 East	934 m	00:05:23	308	00:01:45	280	-00:03:38	▼ 67%
75	B4100 West	Cherwell Services	1759 m	-	0	-	0	-	-
76	B4100 West	M40 South	4983 m	00:08:32	124	00:05:34	137	-00:02:58	▼ 35%
77	B4100 West	B430	3519 m	00:08:27	8	00:06:18	10	-00:02:09	▼ 25%
78	B4100 West	M40 North	7062 m	-	0	-	0	-	-
79	B4100 West	B4100 West	931 m	-	0	00:06:18	4	-	-
80	B4100 West	Ardley Rd West	2432 m	-	0	-	0	-	-
81	B4100 West	Ardley Rd East	3089 m	00:07:48	3	-	0	-	-
82	B4100 West	B430 (New)	2603 m	-	0	00:05:56	26	-	-
83	B4100 West	OxSRFI (South)	2604 m	-	0	00:06:56	8	-	-
84	B4100 West	OxSRFI (North)	2605 m	-	0	00:06:38	8	-	-
85	Ardley Rd West	A43 North	2697 m	00:02:58	11	00:03:53	8	00:00:55	▲ 31%
86	Ardley Rd West	B4100 East	2515 m	-	0	-	0	-	-
87	Ardley Rd West	Cherwell Services	1218 m	-	0	-	0	-	-
88	Ardley Rd West	M40 South	4442 m	-	0	00:05:04	12	-	-
89	Ardley Rd West	B430	1441 m	00:01:37	78	00:02:00	37	00:00:23	▲ 24%
90	Ardley Rd West	M40 North	5887 m	00:03:57	14	00:04:43	13	00:00:46	▲ 20%
91	Ardley Rd West	B4100 West	2314 m	-	0	-	0	-	-
92	Ardley Rd West	Ardley Rd West	1254 m	-	0	-	0	-	-
93	Ardley Rd West	Ardley Rd East	1011 m	00:01:05	66	00:01:26	35	00:00:21	▲ 32%
94	Ardley Rd West	B430 (New)	2615 m	-	0	00:04:06	58	-	-
95	Ardley Rd West	OxSRFI (South)	2616 m	-	0	00:05:04	15	-	-
96	Ardley Rd West	OxSRFI (North)	2617 m	-	0	00:05:00	14	-	-
97	Ardley Rd East	A43 North	3389 m	00:03:27	40	00:04:39	34	00:01:11	▲ 34%
98	Ardley Rd East	B4100 East	3207 m	00:03:35	4	00:05:05	4	00:01:30	▲ 42%
99	Ardley Rd East	Cherwell Services	1910 m	00:02:35	4	00:03:56	4	00:01:20	▲ 52%
100	Ardley Rd East	M40 South	5134 m	00:04:44	8	00:05:55	8	00:01:11	▲ 25%
101	Ardley Rd East	B430	2030 m	00:01:56	189	00:02:32	37	00:00:36	▲ 31%
102	Ardley Rd East	M40 North	6579 m	-	0	00:05:24	31	-	-
103	Ardley Rd East	B4100 West	3006 m	00:03:16	12	00:04:20	4	00:01:04	▲ 33%
104	Ardley Rd East	Ardley Rd West	1014 m	00:00:58	31	00:01:19	26	00:00:22	▲ 38%
105	Ardley Rd East	Ardley Rd East	2602 m	-	0	-	0	-	-
106	Ardley Rd East	B430 (New)	2627 m	-	0	-	0	-	-
107	Ardley Rd East	OxSRFI (South)	2628 m	-	0	-	0	-	-
108	Ardley Rd East	OxSRFI (North)	2629 m	-	0	-	0	-	-
109	B430 (New)	A43 North	2630 m	-	0	00:05:04	115	-	-
110	B430 (New)	B4100 East	2631 m	-	0	-	0	-	-
111	B430 (New)	Cherwell Services	2632 m	-	0	-	0	-	-
112	B430 (New)	M40 South	2633 m	-	0	-	0	-	-
113	B430 (New)	B430	2634 m	-	0	00:04:10	4	-	-
114	B430 (New)	M40 North	2635 m	-	0	00:05:55	153	-	-
115	B430 (New)	B4100 West	2636 m	-	0	00:04:51	22	-	-
116	B430 (New)	Ardley Rd West	2637 m	-	0	00:02:51	17	-	-
117	B430 (New)	Ardley Rd East	2638 m	-	0	-	0	-	-
118	B430 (New)	B430 (New)	2639 m	-	0	-	0	-	-
119	B430 (New)	OxSRFI (South)	2640 m	-	0	00:01:23	193	-	-
120	B430 (New)	OxSRFI (North)	2641 m	-	0	00:01:15	191	-	-
121	OxSRFI (South)	A43 North	2642 m	-	0	00:05:49	12	-	-
122	OxSRFI (South)	B4100 East	2643 m	-	0	-	0	-	-
123	OxSRFI (South)	Cherwell Services	2644 m	-	0	-	0	-	-
124	OxSRFI (South)	M40 South	2645 m	-	0	-	0	-	-
125	OxSRFI (South)	B430	2646 m	-	0	00:04:54	3	-	-
126	OxSRFI (South)	M40 North	2647 m	-	0	00:06:37	4	-	-
127	OxSRFI (South)	B4100 West	2648 m	-	0	-	0	-	-
128	OxSRFI (South)	Ardley Rd West	2649 m	-	0	00:03:34	4	-	-
129	OxSRFI (South)	Ardley Rd East	2650 m	-	0	00:04:19	11	-	-
130	OxSRFI (South)	B430 (New)	2651 m	-	0	00:01:58	53	-	-
131	OxSRFI (South)	OxSRFI (South)	2652 m	-	0	-	0	-	-
132	OxSRFI (South)	OxSRFI (North)	2653 m	-	0	-	0	-	-
133	OxSRFI (North)	A43 North	2654 m	-	0	00:05:18	1	-	-
134	OxSRFI (North)	B4100 East	2655 m	-	0	-	0	-	-
135	OxSRFI (North)	Cherwell Services	2656 m	-	0	-	0	-	-
136	OxSRFI (North)	M40 South	2657 m	-	0	-	0	-	-
137	OxSRFI (North)	B430	2658 m	-	0	00:04:30	0	-	-
138	OxSRFI (North)	M40 North	2659 m	-	0	00:06:31	0	-	-
139	OxSRFI (North)	B4100 West	2660 m	-	0	-	0	-	-
140	OxSRFI (North)	Ardley Rd West	2661 m	-	0	00:03:19	0	-	-
141	OxSRFI (North)	Ardley Rd East	2662 m	-	0	00:03:41	1	-	-
142	OxSRFI (North)	B430 (New)	2663 m	-	0	00:01:31	5	-	-
143	OxSRFI (North)	OxSRFI (South)	2664 m	-	0	-	0	-	-
144	OxSRFI (North)	OxSRFI (North)	2665 m	-	0	-	0	-	-

MG MARKERS - FULL ORIGIN-DESTINATION MARKERS (PARKING LOT TO PARKING LOT)

HEAVY VEHICLES - AM PEAK

Marker	Route			2031 RC1-SensTest		2031 DS1-SensTest		Difference (JTs)	
No.	From	To	Dist.	Avg.	Trips	Avg.	Trips	No.	%
1	A43 North	A43 North	1600 m	-	0	-	0	-	-
2	A43 North	B4100 East	1220 m	00:06:34	16	00:01:33	22	-00:05:00	▼ 76%
3	A43 North	Cherwell Services	2045 m	00:08:02	17	00:03:22	23	-00:04:39	▼ 58%
4	A43 North

MG MARKERS - FULL ORIGIN-DESTINATION MARKERS (PARKING LOT TO PARKING LOT)

ALL VEHICLES - PM PEAK

Marker	Route			2031 RC1-SensTest		2031 DS1-SensTest		Difference (JTs)	
No.	From	To	Dist.	Avg.	Trips	Avg.	Trips	No.	%
1	A43 North	A43 North	1600 m	-	0	00:05:58	2	-	-
2	A43 North	B4100 East	1220 m	00:01:15	283	00:01:20	297	00:00:05	▲ 6%
3	A43 North	Cherwell Services	2045 m	00:02:38	94	00:02:48	94	00:00:09	▲ 6%
4	A43 North	M40 South	5269 m	00:04:35	1130	00:04:46	1130	00:00:11	▲ 4%
5	A43 North	B430	3805 m	00:04:19	145	00:05:42	8	00:01:23	▲ 32%
6	A43 North	M40 North	7348 m	00:05:49	70	00:06:51	68	00:01:02	▲ 18%
7	A43 North	B4100 West	1216 m	00:01:19	54	00:02:00	31	00:00:41	▲ 51%
8	A43 North	Ardley Rd West	2718 m	00:03:23	12	00:04:10	8	00:00:47	▲ 23%
9	A43 North	Ardley Rd East	3374 m	00:03:48	36	00:04:45	16	00:00:57	▲ 25%
10	A43 North	B430 (New)	1298 m	-	0	00:04:50	125	-	-
11	A43 North	OxSRFI (South)	1116 m	-	0	00:05:54	43	-	-
12	A43 North	OxSRFI (North)	1744 m	-	0	00:05:44	44	-	-
13	B4100 East	A43 North	1298 m	00:06:29	232	00:02:07	360	-00:04:21	▼ 67%
14	B4100 East	B4100 East	1116 m	-	0	-	0	-	-
15	B4100 East	Cherwell Services	1744 m	00:07:48	7	00:02:52	11	-00:04:56	▼ 63%
16	B4100 East	M40 South	4968 m	00:09:43	2	00:04:45	9	-00:04:58	▼ 51%
17	B4100 East	B430	3504 m	00:09:37	5	00:05:49	6	-00:03:47	▼ 39%
18	B4100 East	M40 North	7047 m	00:10:55	142	00:07:00	137	-00:03:56	▼ 36%
19	B4100 East	B4100 West	915 m	00:06:32	176	00:01:54	335	-00:04:38	▼ 71%
20	B4100 East	Ardley Rd West	2417 m	-	0	-	0	-	-
21	B4100 East	Ardley Rd East	3073 m	-	0	-	0	-	-
22	B4100 East	B430 (New)	3597 m	-	0	-	0	-	-
23	B4100 East	OxSRFI (South)	2182 m	-	0	00:06:03	13	-	-
24	B4100 East	OxSRFI (North)	5726 m	-	0	00:05:55	15	-	-
25	Cherwell Services	A43 North	2062 m	00:04:11	97	00:04:54	97	00:00:43	▲ 17%
26	Cherwell Services	B4100 East	1880 m	00:04:13	2	00:05:08	2	00:00:55	▲ 22%
27	Cherwell Services	Cherwell Services	583 m	-	0	-	0	-	-
28	Cherwell Services	M40 South	3597 m	00:03:00	229	00:03:09	228	00:00:09	▲ 5%
29	Cherwell Services	B430	2182 m	00:02:48	4	00:03:56	4	00:01:09	▲ 41%
30	Cherwell Services	M40 North	5726 m	00:04:26	145	00:05:31	144	00:01:05	▲ 25%
31	Cherwell Services	B4100 West	1679 m	00:03:56	8	00:04:31	8	00:00:35	▲ 15%
32	Cherwell Services	Ardley Rd West	1096 m	-	0	-	0	-	-
33	Cherwell Services	Ardley Rd East	1752 m	-	0	-	0	-	-
34	Cherwell Services	B430 (New)	5167 m	-	0	-	0	-	-
35	Cherwell Services	OxSRFI (South)	3927 m	-	0	-	0	-	-
36	Cherwell Services	OxSRFI (North)	4583 m	-	0	-	0	-	-
37	M40 South	A43 North	5550 m	00:06:17	1406	00:05:44	1598	-00:00:33	▼ 9%
38	M40 South	B4100 East	5368 m	00:06:30	6	00:06:05	10	-00:00:25	▼ 6%
39	M40 South	Cherwell Services	4071 m	00:04:15	185	00:04:34	183	00:00:20	▲ 8%
40	M40 South	M40 South	7295 m	00:06:15	58	00:06:24	59	00:00:09	▲ 2%
41	M40 South	B430	5013 m	00:04:04	34	00:04:45	28	00:00:41	▲ 17%
42	M40 South	M40 North	8281 m	00:04:53	3906	00:04:55	3784	00:00:02	▲ 1%
43	M40 South	B4100 West	5167 m	00:06:05	43	00:06:23	76	-00:00:42	▼ 12%
44	M40 South	Ardley Rd West	3927 m	00:03:08	64	00:03:24	39	00:00:16	▲ 9%
45	M40 South	Ardley Rd East	4583 m	00:03:32	8	00:04:08	8	00:00:36	▲ 17%
46	M40 South	B430 (New)	6018 m	-	0	-	0	-	-
47	M40 South	OxSRFI (South)	5836 m	-	0	00:06:33	45	-	-
48	M40 South	OxSRFI (North)	5231 m	-	0	00:05:24	45	-	-
49	B430	A43 North	3806 m	00:05:44	255	00:07:47	118	00:02:03	▲ 36%
50	B430	B4100 East	3624 m	00:05:45	4	-	0	-	-
51	B430	Cherwell Services	2327 m	00:03:42	10	00:06:13	11	00:02:31	▲ 68%
52	B430	M40 South	5551 m	00:06:01	40	00:08:06	18	00:02:05	▲ 35%
53	B430	B430	3450 m	-	0	-	0	-	-
54	B430	M40 North	6997 m	00:05:21	188	00:06:40	68	00:01:22	▲ 26%
55	B430	B4100 West	3423 m	00:05:29	15	00:07:24	17	00:01:54	▲ 35%
56	B430	Ardley Rd West	1431 m	00:01:25	70	-	0	-	-
57	B430	Ardley Rd East	2045 m	00:01:50	87	00:02:32	26	00:00:42	▲ 38%
58	B430	B430 (New)	4983 m	-	0	-	0	-	-
59	B430	OxSRFI (South)	3519 m	-	0	00:08:23	6	-	-
60	B430	OxSRFI (North)	7062 m	-	0	00:07:47	6	-	-
61	M40 North	A43 North	6018 m	00:05:42	61	00:05:02	64	-00:00:40	▼ 12%
62	M40 North	B4100 East	5836 m	00:05:47	79	00:05:22	128	-00:00:25	▼ 7%
63	M40 North	Cherwell Services	5231 m	00:04:19	164	00:04:34	165	00:00:15	▲ 6%
64	M40 North	M40 South	8295 m	00:04:45	3334	00:04:46	3318	00:00:02	▲ 1%
65	M40 North	B430	6991 m	00:05:56	102	-	0	-	-
66	M40 North	M40 North	10535 m	00:07:21	9	00:08:25	9	00:01:05	▲ 15%
67	M40 North	B4100 West	5635 m	00:05:26	23	00:04:40	24	-00:00:47	▼ 14%
68	M40 North	Ardley Rd West	5905 m	00:04:57	12	00:05:46	12	00:00:49	▲ 16%
69	M40 North	Ardley Rd East	6561 m	-	0	-	0	-	-
70	M40 North	B430 (New)	2314 m	-	0	00:06:29	134	-	-
71	M40 North	OxSRFI (South)	1254 m	-	0	00:07:54	36	-	-
72	M40 North	OxSRFI (North)	1011 m	-	0	00:07:48	40	-	-
73	B4100 West	A43 North	1116 m	00:09:54	58	00:01:33	66	-00:08:22	▼ 84%
74	B4100 West	B4100 East	934 m	00:10:00	213	00:01:33	196	-00:08:27	▼ 85%
75	B4100 West	Cherwell Services	1759 m	-	0	-	0	-	-
76	B4100 West	M40 South	4983 m	00:12:44	49	00:04:58	52	-00:07:45	▼ 61%
77	B4100 West	B430	3519 m	-	0	-	0	-	-
78	B4100 West	M40 North	7062 m	-	0	-	0	-	-
79	B4100 West	B4100 West	931 m	-	0	00:06:13	8	-	-
80	B4100 West	Ardley Rd West	2432 m	-	0	-	0	-	-
81	B4100 West	Ardley Rd East	3089 m	-	0	-	0	-	-
82	B4100 West	B430 (New)	2603 m	-	0	00:05:12	20	-	-
83	B4100 West	OxSRFI (South)	2604 m	-	0	00:06:11	2	-	-
84	B4100 West	OxSRFI (North)	2605 m	-	0	00:06:04	2	-	-
85	Ardley Rd West	A43 Nor h	2697 m	00:04:44	4	00:06:16	4	00:01:32	▲ 33%
86	Ardley Rd West	B4100 East	2515 m	-	0	-	0	-	-
87	Ardley Rd West	Cherwell Services	1218 m	-	0	-	0	-	-
88	Ardley Rd West	M40 South	4442 m	-	0	00:06:34	19	-	-
89	Ardley Rd West	B430	1441 m	00:01:32	26	00:02:09	2	00:00:37	▲ 40%
90	Ardley Rd West	M40 North	5887 m	00:04:21	4	00:05:19	4	00:00:58	▲ 22%
91	Ardley Rd West	B4100 West	2314 m	-	0	-	0	-	-
92	Ardley Rd West	Ardley Rd West	1254 m	-	0	-	0	-	-
93	Ardley Rd West	Ardley Rd East	1011 m	00:01:04	32	00:01:28	20	00:00:23	▲ 36%
94	Ardley Rd West	B430 (New)	2615 m	-	0	00:05:55	8	-	-
95	Ardley Rd West	OxSRFI (South)	2616 m	-	0	00:06:32	2	-	-
96	Ardley Rd West	OxSRFI (North)	2617 m	-	0	00:06:19	2	-	-
97	Ardley Rd East	A43 Nor h	3389 m	00:05:13	12	00:07:07	16	00:01:54	▲ 36%
98	Ardley Rd East	B4100 East	3207 m	-	0	-	0	-	-
99	Ardley Rd East	Cherwell Services	1910 m	-	0	-	0	-	-
100	Ardley Rd East	M40 South	5134 m	-	0	-	0	-	-
101	Ardley Rd East	B430	2030 m	00:01:50	36	00:02:32	30	00:00:43	▲ 39%
102	Ardley Rd East	M40 North	6579 m	-	0	-	0	-	-
103	Ardley Rd East	B4100 West	3006 m	-	0	-	0	-	-
104	Ardley Rd East	Ardley Rd West	1014 m	00:00:57	58	00:01:19	33	00:00:22	▲ 38%
105	Ardley Rd East	Ardley Rd East	2602 m	-	0	-	0	-	-
106	Ardley Rd East	B430 (New)	2627 m	-	0	-	0	-	-
107	Ardley Rd East	OxSRFI (South)	2628 m	-	0	-	0	-	-
108	Ardley Rd East	OxSRFI (North)	2629 m	-	0	-	0	-	-
109	B430 (New)	A43 Nor h	2630 m	-	0	00:05:44	214	-	-
110	B430 (New)	B4100 East	2631 m	-	0	-	0	-	-
111	B430 (New)	Cherwell Services	2632 m	-	0	-	0	-	-
112	B430 (New)	M40 South	2633 m	-	0	-	0	-	-
113	B430 (New)	B430	2634 m	-	0	-	0	-	-
114	B430 (New)	M40 Nor h	2635 m	-	0	00:06:18	300	-	-
115	B430 (New)	B4100 West	2636 m	-	0	-	0	-	-
116	B430 (New)	Ardley Rd West	2637 m	-	0	00:02:59	68	-	-
117	B430 (New)	Ardley Rd East	2638 m	-	0	-	0	-	-
118	B430 (New)	B430 (New)	2639 m	-	0	-	0	-	-
119	B430 (New)	OxSRFI (South)	2640 m	-	0	00:01:19	80	-	-
120	B430 (New)	OxSRFI (North)	2641 m	-	0	00:01:11	74	-	-
121	OxSRFI (South)	A43 North	2642 m	-	0	00:06:34	260	-	-
122	OxSRFI (South)	B4100 East	2643 m	-	0	00:06:52	27	-	-
123	OxSRFI (South)	Cherwell Services	2644 m	-	0	-	0	-	-
124	OxSRFI (South)	M40 Sou h	2645 m	-	0	00:07:10	93	-	-
125	OxSRFI (South)	B430	2646 m	-	0	00:08:05	44	-	-
126	OxSRFI (South)	M40 Nor h	2647 m	-	0	00:07:15	144	-	-
127	OxSRFI (South)	B4100 West	2648 m	-	0	-	0	-	-
128	OxSRFI (South)	Ardley Rd West	2649 m	-	0	00:03:47	47	-	-
129	OxSRFI (South)	Ardley Rd East	2650 m	-	0	00:04:28	47	-	-
130	OxSRFI (South)	B430 (New)	2651 m	-	0	00:02:05	359	-	-
131	OxSRFI (South)	OxSRFI (South)	2652 m	-	0	-	0	-	-
132	OxSRFI (South)	OxSRFI (North)	2653 m	-	0	-	0	-	-
133	OxSRFI (North)	A43 North	2654 m	-	0	00:06:08	41	-	-
134	OxSRFI (North)	B4100 East	2655 m	-	0	00:06:23	5	-	-
135	OxSRFI (North)	Cherwell Services	2656 m	-	0	-	0	-	-
136	OxSRFI (North)	M40 Sou h	2657 m	-	0	00:06:46	14	-	-
137	OxSRFI (North)	B430	2658 m	-	0	00:04:36	6	-	-
138	OxSRFI (North)	M40 North	2659 m	-	0	00:06:53	22	-	-
139	OxSRFI (North)	B4100 West	2660 m	-	0	-	0	-	-
140	OxSRFI (North)	Ardley Rd West	2661 m	-	0	00:03:21	7	-	-
141	OxSRFI (North)	Ardley Rd East	2662 m	-	0	00:03:57	8	-	-
142	OxSRFI (North)	B430 (New)	2663 m	-	0	00:01:39	60	-	-
143	OxSRFI (North)	OxSRFI (South)	2664 m	-	0	-	0	-	-
144	OxSRFI (North)	OxSRFI (North)	2665 m	-	0	-	0	-	-

MG MARKERS - FULL ORIGIN-DESTINATION MARKERS (PARKING LOT TO PARKING LOT)

LIGHT VEHICLES - PM PEAK

Marker	Route			2031 RC1-SensTest		2031 DS1-SensTest		Difference (JTs)	
No.	From	To	Dist.	Avg.	Trips	Avg.	Trips	No.	%
1	A43 North	A43 North	1600 m	-	0	00:05:58	2	-	-
2	A43 North	B4100 East	1220 m	00:01:15	273	00:01:20	287	00:00:05	▲ 7%
3	A43 North	Cherwell Services	2045 m	00:02:37	86	00:02:47	86	00:00:10	▲ 6%
4	A43 North	M40 South	5269 m	00:04:32	1021	00:04:43	1020	00:00:11	▲ 4%
5	A43 North	B430	3805 m	00:04:18	137	-	0	-	-
6	A43 North	M40 North	7348 m	00:05:46	66	00:06:40	64	00:01:02	▲ 18%
7	A43 North	B4100 West	1216 m	00:01:18	42	00:01:57	20	00:00:40	▲ 51%
8	A43 North	Ardley Rd West	2718 m	00:03:23	12	00:04:10	8	00:00:47	▲ 23%
9	A43 North	Ardley Rd East	3374 m	00:03:48	36	00:04:45	16	00:00:57	▲ 25%
10	A43 North	B430 (New)	1298 m	-	0	00:04:50	125	-	-
11	A43 North	OxSRFI (South)	1116 m	-	0	00:05:50	35	-	-
12	A43 North	OxSRFI (North)	1744 m	-	0	00:05:40	36	-	-
13	B4100 East	A43 North	1298 m	00:06:28	227	00:02:07	352	-00:04:21	▼ 67%
14	B4100 East	B4100 East	1116 m	-	0	-	0	-	-
15	B4100 East	Cherwell Services	1744 m	00:07:48	7	00:02:52	11	-00:04:56	▼ 63%
16	B4100 East	M40 South	4968 m	00:09:43	2	00:04:45	9	-00:04:58	▼ 51%
17	B4100 East	B430	3504 m	00:09:37	5	00:05:49	6	-00:03:47	▼ 39%
18	B4100 East	M40 North	7047 m	00:10:55	140	00:06:59	133	-00:03:56	▼ 36%
19	B4100 East	B4100 West	915 m	00:06:32	173	00:01:54	332	-00:04:38	▼ 71%
20	B4100 East	Ardley Rd West	2417 m	-	0	-	0	-	-
21	B4100 East	Ardley Rd East	3073 m	-	0	-	0	-	-
22	B4100 East	B430 (New)	3597 m	-	0	-	0	-	-
23	B4100 East	OxSRFI (South)	2182 m	-	0	00:06:00	11	-	-
24	B4100 East	OxSRFI (North)	5726 m	-	0	00:05:51	13	-	-
25	Cherwell Services	A43 North	2062 m	00:04:09	82	00:04:51	83	00:00:42	▲ 17%
26	Cherwell Services	B4100 East	1880 m	00:04:13	2	00:05:08	2	00:00:55	▲ 22%
27	Cherwell Services	Cherwell Services	583 m	-	0	-	0	-	-
28	Cherwell Services	M40 South	3597 m	00:02:56	183	00:03:05	182	00:00:09	▲ 5%
29	Cherwell Services	B430	2182 m	00:02:48	4	00:03:56	4	00:01:09	▲ 41%
30	Cherwell Services	M40 North	5726 m	00:04:20	117	00:05:26	115	00:01:05	▲ 25%
31	Cherwell Services	B4100 West	1679 m	00:03:56	8	00:04:31	8	00:00:35	▲ 15%
32	Cherwell Services	Ardley Rd West	1096 m	-	0	-	0	-	-
33	Cherwell Services	Ardley Rd East	1752 m	-	0	-	0	-	-
34	Cherwell Services	B430 (New)	5167 m	-	0	-	0	-	-
35	Cherwell Services	OxSRFI (South)	3927 m	-	0	-	0	-	-
36	Cherwell Services	OxSRFI (North)	4583 m	-	0	-	0	-	-
37	M40 South	A43 North	5550 m	00:06:15	1268	00:05:42	1461	-00:00:33	▼ 9%
38	M40 South	B4100 East	5368 m	00:06:24	4	00:06:00	8	-00:00:23	▼ 6%
39	M40 South	Cherwell Services	4071 m	00:04:12	142	00:04:31	142	00:00:19	▲ 8%
40	M40 South	M40 South	7295 m	00:06:15	58	00:06:24	59	00:00:09	▲ 2%
41	M40 South	B430	5013 m	00:04:02	30	00:04:42	24	00:00:41	▲ 17%
42	M40 South	M40 North	8281 m	00:04:50	3491	00:04:52	3402	00:00:02	▲ 1%
43	M40 South	B4100 West	5167 m	00:06:03	39	00:05:22	72	-00:00:41	▼ 11%
44	M40 South	Ardley Rd West	3927 m	00:03:08	64	00:03:24	39	00:00:16	▲ 9%
45	M40 South	Ardley Rd East	4583 m	00:03:32	8	00:04:08	8	00:00:36	▲ 17%
46	M40 South	B430 (New)	6018 m	-	0	-	0	-	-
47	M40 South	OxSRFI (South)	5836 m	-	0	00:05:12	2	-	-
48	M40 South	OxSRFI (North)	5231 m	-	0	00:05:03	2	-	-
49	B430	A43 North	3806 m	00:05:44	251	00:07:46	114	00:02:02	▲ 35%
50	B430	B4100 East	3624 m	00:05:45	4	-	0	-	-
51	B430	Cherwell Services	2327 m	00:03:42	8	00:06:08	8	00:02:26	▲ 66%
52	B430	M40 South	5551 m	00:05:44	12	00:07:49	12	00:02:05	▲ 36%
53	B430	B430	3450 m	-	0	-	0	-	-
54	B430	M40 North	6997 m	00:05:20	184	00:06:41	64	00:01:21	▲ 25%
55	B430	B4100 West	3423 m	00:05:29	15	00:07:24	17	00:01:54	▲ 35%
56	B430	Ardley Rd West	1431 m	00:01:25	70	-	0	-	-
57	B430	Ardley Rd East	2045 m	00:01:50	85	00:02:32	24	00:00:42	▲ 38%
58	B430	B430 (New)	4983 m	-	0	-	0	-	-
59	B430	OxSRFI (South)	3519 m	-	0	00:08:23	6	-	-
60	B430	OxSRFI (North)	7062 m	-	0	00:07:47	6	-	-
61	M40 North	A43 North	6018 m	00:05:40	57	00:05:00	60	-00:00:40	▼ 12%
62	M40 North	B4100 East	5836 m	00:05:46	76	00:05:21	124	-00:00:24	▼ 7%
63	M40 North	Cherwell Services	5231 m	00:04:12	131	00:04:29	130	00:00:16	▲ 6%
64	M40 North	M40 South	8295 m	00:04:41	3019	00:04:42	3003	00:00:02	▲ 1%
65	M40 North	B430	6991 m	00:05:56	102	-	0	-	-
66	M40 North	M40 North	10535 m	00:07:21	9	00:08:25	9	00:01:05	▲ 15%
67	M40 North	B4100 West	5635 m	00:05:26	23	00:04:40	24	-00:00:47	▼ 14%
68	M40 North	Ardley Rd West	5905 m	00:04:57	12	00:05:46	12	00:00:49	▲ 16%
69	M40 North	Ardley Rd East	6561 m	-	0	-	0	-	-
70	M40 North	B430 (New)	2314 m	-	0	00:06:29	134	-	-
71	M40 North	OxSRFI (South)	1254 m	-	0	00:07:25	12	-	-
72	M40 North	OxSRFI (North)	1011 m	-	0	00:07:18	12	-	-
73	B4100 West	A43 North	1116 m	00:09:54	55	00:01:32	62	-00:08:23	▼ 85%
74	B4100 West	B4100 East	934 m	00:09:59	206	00:01:32	186	-00:08:27	▼ 85%
75	B4100 West	Cherwell Services	1759 m	-	0	-	0	-	-
76	B4100 West	M40 South	4983 m	00:12:42	46	00:04:56	48	-00:07:46	▼ 61%
77	B4100 West	B430	3519 m	-	0	-	0	-	-
78	B4100 West	M40 North	7062 m	-	0	-	0	-	-
79	B4100 West	B4100 West	931 m	-	0	00:06:13	8	-	-
80	B4100 West	Ardley Rd West	2432 m	-	0	-	0	-	-
81	B4100 West	Ardley Rd East	3089 m	-	0	-	0	-	-
82	B4100 West	B430 (New)	2603 m	-	0	00:05:12	20	-	-
83	B4100 West	OxSRFI (South)	2604 m	-	0	00:06:11	2	-	-
84	B4100 West	OxSRFI (North)	2605 m	-	0	00:06:04	2	-	-
85	Ardley Rd West	A43 Nor h	2697 m	00:04:44	4	00:06:16	4	00:01:32	▲ 33%
86	Ardley Rd West	B4100 East	2515 m	-	0	-	0	-	-
87	Ardley Rd West	Cherwell Services	1218 m	-	0	-	0	-	-
88	Ardley Rd West	M40 South	4442 m	-	0	00:06:34	19	-	-
89	Ardley Rd West	B430	1441 m	00:01:32	24	-	0	-	-
90	Ardley Rd West	M40 North	5887 m	00:04:21	4	00:05:19	4	00:00:58	▲ 22%
91	Ardley Rd West	B4100 West	2314 m	-	0	-	0	-	-
92	Ardley Rd West	Ardley Rd West	1254 m	-	0	-	0	-	-
93	Ardley Rd West	Ardley Rd East	1011 m	00:01:04	32	00:01:28	20	00:00:23	▲ 36%
94	Ardley Rd West	B430 (New)	2615 m	-	0	00:05:55	8	-	-
95	Ardley Rd West	OxSRFI (South)	2616 m	-	0	00:06:32	2	-	-
96	Ardley Rd West	OxSRFI (North)	2617 m	-	0	00:06:19	2	-	-
97	Ardley Rd East	A43 North	3389 m	00:05:13	12	00:07:07	16	00:01:54	▲ 36%
98	Ardley Rd East	B4100 East	3207 m	-	0	-	0	-	-
99	Ardley Rd East	Cherwell Services	1910 m	-	0	-	0	-	-
100	Ardley Rd East	M40 South	5134 m	-	0	-	0	-	-
101	Ardley Rd East	B430	2030 m	00:01:50	36	00:02:32	30	00:00:43	▲ 39%
102	Ardley Rd East	M40 North	6579 m	-	0	-	0	-	-
103	Ardley Rd East	B4100 West	3006 m	-	0	-	0	-	-
104	Ardley Rd East	Ardley Rd West	1014 m	00:00:57	58	00:01:19	33	00:00:22	▲ 38%
105	Ardley Rd East	Ardley Rd East	2602 m	-	0	-	0	-	-
106	Ardley Rd East	B430 (New)	2627 m	-	0	-	0	-	-
107	Ardley Rd East	OxSRFI (South)	2628 m	-	0	-	0	-	-
108	Ardley Rd East	OxSRFI (North)	2629 m	-	0	-	0	-	-
109	B430 (New)	A43 Nor h	2630 m	-	0	00:05:44	214	-	-
110	B430 (New)	B4100 East	2631 m	-	0	-	0	-	-
111	B430 (New)	Cherwell Services	2632 m	-	0	-	0	-	-
112	B430 (New)	M40 South	2633 m	-	0	-	0	-	-
113	B430 (New)	B430	2634 m	-	0	-	0	-	-
114	B430 (New)	M40 North	2635 m	-	0	00:06:14	270	-	-
115	B430 (New)	B4100 West	2636 m	-	0	-	0	-	-
116	B430 (New)	Ardley Rd West	2637 m	-	0	00:02:59	68	-	-
117	B430 (New)	Ardley Rd East	2638 m	-	0	-	0	-	-
118	B430 (New)	B430 (New)	2639 m	-	0	-	0	-	-
119	B430 (New)	OxSRFI (South)	2640 m	-	0	00:01:18	78	-	-
120	B430 (New)	OxSRFI (North)	2641 m	-	0	00:01:11	74	-	-
121	OxSRFI (South)	A43 North	2642 m	-	0	00:06:33	247	-	-
122	OxSRFI (South)	B4100 East	2643 m	-	0	00:06:48	23	-	-
123	OxSRFI (South)	Cherwell Services	2644 m	-	0	-	0	-	-
124	OxSRFI (South)	M40 Sou h	2645 m	-	0	00:06:45	24	-	-
125	OxSRFI (South)	B430	2646 m	-	0	00:08:05	44	-	-
126	OxSRFI (South)	M40 Nor h	2647 m	-	0	00:07:02	104	-	-
127	OxSRFI (South)	B4100 West	2648 m	-	0	-	0	-	-
128	OxSRFI (South)	Ardley Rd West	2649 m	-	0	00:03:47	47	-	-
129	OxSRFI (South)	Ardley Rd East	2650 m	-	0	00:04:28	47	-	-
130	OxSRFI (South)	B430 (New)	2651 m	-	0	00:02:05	357	-	-
131	OxSRFI (South)	OxSRFI (South)	2652 m	-	0	-	0	-	-
132	OxSRFI (South)	OxSRFI (North)	2653 m	-	0	-	0	-	-
133	OxSRFI (North)	A43 North	2654 m	-	0	00:06:06	40	-	-
134	OxSRFI (North)	B4100 East	2655 m	-	0	00:06:18	5	-	-
135	OxSRFI (North)	Cherwell Services	2656 m	-	0	-	0	-	-
136	OxSRFI (North)	M40 Sou h	2657 m	-	0	00:06:14	4	-	-
137	OxSRFI (North)	B430	2658 m	-	0	00:04:36	6	-	-
138	OxSRFI (North)	M40 North	2659 m	-	0	00:06:41	16	-	-
139	OxSRFI (North)	B4100 West	2660 m	-	0	-	0	-	-
140	OxSRFI (North)	Ardley Rd West	2661 m	-	0	00:03:21	7	-	-
141	OxSRFI (North)	Ardley Rd East	2662 m	-	0	00:03:57	8	-	-
142	OxSRFI (North)	B430 (New)	2663 m	-	0	00:01:39	60	-	-
143	OxSRFI (North)	OxSRFI (South)	2664 m	-	0	-	0	-	-
144	OxSRFI (North)	OxSRFI (North)	2665 m	-	0	-	0	-	-

MG MARKERS - FULL ORIGIN-DESTINATION MARKERS (PARKING LOT TO PARKING LOT)

HEAVY VEHICLES - PM PEAK

Marker	Route			2031 RC1-SensTest		2031 DS1-SensTest		Difference (JTs)	
No.	From	To	Dist.	Avg.	Trips	Avg.	Trips	No.	%
1	A43 North	A43 North	1600 m	-	0	-	0	-	-
2	A43 North	B4100 East	1220 m	00:01:24	10	00:01:27	10	00:00:03	▲ 4%
3	A43 North	Cherwell Services	2045 m	00:02:55	7	00:02:56	7	00:00:01	▲ 0%
4	A43 North	M40 South	5269 m	00:04:59	110	00:05:14	110	00:00:15	▲ 5%
5	A43 North	B430	3805 m	00:04:38	8	00:05:42	8	00:01:03	▲ 23%
6	A43 North	M40 North	7348 m	00:06:28	4	00:07:22	4

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APPENDIX 43

VISSIM MODELLING IMPACT ASSESSMENT REPORT

MODELLING GROUP



MODELLING IMPACT ASSESSMENT REPORT

MG0163 - Oxfordshire SRFI

Cherwell, Oxfordshire

ADC Infrastructure Ltd

[redacted] 12 March 2026

DOCUMENT CONTROL ISSUE SHEET

Project & document details

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Project number	MG0163
Document title	Modelling Impact Assessment Report
Document reference	05_Technical\04_Reports & Notes\02_Future Year Testing

Document history

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B	Final	Update following client feedback	ADC Infrastructure Ltd
C	Final	Update to include additional scenario testing	ADC Infrastructure Ltd
D	Final	Update to include additional scenario testing & external audit comments	ADC Infrastructure Ltd

Issue control

Issue	Date	Author	Contributors	Approved	Date
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1 EXECUTIVE SUMMARY

1.1 Strategic Context and Infrastructure Imperative

1.1.1 Modelling Group, commissioned by ADC Infrastructure Ltd, has undertaken comprehensive VISSIM microsimulation modelling to assess the highway impacts of the proposed Oxfordshire Strategic Rail Freight Interchange (OxSRFI) adjacent to M40 Junction 10 in Cherwell, Oxfordshire. This assessment supports the Development Consent Order (DCO) application to the Planning Inspectorate for this Nationally Significant Infrastructure Project (NSIP).

1.1.2 The modelling demonstrates that the proposed development, accompanied by its comprehensive highway mitigation package, delivers substantial operational improvements compared to the existing network configuration. Network-wide performance improves significantly, with average vehicle delays reducing from 95 seconds to 50 seconds in the AM peak, whilst enabling over 1,100 additional vehicles to successfully traverse the network that are unable to do so under Reference Case conditions.

1.1.3 Furthermore, when assessed against the potential future baseline position (with improvement works at Baynard's Green delivered by others, rather than by the proposed OxSRFI development), network performance remains comparable to the improved future Reference Case baseline. This is achieved whilst accommodating the additional OxSRFI traffic and providing the required access for the development to the strategic road network. Importantly, the mitigation scheme also addresses operational constraints identified at Ardley roundabout, where M40 northbound off-slip queuing in the 2034 Reference Case extends back onto the motorway mainline, creating safety concerns for strategic road network operation.

1.2 Project Context

1.2.1 The modelling builds upon the validated 2016 base year VISSIM model, originally developed by AECOM on behalf of National Highways. This model was updated to VISSIM 2021 and revalidated by Modelling Group in July 2021, with approval from National Highways, as documented in the Local Model Validation Report (LMVR, approved 14th July 2021).

1.2.2 Future year scenario testing has been developed using flows from the strategic Bicester Transport Model (BTM), with scenarios assessed for the 2031 DfT Circular 01/2022 compliant scenario, the 2031 Opening Year, and the 2034 Completion

Year. The assessment compares future baseline Reference Case scenarios (committed and allocated development per DfT Circular 01/2022 and in accordance with the proposed Cherwell Local Plan 2042 consultation, respectively) against Do-Something scenarios (Reference Case plus OxSRFI development and mitigation).

Albion Land Development

1.2.3 The primary assessment compares Do-Something scenarios against future baseline Reference Case scenarios. The future baseline includes the proposed improvement to the A43 Baynard's Green junction associated with the Albion Land development. This improvement scheme provides significant operational benefits at Baynard's Green, meaning that the future baseline Reference Case represents a substantially improved network compared to the existing junction arrangement.

1.2.4 This assessment approach was requested by the Transport Working Group (comprising Oxfordshire County Council, National Highways, and Cherwell District Council) for the OxSRFI project following a resolution to grant planning permission to the Albion Land scheme in July 2025. However, no decision notice was issued, and the scheme was taken back to planning committee in January 2026, where it was refused planning permission. The decision notice has been issued. Albion Land have appealed the refusal.

1.2.5 Therefore, the Albion Land devrlopment does not have planning permission. But because of the appeal submitted, there is uncertainty as to the future baseline position. To address this uncertainty the DCO for OxSRFI therefore includes two options with regard to the A43 Baynard's Green junction to allow for the following situations:

- An OxSRFI only scheme at Baynard's Green (the OxSRFI 'core' scheme) that would be delivered by OxSRFI should the refusal of the Albion Land development be upheld.
- An OxSRFI alternative scheme at Baynard's Green which enhances (builds upon) the Albion Land highway works at the junction, should the Albion Land development be successful in overturning the refusal at appeal (which could be in late 2026 or early 2027).

1.2.6 Under either condition, the OxSRFI scheme would deliver an improvement at Baynard's Green. To understand the operational benefits in these circumstance, additional VISSIM modelling of the RC1 SRN Reference Case scenario (without

Albion Land or its Baynard's Green improvement) has been undertaken and is reported as part of this assessment alongside the Reference Case scenarios that include for the Albion Land scheme and that schemes highway works. However, all Do-Something scenarios considered in this report are based on the situation described in second bullet above and include the OxSRFI alternative improvement scheme at Baynard's Green.

1.2.7 A separate assessment and modelling exercise have been undertaken to consider the situation described in first bullet above, in which the Do-Something scenario includes the OxSRFI core scheme at the Baynard's Green junction. That work is reported separately and also considers a Sensitivity Test that was requested by National Highways with regards to the calculation of assessment traffic flows.

1.3 Key Findings

Network Performance Without Proposed Mitigation

1.3.1 Assessment of the existing network configuration (without improvements at Baynard's Green) in the DfT Circular 01/2022 compliant Reference Case reveals significant capacity constraints at Baynard's Green roundabout in both peak periods. In the AM peak, queues on the A43 North, B4100 East and B4100 West approaches all extend back to the start of their respective entry points (distances of approximately 770m, 520m and 430m respectively), resulting in 1,143 vehicles unable to enter the network (785 from the A43 North, 126 from the B4100 East and 232 from the B4100 West). In the PM peak, the B4100 East and West approaches are most affected, with queues on the B4100 East reaching back to the start of the entry point (approximately 520 metres) and queues on the B4100 West extending to approximately 430 metres. This results in 390 vehicles unable to enter from the B4100 East and 7 vehicles from the B4100 West. This latent demand must be considered in the context of the results comparisons at junctions south of Baynard's Green, where the true operational impacts are masked by the vehicles unable to enter the network.

1.3.2 The 2034 Reference Case analysis identifies operational constraints on the M40 northbound corridor. Queue lengths on the M40 northbound off-slip at Ardley roundabout reach approximately 660 metres in the AM peak, extending back onto the motorway mainline, creating significant operational and safety concerns. Journey time analysis confirms the severity of this constraint, with northbound M40 traffic experiencing journey times of 4 minutes 13 seconds to

travel the 858-metre section from the M40 to Ardley roundabout — a level of delay that represents a significant operational concern on what should be a free-flowing strategic corridor.

Impact of Proposed Mitigation

1.3.3 Compared to the existing network configuration (the Reference Case scenario without Albion Land and its associated Baynard's Green improvements), the proposed OxSRFI highway works package delivers substantial operational improvements. Network-wide average vehicle delays reduce from 95 seconds to 50 seconds in the AM peak, whilst enabling over 1,100 additional vehicles to successfully traverse the network that are unable to do so under Reference Case conditions.

1.3.4 When assessed against the potential future baseline (with Baynard's Green improvements delivered by the Albion Land development), the proposed OxSRFI mitigation package delivers targeted operational improvements to the M40 northbound corridor. The provision of a new northbound off-slip connecting directly to Padbury junction, combined with comprehensive upgrades to Ardley roundabout (signalisation, additional lanes, expanded circulatory capacity), reduces M40 off-slip queuing at Ardley from approximately 660 metres to 100 metres in the 2034 AM peak — an 85% reduction that addresses the mainline interaction operational and safety concerns.

1.3.5 Journey times from M40 northbound to Ardley roundabout reduce from 4 minutes 13 seconds in the 2034 Reference Case to 54 seconds with the mitigation in place — a reduction of 3 minutes 19 seconds (79% improvement), confirming the effectiveness of the mitigation scheme in addressing strategic network capacity constraints.

1.3.6 Network-wide performance metrics confirm that the mitigation delivers comparable performance to the significantly improved future Reference Case baseline. In the 2034 AM peak, average vehicle delay across the network reduces from 65 seconds per vehicle (Reference Case) to 59 seconds (Do-Something) — a 9% improvement, despite the network accommodating additional OxSRFI development traffic. Average network speed remains stable at 47-48 mph in both scenarios, with zero latent demand confirming that all vehicles can enter and complete their journeys successfully.

1.3.7 The 2031 Opening Year results demonstrate consistent patterns, with M40 northbound off-slip queuing at Ardley reducing from 280–320 metres (Reference Case) to 100–135 metres (Do-Something), and journey time improvements of up

to 1 minute 5 seconds on this movement depending on the scenario tested. Network performance remains comparable between scenarios, with average delays of 46–52 seconds per vehicle and average speeds of 50–52 mph.

Localised Impacts and Balanced Assessment

1.3.8 The assessment identifies localised impacts across the network, the most significant of which are the positive effects at Baynard's Green roundabout. Compared to the existing network configuration, queues on the B4100 East and West approaches are reduced by 85% and 70% respectively in the AM peak, with reductions of 81% and 86% in the PM peak. These reductions deliver journey time savings of 3–5 minutes from these approaches to other parts of the network across both peak periods. The substantially improved performance also enables over 1,100 additional vehicles in the AM peak and nearly 400 additional vehicles in the PM peak to enter the network — in addition to accommodating the proposed development traffic.

1.3.9 When compared to the potential future baseline (including Albion Land and improvements at Baynard's Green), the following localised effects are observed:

- Positive effects include reduced queuing within Ardley village (as traffic reassigns to the new Ardley bypass) and modest journey time improvements on the A43 northbound corridor between Padbury and Baynard's Green junctions (4–8 seconds reduction in the PM peak).
- Other localised effects include increased journey times from Ardley to Cherwell on the northbound corridor (24–51 seconds in AM/PM peaks depending on scenario), attributable to the larger signalised Ardley roundabout requiring vehicles to negotiate additional signal nodes and travel slightly longer distances. The removal of the right-turn lane from Cherwell Services to the A43 North necessitates routing via Ardley roundabout, adding 89–108 seconds to this specific movement due to the additional distance travelled. Some approaches to Baynard's Green roundabout experience modest queue increases (A43 North and B4100 West arms) as signal timings are optimised to accommodate higher A43 corridor flows.

1.3.10 These localised effects represent typical trade-offs associated with strategic infrastructure provision and do not constitute severe or unacceptable impacts. The mitigation addresses M40 mainline capacity constraints whilst accommodating the additional traffic associated with the OxSRFI development.

1.4 Technical Robustness

1.4.1 The assessment's technical credibility is underpinned by the validated base year model, which achieved exemplary calibration and validation performance against DfT TAG Unit 3.1 acceptance criteria. As documented in the approved LMVR:

- Entry flow calibration: 100% compliance (9 of 9 entries within 5%, all achieving GEH <3)
- Junction turning count validation: 100% GEH <5 compliance (43 of 43 movements), with 93% achieving GEH <3
- Journey time validation: 95% compliance with TAG Unit 3.1 criteria (21 of 22 routes within 15% in AM peak, 19 of 22 in PM peak)
- Exit flow validation: 100% compliance (9 of 9 exits within TAG criteria, all GEH <5)

1.4.2 This validation performance significantly exceeds the DfT TAG Unit 3.1 minimum requirement of 85% compliance and was formally approved by National Highways in July 2021.

1.4.3 Future year convergence was achieved following industry-standard dynamic assignment procedures, with all performance results representing full demand operational conditions averaged over 20 random seed runs.

1.5 Assessment Conclusions

1.5.1 The modelling provides clear empirical evidence of two principal findings.

1.5.2 First, compared to the existing network configuration, the proposed OxSRFI development delivers substantial operational improvements. The highway mitigation package — including the enlarged, signalised Baynard's Green roundabout — reduces delays across the network, improves journey times, and creates additional network capacity sufficient to accommodate both the latent demand identified in the Reference Case and the traffic generated by the proposed development, in both peak periods assessed.

1.5.3 Second, when assessed against the improved future Reference Case baseline (with Baynard's Green improvements delivered by others), the proposed OxSRFI development delivers network performance comparable to that baseline whilst also addressing M40 northbound off-slip capacity constraints and safety concerns at Ardley roundabout. Network-wide performance metrics remain comparable across all scenarios tested — the 2031 DfT Circular 01/2022 compliant scenario,

the 2031 Opening Year, and the 2034 Completion Year — confirming adequate capacity provision for future year conditions.

1.5.4 Localised effects are identified, with some movements experiencing improvements and others experiencing modest increases in journey times or queue lengths. The majority of journey time changes remain within ±60 seconds, and queue lengths remain within approach capacities throughout the network. These effects are consistent with the typical trade-offs of strategic infrastructure provision.

1.5.5 The modelling findings provide robust, empirical evidence suitable for supporting the DCO application, demonstrating that the proposed development, with its comprehensive highway mitigation package, can be accommodated within the highway network whilst providing improved operational performance across the range of future year scenarios tested.

2 INTRODUCTION

2.1 Project Background

Introduction

2.1.1 Modelling Group has been commissioned by ADC Infrastructure Ltd to provide technical support and undertake VISSIM microsimulation modelling and analysis for the proposed Oxfordshire Strategic Rail Freight Interchange (OxSRFI) on land east of the former Heyford Air Base and southwest of M40 Junction 10 in Cherwell, Oxfordshire.

2.1.2 The modelling is required to support a Development Consent Order (DCO) application to the Planning Inspectorate; as the development is classified as a Nationally Significant Infrastructure Project (NSIP).

2.1.3 The location of the proposed site is shown in **Figure 2.1**, taken from OxSRFI website[1].

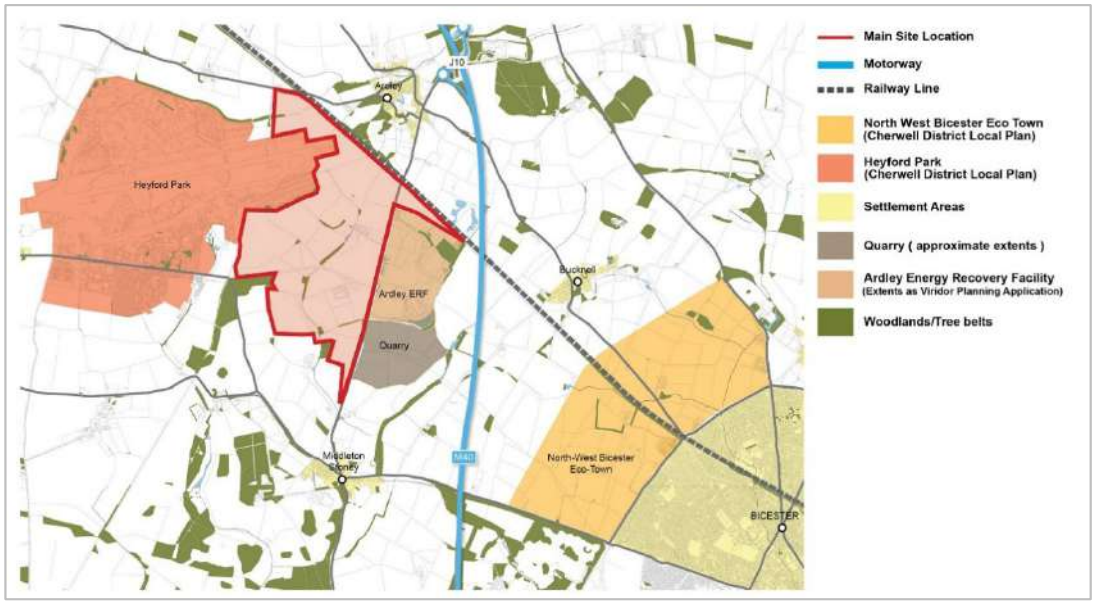


FIGURE 2.1: PROPOSED SITE LOCATION

2.1.4 The future year scenario modelling has been developed using the agreed 2016 base year VISSIM model. This model was originally developed by AECOM (on behalf of National Highways) and has been updated to a more recent software version. The model was extended to include the B430/Ardley Road staggered crossroads and B430 section to the Ardley Fields Household Waste & Recycling Centre. An updated calibration and validation exercise was undertaken to ensure the model remained fit for purpose and representative of current

[1] *https://oxsrfi.co.uk/location-2/*

conditions, with the updated base model approved by National Highways in July 2021.

2.1.5 Further details on the base model update, including comprehensive calibration and validation performance, can be found in the approved Local Model Validation Report: 'MG0163_M40 J10 Model Update_LMVR_R-01B' (Issue 2, approved 14th July 2021), provided in **Appendix A**.

Modelling History

2.1.6 Following approval of the updated base model in July 2021, the development of future year Reference Case and Do-Something scenarios has progressed through several iterations, reflecting both evolving project requirements and the need to incorporate updated strategic modelling flow outputs from the Bicester Transport Model (BTM).

2.1.7 During this period, the Reference Case and mitigation modelling evolved through several iterations, reflecting changes in assessment years, committed developments, committed infrastructure, proposed mitigation schemes, and overall demand flow compositions.

2.1.8 Following recommencement of the project in late 2024 and updating of the BTM, Reference Case and Do-Something flow outputs have been provided, enabling VISSIM testing to proceed.

2034 Reference Case Modelling

2.1.9 The first flow outputs received from the BTM were the 2034 Reference Case flows. Accordingly, the 2034 Reference Case model was updated and tested to understand network performance and establish baseline results for comparison.

2.1.10 This model was submitted to National Highways for approval. Details of the Reference Case development and results can be found in the document 'MG0163_OxfordSRFI_TN_01-A_Draft_2034RC3A' provided in **Appendix B**.

2034 & 2031 Reference Case & Do-Something Modelling

2.1.11 The results of the 2034 and 2031 Reference Case and Do-Something testing was detailed and analysed in the document 'MG0163_OxfordSRFI_R_01-C_Final_MIAR', which was submitted to National Highways for comment in December 2025.

2.1.12 This report and the supporting VISSIM models were reviewed by National Highways and AECOM (term consultants supporting National Highways), and their response was received in February 2026.

Current Status

Updated 2034 & 2031 Modelling

2.1.13 Feedback from National Highways (through their term consultants, AECOM) raised a number of queries on the modelling submitted in December 2025, with the most notable as follows:

- Clarification around the scheme to be modelled at Baynard's Green in the Reference Case scenarios
- Clarifications on a number of modelling elements, including conflict area parameters, changes to the give-way behaviour at Cherwell, changes to the flare orientation on the A43 North at Baynard's Green, relative flows used for the OxSRFI access, clarifications on public transport modelling on the B4100, and clarifications on reduced speed area changes at Padbury and Ardley.
- Considerations around intergreen value changes at Padbury and Ardley junctions.
- Further evidence to demonstrate suitability of use of BTM flows directly in VISSIM modelling without any further adjustments.

2.1.14 A response to the audit comments was prepared and submitted to National Highways and AECOM, providing clarifications and additional information on the modelling elements raised.

2.1.15 Follow-on comments were provided by National Highways/AECOM (included in **Appendix C**), enabling a way forward to be agreed on the outstanding issues and the modelling to be updated accordingly.

2.2 Report Purpose

2.2.1 This report summarises the future year VISSIM modelling process, including the methodology for testing and analysing the comparative performance of the 2031 DfT Circular 01/2022 compliant, 2031 Opening Year and 2034 Completion Year scenarios, the improvements achieved through mitigation proposals, and details of the impacts associated with the proposed development scheme.

2.2.2 The report provides comprehensive assessment of both the 2031 (DfT Circular 01/2022 compliant, Opening Year) and 2034 (Completion Year) scenarios, comparing Reference Case conditions (without the development) against Do-Something conditions (with the development and its associated mitigation package).

2.3 Report Structure

2.3.1 This report is structured as follows:

- **Section 3: Modelling Methodology** – Details of the model development process and all scenarios tested
- **Section 4: Model Convergence** – Convergence results demonstrating model stability for all future year scenarios
- **Section 5: Model Performance Analysis** – Comprehensive comparative assessment including journey times, queue lengths, junction performance, and network-wide statistics
- **Section 6: Sensitivity and Limitations** – Discussion of model scope, assumptions, and limitations
- **Section 7: Modelling Summary and Recommendations** – Overall conclusions and recommendations

3 MODELLING METHODOLOGY

3.1 Overview

3.1.1 The VISSIM model focuses on the area around M40 Junction 10 and includes the following junctions:

- J1: A43/B4100 (Baynard's Green Roundabout)
- J2: M40 Off-Slip/A43 (Padbury Roundabout)
- J3: M40 On-Slip/A43/Services (Cherwell Junction)
- J4: M40 Off-Slip/A43/B430 (Ardley Roundabout)
- J5: B430/Ardley Road

3.1.2 The model extents are shown in **Figure 3.1**.

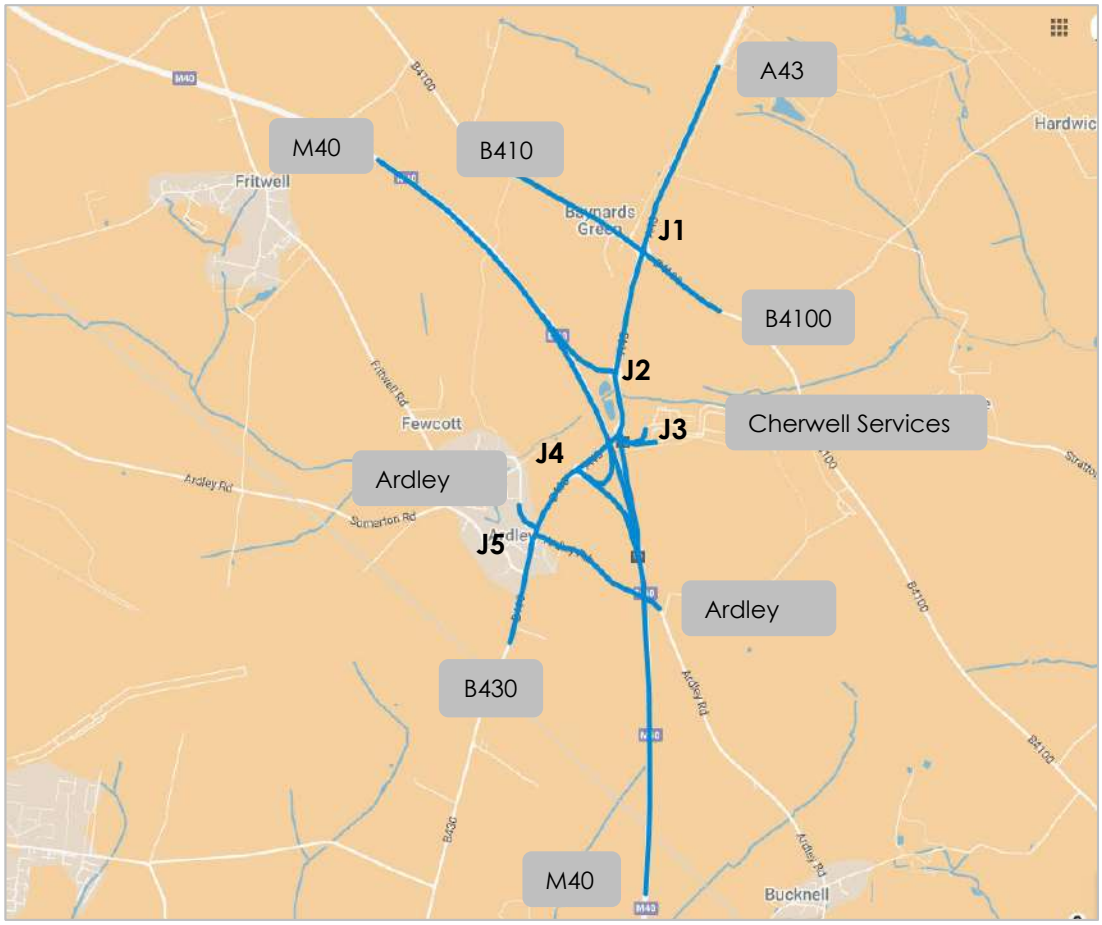


FIGURE 3.1: MODEL EXTENTS

3.1.3 The future year VISSIM models have been developed using the specification detailed in **Table 3.1**.

No.	Model Element	Details
1	VISSIM Version	Version 2021 (Service Pack 07)
2	Base Model Year	2016
3	Model Time Periods	AM Peak • Warm Up Period = 06:45-07:45 • Peak Period = 07:45-08:45 • Cool Down Period = 08:45-09:15 PM Peak • Warm Up Period = 15:30-16:30 • Peak Period = 16:30-17:30 • Cool Down Period = 17:30-18:00
4	Model Units	Length: • Kilometres • Metres Speed: • Miles per hour (mph) Acceleration: • Metres/second squared (m/s²)
5	Vehicle Types Used	• Cars • Light Goods Vehicles (LGVs) • Heavy Goods Vehicles (HGVs) • Buses/Coaches (modelled as public transport routes)

TABLE 3.1: MODEL SPECIFICATION

3.2 Scenarios Tested

3.2.1 The scenarios tested within the future year models presented in this report are detailed in **Table 3.2**.

No.	Scenario Name	Elements Included
1	2034 Reference Case [RC3A] – Reference Case Completion Year	Committed and allocated development and infrastructure in place by 2034 (in accordance with the proposed Cherwell Local Plan 2042 consultation and including M40 J9 improvement scheme associated with live planning application 25-00284-F). This also includes Albion Land development scheme and highway improvements at Baynard's Green roundabout.

No.	Scenario Name	Elements Included
2	2034 Do-Something [DS3A] – Do-Something Completion Year *without* Travel Plan	As SC1, but with the addition of the OxSRFI development and highway mitigation.
3	2031 Reference Case [RC2A] – Reference Case Opening Year	Committed and allocated development and infrastructure in place by 2031 (in accordance with the proposed Cherwell Local Plan 2042 consultation). This also includes Albion Land development scheme and highway improvements at Baynard's Green roundabout.
4	2031 Do-Something [DS2A] – Do-Something Opening Year with first phase of development and mitigation, *without* Travel Plan	As SC4, but with the addition of the OxSRFI development and highway mitigation (note: A43 widening to 3-lanes between Baynard's Green and Padbury improvement is ***not*** part of first phase of highway works).
5	2031 Reference Case [RC1A SRN] – DfT Circular Compliant Scenario	Committed and allocated development and infrastructure (as per definition given in Footnote 21 of DfT Circular 01/2022). This also includes Albion Land development scheme and highway improvements at Baynard's Green roundabout.
6	2031 Do-Something [DS1A SRN] – DfT Circular Compliant Scenario	As SC5, but with the addition of the OxSRFI development and highway mitigation.
7	2031 Reference Case [RC1 SRN] – DfT Circular Compliant Scenario	Committed and allocated development and infrastructure (as per definition given in Footnote 21 of DfT Circular 01/2022). This ***excludes*** the Albion Land development scheme and highway improvements at Baynard's Green roundabout.

TABLE 3.2: MODELLED SCENARIOS

3.2.2 ***Scenario 6 is compared against both Scenarios 5 and 7 in this report, to assess network performance in the 2031 DfT Circular Compliant scenario both with and without the Albion Land proposed development, including the improvements at the Baynard's Green junction. This allows for an assessment of both potential scenarios, depending on the planning outcome of the Albion Land development.***

3.3 Future Year Flows

Background, Committed & Proposed Flows

3.3.1 The Reference Case and Do-Something flows for the various scenarios have been based on outputs from the BTM. These flows have been reviewed and approved by ADC Infrastructure Ltd, before being submitted to Modelling Group.

3.3.2 On receipt of the strategic flows, the peak hour flows for light and heavy vehicles have been converted into 15-minute origin-destination (O-D) matrices for the

warm-up, peak and cool-down periods, based on the same proportional demands as the 2016 base model.

3.3.3 Further details of the flow conversion can be found in **Appendix D** for Scenarios 1-7.

National Highways Audit Comment – Difference in Proposed Development Flows

3.3.4 One of the comments from the audit stated that there was a difference in the demand for the development zones in the VISSIM matrices compared to the proposed development trip generation assumptions set out in the wider Transport Assessment document.

3.3.5 Following a review of the calculations and the trip generations in the Transport Assessment document, these show almost identical values. The issue appears to relate to the key in the BTM output spreadsheets (as provided by Tetra Tech who maintain the BTM on behalf of Oxfordshire County Council), which detail Zone 12 as 'OxSRFI South' (in the DS3A & DS1A scenario). This is not a development zone, but is the continuation of the B430 South (towards Middleton Stoney). As such, demand flows to/from this zone should not be included in any calculations in relation to development traffic.

National Highways Audit Comment – Sensitivity Test with adjusted BTM Flows

3.3.6 A recommendation following the submission of supporting evidence to show the differences in the 2016 base VISSIM and 2016 base BTM flows, was to undertake a sensitivity test for the worst-case Reference Case and Do-Something scenarios.

3.3.7 This would use the absolute differences from the Reference Case or Do-Something BTM flows against the Base BTM flows, which would then be applied to the base VISSIM flows.

3.3.8 This piece of work has been undertaken as part of a separate modelling exercise, with details of the model development, analysis and subsequent findings presented in the document titled 'MG0163_OxfordSRFI_R_01-A_Final_MIAR-CoreScheme&SensTest' (dated 14th March 2026).

Network Development – Reference Case Scenarios (including Albion Land development)

3.3.9 Details of the Reference Case model development can be found in the document *'MG0163_OxfordSRFI_TN_01-A_Draft_2034RC3A'* in **Appendix B**. This includes details of the inclusion of the Albion Land development, the associated improvement scheme at Baynard's Green and the inclusion of the site access junctions on the B4100 to the east and west of Baynard's Green.

National Highways Audit Comment – Baynard's Green Layout

3.3.10 As part of the audit of the initial modelling undertaken by National Highways/AECOM, a query was raised on the mitigation scheme modelled at Baynard's Green associated with the Albion Land development.

3.3.11 On further review, it was found that the 'alternative' mitigation scheme was modelled and not the original Albion Land scheme. As a result, the Reference Case models have been updated with the correct Albion Land mitigation scheme for Baynard's Green, which is shown in **Figure 3.2**.

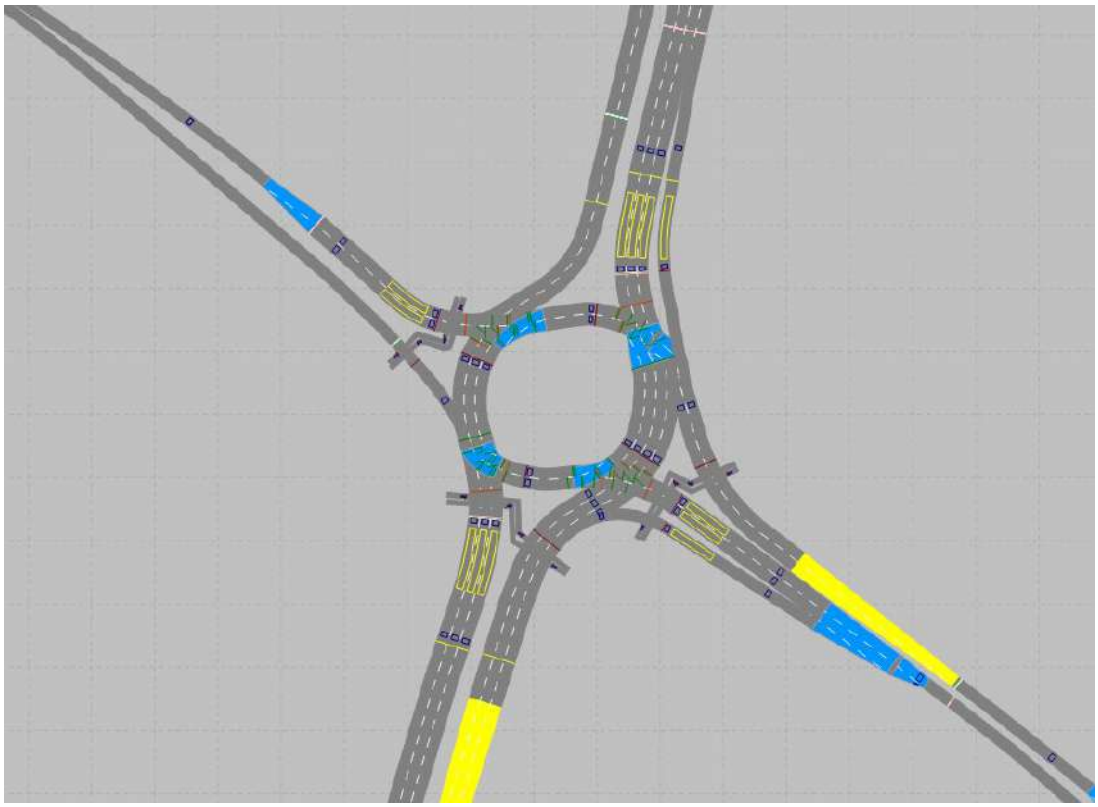


FIGURE 3.2: ALBION LAND – BAYNARD'S GREEN LAYOUT

Key Change: Signal Control – Baynard's Green

3.3.12 In addition to the layout change, a key change that now applies to all of the future year scenario models is the signal control strategy at the Baynard's Green roundabout, developed in close collaboration with the supporting specialist signal engineer. The approach described below was applied consistently to all Baynard's Green signal configurations across the Reference Case and Do-Something scenarios.

3.3.13 A benefit to what was previously reported for the RC3A queuing on the A43 South approach to Baynard's Green is that this is greatly reduced in the PM peak as a result of the new signal set-up.

Initial Set-Up & Limitations

3.3.14 Initially, in the 2034 RC3A scenario, the signal operation was based on separate streams with linking between. This is normal practice for on-street signals. However, there are limitations when using PC MOVA in that the linking can only be configured at the start of the stage through an average hold period. This is different to an on-street controller which has more functionality in terms of hard linking and bespoke special conditioning. These limitations led to the signals in the model losing synchronisation with each other from time-to-time during the simulation runs.

3.3.15 Whilst this issue rectified itself after a few cycles in the 2034 RC3A models (and therefore did not have a significant impact on the overall operation of the junction), it was more of an issue in the 2034 DS3A modelling. In this scenario the signal desynchronisation was much more prevalent and led to a lack of signal co-ordination between the different streams. This led to the junction becoming congested, with instances of the roundabout approaching gridlock conditions.

Way Forward

3.3.16 As a way forward, the signal control was amended to a single stream junction control. This allowed for improved co-ordination of the signal stages which was more akin to the likely on-street operation.

3.3.17 Whilst it is acknowledged that this set-up in the model is not what would be configured on street (multiple streams would be used), the signal operation is more representative of what would be achieved in the signal controller through hard linking and more bespoke special conditioning.

3.3.18 Following the change to a single stream set up, the signal operation was reviewed again in the model and the MOVA dataset optimised, with additional queue functions included to reduce the queuing on the A43 South (in the PM peak most notably), as well as provide more flexible timings on the internal stop-lines to assist with clearance of periods of heavy right-turning traffic.

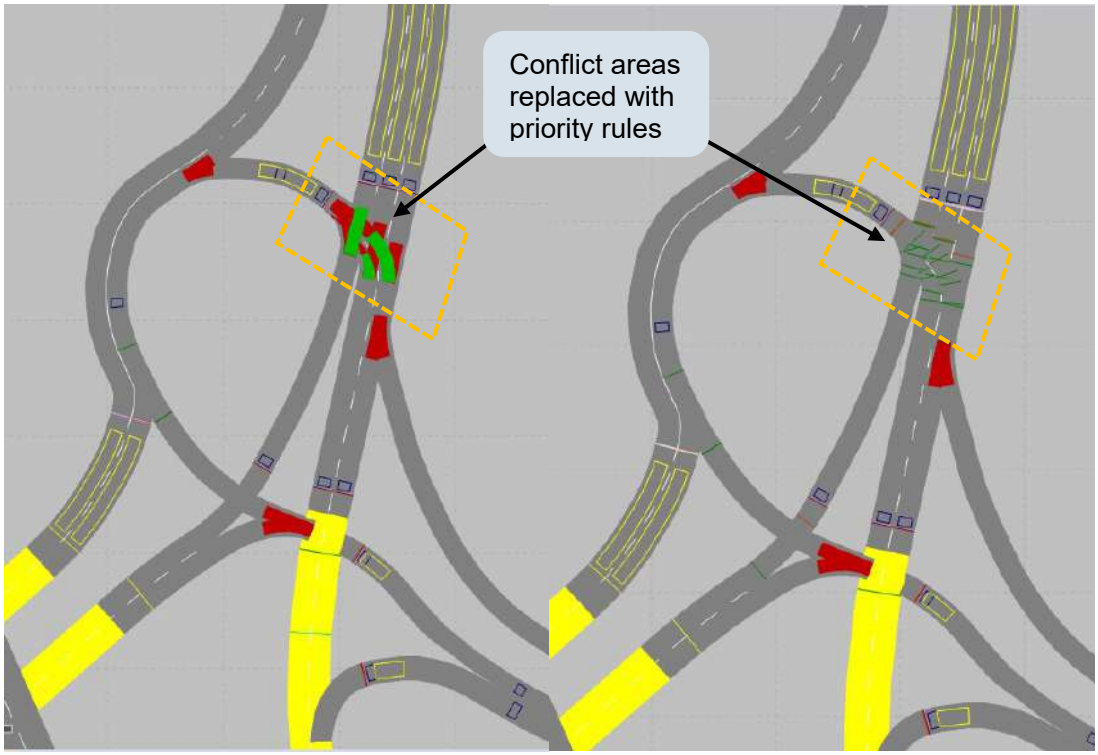
Pedestrian Crossings on Exit Arms

3.3.19 Whilst pedestrian crossing facilities are included in the model, no demands have been modelled in either the AM or PM peak periods for any of the scenarios. This is due to the demands being anticipated to be low and as such, have no significant impact on the junction operation.

Cherwell Junction – Give-Way Behaviour Change

3.3.20 A notable change from the approved base model was the conversion from conflict areas to priority rules at the section where the A43 South approach meets the traffic from the A43 North (heading towards the Cherwell Services or the M40 South).

3.3.21 The before and after layouts are shown in **Figure 3.3**.



Base Layout **Reference Case Layout**

FIGURE 3.3: CHERWELL JUNCTION – GIVE-WAY BEHAVIOUR CHANGES

3.3.22 This set up was originally amended (and agreed) as part of the scenario testing back in 2022 and followed a visual assessment of the network operation in the Reference Case testing.

3.3.23 The original conflict area setup was considered too rigid for the more congested conditions (which were not as prevalent and severe in the base model). Vehicles would leave large gaps and be overly cautious, causing further queuing and congestion that was not considered realistic.

3.3.24 As a result, the setup was changed to using priority rules, which provided greater control over the vehicles to allow a more appropriate and realistic behaviour in congested conditions to be modelled. This provided more 'courtesy' behaviour between vehicles.

National Highways Audit Comment – Give-Way Behaviour Changes

3.3.25 As a result of the audit comments made by National Highways on this behaviour, a review of the priority rule setup was undertaken. This resulted in the removal of some of the 'yellow box' conflict markers, giving more priority to the A43 southbound movement. This was considered a suitable change to not penalise the A43 southbound movement, whilst still having rules to reduce instances of overlapping as vehicles from the A43 North slip headed towards the Cherwell Services and M40 South.

3.4 Network Development – Reference Case Scenario (excluding Albion Land development)

3.4.1 The only difference in the RC1 SRN Reference Case scenario is that there is no proposed Albion Land development and no associated highway improvements (i.e. the highway network configuration is as existing).

3.4.2 This means that the Baynard's Green roundabout is as the existing layout (a priority-controlled roundabout) and there are no development accesses of the B4100 to the East and West of Baynard's Green (see **Figure 3.4** as a recap).



FIGURE 3.4: BAYNARD'S GREEN – EXISTING LAYOUT

3.5 Network Development – Do-Something Scenarios (including Albion Land development)

Albion Land – Site Accesses

Model Layout

3.5.1 The site accesses to the East and West of the Baynard's Green roundabout, as part of the Albion Land development, are retained within the Do-Something scenarios.

3.5.2 As a recap, the layout of the site access junctions in the model are shown in **Figure 3.5** and **Figure 3.6**.

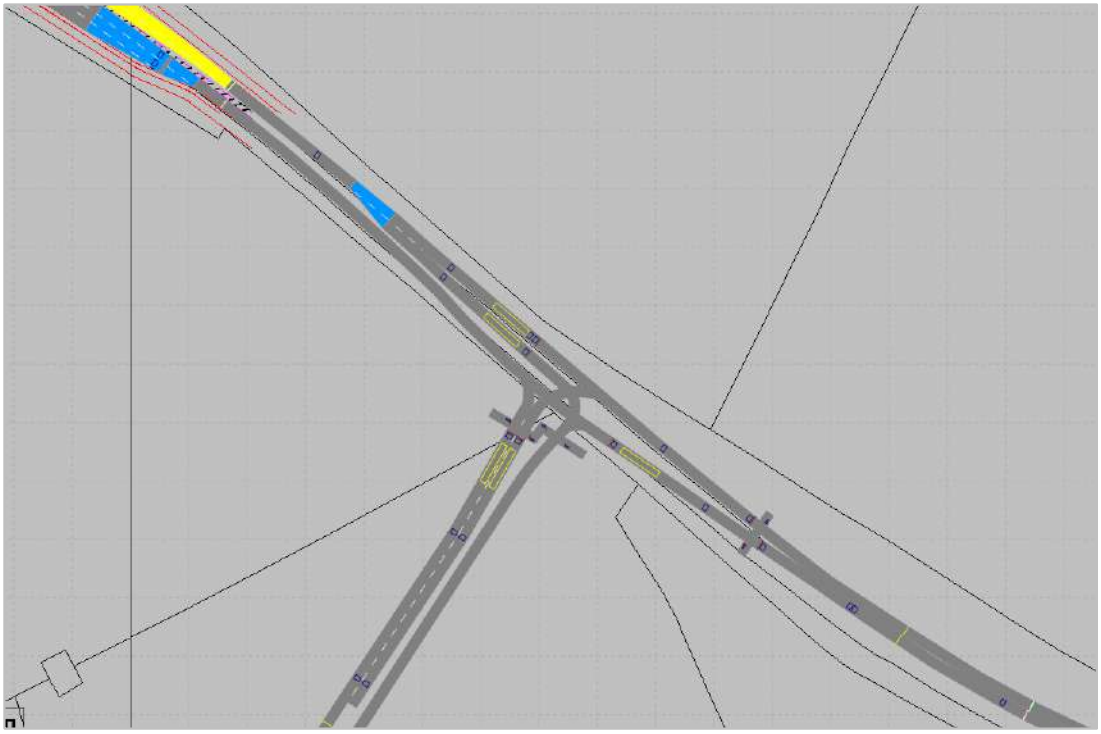


FIGURE 3.5: ALBION LAND – EASTERN ACCESS JUNCTION



FIGURE 3.6: ALBION LAND – WESTERN ACCESS JUNCTION

Proposed Development Mitigation Scheme:

Baynard's Green Roundabout

3.5.3 The Baynard's Green Roundabout has been updated to an 'alternative' scheme as part of the OxSRFI development. This utilises the Albion Land layout and adds the following:

- An additional lane on the western circulatory section for turning right towards the B4100 East from the A43 South.
- An increase from two lanes to three on the A43 North exit
- An increase from two lanes to three on the A43 South exit (to tie in with the new three-lane link travelling southbound between Baynard's Green and Padbury junction.

Model Layout

3.5.4 The model layout showing the network elements to code in this scheme are shown in **Figure 3.7**, with the proposed OxSRFI mitigation drawing provided in **Appendix E**.

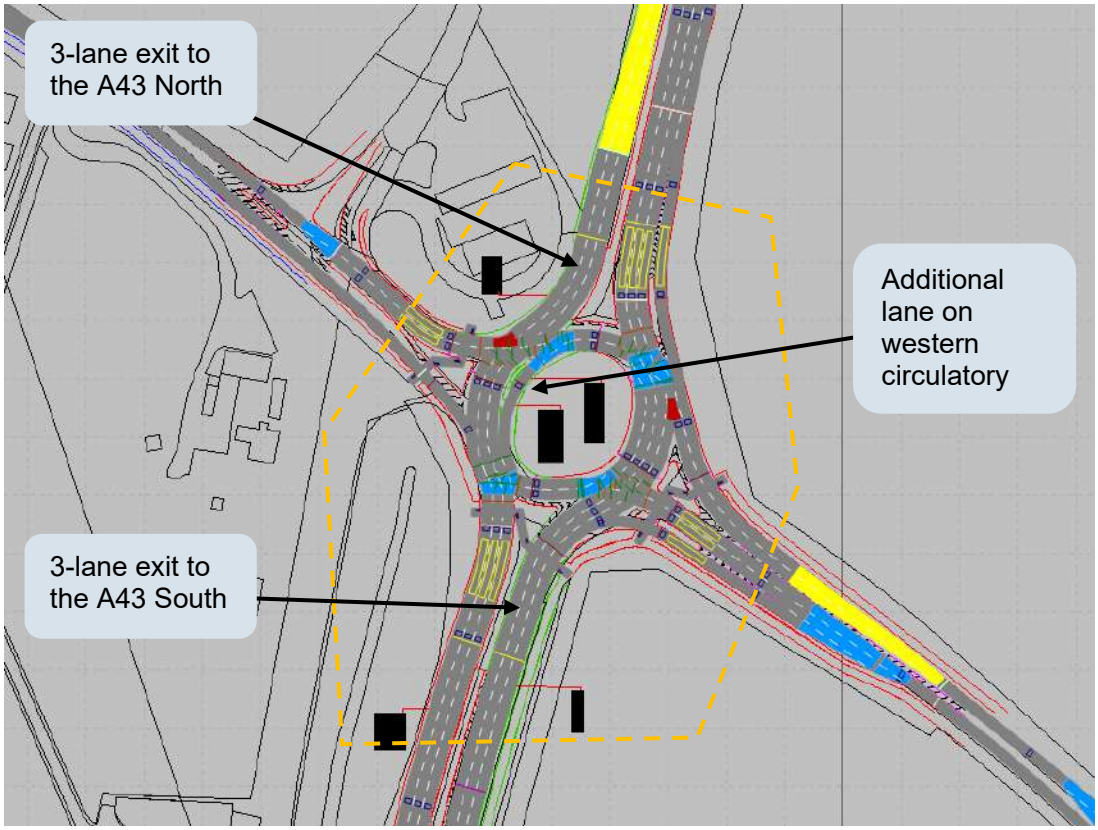


FIGURE 3.7: OXSRFI ALTERNATIVE – BAYNARD'S GREEN LAYOUT

Signal Control

3.5.5 The signal control strategy at Baynard's Green in the Do-Something scenario follows the same single stream approach described in Section 3.3.16–3.3.18, with the MOVA dataset optimised for the Do-Something layout and demand conditions. The additional circulatory lane and revised exit configurations required adjustments to stage sequencing and queue function parameters, but the fundamental control philosophy remains consistent across scenarios.

Padbury Junction & M40 NB Off-Slip Link

3.5.6 At the Padbury junction, there is a complete reconfiguration of the junction, which includes the removal of the existing layout and the conversion to a 4-arm signalised junction. Further elements include:

- A new off-slip from the M40 travelling northbound that connects to the junction.
- Increased number of approach lanes on the M40 southbound off-slip and A43 North approaches.
- Junction configured under MOVA control as a single stream.

Model Layout

3.5.7 The model layout showing the network elements to code in this scheme are shown in **Figure 3.8**, with the proposed OxSRFI mitigation drawing provided in **Appendix E**.

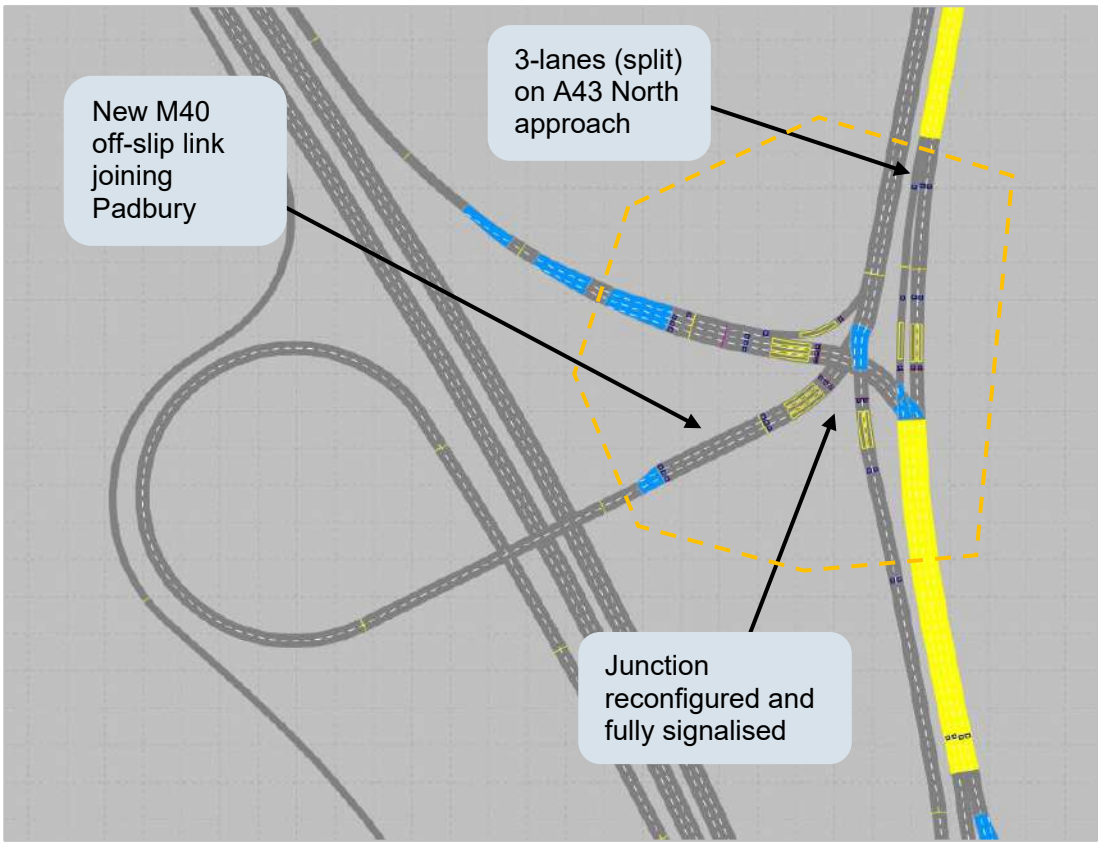


FIGURE 3.8: PADBURY JUNCTION LAYOUT

Signal Control

3.5.8 The new Padbury junction signals have been replicated in the VISSIM model using PC MOVA, where a configuration file was created by our supporting specialist signal engineer. The initial set up was based on ADC Infrastructure Ltd.'s supporting LinSig model, followed by a visual analysis to ensure the operation in the model was both representative of what could be operated on-street and then optimised to the network conditions.

National Highways Audit Comment – Intergreen Value Review

3.5.9 As part of the National Highways review of the initial VISSIM modelling, a comment was made on the need to review the intergreen value at this junction. Changes were made to account for the comments following the use of the JCT Quickgreen software to check the intergreen values required for the conflicting phases (see **Figure 3.9**).

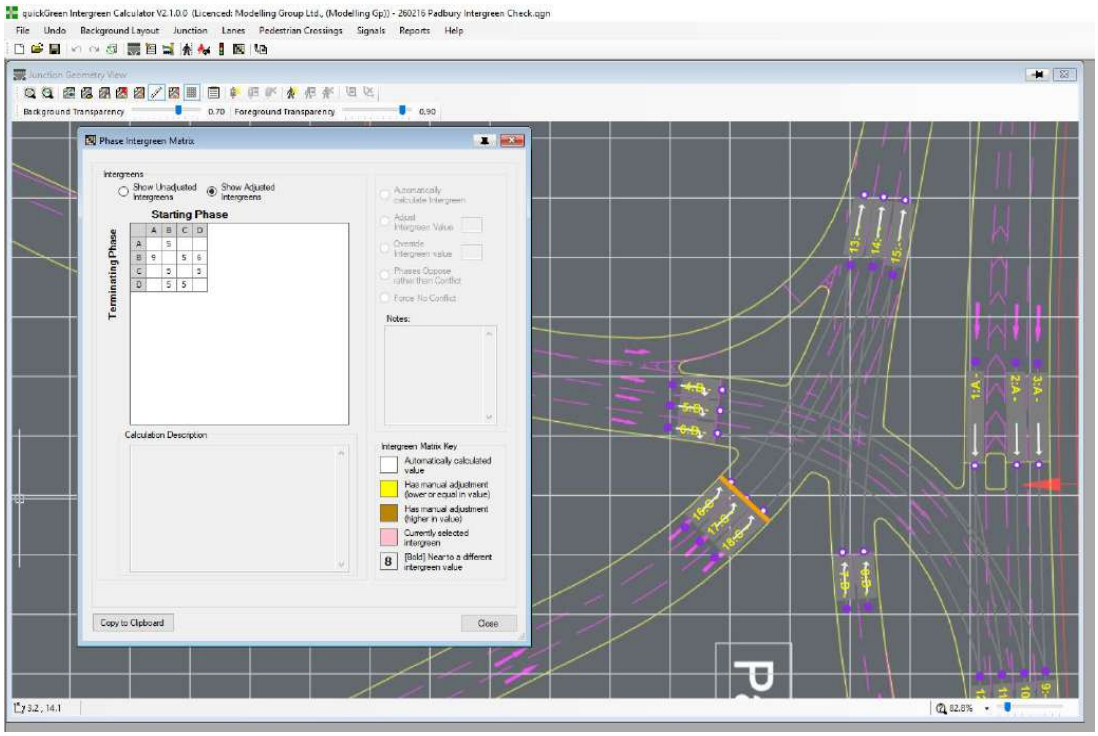


FIGURE 3.9: QUICKGREEN INTERGREEN CALCULATIONS – PADBURY

3.5.10 Following a review of the operation of the model, the intergreen from Phase A to B was increased from 5s to 6s to assist with queue management.

Cherwell Junction – Full Development

3.5.11 At the Cherwell junction, the main improvements associated with the completion of the OxSRFI development include:

- An increase in the number of lanes on the A43 North approach and an increased segregation in the A43 links travelling to the M40 and towards Ardley roundabout.
- The removal of the link to allow the movement from the Cherwell Services to the A43 North. Travelling to the A43 North from the Cherwell Services is now proposed to be via the reconfigured Ardley roundabout.

Model Layout

3.5.12 The model layout showing the network elements to code in this scheme are shown in **Figure 3.10**, with the proposed OxSRFI mitigation drawing provided in **Appendix E**.

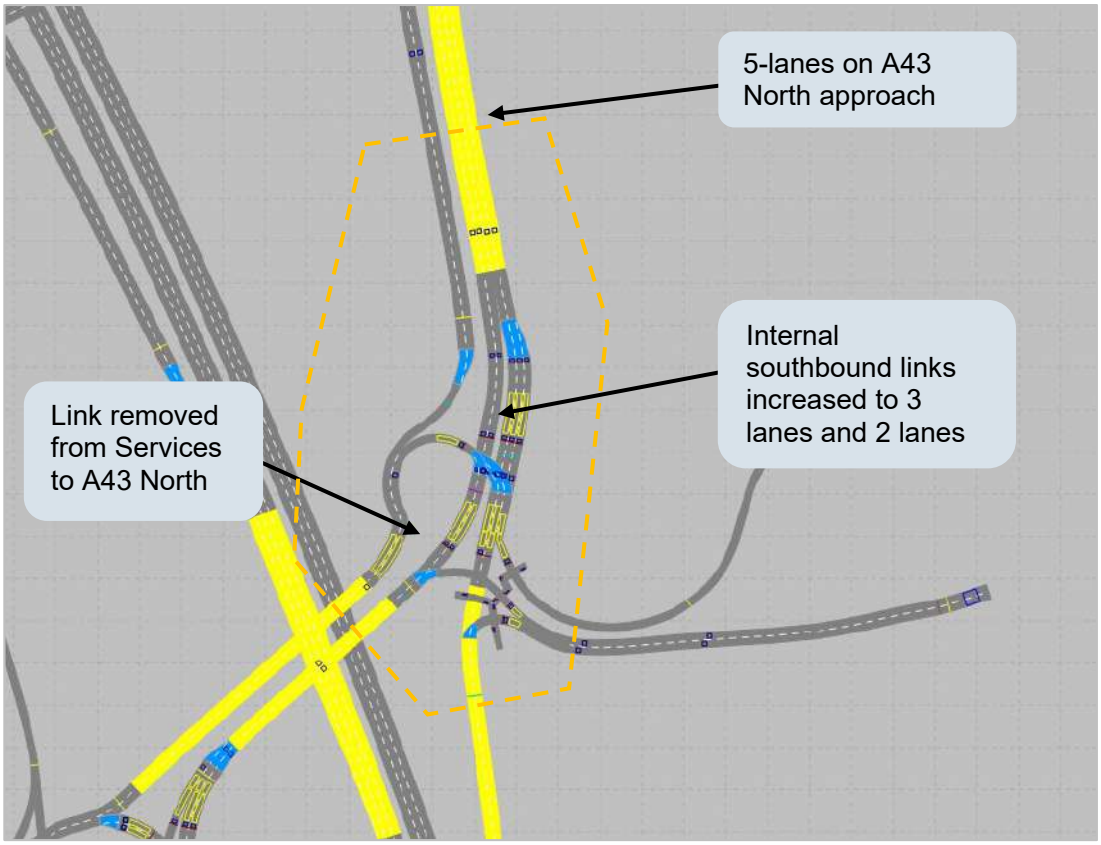


FIGURE 3.10: CHERWELL JUNCTION LAYOUT – FULL DEVELOPMENT

Give-Way Behaviour Change

Signal Control

3.5.13 New MOVA configuration files were produced by the supporting specialist signal engineer to reflect the revised lane arrangement. As with the Baynard's Green signal control (Section 3.3.16–3.3.18), the Cherwell signals were converted from a two-stream configuration (A43 Southbound/Northbound and Services exit) to a single stream junction control, providing improved co-ordination of signal stages more representative of likely on-street operation. The signal operation was reviewed in the model and optimised to the network conditions.

Cherwell Junction – Phase 1

3.5.14 At the Cherwell junction, the main improvements associated with Phase 1 of the OxSRFI development include:

- An increase in the number of lanes on the internal section for southbound traffic towards Ardley roundabout.
- Additional lane on the A43 for right-turning traffic to access the Services and M40 South.
- An extended two-lane merge section on the M40 southbound on-slip on the exit of Cherwell.

Model Layout

3.5.15 The model layout showing the network elements to code in this scheme are shown in **Figure 3.11**, with the proposed OxSRFI mitigation drawing provided in **Appendix E**.

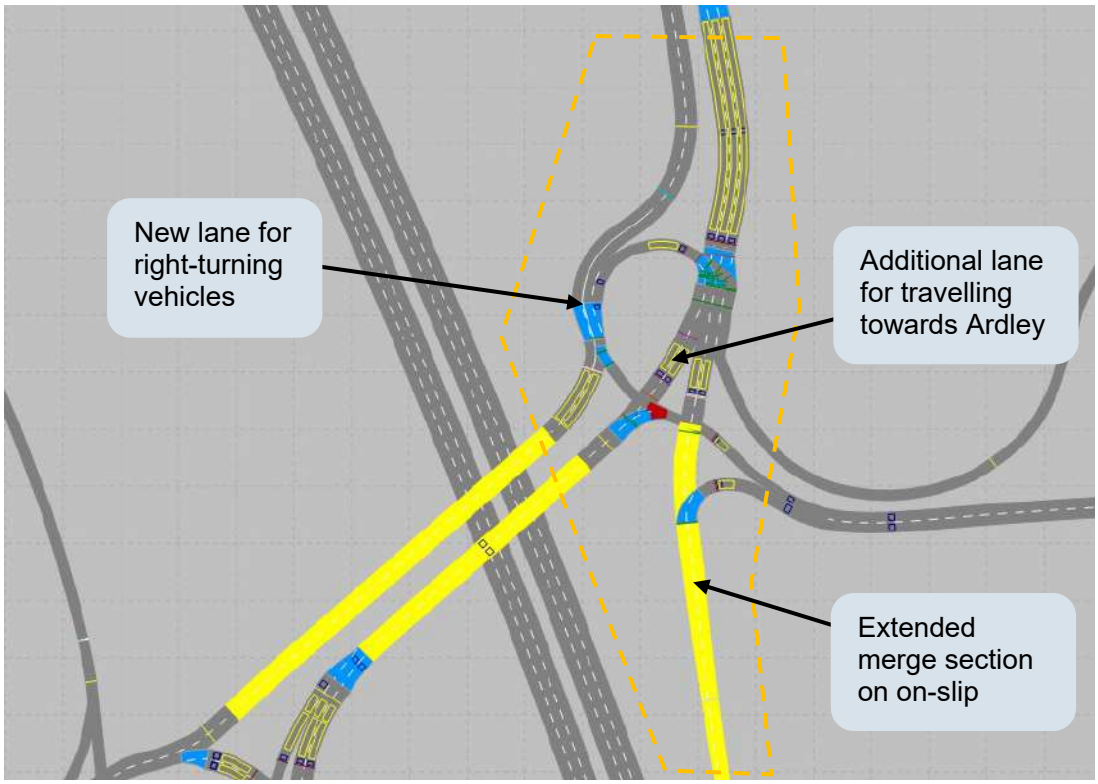


FIGURE 3.11: CHERWELL JUNCTION LAYOUT – PHASE 1

Signal Control

3.5.16 The MOVA configuration files were updated by the supporting specialist signal engineer to reflect the Phase 1 lane changes. The signal operation follows the same single stream control approach described for the full development configuration, with optimisation to the Phase 1 network conditions.

Ardley Roundabout & M40 NB On-Slip Link

3.5.17 At the Ardley roundabout, there is a complete reconfiguration of the junction, which includes a much larger roundabout and the conversion to a 5-arm signalised roundabout. Further elements include:

- A revised alignment for the on-slip for the M40 travelling northbound that connects to the junction.
- A new dedicated cut-through link from the A43 to the new M40 northbound on-slip.
- A new arm and link (the Ardley Bypass) that provides access to the OxSRFI site access junction.

- Pedestrian crossing facilities provided to access the northern and southern sides of the junction.
- Junction configured under MOVA control with multiple streams.

Model Layout

3.5.18 The model layout showing the network elements to code in this scheme are shown in **Figure 3.12,** with the proposed OxSRFI mitigation drawing provided in **Appendix E**.

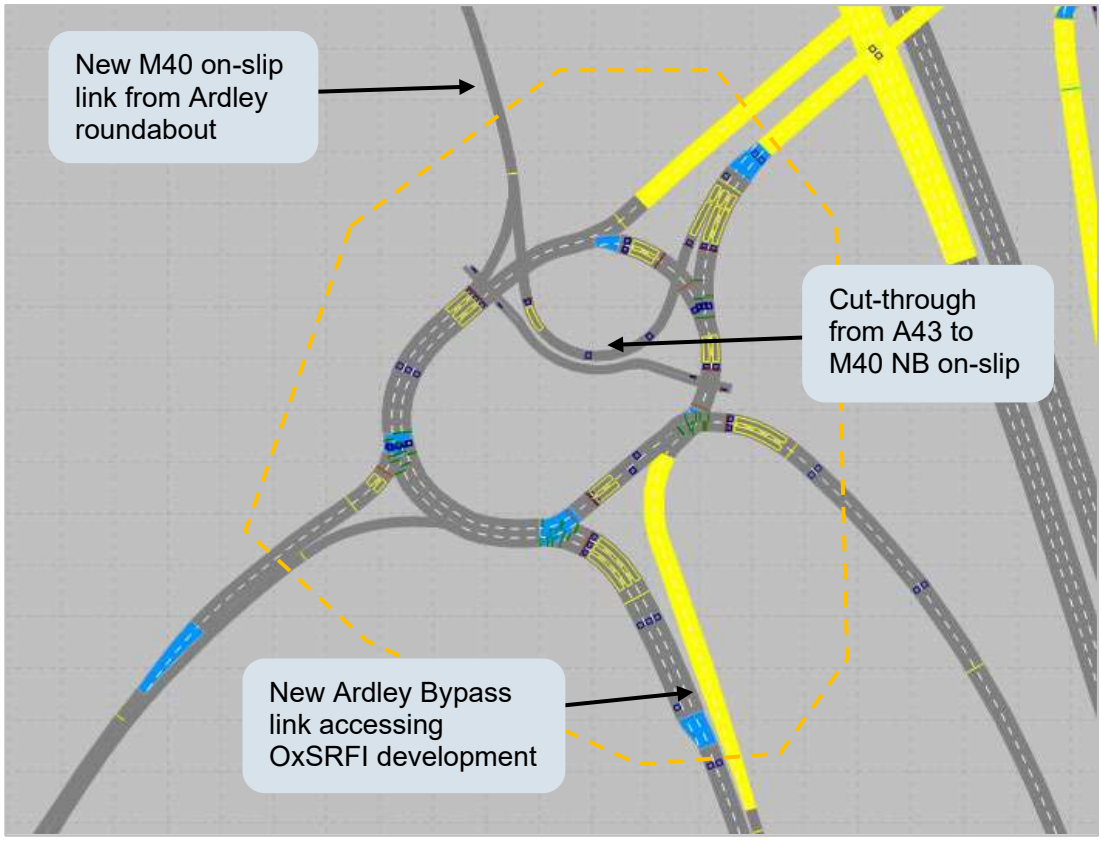


FIGURE 3.12: ARDLEY ROUNDABOUT LAYOUT

Signal Control

3.5.19 Due to the changes at this junction with the new arms and formalised pedestrian crossings, a new MOVA configuration file was created by our supporting specialist signal engineer. As with the Padbury junction, the initial set up was based on ADC Infrastructure Ltd.'s supporting LinSig model, followed by a visual analysis to ensure the operation in the model was both representative of on-street control and optimised to the network conditions.

3.5.20 Whilst there are pedestrian crossing facilities included in the model, no demands have been modelled in either the AM or PM peak periods. This is due to the demands anticipated to be low and as such, will not have a significant impact on the junction operation.

National Highways Audit Comment – Intergreen Value Review

3.5.21 As part of the National Highways review of the initial VISSIM modelling, a comment was made on the need to review the intergreen values at this junction. Changes were made to account for the comments following the use of the JCT Quickgreen software to check the intergreen values required for the conflicting phases (see **Figure 3.13**).

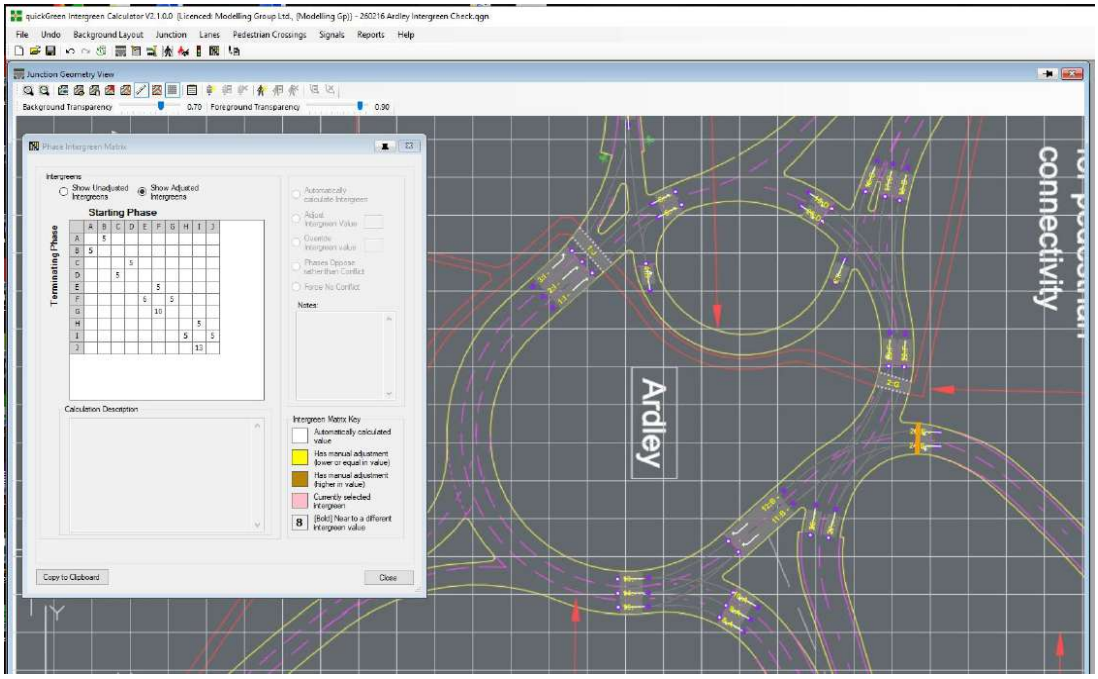


FIGURE 3.13: QUICKGREEN INTERGREEN CALCULATIONS – ARDLEY

3.5.22 Following a review of the operation of the model, the following further intergreen changes were made:

- Phase E to F was increased from 5s to 6s [Stream 3]
- Phase H to I & Phase I to H were increased from 5 to 6s [Stream 4]

3.5.23 These changes were made to assist with queue management, particularly for southbound traffic travelling towards Ardley bypass and reducing instances of exit blocking past the northbound off-slip entry from the southbound merge.

National Highways Audit Comment – Phase Delays Review

3.5.24 In line with recommendations from National Highways, the phase delays have also been reviewed at the Ardley junction, with the following now included to assist with the signal control:

- Stream 3: Phase A – Stage 1 to 2 – Phase Delay of 5s
- Stream 4: Phase A – Stage 1 to 2 – Phase Delay of 8s
- Stream 4: Phase B – Stage 2 to 1 – Phase Delay of 1s

Site Access Roundabout & Bypass Link

3.5.25 The site access junction for the proposed OxSRFI development is a 3-arm signalised roundabout, which also includes the following:

- A ban on HGVs being able to turn right out of the site access, which instead have to use the bypass link to access Ardley.
- A bus gate for buses servicing the site to travel southbound on the southern link towards Middleton Stoney
- Pedestrian crossing facilities on the western arm of the roundabout.
- Stopping up of the B430 south of Ardley village, with access to Ardley roundabout via the new bypass link.

Model Layout

3.5.26 The model layout showing the network elements to code in this scheme are shown in **Figure 3.14,** with the proposed OxSRFI mitigation drawing provided in **Appendix E**. **Figure 3.15** shows the internal OxSRFI roundabout also included within the model.

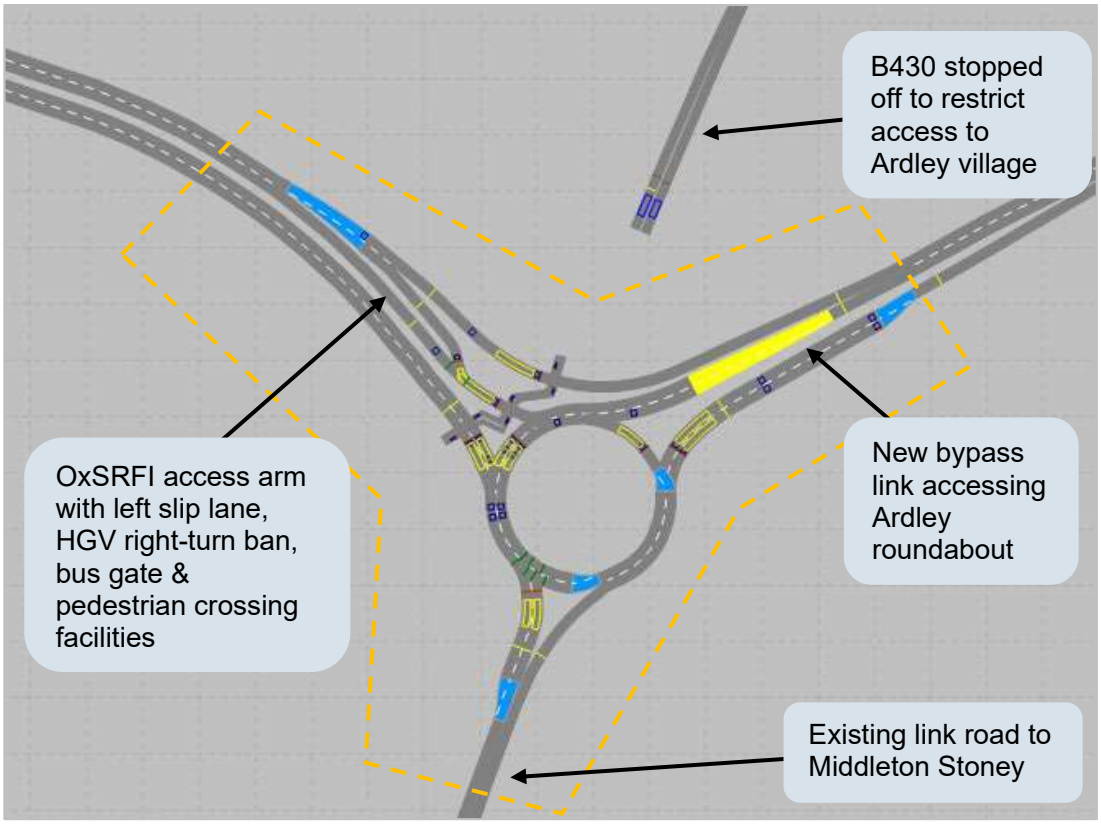


FIGURE 3.14: PROPOSED OXSRFI SITE ACCESS ROUNDABOUT

Signal Control

3.5.27 The new OxSRFI site access junction signals have been replicated in the VISSIM model using PC MOVA, where a configuration file was created by our supporting

specialist signal engineer. This also allowed for the inclusion of priority for buses using the bus gate facility. The initial set up was based on ADC Infrastructure Ltd.'s supporting LinSig model, followed by a visual analysis to ensure the operation in the model was both representative of on-street control and optimised to the network conditions.

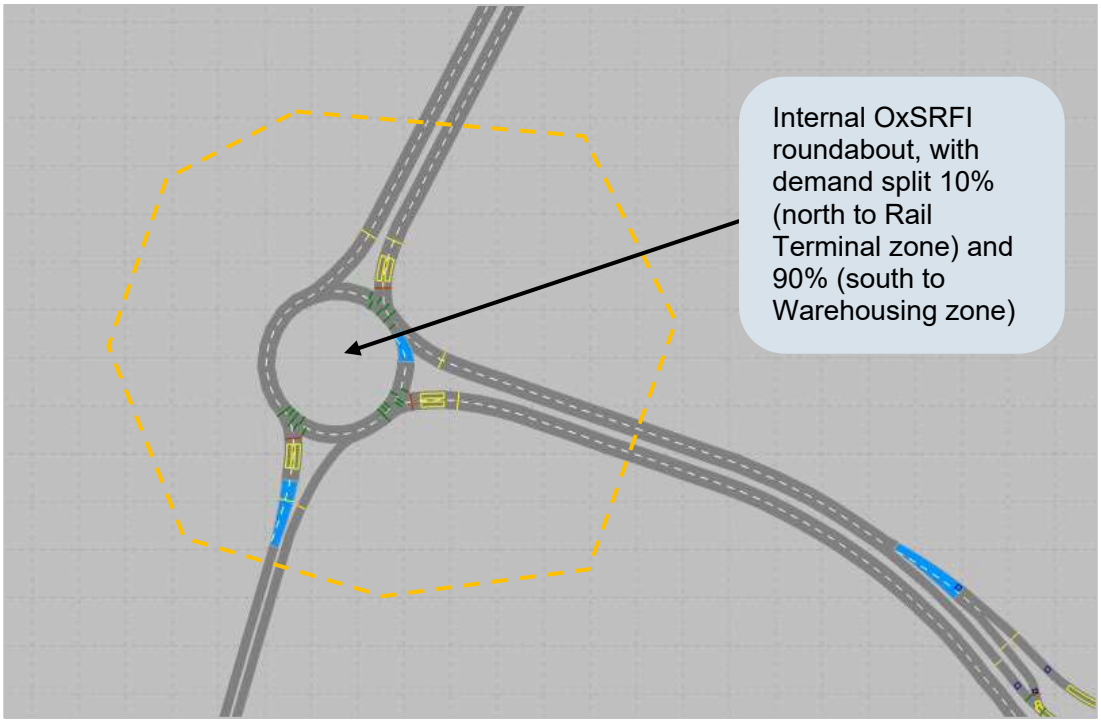


FIGURE 3.15: PROPOSED OXSRFI INTERNAL SITE ACCESS ROUNDABOUT

3.5.28 Whilst there are pedestrian crossing facilities included in the model, no demands have been modelled in either the AM or PM peak periods. This is due to the demands anticipated to be low and as such, will not have a significant impact on the junction operation.

Internal Access Junction – Relative Flow Splits

3.5.29 The split of development traffic entering the network (0.1 for the north entry and 0.9 for the south entry) is based on the proposed approximate development flow splits for using the Rail Terminal to the north and the Warehousing to the south.

3.5.30 Further details on the proposed development trips and the calculated proportions are shown in **Table 3.3** and **Table 3.4**.

	Total Traffic		Rail Terminal (North)		% using Rail Terminal (North)		
	Lights	HGV	Lights	HGV	Lights	HGV	AVG
AM	1000	331	0	35	0.0%	10.6%	5.3%
PM	1336	300	0	42	0.0%	14.0%	7.0%
Daily	15730	4920	90	718	0.6%	14.6%	7.6%

TABLE 3.3: PROPOSED DEVELOPMENT FLOWS – DS1, DS1A & DS3A

	Total Traffic		Rail Terminal (North)		% using Rail Terminal (North)		
	Lights	HGV	Lights	HGV	Lights	HGV	AVG
AM	308	102	0	12	0.0%	11.8%	5.9%
PM	411	93	0	14	0.0%	15.1%	7.5%
Daily	4902	1524	90	239	1.8%	15.7%	8.8%

TABLE 3.4: PROPOSED DEVELOPMENT FLOWS – DS2A

3.5.31 As the relative flows applied to the parking lots apply to all vehicle classes, the split of the Light vehicles is slightly different to that anticipated. However, this is an internal development junction and a slight difference in the Light vehicle splits will not have any impacts on the wider network performance.

Wider Network – Speed Limit Changes

3.5.32 As part of the proposed OxSRFI development, changes to speed limits in the area have also been required to be accounted for in the VISSIM models.

3.5.33 The main changes include:

- A 40mph limit between Padbury and Ardley junctions.
- A 20mph limit speed limit through Ardley village.
- A 40mph speed limit on the new M40 northbound off and on-slips.

3.5.34 The locations of the new speed limits in the network are shown in the drawings in **Figure 3.16**, **Figure 3.17** & **Figure 3.18.**

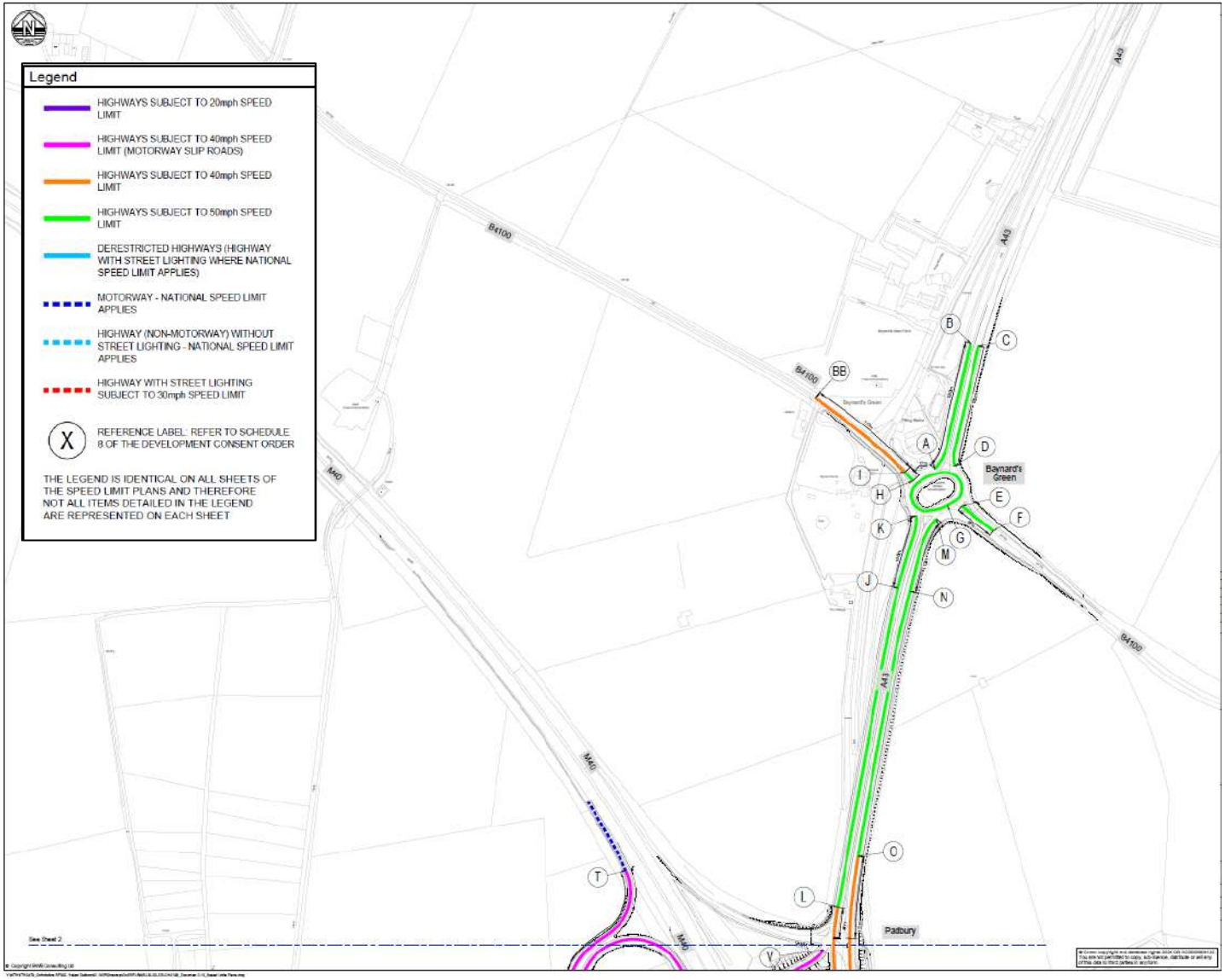


FIGURE 3.16: OXSRFI – PROPOSED SPEED LIMIT CHANGES – SECTION 1 (BAYNARD'S GREEN & PADBURY)

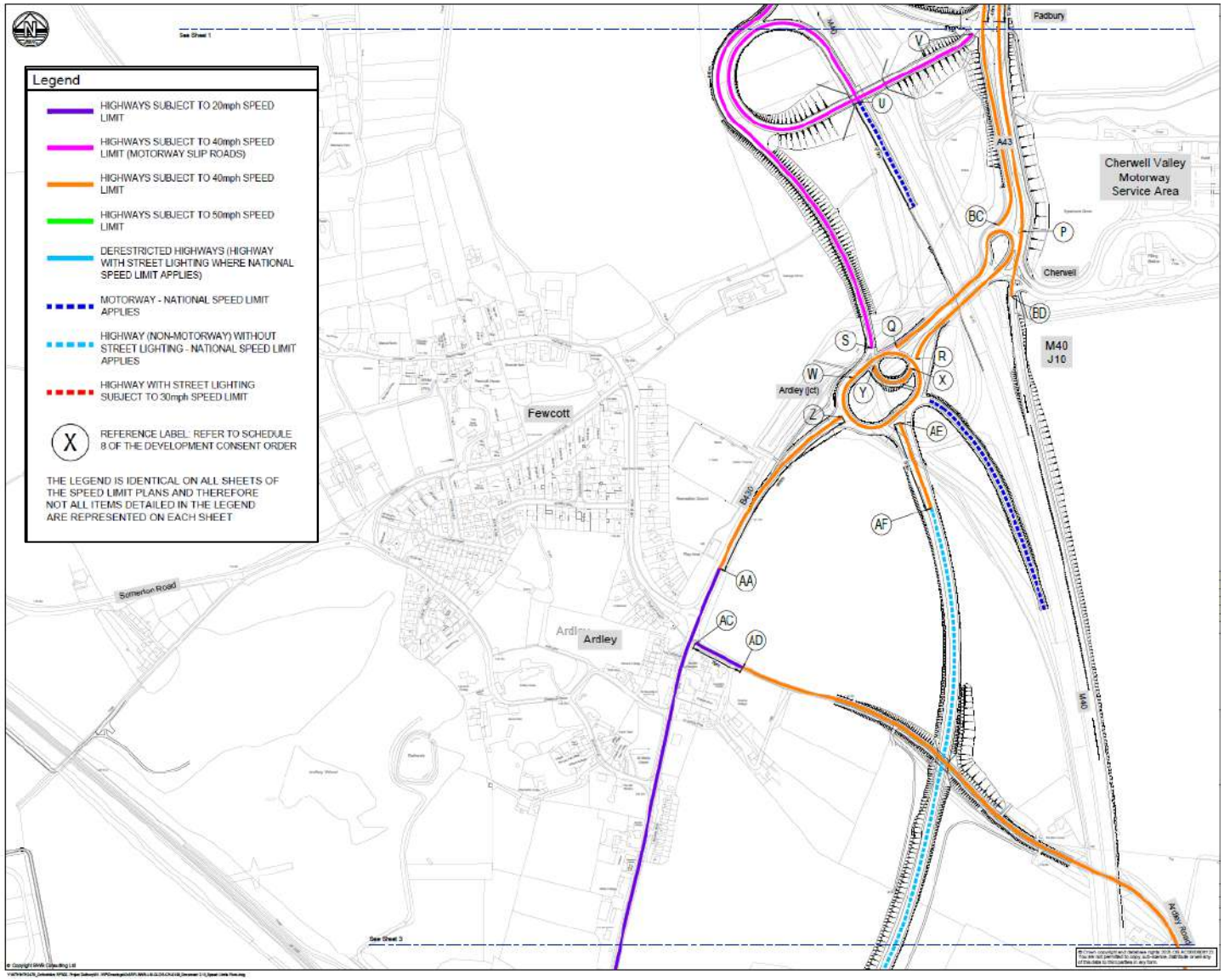


FIGURE 3.17: OXSRFI – PROPOSED SPEED LIMIT CHANGES – SECTION 2 (PADBURY, CHERWELL, ARDLEY, SLIP ROADS, BYPASS)

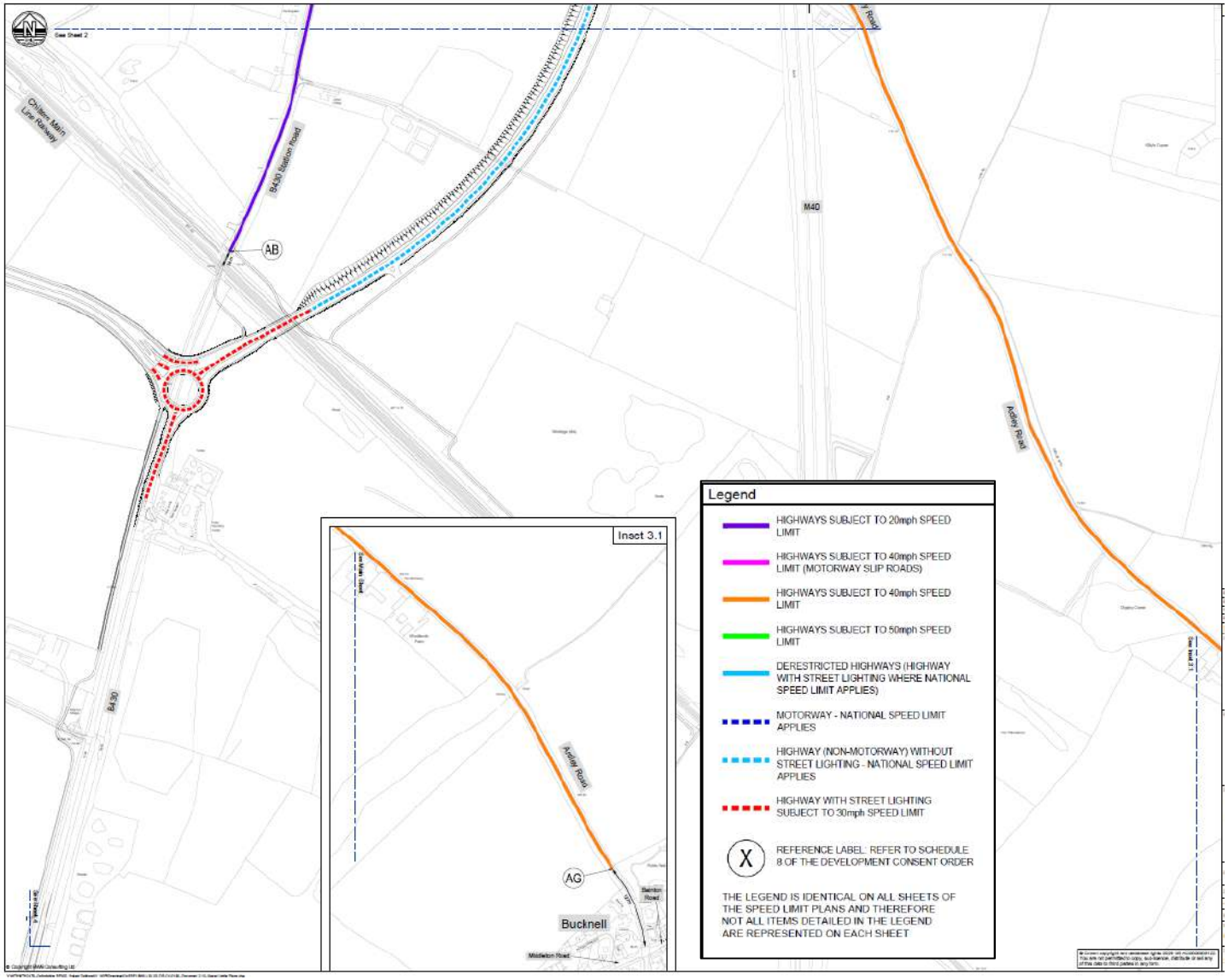


FIGURE 3.18: OXSRFI – PROPOSED SPEED LIMIT CHANGES – SECTION 3 (BYPASS, B430)

3.6 Traffic Compositions

3.6.1 The same vehicle types, classes and compositions have been used as per the 2016 base model for the future year assessments.

3.7 Base Model Calibration and Validation

LMVR Cross-Reference and Model Credibility

3.7.1 The 2016 base year VISSIM model provides the foundation for all future year scenario testing. The model was comprehensively updated from the original AECOM/National Highways version (VISSIM 5.40-06) to VISSIM 2021 (Service Pack 07), with the network extended to include the B430/Ardley Road staggered crossroads.

3.7.2 Following these updates, a complete recalibration and revalidation exercise was undertaken to ensure the model remained fit for purpose and representative of observed network conditions. The validation exercise was documented in the Local Model Validation Report (LMVR Document Reference: *MG0163_M40 J10 Model Update_LMVR_R-01B, Issue 2*, approved by National Highways 14th July 2021), provided in **Appendix A**.

Calibration and Validation Performance

3.7.3 The base model achieved exemplary calibration and validation performance against DfT TAG Unit 3.1 acceptance criteria:

Entry Flow Calibration (Calibration Metric):

- 100% compliance (9 of 9 entries within 5% of observed flows)
- 100% GEH <3 compliance (all 9 entries achieving GEH values below 3)

Junction Turning Count Validation (Primary Validation Metric):

- AM Peak: 100% GEH <5 compliance (43 of 43 movements), with 93% achieving GEH <3
- PM Peak: 100% GEH <5 compliance (43 of 43 movements), with 93% achieving GEH <3
- Individual flow criteria: 98% compliance (42 of 43 movements meeting TAG sliding scale criteria)

Journey Time Validation (Independent Validation Metric):

- AM Peak: 95% compliance (21 of 22 routes within 15% of TomTom observed journey times)

- PM Peak: 95% compliance (19 of 22 routes within 15% of TomTom observed journey times)
- All routes within 60 seconds tolerance, confirming practical validity

Exit Flow Validation (Completeness Check):

- 100% compliance (9 of 9 exits within TAG criteria, all achieving GEH <5)

3.7.4 These results significantly exceed the DfT TAG Unit 3.1 minimum requirement of 85% compliance for flow and turning movement validation, confirming the model provides a robust, defensible platform for future year scenario assessment.

Model Convergence

3.7.5 The base year model was converged using dynamic assignment procedures following TAG Unit 3.1 guidance. Convergence was achieved after 35 runs for both AM and PM peaks, with 100% of paths meeting travel time convergence criteria (within 20% for four consecutive runs), 100% meeting volume convergence criteria, and network performance stability achieved (within 1% total travel time difference).

3.7.6 Further technical details, including model changes, priority rule adjustments, and complete validation data tables, are provided in the LMVR (**Appendix A**).

4 MODEL CONVERGENCE

4.1 Overview

4.1.1 As the future year scenario models were developed using the dynamic assignment module, convergence testing was essential to ensure model stability before extracting performance results.

4.1.2 Given the changes made to the models since the previous modelling exercise, a completely new convergence exercise was undertaken to ensure suitable model stability.

4.1.3 After initial batch runs to build up path (*.WEG) and cost (*.BEW) files for the AM and PM peaks, the various scenario models were tested for convergence.

4.1.4 The individual WEG files were extracted and analysed, together with total travel time from the network performance evaluation file, to verify convergence levels. This involved the following checks:

- **Travel Times Check 1** – Calculating the share of paths that met the convergence criteria as set out in TAG Unit 3.1 (95% within 20% for four consecutive runs)
- **Travel Times Check 2** – Using the WEG file from VISSIM, an additional check identifying whether the internal VISSIM convergence criteria were met for all paths
- **Volume Difference** – Using the New and Old path volumes to check that the convergence criteria were met as set out in TAG (95% within 5 vehicles for a minimum of four consecutive runs)
- **Total Travel Time Difference** – Using the Network Performance evaluation outputs to check the percentage differences between runs and determine whether this met TAG criteria (within 1% for four consecutive runs)

4.2 Convergence Results

2034 RC3A Results

4.2.1 The convergence results for the 2034 Reference Case AM and PM peaks are provided in **Appendix F**. The AM peak converged against the Path Journey Times and Network Performance criteria after 60 runs and the PM peak converged after 100 runs.

4.2.2 The model was converged using 80% of the total demand. This reduced level of demand to achieve convergence was undertaken following guidance provided by PTV, which states that for congested networks, running models with lower

traffic demands to achieve convergence can produce the same paths and distribution[2] (see quoted section below). This methodological choice is discussed further in Section 6 (Sensitivity and Limitations), where the implications for assessment robustness are examined in detail.

> "Heavily overloaded networks typically never converge. Therefore, it may be reasonable to assume that the paths and distribution achieved from convergence runs at 70% traffic volume is similar to those at 100% traffic volume. Rather than assigning 100% demand and never achieving convergence in a congested network, the paths could be developed using incremental increases in demand up to e.g. 70%. At this point, the demand could be fixed at 70% for convergence runs. Assuming that convergence is achieved and the paths are reviewed for suitability, the demand could be increased back to 100% for evaluation runs."

2034 DS3A Results

4.2.3 The convergence results for the AM and PM peaks are provided in **Appendix F**. The AM peak converged after 30 runs and the PM peak converged after 100 runs. The AM peak was run with 80% demand, whilst the PM peak was run with 70% of the total demand.

4.2.4 For the volume difference criterion, the results stabilised at 83-84% and did not increase further. The model extents and complex link/connector structure result in both a significant number of edges and possible paths, as well as multiple paths to the same origin-destination pairs (introducing route choice). The strict TAG criteria (0-5 vehicle difference) means that paths with low flows can oscillate between different route options and therefore never converge mathematically. Given that the percentages in both AM and PM peak models have stabilised consistently at 83-84%, the model is considered stable from a path volume perspective.

2031 RC1A Results

4.2.5 The convergence results for the 2031 Reference Case AM and PM peaks are provided in **Appendix F**. The AM peak converged after 70 runs and the PM peak converged after 120 runs, both tested with 80% of the total demand following the same approach as the 2034 scenarios.

[2] https://support.ptvgroup.com/en-us/knowledgebase/article/KA-04706)

2031 RC1 Results

4.2.6 The convergence results for the 2031 Reference Case (excluding Albion Land) AM and PM peaks are provided in **Appendix F**. The AM peak converged after 10 runs and the PM peak converged after 10 runs, both tested with 80% of the total demand following the same approach as the 2034 scenarios.

2031 RC2A Results

4.2.7 The convergence results for the 2031 Reference Case AM and PM peaks are provided in **Appendix F**. The AM peak converged after 60 runs and the PM peak converged after 100 runs, both tested with 80% of the total demand following the same approach as the 2034 and other 2031 scenarios.

2031 DS1A Results

4.2.8 The convergence results for the 2031 Do-Something AM and PM peaks are provided in **Appendix F**. The AM peak converged against the Path Journey Times and Network Performance criteria after 61 runs and the PM peak converged after 100 runs. The AM peak was run with 80% demand, whilst the PM peak was run with 70% of the total demand.

4.2.9 As with the 2034 DS3A scenario, the volume difference results stabilised at 82–84% and did not increase further, for the same structural reasons described in para 4.2.4. The consistent stabilisation of this metric confirms that the model is stable from a path volume perspective.

2031 DS2A Results

4.2.10 The convergence results for the 2031 Do-Something (Phase 1) AM and PM peaks are provided in **Appendix F**. The AM peak converged against the Path Journey Times and Network Performance criteria after 55 runs, with the PM peak also converging after 40 runs. Both scenarios were tested with 80% of the total demand, consistent with the other scenarios.

4.2.11 Consistent with the DS3A and DS1A scenarios, the volume difference results stabilised at 85%, attributable to the same model structure characteristics described in para 4.2.4. The model is considered stable from a path volume perspective.

5 MODEL PERFORMANCE ANALYSIS

5.1 Overview

5.1.1 The impact of the development on the local network in all future year scenario tests has been assessed using the following model outputs:

- Journey Times
- Queue Lengths
- Junction Performance – Average Vehicle Delays
- Network Performance
  - Average Vehicle Delay
  - Average Speed
  - Latent Demand

Journey Times

5.1.2 For the journey times, route sections have been collected. Two sets of times have been collected. Firstly, those which were previously collected in AECOM's M40 J10 study note, which are listed below and shown in **Figure 5.1** to allow a comparison back to that study. However, these routes does not include the new M40 northbound off-slip to Padbury and therefore does not fully reflect the benefits associated with the new link.

Travel Time Route	
SB1: A43 North to Baynard's Green	NB1: M40 to Ardley
SB2: Baynard's Green to Padbury	NB2: Ardley to Cherwell
SB3: Padbury to Cherwell	NB3: Cherwell to Padbury
SB4: Cherwell to M40 On-Slip	NB4: Padbury to Baynard's Green
SB5: M40 On-Slip to M40	NB5: Baynard's Green to A43 North

TABLE 5.1: TRAVEL TIME ROUTES – AECOM TN

5.1.3 A second set of journey times between each O-D pair have also been collected to allow further comparisons between the scenarios tested. The zones are listed below and shown in **Figure 5.2** to provide a review of all movements through the network, including routes via the new M40 northbound off-slip link to Padbury junction.

Zone	Name	Zone	Name
A	A43 North	G	Ardley Rd West
B	B4100 East	H	M40 North
C	Cherwell Services	I	B4100 West
D	Ardley Rd East	J	OxSRFI North (DS Only)
E	M40 South	K	OxSRFI South (DS Only)
F	B430	L	B430 (New) (DS Only)

TABLE 5.2: TRAVEL TIME ROUTES – O-D ZONES

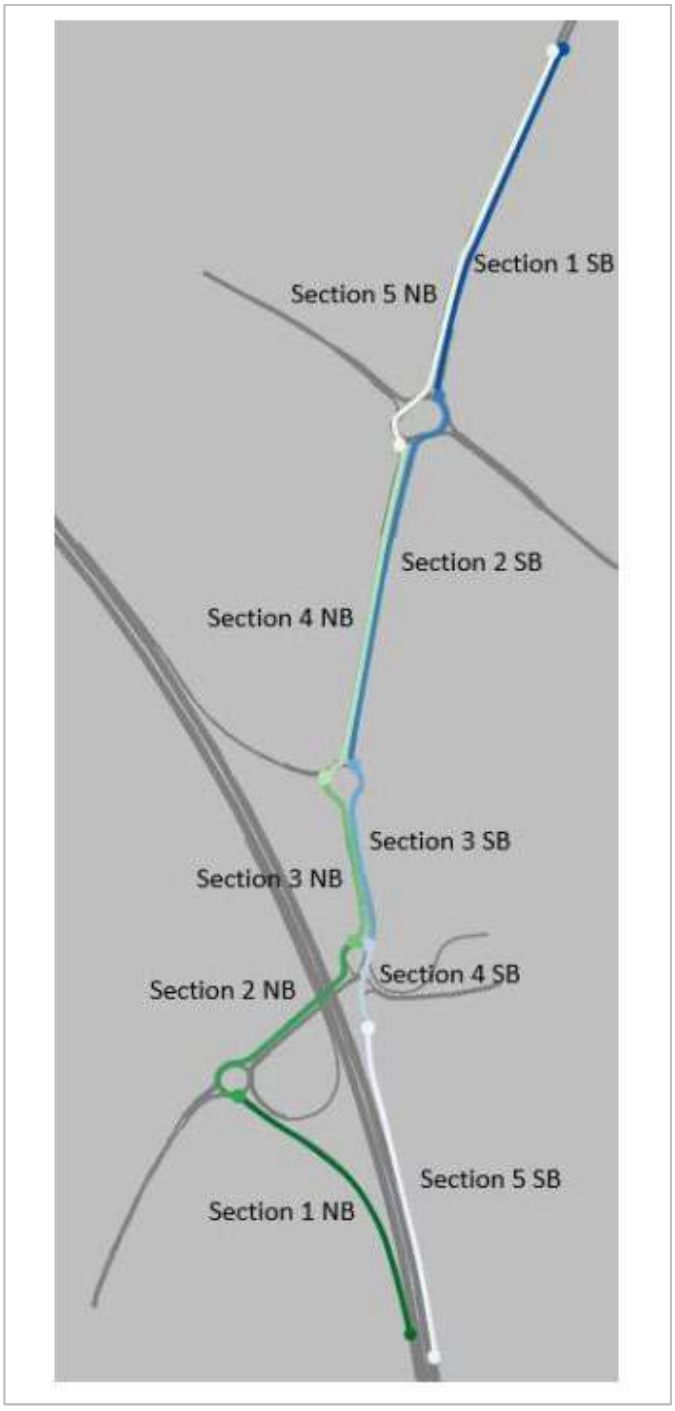


FIGURE 5.1: JOURNEY TIME ROUTES – SET 1

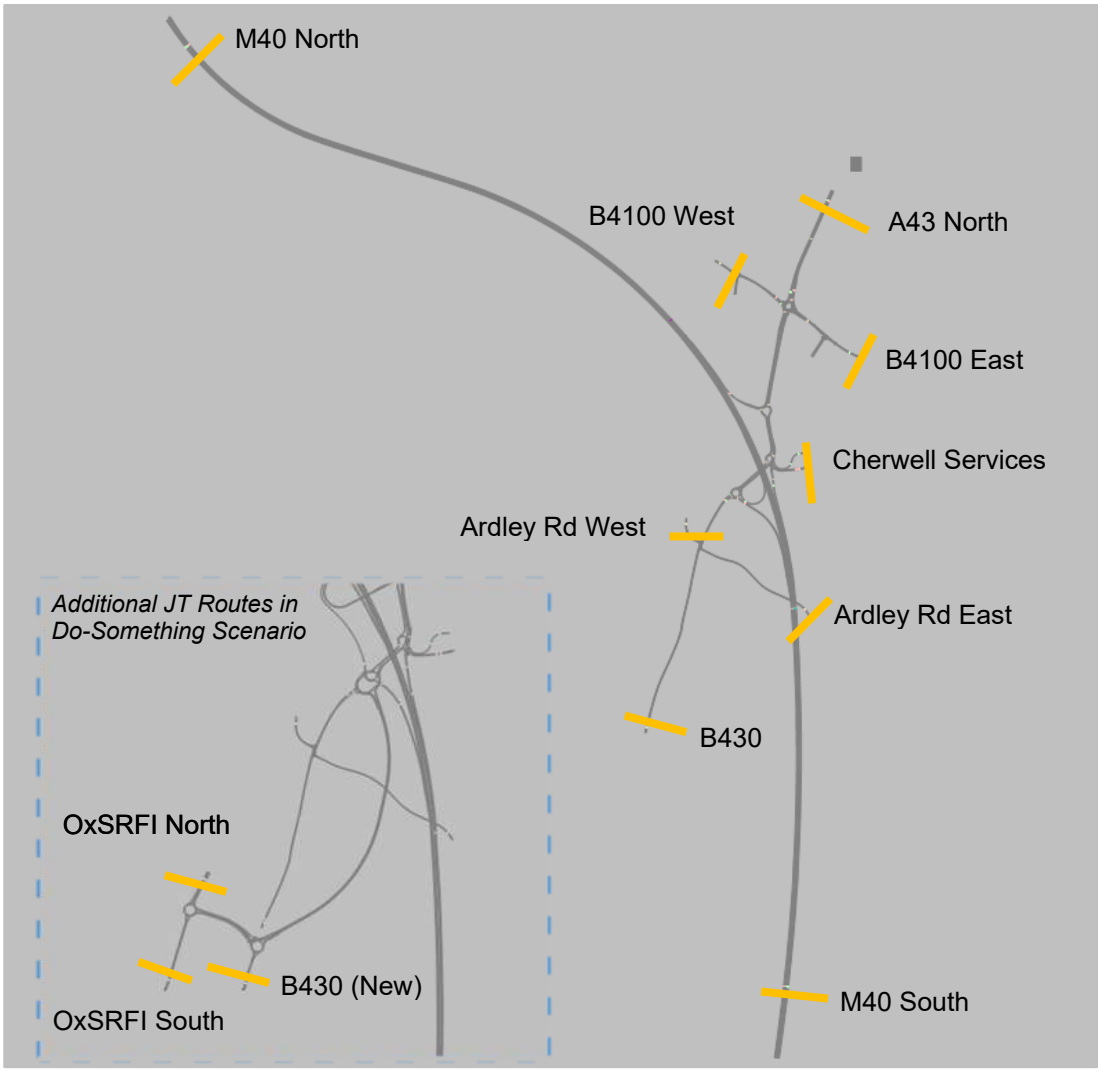


FIGURE 5.2: JOURNEY TIME SECTIONS – SET 2

Queue Length Analysis

5.1.4 For the queue length analysis, the mean-maximum queues have been compared for each scenario. From the modelled outputs, these are derived by taking the average of the maximum queue lengths recorded in each period (5-minutely).

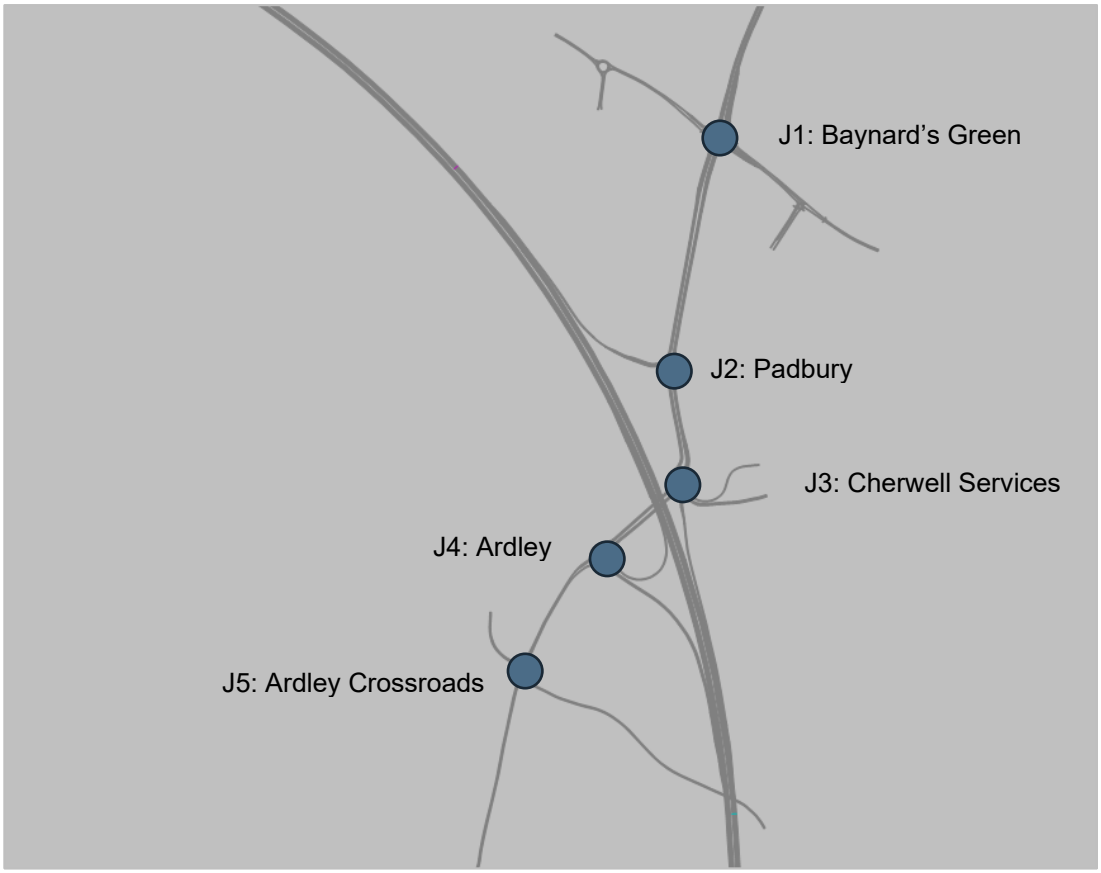


FIGURE 5.3: QUEUE LENGTH ANALYSIS LOCATIONS

5.2 Random Seeds

5.2.1 The results for each modelled scenario have been averaged over 20 seeds (starting seed 42, increment of 10) to reflect daily fluctuations in overall network operation.

5.3 Scenario Comparison Analysis – 2031 RC1 & 2031 DS1A

Overview

5.3.1 The first comparative analysis is of the 2031 Do-Something (DS1A) scenario against the 2031 Reference Case (RC1) scenario.

5.3.2 To recap, RC1 excludes the Albion Land development and its associated improvements at Baynard's Green roundabout and therefore provides a comparison of the proposed OxSRFI embedded highway work to the performance of the existing highway network in the future assessment year.

Journey Time Results – AECOM TN Comparisons

5.3.3 The journey time comparisons for the routes associated with Set 1 can be seen in **Table 5.3** and **Table 5.4**.

AM Peak

5.3.4 The primary finding from the AM peak analysis is that the mitigation schemes associated with the OxSRFI development deliver significant benefits to vehicles travelling southbound on the A43 North through Baynard's Green roundabout. Journey times on this strategic movement reduce from 3 minutes 43 seconds (Reference Case) to 45 seconds (Do-Something) – a reduction of 2 minutes 58 seconds and an 80% improvement. This improvement addresses the operational issues identified in the Reference Case, where there were 785 vehicles unable to enter the network from the A43 North approach as a result of queuing back from the Baynard's Green roundabout.

5.3.5 This latent demand is removed in its entirety with the improvements at Baynard's Green roundabout in place. This is the result of two main elements – the enlargement of the junction to provide additional lanes for vehicles to use, complemented by the signalisation of all arms of the roundabout. These interventions eliminate the capacity constraint that creates the Reference Case queuing.

5.3.6 The Ardley roundabout to Cherwell junction movement shows a 30 second increase in journey time, but this is experienced by a greatly reduced number of vehicles (718 vehicles against 1,312 vehicles in the Reference Case). The introduction of the new M40 northbound off-slip that joins at Padbury junction transfers nearly 600 vehicles to the new slip road, that would otherwise have to travel through Ardley and Cherwell junctions. This frees up capacity on the A43 northbound link between Ardley and Cherwell for additional right-turning traffic

to Cherwell Services and the M40 South, which still has to queue at the signalised node with the A43 North and the heavy southbound movement.

5.3.7 Notwithstanding this, it the comparison is being made against a Reference Case network that experiences significant numbers of vehicles unable to enter the network (over 1,100 vehicles) due to queuing at Baynard's Green roundabout. The absence of these vehicles will subsequently mask the true impacts on the performance at Padbury, Cherwell, Ardley and Ardley Crossroads, and this should be kept in mind when comparing results from the Reference Case scenario.

5.3.8 All other movements in the AM peak have journey time differences of ±1-9s, which are unlikely to be noticed when driving these routes.

PM Peak

5.3.9 As in the AM peak, the most important element to consider when comparing the PM peak results is that the Reference Case includes nearly 400 vehicles unable to enter the model as a result of severe queuing at Baynard's Green. This will subsequently mask the true impacts on the performance at Padbury, Cherwell, Ardley and Ardley Crossroads.

5.3.10 The most notable impact in the Do-Something scenario is a 40s increase from Ardley to Cherwell. However, as in the AM peak, this needs to be considered in the context of 754 trips being diverted to the new M40 northbound off-slip that joins Padbury junction. This frees up capacity on the A43 northbound link for additional traffic to turn right towards Cherwell Services and the M40 South, albeit through a signalised node that conflicts with the heavy A43 southbound movement.

5.3.11 There are improvements with the OxSRFI development, with the most notable being a 16 second reduction in journey time between Padbury and Baynard's Green. This is the result of the Baynard's Green roundabout improvements, with the larger junction and introduction of signals helping to improve the flow of traffic around this junction.

5.3.12 All other movements in the PM peak have journey time differences of ±1-12s, which are unlikely to be noticed when driving these routes.

ALL VEHICLES									
No.	Route			2031 RC1		2031 DS1A		Difference (JTs)	
	From	To	Dist.	Avg.	Trips	Avg.	Trips	No.	%
1	SB1 - A43 North	SB1 - Baynards Green	424m	00:03:43	1503	00:00:45	2212	-00:02:58	▼ 80%
2	SB2 - Baynards Green	SB2 - Padbury	718m	00:00:49	1323	00:00:53	1518	00:00:04	▲ 9%
3	SB3 - Padbury	SB3 - Cherwell	347m	00:00:37	1583	00:00:45	1648	00:00:08	▲ 22%
4	SB4 - Cherwell	SB4 - M40 On-Slip	154m	00:00:15	1078	00:00:16	1592	00:00:01	▲ 5%
5	SB5 - M40 On-Slip	SB5 - M40	862m	00:00:41	1296	00:00:43	1992	00:00:03	▲ 6%
6	NB1 - M40	NB1 - Ardley	858m	00:00:50	1332	00:00:54	847	00:00:04	▲ 8%
7	NB2 - Ardley	NB2 - Cherwell	376m	00:00:29	1312	00:00:58	718	00:00:30	▲ 104%
8	NB3 - Cherwell	NB3 - Padbury	373m	00:00:31	1336	00:00:40	742	00:00:09	▲ 29%
9	NB4 - Padbury	NB4 - Baynards Green	664m	00:00:49	1401	00:00:56	744	00:00:07	▲ 13%
10	NB5 - Baynards Green	NB5 - A43 North	521m	00:00:27	1351	00:00:31	1276	00:00:04	▲ 13%

TABLE 5.3: JOURNEY TIME COMPARISONS (SET 1) – 2031 RC1&DS1A – AM

ALL VEHICLES									
No.	Route			2031 RC1		2031 DS1A		Difference (JTs)	
	From	To	Dist.	Avg.	Trips	Avg.	Trips	No.	%
1	SB1 - A43 North	SB1 - Baynards Green	424m	00:00:44	1827	00:00:38	1624	-00:00:05	▼ 13%
2	SB2 - Baynards Green	SB2 - Padbury	718m	00:00:48	1494	00:00:51	1323	00:00:04	▲ 8%
3	SB3 - Padbury	SB3 - Cherwell	347m	00:00:38	1693	00:00:39	1405	00:00:01	▲ 2%
4	SB4 - Cherwell	SB4 - M40 On-Slip	154m	00:00:16	1264	00:00:15	1297	-00:00:01	▼ 4%
5	SB5 - M40 On-Slip	SB5 - M40	862m	00:00:40	1547	00:00:41	1684	00:00:02	▲ 4%
6	NB1 - M40	NB1 - Ardley	858m	00:00:47	1825	00:00:45	1124	-00:00:02	▼ 4%
7	NB2 - Ardley	NB2 - Cherwell	376m	00:00:31	1748	00:01:10	994	00:00:40	▲ 129%
8	NB3 - Cherwell	NB3 - Padbury	373m	00:00:32	1690	00:00:44	1428	00:00:12	▲ 39%
9	NB4 - Padbury	NB4 - Baynards Green	664m	00:01:20	1755	00:01:04	1435	-00:00:16	▼ 20%
10	NB5 - Baynards Green	NB5 - A43 North	521m	00:00:27	1746	00:00:34	2298	00:00:07	▲ 26%

TABLE 5.4: JOURNEY TIME COMPARISONS (SET 1) – 2031 RC1&DS1A – PM

Journey Time Results – O-D Pair Comparisons

5.3.13 Where journey time comparisons can be made for the routes associated with Set 2, these are shown in **Table 5.5** and **Table 5.6**, with the full suite of O-D pair results shown in **Appendix G.**

AM Peak

5.3.14 From a review of the O-D pair journey time comparisons, the impact of the improvements in journey times from the A43 North, B4100 East and B4100 West stand out as significant reductions. Journey time savings in the range of 3 minutes 3 seconds to 5 minutes 34 seconds (30%-78% time reductions) from the A43 North, B4100 East and B4100 West to other zones in the network highlight the major benefits that are provided by the junction improvements at Baynard's Green. The introduction of the signals in particular provides more opportunities for vehicles to progress around the junction (and therefore continue on their journeys quicker) compared to the existing priority control set-up, where vehicles have to queue and wait for gaps on the busy A43 movements to continue on their routes.

5.3.15 There are only two notable movements where there is a journey increase above 1 minute. This is for the routes from Cherwell Services to the A43 North and the M40 North, which have increases of 1 minute 44 seconds and 1 minute 8 seconds respectively. The increase from Cherwell Services to the A43 North is a result of the closure of the right-turn lane at Cherwell to travel north, with the requirement to now turn right at Ardley roundabout and then travel northbound on the A43, thereby increasing the distance travelled. The increase from the Cherwell Services to the M40 North is a result of the requirement to negotiate through two new signalised stop-lines (A43 North approach and Cut-Through stop-line at Ardley roundabout), therefore increasing time spent delayed at signalised stop-lines.

5.3.16 Elsewhere, where journey times can be compared, the changes are all ±60s. Whilst this indicates a similar performance to the Reference Case, this needs to be considered in the context of the Reference Case scenario having over 1,100 vehicles unable to enter the network, which subsequently masks the true impacts at the junctions south of Baynard's Green.

PM Peak

5.3.17 In the PM peak, there are journey time benefits (as in the AM peak) from the B4100 East and B4100 East entry points, there are savings ranging from 3 minutes 27 seconds to 4 minutes 46 seconds (32%-72% time reductions). The improvements are again attributed to the improvements at Baynard's Green and the

introduction of the signals providing better opportunities for vehicles to progress on their journeys around the junction, as opposed to having to wait for gaps on the busy A43 movements in the Reference Case.

5.3.18 As in the AM peak, there are notable increases in the journey times from Cherwell Services to the A43 North and M40 North in the Do-Something scenario, with increases of 1 minute 28 seconds and 1 minute 2 seconds respectively. As already alluded to, this is due to the closure of the right-turn lane at Cherwell to travel north to the A43, along with the additional signalised stop-lines to travel through to access the M40 North.

5.3.19 The only other journey time difference of note is from the Ardley Road East to the M40 North, where there is an increase in the Do-Something scenario of 1 minute 12 seconds. This is attributed to the change in the speed limit on the B430 to 40mph and then 20mph through Ardley village (which was previously a national speed limit and 30mph through the village).

5.3.20 Elsewhere, the changes in journey times are all ±60s. As in the AM peak, whilst this indicates a similar performance to the Reference Case, this needs to be considered in the context of the Reference Case scenario having nearly 400 vehicles unable to enter the network, which subsequently masks the true impacts at the junctions south of Baynard's Green.

ALL VEHICLES									
No.	Route			2031 RC1		2031 DS1A		Difference (JTs)	
	From	To	Dist.	Avg.	Trips	Avg.	Trips	No.	%
2	A43 North	B4100 East	1220 m	00:06:34	171	00:01:27	323	-00:05:06	▼ 78%
3	A43 North	Cherwell Services	2045 m	00:07:57	48	00:02:59	56	-00:04:58	▼ 62%
4	A43 North	M40 South	5269 m	00:09:56	998	00:05:07	1469	-00:04:48	▼ 48%
7	A43 North	B4100 West	1216 m	00:06:39	11	00:02:04	33	-00:04:35	▼ 69%
13	B4100 East	A43 North	1298 m	00:05:41	217	00:02:08	221	-00:03:33	▼ 63%
18	B4100 East	M40 North	7047 m	00:10:05	161	00:07:01	38	-00:03:03	▼ 30%
19	B4100 East	B4100 West	915 m	00:05:40	231	00:02:04	244	-00:03:36	▼ 64%
25	Cherwell Services	A43 North	2062 m	00:02:45	62	00:04:29	63	00:01:44	▲ 63%
28	Cherwell Services	M40 South	3597 m	00:03:02	213	00:03:40	285	00:00:38	▲ 21%
30	Cherwell Services	M40 North	5726 m	00:04:25	148	00:05:34	150	00:01:08	▲ 26%
37	M40 South	A43 North	5550 m	00:04:45	1079	00:05:19	1053	00:00:34	▲ 12%
39	M40 South	Cherwell Services	4071 m	00:03:40	225	00:04:33	225	00:00:53	▲ 24%
42	M40 South	M40 North	8281 m	00:04:43	2987	00:04:44	2926	00:00:01	▲ 0%
43	M40 South	B4100 West	5167 m	00:04:29	8	00:05:13	4	00:00:44	▲ 16%
44	M40 South	Ardley Rd West	3927 m	00:03:06	14	00:03:23	12	00:00:17	▲ 9%
57	B430	Ardley Rd East	2045 m	00:01:50	92	00:02:30	18	00:00:39	▲ 35%
62	M40 North	B4100 East	5836 m	00:04:29	305	00:05:28	210	00:00:58	▲ 22%
63	M40 North	Cherwell Services	5231 m	00:04:20	189	00:04:38	188	00:00:18	▲ 7%
64	M40 North	M40 South	8295 m	00:04:54	3586	00:04:58	3458	00:00:04	▲ 1%
68	M40 North	Ardley Rd West	5905 m	00:05:03	12	00:05:46	12	00:00:43	▲ 14%
69	M40 North	Ardley Rd East	6561 m	00:05:27	59	00:06:21	16	00:00:54	▲ 16%
73	B4100 West	A43 North	1116 m	00:07:25	53	00:01:50	70	-00:05:34	▼ 75%
74	B4100 West	B4100 East	934 m	00:07:34	293	00:02:01	295	-00:05:33	▼ 73%
76	B4100 West	M40 South	4983 m	00:10:36	81	00:05:31	101	-00:05:04	▼ 48%
85	Ardley Rd West	A43 North	2697 m	00:03:02	4	00:03:53	4	00:00:51	▲ 28%
88	Ardley Rd West	M40 South	4442 m	00:04:15	2	00:04:53	21	00:00:38	▲ 15%
90	Ardley Rd West	M40 North	5887 m	00:03:59	10	00:04:39	10	00:00:40	▲ 17%
93	Ardley Rd West	Ardley Rd East	1011 m	00:01:05	43	00:01:25	12	00:00:20	▲ 31%

ALL VEHICLES									
No.	Route			2031 RC1		2031 DS1A		Difference (JTs)	
	From	To	Dist.	Avg.	Trips	Avg.	Trips	No.	%
101	Ardley Rd East	B430	2030 m	00:01:55	162	00:02:28	6	00:00:34	▲ 29%
102	Ardley Rd East	M40 North	6579 m	00:04:29	118	00:05:27	153	00:00:58	▲ 22%
104	Ardley Rd East	Ardley Rd West	1014 m	00:00:57	12	00:01:16	8	00:00:20	▲ 35%

TABLE 5.5: JOURNEY TIME COMPARISONS (SET 2) – 2031 RC1&DS1A – AM

ALL VEHICLES									
No.	Route			2031 RC1		2031 DS1A		Difference (JTs)	
	From	To	Dist.	Avg.	Trips	Avg.	Trips	No.	%
2	A43 North	B4100 East	1220 m	00:01:24	266	00:01:23	253	-00:00:01	▼ 1%
3	A43 North	Cherwell Services	2045 m	00:02:47	104	00:02:44	106	-00:00:03	▼ 2%
4	A43 North	M40 South	5269 m	00:04:43	1216	00:04:44	1214	00:00:01	▲ 0%
7	A43 North	B4100 West	1216 m	00:01:27	68	00:02:12	44	00:00:45	▲ 51%
13	B4100 East	A43 North	1298 m	00:06:13	260	00:02:31	317	-00:03:42	▼ 60%
16	B4100 East	M40 South	4968 m	00:09:26	3	00:05:07	8	-00:04:18	▼ 46%
18	B4100 East	M40 North	7047 m	00:10:43	151	00:07:16	44	-00:03:27	▼ 32%
19	B4100 East	B4100 West	915 m	00:06:13	177	00:02:25	268	-00:03:48	▼ 61%
20	B4100 East	Ardley Rd West	2417 m	00:08:10	3	00:04:36	4	-00:03:34	▼ 44%
25	Cherwell Services	A43 North	2062 m	00:03:18	86	00:04:46	87	00:01:28	▲ 45%
28	Cherwell Services	M40 South	3597 m	00:03:01	262	00:03:14	261	00:00:13	▲ 7%
30	Cherwell Services	M40 North	5726 m	00:04:29	176	00:05:31	177	00:01:02	▲ 23%
37	M40 South	A43 North	5550 m	00:05:19	1513	00:05:41	1682	00:00:22	▲ 7%
38	M40 South	B4100 East	5368 m	00:05:23	4	00:06:19	8	00:00:56	▲ 17%
39	M40 South	Cherwell Services	4071 m	00:03:57	213	00:04:33	214	00:00:36	▲ 15%
41	M40 South	B430	5013 m	00:04:01	8	00:04:42	2	00:00:41	▲ 17%
42	M40 South	M40 North	8281 m	00:04:54	3962	00:04:56	3836	00:00:03	▲ 1%
44	M40 South	Ardley Rd West	3927 m	00:03:06	68	00:03:23	41	00:00:17	▲ 9%
62	M40 North	B4100 East	5836 m	00:04:56	167	00:05:42	221	00:00:46	▲ 15%
63	M40 North	Cherwell Services	5231 m	00:04:20	195	00:04:34	196	00:00:14	▲ 5%
64	M40 North	M40 South	8295 m	00:04:46	3365	00:04:47	3347	00:00:02	▲ 1%
68	M40 North	Ardley Rd West	5905 m	00:04:55	16	00:05:41	15	00:00:46	▲ 16%
69	M40 North	Ardley Rd East	6561 m	00:05:23	41	00:06:17	12	00:00:54	▲ 17%
73	B4100 West	A43 North	1116 m	00:06:36	56	00:01:50	44	-00:04:46	▼ 72%
74	B4100 West	B4100 East	934 m	00:06:44	219	00:01:59	143	-00:04:45	▼ 71%
76	B4100 West	M40 South	4983 m	00:09:08	44	00:05:16	34	-00:03:52	▼ 42%
85	Ardley Rd West	A43 North	2697 m	00:03:37	8	00:04:29	8	00:00:52	▲ 24%
90	Ardley Rd West	M40 North	5887 m	00:04:12	8	00:05:06	8	00:00:54	▲ 21%

ALL VEHICLES									
No.	Route			2031 RC1		2031 DS1A		Difference (JTs)	
	From	To	Dist.	Avg.	Trips	Avg.	Trips	No.	%
93	Ardley Rd West	Ardley Rd East	1011 m	00:01:03	24	00:01:26	12	00:00:23	▲ 37%
101	Ardley Rd East	B430	2030 m	00:01:49	8	00:02:32	4	00:00:43	▲ 39%
102	Ardley Rd East	M40 North	6579 m	00:04:41	81	00:05:52	132	00:01:12	▲ 26%
104	Ardley Rd East	Ardley Rd West	1014 m	00:00:55	32	00:01:16	8	00:00:21	▲ 38%

TABLE 5.6: JOURNEY TIME COMPARISONS (SET 2) – 2031 RC1&DS1A – PM

Queue Length Results

5.3.21 The mean-maximum queue lengths at Baynard's Green, Padbury, Cherwell, Ardley, Ardley Crossroads and the new Ardley Bypass junction are shown in **Figure 5.4-5.9** for the AM peak and **Figure 5.10-5.15** for the PM peak.

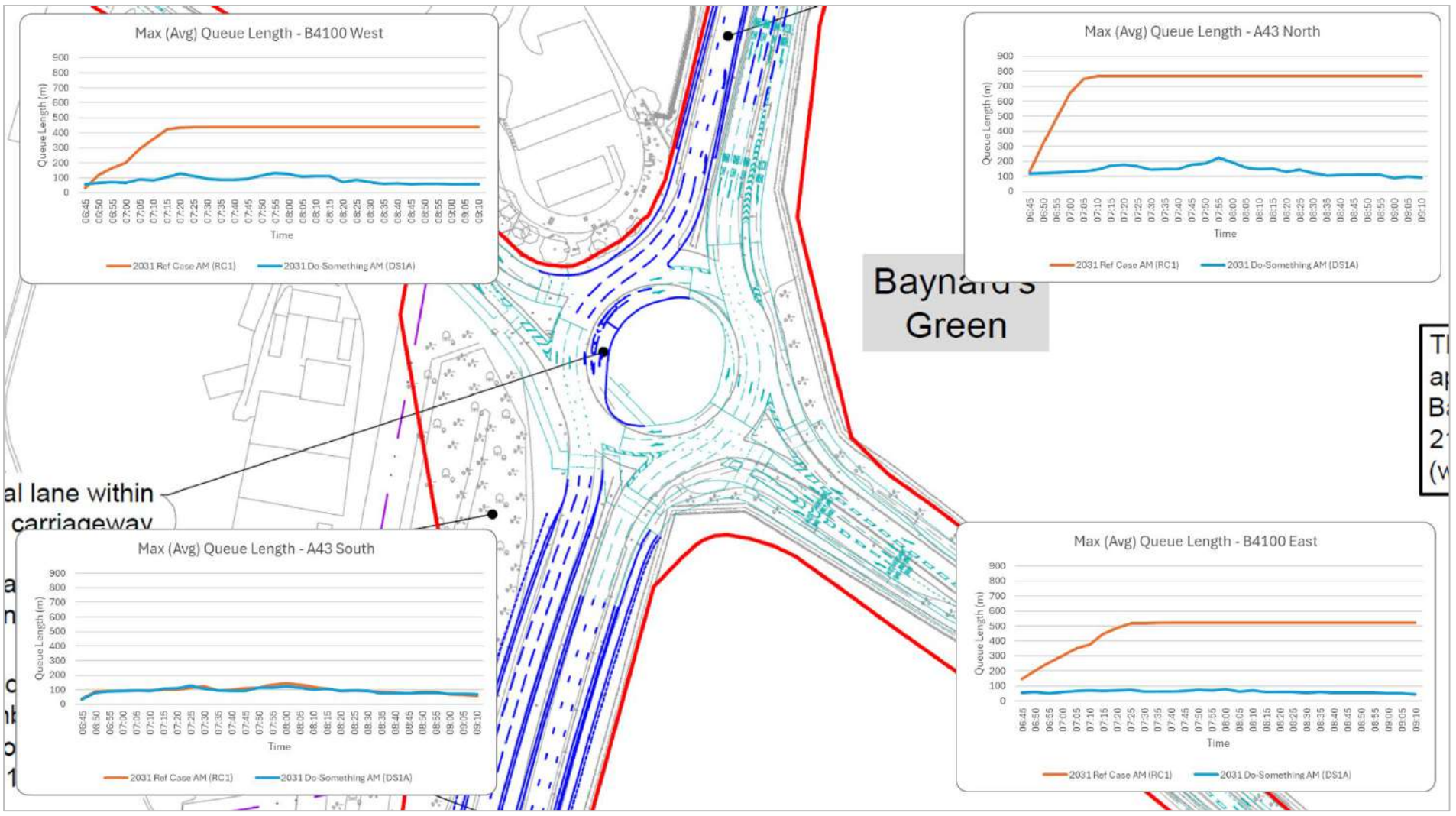


FIGURE 5.4: MAXIMUM (AVERAGE) QUEUE LENGTHS – 2031 RC1&DS1A – AM – BAYNARD'S GREEN

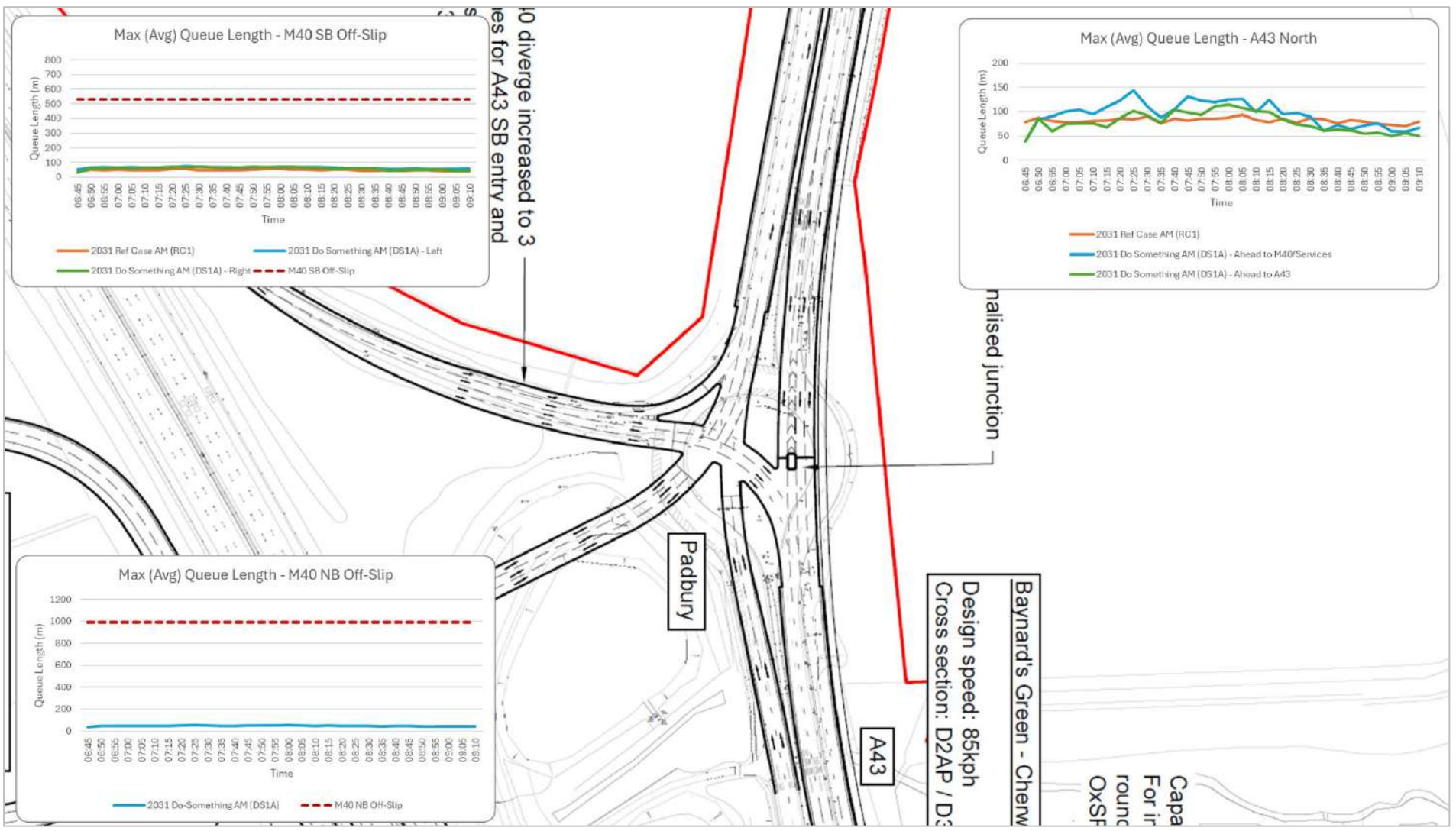


FIGURE 5.5: MAXIMUM (AVERAGE) QUEUE LENGTHS – 2031 RC1&DS1A – AM – PADBURY

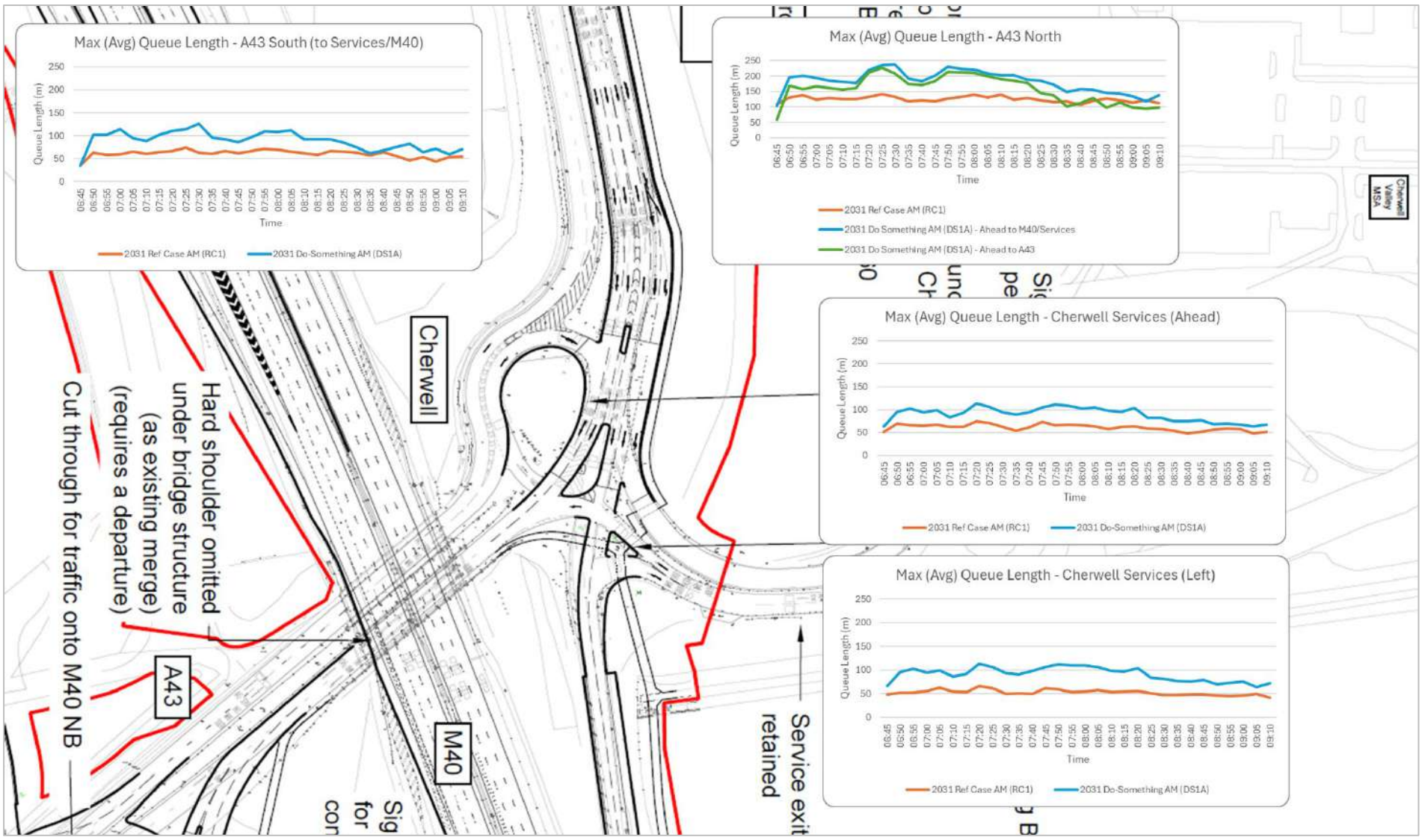


FIGURE 5.6: MAXIMUM (AVERAGE) QUEUE LENGTHS – 2031 RC1&DS1A – AM – CHERWELL

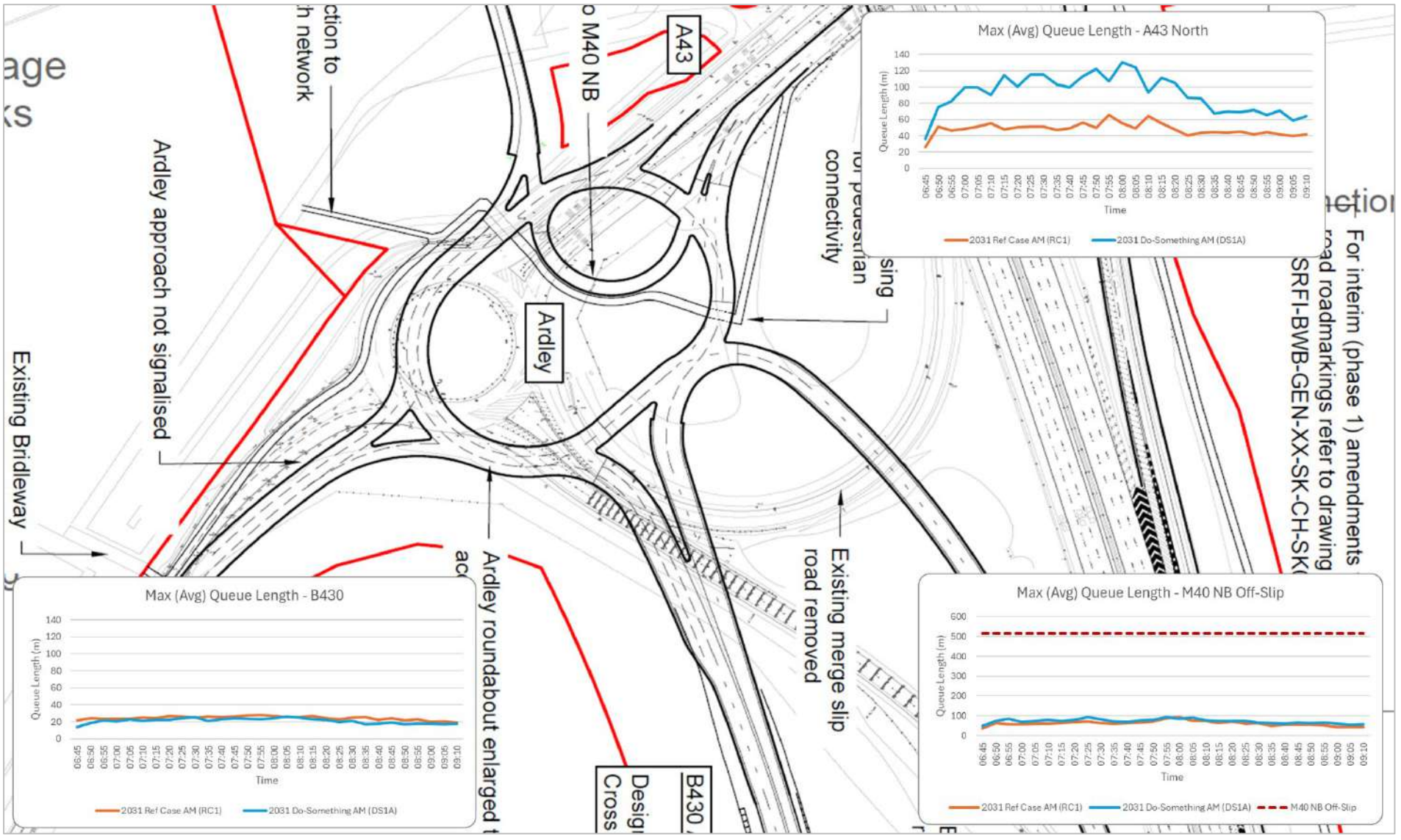


FIGURE 5.7: MAXIMUM (AVERAGE) QUEUE LENGTHS – 2031 RC1&DS1A – AM – ARDLEY

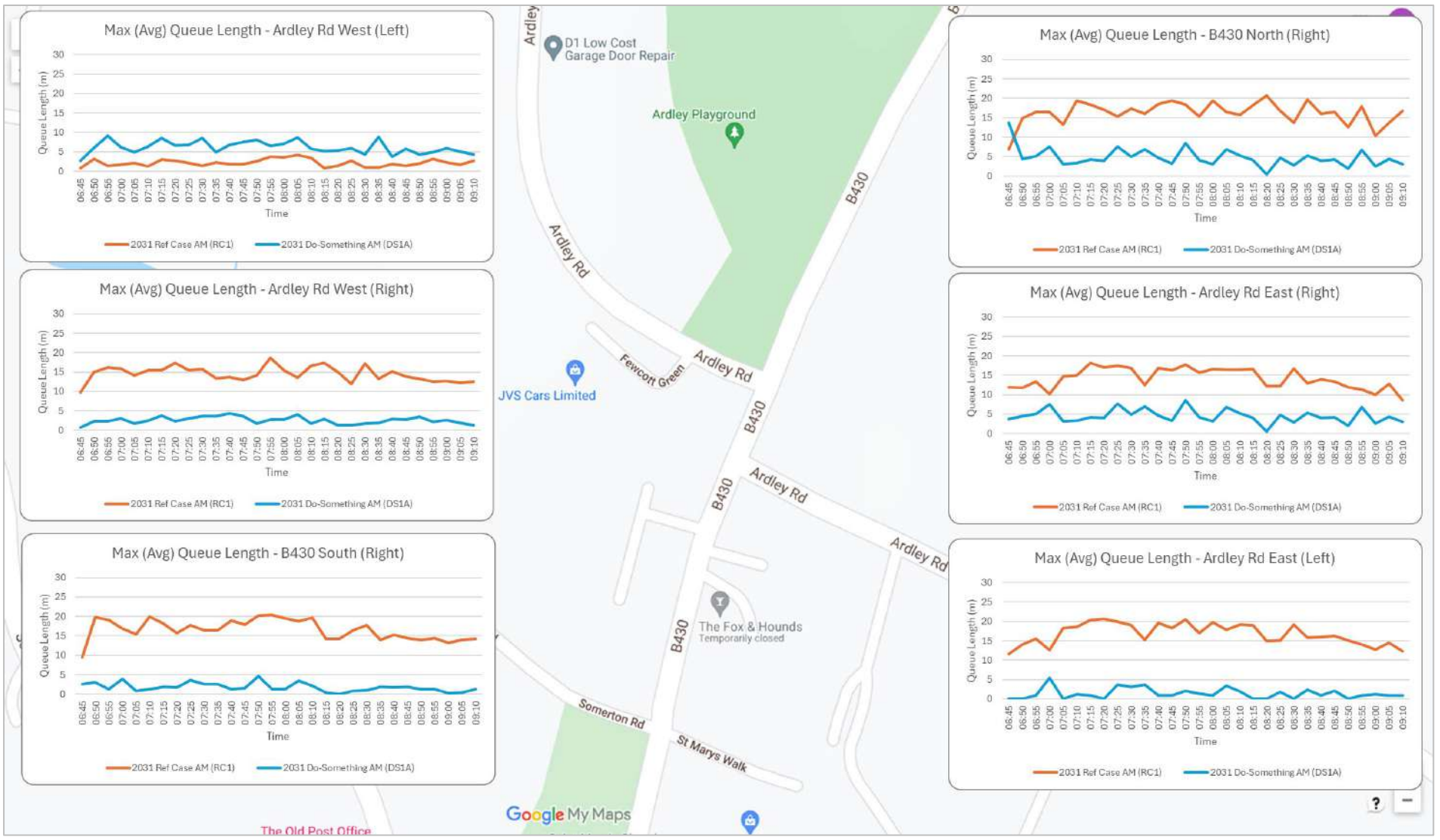


FIGURE 5.8: MAXIMUM (AVERAGE) QUEUE LENGTHS – 2031 RC1&DS1A – AM – ARDLEY CROSSROADS

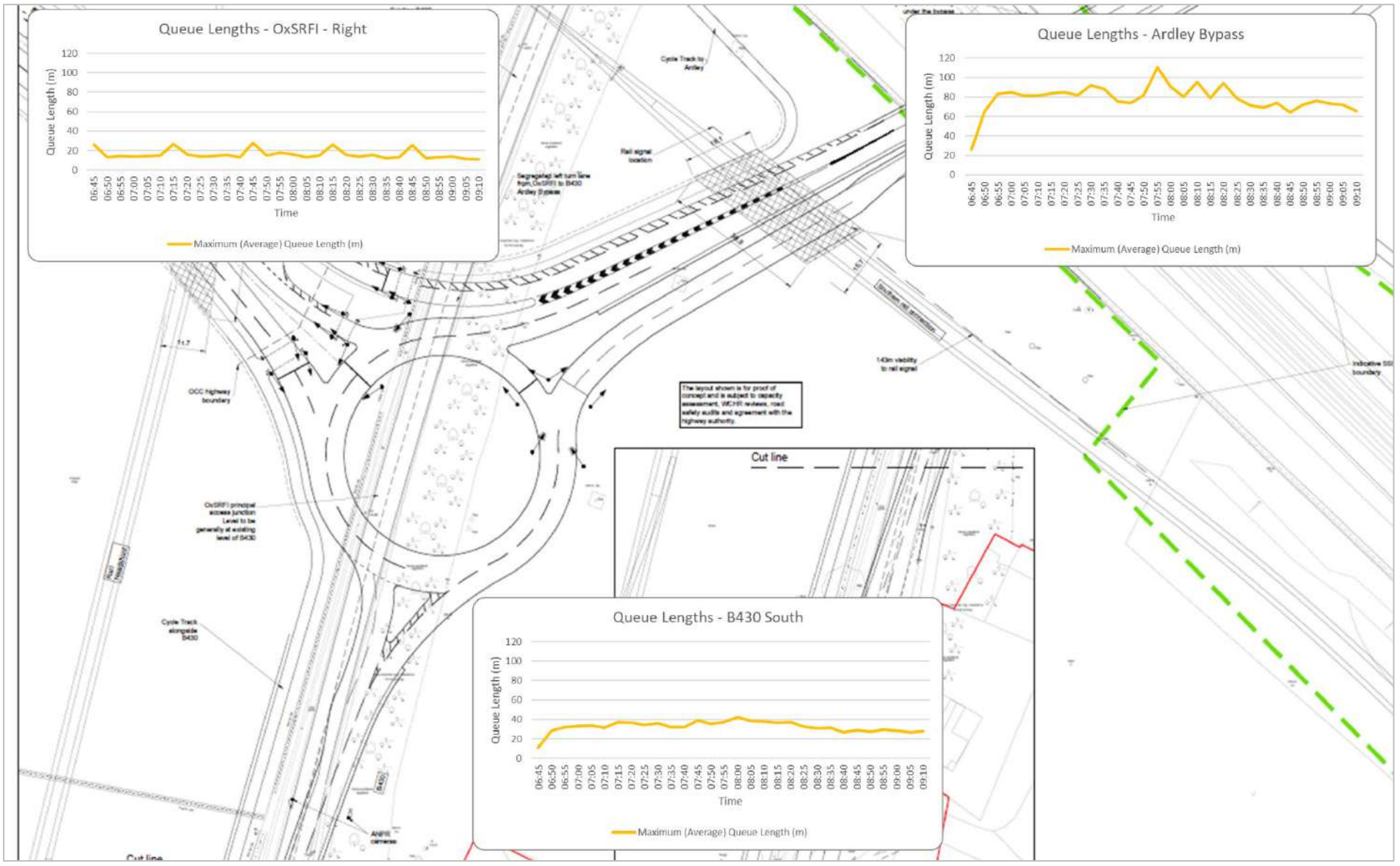


FIGURE 5.9: MAXIMUM (AVERAGE) QUEUE LENGTHS – 2031 DS1A – AM – OXSRFI/ARDLEY BYPASS

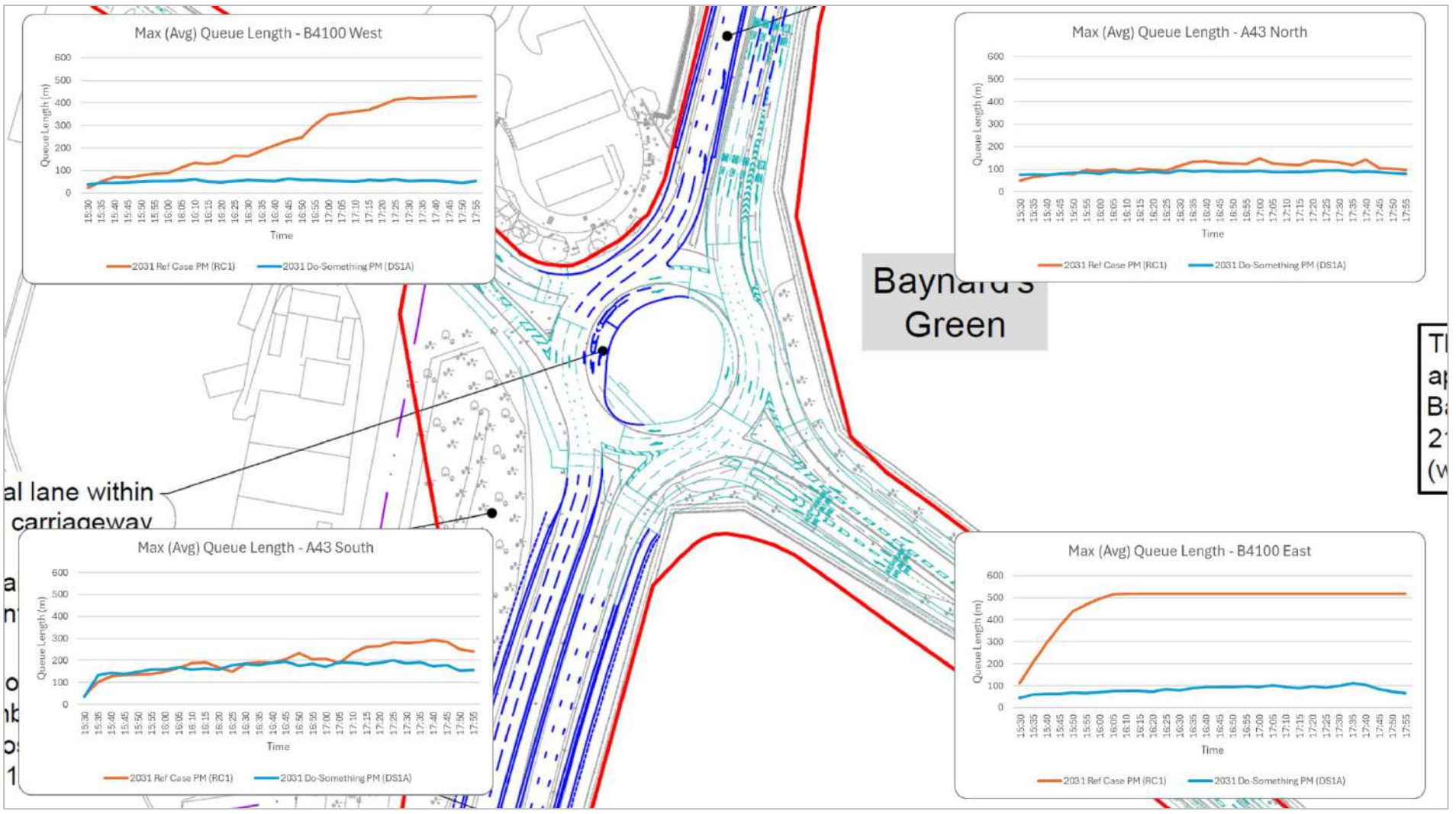


FIGURE 5.10: MAXIMUM (AVERAGE) QUEUE LENGTHS – 2031 RC1&DS1A – PM – BAYNARD'S GREEN

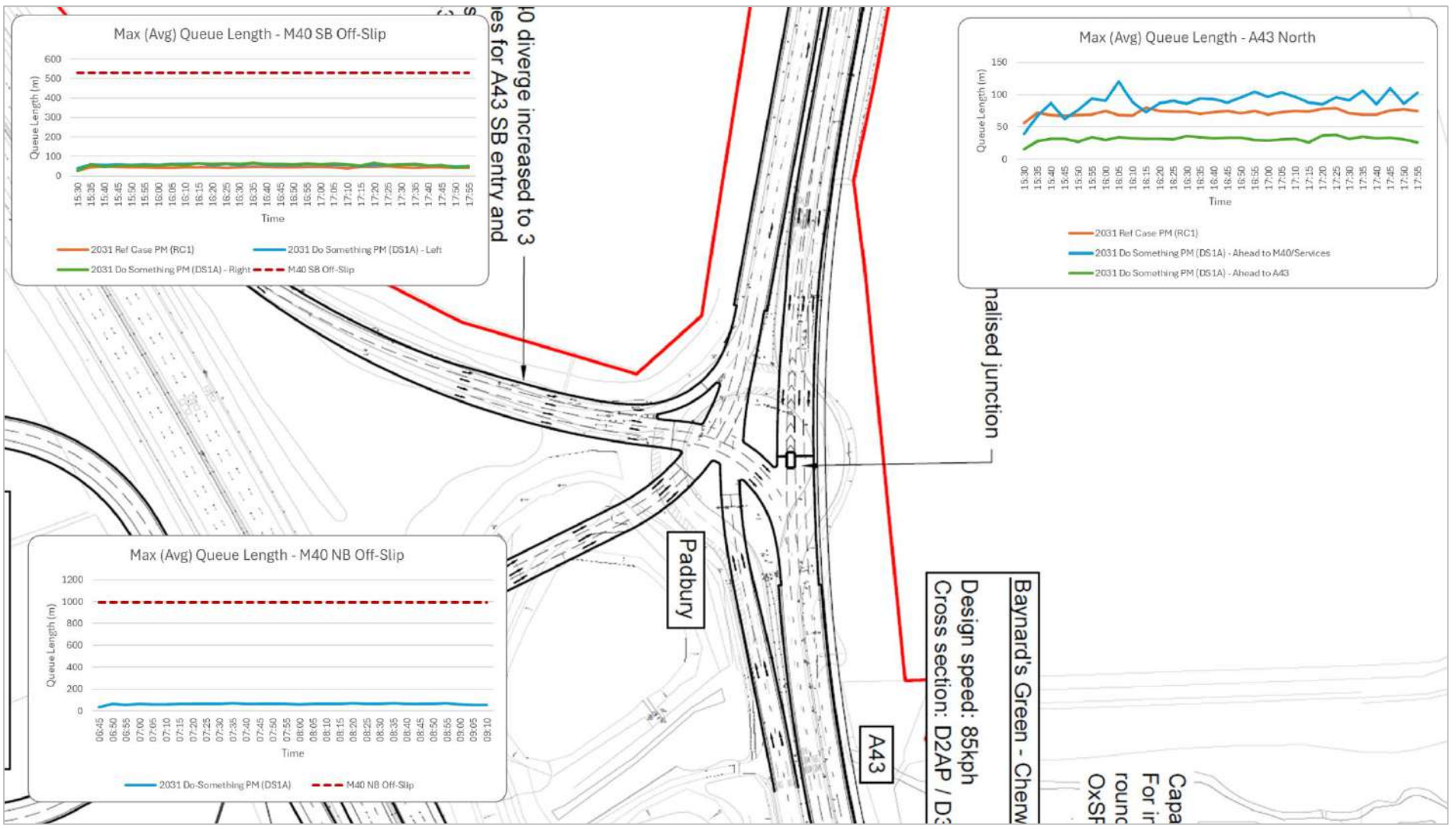


FIGURE 5.11: MAXIMUM (AVERAGE) QUEUE LENGTHS – 2031 RC1&DS1A – PM – PADBURY

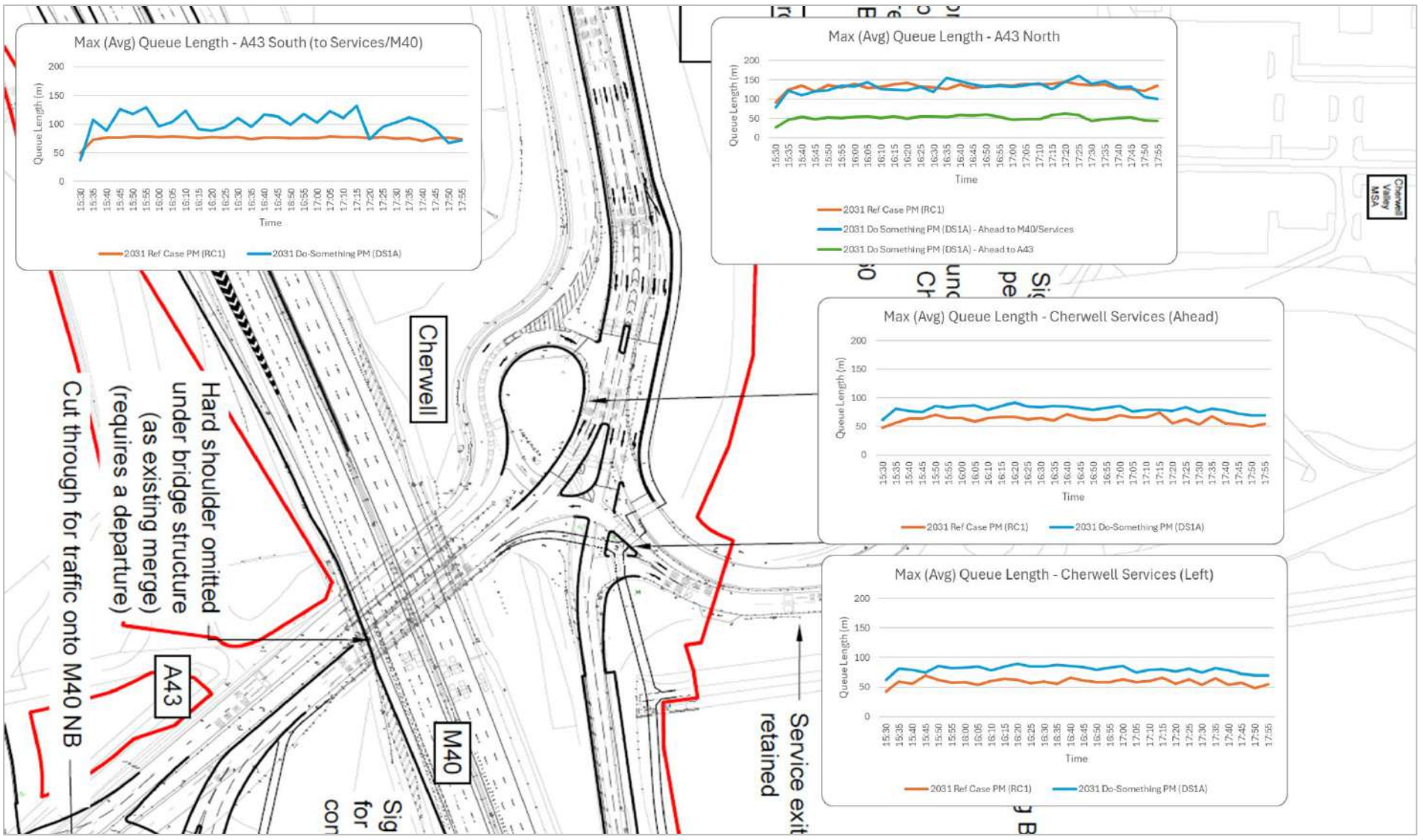


FIGURE 5.12: MAXIMUM (AVERAGE) QUEUE LENGTHS – 2031 RC1&DS1A – PM – CHERWELL

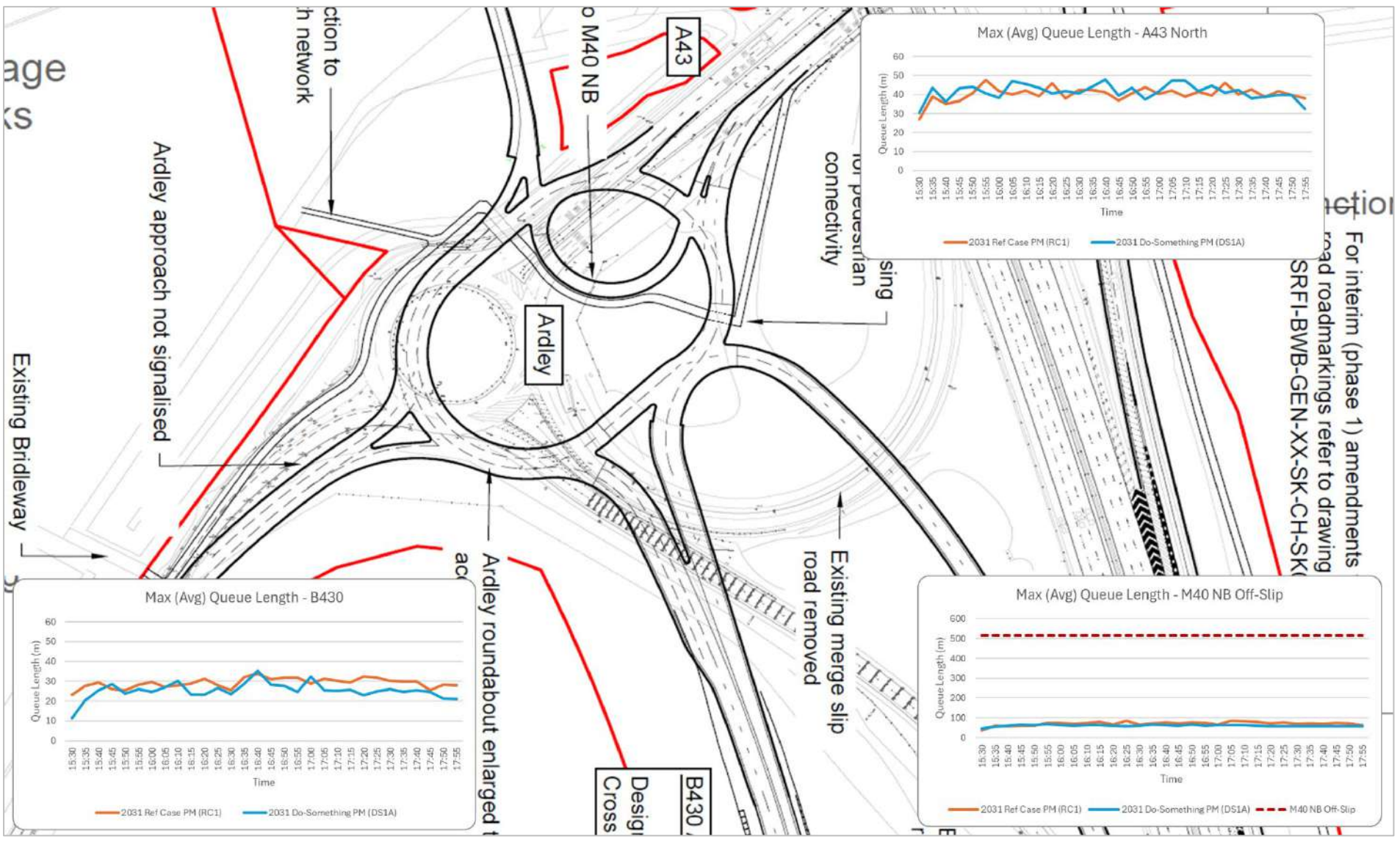


FIGURE 5.13: MAXIMUM (AVERAGE) QUEUE LENGTHS – 2031 RC1&DS1A – PM – ARDLEY

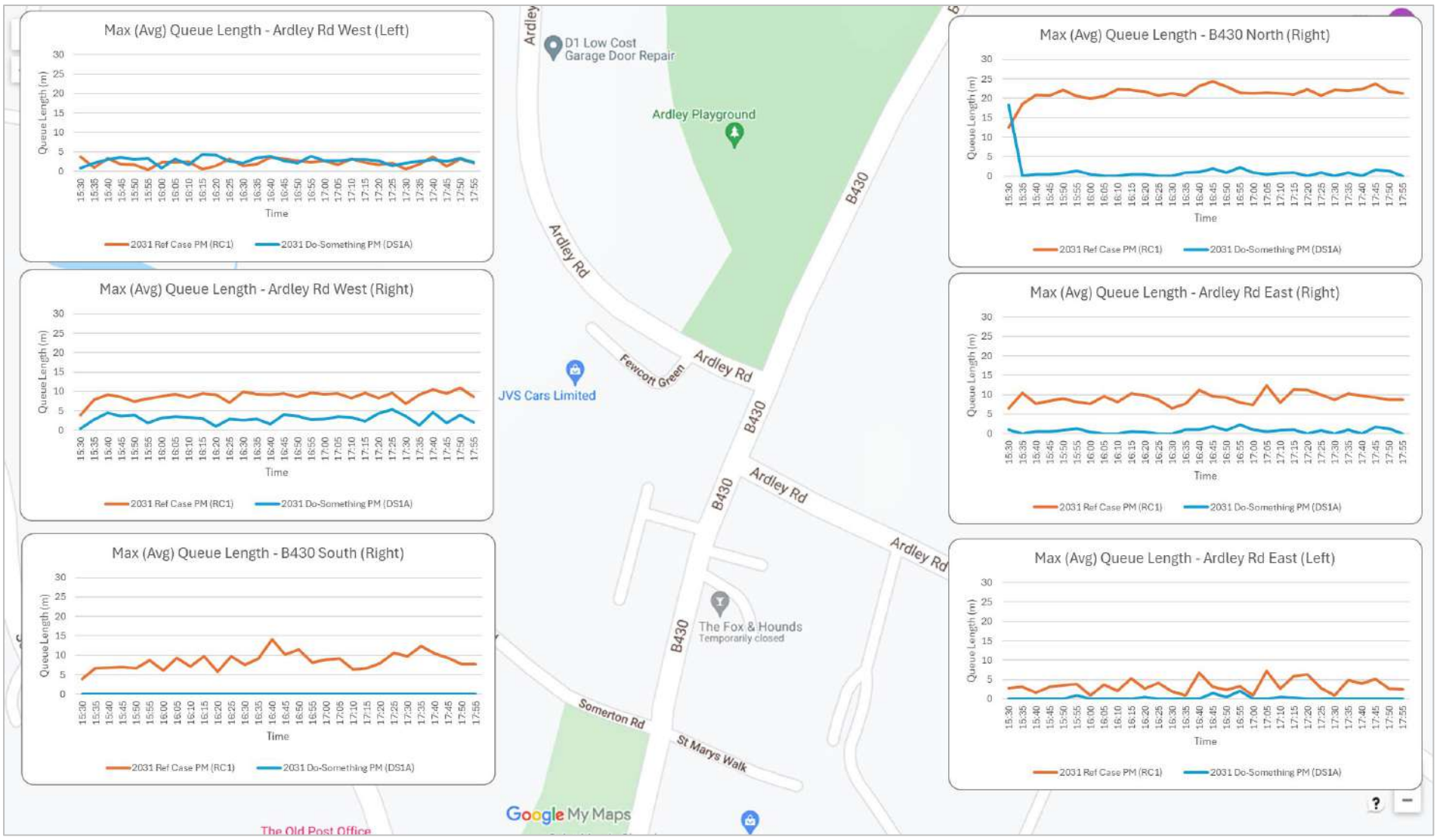


FIGURE 5.14: MAXIMUM (AVERAGE) QUEUE LENGTHS – 2031 RC1&DS1A – PM – ARDLEY CROSSROADS

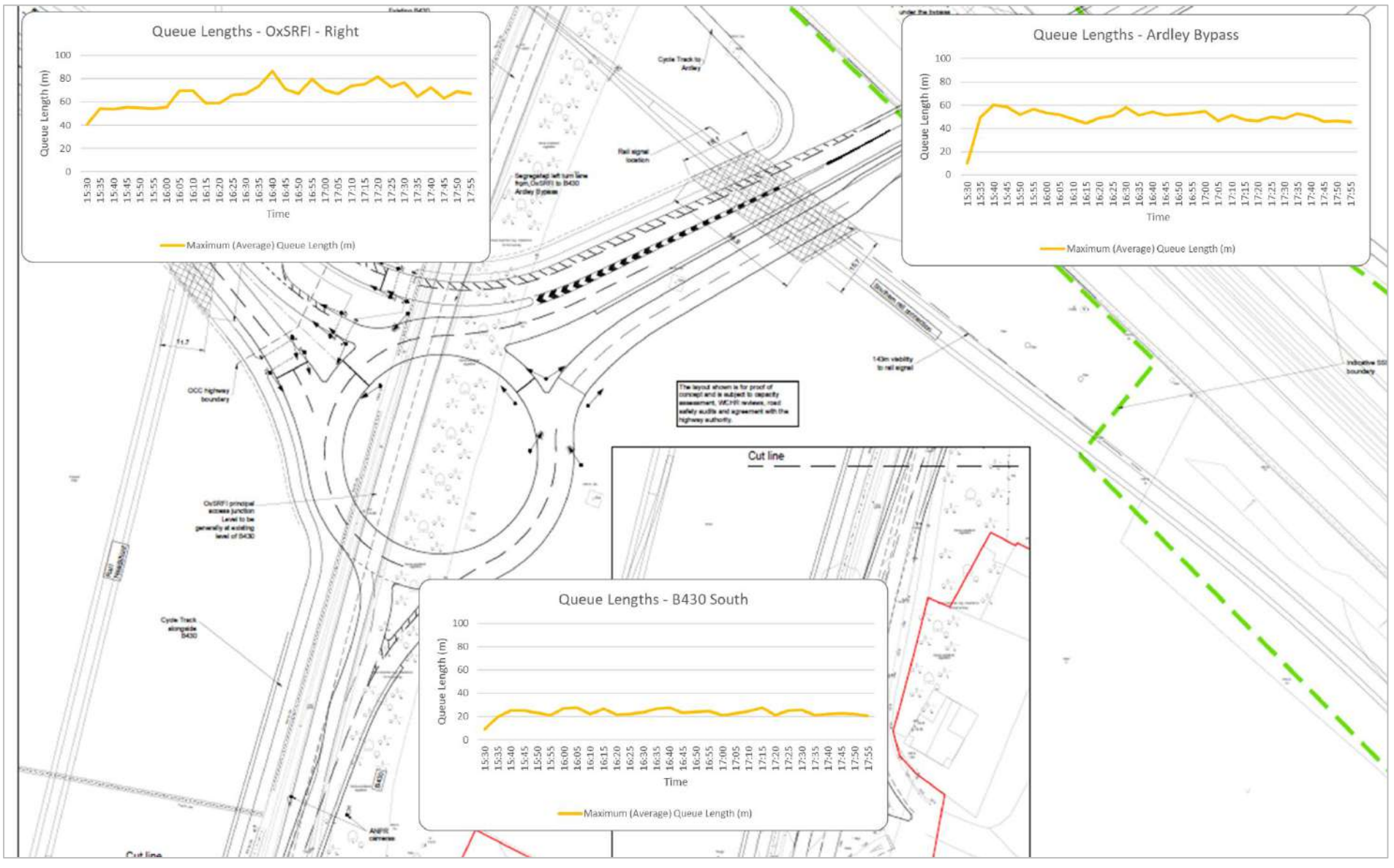


FIGURE 5.15: MAXIMUM (AVERAGE) QUEUE LENGTHS – 2031 DS1A – PM – OXSRFI/ARDLEY BYPASS

AM Peak Queue Analysis

Baynard's Green Roundabout

5.3.22 At Baynard's Green roundabout, the positive impacts as a result of the OxSRFI proposals are very evident. In the Reference Case, the queues on the A43 North, B4100 East and B4100 West approaches all extend back to the start of their respective entry points (distances of ~770m, ~520m and ~430m respectively). However, with the inclusion of the junction improvements, these queues are reduced to lengths of up to ~220m (-71%), ~80m (-85%) and ~130m (-70%) for the A43 North, B4100 East and B4100 West approaches respectively. It is clearly demonstrated that the larger junction and signal strategy proposed have a substantially positive impact on the operation of the network at the junction.

5.3.23 For the A43 South approach, the queues in both scenarios are similar, with a length of approximately 120 metres. These queues are well within the link length on the A43 back to Padbury junction and indicate that the signal strategy successfully balances competing demands whilst maintaining acceptable (or substantially improved) operation across all approaches.

Padbury Junction

5.3.24 At Padbury junction, the Do-Something scheme results in queuing increases on the A43 North, reaching up to 150 metres compared to 95 metres in the Reference Case. A key element to consider on this approach is that in the Do-Something scenario, these queuing levels also take account of the additional traffic that is able to enter the network from the A43 North, B4100 East and B4100 West entry points (as a result of the significantly improved performance at Baynard's Green), whereas in the reference case scenario there is substantial latent demand within the model. This is in addition to the proposed traffic from the OxSRFI and Albion Land developments. In the Reference Case, the queue lengths are low as a result of vehicles being held up at the model entry points and not being able to enter the network and subsequently mask the true impacts at the junctions south of Baynard's Green.

5.3.25 On the M40 southbound off-slip, queue lengths are comparable between the two scenarios. Critically, all queuing is contained on the slip road and does not extend to the M40 mainline – confirming acceptable strategic network operation.

5.3.26 For the new M40 northbound off-slip in the Do-Something scenario, maximum queues reach approximately 50 metres, well within the slip road length and confirming no mainline interaction risk. This validates the design adequacy of the new infrastructure.

Cherwell Junction

5.3.27 At Cherwell junction and similar to Padbury junction, the Do-Something scenario results in increased queues on the A43 North approach compared to the Reference Case. These queues increase from approximately 140 metres in the Reference Case to approximately 230 metres in the Do-Something scenario.

5.3.28 On the A43 South approach (turning towards Cherwell Services and M40 southbound), queues in the Do-Something scenario extend to approximately 130 metres compared to 75 metres in the Reference Case. However, in the Do-Something scenario this approach is reconfigured such that the off-side lane is now a dedicated lane for traffic turning right at Cherwell junction (i.e. towards Cherwell Services or the M40 South). The nearside lane continues to serve A43 northbound traffic, but the traffic flow is significantly reduced for this movement, as M40 to A43 northbound traffic uses the new M40 off-slip that joins Padbury junction in the Do-Something scenario. This is part of the highway mitigation strategy to accommodate the additional OxSRFI traffic (travelling to the M40 southbound), with the proposed highway layout designed to accommodate this increased demand and queue.

5.3.29 Queues from the Cherwell Services arm are increased in the Do-Something scenario, reaching up to approximately 115 metres compared to 75 metres in the Reference Case.

5.3.30 A key element to consider for all these approaches is that in the Do-Something scenario, these queuing levels also take account of the additional traffic that is able to enter the network from the A43 North, B4100 East and B4100 West entry points (as a result of the significantly improved performance at Baynard's Green). This is in addition to the proposed traffic from the OxSRFI and Albion Land developments. In the Reference Case, the queue lengths are low as a result of vehicles being held up at the model entry points and not being able to enter the network and subsequently mask the true impacts at the junctions south of Baynard's Green.

Ardley Roundabout

5.3.31 At Ardley roundabout, and consistent with the patterns observed at Padbury and Cherwell junctions, the Do-Something scenario results in increased queues on the A43 North approach compared to the Reference Case. These queues are increased from 65 metres in the Reference Case to approximately 130 metres in the Do-Something scenario. As mentioned for the other junctions, a key element to consider in these comparisons is that the Do-Something scenario has a higher

amount of traffic using the network as a result of the significantly improved performance at Baynard's Green. This allows all traffic from the A43 North, B4100 East and B4100 West to enter the network and reach their destinations (in addition to the proposed traffic from the OxSRFI and Albion Land developments).

5.3.32 For the M40 northbound off-slip, the queueing levels are similar, reaching up to 100 metres in both scenarios. These lengths are well within the capacity of the slip road and will have no impact on the M40 mainline.

5.3.33 On the B430, the queues are also similar, reaching up to approximately 25 metres in both scenarios.

Ardley Village Crossroads

5.3.34 At the Ardley crossroads within Ardley village, queues remain similar (within 5 metres, or 1 vehicle length) or lower in the Do-Something scenario.

OxSRFI Access/Ardley Bypass Roundabout

5.3.35 Whilst no direct comparison with the Reference Case can be made (this junction exists only in the Do-Something scenario), the queuing levels at the OxSRFI site access and Ardley bypass roundabout are presented to demonstrate acceptable operation of this new infrastructure.

5.3.36 Maximum queues of approximately 110 metres occur on the Ardley Bypass approach, slightly exceeding the two-lane section length. However, this queue length remains acceptable given the rural location and absence of upstream junctions. Queues on the B430 South approach reach approximately 40 metres, with the OxSRFI access arm experiencing maximum queues of approximately 25 metres. These queue levels indicate no severe capacity constraints at this junction and confirm that the signalised roundabout operates acceptably under AM peak demand conditions.

PM Peak Queue Analysis

Baynard's Green Roundabout

5.3.37 In the PM peak at Baynard's Green roundabout and similar to the AM peak, there are significant reductions in the queuing levels. In the PM peak, this focuses on the B4100 East and B4100 West approaches.

5.3.38 On B4100 East, the queues reach back to the start of the entry point in the Reference Case (approximately 520 metres in length), compared to approximately 100m in the Do-Something scenario. This represents an 81% reduction in queue length (as well as the ability for all vehicles to enter the network from this entry point). On the B4100 West, the queue lengths in the

Reference Case build up to approximately 430m in length, compared to 60 metres in the Do-Something scenario (an 86% reduction). This clearly demonstrates the benefits of the improvements, with the signal strategy proving effective in reducing queues on the local road network.

5.3.39 On the A43 North and South approaches, there are some reductions in the queue lengths, but these are more modest compared to the B4100 East and West approaches. On the A43 North, the queues reduce to approximately 95 metres compared to approximately 150 metres in the Reference Case (-37%). On the A43 South approach, queues are maintained at around 180 metres in the Do-Something scenario, compared to up to 290 metres in the Reference Case (a 38% reduction in queue length). This again emphasises the benefits of the junction improvements and the effectiveness of the proposed signal strategy.

Padbury Junction

5.3.40 PM peak queue lengths at Padbury are similar between scenarios on the M40 southbound off-slip approach, with critically no queuing extending back to the M40 mainline from the slip road. This confirms acceptable strategic network operation in both scenarios.

5.3.41 Queues on the A43 North are increased in the Do-Something scenario, reaching up to 120 metres compared to 70m in the Reference Case. As mentioned in the AM peak analysis, a key element to consider in these comparisons is that the Do-Something scenario has a higher amount of traffic using the network as a result of the significantly improved performance at Baynard's Green. This allows all traffic from the A43 North, B4100 East and B4100 West to enter the network and reach their destinations (in addition to the proposed traffic from the OxSRFI and Albion Land developments).

5.3.42 The new M40 northbound off-slip in the Do-Something scenario shows maximum queues of approximately 70 metres, well contained within the slip road length and confirming adequate capacity provision.

Cherwell Junction

5.3.43 Queue behaviour at Cherwell in the PM peak demonstrates comparable levels on the A43 North approach, with both scenarios reaching up to approximately 150m. This indicates that the additional lanes on the A43 southbound link providing increased queuing capacity to accommodate the additional traffic flows released into the network (that was otherwise held outside the network in the Reference Case).

5.3.44 On the A43 South approach (turning to Cherwell Services/M40), queues increase from approximately 80 metres to 130 metres in the Do-Something scenario. As in the AM peak analysis, this results from improved accessibility from Ardley roundabout and increased flows as a result of the proposed OxSRFI and Albion Land developments. However, as in the AM peak, this approach is reconfigured in the Do-Something scenario such that the off-side lane is now a dedicated lane for traffic turning right at the Cherwell junction (i.e. towards Cherwell Services or the M40 South). The nearside lane continues to serve A43 northbound traffic, but the traffic flow is significantly reduced for this movement, as M40 to A43 northbound traffic uses the new M40 off-slip that joins Padbury junction. This is part of the highway mitigation strategy to accommodate the additional OxSRFI traffic (travelling to the M40 southbound), with the proposed highway layout designed to accommodate this increased demand and queue.

5.3.45 Queues from the Cherwell Services arm are higher in the Do-Something scenario, reaching up to 90 metres compared to 75 metres in the Reference Case. This increase is the result of additional green time needing to be assigned to the heavier southbound flows.

Ardley Roundabout

5.3.46 The PM peak queuing levels are similar between both scenarios across all approaches at Ardley roundabout.

5.3.47 M40 northbound off-slip queuing reaches approximately 90 metres in both scenarios, which is well within the slip road length and will have no impact on the M40 mainline.

5.3.48 Queues on the A43 North approach reach up to approximately 50 metres in both scenarios, whilst the B430 queues are up to 35 metres in length.

5.3.49 These results indicate that the improvements proposed as part of the OxSRFI development provide capacity improvements that are able to accommodate both the traffic numbers previously held outside the model as latent demand, as well as all traffic associated with the proposed development.

Ardley Village Crossroads

5.3.50 Ardley village crossroads queuing remains similar or reduces in the Do-Something scenario. This confirms local amenity benefits from traffic reassignment to the Ardley bypass, reducing vehicle movements through the village residential area.

OxSRFI Access/Ardley Bypass Roundabout

5.3.51 At the OxSRFI site access roundabout in the PM peak, maximum queues reach approximately 85 metres on the OxSRFI access arm and 60 metres on the Ardley Bypass arm, with B430 South queues of approximately 30 metres. These queue levels indicate acceptable junction operation with no severe capacity constraints. The junction successfully manages site access traffic alongside through-traffic on the bypass link.

Network Performance Results

5.3.52 The network performance comparisons for the AM and PM peaks are shown in **Table 5.7** and **Table 5.8**.

All Vehicles			
2031 AM			
Scenario	Average Delay per Vehicle (s)	Average Speed (mph)	Latent Demand
2031 Reference Case (RC1)	95	44	1143
2031 Do-Something (DS1A)	50	49	0

TABLE 5.7: NETWORK PERFORMANCE – 2031 RC1&DS1A – AM

5.3.53 The AM peak results show that the proposed OxSRFI development and the package of improvement schemes will result in a significantly improved performance compared to the Reference Case (existing network configuration). The average delay per vehicle reduced by 45 seconds (-48%) and the average network speed increases by 5mph (+10%).

5.3.54 The network improvements also result in the latent demand (vehicles not able to enter the network) reducing completely in the Do-Something, with an additional 1,143 vehicles able to enter the network (785 vehicles from the A43 North, 126 vehicles from the B4100 East and 232 vehicles from the B4100 West), whilst also accommodating the additional OxSRFI development traffic.

All Vehicles			
2031 PM			
Scenario	Average Delay per Vehicle (s)	Average Speed (mph)	Latent Demand
2031 Reference Case (RC1)	60	50	398
2031 Do-Something (DS1A)	51	49	1

TABLE 5.8: NETWORK PERFORMANCE – 2031 RC1&DS1A – PM

5.3.55 In the PM peak, the introduction of the proposed OxSRFI development also led to an improvement in the average delay per vehicle (-9s/-15%), whilst also having a similar average network speed (49-50mph). This demonstrates that the package

of improvements proposed by the OxSRFI development will be effective in both peak periods.

5.3.56 The PM peak also shows a significant reduction in the latent demand figures, with all but 1 vehicle unable to access the network compared to 398 in the reference case (390 from the B4100 East, 7 from the B4100 West and 1 from the M40 South). The single vehicle from the M40 South entry is consistent in both scenarios and is attributed to the stochastic nature of how the flows are input into the model. This effect is negligible and will not affect the assessment conclusions.

Summary of 2031 Model Performance Analysis

5.3.57 Reference Case (existing highway network, excluding Albion Land and their associated mitigation) and Do-Something scenarios were developed for the 2031 DfT Circular compliant scenario, using strategic traffic flows provided by ADC Infrastructure Ltd from the Bicester Transport Model (BTM). Comprehensive performance metrics were extracted, including journey times, queue lengths, junction performance, and network-wide operational statistics.

Network-Wide Performance

5.3.58 Network performance metrics demonstrate that the Do-Something scenario delivers substantial operational improvements compared to the Reference Case baseline, whilst accommodating additional OxSRFI and Albion Land development traffic:

- AM Peak: Average vehicle delay reduces from 95 seconds to 50 seconds, with average network speed increased from 44mph to 49 mph
- PM Peak: Average vehicle delay reduces from 60 seconds to 51 seconds, with average network speed similar at 49-50 mph.

5.3.59 The improvements in network performance are attributable to the comprehensive junction improvement package, particularly at Baynard's Green. The significant enhancement to Baynard's Green junction operation enables over 1,100 additional vehicles to enter the network in the AM peak, and nearly 400 additional vehicles to enter the network in the PM peak that were previously unable to do so in the Reference Case, in addition to accommodating trips associated with the proposed OxSRFI and Albion Land developments.

Localised Effects

5.3.60 The assessment identifies the following localised effects:

- Substantially reduced queuing at Baynard's Green roundabout (A43 North, B4100 East and B4100 West approaches experience reductions of 71%, 85%

and 70% respectively in the AM peak), similar or reduced queuing levels within Ardley village (reflecting traffic reassignment to the Ardley bypass), and effective queue management at the new OxSRFI site access roundabout (maximum queues 25-110 metres, no capacity constraints).

- Increased journey times from Cherwell Services to A43 North (104/88 seconds AM/PM peak – resulting from the removal of the direct right-turn lane, necessitating a right turn at Ardley and hence longer travel distance), increased journey times from Cherwell Services to the M40 North (68/62 seconds AM/PM peaks – attributable to an increased number of signalised stop-lines to traverse), increased journey times from Ardley Road East to M40 North (58/72s AM/PM peaks – the result of a change in speed limits in this area of the network), and increased queuing at Padbury, Cherwell and Ardley in both peaks (attributable to the network accommodating additional traffic that is now able to enter from the A43 North, B4100 East and B4100 West entry points, and that was not able to reach these locations in the Reference Case, in combination with the proposed OxSRFI and Albion Land development traffic).

Assessment of Localised Effects

5.3.61 The localised effects do not constitute severe or unacceptable impacts. Journey time changes (where not significantly reduced) remain within ±60 seconds, whilst accommodating all traffic demand, which is not the case in the Reference Case. This indicates that driver experience across the wider network would be improved. Queue increases remain contained within approach capacities and create no network blocking risks.

5.3.62 The findings support the conclusion that the mitigation package delivers improved network performance, can accommodate the latent demand from the Reference Case, whilst accommodating the strategic infrastructure requirements and additional traffic from the OxSRFI and Albion Land developments.

5.4 Scenario Comparison Analysis – 2031 RC1A & 2031 DS1A

Overview

5.4.1 The second comparative analysis is of the 2031 Do-Something (DS1A) scenario against the 2031 Reference Case (RC1A) scenario (the potential future baseline scenario that includes Albion Land and their highway works).

Journey Time Results – AECOM TN Comparisons

5.4.2 The journey time comparisons for the routes associated with Set 1 can be seen in **Table 5.9** and **Table 5.10**.

AM Peak

5.4.3 The principal finding from the 2031 DS1A/RC1A comparison is that the mitigation schemes associated with the OxSRFI development deliver a positive impact on vehicles travelling northbound from the M40 and travelling towards Ardley roundabout (a 48 second (-47%) decrease in journey time). Whilst the queues on the off-slip in RC1A do not reach back to the mainline, there is an improvement in DS1A as a result of the mitigation proposals.

5.4.4 The Ardley roundabout to Cherwell junction movement shows a 27 second increase in journey time, but this is experienced by a greatly reduced number of vehicles (847 vehicles against 1,365 vehicles in the Reference Case). The introduction of the new M40 northbound off-slip that joins at Padbury junction transfers 518 vehicles to the new slip road, that would otherwise have to travel through Ardley and Cherwell junctions. This frees up capacity on the A43 northbound link between Ardley and Cherwell for additional right-turning traffic to Cherwell Services and the M40 South, which still has to queue at the signalised node with the A43 North and the heavy southbound movement.

5.4.5 All other movements in the AM peak have journey time differences of ±1-8s, which are unlikely to be noticed when driving these routes.

PM Peak

5.4.6 In the PM peak there is a 40 second increase from Ardley to Cherwell. However, as in the AM peak, this needs to be considered in the context of 872 trips being diverted to the new M40 northbound off-slip that joins Padbury junction. This frees up capacity on the A43 northbound link for additional traffic to turn right towards Cherwell Services and the M40 South, albeit through a signalised node that conflicts with the heavy A43 southbound movement.

5.4.7 There are improvements with the OxSRFI development, but these are modest at 7 seconds from Padbury to Baynard's Green (northbound).

5.4.8 All other movements in the PM peak have journey time differences of ±1-12s, which are unlikely to be noticed when driving these routes.

ALL VEHICLES									
No.	Route			2031 RC1A		2031 DS1A		Difference (JTs)	
	From	To	Dist.	Avg.	Trips	Avg.	Trips	No.	%
1	SB1 - A43 North	SB1 - Baynards Green	424m	00:00:41	1890	00:00:45	2212	00:00:04	▲ 9%
2	SB2 - Baynards Green	SB2 - Padbury	718m	00:00:58	1792	00:00:53	1518	-00:00:05	▼ 8%
3	SB3 - Padbury	SB3 - Cherwell	347m	00:00:46	2081	00:00:45	1648	-00:00:01	▼ 2%
4	SB4 - Cherwell	SB4 - M40 On-Slip	154m	00:00:18	1325	00:00:16	1592	-00:00:03	▼ 15%
5	SB5 - M40 On-Slip	SB5 - M40	862m	00:00:42	1546	00:00:43	1992	00:00:01	▲ 2%
6	NB1 - M40	NB1 - Ardley	858m	00:01:42	1365	00:00:54	847	-00:00:48	▼ 47%
7	NB2 - Ardley	NB2 - Cherwell	376m	00:00:31	1348	00:00:58	718	00:00:27	▲ 88%
8	NB3 - Cherwell	NB3 - Padbury	373m	00:00:32	1332	00:00:40	742	00:00:08	▲ 23%
9	NB4 - Padbury	NB4 - Baynards Green	664m	00:00:55	1393	00:00:56	744	00:00:01	▲ 1%
10	NB5 - Baynards Green	NB5 - A43 North	521m	00:00:29	1312	00:00:31	1276	00:00:01	▲ 5%

TABLE 5.9: JOURNEY TIME COMPARISONS (SET 1) – 2031 RC1A&DS1A – AM

ALL VEHICLES									
No.	Route			2031 RC1A		2031 DS1A		Difference (JTs)	
	From	To	Dist.	Avg.	Trips	Avg.	Trips	No.	%
1	SB1 - A43 North	SB1 - Baynards Green	424m	00:00:38	1508	00:00:38	1624	00:00:00	▲ 1%
2	SB2 - Baynards Green	SB2 - Padbury	718m	00:00:52	1444	00:00:51	1323	-00:00:01	▼ 2%
3	SB3 - Padbury	SB3 - Cherwell	347m	00:00:41	1803	00:00:39	1405	-00:00:02	▼ 6%
4	SB4 - Cherwell	SB4 - M40 On-Slip	154m	00:00:18	1284	00:00:15	1297	-00:00:02	▼ 14%
5	SB5 - M40 On-Slip	SB5 - M40	862m	00:00:40	1546	00:00:41	1684	00:00:02	▲ 4%
6	NB1 - M40	NB1 - Ardley	858m	00:00:47	1903	00:00:45	1124	-00:00:02	▼ 5%
7	NB2 - Ardley	NB2 - Cherwell	376m	00:00:31	1866	00:01:10	994	00:00:40	▲ 128%
8	NB3 - Cherwell	NB3 - Padbury	373m	00:00:32	1820	00:00:44	1428	00:00:12	▲ 38%
9	NB4 - Padbury	NB4 - Baynards Green	664m	00:01:11	1902	00:01:04	1435	-00:00:07	▼ 10%
10	NB5 - Baynards Green	NB5 - A43 North	521m	00:00:29	1835	00:00:34	2298	00:00:04	▲ 15%

TABLE 5.10: JOURNEY TIME COMPARISONS (SET 1) – 2031 RC1A&DS1A – PM

Journey Time Results – O-D Pair Comparisons

5.4.9 Where journey time comparisons can be made for the routes associated with Set 2, these are shown in **Table 5.11** and **Table 5.12**, with the full suite of O-D pair results shown in **Appendix H.**

AM Peak

5.4.10 From a review of the O-D pair journey time comparisons, there is a 1 minute 21 second increase from Cherwell Services to the A43 North. As previously mentioned, this is the result of the closure of the right-turn lane at Cherwell to travel north, with the requirement to now turn right at Ardley roundabout and then travel northbound on the A43. There is also an increase of 59 seconds from Cherwell Services to the M40 North, which is attributed additional green time is assigned to the heavier A43 southbound movement.

5.4.11 There are improvements from the M40 South as a result of the Ardley roundabout improvements, with times to other zones reducing by 21-35s.

5.4.12 Routes originating from Ardley village (Ardley Road East & West) travelling northbound towards the M40 an A43 are increased by 41-58s in the Do-Something scenario. This appears to be linked to the change in speed limits in this section of the network (B430 reduced to 40mph and Ardley village speed limit now 20mph).

5.4.13 Elsewhere, where journey times can be compared, the changes are all ±40s, which indicates that the proposed SRFI development and the associated mitigation schemes will lead to a network performance similar to the future baseline Reference Case with the Albion Land improvements at Baynard's Green.

PM Peak

5.4.14 In the PM peak, the most notable journey time changes between the O-D pairs are from Cherwell Services to the A43 North, where there is an increase of 1 minute 30 seconds. As with the AM peak, this is due to the new route required to be taken, following the closure of the link to turn right from Cherwell Services to travel north. The journey time from the services to the M40 North is also increased by 57 seconds in the Do-Something scenario. Like in the AM peak, this is the result of a redistribution of the green time to the heavier A43 southbound flow.

5.4.15 As was the case in the AM peak, there are increases in the journey times from Ardley Road East and West that travel northbound towards the A43 North and the M40 North (increases in the range of 50 seconds to 1 minute 20 seconds). The

consistent increases appear to be linked to the change in the speed limits in this section of the network.

5.4.16 Elsewhere, the changes in journey times are all ±40s, which indicates that the proposed SRFI development and the associated mitigation schemes will lead to a network performance similar to the future baseline Reference Case with the Albion Land improvements at Baynard's Green.

ALL VEHICLES									
No.	Route			2031 RC1A		2031 DS1A		Difference (JTs)	
	From	To	Dist.	Avg.	Trips	Avg.	Trips	No.	%
2	A43 North	B4100 East	1220 m	00:01:27	406	00:01:27	323	00:00:01	▲ 1%
3	A43 North	Cherwell Services	2045 m	00:03:07	63	00:02:59	56	-00:00:08	▼ 4%
4	A43 North	M40 South	5269 m	00:05:12	1260	00:05:07	1469	-00:00:04	▼ 1%
7	A43 North	B4100 West	1216 m	00:02:02	41	00:02:04	33	00:00:02	▲ 2%
13	B4100 East	A43 North	1298 m	00:02:07	222	00:02:08	221	00:00:00	▲ 0%
18	B4100 East	M40 North	7047 m	00:06:27	182	00:07:01	38	00:00:35	▲ 9%
19	B4100 East	B4100 West	915 m	00:02:06	216	00:02:04	244	-00:00:02	▼ 1%
25	Cherwell Services	A43 North	2062 m	00:03:08	62	00:04:29	63	00:01:21	▲ 43%
28	Cherwell Services	M40 South	3597 m	00:03:13	209	00:03:40	285	00:00:27	▲ 14%
30	Cherwell Services	M40 North	5726 m	00:04:35	149	00:05:34	150	00:00:59	▲ 22%
37	M40 South	A43 North	5550 m	00:05:49	1079	00:05:19	1053	-00:00:30	▼ 9%
39	M40 South	Cherwell Services	4071 m	00:04:54	226	00:04:33	225	-00:00:21	▼ 7%
42	M40 South	M40 North	8281 m	00:04:43	2981	00:04:44	2926	00:00:00	▲ 0%
43	M40 South	B4100 West	5167 m	00:05:46	8	00:05:13	4	-00:00:33	▼ 10%
44	M40 South	Ardley Rd West	3927 m	00:03:58	14	00:03:23	12	-00:00:35	▼ 15%
57	B430	Ardley Rd East	2045 m	00:01:52	89	00:02:30	18	00:00:38	▲ 34%
62	M40 North	B4100 East	5836 m	00:05:16	223	00:05:28	210	00:00:12	▲ 4%
63	M40 North	Cherwell Services	5231 m	00:04:45	192	00:04:38	188	-00:00:07	▼ 2%
64	M40 North	M40 South	8295 m	00:04:56	3668	00:04:58	3458	00:00:02	▲ 1%
68	M40 North	Ardley Rd West	5905 m	00:05:24	12	00:05:46	12	00:00:22	▲ 7%
69	M40 North	Ardley Rd East	6561 m	00:05:50	59	00:06:21	16	00:00:31	▲ 9%
73	B4100 West	A43 North	1116 m	00:01:40	61	00:01:50	70	00:00:10	▲ 10%
74	B4100 West	B4100 East	934 m	00:01:51	316	00:02:01	295	00:00:10	▲ 9%
76	B4100 West	M40 South	4983 m	00:05:24	48	00:05:31	101	00:00:07	▲ 2%
85	Ardley Rd West	A43 North	2697 m	00:03:08	4	00:03:53	4	00:00:45	▲ 24%
88	Ardley Rd West	M40 South	4442 m	00:04:35	12	00:04:53	21	00:00:19	▲ 7%
90	Ardley Rd West	M40 North	5887 m	00:03:58	10	00:04:39	10	00:00:41	▲ 17%
93	Ardley Rd West	Ardley Rd East	1011 m	00:01:07	64	00:01:25	12	00:00:18	▲ 27%

ALL VEHICLES									
No.	Route			2031 RC1A		2031 DS1A		Difference (JTs)	
	From	To	Dist.	Avg.	Trips	Avg.	Trips	No.	%
101	Ardley Rd East	B430	2030 m	00:01:57	162	00:02:28	6	00:00:31	▲ 27%
102	Ardley Rd East	M40 North	6579 m	00:04:29	121	00:05:27	153	00:00:58	▲ 22%
104	Ardley Rd East	Ardley Rd West	1014 m	00:00:57	24	00:01:16	8	00:00:19	▲ 34%

TABLE 5.11: JOURNEY TIME COMPARISONS (SET 2) – 2031 RC1A&DS1A – AM

ALL VEHICLES									
No.	Route			2031 RC1A		2031 DS1A		Difference (JTs)	
	From	To	Dist.	Avg.	Trips	Avg.	Trips	No.	%
2	A43 North	B4100 East	1220 m	00:01:23	279	00:01:23	253	00:00:00	▲ 0%
3	A43 North	Cherwell Services	2045 m	00:02:50	104	00:02:44	106	-00:00:06	▼ 4%
4	A43 North	M40 South	5269 m	00:04:48	1214	00:04:44	1214	-00:00:04	▼ 1%
7	A43 North	B4100 West	1216 m	00:02:20	38	00:02:12	44	-00:00:08	▼ 6%
13	B4100 East	A43 North	1298 m	00:02:51	347	00:02:31	317	-00:00:20	▼ 12%
16	B4100 East	M40 South	4968 m	00:05:29	4	00:05:07	8	-00:00:21	▼ 6%
18	B4100 East	M40 North	7047 m	00:06:53	240	00:07:16	44	00:00:24	▲ 6%
19	B4100 East	B4100 West	915 m	00:02:42	216	00:02:25	268	-00:00:18	▼ 11%
20	B4100 East	Ardley Rd West	2417 m	00:04:15	4	00:04:36	4	00:00:21	▲ 8%
25	Cherwell Services	A43 North	2062 m	00:03:16	86	00:04:46	87	00:01:30	▲ 46%
28	Cherwell Services	M40 South	3597 m	00:03:05	261	00:03:14	261	00:00:09	▲ 5%
30	Cherwell Services	M40 North	5726 m	00:04:34	178	00:05:31	177	00:00:57	▲ 21%
37	M40 South	A43 North	5550 m	00:05:16	1588	00:05:41	1682	00:00:25	▲ 8%
38	M40 South	B4100 East	5368 m	00:05:54	4	00:06:19	8	00:00:25	▲ 7%
39	M40 South	Cherwell Services	4071 m	00:04:01	213	00:04:33	214	00:00:32	▲ 13%
41	M40 South	B430	5013 m	00:04:04	4	00:04:42	2	00:00:38	▲ 16%
42	M40 South	M40 North	8281 m	00:04:55	3963	00:04:56	3836	00:00:02	▲ 1%
43	M40 South	B4100 West	5167 m	00:05:13	28	00:05:32	33	00:00:19	▲ 6%
44	M40 South	Ardley Rd West	3927 m	00:03:07	32	00:03:23	41	00:00:16	▲ 9%
62	M40 North	B4100 East	5836 m	00:05:46	253	00:05:42	221	-00:00:04	▼ 1%
63	M40 North	Cherwell Services	5231 m	00:04:40	196	00:04:34	196	-00:00:06	▼ 2%
64	M40 North	M40 South	8295 m	00:04:46	3352	00:04:47	3347	00:00:01	▲ 1%
68	M40 North	Ardley Rd West	5905 m	00:05:16	16	00:05:41	15	00:00:25	▲ 8%
69	M40 North	Ardley Rd East	6561 m	00:05:39	24	00:06:17	12	00:00:38	▲ 11%
73	B4100 West	A43 North	1116 m	00:01:52	46	00:01:50	44	-00:00:02	▼ 2%
74	B4100 West	B4100 East	934 m	00:02:03	143	00:01:59	143	-00:00:05	▼ 4%
76	B4100 West	M40 South	4983 m	00:05:16	32	00:05:16	34	00:00:00	▲ 0%
85	Ardley Rd West	A43 North	2697 m	00:03:39	8	00:04:29	8	00:00:50	▲ 23%

ALL VEHICLES									
No.	Route			2031 RC1A		2031 DS1A		Difference (JTs)	
	From	To	Dist.	Avg.	Trips	Avg.	Trips	No.	%
90	Ardley Rd West	M40 North	5887 m	00:04:11	9	00:05:06	8	00:00:55	▲ 22%
93	Ardley Rd West	Ardley Rd East	1011 m	00:01:02	37	00:01:26	12	00:00:23	▲ 38%
101	Ardley Rd East	B430	2030 m	00:04:05	4	00:05:25	4	00:01:20	▲ 33%
102	Ardley Rd East	M40 North	6579 m	00:01:48	12	00:02:32	4	00:00:44	▲ 41%
104	Ardley Rd East	Ardley Rd West	1014 m	00:04:42	64	00:05:52	132	00:01:10	▲ 25%

TABLE 5.12: JOURNEY TIME COMPARISONS (SET 2) – 2031 RC1A&DS1A – PM

Queue Length Results

5.4.17 The mean-maximum queue lengths at Baynard's Green, Padbury, Cherwell, Ardley, Ardley Crossroads and the new Ardley Bypass junction are shown in **Figure 5.16-5.21** for the AM peak and **Figure 5.22-5.27** for the PM peak.

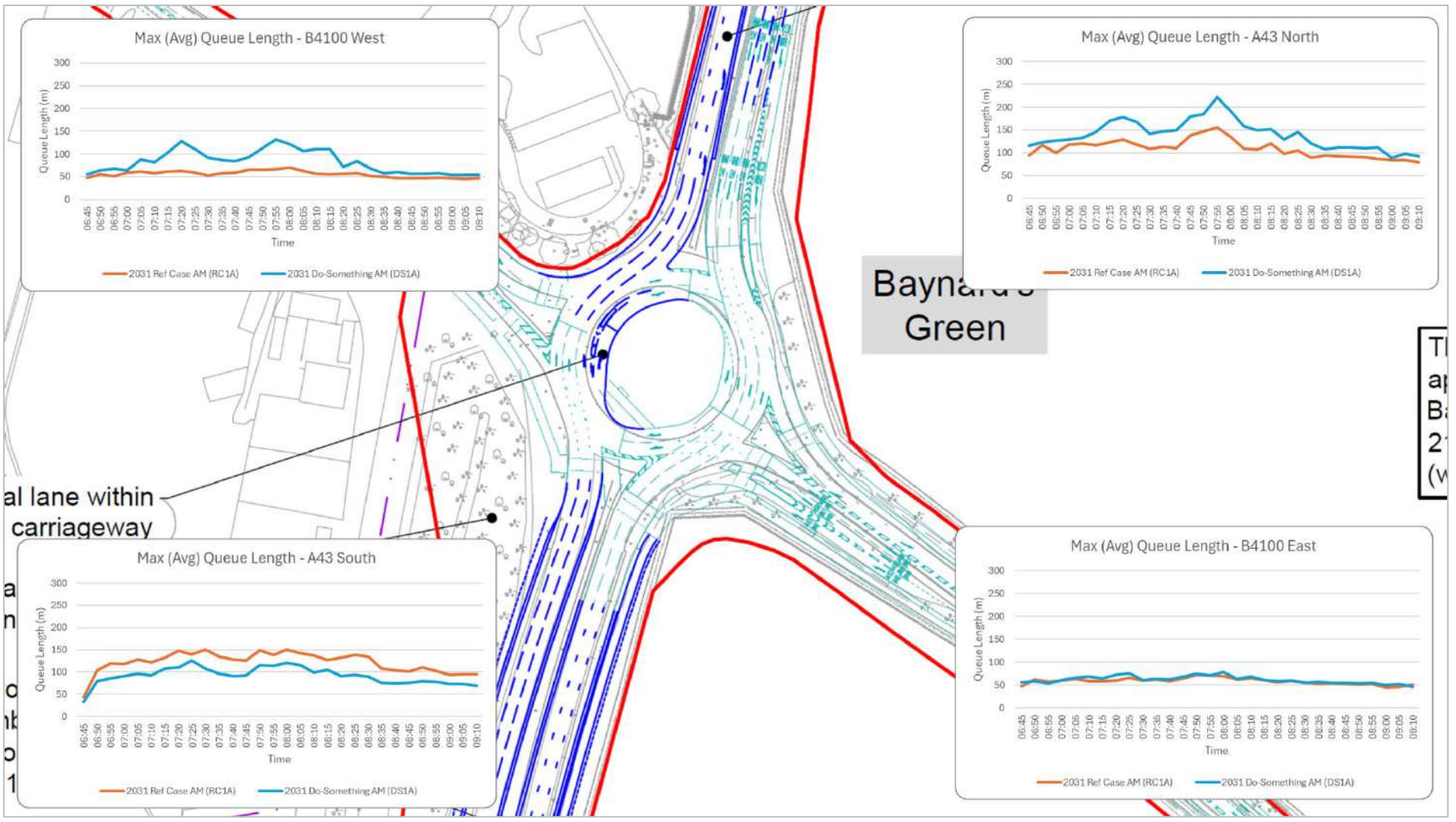


FIGURE 5.16: MAXIMUM (AVERAGE) QUEUE LENGTHS – 2031 RC1A&DS1A – AM – BAYNARD'S GREEN

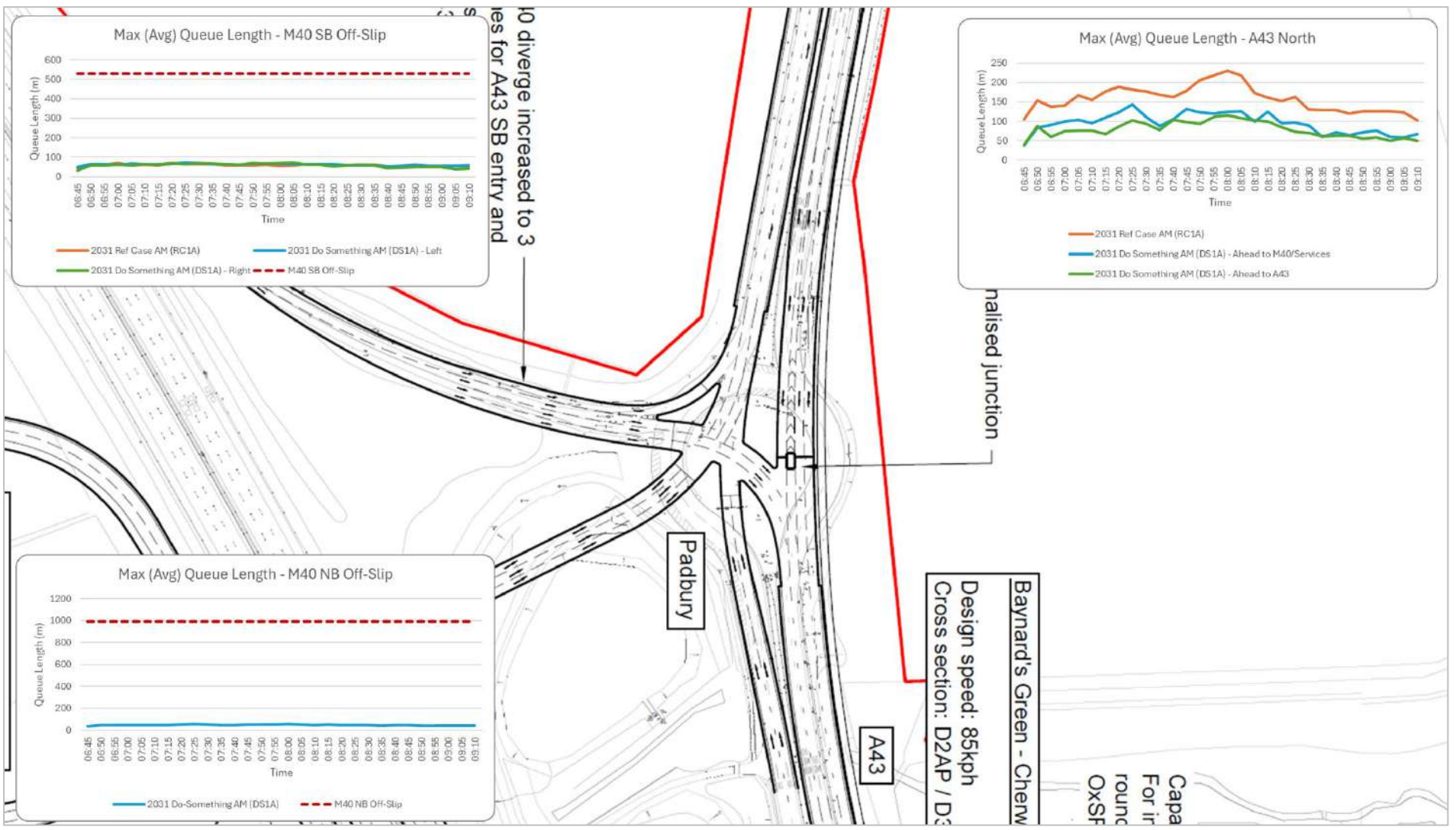


FIGURE 5.17: MAXIMUM (AVERAGE) QUEUE LENGTHS – 2031 RC1A&DS1A – AM – PADBURY

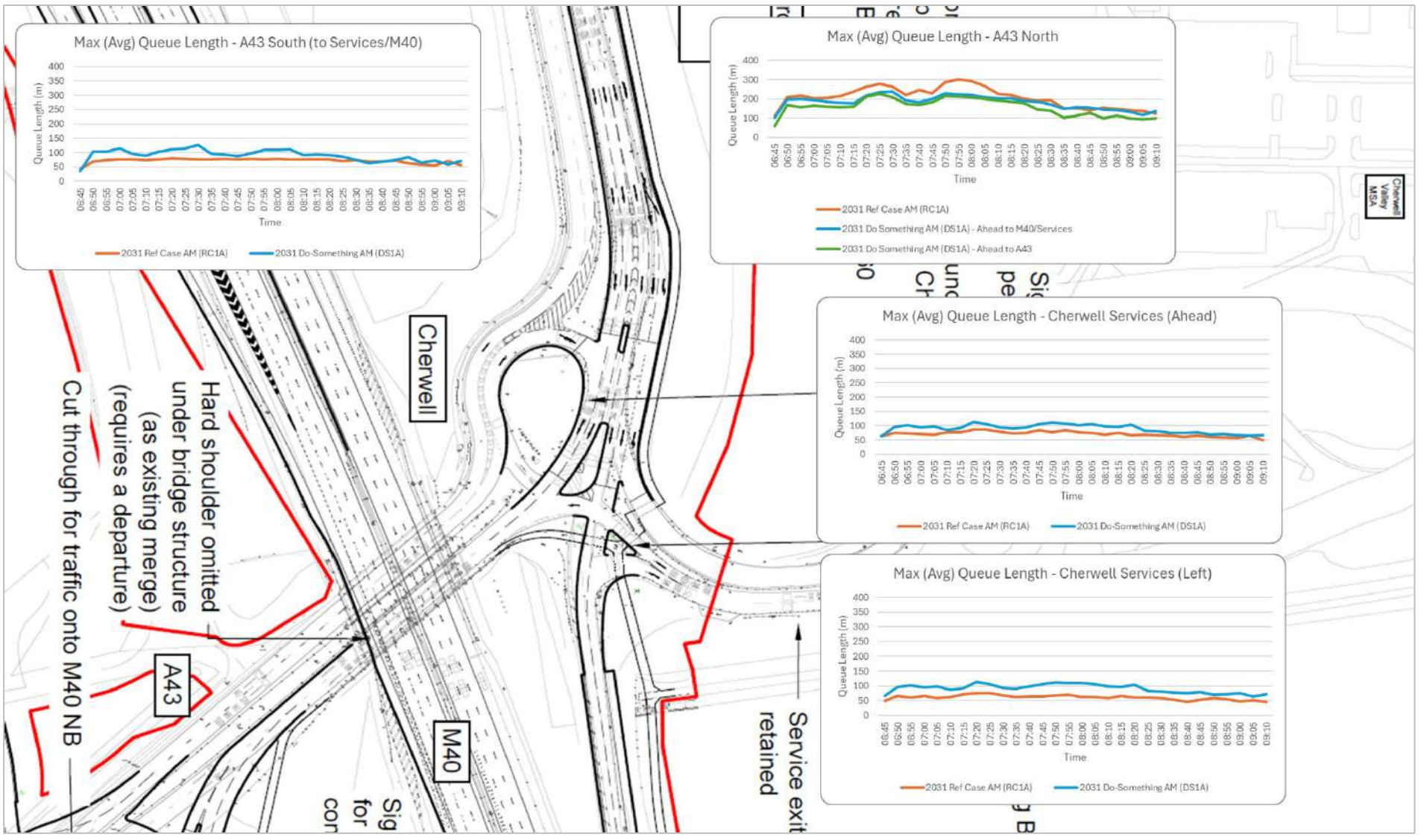


FIGURE 5.18: MAXIMUM (AVERAGE) QUEUE LENGTHS – 2031 RC1A&DS1A – AM – CHERWELL

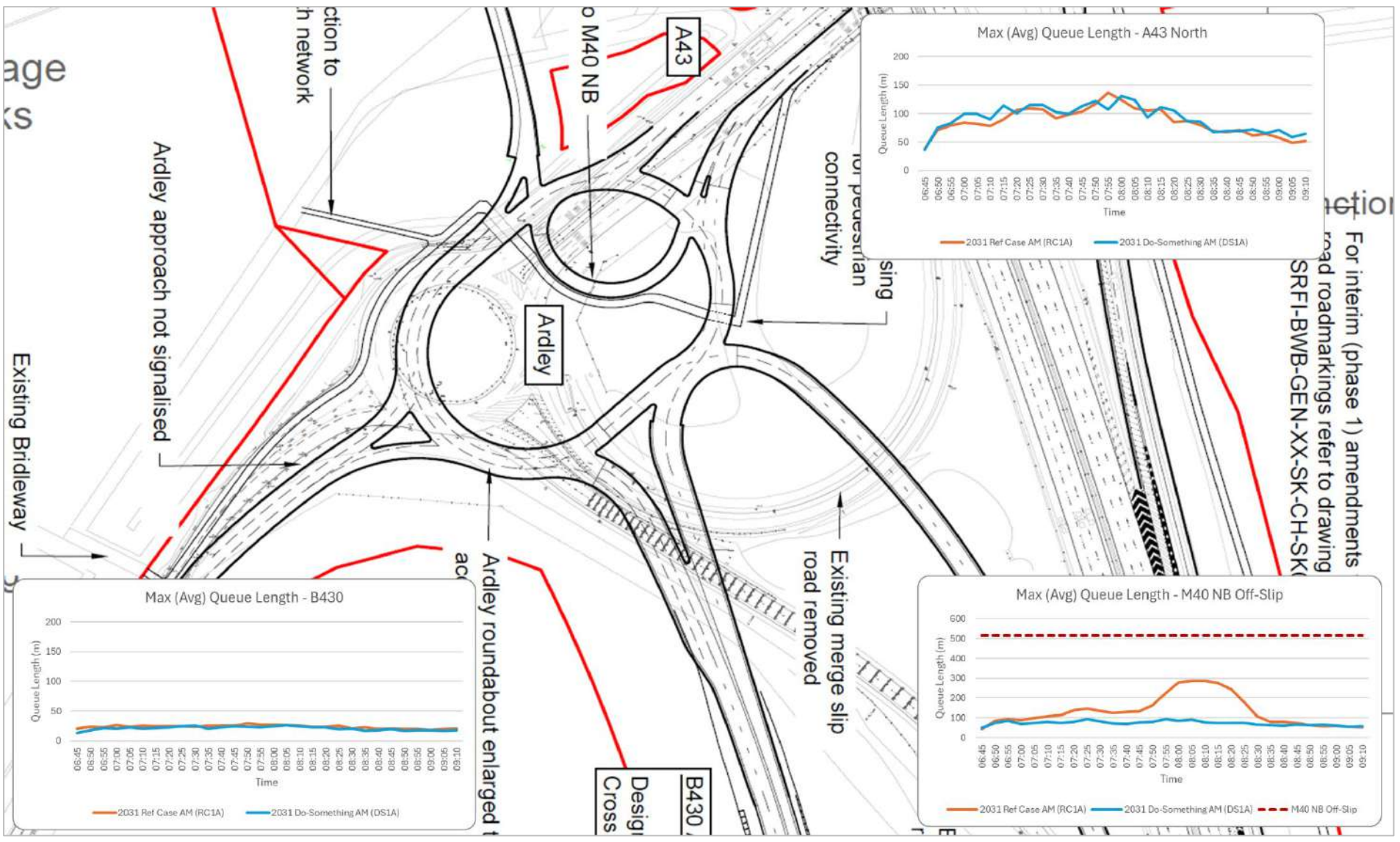


FIGURE 5.19: MAXIMUM (AVERAGE) QUEUE LENGTHS – 2031 RC1A&DS1A – AM – ARDLEY

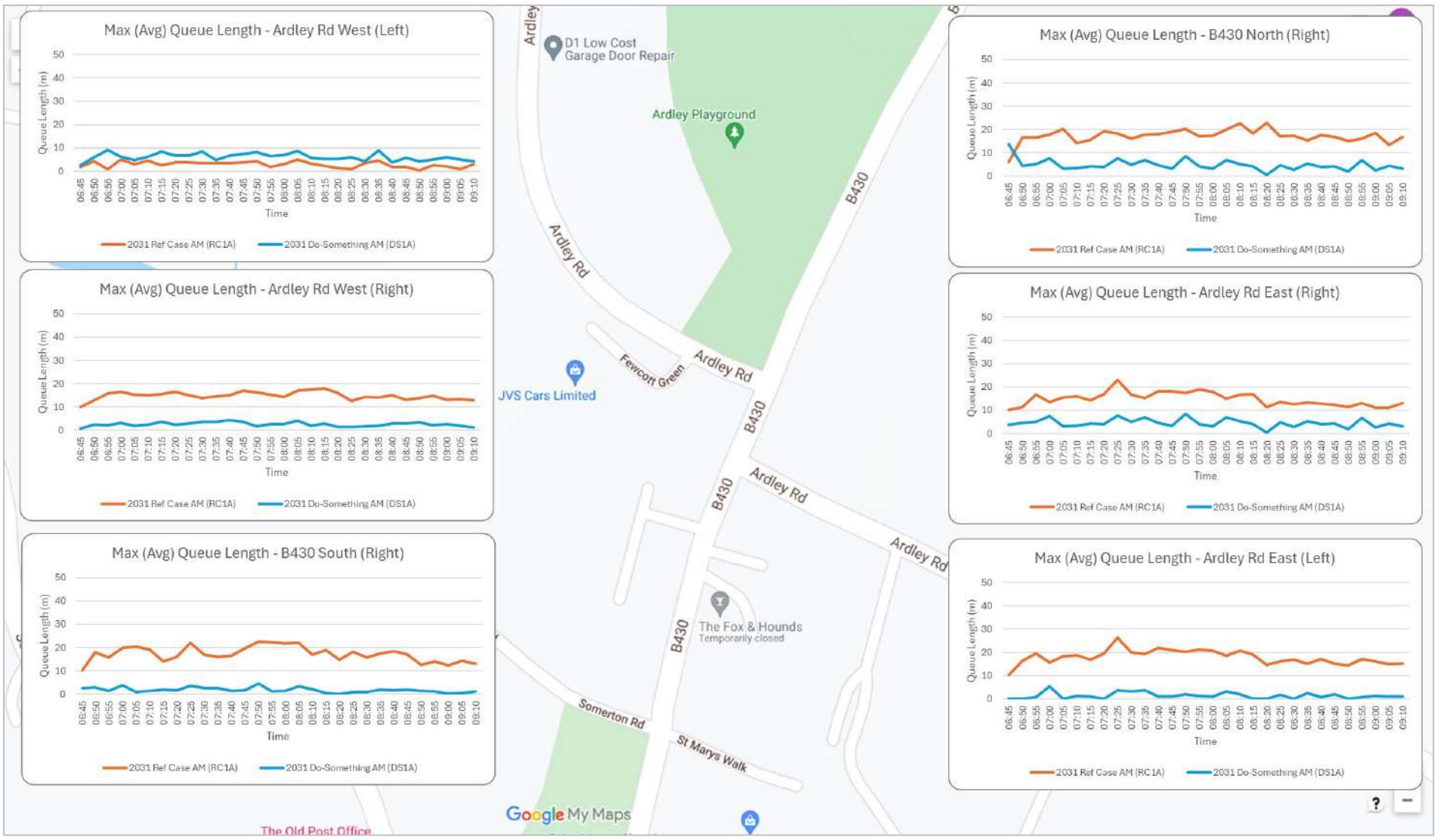


FIGURE 5.20: MAXIMUM (AVERAGE) QUEUE LENGTHS – 2031 RC1A&DS1A – AM – ARDLEY CROSSROADS

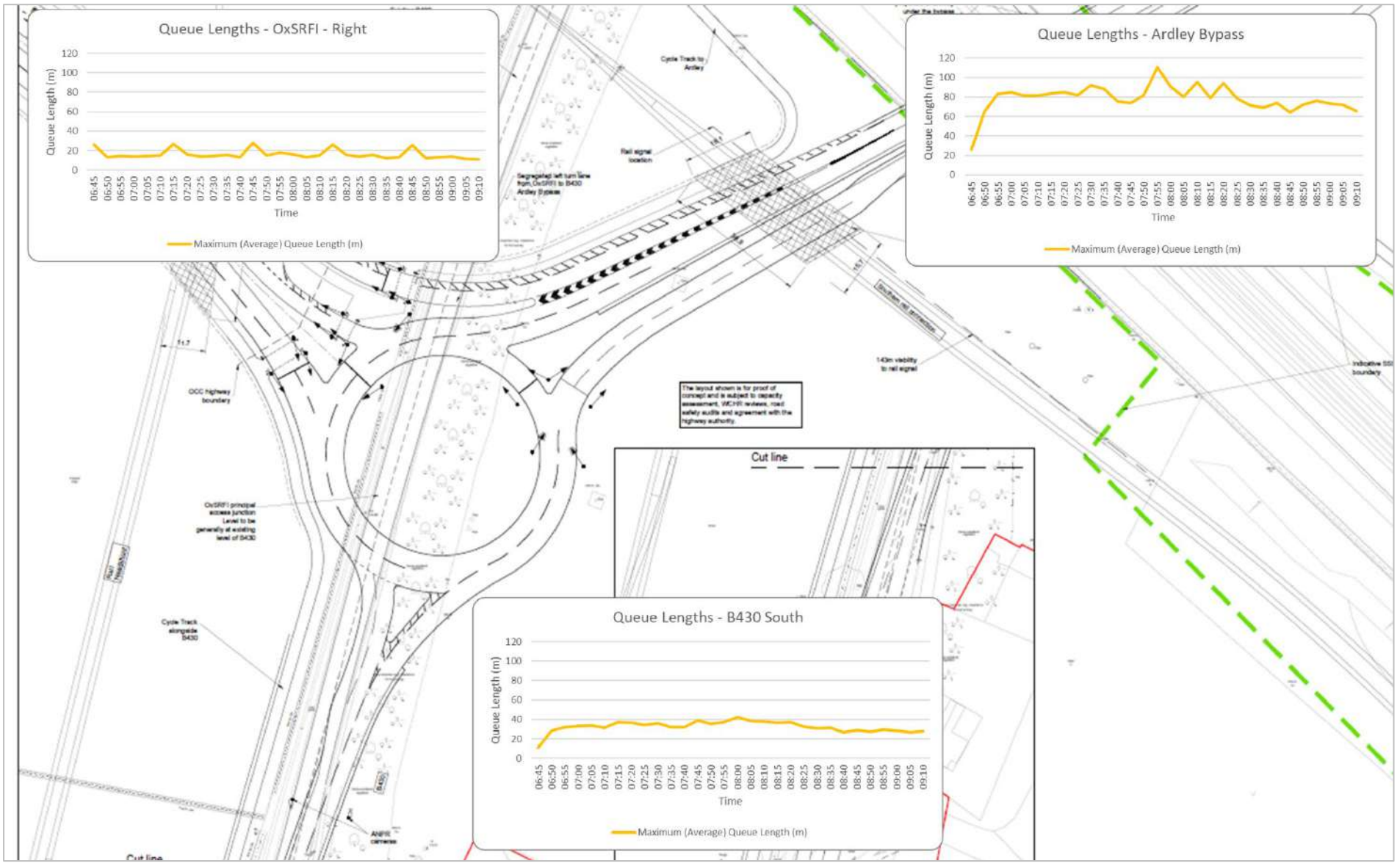


FIGURE 5.21: MAXIMUM (AVERAGE) QUEUE LENGTHS – 2031 RC1A&DS1A – AM – OXSRFI/ARDLEY BYPASS

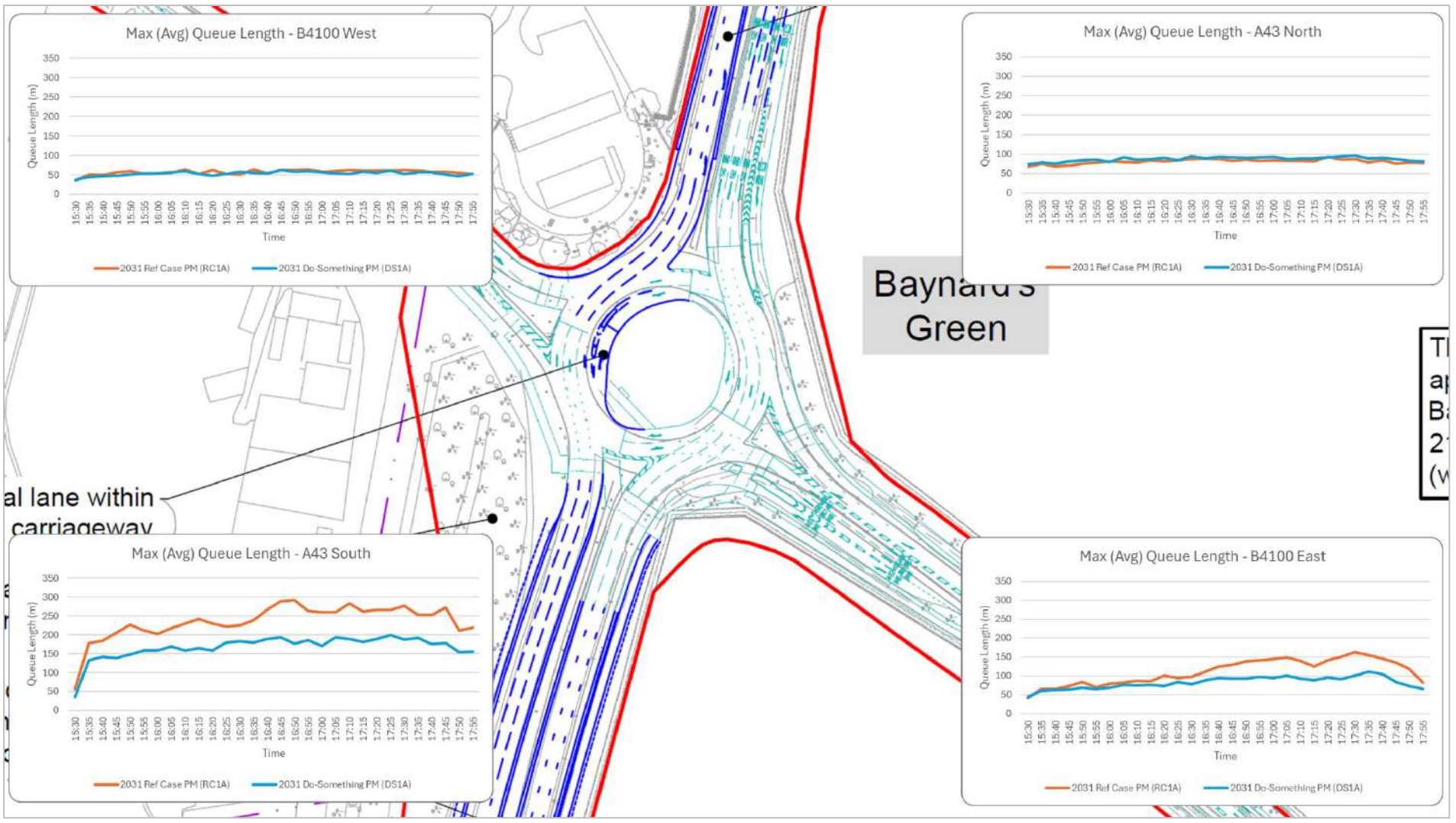


FIGURE 5.22: MAXIMUM (AVERAGE) QUEUE LENGTHS – 2031 RC1A&DS1A – PM – BAYNARD'S GREEN

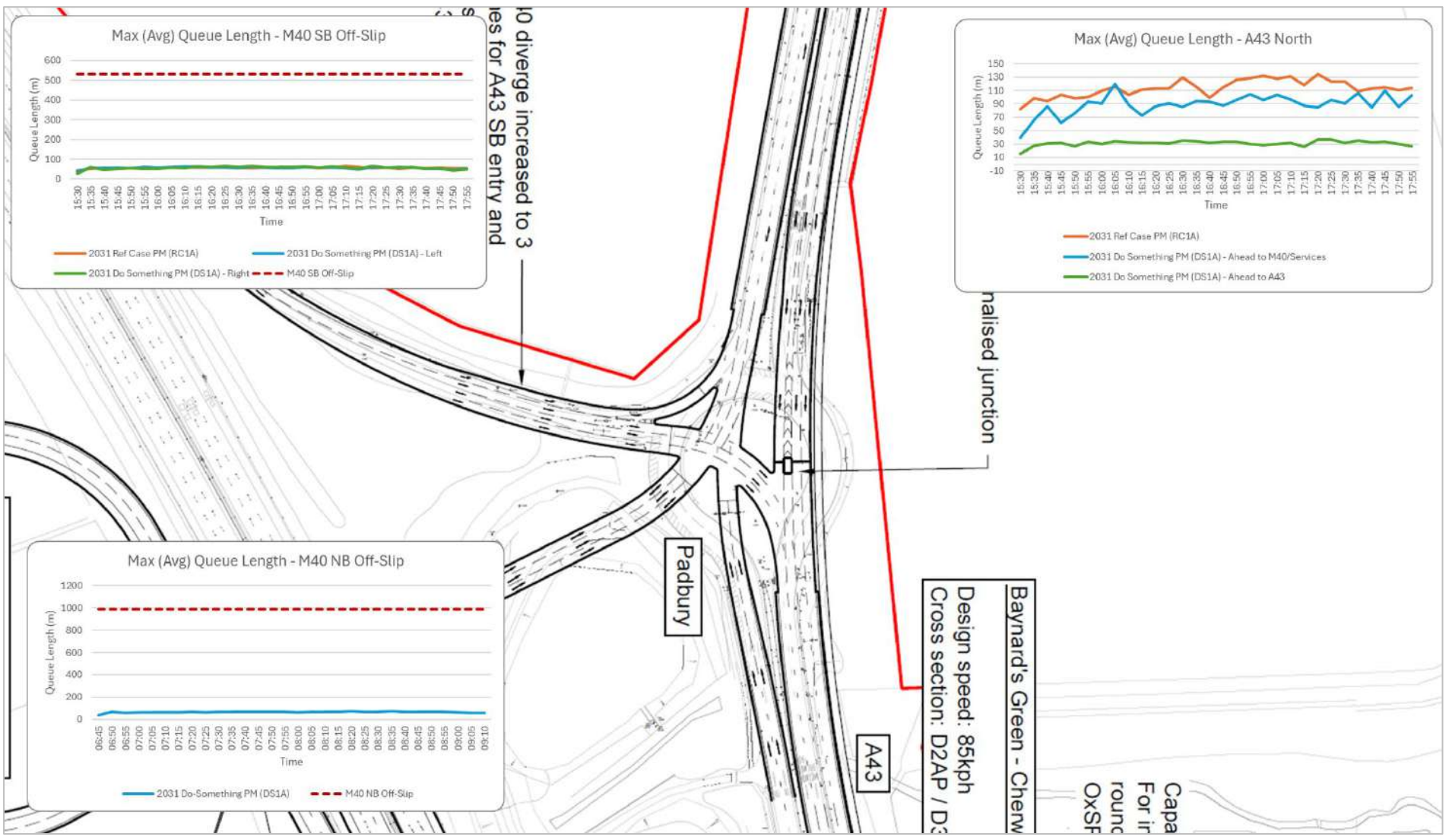


FIGURE 5.23: MAXIMUM (AVERAGE) QUEUE LENGTHS – 2031 RC1A&DS1A – PM – PADBURY

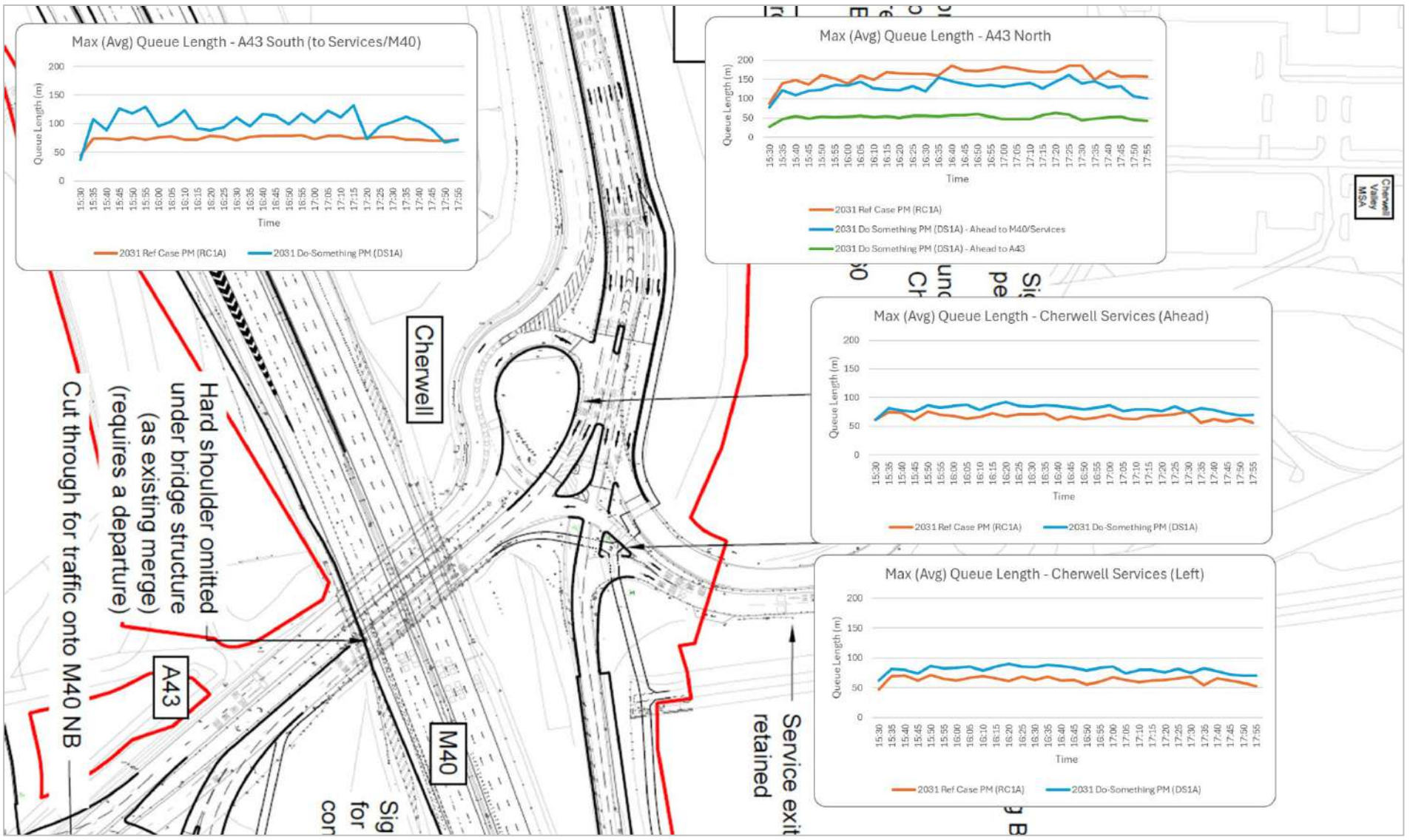


FIGURE 5.24: MAXIMUM (AVERAGE) QUEUE LENGTHS – 2031 RC1A&DS1A – PM – CHERWELL

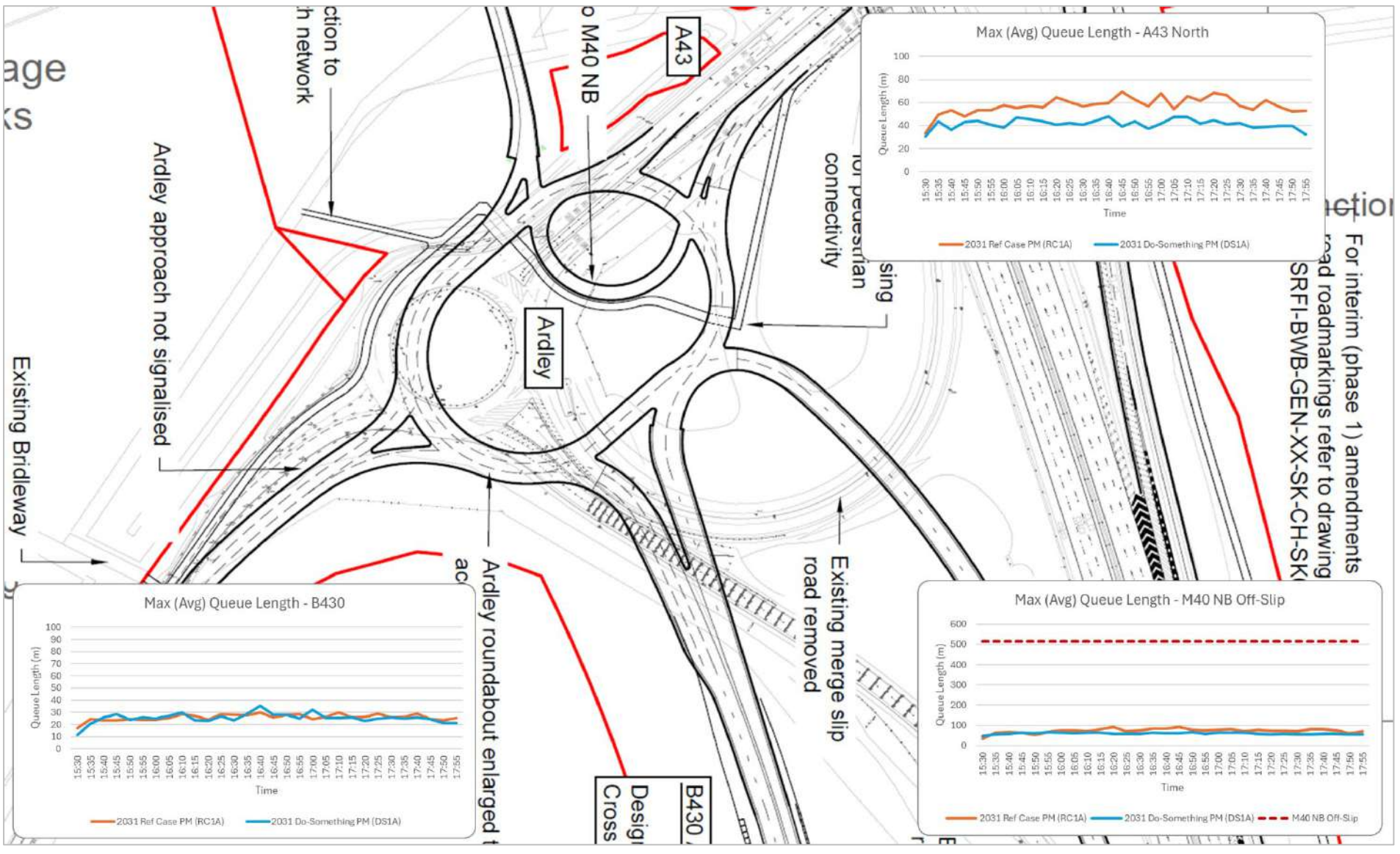


FIGURE 5.25: MAXIMUM (AVERAGE) QUEUE LENGTHS – 2031 RC1A&DS1A – PM – ARDLEY

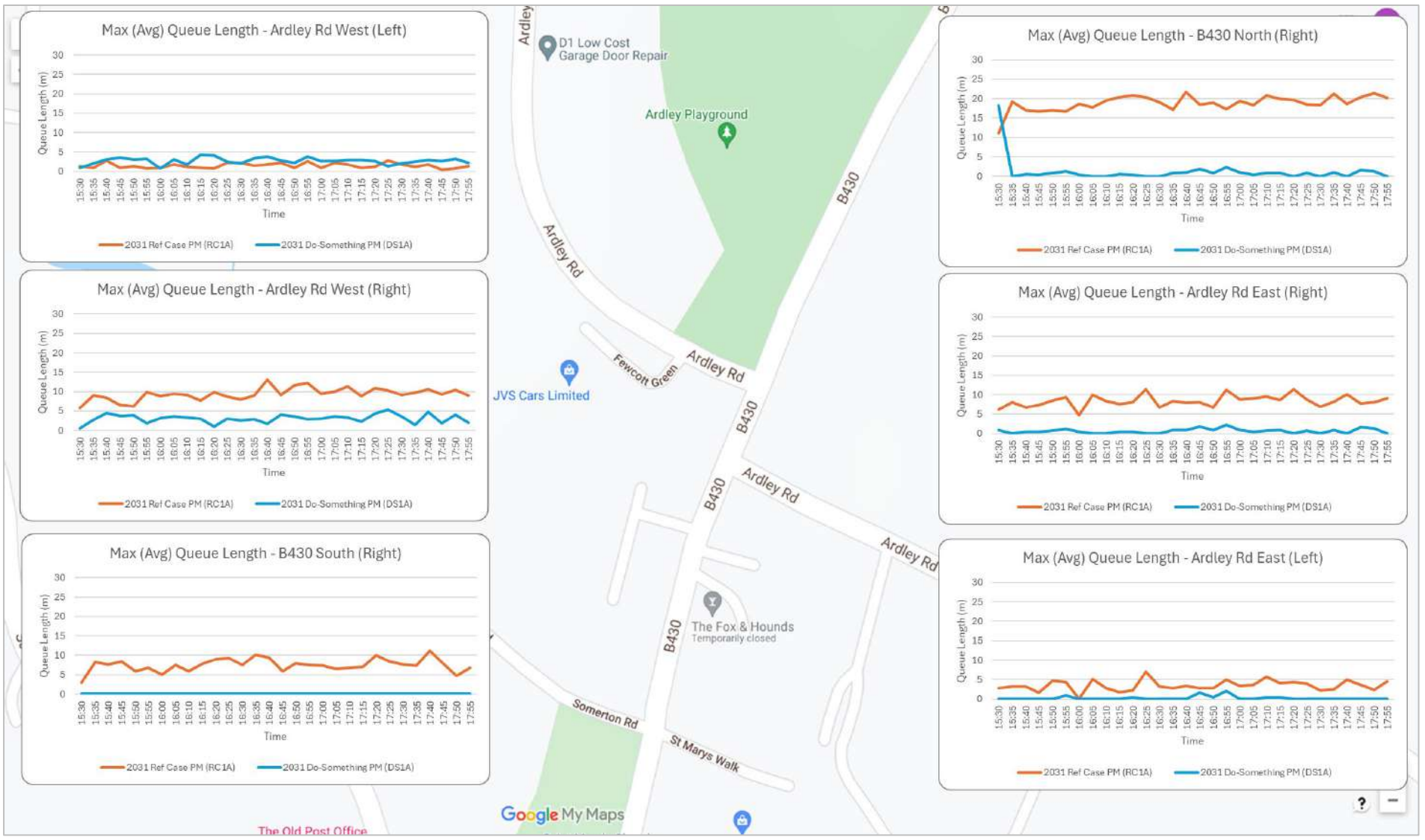


FIGURE 5.26: MAXIMUM (AVERAGE) QUEUE LENGTHS – 2031 RC1A&DS1A – PM – ARDLEY CROSSROADS

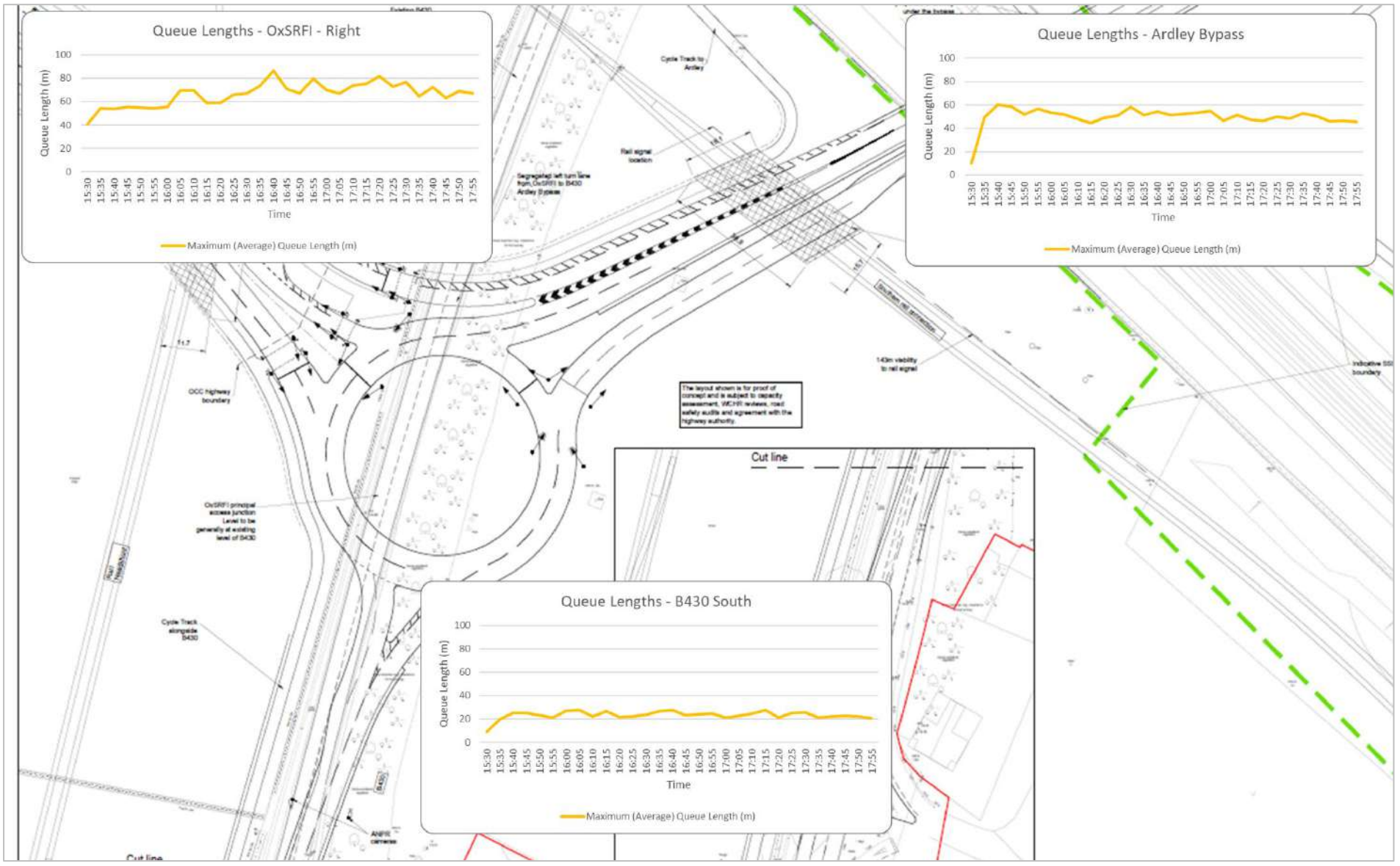


FIGURE 5.27: MAXIMUM (AVERAGE) QUEUE LENGTHS – 2031 RC1A&DS1A – PM – OXSRFI/ARDLEY BYPASS

AM Peak Queue Analysis

Baynard's Green Roundabout

5.4.18 At Baynard's Green roundabout, the Do-Something scenario exhibits longer queues on two approaches compared to the Reference Case (with the Albion Land highway improvement). The A43 North approach experiences maximum queues of approximately 220 metres (compared to ~155 metres in the Reference Case), whilst the B4100 West approach shows queues reaching approximately 130 metres (compared to ~70 metres in the Reference Case).

5.4.19 These queue increases are attributable to the interaction between additional OxSRFI traffic entering from the A43 North and the signal timing optimisation strategy. To accommodate the higher A43 corridor flows whilst preventing capacity exceedance, signal green time is preferentially allocated to the A43 North approach. This green time is necessarily taken from the B4100 approaches, resulting in increased queuing on the B4100 West arm. This represents a deliberate operational prioritisation of the higher-flow strategic A43 corridor over the lower-flow local B4100 movements.

5.4.20 The B4100 West queue increase (~130 metres) remains well clear of the Albion Land junction located approximately 340 metres upstream, confirming adequate capacity separation. The signal strategy therefore successfully balances competing demands whilst maintaining acceptable operation across all approaches.

Padbury Junction

5.4.21 At Padbury junction, queue behaviour differs between scenarios on key approaches, with the Do-Something scheme delivering operational improvements. On the M40 southbound off-slip, queue lengths remain similar between scenarios, with queuing contained on the slip road and no extension to the M40 mainline – confirming acceptable strategic network operation.

5.4.22 On the A43 North approach, the development proposals deliver queue reductions, decreasing from approximately 230 metres (Reference Case) to 140 metres (Do-Something) – a 39% reduction. This improvement demonstrates that the proposed infrastructure effectively manages southbound traffic levels. The reduction is attributable to the additional lanes introduced on the A43 southbound corridor, which provide increased queuing capacity and improved traffic progression. This represents a significant operational benefit for A43 corridor users.

5.4.23 For the new M40 northbound off-slip in the Do-Something scenario, maximum queues reach approximately 50 metres, well within the slip road length and confirming no mainline interaction risk. This validates the design adequacy of the new infrastructure.

Cherwell Junction

5.4.24 At Cherwell junction, the Do-Something scenario delivers queue reductions on the A43 North approach. Queues reduce from approximately 300 metres (Reference Case) to 210 metres (Do-Something) – a 30% reduction. As with Padbury junction, this improvement results from the introduction of additional lanes on the A43 southbound corridor, providing increased queuing capacity. This demonstrates consistent benefits along the A43 corridor arising from the lane capacity enhancements.

5.4.25 On the A43 South approach (turning towards Cherwell Services and M40 southbound), queues in the Do-Something scenario extend to approximately 130 metres compared to 80 metres in the Reference Case. However, in the Do-Something scenario this approach is reconfigured such that the off-side lane is now a dedicated lane for traffic turning right at Cherwell junction (i.e. towards Cherwell Services or the M40 South). The nearside lane continues to serve A43 northbound traffic, but the traffic flow is significantly reduced for this movement, as M40 to A43 northbound traffic uses the new M40 off-slip that joins Padbury junction in the Do-Something scenario. This is part of the highway mitigation strategy to accommodate the additional OxSRFI traffic (travelling to the M40 southbound), with the proposed highway layout designed to accommodate this increased demand and queue.

5.4.26 Queues at Cherwell Services are longer in the Do-Something scenario, reaching lengths of approximately 115 metres, compared to 80 metres in the Reference Case. This is the result of additional green time needing to be given to the heavier A43 southbound movement, which in turn reduces the green time available to exit the services.

Ardley Roundabout

5.4.27 At Ardley roundabout, the Do-Something scenario delivers substantial queue reductions on the critical M40 northbound off-slip and A43 North approaches. M40 off-slip queuing reduces from approximately 290 metres (Reference Case) to 100 metres (Do-Something) – a 66% reduction. Whilst the 2031 Reference Case queuing does not extend to the M40 mainline (unlike the more severe 2034

Reference Case scenario that is considered in the next section), the Do-Something scenario still delivers meaningful operational improvements.

5.4.28 These queue reductions demonstrate that the mitigation package delivers operational benefits in the DfT Circular 01/2022 (2031) scenario.

5.4.29 Queues on the A43 North and B430 approach remain at similar levels between the two scenarios, indicating neutral impact at this location.

Ardley Village Crossroads

5.4.30 At the Ardley crossroads within Ardley village, queues either remain similar or reduce in the Do-Something scenario. This improvement results from two factors: reduced traffic using the village itself, and the stopping up of B430 south of Ardley village, which diverts through-traffic to the new Ardley bypass link. This delivers a local amenity benefit by reducing traffic impacts within the village residential area.

OxSRFI Access/Ardley Bypass Roundabout

5.4.31 Whilst no direct comparison with the Reference Case can be made (this junction exists only in the Do-Something scenario), the queuing levels at the OxSRFI site access and Ardley bypass roundabout are presented to demonstrate acceptable operation of this new infrastructure.

5.4.32 Maximum queues of approximately 110 metres occur on the Ardley Bypass approach, slightly exceeding the two-lane section length. However, this queue length remains acceptable given the rural location and absence of upstream junctions. Queues on the B430 South approach reach approximately 40 metres, with the OxSRFI access arm experiencing maximum queues of approximately 30 metres. These queue levels indicate no severe capacity constraints at this junction and confirm that the signalised roundabout operates acceptably under AM peak demand conditions.

PM Peak Queue Analysis

Baynard's Green Roundabout

5.4.33 In the PM peak at Baynard's Green roundabout, the A43 South approach queues are reduced in the Do-Something scenario (~195 metres compared to ~290 metres in the Reference Case, a 33% reduction). The B4100 East approach also experiences reduced queuing (up to 100 metres compared to ~165 metres, a 39% reduction). In both cases, this is attributable to the improvements at this junction as part of the OxSRFI development. The additional lane on the A43 North exit and

increased number of lanes on the western circulatory prove beneficial in allowing more vehicles to progress through the junction, reducing queues as a result.

5.4.34 Queues on the A43 North and B4100 West approaches all remain similar between the two scenarios, indicating stable operation at these locations.

Padbury Junction

5.4.35 PM peak queue lengths at Padbury remain similar between scenarios on the M40 southbound off-slip approaches, with critically no queuing extending back to the M40 mainline from the slip road. This confirms acceptable strategic network operation in both scenarios.

5.4.36 Queues on the A43 North are reduced in the Do-Something scenario, reaching up to ~120 metres compared to ~135m in the Reference Case. This is attributed to the inclusion of the additional lane on the approach, which provides more queuing capacity for southbound traffic.

5.4.37 The new M40 northbound off-slip in the Do-Something scenario shows maximum queues of approximately 80 metres, well contained within the slip road length and confirming adequate capacity provision.

Cherwell Junction

5.4.38 Queue behaviour at Cherwell in the PM peak demonstrates operational benefits on the A43 North approach, where queues reduce from approximately 190 metres (Reference Case) to 155 metres (Do-Something) – an 18% reduction. This improvement is attributable to the additional lanes on the A43 southbound link providing increased queuing capacity and represents a consistent pattern of A43 corridor benefits arising from the lane capacity enhancements.

5.4.39 On the A43 South approach (turning to Cherwell Services/M40), queues increase from approximately 90 metres to 130 metres in the Do-Something scenario. As in the AM peak analysis, this is the result of the new lane configuration, with a dedicated lane now created to accommodate this queue for the A43 northbound and for travelling to the Services and M40 South.

5.4.40 Queues at Cherwell Services are again slightly longer in the Do-Something scenario, reaching lengths of approximately 90 metres, compared to 80 metres in the Reference Case. This is the result of the redistribution of green time to the A43 southbound movement.

Ardley Roundabout

5.4.41 The PM peak demonstrates continued benefits at Ardley roundabout, with M40 northbound off-slip queuing showing similar levels of queuing. Critically, the

queues are comfortably contained within the length of the slip road and will have no impacts on the M40 mainline.

5.4.42 The A43 North approach queuing reduces from approximately 65 metres to 50 metres – a 23% reduction.

5.4.43 These improvements are attributed to traffic reassignment to the new northbound off-slip joining Padbury, combined with the enhanced capacity provided by the signalised Ardley roundabout with additional lanes. The improvements, whilst numerically smaller than the 2034 AM peak benefits (where Reference Case queuing is greater), demonstrate that the mitigation package delivers operational enhancements across both time horizons and both peak periods.

5.4.44 Queues on the B430 approach remain at similar levels between the two scenarios.

Ardley Village Crossroads

5.4.45 Ardley village crossroads queuing remains similar or reduces in the Do-Something scenario (consistent with AM peak findings). This confirms local amenity benefits from traffic reassignment to the Ardley bypass, reducing vehicle movements through the village residential area.

OxSRFI Access/Ardley Bypass Roundabout

5.4.46 At the OxSRFI site access roundabout in the PM peak, maximum queues reach approximately 85 metres on the OxSRFI access arm and 60 metres on the Ardley Bypass arm, with B430 South queues of approximately 30 metres. These queue levels indicate acceptable junction operation with no severe capacity constraints. The junction successfully manages site access traffic alongside through-traffic on the bypass link.

Network Performance Results

5.4.47 The network performance comparisons for the AM and PM peaks are shown in **Table 5.13** and **Table 5.14**.

All Vehicles			
2031 AM			
Scenario	Average Delay per Vehicle (s)	Average Speed (mph)	Latent Demand
2031 Reference Case (RC1A)	47	51	0
2031 Do-Something (DS1A)	50	49	0

TABLE 5.13: NETWORK PERFORMANCE – 2031 RC1A&DS1A – AM

5.4.48 The AM peak results show that the proposed OxSRFI development and the package of improvement schemes delivers comparable performance to the future baseline Reference Case with Albion Land and that schemes highway works, with only modest changes in average delays and network speed. The similar average delays should also be viewed in the context that the Do-Something network adds more signalised junction to the model extents. Whilst these inevitably cause vehicles to stop as they progress on their journey, the results indicate that the traffic is managed effectively as they travel through the modelled network. The Do-Something scenario also includes for reduction in speeds limits within Ardley and on the A43 between Ardley roundabout and Padbury junction.

5.4.49 There also remains no latent demand in the network, which indicates that all vehicles can enter the network and complete their journeys.

All Vehicles			
2031 PM			
Scenario	Average Delay per Vehicle (s)	Average Speed (mph)	Latent Demand
2031 Reference Case (RC1A)	46	52	1
2031 Do-Something (DS1A)	51	49	1

TABLE 5.14: NETWORK PERFORMANCE – 2031 RC1A&DS1A –PM

5.4.50 In the PM peak, the introduction of the proposed OxSRFI development has a modest increase in the average delay per vehicle (+5s), whilst also having a similar average network speed (52-49mph). The changes are expected as the Do-Something network features more signalised junctions, which inevitably add delays to vehicles who have to stop as they progress on their journey. The Do-Something scenario also includes for reductions in speeds limits within Ardley and on the A43 between Ardley roundabout and Padbury junction.

5.4.51 The PM peak also shows a very small amount of latent demand in both scenarios. This is located at the M40 South entry (on review of the Parking Lot output results) and is attributed to the stochastic nature of how the flows are input into the

model. The numbers are negligible and does not affect the assessment conclusions

Summary of 2031 Model Performance Analysis

5.4.52 Reference Case and Do-Something scenarios were developed for the 2031 DfT Circular 01/2022 compliant scenario, using strategic traffic flows provided by ADC Infrastructure Ltd from the Bicester Transport Model (BTM). Journey times, queue lengths, and network performance metrics were extracted to understand operational performance.

Consistent Strategic Benefits in the DfT Circular 01/2022 Compliant Scenario

5.4.53 The primary finding for the 2031 scenarios is that the OxSRFI development mitigation schemes deliver operational improvements to the M40 northbound corridor, addressing capacity constraints evident in the Reference Case.

5.4.54 In the 2031 AM peak, M40 northbound off-slip queuing at Ardley roundabout reduces from approximately 220 metres (Reference Case) to 115 metres (Do-Something) – a 48% reduction. Whilst the 2031 Reference Case queuing does not extend to the M40 mainline, the Do-Something scenario delivers operational improvements. Journey times from M40 northbound to Ardley reduce by 48 seconds, reflecting enhanced traffic flow.

5.4.55 These findings demonstrate that the mitigation delivers operational improvements across the 2031 (DfT Circular 01/2022 compliant scenario). The deterioration from this scenario to 2034 in the Reference Case (queuing extending from 220 metres to 660 metres at Ardley – see following section) highlights the necessity of the mitigation package to address future operational constraints and safety concerns.

Network Performance Remains Comparable

5.4.56 Network-wide performance metrics for the DfT 01/2022 Circular compliant scenario demonstrate that the Do-Something conditions deliver operation comparable to the future baseline Reference Case with Albion Land and that schemes highway improvements, whilst accommodating the additional traffic from the OxSRFI development:

- AM Peak: Average vehicle delay increases marginally from 47 seconds to 50 seconds (effectively equivalent), with average network speed reducing from 51 mph to 49 mph
- PM Peak: Average vehicle delay increases from 46 seconds to 51 seconds, with average network speed reducing from 52 mph to 49 mph

5.4.57 These changes reflect the introduction of additional signalised junctions in the Do-Something network, which inevitably add stopped time to some vehicle journeys. However, the similarity of network performance metrics – with average delays remaining in the range of 46-51 seconds per vehicle across all scenarios – indicates that traffic is managed effectively. Zero or negligible latent demand in all scenarios confirms network capacity sufficiency. The Do-Something scenario also includes for reductions in speeds limits within Ardley and on the A43 between Ardley roundabout and Padbury junction.

Localised Effects Summary

5.4.58 Localised effects include reduced M40 off-slip and A43 North queuing at Ardley (PM peak) (as discussed above), reduced queuing on the A43 South at Baynard's Green, reduced A43 North queuing at Padbury and Cherwell junctions (additional lanes providing increased capacity), and reduced queuing at Ardley village crossroads (traffic reassignment to bypass).

5.4.59 Other localised effects include increased journey times from Ardley to Cherwell northbound (27-40 seconds AM/PM peaks, albeit for a significantly lower traffic flows as the new off-slip joining Padbury transfers northbound trips to the A43 North away from Ardley and Cherwell), increased journey times from Cherwell Services to A43 North (1 minute 21 seconds to 1 minute 30 seconds AM/PM peaks – due to the right turn now being at Ardley roundabout and therefore increased travel distance), and modest queue increases at some Baynard's Green approaches (A43 North +65 metres, B4100 West +60 metres in the AM peak).

Consistency Across Time Horizons

5.4.60 The consistency of findings between 2031 DfT Circular 01/2022 compliant scenario against the 2031 Reference Case scenarios with and without the proposed Albion Land development and highway improvements provides confidence in the assessment. Both time horizons demonstrate:

- M40 corridor operational improvements (queue reductions, journey time improvements)
- Significant to comparable network-wide performance between Reference Case and Do-Something conditions (depending on the scenario)
- Localised effects that are modest in scale and do not constitute severe effects
- Journey time changes for the majority of movements within ±60 seconds.

5.4.61 This consistency confirms that the mitigation package delivers robust benefits that are evident across different demand levels and time horizons.

5.5 Scenario Comparison Analysis – 2034 RC3A & 2034 DS3A

Overview

5.5.1 The third comparative analysis examines the 2034 Do-Something (DS3A) scenario against the 2034 Reference Case (RC3A) scenario (future baseline scenario including Albion Land and its highway improvements).

Journey Time Results – AECOM TN Comparisons

5.5.2 The journey time comparisons for the routes associated with Set 1 can be seen in **Table 5.15** and **Table 5.16**.

AM Peak Analysis

5.5.3 The primary finding from the AM peak analysis is that the mitigation schemes associated with the OxSRFI development deliver significant benefits to vehicles travelling northbound from the M40 towards Ardley roundabout. Journey times on this critical strategic movement reduce from 4 minutes 13 seconds (Reference Case) to 54 seconds (Do-Something)—a reduction of 3 minutes 19 seconds representing a 79% improvement. This improvement addresses the operational issues identified in the Reference Case, where M40 northbound off-slip queues extend approximately 660 metres beyond the length of the slip road and onto the motorway mainline, creating significant safety concerns.

5.5.4 This arises from two key mitigation elements: the provision of a new M40 northbound off-slip connecting directly to Padbury junction (allowing traffic travelling northbound on the A43 to avoid the Ardley and Cherwell junctions altogether), and comprehensive capacity enhancements at Ardley roundabout itself (signalisation, additional lanes, expanded circulatory). Together, these interventions eliminate the capacity constraint that creates Reference Case queuing.

5.5.5 The only other movement exhibiting notable change is Ardley roundabout to Cherwell junction northbound, where journey times increase by 28 seconds. However, this increases needs to be considered in the context of a greatly reduced number of vehicles making this movement in the Do-Something scenario (731 trips against 1,384 trips in the Reference Case, a 653-vehicle reduction). The introduction of the new M40 northbound off-slip that joins at Padbury junction transfers the 653 vehicles to the new slip road, that would otherwise have to travel through Ardley and Cherwell junctions. This frees up capacity on the A43 northbound link between Ardley and Cherwell for additional right-turning traffic

to Cherwell Services and the M40 South, which still has to queue at the signalised node with the A43 North and the heavy southbound movement.

5.5.6 All other movements in the AM peak exhibit journey time differences of ±1-9 seconds, which fall within the range of daily operational variability and are unlikely to be noticed when driving these routes.

PM Peak Analysis

5.5.7 The PM peak results present a more mixed impact profile, though the strategic M40 corridor benefits remain evident.

5.5.8 The most notable journey time change is a 51-second increase from Ardley to Cherwell northbound. However, as in the AM peak, this needs to be considered in the context of 794 trips being diverted to the new M40 northbound off-slip that joins Padbury junction. This frees up capacity on the A43 northbound link for additional traffic to turn right towards Cherwell Services and the M40 South, albeit through a signalised node that conflicts with the heavy A43 southbound movement.

5.5.9 Journey time improvements are more modest in the PM peak compared to the AM peak but remain beneficial. Padbury to Baynard's Green travelling northbound improves by 8 seconds. These improvements, whilst numerically smaller than AM peak benefits, confirm that the mitigation delivers enhanced traffic management even during the more challenging PM peak conditions.

5.5.10 All other movements in the PM peak exhibit journey time differences of ±1-15 seconds, again falling within normal operational variability and confirming comparable network performance between scenarios.

ALL VEHICLES									
No.	Route			2034 RC3A		2034 DS3A		Difference (JTs)	
	From	To	Dist.	Avg.	Trips	Avg.	Trips	No.	%
1	SB1 - A43 North	SB1 - Baynards Green	424m	00:00:42	1981	00:00:48	2297	00:00:07	▲ 16%
2	SB2 - Baynards Green	SB2 - Padbury	718m	00:01:02	1874	00:01:01	1703	-00:00:01	▼ 1%
3	SB3 - Padbury	SB3 - Cherwell	347m	00:00:49	2149	00:00:58	1864	00:00:09	▲ 18%
4	SB4 - Cherwell	SB4 - M40 On-Slip	154m	00:00:19	1348	00:00:16	1806	-00:00:03	▼ 15%
5	SB5 - M40 On-Slip	SB5 - M40	862m	00:00:43	1576	00:00:45	2228	00:00:02	▲ 5%
6	NB1 - M40	NB1 - Ardley	858m	00:04:13	1406	00:00:54	871	-00:03:19	▼ 79%
7	NB2 - Ardley	NB2 - Cherwell	376m	00:00:34	1384	00:01:02	731	00:00:28	▲ 85%
8	NB3 - Cherwell	NB3 - Padbury	373m	00:00:33	1386	00:00:41	763	00:00:08	▲ 26%
9	NB4 - Padbury	NB4 - Baynards Green	664m	00:00:57	1449	00:01:00	763	00:00:03	▲ 4%
10	NB5 - Baynards Green	NB5 - A43 North	521m	00:00:29	1365	00:00:31	1370	00:00:02	▲ 7%

TABLE 5.15: JOURNEY TIME COMPARISONS (SET 1) – 2034 RC3A&DS3A – AM

ALL VEHICLES									
No.	Route			2034 RC3A		2034 DS3A		Difference (JTs)	
	From	To	Dist.	Avg.	Trips	Avg.	Trips	No.	%
1	SB1 - A43 North	SB1 - Baynards Green	424m	00:00:38	1601	00:00:39	1752	00:00:00	▲ 1%
2	SB2 - Baynards Green	SB2 - Padbury	718m	00:00:54	1533	00:00:53	1407	-00:00:01	▼ 1%
3	SB3 - Padbury	SB3 - Cherwell	347m	00:00:42	1898	00:00:40	1493	-00:00:02	▼ 6%
4	SB4 - Cherwell	SB4 - M40 On-Slip	154m	00:00:17	1283	00:00:15	1382	-00:00:02	▼ 12%
5	SB5 - M40 On-Slip	SB5 - M40	862m	00:00:40	1552	00:00:42	1785	00:00:02	▲ 4%
6	NB1 - M40	NB1 - Ardley	858m	00:00:51	1919	00:00:49	1197	-00:00:01	▼ 3%
7	NB2 - Ardley	NB2 - Cherwell	376m	00:00:32	1844	00:01:22	1050	00:00:51	▲ 158%
8	NB3 - Cherwell	NB3 - Padbury	373m	00:00:32	1819	00:00:47	1535	00:00:15	▲ 46%
9	NB4 - Padbury	NB4 - Baynards Green	664m	00:01:18	1902	00:01:11	1536	-00:00:08	▼ 10%
10	NB5 - Baynards Green	NB5 - A43 North	521m	00:00:30	1871	00:00:34	2452	00:00:05	▲ 17%

TABLE 5.16: JOURNEY TIME COMPARISONS (SET 1) – 2034 RC3A&DS3A – PM

Journey Time Results – O-D Pair Comparisons

5.5.11 Where journey time comparisons can be made for the routes associated with Set 2, these are shown in **Table 5.17** and **Table 5.18**, with the full suite of O-D pair results shown in **Appendix I.**

AM Peak

5.5.12 From a review of the O-D pair journey time comparisons, the impact of the improvement in journey times from the M40 South is notable, with reductions to other zones in the network ranging from 2 minutes 41 seconds to 3 minutes 6 seconds.

5.5.13 The other notable impacts are increases ranging from 47s to 1 minute 29 seconds from the Cherwell Services to the A43 North and M40 North/South. For the routes travelling northbound, this is a result of the closure of the right-turn lane at Cherwell, with the requirement to now turn right at Ardley roundabout and then travel northbound, thereby increasing the distance travelled. The 47s increase to the M40 South is attributed to the need to give additional green time to the A43 movements, which means some increased delays in exiting the services.

5.5.14 Elsewhere, where journey times can be compared, the changes are all ±60s, which indicates that the proposed SRFI development and the associated mitigation schemes will lead to a network performance similar to the Reference Case.

PM Peak

5.5.15 In the PM peak, the most notable journey time changes between the O-D pairs are from the Ardley Road East and West within Ardley Village, where there are increases of 1 minute 55 seconds to 2 minutes 29 seconds to the A43 North/M40 North. This is the result of increased traffic flows around Ardley roundabout, due to the combination of the larger junction and the signalisation of the other arms. Whilst this results in drivers on the B430 having additional waiting time to enter the roundabout, the intergreen times from the signals provide more defined gaps for drivers to progress (in comparison to the Reference Case) The change to the speed limits on the B430 to 40mph and then 20mph through Ardley village (which was previously a national speed limit and 30mph through the village) are also a factor, as vehicles have to travel slower through this section of the network.

5.5.16 The other notable change is from Cherwell Services to the A43 North, where there is a 1 minute 48 second increase in journey time. This is a result of the closure of the right-turn lane at Cherwell to travel north, with the requirement to now turn

right at Ardley roundabout and then travel northbound on the A43, thereby increasing the distance travelled.

5.5.17 Elsewhere, the changes in journey times are all ±60s, which indicates that the proposed SRFI development and the associated mitigation schemes will lead to a network performance similar to the Reference Case.

ALL VEHICLES									
No.	Route			2034 RC3A		2034 DS3A		Difference (JTs)	
	From	To	Dist.	Avg.	Trips	Avg.	Trips	No.	%
2	A43 North	B4100 East	1220 m	00:01:28	396	00:01:31	292	00:00:02	▲ 3%
3	A43 North	Cherwell Services	2045 m	00:03:16	64	00:03:25	60	00:00:09	▲ 5%
4	A43 North	M40 South	5269 m	00:05:22	1313	00:05:38	1664	00:00:16	▲ 5%
7	A43 North	B4100 West	1216 m	00:02:04	43	00:02:11	34	00:00:07	▲ 6%
9	A43 North	Ardley Rd East	3374 m	00:04:40	40	00:04:55	4	00:00:16	▲ 6%
13	B4100 East	A43 North	1298 m	00:02:11	229	00:02:11	227	-00:00:00	▼ 0%
18	B4100 East	M40 North	7047 m	00:06:38	198	00:07:06	43	00:00:28	▲ 7%
19	B4100 East	B4100 West	915 m	00:02:08	222	00:02:07	243	-00:00:01	▼ 0%
25	Cherwell Services	A43 North	2062 m	00:03:12	65	00:04:41	66	00:01:29	▲ 46%
28	Cherwell Services	M40 South	3597 m	00:03:17	216	00:04:04	297	00:00:47	▲ 24%
30	Cherwell Services	M40 North	5726 m	00:04:37	154	00:05:41	156	00:01:04	▲ 23%
37	M40 South	A43 North	5550 m	00:08:23	1096	00:05:27	1098	-00:02:56	▼ 35%
39	M40 South	Cherwell Services	4071 m	00:07:38	229	00:04:54	234	-00:02:44	▼ 36%
41	M40 South	B430	5013 m	00:07:32	4	00:04:39	4	-00:02:53	▼ 38%
42	M40 South	M40 North	8281 m	00:04:45	3117	00:04:45	3026	00:00:00	▲ 0%
43	M40 South	B4100 West	5167 m	00:08:28	8	00:05:23	6	-00:03:05	▼ 36%
44	M40 South	Ardley Rd West	3927 m	00:06:30	15	00:03:24	14	-00:03:06	▼ 48%
45	M40 South	Ardley Rd East	4583 m	00:06:46	4	00:04:05	4	-00:02:41	▼ 40%
57	B430	Ardley Rd East	2045 m	00:01:52	81	00:02:29	19	00:00:37	▲ 33%
62	M40 North	B4100 East	5836 m	00:05:20	249	00:05:44	237	00:00:24	▲ 8%
63	M40 North	Cherwell Services	5231 m	00:04:51	196	00:04:57	196	00:00:06	▲ 2%
64	M40 North	M40 South	8295 m	00:04:59	3973	00:05:06	3666	00:00:06	▲ 2%
68	M40 North	Ardley Rd West	5905 m	00:05:43	12	00:05:49	12	00:00:06	▲ 2%
69	M40 North	Ardley Rd East	6561 m	00:06:05	55	00:06:28	23	00:00:24	▲ 6%
73	B4100 West	A43 North	1116 m	00:01:42	62	00:02:13	72	00:00:32	▲ 31%
74	B4100 West	B4100 East	934 m	00:01:53	316	00:02:25	321	00:00:32	▲ 29%
76	B4100 West	M40 South	4983 m	00:05:32	16	00:06:17	124	00:00:45	▲ 14%
85	Ardley Rd West	A43 North	2697 m	00:03:17	4	00:03:56	4	00:00:39	▲ 20%

ALL VEHICLES									
No.	Route			2034 RC3A		2034 DS3A		Difference (JTs)	
	From	To	Dist.	Avg.	Trips	Avg.	Trips	No.	%
88	Ardley Rd West	M40 South	4442 m	00:04:43	14	00:05:15	24	00:00:32	▲ 11%
90	Ardley Rd West	M40 North	5887 m	00:04:02	11	00:04:43	10	00:00:41	▲ 17%
93	Ardley Rd West	Ardley Rd East	1011 m	00:01:08	64	00:01:24	14	00:00:16	▲ 24%
97	Ardley Rd East	A43 North	3389 m	00:03:48	20	00:04:42	5	00:00:54	▲ 24%
101	Ardley Rd East	B430	2030 m	00:01:58	184	00:02:31	8	00:00:33	▲ 28%
102	Ardley Rd East	M40 North	6579 m	00:04:32	136	00:05:30	178	00:00:58	▲ 21%
104	Ardley Rd East	Ardley Rd West	1014 m	00:00:57	24	00:01:19	11	00:00:23	▲ 40%

TABLE 5.17: JOURNEY TIME COMPARISONS (SET 2) – 2034 RC3A&DS3A – AM

ALL VEHICLES									
No.	Route			2034 RC3A		2034 DS3A		Difference (JTs)	
	From	To	Dist.	Avg.	Trips	Avg.	Trips	No.	%
2	A43 North	B4100 East	1220 m	00:01:23	285	00:01:24	276	00:00:00	▲ 1%
3	A43 North	Cherwell Services	2045 m	00:02:54	110	00:02:49	109	-00:00:05	▼ 3%
4	A43 North	M40 South	5269 m	00:04:53	1206	00:04:49	1292	-00:00:03	▼ 1%
7	A43 North	B4100 West	1216 m	00:02:25	42	00:02:23	48	-00:00:01	▼ 1%
8	A43 North	Ardley Rd West	2718 m	00:03:39	4	00:04:08	1	00:00:29	▲ 13%
9	A43 North	Ardley Rd East	3374 m	00:04:03	54	00:04:51	8	00:00:48	▲ 20%
13	B4100 East	A43 North	1298 m	00:03:29	363	00:03:05	305	-00:00:24	▼ 12%
16	B4100 East	M40 South	4968 m	00:06:07	4	00:05:36	8	-00:00:31	▼ 8%
18	B4100 East	M40 North	7047 m	00:07:23	236	00:07:49	44	00:00:25	▲ 6%
19	B4100 East	B4100 West	915 m	00:03:18	222	00:02:59	270	-00:00:19	▼ 10%
20	B4100 East	Ardley Rd West	2417 m	00:04:59	4	00:05:13	4	00:00:14	▲ 5%
25	Cherwell Services	A43 North	2062 m	00:03:27	91	00:05:14	90	00:01:48	▲ 52%
28	Cherwell Services	M40 South	3597 m	00:03:06	270	00:03:20	272	00:00:13	▲ 7%
30	Cherwell Services	M40 North	5726 m	00:04:38	185	00:05:45	188	00:01:07	▲ 24%
37	M40 South	A43 North	5550 m	00:05:28	1596	00:06:01	1779	00:00:33	▲ 10%
39	M40 South	Cherwell Services	4071 m	00:04:10	217	00:04:54	219	00:00:45	▲ 18%
41	M40 South	B430	5013 m	00:04:09	14	00:04:50	12	00:00:41	▲ 16%
42	M40 South	M40 North	8281 m	00:04:57	4133	00:05:00	3991	00:00:03	▲ 1%
44	M40 South	Ardley Rd West	3927 m	00:03:12	61	00:03:34	44	00:00:22	▲ 11%
57	B430	Ardley Rd East	2045 m	00:01:49	70	00:02:29	5	00:00:40	▲ 36%
62	M40 North	B4100 East	5836 m	00:06:00	291	00:06:15	254	00:00:15	▲ 4%
63	M40 North	Cherwell Services	5231 m	00:04:41	201	00:04:39	199	-00:00:02	▼ 1%
64	M40 North	M40 South	8295 m	00:04:48	3516	00:04:49	3470	00:00:01	▲ 0%
68	M40 North	Ardley Rd West	5905 m	00:05:16	17	00:05:54	16	00:00:38	▲ 12%
69	M40 North	Ardley Rd East	6561 m	00:05:40	36	00:06:31	16	00:00:50	▲ 15%
73	B4100 West	A43 North	1116 m	00:01:58	50	00:01:58	46	-00:00:00	▼ 0%
74	B4100 West	B4100 East	934 m	00:02:07	146	00:02:10	144	00:00:03	▲ 2%
76	B4100 West	M40 South	4983 m	00:05:20	33	00:05:28	36	00:00:09	▲ 3%

ALL VEHICLES									
No.	Route			2034 RC3A		2034 DS3A		Difference (JTs)	
	From	To	Dist.	Avg.	Trips	Avg.	Trips	No.	%
85	Ardley Rd West	A43 North	2697 m	00:03:45	8	00:06:04	8	00:02:19	▲ 62%
88	Ardley Rd West	M40 South	4442 m	00:04:35	4	00:06:08	20	00:01:33	▲ 34%
90	Ardley Rd West	M40 North	5887 m	00:04:17	8	00:06:12	8	00:01:55	▲ 45%
93	Ardley Rd West	Ardley Rd East	1011 m	00:01:04	49	00:01:26	24	00:00:22	▲ 34%
97	Ardley Rd East	A43 North	3389 m	00:04:14	16	00:06:43	12	00:02:29	▲ 59%
101	Ardley Rd East	B430	2030 m	00:01:50	17	00:02:30	8	00:00:40	▲ 36%
102	Ardley Rd East	M40 North	6579 m	00:04:45	85	00:06:50	155	00:02:05	▲ 44%
104	Ardley Rd East	Ardley Rd West	1014 m	00:00:56	43	00:01:19	8	00:00:23	▲ 41%

TABLE 5.18: JOURNEY TIME COMPARISONS (SET 2) – 2034 RC3A&DS3A – PM

Queue Length Results

5.5.18 The mean-maximum queue lengths at Baynard's Green, Padbury, Cherwell, Ardley, Ardley Crossroads and the new Ardley Bypass junction are shown in **Figure 5.28-5.33** for the AM peak and **Figure 5.34-5.39** for the PM peak.

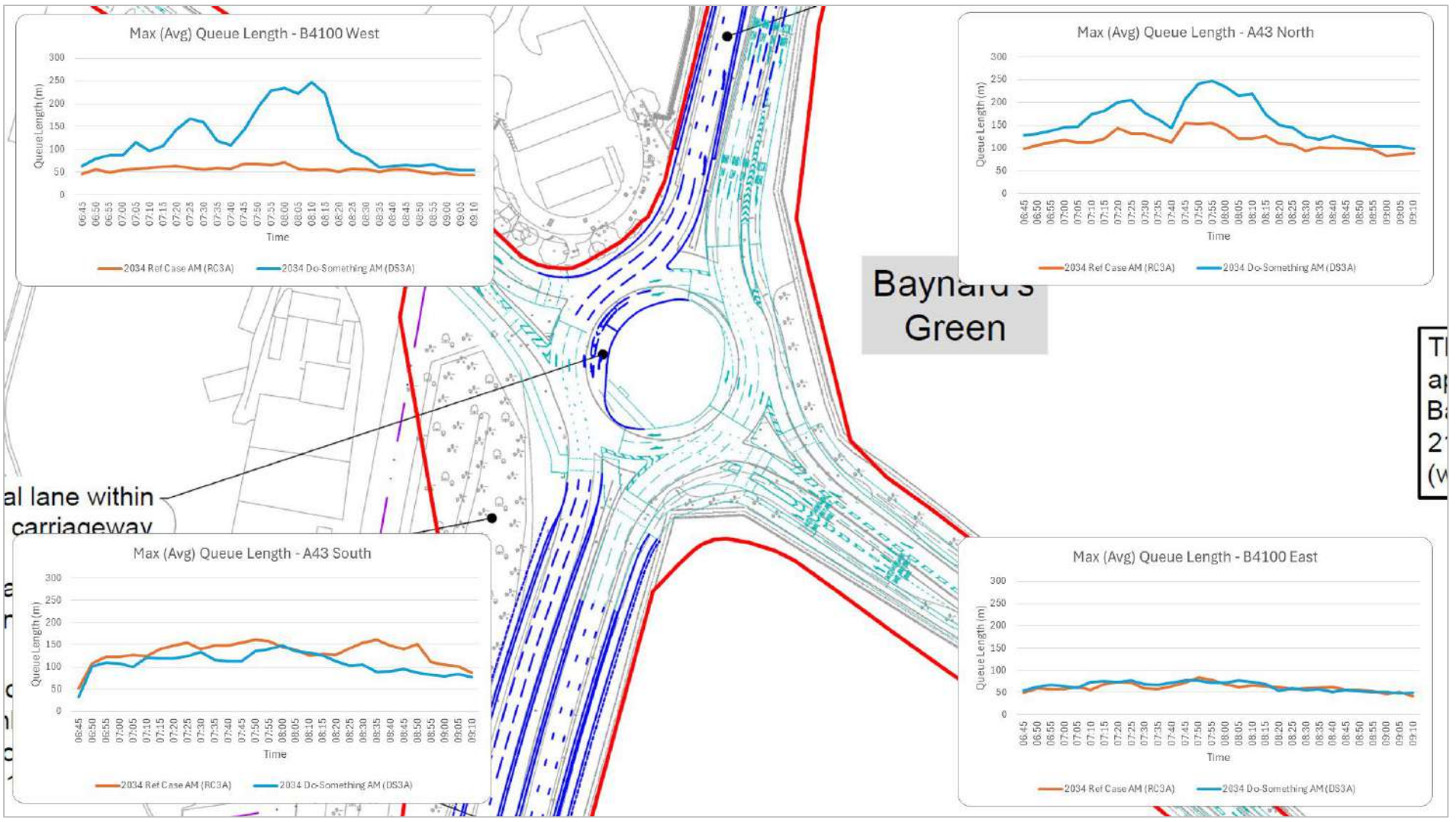


FIGURE 5.28: MAXIMUM (AVERAGE) QUEUE LENGTHS – 2034 RC3A&DS3A – AM – BAYNARD'S GREEN

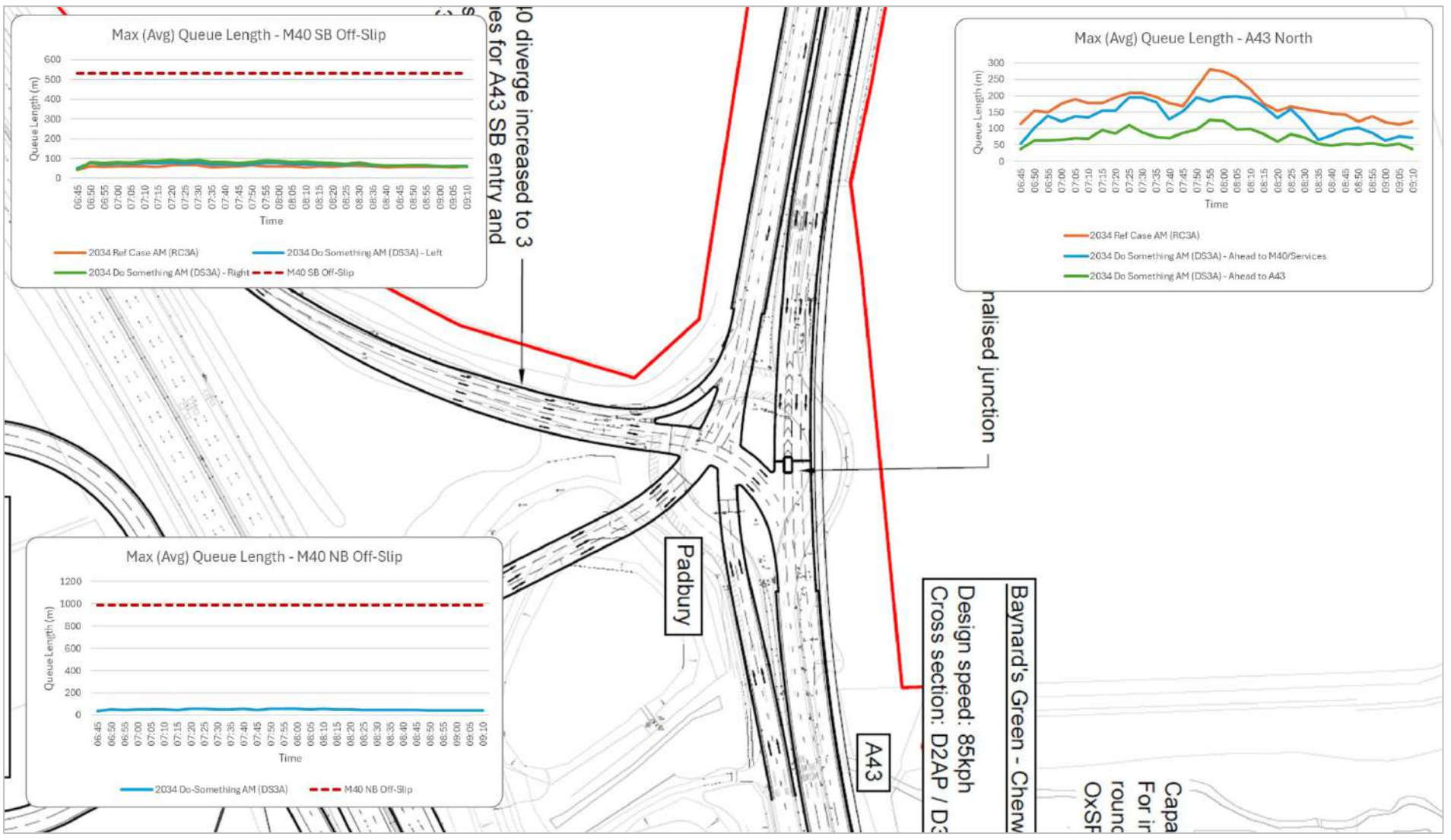


FIGURE 5.29: MAXIMUM (AVERAGE) QUEUE LENGTHS – 2034 RC3A&DS3A – AM – PADBURY

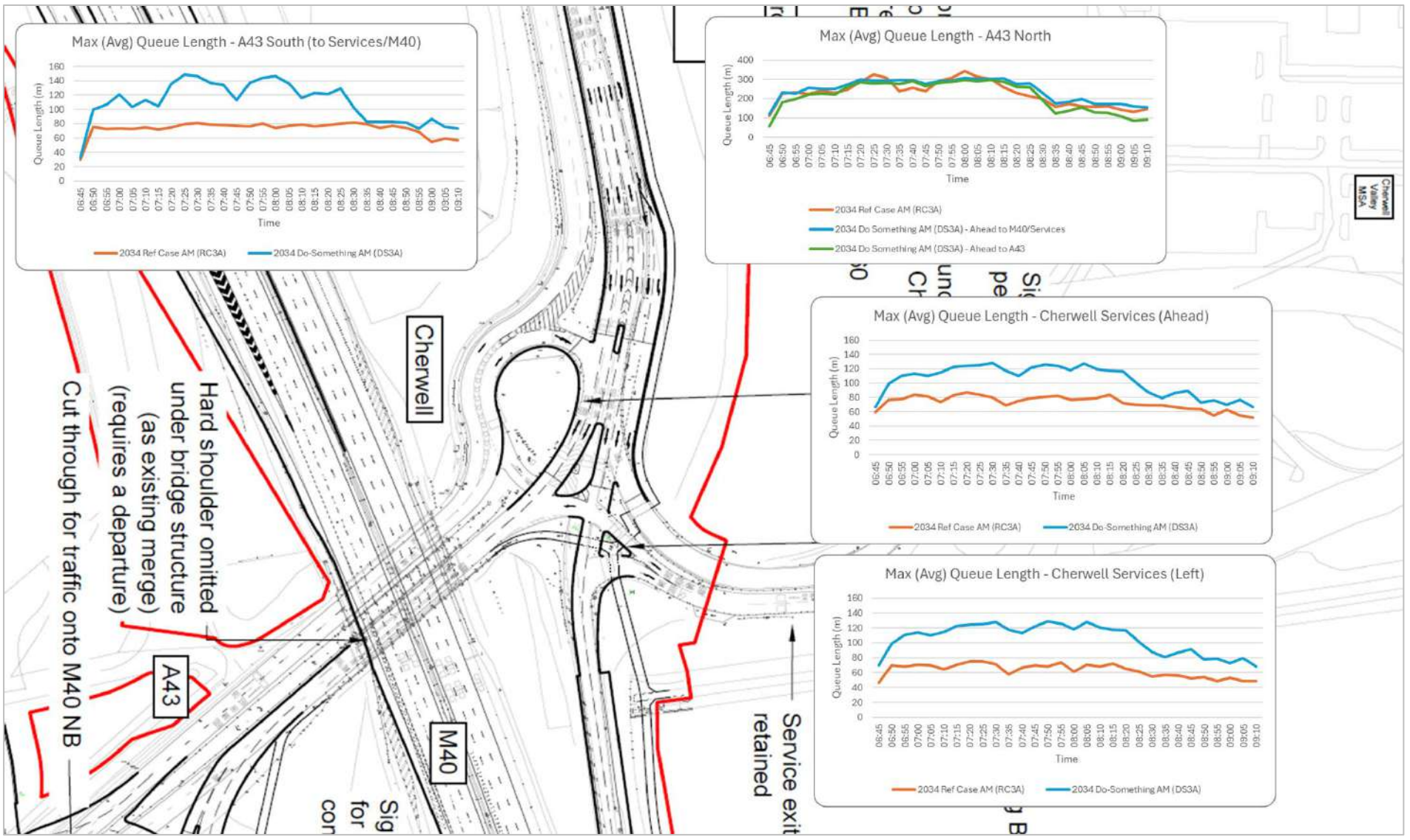


FIGURE 5.30: MAXIMUM (AVERAGE) QUEUE LENGTHS – 2034 RC3A&DS3A – AM – CHERWELL

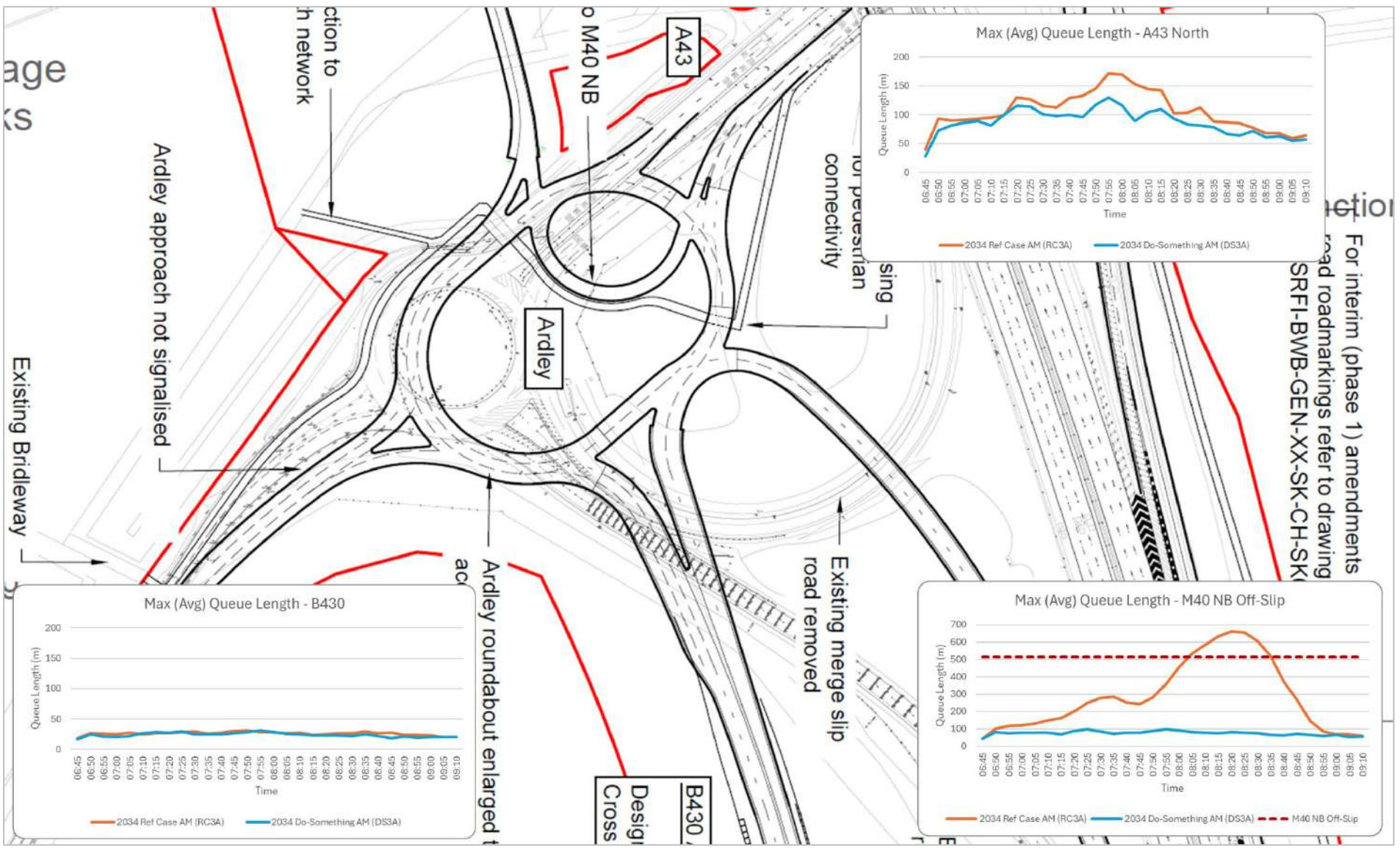


FIGURE 5.31: MAXIMUM (AVERAGE) QUEUE LENGTHS – 2034 RC3A&DS3A – AM – ARDLEY

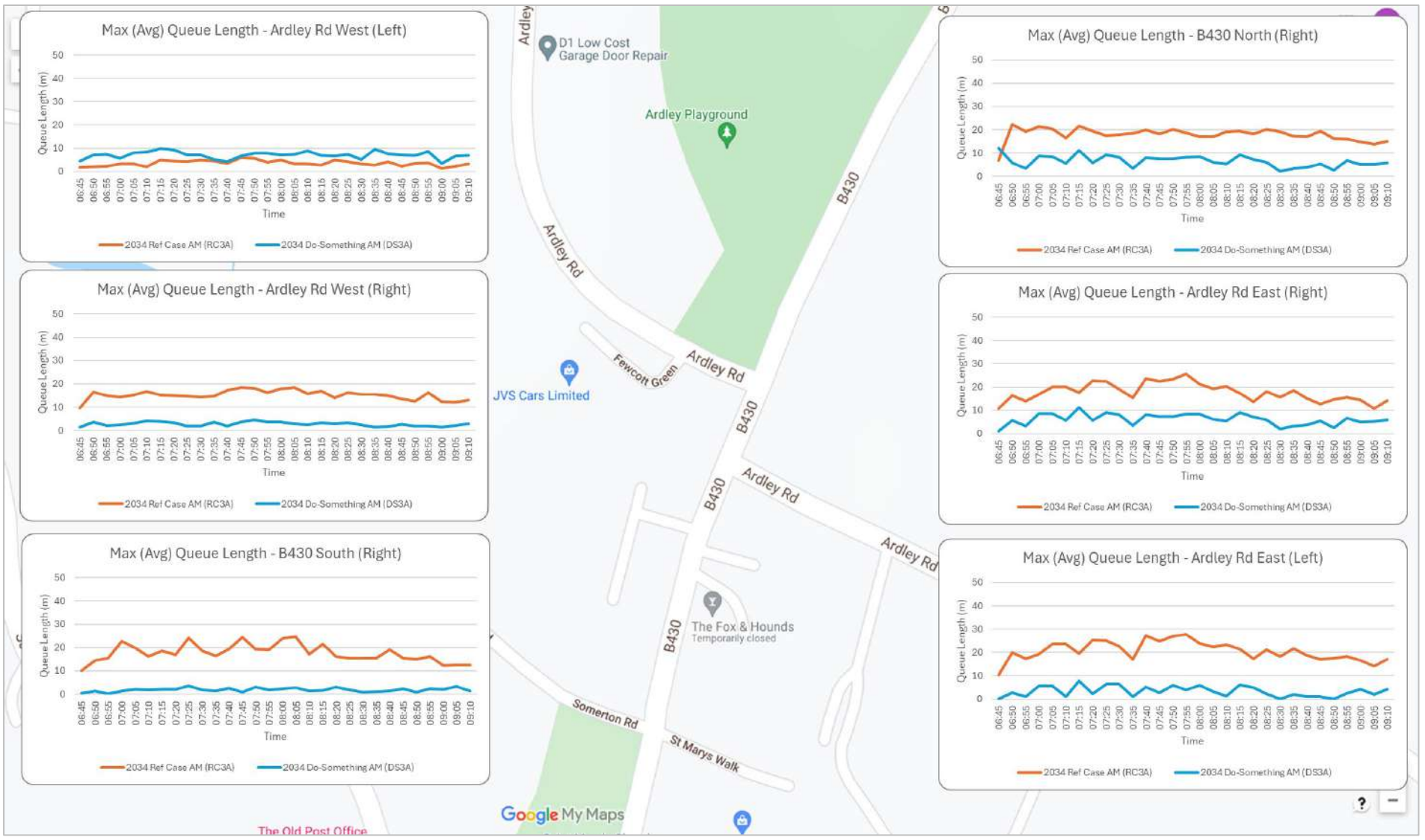


FIGURE 5.32: MAXIMUM (AVERAGE) QUEUE LENGTHS – 2034 RC3A&DS3A – AM – ARDLEY CROSSROADS

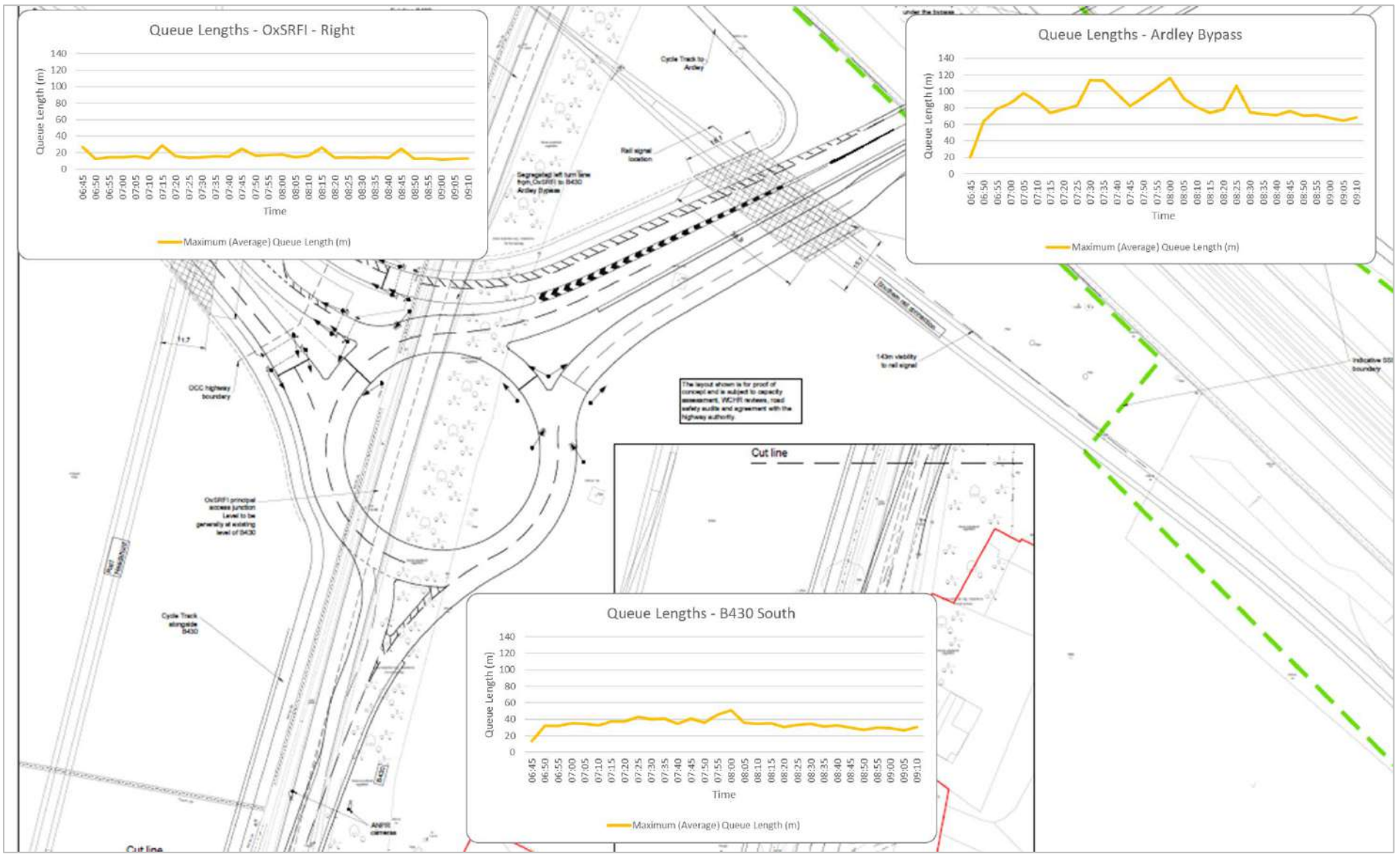


FIGURE 5.33: MAXIMUM (AVERAGE) QUEUE LENGTHS – 2034 RC3A&DS3A – AM – OXSRFI/ARDLEY BYPASS

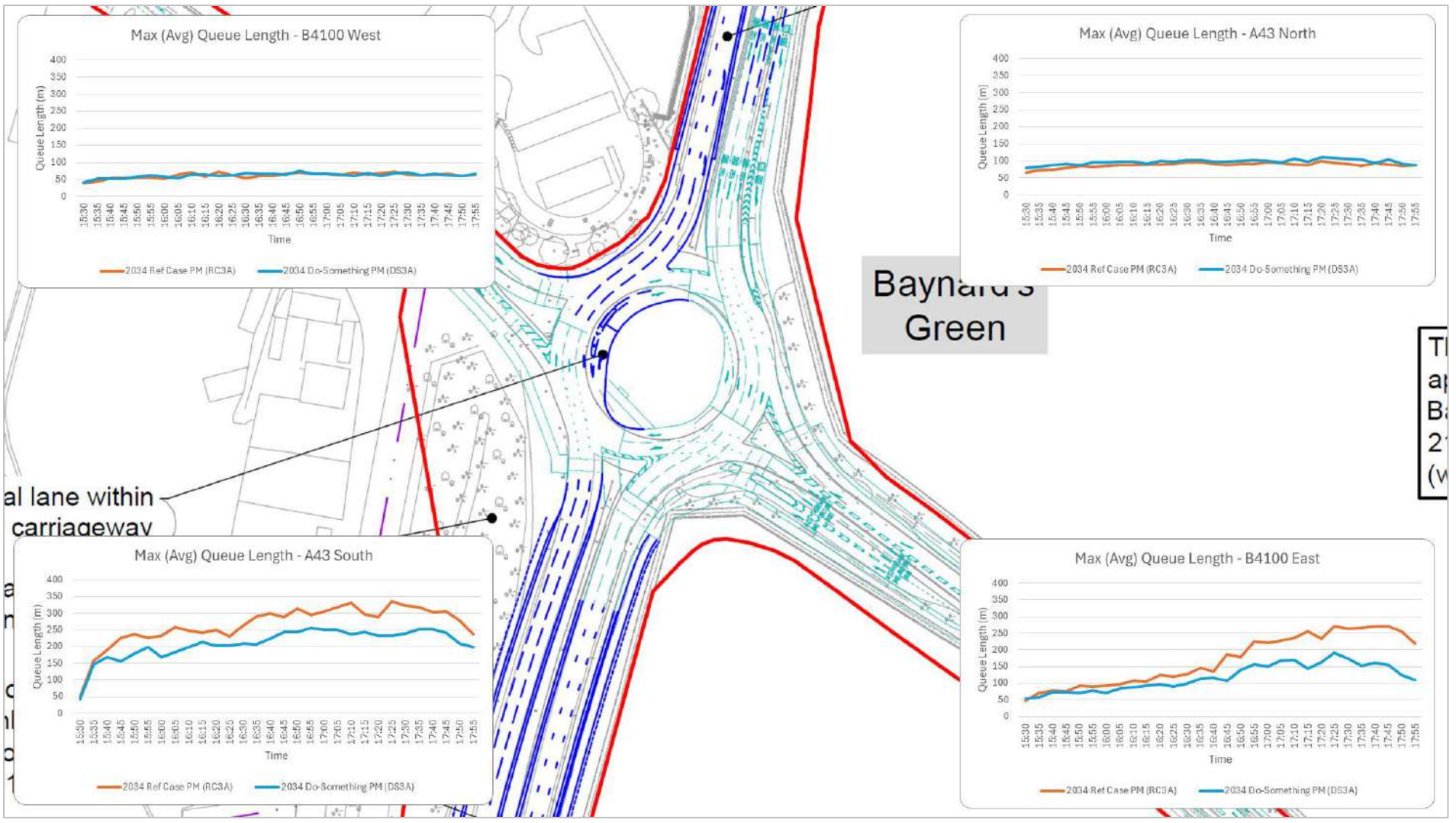


FIGURE 5.34: MAXIMUM (AVERAGE) QUEUE LENGTHS – 2034 RC3A&DS3A – PM – BAYNARD'S GREEN

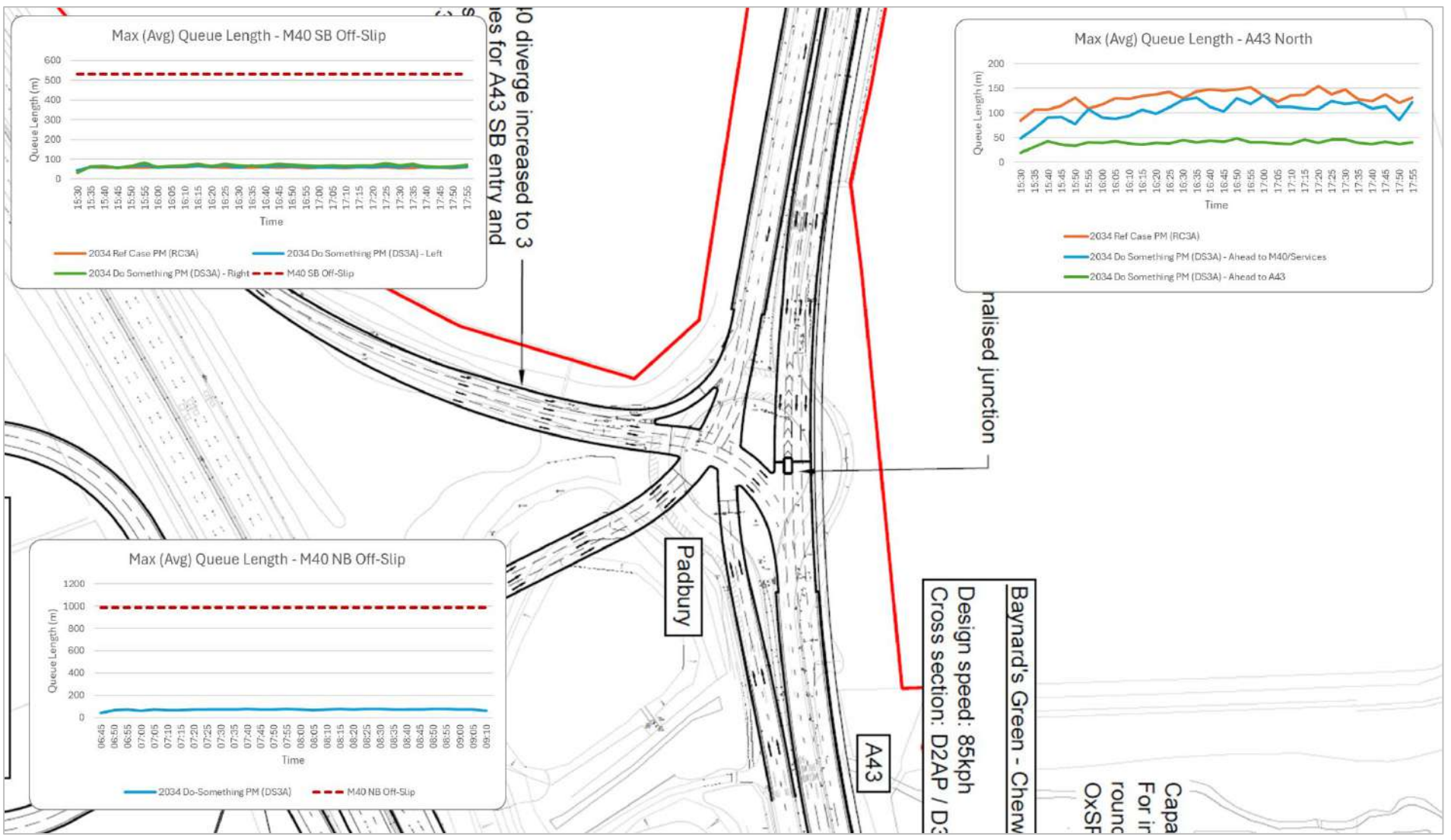


FIGURE 5.35: MAXIMUM (AVERAGE) QUEUE LENGTHS – 2034 RC3A&DS3A – PM – PADBURY

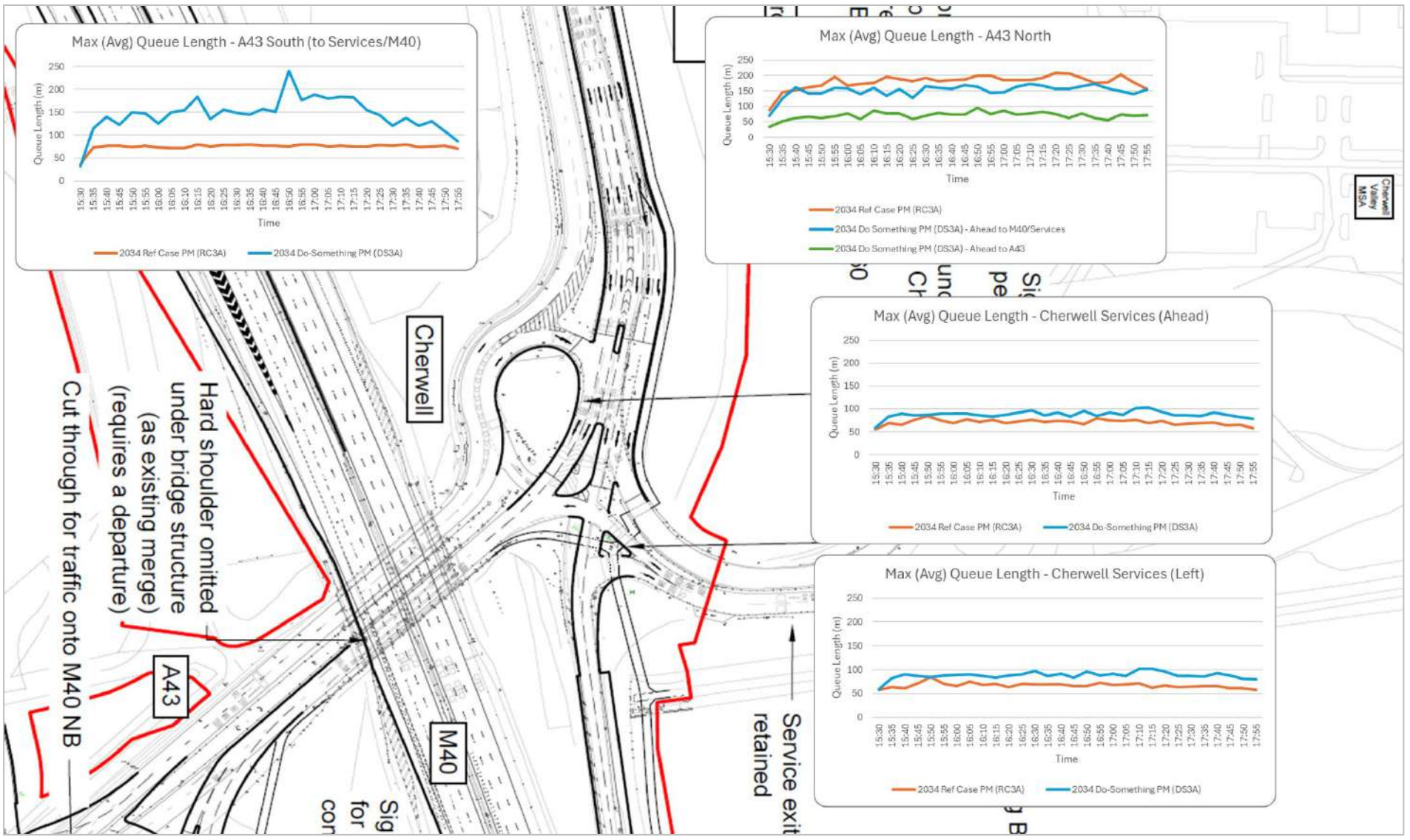


FIGURE 5.36: MAXIMUM (AVERAGE) QUEUE LENGTHS – 2034 RC3A&DS3A – PM – CHERWELL

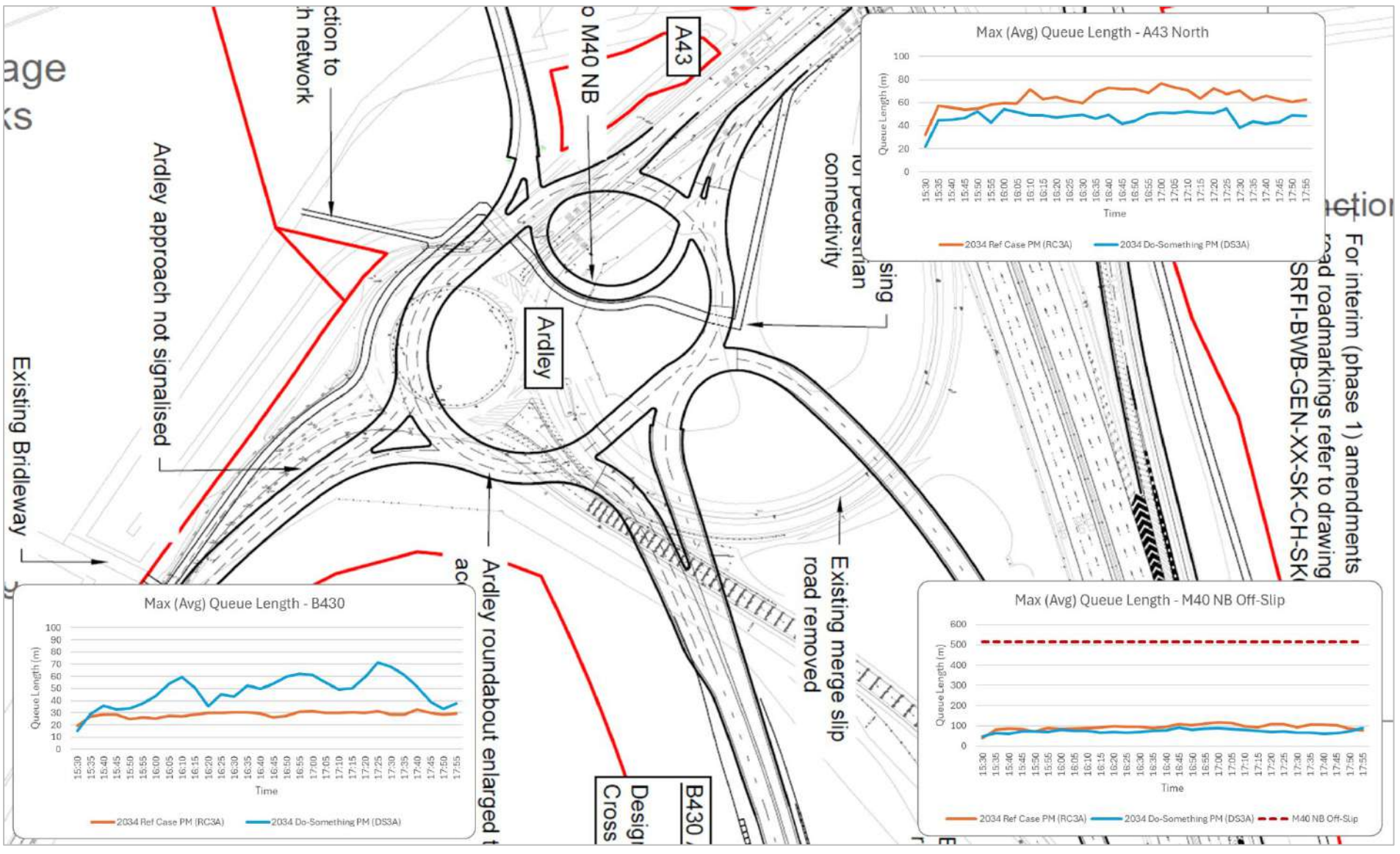


FIGURE 5.37: MAXIMUM (AVERAGE) QUEUE LENGTHS – 2034 RC3A&DS3A – PM – ARDLEY

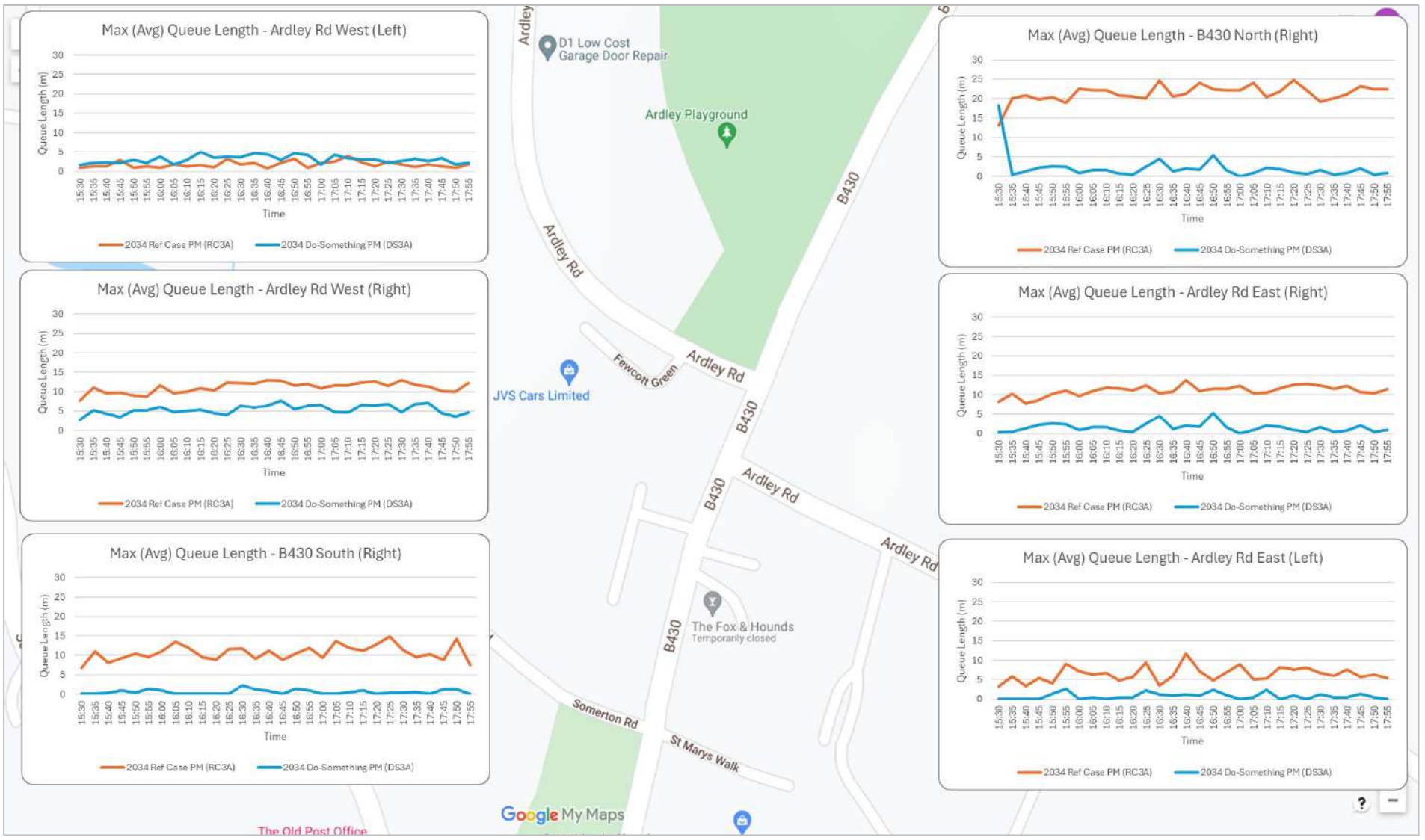


FIGURE 5.38: MAXIMUM (AVERAGE) QUEUE LENGTHS – 2034 RC3A&DS3A – PM – ARDLEY CROSSROADS

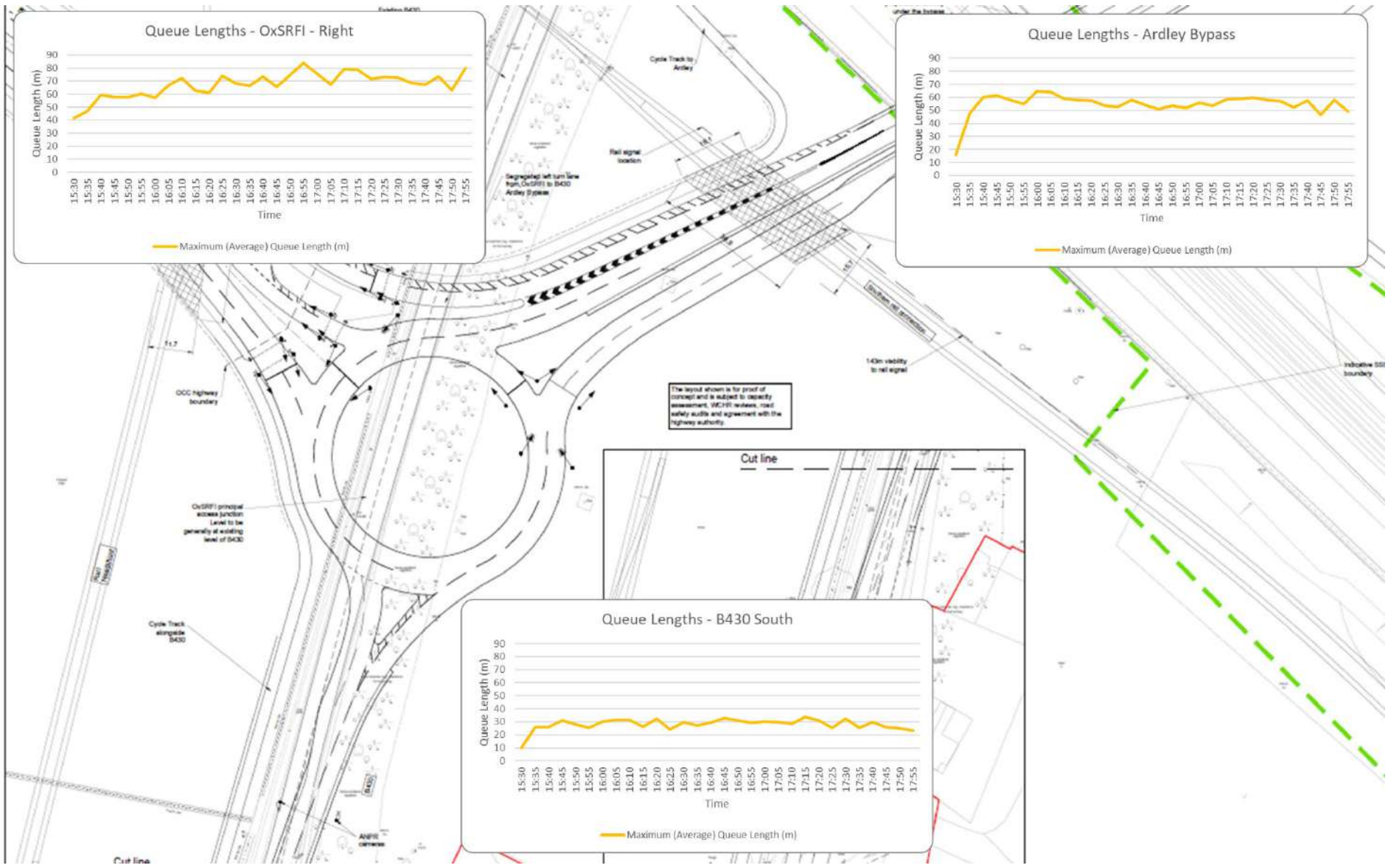


FIGURE 5.39: MAXIMUM (AVERAGE) QUEUE LENGTHS – 2034 RC3A&DS3A – PM – OXSRFI/ARDLEY BYPASS

AM Peak Queue Analysis

Baynard's Green Roundabout

5.5.19 At Baynard's Green roundabout, the Do-Something scenario exhibits longer queues on two approaches compared to the Reference Case. The A43 North approach experiences maximum queues of approximately 250 metres (compared to ~150 metres in the Reference Case), whilst the B4100 West approach shows queues reaching approximately 250 metres (compared to ~70 metres in the Reference Case).

5.5.20 These queue increases are attributable to the interaction between additional OxSRFI traffic entering from the A43 North and the signal timing optimisation strategy. To accommodate the higher A43 corridor flows whilst preventing capacity exceedance, signal green time is preferentially allocated to the A43 North approach. This green time is necessarily taken from the B4100 approaches, resulting in increased queuing on the B4100 West arm. This represents a deliberate operational prioritisation of the higher-flow strategic A43 corridor over the lower-flow local B4100 movements.

5.5.21 Queues on the B4100 East approach remain similar between scenarios (~75 metres), and that even with increased B4100 West queuing, these queues do not extend back to the Albion Land junction located approximately 340 metres upstream. The signal strategy therefore successfully balances competing demands whilst maintaining acceptable operation across all approaches.

Padbury Junction

5.5.22 At Padbury junction, queue lengths demonstrate comparable performance between scenarios on the primary A43 corridor approaches. The A43 North and M40 southbound off-slip approaches show similar queuing in both Reference Case and Do-Something scenarios, with critically no queuing extending back to the M40 mainline from the southbound off-slip. This confirms that the reconfigured Padbury junction to 4-arm signalised junction successfully manages the A43 corridor flows.

5.5.23 For the Do-Something scenario, the new M40 northbound off-slip connecting to Padbury exhibits maximum queues of approximately 60 metres, well within the slip road length and confirming no mainline interaction risk.

Cherwell Junction

5.5.24 At Cherwell junction, queue behaviour on the A43 North approach remains similar between scenarios.

5.5.25 On the A43 South approach (turning towards Cherwell Services and M40), queues in the Do-Something scenario extend to approximately 150 metres compared to 80 metres in the Reference Case. As in the DS1A analysis, this is attributed to a change in lane configuration on this approach. In the Do-Something scenario, this approach is reconfigured such that the off-side lane is now a dedicated lane for traffic turning right at Cherwell junction (i.e. towards Cherwell Services or the M40 South). The nearside lane continues to serve A43 northbound traffic, but the traffic flow is significantly reduced for this movement, as M40 to A43 northbound traffic uses the new M40 off-slip that joins Padbury junction in the Do-Something scenario. This is part of the highway mitigation strategy to accommodate the additional OxSRFI traffic (travelling to the M40 southbound), with the proposed highway layout designed to accommodate this increased demand and queue.

5.5.26 Queues at Cherwell Services are longer in the Do-Something scenario, reaching lengths of approximately 130 metres, compared to 85 metres in the Reference Case. This is the result of additional green time needing to be given to the heavier A43 southbound movement, which in turn reduces the green time available to exit the services.

Ardley Roundabout

5.5.27 At Ardley roundabout, the Do-Something scenario delivers substantial queue reductions on the critical M40 northbound off-slip. Reference Case queuing extends approximately 660 metres back from the roundabout towards the M40 mainline, creating operational issues and safety risks. The Do-Something scenario, with traffic reassignment to the new Padbury off-slip and enhanced Ardley junction capacity, reduces queuing to approximately 100 metres – an 85% reduction. This eliminates mainline interaction risks entirely and represents the most significant operational benefit of the mitigation package.

5.5.28 The A43 North approach also experiences reduced queuing in the Do-Something scenario (~120 metres compared to ~170 metres in the Reference Case), attributable to improved traffic management southbound through the enhanced Ardley and Cherwell junctions.

5.5.29 Queues on the B430 approach remain at similar levels between scenarios.

Ardley Village Crossroads

5.5.30 At the Ardley crossroads within Ardley village, queues either remain similar or reduce in the Do-Something scenario. This improvement results from two factors: reduced traffic using the village itself, and the stopping up of B430 south of Ardley

village, which diverts through-traffic to the new Ardley bypass link. This delivers a local amenity benefit by reducing traffic impacts within the village.

OxSRFI Access/Ardley Bypass Roundabout

5.5.31 Whilst no direct comparison with the Reference Case can be made (this junction exists only in the Do-Something scenario), the queuing levels at the OxSRFI site access and Ardley bypass roundabout are presented to demonstrate acceptable operation of this new infrastructure.

5.5.32 Maximum queues of approximately 120 metres occur on the Ardley Bypass approach (just beyond the two-lane section length). Queues on the B430 South approach reach approximately 50 metres, with the OxSRFI access arm experiencing maximum queues of approximately 30 metres. These queue levels indicate no capacity constraints at this junction and confirm that the signalised roundabout operates acceptably under AM peak demand conditions.

PM Peak Queue Analysis

Baynard's Green Roundabout

5.5.33 In the PM peak, the A43 South approach queues are reduced in the Do-Something scenario (~260 metres compared to ~335 metres in the Reference Case, a 22% reduction). The B4100 East approach also experiences reduced queuing (up to 190 metres compared to ~270 metres, a 30% reduction). In both cases, this is attributable to the improvements at this junction as part of the OxSRFI development. The additional lane on the A43 North exit and increased number of lanes on the western circulatory prove beneficial in allowing more vehicles to progress through the junction, reducing queues as a result.

5.5.34 Critically, queues on the B4100 East in the Do-Something scenario, do not extend back to the Albion Land junction located approximately 250 metres upstream, confirming adequate capacity separation. This is a notable improvement over the Reference Case, which shows that there would be interaction issues between these junctions.

5.5.35 Queues on the A43 North and B4100 West approaches remain comparable between scenarios.

Padbury Junction

5.5.36 PM peak queue lengths at Padbury remain similar between scenarios on the A43 North and M40 southbound off-slip approaches, with no queuing extending back to the M40 mainline. The new M40 northbound off-slip in the Do-Something

scenario shows maximum queues of approximately 75 metres, well contained within the slip road length.

Cherwell Junction

5.5.37 Queue behaviour at Cherwell in the PM peak shows benefits on the A43 North approach, where queues reduce from approximately 210 metres (Reference Case) to 175 metres (Do-Something), attributable to the additional lanes on the A43 southbound link providing increased queuing capacity.

5.5.38 On the A43 South approach (turning to Services/M40), queues increase from approximately 80 metres to 240 metres (as a worst case) in the Do-Something scenario. As in the AM peak, this is the result of the new lane configuration, with a dedicated lane now created to accommodate this queue for the A43 northbound and for travelling to the Services and M40 South.

Queues from the Cherwell Services arm show slightly increased levels in the Do-Something scenario, reaching up to 100 metres compared to 85 metres in the Reference Case. As in the AM peak, this is a result of the need to allocate additional green time to heavier southbound movement.

Ardley Roundabout

5.5.39 The PM peak demonstrates continued benefits on the A43 North at Ardley, with queues reducing from approximately 80 metres in the Reference Case to 55 metres in the Do-Something.

5.5.40 The M40 northbound off-slip shows similar queuing between the scenarios, with the mitigation scheme associated with the OxSRFI development able to accommodate all traffic on the approach without any M40 mainline interaction concerns.

5.5.41 On the B430 approach queues increase from 30 metres in the Reference Case to up to 70 metres in the Do-Something scenario. This is attributed to increased traffic flows around Ardley (through the larger junction and other signalised nodes). This results in increased waiting times on the B430 approach, however the intergreen times from the signals provide more defined gaps for drivers to progress (in comparison to the Reference Case where it is harder for drivers to judge suitable gaps).

Ardley Village and OxSRFI Access

5.5.42 Ardley village crossroads queuing remains similar or reduces in the Do-Something scenario (consistent with AM peak findings), confirming local amenity benefits from traffic reassignment to the Ardley bypass.

5.5.43 At the OxSRFI site access roundabout, PM peak maximum queues reach approximately 85 metres on the OxSRFI access arm and 65 metres on the Ardley Bypass arm, with B430 South queues of approximately 30 metres. These levels indicate acceptable junction operation with no capacity constraints.

Network Performance Results

5.5.44 The network performance comparisons for the AM and PM peaks are shown in **Table 5.19** and **Table 5.20**.

All Vehicles			
2034 AM			
Scenario	Average Delay per Vehicle (s)	Average Speed (mph)	Latent Demand
2034 Reference Case (RC3A)	65	48	0
2034 Do-Something (DS3A)	59	47	0

TABLE 5.19: NETWORK PERFORMANCE – 2034 RC3A&DS3A – AM

5.5.45 The AM peak results show that the proposed OxSRFI development and the package of improvement schemes will provide a modest improvement in the average delay per vehicle (-6s) and will maintain a similar average network speed (47-48mph). The improvements in delays should also be viewed in the context that the Do-Something network adds more signalised junctions to the model extents. Whilst these inevitably cause vehicles to stop as they progress on their journey, the results indicate that the traffic is managed more effectively as they travel through the modelled network. The Do-Something scenario also includes for reductions in speeds limits within Ardley and on the A43 between Ardley roundabout and Padbury junction.

5.5.46 There also remains no latent demand in the network, which indicates that all vehicles can enter the network and complete their journeys.

All Vehicles			
2034 PM			
Scenario	Average Delay per Vehicle (s)	Average Speed (mph)	Latent Demand
2034 Reference Case (RC3A)	52	51	3
2034 Do-Something (DS3A)	61	47	2

TABLE 5.20: NETWORK PERFORMANCE – 2034 RC3A&DS3A – PM

5.5.47 In the PM peak, the introduction of the proposed OxSRFI development has a modest increase in the average delay per vehicle (+9s), whilst also having a similar average network speed (47-51mph). The changes are expected as the Do-Something network features more signalised junctions, which inevitably add delays to vehicles who have to stop as they progress on their journey. The Do-

Something scenario also includes for reductions in speeds limits within Ardley and on the A43 between Ardley roundabout and Padbury junction.

5.5.48 The PM peak also shows a very small amount of latent demand in both scenarios. This is located at the M40 South entry (on review of the Parking Lot output results) and is attributed to the stochastic nature of the flow input into the model. The numbers are negligible and doesn't affect the assessment conclusions.

Summary of 2034 Model Performance Analysis

5.5.49 Reference Case and Do-Something scenarios were developed for the 2034 future year completion scenario, using strategic traffic flows provided by ADC Infrastructure Ltd from the Bicester Transport Model (BTM). Comprehensive performance metrics were extracted, including journey times, queue lengths, junction performance, and network-wide operational statistics.

Strategic M40 Corridor

5.5.50 The primary finding is that the OxSRFI development mitigation schemes deliver benefits to the M40 northbound corridor, eliminating operational issues in the Reference Case.

5.5.51 In the 2034 Reference Case, M40 northbound off-slip queuing at Ardley roundabout extends approximately 660 metres beyond the length of the slip road and onto the motorway mainline during the AM peak, with journey times of 3 minutes 19 seconds to traverse the 858-metre section from M40 to Ardley. This represents a severe capacity constraint with significant strategic road network safety implications.

5.5.52 The Do-Something scenario, incorporating the new M40 northbound off-slip at Padbury and comprehensive Ardley roundabout upgrades, reduces M40 off-slip queuing to approximately 100 metres (86% reduction) and journey times to 54 seconds (79% improvement, saving 3 minutes 19 seconds). This eliminates mainline safety risks entirely and delivers essential strategic network protection.

Network-Wide Performance

5.5.53 Network performance metrics demonstrate that the Do-Something scenario, despite accommodating additional OxSRFI development traffic, delivers operation comparable to the Reference Case baseline:

- AM Peak: Average vehicle delay reduces from 65 seconds to 59 seconds, with average network speed similar at 47-48 mph
- PM Peak: Average vehicle delay increases from 52 seconds to 61 seconds, with average network speed reducing from 51 mph to 47 mph

5.5.54 These changes should be interpreted in context. The Do-Something network introduces additional signalised junctions (Padbury reconfigured, Ardley signalised, OxSRFI site access), which inevitably add stopped time to some journeys. However, the network performance data demonstrate effective traffic management, with the strategic M40 corridor benefits far outweighing these operational trade-offs. Zero or negligible latent demand in both scenarios confirms network capacity sufficiency.

Localised Effects

5.5.55 Beyond the strategic corridor benefits, the assessment identifies the following localised effects:

- Positive localised effects include reduced queuing within Ardley village (traffic reassignment to Ardley bypass), modest journey time improvements on A43 northbound (Padbury to Baynard's Green: -8 seconds PM peak), and effective queue management at the new OxSRFI site access roundabout (maximum queues 30-120 metres, no capacity constraints).
- Other localised effects include increased journey times from Ardley to Cherwell northbound (28-51 seconds AM/PM peaks – albeit for a significantly lower traffic flows as the new off-slip joining Padbury transfers northbound trips to the A43 North away from Ardley and Cherwell), increased journey times from Cherwell Services to A43 North (+1 minute 48 seconds PM peak – resulting from the removal of direct right-turn lane, necessitating a right turn at Ardley), and increased journey times from routes originating within Ardley village (up to 2 minutes 29 seconds in the PM peak) – attributable to signalisation of other arms of Ardley roundabout resulting in increased waiting times on the B430 approach (although drivers have more defined gaps to progress during intergreen periods), along with a reduction in the speed limits in this section of the network.

Assessment of Localised Effects

5.5.56 The localised effects do not constitute severe or unacceptable impacts. Journey time changes for the majority of movements remain within ±60 seconds, indicating that driver experience across the wider network remains largely comparable. Queue increases remain contained within approach capacities and create no network blocking risks.

5.5.57 In the context of the strategic benefits — addressing M40 mainline capacity constraints and associated safety concerns — these localised operational trade-offs are considered acceptable. The findings support the conclusion that the

mitigation package delivers acceptable network performance whilst providing the above operational and safety related strategic infrastructure benefits and accommodating the additional traffic from the OxSRFI development.

5.6 Scenario Comparison Analysis – 2031 RC2A & 2031 DS2A

Overview

5.6.1 The fourth comparative analysis examines the 2031 Do-Something (DS2A) scenario against the 2031 Reference Case (RC2A) scenario.

5.6.2 This is the Opening Year assessment following the completion of Phase 1 of the proposed OxSRFI development, against the associated 2031 Reference Case.

Journey Time Results – AECOM TN Comparisons

5.6.3 The journey time comparisons for the routes associated with Set 1 can be seen in **Table 5.21** and **Table 5.22**.

AM Peak

5.6.4 The main conclusion with the 2031 DS2A/RC2A scenarios is that the mitigation schemes associated with Phase 1 of the OxSRFI development delivers a positive impact on vehicles travelling northbound from the M40 and travelling towards Ardley roundabout (a 1-minute 5 second (-54%) decrease in journey time). Whilst the queues on the off-slip in RC2A do not reach back to the mainline, there is an improvement in DS2A as a result of the mitigation proposals.

5.6.5 The other movement of note is from Ardley roundabout to Cherwell junction, where there is a 24 second increase in journey times. This is the result of the reconfigured Ardley roundabout, which is now both bigger in size and signalised, meaning vehicles have to travel a slightly longer distance to go northbound, as well as negotiate two new signalised nodes (the M40 off-slip/circulatory node and the new M40 on-slip/cut through node). Unlike the DS1A and DS3A scenarios, the DS2A scenario does not include the new M40 northbound off-slip that joins at Padbury junction. This means that there is no reassignment of traffic, with all northbound traffic required to travel on the A43 through Ardley, Cherwell and Padbury junctions.

5.6.6 All other movements in the AM peak have journey time differences of ±1-7s, which are unlikely to be noticed when driving these routes.

PM Peak

5.6.7 In the PM peak, the most notable impact is a 31-second increase from Ardley to Cherwell. This is related to the same reasons as the AM peak, where the larger Ardley roundabout and accompanying signals means more delays to progress through the junction (as well as no new off-slip in this scenario to take traffic away from the A43 northbound link).

5.6.8 All other movements in the PM peak have journey time differences of ±1-6s, which are unlikely to be noticed when driving these routes.

ALL VEHICLES									
No.	Route			2031 RC2A		2031 DS2A		Difference (JTs)	
	From	To	Dist.	Avg.	Trips	Avg.	Trips	No.	%
1	SB1 - A43 North	SB1 - Baynards Green	424m	00:00:41	1904	00:00:42	2011	00:00:01	▲ 3%
2	SB2 - Baynards Green	SB2 - Padbury	718m	00:00:57	1798	00:01:04	1912	00:00:07	▲ 11%
3	SB3 - Padbury	SB3 - Cherwell	347m	00:00:46	2096	00:00:50	1321	00:00:04	▲ 10%
4	SB4 - Cherwell	SB4 - M40 On-Slip	154m	00:00:18	1319	00:00:13	1364	-00:00:05	▼ 30%
5	SB5 - M40 On-Slip	SB5 - M40	862m	00:00:42	1541	00:00:47	1609	00:00:05	▲ 12%
6	NB1 - M40	NB1 - Ardley	858m	00:02:00	1365	00:00:55	1386	-00:01:05	▼ 54%
7	NB2 - Ardley	NB2 - Cherwell	376m	00:00:32	1352	00:00:56	1330	00:00:24	▲ 75%
8	NB3 - Cherwell	NB3 - Padbury	373m	00:00:32	1322	00:00:35	1306	00:00:03	▲ 9%
9	NB4 - Padbury	NB4 - Baynards Green	664m	00:00:55	1388	00:00:56	1371	00:00:01	▲ 1%
10	NB5 - Baynards Green	NB5 - A43 North	521m	00:00:29	1304	00:00:31	1275	00:00:02	▲ 5%

TABLE 5.21: JOURNEY TIME COMPARISONS (SET 1) – 2031 RC2A&DS2A – AM

ALL VEHICLES									
No.	Route			2031 RC2A		2031 DS2A		Difference (JTs)	
	From	To	Dist.	Avg.	Trips	Avg.	Trips	No.	%
1	SB1 - A43 North	SB1 - Baynards Green	424m	00:00:38	1529	00:00:38	1533	00:00:01	▲ 2%
2	SB2 - Baynards Green	SB2 - Padbury	718m	00:00:53	1459	00:00:50	1459	-00:00:03	▼ 6%
3	SB3 - Padbury	SB3 - Cherwell	347m	00:00:42	1835	00:00:44	1328	00:00:02	▲ 5%
4	SB4 - Cherwell	SB4 - M40 On-Slip	154m	00:00:18	1291	00:00:13	1364	-00:00:04	▼ 24%
5	SB5 - M40 On-Slip	SB5 - M40	862m	00:00:40	1549	00:00:45	1626	00:00:06	▲ 14%
6	NB1 - M40	NB1 - Ardley	858m	00:00:48	1882	00:00:48	1983	00:00:01	▲ 2%
7	NB2 - Ardley	NB2 - Cherwell	376m	00:00:31	1860	00:01:03	1889	00:00:31	▲ 99%
8	NB3 - Cherwell	NB3 - Padbury	373m	00:00:32	1808	00:00:37	2061	00:00:06	▲ 18%
9	NB4 - Padbury	NB4 - Baynards Green	664m	00:01:09	1888	00:01:06	2149	-00:00:04	▼ 5%
10	NB5 - Baynards Green	NB5 - A43 North	521m	00:00:29	1820	00:00:33	2043	00:00:04	▲ 13%

TABLE 5.22: JOURNEY TIME COMPARISONS (SET 1) – 2031 RC2A&DS2A – PM

Journey Time Results – O-D Pair Comparisons

5.6.9 Where journey time comparisons can be made for the routes associated with Set 2, these are shown in **Table 5.23** and **Table 5.24**, with the full suite of O-D pair results shown in **Appendix J.**

AM Peak

5.6.10 From a review of the O-D pair journey time comparisons, the most notable impacts are improvements form the M40 South, with savings ranging from 36 seconds to 1 minute. This is the result of the improvements at Ardley roundabout and the reduced queues on the M40 northbound off-slip as a result (even without the new M40 northbound off-slip that joins Padbury, which is not part of the Phase 1 works).

5.6.11 The most notable impacts are from Ardley Road East to the M40 North and A43 North, along with the reverse movements from the M40 North and A43 North to Ardley Road East. For these movements, the increases are in the range of 55 seconds to 1 minute 7 seconds. There are two main elements which lead to these increases. Firstly, there are increased traffic flows around Ardley roundabout due to the combination of the larger junction and the signalisation of the other arms. Whilst this results in drivers on the B430 having to wait for additional time to enter the roundabout, the intergreen times from the signals provide more defined gaps for drivers to progress (in comparison to the Reference Case where it is harder for drivers to judge suitable gaps). Secondly, there is also now a change in the speed limit on the B430 to 40mph and then 20mph through Ardley village (which was previously a national speed limit and 30mph through the village).

5.6.12 Elsewhere, where journey times can be compared, the changes are all ±45s, which indicates that Phase 1 of the proposed SRFI development will lead to a network performance similar to the future baseline Reference Case.

PM Peak

5.6.13 In the PM peak, the most notable changes in journey times are increases in the range of 1 minute 42 seconds to 3 minutes 13 seconds from Ardley Road East and Ardley Road West to the M40 North and A43 North. The times are linked to a large increased queue length on the B430 approach to Ardley roundabout, with vehicles on the approach taking longer to enter the circulatory due to increase numbers of vehicles travelling around the junction, which limits the opportunities for vehicles to pull out (whilst also acknowledging that the signals provide more defined gaps in the intergreen periods for when vehicles can progress). The

change in speed limits are also a factor, as vehicles have to travel slower through Ardley village and on the B430 link to Ardley roundabout.

5.6.14 The reverse direction of traffic travelling from the A43 North and M40 North to Ardley Road East and West have journey times that are increased by 42 seconds to 1 minute 13 seconds. This is a combination of having to travel through additional signal stop-lines at Ardley roundabout, along with the change in speed limits on the B430 on the approach to and through Ardley village.

5.6.15 Elsewhere, the changes in journey times are all ±50s, which indicates that the proposed SRFI development and the associated mitigation schemes will lead to a network performance similar to the Reference Case.

ALL VEHICLES									
No.	Route			2031 RC2A		2031 DS2A		Difference (JTs)	
	From	To	Dist.	Avg.	Trips	Avg.	Trips	No.	%
2	A43 North	B4100 East	1220 m	00:01:27	405	00:01:27	421	00:00:00	▲ 0%
3	A43 North	Cherwell Services	2045 m	00:03:06	63	00:03:06	61	00:00:00	▲ 0%
4	A43 North	M40 South	5269 m	00:05:11	1247	00:05:22	1270	00:00:11	▲ 3%
7	A43 North	B4100 West	1216 m	00:02:01	40	00:02:01	40	00:00:00	▲ 0%
9	A43 North	Ardley Rd East	3374 m	00:04:22	44	00:05:17	44	00:00:55	▲ 21%
13	B4100 East	A43 North	1298 m	00:02:07	222	00:02:06	215	-00:00:01	▼ 1%
18	B4100 East	M40 North	7047 m	00:06:26	181	00:07:09	37	00:00:43	▲ 11%
19	B4100 East	B4100 West	915 m	00:02:05	205	00:02:05	280	00:00:00	▲ 0%
25	Cherwell Services	A43 North	2062 m	00:03:10	62	00:03:08	62	-00:00:01	▼ 1%
28	Cherwell Services	M40 South	5550m	00:03:14	209	00:03:31	241	00:00:17	▲ 9%
30	Cherwell Services	M40 North	5726 m	00:04:35	150	00:05:17	147	00:00:43	▲ 15%
37	M40 South	A43 North	5550 m	00:06:09	1081	00:05:33	1071	-00:00:36	▼ 10%
39	M40 South	Cherwell Services	4071 m	00:05:18	227	00:04:18	224	-00:01:00	▼ 19%
41	M40 South	B430	5013 m	00:05:28	1	00:04:43	3	-00:00:45	▼ 14%
42	M40 South	M40 North	8281 m	00:04:43	2984	00:04:44	2956	00:00:00	▲ 0%
43	M40 South	B4100 West	5167 m	00:06:04	8	00:05:27	4	-00:00:38	▼ 10%
44	M40 South	Ardley Rd West	3927 m	00:04:18	14	00:03:24	12	-00:00:54	▼ 21%
57	B430	Ardley Rd East	2045 m	00:01:51	72	00:02:33	22	00:00:41	▲ 37%
62	M40 North	B4100 East	5836 m	00:05:15	223	00:05:24	212	00:00:09	▲ 3%
63	M40 North	Cherwell Services	5231 m	00:04:44	192	00:04:44	190	-00:00:00	▼ 0%
64	M40 North	M40 South	8295 m	00:04:56	3672	00:04:56	3678	00:00:00	▲ 0%
67	M40 North	B4100 West	5635 m	00:04:48	23	00:04:51	4	00:00:03	▲ 1%
68	M40 North	Ardley Rd West	5905 m	00:05:26	12	00:06:01	12	00:00:35	▲ 11%
69	M40 North	Ardley Rd East	6561 m	00:05:52	59	00:06:48	64	00:00:56	▲ 16%
73	B4100 West	A43 North	1116 m	00:01:41	58	00:01:40	65	-00:00:00	▼ 0%
74	B4100 West	B4100 East	934 m	00:01:53	316	00:01:52	266	-00:00:01	▼ 1%
76	B4100 West	M40 South	4983 m	00:05:25	55	00:05:31	37	00:00:06	▲ 2%
85	Ardley Rd West	A43 North	2697 m	00:03:14	4	00:03:45	4	00:00:31	▲ 16%

ALL VEHICLES									
No.	Route			2031 RC2A		2031 DS2A		Difference (JTs)	
	From	To	Dist.	Avg.	Trips	Avg.	Trips	No.	%
88	Ardley Rd West	M40 South	4442 m	00:04:37	12	00:04:51	17	00:00:14	▲ 5%
90	Ardley Rd West	M40 North	5887 m	00:04:01	10	00:04:47	10	00:00:46	▲ 19%
93	Ardley Rd West	Ardley Rd East	1011 m	00:01:07	64	00:01:29	68	00:00:22	▲ 33%
97	Ardley Rd East	A43 North	3389 m	00:03:41	14	00:04:35	28	00:00:55	▲ 25%
101	Ardley Rd East	B430	2030 m	00:01:58	172	00:02:32	27	00:00:34	▲ 29%
102	Ardley Rd East	M40 North	6579 m	00:04:28	115	00:05:35	229	00:01:07	▲ 25%
104	Ardley Rd East	Ardley Rd West	1014 m	00:00:56	23	00:01:21	30	00:00:24	▲ 43%

TABLE 5.23: JOURNEY TIME COMPARISONS (SET 2) – 2031 RC2A&DS2A – AM

ALL VEHICLES									
No.	Route			2031 RC2A		2031 DS2A		Difference (JTs)	
	From	To	Dist.	Avg.	Trips	Avg.	Trips	No.	%
2	A43 North	B4100 East	1220 m	00:01:23	274	00:01:23	278	00:00:01	▲ 1%
3	A43 North	Cherwell Services	2045 m	00:02:51	104	00:02:40	104	-00:00:11	▼ 6%
4	A43 North	M40 South	5269 m	00:04:49	1215	00:04:50	1231	00:00:01	▲ 0%
7	A43 North	B4100 West	1216 m	00:02:17	38	00:02:14	44	-00:00:04	▼ 3%
8	A43 North	Ardley Rd West	2718 m	00:03:34	4	00:04:17	4	00:00:42	▲ 20%
9	A43 North	Ardley Rd East	3374 m	00:03:57	16	00:04:55	12	00:00:59	▲ 25%
13	B4100 East	A43 North	1298 m	00:02:48	352	00:02:29	331	-00:00:19	▼ 11%
16	B4100 East	M40 South	4968 m	00:05:17	4	00:05:09	8	-00:00:08	▼ 2%
18	B4100 East	M40 North	7047 m	00:06:52	248	00:07:16	38	00:00:24	▲ 6%
19	B4100 East	B4100 West	915 m	00:02:38	204	00:02:22	254	-00:00:16	▼ 10%
20	B4100 East	Ardley Rd West	2417 m	00:04:23	4	00:04:47	4	00:00:24	▲ 9%
25	Cherwell Services	A43 North	2062 m	00:03:14	86	00:03:17	87	00:00:03	▲ 1%
28	Cherwell Services	M40 South	3597 m	00:03:05	261	00:03:16	262	00:00:11	▲ 6%
30	Cherwell Services	M40 North	5726 m	00:04:35	179	00:05:18	178	00:00:43	▲ 16%
37	M40 South	A43 North	5550 m	00:05:14	1579	00:05:53	1635	00:00:39	▲ 12%
38	M40 South	B4100 East	5368 m	00:05:46	4	00:06:36	4	00:00:50	▲ 14%
39	M40 South	Cherwell Services	4071 m	00:04:03	212	00:04:21	209	00:00:18	▲ 7%
41	M40 South	B430	5013 m	00:04:00	4	00:04:41	4	00:00:40	▲ 17%
42	M40 South	M40 North	8281 m	00:04:55	3967	00:04:54	3803	-00:00:01	▼ 0%
43	M40 South	B4100 West	5167 m	00:05:14	28	00:05:44	16	00:00:30	▲ 9%
44	M40 South	Ardley Rd West	3927 m	00:03:06	16	00:03:25	52	00:00:19	▲ 10%
62	M40 North	B4100 East	5836 m	00:05:44	254	00:05:45	259	00:00:00	▲ 0%
63	M40 North	Cherwell Services	5231 m	00:04:39	196	00:04:47	196	00:00:08	▲ 3%
64	M40 North	M40 South	8295 m	00:04:46	3348	00:04:46	3363	00:00:01	▲ 0%
67	M40 North	B4100 West	5635 m	00:05:00	7	00:04:49	6	-00:00:11	▼ 4%
68	M40 North	Ardley Rd West	5905 m	00:05:13	16	00:06:09	16	00:00:56	▲ 18%
69	M40 North	Ardley Rd East	6561 m	00:05:38	25	00:06:51	28	00:01:13	▲ 22%
73	B4100 West	A43 North	1116 m	00:01:53	46	00:01:50	44	-00:00:03	▼ 3%

ALL VEHICLES									
No.	Route			2031 RC2A		2031 DS2A		Difference (JTs)	
	From	To	Dist.	Avg.	Trips	Avg.	Trips	No.	%
74	B4100 West	B4100 East	934 m	00:02:04	143	00:02:01	141	-00:00:03	▼ 2%
76	B4100 West	M40 South	4983 m	00:05:15	32	00:05:13	44	-00:00:02	▼ 1%
85	Ardley Rd West	A43 North	2697 m	00:03:36	8	00:05:18	8	00:01:42	▲ 47%
90	Ardley Rd West	M40 North	5887 m	00:04:12	8	00:07:01	8	00:02:49	▲ 67%
93	Ardley Rd West	Ardley Rd East	1011 m	00:01:02	25	00:01:28	51	00:00:26	▲ 42%
97	Ardley Rd East	A43 North	3389 m	00:04:03	4	00:06:04	48	00:02:00	▲ 50%
101	Ardley Rd East	B430	2030 m	00:01:49	8	00:02:34	4	00:00:45	▲ 42%
102	Ardley Rd East	M40 North	6579 m	00:04:42	54	00:07:55	273	00:03:13	▲ 69%
104	Ardley Rd East	Ardley Rd West	1014 m	00:00:56	35	00:01:22	45	00:00:26	▲ 47%

TABLE 5.24: JOURNEY TIME COMPARISONS (SET 2) – 2031 RC2A&DS2A – PM

Queue Length Results

5.6.16 The mean-maximum queue lengths at Baynard's Green, Padbury, Cherwell, Ardley, Ardley Crossroads and the new Ardley Bypass junction are shown in **Figure 5.40-5.45** for the AM peak and **Figure 5.46-5.51** for the PM peak.

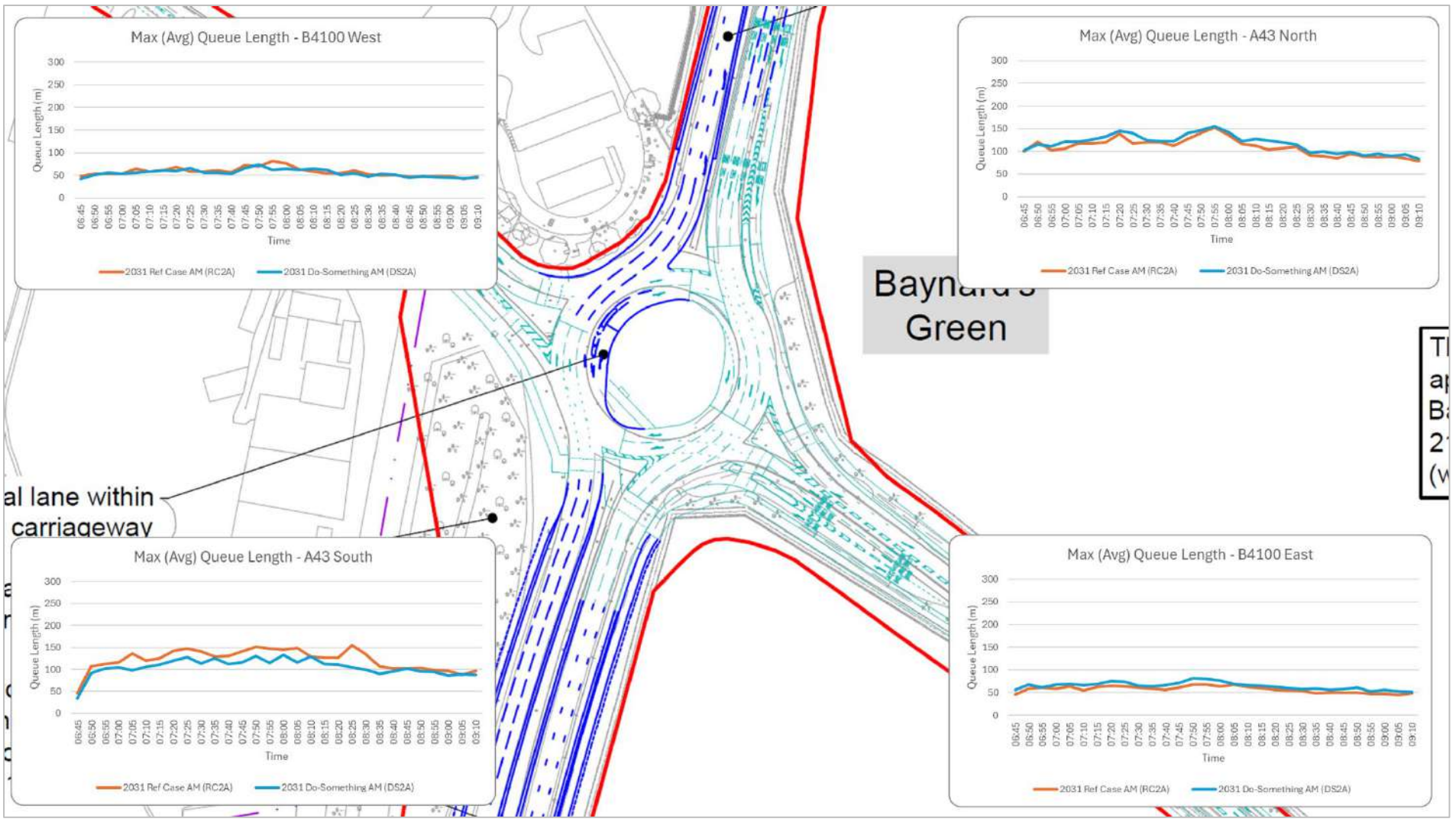


FIGURE 5.40: MAXIMUM (AVERAGE) QUEUE LENGTHS – 2031 RC2A&DS2A – AM – BAYNARD'S GREEN

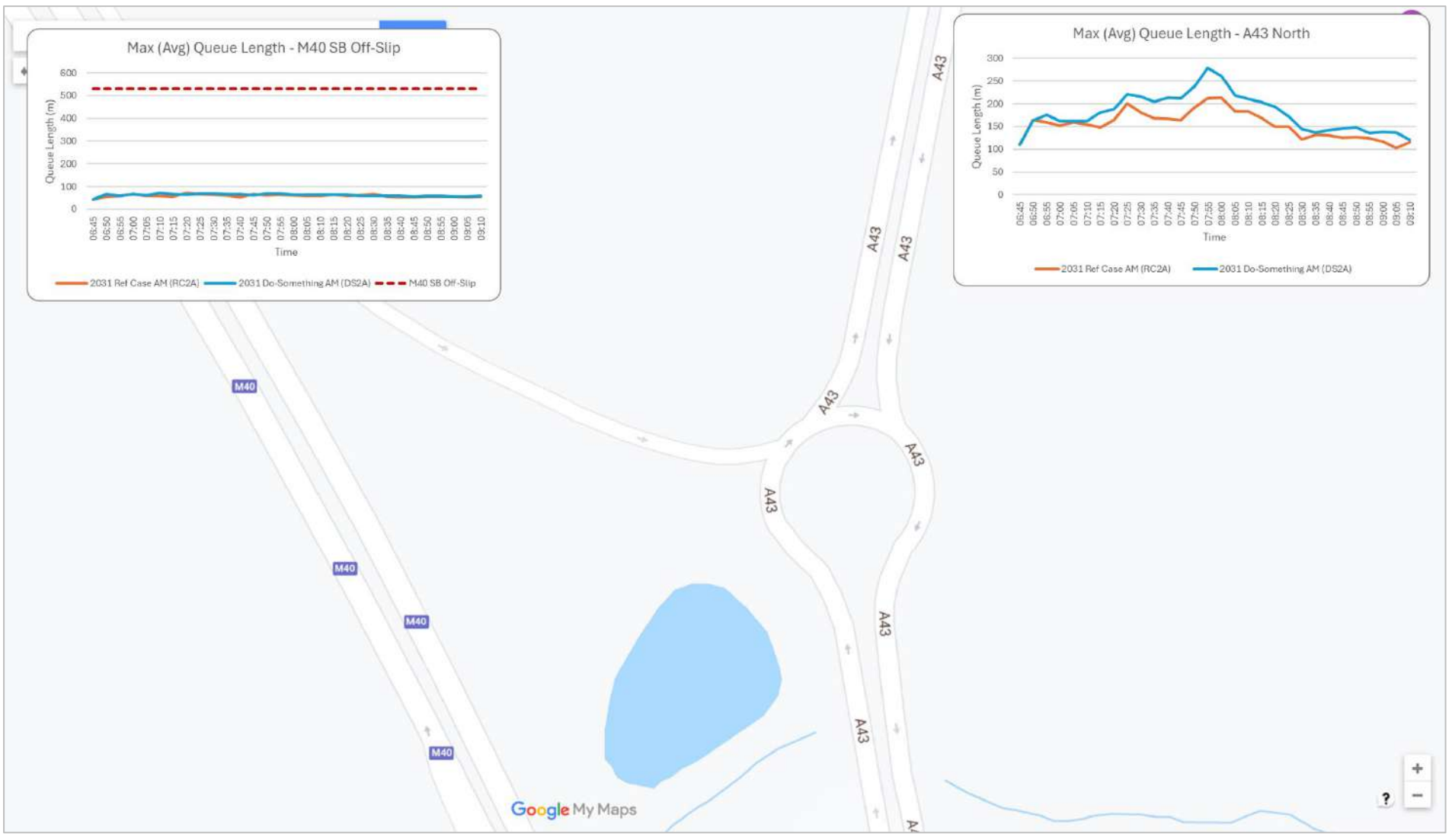


FIGURE 5.41: MAXIMUM (AVERAGE) QUEUE LENGTHS – 2031 RC2A&DS2A – AM – PADBURY

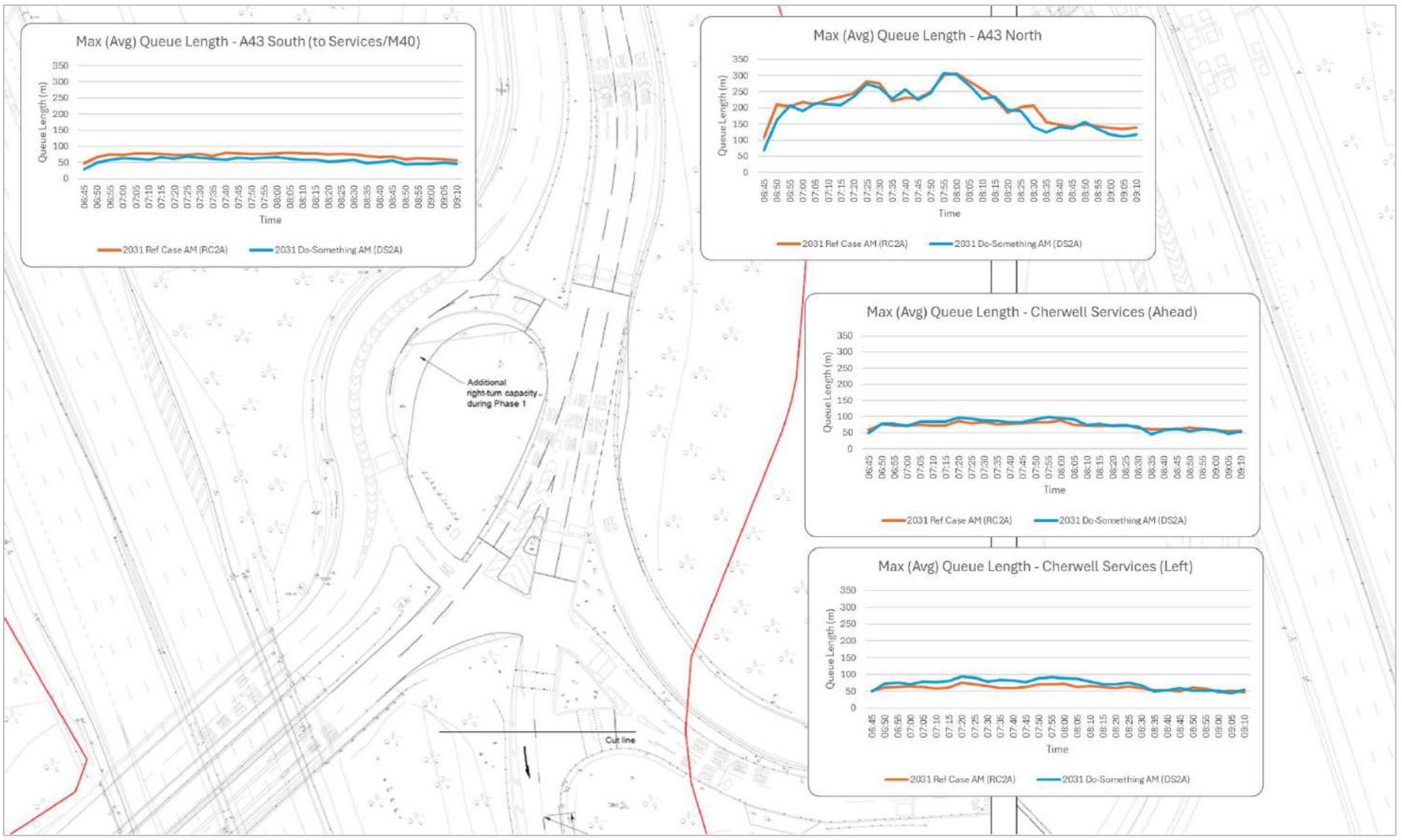


FIGURE 5.42: MAXIMUM (AVERAGE) QUEUE LENGTHS – 2031 RC2A&DS2A – AM – CHERWELL

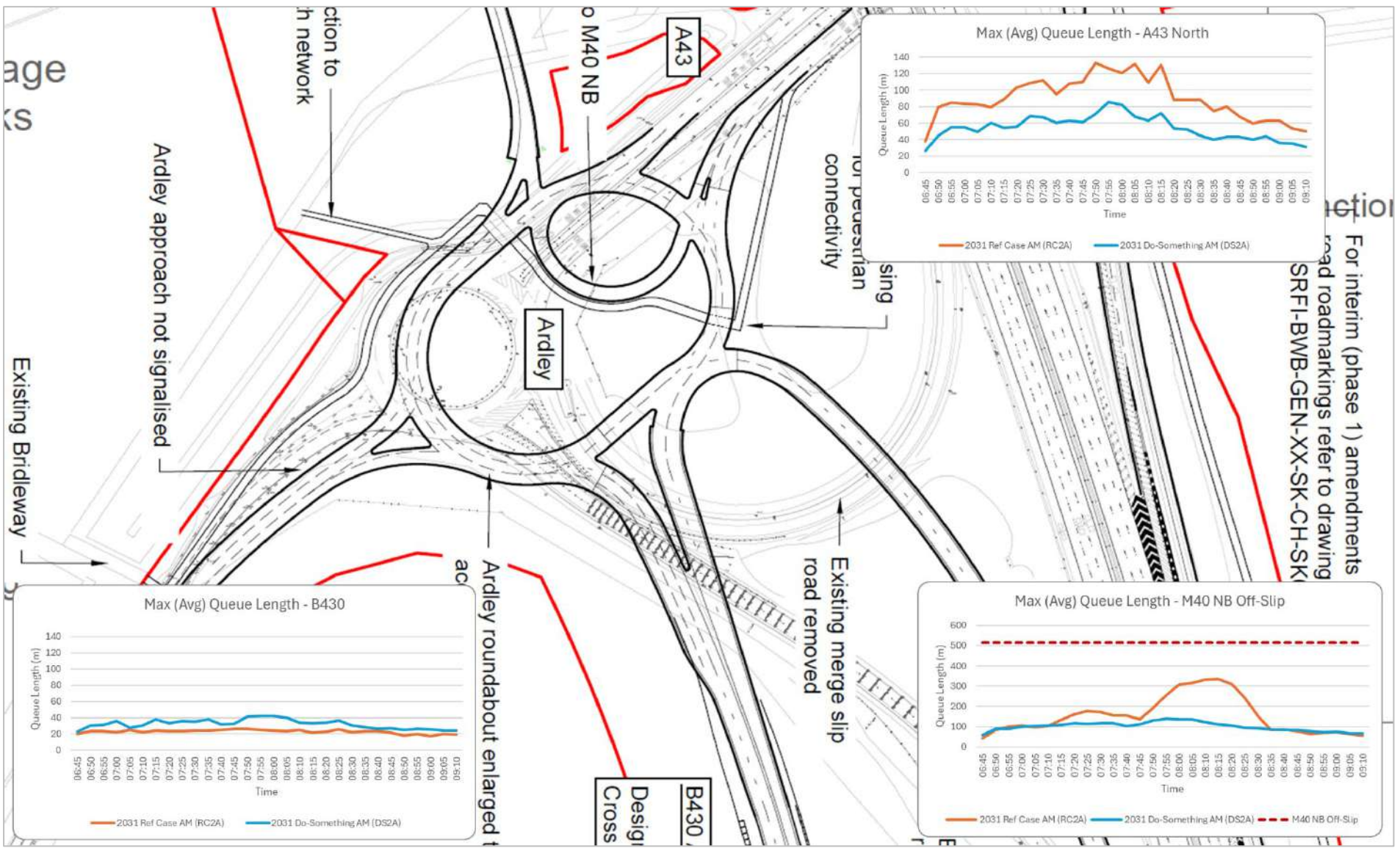


FIGURE 5.43: MAXIMUM (AVERAGE) QUEUE LENGTHS – 2031 RC2A&DS2A – AM – ARDLEY

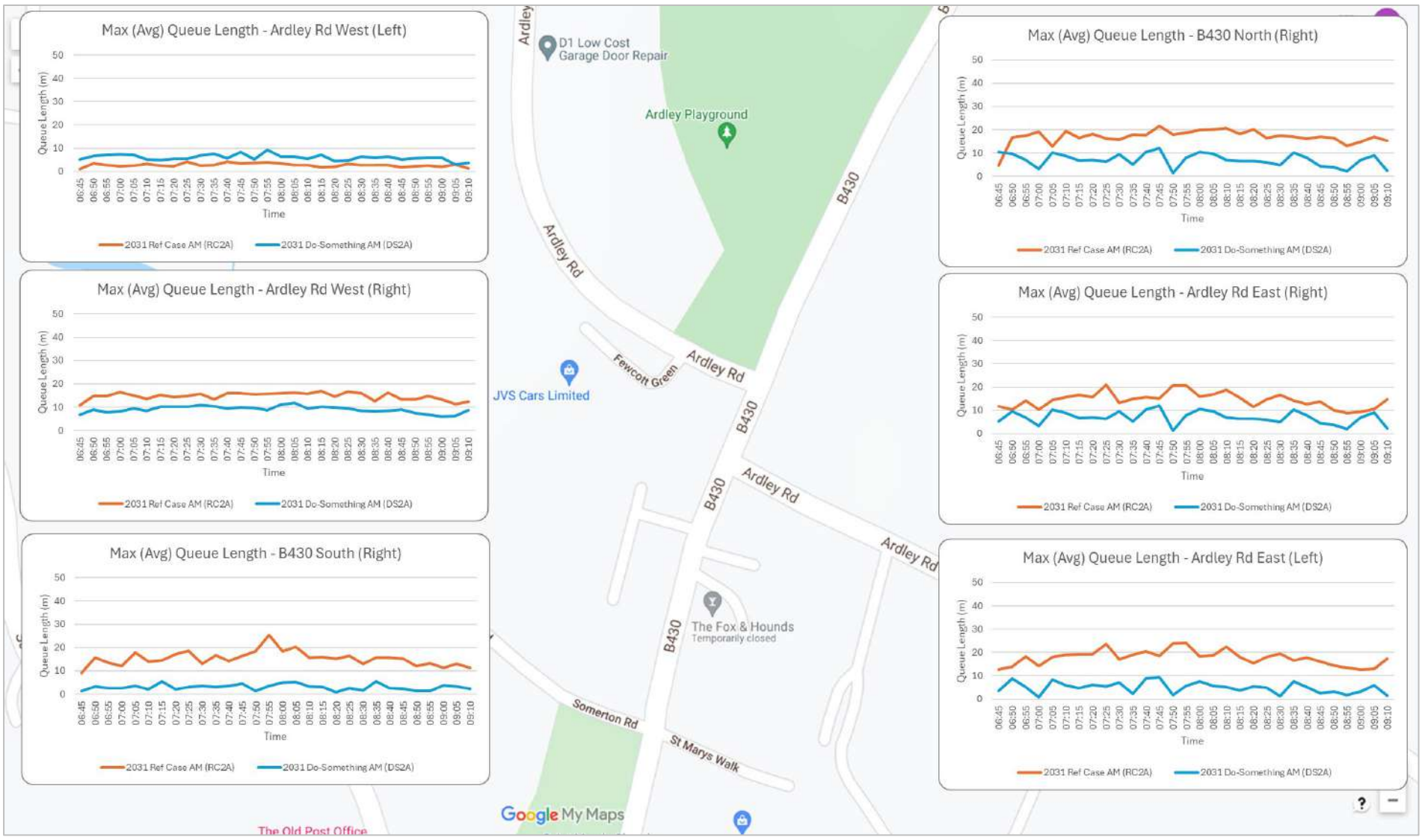


FIGURE 5.44: MAXIMUM (AVERAGE) QUEUE LENGTHS – 2031 RC2A&DS2A – AM – ARDLEY CROSSROADS

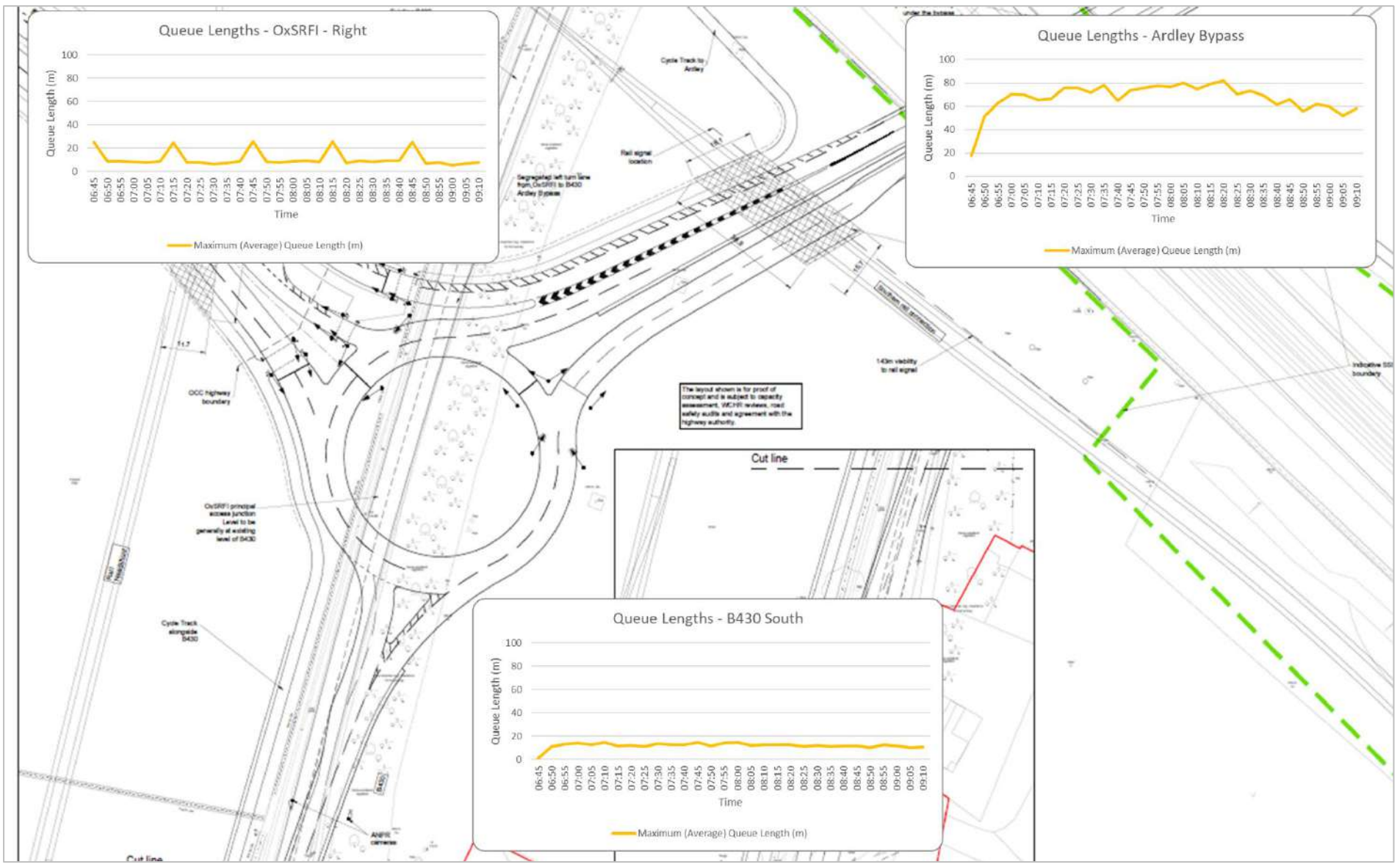


FIGURE 5.45: MAXIMUM (AVERAGE) QUEUE LENGTHS – 2031 RC2A&DS2A – AM – OXSRFI/ARDLEY BYPASS

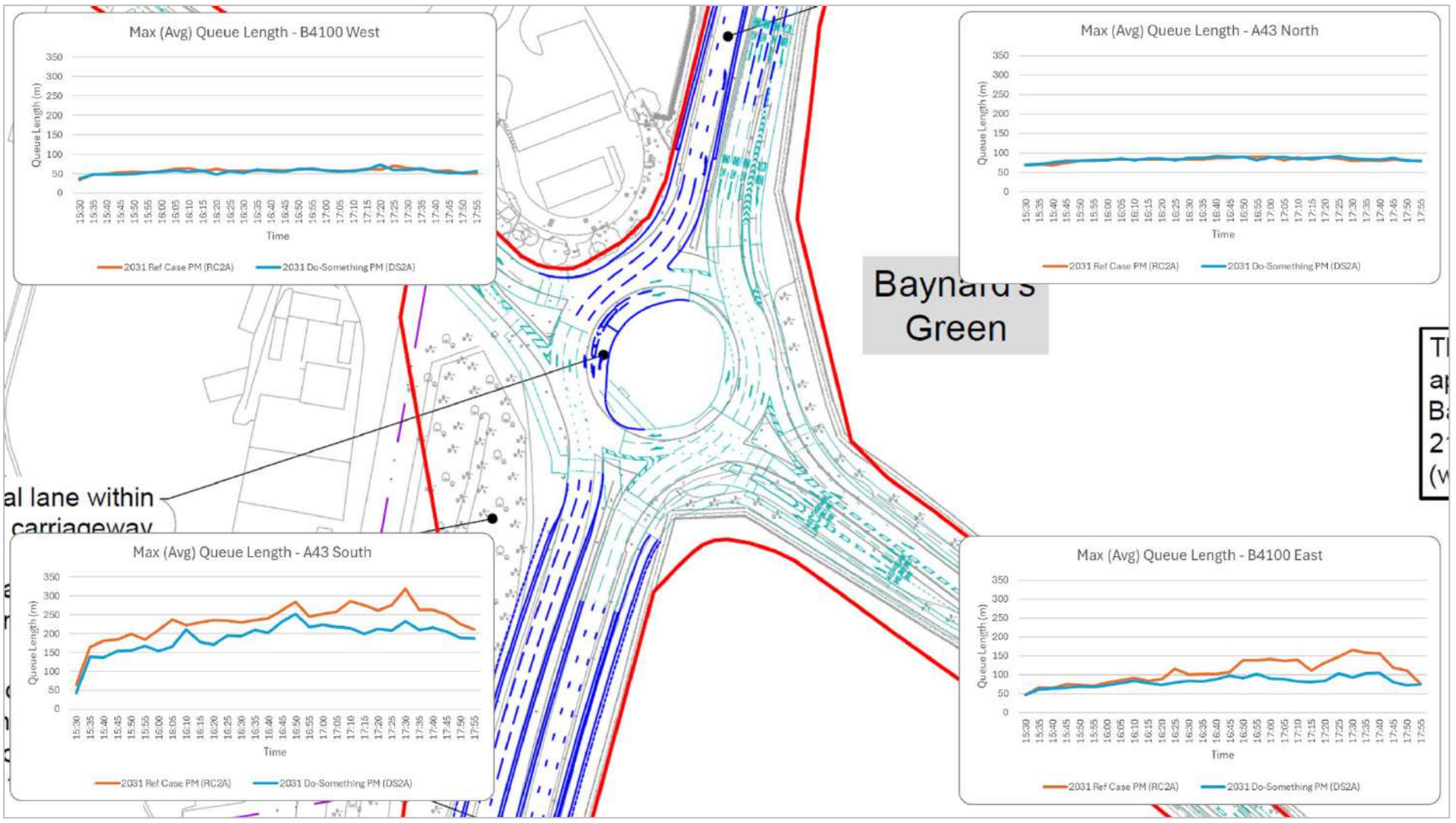


FIGURE 5.46: MAXIMUM (AVERAGE) QUEUE LENGTHS – 2031 RC2A&DS2A – PM – BAYNARD'S GREEN



FIGURE 5.47: MAXIMUM (AVERAGE) QUEUE LENGTHS – 2031 RC2A&DS2A – PM – PADBURY

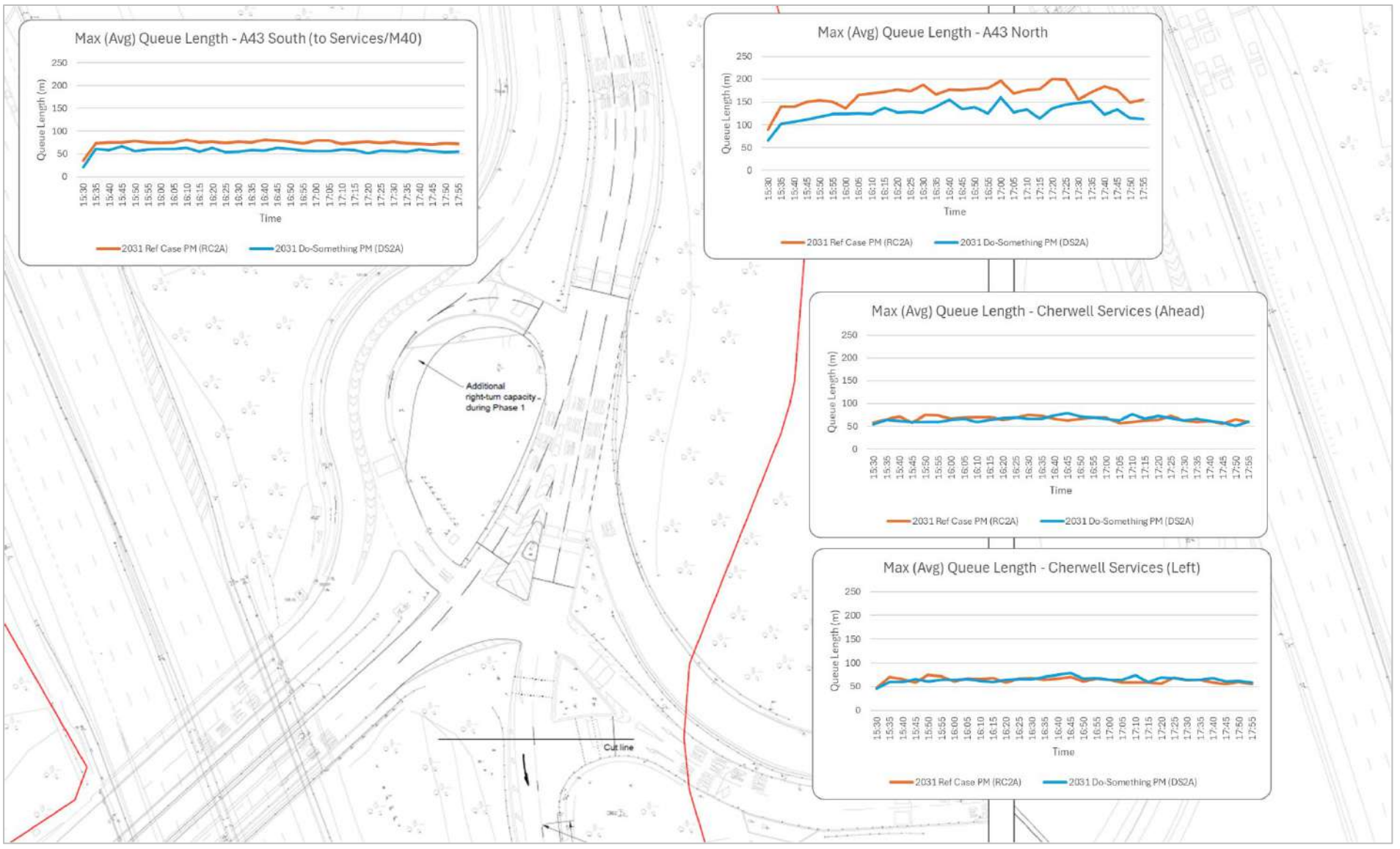


FIGURE 5.48: MAXIMUM (AVERAGE) QUEUE LENGTHS – 2031 RC2A&DS2A – PM – CHERWELL

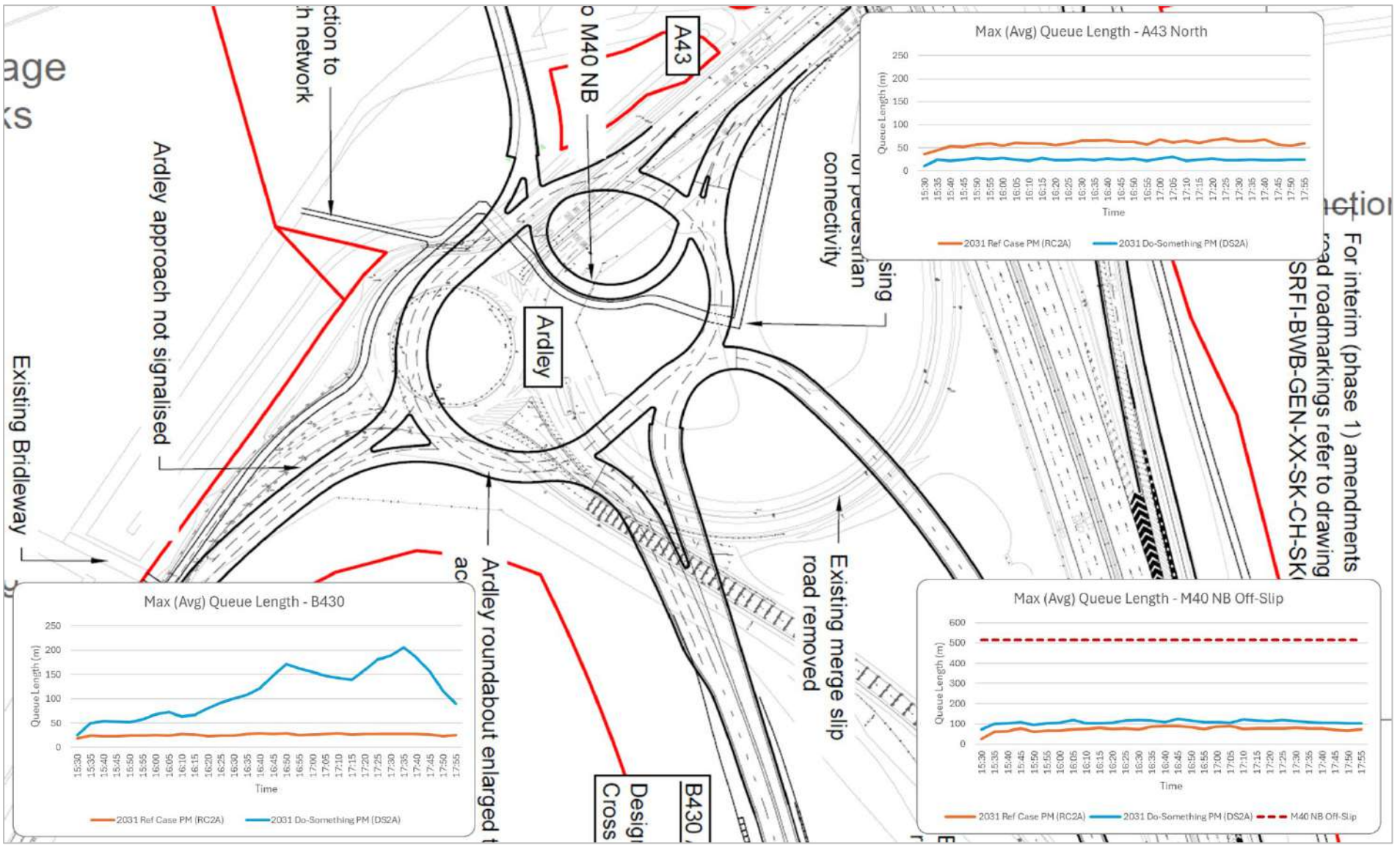


FIGURE 5.49: MAXIMUM (AVERAGE) QUEUE LENGTHS – 2031 RC2A&DS2A – PM – ARDLEY

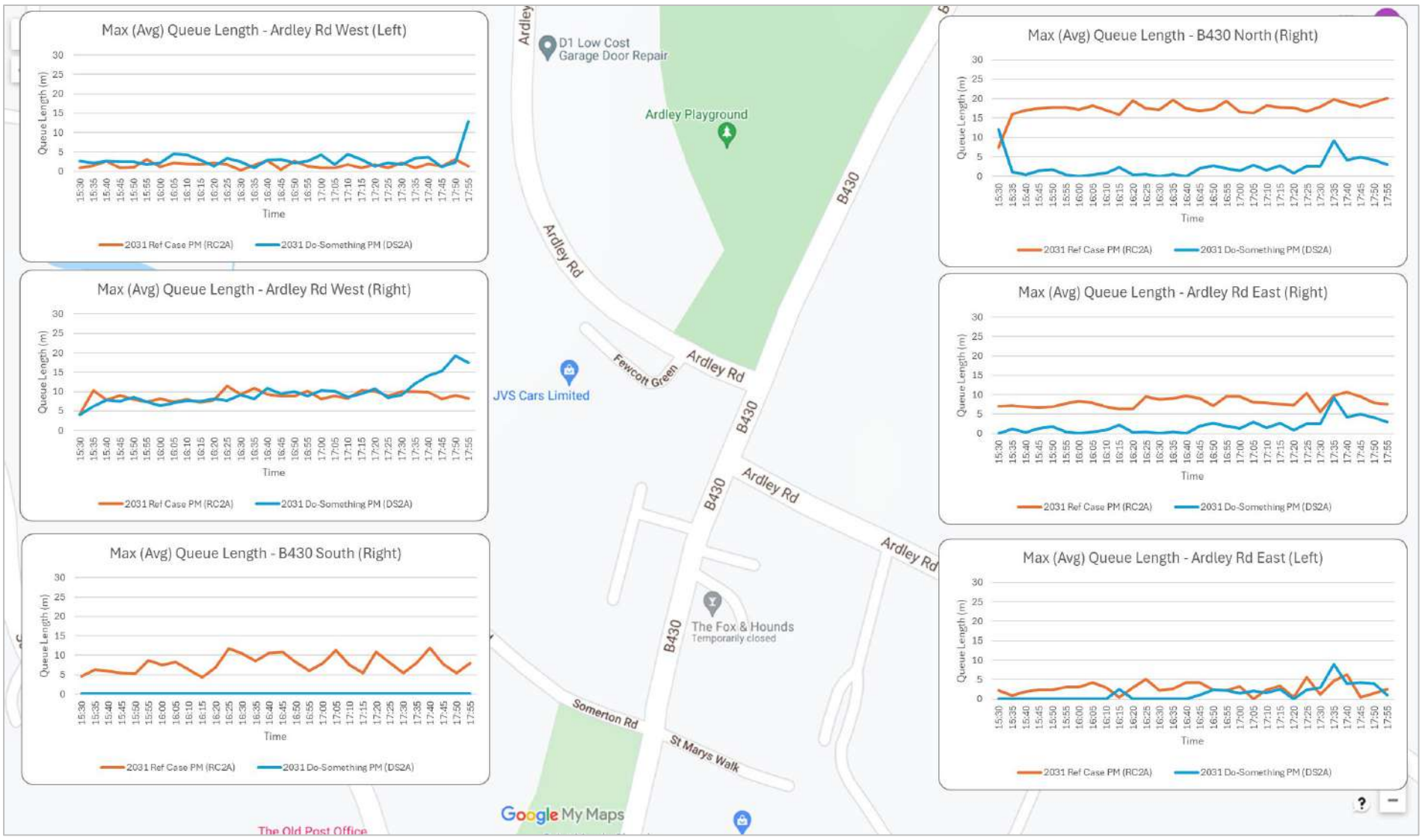


FIGURE 5.50: MAXIMUM (AVERAGE) QUEUE LENGTHS – 2031 RC2A&DS2A – PM – ARDLEY CROSSROADS

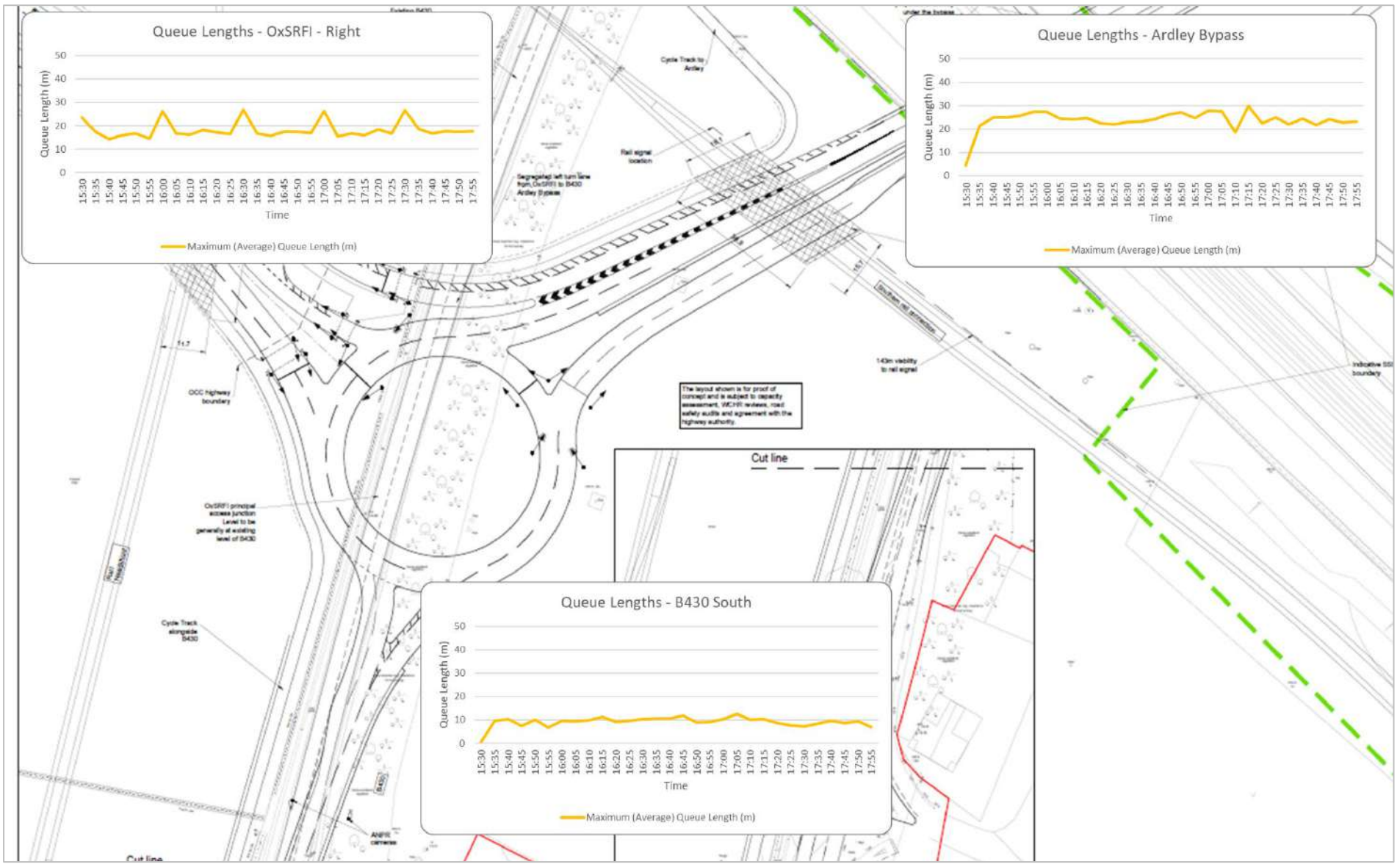


FIGURE 5.51: MAXIMUM (AVERAGE) QUEUE LENGTHS – 2031 RC2A&DS2A – PM – OXSRFI/ARDLEY BYPASS

AM Peak Queue Analysis

Baynard's Green Roundabout

5.6.17 At Baynard's Green roundabout, the queue lengths and profiles are almost identical in both the Reference Case and Do-Something scenarios. This indicates no impact as a result of OxSRFI Phase 1.

Padbury Junction

5.6.18 At Padbury junction, queues on the M40 southbound off-slip remain similar between scenarios, with queuing contained on the slip road and no extension to the M40 mainline – confirming acceptable strategic network operation.

5.6.19 On the A43 North approach, the Phase 1 development proposals and Reference Case queues reach up to approximately 280 metres in length, compared to 210 metres in the Reference Case scenario. The increased queues in the Do-Something scenario are attributed to the extra traffic on the approach from Phase 1 of the OxSRFI development.

Cherwell Junction

5.6.20 At Cherwell junction, the Phase 1 scheme mitigates the impacts of the development traffic on the A43 North and A43 South (to Services/M40) arms, where queue lengths are either similar or slightly reduced.

5.6.21 On the Cherwell Services arm, the Do-Something scenario has slightly longer queues compared to the Reference Case (up to 100 metres compared to 90 metres in the Reference Case). This is the result of additional traffic using the on-slip to access the M40 travelling southbound.

Ardley Roundabout

5.6.22 At Ardley roundabout, the Do-Something scenario delivers substantial queue reductions on the critical M40 northbound off-slip and A43 North approaches. M40 off-slip queuing reduces from approximately 340 metres (Reference Case) to 135 metres (Do-Something) – a 60% reduction. Whilst the 2031 Reference Case queuing does not extend to the M40 mainline, the Do-Something scenario still delivers meaningful operational improvements.

5.6.23 The A43 North approach also experiences reduced queuing in the Do-Something scenario (~85 metres compared to ~135 metres in the Reference Case) – a 37% reduction. This improvement results from the enhanced Ardley roundabout layout and signalisation of the approach.

5.6.24 Queues on the B430 approach are increased from ~25 metres in the Reference Case to ~40 metres in the Do-Something scenario. This is attributed to an increased flow of traffic around Ardley, due to the combination of the larger junction and the signalisation of the other arms. Whilst this results in drivers on the B430 having additional waiting time to enter the roundabout, the intergreen times from the signals provide more defined gaps for drivers to progress (in comparison to the Reference Case).

Ardley Village Crossroads

5.6.25 At the Ardley crossroads within Ardley village, queues either remain similar or reduce in the Do-Something scenario. This improvement results from two factors: reduced traffic using the village itself, and the stopping up of B430 south of Ardley village, which diverts through-traffic to the new Ardley bypass link. This delivers a local amenity benefit by reducing traffic impacts within the village residential area.

OxSRFI Access/Ardley Bypass Roundabout

5.6.26 Whilst no direct comparison with the Reference Case can be made (this junction exists only in the Do-Something scenario), the queuing levels at the OxSRFI site access and Ardley bypass roundabout are presented to demonstrate acceptable operation of this new infrastructure.

5.6.27 Maximum queues of approximately 80 metres occur on the Ardley Bypass approach, within the two-lane approach length. This queue length remains acceptable given the rural location and absence of upstream junctions. Queues on the B430 South approach reach approximately 15 metres, with the OxSRFI access arm experiencing maximum queues of approximately 25 metres. These queue levels indicate no severe capacity constraints at this junction and confirm that the signalised roundabout operates acceptably under AM peak demand conditions.

PM Peak Queue Analysis

Baynard's Green Roundabout

5.6.28 In the PM peak at Baynard's Green roundabout, the A43 South approach experiences the most notable queue reduction in the Do-Something scenario (~250 metres compared to ~320 metres in the Reference Case) – representing a 22% reduction. This change reflects the benefits of the additional exit lane

travelling northbound on the A43, which is introduced as part of the OxSRFI package of improvements.

5.6.29 Queues on the B4100 East are also reduced in the Do-Something scenario, reaching up to approximately 100 metres compared to 165 metres in the Reference Case, a 39% reduction. This is also attributed to the improvement scheme at Baynard's Green as part of the OxSRFI development, which adds an additional lane on the western circulatory (in addition to the third A43 North exit lane), to allow more traffic to traverse the circulatory.

5.6.30 Queues on the A43 North and B4100 West approaches all remain similar between the two scenarios, indicating stable operation at these locations.

Padbury Junction

5.6.31 PM peak queue lengths at Padbury remain similar between scenarios on the M40 southbound off-slip approach, with critically no queuing extending back to the M40 mainline from the slip road. This confirms acceptable strategic network operation in both scenarios.

5.6.32 The A43 North queues are reduced slightly in the Do-Something scenario, reaching up to approximately 120 metres compared to 135 metres in the Reference Case (an 11% reduction). This is attributed to the MOVA signals operating effectively to optimise timings based on the demands across both approaches.

Cherwell Junction

5.6.33 Queue behaviour at Cherwell in the PM peak demonstrates benefits on the A43 North approach, where queues reduce from approximately 200 metres (Reference Case) to 160 metres (Do-Something) – a 20% reduction. As at the Padbury junction, this is attributable to the MOVA signals operating effectively to optimise the signal timings between the A43 North and A43 South approaches.

5.6.34 On the A43 South approach (turning to Cherwell Services/M40), queues reduce slightly from approximately 80 metres to 60 metres in the Do-Something scenario – a 25% reduction. This is attributed to the additional right-turn storage allowing vehicles turning right to not interfere with northbound traffic as often, along with the signal timing strategy providing additional green time to prevent the queuing becoming too excessive.

5.6.35 Queues from the Cherwell Services arm remain similar between the two scenarios, indicating stable operation.

Ardley Roundabout

5.6.36 The PM peak demonstrates continued benefits at Ardley roundabout, with M40 northbound off-slip queuing remaining at a similar level (approximately 100 metres) and the A43 North approach queues reducing from approximately 65 metres to 30 metres – a 54% reduction.

5.6.37 These improvements are attributed to the enhanced capacity provided by the signalised Ardley roundabout with additional lanes. The improvements, whilst numerically smaller than the AM peak benefits (where Reference Case queuing is most severe), demonstrate that the mitigation package delivers operational enhancements across both peak periods.

5.6.38 Queues on the B430 approach are higher in the Do-Something scenario (up to 200 metres compared to 30 metres in the Reference Case). This is more of an increase than in the AM peak and is attributed to increased traffic flows around Ardley as a result of the larger circulatory sections and other signalised nodes. This results in increased waiting times on the B430 approach. However, the intergreen times from the signals do provide more defined gaps for drivers to progress in comparison to the Reference Case where it is harder for drivers to judge suitable gaps.

Ardley Village Crossroads

5.6.39 Ardley village crossroads queuing remains similar or reduces in the Do-Something scenario (consistent with AM peak findings). This confirms local amenity benefits from traffic reassignment to the Ardley bypass, reducing vehicle movements through the village residential area.

OxSRFI Access/Ardley Bypass Roundabout

5.6.40 At the OxSRFI site access roundabout in the PM peak, maximum queues reach approximately 30 metres on the OxSRFI access arm and 30 metres on the Ardley Bypass arm, with B430 South queues of approximately 10 metres. These queue levels indicate acceptable junction operation with no severe capacity constraints. The junction successfully manages site access traffic alongside through-traffic on the bypass link.

Network Performance Results

5.6.41 The network performance comparisons for the AM and PM peaks are shown in **Table 5.25** and **Table 5.26**.

All Vehicles			
2031 AM			
Scenario	Average Delay per Vehicle (s)	Average Speed (mph)	Latent Demand
2031 Reference Case (RC2A)	49	51	0
2031 Do-Something (DS2A)	48	50	0

TABLE 5.25: NETWORK PERFORMANCE – 2031 RC2A&DS2A – AM

5.6.42 The AM peak results show that the Phase 1 proposals for the OxSRFI development and the package of improvement schemes will result in an almost identical performance to the Reference Case, with only modest changes in average delays. The similar average delays should also be viewed in the context that the Do-Something Phase 1 network adds more signalised junction to the model extents. Whilst these inevitably cause vehicles to stop as they progress on their journey, the results indicate that the traffic is managed effectively as they travel through the modelled network. The Do-Something scenario also includes for reductions in speeds limits within Ardley and on the A43 between Ardley roundabout and Padbury junction.

5.6.43 There also remains no latent demand in the network, which indicates that all vehicles can enter the network and complete their journeys.

All Vehicles			
2031 PM			
Scenario	Average Delay per Vehicle (s)	Average Speed (mph)	Latent Demand
2031 Reference Case (RC2A)	46	52	1
2031 Do-Something (DS2A)	52	50	0

TABLE 5.26: NETWORK PERFORMANCE – 2031 RC2A&DS2A –PM

5.6.44 In the PM peak, the introduction of the Phase 1 proposals for the OxSRFI development has a modest increase in the average delay per vehicle (+6s), whilst also having a similar average network speed (52-50mph). The changes are expected as the Do-Something network features more signalised junctions, which inevitably add delays to vehicles who have to stop as they progress on their journey. The Do-Something scenario also includes for reductions in speeds limits within Ardley and on the A43 between Ardley roundabout and Padbury junction.

5.6.45 The PM peak also shows a latent demand of 1 vehicle in the Reference Case scenario. This is located at the M40 South entry (on review of the Parking Lot output results) and is attributed to the stochastic nature of how the flows are input into the model. The number is negligible and does not affect the assessment conclusions.

Summary of 2031 Model Performance Analysis

5.6.46 Reference Case and Do-Something scenarios were developed for the 2031 Phase 1 development scenario, using strategic traffic flows provided by ADC Infrastructure Ltd from the Bicester Transport Model (BTM). Journey times, queue lengths, and network performance metrics were extracted to understand operational performance.

Strategic M40 Corridor Benefit from Phase 1 Works

5.6.47 The primary finding for the 2031 Phase 1 scenarios is that the OxSRFI development mitigation schemes deliver operational improvements to the M40 northbound corridor, addressing capacity constraints evident in the Reference Case.

5.6.48 In the 2031 AM peak, M40 northbound off-slip queuing at Ardley roundabout reduces from approximately 340 metres (Reference Case) to 135 metres (Do-Something) – a 60% reduction. Whilst the 2031 Reference Case queuing does not extend to the M40 mainline, the Do-Something scenario still delivers operational improvements. Journey times from M40 northbound to Ardley reduce by 1 minute 5 seconds, reflecting enhanced traffic flow.

Network Performance Remains Comparable

5.6.49 Network-wide performance metrics for the 2031 Opening Year scenario demonstrate that the Do-Something conditions deliver operation comparable to the Reference Case, whilst accommodating the additional Phase 1 traffic from the OxSRFI development:

- AM Peak: Average vehicle delay reduces marginally from 49 seconds to 48 seconds, with average network speed reducing from 51mph to 50mph.
- PM Peak: Average vehicle delay increases from 46 seconds to 52 seconds, with average network speed reducing from 52 mph to 50 mph

5.6.50 These changes reflect the introduction of additional signalised junctions in the Do-Something network, which inevitably add stopped time to some vehicle journeys. However, the similarity of network performance metrics – with average delays remaining in the range of 46-52 seconds per vehicle across all scenarios –

indicates that traffic is managed effectively. Zero or negligible latent demand in all scenarios confirms network capacity sufficiency.

Localised Effects Consistent with Full Development Findings

5.6.51 Positive localised effects include reduced M40 off-slip and A43 North queuing at Ardley (as discussed above), reduced queuing at Ardley village crossroads (traffic reassignment to Ardley bypass), and reduced A43 North queuing at Padbury and Cherwell junctions.

5.6.52 Other localised effects include increased journey times from Ardley to Cherwell northbound (24-31 seconds for AM/PM peaks), whilst movements to/from Ardley village are impacted.

5.6.53 The busier PM peak experiences the higher delays, where queues increase by up to 170 metres on the B430 at Ardley roundabout and journey times increase by up to 3 minutes 13 seconds. The AM peak is less affected, with queue increases of 15 metres on the B430 at Ardley, and journey time increases of up to 1 minute 7 seconds. Across both peaks, the impacts are partly a result of speed limit changes in this section of the network, along with the improvements at Ardley roundabout. The enhancements increase circulatory flows around Ardley and lead to additional waiting times on the priority controlled B430 approach. However, the signalisation of the other nodes at Ardley roundabout help to provide defined gaps when vehicles from the B430 can progress, in contrast to the Reference Case where it is harder for drivers to judge suitable gaps.

6 SENSITIVITY AND LIMITATIONS

6.1 Overview

6.1.1 This section identifies the key sensitivities and limitations associated with the modelling assessment and discusses their implications for the robustness of the findings presented in this report. The assessment has been undertaken in accordance with established industry practice and DfT TAG Unit 3.1 guidance; the limitations identified below are inherent to microsimulation modelling of this nature and do not undermine the validity of the comparative assessment.

6.2 Convergence Methodology

6.2.1 Dynamic assignment models require convergence testing to establish stable path distributions before performance results can be extracted. The convergence process determines equilibrium route choice patterns that represent realistic driver navigation through the network.

6.2.2 For the M40 Junction 10 future year models, convergence was achieved following industry-standard methodology for complex networks with dynamic assignment, as detailed in Section 4. Convergence runs were undertaken using reduced demand levels (70–80% of total demand), in accordance with PTV guidance for networks where multiple route options and high edge counts may prevent mathematical convergence at full demand. This is an established and recognised approach for congested networks, whereby path distributions developed at reduced demand levels are applied to full demand evaluation runs. The methodology is consistent with DfT TAG Unit 3.1 convergence requirements for dynamic assignment modelling.

6.2.3 For the Do-Something scenarios (DS3A, DS1A, DS2A), the volume difference criterion stabilised at 82–85%, below the strict TAG threshold of 95%. This is attributable to the model extents and complex link/connector structure, which result in a significant number of edges and possible paths, including multiple paths to the same origin-destination pairs. The strict TAG criteria (0–5 vehicle difference) mean that paths with low flows can oscillate between different route options without achieving mathematical convergence, even where the overall path distribution has stabilised. The consistent stabilisation of this metric across all Do-Something scenarios confirms that the models are operationally stable and that the path distributions are representative.

6.2.4 All other convergence criteria — path journey times, internal VISSIM convergence, and total travel time difference — were met in accordance with TAG Unit 3.1 requirements. Convergence was confirmed for all eight scenarios prior to extraction of performance results.

6.2.5 Following convergence of path distributions, all performance results reported in Section 5 were extracted using full demand conditions. The journey times, queue lengths, delays, and network performance statistics reported represent operational performance under 100% of the tested demand levels and provide a definitive assessment of network operation under the future year demand scenarios.

6.3 Model Scope and Assumptions

Temporal Scope

6.3.1 The VISSIM model represents AM peak and PM peak conditions, validated through observed survey data. Peak periods represent the most critical test of junction capacity and network performance, providing the appropriate conditions for impact assessment. Acceptable peak period operation provides confidence in off-peak operability, given the lower traffic volumes during inter-peak and off-peak periods.

Pedestrian Activity

6.3.2 Pedestrian crossing facilities are included in the model at the Baynard's Green roundabout, Cherwell junction, Ardley roundabout and the OxSRFI site access junction, reflecting the proposed designs. No pedestrian demands have been modelled in either peak period, reflecting the rural location and limited pedestrian trip generators in the study area. The signal-controlled crossings are designed to accommodate pedestrian demand on a call-and-demand basis, and the introduction of occasional pedestrian phases would not materially alter the comparative findings between Reference Case and Do-Something scenarios.

Strategic Network Context

6.3.3 The model includes the M40 mainline through Junction 10 with extended approach arms to capture queuing behaviour on the slip roads. The assessment assumes normal M40 mainline operation without significant incidents or planned closures. Strategic network interactions beyond the study area (M40 mainline flow

variations, wider A43 corridor effects) are outside the model scope; however, as the assessment is based on comparative analysis between Reference Case and Do-Something scenarios using the same demand inputs, any such interactions would affect both scenarios equally and would not alter the relative findings.

Stochastic Variation

6.3.4 All results are averaged over 20 random seed runs (starting seed 42, increment of 10), providing a robust representation of typical operational conditions. Individual days may experience variations outside these averaged values due to stochastic factors; however, the use of 20-seed averaging exceeds standard industry practice and provides appropriate statistical confidence in the reported performance metrics.

Model Demand

6.3.5 The future year flow inputs are derived from the strategic Bicester Transport Model (BTM), reflecting committed and allocated development in accordance with the proposed Cherwell Local Plan 2042 consultation and DfT Circular 01/2022 definitions. Strategic model forecasts inherently carry uncertainty regarding development timing, trip generation rates, and background traffic growth. The scenarios tested represent appropriate planning scenario boundaries defined in accordance with established planning policy frameworks, and the assessment provides evidence for these defined scenarios. Actual future conditions will depend on the timing and scale of development delivery and the evolution of background traffic trends.

6.4 Assessment Scope

6.4.1 This modelling assessment evaluates highway operational performance using VISSIM microsimulation. Other impact categories — including air quality, noise, severance, and safety — are outside the modelling scope and are addressed through separate DCO assessment workstreams.

6.4.2 The assessment focuses on vehicular traffic operation. Public transport, cycling, and pedestrian impacts are not comprehensively assessed within this modelling exercise, though pedestrian crossing provision is included in the junction designs where appropriate.

7 MODELLING SUMMARY & RECOMMENDATIONS

7.1 Overview

7.1.1 Modelling Group, commissioned by ADC Infrastructure Ltd, has undertaken comprehensive VISSIM microsimulation modelling to assess the comparative highway impacts of the proposed Oxfordshire Strategic Rail Freight Interchange (OxSRFI) on land east of the former Heyford Air Base and southwest of M40 Junction 10 in Cherwell, Oxfordshire.

7.1.2 The assessment has evaluated 2031 DfT Circular 01/2022 compliant, 2031 Phase 1 Opening Year and 2034 Completion Year scenarios, comparing Reference Case conditions (committed and allocated development in accordance with the proposed Cherwell Local Plan 2042 consultation and DfT Circular 01/2022 requirements) against Do-Something conditions (Reference Case plus OxSRFI development and associated highway mitigation package).

7.1.3 The Reference Case scenarios considered in this report include the Baynard's Green improvement scheme proposed by the Albion Land development, which itself provides improved network performance compared to the existing highway configuration. However, an additional analysis of the RC1 scenario (without the Albion Land scheme) has also been undertaken to assess the operational improvements that the proposed highway works would deliver compared to the existing network.

7.1.4 A separate assessment and modelling exercise have also been undertaken to consider the situation in which the Reference Case and Do-Something scenarios exclude the Albion Land scheme and that scheme's highway improvements altogether. That work is reported separately, and also considers a Sensitivity Test that was requested by National Highways with regards to the calculation of assessment traffic flows.

7.2 Proposed Development against Existing Network Configuration

Baynard's Green Improved Performance

7.2.1 Analysis of the existing network configuration (without any Baynard's Green improvement) demonstrates that the proposed OxSRFI highway works package delivers substantial operational improvements at this junction.

7.2.2 In the AM peak Reference Case, queues on the A43 North, B4100 East and B4100 West approaches all extend back to the start of their respective entry points (approximately 770m, 520m and 430m respectively). With the proposed junction improvements in place, these queues reduce to approximately 220m (−71%), 80m (−85%) and 130m (−70%) respectively. The enlarged junction and signal strategy have a demonstrably positive impact on network operation.

7.2.3 In the PM peak, queues on the B4100 East reach the start of the entry point in the Reference Case (approximately 520 metres), reducing to approximately 100m in the Do-Something scenario — an 81% reduction and the removal of all latent demand from this approach. On the B4100 West, queue lengths reduce from approximately 430m to 60m in the Do-Something scenario — an 86% reduction. The signal strategy is effective in managing traffic flows and reducing queues across the local road network.

Network-Wide Performance

7.2.4 Network performance metrics confirm that the Do-Something scenario delivers operational improvements compared to the Reference Case baseline, whilst accommodating additional OxSRFI and Albion Land development traffic:

- AM Peak: Average vehicle delay reduces from 95 seconds to 50 seconds, with average network speed increasing from 44 mph to 49 mph.
- PM Peak: Average vehicle delay reduces from 60 seconds to 51 seconds, with average network speed maintained at 49-50 mph.

7.2.5 The improvements enable over 1,100 additional vehicles to successfully enter and traverse the network in the AM peak and nearly 400 in the PM peak — vehicles that are unable to do so under Reference Case conditions — whilst also accommodating the proposed development traffic.

Localised Effects Profile

7.2.6 Journey time comparisons across origin-destination pairs confirm significant reductions from the A43 North (AM peak), B4100 East (AM and PM peak) and B4100 West (AM and PM peak), with savings in the range of 3 minutes to 5 minutes 30 seconds. These reductions highlight the substantial benefits delivered by the junction improvements at Baynard's Green.

7.2.7 Other localised effects do not constitute severe or unacceptable impacts. Journey time changes — where not significantly reduced — remain within ±90 seconds, whilst accommodating all traffic demand (which is not the case in the Reference Case). All queue increases remain contained within approach capacities with no network blocking risks. The overall driver experience across the wider network is improved.

7.3 Proposed Development against Potential Future Baseline (with Albion Land and its highway improvements)

M40 Northbound Off-Slip Performance

7.3.1 The mitigation package addresses M40 northbound off-slip operational performance at Ardley roundabout. In the 2034 Reference Case, queuing extends approximately 660 metres on the M40 northbound off-slip during the AM peak, beyond the length of the slip road and onto the motorway mainline. This presents an operational and safety concern in the future Reference Case scenario. The Do-Something scenario — incorporating a new M40 northbound off-slip connecting to Padbury junction and enhanced Ardley roundabout capacity (signalisation, additional lanes) — reducing this queuing to approximately 100 metres, an 85% reduction. This eliminates the mainline interaction and addresses the operational constraint and safety concern that is present in the Reference Case scenario.

7.3.2 Journey time analysis confirms the operational improvement: northbound M40 to Ardley journey times reduce from 4 minutes 13 seconds (Reference Case) to 54 seconds (Do-Something) — a reduction of 3 minutes 19 seconds representing a 79% improvement. This benefit is consistent across the 2031 scenarios, where M40 off-slip queuing reduces from 280–320 metres to 100–135 metres, with journey time improvements of up to 1 minute 5 seconds depending on the scenario tested.

Network-Wide Performance

7.3.3 Network performance metrics confirm that the Do-Something scenarios deliver operational performance comparable to the Reference Case baseline:

- 2034 Scenarios: Average vehicle delays range from 52–65 seconds per vehicle across Reference Case and Do-Something scenarios (AM/PM peaks), with average network speeds of 47–51 mph maintained. Zero or negligible latent demand confirms adequate network capacity.
- 2031 Scenarios: Average vehicle delays range from 46–52 seconds per vehicle, with average network speeds of 50–52 mph. Zero or negligible latent demand confirms network capacity sufficiency.

7.3.4 The introduction of additional signalised junctions in the Do-Something scenarios adds controlled delay to some vehicle journeys; however, the network performance metrics demonstrate effective traffic management throughout the study area.

Localised Effects Profile

Journey Time Performance

7.3.5 Journey time analysis identifies that the majority of network movements experience journey time changes within ±60 seconds between Reference Case and Do-Something scenarios, indicating comparable driver experience across the wider network.

7.3.6 Notable journey time changes, other than the significant improvement for M40 to northbound traffic, include increases on some northbound movements (Ardley to Cherwell: 24–51 seconds increase, attributable to the signalised Ardley roundabout requiring negotiation of additional signal nodes). The Cherwell Services to A43 North movement experiences a journey time increase of 89–108 seconds due to the revised junction layout requiring routing via Ardley roundabout, increasing the distance travelled.

Queue Length Performance

7.3.7 Queue length analysis shows varied patterns across the network. The M40 northbound off-slip at Ardley experiences substantial reductions (660m to 100m in the 2034 AM peak). The A43 corridor at Padbury and Cherwell junctions benefits from additional lane capacity, with queue reductions evident on several approaches.

7.3.8 Some approaches at Baynard's Green roundabout experience modest queue increases (A43 North, B4100 West), attributable to signal timing allocation favouring the higher-flow A43 corridor. Queue lengths remain within approach capacities and do not create upstream blocking effects. Ardley village crossroads experiences similar or reduced queuing in the Do-Something scenarios, reflecting reduced traffic through the village as a result of the bypass provision.

7.4 Technical Basis

7.4.1 The assessment is underpinned by the validated 2016 base year model, which achieved exemplary performance against DfT TAG Unit 3.1 acceptance criteria:

- Entry flows: 100% within 5%, all achieving GEH <3
- Junction turning counts: 100% achieving GEH <5, with 93% achieving GEH <3
- Journey times: 95% within 15% of observed (exceeding the TAG 85% requirement)
- Exit flows: 100% within TAG criteria

7.4.2 This validation performance significantly exceeds minimum requirements and was approved by National Highways in July 2021 (LMVR Document Reference: MG0163_M40 J10 Model Update_LMVR_R-01B, Issue 2).

7.4.3 Future year convergence was achieved following industry-standard dynamic assignment procedures in accordance with DfT TAG Unit 3.1 guidance. All performance results represent full demand operational conditions, providing a definitive assessment under the tested future year scenarios.

7.4.4 The scenarios tested are defined in accordance with the proposed Cherwell Local Plan 2042 consultation and DfT Circular 01/2022 committed development definitions, providing appropriate planning scenario boundaries for DCO assessment purposes. Results are averaged over 20 random seed runs, exceeding industry-standard practice and providing robust statistical representation of typical operational conditions.

7.5 Conclusions

7.5.1 The assessment supports the following conclusions:

7.5.2 The proposed OxSRFI highway mitigation package delivers substantial operational improvements compared to the existing network configuration. The enlarged, signalised Baynard's Green roundabout resolves the severe capacity

constraints identified in the Reference Case, reducing queues by 70–85% across the most affected approaches, enabling over 1,100 additional vehicles to enter and traverse the network in the AM peak, and reducing average vehicle delays by up to 45 seconds. These benefits are evident in both peak periods assessed.

7.5.3 When assessed against the improved future Reference Case baseline (with Baynard's Green improvements delivered by the Albion Land development), the proposed OxSRFI development delivers network operational performance comparable to that baseline. The mitigation package addresses M40 northbound off-slip capacity constraints and safety concerns at Ardley roundabout, with queue reductions of up to 85% and journey time improvements of up to 79% on this movement. This eliminates slip road queuing interaction with the M40 mainline that is present in the Reference Case. Network-wide performance metrics remain comparable across all scenarios tested — the 2031 DfT Circular 01/2022 compliant scenario, the 2031 Opening Year, and the 2034 Completion Year — with average delays of 46–65 seconds per vehicle and average speeds of 47–52 mph. Zero or negligible latent demand across all Do-Something scenarios confirms that the network has sufficient capacity to accommodate both the development traffic and existing demand.

7.5.4 Localised effects are identified across the network. The majority of journey time changes remain within ±60 seconds, and queue lengths remain within approach capacities throughout the network. Where increases are observed, these are attributable to the reconfigured junction geometries and revised signal strategies and are consistent with the typical operational trade-offs associated with strategic infrastructure delivery.

7.5.5 The modelling findings provide robust, empirical evidence that the proposed development, with its comprehensive highway mitigation package, can be accommodated within the highway network whilst providing improved operational performance.

7.6 Recommendations

7.6.1 Based on the modelling findings, the following recommendations are made.

Stakeholder Engagement

7.6.2 It is recommended that these modelling findings be discussed with National Highways, Oxfordshire County Council (as Local Highway Authority), Cherwell District Council (as Planning Authority), and other interested parties to support the DCO application process.

Modelling Findings for DCO Application

7.6.3 The assessment demonstrates that:

- When compared to the existing network configuration (without Baynard's Green improvements), the proposed highway works package delivers substantial operational improvements, resolving existing capacity constraints whilst accommodating development traffic.
- Network-wide performance remains comparable between the improved future baseline (with Baynard's Green improvements) and Do-Something scenarios, confirming adequate capacity provision across all future year conditions tested.
- The mitigation package addresses M40 northbound off-slip queuing identified in the Reference Case, with substantial queue reductions and journey time improvements that resolve mainline interaction and safety concerns that are present in the Reference Case.
- Localised impacts are modest in scale, with the majority of journey time changes within ±60 seconds and queue lengths remaining within approach capacities.

7.6.4 The assessment provides empirical evidence suitable for supporting the DCO application, demonstrating that the proposed development, with its comprehensive highway mitigation package, can be accommodated within the highway network whilst providing improved operational performance across the range of future year scenarios tested.

APPENDIX A:
LOCAL MODEL VALIDATION REPORT

MODELLING GROUP

M40 J10 Model Update – Local Model Validation Report

MG0163 – Oxford SRFI

14 July 2021

ADC INFRASTRUCTURE LTD

DOCUMENT CONTROL ISSUE SHEET

Project & document details

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2	Final	Update following HE audit	ADC

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1 INTRODUCTION

1.1 Introduction

1.1.1 This Local Model Validation Report (LMVR) details changes made to the 'M40 J10' VISSIM model provided by Highways England (HE) to ADC infrastructure Ltd (ADC) for use in testing the relative impact of a proposed Strategic Rail Freight Interchange (SRFI) west of M40 J10 in Oxfordshire, as well as that of any mitigation measures.

1.1.2 The model received from HE had been revalidated in 2017 by AECOM using data from March 2016 and used its previous software version – v5.40-06. Further details of the model updated by AECOM for HE can be found in the LMVR in **Appendix A**.

1.1.3 In order to use this model for the proposed Oxford SRFI, two main changes have been made:

- Firstly, the model has been updated from VISSIM version 5.40-06 to version 2021 Service Pack (SP) 07.
- Secondly, the model has been extended to include the B430/Ardley Road staggered crossroads and the B430 section of road to the Ardley Fields Household Waste & Recycling Centre.

1.1.4 These changes have required an updated calibration and validation exercise to be undertaken to ensure the model is still fit for purpose and representative of current conditions.

1.2 VISSIM Model Extents

1.2.1 The VISSIM model focuses on the area surrounding M40 J10 and includes the following:

- A43/B4100 – Baynard's Green Roundabout
- A43/M40 SB Off-Slip – Padbury Roundabout
- A43/Cherwell Services – Cherwell Junction
- A43/B430 – Ardley Roundabout

1.2.2 The model also includes a long stretch of the M40 mainline through J10, as well as extended entry links on the local road network to understand the levels of queuing on each arm.

1.2.3 The model extents and M40 J10 junctions are shown in **Figures 1.1 and 1.2.**

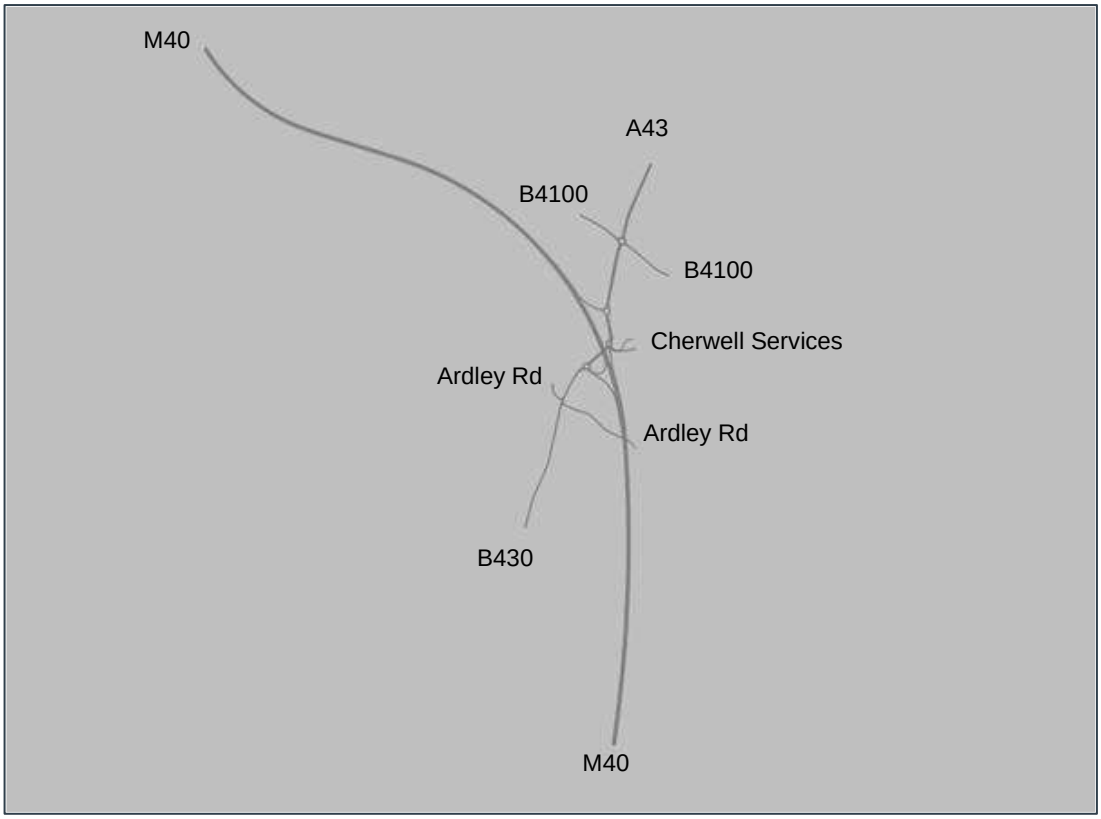


FIGURE 1.1: MODEL EXTENTS



FIGURE 1.2: M40 J10 JUNCTIONS

2 MODEL CHANGES

2.1 Introduction

2.1.1 This section details the changes made to the model from the original version supplied by HE.

2.1.2 A full breakdown of all the changes is provided in the VISSIM Log in **Appendix B**, whilst the following sections provide a breakdown of the key changes made to the model.

2.2 Global Model Changes

Scenario Management

2.2.1 As a result of the VISSIM version update, the model has been placed under scenario management. This has allowed both the AM and PM peaks to be integrated into one model and uses modification files to distinguish between the two.

2.2.2 Modification 1 includes all of the global changes to the model, which apply to both the AM and PM peak periods, whilst Modifications 2 and 3 provide peak specific changes (mainly O-D matrix flows). Modifications 4 and 5 are modifications that have been generated as a result of running the model for the various stages of dynamic assignment (cost/path runs, convergence & outputs).

2D/3D Models

2.2.3 When updating the VISSIM version from 5.40 to 2021 (SP07), there were a number of warnings related to 2D/3D models not existing in the new model. As VISSIM version 5.40 uses a number of old vehicle models and distributions, it was considered more appropriate to update these to the default models and distributions as provided in version 2021 (SP07).

2.2.4 The ‘2D/3D Model Segments’ and ‘2D/3D Model Distributions’ have been updated accordingly to suit the newer version.

Flares

2.2.5 The update of the model to the more recent version has allowed the flares in the model to be replicated in a more representative manner. This approach uses a 0.1m lane width on the approach to the flare, which allows a two-lane connector to join a two-lane link after the flare. In version 5.40, the ability to model different lane widths was not available, so this was not able to be modelled.

2.2.6 A comparison of the previously modelled flare arrangement and the new layout is shown in **Figure 2.1**.

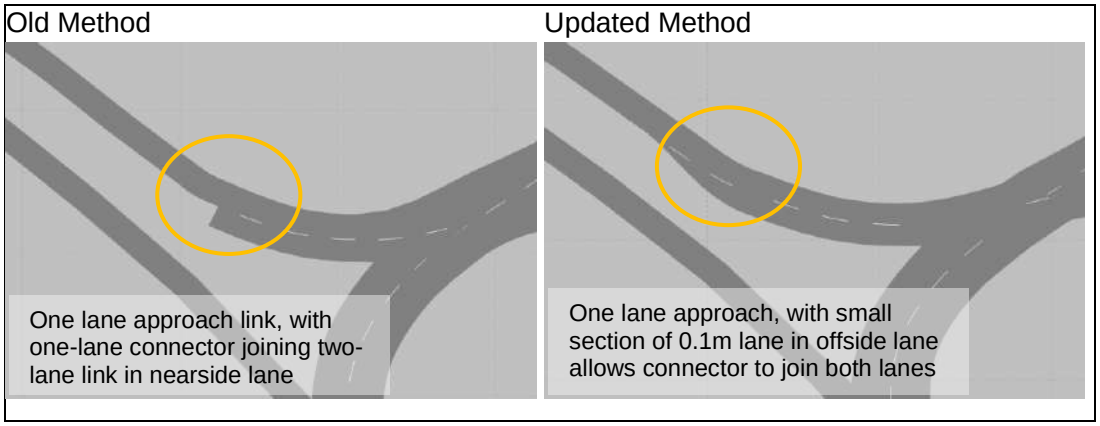


FIGURE 2.1: INITIAL AND REVISED FLARE LAYOUTS IN MODEL

Driver Behaviours

2.2.7 As a result of updating the flare in the model to use the 0.1m lane technique, a new 'flare' driving behaviour has been created which ensures that the vehicles do not change lanes too early and create artificial capacity. The set-up and key parameter changes are shown in **Appendix C**.

2.2.8 An associated display type and link behaviour type called 'flare' have also been created to assign the new flare technique to the model.

2.2.9 It should be noted that for the M40 merge and diverge areas, the driving behaviour has been retained as the 'merge' behaviour from the original model. This was deemed more appropriate for the higher speeds and flows on these links.

Dynamic Assignment

2.2.10 Within the dynamic assignment set-up, three elements have been changed from the original HE model:

- The evaluation interval (under the 'Files' tab) has been changed from 600s to 900s. This is in line with the VISSIM Help File, which recommends evaluation intervals of 15-60 minutes (900-3600s).
- The 'cost for path distribution with Kirchhoff' (under the 'Cost' tab) has been changed from 'sum of edge travel times' to 'measured path travel time'. This is in line with the VISSIM help file, which states that this option is more suitable for links with multiple lanes and for congested networks.
- The 'smoothing method' (under the 'Cost' tab) has been changed from 'exponential smoothing with smoothing factor' to 'MSA (method of successive averages)'. This has been done to give more control over the number of runs used to calculate the arithmetic mean (as MSA gives the previous iterations the same weight as the current iteration).

Desired Speed Distributions

2.2.11 As part of the calibration and validation of the extended section of the B430, the desired speed distributions on the southbound exit from M40 J10 were reviewed and amended. As the journey time was initially too slow, duplicates of distributions 19 and 22 were created (no's 100 and 101) and the lower speed bands were removed. The initial and updated distributions for LGVs and HGVs are shown in **Appendix D**.

Data Collection Points

2.2.12 The initial HE base model featured a number of data collection points which were used to check the entry flows into the model as part of the flow calibration (comparing the matrix vs. the modelled flows).

2.2.13 At the Baynard's Green roundabout in particular, it was noted that the data collection points were not located close to the parking lots where vehicles entered the model. This would have meant that during periods of queuing on the A43 North and B4100 East and West approaches, traffic would have entered the model, but would not have been counted (and therefore affecting the flow calibration comparisons). As such, the locations of data collection points (No's 13, 14, 1, 2, 3, 15, 25, 42, 16 & 17) were repositioned to be closer to the parking lots where they enter and exit the network.

2.3 B430/Ardley Road Staggered Crossroads

Network Layout

2.3.1 Aside from the version update, the other main change in the model was the inclusion of the B430/Ardley Road staggered crossroads and the extension of the B430 down to the Recycling Centre. The new extents are shown in **Figure 2.2**.

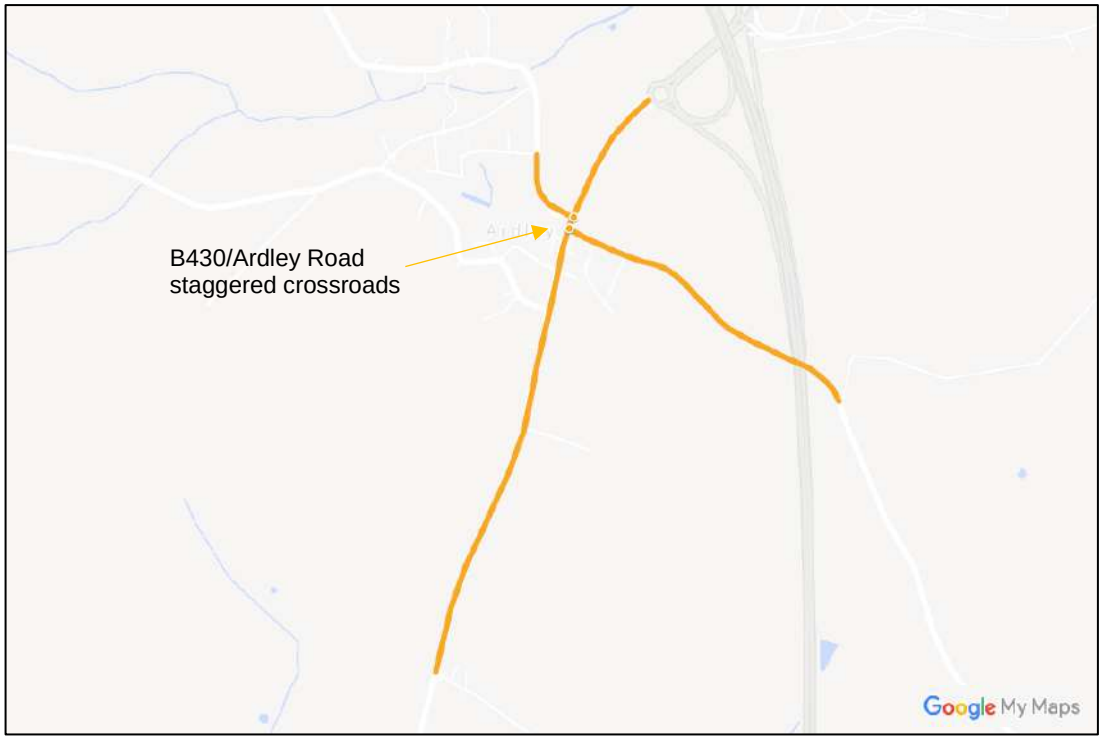


FIGURE 2.2: EXTENDED B430 & JUNCTION WITH ARDLEY ROAD

2.3.2 The new B430/Ardley Road staggered crossroads have been developed with new links and connectors, desired speed decisions to match on-site speed limits and reduced speed areas and priority rules added for the various turns at the junction.

2.3.3 **Figure 2.3** shows the set-up in more detail.

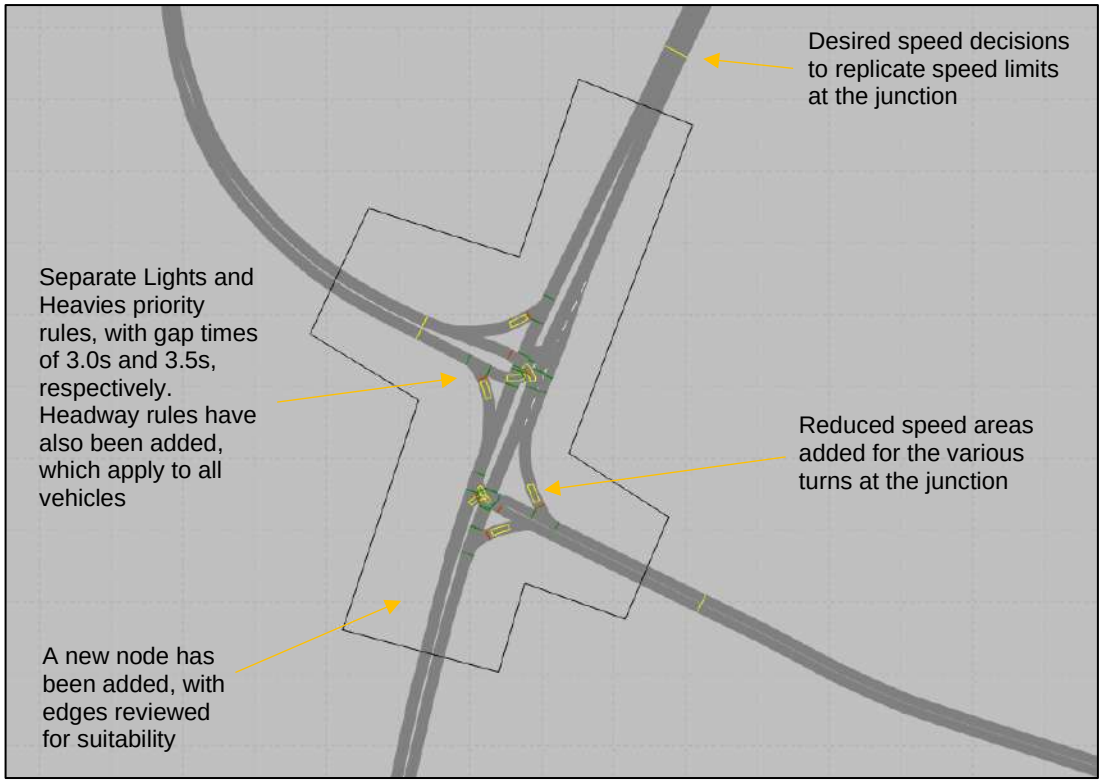


FIGURE 2.3: B430/ARDLEY ROAD JUNCTION SET-UP

2.3.4 The new junction has also introduced two new zones to the network – Zone 8 for Ardley Road West and Zone 9 for Ardley Road East.

Traffic Data

2.3.5 In order to include the B430/Ardley Road junction in the model, a classified turning count has been obtained from Thursday 8th February 2018 as part of the Heyford Park application. This data was used to update the model matrices and form part of the calibration and validation comparisons of the extended model.

2.3.6 The integration of the count data at this junction into the main model matrices is explained more in *Section 3*.

2.3.7 As well as turning count data, historic TomTom journey time data for the B430 between the Ardley Roundabout and the Ardley Fields Household Waste & Recycling Centre has been obtained from Streetwise. This has been acquired for the neutral days (Tuesday, Wednesday & Thursday) in March 2016, to correlate with the 2016 data used to update the HE VISSIM model. Time periods of 0645-0945hrs and 1530-1800hrs have been obtained (in 15-minute intervals) to match the time periods simulated in the HE VISSIM model for the AM and PM peak periods.

2.3.8 The plan of the extracted TomTom journey times as provided by Streetwise is shown in **Figure 2.4**.

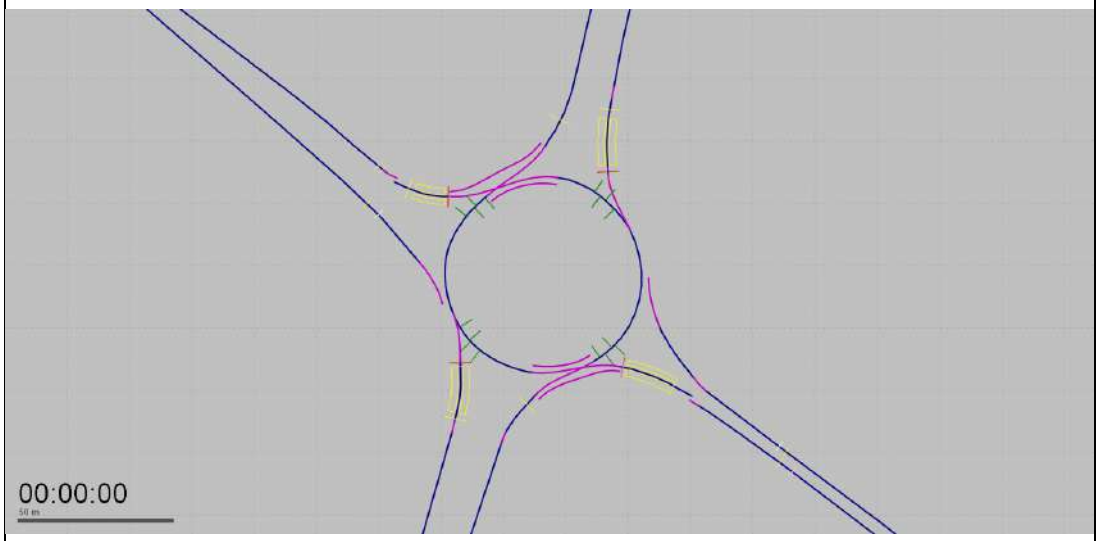


FIGURE 2.4: TOMTOM JOURNEY TIME DATA PLAN

2.4 Baynard's Green Roundabout

2.4.1 At the Baynard's Green roundabout, the main changes have been a review of the link/connector structure, with a view to reducing some of the lengths of the connectors, the amount of overlapping connector occurrences and adding in the new flare technique where applicable. The initial and revised layout is shown in **Figure 2.5**.

Initial Model



Revised Model

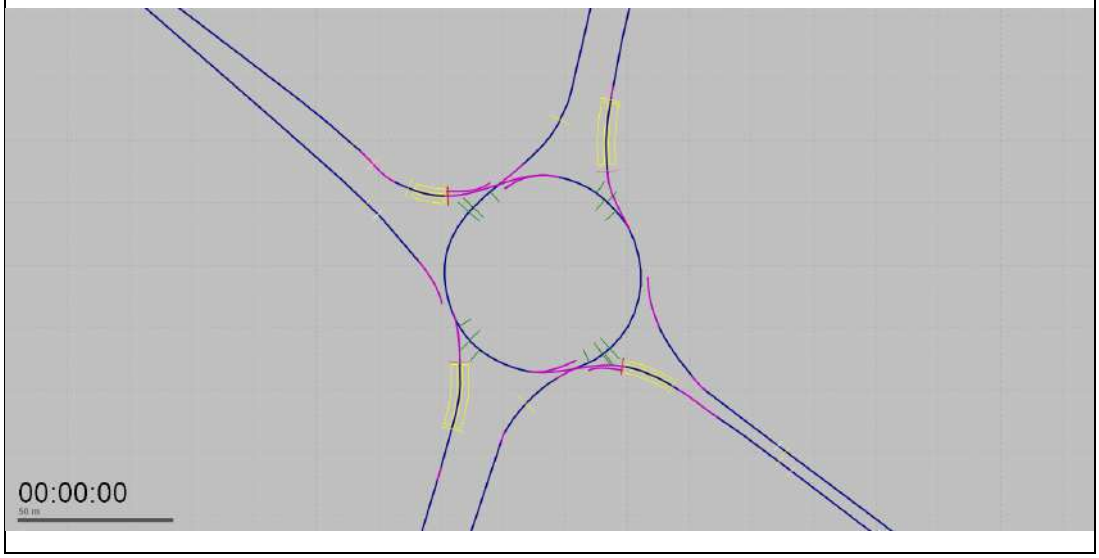


FIGURE 2.5: BAYNARD'S GREEN – UPDATED LINK/CONNECTOR STRUCTURE

2.4.2 Link 13 on the A43 South approach has been extended back slightly, to allow the reduced speed areas (No's 85 & 86) on the approach to be increased in length from 15m to 20m as part of the model calibration and validation. The reduced speed areas on the A43 North approach (No's 34 & 81) have also been increased in length from 15m to 20m.

2.4.3 As well as the link/connector structure, changes have been made to the priority rules during the calibration and validation process. Firstly, on the B4100 East and West approaches, No's 94, 95, 96, 97 and 91, 92, 94, 95 have been moved onto the straight-

ahead connectors (No's 10006 & 10010) and new priority rules (No's 130, 131, 132 & 133) have been added onto the left-turning connectors (10007 & 10002). This has been done to utilise the link structure and apply different rules to the left and ahead/right movements.

2.4.4 Priority Rules 90-97 have also been adjusted in terms of how the conflict markers have been set up for gap times. As the roundabout featured a lot of vehicles on the circulatory itself, there were quite a few instances of overlapping vehicles as the priority rules did not pick up vehicles that were changing lanes (either from Lane 1 to Lane 2 or vice versa). As such, each priority rule was configured with a single conflict marker that stretched across both lanes, to allow the vehicles changing lanes to be observed and to reduce the instances of overlapping vehicles. An example of the new set-up is shown in **Figure 2.6**.

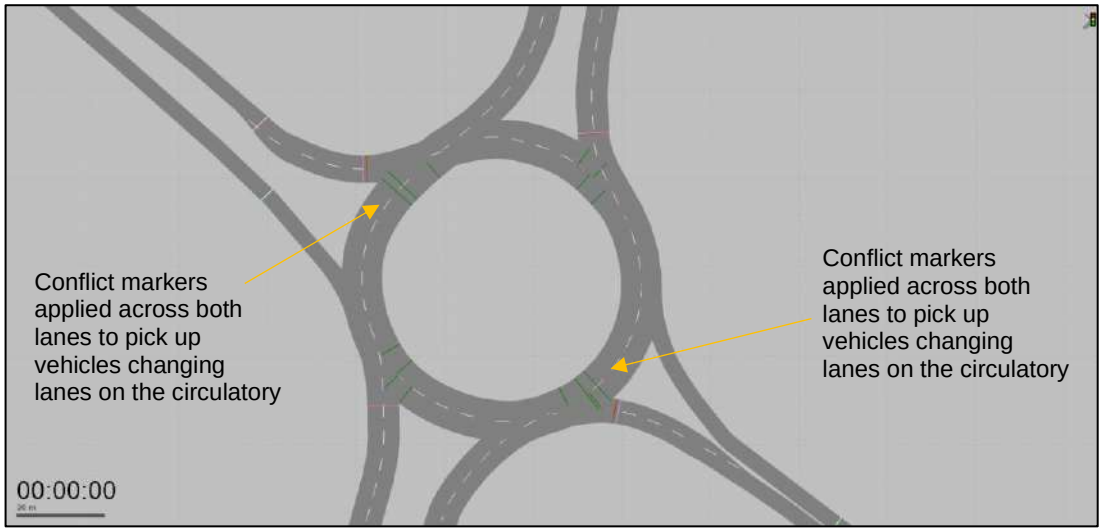


FIGURE 2.6: NEW PRIORITY RULE SET-UP FOR GAP TIMES ON B4100 APPROACHES

2.4.5 As well as these changes, a number of priority rules have reduced gap times to meet the calibration and validation criteria. The original and new values are provided in **Table 2.1**.

Priority Rule No.	Location	Original Gap Time Value	New Gap Time Value
41	A43 North – Lane 2 – Lights	3.9s	3.7s
42	A43 North – Lane 2 – Heavies	4.4s	4.2s
43	A43 North – Lane 1 – Lights	3.9s	3.7s
44	A43 North – Lane 1 – Heavies	4.4s	4.2s
93	B4100 East – Lane 1 - Lights	3.3s	3.6s
90	B4100 East – Lane 1 - Heavies	3.8s	4.1s
92	B4100 East – Lane 2 – Lights	3.3s	3.6s
91	B4100 East – Lane 2 – Heavies	3.8s	4.1s
33	A43 South – Lane 2 – Lights	4.1s	3.8s
34	A43 South – Lane 2 – Heavies	4.6s	4.4s
35	A43 South – Lane 1 – Lights	4.1s	3.8s
36	A43 South – Lane 1 – Heavies	4.6s	4.4s

TABLE 2.1: BAYNARD'S GREEN ROUNDABOUT – PRIORITY RULE CHANGES

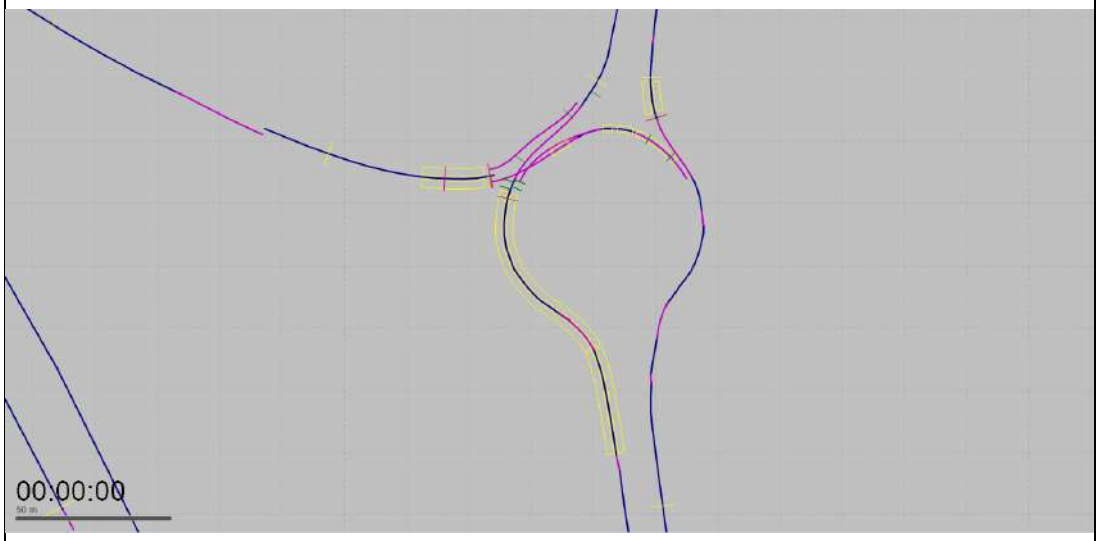
2.4.6 The desired speed decisions on the A43 North approach (No's 20 & 21) and B4100 East (No's 24 & 88) have also been amended from 20mph to 30mph, to be consistent with the other approaches to the roundabout.

2.4.7 The edges around the junction have been checked and any unrealistic movements and U-turns have been closed.

2.5 Padbury Roundabout

2.5.1 At the Padbury roundabout, the main changes have been a review of the link/connector structure, with a view to reducing some of the lengths of the connectors, reducing the level of overlapping connectors and adding in the new flare technique where applicable. The initial and revised layout is shown in **Figure 2.7**.

Initial Model



Revised Model

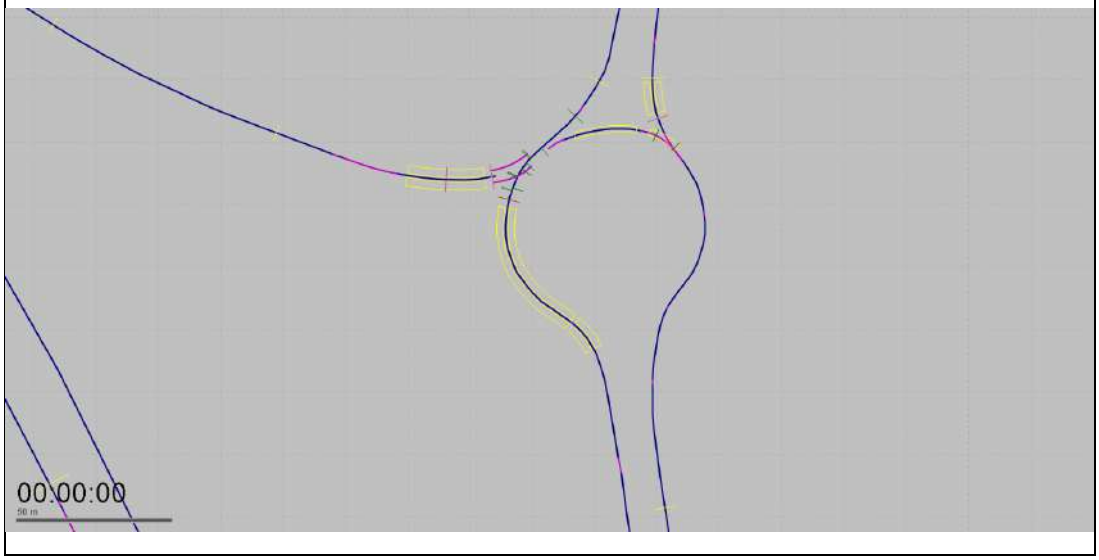


FIGURE 2.7: PADBURY – UPDATED LINK/CONNECTOR STRUCTURE

2.5.2 Following a visual review of the model, changes have also been made to the priority rules, specifically the section where the M40 SB Off-Slip meets the circulatory. On the circulatory, the headway markers on the A43 travelling northbound (No's 102 & 104) having their max speeds updated from 8.1mph to 10mph. The positions of the markers and lengths of the headways have also been adjusted slightly from the original base model and some additional conflict markers added for the M40 SB connectors. This was to reduce the instances of overlapping vehicles. On the M40 SB approach, an additional headway marker has been added to priority rule 103, with both lanes of the A43 now covered with a marker. For the left turn from the M40 SB off-slip, a new headway priority rule (No. 134) has been added to prevent vehicles from pulling out too soon during congestion conditions. The max speeds on all of the headway markers on the M40 SB off-slip have also been adjusted from 8.1mph to 12mph for the left turn and 20mph for turning right. Finally, the headway references for priority rules 1 & 2 have been removed (leaving only gap time parameters).

2.5.3 As part of the calibration and validation process and to tie in with the priority rule changes, some of the reduced speed areas have been adjusted. No's 114, 120 & 121 have been deleted and No's 118 & 119 have been shortened and repositioned from the original base model (see **Figure 2.7**).

2.5.4 The edges around the junction have been checked and any unrealistic movements and U-turns have been closed.

2.6 Cherwell Services Junction

2.6.1 At the Cherwell Services junction, the main changes have been a review of the link/connector structure, with a view to reducing some of the lengths of the connectors and adding in the new flare technique where applicable. There was also a focus on reducing the number of edges at this junction, to assist convergence and with a view to the future testing. There were two main areas of change:

- The A43 South to A43 North two-lane section has been updated to a single, two-lane link with 'no lane change' added between the two lanes. This allowed a single, two-lane connector to be added at each end, as well as a separate connector to access the services and M40 South. For connector 10041, 'no lane change' has been added for both lanes to keep vehicles in the same lanes and observe the hatching on the carriageway. Connector 10155 was modified in terms of its lane change distance and emergency stop distance (increased to 250m and 55m respectively) to remove instances of vehicles disappearing from the network because of not changing lanes in time.
- The connectors accessing the services and M40 South from the A43 South have been consolidated into two connectors as a result of using the 0.1m lane technique.

This has reduced the number of conflict areas required and simplified the edge structure.

2.6.2 The initial and revised layout is shown in **Figure 2.8**.

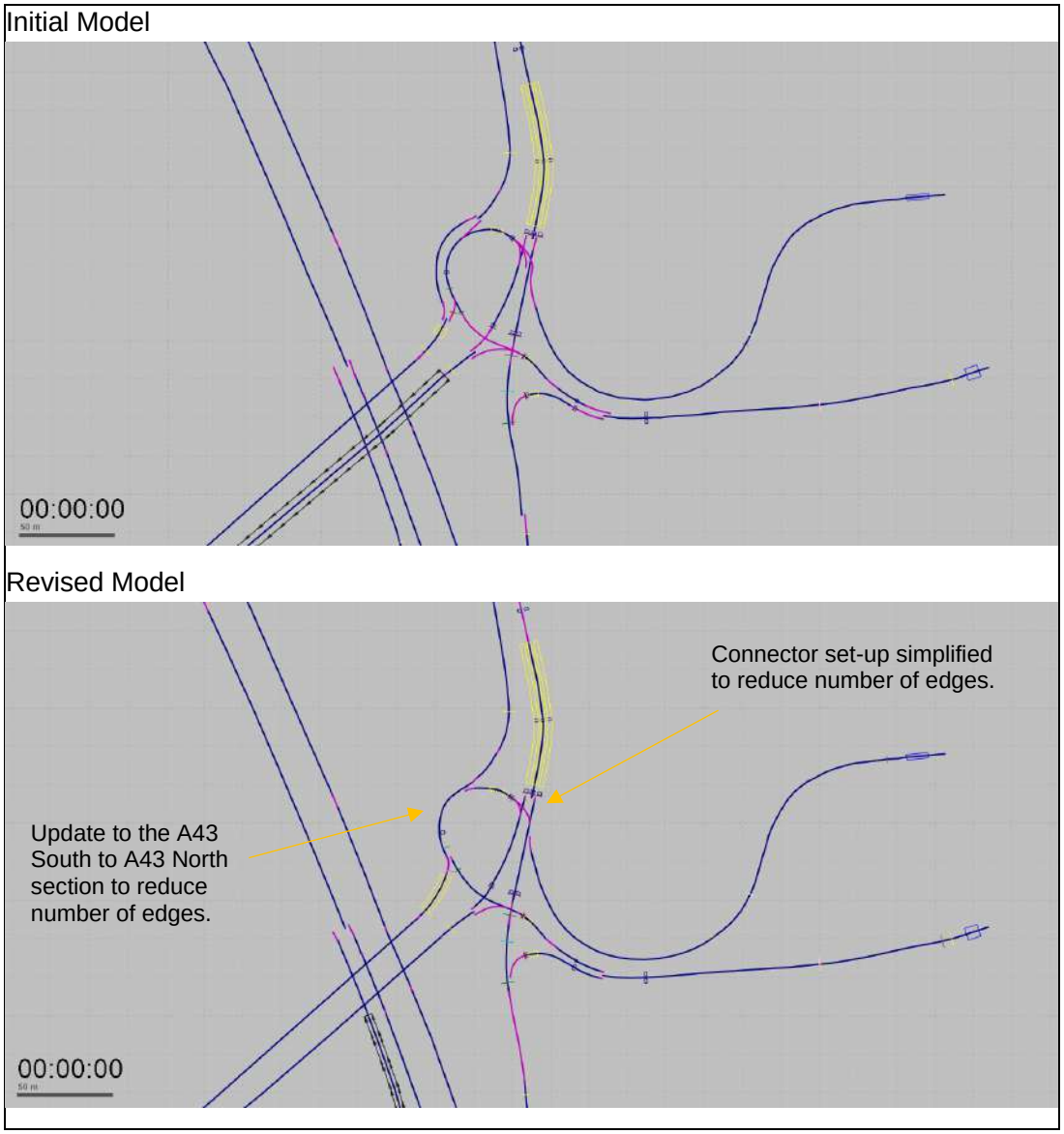


FIGURE 2.8: CHERWELL – UPDATED LINK/CONNECTOR STRUCTURE

2.6.3 The flare orientation on the A43 North has also been switched from the original HE model, with a review of Google Streetview showing that the approach flares to the offside lane, rather than the nearside lane in the original model.

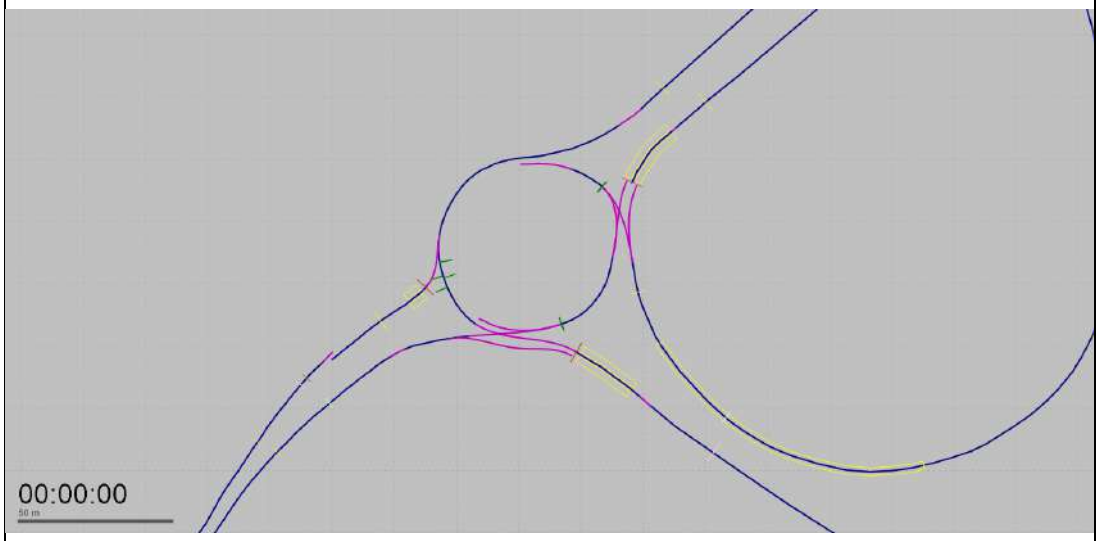
2.6.4 The desired speed decisions on the A43 South exit (No's 67 & 68) have been updated from 30mph to 50mph to match the speed limits at the junction.

2.6.5 The edges around the junction have been checked and any unrealistic movements and U-turns have been closed.

2.7 Ardley Roundabout

2.7.1 At the Ardley roundabout, the main changes have been a review of the link/connector structure, with a view to reducing some of the lengths of the connectors, reducing the level of overlapping connectors and adding in the new flare technique where applicable. The initial and revised layout is shown in **Figure 2.9**.

Initial Model



Revised Model

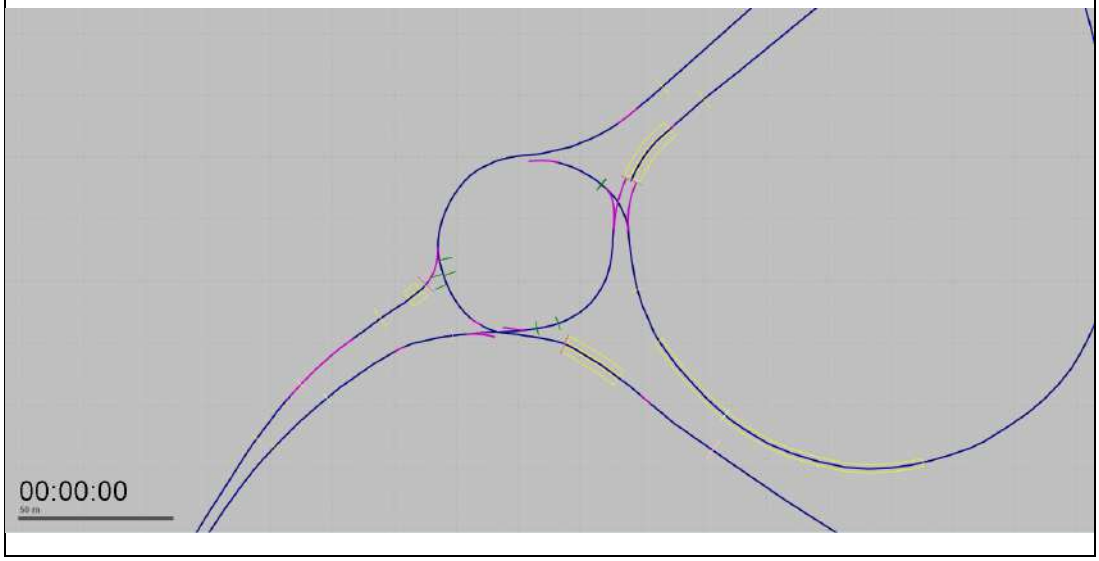


FIGURE 2.9: ARDLEY – UPDATED LINK/CONNECTOR STRUCTURE

2.7.2 To suit the lane markings on the bridge travelling southbound, connectors 10059 & 10060 have had their lane change and emergency stop distances increased from 200m and 5m to 240m and 25m respectively.

2.7.3 As well as the link/connector structure, changes have been made to the priorities during the calibration and validation process. The B430 approach priority rules have required a reduction in the gap times to meet the calibration and validation criteria, whilst the gap times on the M40 NB off-slip. The original and new values are provided in **Table 2.2**.

Priority Rule No.	Location	Original Gap Time Value	New Gap Time Value
49	B430 – Lane 2 – Lights	3.8s	3.4s
50	B430 – Lane 2 – Heavies	4.3s	3.9s
8	B430 – Lane 1 – Lights	3.8s	3.4s
7	B430 – Lane 1 – Heavies	4.3s	3.9s
98	M40 NB Off-Slip – Lane 1 - Lights	3.1s	3.3s
99	M40 NB Off-Slip – Lane 1 – Heavies	3.6s	3.8s
9	M40 NB Off-Slip – Lane 2 – Lights	3.1s	3.3
10	M40 NB Off-Slip – Lane 2 – Heavies	3.6s	3.8

TABLE 2.2: ARDLEY ROUNDABOUT – PRIORITY RULE CHANGES

2.7.4 The edges around the junction have been checked and any unrealistic movements and U-turns have been closed.

2.8 M40 Merge/Diverge Areas

2.8.1 The main change in these locations has been a review of the link/connector structure and the inclusion of the new flare technique. An example of this change for the M40 SB On-Slip and M40 NB Off-Slip is shown in **Figure 2.10**.

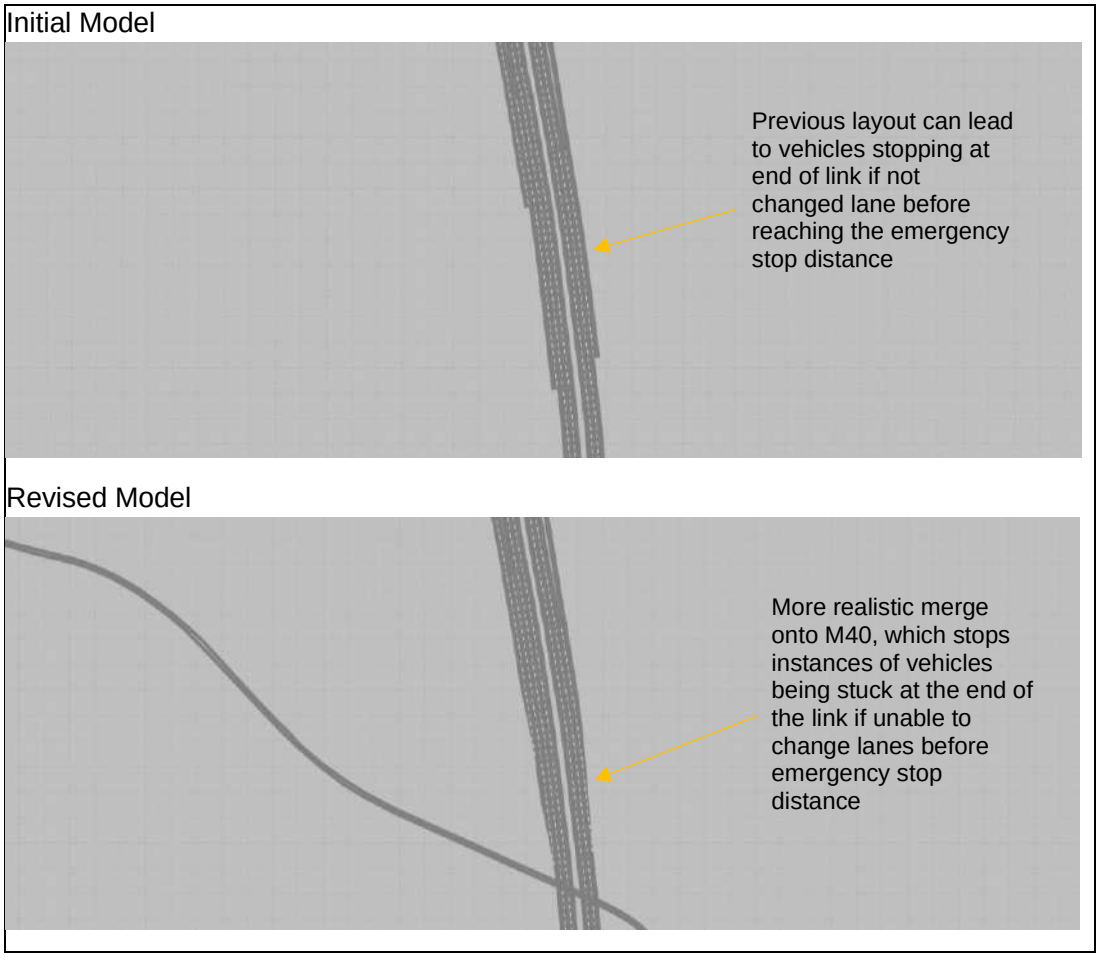


FIGURE 2.10: UPDATED MERGE/DIVERGE AREAS USING FLARE TECHNIQUE

2.8.2 The edges around these merge/diverge areas have been updated to ensure the positions do not overlap any connectors as a result of the link/connector changes.

2.9 PC MOVA Connection File

2.9.1 As a result of the updated model version and use of PC MOVA version 3.2.0.381 to operate the MOVA signals in the model, a new PC MOVA connection file was created. This was based on the original HE model to maintain a consistent set-up.

2.9.2 No other changes have been made to the signal controllers, signal heads or detectors in the model.

3 MODEL O-D MATRIX CHANGES

3.1 Introduction

3.1.1 This section details the changes made to the origin-destination (O-D) matrices to account for the new zones created as part of adding the B430/Ardley Road staggered crossroads.

3.1.2 The new zone layout as a result of the new junction is shown in **Figure 3.1**.

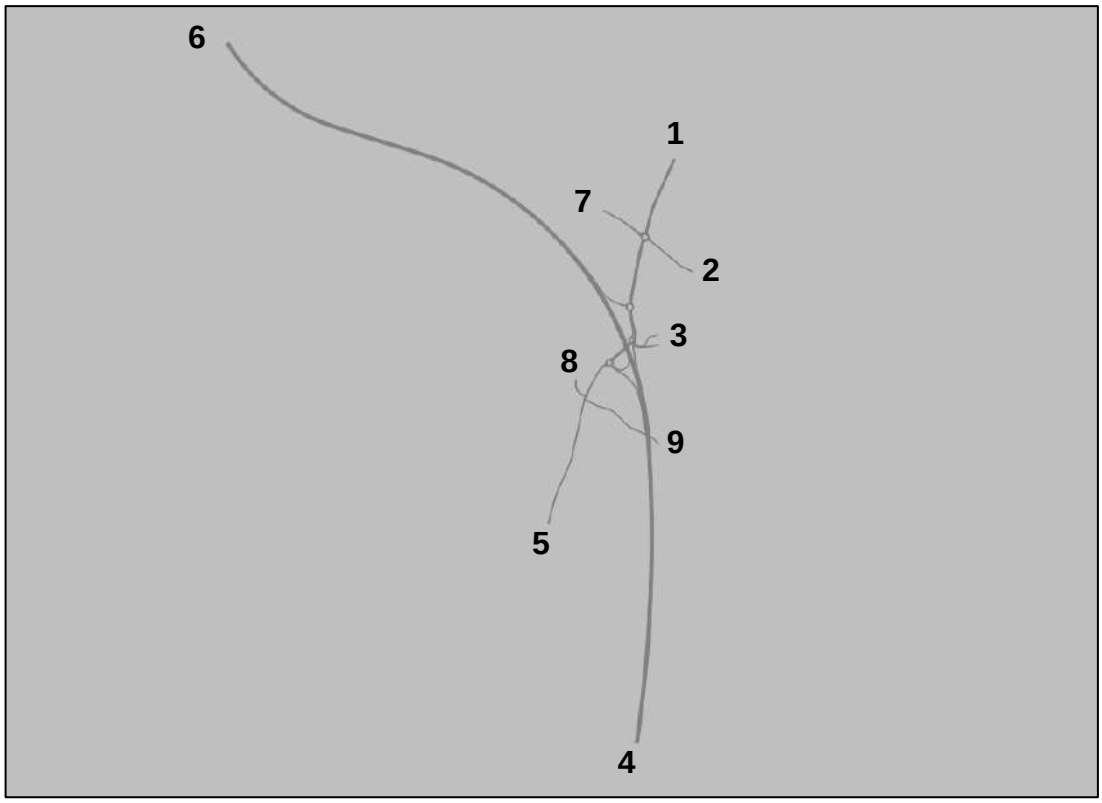


FIGURE 3.1: NEW ZONE LAYOUT

3.2 O-D Matrix Changes

B430/Ardley Road Staggered Crossroads

3.2.1 To update the O-D matrices to include the B430/Ardley staggered crossroads, the following steps were undertaken:

- Step 1 – The B430/Ardley Road junction data was reviewed and split into Lights and Heavies for the Build Up, Peak and Cool Down periods for both the AM and PM periods.
- Step 2 – The B430 North approach was analysed for each 15-minute period. This involved calculations to split the traffic travelling from Zones 1-4, 6 and 7 to Zone 5 in the original model to Zones 5, 8 and 9 in the extended model. The 2016 VISSIM matrix flows were used to proportion this traffic, rather than the 2018 count, for consistency with the existing model. It was acknowledged that there were differences

in the B430 North count between the 2016 model and the 2018 data, but it was felt that any major discrepancies could be dealt with during the model calibration and validation process through manual flow adjustments.

- Step 3 – The Ardley Road East was analysed for each 15-minute period. This involved calculations to split traffic from Zone 8 to Zones 5, 9 and Zones 1-4, 6 and 7. Proportions from the existing VISSIM model were used to assign traffic northbound on the B430. It was acknowledged that there were differences in the B430 North count between the 2016 model and the 2018 data, but it was felt that any major discrepancies could be dealt with during the model calibration and validation process through manual flow adjustments.
- Step 4 – The Ardley Road West was analysed for each 15-minute period. This involved calculations to split traffic from Zone 9 to Zones 5, 8 and Zones 1-4, 6 and 7. Proportions from the existing VISSIM model were used to assign traffic northbound on the B430. It was acknowledged that there were differences in the B430 North count between the 2016 model and the 2018 data, but it was felt that any major discrepancies could be dealt with during the model calibration and validation process through manual flow adjustments.
- Step 5 – The B430 South approach was analysed for each 15-minute period. This involved calculations to split the traffic travelling from Zone 5 to Zones 8, 9 and Zones 1-4, 6 and 7. The 2016 VISSIM matrix flows were used to proportion this traffic, rather than the 2018 count, for consistency with the existing model. It was acknowledged that there were differences in the B430 North count between the 2016 model and the 2018 data, but it was felt that any major discrepancies could be dealt with during the model calibration and validation process through manual flow adjustments.
- Step 6 – The new base matrices for the extended model were collated together from the existing model and the new calculations.

Calibration & Validation – Manual Adjustments

3.2.2 During the calibration and validation of the flows, the only outlier was with the A43 North to A43 South movement at the B430/Ardley Road junction in the AM peak.

3.2.3 There was a difference of ~160 vehicles between the two counts, which caused the model to fail to meet a GEH <5 and the individual flow criteria as detailed in TAG.

3.2.4 In an attempt to rectify this, whilst not affecting other movements in the network, the following vehicles have been manually added to the 15-minute peak hour matrices:

- Lights
  - Z1 (A43 North) to Z5 (B430) = +48 (+12 per 15 min. matrix)
  - Z4 (M40 South) to Z5 (B430) = +12 (+3 per 15 min matrix)

- Z6 (M40 North) to Z5 (B430) = +12 (+3 per 15 min matrix)

- Heavies
  - Z1 (A43 North) to Z5 (B430) = +12 (+3 per 15 min matrix)

3.3 Final O-D Matrices

3.3.1 The final O-D matrices used in the model following the inclusion of the B430/Ardley Road staggered crossroads and the calibration and validation iterations are provided in **Appendix E**.

4 MODEL CONVERGENCE

4.1 Introduction

4.1.1 As the model is dynamic assignment and has been subject to a number of changes, there was a requirement to re-run the model and undertake a convergence exercise. This ensured that the model was suitably stable before running for calibration and validation outputs.

4.1.2 The DfT's *TAG Unit 3.1 (P.22 – Para. 3.4.5)* and TfL's *Model Audit Process, v3.5 (P.140 – Section V222)* provides convergence criteria that can be used to assess the stability of dynamic assignment models. Within VISSIM, the following criteria can be assessed over the modelled peak period:

- 95% of all path traffic volumes change by less than 5% for at least four consecutive iterations
- 95 of travel times on all paths change by less than 20% for at least four consecutive iterations
- the percentage of links on which flows or costs change by less than a fixed percentage (recommended as 1%) between successive iterations.

4.2 Convergence Results

4.2.1 After an initial batch run to build up a cost (*BEW) and path (*WEG) file for the AM and PM peak models, the models were then run for 35 runs, using Random Seed 42 with no increment.

4.2.2 The individual WEG files were extracted and analysed, along with the total travel time from the network performance to check the convergence levels. This involved the following checks:

- Travel Times Check 1 – Calculating the 'share of paths' that have been met the convergence criteria set out in TAG (95% within 20% for four consecutive runs).
- Travel Times Check 2 – Using the WEG file from VISSIM, an additional check identifying if the internal convergence criteria was met for all paths.
- Volume Difference – Using the 'New' and 'Old' path volumes to check that the convergence criteria was met as set out in TAG (95% within 5 vehs for four consecutive runs)
- Total Travel Time Difference – Using the Network Performance outputs to the check the percentage differences between runs and determine if this met TAG criteria (within 1% for four consecutive runs).

4.2.3 The results of each run are shown in **Figures 4.1 and 4.2**.

AM

Run Number	Paths		Vol. Difference (0-5)	Network Performance	
	Travel Times (0-20%)			Total Travel Time (s)	Diff from prev. run
	Check 1 - ShrConvPathTT	Check 2 - Paths List - Converged = Yes			
1	100%	76%	95%	3369038.2	-
2	100%	73%	97%	3398805.4	0.9%
3	100%	77%	96%	3394014.4	-0.1%
4	100%	77%	100%	3394014.4	0.0%
5	100%	79%	100%	3394014.4	0.0%
6	100%	81%	100%	3394014.4	0.0%
7	100%	81%	100%	3394014.4	0.0%
8	100%	83%	100%	3394014.4	0.0%
9	100%	83%	100%	3394014.4	0.0%
10	100%	84%	100%	3394014.4	0.0%
11	100%	85%	100%	3394014.4	0.0%
12	100%	85%	100%	3394014.4	0.0%
13	100%	85%	100%	3394014.4	0.0%
14	100%	85%	100%	3394014.4	0.0%
15	100%	88%	100%	3394014.4	0.0%
16	100%	88%	100%	3394014.4	0.0%
17	100%	88%	100%	3394014.4	0.0%
18	100%	88%	100%	3394014.4	0.0%
19	100%	89%	100%	3394014.4	0.0%
20	100%	92%	100%	3394014.4	0.0%
21	100%	93%	100%	3394014.4	0.0%
22	100%	95%	100%	3394014.4	0.0%
23	100%	95%	100%	3394014.4	0.0%
24	100%	97%	100%	3394014.4	0.0%
25	100%	97%	100%	3394014.4	0.0%
26	100%	99%	100%	3394014.4	0.0%
27	100%	100%	100%	3394014.4	0.0%
28	100%	100%	100%	3394014.4	0.0%
29	100%	100%	100%	3394014.4	0.0%
30	100%	85%	96%	3416478.6	0.7%
31	100%	100%	96%	3394014.4	-0.7%
32	100%	100%	100%	3394014.4	0.0%
33	100%	100%	100%	3394014.4	0.0%
34	100%	100%	100%	3394014.4	0.0%
35	100%	100%	100%	3394014.4	0.0%

Most suitable run - BEW and WEG used for results reporting

FIGURE 4.1: CONVERGENCE RESULTS – AM PEAK

4.2.4 As can be seen in **Figure 4.1**, the AM peak model met all the convergence criteria after 35 runs. As a result, Run 35 has been chosen as the most suitable run for outputting results.

PM

Run Number	Paths		Vol. Difference (0-5)	Network Performance	
	Travel Times (0-20%)			Total Travel Time (s)	Diff from prev. run
	Check 1 - ShrConvPathTT	Check 2 - Paths List - Converged = Yes			
1	100%	71%	100%	3371514.8	-
2	100%	75%	100%	3371514.8	0.0%
3	100%	76%	100%	3371514.8	0.0%
4	100%	80%	100%	3371514.8	0.0%
5	100%	81%	100%	3371514.8	0.0%
6	100%	84%	100%	3371514.8	0.0%
7	100%	84%	100%	3371514.8	0.0%
8	100%	85%	100%	3371514.8	0.0%
9	100%	87%	100%	3371514.8	0.0%
10	100%	87%	100%	3371514.8	0.0%
11	100%	87%	100%	3371514.8	0.0%
12	100%	87%	100%	3371514.8	0.0%
13	100%	87%	100%	3371514.8	0.0%
14	100%	88%	100%	3371514.8	0.0%
15	100%	88%	100%	3371514.8	0.0%
16	100%	88%	100%	3371514.8	0.0%
17	100%	89%	100%	3371514.8	0.0%
18	100%	89%	100%	3371514.8	0.0%
19	100%	91%	100%	3371514.8	0.0%
20	100%	91%	100%	3371514.8	0.0%
21	100%	91%	100%	3371514.8	0.0%
22	100%	92%	100%	3371514.8	0.0%
23	100%	92%	100%	3371514.8	0.0%
24	100%	93%	100%	3371514.8	0.0%
25	100%	93%	100%	3371514.8	0.0%
26	100%	96%	100%	3371514.8	0.0%
27	100%	96%	100%	3371514.8	0.0%
28	100%	96%	100%	3371514.8	0.0%
29	100%	96%	100%	3371514.8	0.0%
30	100%	97%	100%	3371514.8	0.0%
31	100%	97%	100%	3371514.8	0.0%
32	100%	97%	100%	3371514.8	0.0%
33	100%	97%	100%	3371514.8	0.0%
34	100%	97%	100%	3371514.8	0.0%
35	100%	99%	100%	3371514.8	0.0%

Most suitable run - BEW and WEG used for results reporting

FIGURE 4.2: CONVERGENCE RESULTS – PM PEAK

4.2.5 As can be seen in **Figure 4.2**, the PM peak model met all the convergence criteria after 35 runs. As a result, Run 35 has been chosen as the most suitable run for outputting results.

5 MODEL CALIBRATION & VALIDATION

5.1 Introduction

5.1.1 For consistency with the M40 J10 LMVR produced by AECOM in August 2017, the following criteria have been utilised for checking the model calibration and validation:

- Calibration – Entry Flow Checks
- Validation – Junction Turning Count Checks
- Validation – Journey Time Comparisons

5.1.2 It is acknowledged that the LMVR includes commentary on queues. However, in the absence of any data or detailed analysis in the LMVR appendices, only a very high-level summary will be provided on the queue length comparisons.

5.1.3 Whilst not provided in the AECOM LMVR, a check of the Exit Flows in the model has also been compared to provide another validation measure.

5.1.4 The results in the following sections are based on 20 random seed runs, starting with Seed 42 and having an increment of 10.

5.2 Calibration – Entry Flow Checks

5.2.1 To ensure that the correct flows were entering the model, a comparison of the entry flows was required.

5.2.2 TfL's Modelling Guidelines states that model flows should be within 5% of the observed values to ensure that all traffic is successfully loaded into the model during the peak modelled period (*Model Audit Process, v3.5 (P.149 – Section V304).* TAG Unit 3.1 also references validation of the trip matrices (*para. 3.3.7 and Table 1*), with differences between modelled flows and counts required to be within 5%.

5.2.3 The GEH statistic has also been compared, with a value less than 3 deemed suitable in accordance with TfL Guidelines.

5.2.4 The results are summarised in **Figures 5.1 and 5.2** for the AM and PM peak models, with more detail provided in **Appendix F**.

AM (0745-0845hrs) SUMMARY STATISTICS	
Total number of counts considered	9
VISSIM model counts with <5% difference	9
% of VISSIM counts with <5% difference	**100.00%**
VISSIM model counts with GEH <3	9
% of VISSIM counts with GEH <3	**100.00%**

FIGURE 5.1: ENTRY FLOW CALIBRATION – AM PEAK

PM (1630-1730hrs) SUMMARY STATISTICS	
Total number of counts considered	9
VISSIM model counts with <5% difference	9
% of VISSIM counts with <5% difference	**100.00%**
VISSIM model counts with GEH <3	9
% of VISSIM counts with GEH <3	**100.00%**

FIGURE 5.2: ENTRY FLOW CALIBRATION – PM PEAK

5.2.5 From **Figures 5.1 and 5.2**, it can be seen that the AM and PM peak model meets the entry flow criteria, with the modelled flows for all entries being within 5%. As the secondary check, the GEH for all of the modelled flows are also within 3.

5.3 Calibration – Queue Length Comparisons

5.3.1 The original LMVR provided by HE and produced by AECOM, only included a number of paragraphs detailing the queue comparison between the model and the observed conditions.

5.3.2 In order to provide a high-level comparison, the HE base model has been run for screenshots using Seed 42 for each 15-minute period during the AM and PM peaks. A similar set of screenshots have been collected from the updated model and the comparisons are shown in **Appendix G**.

5.3.3 As a brief summary, in the AM peak, the updated model shows consistent queuing with the HE model, with the A43 North approach to the Baynard's Green roundabout being the longest queue in both models. The only difference is that in the updated model, the queues on the B4100 East approach at Baynard's Green are sustained for a longer period of time in comparison to the HE model.

5.3.4 In the PM peak, the updated model shows a northbound queue from the A43 South approach to the Baynard's Green roundabout, which reaches back to the Padbury roundabout by the end of the peak period. This is consistent with the original HE model. The M40 SB off-slip also shows queuing back to the mainline in the updated mode towards the end of the peak period. This is consistent with HE observations of this slip road.

5.4 Validation – Turning Count Checks

5.4.1 The modelled turning counts at each of the junctions have been compared against the observed data, as provided in AECOM's LMVR (Tables 13-19 and Appendix G).

5.4.2 TAG Unit 3.1 (*para. 3.3.11 and Table 2*) sets out the criteria for link flows and turning movements, which are as follows:

Table 2 Link Flow and Turning Movement Validation Criteria and Guidelines		
Criteria	Description of Criteria	Guideline
1	Individual flows within 100 veh/h of counts for flows less than 700 veh/h	> 85% of cases
	Individual flows within 15% of counts for flows from 700 to 2,700 veh/h	
	Individual flows within 400 veh/h of counts for flows more than 2,700 veh/h	
2	GEH < 5 for individual flows	> 85% of cases

FIGURE 5.3: TAG UNIT 3.1 FLOW CALIBRATION & VALIDATION CRITERIA

5.4.3 TfL Guidelines (*Model Audit Process, v3.5 (P.149 – Section V304)* recommend that 'critical' links and turns achieve a GEH of within 3 for more than 85% of the observations. Therefore, the comparison has also been made against this criterion, with the M40 J10 junctions all deemed 'critical' for this model.

5.4.4 The results of the comparisons for the AM and PM peaks are summarised in **Figures 5.4 and 5.5** for All Vehicles. **Appendix H** includes more detailed comparisons for All Vehicles, Light Vehicles and Heavy Vehicles.

AM Peak (0745-0845) Summary - ALL	
Total number of counts considered	43
VISSIM model counts with GEH <3	40
% of VISSIM counts with GEH <3	93.02%
VISSIM model counts with GEH <5	43
% of VISSIM counts with GEH <5	100.00%
VISSIM model counts with GEH <10	43
% of VISSIM counts with GEH <10	100.00%
VISSIM model counts meeting TAG Unit 3.1 criteria	42
% of VISSIM counts meeting TAG Unit 3.1 flow criteria	97.67%

FIGURE 5.4: TURNING COUNT VALIDATION – AM PEAK

5.4.5 **Figure 5.4** shows that the AM peak meets the criteria as set out in TAG for turning count validation. 100% of the turns have a GEH less than 5 and 93% (40/43) have a GEH less than 3. Furthermore, 98% (42/43) satisfy the individual flow criteria.

5.4.6 There is one turn which does not meet the individual flow criteria, which is the north to south movement on the B430 at the junction with Ardley Road. Attempts were made to bring this in through a manual adjustment of the O-D matrices, however this could not be achieved without compromising the other calibration and validation criteria. It should be noted that the comparison is being made to 2018 data, where it was acknowledged that

there were some differences against the 2016 matrix data. Despite this, the count is still within 5 for the GEH and is considered representative.

PM Peak (1630-1730) Summary - ALL	
Total number of counts considered	43
VISSIM model counts with GEH <3	40
% of VISSIM counts with GEH <3	93.02%
VISSIM model counts with GEH <5	43
% of VISSIM counts with GEH <5	100.00%
VISSIM model counts with GEH <10	43
% of VISSIM counts with GEH <10	100.00%
VISSIM model counts meeting TAG Unit 3.1 criteria	43
% of VISSIM counts meeting TAG Unit 3.1 flow criteria	100.00%

FIGURE 5.5: TURNING COUNT VALIDATION – PM PEAK

5.4.7 In the PM peak, **Figure 5.5** shows that the PM peak model achieves the TAG criteria for turning counts. Furthermore, 93% (40/43) are within a GEH of 3.

5.5 Validation – Journey Time Comparisons

5.5.1 The modelled journey times have been compared against the observed data, as provided in AECOM's LMVR (Tables 23 & 24 and Appendix H). For consistency with the initial HE model, all journey time markers have been retained in the same place for the updated model.

5.5.2 Two additional journey time routes have been included to check the extended B430 between Ardley roundabout and the Recycling Centre.

5.5.3 TAG Unit 3.1 (*para. 3.3.15 and Table 3*) sets out the criteria for journey time validation, which is as follows:

Table 3 Journey Time Validation Criterion and Guideline	
Criteria	Guideline
Modelled times along routes should be within 15% of surveyed times (or 1 minute, if higher than 15%)	> 85% of routes

FIGURE 5.6: TAG UNIT 3.1 – JOURNEY TIME VALIDATION CRITERIA

5.5.4 The results of the comparisons for the AM and PM peak periods are summarised in **Figures 5.7 and 5.8**, with more detailed comparisons provided in **Appendix I**.

AM Peak (0745-0845) Summary - ALL	
Vehicle Class	ALL
Total number of routes considered	22
Number of VISSIM routes within 15% of observed	21
% of VISSIM routes within 15% of observed	95.45%
Number of VISSIM routes within 60s of observed	22
% of VISSIM routes within 60s of observed	100.00%
Number of VISSIM routes meeting at least one set of criteria	22
% of VISSIM routes meeting at least one set of criteria	100.00%
Numnber of VISSIM routes within observed min/max range	20
% of VISSIM routes within observed min/max range	90.91%

FIGURE 5.7: JOURNEY TIME VALIDATION – AM PEAK

5.5.5 **Figure 5.7** shows that in the AM peak, 95% (21/22) of the routes are within 15%. This meets the criteria set out in TAG Unit 3.1.

5.5.6 There is one route which is outside of the 15% difference. This is the Route 102 (A43 North to B4100 East). However, this only has a 10s difference, is still within 60s and is also within the observed min/max range. This indicates that the modelled time is still representative.

PM Peak (1630-1730) Summary - ALL	
Vehicle Class	ALL
Total number of routes considered	22
Number of VISSIM routes within 15% of observed	21
% of VISSIM routes within 15% of observed	95.45%
Number of VISSIM routes within 60s of observed	22
% of VISSIM routes within 60s of observed	100.00%
Number of VISSIM routes meeting at least one set of criteria	22
% of VISSIM routes meeting at least one set of criteria	100.00%
Numnber of VISSIM routes within observed min/max range	20
% of VISSIM routes within observed min/max range	90.91%

FIGURE 5.8: JOURNEY TIME VALIDATION – PM PEAK

5.5.7 **Figure 5.8** shows that in the PM peak, the model meets TAG Unit 3.1 criteria, with 95% (19/22) of the routes being within 15%.

5.5.8 Route 702 (B4100 West to B4100 East) is the only route that fails to meet the 15% difference, but is within 60s. Despite efforts to reduce this journey time, this impacted on the journey time validation of other movements in the network. As such, this route should be noted as being too slow in the future year testing undertaken.

5.6 Validation – Exit Flow Checks

5.6.1 The final validation check was on the exit flows, to ensure that the vehicles in the O-D matrices reached their destinations within the AM and PM peak periods.

5.6.2 To check these values, TAG Unit 3.1's criteria on Link Flows has been utilised (see **Figure 5.1**).

5.6.3 **Figures 5.9 and 5.10** summarise the comparisons of the modelled vs. matrix exit flows, with more detailed results provided in **Appendix J**.

AM (0745-0845hrs) SUMMARY STATISTICS	
Total number of counts considered	9
VISSIM model counts with GEH <5	9
% of VISSIM counts with GEH <5	**100.00%**
VISSIM model counts within TAG Unit 3.1 Criteria	9
% of VISSIM counts within TAG Unit 3.1 Criteria	**100.00%**

FIGURE 5.9: EXIT FLOW VALDATION – AM PEAK

PM (1630-1730hrs) SUMMARY STATISTICS	
Total number of counts considered	9
VISSIM model counts with GEH <5	9
% of VISSIM counts with GEH <5	**100.00%**
VISSIM model counts within TAG Unit 3.1 Criteria	9
% of VISSIM counts within TAG Unit 3.1 Criteria	**100.00%**

FIGURE 5.10: EXIT FLOW VALIDATION – PM PEAK

5.6.4 From **Figures 5.9 and 5.10**, it can be seen that all of the exit flows in the AM and PM peak model have a GEH within 5 and meet the Individual Flow criteria.

6 SUMMARY & CONCLUSIONS

6.1 Summary

6.1.1 This Local Model Validation Report (LMVR) has detailed changes made to the 'M40 J10' VISSIM model provided by Highways England (HE) to ADC infrastructure Ltd (ADC) for use in testing a proposed Strategic Rail Freight Interchange (SRFI) west of M40 J10 in Oxfordshire.

6.1.2 This report has also provided comparisons against traffic flows, queue lengths and journey times to check that the updated model is representative of on-site conditions.

6.2 Conclusions

6.2.1 The main conclusions are:

- The model has been successfully updated from VISSIM version 5.40-06 to 2021 (SP07).
- The model has been extended with the addition of the B430/Ardley Road staggered crossroads.
- Notable, additional changes made include:
  - Placing the model under Scenario Management and updating the 2D/3D model distributions, dynamic assignment set-up and data collection point locations.
  - Changes to the link/connector structure at the four M40 J10 roundabouts to reduce the lengths of the connectors and use the 0.1m lane technique for modelling flares.
  - Adjustments to the priority rules to reduce the instances of overlapping vehicles and meet the calibration and validation criteria.
- Following the changes made to the model, a calibration and validation exercise has determined that the model is representative of existing conditions and is suitable for testing the proposed Oxford SRFI proposals.

APPENDIX A:
HE/AECOM LOCAL MODEL VALIDATION REPORT

M40 Junction 10 VISSIM Model Revalidation – Local Model Validation Report

August, 2017

60540307.EMS 107

M40 Junction 10 VISSIM Model Revalidation – Local Model Validation Report

This report outlines the methodology adopted to revalidate the base VISSIM micro-simulation model of the M40 Junction 10.

Quality information

Document name	Ref	Prepared for	Prepared by	Date	Reviewed by
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Rev3	01/08/2017	Checked	Jorge Sanchez Racionero	Consultant
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Introduction

01

Overview

This Local Model Validation Report (LMVR) outlines the methodology adopted to revalidate the base VISSIM micro-simulation model of the M40 Junction 10, including A43 Ardley, Baynards Green, Cherwell, and Padbury junctions.

Background

In FY15/16 AECOM were commissioned by Highways England to undertake an iteration exercise to design an improvement scheme that could accommodate future growth up to 2031 to secure optimal operation on both the M40 mainline and the A43 approach to M40 J10. This scheme included signal controlled arrangements at Ardley, Cherwell and Padbury junctions using MOVA.

The proposed improvement scheme will need to be further investigated in order for it to be considered as a potential scheme to be included in the Department for Transport (DfT) Road Investment Strategy (RIS) for road period 2 (2020-2025) or 3 (beyond 2025).

This will involve having a robust tool for undertaking a Value for Money (VfM) assessment. Therefore, Highways England has commissioned AECOM to use 2016 traffic survey data (undertaken by AECOM between Monday 14th to Sunday 20th March 2016) to revalidate the existing M40 J10 VISSIM model, which was based on traffic surveys from October 2010 and did not include the pinch point scheme delivered in 2015 at M40 J10.

Study Area

The extent of the study area includes:

- A43 Cherwell junction (signal controlled using MOVA);
- A43 / B4100 Baynards Green (priority controlled);
- A43 / B430 Ardley Roundabout (priority controlled); and
- A43 Padbury Junction (priority controlled).

In addition, approximately 5km of the M40 mainline north and south of M40 J10, as well as 1km of the A43 mainline north of A43 / B4100 Baynards Green Roundabout have been modelled. The following local roads have also been included:

- Approximately 500m of the B430 Station Road west approach to A43 / B430 Ardley Roundabout.
- Approximately 450m of the B4100 Banbury Road west approach to A43 / B4100 Baynards Green Roundabout.
- Approximately 500m of the B4100 Banbury Road east approach to A43 / B4100 Baynards Green Roundabout.

A comparison between modelled and observed traffic survey data has been undertaken in order to ensure that the model adequately replicates on-site traffic conditions and can be used to test future year scenarios.

The extents of the model are shown in ***FIGURE 1.1***

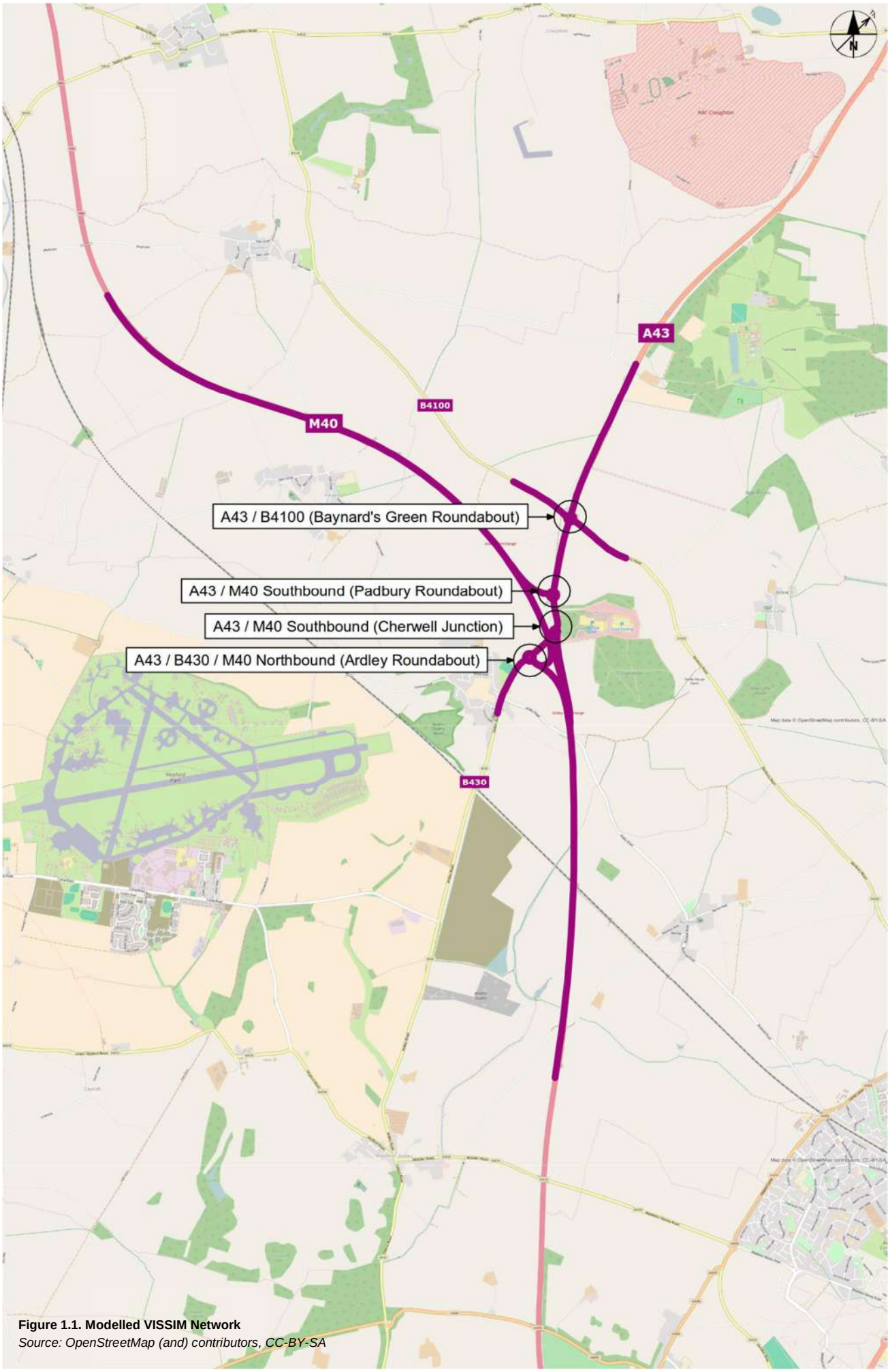

Figure 1.1. Modelled VISSIM Network
Source: OpenStreetMap (and) contributors, CC-BY-SA

Study Objectives

The main objective of the study is to revalidate the existing M40 Junction 10 VISSIM model to allow future year testing.

The purpose of the study is to update the existing VISSIM model of M40 Junction 10 to incorporate the pinch point scheme implemented in 2015, using 2016 traffic survey data to produce a micro-simulation model which is calibrated and validated against observed site data to DMRB and WebTAG standards. Once the model is calibrated and validated it will allow further testing of an improvement scheme designed by AECOM in FY 15/16 in order for it to be considered as a potential scheme for inclusion in RIS 2 or RIS 3.

This latest revision of the Local Model Validation Report (LMVR) follows discussions with Highways England's Transport Planning Group (TPG), formerly TAME. It was deemed that although the previous base model provided suitable levels of validation in accordance with both DMRB and WebTAG standards, tighter levels of validation were required at one approach. Thus, it was agreed to revise and refine the model focusing on validation enhancements to the model, particularly for the PM peak model. This LMVR reports the enhanced base model validation.

Observed Conditions

02

Observed Data

Traffic surveys were undertaken from Monday 14th March to Sunday 20th March 2016 by National Data Collection (NDC).

In order to revalidate the existing VISSIM model of M40 Junction 10, the following baseline data was obtained:

- Fully Classified Turning Counts (using video surveys);
- Origin – Destination (O-D) matrices and Journey Time data (using Automatic Number Plate Recognition (ANPR) data);
- Automatic Traffic Counts (ATCs);
- Passage Count data (from HE TRADS database);
- Bus Information;
- Base Mapping;
- Video and Site Observations;
- Signal Specifications.

Traffic Surveys

Traffic surveys were undertaken from Monday 14th March to Sunday 20th March 2016 by National Data Collection (NDC) following the traffic survey specification "*160304-60343293-EM20-TSS-001*" which can be found in Appendix A.

Number Plate Surveys on Thursday 17th March 2016 at 15 cordon points across the network were carried out from 06:30 to 09:30 and from 15:30 to 18:30 using ANPR. These were collected to establish O-D data and to derive journey time estimates. The cordon points are detailed below and are shown in ***Figure 2.1*** below:

- Baynards Green Roundabout
  - ID 1 – B4100 Banbury Road West - Westbound;
  - ID 2 – B4100 Banbury Road West - Eastbound;
  - ID 3 – A43 North – Northbound;
  - ID 4 – A43 North - Southbound;
  - ID 5 – B4100 Banbury Road East - Eastbound;
  - ID 6 – B4100 Banbury Road East – Westbound.
- Padbury Junction
  - ID 7 – M40 Southbound Off-Slip.
- Ardley Roundabout
  - ID 8 – B430 Station Road South - Northbound;
  - ID 9 – B430 Station Road South - Southbound;
  - ID 10 – M40 Northbound Off-Slip;
  - ID 11 – M40 Northbound On-Slip.
- Cherwell Roundabout
  - ID 12 – M40 Southbound On-Slip;
  - ID 13 – Moto Cherwell Valley Services Entry;
  - ID 14&15 – Moto Cherwell Valley Services Exit.

ATCs were collected between Monday 14th to Sunday 20th March 2016, inclusive at the following locations:

- Baynards Green Roundabout
  - ATC 1: B4100 Banbury Road - West of Baynards Green Roundabout;
  - ATC 2: B4100 Banbury Road – East of Baynards Green Roundabout;
- Ardley Roundabout
  - ATC 3: B430 Station Road – West of Ardley Roundabout.

Fully Classified Turning Counts were undertaken on Thursday 17th March 2016 at Ardley Roundabout, Cherwell Junction, Padbury Junction and Baynards Green Roundabout at each approach of these junctions. The locations are as detailed below and shown in ***Figure 2.2***:

- Baynards Green Roundabout
  - A – A43 North of Baynards Green Roundabout;
  - B – B4100 Banbury Road West;
  - C – A43 South of Baynards Green Roundabout;
  - D – B4100 Banbury Road East.
- Padbury Junction
  - A – A43 North of Padbury Junction;
  - B – M40 Southbound Off-Slip;
  - C – A43 South of Padbury Junction.
- Ardley Roundabout
  - A – B430 Station Road South of Ardley Roundabout;
  - B – M40 Northbound On/Off-Slip;
  - C – A43 North of Ardley Roundabout.

- Cherwell Roundabout
  - A – A43 North of Cherwell junction;
  - B – A43 South-West of Cherwell junction;
  - C – M40 Southbound On-Slip;
  - D – Moto Cherwell Valley Services.

Figure 2.1. ANPR Sites locations.
Source: Nationwide Data Collection (NDC)



NDC	**Site / Location:**	Sites 1 to 15	**Project No:**	6102	**Drawing No:**	6102-ANPR	**Drawn By:**	NT
	Survey Date:	Thursday 17th March 2016	**Project Name:**	M40 Junction 10				
	Survey Times:	06:30 to 09:30 & 15:30 to 18:30	**Drawing Title:**	ANPR Survey Locations				

Figure 2.2. MCC Sites locations.
Source: Nationwide Data Collection (NDC)



NDC	Site / Location:	Site 1 - A43/B4100	Project No:	6102	Drawing No:	6102/01	Drawn By:	CW
	Survey Date:	Thursday 17th March 2016	Project Name:	M40 Jct 10				
	Survey Times:	0600 - 1900	Drawing Title:	Site Layout and Observed Movements				



NDC	Site / Location:	Sites 3 to 4	Project No:	6102	Drawing No:	6102/02	Drawn By:	CW
	Survey Date:	Thursday 17th March 2016	Project Name:	M40 Jct 10				
	Survey Times:	0600 - 1900	Drawing Title:	Site Layout and Observed Movements				

Passage Count Data

Passage Count Data was obtained from the ANPR / MCC / ATC counts carried out on 17th March 2016 at the locations which are shown in Traffic Surveys, Figure 2.1 and Figure 2.2.

AECOM's Technical Note *160504 EM8 TN1 - Survey Data Check*, dated 5th May 2016, explains the traffic survey data checks in more detail and can be found in Appendix B of this report.

TRADS sites M40/9113B and M40/9023A have been used to derive traffic flows on the M40 mainline. The derived traffic flows have then been used to prepare the O-D matrices to be used within the VISSIM model. TRADS sites locations are shown in ***FIGURE 2.3***.

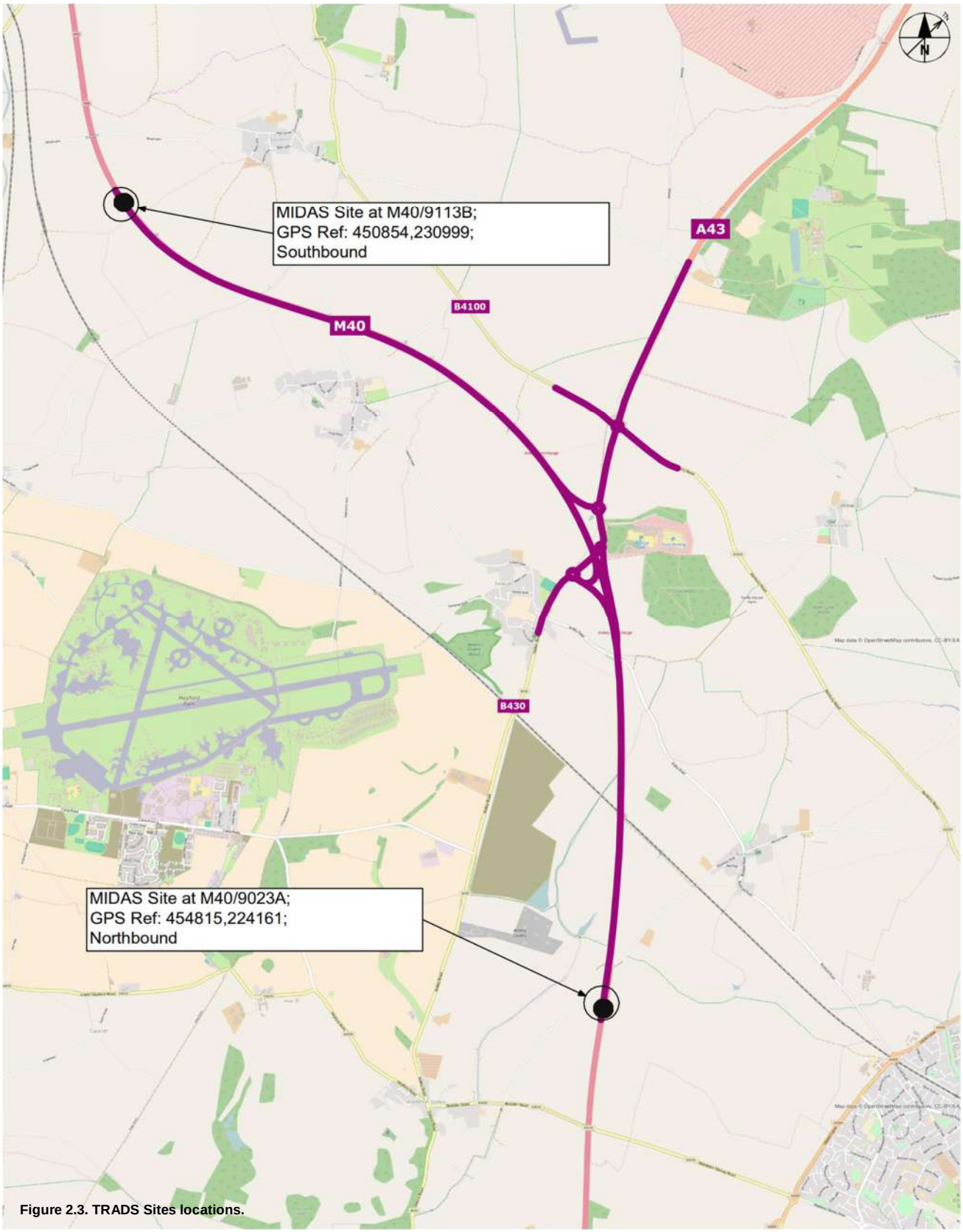

Figure 2.3. TRADS Sites locations.

Bus information

From the site observations (on Thursday 17th March 2016) it was noted that no public transport routes run through the model extent. Afterwards, a desk top check was carried out using Google Maps and Traveline website to confirm this. It was found that bus route 81 travels along the B4100 from Bicester along the A43 until the B430 / Ardley Road junction, continuing towards Somerton. However, after reviewing bus times for this route it was confirmed that all services are outside of the peak periods modelled and therefore have not been included in the model.

The 81A also has stops along the network on the B430; however this is outside the model extent. Therefore no public transport stops have been included in the model.

Base mapping

In order to construct the network, Mastermap topographical mapping was obtained from Highways England on 16th June 2016 for the areas around M40 J10, Ardley Roundabout, Cherwell Junction, Padbury Junction and Baynards Green Roundabout. This has allowed for the network to be updated on mapping which is to the correct scale and extents, including recently implemented Pinch Point Scheme at Cherwell Junction.

"*Drawing No.530011_GA00_01*" (as shown in Appendix C) obtained from A-One+ on 26th March 2014 and site observations have been used to ensure that the network is updated with accurate road markings and signal locations at Cherwell Junction.

Site Observations

Site observations were undertaken by AECOM during a site visit to M40 J10, Baynards Green Roundabout, Padbury Junction, Cherwell Junction and Ardley Roundabout on Thursday 17th March 2016. Site observations were collected during AM peak period of 07:00-10:00 and PM peak period of 16:00-19:00. Site observations were used to gather information on the following:

- Photos of road markings at the junctions;
- Observations and notes of driver behaviour, lane usage and queues at the junctions;
- Determination of speed limits in the immediate vicinity of the junctions;
- Check of public transport stops – determining services at each stop and indicative locations.

Video Observations

Video footage was also obtained for the survey day, collected by NDC as part of the survey specification agreement. The videos were obtained on the 17th March 2016 from 06:00 until 19:00, at MCC locations shown in ***FIGURE 2.2***.

The footage has been used to check the operation of the modelled network and to observe driver behaviour.

This has been particularly relevant to identify timings and the precise location of a minor incident that occurred at the stopline of the nearside lane on the A43 North Entry approach to Baynards Green roundabout, where a vehicle was stopped for approximately nine minutes (from 07:33 to 07:42) on the survey date (Thursday 17th March 2016).

Highways England's Transport Planning Group (TPG), formerly TAME, advised AECOM to better replicate the performance and behavior in the model at the M40 J10 southbound off-slip. A detailed review of the video footage recorded on the survey date at the M40 J10 SB off-slip and the A43 northbound link between Baynards Green roundabout and Cherwell junction has been undertaken, in order to accurately replicate driver's behaviors and queues at these approaches. This was especially important during the PM period, where queues formed at the A43 northbound entry approach at Baynards Green roundabout extended back through Padbury junction, creating long queues on the M40 J10 SB off-slip. Aggressive gap acceptance and 'pushy' driver behaviour of vehicles on the M40 J10 SB off-slip and collaborative 'merge-in-turn' driver behavior of vehicles on the A43 is observed in the video footage. AECOM has sought to replicate these behaviours in the model.

Signal Specifications

In order to accurately represent traffic signals at Cherwell Junction, in February 2016 signal data was obtained from AOne+ (as shown in ***TABLE 1***).

Table 1: Signal Data Received

Location	Data Type	Name	Description	Date	Received From
Cherwell Junction	MOVA Dataset	M40J10.mds	Cherwell Junction	February 2016	AOne+
	MOVA PR File	M40J10.pr	Cherwell Junction	February 2016	AOne+
	MOVA Link Diagram	MOVA Cherwell Junction	MOVA Lane/Link Configuration	August 2015	AOne+

Data Review of Observed Data

Traffic data received has been carefully checked and reviewed to ensure its suitability for being used in model development and validation.

To verify the suitability of the observed data, a series of checks were made to identify any potential issues which may have led to problems calibrating and validating the VISSIM models. AECOM's Technical Note *"160504 EM8 TN1 - Survey Data Check*", dated 5th May 2016, explains the data checks in more detail and can be found in Appendix B of this report

This note concluded that the survey data submitted by NDC is satisfactory, with some minor problems attributed to ATC Site 1. It was recommended to exclude ATC Site 1 from the VISSIM model development and to use alternative traffic data (e.g. MCC or TRADS). All other ATC sites are acceptable overall for use in the model development.

Independent checks of the MCC data against the ATC and TRADS data illustrated that the data collected by NDC is acceptable to create origin-destination matrices.

It is noted that a minor incident took place at the stopline of the nearside lane on the A43 North Entry approach to Baynards Green roundabout on 17th March 2016 at approximately 07:33, with a vehicle stopped at the nearside lane until approximately 07:42. This was identified as a potential risk for the VISSIM model re-validation.

Peak Determination

Modelled AM and PM Peak periods identified are 07:45 – 08:45 and 16:30 – 17:30 respectively.

Once the survey data had been reviewed, the AM and PM peak periods were determined based on the MCC data for each individual junction. From the MCC data it was found that the overall peak hours for the network was as follows:

- AM peak: 07:15 – 08:15;
- PM peak: 16:30 – 17:30.

However, due to unusual queues formed during the survey date at the stopline of the nearside lane on the A43 North Entry approach to Baynards Green roundabout because of the minor incident that took place on the survey day for approximately 9minutes (07:33 – 07:42), it was decided to further analyse traffic levels for different AM periods using MCC data. It was found that there were very little differences in traffic flow levels between 07:15 – 08:15 and 07:45 – 08:45 periods, so 07:45 – 08:45 period was adopted as AM peak period.

Therefore the peak hours used in the VISSIM modelling are as follows:

- AM peak: 07:45 – 08:45;
- PM peak: 16:30 – 17:30.

Modelling Approach

03

Approach Overview

A VISSIM micro-simulation model of the M40 Junction 10 network has been updated to reflect existing conditions at the M40 Junction 10 and to provide a controlled base for allowing future testing at the junction to be undertaken.

VISSIM is a microscopic, behaviour-based multi-purpose traffic simulation program developed by PTV. The model uses the psycho-physical car-following model developed by Wiedemann and a related lane-changing model originally designed by Sparmann.

VISSIM has been used to model the M40 Junction 10, Ardley Roundabout, Baynards Green Roundabout, Padbury Junction and Cherwell Junction as the program can analyse various typical traffic operations including scenarios of merging / diverging traffic under congested and free flow conditions, with constraints such as lane configuration, traffic composition and priority control. Complex signalised junctions can also be modelled in VISSIM with a reasonable degree of accuracy when combined with external software such as VAP (vehicle actuated program) and more recently PC MOVA.

The wide range of tools combined with the ability to assess interaction between consecutive junctions makes VISSIM an extremely useful tool for the evaluation of the base year performance and any future year testing.

Another benefit of VISSIM is its graphical interface that allows the user to add traffic and signal data to existing base maps or aerial photographs of intersections and road layouts. The capability dramatically improves the quality of animation of traffic operations providing an important graphical interface to aid in presentation of the outcomes.

The simulation can be calibrated and validated using local traffic counts, queue lengths and journey time information. This allows the production of a site-specific base model that can accurately reflect the behaviour of traffic in the study area.

Model Coverage

The M40 Junction 10 VISSIM model includes the following junctions:

- A43 / B4100 Banbury Road Baynards Green Roundabout;
- A43 / M40 Southbound Padbury Junction;
- A43 / M40 Southbound Cherwell Junction;
- A43 / B430 Station Road / M40 Northbound Ardley Roundabout.

The extents of the model can be seen in ***FIGURE 3.1***.

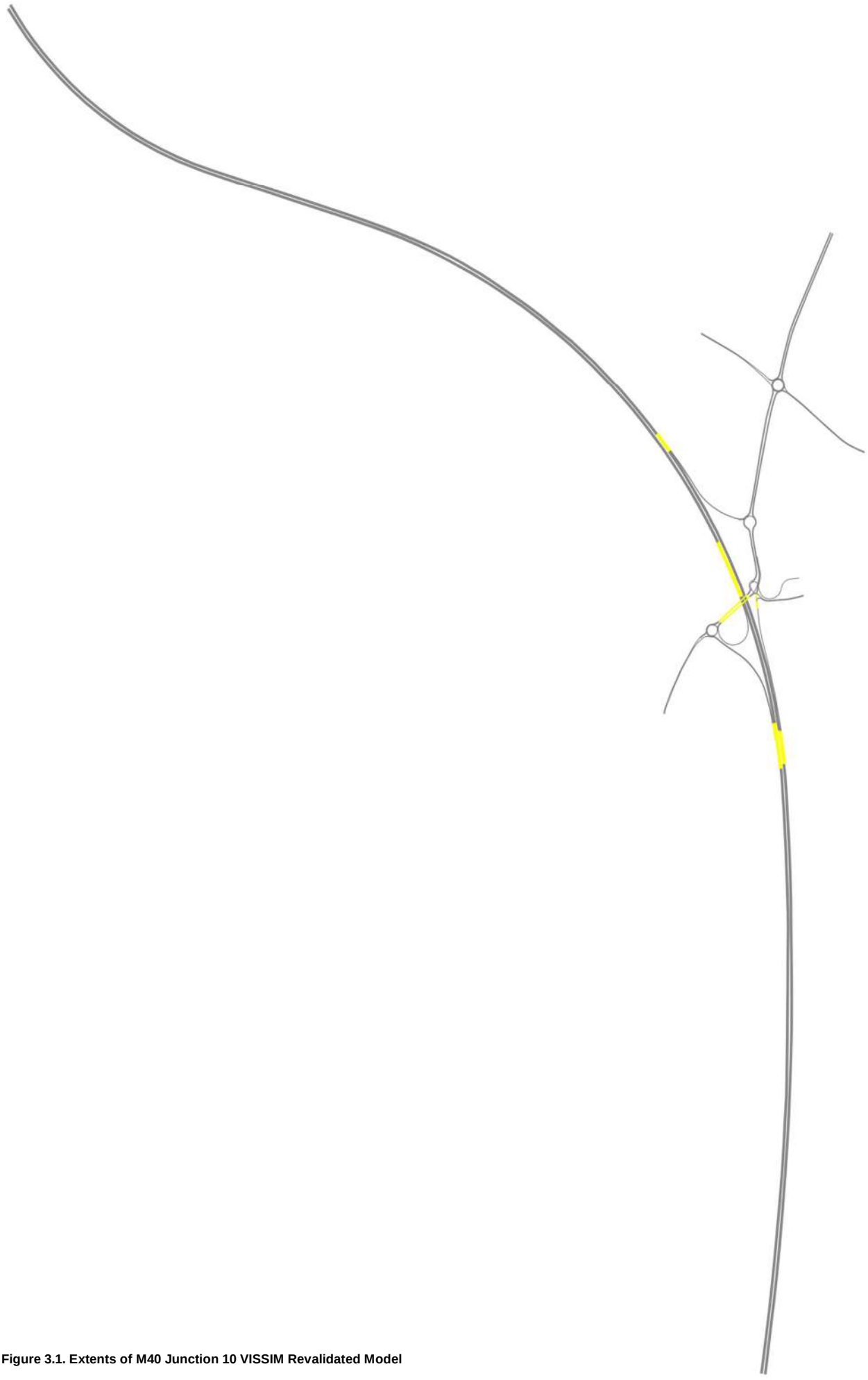

Figure 3.1. Extents of M40 Junction 10 VISSIM Revalidated Model

Modelling Specifications

The M40 Junction 10 VISSIM model has been developed using the following specification

Table 2: Modelling Parameters

Modelling Parameters		
Assessment Year	2016	
Assessment Scenarios	AM Peak	
	PM Peak	
	AM Period	0645-0915hrs
	AM Build-Up Period	0645-0745hrs
	AM Peak Period	0745-0845hrs
	AM Cool-Down Period	0845-0915hrs
	PM Period	1530-1800hrs
	PM Build-Up Period	1530-1630hrs
	PM Peak Period	1630-1730hrs
	PM Cool-Down Period	1730-1800hrs
Evaluation Periods	AM Peak Period	0745-0845hrs
	PM Peak Period	1630-1730hrs
Vehicle Types	Light Vehicles, LVs	
	Heavy Vehicles, HVs	
VISSIM Version	5.40.06	
PC MOVA Version	PC MOVA 2.0.4	
	MOVA Kernel 7.0	

Network Development

04

Network Development

Model development has been undertaken in accordance with guidance in both *DMRB Volume 12a and Interim Advice Note 36-01 'The use and application of micro-simulation models*'.

This section describes how the model network has been built and provides a brief overview of the data used. It then describes the data entry checks undertaken. Model building has been undertaken in accordance with guidance in both *DMRB Volume 12a* and *Interim Advice Note 36-01 'The use and application of micro-simulation models'*.

The network has been updated using OS mapping and A-One+ *Drawing No.530011_GA00_01* of the Pinch Point Scheme at Cherwell Junction. These layers acted as the base mapping, which allowed junction geometry to be checked to ensure that the network incorporated in the model was representative. Lane widths and flare lengths have been checked using the base mapping, together with Google Earth Imagery and video footage from the traffic survey conducted on 17th March 2016. Furthermore, site observations such as pictures, sketches, site visit logs and videos have been used to check geometry coding.

Changes to Cherwell Junction include:

- An additional lane at the A43 North Southbound approach (2 lanes increased to 3 lanes);
- Signalisation of all approaches;
- Segregated lane from A43 South to A43 North;
- Relocation of M40 Southbound On-Slip (previously located at Padbury Junction).

Finalised layout is shown in ***APPENDIX C***.

The VISSIM network is made up of a series of links joined together by connectors. A link is a unidirectional representation of a section of highway. A connector is a unidirectional section of highway that joins two links. The information required for each link is:

- Lane width;
- Link length;
- Number of lanes;

Traffic enters and leaves the network via external points known as parking lots in VISSIM; a practice referred to as zone / zone loading in more traditional traffic modelling.

A collection of links and connectors that form a significant traffic route decision is referred to as a node. This represents a junction.

A summary of the modelled network is as follows.

The model network contains:

- 7 Model Zones (14 Parking Lots);
- 18 Nodes (significant areas of route decisions – junctions);
- 176 Links and Connectors;
- 1 Signal Controller.

Vehicular parameters

After checking the physical characteristics of the network, vehicular parameters were reviewed in order to make the model reflect existing site conditions as accurately as possible.

VISSIM has a set of default values for various vehicle characteristics such as; range of vehicular lengths, standard weights and power distributions, maximum / minimum acceleration values. As changes in gradient have not been used within this model, these default settings were deemed appropriate and have been applied.

Signal Control

As outlined in ***SIGNAL SPECIFICATIONS***, one signal controller and 9 stoplines (each lane is coded as a stopline) are included within the model in order to code the existing signalised Cherwell Junction.

In order to model the operation of the signals, signal data has been obtained as detailed in ***SIGNAL SPECIFICATIONS***, ***TABLE 1***.

Cherwell Junction has been modelled under PC MOVA control, utilising the MOVA dataset obtained from A-one+. This dataset has been revised, having removed the "all red" Stage 3 after having reviewed the traffic survey videos, that showed that this stage was never called and signals operation was limited to Stages 1 and 2.

A signal controller has been created in VISSIM to model the traffic signals using this updated dataset.

The link/lane/detector layout drawing obtained from A-one+ has been used to determine the locations of all the detectors at the junction, whilst the signal specifications have been used to create the PC MOVA connection file (used to control the MOVA signals in the model).

Desired Speed Decisions and Distribution Profiles

Desired speed decisions, which specify the speed distribution profile, are placed along a link in VISSIM to ensure that once a vehicle passes through the marker, it adopts the speed distribution profile associated with that marker. This allows on-site speeds to be modelled. The locations of any desired speed decisions in the VISSIM model were identified during the site visits and then confirmed, including their extents, using recorded videos for the modelling periods.

Speed distribution profiles used in the model have been derived from three sources:

– ATC speed data received from NDC;

– Department for Transport (DfT) National vehicle free-flow speeds statistics data;

– VISSIM default speed distributions.

In the locations where ATC counters were placed within the modelled network (***TRAFFIC SURVEYS***), speeds recorded on Thursday 17th March 2016 were utilised to produce speed distribution graphs. These speed profiles have been derived for light and heavy vehicle classes separately. The final profiles are given in Appendix D.

At the locations where no ATC data was available, speed distributions have been amended based on DfT National vehicle free-flow speeds statistics data.

The parameters used are detailed in ***TABLE 3***.

Table 3: Desired Speed Decisions and Distribution Profiles

No	Location	Source	Vehicle Class	Speed Distribution
Baynards Green Roundabout				
20, 21	A43 North Southbound	VISSIM	LVs	20mph LVs
			HVs	20mph HVs
109, 110	A43 North Southbound	DfT	LVs	70mph LVs
			HVs	70mph HVs
77, 78	A43 North Southbound	DfT	LVs	60mph LVs
			HVs	60mph HVs
79, 84	A43 North Southbound	DfT	LVs	50mph LVs
			HVs	50mph HVs
119, 120	A43 North Northbound	DfT	LVs	70mph LVs
			HVs	70mph HVs
22, 23	B4100 West Eastbound	DfT	LVs	30mph LVs
			HVs	30mph HVs
107	B4100 West Eastbound	DfT	LVs	50mph LVs
			HVs	50mph HVs
90	B4100 West Eastbound	ATC	LVs	ATC1 EB LVs
			HVs	ATC1 EB HVs
47	B4100 West Westbound	ATC	LVs	ATC1 WB LVs
			HVs	ATC1 WB HVs
25, 26	A43 South Northbound	DfT	LVs	30mph LVs
			HVs	30mph HVs
48, 49	A43 South Southbound	DfT	LVs	50mph LVs
			HVs	50mph HVs
24, 88	B4100 East Westbound	DfT	LVs	20mph LVs
			HVs	20mph HVs
91	B4100 East Westbound	ATC	LVs	ATC2 WB LVs
			HVs	ATC2 WB HVs

No	Location	Source	Vehicle Class	Speed Distribution
106	B4100 East Westbound	DfT	LVs	50mph LVs
			HVs	50mph HVs
46	B4100 East Eastbound	ATC	LVs	ATC2 EB LVs
			HVs	ATC2 EB HVs
Padbury Junction				
27, 28	A43 North Southbound	DfT	LVs	30mph LVs
			HVs	30mph HVs
117, 118	A43 North Northbound	DfT	LVs	50mph LVs
			HVs	50mph HVs
50, 51	A43 South Southbound	DfT	LVs	50mph LVs
			HVs	50mph HVs
32, 33	M40 Southbound Off-Slip	DfT	LVs	30mph LVs
			HVs	30mph HVs
87	M40 Southbound Off-Slip	DfT	LVs	40mph LVs
			HVs	40mph HVs
96	M40 Southbound Off-Slip	DfT	LVs	50mph LVs
			HVs	50mph HVs
10	M40 Southbound Off-Slip	DfT	LVs	60mph LVs
			HVs	60mph HVs
Cherwell Junction				
34, 35	A43 North Southbound	DfT	LVs	30mph LVs
			HVs	30mph HVs
93	Cherwell Services Entry	VISSIM	LVs	20mph LVs
			HVs	20mph HVs
67, 68	A43 South Southbound	DfT	LVs	30mph LVs
			HVs	30mph HVs
38, 39	A43 South Northbound	DfT	LVs	30mph LVs
			HVs	30mph HVs
63, 64	A43 North Northbound	DfT	LVs	50mph LVs
			HVs	50mph HVs
99	M40 Southbound On-Slip	DfT	LVs	70mph LVs
			HVs	70mph HVs
Ardley Roundabout				
40, 41	A43 North Southbound	DfT	LVs	30mph LVs
			HVs	30mph HVs
58	B430 West Southbound	ATC	LVs	ATC3 SB LVs
			HVs	ATC3 SB HVs
108	B430 West Northbound	DfT	LVs	50mph LVs
			HVs	50mph HVs
92	B430 West Northbound	ATC	LVs	ATC3 NB LVs
			HVs	ATC3 NB HVs
44, 45	B430 West Northbound	DfT	LVs	30mph LVs
			HVs	30mph HVs
61, 62	A43 North Northbound	DfT	LVs	50mph LVs
			HVs	50mph HVs

No	Location	Source	Vehicle Class	Speed Distribution
7, 8	M40 Northbound Off-Slip	DfT	LVs	60mph LVs
			HVs	60mph HVs
71, 72	M40 Northbound Off-Slip	DfT	LVs	50mph LVs
			HVs	50mph HVs
73, 74	M40 Northbound Off-Slip	DfT	LVs	40mph LVs
			HVs	40mph HVs
75, 76	M40 Northbound Off-Slip	DfT	LVs	30mph LVs
			HVs	30mph HVs
15	M40 Northbound On-Slip	DfT	LVs	50mph LVs
			HVs	50mph HVs
97	M40 Northbound On-Slip	DfT	LVs	70mph LVs
			HVs	70mph HVs
M40 Mainline				
114, 115, 116	M40 Northbound	DfT	LVs	Motorway LVs
			HVs	Motorway HVs
111, 112, 113	M40 Southbound	DfT	LVs	Motorway LVs
			HVs	Motorway HVs
98, 102, 103	M40 Northbound	DfT	LVs	Motorway LVs
			HVs	Motorway HVs
121, 122, 123	M40 Southbound	DfT	LVs	Motorway LVs
			HVs	Motorway HVs

Priority Markers and Gap Times

Priority rules inform a vehicle to wait at a junction unless the gap time is large enough for it to pull out. The priority rules have been placed in the vicinity of all junctions within the model. The gap times were based on site observations from the video surveys conducted on 17th March 2016.

As part of the calibration process, these have been suitably adjusted to suit the level of queuing observed. Gap times used below are all within the normal variance adopted in VISSIM. In addition, priority markers for headways have been used to prevent overlapping vehicles, having used the same parameters for both AM and PM peak models

The final gap times used for the relevant priority approach are detailed in ***TABLE 4***.

Table 4: Gap Times used in VISSIM Models (s)

Approach	Vehicle Type	Gap times (s) AM and PM					
		Lane 1	Lane 2	Lane 3	Lane 1	Lane 2	Lane 3
Baynards Green Roundabout							
A43 North	LVs	3.9s	3.9s	-	3.9s	3.9s	-
	HVs	4.4s	4.4s	-	4.4s	4.4s	-
B4100 Banbury Road East	LVs	3.3s	3.3s	-	3.3s	3.3s	-
	HVs	3.8s	3.8s	-	3.8s	3.8s	-
A43 South	LVs	4.1s	4.1s	-	4.1s	4.1s	-
	HVs	4.6s	4.6s	-	4.6s	4.6s	-
B4100 Banbury Road West	LVs	3.0s	3.0s	-	3.0s	3.0s	-
	HVs	3.5s	3.5s	-	3.5s	3.5s	-
Cherwell Junction							
A43 South	LVs	3.5s	-	-	3.5s	-	-
	HVs	4.0s	-	-	4.0s	-	-

Approach	Vehicle Type	Gap times (s) AM and PM					
		Lane 1	Lane 2	Lane 3	Lane 1	Lane 2	Lane 3
Padbury Junction							
M40 Southbound Off-Slip	LVs	3.9s	2.5s	-	3.9s	2.5s	-
	HVs	4.4s	3.0s	-	4.4s	3.0s	-
A43 North	LVs	3.5s	3.5s	-	3.5s	3.5s	-
	HVs	4.0s	4.0s	-	4.0s	4.0s	-
Ardley Junction							
A43 North	LVs	4.0s	4.0s	-	4.0s	4.0s	-
	HVs	4.5s	4.5s	-	4.5s	4.5s	-
M40 Northbound Off-Slip	LVs	3.1s	3.1s	-	3.1s	3.1s	-
	HVs	3.6s	3.6s	-	3.6s	3.6s	-
B430 Station Road	LVs	3.8s	3.8s	-	3.8s	3.8s	-
	HVs	4.3s	4.3s	-	4.3s	4.3s	-

Note: Lanes 1 and 2 correspond to the offside and nearside lanes respectively.

Conflict Areas

Conflict areas have been inserted on diverges to prevent overlapping of vehicles in the model.

Reduced Speed Areas

Reduced speed areas are inserted before a junction to slow the vehicles down before they reach the junction, where the speed limit reduces or where the geometry means drivers slow down. Reduced speed areas have to be applied to each lane of the link and the parameters set for Cars, HGV's and Buses.

The location of the reduced speed areas have been identified from the video surveys where vehicles could clearly be seen reducing their speed or travelling slower than the stated speed limit. As part of the calibration and validation process, some of the reduced speed areas have been adjusted in terms of speed and length in order to reflect the level of queuing observed.

Reduced speed areas have been used on the approaches to A43 Baynards Green Roundabout, A43 Padbury Junction, A43 Cherwell Junction and A43 Ardley Roundabout. There is also a reduced speed area used on the M40 Northbound On-Slip, this is because of the tight bend before vehicles join the M40 mainline.

20mph speed distributions have been used at junction approaches, whereas 50mph speed distributions have been used on the M40 Northbound On-Slip. VISSIM default deceleration parameters have remained unchanged.

In terms of length, reduced speed areas on circulatory approaches are within the range of 5-20m. For the M40 Northbound On-Slip, the length of the reduced speed area has been set to 100m.

Routing Decisions

A number of routing decisions were removed from the junctions because they were either redundant or circular.

A route closure has been input into the model at Cherwell junction, to avoid vehicles leaving the M40 via the M40 Southbound off-slip to re-join the M40 via the M40 Southbound on-slip, which is south of Cherwell Junction. This is shown in ***FIGURE 4.1***



Figure 4.1. Route closure at Cherwell Junction. *Non-Permitted route is colored in magenta.*

Redundant routes included those which did not follow the correct lane markings and allocations around the junction. This allowed the model to better replicate lane choice and routing both on the approaches and around the circulatory.

Lane Change Decisions

The lane change decision distance governs how far in advance a vehicle will alter its path of travel to move from one link to another link via a connector. The default lane change decision distance in VISSIM is 200m.

During the calibration process lane change decision distances on some sections of the network have been adjusted to better reflect on-site conditions. Connectors on the M40 Southbound off-slip have had its lane change decisions amended to 1000m. While connectors on the M40 Northbound off-slip have had its lane change distance amended to 1500m.

At the Baynards Green Roundabout, the lane change distance at B4100 East Exit has been set at 400m. The other lane change decisions across this junction are at VISSIM default 200m.

At the Padbury Junction, the A43 North approach lane change decision has been amended to 500m, while the other lane change distances at this roundabout are set at 200m.

Lane change decisions at Cherwell junction have been adjusted, with the A43 North and South approaches being set up to 400m and 250m, respectively. Additionally, the M40 Southbound On-Slip lane change decision has been increased to 250m. The rest of the lane change decisions at this junction are at 200m default value.

These changes have provided vehicles with enough time to diverge from the roundabout approaches, preventing a backlog of queues and unrealistic behaviour. The default lane change distance of 200 meters has been maintained for Ardley Roundabout for all connectors.

Public Transport

As previously discussed in ***BUS INFORMATION***, no public transport has been coded into this model because no bus services travel through the network during modelling periods.

Driving Behaviour Parameters

VISSIM has a default set of driving behaviours contained in a complex array of parameters which can be edited to more accurately reflect site specific conditions. These parameters affect; the car following and lane change models of vehicles, lateral behaviour and vehicular reaction to traffic signals. These sets of parameters are associated with link types so that all vehicles travelling along a specific link display the same driving behaviour properties.

The driver behaviour profiles have been used on a variety of different links, depending on their location within the VISSIM model.

The M40 and A43 mainlines have been modelled using the default “Left-Side Rule (motorised)” behaviour type.

The default driving behaviour type "Urban (motorised)" has been used for all single carriageway links and circulatory links at Baynards Green Roundabout, Padbury Junction, Cherwell Junction and Ardley Roundabout.

The “Merge” driver behaviour has been created to allow a more co-operative driver behaviour and more efficient lane changing behaviour under congested conditions. It has been used on the merge and diverge areas connecting the M40 Junction 10 slip roads to the M40 mainline, as well as in the vicinity of A43 South Northbound and Southbound and M40 Southbound approaches at Cherwell Junction.

For this new driver behaviour type, the “Urban (motorised)” type was used as a template, adjusting some of the parameters to represent different driving behaviours based on the video footage of the traffic survey conducted on 17th March 2016 and on the site visit observations.

The different driving behaviour types used within the model are summarised in Appendix E.

Network Checks

A series of checks were made to ensure that the base models correlated with the physical characteristics observed on site. These checks are described under the following bullet points:

- Range Checks – the characteristics of all links were checked to ensure that they were within appropriate ranges for the class of link. Characteristics include driver behaviour, speed and number of entry lanes.
- Link Lengths – the lengths of all links in the network were checked against total distance measured from the base mapping and site observations.
- Route Checking – the origin to destination routes for each vehicle type were checked for illogical routing through the network. Any anomalies were closed by the Network Edge function or Route Closures.

Matrix Development

05

Traffic Modelling Zoning System

The VISSIM models were built using a dynamic (matrix based) demand assignment in which vehicles choose their route through the network based on calculated cost paths.

This section describes the development of the demand matrices used in the dynamic assignment of vehicles in the VISSIM micro-simulation model.

The VISSIM models were built using a dynamic (matrix based) demand assignment in which vehicles choose their route through the network based on calculated cost paths. A dynamic assignment was chosen because of data availability and the ease of amending a dynamic model for future scenarios. The nature of the network is also best replicated by a dynamic assignment due to the lane changing characteristics, which are catered for by forward thinking route choice rather than a static set of paths.

The zoning system, on which dynamic assignments are based, provides a series of vehicular entry / exit points on the network. The inter-zone movements, which are generated by the assignment process, provide a representation of the vehicle paths and driver behaviour between the origins and destinations in the model network.

The zoning system for the VISSIM model is shown in ***FIGURE 5.1*** with the traffic entry and exit points. The traffic entry and exit points for the traffic model are as follows:

- Zone 1 – A43 North;
- Zone 2 – B4100 Banbury Road East;
- Zone 3 – Moto Cherwell Valley Services;
- Zone 4 – M40 Mainline South;
- Zone 5 – B430 Station Road;
- Zone 6 – M40 Mainline North;
- Zone 7 – B4100 Banbury Road West.

Types of Traffic Flow Input Files Used

For this model, Origin Destination (O-D) matrices were created and used to distribute traffic around the network. ANPR and MCC survey data was used to produce the matrices for the network extents. TRADS data obtained from the Highways England Traffic Information Database were used to produce the M40 mainline matrices for the network extents.

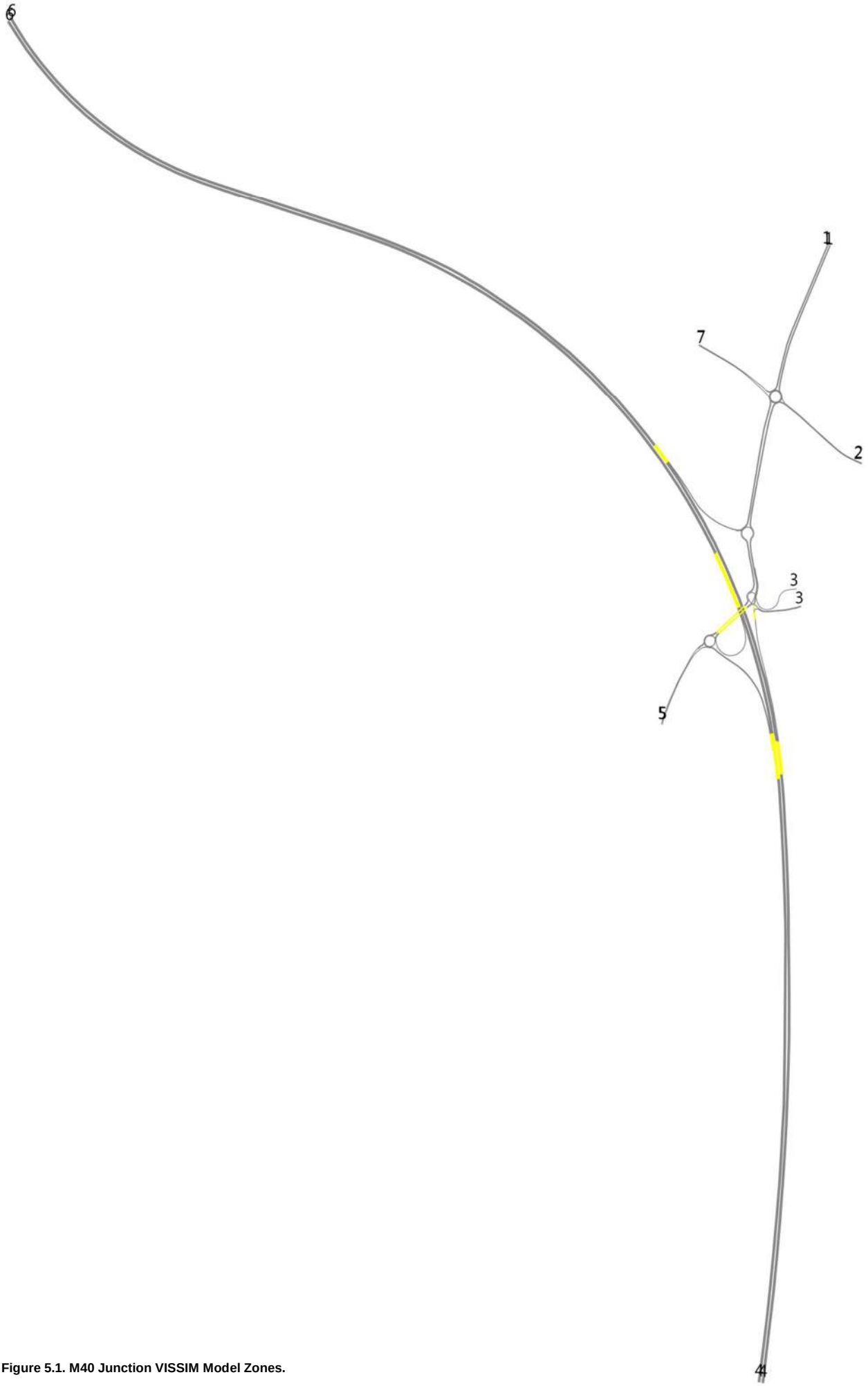

Figure 5.1. M40 Junction VISSIM Model Zones.

Matrix Development

O-D matrix has been developed using the ANPR data, MCC data and the TRADS data.

The matrices used in the model have been derived through the collection, analysis and subsequent assembly of O-D data recorded for a cordon around M40 Junction 10, Baynards Green Roundabout, Padbury Junction, Cherwell Junction and Ardley Roundabout.

TRAFFIC SURVEYS details the traffic surveys used in matrix development.

The matrix development for the AM and PM VISSIM models has been undertaken in four stages. These stages are as follows:

Stage 1 – Derive ANPR Matrix data

The first step was to carry out an analysis of the ANPR data provided by NDC and create ANPR O-D Matrix for each of the modelling periods.

Separate matrices were derived for each vehicle class (LVs and HVs) in 15min periods.

Stage 2 – Derive MCC Origin/Destination Totals

MCC data was analysed and origin and destination totals were calculated for the locations at ANPR cordon points so that these could be compared with the MCC counts.

Similarly to the previous stage, matrices were produced for each vehicle class (LVs and HVs) and modelling periods (build-up, peak and cool-down) in 15min periods.

Stage 3 – Extract WebTRIS data

As detailed in ***PASSAGE COUNT DATA***, flows at the M40 mainline were derived from WebTRIS and added into the appropriate zones travelling on the mainline.

Stage 4 – Uplift ANPR Matrix

The ANPR matrix was uplifted to match the MCC Origin/Destination totals, previously derived in Stage 2. This was carried out by applying a doubly constrained factor model using the Furness method.

In total, for each of the AM and PM peak models, ten 15min matrices were constructed for each vehicle type (LVs and HVs):

- AM period (0645-0915hrs)
  - Build-Up (4 matrices): 0645-0745hrs
  - Peak (4 matrices): 0745-0845hrs
  - Cool-Down (2 matrices): 0845-0915hrs
- PM period (1530-1800hrs)
  - Build-Up (4 matrices): 1530-1630hrs
  - Peak (4 matrices): 1630-1730hrs
  - Cool-Down (2 matrices): 1730-1800hrs

Once the O-D matrices were complete, they were entered into the VISSIM model and it was run a number of times to ensure that all of the elements operated correctly. Any errors that were shown in the error files were corrected before the modelling process was taken any further. The final matrices are detailed in Appendix F.

Model Convergence

06

DMRB (Volume 12, Section 2, Part 1, Chapter 4) and *TfL's "Traffic Modelling Guidelines: TfL Traffic Manager and Network Performance Best Practice. Version 3.0"* have been used to assess the convergence of the M40 Junction 10 traffic model.

The VISSIM model has been run using the Dynamic Assignment module, in which a series of iterated simulations are used to determine the route of a vehicle through the network based on a total travel cost. As a result of this, there is a need to assess the convergence of the model to establish that the travel times and volumes do not change significantly from one iteration to the next, enabling the model to be deemed stable and results to be analysed in confidence.

DMRB (Volume 12, Section 2, Part 1, Chapter 4) and TfL's "Traffic Modelling Guidelines: TfL Traffic Manager and Network Performance Best Practice. Version 3.0" provide a series of convergence criteria that should be used to assess the convergence and stability of traffic models. The following convergence criteria can be assessed within the context of VISSIM:

- 95% of all path traffic volumes change by less than 5% for at least four consecutive iterations;
- 95% of the travel times on all paths change by less than 20% for at least four consecutive iterations;
- The percentage change in user costs or time spent within the network (V) should be less than 1% for four consecutive iterations.

Convergence Results

The AM and PM models were initially run, for a single simulation using Random Seed 42 to establish the initial costs (BEW files) and paths (WEG files) within the network. Using the node evaluation window, the paths through the network were reviewed and any paths that were deemed incorrect or unfeasible were closed.

The AM and PM models were then run, using Random Seed 42 and assigning travel demand matrices in batch mode. The simulation started with only 10% of the total origin and destination O-D demand which was gradually increased by 10% step until reaching 100%.

Using the path and cost files from the previous process, a batch run of each model was then undertaken, using Random Seed 42 and running the model until the criteria stated above is fulfilled, using the same random seed in order to assess the convergence of the model. For each of the simulation runs, a cost file, Network Performance Evaluation (NPE file) and Convergence Evaluation file (CVA file) were output.

The CVA files have been used to examine the percentage change in flow and travel time on paths for the modelling periods for each model run. The total travel times in the network have also been extracted from the NPE files and the results of this analysis can be seen in ***TABLE 5***, and ***TABLE 6****ERROR! REFERENCE SOURCE NOT FOUND.*.

Very high levels of convergence have been achieved with some small percentages variations between each seed run being seen. Convergence criteria have been fully met after 41 and 20 iterations in the AM and PM models, respectively.

Convergence criteria were fully met after 41 and 20 iterations in the AM and PM models, respectively.

In summary, the results indicate that both AM and PM models are fully converged and provide a suitable platform in order to take forward and extract results for validation against other data sources.

Table 5: Convergence Evaluation Files for Seed 42 – Summary – AM Period

Run Number	Total Travel Time		Convergence Figures on Paths	
	Total Travel Time (hrs)	Difference from previous run (%)	Traffic Volumes (%)	Travel Time (%)
1	2093.46	-	84%	89%
2	2099.72	0.30%	99%	92%
3	2120.25	0.98%	100%	95%
4	2113.96	-0.30%	100%	100%
5	2086.64	-1.29%	99%	99%
6	2081.94	-0.23%	99%	100%
7	2056.70	-1.21%	100%	100%
8	2081.24	1.19%	100%	99%
9	2090.03	0.42%	99%	100%
10	2079.70	-0.49%	100%	100%
11	2083.23	0.17%	100%	100%
12	2112.44	1.40%	99%	100%
13	2060.67	-2.45%	99%	100%
14	2098.11	1.82%	100%	100%
15	2080.46	-0.84%	99%	100%
16	2085.66	0.25%	100%	100%
17	2071.30	-0.69%	98%	98%
18	2112.76	2.00%	99%	100%
19	2102.52	-0.48%	100%	100%
20	2067.63	-1.66%	99%	100%
21	2073.20	0.27%	100%	100%
22	2068.75	-0.21%	100%	100%
23	2124.60	2.70%	98%	99%
24	2014.75	-5.17%	99%	100%
25	2086.96	3.58%	99%	100%
26	2035.70	-2.46%	99%	100%
27	2087.12	2.53%	100%	100%
28	2082.34	-0.23%	100%	99%
29	2044.28	-1.83%	100%	100%
30	2077.33	1.62%	100%	100%
31	2104.42	1.30%	99%	100%
32	2033.09	-3.39%	99%	100%
33	2106.11	3.59%	99%	100%
34	2080.50	-1.22%	100%	100%
35	2101.26	1.00%	99%	100%
36	2052.84	-2.30%	99%	100%
37	2079.93	1.32%	100%	100%
38	2084.42	0.22%	100%	100%
39	2102.78	0.88%	100%	100%
40	2099.18	-0.17%	99%	100%
41	2108.96	0.47%	99%	100%

Table 6: Convergence Evaluation Files for Seed 42 – Summary – PM Period

Run Number	Total Travel Time		Convergence Figures on Paths	
	Total Travel Time (hrs)	Difference from previous run (%)	Traffic Volumes (%)	Travel Time (%)
1	2209.21	-	84%	89%
2	2259.91	2.29%	100%	92%
3	2267.82	0.35%	100%	96%
4	2229.94	-1.67%	100%	98%
5	2236.06	0.27%	100%	100%
6	2254.46	0.82%	100%	100%
7	2221.76	-1.45%	100%	100%
8	2230.22	0.38%	100%	99%
9	2271.69	1.86%	100%	100%
10	2250.81	-0.92%	100%	100%
11	2232.60	-0.81%	100%	100%
12	2246.84	0.64%	100%	100%
13	2219.41	-1.22%	100%	99%
14	2234.95	0.70%	100%	100%
15	2269.74	1.56%	98%	100%
16	2237.95	-1.40%	100%	100%
17	2248.94	0.49%	100%	100%
18	2236.68	-0.54%	100%	100%
19	2240.12	0.15%	100%	100%
20	2253.38	0.59%	100%	99%

Model Calibration

07

Model Calibration

As a part of the calibration process, several checks were undertaken. These checks include coding of the network, O-D matrix flows and signal operation and queues.

Following on from the convergence run, the VISSIM model was taken forward for model calibration. This process is done to ensure that the inputs into the model are representative of on-site conditions.

In order to check calibration levels, the model was multi-run to produce a set of average traffic flow results. The VISSIM model was run using 10 different random seeds, starting with random seed 1 and ending at random seed 10, with a random seed increment of 1.

To enable a robust assessment, the results used in the model calibration process represent an average of the 10 simulation runs for each of the AM and PM peaks.

The purpose of model calibration is to ensure that the model represents existing traffic conditions. In order to correctly model on-site behaviour, a number of factors have been considered as listed below:

- Traffic patterns in the area are modelled accurately;
- Key junctions in the area are modelled accurately;
- The correct level of traffic is getting through the network and equally the right levels are being suppressed;
- Traffic volumes on side roads and alternative routes are modelled accurately.

Calibration is an iterative process in which the model is continually revised to ensure that the most accurate replications of base year conditions are represented. This includes:

- Checking the coding of network elements;
- Refining and adjustment of the trip matrices.

Calibration Checks

The following calibration checks were undertaken for each model period using the previously identified elements of the survey database:

Checking the Coding of the Network

The addition of the O-D matrix flows into the base models allows a visual check of the model to be undertaken. This allows the construction of the network to be checked, as well as highlighting any program error files that may require addressing. Network elements checked included priority rules, speed decisions marker locations and lengths and alignments of the roads to ensure that they replicated on-street conditions. Any identified errors were subsequently corrected.

Checking the O-D Matrix Flows

To demonstrate that the correct flows enter the model, comparisons were made between the O-D matrix and VISSIM model entry flows. To test the robustness of the models, results were extracted for 10 different seeds and the corresponding average values were used. ***TABLE 7*** and ***TABLE 8*** show the results of the entry flow comparisons.

Table 7: Entry Flow Calibration – Total Vehicles – AM Peak

Entry Zone		0745-0845		Difference		
Zone	Location	Matrix	Modelled	Abs.	%	<5%?
1	A43 North	1752	1641	-112	-6%	N
2	B4100 Banbury Road East	530	532	2	0%	Y
3	Cherwell Services	396	397	1	0%	Y
4	M40 south	3455	3455	0	0%	Y
5	B430 Station Road	445	446	1	0%	Y
6	M40 North	3217	3218	1	0%	Y
7	B4100 Banbury Road West	532	535	4	1%	Y

Table 8: Entry Flow Calibration – Total Vehicles – PM Peak

Entry Zone		1630-1730		Difference		
Zone	**Location**	**Matrix**	**Modelled**	**Abs.**	**%**	**<5%?**
1	A43 North	1498	1487	-11	-1%	Y
2	B4100 Banbury Road East	704	685	-19	-3%	Y
3	Cherwell Services	412	413	1	0%	Y
4	M40 south	4706	4728	22	0%	Y
5	B430 Station Road	631	628	-3	0%	Y
6	M40 North	3288	3276	-12	0%	Y
7	B4100 Banbury Road West	370	355	-15	-4%	Y

From Table 7 and Table 8, it can be seen a difference of less than 5% has been achieved for all entry zones during both AM and PM peak periods with the exception of the A43 North approach at Baynards Green Roundabout during the AM peak. However, the maximum deviation observed is 6%, thus, the entry flow calibration is considered acceptable.

Checking Signal Operation and Queues

A visual comparison has been made for the AM and PM peak signals to ensure that they were behaving as noted in the signal specifications and traffic survey videos. As Cherwell Junction is operated on MOVA traffic signals, this junction was assessed by how representative the queues were on each arm. This was done by visually comparing observed queues in the traffic survey videos and those displayed in the VISSIM model.

After reviewing the traffic survey videos along the A43 during the PM peak period, the maximum queues formed on the A43 Northbound approach to A43 / B4100 Banbury Road Baynards Green roundabout appeared to extend back to Padbury and Cherwell junctions. The level of accuracy of the modelled queue at this approach has been key to successfully replicate the network operation during the PM peak period since it has a major impact in the M40J10 operation.

In addition, queues have also been compared in the rest of the model to ensure that the correct levels of queuing are represented at every junction.

Model Validation

08

Model Validation Criteria

DMRB standards have been used to assess the validation of the M40 Junction 10 traffic model.

Following on from the model calibration, the VISSIM model was taken forward for model validation. This process involves comparing model outputs against independent data to ensure that the model is correctly calibrated.

As stated in ***CALIBRATION CHECKS***, in order to determine the validation levels, the models were multi-run in order to produce a set of average traffic flow and journey time results. Similarly to the calibration stage, the VISSIM model was run using 100 different random seeds, starting with Random Seed 1 and ending at Random Seed 100, with a random seed increment of 1.

The following paragraphs summarise the validation of the M40 J10 VISSIM model which has been undertaken to comply with current guidance and recommendations.

Network validation has been carried out in accordance with *DMRB Volume 12, Section 2, Part 1, Chapter 4.* Current advice on micro-simulation modelling is also contained in HE's *Interim Advice Note 36-01 'The Use and Application of Micro-Simulation Models'*. A summary of the acceptable criteria is listed in ***TABLE 9***.

In order to demonstrate that the developed models provide a robust platform for future testing, the following validation checks were carried out:

- Traffic Flow Validation
  - Individual Flows
  - GEH Statistic
- Average Journey Time Validation.

Table 9: Summary of Assignment Validation: Acceptability Guidelines.

Criteria and Measures	Acceptability Guideline
Assigned Hourly Flows* compared with observed flows.	
1. Individual flows within 15% for flows 700-2700 vph	
2. Individual flows within 100 vph for flows < 700 vph	
3. Individual flows within 400 vph for flows > 2700 vph	
4. Total screenline flows (normally >5 links) to be within 5%	
5. GEH Statistic	All (or nearly all) screenlines
i. Individual flows: GEH < 5	Greater than 85% of all cases
ii. Screenline** totals: GEH < 4	
Notes:	
* link flows or turning movements	
**Screenlines containing high flow routes such as motorways should be presented both including and excluding such routes.	
Modelled journey times compared with observed times	> 85% of routes
6. Times within 15% (or 1 minute if higher)	

DMRB Volume 12, Section 2 Part 1 Chapter 4

Traffic Flow Validation

100% of turning movements are within required DMRB validation criteria during both AM and PM peaks respectively.

The observed and modelled flows were compared for each of the junction turning counts during AM and PM peak periods against DMRB individual flows validation criteria shown in ***TABLE 9*** above. The permissible differences were then calculated for each value (based on the observed figure) and compared to that which had been produced in the model, both for absolute differences and for GEH statistic.

The percentage differences between observed and modelled datasets can be misleading given the relative value of the difference. The standard method used to compare modelled values against observations on a link therefore involves the calculation of the Geoff Havers (GEH) statistic, which is a form of the Chi-squared statistic, incorporating both the relative and the absolute errors. The GEH statistic is defined as:

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

Where C and M are observed flows and modelled flows respectively. Results are summarized in Table 12 and Table 13 below with a more detailed breakdown in Appendix G.

Table 12 and Table 13 show that all modelled traffic flows during AM and PM peak periods fulfill both DMRB GEH validation (<5) and individual flow criteria.

This indicates that VISSIM models for both the AM and PM peak periods modelled flows suitably correlate with observed data.

Table 10: Summary of Traffic Flow Validation – AM Peak

DMRB Traffic Flow Validation Criteria	No. Within	Total	Percentage
Percentage of Counts within GEH < 5	31	31	100%
Percentage of Counts meeting Individual Flow	31	31	100%

Table 11: Summary of Traffic Flow Validation – PM Peak

DMRB Traffic Flow Validation Criteria	No. Within	Total	Percentage
Percentage of Counts within GEH < 5	231	31	100%
Percentage of Counts meeting Individual Flow	31	31	100%

Table 12: Traffic Flow Validation – Ardley Roundabout – AM Peak (Total Vehicles)

From	To			Difference		DMRB Criteria	
		Observed	Modelled	Abs.	GEH	Individual Flow	GEH<5.0
A43 North-East	M40 Northbound Off-Slip	269	267	-2	0.1	Y	Y
	B430 Station Road South	484	470	-14	0.6	Y	Y
M40 Northbound Off-Slip	A43 North-East	1031	1042	11	0.3	Y	Y
	B430 Station Road South	32	33	1	0.1	Y	Y
B430 South	A43 North-East	237	240	3	0.2	Y	Y
	M40 Northbound Off-Slip	205	207	2	0.1	Y	Y

Table 13: Traffic Flow Validation – Baynards Green Roundabout – AM Peak (Total Vehicles)

From	To			Difference		DMRB Criteria	
		Observed	Modelled	Abs.	GEH	Individual Flow	GEH<5.0
A43 North	B4100 Banbury Road East	229	214	-15	1.0	Y	Y
	A43 South	1440	1363	-77	2.1	Y	Y
	B4100 Banbury Road West	66	63	-3	0.4	Y	Y
B4100 Banbury Road East	A43 North	191	194	3	0.2	Y	Y
	A43 South	101	107	6	0.6	Y	Y
	B4100 Banbury Road West	233	233	0	0.0	Y	Y
A43 South	A43 North	1049	1056	7	0.2	Y	Y
	B4100 Banbury Road East	148	153	5	0.4	Y	Y
	B4100 Banbury Road West	119	112	-7	0.7	Y	Y
A4100 Banbury Road West	A43 North	94	95	1	0.1	Y	Y
	B4100 Banbury Road East	276	277	1	0.0	Y	Y
	A43 South	150	160	10	0.8	Y	Y

Table 14: Traffic Flow Validation – Cherwell Junction – AM Peak (Total Vehicles)

From	To			Difference		DMRB Criteria	
		Observed	Modelled	Abs.	GEH	Individual Flow	GEH<5.0
A43 North	Cherwell Service Station	217	220	3	0.2	Y	Y
	M40 Southbound On-Slip	1238	1124	-114	3.3	Y	Y
	A43 South	642	602	-40	1.6	Y	Y
Cherwell Service Station	A43 North	44	59	15	2.1	Y	Y
	M40 Southbound On-Slip	204	204	0	0.0	Y	Y
	A43 South	146	134	-12	1.0	Y	Y
A43 South	A43 North	1089	1059	-30	0.9	Y	Y
	M40 Southbound On-Slip	36	68	32	4.4	Y	Y
	Cherwell Service Station	167	161	-6	0.5	Y	Y

Table 15: Traffic Flow Validation – Padbury Junction – AM Peak (Total Vehicles)

				Difference		DMRB Criteria	
From	To	Observed	Modelled	Abs.	GEH	Individual Flow	GEH<5.0
A43 South	A43 North	1113	1117	4	0.1	Y	Y
M40 Southbound Off-Slip	A43 South	315	317	2	0.1	Y	Y
	A43 North	219	204	-15	1.1	Y	Y
A43 North	A43 South	1718	1629	-89	2.2	Y	Y

Table 16: Traffic Flow Validation – Ardley Roundabout – PM Peak (Total Vehicles)

From	To			Difference		DMRB Criteria	
		Observed	Modelled	Abs.	GEH	Individual Flow	GEH<5.0
A43 North-East	M40 Northbound Off-Slip	282	276	-6	0.3	Y	Y
	B430 Station Road South	274	255	-19	1.2	Y	Y
M40 Northbound Off-Slip	A43 North-East	1457	1431	-26	0.7	Y	Y
	B430 Station Road South	36	35	-1	0.2	Y	Y
B430 South	A43 North-East	451	446	-5	0.2	Y	Y
	M40 Northbound Off-Slip	182	182	0	0.0	Y	Y

Table 17: Traffic Flow Validation – Baynards Green Roundabout – PM Peak (Total Vehicles)

From	To			Difference		DMRB Criteria	
		Observed	Modelled	Abs.	GEH	Individual Flow	GEH<5.0
A43 North	B4100 Banbury Road East	258	257	-1	0.1	Y	Y
	A43 South	1191	1179	-12	0.3	Y	Y
	B4100 Banbury Road West	49	49	0	0.0	Y	Y
B4100 Banbury Road East	A43 North	321	311	-10	0.6	Y	Y
	A43 South	106	102	-4	0.4	Y	Y
	B4100 Banbury Road West	279	268	-11	0.7	Y	Y
A43 South	A43 North	1719	1635	-84	2.1	Y	Y
	B4100 Banbury Road East	92	85	-7	0.7	Y	Y
	B4100 Banbury Road West	103	93	-10	1.0	Y	Y
A4100 Banbury Road West	A43 North	57	55	-2	0.2	Y	Y
	B4100 Banbury Road East	238	226	-12	0.8	Y	Y
	A43 South	67	63	-4	0.5	Y	Y

Table 18: Traffic Flow Validation – Cherwell Junction – PM Peak (Total Vehicles)

From	To			Difference		DMRB Criteria	
		Observed	Modelled	Abs.	GEH	Individual Flow	GEH<5.0
A43 North	Cherwell Service Station	187	221	34	2.4	Y	Y
	M40 Southbound On-Slip	1014	956	-58	1.9	Y	Y
	A43 South	438	406	-32	1.6	Y	Y
Cherwell Service Station	A43 North	68	96	28	3.1	Y	Y
	M40 Southbound On-Slip	190	191	1	0.0	Y	Y
	A43 South	156	126	-30	2.5	Y	Y
A43 South	A43 North	1686	1633	-53	1.3	Y	Y
	M40 Southbound On-Slip	54	75	21	2.6	Y	Y
	Cherwell Service Station	206	166	-40	2.9	Y	Y

Table 19: Traffic Flow Validation – Padbury Junction – PM Peak (Total Vehicles)

From	To			Difference		DMRB Criteria	
		Observed	Modelled	Abs.	GEH	Individual Flow	GEH<5.0
A43 South	A43 North	1721	1720	-1	0.0	Y	Y
M40 Southbound Off-Slip	A43 South	250	241	-9	0.6	Y	Y
	A43 North	219	164	-55	3.9	Y	Y
A43 North	A43 South	1396	1343	-53	1.4	Y	Y

Average Journey Time Validation

90% and 95% of the selected routes for validation purposes fulfil DMRB Journey Time criteria for both AM and PM peak periods.

As explained in Traffic Surveys, journey time survey data was collected using ANPR cameras for all routes within the model extent to assist with the validation of the VISSIM model.

Journey time survey data has been filtered using the Tukey's test. This statistical "filter" has only been applied to screen journey times in order to dismiss measurements from the raw data which can be statistically considered as "outliers", to ensure that the correct levels of accuracy for the observed data are achieved.

DMRB standards (Volume 13, Section 1, Part 5, Chapter 11) recommends aiming for an accuracy of ±10% in the estimate of journey times on the exiting route, at the 95% confidence level. This level of accuracy, A, is defined as:

$$A = t\frac{s}{m\sqrt{n}}$$

Where m, s and n are the mean, the standard deviation and number of measurements of the journey time sample and the value of t depends on the number of degrees of freedom and the confidence level according to the Student's t-distribution.

Table 20 shows the level of accuracy observed for each of the surveyed routes for both AM and PM peak periods.

Table 20: Observed Journey Times – Level of Accuracy

Origin Zone	Destination Zone	Observed Mean (seconds)		Number of Measurements		Standard Deviation (seconds)		Accuracy (95% Confidence Level)	
		AM	PM	AM	PM	AM	PM	AM	PM
Zone 1	Zone 1	-	199	-	3	-	280	-	349.32%
Zone 1	Zone 2	31	24	151	158	9	6	4.65%	4.18%
Zone 1	Zone 3	141	122	42	46	25	18	5.58%	4.48%
Zone 1	Zone 4	127	106	537	727	21	19	1.41%	1.28%
Zone 1	Zone 5	145	134	209	97	16	16	1.53%	2.46%
Zone 1	Zone 6	136	124	42	37	14	15	3.19%	4.15%
Zone 1	Zone 7	22	16	59	28	7	5	8.65%	10.96%
Zone 2	Zone 1	72	53	160	213	27	20	5.89%	5.02%
Zone 2	Zone 2	-	-	-	-	-	-	-	-
Zone 2	Zone 3	147	136	6	9	40	35	28.48%	20.02%
Zone 2	Zone 4	161	-	3	-	60	-	91.89%	-
Zone 2	Zone 5	188	1219	6	3	52	1127	28.85%	229.65%
Zone 2	Zone 6	175	138	80	67	35	24	4.39%	4.20%
Zone 2	Zone 7	64	34	174	101	34	18	7.91%	10.29%
Zone 3	Zone 1	140	225	37	55	28	61	6.64%	7.28%
Zone 3	Zone 2	-	186	-	3	-	93	-	123.74%
Zone 3	Zone 3	-	-	-	-	-	-	-	-
Zone 3	Zone 4	50	41	118	137	17	17	6.26%	7.09%
Zone 3	Zone 5	76	83	24	9	16	26	9.05%	24.07%
Zone 3	Zone 6	75	69	87	86	22	18	6.23%	5.49%
Zone 3	Zone 7	-	223	-	6	-	100	-	47.22%

Origin Zone	Destination Zone	Observed Mean (seconds)		Number of Measurements		Standard Deviation (seconds)		Accuracy (95% Confidence Level)	
		AM	PM	AM	PM	AM	PM	AM	PM
Zone 4	Zone 1	115	235	662	904	19	81	1.27%	2.27%
Zone 4	Zone 2	112	-	4	-	16	-	23.26%	-
Zone 4	Zone 3	83	86	134	151	21	19	4.27%	3.47%
Zone 4	Zone 4	-	-	-	-	-	-	-	-
Zone 4	Zone 5	17	13	23	13	6	2	16.87%	7.27%
Zone 4	Zone 6	420	477	11	9	572	457	91.51%	73.55%
Zone 4	Zone 7	97	217	62	49	16	74	4.20%	9.80%
Zone 5	Zone 1	114	232	109	284	19	87	3.14%	4.39%
Zone 5	Zone 2	113	159	8	6	13	76	9.29%	50.15%
Zone 5	Zone 3	78	91	15	17	12	19	8.82%	10.51%
Zone 5	Zone 4	98	88	23	14	20	17	8.65%	11.10%
Zone 5	Zone 5	1067	-	4	-	1197	-	178.50%	-
Zone 5	Zone 6	25	27	195	147	8	13	4.40%	7.62%
Zone 5	Zone 7	98	160	25	14	16	52	6.70%	18.80%
Zone 6	Zone 1	84	217	37	33	21	103	8.30%	16.89%
Zone 6	Zone 2	79	201	122	108	13	84	2.86%	7.98%
Zone 6	Zone 3	101	209	130	98	20	112	3.38%	10.75%
Zone 6	Zone 4	94	177	20	25	18	117	8.83%	27.22%
Zone 6	Zone 5	116	252	143	98	22	125	3.11%	9.95%
Zone 6	Zone 6	219	-	4	-	229	-	166.50%	-
Zone 6	Zone 7	62	205	16	17	12	91	10.05%	22.92%
Zone 7	Zone 1	54	48	43	51	19	14	10.77%	8.30%
Zone 7	Zone 2	33	24	113	106	9	5	4.96%	4.11%
Zone 7	Zone 3	-	-	-	-	-	-	-	-
Zone 7	Zone 4	123	109	231	72	20	22	2.08%	4.80%
Zone 7	Zone 5	141	140	26	14	15	7	4.42%	3.07%
Zone 7	Zone 6	-	-	-	-	-	-	-	-
Zone 7	Zone 7	-	-	-	-	-	-	-	-

From Table 20, it can be seen that 20 routes were in accordance with the ±10% criteria in both the AM and PM.

The observed average journey times for these 20 routes have been compared to the modelled average journey times in accordance with the criteria outlined in ***TABLE 9***.

The difference was then calculated for each value (based on the observed figure) and compared to that which had been produced in the model.

The results are summarised in Table 21 and Table 22.

The validation criteria used is highlighted in the model validation summary tables below. The initial step was to check that the average journey times from the model were within 15% of those observed. Following that, a check of the modelled journey times being within 60 seconds of those observed was undertaken.

Table 21: Summary of Journey Time Validation – AM Peak

DMRB Journey Time Validation Criteria	No. Within	Total	Percentage
Percentage of Times within 15%	18	20	90%
Percentage of Times within 60 seconds	20	20	100%

Table 22: Summary of Journey Time Validation – PM Peak

DMRB Journey Time Validation Criteria	No. Within	Total	Percentage
Percentage of Times within 15%	19	20	95%
Percentage of Times within 60 seconds	19	20	100%

A more detailed breakdown of the journey time validation can be seen in Table 23, Table 24 and Appendix H.

Table 23: Journey Time Validation – AM Peak

From	To	0745 – 0845			Difference		
		Observed	Modelled	%	Validated	Abs.	Validated
A43 North	B4100 Banbury Road East	31	43	39%	N	-12	Y
	Cherwell Service Station	141	140	-1%	Y	2	Y
	M40 Southbound Off-Slip	127	140	10%	Y	-13	Y
	B430 Station Road South	145	160	11%	Y	-15	Y
	M40 Northbound Off-Slip	136	153	12%	Y	-16	Y
B4100 Banbury Road East	A43 North	72	63	-13%	Y	9	Y
	M40 Northbound Off-Slip	175	166	-5%	Y	9	Y
Cherwell Service Station	A43 North	140	124	-11%	Y	16	Y
	M40 Southbound Off-Slip	50	49	-3%	Y	1	Y
	M40 Northbound Off-Slip	75	72	-5%	Y	4	Y
M40 Northbound Off-Slip	A43 North	115	119	4%	Y	-5	Y
	Cherwell Service Station	83	87	5%	Y	-4	Y
	B4100 Banbury Road West	97	113	17%	N	-16	Y
B430 Station Road South	A43 North	114	116	1%	Y	-1	Y
	M40 Northbound Off-Slip	25	23	-9%	Y	2	Y
M40 Southbound Off-Slip	B4100 Banbury Road East	79	83	5%	Y	-4	Y
	B430 Station Road South	116	124	7%	Y	-9	Y
B4100 Banbury Road West	B4100 Banbury Road East	33	29	-12%	Y	4	Y
	M40 Southbound Off-Slip	123	120	-3%	Y	3	Y
	B430 Station Road South	141	139	-2%	Y	2	Y

Table 24: Journey Time Validation – PM Peak

From	To	1630 – 1730			Difference		
		Observed	Modelled	%	Validated	Abs.	Validated
A43 North	B4100 Banbury Road East	24	23	-6%	Y	1	Y
	Cherwell Service Station	122	110	-10%	Y	12	Y
	M40 Southbound Off-Slip	106	110	5%	Y	-5	Y
	B430 Station Road South	134	131	-2%	Y	2	Y
	M40 Northbound Off-Slip	124	127	2%	Y	-3	Y
B4100 Banbury Road East	A43 North	53	46	-14%	Y	7	Y
	M40 Northbound Off-Slip	138	141	2%	Y	-3	Y
Cherwell Service Station	A43 North	225	203	-10%	Y	21	Y
	M40 Southbound Off-Slip	41	44	9%	Y	-4	Y
	M40 Northbound Off-Slip	69	70	2%	Y	-1	Y
M40 Northbound Off-Slip	A43 North	235	211	-10%	Y	23	Y
	Cherwell Service Station	86	82	-5%	Y	4	Y
	B4100 Banbury Road West	217	217	0%	Y	1	Y

From	To	1630 – 1730			Difference		
		Observed	Modelled	%	Validated	Abs.	Validated
B430 Station Road South	A43 North	232	218	-6%	Y	14	Y
	M40 Northbound Off-Slip	27	30	9%	Y	-2	Y
M40 Southbound Off-Slip	B4100 Banbury Road East	201	225	12%	Y	-24	Y
	B430 Station Road South	252	249	-1%	Y	3	Y
B4100 Banbury Road West	B4100 Banbury Road East	24	48	99%	N	-24	Y
	M40 Southbound Off-Slip	109	125	15%	Y	-16	Y
	B430 Station Road South	140	146	4%	Y	-6	Y

Summary & Conclusions

09

Model Summary

The M40 Junction 10 VISSIM model has been re-validated successfully.

A 2010 base VISSIM model of M40 Junction 10 has been updated to 2016 to allow for future testing of traffic growth which may have an impact onto the junction. Traffic data was collected between Monday 14th to Sunday 20th March 2016 in order to reflect current traffic conditions at the junction. The VISSIM model has been updated, calibrated and validated successfully. A summary of the results is detailed in the following sections.

Convergence

The VISSIM model has been successfully converged for both AM and PM periods, meeting DMRB and TfL's convergence criteria, demonstrating a high level of stability.

Traffic Flow Calibration

The VISSIM model has been successfully calibrated for both AM and PM peak periods with all modelled entry flows being within 5% of the O-D matrix with the exception of the A43 North approach at Baynards Green Roundabout during the AM peak.

Traffic Flow Validation

The VISSIM model has produced a high level of validation to the DMRB Individual Flow criteria, having achieved a 100% correlation between modelled and observed turning movements during both AM and PM peaks.

GEH Statistic Validation

The VISSIM model has demonstrated high levels of validation to DMRB GEH Statistic criteria, in which 100% of modelled turning counts during both AM and PM peaks have GEH values lower than 5 (against a desired percentage of 85%) when compared to the turning counts for both AM and PM peaks respectively.

Journey Time Validation

The VISSIM model has demonstrated a suitable level of journey time validation for both AM and PM peak periods in accordance with DMRB criteria, with 90% and 95% of the routes during AM and PM peaks respectively being within 15% of the observed average journey time and all routes during AM and PM peaks being within 60 seconds of the observed average time.

As a result of this, both AM and PM peak period models are considered an appropriate representation of network conditions.

Overall Conclusion

The M40 Junction 10 VISSIM model has successfully converged, calibrated and validated against DMRB standards and is considered a suitable tool for future year testing.

Overall the AM and PM peak period models are considered an appropriate representation of the network conditions and good level of validation have been reached in line with DMRB requirements.

Both AM and PM peak models validate against Traffic Flows and Journey Time data and are considered an acceptable tool for future year testing.

Appendices

Appendix A – *160304-60343293-EM20-TSS-001* – Traffic Survey Specification

Traffic Survey Specification – M40 Junction 10

Project:	**60343293 - Highways England Spatial Planning Arrangement**	HE Ref:	**EM 20 14/15**
Subject:	**M40 Junction 10 - Traffic Survey**	Date:	**4th March 2016**
Doc No:	**160304-60343293-EM20-TSS-001**	Task:	**EM20**
Rev No:	**-**		

1. Introduction

This specification outlines AECOM's requirements for the collection, and subsequent analysis of the following survey data:

1) Video surveys to provide fully classified turning counts;
2) Automatic Number Plate Recognition (ANPR) surveys; and
3) Automatic Traffic Counts (ATC's)

Tenderers should read this specification and the attached Sub-Consultancy Agreement in full to ensure that they are able to fulfil all requirements within the required timescales. Failure to fulfil all of the requirements within the stated timescales and/or failure to meet the specification in any respect will be considered a breach of this agreement and may result in either termination of this agreement and/or a partial or total non-payment of fees due.

2. Quotes

You are invited to provide a quote for undertaking the work described in this survey specification. The work will be undertaken in accordance with AECOM's Sub-Consultancy Agreement which is attached for your reference. All quoted prices shall:

- Include for complying with the sub-consultancy agreement and insurance requirements contained therein;
- Include for compliance with the terms and conditions as set out in the Highways England Spatial Planning Arrangement contract (attached);
- Be inclusive of all costs incurred by the survey company in order to satisfy the survey requirements detailed in this traffic survey specification, and for any materials and work which may not be specified but which are implied and necessary for the satisfactory completion of the work; and
- Be exclusive of VAT.

Variations to methods described in this specification may be acceptable but these must be discussed with AECOM prior to the submission of your quotation. The contact for any queries to this tender is [redacted]

All quotes should be submitted by **1700hrs on Wednesday 9th March 2016**. Quotes received after this time will not be considered. AECOM will contact all companies to indicate whether they have been successful by **1700hrs on Thursday 10th March 2016**.

If, on receipt of this specification you wish to quote for this work, please contact AECOM by responding to the email which you have received, to confirm that you are able to respond within the specified timescales.

[redacted]

Colmore Plaza
Colmore Circus Queensway
Birmingham B4 6AT

3. Surveys

3.1 Location and Date

The junctions for the collection of the survey data are:

- Site 1 – A43 / B4100 (Baynard's Green Roundabout)
- Site 2 – A43 / M40 Southbound (Padbury Roundabout)
- Site 3 – A43 / M40 Southbound (Cherwell Junction)
- Site 4 – A43 / B430 / M40 Northbound (Ardley Roundabout)

The location of these sites is shown in the **Figure 1**.

Survey dates shall be confirmed with AECOM prior to the survey being undertaken. It is intended that the ATC's and video surveys will be carried out on **Thursday 17th March 2016**. All data shall be collected outside local school holidays when the operations of the network are typical.

3.2 Survey Requirements

Tenderers shall set out their survey methodology in their tender response. The methodology should include a marked up plan indicating the anticipated locations of equipment.



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3.2.1 Fully Classified Turning Count Video Surveys

AECOM encourages the survey company to consider the most appropriate methodology for obtaining reliable turning count data. However the following requirements are expected to be adhered to:

- All turning counts are to be carried out on **Thursday 17th March 2016** (or other neutral day, as agreed at AECOM's discretion);
- The survey period is 0600 – 1900 hrs;
- Turning counts are required for all arms at the four sites indicated in **Figure 1**;
- Each camera is to be positioned in such a way as to provide a clear field of view of the junction, the traffic stopline and where applicable, the traffic signals (this would preferably mean that the camera is positioned approximately 30m back from the stopline, looking towards the junction and at a reasonable height); and
- All cameras used for this survey shall be digital and synchronised to GMT.

If any of the above cannot be achieved, please liaise with AECOM in advance of providing a quote.

3.2.1.1 Analysis and Outputs

The video data shall be analysed using the vehicle classifications shown in **Table 1** in accordance with DMRB class standards (DMRB 13.1.4).

Class	Car / Taxi	LGV	OGV1	OGV2/HGV	Bus	Motorcycle	Cycle

Table 1: Vehicle Classifications

No interpolation or extrapolation of data, nor infilling of results shall be included in the turning count without prior approval of AECOM

The video data analysis shall be of the entire 13 hour period (0600-1900) and shall populate an Excel spreadsheet in 15 minute intervals.



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3.2.2 Automatic Number Plate Recognition (ANPR) for Origin – Destination (O-D) data

AECOM encourages the survey company to consider the most appropriate methodology for obtaining reliable Origin – Destination data. However the following requirements are expected to be adhered to:

- All ANPR data is to be collected on **Thursday 17th March 2016** (or other neutral day, as agreed at AECOM's discretion);
- The survey period is broken down into the two peak periods; 0600-0930 in the AM and 1530-1900 in the PM;
- The Origin – Destination cordon is indicated in **Figure 1**;
- There is no requirement to record registration plates on the M40 mainline; and
- All cameras used for this survey shall be synchronised to GMT.

If any of the above cannot be achieved, please liaise with AECOM in advance of providing a quote.

The data capture should record the vehicle registration number and the vehicle classification, the time and a site number where the vehicle crossed the entry cordon and (for matched registrations) the time and a site number where the vehicle crossed the exit cordon.

3.2.2.1 Analysis and Outputs

The data obtained from the analysis of the ANPR surveys shall be processed to provide O-D matrices. Registration matching techniques shall be used to determine O-Ds between all of the nominated entries and exits.

The analysis shall be of the full AM peak (06.00-09.30) and PM peak (15.30-19.30) periods and shall use the vehicle classifications as stated in **Table 2 below.**

Class	Car / Taxi	LGV	OGV1	OGV2 / HGV	Bus	Motorcycle	Cycle

Table 2: Vehicle Classifications and PCU Values

The capture rate that is likely to be achieved should be stated, with an anticipated minimum of 75% of the vehicles crossing the screen line expected to be recorded to achieve the desired minimum 50% matching of vehicles at each entry in each 15 minute period.

The outputs of the O-D processing shall be as follows:

- The Raw Data capture, as described in 3.2.2
- The Processed Data, including:
  - An O-D matrix derived from matched registrations for each class for each 15 minute period; and
  - A summary table of the proportion of matched registrations at each entry screen-line, for each 15 minute period.

Please note that a minimum of 50% matched vehicles is required at the Cordon Entry and Exit points.

Failure to achieve a 50% match will result in non-payment of survey fees, in accordance with the AECOM Sub Consultancy Agreement.



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3.2.3 Automatic Traffic Counts (ATC's)

AECOM encourages the survey company to consider the most appropriate methodology for obtaining reliable data from ATC's. However the following requirements are expected to be adhered to:

- All ATC data is to be carried out between **Monday 14th – Sunday 20th March 2016**;
- The survey period is 24 hours;
- ATC data is required at the following locations:
    - B4100 – West of A43 / B4100 (Baynard's Green Roundabout);
    - B4100 – East of A43 / B4100 (Baynard's Green Roundabout); and
    - B430 – South of A43 / B430 / M40 Northbound (Ardley Roundabout).
- The ATC's locations are indicated in **Figure 1**; and
- There is no requirement to record ATC data on the M40 mainline.

ATC survey equipment shall be placed so as to provide separate counts for each direction of traffic.

The survey supplier shall make sufficient arrangements and checks to ensure that any data lost due to damaged equipment is minimised and shall also contact AECOM, Local highway Authority and Private Landowners to notify them of the placement of survey equipment in the highway and the duration of the survey.

3.2.3.1 Analysis and Outputs

The analysis shall populate an Excel spreadsheet per location with separate columns for each class and day, such that the following data is available:

- Daily classified count data recorded by vehicle class in intervals of fifteen minutes;
- Daily total count data in intervals of fifteen minutes;
- Hourly count data by total class;
- Full day count totals by class and by movement;
- 15 minute vehicle speed profiles by class; and
- A summary table of the proportion of matched registrations at each screen-line, for each 15 minute period.



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4. Deliverables

All deliverables shall be provided to AECOM by **1700hrs** on **Friday 22nd April 2016**. AECOM will review the deliverables on receipt. Any errors or omissions identified shall be resolved to AECOM's satisfaction and failure to resolve errors or emissions will result in non-payment of survey fees, in accordance with the AECOM sub consultancy agreement.

The following shall be supplied to AECOM following analysis of the survey data.

Site Plan

A site plan detailing the location of ATC surveys and all of the cameras used in undertaking the surveys in this specification is required. The plan shall be annotated with the site numbers and shall clearly indicate the field of view of cameras and the date of the survey.

Format of data to be delivered

All data shall be provided as follows:

- Soft copy data shall be in the originating format (.doc /.xls/etc.) and each file shall be for an individual site (for turning counts). The documents shall clearly identify the survey date, time and weather and contain a diagram clearly identifying the survey location and data recorded. The documents also must be provided in an 'unprotected' state and with unrestricted access;
- All video data collected in the undertaking of the surveys shall be provided on an External Hard Drive and provided with relevant site numbers.

Site Report

A short report shall be provided that gives a record of the surveys undertaken, methodology used and a commentary on prevailing site conditions and any additional information or situations arising during the survey that may, in the opinion of the surveyor, have affected the accuracy or reliability of the survey data.

Output Data

Output data should be provided to AECOM as specified in sections *3.2.1.1, 3.2.2.1,* and *3.2.3.1*

5. Road Space Bookings & Health and Safety

Upon appointment and to ensure that safe working practices are being followed, the winning contractor would be expected to submit the following to AECOM:

- A risk assessment identifying and assessing the risks associated with carrying out the surveys and setting out appropriate mitigation; and
- Written confirmation that all equipment can be installed/removed at each location in 15 minutes or less and that a safety zone of at least 1.2m can be maintained at all times between the live carriageway and personnel installing the equipment. If this cannot be achieved, please liaise with AECOM in advance of providing a quote.

The winning contractor would also be expected to contact and gain approval from the local Highway Authority to work on their network before commencement of the survey works.



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Contractors shall obtain authorisation for the method of working and written confirmation for any equipment installed in the carriageway. Failure to abide by these Health and Safety requirements will be considered a serious breach of contract and may result in the termination of the contract without payment.

[redacted]

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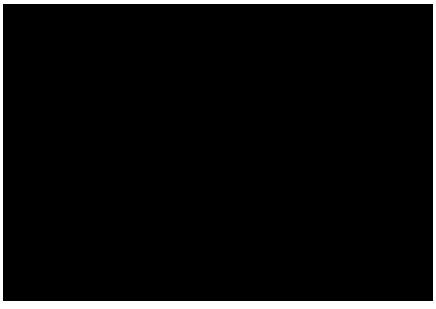
Figures



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Filename: C:\USERS\GONZALEZM2\DESKTOP\M40J10 STUFF\60343293-SKE-10-EM10-V.DWG Last saved by: GONZALEZM2 Last Plotted: 3/4/2016 2:05 PM
Project Management Initials: Designer: MG Checked: Approved: ISO A3 297mm x 420mm

ATC1

Site 1 - A43 / B4100 (Baynard's Green Roundabout)

ATC2

Site 2 - A43 / M40 Southbound (Padbury Roundabout)

Site 3 - A43 / M40 Southbound (Cherwell Junction)

Site 4 - A43 / B430 / M40 Northbound (Ardley Roundabout)

ATC3

M40
A43
B4100
B430
Ardley Interchange 10
Banbury Road
Stoke Bushes
The Street
Stoke Lyne
Stoke Wood
Swifts House Farm
Stoke Little Wood
Fritwell Road
Fewcott
Water Lane
Somerton Road
Ardley Road

Legend

- ANPR Cordon
- ATC Locations

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HESPA - M40 Junction 10 Study - ANPR Cordon and ATC Locations

60343293-SKE-10-EM20-V

Survey Specification - ANPR Cordon and ATC Locations

Appendix B – *160504 EM8 TN1* – Survey Data Check

Project:	**Highways England Spatial Planning Arrangement**	Job No:	**60343293**
Subject:	**M40 Junction 10 Study –Traffic Survey Data Check**	Date:	**5th May 2016**
HA ref:	**EM 8 16/17**	Task:	**EM8**

1. Introduction

On behalf of Highways England, AECOM commissioned Nationwide Data Collection (NDC) to conduct a traffic survey at the following junctions:

- A43 / B4100 (Baynards Green Roundabout);
- A43 / M40 Southbound (Padbury Roundabout);
- A43 / M40 Southbound (Cherwell Junction);
- A43 / B430 / M40 Northbound (Ardley Roundabout).

The survey was to be conducted in line with the details set out in document number 160304-60343293-EM20-TSS-001, titled *'Traffic Survey Specification – M40 Junction 10',* dated 4th March 2016. This note is a check of the data received against the traffic survey specification (TSS).

The surveys and dates carried out are detailed as follows:

- Video Surveys to provide Fully Classified Turning Counts (MCC);
- Automatic Number Plate Recognition (ANPR) surveys;
- Automatic Traffic Counts (ATCs).

2. NDC Traffic Survey Check against TSS

The traffic survey data submitted by NDC has been uploaded to the project network in the following location:

[redacted]

Table 1 provides a breakdown of the information set out by AECOM in the TSS along with a comparison with the data provided by NDC. Any points which do not comply with the TSS have been highlighted and comments have been provided.

Key:

✓	Compliant with AECOM TSS	×	Not compliant with AECOM TSS	✓/×	Compliant with AECOM TSS but with minor issues

Table 1: Comparing the AECOM TSS and the traffic survey data submitted by NDC

Item	Requirements met?	Comments
ATC		
3 ATC sites used?	✓	
3 ATC sites used as per "150304 M40 Junction 10 - Traffic Survey Specifications"?	✓	
ATC performed for 7 days period, 24 hours per day?	✓	Collected for 7 days between 17/03/16 and 23/03/16. This also includes the survey date

Item	Requirements met?	Comments
		which was on the 17/03/16
ATC survey conducted with classified vehicle counts?	✓	Vehicles have been classified and a classification guide spreadsheet has been provided
ATC data provided by vehicle class every 15 minutes?	✓	
15 minute totals provided for ATC data?	✓	
Hourly totals by class provided?	×	Hourly totals have not been provided but could be calculated if required.
Full day's totals by class and movement (direction) provided?	✓	Totals for each day per class have been provided. Sheets have been named with direction.
15 minute vehicle speed profiles by class provided?	×	Vehicles speed bins have been provided for each 15 minutes period. Speed data has not been recorded by class
ATC diagram with survey locations, directions and ATC site numbers provided?	✓	ATC summary provided along with vehicle classification spreadsheet.
Have all sites recorded data fully without any failure?	×	ATC Site 1 EB and WB appears to have failed collecting data from 0830 to 0845 on 17th March 2016.
MCC		
MCC Survey carried out on single, neutral day?	✓	Undertaken on 17/03/16 as stated in traffic survey specification.
MCC Survey data collected for each specified site?	✓	
MCC Survey for 12 hours (0600-1800).	✓	MCC surveys were undertaken between 0600-1900. Therefore the full 12 hours requested in the traffic survey specification plus an extra hour have been measured.
MCC Survey data provided for 12 hours (0600-1800)	✓	
MCC Survey data provided by class - Cars, Car/Taxi, LGV, OGV 1, OGV 2/ HGV, Bus, Motorcycle, Cycle.	✓	
MCC Survey provided in 15 minute intervals?	✓	
MCC Survey hourly totals provided for 15 minutes by class and route?	✓	
MCC Survey hourly totals provided by class and route.	✓	
MCC Survey full analysis period totals provided by class.	✓	
ANPR		
Has the ANPR survey been carried out on a single neutral day?	✓	The survey was carried out on the Thursday 17th March 2016.
Were the ANPR surveys carried out on the same day as the MCC and queue survey's?	✓	The survey was carried out on the same day as the MCC survey.
Have the ANPR surveys been undertaken between 0600 - 0930 and 1500 - 1830?	×	The survey was undertaken between 0630 – 0930 and 1530 – 1830. NDC stated that "Due to the need to change over from infra-red to daylight camera settings the 06:00 to 06:30 and 18:30 to 18:45 time periods have missed significant numbers of vehicles, so have not been analysed. Changing the settings takes a couple of minutes per camera and unfortunately has to be done manually."

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Item	Requirements met?	Comments
Have the ANPR surveys been set up as per the ANPR layout in the specification?	✓	
Have vehicles been classified within the survey?	✓/×	Vehicles have been classified although not to the extent suggested within the survey specification.
Has a 75% total screenline macthing of vehicles been achieved?	✓	87% of vehicles have been matched within the AM and PM peaks.
Has a 50% matching percentage been achieved at each entry point?	✓	The minimum percentage capture is 75%
Have ANPR network O-D matrices been provided for each class and 15 minute intervals.	✓/×	Vehicles have been classified in each 15 minute interval although not to the extent suggested within the survey specification.
Overall		
All data received by 22nd April 2016?	✓	MCC and ATC data was received 19th April 2016. ANPR data was received on 21st April 2016. ATC data with individual speed distribution received 25th April 2016.
Site plans provided for ATC surveys and all of the camera used in the surveys provided?	✓	
Site report detailing site conditions, information on anything which might affect the accuracy / reliability or survey and record of surveys provided?	✓	*AECOM M40 Junction 10 Traffic Survey – Survey Report March 2016* dated 27th April 2016 submitted by NDC.
Data provide as soft copies (.doc / .xls/ etc)?	✓	
All survey videos provided on External Hard drive?	×	External hard drive has not been provided. However, NDC indicated that it could be provided if requested.

3. NDC Traffic Survey Data Check

The traffic survey data submitted by NDC has been uploaded to the project network in the following location:

[redacted]

The following spreadsheet checks the received NDC Survey Data including ATC data, MCC data and ANPR data along with the acquired TRADS data as detailed below:

1. *Peak determination from the MCC data*

   The MCC data collected by NDC that took place on the 17th March 2016 has been evaluated and the following peak periods for the network have been identified as:

   - **AM Peak – 07:15-08:15**
   - **PM Peak – 16:30-17:30**

   These peak periods shall be used for the VISSIM model to produce the O-D matrix files and to identify public transport vehicles that may be operating within the network between these periods.

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2. *A comparison of the MCC entry and exit flows*

The MCC data collected by NDC on the 17th March 2016 has been used to compare the entry and exit flows for each of the junctions ensuring that they correlate. The differences are shown below.

- Between the Baynard's Green Roundabout (Site 1) and Padbury Roundabout (Site 2) flows have been calculated and show maximum differences of 2%.
- Between Padbury Roundabout (Site 2) and Cherwell Junction (Site 3) flows have been calculated and show maximum differences of 2%.
- Between Cherwell Junction (Site 3) and Ardley Roundabout (Site 4) flows have been calculated and show maximum differences of 1%.

These flow differences are considered minimal and therefore the counts are **acceptable** for use in the VISSIM model.

3. *A comparison of the MCC data with ATC flows*

The MCC data collected by NDC on the 17th March 2016 has been compared with the ATC data on the same date.

The comparison shows that most of the sites are within 10%. However, some of the sites have a higher percentage difference and are areas of concern. The table below shows a summary of the percentage differences for both the AM and PM peaks.

ATC Site	Location	Direction	Percentage Difference AM Peak	Percentage Difference PM Peak
1	B4100 West – Baynard's Green Roundabout	Eastbound	-10%	2%
		Westbound	-31%	-40%
2	B4100 East – Baynard's Green Roundabout	Eastbound	-7%	-6%
		Westbound	2%	1%
3	B430 South – Ardley Roundabout	Northbound	-2%	-0%
		Southbound	-6%	-1%

Based on this information, it is recommended that the data recorded from ATC 1 is **not used** within the VISSIM model development and alternative data is used e.g. ANPR surveys or MCC surveys.

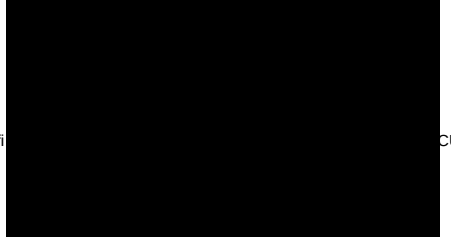
4. *A comparison of the turning count data with the survey day TRADS data flows*

The comparisons were conducted between the AM (07:15 – 08:15) and PM (16:30 – 17:30) peak periods.

The comparison shows that the highest percentage difference between the MCC survey data and TRADS data was 4%.

This indicated that the MCC data and TRADS data closely correlate and are therefore **acceptable** for use in the VISSIM model development.

6. *A comparison of the ANPR screen-line counts (OV Counts) against the ATC neutral day flows*



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The ANPR and ATC data provided by NDC have been compared using the OV counts from the ANPR survey and the week ATC average flow. A comparison between the percentage and vehicle flows was conducted between the AM peak (06:30 – 09:30) and PM Peak (15:30 – 18:30).

Overall, the majority of the collected site data have a percentage difference under 10% indicating that there is a minimal difference between the ANPR and ATC data. However, there are a couple of minor issues for the AM Peak.

During the AM Peak, the B4100 East entry arm at Baynard's Green Roundabout had a percentage difference of 13% and the B430 South exit arm at Ardley Roundabout had a percentage difference of 12%.

The cause for the higher percentage difference is unclear, but a possible explanation may be due to significant queuing. This could be affecting the vehicles counted by the ATC.

This indicated that the ANPR data and ATC data closely correlate and are therefore **acceptable** for use in the VISSIM model development

7. *Checking the TRADS survey day data against the TRADS neutral day data.*

The TRADS survey day data has been compared against the TRADS 2 week neutral day data.

The comparison shows that the percentage difference between the TRADS survey day and the TRADS 2 week neutral data to be under 5% for both peak periods with no great anomalies in the data trends. This is therefore considered **acceptable** for use in the VISSIM model development.

8. *Checking the ANPR Journey Times measured at A43 southbound approach at Baynard's Green Roundabout during AM Peak Hour Period.*

NDC reported that on 17th March 2016, there was a minor collision between two vehicles on the A43 southbound approaching the B4100 at 07:33 and that a vehicle remained stopped in Lane 1 until around 07:40.

In order to quantify how much impact this incident could have had on journey times measured at this location, AECOM carried out an independent check to journey times provided by NDC. AECOM checked journey times for vehicles routing from A43 southbound approach at Baynards Green Roundabout to B100 East exit arm and derived average journey times of 31s for the time period 06:00 to 07:32, 1min 45s for the time period 07:32 to 07:40 and 30s for the time period 07:40 to 09:30. Thus, the minor collision had a clear impact on journey times with origin the A43 southbound approach to Baynard's Green Roundabout. Therefore, AECOM note that this incident must be taken into account in the VISSIM model development.

4. Conclusions

Overall, the survey data submitted by NDC is satisfactory, with some minor problems attributed to ATC Site 1.

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[redacted]

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Appendix C – Drawing No. 530011-GA00-01

N

PROPOSED ROAD MARKINGS

PROPOSED WHITE LINING

PROPOSED KERB ALIGNMENT
CLOSING OFF 'DBFO' SLIP ROAD

FLEXIBLE MARKER POSTS IN SOCKET INSTALLATION WITH
AMBER REFLECTORS TO FACE ONCOMING TRAFFIC. POSITION
600MM FROM KERB FACE AT 2000MM SPACINGS

PROPOSED STREET LIGHTING

PROPOSED SIGNS

RENEW EXISTING WHITE LINING
AND ROAD MARKINGS

PROPOSED WHITE LINING
/ ROAD MARKINGS

PROPOSED TRAFFIC SIGNAL CONTROLLER

EXISTING BARRIER

PROPOSED MAINTENACE BAY

WHITE LINING

PROPOSED BUILD OUTS

PROPOSED VEHICLE RESTRAINT SYSTEM

PROPOSED KERB RE-ALIGNMENT
AND ROUNDABOUT WIDENING.

PROPOSED, LIGHTING AND
ELECTRICAL ASSEMBLIES

PROPOSED BUILD OUTS

EXISTING VRS

PROPOSED VRS

PROPOSALS , SLIP ROAD
ONTO EXISTING SLIP ROAD

EXISTING SLIP ROAD TO
BE MADE REDUNDANT

Water

Water

Pond

Sycamore Grove

A43

M40

M40

Def

Def

NOTES:

- EXISTING 'DBFO' SLIP ROAD TO BE PECKERED AND TOPSOILED
- PROPOSED MAINTENACE BAYS / GRASSCRETE AREAS
- PROPOSED ROAD MARKINGS / WHITE LINING
- PROPOSED ALIGNMENT SERVICES SLIP ROAD
- EXISTING SERVICES SLIP ROAD TO BE MADE REDUNDANT
- PROPOSED STREET LIGHTING
- PROPOSED SIGN LOCATIONS
- PROPOSED TRAFFIC SIGNALS
- PROPOSED TRAFFIC SIGNALS CONTROLLER
- PROPOSED TRAFFIC SIGNALS LOOPS
- PROPOSED SIGN LOCATIONS
- PROPOSED REMOVABLE MARKER POSTS
- PROPOSED VEHICLE RESTRAINT SYSTEM# (TERMINAL IDENTIFICATION)
- EXISTING VEHICLE RESTRAINT SYSTEM
- PROPOSED KERB ALIGNMENT

PRELIMINARY

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Rev	By	Chk	App	Date	Description

Client: HIGHWAYS AGENCY, an Executive Agency of the Department for Transport

Integrated Highway Services — A HALCROW / COLAS / COSTAIN COMPANY

Project: M40, J10 IMPROVEMENT SCHEME

Drawing: GENERAL ARRANGEMENT

Drawn by	AB	Date: 20/09/2013
Designed by	DWJ	Date: 26.09.13
Checked by	AW	Date: 26.09.13
Approved by	SW	Date: 26.09.13

Drawing No. 530011_GA00_01 — Revision -

Drawing Scale: 1:1000 — Sheet size A1

DO NOT SCALE FROM DRAWING

Frame 08-13

Drawing file path & name \\ukbhm2fp001\ukbhm2fp001-v1tp\TP\PROJECT\Traffic - HASPA\6000 - Studies\6027 - A43 - M40 J10 Modelling\3 - Tech Info Rcvd\131114 M40 J10 PPP CAD Drawing from A-one+\530011 - General Arrangement - Xrefs Inserted.dwg

Appendix D – VISSIM Speed Profiles

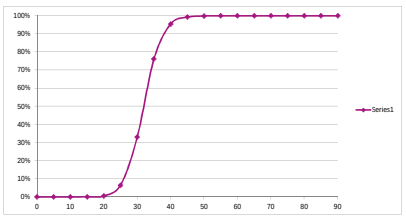
Project Name: HESPA 16 - M40 J10 Revalidation
Project Number: HESPA 16
Subject: M40 Junction 10 - ATC Speed Distributions
Date: 16/05/2016

LGVs

LGVs group include: SV MC

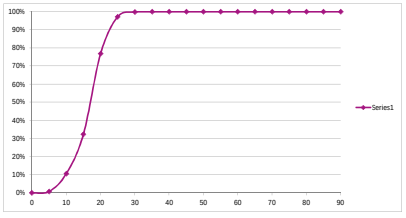
ATC 1 - B4100 West of Baynard's Green Roundabout - Westbound

ATC 1 - B4100 West of Baynard's Green Roundabout - Westbound - Flow Distribution Data																				
Speed (mph)	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95
Frequency	0	0	0	24	119	1585	7095	11533	5153	1020	170	33	1	0	0	0	0	0	0	0
Percentage	0%	0%	0%	0%	0%	6%	27%	43%	19%	4%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Cuimative Percentage	0%	0%	0%	0%	1%	6%	33%	76%	95%	99%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%



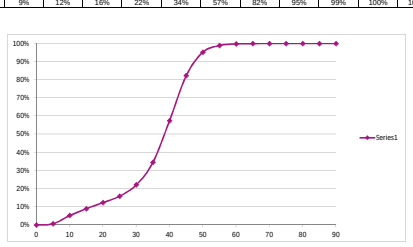
ATC 1 - B4100 West of Baynard's Green Roundabout - Eastbound

ATC 1 - B4100 West of Baynard's Green Roundabout - Eastbound - Flow Distribution Data																				
Speed (mph)	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95
Frequency	0	180	2459	5396	11036	5032	647	26	1	1	0	0	0	0	0	0	0	0	0	0
Percentage	0%	1%	10%	22%	45%	20%	3%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Cuimative Percentage	0%	1%	11%	32%	77%	97%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%



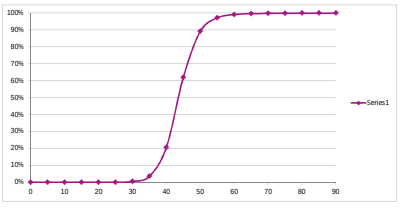
ATC 2 - B4100 East of Baynard's Green Roundabout - Westbound

ATC 2 - B4100 East of Baynard's Green Roundabout - Westbound - Flow Distribution Data																				
Speed (mph)	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95
Frequency	0	212	1570	1315	1150	1232	2166	4301	7952	8571	4490	1269	304	68	18	10	0	0	0	2
Percentage	0%	1%	5%	4%	3%	4%	6%	12%	23%	25%	13%	4%	1%	0%	0%	0%	0%	0%	0%	0%
Cuimative Percentage	0%	1%	5%	9%	12%	16%	22%	34%	57%	82%	95%	99%	100%	100%	100%	100%	100%	100%	100%	100.0%



ATC 2 - B4100 East of Baynard's Green Roundabout - Eastbound

ATC 2 - B4100 East of Baynard's Green Roundabout - Eastbound - Flow Distribution Data																				
Speed (mph)	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95
Frequency	0	0	2	4	5	26	149	1080	5984	14552	9589	2811	672	199	63	21	9	3	0	0
Percentage	0%	0%	0%	0%	0%	0%	0%	3%	17%	41%	27%	8%	2%	1%	0%	0%	0%	0%	0%	0%
Cuimative Percentage	0%	0%	0%	0%	0%	0%	1%	4%	21%	62%	89%	97%	99%	100%	100%	100%	100%	100%	100%	100%

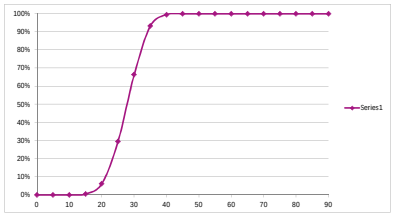


HGVs

HGVs group include: SVT TB1 TB2 TB3 T4 ART3 ART4 ART5 ART6 BD DRT

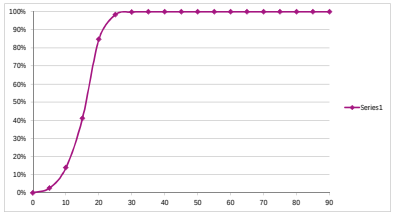
ATC 1 - B4100 West of Baynard's Green Roundabout - Westbound

ATC 1 - B4100 West of Baynard's Green Roundabout - Westbound - Flow Distribution Data																				
Speed (mph)	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95
Frequency	0	0	1	16	184	759	1199	877	201	15	0	0	0	0	0	0	0	0	0	0
Percentage	0%	0%	0%	0%	6%	23%	37%	27%	6%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Cuimative Percentage	0%	0%	0%	1%	6%	30%	66%	93%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%



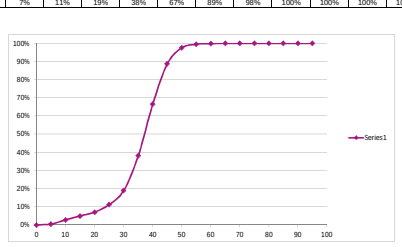
ATC 1 - B4100 West of Baynard's Green Roundabout - Eastbound

ATC 1 - B4100 West of Baynard's Green Roundabout - Eastbound - Flow Distribution Data																				
Speed (mph)	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95
Frequency	0	72	310	748	1197	369	41	2	0	0	0	0	0	0	0	0	0	0	0	0
Percentage	0%	3%	11%	27%	44%	13%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Cuimative Percentage	0%	3%	14%	41%	85%	98%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%



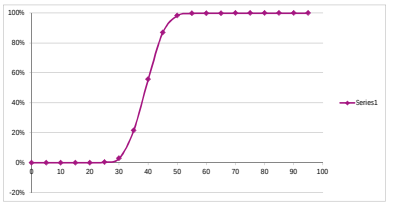
ATC 2 - B4100 East of Baynard's Green Roundabout - Westbound

ATC 2 - B4100 East of Baynard's Green Roundabout - Westbound - Flow Distribution Data																				
Speed (mph)	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95
Frequency	0	19	100	90	91	177	327	814	1211	941	372	85	14	5	0	0	0	0	0	0
Percentage	0%	0%	2%	2%	2%	4%	8%	19%	29%	22%	9%	2%	0%	0%	0%	0%	0%	0%	0%	0%
Cuimative Percentage	0%	0%	3%	5%	7%	11%	19%	38%	67%	89%	98%	100%	100%	100%	100%	100%	100%	100%	100%	100%



ATC 2 - B4100 East of Baynard's Green Roundabout - Eastbound

ATC 2 - B4100 East of Baynard's Green Roundabout - Eastbound - Flow Distribution Data																				
Speed (mph)	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95
Frequency	0	0	0	0	4	13	103	745	1370	1251	451	58	7	0	1	0	0	0	0	0
Percentage	0%	0%	0%	0%	0%	0%	3%	19%	34%	31%	11%	1%	0%	0%	0%	0%	0%	0%	0%	0%
Cuimative Percentage	0%	0%	0%	0%	0%	0%	3%	22%	56%	87%	98%	100%	100%	100%	100%	100%	100%	100%	100%	100%



Prepared By:	Marino Gonzalez	16/05/2016
Checked By:	Jorge Sanchez	20/05/2016

M40 Junction 10 - ATC Speed Distributions

AECOM

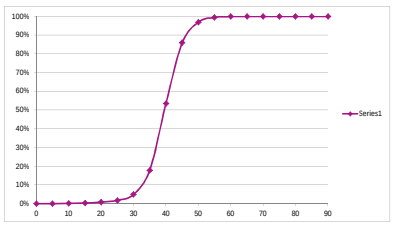
Project Name: HESPA 16 - M40 J10 Revalidation
Project Number: HESPA 16
Subject: M40 Junction 10 - ATC Speed Distributions
Date: 16/05/2016

LGVs

LGVs group include: SV MC

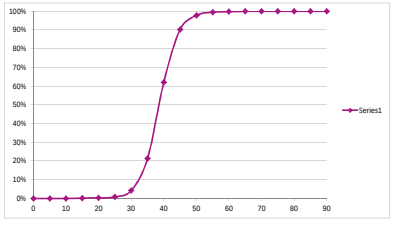
ATC 3 - B430 West of Ardley Roundabout - Northbound

ATC 3 - B430 West of Ardley Roundabout - Northbound - Flow Distribution Data																				
Speed (mph)	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95
Frequency	0	1	36	56	107	249	754	3174	8722	7926	2707	610	109	18	2	0	1	0	0	0
Percentage	0%	0%	0%	0%	0%	1%	3%	13%	36%	32%	11%	2%	0%	0%	0%	0%	0%	0%	0%	0%
Culmative Percentage	0%	0%	0%	0%	1%	2%	5%	18%	54%	86%	97%	99%	100%	100%	100%	100%	100%	100%	100%	100%



ATC 3 - B430 West of Ardley Roundabout - Southbound

ATC 3 - B430 West of Ardley Roundabout - Southbound - Flow Distribution Data																				
Speed (mph)	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95
Frequency	0	0	6	38	35	110	808	3960	9489	6562	1744	370	95	25	3	0	0	0	0	0
Percentage	0%	0%	0%	0%	0%	1%	4%	21%	62%	90%	98%	99%	100%	100%	100%	100%	100%	100%	100%	100%
Culmative Percentage	0%	0%	0%	0%	0%	1%	4%	21%	62%	90%	98%	99%	100%	100%	100%	100%	100%	100%	100%	100%

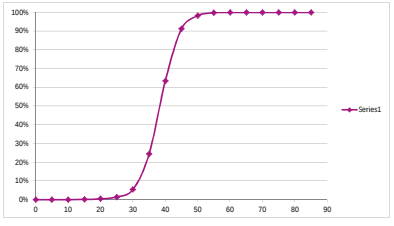


HGVs

HGVs group include: SVT TB1 TB2 TB3 T4 ART3 ART4 ART5 ART6 BD DRT

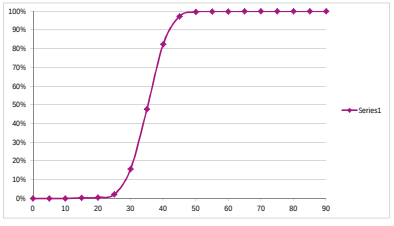
ATC 3 - B430 West of Ardley Roundabout - Northbound

ATC 3 - B430 West of Ardley Roundabout - Northbound - Flow Distribution Data																				
Speed (mph)	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95
Frequency	0	0	2	5	14	43	177	824	1695	1210	302	70	4	1	0	0	0	0	0	0
Percentage	0%	0%	0%	0%	0%	1%	4%	19%	39%	28%	7%	2%	0%	0%	0%	0%	0%	0%		0%
Culmative Percentage	0%	0%	0%	0%	0%	1%	6%	24%	63%	91%	98%	100%	100%	100%	100%	100%	100%	100%		100%



ATC 3 - B430 West of Ardley Roundabout - Southbound

ATC 3 - B430 West of Ardley Roundabout - Southbound - Flow Distribution Data																				
Speed (mph)	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95
Frequency	0	0	1	10	7	54	444	1047	1139	490	78	7	0	1	0	0	0	0	0	0
Percentage	0%	0%	0%	0%	1%	2%	16%	48%	82%	97%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Culmative Percentage	0%	0%	0%	0%	1%	2%	16%	48%	82%	97%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%



Prepared By:	Marino Gonzalez	16/05/2016
Checked By:	Jorge Sanchez	20/05/2016

M40 Junction 10 - ATC Speed Distributions

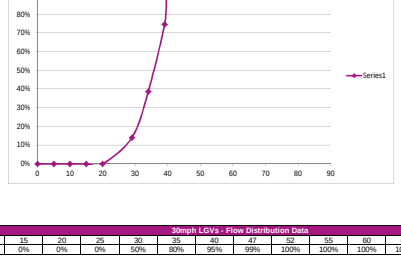
AECOM

Project Name: HESPA 16 - M40 J10 Revalidation
Project Number: HESPA 16
Subject: M40 Junction 10 - ATC Speed Distributions
Date: 16/05/2016

LGVs

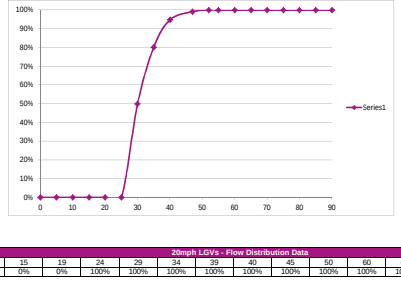
70mph LGVs

70mph LGVs - Flow Distribution Data																				
Speed (mph)	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95
Culmative Percentage	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	19%	35%	55%	#N/A	88%	#N/A	100%	100%



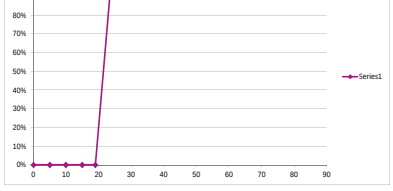
60mph LGVs

60mph LGVs - Flow Distribution Data																				
Speed (mph)	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95
Culmative Percentage	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	55%	#N/A	87%	97%	98%	#N/A	#N/A	#N/A	100%	100%



50mph LGVs

50mph LGVs - Flow Distribution Data																				
Speed (mph)	0	5	10	15	20	25	30	35	40	47	52	55	60	65	70	75	80	85	90	95
Culmative Percentage	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%



40mph LGVs

40mph LGVs - Flow Distribution Data																				
Speed (mph)	0	5	10	15	20	25	29	34	39	40	45	50	60	65	70	75	80	85	90	95
Culmative Percentage	0%	0%	0%	0%	0%	#N/A	14%	39%	75%	92%	96%	99%	100%	100%	100%	100%	100%	100%	100%	100%

30mph LGVs

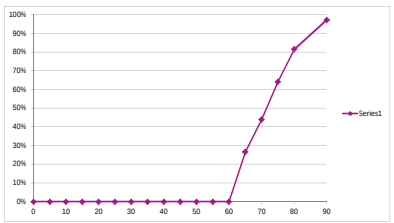
30mph LGVs - Flow Distribution Data																				
Speed (mph)	0	5	10	15	20	25	30	35	40	47	52	55	60	65	70	75	80	85	90	95
Culmative Percentage	0%	0%	0%	0%	0%	0%	50%	80%	95%	99%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

20mph LGVs

20mph LGVs - Flow Distribution Data																				
Speed (mph)	0	5	10	15	19	24	29	34	39	40	45	50	60	65	70	75	80	85	90	95
Culmative Percentage	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Motorway LGVs

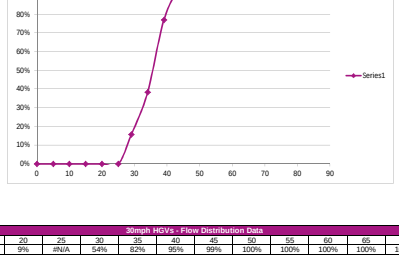
Motorway LGVs - Flow Distribution Data																				
Speed (mph)	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	100
Culmative Percentage	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	27%	44%	64%	82%	#N/A	97%	100%



HGVs

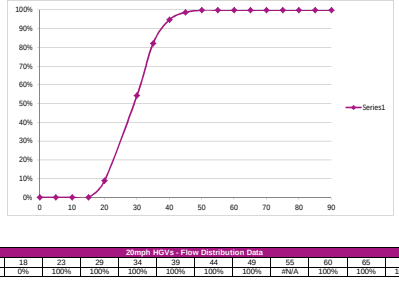
70mph HGVs

70mph HGVs - Flow Distribution Data																				
Speed (mph)	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95
Culmative Percentage	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	21%	#N/A	57%	#N/A	100%	100%	100%	100%	100%	100%



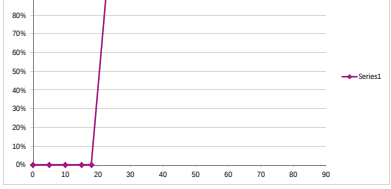
60mph HGVs

60mph HGVs - Flow Distribution Data																				
Speed (mph)	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95
Culmative Percentage	0%	0%	0%	0%	0%	0%	0%	0%	22%	#N/A	69%	#N/A	95%	98%	99%	#N/A	100%	100%	100%	100%



50mph HGVs

50mph HGVs - Flow Distribution Data																				
Speed (mph)	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95
Culmative Percentage	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%



40mph HGVs

40mph HGVs - Flow Distribution Data																				
Speed (mph)	0	5	10	15	20	25	29	34	39	44	49	55	60	65	70	75	80	85	90	95
Culmative Percentage	0%	0%	0%	0%	0%	0%	16%	38%	77%	94%	99%	#N/A	100%	100%	100%	100%	100%	100%	100%	100%

30mph HGVs

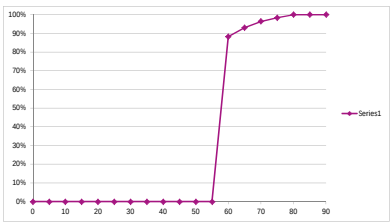
30mph HGVs - Flow Distribution Data																				
Speed (mph)	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95
Culmative Percentage	0%	0%	0%	0%	9%	#N/A	54%	82%	95%	99%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

20mph HGVs

20mph HGVs - Flow Distribution Data																				
Speed (mph)	0	5	10	15	18	23	29	34	39	44	49	55	60	65	70	75	80	85	90	95
Culmative Percentage	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%	100%	#N/A	100%	100%	100%	100%	100%	100%	100%	100%

Motorway HGVs

Motorway HGVs - Flow Distribution Data																				
Speed (mph)	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95
Culmative Percentage	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	88%	93%	96%	98%	100%	100%	100%	100%



Prepared By:	Marino Gonzalez	16/05/2016
Checked By:	Jorge Sanchez	20/05/2016

Appendix E – VISSIM Driving Behaviours

Driving Behaviour	Urban (motorised)		Right-Side Rule (motorised)		Merge (Dual Carriageway)	
Car following model	Wiedemann 74		Wiedemann 99		Wiedemann 99	
Look ahead distance (min, max)	0.00m, 250.00m		0.00m, 250.00m		0.00m, 250.00m	
No. of observed vehicles	4		2		4	
Look back distance (min, max)	0.00m, 150.00m		0.00m, 150.00m		0.00m, 150.00m	
Average standstill distance	2.00m		-		-	
Additive part of safety distance	2.00m		-		-	
Multiplic part of safety distance	3.00m		-		-	
CC0 (Standstill Distance)	-		1.50m		1.50m	
CC1 (Headway Time)	-		0.9s		1.0s	
CC2 ('Following' Variation)	-		4.00m		6.00m	
CC3 (Threshold for entering 'following')	-		-8.00		-8.00	
CC4 (Negative 'following' threshold)	-		-0.35		-0.35	
CC5 (Positive 'following' threshold)	-		0.35		0.35	
CC6 (Speed dependency of oscillation)	-		11.44		11.44	
CC7 (Oscillation acceleration)	-		0.25m/s²		0.25m/s²	
CC8 (Standstill acceleration)	-		3.50m/s²		3.50m/s²	
CC9 (Acceleration at 50mph)	-		1.50m/s²		1.50m/s²	
General Behaviour	Free Lane Selection		Left-Side Rule		Free Lane Selection	
	Own	Trailing Vehicle	Own	Trailing Vehicle	Own	Trailing Vehicle
Maximum deceleration	-4.00 m/s²	-3.00 m/s²	-4.00 m/s²	-3.00 m/s²	-4.00 m/s²	-4.00 m/s²
-1 m/s² per distance	100.00m	100.00m	200.00m	200.00m	100.00m	100.00m
Accepted deceleration	-1.00 m/s²	-1.00 m/s²	-1.00 m/s²	-0.50 m/s²	-1.00 m/s²	-1.50 m/s²
Waiting time before diffusion	60.00s		60.00s		60.00s	
Min. Headway (front/rear)	0.50m		0.50m		0.50m	
To slower lane if collision time above	-		0.00s		-	
Safety distance reduction factor	0.60		0.60		0.10	
Maximum deceleration for cooperative braking	-3.00 m/s²		-3.00 m/s²		-9.00 m/s²	
Advanced merging	N		N		Y	
Cooperative Lane Change?	N		N		Y	
Maximum speed difference	-		-		6.71mph	
Maximum collision time	-		-		10.00s	

Appendix F – Final O-D Matrices

M40 Jct10 Revalidation - LGVs - Final AM O-D Matrix

Project Name: HESPA - M40 Jct10 Revalidation
Project Number: 60504781 M10.01
Subject: M40 Jct10 Revalidation - LGVs - Final AM O-D Matrix
Date: May-16

AM Build-Up Period_0645 - 0745

	1	2	3	4	5	6	7
1	1	256	32	717	436	40	72
2	182	0	0	3	11	66	181
3	24	8	0	105	34	71	9
4	564	2	122	0	26	2013	48
5	115	4	14	29	1	211	18
6	32	127	102	2545	135	0	13
7	55	91	1	200	26	2	0

AM Peak Period_0745 - 0845

	1	2	3	4	5	6	7
1	2	228	50	699	311	66	82
2	182	0	7	4	6	90	203
3	38	3	0	130	33	108	0
4	680	5	133	0	27	2118	69
5	111	8	18	20	2	218	20
6	34	120	118	2206	151	4	11
7	49	131	1	267	30	2	0

AM Cool-Down Period_0845 - 0915

	1	2	3	4	5	6	7
1	0	101	19	387	99	27	32
2	58	0	3	3	6	24	76
3	24	3	0	87	11	57	1
4	240	1	85	1	22	802	28
5	23	0	8	3	0	49	5
6	13	47	57	1065	32	0	4
7	22	78	0	87	4	0	0

Assumptions Undertaken:Trips from/to zone 4 & 6 (and vicerversa) travelling through M40 J10 instead of travelling through M40 mainline, that have been dismissed. These are shown in "4. O-D Matrix AM" tab.

Discounting these trips could underestimate significantly the number of vehicles for these routes (from zone 4 to zone 6 and viceversa). But having taken a look to the total vehicles for each one of these routes, it is deemed not to have major impact on the modelling results. However, this should be observed when undertaking the model calibration and validation, when it might be decided to include them.



M40 Jct10 Revalidation - LGVs - Final PM O-D Matrix

Project Name: HESPA - M40 Jct10 Revalidation
Project Number: 60504781 M10.01
Subject: M40 Jct10 Revalidation - LGVs - Final PM O-D Matrix
Date: May-16

PM Build-Up Period_1530 - 1630

	1	2	3	4	5	6	7
1	3	161	46	723	119	38	42
2	218	3	13	6	6	74	183
3	59	3	6	161	21	144	0
4	847	1	177	2	21	2917	66
5	219	8	13	19	1	153	16
6	21	70	121	2427	88	0	13
7	64	114	3	120	16	1	0

PM Peak Period_1630 - 1730

	1	2	3	4	5	6	7
1	3	210	51	899	121	46	38
2	365	0	16	3	3	110	191
3	63	4	1	148	9	102	7
4	1064	1	162	1	34	2964	61
5	355	8	19	14	1	194	18
6	35	126	96	2556	117	1	20
7	76	153	1	99	19	0	0

PM Cool-Down Period_1730 - 1800

	1	2	3	4	5	6	7
1	0	102	13	414	65	15	25
2	155	0	0	0	7	49	80
3	23	2	0	74	17	57	0
4	478	1	105	0	13	1528	43
5	152	4	12	12	0	95	11
6	8	72	52	1200	59	0	7
7	41	77	0	45	14	1	0

Assumptions Undertaken:Trips from/to zone 4 & 6 (and vicerversa) travelling through M40 J10 instead of travelling through M40 mainline, that have been dismissed. These are shown in "4. O-D Matrix AM" tab.

Discounting these trips could underestimate significantly the number of vehicles for these routes (from zone 4 to zone 6 and viceversa). But having taken a look to the total vehicles for each one of these routes, it is deemed not to have major impact on the modelling results. However, this should be observed when undertaking the model calibration and validation, when it might be decided to include them.



M40 Jct10 Revalidation - HGVs - Final AM O-D Matrix

AECOM

Project Name: HESPA - M40 Jct10 Revalidation
Project Number: 60343293
Subject: M40 Jct10 Revalidation - HGVs - Final AM O-D Matrix
Date: May-16

AM Build-Up Period_0645 - 0745

	1	2	3	4	5	6	7
1	0	25	15	194	13	6	9
2	13	0	0	2	0	7	20
3	12	0	0	51	0	27	3
4	130	0	22	0	13	306	10
5	22	0	3	4	1	8	4
6	10	9	34	668	7	0	0
7	13	0	0	17	0	0	0

AM Peak Period_0745 - 0845

	1	2	3	4	5	6	7
1	0	17	17	212	30	9	12
2	14	0	0	0	2	8	12
3	18	0	0	41	1	21	1
4	105	0	22	0	8	219	4
5	14	1	0	7	0	13	9
6	8	18	27	458	8	0	7
7	11	16	0	16	2	0	0

AM Cool-Down Period_0845 - 0915

	1	2	3	4	5	6	7
1	0	9	9	90	7	4	4
2	15	0	0	0	0	5	2
3	2	0	0	29	0	8	0
4	62	0	13	0	3	106	0	0
5	7	0	3	7	0	6	1
6	8	6	29	223	3	0	3
7	6	10	0	6	0	0	0



M40 Jct10 Revalidation - HGVs - Final PM O-D Matrix

AECOM

Project Name: HESPA - M40 Jct10 Revalidation
Project Number: 60343293
Subject: M40 Jct10 Revalidation - HGVs - Final PM O-D Matrix
Date: May-16

PM Build-Up Period_1530 - 1630

	1	2	3	4	5	6	7
1	0	6	15	121	9	5	8
2	9	2	0	3	2	10	9
3	23	3	0	30	3	20	0
4	176	1	37	0	4	330	4
5	11	2	0	5	0	5	1
6	5	7	26	336	6	2	4
7	0	4	0	25	4	0	0

PM Peak Period_1630 - 1730

	1	2	3	4	5	6	7
1	1	6	9	90	6	4	14
2	8	0	0	0	0	6	2
3	13	0	1	39	4	20	1
4	116	1	33	0	2	264	3
5	10	0	3	4	0	4	1
6	5	7	23	295	4	1	2
7	0	4	0	14	4	0	0

PM Cool-Down Period_1730 - 1800

	1	2	3	4	5	6	7
1	0	4	8	46	1	1	1
2	4	0	0	2	0	2	0
3	6	0	0	6	0	14	0
4	57	0	19	3	3	116	3
5	4	0	2	2	0	4	0
6	1	0	11	136	0	0	0
7	0	0	0	0	0	0	0



Appendix G – Traffic Flow Validation

M10. M40 J10 Revalidation - Validation - Turning Counts - AM Peak

AECOM

Project: Highways England Spatial Planning Arrangement
Subject: M10. M40 J10 Revalidation - Validation - Turning Counts - AM Peak
Job Number: 60504781
HE Reference: M10. M40 J10 Revalidation
Date: 12/10/2016

AM Peak Observed Data

Reference: J:\03 Inputs\02 Matrices
Spreadsheet: 160524 O-D Matrices - Lights, 160524 O-D Matrices - Heavies
Tab: 8. Final O-D LGV's Matrix AM, 9. Final O-D LGV's Matrix PM, 8. Final O-D Matrix AM, 9. Final O-D Matrix PM

Site 1
Baynards Green Roundabout - All Vehicles

Junction	From (Link)			To (Link)			Flow 0745-0845		Difference		GEH				Individual Flows
							Observed	Modelled	Value	%	Value	<5	<7.5	<10	
Baynards Green R'bt (A43 / B4100)	A	20	A43 North	D	12	B4100 East	229	243	14	6%	0.9	Y	Y	Y	OK
	A	20		C	16	A43 Sou h	1440	1369	-71	-5%	1.9	Y	Y	Y	OK
	A	20		B	8	B4100 West	66	92	26	39%	2.9	Y	Y	Y	OK
	D	11	B4100 East	A	33	A43 North	191	191	0	0%	0.0	Y	Y	Y	OK
	D	11		C	16	A43 Sou h	101	114	13	13%	1.2	Y	Y	Y	OK
	D	11		B	8	B4100 West	233	210	-23	-10%	1.5	Y	Y	Y	OK
	C	14	A43 South	A	33	A43 North	1049	1008	-41	-4%	1.3	Y	Y	Y	OK
	C	14		D	12	B4100 East	148	155	7	5%	0.6	Y	Y	Y	OK
	C	14		B	8	B4100 West	119	120	1	1%	0.1	Y	Y	Y	OK
	B	6	B4100 West	A	33	A43 North	94	60	-34	-36%	3.9	Y	Y	Y	OK
	B	6		D	12	B4100 East	276	145	-131	-47%	9.0	N	N	Y	OK
	B	6		C	16	A43 Sou h	150	318	168	112%	11.0	N	N	N	Fail

Total Vehicles	4096	4024	-72	-2%

Site 2
Cherwell Junction - All Vehicles

Junction	From (Link)			To (Link)			Flow 0745-0845		Difference		GEH				Individual Flows
							Observed	Modelled	Value	%	Value	<5	<7.5	<10	
Cherwell Junction (A43 North, A43 South, Services)	A	36	A43 North	D	42	Cherwell Services	217	214	-3	-1%	0.2	Y	Y	Y	OK
	A	36		C	39	M40 SB On-Slip	1238	1172	-66	-5%	1.9	Y	Y	Y	OK
	A	36		B	45	A43 South	642	707	65	10%	2.5	Y	Y	Y	OK
	D	43	Cherwell Service Sta ion	A	35	A43 North	44	60	16	36%	2.2	Y	Y	Y	OK
	D	50		C	49	M40 SB On-Slip	204	170	-34	-17%	2.5	Y	Y	Y	OK
	D	43		B	45	A43 South	146	164	18	12%	1.4	Y	Y	Y	OK
	B	44	A43 Sou h	A	35	A43 North	1089	1025	-64	-6%	2.0	Y	Y	Y	OK
	B	44		C	39	M40 SB On-Slip	36	28	-8	-23%	1.5	Y	Y	Y	OK
	B	44		D	42	Cherwell Services	167	172	5	3%	0.4	Y	Y	Y	OK

Total Vehicles	3783	3711	-72	-2%

Site 3
Padbury Junction - All Vehicles

Junction	From (Link)			To (Link)			Flow 0745-0845		Difference		GEH				Individual Flows
							Observed	Modelled	Value	%	Value	<5	<7.5	<10	
Padbury Junction (A43 / M40 Off-Slip)	C	35	A43 Sou h	A	23	A43 North	1113	1085	-28	-3%	0.9	Y	Y	Y	OK
	B	90	M40 Off-Slip	C	29	A43 Sou h	315	305	-10	-3%	0.6	Y	Y	Y	OK
	B	90		A	23	A43 North	219	199	-20	-9%	1.4	Y	Y	Y	OK
	A	79	A43 North	C	29	A43 Sou h	1718	1797	79	5%	1.9	Y	Y	Y	OK

Total Vehicles	3365	3386	21	1%

Site 4
Ardley Roundabout - All Vehicles

Junction	From (Link)			To (Link)			Flow 0745-0845		Difference		GEH				Individual Flows
							Observed	Modelled	Value	%	Value	<5	<7.5	<10	
Padbury Junction (A43 / M40 Off-Slip)	C	46	A43 SB	B	57	M40 On-Slip	269	300	31	11%	1.8	Y	Y	Y	OK
	C	46		A	61	B430 SB	484	570	86	18%	3.7	Y	Y	Y	OK
	B	59	M40 Off-Slip	C	47	A43 NB	1031	1019	-12	-1%	0.4	Y	Y	Y	OK
	B	59		A	61	B430 SB	32	34	2	7%	0.4	Y	Y	Y	OK
	A	63	B430 NB	C	47	A43 NB	237	209	-28	-12%	1.9	Y	Y	Y	OK
	A	63		B	57	M40 On-Slip	205	231	26	13%	1.8	Y	Y	Y	OK

Total Vehicles	2258	2363	105	5%

Percentage of Validation Counts with GEH < 5 =	29 2	93.5
Percentage of Validation Counts with GEH < 10 =	30 1	96.8
Individual Flows meeting DMRB criteria =	30 1	96.8

Site 1
Baynards Green Roundabout - Lights

Junction	From (Link)			To (Link)			Flow 0745-0845		Difference		GEH				Individual Flows
							Observed	Modelled	Value	%	Value	<5	<7.5	<10	
Baynards Green R'bt	20	A43 North	12	B4100 East			207	226	19	9%	1.3	Y	Y	Y	OK
	20		16	A43 South			1178	1107	-71	-6%	2.1	Y	Y	Y	OK
	20		8	B4100 West			54	80	26	49%	3.2	Y	Y	Y	OK
	11	B4100 East	33	A43 North			177	177	0	0%	0.0	Y	Y	Y	OK
	11		16	A43 South			93	103	10	11%	1.0	Y	Y	Y	OK
	11		8	B4100 West			224	198	-26	-12%	1.8	Y	Y	Y	OK
	14	A43 South	33	A43 North			908	861	-47	-5%	1.6	Y	Y	Y	OK
	14		12	B4100 East			133	137	4	3%	0.3	Y	Y	Y	OK
	14		8	B4100 West			100	99	-1	-1%	0.1	Y	Y	Y	OK
	6	B4100 West	33	A43 North			83	48	-35	-42%	4.3	Y	Y	Y	OK
	6		12	B4100 East			254	129	-125	-49%	9.0	N	N	Y	OK
	6		16	A43 South			138	300	162	117%	10.9	N	N	N	Fail

Total Vehicles	3549	3466	-83	-2%

Site 2
Cherwell Junction - Lights

Junction	From (Link)			To (Link)			Flow 0745-0845		Difference		GEH				Individual Flows
							Observed	Modelled	Value	%	Value	<5	<7.5	<10	
Cherwell Junction (A43 North, A43 South, Services)	36	A43 North	42	Cherwell Services			172	172	0	0%	0.0	Y	Y	Y	OK
	36		39	M40 SB On-Slip			1019	950	-69	-7%	2.2	Y	Y	Y	OK
	36		45	A43 South			587	650	63	11%	2.5	Y	Y	Y	OK
	43	Cherwell Service Station	35	A43 North			27	41	14	52%	2.4	Y	Y	Y	OK
	50		49	M40 SB On-Slip			155	129	-26	-17%	2.2	Y	Y	Y	OK
	43		45	A43 South			130	141	11	9%	1.0	Y	Y	Y	OK
	44	A43 South	35	A43 North			957	889	-68	-7%	2.2	Y	Y	Y	OK
	44		39	M40 SB On-Slip			33	20	-13	-38%	2.4	Y	Y	Y	OK
	44		42	Cherwell Services			136	150	14	11%	1.2	Y	Y	Y	OK

Total Vehicles	3216	3144	-72	-2%

Site 3
Padbury Junction - Lights

Junction	From (Link)			To (Link)			Flow 0745-0845		Difference		GEH				Individual Flows
							Observed	Modelled	Value	%	Value	<5	<7.5	<10	
Padbury Junction (A43 / M40 Off-Slip)	35	A43 South	23	A43 North			966	930	-36	-4%	1.2	Y	Y	Y	OK
	90	M40 Off-Slip	29	A43 South			279	271	-8	-3%	0.5	Y	Y	Y	OK
	90		23	A43 North			187	167	-20	-11%	1.5	Y	Y	Y	OK
	79	A43 North	29	A43 South			1440	1508	68	5%	1.8	Y	Y	Y	OK

Total Vehicles	2872	2876	4	0%

Site 4
Ardley Roundabout - Lights

Junction	From (Link)			To (Link)			Flow 0745-0845		Difference		GEH				Individual Flows
							Observed	Modelled	Value	%	Value	<5	<7.5	<10	
Padbury Junction (A43 / M40 Off-Slip)	46	A43 SB	57	M40 On-Slip			241	262	21	9%	1.3	Y	Y	Y	OK
	46		61	B430 SB			446	529	83	19%	3.7	Y	Y	Y	OK
	59	M40 Off-Slip	47	A43 NB			898	886	-12	-1%	0.4	Y	Y	Y	OK
	59		61	B430 SB			24	26	2	8%	0.4	Y	Y	Y	OK
	63	B430 NB	47	A43 NB			203	178	-25	-12%	1.8	Y	Y	Y	OK
	63		57	M40 On-Slip			196	218	22	11%	1.6	Y	Y	Y	OK

Total Vehicles	2008	2099	91	5%

Percentage of Validation Counts with GEH < 5 =	29 2	93.5
Percentage of Validation Counts with GEH < 10 =	30 1	96.8
Individual Flows meeting DMRB criteria =	30 1	96.8

Site 1
Baynards Green Roundabout - Heavies

Junction	From (Link)			To (Link)			Flow 0745-0845		Difference		GEH				Individual Flows
							Observed	Modelled	Value	%	Value	<5	<7.5	<10	
Baynards Green R'bt	20	A43 North	12	B4100 East			22	17	-5	-23%	1.1	Y	Y	Y	OK
	20		16	A43 Sou h			262	261	-1	0%	0.0	Y	Y	Y	OK
	20		8	B4100 West			12	12	0	-3%	0.1	Y	Y	Y	OK
	11	B4100 East	33	A43 North			14	14	0	0%	0.0	Y	Y	Y	OK
	11		16	A43 Sou h			8	10	2	29%	0.8	Y	Y	Y	OK
	11		8	B4100 West			9	12	3	33%	0.9	Y	Y	Y	OK
	14	A43 South	33	A43 North			141	147	6	5%	0.5	Y	Y	Y	OK
	14		12	B4100 East			15	18	3	22%	0.8	Y	Y	Y	OK
	14		8	B4100 West			19	21	2	11%	0.5	Y	Y	Y	OK
	6	B4100 West	33	A43 North			11	11	0	3%	0.1	Y	Y	Y	OK
	6		12	B4100 East			22	16	-6	-29%	1.5	Y	Y	Y	OK
	6		16	A43 Sou h			12	18	6	50%	1.5	Y	Y	Y	OK

Total Vehicles	547	558	11	2%

Site 2
Cherwell Junction - Heavies

Junction	From (Link)			To (Link)			Flow 0745-0845		Difference		GEH				Individual Flows
							Observed	Modelled	Value	%	Value	<5	<7.5	<10	
Cherwell Junction (A43 North, A43 South, Services)	36	A43 North	42	Cherwell Services			45	42	-3	-7%	0.5	Y	Y	Y	OK
	36		39	M40 SB On-Slip			219	222	3	1%	0.2	Y	Y	Y	OK
	36		45	A43 South			55	57	2	4%	0.3	Y	Y	Y	OK
	43	Cherwell Service Station	35	A43 North			17	19	2	10%	0.4	Y	Y	Y	OK
	50		49	M40 SB On-Slip			49	41	-8	-16%	1.2	Y	Y	Y	OK
	43		45	A43 South			16	22	6	39%	1.4	Y	Y	Y	OK
	44	A43 South	35	A43 North			132	135	3	3%	0.3	Y	Y	Y	OK
	44		39	M40 SB On-Slip			3	7	4	137%	1.8	Y	Y	Y	OK
	44		42	Cherwell Services			31	21	-10	-31%	1.9	Y	Y	Y	OK

Total Vehicles	567	567	0	0%

Site 3
Padbury Junction - Heavies

Junction	From (Link)			To (Link)			Flow 0745-0845		Difference		GEH				Individual Flows
							Observed	Modelled	Value	%	Value	<5	<7.5	<10	
Padbury Junction (A43 / M40 Off-Slip)	35	A43 South	23	A43 North			147	155	8	5%	0.6	Y	Y	Y	OK
	90	M40 Off-Slip	29	A43 Sou h			36	34	-2	-6%	0.3	Y	Y	Y	OK
	90		23	A43 North			32	32	0	1%	0.0	Y	Y	Y	OK
	79	A43 North	29	A43 South			278	289	11	4%	0.7	Y	Y	Y	OK

Total Vehicles	493	510	17	3%

Site 4
Ardley Roundabout - Heavies

Junction	From (Link)			To (Link)			Flow 0745-0845		Difference		GEH				Individual Flows
							Observed	Modelled	Value	%	Value	<5	<7.5	<10	
Padbury Junction (A43 / M40 Off-Slip)	46	A43 SB	57	M40 On-Slip			28	38	10	36%	1.8	Y	Y	Y	OK
	46		61	B430 SB			38	41	3	8%	0.5	Y	Y	Y	OK
	59	M40 Off-Slip	47	A43 NB			133	133	0	0%	0.0	Y	Y	Y	OK
	59		61	B430 SB			8	8	0	6%	0.2	Y	Y	Y	OK
	63	B430 NB	47	A43 NB			34	31	-3	-8%	0.5	Y	Y	Y	OK
	63		57	M40 On-Slip			9	13	4	43%	1.2	Y	Y	Y	OK

Total Vehicles	250	264	14	6%

Percentage of Validation Counts with GEH < 5 =	31 0	100.0
Percentage of Validation Counts with GEH < 10 =	31 0	100.0
Individual Flows meeting DMRB criteria =	31 0	100.0

Prepared By:	Marino Gonzalez	12/10/2016
Checked By:	Irene Echeverria	12/10/2016

M10. M40 J10 Revalidation - Validation - Turning Counts - PM Peak

AECOM

Project: Highways England Spatial Planning Arrangement
Subject: M10. M40 J10 Revalidation - Validation - Turning Counts - PM Peak
Job Number: 60504781
HE Reference: M10. M40 J10 Revalidation
Date: 12/10/2016

PM Peak Observed Data

Reference: J:\03 Inputs\02 Matrices
Spreadsheet: 160524 O-D Matrices - Lights, 160524 O-D Matrices - Heavies
Tab: 8. Final O-D LGV's Matrix AM, 9. Final O-D LGV's Matrix PM, 8. Final O-D Matrix AM, 9. Final O-D Matrix PM

Site 1
Baynards Green Roundabout - All Vehicles

Junction	From (Link)		To (Link)			Flow 1630-1730		Difference		GEH				Individual Flows
						Observed	Modelled	Value	%	Value	<5	<7.5	<10	
Baynards Green R'bt (A43 / B4100)	A	20	D	12	B4100 East	258	215	-43	-17%	2.8	Y	Y	Y	OK
	A	20 A43 North	C	16	A43 Sou h	1191	1221	30	3%	0.9	Y	Y	Y	OK
	A	20	B	8	B4100 West	49	52	3	7%	0.5	Y	Y	Y	OK
	D	11	A	33	A43 North	321	370	49	15%	2.6	Y	Y	Y	OK
	D	11 B4100 East	C	16	A43 Sou h	106	137	31	29%	2.8	Y	Y	Y	OK
	D	11	B	8	B4100 West	279	192	-87	-31%	5.7	N	Y	Y	OK
	C	14	A	33	A43 North	1719	1555	-164	-10%	4.1	Y	Y	Y	OK
	C	14 A43 South	D	12	B4100 East	92	133	41	45%	3.9	Y	Y	Y	OK
	C	14	B	8	B4100 West	103	109	6	6%	0.6	Y	Y	Y	OK
	B	6	A	33	A43 North	57	74	17	30%	2.1	Y	Y	Y	OK
	B	6 B4100 West	D	12	B4100 East	238	155	-83	-35%	5.9	N	Y	Y	OK
	B	6	C	16	A43 Sou h	67	138	71	105%	7.0	N	Y	Y	OK

Total Vehicles	4480	4351	-129	-3%

Site 2
Cherwell Junction - All Vehicles

Junction	From (Link)		To (Link)			Flow 1630-1730		Difference		GEH				Individual Flows
						Observed	Modelled	Value	%	Value	<5	<7.5	<10	
Cherwell Junction (A43 North, A43 South, Services)	A	36	D	42	Cherwell Services	187	194	7	4%	0.5	Y	Y	Y	OK
	A	36 A43 North	C	39	M40 SB On-Slip	1014	1099	85	8%	2.6	Y	Y	Y	OK
	A	36	B	45	A43 South	438	434	-4	-1%	0.2	Y	Y	Y	OK
	D	43	A	35	A43 North	68	88	20	29%	2.3	Y	Y	Y	OK
	D	50 Cherwell Service Sta ion	C	49	M40 SB On-Slip	190	187	-3	-1%	0.2	Y	Y	Y	OK
	D	43	B	45	A43 South	156	136	-20	-13%	1.7	Y	Y	Y	OK
	B	44	A	35	A43 North	1686	1627	-59	-3%	1.4	Y	Y	Y	OK
	B	44 A43 Sou h	C	39	M40 SB On-Slip	54	19	-35	-65%	5.8	N	Y	Y	OK
	B	44	D	42	Cherwell Services	206	216	10	5%	0.7	Y	Y	Y	OK

Total Vehicles	3999	4000	1	0%

Site 3
Padbury Junction - All Vehicles

Junction	From (Link)		To (Link)			Flow 1630-1730		Difference		GEH				Individual Flows
						Observed	Modelled	Value	%	Value	<5	<7.5	<10	
Padbury Junction (A43 / M40 Off-Slip)	C	35 A43 Sou h	A	23	A43 North	1721	1707	-14	-1%	0.3	Y	Y	Y	OK
	B	90 M40 Off-Slip	C	29	A43 Sou h	250	232	-18	-7%	1.2	Y	Y	Y	OK
	B	90	A	23	A43 North	219	185	-34	-16%	2.4	Y	Y	Y	OK
	A	79 A43 North	C	29	A43 Sou h	1396	1493	97	7%	2.6	Y	Y	Y	OK

Total Vehicles	3586	3617	31	1%

Site4
Ardley Roundabout - All Vehicles

Junction	From (Link)		To (Link)			Flow 1630-1730		Difference		GEH				Individual Flows
						Observed	Modelled	Value	%	Value	<5	<7.5	<10	
Padbury Junction (A43 / M40 Off-Slip)	C	46 A43 SB	B	57	M40 On-Slip	282	289	7	2%	0.4	Y	Y	Y	OK
	C	46	A	61	B430 SB	274	280	6	2%	0.3	Y	Y	Y	OK
	B	59 M40 Off-Slip	C	47	A43 NB	1457	1436	-21	-1%	0.5	Y	Y	Y	OK
	B	59	A	61	B430 SB	36	35	-1	-2%	0.1	Y	Y	Y	OK
	A	63 B430 NB	C	47	A43 NB	451	430	-21	-5%	1.0	Y	Y	Y	OK
	A	63	B	57	M40 On-Slip	182	198	16	9%	1.2	Y	Y	Y	OK

Total Vehicles	2682	2669	-13	0%

Percentage of Validation Counts with GEH < 5 =	27 4	87.1
Percentage of Validation Counts with GEH < 10 =	31 0	100.0
Individual Flows meeting DMRB criteria =	31 0	100.0

Site 1
Baynards Green Roundabout - Lights

Junction	From (Link)		To (Link)			Flow 1630-1730		Difference		GEH				Individual Flows
						Observed	Modelled	Value	%	Value	<5	<7.5	<10	
Baynards Green R'bt	20		12	B4100 East		249	209	-40	-16%	2.6	Y	Y	Y	OK
	20	A43 North	16	A43 South		1082	1112	30	3%	0 9	Y	Y	Y	OK
	20		8	B4100 West		38	38	0	1%	0.1	Y	Y	Y	OK
	11	B4100 East	33	A43 North		312	362	50	16%	2.7	Y	Y	Y	OK
	11		16	A43 South		102	131	29	28%	2.7	Y	Y	Y	OK
	11		8	B4100 West		277	190	-87	-31%	5.7	N	Y	Y	OK
	14	A43 South	33	A43 North		1586	1414	-172	-11%	4.4	Y	Y	Y	OK
	14		12	B4100 East		85	126	41	48%	4 0	Y	Y	Y	OK
	14		8	B4100 West		97	102	5	5%	0 5	Y	Y	Y	OK
	6	B4100 West	33	A43 North		52	74	22	42%	2 8	Y	Y	Y	OK
	6		12	B4100 East		229	151	-78	-34%	5.6	N	Y	Y	OK
	6		16	A43 South		60	119	59	99%	6 2	N	Y	Y	OK

Total Vehicles	4169	4029	-140	-3%

Site 2
Cherwell Junction - Lights

Junction	From (Link)		To (Link)			Flow 1630-1730		Difference		GEH				Individual Flows
						Observed	Modelled	Value	%	Value	<5	<7.5	<10	
Cherwell Junction (A43 North, A43 South, Services)	36		42	Cherwell Services		153	163	10	6%	0 8	Y	Y	Y	OK
	36	A43 North	39	M40 SB On-Slip		919	992	73	8%	2.4	Y	Y	Y	OK
	36		45	A43 South		404	409	5	1%	0.2	Y	Y	Y	OK
	43	Cherwell Service Station	35	A43 North		54	74	20	37%	2 5	Y	Y	Y	OK
	50		49	M40 SB On-Slip		151	148	-3	-2%	0.2	Y	Y	Y	OK
	43		45	A43 South		132	112	-20	-15%	1 8	Y	Y	Y	OK
	44	A43 South	35	A43 North		1554	1492	-62	-4%	1.6	Y	Y	Y	OK
	44		39	M40 SB On-Slip		46	15	-31	-67%	5.6	N	Y	Y	OK
	44		42	Cherwell Services		168	180	12	7%	0 9	Y	Y	Y	OK

Total Vehicles	3581	3585	4	0%

Site 3
Padbury Junction - Lights

Junction	From (Link)		To (Link)			Flow 1630-1730		Difference		GEH				Individual Flows
						Observed	Modelled	Value	%	Value	<5	<7.5	<10	
Padbury Junction (A43 / M40 Off-Slip)	35	A43 South	23	A43 North		1586	1557	-29	-2%	0.7	Y	Y	Y	OK
	90	M40 Off-Slip	29	A43 South		225	205	-20	-9%	1 3	Y	Y	Y	OK
	90		23	A43 North		203	172	-31	-15%	2 3	Y	Y	Y	OK
	79	A43 North	29	A43 South		1265	1358	93	7%	2.6	Y	Y	Y	OK

Total Vehicles	3279	3293	14	0%

Site 3
Ardley Roundabout - Lights

Junction	From (Link)		To (Link)			Flow 1630-1730		Difference		GEH				Individual Flows
						Observed	Modelled	Value	%	Value	<5	<7.5	<10	
Padbury Junction (A43 / M40 Off-Slip)	46	A43 SB	57	M40 On-Slip		248	258	10	4%	0.6	Y	Y	Y	OK
	46		61	B430 SB		256	262	6	2%	0.4	Y	Y	Y	OK
	59	M40 Off-Slip	47	A43 NB		1304	1280	-24	-2%	0.7	Y	Y	Y	OK
	59		61	B430 SB		33	33	0	1%	0.1	Y	Y	Y	OK
	63	B430 NB	47	A43 NB		433	413	-20	-5%	1.0	Y	Y	Y	OK
	63		57	M40 On-Slip		178	194	16	9%	1.2	Y	Y	Y	OK

Total Vehicles	2452	2439	-13	-1%

Percentage of Validation Counts with GEH < 5 =	27 4	87.1
Percentage of Validation Counts with GEH < 10 =	31 0	100.0
Individual Flows meeting DMRB criteria =	31 0	100.0

Site 1
Baynards Green Roundabout - Heavies

Junction	From (Link)		To (Link)			Flow 1630-1730		Difference		GEH				Individual Flows
						Observed	Modelled	Value	%	Value	<5	<7.5	<10	
Baynards Green R'bt	20		12	B4100 East		9	6	-3	-31%	1.0	Y	Y	Y	OK
	20	A43 North	16	A43 Sou h		109	109	0	0%	0.0	Y	Y	Y	OK
	20		8	B4100 West		11	14	3	26%	0.8	Y	Y	Y	OK
	11	B4100 East	33	A43 North		9	8	-1	-14%	0.4	Y	Y	Y	OK
	11		16	A43 Sou h		4	6	2	58%	1.0	Y	Y	Y	OK
	11		8	B4100 West		2	2	0	0%	0.0	Y	Y	Y	OK
	14	A43 South	33	A43 North		133	140	7	5%	0.6	Y	Y	Y	OK
	14		12	B4100 East		7	7	0	2%	0.0	Y	Y	Y	OK
	14		8	B4100 West		6	6	0	7%	0.2	Y	Y	Y	OK
	6	B4100 West	33	A43 North		5	0	-5	0%	0.0	Y	Y	Y	OK
	6		12	B4100 East		9	4	-5	-57%	2.0	Y	Y	Y	OK
	6		16	A43 Sou h		7	19	12	165%	3.2	Y	Y	Y	OK

Total Vehicles	311	322	11	3%

Site 2
Cherwell Junction - Heavies

Junction	From (Link)		To (Link)			Flow 1630-1730		Difference		GEH				Individual Flows
						Observed	Modelled	Value	%	Value	<5	<7.5	<10	
Cherwell Junction (A43 North, A43 South, Services)	36		42	Cherwell Services		34	31	-3	-9%	0.5	Y	Y	Y	OK
	36	A43 North	39	M40 SB On-Slip		95	107	12	12%	1.2	Y	Y	Y	OK
	36		45	A43 South		34	25	-9	-26%	1.6	Y	Y	Y	OK
	43	Cherwell Service Station	35	A43 North		14	14	0	1%	0.0	Y	Y	Y	OK
	50		49	M40 SB On-Slip		39	39	0	0%	0.0	Y	Y	Y	OK
	43		45	A43 South		24	24	0	0%	0.0	Y	Y	Y	OK
	44	A43 South	35	A43 North		132	135	3	2%	0.3	Y	Y	Y	OK
	44		39	M40 SB On-Slip		8	4	-4	-49%	1.6	Y	Y	Y	OK
	44		42	Cherwell Services		38	36	-2	-6%	0.4	Y	Y	Y	OK

Total Vehicles	418	415	-3	-1%

Site 3
Padbury Junction - Heavies

Junction	From (Link)		To (Link)			Flow 1630-1730		Difference		GEH				Individual Flows
						Observed	Modelled	Value	%	Value	<5	<7.5	<10	
Padbury Junction (A43 / M40 Off-Slip)	35	A43 South	23	A43 North		135	149	14	11%	1.2	Y	Y	Y	OK
	90	M40 Off-Slip	29	A43 Sou h		25	27	2	7%	0.3	Y	Y	Y	OK
	90		23	A43 North		16	13	-3	-19%	0.8	Y	Y	Y	OK
	79	A43 North	29	A43 South		131	135	4	3%	0.4	Y	Y	Y	OK

Total Vehicles	307	324	17	6%

Site 3
Ardley Roundabout - Heavies

Junction	From (Link)		To (Link)			Flow 1630-1730		Difference		GEH				Individual Flows
						Observed	Modelled	Value	%	Value	<5	<7.5	<10	
Padbury Junction (A43 / M40 Off-Slip)	46	A43 SB	57	M40 On-Slip		34	31	-3	-8%	0.4	Y	Y	Y	OK
	46		61	B430 SB		18	18	0	-1%	0.1	Y	Y	Y	OK
	59	M40 Off-Slip	47	A43 NB		153	156	3	2%	0.3	Y	Y	Y	OK
	59		61	B430 SB		3	2	-1	-30%	0.6	Y	Y	Y	OK
	63	B430 NB	47	A43 NB		18	18	0	-2%	0.1	Y	Y	Y	OK
	63		57	M40 On-Slip		4	4	0	0%	0.0	Y	Y	Y	OK

Total Vehicles	230	229	-1	0%

Percentage of Validation Counts with GEH < 5 =	31 0	100.0
Percentage of Validation Counts with GEH < 10 =	31 0	100.0
Individual Flows meeting DMRB criteria =	31 0	100.0

Prepared By:	Marino Gonzalez	12/10/2016
Checked By:	Irene Echeverria	12/10/2016

Appendix H – Journey Time Validation

M10. M40 J10 Revalidation - Validation - Journey Times - AM Peak

AECOM

Project Name: HESPA 16 - M40 J10 Revalidation
Project Number: 60504781
Subject: M10. M40 J10 Revalidation - Validation - Journey Times - AM Peak
Date: 16/08/2016

AM Peak - All Vehicles

JT Markers		ANPR			Site				Journey Time (s) 0745-0845		Difference				Car Journey Time (s) 0745-0845			No. of Vehs
		FROM		TO	From (VISSIM Zone)		To (VISSIM Zone)		Observed Avg	Modelled Avg	%	Modelled within ±15%	Absolute	Modelled within ±60s	Obs. Min	Obs. Max	Modelled within Min/Max	Volume
	102	004		005	1	A43 North Entry - Baynards Green Rbt	2	B4100 East Exit - Baynards Green Rbt	31	33	9%	Y	-3	Y	17	54	Y	151
	103	004		013	1		3	Cherwell RSA Entry - Cherwell Jct	141	129	-8%	Y	12	Y	99	205	Y	42
	104	004		012	1		4	M40 SB On-Slip - Cherwell Jct	127	125	-1%	Y	2	Y	79	189	Y	537
	105	004		009	1		5	B430 Exit - Ardley Rbt	145	142	-2%	Y	2	Y	109	188	Y	209
	106	004		011	1		6	M40 NB On-Slip - Ardley Rbt	136	135	-1%	Y	1	Y	107	163	Y	42
	201	006		003	2	B4100 East Entry - Baynards Green Rbt	1	A43 North Exit - Baynards Green Rbt	72	54	-26%	N	19	Y	24	148	Y	160
	206	006		011	2		6	M40 NB On-Slip - Ardley Rbt	175	154	-12%	Y	21	Y	104	257	Y	80
	301	014	015	003	3	Cherwell RSA Exit - Cherwell Jct	1	A43 North Exit - Baynards Green Rbt	140	117	-17%	N	23	Y	89	195	Y	37
	304	014	015	012	3		4	M40 SB On-Slip - Cherwell Jct	50	50	0%	Y	0	Y	18	95	Y	118
	306	014	015	011	3		6	M40 NB On-Slip - Ardley Rbt	75	66	-13%	Y	10	Y	36	163	Y	87
	401	010		003	4	M40 NB Off-Slip - Ardley Rbt	1	A43 North Exit - Baynards Green Rbt	115	111	-3%	Y	4	Y	67	167	Y	662
	403	010		013	4		3	Cherwell RSA Entry - Cherwell Jct	83	84	1%	Y	-1	Y	47	142	Y	134
	407	010		001	4		7	B4100 West Exit - Baynards Green Rbt	97	105	9%	Y	-9	Y	62	136	Y	62
	501	008		003	5	B430 Entry - Ardley Rbt	1	A43 North Exit - Baynards Green Rbt	114	106	-7%	Y	8	Y	78	163	Y	109
	506	008		011	5		6	M40 NB On-Slip - Ardley Rbt	25	23	-7%	Y	2	Y	13	47	Y	195
	602	007		005	6	M40 SB Off-Slip - Padbury Jct	2	B4100 East Exit - Baynards Green Rbt	79	79	0%	Y	0	Y	54	113	Y	122
	605	007		009	6		5	B430 Exit - Ardley Rbt	116	102	-12%	Y	13	Y	78	176	Y	143
	702	002		005	7	B4100 West Entry - Baynards Green Rbt	2	B4100 East Exit - Baynards Green Rbt	33	28	-13%	Y	4	Y	16	58	Y	113
	704	002		012	7		4	M40 SB On-Slip - Cherwell Jct	123	117	-5%	Y	7	Y	91	176	Y	231
	705	002		009	7		5	B430 Exit - Ardley Rbt	141	135	-4%	Y	6	Y	115	161	Y	26
												18		20			20	

Validation Summary

AM Peak - All

Percentage of journey times within 15% =	18 / 20	90%
Percentage of journey times within 60 seconds =	20 / 20	100%
Percentage of journey times secions wihin min/max modelled range =	20 / 20	100%

Prepared by:	Marino Gonzalez	16/08/2016
Checked by:	Jorge Sanchez Racionero	16/08/2016

M10. M40 J10 Revalidation - Validation - Journey Times - PM Peak

AECOM

Project Name: HESPA 16 - M40 J10 Revalidation
Project Number: 60504781
Subject: M10. M40 J10 Revalidation - Validation - Journey Times - PM Peak
Date: 16/08/2016

PM Peak - All Vehicles

JT Markers		ANPR			Site				Journey Time (s) 1630-1730		Difference				Car Journey Time (s) 1630-1730			No. of Vehs
		FROM		TO	From (VISSIM Zone)		To (VISSIM Zone)		Observed Avg	Modelled Avg	%	Modelled within ±15%	Absolute	Modelled within ±60s	Obs. Min	Obs. Max	Modelled within Min/Max	Volume
	102	004		005	1	A43 North Entry - Baynards Green Rbt	2	B4100 East Exit - Baynards Green Rbt	24	20	-15%	Y	4	Y	13	43	Y	158
	103	004		013	1		3	Cherwell RSA Entry - Cherwell Jct	122	109	-11%	Y	13	Y	87	159	Y	46
	104	004		012	1		4	M40 SB On-Slip - Cherwell Jct	106	104	-1%	Y	2	Y	67	161	Y	727
	105	004		009	1		5	B430 Exit - Ardley Rbt	134	118	-12%	Y	15	Y	101	181	Y	97
	106	004		011	1		6	M40 NB On-Slip - Ardley Rbt	124	114	-8%	Y	10	Y	96	160	Y	37
	201	006		003	2	B4100 East Entry - Baynards Green Rbt	1	A43 North Exit - Baynards Green Rbt	53	38	-29%	N	16	Y	23	116	Y	213
	206	006		011	2		6	M40 NB On-Slip - Ardley Rbt	138	121	-12%	Y	17	Y	98	204	Y	67
	301	014	015	003	3	Cherwell RSA Exit - Cherwell Jct	1	A43 North Exit - Baynards Green Rbt	225	204	-9%	Y	21	Y	120	358	Y	55
	304	014	015	012	3		4	M40 SB On-Slip - Cherwell Jct	41	46	13%	Y	-5	Y	12	84	Y	137
	306	014	015	011	3		6	M40 NB On-Slip - Ardley Rbt	69	63	-9%	Y	6	Y	38	137	Y	86
	401	010		003	4	M40 NB Off-Slip - Ardley Rbt	1	A43 North Exit - Baynards Green Rbt	235	204	-13%	Y	30	Y	88	418	Y	904
	403	010		013	4		3	Cherwell RSA Entry - Cherwell Jct	86	81	-6%	Y	5	Y	51	131	Y	151
	407	010		001	4		7	B4100 West Exit - Baynards Green Rbt	217	197	-10%	Y	21	Y	86	346	Y	49
	501	008		003	5	B430 Entry - Ardley Rbt	1	A43 North Exit - Baynards Green Rbt	232	210	-10%	Y	22	Y	78	424	Y	284
	506	008		011	5		6	M40 NB On-Slip - Ardley Rbt	27	30	11%	Y	-3	Y	11	71	Y	147
	602	007		005	6	M40 SB Off-Slip - Padbury Jct	2	B4100 East Exit - Baynards Green Rbt	201	203	1%	Y	-3	Y	67	412	Y	108
	605	007		009	6		5	B430 Exit - Ardley Rbt	252	129	-49%	N	123	N	80	482	Y	98
	702	002		005	7	B4100 West Entry - Baynards Green Rbt	2	B4100 East Exit - Baynards Green Rbt	24	41	71%	N	-17	Y	14	36	N	106
	704	002		012	7		4	M40 SB On-Slip - Cherwell Jct	109	119	9%	Y	-10	Y	69	151	Y	72
	705	002		009	7		5	B430 Exit - Ardley Rbt	140	133	-5%	Y	7	Y	131	153	Y	14
												17		19			19	

Validation Summary

PM Peak - All

Percentage of journey times within 15% =	17 / 20	85%
Percentage of journey times within 60 seconds =	19 / 20	95%
Percentage of journey times secions wihin min/max modelled range =	19 / 20	95%

Prepared by:	Marino Gonzalez	16/08/2016
Checked by:	Jorge Sanchez Racionero	16/08/2016

M10. M40 J10 Revalidation - Validation - Journey Times - All Routes - AM Peak

AECOM

Project Name: HESPA 16 - M40 J10 Revalidation
Project Number: 60504781
Subject: M10. M40 J10 Revalidation - Validation - Journey Times - All Routes - AM Peak
Date: 13/10/2016

AM Peak - All Vehicles

JT Markers	ANPR FROM	ANPR TO	Site From (VISSIM Zone)		Site To (VISSIM Zone)		Journey Time (s) 0745-0845 Observed Avg	Journey Time (s) 0745-0845 Modelled Avg	Difference %	Difference Modelled within ±15%	Difference Absolute	Difference Modelled within ±60s	Car Journey Time (s) 0745-0845 Obs. Min	Car Journey Time (s) 0745-0845 Obs. Max	Car Journey Time (s) 0745-0845 Modelled within Min/Max	No. of Vehs Volume
102	004	005	1	A43 North Entry - Baynards Green Rbt	2	B4100 East Exit - Baynards Green Rbt	31	33	9%	Y	-3	Y	17	54	Y	151
103	004	013	1		3	Cherwell RSA Entry - Cherwell Jct	141	129	-8%	Y	12	Y	99	205	Y	42
104	004	012	1		4	M40 SB On-Slip - Cherwell Jct	127	125	-1%	Y	2	Y	79	189	Y	537
105	004	009	1		5	B430 Exit - Ardley Rbt	145	142	-2%	Y	2	Y	109	188	Y	209
106	004	011	1		6	M40 NB On-Slip - Ardley Rbt	136	135	-1%	Y	1	Y	107	163	Y	42
201	006	003	2	B4100 East Entry - Baynards Green Rbt	1	A43 North Exit - Baynards Green Rbt	72	54	-26%	N	19	Y	24	148	Y	160
206	006	011	2		6	M40 NB On-Slip - Ardley Rbt	175	154	-12%	Y	21	Y	104	257	Y	80
301	014 015	003	3	Cherwell RSA Exit - Cherwell Jct	1	A43 North Exit - Baynards Green Rbt	140	117	-17%	N	23	Y	89	195	Y	37
304	014 015	012	3		4	M40 SB On-Slip - Cherwell Jct	50	50	0%	Y	0	Y	18	95	Y	118
306	014 015	011	3		6	M40 NB On-Slip - Ardley Rbt	75	66	-13%	Y	10	Y	36	163	Y	87
401	010	003	4	M40 NB Off-Slip - Ardley Rbt	1	A43 North Exit - Baynards Green Rbt	115	111	-3%	Y	4	Y	67	167	Y	662
403	010	013	4		3	Cherwell RSA Entry - Cherwell Jct	83	84	1%	Y	-1	Y	47	142	Y	134
407	010	001	4		7	B4100 West Exit - Baynards Green Rbt	97	105	9%	Y	-9	Y	62	136	Y	62
501	008	003	5	B430 Entry - Ardley Rbt	1	A43 North Exit - Baynards Green Rbt	114	106	-7%	Y	8	Y	78	163	Y	109
506	008	011	5		6	M40 NB On-Slip - Ardley Rbt	25	23	-7%	Y	2	Y	13	47	Y	195
602	007	005	6	M40 SB Off-Slip - Padbury Jct	2	B4100 East Exit - Baynards Green Rbt	79	79	0%	Y	0	Y	54	113	Y	122
605	007	009	6		5	B430 Exit - Ardley Rbt	116	102	-12%	Y	13	Y	78	176	Y	143
702	002	005	7	B4100 West Entry - Baynards Green Rbt	2	B4100 East Exit - Baynards Green Rbt	33	28	-13%	Y	4	Y	16	58	Y	113
704	002	012	7		4	M40 SB On-Slip - Cherwell Jct	123	117	-5%	Y	7	Y	91	176	Y	231
705	002	009	7		5	B430 Exit - Ardley Rbt	141	135	-4%	Y	6	Y	115	161	Y	26
101	004	005	1	A43 North Entry - Baynards Green Rbt	1	B4100 East Exit - Baynards Green Rbt	31	52	71%	N	-22	Y	17	54	Y	151
107	004	001	1		7	Cherwell RSA Entry - Cherwell Jct	22	40	80%	N	-18	Y	11	41	Y	59
202	006	005	2	B4100 East Entry - Baynards Green Rbt	2	B4100 East Exit - Baynards Green Rbt										
203	006	013	2		3	Cherwell RSA Entry - Cherwell Jct	147	140	-5%	Y	7	Y	111	214	Y	6
204	006	012	2		4	M40 SB On-Slip - Cherwell Jct	161	137	-15%	N	25	Y	122	230	Y	3
205	006	009	2		5	B430 Exit - Ardley Rbt	188	164	-13%	Y	23	Y	130	250	Y	6
207	006	001	2		7	B4100 West Exit - Baynards Green Rbt	64	58	-10%	Y	6	Y	10	142	Y	174
302	014 015	005	3	Cherwell RSA Exit - Cherwell Jct	2	B4100 East Exit - Baynards Green Rbt										
303	014 015	013	3		3	Cherwell RSA Entry - Cherwell Jct										
305	014 015	009	3		5	B430 Exit - Ardley Rbt	76	68	-10%	Y	8	Y	43	111	Y	24
307	014 015	001	3		7	B4100 West Exit - Baynards Green Rbt										
402	010	005	4	M40 NB Off-Slip - Ardley Rbt	2	B4100 East Exit - Baynards Green Rbt	112	118	6%	Y	-7	Y	99	134	Y	4
404	010	012	4		4	M40 SB On-Slip - Cherwell Jct										
405	010	009	4		5	B430 Exit - Ardley Rbt	17	18	9%	Y	-2	Y	11	32	Y	23
406	010	011	4		6	M40 NB On-Slip - Ardley Rbt	420	0	-100%	N	420	N	27	1554	N	11
502	008	005	5	B430 Entry - Ardley Rbt	2	B4100 East Exit - Baynards Green Rbt	113	112	-1%	Y	1	Y	101	135	Y	8
503	008	013	5		3	Cherwell RSA Entry - Cherwell Jct	78	78	-1%	Y	1	Y	59	100	Y	15
504	008	012	5		4	M40 SB On-Slip - Cherwell Jct	98	90	-8%	Y	7	Y	60	130	Y	23
505	008	009	5		5	B430 Exit - Ardley Rbt	1067	26	-98%	N	1041	N	31	2214	N	4
507	008	001	5		7	B4100 West Exit - Baynards Green Rbt	98	104	6%	Y	-6	Y	71	124	Y	25
601	007	003	6	M40 SB Off-Slip - Padbury Jct	1	A43 North Exit - Baynards Green Rbt	84	71	-16%	N	13	Y	57	143	Y	37
603	007	013	6		3	Cherwell RSA Entry - Cherwell Jct	101	88	-13%	Y	13	Y	63	146	Y	130
604	007	012	6		4	M40 SB On-Slip - Cherwell Jct	94	0	-100%	N	94	N	70	144	N	20
606	007	011	6		6	M40 NB On-Slip - Ardley Rbt	219	95	-57%	N	125	N	78	559	Y	4
607	007	001	6		7	B4100 West Exit - Baynards Green Rbt	62	68	10%	Y	-6	Y	45	85	Y	16
701	002	003	7	B4100 West Entry - Baynards Green Rbt	1	A43 North Exit - Baynards Green Rbt	54	21	-61%	N	33	Y	23	109	N	43
703	002	013	7		3	Cherwell RSA Entry - Cherwell Jct										
706	002	011	7		6	M40 NB On-Slip - Ardley Rbt										
707	002	001	7		7	B4100 West Exit - Baynards Green Rbt										
										30		37			37	

Validation Summary

AM Peak - All

Percentage of journey times within 15% =	30 / 41	73%
Percentage of journey times within 60 seconds =	37 / 41	90%
Percentage of journey times secions wihin min/max modelled range =	37 / 41	90%

Prepared by:	Marino Gonzalez	13/10/2016
Checked by:	Irene Echeverria	13/10/2016

M10. M40 J10 Revalidation - Validation - Journey Times - All Routes - PM Peak

AECOM

Project Name: HESPA 16 - M40 J10 Revalidation
Project Number: 60504781
Subject: M10. M40 J10 Revalidation - Validation - Journey Times - All Routes - PM Peak
Date: 13/10/2016

PM Peak - All Vehicles

JT Markers	ANPR FROM	ANPR TO	Site From (VISSIM Zone)		Site To (VISSIM Zone)		Journey Time (s) 1630-1730 Observed Avg	Journey Time (s) 1630-1730 Modelled Avg	Difference %	Difference Modelled within ±15%	Difference Absolute	Difference Modelled within ±60s	Car Journey Time (s) 1630-1730 Obs. Min	Car Journey Time (s) 1630-1730 Obs. Max	Car Journey Time (s) 1630-1730 Modelled within Min/Max	No. of Vehs Volume
102	004	005	1	A43 North Entry - Baynards Green Rbt	2	B4100 East Exit - Baynards Green Rbt	24	20	-15%	Y	4	Y	13	43	Y	158
103	004	013	1		3	Cherwell RSA Entry - Cherwell Jct	122	109	-11%	Y	13	Y	87	159	Y	46
104	004	012	1		4	M40 SB On-Slip - Cherwell Jct	106	104	-1%	Y	2	Y	67	161	Y	727
105	004	009	1		5	B430 Exit - Ardley Rbt	134	118	-12%	Y	15	Y	101	181	Y	97
106	004	011	1		6	M40 NB On-Slip - Ardley Rbt	124	114	-8%	Y	10	Y	96	160	Y	37
201	006	003	2	B4100 East Entry - Baynards Green Rbt	1	A43 North Exit - Baynards Green Rbt	53	38	-29%	N	16	Y	23	116	Y	213
206	006	011	2		6	M40 NB On-Slip - Ardley Rbt	138	121	-12%	Y	17	Y	98	204	Y	67
301	014 015	003	3	Cherwell RSA Exit - Cherwell Jct	1	A43 North Exit - Baynards Green Rbt	225	204	-9%	Y	21	Y	120	358	Y	55
304	014 015	012	3		4	M40 SB On-Slip - Cherwell Jct	41	46	13%	Y	-5	Y	12	84	Y	137
306	014 015	011	3		6	M40 NB On-Slip - Ardley Rbt	69	63	-9%	Y	6	Y	38	137	Y	86
401	010	003	4	M40 NB Off-Slip - Ardley Rbt	1	A43 North Exit - Baynards Green Rbt	235	204	-13%	Y	30	Y	88	418	Y	904
403	010	013	4		3	Cherwell RSA Entry - Cherwell Jct	86	81	-6%	Y	5	Y	51	131	Y	151
407	010	001	4		7	B4100 West Exit - Baynards Green Rbt	217	197	-10%	Y	21	Y	86	346	Y	49
501	008	003	5	B430 Entry - Ardley Rbt	1	A43 North Exit - Baynards Green Rbt	232	210	-10%	Y	22	Y	78	424	Y	284
506	008	011	5		6	M40 NB On-Slip - Ardley Rbt	27	30	11%	Y	-3	Y	11	71	Y	147
602	007	005	6	M40 SB Off-Slip - Padbury Jct	2	B4100 East Exit - Baynards Green Rbt	201	203	1%	Y	-3	Y	67	412	Y	108
605	007	009	6		5	B430 Exit - Ardley Rbt	252	129	-49%	N	123	N	80	482	Y	98
702	002	005	7	B4100 West Entry - Baynards Green Rbt	2	B4100 East Exit - Baynards Green Rbt	24	41	71%	N	-17	Y	14	36	N	106
704	002	012	7		4	M40 SB On-Slip - Cherwell Jct	109	119	9%	Y	-10	Y	69	151	Y	72
705	002	009	7		5	B430 Exit - Ardley Rbt	140	133	-5%	Y	7	Y	131	153	Y	14
101	004	005	1	A43 North Entry - Baynards Green Rbt	1	B4100 East Exit - Baynards Green Rbt	24	33	36%	N	-9	Y	13	43	Y	158
107	004	001	1		7	Cherwell RSA Entry - Cherwell Jct	16	26	61%	N	-10	Y	11	27	Y	28
202	006	005	2	B4100 East Entry - Baynards Green Rbt	2	B4100 East Exit - Baynards Green Rbt										
203	006	013	2		3	Cherwell RSA Entry - Cherwell Jct	136	112	-18%	N	24	Y	99	212	Y	9
204	006	012	2		4	M40 SB On-Slip - Cherwell Jct										
205	006	009	2		5	B430 Exit - Ardley Rbt	1219	127	-90%	N	1092	N	181	2417	N	3
207	006	001	2		7	B4100 West Exit - Baynards Green Rbt	34	34	-1%	Y	0	Y	10	83	Y	101
302	014 015	005	3	Cherwell RSA Exit - Cherwell Jct	2	B4100 East Exit - Baynards Green Rbt	186	212	14%	Y	-25	Y	124	293	Y	3
303	014 015	013	3		3	Cherwell RSA Entry - Cherwell Jct										
305	014 015	009	3		5	B430 Exit - Ardley Rbt	83	68	-18%	N	15	Y	50	138	Y	9
307	014 015	001	3		7	B4100 West Exit - Baynards Green Rbt	223	206	-8%	Y	17	Y	89	343	Y	6
402	010	005	4	M40 NB Off-Slip - Ardley Rbt	2	B4100 East Exit - Baynards Green Rbt										
404	010	012	4		4	M40 SB On-Slip - Cherwell Jct										
405	010	009	4		5	B430 Exit - Ardley Rbt	13	15	13%	Y	-2	Y	11	16	Y	13
406	010	011	4		6	M40 NB On-Slip - Ardley Rbt	477	0	-100%	N	477	N	35	1363	N	9
502	008	005	5	B430 Entry - Ardley Rbt	2	B4100 East Exit - Baynards Green Rbt	159	215	35%	N	-56	Y	106	310	Y	6
503	008	013	5		3	Cherwell RSA Entry - Cherwell Jct	91	85	-7%	Y	7	Y	62	125	Y	17
504	008	012	5		4	M40 SB On-Slip - Cherwell Jct	88	99	12%	Y	-11	Y	66	117	Y	14
505	008	009	5		5	B430 Exit - Ardley Rbt										
507	008	001	5		7	B4100 West Exit - Baynards Green Rbt	160	207	29%	N	-47	Y	82	249	Y	14
601	007	003	6	M40 SB Off-Slip - Padbury Jct	1	A43 North Exit - Baynards Green Rbt	217	187	-14%	Y	30	Y	91	438	Y	33
603	007	013	6		3	Cherwell RSA Entry - Cherwell Jct	209	119	-43%	N	89	N	71	485	Y	98
604	007	012	6		4	M40 SB On-Slip - Cherwell Jct	177	0	-100%	N	177	N	67	397	N	25
606	007	011	6		6	M40 NB On-Slip - Ardley Rbt										
607	007	001	6		7	B4100 West Exit - Baynards Green Rbt	205	179	-13%	Y	26	Y	55	370	Y	17
701	002	003	7	B4100 West Entry - Baynards Green Rbt	1	A43 North Exit - Baynards Green Rbt	48	33	-30%	N	14	Y	24	83	Y	51
703	002	013	7		3	Cherwell RSA Entry - Cherwell Jct										
706	002	011	7		6	M40 NB On-Slip - Ardley Rbt										
707	002	001	7		7	B4100 West Exit - Baynards Green Rbt										
										25		34			35	

Validation Summary

PM Peak - All

Percentage of journey times within 15% =	25 / 39	64%
Percentage of journey times within 60 seconds =	34 / 39	87%
Percentage of journey times secions wihin min/max modelled range =	35 / 39	90%

Prepared by:	Marino Gonzalez	13/10/2016
Checked by:	Irene Echeverria	13/10/2016

About AECOM

AECOM (NYSE: ACM) is built to deliver a better world. We design, build, finance and operate infrastructure assets for governments, businesses and organizations in more than 150 countries.

As a fully integrated firm, we connect knowledge and experience across our global network of experts to help clients solve their most complex challenges.

From high-performance buildings and infrastructure, to resilient communities and environments, to stable and secure nations, our work is transformative, differentiated and vital. A Fortune 500 firm, AECOM companies had revenue of approximately US$19 billion during the 12 months ended June 30, 2015.

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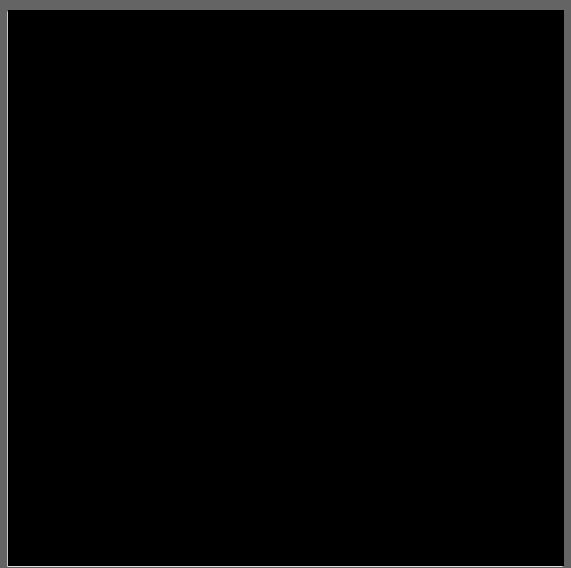


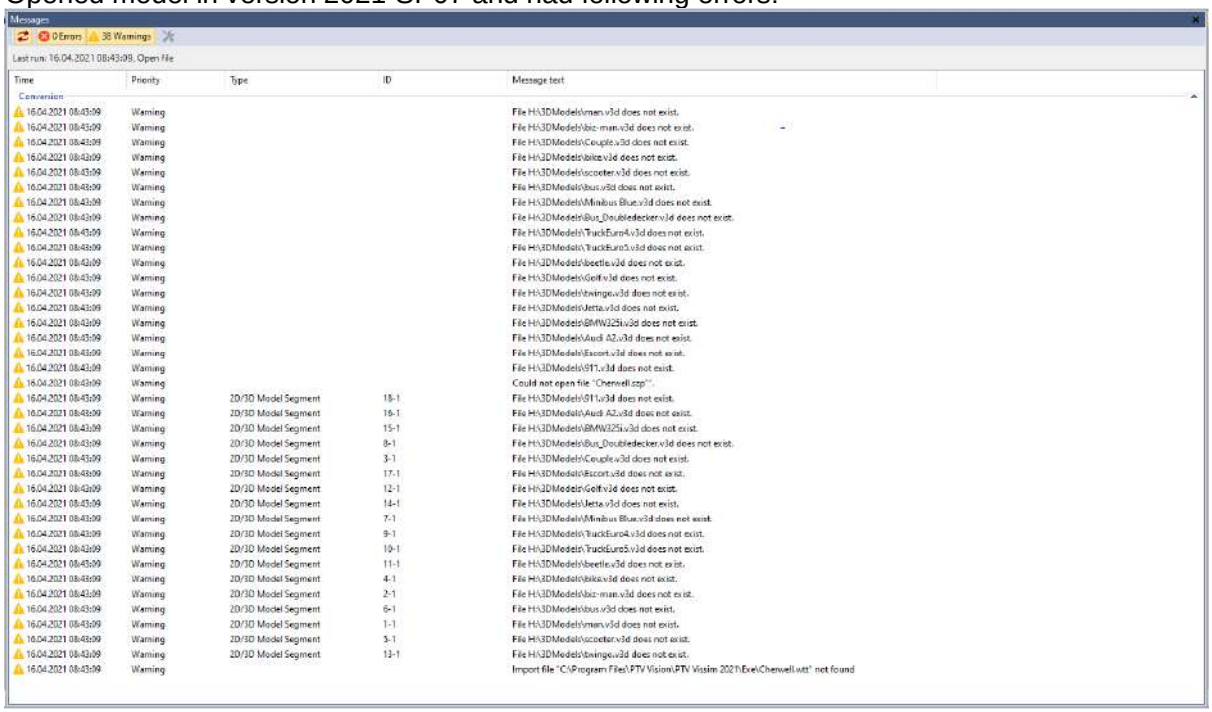
APPENDIX B:
VISSIM LOG

VISSIM Log – M40 J10 Update & Revalidation

16/04/21

Version Change

Opened model in version 2021-SP07 and had following errors:



Placed model under scenario management and created two scenarios – 2016 AM and 2016 PM

Project Explorer

Created 3 modification files – No. 1 to make global changes to HE model, No. 2 to make AM specific changes and No.3 to make PM specific changes.

Mod 1 – Network Changes

Background Images

- Loaded in '160516 M40 J10 OS Mapping'. When loading into VISSIM, chose option 'Use from positioning file (bgr)'. Note:- tried to load with option 'use from file (VISSIM-Koordinaten)', but drawing loaded far away from network. May need to move the model at a later date when loading in future year testing drawings.

2D/3D Models

- Updated the models and distributions to defaults in v2021
- Kept 'Motorbike' 2D/3D model and used more up to date V3DM model.

B430 / Ardley Staggered Crossing

- Extended Links 63 and 61 to recycling centre
- Added additional links to model Ardley Road East and West
- Updated link structure around Ardley Crossroads to model junction with B430.
- Added Node 19 to control movements
- Added parking lots and nodes for Ardley Rd entries
- Added RSAs for all turns
- Added PRs 105-129 for turns in and out of Ardley Rd East and West

Baynard's Green Roundabout

- Adjusted link structure on B4100 East and West approaches – inclusion of 0.1m links for flares and some adjustment to circulatory sections to reduce lengths of connectors.

- Adjusted Node 1 to not be overlapping connectors (due to flare change)
- Reviewed priority rules and positioned as close to HE base model as possible after link/connector changes.
- Reviewed positions of queue counters and made these 0.1m behind priority rules
- Added in RSAS to match HE base model
- Reviewed edges and closed all unrealistic turns and U-turns

Padbury Roundabout

- Adjusted link structure on M40 SB off-slip – inclusion of 0.1m links for flares and some adjustment to circulatory sections to reduce lengths of connectors.
- Changes to link structure on north section of circulatory to add in flare and reduction of connector lengths in NE section.
- Adjusted Node 2 to not be overlapping connectors (due to flare change)
- Reviewed priority rules and positioned as close to HE base model as possible after link/connector changes.
- Reviewed positions of queue counters and made these 0.1m behind priority rules
- On A43 South approach, reduced length of connector and updated RSA lengths to match HE base model.
- Added in RSAS to match HE base model
- Reviewed edges and closed all unrealistic turns and U-turns

Cherwell Roundabout

- Adjusted link structure on A43 North approach – inclusion of 0.1m link for flare and adjusted flare orientation to suit Google Maps/Streetview.
- Updated M40 SB On-Slip with 0.1m link to model merge.
- Shortening of connectors from services and extension of links.
- Added in RSAS to match HE base model
- Adjusted queue counter 10 to be on Link 10041
- Adjusted Node 3 to include the M40 SB on-slip merge
- Reviewed priority rules and positioned as close to HE base model as possible after link/connector changes.
- Reviewed positions of queue counters and made these 0.1m behind priority rules
- Reviewed edges and closed all unrealistic turns and U-turns

Ardley Roundabout

- Adjusted link structure on A43 NE approach and amendment to links/connectors on NE circulatory section.
- Adjusted link structure on SW circulatory section
- Adjustment of link structure on B430 approach, including 0.1m link to model flare on approach
- Adjustment of Node 4 to position away from overlapping connectors.
- Reviewed priority rules and positioned as close to HE base model as possible after link/connector changes.
- PRs 9 & 10 – moved green markers from position 37m to 38m
- Reviewed positions of queue counters and made these 0.1m behind priority rules
- Reviewed edges and closed all unrealistic turns and U-turns

19/04/21

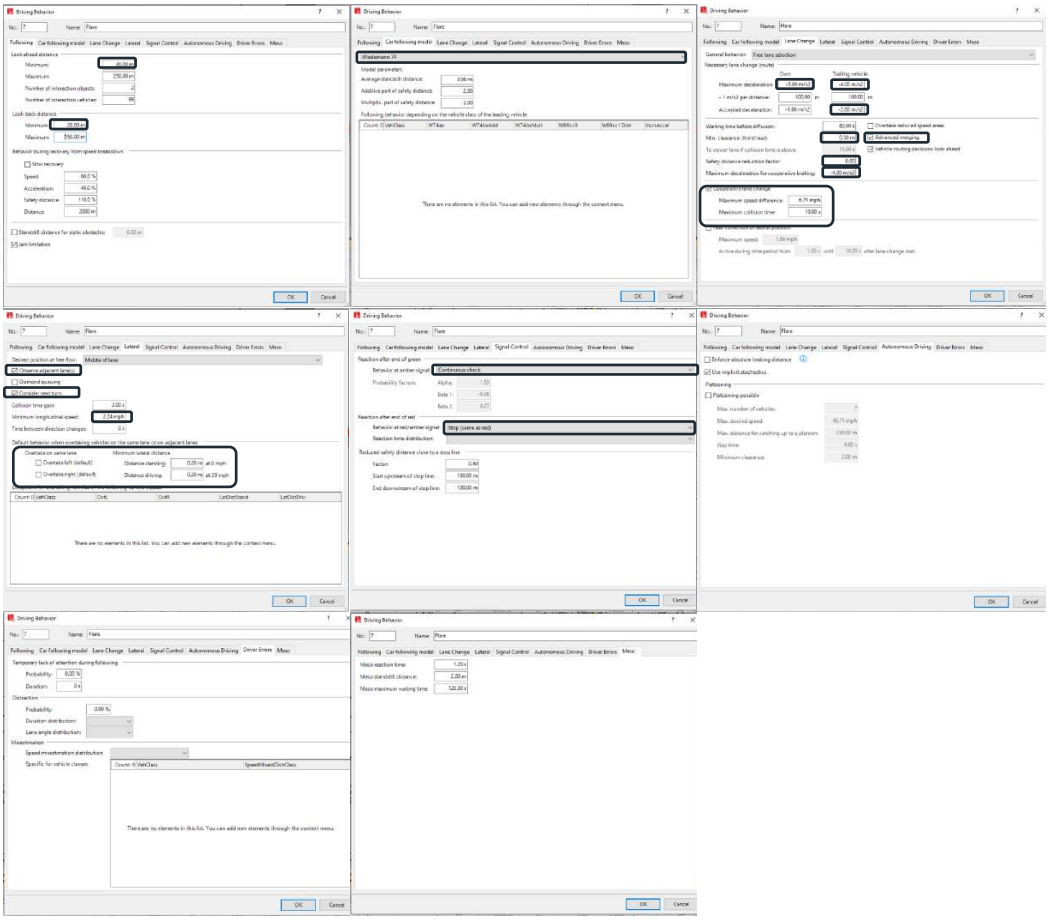
<u>Mod 1 – Network Changes</u>

M40 Slip Roads

- Adjusted links at merge sections to include 0.1m to model merge/diverge areas
- Adjustments to Nodes 18, 8, 5 and 6 to account for link changes to merge/diverge areas
- Links 10078, 10079, 10084, 10070 – updated behaviour and display types to 'merge'
- Link 10076 – updated behaviour to 'left-side rule' and display type to No. 6 (from 'merge')

Flares

- To accompany the modelling of flares using the 0.1m link, a driving behaviour and display type called 'Flare' has been created and applied to the various flares in the network. The driver behaviour parameters are below:



- Created new Link Behaviour Type 'flare' to apply to links in network

Results Outputs

- Added JT routes 800 and 801 for SB and NB times on B430.

Dynamic Assignment

- Files
  - Updated evaluation interval to 900s (from 600s) – considered more suitable time period for journey times (as recommended in PTV guidance)
- Cost
  - Amended 'cost for path distribution with Kirchoff' from 'sum of travel time edges' to 'measure path travel times' – better representation of cost against full travel time path.
  - Adjusted 'smoothing method' from Exponential Smoothing to MSA.

Signal Controllers
- Re-referenced Program File and Dialog DDL file to correct folder.
- Re-added Cherwell.wtt file to SC1.

Mod 2 – AM Changes
- Made mod files dependent on Mod 1 (required to pick up additional zones)
- Updated matrices names and flows to suit new network layout.
- Updated matrices in Dynamic Assignment

Mod 3 – PM Changes
- Made mod files dependent on Mod 1 (required to pick up additional zones)
- Updated matrices names and flows to suit new network layout.
- Updated matrices in Dynamic Assignment

PC MOVA Connection File
- Re-created connection file to account for version update.

Calibration & Validation Iterations
20/04/21
Mod 1 – Network Changes
Data Collection Points
- Adjusted positions of No's 13, 14, 1, 2, 3, 15, 25, 42, 16 & 17 to be closer to entry/exit points (as cal/val check is modelled vs. matrix)
- Added names to assist with Data Collection Measurements
- Added No's 26-19 for Ardley Rd East and West

Data Collection Measurements
- Updated measurements to include multiple lanes and renamed to assist with collecting Entry Flows, deleted measurements 19-25 as no longer needed.

Baynard's Green Roundabout
Conflict Areas
- Deactivated No's 23 and 9 at Baynard's Green roundabout

Priority Rules
- No's 43 & 44
  - adjusted position of marker 1-2 from 12.7m to 13.5m
  - adjusted position of marker 1-1 from 15.1m to 17m
  - adjusted gap times from 3.9s and 4.4s to 3.7s and 4.2s respectively
- No's 41 & 42
  - adjusted position of marker 1-2 from 17.1m to 18m
  - adjusted position of marker 1-1 from 20.1m to 22m
  -

Desired Speed Decisions
- No's 20 & 21 – updated from 20mph to 30mph to match A43 South approach

Links/Connectors
- No. 10086 – adjusted behaviour from 'Urban (motorised)' to 'Left Side Rule'

21/04/21
Mod 1 – Network Changes
Baynard's Green Roundabout

Priority Rules
- No's 33 & 34
  - adjusted gap times from 4.1s and 4.6s to 3.4s and 4.0s respectively
- No's 35 & 36
  - adjusted gap times from 4.1s and 4.6s to 3.4s and 4.0s respectively

Conflict Areas
- Deactivated No 12 at Baynard's Green roundabout

Ardley Roundabout
Priority Rules
- No's 49 & 50
  - adjusted gap times from 3.8s and 4.3s to 3.6s and 4.1s respectively
- No's 7 & 8
  - adjusted gap times from 3.8s and 4.3s to 3.6s and 4.1s respectively

22/04/21
Mod 1 – Network Changes
Cherwell Roundabout
Link/Connectors
- Split link 38 and added new 0.1m lane to allow two-lane connector to join lanes 2 and 3 of link 40 (rather than separate connectors).
- Split link 38 and made two lanes with no lane change to replicate soft hatching of lanes. Adjusted connectors either end to suit the new link structure. Change made to reduce instance of multiple edges from A43 South to A43 North and to help with model convergence. Checked edges after making link/connector changes.
- Link 1055 – increased lane change from 200m to 250m, emergency stop from 5m to 48m.

Baynard's Green Roundabout
Links/Connectors
- Extended links 10007 and 10006 back so that priority rules could be added onto connectors as opposed to links.
- Extended links 10010 and 10002 back so that priority rules could be added onto connectors as opposed to links.

Priority Rules
- No's 96 & 97 – relocated from link 5 to link 10006 (lane 2)
- No's 94 & 95 – relocated from link 5 to link 10006 (lane 1)
- Added No's 130 & 131 on link 10007 for left turning movement (Lights – 3s nearside lane, 1.8s outside lane, Heavies – 3.5s nearside lane, 2.3s outside lane)
- No's 91 & 92 – relocated from link 9 to link 10010 (lane 2)
- No's 94 & 95 – relocated from link 9 to link 10010 (lane 1)
- Added No's 132 & 133 on link 10002 for left turning movement (Lights – 3.3s nearside lane, 2.3s outside lane, Heavies – 3.8s nearside lane, 2.8s outside lane)
- No's 90 & 93 – adjusted markers from positions 70.4m and 69.2m to 74m and 70.5m respectively.

Padbury Roundabout
Priority Rules
No's 1 & 2 – removed reference to headways in PRs

Desired Speed Distributions
- Duplicated no. 19 to create no. 100, set 35mph speed band to 0 and deleted 25mph and 30mph speed band
- Duplicated no. 22 to create no. 101, set 35mph speed band to 0 and deleted 20mph, 25mph and 30mph speed band

Desired Speed Decisions
- No. 58 – updated speed distributions to no's 100 and 101, as opposed to 19 and 22.

Mod 2 – AM Changes
- Updated matrices with changes as a result of flow cal/val (+60vehs from Z1 to Z5).

26/04/21
Mod 1 – Network Changes
Baynard's Green Roundabout
Priority Rules
- No's 90 & 93 – adjusted gap times from 3.3s and 3.8s to 3.5s and 4.0s respectively
- No's 91 & 92 – adjusted gap times from 3.3s and 3.8s to 3.5s and 4.0s respectively
- No's 132 & 133
    - adjusted gap times from 3.3s and 3.8s to 3.4s and 3.9s respectively
    - adjusted gap times from 2.3s and 2.8s to 2.4s and 2.9s respectively
- No's 34 & 36 (HGVS) – adjusted gap times from 4.0s to 4.4s
- No's 33 & 35 (LGVS) – adjusted gap times from 3.4s to 3.8s
- No's 130 & 131
    - Adjusted gap times from 3.0s and 3.5s to 2.9s and 3.4s respectively

Desired Speed Decisions
- No's 24 & 88 – updated speeds from 20mph to 30mph to tie in with other DSDs at the roundabout
- No's 25 & 26 – adjusted position from 17.6m (on extended link) to 14m
- No's 20 & 21 – adjusted position from 5m to 2m

Links/Connectors
- No. 10011 – amended lane change from 400m to 200m
- Adjusted length of Link 13 to increase RSA length

Reduced Speed Areas
- No's 85 & 86 – adjusted length and position from 15m and 19m (on extended link) to 20m and 15m respectively.
- No's 34 & 81 – adjusted length and position from 15m and 8m to 20m and 3m respectively.

Padbury Roundabout
Priority Rules
- No. 104
    - adjusted marker position to match No. 102 (pos. 4m on link 23 to pos. 83m on link 89)
    - adjusted headway from 42m to 32m
- No. 103 – added headway marker on link 89, lane 1
- No's 102 & 104 – adjusted max speed from 8.1mph to 10mph

- No. 104 – increased headway from 32m to 34m

Reduced Speed Areas
- Deleted no's 114, 120, 121
- Adjusted length of no's 118, 119, 122, 123
- No's 89 & 90
    - Adjusted position from 8m to 3m
    - Adjusted length from 20m to 25m

Priority Rules
- No's 53 & 54 – increased gap times from 2.5s and 3.0s to 2.8s and 3.3s

Cherwell Junction
Desired Speed Decisions
- No's 67 & 68 – updated from 30mph to 50mph to suit speed limits

Reduced Speed Areas
- No's 98 & 99 – adjusted position and length from 14.3m and 5m to 5m and 20m respectively.
- No. 112 – increased length from 6m to 10m

Ardley Roundabout
Priority Rules
- No's 7 & 8 – adjusted gap times from 3.6s and 4.1s to 3.4s and 3.9s respectively
- No's 49 & 50 – adjusted gap times from 3.6s and 4.1s to 3.4s and 3.9s respectively

Links/Connectors
- No's 10059 & 10060
    - increased lane change from 200m to 240m – based on lane markings over bridge
    - increased emergency stop from 5m to 25m – based on lane markings over bridge

28/04/21
<u>Mod 1 – Network Changes</u>
Baynard's Green Roundabout
Priority Rules
- No's 90 & 93
    - Replaced green markers with single green marker across both lanes, position 71m, adjusted gap times from
- No's 91 & 92
    - Replaced green markers with single green marker across both lanes, position 74m
- No's 94 & 95
    - Replaced green markers with single green marker across both lanes, position 68m
- No's 96 & 97
    - Replaced green markers with single green marker across both lanes, position 70m

Padbury Roundabout
Priority Rules
- No's 102
    - Reduced headway from 32m to 20m

    - Added headway marker on link 10034
- No's 104
    - Reduced headway from 34m to 22m
    - Added headway marker on link 10096
- No's 53 & 54
    - adjusted green marker position from 54.7m and 53.7m to 58.7m and 55.7m
- Added No. 134 for headway across Link 89
- No. 103
    - Adjusted marker 2 position from 60m to 56m, adjusted length from 10m to 7.5m
    - Both markers – adjusted max speed from 10mph to 12mph

Cherwell Junction

Priority Rules

- No's 83 & 84
    - adjusted red marker position from 2.72m to 2.0m
    - adjusted green marker position from 37.7m to 39m
- No. 85
    - adjusted red marker position from 2.72m to 2.0m
    - adjusted green marker position from 5m to 5.5m
    - adjusted max speed from 10.1mph to 12mph

Links/Connectors

- No. 10041
    - made connector 'no lane change' for both links
    - changed behaviour from 'left-side rule' to 'urban (motorised)'
- No. 10155 – increased emergency stop distance from 48m to 55m

Ardley Roundabout

Priority Rules

- No's 98 & 99
    - adjusted red marker position from 26.5m to 30.5m
    - adjusted green marker position from 37m to 38m
    - adjusted gap times from 3.1s and 3.6s to 3.3s and 3.8s
- No's 9 & 10
    - adjusted red marker position from 26.5m to 30.5m
    - adjusted green marker position from 38m to 45m
    - adjusted gap times from 3.1s and 3.6s to 3.3s and 3.8s

Queue Markers

- Adjusted position of No. 12 from 26.4m to 30.4m

Reduced Speed Areas

- Adjusted position of No's 102 & 103 from 5m to 10m

12/07/21 – Changes following HE model audit (model v2)

Mod 1 – Network Changes

Padbury Roundabout

Priority Rules

- No. 1 – increased gap times from 4.4s to 4.6s
- No. 2 – decreased gap times from 3.9s to 3.7s.
- No's 53 & 54 – decreased gap times from 2.8s and 3.3s to 2.7s and 3.2s
- No. 103 – increased max speed from 12mph to 20mph

Baynard's Green

Priority Rules

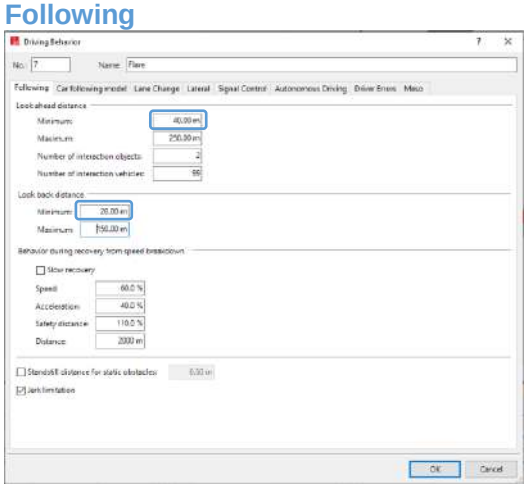
- No's 90 & 93 – increased gap times from 3.5s and 4.0s to 3.6s and 4.1s
- No's 91 & 92 – increased gap times from 3.5s and 4.0s to 3.6s and 4.1s

APPENDIX C:
FLARE BEHAVIOUR

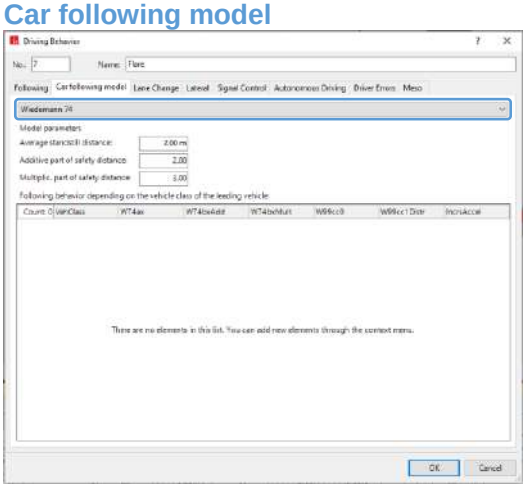
New Driver Behaviour – Flare

(key changes highlighted)

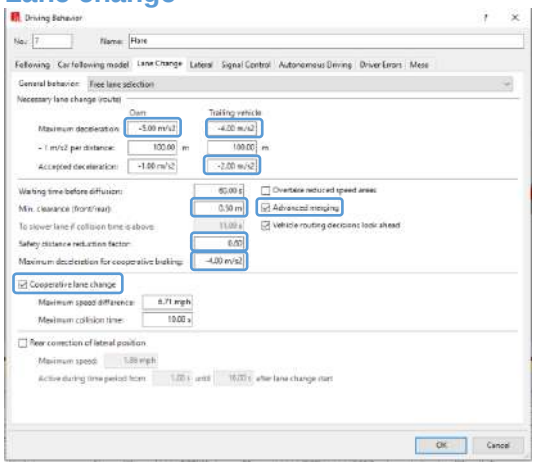
Following



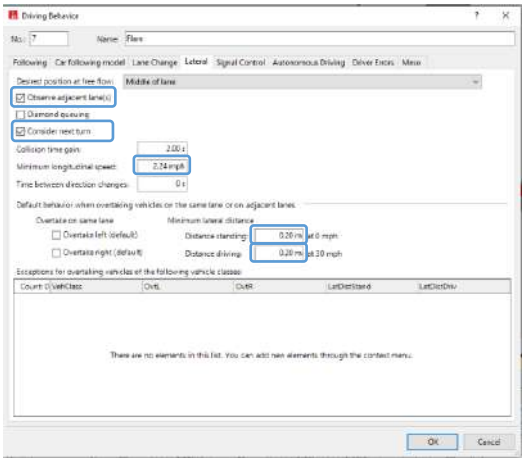
Car following model



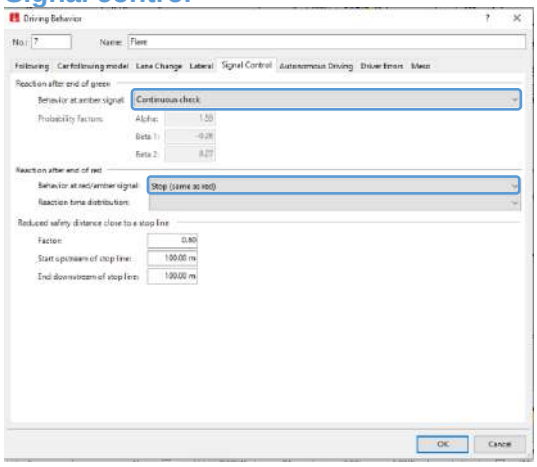
Lane change



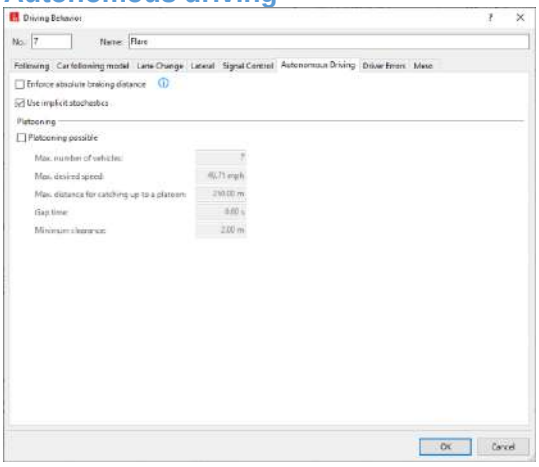
Lateral



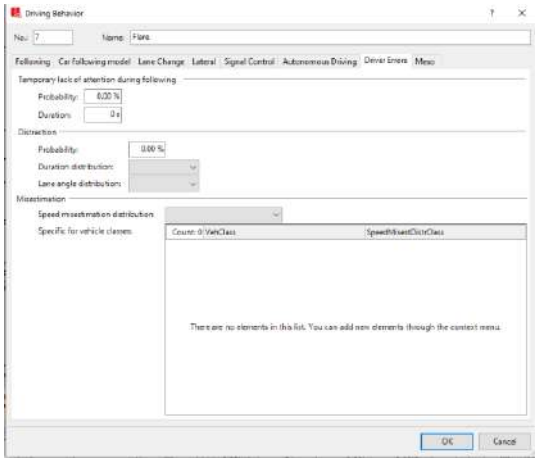
Signal control



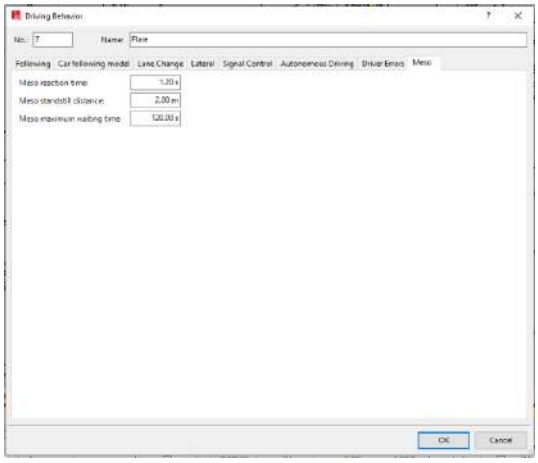
Autonomous driving



Driver errors



Meso

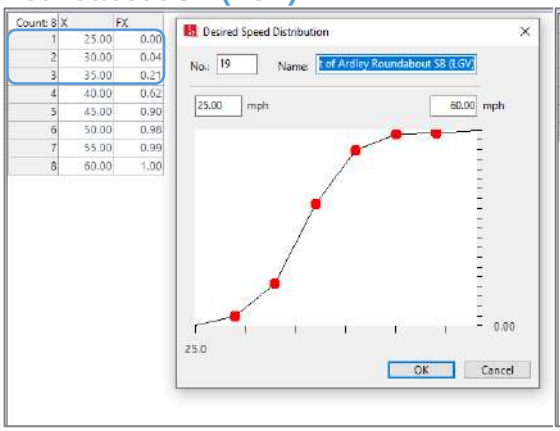


APPENDIX D:
SPEED DISTRIBUTION DIFFERENCES

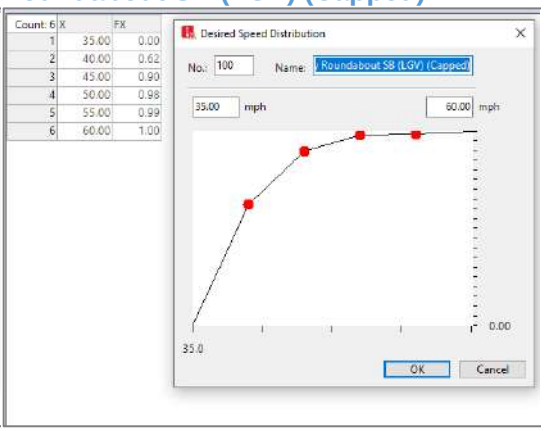
Desired Speed Distribution Changes

(key changes highlighted)

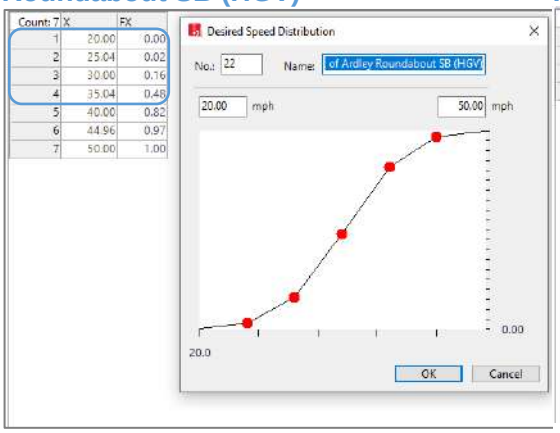
No. 19 - B430 West of Ardley Roundabout SB (LGV)



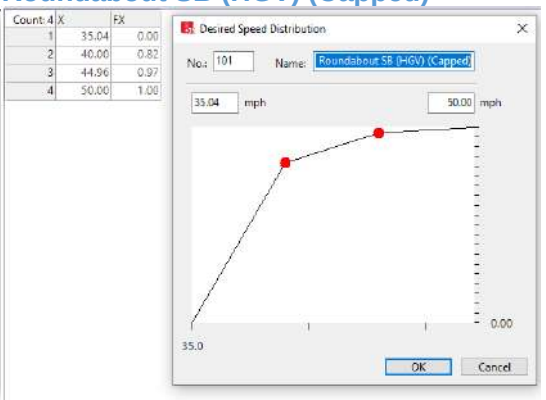
No. 100 - B430 West of Ardley Roundabout SB (LGV) (Capped)



No. 22 - B430 West of Ardley Roundabout SB (HGV)



No. 101 - B430 West of Ardley Roundabout SB (HGV) (Capped)



APPENDIX E:
FINAL O-D MATRICES

Final O-D Matrices

AM Peak

VISSIM MODEL: 01 Base 2016

LIGHTS

0645-0700

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	58	16	273	87	2	8	3	2	448
2	41	0	0	0	0	23	25	0	0	89
3	6	4	0	30	6	4	3	0	0	53
4	101	0	11	10	1	384	6	0	0	513
5	14	2	5	5	0	22	1	6	11	66
6	9	25	32	713	21	4	1	1	0	806
7	9	40	0	19	1	0	0	0	0	69
8	2	0	1	1	16	4	0	0	11	35
9	7	1	3	2	11	11	0	7	0	42
TOTAL	189	130	68	1053	142	454	44	16	25	2121

0700-0715

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	64	6	237	102	10	10	1	2	433
2	56	0	0	0	5	18	38	0	0	117
3	4	1	0	28	11	11	5	0	0	60
4	136	1	35	3	4	468	13	0	0	660
5	19	3	1	5	0	30	3	2	4	67
6	4	35	32	652	24	3	2	0	1	753
7	6	41	0	14	4	1	0	0	0	66
8	4	1	0	1	19	6	1	0	3	34
9	6	1	0	1	2	9	1	6	0	27
TOTAL	235	147	74	941	171	556	73	10	11	2217

0715-0730

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	72	11	222	100	8	20	3	2	437
2	51	0	0	2	3	20	41	0	0	117
3	7	3	0	32	7	16	1	0	0	66
4	164	1	34	9	4	507	9	0	0	728
5	18	0	1	7	0	32	2	0	4	66
6	11	34	18	674	34	1	7	1	1	781
7	25	53	0	32	3	0	0	0	0	113
8	2	0	0	1	11	4	0	0	8	27
9	11	0	1	4	5	20	1	5	0	48
TOTAL	290	163	65	983	166	609	81	9	17	2383

0730-0745

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	32	8	154	63	6	11	3	1	278
2	48	0	0	1	4	16	55	0	0	124
3	9	3	0	37	8	17	0	0	0	74
4	155	1	44	8	10	551	10	1	0	780
5	19	1	1	4	0	42	6	5	8	83
6	9	38	30	596	32	3	3	2	0	713
7	20	61	1	44	6	0	1	0	0	133
8	4	0	0	1	12	8	1	0	11	37
9	9	0	0	2	10	20	2	6	0	49
TOTAL	272	136	84	846	144	664	87	17	21	2271

LIGHTS TOTAL

0645-0745

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	226	41	886	351	26	49	10	7	1596
2	196	0	0	3	11	77	159	0	0	447
3	26	11	0	127	31	48	9	1	1	253
4	556	3	124	30	19	1910	38	1	0	2681
5	70	6	8	20	0	127	10	13	29	282
6	33	132	112	2635	111	11	13	4	2	3053
7	60	195	1	109	13	1	1	0	0	381
8	12	1	1	3	58	22	2	0	33	133
9	33	2	4	10	28	61	4	24	0	166
TOTAL	986	576	291	3823	623	2283	285	53	72	8992

0745-0800

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	66	9	229	77	15	12	2	1	411
2	68	0	0	3	1	17	55	0	0	144
3	14	1	0	36	5	29	0	0	0	85
4	180	1	27	10	12	604	16	0	0	850
5	23	3	1	0	33	2	2	10	2	92
6	9	30	31	650	33	2	1	1	1	758
7	21	51	0	42	2	0	1	0	0	117
8	3	0	0	1	17	4	0	0	9	34
9	9	1	1	3	21	15	1	7	0	57
TOTAL	327	153	69	980	167	724	88	13	27	2548

0800-0815

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	44	12	222	69	13	16	2	1	379
2	50	0	3	2	1	34	62	0	0	152
3	10	0	0	45	8	18	1	0	0	82
4	196	1	22	8	12	574	11	0	0	824
5	14	1	4	0	37	3	7	3	8	88
6	17	27	35	522	49	5	3	1	1	660
7	27	85	0	38	2	1	1	0	0	154
8	5	0	1	1	20	7	1	0	19	53
9	9	0	1	2	7	13	1	7	0	40
TOTAL	337	158	78	844	167	702	99	18	29	2432

0815-0830

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	49	14	202	78	19	18	3	2	385
2	31	0	1	0	2	17	50	0	0	101
3	5	0	0	36	8	23	0	0	0	72
4	158	1	28	7	5	472	13	0	0	684
5	18	2	2	6	0	31	2	8	14	80
6	9	37	28	606	36	1	5	2	1	725
7	21	50	0	27	4	0	3	0	0	105
8	2	0	0	1	14	4	0	0	9	30
9	9	1	1	2	6	16	1	8	0	44
TOTAL	253	140	74	885	153	582	92	22	26	2226

0830-0845

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	48	14	184	69	12	8	3	2	340
2	28	0	2	0	1	15	57	0	0	103
3	10	1	0	38	6	19	0	0	0	75
4	163	1	39	2	7	420	23	0	0	705
5	20	2	1	0	0	22	2	8	11	78
6	9	23	23	510	32	3	3	2	1	606
7	14	68	1	27	3	0	0	0	0	113
8	2	0	0	0	19	2	1	0	11	35
9	7	1	2	1	12	8	2	9	0	41
TOTAL	252	144	86	765	149	551	101	23	25	2096

0745-0845

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	207	49	837	292	59	54	10	6	1515
2	177	0	6	5	5	83	224	0	0	500
3	39	2	0	155	27	89	1	1	1	314
4	697	4	116	27	35	2120	63	1	1	3063
5	85	7	12	18	0	128	14	25	49	338
6	44	117	117	2288	151	11	12	6	3	2749
7	83	254	1	134	10	1	5	0	0	489
8	11	1	2	2	70	17	2	0	48	152
9	33	3	5	7	46	51	5	31	0	182
TOTAL	1169	595	307	3474	636	2559	380	75	108	9302
										0
										18604.92

0845-0900

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	42	13	190	49	19	14	2	2	331
2	22	1	3	3	3	10	37	0	0	79
3	11	0	0	45	5	29	0	0	0	90
4	131	0	35	1	8	395	14	0	0	585
5	8	1	2	0	4	11	2	4	1	37
6	9	25	29	583	22	1	2	1	1	673
7	18	54	0	24	1	0	0	0	0	97
8	2	0	1	0	22	3	1	0	20	48
9	4	0	1	0	17	8	1	7	0	38
TOTAL	204	122	84	847	126	480	71	15	28	1978

0900-0915

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	34	8	217	42	11	6	4	7	330
2	39	0	0	0	2	13	38	0	0	93
3	12	2	0	53	3	22	2	0	1	95
4	120	1	46	4	8	392	10	1	1	583
5	16	1	3	1	0	11	2	8	1	43
6	6	17	29	492	6	1	2	1	1	555
7	12	46	0	31	1	0	2	0	0	92
8	1	0	0	0	9	2	0	0	7	20
9	3	0	1	0	1	3	4	0	3	14
TOTAL	203	100	87	799	75	458	61	18	24	1825

Change	Per 15 min
21 to 25	48 12
24 to 25	12 3
26 to 25	12 3

0845-0915

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	76	33	410	91	30	20	7	9	676
2	61	1	15	6	5	23	75	0	0	187
3	23	2	0	98	8	51	2	1	1	185
4	251	1	81	5	16	787	24	1	2	1168
5	17	0	5	2	0	28	3	12	12	80
6	15	42	58	1075	28	2	4	2	2	1228
7	30	100	0	55	2	0	2	0	0	189
8	3	0	1	0	31	5	1	0	27	68
9	7	0	2	1	20	11	1	10	0	52
TOTAL	407	222	195	1652	201	938	132	33	53	3833
										0
										7666

HEAVIES

0645-0700

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	2	5	58	8	0	0	0	0	78
2	5	0	0	0	0	0	0	0	0	5
3	6	0	0	15	0	4	2	0	0	27
4	27	0	4	0	0	100	1	0	0	132
5	5	0	0	1	0	0	1	1	0	8
6	1	5	5	172	2	1	0	0	0	186
7	2	0	0	7	0	3	1	0	0	12
8	0	0	0	0	1	0	0	0	1	2
9	0	0	0	0	0	0	0	0	0	1
TOTAL	46	9	14	253	11	109	6	1	1	451

0700-0715

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	5	6	59	3	1	2	0	0	76
2	3	0	0	0	0	2	5	0	0	10
3	1	0	0	14	0	7	0	0	0	22
4	35	0	5	2	1	92	7	0	0	142
5	5	0	1	0	0	2	0	0	1	9
6	2	3	8	131	3	0	0	0	0	147
7	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0
TOTAL	46	8	20	206	11	104	10	0	1	406

0715-0730

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	3	1	57	3	2	2	0	0	66
2	4	0	0	3	0	0	2	0	0	9
3	3	0	0	14	0	5	0	0	0	22
4	32	0	5	0	2	80	2	0	0	126
5	3	0	0	0	0	2	2	0	1	7
6	7	1	6	164	1	0	0	0	0	179
7	2	3	0	3	0	0	0	0	0	8
8	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0
TOTAL	51	7	12	241	9	89	8	1	0	418

0730-0745

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	3	0	42	0	0	0	0	0	49
2	0	0	0	0	0	2	5	0	0	7
3	0	0	0	11	0	8	0	0	0	19
4	33	0	9	2	0	76	2	0	0	122
5	10	0	2	5	0	2	0	1	0	20
6	1	3	10	134	0	0	0	0	0	148
7	4	3	0	3	0	0	0	0	0	10
8	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	1	0	0	0	1
TOTAL	48	9	21	197	5	88	7	1	1	377

HEAVIES TOTAL

0645-0745

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	13	12	216	16	7	5	0	0	269
2	12	0	0	3	0	4	12	0	0	31
3	10	0	0	54	0	24	2	0	0	90
4	127	0	23	4	12	348	8	0	0	522
5	23	0	3	6	0	6	3	2	1	44
6	7	15	29	416	9	0	5	1	1	482
7	11	22	0	11	0	0	0	0	0	44
8	1	0	0	0	0	5	0	0	3	9
9	1	0	0	0	2	1	1	0	0	5
TOTAL	191	33	67	897	36	390	31	3	3	1652

0745-0845

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	22	24	201	31	6	12	0	0	297
2	14	0	0	0	0	7	9	0	0	30
3	16	0	0	49	1	16	1	0	0	83
4	102	0	23	2	5	264	5	0	0	402
5	16	0	0	7	0	7	9	4	2	45
6	7	15	29	416	9	0	5	1	1	482
7	11	22	0	11	0	0	0	0	0	44
8	1	0	0	0	0	5	0	0	3	9
9	1	0	0	0	2	1	1	0	0	5
TOTAL	167	59	76	686	54	301	42	6	6	1397

0800-0815

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	3	5	59	3	2	4	0	0	82
2	4	0	0	0	0	1	3	0	0	8
3	5	0	0	9	0	3	0	0	0	17
4	27	0	5	0	1	64	0	0	0	99
5	3	0	0	0	0	4	6	1	0	13
6	0	4	4	93	6	0	1	1	1	109
7	4	12	0	2	0	0	0	0	0	18
8	0	0	0	0	0	0	0	0	1	1
9	0	0	0	0	0	1	0	0	0	1
TOTAL	43	19	14	163	17	73	15	2	2	348

0815-0830

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	7	12	44	10	3	4	0	0	80
2	3	0	0	0	0	3	2	0	0	8
3	6	0	0	17	0	6	0	0	0	29
4	22	0	0	6	0	1	46	2	0	77
5	6	0	0	0	0	4	0	2	1	13
6	3	7	7	107	2	0	1	0	0	127
7	1	5	0	1	0	0	0	0	0	8
8	1	0	0	0	0	3	0	0	1	5
9	0	0	0	0	1	1	0	0	0	2
TOTAL	39	8	18	167	10	58	9	2	2	313

0830-0845

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	2	4	44	6	1	4	0	0	61
2	3	0	0	0	0	3	2	0	0	8
3	6	0	0	17	0	6	0	0	0	29
4	22	0	0	6	0	1	46	2	0	77
5	6	0	0	1	0	4	0	2	1	13
6	1	1	8	101	0	0	1	0	0	112
7	1	5	0	1	0	0	0	0	0	7
8	1	0	0	0	0	5	0	0	1	7
9	1	0	0	0	0	2	1	1	0	5
TOTAL	47	9	12	170	6	22	54	5	2	321

0845-0900

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	4	7	38	6	0	0	0	0	55
2	8	0	0	0	0	3	2	0	0	13
3	0	0	0	13	0	4	0	0	0	17
4	31	0	3	2	2	58	0	0	0	96
5	5	0	0	3	0	5	1	0	0	14
6	7	2	12	110	3	1	1	0	0	136
7	3	9	0	2	0	0	0	0	0	14
8	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0
TOTAL	54	15	22	168	11	71	4	0	0	345

0900-0915

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	7	5	45	3	2	3	0	1	66
2	6	0	0	0	0	2	1	0	0	9
3	5	0	0	16	0	1	0	0	0	22
4	35	0	6	1	1	66	0	0	0	109
5	3	0	3	3	0	2	0	0	1	12
6	4	3	15	92	1	0	1	0	0	116
7	2	6	0	0	0	0	0	0	0	8
8	0	0	0	0	1	0	0	0	1	2
9	0	0	0	0	1	0	0	0	0	1
TOTAL	55	16	29	157	7	73	5	0	3	345

Change	Per 15 min
21 to 25	12 3

0845-0915

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	11	12	83	9	2	3	0	1	121
2	14	0	0	0	0	5	3	0	0	22
3	5	0	0	29	0	5	0	0	0	39
4	66	0	9	3	3	124	0	0	0	205
5	8	0	3	6	0	7	1	0	1	26
6	11	5	27	202	4	1	2	0	0	252
7	5	15	0	2	0	0	0	0	0	22
8	0	0	0	0	1	0	0	0	1	2
9	0	0	0	0	1	0	0	0	0	1
TOTAL	109	31	51	325	18	144	9	0	3	690

ALL VEHS TOTAL

0645-0700

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	60	21	331	94	6	9	3	2	526
2	46	0	0	0	0	23	25	0	0	94
3	12	4	0	45	6	8	5	0	0	80
4	128	0	15	10	1	484	7	0	0	645
5	18	2	5	6	0	22	2	7	12	74
6	10	30	37	885	23	5	1	1	0	992
7	11	42	0	26	1	0	1	0	0	81
8	2	0	1	1	17	4	0	0	12	37
9	7	1	3	2	11	11	0	7	0	43
TOTAL	235	139	82	1306	153	563	50	18	26	2572

0700-0715

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	69	12	296	105	11	12	1	2	509
2	59	0	0	0	5	20	43	0	0	127
3	5	1	0	0	42	11	18	5	0	82
4	171	1	40	5	9	560	16	0	0	802
5	24	3	2	5	0	32	3	2	5	76
6	6	38	40	783	27	3	2	0	1	900
7	6	41	0	14	4	1	0	0	0	66
8	4	1	0	1	19	6	1	0	3	34
9	6	1	0	1	2	9	1	6	0	27
TOTAL	281	155	94	1147	182	660	83	10	12	2623

0715-0730

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	75	12	279	101	10	22	3	2	503
2	55	0	0	5	3	20	43	0	0	126
3	10	3	0	46	7	21	1	0	0	88
4	196	1	39	9	11	587	11	0	0	854
5	21	0	1	7	0	34	4	0	6	73
6	18	35	24	838	35	1	7	1	1	960
7	27	56	0	35	3	0	0	0	0	121
8	2	0	0	1	11	4	0	0	8	27
9	11	0	1	4	5	20	1	6	0	49
TOTAL	341	170	77	1224	175	698	89	10	17	2801

0730-0745

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	35	8	196	67	6	11	3	1	327
2	48	0	0	1	4	18	60	0	0	131
3	9	3	0	38	6	25	0	0	0	93
4	683	3	147	34	31	2258	46	1	0	3203
5	92	6	11	26	0	133	13	15	31	326
6	44	144	141	3236	117	12	13	4	2	3713
7	68	203	1	122	13	1	2	0	0	411
8	12	1	1	3	59	22	2	0	35	136
9	3	0	2	4	10	29	4	25	0	169
TOTAL	1177	609	358	4720	659	2673	316	56	76	10644

0745-0800

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | TOTAL |
|---|---|---|---|---

PM Peak

VISSIM MODEL: 01 Base 2016

LIGHTS

1530-1545

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	32	13	176	23	15	8	3	6	276
2	46	0	0	2	0	15	56	0	0	119
3	13	0	0	55	3	22	0	0	1	94
4	213	1	40	11	5	708	19	1	1	999
5	25	1	2	4	0	25	4	15	7	84
6	8	10	32	548	13	3	6	2	4	625
7	13	37	1	12	2	1	0	0	1	67
8	1	0	0	0	4	1	0	0	5	12
9	3	0	0	1	8	3	1	8	0	24
TOTAL	322	81	88	809	58	793	94	30	25	2300

1545-1600

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	32	27	180	25	17	2	3	7	294
2	42	0	6	1	1	15	54	0	0	120
3	19	2	0	50	1	36	0	0	0	108
4	229	0	20	4	7	672	23	1	2	958
5	43	1	0	2	0	25	4	16	8	98
6	8	10	30	612	11	0	2	2	3	678
7	14	50	0	17	1	0	0	0	0	82
8	1	0	0	0	0	5	1	0	0	12
9	4	0	0	0	9	3	0	9	0	25
TOTAL	361	95	83	866	60	768	85	31	26	2375

1600-1615

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	37	9	207	24	10	11	1	2	302
2	54	0	2	1	2	17	44	0	0	120
3	12	0	0	51	3	31	0	0	0	98
4	222	1	41	7	6	686	12	0	1	976
5	63	1	0	6	0	46	3	18	10	149
6	6	12	44	650	20	0	3	1	2	738
7	15	58	0	17	2	0	0	0	0	92
8	3	0	0	0	5	2	0	0	8	18
9	3	0	0	0	8	2	0	8	0	22
TOTAL	376	109	103	939	70	794	71	29	24	2515

1615-1630

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	32	23	169	27	12	8	4	4	279
2	63	0	3	0	1	21	60	0	0	148
3	20	0	0	49	2	26	0	0	0	98
4	223	0	36	12	2	730	8	0	0	1012
5	63	4	2	2	0	14	6	6	1	159
6	12	21	27	674	14	1	4	2	2	757
7	17	54	0	10	2	0	2	0	0	85
8	1	0	0	0	4	0	0	4	0	13
9	5	0	0	0	13	2	0	6	0	27
TOTAL	434	111	91	916	69	826	88	19	25	2578

LIGHTS TOTAL

1530-1630

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	133	72	732	99	54	29	12	20	1151
2	205	0	11	4	4	68	214	0	1	507
3	64	2	0	205	9	115	0	1	2	398
4	887	2	137	34	20	2796	62	2	4	3945
5	223	6	10	13	0	129	14	55	38	490
6	34	53	133	2484	58	4	15	6	11	2798
7	59	199	1	56	6	1	2	1	1	326
8	6	0	0	0	22	4	0	0	22	55
9	16	0	1	1	38	10	1	31	0	98
TOTAL	1493	396	365	3530	257	3181	338	109	99	9768

1630-1645

	1	2	3	4	5	6	7	8	9	TOTAL
1	1	58	13	184	22	18	10	3	4	313
2	69	0	6	2	0	21	62	0	0	160
3	23	1	0	39	2	26	4	0	0	95
4	255	0	23	14	5	727	8	1	1	1034
5	40	1	2	4	0	25	5	9	8	155
6	10	17	35	680	12	4	6	2	2	768
7	12	56	0	21	2	0	1	0	0	92
8	1	0	0	0	3	0	0	0	9	13
9	4	0	0	0	9	2	0	10	0	25
TOTAL	458	133	79	942	54	847	96	25	21	2655

1645-1700

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	63	12	215	17	17	11	2	6	343
2	79	0	2	2	1	12	78	0	0	174
3	18	0	0	41	0	25	0	0	0	84
4	274	0	35	14	3	756	8	0	1	1092
5	50	1	0	4	0	25	5	16	9	161
6	22	27	24	628	24	2	3	3	8	741
7	13	50	0	11	2	0	2	0	1	79
8	2	0	0	0	5	1	0	0	4	12
9	5	0	0	0	11	2	0	4	0	23
TOTAL	492	141	76	918	63	858	108	29	24	2709

1700-1715

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	69	25	206	25	18	7	3	7	361
2	88	0	3	0	1	18	57	0	0	168
3	20	0	0	38	1	12	1	0	0	73
4	266	0	24	16	7	671	17	1	2	1004
5	50	1	0	4	0	30	3	28	24	188
6	22	14	31	612	15	1	8	4	8	715
7	12	56	1	7	1	0	4	0	1	82
8	4	0	0	0	7	1	0	0	7	19
9	5	0	0	0	7	2	0	16	0	30
TOTAL	515	140	90	881	65	753	97	53	46	2640

1715-1730

	1	2	3	4	5	6	7	8	9	TOTAL
1	1	59	16	210	24	13	10	3	7	343
2	76	0	1	1	1	26	80	0	0	185
3	13	1	0	33	1	32	3	0	0	84
4	277	1	32	15	8	745	15	1	2	1096
5	60	2	2	3	0	41	2	17	4	165
6	5	20	23	645	29	3	8	4	8	745
7	15	67	0	8	3	0	2	0	1	96
8	1	0	0	0	6	1	0	0	3	11
9	8	0	0	0	12	4	0	9	0	34
TOTAL	487	150	75	914	83	867	120	35	28	2759

1630-1730

	1	2	3	4	5	6	7	8	9	TOTAL
1	2	249	66	815	88	66	38	12	24	1360
2	76	0	1	1	1	26	80	0	0	185
3	74	2	0	151	4	95	8	1	1	336
4	1072	1	114	59	23	2899	48	3	7	4226
5	353	5	13	12	0	165	15	72	35	669
6	59	78	113	2565	79	10	25	13	27	2969
7	52	229	1	47	7	0	9	1	3	349
8	7	0	0	0	21	3	0	0	23	55
9	21	0	1	1	39	10	1	39	0	112
TOTAL	1952	564	320	3655	265	3325	421	141	120	10763
									0	
									21526.46	

1730-1745

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	51	11	182	22	13	12	4	8	303
2	60	0	0	3	24	66	0	1	1	154
3	33	0	0	43	4	18	0	1	1	100
4	266	0	27	14	8	708	16	1	3	1043
5	38	1	2	4	0	14	5	13	8	164
6	8	17	35	657	13	0	5	2	5	742
7	16	65	0	15	5	1	2	1	2	106
8	3	0	0	0	4	2	0	0	8	17
9	5	0	0	0	12	2	0	13	0	33
TOTAL	479	134	77	913	71	812	108	35	33	2662

1745-1800

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	66	18	192	42	12	13	4	7	355
2	66	0	0	1	2	19	56	0	0	145
3	16	1	0	40	3	18	0	0	1	79
4	265	1	28	16	8	754	22	1	1	1096
5	50	1	0	4	0	31	3	8	3	43
6	14	37	39	584	6	1	10	1	1	693
7	14	55	0	4	1	0	1	0	0	75
8	1	0	0	0	9	2	0	0	7	20
9	3	0	1	0	3	4	0	3	0	14
TOTAL	389	160	89	839	75	823	103	18	24	2520

1730-1800

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	117	29	374	65	25	25	8	15	658
2	126	0	0	1	5	43	122	1	1	299
3	49	1	0	83	7	36	0	1	2	179
4	531	1	55	30	16	1462	38	2	4	2139
5	98	1	6	3	0	57	7	21	13	207
6	22	54	74	1241	19	1	15	3	6	1435
7	30	120	0	19	5	1	3	1	2	181
8	4	0	1	0	13	3	0	0	15	37
9	8	0	1	1	15	6	1	16	0	47
TOTAL	868	294	166	1752	146	1635	211	53	57	5182
									0	
									10364	

HEAVIES

1530-1545

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	2	13	36	2	1	1	0	0	55
2	1	0	0	0	1	2	7	0	0	11
3	5	0	0	9	0	2	0	0	0	16
4	44	0	3	2	0	141	0	0	0	190
5	2	1	0	0	0	0	1	0	0	4
6	2	0	5	93	0	1	1	0	0	102
7	2	4	0	1	1	0	0	0	0	8
8	0	0	0	0	0	0	0	0	0	1
9	0	0	0	0	0	0	0	0	0	0
TOTAL	56	7	21	141	4	147	10	0	1	387

1545-1600

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	2	0	34	3	0	3	0	0	42
2	3	0	0	0	1	3	0	0	0	7
3	8	0	0	12	0	6	0	0	0	26
4	44	0	8	2	2	127	2	0	0	186
5	4	0	0	0	0	0	0	0	0	4
6	3	1	9	77	0	0	2	0	0	92
7	2	5	0	1	1	0	2	0	0	11
8	0	0	1	0	0	0	0	0	0	1
9	0	0	0	0	0	0	0	0	0	0
TOTAL	60	8	17	130	8	136	9	0	1	370

1600-1615

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	2	2	27	4	2	1	0	0	38
2	4	0	0	1	0	1	3	0	0	9
3	5	1	0	9	0	3	0	0	0	18
4	54	0	11	2	2	96	0	0	0	165
5	4	0	0	3	0	1	0	0	0	7
6	1	0	5	70	0	0	1	0	0	77
7	2	7	0	3	0	0	0	0	0	12
8	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0
TOTAL	69	10	18	115	6	103	5	0	0	326

1615-1630

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	1	7	18	0	3	3	0	0	32
2	2	0	0	1	1	3	2	0	0	9
3	7	0	0	9	0	1	0	0	0	17
4	41	0	3	0	2	91	2	0	0	139
5	5	0	0	0	0	1	0	1	0	11
6	0	1	8	75	3	1	0	0	0	88
7	1	2	0	0	0	0	1	0	0	4
8	1	0	0	0	1	0	0	0	0	2
9	0	0	0	0	0	0	0	0	0	0
TOTAL	57	4	18	103	7	102	8	1	2	302

HEAVIES TOTAL

1530-1630

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	7	22	115	9	6	8	0	1	167
2	10	0	0	2	3	9	12	0	0	36
3	25	1	0	39	2	12	0	0	0	77
4	183	0	25	6	6	455	4	0	0	680
5	10	1	0	7	0	4	1	1	3	26
6	6	2	27	315	3	2	4	0	0	359
7	7	18	0	5	2	0	3	0	0	35
8	1	0	0	0	2	0	0	0	0	3
9	1	0	0	0	1	0	0	0	0	2
TOTAL	242	29	74	489	25	488	32	1	4	1385

1630-1645

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	1	2	21	0	0	0	0	0	24
2	5	0	0	0	0	2	1	0	0	8
3	3	0	0	0	0	0	0	0	0	3
4	28	2	12	0	0	92	0	0	0	134
5	1	0	0	0	0	0	0	0	0	1
6	2	1	10	79	3	0	0	0	1	96
7	2	2	0	0	0	0	0	0	0	4
8	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0
TOTAL	41	6	24	115	2	102	1	0	1	292

1645-1700

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	2	0	17	5	5	5	0	0	34
2	1	0	0	0	2	0	0	0	0	3
3	3	0	0	12	1	4	0	0	0	20
4	22	0	6	0	2	90	4	0	0	124
5	1	0	2	0	0	0	1	0	1	6
6	1	3	6	62	0	0	0	0	0	72
7	1	3	0	2	0	0	0	0	0	6
8	0	0	0	0	2	0	0	0	0	2
9	0	0	0	0	0	0	0	0	0	0
TOTAL	32	8	14	93	10	101	9	1	1	269

1700-1715

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	4	0	29	4	0	4	0	0	41
2	1	0	0	0	0	0	1	0	0	2
3	2	0	0	7	0	8	0	0	0	17
4	27	0	11	0	1	93	0	0	0	132
5	1	0	0	0	0	0	1	0	0	6
6	1	0	7	70	0	1	1	0	0	80
7	2	2	0	1	1	0	0	0	0	6
8	0	0	0	0	0	0	0	0	0	0
9	1	0	0	0	1	0	0	0	0	2
TOTAL	36	6	18	109	7	103	6	0	1	286

1715-1730

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	2	4	23	0	0	2	0	0	31
2	2	0	0	0	0	6	0	0	0	8
3	4	0	0	8	0	5	0	0	0	17
4	30	0	7	0	0	75	0	0	0	112
5	1	0	0	0	0	2	0	0	0	3
6	0	1	3	63	0	0	0	0	0	67
7	0	2	0	4	0	0	0	0	0	6
8	0	0	0	0	0	1	0	0	0	1
9	0	0	0	0	0	0	0	0	0	0
TOTAL	37	5	14	99	6	82	2	0	0	245

1730-1745

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	1	3	21	0	0	0	0	0	25
2	0	0	0	1	0	0	3	0	0	4
3	6	0	0	4	0	5	0	0	0	15
4	33	0	9	4	1	71	1	0	0	119
5	2	0	1	0	0	0	0	0	0	5
6	1	0	5	60	0	0	0	0	0	75
7	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0
TOTAL	42	1	18	101	1	76	4	0	0	243

1745-1800

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	3	8	21	3	2	1	0	0	38
2	2	0	0	0	0	1	1	0	0	4
3	5	0	0	3	0	4	0	0	0	12
4	29	0	5	0	1	76	2	0	0	113
5	1	0	1	0	0	4	0	0	0	8
6	0	0	8	62	1	0	0	0	0	71
7	0	1	0	0	0	0	0	0	0	1
8	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0
TOTAL	39	4	22	86	5	87	4	0	0	247

1730-1800

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	4	11	42	3	2	1	0	0	63
2	2	0	0	1	0	1	4	0	0	8
3	11	0	0	7	0	9	0	0	0	27
4	62	0	14	4	2	147	3	0	0	232
5	5	0	2	2	0	4	0	0	0	13
6	1	0	13	131	1	0	0	0	0	146
7	0	1	0	0	0	0	0	0	0	1
8	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0
TOTAL	81	5	40	187	6	163	8	0	0	490

TOTAL

1530-1545

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	34	26	212	25	16	9	3	7	331
2	47	0	0	2	1	17	63	0	0	130
3	18	0	0	64	3	24	0	0	1	130
4	257	1	43	13	5	849	19	1	1	1189
5	27	2	2	4	0	25	5	16	8	88
6	10	10	37	641	13	4	7	2	4	727
7	15	41	1	13	3	1	0	0	1	75
8	1	0	0	0	5	1	0	0	5	12
9	3	0	0	1	9	3	1	8	0	24
TOTAL	378	88	109	950	62	940	104	30	26	2687

1545-1600

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	34	27	214	28	17	5	3	8	336
2	45	0	6	1	3	18	54	0	1	127
3	27	2	0	62	1	42	0	0	0	134
4	273	0	28	6	9	799	25	1	2	1144
5	43	1	0	5	0	25	4	16	8	102
6	11	11	39	689	11	0	4	2	3	770
7	16	55	0	18	2	0	2	0	0	93
8	1	0	0	0	5	1	0	0	5	13
9	4	0	0	0	9	3	0	9	0	25
TOTAL	421	103	100	996	68	904	94	31	27	2744

1600-1615

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	39	11	234	28	12	12	1	2	340
2	58	0	2	2	2	18	47	0	0	129
3	17	1	0	60	3	34	0	0	0	116
4	276	1	52	9	8	782	12	0	1	1141
5	64	1	6	9	0	47	1	18	10	156
6	7	12	49	720	20	0	4	1	2	815
7	17	65	0	20	2	0	0	0	0	104
8	3	0	0	0	5	2	0	0	8	18
9	3	0	0	0	8	2	0	8	0	22
TOTAL	445	119	121	1054	76	897	76	29	24	2841

1615-1630

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	33	30	187	27	15	11	4	4	311
2	65	0	3	1	2	24	62	0	0	157
3	27	0	0	58	2	27	0	0	0	115
4	264	0	39	12	4	821	10	0	0	1151
5	233	7	10	20	0	133	15	57	41	516
6	12	22	35	749	17	2	4	2	2	845
7	18	56	0	10	2	0	3	0	0	89
8	1	0	0	0	0	0	0	0	4	15
9	5	0	0	0	13	2	0	6	0	27
TOTAL	491	115	109	1019	76	928	96	20	27	2880

All VEHS TOTAL

1530-1630

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	140	94	847	108	60	37	12	21	1318
2	215	0	11	6	7	77	226	0	1

APPENDIX F:
ENTRY FLOW CALIBRATION

Entry Flow Calibration – Model Comparisons

AM Peak

AM (0745-0845hrs) SUMMARY STATISTICS	
Total number of counts considered	9
VISSIM model counts with <5% difference	9
% of VISSIM counts with <5% difference	100.00%
VISSIM model counts with GEH <3	9
% of VISSIM counts with GEH <3	100.00%

Entry			DATA		DIFFERENCE		GEH	
			Matrix	Modelled				
Zone	Location	Data Measurement No.	All Vehicles	All Vehicles	No.	%	GEH	GEH
1	A43 North	8	1811	1720	-91	-5%	2.17	YES
2	B4100 East	9	530	529	-1	0%	0.04	YES
3	Cherwell Services	10	397	396	-1	0%	0.05	YES
4	M40 South	11	3465	3465	0	0%	0.00	YES
5	B430	12	383	386	3	1%	0.15	YES
6	M40 North	13	3231	3233	2	0%	0.04	YES
7	B4100 West	14	533	528	-5	-1%	0.22	YES
8	Ardley Rd West	18	161	162	1	1%	0.08	YES
9	Ardley Rd East	17	187	189	2	1%	0.15	YES

Modified from 2016 HE model as count relocated south of B430 / Ardley Rd crossroads
Based on data from Thursday 8th February 2018

PM Peak

PM (1630-1730hrs) SUMMARY STATISTICS	
Total number of counts considered	9
VISSIM model counts with <5% difference	9
% of VISSIM counts with <5% difference	100.00%
VISSIM model counts with GEH <3	9
% of VISSIM counts with GEH <3	100.00%

Entry			DATA		DIFFERENCE		GEH	
			Matrix	Modelled				
Zone	Location	Data Measurement No.	All Vehicles	All Vehicles	No.	%	GEH	GEH
1	A43 North	8	1490	1487	-3	0%	0.08	YES
2	B4100 East	9	708	707	-1	0%	0.04	YES
3	Cherwell Services	10	413	411	-2	0%	0.10	YES
4	M40 South	11	4728	4727	-1	0%	0.01	YES
5	B430	12	691	695	4	1%	0.15	YES
6	M40 North	13	3282	3283	1	0%	0.02	YES
7	B4100 West	14	371	362	-9	-2%	0.47	YES
8	Ardley Rd West	18	58	58	0	0%	0.00	YES
9	Ardley Rd East	17	114	112	-2	-2%	0.19	YES

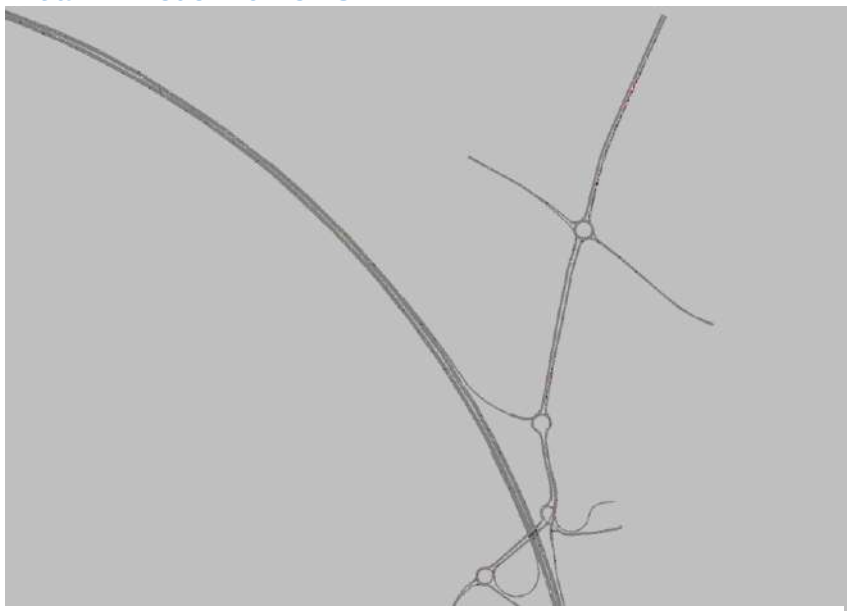
Modified from 2016 HE model as count relocated south of B430 / Ardley Rd crossroads
Based on data from Thursday 8th February 2018

APPENDIX G:
QUEUE COMPARISONS

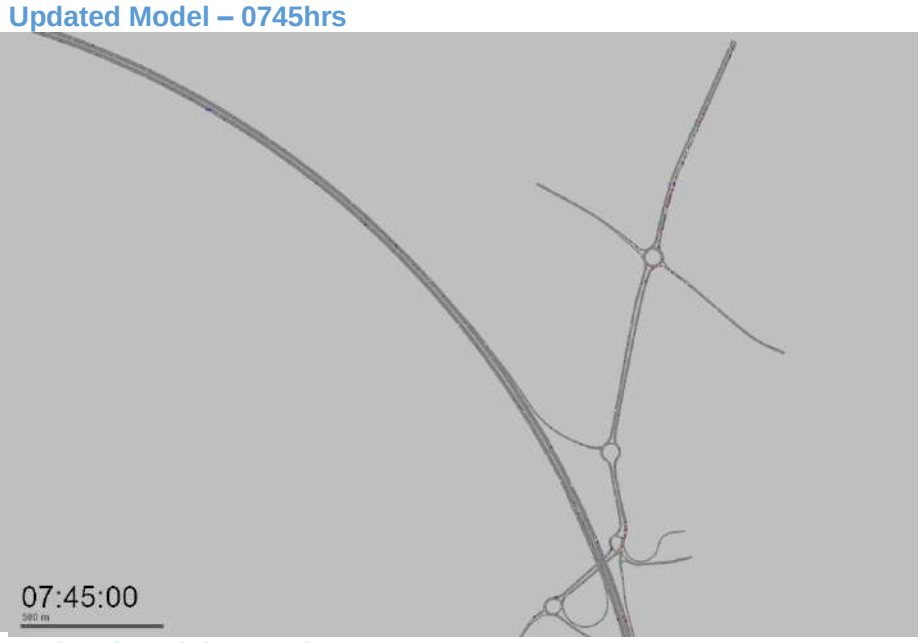
Queue Calibration – Model Comparisons

AM Peak

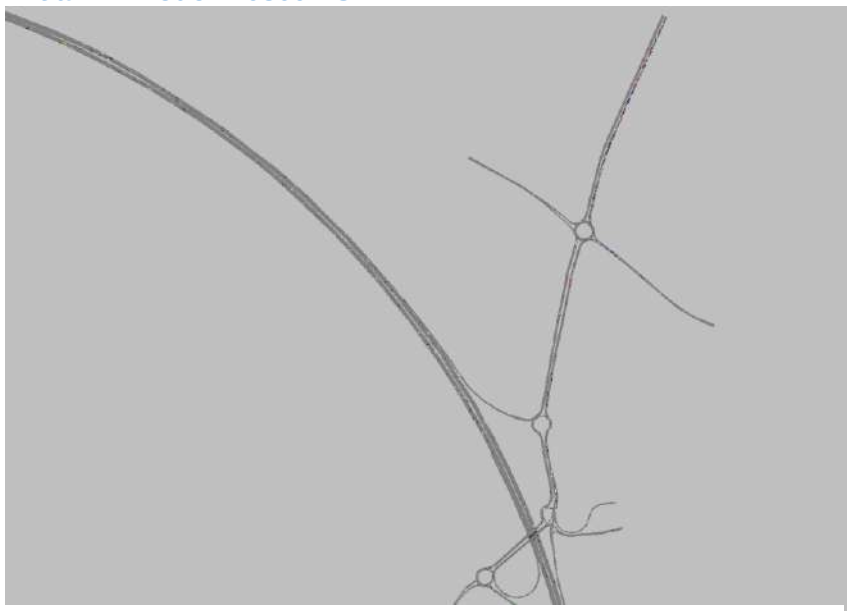
Initial HE Model – 0745hrs



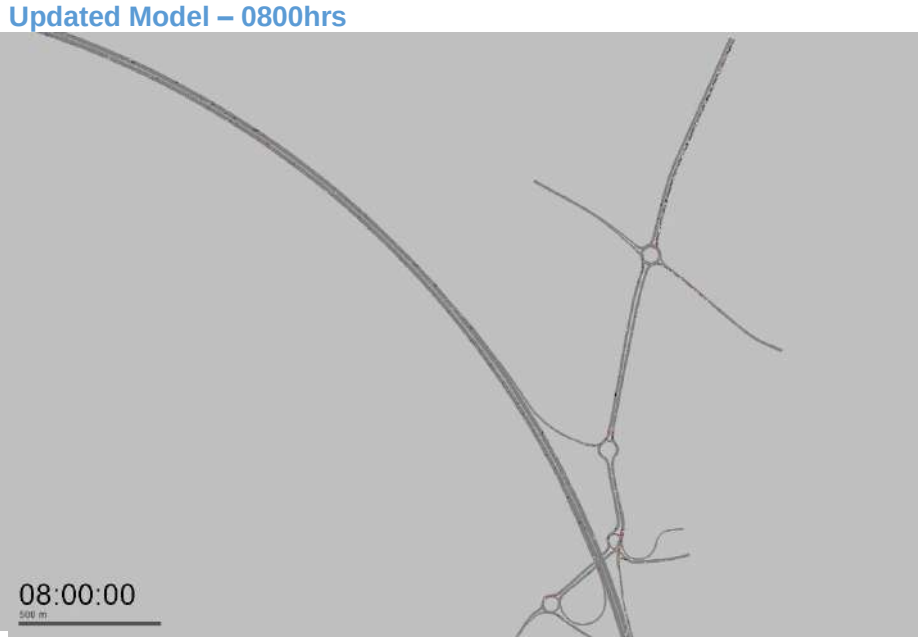
Updated Model – 0745hrs



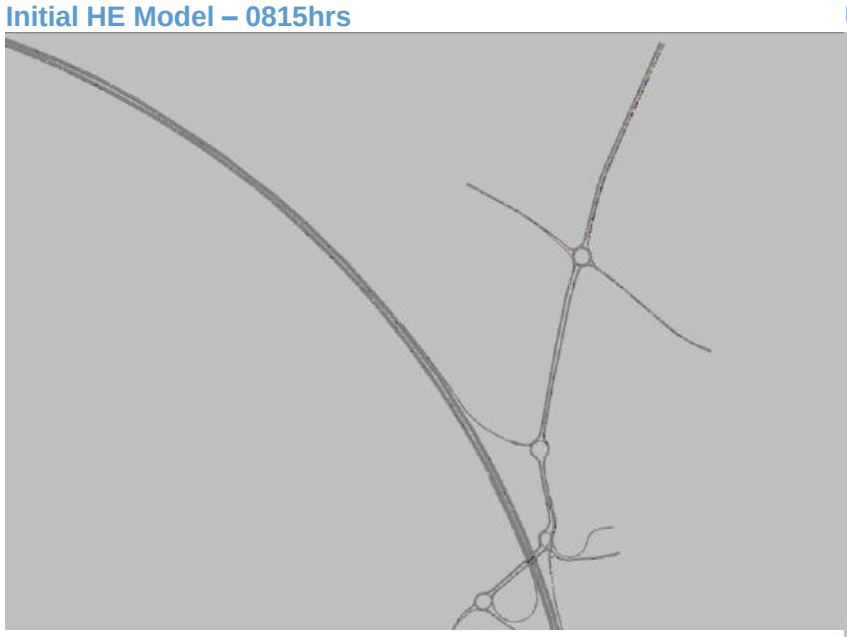
Initial HE Model – 0800hrs



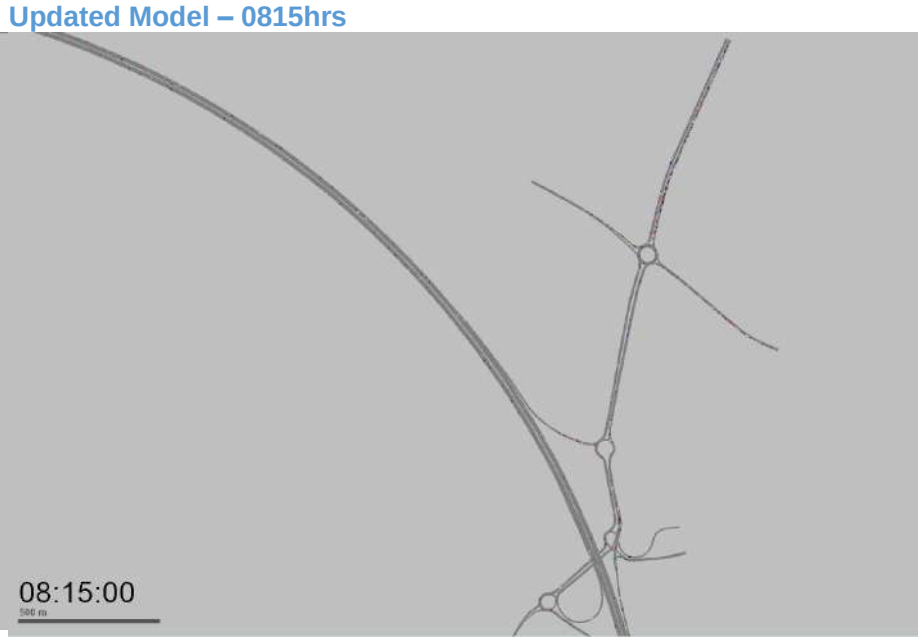
Updated Model – 0800hrs



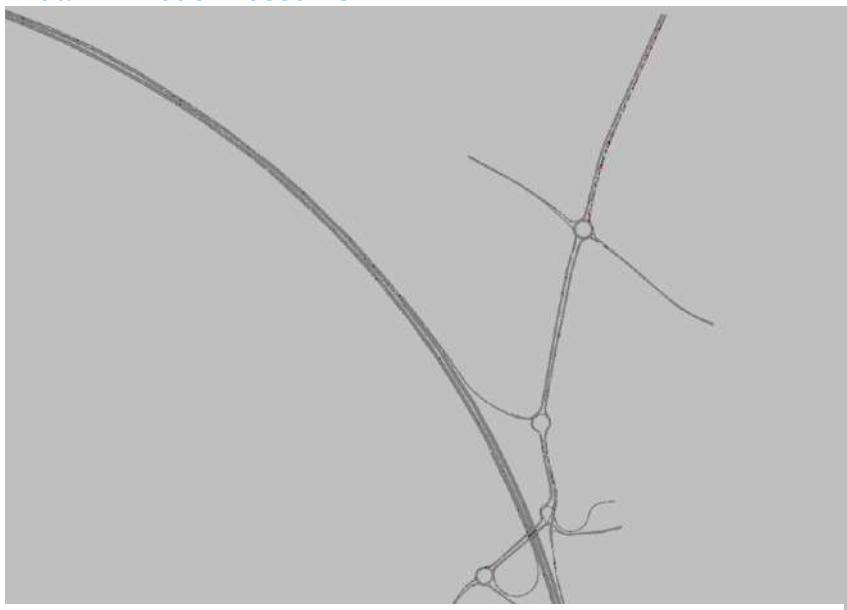
Initial HE Model – 0815hrs



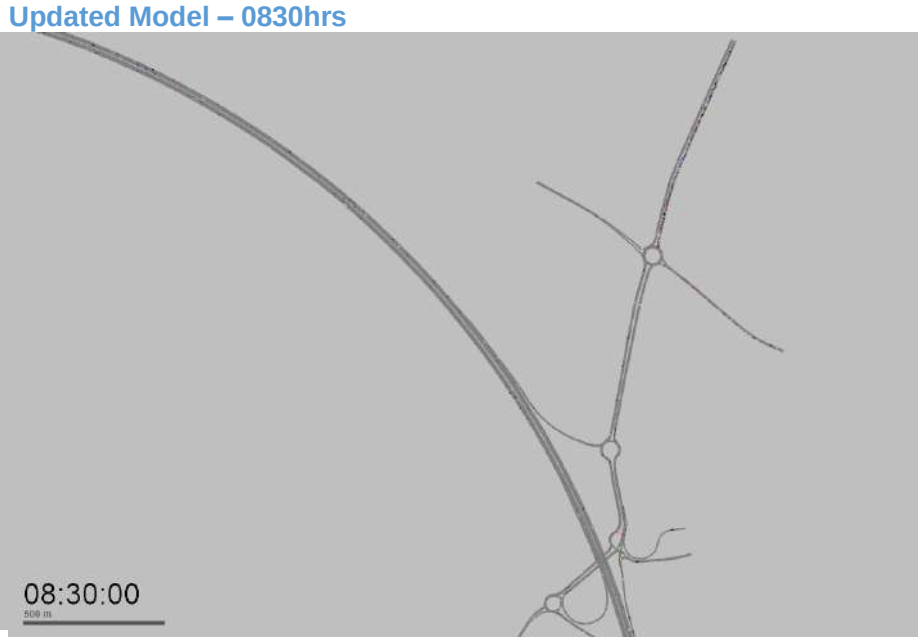
Updated Model – 0815hrs



Initial HE Model – 0830hrs



Updated Model – 0830hrs



Initial HE Model – 0845hrs

Updated Model – 0845hrs



PM Peak

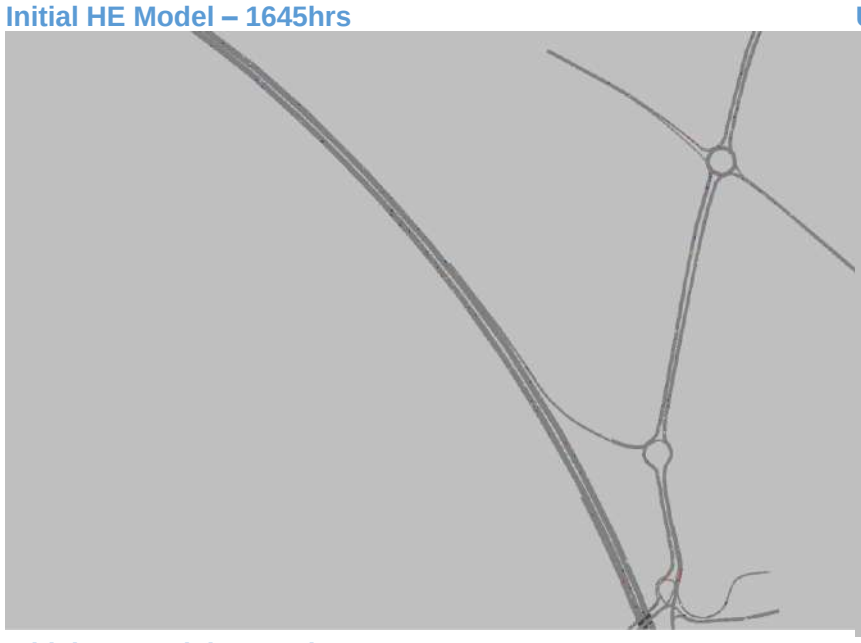
Initial HE Model – 1630hrs



Updated Model – 1630hrs



Initial HE Model – 1645hrs



Updated Model – 1645hrs



Initial HE Model – 1700hrs

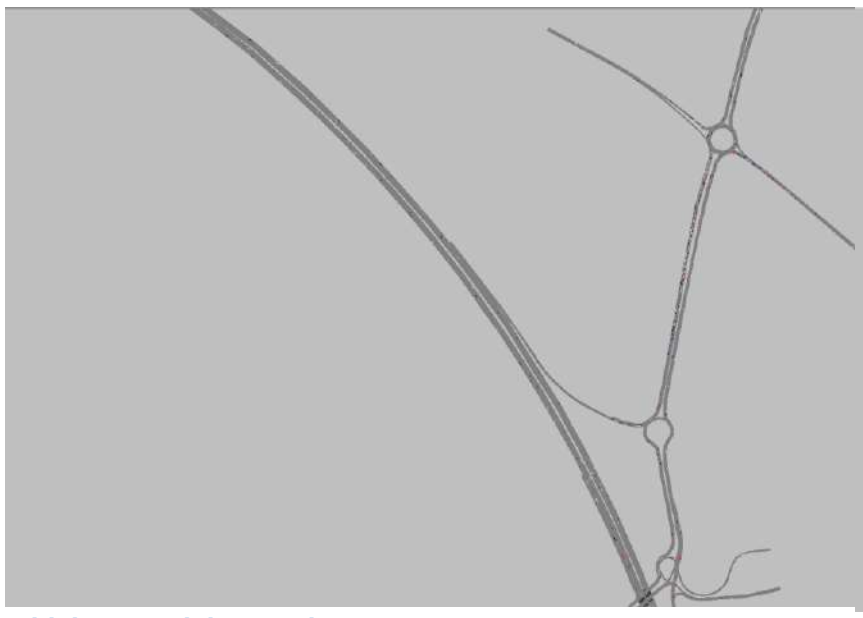


Updated Model – 1700hrs

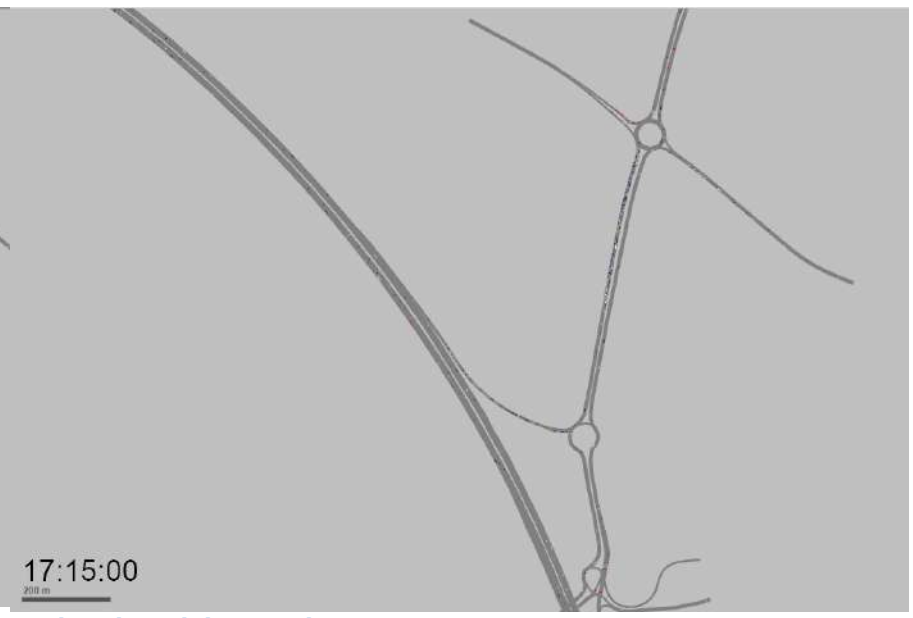


Initial HE Model – 1715hrs

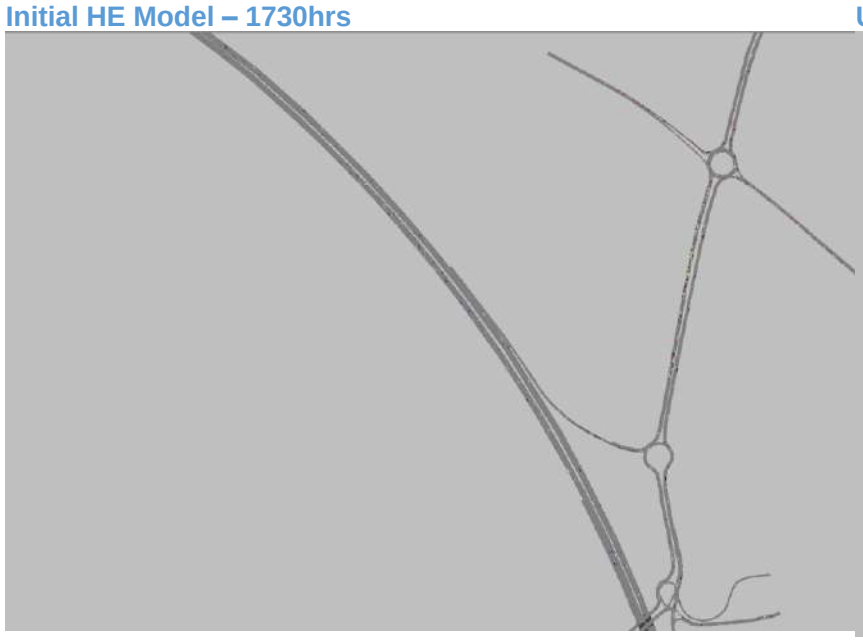
Updated Model – 1715hrs



Initial HE Model – 1730hrs



Updated Model – 1730hrs





APPENDIX H:
TURNING COUNT VALIDATION

Turning Count Flow Validation Calibration – Model Comparisons

AM Peak

AM Peak (0745-0845) Summary - ALL	
Total number of counts considered	43
VISSIM model counts with GEH <3	40
% of VISSIM counts with GEH <3	93.02%
VISSIM model counts with GEH <5	43
% of VISSIM counts with GEH <5	100.00%
VISSIM model counts with GEH <10	43
% of VISSIM counts with GEH <10	100.00%
VISSIM model counts meeting TAG Unit 3.1 criteria	42
% of VISSIM counts meeting TAG Unit 3.1 flow criteria	97.67%

Junction	Junction/ Movement		Vehicle Flow		Difference		GEH Criteria Met			Flow Criteria Met			
	From	To	Observed	Modelled	Actual	%	Critical	GEH	Pass	FLOW	<700	700 – 2700	>2700
Baynards Green Roundabout	A43 North	B4100 East	229	207	-22	-10%	Y	1.49	✓	✓			
		A43 South	1440	1377	-63	-4%	Y	1.68	✓	✓			
		B4100 West	66	61	-5	-8%	Y	0.63	✓	✓			
	B4100 East	A43 North	191	186	-5	-3%	Y	0.36	✓	✓			
		A43 South	101	102	1	1%	Y	0.10	✓	✓			
		B4100 West	233	217	-16	-7%	Y	1.07	✓	✓			
	A43 South	A43 North	1049	1056	7	1%	Y	0.22	✓	✓			
		B4100 East	148	154	6	4%	Y	0.49	✓	✓			
		B4100 West	119	113	-6	-5%	Y	0.56	✓	✓			
	B4100 West	A43 North	94	94	0	0%	Y	0.00	✓	✓			
		B4100 East	276	277	1	0%	Y	0.06	✓	✓			
		A43 South	150	159	9	6%	Y	0.72	✓	✓			
Cherwell Junction	A43 North	Cherwell Services	217	218	1	0%	Y	0.07	✓	✓			
		M40 SB On-Slip	1238	1098	-140	-11%	Y	4.10	×	✓			
		A43 South	642	652	10	2%	Y	0.39	✓	✓			
	Cherwell Services	A43 North	44	58	14	32%	Y	1.96	✓	✓			
		M40 SB On-Slip	204	203	-1	0%	Y	0.07	✓	✓			
		A43 South	146	133	-13	-9%	Y	1.10	✓	✓			
	A43 South	A43 North	1089	1060	-29	-3%	Y	0.88	✓	✓			
		M40 SB On-Slip	36	69	33	92%	Y	4.55	×	✓			
		Cherwell Services	167	159	-8	-5%	Y	0.63	✓	✓			
Padbury Roundabout	A43 South	A43 North	1113	1118	5	0%	Y	0.15	✓	✓			
	M40 SB Off-Slip	A43 South	315	332	17	5%	Y	0.95	✓	✓			
		A43 North	219	203	-16	-7%	Y	1.10	✓	✓			
	A43 North	A43 South	1718	1634	-84	-5%	Y	2.05	✓	✓			
Ardley Roundabout	A43 North-East	M40 NB On-Slip	269	260	-9	-3%	Y	0.55	✓	✓			
		B430	484	525	41	8%	Y	1.83	✓	✓			
	M40 NB Off-Slip	A43 North-East	1031	1040	9	1%	Y	0.28	✓	✓			
		B430	32	42	10	31%	Y	1.64	✓	✓			
	B430	A43 North-East	237	246	9	4%	Y	0.58	✓	✓			
		M40 NB On-Slip	205	209	4	2%	Y	0.28	✓	✓			
B430/Ardley Road Staggered Crossroads	B430 North	B4100 East	13	10	-3	-23%	N	0.88	✓	✓			
		B430 South	650	542	-108	-17%	N	4.42	✓	×	×		
		B4100 West	20	16	-4	-20%	N	0.94	✓	✓			
	Ardley Rd East	B430 North	107	110	3	3%	N	0.29	✓	✓			
		B430 South	48	48	0	0%	N	0.00	✓	✓			
		B4100 West	32	32	0	0%	N	0.00	✓	✓			
	B430 South	B430 North	303	308	5	2%	N	0.29	✓	✓			
		B4100 East	51	51	0	0%	N	0.00	✓	✓			
		B4100 West	29	29	0	0%	N	0.00	✓	✓			
	Ardley Rd West	B430 North	35	36	1	3%	N	0.17	✓	✓			
		B4100 East	51	51	0	0%	N	0.00	✓	✓			
		B430 South	75	75	0	0%	N	0.00	✓	✓			

Based on data from Thursday 8th February 2018

AM Peak (0745-0845) Summary - LIGHTS	
Total number of counts considered	43
VISSIM model counts with GEH <3	40
% of VISSIM counts with GEH <3	93.02%
VISSIM model counts with GEH <5	43
% of VISSIM counts with GEH <5	100.00%
VISSIM model counts with GEH <10	43
% of VISSIM counts with GEH <10	100.00%
VISSIM model counts meeting TAG Unit 3.1 criteria	42
% of VISSIM counts meeting TAG Unit 3.1 flow criteria	97.67%

Junction	Junction/ Movement		Vehicle Flow		Difference		GEH Criteria Met			Flow Criteria Met			
	From	To	Observed	Modelled	Actual	%	Critical	GEH	Pass	FLOW	<700	700 – 2700	>2700
Baynards Green Roundabout	A43 North	B4100 East	207	186	-21	-10%	Y	1.50	✓	✓			
		A43 South	1178	1136	-42	-4%	Y	1.23	✓	✓			
		B4100 West	54	52	-2	-4%	Y	0.27	✓	✓			
	B4100 East	A43 North	177	174	-3	-2%	Y	0.23	✓	✓			
		A43 South	93	95	2	2%	Y	0.21	✓	✓			
		B4100 West	224	208	-16	-7%	Y	1.09	✓	✓			
	A43 South	A43 North	908	909	1	0%	Y	0.03	✓	✓			
		B4100 East	133	138	5	4%	Y	0.43	✓	✓			
		B4100 West	100	93	-7	-7%	Y	0.71	✓	✓			
	B4100 West	A43 North	83	83	0	0%	Y	0.00	✓	✓			
		B4100 East	254	255	1	0%	Y	0.06	✓	✓			
		A43 South	138	148	10	7%	Y	0.84	✓	✓			
Cherwell Junction	A43 North	Cherwell Services	172	167	-5	-3%	Y	0.38	✓	✓			
		M40 SB On-Slip	1019	900	-119	-12%	Y	3.84	×	✓			
		A43 South	587	603	16	3%	Y	0.66	✓	✓			
	Cherwell Services	A43 North	27	42	15	56%	Y	2.55	✓	✓			
		M40 SB On-Slip	155	155	0	0%	Y	0.00	✓	✓			
		A43 South	130	116	-14	-11%	Y	1.26	✓	✓			
	A43 South	A43 North	957	923	-34	-4%	Y	1.11	✓	✓			
		M40 SB On-Slip	33	59	26	79%	Y	3.83	×	✓			
		Cherwell Services	136	136	0	0%	Y	0.00	✓	✓			
Padbury Roundabout	A43 South	A43 North	966	964	-2	0%	Y	0.06	✓	✓			
	M40 SB Off-Slip	A43 South	279	291	12	4%	Y	0.71	✓	✓			
		A43 North	187	176	-11	-6%	Y	0.82	✓	✓			
	A43 North	A43 South	1440	1377	-63	-4%	Y	1.68	✓	✓			
Ardley Roundabout	A43 North-East	M40 NB On-Slip	241	233	-8	-3%	Y	0.52	✓	✓			
		B430	446	486	40	9%	Y	1.85	✓	✓			
	M40 NB Off-Slip	A43 North-East	898	905	7	1%	Y	0.23	✓	✓			
		B430	24	37	13	54%	Y	2.35	✓	✓			
	B430	A43 North-East	203	210	7	3%	Y	0.49	✓	✓			
		M40 NB On-Slip	196	201	5	3%	Y	0.35	✓	✓			
B430/Ardley Road Staggered Crossroads	B430 North	B4100 East	12	9	-3	-25%	N	0.93	✓	✓			
		B430 South	605	499	-106	-18%	N	4.51	✓	×	×		
		B4100 West	19	15	-4	-21%	N	0.97	✓	✓			
	Ardley Rd East	B430 North	105	108	3	3%	N	0.29	✓	✓			
		B430 South	46	46	0	0%	N	0.00	✓	✓			
		B4100 West	31	31	0	0%	N	0.00	✓	✓			
	B430 South	B430 North	264	267	3	1%	N	0.18	✓	✓			
		B4100 East	49	49	0	0%	N	0.00	✓	✓			
		B4100 West	25	25	0	0%	N	0.00	✓	✓			
	Ardley Rd West	B430 North	34	35	1	3%	N	0.17	✓	✓			
		B4100 East	48	48	0	0%	N	0.00	✓	✓			
		B430 South	70	70	0	0%	N	0.00	✓	✓			

Based on data from Thursday 8th February 2018

AM Peak (0745-0845) Summary - HEAVIES	
Total number of counts considered	43
VISSIM model counts with GEH <3	43
% of VISSIM counts with GEH <3	100.00%
VISSIM model counts with GEH <5	43
% of VISSIM counts with GEH <5	100.00%
VISSIM model counts with GEH <10	43
% of VISSIM counts with GEH <10	100.00%
VISSIM model counts meeting TAG Unit 3.1 criteria	43
% of VISSIM counts meeting TAG Unit 3.1 flow criteria	100.00%

Junction	Junction/ Movement		Vehicle Flow		Difference		GEH Criteria Met			Flow Criteria Met			
	From	To	Observed	Modelled	Actual	%	Critical	GEH	Pass	FLOW	<700	700 – 2700	>2700
Baynards Green Roundabout	A43 North	B4100 East	22	21	-1	-5%	Y	0.22	✓	✓			
		A43 South	262	241	-21	-8%	Y	1.32	✓	✓			
		B4100 West	12	10	-2	-17%	Y	0.60	✓	✓			
	B4100 East	A43 North	14	13	-1	-7%	Y	0.27	✓	✓			
		A43 South	8	6	-2	-25%	Y	0.76	✓	✓			
		B4100 West	9	9	0	0%	Y	0.00	✓	✓			
	A43 South	A43 North	141	146	5	4%	Y	0.42	✓	✓			
		B4100 East	15	16	1	7%	Y	0.25	✓	✓			
		B4100 West	19	20	1	5%	Y	0.23	✓	✓			
	B4100 West	A43 North	11	11	0	0%	Y	0.00	✓	✓			
		B4100 East	22	22	0	0%	Y	0.00	✓	✓			
		A43 South	12	11	-1	-8%	Y	0.29	✓	✓			
Cherwell Junction	A43 North	Cherwell Services	45	51	6	13%	Y	0.87	✓	✓			
		M40 SB On-Slip	219	197	-22	-10%	Y	1.53	✓	✓			
		A43 South	55	50	-5	-9%	Y	0.69	✓	✓			
	Cherwell Services	A43 North	17	17	0	0%	Y	0.00	✓	✓			
		M40 SB On-Slip	49	49	0	0%	Y	0.00	✓	✓			
		A43 South	16	17	1	6%	Y	0.25	✓	✓			
	A43 South	A43 North	132	137	5	4%	Y	0.43	✓	✓			
		M40 SB On-Slip	3	10	7	233%	Y	2.75	✓	✓			
		Cherwell Services	31	24	-7	-23%	Y	1.33	✓	✓			
Padbury Roundabout	A43 South	A43 North	147	154	7	5%	Y	0.57	✓	✓			
	M40 SB Off-Slip	A43 South	36	41	5	14%	Y	0.81	✓	✓			
		A43 North	32	28	-4	-13%	Y	0.73	✓	✓			
	A43 North	A43 South	278	258	-20	-7%	Y	1.22	✓	✓			
Ardley Roundabout	A43 North-East	M40 NB On-Slip	28	27	-1	-4%	Y	0.19	✓	✓			
		B430	38	40	2	5%	Y	0.32	✓	✓			
	M40 NB Off-Slip	A43 North-East	133	135	2	2%	Y	0.17	✓	✓			
		B430	8	6	-2	-25%	Y	0.76	✓	✓			
	B430	A43 North-East	34	36	2	6%	Y	0.34	✓	✓			
		M40 NB On-Slip	9	8	-1	-11%	Y	0.34	✓	✓			
B430/Ardley Road Staggered Crossroads	B430 North	B4100 East	1	1	0	0%	N	0.00	✓	✓			
		B430 South	45	44	-1	-2%	N	0.15	✓	✓			
		B4100 West	1	1	0	0%	N	0.00	✓	✓			
	Ardley Rd East	B430 North	2	2	0	0%	N	0.00	✓	✓			
		B430 South	2	2	0	0%	N	0.00	✓	✓			
		B4100 West	1	1	0	0%	N	0.00	✓	✓			
	B430 South	B430 North	39	41	2	5%	N	0.32	✓	✓			
		B4100 East	2	2	0	0%	N	0.00	✓	✓			
		B4100 West	4	4	0	0%	N	0.00	✓	✓			
	Ardley Rd West	B430 North	1	1	0	0%	N	0.00	✓	✓			
		B4100 East	3	3	0	0%	N	0.00	✓	✓			
		B430 South	5	5	0	0%	N	0.00	✓	✓			

Based on data from Thursday 8th February 2018

PM Peak

PM Peak (1630-1730) Summary - ALL	
Total number of counts considered	43
VISSIM model counts with GEH <3	40
% of VISSIM counts with GEH <3	93.02%
VISSIM model counts with GEH <5	43
% of VISSIM counts with GEH <5	100.00%
VISSIM model counts with GEH <10	43
% of VISSIM counts with GEH <10	100.00%
VISSIM model counts meeting TAG Unit 3.1 criteria	43
% of VISSIM counts meeting TAG Unit 3.1 flow criteria	100.00%

Junction	Junction/ Movement		Vehicle Flow		Difference		GEH Criteria Met			Flow Criteria Met			
	From	To	Observed	Modelled	Actual	%	Critical	GEH	Pass	FLOW	<700	700 – 2700	>2700
Baynards Green Roundabout	A43 North	B4100 East	258	256	-2	-1%	Y	0.12	✓	✓			
		A43 South	1191	1176	-15	-1%	Y	0.44	✓	✓			
		B4100 West	49	48	-1	-2%	Y	0.14	✓	✓			
	B4100 East	A43 North	321	308	-13	-4%	Y	0.73	✓	✓			
		A43 South	106	102	-4	-4%	Y	0.39	✓	✓			
		B4100 West	279	266	-13	-5%	Y	0.79	✓	✓			
	A43 South	A43 North	1719	1633	-86	-5%	Y	2.10	✓	✓			
		B4100 East	92	85	-7	-8%	Y	0.74	✓	✓			
		B4100 West	103	92	-11	-11%	Y	1.11	✓	✓			
	B4100 West	A43 North	57	57	0	0%	Y	0.00	✓	✓			
		B4100 East	238	230	-8	-3%	Y	0.52	✓	✓			
		A43 South	67	66	-1	-1%	Y	0.12	✓	✓			
Cherwell Junction	A43 North	Cherwell Services	187	222	35	19%	Y	2.45	✓	✓			
		M40 SB On-Slip	1014	952	-62	-6%	Y	1.98	✓	✓			
		A43 South	438	413	-25	-6%	Y	1.21	✓	✓			
	Cherwell Services	A43 North	68	96	28	41%	Y	3.09	×	✓			
		M40 SB On-Slip	190	191	1	1%	Y	0.07	✓	✓			
		A43 South	156	125	-31	-20%	Y	2.62	✓	✓			
	A43 South	A43 North	1686	1636	-50	-3%	Y	1.23	✓	✓			
		M40 SB On-Slip	54	76	22	41%	Y	2.73	✓	✓			
		Cherwell Services	206	163	-43	-21%	Y	3.17	×	✓			
Padbury Roundabout	A43 South	A43 North	1721	1722	1	0%	Y	0.02	✓	✓			
	M40 SB Off-Slip	A43 South	250	251	1	0%	Y	0.06	✓	✓			
		A43 North	219	164	-55	-25%	Y	3.97	×	✓			
	A43 North	A43 South	1396	1341	-55	-4%	Y	1.49	✓	✓			
Ardley Roundabout	A43 North-East	M40 NB On-Slip	282	277	-5	-2%	Y	0.30	✓	✓			
		B430	274	260	-14	-5%	Y	0.86	✓	✓			
	M40 NB Off-Slip	A43 North-East	1457	1430	-27	-2%	Y	0.71	✓	✓			
		B430	36	34	-2	-6%	Y	0.34	✓	✓			
	B430	A43 North-East	451	447	-4	-1%	Y	0.19	✓	✓			
		M40 NB On-Slip	182	182	0	0%	Y	0.00	✓	✓			
B430/Ardley Road Staggered Crossroads	B430 North	B4100 East	62	54	-8	-13%	N	1.05	✓	✓			
		B430 South	224	214	-10	-4%	N	0.68	✓	✓			
		B4100 West	29	25	-4	-14%	N	0.77	✓	✓			
	Ardley Rd East	B430 North	35	33	-2	-6%	N	0.34	✓	✓			
		B430 South	40	40	0	0%	N	0.00	✓	✓			
		B4100 West	39	39	0	0%	N	0.00	✓	✓			
	B430 South	B430 North	581	586	5	1%	N	0.21	✓	✓			
		B4100 East	37	38	1	3%	N	0.16	✓	✓			
		B4100 West	73	72	-1	-1%	N	0.12	✓	✓			
	Ardley Rd West	B430 North	12	12	0	0%	N	0.00	✓	✓			
		B4100 East	23	23	0	0%	N	0.00	✓	✓			
		B430 South	23	23	0	0%	N	0.00	✓	✓			

Based on data from Thursday 8th February 2018

PM Peak (1630-1730) Summary - LIGHTS	
Total number of counts considered	43
VISSIM model counts with GEH <3	38
% of VISSIM counts with GEH <3	88.37%
VISSIM model counts with GEH <5	43
% of VISSIM counts with GEH <5	100.00%
VISSIM model counts with GEH <10	43
% of VISSIM counts with GEH <10	100.00%
VISSIM model counts meeting TAG Unit 3.1 criteria	43
% of VISSIM counts meeting TAG Unit 3.1 flow criteria	100.00%

Junction	Junction/ Movement		Vehicle Flow		Difference		GEH Criteria Met			Flow Criteria Met			
	From	To	Observed	Modelled	Actual	%	Critical	GEH	Pass	FLOW	<700	700 – 2700	>2700
Baynards Green Roundabout	A43 North	B4100 East	249	247	-2	-1%	Y	0.13	✓	✓			
		A43 South	1082	1066	-16	-1%	Y	0.49	✓	✓			
		B4100 West	38	37	-1	-3%	Y	0.16	✓	✓			
	B4100 East	A43 North	312	299	-13	-4%	Y	0.74	✓	✓			
		A43 South	102	93	-9	-9%	Y	0.91	✓	✓			
		B4100 West	277	263	-14	-5%	Y	0.85	✓	✓			
	A43 South	A43 North	1586	1502	-84	-5%	Y	2.14	✓	✓			
		B4100 East	85	79	-6	-7%	Y	0.66	✓	✓			
		B4100 West	97	87	-10	-10%	Y	1.04	✓	✓			
	B4100 West	A43 North	52	51	-1	-2%	Y	0.14	✓	✓			
		B4100 East	229	221	-8	-3%	Y	0.53	✓	✓			
		A43 South	60	58	-2	-3%	Y	0.26	✓	✓			
Cherwell Junction	A43 North	Cherwell Services	153	189	36	24%	Y	2.75	✓	✓			
		M40 SB On-Slip	919	857	-62	-7%	Y	2.08	✓	✓			
		A43 South	404	384	-20	-5%	Y	1.01	✓	✓			
	Cherwell Services	A43 North	54	84	30	56%	Y	3.61	×	✓			
		M40 SB On-Slip	151	152	1	1%	Y	0.08	✓	✓			
		A43 South	132	99	-33	-25%	Y	3.07	×	✓			
	A43 South	A43 North	1554	1510	-44	-3%	Y	1.12	✓	✓			
		M40 SB On-Slip	46	70	24	52%	Y	3.15	×	✓			
		Cherwell Services	168	127	-41	-24%	Y	3.38	×	✓			
Padbury Roundabout	A43 South	A43 North	1586	1583	-3	0%	Y	0.08	✓	✓			
	M40 SB Off-Slip	A43 South	225	220	-5	-2%	Y	0.34	✓	✓			
		A43 North	203	155	-48	-24%	Y	3.59	×	✓			
	A43 North	A43 South	1265	1214	-51	-4%	Y	1.45	✓	✓			
Ardley Roundabout	A43 North-East	M40 NB On-Slip	248	242	-6	-2%	Y	0.38	✓	✓			
		B430	256	240	-16	-6%	Y	1.02	✓	✓			
	M40 NB Off-Slip	A43 North-East	1304	1279	-25	-2%	Y	0.70	✓	✓			
		B430	33	31	-2	-6%	Y	0.35	✓	✓			
	B430	A43 North-East	433	430	-3	-1%	Y	0.14	✓	✓			
		M40 NB On-Slip	178	177	-1	-1%	Y	0.08	✓	✓			
B430/Ardley Road Staggered Crossroads	B430 North	B4100 East	61	53	-8	-13%	N	1.06	✓	✓			
		B430 South	217	192	-25	-12%	N	1.75	✓	✓			
		B4100 West	29	25	-4	-14%	N	0.77	✓	✓			
	Ardley Rd East	B430 North	34	32	-2	-6%	N	0.35	✓	✓			
		B430 South	39	39	0	0%	N	0.00	✓	✓			
		B4100 West	39	39	0	0%	N	0.00	✓	✓			
	B430 South	B430 North	562	566	4	1%	N	0.17	✓	✓			
		B4100 East	35	36	1	3%	N	0.17	✓	✓			
		B4100 West	72	71	-1	-1%	N	0.12	✓	✓			
	Ardley Rd West	B430 North	11	11	0	0%	N	0.00	✓	✓			
		B4100 East	23	23	0	0%	N	0.00	✓	✓			
		B430 South	21	21	0	0%	N	0.00	✓	✓			

Based on data from Thursday 8th February 2018

PM Peak (1630-1730) Summary - HEAVIES	
Total number of counts considered	43
VISSIM model counts with GEH <3	42
% of VISSIM counts with GEH <3	97.67%
VISSIM model counts with GEH <5	43
% of VISSIM counts with GEH <5	100.00%
VISSIM model counts with GEH <10	43
% of VISSIM counts with GEH <10	100.00%
VISSIM model counts meeting TAG Unit 3.1 criteria	43
% of VISSIM counts meeting TAG Unit 3.1 flow criteria	100.00%

Junction	Junction/ Movement		Vehicle Flow		Difference		GEH Criteria Met			Flow Criteria Met			
	From	To	Observed	Modelled	Actual	%	Critical	GEH	Pass	FLOW	<700	700 – 2700	>2700
Baynards Green Roundabout	A43 North	B4100 East	9	9	0	0%	Y	0.00	✓	✓			
		A43 South	109	110	1	1%	Y	0.10	✓	✓			
		B4100 West	11	11	0	0%	Y	0.00	✓	✓			
	B4100 East	A43 North	9	9	0	0%	Y	0.00	✓	✓			
		A43 South	4	9	5	125%	Y	1.96	✓	✓			
		B4100 West	2	2	0	0%	Y	0.00	✓	✓			
	A43 South	A43 North	133	131	-2	-2%	Y	0.17	✓	✓			
		B4100 East	7	7	0	0%	Y	0.00	✓	✓			
		B4100 West	6	6	0	0%	Y	0.00	✓	✓			
	B4100 West	A43 North	5	5	0	0%	Y	0.00	✓	✓			
		B4100 East	9	9	0	0%	Y	0.00	✓	✓			
		A43 South	7	7	0	0%	Y	0.00	✓	✓			
Cherwell Junction	A43 North	Cherwell Services	34	33	-1	-3%	Y	0.17	✓	✓			
		M40 SB On-Slip	95	95	0	0%	Y	0.00	✓	✓			
		A43 South	34	29	-5	-15%	Y	0.89	✓	✓			
	Cherwell Services	A43 North	14	12	-2	-14%	Y	0.55	✓	✓			
		M40 SB On-Slip	39	39	0	0%	Y	0.00	✓	✓			
		A43 South	24	26	2	8%	Y	0.40	✓	✓			
	A43 South	A43 North	132	126	-6	-5%	Y	0.53	✓	✓			
		M40 SB On-Slip	8	6	-2	-25%	Y	0.76	✓	✓			
		Cherwell Services	38	37	-1	-3%	Y	0.16	✓	✓			
Padbury Roundabout	A43 South	A43 North	135	139	4	3%	Y	0.34	✓	✓			
	M40 SB Off-Slip	A43 South	25	31	6	24%	Y	1.13	✓	✓			
		A43 North	16	10	-6	-38%	Y	1.66	✓	✓			
	A43 North	A43 South	131	126	-5	-4%	Y	0.44	✓	✓			
Ardley Roundabout	A43 North-East	M40 NB On-Slip	34	35	1	3%	Y	0.17	✓	✓			
		B430	18	20	2	11%	Y	0.46	✓	✓			
	M40 NB Off-Slip	A43 North-East	153	151	-2	-1%	Y	0.16	✓	✓			
		B430	3	3	0	0%	Y	0.00	✓	✓			
	B430	A43 North-East	18	17	-1	-6%	Y	0.24	✓	✓			
		M40 NB On-Slip	4	5	1	25%	Y	0.47	✓	✓			
B430/Ardley Road Staggered Crossroads	B430 North	B4100 East	1	1	0	0%	N	0.00	✓	✓			
		B430 South	7	22	15	214%	N	3.94	✓	✓			
		B4100 West	0	0	0	-	N	0.00	✓	✓			
	Ardley Rd East	B430 North	1	1	0	0%	N	0.00	✓	✓			
		B430 South	1	1	0	0%	N	0.00	✓	✓			
		B4100 West	0	0	0	-	N	0.00	✓	✓			
	B430 South	B430 North	19	20	1	5%	N	0.23	✓	✓			
		B4100 East	2	2	0	0%	N	0.00	✓	✓			
		B4100 West	1	1	0	0%	N	0.00	✓	✓			
	Ardley Rd West	B430 North	1	1	0	0%	N	0.00	✓	✓			
		B4100 East	0	0	0	-	N	0.00	✓	✓			
		B430 South	2	2	0	0%	N	0.00	✓	✓			

Based on data from Thursday 8th February 2018

APPENDIX I:
JOURNEY TIME VALIDATION

Journey Time Validation– Model Comparisons

AM Peak

AM Peak (0745-0845) Summary - ALL	
Vehicle Class	ALL
Total number of routes considered	22
Number of VISSIM routes within 15% of observed	21
% of VISS M routes within 15% of observed	95.45%
Number of VISSIM routes within 60s of observed	22
% of VISS M routes within 60s of observed	100.00%
Number of VISSIM routes meeting at least one set of criteria	22
% of VISS M routes meeting at least one set of criteria	100.00%
Numnber of VISSIM routes within observed min/max range	20
% of VISS M routes within observed min/max range	90.91%

AM - 0745-0845hrs															
JT Marker No.	Route			Observed			Modelled			Validation					
	From	To	Dist.	Min.	Avg.	Max.	Min.	Avg.	Max.	Actual Diff.	% Diff.	Within 15%	Within 60s	Validates	Within Min/Max Range
102	A43 North	B4100 East	183m	17	31	54	39	41	44	10	34%	×	✓	✓	✓
103	A43 North	Cherwell Services	1325m	99	141	205	136	141	148	0	0%	✓	✓	✓	✓
104	A43 North	M40 SB On-Slip	1335m	79	127	189	137	141	147	14	11%	✓	✓	✓	✓
105	A43 North	B430	1586m	109	145	188	158	166	172	21	14%	✓	✓	✓	✓
106	A43 North	M40 NB On-Slip	1536m	107	136	163	149	156	166	20	15%	✓	✓	✓	✓
201	B4100 East	A43 North	254m	24	72	148	66	70	75	-2	-2%	✓	✓	✓	✓
206	B4100 East	M40 NB On-Slip	1465m	104	175	257	179	187	194	12	7%	✓	✓	✓	✓
301	Cherwell Services	A43 North	1398m	89	140	195	116	123	128	-17	-12%	✓	✓	✓	✓
304	Cherwell Services	M40 NB On-Slip	272m	18	50	95	46	49	51	-1	-2%	✓	✓	✓	✓
306	Cherwell Services	M40 SB On-Slip	522m	36	75	163	65	69	74	-6	-8%	✓	✓	✓	✓
401	M40 NB Off-Slip	A43 North	1624m	67	115	167	113	115	117	0	0%	✓	✓	✓	✓
403	M40 NB Off-Slip	Cherwell Services	698m	47	83	142	78	84	91	1	1%	✓	✓	✓	✓
407	M40 NB Off-Slip	B4100 West	1537m	62	97	136	105	108	110	11	11%	✓	✓	✓	✓
501	B430	A43 North	1572m	78	114	163	105	109	111	-5	-5%	✓	✓	✓	✓
506	B430	M40 NB On-Slip	223m	13	25	47	22	23	24	-2	-9%	✓	✓	✓	✓
602	M40 SB Off-Slip	B4100 East	1099m	54	79	113	79	86	98	7	8%	✓	✓	✓	✓
605	M40 SB Off-Slip	B430	1078m	78	116	176	117	128	156	12	11%	✓	✓	✓	✓
702	B4100 West	B4100 East	180m	16	33	58	28	31	33	-2	-7%	✓	✓	✓	✓
704	B4100 West	M40 SB On-Slip	1332m	91	123	176	118	122	129	-1	-1%	✓	✓	✓	✓
705	B4100 West	B430	1583m	115	141	161	137	149	167	8	6%	✓	✓	✓	✓
800	B430 (Ardley Roundabout)	B430 (Recycling Centre)	1604m	98	99	102	101	102	104	3	3%	✓	✓	✓	×
801	B430 (Recycling Centre)	B430 (Ardley Roundabout)	1609m	87	88	89	95	96	98	8	9%	✓	✓	✓	×

Additional JT routes to account for extended model on B430 to include B430 / Ardley Rd staggered crossroads

PM Peak

PM Peak (1630-1730) Summary - ALL	
Vehicle Class	ALL
Total number of routes considered	22
Number of VISSIM routes within 15% of observed	21
% of VISS M routes within 15% of observed	95.45%
Number of VISSIM routes within 60s of observed	22
% of VISS M routes within 60s of observed	100.00%
Number of VISSIM routes meeting at least one set of criteria	22
% of VISS M routes meeting at least one set of criteria	100.00%
Numnber of VISSIM routes within observed min/max range	20
% of VISS M routes within observed min/max range	90.91%

PM - 1630-1730hrs															
JT Marker No.	Route			Observed			Modelled			Validation					
	From	To	Dist.	Min.	Avg.	Max.	Min.	Avg.	Max.	Actual Diff.	% Diff.	Within 15%	Within 60s	Validates	Within Min/Max Range
102	A43 North	B4100 East	183m	13	24	43	19	21	22	-4	-15%	✓	✓	✓	✓
103	A43 North	Cherwell Services	1325m	87	122	159	105	108	111	-14	-12%	✓	✓	✓	✓
104	A43 North	M40 SB On-Slip	1335m	67	106	161	106	108	109	2	2%	✓	✓	✓	✓
105	A43 North	B430	1586m	101	134	181	127	130	134	-4	-3%	✓	✓	✓	✓
106	A43 North	M40 NB On-Slip	1536m	96	124	160	121	125	130	1	1%	✓	✓	✓	✓
201	B4100 East	A43 North	254m	23	53	116	42	47	52	-6	-11%	✓	✓	✓	✓
206	B4100 East	M40 NB On-Slip	1465m	98	138	204	138	146	154	8	6%	✓	✓	✓	✓
301	Cherwell Services	A43 North	1398m	120	225	358	159	203	226	-22	-10%	✓	✓	✓	✓
304	Cherwell Services	M40 NB On-Slip	272m	12	41	84	42	44	47	3	8%	✓	✓	✓	✓
306	Cherwell Services	M40 SB On-Slip	522m	38	69	137	66	69	72	0	-1%	✓	✓	✓	✓
401	M40 NB Off-Slip	A43 North	1624m	88	235	418	160	206	228	-29	-13%	✓	✓	✓	✓
403	M40 NB Off-Slip	Cherwell Services	698m	51	86	131	76	79	84	-7	-8%	✓	✓	✓	✓
407	M40 NB Off-Slip	B4100 West	1537m	86	217	346	155	210	233	-7	-3%	✓	✓	✓	✓
501	B430	A43 North	1572m	78	232	424	165	210	236	-22	-9%	✓	✓	✓	✓
506	B430	M40 NB On-Slip	223m	11	27	71	27	29	32	2	8%	✓	✓	✓	✓
602	M40 SB Off-Slip	B4100 East	1099m	67	201	412	180	226	342	25	12%	✓	✓	✓	✓
605	M40 SB Off-Slip	B430	1078m	80	252	482	178	234	353	-18	-7%	✓	✓	✓	✓
702	B4100 West	B4100 East	180m	14	24	36	40	51	60	27	114%	×	✓	✓	×
704	B4100 West	M40 SB On-Slip	1332m	69	109	151	112	118	125	9	8%	✓	✓	✓	✓
705	B4100 West	B430	1583m	131	140	153	128	139	152	-1	0%	✓	✓	✓	✓
800	B430 (Ardley Roundabout)	B430 (Recycling Centre)	1604m	83	84	85	94	97	98	13	15%	✓	✓	✓	×
801	B430 (Recycling Centre)	B430 (Ardley Roundabout)	1609m	103	105	106	101	104	107	-1	-1%	✓	✓	✓	✓

Additional JT routes to account for extended model on B430 to include B430 / Ardley Rd staggered crossroads

APPENDIX J:
EXIT FLOW VALIDATION

Exit Flow Validation – Model Comparisons

AM Peak

AM (0745-0845hrs) SUMMARY STATISTICS	
Total number of counts considered	9
VISSIM model counts with GEH <5	9
% of VISSIM counts with GEH <5	100.00%
VISSIM model counts within TAG Unit 3.1 Criteria	9
% of VISSIM counts within TAG Unit 3.1 Criteria	100.00%

Entry			DATA		DIFFERENCE		GEH		Flow Criteria Met			
			Matrix	Modelled	No.	%	GEH	GEH	FLOW	<700	700 – 2700	>2700
Zone	Location	Data Measurement No.	All Vehicles	All Vehicles								
1	A43 North	1	1336	1338	2	0%	0.05	YES	✓			
2	B4100 East	2	654	638	-16	-2%	0.63	YES	✓			
3	Cherwell Services	3	383	378	-5	-1%	0.26	YES	✓			
4	M40 South	4	4160	4126	-34	-1%	0.53	YES	✓			
5	B430	5	690	664	-26	-4%	1.00	YES	✓			
6	M40 North	6	2860	2910	50	2%	0.93	YES	✓			
7	B4100 West	7	422	392	-30	-7%	1.49	YES	✓			
8	Ardley Rd West	16	81	77	-4	-5%	0.45	YES	✓			
9	Ardley Rd East	15	114	111	-3	-3%	0.28	YES	✓			

Modified from 2016 HE model as count relocated south of B430 / Ardley Rd crossroads
Based on data from Thursday 8th February 2018

PM Peak

PM (1630-1730hrs) SUMMARY STATISTICS	
Total number of counts considered	9
VISSIM model counts with GEH <5	9
% of VISSIM counts with GEH <5	100.00%
VISSIM model counts within TAG Unit 3.1 Criteria	9
% of VISSIM counts within TAG Unit 3.1 Criteria	100.00%

Entry			DATA		DIFFERENCE		GEH		Flow Criteria Met			
			Matrix	Modelled	No.	%	GEH	GEH	FLOW	<700	700 – 2700	>2700
Zone	Location	Data Measurement No.	All Vehicles	All Vehicles								
1	A43 North	1	2098	1999	-99	-5%	2.19	YES	✓			
2	B4100 East	2	589	570	-19	-3%	0.79	YES	✓			
3	Cherwell Services	3	390	386	-4	-1%	0.20	YES	✓			
4	M40 South	4	4071	4072	1	0%	0.02	YES	✓			
5	B430	5	290	276	-14	-5%	0.83	YES	✓			
6	M40 North	6	3713	3709	-4	0%	0.07	YES	✓			
7	B4100 West	7	439	406	-33	-8%	1.61	YES	✓			
8	Ardley Rd West	16	142	136	-6	-4%	0.51	YES	✓			
9	Ardley Rd East	15	123	115	-8	-7%	0.73	YES	✓			

Modified from 2016 HE model as count relocated south of B430 / Ardley Rd crossroads
Based on data from Thursday 8th February 2018

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APPENDIX B:

2034 REFERENCE CASE TN

Prepared by:	[redacted]	Reviewed by:	Luke Best
Client:	ADC Infrastructure Ltd	Date:	02 September 2025

MG0163 – Oxford SRFI – 2034 Reference Case Modelling

1 INTRODUCTION

1.1 This Technical Note summarises the model changes and results obtained for the 2034 Reference Case scenario, as part of the proposed Oxfordshire Strategic Rail Freight Interchange (OxSRFI) development.

2 REFERENCE CASE MODELLING HISTORY

2.1 The Reference Case modelling was first undertaken in 2021 and there have been various iterations to account for different 2031 traffic flows and different compositions of committed improvements (improvements at Padbury roundabout and then with and without potential improvements at the Bayard's Green roundabout).

2.2 The previous reporting of the changes made to the approved M40 J10 was detailed in Modelling Group's technical note[1], provided in **Appendix 1** for reference.

3 NEW COMMITTED DEVELOPMENT – ALBION LAND AXIS J10

3.1 The most recent development to account for as part of the Reference Case modelling is the granting of planning permission for the proposed Albion Land Axis J10 development. This is a ~160 acres logistics park, located on land to the East and West of the Baynard's Green roundabout. The proposed location and masterplan is shown in **Figure 1**[2].

3.2 As part of the Albion Land development, there are the following network improvements that are required to be accounted for in the Reference Case modelling:

[1] 230301 MG0163 Oxford SRFI Summary Changes Ref Case_v2_Rev3

[redacted]

Mobile [redacted]

[redacted]

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- Baynard's Green – updated junction layout with increased number of lanes on all approaches, fully signalised and amended circulatory sections.
- Eastern Site Access – a new signalised T-junction to access the site to the east.
- Western Site Access – a new priority roundabout to access the site to the west.

3.3 Further details of the proposed junction layouts can be found in **Appendix 2**.



FIGURE 3.1: ALBION LAND AXIS J10 – PROPOSED LOCATION & MASTERPLAN

4 2042 REFERENCE CASE – MODEL CHANGES

4.1 To create the 2034 Reference Case (2034 RC3A) model, the following changes have been made to the previous 2031 Reference Case model.

Committed Development – Albion Land

Link/Connector Structure

4.2 To include the committed Albion Land development, the proposed junction improvements at Baynard's Green roundabout, along with the eastern and western site accesses have been coded into the model.

4.3 The updated layout in the model is shown in **Figure 4.1**, **Figure 4.2** and **Figure 4.3.**

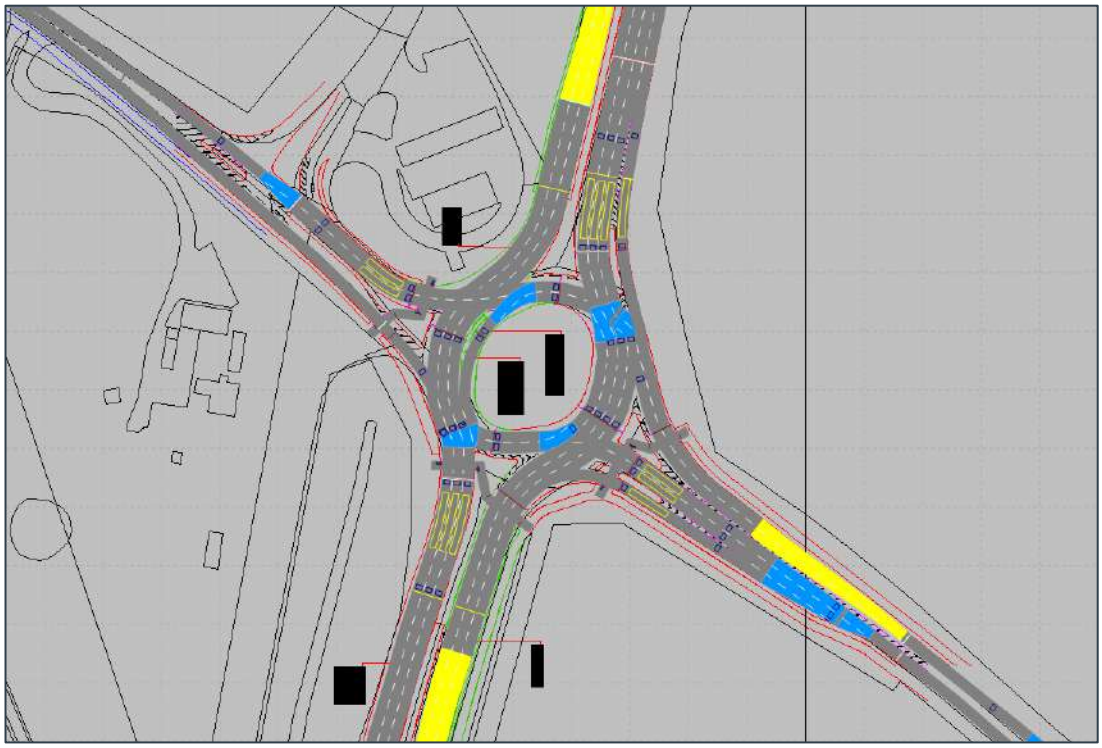


FIGURE 4.1: ALBION LAND – BAYNARD'S GREEN LAYOUT

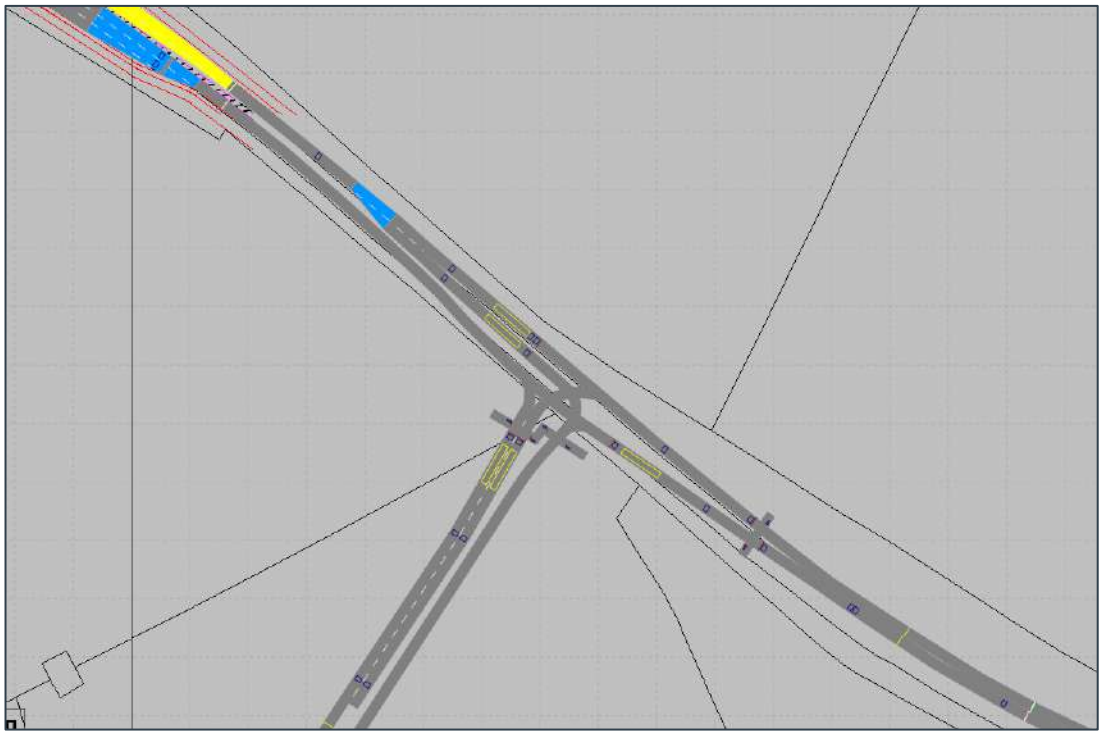


FIGURE 4.2: ALBION LAND – EASTERN ACCESS JUNCTION



FIGURE 4.3: ALBION LAND – WESTERN ACCESS JUNCTION

Signal Control

4.4 For the signal control associated with the updated Baynard's Green roundabout and new eastern site access junction, a MOVA control operation has been assumed.

4.5 A supporting LinSig model of the likely operation of the junctions has been provided by ADC Infrastructure Ltd, which has been converted into MOVA control through the creation of a number of datasets[3] to control the various junction streams.

4.6 At the Baynard's Green roundabout, a separate stream has been modelled for each approach node, with a further three streams included for each of the pedestrian crossings on the B4100 East, A43 South and B4100 West exits. Our signal engineer has reviewed the model operation and applied the necessary linking to mimic the most likely on-street operation (with acknowledgement of the limitations to which specialist functions can be applied in PC MOVA compared to a full MOVA implementation).

[3] All MOVA datasets created by dedicated signal engineering specialist

4.7 For the Eastern access of the Albion Land development, two streams have been modelled. One for the main junction and a separate stream for the pedestrian crossing on the B4100 East exit. Whilst there are no demands modelled for this crossing, the inclusion of the configuration was felt appropriate should there be a requirement to test any demands from the crossing in future.

Simulation Resolution

4.7.1 Another notable change to the model set up involves the change in the simulation resolution from 10 to 6-time steps per second. This is based on TfL guidance (where the recommended minimum value is 5) and is line with the number of decisions a human can realistically make in 1 second according to large-scale study[4]. An even number for the resolution was required for VISSIM to be correctly configured with PC MOVA.

4.7.2 The reduction in the simulation resolution was also found to be favourable in the reliability of running the model with PC MOVA-connected signals, where 'losing connection' and 'not responding' errors were much more infrequent than has been experienced at higher simulation resolutions.

Traffic Flows

4.8 Traffic flow outputs from the Bicester Transport Model (BTM) have been provided by ADC Infrastructure Ltd. These peak hour flows for light and heavy vehicles have been converted into 15-minute origin-destination (O-D) matrices for the warm-up, peak and cool-down periods, based on the same proportional demands as the 2017 base model.

4.9 Further details of the flow conversion can be found in **Appendix 3**.

Scenario Management

4.10 The project explorer has been updated with a number of additions/amendments, detailed as follows.

[4] A study of over 81 million individual tests has highlighted that the average (median) number of decisions a human can realistically make is ~4-5, based on a reaction time of 200-250 milliseconds (273 minus estimated electrical interaction [redacted]

Modification Files

4.11 Modification file number 6 has been updated to include the committed development schemes associated with the Albion Land development (Baynard's Green roundabout changes and East, West site access junctions).

4.12 Modification file numbers 7,8,11,12,15 & 16 have been added to include flows for the following:

Modifications 7 & 8	2034 RC3A [Reference Case Completion Year]
2034 Reference Case with committed and allocated development and infrastructure in place by 2034 (in accordance with the proposed Cherwell Local Plan 2042 consultation and including the Albion Land development and M40 J9 improvement scheme associated with live planning application 25-00284-F).	
Modifications 11 & 12	2031 RC2A [Reference Case Opening Year]
2031 Reference Case with committed and allocated development and infrastructure in place by 2031 (in accordance with the proposed Cherwell Local Plan 2042 consultation) and including the Albion Land development.	
Modifications 15 & 16	2031 RC1A [DfT Circular 01/2022 compliant scenario]
2031 Reference Case with committed and allocated development and infrastructure (as per definition given at Footnote 21 of the Circular) and including the Albion Land development.	

4.13 Modification numbers 9, 10, 13, 14, 17 & 18 have been created for internal modelling purposes and allow the dynamic assignment parameters to be changed and saved, without a '*<generated automatically>*' modification being created when making changes within a scenario itself.

Scenarios

4.14 Scenarios 3, 4, 5, 6, 7 & 8 have been created to model the following scenarios:

- 2034 RC3A: Scenarios 3 & 4
- 2031 RC2A: Scenarios 5 & 6
- 2031 RC1A: Scenarios 7 & 8

IT SHOULD BE NOTED THAT, AT THIS TIME, ONLY BTM OUTPUTS FOR THE 2034 RC3A SCENARIO HAVE BEEN PROVIDED AND THEREFORE ONLY RESULTS FOR THIS SCENARIO ARE PRESENTED IN SECTION 4 OF THIS NOTE.

Accounting for AECOM's Base Model Update Changes

4.15 During a Transport Working Group meeting that ADC attended in March 2025 with other stakeholders involved in the proposed SRFI development, it was learnt from National Highways that the M40 J10 base model had been updated by AECOM in 2023 to address unrealistic queuing southbound into Ardley roundabout. The update included making model changes and undertaking a recalibration and revalidation exercise. The associated technical note is provided in **Appendix 4**.

4.16 Modelling Group have reviewed the changes made and have adopted the following into the future year modelling being undertaken for the proposed Oxford SRFI development:

- Priority Rules
  - No's 88 & 101 – gap time reduced from 4.0s to 3.5s
  - No's 89 & 100 – gap time reduced from 4.5s to 4.0s
  - No's 10 & 98 – gap time reduced from 3.3s to 3.2s
  - No's 9 & 58 – gap time reduced from 3.8s to 3.7s
  - No's 143, 145 & 147 – gap time increased from 3.0s to 3.5s
- No's 144, 146 & 148 – gap time increased from 3.5s to 4.0s
  - No's 154 & 155 – deleted from network
- Reduced Speed Areas
  - No's 102 & 103 – position amended from 10m to 0.5m and length adjusted from 20m to 29m.
  - Link 59 updated to shorten connector 10064 and new RSAs (no's 138 & 139) added to link 59 (position 483.3m, length 39m).

4.17 There were a number of other changes made by AECOM in the base model, but these have not been included the updated Reference Case model. The changes and justification are as follows:

- Connector 10041 – the surcharge has not been added as the link structure was changed as part of Modelling Group's initial base model update. This removed the two single-lane connectors and used a single two-lane connector instead. As such, the surcharge could not be applied.

- The VISSIM version has been retained as V2021 - Service Pack 07, as this was the version used for Modelling Group's initial base model update and any update would invalidate the approved base model.
- The version of PC MOVA has not been changed, as the latest version is already being used.

5 2034 REFERENCE CASE – OUTPUT CONFIGURATION

Outputs Obtained

5.1 To understand the performance of the 2034 RC3A scenario, the following outputs have been obtained:

- Journey Times
- Queue Lengths
- Junction Performance – Average Vehicle Delay
- Network Performance – Latent Demand
- Network Performance – Total Delay

Journey Times

5.2 For the journey times, route sections have been collected. These are consistent with those previously collected in AECOM's M40 J10 study note and can be seen in **Figure 5.1**.

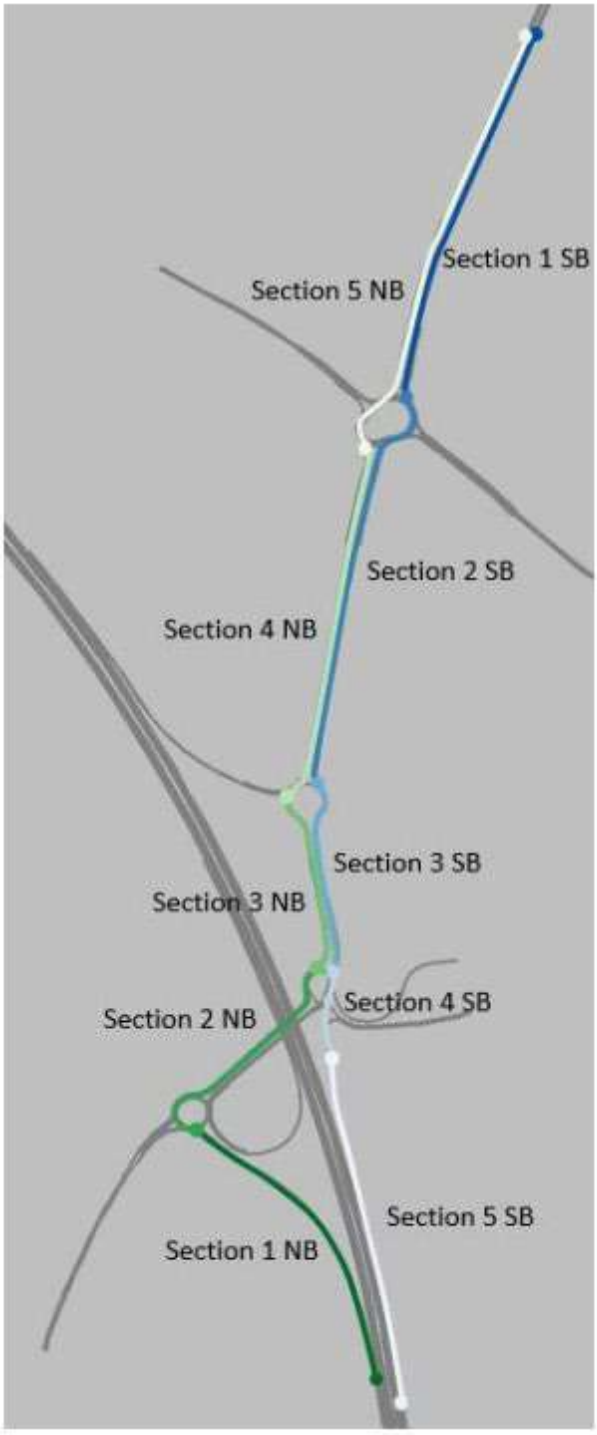


FIGURE 5.1: JOURNEY TIME ROUTES

Queue Lengths

5.3 The queue lengths have been obtained from each approach at each junction in the model, shown in **Figure 5.2**.

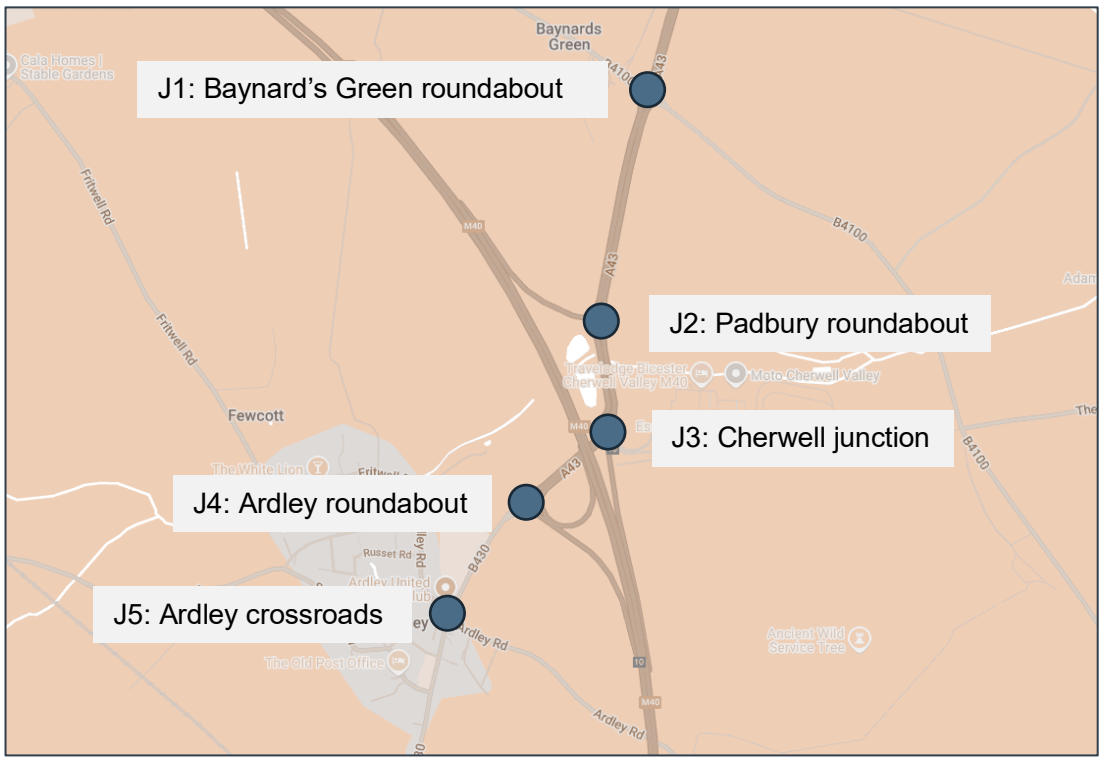


FIGURE 5.2: QUEUE LENGTH ANALYSIS LOCATIONS

5.4 For each of the junction approaches, the mean-mean and mean-maximum queue length has been collected, to gain an understanding of the level of queuing in the network.

Junction Performance – Average Vehicle Delay

5.5 For each movement at each of the junctions, the average delay per vehicle has been obtained to provide an overview of the delays experienced by vehicles on the various movements around the network.

Network Performance – Latent Demand

5.6 The total latent demand (total number of vehicles unable to enter the network due to queuing and/or congestion) has been recorded for comparison with the other scenarios.

6 2034 REFERENCE CASE – MODEL CONVERGENCE

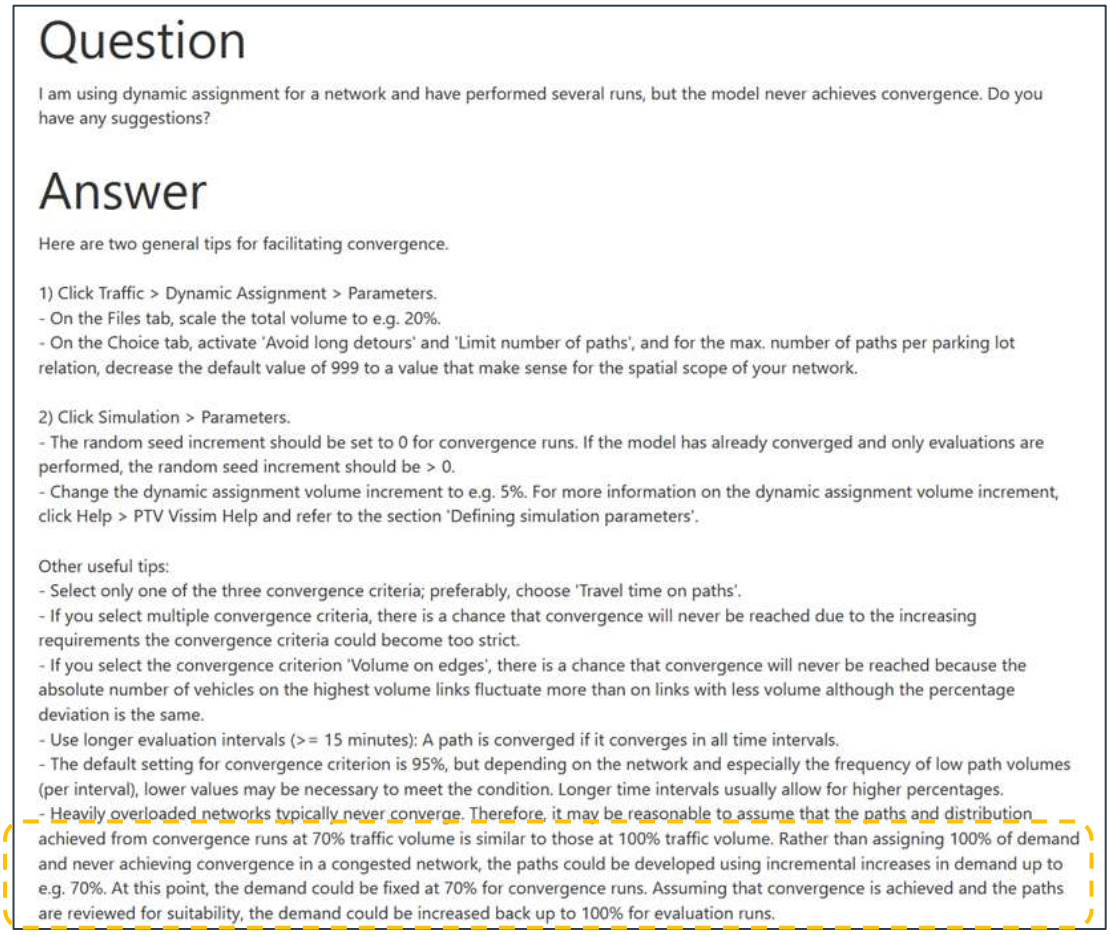
6.1 As the model has been developed using the dynamic assignment module, there was a need to ensure that the model was suitably converged before any results were obtained.

6.2 After an initial batch run to build up path (*WEG) and cost (*BEW) files for the AM and PM peaks, the 2034 RC3A models were then run for convergence.

6.3 The convergence results for the AM and PM peaks are provided in **Appendix 5** and show that the AM peak converged after 46 runs and the PM peak converged after 40 runs, both run with 80% of the total demand.

6.4 The reduced level of demand to achieve convergence was in line with guidance provided by PTV, where it is stated that for congested networks, running the models with lower traffic demands to achieve convergence can produce the same paths and distribution

(see **Figure 6.1** and website [redacted]



Question

I am using dynamic assignment for a network and have performed several runs, but the model never achieves convergence. Do you have any suggestions?

Answer

Here are two general tips for facilitating convergence.

1) Click Traffic > Dynamic Assignment > Parameters.
- On the Files tab, scale the total volume to e.g. 20%.
- On the Choice tab, activate 'Avoid long detours' and 'Limit number of paths', and for the max. number of paths per parking lot relation, decrease the default value of 999 to a value that make sense for the spatial scope of your network.

2) Click Simulation > Parameters.
- The random seed increment should be set to 0 for convergence runs. If the model has already converged and only evaluations are performed, the random seed increment should be > 0.
- Change the dynamic assignment volume increment to e.g. 5%. For more information on the dynamic assignment volume increment, click Help > PTV Vissim Help and refer to the section 'Defining simulation parameters'.

Other useful tips:
- Select only one of the three convergence criteria; preferably, choose 'Travel time on paths'.
- If you select multiple convergence criteria, there is a chance that convergence will never be reached due to the increasing requirements the convergence criteria could become too strict.
- If you select the convergence criterion 'Volume on edges', there is a chance that convergence will never be reached because the absolute number of vehicles on the highest volume links fluctuate more than on links with less volume although the percentage deviation is the same.
- Use longer evaluation intervals (>= 15 minutes): A path is converged if it converges in all time intervals.
- The default setting for convergence criterion is 95%, but depending on the network and especially the frequency of low path volumes (per interval), lower values may be necessary to meet the condition. Longer time intervals usually allow for higher percentages.
- Heavily overloaded networks typically never converge. Therefore, it may be reasonable to assume that the paths and distribution achieved from convergence runs at 70% traffic volume is similar to those at 100% traffic volume. Rather than assigning 100% of demand and never achieving convergence in a congested network, the paths could be developed using incremental increases in demand up to e.g. 70%. At this point, the demand could be fixed at 70% for convergence runs. Assuming that convergence is achieved and the paths are reviewed for suitability, the demand could be increased back up to 100% for evaluation runs.

FIGURE 6.1: CONVERGENCE GUIDANCE FROM PTV

7 2034 REFERENCE CASE – MODEL RESULTS

Random Seed Runs

7.1 For both 2034 RC3A peak models, the results have been averaged over 20 runs, starting at seed 42 with an increment of 10.

Journey Times

7.2 The journey time results for the AM and PM peak period are shown in **Figure 7.1** and **Figure 7.2**.

ALL VEHICLES					
2034 Ref Case AM (RC3A)					
JT	Route			Modelled JT	
Marker	From	To	Dist.	Avg.	Trips
1001	SB1 - A43 North	SB1 - Baynards Green	424m	00:00:40	1979
1002	SB2 - Baynards Green	SB2 - Padbury	718m	00:01:08	1874
1003	SB3 - Padbury	SB3 - Cherwell	347m	00:00:53	2154
1004	SB4 - Cherwell	SB4 - M40 On-Slip	154m	00:00:19	1349
1005	SB5 - M40 On-Slip	SB5 - M40	862m	00:00:43	1581
1006	NB1 - M40	NB1 - Ardley	858m	00:04:17	1410
1007	NB2 - Ardley	NB2 - Cherwell	376m	00:00:32	1382
1008	NB3 - Cherwell	NB3 - Padbury	373m	00:00:32	1382
1009	NB4 - Padbury	NB4 - Baynards Green	664m	00:00:59	1443
1010	NB5 - Baynards Green	NB5 - A43 North	521m	00:00:32	1357

FIGURE 7.1: JOURNEY TIME RESULTS – AM

7.3 From **Figure 7.1**, it can be seen that the longest travel times are when travelling northbound from the M40 to the Ardley roundabout (over 4 minutes). All other travel times are in the region of 30-60s.

ALL VEHICLES					
2034 Ref Case PM (RC3A)					
JT	Route			Modelled	
Marker	From	To	Dist.	Avg.	Trips
1001	SB1 - A43 North	SB1 - Baynards Green	424m	00:00:37	1603
1002	SB2 - Baynards Green	SB2 - Padbury	718m	00:00:55	1534
1003	SB3 - Padbury	SB3 - Cherwell	347m	00:00:40	1910
1004	SB4 - Cherwell	SB4 - M40 On-Slip	154m	00:00:16	1281
1005	SB5 - M40 On-Slip	SB5 - M40	862m	00:00:40	1554
1006	NB1 - M40	NB1 - Ardley	858m	00:00:50	1919
1007	NB2 - Ardley	NB2 - Cherwell	376m	00:00:31	1844
1008	NB3 - Cherwell	NB3 - Padbury	373m	00:00:38	1805
1009	NB4 - Padbury	NB4 - Baynards Green	664m	00:02:06	1861
1010	NB5 - Baynards Green	NB5 - A43 North	521m	00:00:33	1831

FIGURE 7.2: JOURNEY TIME RESULTS – PM

7.4 From **Figure 7.2**, it can be seen that the longest travel times are travelling between Padbury and Baynard's Green roundabout in a northbound direction (just over 2 minutes). All other travel times are in the region of 30-60s.

Queue Lengths

7.5 The mean-mean and mean-maximum queue lengths at each of the junctions are shown in **Appendix 6**.

AM Peak

7.6 The main findings in the AM peak are that the queues on the M40 northbound off-slip at the Ardley Roundabout reach back to the M40 mainline for a period of ~30

minutes between 08:05 and 08:35. This will have flow breakdown and safety implications as a result.

7.7 There are also long queues on the A43 North approaches to Padbury and Cherwell, due to the high flow travelling southbound towards the M40.

PM Peak

7.8 In the PM peak, the longest queue is on the A43 South approach to the Baynard's Green roundabout, which builds over the peak hour and affects the northbound throughput at Padbury and Cherwell.

Junction Performance – Average Vehicle Delay

7.9 The junction performance results are shown in **Appendix 7,** with summarising comments as follows.

AM Peak

7.10 In the AM peak, the Baynard's Green roundabout has collectively the highest delays (~40s on average), notwithstanding the reconfiguration and conversion to signals as part of the Albion Land development.

7.11 The greatest delays are on the A43 South approach to Cherwell, which is the result of the high southbound flow on the A43 and the need to provide more green time to this approach.

PM Peak

7.12 In the PM peak, the Baynard's Green roundabout again has collectively the highest delays (~40s on average), notwithstanding the reconfiguration and conversion to signals as part of the Albion Land development.

7.13 The greatest delays are on the A43 South approach to Cherwell, which is the result of the northbound queuing back from the Baynard's Green roundabout.

Network Performance – Latent Demand

7.14 The latent demand figures for the AM and PM peak periods are shown in **Figure 7.3** and **Figure 7.4**.

No.	Entry	2034 Ref Case AM (RC3A) Average Latent Demand					
		0645-0715	0715-0745	0745-0815	0815-0845	0845-0915	TOTAL
1	A43 North	0	0	0	0	0	**0**
3	B4100 East	0	0	0	0	0	**0**
5	Cherwell Services	0	0	0	0	0	**0**
7	M40 South	0	0	0	0	0	**0**
9	B430 South	0	0	0	0	0	**0**
11	M40 North	0	0	0	0	0	**0**
13	B4100 West	0	0	0	0	0	**0**
15	Ardley Rd West	0	0	0	0	0	**0**
17	Ardley Rd West	0	0	0	0	0	**0**
19	Albion Land - East	0	0	0	0	0	**0**
21	Albion Land - West	0	0	0	0	0	**0**

FIGURE 7.3: LATENT DEMAND SUMMARY – AM

7.15 In the AM peak, there is no latent demand, with all of the traffic able to enter the network and complete their journey.

No.	Entry	2034 Ref Case PM (RC3A) Average Latent Demand					
		1530-1600	1600-1630	1630-1700	1700-1730	1730-1800	TOTAL
1	A43 North	0	0	0	0	0	**0**
3	B4100 East	0	0	0	0	0	**0**
5	Cherwell Services	0	0	0	0	0	**0**
7	M40 South	0	1	0	1	0	**2**
9	B430 South	0	0	0	0	0	**0**
11	M40 North	0	0	0	0	0	**0**
13	B4100 West	0	0	0	0	0	**0**
15	Ardley Rd West	0	0	0	0	0	**0**
17	Ardley Rd West	0	0	0	0	0	**0**
19	Albion Land - East	0	0	0	0	0	**0**
21	Albion Land - West	0	0	0	0	0	**0**

FIGURE 7.4: LATENT DEMAND SUMMARY – PM

7.16 The PM peak also shows a very small amount of latent demand on the M40 South, which is attributed to the stochastic nature of how the flows are input into the model. The numbers are negligible and will not have any impact on the conclusions drawn from the modelled results obtained.

8 2034 REFERENCE CASE – VISUAL ANALYSIS

8.1 To further demonstrate the performance of the 2034 RC3A scenario, screenshots of the network during the middle of the AM and PM peak periods (08:15 and 17:00 respectively) have been obtained. The random seeds used as those which show the runs closest to the average vehicle delay, therefore representing 'typical' conditions.

8.2 The vehicles are colour-coded based on speed, with green being a free-flow speed and red being very slow speed/stationary vehicle.

8.3 Further screenshots for each 15-minutes within the peak hour are provided in **Appendix 8** for reference.

Baynards Green Roundabout

AM Peak

8.4 The visual observations in the AM and PM peaks are shown in **Figure 8.1**.



FIGURE 8.1: BAYNARD GREEN – SEED 122 – AM

PM Peak

8.5 The visual observations in the PM peak are shown in **Figure 8.2**.



FIGURE 8.2: BAYNARD GREEN – SEED 192 – PM

Padbury Roundabout & Cherwell Junction

AM Peak

8.6 The visual observations in the AM peak are shown in **Figure 8.3**.

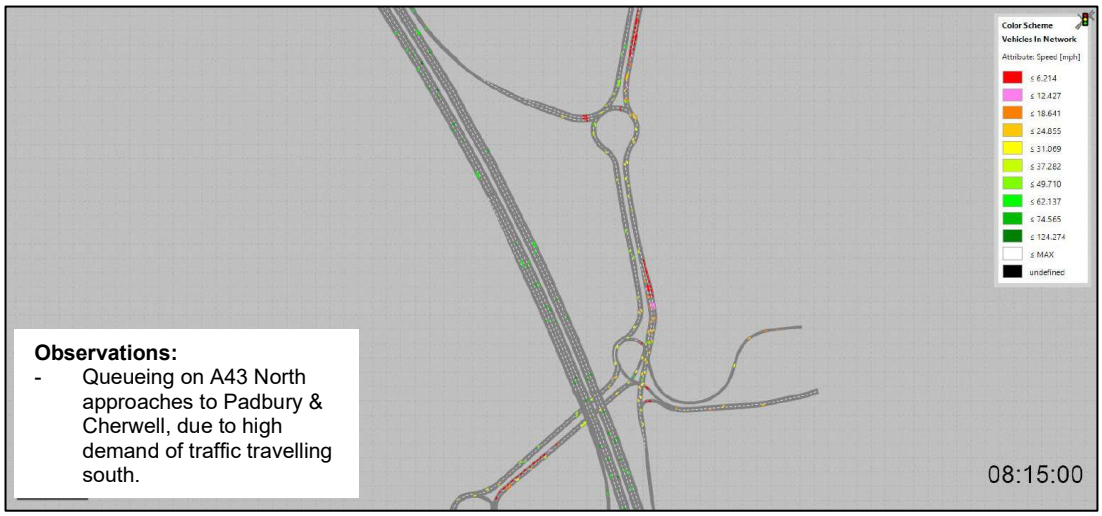


FIGURE 8.3: PADBURY & CHERWELL – SEED 122 – AM

PM Peak

8.7 The visual observations in the PM peak are shown in **Figure 8.4**.



FIGURE 8.4: PADBURY & CHERWELL – SEED 192 – PM

Ardley Roundabout

AM Peak

8.8 The visual observations in the AM peak are shown in **Figure 8.5**.



FIGURE 8.5: ARDLEY – SEED 122 – AM

PM Peak

8.9 The visual observations in the PM peak are shown in **Figure 8.6**.

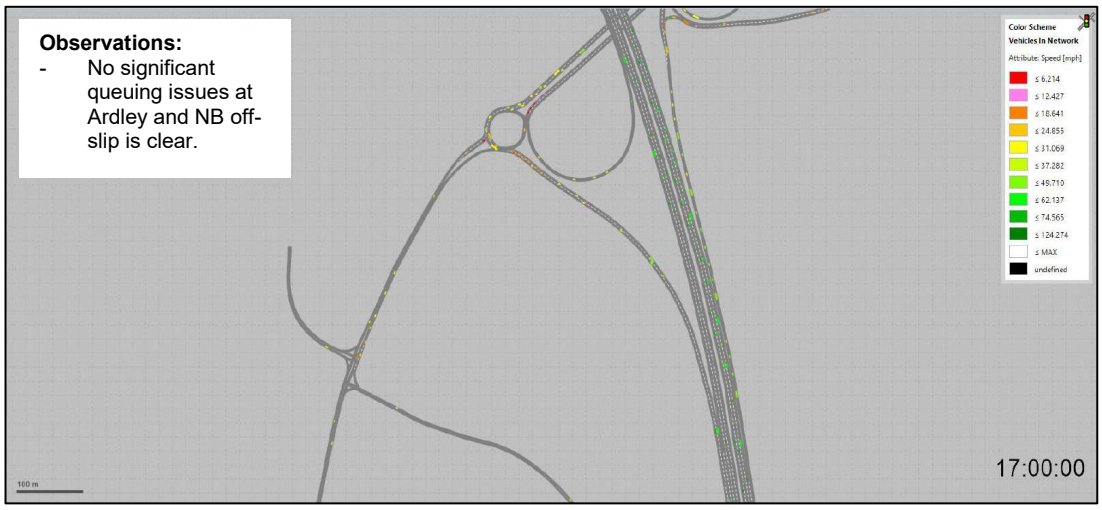


FIGURE 8.6: ARDLEY – SEED 192 – PM

9 SUMMARY & CONCLUSIONS

9.1 This Technical Note summarises the model changes and results obtained for the 2034 Reference Case scenario, as part of the proposed Oxfordshire Strategic Rail Freight Interchange (OxSRFI) development.

9.2 The updated Reference Case model was to account for the recommencement of the OxSRFI project and the need to include updated flows from the Bicester Transport Model, along with flows and network improvements associated with the committed Albion Land Axis J10 development.

9.3 The 2034 Reference Case (RC3A) results show that updated Baynard's Green roundabout will show no notable issues in the AM peak but does have long queues back from the A43 South approach in the PM peak. This is a result of the high northbound demand, along with the need from the new signals at Baynard's Green to balance out the queues and delays on the other approaches.

9.4 In the AM peak, away from the Baynard's Green operation, queues from the M40 northbound off-slip at Ardley roundabout reach back to the mainline for a period of time, which will lead to flow breakdown and safety issues.

9.5 In the PM peak, there are no other notable issues in the network aside from the queuing from Baynard's Green roundabout travelling northbound.

9.6 Despite the impacts on the network, the 2034 RC3A scenario is considered a representative baseline in which to compare the proposed OxSRFI proposals.

APPENDIX 1 – PREVIOUS MODEL CHANGES TN

Prepared by:	[redacted]	Reviewed by:	[redacted]
Client:	ADC Infrastructure Ltd	Date:	01 March 2023

MG0163 – Oxford SRFI – Summary VISSIM Model Changes – Reference Case_v2

1 INTRODUCTION

1.1 This Technical Note (TN) summarises the key changes made to the approved M40 J10 base VISSIM model to create the 2031 Reference Case models for the proposed Strategic Rail Freight Interchange (SRFI) known as Oxford SRFI.

1.2 The original Reference Case model was approved by National Highways (NH) in May 2022. However, since then, the previously committed scheme at Baynards Green Roundabout has been withdrawn by Oxfordshire County Council (OCC). This was included in the original Reference Case model. As a result, a revised Reference Case model was required to be developed, that excluded any proposed works at the Baynards Green Roundabout.

1.3 The flows in the Reference Case model have also been updated, which have now been based on the Bicester Transport Model (BTM). The strategic BTM allows for a more informed flow-set to be used in the VISSIM model, accounting for any reassignment and/or re-routing as a result of the proposed schemes.

1.4 This document has therefore been produced to detail the new change made to the model for auditing purposes. For details of the previous changes, Modelling Group's original changes TN can be found in **Appendix A**.

1.5 It should be noted that the VISSIM model file includes a 2026 opening year traffic flow-set, in additional to the 2031 flow-set. However, the opening year has been recently revised to 2028 and subsequently, the 2026 flows will be updated in due course. As such, the focus of the audit should be on the 2031 Reference Case scenario only.

2 KEY CHANGES MADE

2.1 The following headings provide details on the key changes made from the 2017 base model to create the 2031 Reference Case VISSIM models.

2.2 The main difference from the base model is the addition of committed improvements proposed by OCC at the Padbury Roundabout.

2.3 As the base model had previously been approved by National Highways, it was felt that it was more appropriate (and an easier process) to go back to the base model and add in Padbury, rather than remove the Baynards Green improvement from the previous Reference Case modelling.

2.4 A full breakdown of the changes made to the updated Reference Case model can be found in **Appendix B**.

Scenario Management

Modification Files

2.5 Modification File No. 6 ('Committed Infrastructure') has been created to code in the committed improvement at the Padbury Roundabout.

2.6 Modification File No's 7 & 8 ('2031 AM/PM Ref Case Flows') have been created to update the origin-destination (O-D) matrices to account for the 2031 future year.

2.7 Modification Files 9 & 10 ('SC3/4 DynAssignEdits') have been created for internal modelling purposes and allow the dynamic assignment parameters to be changed and saved, without a '*<generated automatically>*' modification being created when making changes within a scenario itself.

Scenarios

2.8 Scenario No's 3 & 4 have been created to model the 2031 AM/PM Reference Cases.

Backgrounds

2.9 The following DWG file has been used to code in NH's committed improvements at the Padbury Roundabout:

- HE604237-KIER-GEN-M40_JN10_Z-DR-Z-0100_04.dwg

OD-Matrices

2.10 The modelled 2031 Reference Case flows have been taken from the following spreadsheet:

- 230224 BTM Flows - 2031 REF CASE – VISSIM

2.11 The flows are now based on outputs from the BTM and the spreadsheet translates these outputs into 15-minute O-D matrices for the warm-up, peak-hour and cool-down periods (based on the same proportional demands as the 2017 base model).

2.12 Further details on the calculations of the 2031 Reference Case flows are provided in **Appendix C**.

Motorcycles – Ardley Road Junction

2.13 The motorbike vehicle class has been added to the reduced speed areas at the Ardley Road Junction, which was corrected following an external audit of the original Reference Case model.

Signal Controllers – Padbury

Signal Controllers

2.14 To replicate the new Padbury signals in the Reference Case models, new signal controllers (No's 2 & 3) have been added to the 'Base Network' for the two streams.

2.15 Two new dummy links have also been added, with the relevant detectors added on each of the links for the appropriate signal controller (see **Figure 2.1**).

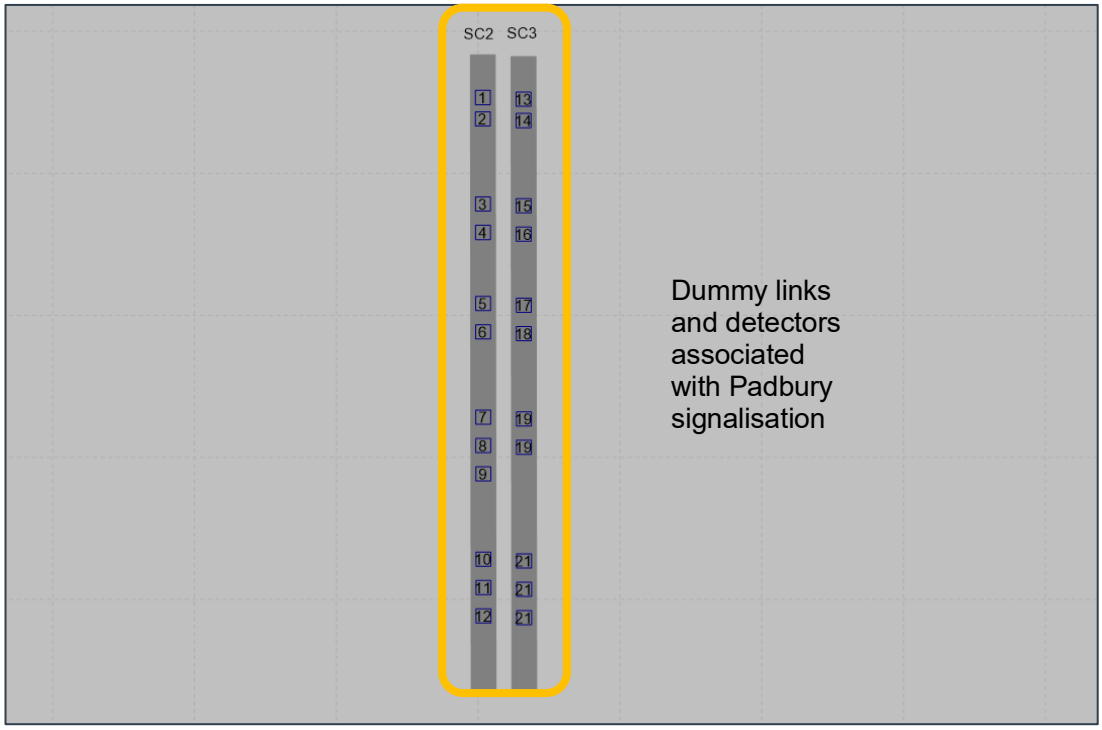


FIGURE 2.1: BASE NETWORK – DUMMY LINK & DETECTOR LAYOUT

2.16 This approach has been taken as if you add or amend a PC MOVA controlled signalised junction in a modification file (for loading into a scenario), the changes do not show up when creating or editing a PC MOVA Connection file. This is because PC MOVA can only read the INP/INPX file (or 'Base Network' in Scenario Management) and not any associated Scenario or Modification files.

PC MOVA Connection File – Cherwell Phase Delays

2.17 Following discussions with National Highways, it was mentioned that the original modelling undertaken by AECOM as part of their M40 J10 study included phase delays at the Cherwell Junction.

2.18 A review of the previously agreed Reference Case model found that these had not been included.

2.19 Therefore, to rectify this issue, the following phase delays were added to the updated Reference Case model, to match those previously included in the AECOM modelling (see **Figure 2.2**).

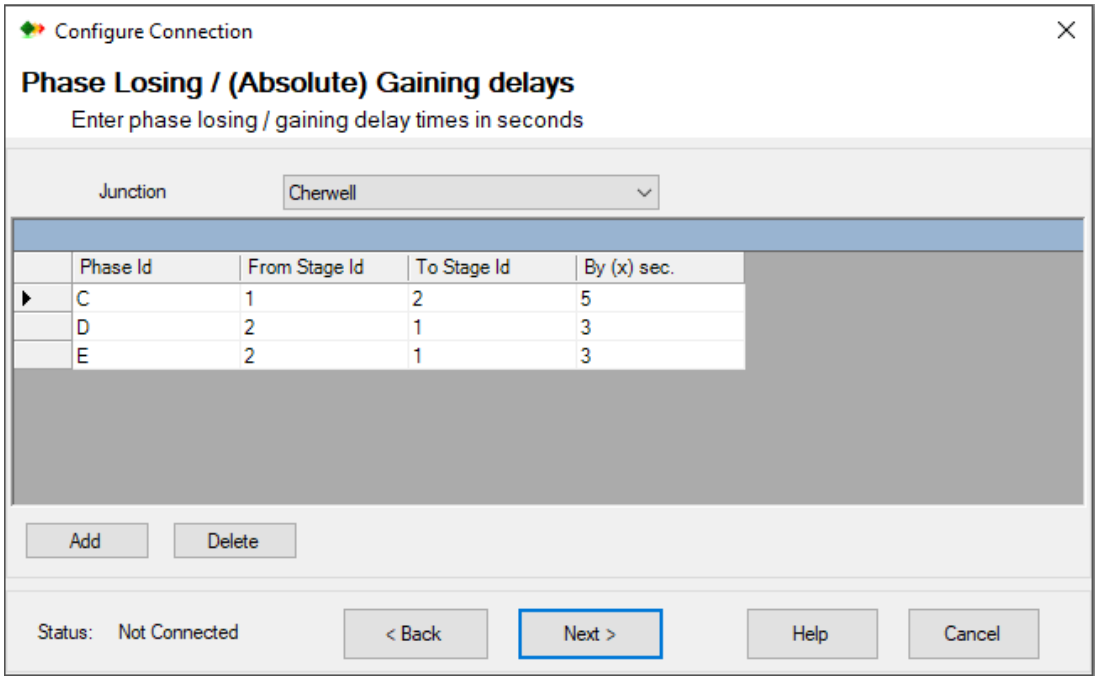


FIGURE 2.2: CHERWELL JUNCTION – PHASE DELAYS

Local Changes – Padbury

Links/Connectors

2.20 As before, the roundabout has been subject to significant changes to the link/behaviour structure. The only difference in this submission is that some of the link/connector numbers are different.

2.21 In the updated model, Links/Connectors 10156, 139, 10157, 140, 10158, 141, 10159, 142, 10160 & 143 have had their behaviour changed from 'Left-Side Rule' to 'Urban (motorised)', whilst the following connectors have different emergency stop values (**Table 2.1**).

No.	Location	Emergency Stop	Lane Change
10061	M40 SB Off-Slip – Left	30m	200m
10062	M40 SB Off-Slip - Right	20m	200m

TABLE 2.1: NOTABLE CONNECTOR CHANGES

Priority Rules

2.22 As before, priority rules have been included to reduce overlapping vehicles. In this model, numbers 135-152 have been included around the junction, which feature a mix of gap times and headways.

Signal Heads & Detectors

2.23 New signal heads (No's 10-18) have been added at the locations of the proposed signalised stop-lines.

Local Changes – Cherwell

Signal Heads & Detectors

2.24 The 'IN' MOVA detectors have been relocated to the two-lane section further upstream (see **Figure 2.3**) and the Cherwell MOVA dataset has been updated to reflect the new detector distances from the stop-line. This was corrected following an external audit of the original Reference Case model.

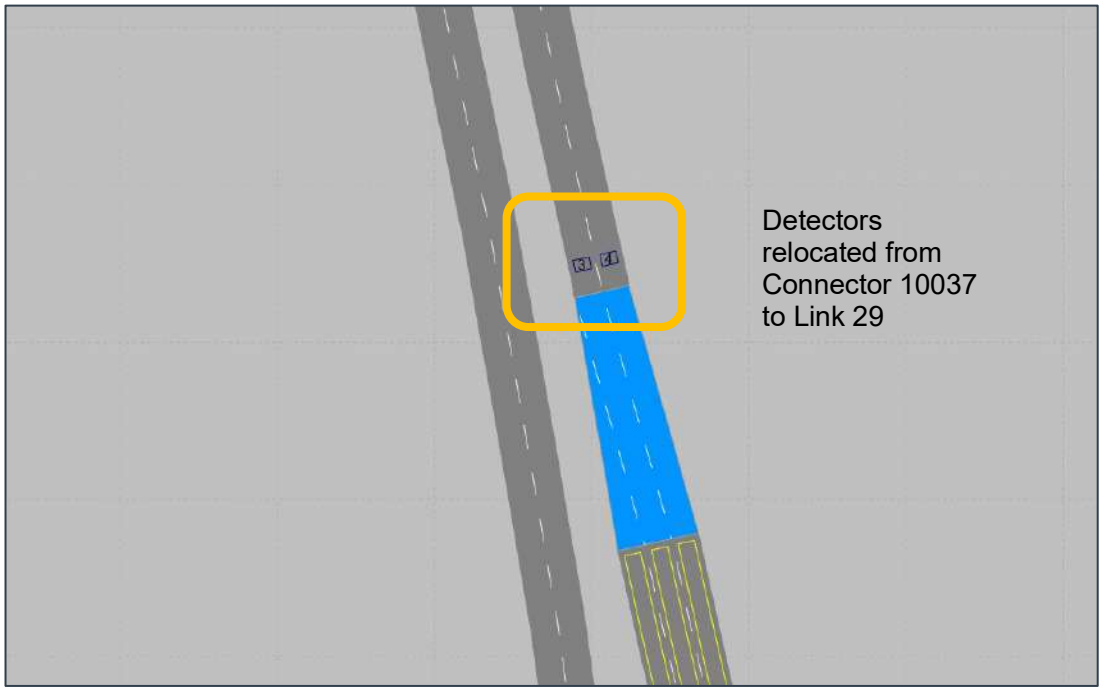


FIGURE 2.3: CHERWELL – A43 NORTH – UPDATED MOVA 'IN' DETECTOR LOCATIONS

Local Changes – Ardley

Priority Rules

2.25 Priority Rule No's 154 & 155 have been added to the M40 NB Off-Slip to reduce instances of overlapping between vehicles entering the roundabout and vehicles exiting to the B430.

2.26 Priority Rule No's 7,8,49 & 50 have been updated to include headway markers on the circulatory. This has been done to reduce the number of overlapping vehicles in congested conditions.

2.27 Priority Rule No's 162, 164 & 165 have been added to the circulatory to reduce the number of overlapping vehicles in congested conditions.

Local Changes – Baynards Green

Priority Rules

2.28 Priority Rule No's 166-178 have been added to the approaches and various circulatory sections at Baynards Green. This has been done to reduce the number of overlapping vehicles in congested conditions.

3 SUMMARY

3.1 This Technical Note (TN) summarises the key changes made to the approved M40 J10 base VISSIM model to create the 2031 Reference Case models for the proposed Strategic Rail Freight Interchange (SRFI) known as Oxford SRFI.

3.2 The original Reference Case model was approved by National Highways (NH) in May 2022. However, since then, the previously committed scheme at Baynards Green Roundabout has been withdrawn by Oxfordshire County Council (OCC). This was included in the original Reference Case model. As a result, a revised Reference Case model was required to be developed, that excluded any proposed works at the Baynards Green Roundabout.

3.3 All parameters and network elements amended have been listed, detailed and explained for auditing purposes.

APPENDIX A – PREVIOUS MODELLING GROUP CHANGES TN

Prepared by:	[redacted]	Reviewed by:	[redacted]
Client:	ADC Infrastructure Ltd	Date:	29 November 2021

MG0163 – Oxford SRFI – Summary VISSIM Model Changes – Reference Case

1 INTRODUCTION

1.1 This Technical Note (TN) summarises the key changes made to the approved M40 J10 base VISSIM model to create the 2031 Reference Case models for the proposed Strategic Rail Freight Interchange (SRFI) known as Oxford SRFI.

1.2 This document has been produced for auditing purposes, to allow the Reference Case VISSIM model development to be understood.

2 KEY CHANGES MADE

2.1 The following headings provide details on the key changes made to create the 2031 Reference Case VISSIM models.

2.2 The main difference from the base model is the addition of committed improvements proposed by National Highways (NH) at the Baynard's Green and Padbury roundabouts.

2.3 A full breakdown of the changes made to the Reference Case models can be found in **Appendix A**.

Scenario Management

Modification Files

2.4 Modification File No. 6 ('Committed Infrastructure') has been created to code in the NH improvements at the Baynard's Green and Padbury roundabouts.

2.5 Modification File No's 7 & 8 ('2026 AM/PM Ref Case Flows') have been created to update the origin-destination (O-D) matrices to account for the 2026 future year.

2.6 Modification File No's 11 & 12 ('2031 AM/PM Ref Case Flows') have been created to update the origin-destination (O-D) matrices to account for the 2031 future year.

2.7 Modification Files 9, 10, 13 and 14 ('SC3/4/5/6 DynAssignEdits') have been created for internal modelling purposes and allow the dynamic assignment parameters to be changed and saved, without a '*<generated automatically>*' modification being created when making changes within a scenario itself.

Mobile [redacted]

Registered Office Crosby Court, 28 George St, Birmingham B3 1QG

Scenarios

2.8 Scenario No's 3, 4, 5 & 6 have been created to model the 2026 AM/PM and 2031 AM/PM Reference Cases.

2.9 It should be noted that whilst the 2026 AM and PM Reference Case scenarios have been created in VISSIM, these have not been tested at this time as there is not an equivalent 2026 flow-set in the previous modelling for comparing outputs results.

Backgrounds

2.10 The following DWG files have been used to code in NH's committed improvements at the Baynard's Green and Padbury roundabouts (see **Appendix B**):

- HE604237-KIER-GEN-M40_JN10_Z-DR-Z-0100_02 – 03.dwg
- HE604237-KIER-GEN-M40_JN10_Z-DR-Z-0100_04.dwg

O-D Matrices

2.11 The modelled 2031 Reference Case scenario flows have been taken from the following spreadsheets:

- 210705 ADC Flows - 2031 REF CASE - VISSIM CONVERSION

2.12 This spreadsheet translates the warm-up and peak hour flow matrices into 15-minute O-D matrices, as well as the creation of two cool-down 15-minute matrices (derived from the same proportional demand as in the 2017 base model).

2.13 Further details on the calculation of the 2031 Reference Case flows are provided in **Appendix C**.

Signal Controllers & MOVA Datasets – Baynard's Green

2.14 The signal set-up for the Baynard's Green roundabout has been based on the set-up as in AECOM's Do-Something 3 VISSIM models. These signals are proposed to be MOVA controlled on site and to mimic this in the model, the signals have been modelled using PC MOVA.

2.15 To ensure consistency, the Reference Case model signals are also modelled using PC MOVA and the same MOVA datasets and detector layout has been used as in AECOM's Do-Something 3 models.

Signal Controllers

2.16 To replicate the new Baynard's Green signals in the Reference Case models, new signal controllers (No's 2, 3, 4 & 5) have been added to the 'Base Network' for the four streams.

2.17 Four new dummy links have also been added, with the relevant detectors added on each of the links for the appropriate signal controller (see **Figure 2.1**).

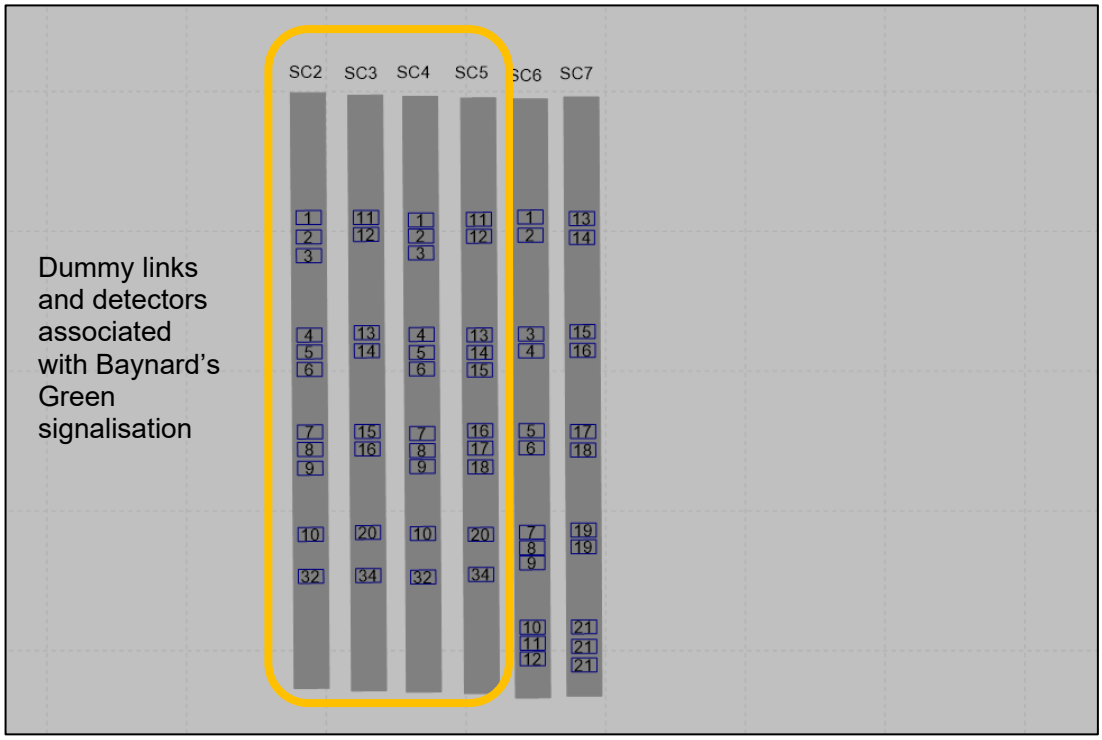


FIGURE 2.1: BASE NETWORK – DUMMY LINK & DETECTOR LAYOUT

2.18 This approach has been taken as if you add or amend a PC MOVA controlled signalised junction in a modification file (for loading into a scenario), the changes do not show up when creating or editing a PC MOVA Connection file. This is because PC MOVA can only read the INP/INPX file (or 'Base Network' in Scenario Management) and not any associated Scenario or Modification files.

2.19 Modelling Group have prepared a note on the use of PC MOVA and Scenario Management, which can be found in **Appendix D**.

MOVA Datasets

2.20 The MOVA datasets used for the NH VISSIM modelling study at M40 J10 have been reviewed and the following changes have been made.

Baynard's Green – Node 1

- Renamed from 'NRBTC1ST1' to 'Bay_NB_St1'
- In MOVA Tools:
  - Set dataset name *to 'Bay_NB_St1'*
  - Updated Design Diagram to suit link/lane layout (see **Figure 2.2**).

Baynard's Green – Node 2

- Renamed 'NRBTC1ST2' as 'Bay_NB_St2'
- In MOVA Tools:
  - Set dataset name to 'Bay_NB_St2'
  - Updated Design Diagram (see **Figure 2.2**).
  - Detectors – Main Detectors – re-numbered the X and Stop-line detectors to follow on from the numbering of the IN detectors.

Baynard's Green – Node 3

- Renamed 'NRBTC2ST1' as 'Bay_SB_St1'
- In MOVA Tools:
  - Set dataset name to 'Bay_SB_St1'
  - Updated Design Diagram (see **Figure 2.2**).
  - Lanes – Lanes: Main – Lane 1 set as 'Short' lane. This has been updated to a 'Normal' lane based on CAD drawing received.
  - Detectors – Main Detectors – to account for Lane 1 now being a 'Normal' lane, added IN Det 1 to this lane and subsequently updated the rest of the detector numbering to follow-on.
  - E/P – Emergency/Priority: Links – updated EP1 detector number from 9 to 10

Baynard's Green – Node 4

- Renamed 'NRBTC2ST2' as 'Bay_SB_St2'
- In MOVA Tools:
  - Set dataset name to 'Bay_SB_St2'
  - Updated Design Diagram (see **Figure 2.2**).
  - Signals
    - Phases – Added a new Phase to account for new Link
    - Stages – Updated to include Phase C in Stage 2 (out of Stage 1) and added Phase F to Stage 1
  - Links – Links: Main
    - Added a new Link 1 to account for 3 lane approach, based on updated drawing
    - Updated Phases to suit additional lane
  - Lanes – Lanes: Main
    - Set Lane 1 to 'Short' lane, with a distance of 87m, based on updated drawing.

- Lanes 2 and 3 – set Lane Weighting factor to 6 instead of 1 (similar to Pad_St1)

- Detectors – Main Detectors
  - Lanes 2 and 3 – Det no's 11 & 12 – updated distance from 100m to 94m
  - Lane 1
    - Removed ALT-UP Detector No. 11 being configured (short lane)
    - Updated X and Stop-line detector numbers (to no's 13 and 16 respectively)
- SD Codes – Set to 1 for Links 4-6 in Stage 1 and 1-3 in Stage 2
  - to account for Lane 1 now being a 'Normal' lane, added IN Det 1 to this lane and subsequently updated the rest of the detector numbering to follow-on.
- E/P – Emergency/Priority: Links – updated EP1 detector number from 9 to 10

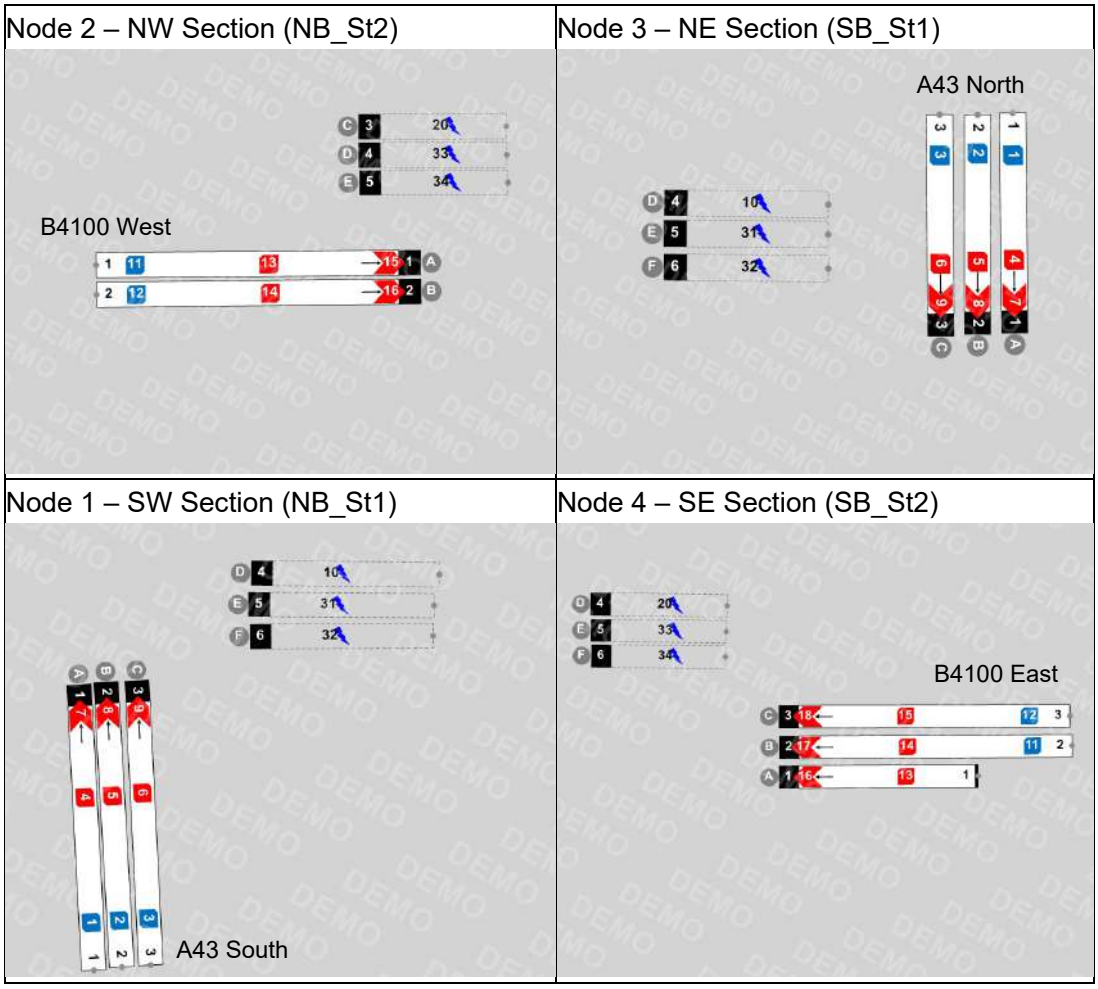


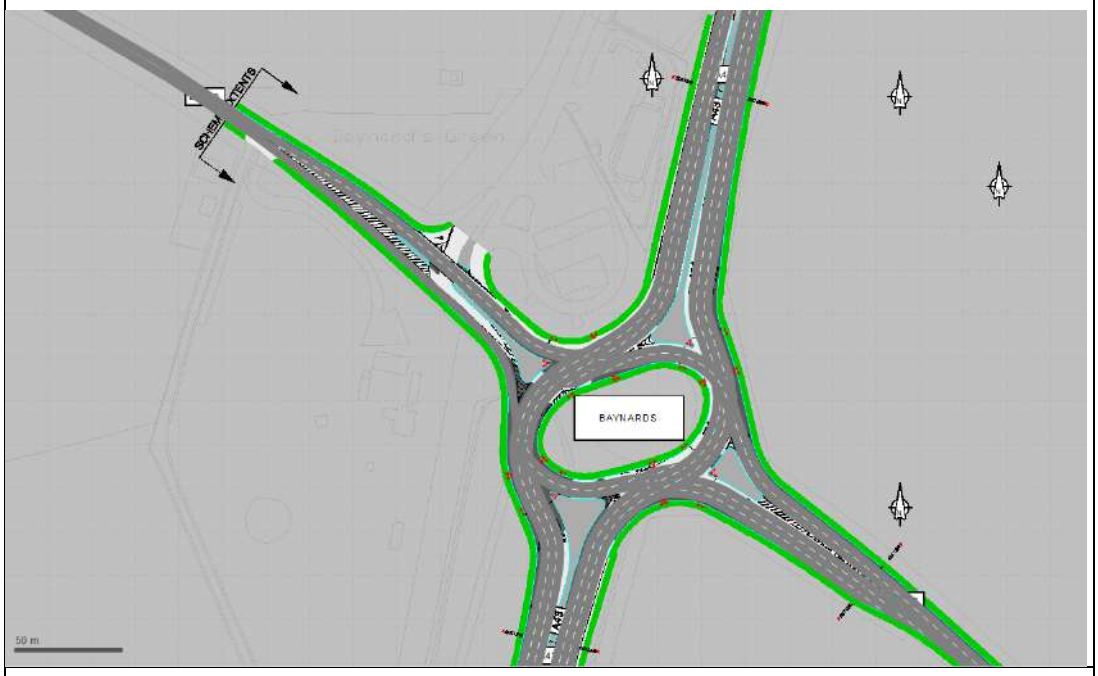
FIGURE 2.2: NODE 1-4 – UPDATED MOVA TOOLS DESIGN DIAGRAMS

Local Changes – Baynard's Green

Links/Connectors

2.21 The roundabout has been subject to significant changes to the link/connector structure, as a result of the number of lanes and anticipated routing around the junction as shown by the lane markings. The new link structure in shown in **Figure 2.3**.

Normal Link View



Wireframe Link View



FIGURE 2.3: BAYNARD'S GREEN – NEW LINK/CONNECTOR STRUCTURE

2.22 As a result of the new link/connector structure, Links 138 & 14 have had their behaviour changed from 'Left-Side Rule' to 'Urban (motorised)'.

2.23 Whilst the majority of the connectors have been kept as the default values for the lane change and emergency stop distances, there are some differences, as detailed in **Table 2.1**.

No.	Location	Emergency Stop	Lane Change
10160	A43 North - Exit	5m	130m
10164	A43 South - Exit	5m	150m
10011	Circulatory – Exit to B4100 East	50m	400m
10172	Circulatory – Exit to B4100 West	50m	400m
10169	Circulatory – South Section	5m	250m
10176	Circulatory – North Section	5m	300m
10170	B4100 East – Left	60m	200m
10171	B4100 East – Ahead	60m	200m
10179	B4100 West – Left	35m	200m

TABLE 2.1: NOTABLE CONNECTOR CHANGES

Desired Speeds & Reduced Speed Areas

2.24 On all four approaches, new desired speed decision markers have been included to account for the additional lanes on the approaches. The positions have been matched to NH's Do-Something 3 model and the speed on the approaches have been amended from 30mph to 40mph to match the NH model.

2.25 On all four approaches, the positions of the reduced speed areas (RSAs) have been adjusted to sit behind the signalised stop-lines. On the A43 North, B4100 East and A43 South approaches, additional RSAs have been added to account for the additional lanes.

Priority Rules & Conflict Areas

2.26 Following a visual assessment of the model with the future year traffic in place, it became quickly apparent that priority rules (PRs) were required to reduce instances of overlapping vehicles and to stop the roundabout locking up during busy periods. As a result, a large number of PRs have been included (No's 136-159, 181-201) around the junction, which feature a mix of gap times and headways, to produce an operation that would be representative of congested conditions.

2.27 Conflict Area No's 497, 476, 454 & 456 have been activated to reduce instances of overlapping vehicles.

Signal Heads & Detectors

2.28 New signal heads (No's 10-30) have been added at the locations of the proposed signalised stop-lines.

2.29 The detectors have been modified to match NH's Do-Something 3 model, as well as the updated MOVA Dataset (MDS) files (see **Figure 2.4**).



FIGURE 2.4: BAYNARD'S GREEN – DETECTOR LAYOUT

2.30 As a result of the changes made to some of the MOVA Datasets (see Section 2.19), the following changes to the detectors have also been made:

SC2 – Bay_NB_St1

- For Detector No. 10 – increased distance from stop-line from 14m to 20m (to account for different design and longer circulatory section)

SC3 – Bay_NB_St2

- Re-numbered detectors to suit updated MDS file
- For Detector No. 20, decreased length from stop-line from 20m to 17m (to account for different design and shorter circulatory section)

SC4 – Bay_SB_St1

- For Detector No's 1-9, updated these to be 1-10 to account for 'normal' traffic link (based on length of lanes shown on updated drawings)
- For Detector No. 10, increased length from stop-line from 9m to 18m (to account for different design and longer circulatory section)

SC5 – Bay_SB_St2

- Added Detector No's 13 and 16 to account for additional lane on approach

Vehicle Inputs, Routes & Parking Lots

2.31 No changes from previously validated base model.

Nodes

2.32 Node No. 1 has been re-sized to account for the increased number of lanes and length of flaring on the approaches. An Edge Selection exercise has also been undertaken to close off all unrealistic movements and U-turns.

Evaluation Markers

2.33 The queue markers have been updated to match the stop-lines on each approach

2.34 The travel time markers have been updated to match the base model as closely as possible.

Signal Controllers & MOVA Datasets – Padbury

Signal Controllers

2.35 To replicate the new Padbury signals in the Reference Case models, new signal controllers (No's 6 & 7) have been added to the 'Base Network' for the two streams.

2.36 Two new dummy links have also been added, with the relevant detectors added on each of the links for the appropriate signal controller (see **Figure 2.5**).

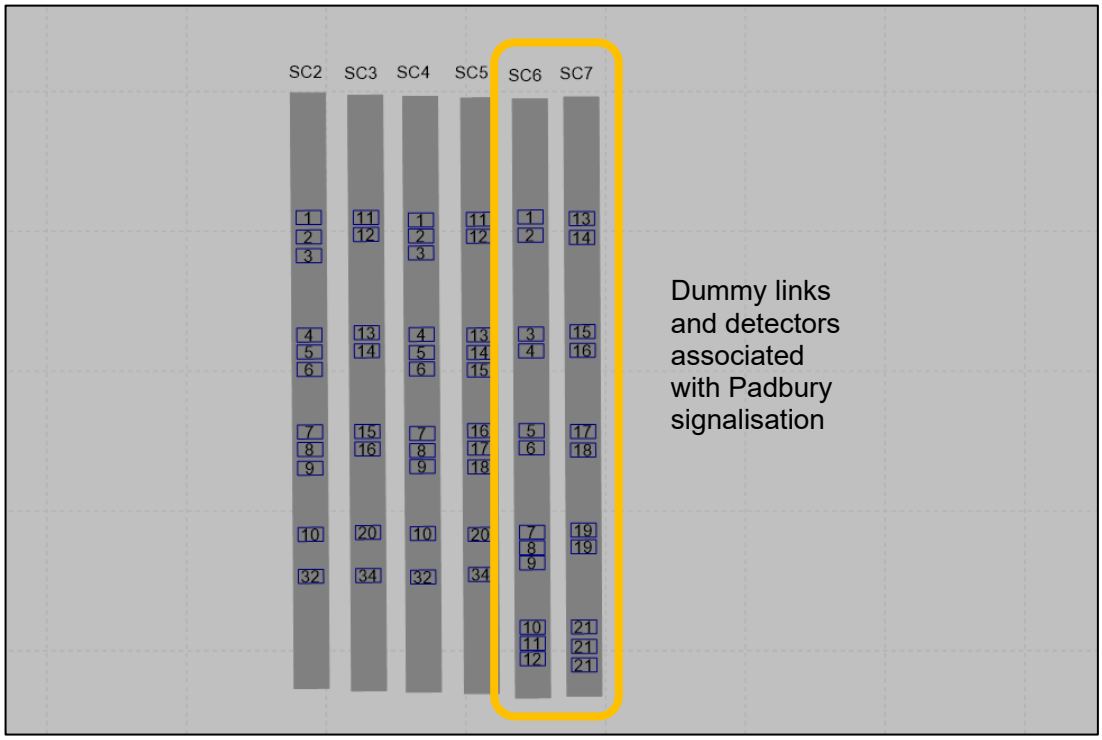


FIGURE 2.5: BASE NETWORK – DUMMY LINK & DETECTOR LAYOUT

2.37 As with the Baynard's Green signalisation, this approach has been taken as if you add or amend a PC MOVA controlled signalised junction in a modification file (for loading into a scenario), the changes do not show up when creating or editing a PC MOVA Connection file. This is because PC MOVA can only read the INP/INPX file (or 'Base Network' in Scenario Management) and not any associated Scenario or Modification files.

2.38 Modelling Group have prepared a note on the use of PC MOVA and Scenario Management, which can be found in **Appendix D**.

MOVA Datasets

2.39 The MOVA datasets used for the NH VISSIM modelling study at M40 J10 have been reviewed and the following changes have been made.

Padbury – Node 1

- Renamed 'M40J10SBslipST1' as 'Pad_S1'
- In MOVA Tools:
  - Set dataset name to 'Pad_S1'
  - Updated Design Diagram (see **Figure 2.6**)
  - Lanes – Lanes: Main – Lane 3 – updated short lane distance from 50m to 62m based on CAD drawing

Padbury – Node 2

- Renamed 'M40J10SBslipST2' as 'Pad_S2'
- In MOVA Tools:
  - Set dataset name to 'Pad_S2'
  - Updated Design Diagram (see **Figure 2.6**)

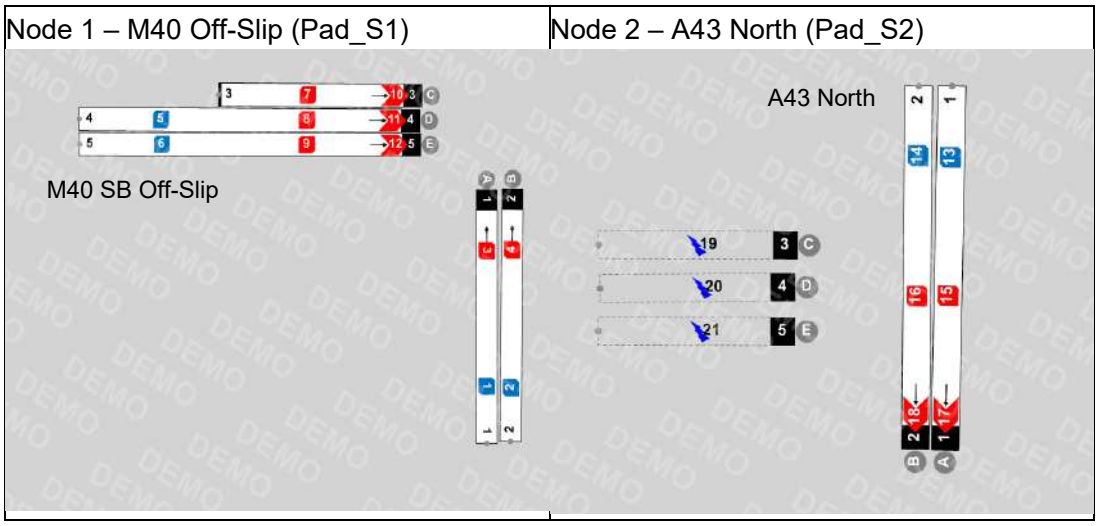


FIGURE 2.6: NODE 1 & 2 – UPDATED MOVA TOOLS DESIGN DIAGRAMS

Local Changes – Padbury

Links/Connectors

2.40 The roundabout has been subject to significant changes to the link/connector structure, as a result of the number of lanes and anticipated routing around the junction as shown by the lane markings. The new link structure in shown in **Figure 2.7**.

Normal Link View



Wireframe Link View

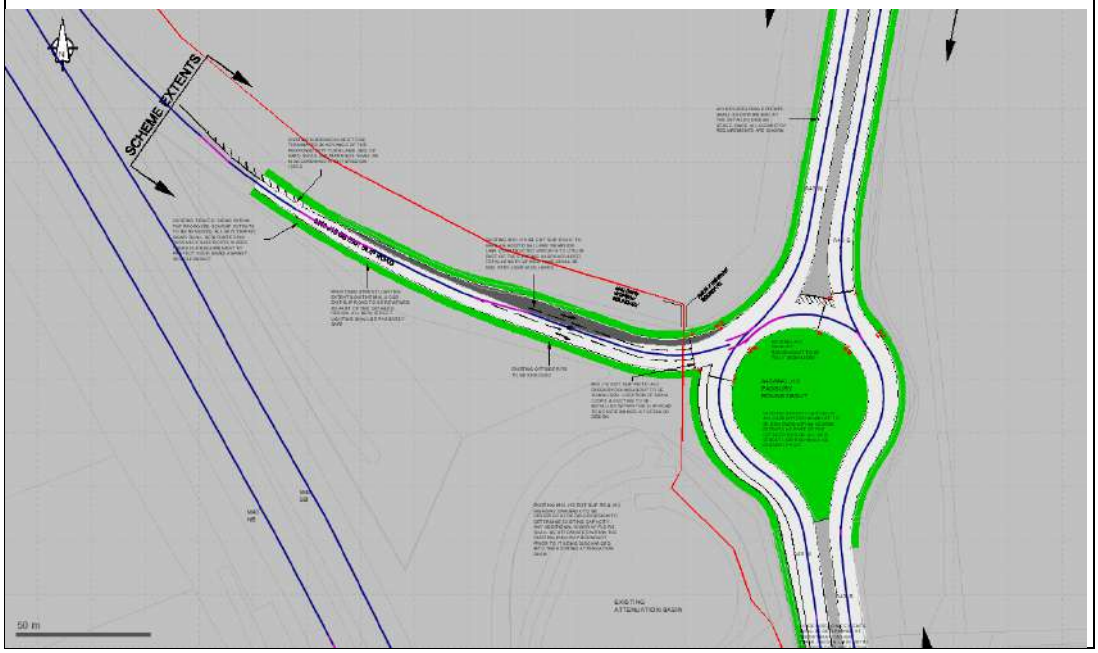


FIGURE 2.7: PADBURY – NEW LINK/CONNECTOR STRUCTURE

2.41 As a result of the new link/connector structure, Links/Connectors 10189, 158, 10190, 159, 10187, 156, 10191, 121 & 1033 have had their behaviour changed from 'Left-Side Rule' to 'Urban (motorised)'.

2.42 Whilst the majority of the connectors have been kept as the default values for the lane change and emergency stop distances, there are some differences, as detailed in **Table 2.2**.

No.	Location	Emergency Stop	Lane Change
10034	M40 SB Off-Slip – Left	30m	200m
10096	M40 SB Off-Slip - Right	20m	200m

TABLE 2.2: NOTABLE CONNECTOR CHANGES

Desired Speeds & Reduced Speed Areas

2.43 On the M40 SB Off-Slip and A43 North approaches, the desired speed decision markers have been repositioned to account for the signalised approaches and on the off-slip, the additional flaring. The positions have been matched to NH's Do-Something 3 model and the speed on the approaches have been amended from 30mph to 40mph to match the NH model.

2.44 On the M40 SB Off-Slip and A43 North approaches, the positions of the reduced speed areas (RSAs) have been adjusted to sit behind the signalised stop-lines. On the M40 SB Off-Slip, an additional RSA has been added for the additional lane. On the North circulatory section, RSA No. 115 has been reduced in length from 20m to 10m, repositioned to sit behind the stop-line and No. 137 has been added to Lane 2.

Priority Rules & Conflict Areas

2.45 Following a visual assessment of the model with the future year traffic in place, it became quickly apparent that priority rules (PRs) were required to reduce instances of overlapping vehicles. As a result, a large number of PRs have been included (No's 160-177) around the junction, which feature a mix of gap times and headways, to produce an operation that would be representative of congested conditions.

2.46 No Conflict Areas have been required to be activated, as the PRs are enough to reduce the instances of overlapping vehicles.

Signal Heads & Detectors

2.47 New signal heads (No's 31-39) have been added at the locations of the proposed signalised stop-lines.

2.48 The detectors have been modified to match NH's Do-Something 3 model (see **Figure 2.8**).

2.49



FIGURE 2.8: PADBURY – DETECTOR LAYOUT

Vehicle Inputs, Routes & Parking Lots

2.50 No changes from previously validated base model.

Nodes

2.51 Node No. 2 has been re-sized to account for the increased number of lanes and length of flaring on the approaches. An Edge Selection exercise has also been undertaken to close off all unrealistic movements and U-turns.

Evaluation Markers

2.52 The queue markers have been updated to match the stop-lines on each approach

Signal Controllers & MOVA Datasets – Cherwell

Signal Controllers

2.53 No changes have been made from the previously validated base model.

MOVA Datasets

2.54 The Cherwell MOVA Dataset (MDS), previously titled 'M40J10.mds' has been renamed 'Cherwell.mds' to distinguish between the other MDS files.

NH Do-Something 3 Set-Up

2.55 It was noted that in NH's Do-Something 3 model, the detector set-up had been changed from the previously validated base model. This also led to a different MDS file being used for the Cherwell junction.

2.56 It was noted in the Do-Something 3 model that there were two sets of detectors overlapping each other on the nearside lane on the A43 North approach. The corresponding MDS file also has four links and lanes for the A43 North approach. It is not clear why this has been done and there is no mention of this change in AECOM's '*M40 Junction 10 TN11 – VISSIM Forecasting Modelling*' note from March 2020. For this testing, the MDS file has been updated to include three links/lanes on the A43 North approach and the number of detectors has been amended to only have one set of detectors in the nearside lane. Further details on the differences can be found in **Appendix E**.

2.57 The new configuration was tested in the Reference Case model, but it became quickly apparent that this set-up was not suitable, as 20 minutes into the AM model warm up period, the queuing northbound from Cherwell had already extended back to the M40 NB Off-Slip approach (**Figure 2.9**) and by 0728hrs, this had extended back to the M40 mainline and was causing long queues on the B430 (**Figure 2.10**).

2.58 As such, the signal set-up for Cherwell has been kept as the validated base model set-up.

2.59



FIGURE 2.9: NORTHBOUND QUEUING – 20 MINUTES INTO AM WARM UP PERIOD

2.60



FIGURE 2.10: NORTHBOUND QUEUING – ~45 MINUTES INTO AM WARM UP PERIOD

Local Changes – Cherwell

Priority Rules

2.61 Priority Rule No. 178 has been added to reduce instances of overlapping between vehicles leaving Cherwell Services and vehicles queuing over the bridge to travel southbound.

Local Changes – Ardley

Priority Rules

2.62 Priority Rule No's 179 & 180 has been added to the M40 NB Off-Slip to reduce instances of overlapping between vehicles entering the roundabout and vehicles exiting to the B430.

Evaluation Markers

2.63 Two new sets of travel time markers have also been included in the model, along with the existing markers from the validated base model.

2.64 One set (No's 1001-1010) which correlates with the markers in AECOM's M40 J10 Study (for comparison) (see **Figure 2.11**) and one set (No's 2001-2081) which are from each O-D pair to allow the various scenario outputs to be compared (see **Figure 2.12**).

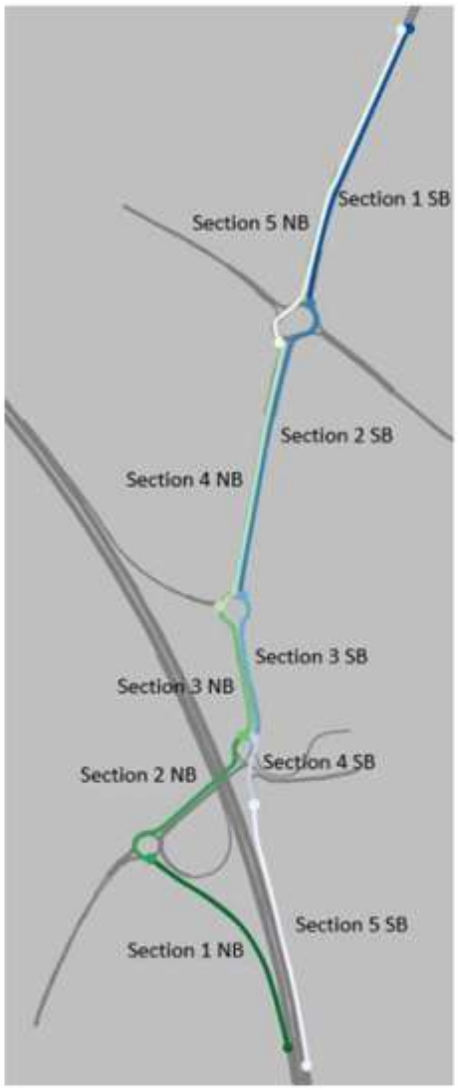


Figure 6. Locations of journey time route sections.

2.65

FIGURE 2.11: JOURNEY TIME SECTIONS – SET 1 – BASED ON AECOM TN

2.66

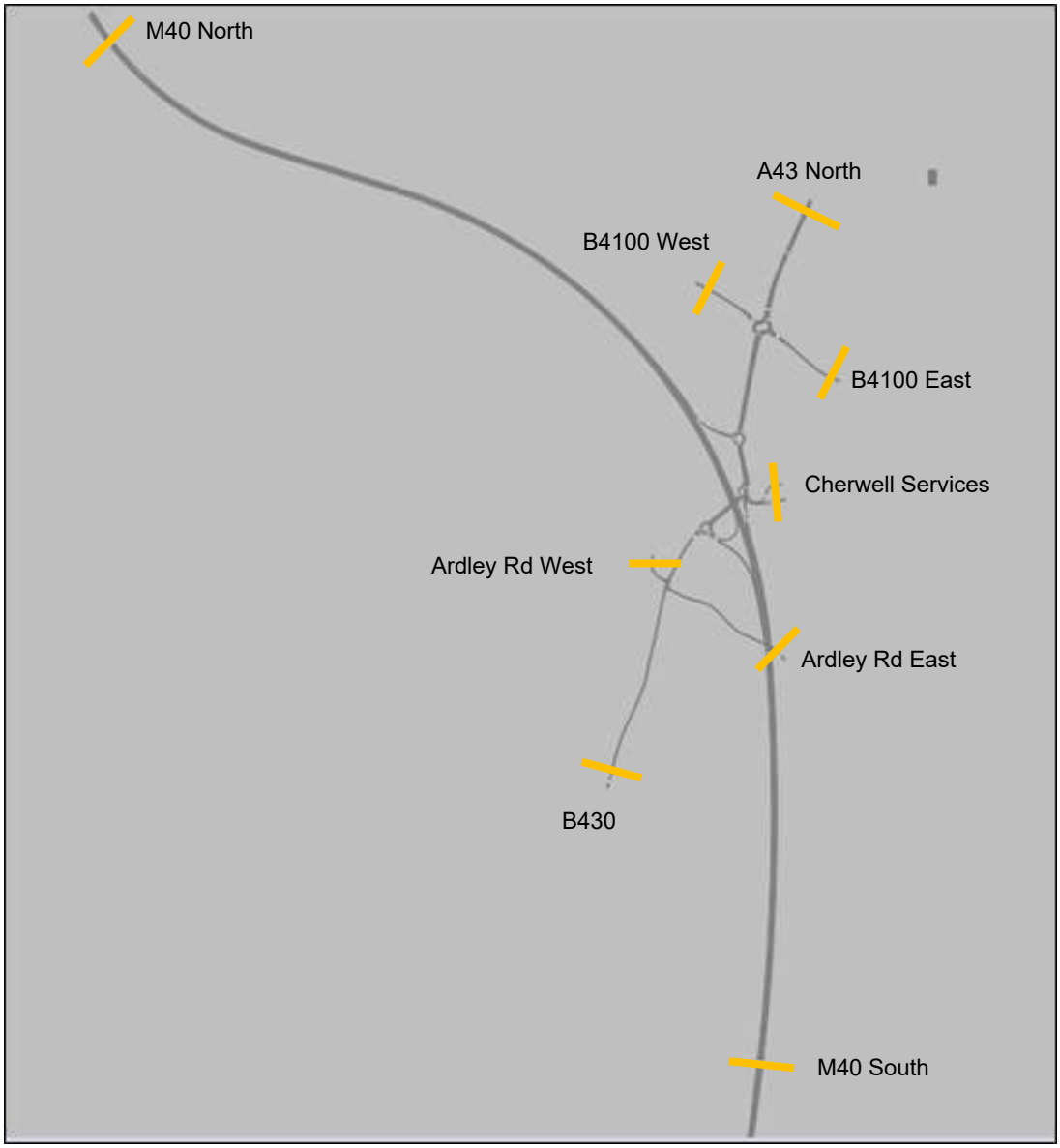


FIGURE 2.12: JOURNEY TIME SECTIONS – SET 2 – ZONE TO ZONE MARKERS

PC MOVA Connection File

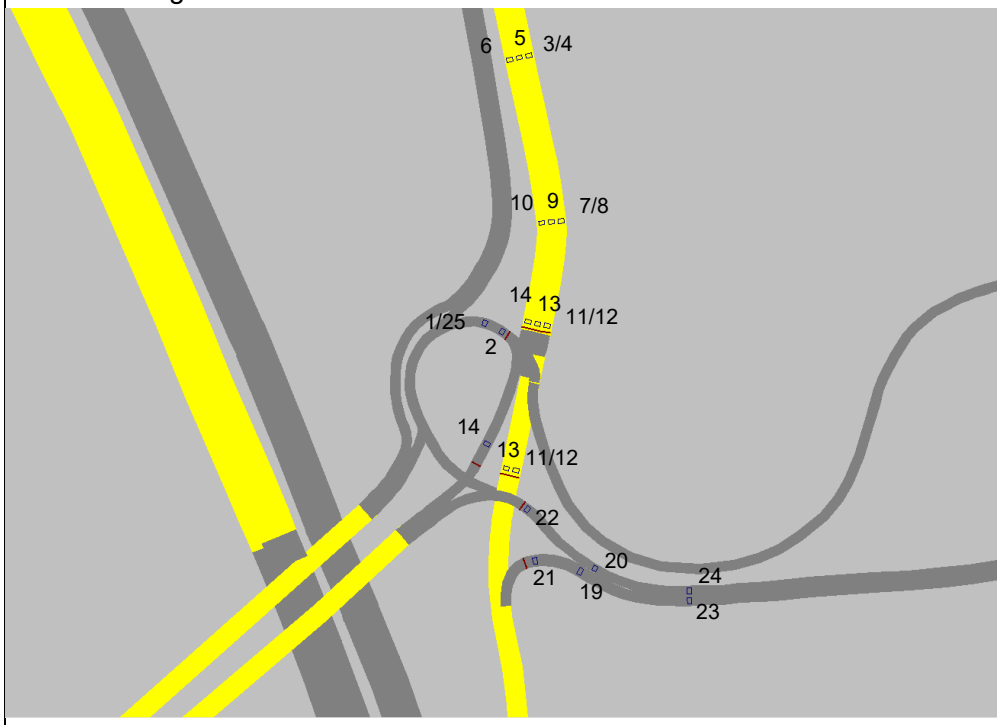
2.67 A new PC MOVA Connection File titled 'M40J10_RefCase.mvml' has been created, which accounts for the new signals at Baynard's Green and Padbury roundabouts.

2.68 As stated in paragraph 2.54, there were differences in the detector set up at the Cherwell junction between the validated base model and the Do-Something 3 model. However, the base model set-up has been retained as this did not cause the same immediate queuing issues northbound (**Figures 2.10 & 2.11**).

2.69 This has led to a slight difference in the PC MOVA Connection File set-up for the Cherwell junction.

2.70 The Detector Mapping differences are shown in **Figure 2.13 and 2.14,** whilst the Queue Detection differences are shown in **Figure 2.15**.

Do-Something 3 Model



Reference Case Model

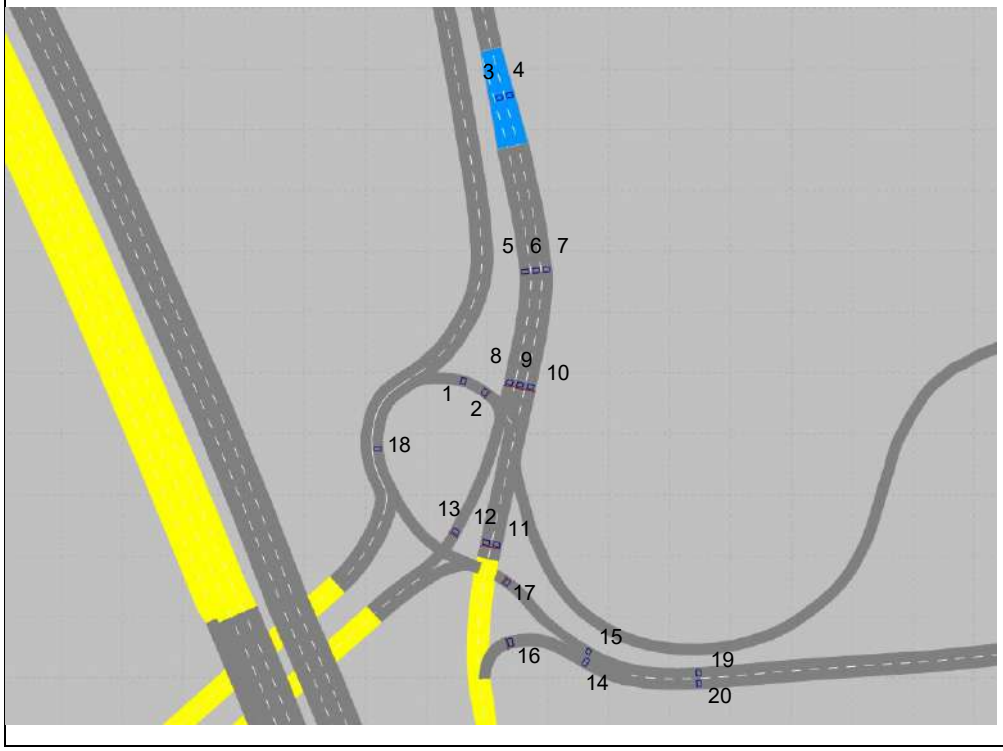
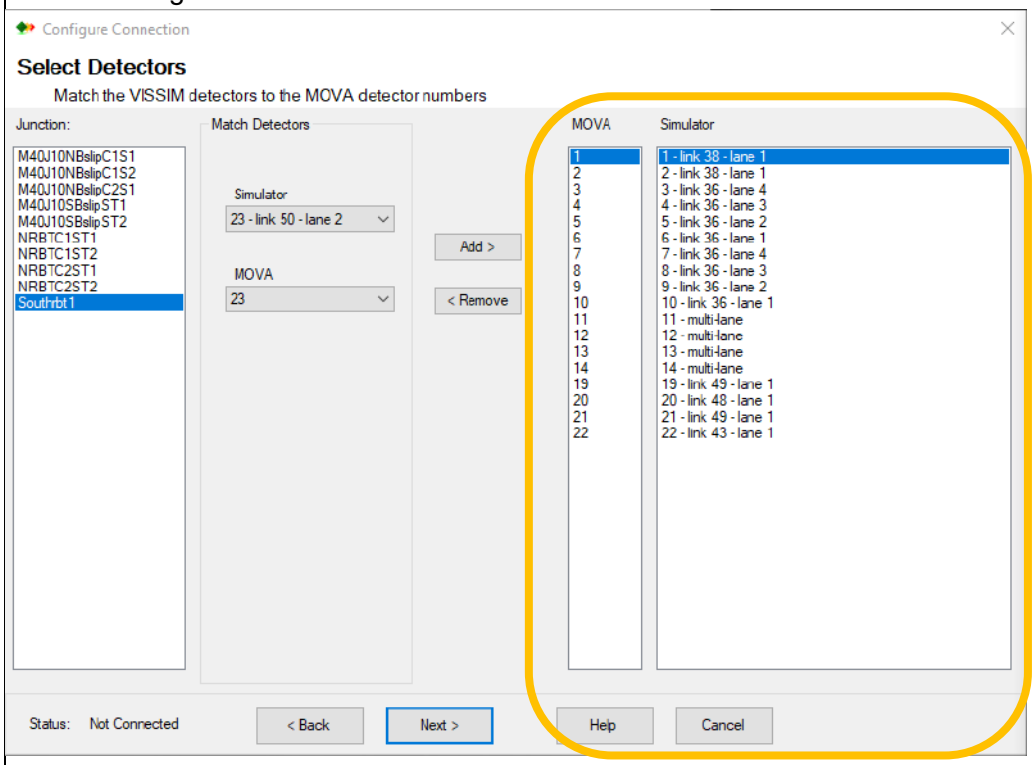


FIGURE 2.13: VISSIM MODELS – DETECTOR MAPPING DIFFERENCES

Do-Something 3 Model



Reference Case Model

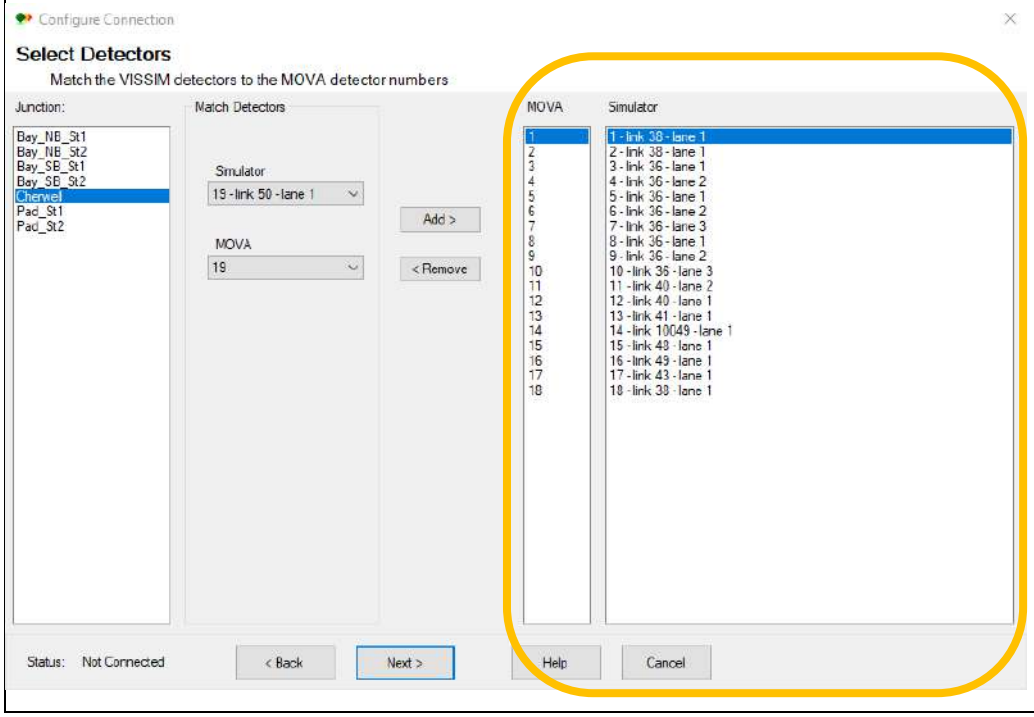
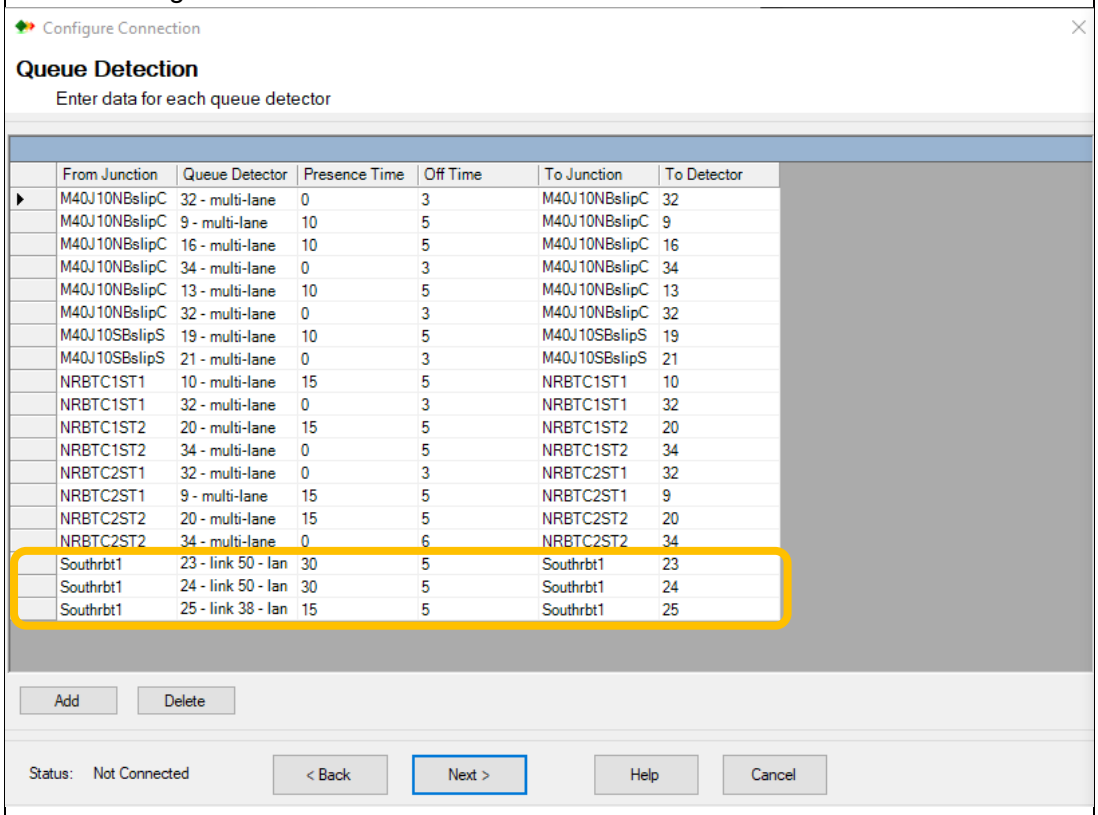


FIGURE 2.14: PC MOVA CONNECTION FILE – DETECTOR MAPPING DIFFERENCES

Do-Something 3 Model



Reference Case Model

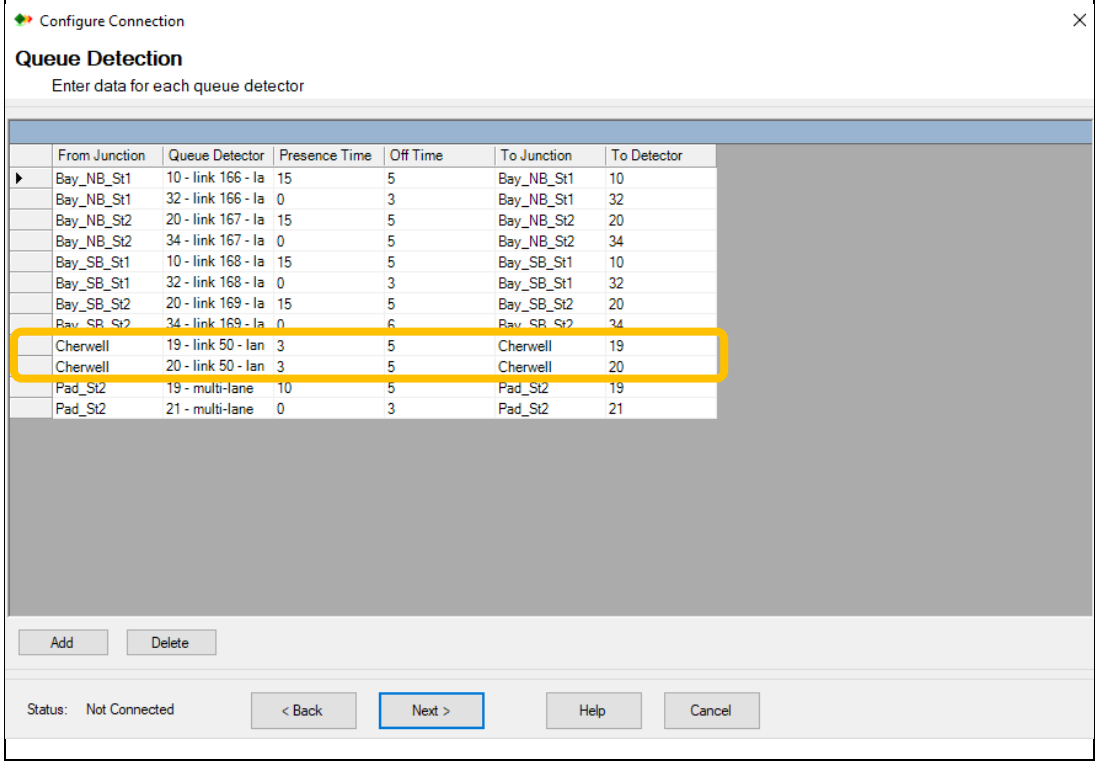


FIGURE 2.15: PC MOVA CONNECTION FILE – QUEUE DETECTION DIFFERENCES

2.71 **Figures 2.13** and **2.14** show the detector numbing in the models and also the mapping applied in the PC MOVA Connection File. The main difference between the two appears to be on the internal section from the A43 South, where Detector No. 18 in the Reference Case is grouped within the main detectors, whereas the Do-Something 3 model has Detector No. 25, which is classed as a queue detector.

2.72 As detailed in paragraph 2.65, the Do-Something 3 model also has two sets of detectors overlapping each other on the nearside lane on the A43 North approach. It is not clear why this has been done, but this explains for the additional detector numbers in comparison to the Reference Case model.

2.73 For the Queue Detection parameters (**Figure 2.15**), the main differences are:

- The presence times for the Cherwell Services detectors (No's 23 & 24 in the Do-Something 3 model and No's 19 & 20 in the Reference Case model). In the Reference Case model, the presence time has been kept as 3s, rather than 30s in the Do-Something model. It was felt that the smaller presence time was more beneficial as it gave the Services phases (and internal signal phase from the A43 South) more opportunity to be called and flush through more traffic travelling northbound (and accessing the Services).
- The only other difference was that the Do-Something 3 model had a queue detector for the internal link from the A43 South, whereas this was not included in the Reference Case model. However, the reduced presence time in the Reference Case model meant that this stage was called more often and mitigated against the lack of a queue detector.

3 SUMMARY

3.1 This Technical Note (TN) summarises the key changes made to the approved M40 J10 base VISSIM model to create the 2031 Reference Case models for the proposed Strategic Rail Freight Interchange (SRFI) known as Oxford SRFI.

3.2 All parameters and network elements amended have been listed, detailed and explained for auditing purposes.

4 APPENDIX A – REFERENCE CASE LOG

VISSIM Log – Oxford SRFI

17/05/21

Committed Infrastructure

Project Explorer

- Created new modification file – 'Committed Infrastructure' to add in committed schemes at Baynard's Green & Padbury roundabouts
- Created two new scenarios – '2026 Ref Case AM' and '2026 Ref Case PM', with Modification File 6 included.

MOVA Datasets – Baynard's Green

- Renamed 'NRBTC1ST1' as 'Bay_NB_St1'
- In MOVA Tools:
    - Set dataset name to 'Bay_NB_St1'
    - Updated Design Diagram

- Renamed 'NRBTC1ST2' as 'Bay_NB_St2'
- In MOVA Tools:
    - Set dataset name to 'Bay_NB_St2'
    - Updated Design Diagram
    - Detectors – Main Detectors – re-numbered the X and Stopline detectors to follow on from numbering of IN detectors.

- Renamed 'NRBTC2ST1' as 'Bay_SB_St1'
- In MOVA Tools:
    - Set dataset name to 'Bay_SB_St1'
    - Updated Design Diagram
    - Lanes – Lanes: Main – Lane 1 set at 'Short' lane. This has been updated to 'Normal' based on updated drawing.
    - Detectors – Main Detectors – to account for Lane 1 now being a 'Normal' lane, added IN Det 1 to this lane and subsequently updated the rest of the detector numbering to follow-on.
    - E/P – Emergency/Priority: Links – updated EP1 detector number from 9 to 10

- Renamed 'NRBTC2ST2' as 'Bay_SB_St2'
- In MOVA Tools:
    - Set dataset name to 'Bay_SB_St2'
    - Updated Design Diagram
    - Signals
        - Phases – Added a new Phase to account for new Link
        - Stages – Updated to include Phase C in Stage 2 (out of Stage 1) and added Phase F to Stage 1
    - Links – Links: Main
        - Added a new Link 1 to account for 3 lane approach, based on updated drawing

        - Updated Phases to suit additional lane
    - Lanes – Lanes: Main
        - Set Lane 1 to 'Short' lane, with a distance of 87m, based on updated drawing.
        - Lanes 2 and 3 – set Lane Weighting factor to 6 instead of 1 (similar to Pad_St1)
    - Detectors – Main Detectors
        - Lanes 2 and 3 – Det no's 11 & 12 – updated distance from 100m to 94m
        - Lane 1
            - removed ALT-UP Detector No. 11 being configured (short lane)
            - Updated X and Stopline detector numbers (to no's 13 and 16 respectively)
    - SD Codes – Set to 1 for Links 4-6 in Stage 1 and 1-3 in Stage 2
        - – to account for Lane 1 now being a 'Normal' lane, added IN Det 1 to this lane and subsequently updated the rest of the detector numbering to follow-on.
    - E/P – Emergency/Priority: Links – updated EP1 detector number from 9 to 10

<u>MOVA Datasets - Padbury</u>

- Renamed 'M40J10SBslipST1' as 'Pad_S1'
- In MOVA Tools:
    - Set dataset name to 'Pad_S1'
    - Updated Design Diagram
    - Lanes – Lanes: Main – Lane 3 – updated short lane distance from 50m to 62m based on CAD drawing

- Renamed 'M40J10SBslipST2' as 'Pad_S2'
- In MOVA Tools:
    - Set dataset name to 'Pad_S2'
    - Updated Design Diagram

<u>MOVA Dataset – Cherwell</u>

- Renamed 'M40J10' mds file to 'Cherwell' to distinguish between other mds files

<u>Base Network</u>

Signal Controllers

- Created No's 2, 3, 4, & 5 to model the four streams at Baynard's Green roundabout
- Created No's 6 & 7 to model the two streams at Padbury roundabout

Dummy Link & Detectors

- Set up 6 dummy links to include all of the detectors associated with SC 2-7. This is to allow the detectors to be mapped in PC MOVA from VISSIM.

Modification 6

Background Images

- Added *'HE604237-KIER-GEN-M40_JN10_Z-DR-Z-0100_02 - 03.dwg'* and repositioned to suit model location

Baynard's Green Roundabout

Links/Connectors

- Updated link/connector structure to suit drawing. Deleted a lot of the connectors and created new ones as a result of the changes to link lengths and positions.
- Links 138, 14 – changed behaviour from 'Left Side Rule' to 'Urban (motorised)'.
- Connector 10160 – adjusted lane change from 200m to 130m
- Connector 10158 – adjusted lane change from 200m to 180m
- Connector 10164 – adjusted lane change from 200m to 150m

Desired Speed Decisions

A43 North

- No's 20 & 21 – repositioned further back from stopline as a result of 3 lane, signalised approach. Created new marker for Lane 3 (No. 133). Adjusted speeds from 30mph to 40mph to match HE model.
- For exit, created new marker for Lane 3 (No. 135).

B4100 East

- No's 24 & 88 – repositioned & created new marker for Lane 3 (No. 134). Adjusted speeds from 30mph to 40mph to match HE model.
- No. 91 – repositioned as close to original position as possible, added new markers for Lanes 2 and 3 (No's 136 & 137).
- No. 46 – repositioned as close to original position as possible, added new marker for Lane 2 (No 138).

A43 South

- No's 25 & 26 – repositioned further back from stopline as a result of 3 lane, signalised approach. Created new marker for Lane 3 (No. 139). Adjusted speeds from 30mph to 40mph to match HE model.
- For exit, created new marker for Lane 3 (No. 140).

B4100 West

- No's 22 & 23 – repositioned. Adjusted speeds from 30mph to 40mph to match HE model.
- No. 47 – repositioned as close to original position as possible
- No. 90 – repositioned as close to original position as possible, added new marker for Lane 2 (No 141).

Reduced Speed Areas

- Adjusted RSAs on approaches – kept lengths the same, but adjusted positions to sit behind signal stopline. Added additional RSAs on A43 North, B4100 East & A43 South due to increased no. of lanes (No's 133, 134, 135)

Conflict Areas

- Deactivated all conflict areas – will review need for activating once future year flows are added and model is running

Priority Rules

- Deleted all PRs around Baynards as junction is now signalised – will review need for PRs once future year flows are added and model is running

Signal Heads

- Added No's 10-30 to model signal heads at Baynard's Green

Detectors

- Added detector mapping to match HE model and MDS files (det no's 21-73). Where difference between model and MDS file, used MDS file distances.
- SC2 – Bay_NB_St1
    - For detector no's 10 – increased distance from stop-line from 14m to 20m (to account for different design and longer circulatory section)
- SC3 – Bay_NB_St2
    - Re-numbered detectors to suit updated MDS file
    - for detector no. 20, decreased length from stop-line from 20m to 17m (to account for different design and shorter circulatory section)
- SC4 – Bay_SB_St1
    - For detector no's 1-9, updated these to be 1-10 to account for 'normal' traffic link (based on length of lanes shown on updated drawings)
    - For detector no 10, increased length from stop-line from 9m to 18m (to account for different design and longer circulatory section)
- SC5 – Bay_SB_St2
    - Added detector no's 13 and 16 to account for additional lane on approach

Nodes

- Adjusted position of Node 1 to account for increased number of lanes and length of flaring on approaches
- Undertook Edge Selection to close all unrealistic turns

Vehicle Travel Times

- Updated to match existing model as close as possible

Queue Counters

- Updated to match stop-line locations on each approach

Padbury Roundabout

Links/Connectors

- Updated link/connector structure to suit drawing. Deleted a lot of the connectors and created new ones as a result of the changes to link lengths and positions.
- On M40 SB off-slip, adjusted behaviour on approach from 'Left Side Rule' to 'Urban (motorised)' for links/connectors 10189, 158, 10190, 159, 10187, 156, 10191, 121 &10033.

Desired Speed Decisions

A43 North

- No's 27 & 28 – repositioned further back from stopline as a result of signalised approach.

M40 SB Off-Slip

- No. 87 – repositioned 40mph slightly further back to account for additional flaring on approach.
- No's 33 & 142 – tried to retain in position of base model

Reduced Speed Areas

- On A43 approach, kept length the same, but adjusted positions to sit behind signal stopline.
- On A43 South, kept RSAs as base model
- On M40 SB off-slip, kept length the same, but adjusted positions to sit behind signal stopline, added No. 136 for Lane 3
- On North circulatory, reduced length from 20m to 10m, adjusted positions to sit behind signal stopline, added No. 137 for Lane 2.

Conflict Areas

- Deactivated all conflict areas – will review need for activating once future year flows are added and model is running

Priority Rules

- Deleted all PRs around Padbury as junction is now signalised – will review need for PRs once future year flows are added and model is running

Signal Heads

- Added No's 31-39 to model signal heads at Padbury

Detectors

- Added detector mapping to match HE model (det no's 74-96)

Nodes

- Adjusted position of Node 2 to account for increased number of lanes and length of flaring on approaches
- Undertook Edge Selection to close all unrealistic turns and U-turns

Queue Counters

- Updated to match stop-line locations on each approach

PC MOVA Connection File

Created new connection file to account for committed schemes at Baynards Green and Padbury.

For Cherwell junction, some differences between Base & DS3 in terms of detector numbering and queue detection parameters. For now, kept as existing base model, but can review when model is running. Main difference is Presence Time (3s vs. 30s) for Dets 19/20 (23/24) and no queue detection for No. 18 in Base (but parameters for No. 25 in DS3)

19/05/21

2026 Reference Case Flows

Project Explorer

- Created two new modification files (No's 7 & 8) – '2026 AM Ref Case Flows' and '2026 PM Ref Case Flows'
- Created two new scenarios – 'SC3 - 2026 Ref Case AM' and 'SC4 - 2026 Ref Case PM', with Modification Files 6, 7 and 6, 8 included.

01/06/21

Modification 6

Links/Connectors

- Connector 10011 (Bay Green – Exit to B4100 East)
    - increased lane change distance from 200m to 400m
    - increased emergency stop from 5m to 50m
-
- Connector 10158 (Bay Green – B4100 East Exit) – adjusted lane change from 180m to 200m
- Connector 10172 (Bay Green – Exit to B4100 West)
    - adjusted lane change from 200m to 400m
    - increased emergency stop from 5m to 50m
- Connector 10169 (Bay Green – South Circ) – increased lane change distance from 200m to 250m
- Connector 10176 (Bay Green – North Circ) – increased lane change distance from 200m to 250m

Priority Rules

- Added No. 135

Conflict Areas

- Activated conflict areas 418, 429, 476, 481 & 541

06/07/21

Changes following 2031 Ref Case Visual Assessment

Modification 6

Priority Rules

- Added No's 136-180, 181-201
- Updated No's 49, 50, 7, 8

Conflict Areas

- Activated No's 456, 454
- De-activated No's 429, 541, 481, 418

Links/Connectors

- No. 10170 (Bay Green – B4100 East approach – Left Turn) – emergency stop changed from 5m to 60m
- No. 10171 (Bay Green – B4100 East approach – Ahead) – emergency stop changed from 5m to 60m
- No. 10179 (Bay Green – B4100 West approach – Left Turn) – emergency stop changed from 5m to 35m
- No. 10034 (Pad – M40 SB off-slip – Left) – emergency stop changed from 5m to 30m
- No. 10096 (Pad – M40 SB off-slip – Right) – emergency stop changed from 20m to 30m

Cherwell Junction – DS3 MOVA Set-Up

Introduction

Produced separate version of Ref Case with signal set-up at Cherwell as per DS3 model. The changes of this are detailed below.

MOVA Datasets – Cherwell

- Took copy of 'Southrbt1' from DS3 folder and renamed as 'Cherwell_v2'
- In MOVA Tools:
    - Set dataset name to 'Cherwell_v2'
    - Updated Design Diagram
    - Deleted Lane/Link No. 2 – unclear as to why 4 lanes modelled on A43 North, when have 3 lanes in model/on drawings – see 'Cherwell - MDS Changes - Ref Case' doc.
    - Re-numbered Links and Lanes to remove error of needing consecutive numbering.

Cherwell

Detectors

Adjusted detector mapping to suit new layout in 'Design Diagram' in updated MDS file.

Base Network

Signal Controllers

- Created SC8 – 'Cherwell – FY Ref Case' and added dummy link with detectors for linking to new PC MOVA connection file.

PC MOVA Connection File

- Created new connection file to account for committed schemes at Baynards Green and Padbury.
- For Cherwell junction, used set-up as provided in DS3 model. This takes into account removal of previous Link/Lane 2.

Modification 6

Signal Controllers

- For SC1 – made this 'inactive' so that PC MOVA would not cause an error when starting up

Signal Heads & Detectors

- For signal heads and detectors previously assigned to SC1, these have now been assigned to SC8.

Conclusions

Signal operation improved for southbound movement, but this is counteracted with queues quickly reaching mainline on northbound off-slip. This appears to be due to set-up not being responsive enough. Have reverted back to Base set-up for initial model convergence and results runs.



09/07/21

Journey Time Markers

- Added No's 1001-1010 to match HE JT routes from reporting TN
- Added No's 2001-2081 to cover all O-D pairs (in case needed for wider assessment)

Priority Rules

- Added No's 181-201

Conflict Areas

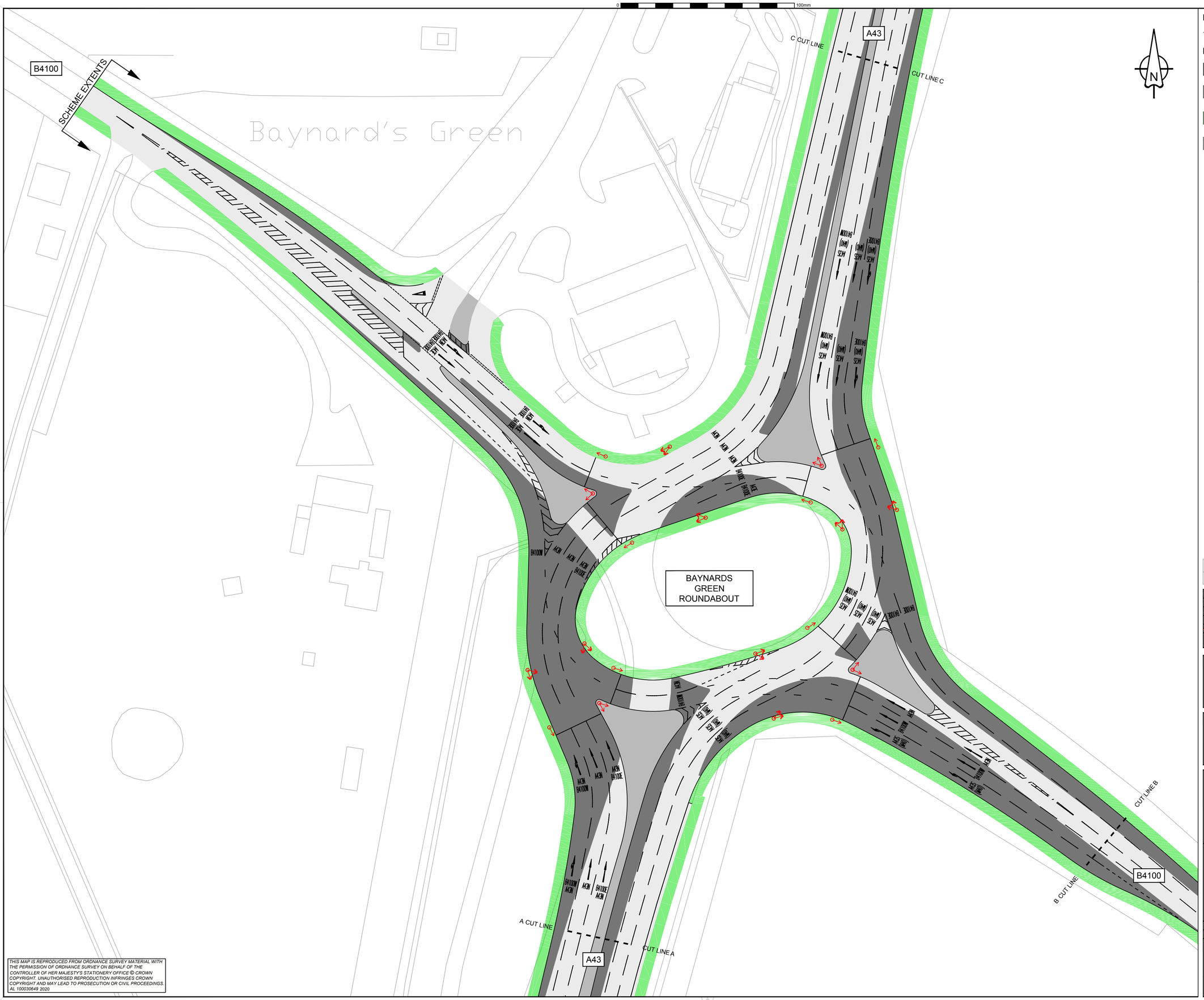
- De-activated No's 429, 541, 481, 418

Links/Connectors

- No. 10176 (Bay Green – North Circ) – lane change increased from 250m to 300m

5 APPENDIX B – BAYNARD'S GREEN & PADBURY ROUNDABOUT IMPROVEMENTS

0 100mm



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NOTES:

1. ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE STATED.

KEY:

- PROPOSED CARRIAGEWAY WIDENING WORKS.
- PROPOSED SPLITTER ISLANDS AND HARDSTANDING AREAS.
- VERGE.
- EXISTING CARRIAGEWAY, AREA TO REMAIN WITHIN EXTENTS OF WIDENING WORKS.
- PROPOSED TRAFFIC SIGNALS

REV	DETAILS	CHKD	APPD	DATE

DRAWN : ADB		DRAWING STATUS:	
DESIGN : ADB		WORK IN PROGRESS	✓
CHKD :		PRELIMINARY DRAWING	
APPD :		EXTERNAL ISSUE	
DATE :		AS-BUILT	
SUITABILITY : S0		NOT FOR ISSUE	

CLIENT:

highways england

AGENT

KIER

SCHEME NAME

M40 J10 IMPROVEMENT SCHEME

DRAWING TITLE

BAYNARDS GREEN ROUNDABOUT
GENERAL ARRANGEMENT
SHEET 1 OF 2

ORIG DRAWING SIZE : A1	DIMENSIONS : m
COPYRIGHT © KIER	SCALE : 1:500

DRAWING NUMBER

PROJECT	ORIGINATOR	VOLUME	SCHEME REFERENCE No.
HE604237	KIER	GEN	2170038

LOCATION	TYPE	ROLE	NUMBER	REVISION
M40_JN10_Z	DR	CH	0100_02	-

File ref - n:\s278 schemes\604237 - s278 m40 j10 baynards green\03 drawings\01 - live drawings\gen\ga.dwg Plotted 31.03.2020 by Antbenne

0 100mm

N

SCHEME EXTENTS

SCHEME EXTENTS

EXISTING HARDSHOULDER TO BE TERMINATED IN ADVANCE OF THE PROPOSED LEFT TURN LANE. END OF HARD SHOULDER MARKINGS SHALL BE IN ACCORDANCE WITH TSRGD DIA 1040.5

EXISTING TRAFFIC SIGNS WITHIN THE PROPOSED SCHEME EXTENTS TO BE REMOVED. ALL NEW TRAFFIC SIGNS SHALL BE MOUNTED ON PASSIVELY SAFE POSTS WHERE THERE IS A REQUIREMENT TO PROTECT SUCH SIGNS AGAINST VEHICLE IMPACT

M40 J10 SB EXIT SLIP ROAD

PROPOSED STREET LIGHTING EXTENTS ON THE M40 J10 SB EXIT SLIP ROAD TO BE REVIEWED AS PART OF THE DETAILED DESIGN. ALL NEW STREET LIGHTING SHALL BE PASSIVELY SAFE

EXISTING M40 J10 SB EXIT SLIP ROAD TO HAVE AN ADDITIONAL LANE NEARSIDE LANE CONSTRUCTED WHICH IS TO UTILISE PART OF THE EXISTING HARDSHOULDER. TOTAL LENGTH OF NEW LANE SHALL BE 80M, WITH 3.65M WIDE LANES

M40 DBFO HIGHWAY BOUNDARY

AREE 7 HIGHWAY BOUNDARY

EXISTING OFFSIDE RRS TO BE REMOVED

M40 J10 EXIT SLIP RD TO A43 PADBURY ROUNDABOUT TO BE SIGNALISED. LOCATION OF MOVA LOOPS & DUCTING TO BE INSTALLED WITHIN THE SLIP ROAD TO BE DETERMINED AT DETAILED DESIGN

A43 RESURFACING EXTENTS SHALL BE DETERMINED AT THE DETAILED DESIGN STAGE, ONCE ALL GEOMETRY REQUIREMENTS ARE KNOWN

A43 N

A43 S

EXISTING A43 PADBURY ROUNDABOUT TO BE FULLY SIGNALISED

A43/M40 J10 PADBURY ROUNDABOUT

EXISTING STREET LIGHTING AT A43 PADBURY ROUNDABOUT TO BE REVIEWED WITHIN SCHEME EXTENTS AS PART OF THE DETAILED DESIGN. ALL NEW STREET LIGHTING SHALL BE PASSIVELY SAFE

M40 SB

M40 NB

EXISTING M40 J10 EXIT SLIP RD & A43 HIGHWAY DRAINAGE TO BE REVIEWED AT DETAILED DESIGN TO DETERMINE EXISTING CAPACITY. ANY ADDITIONAL HIGHWAY FLOWS SHALL BE ATTENUATED WITHIN THE EXISTING HIGHWAY BOUNDARY PRIOR TO IT BEING DISCHARGED INTO THE EXISTING ATTENUATION BASIN

EXISTING ATTENUATION BASIN

A43 N

A43 S

A43 RESURFACING EXTENTS SHALL BE DETERMINED AT THE DETAILED DESIGN STAGE, ONCE ALL GEOMETRY REQUIREMENTS ARE KNOWN

SCHEME EXTENTS

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NOTES:

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KEY:

- PROPOSED CARRIAGEWAY WIDENING WORKS.
- PROPOSED SPLITTER ISLANDS AND HARDSTANDING AREAS.
- EXISTING VERGE.
- EXISTING CARRIAGEWAY, AREA TO REMAIN WITHIN EXTENTS OF WIDENING WORKS.
- PROPOSED TRAFFIC SIGNALS
- HIGHWAYS ENGLAND MAINTENANCE BOUNDARY

REV	DETAILS	CHKD	APPD	DATE

DRAWN : JSL		DRAWING STATUS:	
DESIGN : ADB		WORK IN PROGRESS	✓
CHKD :		PRELIMINARY DRAWING	
APPD :		EXTERNAL ISSUE	
DATE :		AS-BUILT	
SUITABILITY: S0		NOT FOR ISSUE	

CLIENT: highways england

AGENT: KIER

SCHEME NAME
M40 J10 IMPROVEMENT SCHEME

DRAWING TITLE
PADBURY ROUNDABOUT
GENERAL ARRANGEMENT

ORIG DRAWING SIZE : A1	DIMENSIONS : m
COPYRIGHT © KIER	SCALE : 1:500

DRAWING NUMBER

PROJECT	ORIGINATOR	VOLUME	SCHEME REFERENCE No.
HE604237	KIER	GEN	2170038

LOCATION	TYPE	ROLE	NUMBER	REVISION
M40_JN10_Z	DR	CH	0100_04	-

6 APPENDIX C – 2031 FLOW CALCULATIONS

2031 REFERENCE CASE CALCULATIONS - AM PEAK

STEP 1 - TRANSLATE ADC FLOWS TO VISSIM ZONES (MOVE Z10 to Z5)

0645-0745

Lights

	1	2	3	4	5	6	7	8	9	Total
1	0	416	55	1092	570	33	44	11	90	2311
2	350	0	0	6	27	149	210	1	4	747
3	32	22	0	164	52	64	9	1	8	352
4	699	6	173	40	30	2576	34	1	7	3566
5	122	0	16	38	48	247	12	48	151	650
6	39	241	145	3212	178	14	11	3	28	3871
7	36	180	1	68	11	1	0	0	2	299
8	12	1	1	4	26	20	1	0	189	254
9	28	3	4	8	10	48	3	17	0	121
Total	1318	885	395	4632	904	3152	324	82	479	12173

HGVs

	1	2	3	4	5	6	7	8	9	Total
1	0	13	13	215	11	7	5	0	0	264
2	13	0	0	3	0	4	12	0	0	33
3	10	0	0	55	0	24	2	0	0	91
4	150	0	28	4	9	400	8	0	0	599
5	28	0	3	6	0	7	3	1	0	48
6	12	12	37	671	5	1	0	0	0	738
7	8	8	0	13	0	0	1	0	0	30
8	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0
Total	221	33	81	967	25	443	31	1	0	1802

Total

	1	2	3	4	5	6	7	8	9	Total
1	0	429	68	1307	581	40	49	11	90	2575
2	363	0	0	9	27	153	223	1	4	779
3	42	22	0	219	52	88	11	1	8	443
4	849	6	201	44	39	2976	42	1	7	4165
5	150	16	19	44	0	254	15	49	151	698
6	51	253	182	3883	183	15	11	3	28	4609
7	44	188	1	81	11	1	1	0	2	329
8	12	1	1	4	26	20	1	0	189	254
9	28	3	4	8	10	48	3	17	0	121
Total	1539	918	476	5599	929	3595	355	83	479	13973

0745-0845

Lights

	1	2	3	4	5	6	7	8	9	Total
1	0	402	64	1083	436	76	46	9	77	2193
2	318	0	11	10	14	161	288	0	2	804
3	46	4	0	195	46	113	1	1	8	414
4	856	8	157	36	41	2784	53	1	8	3944
5	141	19	22	33	0	232	16	48	151	662
6	51	238	151	2844	235	13	10	6	42	3570
7	50	252	1	88	9	1	1	0	2	404
8	12	2	2	3	26	19	1	0	189	254
9	10	4	4	7	10	45	4	17	0	121
Total	1504	909	412	4299	817	3444	420	82	479	12366

HGVs

	1	2	3	4	5	6	7	8	9	Total
1	0	424	84	1284	466	82	58	9	77	2478
2	334	0	11	10	14	168	297	0	2	836
3	62	4	0	245	47	129	2	1	8	498
4	977	8	184	38	49	3091	58	1	8	4414
5	162	19	22	42	0	243	25	49	151	713
6	59	234	185	3318	245	13	15	6	42	4117
7	61	274	1	99	9	1	1	0	2	448
8	12	2	2	3	26	19	1	0	189	254
9	10	4	4	7	10	45	4	17	0	121
Total	1697	969	497	5046	866	3791	461	83	479	13879

STEP 2 - CONVERT TO 15 MIN MATRICES USING 2016 BASE PROPORTIONS

LIGHTS

Time Period	Total	Overall Total	Proportion
0645-0700	2121	8892	24%
0700-0715	2217	8892	25%
0715-0730	2383	8892	27%
0730-0745	2271	8892	25%
			100%

HEAVIES

Time Period	Total	Overall Total	Proportion
0645-0700	2548	9302	27%
0700-0715	2432	9302	26%
0715-0730	2236	9302	24%
0730-0745	2096	9302	23%
			100%

LIGHTS

Time Period	Total	Overall Total	Proportion
0745-0800	2548	9302	27%
0800-0815	2432	9302	26%
0815-0830	2226	9302	24%
0830-0845	2096	9302	23%
			100%

HEAVIES

Time Period	Total	Overall Total	Proportion
0745-0800	372	1397	27%
0800-0815	348	1397	25%
0815-0830	364	1397	26%
0830-0845	313	1397	22%
			100%

LIGHTS

Time Period	Total	Overall Total	Proportion
0845-0900	1978	9302	21%
0900-0915	1825	9302	20%
			41%

Used peak total to determine proportions for cool down period

HEAVIES

Time Period	Total	Overall Total	Proportion
0845-0900	345	1397	25%
0900-0915	345	1397	25%
			49%

Used peak total to determine proportions for cool down period

LIGHTS

0645-0700

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	98	13	258	134	8	10	3	21	**545**
2	83	0	0	1	6	35	50	0	1	**176**
3	8	5	0	39	12	15	2	0	2	**83**
4	165	1	41	9	7	608	8	0	2	**841**
5	29	4	4	9	0	58	3	11	36	**153**
6	9	57	34	758	42	3	3	1	7	**913**
7	8	42	0	16	3	0	0	0	0	**71**
8	3	0	0	1	6	5	0	0	45	**60**
9	7	1	1	2	2	11	1	4	0	**29**
TOTAL		**311**	**209**	**93**	**1093**	**213**	**743**	**76**	**19**	**113**	**2871**

0700-0715

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	103	14	269	141	8	11	3	22	**570**
2	86	0	0	1	7	37	52	0	1	**184**
3	8	5	0	40	13	16	2	0	2	**87**
4	172	1	43	10	7	635	8	0	2	**879**
5	30	4	4	9	0	61	3	12	37	**160**
6	10	59	36	792	44	3	3	1	7	**954**
7	9	44	0	17	3	0	0	0	0	**74**
8	3	0	0	1	6	5	0	0	47	**63**
9	7	1	1	2	2	12	1	4	0	**30**
TOTAL		**325**	**218**	**97**	**1142**	**223**	**777**	**80**	**20**	**118**	**3001**

0715-0730

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	110	15	289	151	9	12	3	24	**612**
2	93	0	0	2	7	39	56	0	1	**198**
3	8	6	0	43	14	17	2	0	2	**93**
4	185	2	46	11	8	683	9	0	2	**945**
5	32	4	4	10	0	65	3	13	40	**172**
6	10	64	38	851	47	4	3	1	7	**1026**
7	10	48	0	18	3	0	0	0	1	**79**
8	3	0	0	1	7	5	0	0	50	**67**
9	7	1	1	2	3	13	1	5	0	**32**
TOTAL		**349**	**235**	**105**	**1228**	**240**	**835**	**86**	**22**	**127**	**3226**

0730-0745

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	105	14	276	144	8	11	3	23	**584**
2	88	0	0	2	7	38	53	0	1	**189**
3	8	6	0	41	13	16	2	0	2	**89**
4	177	2	44	10	8	651	9	0	2	**901**
5	31	4	4	10	0	62	3	12	38	**164**
6	10	61	37	811	45	4	3	1	7	**978**
7	9	45	0	17	3	0	0	0	1	**76**
8	3	0	0	1	7	5	0	0	48	**64**
9	7	1	1	2	3	12	1	4	0	**31**
TOTAL		**333**	**224**	**100**	**1170**	**228**	**796**	**82**	**25**	**121**	**3074**	**12171**	Y

0745-0800

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	110	18	297	119	21	13	2	21	**601**
2	87	0	3	3	4	44	79	0	1	**220**
3	13	1	0	53	13	31	0	0	2	**113**
4	234	2	43	10	11	763	15	0	2	**1080**
5	39	5	6	9	0	64	4	13	41	**181**
6	14	60	41	779	64	4	3	2	12	**978**
7	14	68	0	24	2	0	0	0	1	**111**
8	3	1	1	1	7	5	0	0	52	**70**
9	8	1	1	2	3	12	1	5	0	**33**
TOTAL		**412**	**249**	**113**	**1178**	**224**	**943**	**115**	**22**	**131**	**3337**

0800-0815

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	105	17	283	114	20	12	2	20	**573**
2	83	0	3	3	4	42	75	0	1	**210**
3	12	1	0	51	12	30	0	0	2	**108**
4	224	2	41	9	11	728	14	0	2	**1031**
5	37	5	6	9	0	61	4	13	39	**173**
6	13	57	39	744	61	3	3	2	11	**933**
7	13	66	0	23	2	0	0	0	1	**106**
8	3	1	1	1	7	5	0	0	49	**66**
9	8	1	1	2	3	12	1	4	0	**32**
TOTAL		**393**	**238**	**108**	**1124**	**214**	**900**	**110**	**21**	**125**	**3233**

0815-0830

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	96	15	259	104	18	11	2	18	**525**
2	76	0	3	2	3	39	69	0	0	**192**
3	11	1	0	47	11	27	0	0	2	**99**
4	205	2	38	9	10	666	13	0	2	**944**
5	34	5	5	8	0	56	4	11	36	**158**
6	12	52	36	681	56	3	2	1	10	**854**
7	12	60	0	21	2	0	0	0	0	**97**
8	3	1	0	1	6	5	0	0	45	**61**
9	7	1	1	2	2	11	1	4	0	**29**
TOTAL		**360**	**218**	**99**	**1029**	**196**	**824**	**101**	**20**	**115**	**2960**

0830-0845

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	91	14	244	98	17	10	2	17	**494**
2	72	0	2	2	3	36	65	0	0	**181**
3	10	1	0	44	10	25	0	0	2	**93**
4	193	2	35	8	9	627	12	0	2	**889**
5	32	4	5	7	0	52	4	11	34	**149**
6	11	49	34	641	53	3	2	1	9	**804**
7	11	57	0	20	2	0	0	0	0	**91**
8	3	0	0	1	6	4	0	0	43	**57**
9	7	1	1	2	2	10	1	4	0	**27**
TOTAL		**339**	**205**	**93**	**969**	**184**	**776**	**95**	**18**	**108**	**2786**	**12366**	Y

0845-0900

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	85	14	230	93	16	10	2	16	**466**
2	68	0	2	2	3	34	61	0	0	**171**
3	10	1	0	41	10	24	0	0	2	**88**
4	182	2	33	8	9	592	11	0	2	**839**
5	30	4	5	7	0	49	3	10	32	**141**
6	11	46	32	605	50	3	2	1	9	**759**
7	11	54	0	19	2	0	0	0	0	**86**
8	3	0	0	1	6	4	0	0	40	**54**
9	6	1	1	1	2	10	1	4	0	**26**
TOTAL		**320**	**193**	**88**	**914**	**174**	**732**	**89**	**17**	**102**	**2629**

0900-0915

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	79	13	212	86	15	9	2	15	**430**
2	62	0	2	2	3	32	57	0	0	**158**
3	9	1	0	38	9	22	0	0	2	**81**
4	168	2	31	7	8	546	10	0	2	**774**
5	28	4	4	6	0	46	3	9	30	**130**
6	10	43	30	558	46	3	2	1	8	**700**
7	10	49	0	17	2	0	0	0	0	**79**
8	2	0	0	1	5	4	0	0	37	**50**
9	6	1	1	1	2	9	1	3	0	**24**
TOTAL		**295**	**178**	**81**	**843**	**160**	**676**	**82**	**16**	**94**	**2426**	**5055.42573**	5055.425728

HEAVIES

0645-0700

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	4	4	59	3	2	1	0	0	**72**
2	4	0	0	1	0	1	3	0	0	**9**
3	3	0	0	15	0	7	1	0	0	**25**
4	41	0	8	1	2	110	2	0	0	**164**
5	8	0	1	2	0	2	1	0	0	**13**
6	3	3	10	184	1	0	0	0	0	**202**
7	2	2	0	4	0	0	0	0	0	**8**
8	0	0	0	0	0	0	0	0	0	**0**
9	0	0	0	0	0	0	0	0	0	**0**
TOTAL		**61**	**9**	**22**	**265**	**7**	**121**	**8**	**0**	**0**	**494**

0700-0715

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	3	3	56	3	2	1	0	0	**69**
2	3	0	0	1	0	1	3	0	0	**8**
3	3	0	0	14	0	6	1	0	0	**24**
4	39	0	7	1	2	105	2	0	0	**157**
5	7	0	1	2	0	2	1	0	0	**13**
6	3	3	10	175	1	0	0	0	0	**193**
7	2	2	0	3	0	0	0	0	0	**8**
8	0	0	0	0	0	0	0	0	0	**0**
9	0	0	0	0	0	0	0	0	0	**0**
TOTAL		**58**	**9**	**21**	**253**	**7**	**116**	**8**	**0**	**0**	**471**

0715-0730

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	3	3	51	3	2	1	0	0	**63**
2	3	0	0	1	0	1	3	0	0	**8**
3	2	0	0	13	0	6	0	0	0	**22**
4	36	0	7	1	2	96	2	0	0	**143**
5	7	0	1	1	0	2	1	0	0	**11**
6	3	3	9	161	1	0	0	0	0	**177**
7	2	2	0	3	0	0	0	0	0	**7**
8	0	0	0	0	0	0	0	0	0	**0**
9	0	0	0	0	0	0	0	0	0	**0**
TOTAL		**53**	**8**	**19**	**231**	**6**	**106**	**7**	**0**	**0**	**431**

0730-0745

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	3	3	48	2	2	1	0	0	**59**
2	3	0	0	1	0	1	3	0	0	**7**
3	2	0	0	12	0	5	0	0	0	**21**
4	34	0	6	1	2	90	2	0	0	**135**
5	6	0	1	1	0	2	1	0	0	**11**
6	3	3	8	151	1	0	0	0	0	**166**
7	2	2	0	3	0	0	0	0	0	**7**
8	0	0	0	0	0	0	0	0	0	**0**
9	0	0	0	0	0	0	0	0	0	**0**
TOTAL		**50**	**7**	**18**	**218**	**6**	**100**	**7**	**0**	**0**	**406**	**1802**	Y

0745-0800

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	6	6	54	5	2	3	0	0	**76**
2	4	0	0	0	0	2	2	0	0	**9**
3	4	0	0	13	0	4	0	0	0	**22**
4	32	0	7	1	2	82	1	0	0	**125**
5	6	0	0	2	0	3	2	0	0	**14**
6	2	4	9	126	3	1	1	0	0	**146**
7	3	6	0	3	0	0	0	0	0	**12**
8	0	0	0	0	0	0	0	0	0	**0**
9	0	0	0	0	0	0	0	0	0	**0**
TOTAL		**51**	**16**	**23**	**199**	**10**	**92**	**11**	**0**	**0**	**403**

0800-0815

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	5	6	50	5	1	3	0	0	**71**
2	4	0	0	0	0	2	2	0	0	**8**
3	4	0	0	12	0	4	0	0	0	**21**
4	30	0	7	0	2	76	1	0	0	**117**
5	5	0	0	2	0	3	2	0	0	**13**
6	2	4	8	118	2	0	1	0	0	**136**
7	3	5	0	3	0	0	0	0	0	**11**
8	0	0	0	0	0	0	0	0	0	**0**
9	0	0	0	0	0	0	0	0	0	**0**
TOTAL		**48**	**15**	**21**	**186**	**10**	**86**	**10**	**0**	**0**	**377**

0815-0830

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	6	6	52	5	2	3	0	0	**74**
2	4	0	0	0	0	2	2	0	0	**8**
3	4	0	0	13	0	4	0	0	0	**22**
4	32	0	7	1	2	80	1	0	0	**122**
5	5	0	0	2	0	3	2	0	0	**13**
6	2	4	9	124	3	0	1	0	0	**143**
7	3	6	0	3	0	0	0	0	0	**11**
8	0	0	0	0	0	0	0	0	0	**0**
9	0	0	0	0	0	0	0	0	0	**0**
TOTAL		**50**	**16**	**22**	**195**	**10**	**90**	**11**	**0**	**0**	**394**

0830-0845

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	5	5	45	4	1	3	0	0	**64**
2	4	0	0	0	0	2	2	0	0	**7**
3	4	0	0	11	0	4	0	0	0	**19**
4	27	0	6	0	2	69	1	0	0	**105**
5	5	0	0	2	0	2	2	0	0	**11**
6	2	4	8	106	2	0	1	0	0	**123**
7	2	5	0	2	0	0	0	0	0	**10**
8	0	0	0	0	0	0	0	0	0	**0**
9	0	0	0	0	0	0	0	0	0	**0**
TOTAL		**43**	**13**	**19**	**167**	**9**	**78**	**9**	**0**	**0**	**339**	**1513**	Y

0845-0900

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	5	6	50	5	1	3	0	0	**70**
2	4	0	0	0	0	2	2	0	0	**8**
3	4	0	0	12	0	4	0	0	0	**21**
4	30	0	7	0	2	76	1	0	0	**116**
5	5	0	0	2	0	3	2	0	0	**13**
6	2	4	8	117	2	0	1	0	0	**135**
7	3	5	0	3	0	0	0	0	0	**11**
8	0	0	0	0	0	0	0	0	0	**0**
9	0	0	0	0	0	0	0	0	0	**0**
TOTAL		**48**	**15**	**21**	**184**	**10**	**86**	**10**	**0**	**0**	**374**

0900-0915

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	5	6	50	5	1	3	0	0	**70**
2	4	0	0	0	0	2	2	0	0	**8**
3	4	0	0	12	0	4	0	0	0	**21**
4	30	0	7	0	2	76	1	0	0	**116**
5	5	0	0	2	0	3	2	0	0	**13**
6	2	4	8	117	2	0	1	0	0	**135**
7	3	5	0	3	0	0	0	0	0	**11**
8	0	0	0	0	0	0	0	0	0	**0**
9	0	0	0	0	0	0	0	0	0	**0**
TOTAL		**48**	**15**	**21**	**184**	**10**	**86**	**10**	**0**	**0**	**374**	**747.29420**	747.2942019

2031 REFERENCE CASE CALCULATIONS - PM PEAK

STEP 1 - TRANSLATE ADC FLOWS TO VISSIM ZONES (MOVE Z10 to Z5)

1530-1630

Lights

	1	2	3	4	5	6	7	8	9	Total
1	0	287	73	659	152	62	18	12	24	1327
2	464	0	24	8	16	170	300	1	2	985
3	7	21	5	0	214	21	154	0	1	3	475
4	1147	6	172	38	49	4017	49	3	6	5487
5	186	0	10	8	0	124	7	111	136	590
6	50	154	183	3058	148	7	14	10	19	3643
7	10	205	0	23	6	1	1	0	1	247
8	12	1	1	3	123	7	1	0	50	196
9	48	3	2	4	18	30	2	20	0	197
Total	2014	671	463	4013	643	4572	392	158	241	13167

HGVs

	1	2	3	4	5	6	7	8	9	Total
1	0	12	24	99	5	6	8	0	0	154
2	10	0	0	2	1	9	12	0	0	34
3	29	2	0	46	4	15	0	0	0	96
4	217	0	35	6	5	580	5	0	0	848
5	11	2	0	7	0	4	1	1	0	26
6	6	4	38	350	6	2	4	0	0	410
7	5	24	0	4	0	0	3	0	0	36
8	0	0	0	0	2	0	0	0	0	2
9	0	0	0	0	0	0	0	0	0	0
Total	278	44	97	514	23	616	33	1	0	1606

Total

	1	2	3	4	5	6	7	8	9	Total
1	0	299	97	758	157	68	26	12	24	1481
2	474	0	24	10	17	179	312	1	2	1019
3	106	7	0	260	25	169	0	1	3	571
4	1364	6	207	44	54	4597	54	3	6	6335
5	197	12	0	15	0	128	8	112	136	616
6	56	158	221	3408	154	9	18	10	19	4053
7	15	229	0	27	6	1	4	0	1	303
8	12	1	1	3	125	7	1	0	50	198
9	48	3	2	4	18	30	2	20	0	197
Total	2292	715	560	4527	666	5188	425	159	241	14773

1630-1730

Lights

	1	2	3	4	5	6	7	8	9	Total
1	2	441	69	734	179	75	25	10	20	1555
2	617	0	25	10	11	178	368	1	1	1211
3	91	4	0	172	11	136	6	1	1	432
4	1333	2	154	67	60	4244	40	3	7	5910
5	308	8	11	9	0	170	9	111	136	762
6	79	189	165	3174	220	16	22	12	24	3901
7	27	220	1	23	8	0	3	0	1	283
8	14	0	1	1	123	7	0	0	50	196
9	53	1	2	3	88	29	1	20	0	197
Total	2524	865	428	4193	700	4853	474	158	240	14437

HGVs

	1	2	3	4	5	6	7	8	9	Total
1	0	13	6	80	7	5	10	0	0	121
2	10	0	0	0	3	4	2	0	0	19
3	14	0	0	43	2	30	0	0	0	89
4	132	4	47	0	3	447	5	0	0	638
5	10	0	3	4	0	4	0	1	0	22
6	4	9	32	301	1	1	1	0	0	340
7	5	12	0	6	1	0	0	0	0	24
8	0	0	0	0	2	0	0	0	0	2
9	0	0	0	0	0	0	0	0	0	0
Total	175	38	88	434	19	491	18	1	0	1264

Total

	1	2	3	4	5	6	7	8	9	Total
1	2	454	75	814	186	80	35	10	20	1676
2	627	0	25	10	14	182	370	1	1	1230
3	105	4	0	215	13	166	6	1	1	513
4	1465	6	201	67	63	4691	45	3	7	6548
5	318	8	14	13	0	174	9	112	136	784
6	83	198	197	3475	221	17	23	12	24	4250
7	32	232	1	29	9	0	3	0	1	307
8	14	0	1	1	125	7	0	0	50	198
9	53	1	2	3	88	29	1	20	0	197
Total	2699	903	516	4627	719	5146	492	159	240	15703

STEP 2 - CONVERT TO 15 MIN MATRICES USING 2016 BASE PROPORTIONS

LIGHTS

Time Period	Total	Overall Total	Proportion
1530-1545	2300	9768	24%
1545-1600	2375	9768	24%
1600-1615	2515	9768	26%
1615-1630	2578	9768	26%
			100%

HEAVIES

Time Period	Total	Overall Total	Proportion
1530-1545	387	1385	28%
1545-1600	370	1385	27%
1600-1615	326	1385	24%
1615-1630	302	1385	22%
			100%

LIGHTS

Time Period	Total	Overall Total	Proportion
1630-1645	2655	10763	25%
1645-1700	2709	10763	25%
1700-1715	2640	10763	25%
1715-1730	2759	10763	26%
			100%

HEAVIES

Time Period	Total	Overall Total	Proportion
1630-1645	292	1092	27%
1645-1700	269	1092	25%
1700-1715	286	1092	26%
1715-1730	245	1092	22%
			100%

LIGHTS

Time Period	Total	Overall Total	Proportion
1730-1745	2662	10763	25%
1745-1800	2520	10763	23%
			48%

HEAVIES

Time Period	Total	Overall Total	Proportion
1730-1745	243	1092	22%
1745-1800	247	1092	23%
			45%

Used peak total to determine proportions for cool down period

Used peak total to determine proportions for cool down period

LIGHTS

1530-1545

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	68	17	155	45	15	4	3	6	**312**
2	109	0	6	2	4	40	71	0	0	**232**
3	18	1	0	50	5	36	0	0	1	**112**
4	270	1	41	9	12	946	12	1	1	**1292**
5	44	2	2	0	0	29	2	26	32	**139**
6	12	36	43	720	35	2	3	2	4	**858**
7	7	48	0	5	1	0	0	0	0	**63**
8	3	0	0	0	0	29	2	0	12	**46**
9	11	1	0	1	21	7	0	5	0	**46**
TOTAL		**474**	**158**	**109**	**945**	**151**	**1077**	**92**	**37**	**57**	**3100**

1545-1600

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	70	18	160	47	15	4	3	6	**323**
2	113	0	6	2	4	41	73	0	0	**239**
3	19	1	0	52	5	37	0	0	1	**115**
4	279	1	42	9	12	977	12	1	1	**1334**
5	45	2	2	2	0	30	2	27	33	**143**
6	12	37	44	743	36	2	3	2	5	**886**
7	7	50	0	6	1	0	0	0	0	**65**
8	3	0	0	0	0	30	2	0	12	**48**
9	12	1	0	1	21	7	0	5	0	**48**
TOTAL		**490**	**163**	**113**	**976**	**156**	**1111**	**95**	**38**	**59**	**3201**

1600-1615

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	74	19	170	49	16	5	3	6	**342**
2	119	0	6	2	4	44	77	0	1	**254**
3	20	1	0	55	5	40	0	0	1	**122**
4	295	2	44	10	13	1034	13	1	2	**1413**
5	48	3	2	2	0	32	2	29	35	**152**
6	13	40	47	787	38	2	4	3	5	**938**
7	8	53	0	6	2	0	0	0	0	**69**
8	3	0	0	0	0	32	2	0	13	**50**
9	12	1	1	1	23	8	1	5	0	**51**
TOTAL		**519**	**173**	**119**	**1033**	**166**	**1177**	**101**	**41**	**62**	**3390**

1615-1630

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	76	19	174	51	16	5	3	6	**350**
2	122	0	6	2	4	45	79	0	1	**260**
3	20	1	0	56	6	41	0	0	1	**125**
4	303	2	45	10	13	1060	13	1	2	**1448**
5	49	3	2	2	0	33	2	29	36	**156**
6	13	41	48	807	39	2	4	3	5	**962**
7	8	54	0	6	2	0	0	0	0	**70**
8	3	0	0	0	32	2	0	0	13	**52**
9	13	1	1	1	23	8	1	5	0	**52**
TOTAL		**532**	**177**	**122**	**1059**	**170**	**1207**	**103**	**42**	**64**	**3475**	**13167** Y

1630-1645

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	109	17	181	44	19	6	2	5	**384**
2	152	0	6	2	3	44	91	0	0	**299**
3	22	1	0	42	3	34	1	0	0	**104**
4	329	0	38	17	15	1047	10	1	2	**1458**
5	76	2	3	2	0	42	2	27	34	**188**
6	19	47	41	783	54	4	5	3	6	**962**
7	7	54	0	6	2	0	1	0	0	**70**
8	3	0	0	0	30	2	0	0	12	**48**
9	13	0	0	1	22	7	0	5	0	**49**
TOTAL		**623**	**213**	**106**	**1034**	**173**	**1198**	**117**	**39**	**59**	**3541**

1645-1700

	1	2	3	4	5	6	7	8	9	TOTAL
1	1	111	17	185	45	19	6	3	5	**391**
2	155	0	6	3	3	45	93	0	0	**305**
3	23	1	0	43	3	34	2	0	0	**106**
4	336	1	39	17	15	1068	10	1	2	**1487**
5	78	2	3	2	0	43	2	26	34	**192**
6	20	48	42	799	55	4	6	3	6	**982**
7	7	55	0	6	2	0	1	0	0	**71**
8	4	0	0	0	0	31	2	0	0	**49**
9	13	0	0	1	1	22	7	0	5	**50**
TOTAL		**635**	**218**	**108**	**1055**	**176**	**1222**	**119**	**40**	**60**	**3634**

1700-1715

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	108	17	180	44	18	6	2	5	**381**
2	151	0	6	2	3	44	90	0	0	**297**
3	22	1	0	42	3	33	1	0	0	**104**
4	327	0	38	16	15	1041	10	1	2	**1450**
5	76	2	3	2	0	42	2	27	33	**187**
6	19	46	40	779	54	4	5	3	6	**957**
7	7	54	0	6	2	0	1	0	0	**69**
8	3	0	0	0	30	2	0	0	12	**48**
9	13	0	0	1	22	7	0	5	0	**48**
TOTAL		**619**	**212**	**105**	**1029**	**172**	**1191**	**116**	**39**	**59**	**3541**

1715-1730

	1	2	3	4	5	6	7	8	9	TOTAL
1	1	113	18	188	46	19	6	3	5	**399**
2	158	0	6	3	3	46	94	0	0	**310**
3	23	1	0	44	3	35	2	0	0	**108**
4	342	1	39	17	15	1088	10	1	2	**1515**
5	79	2	3	2	0	44	2	28	35	**195**
6	20	48	42	814	56	4	6	3	6	**1000**
7	7	56	0	6	2	0	1	0	0	**73**
8	4	0	0	0	32	2	0	0	13	**50**
9	14	0	1	1	23	7	0	5	0	**50**
TOTAL		**647**	**222**	**110**	**1075**	**179**	**1245**	**122**	**41**	**62**	**3701**	**14437** Y

1730-1745

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	109	17	182	44	19	6	2	5	**385**
2	153	0	6	2	3	44	91	0	0	**300**
3	23	1	0	43	3	34	1	0	0	**104**
4	330	0	38	17	15	1050	10	1	2	**1462**
5	76	2	3	2	0	42	2	27	34	**188**
6	20	47	41	785	54	4	5	3	6	**965**
7	7	54	0	6	2	0	1	0	0	**70**
8	3	0	0	0	30	2	0	0	12	**48**
9	13	0	0	1	22	7	0	5	0	**49**
TOTAL		**624**	**214**	**106**	**1037**	**173**	**1201**	**117**	**39**	**59**	**3571**

1745-1800

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	103	16	172	42	18	6	2	5	**364**
2	144	0	6	2	3	42	86	0	0	**284**
3	21	1	0	40	3	32	1	0	0	**99**
4	312	0	36	16	14	994	9	1	2	**1384**
5	72	2	3	2	0	40	2	26	32	**178**
6	18	44	39	743	52	4	5	3	6	**913**
7	6	52	0	5	2	0	1	0	0	**66**
8	3	0	0	0	29	2	0	0	12	**46**
9	12	0	0	1	21	7	0	5	0	**46**
TOTAL		**591**	**203**	**100**	**982**	**164**	**1137**	**111**	**37**	**56**	**3380**	**6950.75045**	6950.750455

HEAVIES

1530-1545

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	3	7	28	1	2	2	0	0	**43**
2	3	0	0	1	0	3	3	0	0	**10**
3	8	1	0	13	1	4	0	0	0	**27**
4	61	0	10	2	1	162	1	0	0	**237**
5	3	1	0	2	0	1	0	0	0	**7**
6	2	1	11	98	2	1	1	0	0	**115**
7	1	7	0	1	0	0	1	0	0	**10**
8	0	0	0	0	1	0	0	0	0	**1**
9	0	0	0	0	0	0	0	0	0	**0**
TOTAL		**78**	**12**	**27**	**144**	**6**	**172**	**9**	**0**	**0**	**449**

1545-1600

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	3	6	26	1	2	2	0	0	**41**
2	3	0	0	1	0	2	3	0	0	**9**
3	8	1	0	12	1	4	0	0	0	**26**
4	58	0	9	2	1	155	1	0	0	**226**
5	3	1	0	2	0	1	0	0	0	**7**
6	2	1	10	93	2	1	1	0	0	**109**
7	1	6	0	1	0	0	1	0	0	**10**
8	0	0	0	0	1	0	0	0	0	**1**
9	0	0	0	0	0	0	0	0	0	**0**
TOTAL		**74**	**12**	**26**	**137**	**6**	**164**	**9**	**0**	**0**	**429**

1600-1615

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	3	6	23	1	1	2	0	0	**36**
2	2	0	0	0	0	2	3	0	0	**8**
3	7	0	0	11	1	4	0	0	0	**23**
4	51	0	8	1	1	137	1	0	0	**200**
5	3	0	0	2	0	1	0	0	0	**6**
6	1	1	9	82	1	0	1	0	0	**97**
7	1	6	0	1	0	0	1	0	0	**8**
8	0	0	0	0	0	0	0	0	0	**0**
9	0	0	0	0	0	0	0	0	0	**0**
TOTAL		**65**	**10**	**23**	**121**	**5**	**145**	**8**	**0**	**0**	**378**

1615-1630

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	3	5	22	1	1	2	0	0	**34**
2	2	0	0	0	0	2	3	0	0	**7**
3	6	0	0	10	1	3	0	0	0	**21**
4	47	0	8	1	1	126	1	0	0	**185**
5	2	0	0	2	0	1	0	0	0	**6**
6	1	1	8	76	1	0	1	0	0	**89**
7	1	5	0	1	0	0	1	0	0	**8**
8	0	0	0	0	0	0	0	0	0	**0**
9	0	0	0	0	0	0	0	0	0	**0**
TOTAL		**61**	**10**	**21**	**112**	**5**	**134**	**7**	**0**	**0**	**350**	**1606** Y

1630-1645

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	3	2	21	2	1	3	0	0	**32**
2	3	0	0	0	1	1	1	0	0	**5**
3	4	0	0	11	1	8	0	0	0	**24**
4	35	1	13	0	1	120	1	0	0	**171**
5	3	0	1	1	0	1	0	0	0	**6**
6	1	2	9	80	0	0	0	0	0	**93**
7	1	3	0	2	0	0	0	0	0	**6**
8	0	0	0	0	1	0	0	0	0	**1**
9	0	0	0	0	0	0	0	0	0	**0**
TOTAL		**47**	**10**	**24**	**116**	**5**	**131**	**5**	**0**	**0**	**338**

1645-1700

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	3	1	20	2	1	2	0	0	**30**
2	2	0	0	1	0	1	0	0	0	**5**
3	3	0	0	11	0	7	0	0	0	**22**
4	33	1	12	0	1	110	1	0	0	**157**
5	2	0	1	1	0	1	0	0	0	**5**
6	1	2	8	74	0	0	0	0	0	**86**
7	1	3	0	1	0	0	0	0	0	**6**
8	0	0	0	0	0	0	0	0	0	**0**
9	0	0	0	0	0	0	0	0	0	**0**
TOTAL		**43**	**9**	**22**	**107**	**5**	**121**	**4**	**0**	**0**	**311**

1700-1715

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	3	2	21	2	1	3	0	0	**32**
2	3	0	0	0	1	1	1	0	0	**5**
3	4	0	0	11	1	8	0	0	0	**23**
4	35	1	12	0	1	117	1	0	0	**167**
5	3	0	1	1	0	1	0	0	0	**6**
6	1	2	8	79	0	0	0	0	0	**91**
7	1	3	0	2	0	0	0	0	0	**6**
8	0	0	0	0	1	0	0	0	0	**1**
9	0	0	0	0	0	0	0	0	0	**0**
TOTAL		**46**	**10**	**23**	**114**	**5**	**129**	**5**	**0**	**0**	**331**

1715-1730

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	3	1	18	2	1	2	0	0	**27**
2	2	0	0	0	1	1	0	0	0	**4**
3	3	0	0	10	0	7	0	0	0	**20**
4	30	1	11	0	1	100	1	0	0	**143**
5	2	0	1	1	0	1	0	0	0	**5**
6	1	2	7	68	0	0	0	0	0	**78**
7	1	3	0	1	0	0	0	0	0	**5**
8	0	0	0	0	0	0	0	0	0	**0**
9	0	0	0	0	0	0	0	0	0	**0**
TOTAL		**39**	**9**	**20**	**97**	**4**	**110**	**4**	**0**	**0**	**284**	**1264** Y

1730-1745

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	3	1	18	2	1	2	0	0	**27**
2	2	0	0	0	1	1	0	0	0	**4**
3	3	0	0	10	0	7	0	0	0	**20**
4	29	1	10	0	1	99	1	0	0	**142**
5	2	0	1	1	0	1	0	0	0	**5**
6	1	2	7	67	0	0	0	0	0	**78**
7	1	3	0	1	0	0	0	0	0	**5**
8	0	0	0	0	0	0	0	0	0	**0**
9	0	0	0	0	0	0	0	0	0	**0**
TOTAL		**39**	**8**	**20**	**97**	**4**	**109**	**4**	**0**	**0**	**281**

1745-1800

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	3	1	18	2	1	2	0	0	**27**
2	2	0	0	0	1	1	0	0	0	**4**
3	3	0	0	10	0	7	0	0	0	**20**
4	30	1	11	0	1	101	1	0	0	**144**
5	2	0	1	1	0	1	0	0	0	**5**
6	1	2	7	68	0	0	0	0	0	**79**
7	1	3	0	1	0	0	0	0	0	**5**
8	0	0	0	0	0	0	0	0	0	**0**
9	0	0	0	0	0	0	0	0	0	**0**
TOTAL		**40**	**9**	**20**	**98**	**4**	**111**	**4**	**0**	**0**	**286**	**567.17949**	567.1794872

7 APPENDIX D – PC MOVA & SCENARIO MANAGEMENT TN

Prepared by:	[redacted]	Reviewed by:	[redacted]
Client:	Internal	Date:	23 August 2021

PC MOVA & Scenario Management

1 INTRODUCTION

1.1 At Modelling Group, we undertake many projects which require the use of TRL's external signal controller programme, PC MOVA, for replicating MOVA signals in a VISSIM environment.

1.2 This note focuses on the interaction between PC MOVA & Scenario Management and details how both features are used in VISSIM.

2 BACKGROUND

2.1 The traditional way to configure MOVA signals in VISSIM is to create a PC MOVA Connection file and map the detectors in the MOVA dataset to those loaded from the INP/INPX file in VISSIM. An example of this is shown in **Figure 2.1**.

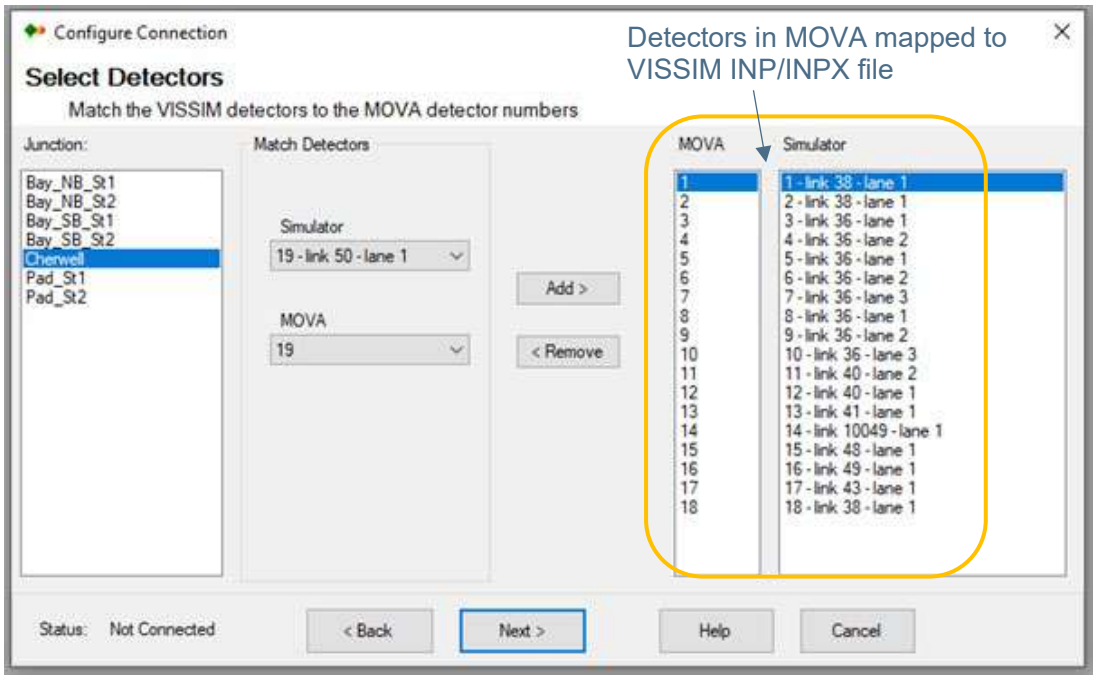


FIGURE 2.1: EXAMPLE OF TRADITIONAL DETECTOR MAPPING

Mobile [redacted]
[redacted]
Registered Office Crosby Court, 28 George St, Birmingham B3 1QG

PC MOVA & Scenario Management

2.2 However, since the introduction of Scenario Management in VISSIM 8, there is an issue whereby if a PC MOVA controlled signalised junction is added or amended in a modification file (for loading into a scenario), the changes do not show up when creating or editing a PC MOVA Connection file. This is because PC MOVA can only read the INP/INPX file (or 'Base Network' in Scenario Management) and not any associated Scenario or Modification files.

2.3 To get around this issue, there are a couple of options available:

Option 1

2.4 For the scenario which features the new/updated signalised junction changes, export the scenario using 'Project Explorer' to create an INP/INPX file (see **Figure 2.2**). This will then allow the detectors to be mapped as in **Figure 2.1**.

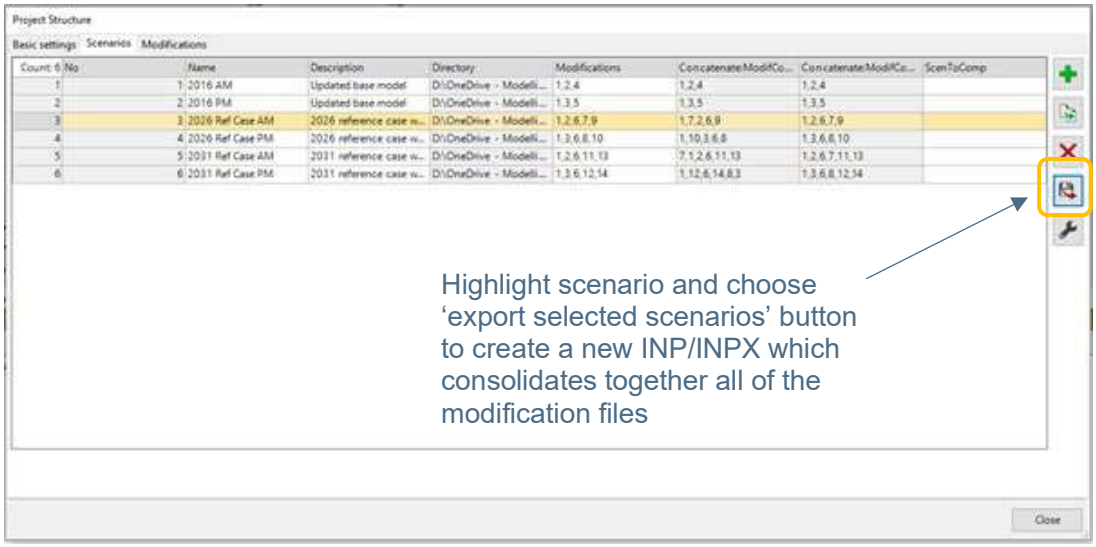


FIGURE 2.2: EXAMPLE OF EXPORTING SCENARIO FOR INP/INPX

Option 2

2.5 Within the 'Base Network', create a dummy link which includes of the new/amended detectors and link these to a new/existing signal controller. An example of this is shown in **Figure 2.3**.

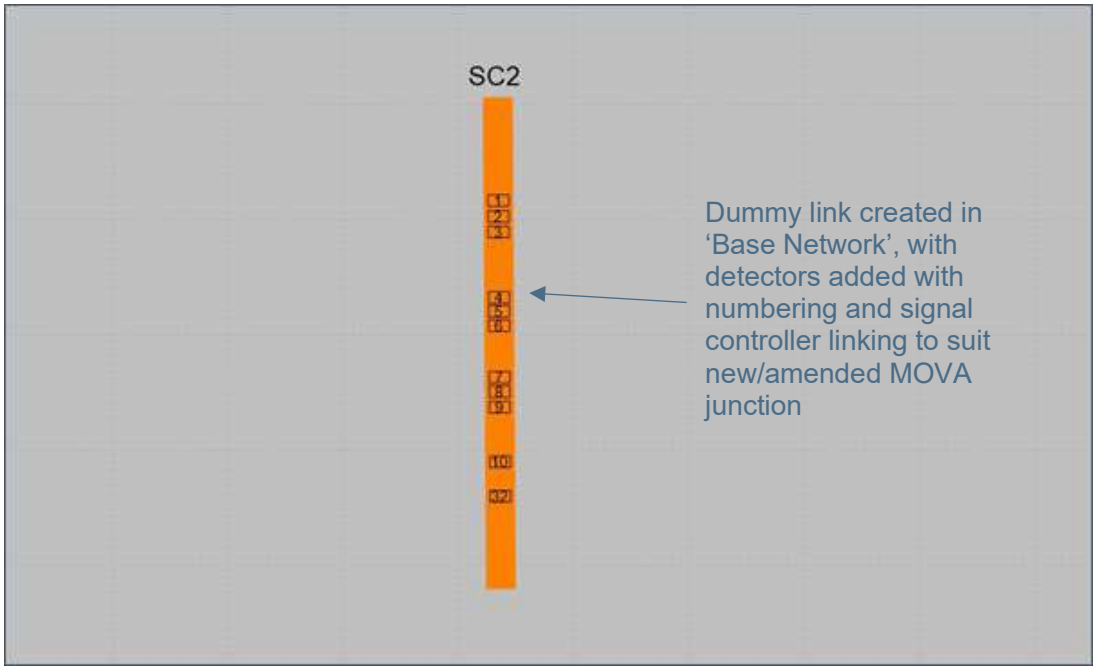


FIGURE 2.3: EXAMPLE OF DUMMY LINK & DETECTORS IN BASE MODEL

2.6 The second option provides more flexibility in being able to continue working in Scenario Manager and not have to export each scenario into separate INP/INPX files.

2.7 The PC MOVA Connection file can be created as normal by mapping the detectors and then, when a Scenario is loaded and played, PC MOVA responds to the demands on the detectors and operates the signals accordingly.

2.8 This approach suggests that the PC MOVA Connection file only needs to link the MOVA dataset to the correct VISSIM detector number, regardless of what the link number is that the detector is on.

3 WORKING EXAMPLE

3.1 To demonstrate that the use of the modification file and detector mapping (Method 2) produces the same performance as exporting to an INP/INPX file (Method 1), a working example has been developed.

3.2 This has used a single junction model which features an improvement that includes MOVA signals. The model has been coded using static assignment, with fictitious flows, turning proportions and vehicle compositions used to populate the model.

3.3 The junction modelled and detector mapping are shown in **Figure 3.1**.

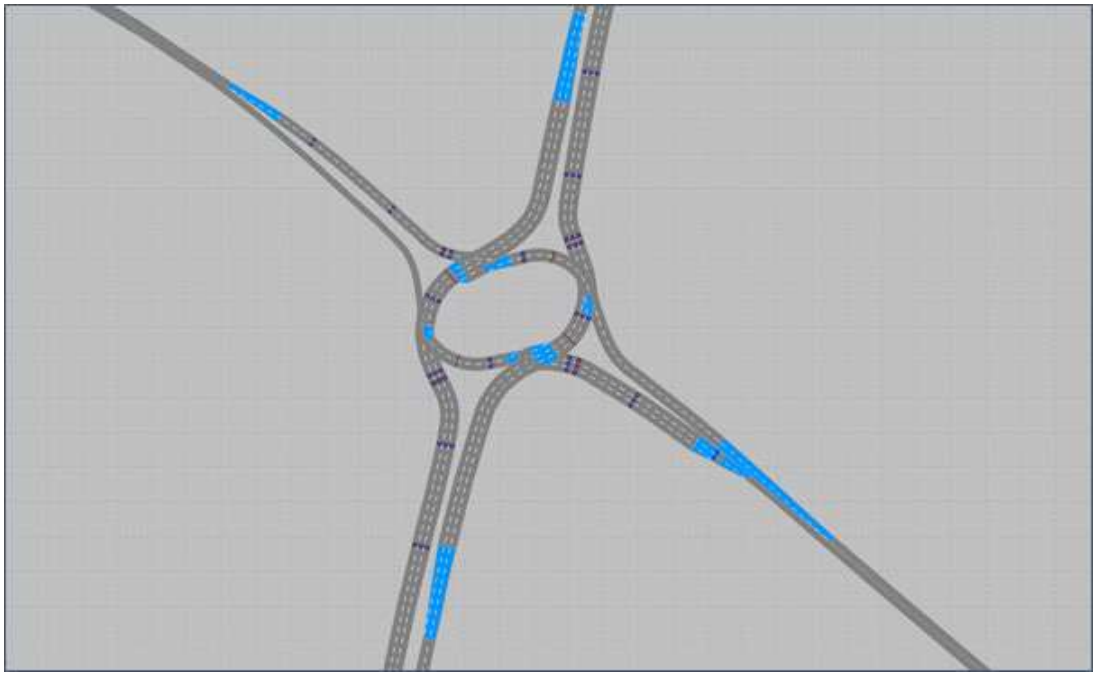


FIGURE 3.1: WORKING EXAMPLE MODEL LAYOUT

3.4 Both models have been run for results, with junction flows, queue lengths and journey times obtained from the average of 5 random seed runs.

3.5 The results of the comparisons of junction flows, average queue lengths and journey times are shown in **Figure 3.2-3.4**.

From	To	No. of Vehs (All Vehs)		Difference	
		Method 1	Method 2	No.	%
North	East	490	490	0	0%
	South	1420	1420	0	0%
	West	101	101	0	0%
East	North	392	392	0	0%
	South	413	413	0	0%
	West	194	194	0	0%
South	North	1402	1402	0	0%
	East	103	103	0	0%
	West	502	502	0	0%
West	North	400	400	0	0%
	East	196	196	0	0%
	South	407	407	0	0%

FIGURE 3.2: JUNCTION FLOW COMPARISONS



FIGURE 3.3: QUEUE LENGTH COMPARISONS

From	To	Avg Journey Time (s)		Difference	
		Method 1	Method 2	No.	%
North	East	89	89	0	0%
	South	96	96	0	0%
	West	108	108	0	0%
East	North	103	103	0	0%
	South	72	72	0	0%
	West	83	83	0	0%
South	North	91	91	0	0%
	East	108	108	0	0%
	West	79	79	0	0%
West	North	81	81	0	0%
	East	93	93	0	0%
	South	112	112	0	0%

FIGURE 3.4: JOURNEY TIME COMPARISONS

3.6 From the results collated, it can be seen that both methods produce the same network performance in terms of flows, queue lengths and journey times.

3.7 This gives confidence that the use of modification files and detector mapping is a suitable alternative to exporting to an INP/INPX file, allowing the use of scenario manager for VISSIM modelling studies if this is a preferred method of working.

4 SUMMARY

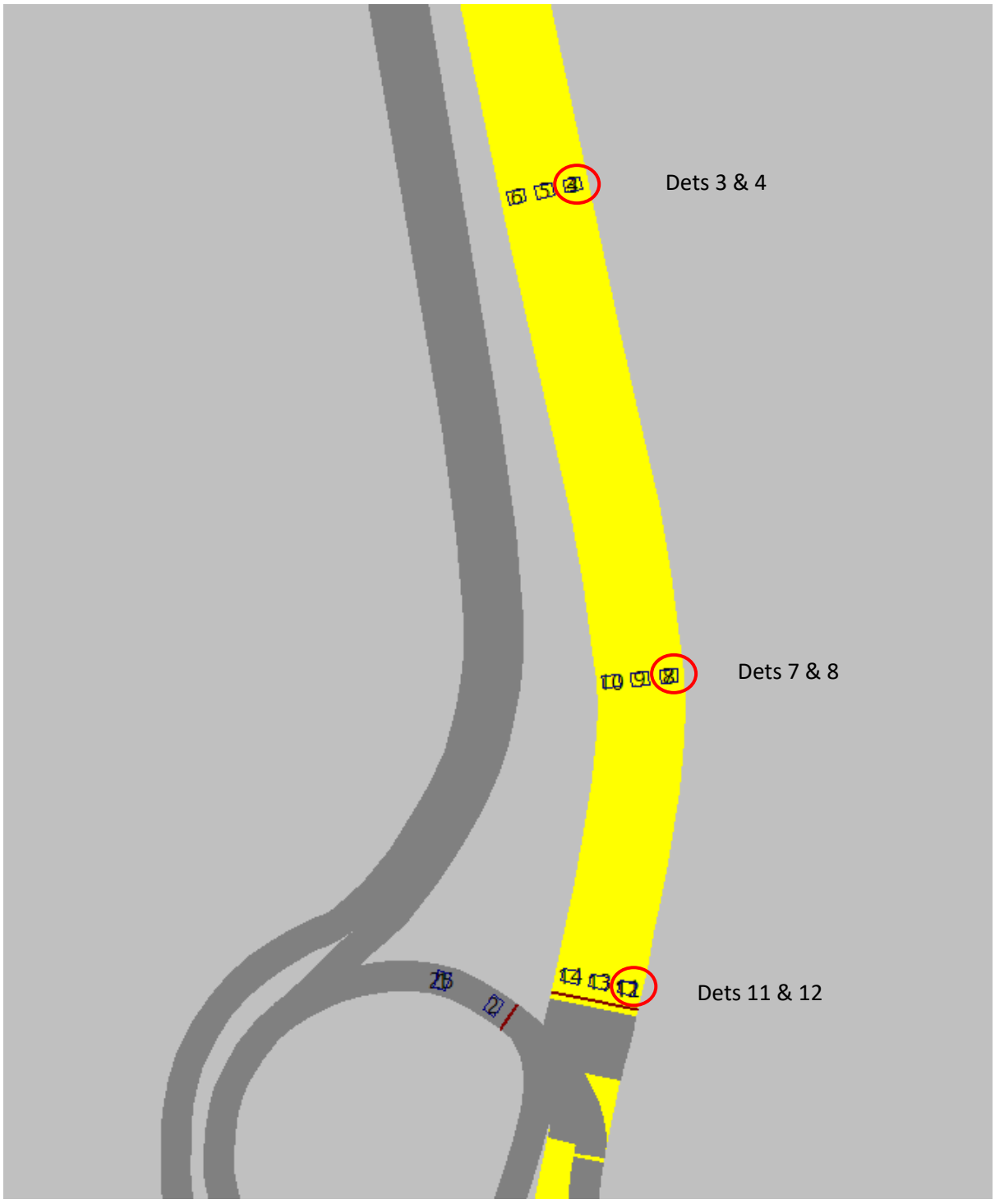
4.1 This note focuses on the interaction between PC MOVA & Scenario Management and details how both features are used in VISSIM.

4.2 Based on the working example provided, it has been demonstrated that using Scenario Management and Dummy Links with Detectors within the Base Network for a new or amended PC MOVA controlled junction provides the same modelled results as exporting the changes into a new INP/INPX file.

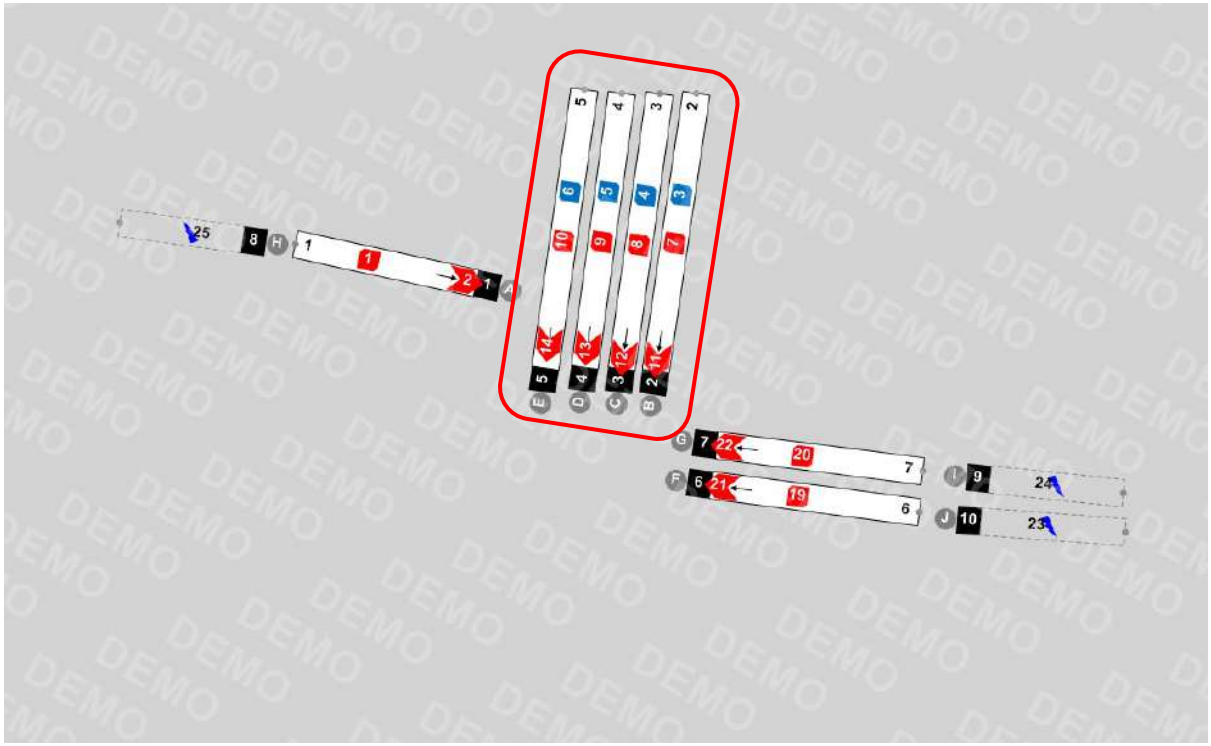
8 APPENDIX E – CHERWELL DIFFERENCES

Cherwell Set-Up

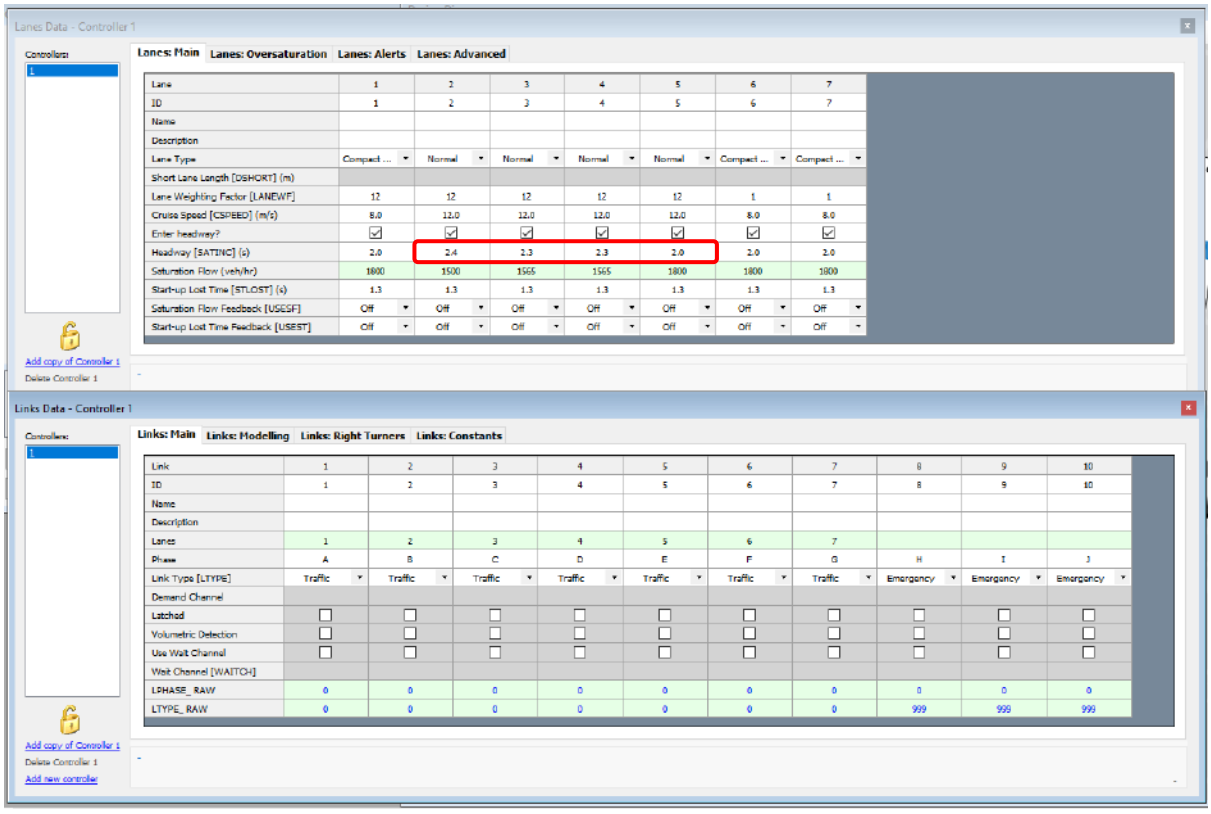
DS3 Model – Detectors overlapping each other on A43 North approach



MOVA Dataset (Southrbt1) shows 4 lanes on A43 North approach, but only 3 lanes in design drawings and in model



Lanes and Links settings show similar settings between No's 2-5, with only 'Headway [SATINC] (s)' being different



Way Forward

Given settings are almost identical, removing Lane 2 to only have 3 lanes/links on A43 North in updated MOVA Dataset (Cherwell_v2)

APPENDIX B – NEW VISSIM LOG

VISSIM Log – M40 J10 – Updated Reference Case Model

Committed Infrastructure

Project Explorer

- Created new modification file – 'Committed Infrastructure' to add in committed scheme at Padbury roundabout.
- Created two new scenarios – '2031 Ref Case AM' and '2031 Ref Case PM', with Modification File 6 included.

MOVA Datasets - Padbury

- Renamed 'M40J10SBslipST1' as 'Pad_S1'
- In MOVA Tools:
    - Set dataset name to 'Pad_S1'
    - Updated Design Diagram
    - Lanes – Lanes: Main – Lane 3 – updated short lane distance from 50m to 62m based on CAD drawing

- Renamed 'M40J10SBslipST2' as 'Pad_S2'
- In MOVA Tools:
    - Set dataset name to 'Pad_S2'
    - Updated Design Diagram

MOVA Dataset – Cherwell

- Renamed 'M40J10' mds file to 'Cherwell' to distinguish between other mds files

Base Network

Signal Controllers

- Created No's 2 & 3 to model the two streams at Padbury roundabout

Dummy Link & Detectors

- Set up 2 dummy links to include all of the detectors associated with SC 2&3. This is to allow the detectors to be mapped in PC MOVA from VISSIM.

Modification 1

Background Images

Deleted and re-added the background '160516 M40 J10 OS Mapping.dxf' and repositioned the network to match the background location (better practice and ensures model is in the same place for further background additions).

Modification 6

Padbury Roundabout

Background Images

- Added *'HE604237-KIER-GEN-M40_JN10_Z-DR-Z-0100_04.dwg'* and repositioned network to suit drawing location

Links/Connectors

- Updated link/connector structure to suit drawing. Deleted a lot of the connectors and created new ones as a result of the changes to link lengths and positions.
- On M40 SB off-slip, adjusted behaviour on approach from 'Left Side Rule' to 'Urban (motorised)' for links/connectors 10156, 139, 10157, 140, 10158, 141, 10159, 142, 10160 & 143.
- No. 10061 (Pad – M40 SB off-slip – Left) – emergency stop changed from 5m to 30m
- No. 10062 (Pad – M40 SB off-slip – Right) – emergency stop changed from 20m to 30m

Desired Speed Decisions

A43 North

- No's 27 & 28 – repositioned further back from stopline as a result of signalised approach.

M40 SB Off-Slip

- No. 87 – repositioned 40mph slightly further back to account for additional flaring on approach.
- No's 33 & 142 – tried to retain in position of base model

Reduced Speed Areas

- On A43 approach, kept length the same, but adjusted positions to sit behind signal stopline.
- On A43 South, kept RSAs as base model
- On M40 SB off-slip, kept length the same, but adjusted positions to sit behind signal stopline, added No. 136 for Lane 3
- On North circulatory, reduced length from 20m to 10m, adjusted positions to sit behind signal stopline, added No. 137 for Lane 2.

Priority Rules

- Added no's 135-152

Signal Heads

- Added No's 10-18 to model signal heads at Padbury

Detectors

- Added detector mapping to match HE model (det no's 45-67)

Nodes

- Adjusted position of Node 2 to account for increased number of lanes and length of flaring on approaches
- Undertook Edge Selection to close all unrealistic turns and U-turns

Queue Counters

- Updated to match stop-line locations on each approach

Cherwell Roundabout

Priority Rules

- Added no. 153

Detectors

- SC1 – Dets 3 & 4 (BIN3 & BIN4) – relocated from conn 10037 (pos. 15.255m) to link 29 (pos. 134m)

MOVA Dataset – Cherwell

- Amended Detector spacing for BIN3 and BIN4 from 100m to 118m to suit relocated detectors.
- Named the dataset filename 'Cherwell' to avoid errors when exporting the dataset.

Ardley Roundabout

Priority Rules

- Added no's 154 & 155

Ardley Road Staggered Junction

Reduced Speed Areas

- No's 124, 126, 127, 128, 129, 130, 131 & 132 – applied 20mph speed profiles to Motorbikes vehicle class to be consistent with the other RSAs in the network.

Journey Time Markers

- Added No's 1001-1010 to match HE JT routes from reporting TN
- Added No's 2001-2081 to cover all O-D pairs (in case needed for wider assessment)

<u>PC MOVA Connection File</u>

Created new connection file to account for committed schemes at Padbury.

For Cherwell junction, some differences between Base & DS3 in terms of detector numbering and queue detection parameters. For now, kept as existing base model, but can review when model is running. Main difference is Presence Time (3s vs. 30s) for Dets 19/20 (23/24) and no queue detection for No. 18 in Base (but parameters for No. 25 in DS3)

Network Edits following Visual Assessment

Cherwell

Links/Connectors

Connector 10099 – increased emergency stop distance from 5m to 50m

Conflict Areas

Deactivated CA's 19, 47, 4 & 7 – vehicles being too cautious when signal is green on circulatory section. In reality, would go and block A43 North approach.

Priority Rules

Added PRs 156, 157, 158, 159, 160 & 161 (to give more realistic driver behaviour in give-way and congested conditions)

Adjusted PR 86 – moved conflict marker so that it only applied to main road, not looking at vehs on the connector. Reduced length from 12m to 8m.

Ardley

Priority Rules

No's 154 & 155 – adjusted conflict marker locations

No's 7,8,49 & 50 – added headway markers

Added PR 162 – reduce overlapping vehs

Added PRs 164 & 165 – reduce overlapping vehs

Baynard's Green

Priority Rules

Added PRs 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178 – added to reduce instances of overlapping vehicles and provide suitable behaviour around roundabout at congested times.

07/12/22 – Updated following receipt of BTM Flows – 2026 Ref Case

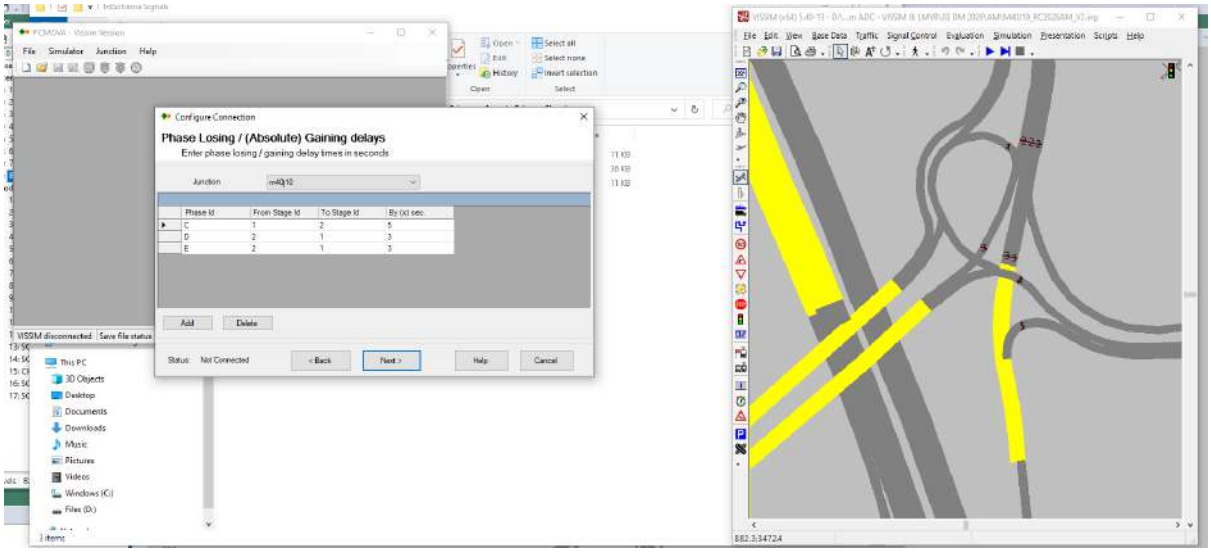
Project Explorer

- Created new modification files – '2026 AM Ref Case Flows' and '2026 PM Ref Case Flows' to add in 2026 flows from the BTM (strategic transport model – provided by ADC).
- Created new modification files – 'SC5 - DynAssignEdits' and 'SC5 - DynAssignEdits' to pick up dynamic assignment changes when running the model for paths, costs, convergence and results.
- Created two new scenarios – '2026 Ref Case AM' and '2026 Ref Case PM', with the new modification files added.

14/02/23 – Updated to account for signal changes – 2026 Ref Case

PC MOVA Connection File

Added the following phase delays, based on what was previously included in AECOM's previous M40 J10 testing.



Modification 6

Static Route Closure

Added a route closure for M40 southbound traffic – to stop vehicles turning off and then re-joining the M40 mainline (which wasn't picked up through edge closures).

24/02/23 – Updated following receipt of BTM Flows – 2031 Ref Case

Modification 7

Matrices

Updated matrices to account for updated 2031 BTM flows

Modification 8

Matrices

Updated matrices to account for updated 2031 BTM flows

APPENDIX C – 2031 REFERENCE CASE FLOW CALCULATIONS

2031 REFERENCE CASE CALCULATIONS - AM PEAK

STEP 1 - FLOWS FROM RTM

AM PEAK

LIGHTS

	1	2	3	4	5	6	7	8	9	Total
1	0	295	59	1515	809	0	25	5	25	2734
2	153	0	0	2	90	149	319	0	0	803
3	52	0	0	1	243	79	169	0	0	543
4	928	8	216	0	2	2615	5	13	4	3812
5	130	15	0	0	0	0	92	15	51	303
6	0	281	130	6103	167	0	23	11	63	3725
7	5	55	386	0	312	17	0	0	5	779
8	4	1	0	2	28	10	0	0	61	84
9	127	8	0	0	0	169	53	0	0	357
Total	1276	970	651	6669	797	3059	396	72	211	13082

HGVs

	1	2	3	4	5	6	7	8	9	Total
1	0	0	0	0	256	0	0	0	0	256
2	54	0	0	0	0	0	45	0	0	99
3	22	0	0	0	59	0	73	0	0	155
4	72	0	28	0	0	512	0	0	0	612
5	0	0	0	0	0	0	0	0	13	13
6	0	63	102	838	0	0	0	0	24	1027
7	0	12	0	0	0	0	0	0	0	12
8	0	0	0	0	0	0	0	0	18	18
9	0	0	0	0	0	0	0	0	0	0
Total	146	94	130	1129	0	589	45	0	68	2186

Total

	1	2	3	4	5	6	7	8	9	Total
1	0	295	59	1515	1065	0	25	5	25	2990
2	208	0	0	2	90	149	364	0	0	902
3	74	0	0	1	302	79	242	0	0	698
4	999	8	244	0	2	3127	5	13	4	4423
5	130	15	0	0	0	0	92	15	51	303
6	0	344	232	6941	167	0	23	11	88	7751
7	5	67	386	0	312	17	0	0	5	791
8	4	1	0	2	28	10	0	0	61	102
9	127	8	0	0	0	169	53	0	0	357
Total	1621	1036	920	8461	1965	3552	804	44	233	18517

STEP 2 - CONVERT TO 15 MIN MATRICES USING 2016 BASE PROPORTIONS

LIGHTS

Time Period	Total	Overall Total	Proportion
0645-0700	2121	9302	23%
0700-0715	2217	9302	24%
0715-0730	2381	9302	26%
0730-0745	2271	9302	24%
			97%

HEAVIES

Time Period	Total	Overall Total	Proportion
0645-0700	451	1397	32%
0700-0715	406	1397	29%
0715-0730	418	1397	30%
0730-0745	377	1397	27%
			118%

LIGHTS

Time Period	Total	Overall Total	Proportion
0745-0800	2568	9302	27%
0800-0815	2432	9302	26%
0815-0830	2336	9302	24%
0830-0845	2096	9302	23%
			100%

HEAVIES

Time Period	Total	Overall Total	Proportion
0745-0800	372	1397	27%
0800-0815	348	1397	25%
0815-0830	366	1397	26%
0830-0845	313	1397	22%
			100%

LIGHTS

Time Period	Total	Overall Total	Proportion
0815-0900	1978	9302	21%
0900-0915	1825	9302	20%
			41%

HEAVIES

Time Period	Total	Overall Total	Proportion
0815-0900	343	1397	25%
0900-0915	344	1397	25%
			49%

Used week total to determine proportions for warm-up and cool-down periods

Used week total to determine proportions for cool down period

LIGHTS

0645-0700

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	60	19	305	68	0	5	0	0	453
2	29	0	0	0	6	34	73	0	0	138
3	12	0	0	37	56	18	0	0	0	89
4	212	1	49	0	0	602	1	3	1	869
5	25	3	0	1	0	21	3	7	23	84
6	0	64	30	1407	38	0	5	3	10	655
7	13	90	0	23	0	0	0	0	1	131
8	1	0	0	0	6	2	0	0	7	16
9	0	0	0	0	0	38	22	2	3	67
TOTAL	291	221	92	1869	175	755	93	16	48	2705

0700-0715

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	69	14	319	75	0	5	0	0	474
2	27	0	0	0	5	35	79	0	0	146
3	12	0	0	99	17	25	0	0	0	93
4	221	1	51	0	0	629	1	3	1	908
5	26	3	0	1	0	22	3	7	23	88
6	0	69	31	740	35	0	5	3	10	894
7	13	96	0	24	0	0	0	0	1	137
8	1	0	0	0	6	2	0	0	7	20
9	0	0	0	0	0	38	22	2	3	79
TOTAL	304	231	96	1118	183	757	94	17	50	2839

0715-0730

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	68	15	337	77	0	6	0	7	509
2	29	0	0	0	5	38	83	0	0	155
3	13	0	0	62	18	27	0	0	0	100
4	238	1	55	0	1	676	2	3	1	976
5	28	4	0	1	0	24	4	8	26	96
6	0	75	33	795	38	0	6	3	11	960
7	14	101	0	26	0	0	0	0	1	167
8	1	0	0	0	6	2	0	0	8	21
9	0	0	0	0	0	42	24	2	4	76
TOTAL	327	249	103	1231	154	752	121	16	56	3059

0730-0745

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	65	16	321	73	0	5	0	6	486
2	28	0	0	0	5	36	78	0	0	147
3	13	0	0	60	17	26	0	0	0	95
4	227	1	52	0	0	645	1	3	1	931
5	27	4	0	1	0	22	4	7	25	90
6	0	71	32	758	36	0	6	3	10	915
7	13	97	0	25	0	0	0	0	1	140
8	1	0	0	0	6	2	0	0	8	20
9	0	0	0	0	0	40	23	2	4	72
TOTAL	311	237	99	1165	185	755	96	16	52	2897

0745-0800

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	73	16	360	82	0	6	0	7	545
2	31	0	0	1	5	41	87	0	0	165
3	14	0	0	65	19	29	0	0	0	107
4	256	1	59	0	1	723	2	4	1	1046
5	30	4	0	1	0	25	4	8	29	101
6	0	80	36	850	40	0	6	3	12	1027
7	15	108	0	28	0	0	0	0	1	157
8	1	0	0	0	6	2	0	0	8	23
9	0	0	0	0	0	44	25	2	4	84
TOTAL	348	266	111	1286	207	867	108	20	58	3256

0800-0815

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	69	15	346	78	0	6	0	7	522
2	30	0	0	0	5	39	83	0	0	158
3	14	0	0	69	18	28	0	0	0	132
4	263	1	56	0	1	690	2	4	1	997
5	29	4	0	1	0	24	4	8	27	96
6	0	76	34	811	38	0	6	3	11	982
7	14	103	0	27	0	0	0	0	1	150
8	1	0	0	0	6	2	0	0	8	22
9	0	0	0	0	0	42	24	2	4	77
TOTAL	353	254	106	1226	196	868	103	19	59	3112

0815-0830

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	63	14	315	72	0	5	0	6	474
2	27	0	0	0	5	36	76	0	0	144
3	12	0	0	59	17	25	0	0	0	94
4	242	1	51	0	0	632	1	3	1	912
5	26	4	0	1	0	22	4	7	24	88
6	0	70	31	743	35	0	6	3	10	897
7	13	95	0	24	0	0	0	0	1	132
8	1	0	0	0	6	2	0	0	7	22
9	0	0	0	0	0	40	23	2	4	71
TOTAL	325	233	97	1122	181	780	96	17	51	2840

0830-0845

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	60	13	296	68	0	5	0	6	448
2	26	0	0	0	4	33	72	0	0	136
3	12	0	0	57	16	24	0	0	0	89
4	209	1	48	0	0	595	1	3	1	859
5	25	3	0	1	0	21	3	7	23	83
6	0	66	29	699	33	0	5	3	10	845
7	12	89	0	23	0	0	0	0	1	125
8	1	0	0	0	6	2	0	0	7	19
9	0	0	0	0	0	37	21	2	4	67
TOTAL	287	219	91	1057	171	687	88	16	48	2670

0645-0800

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	60	19	305	68	0	5	0	6	453
2	29	0	0	0	6	34	73	0	0	138
3	12	0	0	37	56	18	0	0	0	89
4	212	1	49	0	0	602	1	3	1	869
5	25	3	0	1	0	21	3	7	23	84
6	0	64	30	1407	38	0	5	3	10	655
7	13	90	0	23	0	0	0	0	1	131
8	1	0	0	0	6	2	0	0	7	16
9	0	0	0	0	0	38	22	2	3	67
TOTAL	291	221	92	1869	175	755	93	16	48	2705

0700-0715

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	69	14	319	75	0	5	0	6	474
2	27	0	0	0	5	35	79	0	0	146
3	12	0	0	99	17	25	0	0	0	93
4	221	1	51	0	0	629	1	3	1	908
5	26	4	0	1	0	22	4	7	23	88
6	0	69	31	740	35	0	5	3	10	894
7	13	96	0	24	0	0	0	0	1	137
8	1	0	0	0	6	2	0	0	7	20
9	0	0	0	0	0	38	22	2	3	79
TOTAL	304	231	96	1118	183	757	94	17	50	2839

0715-0730

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	68	15	337	77	0	6	0	7	509
2	29	0	0	0	5	38	83	0	0	155
3	13	0	0	62	18	27	0	0	0	100
4	238	1	55	0	1	676	2	3	1	976
5	28	4	0	1	0	24	4	8	26	96
6	0	75	33	795	38	0	6	3	11	960
7	14	101	0	26	0	0	0	0	1	167
8	1	0	0	0	6	2	0	0	8	21
9	0	0	0	0	0	42	24	2	4	76
TOTAL	327	249	103	1231	154	752	121	16	56	3059

0730-0745

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	65	16	321	73	0	5	0	6	486
2	28	0	0	0	5	36	78	0	0	147
3	13	0	0	60	17	26	0	0	0	95
4	227	1	52	0	0	645	1	3	1	931
5	27	4	0	1	0	22	4	7	25	90
6	0	71	32	758	36	0	6	3	10	915
7	13	97	0	25	0	0	0	0	1	140
8	1	0	0	0	6	2	0	0	8	20
9	0	0	0	0	0	40	23	2	4	72
TOTAL	311	237	99	1165	185	755	96	16	52	2897

0745-0800

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	73	16	360	82	0	6	0	7	545
2	31	0	0	1	5	41	87	0	0	165
3	14	0	0	65	19	29	0	0	0	107
4	256	1	59	0	1	723	2	4	1	1046
5	30	4	0	1	0	25	4	8	29	101
6	0	80	36	850	40	0	6	3	12	1027
7	15	108	0	28	0	0	0	0	1	157
8	1	0	0	0	6	2	0	0	8	23
9	0	0	0	0	0	44	25	2	4	84
TOTAL	348	266	111	1286	207	867	108	20	58	3256

0800-0815

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	69	15	346	78	0	6	0	7	522
2	30	0	0	0	5	39	83	0	0	158
3	14	0	0	69	18	28	0	0	0	132
4	263	1	56	0	1	690	2	4	1	997
5	29	4	0	1	0	24	4	8	27	96
6	0	76	34	811	38	0	6	3	11	982
7	14	103	0	27	0	0	0	0	1	150
8	1	0	0	0	6	2	0	0	8	22
9	0	0	0	0	0	42	24	2	4	77
TOTAL	353	254	106	1226	196	868	103	19	59	3112

0815-0830

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	63	14	315	72	0	5	0	6	474
2	27	0	0	0	5	36	76	0	0	144
3	12	0	0	59	17	25	0	0	0	94
4	242	1	51	0	0	632	1	3	1	912
5	26	4	0	1	0	22	4	7	24	88
6	0	70	31	743	35	0	6	3	10	897
7	13	95	0	24	0	0	0	0	1	132
8	1	0	0	0	6	2	0	0	7	22
9	0	0	0	0	0	40	23	2	4	71
TOTAL	325	263	97	1122	181	780	96	17	51	2840

0830-0845

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	60	13	296	68	0	5	0	6	448
2	26	0	0	0	4	33	72	0	0	136
3	12	0	0	57	16	24	0	0	0	89
4	209	1	48	0	0	595	1	3	1	859
5	25	3	0	1	0	21	3	7	23	83
6	0	66	29	699	33	0	5	3	10	845
7	12	89	0	23	0	0	0	0	1	125
8	1	0	0	0	6	2	0	0	7	19
9	0	0	0	0	0	37	21	2	4	67
TOTAL	287	219	91	1057	171	687	88	16	48	2670

0645-0900

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	94	13	280	64	0	5	0	6	623
2	24	0	0	0	4	32	68	0	0	128
3	11	0	0	35	15	23	0	0	0	84
4	197	1	45	0	0	562	1	3	1	810
5	23	3	0	1	0	20	3	7	22	79
6	0	62	28	660	31	0	5	2	9	797
7	12	84	0	22	4	0	0	0	1	123
8	1	0	0	0	6	2	0	0	7	16
9	0	0	0	0	0	33	20	2	3	58
TOTAL	271	206	86	997	161	668	86	11	45	2523

0700-0715

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	92	12	258	58	0	4	0	5	390
2	22	0	0	0	4	29	64	0	0	118
3	10	0	0	82	14	21	0	0	0	77
4	182	1	42	0	0	518	1	3	1	748
5	21	3	0	1	0	18	3	6	20	73
6	0	57	26	605	29	0	5	2	8	736
7	11	78	0	20	3	0	0	0	1	113
8	1	0	0	0	7	2	0	0	9	19
9	2	0	0	0	0	32	19	2	3	58
TOTAL	250	190	79	920	168	667	77	14	41	2328

0715-0730

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	0	1	57	0	0	0	0	0	58
2	24	0	0	0	0	0	33	0	0	57
3	10	0	0	82	14	21	0	0	0	77
4	182	1	42	0	0	518	1	3	1	748
5	21	3	0	1	0	18	3	6	20	73
6	0	57	26	605	29	0	5	2	8	736
7	11	78	0	20	3	0	0	0	1	113
8	1	0	0	0	7	2	0	0	9	19
9	2	0	0	0	0	32	19	2	3	58
TOTAL	250	190	79	920	168	607	77	14	41	2328

0730-0745

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	0	1	52	0	0	0	0	0	53
2	26	0	0	0	0	0	0	0	0	26
3	12	0	0	0	0	0	0	0	0	12
4	169	1	39	0	0	480	1	3	1	693
5	19	3	0	1	0	17	3	6	19	68
6	0	53	24	560	27	0	5	2	7	678
7	10	72	0	19	3	0	0	0	1	105
8	1	0	0	0	6	2	0	0	8	17
9	0	0	0	0	0	30	18	2	3	53
TOTAL	233	176	73	832	156	529	67	13	39	2126

0745-0800

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	0	1	52	0	0	0	0	0	53
2	26	0	0	0	0	0	0	0	0	26
3	12	0	0	0	0	0	0	0	0	12
4	169	1	39	0	0	480	1	3	1	693
5	19	3	0	1	0	17	3	6	19	68
6	0	53	24	560	27	0	5	2	7	678
7	10	72	0	19	3	0	0	0	1	105
8	1	0	0	0	6	2	0	0	8	17
9	0	0	0	0	0	30	18	2	3	53
TOTAL	233	176	73	832	156	529	67	13	39	2126

0800-0815

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	0	1	48	0	0	0	0	0	49
2	14	0	0	0	0	11	0	0	0	25
3	5	0	0	24	0	0	0	0	0	29
4	18	0	0	7	0	0	127	0	0	152
5	3	0	0	0	0	0	0	0	0	3
6	0	11	25	209	0	0	0	0	6	251
7	1	0	0	0	0	0	0	0	0	1
8	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0
TOTAL	86	14	33	281	0	147	11	0	12	535

0815-0830

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	0	1	51	0	0	0	0	0	52
2	14	0	0	0	0	12	0	0	0	26
3	6	0	0	25	0	20	0	0	0	51
4	18	0	0	7	0	0	103	0	0	129
5	3	0	0	0	0	0	0	0	0	3
6	0	11	27	216	0	0	0	0	6	262
7	1	0	0	0	0	0	0	0	0	1
8	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0
TOTAL	86	16	35	296	0	155	12	0	12	559

0830-0845

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	0	1	44	0	0	0	0	0	44
2	12	0	0	0	0	10	0	0	0	22
3	5	0	0	22	0	17	0	0	0	44
4	16	0	0	6	0	0	115	0	0	137
5	3	0	0	0	0	0	0	0	0	3
6	0	10	23	185	0	0	0	0	5	226
7	1	0	0	0	0	0	0	0	0	1
8	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0
TOTAL	33	12	30	253	0	122	10	0	11	681

0645-0900

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	0	1	68	0	0	0	0	0	69
2	13	0	0	0	0	11	0	0	0	25
3	5	0	0	24	0	19	0	0	0	48
4	17	0	0	7	0	126	0	0	0	151
5	0	0	0	0	0	0	0	0	0	0
6	0	14	33	203	0	0	0	0	5	255
7	1	0	0	0	0	0	0	0	0	1
8	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0
TOTAL	36	14	33	279	0	165	11	0	12	550

0700-0

2031 REFERENCE CASE CALCULATIONS - PM PEAK

STEP 1 - TRANSLATE ADC FLOWS TO MIN M ZONES (MOVEM10 to 20)

LIGHTS

	1	2	3	4	5	6	7	8	9	Total
1	0	213	105	1116	102	0	16	0	15	1467
2	322	0	0	8	7	247	319	6	0	909
3	76	0	0	0	219	0	169	0	0	464
4	1535	4	179	0	7	1669	11	17	0	3453
5	137	0	0	0	0	0	166	0	126	67	496
6	0	213	105	6083	65	0	0	11	67	6546
7	7	22	322	0	47	15	0	0	5	353
8	0	0	0	0	2	17	0	0	15	49
9	0	0	0	0	0	0	0	0	0	0
Total	2132	714	693	6492	451	4296	886	191	346	19604

HGVs

	1	2	3	4	5	6	7	8	9	Total
1	0	17	0	214	0	0	0	0	0	175
2	0	0	0	0	0	0	0	0	0	0
3	23	0	0	0	82	0	0	0	0	105
4	101	0	80	0	0	670	0	0	0	855
5	0	0	0	0	0	0	0	0	0	0
6	0	0	89	532	0	0	0	0	0	621
7	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0
Total	124	17	169	746	82	670	0	0	0	1756

Total

	1	2	3	4	5	6	7	8	9	Total
1	0	230	105	1330	102	0	16	0	15	1642
2	322	0	0	8	7	247	319	6	0	909
3	99	0	0	0	301	0	169	0	0	569
4	1636	4	259	0	7	2339	11	17	0	4308
5	137	0	0	0	0	0	166	0	126	75	496
6	0	213	194	6615	65	0	0	11	67	7167
7	7	22	322	0	47	15	0	0	5	418
8	0	0	0	0	2	17	0	0	15	49
9	0	0	0	0	0	0	0	0	0	0
Total	2259	780	886	5221	551	5087	688	191	550	14896

STEP 2 - CONVERT TO 15 MIN MATRICES USING 2016 AM8 PROPORTIONS

LIGHTS

Time Period	Total	Overall Total	Proportion
1530-1545	2300	10763	21%
1545-1600	2375	10763	22%
1600-1615	2533	10763	23%
1615-1630	2578	10763	24%
			91%

HEAVIES

Time Period	Total	Overall Total	Proportion
1530-1545	387	1092	35%
1545-1600	370	1092	34%
1600-1615	328	1092	30%
1615-1630	302	1092	28%
			127%

LIGHTS

Time Period	Total	Overall Total	Proportion
1630-1645	2655	10763	25%
1645-1700	2709	10763	25%
1700-1715	2640	10763	25%
1715-1730	2759	10763	26%
			100%

HEAVIES

Time Period	Total	Overall Total	Proportion
1630-1645	292	1092	27%
1645-1700	269	1092	25%
1700-1715	286	1092	26%
1715-1730	245	1092	22%
			100%

LIGHTS

Time Period	Total	Overall Total	Proportion
1730-1745	2662	10763	25%
1745-1800	2520	10763	23%
			48%

Used peak total to determine proportions for cool down period

HEAVIES

Time Period	Total	Overall Total	Proportion
1730-1745	243	1092	22%
1745-1800	247	1092	23%
			45%

Used peak total to determine proportions for cool down period

LIGHTS

1530-1545

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	54	29	242	22	0	12	1	2	356
2	69	0	0	2	2	53	69	1	0	196
3	16	0	0	67	0	31	0	0	0	94
4	333	1	38	0	1	356	2	4	0	1145
5	29	1	0	0	0	29	0	27	14	100
6	0	45	21	1319	14	0	0	3	13	766
7	5	52	0	10	3	0	0	0	1	71
8	2	0	0	0	6	2	0	0	0	10
9	0	0	0	0	0	2	17	0	5	24
TOTAL	455	153	92	960	56	918	82	41	31	2757

1545-1600

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	54	29	250	22	0	12	1	0	368
2	71	0	0	1	2	53	70	1	0	199
3	17	0	0	68	0	32	0	0	0	97
4	341	1	40	0	1	414	2	4	0	1202
5	30	1	0	0	0	30	0	28	15	103
6	0	47	22	680	15	0	0	3	13	791
7	5	53	0	10	3	0	0	0	1	77
8	2	0	0	0	6	2	0	0	0	10
9	0	0	0	0	0	2	17	0	6	25
TOTAL	470	158	95	981	55	968	85	42	32	2877

1600-1615

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	58	25	265	23	0	13	1	0	390
2	75	0	0	2	2	57	75	1	0	211
3	18	0	0	73	0	34	0	0	0	103
4	361	1	42	0	1	442	2	4	0	1274
5	32	1	0	0	0	31	0	30	16	110
6	0	50	24	720	16	0	0	4	14	838
7	10	57	0	11	3	0	0	0	1	82
8	2	0	0	0	6	2	0	0	0	14
9	0	0	0	0	0	2	18	0	6	26
TOTAL	498	167	101	1068	59	1004	98	45	36	3047

1615-1630

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	60	26	272	24	0	13	1	0	399
2	77	0	0	2	2	58	76	1	0	216
3	18	0	0	52	0	35	0	0	0	105
4	370	1	43	0	2	454	2	4	0	1356
5	33	1	0	0	0	32	0	30	16	112
6	0	51	25	748	20	0	0	4	11	859
7	10	58	0	11	4	0	0	0	1	84
8	2	0	0	0	6	2	0	0	0	14
9	0	0	0	0	0	2	19	0	6	27
TOTAL	511	171	106	1079	60	1029	92	46	35	3126	11835

1630-1645

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	62	27	280	25	0	14	1	0	411
2	79	0	0	2	2	66	79	1	0	229
3	19	0	0	54	0	36	0	0	0	108
4	381	1	44	0	2	933	3	4	0	1165
5	34	1	0	0	0	33	0	31	17	116
6	0	52	39	760	21	0	0	4	12	885
7	10	60	0	12	4	0	0	0	1	86
8	2	0	0	0	7	2	0	0	0	15
9	0	0	0	0	0	2	19	0	6	28
TOTAL	526	176	107	1108	62	1060	95	47	36	3217

1645-1700

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	64	27	285	24	0	14	1	0	420
2	81	0	0	2	2	61	80	1	0	227
3	19	0	0	55	0	36	0	0	0	111
4	389	1	45	0	2	929	3	4	0	1373
5	35	1	0	0	0	34	0	32	17	119
6	0	54	36	776	21	0	0	4	12	903
7	11	61	0	12	4	0	0	0	1	89
8	2	0	0	0	7	2	0	0	0	15
9	0	0	0	0	0	2	18	0	6	26
TOTAL	556	180	109	1131	65	1065	97	43	37	3302

1700-1715

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	62	27	278	25	0	14	1	0	428
2	79	0	0	2	2	59	78	1	0	221
3	19	0	0	54	0	35	0	0	0	108
4	379	1	44	0	2	905	3	4	0	1338
5	34	1	0	0	0	33	0	31	17	115
6	0	52	38	756	21	0	0	4	12	883
7	10	59	0	11	4	0	0	0	1	86
8	2	0	0	0	7	2	0	0	0	15
9	0	0	0	0	0	2	18	0	6	28
TOTAL	523	175	106	1102	61	1054	95	47	36	3199

1715-1730

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	65	28	291	26	0	14	1	0	427
2	83	0	0	2	2	62	82	1	0	231
3	20	0	0	56	0	37	0	0	0	113
4	396	1	46	0	2	946	3	4	0	1398
5	35	1	0	0	0	34	0	32	17	120
6	0	54	67	792	22	0	0	4	12	919
7	11	62	0	12	4	0	0	0	1	90
8	2	0	0	0	7	2	0	0	0	15
9	0	0	0	0	0	2	19	0	6	28
TOTAL	546	183	111	1152	64	1121	99	43	37	3365	13041	Y

1730-1745

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	62	27	280	25	0	14	1	0	412
2	80	0	0	2	2	60	79	1	0	223
3	19	0	0	54	0	36	0	0	0	109
4	382	1	44	0	2	912	3	4	0	1148
5	34	1	0	0	0	33	0	31	17	116
6	0	53	36	762	21	0	0	4	12	887
7	10	60	0	12	4	0	0	0	1	87
8	2	0	0	0	7	2	0	0	0	15
9	0	0	0	0	0	2	18	0	6	26
TOTAL	527	177	107	1111	62	1063	95	47	36	3125

1745-1800

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	59	25	266	24	0	13	1	0	392
2	75	0	0	2	2	57	75	1	0	211
3	18	0	0	51	0	34	0	0	0	103
4	362	1	42	0	1	865	3	4	0	1278
5	32	1	0	0	0	31	0	30	16	109
6	0	50	24	722	20	0	0	4	11	882
7	10	57	0	11	3	0	0	0	1	82
8	2	0	0	0	6	2	0	0	0	14
9	0	0	0	0	0	2	18	0	6	26
TOTAL	499	167	101	1092	59	1006	90	45	34	3093	6279

HEAVIES

1530-1545

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	6	1	40	0	0	0	0	0	47
2	0	0	0	0	0	0	1	0	0	1
3	0	0	0	0	0	0	0	0	0	0
4	67	0	28	0	0	238	2	0	0	335
5	0	0	0	0	0	0	0	0	0	0
6	0	3	0	32	189	0	0	0	0	221
7	0	3	0	0	0	0	0	0	0	3
8	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	1	0	0	0	20
TOTAL	67	9	29	72	189	239	3	0	0	628

1545-1600

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	6	1	38	0	0	0	0	0	45
2	0	0	0	0	0	0	1	0	0	1
3	0	0	0	0	0	0	0	0	0	0
4	64	0	27	0	0	227	2	0	0	320
5	0	0	0	0	0	0	0	0	0	0
6	0	3	0	30	181	0	0	0	0	211
7	0	3	0	0	0	0	0	0	0	3
8	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	1	0	0	0	19
TOTAL	64	9	28	68	181	228	3	0	0	629

1600-1615

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	5	1	34	0	0	0	0	0	39
2	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0
4	51	0	24	0	0	200	2	0	0	276
5	0	0	0	0	0	0	0	0	0	0
6	0	3	0	27	159	0	0	0	0	186
7	0	3	0	0	0	0	0	0	0	3
8	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	17
TOTAL	51	8	25	61	159	200	2	0	0	526

1615-1630

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	5	1	33	0	0	0	0	0	39
2	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0
4	29	0	12	0	0	165	2	0	0	208
5	0	0	0	0	0	0	0	0	0	0
6	0	3	0	25	132	0	0	0	0	172
7	0	2	0	0	0	0	0	0	0	2
8	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	16
TOTAL	29	6	13	58	132	165	2	0	0	419

1700-1715

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	5	1	29	0	0	0	0	0	34
2	0	0	0	0	0	0	1	0	0	1
3	0	0	0	0	0	0	0	0	0	0
4	27	0	11	0	0	176	2	0	0	216
5	0	0	0	0	0	0	0	0	0	0
6	0	3	0	23	140	0	0	0	0	163
7	0	2	0	0	0	0	0	0	0	2
8	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	14
TOTAL	33	7	11	52	140	176	3	0	0	431

1715-1730

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	5	1	33	0	0	0	0	0	39
2	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0
4	24	0	10	0	0	150	2	0	0	192
5	0	0	0	0	0	0	0	0	0	0
6	0	3	0	20	120	0	0	0	0	142
7	0	2	0	0	0	0	0	0	0	2
8	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	14
TOTAL	29	6	10	53	120	150	2	0	0	389	1655	Y

1730-1745

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	6	1	25	0	0	0	0	0	29
2	0	0	0	0	0	0	0	0	0	0
3	5	0	0	0	0	0	0	0	0	0
4	23	0	10	0	0	169	2	0	0	192
5	0	0	0	0	0	0	0	0	0	0
6	0	3	0	119	0	0	0	0	0	122
7	0	2	0	0	0	0	0	0	0	2
8	0	0	0	0	0	0	0	0	0	0
9	0	0	0	12	0	0	0	0	0	14
TOTAL	28	6	11	156	0	169	2	0	0	360

1745-1800

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	6	1	25	0	0	0	0	0	32
2	0	0	0	0	0	0	0	0	0	0
3	5	0	0	0	0	0	0	0	0	5
4	24	0	10	0	0	152	2	0	0	192
5	0	0	0	0	0	0	0	0	0	0	0
6	0	3	0	19	0	0	0	0	0	22
7	0	2	0	0	0	0	0	0	0	2
8	0	0	0	0	0	0	0	0	0	0
9	0	0	0	12	0	0	0	0	0	14
TOTAL	29	6	11	56	0	152	2	0	0	369	832

APPENDIX 2 – ALBION LAND PROPOSED IMPROVEMENTS

N

Forward visibility splay for 120kph (295m)

247m Forward visibility within Highway

Forward visibility splay for 100kph (215m)

Exit visibility splay for 1 step below 120kph

Forward visibility splay for 100kph

Exit visibility splay for 1 step below 100kph

Forward visibility splay for 120kph

Exit visibility splay for 1 step below 120kph

Forward visibility splay 85kph

Forward visibility splay 100kph

Key

- New channel
- Areas of new carriageway construction
- Areas of new footway construction
- New road markings
- New traffic signals
- Highway Extents
- Land under control of either OCC or NH (highway status unkown)
- Junction intervisibility zone & visibility splays
- Areas of applicants land that could be dedicated as Highway for visibility splays

REV.	DETAILS	DRAWN	CHECKED	DATE
.	.	.	.	.

Notes:

1. This is not a construction drawing and is intended for illustrative purposes only. White lining is indicative only.
2. Do not scale.
3. Topographical survey provided by National Highways

Note:
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Symmetry Park

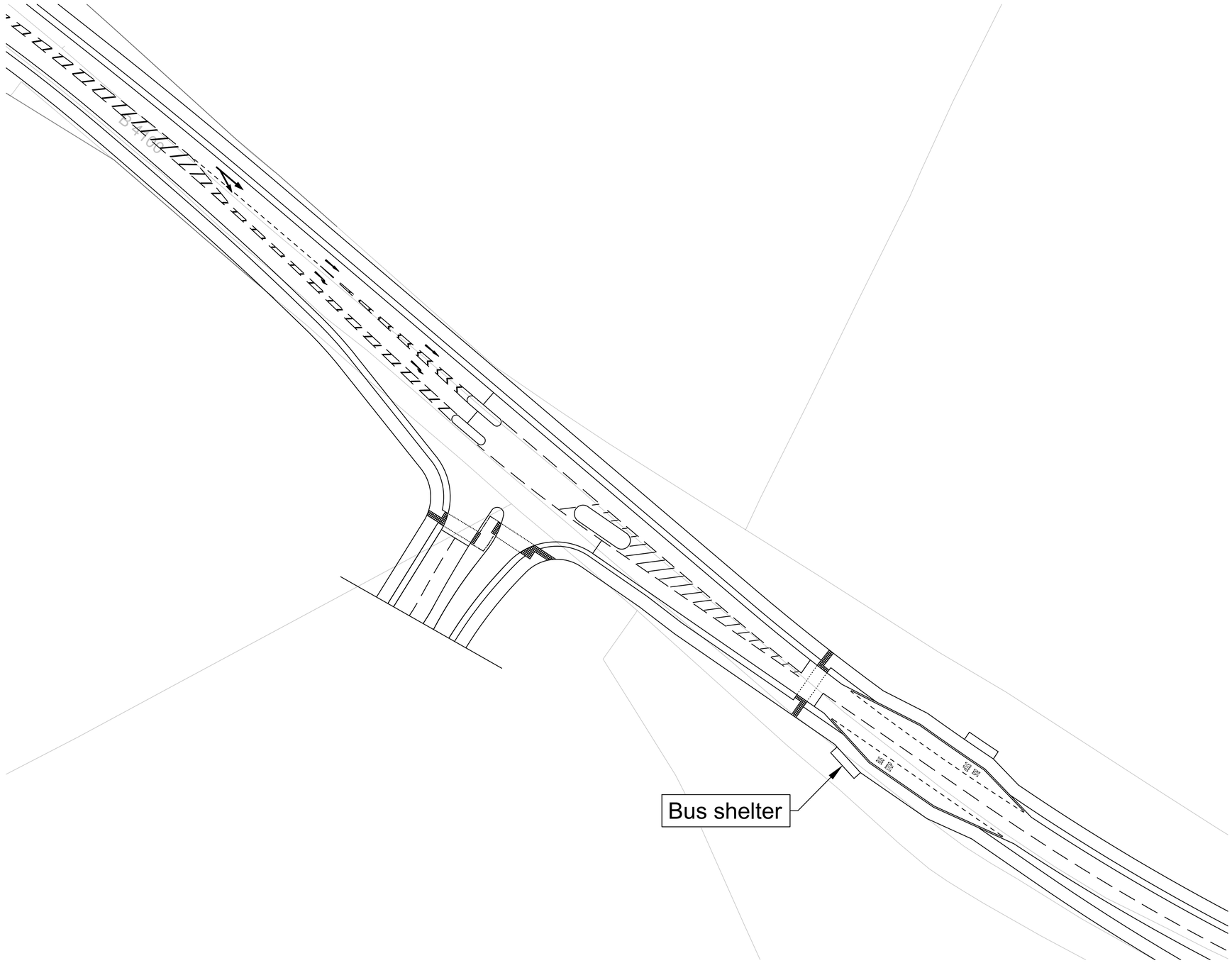
A43 / B4100 Baynards Green Roundabout
Junction Improvement
General Arrangement

DRAWN:	CHECKED:	DATE:	SCALES:
RB	JB	15.05.23	1:500 @A1

Tritax Symmetry

SLR

DRAW NG NUMBER:	REVISION:
216285/A/14	A



0 25 50 Meters

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REV	DESCRIPTION	DRAWN	INITIALS	DATE

DRAWING STATUS	CHECKED BY	DATE

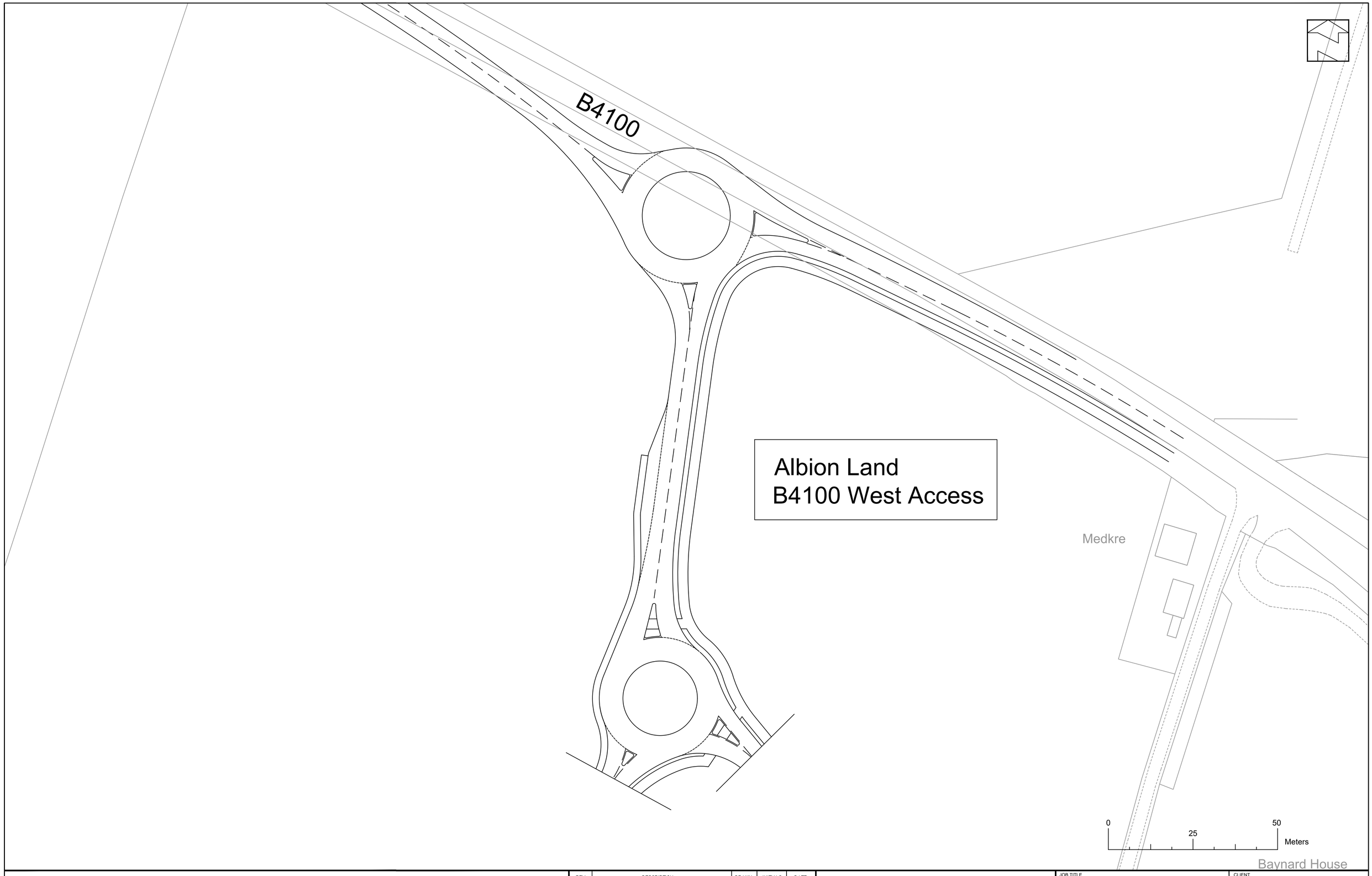
david tucker associates
transport planning consultants

Forester House, Doctors Lane
Henley-in-Arden
Warwickshire B95 5AW
Tel: +44(0)1564 793598
Fax: +44(0)1564 793983
www.dtatransportation.co.uk

JOB TITLE	CLIENT
M40 JUNCTION 10	ALBION LAND

DRAWING TITLE
EASTERN ACCESS GENERAL ARRANGEMENT
WITH B4100 BUS STOPS & CROSSING

SCALE	DRAWN BY	DATE	DRAWING No	REVISION
1:500@A1	BM/RM	03/05/24	17213-35-GA	P0



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REV	DESCRIPTION	DRAWN	INITIALS	DATE

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Tel: +44(0)1564 793598
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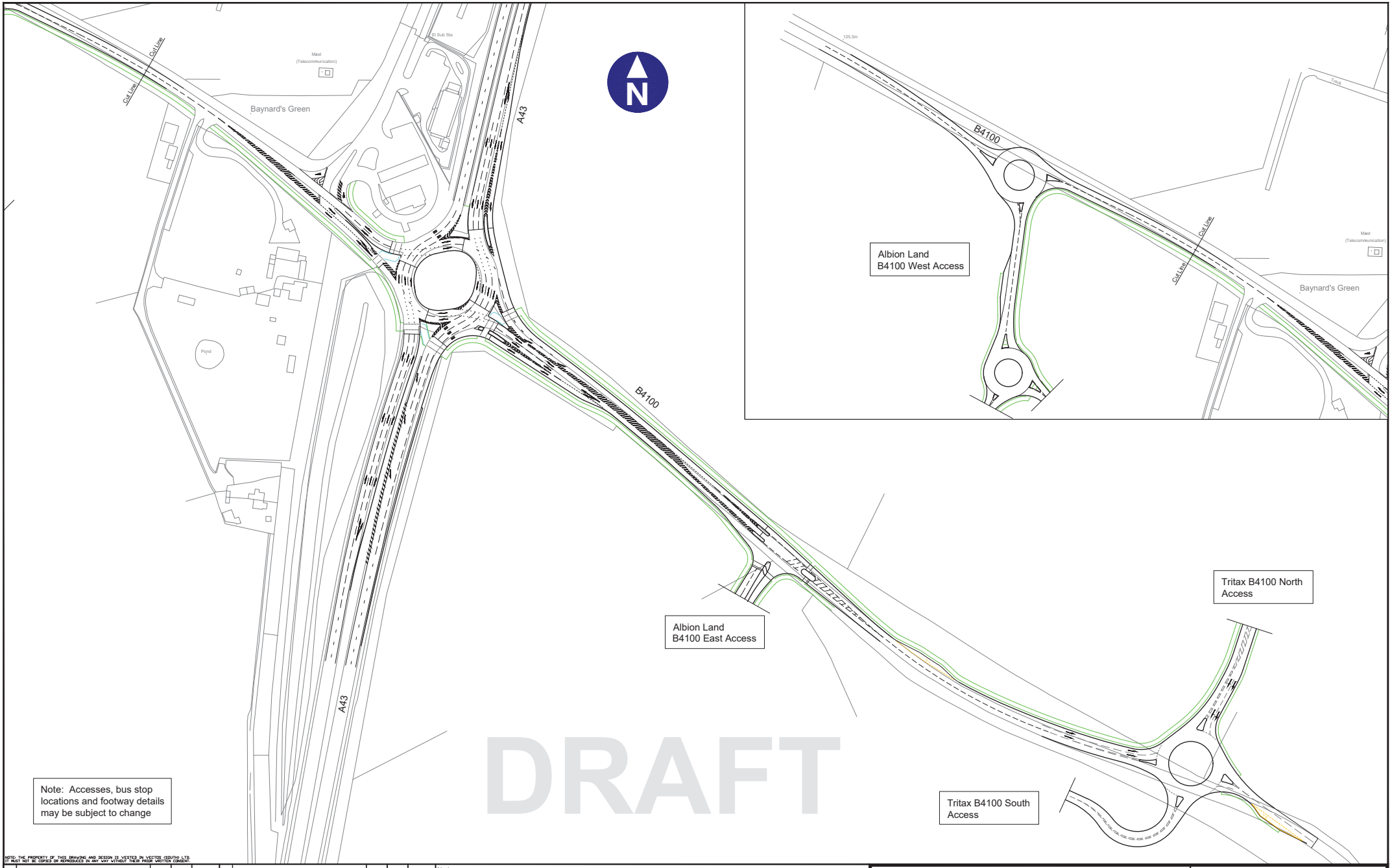
www.dtatransportation.co.uk

JOB TITLE: M40 JUNCTION 10			CLIENT: ALBION LAND	
DRAWING TITLE: WESTERN ACCESS GENERAL ARRANGEMENT				
SCALE: 1:500@A1	DRAWN BY:	DATE: 18/03/24	DRAWING No: 17213–09–GA	REVISION: P1



Note: Accesses, bus stop locations and footway details may be subject to change

DRAFT

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REV.	DETAILS	DRAWN	CHECKED	DATE
A	West Albion access included.	RB	JB	25 04 23

REV.	DETAILS	DRAWN	CHECKED	DATE

Notes:
1. This is not a construction drawing and is intended for illustrative purposes only.
2. White lining is indicative only.

PROJECT: Symmetry Park Ardley

CLIENT: Tritax Group

DRAWING TITLE: Baynards Green & B4100 Accesses General Arrangement

DRAWN	CHECKED	DATE	SCALES	DRAWING NUMBER	REVISION
HC	RB	21.04 23	1:1250 at A1	216285/SK/06	A

APPENDIX 3 – BTM FLOW CONVERSION

2034 RC3A CALCULATIONS - AM PEAK

STEP 1 - FLOWS FROM BTH

AM PEAK

Lights

	1	2	3	4	5	6	7	8	9	10	11	Total
1	0	205	60	1065	467	0	43	2	23	43	27	1146
2	212	0	0	1	9	196	207	0	0	42	29	696
3	53	0	0	157	82	107	0	0	0	0	0	399
4	965	2	216	0	3	2723	7	15	5	13	6	3955
5	175	9	5	0	0	107	0	31	60	11	7	405
6	0	230	132	3370	148	0	3	12	55	19	10	3979
7	61	307	5	16	0	0	0	0	0	36	11	439
8	4	1	0	14	5	11	0	0	64	1	0	99
9	19	0	0	0	180	136	0	0	24	0	0	363
10	5	21	0	2	7	1	8	0	4	0	0	49
11	3	14	0	1	4	1	3	0	0	0	0	27
Total	1438	980	409	4621	905	3281	272	84	248	164	91	12552

HGVs

	1	2	3	4	5	6	7	8	9	10	11	Total
1	0	2	2	238	5	0	0	0	0	15	8	268
2	18	0	0	0	0	0	12	0	0	2	1	33
3	13	0	0	57	0	46	0	0	0	0	0	116
4	142	0	17	0	0	363	0	0	0	10	9	540
5	0	0	0	1	0	1	0	0	0	1	0	3
6	0	18	61	561	0	0	0	0	0	4	2	644
7	0	7	0	0	0	0	0	0	0	0	0	7
8	0	0	0	0	8	0	0	0	0	0	0	8
9	0	0	0	0	5	0	0	0	0	0	0	5
10	16	2	0	15	1	4	0	0	0	0	0	38
11	9	1	0	3	0	3	0	0	0	0	0	16
Total	195	26	79	882	18	415	12	0	0	37	21	1687

Total

	1	2	3	4	5	6	7	8	9	10	11	Total
1	0	205	62	1258	472	0	43	2	39	44	28	2412
2	228	0	0	1	9	195	220	0	0	44	30	728
3	66	0	0	214	82	153	0	0	0	0	0	515
4	1107	2	233	0	3	3086	7	15	5	28	15	4500
5	179	9	5	0	0	108	0	31	60	12	7	413
6	0	248	193	3931	148	0	3	12	55	23	13	4623
7	61	314	5	16	0	0	0	0	0	36	11	427
8	4	1	0	14	13	11	0	0	64	1	0	107
9	19	0	0	0	185	136	0	0	24	0	0	367
10	21	23	0	17	8	5	8	0	4	0	0	87
11	12	15	0	4	4	4	3	0	0	0	0	43
Total	1693	1006	488	5503	924	3696	285	84	248	201	111	14238

STEP 2 - CONVERT TO 15 MIN MATRICES USING 2016 BASE PROPORTIONS

LIGHTS

Time Period	Total	Overall Total	Proportion
0645-0700	2121	9302	23%
0700-0715	2217	9302	24%
0715-0730	2363	9302	25%
0730-0745	2271	9302	24%
			97%

HEAVIES

Time Period	Total	Overall Total	Proportion
0645-0700	451	1397	32%
0700-0715	406	1397	29%
0715-0730	418	1397	30%
0730-0745	377	1397	27%
			118%

LIGHTS

Time Period	Total	Overall Total	Proportion
0745-0800	2548	9302	27%
0800-0815	2432	9302	26%
0815-0830	2226	9302	24%
0830-0845	2096	9302	23%
			100%

HEAVIES

Time Period	Total	Overall Total	Proportion
0745-0800	372	1397	27%
0800-0815	348	1397	25%
0815-0830	364	1397	26%
0830-0845	313	1397	22%
			100%

LIGHTS

Time Period	Total	Overall Total	Proportion
0845-0900	1979	9302	21%
0900-0915	1825	9302	20%
			41%

Used peak total to determine proportions for warm up and cool down periods

HEAVIES

Time Period	Total	Overall Total	Proportion
0845-0900	345	1397	25%
0900-0915	345	1397	25%
			49%

Used peak total to determine proportions for cool down period

LIGHTS

0645-0700

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	50	14	242	106	0	10	0	0	9	6	**489**
2	48	0	0	0	2	45	47	0	0	10	7	**159**
3	12	0	0	36	19	24	0	0	0	0	0	**91**
4	220	0	49	0	1	621	2	3	1	3	1	**902**
5	40	2	0	0	0	24	0	7	18	2	2	**96**
6	0	53	30	766	34	0	1	3	12	4	2	**907**
7	14	70	1	4	0	0	0	0	0	8	2	**96**
8	1	0	0	3	1	2	0	0	15	0	0	**23**
9	4	0	0	0	41	31	0	0	0	1	0	**77**
10	1	5	0	0	2	0	2	0	1	0	0	**11**
11	1	3	0	0	1	0	1	0	0	0	0	**6**
TOTAL		**342**	**223**	**93**	**1054**	**206**	**748**	**62**	**19**	**57**	**37**	**21**	**2862**

0700-0715

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	54	14	253	111	0	10	0	0	9	7	**511**
2	51	0	0	0	0	2	47	49	0	0	7	**166**
3	13	0	0	0	37	19	26	0	0	0	0	**95**
4	230	0	53	0	1	649	2	4	1	3	1	**943**
5	42	2	0	0	0	25	0	7	19	3	2	**100**
6	0	55	32	803	35	0	1	3	13	5	2	**940**
7	14	73	0	4	0	0	0	0	0	6	3	**100**
8	1	0	0	3	1	3	0	0	15	0	0	**24**
9	5	0	0	0	43	32	0	0	6	1	0	**86**
10	1	5	0	0	2	0	2	0	1	0	0	**12**
11	1	3	0	0	1	0	1	0	0	0	0	**6**
TOTAL		**367**	**233**	**97**	**1101**	**216**	**782**	**65**	**20**	**59**	**39**	**22**	**2991**

0715-0730

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	101	15	272	120	0	11	0	0	13	7	**549**
2	54	0	0	0	2	50	53	0	0	11	7	**178**
3	13	0	0	40	21	27	0	0	0	0	0	**102**
4	247	0	55	0	1	698	2	4	1	3	2	**1013**
5	45	2	0	0	0	27	0	8	20	3	2	**108**
6	0	59	34	863	38	0	1	3	14	5	3	**1010**
7	16	79	0	4	0	0	0	0	0	7	3	**109**
8	1	0	0	3	1	3	0	0	16	0	0	**25**
9	5	0	0	0	46	35	0	0	6	1	0	**93**
10	1	5	0	0	2	0	2	0	1	0	0	**13**
11	1	4	0	0	1	0	1	0	0	0	0	**7**
TOTAL		**364**	**251**	**185**	**1184**	**232**	**840**	**70**	**21**	**64**	**42**	**23**	**3215**

0730-0745

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	97	15	259	114	0	11	0	0	10	7	**523**
2	52	0	0	0	2	48	51	0	0	0	0	**170**
3	13	0	0	38	20	26	0	0	0	0	0	**97**
4	236	0	53	0	1	665	2	4	1	3	1	**966**
5	43	2	0	0	0	26	0	8	19	3	2	**103**
6	0	56	32	823	36	0	1	3	13	5	3	**971**
7	15	75	0	4	0	0	0	0	0	6	3	**103**
8	1	0	0	3	1	3	0	0	16	0	0	**24**
9	5	0	0	0	44	33	0	0	6	1	0	**89**
10	1	5	0	0	2	0	2	0	1	0	0	**12**
11	1	4	0	0	1	0	1	0	0	0	0	**7**
TOTAL		**366**	**239**	**190**	**1128**	**223**	**801**	**66**	**20**	**61**	**40**	**22**	**3064**	**12132**

0745-0800

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	108	16	290	126	0	12	0	0	11	14	**567**
2	58	0	0	2	54	57	0	0	0	12	8	**191**
3	14	0	0	43	22	29	0	0	0	0	0	**109**
4	264	0	59	0	1	746	2	4	1	3	2	**1083**
5	48	3	0	0	0	29	0	8	22	3	2	**115**
6	0	63	36	922	41	0	1	3	15	5	3	**1090**
7	17	84	0	4	0	0	0	0	0	7	3	**115**
8	1	0	0	4	1	3	0	0	18	0	0	**27**
9	5	0	0	0	49	37	0	0	7	0	1	**99**
10	1	6	0	0	2	0	2	0	1	0	0	**13**
11	1	4	0	0	1	0	1	0	0	0	0	**7**
TOTAL		**410**	**268**	**112**	**1296**	**246**	**889**	**75**	**23**	**68**	**45**	**25**	**3436**

0800-0815

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	103	16	277	122	0	11	0	0	13	7	**561**
2	55	0	0	0	0	2	51	54	0	0	7	**182**
3	14	0	0	41	21	28	0	0	0	0	0	**104**
4	252	0	57	0	1	712	2	4	1	3	2	**1034**
5	46	2	0	0	0	28	0	8	21	3	2	**110**
6	0	60	35	881	39	0	1	3	14	5	3	**1040**
7	16	80	0	4	0	0	0	0	0	7	3	**110**
8	1	0	0	3	1	3	0	0	17	0	0	**26**
9	5	0	0	0	47	35	0	0	6	1	0	**95**
10	1	5	0	0	2	0	2	0	1	0	0	**13**
11	1	4	0	0	1	0	1	0	0	0	0	**7**
TOTAL		**382**	**256**	**107**	**1208**	**227**	**858**	**71**	**22**	**65**	**43**	**24**	**3281**

0815-0830

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	95	14	254	112	0	10	0	0	9	12	**513**
2	51	0	0	0	2	47	50	0	0	10	7	**167**
3	13	0	0	38	20	26	0	0	0	0	0	**95**
4	231	0	52	0	1	652	2	4	1	3	1	**947**
5	42	2	0	0	0	26	0	7	19	3	2	**101**
6	0	55	32	806	35	0	1	3	13	5	2	**952**
7	15	73	0	4	0	0	0	0	0	6	3	**101**
8	1	0	0	3	1	3	0	0	15	0	0	**24**
9	5	0	0	0	43	32	0	0	6	1	0	**87**
10	1	5	0	0	2	0	2	0	1	0	0	**12**
11	1	3	0	0	1	0	1	0	0	0	0	**6**
TOTAL		**359**	**234**	**96**	**1106**	**217**	**785**	**65**	**20**	**59**	**39**	**22**	**3004**

0830-0845

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	89	14	239	105	0	10	0	0	9	11	**483**
2	46	0	0	0	2	44	47	0	0	10	6	**157**
3	12	0	0	35	18	24	0	0	0	0	0	**90**
4	218	0	49	0	1	614	2	3	1	3	1	**891**
5	40	2	0	0	0	24	0	7	18	2	2	**95**
6	0	52	30	759	33	0	1	3	12	4	2	**897**
7	14	69	0	4	0	0	0	0	0	5	2	**95**
8	1	0	0	3	1	2	0	0	14	0	0	**22**
9	4	0	0	0	41	31	0	0	5	0	1	**82**
10	1	5	0	0	2	0	2	0	1	0	0	**11**
11	1	3	0	0	1	0	1	0	0	0	0	**6**
TOTAL		**338**	**221**	**92**	**1041**	**204**	**739**	**61**	**19**	**56**	**27**	**20**	**3828**	**12552** Y

0845-0900

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	84	13	225	99	0	9	0	0	8	11	**456**
2	45	0	0	0	2	42	44	0	0	9	6	**148**
3	13	0	0	33	17	23	0	0	0	0	0	**85**
4	200	0	46	0	1	579	2	3	1	3	1	**841**
5	37	2	0	0	0	23	0	7	17	2	1	**89**
6	0	49	28	716	31	0	1	2	12	4	2	**846**
7	13	66	0	3	0	0	0	0	0	5	2	**89**
8	1	0	0	3	1	2	0	0	14	0	0	**21**
9	4	0	0	0	38	29	0	0	5	0	1	**77**
10	1	4	0	0	2	0	2	0	1	0	0	**10**
11	1	3	0	0	1	0	1	0	0	0	0	**6**
TOTAL		**319**	**208**	**87**	**963**	**192**	**698**	**58**	**18**	**53**	**35**	**19**	**2669**

0900-0915

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	78	12	208	92	0	8	0	0	8	10	**416**
2	42	0	0	0	0	2	38	41	0	0	6	**129**
3	10	0	0	0	31	16	21	0	0	0	0	**78**
4	189	0	43	0	1	534	2	3	1	2	1	**776**
5	34	2	0	0	0	21	0	6	16	2	1	**83**
6	0	45	26	661	29	0	1	2	11	4	2	**781**
7	12	60	0	3	0	0	0	0	0	5	2	**83**
8	1	0	0	3	1	2	0	0	13	0	0	**19**
9	4	0	0	0	35	27	0	0	5	0	1	**73**
10	1	4	0	0	1	0	2	0	1	0	0	**10**
11	1	3	0	0	1	0	1	0	0	0	0	**6**
TOTAL		**294**	**192**	**80**	**907**	**178**	**644**	**53**	**16**	**49**	**32**	**18**	**2462**

5131

HEAVIES

0645-0700

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	0	1	77	2	0	0	0	0	5	3	**88**
2	5	0	0	0	0	0	4	0	0	1	0	**10**
3	4	0	0	18	0	15	0	0	0	0	0	**37**
4	46	0	5	0	0	117	0	0	0	5	3	**176**
5	0	0	0	0	0	0	0	0	0	0	0	**1**
6	0	5	20	191	0	0	0	0	0	1	1	**218**
7	0	2	0	0	0	0	0	0	0	0	0	**2**
8	0	0	0	3	0	0	0	0	0	0	0	**3**
9	1	0	0	1	0	0	0	0	0	0	0	**1**
10	5	1	0	5	0	1	0	0	0	0	0	**12**
11	3	0	0	3	0	1	0	0	0	0	0	**7**
TOTAL		**63**	**9**	**26**	**285**	**6**	**134**	**4**	**0**	**0**	**12**	**7**	**545**

0700-0715

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	0	1	69	1	0	0	0	0	4	2	**78**
2	5	0	0	0	0	0	4	0	0	1	0	**9**
3	4	0	0	17	0	13	0	0	0	0	0	**34**
4	41	0	5	0	0	105	0	0	0	4	3	**158**
5	0	0	0	0	0	0	0	0	0	0	0	**1**
6	0	5	16	163	0	0	0	0	0	1	1	**187**
7	0	2	0	0	0	0	0	0	0	0	0	**3**
8	0	0	0	0	2	0	0	0	0	0	0	**2**
9	0	1	0	0	1	0	0	0	0	0	0	**1**
10	5	1	0	4	0	1	0	0	0	0	0	**11**
11	3	0	0	3	0	1	0	0	0	0	0	**6**
TOTAL		**57**	**8**	**23**	**256**	**5**	**121**	**4**	**0**	**0**	**11**	**6**	**490**

0715-0730

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	0	1	71	1	0	0	0	0	4	3	**80**
2	5	0	0	0	0	0	4	0	0	1	0	**10**
3	4	0	0	17	0	14	0	0	0	0	0	**35**
4	42	0	5	0	0	109	0	0	0	5	3	**163**
5	0	0	0	0	0	0	0	0	0	0	0	**1**
6	0	5	16	166	0	0	0	0	0	1	1	**193**
7	0	2	0	0	0	0	0	0	0	0	0	**2**
8	0	0	0	0	2	0	0	0	0	0	0	**2**
9	0	0	0	0	1	0	0	0	0	0	0	**1**
10	5	1	0	5	0	1	0	0	0	0	0	**11**
11	3	0	0	3	0	1	0	0	0	0	0	**6**
TOTAL		**58**	**8**	**24**	**264**	**6**	**124**	**4**	**0**	**0**	**11**	**6**	**505**

0730-0745

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	0	1	64	1	0	0	0	0	4	2	**72**
2	4	0	0	0	0	0	3	0	0	0	1	**9**
3	3	0	0	15	0	12	0	0	0	0	0	**31**
4	38	0	4	0	0	98	0	0	0	4	2	**147**
5	0	0	0	0	0	0	0	0	0	0	0	**1**
6	0	4	16	151	0	0	0	0	0	1	1	**174**
7	0	2	0	0	0	0	0	0	0	0	0	**2**
8	0	0	0	0	2	0	0	0	0	0	0	**2**
9	0	0	0	0	1	0	0	0	0	0	0	**1**
10	4	1	0	4	0	1	0	0	0	0	0	**10**
11	2	0	0	2	0	1	0	0	0	0	0	**6**
TOTAL		**53**	**7**	**21**	**238**	**5**	**112**	**3**	**0**	**0**	**10**	**6**	**455**	**1995**

0745-0800

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	0	1	63	1	0	0	0	0	4	2	**71**
2	4	0	0	0	0	3	0	0	0	1	0	**8**
3	3	0	0	15	0	12	0	0	0	0	0	**31**
4	38	0	4	0	0	97	0	0	0	4	2	**145**
5	0	0	0	0	0	0	0	0	0	0	1	**1**
6	0	4	16	149	0	0	0	0	0	1	1	**171**
7	0	2	0	0	0	0	0	0	0	0	0	**2**
8	0	0	0	0	0	2	0	0	0	0	0	**2**
9	0	0	0	0	0	0	0	0	0	0	0	**0**
10	4	1	0	4	0	1	0	0	0	0	0	**10**
11	2	0	0	2	0	1	0	0	0	0	0	**6**
TOTAL		**52**	**7**	**21**	**235**	**5**	**111**	**3**	**0**	**0**	**10**	**6**	**449**

0800-0815

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	0	1	59	1	0	0	0	0	4	2	**67**
2	4	0	0	0	0	0	3	0	0	1	0	**8**
3	3	0	0	14	0	11	0	0	0	0	0	**29**
4	35	0	4	0	0	90	0	0	0	4	2	**135**
5	0	0	0	0	0	0	0	0	0	0	1	**1**
6	0	4	15	140	0	0	0	0	0	1	1	**161**
7	0	2	0	0	0	0	0	0	0	0	0	**2**
8	0	0	0	0	2	0	0	0	0	0	0	**2**
9	0	0	0	0	0	0	1	0	0	0	0	**1**
10	4	1	0	4	0	1	0	0	0	0	0	**10**
11	2	0	0	2	0	1	0	0	0	0	0	**6**
TOTAL		**49**	**7**	**30**	**220**	**5**	**103**	**3**	**0**	**0**	**9**	**5**	**430**

0815-0830

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	0	1	62	1	0	0	0	0	4	2	**70**
2	4	0	0	0	0	3	0	0	0	1	0	**8**
3	3	0	0	15	0	12	0	0	0	0	0	**30**
4	37	0	4	0	0	95	0	0	0	4	2	**142**
5	0	0	0	0	0	0	0	0	0	0	1	**1**
6	0	4	16	146	0	0	0	0	0	1	1	**168**
7	0	2	0	0	0	0	0	0	0	0	0	**2**
8	0	0	0	0	2	0	0	0	0	0	0	**2**
9	0	0	0	0	0	1	0	0	0	0	0	**1**
10	4	1	0	4	0	1	0	0	0	0	0	**10**
11	2	0	0	2	0	1	0	0	0	0	0	**6**
TOTAL		**55**	**7**	**21**	**230**	**5**	**108**	**3**	**0**	**0**	**10**	**5**	**439**

0830-0845

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	0	0	53	1	0	0	0	0	3	2	**60**
2	4	0	0	0	0	0	3	0	0	0	0	**7**
3	3	0	0	13	0	10	0	0	0	0	0	**26**
4	32

2034 RC3A CALCULATIONS - PM PEAK

STEP 1 - FLOWS FROM BTH

AM PEAK

Lights

	1	2	3	4	5	6	7	8	9	10	11	Total
1	0	274	105	1106	156	0	42	2	15	12	7	1767
2	374	0	0	3	2	240	229	4	0	17	11	879
3	77	0	0	221	0	146	8	0	0	0	0	448
4	1488	1	173	0	14	3731	1	61	0	2	1	5472
5	194	2	0	0	0	133	0	64	71	0	3	468
6	0	292	148	3182	91	0	7	15	35	3	2	3775
7	50	143	0	34	0	0	0	0	0	6	3	235
8	8	0	0	2	37	9	0	3	47	0	0	103
9	15	0	0	0	18	87	0	0	43	0	1	163
10	50	50	0	10	11	13	37	1	8	0	0	179
11	27	34	0	6	1	8	14	0	1	0	0	99
Total	2242	798	429	4565	340	4346	330	191	216	43	24	13525

HGVs

	1	2	3	4	5	6	7	8	9	10	11	Total
1	0	10	2	101	9	0	0	0	0	0	0	122
2	0	0	0	0	0	4	0	0	0	2	1	8
3	14	0	0	49	0	39	0	0	0	0	0	102
4	127	0	46	0	0	425	0	0	0	13	7	618
5	3	0	0	0	0	0	0	1	0	1	0	5
6	0	0	53	336	0	0	0	0	0	3	2	395
7	0	5	0	0	0	0	0	0	0	0	0	5
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	12	2	0	12	1	3	0	0	0	0	0	30
11	0	0	0	0	0	0	0	0	0	0	0	0
Total	163	18	101	506	1	474	0	1	0	33	18	1313

Total

	1	2	3	4	5	6	7	8	9	10	11	Total
1	0	284	107	1207	165	0	42	2	15	12	7	1889
2	374	0	0	3	2	244	229	4	0	19	12	887
3	91	0	0	270	0	185	8	0	0	0	0	550
4	1615	1	219	0	14	4155	1	61	0	15	8	6090
5	197	2	0	0	0	133	0	65	71	4	2	474
6	0	292	201	3517	91	0	7	15	35	6	4	4169
7	50	148	0	34	0	0	0	0	0	6	2	241
8	8	0	0	2	37	9	0	0	47	0	0	103
9	15	0	0	0	18	87	0	0	43	0	1	163
10	62	52	0	23	12	16	37	1	8	0	0	209
11	27	34	0	6	1	8	14	0	1	0	0	99
Total	2405	815	530	5071	341	4820	331	192	216	76	42	14839

STEP 2 - CONVERT TO 15 MIN MATRICES USING 2034 BASE PROPORTIONS

LIGHTS

Time Period	Total	Overall Total	Proportion
1530-1545	2300	10763	21%
1545-1600	2375	10763	22%
1600-1615	2515	10763	23%
1615-1630	2579	10763	24%
			91%

HEAVIES

Time Period	Total	Overall Total	Proportion
1530-1545	367	1092	34%
1545-1600	370	1092	34%
1600-1615	326	1092	30%
1615-1630	302	1092	28%
			127%

LIGHTS

Time Period	Total	Overall Total	Proportion
1630-1645	2659	10763	25%
1645-1700	2709	10763	25%
1700-1715	2660	10763	25%
1715-1730	2759	10763	26%
			100%

HEAVIES

Time Period	Total	Overall Total	Proportion
1630-1645	292	1092	27%
1645-1700	269	1092	25%
1700-1715	286	1092	26%
1715-1730	245	1092	22%
			100%

LIGHTS

Time Period	Total	Overall Total	Proportion
1730-1745	2662	10763	25%
1745-1800	2520	10763	23%
			48%

Used peak total to determine proportions for cool down per od

HEAVIES

Time Period	Total	Overall Total	Proportion
1730-1745	243	1092	22%
1745-1800	247	1092	23%
			45%

Used peak total to determine proportions for cool down period

LIGHTS

1530-1545

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	59	20	237	34	0	9	1	12	3	1	**378**
2	80	0	0	1	1	51	49	1	0	4	2	**188**
3	16	0	0	47	0	31	8	0	0	0	0	**96**
4	318	0	37	0	3	797	0	13	0	0	0	**1169**
5	33	0	1	0	0	24	0	14	15	1	0	**87**
6	0	62	32	680	20	0	1	3	7	1	0	**807**
7	11	31	0	7	0	0	0	0	0	1	0	**50**
8	2	0	0	0	0	8	2	0	0	10	0	**22**
9	3	0	0	0	0	4	19	0	0	0	0	**26**
10	11	11	0	2	2	3	8	0	2	0	0	**38**
11	4	7	0	3	2	2	3	0	1	0	0	**21**
TOTAL		**479**	**170**	**92**	**976**	**73**	**929**	**71**	**41**	**46**	**9**	**5**	**2890**

1545-1600

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	60	24	244	35	0	9	1	12	3	1	**390**
2	82	0	0	1	1	53	51	1	0	4	2	**194**
3	17	0	0	49	0	32	8	0	0	0	0	**98**
4	328	0	38	0	3	823	0	14	0	0	0	**1207**
5	34	1	0	0	0	25	0	14	16	1	0	**90**
6	0	64	33	702	20	0	2	3	8	1	0	**833**
7	11	32	0	7	0	0	0	0	0	1	0	**52**
8	2	0	0	0	0	8	2	0	0	10	0	**23**
9	3	0	0	0	0	4	19	0	0	0	0	**26**
10	11	11	0	2	2	3	8	0	2	0	0	**39**
11	4	7	0	3	2	2	3	0	1	0	0	**22**
TOTAL		**495**	**176**	**95**	**1007**	**75**	**959**	**73**	**42**	**48**	**10**	**5**	**2964**

1600-1615

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	64	25	259	37	0	10	1	13	3	2	**413**
2	87	0	0	1	1	56	54	1	0	4	2	**205**
3	18	0	0	52	0	34	0	0	0	0	0	**104**
4	348	0	40	0	3	872	0	14	0	0	0	**1279**
5	36	1	0	0	0	26	0	15	17	1	0	**95**
6	0	68	35	743	21	0	2	4	8	1	0	**882**
7	12	34	0	8	0	0	0	0	0	2	0	**55**
8	2	0	0	0	0	9	2	0	0	11	0	**24**
9	3	0	0	0	0	4	20	0	0	0	0	**28**
10	12	12	0	2	2	3	9	0	2	0	0	**42**
11	4	8	0	3	2	2	3	0	1	0	0	**23**
TOTAL		**524**	**186**	**100**	**1067**	**80**	**1016**	**77**	**45**	**50**	**10**	**6**	**3160**

1615-1630

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	66	26	265	38	0	10	1	13	3	2	**423**
2	90	0	0	1	1	58	55	1	0	4	3	**211**
3	18	0	0	53	0	35	0	0	0	0	0	**106**
4	356	0	41	0	3	894	0	15	0	0	0	**1311**
5	37	1	0	0	0	27	0	15	17	1	0	**98**
6	0	70	35	762	22	0	2	4	8	1	0	**904**
7	12	34	0	8	0	0	0	0	0	2	1	**56**
8	2	0	0	0	0	9	2	0	0	11	0	**25**
9	4	0	0	0	0	4	21	0	0	0	0	**29**
10	12	12	0	2	2	3	9	0	2	0	0	**43**
11	4	8	0	3	2	2	3	0	1	0	0	**24**
TOTAL		**537**	**191**	**103**	**1093**	**82**	**1041**	**79**	**46**	**52**	**10**	**6**	**3240**	**12274**

1630-1645

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	68	27	273	39	0	10	1	13	3	2	**436**
2	92	0	0	1	1	59	56	1	0	4	3	**217**
3	19	0	0	55	0	36	0	0	0	0	0	**109**
4	367	0	43	0	3	920	0	15	0	0	0	**1350**
5	38	1	0	0	0	28	0	16	17	1	0	**101**
6	0	72	36	786	23	0	2	4	9	1	0	**933**
7	12	35	0	8	0	0	0	0	0	2	1	**58**
8	2	0	0	1	0	9	2	0	0	12	0	**26**
9	4	0	0	0	0	4	21	0	0	0	0	**29**
10	12	12	0	2	3	3	9	0	2	0	0	**43**
11	7	8	0	3	2	2	3	0	1	0	0	**24**
TOTAL		**553**	**197**	**106**	**1126**	**84**	**1072**	**81**	**47**	**53**	**11**	**6**	**3336**

1645-1700

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	69	27	279	40	0	11	1	14	3	2	**445**
2	94	0	0	1	1	60	58	1	0	4	3	**221**
3	19	0	0	56	0	37	0	0	0	0	0	**112**
4	374	0	44	0	4	939	0	15	0	0	0	**1377**
5	39	1	0	0	0	28	0	16	18	1	0	**103**
6	0	74	37	801	23	0	2	4	9	1	0	**950**
7	13	36	0	8	0	0	0	0	0	2	1	**59**
8	2	0	0	1	0	9	2	0	0	12	0	**26**
9	4	0	0	0	0	4	22	0	0	0	0	**30**
10	13	13	0	3	3	3	9	0	2	0	0	**46**
11	7	9	0	3	2	2	4	0	0	0	0	**26**
TOTAL		**564**	**201**	**108**	**1149**	**86**	**1094**	**83**	**46**	**54**	**11**	**6**	**3404**

1700-1715

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	67	27	272	39	0	10	1	13	3	2	**433**
2	92	0	0	1	1	59	56	1	0	4	3	**219**
3	19	0	0	54	0	36	0	0	0	0	0	**109**
4	365	0	42	0	3	933	0	15	0	0	0	**1362**
5	38	1	0	0	0	28	0	16	17	1	0	**100**
6	0	72	36	780	22	0	2	4	9	1	0	**926**
7	12	35	0	8	0	0	0	0	0	2	1	**58**
8	2	0	0	1	0	9	2	0	0	12	0	**25**
9	4	0	0	0	0	4	21	0	0	0	0	**29**
10	12	12	0	2	3	3	9	0	2	0	0	**43**
11	7	8	0	3	2	2	3	0	1	0	0	**24**
TOTAL		**560**	**196**	**105**	**1120**	**83**	**1066**	**81**	**47**	**53**	**11**	**6**	**3310**

1715-1730

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	70	28	284	41	0	11	1	14	3	2	**453**
2	96	0	0	1	1	62	59	1	0	4	3	**225**
3	20	0	0	57	0	37	0	0	0	0	0	**114**
4	381	0	44	0	4	956	0	16	0	0	0	**1403**
5	40	1	0	0	0	29	0	16	18	1	0	**105**
6	0	75	38	816	23	0	2	4	9	1	0	**968**
7	13	37	0	9	0	0	0	0	0	2	1	**60**
8	2	0	0	1	0	9	2	0	0	12	0	**27**
9	4	0	0	0	0	5	22	0	0	0	0	**42**
10	13	13	0	3	3	3	9	0	2	0	0	**46**
11	7	9	0	3	2	2	4	0	0	0	0	**26**
TOTAL		**575**	**264**	**110**	**1370**	**87**	**1114**	**85**	**49**	**55**	**11**	**6**	**3467**	**13525** Y

1730-1745

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	68	27	274	39	0	10	1	14	3	2	**427**
2	92	0	0	1	1	59	57	1	0	4	3	**217**
3	19	0	0	55	0	38	0	0	0	0	0	**110**
4	368	0	43	0	3	923	0	15	0	0	0	**1353**
5	38	1	0	0	0	28	0	16	18	1	0	**101**
6	0	72	37	787	23	0	2	4	9	1	0	**935**
7	12	36	0	8	0	0	0	0	0	2	1	**59**
8	2	0	0	1	0	9	2	0	0	12	0	**26**
9	4	0	0	0	0	4	21	0	0	0	0	**29**
10	12	12	0	3	3	3	9	0	2	0	0	**44**
11	7	8	0	3	2	2	3	0	1	0	0	**24**
TOTAL		**555**	**197**	**106**	**1129**	**84**	**1075**	**82**	**47**	**53**	**11**	**6**	**3345**

1745-1800

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	64	25	259	37	0	10	1	13	3	2	**414**
2	88	0	0	1	1	56	54	1	0	4	2	**206**
3	18	0	0	52	0	34	0	0	0	0	0	**104**
4	346	0	40	0	3	870	0	14	0	0	0	**1273**
5	36	1	0	0	0	26	0	15	17	1	0	**96**
6	0	68	35	740	21	0	2	4	8	1	0	**879**
7	12	34	0	8	0	0	0	0	0	2	0	**55**
8	2	0	0	0	0	9	2	0	0	11	0	**24**
9	3	0	0	0	0	4	20	0	0	0	0	**28**
10	12	12	0	2	2	3	9	0	2	0	0	**42**
11	6	8	0	3	2	2	3	0	1	0	0	**23**
TOTAL		**525**	**187**	**101**	**1069**	**80**	**1018**	**77**	**45**	**55**	**10**	**6**	**3167**

6512

HEAVIES

1530-1545

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	4	4	36	0	0	0	0	0	5	3	**47**
2	0	0	0	0	0	2	0	0	0	1	0	**3**
3	0	0	0	17	0	14	0	0	0	0	0	**36**
4	45	0	16	0	0	151	0	0	0	5	3	**219**
5	1	0	0	0	0	0	0	0	0	0	0	**2**
6	0	0	19	119	0	0	0	0	0	1	1	**140**
7	0	2	0	0	0	0	0	0	0	0	0	**2**
8	0	0	0	0	0	0	0	0	0	0	0	**0**
9	0	0	0	0	0	0	0	0	0	0	0	**0**
10	4	1	0	4	0	1	0	0	0	0	0	**11**
11	2	0	0	2	0	1	0	0	0	0	0	**6**
TOTAL		**58**	**6**	**36**	**179**	**0**	**168**	**0**	**0**	**0**	**12**	**6**	**466**

1545-1600

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	3	1	34	0	0	1	0	0	0	0	**45**
2	0	0	0	0	0	1	0	0	0	1	0	**3**
3	5	0	0	17	0	13	0	0	0	0	0	**35**
4	43	0	16	0	0	144	0	0	0	5	2	**209**
5	1	0	0	0	0	0	0	0	0	0	0	**1**
6	0	0	18	114	0	0	0	0	0	1	1	**134**
7	0	2	0	0	0	0	0	0	0	0	0	**2**
8	0	0	0	0	0	0	0	0	0	0	0	**0**
9	0	0	0	0	0	0	0	0	0	0	0	**0**
10	4	1	0	4	0	1	0	0	0	0	0	**10**
11	2	0	0	2	0	1	0	0	0	0	0	**6**
TOTAL		**55**	**6**	**34**	**171**	**0**	**160**	**0**	**0**	**0**	**11**	**6**	**445**

1600-1615

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	3	0	30	0	0	0	0	0	4	2	**40**
2	0	0	0	0	0	1	0	0	0	1	0	**2**
3	4	0	0	15	0	12	0	0	0	0	0	**30**
4	38	0	14	0	0	127	0	0	0	4	2	**185**
5	1	0	0	0	0	0	0	0	0	0	0	**2**
6	0	0	16	100	0	0	0	0	0	1	1	**118**
7	0	2	0	0	0	0	0	0	0	0	0	**2**
8	0	0	0	0	0	0	0	0	0	0	0	**0**
9	0	0	0	0	0	0	0	0	0	0	0	**0**
10	4	1	0	4	0	1	0	0	0	0	0	**9**
11	2	0	0	2	0	1	0	0	0	0	0	**5**
TOTAL		**49**	**5**	**30**	**151**	**0**	**141**	**0**	**0**	**0**	**10**	**5**	**392**

1615-1630

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	3	0	28	0	0	0	0	0	4	2	**37**
2	0	0	0	0	0	1	0	0	0	0	0	**2**
3	4	0	0	14	0	11	0	0	0	0	0	**29**
4	35	0	13	0	0	117	0	0	0	4	2	**171**
5	1	0	0	0	0	0	0	0	0	0	0	**1**
6	0	0	15	93	0	0	0	0	0	1	1	**109**
7	0	1	0	0	0	0	0	0	0	0	0	**1**
8	0	0	0	0	0	0	0	0	0	0	0	**0**
9	0	0	0	0	0	0	0	0	0	0	0	**0**
10	3	0	0	3	0	1	0	0	0	0	0	**8**
11	2	0	0	2	0	1	0	0	0	0	0	**5**
TOTAL		**45**	**5**	**28**	**140**	**0**	**131**	**0**	**0**	**0**	**9**	**5**	**363**	**1666**

1630-1645

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	3	0	27	0	0	0	0	0	4	2	**36**
2	0	0	0	1	0	0	0	0	0	0	0	**2**
3	4	0	0	13	0	11	0	0	0	0	0	**27**
4	34	0	12	0	0	114	0	0	0	4	2	**165**
5	1	0	0	0	0	0	0	0	0	0	0	**1**
6	0	0	14	90	0	0	0	0	0	1	1	**106**
7	0	1	0	0	0	0	0	0	0	0	0	**1**
8	0	0	0	0	0	0	0	0	0	0	0	**0**
9	0	0	0	0	0	0	0	0	0	0	0	**0**
10	3	0	0	3	0	1	0	0	0	0	0	**7**
11	2	0	0	2	0	0	0	0	0	0	0	**5**
TOTAL		**43**	**5**	**27**	**135**	**0**	**127**	**0**	**0**	**0**	**9**	**5**	**351**

1645-1700

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	2	0	25	0	0	0	0	0	3	2	**33**
2	0	0	0	0	0	1	0	0	0	0	0	**2**
3	3	0	0	12	0	10	0	0	0	0	0	**25**
4	31	0	11	0	0	105	0	0	0	3	2	**152**
5	1	0	0	0	0	0	0	0	0	0	0	**1**
6	0	0	13	83	0	0	0	0	0	1	0	**97**
7	0	1	0	0	0	0	0	0	0	0	0	**1**
8	0	0	0	0	0	0	0	0	0	0	0	**0**
9	0	0	0	0	0	0	0	0	0	0	0	**0**
10	3	0	0	3	0	1	0	0	0	0	0	**7**
11	2	0	0	2	0	0	0	0	0	0	0	**4**
TOTAL		**49**	**4**	**35**	**125**	**0**	**117**	**0**	**0**	**0**	**6**	**4**	**324**

1700-1715

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	3	0	27	0	0	0	0	0	4	2	**35**
2	0	0	0	1	0	1	0	0	0	0	0	**2**
3	4	0	0	13	0	10	0	0	0	0	0	**27**
4	33	0	12	0	0	111	0	0	0	3	2	**162**
5	1	0	0	0	0	0	0	0	0	0	0	**1**
6	0	0	14	88	0	0	0	0	0	1	0	**103**
7	0	1	0	0	0	0	0	0	0	0	0	**1**
8	0	0	0	0	0	0	0	0	0	0	0	**0**
9	0	0	0	0	0	0	0	0	0	0	0	**0**
10	3	0	0	3	0	1	0	0	0	0	0	**7**
11	2	0	0	2	0	0	0	0	0	0	0	**4**
TOTAL		**43**	**5**	**36**	**132**	**0**	**124**	**0**	**0**	**0**	**9**	**5**	**344**

1715-1730

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	2	0	23	0	0	0	0	0	3	2	**30**
2	0	0	0	0	0	1	0	0	0	0	0	**2**
3	3	0	0	11	0	9	0	0	0	0	0	**23**

APPENDIX 4 – AECOM M40 J10 REVALIDATION TN

M40 Junction 10 - Vissim Model Revalidation Addendum

National Highways

June 2023

Delivering a better world

Quality information

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Revision History

Revision	Revision date	Details	Name	Position
1	09/06/2023	Amendments following National Highways comments.	[redacted]	Associate Director

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1. Introduction

1.1 National Highways has commissioned AECOM to review the 2016 M40 Junction 10 Vissim base model created in 2017 and provide suitable network adjustments to allow for future option scenario assessments to be undertaken.

1.2 The request came after future year modelling of the network identified large queues extending on the A43 from Ardley roundabout. Concerns had been raised that the give way priority rules at Ardley roundabout may be too restrictive and amending these would provide more realistic future year scenarios.

1.3 An initial test of this alteration in November 2022 identified that this model change would improve the performance of the network and provide a more robust assessment tool.

1.4 This addendum report therefore provides details on the amendments made to the 2016 Base Year microsimulation model as well as the validation results. For further details on the data used, matrix production and model development, the appended Local Model Validation Report (LMVR) produced in 2017 should be reviewed.

1.5 Upon completion of the revalidation, the 2016 Base Year microsimulation model will then be available to be used to assess future year option scenarios.

2. Background

2.1 In 2015/16 AECOM were commissioned by National Highways to design an improvement scheme that could accommodate future growth up to 2031 to secure optimal operation on both the M40 mainline and the A43 approach to M40 Junction 10. This scheme included signal-controlled arrangements at Ardley, Cherwell and Padbury junctions using MOVA.

2.2 Following on from this, in 2016/17 National Highways then commissioned AECOM to revalidate the existing M40 Junction 10 Vissim microsimulation model to create a robust tool for option assessments. This was successfully completed with details of this being provided in the LMVR appended in **Appendix B.**

2.3 In 2022/23 National Highways requested that AECOM amend and revalidate the M40 Junction 10 Vissim microsimulation model further following identification of large and improbable queues forming in the future year assessments.

2.4 This addendum therefore provides details on the model changes and latest revalidation results.

Model Extents

2.5 The extent of the study area includes the following junctions:

- A43 Cherwell junction (signal controlled using MOVA);
- A43 / B4100 Baynards Green (priority controlled);
- A43 / B430 Ardley Roundabout (priority controlled); and
- A43 Padbury Junction (priority controlled).

2.6 In addition to these junctions being modelled, approximately 5km of the M40 mainline north and south of M40 J10, as well as 1km of the A43 mainline north of A43 / B4100 Baynards Green Roundabout have been modelled. The following local roads have also been included:

- Approximately 500m of the B430 Station Road west approach to A43 / B430 Ardley Roundabout.
- Approximately 450m of the B4100 Banbury Road west approach to A43 / B4100 Baynards Green Roundabout.
- Approximately 500m of the B4100 Banbury Road east approach to A43 / B4100 Baynards Green Roundabout.

Figure 2-1: Study Area Map



3. Base Model Revalidation

Model Amendments

3.1 To enhance future year option testing, the 2016 base year Vissim model of the M40 J10 network has been revalidated. The revalidation addresses previously identified unrealistic future year queuing behaviour on the A43 approach to Ardley roundabout.

3.2 The 2016 base year Vissim model has been amended with the following changes:

- Reducing the priority rule gap times on the A43 approach to Ardley Roundabout:
  - Cars and Motorbikes have been amended from 4.0 seconds to 3.5 seconds.
  - HGVs and Buses have been amended from 4.5 seconds to 4.0 seconds.
- Increasing the priority rule gap times on the M40 Northbound off-slip approach to Ardley roundabout:
  - Cars and Motorbikes have been amended from 3.1 seconds to 3.2 seconds.
  - HGVs and Buses have been amended from 3.6 seconds to 3.7 seconds.
- Reducing the priority rule gap times on the M40 Southbound off-slip approach to Padbury roundabout:
  - Cars and Motorbikes have been amended from 3.9 seconds to 3.5 seconds.
  - HGVs and Buses have been amended from 4.4 seconds to 4.0 seconds.
- Removal of the conflict marker on the M40 Northbound off-slip approach to Ardley roundabout.
- A dynamic assignment costs surcharge of 150 has been added to connector 10041. This connector is the farside lane linking the B430 South and A43 North at Cherwell Roundabout. A surcharge has been added to disincentivise vehicles from using the farside lane for this movement and instead use more the free-flow inside lane that also connects the B430 South and A43 North.
- Extension of the Reduced Speed Areas on the M40 Northbound off-slip.
  - The total length of the Reduced Speed Areas has been extended from 20 metres to 59 metres.
- Vissim version 2022-07 has been used instead of 5.40-06.
- PC MOVA version 3.2.0.381 has been used instead of 2.0.4.

Model Convergence

3.3 TfL's *"Traffic Modelling Guidelines Version 4.0"* have been used to assess the convergence of the M40 Junction 10 traffic model. The Vissim model has been run using the Dynamic Assignment module, in which a series of iterated simulations are used to determine the route of a vehicle through the network based on a total travel cost. As a result of this, there is a need to assess the convergence of the model to establish that the travel times and volumes do not change significantly from one iteration to the next, enabling the model to be deemed stable and results to be analysed in confidence.

3.4 *TfL's "Traffic Modelling Guidelines Version 4.0"* provide a series of convergence criteria that should be used to assess the convergence and stability of traffic models. The following convergence criteria can be assessed within the context of Vissim:

- 95% of all path traffic volumes change by less than 5% for at least four consecutive iterations;
- 95% of the travel times on all paths change by less than 20% for at least four consecutive iterations.

Table 3-1: Convergence Evaluation Summary – AM Period

Run Number	Convergence Figures on Paths	
	Traffic Volumes (%)	Travel Time (%)
1	100%	97%
2	100%	97%
3	99%	92%
4	99%	98%
5	100%	95%
6	99%	99%
7	100%	97%
8	100%	98%
9	99%	96%
10	100%	97%

Table 3-2: Convergence Evaluation Summary – PM Period

Run Number	Convergence Figures on Paths	
	Traffic Volumes (%)	Travel Time (%)
1	100%	96%
2	100%	95%
3	100%	96%
4	100%	98%
5	100%	96%
6	100%	92%
7	100%	97%
8	100%	98%
9	100%	97%
10	100%	98%

3.5 The results above therefore show that both peak period models have successfully converged based on the evaluation criteria.

Model Validation

3.6 To retain the validation methodology approach undertaken in 2017, the base model has been revalidated to 2016 observed turning counts and journey times provided from traffic surveys. The model has been successfully revalidated to TAG Unit M3.1, Table 2 and Table 3 with the following summary validation results achieved. The full turning count and journey time validation can be found in **Appendix A**.

Table 3-3: Summary of Turning Count Validation – AM Peak

DMRB Traffic Flow Validation Criteria	No. Within	Total	Percentage
Percentage of Counts within GEH < 5	31	31	**100%**
Percentage of Counts meeting Individual Flow	31	31	**100%**

Table 3-4: Summary of Turning Count Validation – PM Peak

DMRB Traffic Flow Validation Criteria	No. Within	Total	Percentage
Percentage of Counts within GEH < 5	31	31	**100%**
Percentage of Counts meeting Individual Flow	31	31	**100%**

Table 3-5: Summary of Journey Time Validation – AM Peak

DMRB Traffic Flow Validation Criteria	No. Within	Total	Percentage
Percentage of Times within 15%	19	20	**95%**
Percentage of Times within 60 seconds	20	20	**100%**

Table 3-6: Summary of Journey Time Validation – PM Peak

DMRB Traffic Flow Validation Criteria	No. Within	Total	Percentage
Percentage of Times within 15%	17	20	**85%**
Percentage of Times within 60 seconds	20	20	**100%**

3.7 The above tables confirm that the base model has been satisfactorily revalidated and can therefore be used to assess 2026 and 2036 future year scenario options.

3.8 The one solitary journey time route in the AM peak which did not been the TAG criteria had a low observed journey time average of 31 seconds which made the criteria difficult to achieve.

3.9 In the PM peak, two of the journey time routes had a low observed journey time average and the other route had a high minimum and maximum observed journey time range. The modelled average for the route was comfortably within the observed journey time range.

4. Summary & Conclusions

Model Summary

4.1 The M40 Junction 10 2016 base Vissim model has been re-validated successfully. The updated model will allow more accurate future testing of traffic growth which may have an impact on the junction.

Convergence

4.2 The Vissim model has been successfully converged for both AM and PM periods, meeting TfL's convergence criteria and demonstrating a high level of stability.

Turning Count Validation

4.3 The Vissim model has produced a high level of validation to the DMRB Individual Flow criteria, having achieved a 100% correlation between modelled and observed turning movements during both AM and PM peaks.

4.4 The Vissim model has demonstrated high levels of validation to DMRB GEH Statistic criteria, in which 100% of modelled turning counts during both AM and PM peaks have GEH values lower than 5 (against a desired percentage of 85%) when compared to the turning counts for both AM and PM peaks respectively.

Journey Time Validation

4.5 The Vissim model has demonstrated a suitable level of journey time validation for both AM and PM peak periods in accordance with DMRB criteria, with 95% and 85% of the routes during AM and PM peaks respectively being within 15% of the observed average journey time and all routes during AM and PM peaks being within 60 seconds of the observed average time.

4.6 As a result of this, both AM and PM peak period models are considered an appropriate representation of network conditions.

Overall Conclusion

4.7 The M40 Junction 10 Vissim model has successfully converged, has been calibrated and validated against DMRB standards and is considered to be a suitable tool for future year testing. Overall, the AM and PM peak period models are considered an appropriate representation of the network conditions and good levels of validation have been reached in line with TAG Unit M3.1 requirements.

Appendix A – Validation Results

A.1 2016 Turning Count Validation Results

500 A43 Baynards Green 2016 Base Revalidation - Turning Count Validation - AM Peak

AECOM

Project Name: NHSPC 2022 - 500 A43 Baynards Green
Project Number: 60681219
Subject: 500 A43 Baynards Green 2016 Base Revalida ion - Turning Count Validation - AM Peak
Date: 27/04/2023

Average Range	
FROM	TO
2	6

AM Peak Observed Data	
Ref	\\Ukbhm2fp002\ukbhm2fp001-v1\tp\TP\PROJECT\Traffic - HESPA - 17\Studies\EM S 107 M40 J10 Base Model TAME re vali\03 EXECUTION\09 Calculations\01 O-D Matrices 15min\MCC Data
File(s)	6102 M40 Jct 10 MCC - client.xlsx
Tab(s)	Site 1, Site 2, site 3 and Site 4

Site 1 **1**
Baynards Green Roundabout - All Vehicles

Junction	From (Link)			To (Link)			Flow 0745-0845		Difference		GEH			Individual Flows
							Observed	Modelled	Value	%	Value	<5	<10	
Baynards Green Roundabout (A43 / B4100)	A	20	A43 North	D	12	B4100 East	229	213	-16	-7%	1.1	Y	Y	OK
	A	20		C	16	A43 South	1440	1363	-77	-5%	2.1	Y	Y	OK
	A	20		B	8	B4100 West	66	63	-3	-4%	0.3	Y	Y	OK
	D	11	B4100 East	A	33	A43 North	191	192	1	0%	0.0	Y	Y	OK
	D	11		C	16	A43 South	101	106	5	5%	0.5	Y	Y	OK
	D	11		B	8	B4100 West	233	222	-11	-5%	0.7	Y	Y	OK
	C	14	A43 South	A	33	A43 North	1049	1048	-1	0%	0.0	Y	Y	OK
	C	14		D	12	B4100 East	148	155	7	5%	0.6	Y	Y	OK
	C	14		B	8	B4100 West	119	111	-8	-6%	0.7	Y	Y	OK
	B	6	B4100 West	A	33	A43 North	94	95	1	1%	0.1	Y	Y	OK
	B	6		D	12	B4100 East	276	276	0	0%	0.0	Y	Y	OK
	B	6		C	16	A43 South	150	161	11	7%	0.9	Y	Y	OK
				Total Vehicles			4096	4006	-90	-2%				

Site 1 1
Baynards Green Roundabout - LVs

Junction	From (Link)			To (Link)			Flow 0745-0845		Difference		GEH			Individual Flows
							Observed	Modelled	Value	%	Value	<5	<10	
Baynards Green Roundabout (A43 / B4100)	20	A43 North		12	B4100 East		207	191	-16	-8%	1.1	Y	Y	OK
	20			16	A43 South		1178	1124	-54	-5%	1.6	Y	Y	OK
	20			8	B4100 West		54	52	-2	-4%	0.3	Y	Y	OK
	11	B4100 East		33	A43 North		177	179	2	1%	0.1	Y	Y	OK
	11			16	A43 South		93	99	6	7%	0.7	Y	Y	OK
	11			8	B4100 West		224	213	-11	-5%	0.8	Y	Y	OK
	14	A43 South		33	A43 North		908	906	-2	0%	0.1	Y	Y	OK
	14			12	B4100 East		133	139	6	5%	0.5	Y	Y	OK
	14			8	B4100 West		100	94	-6	-6%	0.7	Y	Y	OK
	6	B4100 West		33	A43 North		83	84	1	1%	0.1	Y	Y	OK
	6			12	B4100 East		254	254	0	0%	0.0	Y	Y	OK
	6			16	A43 South		138	150	12	9%	1.0	Y	Y	OK
				Total Vehicles			3549	3485	-64	-2%				

Site 1
Baynards Green Roundabout - HVs

Junction	From (Link)			To (Link)			Flow 0745-0845		Difference		GEH			Individual Flows
							Observed	Modelled	Value	%	Value	<5	<10	
Baynards Green Roundabout (A43 / B4100)	20	A43 North		12	B4100 East		22	22	0	-1%	0.0	Y	Y	OK
	20			16	A43 South		262	239	-23	-9%	1.4	Y	Y	OK
	20			8	B4100 West		12	11	-1	-5%	0.2	Y	Y	OK
	11	B4100 East		33	A43 North		14	13	-1	-10%	0.4	Y	Y	OK
	11			16	A43 South		8	6	-2	-23%	0.7	Y	Y	OK
	11			8	B4100 West		9	9	0	4%	0.1	Y	Y	OK
	14	A43 South		33	A43 North		141	142	1	0%	0.1	Y	Y	OK
	14			12	B4100 East		15	16	1	5%	0.2	Y	Y	OK
	14			8	B4100 West		19	18	-1	-6%	0.3	Y	Y	OK
	6	B4100 West		33	A43 North		11	11	0	4%	0.1	Y	Y	OK
	6			12	B4100 East		22	22	0	1%	0.0	Y	Y	OK
	6			16	A43 South		12	11	-1	-8%	0.3	Y	Y	OK
				Total Vehicles			547	521	-26	-5%				

Site 2 **3**
Cherwell Junction - All Vehicles

Junction	From (Link)			To (Link)			Flow 0745-0845		Difference		GEH			Individual Flows
							Observed	Modelled	Value	%	Value	<5	<10	
Cherwell Junction (A43 North, A43 South, Services)	A	36	A43 North	D	42	Cherwell Services	217	225	8	4%	0.5	Y	Y	OK
	A	36		C	39	M40 SB On-Slip	1238	1125	-113	-9%	3.3	Y	Y	OK
	A	36		B	45	A43 South	642	595	-47	-7%	1.9	Y	Y	OK
	D	43	Cherwell Service Station	A	35	A43 North	44	58	14	32%	2.0	Y	Y	OK
	D	50		C	49	M40 SB On-Slip	204	204	0	0%	0.0	Y	Y	OK
	D	43		B	45	A43 South	146	136	-10	-7%	0.9	Y	Y	OK
	B	44	A43 South	A	35	A43 North	1089	1052	-37	-3%	1.1	Y	Y	OK
	B	44		C	39	M40 SB On-Slip	36	67	31	86%	4.3	Y	Y	OK
	B	44		D	42	Cherwell Services	167	156	-11	-7%	0.9	Y	Y	OK
				Total Vehicles			3783	3618	-165	-4%				

Site 2
Cherwell Junction - LVs

Junction	From (Link)			To (Link)			Flow 0745-0845		Difference		GEH			Individual Flows
							Observed	Modelled	Value	%	Value	<5	<10	
Cherwell Junction (A43 North, A43 South, Services)	36	A43 North		42	Cherwell Services		172	172	0	0%	0.0	Y	Y	OK
	36			39	M40 SB On-Slip		1019	923	-96	-9%	3.1	Y	Y	OK
	36			45	A43 South		587	551	-36	-6%	1.5	Y	Y	OK
	43	Cherwell Service Station		35	A43 North		27	42	15	54%	2.5	Y	Y	OK
	50			49	M40 SB On-Slip		155	155	0	0%	0.0	Y	Y	OK
	43			45	A43 South		130	119	-11	-8%	1.0	Y	Y	OK
	44	A43 South		35	A43 North		957	920	-37	-4%	1.2	Y	Y	OK
	44			39	M40 SB On-Slip		33	56	23	68%	3.4	Y	Y	OK
	44			42	Cherwell Services		136	133	-3	-2%	0.2	Y	Y	OK
				Total Vehicles			3216	3071	-145	-5%				

Site 2
Cherwell Junction - HVs

Junction	From (Link)			To (Link)			Flow 0745-0845		Difference		GEH			Individual Flows
							Observed	Modelled	Value	%	Value	<5	<10	
Cherwell Junction (A43 North, A43 South, Services)	36	A43 North		42	Cherwell Services		45	53	8	17%	1.1	Y	Y	OK
	36			39	M40 SB On-Slip		219	202	-17	-8%	1.2	Y	Y	OK
	36			45	A43 South		55	44	-11	-20%	1.5	Y	Y	OK
	43	Cherwell Service Station		35	A43 North		17	17	0	-2%	0.1	Y	Y	OK
	50			49	M40 SB On-Slip		49	49	0	0%	0.0	Y	Y	OK
	43			45	A43 South		16	17	1	5%	0.2	Y	Y	OK
	44	A43 South		35	A43 North		132	132	0	0%	0.0	Y	Y	OK
	44			39	M40 SB On-Slip		3	11	8	273%	3.1	Y	Y	OK
	44			42	Cherwell Services		31	23	-8	-26%	1.6	Y	Y	OK
				Total Vehicles			567	547	-20	-4%				

Site 3 **2**
Padbury Junction - All Vehicles

Junction	From (Link)			To (Link)			Flow 0745-0845		Difference		GEH			Individual Flows
							Observed	Modelled	Value	%	Value	<5	<10	
Padbury Junction (A43 / M40 Off-Slip)	C	35	A43 South	A	23	A43 North	1113	1109	-4	0%	0.1	Y	Y	OK
	B	90	M40 Off-Slip	C	29	A43 South	315	318	3	1%	0.2	Y	Y	OK
	B	90		A	23	A43 North	219	206	-13	-6%	0.9	Y	Y	OK
	A	79	A43 North	C	29	A43 South	1718	1632	-86	-5%	2.1	Y	Y	OK
				Total Vehicles			3365	3264	-101	-3%				

Site 3
Padbury Junction - LVs

Junction	From (Link)			To (Link)			Flow 0745-0845		Difference		GEH			Individual Flows
							Observed	Modelled	Value	%	Value	<5	<10	
Padbury Junction (A43 / M40 Off-Slip)	35	A43 South		23	A43 North		966	962	-4	0%	0.1	Y	Y	OK
	90	M40 Off-Slip		29	A43 South		279	276	-3	-1%	0.2	Y	Y	OK
	90			23	A43 North		187	178	-9	-5%	0.6	Y	Y	OK
	79	A43 North		29	A43 South		1440	1374	-66	-5%	1.8	Y	Y	OK
				Total Vehicles			2872	2791	-81	-3%				

Site 3
Padbury Junction - HVs

Junction	From (Link)			To (Link)			Flow 0745-0845		Difference		GEH			Individual Flows
							Observed	Modelled	Value	%	Value	<5	<10	
Padbury Junction (A43 / M40 Off-Slip)	35	A43 South		23	A43 North		147	147	0	0%	0.0	Y	Y	OK
	90	M40 Off-Slip		29	A43 South		36	42	6	16%	0.9	Y	Y	OK
	90			23	A43 North		32	27	-5	-15%	0.9	Y	Y	OK
	79	A43 North		29	A43 South		278	258	-20	-7%	1.2	Y	Y	OK
				Total Vehicles			493	474	-19	-4%				

Site 4 **4**
Ardley Roundabout - All Vehicles

Junction	From (Link)			To (Link)			Flow 0745-0845		Difference		GEH			Individual Flows
							Observed	Modelled	Value	%	Value	<5	<10	
Ardley Roundabout (A43 / M40 Off-Slip)	C	46	A43 SB	B	57	M40 On-Slip	269	264	-5	-2%	0.3	Y	Y	OK
	C	46		A	61	B430 SB	484	469	-15	-3%	0.7	Y	Y	OK
	B	59	M40 Off-Slip	C	47	A43 NB	1031	1041	10	1%	0.3	Y	Y	OK
	B	59		A	61	B430 SB	32	33	1	3%	0.1	Y	Y	OK
	A	63	B430 NB	C	47	A43 NB	237	239	2	1%	0.1	Y	Y	OK
	A	63		B	57	M40 On-Slip	205	206	1	0%	0.1	Y	Y	OK
				Total Vehicles			2258	2252	-6	0%				

Site 4
Ardley Roundabout - LVs

Junction	From (Link)			To (Link)			Flow 0745-0845		Difference		GEH			Individual Flows
							Observed	Modelled	Value	%	Value	<5	<10	
Ardley Roundabout (A43 / M40 Off-Slip)	46	A43 SB		57	M40 On-Slip		241	237	-4	-2%	0.3	Y	Y	OK
	46			61	B430 SB		446	436	-10	-2%	0.5	Y	Y	OK
	59	M40 Off-Slip		47	A43 NB		898	909	11	1%	0.4	Y	Y	OK
	59			61	B430 SB		24	25	1	6%	0.3	Y	Y	OK
	63	B430 NB		47	A43 NB		203	205	2	1%	0.2	Y	Y	OK
	63			57	M40 On-Slip		196	197	1	1%	0.1	Y	Y	OK
				Total Vehicles			2008	2009	1	0%				

Site 4
Ardley Roundabout - HVs

Junction	From (Link)			To (Link)			Flow 0745-0845		Difference		GEH			Individual Flows
							Observed	Modelled	Value	%	Value	<5	<10	
Ardley Roundabout (A43 / M40 Off-Slip)	46	A43 SB		57	M40 On-Slip		28	28	0	-1%	0.1	Y	Y	OK
	46			61	B430 SB		38	34	-4	-12%	0.7	Y	Y	OK
	59	M40 Off-Slip		47	A43 NB		133	132	-1	0%	0.1	Y	Y	OK
	59			61	B430 SB		8	7	-1	-8%	0.2	Y	Y	OK
	63	B430 NB		47	A43 NB		34	33	-1	-2%	0.1	Y	Y	OK
	63			57	M40 On-Slip		9	9	0	-2%	0.1	Y	Y	OK
				Total Vehicles			250	243	-7	-3%				

Validation Summary All Vehicles			
	Percentage of Validation Counts with GEH < 5 =	31	100.00%
		0	
	Percentage of Validation Counts with GEH < 10 =	31	100.00%
		0	
	Individual Flows meeting DMRB criteria =	31	100.00%
		0	

Validation Summary LVs			
	Percentage of Validation Counts with GEH < 5 =	31	100.00%
		0	
	Percentage of Validation Counts with GEH < 10 =	31	100.00%
		0	
	Individual Flows meeting DMRB criteria =	31	100.00%
		0	

Validation Summary HVs			
	Percentage of Validation Counts with GEH < 5 =	31	100.00%
		0	
	Percentage of Validation Counts with GEH < 10 =	31	100.00%
		0	
	Individual Flows meeting DMRB criteria =	31	100.00%
		0	

500 A43 Baynards Green 2016 Base Revalidation - Turning Count Validation - PM Peak

AECOM

Project Name: NHSPC 2022 - 500 A43 Baynards Green
Project Number: 60681219
Subject: 500 A43 Baynards Green 2016 Base Revalida ion - Turning Count Validation - PM Peak
Date: 27/04/2023

Average Range	
FROM	TO
1	5

PM Peak Observed Data	
Ref	\\Ukbhm2fp002\ukbhm2fp001-v1\tp\TP\PROJECT\Traffic - HESPA - 17\Studies\EM S 107 M40 J10 Base Model TAME re vali\03 EXECUTION\09 Calculations\01 O-D Matrices 15min\MCC Data
File(s)	6102 M40 Jct 10 MCC - client.xlsx
Tab(s)	Site 1, Site 2, site 3 and Site 4

Site 1 **1**
Baynards Green Roundabout - All Vehicles

Junction	From (Link)			To (Link)			Flow 1630-1730		Difference		GEH			Individual Flows
							Observed	Modelled	Value	%	Value	<5	<10	
Baynards Green Roundabout (A43 / B4100)	A	20	A43 North	D	12	B4100 East	258	258	0	0%	0.0	Y	Y	OK
	A	20		C	16	A43 South	1191	1184	-7	-1%	0.2	Y	Y	OK
	A	20		B	8	B4100 West	49	50	1	1%	0.1	Y	Y	OK
	D	11	B4100 East	A	33	A43 North	321	309	-12	-4%	0.7	Y	Y	OK
	D	11		C	16	A43 South	106	101	-5	-5%	0.5	Y	Y	OK
	D	11		B	8	B4100 West	279	266	-13	-5%	0.8	Y	Y	OK
	C	14	A43 South	A	33	A43 North	1719	1632	-87	-5%	2.1	Y	Y	OK
	C	14		D	12	B4100 East	92	87	-5	-5%	0.5	Y	Y	OK
	C	14		B	8	B4100 West	103	92	-11	-11%	1.1	Y	Y	OK
	B	6	B4100 West	A	33	A43 North	57	56	-1	-1%	0.1	Y	Y	OK
	B	6		D	12	B4100 East	238	231	-7	-3%	0.4	Y	Y	OK
	B	6		C	16	A43 South	67	65	-2	-3%	0.2	Y	Y	OK
				Total Vehicles			4480	4332	-148	-3%				

Site 1
Baynards Green Roundabout - LVs

Junction	From (Link)			To (Link)			Flow 1630-1730		Difference		GEH			Individual Flows
							Observed	Modelled	Value	%	Value	<5	<10	
Baynards Green Roundabout (A43 / B4100)	20	A43 North		12	B4100 East		248	249	1	0%	0.1	Y	Y	OK
	20			16	A43 South		1082	1073	-9	-1%	0.3	Y	Y	OK
	20			8	B4100 West		38	39	1	2%	0.1	Y	Y	OK
	11	B4100 East		33	A43 North		312	301	-11	-4%	0.6	Y	Y	OK
	11			16	A43 South		102	94	-8	-8%	0.8	Y	Y	OK
	11			8	B4100 West		277	264	-13	-5%	0.8	Y	Y	OK
	14	A43 South		33	A43 North		1586	1498	-88	-6%	2.2	Y	Y	OK
	14			12	B4100 East		85	81	-4	-5%	0.5	Y	Y	OK
	14			8	B4100 West		97	86	-11	-11%	1.1	Y	Y	OK
	6	B4100 West		33	A43 North		52	51	-1	-2%	0.1	Y	Y	OK
	6			12	B4100 East		229	222	-7	-3%	0.4	Y	Y	OK
	6			16	A43 South		60	58	-2	-4%	0.3	Y	Y	OK
				Total Vehicles			4168	4016	-152	-4%				

Site 1
Baynards Green Roundabout - HVs

Junction	From (Link)			To (Link)			Flow 1630-1730		Difference		GEH			Individual Flows
							Observed	Modelled	Value	%	Value	<5	<10	
Baynards Green Roundabout (A43 / B4100)	20	A43 North		12	B4100 East		9	9	0	0%	0.0	Y	Y	OK
	20			16	A43 South		109	111	2	2%	0.2	Y	Y	OK
	20			8	B4100 West		11	11	0	0%	0.0	Y	Y	OK
	11	B4100 East		33	A43 North		9	8	-1	-7%	0.2	Y	Y	OK
	11			16	A43 South		4	7	3	75%	1.3	Y	Y	OK
	11			8	B4100 West		2	2	0	20%	0.3	Y	Y	OK
	14	A43 South		33	A43 North		133	134	1	1%	0.1	Y	Y	OK
	14			12	B4100 East		7	7	0	-6%	0.2	Y	Y	OK
	14			8	B4100 West		6	5	-1	-10%	0.3	Y	Y	OK
	6	B4100 West		33	A43 North		5	5	0	0%	0.0	Y	Y	OK
	6			12	B4100 East		9	9	0	-2%	0.1	Y	Y	OK
	6			16	A43 South		7	7	0	6%	0.1	Y	Y	OK
				Total Vehicles			311	316	5	2%				

Site 2 **3**
Cherwell Junction - All Vehicles

Junction	From (Link)			To (Link)			Flow 1630-1730		Difference		GEH			Individual Flows
							Observed	Modelled	Value	%	Value	<5	<10	
Cherwell Junction (A43 North, A43 South, Services)	A	36	A43 North	D	42	Cherwell Services	187	223	36	19%	2.5	Y	Y	OK
	A	36		C	39	M40 SB On-Slip	1014	962	-52	-5%	1.6	Y	Y	OK
	A	36		B	45	A43 South	438	413	-25	-6%	1.2	Y	Y	OK
	D	43	Cherwell Service Station	A	35	A43 North	68	96	28	41%	3.1	Y	Y	OK
	D	50		C	49	M40 SB On-Slip	190	190	0	0%	0.0	Y	Y	OK
	D	43		B	45	A43 South	156	127	-29	-19%	2.5	Y	Y	OK
	B	44	A43 South	A	35	A43 North	1686	1635	-51	-3%	1.3	Y	Y	OK
	B	44		C	39	M40 SB On-Slip	54	75	21	39%	2.6	Y	Y	OK
	B	44		D	42	Cherwell Services	206	166	-40	-20%	3.0	Y	Y	OK
				Total Vehicles			3999	3887	-112	-3%				

Site 2
Cherwell Junction - LVs

Junction	From (Link)			To (Link)			Flow 1630-1730		Difference		GEH			Individual Flows
							Observed	Modelled	Value	%	Value	<5	<10	
Cherwell Junction (A43 North, A43 South, Services)	36	A43 North		42	Cherwell Services		153	189	36	24%	2.8	Y	Y	OK
	36			39	M40 SB On-Slip		919	866	-53	-6%	1.8	Y	Y	OK
	36			45	A43 South		404	386	-18	-4%	0.9	Y	Y	OK
	43	Cherwell Service Station		35	A43 North		54	84	30	56%	3.6	Y	Y	OK
	50			49	M40 SB On-Slip		151	151	0	0%	0.0	Y	Y	OK
	43			45	A43 South		132	101	-31	-23%	2.8	Y	Y	OK
	44	A43 South		35	A43 North		1554	1509	-45	-3%	1.1	Y	Y	OK
	44			39	M40 SB On-Slip		46	71	25	55%	3.3	Y	Y	OK
	44			42	Cherwell Services		168	129	-39	-23%	3.2	Y	Y	OK
				Total Vehicles			3581	3487	-94	-3%				

Site 2
Cherwell Junction - HVs

Junction	From (Link)			To (Link)			Flow 1630-1730		Difference		GEH			Individual Flows
							Observed	Modelled	Value	%	Value	<5	<10	
Cherwell Junction (A43 North, A43 South, Services)	36	A43 North		42	Cherwell Services		34	34	0	0%	0.0	Y	Y	OK
	36			39	M40 SB On-Slip		95	96	1	1%	0.1	Y	Y	OK
	36			45	A43 South		34	27	-7	-21%	1.3	Y	Y	OK
	43	Cherwell Service Station		35	A43 North		14	12	-2	-16%	0.6	Y	Y	OK
	50			49	M40 SB On-Slip		39	39	0	0%	0.0	Y	Y	OK
	43			45	A43 South		24	25	1	6%	0.3	Y	Y	OK
	44	A43 South		35	A43 North		132	125	-7	-5%	0.6	Y	Y	OK
	44			39	M40 SB On-Slip		8	4	-4	-50%	1.6	Y	Y	OK
	44			42	Cherwell Services		38	37	-1	-3%	0.2	Y	Y	OK
				Total Vehicles			418	400	-18	-4%				

Site 3 **2**
Padbury Junction - All Vehicles

Junction	From (Link)			To (Link)			Flow 1630-1730		Difference		GEH			Individual Flows
							Observed	Modelled	Value	%	Value	<5	<10	
Padbury Junction (A43 / M40 Off-Slip)	C	35	A43 South	A	23	A43 North	1721	1727	6	0%	0.1	Y	Y	OK
	B	90	M40 Off-Slip	C	29	A43 South	250	252	2	1%	0.2	Y	Y	OK
	B	90		A	23	A43 North	219	167	-52	-24%	3.7	Y	Y	OK
	A	79	A43 North	C	29	A43 South	1396	1349	-47	-3%	1.3	Y	Y	OK
				Total Vehicles			3586	3495	-91	-3%				

Site 3
Padbury Junction - LVs

Junction	From (Link)			To (Link)			Flow 1630-1730		Difference		GEH			Individual Flows
							Observed	Modelled	Value	%	Value	<5	<10	
Padbury Junction (A43 / M40 Off-Slip)	35	A43 South		23	A43 North		1586	1588	2	0%	0.1	Y	Y	OK
	90	M40 Off-Slip		29	A43 South		225	221	-4	-2%	0.3	Y	Y	OK
	90			23	A43 North		203	158	-45	-22%	3.4	Y	Y	OK
	79	A43 North		29	A43 South		1265	1224	-41	-3%	1.2	Y	Y	OK
				Total Vehicles			3279	3190	-89	-3%				

Site 3
Padbury Junction - HVs

Junction	From (Link)			To (Link)			Flow 1630-1730		Difference		GEH			Individual Flows
							Observed	Modelled	Value	%	Value	<5	<10	
Padbury Junction (A43 / M40 Off-Slip)	35	A43 South		23	A43 North		135	139	4	3%	0.3	Y	Y	OK
	90	M40 Off-Slip		29	A43 South		25	32	7	27%	1.3	Y	Y	OK
	90			23	A43 North		16	10	-6	-39%	1.7	Y	Y	OK
	79	A43 North		29	A43 South		131	125	-6	-5%	0.5	Y	Y	OK
				Total Vehicles			307	305	-2	-1%				

Site 4 **4**
Ardley Roundabout - All Vehicles

Junction	From (Link)			To (Link)			Flow 1630-1730		Difference		GEH			Individual Flows
							Observed	Modelled	Value	%	Value	<5	<10	
Ardley Roundabout (A43 / M40 Off-Slip)	C	46	A43 SB	B	57	M40 On-Slip	282	278	-4	-1%	0.2	Y	Y	OK
	C	46		A	61	B430 SB	274	263	-11	-4%	0.7	Y	Y	OK
	B	59	M40 Off-Slip	C	47	A43 NB	1457	1431	-26	-2%	0.7	Y	Y	OK
	B	59		A	61	B430 SB	36	35	-1	-2%	0.1	Y	Y	OK
	A	63	B430 NB	C	47	A43 NB	451	446	-5	-1%	0.2	Y	Y	OK
	A	63		B	57	M40 On-Slip	182	180	-2	-1%	0.1	Y	Y	OK
				Total Vehicles			2682	2633	-49	-2%				

Site 4
Ardley Roundabout - LVs

Junction	From (Link)			To (Link)			Flow 1630-1730		Difference		GEH			Individual Flows
							Observed	Modelled	Value	%	Value	<5	<10	
Ardley Roundabout (A43 / M40 Off-Slip)	46	A43 SB		57	M40 On-Slip		248	243	-5	-2%	0.3	Y	Y	OK
	46			61	B430 SB		256	245	-11	-4%	0.7	Y	Y	OK
	59	M40 Off-Slip		47	A43 NB		1304	1282	-22	-2%	0.6	Y	Y	OK
	59			61	B430 SB		33	32	-1	-4%	0.2	Y	Y	OK
	63	B430 NB		47	A43 NB		433	429	-4	-1%	0.2	Y	Y	OK
	63			57	M40 On-Slip		178	177	-1	-1%	0.1	Y	Y	OK
				Total Vehicles			2452	2407	-45	-2%				

Site 4
Ardley Roundabout - HVs

Junction	From (Link)			To (Link)			Flow 1630-1730		Difference		GEH			Individual Flows
							Observed	Modelled	Value	%	Value	<5	<10	
Ardley Roundabout (A43 / M40 Off-Slip)	46	A43 SB		57	M40 On-Slip		34	35	1	4%	0.2	Y	Y	OK
	46			61	B430 SB		18	18	0	-2%	0.1	Y	Y	OK
	59	M40 Off-Slip		47	A43 NB		153	149	-4	-3%	0.3	Y	Y	OK
	59			61	B430 SB		3	4	1	20%	0.3	Y	Y	OK
	63	B430 NB		47	A43 NB		18	17	-1	-3%	0.1	Y	Y	OK
	63			57	M40 On-Slip		4	4	0	-5%	0.1	Y	Y	OK
				Total Vehicles			230	227	-3	-1%				

Validation Summary All Vehicles

Percentage of Validation Counts with GEH < 5 =	31 / 0	100.00%
Percentage of Validation Counts with GEH < 10 =	31 / 0	100.00%
Individual Flows meeting DMRB criteria =	31 / 0	100.00%

Validation Summary LVs

Percentage of Validation Counts with GEH < 5 =	31 / 0	100.00%
Percentage of Validation Counts with GEH < 10 =	31 / 0	100.00%
Individual Flows meeting DMRB criteria =	31 / 0	100.00%

Validation Summary HVs

Percentage of Validation Counts with GEH < 5 =	31 / 0	100.00%
Percentage of Validation Counts with GEH < 10 =	31 / 0	100.00%
Individual Flows meeting DMRB criteria =	31 / 0	100.00%

A.2 2016 Journey Time Validation Results

M40 J10 Revalidation - Journey Time Validation - AM Peak

AECOM

Project Name: M40 J10 Vissim Revalidation
Project Number: 60681219
Subject: M40 J10 Revalidation - Journey Time Validation - AM Peak
Date: 27/04/2023

Average Range	
FROM	TO
1	100

avg

AM Peak - All Vehicles

	JT Markers	ANPR		Site				Journey Time (s) 0745-0845		Difference				Car Journey Time (s) 0745-0845			No. of Vehs	Modelled DMRB Accuracy		
		FROM	TO	From (VISSIM Zone)		To (VISSIM Zone)		Observed Avg	Modelled Avg	%	Modelled within ±15%	Absolute	Modelled within ±60s	Obs. Min	Obs. Max	Modelled within Min/Max	Volume	DMRB Accuracy	Accuracy <10%	Accuracy <7.5%
avg102	102	004	005	1	A43 North Entry - Baynards Green Rbt	2	B4100 East Exit - Baynards Green Rbt	31	44	43%	N	-13	Y	17	54	Y	151	0.51%	Y	Y
avg103	103	004	013	1		3	Cherwell RSA Entry - Cherwell Jct	141	141	0%	Y	0	Y	99	205	Y	42	0.26%	Y	Y
avg104	104	004	012	1		4	M40 SB On-Slip - Cherwell Jct	127	141	11%	Y	-14	Y	79	189	Y	537	0.21%	Y	Y
avg105	105	004	009	1		5	B430 Exit - Ardley Rbt	145	158	9%	Y	-13	Y	109	188	Y	209	0.23%	Y	Y
avg106	106	004	011	1		6	M40 NB On-Slip - Ardley Rbt	136	151	10%	Y	-14	Y	107	163	Y	42	0.36%	Y	Y
avg201	201	006	003	2	B4100 East Entry - Baynards Green Rbt	1	A43 North Exit - Baynards Green Rbt	72	74	2%	Y	-2	Y	24	148	Y	160	1.06%	Y	Y
avg206	206	006	011	2		6	M40 NB On-Slip - Ardley Rbt	175	178	2%	Y	-3	Y	104	257	Y	80	0.54%	Y	Y
avg301	301	014 015	003	3	Cherwell RSA Exit - Cherwell Jct	1	A43 North Exit - Baynards Green Rbt	140	125	-11%	Y	15	Y	89	195	Y	37	0.47%	Y	Y
avg304	304	014 015	012	3		4	M40 SB On-Slip - Cherwell Jct	50	50	0%	Y	0	Y	18	95	Y	118	0.67%	Y	Y
avg306	306	014 015	011	3		6	M40 NB On-Slip - Ardley Rbt	75	70	-7%	Y	6	Y	36	163	Y	87	0.57%	Y	Y
avg401	401	010	003	4	M40 NB Off-Slip - Ardley Rbt	1	A43 North Exit - Baynards Green Rbt	115	115	0%	Y	0	Y	67	167	Y	662	0.46%	Y	Y
avg403	403	010	013	4		3	Cherwell RSA Entry - Cherwell Jct	83	80	-4%	Y	3	Y	47	142	Y	134	1.47%	Y	Y
avg407	407	010	001	4		7	B4100 West Exit - Baynards Green Rbt	97	108	12%	Y	-12	Y	62	136	Y	62	0.62%	Y	Y
avg501	501	008	003	5	B430 Entry - Ardley Rbt	1	A43 North Exit - Baynards Green Rbt	114	112	-2%	Y	2	Y	78	163	Y	109	0.54%	Y	Y
avg506	506	008	011	5		6	M40 NB On-Slip - Ardley Rbt	25	24	-5%	Y	1	Y	13	47	Y	195	0.43%	Y	Y
avg602	602	007	005	6	M40 SB Off-Slip - Padbury Jct	2	B4100 East Exit - Baynards Green Rbt	79	80	2%	Y	-1	Y	54	113	Y	122	0.64%	Y	Y
avg605	605	007	009	6		5	B430 Exit - Ardley Rbt	116	115	0%	Y	0	Y	78	176	Y	143	1.06%	Y	Y
avg702	702	002	005	7	B4100 West Entry - Baynards Green Rbt	2	B4100 East Exit - Baynards Green Rbt	33	29	-10%	Y	3	Y	16	58	Y	113	0.64%	Y	Y
avg704	704	002	012	7		4	M40 SB On-Slip - Cherwell Jct	123	119	-3%	Y	4	Y	91	176	Y	231	0.32%	Y	Y
avg705	705	002	009	7		5	B430 Exit - Ardley Rbt	141	136	-4%	Y	6	Y	115	161	Y	26	0.68%	Y	Y
											19		20			20			20	20

Iterative Process - Monitoring	
AM Peak - All	
RSME =	7.86
%RSME =	7.78%
MAE =	5.71
%MAE =	5.65%

Validation Summary		
AM Peak - All		
Percentage of journey times within 15% =	19 20	95%
Percentage of journey times within 60 seconds =	20 20	100%
Percentage of journey times secions wihin min/max modelled range =	20 20	100%

M40 J10 Revalidation - Journey Time Validation - PM Peak

AECOM

Project Name: M40 J10 Vissim Revalidation
Project Number: 60681219
Subject: M40 J10 Revalidation - Journey Time Validation - PM Peak
Date: 03/04/2023

Average Range	
FROM	TO
1	100

avg

PM Peak - All Vehicles

	JT Markers	ANPR		Site				Journey Time (s) 1630-1730		Difference				Car Journey Time (s) 1630-1730			No. of Vehs	Modelled DMRB Accuracy		
		FROM	TO	From (VISSIM Zone)		To (VISSIM Zone)		Observed Avg	Modelled Avg	%	Modelled within ±15%	Absolute	Modelled within ±60s	Obs. Min	Obs. Max	Modelled within Min/Max	Volume	DMRB Accuracy	Accuracy <10%	Accuracy <7.5%
avg102	102	004	005	1	A43 North Entry - Baynards Green Rbt	2	B4100 East Exit - Baynards Green Rbt	24	23	-5%	Y	1	Y	13	43	Y	158	0.64%	Y	Y
avg103	103	004	013	1		3	Cherwell RSA Entry - Cherwell Jct	122	111	-9%	Y	12	Y	87	159	Y	46	0.29%	Y	Y
avg104	104	004	012	1		4	M40 SB On-Slip - Cherwell Jct	106	111	5%	Y	-5	Y	67	161	Y	727	0.17%	Y	Y
avg105	105	004	009	1		5	B430 Exit - Ardley Rbt	134	128	-4%	Y	6	Y	101	181	Y	97	0.22%	Y	Y
avg106	106	004	011	1		6	M40 NB On-Slip - Ardley Rbt	124	125	1%	Y	-1	Y	96	160	Y	37	0.28%	Y	Y
avg201	201	006	003	2	B4100 East Entry - Baynards Green Rbt	1	A43 North Exit - Baynards Green Rbt	53	51	-4%	Y	2	Y	23	116	Y	213	0.99%	Y	Y
avg206	206	006	011	2		6	M40 NB On-Slip - Ardley Rbt	138	145	5%	Y	-7	Y	98	204	Y	67	0.50%	Y	Y
avg301	301	014 015	003	3	Cherwell RSA Exit - Cherwell Jct	1	A43 North Exit - Baynards Green Rbt	225	203	-10%	Y	22	Y	120	358	Y	55	2.09%	Y	Y
avg304	304	014 015	012	3		4	M40 SB On-Slip - Cherwell Jct	41	44	7%	Y	-3	Y	12	84	Y	137	0.56%	Y	Y
avg306	306	014 015	011	3		6	M40 NB On-Slip - Ardley Rbt	69	67	-3%	Y	2	Y	38	137	Y	86	0.52%	Y	Y
avg401	401	010	003	4	M40 NB Off-Slip - Ardley Rbt	1	A43 North Exit - Baynards Green Rbt	235	208	-11%	Y	27	Y	88	418	Y	904	2.27%	Y	Y
avg403	403	010	013	4		3	Cherwell RSA Entry - Cherwell Jct	86	76	-12%	Y	11	Y	51	131	Y	151	1.13%	Y	Y
avg407	407	010	001	4		7	B4100 West Exit - Baynards Green Rbt	217	216	-1%	Y	2	Y	86	346	Y	49	2.55%	Y	Y
avg501	501	008	003	5	B430 Entry - Ardley Rbt	1	A43 North Exit - Baynards Green Rbt	232	219	-6%	Y	13	Y	78	424	Y	284	2.32%	Y	Y
avg506	506	008	011	5		6	M40 NB On-Slip - Ardley Rbt	27	33	23%	N	-6	Y	11	71	Y	147	1.23%	Y	Y
avg602	602	007	005	6	M40 SB Off-Slip - Padbury Jct	2	B4100 East Exit - Baynards Green Rbt	201	179	-11%	Y	22	Y	67	412	Y	108	3.43%	Y	Y
avg605	605	007	009	6		5	B430 Exit - Ardley Rbt	252	174	-31%	N	78	N	80	482	Y	98	4.06%	Y	Y
avg702	702	002	005	7	B4100 West Entry - Baynards Green Rbt	2	B4100 East Exit - Baynards Green Rbt	24	47	97%	N	-23	Y	14	36	N	106	1.07%	Y	Y
avg704	704	002	012	7		4	M40 SB On-Slip - Cherwell Jct	109	123	13%	Y	-14	Y	69	151	Y	72	0.52%	Y	Y
avg705	705	002	009	7		5	B430 Exit - Ardley Rbt	140	142	2%	Y	-2	Y	131	153	Y	14	0.89%	Y	Y
											17		19			19			20	20

Iterative Process - Monitoring	
PM Peak - All	
RSME =	21.33
%RSME =	16.67%
MAE =	12.95
%MAE =	10.12%

Validation Summary		
PM Peak - All		
Percentage of journey times within 15% =	17	85%
	20	
Percentage of journey times within 60 seconds =	19	95%
	20	
Percentage of journey times secions wihin min/max modelled range =	19	95%
	20	

Appendix B – M40 Junction 10 VISSIM Model Revalidation - Local Model Validation Report (August 2017)

M40 Junction 10 VISSIM Model Revalidation – Local Model Validation Report

August, 2017

60540307.EMS 107

M40 Junction 10 VISSIM Model Revalidation – Local Model Validation Report

This report outlines the methodology adopted to revalidate the base VISSIM micro-simulation model of the M40 Junction 10.

Quality information

Document name	Ref	Prepared for	Prepared by	Date	Reviewed by
M40J10 Revalidation Model LMVR	60540307.EMS107	Highways England	Marino Gonzalez	30/06/2016	Jorge Sanchez Racionero

Revision history

Revision	Revision date	Details	Name	Position
Rev1	02/08/2016	Prepared	Marino Gonzalez	Graduate Consultant
Rev1	18/08/2016	Checked	Jorge Sanchez Racionero	Consultant
Rev1	23/08/2016	Approved	Matthew Jopp	Principal Consultant
Rev2	14/10/2016	Prepared	Marino Gonzalez	Graduate Engineer
Rev2	19/10/2016	Checked	Jorge Sanchez Racionero	Consultant
Rev2	31/10/2016	Approved	Matthew Jopp	Principal Consultant
Rev3	01/08/2017	Prepared	Marino Gonzalez	Engineer
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Introduction

01

Overview

This Local Model Validation Report (LMVR) outlines the methodology adopted to revalidate the base VISSIM micro-simulation model of the M40 Junction 10, including A43 Ardley, Baynards Green, Cherwell, and Padbury junctions.

Background

In FY15/16 AECOM were commissioned by Highways England to undertake an iteration exercise to design an improvement scheme that could accommodate future growth up to 2031 to secure optimal operation on both the M40 mainline and the A43 approach to M40 J10. This scheme included signal controlled arrangements at Ardley, Cherwell and Padbury junctions using MOVA.

The proposed improvement scheme will need to be further investigated in order for it to be considered as a potential scheme to be included in the Department for Transport (DfT) Road Investment Strategy (RIS) for road period 2 (2020-2025) or 3 (beyond 2025).

This will involve having a robust tool for undertaking a Value for Money (VfM) assessment. Therefore, Highways England has commissioned AECOM to use 2016 traffic survey data (undertaken by AECOM between Monday 14th to Sunday 20th March 2016) to revalidate the existing M40 J10 VISSIM model, which was based on traffic surveys from October 2010 and did not include the pinch point scheme delivered in 2015 at M40 J10.

Study Area

The extent of the study area includes:

- A43 Cherwell junction (signal controlled using MOVA);
- A43 / B4100 Baynards Green (priority controlled);
- A43 / B430 Ardley Roundabout (priority controlled); and
- A43 Padbury Junction (priority controlled).

In addition, approximately 5km of the M40 mainline north and south of M40 J10, as well as 1km of the A43 mainline north of A43 / B4100 Baynards Green Roundabout have been modelled. The following local roads have also been included:

- Approximately 500m of the B430 Station Road west approach to A43 / B430 Ardley Roundabout.
- Approximately 450m of the B4100 Banbury Road west approach to A43 / B4100 Baynards Green Roundabout.
- Approximately 500m of the B4100 Banbury Road east approach to A43 / B4100 Baynards Green Roundabout.

A comparison between modelled and observed traffic survey data has been undertaken in order to ensure that the model adequately replicates on-site traffic conditions and can be used to test future year scenarios.

The extents of the model are shown in ***FIGURE 1.1***

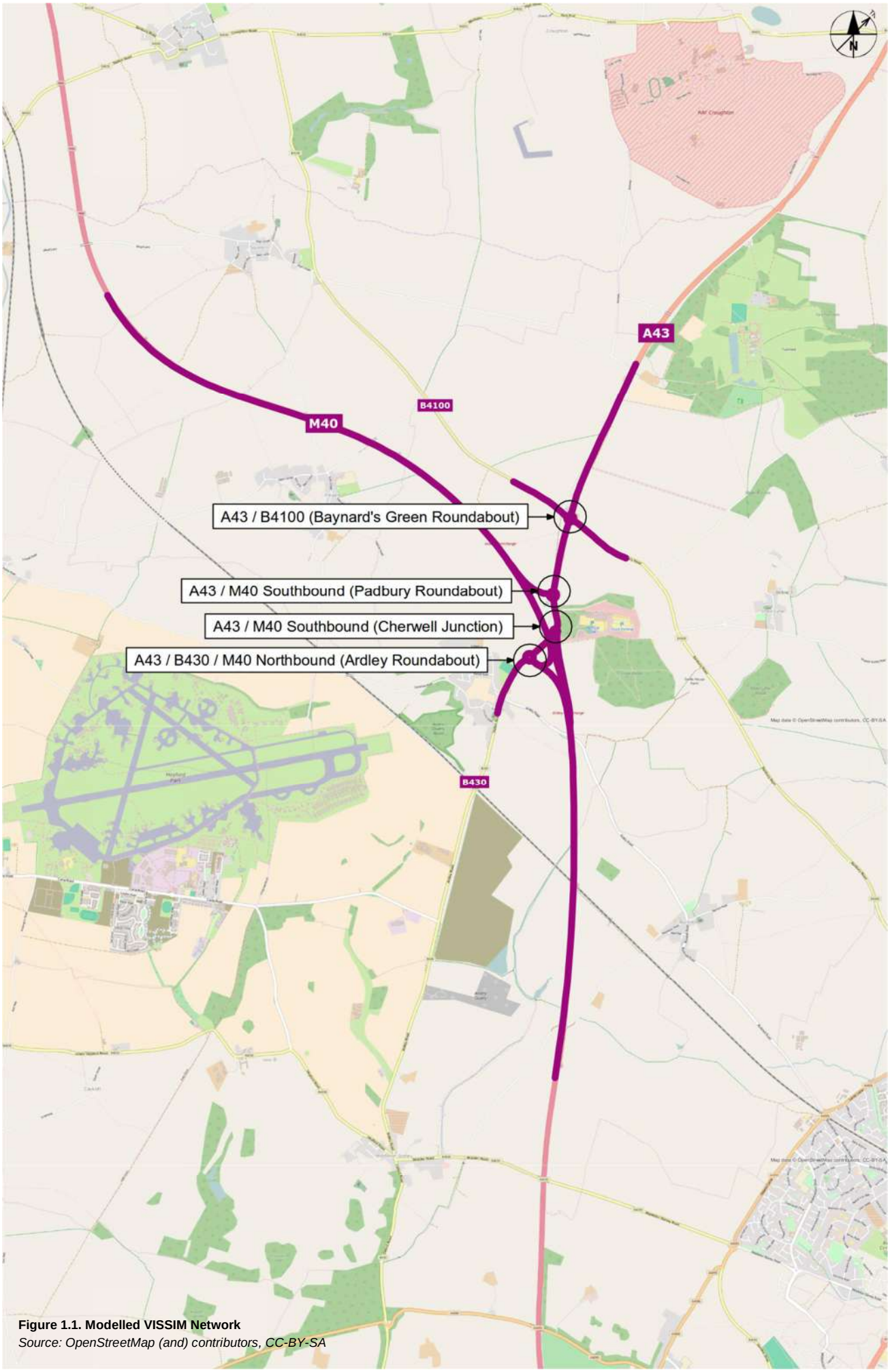

Figure 1.1. Modelled VISSIM Network
Source: OpenStreetMap (and) contributors, CC-BY-SA

Study Objectives

The main objective of the study is to revalidate the existing M40 Junction 10 VISSIM model to allow future year testing.

The purpose of the study is to update the existing VISSIM model of M40 Junction 10 to incorporate the pinch point scheme implemented in 2015, using 2016 traffic survey data to produce a micro-simulation model which is calibrated and validated against observed site data to DMRB and WebTAG standards. Once the model is calibrated and validated it will allow further testing of an improvement scheme designed by AECOM in FY 15/16 in order for it to be considered as a potential scheme for inclusion in RIS 2 or RIS 3.

This latest revision of the Local Model Validation Report (LMVR) follows discussions with Highways England's Transport Planning Group (TPG), formerly TAME. It was deemed that although the previous base model provided suitable levels of validation in accordance with both DMRB and WebTAG standards, tighter levels of validation were required at one approach. Thus, it was agreed to revise and refine the model focusing on validation enhancements to the model, particularly for the PM peak model. This LMVR reports the enhanced base model validation.

Observed Conditions

02

Observed Data

Traffic surveys were undertaken from Monday 14th March to Sunday 20th March 2016 by National Data Collection (NDC).

In order to revalidate the existing VISSIM model of M40 Junction 10, the following baseline data was obtained:

- Fully Classified Turning Counts (using video surveys);
- Origin – Destination (O-D) matrices and Journey Time data (using Automatic Number Plate Recognition (ANPR) data);
- Automatic Traffic Counts (ATCs);
- Passage Count data (from HE TRADS database);
- Bus Information;
- Base Mapping;
- Video and Site Observations;
- Signal Specifications.

Traffic Surveys

Traffic surveys were undertaken from Monday 14th March to Sunday 20th March 2016 by National Data Collection (NDC) following the traffic survey specification "*160304-60343293-EM20-TSS-001*" which can be found in Appendix A.

Number Plate Surveys on Thursday 17th March 2016 at 15 cordon points across the network were carried out from 06:30 to 09:30 and from 15:30 to 18:30 using ANPR. These were collected to establish O-D data and to derive journey time estimates. The cordon points are detailed below and are shown in ***Figure 2.1*** below:

- Baynards Green Roundabout
  - ID 1 – B4100 Banbury Road West - Westbound;
  - ID 2 – B4100 Banbury Road West - Eastbound;
  - ID 3 – A43 North – Northbound;
  - ID 4 – A43 North - Southbound;
  - ID 5 – B4100 Banbury Road East - Eastbound;
  - ID 6 – B4100 Banbury Road East – Westbound.
- Padbury Junction
  - ID 7 – M40 Southbound Off-Slip.
- Ardley Roundabout
  - ID 8 – B430 Station Road South - Northbound;
  - ID 9 – B430 Station Road South - Southbound;
  - ID 10 – M40 Northbound Off-Slip;
  - ID 11 – M40 Northbound On-Slip.
- Cherwell Roundabout
  - ID 12 – M40 Southbound On-Slip;
  - ID 13 – Moto Cherwell Valley Services Entry;
  - ID 14&15 – Moto Cherwell Valley Services Exit.

ATCs were collected between Monday 14th to Sunday 20th March 2016, inclusive at the following locations:

- Baynards Green Roundabout
  - ATC 1: B4100 Banbury Road - West of Baynards Green Roundabout;
  - ATC 2: B4100 Banbury Road – East of Baynards Green Roundabout;
- Ardley Roundabout
  - ATC 3: B430 Station Road – West of Ardley Roundabout.

Fully Classified Turning Counts were undertaken on Thursday 17th March 2016 at Ardley Roundabout, Cherwell Junction, Padbury Junction and Baynards Green Roundabout at each approach of these junctions. The locations are as detailed below and shown in ***Figure 2.2***:

- Baynards Green Roundabout
  - A – A43 North of Baynards Green Roundabout;
  - B – B4100 Banbury Road West;
  - C – A43 South of Baynards Green Roundabout;
  - D – B4100 Banbury Road East.
- Padbury Junction
  - A – A43 North of Padbury Junction;
  - B – M40 Southbound Off-Slip;
  - C – A43 South of Padbury Junction.
- Ardley Roundabout
  - A – B430 Station Road South of Ardley Roundabout;
  - B – M40 Northbound On/Off-Slip;
  - C – A43 North of Ardley Roundabout.

- Cherwell Roundabout
  - A – A43 North of Cherwell junction;
  - B – A43 South-West of Cherwell junction;
  - C – M40 Southbound On-Slip;
  - D – Moto Cherwell Valley Services.

Figure 2.1. ANPR Sites locations.
Source: Nationwide Data Collection (NDC)



NDC	**Site / Location:**	Sites 1 to 15	**Project No:**	6102	**Drawing No:**	6102-ANPR	**Drawn By:**	NT
	Survey Date:	Thursday 17th March 2016	**Project Name:**	M40 Junction 10				
	Survey Times:	06:30 to 09:30 & 15:30 to 18:30	**Drawing Title:**	ANPR Survey Locations				

Figure 2.2. MCC Sites locations.
Source: Nationwide Data Collection (NDC)



NDC	Site / Location:	Site 1 - A43/B4100	Project No:	6102	Drawing No:	6102/01	Drawn By:	CW
	Survey Date:	Thursday 17th March 2016	Project Name:	M40 Jct 10				
	Survey Times:	0600 - 1900	Drawing Title:	Site Layout and Observed Movements				



NDC	Site / Location:	Sites 3 to 4	Project No:	6102	Drawing No:	6102/02	Drawn By:	CW
	Survey Date:	Thursday 17th March 2016	Project Name:	M40 Jct 10				
	Survey Times:	0600 - 1900	Drawing Title:	Site Layout and Observed Movements				

Passage Count Data

Passage Count Data was obtained from the ANPR / MCC / ATC counts carried out on 17th March 2016 at the locations which are shown in Traffic Surveys, Figure 2.1 and Figure 2.2.

AECOM's Technical Note *160504 EM8 TN1 - Survey Data Check*, dated 5th May 2016, explains the traffic survey data checks in more detail and can be found in Appendix B of this report.

TRADS sites M40/9113B and M40/9023A have been used to derive traffic flows on the M40 mainline. The derived traffic flows have then been used to prepare the O-D matrices to be used within the VISSIM model. TRADS sites locations are shown in ***FIGURE 2.3***.

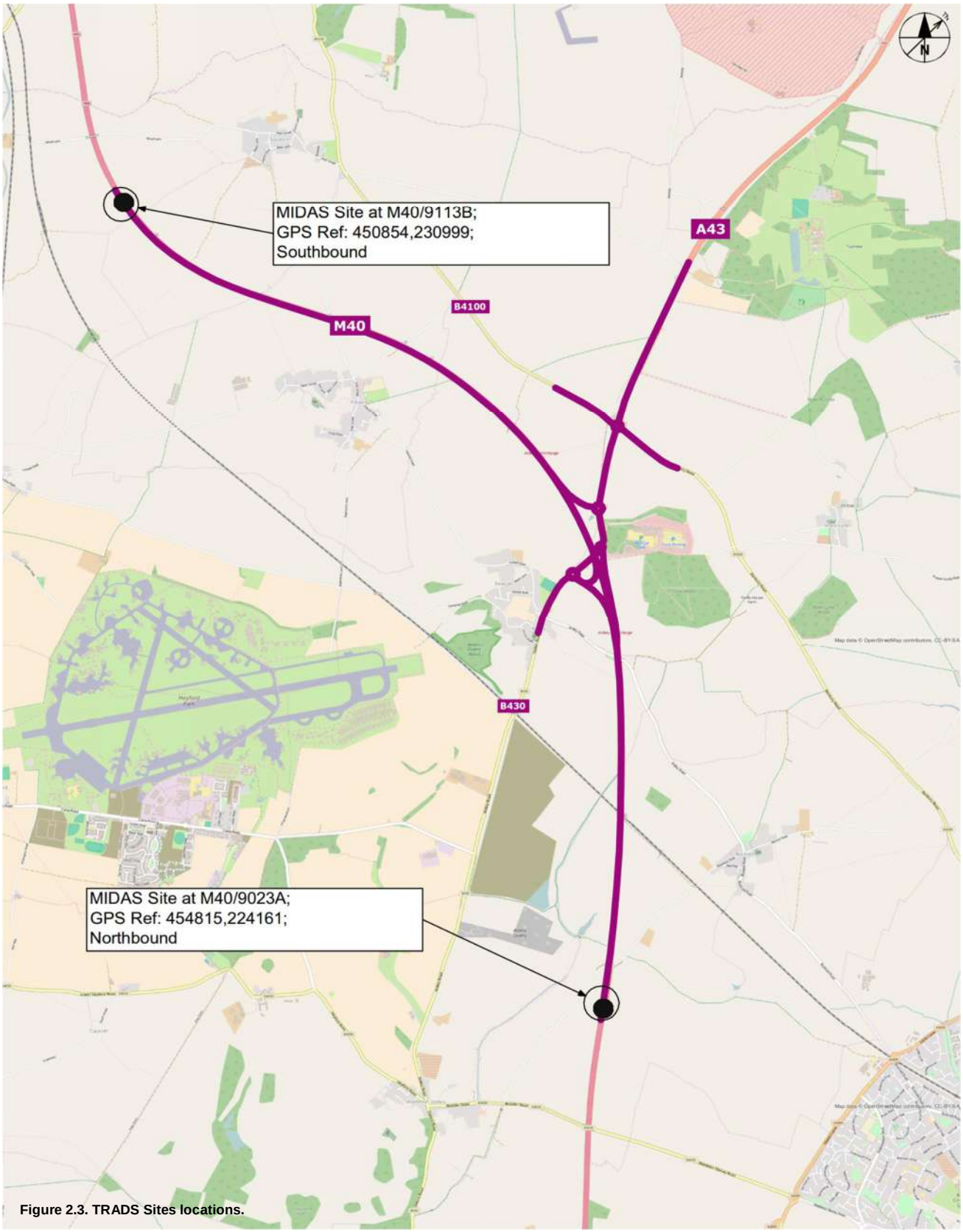

Figure 2.3. TRADS Sites locations.

Bus information

From the site observations (on Thursday 17th March 2016) it was noted that no public transport routes run through the model extent. Afterwards, a desk top check was carried out using Google Maps and Traveline website to confirm this. It was found that bus route 81 travels along the B4100 from Bicester along the A43 until the B430 / Ardley Road junction, continuing towards Somerton. However, after reviewing bus times for this route it was confirmed that all services are outside of the peak periods modelled and therefore have not been included in the model.

The 81A also has stops along the network on the B430; however this is outside the model extent. Therefore no public transport stops have been included in the model.

Base mapping

In order to construct the network, Mastermap topographical mapping was obtained from Highways England on 16th June 2016 for the areas around M40 J10, Ardley Roundabout, Cherwell Junction, Padbury Junction and Baynards Green Roundabout. This has allowed for the network to be updated on mapping which is to the correct scale and extents, including recently implemented Pinch Point Scheme at Cherwell Junction.

"*Drawing No.530011_GA00_01*" (as shown in Appendix C) obtained from A-One+ on 26th March 2014 and site observations have been used to ensure that the network is updated with accurate road markings and signal locations at Cherwell Junction.

Site Observations

Site observations were undertaken by AECOM during a site visit to M40 J10, Baynards Green Roundabout, Padbury Junction, Cherwell Junction and Ardley Roundabout on Thursday 17th March 2016. Site observations were collected during AM peak period of 07:00-10:00 and PM peak period of 16:00-19:00. Site observations were used to gather information on the following:

- Photos of road markings at the junctions;
- Observations and notes of driver behaviour, lane usage and queues at the junctions;
- Determination of speed limits in the immediate vicinity of the junctions;
- Check of public transport stops – determining services at each stop and indicative locations.

Video Observations

Video footage was also obtained for the survey day, collected by NDC as part of the survey specification agreement. The videos were obtained on the 17th March 2016 from 06:00 until 19:00, at MCC locations shown in ***FIGURE 2.2***.

The footage has been used to check the operation of the modelled network and to observe driver behaviour.

This has been particularly relevant to identify timings and the precise location of a minor incident that occurred at the stopline of the nearside lane on the A43 North Entry approach to Baynards Green roundabout, where a vehicle was stopped for approximately nine minutes (from 07:33 to 07:42) on the survey date (Thursday 17th March 2016).

Highways England's Transport Planning Group (TPG), formerly TAME, advised AECOM to better replicate the performance and behavior in the model at the M40 J10 southbound off-slip. A detailed review of the video footage recorded on the survey date at the M40 J10 SB off-slip and the A43 northbound link between Baynards Green roundabout and Cherwell junction has been undertaken, in order to accurately replicate driver's behaviors and queues at these approaches. This was especially important during the PM period, where queues formed at the A43 northbound entry approach at Baynards Green roundabout extended back through Padbury junction, creating long queues on the M40 J10 SB off-slip. Aggressive gap acceptance and 'pushy' driver behaviour of vehicles on the M40 J10 SB off-slip and collaborative 'merge-in-turn' driver behavior of vehicles on the A43 is observed in the video footage. AECOM has sought to replicate these behaviours in the model.

Signal Specifications

In order to accurately represent traffic signals at Cherwell Junction, in February 2016 signal data was obtained from AOne+ (as shown in ***TABLE 1***).

Table 1: Signal Data Received

Location	Data Type	Name	Description	Date	Received From
Cherwell Junction	MOVA Dataset	M40J10.mds	Cherwell Junction	February 2016	AOne+
	MOVA PR File	M40J10.pr	Cherwell Junction	February 2016	AOne+
	MOVA Link Diagram	MOVA Cherwell Junction	MOVA Lane/Link Configuration	August 2015	AOne+

Data Review of Observed Data

Traffic data received has been carefully checked and reviewed to ensure its suitability for being used in model development and validation.

To verify the suitability of the observed data, a series of checks were made to identify any potential issues which may have led to problems calibrating and validating the VISSIM models. AECOM's Technical Note *"160504 EM8 TN1 - Survey Data Check*", dated 5th May 2016, explains the data checks in more detail and can be found in Appendix B of this report

This note concluded that the survey data submitted by NDC is satisfactory, with some minor problems attributed to ATC Site 1. It was recommended to exclude ATC Site 1 from the VISSIM model development and to use alternative traffic data (e.g. MCC or TRADS). All other ATC sites are acceptable overall for use in the model development.

Independent checks of the MCC data against the ATC and TRADS data illustrated that the data collected by NDC is acceptable to create origin-destination matrices.

It is noted that a minor incident took place at the stopline of the nearside lane on the A43 North Entry approach to Baynards Green roundabout on 17th March 2016 at approximately 07:33, with a vehicle stopped at the nearside lane until approximately 07:42. This was identified as a potential risk for the VISSIM model re-validation.

Peak Determination

Modelled AM and PM Peak periods identified are 07:45 – 08:45 and 16:30 – 17:30 respectively.

Once the survey data had been reviewed, the AM and PM peak periods were determined based on the MCC data for each individual junction. From the MCC data it was found that the overall peak hours for the network was as follows:

- AM peak: 07:15 – 08:15;
- PM peak: 16:30 – 17:30.

However, due to unusual queues formed during the survey date at the stopline of the nearside lane on the A43 North Entry approach to Baynards Green roundabout because of the minor incident that took place on the survey day for approximately 9minutes (07:33 – 07:42), it was decided to further analyse traffic levels for different AM periods using MCC data. It was found that there were very little differences in traffic flow levels between 07:15 – 08:15 and 07:45 – 08:45 periods, so 07:45 – 08:45 period was adopted as AM peak period.

Therefore the peak hours used in the VISSIM modelling are as follows:

- AM peak: 07:45 – 08:45;
- PM peak: 16:30 – 17:30.

Modelling Approach

03

Approach Overview

A VISSIM micro-simulation model of the M40 Junction 10 network has been updated to reflect existing conditions at the M40 Junction 10 and to provide a controlled base for allowing future testing at the junction to be undertaken.

VISSIM is a microscopic, behaviour-based multi-purpose traffic simulation program developed by PTV. The model uses the psycho-physical car-following model developed by Wiedemann and a related lane-changing model originally designed by Sparmann.

VISSIM has been used to model the M40 Junction 10, Ardley Roundabout, Baynards Green Roundabout, Padbury Junction and Cherwell Junction as the program can analyse various typical traffic operations including scenarios of merging / diverging traffic under congested and free flow conditions, with constraints such as lane configuration, traffic composition and priority control. Complex signalised junctions can also be modelled in VISSIM with a reasonable degree of accuracy when combined with external software such as VAP (vehicle actuated program) and more recently PC MOVA.

The wide range of tools combined with the ability to assess interaction between consecutive junctions makes VISSIM an extremely useful tool for the evaluation of the base year performance and any future year testing.

Another benefit of VISSIM is its graphical interface that allows the user to add traffic and signal data to existing base maps or aerial photographs of intersections and road layouts. The capability dramatically improves the quality of animation of traffic operations providing an important graphical interface to aid in presentation of the outcomes.

The simulation can be calibrated and validated using local traffic counts, queue lengths and journey time information. This allows the production of a site-specific base model that can accurately reflect the behaviour of traffic in the study area.

Model Coverage

The M40 Junction 10 VISSIM model includes the following junctions:

- A43 / B4100 Banbury Road Baynards Green Roundabout;
- A43 / M40 Southbound Padbury Junction;
- A43 / M40 Southbound Cherwell Junction;
- A43 / B430 Station Road / M40 Northbound Ardley Roundabout.

The extents of the model can be seen in ***FIGURE 3.1***.

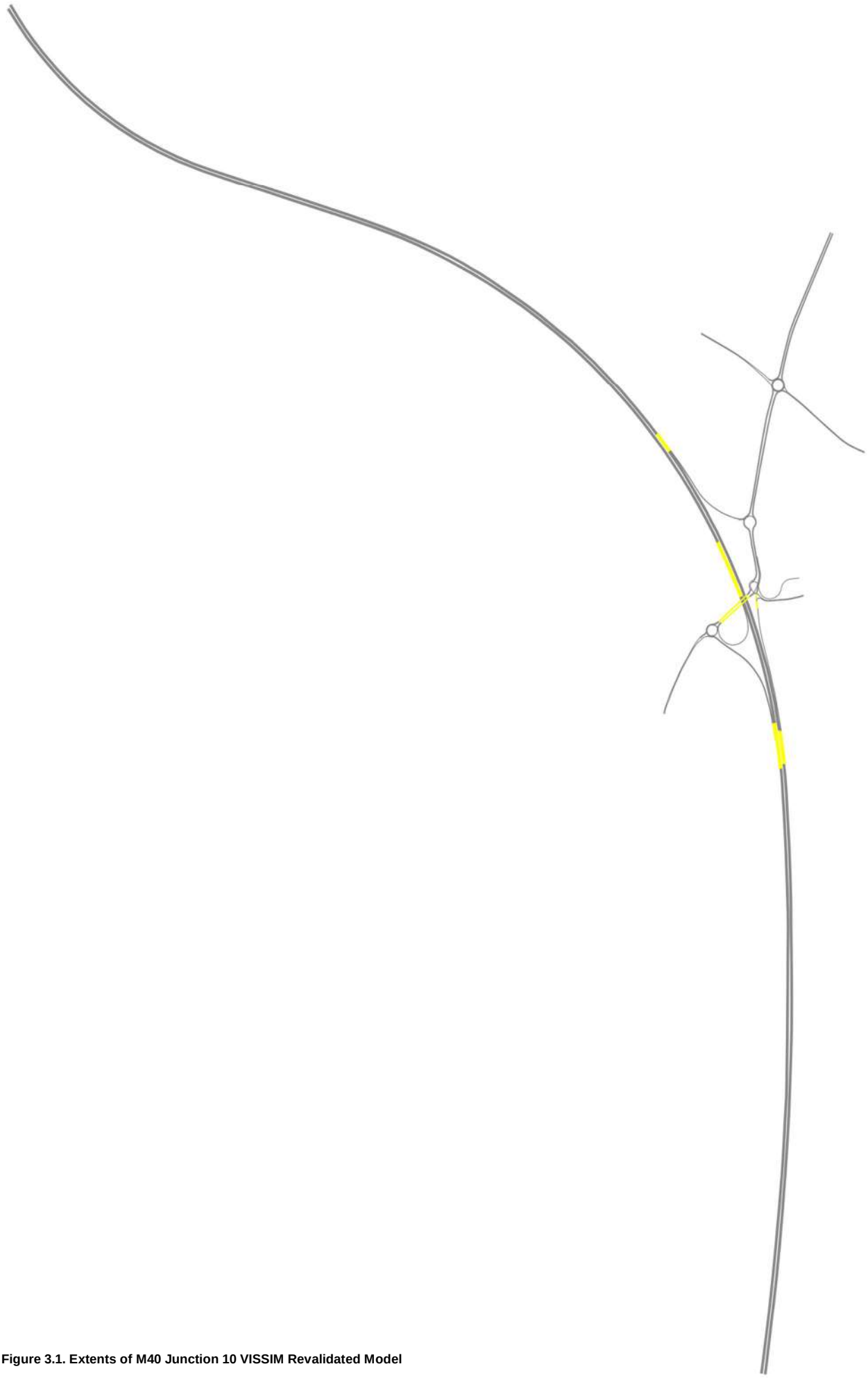

Figure 3.1. Extents of M40 Junction 10 VISSIM Revalidated Model

Modelling Specifications

The M40 Junction 10 VISSIM model has been developed using the following specification

Table 2: Modelling Parameters

Modelling Parameters		
Assessment Year	2016	
Assessment Scenarios	AM Peak	
	PM Peak	
	AM Period	0645-0915hrs
	AM Build-Up Period	0645-0745hrs
	AM Peak Period	0745-0845hrs
	AM Cool-Down Period	0845-0915hrs
	PM Period	1530-1800hrs
	PM Build-Up Period	1530-1630hrs
	PM Peak Period	1630-1730hrs
	PM Cool-Down Period	1730-1800hrs
Evaluation Periods	AM Peak Period	0745-0845hrs
	PM Peak Period	1630-1730hrs
Vehicle Types	Light Vehicles, LVs	
	Heavy Vehicles, HVs	
VISSIM Version	5.40.06	
PC MOVA Version	PC MOVA 2.0.4	
	MOVA Kernel 7.0	

Network Development

04

Network Development

Model development has been undertaken in accordance with guidance in both *DMRB Volume 12a and Interim Advice Note 36-01 'The use and application of micro-simulation models*'.

This section describes how the model network has been built and provides a brief overview of the data used. It then describes the data entry checks undertaken. Model building has been undertaken in accordance with guidance in both *DMRB Volume 12a* and *Interim Advice Note 36-01 'The use and application of micro-simulation models'*.

The network has been updated using OS mapping and A-One+ *Drawing No.530011_GA00_01* of the Pinch Point Scheme at Cherwell Junction. These layers acted as the base mapping, which allowed junction geometry to be checked to ensure that the network incorporated in the model was representative. Lane widths and flare lengths have been checked using the base mapping, together with Google Earth Imagery and video footage from the traffic survey conducted on 17th March 2016. Furthermore, site observations such as pictures, sketches, site visit logs and videos have been used to check geometry coding.

Changes to Cherwell Junction include:

- An additional lane at the A43 North Southbound approach (2 lanes increased to 3 lanes);
- Signalisation of all approaches;
- Segregated lane from A43 South to A43 North;
- Relocation of M40 Southbound On-Slip (previously located at Padbury Junction).

Finalised layout is shown in ***APPENDIX C***.

The VISSIM network is made up of a series of links joined together by connectors. A link is a unidirectional representation of a section of highway. A connector is a unidirectional section of highway that joins two links. The information required for each link is:

- Lane width;
- Link length;
- Number of lanes;

Traffic enters and leaves the network via external points known as parking lots in VISSIM; a practice referred to as zone / zone loading in more traditional traffic modelling.

A collection of links and connectors that form a significant traffic route decision is referred to as a node. This represents a junction.

A summary of the modelled network is as follows.

The model network contains:

- 7 Model Zones (14 Parking Lots);
- 18 Nodes (significant areas of route decisions – junctions);
- 176 Links and Connectors;
- 1 Signal Controller.

Vehicular parameters

After checking the physical characteristics of the network, vehicular parameters were reviewed in order to make the model reflect existing site conditions as accurately as possible.

VISSIM has a set of default values for various vehicle characteristics such as; range of vehicular lengths, standard weights and power distributions, maximum / minimum acceleration values. As changes in gradient have not been used within this model, these default settings were deemed appropriate and have been applied.

Signal Control

As outlined in ***SIGNAL SPECIFICATIONS***, one signal controller and 9 stoplines (each lane is coded as a stopline) are included within the model in order to code the existing signalised Cherwell Junction.

In order to model the operation of the signals, signal data has been obtained as detailed in ***SIGNAL SPECIFICATIONS***, ***TABLE 1***.

Cherwell Junction has been modelled under PC MOVA control, utilising the MOVA dataset obtained from A-one+. This dataset has been revised, having removed the "all red" Stage 3 after having reviewed the traffic survey videos, that showed that this stage was never called and signals operation was limited to Stages 1 and 2.

A signal controller has been created in VISSIM to model the traffic signals using this updated dataset.

The link/lane/detector layout drawing obtained from A-one+ has been used to determine the locations of all the detectors at the junction, whilst the signal specifications have been used to create the PC MOVA connection file (used to control the MOVA signals in the model).

Desired Speed Decisions and Distribution Profiles

Desired speed decisions, which specify the speed distribution profile, are placed along a link in VISSIM to ensure that once a vehicle passes through the marker, it adopts the speed distribution profile associated with that marker. This allows on-site speeds to be modelled. The locations of any desired speed decisions in the VISSIM model were identified during the site visits and then confirmed, including their extents, using recorded videos for the modelling periods.

Speed distribution profiles used in the model have been derived from three sources:

– ATC speed data received from NDC;

– Department for Transport (DfT) National vehicle free-flow speeds statistics data;

– VISSIM default speed distributions.

In the locations where ATC counters were placed within the modelled network (***TRAFFIC SURVEYS***), speeds recorded on Thursday 17th March 2016 were utilised to produce speed distribution graphs. These speed profiles have been derived for light and heavy vehicle classes separately. The final profiles are given in Appendix D.

At the locations where no ATC data was available, speed distributions have been amended based on DfT National vehicle free-flow speeds statistics data.

The parameters used are detailed in ***TABLE 3***.

Table 3: Desired Speed Decisions and Distribution Profiles

No	Location	Source	Vehicle Class	Speed Distribution
Baynards Green Roundabout				
20, 21	A43 North Southbound	VISSIM	LVs	20mph LVs
			HVs	20mph HVs
109, 110	A43 North Southbound	DfT	LVs	70mph LVs
			HVs	70mph HVs
77, 78	A43 North Southbound	DfT	LVs	60mph LVs
			HVs	60mph HVs
79, 84	A43 North Southbound	DfT	LVs	50mph LVs
			HVs	50mph HVs
119, 120	A43 North Northbound	DfT	LVs	70mph LVs
			HVs	70mph HVs
22, 23	B4100 West Eastbound	DfT	LVs	30mph LVs
			HVs	30mph HVs
107	B4100 West Eastbound	DfT	LVs	50mph LVs
			HVs	50mph HVs
90	B4100 West Eastbound	ATC	LVs	ATC1 EB LVs
			HVs	ATC1 EB HVs
47	B4100 West Westbound	ATC	LVs	ATC1 WB LVs
			HVs	ATC1 WB HVs
25, 26	A43 South Northbound	DfT	LVs	30mph LVs
			HVs	30mph HVs
48, 49	A43 South Southbound	DfT	LVs	50mph LVs
			HVs	50mph HVs
24, 88	B4100 East Westbound	DfT	LVs	20mph LVs
			HVs	20mph HVs
91	B4100 East Westbound	ATC	LVs	ATC2 WB LVs
			HVs	ATC2 WB HVs

No	Location	Source	Vehicle Class	Speed Distribution
106	B4100 East Westbound	DfT	LVs	50mph LVs
			HVs	50mph HVs
46	B4100 East Eastbound	ATC	LVs	ATC2 EB LVs
			HVs	ATC2 EB HVs
Padbury Junction				
27, 28	A43 North Southbound	DfT	LVs	30mph LVs
			HVs	30mph HVs
117, 118	A43 North Northbound	DfT	LVs	50mph LVs
			HVs	50mph HVs
50, 51	A43 South Southbound	DfT	LVs	50mph LVs
			HVs	50mph HVs
32, 33	M40 Southbound Off-Slip	DfT	LVs	30mph LVs
			HVs	30mph HVs
87	M40 Southbound Off-Slip	DfT	LVs	40mph LVs
			HVs	40mph HVs
96	M40 Southbound Off-Slip	DfT	LVs	50mph LVs
			HVs	50mph HVs
10	M40 Southbound Off-Slip	DfT	LVs	60mph LVs
			HVs	60mph HVs
Cherwell Junction				
34, 35	A43 North Southbound	DfT	LVs	30mph LVs
			HVs	30mph HVs
93	Cherwell Services Entry	VISSIM	LVs	20mph LVs
			HVs	20mph HVs
67, 68	A43 South Southbound	DfT	LVs	30mph LVs
			HVs	30mph HVs
38, 39	A43 South Northbound	DfT	LVs	30mph LVs
			HVs	30mph HVs
63, 64	A43 North Northbound	DfT	LVs	50mph LVs
			HVs	50mph HVs
99	M40 Southbound On-Slip	DfT	LVs	70mph LVs
			HVs	70mph HVs
Ardley Roundabout				
40, 41	A43 North Southbound	DfT	LVs	30mph LVs
			HVs	30mph HVs
58	B430 West Southbound	ATC	LVs	ATC3 SB LVs
			HVs	ATC3 SB HVs
108	B430 West Northbound	DfT	LVs	50mph LVs
			HVs	50mph HVs
92	B430 West Northbound	ATC	LVs	ATC3 NB LVs
			HVs	ATC3 NB HVs
44, 45	B430 West Northbound	DfT	LVs	30mph LVs
			HVs	30mph HVs
61, 62	A43 North Northbound	DfT	LVs	50mph LVs
			HVs	50mph HVs

No	Location	Source	Vehicle Class	Speed Distribution
7, 8	M40 Northbound Off-Slip	DfT	LVs	60mph LVs
			HVs	60mph HVs
71, 72	M40 Northbound Off-Slip	DfT	LVs	50mph LVs
			HVs	50mph HVs
73, 74	M40 Northbound Off-Slip	DfT	LVs	40mph LVs
			HVs	40mph HVs
75, 76	M40 Northbound Off-Slip	DfT	LVs	30mph LVs
			HVs	30mph HVs
15	M40 Northbound On-Slip	DfT	LVs	50mph LVs
			HVs	50mph HVs
97	M40 Northbound On-Slip	DfT	LVs	70mph LVs
			HVs	70mph HVs
M40 Mainline				
114, 115, 116	M40 Northbound	DfT	LVs	Motorway LVs
			HVs	Motorway HVs
111, 112, 113	M40 Southbound	DfT	LVs	Motorway LVs
			HVs	Motorway HVs
98, 102, 103	M40 Northbound	DfT	LVs	Motorway LVs
			HVs	Motorway HVs
121, 122, 123	M40 Southbound	DfT	LVs	Motorway LVs
			HVs	Motorway HVs

Priority Markers and Gap Times

Priority rules inform a vehicle to wait at a junction unless the gap time is large enough for it to pull out. The priority rules have been placed in the vicinity of all junctions within the model. The gap times were based on site observations from the video surveys conducted on 17th March 2016.

As part of the calibration process, these have been suitably adjusted to suit the level of queuing observed. Gap times used below are all within the normal variance adopted in VISSIM. In addition, priority markers for headways have been used to prevent overlapping vehicles, having used the same parameters for both AM and PM peak models

The final gap times used for the relevant priority approach are detailed in ***TABLE 4***.

Table 4: Gap Times used in VISSIM Models (s)

Approach	Vehicle Type	Gap times (s) AM and PM					
		Lane 1	Lane 2	Lane 3	Lane 1	Lane 2	Lane 3
Baynards Green Roundabout							
A43 North	LVs	3.9s	3.9s	-	3.9s	3.9s	-
	HVs	4.4s	4.4s	-	4.4s	4.4s	-
B4100 Banbury Road East	LVs	3.3s	3.3s	-	3.3s	3.3s	-
	HVs	3.8s	3.8s	-	3.8s	3.8s	-
A43 South	LVs	4.1s	4.1s	-	4.1s	4.1s	-
	HVs	4.6s	4.6s	-	4.6s	4.6s	-
B4100 Banbury Road West	LVs	3.0s	3.0s	-	3.0s	3.0s	-
	HVs	3.5s	3.5s	-	3.5s	3.5s	-
Cherwell Junction							
A43 South	LVs	3.5s	-	-	3.5s	-	-
	HVs	4.0s	-	-	4.0s	-	-

Approach	Vehicle Type	Gap times (s) AM and PM					
		Lane 1	Lane 2	Lane 3	Lane 1	Lane 2	Lane 3
Padbury Junction							
M40 Southbound Off-Slip	LVs	3.9s	2.5s	-	3.9s	2.5s	-
	HVs	4.4s	3.0s	-	4.4s	3.0s	-
A43 North	LVs	3.5s	3.5s	-	3.5s	3.5s	-
	HVs	4.0s	4.0s	-	4.0s	4.0s	-
Ardley Junction							
A43 North	LVs	4.0s	4.0s	-	4.0s	4.0s	-
	HVs	4.5s	4.5s	-	4.5s	4.5s	-
M40 Northbound Off-Slip	LVs	3.1s	3.1s	-	3.1s	3.1s	-
	HVs	3.6s	3.6s	-	3.6s	3.6s	-
B430 Station Road	LVs	3.8s	3.8s	-	3.8s	3.8s	-
	HVs	4.3s	4.3s	-	4.3s	4.3s	-

Note: Lanes 1 and 2 correspond to the offside and nearside lanes respectively.

Conflict Areas

Conflict areas have been inserted on diverges to prevent overlapping of vehicles in the model.

Reduced Speed Areas

Reduced speed areas are inserted before a junction to slow the vehicles down before they reach the junction, where the speed limit reduces or where the geometry means drivers slow down. Reduced speed areas have to be applied to each lane of the link and the parameters set for Cars, HGV's and Buses.

The location of the reduced speed areas have been identified from the video surveys where vehicles could clearly be seen reducing their speed or travelling slower than the stated speed limit. As part of the calibration and validation process, some of the reduced speed areas have been adjusted in terms of speed and length in order to reflect the level of queuing observed.

Reduced speed areas have been used on the approaches to A43 Baynards Green Roundabout, A43 Padbury Junction, A43 Cherwell Junction and A43 Ardley Roundabout. There is also a reduced speed area used on the M40 Northbound On-Slip, this is because of the tight bend before vehicles join the M40 mainline.

20mph speed distributions have been used at junction approaches, whereas 50mph speed distributions have been used on the M40 Northbound On-Slip. VISSIM default deceleration parameters have remained unchanged.

In terms of length, reduced speed areas on circulatory approaches are within the range of 5-20m. For the M40 Northbound On-Slip, the length of the reduced speed area has been set to 100m.

Routing Decisions

A number of routing decisions were removed from the junctions because they were either redundant or circular.

A route closure has been input into the model at Cherwell junction, to avoid vehicles leaving the M40 via the M40 Southbound off-slip to re-join the M40 via the M40 Southbound on-slip, which is south of Cherwell Junction. This is shown in ***FIGURE 4.1***



Figure 4.1. Route closure at Cherwell Junction. *Non-Permitted route is colored in magenta.*

Redundant routes included those which did not follow the correct lane markings and allocations around the junction. This allowed the model to better replicate lane choice and routing both on the approaches and around the circulatory.

Lane Change Decisions

The lane change decision distance governs how far in advance a vehicle will alter its path of travel to move from one link to another link via a connector. The default lane change decision distance in VISSIM is 200m.

During the calibration process lane change decision distances on some sections of the network have been adjusted to better reflect on-site conditions. Connectors on the M40 Southbound off-slip have had its lane change decisions amended to 1000m. While connectors on the M40 Northbound off-slip have had its lane change distance amended to 1500m.

At the Baynards Green Roundabout, the lane change distance at B4100 East Exit has been set at 400m. The other lane change decisions across this junction are at VISSIM default 200m.

At the Padbury Junction, the A43 North approach lane change decision has been amended to 500m, while the other lane change distances at this roundabout are set at 200m.

Lane change decisions at Cherwell junction have been adjusted, with the A43 North and South approaches being set up to 400m and 250m, respectively. Additionally, the M40 Southbound On-Slip lane change decision has been increased to 250m. The rest of the lane change decisions at this junction are at 200m default value.

These changes have provided vehicles with enough time to diverge from the roundabout approaches, preventing a backlog of queues and unrealistic behaviour. The default lane change distance of 200 meters has been maintained for Ardley Roundabout for all connectors.

Public Transport

As previously discussed in ***BUS INFORMATION***, no public transport has been coded into this model because no bus services travel through the network during modelling periods.

Driving Behaviour Parameters

VISSIM has a default set of driving behaviours contained in a complex array of parameters which can be edited to more accurately reflect site specific conditions. These parameters affect; the car following and lane change models of vehicles, lateral behaviour and vehicular reaction to traffic signals. These sets of parameters are associated with link types so that all vehicles travelling along a specific link display the same driving behaviour properties.

The driver behaviour profiles have been used on a variety of different links, depending on their location within the VISSIM model.

The M40 and A43 mainlines have been modelled using the default “Left-Side Rule (motorised)” behaviour type.

The default driving behaviour type "Urban (motorised)" has been used for all single carriageway links and circulatory links at Baynards Green Roundabout, Padbury Junction, Cherwell Junction and Ardley Roundabout.

The “Merge” driver behaviour has been created to allow a more co-operative driver behaviour and more efficient lane changing behaviour under congested conditions. It has been used on the merge and diverge areas connecting the M40 Junction 10 slip roads to the M40 mainline, as well as in the vicinity of A43 South Northbound and Southbound and M40 Southbound approaches at Cherwell Junction.

For this new driver behaviour type, the “Urban (motorised)” type was used as a template, adjusting some of the parameters to represent different driving behaviours based on the video footage of the traffic survey conducted on 17th March 2016 and on the site visit observations.

The different driving behaviour types used within the model are summarised in Appendix E.

Network Checks

A series of checks were made to ensure that the base models correlated with the physical characteristics observed on site. These checks are described under the following bullet points:

- Range Checks – the characteristics of all links were checked to ensure that they were within appropriate ranges for the class of link. Characteristics include driver behaviour, speed and number of entry lanes.
- Link Lengths – the lengths of all links in the network were checked against total distance measured from the base mapping and site observations.
- Route Checking – the origin to destination routes for each vehicle type were checked for illogical routing through the network. Any anomalies were closed by the Network Edge function or Route Closures.

Matrix Development

05

Traffic Modelling Zoning System

The VISSIM models were built using a dynamic (matrix based) demand assignment in which vehicles choose their route through the network based on calculated cost paths.

This section describes the development of the demand matrices used in the dynamic assignment of vehicles in the VISSIM micro-simulation model.

The VISSIM models were built using a dynamic (matrix based) demand assignment in which vehicles choose their route through the network based on calculated cost paths. A dynamic assignment was chosen because of data availability and the ease of amending a dynamic model for future scenarios. The nature of the network is also best replicated by a dynamic assignment due to the lane changing characteristics, which are catered for by forward thinking route choice rather than a static set of paths.

The zoning system, on which dynamic assignments are based, provides a series of vehicular entry / exit points on the network. The inter-zone movements, which are generated by the assignment process, provide a representation of the vehicle paths and driver behaviour between the origins and destinations in the model network.

The zoning system for the VISSIM model is shown in ***FIGURE 5.1*** with the traffic entry and exit points. The traffic entry and exit points for the traffic model are as follows:

- Zone 1 – A43 North;
- Zone 2 – B4100 Banbury Road East;
- Zone 3 – Moto Cherwell Valley Services;
- Zone 4 – M40 Mainline South;
- Zone 5 – B430 Station Road;
- Zone 6 – M40 Mainline North;
- Zone 7 – B4100 Banbury Road West.

Types of Traffic Flow Input Files Used

For this model, Origin Destination (O-D) matrices were created and used to distribute traffic around the network. ANPR and MCC survey data was used to produce the matrices for the network extents. TRADS data obtained from the Highways England Traffic Information Database were used to produce the M40 mainline matrices for the network extents.

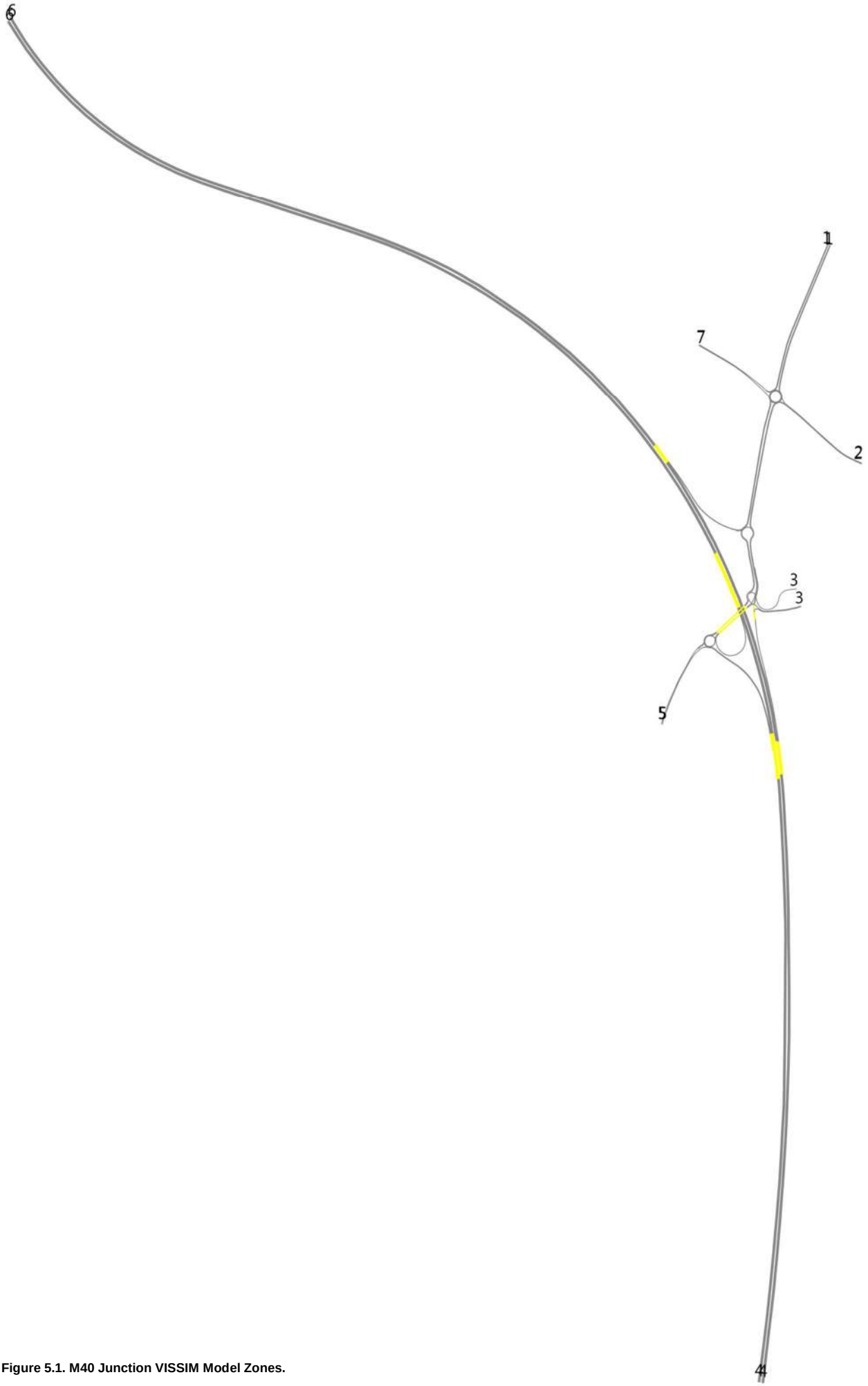

Figure 5.1. M40 Junction VISSIM Model Zones.

Matrix Development

O-D matrix has been developed using the ANPR data, MCC data and the TRADS data.

The matrices used in the model have been derived through the collection, analysis and subsequent assembly of O-D data recorded for a cordon around M40 Junction 10, Baynards Green Roundabout, Padbury Junction, Cherwell Junction and Ardley Roundabout.

TRAFFIC SURVEYS details the traffic surveys used in matrix development.

The matrix development for the AM and PM VISSIM models has been undertaken in four stages. These stages are as follows:

Stage 1 – Derive ANPR Matrix data

The first step was to carry out an analysis of the ANPR data provided by NDC and create ANPR O-D Matrix for each of the modelling periods.

Separate matrices were derived for each vehicle class (LVs and HVs) in 15min periods.

Stage 2 – Derive MCC Origin/Destination Totals

MCC data was analysed and origin and destination totals were calculated for the locations at ANPR cordon points so that these could be compared with the MCC counts.

Similarly to the previous stage, matrices were produced for each vehicle class (LVs and HVs) and modelling periods (build-up, peak and cool-down) in 15min periods.

Stage 3 – Extract WebTRIS data

As detailed in ***PASSAGE COUNT DATA***, flows at the M40 mainline were derived from WebTRIS and added into the appropriate zones travelling on the mainline.

Stage 4 – Uplift ANPR Matrix

The ANPR matrix was uplifted to match the MCC Origin/Destination totals, previously derived in Stage 2. This was carried out by applying a doubly constrained factor model using the Furness method.

In total, for each of the AM and PM peak models, ten 15min matrices were constructed for each vehicle type (LVs and HVs):

- AM period (0645-0915hrs)
  - Build-Up (4 matrices): 0645-0745hrs
  - Peak (4 matrices): 0745-0845hrs
  - Cool-Down (2 matrices): 0845-0915hrs
- PM period (1530-1800hrs)
  - Build-Up (4 matrices): 1530-1630hrs
  - Peak (4 matrices): 1630-1730hrs
  - Cool-Down (2 matrices): 1730-1800hrs

Once the O-D matrices were complete, they were entered into the VISSIM model and it was run a number of times to ensure that all of the elements operated correctly. Any errors that were shown in the error files were corrected before the modelling process was taken any further. The final matrices are detailed in Appendix F.

Model Convergence

06

DMRB (Volume 12, Section 2, Part 1, Chapter 4) and *TfL's "Traffic Modelling Guidelines: TfL Traffic Manager and Network Performance Best Practice. Version 3.0"* have been used to assess the convergence of the M40 Junction 10 traffic model.

The VISSIM model has been run using the Dynamic Assignment module, in which a series of iterated simulations are used to determine the route of a vehicle through the network based on a total travel cost. As a result of this, there is a need to assess the convergence of the model to establish that the travel times and volumes do not change significantly from one iteration to the next, enabling the model to be deemed stable and results to be analysed in confidence.

DMRB (Volume 12, Section 2, Part 1, Chapter 4) and TfL's "Traffic Modelling Guidelines: TfL Traffic Manager and Network Performance Best Practice. Version 3.0" provide a series of convergence criteria that should be used to assess the convergence and stability of traffic models. The following convergence criteria can be assessed within the context of VISSIM:

- 95% of all path traffic volumes change by less than 5% for at least four consecutive iterations;
- 95% of the travel times on all paths change by less than 20% for at least four consecutive iterations;
- The percentage change in user costs or time spent within the network (V) should be less than 1% for four consecutive iterations.

Convergence Results

The AM and PM models were initially run, for a single simulation using Random Seed 42 to establish the initial costs (BEW files) and paths (WEG files) within the network. Using the node evaluation window, the paths through the network were reviewed and any paths that were deemed incorrect or unfeasible were closed.

The AM and PM models were then run, using Random Seed 42 and assigning travel demand matrices in batch mode. The simulation started with only 10% of the total origin and destination O-D demand which was gradually increased by 10% step until reaching 100%.

Using the path and cost files from the previous process, a batch run of each model was then undertaken, using Random Seed 42 and running the model until the criteria stated above is fulfilled, using the same random seed in order to assess the convergence of the model. For each of the simulation runs, a cost file, Network Performance Evaluation (NPE file) and Convergence Evaluation file (CVA file) were output.

The CVA files have been used to examine the percentage change in flow and travel time on paths for the modelling periods for each model run. The total travel times in the network have also been extracted from the NPE files and the results of this analysis can be seen in ***TABLE 5***, and ***TABLE 6****ERROR! REFERENCE SOURCE NOT FOUND.*.

Very high levels of convergence have been achieved with some small percentages variations between each seed run being seen. Convergence criteria have been fully met after 41 and 20 iterations in the AM and PM models, respectively.

Convergence criteria were fully met after 41 and 20 iterations in the AM and PM models, respectively.

In summary, the results indicate that both AM and PM models are fully converged and provide a suitable platform in order to take forward and extract results for validation against other data sources.

Table 5: Convergence Evaluation Files for Seed 42 – Summary – AM Period

Run Number	Total Travel Time		Convergence Figures on Paths	
	Total Travel Time (hrs)	Difference from previous run (%)	Traffic Volumes (%)	Travel Time (%)
1	2093.46	-	84%	89%
2	2099.72	0.30%	99%	92%
3	2120.25	0.98%	100%	95%
4	2113.96	-0.30%	100%	100%
5	2086.64	-1.29%	99%	99%
6	2081.94	-0.23%	99%	100%
7	2056.70	-1.21%	100%	100%
8	2081.24	1.19%	100%	99%
9	2090.03	0.42%	99%	100%
10	2079.70	-0.49%	100%	100%
11	2083.23	0.17%	100%	100%
12	2112.44	1.40%	99%	100%
13	2060.67	-2.45%	99%	100%
14	2098.11	1.82%	100%	100%
15	2080.46	-0.84%	99%	100%
16	2085.66	0.25%	100%	100%
17	2071.30	-0.69%	98%	98%
18	2112.76	2.00%	99%	100%
19	2102.52	-0.48%	100%	100%
20	2067.63	-1.66%	99%	100%
21	2073.20	0.27%	100%	100%
22	2068.75	-0.21%	100%	100%
23	2124.60	2.70%	98%	99%
24	2014.75	-5.17%	99%	100%
25	2086.96	3.58%	99%	100%
26	2035.70	-2.46%	99%	100%
27	2087.12	2.53%	100%	100%
28	2082.34	-0.23%	100%	99%
29	2044.28	-1.83%	100%	100%
30	2077.33	1.62%	100%	100%
31	2104.42	1.30%	99%	100%
32	2033.09	-3.39%	99%	100%
33	2106.11	3.59%	99%	100%
34	2080.50	-1.22%	100%	100%
35	2101.26	1.00%	99%	100%
36	2052.84	-2.30%	99%	100%
37	2079.93	1.32%	100%	100%
38	2084.42	0.22%	100%	100%
39	2102.78	0.88%	100%	100%
40	2099.18	-0.17%	99%	100%
41	2108.96	0.47%	99%	100%

Table 6: Convergence Evaluation Files for Seed 42 – Summary – PM Period

Run Number	Total Travel Time		Convergence Figures on Paths	
	Total Travel Time (hrs)	Difference from previous run (%)	Traffic Volumes (%)	Travel Time (%)
1	2209.21	-	84%	89%
2	2259.91	2.29%	100%	92%
3	2267.82	0.35%	100%	96%
4	2229.94	-1.67%	100%	98%
5	2236.06	0.27%	100%	100%
6	2254.46	0.82%	100%	100%
7	2221.76	-1.45%	100%	100%
8	2230.22	0.38%	100%	99%
9	2271.69	1.86%	100%	100%
10	2250.81	-0.92%	100%	100%
11	2232.60	-0.81%	100%	100%
12	2246.84	0.64%	100%	100%
13	2219.41	-1.22%	100%	99%
14	2234.95	0.70%	100%	100%
15	2269.74	1.56%	98%	100%
16	2237.95	-1.40%	100%	100%
17	2248.94	0.49%	100%	100%
18	2236.68	-0.54%	100%	100%
19	2240.12	0.15%	100%	100%
20	2253.38	0.59%	100%	99%

Model Calibration

07

Model Calibration

As a part of the calibration process, several checks were undertaken. These checks include coding of the network, O-D matrix flows and signal operation and queues.

Following on from the convergence run, the VISSIM model was taken forward for model calibration. This process is done to ensure that the inputs into the model are representative of on-site conditions.

In order to check calibration levels, the model was multi-run to produce a set of average traffic flow results. The VISSIM model was run using 10 different random seeds, starting with random seed 1 and ending at random seed 10, with a random seed increment of 1.

To enable a robust assessment, the results used in the model calibration process represent an average of the 10 simulation runs for each of the AM and PM peaks.

The purpose of model calibration is to ensure that the model represents existing traffic conditions. In order to correctly model on-site behaviour, a number of factors have been considered as listed below:

- Traffic patterns in the area are modelled accurately;
- Key junctions in the area are modelled accurately;
- The correct level of traffic is getting through the network and equally the right levels are being suppressed;
- Traffic volumes on side roads and alternative routes are modelled accurately.

Calibration is an iterative process in which the model is continually revised to ensure that the most accurate replications of base year conditions are represented. This includes:

- Checking the coding of network elements;
- Refining and adjustment of the trip matrices.

Calibration Checks

The following calibration checks were undertaken for each model period using the previously identified elements of the survey database:

Checking the Coding of the Network

The addition of the O-D matrix flows into the base models allows a visual check of the model to be undertaken. This allows the construction of the network to be checked, as well as highlighting any program error files that may require addressing. Network elements checked included priority rules, speed decisions marker locations and lengths and alignments of the roads to ensure that they replicated on-street conditions. Any identified errors were subsequently corrected.

Checking the O-D Matrix Flows

To demonstrate that the correct flows enter the model, comparisons were made between the O-D matrix and VISSIM model entry flows. To test the robustness of the models, results were extracted for 10 different seeds and the corresponding average values were used. ***TABLE 7*** and ***TABLE 8*** show the results of the entry flow comparisons.

Table 7: Entry Flow Calibration – Total Vehicles – AM Peak

Entry Zone		0745-0845		Difference		
Zone	Location	Matrix	Modelled	Abs.	%	<5%?
1	A43 North	1752	1641	-112	-6%	N
2	B4100 Banbury Road East	530	532	2	0%	Y
3	Cherwell Services	396	397	1	0%	Y
4	M40 south	3455	3455	0	0%	Y
5	B430 Station Road	445	446	1	0%	Y
6	M40 North	3217	3218	1	0%	Y
7	B4100 Banbury Road West	532	535	4	1%	Y

Table 8: Entry Flow Calibration – Total Vehicles – PM Peak

Entry Zone		1630-1730		Difference		
Zone	**Location**	**Matrix**	**Modelled**	**Abs.**	**%**	**<5%?**
1	A43 North	1498	1487	-11	-1%	Y
2	B4100 Banbury Road East	704	685	-19	-3%	Y
3	Cherwell Services	412	413	1	0%	Y
4	M40 south	4706	4728	22	0%	Y
5	B430 Station Road	631	628	-3	0%	Y
6	M40 North	3288	3276	-12	0%	Y
7	B4100 Banbury Road West	370	355	-15	-4%	Y

From Table 7 and Table 8, it can be seen a difference of less than 5% has been achieved for all entry zones during both AM and PM peak periods with the exception of the A43 North approach at Baynards Green Roundabout during the AM peak. However, the maximum deviation observed is 6%, thus, the entry flow calibration is considered acceptable.

Checking Signal Operation and Queues

A visual comparison has been made for the AM and PM peak signals to ensure that they were behaving as noted in the signal specifications and traffic survey videos. As Cherwell Junction is operated on MOVA traffic signals, this junction was assessed by how representative the queues were on each arm. This was done by visually comparing observed queues in the traffic survey videos and those displayed in the VISSIM model.

After reviewing the traffic survey videos along the A43 during the PM peak period, the maximum queues formed on the A43 Northbound approach to A43 / B4100 Banbury Road Baynards Green roundabout appeared to extend back to Padbury and Cherwell junctions. The level of accuracy of the modelled queue at this approach has been key to successfully replicate the network operation during the PM peak period since it has a major impact in the M40J10 operation.

In addition, queues have also been compared in the rest of the model to ensure that the correct levels of queuing are represented at every junction.

Model Validation

08

Model Validation Criteria

DMRB standards have been used to assess the validation of the M40 Junction 10 traffic model.

Following on from the model calibration, the VISSIM model was taken forward for model validation. This process involves comparing model outputs against independent data to ensure that the model is correctly calibrated.

As stated in ***CALIBRATION CHECKS***, in order to determine the validation levels, the models were multi-run in order to produce a set of average traffic flow and journey time results. Similarly to the calibration stage, the VISSIM model was run using 100 different random seeds, starting with Random Seed 1 and ending at Random Seed 100, with a random seed increment of 1.

The following paragraphs summarise the validation of the M40 J10 VISSIM model which has been undertaken to comply with current guidance and recommendations.

Network validation has been carried out in accordance with *DMRB Volume 12, Section 2, Part 1, Chapter 4.* Current advice on micro-simulation modelling is also contained in HE's *Interim Advice Note 36-01 'The Use and Application of Micro-Simulation Models'*. A summary of the acceptable criteria is listed in ***TABLE 9***.

In order to demonstrate that the developed models provide a robust platform for future testing, the following validation checks were carried out:

- Traffic Flow Validation
  - Individual Flows
  - GEH Statistic
- Average Journey Time Validation.

Table 9: Summary of Assignment Validation: Acceptability Guidelines.

Criteria and Measures	Acceptability Guideline
Assigned Hourly Flows* compared with observed flows.	
1. Individual flows within 15% for flows 700-2700 vph	
2. Individual flows within 100 vph for flows < 700 vph	
3. Individual flows within 400 vph for flows > 2700 vph	
4. Total screenline flows (normally >5 links) to be within 5%	
5. GEH Statistic	All (or nearly all) screenlines
i. Individual flows: GEH < 5	Greater than 85% of all cases
ii. Screenline** totals: GEH < 4	
Notes:	
* link flows or turning movements	
**Screenlines containing high flow routes such as motorways should be presented both including and excluding such routes.	
Modelled journey times compared with observed times	> 85% of routes
6. Times within 15% (or 1 minute if higher)	

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Traffic Flow Validation

100% of turning movements are within required DMRB validation criteria during both AM and PM peaks respectively.

The observed and modelled flows were compared for each of the junction turning counts during AM and PM peak periods against DMRB individual flows validation criteria shown in ***TABLE 9*** above. The permissible differences were then calculated for each value (based on the observed figure) and compared to that which had been produced in the model, both for absolute differences and for GEH statistic.

The percentage differences between observed and modelled datasets can be misleading given the relative value of the difference. The standard method used to compare modelled values against observations on a link therefore involves the calculation of the Geoff Havers (GEH) statistic, which is a form of the Chi-squared statistic, incorporating both the relative and the absolute errors. The GEH statistic is defined as:

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

Where C and M are observed flows and modelled flows respectively. Results are summarized in Table 12 and Table 13 below with a more detailed breakdown in Appendix G.

Table 12 and Table 13 show that all modelled traffic flows during AM and PM peak periods fulfill both DMRB GEH validation (<5) and individual flow criteria.

This indicates that VISSIM models for both the AM and PM peak periods modelled flows suitably correlate with observed data.

Table 10: Summary of Traffic Flow Validation – AM Peak

DMRB Traffic Flow Validation Criteria	No. Within	Total	Percentage
Percentage of Counts within GEH < 5	31	31	100%
Percentage of Counts meeting Individual Flow	31	31	100%

Table 11: Summary of Traffic Flow Validation – PM Peak

DMRB Traffic Flow Validation Criteria	No. Within	Total	Percentage
Percentage of Counts within GEH < 5	231	31	100%
Percentage of Counts meeting Individual Flow	31	31	100%

Table 12: Traffic Flow Validation – Ardley Roundabout – AM Peak (Total Vehicles)

From	To			Difference		DMRB Criteria	
		Observed	Modelled	Abs.	GEH	Individual Flow	GEH<5.0
A43 North-East	M40 Northbound Off-Slip	269	267	-2	0.1	Y	Y
	B430 Station Road South	484	470	-14	0.6	Y	Y
M40 Northbound Off-Slip	A43 North-East	1031	1042	11	0.3	Y	Y
	B430 Station Road South	32	33	1	0.1	Y	Y
B430 South	A43 North-East	237	240	3	0.2	Y	Y
	M40 Northbound Off-Slip	205	207	2	0.1	Y	Y

Table 13: Traffic Flow Validation – Baynards Green Roundabout – AM Peak (Total Vehicles)

From	To			Difference		DMRB Criteria	
		Observed	Modelled	Abs.	GEH	Individual Flow	GEH<5.0
A43 North	B4100 Banbury Road East	229	214	-15	1.0	Y	Y
	A43 South	1440	1363	-77	2.1	Y	Y
	B4100 Banbury Road West	66	63	-3	0.4	Y	Y
B4100 Banbury Road East	A43 North	191	194	3	0.2	Y	Y
	A43 South	101	107	6	0.6	Y	Y
	B4100 Banbury Road West	233	233	0	0.0	Y	Y
A43 South	A43 North	1049	1056	7	0.2	Y	Y
	B4100 Banbury Road East	148	153	5	0.4	Y	Y
	B4100 Banbury Road West	119	112	-7	0.7	Y	Y
A4100 Banbury Road West	A43 North	94	95	1	0.1	Y	Y
	B4100 Banbury Road East	276	277	1	0.0	Y	Y
	A43 South	150	160	10	0.8	Y	Y

Table 14: Traffic Flow Validation – Cherwell Junction – AM Peak (Total Vehicles)

From	To			Difference		DMRB Criteria	
		Observed	Modelled	Abs.	GEH	Individual Flow	GEH<5.0
A43 North	Cherwell Service Station	217	220	3	0.2	Y	Y
	M40 Southbound On-Slip	1238	1124	-114	3.3	Y	Y
	A43 South	642	602	-40	1.6	Y	Y
Cherwell Service Station	A43 North	44	59	15	2.1	Y	Y
	M40 Southbound On-Slip	204	204	0	0.0	Y	Y
	A43 South	146	134	-12	1.0	Y	Y
A43 South	A43 North	1089	1059	-30	0.9	Y	Y
	M40 Southbound On-Slip	36	68	32	4.4	Y	Y
	Cherwell Service Station	167	161	-6	0.5	Y	Y

Table 15: Traffic Flow Validation – Padbury Junction – AM Peak (Total Vehicles)

				Difference		DMRB Criteria	
From	To	Observed	Modelled	Abs.	GEH	Individual Flow	GEH<5.0
A43 South	A43 North	1113	1117	4	0.1	Y	Y
M40 Southbound Off-Slip	A43 South	315	317	2	0.1	Y	Y
	A43 North	219	204	-15	1.1	Y	Y
A43 North	A43 South	1718	1629	-89	2.2	Y	Y

Table 16: Traffic Flow Validation – Ardley Roundabout – PM Peak (Total Vehicles)

From	To			Difference		DMRB Criteria	
		Observed	Modelled	Abs.	GEH	Individual Flow	GEH<5.0
A43 North-East	M40 Northbound Off-Slip	282	276	-6	0.3	Y	Y
	B430 Station Road South	274	255	-19	1.2	Y	Y
M40 Northbound Off-Slip	A43 North-East	1457	1431	-26	0.7	Y	Y
	B430 Station Road South	36	35	-1	0.2	Y	Y
B430 South	A43 North-East	451	446	-5	0.2	Y	Y
	M40 Northbound Off-Slip	182	182	0	0.0	Y	Y

Table 17: Traffic Flow Validation – Baynards Green Roundabout – PM Peak (Total Vehicles)

From	To			Difference		DMRB Criteria	
		Observed	Modelled	Abs.	GEH	Individual Flow	GEH<5.0
A43 North	B4100 Banbury Road East	258	257	-1	0.1	Y	Y
	A43 South	1191	1179	-12	0.3	Y	Y
	B4100 Banbury Road West	49	49	0	0.0	Y	Y
B4100 Banbury Road East	A43 North	321	311	-10	0.6	Y	Y
	A43 South	106	102	-4	0.4	Y	Y
	B4100 Banbury Road West	279	268	-11	0.7	Y	Y
A43 South	A43 North	1719	1635	-84	2.1	Y	Y
	B4100 Banbury Road East	92	85	-7	0.7	Y	Y
	B4100 Banbury Road West	103	93	-10	1.0	Y	Y
A4100 Banbury Road West	A43 North	57	55	-2	0.2	Y	Y
	B4100 Banbury Road East	238	226	-12	0.8	Y	Y
	A43 South	67	63	-4	0.5	Y	Y

Table 18: Traffic Flow Validation – Cherwell Junction – PM Peak (Total Vehicles)

From	To			Difference		DMRB Criteria	
		Observed	Modelled	Abs.	GEH	Individual Flow	GEH<5.0
A43 North	Cherwell Service Station	187	221	34	2.4	Y	Y
	M40 Southbound On-Slip	1014	956	-58	1.9	Y	Y
	A43 South	438	406	-32	1.6	Y	Y
Cherwell Service Station	A43 North	68	96	28	3.1	Y	Y
	M40 Southbound On-Slip	190	191	1	0.0	Y	Y
	A43 South	156	126	-30	2.5	Y	Y
A43 South	A43 North	1686	1633	-53	1.3	Y	Y
	M40 Southbound On-Slip	54	75	21	2.6	Y	Y
	Cherwell Service Station	206	166	-40	2.9	Y	Y

Table 19: Traffic Flow Validation – Padbury Junction – PM Peak (Total Vehicles)

From	To			Difference		DMRB Criteria	
		Observed	Modelled	Abs.	GEH	Individual Flow	GEH<5.0
A43 South	A43 North	1721	1720	-1	0.0	Y	Y
M40 Southbound Off-Slip	A43 South	250	241	-9	0.6	Y	Y
	A43 North	219	164	-55	3.9	Y	Y
A43 North	A43 South	1396	1343	-53	1.4	Y	Y

Average Journey Time Validation

90% and 95% of the selected routes for validation purposes fulfil DMRB Journey Time criteria for both AM and PM peak periods.

As explained in Traffic Surveys, journey time survey data was collected using ANPR cameras for all routes within the model extent to assist with the validation of the VISSIM model.

Journey time survey data has been filtered using the Tukey's test. This statistical "filter" has only been applied to screen journey times in order to dismiss measurements from the raw data which can be statistically considered as "outliers", to ensure that the correct levels of accuracy for the observed data are achieved.

DMRB standards (Volume 13, Section 1, Part 5, Chapter 11) recommends aiming for an accuracy of ±10% in the estimate of journey times on the exiting route, at the 95% confidence level. This level of accuracy, A, is defined as:

$$A = t\frac{s}{m\sqrt{n}}$$

Where m, s and n are the mean, the standard deviation and number of measurements of the journey time sample and the value of t depends on the number of degrees of freedom and the confidence level according to the Student's t-distribution.

Table 20 shows the level of accuracy observed for each of the surveyed routes for both AM and PM peak periods.

Table 20: Observed Journey Times – Level of Accuracy

Origin Zone	Destination Zone	Observed Mean (seconds)		Number of Measurements		Standard Deviation (seconds)		Accuracy (95% Confidence Level)	
		AM	PM	AM	PM	AM	PM	AM	PM
Zone 1	Zone 1	-	199	-	3	-	280	-	349.32%
Zone 1	Zone 2	31	24	151	158	9	6	4.65%	4.18%
Zone 1	Zone 3	141	122	42	46	25	18	5.58%	4.48%
Zone 1	Zone 4	127	106	537	727	21	19	1.41%	1.28%
Zone 1	Zone 5	145	134	209	97	16	16	1.53%	2.46%
Zone 1	Zone 6	136	124	42	37	14	15	3.19%	4.15%
Zone 1	Zone 7	22	16	59	28	7	5	8.65%	10.96%
Zone 2	Zone 1	72	53	160	213	27	20	5.89%	5.02%
Zone 2	Zone 2	-	-	-	-	-	-	-	-
Zone 2	Zone 3	147	136	6	9	40	35	28.48%	20.02%
Zone 2	Zone 4	161	-	3	-	60	-	91.89%	-
Zone 2	Zone 5	188	1219	6	3	52	1127	28.85%	229.65%
Zone 2	Zone 6	175	138	80	67	35	24	4.39%	4.20%
Zone 2	Zone 7	64	34	174	101	34	18	7.91%	10.29%
Zone 3	Zone 1	140	225	37	55	28	61	6.64%	7.28%
Zone 3	Zone 2	-	186	-	3	-	93	-	123.74%
Zone 3	Zone 3	-	-	-	-	-	-	-	-
Zone 3	Zone 4	50	41	118	137	17	17	6.26%	7.09%
Zone 3	Zone 5	76	83	24	9	16	26	9.05%	24.07%
Zone 3	Zone 6	75	69	87	86	22	18	6.23%	5.49%
Zone 3	Zone 7	-	223	-	6	-	100	-	47.22%

Origin Zone	Destination Zone	Observed Mean (seconds)		Number of Measurements		Standard Deviation (seconds)		Accuracy (95% Confidence Level)	
		AM	PM	AM	PM	AM	PM	AM	PM
Zone 4	Zone 1	115	235	662	904	19	81	1.27%	2.27%
Zone 4	Zone 2	112	-	4	-	16	-	23.26%	-
Zone 4	Zone 3	83	86	134	151	21	19	4.27%	3.47%
Zone 4	Zone 4	-	-	-	-	-	-	-	-
Zone 4	Zone 5	17	13	23	13	6	2	16.87%	7.27%
Zone 4	Zone 6	420	477	11	9	572	457	91.51%	73.55%
Zone 4	Zone 7	97	217	62	49	16	74	4.20%	9.80%
Zone 5	Zone 1	114	232	109	284	19	87	3.14%	4.39%
Zone 5	Zone 2	113	159	8	6	13	76	9.29%	50.15%
Zone 5	Zone 3	78	91	15	17	12	19	8.82%	10.51%
Zone 5	Zone 4	98	88	23	14	20	17	8.65%	11.10%
Zone 5	Zone 5	1067	-	4	-	1197	-	178.50%	-
Zone 5	Zone 6	25	27	195	147	8	13	4.40%	7.62%
Zone 5	Zone 7	98	160	25	14	16	52	6.70%	18.80%
Zone 6	Zone 1	84	217	37	33	21	103	8.30%	16.89%
Zone 6	Zone 2	79	201	122	108	13	84	2.86%	7.98%
Zone 6	Zone 3	101	209	130	98	20	112	3.38%	10.75%
Zone 6	Zone 4	94	177	20	25	18	117	8.83%	27.22%
Zone 6	Zone 5	116	252	143	98	22	125	3.11%	9.95%
Zone 6	Zone 6	219	-	4	-	229	-	166.50%	-
Zone 6	Zone 7	62	205	16	17	12	91	10.05%	22.92%
Zone 7	Zone 1	54	48	43	51	19	14	10.77%	8.30%
Zone 7	Zone 2	33	24	113	106	9	5	4.96%	4.11%
Zone 7	Zone 3	-	-	-	-	-	-	-	-
Zone 7	Zone 4	123	109	231	72	20	22	2.08%	4.80%
Zone 7	Zone 5	141	140	26	14	15	7	4.42%	3.07%
Zone 7	Zone 6	-	-	-	-	-	-	-	-
Zone 7	Zone 7	-	-	-	-	-	-	-	-

From Table 20, it can be seen that 20 routes were in accordance with the ±10% criteria in both the AM and PM.

The observed average journey times for these 20 routes have been compared to the modelled average journey times in accordance with the criteria outlined in ***TABLE 9***.

The difference was then calculated for each value (based on the observed figure) and compared to that which had been produced in the model.

The results are summarised in Table 21 and Table 22.

The validation criteria used is highlighted in the model validation summary tables below. The initial step was to check that the average journey times from the model were within 15% of those observed. Following that, a check of the modelled journey times being within 60 seconds of those observed was undertaken.

Table 21: Summary of Journey Time Validation – AM Peak

DMRB Journey Time Validation Criteria	No. Within	Total	Percentage
Percentage of Times within 15%	18	20	90%
Percentage of Times within 60 seconds	20	20	100%

Table 22: Summary of Journey Time Validation – PM Peak

DMRB Journey Time Validation Criteria	No. Within	Total	Percentage
Percentage of Times within 15%	19	20	95%
Percentage of Times within 60 seconds	19	20	100%

A more detailed breakdown of the journey time validation can be seen in Table 23, Table 24 and Appendix H.

Table 23: Journey Time Validation – AM Peak

From	To	0745 – 0845			Difference		
		Observed	Modelled	%	Validated	Abs.	Validated
A43 North	B4100 Banbury Road East	31	43	39%	N	-12	Y
	Cherwell Service Station	141	140	-1%	Y	2	Y
	M40 Southbound Off-Slip	127	140	10%	Y	-13	Y
	B430 Station Road South	145	160	11%	Y	-15	Y
	M40 Northbound Off-Slip	136	153	12%	Y	-16	Y
B4100 Banbury Road East	A43 North	72	63	-13%	Y	9	Y
	M40 Northbound Off-Slip	175	166	-5%	Y	9	Y
Cherwell Service Station	A43 North	140	124	-11%	Y	16	Y
	M40 Southbound Off-Slip	50	49	-3%	Y	1	Y
	M40 Northbound Off-Slip	75	72	-5%	Y	4	Y
M40 Northbound Off-Slip	A43 North	115	119	4%	Y	-5	Y
	Cherwell Service Station	83	87	5%	Y	-4	Y
	B4100 Banbury Road West	97	113	17%	N	-16	Y
B430 Station Road South	A43 North	114	116	1%	Y	-1	Y
	M40 Northbound Off-Slip	25	23	-9%	Y	2	Y
M40 Southbound Off-Slip	B4100 Banbury Road East	79	83	5%	Y	-4	Y
	B430 Station Road South	116	124	7%	Y	-9	Y
B4100 Banbury Road West	B4100 Banbury Road East	33	29	-12%	Y	4	Y
	M40 Southbound Off-Slip	123	120	-3%	Y	3	Y
	B430 Station Road South	141	139	-2%	Y	2	Y

Table 24: Journey Time Validation – PM Peak

From	To	1630 – 1730			Difference		
		Observed	Modelled	%	Validated	Abs.	Validated
A43 North	B4100 Banbury Road East	24	23	-6%	Y	1	Y
	Cherwell Service Station	122	110	-10%	Y	12	Y
	M40 Southbound Off-Slip	106	110	5%	Y	-5	Y
	B430 Station Road South	134	131	-2%	Y	2	Y
	M40 Northbound Off-Slip	124	127	2%	Y	-3	Y
B4100 Banbury Road East	A43 North	53	46	-14%	Y	7	Y
	M40 Northbound Off-Slip	138	141	2%	Y	-3	Y
Cherwell Service Station	A43 North	225	203	-10%	Y	21	Y
	M40 Southbound Off-Slip	41	44	9%	Y	-4	Y
	M40 Northbound Off-Slip	69	70	2%	Y	-1	Y
M40 Northbound Off-Slip	A43 North	235	211	-10%	Y	23	Y
	Cherwell Service Station	86	82	-5%	Y	4	Y
	B4100 Banbury Road West	217	217	0%	Y	1	Y

From	To	1630 – 1730			Difference		
		Observed	Modelled	%	Validated	Abs.	Validated
B430 Station Road South	A43 North	232	218	-6%	Y	14	Y
	M40 Northbound Off-Slip	27	30	9%	Y	-2	Y
M40 Southbound Off-Slip	B4100 Banbury Road East	201	225	12%	Y	-24	Y
	B430 Station Road South	252	249	-1%	Y	3	Y
B4100 Banbury Road West	B4100 Banbury Road East	24	48	99%	N	-24	Y
	M40 Southbound Off-Slip	109	125	15%	Y	-16	Y
	B430 Station Road South	140	146	4%	Y	-6	Y

Summary & Conclusions

09

Model Summary

The M40 Junction 10 VISSIM model has been re-validated successfully.

A 2010 base VISSIM model of M40 Junction 10 has been updated to 2016 to allow for future testing of traffic growth which may have an impact onto the junction. Traffic data was collected between Monday 14th to Sunday 20th March 2016 in order to reflect current traffic conditions at the junction. The VISSIM model has been updated, calibrated and validated successfully. A summary of the results is detailed in the following sections.

Convergence

The VISSIM model has been successfully converged for both AM and PM periods, meeting DMRB and TfL's convergence criteria, demonstrating a high level of stability.

Traffic Flow Calibration

The VISSIM model has been successfully calibrated for both AM and PM peak periods with all modelled entry flows being within 5% of the O-D matrix with the exception of the A43 North approach at Baynards Green Roundabout during the AM peak.

Traffic Flow Validation

The VISSIM model has produced a high level of validation to the DMRB Individual Flow criteria, having achieved a 100% correlation between modelled and observed turning movements during both AM and PM peaks.

GEH Statistic Validation

The VISSIM model has demonstrated high levels of validation to DMRB GEH Statistic criteria, in which 100% of modelled turning counts during both AM and PM peaks have GEH values lower than 5 (against a desired percentage of 85%) when compared to the turning counts for both AM and PM peaks respectively.

Journey Time Validation

The VISSIM model has demonstrated a suitable level of journey time validation for both AM and PM peak periods in accordance with DMRB criteria, with 90% and 95% of the routes during AM and PM peaks respectively being within 15% of the observed average journey time and all routes during AM and PM peaks being within 60 seconds of the observed average time.

As a result of this, both AM and PM peak period models are considered an appropriate representation of network conditions.

Overall Conclusion

The M40 Junction 10 VISSIM model has successfully converged, calibrated and validated against DMRB standards and is considered a suitable tool for future year testing.

Overall the AM and PM peak period models are considered an appropriate representation of the network conditions and good level of validation have been reached in line with DMRB requirements.

Both AM and PM peak models validate against Traffic Flows and Journey Time data and are considered an acceptable tool for future year testing.

Appendices

Appendix A – *160304-60343293-EM20-TSS-001* – Traffic Survey Specification

Appendix B – *160504 EM8 TN1* – Survey Data Check

Appendix C – Drawing No. 530011-GA00-01

Appendix D – VISSIM Speed Profiles

Appendix E – VISSIM Driving Behaviours

Appendix F – Final O-D Matrices

Appendix G – Traffic Flow Validation

Appendix H – Journey Time Validation

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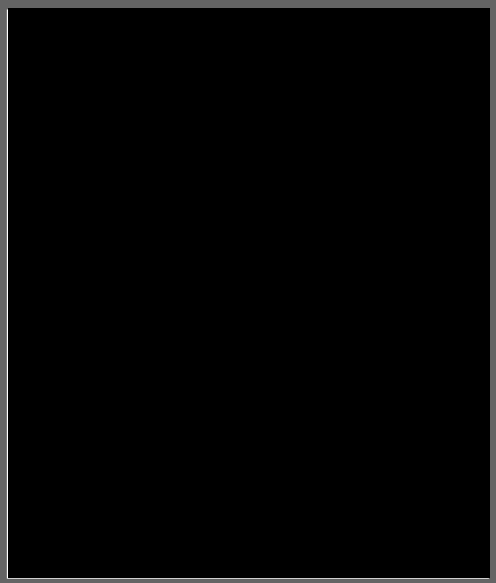

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APPENDIX 5 – CONVERGENCE RESULTS

AM					
Run #	Paths			Network Performance	
	Travel Times (0-20%)	Travel Times (0-20%)	Vol.Difference (0-5%)		
	Check - ShrConvPathTT	Check - Paths List - Converged = Yes		Total Travel Time (s)	Diff from prev. run
1	63%	74%	46%	3110141.5	-
2	59%	73%	100%	3118449.83	0.3%
3	75%	81%	100%	3110971.33	-0.2%
4	75%	82%	100%	3113975	0.1%
5	75%	82%	100%	3119522.17	0.2%
6	66%	76%	100%	3106340.33	-0.4%
7	80%	83%	100%	3114862.33	0.3%
8	75%	82%	100%	3109877.33	-0.2%
9	76%	83%	100%	3115310.67	0.2%
10	83%	88%	100%	3115185.83	0.0%
11	80%	87%	100%	3112839	-0.1%
12	89%	88%	100%	3112535.83	0.0%
13	86%	90%	100%	3116728.83	0.1%
14	86%	88%	100%	3110289.33	-0.2%
15	87%	89%	100%	3118943.17	0.3%
16	86%	90%	100%	3116080.33	-0.1%
17	87%	90%	100%	3111527.83	-0.1%
18	92%	95%	100%	3112189.33	0.0%
19	93%	92%	100%	3113260	0.0%
20	83%	89%	100%	3112941.33	0.0%
21	93%	93%	100%	3114275.67	0.0%
22	90%	91%	100%	3112634.67	-0.1%
23	90%	91%	100%	3110245.67	-0.1%
24	93%	92%	100%	3110048.17	0.0%
25	93%	96%	100%	3111055	0.0%
26	90%	92%	100%	3110932.67	0.0%
27	93%	94%	100%	3111656	0.0%
28	89%	90%	100%	3109454.67	-0.1%
29	93%	94%	100%	3107342.33	-0.1%
30	93%	92%	100%	3115672.17	0.3%
31	94%	95%	100%	3113186.67	-0.1%
32	93%	93%	100%	3108764.17	-0.1%
33	96%	96%	100%	3121969.17	0.4%
34	94%	95%	100%	3111212.67	-0.3%
35	94%	95%	100%	3120298.17	0.3%
36	94%	96%	100%	3121449.33	0.0%
37	97%	97%	100%	3110141.5	-0.4%
38	97%	96%	100%	3118449.83	0.3%
39	97%	97%	100%	3110971.33	-0.2%
40	97%	96%	100%	3113975	0.1%
41	96%	96%	100%	3119522.17	0.2%
42	99%	98%	100%	3106340.33	-0.4%
43	97%	96%	100%	3118449.83	0.4%
44	97%	98%	100%	3110971.33	-0.2%
45	97%	96%	100%	3113975	0.1%
46	97%	96%	100%	3119522.17	0.2%
47	94%	93%	100%	3106340.33	-0.4%
48	96%	92%	100%	3114862.33	0.3%
49	94%	95%	100%	3109877.33	-0.2%
50	96%	97%	100%	3110633.5	0.0%

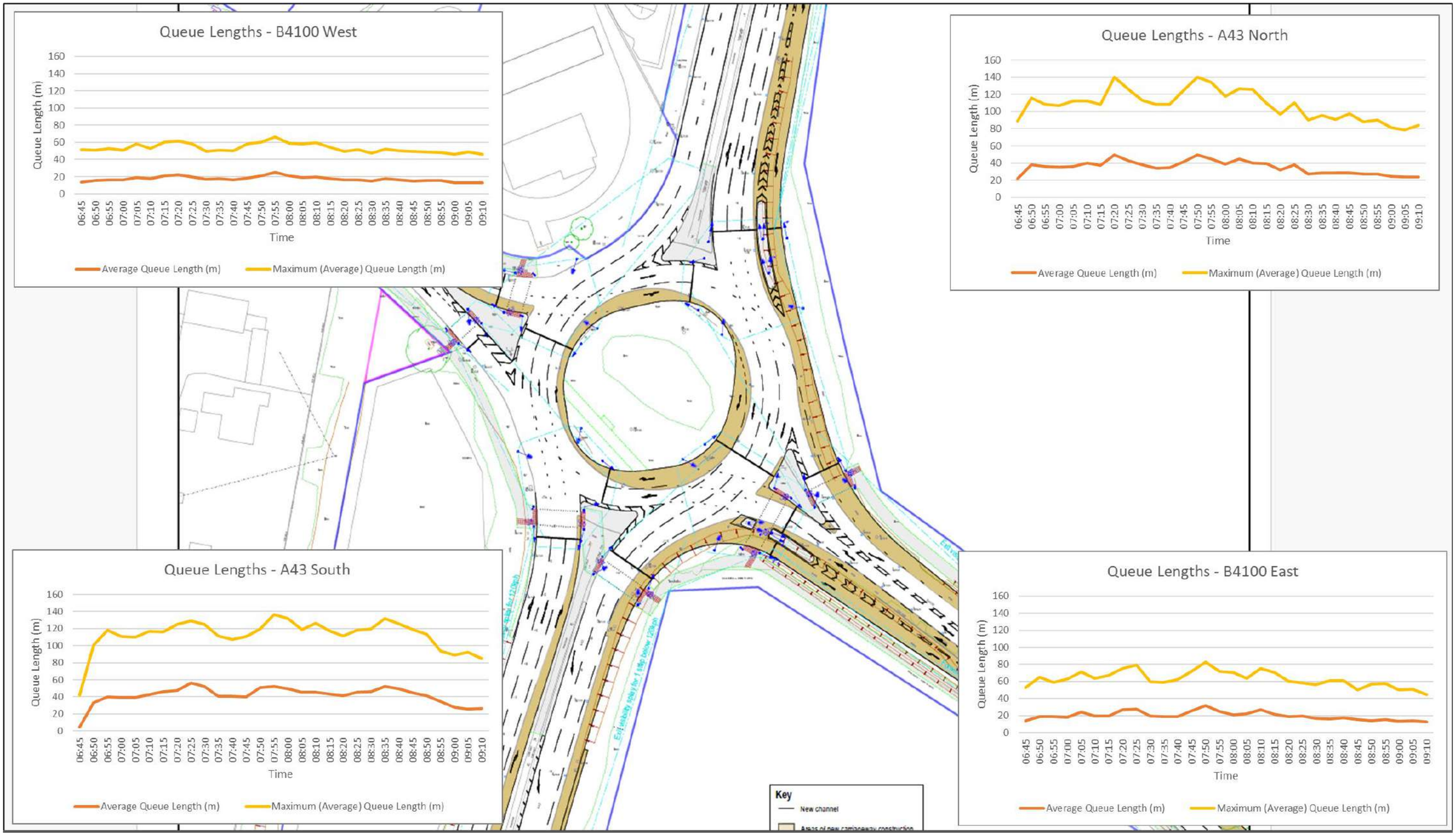
Most suitable run - BEW and WEG used for results reporting - demand reduced to 80% for suitable convergence levels

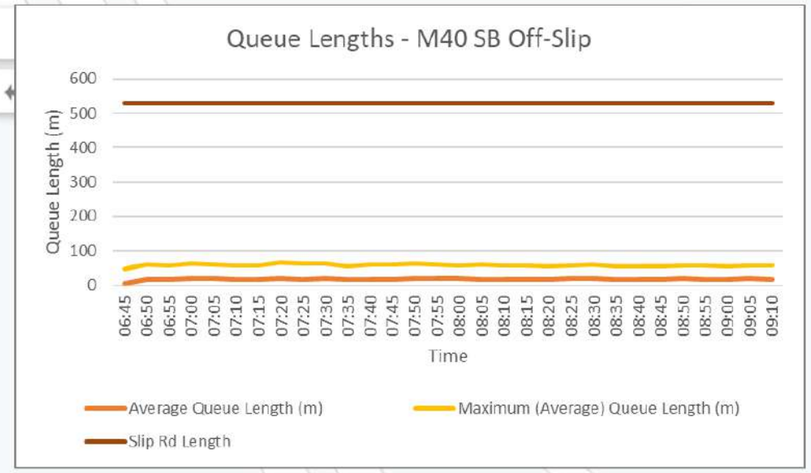
PM					
Run #	Paths			Network Performance	
	Travel Times (0-20%)	Travel Times (0-20%)	Vol.Difference (0-5%)		
	Check - ShrConvPathTT	Check - Paths List - Converged = Yes		Total Travel Time (s)	Diff from prev. run
1	83%	85%	47%	3283341.67	-
2	84%	88%	100%	3266229.83	-0.5%
3	86%	88%	100%	3259534.17	-0.2%
4	91%	92%	100%	3269119	0.3%
5	88%	90%	100%	3289318.83	0.6%
6	91%	91%	100%	3269747.67	-0.6%
7	90%	91%	100%	3266454.67	-0.1%
8	91%	90%	100%	3264746.67	-0.1%
9	96%	93%	100%	3283341.67	0.6%
10	96%	95%	100%	3266229.83	-0.5%
11	94%	94%	100%	3259534.17	-0.2%
12	96%	96%	100%	3269119	0.3%
13	96%	94%	100%	3289318.83	0.6%
14	93%	94%	100%	3269747.67	-0.6%
15	96%	94%	100%	3266454.67	-0.1%
16	96%	92%	100%	3264746.67	-0.1%
17	96%	96%	100%	3283341.67	0.6%
18	96%	96%	100%	3266229.83	-0.5%
19	96%	96%	100%	3259534.17	-0.2%
20	94%	96%	100%	3269119	0.3%
21	99%	97%	100%	3283341.67	0.4%
22	99%	97%	100%	3266229.83	-0.5%
23	99%	96%	100%	3259534.17	-0.2%
24	94%	96%	100%	3269119	0.3%
25	97%	97%	100%	3289318.83	0.6%
26	94%	95%	100%	3269747.67	-0.6%
27	96%	96%	100%	3266454.67	-0.1%
28	96%	94%	100%	3264746.67	-0.1%
29	99%	98%	100%	3283341.67	0.6%
30	99%	96%	100%	3266229.83	-0.5%
31	100%	96%	100%	3259534.17	-0.2%
32	94%	96%	100%	3269119	0.3%
33	97%	97%	100%	3289318.83	0.6%
34	96%	96%	100%	3269747.67	-0.6%
35	96%	96%	100%	3266454.67	-0.1%
36	96%	95%	100%	3264746.67	-0.1%
37	99%	96%	100%	3260092	-0.1%
38	97%	97%	100%	3283341.67	0.7%
39	99%	96%	100%	3266229.83	-0.5%
40	100%	97%	100%	3259534.17	-0.2%
41	94%	96%	100%	3269119	0.3%
42	97%	97%	100%	3289318.83	0.6%
43	96%	96%	100%	3269747.67	-0.6%
44	96%	96%	100%	3266454.67	-0.1%
45	96%	95%	100%	3264746.67	-0.1%
46	99%	96%	100%	3260092	-0.1%
47	93%	94%	100%	3263013.17	0.1%
48	91%	93%	100%	3266882.83	0.1%
49	94%	96%	100%	3273365.17	0.2%
50	97%	96%	100%	3265319	-0.2%

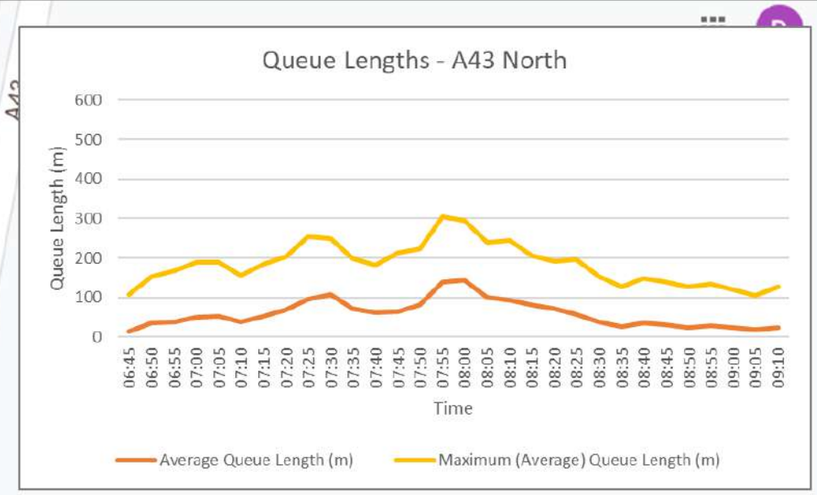
Most suitable run - BEW and WEG used for results reporting - demand reduced to 80% for suitable convergence levels

APPENDIX 6 – QUEUE LENGTH ANALYSIS

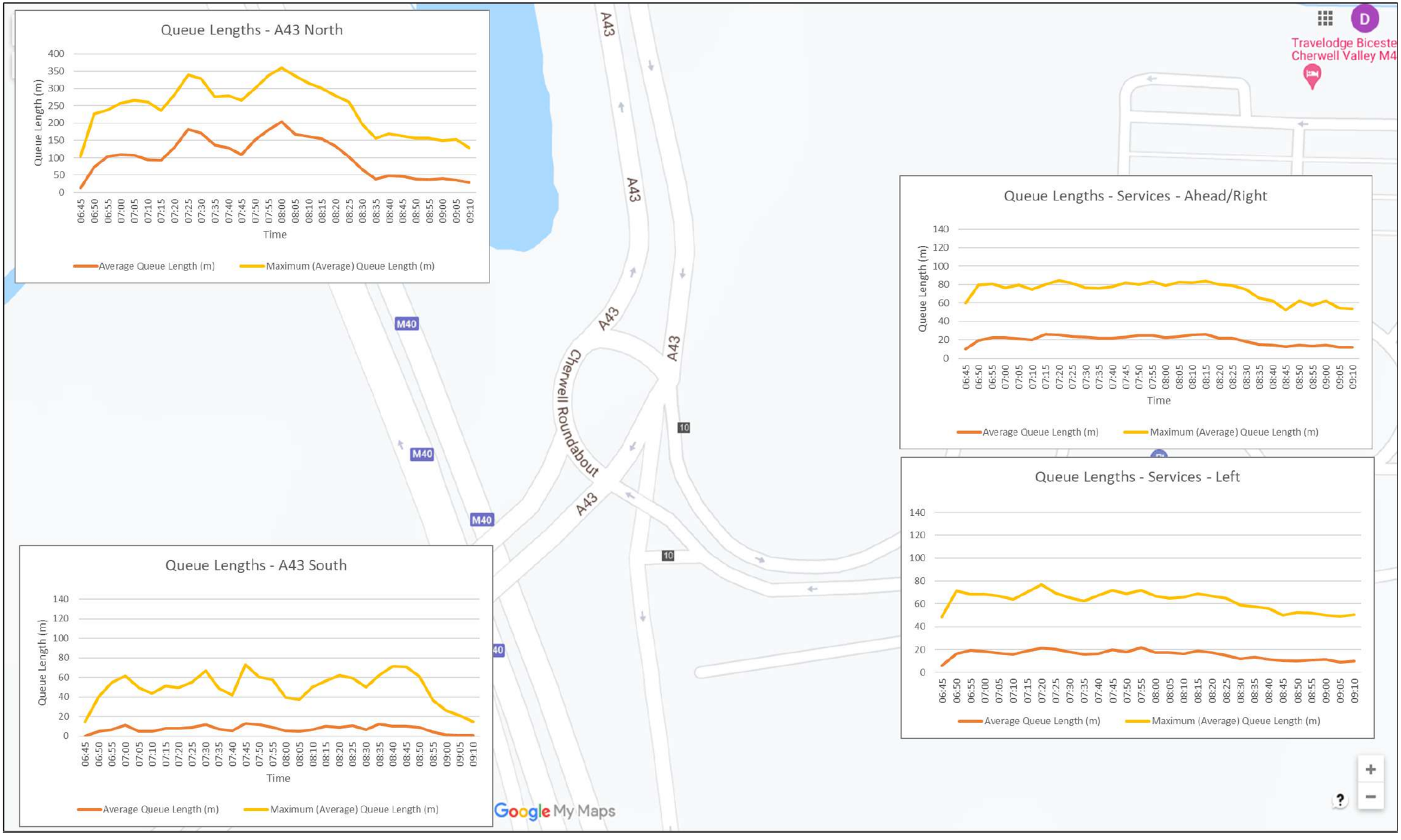
QUEUE LENGTHS – AM PEAK

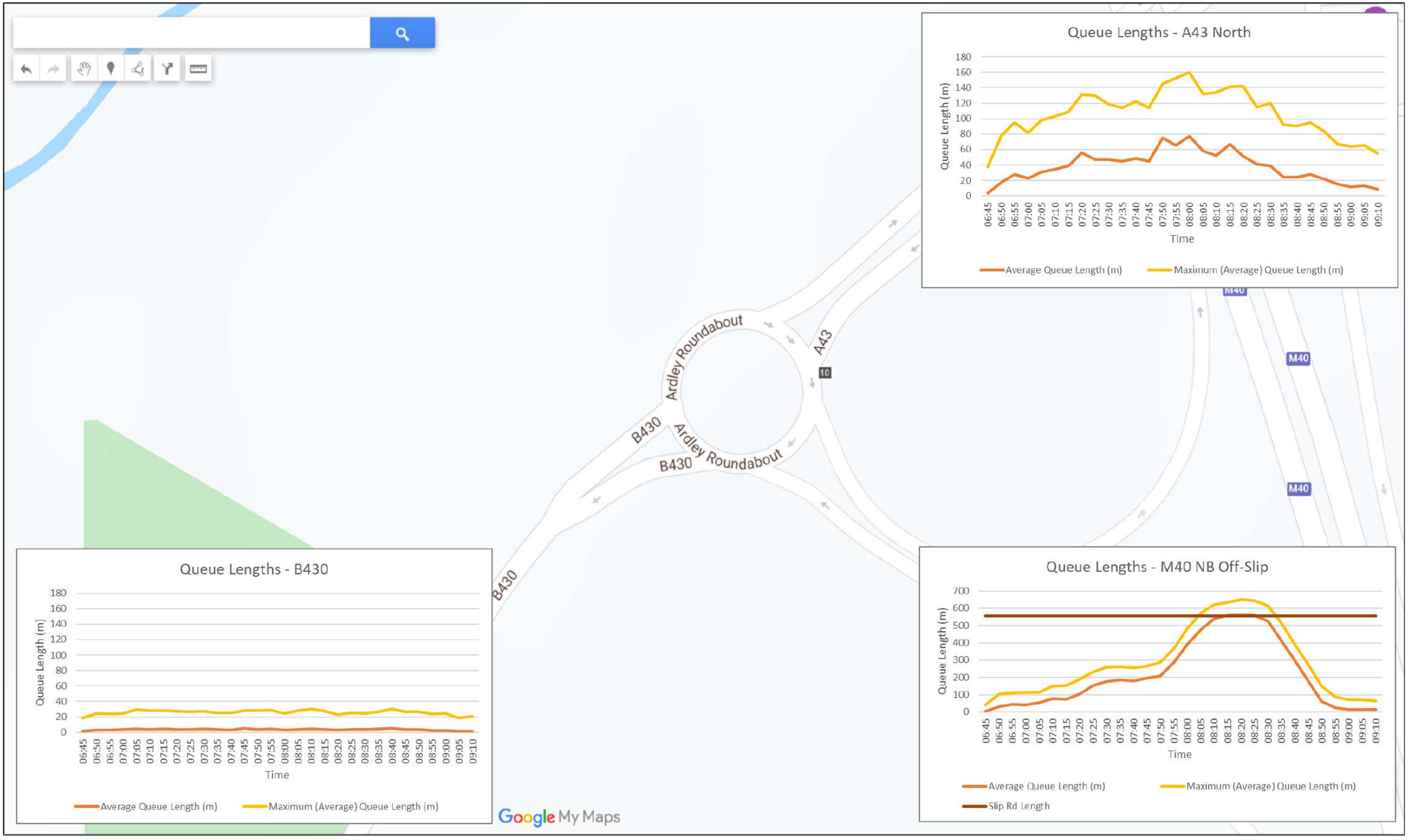



Queue Lengths - M40 SB Off-Slip
Queue Length (m)
600
500
400
300
200
100
0
06:45 06:50 06:55 07:00 07:05 07:10 07:15 07:20 07:25 07:30 07:35 07:40 07:45 07:50 07:55 08:00 08:05 08:10 08:15 08:20 08:25 08:30 08:35 08:40 08:45 08:50 08:55 09:00 09:05 09:10
Time
Average Queue Length (m)
Maximum (Average) Queue Length (m)
Slip Rd Length


Queue Lengths - A43 North
Queue Length (m)
600
500
400
300
200
100
0
06:45 06:50 06:55 07:00 07:05 07:10 07:15 07:20 07:25 07:30 07:35 07:40 07:45 07:50 07:55 08:00 08:05 08:10 08:15 08:20 08:25 08:30 08:35 08:40 08:45 08:50 08:55 09:00 09:05 09:10
Time
Average Queue Length (m)
Maximum (Average) Queue Length (m)

M40
M40
M40
M40
A43
A43
A43
A43
A43
A43
Google My Maps

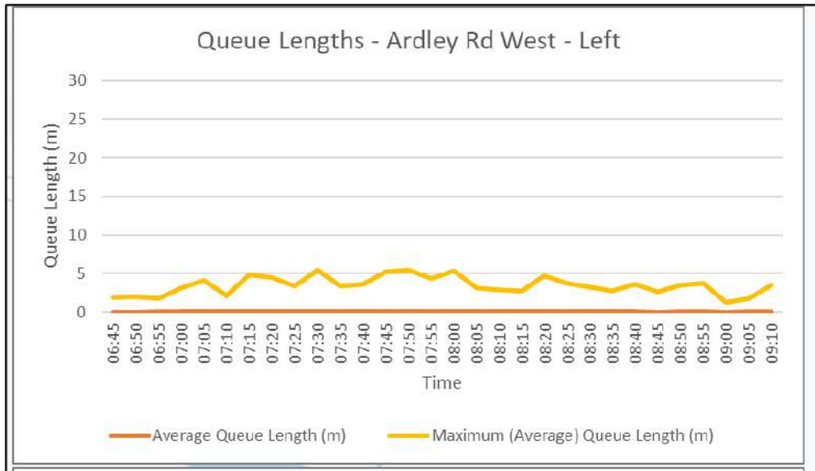

Queue Lengths - A43 North
Queue Length (m)
400
350
300
250
200
150
100
50
0
06:45 06:50 06:55 07:00 07:05 07:10 07:15 07:20 07:25 07:30 07:35 07:40 07:45 07:50 07:55 08:00 08:05 08:10 08:15 08:20 08:25 08:30 08:35 08:40 08:45 08:50 08:55 09:00 09:05 09:10
Time
Average Queue Length (m)
Maximum (Average) Queue Length (m)
Queue Lengths - Services - Ahead/Right
Queue Length (m)
140
120
100
80
60
40
20
0
06:45 06:50 06:55 07:00 07:05 07:10 07:15 07:20 07:25 07:30 07:35 07:40 07:45 07:50 07:55 08:00 08:05 08:10 08:15 08:20 08:25 08:30 08:35 08:40 08:45 08:50 08:55 09:00 09:05 09:10
Time
Average Queue Length (m)
Maximum (Average) Queue Length (m)
Queue Lengths - Services - Left
140
120
100
80
60
40
20
0
06:45 06:50 06:55 07:00 07:05 07:10 07:15 07:20 07:25 07:30 07:35 07:40 07:45 07:50 07:55 08:00 08:05 08:10 08:15 08:20 08:25 08:30 08:35 08:40 08:45 08:50 08:55 09:00 09:05 09:10
Average Queue Length (m)
Maximum (Average) Queue Length (m)
Queue Lengths - A43 South
Queue Length (m)
140
120
100
80
60
40
20
0
06:45 06:50 06:55 07:00 07:05 07:10 07:15 07:20 07:25 07:30 07:35 07:40 07:45 07:50 07:55 08:00 08:05 08:10 08:15 08:20 08:25 08:30 08:35 08:40 08:45 08:50 08:55 09:00 09:05 09:10
Time
Average Queue Length (m)
Maximum (Average) Queue Length (m)
A43
M40
Cherwell Roundabout
10
Travelodge Bicester
Cherwell Valley M4
Google My Maps

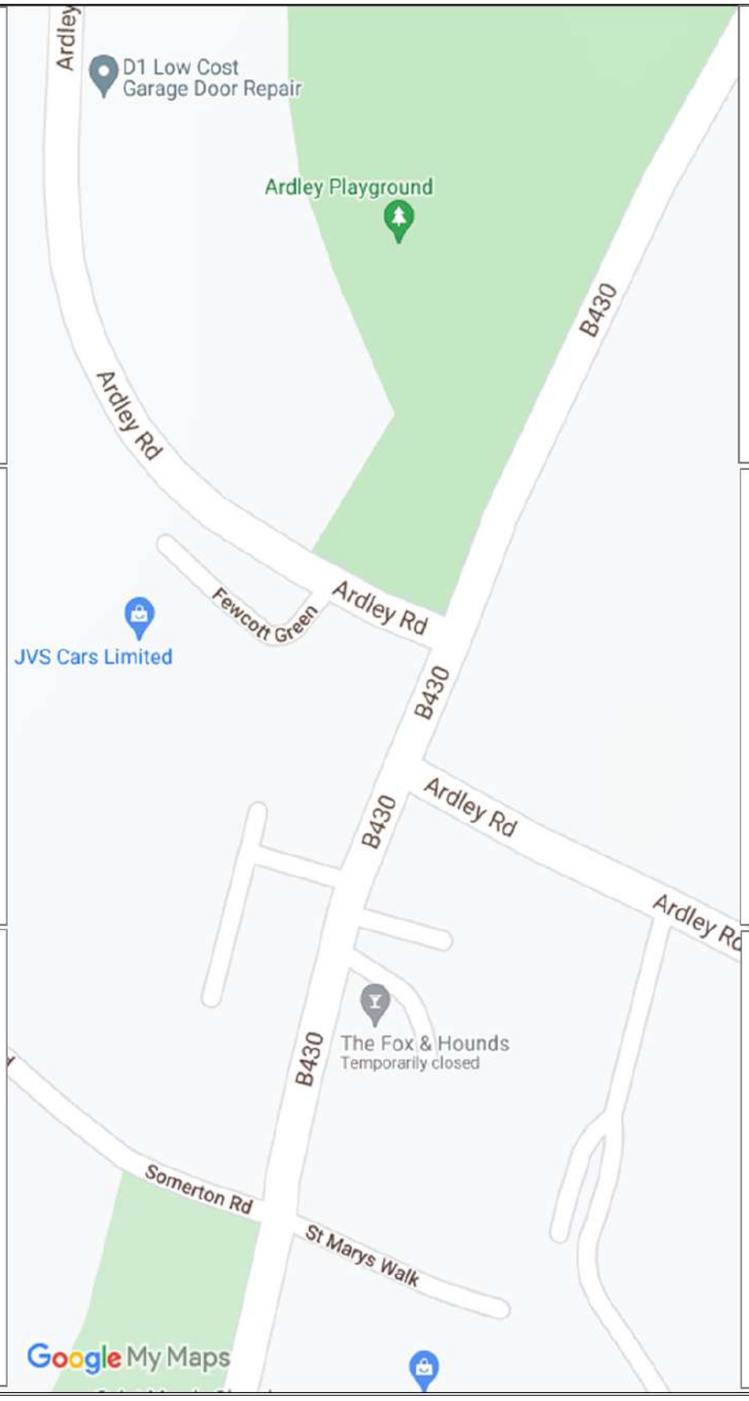

Ardley Roundabout
A43
10
B430
Ardley Roundabout
B430
Ardley Roundabout
B430
M40
M40
M40
Google My Maps

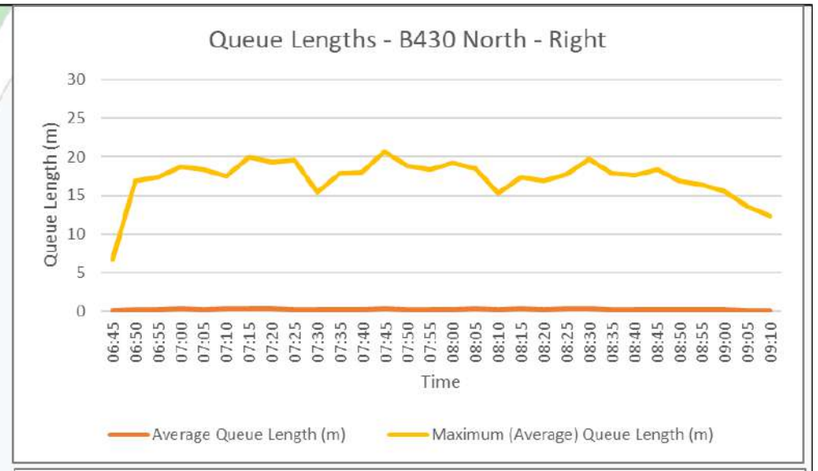
Queue Lengths - A43 North
Queue Length (m)
180
160
140
120
100
80
60
40
20
0
06:45
06:50
06:55
07:00
07:05
07:10
07:15
07:20
07:25
07:30
07:35
07:40
07:45
07:50
07:55
08:00
08:05
08:10
08:15
08:20
08:25
08:30
08:35
08:40
08:45
08:50
08:55
09:00
09:05
09:10
Time
Average Queue Length (m)
Maximum (Average) Queue Length (m)

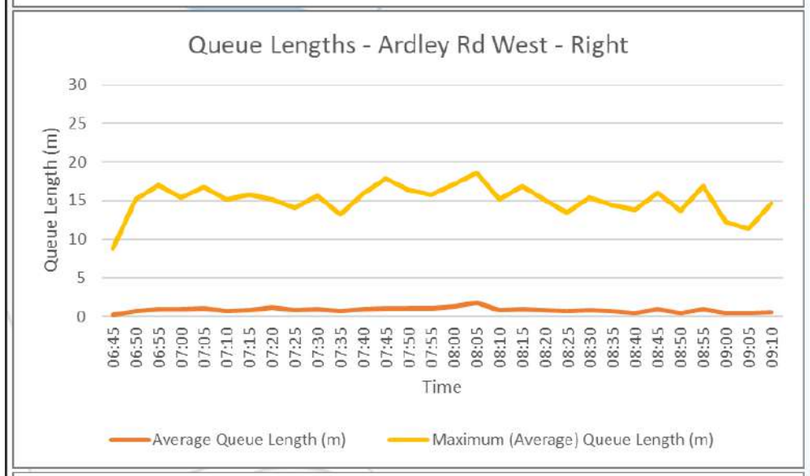
Queue Lengths - B430
Queue Length (m)
180
160
140
120
100
80
60
40
20
0
06:45
06:50
06:55
07:00
07:05
07:10
07:15
07:20
07:25
07:30
07:35
07:40
07:45
07:50
07:55
08:00
08:05
08:10
08:15
08:20
08:25
08:30
08:35
08:40
08:45
08:50
08:55
09:00
09:05
09:10
Time
Average Queue Length (m)
Maximum (Average) Queue Length (m)

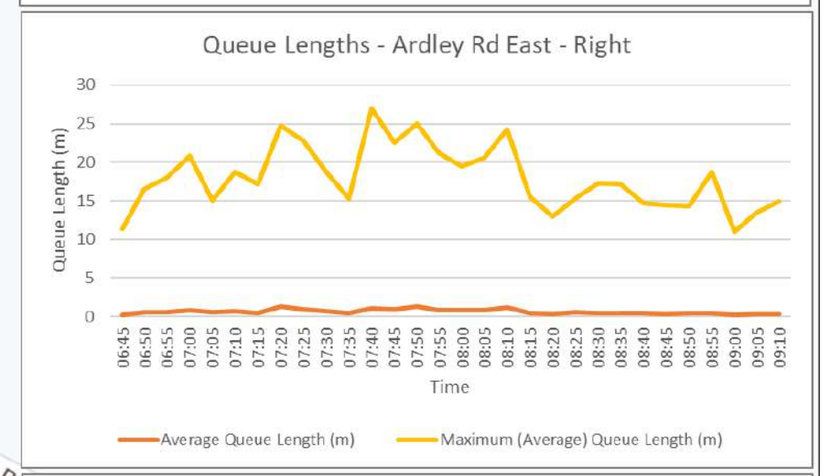
Queue Lengths - M40 NB Off-Slip
Queue Length (m)
700
600
500
400
300
200
100
0
06:45
06:50
06:55
07:00
07:05
07:10
07:15
07:20
07:25
07:30
07:35
07:40
07:45
07:50
07:55
08:00
08:05
08:10
08:15
08:20
08:25
08:30
08:35
08:40
08:45
08:50
08:55
09:00
09:05
09:10
Time
Average Queue Length (m)
Maximum (Average) Queue Length (m)
Slip Rd Length

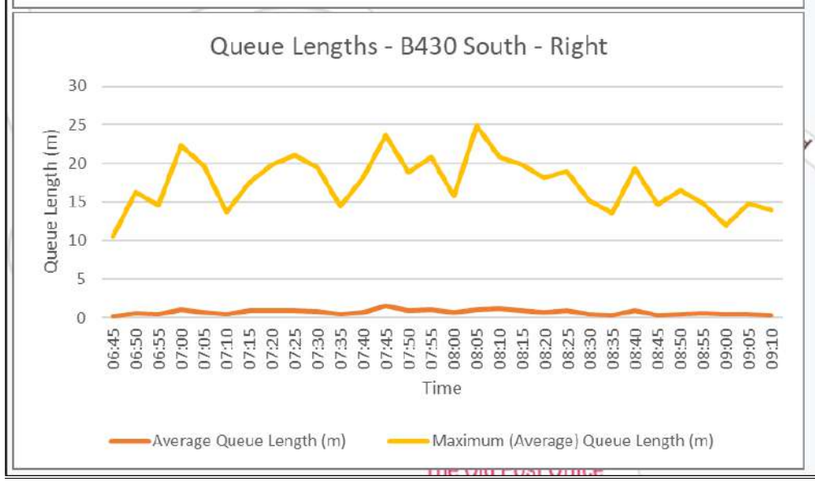

Queue Lengths - Ardley Rd West - Left
Queue Length (m)
Time
Average Queue Length (m)
Maximum (Average) Queue Length (m)

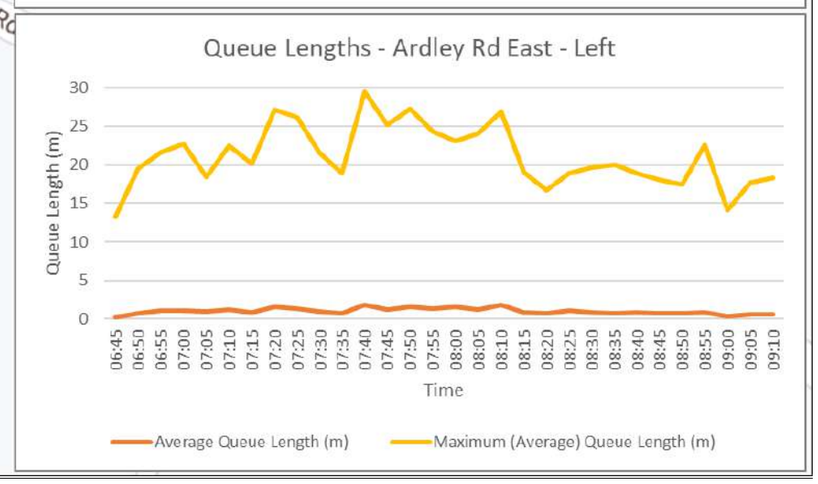

Ardley
D1 Low Cost
Garage Door Repair
Ardley Playground
B430
Ardley Rd
Fewcott Green
Ardley Rd
JVS Cars Limited
B430
Ardley Rd
B430
The Fox & Hounds
Temporarily closed
Somerton Rd
St Marys Walk
Google My Maps

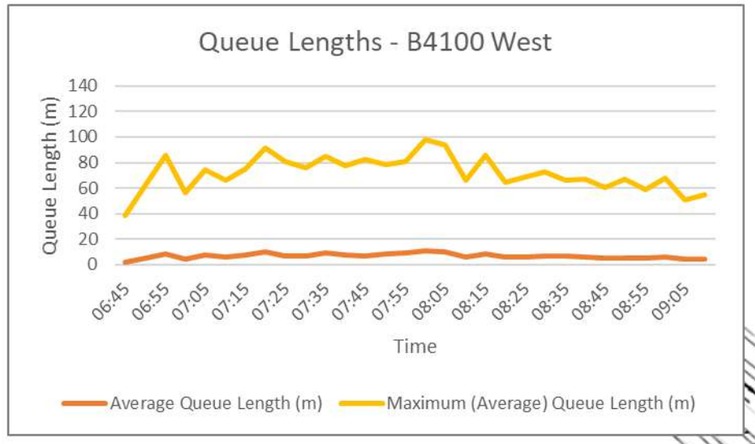

Queue Lengths - B430 North - Right
Queue Length (m)
Time
Average Queue Length (m)
Maximum (Average) Queue Length (m)

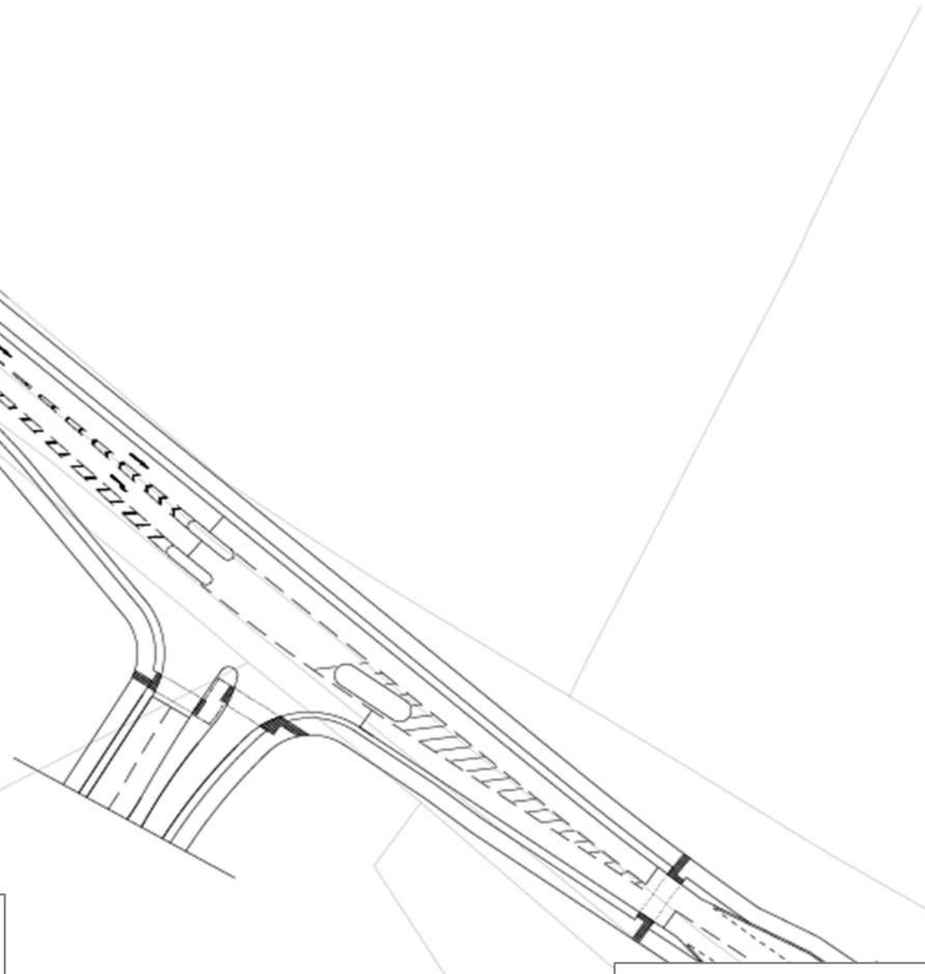

Queue Lengths - Ardley Rd West - Right
Queue Length (m)
Time
Average Queue Length (m)
Maximum (Average) Queue Length (m)

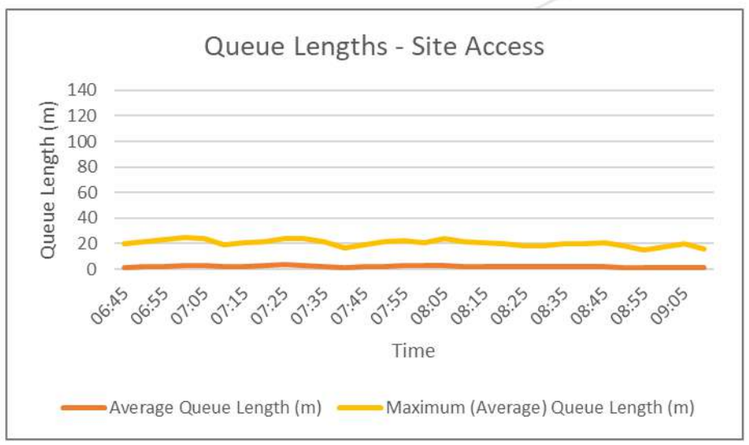

Queue Lengths - Ardley Rd East - Right
Queue Length (m)
Time
Average Queue Length (m)
Maximum (Average) Queue Length (m)

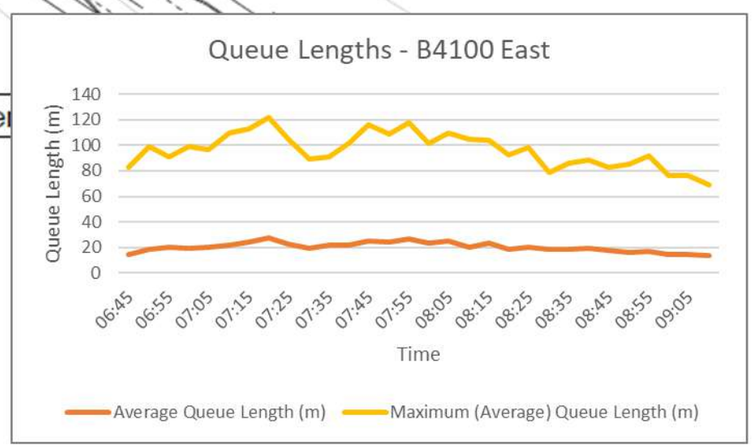

Queue Lengths - B430 South - Right
Queue Length (m)
Time
Average Queue Length (m)
Maximum (Average) Queue Length (m)

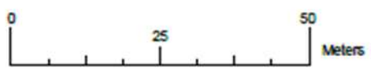

Queue Lengths - Ardley Rd East - Left
Queue Length (m)
Time
Average Queue Length (m)
Maximum (Average) Queue Length (m)

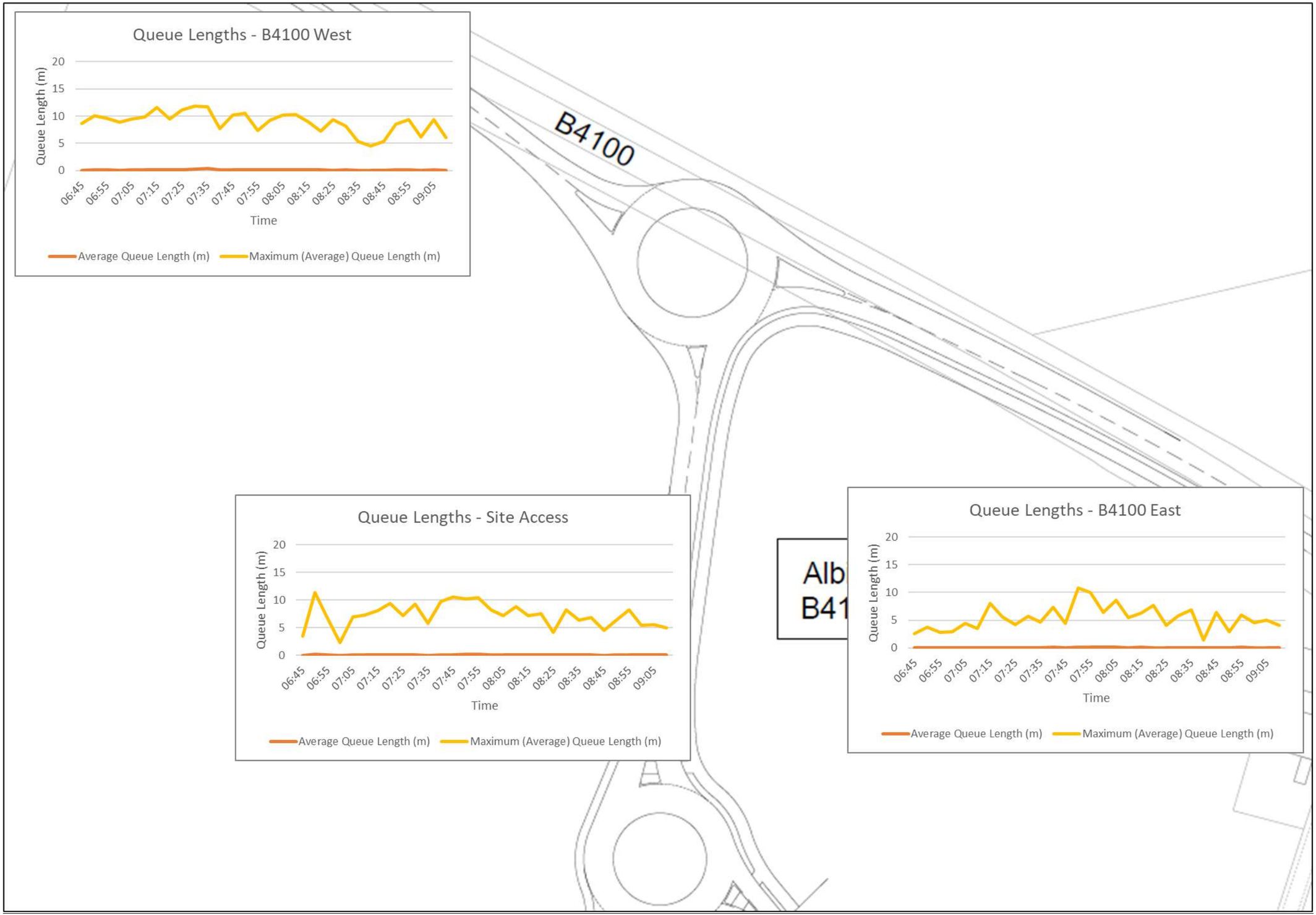

Queue Lengths - B4100 West
Queue Length (m)
140
120
100
80
60
40
20
0
06:45
06:55
07:05
07:15
07:25
07:35
07:45
07:55
08:05
08:15
08:25
08:35
08:45
08:55
09:05
Time
Average Queue Length (m)
Maximum (Average) Queue Length (m)


Bus shelter

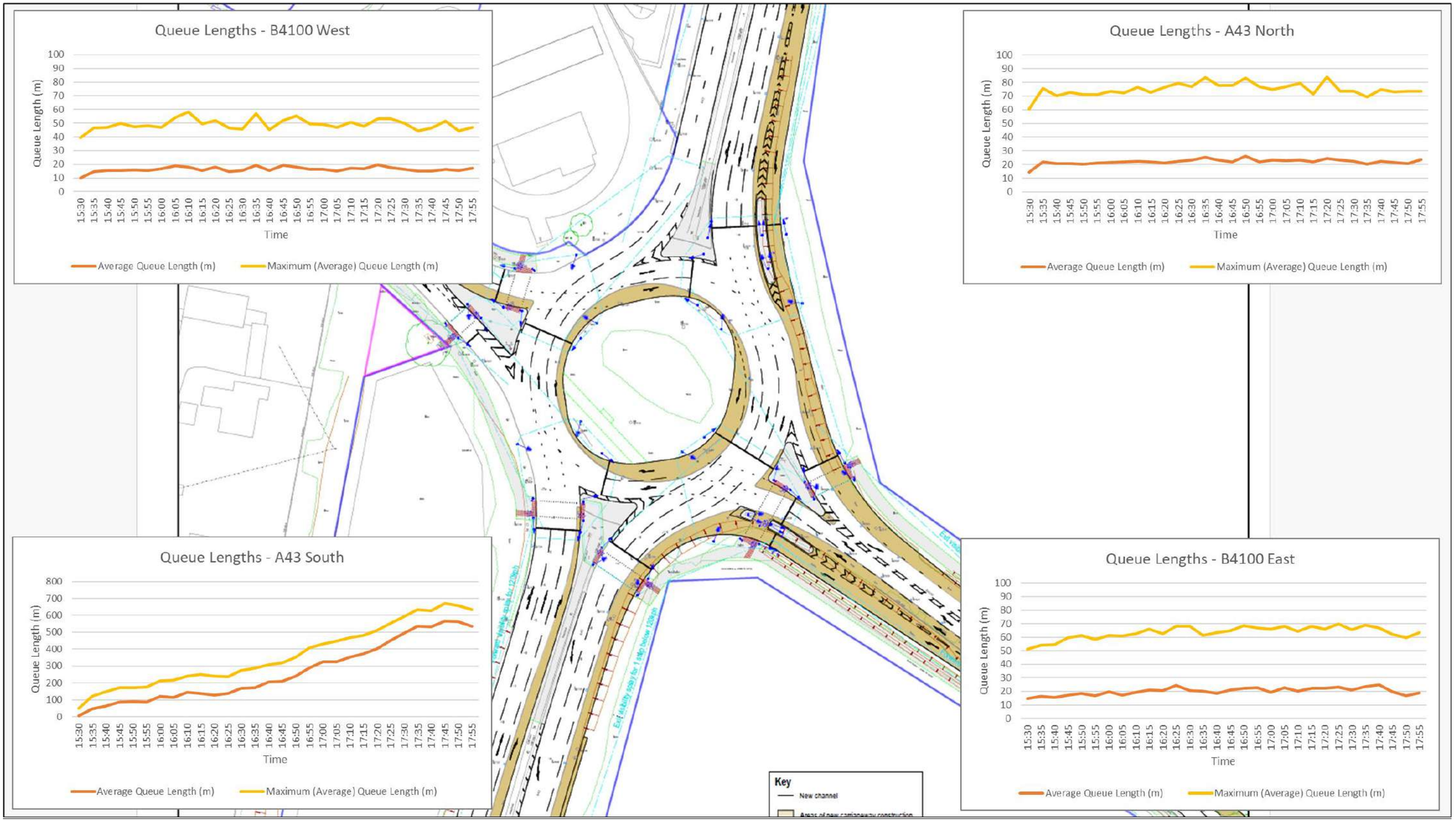

Queue Lengths - Site Access
Queue Length (m)
140
120
100
80
60
40
20
0
06:45
06:55
07:05
07:15
07:25
07:35
07:45
07:55
08:05
08:15
08:25
08:35
08:45
08:55
09:05
Time
Average Queue Length (m)
Maximum (Average) Queue Length (m)

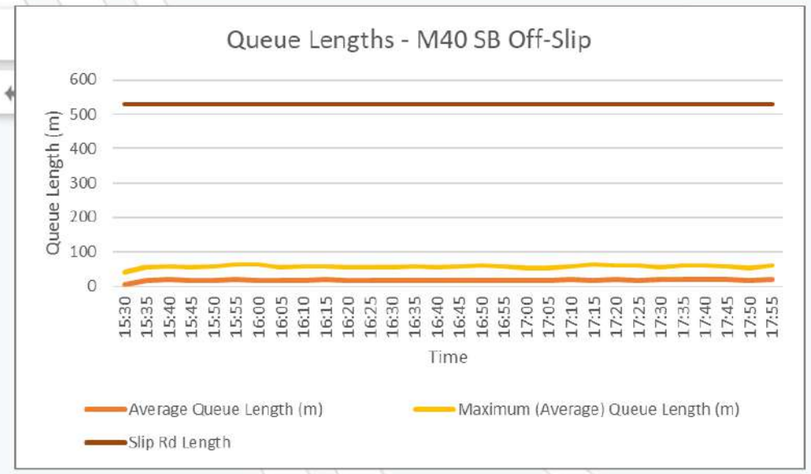

Queue Lengths - B4100 East
Queue Length (m)
140
120
100
80
60
40
20
0
06:45
06:55
07:05
07:15
07:25
07:35
07:45
07:55
08:05
08:15
08:25
08:35
08:45
08:55
09:05
Time
Average Queue Length (m)
Maximum (Average) Queue Length (m)

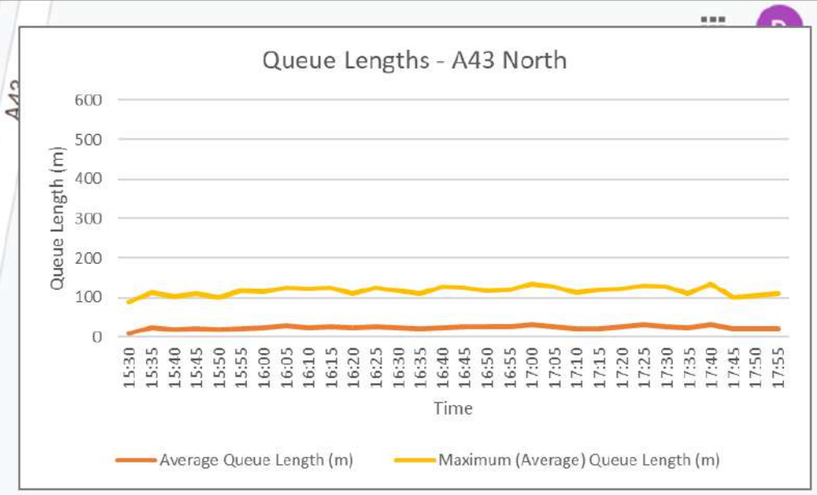

0
25
50
Meters


Queue Lengths - B4100 West
Queue Length (m)
20
15
10
5
0
06:45
06:55
07:05
07:15
07:25
07:35
07:45
07:55
08:05
08:15
08:25
08:35
08:45
08:55
09:05
Time
Average Queue Length (m)
Maximum (Average) Queue Length (m)
B4100
Queue Lengths - Site Access
Queue Length (m)
20
15
10
5
0
06:45
06:55
07:05
07:15
07:25
07:35
07:45
07:55
08:05
08:15
08:25
08:35
08:45
08:55
09:05
Time
Average Queue Length (m)
Maximum (Average) Queue Length (m)
Queue Lengths - B4100 East
Queue Length (m)
20
15
10
5
0
06:45
06:55
07:05
07:15
07:25
07:35
07:45
07:55
08:05
08:15
08:25
08:35
08:45
08:55
09:05
Time
Average Queue Length (m)
Maximum (Average) Queue Length (m)

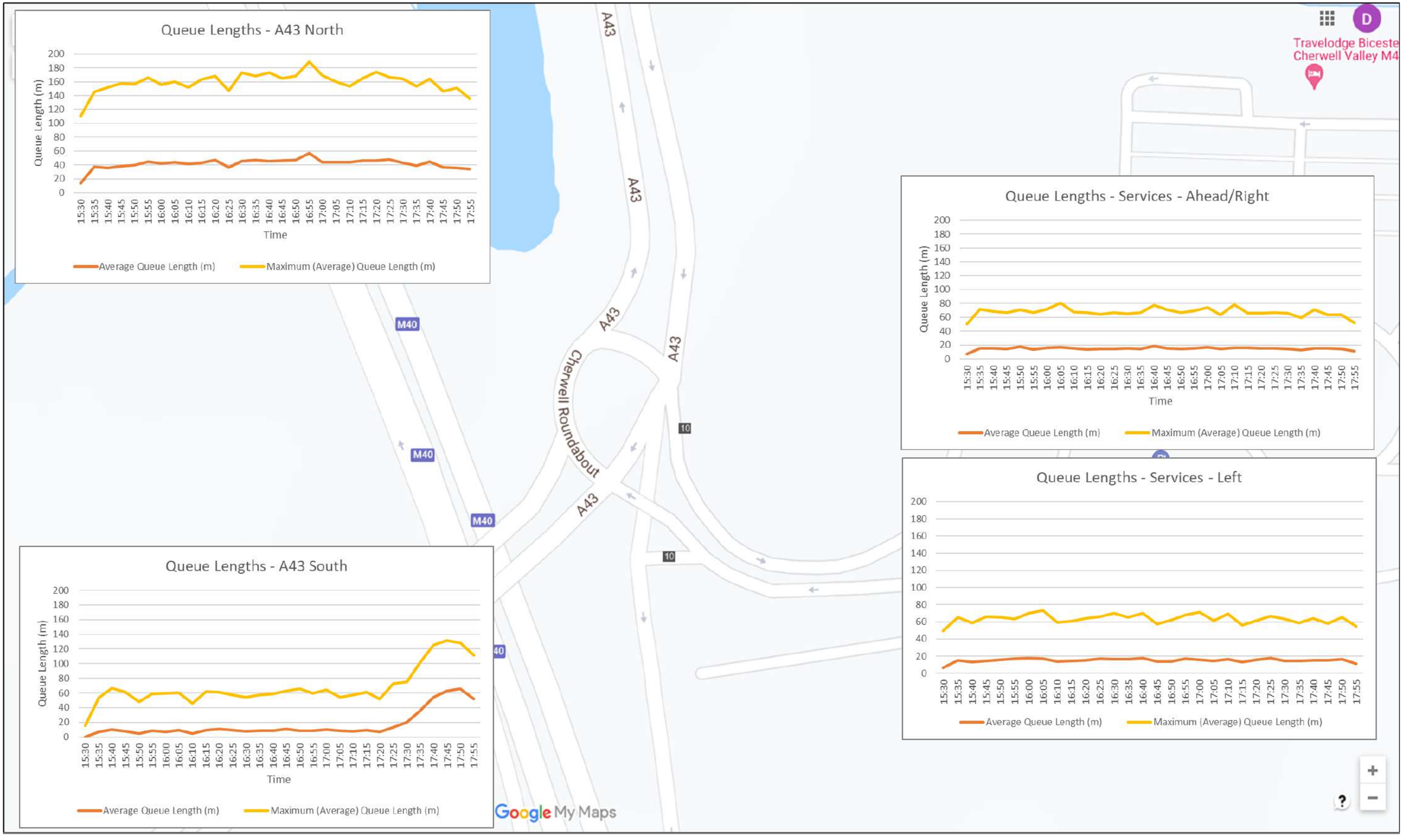
QUEUE LENGTHS – PM PEAK

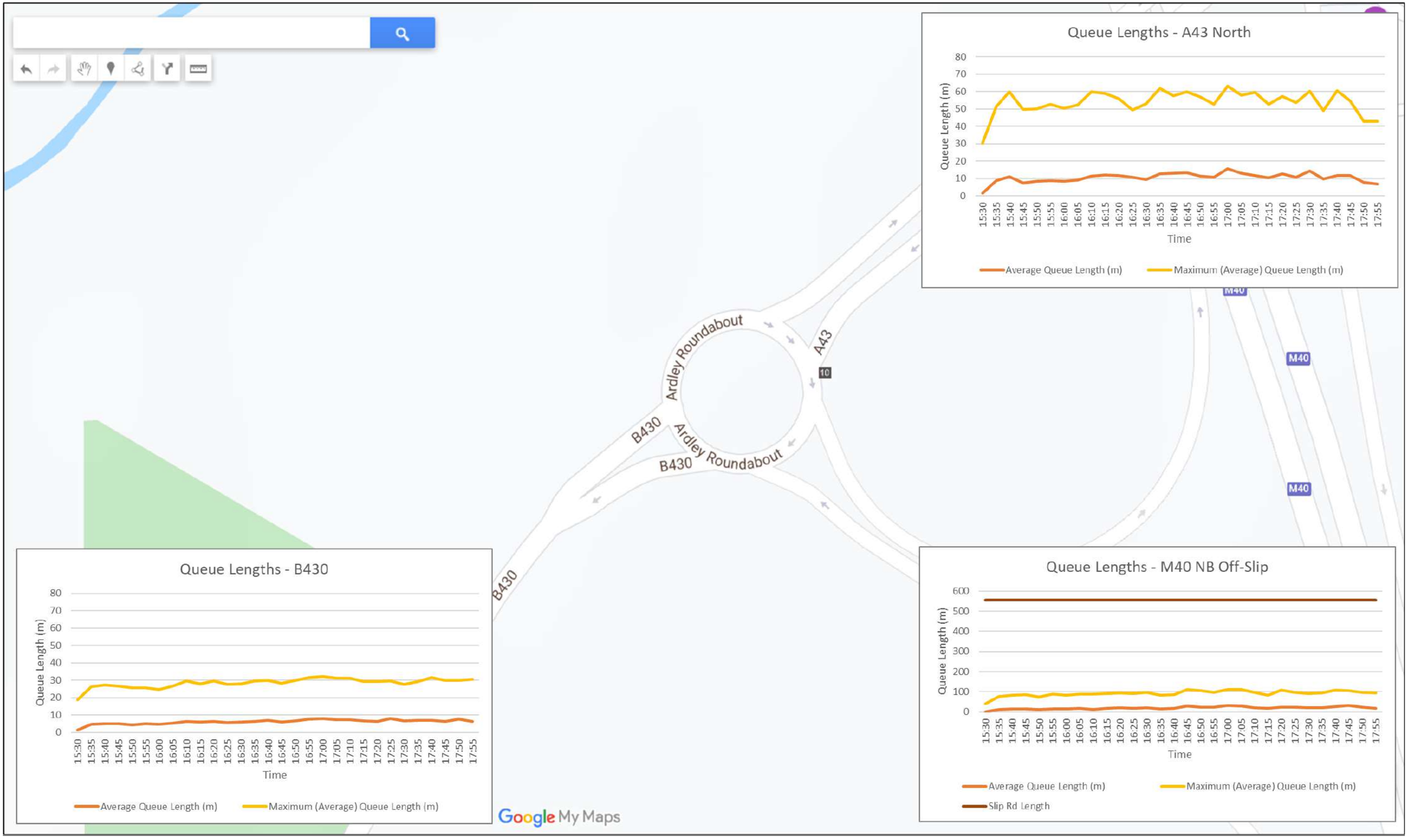



Queue Lengths - M40 SB Off-Slip
Queue Length (m)
600
500
400
300
200
100
0
15:30 15:35 15:40 15:45 15:50 15:55 16:00 16:05 16:10 16:15 16:20 16:25 16:30 16:35 16:40 16:45 16:50 16:55 17:00 17:05 17:10 17:15 17:20 17:25 17:30 17:35 17:40 17:45 17:50 17:55
Time
Average Queue Length (m)
Maximum (Average) Queue Length (m)
Slip Rd Length


Queue Lengths - A43 North
Queue Length (m)
600
500
400
300
200
100
0
15:30 15:35 15:40 15:45 15:50 15:55 16:00 16:05 16:10 16:15 16:20 16:25 16:30 16:35 16:40 16:45 16:50 16:55 17:00 17:05 17:10 17:15 17:20 17:25 17:30 17:35 17:40 17:45 17:50 17:55
Time
Average Queue Length (m)
Maximum (Average) Queue Length (m)

M40
M40
M40
M40
A43
A43
A43
A43
A43
A43
Google My Maps

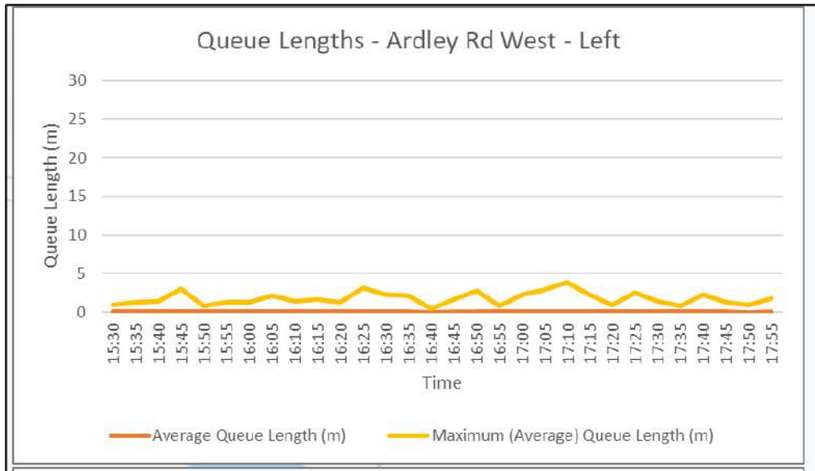

A43
A43
A43
A43
M40
M40
M40
40
10
10
Cherwell Roundabout
Travelodge Biceste
Cherwell Valley M4
Queue Lengths - A43 North
Queue Length (m)
Time
Average Queue Length (m)
Maximum (Average) Queue Length (m)
Queue Lengths - Services - Ahead/Right
Queue Length (m)
Time
Average Queue Length (m)
Maximum (Average) Queue Length (m)
Queue Lengths - Services - Left
Queue Length (m)
Time
Average Queue Length (m)
Maximum (Average) Queue Length (m)
Queue Lengths - A43 South
Queue Length (m)
Time
Average Queue Length (m)
Maximum (Average) Queue Length (m)
Google My Maps

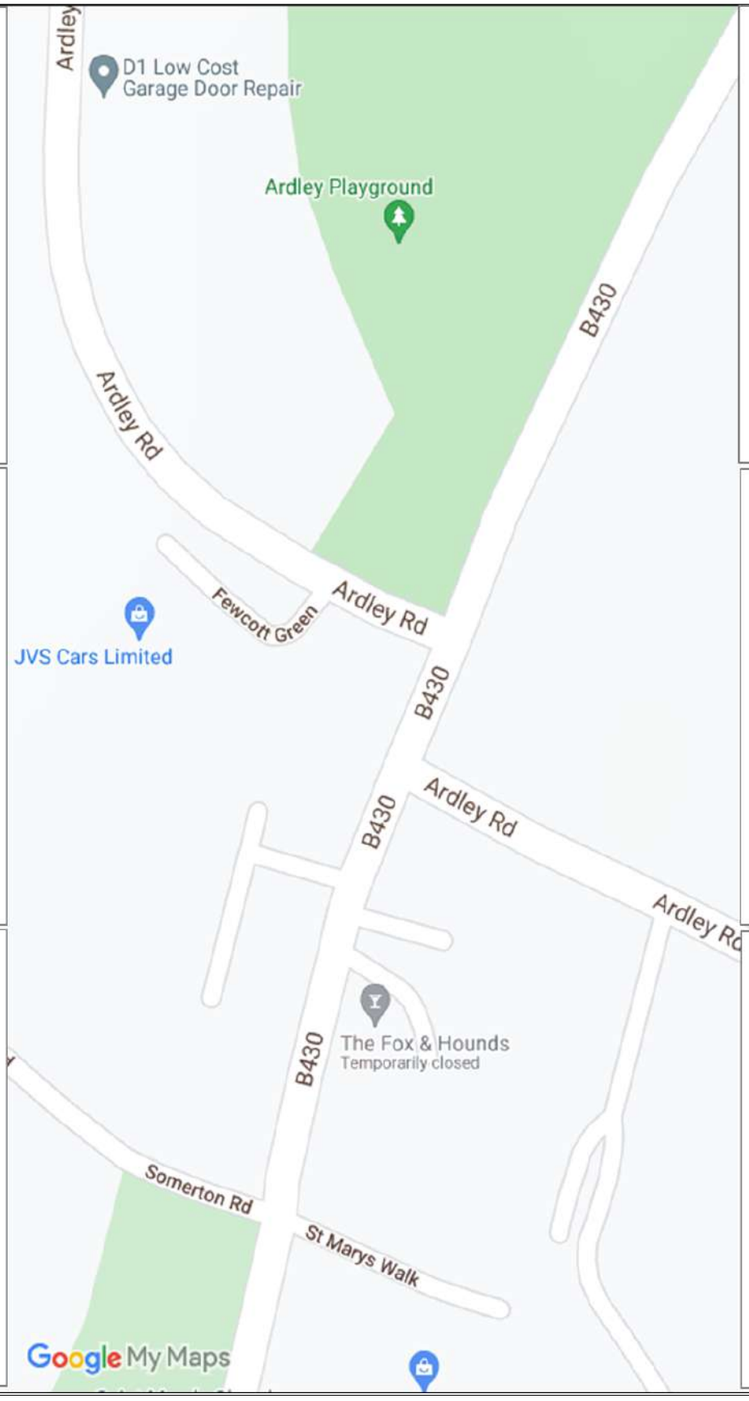

Ardley Roundabout
A43
10
B430
Ardley Roundabout
B430
Ardley Roundabout
B430
M40
M40
M40
Google My Maps

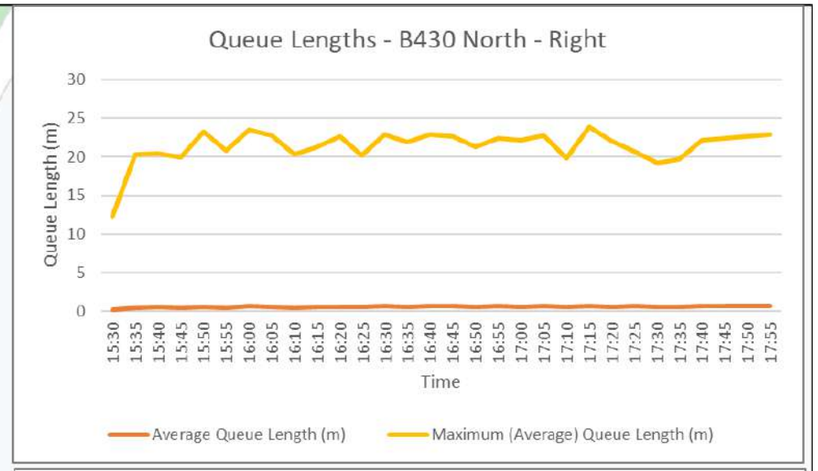
Queue Lengths - A43 North
Queue Length (m)
80
70
60
50
40
30
20
10
0
15:30 15:35 15:40 15:45 15:50 15:55 16:00 16:05 16:10 16:15 16:20 16:25 16:30 16:35 16:40 16:45 16:50 16:55 17:00 17:05 17:10 17:15 17:20 17:25 17:30 17:35 17:40 17:45 17:50 17:55
Time
Average Queue Length (m)
Maximum (Average) Queue Length (m)

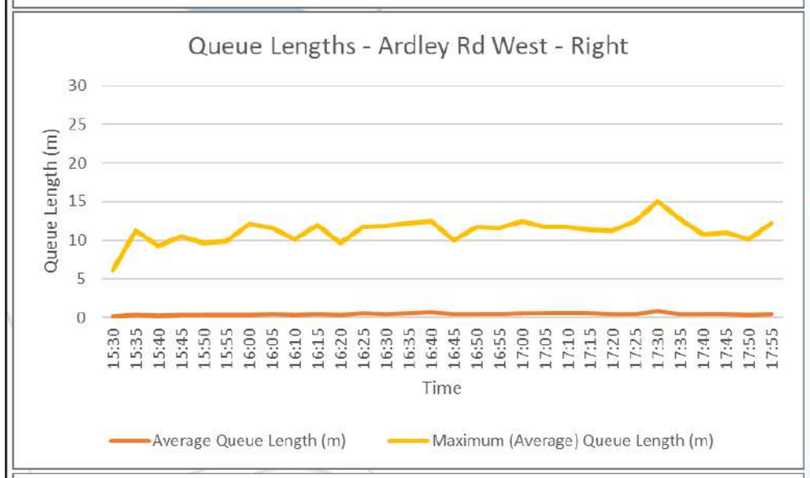
Queue Lengths - B430
Queue Length (m)
80
70
60
50
40
30
20
10
0
15:30 15:35 15:40 15:45 15:50 15:55 16:00 16:05 16:10 16:15 16:20 16:25 16:30 16:35 16:40 16:45 16:50 16:55 17:00 17:05 17:10 17:15 17:20 17:25 17:30 17:35 17:40 17:45 17:50 17:55
Time
Average Queue Length (m)
Maximum (Average) Queue Length (m)

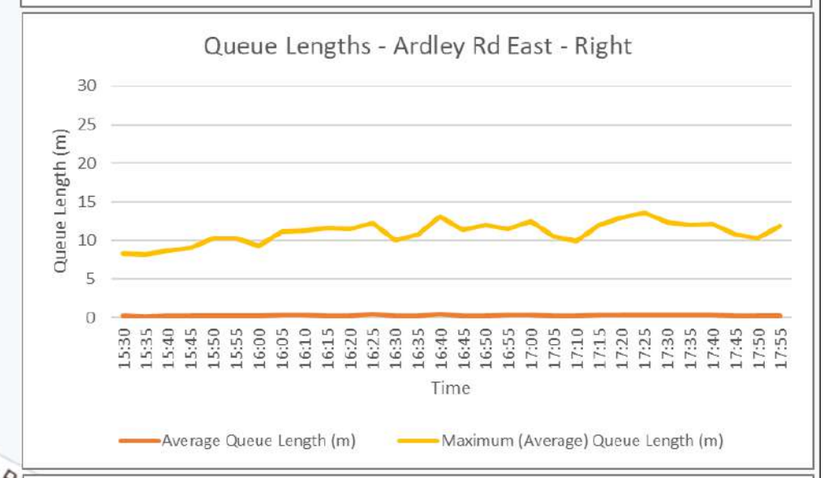
Queue Lengths - M40 NB Off-Slip
Queue Length (m)
600
500
400
300
200
100
0
15:30 15:35 15:40 15:45 15:50 15:55 16:00 16:05 16:10 16:15 16:20 16:25 16:30 16:35 16:40 16:45 16:50 16:55 17:00 17:05 17:10 17:15 17:20 17:25 17:30 17:35 17:40 17:45 17:50 17:55
Time
Average Queue Length (m)
Maximum (Average) Queue Length (m)
Slip Rd Length

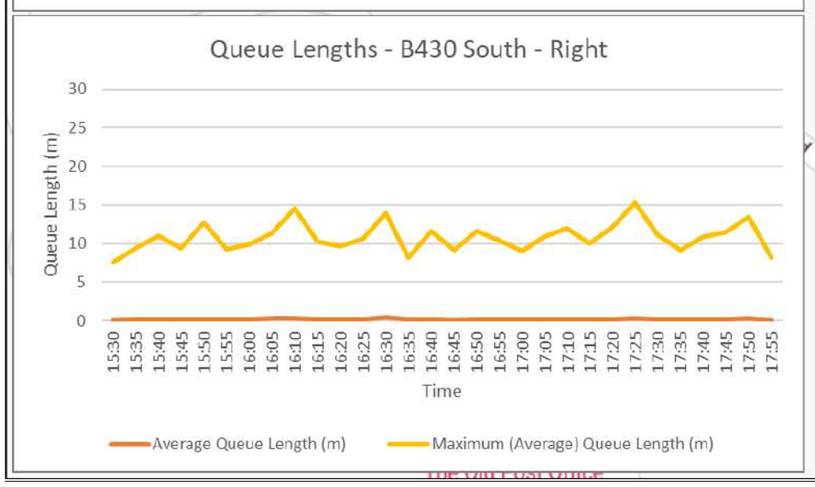

Queue Lengths - Ardley Rd West - Left
Queue Length (m)
Time
Average Queue Length (m)
Maximum (Average) Queue Length (m)

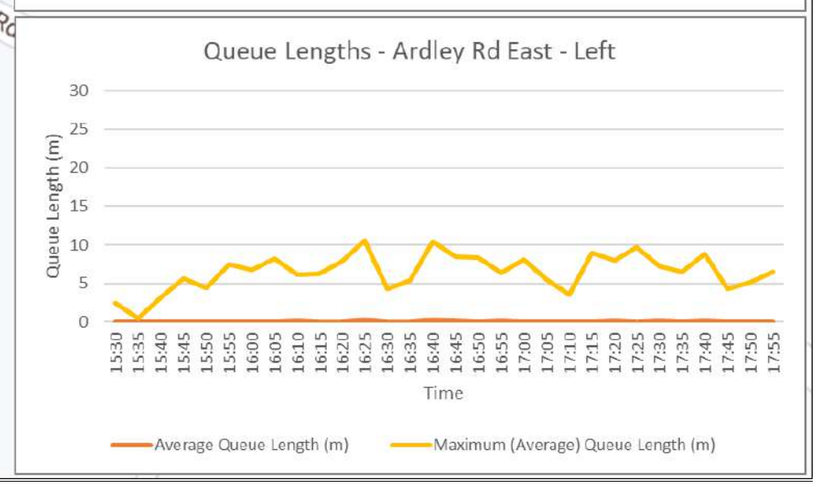

Ardley
D1 Low Cost
Garage Door Repair
Ardley Playground
B430
Ardley Rd
Fewcott Green
Ardley Rd
JVS Cars Limited
B430
Ardley Rd
Ardley Rd
B430
The Fox & Hounds
Temporarily closed
Somerton Rd
St Marys Walk
Google My Maps

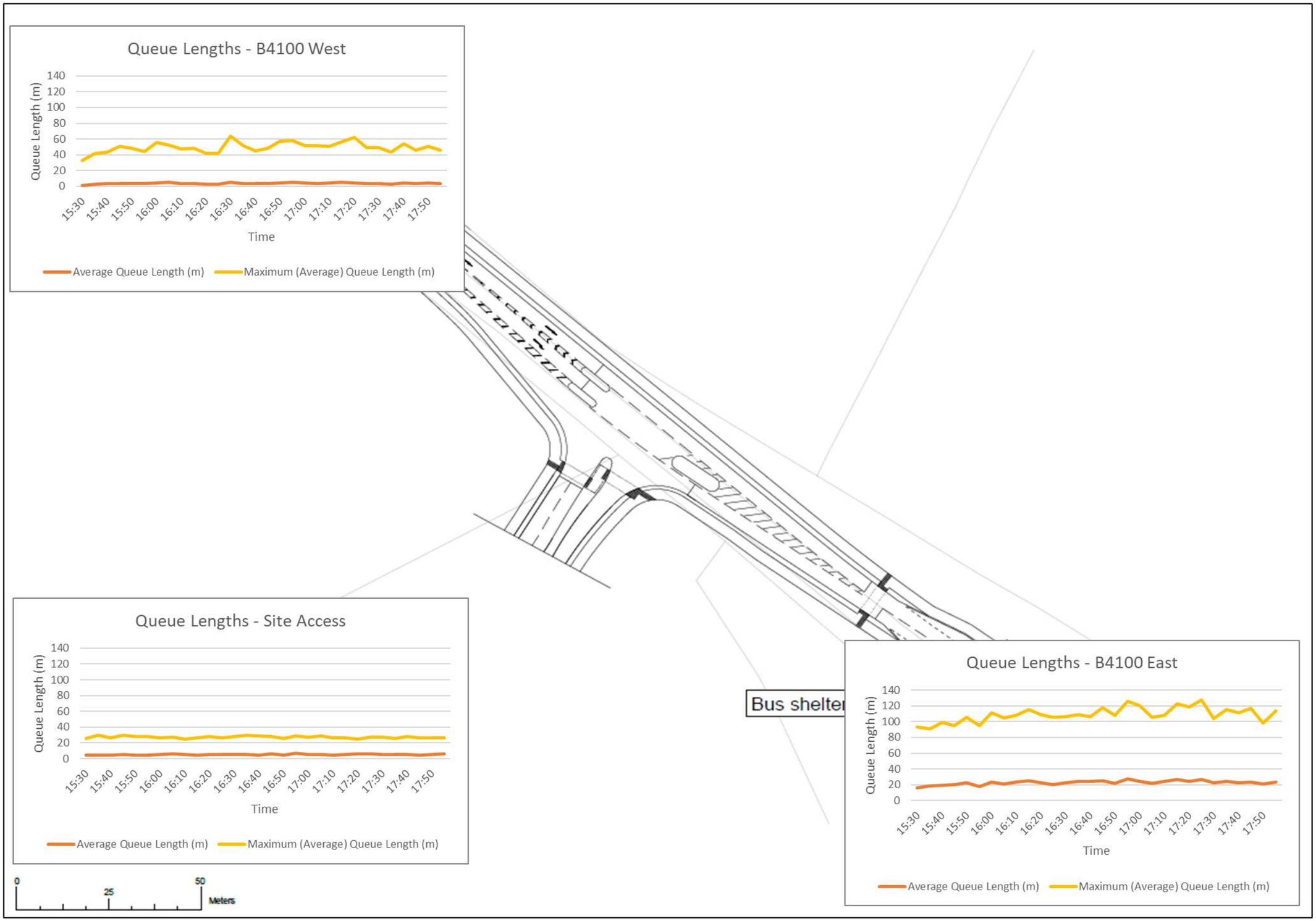

Queue Lengths - B430 North - Right
Queue Length (m)
Time
Average Queue Length (m)
Maximum (Average) Queue Length (m)

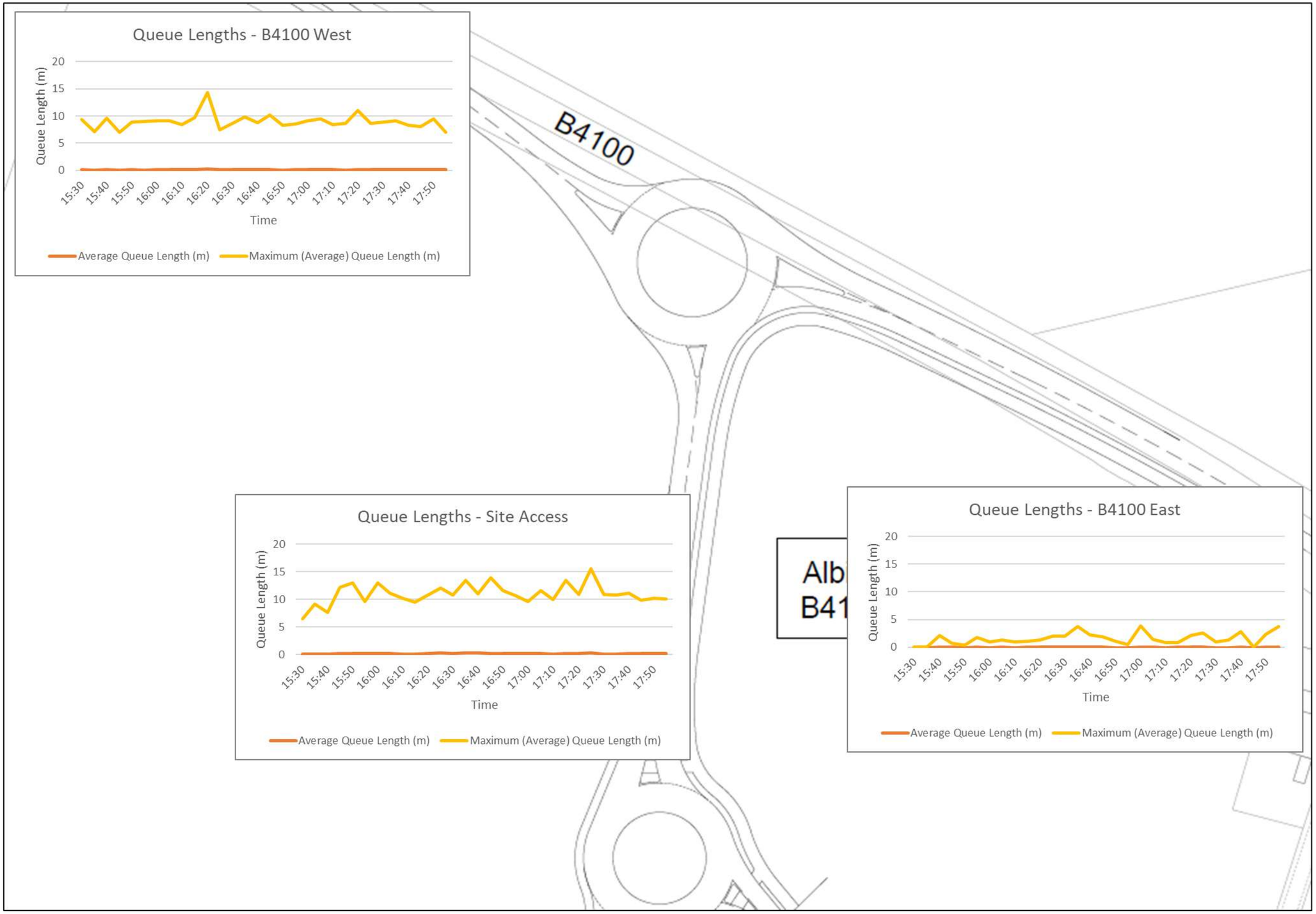

Queue Lengths - Ardley Rd West - Right
Queue Length (m)
Time
Average Queue Length (m)
Maximum (Average) Queue Length (m)


Queue Lengths - Ardley Rd East - Right
Queue Length (m)
Time
Average Queue Length (m)
Maximum (Average) Queue Length (m)


Queue Lengths - B430 South - Right
Queue Length (m)
Time
Average Queue Length (m)
Maximum (Average) Queue Length (m)


Queue Lengths - Ardley Rd East - Left
Queue Length (m)
Time
Average Queue Length (m)
Maximum (Average) Queue Length (m)


Queue Lengths - B4100 West
Queue Length (m)
140
120
100
80
60
40
20
0
15:30
15:40
15:50
16:00
16:10
16:20
16:30
16:40
16:50
17:00
17:10
17:20
17:30
17:40
17:50
Time
Average Queue Length (m)
Maximum (Average) Queue Length (m)
Bus shelter
Queue Lengths - Site Access
Queue Length (m)
Time
Average Queue Length (m)
Maximum (Average) Queue Length (m)
Queue Lengths - B4100 East
Queue Length (m)
Time
Average Queue Length (m)
Maximum (Average) Queue Length (m)
0
25
50
Meters


Queue Lengths - B4100 West
Queue Length (m)
20
15
10
5
0
15:30
15:40
15:50
16:00
16:10
16:20
16:30
16:40
16:50
17:00
17:10
17:20
17:30
17:40
17:50
Time
Average Queue Length (m)
Maximum (Average) Queue Length (m)
B4100
Queue Lengths - Site Access
Queue Length (m)
20
15
10
5
0
15:30
15:40
15:50
16:00
16:10
16:20
16:30
16:40
16:50
17:00
17:10
17:20
17:30
17:40
17:50
Time
Average Queue Length (m)
Maximum (Average) Queue Length (m)
Queue Lengths - B4100 East
Queue Length (m)
20
15
10
5
0
15:30
15:40
15:50
16:00
16:10
16:20
16:30
16:40
16:50
17:00
17:10
17:20
17:30
17:40
17:50
Time
Average Queue Length (m)
Maximum (Average) Queue Length (m)

APPENDIX 7 – JUNCTION PERFORMANCE RESULTS

Junction Performance – AM

ALL VEHICLES 2034 Ref Case AM (RC3A)				
Junction	Junction/ Movement		Junction Control	Avg Veh Delay (s)
	From	To	Type	Modelled
Baynards Green Roundabout	A43 North	B4100 East	Signal	14.8
		A43 South	Signal	18.9
		B4100 West	Signal	33.5
	B4100 East	A43 North	Signal	41.2
		A43 South	Signal	25.5
		B4100 West	Signal	41.9
	A43 South	A43 North	Signal	19.8
		B4100 East	Signal	40.4
		B4100 West	Signal	14.9
	B4100 West	A43 North	Signal	34.7
		B4100 East	Signal	39.0
		A43 South	Signal	43.7
Cherwell Junction	A43 North	Cherwell Services	Signal	7.7
		M40 SB On-Slip	Signal	12.8
		A43 South	Signal	6.7
	Cherwell Services	A43 North	Signal	26.5
		M40 SB On-Slip	Signal	24.3
		A43 South	Signal	25.0
	A43 South	A43 North	Priority	3.1
		M40 SB On-Slip	Priority	56.4
		Cherwell Services	Priority	41.3
Padbury Roundabout	A43 South	A43 North	Signal	6.4
	M40 SB Off-Slip	A43 South	Signal	30.2
		A43 North	Signal	20.6
	A43 North	A43 South	Signal	12.1
Ardley Roundabout	A43 North-East	M40 NB On-Slip	Priority	5.5
		B430	Priority	13.0
	M40 NB Off-Slip	A43 North-East	Priority	22.9
		B430	Priority	22.7
	B430	A43 North-East	Priority	7.0
		M40 NB On-Slip	Priority	8.8
B430/Ardley Road Staggered Crossroads	B430 North	B4100 East	Priority	1.4
		B430 South	Priority	1.5
		B4100 West	Priority	4.5
	Ardley Rd East	B430 North	Priority	3.0
		B430 South	Priority	4.1
		B4100 West	Priority	2.7
	B430 South	B430 North	Priority	2.0
		B4100 East	Priority	5.7
		B4100 West	Priority	1.2
	Ardley Rd West	B430 North	Priority	1.7
		B4100 East	Priority	12.2
		B430 South	Priority	9.3
Albion Land - East Access	B4100 East	Site Access	Signal	11.2
		B4100 West	Signal	12.0
	Site Access	B4100 West	Signal	21.8
		B4100 East	Signal	23.1
	B4100 West	B4100 East	Signal	3.2
		Site Access	Signal	10.8
Albion Land - West Access	B4100 East	Site Access	Priority	0.6
		B4100 West	Priority	2.0
	Site Access	B4100 West	Priority	1.1
		B4100 East	Priority	1.1
	B4100 West	B4100 East	Priority	0.6
		Site Access	Priority	4.1

Junction Performance – PM

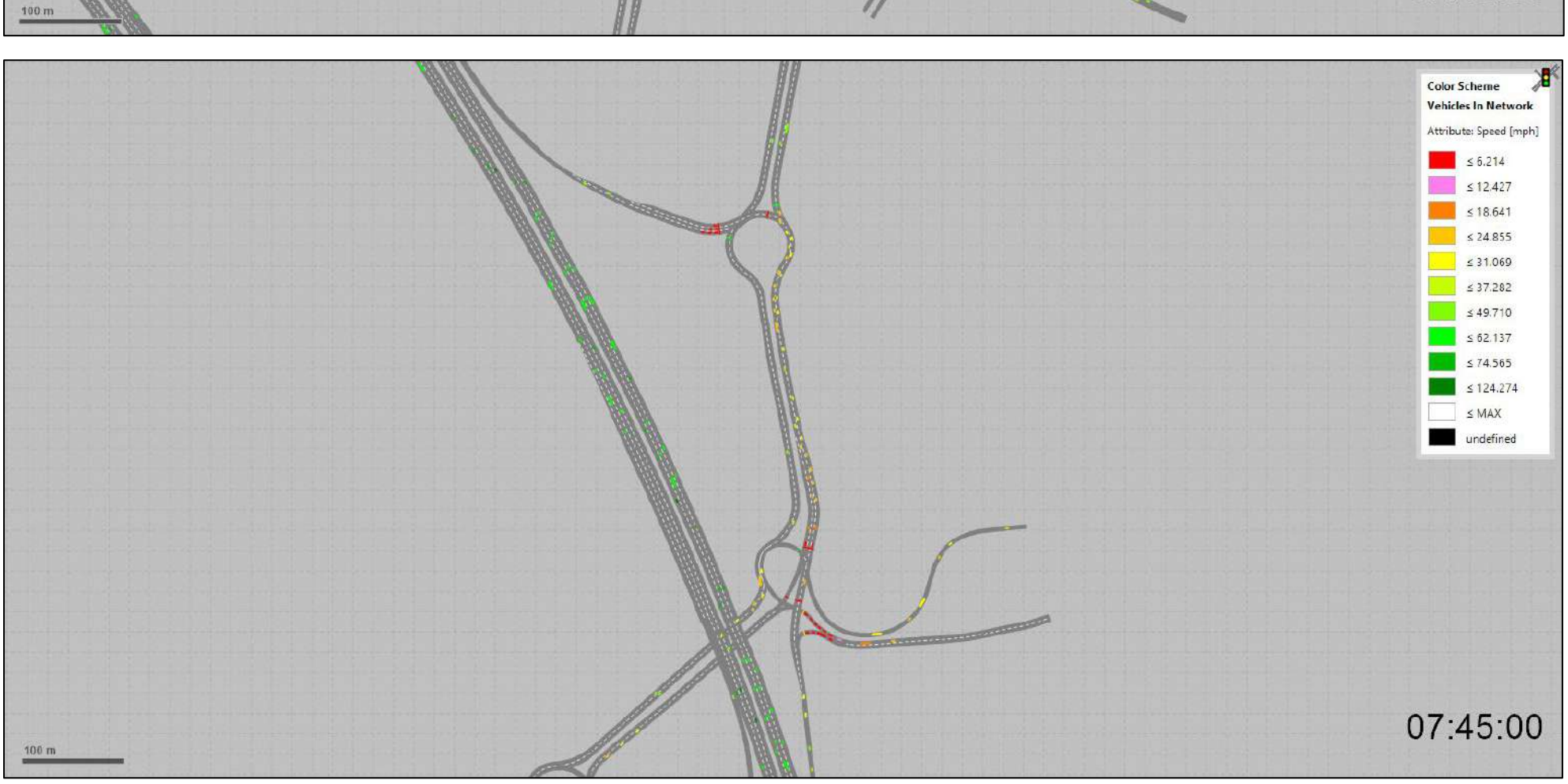
ALL VEHICLES 2034 Ref Case PM (RC3A)				
Junction	Junction/ Movement		Junction Control	Avg Veh Delay (s)
	From	To	Type	Modelled
Baynards Green Roundabout	A43 North	B4100 East	Signal	13.8
		A43 South	Signal	17.9
		B4100 West	Signal	34.3
	B4100 East	A43 North	Signal	34.2
		A43 South	Signal	24.8
		B4100 West	Signal	32.2
	A43 South	A43 North	Signal	25.5
		B4100 East	Signal	38.9
		B4100 West	Signal	21.5
	B4100 West	A43 North	Signal	36.9
		B4100 East	Signal	40.9
		A43 South	Signal	44.8
Cherwell Junction	A43 North	Cherwell Services	Signal	6.6
		M40 SB On-Slip	Signal	9.4
		A43 South	Signal	6.2
	Cherwell Services	A43 North	Signal	22.9
		M40 SB On-Slip	Signal	20.1
		A43 South	Signal	20.7
	A43 South	A43 North	Priority	3.2
		M40 SB On-Slip	Priority	51.3
		Cherwell Services	Priority	31.7
Padbury Roundabout	A43 South	A43 North	Signal	12.0
	M40 SB Off-Slip	A43 South	Signal	29.9
		A43 North	Signal	26.7
	A43 North	A43 South	Signal	7.4
Ardley Roundabout	A43 North-East	M40 NB On-Slip	Priority	7.8
		B430	Priority	6.7
	M40 NB Off-Slip	A43 North-East	Priority	6.0
		B430	Priority	5.6
	B430	A43 North-East	Priority	13.6
		M40 NB On-Slip	Priority	16.2
B430/Ardley Road Staggered Crossroads	B430 North	B4100 East	Priority	1.5
		B430 South	Priority	1.1
		B4100 West	Priority	4.2
	Ardley Rd East	B430 North	Priority	2.4
		B430 South	Priority	1.1
		B4100 West	Priority	1.9
	B430 South	B430 North	Priority	1.5
		B4100 East	Priority	2.3
		B4100 West	Priority	1.1
	Ardley Rd West	B430 North	Priority	1.2
		B4100 East	Priority	9.0
		B430 South	Priority	4.6
Albion Land - East Access	B4100 East Site Access	Site Access	Signal	9.9
		B4100 East	Signal	21.5
	B4100 West	B4100 East	Signal	3.0
		Site Access	Signal	14.0
Albion Land - West Access	B4100 East	Site Access	Priority	0.5
		B4100 West	Priority	1.8
	Site Access	B4100 West	Priority	1.5
		B4100 East	Priority	1.1
	B4100 West	B4100 East	Priority	0.6
		Site Access	Priority	4.2

APPENDIX 8 – SCREENSHOTS

Screenshots – 2034 Ref Case (RC3A) – AM – Seed 122 (closest to avg veh delay)

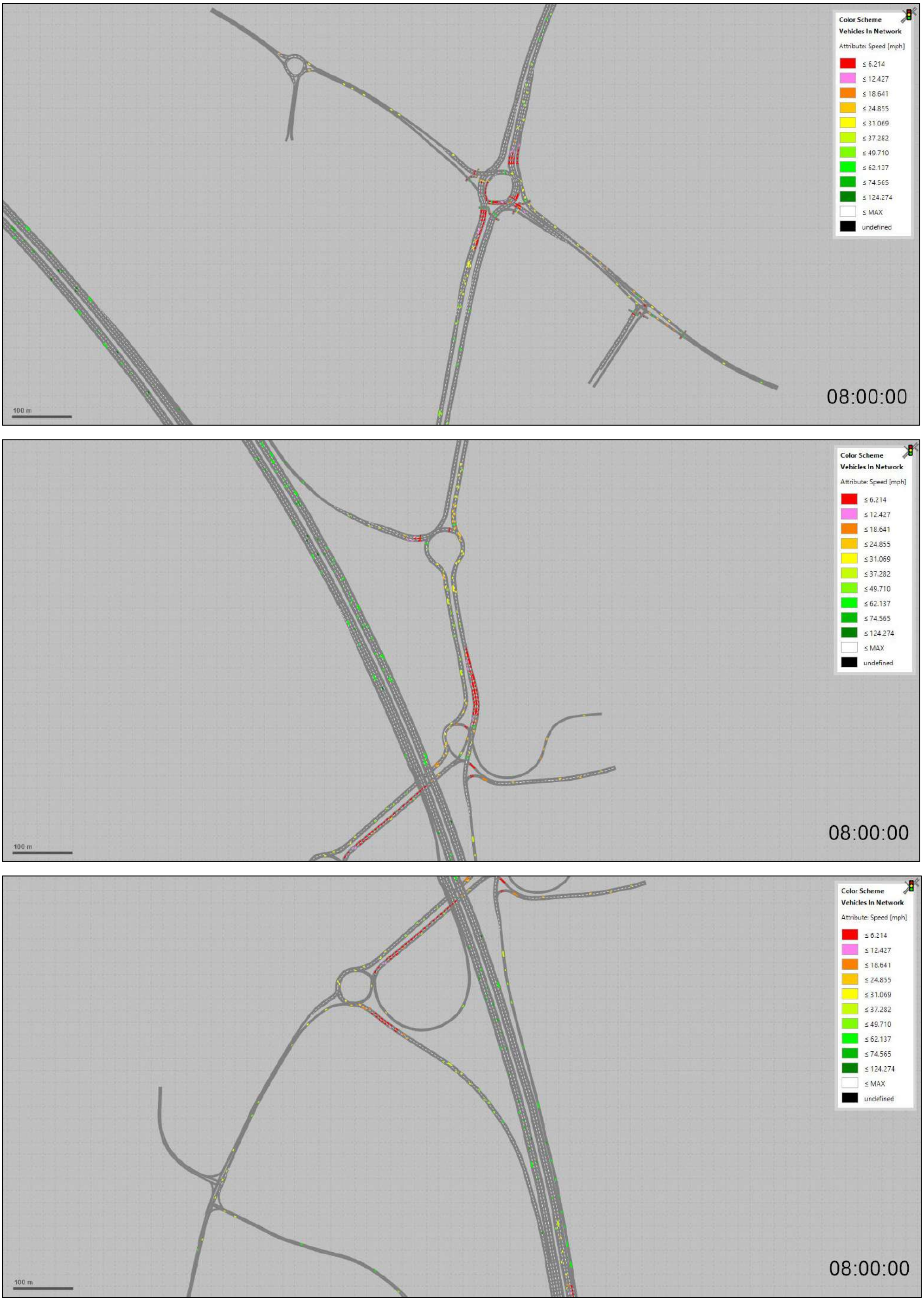
0745 (Start of AM peak)





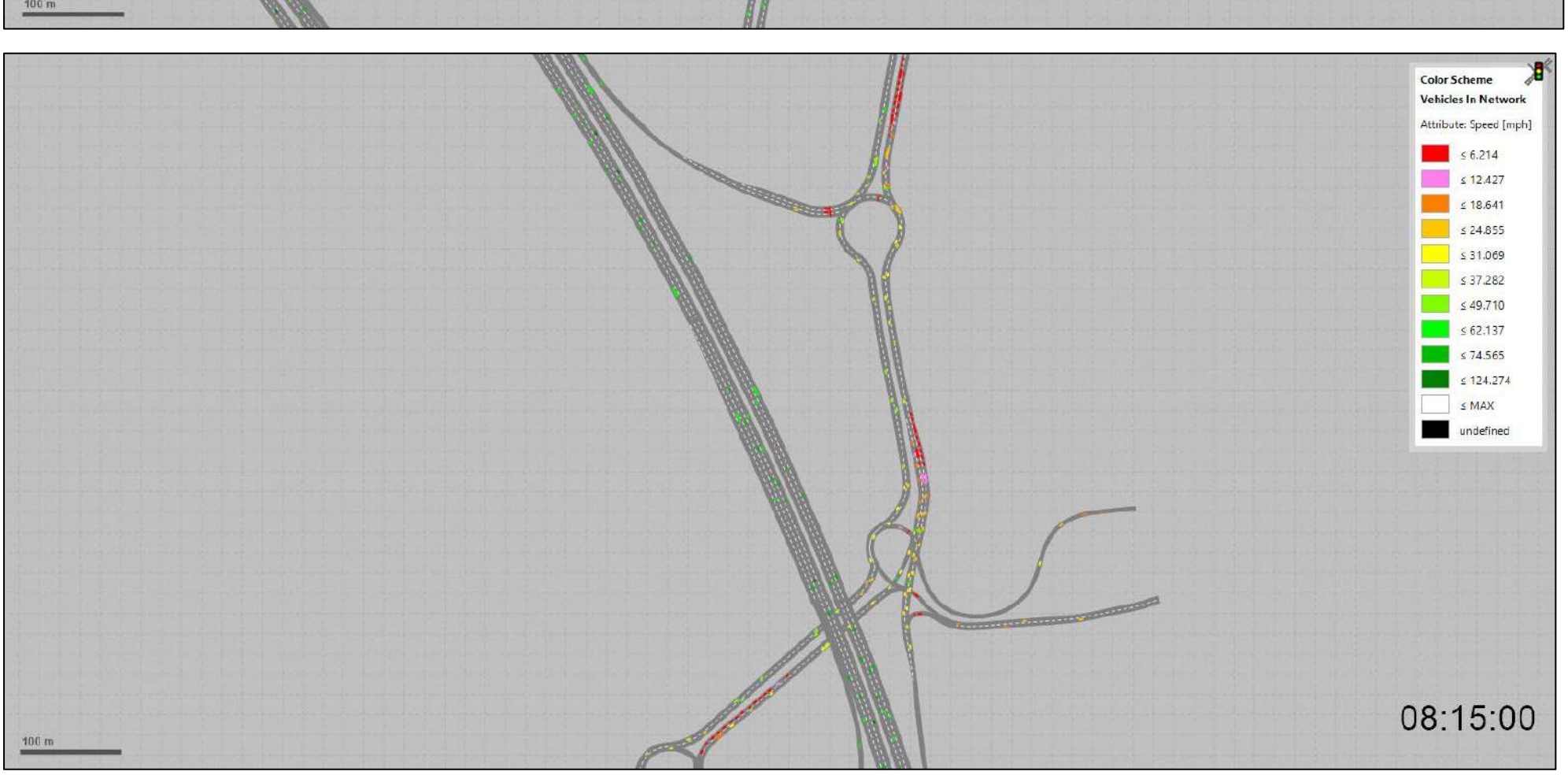


0800


Color Scheme
Vehicles In Network
Attribute: Speed [mph]
≤ 6.214
≤ 12.427
≤ 18.641
≤ 24.855
≤ 31.069
≤ 37.282
≤ 49.710
≤ 62.137
≤ 74.565
≤ 124.274
≤ MAX
undefined
08:00:00
100 m

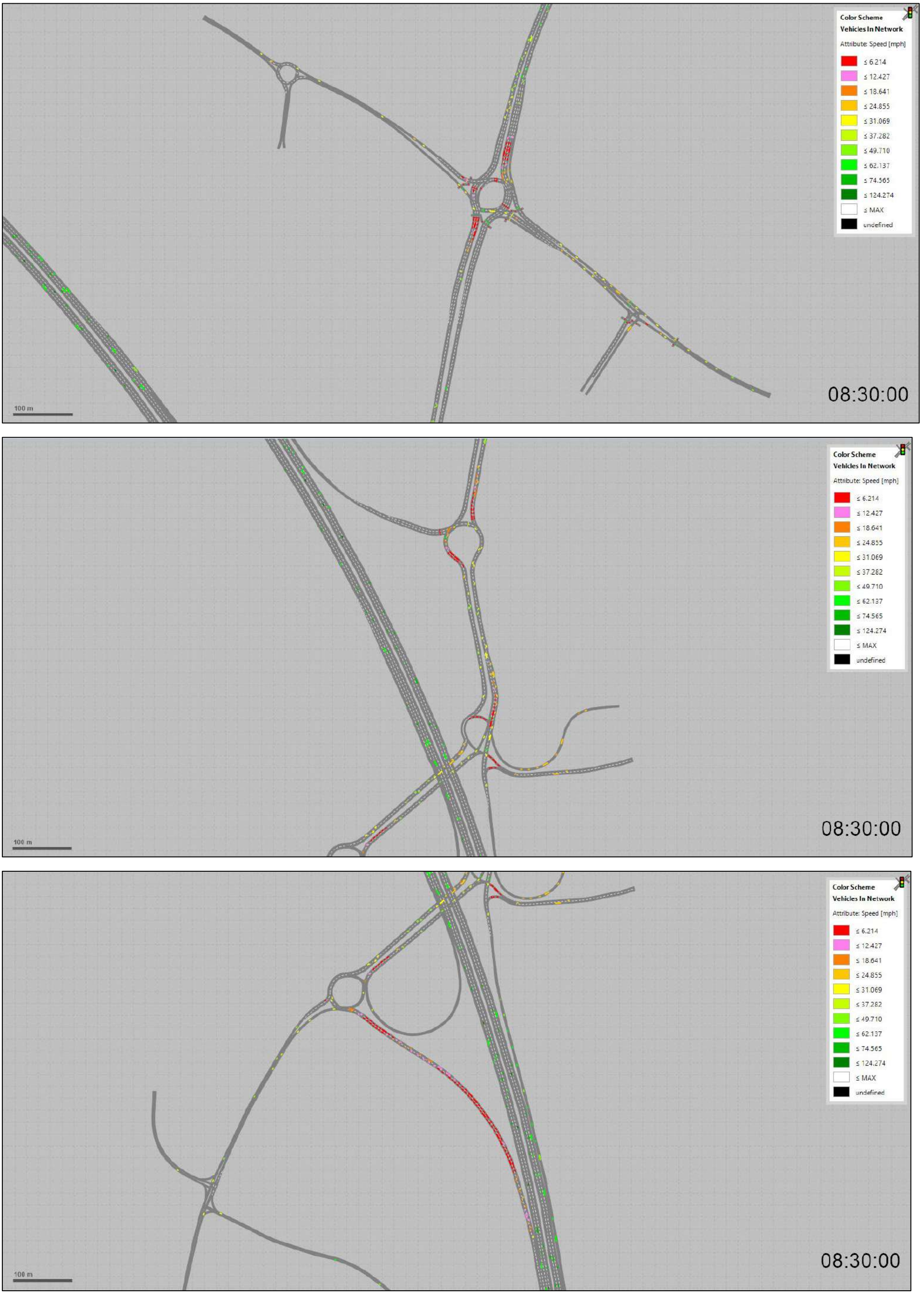
0815


Color Scheme
Vehicles In Network
Attribute: Speed [mph]
≤ 6.214
≤ 12.427
≤ 18.641
≤ 24.855
≤ 31.069
≤ 37.282
≤ 49.710
≤ 62.137
≤ 74.565
≤ 124.274
≤ MAX
undefined
08:15:00
100 m


Color Scheme
Vehicles In Network
Attribute: Speed [mph]
≤ 6.214
≤ 12.427
≤ 18.641
≤ 24.855
≤ 31.069
≤ 37.282
≤ 49.710
≤ 62.137
≤ 74.565
≤ 124.274
≤ MAX
undefined
08:15:00
100 m


Color Scheme
Vehicles In Network
Attribute: Speed [mph]
≤ 6.214
≤ 12.427
≤ 18.641
≤ 24.855
≤ 31.069
≤ 37.282
≤ 49.710
≤ 62.137
≤ 74.565
≤ 124.274
≤ MAX
undefined
08:15:00
100 m

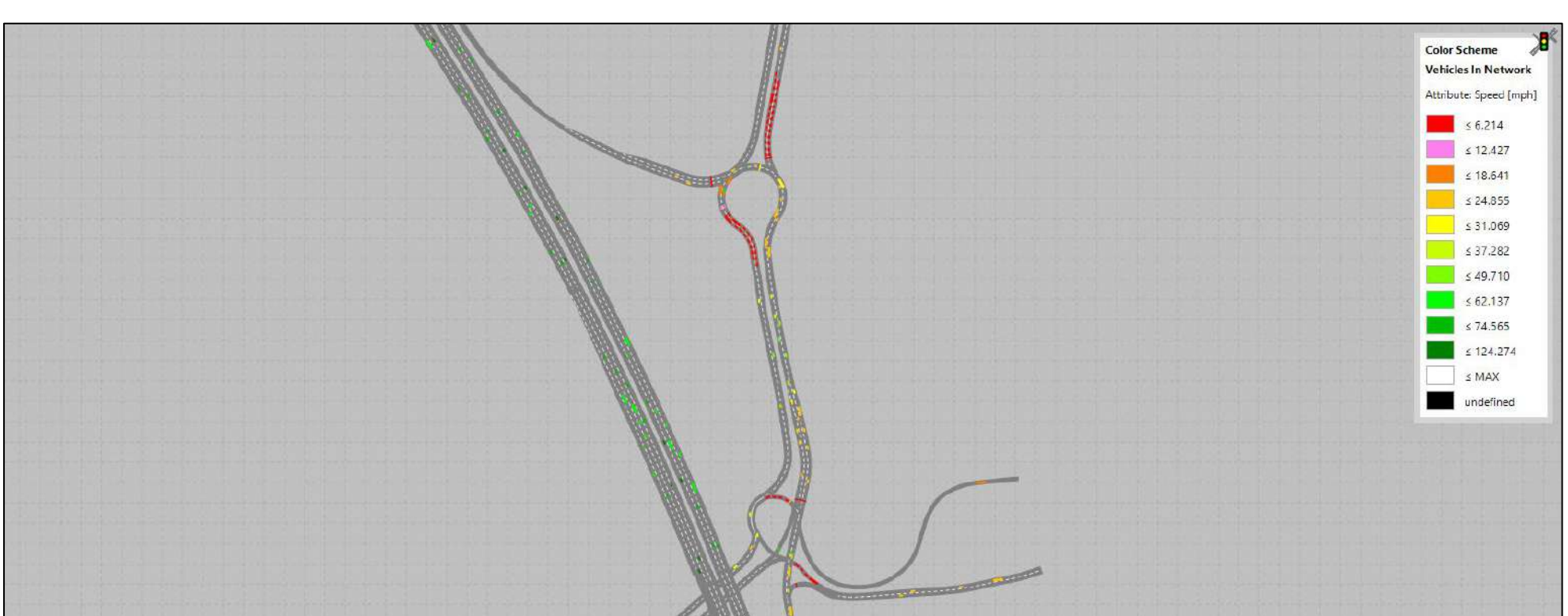
0830


Color Scheme
Vehicles In Network
Attribute: Speed [mph]
≤ 6.214
≤ 12.427
≤ 18.641
≤ 24.855
≤ 31.069
≤ 37.282
≤ 49.710
≤ 62.137
≤ 74.565
≤ 124.274
≤ MAX
undefined
08:30:00
100 m

0845


Color Scheme
Vehicles In Network
Attribute: Speed [mph]
≤ 6.214
≤ 12.427
≤ 18.641
≤ 24.855
≤ 31.069
≤ 37.282
≤ 49.710
≤ 62.137
≤ 74.565
≤ 124.274
≤ MAX
undefined
08:45:00
100 m

Color Scheme
Vehicles In Network
Attribute: Speed [mph]
≤ 6.214
≤ 12.427
≤ 18.641
≤ 24.855
≤ 31.069
≤ 37.282
≤ 49.710
≤ 62.137
≤ 74.565
≤ 124.274
≤ MAX
undefined
08:45:00
100 m


Color Scheme
Vehicles In Network
Attribute: Speed [mph]
≤ 6.214
≤ 12.427
≤ 18.641
≤ 24.855
≤ 31.069
≤ 37.282
≤ 49.710
≤ 62.137
≤ 74.565
≤ 124.274
≤ MAX
undefined
08:45:00
100 m

Screenshots – 2034 Ref Case (RC3A) – PM – Seed 192 (closest to avg veh delay)

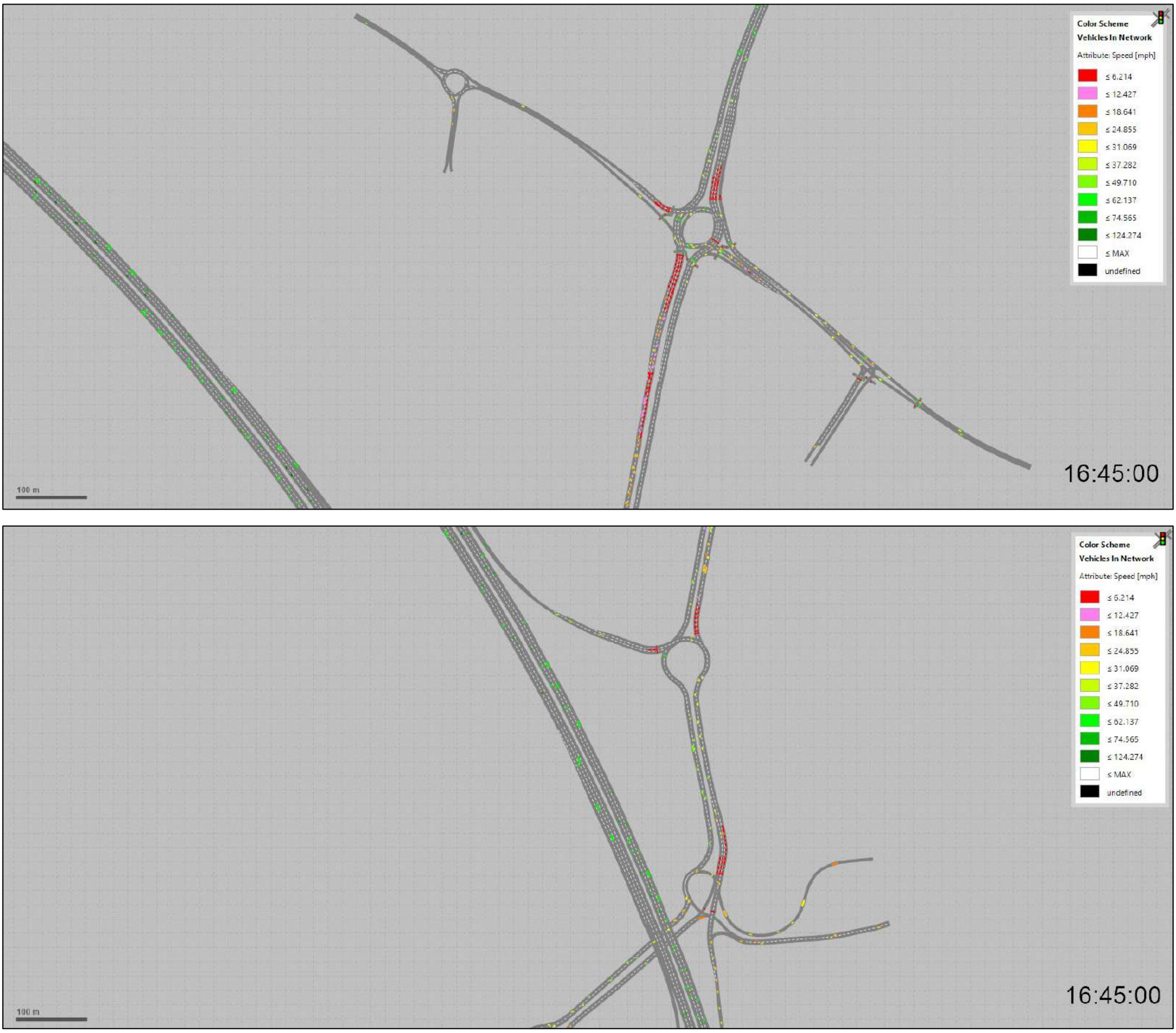
1630 (Start of PM peak)







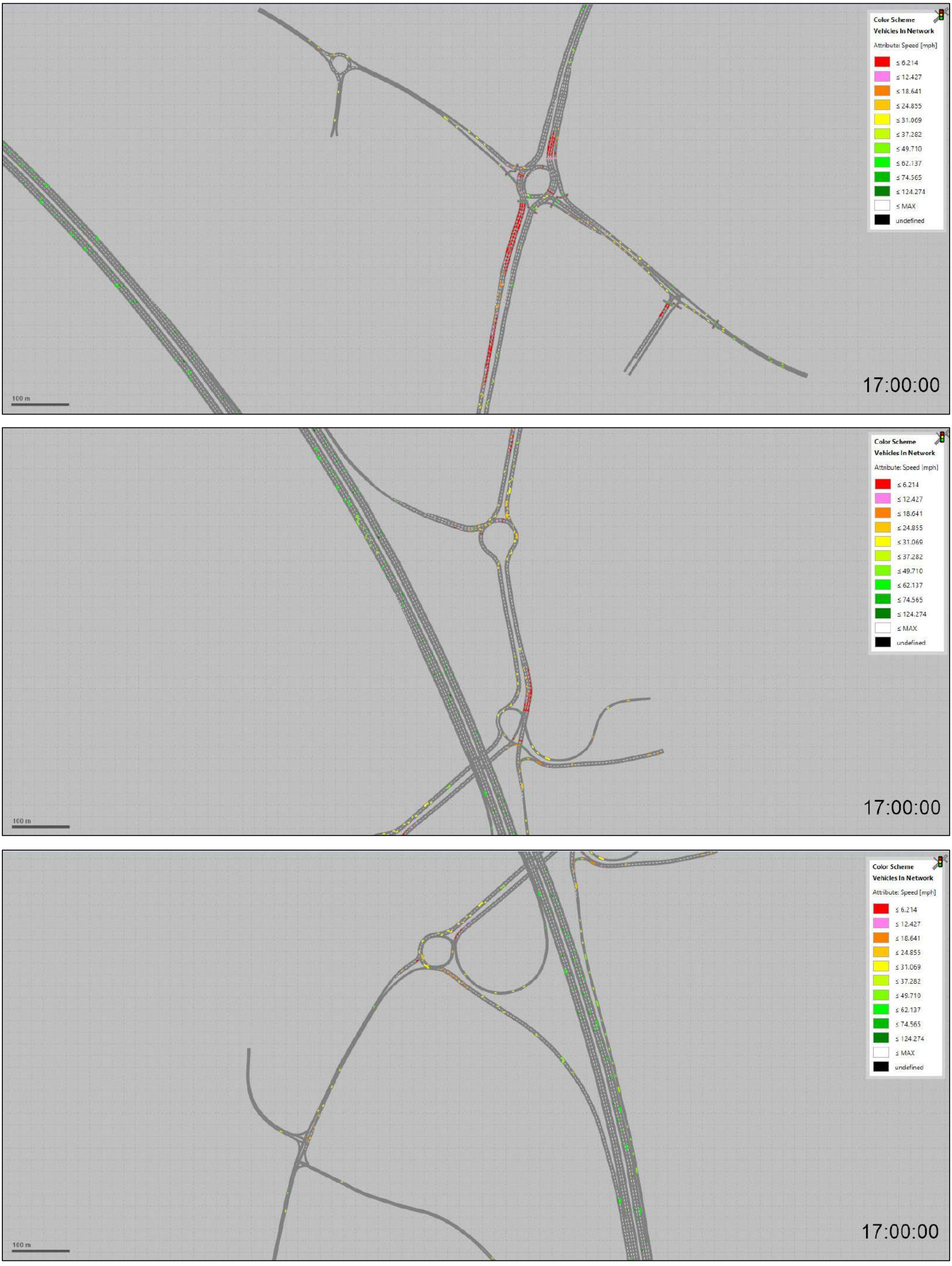
1645


Color Scheme
Vehicles In Network
Attribute: Speed [mph]
≤ 6.214
≤ 12.427
≤ 18.641
≤ 24.855
≤ 31.069
≤ 37.282
≤ 49.710
≤ 62.137
≤ 74.565
≤ 124.274
≤ MAX
undefined
100 m
16:45:00

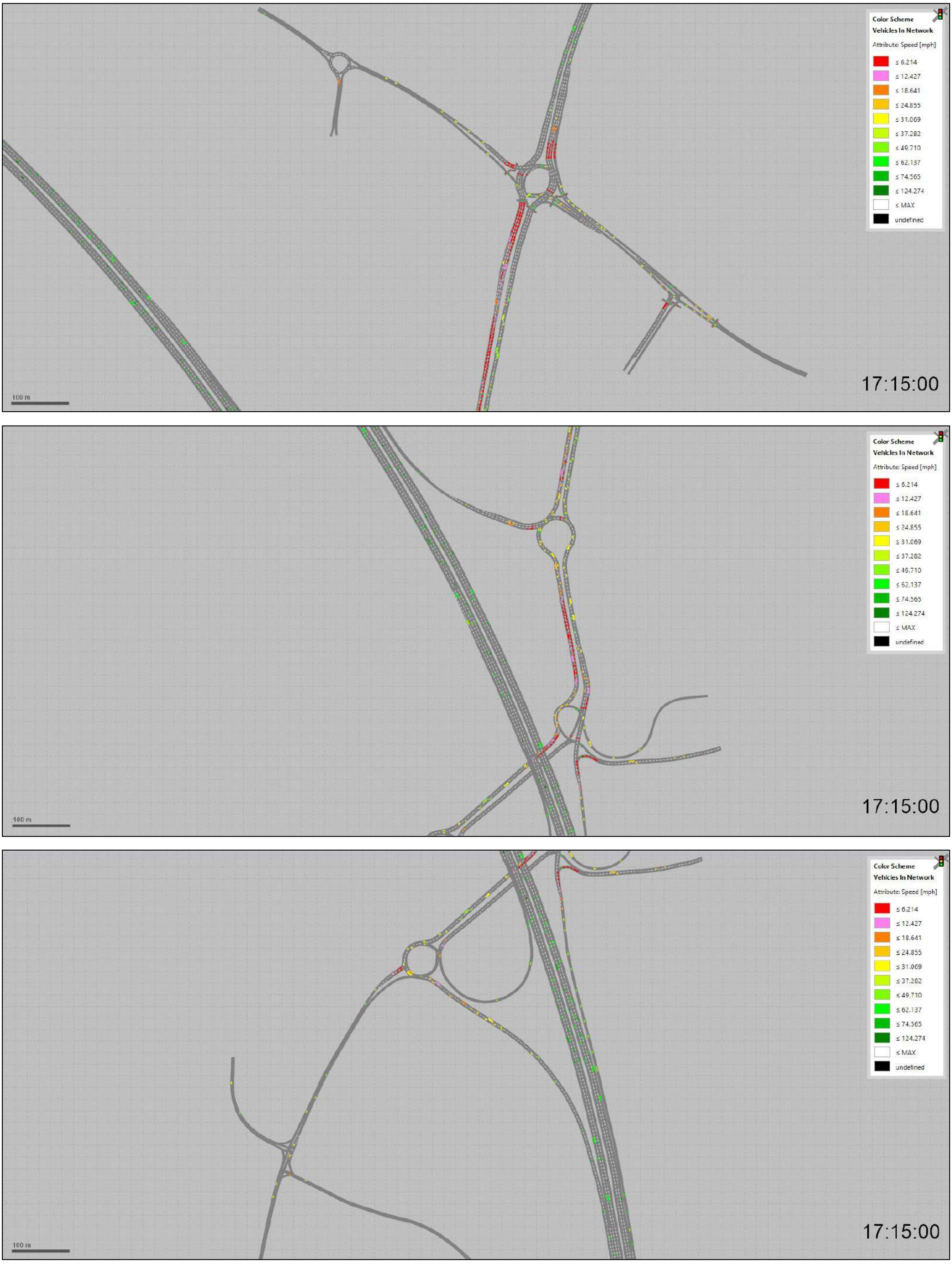
Color Scheme
Vehicles In Network
Attribute: Speed [mph]
≤ 6.214
≤ 12.427
≤ 18.641
≤ 24.855
≤ 31.069
≤ 37.282
≤ 49.710
≤ 62.137
≤ 74.565
≤ 124.274
≤ MAX
undefined
100 m
16:45:00


Color Scheme
Vehicles In Network
Attribute: Speed [mph]
≤ 6.214
≤ 12.427
≤ 18.641
≤ 24.855
≤ 31.069
≤ 37.282
≤ 49.710
≤ 62.137
≤ 74.565
≤ 124.274
≤ MAX
undefined
100 m
16:45:00

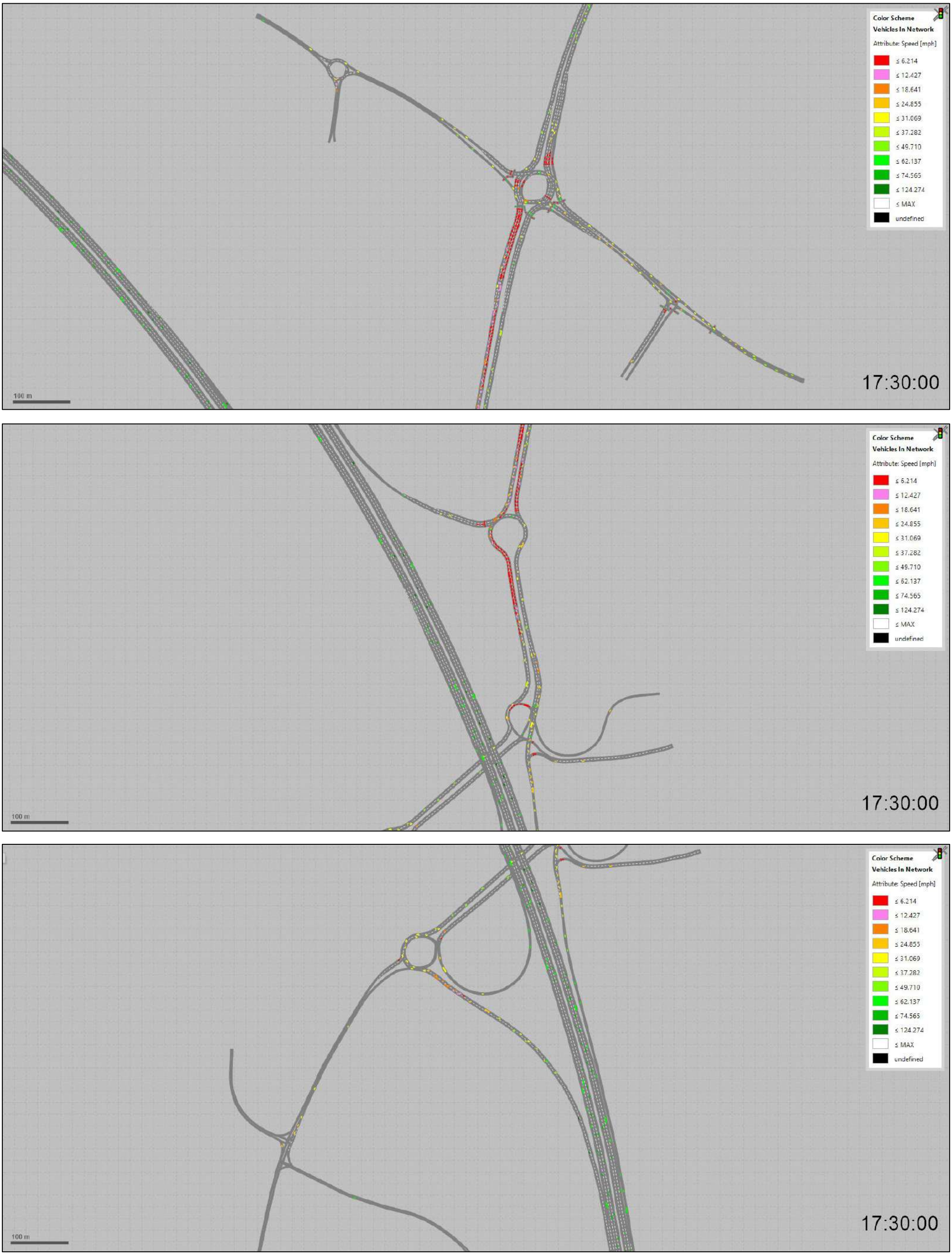
1700


Color Scheme
Vehicles In Network
Attribute: Speed [mph]
≤ 6.214
≤ 12.427
≤ 18.641
≤ 24.855
≤ 31.069
≤ 37.282
≤ 49.710
≤ 62.137
≤ 74.565
≤ 124.274
≤ MAX
undefined
17:00:00
100 m

1715


Color Scheme
Vehicles In Network
Attribute: Speed [mph]
≤ 6.214
≤ 12.427
≤ 18.641
≤ 24.855
≤ 31.069
≤ 37.282
≤ 49.710
≤ 62.137
≤ 74.565
≤ 124.274
≤ MAX
undefined
17:15:00
100 m

1730


Color Scheme
Vehicles In Network
Attribute: Speed [mph]
≤ 6.214
≤ 12.427
≤ 18.641
≤ 24.855
≤ 31.069
≤ 37.282
≤ 49.710
≤ 62.137
≤ 74.565
≤ 124.274
≤ MAX
undefined
17:30:00
100 m

APPENDIX C:
NATIONAL HIGHWAYS AUDIT & SUBSEQUENT RESPONSES

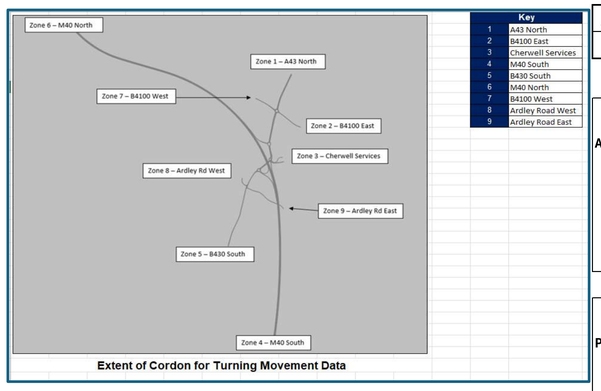
OxSRFI - Response to Modelling Review

AECOM TN 08

No.	Section	Para.	Comment	Response & Way Forward	Action	NH/AECOM Comment	Further MG Response
1	Modelling Approach	3.6	Agree developments & schemes for Ref Case modelling	The Reference Case (with Albion Land) layout for Baynard's Green will be updated. This will be updated to include the correct Albion Land proposal, which only includes 3 lanes on the western circulatory section and a 2-lane exit to the A43 North. Following the planning refusal of the Ablion Land scheme, the next iteration of testing will also include a further Do-Something scenario (DS1), which looks a the impacts on the network with only the proposed OxSRFI development in place (and no Albion Land). Further details on this scenario, along with the composition of all of the other modelled scenarios for clarification can be found in the 'SCENARIOS' tab.	MG to review/update	Resolved - The comparison between RC and DS scenarios without Albion Land is considered appropriate.	
2	Ref Case Scenarios	4.3	Inconsistent parameters for conflict areas	The conflict area parameters for RC2A and RC3A will be updated to 0.5 for the 'mingapblockdef' to be consistent with the other scenarios modelled.	MG to review/update	Accepted - subject to final model review	
3		4.4	Inconsistent give-way parameters at Cherwell	The set up was amended as part of the scenario testing undertaken in 2022, and followed a visual assessment of network operation of the initial Reference Case testing. The original conflict area set-up was considered too rigid for the more congested conditions (which were not as prevalent and severe in the base model). As a result, the use of priority rules was considered a more representative behaviour in congested conditions where there is more 'courtesy' behaviour between vehicles. It should also be noted that no comments were previously raised on the change of use of conflict areas to priority rules at this location, with the associated Reference Case model changes accepted by NH/AECOM in May 2022.	NH/AECOM to agree on response and suggested way forward	OK - Add justification to the report	Changes to give-way behaviour have been detailed in para's 3.3.20 - 3.3.25 in Modelling Impact Assessment Report (MIAR)
4	Do-Something Scenarios	5.2	Inconsistent flare orientation on A43 north of Baynard's Green	Flare orientation as per DS3A to be adopted for all other Do-Something models.	MG to review/update	Accepted - subject to final model review	
5		5.3	Inconsistent relative flows from OxSRFI parking lots	0.1 and 0.9 proportions to be applied to all Do-Something scenarios, based on flows proposed from the Rail Terminal (Entry 1) and the Warehousing (Entry 2). The prospective flow from the development site are presented in the 'DEVELOPMENT FLOWS' tab. It is acknowledged that, as the relative flows applied to the parking lots apply to all vehicle classes, the split of the Light vehicles is slightly different to that anticipated. However, it is also worth noting that this is an internal development junction and a slight difference in the Light vehicle splits is not going to have any impacts on the wider network performance.	NH/AECOM to review and agree on response	OK - Add justification to the report	Details of the relative flow splits have been detailed in para's 3.5.29 - 3.5.31 in the MIAR
6		5.4	Ardley bypass merge - need to be increased?	Modelling Group and ADC to investigate and finalise in due course.	MG/ADC to review/update	Accepted - subject to final model review	
7		5.5, 5.7	Intergreen differences	Intergreen check undertaken in 'INTERGREEN CHECK' tab. Missing pedestrian crossing intergreens to be added within PC MOVA Connection file. To check NH/AECOM suggested values, used JCT Quickgreen software to confirm intergreen calculations (files provided with this response).	NH/AECOM to review and agree on response	The intergreens modelled in Vissim are longer than the values shown in the intergreen matrix because the MOVA connection file is missing the phase delay configuration to prevent intergreens from being extended for all phases by the maximum value. More details in Intergreen check tab	Intergreens have been reviewed and updated. Details of the changes for Padbury can be found in para's 3.5.9 - 3.5.10 and 3.5.21 - 3.5.24 for the Ardley roundabout in the MIAR
8		5.9	Give-way behaviour at Cherwell	There are no prority rules at the Cherwell junction in the Do-Something scenarios. It is not clear if this comment is a hangover from the Reference Case check? As a way forward, a visual assessment in this location will be undertaken to observe if queuing and congestion leads to high instances of unreleased vehicles. If so, then new priority rules will be added, based on the same 'courtesty' behaviour as modelled in the Reference Case.	MG to review/update NH/AECOM to agree on response and suggested way forward	See comment number 3	
9	Forecast Demand Development	6.6	Compare base demands of VISSIM and BTM strategic model	Base 2016 BTM flows to be compared with base 2016 VISSIM flows to understand the differences. This has shown that overall, there is a very good correlation between the two flowsets, with the total numbers of Lights being within 1-2% and the total number of Heavies being within 5-8% across the modelled cordons. Whilst there are naturally some differences in the specific O-D pairs, the majority of these are within a GEH of 5 and only a handful of movements in both peak periods have a GEH over 10. On closer inspection of these O-D pairs, they were found to be only small differences when accounting for the total entry flow on the link, meaning there would not be any significant differences in network operation. There were also a couple of movements where the BTM flows were higher than the VISSIM flows (and had a GEH over 10), but these were considered acceptable as it was the BTM flows that were adopted into the model and would therefore allow a worst case assessment to be undertaken. As a result, the flows taken from the BTM for use in the VISSIM modelling are considered to be of a suitable representation of baseline conditions in 2016 and do not require any further adjustment for use in the VISSIM assessment. Further details of the comparisons can be found in the accompanying '260218 2026 BTM vs VISSIM Flows' spreadsheet, which is provided as part of this response.	NH/AECOM to review and agree on response	Some of the main flow differences between the Vissim Base and Reference Case models are the result of an inconsistency between the Base matrices in BTM and Vissim, and not the result of predicted flow changes in the area (See Demand Analysis tab). These discrepancies between BTM and Vissim base model demand are especially significant at Zones 1/2, 5 and 7, where the current methodology underestimates the growth included in the Vissim models. The opposite happens on the M40 mainline, where the current methodology overestimates the demand. Due to the complex analysis required to determine the impact of these demand changes, AECOM recommends that a sensitivity test is carried out for the worst-case RC and DS scenarios. The demand for this test should be developed by adding the absolute growth predicted by BTM at OD level (Base - RC or Base - DS) to the VIssim base model demand. This will show the impact of the predicted demand changes in BTM, without the discrepancies between base year BTM/ Vissim demand impacting the analysis.	A Sensitiviy Test has been carried out for the 2031 RC1 and DS1 scenarios - full details of the flow calculations, modelling process and subsequent results analysis can be found in the MIAR titled 'MG0163_OxfordSRFI_R_01-A_Final_MIAR-CoreScheme&SensTest' (dated 14th March 2026)'
10		6.7	Include details on differences in flows	The RC1A and RC1 flows have been checked and the results are found in the 'RC1A & RC1 FLOW CHECK' tab. This shows that the differences between RC1A and RC1 are minimal (within 1-2%, as expected). From AECOM's TN (Table 3), the larger difference for the 0830-0845 time period appears to be due to the 0830-0845 time period having the same flow is the same as the 0815-0830 (possibly a duplicate that requires a check and update).	NH/AECOM to review and agree on response	Resolved - The issue is superseded by the new scenario configuration reagrding Albion Land.	
11		6.4	Differences in OxSRFI trips in VISSIM compared to TA	The differences are largely attributed to not all VISSIM flows having reached the proposed development by the end of the peak period (but still currently active and travelling within the network).	NH/AECOM to review and agree on response	The demand for the development zones in the Vissim matrices (Zones 12 and 13) in Scenarios DS 1A and 3A is higher than the proposed development trip generation assumptions set out in the TA	MIAR (para's 3.3.4 - 3.3.5) provide details on proposed development differences. These appear to be linked to Zone 12 in the BTM outputs being labelled as 'OxSRFI South', when it is in fact the continuation of the B430 South (towards Middleton Stoney).

Appendix A

No.	Ref	ID	Comment	Response	Action	NH/AECOM Agreement	Further MG Response
12	RC.4	2.1	B4100 East - new bus stops as part of Albion Land	No information available on likely services, frequencies, timetables etc. It is also noted that even if the stops were included, the impact on the modelled results will be minimal. The number of buses in the peak hours are unlikely to be significant, and impact on traffic will be minimal as buses are stopped in their own dedicated laybys and no on-street.	NH/AECOM to review and agree on response	Resolved	
13	RC.6		Albion Land site access roundabout not in correct place according to background.	The input of the new background drawing with the DWG version of the Albion Land scheme at Baynard's Green indicates that roundabout is in the correct location.	NH/AECOM to review and agree on response	Resolved	
14	RC.8 & RC.20	14.1	Conflict areas removed and priority rules added	See comment no. 3 above			
15	RC.19		Prority rules added and/or amended from base model	Prioruty rule no. 162 added to reduce instances of overlapping vehicles - this was an issue in the initial Reference Case modelling (without any improvements at Baynard's Green), where vehicles would queue back. That level of queuing does not now occur, so priority rule will have a minimal impact on the performance. Changes to priority rule no's 7, 8, 49 & 50 include the addition of headway markers. This was to stop vehicles pulling out unrealistically during times of queuing and congestion (which occured in previous iterations of the Reference Case modelling). As with the PR 162 addition, these additional markers will not significantly impact on the performance as the queuing back travelling northbound on the A43 is not as severe.	NH/AECOM to review and agree on response	Resolved	
16	RC.22		RSA 117 should be included in Reference Case model	The RSA was removed as the nature of the node has changed from priorty to signalised control. This will change driver behaviour and speeds through the circulatory section. The RSAs on the circulatory approach to the signals have been retained to model saturation flows at the stop-lines, so only RSA for turn removed (which is no longer as critical as node is signalised).	NH/AECOM to review and agree on response	Resolved	
17	RC.23		RSAs 138 & 139 to be reverted back to base model	RSA no's 138 & 139 were amended as per AECOM's update to base model in 2023 (M40 Junction 10 - VISSIM Revalidation Addendum Report, dated June 2023). These changes were requested to be considered by NH at the Transport Working Group meeting on 25 March 2025.	NH/AECOM to review and agree on response	Resolved	
18		3.1	Conflict area parameter differences	See comment no. 2 above			
19		10.1	A43 North approach at Baynard's Green - flare orientation different	See comment no. 4 above			
20		11.2	Relative flows difference for Do-Something scenarios	See comment no. 5 above			
21		21.5	Check intergreens at Ardley and Padbury in Do-Something models	See comment no. 7 above			
22		21.8	Vehicles on the A43 southbound through Cherwell Junction often collide and overlap with vehicles queuing to turn from the A43 NB onto the M40 southbound off-slip or into Cherwell Services and vice versa. The priority rules coded on the A43 southbound through Cherwell Junction replicate a yellow box behaviour that is not shown in the design drawings for this junction.	See comment no. 11 above			



Extent of Cordon for Turning Movement Data

Key	
1	A43 North
2	B4100 East
3	Cherwell Services
4	M40 South
5	B430 South
6	M40 North
7	B4100 West
8	Ardley Road West
9	Ardley Road East

Total Growth	Included in Vissim	Predicted by BTM
AM	2484	2506
PM	2063	2285

Growth inc in Vissim

Difference Between Base and RC Vissim models (+ means RC is higher)

AM

	1	2	3	4	5	6	7	8	9	Total
1	0	-3	-10	273	12	-65	-52	-10	29	**174**
2	59	0	-6	-5	8	95	32	0	0	**183**
3	7	-2	0	9	45	43	-2	0	0	**100**
4	276	-1	85	-29	-40	577	-60	14	4	**826**
5	92	4	-12	-26	0	-43	-6	-11	40	**38**
6	-51	168	41	846	-21	-11	13	5	53	**1043**
7	-20	122	-1	-33	-11	-1	-5	0	3	**54**
8	-9	0	-1	-1	-26	-7	-2	0	-8	**-54**
9	-24	-3	-5	-8	114	64	2	-20	0	**120**

PM

	1	2	3	4	5	6	7	8	9	
1	-2	9	33	320	49	-71	19	-7	-4	**346**
2	63	0	-12	-1	-5	142	-18	4	0	**173**
3	1	-2	0	72	-6	59	-8	0	0	**116**
4	358	1	63	-59	-18	729	-52	65	-6	**1081**
5	-221	-1	-16	4	0	-50	-16	-3	24	**-279**
6	-63	85	57	531	20	-11	-26	3	14	**610**
7	5	13	-1	-4	-9	0	-9	0	-3	**-8**
8	0	0	0	0	9	4	0	0	1	**14**
9	-23	0	0	0	-32	72	0	-7	0	**10**

Base Model Discrepancies

Difference Between BTM Base and Vissim Base (+ means BTM is higher)

	1	2	3	4	5	6	7	8	9
1	0	45	-26	-45	40	-65	-17	-9	-1
2	38	0	-6	-4	1	-65	-28	0	0
3	-1	-2	0	-7	3	34	-2	-1	-1
4	89	-3	51	-29	-38	107	-63	0	-1
5	24	-6	-12	-22	0	-59	0	-9	-28
6	-51	93	17	120	-21	-11	14	4	86
7	-27	-5	-1	-54	-10	-1	-5	0	0
8	-6	0	-2	9	-35	-3	-2	0	-26
9	-32	-3	-5	-8	-33	117	-4	-20	0

	1	2	3	4	5	6	7	8	9
1	-2	-18	13	92	1	-71	14	-8	-16
2	-38	0	-12	0	-2	-37	-56	4	-1
3	-11	-2	0	34	-6	34	-8	-1	-1
4	90	-2	29	-59	-25	54	-42	3	-7
5	-119	-1	-11	-17	0	-69	-15	1	-26
6	-63	87	32	30	-2	-11	-24	2	50
7	-21	-46	-1	-17	5	0	-9	-1	8
8	4	0	0	1	4	5	0	0	-7
9	-13	0	-1	-1	-30	139	-1	-28	0

Growth Predicted by BTM

Difference Between BTM base and forecast (+ means there is forecst is higher)

	1	2	3	4	5	6	7	8	9	
1	0	-48	16	318	-28	0	-35	-1	30	**251**
2	21	0	0	-1	7	160	60	0	0	**246**
3	8	0	0	16	42	9	0	1	1	**77**
4	187	2	34	0	-2	470	3	14	5	**714**
5	68	10	0	-4	0	16	-6	-2	68	**151**
6	0	75	24	726	0	0	-1	1	-33	**792**
7	7	127	0	21	-1	0	0	0	3	**158**
8	-3	0	1	-10	9	-4	0	0	18	**10**
9	8	0	0	0	147	-53	6	0	0	**106**

	1	2	3	4	5	6	7	8	9	
1	0	27	20	228	48	0	5	1	12	**341**
2	101	0	0	-1	-3	179	38	0	1	**314**
3	12	0	0	38	0	25	0	1	1	**77**
4	268	3	34	0	7	675	-10	62	1	**1038**
5	-102	0	-5	21	0	19	-1	-4	50	**-23**
6	0	-2	25	501	22	0	-2	1	-36	**510**
7	26	59	0	13	-14	0	0	1	-11	**75**
8	-4	0	0	-1	5	-1	0	0	8	**8**
9	-10	0	1	1	-2	-67	1	21	0	**-56**

Changes in Growth Per Origin due to modelling approach (negative means Vissim underestimates growth/ positive means Vissim overestimates growth)	% of Vissim Base demand
-77	**-4%**
-63	**-12%**
23	**6%**
112	**3%**
-113	**-29%**
251	**8%**
-104	**-20%**
-64	**-39%**
14	**7%**

Changes in Growth Per Origin due to modelling approach (negative means Vissim underestimates growth/ positive means Vissim overestimates growth)	% of Vissim Base demand
5	**0%**
-141	**-20%**
39	**9%**
43	**1%**
-256	**-37%**
100	**3%**
-83	**-22%**
6	**11%**
66	**59%**

MODELLED SCENARIOS & COMPOSITIONS

Element	Additional Details	Scenario							
		2031						2034	
		RC1	RC1A	DS1	DS1A	RC2A	DS2A	RC3A	DS3A
M40 J9 Improvements (demand changes only)								✓	✓
Committed & allocated development traffic	As DfT Circular 01/2022	✓	✓	✓	✓				
	As Cherwell Local Plan					✓	✓	✓	✓
Proposed Albion Land development & site access junctions	Plus Albion Land Baynard's Green mitigation scheme		✓			✓		✓	
Proposed Albion Land development & site access junctions	Plus OxSRFI enhanced Baynard's Green mitigation scheme (Highway Plan Document 2.7X)				✓		✓		✓
Baynard's Green junction improvement	Without Albion Land development (Highway Plan Document 2.7A)			✓					
Padbury junction improvement				✓	✓				✓
Cherwell junction improvement				✓	✓				✓
Ardley junction improvement				✓	✓		✓		✓
OxSRFI site access junction				✓	✓		✓		✓

DEVELOPMENT FLOW - SPLITS TO NORTH AND SOUTH ACCESSES

DS1, DS1A, DS3

	Total Traffic		Rail Terminal		% using Rail Terminal (northern internal access)	
	Lights	HGV	Lights	HGV	Lights	HGV
AM	1000	331	0	35	0.0%	10.6%
PM	1336	300	0	42	0.0%	14.0%
Daily	15730	4920	90	718	0.6%	14.6%

DS2

	Total Traffic		Rail Terminal		% using Rail Terminal (northern internal access)	
	Lights	HGV	Lights	HGV	Lights	HGV
AM	308	102	0	12	0.0%	11.8%
PM	411	93	0	14	0.0%	15.1%
Daily	4902	1524	90	239	1.8%	15.7%

Proposed Relative Flow splits for VISSIM Zone 13

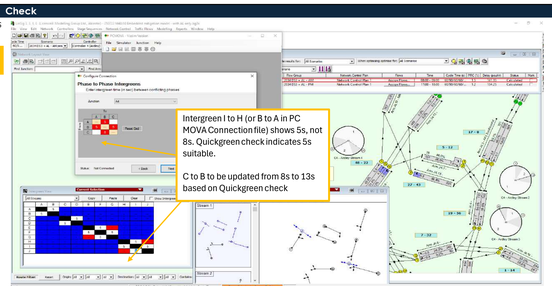
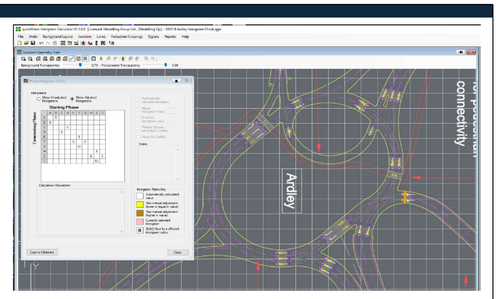
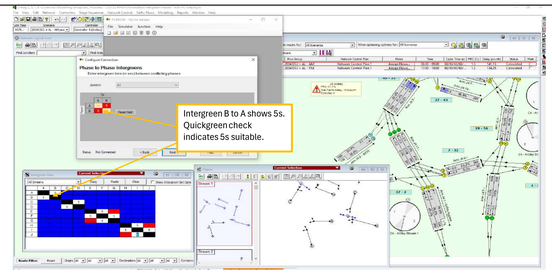
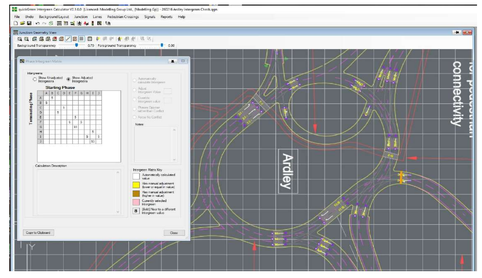
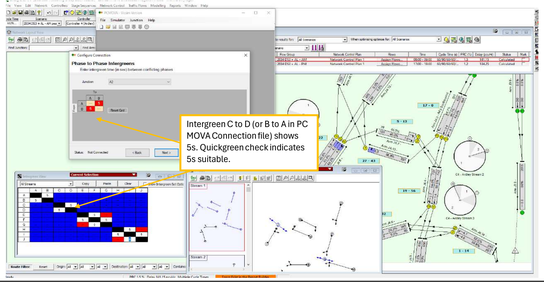
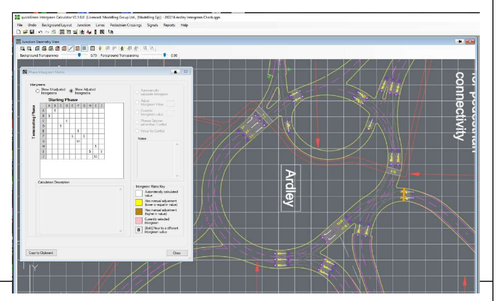
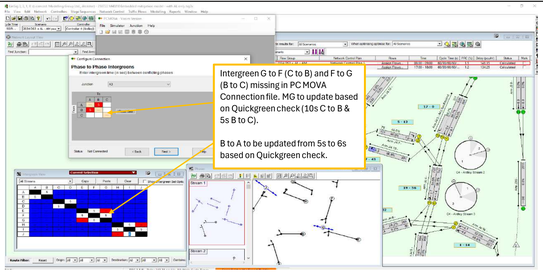
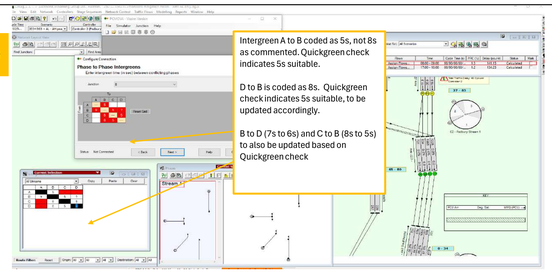
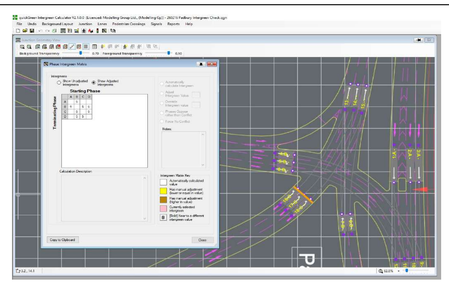
DS1, DS1A, DS3

Northern Access	6.6%	**0.10**
Southern Access	93.4%	**0.90**

DS2

Northern Access	7.4%	**0.10**
Southern Access	92.6%	**0.90**

INTERGREEN CHECKS

Ref	Comment	Check	
5.5	Intergreen from A43 slip to circulatory arm, modelled as 8s but AECOM estimate 6s Code in phase delay from phase A, so the intergree is not extended to 13s		
	Intergreen between B430 bypass northbound and gyratory are 5s, whilst AECOM estimates they should be 6s		
	Intergreen between A43 southbound and gyratory are 5s, whilst AECOM estimates they should be 6s		
	Pedestrian stage between at Eastern circulatory has 3s intergreen from traffic and 5s intergreen from pedestrian to traffic		
	Intergreens from A to B and D to B coded as 8s, but AECOM estimate these to be 6s Code in phase delays in the MOVA configuration file - otherwise intergreens from A to B and D to B in Vissim get extended to the maximum value (8s)		

REFERENCE CASE FLOW CHECKS - RC1A & RC1

Demand Comparisons - excluding Albion Land development (Zones 10 & 11)

Peak Period	Time Interval	Lights		Diff.	
		RC1A	RC1	No.	%
AM	0745-0800	3177	3193	16	1%
	0800-0815	3032	3048	15	1%
	0815-0830	2776	2790	14	1%
	0830-0845	2613	2627	13	1%
PM	1630-1645	3098	3135	37	1%
	1645-1700	3161	3199	37	1%
	1700-1715	3081	3117	37	1%
	1715-1730	3219	3258	38	1%

Peak Period	Time Interval	Heavies		Diff.	
		RC1A	RC1	No.	%
AM	0745-0800	408	409	1	0%
	0800-0815	381	382	1	0%
	0815-0830	399	400	1	0%
	0830-0845	343	344	1	0%
PM	1630-1645	318	324	6	2%
	1645-1700	293	299	6	2%
	1700-1715	312	318	6	2%
	1715-1730	267	272	5	2%

Table 3 Demand Comparison excluding Albion Land Development - RC1A and RC1

Peak Period	Time Interval	Demand		
		RC1A LV	RC1 LV	Difference
AM	07:45-08:00	3177	3193	-16
	08:00-08:15	3031	3047	-16
	08:15-08:30	2777	2787	-10
	08:30-08:45	2777	2625	152
PM	16:30-16:45	3101	3136	-35
	16:45-17:00	3161	3199	-38
	17:00-17:15	3080	3117	-37
	17:15-17:30	3222	3256	-34

APPENDIX D:

2031 & 2034 FLOW CALCS

2031 RC1 CALCULATIONS - AM PEAK

STEP 1 - FLOWS FROM BTM

Lights

AM PEAK	1	2	3	4	5	6	7	8	9	Total
1	0	227	60	1070	331	0	14	1	35	1738
2	233	0	0	2	13	185	254	0	0	687
3	51	0	0	157	73	104	0	0	0	385
4	938	2	208	0	2	2608	7	14	5	3784
5	193	13	0	0	0	93	17	18	90	424
6	0	285	128	3005	139	0	30	11	57	3655
7	73	389	0	112	0	0	0	0	2	577
8	5	1	0	2	41	10	0	0	43	102
9	10	0	4	0	59	117	8	13	0	306
Total	1503	916	396	4347	759	3117	330	58	232	11657

HGVs

	1	2	3	4	5	6	7	8	9	Total
1	0	0	2	240	5	0	0	0	0	247
2	39	0	0	0	0	0	12	0	0	28
3	12	0	0	0	96	0	45	0	0	153
4	137	0	16	0	0	352	0	0	0	505
5	0	0	0	1	0	1	0	0	0	2
6	0	16	59	546	0	0	0	0	0	621
7	0	7	0	0	0	0	0	0	0	7
8	0	0	0	0	0	8	0	0	0	8
9	0	0	0	0	0	4	0	0	0	4
Total	186	23	77	843	17	397	12	0	0	1535

Total

	1	2	3	4	5	6	7	8	9	Total
1	0	227	62	1310	336	0	14	1	35	1985
2	249	0	0	2	13	185	266	0	0	715
3	63	0	0	213	73	148	0	0	0	498
4	1075	2	224	0	2	2960	7	14	5	4289
5	193	13	0	1	0	94	17	18	90	426
6	0	301	186	3550	139	0	30	11	57	4276
7	73	397	0	112	0	0	0	0	2	584
8	5	1	0	2	49	10	0	0	43	110
9	10	0	4	0	63	117	8	13	0	310
Total	1668	939	473	5190	776	3514	342	58	232	13192

STEP 2 - CONVERT TO 15 MIN MATRICES USING 2016 BASE PROPORTIONS

LIGHTS

Time Period	Total	Overall Total	Proportion
0645-0700	2121	9302	23%
0700-0715	2217	9302	24%
0715-0730	2383	9302	26%
0730-0745	2271	9302	24%
			97%

HEAVIES

Time Period	Total	Overall Total	Proportion
0645-0700	451	1397	32%
0700-0715	406	1397	29%
0715-0730	418	1397	30%
0730-0745	377	1397	27%
			118%

LIGHTS

Time Period	Total	Overall Total	Proportion
0745-0800	2548	9302	27%
0800-0815	2432	9302	26%
0815-0830	2226	9302	24%
0830-0845	2096	9302	23%
			100%

HEAVIES

Time Period	Total	Overall Total	Proportion
0745-0800	372	1397	27%
0800-0815	348	1397	25%
0815-0830	364	1397	26%
0830-0845	313	1397	22%
			100%

LIGHTS

Time Period	Total	Overall Total	Proportion
0845-0900	1978	9302	21%
0900-0915	1825	9302	20%
			41%

Used peak total to determine proportions for warm-up and cool down periods

HEAVIES

Time Period	Total	Overall Total	Proportion
0845-0900	345	1397	25%
0900-0915	345	1397	25%
			49%

Used peak total to determine proportions for cool down period

LIGHTS

0645-0700

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	52	14	244	76	0	3	0	8	396
2	53	0	0	0	3	42	58	0	0	157
3	12	0	0	36	17	24	0	0	0	88
4	214	0	47	0	0	595	2	3	1	863
5	44	3	0	0	0	21	4	4	21	97
6	0	65	29	685	32	0	7	3	13	833
7	17	89	0	25	0	0	0	0	0	131
8	1	0	0	0	9	2	0	0	10	23
9	2	0	0	0	36	27	2	3	0	79
TOTAL	343	209	90	991	173	711	75	13	53	2658

0700-0715

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	54	14	255	79	0	3	0	8	414
2	56	0	0	0	3	44	60	0	0	164
3	12	0	0	38	17	25	0	0	0	92
4	223	1	50	0	0	622	2	3	1	902
5	46	3	0	0	0	22	4	4	21	101
6	0	68	30	716	33	0	7	3	14	871
7	17	93	0	27	0	0	0	0	1	137
8	1	0	0	0	10	2	0	0	10	24
9	2	0	0	0	38	28	2	3	0	73
TOTAL	358	218	94	1036	181	743	79	14	55	2778

0715-0730

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	58	15	274	85	0	4	0	9	445
2	60	0	0	0	3	47	65	0	0	176
3	13	0	0	40	19	27	0	0	0	99
4	240	1	53	0	1	668	2	4	1	969
5	50	3	0	0	0	24	4	5	23	109
6	0	73	33	770	36	0	8	3	15	936
7	19	100	0	29	0	0	0	1	146	
8	1	0	0	1	11	3	0	0	11	26
9	2	0	0	0	41	30	2	3	0	78
TOTAL	385	235	101	1114	194	799	85	15	59	2986

0730-0745

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	55	15	261	81	0	3	0	8	424
2	57	0	0	0	3	45	62	0	0	168
3	12	0	0	38	18	25	0	0	0	94
4	229	1	51	0	0	637	2	3	1	924
5	47	3	0	0	0	23	4	4	22	104
6	0	79	31	734	34	0	7	3	14	902
7	18	95	0	27	0	0	0	0	1	141
8	1	0	0	0	10	3	0	0	10	26
9	2	0	0	0	39	29	2	3	0	75
TOTAL	367	224	97	1061	185	791	81	14	57	2846

11268

0745-0800

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	62	16	293	95	0	4	0	10	476
2	64	0	0	0	4	51	69	0	0	188
3	13	0	0	43	20	28	0	0	0	105
4	257	1	57	0	1	714	2	4	1	1036
5	53	3	0	0	0	25	5	5	25	116
6	0	78	35	823	38	0	8	3	16	1001
7	20	107	0	31	0	0	0	0	1	158
8	1	0	0	1	11	3	0	0	12	28
9	3	0	0	0	43	32	2	3	0	84
TOTAL	412	251	108	1191	208	854	90	16	63	3193

0800-0815

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	59	16	280	87	0	4	0	9	454
2	61	0	0	0	3	46	66	0	0	180
3	13	0	0	41	19	27	0	0	0	101
4	245	1	54	0	1	682	2	4	1	989
5	51	3	0	0	0	24	4	5	24	111
6	0	74	33	786	36	0	8	3	15	956
7	19	102	0	29	0	0	0	0	1	151
8	1	0	0	1	11	3	0	0	11	27
9	3	0	0	0	41	31	2	3	0	80
TOTAL	393	239	104	1136	198	815	86	15	61	3048

0815-0830

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	54	14	256	79	0	3	0	8	416
2	56	0	0	0	3	44	61	0	0	164
3	12	0	0	38	18	25	0	0	0	92
4	224	1	50	0	0	624	2	3	1	906
5	46	3	0	0	0	22	4	4	22	102
6	0	68	31	719	33	0	7	3	14	875
7	18	93	0	27	0	0	0	0	1	138
8	1	0	0	0	10	2	0	0	10	24
9	2	0	0	0	38	28	2	3	0	73
TOTAL	360	219	95	1040	182	746	79	14	55	2790

0830-0845

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	51	14	241	75	0	3	0	8	392
2	53	0	0	0	3	42	57	0	0	155
3	11	0	0	35	16	23	0	0	0	87
4	211	0	47	0	0	588	2	3	1	853
5	44	3	0	0	0	21	4	4	20	96
6	0	64	29	677	31	0	7	3	13	824
7	17	88	0	25	0	0	0	0	0	130
8	1	0	0	0	9	2	0	0	10	23
9	2	0	0	0	36	26	2	3	0	69
TOTAL	339	206	89	979	171	702	74	13	52	2627

11657 Y

0845-0900

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	48	13	227	70	0	3	0	7	369
2	50	0	0	0	3	39	54	0	0	146
3	11	0	0	33	16	22	0	0	0	82
4	199	0	44	0	0	555	2	3	1	805
5	41	3	0	0	0	20	4	4	19	90
6	0	61	27	639	30	0	6	2	12	777
7	16	83	0	24	0	0	0	0	0	123
8	1	0	0	0	9	2	0	0	9	22
9	2	0	0	0	34	25	2	3	0	65
TOTAL	319	195	84	924	161	663	70	12	49	2479

0900-0915

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	44	12	210	65	0	3	0	7	341
2	46	0	0	0	3	36	50	0	0	135
3	10	0	0	0	14	20	0	0	0	75
4	184	0	41	0	0	512	1	3	1	742
5	38	2	0	0	0	18	3	4	18	83
6	0	56	25	589	27	0	6	2	11	717
7	14	76	0	22	0	0	0	0	0	113
8	1	0	0	0	8	2	0	0	8	20
9	2	0	0	0	31	23	2	2	0	60
TOTAL	295	180	78	853	149	612	65	11	45	2287

4766

HEAVIES

0645-0700

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	0	1	78	2	0	0	0	0	80
2	5	0	0	0	0	0	4	0	0	9
3	4	0	0	18	0	14	0	0	0	36
4	44	0	5	0	0	114	0	0	0	163
5	0	0	0	0	0	0	0	0	0	1
6	0	5	19	176	0	0	0	0	0	200
7	0	2	0	0	0	0	0	0	0	2
8	0	0	0	0	3	0	0	0	0	3
9	0	0	0	0	1	0	0	0	0	1
TOTAL	53	8	25	272	5	128	4	0	0	496

0700-0715

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	0	1	70	1	0	0	0	0	72
2	5	0	0	0	0	0	4	0	0	8
3	4	0	0	16	0	13	0	0	0	33
4	40	0	5	0	0	102	0	0	0	147
5	0	0	0	0	0	0	0	0	0	1
6	0	5	17	159	0	0	0	0	0	180
7	0	2	0	0	0	0	0	0	0	2
8	0	0	0	0	2	0	0	0	0	2
9	0	0	0	0	1	0	0	0	0	1
TOTAL	48	7	22	245	5	115	4	0	0	446

0715-0730

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	0	1	72	1	0	0	0	0	74
2	5	0	0	0	0	0	4	0	0	8
3	4	0	0	17	0	13	0	0	0	34
4	41	0	5	0	0	105	0	0	0	151
5	0	0	0	0	0	0	0	0	0	1
6	0	5	18	163	0	0	0	0	0	186
7	0	2	0	0	0	0	0	0	0	2
8	0	0	0	0	2	0	0	0	0	2
9	0	0	0	0	1	0	0	0	0	1
TOTAL	50	7	23	252	5	119	4	0	0	459

0730-0745

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	0	1	65	1	0	0	0	0	67
2	4	0	0	0	0	0	3	0	0	8
3	3	0	0	15	0	12	0	0	0	30
4	37	0	4	0	0	99	0	0	0	136
5	0	0	0	0	0	0	0	0	0	1
6	0	4	16	147	0	0	0	0	0	167
7	0	2	0	0	0	0	0	0	0	2
8	0	0	0	0	2	0	0	0	0	2
9	0	0	0	0	1	0	0	0	0	1
TOTAL	45	6	21	227	5	107	3	0	0	414

1815

0745-0800

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	0	1	64	1	0	0	0	0	66
2	4	0	0	0	0	0	3	0	0	8
3	3	0	0	15	0	12	0	0	0	30
4	37	0	4	0	0	94	0	0	0	134
5	0	0	0	0	0	0	0	0	0	1
6	0	4	16	145	0	0	0	0	0	165
7	0	2	0	0	0	0	0	0	0	2
8	0	0	0	0	2	0	0	0	0	2
9	0	0	0	0	1	0	0	0	0	1
TOTAL	44	6	21	224	4	106	3	0	0	409

0800-0815

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	0	1	60	1	0	0	0	0	62
2	4	0	0	0	0	0	3	0	0	7
3	3	0	0	14	0	11	0	0	0	28
4	34	0	4	0	0	86	0	0	0	126
5	0	0	0	0	0	0	0	0	0	1
6	0	4	15	136	0	0	0	0	0	155
7	0	2	0	0	0	0	0	0	0	2
8	0	0	0	0	2	0	0	0	0	2
9	0	0	0	0	1	0	0	0	0	1
TOTAL	41	6	19	210	4	99	3	0	0	382

0815-0830

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	0	1	63	1	0	0	0	0	64
2	4	0	0	0	0	0	3	0	0	7
3	3	0	0	15	0	12	0	0	0	29
4	36	0	4	0	0	92	0	0	0	132
5	0	0	0	0	0	0	0	0	0	1
6	0	4	15	142	0	0	0	0	0	162
7	0	2	0	0	0	0	0	0	0	2
8	0	0	0	0	2	0	0	0	0	2
9	0	0	0	0	1	0	0	0	0	1
TOTAL	43	6	20	220	4	103	3	0	0	400

0830-0845

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	0	0	54	1	0	0	0	0	55
2	4	0	0	0	0	0	3	0	0	6
3	3	0	0	12	0	10	0	0	0	25
4	31	0	4	0	0	79	0	0	0	113
5	0	0	0	0	0	0	0	0	0	0
6	0	4	13	122	0	0	0	0	0	139
7	0	2	0	0	0	0	0	0	0	2
8	0	0	0	0	2	0	0	0	0	2
9	0	0	0	0	1	0	0	0	0	1
TOTAL	37	5	17	189	4	89	3	0	0	344

1535 Y

0845-0900

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	0	1	59	1	0	0	0	0	61
2	4	0	0	0	0	3	0	0	0	7
3	3	0	0	14	0	11	0	0	0	28
4	34	0	4	0	0	87	0	0	0	125
5	0	0	0	0	0	0	0	0	0	1
6	0	4	15	135	0	0	0	0	0	153
7	0	2	0	0	0	0	0	0	0	2
8	0	0	0	0	2	0	0	0	0	2
9	0	0	0	0	1	0	0	0	0	1
TOTAL	41	6	19	208	4	98	3	0	0	379

0900-0915

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	0	1	59	1	0	0	0	0	61
2	4	0	0	0	0	3	0	0	0	7
3	3	0	0	14	0	11	0	0	0	28
4	34	0	4	0	0	87	0	0	0	125
5	0	0	0	0	0	0	0	0	0	1
6	0	4	15	135	0	0	0	0	0	153
7	0	2	0	0	0	0	0	0	0	2
8	0	0	0	0	2	0	0	0	0	2
9	0	0	0	0	1	0	0	0	0	1
TOTAL	41	6	19	208	4	98	3	0	0	379

756

2031 RC1 CALCULATIONS - PM PEAK

STEP 1 - FLOWS FROM BTM

Lights

AM PEAK	1	2	3	4	5	6	7	8	9	Total
1	0	257	105	1126	146	0	68	3	20	1726
2	394	0	0	4	5	220	261	4	0	879
3	74	0	0	213	0	140	0	0	0	427
4	1409	3	169	0	9	3559	1	67	0	5218
5	140	3	0	0	0	119	0	71	61	394
6	0	169	143	3044	100	0	0	15	41	3512
7	62	247	0	50	1	0	0	0	0	360
8	8	0	0	2	31	9	0	0	24	73
9	0	0	0	0	0	8	93	0	31	132
Total	2077	678	416	4440	301	4130	330	592	146	12708

HGVs

	1	2	3	4	5	6	7	8	9	Total
1	0	10	2	99	0	0	0	0	0	110
2	0	0	0	0	0	4	0	0	0	5
3	13	0	0	0	48	0	38	0	0	99
4	128	0	45	0	0	419	0	0	0	592
5	0	0	0	22	0	0	1	0	0	23
6	0	0	52	327	0	0	0	0	0	379
7	0	5	0	0	0	0	0	0	0	5
8	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0
Total	141	15	99	495	0	462	0	1	0	1213

Total

	1	2	3	4	5	6	7	8	9	Total
1	0	266	107	1225	146	0	68	3	20	1836
2	394	0	0	4	5	224	261	4	0	883
3	87	0	0	213	0	179	0	0	0	527
4	1537	3	214	0	9	3978	1	67	0	5810
5	140	3	0	22	0	119	0	72	61	417
6	0	169	195	3371	100	0	0	15	41	3890
7	62	252	0	50	1	0	0	0	0	365
8	8	0	0	2	31	9	0	0	24	73
9	0	0	0	0	0	8	93	0	31	132
Total	2218	692	555	4835	301	4491	330	593	146	13921

STEP 2 - CONVERT TO 15 MIN MATRICES USING 2016 BASE PROPORTIONS

LIGHTS

Time Period	Total	Overall Total	Proportion
1530-1545	2300	10763	21%
1545-1600	2375	10763	22%
1600-1615	2515	10763	23%
1615-1630	2578	10763	24%
			91%

HEAVIES

Time Period	Total	Overall Total	Proportion
1530-1545	387	1092	35%
1545-1600	370	1092	34%
1600-1615	326	1092	30%
1615-1630	302	1092	28%
			127%

LIGHTS

Time Period	Total	Overall Total	Proportion
1630-1645	2655	10763	25%
1645-1700	2709	10763	25%
1700-1715	2640	10763	25%
1715-1730	2759	10763	26%
			100%

HEAVIES

Time Period	Total	Overall Total	Proportion
1630-1645	292	1092	27%
1645-1700	269	1092	25%
1700-1715	286	1092	26%
1715-1730	245	1092	22%
			100%

LIGHTS

Time Period	Total	Overall Total	Proportion
1730-1745	2662	10763	25%
1745-1800	2520	10763	23%
			48%

Used peak total to determine proportions for cool down period

HEAVIES

Time Period	Total	Overall Total	Proportion
1730-1745	243	1092	22%
1745-1800	247	1092	23%
			45%

Used peak total to determine proportions for cool down period

LIGHTS

1530-1545

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	55	22	241	31	0	14	1	4	369
2	82	0	0	1	1	47	56	1	0	188
3	16	0	0	46	0	30	0	0	0	91
4	301	1	36	0	2	760	0	14	0	1114
5	30	1	0	0	0	25	0	15	13	84
6	0	36	30	651	21	0	0	3	9	750
7	13	53	0	11	0	0	0	0	0	77
8	2	0	0	0	7	2	0	0	5	16
9	0	0	0	0	0	18	0	7	0	26
TOTAL	444	145	89	949	64	882	70	41	31	2716

1545-1600

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	57	23	249	32	0	15	1	4	381
2	85	0	0	1	1	49	58	1	0	194
3	16	0	0	47	0	31	0	0	0	94
4	311	1	37	0	2	785	0	15	0	1151
5	31	1	0	0	0	26	0	16	13	87
6	0	37	31	672	22	0	0	3	9	775
7	14	55	0	11	0	0	0	0	0	79
8	2	0	0	0	7	2	0	0	5	16
9	0	0	0	0	2	18	0	7	0	27
TOTAL	458	149	92	980	66	911	73	42	32	2804

1600-1615

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	60	25	263	34	0	16	1	5	403
2	90	0	0	1	1	51	61	1	0	205
3	17	0	0	50	0	33	0	0	0	100
4	329	1	39	0	2	832	0	16	0	1219
5	33	1	0	0	0	28	0	17	14	92
6	0	39	33	711	23	0	0	4	10	821
7	14	58	0	12	0	0	0	0	0	84
8	2	0	0	0	7	2	0	0	6	17
9	0	0	0	0	2	19	0	7	0	28
TOTAL	485	158	97	1037	70	965	77	45	34	2969

1615-1630

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	61	25	270	35	0	16	1	5	413
2	92	0	0	1	1	53	62	1	0	210
3	18	0	0	51	0	34	0	0	0	102
4	337	1	40	0	2	852	0	16	0	1249
5	34	1	0	0	0	29	0	17	15	94
6	0	40	34	729	24	0	0	4	10	841
7	15	59	0	12	0	0	0	0	0	86
8	2	0	0	0	8	2	0	0	6	17
9	0	0	0	0	0	2	20	0	7	29
TOTAL	497	162	100	1063	72	989	79	40	35	3044	11533

1630-1645

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	63	26	278	36	0	17	1	5	426
2	95	0	0	1	1	54	64	1	0	217
3	18	0	0	53	0	35	0	0	0	106
4	348	1	42	0	2	878	0	17	0	1287
5	35	1	0	0	0	29	0	17	15	97
6	0	42	35	751	25	0	0	4	10	866
7	15	61	0	12	0	0	0	0	0	89
8	2	0	0	0	8	2	0	0	6	18
9	0	0	0	0	2	20	0	8	0	30
TOTAL	512	167	103	1095	74	1019	81	47	36	3135

1645-1700

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	65	26	284	37	0	17	1	5	434
2	97	0	0	1	1	55	66	1	0	221
3	19	0	0	54	0	35	0	0	0	108
4	355	1	42	0	2	896	0	17	0	1313
5	35	1	0	0	0	30	0	18	15	99
6	0	42	36	766	25	0	0	4	10	884
7	16	62	0	13	0	0	0	0	0	91
8	2	0	0	0	8	2	0	0	6	18
9	0	0	0	0	2	21	0	8	0	31
TOTAL	523	171	105	1117	76	1039	83	48	37	3199

1700-1715

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	63	26	276	36	0	17	1	5	423
2	94	0	0	1	1	54	64	1	0	216
3	18	0	0	52	0	34	0	0	0	105
4	346	1	41	0	2	873	0	17	0	1279
5	34	1	0	0	0	29	0	17	15	97
6	0	41	35	747	25	0	0	4	10	861
7	15	61	0	12	0	0	0	0	0	88
8	2	0	0	0	8	2	0	0	6	18
9	0	0	0	0	2	20	0	8	0	30
TOTAL	509	166	102	1089	74	1013	81	47	36	3117

1715-1730

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	66	27	289	37	0	17	1	5	442
2	98	0	0	1	1	56	67	1	0	225
3	19	0	0	55	0	36	0	0	0	110
4	361	1	43	0	2	912	0	17	0	1337
5	36	1	0	0	0	31	0	18	16	101
6	0	43	37	780	26	0	0	4	11	900
7	16	63	0	13	0	0	0	0	0	92
8	2	0	0	0	8	2	0	0	6	19
9	0	0	0	0	2	21	0	8	0	31
TOTAL	532	174	107	1138	77	1059	84	49	38	3258	12708	Y

1730-1745

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	63	26	279	36	0	17	1	5	427
2	95	0	0	1	1	54	65	1	0	217
3	18	0	0	53	0	35	0	0	0	106
4	348	1	42	0	2	880	0	17	0	1290
5	35	1	0	0	0	30	0	18	15	97
6	0	42	35	753	25	0	0	4	10	868
7	15	61	0	12	0	0	0	0	0	89
8	2	0	0	0	8	2	0	0	6	18
9	0	0	0	0	2	20	0	8	0	30
TOTAL	514	168	103	1098	74	1021	81	47	36	3143

1745-1800

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	60	25	264	34	0	16	1	5	404
2	90	0	0	1	1	52	61	1	0	206
3	17	0	0	50	0	33	0	0	0	100
4	330	1	39	0	2	833	0	16	0	1221
5	33	1	0	0	0	29	0	17	14	92
6	0	39	33	713	23	0	0	4	10	822
7	14	58	0	12	0	0	0	0	0	84
8	2	0	0	0	7	2	0	0	6	17
9	0	0	0	0	2	19	0	7	0	28
TOTAL	486	159	97	1040	70	967	77	45	34	2975

6118

HEAVIES

1530-1545

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	3	1	35	0	0	0	0	0	39
2	0	0	0	0	0	2	0	0	0	2
3	5	0	0	17	0	14	0	0	0	35
4	45	0	16	0	0	149	0	0	0	210
5	0	0	0	8	0	0	0	0	0	8
6	0	0	16	116	0	0	0	0	0	134
7	0	2	0	0	0	0	0	0	0	2
8	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0
TOTAL	50	5	35	176	0	164	0	0	0	430

1545-1600

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	3	1	33	0	0	0	0	0	37
2	0	0	0	0	0	1	0	0	0	2
3	4	0	0	16	0	13	0	0	0	34
4	43	0	15	0	0	142	0	0	0	200
5	0	0	0	7	0	0	0	0	0	8
6	0	0	16	111	0	0	0	0	0	128
7	0	2	0	0	0	0	0	0	0	2
8	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0
TOTAL	48	5	33	168	0	156	0	0	0	411

1600-1615

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	3	0	29	0	0	0	0	0	33
2	0	0	0	0	0	1	0	0	0	1
3	0	0	0	14	0	11	0	0	0	30
4	38	0	14	0	0	125	0	0	0	177
5	0	0	0	6	0	0	0	0	0	7
6	0	0	16	96	0	0	0	0	0	113
7	0	2	0	0	0	0	0	0	0	2
8	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0
TOTAL	42	4	30	148	0	138	0	0	0	362

1615-1630

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	3	0	27	0	0	0	0	0	30
2	0	0	0	0	0	1	0	0	0	1
3	4	0	0	13	0	11	0	0	0	27
4	35	0	13	0	0	116	0	0	0	164
5	0	0	0	6	0	0	0	0	0	6
6	0	0	14	90	0	0	0	0	0	105
7	0	1	0	0	0	0	0	0	0	1
8	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0
TOTAL	39	4	27	137	0	128	0	0	0	335	1538

1630-1645

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	3	0	26	0	0	0	0	0	29
2	0	0	0	0	0	1	0	0	0	1
3	4	0	0	13	0	10	0	0	0	27
4	34	0	12	0	0	112	0	0	0	158
5	0	0	0	6	0	0	0	0	0	6
6	0	0	14	87	0	0	0	0	0	101
7	0	1	0	0	0	0	0	0	0	1
8	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0
TOTAL	38	4	26	132	0	124	0	0	0	324

1645-1700

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	2	0	24	0	0	0	0	0	27
2	0	0	0	0	0	1	0	0	0	1
3	3	0	0	12	0	9	0	0	0	24
4	31	0	11	0	0	103	0	0	0	146
5	0	0	0	5	0	0	0	0	0	6
6	0	0	13	80	0	0	0	0	0	93
7	0	1	0	0	0	0	0	0	0	1
8	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0
TOTAL	35	4	24	122	0	114	0	0	0	299

1700-1715

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	3	0	26	0	0	0	0	0	29
2	0	0	0	0	0	1	0	0	0	1
3	3	0	0	12	0	10	0	0	0	26
4	33	0	12	0	0	110	0	0	0	155
5	0	0	0	6	0	0	0	0	0	6
6	0	0	14	86	0	0	0	0	0	99
7	0	1	0	0	0	0	0	0	0	1
8	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0
TOTAL	37	4	26	130	0	121	0	0	0	318

1715-1730

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	2	0	22	0	0	0	0	0	25
2	0	0	0	0	0	1	0	0	0	1
3	3	0	0	11	0	9	0	0	0	24
4	29	0	10	0	0	94	0	0	0	133
5	0	0	0	5	0	0	0	0	0	5
6	0	0	12	73	0	0	0	0	0	85
7	0	1	0	0	0	0	0	0	0	1
8	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0
TOTAL	32	3	22	111	0	104	0	0	0	272	1213	Y

1730-1745

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	2	0	22	0	0	0	0	0	24
2	0	0	0	0	0	1	0	0	0	1
3	3	0	0	11	0	9	0	0	0	22
4	28	0	10	0	0	93	0	0	0	132
5	0	0	0	5	0	0	0	0	0	5
6	0	0	12	73	0	0	0	0	0	84
7	0	1	0	0	0	0	0	0	0	1
8	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0
TOTAL	31	3	22	110	0	103	0	0	0	270

1745-1800

	1	2	3	4	5	6	7	8	9	TOTAL
1	0	2	0	22	0	0	0	0	0	25
2	0	0	0	0	0	1	0	0	0	1
3	3	0	0	11	0	9	0	0	0	22
4	29	0	10	0	0	95	0	0	0	134
5	0	0	0	5	0	0	0	0	0	5
6	0	0	12	74	0	0	0	0	0	86
7	0	1	0	0	0	0	0	0	0	1
8	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0
TOTAL	32	3	22	112	0	104	0	0	0	274

544

2031 RCL4 CALCULATIONS - AM PEAK

TRIPS BY ORIGIN AND DESTINATION

ORIGIN	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	2649	466	1099	4109	0	23	2	4.5	171	14	8487
2	2981	0	0	0	0	1178	0	484	0	41	28	4682
3	511	0	0	0	162	79	1154	0	0	0	0	1905
4	958	0	0	0	0	0	2458	0	14	0	1.5	3431
5	1161	11	0	0	0	0	96	0	34	89	2.5	1393
6	0	2196	1078	3890	1.5	0	23	11	56	16	0	7277
7	42	2196	0	47	0	0	0	0	0	27	12	2324
8	1.5	0	0	0	0	0	0	0	0	0	0	1.5
9	1.5	0	0	0	0	0	1.5	0	0	0	0	3
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
Total	5616	7052	1544	5036	4272	1257	3755	497	109	344	58	29520

ORIGIN	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	0	0	0	2.5	0	0	0	0	0	0	2.5
2	1.5	0	0	0	0	0	0	0	0	0	0	1.5
3	1.5	0	0	0	0	0	0	0	0	0	0	1.5
4	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	1.5	0	1.5	0	0	0	0	3
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
Total	3	0	0	0	4	0	1.5	0	0	0	0	8.5

ORIGIN	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	454	69	1626	636	0	14	2	4.5	97	10	2906
2	2981	0	0	0	0	178	144	0	0	40	28	3372
3	69	0	0	0	207	79	148	0	0	0	0	503
4	1067	1	216	0	0	2967	0	14	0	29	19	4313
5	1161	11	0	1	0	96	0	34	89	13	0	1413
6	0	2196	1078	3890	1626	178	0	25	51	16	25	9085
7	42	2196	0	47	0	0	0	0	0	27	12	2324
8	1.5	0	0	0	0	0	0	0	0	0	0	1.5
9	1.5	0	0	0	0	0	1.5	0	0	0	0	3
10	24	23	0	14	6	4	0	0	4	0	0	417
11	0	0	0	0	0	0	0	0	0	0	0	0
Total	5812	9911	4727	5178	4333	3513	2954	93	2584	2253	113	135585

STEP 2 - CONVERT TO DA PEAK HOUR TRIP PROPORTIONS USING 2011 AM BASE PROPORTIONS

LIGHTS

Time Period	Total	Choice (Total)	Proportion
0645-0700	2125	9362	23%
0700-0715	2212	9362	24%
0715-0730	2360	9362	25%
0730-0745	2671	9362	29%
			97%

HEAVIES

Time Period	Total	Choice (Total)	Proportion
0645-0700	451	1397	32%
0700-0715	499	1397	36%
0715-0730	414	1397	30%
0730-0745	377	1397	27%
			125%

LIGHTS

Time Period	Total	Choice (Total)	Proportion
0745-0800	2548	9362	27%
0800-0815	2432	9362	26%
0815-0830	2236	9362	24%
0830-0845	2096	9362	22%
			100%

HEAVIES

Time Period	Total	Choice (Total)	Proportion
0745-0800	372	1397	27%
0800-0815	348	1397	25%
0815-0830	363	1397	26%
0830-0845	313	1397	22%
			100%

LIGHTS

Time Period	Total	Choice (Total)	Proportion
0845-0900	1976	9362	21%
0900-0915	1639	9362	18%
			40%

Used peak total to determine proport ions for we re up and cost down periods

HEAVIES

Time Period	Total	Choice (Total)	Proportion
0845-0900	344	1397	25%
0900-0915	343	1397	25%
			49%

Used peak total to defer mine proportions for cost down period

LIGHTS

0645-0700

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	462	14	1099	98	0	9	0	10	12	6	1711
2	49	0	0	0	0	41	49	0	0	0	0	139
3	12	0	0	0	39	19	24	0	0	0	0	93
4	19	0	0	0	0	0	37	0	0	0	0	56
5	39	1	0	0	0	0	23	0	0	0	0	63
6	0	49	26	756	26	0	0	0	5	11	4	2	839
7	14	73	0	0	11	0	0	0	3	14	2	2	120
8	1	0	0	0	0	0	0	0	0	0	0	0	1
9	1	0	0	0	0	0	0	0	0	0	0	0	1
10	1	0	0	0	0	0	0	0	0	0	0	0	1
11	1	0	0	0	0	0	0	0	0	0	0	0	1
TOTAL	136	585	40	1855	174	60	142	0	18	37	12	3059

0700-0715

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	99	14	240	102	0	10	0	10	12	7	494
2	49	0	0	0	0	41	49	0	0	0	0	139
3	12	0	0	0	39	19	24	0	0	0	0	93
4	19	0	0	0	0	0	37	0	0	0	0	56
5	39	1	0	0	0	0	23	0	0	0	0	63
6	0	49	26	756	26	0	0	0	5	11	4	2	839
7	14	73	0	0	11	0	0	0	3	14	2	2	120
8	1	0	0	0	0	0	0	0	0	0	0	0	1
9	1	0	0	0	0	0	0	0	0	0	0	0	1
10	1	0	0	0	0	0	0	0	0	0	0	0	1
11	1	0	0	0	0	0	0	0	0	0	0	0	1
TOTAL	139	226	41	1027	188	742	69	24	43	39	13	2443

0715-0730

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	104	16	248	110	0	10	0	11	13	7	519
2	52	0	0	0	0	2	49	52	0	0	0	173
3	13	0	0	0	39	20	27	0	0	0	0	99
4	20	0	0	0	0	0	39	0	0	0	0	59
5	39	1	0	0	0	0	24	0	0	0	0	64
6	0	53	28	792	28	0	0	0	5	11	4	2	912
7	15	78	0	0	12	0	0	0	3	15	2	2	128
8	1	0	0	0	0	0	0	0	0	0	0	0	1
9	1	0	0	0	0	0	0	0	0	0	0	0	1
10	1	0	0	0	0	0	0	0	0	0	0	0	1
11	1	0	0	0	0	0	0	0	0	0	0	0	1
TOTAL	365	247	103	1144	214	794	73	52	40	42	23	3656

0730-0745

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	99	15	248	103	0	10	0	11	13	7	506
2	50	0	0	0	0	2	44	50	0	0	0	145
3	13	0	0	0	37	19	25	0	0	0	0	94
4	19	0	0	0	0	0	37	0	0	0	0	56
5	37	1	0	0	0	0	23	0	0	0	0	60
6	0	50	26	754	26	0	0	0	5	11	4	2	877
7	15	75	0	0	12	0	0	0	3	15	2	2	123
8	1	0	0	0	0	0	0	0	0	0	0	0	1
9	1	0	0	0	0	0	0	0	0	0	0	0	1
10	1	0	0	0	0	0	0	0	0	0	0	0	1
11	1	0	0	0	0	0	0	0	0	0	0	0	1
TOTAL	167	225	96	1002	204	761	70	51	40	40	22	2613	11832

0745-0800

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	111	16	276	118	0	11	0	12	14	8	566
2	56	0	0	0	0	49	56	0	0	11	8	182
3	14	0	0	0	42	22	28	0	0	0	0	107
4	22	0	0	0	0	0	42	0	0	0	0	64
5	42	0	0	0	0	0	26	0	0	0	0	68
6	0	56	29	846	30	0	0	0	6	12	4	2	1007
7	17	84	0	0	13	0	0	0	3	16	2	2	134
8	1	0	0	0	0	0	0	0	0	0	0	0	1
9	1	0	0	0	0	0	0	0	0	0	0	0	1
10	1	0	0	0	0	0	0	0	0	0	0	0	1
11	1	0	0	0	0	0	0	0	0	0	0	0	1
TOTAL	206	256	108	1181	239	853	79	23	71	45	26	3369

0800-0815

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	106	16	263	122	0	11	0	11	13	8	540
2	53	0	0	0	0	47	53	0	0	11	7	171
3	13	0	0	0	40	21	27	0	0	0	0	101
4	21	0	0	0	0	0	40	0	0	0	0	61
5	39	1	0	0	0	0	25	0	0	0	0	65
6	0	53	28	806	28	0	0	0	6	11	4	2	938
7	16	80	0	0	12	0	0	0	3	15	2	2	128
8	1	0	0	0	0	0	0	0	0	0	0	0	1
9	1	0	0	0	0	0	0	0	0	0	0	0	1
10	1	0	0	0	0	0	0	0	0	0	0	0	1
11	1	0	0	0	0	0	0	0	0	0	0	0	1
TOTAL	370	260	103	1027	218	816	79	22	69	43	26	3119

0815-0830

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	97	14	241	105	0	10	0	10	12	7	494
2	48	0	0	0	0	2	43	49	0	0	0	139
3	12	0	0	0	38	19	24	0	0	0	0	93
4	19	0	0	0	0	0	36	0	0	0	0	55
5	36	0	0	0	0	0	23	0	0	0	0	59
6	0	49	25	740	32	0	0	0	5	11	4	2	868
7	14	73	0	0	11	0	0	0	3	14	2	2	119
8	1	0	0	0	0	0	0	0	0	0	0	0	1
9	1	0	0	0	0	0	0	0	0	0	0	0	1
10	1	0	0	0	0	0	0	0	0	0	0	0	1
11	1	0	0	0	0	0	0	0	0	0	0	0	1
TOTAL	341	231	93	1032	286	793	68	29	62	49	33	3616

0830-0845

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	90	13	227	97	0	9	0	10	12	6	455
2	44	0	0	0	0	2	40	46	0	0	0	132
3	11	0	0	0	35	18	22	0	0	0	0	86
4	17	0	0	0	0	0	33	0	0	0	0	50
5	33	0	0	0	0	0	21	0	0	0	0	54
6	0	44	23	681	29	0	0	0	5	10	4	2	798
7	12	67	0	0	10	0	0	0	2	13	2	2	109
8	1	0	0	0	0	0	0	0	0	0	0	0	1
9	1	0	0	0	0	0	0	0	0	0	0	0	1
10	1	0	0	0	0	0	0	0	0	0	0	0	1
11	1	0	0	0	0	0	0	0	0	0	0	0	1
TOTAL	314	201	86	951	264	732	63	46	57	45	30	3349

0845-0900

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	88	13	214	91	0	9	0	9	11	6	439
2	43	0	0	0	0	2	39	45	0	0	0	129
3	11	0	0	0	33	17	22	0	0	0	0	82
4	16	0	0	0	0	0	33	0	0	0	0	49
5	33	0	0	0	0	0	19	0	0	0	0	52
6	0	43	22	663	28	0	0	0	5	10	4	2	782
7	12	65	0	0	10	0	0	0	2	12	2	2	104
8	1	0	0	0	0	0	0	0	0	0	0	0	1
9	1	0	0	0	0	0	0	0	0	0	0	0	1
10	1	0	0	0	0	0	0	0	0	0	0	0	1
11	1	0	0	0	0	0	0	0	0	0	0	0	1
TOTAL	332	196	84	948	178	662	61	18	55	36	19	2607

0900-0915

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	79	12	187	84	0	8	0	8	10	6	425
2	40	0	0	0	0	2	35	40	0	0	0	117
3	10	0	0	0	30	16	20	0	0	0	0	75
4	14	0	0	0	0	0	30	0	0	0	0	44
5	30	0	0	0	0	0	18	0	0	0	0	48
6	0	40	20	606	26	0	0	0	5	9	4	2	711
7	11	60	0	0	9	0	0	0	2	11	2	2	97
8	1	0	0	0	0	0	0	0	0	0	0	0	1
9	1	0	0	0	0	0	0	0	0	0	0	0	1
10	1	0	0	0	0	0	0	0	0	0	0	0	1
11	1	0	0	0	0	0	0	0	0	0	0	0	1
TOTAL	279	180	79	868	184	611	56	17	51	32	18	2181

HEAVIES

0645-0700

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	0	1	77	2	0	0	0	0	1	0	81
2	5	0	0	0	0	4	0	0	0	1	0	10
3	1	0	0	0	16	0	14	0	0	0	0	31
4	44	0	5	0	0	0	113	0	0	0	0	3	165
5	3	0	0	0	0	0	0	0	0	0	0	0	3
6	0	0	0	196	179	0	0	0	1	1	1	1	380
7	0	0	2	0	0	0	0	0	0	0	0	0	2
8	0	0	0	0	0	1	0	0	0	0	0	0	1
9	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	55	0	9	25	279	6	130	0	1	3	1	4	52	7	572

0700-0715

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	0	1	68	1	0	0	0	0	0	0	70
2	5	0	0	0	0	4	0	0	0	1	0	9
3	1	0	0	0	16	0	13	0	0	0	0	30
4	43	0	5	0	0	0	102	0	0	0	0	3	154
5	3	0	0	0	0	0	0	0	0	0	0	0	3
6	0	0	0	177	159	0	0	0	1	1	1	1	340
7	0	0	2	0	0	0	0	0	0	0	0	0	2
8	0	0	0	0	0	1	0	0	0	0	0	0	1
9	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	55	0	8	23	251	5	127	0	1	1	1	4	476

0715-0730

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	0	1	71	1	0	0	0	0	0	0	73
2	5	0	0	0	0	4	0	0	0	1	0	9
3	1	0	0	0	17	0	13	0	0	0	0	31
4	45	0	5	0	0	0	105	0	0	0	0	3	158
5	3	0	0	0	0	0	0	0	0	0	0	0	3
6	0	0	0	182	163	0	0	0	1	1	1	1	349
7	0	0	2	0	0	0	0	0	0	0	0	0	2
8	0	0	0	0	0	1	0	0	0	0	0	0	1
9	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	57	0	8	23	256	5	118	0	1	1	1	4	474

0730-0745

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	0	1	66	1	0	0	0	0	0	0	68
2	5	0	0	0	0	4	0	0	0	1	0	9
3	1	0	0	0	15	0	12	0	0	0	0	28
4	41	0	5	0	0	0	96	0	0	0	0	3	145
5	3	0	0	0	0	0	0	0	0	0	0	0	3
6	0	0	0	167	149	0	0	0	1	1	1	1	320
7	0	0	2	0	0	0	0	0	0	0	0	0	2
8	0	0	0	0	0	1	0	0	0	0	0	0	1
9	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	51	0	7	21	165	5	109	0	1	1	1	4	365	1850

0745-0800

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	0	1	63	1	0	0	0	0	0	0	72
2	6	0	0	0	0	5	0	0	0	1	0	12
3	1	0	0	0	15	0	12	0	0	0	0	28
4	39	0	5	0	0	0	93	0	0	0	0	3	141
5	3	0	0	0	0	0	0	0	0	0	0	0	3
6	0	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	2	0	0	0	0	0	0	0	0	0	2
8	0	0	0	0	0	1	0	0	0	0	0	0	1
9	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	50	0	7	20	216	5	105	0	1	1	1	4	410

0800-0815

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	0	1	68	1	0	0	0	0	0	0	70
2	5	0	0	0	0	4	0	0	0	1	0	9
3	1	0	0	0	14	0	11	0	0	0	0	26
4	36	0	4	0	0	0	87	0	0	0	0	3	131
5	3	0	0	0	0	0	0	0	0	0	0	0	3
6	0	0	0	156	135	0	0	0	1	1	1	1	295
7	0	0	2	0	0	0	0	0	0	0	0	0	2
8	0	0	0	0	0	1	0	0	0	0	0	0	1
9	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	47	0	7	19	154	4	98	0	1	1	1	4	337	1497

0815-0830

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	0	1	62	1	0	0	0	0	0	0	63
2	5	0	0	0	0	4	0	0	0	1	0	9
3	1	0	0	0	13	0	10	0	0	0	0	24
4	33	0	4	0	0	0	80	0	0	0	0	3	120
5	3	0	0	0	0	0	0	0	0	0	0	0	3
6	0	0	0	143	124	0	0	0	1	1	1	1	271
7	0	0	2	0	0	0	0	0	0	0

2031 RC&A CALCULATIONS - PM PEAK

STEP 01 - AM PEAK ORIGIN MATRIX

AM PEAK

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	2449	648	1207	407	0	69	2	20	19	1	4823
2	393	0	0	0	0	2186	1	458	0	0	17	3055
3	74	0	0	319	0	1.66	0	0	0	0	0	455
4	1476	0	0	0	0	1057	38	0	0	0	0	2571
5	1.66	0	0	0	0	1.07	0	76	0.6	4	2	1.55
6	0	2.06	0	1.03	0.04	0	0	0	2.5	0	0	3.77
7	0.6	2.49	0	0	0	0	0	0	0	0	0	3.09
8	0.4	0	0	0	0	0	0	0	0	0	0	0.4
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0.6	0.2	0	0.6	0.2	0.6	0.6	1	0	0	0	4.76
11	2.7	0.6	0	0	0.6	0	0	0	0	0	0	3.9
Total	2.349	7.82	2.58	4.658	2.67	4.234	3.49	5.79	3.46	4.4	2.6	2.3957

STEP 02 - CONVERT TO 3 X 3 PEAK MATRICES USING 3 X 3 BASE PROPORTIONS

LIGHTS

Time Period	Total	Choice (Total	Proportion
1600-1645	21000	10750	19%
1645-1800	21776	10750	22%
1800-1815	20116	10750	19%
1615-1830	20.76	10750	19%
			81%

HEAVIES

Time Period	Total	Choice (Total	Proportion
1600-1645	1817	1050	16%
1645-1800	370	1050	51%
1800-1815	1016	1050	36%
1615-1830	1612	1050	26%
			127%

LIGHTS

Time Period	Total	Choice (Total	Proportion
1600-1645	20116	10750	19%
1645-1750	27799	10750	26%
1750-1715	19.60	10750	19%
1715-1730	27.99	10750	26%
			89%

HEAVIES

Time Period	Total	Choice (Total	Proportion
1600-1645	2561	1064	27%
1645-1750	2669	1063	25%
1750-1715	2566	1063	26%
1715-1730	2.65	1063	22%
			100%

LIGHTS

Time Period	Total	Choice (Total	Proportion
1715-1765	28462	10750	26%
1765-1800	29.09	10750	23%
			49%

Used peak total to determine proport ions for cost down period

HEAVIES

Time Period	Total	Choice (Total	Proportion
1715-1765	2.63	1063	22%
1765-1800	2.47	1063	23%
			45%

Used peak total to defer mine proportions for cost down period

LIGHTS

1600-1645

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	68	22	209	21	0	0	0	0	2	1	353
2	79	0	0	0	0	61	47	1	0	0	0	191
3	26	0	0	46	0	0	0	0	0	0	0	72
4	209	0	0	0	0	0	0	0	0	0	0	209
5	21	1	0	0	0	2.0	2	1.6	1.0	0	0	2.3
6	0	3.5	0	0	0	0	0	0	0	0	0	3.5
7	0	0	0	0	0	0	0	0	0	0	0	0
8	2	0	0	0	0	0	2	0	0	0	0	2.0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	2	0	0	0	0	0	0	0	0	0	2.0
TOTAL	488	162	69	944	57	483	75	26	11	9	6	2794

1645-1800

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	69	23	248	21	0	0	1	0	0	1	369
2	77	0	0	0	1	53	46	1	0	0	0	187
3	26	0	0	47	0	0	0	0	0	0	0	86
4	248	0	0	0	0	0	0	0	0	0	0	248
5	20	1	0	0	0	1.6	1.6	1.7	1.1	0	0	2.7
6	0	3.7	0.1	0.0	0.0	0	0	0	0	0	0	3.8
7	1.1	0.1	0	0	0	0	0	0	0	0	0	1.2
8	2	0	0	0	0	0	2	0	0	0	0	2.0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	2	0	0	0	0	0	0	0	0	0	2.0
TOTAL	481	166	62	974	58	532	77	34	13	10	6	2427

1800-1815

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	63	25	265	23	0	10	1	0	3	2	391
2	82	0	0	0	1	56	51	1	0	0	0	196
3	27	0	0	50	0	0	0	0	0	0	0	77
4	265	0	0	0	0	0	0	0	0	0	0	265
5	23	1.1	0	0	0	1.7	1.7	1.8	1.2	0	0	2.9
6	0	4.0	0.1	0.0	0.0	0	0	0	0	0	0	4.1
7	1.2	0.1	0	0	0	0	0	0	0	0	0	1.3
8	2	0	0	0	0	0	2	0	0	0	0	2.0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	2	0	0	0	0	0	0	0	0	0	2.0
TOTAL	509	178	67	1030	63	615	82	40	16	10	6	3614

1615-1830

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	65	25	266	23	0	10	1	0	3	2	401
2	84	0	0	0	1	57	52	1	0	0	0	195
3	28	0	0	51	0	0	0	0	0	0	0	80
4	266	0	0	0	0	0	0	0	0	0	0	266
5	23	1	0	0	0	1.8	1.8	1.8	1.2	0	0	2.9
6	0	4.2	0.1	0.0	0.0	0	0	0	0	0	0	4.3
7	1.1	0.1	0	0	0	0	0	0	0	0	0	1.2
8	2	0	0	0	0	0	2	0	0	0	0	2.0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	2	0	0	0	0	0	0	0	0	0	2.0
TOTAL	522	182	100	1099	64	966	84	41	25	16	8	3291	11711

1630-1645

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	68	26	276	24	0	11	1	0	3	2	413
2	87	0	0	0	1	59	54	1	0	0	0	203
3	29	0	0	53	0	0	0	0	0	0	0	82
4	276	0	0	0	0	0	0	0	0	0	0	276
5	24	1	0	0	0	2.7	2	1.9	1.4	1	0	3.4
6	0	5.6	0.1	0.0	0.0	0	0	0	0	0	0	5.7
7	1.1	0.1	0	0	0	0	0	0	0	0	0	1.2
8	2	0	0	0	0	0	2	0	0	0	0	2.0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	2	0	0	0	0	0	0	0	0	0	2.0
TOTAL	536	187	103	1099	66	1.658	86	43	36	11	6	3.915

1645-1700

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	69	26	281	24	0	11	1	0	3	2	421
2	89	0	0	0	1	60	55	1	0	0	0	212
3	29	0	0	54	0	0	0	0	0	0	0	83
4	281	0	0	0	0	0	0	0	0	0	0	281
5	27	1	0	0	0	2.7	2	1.9	1.5	1	0	3.5
6	0	5.7	0.1	0.0	0.0	0	0	0	0	0	0	5.8
7	1.2	0.1	0	0	0	0	0	0	0	0	0	1.3
8	2	0	0	0	0	0	2	0	0	0	0	2.0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	2	0	0	0	0	0	0	0	0	0	2.0
TOTAL	549	195	105	1111	67	1041	88	43	37	11	6	3.565

1700-1715

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	66	26	270	24	0	11	1	0	3	2	411
2	86	0	0	0	1	58	53	1	0	0	0	200
3	28	0	0	52	0	0	0	0	0	0	0	80
4	270	0	0	0	0	0	0	0	0	0	0	270
5	24	1	0	0	0	2.6	2	1.9	1.4	1	0	3.4
6	0	5.5	0.1	0.0	0.0	0	0	0	0	0	0	5.6
7	1.1	0.1	0	0	0	0	0	0	0	0	0	1.2
8	2	0	0	0	0	0	2	0	0	0	0	2.0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	2	0	0	0	0	0	0	0	0	0	2.0
TOTAL	535	186	102	1050	65	1014	86	42	36	11	6	3.535

1715-1730

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	69	27	286	25	0	11	1	0	3	2	429
2	90	0	0	0	1	61	56	1	0	0	0	217
3	29	0	0	55	0	0	0	0	0	0	0	84
4	286	0	0	0	0	0	0	0	0	0	0	286
5	25	1	0	0	0	2.8	2	2	1.5	1	0	3.6
6	0	5.8	0.1	0.0	0.0	0	0	0	0	0	0	5.9
7	1.2	0.1	0	0	0	0	0	0	0	0	0	1.3
8	2	0	0	0	0	0	2	0	0	0	0	2.0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	2	0	0	0	0	0	0	0	0	0	2.0
TOTAL	559	195	107	1.132	68	1.083	89	44	37	11	6	3.595	12966	9

1730-1750

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	67	26	276	24	0	11	1	0	3	2	414
2	87	0	0	0	1	59	54	1	0	0	0	203
3	28	0	0	53	0	0	0	0	0	0	0	80
4	276	0	0	0	0	0	0	0	0	0	0	276
5	24	1	0	0	0	2.7	2	1.9	1.4	1	0	3.4
6	0	5.6	0.1	0.0	0.0	0	0	0	0	0	0	5.7
7	1.1	0.1	0	0	0	0	0	0	0	0	0	1.2
8	2	0	0	0	0	0	2	0	0	0	0	2.0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	2	0	0	0	0	0	0	0	0	0	2.0
TOTAL	539	188	103	1.092	66	1.022	86	42	36	11	6	3.352

1750-1800

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	63	25	262	23	0	10	1	0	3	2	392
2	82	0	0	0	1	56	51	1	0	0	0	193
3	27	0	0	50	0	0	0	0	0	0	0	169
4	262	0	0	0	0	0	0	0	0	0	0	262
5	23	1	1	0	0	2.6	1.9	1.8	1.4	1	0	3.3
6	0	5.4	0.1	0.0	0.0	0	0	0	0	0	0	5.5
7	1.1	0.1	0	0	0	0	0	0	0	0	0	1.2
8	2	0	0	0	0	0	2	0	0	0	0	2.0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	2	0	0	0	0	0	0	0	0	0	2.0
TOTAL	516	176	87	1014	62	966	82	40	34	10	6	3.521

42.62

HEAVIES

1600-1645

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	0	0	55	0	0	0	0	0	0	0	55
2	0	0	0	0	0	2	0	0	0	0	0	3
3	0	0	0	17	0	0	0	0	0	0	0	17
4	49	0	0	0	0	1.68	0	0	0	0	0	217
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	1.6	1.04	0	0	0	0	1	1	1.06
7	0	2	0	0	0	0	0	0	0	0	0	2
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	2	0	0	0	0	0	0	0	0	0	0	2
TOTAL	67	6	26	171	6	1.68	0	0	0	0	0	4.07

1645-1800

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	0	0	61	0	0	0	0	0	0	0	61
2	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	19	0	0	0	0	0	0	0	19
4	61	0	0	0	0	0	0	0	0	0	0	61
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	1.81	1.11	0	0	0	0	0	0	1.92
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	66	6	26	341	12	0	0	0	0	0	0	4.41

1800-1815

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	0	0	28	0	0	0	0	0	0	0	28
2	0	0	0	0	0	1	0	0	0	0	0	2
3	0	0	0	14	0	0	0	0	0	0	0	14
4	28	0	0	0	0	0	0	0	0	0	0	28
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	1.41	0.86	0	0	0	0	0	0	1.49
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	28	6	26	143	9	1	0	0	0	0	0	2.13

1615-1830

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	0	0	27	0	0	0	0	0	0	0	27
2	0	0	0	0	0	1	0	0	0	0	0	2
3	0	0	0	13	0	0	0	0	0	0	0	13
4	34	0	0	0	0	0	0	0	0	0	0	34
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	1.34	0.82	0	0	0	0	0	0	1.42
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	34	6	26	127	8	1	0	0	0	0	0	2.04	1813

1630-1645

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	0	0	26	0	0	0	0	0	0	0	26
2	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	13	0	0	0	0	0	0	0	13
4	26	0	0	0	0	0	0	0	0	0	0	26
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	1.32	0.8	0	0	0	0	0	0	1.4
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	26	6	26	134	8	1	0	0	0	0	0	2.01

1645-1700

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	0	0	24	0	0	0	0	0	0	0	24
2	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	12	0	0	0	0	0	0	0	12
4	24	0	0	0	0	0	0	0	0	0	0	24
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	1.21	0.74	0	0	0	0	0	0	1.29
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	24	6	24	121	7	0	0	0	0	0	0	2.01

1700-1715

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	0	0	26	0	0	0	0	0	0	0	26
2	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	12	0	0	0	0	0	0	0	12
4	26	0	0	0	0	0	0	0	0	0	0	26
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	1.14	0.7	0	0	0	0	0	0	1.22
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	26	6	24	114	7	0	0	0	0	0	0	1.91

1715-1730

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	0	0	22	0	0	0	0	0	0	0	22
2	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	11	0	0	0	0	0	0	0	11
4	22	0	0	0	0	0	0	0	0	0	0	22
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0.96	0.59	0	0	0	0	0	0	1.03
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	22	6	22	96	6	0	0	0	0	0	0	1.56	1294	9

1730-1750

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	0	0	27	0	0	0	0	0	0	0	27
2	0	0	0	0	0	1	0	0	0	0	0	2
3	0	0	0	13	0	0	0	0	0	0	0	13
4	34	0	0	0	0	0	0	0	0	0	0	34
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	1.34	0.82	0	0	0	0	0	0	1.42
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0

2023 OSFA CALCULATIONS - AM PEAK

STEP 1 - ALL DAILY MOVEMENTS

start min	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Total
1	0	212	0	1148	0	0	23	0	0	47	28	361	221	0	0	2040
2	192	0	0	0	0	0	198	0	0	0	0	0	0	0	0	390
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	534	0	1018	0	2	2373	5	4.2	0	10	0	0	0	0	0	3941
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	200	618	2678	0	0	0	11	0	38	0	213	170	0	0	3958
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	432	0	0	0	0	0	0	0	0	0	476
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	199	0	0	0	0	195	0	0	0	0	0	0	0	0	0	397
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	1,125	412	1,636	3,826	2	3,000	226	15	0	103	28	574	391	0	0	10,737

start min	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Total
1	0	0	0	2.28	0	0	0	0	0	0	14	0	0	0	0	16
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	2.22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2.22
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	2.22	0	0	2.28	0	0	0	0	0	0	14	0	0	0	0	18.22

start min	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Total
1	0	212	17	1148	0	0	23	0	0	61	28	361	221	0	0	2052
2	192	0	0	0	0	0	198	0	0	0	0	0	0	0	0	390
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0.536	0	0.18	0	2	2.373	5	4.2	0	10	0	0	0	0	0	3.944
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	200	618	2678	0	0	0	11	0	38	0	213	170	0	0	3958
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	1,125	412	1,636	3,826	2	3,000	226	15	0	103	28	574	391	0	0	10,737

STEP 2 - CONVERT TO 15 MIN METHOD 3 VERSION 2 & 4 BUILT PROPORTIONS

0645-0700

Time Period	Total	Overall Total	Prop. hrs
0645-0700	2123	9302	23%
0700-0715	2417	9302	26%
0715-0730	2304	9302	25%
0730-0745	2271	9302	24%
			97%

HEAVIES

Time Period	Total	Overall Total	Prop. hrs
0645-0700	414	1067	39%
0700-0715	406	1067	38%
0715-0730	148	1067	14%
0730-0745	177	1067	17%
			110%

0745-0800

Time Period	Total	Overall Total	Prop. hrs
0745-0800	2548	9302	27%
0800-0815	2432	9302	26%
0815-0830	2235	9302	24%
0830-0845	2086	9302	22%
			100%

HEAVIES

Time Period	Total	Overall Total	Prop. hrs
0745-0800	372	1067	27%
0800-0815	348	1067	25%
0815-0830	356	1067	26%
0830-0845	343	1067	25%
			103%

0845-0900

Time Period	Total	Overall Total	Prop. hrs
0845-0900	1879	9302	21%
0900-0915	1819	9302	20%
			41%

HEAVIES

Time Period	Total	Overall Total	Prop. hrs
0845-0900	345	1067	25%
0900-0915	345	1067	25%
			49%

Overall predicted hrs for entire network peak hour. Shows the heavy, heavy and overall distribution per cordon.

Overall predicted hrs for determining the ongoing cordon by the overall, heavies per cord

LIGHTS

0645-0700

	1	2	3	4	5	6	7	8	9	10	11	12	13	TOTAL
1	0	74	12	220	0	0	7	0	0	11	0	52	51	426
2	47	0	0	1	0	0	0.2	0	0	10	7	1	0.5	425
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0.4	0	47	0	0	0.6	1	0	0	2	1	0	0	452
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	44	245	656	0	0	0	0	0	0	0	0	0
7	45	60	0	22	0	0	0	0	0	45	0	0	0	734
8	0	0	0	0	0	0	0	0	0	0	0	0	0	415
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0.4	60	44	245	656	0	0	0	0	45	0	0	0	1,000

0700-0715

	1	2	3	4	5	6	7	8	9	10	11	12	13	TOTAL
1	0	77	13	236	0	0	0	0	0	11	0	53	53	444
2	49	0	0	1	0	0	0.5	0	0	11	7	1	0.5	470
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0.6	0	51	0	0	0.8	1	0	0	2	1	0	0	496
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	48	264	665	0	0	0	0	0	0	0	0	0
7	47	65	0	25	0	0	0	0	0	46	0	0	0	743
8	0	0	0	0	0	0	0	0	0	0	0	0	0	443
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0.6	142	64	265	665	0	0	0	0	46	0	0	0	1,000

0715-0730

	1	2	3	4	5	6	7	8	9	10	11	12	13	TOTAL
1	0	83	14	148	0	0	0	0	0	11	0	53	54	416
2	52	0	0	1	0	0	0.5	0	0	11	7	1	0.5	444
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0.6	0	54	0	0	0.8	1	0	0	2	1	0	0	469
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	51	279	702	0	0	0	0	0	0	0	0	0
7	50	69	0	26	0	0	0	0	0	49	0	0	0	784
8	0	0	0	0	0	0	0	0	0	0	0	0	0	438
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0.6	152	69	279	702	0	0	0	0	49	0	0	0	1,000

0730-0745

	1	2	3	4	5	6	7	8	9	10	11	12	13	TOTAL
1	0	77	13	247	0	0	0	0	0	11	0	53	54	454
2	49	0	0	1	0	0	0.5	0	0	11	7	1	0.5	470
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0.6	0	49	0	0	0.8	1	0	0	2	1	0	0	496
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	49	261	737	0	0	0	0	0	0	0	0	0
7	48	73	0	25	0	0	0	0	0	47	0	0	0	827
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0.6	150	62	534	737	0	0	0	0	47	0	0	0	1,000

0745-0800

	1	2	3	4	5	6	7	8	9	10	11	12	13	TOTAL
1	0	69	12	208	0	0	0	0	0	10	0	47	47	394
2	44	0	0	1	0	0	0.5	0	0	10	6	1	0.5	419
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0.5	0	44	0	0	0.7	1	0	0	2	1	0	0	442
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	43	231	584	0	0	0	0	0	0	0	0	0
7	42	61	0	22	0	0	0	0	0	41	0	0	0	698
8	0	0	0	0	0	0	0	0	0	0	0	0	0	391
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0.5	134	56	234	584	0	0	0	0	41	0	0	0	885

0800-0815

	1	2	3	4	5	6	7	8	9	10	11	12	13	TOTAL
1	0	64	11	179	0	0	0	0	0	10	0	46	46	402
2	43	0	0	1	0	0	0.5	0	0	10	6	1	0.5	428
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0.5	0	43	0	0	0.7	1	0	0	2	1	0	0	451
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	42	226	571	0	0	0	0	0	0	0	0	0
7	41	59	0	21	0	0	0	0	0	40	0	0	0	683
8	0	0	0	0	0	0	0	0	0	0	0	0	0	382
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0.5	131	54	228	571	0	0	0	0	40	0	0	0	863

0815-0830

	1	2	3	4	5	6	7	8	9	10	11	12	13	TOTAL
1	0	59	10	154	0	0	0	0	0	9	0	40	40	348
2	37	0	0	1	0	0	0.4	0	0	9	5	1	0.4	364
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0.4	0	37	0	0	0.6	1	0	0	2	1	0	0	384
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	36	193	487	0	0	0	0	0	0	0	0	0
7	35	50	0	18	0	0	0	0	0	34	0	0	0	583
8	0	0	0	0	0	0	0	0	0	0	0	0	0	326
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0.4	112	46	194	487	0	0	0	0	34	0	0	0	736

0830-0845

	1	2	3	4	5	6	7	8	9	10	11	12	13	TOTAL
1	0	49	8	131	0	0	0	0	0	8	0	34	34	296
2	31	0	0	1	0	0	0.3	0	0	8	4	1	0.3	309
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0.3	0	31	0	0	0.5	1	0	0	2	1	0	0	326
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	30	164	414	0	0	0	0	0	0	0	0	0
7	29	42	0	15	0	0	0	0	0	28	0	0	0	495
8	0	0	0	0	0	0	0	0	0	0	0	0	0	277
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0.3	95	39	165	414	0	0	0	0	28	0	0	0	626

0845-0900

	1	2	3	4	5	6	7	8	9	10	11	12	13	TOTAL
1	0	59	10	158	0	0	0	0	0	9	0	41	41	358
2	38	0	0	1	0	0	0.4	0	0	9	5	1	0.4	373
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0.4	0	38	0	0	0.6	1	0	0	2	1	0	0	394
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	37	198	500	0	0	0	0	0	0	0	0	0
7	36	51	0	19	0	0	0	0	0	34	0	0	0	598
8	0	0	0	0	0	0	0	0	0	0	0	0	0	335
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0.4	110	46	199	500	0	0	0	0	34	0	0	0	756

0900-0915

	1	2	3	4	5	6	7	8	9	10	11	12	13	TOTAL
1	0	49	8	131	0	0	0	0	0	8	0	34	34	296
2	31	0	0	1	0	0	0.3	0	0	8	4	1	0.3	309
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0.3	0	31	0	0	0.5	1	0	0	2	1	0	0	326
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	30	164	414	0	0	0	0	0	0	0	0	0
7	29	42	0	15	0	0	0	0	0	28	0	0	0	495
8	0	0	0	0	0	0	0	0	0	0	0	0	0	277
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0.3	95	39	165	414	0	0	0	0	28	0	0	0	626

HEAVIES

0645-0700

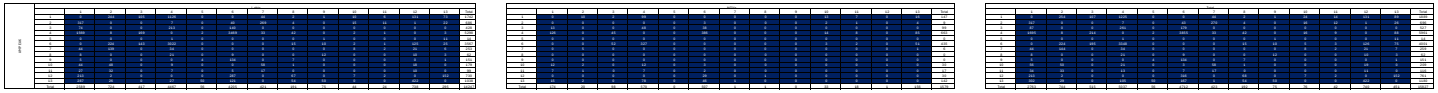
	1	2	3	4	5	6	7	8	9	10	11	12	13	TOTAL
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0

0700-0715

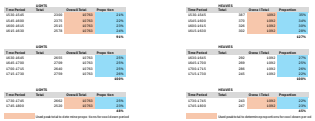
	1	2	3	4	5	6	7	8	9	10	11	12	13	TOTAL
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0	0	0	0	0

2023 DSA CALCULATIONS - PM PEAK

STEP 1 - PLOT ALL THE DATA



STEP 2 - CONVERT TO 15 MIN PERIOD VERSIONS & BUILT PROPORTIONS



2031 RCZA CALCULATIONS - AM PEAK

STEP 01 - AM PEAK ORIGIN MATRIX

AM PEAK

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	2649	466	1855	4609	0	1895	0	0	1	0	11475
2	2905	0	0	0	0	1378	0	1895	0	0	0	6178
3	511	0	0	0	1612	779	1154	0	0	0	0	4056
4	1855	0	0	0	0	0	2697	0	1154	0	0	5706
5	1142	0	0	0	0	0	0	0	0	0	0	1142
6	0	1378	0	1378	3699	0	0	0	0	0	0	6455
7	0	0	1154	0	0	0	0	0	0	0	0	1154
8	1895	0	0	0	0	0	0	0	0	0	0	1895
9	0	0	0	0	0	0	0	0	0	0	0	0
10	1	0	0	0	0	0	0	0	0	0	0	1
11	0	0	0	0	0	0	0	0	0	0	0	0
Total	7504	4027	1620	3233	9920	2157	5746	1895	1154	1	0	37257

2031 RCZA CALCULATIONS - PM PEAK

STEP 01 - AM PEAK HOUR MATRIX

STEP 02 - CONVERT TO 5 X 5 MINUTE PEAK HOUR USING EQUIVALENCE PROPORTIONS

LIGHTS

Time Period	Total	Choice (Total)	Proportion
1600-1645	23300	107763	22%
1645-1730	21776	107763	20%
1800-1815	20116	107763	19%
1815-1830	20178	107763	19%
			80%

HEAVIES

Time Period	Total	Overall Total	Proportion
1600-1645	3817	10963	34%
1645-1800	3707	10963	32%
1800-1815	3206	10963	30%
1815-1830	3612	10963	28%
			127%

LIGHTS

Time Period	Total	Choice (Total)	Proportion
1630-1645	23016	107763	19%
1645-1700	27398	107763	25%
1700-1715	28160	107763	26%
1715-1730	27398	107763	25%
			94%

HEAVIES

Time Period	Total	Overall Total	Proportion
1630-1645	2962	10963	27%
1645-1700	2969	10963	26%
1700-1715	2966	10963	26%
1715-1730	2165	10963	22%
			100%

LIGHTS

Time Period	Total	Choice (Total)	Proportion
1730-1745	28462	107763	26%
1745-1800	24169	107763	23%
			49%

Used peak total to determine proport ions for east-down period

HEAVIES

Time Period	Total	Overall Total	Proportion
1730-1745	2411	10963	22%
1745-1800	2417	10963	22%
			45%

Used peak total to defer mine proportions for east-down period

LIGHTS

1600-1645

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	67	22	1400	25	0	0	0	3	2	1	360
2	79	0	0	0	1	63	1	0	0	4	2	157
3	28	0	0	0	46	0	30	0	0	0	0	81
4	1400	0	0	0	0	0	1400	0	0	0	0	1400
5	30	1	0	0	0	26	0	21	12	1	0	99
6	0	66	30	647	26	0	1	0	0	0	0	782
7	10	30	0	0	0	0	0	0	0	0	0	40
8	2	0	0	0	0	10	2	0	0	0	0	14
9	0	0	0	0	0	0	0	0	0	0	0	0
10	11	1	0	0	0	2	0	0	0	0	0	14
11	0	7	0	0	2	0	0	0	0	0	0	21
TOTAL	480	181	89	966	94	488	71	27	27	9	6	2756

1645-1800

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	68	23	1400	26	0	0	1	3	3	1	372
2	79	0	0	0	1	65	1	0	0	4	2	157
3	28	0	0	0	47	0	31	0	0	0	0	86
4	1400	0	0	0	0	0	1400	0	0	0	0	1400
5	31	1	0	0	0	26	0	22	13	1	0	99
6	0	67	31	1400	26	0	1	0	0	0	0	786
7	10	31	0	0	0	0	0	0	0	0	0	41
8	2	0	0	0	0	10	2	0	0	0	0	14
9	0	0	0	0	0	0	0	0	0	0	0	0
10	11	1	0	0	0	2	0	0	0	0	0	14
11	0	7	0	0	2	0	0	0	0	0	0	22
TOTAL	480	186	82	975	96	466	73	24	29	10	6	2448

1800-1815

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	63	25	260	23	0	0	1	4	3	2	384
2	63	0	0	1	1	54	45	1	0	0	0	169
3	17	0	0	60	1	33	0	0	0	0	0	109
4	1400	0	0	0	0	0	1400	0	0	0	0	1400
5	34	1	0	0	0	29	0	25	14	1	0	104
6	0	63	33	708	22	0	1	0	0	0	0	826
7	11	33	0	0	0	0	0	0	0	0	0	43
8	2	0	0	0	0	11	2	0	0	0	0	15
9	0	0	0	0	0	0	0	0	0	0	0	0
10	12	1	0	0	0	2	0	0	0	0	0	15
11	0	8	0	0	1	0	0	0	0	0	0	10
TOTAL	1539	170	67	1032	70	909	77	45	20	10	6	3944

1815-1830

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	60	25	269	24	0	0	1	4	3	2	403
2	60	0	0	1	1	50	43	1	0	0	0	155
3	16	0	0	51	0	31	0	0	0	0	0	102
4	1400	0	0	0	0	0	1400	0	0	0	0	1400
5	32	1	0	0	0	28	0	24	14	1	0	101
6	0	61	30	726	23	0	1	0	0	0	0	846
7	11	30	0	0	0	0	0	0	0	0	0	41
8	2	0	0	0	0	11	2	0	0	0	0	15
9	0	0	0	0	0	0	0	0	0	0	0	0
10	12	1	0	0	0	2	0	0	0	0	0	15
11	0	7	0	0	2	0	0	0	0	0	0	10
TOTAL	1571	160	68	1048	74	931	79	42	20	10	6	3010

1630-1645

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	65	26	277	24	0	0	1	4	3	2	413
2	66	0	0	1	1	61	51	1	0	0	0	210
3	18	0	0	43	0	28	0	0	0	0	0	89
4	1400	0	0	0	0	0	1400	0	0	0	0	1400
5	26	1	0	0	0	24	0	20	11	1	0	84
6	0	63	26	747	23	0	1	0	0	0	0	861
7	11	26	0	0	0	0	0	0	0	0	0	37
8	2	0	0	0	0	11	2	0	0	0	0	15
9	0	0	0	0	0	0	0	0	0	0	0	0
10	12	1	0	0	0	2	0	0	0	0	0	15
11	0	7	0	0	2	0	0	0	0	0	0	10
TOTAL	637	186	103	1090	73	1653	81	43	31	11	6	3164

1645-1700

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	67	26	262	30	0	0	1	4	3	2	426
2	69	0	0	1	1	63	53	1	0	0	0	214
3	18	0	0	43	0	28	0	0	0	0	0	89
4	1400	0	0	0	0	0	1400	0	0	0	0	1400
5	26	1	0	0	0	24	0	20	11	1	0	99
6	0	63	26	763	24	0	1	0	0	0	0	877
7	11	26	0	0	0	0	0	0	0	0	0	37
8	2	0	0	0	0	11	2	0	0	0	0	15
9	0	0	0	0	0	0	0	0	0	0	0	0
10	12	1	0	0	0	2	0	0	0	0	0	15
11	0	7	0	0	2	0	0	0	0	0	0	10
TOTAL	648	186	105	1112	76	1046	82	44	32	11	6	3169

1700-1715

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	65	26	275	29	0	0	1	4	3	2	413
2	67	0	0	1	1	61	50	1	0	0	0	200
3	17	0	0	42	0	27	0	0	0	0	0	86
4	1400	0	0	0	0	0	1400	0	0	0	0	1400
5	34	1	0	0	0	28	0	25	14	1	0	103
6	0	61	25	741	23	0	1	0	0	0	0	851
7	11	34	0	0	0	0	0	0	0	0	0	36
8	2	0	0	0	0	11	2	0	0	0	0	15
9	0	0	0	0	0	0	0	0	0	0	0	0
10	12	1	0	0	0	2	0	0	0	0	0	15
11	0	8	0	0	2	0	0	0	0	0	0	10
TOTAL	1554	169	102	1094	73	1013	81	43	31	11	6	3566

1715-1730

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	66	27	286	30	0	0	1	4	3	2	432
2	66	0	0	1	1	64	53	1	0	0	0	216
3	18	0	0	45	0	29	0	0	0	0	0	92
4	1400	0	0	0	0	0	1400	0	0	0	0	1400
5	36	1	0	0	0	30	0	26	15	1	0	108
6	0	64	27	777	24	0	1	0	0	0	0	893
7	12	36	0	0	0	0	0	0	0	0	0	38
8	2	0	0	0	0	12	2	0	0	0	0	15
9	0	0	0	0	0	0	0	0	0	0	0	0
10	13	1	0	0	0	2	0	0	0	0	0	16
11	0	8	0	0	2	0	0	0	0	0	0	10
TOTAL	658	180	107	1132	78	1063	86	45	33	11	6	3599

1730-1745

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	66	26	277	29	0	0	1	4	3	2	417
2	66	0	0	1	1	61	51	1	0	0	0	210
3	18	0	0	43	0	28	0	0	0	0	0	89
4	1400	0	0	0	0	0	1400	0	0	0	0	1400
5	35	1	0	0	0	29	0	25	14	1	0	105
6	0	63	26	746	23	0	1	0	0	0	0	861
7	11	35	0	0	0	0	0	0	0	0	0	36
8	2	0	0	0	0	11	2	0	0	0	0	15
9	0	0	0	0	0	0	0	0	0	0	0	0
10	12	1	0	0	0	2	0	0	0	0	0	15
11	0	8	0	0	2	0	0	0	0	0	0	10
TOTAL	638	186	103	1069	74	1033	81	43	31	11	6	3165

1745-1800

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	62	25	263	28	0	0	1	4	3	2	394
2	63	0	0	1	1	58	48	1	0	0	0	199
3	17	0	0	41	0	26	0	0	0	0	0	84
4	1400	0	0	0	0	0	1400	0	0	0	0	1400
5	33	1	0	0	0	27	0	23	13	1	0	98
6	0	60	25	709	22	0	1	0	0	0	0	818
7	11	33	0	0	0	0	0	0	0	0	0	34
8	2	0	0	0	0	10	2	0	0	0	0	14
9	0	0	0	0	0	0	0	0	0	0	0	0
10	12	1	0	0	0	2	0	0	0	0	0	14
11	0	8	0	0	2	0	0	0	0	0	0	10
TOTAL	1552	165	68	1014	76	971	77	41	30	10	6	3102

HEAVIES

1600-1645

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	0	1	55	0	0	0	0	0	0	0	60
2	0	0	0	0	0	2	0	0	0	0	0	3
3	0	0	0	17	0	14	0	0	0	0	0	35
4	49	0	24	0	0	140	0	0	0	0	0	217
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	24	116	0	0	0	0	0	0	0	140
7	0	2	0	0	0	0	0	0	0	0	0	3
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	4	0	0	0	0	0	0	0	4
11	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	97	6	26	571	0	160	0	0	0	0	0	867

1645-1800

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	0	1	53	0	0	0	0	0	0	0	60
2	0	0	0	0	0	1	0	0	0	0	0	3
3	0	0	0	16	0	13	0	0	0	0	0	34
4	43	0	15	0	0	142	0	0	0	0	0	200
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	14	111	0	0	0	0	0	0	0	125
7	0	2	0	0	0	0	0	0	0	0	0	3
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	4	0	0	0	0	0	0	0	4
11	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	86	6	31	347	0	168	0	0	0	0	0	641

1800-1815

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	0	0	30	0	0	0	0	0	0	0	30
2	0	0	0	0	0	1	0	0	0	0	0	2
3	0	0	0	14	0	11	0	0	0	0	0	26
4	38	0	14	0	0	126	0	0	0	0	0	178
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	14	98	0	0	0	0	0	0	0	112
7	0	2	0	0	0	0	0	0	0	0	0	2
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	4	0	0	0	0	0	0	0	4
11	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	76	6	29	147	0	139	0	0	0	0	0	396

1630-1645

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	0	0	27	0	0	0	0	0	0	0	27
2	0	0	0	0	0	1	0	0	0	0	0	1
3	0	0	0	11	0	9	0	0	0	0	0	20
4	34	0	13	0	0	114	0	0	0	0	0	161
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	13	94	0	0	0	0	0	0	0	107
7	0	1	0	0	0	0	0	0	0	0	0	1
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	4	0	0	0	0	0	0	0	4
11	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	34	1	26	136	0	124	0	0	0	0	0	321

1645-1700

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	0	0	24	0	0	0	0	0	0	0	32
2	0	0	0	0	0	1	0	0	0	0	0	2
3	0	0	0	12	0	9	0	0	0	0	0	25
4	31	0	11	0	0	103	0	0	0	0	0	145
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	11	76	0	0	0	0	0	0	0	87
7	0	1	0	0	0	0	0	0	0	0	0	1
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	3	0	1	0	0	0	0	0	4
11	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	31	1	22	115	0	114	0	0	0	0	0	297

1700-1715

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	0	0	36	0	0	0	0	0	0	0	36
2	0	0	0	0	0	1	0	0	0	0	0	2
3	0	0	0	12	0	10	0	0	0	0	0	26
4	33	0	12	0	0	110	0	0	0	0	0	155
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	12	83	0	0	0	0	0	0	0	95
7	0	1	0	0	0	0	0	0	0	0	0	1
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	3	0	1	0	0	0	0	0	4
11	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	33	1	24	134	0	122	0	0	0	0	0	357

1715-1730

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	0	0	33	0	0	0	0	0	0	0	39
2	0	0	0	0	0	1	0	0	0	0	0	2
3	0	0	0	11	0	9	0	0	0	0	0	23
4	29	0	11	0	0	96	0	0	0	0	0	136
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	11	74	0	0	0	0	0	0	0	85
7	0	1	0	0	0	0	0	0	0	0	0	1
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	3	0	1	0	0	0	0	0	4
11	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	29	1	22	121	0	107	0	0	0	0	0	310

1730-1745

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	0	0	33	0	0	0	0	0	0	0	39
2	0	0	0	0	0	1	0	0	0	0	0	2
3	0	0	0	11	0	9	0	0	0	0	0	23
4	29	0	11	0	0	96	0	0	0	0	0	136
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	11	74	0	0	0	0	0	0	0	85
7	0	1	0	0	0	0	0	0	0	0	0	1
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	3	0	1	0	0	0	0	0	4
11	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	29	1	22	121	0	107	0	0	0	0	0	310

1745-1800

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	0	0	33	0	0	0	0	0	0	0	39
2	0	0	0	0	0	1	0	0	0	0	0	2
3	0	0	0	11	0	9	0	0	0	0	0	23
4	29	0	10	0	0	95	0	0	0	0	0	134
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	10	74	0	0	0	0	0	0	0	84
7	0	1	0	0	0	0	0	0	0	0	0	1
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	3	0	1	0	0	0	0	0	4
11	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	29	1	20	121	0	106	0	0	0	0	0	287

2031 DS2A CALCULATIONS - AM PEAK

STEP 1 - FLOWS FROM BTM

Lights

AM PEAK	1	2	3	4	5	6	7	8	9	10	11	12	13	Total
1	0	421	88	1062	0	0	9	0	0	44	88	31	62	1795
2	219	0	0	0	247	0	0	43	0	0	44	31	62	646
3	61	0	0	193	0	104	0	0	0	0	49	0	0	385
4	165	1	208	0	2	2079	5	12	5	10	0	0	0	2761
5	0	0	0	0	0	0	0	0	0	22	0	0	12	34
6	0	195	128	3089	0	0	11	63	16	0	133	31	0	3667
7	44	293	0	27	0	0	0	0	28	11	17	9	412	
8	39	0	0	0	0	0	0	0	0	0	0	0	0	39
9	21	1	0	17	226	0	0	31	0	1	0	0	13	341
10	0	21	0	1	0	0	0	0	0	0	0	0	0	49
11	0	14	0	0	0	0	0	0	0	0	0	0	0	27
12	99	4	0	0	0	49	13	7	20	10	7	0	96	306
13	0	0	0	0	0	0	7	1	0	0	0	0	0	8
Total	1301	956	394	4361	30	3028	340	65	241	164	91	809	277	12096

HGVs

	1	2	3	4	5	6	7	8	9	10	11	12	13	Total
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	19	0	0	23	0	0	0	13	0	0	0	0	0	55
3	12	0	0	58	0	0	45	0	0	0	0	0	0	115
4	137	0	16	0	0	0	351	0	0	0	56	0	28	588
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	15	19	19	546	0	0	0	0	4	0	0	603
7	0	7	0	0	0	0	0	0	0	0	0	0	8	
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	16	2	0	15	0	0	4	0	0	0	0	0	0	36
11	9	2	0	0	0	0	0	0	0	0	0	0	0	11
12	0	0	0	0	0	0	0	0	1	0	0	0	0	1
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	194	37	77	883	0	419	13	0	0	37	21	6	52	1740

Total

	1	2	3	4	5	6	7	8	9	10	11	12	13	Total
1	0	421	88	1062	0	0	9	0	0	44	88	31	62	1795
2	219	0	0	23	247	0	0	56	0	0	44	31	62	701
3	61	0	0	251	0	104	45	0	0	0	49	0	0	498
4	302	1	224	0	2	2079	5	12	5	10	56	0	28	4349
5	0	0	0	0	0	0	0	0	0	22	0	0	12	34
6	0	195	128	3089	0	0	11	63	16	0	133	31	0	3667
7	44	293	0	27	0	0	0	0	28	11	17	9	412	
8	39	0	0	0	0	0	0	0	0	0	0	0	0	39
9	21	1	0	17	226	0	0	31	0	1	0	0	13	341
10	16	23	0	16	0	0	4	0	0	0	0	0	0	85
11	9	16	0	0	0	0	0	0	0	0	0	0	0	38
12	99	4	0	0	0	49	13	7	21	10	7	0	96	307
13	0	0	0	0	0	0	7	1	0	0	0	0	0	8
Total	1570	953	471	5244	30	3447	353	65	241	201	112	814	329	13836

STEP 2 - CONVERT TO 13 HR MATRICES USING 2016 BASE PROPORTIONS

LIGHTS

Time Period	Total	Overall Total	Proportion
0645-0700	2121	9302	23%
0700-0715	2177	9302	24%
0715-0730	2383	9302	26%
0730-0745	2271	9302	24%
			97%

HEAVES

Time Period	Total	Overall Total	Proportion
0645-0700	451	1397	32%
0700-0715	468	1397	33%
0715-0730	418	1397	30%
0730-0745	377	1397	27%
			118%

LIGHTS

Time Period	Total	Overall Total	Proportion
0745-0800	2548	9302	27%
0800-0815	2432	9302	26%
0815-0830	2226	9302	24%
0830-0845	2096	9302	23%
			100%

HEAVES

Time Period	Total	Overall Total	Proportion
0745-0800	272	1397	27%
0800-0815	348	1397	31%
0815-0830	364	1397	26%
0830-0845	313	1397	32%
			104%

LIGHTS

Time Period	Total	Overall Total	Proportion
0645-0900	1878	9302	21%
0900-0915	1825	9302	20%
			41%

HEAVES

Time Period	Total	Overall Total	Proportion
0645-0900	345	1397	31%
0900-0915	345	1397	25%
			69%

Used peak total to determine proportions for warm up and cool down periods

Used peak total to determine proportions for cool down period

LIGHTS

0645-0700

	1	2	3	4	5	6	7	8	9	10	11	12	13	TOTAL
1	0	96	13	233	0	0	9	0	0	10	12	7	105	16	502
2	45	0	0	0	54	0	0	9	0	0	10	7	23	7	155
3	12	0	0	42	0	24	0	0	0	0	11	0	0	7	77
4	21	0	47	0	0	586	1	3	1	2	0	0	0	2	665
5	0	0	0	0	0	0	0	0	0	5	0	0	0	3	9
6	0	50	44	29	0	707	0	3	0	0	0	0	0	0	833
7	99	64	0	4	0	0	0	0	4	2	0	0	0	0	173
8	9	0	0	0	0	0	0	0	0	0	0	0	0	0	9
9	6	0	0	0	0	52	0	0	7	1	0	0	0	0	66
10	1	5	0	0	0	0	2	0	0	1	0	0	2	0	11
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	23	2	0	0	0	16	3	2	7	2	2	0	21	5	83
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL		315	104	308	90	994	7	698	78	55	55	37	21	164	63	3750

0700-0715

	1	2	3	4	5	6	7	8	9	10	11	12	13	TOTAL
1	0	100	14	243	0	0	9	0	0	10	12	7	110	18	525
2	47	0	0	0	61	0	0	9	0	0	10	7	24	7	167
3	12	0	0	0	0	44	0	0	0	0	0	11	0	0	69
4	229	0	16	50	0	0	615	1	0	0	1	0	0	3	916
5	0	0	0	0	0	0	0	0	0	5	0	0	0	3	9
6	0	50	46	30	0	736	0	3	0	0	0	0	0	0	865
7	99	64	0	4	0	0	0	0	4	2	0	0	0	0	173
8	9	0	0	0	0	0	0	0	0	0	0	0	0	0	9
9	7	1	0	0	0	54	0	0	7	1	0	0	0	0	70
10	1	5	0	0	0	0	2	0	0	1	0	0	2	0	11
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	24	2	0	0	0	16	3	2	7	2	2	0	22	5	86
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL		328	218	94	1030	7	722	81	15	57	26	22	193	46	2863

0715-0730

	1	2	3	4	5	6	7	8	9	10	11	12	13	TOTAL
1	0	106	15	282	0	0	10	0	0	11	13	8	118	20	584
2	51	0	0	0	0	0	9	0	0	0	11	8	26	8	142
3	13	0	0	0	0	47	0	0	0	0	0	0	12	0	86
4	237	0	0	53	0	0	691	1	0	0	1	0	0	3	986
5	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3
6	0	50	46	33	0	794	0	3	0	0	0	0	0	0	926
7	99	64	0	4	0	0	0	0	4	2	0	0	0	0	173
8	9	0	0	0	0	0	0	0	0	0	0	0	0	0	9
9	8	1	0	0	0	58	0	0	7	1	0	0	0	0	75
10	1	5	0	0	0	0	2	0	0	1	0	0	2	0	11
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	25	2	0	0	0	18	3	2	8	2	3	0	24	6	93
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL		364	226	181	1117	6	776	67	17	62	42	25	207	75	3066

0730-0745

	1	2	3	4	5	6	7	8	9	10	11	12	13	TOTAL
1	0	103	14	249	0	0	9	0	0	11	12	7	133	19	558
2	48	0	0	0	0	0	9	0	0	0	12	7	35	7	118
3	12	0	0	0	0	45	0	0	0	0	0	0	12	0	69
4	226	0	15	0	0	0	658	1	0	0	1	0	0	3	904
5	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3
6	0	50	46	30	0	757	0	3	0	0	0	0	0	0	886
7	99	64	0	4	0	0	0	0	4	2	0	0	0	0	173
8	9	0	0	0	0	0	0	0	0	0	0	0	0	0	9
9	7	1	0	0	0	56	0	0	7	1	0	0	0	0	72
10	1	5	0	0	0	0	2	0	0	1	0	0	2	0	11
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	24	2	0	0	0	17	3	2	7	3	2	0	23	5	88
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL		337	224	96	1065	7	739	83	16	18	40	32	187	68	2953	11692

0745-0800

	1	2	3	4	5	6	7	8	9	10	11	12	13	TOTAL
1	0	110	16	295	0	0	10	0	0	12	13	8	125	21	611
2	54	0	0	0	0	0	10	0	0	0	13	8	28	8	167
3	14	0	0	50	0	28	0	0	0	0	13	0	0	8	113
4	253	0	17	0	1	706	1	3	1	3	1	0	0	3	1028
5	0	0	0	0	0	0	0	0	0	6	0	0	0	3	9
6	0	53	35	849	0	0	1	3	17	4	2	0	36	9	965
7	99	64	0	4	0	0	0	0	4	2	0	0	0	0	173
8	9	0	0	0	0	0	0	0	0	0	0	0	0	0	9
9	8	1	0	0	0	62	0	0	8	1	0	0	0	0	80
10	1	5	0	0	0	0	2	0	0	1	0	0	2	0	11
11	1	4	0	0	0	0	0	0	0	0	0	0	1	0	6
12	27	2	0	0	0	19	3	2	8	2	3	0	25	6	97
13	1	0	0	0	0	0	0	0	0	0	0	0	4	0	4
TOTAL		378	251	198	1194	9	839	93	16	46	45	25	221	76	3313

0800-0815

	1	2	3	4	5	6	7	8	9	10	11	12	13	TOTAL
1	0	135	15	357	0	0	10	0	0	13	15	9	133	25	575
2	52	0	0	0	0	0	10	70	0	0	11	8	26	8	150
3	14	0	0	60	0	27	0	0	0	0	12	0	0	8	121
4	242	0	56	0	1	674	1	3	1	3	1	0	0	2	983
5	0	0	0	0	0	0	0	0	0	6	0	0	0	3	9
6	0	51	33	810	0	0	1	3	16	4	2	0	35	8	963
7	99	64	0	4	0	0	0	0	4	2	0	0	0	0	173
8	9	0	0	0	0	0	0	0	0	0	0	0	0	0	9
9	7	1	0	0	0	60	0	0	8	1	0	0	0	0	77
10	1	5	0	0	0	0	2	0	0	1	0	0	2	0	11
11	1	4	0	0	0	0	0	0	0	0	0	0	1	0	6
12	26	2	0	0	0	18	3	2	8	2	3	0	24	6	94
13	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
TOTAL		361	239	1231	1	779	17	78	37	32	44	17	227	70	3162

0815-0830

	1	2	3	4	5	6	7	8	9	10	11	12	13	TOTAL
1	0	197	14	245	0	0	9	0	0	12	7	110	18	617
2	47	0	0	0	0	0	9	64	0	0	10	7	24	7	168
3	12	0	0	44	0	25	0	0	0	0	11	0	0	7	99
4	221	0	50	0	0	617	1	3	1	2	1	0	0	2	898
5	0	0	0	0	0	0	0	0	0	6	0	0	0	3	9
6	0	47	31	742	0	0	1	3	15	4	2	0	32	7	843
7	99	64	0	4	0	0	0	0	4	2	0	0	0	0	173
8	9	0	0	0	0	0	0	0	0	0	0	0	0	0	9
9	7	1	0	0	0	54	0	0	7	1	0	0	2	0	72
10	1	5	0	0	0	0	2	0	0	1	0	0	2	0	11
11	1	3	0	0	0	0	0	0	0	0	0	0	1	0	5
12	24	2	0	0	0	17	3	2	7	2	2	0	22	5	86
13	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
TOTAL		331	219	94	1044	7	725	81	16	58	39	22	194	66	2895

0830-0845

	1	2	3	4	5	6	7	8	9	10	11	12	13	TOTAL
1	0	95	13	220	0	0	9	0	0	10	12	7	114	17	497
2	44	0	0	0	0	0	8	60	0	0	10	7	23	7	179
3	11	0	0	41	0	22	0	0	0	0	11	0	0	7	92
4	208	0	47	0	0	581	1	3	1	2	1	0	0	2	845
5	0	0	0	0	0	0	0	0	0	6	0	0	0	3	9
6	0	44	29	698	0	0	1	3	14	4	2	0	30	7	794
7	99	64	0	4	0	0	0	0	4	2	0	0	0	0	173
8	9	0	0	0	0	0	0	0	0	0	0	0	0	0	9
9	6	0	0	0	0	55	0	0	7	1	0	0	0	0	69
10	1	5	0	0	0	0	2	0	0	1	0	0	2	0	11
11	1	3	0	0	0	0	0	0	0	0	0	0	1	0	5
12	22	2	0	0	0	16	3	2	7	2	2	0	21	5	83
13	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
TOTAL		311	206	963	7	674	76	68	33	26	38	14	216	61	2725	10998

0645-0900

	1	2	3	4	5	6	7	8	9	10	11	12	13	TOTAL
1	0	69	13	157	0	0	9	0	0	10	13	8	98	19	398
2	42	0	0	0	0	0	8	57	0	0	9	6	21	6	122
3	11	0	0	39	0	22	0	0	0	0	10	0	0	7	73
4	197	0	0	44	0	546	1	3	1	2	1	0	0	2	796
5	0	0	0	0	0	0	0	0	0	5	0	0	0	3	9
6	0	41	27	669	0	0	1	2	13	3	2	0	28	7	769
7	94	54	0	4	0	0	0	0	4	2	0	0	0	0	154
8	8	0	0	0	0	0	0	0	0	0	0	0	0	0	8
9	6	0	0	0	0	48	0	0	7	1	0	0	2	0	64
10	1	4	0	0	0	0	2	0	0	1	0	0	2	0	9
11	1	3	0	0	0	0	0	0	0	0	0	0	1	0	5
12	21	2	0	0	0	15	3	2	6	2	1	0	20	5	77
13	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
TOTAL		294	185	914	927	6	644	72	14	51	35	19	172	59	3372

0900-0915

	1	2	3	4	5	6	7	8	9	10	11	12	13	TOTAL
1	0	83	13	206	0	0	8	0	0	9	10	6	93	15	432
2	36	0	0	0	0	0	7	52	0	0	8	6	20	5	134
3	10	0	0	36	0	20	0	0	0	0	9	0	0	6	86
4	181	0	41	0	0	506	1	2	1	2	1	0	0	2	735
5	0	0	0	0	0	0	0	0	0	4	0	0	0	2	6
6	0	36	25	606	0	0	1	2	12	3	2	0	26	6	691
7	93	50	0	3	0	0	0	0	3	2	0	0	0	0	150
8	7	0	0	0	0	0	0	0	0	0	0	0	0	0	7
9	6	0	0	0	0	45	0	0	6	1	0	0	2	0	60
10	1	4	0	0	0	0	2	0	0	1	0	0	2	0	9
11	1	3	0	0	0	0	0	0	0	0	0	0	1	0	5
12	19	1	0	0	0	14	3	1	6	2	1	0	18	4	69
13	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
TOTAL		271	180	77	855	6	584	57	13	47	32	18	159	54	2373

HEAVES

0645-0700

	1	2	3	4	5	6	7	8	9	10	11	12	13	TOTAL
1	0	0	1	75	0	0	0	0	0	0	0	0	0	76
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	4	0	0	18	0	14	0	0	0	0	0	0	0	36
4	44	0	5	0	0	113	0	0	0	5	3	0	0	171
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	19	176	0	0	0	0	1	1	0	6	202
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	3	0	0	0	0	0	0	0	0	0	0	0	0	3
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL		63	12	25	285	0	135	4	0	0	12	7	2	17	562

0700-0715

	1	2	3	4	5	6	7	8	9	10	11	12	13	TOTAL
1	0	0	0	68	0	0	0	0	0	0	0	1	1	70
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	4	0	0	18	0	11	0	0	0	0	0	0	0	33
4	40	0	0	0	0	102	0	0	0	0	0	0	0	154
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	17	159	0	0	0	0	1	1	0	6	182
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	3	0	0	0	0	0	0	0	0	0	0	0	0	3
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL		56	11	22	257	0	122	4	0	0

2031 DS2A CALCULATIONS - PM PEAK

STEP 1 - FLOWS FROM BTM

LIGHTS

ANYTM	1	2	3	4	5	6	7	8	9	10	11	12	13	Total
1	0	269	185	1140	0	0	44	0	0	0	0	0	0	1638
2	378	0	0	0	0	14	265	4	14	16	11	4	23	677
3	74	0	0	213	0	140	0	0	0	0	0	0	0	428
4	1528	0	165	0	5	1653	15	51	0	1	1	0	2	3180
5	0	0	0	0	0	0	0	0	0	0	1	0	3	4
6	0	0	259	143	3089	0	0	16	27	0	0	70	2	3606
7	42	137	0	42	0	0	0	0	0	0	0	0	0	221
8	42	0	0	0	0	0	0	0	0	0	0	0	0	42
9	48	0	0	2	4	282	0	46	0	0	0	0	0	382
10	51	63	0	12	0	0	50	1	3	0	0	9	0	179
11	26	34	0	8	0	6	16	0	0	0	0	0	0	90
12	175	9	0	0	0	106	23	11	29	4	2	0	42	402
13	36	0	0	0	0	14	37	13	0	0	0	0	0	100
Total	2375	774	613	4469	34	4026	422	135	138	44	14	303	90	13237

HGVS

	1	2	3	4	5	6	7	8	9	10	11	12	13	Total
1	0	20	2	0	0	0	0	0	0	0	0	0	0	22
2	17	0	0	0	0	0	2	0	0	0	0	0	0	19
3	13	0	0	0	0	48	0	28	0	0	0	0	0	89
4	125	0	44	0	0	0	406	0	0	0	13	7	26	621
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	13	0	13	327	0	0	0	0	0	0	353
7	0	5	0	0	0	0	0	0	0	0	0	0	0	5
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	12	2	0	0	0	12	0	0	3	0	0	0	0	30
11	7	0	0	0	0	0	0	0	0	0	0	0	0	7
12	0	0	0	0	0	0	0	0	0	0	1	0	0	1
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	183	18	46	13	0	86	735	28	3	0	14	7	26	1161

Total

	1	2	3	4	5	6	7	8	9	10	11	12	13	Total
1	0	289	187	1140	0	0	44	0	0	0	0	0	0	1660
2	395	0	0	0	0	14	267	4	14	16	11	4	23	696
3	87	0	0	213	0	188	0	28	0	0	0	0	0	517
4	1653	0	209	0	5	1653	421	51	0	1	14	7	28	5204
5	0	0	0	0	0	0	0	0	0	0	1	0	3	4
6	0	0	259	156	3089	13	327	16	27	0	0	70	2	3959
7	42	142	0	42	0	0	0	0	0	0	0	0	0	226
8	42	0	0	0	0	0	0	0	0	0	0	0	0	42
9	48	0	0	2	4	282	0	46	0	0	0	0	0	382
10	63	65	0	12	0	12	50	1	6	0	0	9	0	209
11	33	34	0	8	0	6	16	0	0	0	0	0	0	97
12	175	9	0	0	0	106	23	11	29	4	2	0	42	402
13	36	0	0	0	0	14	37	13	0	0	0	0	0	100
Total	2537	792	655	4582	34	4167	1157	263	141	44	28	310	116	14413

STEP 2 - CONVERT TO 13 HR MATRICES USING 2016 BASE PROPORTIONS

LIGHTS

Time Period	Total	Overall Total	Proportion
1530-1545	2200	10763	21%
1545-1600	2175	10763	22%
1600-1615	2515	10763	23%
1615-1630	2579	10763	24%
			91%

HEAVES

Time Period	Total	Overall Total	Proportion
1530-1545	367	1092	34%
1545-1600	378	1092	34%
1600-1615	326	1092	30%
1615-1630	362	1092	33%
			127%

LIGHTS

Time Period	Total	Overall Total	Proportion
1630-1645	2655	10764	25%
1645-1700	2709	10763	25%
1700-1715	2646	10763	25%
1715-1730	2759	10763	26%
			100%

HEAVES

Time Period	Total	Overall Total	Proportion
1630-1645	292	1092	27%
1645-1700	269	1092	25%
1700-1715	286	1092	26%
1715-1730	245	1092	22%
			100%

LIGHTS

Time Period	Total	Overall Total	Proportion
1730-1745	2662	10763	25%
1745-1800	2533	10763	23%
			48%

Used peak total to determine proportions for cool down period

HEAVES

Time Period	Total	Overall Total	Proportion
1730-1745	243	1092	22%
1745-1800	247	1092	23%
			45%

Used peak total to determine proportions for cool down period

LIGHTS

1530-1545

	1	2	3	4	5	6	7	8	9	10	11	12	13	TOTAL
1	0	58	22	244	0	0	9	0	3	0	1	16	5	361
2	72	0	0	1	0	7	55	1	3	3	2	1	2	142
3	16	0	0	46	0	30	0	0	0	0	0	0	0	91
4	325	1	35	0	1	729	3	11	0	0	0	0	0	1106
5	0	0	0	0	0	0	0	0	0	0	0	1	0	1
6	0	0	55	30	656	0	0	3	6	0	0	15	0	765
7	9	29	0	9	0	0	0	0	0	0	0	0	0	47
8	9	0	0	0	0	0	0	0	0	0	0	0	0	9
9	10	0	0	0	1	60	0	10	0	0	0	0	0	82
10	11	13	0	3	0	0	11	0	1	0	0	2	0	36
11	6	7	0	2	0	1	3	0	0	0	0	0	0	19
12	37	2	0	0	0	23	5	2	4	1	0	0	0	74
13	7	7	0	0	0	4	1	0	0	0	0	0	0	19
TOTAL	567	165	80	935	5	960	90	29	30	4	5	65	19	3029

1545-1600

	1	2	3	4	5	6	7	8	9	10	11	12	13	TOTAL
1	0	59	23	253	0	0	10	0	3	3	1	17	5	373
2	74	0	0	2	0	7	56	1	3	4	2	1	2	156
3	16	0	0	0	0	47	0	31	0	0	0	0	0	94
4	335	1	36	0	0	753	3	11	0	0	0	0	0	1142
5	0	0	0	0	0	0	0	0	0	0	0	1	0	1
6	0	0	57	31	678	0	0	3	6	0	0	15	0	790
7	9	30	0	9	0	0	0	0	0	0	0	0	0	48
8	9	0	0	0	0	0	0	0	0	0	0	0	0	9
9	10	0	0	0	1	62	0	10	0	0	0	0	0	83
10	11	12	0	3	0	0	11	0	1	0	0	2	0	40
11	6	8	0	2	0	1	4	0	0	0	0	0	0	21
12	39	2	0	0	0	23	5	3	4	1	0	0	0	77
13	7	7	0	0	0	4	1	0	0	0	0	0	0	19
TOTAL	524	175	91	906	5	888	93	30	30	10	5	67	20	3020

1600-1615

	1	2	3	4	5	6	7	8	9	10	11	12	13	TOTAL
1	0	63	25	266	0	0	10	1	3	3	1	18	5	395
2	79	0	0	2	0	8	60	1	3	4	3	1	2	164
3	17	0	0	50	0	33	0	0	0	0	0	0	0	100
4	355	1	39	0	0	797	4	12	0	0	0	0	0	1208
5	0	0	0	0	0	0	0	0	0	0	0	1	0	1
6	0	0	61	33	720	0	0	3	6	0	0	16	0	839
7	10	32	0	10	0	0	0	0	0	0	0	0	0	52
8	10	0	0	0	0	0	0	0	0	0	0	0	0	10
9	11	0	0	0	1	66	0	11	0	0	0	0	0	89
10	12	14	0	3	0	0	12	0	1	0	0	2	0	44
11	6	8	0	2	0	1	4	0	0	0	0	0	0	21
12	41	2	0	0	0	25	5	3	5	1	0	0	0	82
13	7	8	0	0	0	4	1	0	0	0	0	0	0	20
TOTAL	555	181	97	1044	6	941	99	32	32	10	6	71	25	3093

1615-1630

	1	2	3	4	5	6	7	8	9	10	11	12	13	TOTAL
1	0	65	25	273	0	0	11	1	3	3	2	19	5	405
2	80	0	0	2	0	8	61	1	3	4	3	1	2	165
3	18	0	0	51	0	34	0	0	0	0	0	0	0	103
4	364	1	40	0	0	817	4	12	0	0	0	0	0	1240
5	0	0	0	0	0	0	0	0	0	0	0	1	0	1
6	0	0	63	34	738	0	0	3	6	0	0	17	0	861
7	10	33	0	10	0	0	0	0	0	0	0	0	0	53
8	10	0	0	0	0	0	0	0	0	0	0	0	0	10
9	12	0	0	0	1	68	0	11	0	0	0	0	0	92
10	12	14	0	3	0	0	12	0	1	0	0	2	0	44
11	7	8	0	2	0	1	4	0	0	0	0	0	0	22
12	42	2	0	0	0	25	5	3	5	1	0	0	0	83
13	7	8	0	0	0	4	1	0	0	0	0	0	0	20
TOTAL	569	185	99	1070	6	964	101	32	33	10	6	73	22	3171

1630-1645

	1	2	3	4	5	6	7	8	9	10	11	12	13	TOTAL
1	0	66	26	277	0	0	11	1	3	3	2	19	6	414
2	83	0	0	2	0	9	64	1	3	4	3	1	2	173
3	18	0	0	53	0	36	0	0	0	0	0	0	0	107
4	375	1	41	0	1	842	4	13	0	0	0	1	1	1277
5	0	0	0	0	0	0	0	0	0	0	0	1	0	1
6	0	0	64	35	760	0	0	4	7	0	0	17	2	891
7	9	30	0	9	0	0	0	0	0	0	0	0	0	48
8	9	0	0	0	0	0	0	0	0	0	0	0	0	9
9	12	0	0	0	1	70	0	11	0	1	0	0	0	95
10	13	13	0	3	0	0	12	0	1	0	0	2	0	44
11	7	8	0	2	0	1	4	0	0	0	0	0	0	22
12	43	2	0	0	0	26	5	3	5	1	0	0	0	85
13	7	8	0	0	0	4	1	0	0	0	0	0	0	20
TOTAL	586	191	102	1102	6	993	104	33	34	11	6	75	22	3265

1645-1700

	1	2	3	4	5	6	7	8	9	10	11	12	13	TOTAL
1	0	66	26	287	0	0	11	1	3	3	2	19	6	424
2	86	0	0	2	0	9	64	1	3	4	3	1	2	167
3	18	0	0	54	0	36	0	0	0	0	0	0	0	108
4	383	1	42	0	1	859	4	13	0	0	0	1	1	1303
5	0	0	0	0	0	0	0	0	0	0	0	1	0	1
6	0	65	36	765	0	0	0	2	4	7	1	18	2	899
7	9	31	0	9	0	0	0	0	0	0	0	0	0	49
8	9	0	0	0	0	0	0	0	0	0	0	0	0	9
9	12	0	0	0	1	71	0	11	0	1	0	0	0	96
10	13	13	0	3	0	0	13	0	1	0	0	2	0	45
11	7	8	0	2	0	1	4	0	0	0	0	0	0	22
12	43	2	0	0	0	27	5	3	5	1	0	0	0	86
13	23	2	0	0	0	4	1	0	0	0	0	0	0	30
TOTAL	604	191	104	1129	6	1013	106	34	35	11	6	79	23	3232

1700-1715

	1	2	3	4	5	6	7	8	9	10	11	12	13	TOTAL
1	0	65	25	280	0	0	11	1	3	3	2	19	6	414
2	82	0	0	2	0	8	61	1	3	4	3	1	2	163
3	18	0	0	52	0	36	0	0	0	0	0	0	0	105
4	373	1	41	0	1	837	4	13	0	0	0	1	1	1268
5	0	0	0	0	0	0	0	0	0	0	0	1	0	1
6	0	64	35	745	0	0	0	2	4	7	1	17	2	857
7	9	30	0	9	0	0	0	0	0	0	0	0	0	48
8	9	0	0	0	0	0	0	0	0	0	0	0	0	9
9	12	0	0	0	1	69	0	11	0	1	0	0	0	94
10	12	13	0	3	0	0	12	0	1	0	0	2	0	43
11	7	8	0	2	0	1	4	0	0	0	0	0	0	22
12	43	2	0	0	0	26	5	3	5	1	0	0	0	85
13	23	2	0	0	0	4	1	0	0	0	0	0	0	30
TOTAL	583	190	101	1096	6	988	104	33	34	11	6	74	22	3247

1715-1730

	1	2	3	4	5	6	7	8	9	10	11	12	13	TOTAL
1	0	69	27	292	0	0	11	1	3	3	2	20	6	433
2	86	0	0	2	0	9	65	1	3	4	3	1	2	176
3	19	0	0	55	0	38	0	0	0	0	0	0	0	110
4	390	1	42	0	1	875	4	13	0	0	0	1	1	1327
5	0	0	0	0	0	0	0	0	0	0	0	1	0	1
6	0	66	37	779	0	0	0	2	4	7	1	18	2	916
7	9	31	0	9	0	0	0	0	0	0	0	0	0	49
8	9	0	0	0	0	0	0	0	0	0	0	0	0	9
9	13	0	0	0	1	72	0	12	0	1	0	0	0	98
10	13	14	0	3	0	0	13	0	1	0	0	2	0	46
11	7	9	0	2	0	1	4	0	0	0	0	0	0	23
12	45	2	0	0	0	27	5	3	5	1	0	0	0	88
13	23	2	0	0	0	4	1	0	0	0	0	0	0	30
TOTAL	659	196	106	1146	6	1032	106	35	35	11	6	78	23	3565

1730-1745

	1	2	3	4	5	6	7	8	9	10	11	12	13	TOTAL
1	0	67	26	298	0	0	11	1	3	3	2	19	6	436
2	83	0	0	2	0	8	63	1	3	4	3	1	2	166
3	18	0	0	53	0	35	0	0	0	0	0	0	0	106
4	376	1	41	0	1	844	4	13	0	0	0	1	1	1280
5	0	0	0	0	0	0	0	0	0	0	0	1	0	1
6	0	64	35	750	0	0	0	2	4	7	1	17	2	882
7	11	34	0	11	0	0	0	0	0	0	0	0	0	56
8	11	0	0	0	0	0	0	0	0	0	0	0	0	11
9	12	0	0	0	1	70	0	11	0	1	0	0	0	95
10	13	13	0	3	0	0	12	0	1	0	0	2	0	42
11	7	8	0	2	0	1	4	0	0	0	0	0	0	22
12	43	2	0	0	0	26	6	3	5	1	0	0	0	87
13	23	2	0	0	0	4	1	0	0	0	0	0	0	30
TOTAL	587	191	102	1185	6	996	104	33	34	11	6	75	22	3374

1745-1800

	1	2	3	4	5	6	7	8	9	10	11	12	13	TOTAL
1	0	63	25	267	0	0	10	1	3	3	1	18	5	396
2	79	0	0	2	0	8	60	1	3	4	3	1	2	165
3	17	0	0	50	0	33	0	0	0	0	0	0	0	100
4	356	1	39	0	0	799	4	12	0	0	0	0	0	1211
5	0	0	0	0	0	0	0	0	0	0	0	1	0	1
6	0	61	35	731	0	0	0	2	4	7	1	16	2	859
7	10	32	0	10	0	0	0	0	0	0	0	0	0	52
8	10	0	0	0	0	0	0	0	0	0	0	0	0	10
9	11	0	0	0	1	66	0	10	0	0	0	0	0	88
10	12	12	0	3	0	0	12	0	1	0	0	2	0	42
11	7	8	0	2	0	1	4	0	0	0	0	0	0	22
12	41	2	0	0	0	25	5	3	5	1	0	0	0	82
13	7	8	0	0	0	4	1	0	0	0	0	0	0	20
TOTAL	556	181	97	1046	6	943	99	32	32	10	6	71	21	3099

4373

HEAVES

1530-1545

	1	2	3	4	5	6	7	8	9	10	11	12	13	TOTAL
1	0	0	1	35	0	0	0	0	0	0	0	2	0	38
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	5	0	0	17	0	14	0	0	0	0	0	0	0	36
4	44	0	16	0	0	145	0	0	5	3	0	0	0	212
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	18	116	0	0	0	0	1	1	0	0	0	136
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	4	1	0	4	0	1	0	0	0	0	0	0	0	11
11	2	0	0	2	0	1	0	0	0	0	0	0	0	5
12	4	1	0	0	0	2	0	0	0	0	0	0	0	7
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	57	7	35	196	0	167	0	0	0	11	6	0	17	496

1545-1600

	1	2	3	4	5	6	7	8	9	10	11	12	13	TOTAL
1	0	0	0	33	0	0	0	0	0	0	0	0	0	33
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	4	0	0	16	0	13	0	0	0	0	0	0	0	34
4	42	0	15	0	0	136	0	0	0	4	2	0	0	202
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	16	111	0	0	0	0	1	0	0	0	128
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	4	1	0	4	0	1	0	0	0	0	0	0	0	10
11	2	0	0	2	0	1	0	0	0	0	0	0	0	5
12	2	0	0	0	0	2	0	0	0	0	0	0	0	4
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	55	6	33	170	0	159	0	0	0	11	6	0	16	456

1600-1615

	1	2	3	4	5	6	7	8	9	10	11	12	13	TOTAL
1	0	0	0	29	0	0	0	0	0	0	0	2	0	31
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	4	0	0	13	0	11	0	0	0	0	0	0	0	28
4	37	0	13	0	0	122	0	0	0	4	2	0	0	178
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	16	98	0	0	0	0	1	0	0	0	115
7	0	0	0	0	0

2034 RCGA CALCULATIONS - AM PEAK

STEP 01 - AM PEAK HOUR MATRIX

ANY ROW	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	1945	400	1980	4870	0	20	2	30	20	10	9277
2	1910	0	0	0	0	1780	1870	0	40	20	10	5630
3	510	0	0	1647	810	1107	0	0	0	0	0	4074
4	1980	0	0	0	0	2703	0	10	0	10	0	4703
5	1770	0	0	0	0	1107	0	20	810	10	0	3917
6	0	1780	1700	2670	1080	0	0	10	10	10	0	7260
7	20	1870	0	10	0	0	0	0	20	10	0	1930
8	2	40	0	0	0	0	0	0	0	0	0	42
9	30	0	0	0	0	0	0	0	0	0	0	30
10	20	20	0	0	0	0	0	0	0	0	0	40
11	10	10	0	0	0	0	0	0	0	0	0	20
Total	14490	9950	4099	14823	9555	15281	3772	914	3160	3464	914	109922

LIGHTS	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	1945	400	1980	4870	0	20	2	30	20	10	9277
2	1910	0	0	0	0	1780	1870	0	40	20	10	5630
3	510	0	0	1647	810	1107	0	0	0	0	0	4074
4	1980	0	0	0	0	2703	0	10	0	10	0	4703
5	1770	0	0	0	0	1107	0	20	810	10	0	3917
6	0	1780	1700	2670	1080	0	0	10	10	10	0	7260
7	20	1870	0	10	0	0	0	0	20	10	0	1930
8	2	40	0	0	0	0	0	0	0	0	0	42
9	30	0	0	0	0	0	0	0	0	0	0	30
10	20	20	0	0	0	0	0	0	0	0	0	40
11	10	10	0	0	0	0	0	0	0	0	0	20
Total	14490	9950	4099	14823	9555	15281	3772	914	3160	3464	914	109922

HGVs	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	0	0	2	0	0	0	0	0	0	0	2
2	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	2	0	0	0	0	0	0	0	2

0-1	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	1945	400	1978	4870	0	20	2	30	20	10	9275
2	1910	0	0	0	0	1780	1870	0	40	20	10	5630
3	510	0	0	1647	810	1107	0	0	0	0	0	4074
4	1980	0	0	0	0	2703	0	10	0	10	0	4703
5	1770	0	0	0	0	1107	0	20	810	10	0	3917
6	0	1780	1700	2670	1080	0	0	10	10	10	0	7260
7	20	1870	0	10	0	0	0	0	20	10	0	1930
8	2	40	0	0	0	0	0	0	0	0	0	42
9	30	0	0	0	0	0	0	0	0	0	0	30
10	20	20	0	0	0	0	0	0	0	0	0	40
11	10	10	0	0	0	0	0	0	0	0	0	20
Total	14490	9950	4099	14823	9555	15281	3772	914	3160	3464	914	109922

STEP 02 - CONVERT TO 5 MINS PEAK FLOW USING EQUATIONS FROM PROPORTIONS

LIGHTS

Time Period	Total	Choice (Total)	Proportion
0845-0750	21125	65552	32%
0750-0715	22157	65552	34%
0715-0720	22583	65552	34%
0720-0745	22771	65552	34%
			97%

HEAVIES

Time Period	Total	Overall Total	Proportion
0845-0750	4511	13957	32%
0750-0715	4981	13957	35%
0715-0720	4514	13957	32%
0720-0745	4777	13957	34%
			132%

LIGHTS

Time Period	Total	Choice (Total)	Proportion
0745-0800	25180	65552	37%
0800-0815	24252	65552	36%
0815-0830	22236	65552	34%
0830-0845	20996	65552	32%
			139%

HEAVIES

Time Period	Total	Overall Total	Proportion
0745-0800	372	1957	27%
0800-0815	348	1957	26%
0815-0830	363	1957	26%
0830-0845	313	1957	22%
			100%

LIGHTS

Time Period	Total	Choice (Total)	Proportion
0845-0900	1976	65552	25%
0900-0915	1626	65552	20%
			45%

Used peak total to determine proport ions for we ns up and cost down periods

HEAVIES

Time Period	Total	Overall Total	Proportion
0845-0900	344	1957	25%
0900-0915	343	1957	35%
			60%

Used peak total to defer mine proportions for cost down period

LIGHTS

0845-0750

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	360	14	162	108	0	10	0	0	11	4	669
2	49	0	0	0	0	43	47	0	0	10	7	156
3	10	0	0	0	36	19	24	0	0	0	0	91
4	360	0	0	0	0	0	0	0	0	0	0	360
5	49	0	0	0	0	14	7	0	10	2	2	84
6	0	43	0	760	14	0	1	0	12	4	2	837
7	14	47	0	0	0	1	0	0	0	0	0	62
8	1	0	0	0	0	1	2	0	0	0	0	4
9	0	0	0	0	0	0	0	0	0	0	0	0
10	11	10	0	0	0	0	0	0	0	0	0	21
11	4	7	0	0	0	0	0	0	0	0	0	11
TOTAL	342	223	61	1054	266	768	63	19	97	27	15	2882

0750-0800

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	96	14	263	111	0	10	0	0	10	7	511
2	51	0	0	0	0	2	47	0	0	10	7	105
3	10	0	0	37	19	24	0	0	0	0	0	90
4	263	0	0	0	0	0	0	0	0	0	0	263
5	40	2	0	0	0	26	0	0	7	10	3	100
6	0	56	32	603	26	0	1	0	12	6	2	968
7	14	73	0	4	0	0	0	0	0	0	0	91
8	1	0	0	0	0	1	0	0	0	0	0	2
9	0	0	0	0	0	0	0	0	0	0	0	0
10	7	3	0	0	0	0	0	0	0	0	0	10
11	1	2	0	0	0	0	0	0	0	0	0	3
TOTAL	197	233	47	1021	156	752	65	20	99	39	22	2965

0715-0720

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	101	16	270	120	0	11	0	0	10	7	549
2	54	0	0	0	0	2	50	0	0	11	7	124
3	11	0	0	40	21	27	0	0	0	0	0	100
4	270	0	0	0	0	0	0	0	0	0	0	270
5	44	2	0	0	0	29	0	0	8	10	3	104
6	0	59	34	660	28	0	1	0	14	5	2	1004
7	14	79	0	4	0	0	0	0	0	0	0	97
8	1	0	0	0	0	1	0	0	0	0	0	2
9	0	0	0	0	0	0	0	0	0	0	0	0
10	8	3	0	0	0	0	0	0	0	0	0	11
11	1	2	0	0	0	0	0	0	0	0	0	3
TOTAL	364	251	68	1146	222	869	70	21	66	42	23	3326

0720-0745

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	97	15	259	114	9	11	0	10	13	7	535
2	52	0	0	0	0	2	48	0	0	11	7	170
3	11	0	0	38	20	26	0	0	0	0	0	97
4	259	0	0	0	0	0	0	0	0	0	0	259
5	43	2	0	0	0	28	0	0	8	10	3	100
6	0	56	32	623	26	0	1	0	13	5	3	971
7	14	75	0	4	0	0	0	0	0	0	0	93
8	1	0	0	0	0	1	0	0	0	0	0	2
9	0	0	0	0	0	0	0	0	0	0	0	0
10	8	3	0	0	0	0	0	0	0	0	0	11
11	1	2	0	0	0	0	0	0	0	0	0	3
TOTAL	369	239	100	1129	221	881	69	20	61	48	22	3356

0745-0800

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	109	16	295	126	0	12	0	11	14	7	617
2	58	0	0	0	0	2	54	0	0	12	8	191
3	12	0	0	43	22	29	0	0	0	0	0	106
4	295	0	0	0	0	0	0	0	0	0	0	295
5	49	3	0	0	0	29	0	0	22	3	2	113
6	0	63	36	685	29	0	1	0	14	5	2	1099
7	17	84	0	4	0	0	0	0	0	0	0	105
8	1	0	0	0	0	1	0	0	0	0	0	2
9	0	0	0	0	0	0	0	0	0	0	0	0
10	9	3	0	0	0	0	0	0	0	0	0	12
11	1	2	0	0	0	0	0	0	0	0	0	3
TOTAL	419	266	112	1266	206	899	75	23	68	45	26	3426

0800-0815

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	103	16	277	122	0	11	0	10	13	7	561
2	56	0	0	0	0	2	51	0	0	11	7	142
3	11	0	0	41	21	28	0	0	0	0	0	101
4	277	0	0	0	0	0	0	0	0	0	0	277
5	46	2	0	0	0	28	0	0	21	3	2	130
6	0	60	35	691	28	0	1	0	14	5	2	1166
7	16	80	0	4	0	0	0	0	0	0	0	100
8	1	0	0	0	0	1	0	0	0	0	0	2
9	0	0	0	0	0	0	0	0	0	0	0	0
10	8	3	0	0	0	0	0	0	0	0	0	11
11	1	2	0	0	0	0	0	0	0	0	0	3
TOTAL	392	256	107	1266	217	868	71	22	65	43	26	3391

0815-0830

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	89	14	239	105	0	10	0	9	12	7	485
2	48	0	0	0	0	2	44	0	0	10	6	130
3	10	0	0	35	18	24	0	0	0	0	0	87
4	239	0	0	0	0	0	0	0	0	0	0	239
5	40	2	0	0	0	26	0	0	19	3	2	112
6	0	52	30	595	24	0	1	0	12	4	2	1000
7	14	69	0	4	0	0	0	0	0	0	0	87
8	1	0	0	0	0	1	0	0	0	0	0	2
9	0	0	0	0	0	0	0	0	0	0	0	0
10	7	3	0	0	0	0	0	0	0	0	0	10
11	1	2	0	0	0	0	0	0	0	0	0	3
TOTAL	359	216	58	1106	217	783	65	20	59	39	22	3024

0830-0845

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	89	14	239	105	0	10	0	9	11	6	483
2	48	0	0	0	0	2	44	0	0	10	6	107
3	10	0	0	35	18	24	0	0	0	0	0	87
4	239	0	0	0	0	0	0	0	0	0	0	239
5	40	2	0	0	0	26	0	0	19	3	2	112
6	0	52	30	595	24	0	1	0	12	4	2	1000
7	14	69	0	4	0	0	0	0	0	0	0	87
8	1	0	0	0	0	1	0	0	0	0	0	2
9	0	0	0	0	0	0	0	0	0	0	0	0
10	7	3	0	0	0	0	0	0	0	0	0	10
11	1	2	0	0	0	0	0	0	0	0	0	3
TOTAL	359	216	58	1106	217	783	65	20	59	39	22	3024

0845-0900

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	84	13	226	99	0	9	0	8	11	6	456
2	45	0	0	0	0	2	42	0	0	9	6	103
3	11	0	0	33	17	23	0	0	0	0	0	83
4	226	0	0	0	0	0	0	0	0	0	0	226
5	39	2	0	0	0	25	0	0	17	2	2	106
6	0	49	28	734	31	0	1	2	12	4	2	868
7	13	65	0	3	0	0	0	0	0	0	0	80
8	1	0	0	0	1	2	0	0	1	0	0	5
9	0	0	0	0	0	0	0	0	0	0	0	0
10	5	3	0	0	0	0	0	0	0	0	0	8
11	1	2	0	0	0	0	0	0	0	0	0	3
TOTAL	339	205	54	1022	148	852	52	2	38	26	16	2955

0900-0915

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	78	12	208	92	0	8	0	8	10	6	421
2	42	0	0	0	0	2	39	0	0	8	6	127
3	10	0	0	31	16	21	0	0	0	0	0	79
4	208	0	0	0	0	0	0	0	0	0	0	208
5	36	2	0	0	0	24	0	0	16	2	2	82
6	0	45	26	661	28	0	1	2	11	4	2	781
7	12	60	0	3	0	0	0	0	0	0	0	72
8	1	0	0	0	1	2	0	0	1	0	0	5
9	0	0	0	0	0	0	0	0	0	0	0	0
10	5	3	0	0	0	0	0	0	0	0	0	8
11	1	2	0	0	0	0	0	0	0	0	0	3
TOTAL	291	190	49	912	137	749	48	2	35	24	16	2453

HEAVIES

0845-0750

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	0	1	77	2	0	0	0	0	1	0	81
2	1	0	0	0	0	0	0	0	0	0	0	1
3	0	0	0	16	0	0	0	0	0	0	0	17
4	49	0	0	0	0	0	0	0	0	0	0	49
5	1	0	0	0	0	0	0	0	0	0	0	1
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	51	0	1	93	2	0	0	0	0	1	0	149

0750-0800

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	0	1	68	1	0	0	0	0	2	0	72
2	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	17	0	0	0	0	0	0	0	17
4	41	0	0	0	0	0	0	0	0	0	0	41
5	1	0	0	0	0	0	0	0	0	0	0	1
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	42	0	1	85	1	0	0	0	0	2	0	131

0715-0720

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	0	1	71	1	0	0	0	0	4	0	77
2	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	17	0	0	0	0	0	0	0	17
4	42	0	0	0	0	0	0	0	0	0	0	42
5	1	0	0	0	0	0	0	0	0	0	0	1
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	43	0	1	88	1	0	0	0	0	4	0	137

0720-0745

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	0	1	66	1	0	0	0	0	4	0	72
2	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	15	0	0	0	0	0	0	0	15
4	34	0	0	0	0	0	0	0	0	0	0	34
5	1	0	0	0	0	0	0	0	0	0	0	1
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	35	0	1	81	1	0	0	0	0	4	0	122

0745-0800

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	0	1	91	1	0	0	0	0	4	2	99
2	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	19	0	0	0	0	0	0	0	19
4	46	0	0	0	0	0	0	0	0	0	0	46
5	1	0	0	0	0	0	0	0	0	0	0	1
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	47	0	1	110	1	0	0	0	0	4	2	165

0800-0815

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	0	1	69	1	0	0	0	0	4	2	77
2	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	14	0	0	0	0	0	0	0	14
4	35	0	0	0	0	0	0	0	0	0	0	35
5	1	0	0	0	0	0	0	0	0	0	0	1
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	36	0	1	83	1	0	0	0	0	4	2	127

0815-0830

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	0	1	62	1	0	0	0	0	4	2	70
2	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	15

2034 RCSA CALCULATIONS - PM PEAK

TOTAL ALL PEAK DIRECTIONS

ANY ROW	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	2749	648	1098	648	0	65	4	65	130	7	5406
2	376	0	0	0	0	648	109	4	0	17	14	1167
3	77	0	0	321	0	648	0	0	0	0	0	1045
4	1648	0	979	0	54	3791	0	65	0	0	0	6537
5	156	2	0	0	0	0	113	0	65	71	0	407
6	0	0	259	648	1945	0	0	0	26	0	0	2878
7	54	1145	0	54	27	0	0	0	0	0	0	1280
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	54	97	0	0	0	0	151
10	54	54	0	54	11	11	27	1	0	0	0	211
11	27	54	0	0	0	54	0	0	0	0	0	135
Total	2342	3984	1886	2175	2685	5196	411	74	156	218	21	21153

HGV

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	54	0	108	0	0	0	0	0	0	0	162
2	0	0	0	0	0	0	0	0	0	0	0	0
3	14	0	0	49	0	0	0	0	0	0	0	63
4	137	0	0	0	0	425	0	0	0	0	0	562
5	0	0	0	0	0	0	0	1	0	1	0	2
6	0	0	0	54	108	0	0	0	0	0	0	162
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	12	2	0	12	1	1	0	0	0	0	0	30
11	7	1	0	0	0	0	0	0	0	0	0	8
Total	170	58	0	223	109	426	0	1	0	1	0	1028

C-1

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	2642	1296	5296	1296	0	65	4	65	130	7	10805
2	376	0	0	0	0	1296	109	4	0	17	14	1817
3	91	0	0	321	0	1296	0	0	0	0	0	1708
4	1648	0	1296	0	54	4155	0	65	0	0	0	7218
5	167	2	0	0	0	0	113	0	65	71	0	418
6	0	0	259	972	2053	0	0	0	26	0	0	3309
7	54	1145	0	54	27	0	0	0	0	0	0	1280
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	54	97	0	0	0	0	151
10	66	54	0	54	11	11	27	1	0	0	0	224
11	34	54	0	0	0	54	0	0	0	0	0	142
Total	2435	4042	1555	6697	3441	6892	411	74	156	218	21	25941

STEP 2 - CONVERT TO 24 HOUR PASSENGER CAR EQUIVALENT PROPORTIONS

LIGHTS

Time Period	Total	Choice (Total)	Proportion
1600-1645	23300	10763	20%
1645-1730	21776	10763	22%
1800-1815	20116	10763	23%
1815-1830	20176	10763	24%
			91%

HEAVIES

Time Period	Total	Overall Total	Proportion
1600-1645	3917	10963	36%
1645-1800	3707	10963	32%
1800-1815	3206	10963	30%
1815-1830	3612	10963	29%
			127%

LIGHTS

Time Period	Total	Choice (Total)	Proportion
1630-1645	20016	10763	19%
1645-1700	27799	10763	26%
1700-1715	28160	10763	26%
1715-1730	27799	10763	26%
			96%

HEAVIES

Time Period	Total	Overall Total	Proportion
1630-1645	2962	10963	27%
1645-1700	2969	10963	26%
1700-1715	2966	10963	26%
1715-1730	2426	10963	22%
			100%

LIGHTS

Time Period	Total	Choice (Total)	Proportion
1730-1745	28462	10763	26%
1745-1800	26100	10763	23%
			49%

Used peak total to determine proport ions for cost down period

HEAVIES

Time Period	Total	Overall Total	Proportion
1730-1745	2421	10963	22%
1745-1800	2417	10963	21%
			43%

Used peak total to defer mine proportions for cost down period

LIGHTS

1600-1645

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	69	23	227	54	0	0	1	12	3	1	376
2	60	0	0	0	1	51	49	1	0	0	2	164
3	19	0	0	47	0	0	0	0	0	0	0	66
4	138	0	0	0	0	0	0	0	0	0	0	138
5	19	1	0	0	0	0	14	0	0	0	0	37
6	0	62	32	692	20	0	1	0	7	1	0	807
7	11	0	0	0	0	0	0	0	0	0	0	12
8	2	0	0	0	0	0	2	0	0	0	0	4
9	0	0	0	0	0	0	0	0	0	0	0	0
10	11	0	12	0	0	0	0	0	0	0	0	23
11	9	7	0	0	2	2	0	0	0	0	0	21
TOTAL	479	170	82	976	73	409	71	41	40	9	6	2356

1645-1700

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	69	27	279	69	0	0	1	14	3	2	464
2	94	0	0	0	1	69	69	1	0	0	3	231
3	27	0	0	69	0	0	0	0	0	0	0	96
4	193	0	0	0	0	0	0	0	0	0	0	193
5	39	1	0	0	0	0	28	0	16	16	1	101
6	0	72	36	796	23	0	2	0	8	1	0	938
7	12	0	0	0	0	0	0	0	0	0	0	12
8	2	0	0	0	0	0	2	0	0	0	0	4
9	0	0	0	0	0	0	0	0	0	0	0	0
10	12	0	12	0	0	0	0	0	0	0	0	24
11	7	2	0	0	2	2	0	0	0	0	0	13
TOTAL	396	176	91	1027	76	408	73	42	43	10	6	2346

1700-1715

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	69	27	279	69	0	0	1	14	3	2	464
2	94	0	0	0	1	69	69	1	0	0	3	231
3	27	0	0	69	0	0	0	0	0	0	0	96
4	193	0	0	0	0	0	0	0	0	0	0	193
5	39	1	0	0	0	0	28	0	16	16	1	101
6	0	72	36	796	23	0	2	0	8	1	0	938
7	12	0	0	0	0	0	0	0	0	0	0	12
8	2	0	0	0	0	0	2	0	0	0	0	4
9	0	0	0	0	0	0	0	0	0	0	0	0
10	12	0	12	0	0	0	0	0	0	0	0	24
11	7	2	0	0	2	2	0	0	0	0	0	13
TOTAL	396	176	91	1027	76	408	73	42	43	10	6	2346

1800-1815

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	64	26	208	37	0	0	1	13	3	2	353
2	67	0	0	0	1	54	54	1	0	0	2	179
3	19	0	0	62	0	0	0	0	0	0	0	81
4	154	0	0	0	0	0	0	0	0	0	0	154
5	16	1	0	0	0	0	19	0	17	1	0	54
6	0	63	36	760	21	0	2	0	8	1	0	892
7	12	14	0	0	0	0	0	0	0	0	0	26
8	2	0	0	0	0	0	2	0	0	0	0	4
9	0	0	0	0	0	0	0	0	0	0	0	0
10	11	0	12	0	0	0	0	0	0	0	0	23
11	6	0	0	1	2	2	0	0	0	0	0	11
TOTAL	514	144	100	1047	80	1014	77	45	50	10	6	3163

1815-1830

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	66	26	265	56	0	0	1	13	3	2	432
2	69	0	0	0	1	56	56	1	0	0	2	185
3	19	0	0	63	0	0	0	0	0	0	0	82
4	141	0	0	0	0	0	0	0	0	0	0	141
5	17	1	0	0	0	0	19	0	17	1	0	55
6	0	64	36	762	22	0	2	0	8	1	0	894
7	12	14	0	0	0	0	0	0	0	0	0	26
8	2	0	0	0	0	0	2	0	0	0	0	4
9	0	0	0	0	0	0	0	0	0	0	0	0
10	11	0	12	0	0	0	0	0	0	0	0	23
11	6	0	0	1	2	2	0	0	0	0	0	11
TOTAL	527	145	110	1095	82	1061	79	46	53	10	6	3213

1630-1645

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	69	27	279	69	0	0	1	14	3	2	464
2	94	0	0	0	1	69	69	1	0	0	3	231
3	27	0	0	69	0	0	0	0	0	0	0	96
4	193	0	0	0	0	0	0	0	0	0	0	193
5	39	1	0	0	0	0	28	0	16	16	1	101
6	0	72	36	796	23	0	2	0	8	1	0	938
7	12	0	0	0	0	0	0	0	0	0	0	12
8	2	0	0	0	0	0	2	0	0	0	0	4
9	0	0	0	0	0	0	0	0	0	0	0	0
10	12	0	12	0	0	0	0	0	0	0	0	24
11	7	2	0	0	2	2	0	0	0	0	0	13
TOTAL	396	176	91	1027	76	408	73	42	43	10	6	2346

1645-1700

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	69	27	279	69	0	0	1	14	3	2	464
2	94	0	0	0	1	69	69	1	0	0	3	231
3	27	0	0	69	0	0	0	0	0	0	0	96
4	193	0	0	0	0	0	0	0	0	0	0	193
5	39	1	0	0	0	0	28	0	16	16	1	101
6	0	72	36	796	23	0	2	0	8	1	0	938
7	12	0	0	0	0	0	0	0	0	0	0	12
8	2	0	0	0	0	0	2	0	0	0	0	4
9	0	0	0	0	0	0	0	0	0	0	0	0
10	12	0	12	0	0	0	0	0	0	0	0	24
11	7	2	0	0	2	2	0	0	0	0	0	13
TOTAL	396	176	91	1027	76	408	73	42	43	10	6	2346

1700-1715

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	69	27	279	69	0	0	1	14	3	2	464
2	94	0	0	0	1	69	69	1	0	0	3	231
3	27	0	0	69	0	0	0	0	0	0	0	96
4	193	0	0	0	0	0	0	0	0	0	0	193
5	39	1	0	0	0	0	28	0	16	16	1	101
6	0	72	36	796	23	0	2	0	8	1	0	938
7	12	0	0	0	0	0	0	0	0	0	0	12
8	2	0	0	0	0	0	2	0	0	0	0	4
9	0	0	0	0	0	0	0	0	0	0	0	0
10	12	0	12	0	0	0	0	0	0	0	0	24
11	7	2	0	0	2	2	0	0	0	0	0	13
TOTAL	396	176	91	1027	76	408	73	42	43	10	6	2346

1730-1745

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	70	28	294	73	0	0	1	15	3	2	490
2	99	0	0	0	1	73	73	1	0	0	3	244
3	28	0	0	73	0	0	0	0	0	0	0	101
4	203	0	0	0	0	0	0	0	0	0	0	203
5	41	1	0	0	0	0	29	0	16	16	1	104
6	0	75	38	838	24	0	2	0	8	1	0	987
7	13	0	0	0	0	0	0	0	0	0	0	13
8	2	0	0	0	0	0	2	0	0	0	0	4
9	0	0	0	0	0	0	0	0	0	0	0	0
10	12	0	12	0	0	0	0	0	0	0	0	24
11	7	2	0	0	2	2	0	0	0	0	0	13
TOTAL	406	148	78	1205	100	75	106	2	39	20	6	2184

1745-1800

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	66	25	258	37	0	0	1	13	3	2	404
2	86	0	0	0	1	56	56	1	0	0	2	202
3	19	0	0	62	0	0	0	0	0	0	0	81
4	138	0	0	0	0	0	0	0	0	0	0	138
5	16	1	0	0	0	0	19	0	17	1	0	54
6	0	63	35	766	23	0	2	0	8	1	0	898
7	12	14	0	0	0	0	0	0	0	0	0	26
8	2	0	0	0	0	0	2	0	0	0	0	4
9	0	0	0	0	0	0	0	0	0	0	0	0
10	12	0	12	0	0	0	0	0	0	0	0	24
11	7	2	0	0	2	2	0	0	0	0	0	13
TOTAL	390	146	72	1084	63	1058	81	47	53	11	6	3010

HEAVIES

1600-1645

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	0	0	0	96	0	0	0	0	0	0	96
2	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0
4	49	0	0	96	0	0	0	0	0	0	0	145
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	49	0	0	96	96	0	0	0	0	0	0	241

1645-1700

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	0	0	0	54	0	0	0	0	0	0	54
2	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0
4	96	0	0	0	0	0	0	0	0	0	0	96
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	96	0	0	0	54	0	0	0	0	0	0	150

1700-1715

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	0	0	0	30	0	0	0	0	0	0	30
2	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	0	0	30	0	0	0	0	0	0	30

1730-1745

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	0	0	0	25	0	0	0	0	0	0	25
2	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	0	0	25	0	0	0	0	0	0	25

1745-1800

	1	2	3	4	5	6	7	8	9	10	11	TOTAL
1	0	0	0	0	25	0	0	0	0	0	0	25
2	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	0	0	25	0	0	0	0	0	0	25

SIDRA CALCULATIONS - AM PEAK

STEP 1 - ALIGN METHODOLOGY

SGM SGM CALCULATIONS - PM PEAK

STEP 1 - PA Count Matrix Data

origin \ dest	1	2	3	4	5	6	7	8	9	10	11	12	13	Total
1	0	217	418	1,147	0	0	28	0	0	0	479	71	0	2,360
2	186	0	0	0	0	0	107	0	0	0	0	0	0	293
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	1,994	0	475	0	0	0	2,468	0	0	0	0	0	0	4,937
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	256	0	0	0	0	0	0	0	0	0	0	0	256
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	2,180	473	893	1,147	0	0	2,603	0	0	0	479	71	0	7,846

origin \ dest	1	2	3	4	5	6	7	8	9	10	11	12	13	Total
1	0	44	2	231	0	0	0	0	0	0	44	0	0	321
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	402	0	96	0	0	0	586	0	0	0	0	0	0	1,084
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	53	0.00	0	0	0	0	0	0	0	0	0	53
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	476	44	151	231	0	0	586	0	0	0	44	0	0	1,536

origin \ dest	1	2	3	4	5	6	7	8	9	10	11	12	13	Total
1	0	217	514	2,298	0	0	28	0	0	0	523	141	479	4,201
2	186	0	0	0	0	0	107	0	0	0	0	0	0	293
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	4,794	0	2,111	0	0	0	4,893	0	0	0	0	0	0	11,797
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	256	214	0.472	0	0	0	0	0	0	0	0	0	470
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	4,980	473	2,625	2,770	0	0	5,028	0	0	0	523	141	479	16,420

STEP 2 - CONVERT TO 12 HOUR PERIODS USING DOA & BUILT PROPORTIONS

LIGHTS

Time Period	Trips	Overall Total	Propn Sum
07:30-07:45	2,559	16,793	15%
07:45-08:00	2,676	16,793	16%
08:00-08:15	2,559	16,793	15%
08:15-08:30	2,579	16,793	15%
			61%

HEAVIES

Time Period	Trips	Zones (Total)	Proportion
07:30-07:45	167	1,052	16%
07:45-08:00	174	1,052	17%
08:00-08:15	167	1,052	16%
08:15-08:30	168	1,052	16%
			64%

LIGHTS

Time Period	Trips	Overall Total	Propn Sum
08:30-08:45	2,603	16,793	15%
08:45-17:30	27,598	16,793	165%
17:30-17:45	2,640	16,793	16%
17:45-18:00	2,749	16,793	16%
			163%

HEAVIES

Time Period	Trips	Zones (Total)	Proportion
08:30-08:45	280	1,052	27%
08:45-17:30	2,918	1,052	277%
17:30-17:45	280	1,052	27%
17:45-18:00	291	1,052	28%
			359%

LIGHTS

Time Period	Trips	Overall Total	Propn Sum
17:45-17:45	2,642	16,793	15%
17:45-18:00	2,749	16,793	16%
			32%

HEAVIES

Time Period	Trips	Zones (Total)	Proportion
17:45-17:45	245	1,052	23%
17:45-18:00	247	1,052	23%
			47%

Overall predicted trips for the entire network peak hour. Use only the most critical time period

Overall predicted trips for the determined morning and evening time period, whichever is used

LIGHTS

16:30-16:45

	1	2	3	4	5	6	7	8	9	10	11	12	13	TOTAL
1	0	17	43	118	0	0	3	0	0	0	49	7	0	243
2	19	0	0	0	0	0	11	0	0	0	0	0	0	30
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	205	0	49	0	0	0	254	0	0	0	0	0	0	508
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	26	0	0	0	0	0	0	0	0	0	0	0	26
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	224	43	92	118	0	0	268	0	0	0	49	7	0	809

16:45-17:00

	1	2	3	4	5	6	7	8	9	10	11	12	13	TOTAL
1	0	17	43	118	0	0	3	0	0	0	49	7	0	243
2	19	0	0	0	0	0	11	0	0	0	0	0	0	30
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	205	0	49	0	0	0	254	0	0	0	0	0	0	508
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	26	0	0	0	0	0	0	0	0	0	0	0	26
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	224	43	92	118	0	0	268	0	0	0	49	7	0	809

17:00-17:15

	1	2	3	4	5	6	7	8	9	10	11	12	13	TOTAL
1	0	17	43	118	0	0	3	0	0	0	49	7	0	243
2	19	0	0	0	0	0	11	0	0	0	0	0	0	30
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	205	0	49	0	0	0	254	0	0	0	0	0	0	508
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	26	0	0	0	0	0	0	0	0	0	0	0	26
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	224	43	92	118	0	0	268	0	0	0	49	7	0	809

17:15-17:30

	1	2	3	4	5	6	7	8	9	10	11	12	13	TOTAL
1	0	17	43	118	0	0	3	0	0	0	49	7	0	243
2	19	0	0	0	0	0	11	0	0	0	0	0	0	30
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	205	0	49	0	0	0	254	0	0	0	0	0	0	508
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	26	0	0	0	0	0	0	0	0	0	0	0	26
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	224	43	92	118	0	0	268	0	0	0	49	7	0	809

17:30-17:45

	1	2	3	4	5	6	7	8	9	10	11	12	13	TOTAL
1	0	17	43	118	0	0	3	0	0	0	49	7	0	243
2	19	0	0	0	0	0	11	0	0	0	0	0	0	30
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	205	0	49	0	0	0	254	0	0	0	0	0	0	508
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	26	0	0	0	0	0	0	0	0	0	0	0	26
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	224	43	92	118	0	0	268	0	0	0	49	7	0	809

17:45-18:00

	1	2	3	4	5	6	7	8	9	10	11	12	13	TOTAL
1	0	17	43	118	0	0	3	0	0	0	49	7	0	243
2	19	0	0	0	0	0	11	0	0	0	0	0	0	30
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	205	0	49	0	0	0	254	0	0	0	0	0	0	508
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	26	0	0	0	0	0	0	0	0	0	0	0	26
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	224	43	92	118	0	0	268	0	0	0	49	7	0	809

16:30-16:45

	1	2	3	4	5	6	7	8	9	10	11	12	13	TOTAL
1	0	17	43	118	0	0	3	0	0	0	49	7	0	243
2	19	0	0	0	0	0	11	0	0	0	0	0	0	30
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	205	0	49	0	0	0	254	0	0	0	0	0	0	508
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	26	0	0	0	0	0	0	0	0	0	0	0	26
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	224	43	92	118	0	0	268	0	0	0	49	7	0	809

16:45-17:00

	1	2	3	4	5	6	7	8	9	10	11	12	13	TOTAL
1	0	17	43	118	0	0	3	0	0	0	49	7	0	243
2	19	0	0	0	0	0	11	0	0	0	0	0	0	30
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	205	0	49	0	0	0	254	0	0	0	0	0	0	508
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	26	0	0	0	0	0	0	0	0	0	0	0	26
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	224	43	92	118	0	0	268	0	0	0	49	7	0	809

17:00-17:15

	1	2	3	4	5	6	7	8	9	10	11	12	13	TOTAL
1	0	17	43	118	0	0	3	0	0	0	49	7	0	243
2	19	0	0	0	0	0	11	0	0	0	0	0	0	30
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	205	0	49	0	0	0	254	0	0	0	0	0	0	508
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	26	0	0	0	0	0	0	0	0	0	0	0	26
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	224	43	92	118	0	0	268	0	0	0	49	7	0	809

17:15-17:30

	1	2	3	4	5	6	7	8	9	10	11	12	13	TOTAL
1	0	17	43	118	0	0	3	0	0	0	49	7	0	243
2	19	0	0	0	0	0	11	0	0	0	0	0	0	30
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	205	0	49	0	0	0	254	0	0	0	0	0	0	508
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	26	0	0	0	0	0	0	0	0	0	0	0	26
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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11	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	224	43	92	118	0	0	268	0	0	0	49	7	0	809

17:30-17:45

	1	2	3	4	5	6	7	8	9	10	11	12	13	TOTAL
1	0	17	43	118	0	0	3	0	0	0	49	7	0	243
2	19	0	0	0	0	0	11	0	0	0	0	0	0	30
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	205	0	49	0	0	0	254	0	0	0	0	0	0	508
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	26	0	0	0	0	0	0	0	0	0	0	0	26
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	224	43	92	118	0	0	268	0	0	0	49	7	0	809

17:45-18:00

	1	2	3	4	5	6	7	8	9	10	11	12	13	TOTAL
1	0	17	43	118	0	0	3	0	0	0	49	7	0	243
2	19	0	0	0	0	0	11	0	0	0	0	0	0	30
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	205	0	49	0	0	0	254	0	0	0	0	0	0	508
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	26	0	0	0	0	0	0	0	0	0	0	0	26
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12	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	224	43	92	118	0	0	268	0	0	0	49	7	0	809

HEAVIES

16:30-16:45

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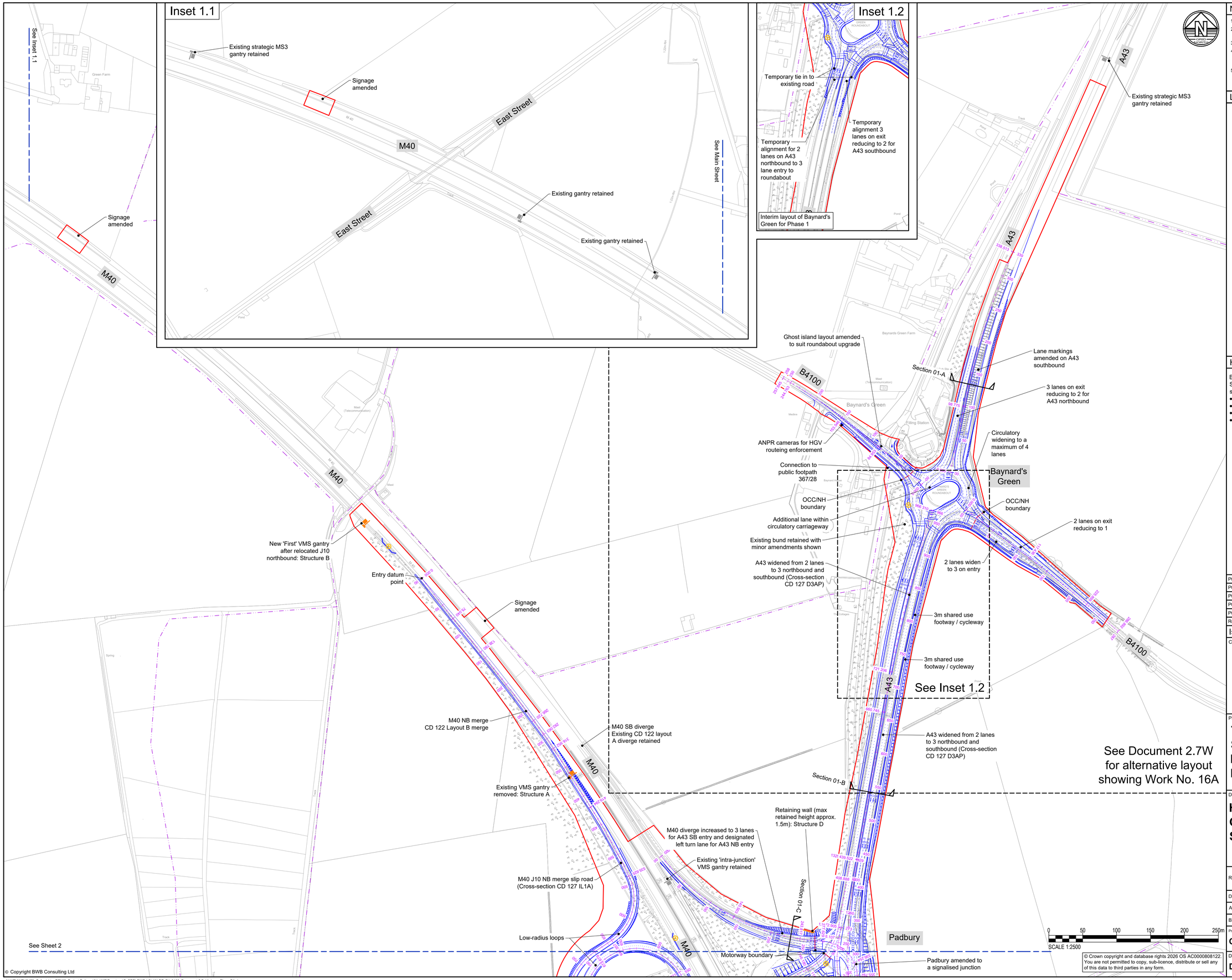
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0

APPENDIX E:

PROPOSED SCHEME DRAWINGS



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Notes

1. All dimensions in metres unless noted otherwise.
2. The height of proposed bridges, embankments and depths of cuttings are indicative subject to the limits of deviation referred to in the order.
3. All structure positions and sizes shown are indicative only.
4. The proposed works including their specific alignment will be subject to detailed design within the limits of deviation identified on the works plans.
5. Horizontal and vertical deviation of the highway alignments are permitted in accordance with Article 4 of the Development Consent Order.

Legend

- Order Limits
- Highway Works
- Cross-section locations
- 250 Chainage
- New, amended or removed structures (various types as annotated) - refer to Bridge Plans (Document 2.12)
- Existing public right of way retained (shown for reference only)
- 3rd party scheme as annotated (indicative and shown for reference only)
- Private railway (shown for reference only, refer to Rail Plans, Document 2.11)
- Highway boundary/interface as described
- Highway Drainage Outfall
- Maintenance Hardstanding Area

The legend is identical on all sheets of the highway plans and therefore not all items detailed in the legend are represented on each sheet

Highway Works

By reference to the Works Plans (Document 2.2) and Schedule 1 of the Development Consent Order this plan shows the following Highway Works:

- Work Nos. 14A (part) & 14B (part)
- Work No. 15B (part)
- Work No. 16
- Work No. 17

Highway Plans Cross Sections
Refer to Document 2.7F for:
- Sections 01-A, 01-B & 01-C

Highway Plans Long Sections
Refer to Documents 2.7N and 2.7O for:
- A43 North
- B4100 West
- B4100 East
- A43 Mainline
- M40 SB Diverge

Highway Bridge Plans
Refer to Document 2.12I for:
- Structure B

Rev	Date	Details of issue / revision	Drw	Ch'd	Apv
P05	27.02.26	DCO Submission	RP	SRH	SRH
P04	02.02.26	Updated following consultation	RP	SRH	SRH
P03	15.09.25	Issued for consultation	SRH	SRH	SRH
P02	01.09.25	General updates	SB	SRH	SRH
P01	31.07.25	Preliminary Issue	RP	SRH	SRH

Issues & Revisions

Client

OxSRFI
OXFORDSHIRE
STRATEGIC RAIL FREIGHT INTERCHANGE

Project Title

THE OXFORDSHIRE STRATEGIC RAIL FREIGHT INTERCHANGE AND HIGHWAYS ORDER 202X

Drawing Title

HIGHWAY PLANS GENERAL ARRANGEMENT SHEET 01

Regulation:	6(2)	Document:	2.7A
Drawn:	R.Picknell	Checked:	S.Hilditch
Approved:	S.Hilditch	Date:	31.07.25
BWB Ref:	NTH2479	Scale@A1:	1:2500

Project - Originator - Functional Breakdown - Spatial Breakdown - Form - Discipline - Number

OxSRFI-BWB-LSI-01-DR-CH-0101

Drawing Status	Rev
DCO SUBMISSION	P05

0 50 100 150 200 250m
SCALE 1:2500

See Sheet 1

Low-radius loops
M40
Motorway boundary
Padbury
Padbury amended to a signalised junction
M40-A43 NB overbridge: Bridge 12
Section 02-A
New confirmatory VMS gantry: Structure C
Connection to public Bridleway 367/21
M40 NB - A43 NB link (Cross-section CD 127 IL2A)
Watercourse culvert extended: Structure H
New directional signage gantry: Structure I
Section 02-B
Drainage basin
A43
3m shared use footway / cycleway
Section 02-C
Drainage basin
Cherwell Valley Motorway Service Area
M40 J10 NB merge slip road (Cross-section CD 127 IL1A)
Mammal culvert (indicative location)
Capacity improvement to Cherwell junction
M40 J10 NB merge culvert: Bridge 13
Section 02-D
A43 NB overbridge: Bridge 14
Signalised crossings for pedestrians / cyclists
Cherwell
Motorway boundary
M40 NB hard shoulder omitted under bridge structure (as existing merge) (departure)
Service area access retained
Cut-through for traffic onto M40 NB or A43 NB
Motorway boundary
Bridleway 367/20
3m shared use footway / cycleway
A43 SB overbridge: Bridge 15
Signalised crossing for pedestrians / cyclists
Cycle track connection to public bridleway 367/20
Connection to public footpaths 109/6 and 109/32
M40 J10
Section 02-E
Ardley roundabout enlarged to accommodate the bypass and the realigned slip roads
Exit datum point
Ardley (jct)
OCC/NH boundary
Motorway boundary
M40 J10 SB widened merge slip road (Cross-section CD 127 MG2C)
Existing B430 approach from Ardley realigned
Existing NB merge slip road stopped up
ANPR cameras for HGV routeing enforcement
Fewcott
Connection to public Bridleway 109/9
See Inset 2.1
OCC/NH boundary
Field access relocated for final scheme, used for construction access during works
Section 02-F
M40 J10 NB realigned diverge slip road (Cross-section CD 127 DG2A)
430
Speed limit reduced to 50mph on existing B430 north of Ardley
Existing diverge slip road stopped up
Existing 'confirmatory' VMS gantry retained
Area of construction compound (indicative)
Area of archaeological banjo, refer to RPS drawings and Environmental Statement for further details
Mammal culvert (indicative location)
Section 02-G
Somerton Road
Ardley Bypass (Cross-section CD 127 WS2+1)
B430 Ardley Bypass
Ardley
Propsoed bridleway - refer to Access and Rights of Way Plans (Document 2.3)
Replacement field access
M40
Merge layout amended to CD 122 Layout E option 3
Quarry cottages stopped up and turning head provided
Replacement field access
Visual screening bund
Existing CD 122 Layout A diverge retained
Ardley Wood
Ardley Road bridge over B430 Ardley Bypass: Bridge 16
Section 02-H
Bridge over Chiltern main Line railway, parapets amended for bridleway use: Bridge 03
Signage works
Noise attenuation and visual screening bund
Replacement field access
Private access amended
Field access amended
Hardshoulder reduced to 0.6m hardstrip in front of Ardley Road overbridge (departure)
Public footpath 109/22 diverted alongside bypass to the Ardley Road overbridge
Bridleway alongside bypass
Ardley Road
Propsed bridleway - refer to Access and Rights of Way Plans (Document 2.3)
Private railway
See Sheet 3
Mammal culvert (indicative location)
Ardley Bypass (Cross-section WS2+1)
Entry datum point

Inset 2.1

Two lanes provided onto link over the M40
Cherwell
Additional right turn lane (only provided during interim phase)
Length of lane drop extended
M40 J10
Lane reduction taper before merge
Interim layout of Cherwell junction and M40 J10 southboud merge

Inset 2.2

Replacement field access

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Notes

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2. The height of proposed bridges, embankments and depths of cuttings are indicative subject to the limits of deviation referred to in the order.
3. All structure positions and sizes shown are indicative only.
4. The proposed works including their specific alignment will be subject to detailed design within the limits of deviation identified on the works plans.
5. Horizontal and vertical deviation of the highway alignments are permitted in accordance with Article 4 of the Development Consent Order.

Legend

- Order Limits
- Highway Works
- Cross-section locations
- 250 Chainage
- New, amended or removed structures (various types as annotated) - refer to Bridge Plans (Document 2.12)
- Existing public right of way retained (shown for reference only)
- 3rd party scheme as annotated (indicative and shown for reference only)
- Private railway (shown for reference only, refer to Rail Plans, Document 2.11)
- Highway boundary/interface as described
- Highway Drainage Outfall
- Maintenance Hardstanding Area

The legend is identical on all sheets of the highway plans and therefore not all items detailed in the legend are represented on each sheet

Highway Works

By reference to the Works Plans (Document 2.2) and Schedule 1 of the Development Consent Order this plan shows the following Highway Works:

- Work Nos. 14A & 14B (part)
- Work Nos. 15A & 15B (part)
- Work No. 18
- Work No. 19
- Work No. 20 (part)
- Work No. 21 (part)
- Work No. 26
- Work No. 36 (part)

Highway Plans Cross Sections
Refer to Documents 2.7F, 2.7G and 2.7H for:

- Sections 02-A, 02-B, 02-C, 02-D, 02-E, 02-F, 02-G & 02-H

Highway Plans Long Sections
Refer to Documents 2.7O, 2.7P, 2.7Q and 2.7R for:

- A43 NB Padbury
- M40 NB Diverge
- M40 NB Merge
- M40 SB Merge
- B430 NB
- Ardley Road
- Ardley Bypass

Highway Bridge Plans
Refer to Documents 2.12C, 2.12D, 2.12F and 2.12I for:

- Bridges 12, 13 & 16
- Structures C & I

P05	27.02.26	DCO Submission	RP	SRH	SRH
P04	02.02.26	Updated following consultation	RP	SRH	SRH
P03	15.09.25	Issued for consultation	SRH	SRH	SRH
P02	01.09.25	General amendments	SB	SRH	SRH
P01	31.07.25	Preliminary Issue	RP	SRH	SRH
Rev	Date	Details of issue / revision	Drw	Ch'd	Apv

Issues & Revisions

Client

OxSRFI OXFORDSHIRE STRATEGIC RAIL FREIGHT INTERCHANGE

Project Title

THE OXFORDSHIRE STRATEGIC RAIL FREIGHT INTERCHANGE AND HIGHWAYS ORDER 202X

Drawing Title

HIGHWAY PLANS GENERAL ARRANGEMENT SHEET 02

Regulation:	5(2)(o) & 6(2)	Document:	2.7B
Drawn:	R.Picknell	Checked:	S.Hilditch
Approved:	S.Hilditch	Date:	31.07.25
BWB Ref:	NTH2479	Scale@A1:	1:2500

Project - Originator - Functional Breakdown - Spatial Breakdown - Form - Discipline - Number

OxSRFI-BWB-LSI-02-DR-CH-0102

Drawing Status: **DCO SUBMISSION**

Rev: **P05**

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Private railway

See Sheet 2

Chiltern Main Line Railway

Turning head with amended field access

Locakable gate with bypass for pedestrians, cyclists and equestrians

Footpath 109/24 stopped up

Ardley Bypass (Cross-section WS2+1)

Mammal culvert (indicative location)

Entry datum point

B430 Station Road

B430 Ardley Bypass

Existing B430 to have no motor vehicles (except for access) restriction

Noise attenuation and visual screening bund

Existing 'First' VMS gantry retained

Private railway

Turning head

Section 03-A

Bridleway 109/26 stopped up and diverted alongside railway and Ardley Bypass, away from M40

M40

Bridge over Chiltern main Line railway, parapets amended for cyclist use: Bridge 04

Pipe bridge: Structure E

Drainage basin

Footpath 109/24 stopped up

3m shared use cycle track

Bridleway alongside bypass

Replacement field access

Passing place for single for single track Network Rail access

Mammal culvert (indicative location)

ANPR cameras for HGV routeing enforcement

Drainage basin

B430 Ardley Bypass bridge over Chiltern Main Line: Bridge 07

Section 03-B

Bridleway alongside railway

Principal access bridge over private railway: Bridge 05

Passing place for single for single track Network Rail access

Raising barriers at bus exit into roundabout

B430 Ardley Bypass bridge over new sidings: Bridge 06

Principal Access to the Main Site

Widening on corner to allow for Network Rail Class 1 access

OxSRFI / OCC highway boundary

Section 03-C

ANPR cameras for HGV routeing enforcement

Passing place for single for single track Network Rail access

Recycling access layout amended

Widening on corner to allow for Network Rail Class 1 access

Bridge over Chiltern main Line railway, parapets amended for bridleway use: Bridge 08

3m shared use cycle track

Signage replaced

Bridleway bridge over private railway: Bridge 09

Private railway

Bridleway diverted

Bridleway 109/26 stopped up and diverted alongside railway and Ardley Bypass, away from M40

Bucknells Farm culvert: Structure G

Bucknells Farm bridleway Level crossing closed

Existing strategic MS3 gantry retained

M40

B430

Private railway

Ashgrove Cottages driveway retained

3m shared use cycle track

Chiltern Main Line Railway

Ardley Road

See Sheet 4

Tie into existing cross-section

3m shared use cycle track parallel to B430

See Inset 3.1

Inset 3.2

Chilgrove Drive realignment as part of the Heyford Park highway works

Proposed bridleway - refer to Access and Rights of Way Plans (Document 2.3)

Inset 3.1

See Inset 3.1

Signage replaced

0 50 100 150 200 250m

SCALE 1:2500

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Notes

1. All dimensions in metres unless noted otherwise.
2. The height of proposed bridges, embankments and depths of cuttings are indicative subject to the limits of deviation referred to in the order.
3. All structure positions and sizes shown are indicative only.
4. The proposed works including their specific alignment will be subject to detailed design within the limits of deviation identified on the works plans.
5. Horizontal and vertical deviation of the highway alignments are permitted in accordance with Article 4 of the Development Consent Order.

Legend

- Order Limits
- Highway Works
- Cross-section locations
- 250 Chainage
- New, amended or removed structures (various types as annotated) - refer to Bridge Plans (Document 2.12)
- Existing public right of way retained (shown for reference only)
- 3rd party scheme as annotated (indicative and shown for reference only)
- Private railway (shown for reference only, refer to Rail Plans, Document 2.11)
- Highway boundary/interface as described
- Highway Drainage Outfall
- Maintenance Hardstanding Area

The legend is identical on all sheets of the highway plans and therefore not all items detailed in the legend are represented on each sheet

Highway Works

By reference to the Works Plans (Document 2.2) and Schedule 1 of the Development Consent Order this plan shows the following Highway Works:

- Work No. 10
- Work No. 11
- Work No. 14A (part)
- Work No. 20 (part)
- Work No. 21 (part)
- Work No. 25B (part)
- Work No. 36 (part)

Highway Plans Cross Sections
Refer to Documents 2.7H and 2.7I for:
- Sections 03-A, 03-B & 03-C

Highway Plans Long Sections
Refer to Documents 2.7R and 2.7S for:
- Ardley Bypass
- SRFI Access
- B430

Bridge Plans
Refer to Documents 2.12A and 2.12B for:
- Bridges 06 & 07

Rev	Date	Details of issue / revision	Drw	Ch'd	Apv
P05	27.02.26	DCO Submission	RP	SRH	SRH
P04	02.02.26	Updated following consultation	RP	SRH	SRH
P03	15.09.25	Issued for consultation	SRH	SRH	SRH
P02	01.09.25	Sections markers 03-B & 03-C	SB	SRH	SRH
P01	31.07.25	Preliminary Issue	RP	SRH	SRH

Issues & Revisions

Client

OxSRFI OXFORDSHIRE STRATEGIC RAIL FREIGHT INTERCHANGE

Project Title

THE OXFORDSHIRE STRATEGIC RAIL FREIGHT INTERCHANGE AND HIGHWAYS ORDER 202X

Drawing Title

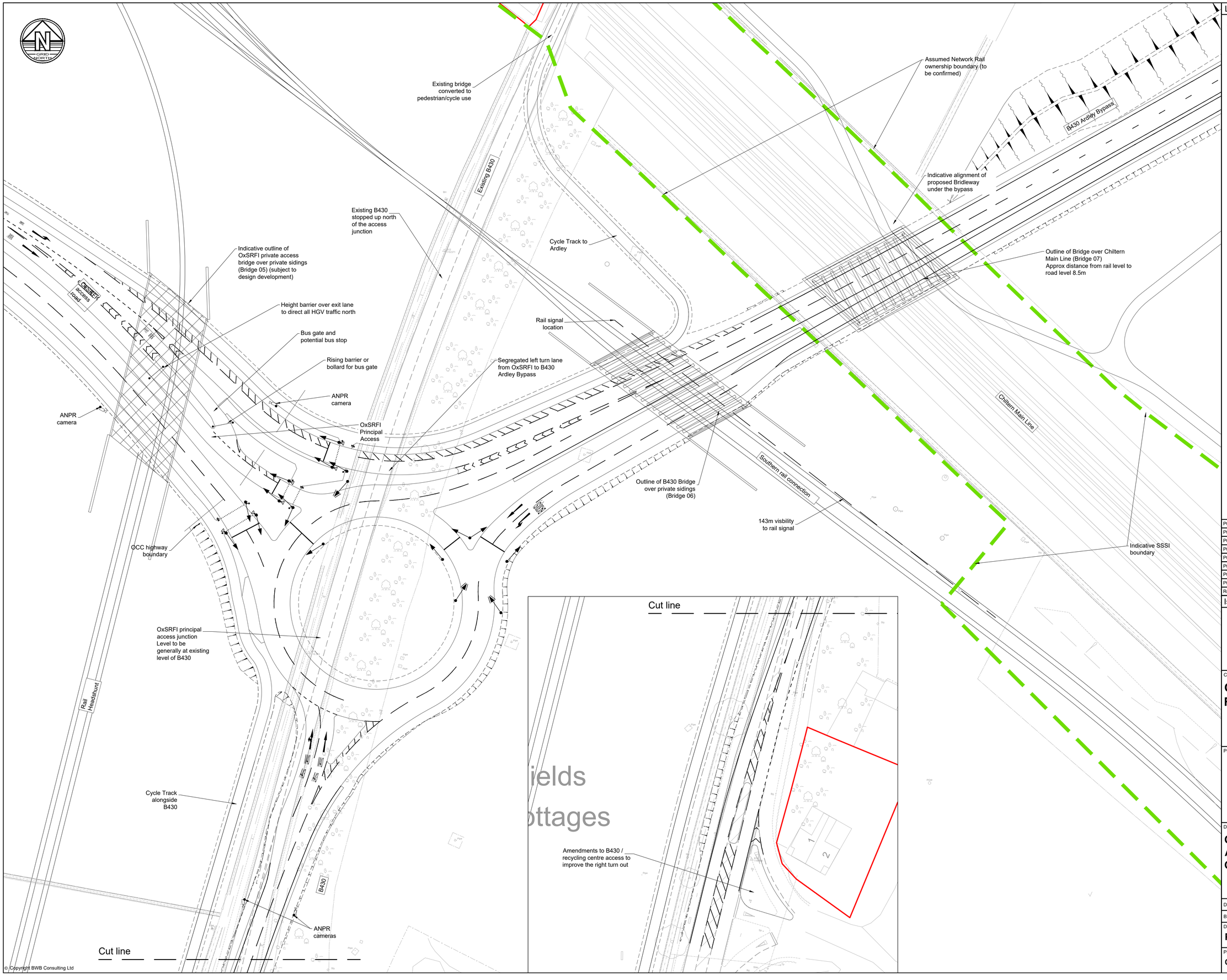
HIGHWAY PLANS GENERAL ARRANGEMENT SHEET 03

Regulation:	5(2)(o) & 6(2)	Document:	2.7C
Drawn:	R.Picknell	Checked:	S.Hilditch
Approved:	S.Hilditch	Date:	31.07.25
BWB Ref:	NTH2479	Scale@A1:	1:2500

Project - Originator - Functional Breakdown - Spatial Breakdown - Form - Discipline - Number

OxSRFI-BWB-LSI-03-DR-CH-0103

Drawing Status	Rev
DCO SUBMISSION	**P05**



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Legend

Order Limits

Rev	Date	Details of issue / revision	Drw	Rev
P08	19.03.26	Issued following updates	RP	SRH
P07	20.03.25	Bus exit added, rail signal added	SRH	SRH
P06	06.02.25	Layout reverted to roundabout	SRH	SRH
P05	09.10.24	Layout amended to signalised junction	SRH	SRH
P04	30.03.23	General scheme updates	SRH	SRH
P03	03.05.22	Amendments to labels, cycle tracks added	SRH	SRH
P02	09.06.21	B430 NB exit widened to two lanes	SRH	SRH
P01	04.06.21	Preliminary issue	SRH	SRH

Issues & Revisions

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Client

OXFORDSHIRE RAILFREIGHT LIMITED

Project Title

OxSRFI
OXFORDSHIRE
STRATEGIC RAIL FREIGHT INTERCHANGE

Drawing Title

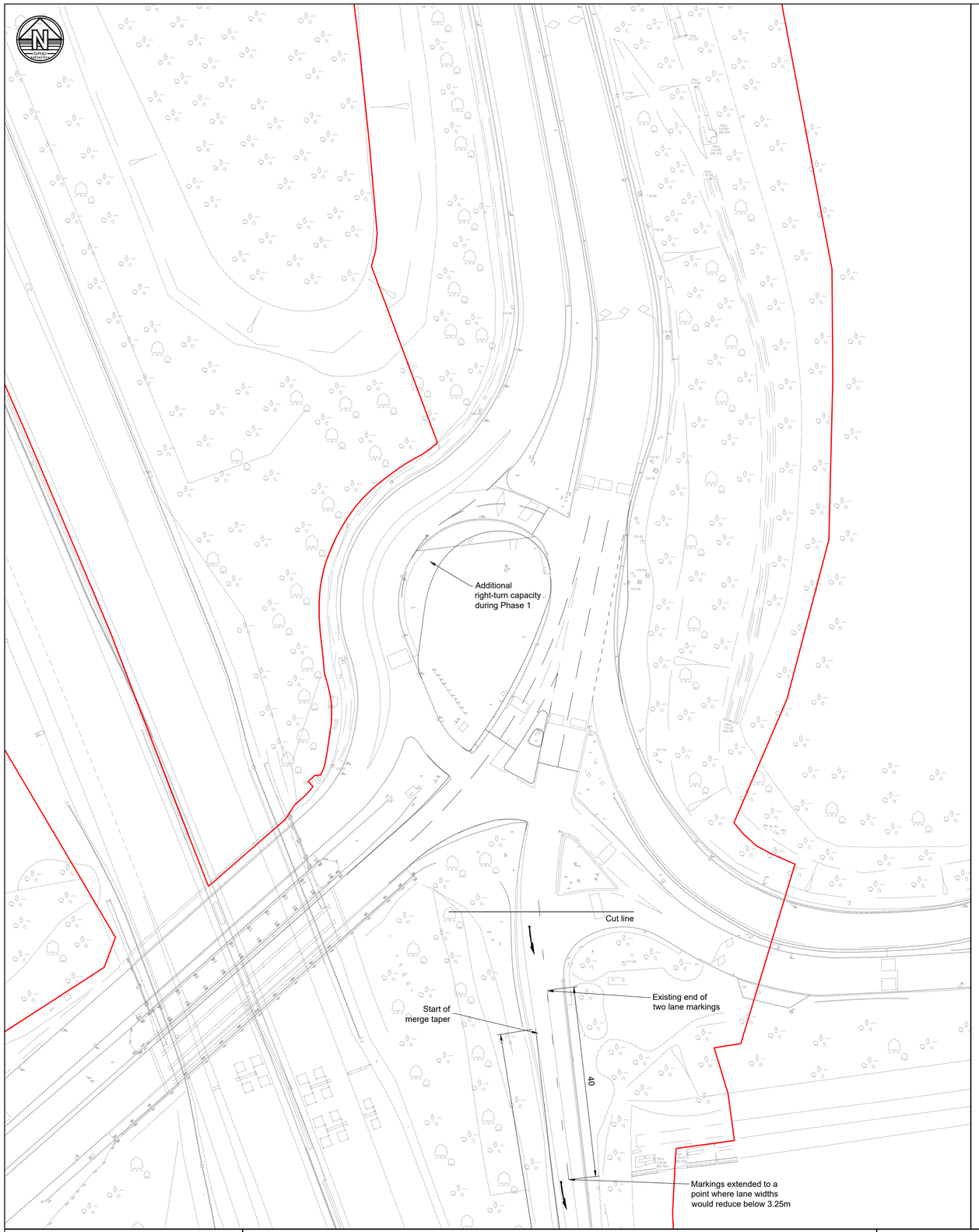
OxSRFI PRINCIPAL ACCESS JUNCTION GENERAL ARRANGEMENT

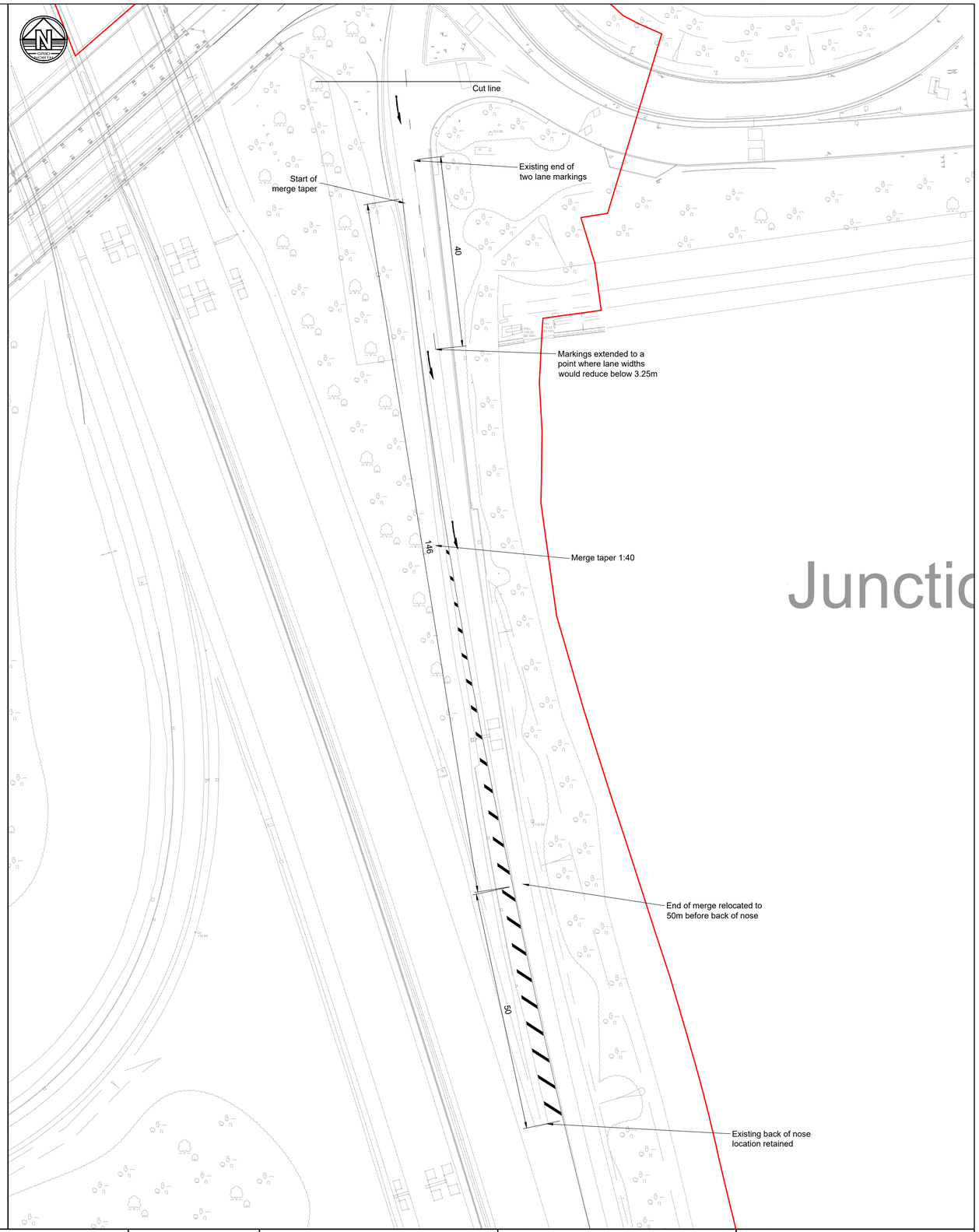
Drawn:	S. Hilditch		Reviewed:	S. Hilditch	
BWB Ref:	NTH2479	Date:	04.06.21	Scale@A1:	1:500

Drawing Status

PRELIMINARY

Project - Originator - Zone - Level - Type - Role - Number	Status	Rev
OxSRFI-BWB-GEN-ZZ-SK-CH-SK018	S1	P08





Notes

1. Do not scale this drawing. All dimensions must be checked/ verified on site. If in doubt ask.
2. This drawing is to be read in conjunction with all relevant architects, engineers and specialists drawings and specifications.
3. All dimensions in metres unless noted otherwise. All levels in metres unless noted otherwise.
4. Any discrepancies noted on site are to be reported to the engineer immediately.

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ISSUES & REVISIONS

Rev	Date	Details of issue / revision	Drw	Rev
P01	02.02.23	Preliminary Issue	SRH	SRH
P02	06.04.23	Cherwell roundabout added	SRH	SRH
P03	19.03.26	Issued following updates	RP	SRH

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Client
OXFORDSHIRE RAILFREIGHT LTD.

Project Title
OxSRFI OXFORDSHIRE STRATEGIC RAIL FREIGHT INTERCHANGE

Drawing Title
M40 J10 BAYNARD'S GREEN, CHERWELL AND SOUTHBOUND MERGE INTERIM LAYOUT

Drawn:	S. Hilditch		Reviewed:	S. Hilditch		
BWB Ref:	NTH2479	Date:	02.02.23	Scale@A1:	1:500	

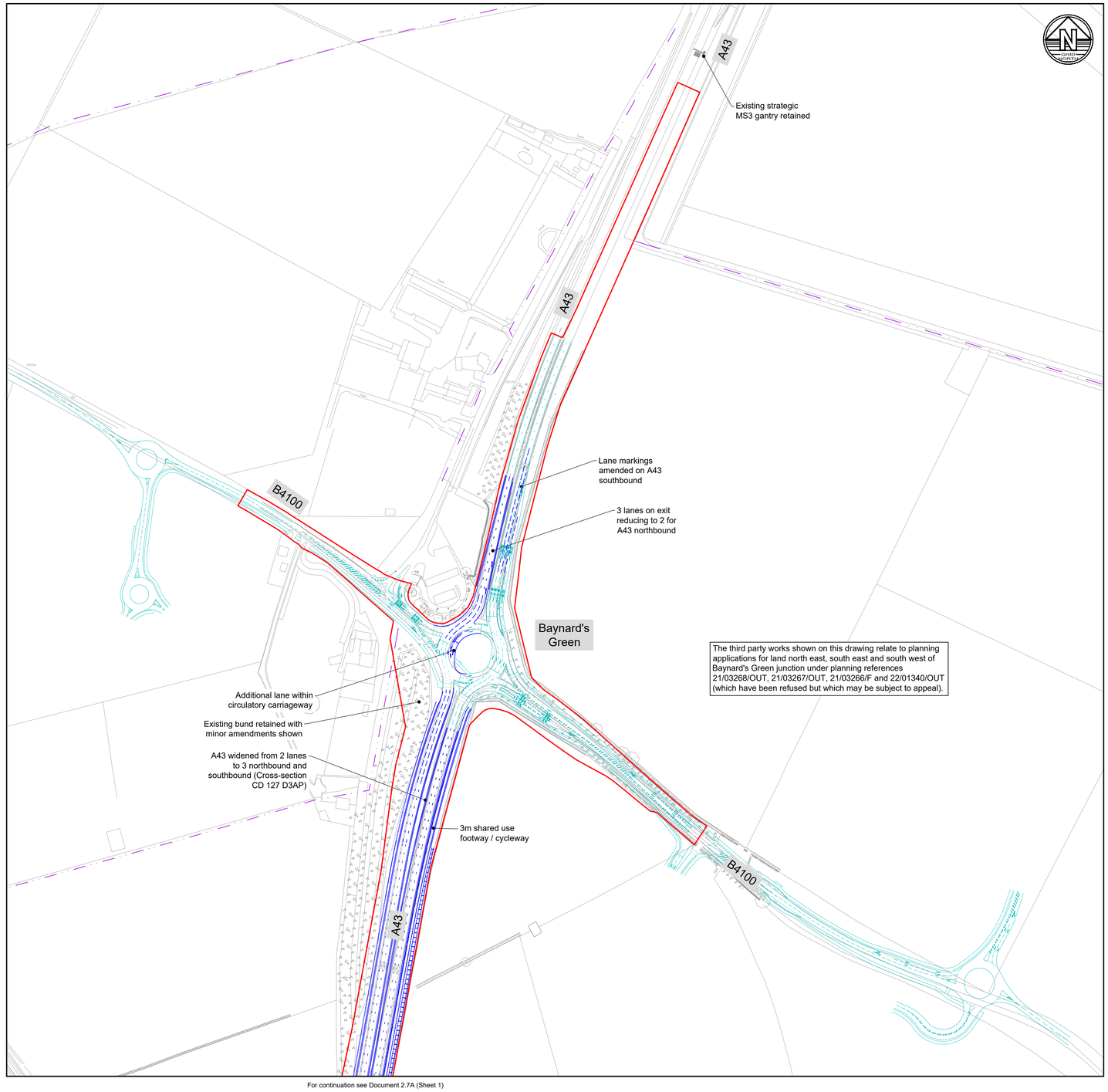
Drawing Status
PRELIMINARY

Project - Originator - Zone - Level - Type - Role - Number
OxSRFI-BWB-GEN-XX-SK-CH-SK060

Status: **S1**

Rev: **P03**

Y:\NTH\NTH2479_Oxfordshire RFI\02. Project Delivery\01. WIP\Sketches\OxSRFI-BWB-GEN-XX-SK-CH-SK060_M40 J10 Baynards Green Cherwell roundabout and SB merge interim layout.dwg



For continuation see Document 2.7A (Sheet 1)

Notes

1. All dimensions in metres unless noted otherwise. All levels in metres unless noted otherwise.
2. The height of proposed bridges, embankments and depths of cuttings are indicative subject to the limits of deviation referred to in the order.
3. All structure positions and sizes shown are indicative only.
4. The proposed works including their specific alignment will be subject to detailed design within the limits of deviation identified on the works plans.
5. Horizontal and vertical deviation of the highway alignments are permitted in accordance with Article 4 of the Development Consent Order.

Legend

- Order Limits
- Highway Works
- Cross-section locations
- 250 Chainage
- New, amended or removed structures (various types as annotated) - refer to Bridge Plans (Document 2.12)
- Existing public right of way retained (shown for reference only)
- 3rd party scheme as annotated (indicative and shown for reference only)
- Private railway (shown for reference only, refer to Rail Plans, Document 2.11)
- Highway boundary/interface as described
- Highway Drainage Outfall
- Maintenance Hardstanding Area

The legend is identical on all sheets of the highway plans and therefore not all items detailed in the legend are represented on each sheet

Highway Works

By reference to the Works Plans (Document 2.2) and Schedule 1 of the Development Consent Order this plan shows the following highway works:

- Work No. 15B (part)
- Work No. 16A

Note in this alternative Work No. 17 is reduced to signage works and ANPR installation.

Rev	Date	Details of issue / revision	Drw	Ch'd	Apv
P04	27.02.26	DCO Submission	RP	SRH	SRH
P03	02.02.26	Updated following consultation	RP	SRH	SRH
P02	16.11.25	Preliminary Issue	SRH	SRH	SRH
P01	16.09.25	Preliminary Issue	SB	SRH	SRH

Issues & Revisions

Client

OxSRFI OXFORDSHIRE STRATEGIC RAIL FREIGHT INTERCHANGE

Project Title

THE OXFORDSHIRE STRATEGIC RAIL FREIGHT INTERCHANGE AND HIGHWAYS ORDER 202X

Drawing Title

HIGHWAY PLANS GENERAL ARRANGEMENT SHEET 01 ALTERNATIVE

Regulation:	5(2)(o)	Document:	2.7W
Drawn:	S.Birchall	Checked:	S.Hilditch
Approved:	S.Hilditch	Date:	16.09.25
BWB Ref:	NTH2479	Scale@A1:	1:2500

Project - Originator - Functional Breakdown - Spatial Breakdown - Form - Discipline - Number

OxSRFI-BWB-LSI-01A-DR-CH-0101A

Drawing Status: **DCO SUBMISSION** Rev: **P04**

0 50 100 150 200 250m

SCALE 1:2500

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Y:\NTH\NTH2479_Oxfordshire RFI\02. Project Delivery\01. WIP\Drawings\OxSRFI-BWB-LSI-01A-DR-CH-0101A_Document 2.7W_Highway Plans GA Sheet 01 Alternative.dwg

APPENDIX F:
CONVERGENCE RESULTS

CONVERGENCE- 2031 RC1

AM

Run #	Paths			Network Performance	
	Travel Times (0-20%)	Travel Times (0-20%)	Vol.Difference		
	Check - ShrConvPathTT	Check - Paths List - Converged = Yes	(0-5%)	Total Travel Time (s)	Diff from prev. run
1	39%	59%	39%	3285885.83	-
2	100%	100%	100%	3285885.83	0.0%
3	100%	100%	100%	3285885.83	0.0%
4	100%	100%	100%	3285885.83	0.0%
5	100%	100%	100%	3285885.83	0.0%
6	100%	100%	100%	3285885.83	0.0%
7	100%	100%	100%	3285885.83	0.0%
8	100%	100%	100%	3285885.83	0.0%
9	100%	100%	100%	3285885.83	0.0%
10	100%	100%	100%	3285885.83	0.0%

Most suitable run - BEW and WEG used for results reporting - demand reduced to 80% for suitable convergence levels

PM

Run #	Paths			Network Performance	
	Travel Times (0-20%)	Travel Times (0-20%)	Vol.Difference		
	Check - ShrConvPathTT	Check - Paths List - Converged = Yes	(0-5%)	Total Travel Time (s)	Diff from prev. run
1	36%	60%	43%	2959508	-
2	100%	100%	100%	2959508	0.0%
3	100%	100%	100%	2959508	0.0%
4	100%	100%	100%	2959508	0.0%
5	100%	100%	100%	2959508	0.0%
6	100%	100%	100%	2959508	0.0%
7	100%	100%	100%	2959508	0.0%
8	100%	100%	100%	2959508	0.0%
9	100%	100%	100%	2959508	0.0%
10	100%	100%	100%	2959508	0.0%

Most suitable run - BEW and WEG used for results reporting - demand reduced to 80% for suitable convergence levels

CONVERGENCE- 2031 DS1A

	AM					
	Run #	Paths			Network Performance	
		Travel Times (0-20%)	Travel Times (0-20%)	Vol.Difference		
		Check - ShrConvPathTT	Check - Paths List - Converged = Yes	(0-5%)	Total Travel Time (s)	Diff from prev. run
42	1	92%	96%	84%	3040026.2	-
43	2	93%	96%	84%	3040026.2	0.0%
44	3	93%	96%	84%	3040026.2	0.0%
45	4	93%	96%	84%	3040015.8	0.0%
46	5	94%	96%	84%	3040015.8	0.0%
47	6	94%	96%	84%	3040015.8	0.0%
48	7	94%	96%	84%	3040015.8	0.0%
49	8	96%	97%	84%	3040015.8	0.0%
50	9	96%	97%	84%	3040015.8	0.0%
51	10	97%	97%	83%	3038314.2	-0.1%
52	11	98%	97%	83%	3038313.8	0.0%
53	12	98%	97%	84%	3038314.2	0.0%
54	13	98%	98%	84%	3038314.2	0.0%
55	14	98%	98%	83%	3038314.2	0.0%
56	15	98%	98%	82%	3038313.8	0.0%
57	16	98%	98%	84%	3038192	0.0%
58	17	98%	98%	84%	3038192	0.0%
59	18	98%	98%	84%	3038192	0.0%
60	19	98%	98%	83%	3038192	0.0%
61	20	98%	98%	82%	3038191.6	0.0%

Most suitable run - BEW and WEG used for results reporting - demand reduced to 80% for suitable convergence levels

PM					
Run #	Paths			Network Performance	
	Travel Times (0-20%)	Travel Times (0-20%)	Vol.Difference (0-5%)		
	Check - ShrConvPathTT	Check - Paths List - Converged = Yes		Total Travel Time (s)	Diff from prev. run
50	86%	86%	84%	2887443	0.0%
51	86%	86%	84%	2887419.5	0.0%
52	86%	86%	84%	2887419.5	0.0%
53	85%	85%	84%	2886817.67	0.0%
54	86%	86%	84%	2886817.67	0.0%
55	86%	86%	84%	2886817.67	0.0%
56	87%	87%	84%	2886199.5	0.0%
57	87%	87%	84%	2886199.5	0.0%
58	87%	87%	84%	2885927.33	0.0%
59	88%	88%	84%	2885927.33	0.0%
60	88%	88%	84%	2885927.33	0.0%
61	90%	90%	84%	2885927.33	0.0%
62	89%	89%	84%	2885709.33	0.0%
63	92%	92%	84%	2885511.67	0.0%
64	92%	92%	84%	2885473.33	0.0%
65	92%	92%	84%	2885473.33	0.0%
66	92%	92%	84%	2885473.33	0.0%
67	92%	92%	84%	2885473.33	0.0%
68	92%	92%	84%	2885473.33	0.0%
69	92%	92%	84%	2886546	0.0%
70	92%	92%	84%	2886546	0.0%
71	92%	92%	84%	2886546	0.0%
72	92%	92%	84%	2885733.83	0.0%
73	92%	92%	84%	2885733.83	0.0%
74	92%	92%	84%	2885134.5	0.0%
75	94%	94%	84%	2885134.5	0.0%
76	94%	94%	84%	2885134.5	0.0%
77	94%	94%	84%	2885134.5	0.0%
78	94%	94%	84%	2885134.5	0.0%
79	94%	94%	84%	2885134.5	0.0%
80	94%	94%	84%	2885134.5	0.0%
81	94%	94%	84%	2885134.5	0.0%
82	94%	94%	84%	2885134.5	0.0%
83	93%	93%	84%	2886402	0.0%
84	93%	93%	84%	2886402	0.0%
85	93%	93%	84%	2886402	0.0%
86	93%	93%	84%	2886402	0.0%
87	92%	92%	84%	2887656.83	0.0%
88	92%	92%	84%	2887656.83	0.0%
89	92%	92%	84%	2887656.83	0.0%
90	92%	92%	84%	2887656.83	0.0%
91	93%	93%	84%	2887656.83	0.0%
92	95%	95%	84%	2887656.83	0.0%
93	96%	96%	84%	2887656.83	0.0%
94	96%	96%	84%	2887656.83	0.0%
95	96%	96%	84%	2887656.83	0.0%
96	96%	96%	84%	2887670.83	0.0%
97	96%	96%	84%	2887670.83	0.0%
98	96%	96%	84%	2887670.83	0.0%
99	97%	97%	84%	2887670.83	0.0%
100	97%	97%	84%	2886140.33	-0.1%

Most suitable run - BEW and WEG used for results reporting - demand reduced to 80% for suitable convergence levels

CONVERGENCE- 2031 RC1A

AM					
Run #	Paths			Network Performance	
	Travel Times (0-20%)	Travel Times (0-20%)	Vol.Difference		
	Check - ShrConvPathTT	Check - Paths List - Converged = Yes	(0-5%)	Total Travel Time (s)	Diff from prev. run
21	81%	87%	100%	2813517.83	0.0%
22	81%	87%	100%	2813517.83	0.0%
23	81%	87%	100%	2813517.83	0.0%
24	81%	87%	100%	2813517.83	0.0%
25	81%	87%	100%	2813517.83	0.0%
26	83%	88%	100%	2813517.83	0.0%
27	84%	88%	100%	2813517.83	0.0%
28	86%	89%	100%	2813517.83	0.0%
29	86%	90%	100%	2813517.83	0.0%
30	87%	92%	100%	2813517.83	0.0%
31	89%	93%	100%	2813517.83	0.0%
32	89%	93%	100%	2813517.83	0.0%
33	91%	95%	100%	2813517.83	0.0%
34	91%	95%	100%	2813517.83	0.0%
35	93%	96%	100%	2813517.83	0.0%
36	93%	96%	100%	2813517.83	0.0%
37	93%	96%	100%	2813517.83	0.0%
38	94%	96%	100%	2813517.83	0.0%
39	94%	96%	100%	2813517.83	0.0%
40	94%	96%	100%	2813517.83	0.0%
41	94%	96%	100%	2813517.83	0.0%
42	94%	96%	100%	2813517.83	0.0%
43	94%	96%	100%	2813517.83	0.0%
44	94%	96%	100%	2813517.83	0.0%
45	94%	96%	100%	2813517.83	0.0%
46	94%	96%	100%	2813517.83	0.0%
47	94%	96%	100%	2813517.83	0.0%
48	94%	96%	100%	2813517.83	0.0%
49	94%	96%	100%	2813517.83	0.0%
50	94%	96%	100%	2813517.83	0.0%
51	94%	96%	100%	2813517.83	0.0%
52	94%	96%	100%	2813517.83	0.0%
53	94%	96%	100%	2813517.83	0.0%
54	94%	96%	100%	2813517.83	0.0%
55	94%	96%	100%	2813517.83	0.0%
56	94%	96%	100%	2813517.83	0.0%
57	94%	96%	100%	2813517.83	0.0%
58	96%	96%	100%	2813517.83	0.0%
59	99%	98%	100%	2813517.83	0.0%
60	99%	98%	100%	2813517.83	0.0%
61	99%	98%	100%	2813517.83	0.0%
62	100%	99%	100%	2813517.83	0.0%
63	100%	99%	100%	2813517.83	0.0%
64	100%	100%	100%	2813517.83	0.0%
65	100%	100%	100%	2813517.83	0.0%
66	100%	100%	100%	2813517.83	0.0%
67	100%	100%	100%	2813517.83	0.0%
68	100%	100%	100%	2813517.83	0.0%
69	100%	100%	100%	2813517.83	0.0%
70	100%	100%	100%	2813517.83	0.0%

Most suitable run - BEW and WEG used for results reporting - demand reduced to 80% for suitable convergence levels

PM					
Run #	Paths			Network Performance	
	Travel Times (0-20%)	Travel Times (0-20%)	Vol.Difference		
	Check - ShrConvPathTT	Check - Paths List - Converged = Yes	(0-5%)	Total Travel Time (s)	Diff from prev. run
70	91%	94%	100%	2973088.17	0.0%
71	91%	94%	100%	2973088.17	0.0%
72	91%	94%	100%	2973088.17	0.0%
73	91%	94%	100%	2973088.17	0.0%
74	93%	94%	100%	2973088.17	0.0%
75	93%	94%	100%	2973088.17	0.0%
76	93%	94%	100%	2973088.17	0.0%
77	93%	94%	100%	2973088.17	0.0%
78	93%	94%	100%	2973088.17	0.0%
79	93%	94%	100%	2973088.17	0.0%
80	93%	94%	100%	2973088.17	0.0%
81	93%	94%	100%	2973088.17	0.0%
82	93%	94%	100%	2973088.17	0.0%
83	93%	94%	100%	2973088.17	0.0%
84	93%	94%	100%	2973088.17	0.0%
85	93%	94%	100%	2973088.17	0.0%
86	93%	94%	100%	2973088.17	0.0%
87	93%	94%	100%	2973088.17	0.0%
88	93%	94%	100%	2973088.17	0.0%
89	93%	94%	100%	2973088.17	0.0%
90	93%	94%	100%	2973088.17	0.0%
91	93%	94%	100%	2973088.17	0.0%
92	93%	94%	100%	2973088.17	0.0%
93	93%	94%	100%	2973088.17	0.0%
94	93%	94%	100%	2973088.17	0.0%
95	93%	94%	100%	2973088.17	0.0%
96	93%	94%	100%	2973088.17	0.0%
97	93%	94%	100%	2973088.17	0.0%
98	93%	94%	100%	2973088.17	0.0%
99	93%	94%	100%	2973088.17	0.0%
100	93%	94%	100%	2973088.17	0.0%
101	93%	95%	100%	2973088.17	0.0%
102	94%	95%	100%	2973088.17	0.0%
103	96%	96%	100%	2973088.17	0.0%
104	96%	96%	100%	2973088.17	0.0%
105	96%	96%	100%	2973088.17	0.0%
106	96%	96%	100%	2973088.17	0.0%
107	97%	96%	100%	2973088.17	0.0%
108	97%	96%	100%	2973088.17	0.0%
109	97%	97%	100%	2973088.17	0.0%
110	97%	97%	100%	2973088.17	0.0%
111	99%	97%	100%	2973088.17	0.0%
112	99%	97%	100%	2973088.17	0.0%
113	99%	99%	100%	2973088.17	0.0%
114	99%	99%	100%	2973088.17	0.0%
115	99%	99%	100%	2973088.17	0.0%
116	100%	99%	100%	2973088.17	0.0%
117	100%	99%	100%	2973088.17	0.0%
118	100%	99%	100%	2973088.17	0.0%
119	100%	99%	100%	2973088.17	0.0%
120	100%	100%	100%	2973088.17	0.0%

Most suitable run - BEW and WEG used for results reporting - demand reduced to 80% for suitable convergence levels

CONVERGENCE- 2034 RC3A

AM					
Run #	Paths			Network Performance	
	Travel Times (0-20%)	Travel Times (0-20%)	Vol.Difference		
	Check - ShrConvPathTT	Check - Paths List - Converged = Yes	(0-5%)	Total Travel Time (s)	Diff from prev. run
10	68%	77%	100%	2996717.83	0.0%
11	69%	78%	100%	2996717.83	0.0%
12	69%	78%	100%	2996717.83	0.0%
13	70%	80%	100%	2996717.83	0.0%
14	72%	80%	100%	2996717.83	0.0%
15	72%	81%	100%	2996717.83	0.0%
16	75%	82%	100%	2996717.83	0.0%
17	75%	82%	100%	2996717.83	0.0%
18	75%	83%	100%	2996717.83	0.0%
19	75%	83%	100%	2996717.83	0.0%
20	76%	84%	100%	2996717.83	0.0%
21	77%	85%	100%	2996717.83	0.0%
22	79%	86%	100%	2996717.83	0.0%
23	79%	86%	100%	2996717.83	0.0%
24	79%	86%	100%	2996717.83	0.0%
25	82%	88%	100%	2996717.83	0.0%
26	83%	88%	100%	2996717.83	0.0%
27	85%	89%	100%	2996717.83	0.0%
28	86%	90%	100%	2996717.83	0.0%
29	87%	91%	100%	2996717.83	0.0%
30	87%	92%	100%	2996717.83	0.0%
31	87%	92%	100%	2996717.83	0.0%
32	89%	93%	100%	2996717.83	0.0%
33	89%	93%	100%	2996717.83	0.0%
34	89%	93%	100%	2996717.83	0.0%
35	92%	95%	100%	2996717.83	0.0%
36	93%	96%	100%	2996717.83	0.0%
37	93%	96%	100%	2996717.83	0.0%
38	93%	96%	100%	2996717.83	0.0%
39	93%	96%	100%	2996717.83	0.0%
40	93%	96%	100%	2996717.83	0.0%
41	94%	96%	100%	2996717.83	0.0%
42	94%	96%	100%	2996717.83	0.0%
43	94%	96%	100%	2996717.83	0.0%
44	94%	96%	100%	2996717.83	0.0%
45	94%	96%	100%	2996717.83	0.0%
46	94%	96%	100%	2996717.83	0.0%
47	94%	96%	100%	2996717.83	0.0%
48	94%	96%	100%	2996717.83	0.0%
49	94%	96%	100%	2996717.83	0.0%
50	96%	97%	100%	2996717.83	0.0%
51	96%	97%	100%	2996717.83	0.0%
52	97%	98%	100%	2996717.83	0.0%
53	99%	99%	100%	2996717.83	0.0%
54	99%	99%	100%	2996717.83	0.0%
55	99%	99%	100%	2996717.83	0.0%
56	99%	99%	100%	2996717.83	0.0%
57	99%	99%	100%	2996717.83	0.0%
58	99%	99%	100%	2996717.83	0.0%
59	100%	100%	100%	2996717.83	0.0%
60	100%	100%	100%	2996717.83	0.0%

Most suitable run - BEW and WEG used for results reporting - demand reduced to 80% for suitable convergence levels

PM					
Run #	Paths			Network Performance	
	Travel Times (0-20%)	Travel Times (0-20%)	Vol.Difference		
	Check - ShrConvPathTT	Check - Paths List - Converged = Yes	(0-5%)	Total Travel Time (s)	Diff from prev. run
51	88%	90%	100%	3132943.17	0.0%
52	88%	90%	100%	3132943.17	0.0%
53	90%	91%	100%	3132943.17	0.0%
54	90%	92%	100%	3132943.17	0.0%
55	90%	92%	100%	3132943.17	0.0%
56	90%	93%	100%	3132943.17	0.0%
57	91%	93%	100%	3132943.17	0.0%
58	91%	93%	100%	3132943.17	0.0%
59	91%	94%	100%	3132943.17	0.0%
60	91%	94%	100%	3132943.17	0.0%
61	91%	94%	100%	3132943.17	0.0%
62	91%	94%	100%	3132943.17	0.0%
63	91%	94%	100%	3132943.17	0.0%
64	91%	94%	100%	3132943.17	0.0%
65	93%	94%	100%	3132943.17	0.0%
66	93%	94%	100%	3132943.17	0.0%
67	93%	94%	100%	3132943.17	0.0%
68	93%	94%	100%	3132943.17	0.0%
69	93%	94%	100%	3132943.17	0.0%
70	93%	94%	100%	3132943.17	0.0%
71	93%	94%	100%	3132943.17	0.0%
72	93%	94%	100%	3132943.17	0.0%
73	94%	95%	100%	3132943.17	0.0%
74	94%	96%	100%	3132943.17	0.0%
75	96%	96%	100%	3132943.17	0.0%
76	96%	96%	100%	3132943.17	0.0%
77	96%	96%	100%	3132943.17	0.0%
78	96%	96%	100%	3132943.17	0.0%
79	97%	96%	100%	3132943.17	0.0%
80	97%	96%	100%	3132943.17	0.0%
81	97%	96%	100%	3132943.17	0.0%
82	97%	97%	100%	3132943.17	0.0%
83	97%	97%	100%	3132943.17	0.0%
84	97%	97%	100%	3132943.17	0.0%
85	97%	97%	100%	3132943.17	0.0%
86	97%	98%	100%	3132943.17	0.0%
87	97%	98%	100%	3132943.17	0.0%
88	97%	98%	100%	3132943.17	0.0%
89	99%	98%	100%	3132943.17	0.0%
90	99%	98%	100%	3132943.17	0.0%
91	99%	98%	100%	3132943.17	0.0%
92	99%	98%	100%	3132943.17	0.0%
93	99%	98%	100%	3132943.17	0.0%
94	99%	98%	100%	3132943.17	0.0%
95	100%	98%	100%	3132943.17	0.0%
96	100%	99%	100%	3132943.17	0.0%
97	100%	99%	100%	3132943.17	0.0%
98	100%	100%	100%	3132943.17	0.0%
99	100%	100%	100%	3132943.17	0.0%
100	100%	100%	100%	3132943.17	0.0%

Most suitable run - BEW and WEG used for results reporting - demand reduced to 80% for suitable convergence levels

CONVERGENCE- 2034 DS3A

AM					
Run #	Paths			Network Performance	
	Travel Times (0-20%)	Travel Times (0-20%)	Vol.Difference		
	Check - ShrConvPathTT	Check - Paths List - Converged = Yes	(0-5%)	Total Travel Time (s)	Diff from prev. run
1	83%	92%	84%	3229517.17	-
2	83%	92%	84%	3229517.17	0.0%
3	83%	92%	84%	3229517.17	0.0%
4	84%	92%	84%	3229517.17	0.0%
5	87%	94%	84%	3231641.83	0.1%
6	84%	92%	84%	3233528.17	0.1%
7	84%	92%	84%	3233484.5	0.0%
8	88%	94%	84%	3231514.83	-0.1%
9	88%	94%	84%	3231550.83	0.0%
10	89%	94%	83%	3231508.5	0.0%
11	90%	94%	83%	3233094.67	0.0%
12	90%	94%	83%	3233051.83	0.0%
13	90%	94%	82%	3231581.83	0.0%
14	91%	95%	84%	3232221	0.0%
15	91%	95%	84%	3232858.17	0.0%
16	91%	95%	83%	3232128.67	0.0%
17	94%	95%	82%	3232490.17	0.0%
18	94%	96%	83%	3232117.67	0.0%
19	95%	96%	83%	3232490.17	0.0%
20	95%	97%	84%	3232490.17	0.0%
21	93%	97%	83%	3231328.33	0.0%
22	94%	96%	84%	3232252.33	0.0%
23	95%	96%	84%	3232252.33	0.0%
24	94%	95%	83%	3233938.5	0.1%
25	94%	95%	83%	3234316	0.0%
26	97%	98%	83%	3231678	-0.1%
27	96%	98%	84%	3230819.33	0.0%
28	96%	98%	84%	3232441.17	0.1%
29	96%	98%	83%	3232027.5	0.0%
30	97%	98%	83%	3232034	0.0%

Most suitable run - BEW and WEG used for results reporting - demand reduced to 80% for suitable convergence levels

PM					
Run #	Paths			Network Performance	
	Travel Times (0-20%)	Travel Times (0-20%)	Vol.Difference (0-5%)		
	Check - ShrConvPathTT	Check - Paths List - Converged = Yes		Total Travel Time (s)	Diff from prev. run
50	85%	85%	82%	3069789.33	0.0%
51	86%	86%	82%	3068516.83	0.0%
52	88%	88%	83%	3067809.17	0.0%
53	86%	86%	82%	3068432.67	0.0%
54	88%	88%	82%	3067829.83	0.0%
55	88%	88%	83%	3067708.17	0.0%
56	87%	87%	82%	3068440.17	0.0%
57	88%	88%	82%	3067654	0.0%
58	88%	88%	84%	3067755	0.0%
59	89%	89%	82%	3068356	0.0%
60	88%	88%	82%	3067755	0.0%
61	89%	89%	83%	3068445.67	0.0%
62	88%	88%	82%	3067775.67	0.0%
63	87%	87%	83%	3070017.5	0.1%
64	89%	89%	83%	3069049.17	0.0%
65	90%	90%	82%	3068994.33	0.0%
66	91%	91%	82%	3069109.17	0.0%
67	91%	91%	82%	3069147	0.0%
68	90%	90%	82%	3068952.67	0.0%
69	90%	90%	82%	3069413	0.0%
70	90%	90%	82%	3068994.5	0.0%
71	90%	90%	83%	3068896.83	0.0%
72	89%	89%	82%	3069550.67	0.0%
73	91%	91%	83%	3068815.83	0.0%
74	91%	91%	83%	3068752.5	0.0%
75	92%	92%	82%	3068511.17	0.0%
76	92%	92%	84%	3068506.33	0.0%
77	91%	91%	82%	3068941	0.0%
78	92%	92%	82%	3069803.83	0.0%
79	92%	92%	84%	3068369.17	0.0%
80	92%	92%	82%	3069789.33	0.0%
81	92%	92%	83%	3068403.5	0.0%
82	93%	93%	83%	3069864.17	0.0%
83	94%	94%	83%	3069994.5	0.0%
84	95%	95%	82%	3068443.83	-0.1%
85	96%	96%	81%	3070152.5	0.1%
86	96%	96%	83%	3069994.5	0.0%
87	95%	95%	83%	3068840	0.0%
88	97%	97%	82%	3069636.5	0.0%
89	96%	96%	82%	3068872.83	0.0%
90	97%	97%	83%	3070121	0.0%
91	96%	96%	83%	3068534.67	-0.1%
92	96%	96%	82%	3070549	0.1%
93	96%	96%	82%	3067032.83	-0.1%
94	96%	96%	81%	3068459.17	0.0%
95	96%	96%	82%	3066952.67	0.0%
96	96%	96%	84%	3066999.67	0.0%
97	96%	96%	82%	3067008.83	0.0%
98	96%	96%	82%	3068148	0.0%
99	97%	97%	83%	3067343.83	0.0%
100	97%	97%	83%	3067381.33	0.0%

Most suitable run - BEW and WEG used for results reporting - demand reduced to 80% for suitable convergence levels

CONVERGENCE- 2031 RC2A

AM					
Run #	Paths			Network Performance	
	Travel Times (0-20%)	Travel Times (0-20%)	Vol.Difference		
	Check - ShrConvPathTT	Check - Paths List - Converged = Yes	(0-5%)	Total Travel Time (s)	Diff from prev. run
11	65%	77%	100%	2816751.33	0.0%
12	65%	77%	100%	2816751.33	0.0%
13	68%	79%	100%	2816751.33	0.0%
14	71%	81%	100%	2816751.33	0.0%
15	72%	81%	100%	2816751.33	0.0%
16	74%	83%	100%	2816751.33	0.0%
17	78%	85%	100%	2816751.33	0.0%
18	78%	85%	100%	2816751.33	0.0%
19	80%	86%	100%	2816751.33	0.0%
20	80%	86%	100%	2816751.33	0.0%
21	80%	86%	100%	2816751.33	0.0%
22	80%	86%	100%	2816751.33	0.0%
23	83%	87%	100%	2816751.33	0.0%
24	83%	87%	100%	2816751.33	0.0%
25	83%	87%	100%	2816751.33	0.0%
26	86%	88%	100%	2816751.33	0.0%
27	87%	90%	100%	2816751.33	0.0%
28	90%	93%	100%	2816751.33	0.0%
29	90%	94%	100%	2816751.33	0.0%
30	90%	94%	100%	2816751.33	0.0%
31	90%	94%	100%	2816751.33	0.0%
32	91%	95%	100%	2816751.33	0.0%
33	91%	95%	100%	2816751.33	0.0%
34	93%	96%	100%	2816751.33	0.0%
35	93%	96%	100%	2816751.33	0.0%
36	94%	96%	100%	2816751.33	0.0%
37	94%	96%	100%	2816751.33	0.0%
38	96%	97%	100%	2816751.33	0.0%
39	96%	97%	100%	2816751.33	0.0%
40	96%	97%	100%	2816751.33	0.0%
41	96%	97%	100%	2816751.33	0.0%
42	96%	97%	100%	2816751.33	0.0%
43	96%	97%	100%	2816751.33	0.0%
44	96%	97%	100%	2816751.33	0.0%
45	96%	97%	100%	2816751.33	0.0%
46	96%	97%	100%	2816751.33	0.0%
47	97%	98%	100%	2816751.33	0.0%
48	97%	98%	100%	2816751.33	0.0%
49	97%	98%	100%	2816751.33	0.0%
50	97%	98%	100%	2816751.33	0.0%
51	97%	98%	100%	2816751.33	0.0%
52	97%	98%	100%	2816751.33	0.0%
53	97%	98%	100%	2816751.33	0.0%
54	97%	98%	100%	2816751.33	0.0%
55	97%	98%	100%	2816751.33	0.0%
56	97%	98%	100%	2816751.33	0.0%
57	97%	98%	100%	2816751.33	0.0%
58	99%	99%	100%	2816751.33	0.0%
59	99%	99%	100%	2816751.33	0.0%
60	99%	99%	100%	2816751.33	0.0%

Most suitable run - BEW and WEG used for results reporting - demand reduced to 80% for suitable convergence levels

PM					
Run #	Paths			Network Performance	
	Travel Times (0-20%)	Travel Times (0-20%)	Vol.Difference		
	Check - ShrConvPathTT	Check - Paths List - Converged = Yes	(0-5%)	Total Travel Time (s)	Diff from prev. run
51	89%	89%	100%	2970366.17	0.0%
52	90%	90%	100%	2970366.17	0.0%
53	90%	90%	100%	2970366.17	0.0%
54	90%	91%	100%	2970366.17	0.0%
55	90%	91%	100%	2970366.17	0.0%
56	90%	91%	100%	2970366.17	0.0%
57	90%	91%	100%	2970366.17	0.0%
58	91%	92%	100%	2970366.17	0.0%
59	91%	92%	100%	2970366.17	0.0%
60	91%	92%	100%	2970366.17	0.0%
61	91%	92%	100%	2970366.17	0.0%
62	91%	92%	100%	2970366.17	0.0%
63	91%	93%	100%	2970366.17	0.0%
64	91%	93%	100%	2970366.17	0.0%
65	93%	93%	100%	2970366.17	0.0%
66	93%	93%	100%	2970366.17	0.0%
67	93%	93%	100%	2970366.17	0.0%
68	93%	93%	100%	2970366.17	0.0%
69	93%	93%	100%	2970366.17	0.0%
70	93%	93%	100%	2970366.17	0.0%
71	93%	93%	100%	2970366.17	0.0%
72	93%	94%	100%	2970366.17	0.0%
73	94%	95%	100%	2970366.17	0.0%
74	94%	95%	100%	2970366.17	0.0%
75	94%	95%	100%	2970366.17	0.0%
76	94%	96%	100%	2970366.17	0.0%
77	96%	96%	100%	2970366.17	0.0%
78	97%	96%	100%	2970366.17	0.0%
79	97%	96%	100%	2970366.17	0.0%
80	97%	96%	100%	2970366.17	0.0%
81	97%	96%	100%	2970366.17	0.0%
82	97%	96%	100%	2970366.17	0.0%
83	97%	97%	100%	2970366.17	0.0%
84	97%	97%	100%	2970366.17	0.0%
85	97%	97%	100%	2970366.17	0.0%
86	97%	97%	100%	2970366.17	0.0%
87	97%	97%	100%	2970366.17	0.0%
88	99%	98%	100%	2970366.17	0.0%
89	100%	98%	100%	2970366.17	0.0%
90	100%	98%	100%	2970366.17	0.0%
91	100%	98%	100%	2970366.17	0.0%
92	100%	98%	100%	2970366.17	0.0%
93	100%	98%	100%	2970366.17	0.0%
94	100%	99%	100%	2970366.17	0.0%
95	100%	99%	100%	2970366.17	0.0%
96	100%	99%	100%	2970366.17	0.0%
97	100%	99%	100%	2970366.17	0.0%
98	100%	99%	100%	2970366.17	0.0%
99	100%	99%	100%	2970366.17	0.0%
100	100%	100%	100%	2970366.17	0.0%

Most suitable run - BEW and WEG used for results reporting - demand reduced to 80% for suitable convergence levels

CONVERGENCE- 2031 DS2A

AM					
Run #	Paths			Network Performance	
	Travel Times (0-20%)	Travel Times (0-20%)	Vol.Difference		
	Check - ShrConvPathTT	Check - Paths List - Converged = Yes	(0-5%)	Total Travel Time (s)	Diff from prev. run
6	82%	90%	85%	2952202.6	0.0%
7	83%	90%	85%	2952202.6	0.0%
8	84%	91%	85%	2952202.6	0.0%
9	85%	92%	85%	2952202.6	0.0%
10	85%	92%	85%	2952202.6	0.0%
11	87%	93%	85%	2952202.6	0.0%
12	88%	93%	85%	2952202.6	0.0%
13	88%	93%	85%	2952202.6	0.0%
14	88%	93%	85%	2952202.6	0.0%
15	88%	93%	85%	2952202.6	0.0%
16	89%	93%	85%	2952202.6	0.0%
17	90%	94%	85%	2952202.6	0.0%
18	90%	94%	85%	2952202.6	0.0%
19	90%	94%	85%	2952202.6	0.0%
20	91%	94%	85%	2952202.6	0.0%
21	91%	94%	85%	2952202.6	0.0%
22	91%	94%	85%	2952202.6	0.0%
23	92%	95%	85%	2952202.6	0.0%
24	93%	96%	85%	2952202.6	0.0%
25	93%	96%	85%	2952202.6	0.0%
26	93%	96%	85%	2952202.6	0.0%
27	93%	96%	85%	2952202.6	0.0%
28	94%	96%	85%	2952202.6	0.0%
29	94%	96%	85%	2952202.6	0.0%
30	94%	96%	85%	2952202.6	0.0%
31	94%	97%	85%	2952202.6	0.0%
32	94%	97%	85%	2952202.6	0.0%
33	94%	97%	85%	2952202.6	0.0%
34	94%	97%	85%	2952202.6	0.0%
35	95%	97%	85%	2952202.6	0.0%
36	96%	97%	85%	2952202.6	0.0%
37	97%	97%	85%	2952202.6	0.0%
38	98%	97%	85%	2952202.6	0.0%
39	98%	97%	85%	2952202.6	0.0%
40	98%	97%	85%	2952202.6	0.0%
41	98%	98%	85%	2952202.6	0.0%
42	98%	98%	85%	2952202.6	0.0%
43	98%	98%	85%	2952202.6	0.0%
44	98%	98%	85%	2952202.6	0.0%
45	98%	98%	85%	2952202.6	0.0%
46	98%	98%	85%	2952202.6	0.0%
47	98%	98%	85%	2952202.6	0.0%
48	98%	98%	85%	2952202.6	0.0%
49	98%	98%	85%	2952202.6	0.0%
50	98%	98%	85%	2952202.6	0.0%
51	98%	98%	85%	2952202.6	0.0%
52	98%	98%	85%	2952202.6	0.0%
53	99%	98%	85%	2952202.6	0.0%
54	99%	98%	85%	2952202.6	0.0%
55	99%	98%	85%	2952202.6	0.0%

Most suitable run - BEW and WEG used for results reporting - demand reduced to 80% for suitable convergence levels

PM					
Run #	Paths			Network Performance	
	Travel Times (0-20%)	Travel Times (0-20%)	Vol.Difference		
	Check - ShrConvPathTT	Check - Paths List - Converged = Yes	(0-5%)	Total Travel Time (s)	Diff from prev. run
1	89%	94%	85%	3110412.2	-
2	89%	94%	85%	3110412.2	0.0%
3	89%	94%	85%	3110412.2	0.0%
4	89%	94%	85%	3110412.2	0.0%
5	90%	95%	85%	3110412.2	0.0%
6	90%	95%	85%	3110412.2	0.0%
7	91%	95%	85%	3110412.2	0.0%
8	92%	96%	85%	3110412.2	0.0%
9	92%	96%	85%	3110412.2	0.0%
10	92%	96%	85%	3110412.2	0.0%
11	93%	96%	85%	3110412.2	0.0%
12	93%	96%	85%	3110412.2	0.0%
13	93%	96%	85%	3110412.2	0.0%
14	93%	96%	85%	3110412.2	0.0%
15	93%	96%	85%	3110412.2	0.0%
16	93%	96%	85%	3110412.2	0.0%
17	93%	96%	85%	3110412.2	0.0%
18	93%	96%	85%	3110412.2	0.0%
19	93%	96%	85%	3110412.2	0.0%
20	93%	96%	85%	3110412.2	0.0%
21	94%	96%	85%	3110412.2	0.0%
22	95%	96%	85%	3110412.2	0.0%
23	95%	96%	85%	3110412.2	0.0%
24	95%	96%	85%	3110412.2	0.0%
25	95%	97%	85%	3110412.2	0.0%
26	95%	97%	85%	3110412.2	0.0%
27	95%	97%	85%	3110412.2	0.0%
28	95%	97%	85%	3110412.2	0.0%
29	95%	97%	85%	3110412.2	0.0%
30	95%	97%	85%	3110412.2	0.0%
31	95%	97%	85%	3110412.2	0.0%
32	95%	97%	85%	3110412.2	0.0%
33	95%	97%	85%	3110412.2	0.0%
34	95%	97%	85%	3110412.2	0.0%
35	95%	97%	85%	3110412.2	0.0%
36	95%	97%	85%	3110412.2	0.0%
37	96%	98%	85%	3110412.2	0.0%
38	96%	98%	85%	3110412.2	0.0%
39	96%	98%	85%	3110412.2	0.0%
40	97%	98%	85%	3110412.2	0.0%

Most suitable run - BEW and WEG used for results reporting - demand reduced to 80% for suitable convergence levels

APPENDIX G:

2031 RC1&DS1A ROUTE PERFORMANCE– O-D JOURNEY TIME RESULTS

MG MARKERS - FULL ORIGIN-DESTINATION MARKERS (PARKING LOT TO PARKING LOT)

ALL VEHICLES - AM PEAK

Marker	Route			2031 RC1		2031 DS1A		Difference (JTs)	
No.	From	To	Dist.	Avg.	Trips	Avg.	Trips	No.	%
1	A43 North	A43 North	1600 m	-	0	-	0	-	-
2	A43 North	B4100 East	1220 m	00:06:34	171	00:01:27	323	-00:05:06	▼ 78%
3	A43 North	Cherwell Services	2045 m	00:07:57	48	00:02:59	56	-00:04:58	▼ 62%
4	A43 North	M40 South	5269 m	00:09:56	998	00:05:07	1469	-00:04:48	▼ 48%
5	A43 North	B430	3805 m	00:09:46	256	-	0	-	-
6	A43 North	M40 North	7348 m	-	0	-	0	-	-
7	A43 North	B4100 West	1216 m	00:06:39	11	00:02:04	33	-00:04:35	▼ 69%
8	A43 North	Ardley Rd West	2718 m	-	0	-	0	-	-
9	A43 North	Ardley Rd East	3374 m	00:09:07	27	-	0	-	-
10	A43 North	B430 (New)	1298 m	-	0	00:05:20	369	-	-
11	A43 North	OxSRFI (South)	1116 m	-	0	00:06:18	119	-	-
12	A43 North	OxSRFI (North)	1744 m	-	0	00:06:11	121	-	-
13	B4100 East	A43 North	1298 m	00:05:41	217	00:02:08	221	-00:03:33	▼ 63%
14	B4100 East	B4100 East	1116 m	-	0	-	0	-	-
15	B4100 East	Cherwell Services	1744 m	-	0	-	0	-	-
16	B4100 East	M40 South	4968 m	-	0	00:05:15	4	-	-
17	B4100 East	B430	3504 m	00:08:47	11	-	0	-	-
18	B4100 East	M40 North	7047 m	00:10:05	161	00:07:01	38	-00:03:03	▼ 30%
19	B4100 East	B4100 West	915 m	00:05:40	231	00:02:04	244	-00:03:36	▼ 64%
20	B4100 East	Ardley Rd West	2417 m	-	0	-	0	-	-
21	B4100 East	Ardley Rd East	3073 m	-	0	-	0	-	-
22	B4100 East	B430 (New)	3597 m	-	0	00:05:46	4	-	-
23	B4100 East	OxSRFI (South)	2182 m	-	0	00:06:35	29	-	-
24	B4100 East	OxSRFI (North)	5726 m	-	0	00:06:25	32	-	-
25	Cherwell Services	A43 North	2062 m	00:02:45	62	00:04:29	63	00:01:44	▲ 63%
26	Cherwell Services	B4100 East	1880 m	-	0	-	0	-	-
27	Cherwell Services	Cherwell Services	583 m	-	0	-	0	-	-
28	Cherwell Services	M40 South	3597 m	00:03:02	213	00:03:40	285	00:00:38	▲ 21%
29	Cherwell Services	B430	2182 m	00:02:53	73	-	0	-	-
30	Cherwell Services	M40 North	5726 m	00:04:25	148	00:05:34	150	00:01:08	▲ 26%
31	Cherwell Services	B4100 West	1679 m	-	0	-	0	-	-
32	Cherwell Services	Ardley Rd West	1096 m	-	0	-	0	-	-
33	Cherwell Services	Ardley Rd East	1752 m	-	0	-	0	-	-
34	Cherwell Services	B430 (New)	5167 m	-	0	00:03:52	4	-	-
35	Cherwell Services	OxSRFI (South)	3927 m	-	0	-	0	-	-
36	Cherwell Services	OxSRFI (North)	4583 m	-	0	-	0	-	-
37	M40 South	A43 North	5550 m	00:04:45	1079	00:05:19	1053	00:00:34	▲ 12%
38	M40 South	B4100 East	5368 m	00:04:49	3	-	0	-	-
39	M40 South	Cherwell Services	4071 m	00:03:40	225	00:04:33	225	00:00:53	▲ 24%
40	M40 South	M40 South	7295 m	-	0	-	0	-	-
41	M40 South	B430	5013 m	00:04:10	2	-	0	-	-
42	M40 South	M40 North	8281 m	00:04:43	2987	00:04:44	2926	00:00:01	▲ 0%
43	M40 South	B4100 West	5167 m	00:04:29	8	00:05:13	4	00:00:44	▲ 16%
44	M40 South	Ardley Rd West	3927 m	00:03:06	14	00:03:23	12	00:00:17	▲ 9%
45	M40 South	Ardley Rd East	4583 m	00:03:28	4	-	0	-	-
46	M40 South	B430 (New)	6018 m	-	0	-	0	-	-
47	M40 South	OxSRFI (South)	5836 m	-	0	00:05:47	59	-	-
48	M40 South	OxSRFI (North)	5231 m	-	0	00:05:36	58	-	-
49	B430	A43 Nor h	3806 m	00:03:58	197	-	0	-	-
50	B430	B4100 East	3624 m	00:04:03	12	-	0	-	-
51	B430	Cherwell Services	2327 m	-	0	-	0	-	-
52	B430	M40 South	5551 m	-	0	00:06:04	4	-	-
53	B430	B430	3450 m	-	0	-	0	-	-
54	B430	M40 North	6997 m	00:04:55	92	-	0	-	-
55	B430	B4100 West	3423 m	00:03:46	17	-	0	-	-
56	B430	Ardley Rd West	1431 m	00:01:23	18	-	0	-	-
57	B430	Ardley Rd East	2045 m	00:01:50	92	00:02:30	18	00:00:39	▲ 35%
58	B430	B430 (New)	4983 m	-	0	-	0	-	-
59	B430	OxSRFI (South)	3519 m	-	0	00:06:09	22	-	-
60	B430	OxSRFI (North)	7062 m	-	0	00:06:02	19	-	-
61	M40 North	A43 Nor h	6018 m	-	0	-	0	-	-
62	M40 North	B4100 East	5836 m	00:04:29	305	00:05:28	210	00:00:58	▲ 22%
63	M40 North	Cherwell Services	5231 m	00:04:20	189	00:04:38	188	00:00:18	▲ 7%
64	M40 North	M40 South	8295 m	00:04:54	3586	00:04:58	3458	00:00:04	▲ 1%
65	M40 North	B430	6991 m	00:06:03	140	-	0	-	-
66	M40 North	M40 North	10535 m	-	0	-	0	-	-
67	M40 North	B4100 West	5635 m	00:04:09	30	-	0	-	-
68	M40 North	Ardley Rd West	5905 m	00:05:03	12	00:05:46	12	00:00:43	▲ 14%
69	M40 North	Ardley Rd East	6561 m	00:05:27	59	00:06:21	16	00:00:54	▲ 16%
70	M40 North	B430 (New)	2314 m	-	0	00:06:46	306	-	-
71	M40 North	OxSRFI (South)	1254 m	-	0	00:07:56	82	-	-
72	M40 North	OxSRFI (North)	1011 m	-	0	00:07:48	80	-	-
73	B4100 West	A43 Nor h	1116 m	00:07:25	53	00:01:50	70	-00:05:34	▼ 75%
74	B4100 West	B4100 East	934 m	00:07:34	293	00:02:01	295	-00:05:33	▼ 73%
75	B4100 West	Cherwell Services	1759 m	-	0	-	0	-	-
76	B4100 West	M40 South	4983 m	00:10:36	81	00:05:31	101	-00:05:04	▼ 48%
77	B4100 West	B430	3519 m	-	0	-	0	-	-
78	B4100 West	M40 North	7062 m	-	0	-	0	-	-
79	B4100 West	B4100 West	931 m	-	0	-	0	-	-
80	B4100 West	Ardley Rd West	2432 m	-	0	-	0	-	-
81	B4100 West	Ardley Rd East	3089 m	00:09:52	3	-	0	-	-
82	B4100 West	B430 (New)	2603 m	-	0	00:05:56	67	-	-
83	B4100 West	OxSRFI (South)	2604 m	-	0	00:06:55	19	-	-
84	B4100 West	OxSRFI (North)	2605 m	-	0	00:06:47	19	-	-
85	Ardley Rd West	A43 Nor h	2697 m	00:03:02	4	00:03:53	4	00:00:51	▲ 28%
86	Ardley Rd West	B4100 East	2515 m	-	0	-	0	-	-
87	Ardley Rd West	Cherwell Services	1218 m	-	0	-	0	-	-
88	Ardley Rd West	M40 South	4442 m	00:04:15	2	00:04:53	21	00:00:38	▲ 15%
89	Ardley Rd West	B430	1441 m	00:01:37	50	-	0	-	-
90	Ardley Rd West	M40 North	5887 m	00:03:59	10	00:04:39	10	00:00:40	▲ 17%
91	Ardley Rd West	B4100 West	2314 m	-	0	-	0	-	-
92	Ardley Rd West	Ardley Rd West	1254 m	-	0	-	0	-	-
93	Ardley Rd West	Ardley Rd East	1011 m	00:01:05	43	00:01:25	12	00:00:20	▲ 31%
94	Ardley Rd West	B430 (New)	2615 m	-	0	00:04:00	34	-	-
95	Ardley Rd West	OxSRFI (South)	2616 m	-	0	00:04:53	4	-	-
96	Ardley Rd West	OxSRFI (North)	2617 m	-	0	00:04:44	4	-	-
97	Ardley Rd East	A43 Nor h	3389 m	00:03:32	10	-	0	-	-
98	Ardley Rd East	B4100 East	3207 m	-	0	-	0	-	-
99	Ardley Rd East	Cherwell Services	1910 m	-	0	-	0	-	-
100	Ardley Rd East	M40 South	5134 m	-	0	-	0	-	-
101	Ardley Rd East	B430	2030 m	00:01:55	162	00:02:28	6	00:00:34	▲ 29%
102	Ardley Rd East	M40 North	6579 m	00:04:29	118	00:05:27	153	00:00:58	▲ 22%
103	Ardley Rd East	B4100 West	3006 m	00:03:20	8	-	0	-	-
104	Ardley Rd East	Ardley Rd West	1014 m	00:00:57	12	00:01:16	8	00:00:20	▲ 35%
105	Ardley Rd East	Ardley Rd East	2602 m	-	0	-	0	-	-
106	Ardley Rd East	B430 (New)	2627 m	-	0	-	0	-	-
107	Ardley Rd East	OxSRFI (South)	2628 m	-	0	-	0	-	-
108	Ardley Rd East	OxSRFI (North)	2629 m	-	0	-	0	-	-
109	B430 (New)	A43 Nor h	2630 m	-	0	00:05:05	128	-	-
110	B430 (New)	B4100 East	2631 m	-	0	-	0	-	-
111	B430 (New)	Cherwell Services	2632 m	-	0	-	0	-	-
112	B430 (New)	M40 South	2633 m	-	0	-	0	-	-
113	B430 (New)	B430	2634 m	-	0	00:04:07	4	-	-
114	B430 (New)	M40 Nor h	2635 m	-	0	00:06:01	175	-	-
115	B430 (New)	B4100 West	2636 m	-	0	-	0	-	-
116	B430 (New)	Ardley Rd West	2637 m	-	0	00:02:50	38	-	-
117	B430 (New)	Ardley Rd East	2638 m	-	0	-	0	-	-
118	B430 (New)	B430 (New)	2639 m	-	0	-	0	-	-
119	B430 (New)	OxSRFI (South)	2640 m	-	0	00:01:23	198	-	-
120	B430 (New)	OxSRFI (North)	2641 m	-	0	00:01:16	192	-	-
121	OxSRFI (South)	A43 Nor h	2642 m	-	0	00:06:02	25	-	-
122	OxSRFI (South)	B4100 East	2643 m	-	0	00:06:53	3	-	-
123	OxSRFI (South)	Cherwell Services	2644 m	-	0	-	0	-	-
124	OxSRFI (South)	M40 Sou h	2645 m	-	0	00:07:17	81	-	-
125	OxSRFI (South)	B430	2646 m	-	0	00:04:57	3	-	-
126	OxSRFI (South)	M40 Nor h	2647 m	-	0	00:07:25	51	-	-
127	OxSRFI (South)	B4100 West	2648 m	-	0	-	0	-	-
128	OxSRFI (South)	Ardley Rd West	2649 m	-	0	00:03:37	4	-	-
129	OxSRFI (South)	Ardley Rd East	2650 m	-	0	00:04:14	11	-	-
130	OxSRFI (South)	B430 (New)	2651 m	-	0	00:01:58	54	-	-
131	OxSRFI (South)	OxSRFI (South)	2652 m	-	0	-	0	-	-
132	OxSRFI (South)	OxSRFI (North)	2653 m	-	0	-	0	-	-
133	OxSRFI (North)	A43 North	2654 m	-	0	00:05:44	4	-	-
134	OxSRFI (North)	B4100 East	2655 m	-	0	00:06:07	0	-	-
135	OxSRFI (North)	Cherwell Services	2656 m	-	0	-	0	-	-
136	OxSRFI (North)	M40 Sou h	2657 m	-	0	00:06:50	10	-	-
137	OxSRFI (North)	B430	2658 m	-	0	00:04:20	1	-	-
138	OxSRFI (North)	M40 North	2659 m	-	0	00:06:53	6	-	-
139	OxSRFI (North)	B4100 West	2660 m	-	0	-	0	-	-
140	OxSRFI (North)	Ardley Rd West	2661 m	-	0	00:03:05	0	-	-
141	OxSRFI (North)	Ardley Rd East	2662 m	-	0	00:03:51	1	-	-
142	OxSRFI (North)	B430 (New)	2663 m	-	0	00:01:32	6	-	-
143	OxSRFI (North)	OxSRFI (South)	2664 m	-	0	-	0	-	-
144	OxSRFI (North)	OxSRFI (North)	2665 m	-	0	-	0	-	-

MG MARKERS - FULL ORIGIN-DESTINATION MARKERS (PARKING LOT TO PARKING LOT)

LIGHT VEHICLES - AM PEAK

JT Marker	Route			2031 RC1		2031 DS1A		Difference (JTs)	
No.	From	To	Dist.	Avg.	Trips	Avg.	Trips	No.	%
1	A43 North	A43 North	1600 m	-	0	-	0	-	-
2	A43 North	B4100 East	1220 m	00:06:34	171	00:01:27	323	-00:05:06	▼ 78%
3	A43 North	Cherwell Services	2045 m	00:07:57	46	00:02:59	54	-00:04:59	▼ 63%
4	A43 North	M40 South	5269 m	00:09:51	811	00:05:04	1247	-00:04:48	▼ 49%
5	A43 North	B430	3805 m	00:09:46	253	-	0	-	-
6	A43 North	M40 North	7348 m	-	0	-	0	-	-
7	A43 North	B4100 West	1216 m	00:06:39	11	00:02:04	33	-00:04:35	▼ 69%
8	A43 North	Ardley Rd West	2718 m	-	0	-	0	-	-
9	A43 North	Ardley Rd East	3374 m	00:09:07	27	-	0	-	-
10	A43 North	B430 (New)	1298 m	-	0	00:05:20	365	-	-
11	A43 North	OxSRFI (South)	1116 m	-	0	00:06:16	111	-	-
12	A43 North	OxSRFI (North)	1744 m	-	0	00:06:09	114	-	-
13	B4100 East	A43 North	1298 m	00:05:40	203	00:02:07	205	-00:03:33	▼ 63%
14	B4100 East	B4100 East	1116 m	-	0	-	0	-	-
15	B4100 East	Cherwell Services	1744 m	-	0	-	0	-	-
16	B4100 East	M40 South	4968 m	-	0	00:05:15	4	-	-
17	B4100 East	B430	3504 m	00:08:47	11	-	0	-	-
18	B4100 East	M40 North	7047 m	00:10:05	161	00:07:01	38	-00:03:03	▼ 30%
19	B4100 East	B4100 West	915 m	00:05:40	221	00:02:04	232	-00:03:36	▼ 64%
20	B4100 East	Ardley Rd West	2417 m	-	0	-	0	-	-
21	B4100 East	Ardley Rd East	3073 m	-	0	-	0	-	-
22	B4100 East	B430 (New)	3597 m	-	0	00:05:46	4	-	-
23	B4100 East	OxSRFI (Sou h)	2182 m	-	0	00:06:33	27	-	-
24	B4100 East	OxSRFI (North)	5726 m	-	0	00:06:24	30	-	-
25	Cherwell Services	A43 North	2062 m	00:02:42	49	00:04:26	51	00:01:43	▲ 64%
26	Cherwell Services	B4100 East	1880 m	-	0	-	0	-	-
27	Cherwell Services	Cherwell Services	583 m	-	0	-	0	-	-
28	Cherwell Services	M40 South	3597 m	00:02:58	157	00:03:37	228	00:00:39	▲ 22%
29	Cherwell Services	B430	2182 m	00:02:53	73	-	0	-	-
30	Cherwell Services	M40 North	5726 m	00:04:15	103	00:05:23	105	00:01:09	▲ 27%
31	Cherwell Services	B4100 West	1679 m	-	0	-	0	-	-
32	Cherwell Services	Ardley Rd West	1096 m	-	0	-	0	-	-
33	Cherwell Services	Ardley Rd East	1752 m	-	0	-	0	-	-
34	Cherwell Services	B430 (New)	5167 m	-	0	00:03:52	4	-	-
35	Cherwell Services	OxSRFI (South)	3927 m	-	0	-	0	-	-
36	Cherwell Services	OxSRFI (North)	4583 m	-	0	-	0	-	-
37	M40 South	A43 North	5550 m	00:04:41	940	00:05:16	930	00:00:35	▲ 12%
38	M40 South	B4100 East	5368 m	00:04:49	3	-	0	-	-
39	M40 South	Cherwell Services	4071 m	00:03:39	209	00:04:32	209	00:00:53	▲ 24%
40	M40 South	M40 South	7295 m	-	0	-	0	-	-
41	M40 South	B430	5013 m	00:04:10	2	-	0	-	-
42	M40 South	M40 North	8281 m	00:04:38	2626	00:04:39	2589	00:00:01	▲ 0%
43	M40 South	B4100 West	5167 m	00:04:29	8	00:05:13	4	00:00:44	▲ 16%
44	M40 South	Ardley Rd West	3927 m	00:03:06	14	00:03:23	12	00:00:17	▲ 9%
45	M40 South	Ardley Rd East	4583 m	00:03:28	4	-	0	-	-
46	M40 South	B430 (New)	6018 m	-	0	-	0	-	-
47	M40 South	OxSRFI (South)	5836 m	-	0	00:05:30	11	-	-
48	M40 South	OxSRFI (North)	5231 m	-	0	00:05:21	11	-	-
49	B430	A43 North	3806 m	00:03:58	197	-	0	-	-
50	B430	B4100 East	3624 m	00:04:03	12	-	0	-	-
51	B430	Cherwell Services	2327 m	-	0	-	0	-	-
52	B430	M40 South	5551 m	-	0	00:06:04	4	-	-
53	B430	B430	3450 m	-	0	-	0	-	-
54	B430	M40 North	6997 m	00:04:55	92	-	0	-	-
55	B430	B4100 West	3423 m	00:03:46	17	-	0	-	-
56	B430	Ardley Rd West	1431 m	00:01:23	18	-	0	-	-
57	B430	Ardley Rd East	2045 m	00:01:50	92	00:02:30	18	00:00:39	▲ 35%
58	B430	B430 (New)	4983 m	-	0	-	0	-	-
59	B430	OxSRFI (South)	3519 m	-	0	00:06:09	22	-	-
60	B430	OxSRFI (North)	7062 m	-	0	00:06:02	19	-	-
61	M40 North	A43 North	6018 m	-	0	-	0	-	-
62	M40 North	B4100 East	5836 m	00:04:28	289	00:05:26	194	00:00:58	▲ 22%
63	M40 North	Cherwell Services	5231 m	00:04:13	129	00:04:32	129	00:00:19	▲ 8%
64	M40 North	M40 South	8295 m	00:04:48	3031	00:04:53	2903	00:00:04	▲ 2%
65	M40 North	B430	6991 m	00:06:03	140	-	0	-	-
66	M40 North	M40 North	10535 m	-	0	-	0	-	-
67	M40 North	B4100 West	5635 m	00:04:09	30	-	0	-	-
68	M40 North	Ardley Rd West	5905 m	00:05:03	12	00:05:46	12	00:00:43	▲ 14%
69	M40 North	Ardley Rd East	6561 m	00:05:27	59	00:06:21	16	00:00:54	▲ 16%
70	M40 North	B430 (New)	2314 m	-	0	00:06:46	306	-	-
71	M40 North	OxSRFI (South)	1254 m	-	0	00:07:43	53	-	-
72	M40 North	OxSRFI (North)	1011 m	-	0	00:07:36	51	-	-
73	B4100 West	A43 North	1116 m	00:07:25	53	00:01:50	70	-00:05:34	▼ 75%
74	B4100 West	B4100 East	934 m	00:07:34	288	00:02:01	287	-00:05:33	▼ 73%
75	B4100 West	Cherwell Services	1759 m	-	0	-	0	-	-
76	B4100 West	M40 South	4983 m	00:10:36	81	00:05:31	101	-00:05:04	▼ 48%
77	B4100 West	B430	3519 m	-	0	-	0	-	-
78	B4100 West	M40 North	7062 m	-	0	-	0	-	-
79	B4100 West	B4100 West	931 m	-	0	-	0	-	-
80	B4100 West	Ardley Rd West	2432 m	-	0	-	0	-	-
81	B4100 West	Ardley Rd East	3089 m	00:09:52	3	-	0	-	-
82	B4100 West	B430 (New)	2603 m	-	0	00:05:56	67	-	-
83	B4100 West	OxSRFI (South)	2604 m	-	0	00:06:55	19	-	-
84	B4100 West	OxSRFI (North)	2605 m	-	0	00:06:47	19	-	-
85	Ardley Rd West	A43 North	2697 m	00:03:02	4	00:03:53	4	00:00:51	▲ 28%
86	Ardley Rd West	B4100 East	2515 m	-	0	-	0	-	-
87	Ardley Rd West	Cherwell Services	1218 m	-	0	-	0	-	-
88	Ardley Rd West	M40 South	4442 m	00:04:15	2	00:04:53	21	00:00:38	▲ 15%
89	Ardley Rd West	B430	1441 m	00:01:35	41	-	0	-	-
90	Ardley Rd West	M40 North	5887 m	00:03:59	10	00:04:39	10	00:00:40	▲ 17%
91	Ardley Rd West	B4100 West	2314 m	-	0	-	0	-	-
92	Ardley Rd West	Ardley Rd West	1254 m	-	0	-	0	-	-
93	Ardley Rd West	Ardley Rd East	1011 m	00:01:05	43	00:01:25	12	00:00:20	▲ 31%
94	Ardley Rd West	B430 (New)	2615 m	-	0	00:03:56	26	-	-
95	Ardley Rd West	OxSRFI (South)	2616 m	-	0	00:04:53	4	-	-
96	Ardley Rd West	OxSRFI (North)	2617 m	-	0	00:04:44	4	-	-
97	Ardley Rd East	A43 North	3389 m	00:03:32	10	-	0	-	-
98	Ardley Rd East	B4100 East	3207 m	-	0	-	0	-	-
99	Ardley Rd East	Cherwell Services	1910 m	-	0	-	0	-	-
100	Ardley Rd East	M40 South	5134 m	-	0	-	0	-	-
101	Ardley Rd East	B430	2030 m	00:01:54	158	00:02:28	6	00:00:34	▲ 30%
102	Ardley Rd East	M40 North	6579 m	00:04:29	118	00:05:27	153	00:00:58	▲ 22%
103	Ardley Rd East	B4100 West	3006 m	00:03:20	8	-	0	-	-
104	Ardley Rd East	Ardley Rd West	1014 m	00:00:57	12	00:01:16	8	00:00:20	▲ 35%
105	Ardley Rd East	Ardley Rd East	2602 m	-	0	-	0	-	-
106	Ardley Rd East	B430 (New)	2627 m	-	0	-	0	-	-
107	Ardley Rd East	OxSRFI (South)	2628 m	-	0	-	0	-	-
108	Ardley Rd East	OxSRFI (North)	2629 m	-	0	-	0	-	-
109	B430 (New)	A43 North	2630 m	-	0	00:05:01	112	-	-
110	B430 (New)	B4100 East	2631 m	-	0	-	0	-	-
111	B430 (New)	Cherwell Services	2632 m	-	0	-	0	-	-
112	B430 (New)	M40 South	2633 m	-	0	-	0	-	-
113	B430 (New)	B430	2634 m	-	0	00:04:07	4	-	-
114	B430 (New)	M40 North	2635 m	-	0	00:05:55	151	-	-
115	B430 (New)	B4100 West	2636 m	-	0	-	0	-	-
116	B430 (New)	Ardley Rd West	2637 m	-	0	00:02:50	38	-	-
117	B430 (New)	Ardley Rd East	2638 m	-	0	-	0	-	-
118	B430 (New)	B430 (New)	2639 m	-	0	-	0	-	-
119	B430 (New)	OxSRFI (South)	2640 m	-	0	00:01:23	196	-	-
120	B430 (New)	OxSRFI (North)	2641 m	-	0	00:01:16	192	-	-
121	OxSRFI (South)	A43 North	2642 m	-	0	00:05:45	11	-	-
122	OxSRFI (South)	B4100 East	2643 m	-	0	-	0	-	-
123	OxSRFI (South)	Cherwell Services	2644 m	-	0	-	0	-	-
124	OxSRFI (South)	M40 South	2645 m	-	0	-	0	-	-
125	OxSRFI (South)	B430	2646 m	-	0	00:04:57	3	-	-
126	OxSRFI (South)	M40 North	2647 m	-	0	00:06:36	3	-	-
127	OxSRFI (South)	B4100 West	2648 m	-	0	-	0	-	-
128	OxSRFI (South)	Ardley Rd West	2649 m	-	0	00:03:37	4	-	-
129	OxSRFI (South)	Ardley Rd East	2650 m	-	0	00:04:14	11	-	-
130	OxSRFI (South)	B430 (New)	2651 m	-	0	00:01:58	52	-	-
131	OxSRFI (South)	OxSRFI (South)	2652 m	-	0	-	0	-	-
132	OxSRFI (South)	OxSRFI (North)	2653 m	-	0	-	0	-	-
133	OxSRFI (North)	A43 North	2654 m	-	0	00:05:19	2	-	-
134	OxSRFI (North)	B4100 East	2655 m	-	0	-	0	-	-
135	OxSRFI (North)	Cherwell Services	2656 m	-	0	-	0	-	-
136	OxSRFI (North)	M40 South	2657 m	-	0	00:06:21	1	-	-
137	OxSRFI (North)	B430	2658 m	-	0	00:04:20	1	-	-
138	OxSRFI (North)	M40 North	2659 m	-	0	00:06:07	1	-	-
139	OxSRFI (North)	B4100 West	2660 m	-	0	-	0	-	-
140	OxSRFI (North)	Ardley Rd West	2661 m	-	0	00:03:05	0	-	-
141	OxSRFI (North)	Ardley Rd East	2662 m	-	0	00:03:51	1	-	-
142	OxSRFI (North)	B430 (New)	2663 m	-	0	00:01:32	6	-	-
143	OxSRFI (North)	OxSRFI (South)	2664 m	-	0	-	0	-	-
144	OxSRFI (North)	OxSRFI (North)	2665 m	-	0	-	0	-	-

MG MARKERS - FULL ORIGIN-DESTINATION MARKERS (PARKING LOT TO PARKING LOT)

HEAVY VEHICLES - AM PEAK

Marker	Route			2031 RC1		2031 DS1A		Difference (JTs)	
No.	From	To	Dist.	Avg.	Trips	Avg.	Trips	No.	%
1	A43 North	A43 North	1600 m	-	0	-	0	-	-
2	A43 North	B4100 East	1220 m	-	0	-	0	-	-
3	A43 North	Cherwell Services	2045 m	00:07:58	3	00:03:13	2	-00:04:44	▼ 59%
4	A43 North	M40 South	5269 m	00:10:15	187	00:05:29	222	-00:04:46	▼ 47%
5	A43 North	B430	3805 m	00:10:07	3	-	0	-	-
6	A43 North	M40 North	7348 m	-	0	-	0	-	-
7	A43 North	B4100 West	1216 m	-	0	-	0	-	-
8	A43 North	Ardley Rd West	2718 m	-	0	-	0	-	-
9	A43 North	Ardley Rd East	3374 m	-	0	-	0	-	-
10	A43 North	B430 (New)	1298 m	-	0	00:05:37	4	-	-
11	A43 North	OxSRFI (South)	1116 m	-	0	00:06:43	8	-	-
12	A43 North	OxSRFI (North)	1744 m	-	0	00:06:31	7	-	-
13	B4100 East	A43 North	1298 m	00:05:55	14	00:02:17	16	-00:03:38	▼ 61%
14	B4100 East	B4100 East	1116 m	-	0	-	0	-	-
15	B4100 East	Cherwell Services	1744 m	-	0	-	0	-	-
16	B4100 East	M40 South	4968 m	-	0	-	0	-	-
17	B4100 East	B430	3504 m	-	0	-	0	-	-
18	B4100 East	M40 North	7047 m	-	0	-	0	-	-
19	B4100 East	B4100 West	915 m	00:05:47	10	00:02:11	12	-00:03:36	▼ 62%
20	B4100 East	Ardley Rd West	2417 m	-	0	-	0	-	-
21	B4100 East	Ardley Rd East	3073 m	-	0	-	0	-	-
22	B4100 East	B430 (New)	3597 m	-	0	-	0	-	-
23	B4100 East	OxSRFI (Sou h)	2182 m	-	0	00:07:08	2	-	-
24	B4100 East	OxSRFI (North)	5726 m	-	0	00:06:54	2	-	-
25	Cherwell Services	A43 North	2062 m	00:02:58	12	00:04

MG MARKERS - FULL ORIGIN-DESTINATION MARKERS (PARKING LOT TO PARKING LOT)

ALL VEHICLES - PM PEAK

Marker	Route			2031 RC1		2031 DS1A		Difference (JTs)	
No.	From	To	Dist.	Avg.	Trips	Avg.	Trips	No.	%
1	A43 North	A43 North	1600 m	-	0	-	0	-	-
2	A43 North	B4100 East	1220 m	00:01:24	266	00:01:23	253	-00:00:01	▼ 1%
3	A43 North	Cherwell Services	2045 m	00:02:47	104	00:02:44	106	-00:00:03	▼ 2%
4	A43 North	M40 South	5269 m	00:04:43	1216	00:04:44	1214	00:00:01	▲ 0%
5	A43 North	B430	3805 m	00:04:27	145	-	0	-	-
6	A43 North	M40 North	7348 m	-	0	-	0	-	-
7	A43 North	B4100 West	1216 m	00:01:27	68	00:02:12	44	00:00:45	▲ 51%
8	A43 North	Ardley Rd West	2718 m	00:03:32	4	-	0	-	-
9	A43 North	Ardley Rd East	3374 m	00:03:54	20	-	0	-	-
10	A43 North	B430 (New)	1298 m	-	0	00:04:45	131	-	-
11	A43 North	OxSRFI (South)	1116 m	-	0	00:05:47	45	-	-
12	A43 North	OxSRFI (North)	1744 m	-	0	00:05:39	43	-	-
13	B4100 East	A43 North	1298 m	00:06:13	260	00:02:31	317	-00:03:42	▼ 60%
14	B4100 East	B4100 East	1116 m	-	0	-	0	-	-
15	B4100 East	Cherwell Services	1744 m	-	0	-	0	-	-
16	B4100 East	M40 South	4968 m	00:09:26	3	00:05:07	8	-00:04:18	▼ 46%
17	B4100 East	B430	3504 m	00:09:06	3	-	0	-	-
18	B4100 East	M40 North	7047 m	00:10:43	151	00:07:16	44	-00:03:27	▼ 32%
19	B4100 East	B4100 West	915 m	00:06:13	177	00:02:25	268	-00:03:48	▼ 61%
20	B4100 East	Ardley Rd West	2417 m	00:08:10	3	00:04:36	4	-00:03:34	▼ 44%
21	B4100 East	Ardley Rd East	3073 m	-	0	-	0	-	-
22	B4100 East	B430 (New)	3597 m	-	0	-	0	-	-
23	B4100 East	OxSRFI (South)	2182 m	-	0	00:06:22	12	-	-
24	B4100 East	OxSRFI (North)	5726 m	-	0	00:06:13	14	-	-
25	Cherwell Services	A43 North	2062 m	00:03:18	86	00:04:46	87	00:01:28	▲ 45%
26	Cherwell Services	B4100 East	1880 m	-	0	-	0	-	-
27	Cherwell Services	Cherwell Services	583 m	-	0	-	0	-	-
28	Cherwell Services	M40 South	3597 m	00:03:01	262	00:03:14	261	00:00:13	▲ 7%
29	Cherwell Services	B430	2182 m	-	0	-	0	-	-
30	Cherwell Services	M40 North	5726 m	00:04:29	176	00:05:31	177	00:01:02	▲ 23%
31	Cherwell Services	B4100 West	1679 m	-	0	-	0	-	-
32	Cherwell Services	Ardley Rd West	1096 m	-	0	-	0	-	-
33	Cherwell Services	Ardley Rd East	1752 m	-	0	-	0	-	-
34	Cherwell Services	B430 (New)	5167 m	-	0	-	0	-	-
35	Cherwell Services	OxSRFI (South)	3927 m	-	0	-	0	-	-
36	Cherwell Services	OxSRFI (North)	4583 m	-	0	-	0	-	-
37	M40 South	A43 North	5550 m	00:05:19	1513	00:05:41	1682	00:00:22	▲ 7%
38	M40 South	B4100 East	5368 m	00:05:23	4	00:06:19	8	00:00:56	▲ 17%
39	M40 South	Cherwell Services	4071 m	00:03:57	213	00:04:33	214	00:00:36	▲ 15%
40	M40 South	M40 South	7295 m	-	0	-	0	-	-
41	M40 South	B430	5013 m	00:04:01	8	00:04:42	2	00:00:41	▲ 17%
42	M40 South	M40 North	8281 m	00:04:54	3962	00:04:56	3836	00:00:03	▲ 1%
43	M40 South	B4100 West	5167 m	-	0	00:05:32	33	-	-
44	M40 South	Ardley Rd West	3927 m	00:03:06	68	00:03:23	41	00:00:17	▲ 9%
45	M40 South	Ardley Rd East	4583 m	-	0	-	0	-	-
46	M40 South	B430 (New)	6018 m	-	0	-	0	-	-
47	M40 South	OxSRFI (South)	5836 m	-	0	00:05:33	47	-	-
48	M40 South	OxSRFI (North)	5231 m	-	0	00:05:25	43	-	-
49	B430	A43 Nor h	3806 m	00:04:36	139	-	0	-	-
50	B430	B4100 East	3624 m	00:04:46	4	-	0	-	-
51	B430	Cherwell Services	2327 m	-	0	-	0	-	-
52	B430	M40 South	5551 m	00:05:49	22	-	0	-	-
53	B430	B430	3450 m	-	0	-	0	-	-
54	B430	M40 North	6997 m	00:05:09	119	-	0	-	-
55	B430	B4100 West	3423 m	-	0	-	0	-	-
56	B430	Ardley Rd West	1431 m	00:01:23	70	-	0	-	-
57	B430	Ardley Rd East	2045 m	00:01:48	61	-	0	-	-
58	B430	B430 (New)	4983 m	-	0	-	0	-	-
59	B430	OxSRFI (South)	3519 m	-	0	00:06:09	6	-	-
60	B430	OxSRFI (North)	7062 m	-	0	00:06:05	6	-	-
61	M40 North	A43 Nor h	6018 m	-	0	-	0	-	-
62	M40 North	B4100 East	5836 m	00:04:56	167	00:05:42	221	00:00:46	▲ 15%
63	M40 North	Cherwell Services	5231 m	00:04:20	195	00:04:34	196	00:00:14	▲ 5%
64	M40 North	M40 South	8295 m	00:04:46	3365	00:04:47	3347	00:00:02	▲ 1%
65	M40 North	B430	6991 m	00:05:55	99	-	0	-	-
66	M40 North	M40 North	10535 m	-	0	-	0	-	-
67	M40 North	B4100 West	5635 m	-	0	-	0	-	-
68	M40 North	Ardley Rd West	5905 m	00:04:55	16	00:05:41	15	00:00:46	▲ 16%
69	M40 North	Ardley Rd East	6561 m	00:05:23	41	00:06:17	12	00:00:54	▲ 17%
70	M40 North	B430 (New)	2314 m	-	0	00:06:23	125	-	-
71	M40 North	OxSRFI (South)	1254 m	-	0	00:07:49	39	-	-
72	M40 North	OxSRFI (North)	1011 m	-	0	00:07:44	37	-	-
73	B4100 West	A43 Nor h	1116 m	00:06:36	56	00:01:50	44	-00:04:46	▼ 72%
74	B4100 West	B4100 East	934 m	00:06:44	219	00:01:59	143	-00:04:45	▼ 71%
75	B4100 West	Cherwell Services	1759 m	-	0	-	0	-	-
76	B4100 West	M40 South	4983 m	00:09:08	44	00:05:16	34	-00:03:52	▼ 42%
77	B4100 West	B430	3519 m	-	0	-	0	-	-
78	B4100 West	M40 North	7062 m	-	0	-	0	-	-
79	B4100 West	B4100 West	931 m	-	0	-	0	-	-
80	B4100 West	Ardley Rd West	2432 m	-	0	-	0	-	-
81	B4100 West	Ardley Rd East	3089 m	-	0	-	0	-	-
82	B4100 West	B430 (New)	2603 m	-	0	00:05:30	20	-	-
83	B4100 West	OxSRFI (South)	2604 m	-	0	00:06:36	2	-	-
84	B4100 West	OxSRFI (North)	2605 m	-	0	00:06:09	2	-	-
85	Ardley Rd West	A43 Nor h	2697 m	00:03:37	8	00:04:29	8	00:00:52	▲ 24%
86	Ardley Rd West	B4100 East	2515 m	-	0	-	0	-	-
87	Ardley Rd West	Cherwell Services	1218 m	-	0	-	0	-	-
88	Ardley Rd West	M40 South	4442 m	-	0	00:04:58	20	-	-
89	Ardley Rd West	B430	1441 m	00:01:29	32	-	0	-	-
90	Ardley Rd West	M40 North	5887 m	00:04:12	8	00:05:06	8	00:00:54	▲ 21%
91	Ardley Rd West	B4100 West	2314 m	-	0	-	0	-	-
92	Ardley Rd West	Ardley Rd West	1254 m	-	0	-	0	-	-
93	Ardley Rd West	Ardley Rd East	1011 m	00:01:03	24	00:01:26	12	00:00:23	▲ 37%
94	Ardley Rd West	B430 (New)	2615 m	-	0	00:04:01	8	-	-
95	Ardley Rd West	OxSRFI (South)	2616 m	-	0	00:04:50	2	-	-
96	Ardley Rd West	OxSRFI (North)	2617 m	-	0	00:04:43	2	-	-
97	Ardley Rd East	A43 Nor h	3389 m	-	0	00:05:25	4	-	-
98	Ardley Rd East	B4100 East	3207 m	-	0	-	0	-	-
99	Ardley Rd East	Cherwell Services	1910 m	-	0	-	0	-	-
100	Ardley Rd East	M40 South	5134 m	-	0	-	0	-	-
101	Ardley Rd East	B430	2030 m	00:01:49	8	00:02:32	4	00:00:43	▲ 39%
102	Ardley Rd East	M40 North	6579 m	00:04:41	81	00:05:52	132	00:01:12	▲ 26%
103	Ardley Rd East	B4100 West	3006 m	-	0	-	0	-	-
104	Ardley Rd East	Ardley Rd West	1014 m	00:00:55	32	00:01:16	8	00:00:21	▲ 38%
105	Ardley Rd East	Ardley Rd East	2602 m	-	0	-	0	-	-
106	Ardley Rd East	B430 (New)	2627 m	-	0	-	0	-	-
107	Ardley Rd East	OxSRFI (South)	2628 m	-	0	-	0	-	-
108	Ardley Rd East	OxSRFI (North)	2629 m	-	0	-	0	-	-
109	B430 (New)	A43 Nor h	2630 m	-	0	00:05:34	214	-	-
110	B430 (New)	B4100 East	2631 m	-	0	-	0	-	-
111	B430 (New)	Cherwell Services	2632 m	-	0	-	0	-	-
112	B430 (New)	M40 South	2633 m	-	0	-	0	-	-
113	B430 (New)	B430	2634 m	-	0	-	0	-	-
114	B430 (New)	M40 North	2635 m	-	0	00:06:15	317	-	-
115	B430 (New)	B4100 West	2636 m	-	0	-	0	-	-
116	B430 (New)	Ardley Rd West	2637 m	-	0	00:02:59	66	-	-
117	B430 (New)	Ardley Rd East	2638 m	-	0	-	0	-	-
118	B430 (New)	B430 (New)	2639 m	-	0	-	0	-	-
119	B430 (New)	OxSRFI (South)	2640 m	-	0	00:01:19	77	-	-
120	B430 (New)	OxSRFI (North)	2641 m	-	0	00:01:12	77	-	-
121	OxSRFI (South)	A43 Nor h	2642 m	-	0	00:06:24	273	-	-
122	OxSRFI (South)	B4100 East	2643 m	-	0	00:07:03	27	-	-
123	OxSRFI (South)	Cherwell Services	2644 m	-	0	-	0	-	-
124	OxSRFI (South)	M40 Sou h	2645 m	-	0	00:07:08	95	-	-
125	OxSRFI (South)	B430	2646 m	-	0	00:05:05	45	-	-
126	OxSRFI (South)	M40 Nor h	2647 m	-	0	00:07:12	149	-	-
127	OxSRFI (South)	B4100 West	2648 m	-	0	-	0	-	-
128	OxSRFI (South)	Ardley Rd West	2649 m	-	0	00:03:47	49	-	-
129	OxSRFI (South)	Ardley Rd East	2650 m	-	0	00:04:26	45	-	-
130	OxSRFI (South)	B430 (New)	2651 m	-	0	00:02:08	383	-	-
131	OxSRFI (South)	OxSRFI (South)	2652 m	-	0	-	0	-	-
132	OxSRFI (South)	OxSRFI (North)	2653 m	-	0	-	0	-	-
133	OxSRFI (North)	A43 North	2654 m	-	0	00:05:57	29	-	-
134	OxSRFI (North)	B4100 East	2655 m	-	0	00:06:41	3	-	-
135	OxSRFI (North)	Cherwell Services	2656 m	-	0	-	0	-	-
136	OxSRFI (North)	M40 Sou h	2657 m	-	0	00:06:39	12	-	-
137	OxSRFI (North)	B430	2658 m	-	0	00:04:36	5	-	-
138	OxSRFI (North)	M40 North	2659 m	-	0	00:06:50	17	-	-
139	OxSRFI (North)	B4100 West	2660 m	-	0	-	0	-	-
140	OxSRFI (North)	Ardley Rd West	2661 m	-	0	00:03:19	5	-	-
141	OxSRFI (North)	Ardley Rd East	2662 m	-	0	00:04:00	5	-	-
142	OxSRFI (North)	B430 (New)	2663 m	-	0	00:01:41	41	-	-
143	OxSRFI (North)	OxSRFI (South)	2664 m	-	0	-	0	-	-
144	OxSRFI (North)	OxSRFI (North)	2665 m	-	0	-	0	-	-

MG MARKERS - FULL ORIGIN-DESTINATION MARKERS (PARKING LOT TO PARKING LOT)

LIGHT VEHICLES - PM PEAK

JT Marker	Route			2031 RC1		2031 DS1A		Difference (JTs)	
No.	From	To	Dist.	Avg.	Trips	Avg.	Trips	No.	%
1	A43 North	A43 North	1600 m	-	0	-	0	-	-
2	A43 North	B4100 East	1220 m	00:01:24	256	00:01:23	242	-00:00:01	▼ 1%
3	A43 North	Cherwell Services	2045 m	00:02:47	104	00:02:44	106	-00:00:03	▼ 2%
4	A43 North	M40 South	5269 m	00:04:41	1116	00:04:42	1115	00:00:01	▲ 0%
5	A43 North	B430	3805 m	00:04:27	145	-	0	-	-
6	A43 North	M40 North	7348 m	-	0	-	0	-	-
7	A43 North	B4100 West	1216 m	00:01:27	68	00:02:12	44	00:00:45	▲ 51%
8	A43 North	Ardley Rd West	2718 m	00:03:32	4	-	0	-	-
9	A43 North	Ardley Rd East	3374 m	00:03:54	20	-	0	-	-
10	A43 North	B430 (New)	1298 m	-	0	00:04:45	131	-	-
11	A43 North	OxSRFI (South)	1116 m	-	0	00:05:43	37	-	-
12	A43 North	OxSRFI (North)	1744 m	-	0	00:05:33	34	-	-
13	B4100 East	A43 North	1298 m	00:06:13	260	00:02:31	317	-00:03:42	▼ 60%
14	B4100 East	B4100 East	1116 m	-	0	-	0	-	-
15	B4100 East	Cherwell Services	1744 m	-	0	-	0	-	-
16	B4100 East	M40 South	4968 m	00:09:26	3	00:05:07	8	-00:04:18	▼ 46%
17	B4100 East	B430	3504 m	00:09:06	3	-	0	-	-
18	B4100 East	M40 North	7047 m	00:10:42	148	00:07:13	40	-00:03:29	▼ 33%
19	B4100 East	B4100 West	915 m	00:06:13	177	00:02:25	268	-00:03:48	▼ 61%
20	B4100 East	Ardley Rd West	2417 m	00:08:10	3	00:04:36	4	-00:03:34	▼ 44%
21	B4100 East	Ardley Rd East	3073 m	-	0	-	0	-	-
22	B4100 East	B430 (New)	3597 m	-	0	-	0	-	-
23	B4100 East	OxSRFI (Sou h)	2182 m	-	0	00:06:16	11	-	-
24	B4100 East	OxSRFI (North)	5726 m	-	0	00:06:09	11	-	-
25	Cherwell Services	A43 North	2062 m	00:03:15	73	00:04:44	74	00:01:28	▲ 45%
26	Cherwell Services	B4100 East	1880 m	-	0	-	0	-	-
27	Cherwell Services	Cherwell Services	583 m	-	0	-	0	-	-
28	Cherwell Services	M40 South	3597 m	00:02:58	214	00:03:11	212	00:00:13	▲ 7%
29	Cherwell Services	B430	2182 m	-	0	-	0	-	-
30	Cherwell Services	M40 North	5726 m	00:04:22	139	00:05:25	138	00:01:03	▲ 24%
31	Cherwell Services	B4100 West	1679 m	-	0	-	0	-	-
32	Cherwell Services	Ardley Rd West	1096 m	-	0	-	0	-	-
33	Cherwell Services	Ardley Rd East	1752 m	-	0	-	0	-	-
34	Cherwell Services	B430 (New)	5167 m	-	0	-	0	-	-
35	Cherwell Services	OxSRFI (Sou h)	3927 m	-	0	-	0	-	-
36	Cherwell Services	OxSRFI (North)	4583 m	-	0	-	0	-	-
37	M40 South	A43 North	5550 m	00:05:17	1383	00:05:39	1553	00:00:22	▲ 7%
38	M40 South	B4100 East	5368 m	00:05:23	4	00:06:19	8	00:00:56	▲ 17%
39	M40 South	Cherwell Services	4071 m	00:03:54	167	00:04:31	168	00:00:36	▲ 15%
40	M40 South	M40 South	7295 m	-	0	-	0	-	-
41	M40 South	B430	5013 m	00:04:01	8	00:04:42	2	00:00:41	▲ 17%
42	M40 South	M40 North	8281 m	00:04:50	3535	00:04:53	3443	00:00:03	▲ 1%
43	M40 South	B4100 West	5167 m	-	0	00:05:32	33	-	-
44	M40 South	Ardley Rd West	3927 m	00:03:06	68	00:03:23	41	00:00:17	▲ 9%
45	M40 South	Ardley Rd East	4583 m	-	0	-	0	-	-
46	M40 South	B430 (New)	6018 m	-	0	-	0	-	-
47	M40 South	OxSRFI (South)	5836 m	-	0	00:05:12	2	-	-
48	M40 South	OxSRFI (North)	5231 m	-	0	00:05:00	2	-	-
49	B430	A43 North	3806 m	00:04:36	139	-	0	-	-
50	B430	B4100 East	3624 m	00:04:46	4	-	0	-	-
51	B430	Cherwell Services	2327 m	-	0	-	0	-	-
52	B430	M40 South	5551 m	-	0	-	0	-	-
53	B430	B430	3450 m	-	0	-	0	-	-
54	B430	M40 North	6997 m	00:05:09	119	-	0	-	-
55	B430	B4100 West	3423 m	-	0	-	0	-	-
56	B430	Ardley Rd West	1431 m	00:01:23	70	-	0	-	-
57	B430	Ardley Rd East	2045 m	00:01:48	61	-	0	-	-
58	B430	B430 (New)	4983 m	-	0	-	0	-	-
59	B430	OxSRFI (South)	3519 m	-	0	00:06:09	6	-	-
60	B430	OxSRFI (North)	7062 m	-	0	00:06:05	6	-	-
61	M40 North	A43 North	6018 m	-	0	-	0	-	-
62	M40 North	B4100 East	5836 m	00:04:56	167	00:05:42	221	00:00:46	▲ 15%
63	M40 North	Cherwell Services	5231 m	00:04:13	142	00:04:27	143	00:00:14	▲ 6%
64	M40 North	M40 South	8295 m	00:04:42	3032	00:04:43	3014	00:00:02	▲ 1%
65	M40 North	B430	6991 m	00:05:55	99	-	0	-	-
66	M40 North	M40 North	10535 m	-	0	-	0	-	-
67	M40 North	B4100 West	5635 m	-	0	-	0	-	-
68	M40 North	Ardley Rd West	5905 m	00:04:55	16	00:05:41	15	00:00:46	▲ 16%
69	M40 North	Ardley Rd East	6561 m	00:05:23	41	00:06:17	12	00:00:54	▲ 17%
70	M40 North	B430 (New)	2314 m	-	0	00:06:23	125	-	-
71	M40 North	OxSRFI (South)	1254 m	-	0	00:07:19	13	-	-
72	M40 North	OxSRFI (North)	1011 m	-	0	00:07:14	11	-	-
73	B4100 West	A43 North	1116 m	00:06:36	56	00:01:50	44	-00:04:46	▼ 72%
74	B4100 West	B4100 East	934 m	00:06:44	215	00:01:58	139	-00:04:45	▼ 71%
75	B4100 West	Cherwell Services	1759 m	-	0	-	0	-	-
76	B4100 West	M40 South	4983 m	00:09:08	44	00:05:16	34	-00:03:52	▼ 42%
77	B4100 West	B430	3519 m	-	0	-	0	-	-
78	B4100 West	M40 North	7062 m	-	0	-	0	-	-
79	B4100 West	B4100 West	931 m	-	0	-	0	-	-
80	B4100 West	Ardley Rd West	2432 m	-	0	-	0	-	-
81	B4100 West	Ardley Rd East	3089 m	-	0	-	0	-	-
82	B4100 West	B430 (New)	2603 m	-	0	00:05:30	20	-	-
83	B4100 West	OxSRFI (South)	2604 m	-	0	00:06:36	2	-	-
84	B4100 West	OxSRFI (North)	2605 m	-	0	00:06:09	2	-	-
85	Ardley Rd West	A43 North	2697 m	00:03:37	8	00:04:29	8	00:00:52	▲ 24%
86	Ardley Rd West	B4100 East	2515 m	-	0	-	0	-	-
87	Ardley Rd West	Cherwell Services	1218 m	-	0	-	0	-	-
88	Ardley Rd West	M40 South	4442 m	-	0	00:04:58	20	-	-
89	Ardley Rd West	B430	1441 m	00:01:29	32	-	0	-	-
90	Ardley Rd West	M40 North	5887 m	00:04:12	8	00:05:06	8	00:00:54	▲ 21%
91	Ardley Rd West	B4100 West	2314 m	-	0	-	0	-	-
92	Ardley Rd West	Ardley Rd West	1254 m	-	0	-	0	-	-
93	Ardley Rd West	Ardley Rd East	1011 m	00:01:03	24	00:01:26	12	00:00:23	▲ 37%
94	Ardley Rd West	B430 (New)	2615 m	-	0	00:04:01	8	-	-
95	Ardley Rd West	OxSRFI (South)	2616 m	-	0	00:04:50	2	-	-
96	Ardley Rd West	OxSRFI (North)	2617 m	-	0	00:04:43	2	-	-
97	Ardley Rd East	A43 North	3389 m	-	0	00:05:25	4	-	-
98	Ardley Rd East	B4100 East	3207 m	-	0	-	0	-	-
99	Ardley Rd East	Cherwell Services	1910 m	-	0	-	0	-	-
100	Ardley Rd East	M40 South	5134 m	-	0	-	0	-	-
101	Ardley Rd East	B430	2030 m	00:01:49	8	00:02:32	4	00:00:43	▲ 39%
102	Ardley Rd East	M40 North	6579 m	00:04:41	81	00:05:52	132	00:01:12	▲ 26%
103	Ardley Rd East	B4100 West	3006 m	-	0	-	0	-	-
104	Ardley Rd East	Ardley Rd West	1014 m	00:00:55	32	00:01:16	8	00:00:21	▲ 38%
105	Ardley Rd East	Ardley Rd East	2602 m	-	0	-	0	-	-
106	Ardley Rd East	B430 (New)	2627 m	-	0	-	0	-	-
107	Ardley Rd East	OxSRFI (South)	2628 m	-	0	-	0	-	-
108	Ardley Rd East	OxSRFI (North)	2629 m	-	0	-	0	-	-
109	B430 (New)	A43 North	2630 m	-	0	00:05:34	214	-	-
110	B430 (New)	B4100 East	2631 m	-	0	-	0	-	-
111	B430 (New)	Cherwell Services	2632 m	-	0	-	0	-	-
112	B430 (New)	M40 South	2633 m	-	0	-	0	-	-
113	B430 (New)	B430	2634 m	-	0	-	0	-	-
114	B430 (New)	M40 North	2635 m	-	0	00:06:12	287	-	-
115	B430 (New)	B4100 West	2636 m	-	0	-	0	-	-
116	B430 (New)	Ardley Rd West	2637 m	-	0	00:02:59	66	-	-
117	B430 (New)	Ardley Rd East	2638 m	-	0	-	0	-	-
118	B430 (New)	B430 (New)	2639 m	-	0	-	0	-	-
119	B430 (New)	OxSRFI (South)	2640 m	-	0	00:01:19	75	-	-
120	B430 (New)	OxSRFI (North)	2641 m	-	0	00:01:12	77	-	-
121	OxSRFI (South)	A43 North	2642 m	-	0	00:06:23	259	-	-
122	OxSRFI (South)	B4100 East	2643 m	-	0	00:07:00	24	-	-
123	OxSRFI (South)	Cherwell Services	2644 m	-	0	-	0	-	-
124	OxSRFI (South)	M40 South	2645 m	-	0	00:06:43	25	-	-
125	OxSRFI (South)	B430	2646 m	-	0	00:05:05	45	-	-
126	OxSRFI (South)	M40 North	2647 m	-	0	00:07:01	108	-	-
127	OxSRFI (South)	B4100 West	2648 m	-	0	-	0	-	-
128	OxSRFI (South)	Ardley Rd West	2649 m	-	0	00:03:47	49	-	-
129	OxSRFI (South)	Ardley Rd East	2650 m	-	0	00:04:26	45	-	-
130	OxSRFI (South)	B430 (New)	2651 m	-	0	00:02:08	381	-	-
131	OxSRFI (South)	OxSRFI (South)	2652 m	-	0	-	0	-	-
132	OxSRFI (South)	OxSRFI (North)	2653 m	-	0	-	0	-	-
133	OxSRFI (North)	A43 North	2654 m	-	0	00:05:55	28	-	-
134	OxSRFI (North)	B4100 East	2655 m	-	0	00:06:34	3	-	-
135	OxSRFI (North)	Cherwell Services	2656 m	-	0	-	0	-	-
136	OxSRFI (North)	M40 South	2657 m	-	0	00:06:09	3	-	-
137	OxSRFI (North)	B430	2658 m	-	0	00:04:36	5	-	-
138	OxSRFI (North)	M40 North	2659 m	-	0	00:06:38	12	-	-
139	OxSRFI (North)	B4100 West	2660 m	-	0	-	0	-	-
140	OxSRFI (North)	Ardley Rd West	2661 m	-	0	00:03:19	5	-	-
141	OxSRFI (North)	Ardley Rd East	2662 m	-	0	00:04:00	5	-	-
142	OxSRFI (North)	B430 (New)	2663 m	-	0	00:01:41	41	-	-
143	OxSRFI (North)	OxSRFI (South)	2664 m	-	0	-	0	-	-
144	OxSRFI (North)	OxSRFI (North)	2665 m	-	0	-	0	-	-

MG MARKERS - FULL ORIGIN-DESTINATION MARKERS (PARKING LOT TO PARKING LOT)

HEAVY VEHICLES - PM PEAK

Marker	Route			2031 RC1		2031 DS1A		Difference (JTs)	
No.	From	To	Dist.	Avg.	Trips	Avg.	Trips	No.	%
1	A43 North	A43 North	1600 m	-	0	-	0	-	-
2	A43 North	B4100 East	1220 m	00:01:32	10	00:01:31	10	-00:00:00	▼ 0%
3	A43 North	Cherwell Services	2045 m	-	0	-	0	-	-
4	A43 North	M40 South	5269 m	00:05:09	100	00:05:09	99	00:00:01	▲ 0%
5	A43 North	B430	3805 m	-	0	-	0	-	-
6	A43 North	M40 North	7348 m	-	0	-	0	-	-
7	A43 North	B4100 West	1216 m	-	0	-	0	-	-
8	A43 North	Ardley Rd West	2718 m	-	0	-	0	-	-
9	A43 North	Ardley Rd East	3374 m	-	0	-	0	-	-
10	A43 North	B430 (New)	1298 m	-	0	-	0	-	-
11	A43 North	OxSRFI (South)	1116 m	-	0	00:06:07	7	-	-
12	A43 North	OxSRFI (North)	1744 m	-	0	00:06:01	9	-	-
13	B4100 East	A43 North	1298 m	-	0	-	0	-	-
14	B4100 East	B4100 East	1116 m	-	0	-	0	-	-
15	B4100 East	Cherwell Services	1744 m	-	0	-	0	-	-
16	B4100 East	M40 South	4968 m	-	0	-	0	-	-
17	B4100 East	B430	3504 m	-	0	-	0	-	-
18	B4100 East	M40 North	7047 m	00:11:19	3	00:07:48	4	-00:03:31	▼ 31%
19	B4100 East	B4100 West	915 m	-	0	-	0	-	-
20	B4100 East	Ardley Rd West	2417 m	-	0	-	0	-	-
21	B4100 East	Ardley Rd East	3073 m	-	0	-	0	-	-
22	B4100 East	B430 (New)	3597 m	-	0	-	0	-	-
23	B4100 East	OxSRFI (Sou h)	2182 m	-	0	00:06:56	2	-	-
24	B4100 East	OxSRFI (North)	5726 m	-	0	00:08:35	2	-	-
25	Cherwell Services	A43 North	2062 m	00:03:31	13	00:04:59	13	00:01:28	▲ 42%
26	Cherwell Services	B4100 East	1880 m	-	0	-	0	-	-

APPENDIX H:

2031 RC1A&DS1A ROUTE PERFORMANCE– O-D JOURNEY TIME RESULTS

MG MARKERS - FULL ORIGIN-DESTINATION MARKERS (PARKING LOT TO PARKING LOT)

ALL VEHICLES - AM PEAK

Marker	Route			2031 RC1A		2031 DS1A		Difference (JTs)	
No.	From	To	Dist.	Avg.	Trips	Avg.	Trips	No.	%
1	A43 North	A43 North	1600 m	-	0	-	0	-	-
2	A43 North	B4100 East	1220 m	00:01:27	406	00:01:27	323	00:00:01	▲ 1%
3	A43 North	Cherwell Services	2045 m	00:03:07	63	00:02:59	56	-00:00:08	▼ 4%
4	A43 North	M40 South	5269 m	00:08:12	1260	00:08:07	1469	-00:00:04	▼ 1%
5	A43 North	B430	3805 m	00:05:00	439	-	0	-	-
6	A43 North	M40 North	7348 m	-	0	-	0	-	-
7	A43 North	B4100 West	1216 m	00:02:02	41	00:02:04	33	00:00:02	▲ 2%
8	A43 North	Ardley Rd West	2718 m	-	0	-	0	-	-
9	A43 North	Ardley Rd East	3374 m	00:04:21	45	-	0	-	-
10	A43 North	B430 (New)	1298 m	-	0	00:05:20	369	-	-
11	A43 North	OxSRFI (South)	1116 m	-	0	00:06:16	119	-	-
12	A43 North	OxSRFI (North)	1744 m	-	0	00:06:11	121	-	-
13	B4100 East	A43 North	1298 m	00:02:07	222	00:02:08	221	00:00:00	▲ 0%
14	B4100 East	B4100 East	1116 m	-	0	-	0	-	-
15	B4100 East	Cherwell Services	1744 m	-	0	-	0	-	-
16	B4100 East	M40 South	4968 m	-	0	00:05:15	4	-	-
17	B4100 East	B430	3504 m	00:05:19	10	-	0	-	-
18	B4100 East	M40 North	7047 m	00:06:27	182	00:07:01	38	00:00:35	▲ 9%
19	B4100 East	B4100 West	915 m	00:02:06	216	00:02:04	244	-00:00:02	▼ 1%
20	B4100 East	Ardley Rd West	2417 m	-	0	-	0	-	-
21	B4100 East	Ardley Rd East	3073 m	-	0	-	0	-	-
22	B4100 East	B430 (New)	3597 m	-	0	00:05:46	4	-	-
23	B4100 East	OxSRFI (South)	2182 m	-	0	00:06:35	29	-	-
24	B4100 East	OxSRFI (North)	5726 m	-	0	00:06:25	32	-	-
25	Cherwell Services	A43 North	2062 m	00:03:08	62	00:04:29	63	00:01:21	▲ 43%
26	Cherwell Services	B4100 East	1880 m	-	0	-	0	-	-
27	Cherwell Services	Cherwell Services	583 m	-	0	-	0	-	-
28	Cherwell Services	M40 South	3597 m	00:03:13	209	00:03:40	285	00:00:27	▲ 14%
29	Cherwell Services	B430	2182 m	00:03:11	80	-	0	-	-
30	Cherwell Services	M40 North	5726 m	00:04:35	149	00:05:34	150	00:00:59	▲ 22%
31	Cherwell Services	B4100 West	1679 m	-	0	-	0	-	-
32	Cherwell Services	Ardley Rd West	1096 m	-	0	-	0	-	-
33	Cherwell Services	Ardley Rd East	1752 m	-	0	-	0	-	-
34	Cherwell Services	B430 (New)	5167 m	-	0	00:03:52	4	-	-
35	Cherwell Services	OxSRFI (South)	3927 m	-	0	-	0	-	-
36	Cherwell Services	OxSRFI (North)	4583 m	-	0	-	0	-	-
37	M40 South	A43 North	5550 m	00:05:49	1079	00:05:19	1053	-00:00:30	▼ 9%
38	M40 South	B4100 East	5368 m	-	0	-	0	-	-
39	M40 South	Cherwell Services	4071 m	00:04:54	226	00:04:33	225	-00:00:21	▼ 7%
40	M40 South	M40 South	7295 m	-	0	-	0	-	-
41	M40 South	B430	5013 m	00:05:14	2	-	0	-	-
42	M40 South	M40 North	8281 m	00:04:43	2981	00:04:44	2926	00:00:00	▲ 0%
43	M40 South	B4100 West	5167 m	00:05:46	8	00:05:13	4	-00:00:33	▼ 10%
44	M40 South	Ardley Rd West	3927 m	00:03:58	14	00:03:23	12	-00:00:35	▼ 15%
45	M40 South	Ardley Rd East	4583 m	-	89	-	0	-	-
46	M40 South	B430 (New)	6018 m	-	0	-	0	-	-
47	M40 South	OxSRFI (South)	5836 m	-	0	00:05:47	59	-	-
48	M40 South	OxSRFI (North)	5231 m	-	0	00:05:36	58	-	-
49	B430	A43 Nor h	3806 m	00:04:10	152	-	0	-	-
50	B430	B4100 East	3624 m	00:04:36	11	-	0	-	-
51	B430	Cherwell Services	2327 m	-	0	-	0	-	-
52	B430	M40 South	5551 m	-	0	00:06:04	4	-	-
53	B430	B430	3450 m	-	0	-	0	-	-
54	B430	M40 North	6997 m	00:04:56	97	-	0	-	-
55	B430	B4100 West	3423 m	-	0	-	0	-	-
56	B430	Ardley Rd West	1431 m	00:01:24	34	-	0	-	-
57	B430	Ardley Rd East	2045 m	00:01:52	89	00:02:30	18	00:00:38	▲ 34%
58	B430	B430 (New)	4983 m	-	0	-	0	-	-
59	B430	OxSRFI (South)	3519 m	-	0	00:06:09	22	-	-
60	B430	OxSRFI (North)	7062 m	-	0	00:06:02	19	-	-
61	M40 North	A43 Nor h	6018 m	-	0	-	0	-	-
62	M40 North	B4100 East	5836 m	00:05:16	223	00:05:28	210	00:00:12	▲ 4%
63	M40 North	Cherwell Services	5231 m	00:04:45	192	00:04:38	188	-00:00:07	▼ 2%
64	M40 North	M40 South	8295 m	00:04:56	3668	00:04:58	3458	00:00:02	▲ 1%
65	M40 North	B430	6991 m	00:06:28	137	-	0	-	-
66	M40 North	M40 North	10535 m	-	0	-	0	-	-
67	M40 North	B4100 West	5635 m	00:04:46	23	-	0	-	-
68	M40 North	Ardley Rd West	5905 m	00:05:24	12	00:05:46	12	00:00:22	▲ 7%
69	M40 North	Ardley Rd East	6561 m	00:05:50	59	00:06:21	16	00:00:31	▲ 9%
70	M40 North	B430 (New)	2314 m	-	0	00:06:46	306	-	-
71	M40 North	OxSRFI (South)	1254 m	-	0	00:07:56	82	-	-
72	M40 North	OxSRFI (North)	1011 m	-	0	00:07:48	80	-	-
73	B4100 West	A43 Nor h	1116 m	00:01:40	61	00:01:50	70	00:00:10	▲ 10%
74	B4100 West	B4100 East	934 m	00:01:51	316	00:02:01	295	00:00:10	▲ 9%
75	B4100 West	Cherwell Services	1759 m	-	0	-	0	-	-
76	B4100 West	M40 South	4983 m	00:05:24	48	00:05:31	101	00:00:07	▲ 2%
77	B4100 West	B430	3519 m	-	0	-	0	-	-
78	B4100 West	M40 North	7062 m	-	0	-	0	-	-
79	B4100 West	B4100 West	931 m	-	0	-	0	-	-
80	B4100 West	Ardley Rd West	2432 m	-	0	-	0	-	-
81	B4100 West	Ardley Rd East	3089 m	-	0	-	0	-	-
82	B4100 West	B430 (New)	2603 m	-	0	00:05:56	67	-	-
83	B4100 West	OxSRFI (South)	2604 m	-	0	00:06:55	19	-	-
84	B4100 West	OxSRFI (North)	2605 m	-	0	00:06:47	19	-	-
85	Ardley Rd West	A43 Nor h	2697 m	00:03:08	4	00:03:53	4	00:00:45	▲ 24%
86	Ardley Rd West	B4100 East	2515 m	-	0	-	0	-	-
87	Ardley Rd West	Cherwell Services	1218 m	-	0	-	0	-	-
88	Ardley Rd West	M40 South	4442 m	00:04:35	12	00:04:53	21	00:00:19	▲ 7%
89	Ardley Rd West	B430	1441 m	00:01:41	19	-	0	-	-
90	Ardley Rd West	M40 North	5887 m	00:03:58	10	00:04:39	10	00:00:41	▲ 17%
91	Ardley Rd West	B4100 West	2314 m	-	0	-	0	-	-
92	Ardley Rd West	Ardley Rd West	1254 m	-	0	-	0	-	-
93	Ardley Rd West	Ardley Rd East	1011 m	00:01:07	64	00:01:25	12	00:00:18	▲ 27%
94	Ardley Rd West	B430 (New)	2615 m	-	0	00:04:00	34	-	-
95	Ardley Rd West	OxSRFI (South)	2616 m	-	0	00:04:53	4	-	-
96	Ardley Rd West	OxSRFI (North)	2617 m	-	0	00:04:44	4	-	-
97	Ardley Rd East	A43 Nor h	3389 m	00:03:42	15	-	0	-	-
98	Ardley Rd East	B4100 East	3207 m	-	0	-	0	-	-
99	Ardley Rd East	Cherwell Services	1910 m	-	0	-	0	-	-
100	Ardley Rd East	M40 South	5134 m	-	0	-	0	-	-
101	Ardley Rd East	B430	2030 m	00:01:57	162	00:02:28	6	00:00:31	▲ 27%
102	Ardley Rd East	M40 North	6579 m	00:04:29	121	00:05:27	153	00:00:58	▲ 22%
103	Ardley Rd East	B4100 West	3006 m	-	0	-	0	-	-
104	Ardley Rd East	Ardley Rd West	1014 m	00:00:57	24	00:01:16	8	00:00:19	▲ 34%
105	Ardley Rd East	Ardley Rd East	2602 m	-	0	-	0	-	-
106	Ardley Rd East	B430 (New)	2627 m	-	0	-	0	-	-
107	Ardley Rd East	OxSRFI (South)	2628 m	-	0	-	0	-	-
108	Ardley Rd East	OxSRFI (North)	2629 m	-	0	-	0	-	-
109	B430 (New)	A43 Nor h	2630 m	-	0	00:05:05	128	-	-
110	B430 (New)	B4100 East	2631 m	-	0	-	0	-	-
111	B430 (New)	Cherwell Services	2632 m	-	0	-	0	-	-
112	B430 (New)	M40 South	2633 m	-	0	-	0	-	-
113	B430 (New)	B430	2634 m	-	0	00:04:07	4	-	-
114	B430 (New)	M40 Nor h	2635 m	-	0	00:06:01	175	-	-
115	B430 (New)	B4100 West	2636 m	-	0	-	0	-	-
116	B430 (New)	Ardley Rd West	2637 m	-	0	00:02:50	38	-	-
117	B430 (New)	Ardley Rd East	2638 m	-	0	-	0	-	-
118	B430 (New)	B430 (New)	2639 m	-	0	-	0	-	-
119	B430 (New)	OxSRFI (South)	2640 m	-	0	00:01:23	198	-	-
120	B430 (New)	OxSRFI (North)	2641 m	-	0	00:01:16	192	-	-
121	OxSRFI (South)	A43 Nor h	2642 m	-	0	00:06:02	25	-	-
122	OxSRFI (South)	B4100 East	2643 m	-	0	00:06:53	3	-	-
123	OxSRFI (South)	Cherwell Services	2644 m	-	0	-	0	-	-
124	OxSRFI (South)	M40 Sou h	2645 m	-	0	00:07:17	81	-	-
125	OxSRFI (South)	B430	2646 m	-	0	00:04:57	3	-	-
126	OxSRFI (South)	M40 Nor h	2647 m	-	0	00:07:25	51	-	-
127	OxSRFI (South)	B4100 West	2648 m	-	0	-	0	-	-
128	OxSRFI (South)	Ardley Rd West	2649 m	-	0	00:03:37	4	-	-
129	OxSRFI (South)	Ardley Rd East	2650 m	-	0	00:04:14	11	-	-
130	OxSRFI (South)	B430 (New)	2651 m	-	0	00:01:58	54	-	-
131	OxSRFI (South)	OxSRFI (South)	2652 m	-	0	-	0	-	-
132	OxSRFI (South)	OxSRFI (North)	2653 m	-	0	-	0	-	-
133	OxSRFI (North)	A43 North	2654 m	-	0	00:05:44	4	-	-
134	OxSRFI (North)	B4100 East	2655 m	-	0	00:06:07	0	-	-
135	OxSRFI (North)	Cherwell Services	2656 m	-	0	-	0	-	-
136	OxSRFI (North)	M40 Sou h	2657 m	-	0	00:06:50	10	-	-
137	OxSRFI (North)	B430	2658 m	-	0	00:04:20	1	-	-
138	OxSRFI (North)	M40 North	2659 m	-	0	00:06:53	6	-	-
139	OxSRFI (North)	B4100 West	2660 m	-	0	-	0	-	-
140	OxSRFI (North)	Ardley Rd West	2661 m	-	0	00:03:05	0	-	-
141	OxSRFI (North)	Ardley Rd East	2662 m	-	0	00:03:51	1	-	-
142	OxSRFI (North)	B430 (New)	2663 m	-	0	00:01:32	6	-	-
143	OxSRFI (North)	OxSRFI (South)	2664 m	-	0	-	0	-	-
144	OxSRFI (North)	OxSRFI (North)	2665 m	-	0	-	0	-	-

MG MARKERS - FULL ORIGIN-DESTINATION MARKERS (PARKING LOT TO PARKING LOT)

LIGHT VEHICLES - AM PEAK

JT Marker	Route			2031 RC1A		2031 DS1A		Difference (JTs)	
No.	From	To	Dist.	Avg.	Trips	Avg.	Trips	No.	%
1	A43 North	A43 North	1600 m	-	0	-	0	-	-
2	A43 North	B4100 East	1220 m	00:01:27	406	00:01:27	323	00:00:01	▲ 1%
3	A43 North	Cherwell Services	2045 m	00:03:06	59	00:02:59	54	-00:00:08	▼ 4%
4	A43 North	M40 South	5269 m	00:08:07	1018	00:08:04	1247	-00:00:03	▼ 1%
5	A43 North	B430	3805 m	00:04:59	435	-	0	-	-
6	A43 North	M40 North	7348 m	-	0	-	0	-	-
7	A43 North	B4100 West	1216 m	00:02:02	41	00:02:04	33	00:00:02	▲ 2%
8	A43 North	Ardley Rd West	2718 m	-	0	-	0	-	-
9	A43 North	Ardley Rd East	3374 m	00:04:21	45	-	0	-	-
10	A43 North	B430 (New)	1298 m	-	0	00:05:20	365	-	-
11	A43 North	OxSRFI (South)	1116 m	-	0	00:06:16	111	-	-
12	A43 North	OxSRFI (North)	1744 m	-	0	00:06:09	114	-	-
13	B4100 East	A43 North	1298 m	00:02:06	205	00:02:07	205	00:00:01	▲ 0%
14	B4100 East	B4100 East	1116 m	-	0	-	0	-	-
15	B4100 East	Cherwell Services	1744 m	-	0	-	0	-	-
16	B4100 East	M40 South	4968 m	-	0	00:05:15	4	-	-
17	B4100 East	B430	3504 m	00:05:19	10	-	0	-	-
18	B4100 East	M40 North	7047 m	00:06:27	182	00:07:01	38	00:00:35	▲ 9%
19	B4100 East	B4100 West	915 m	00:02:06	204	00:02:04	232	-00:00:02	▼ 1%
20	B4100 East	Ardley Rd West	2417 m	-	0	-	0	-	-
21	B4100 East	Ardley Rd East	3073 m	-	0	-	0	-	-
22	B4100 East	B430 (New)	3597 m	-	0	00:05:46	4	-	-
23	B4100 East	OxSRFI (Sou h)	2182 m	-	0	00:06:33	27	-	-
24	B4100 East	OxSRFI (North)	5726 m	-	0	00:06:24	30	-	-
25	Cherwell Services	A43 North	2062 m	00:03:05	50	00:04:26	51	00:01:21	▲ 44%
26	Cherwell Services	B4100 East	1880 m	-	0	-	0	-	-
27	Cherwell Services	Cherwell Services	583 m	-	0	-	0	-	-
28	Cherwell Services	M40 South	3597 m	00:03:09	152	00:03:37	228	00:00:28	▲ 15%
29	Cherwell Services	B430	2182 m	00:03:11	80	-	0	-	-
30	Cherwell Services	M40 North	5726 m	00:04:24	103	00:05:23	105	00:01:00	▲ 23%
31	Cherwell Services	B4100 West	1679 m	-	0	-	0	-	-
32	Cherwell Services	Ardley Rd West	1096 m	-	0	-	0	-	-
33	Cherwell Services	Ardley Rd East	1752 m	-	0	-	0	-	-
34	Cherwell Services	B430 (New)	5167 m	-	0	00:03:52	4	-	-
35	Cherwell Services	OxSRFI (South)	3927 m	-	0	-	0	-	-
36	Cherwell Services	OxSRFI (North)	4583 m	-	0	-	0	-	-
37	M40 South	A43 North	5550 m	00:05:46	939	00:05:16	930	-00:00:30	▼ 9%
38	M40 South	B4100 East	5368 m	-	0	-	0	-	-
39	M40 South	Cherwell Services	4071 m	00:04:53	210	00:04:32	209	-00:00:22	▼ 7%
40	M40 South	M40 South	7295 m	-	0	-	0	-	-
41	M40 South	B430	5013 m	00:05:14	2	-	0	-	-
42	M40 South	M40 North	8281 m	00:04:38	2626	00:04:39	2589	00:00:00	▲ 0%
43	M40 South	B4100 West	5167 m	00:05:46	8	00:05:13	4	-00:00:33	▼ 10%
44	M40 South	Ardley Rd West	3927 m	00:03:58	14	00:03:23	12	-00:00:35	▼ 15%
45	M40 South	Ardley Rd East	4583 m	-	0	-	0	-	-
46	M40 South	B430 (New)	6018 m	-	0	-	0	-	-
47	M40 South	OxSRFI (South)	5836 m	-	0	00:05:30	11	-	-
48	M40 South	OxSRFI (North)	5231 m	-	0	00:05:21	11	-	-
49	B430	A43 North	3806 m	00:04:10	152	-	0	-	-
50	B430	B4100 East	3624 m	00:04:36	11	-	0	-	-
51	B430	Cherwell Services	2327 m	-	0	-	0	-	-
52	B430	M40 South	5551 m	-	0	00:06:04	4	-	-
53	B430	B430	3450 m	-	0	-	0	-	-
54	B430	M40 North	6997 m	00:04:56	97	-	0	-	-
55	B430	B4100 West	3423 m	-	0	-	0	-	-
56	B430	Ardley Rd West	1431 m	00:01:24	34	-	0	-	-
57	B430	Ardley Rd East	2045 m	00:01:52	89	00:02:30	18	00:00:38	▲ 34%
58	B430	B430 (New)	4983 m	-	0	-	0	-	-
59	B430	OxSRFI (South)	3519 m	-	0	00:06:09	22	-	-
60	B430	OxSRFI (North)	7062 m	-	0	00:06:02	19	-	-
61	M40 North	A43 North	6018 m	-	0	-	0	-	-
62	M40 North	B4100 East	5836 m	00:05:14	207	00:05:26	194	00:00:12	▲ 4%
63	M40 North	Cherwell Services	5231 m	00:04:37	132	00:04:32	129	-00:00:06	▼ 2%
64	M40 North	M40 South	8295 m	00:04:51	3114	00:04:53	2903	00:00:02	▲ 1%
65	M40 North	B430	6991 m	00:06:28	137	-	0	-	-
66	M40 North	M40 North	10535 m	-	0	-	0	-	-
67	M40 North	B4100 West	5635 m	00:04:46	23	-	0	-	-
68	M40 North	Ardley Rd West	5905 m	00:05:24	12	00:05:46	12	00:00:22	▲ 7%
69	M40 North	Ardley Rd East	6561 m	00:05:50	59	00:06:21	16	00:00:31	▲ 9%
70	M40 North	B430 (New)	2314 m	-	0	00:06:46	306	-	-
71	M40 North	OxSRFI (South)	1254 m	-	0	00:07:43	53	-	-
72	M40 North	OxSRFI (North)	1011 m	-	0	00:07:36	51	-	-
73	B4100 West	A43 North	1116 m	00:01:40	61	00:01:50	70	00:00:10	▲ 10%
74	B4100 West	B4100 East	934 m	00:01:51	308	00:02:01	287	00:00:10	▲ 9%
75	B4100 West	Cherwell Services	1759 m	-	0	-	0	-	-
76	B4100 West	M40 South	4983 m	00:05:24	48	00:05:31	101	00:00:07	▲ 2%
77	B4100 West	B430	3519 m	-	0	-	0	-	-
78	B4100 West	M40 North	7062 m	-	0	-	0	-	-
79	B4100 West	B4100 West	931 m	-	0	-	0	-	-
80	B4100 West	Ardley Rd West	2432 m	-	0	-	0	-	-
81	B4100 West	Ardley Rd East	3089 m	-	0	-	0	-	-
82	B4100 West	B430 (New)	2603 m	-	0	00:05:50	67	-	-
83	B4100 West	OxSRFI (South)	2604 m	-	0	00:06:55	19	-	-
84	B4100 West	OxSRFI (North)	2605 m	-	0	00:06:47	19	-	-
85	Ardley Rd West	A43 North	2697 m	00:03:08	4	00:03:53	4	00:00:45	▲ 24%
86	Ardley Rd West	B4100 East	2515 m	-	0	-	0	-	-
87	Ardley Rd West	Cherwell Services	1218 m	-	0	-	0	-	-
88	Ardley Rd West	M40 South	4442 m	00:04:35	12	00:04:53	21	00:00:19	▲ 7%
89	Ardley Rd West	B430	1441 m	00:01:38	11	-	0	-	-
90	Ardley Rd West	M40 North	5887 m	00:03:58	10	00:04:39	10	00:00:41	▲ 17%
91	Ardley Rd West	B4100 West	2314 m	-	0	-	0	-	-
92	Ardley Rd West	Ardley Rd West	1254 m	-	0	-	0	-	-
93	Ardley Rd West	Ardley Rd East	1011 m	00:01:07	64	00:01:25	12	00:00:18	▲ 27%
94	Ardley Rd West	B430 (New)	2615 m	-	0	00:03:56	26	-	-
95	Ardley Rd West	OxSRFI (South)	2616 m	-	0	00:04:53	4	-	-
96	Ardley Rd West	OxSRFI (North)	2617 m	-	0	00:04:44	4	-	-
97	Ardley Rd East	A43 North	3389 m	00:03:42	15	-	0	-	-
98	Ardley Rd East	B4100 East	3207 m	-	0	-	0	-	-
99	Ardley Rd East	Cherwell Services	1910 m	-	0	-	0	-	-
100	Ardley Rd East	M40 South	5134 m	-	0	-	0	-	-
101	Ardley Rd East	B430	2030 m	00:01:57	158	00:02:28	6	00:00:32	▲ 27%
102	Ardley Rd East	M40 North	6579 m	00:04:29	121	00:05:27	153	00:00:58	▲ 22%
103	Ardley Rd East	B4100 West	3006 m	-	0	-	0	-	-
104	Ardley Rd East	Ardley Rd West	1014 m	00:00:57	24	00:01:16	8	00:00:19	▲ 34%
105	Ardley Rd East	Ardley Rd East	2602 m	-	0	-	0	-	-
106	Ardley Rd East	B430 (New)	2627 m	-	0	-	0	-	-
107	Ardley Rd East	OxSRFI (South)	2628 m	-	0	-	0	-	-
108	Ardley Rd East	OxSRFI (North)	2629 m	-	0	-	0	-	-
109	B430 (New)	A43 North	2630 m	-	0	00:05:01	112	-	-
110	B430 (New)	B4100 East	2631 m	-	0	-	0	-	-
111	B430 (New)	Cherwell Services	2632 m	-	0	-	0	-	-
112	B430 (New)	M40 South	2633 m	-	0	-	0	-	-
113	B430 (New)	B430	2634 m	-	0	00:04:07	4	-	-
114	B430 (New)	M40 North	2635 m	-	0	00:05:55	151	-	-
115	B430 (New)	B4100 West	2636 m	-	0	-	0	-	-
116	B430 (New)	Ardley Rd West	2637 m	-	0	00:02:50	38	-	-
117	B430 (New)	Ardley Rd East	2638 m	-	0	-	0	-	-
118	B430 (New)	B430 (New)	2639 m	-	0	-	0	-	-
119	B430 (New)	OxSRFI (South)	2640 m	-	0	00:01:23	196	-	-
120	B430 (New)	OxSRFI (North)	2641 m	-	0	00:01:16	192	-	-
121	OxSRFI (South)	A43 North	2642 m	-	0	00:05:45	11	-	-
122	OxSRFI (South)	B4100 East	2643 m	-	0	-	0	-	-
123	OxSRFI (South)	Cherwell Services	2644 m	-	0	-	0	-	-
124	OxSRFI (South)	M40 South	2645 m	-	0	-	0	-	-
125	OxSRFI (South)	B430	2646 m	-	0	00:04:57	3	-	-
126	OxSRFI (South)	M40 North	2647 m	-	0	00:06:38	3	-	-
127	OxSRFI (South)	B4100 West	2648 m	-	0	-	0	-	-
128	OxSRFI (South)	Ardley Rd West	2649 m	-	0	00:03:37	4	-	-
129	OxSRFI (South)	Ardley Rd East	2650 m	-	0	00:04:14	11	-	-
130	OxSRFI (South)	B430 (New)	2651 m	-	0	00:01:58	52	-	-
131	OxSRFI (South)	OxSRFI (South)	2652 m	-	0	-	0	-	-
132	OxSRFI (South)	OxSRFI (North)	2653 m	-	0	-	0	-	-
133	OxSRFI (North)	A43 North	2654 m	-	0	00:05:19	2	-	-
134	OxSRFI (North)	B4100 East	2655 m	-	0	-	0	-	-
135	OxSRFI (North)	Cherwell Services	2656 m	-	0	-	0	-	-
136	OxSRFI (North)	M40 South	2657 m	-	0	-	0	-	-
137	OxSRFI (North)	B430	2658 m	-	0	00:04:20	1	-	-
138	OxSRFI (North)	M40 North	2659 m	-	0	00:06:07	1	-	-
139	OxSRFI (North)	B4100 West	2660 m	-	0	-	0	-	-
140	OxSRFI (North)	Ardley Rd West	2661 m	-	0	00:03:05	0	-	-
141	OxSRFI (North)	Ardley Rd East	2662 m	-	0	00:03:51	1	-	-
142	OxSRFI (North)	B430 (New)	2663 m	-	0	00:01:32	6	-	-
143	OxSRFI (North)	OxSRFI (South)	2664 m	-	0	-	0	-	-
144	OxSRFI (North)	OxSRFI (North)	2665 m	-	0	-	0	-	-

MG MARKERS - FULL ORIGIN-DESTINATION MARKERS (PARKING LOT TO PARKING LOT)

HEAVY VEHICLES - AM PEAK

Marker	Route			2031 RC1A		2031 DS1A		Difference (JTs)	
No.	From	To	Dist.	Avg.	Trips	Avg.	Trips	No.	%
1	A43 North	A43 North	1600 m	-	0	-	0	-	-
2	A43 North	B4100 East	1220 m	-	0	-	0	-	-
3	A43 North	Cherwell Services	2045 m	00:03:20	3	00:03:13	2	-00:00:07	▼ 3%
4	A43 North	M40 South	5269 m	00:08:32	241	00:08:29	222	-00:00:03	▼ 1%
5	A43 North	B430	3805 m	00:05:10	4	-	0	-	-
6	A43 North	M40 North	7348 m	-	0	-	0	-	-
7	A43 North	B4100 West	1216 m	-	0	-	0	-	-
8	A43 North	Ardley Rd West	2718 m	-	0	-	0	-	-
9	A43 North	Ardley Rd East	3374 m	-	0	-	0	-	-
10	A43 North	B430 (New)	1298 m	-	0	00:05:37	4	-	-
11	A43 North	OxSRFI (South)	1116 m	-	0	00:06:43	8	-	-
12	A43 North	OxSRFI (North)	1744 m	-	0	00:06:31	7	-	-
13	B4100 East	A43 North	1298 m	00:02:19	16	00:02:17	16	-00:00:02	▼ 1%
14	B4100 East	B4100 East	1116 m	-	0	-	0	-	-
15	B4100 East	Cherwell Services	1744 m	-	0	-	0	-	-
16	B4100 East	M40 South	4968 m	-	0	-	0	-	-
17	B4100 East	B430	3504 m	-	0	-	0	-	-
18	B4100 East	M40 North	7047 m	-	0	-	0	-	-
19	B4100 East	B4100 West	915 m	00:02:11	12	00:02:11	12	00:00:00	▲ 0%
20	B4100 East	Ardley Rd West	2417 m	-	0	-	0	-	-
21	B4100 East	Ardley Rd East	3073 m	-	0	-	0	-	-
22	B4100 East	B430 (New)	3597 m	-	0	-	0	-	-
23	B4100 East	OxSRFI (Sou h)	2182 m	-	0	00:07:08	2	-	-
24	B4100 East	OxSRFI (North)	5726 m	-	0	00:06:54	2	-	-
25	Cherwell Services	A43 North	2062 m	00:03:22	12	00:04:44	12	00:01:22	▲ 41%
26	Cherwell Services	B4100 East	1880 m	-	0	-	0	-

MG MARKERS - FULL ORIGIN-DESTINATION MARKERS (PARKING LOT TO PARKING LOT)

ALL VEHICLES - PM PEAK

Marker	Route			2031 RC1A		2031 DS1A		Difference (JTs)	
No.	From	To	Dist.	Avg.	Trips	Avg.	Trips	No.	%
1	A43 North	A43 North	1600 m	-	0	-	0	-	-
2	A43 North	B4100 East	1220 m	00:01:23	279	00:01:23	253	00:00:00	▲ 0%
3	A43 North	Cherwell Services	2045 m	00:02:50	104	00:02:44	106	-00:00:06	▼ 4%
4	A43 North	M40 South	5269 m	00:04:48	1214	00:04:44	1214	-00:00:04	▼ 1%
5	A43 North	B430	3805 m	00:04:26	96	-	0	-	-
6	A43 North	M40 North	7348 m	-	0	-	0	-	-
7	A43 North	B4100 West	1216 m	00:02:20	38	00:02:12	44	-00:00:08	▼ 6%
8	A43 North	Ardley Rd West	2718 m	00:03:32	4	-	0	-	-
9	A43 North	Ardley Rd East	3374 m	00:03:54	24	-	0	-	-
10	A43 North	B430 (New)	1298 m	-	0	00:04:45	131	-	-
11	A43 North	OxSRFI (South)	1116 m	-	0	00:05:47	45	-	-
12	A43 North	OxSRFI (North)	1744 m	-	0	00:05:39	43	-	-
13	B4100 East	A43 North	1298 m	00:02:51	347	00:02:31	317	-00:00:20	▼ 12%
14	B4100 East	B4100 East	1116 m	-	0	-	0	-	-
15	B4100 East	Cherwell Services	1744 m	-	0	-	0	-	-
16	B4100 East	M40 South	4968 m	00:05:29	4	00:05:07	8	-00:00:21	▼ 6%
17	B4100 East	B430	3504 m	00:05:12	4	-	0	-	-
18	B4100 East	M40 North	7047 m	00:06:53	240	00:07:16	44	00:00:24	▲ 6%
19	B4100 East	B4100 West	915 m	00:02:42	216	00:02:25	268	-00:00:18	▼ 11%
20	B4100 East	Ardley Rd West	2417 m	00:04:15	4	00:04:36	4	00:00:21	▲ 8%
21	B4100 East	Ardley Rd East	3073 m	-	0	-	0	-	-
22	B4100 East	B430 (New)	3597 m	-	0	-	0	-	-
23	B4100 East	OxSRFI (South)	2182 m	-	0	00:06:22	12	-	-
24	B4100 East	OxSRFI (North)	5726 m	-	0	00:06:13	14	-	-
25	Cherwell Services	A43 North	2062 m	00:03:16	86	00:04:46	87	00:01:30	▲ 46%
26	Cherwell Services	B4100 East	1880 m	-	0	-	0	-	-
27	Cherwell Services	Cherwell Services	583 m	-	0	-	0	-	-
28	Cherwell Services	M40 South	3597 m	00:03:05	261	00:03:14	261	00:00:09	▲ 5%
29	Cherwell Services	B430	2182 m	-	0	-	0	-	-
30	Cherwell Services	M40 North	5726 m	00:04:34	178	00:05:31	177	00:00:57	▲ 21%
31	Cherwell Services	B4100 West	1679 m	-	0	-	0	-	-
32	Cherwell Services	Ardley Rd West	1096 m	-	0	-	0	-	-
33	Cherwell Services	Ardley Rd East	1752 m	-	0	-	0	-	-
34	Cherwell Services	B430 (New)	5167 m	-	0	-	0	-	-
35	Cherwell Services	OxSRFI (South)	3927 m	-	0	-	0	-	-
36	Cherwell Services	OxSRFI (North)	4583 m	-	0	-	0	-	-
37	M40 South	A43 North	5550 m	00:05:16	1588	00:05:41	1682	00:00:25	▲ 8%
38	M40 South	B4100 East	5368 m	00:05:54	4	00:06:19	8	00:00:25	▲ 7%
39	M40 South	Cherwell Services	4071 m	00:04:01	213	00:04:33	214	00:00:32	▲ 13%
40	M40 South	M40 South	7295 m	-	0	-	0	-	-
41	M40 South	B430	5013 m	00:04:04	4	00:04:42	2	00:00:38	▲ 16%
42	M40 South	M40 North	8281 m	00:04:55	3963	00:04:56	3836	00:00:02	▲ 1%
43	M40 South	B4100 West	5167 m	00:05:13	28	00:05:32	33	00:00:19	▲ 6%
44	M40 South	Ardley Rd West	3927 m	00:03:07	32	00:03:23	41	00:00:16	▲ 9%
45	M40 South	Ardley Rd East	4583 m	-	0	-	0	-	-
46	M40 South	B430 (New)	6018 m	-	0	-	0	-	-
47	M40 South	OxSRFI (South)	5836 m	-	0	00:05:33	47	-	-
48	M40 South	OxSRFI (North)	5231 m	-	0	00:05:25	43	-	-
49	B430	A43 North	3806 m	00:04:33	146	-	0	-	-
50	B430	B4100 East	3624 m	00:05:09	4	-	0	-	-
51	B430	Cherwell Services	2327 m	-	0	-	0	-	-
52	B430	M40 South	5551 m	-	0	-	0	-	-
53	B430	B430	3450 m	-	0	-	0	-	-
54	B430	M40 North	6997 m	00:05:10	108	-	0	-	-
55	B430	B4100 West	3423 m	-	0	-	0	-	-
56	B430	Ardley Rd West	1431 m	00:01:23	77	-	0	-	-
57	B430	Ardley Rd East	2045 m	00:01:48	58	-	0	-	-
58	B430	B430 (New)	4983 m	-	0	-	0	-	-
59	B430	OxSRFI (South)	3519 m	-	0	00:06:09	6	-	-
60	B430	OxSRFI (North)	7062 m	-	0	00:06:05	6	-	-
61	M40 North	A43 Nor h	6018 m	-	0	-	0	-	-
62	M40 North	B4100 East	5836 m	00:05:46	253	00:05:42	221	-00:00:04	▼ 1%
63	M40 North	Cherwell Services	5231 m	00:04:40	196	00:04:34	196	-00:00:06	▼ 2%
64	M40 North	M40 South	8295 m	00:04:46	3352	00:04:47	3347	00:00:01	▲ 1%
65	M40 North	B430	6991 m	00:06:11	93	-	0	-	-
66	M40 North	M40 North	10535 m	-	0	-	0	-	-
67	M40 North	B4100 West	5635 m	00:05:05	7	-	0	-	-
68	M40 North	Ardley Rd West	5905 m	00:05:16	16	00:05:41	15	00:00:25	▲ 8%
69	M40 North	Ardley Rd East	6561 m	00:05:39	24	00:06:17	12	00:00:38	▲ 11%
70	M40 North	B430 (New)	2314 m	-	0	00:06:23	125	-	-
71	M40 North	OxSRFI (South)	1254 m	-	0	00:07:49	39	-	-
72	M40 North	OxSRFI (North)	1011 m	-	0	00:07:44	37	-	-
73	B4100 West	A43 Nor h	1116 m	00:01:52	46	00:01:50	44	-00:00:02	▼ 2%
74	B4100 West	B4100 East	934 m	00:02:03	143	00:01:59	143	-00:00:05	▼ 4%
75	B4100 West	Cherwell Services	1759 m	-	0	-	0	-	-
76	B4100 West	M40 South	4983 m	00:05:16	32	00:05:16	34	00:00:00	▲ 0%
77	B4100 West	B430	3519 m	-	0	-	0	-	-
78	B4100 West	M40 North	7062 m	-	0	-	0	-	-
79	B4100 West	B4100 West	931 m	-	0	-	0	-	-
80	B4100 West	Ardley Rd West	2432 m	-	0	-	0	-	-
81	B4100 West	Ardley Rd East	3089 m	-	0	-	0	-	-
82	B4100 West	B430 (New)	2603 m	-	0	00:05:30	20	-	-
83	B4100 West	OxSRFI (South)	2604 m	-	0	00:06:36	2	-	-
84	B4100 West	OxSRFI (North)	2605 m	-	0	00:06:09	2	-	-
85	Ardley Rd West	A43 Nor h	2697 m	00:03:39	8	00:04:29	8	00:00:50	▲ 23%
86	Ardley Rd West	B4100 East	2515 m	-	0	-	0	-	-
87	Ardley Rd West	Cherwell Services	1218 m	-	0	-	0	-	-
88	Ardley Rd West	M40 South	4442 m	-	0	00:04:58	20	-	-
89	Ardley Rd West	B430	1441 m	00:01:29	36	-	0	-	-
90	Ardley Rd West	M40 North	5887 m	00:04:11	9	00:05:06	8	00:00:55	▲ 22%
91	Ardley Rd West	B4100 West	2314 m	-	0	-	0	-	-
92	Ardley Rd West	Ardley Rd West	1254 m	-	0	-	0	-	-
93	Ardley Rd West	Ardley Rd East	1011 m	00:01:02	37	00:01:26	12	00:00:23	▲ 38%
94	Ardley Rd West	B430 (New)	2615 m	-	0	00:04:01	8	-	-
95	Ardley Rd West	OxSRFI (South)	2616 m	-	0	00:04:50	2	-	-
96	Ardley Rd West	OxSRFI (North)	2617 m	-	0	00:04:43	2	-	-
97	Ardley Rd East	A43 Nor h	3389 m	00:04:05	4	00:05:25	4	00:01:20	▲ 33%
98	Ardley Rd East	B4100 East	3207 m	-	0	-	0	-	-
99	Ardley Rd East	Cherwell Services	1910 m	-	0	-	0	-	-
100	Ardley Rd East	M40 South	5134 m	-	0	-	0	-	-
101	Ardley Rd East	B430	2030 m	00:01:48	12	00:02:32	4	00:00:44	▲ 41%
102	Ardley Rd East	M40 North	6579 m	00:04:42	64	00:05:52	132	00:01:10	▲ 25%
103	Ardley Rd East	B4100 West	3006 m	-	0	-	0	-	-
104	Ardley Rd East	Ardley Rd West	1014 m	00:00:55	38	00:01:16	8	00:00:21	▲ 39%
105	Ardley Rd East	Ardley Rd East	2602 m	-	0	-	0	-	-
106	Ardley Rd East	B430 (New)	2627 m	-	0	-	0	-	-
107	Ardley Rd East	OxSRFI (South)	2628 m	-	0	-	0	-	-
108	Ardley Rd East	OxSRFI (North)	2629 m	-	0	-	0	-	-
109	B430 (New)	A43 Nor h	2630 m	-	0	00:05:34	214	-	-
110	B430 (New)	B4100 East	2631 m	-	0	-	0	-	-
111	B430 (New)	Cherwell Services	2632 m	-	0	-	0	-	-
112	B430 (New)	M40 South	2633 m	-	0	-	0	-	-
113	B430 (New)	B430	2634 m	-	0	-	0	-	-
114	B430 (New)	M40 Nor h	2635 m	-	0	00:06:15	317	-	-
115	B430 (New)	B4100 West	2636 m	-	0	-	0	-	-
116	B430 (New)	Ardley Rd West	2637 m	-	0	00:02:59	66	-	-
117	B430 (New)	Ardley Rd East	2638 m	-	0	-	0	-	-
118	B430 (New)	B430 (New)	2639 m	-	0	-	0	-	-
119	B430 (New)	OxSRFI (South)	2640 m	-	0	00:01:19	77	-	-
120	B430 (New)	OxSRFI (North)	2641 m	-	0	00:01:12	77	-	-
121	OxSRFI (South)	A43 North	2642 m	-	0	00:06:24	273	-	-
122	OxSRFI (South)	B4100 East	2643 m	-	0	00:07:03	27	-	-
123	OxSRFI (South)	Cherwell Services	2644 m	-	0	-	0	-	-
124	OxSRFI (South)	M40 Sou h	2645 m	-	0	00:07:08	95	-	-
125	OxSRFI (South)	B430	2646 m	-	0	00:05:05	45	-	-
126	OxSRFI (South)	M40 Nor h	2647 m	-	0	00:07:12	149	-	-
127	OxSRFI (South)	B4100 West	2648 m	-	0	-	0	-	-
128	OxSRFI (South)	Ardley Rd West	2649 m	-	0	00:03:47	49	-	-
129	OxSRFI (South)	Ardley Rd East	2650 m	-	0	00:04:26	45	-	-
130	OxSRFI (South)	B430 (New)	2651 m	-	0	00:02:08	383	-	-
131	OxSRFI (South)	OxSRFI (South)	2652 m	-	0	-	0	-	-
132	OxSRFI (South)	OxSRFI (North)	2653 m	-	0	-	0	-	-
133	OxSRFI (North)	A43 North	2654 m	-	0	00:05:57	29	-	-
134	OxSRFI (North)	B4100 East	2655 m	-	0	00:06:41	3	-	-
135	OxSRFI (North)	Cherwell Services	2656 m	-	0	-	0	-	-
136	OxSRFI (North)	M40 Sou h	2657 m	-	0	00:06:39	12	-	-
137	OxSRFI (North)	B430	2658 m	-	0	00:04:36	5	-	-
138	OxSRFI (North)	M40 North	2659 m	-	0	00:06:50	17	-	-
139	OxSRFI (North)	B4100 West	2660 m	-	0	-	0	-	-
140	OxSRFI (North)	Ardley Rd West	2661 m	-	0	00:03:19	5	-	-
141	OxSRFI (North)	Ardley Rd East	2662 m	-	0	00:04:00	5	-	-
142	OxSRFI (North)	B430 (New)	2663 m	-	0	00:01:41	41	-	-
143	OxSRFI (North)	OxSRFI (South)	2664 m	-	0	-	0	-	-
144	OxSRFI (North)	OxSRFI (North)	2665 m	-	0	-	0	-	-

MG MARKERS - FULL ORIGIN-DESTINATION MARKERS (PARKING LOT TO PARKING LOT)

LIGHT VEHICLES - PM PEAK

Marker	Route			2031 RC1A		2031 DS1A		Difference (JTs)	
No.	From	To	Dist.	Avg.	Trips	Avg.	Trips	No.	%
1	A43 North	A43 North	1600 m	-	0	-	0	-	-
2	A43 North	B4100 East	1220 m	00:01:23	269	00:01:23	242	00:00:00	▲ 0%
3	A43 North	Cherwell Services	2045 m	00:02:50	104	00:02:44	106	-00:00:06	▼ 4%
4	A43 North	M40 South	5269 m	00:04:45	1114	00:04:42	1115	-00:00:04	▼ 1%
5	A43 North	B430	3805 m	00:04:26	96	-	0	-	-
6	A43 North	M40 North	7348 m	-	0	-	0	-	-
7	A43 North	B4100 West	1216 m	00:02:20	38	00:02:12	44	-00:00:08	▼ 6%
8	A43 North	Ardley Rd West	2718 m	00:03:32	4	-	0	-	-
9	A43 North	Ardley Rd East	3374 m	00:03:54	24	-	0	-	-
10	A43 North	B430 (New)	1298 m	-	0	00:04:45	131	-	-
11	A43 North	OxSRFI (South)	1116 m	-	0	00:05:43	37	-	-
12	A43 North	OxSRFI (North)	1744 m	-	0	00:05:33	34	-	-
13	B4100 East	A43 North	1298 m	00:02:51	347	00:02:31	317	-00:00:20	▼ 12%
14	B4100 East	B4100 East	1116 m	-	0	-	0	-	-
15	B4100 East	Cherwell Services	1744 m	-	0	-	0	-	-
16	B4100 East	M40 South	4968 m	00:05:29	4	00:05:07	8	-00:00:21	▼ 6%
17	B4100 East	B430	3504 m	00:05:12	4	-	0	-	-
18	B4100 East	M40 North	7047 m	00:06:52	236	00:07:13	40	00:00:21	▲ 5%
19	B4100 East	B4100 West	915 m	00:02:42	216	00:02:25	268	-00:00:18	▼ 11%
20	B4100 East	Ardley Rd West	2417 m	00:04:15	4	00:04:36	4	00:00:21	▲ 8%
21	B4100 East	Ardley Rd East	3073 m	-	0	-	0	-	-
22	B4100 East	B430 (New)	3597 m	-	0	-	0	-	-
23	B4100 East	OxSRFI (South)	2182 m	-	0	00:06:16	11	-	-
24	B4100 East	OxSRFI (North)	5726 m	-	0	00:06:09	11	-	-
25	Cherwell Services	A43 North	2062 m	00:03:13	73	00:04:44	74	00:01:31	▲ 47%
26	Cherwell Services	B4100 East	1880 m	-	0	-	0	-	-
27	Cherwell Services	Cherwell Services	583 m	-	0	-	0	-	-
28	Cherwell Services	M40 South	3597 m	00:03:02	212	00:03:11	212	00:00:09	▲ 5%
29	Cherwell Services	B430	2182 m	-	0	-	0	-	-
30	Cherwell Services	M40 North	5726 m	00:04:27	139	00:05:25	138	00:00:58	▲ 22%
31	Cherwell Services	B4100 West	1679 m	-	0	-	0	-	-
32	Cherwell Services	Ardley Rd West	1096 m	-	0	-	0	-	-
33	Cherwell Services	Ardley Rd East	1752 m	-	0	-	0	-	-
34	Cherwell Services	B430 (New)	5167 m	-	0	-	0	-	-
35	Cherwell Services	OxSRFI (South)	3927 m	-	0	-	0	-	-
36	Cherwell Services	OxSRFI (North)	4583 m	-	0	-	0	-	-
37	M40 South	A43 North	5550 m	00:05:14	1461	00:05:39	1553	00:00:25	▲ 8%
38	M40 South	B4100 East	5368 m	00:05:54	4	00:06:19	8	00:00:25	▲ 7%
39	M40 South	Cherwell Services	4071 m	00:03:58	168	00:04:31	168	00:00:33	▲ 14%
40	M40 South	M40 South	7295 m	-	0	-	0	-	-
41	M40 South	B430	5013 m	00:04:04	4	00:04:42	2	00:00:38	▲ 16%
42	M40 South	M40 North	8281 m	00:04:51	3536	00:04:53	3443	00:00:02	▲ 1%
43	M40 South	B4100 West	5167 m	00:05:13	28	00:05:32	33	00:00:19	▲ 6%
44	M40 South	Ardley Rd West	3927 m	00:03:07	32	00:03:23	41	00:00:16	▲ 9%
45	M40 South	Ardley Rd East	4583 m	-	0	-	0	-	-
46	M40 South	B430 (New)	6018 m	-	0	-	0	-	-
47	M40 South	OxSRFI (South)	5836 m	-	0	00:05:12	2	-	-
48	M40 South	OxSRFI (North)	5231 m	-	0	00:05:00	2	-	-
49	B430	A43 North	3806 m	00:04:33	146	-	0	-	-
50	B430	B4100 East	3624 m	00:05:09	4	-	0	-	-
51	B430	Cherwell Services	2327 m	-	0	-	0	-	-
52	B430	M40 South	5551 m	-	0	-	0	-	-
53	B430	B430	3450 m	-	0	-	0	-	-
54	B430	M40 North	6997 m	00:05:10	108	-	0	-	-
55	B430	B4100 West	3423 m	-	0	-	0	-	-
56	B430	Ardley Rd West	1431 m	00:01:23	77	-	0	-	-
57	B430	Ardley Rd East	2045 m	00:01:48	58	-	0	-	-
58	B430	B430 (New)	4983 m	-	0	-	0	-	-
59	B430	OxSRFI (South)	3519 m	-	0	00:06:09	6	-	-
60	B430	OxSRFI (North)	7062 m	-	0	00:06:05	6	-	-
61	M40 North	A43 Nor h	6018 m	-	0	-	0	-	-
62	M40 North	B4100 East	5836 m	00:05:46	253	00:05:42	221	-00:00:04	▼ 1%
63	M40 North	Cherwell Services	5231 m	00:04:32	142	00:04:27	143	-00:00:05	▼ 2%
64	M40 North	M40 South	8295 m	00:04:42	3020	00:04:43	3014	00:00:02	▲ 1%
65	M40 North	B430	6991 m	00:06:11	93	-	0	-	-
66	M40 North	M40 North	10535 m	-	0	-	0	-	-
67	M40 North	B4100 West	5635 m	00:05:05	7	-	0	-	-
68	M40 North	Ardley Rd West	5905 m	00:05:16	16	00:05:41	15	00:00:25	▲ 8%
69	M40 North	Ardley Rd East	6561 m	00:05:39	24	00:06:17	12	00:00:38	▲ 11%
70	M40 North	B430 (New)	2314 m	-	0	00:06:23	125	-	-
71	M40 North	OxSRFI (South)	1254 m	-	0	00:07:19	13	-	-
72	M40 North	OxSRFI (North)	1011 m	-	0	00:07:14	11	-	-
73	B4100 West	A43 North	1116 m	00:01:52	46	00:01:50	44	-00:00:02	▼ 2%
74	B4100 West	B4100 East	934 m	00:02:03	139	00:01:58	139	-00:00:05	▼ 4%
75	B4100 West	Cherwell Services	1759 m	-	0	-	0	-	-
76	B4100 West	M40 South	4983 m	00:05:16	32	00:05:16	34	00:00:00	▲ 0%
77	B4100 West	B430	3519 m	-	0	-	0	-	-
78	B4100 West	M40 North	7062 m	-	0	-	0	-	-
79	B4100 West	B4100 West	931 m	-	0	-	0	-	-
80	B4100 West	Ardley Rd West	2432 m	-	0	-	0	-	-
81	B4100 West	Ardley Rd East	3089 m	-	0	-	0	-	-
82	B4100 West	B430 (New)	2603 m	-	0	00:05:30	20	-	-
83	B4100 West	OxSRFI (South)	2604 m	-	0	00:06:36	2	-	-
84	B4100 West	OxSRFI (North)	2605 m	-	0	00:06:09	2	-	-
85	Ardley Rd West	A43 Nor h	2697 m	00:03:39	8	00:04:29	8	00:00:50	▲ 23%
86	Ardley Rd West	B4100 East	2515 m	-	0	-	0	-	-
87	Ardley Rd West	Cherwell Services	1218 m	-	0	-	0	-	-
88	Ardley Rd West	M40 South	4442 m	-	0	00:04:58	20	-	-
89	Ardley Rd West	B430	1441 m	00:01:29	36	-	0	-	-
90	Ardley Rd West	M40 North	5887 m	00:04:11	9	00:05:06	8	00:00:55	▲ 22%
91	Ardley Rd West	B4100 West	2314 m	-	0	-	0	-	-
92	Ardley Rd West	Ardley Rd West	1254 m	-	0	-	0	-	-
93	Ardley Rd West	Ardley Rd East	1011 m	00:01:02	37	00:01:26	12	00:00:23	▲ 38%
94	Ardley Rd West	B430 (New)	2615 m	-	0	00:04:01	8	-	-
95	Ardley Rd West	OxSRFI (South)	2616 m	-	0	00:04:50	2	-	-
96	Ardley Rd West	OxSRFI (North)	2617 m	-	0	00:04:43	2	-	-
97	Ardley Rd East	A43 Nor h	3389 m	00:04:05	4	00:05:25	4	00:01:20	▲ 33%
98	Ardley Rd East	B4100 East	3207 m	-	0	-	0	-	-
99	Ardley Rd East	Cherwell Services	1910 m	-	0	-	0	-	-
100	Ardley Rd East	M40 South	5134 m	-	0	-	0	-	-
101	Ardley Rd East	B430	2030 m	00:01:48	12	00:02:32	4	00:00:44	▲ 41%
102	Ardley Rd East	M40 North	6579 m	00:04:42	64	00:05:52	132	00:01:10	▲ 25%
103	Ardley Rd East	B4100 West	3006 m	-	0	-	0	-	-
104	Ardley Rd East	Ardley Rd West	1014 m	00:00:55	38	00:01:16	8	00:00:21	▲ 39%
105	Ardley Rd East	Ardley Rd East	2602 m	-	0	-	0	-	-
106	Ardley Rd East	B430 (New)	2627 m	-	0	-	0	-	-
107	Ardley Rd East	OxSRFI (South)	2628 m	-	0	-	0	-	-
108	Ardley Rd East	OxSRFI (North)	2629 m	-	0	-	0	-	-
109	B430 (New)	A43 Nor h	2630 m	-	0	00:05:34	214	-	-
110	B430 (New)	B4100 East	2631 m	-	0	-	0	-	-
111	B430 (New)	Cherwell Services	2632 m	-	0	-	0	-	-
112	B430 (New)	M40 South	2633 m	-	0	-	0	-	-
113	B430 (New)	B430	2634 m	-	0	-	0	-	-
114	B430 (New)	M40 North	2635 m	-	0	00:06:12	287	-	-
115	B430 (New)	B4100 West	2636 m	-	0	-	0	-	-
116	B430 (New)	Ardley Rd West	2637 m	-	0	00:02:59	66	-	-
117	B430 (New)	Ardley Rd East	2638 m	-	0	-	0	-	-
118	B430 (New)	B430 (New)	2639 m	-	0	-	0	-	-
119	B430 (New)	OxSRFI (South)	2640 m	-	0	00:01:19	75	-	-
120	B430 (New)	OxSRFI (North)	2641 m	-	0	00:01:12	77	-	-
121	OxSRFI (South)	A43 North	2642 m	-	0	00:06:23	259	-	-
122	OxSRFI (South)	B4100 East	2643 m	-	0	00:07:00	24	-	-
123	OxSRFI (South)	Cherwell Services	2644 m	-	0	-	0	-	-
124	OxSRFI (South)	M40 Sou h	2645 m	-	0	00:06:43	25	-	-
125	OxSRFI (South)	B430	2646 m	-	0	00:05:05	45	-	-
126	OxSRFI (South)	M40 Nor h	2647 m	-	0	00:07:01	108	-	-
127	OxSRFI (South)	B4100 West	2648 m	-	0	-	0	-	-
128	OxSRFI (South)	Ardley Rd West	2649 m	-	0	00:03:47	49	-	-
129	OxSRFI (South)	Ardley Rd East	2650 m	-	0	00:04:26	45	-	-
130	OxSRFI (South)	B430 (New)	2651 m	-	0	00:02:08	381	-	-
131	OxSRFI (South)	OxSRFI (South)	2652 m	-	0	-	0	-	-
132	OxSRFI (South)	OxSRFI (North)	2653 m	-	0	-	0	-	-
133	OxSRFI (North)	A43 North	2654 m	-	0	00:05:55	28	-	-
134	OxSRFI (North)	B4100 East	2655 m	-	0	00:06:34	3	-	-
135	OxSRFI (North)	Cherwell Services	2656 m	-	0	-	0	-	-
136	OxSRFI (North)	M40 Sou h	2657 m	-	0	00:06:09	3	-	-
137	OxSRFI (North)	B430	2658 m	-	0	00:04:36	5	-	-
138	OxSRFI (North)	M40 North	2659 m	-	0	00:06:38	12	-	-
139	OxSRFI (North)	B4100 West	2660 m	-	0	-	0	-	-
140	OxSRFI (North)	Ardley Rd West	2661 m	-	0	00:03:19	5	-	-
141	OxSRFI (North)	Ardley Rd East	2662 m	-	0	00:04:00	5	-	-
142	OxSRFI (North)	B430 (New)	2663 m	-	0	00:01:41	41	-	-
143	OxSRFI (North)	OxSRFI (South)	2664 m	-	0	-	0	-	-
144	OxSRFI (North)	OxSRFI (North)	2665 m	-	0	-	0	-	-

MG MARKERS - FULL ORIGIN-DESTINATION MARKERS (PARKING LOT TO PARKING LOT)

HEAVY VEHICLES - PM PEAK

Marker	Route			2031 RC1A		2031 DS1A		Difference (JTs)	
No.	From	To	Dist.	Avg.	Trips	Avg.	Trips	No.	%
1	A43 North	A43 North	1600 m	-	0	-	0	-	-
2	A43 North	B4100 East	1220 m	00:01:34	10	00:01:31	10	-00:00:03	▼ 3%
3	A43 North	Cherwell Services	2045 m	-	0	-	0	-	-
4	A43 North	M40 South	5269 m	00:05:15	100	00:05:09	99	-00:00:05	▼ 2%
5	A43 North	B430	3805 m	-	0	-	0	-	-
6	A43 North	M40 North	7348 m	-	0	-	0	-	-
7	A43 North	B4100 West	1216 m	-	0	-	0	-	-
8	A43 North	Ardley Rd West	2718 m	-	0	00:06:07	7	-	-
9	A43 North	Ardley Rd East	3374 m	-	0	-	0	-	-
10	A43 North	B430 (New)	1298 m	-	0	-	0	-	-
11	A43 North	OxSRFI (South)	1116 m	-	0	00:06:01	9	-	-
12	A43 North	OxSRFI (North)	1744 m	-	0	00:06:01	9	-	-
13	B4100 East	A43 North	1298 m	-	0	-	0	-	-
14	B4100 East	B4100 East	1116 m	-	0	-	0	-	-
15	B4100 East	Cherwell Services	1744 m	-	0	-	0	-	-
16	B4100 East	M40 South	4968 m	-	0	-	0	-	-
17	B4100 East	B430	3504 m	-	0	-	0	-	-
18	B4100 East	M40 North	7047 m	00:07:28	4	00:07:48	4	00:00:21	▲ 5%
19	B4100 East	B4100 West	915 m	-	0	-	0	-	-
20	B4100 East	Ardley Rd West	2417 m	-	0	-	0	-	-
21	B4100 East	Ardley Rd East	3073 m	-	0	-	0	-	-
22	B4100 East	B430 (New)	3597 m	-	0	-	0	-	-
23	B4100 East	OxSRFI (South)	2182 m	-	0	00:06:56	2	-	-
24	B4100 East	OxSRFI (North)	5726 m	-	0	00:06:35	2	-	-
25	Cherwell Services	A43 North

APPENDIX I:

2034 RC3A&DS3A ROUTE PERFORMANCE– O-D JOURNEY TIME RESULTS

MG MARKERS - FULL ORIGIN-DESTINATION MARKERS (PARKING LOT TO PARKING LOT)

ALL VEHICLES - AM PEAK

Marker	Route			2034 RC3A		2034 DS3A		Difference (JTs)	
No.	From	To	Dist.	Avg.	Trips	Avg.	Trips	No.	%
1	A43 North	A43 North	1600 m	-	0	-	0	-	-
2	A43 North	B4100 East	1220 m	00:01:28	396	00:01:31	292	00:00:02	▲ 3%
3	A43 North	Cherwell Services	2045 m	00:03:16	64	00:03:25	60	00:00:09	▲ 5%
4	A43 North	M40 South	5269 m	00:05:22	1313	00:05:38	1664	00:00:16	▲ 5%
5	A43 North	B430	3805 m	00:05:18	476	-	0	-	-
6	A43 North	M40 North	7348 m	-	0	-	0	-	-
7	A43 North	B4100 West	1216 m	00:02:04	43	00:02:11	34	00:00:07	▲ 6%
8	A43 North	Ardley Rd West	2718 m	-	0	-	0	-	-
9	A43 North	Ardley Rd East	3374 m	00:04:40	40	00:04:55	4	00:00:16	▲ 6%
10	A43 North	B430 (New)	1298 m	-	0	00:05:24	270	-	-
11	A43 North	OxSRFI (South)	1116 m	-	0	00:06:23	117	-	-
12	A43 North	OxSRFI (North)	1744 m	-	0	00:06:14	114	-	-
13	B4100 East	A43 North	1298 m	00:02:11	229	00:02:11	227	-00:00:00	▼ 0%
14	B4100 East	B4100 East	1116 m	-	0	-	0	-	-
15	B4100 East	Cherwell Services	1744 m	-	0	-	0	-	-
16	B4100 East	M40 South	4968 m	-	0	00:05:44	4	-	-
17	B4100 East	B430	3504 m	00:05:38	8	-	0	-	-
18	B4100 East	M40 North	7047 m	00:06:38	198	00:07:06	43	00:00:28	▲ 7%
19	B4100 East	B4100 West	915 m	00:02:08	222	00:02:07	243	-00:00:01	▼ 0%
20	B4100 East	Ardley Rd West	2417 m	-	0	-	0	-	-
21	B4100 East	Ardley Rd East	3073 m	-	0	-	0	-	-
22	B4100 East	B430 (New)	3597 m	-	0	00:05:39	3	-	-
23	B4100 East	OxSRFI (South)	2182 m	-	0	00:06:30	30	-	-
24	B4100 East	OxSRFI (North)	5726 m	-	0	00:06:31	30	-	-
25	Cherwell Services	A43 North	2062 m	00:03:12	65	00:04:41	66	00:01:29	▲ 46%
26	Cherwell Services	B4100 East	1880 m	-	0	-	0	-	-
27	Cherwell Services	Cherwell Services	583 m	-	0	-	0	-	-
28	Cherwell Services	M40 South	3597 m	00:03:17	216	00:04:04	297	00:00:47	▲ 24%
29	Cherwell Services	B430	2182 m	00:03:24	82	-	0	-	-
30	Cherwell Services	M40 North	5726 m	00:04:37	154	00:05:41	156	00:01:04	▲ 23%
31	Cherwell Services	B4100 West	1679 m	-	0	-	0	-	-
32	Cherwell Services	Ardley Rd West	1096 m	-	0	-	0	-	-
33	Cherwell Services	Ardley Rd East	1752 m	-	0	-	0	-	-
34	Cherwell Services	B430 (New)	5167 m	-	0	-	0	-	-
35	Cherwell Services	OxSRFI (South)	3927 m	-	0	-	0	-	-
36	Cherwell Services	OxSRFI (North)	4583 m	-	0	-	0	-	-
37	M40 South	A43 North	5550 m	00:08:23	1096	00:05:27	1098	-00:02:56	▼ 35%
38	M40 South	B4100 East	5368 m	-	0	-	0	-	-
39	M40 South	Cherwell Services	4071 m	00:07:38	229	00:04:54	234	-00:02:44	▼ 36%
40	M40 South	M40 South	7295 m	-	0	-	0	-	-
41	M40 South	B430	5013 m	00:07:32	4	00:04:39	4	-00:02:53	▼ 38%
42	M40 South	M40 North	8281 m	00:04:45	3117	00:04:45	3026	00:00:00	▲ 0%
43	M40 South	B4100 West	5167 m	00:08:28	8	00:08:23	6	-00:03:05	▼ 36%
44	M40 South	Ardley Rd West	3927 m	00:06:30	15	00:05:24	14	-00:03:06	▼ 48%
45	M40 South	Ardley Rd East	4583 m	00:06:46	4	00:04:05	4	-00:02:41	▼ 40%
46	M40 South	B430 (New)	6018 m	-	0	-	0	-	-
47	M40 South	OxSRFI (South)	5836 m	-	0	00:05:44	61	-	-
48	M40 South	OxSRFI (North)	5231 m	-	0	00:05:36	62	-	-
49	B430	A43 Nor h	3806 m	00:04:14	176	-	0	-	-
50	B430	B4100 East	3624 m	00:04:45	9	-	0	-	-
51	B430	Cherwell Services	2327 m	-	0	-	0	-	-
52	B430	M40 South	5551 m	-	0	00:06:34	6	-	-
53	B430	B430	3450 m	-	0	-	0	-	-
54	B430	M40 North	6997 m	00:04:58	108	-	0	-	-
55	B430	B4100 West	3423 m	-	0	-	0	-	-
56	B430	Ardley Rd West	1431 m	00:01:23	30	-	0	-	-
57	B430	Ardley Rd East	2045 m	00:01:52	81	00:02:29	19	00:00:37	▲ 33%
58	B430	B430 (New)	4983 m	-	0	-	0	-	-
59	B430	OxSRFI (South)	3519 m	-	0	00:06:14	20	-	-
60	B430	OxSRFI (North)	7062 m	-	0	00:06:05	18	-	-
61	M40 North	A43 Nor h	6018 m	-	0	00:05:23	35	-	-
62	M40 North	B4100 East	5836 m	00:05:20	249	00:05:44	237	00:00:24	▲ 8%
63	M40 North	Cherwell Services	5231 m	00:04:51	196	00:04:57	196	00:00:06	▲ 2%
64	M40 North	M40 South	8295 m	00:04:59	3973	00:05:06	3666	00:00:06	▲ 2%
65	M40 North	B430	6991 m	00:06:43	150	-	0	-	-
66	M40 North	M40 North	10535 m	-	0	-	0	-	-
67	M40 North	B4100 West	5635 m	00:04:39	4	-	0	-	-
68	M40 North	Ardley Rd West	5905 m	00:05:43	12	00:05:49	12	00:00:06	▲ 2%
69	M40 North	Ardley Rd East	6561 m	00:06:05	55	00:06:28	23	00:00:24	▲ 6%
70	M40 North	B430 (New)	2314 m	-	0	00:06:50	359	-	-
71	M40 North	OxSRFI (South)	1254 m	-	0	00:07:58	92	-	-
72	M40 North	OxSRFI (North)	1011 m	-	0	00:07:50	90	-	-
73	B4100 West	A43 Nor h	1116 m	00:01:42	62	00:02:13	72	00:00:32	▲ 31%
74	B4100 West	B4100 East	934 m	00:01:53	316	00:02:25	321	00:00:32	▲ 29%
75	B4100 West	Cherwell Services	1759 m	-	0	-	0	-	-
76	B4100 West	M40 South	4983 m	00:05:32	16	00:06:17	124	00:00:45	▲ 14%
77	B4100 West	B430	3519 m	-	0	-	0	-	-
78	B4100 West	M40 North	7062 m	-	0	-	0	-	-
79	B4100 West	B4100 West	931 m	-	0	-	0	-	-
80	B4100 West	Ardley Rd West	2432 m	-	0	-	0	-	-
81	B4100 West	Ardley Rd East	3089 m	-	0	-	0	-	-
82	B4100 West	B430 (New)	2603 m	-	0	00:06:20	48	-	-
83	B4100 West	OxSRFI (South)	2604 m	-	0	00:07:16	17	-	-
84	B4100 West	OxSRFI (North)	2605 m	-	0	00:07:11	17	-	-
85	Ardley Rd West	A43 Nor h	2697 m	00:03:17	4	00:03:56	4	00:00:39	▲ 20%
86	Ardley Rd West	B4100 East	2515 m	-	0	-	0	-	-
87	Ardley Rd West	Cherwell Services	1218 m	-	0	-	0	-	-
88	Ardley Rd West	M40 South	4442 m	00:04:43	14	00:05:15	24	00:00:32	▲ 11%
89	Ardley Rd West	B430	1441 m	00:01:43	12	-	0	-	-
90	Ardley Rd West	M40 North	5887 m	00:04:02	11	00:04:43	10	00:00:41	▲ 17%
91	Ardley Rd West	B4100 West	2314 m	-	0	-	0	-	-
92	Ardley Rd West	Ardley Rd West	1254 m	-	0	-	0	-	-
93	Ardley Rd West	Ardley Rd East	1011 m	00:01:08	64	00:01:24	14	00:00:16	▲ 24%
94	Ardley Rd West	B430 (New)	2615 m	-	0	00:04:00	34	-	-
95	Ardley Rd West	OxSRFI (South)	2616 m	-	0	00:04:58	4	-	-
96	Ardley Rd West	OxSRFI (North)	2617 m	-	0	00:04:49	4	-	-
97	Ardley Rd East	A43 Nor h	3389 m	00:03:48	20	00:04:42	5	00:00:54	▲ 24%
98	Ardley Rd East	B4100 East	3207 m	-	0	-	0	-	-
99	Ardley Rd East	Cherwell Services	1910 m	-	0	-	0	-	-
100	Ardley Rd East	M40 South	5134 m	-	0	-	0	-	-
101	Ardley Rd East	B430	2030 m	00:01:58	184	00:02:31	8	00:00:33	▲ 28%
102	Ardley Rd East	M40 North	6579 m	00:04:32	136	00:05:30	178	00:00:58	▲ 21%
103	Ardley Rd East	B4100 West	3006 m	-	0	-	0	-	-
104	Ardley Rd East	Ardley Rd West	1014 m	00:00:57	24	00:01:19	11	00:00:23	▲ 40%
105	Ardley Rd East	Ardley Rd East	2602 m	-	0	-	0	-	-
106	Ardley Rd East	B430 (New)	2627 m	-	0	-	0	-	-
107	Ardley Rd East	OxSRFI (South)	2628 m	-	0	00:05:41	4	-	-
108	Ardley Rd East	OxSRFI (North)	2629 m	-	0	00:05:35	4	-	-
109	B430 (New)	A43 Nor h	2630 m	-	0	00:05:13	132	-	-
110	B430 (New)	B4100 East	2631 m	-	0	-	0	-	-
111	B430 (New)	Cherwell Services	2632 m	-	0	-	0	-	-
112	B430 (New)	M40 South	2633 m	-	0	-	0	-	-
113	B430 (New)	B430	2634 m	-	0	-	0	-	-
114	B430 (New)	M40 North	2635 m	-	0	00:06:03	205	-	-
115	B430 (New)	B4100 West	2636 m	-	0	00:05:11	4	-	-
116	B430 (New)	Ardley Rd West	2637 m	-	0	00:02:51	35	-	-
117	B430 (New)	Ardley Rd East	2638 m	-	0	-	0	-	-
118	B430 (New)	B430 (New)	2639 m	-	0	-	0	-	-
119	B430 (New)	OxSRFI (South)	2640 m	-	0	00:01:24	183	-	-
120	B430 (New)	OxSRFI (North)	2641 m	-	0	00:01:16	183	-	-
121	OxSRFI (South)	A43 Nor h	2642 m	-	0	00:06:08	26	-	-
122	OxSRFI (South)	B4100 East	2643 m	-	0	00:07:01	4	-	-
123	OxSRFI (South)	Cherwell Services	2644 m	-	0	-	0	-	-
124	OxSRFI (South)	M40 Sou h	2645 m	-	0	00:07:45	79	-	-
125	OxSRFI (South)	B430	2646 m	-	0	00:04:48	3	-	-
126	OxSRFI (South)	M40 Nor h	2647 m	-	0	00:07:23	54	-	-
127	OxSRFI (South)	B4100 West	2648 m	-	0	-	0	-	-
128	OxSRFI (South)	Ardley Rd West	2649 m	-	0	00:03:37	4	-	-
129	OxSRFI (South)	Ardley Rd East	2650 m	-	0	00:04:13	10	-	-
130	OxSRFI (South)	B430 (New)	2651 m	-	0	00:01:58	55	-	-
131	OxSRFI (South)	OxSRFI (South)	2652 m	-	0	-	0	-	-
132	OxSRFI (South)	OxSRFI (North)	2653 m	-	0	-	0	-	-
133	OxSRFI (North)	A43 North	2654 m	-	0	00:05:34	4	-	-
134	OxSRFI (North)	B4100 East	2655 m	-	0	00:06:57	1	-	-
135	OxSRFI (North)	Cherwell Services	2656 m	-	0	-	0	-	-
136	OxSRFI (North)	M40 Sou h	2657 m	-	0	00:07:17	10	-	-
137	OxSRFI (North)	B430	2658 m	-	0	00:04:12	1	-	-
138	OxSRFI (North)	M40 North	2659 m	-	0	00:06:58	7	-	-
139	OxSRFI (North)	B4100 West	2660 m	-	0	-	0	-	-
140	OxSRFI (North)	Ardley Rd West	2661 m	-	0	00:03:19	1	-	-
141	OxSRFI (North)	Ardley Rd East	2662 m	-	0	00:03:42	1	-	-
142	OxSRFI (North)	B430 (New)	2663 m	-	0	00:01:32	6	-	-
143	OxSRFI (North)	OxSRFI (South)	2664 m	-	0	-	0	-	-
144	OxSRFI (North)	OxSRFI (North)	2665 m	-	0	-	0	-	-

MG MARKERS - FULL ORIGIN-DESTINATION MARKERS (PARKING LOT TO PARKING LOT)

LIGHT VEHICLES - AM PEAK

JT Marker	Route			2034 RC3A		2034 DS3A		Difference (JTs)	
No.	From	To	Dist.	Avg.	Trips	Avg.	Trips	No.	%
1	A43 North	A43 North	1600 m	-	0	-	0	-	-
2	A43 North	B4100 East	1220 m	00:01:28	396	00:01:31	292	00:00:02	▲ 3%
3	A43 North	Cherwell Services	2045 m	00:03:15	60	00:03:24	57	00:00:09	▲ 5%
4	A43 North	M40 South	5269 m	00:05:17	1071	00:05:35	1433	00:00:17	▲ 5%
5	A43 North	B430	3805 m	00:05:18	472	-	0	-	-
6	A43 North	M40 North	7348 m	-	0	-	0	-	-
7	A43 North	B4100 West	1216 m	00:02:04	43	00:02:11	34	00:00:07	▲ 6%
8	A43 North	Ardley Rd West	2718 m	-	0	-	0	-	-
9	A43 North	Ardley Rd East	3374 m	00:04:40	40	00:04:55	4	00:00:16	▲ 6%
10	A43 North	B430 (New)	1298 m	-	0	00:05:23	266	-	-
11	A43 North	OxSRFI (South)	1116 m	-	0	00:06:22	110	-	-
12	A43 North	OxSRFI (North)	1744 m	-	0	00:06:13	107	-	-
13	B4100 East	A43 North	1298 m	00:02:10	213	00:02:10	211	-00:00:00	▼ 0%
14	B4100 East	B4100 East	1116 m	-	0	-	0	-	-
15	B4100 East	Cherwell Services	1744 m	-	0	-	0	-	-
16	B4100 East	M40 South	4968 m	-	0	00:05:44	4	-	-
17	B4100 East	B430	3504 m	00:05:38	8	-	0	-	-
18	B4100 East	M40 North	7047 m	00:06:38	198	00:07:06	43	00:00:28	▲ 7%
19	B4100 East	B4100 West	915 m	00:02:07	210	00:02:07	231	-00:00:00	▼ 0%
20	B4100 East	Ardley Rd West	2417 m	-	0	-	0	-	-
21	B4100 East	Ardley Rd East	3073 m	-	0	-	0	-	-
22	B4100 East	B430 (New)	3597 m	-	0	00:05:39	3	-	-
23	B4100 East	OxSRFI (Sou h)	2182 m	-	0	00:06:37	28	-	-
24	B4100 East	OxSRFI (North)	5726 m	-	0	00:06:31	27	-	-
25	Cherwell Services	A43 North	2062 m	00:03:10	53	00:04:38	54	00:01:28	▲ 47%
26	Cherwell Services	B4100 East	1880 m	-	0	-	0	-	-
27	Cherwell Services	Cherwell Services	583 m	-	0	-	0	-	-
28	Cherwell Services	M40 South	3597 m	00:03:14	158	00:04:02	239	00:00:48	▲ 25%
29	Cherwell Services	B430	2182 m	00:03:24	82	-	0	-	-
30	Cherwell Services	M40 North	5726 m	00:04:27	108	00:05:31	109	00:01:04	▲ 24%
31	Cherwell Services	B4100 West	1679 m	-	0	-	0	-	-
32	Cherwell Services	Ardley Rd West	1096 m	-	0	-	0	-	-
33	Cherwell Services	Ardley Rd East	1752 m	-	0	-	0	-	-
34	Cherwell Services	B430 (New)	5167 m	-	0	-	0	-	-
35	Cherwell Services	OxSRFI (Sou h)	3927 m	-	0	-	0	-	-
36	Cherwell Services	OxSRFI (North)	4583 m	-	0	-	0	-	-
37	M40 South	A43 North	5550 m	00:08:19	953	00:05:23	971	-00:02:56	▼ 35%
38	M40 South	B4100 East	5368 m	-	0	-	0	-	-
39	M40 South	Cherwell Services	4071 m	00:07:37	213	00:04:53	218	-00:02:44	▼ 36%
40	M40 South	M40 South	7295 m	-	0	-	0	-	-
41	M40 South	B430	5013 m	00:07:32	4	00:04:39	4	-00:02:53	▼ 38%
42	M40 South	M40 North	8281 m	00:04:40	2748	00:04:41	2682	00:00:01	▲ 0%
43	M40 South	B4100 West	5167 m	00:08:28	8	00:08:23	6	-00:03:05	▼ 36%
44	M40 South	Ardley Rd West	3927 m	00:06:30	15	00:05:24	14	-00:03:06	▼ 48%
45	M40 South	Ardley Rd East	4583 m	00:06:46	4	00:04:05	4	-00:02:41	▼ 40%
46	M40 South	B430 (New)	6018 m	-	0	-	0	-	-
47	M40 South	OxSRFI (South)	5836 m	-	0	00:05:23	14	-	-
48	M40 South	OxSRFI (North)	5231 m	-	0	00:05:19	15	-	-
49	B430	A43 North	3806 m	00:04:14	176	-	0	-	-
50	B430	B4100 East	3624 m	00:04:45	9	-	0	-	-
51	B430	Cherwell Services	2327 m	-	0	-	0	-	-
52	B430	M40 South	5551 m	-	0	00:06:34	6	-	-
53	B430	B430	3450 m	-	0	-	0	-	-
54	B430	M40 North	6997 m	00:04:58	108	-	0	-	-
55	B430	B4100 West	3423 m	-	0	-	0	-	-
56	B430	Ardley Rd West	1431 m	00:01:23	30	-	0	-	-
57	B430	Ardley Rd East	2045 m	00:01:52	81	00:02:29	19	00:00:37	▲ 33%
58	B430	B430 (New)	4983 m	-	0	-	0	-	-
59	B430	OxSRFI (South)	3519 m	-	0	00:06:14	20	-	-
60	B430	OxSRFI (North)	7062 m	-	0	00:06:05	18	-	-
61	M40 North	A43 North	6018 m	-	0	00:05:23	35	-	-
62	M40 North	B4100 East	5836 m	00:05:18	233	00:05:42	221	00:00:24	▲ 8%
63	M40 North	Cherwell Services	5231 m	00:04:44	134	00:04:51	135	00:00:07	▲ 3%
64	M40 North	M40 South	8295 m	00:04:55	3402	00:05:01	3093	00:00:06	▲ 2%
65	M40 North	B430	6991 m	00:06:43	150	-	0	-	-
66	M40 North	M40 North	10535 m	-	0	-	0	-	-
67	M40 North	B4100 West	5635 m	00:04:39	4	-	0	-	-
68	M40 North	Ardley Rd West	5905 m	00:05:43	12	00:05:49	12	00:00:06	▲ 2%
69	M40 North	Ardley Rd East	6561 m	00:06:05	55	00:06:28	23	00:00:24	▲ 6%
70	M40 North	B430 (New)	2314 m	-	0	00:06:50	359	-	-
71	M40 North	OxSRFI (South)	1254 m	-	0	00:07:48	63	-	-
72	M40 North	OxSRFI (North)	1011 m	-	0	00:07:40	61	-	-
73	B4100 West	A43 North	1116 m	00:01:42	62	00:02:13	72	00:00:32	▲ 31%
74	B4100 West	B4100 East	934 m	00:01:53	308	00:02:25	312	00:00:33	▲ 29%
75	B4100 West	Cherwell Services	1759 m	-	0	-	0	-	-
76	B4100 West	M40 South	4983 m	00:05:32	16	00:06:17	124	00:00:45	▲ 14%
77	B4100 West	B430	3519 m	-	0	-	0	-	-
78	B4100 West	M40 North	7062 m	-	0	-	0	-	-
79	B4100 West	B4100 West	931 m	-	0	-	0	-	-
80	B4100 West	Ardley Rd West	2432 m	-	0	-	0	-	-
81	B4100 West	Ardley Rd East	3089 m	-	0	-	0	-	-
82	B4100 West	B430 (New)	2603 m	-	0	00:06:20	48	-	-
83	B4100 West	OxSRFI (South)	2604 m	-	0	00:07:16	17	-	-
84	B4100 West	OxSRFI (North)	2605 m	-	0	00:07:11	17	-	-
85	Ardley Rd West	A43 North	2697 m	00:03:17	4	00:03:56	4	00:00:39	▲ 20%
86	Ardley Rd West	B4100 East	2515 m	-	0	-	0	-	-
87	Ardley Rd West	Cherwell Services	1218 m	-	0	-	0	-	-
88	Ardley Rd West	M40 South	4442 m	00:04:43	14	00:05:15	24	00:00:32	▲ 11%
89	Ardley Rd West	B430	1441 m	00:01:39	4	-	0	-	-
90	Ardley Rd West	M40 North	5887 m	00:04:02	11	00:04:43	10	00:00:41	▲ 17%
91	Ardley Rd West	B4100 West	2314 m	-	0	-	0	-	-
92	Ardley Rd West	Ardley Rd West	1254 m	-	0	-	0	-	-
93	Ardley Rd West	Ardley Rd East	1011 m	00:01:08	64	00:01:24	14	00:00:16	▲ 24%
94	Ardley Rd West	B430 (New)	2615 m	-	0	00:03:56	26	-	-
95	Ardley Rd West	OxSRFI (South)	2616 m	-	0	00:04:58	4	-	-
96	Ardley Rd West	OxSRFI (North)	2617 m	-	0	00:04:49	4	-	-
97	Ardley Rd East	A43 North	3389 m	00:03:48	20	00:04:42	5	00:00:54	▲ 24%
98	Ardley Rd East	B4100 East	3207 m	-	0	-	0	-	-
99	Ardley Rd East	Cherwell Services	1910 m	-	0	-	0	-	-
100	Ardley Rd East	M40 South	5134 m	-	0	-	0	-	-
101	Ardley Rd East	B430	2030 m	00:01:58	180	00:02:31	8	00:00:33	▲ 28%
102	Ardley Rd East	M40 North	6579 m	00:04:32	136	00:05:30	178	00:00:58	▲ 21%
103	Ardley Rd East	B4100 West	3006 m	-	0	-	0	-	-
104	Ardley Rd East	Ardley Rd West	1014 m	00:00:57	24	00:01:19	11	00:00:23	▲ 40%
105	Ardley Rd East	Ardley Rd East	2602 m	-	0	-	0	-	-
106	Ardley Rd East	B430 (New)	2627 m	-	0	-	0	-	-
107	Ardley Rd East	OxSRFI (South)	2628 m	-	0	00:05:41	4	-	-
108	Ardley Rd East	OxSRFI (North)	2629 m	-	0	00:05:35	4	-	-
109	B430 (New)	A43 North	2630 m	-	0	00:05:10	116	-	-
110	B430 (New)	B4100 East	2631 m	-	0	-	0	-	-
111	B430 (New)	Cherwell Services	2632 m	-	0	-	0	-	-
112	B430 (New)	M40 South	2633 m	-	0	-	0	-	-
113	B430 (New)	B430	2634 m	-	0	-	0	-	-
114	B430 (New)	M40 North	2635 m	-	0	00:05:58	181	-	-
115	B430 (New)	B4100 West	2636 m	-	0	00:05:11	4	-	-
116	B430 (New)	Ardley Rd West	2637 m	-	0	00:02:51	35	-	-
117	B430 (New)	Ardley Rd East	2638 m	-	0	-	0	-	-
118	B430 (New)	B430 (New)	2639 m	-	0	-	0	-	-
119	B430 (New)	OxSRFI (South)	2640 m	-	0	00:01:24	181	-	-
120	B430 (New)	OxSRFI (North)	2641 m	-	0	00:01:16	183	-	-
121	OxSRFI (South)	A43 North	2642 m	-	0	00:05:51	12	-	-
122	OxSRFI (South)	B4100 East	2643 m	-	0	00:06:47	1	-	-
123	OxSRFI (South)	Cherwell Services	2644 m	-	0	-	0	-	-
124	OxSRFI (South)	M40 South	2645 m	-	0	-	0	-	-
125	OxSRFI (South)	B430	2646 m	-	0	00:04:48	3	-	-
126	OxSRFI (South)	M40 North	2647 m	-	0	00:06:44	7	-	-
127	OxSRFI (South)	B4100 West	2648 m	-	0	-	0	-	-
128	OxSRFI (South)	Ardley Rd West	2649 m	-	0	00:03:37	4	-	-
129	OxSRFI (South)	Ardley Rd East	2650 m	-	0	00:04:13	10	-	-
130	OxSRFI (South)	B430 (New)	2651 m	-	0	00:01:58	53	-	-
131	OxSRFI (South)	OxSRFI (South)	2652 m	-	0	-	0	-	-
132	OxSRFI (South)	OxSRFI (North)	2653 m	-	0	-	0	-	-
133	OxSRFI (North)	A43 North	2654 m	-	0	00:05:21	2	-	-
134	OxSRFI (North)	B4100 East	2655 m	-	0	-	0	-	-
135	OxSRFI (North)	Cherwell Services	2656 m	-	0	-	0	-	-
136	OxSRFI (North)	M40 South	2657 m	-	0	-	0	-	-
137	OxSRFI (North)	B430	2658 m	-	0	00:04:12	1	-	-
138	OxSRFI (North)	M40 North	2659 m	-	0	00:06:21	1	-	-
139	OxSRFI (North)	B4100 West	2660 m	-	0	-	0	-	-
140	OxSRFI (North)	Ardley Rd West	2661 m	-	0	00:03:19	1	-	-
141	OxSRFI (North)	Ardley Rd East	2662 m	-	0	00:03:42	1	-	-
142	OxSRFI (North)	B430 (New)	2663 m	-	0	00:01:32	6	-	-
143	OxSRFI (North)	OxSRFI (South)	2664 m	-	0	-	0	-	-
144	OxSRFI (North)	OxSRFI (North)	2665 m	-	0	-	0	-	-

MG MARKERS - FULL ORIGIN-DESTINATION MARKERS (PARKING LOT TO PARKING LOT)

HEAVY VEHICLES - AM PEAK

Marker	Route			2034 RC3A		2034 DS3A		Difference (JTs)	
No.	From	To	Dist.	Avg.	Trips	Avg.	Trips	No.	%
1	A43 North	A43 North	1600 m	-	0	-	0	-	-
2	A43 North	B4100 East	1220 m	-	0	-	0	-	-
3	A43 North	Cherwell Services	2045 m	00:03:36	3	00:03:48	3	00:00:13	▲ 6%
4	A43 North	M40 South	5269 m	00:05:41	242	00:05:59	231	00:00:18	▲ 5%
5	A43 North	B430	3805 m	00:05:35	4	-	0	-	-
6	A43 North	M40 North	7348 m	-	0	-	0	-	-
7	A43 North	B4100 West	1216 m	-	0	-	0	-	-
8	A43 North	Ardley Rd West	2718 m	-	0	-	0	-	-
9	A43 North	Ardley Rd East	3374 m	-	0	-	0	-	-
10	A43 North	B430 (New)	1298 m	-	0	00:05:47	4	-	-
11	A43 North	OxSRFI (South)	1116 m	-	0	00:06:44	8	-	-
12	A43 North	OxSRFI (North)	1744 m	-	0	00:06:32	7	-	-
13	B4100 East	A43 North	1298 m	-	16	00:02:23	16	-	-
14	B4100 East	B4100 East	1116 m	00:02:25	0	-	0	-	-
15	B4100 East	Cherwell Services	1744 m	-	0	-	0	-	-
16	B4100 East	M40 South	4968 m	-	0	-	0	-	-
17	B4100 East	B430	3504 m	-	0	-	0	-	-
18	B4100 East	M40 North	7047 m	-	0	-	0	-	-
19	B4100 East	B4100 West	915 m	-	12	00:02:13	12	-	-
20	B4100 East	Ardley Rd West	2417 m	00:02:14	0	-	0	-	-
21	B4100 East	Ardley Rd East	3073 m	-	0	-	0	-	-
22	B4100 East	B430 (New)	3597 m	-	0	-	0	-	-
23	B4100 East	OxSRFI (Sou h)	2182 m	-	0	00:07:07

MG MARKERS - FULL ORIGIN-DESTINATION MARKERS (PARKING LOT TO PARKING LOT)

ALL VEHICLES - PM PEAK

Marker No.	Route			2034 RC3A		2034 DS3A		Difference (JTs)	
	From	To	Dist.	Avg.	Trips	Avg.	Trips	No.	%
1	A43 North	A43 North	1600 m	-	0	-	0	-	-
2	A43 North	B4100 East	1220 m	00:01:23	285	00:01:24	276	00:00:00	▲ 1%
3	A43 North	Cherwell Services	2045 m	00:02:54	110	00:02:49	109	-00:00:05	▼ 3%
4	A43 North	M40 South	5269 m	00:04:53	1206	00:04:49	1292	-00:00:03	▼ 1%
5	A43 North	B430	3805 m	00:04:35	158	-	0	-	-
6	A43 North	M40 North	7348 m	-	0	-	0	-	-
7	A43 North	B4100 West	1216 m	00:02:25	42	00:02:23	48	-00:00:01	▼ 1%
8	A43 North	Ardley Rd West	2718 m	00:03:39	4	00:04:08	1	00:00:29	▲ 13%
9	A43 North	Ardley Rd East	3374 m	00:04:03	54	00:04:51	8	00:00:48	▲ 20%
10	A43 North	B430 (New)	1298 m	-	0	00:04:57	176	-	-
11	A43 North	OxSRFI (South)	1116 m	-	0	00:05:57	43	-	-
12	A43 North	OxSRFI (North)	1744 m	-	0	00:05:55	45	-	-
13	B4100 East	A43 North	1298 m	00:03:29	363	00:03:05	305	-00:00:24	▼ 12%
14	B4100 East	B4100 East	1116 m	-	0	-	0	-	-
15	B4100 East	Cherwell Services	1744 m	-	0	-	0	-	-
16	B4100 East	M40 South	4968 m	00:06:07	4	00:05:36	8	-00:00:31	▼ 8%
17	B4100 East	B430	3504 m	00:05:47	4	-	0	-	-
18	B4100 East	M40 North	7047 m	00:07:23	236	00:07:49	44	00:00:25	▲ 6%
19	B4100 East	B4100 West	915 m	00:03:18	222	00:02:59	270	-00:00:19	▼ 10%
20	B4100 East	Ardley Rd West	2417 m	00:04:59	4	00:05:13	4	00:00:14	▲ 5%
21	B4100 East	Ardley Rd East	3073 m	-	0	-	0	-	-
22	B4100 East	B430 (New)	3597 m	-	0	-	0	-	-
23	B4100 East	OxSRFI (South)	2182 m	-	0	00:06:54	11	-	-
24	B4100 East	OxSRFI (North)	5726 m	-	0	00:06:48	12	-	-
25	Cherwell Services	A43 North	2062 m	00:03:27	91	00:05:14	90	00:01:48	▲ 52%
26	Cherwell Services	B4100 East	1880 m	-	0	-	0	-	-
27	Cherwell Services	Cherwell Services	583 m	-	0	-	0	-	-
28	Cherwell Services	M40 South	3597 m	00:03:06	270	00:03:20	272	00:00:13	▲ 7%
29	Cherwell Services	B430	2182 m	-	0	-	0	-	-
30	Cherwell Services	M40 North	5726 m	00:04:38	185	00:05:45	188	00:01:07	▲ 24%
31	Cherwell Services	B4100 West	1679 m	-	0	-	0	-	-
32	Cherwell Services	Ardley Rd West	1096 m	-	0	-	0	-	-
33	Cherwell Services	Ardley Rd East	1752 m	-	0	-	0	-	-
34	Cherwell Services	B430 (New)	5167 m	-	0	-	0	-	-
35	Cherwell Services	OxSRFI (South)	3927 m	-	0	-	0	-	-
36	Cherwell Services	OxSRFI (North)	4583 m	-	0	-	0	-	-
37	M40 South	A43 North	5550 m	00:05:28	1596	00:06:01	1779	00:00:33	▲ 10%
38	M40 South	B4100 East	5368 m	-	0	00:07:09	8	-	-
39	M40 South	Cherwell Services	4071 m	00:04:10	217	00:04:54	219	00:00:45	▲ 18%
40	M40 South	M40 South	7295 m	-	0	-	0	-	-
41	M40 South	B430	5013 m	00:04:09	14	00:04:50	12	00:00:41	▲ 16%
42	M40 South	M40 North	8281 m	00:04:57	4133	00:05:00	3991	00:00:03	▲ 1%
43	M40 South	B4100 West	5167 m	-	0	00:05:51	38	-	-
44	M40 South	Ardley Rd West	3927 m	00:03:12	61	00:03:34	44	00:00:22	▲ 11%
45	M40 South	Ardley Rd East	4583 m	-	0	-	0	-	-
46	M40 South	B430 (New)	6018 m	-	0	-	0	-	-
47	M40 South	OxSRFI (South)	5836 m	-	0	00:05:39	44	-	-
48	M40 South	OxSRFI (North)	5231 m	-	0	00:05:32	46	-	-
49	B430	A43 North	3806 m	00:04:42	159	-	0	-	-
50	B430	B4100 East	3624 m	00:05:37	4	-	0	-	-
51	B430	Cherwell Services	2327 m	-	0	-	0	-	-
52	B430	M40 South	5551 m	-	0	00:07:24	4	-	-
53	B430	B430	3450 m	-	0	-	0	-	-
54	B430	M40 North	6997 m	00:05:12	113	-	0	-	-
55	B430	B4100 West	3423 m	-	0	-	0	-	-
56	B430	Ardley Rd West	1431 m	00:01:23	64	-	0	-	-
57	B430	Ardley Rd East	2045 m	00:01:49	70	00:02:29	5	00:00:40	▲ 36%
58	B430	B430 (New)	4983 m	-	0	-	0	-	-
59	B430	OxSRFI (South)	3519 m	-	0	00:07:25	5	-	-
60	B430	OxSRFI (North)	7062 m	-	0	00:07:06	5	-	-
61	M40 North	A43 Nor h	6018 m	-	0	-	0	-	-
62	M40 North	B4100 East	5836 m	00:06:00	291	00:06:15	254	00:00:15	▲ 4%
63	M40 North	Cherwell Services	5231 m	00:04:41	201	00:04:39	199	-00:00:02	▼ 1%
64	M40 North	M40 South	8295 m	00:04:48	3516	00:04:49	3470	00:00:01	▲ 0%
65	M40 North	B430	6991 m	00:06:12	91	-	0	-	-
66	M40 North	M40 North	10535 m	-	0	-	0	-	-
67	M40 North	B4100 West	5635 m	00:05:11	8	-	0	-	-
68	M40 North	Ardley Rd West	5905 m	00:05:16	17	00:05:54	16	00:00:38	▲ 12%
69	M40 North	Ardley Rd East	6561 m	00:05:40	36	00:06:31	16	00:00:50	▲ 15%
70	M40 North	B430 (New)	2314 m	-	0	00:06:37	165	-	-
71	M40 North	OxSRFI (South)	1254 m	-	0	00:07:59	41	-	-
72	M40 North	OxSRFI (North)	1011 m	-	0	00:07:54	38	-	-
73	B4100 West	A43 Nor h	1116 m	00:01:58	50	00:01:58	46	-00:00:00	▼ 0%
74	B4100 West	B4100 East	934 m	00:02:07	146	00:02:10	144	00:00:03	▲ 2%
75	B4100 West	Cherwell Services	1759 m	-	0	-	0	-	-
76	B4100 West	M40 South	4983 m	00:05:20	33	00:05:28	36	00:00:09	▲ 3%
77	B4100 West	B430	3519 m	-	0	-	0	-	-
78	B4100 West	M40 North	7062 m	-	0	-	0	-	-
79	B4100 West	B4100 West	931 m	-	0	-	0	-	-
80	B4100 West	Ardley Rd West	2432 m	-	0	-	0	-	-
81	B4100 West	Ardley Rd East	3089 m	-	0	-	0	-	-
82	B4100 West	B430 (New)	2603 m	-	0	00:05:47	23	-	-
83	B4100 West	OxSRFI (South)	2604 m	-	0	00:06:47	2	-	-
84	B4100 West	OxSRFI (North)	2605 m	-	0	00:06:57	2	-	-
85	Ardley Rd West	A43 Nor h	2697 m	00:03:45	8	00:06:04	8	00:02:19	▲ 62%
86	Ardley Rd West	B4100 East	2515 m	-	0	-	0	-	-
87	Ardley Rd West	Cherwell Services	1218 m	-	0	-	0	-	-
88	Ardley Rd West	M40 South	4442 m	00:04:35	4	00:06:08	20	00:01:33	▲ 34%
89	Ardley Rd West	B430	1441 m	00:01:31	36	-	0	-	-
90	Ardley Rd West	M40 North	5887 m	00:04:17	8	00:06:12	8	00:01:55	▲ 45%
91	Ardley Rd West	B4100 West	2314 m	-	0	-	0	-	-
92	Ardley Rd West	Ardley Rd West	1254 m	-	0	-	0	-	-
93	Ardley Rd West	Ardley Rd East	1011 m	00:01:04	49	00:01:26	24	00:00:22	▲ 34%
94	Ardley Rd West	B430 (New)	2615 m	-	0	00:05:12	4	-	-
95	Ardley Rd West	OxSRFI (South)	2616 m	-	0	00:07:05	2	-	-
96	Ardley Rd West	OxSRFI (North)	2617 m	-	0	00:05:51	2	-	-
97	Ardley Rd East	A43 Nor h	3389 m	00:04:14	16	00:06:43	12	00:02:29	▲ 59%
98	Ardley Rd East	B4100 East	3207 m	-	0	-	0	-	-
99	Ardley Rd East	Cherwell Services	1910 m	-	0	-	0	-	-
100	Ardley Rd East	M40 South	5134 m	-	0	-	0	-	-
101	Ardley Rd East	B430	2030 m	00:01:50	17	00:02:30	8	00:00:40	▲ 36%
102	Ardley Rd East	M40 North	6579 m	00:04:45	85	00:06:50	155	00:02:05	▲ 44%
103	Ardley Rd East	B4100 West	3006 m	-	0	-	0	-	-
104	Ardley Rd East	Ardley Rd West	1014 m	00:00:56	43	00:01:19	8	00:00:23	▲ 41%
105	Ardley Rd East	Ardley Rd East	2602 m	-	0	-	0	-	-
106	Ardley Rd East	B430 (New)	2627 m	-	0	-	0	-	-
107	Ardley Rd East	OxSRFI (South)	2628 m	-	0	-	0	-	-
108	Ardley Rd East	OxSRFI (North)	2629 m	-	0	-	0	-	-
109	B430 (New)	A43 Nor h	2630 m	-	0	00:05:59	258	-	-
110	B430 (New)	B4100 East	2631 m	-	0	-	0	-	-
111	B430 (New)	Cherwell Services	2632 m	-	0	-	0	-	-
112	B430 (New)	M40 South	2633 m	-	0	-	0	-	-
113	B430 (New)	B430	2634 m	-	0	-	0	-	-
114	B430 (New)	M40 Nor h	2635 m	-	0	00:06:25	388	-	-
115	B430 (New)	B4100 West	2636 m	-	0	-	0	-	-
116	B430 (New)	Ardley Rd West	2637 m	-	0	00:03:04	69	-	-
117	B430 (New)	Ardley Rd East	2638 m	-	0	-	0	-	-
118	B430 (New)	B430 (New)	2639 m	-	0	-	0	-	-
119	B430 (New)	OxSRFI (South)	2640 m	-	0	00:01:19	75	-	-
120	B430 (New)	OxSRFI (North)	2641 m	-	0	00:01:12	78	-	-
121	OxSRFI (South)	A43 North	2642 m	-	0	00:06:49	262	-	-
122	OxSRFI (South)	B4100 East	2643 m	-	0	00:07:46	25	-	-
123	OxSRFI (South)	Cherwell Services	2644 m	-	0	-	0	-	-
124	OxSRFI (South)	M40 Sou h	2645 m	-	0	00:07:23	96	-	-
125	OxSRFI (South)	B430	2646 m	-	0	00:05:08	40	-	-
126	OxSRFI (South)	M40 Nor h	2647 m	-	0	00:07:19	161	-	-
127	OxSRFI (South)	B4100 West	2648 m	-	0	-	0	-	-
128	OxSRFI (South)	Ardley Rd West	2649 m	-	0	00:03:50	44	-	-
129	OxSRFI (South)	Ardley Rd East	2650 m	-	0	00:04:31	56	-	-
130	OxSRFI (South)	B430 (New)	2651 m	-	0	00:02:11	333	-	-
131	OxSRFI (South)	OxSRFI (South)	2652 m	-	0	-	0	-	-
132	OxSRFI (South)	OxSRFI (North)	2653 m	-	0	-	0	-	-
133	OxSRFI (North)	A43 North	2654 m	-	0	00:06:21	42	-	-
134	OxSRFI (North)	B4100 East	2655 m	-	0	00:07:19	3	-	-
135	OxSRFI (North)	Cherwell Services	2656 m	-	0	-	0	-	-
136	OxSRFI (North)	M40 Sou h	2657 m	-	0	00:06:56	16	-	-
137	OxSRFI (North)	B430	2658 m	-	0	00:04:44	7	-	-
138	OxSRFI (North)	M40 North	2659 m	-	0	00:06:53	26	-	-
139	OxSRFI (North)	B4100 West	2660 m	-	0	-	0	-	-
140	OxSRFI (North)	Ardley Rd West	2661 m	-	0	00:03:22	6	-	-
141	OxSRFI (North)	Ardley Rd East	2662 m	-	0	00:04:05	9	-	-
142	OxSRFI (North)	B430 (New)	2663 m	-	0	00:01:46	56	-	-
143	OxSRFI (North)	OxSRFI (South)	2664 m	-	0	-	0	-	-
144	OxSRFI (North)	OxSRFI (North)	2665 m	-	0	-	0	-	-

MG MARKERS - FULL ORIGIN-DESTINATION MARKERS (PARKING LOT TO PARKING LOT)

LIGHT VEHICLES - PM PEAK

Marker No.	Route			2034 RC3A		2034 DS3A		Difference (JTs)	
	From	To	Dist	Avg.	Trips	Avg.	Trips	No.	%
1	A43 North	A43 North	1600 m	-	0	-	0	-	-
2	A43 North	B4100 East	1220 m	00:01:23	275	00:01:23	266	00:00:00	▲ 1%
3	A43 North	Cherwell Services	2045 m	00:02:54	110	00:02:49	109	-00:00:05	▼ 3%
4	A43 North	M40 South	5269 m	00:04:50	1102	00:04:47	1188	-00:00:03	▼ 1%
5	A43 North	B430	3805 m	00:04:35	158	-	0	-	-
6	A43 North	M40 North	7348 m	-	0	-	0	-	-
7	A43 North	B4100 West	1216 m	00:02:25	42	00:02:23	48	-00:00:01	▼ 1%
8	A43 North	Ardley Rd West	2718 m	00:03:39	4	00:04:08	1	00:00:29	▲ 13%
9	A43 North	Ardley Rd East	3374 m	00:04:03	54	00:04:51	8	00:00:48	▲ 20%
10	A43 North	B430 (New)	1298 m	-	0	00:04:57	176	-	-
11	A43 North	OxSRFI (South)	1116 m	-	0	00:05:53	35	-	-
12	A43 North	OxSRFI (North)	1744 m	-	0	00:05:50	37	-	-
13	B4100 East	A43 North	1298 m	00:03:29	363	00:03:05	305	-00:00:24	▼ 12%
14	B4100 East	B4100 East	1116 m	-	0	-	0	-	-
15	B4100 East	Cherwell Services	1744 m	-	0	-	0	-	-
16	B4100 East	M40 South	4968 m	00:06:07	4	00:05:36	8	-00:00:31	▼ 8%
17	B4100 East	B430	3504 m	00:05:47	4	-	0	-	-
18	B4100 East	M40 North	7047 m	00:07:22	232	00:07:45	40	00:00:23	▲ 5%
19	B4100 East	B4100 West	915 m	00:03:18	222	00:02:59	270	-00:00:19	▼ 10%
20	B4100 East	Ardley Rd West	2417 m	00:04:59	4	00:05:13	4	00:00:14	▲ 5%
21	B4100 East	Ardley Rd East	3073 m	-	0	-	0	-	-
22	B4100 East	B430 (New)	3597 m	-	0	-	0	-	-
23	B4100 East	OxSRFI (South)	2182 m	-	0	00:06:49	10	-	-
24	B4100 East	OxSRFI (North)	5726 m	-	0	00:06:41	10	-	-
25	Cherwell Services	A43 North	2062 m	00:03:25	77	00:05:12	76	00:01:47	▲ 52%
26	Cherwell Services	B4100 East	1880 m	-	0	-	0	-	-
27	Cherwell Services	Cherwell Services	583 m	-	0	-	0	-	-
28	Cherwell Services	M40 South	3597 m	00:03:03	221	00:03:17	222	00:00:13	▲ 7%
29	Cherwell Services	B430	2182 m	-	0	-	0	-	-
30	Cherwell Services	M40 North	5726 m	00:04:31	145	00:05:38	147	00:01:07	▲ 25%
31	Cherwell Services	B4100 West	1679 m	-	0	-	0	-	-
32	Cherwell Services	Ardley Rd West	1096 m	-	0	-	0	-	-
33	Cherwell Services	Ardley Rd East	1752 m	-	0	-	0	-	-
34	Cherwell Services	B430 (New)	5167 m	-	0	-	0	-	-
35	Cherwell Services	OxSRFI (South)	3927 m	-	0	-	0	-	-
36	Cherwell Services	OxSRFI (North)	4583 m	-	0	-	0	-	-
37	M40 South	A43 North	5550 m	00:05:26	1469	00:05:59	1645	00:00:33	▲ 10%
38	M40 South	B4100 East	5368 m	-	0	00:07:09	8	-	-
39	M40 South	Cherwell Services	4071 m	00:04:08	170	00:04:52	173	00:00:44	▲ 18%
40	M40 South	M40 South	7295 m	-	0	-	0	-	-
41	M40 South	B430	5013 m	00:04:09	14	00:04:50	12	00:00:41	▲ 16%
42	M40 South	M40 North	8281 m	00:04:54	3700	00:04:57	3585	00:00:03	▲ 1%
43	M40 South	B4100 West	5167 m	-	0	00:05:51	38	-	-
44	M40 South	Ardley Rd West	3927 m	00:03:12	61	00:03:34	44	00:00:22	▲ 11%
45	M40 South	Ardley Rd East	4583 m	-	0	-	0	-	-
46	M40 South	B430 (New)	6018 m	-	0	-	0	-	-
47	M40 South	OxSRFI (South)	5836 m	-	0	00:05:15	2	-	-
48	M40 South	OxSRFI (North)	5231 m	-	0	00:05:19	2	-	-
49	B430	A43 North	3806 m	00:04:41	155	-	0	-	-
50	B430	B4100 East	3624 m	00:05:37	4	-	0	-	-
51	B430	Cherwell Services	2327 m	-	0	-	0	-	-
52	B430	M40 South	5551 m	-	0	00:07:24	4	-	-
53	B430	B430	3450 m	-	0	-	0	-	-
54	B430	M40 North	6997 m	00:05:12	113	-	0	-	-
55	B430	B4100 West	3423 m	-	0	-	0	-	-
56	B430	Ardley Rd West	1431 m	00:01:23	64	-	0	-	-
57	B430	Ardley Rd East	2045 m	00:01:49	70	00:02:29	5	00:00:40	▲ 36%
58	B430	B430 (New)	4983 m	-	0	-	0	-	-
59	B430	OxSRFI (South)	3519 m	-	0	00:07:25	5	-	-
60	B430	OxSRFI (North)	7062 m	-	0	00:07:06	5	-	-
61	M40 North	A43 Nor h	6018 m	-	0	-	0	-	-
62	M40 North	B4100 East	5836 m	00:06:00	291	00:06:15	254	00:00:15	▲ 4%
63	M40 North	Cherwell Services	5231 m	00:04:33	147	00:04:32	146	-00:00:01	▼ 0%
64	M40 North	M40 South	8295 m	00:04:44	3173	00:04:46	3127	00:00:01	▲ 0%
65	M40 North	B430	6991 m	00:06:12	91	-	0	-	-
66	M40 North	M40 North	10535 m	-	0	-	0	-	-
67	M40 North	B4100 West	5635 m	00:05:11	8	-	0	-	-
68	M40 North	Ardley Rd West	5905 m	00:05:16	17	00:05:54	16	00:00:38	▲ 12%
69	M40 North	Ardley Rd East	6561 m	00:05:40	36	00:06:31	16	00:00:50	▲ 15%
70	M40 North	B430 (New)	2314 m	-	0	00:06:37	165	-	-
71	M40 North	OxSRFI (South)	1254 m	-	0	00:07:33	15	-	-
72	M40 North	OxSRFI (North)	1011 m	-	0	00:07:28	13	-	-
73	B4100 West	A43 North	1116 m	00:01:58	50	00:01:58	46	-00:00:00	▼ 0%
74	B4100 West	B4100 East	934 m	00:02:07	142	00:02:09	140	00:00:03	▲ 2%
75	B4100 West	Cherwell Services	1759 m	-	0	-	0	-	-
76	B4100 West	M40 South	4983 m	00:05:20	33	00:05:28	36	00:00:09	▲ 3%
77	B4100 West	B430	3519 m	-	0	-	0	-	-
78	B4100 West	M40 North	7062 m	-	0	-	0	-	-
79	B4100 West	B4100 West	931 m	-	0	-	0	-	-
80	B4100 West	Ardley Rd West	2432 m	-	0	-	0	-	-
81	B4100 West	Ardley Rd East	3089 m	-	0	-	0	-	-
82	B4100 West	B430 (New)	2603 m	-	0	00:05:47	23	-	-
83	B4100 West	OxSRFI (South)	2604 m	-	0	00:06:47	2	-	-
84	B4100 West	OxSRFI (North)	2605 m	-	0	00:06:57	2	-	-
85	Ardley Rd West	A43 Nor h	2697 m	00:03:45	8	00:06:04	8	00:02:19	▲ 62%
86	Ardley Rd West	B4100 East	2515 m	-	0	-	0	-	-
87	Ardley Rd West	Cherwell Services	1218 m	-	0	-	0	-	-
88	Ardley Rd West	M40 South	4442 m	00:04:35	4	00:06:08	20	00:01:33	▲ 34%
89	Ardley Rd West	B430	1441 m	00:01:31	36	-	0	-	-
90	Ardley Rd West	M40 North	5887 m	00:04:17	8	00:06:12	8	00:01:55	▲ 45%
91	Ardley Rd West	B4100 West	2314 m	-	0	-	0	-	-
92	Ardley Rd West	Ardley Rd West	1254 m	-	0	-	0	-	-
93	Ardley Rd West	Ardley Rd East	1011 m	00:01:04	49	00:01:26	24	00:00:22	▲ 34%
94	Ardley Rd West	B430 (New)	2615 m	-	0	00:05:12	4	-	-
95	Ardley Rd West	OxSRFI (South)	2616 m	-	0	00:07:05	2	-	-
96	Ardley Rd West	OxSRFI (North)	2617 m	-	0	00:05:51	2	-	-
97	Ardley Rd East	A43 North	3389 m	00:04:14	16	00:06:43	12	00:02:29	▲ 59%
98	Ardley Rd East	B4100 East	3207 m	-	0	-	0	-	-
99	Ardley Rd East	Cherwell Services	1910 m	-	0	-	0	-	-
100	Ardley Rd East	M40 South	5134 m	-	0	-	0	-	-
101	Ardley Rd East	B430	2030 m	00:01:50	17	00:02:30	8	00:00:40	▲ 36%
102	Ardley Rd East	M40 North	6579 m	00:04:45	85	00:06:50	155	00:02:05	▲ 44%
103	Ardley Rd East	B4100 West	3006 m	-	0	-	0	-	-
104	Ardley Rd East	Ardley Rd West	1014 m	00:00:56	43	00:01:19	8	00:00:23	▲ 41%
105	Ardley Rd East	Ardley Rd East	2602 m	-	0	-	0	-	-
106	Ardley Rd East	B430 (New)	2627 m	-	0	-	0	-	-
107	Ardley Rd East	OxSRFI (South)	2628 m	-	0	-	0	-	-
108	Ardley Rd East	OxSRFI (North)	2629 m	-	0	-	0	-	-
109	B430 (New)	A43 Nor h	2630 m	-	0	00:05:59	258	-	-
110	B430 (New)	B4100 East	2631 m	-	0	-	0	-	-
111	B430 (New)	Cherwell Services	2632 m	-	0	-	0	-	-
112	B430 (New)	M40 South	2633 m	-	0	-	0	-	-
113	B430 (New)	B430	2634 m	-	0	-	0	-	-
114	B430 (New)	M40 North	2635 m	-	0	00:06:22	358	-	-
115	B430 (New)	B4100 West	2636 m	-	0	-	0	-	-
116	B430 (New)	Ardley Rd West	2637 m	-	0	00:03:04	69	-	-
117	B430 (New)	Ardley Rd East	2638 m	-	0	-	0	-	-
118	B430 (New)	B430 (New)	2639 m	-	0	-	0	-	-
119	B430 (New)	OxSRFI (South)	2640 m	-	0	00:01:19	73	-	-
120	B430 (New)	OxSRFI (North)	2641 m	-	0	00:01:12	78	-	-
121	OxSRFI (South)	A43 North	2642 m	-	0	00:06:47	248	-	-
122	OxSRFI (South)	B4100 East	2643 m	-	0	00:07:43	21	-	-
123	OxSRFI (South)	Cherwell Services	2644 m	-	0	-	0	-	-
124	OxSRFI (South)	M40 Sou h	2645 m	-	0	00:06:58	29	-	-
125	OxSRFI (South)	B430	2646 m	-	0	00:05:08	40	-	-
126	OxSRFI (South)	M40 Nor h	2647 m	-	0	00:07:09	122	-	-
127	OxSRFI (South)	B4100 West	2648 m	-	0	-	0	-	-
128	OxSRFI (South)	Ardley Rd West	2649 m	-	0	00:03:50	44	-	-
129	OxSRFI (South)	Ardley Rd East	2650 m	-	0	00:04:31	56	-	-
130	OxSRFI (South)	B430 (New)	2651 m	-	0	00:02:11	331	-	-
131	OxSRFI (South)	OxSRFI (South)	2652 m	-	0	-	0	-	-
132	OxSRFI (South)	OxSRFI (North)	2653 m	-	0	-	0	-	-
133	OxSRFI (North)	A43 North	2654 m	-	0	00:06:20	40	-	-
134	OxSRFI (North)	B4100 East	2655 m	-	0	00:07:14	3	-	-
135	OxSRFI (North)	Cherwell Services	2656 m	-	0	-	0	-	-
136	OxSRFI (North)	M40 Sou h	2657 m	-	0	00:06:26	4	-	-
137	OxSRFI (North)	B430	2658 m	-	0	00:04:44	7	-	-
138	OxSRFI (North)	M40 North	2659 m	-	0	00:06:43	20	-	-
139	OxSRFI (North)	B4100 West	2660 m	-	0	-	0	-	-
140	OxSRFI (North)	Ardley Rd West	2661 m	-	0	00:03:22	6	-	-
141	OxSRFI (North)	Ardley Rd East	2662 m	-	0	00:04:05	9	-	-
142	OxSRFI (North)	B430 (New)	2663 m	-	0	00:01:46	56	-	-
143	OxSRFI (North)	OxSRFI (South)	2664 m	-	0	-	0	-	-
144	OxSRFI (North)	OxSRFI (North)	2665 m	-	0	-	0	-	-

MG MARKERS - FULL ORIGIN-DESTINATION MARKERS (PARKING LOT TO PARKING LOT)

HEAVY VEHICLES - PM PEAK

Marker No.	Route			2034 RC3A		2034 DS3A		Difference (JTs)	
	From	To	Dist.	Avg.	Trips	Avg.	Trips	No.	%
1	A43 North	A43 North	1600 m	-	0	-	0	-	-
2	A43 North	B4100 East	1220 m	00:01:34	10	00:01:35	10	00:00:01	▲ 1%
3	A43 North	Cherwell Services	2045 m	-	0	-	0	-	-
4	A43 North	M40 South	5269 m	00:05:19	105	00:05:15	104	-00:00:04	▼ 1%
5	A43 North	B430	3805 m	-	0	-	0	-	-
6	A43 North	M40 North	7348 m	-	0	-	0	-	-
7	A43 North	B4100 West	1216 m	-	0	-	0	-	-
8	A43 North	Ardley Rd West	2718 m	-	0	-	0	-	-
9	A43 North	Ardley Rd East	3374 m	-	0	-	0	-	-
10	A43 North	B430 (New)	1298 m	-	0	-	0	-	-
11	A43 North	OxSRFI (South)	1116 m	-	0	00:06:18	8	-	-
12	A43 North	OxSRFI (North)	1744 m	-	0	00:06:19	8	-	-
13	B4100 East	A43 North	1298 m	-	0	-	0	-	-
14	B4100 East	B4100 East	1116 m	-	0	-	0	-	-
15	B4100 East	Cherwell Services	1744 m	-	0	-	0	-	-
16	B4100 East	M40 South	4968 m	-	0	-	0	-	-
17	B4100 East	B430	3504 m	-	0	-	0	-	-
18	B4100 East	M40 North	7047 m	00:08:10	4	00:08:21	4	00:00:11	▲ 2%
19	B4100 East	B4100 West	915 m	-	0	-	0	-	-
20	B4100 East	Ardley Rd West	2417 m	-	0	-	0	-	-
21	B4100 East	Ardley Rd East	3073 m	-	0	-	0	-	-
22	B4100 East	B430 (New)	3597 m	-	0	-	0	-	-
23	B4100 East	OxSRFI (South)	2182 m	-	0	00:07:15	2

APPENDIX J:

2031 RC2A&DS2A ROUTE PERFORMANCE– O-D JOURNEY TIME RESULTS

MG MARKERS - FULL ORIGIN-DESTINATION MARKERS (PARKING LOT TO PARKING LOT)

ALL VEHICLES - AM PEAK

Marker	Route			2031 RC2A		2031 DS2A		Difference (JTs)	
No.	From	To	Dist.	Avg.	Trips	Avg.	Trips	No.	%
1	A43 North	A43 North	1600 m	-	0	-	0	-	-
2	A43 North	B4100 East	1220 m	00:01:27	405	00:01:27	421	00:00:00	▲ 0%
3	A43 North	Cherwell Services	2045 m	00:03:06	63	00:03:06	61	00:00:00	▲ 0%
4	A43 North	M40 South	5269 m	00:05:11	1247	00:05:22	1270	00:00:11	▲ 3%
5	A43 North	B430	3805 m	00:05:01	462	-	0	-	-
6	A43 North	M40 North	7348 m	-	0	-	0	-	-
7	A43 North	B4100 West	1216 m	00:02:01	40	00:02:01	40	00:00:00	▲ 0%
8	A43 North	Ardley Rd West	2718 m	-	0	-	0	-	-
9	A43 North	Ardley Rd East	3374 m	00:04:22	44	00:05:17	44	00:00:55	▲ 21%
10	A43 North	B430 (New)	1298 m	-	0	00:05:28	471	-	-
11	A43 North	OxSRFI (South)	1116 m	-	0	00:06:20	40	-	-
12	A43 North	OxSRFI (North)	1744 m	-	0	00:06:14	41	-	-
13	B4100 East	A43 North	1298 m	00:02:07	222	00:02:06	215	-00:00:01	▼ 1%
14	B4100 East	B4100 East	1116 m	-	0	-	0	-	-
15	B4100 East	Cherwell Services	1744 m	-	0	-	0	-	-
16	B4100 East	M40 South	4968 m	-	0	-	0	-	-
17	B4100 East	B430	3504 m	00:05:19	10	-	0	-	-
18	B4100 East	M40 North	7047 m	00:06:26	181	00:07:09	37	00:00:43	▲ 11%
19	B4100 East	B4100 West	915 m	00:02:05	205	00:02:05	280	00:00:00	▲ 0%
20	B4100 East	Ardley Rd West	2417 m	-	0	-	0	-	-
21	B4100 East	Ardley Rd East	3073 m	-	0	-	0	-	-
22	B4100 East	B430 (New)	3597 m	-	0	00:05:41	103	-	-
23	B4100 East	OxSRFI (South)	2182 m	-	0	00:06:34	15	-	-
24	B4100 East	OxSRFI (North)	5726 m	-	0	00:06:25	15	-	-
25	Cherwell Services	A43 North	2062 m	00:03:10	62	00:03:08	62	-00:00:01	▼ 1%
26	Cherwell Services	B4100 East	1880 m	-	0	-	0	-	-
27	Cherwell Services	Cherwell Services	583 m	-	0	-	0	-	-
28	Cherwell Services	M40 South	3597 m	00:03:14	209	00:03:31	241	00:00:17	▲ 9%
29	Cherwell Services	B430	2182 m	00:03:15	81	-	0	-	-
30	Cherwell Services	M40 North	5726 m	00:04:35	150	00:05:17	147	00:00:43	▲ 15%
31	Cherwell Services	B4100 West	1679 m	-	0	-	0	-	-
32	Cherwell Services	Ardley Rd West	1096 m	-	0	-	0	-	-
33	Cherwell Services	Ardley Rd East	1752 m	-	0	-	0	-	-
34	Cherwell Services	B430 (New)	5167 m	-	0	00:03:34	48	-	-
35	Cherwell Services	OxSRFI (South)	3927 m	-	0	-	0	-	-
36	Cherwell Services	OxSRFI (North)	4583 m	-	0	-	0	-	-
37	M40 South	A43 North	5550 m	00:06:09	1081	00:05:33	1071	-00:00:36	▼ 10%
38	M40 South	B4100 East	5368 m	-	0	-	0	-	-
39	M40 South	Cherwell Services	4071 m	00:05:18	227	00:04:18	224	-00:01:00	▼ 19%
40	M40 South	M40 South	7295 m	-	0	-	0	-	-
41	M40 South	B430	5013 m	00:05:28	1	00:04:43	3	-00:00:45	▼ 14%
42	M40 South	M40 North	8281 m	00:04:43	2984	00:04:44	2956	00:00:00	▲ 0%
43	M40 South	B4100 West	5167 m	00:06:04	8	00:05:27	4	-00:00:38	▼ 10%
44	M40 South	Ardley Rd West	3927 m	00:04:18	14	00:03:24	12	-00:00:54	▼ 21%
45	M40 South	Ardley Rd East	4583 m	-	72	00:04:06	4	-	-
46	M40 South	B430 (New)	6018 m	-	0	-	0	-	-
47	M40 South	OxSRFI (South)	5836 m	-	0	00:05:29	20	-	-
48	M40 South	OxSRFI (North)	5231 m	-	0	00:05:22	18	-	-
49	B430	A43 Nor h	3806 m	00:04:10	144	-	0	-	-
50	B430	B4100 East	3624 m	00:04:39	8	-	0	-	-
51	B430	Cherwell Services	2327 m	-	0	-	0	-	-
52	B430	M40 South	5551 m	-	0	-	0	-	-
53	B430	B430	3450 m	-	0	-	0	-	-
54	B430	M40 North	6997 m	00:04:56	97	-	0	-	-
55	B430	B4100 West	3423 m	-	0	-	0	-	-
56	B430	Ardley Rd West	1431 m	00:01:23	34	-	0	-	-
57	B430	Ardley Rd East	2045 m	00:01:51	72	00:02:33	22	00:00:41	▲ 37%
58	B430	B430 (New)	4983 m	-	0	-	0	-	-
59	B430	OxSRFI (South)	3519 m	-	0	00:06:08	6	-	-
60	B430	OxSRFI (North)	7062 m	-	0	00:05:59	7	-	-
61	M40 North	A43 Nor h	6018 m	-	0	-	0	-	-
62	M40 North	B4100 East	5836 m	00:05:15	223	00:05:24	212	00:00:09	▲ 3%
63	M40 North	Cherwell Services	5231 m	00:04:44	192	00:04:44	190	-00:00:00	▼ 0%
64	M40 North	M40 South	8295 m	00:04:56	3672	00:04:56	3678	00:00:00	▲ 0%
65	M40 North	B430	6991 m	00:06:29	136	-	0	-	-
66	M40 North	M40 North	10535 m	-	0	-	0	-	-
67	M40 North	B4100 West	5635 m	00:04:48	23	00:04:51	4	00:00:03	▲ 1%
68	M40 North	Ardley Rd West	5905 m	00:05:26	12	00:06:01	12	00:00:35	▲ 11%
69	M40 North	Ardley Rd East	6561 m	00:05:52	59	00:06:48	64	00:00:56	▲ 16%
70	M40 North	B430 (New)	2314 m	-	0	00:06:58	136	-	-
71	M40 North	OxSRFI (South)	1254 m	-	0	00:08:01	26	-	-
72	M40 North	OxSRFI (North)	1011 m	-	0	00:07:56	23	-	-
73	B4100 West	A43 Nor h	1116 m	00:01:41	58	00:01:40	65	-00:00:00	▼ 0%
74	B4100 West	B4100 East	934 m	00:01:53	316	00:01:52	266	-00:00:01	▼ 1%
75	B4100 West	Cherwell Services	1759 m	-	0	-	0	-	-
76	B4100 West	M40 South	4983 m	00:05:25	55	00:05:31	37	00:00:06	▲ 2%
77	B4100 West	B430	3519 m	-	0	-	0	-	-
78	B4100 West	M40 North	7062 m	-	0	-	0	-	-
79	B4100 West	B4100 West	931 m	-	0	-	0	-	-
80	B4100 West	Ardley Rd West	2432 m	-	0	-	0	-	-
81	B4100 West	Ardley Rd East	3089 m	-	0	-	0	-	-
82	B4100 West	B430 (New)	2603 m	-	0	00:05:48	17	-	-
83	B4100 West	OxSRFI (South)	2604 m	-	0	00:06:32	4	-	-
84	B4100 West	OxSRFI (North)	2605 m	-	0	00:06:35	5	-	-
85	Ardley Rd West	A43 Nor h	2697 m	00:03:14	4	00:03:45	4	00:00:31	▲ 16%
86	Ardley Rd West	B4100 East	2515 m	-	0	00:04:43	8	-	-
87	Ardley Rd West	Cherwell Services	1218 m	-	0	-	0	-	-
88	Ardley Rd West	M40 South	4442 m	00:04:37	12	00:04:51	17	00:00:14	▲ 5%
89	Ardley Rd West	B430	1441 m	00:01:43	15	-	0	-	-
90	Ardley Rd West	M40 North	5887 m	00:04:01	10	00:04:47	10	00:00:46	▲ 19%
91	Ardley Rd West	B4100 West	2314 m	-	0	-	0	-	-
92	Ardley Rd West	Ardley Rd West	1254 m	-	0	-	0	-	-
93	Ardley Rd West	Ardley Rd East	1011 m	00:01:07	64	00:01:29	68	00:00:22	▲ 33%
94	Ardley Rd West	B430 (New)	2615 m	-	0	00:04:03	12	-	-
95	Ardley Rd West	OxSRFI (South)	2616 m	-	0	00:04:52	2	-	-
96	Ardley Rd West	OxSRFI (North)	2617 m	-	0	00:04:49	2	-	-
97	Ardley Rd East	A43 Nor h	3389 m	00:03:41	14	00:04:35	28	00:00:55	▲ 25%
98	Ardley Rd East	B4100 East	3207 m	-	0	-	0	-	-
99	Ardley Rd East	Cherwell Services	1910 m	-	0	-	0	-	-
100	Ardley Rd East	M40 South	5134 m	-	0	-	0	-	-
101	Ardley Rd East	B430	2030 m	00:01:58	172	00:02:32	27	00:00:34	▲ 29%
102	Ardley Rd East	M40 North	6579 m	00:04:28	115	00:05:35	229	00:01:07	▲ 25%
103	Ardley Rd East	B4100 West	3006 m	-	0	-	0	-	-
104	Ardley Rd East	Ardley Rd West	1014 m	00:00:56	23	00:01:21	30	00:00:24	▲ 43%
105	Ardley Rd East	Ardley Rd East	2602 m	-	0	-	0	-	-
106	Ardley Rd East	B430 (New)	2627 m	-	0	00:04:48	8	-	-
107	Ardley Rd East	OxSRFI (South)	2628 m	-	0	00:05:44	6	-	-
108	Ardley Rd East	OxSRFI (North)	2629 m	-	0	00:05:31	6	-	-
109	B430 (New)	A43 Nor h	2630 m	-	0	00:04:54	100	-	-
110	B430 (New)	B4100 East	2631 m	-	0	00:05:37	8	-	-
111	B430 (New)	Cherwell Services	2632 m	-	0	-	0	-	-
112	B430 (New)	M40 South	2633 m	-	0	-	0	-	-
113	B430 (New)	B430	2634 m	-	0	-	0	-	-
114	B430 (New)	M40 North	2635 m	-	0	00:05:53	71	-	-
115	B430 (New)	B4100 West	2636 m	-	0	00:04:56	13	-	-
116	B430 (New)	Ardley Rd West	2637 m	-	0	00:02:50	8	-	-
117	B430 (New)	Ardley Rd East	2638 m	-	0	00:03:32	30	-	-
118	B430 (New)	B430 (New)	2639 m	-	0	-	0	-	-
119	B430 (New)	OxSRFI (South)	2640 m	-	0	00:01:15	48	-	-
120	B430 (New)	OxSRFI (North)	2641 m	-	0	00:01:09	46	-	-
121	OxSRFI (South)	A43 Nor h	2642 m	-	0	00:05:57	7	-	-
122	OxSRFI (South)	B4100 East	2643 m	-	0	00:06:46	3	-	-
123	OxSRFI (South)	Cherwell Services	2644 m	-	0	-	0	-	-
124	OxSRFI (South)	M40 Sou h	2645 m	-	0	00:07:19	22	-	-
125	OxSRFI (South)	B430	2646 m	-	0	-	0	-	-
126	OxSRFI (South)	M40 Nor h	2647 m	-	0	00:07:28	14	-	-
127	OxSRFI (South)	B4100 West	2648 m	-	0	-	0	-	-
128	OxSRFI (South)	Ardley Rd West	2649 m	-	0	-	0	-	-
129	OxSRFI (South)	Ardley Rd East	2650 m	-	0	00:04:21	4	-	-
130	OxSRFI (South)	B430 (New)	2651 m	-	0	00:01:45	16	-	-
131	OxSRFI (South)	OxSRFI (South)	2652 m	-	0	-	0	-	-
132	OxSRFI (South)	OxSRFI (North)	2653 m	-	0	-	0	-	-
133	OxSRFI (North)	A43 North	2654 m	-	0	00:05:19	1	-	-
134	OxSRFI (North)	B4100 East	2655 m	-	0	00:06:33	0	-	-
135	OxSRFI (North)	Cherwell Services	2656 m	-	0	-	0	-	-
136	OxSRFI (North)	M40 Sou h	2657 m	-	0	00:06:51	2	-	-
137	OxSRFI (North)	B430	2658 m	-	0	-	0	-	-
138	OxSRFI (North)	M40 Nor h	2659 m	-	0	00:06:53	2	-	-
139	OxSRFI (North)	B4100 West	2660 m	-	0	-	0	-	-
140	OxSRFI (North)	Ardley Rd West	2661 m	-	0	-	0	-	-
141	OxSRFI (North)	Ardley Rd East	2662 m	-	0	00:04:01	0	-	-
142	OxSRFI (North)	B430 (New)	2663 m	-	0	00:01:17	2	-	-
143	OxSRFI (North)	OxSRFI (South)	2664 m	-	0	-	0	-	-
144	OxSRFI (North)	OxSRFI (North)	2665 m	-	0	-	0	-	-

MG MARKERS - FULL ORIGIN-DESTINATION MARKERS (PARKING LOT TO PARKING LOT)

LIGHT VEHICLES - AM PEAK

JT Marker	Route			2031 RC2A		2031 DS2A		Difference (JTs)	
No.	From	To	Dist.	Avg.	Trips	Avg.	Trips	No.	%
1	A43 North	A43 North	1600 m	-	0	-	0	-	-
2	A43 North	B4100 East	1220 m	00:01:27	405	00:01:27	421	00:00:00	▲ 0%
3	A43 North	Cherwell Services	2045 m	00:03:05	60	00:03:05	58	00:00:00	◄► 0%
4	A43 North	M40 South	5269 m	00:05:06	1005	00:05:17	1030	00:00:11	▲ 4%
5	A43 North	B430	3805 m	00:05:01	458	-	0	-	-
6	A43 North	M40 North	7348 m	-	0	-	0	-	-
7	A43 North	B4100 West	1216 m	00:02:01	40	00:02:01	40	00:00:00	▲ 0%
8	A43 North	Ardley Rd West	2718 m	-	0	-	0	-	-
9	A43 North	Ardley Rd East	3374 m	00:04:22	44	00:05:17	44	00:00:55	▲ 21%
10	A43 North	B430 (New)	1298 m	-	0	00:05:28	467	-	-
11	A43 North	OxSRFI (South)	1116 m	-	0	00:06:20	37	-	-
12	A43 North	OxSRFI (North)	1744 m	-	0	00:06:13	40	-	-
13	B4100 East	A43 North	1298 m	00:02:06	206	00:02:05	199	-00:00:01	▼ 1%
14	B4100 East	B4100 East	1116 m	-	0	-	0	-	-
15	B4100 East	Cherwell Services	1744 m	-	0	-	0	-	-
16	B4100 East	M40 South	4968 m	-	0	-	0	-	-
17	B4100 East	B430	3504 m	00:05:19	10	-	0	-	-
18	B4100 East	M40 North	7047 m	00:06:26	181	00:07:09	37	00:00:43	▲ 11%
19	B4100 East	B4100 West	915 m	00:02:05	193	00:02:05	268	00:00:00	▲ 0%
20	B4100 East	Ardley Rd West	2417 m	-	0	-	0	-	-
21	B4100 East	Ardley Rd East	3073 m	-	0	-	0	-	-
22	B4100 East	B430 (New)	3597 m	-	0	00:05:41	103	-	-
23	B4100 East	OxSRFI (Sou h)	2182 m	-	0	00:06:34	15	-	-
24	B4100 East	OxSRFI (North)	5726 m	-	0	00:06:25	15	-	-
25	Cherwell Services	A43 North	2062 m	00:03:06	50	00:03:06	50	-00:00:00	▼ 0%
26	Cherwell Services	B4100 East	1880 m	-	0	-	0	-	-
27	Cherwell Services	Cherwell Services	583 m	-	0	-	0	-	-
28	Cherwell Services	M40 South	3597 m	00:03:11	152	00:03:28	184	00:00:17	▲ 9%
29	Cherwell Services	B430	2182 m	00:03:15	81	-	0	-	-
30	Cherwell Services	M40 North	5726 m	00:04:24	104	00:05:07	101	00:00:43	▲ 16%
31	Cherwell Services	B4100 West	1679 m	-	0	-	0	-	-
32	Cherwell Services	Ardley Rd West	1096 m	-	0	-	0	-	-
33	Cherwell Services	Ardley Rd East	1752 m	-	0	-	0	-	-
34	Cherwell Services	B430 (New)	5167 m	-	0	00:03:34	48	-	-
35	Cherwell Services	OxSRFI (South)	3927 m	-	0	-	0	-	-
36	Cherwell Services	OxSRFI (North)	4583 m	-	0	-	0	-	-
37	M40 South	A43 North	5550 m	00:06:05	940	00:05:29	930	-00:00:36	▼ 10%
38	M40 South	B4100 East	5368 m	-	0	-	0	-	-
39	M40 South	Cherwell Services	4071 m	00:05:18	211	00:04:18	208	-00:01:00	▼ 19%
40	M40 South	M40 South	7295 m	-	0	-	0	-	-
41	M40 South	B430	5013 m	00:05:28	1	00:04:43	3	-00:00:45	▼ 14%
42	M40 South	M40 North	8281 m	00:04:38	2627	00:04:38	2600	00:00:00	▲ 0%
43	M40 South	B4100 West	5167 m	00:06:04	8	00:05:27	4	-00:00:38	▼ 10%
44	M40 South	Ardley Rd West	3927 m	00:04:18	14	00:03:24	12	-00:00:54	▼ 21%
45	M40 South	Ardley Rd East	4583 m	-	0	00:04:06	4	-	-
46	M40 South	B430 (New)	6018 m	-	0	-	0	-	-
47	M40 South	OxSRFI (South)	5836 m	-	0	00:05:10	5	-	-
48	M40 South	OxSRFI (North)	5231 m	-	0	00:05:03	3	-	-
49	B430	A43 North	3806 m	00:04:10	144	-	0	-	-
50	B430	B4100 East	3624 m	00:04:39	8	-	0	-	-
51	B430	Cherwell Services	2327 m	-	0	-	0	-	-
52	B430	M40 South	5551 m	-	0	-	0	-	-
53	B430	B430	3450 m	-	0	-	0	-	-
54	B430	M40 North	6997 m	00:04:56	97	-	0	-	-
55	B430	B4100 West	3423 m	-	0	-	0	-	-
56	B430	Ardley Rd West	1431 m	00:01:23	34	-	0	-	-
57	B430	Ardley Rd East	2045 m	00:01:51	72	00:02:33	22	00:00:41	▲ 37%
58	B430	B430 (New)	4983 m	-	0	-	0	-	-
59	B430	OxSRFI (South)	3519 m	-	0	00:06:08	6	-	-
60	B430	OxSRFI (North)	7062 m	-	0	00:05:59	7	-	-
61	M40 North	A43 North	6018 m	-	0	-	0	-	-
62	M40 North	B4100 East	5836 m	00:05:13	207	00:05:22	197	00:00:10	▲ 3%
63	M40 North	Cherwell Services	5231 m	00:04:37	132	00:04:36	130	-00:00:00	▼ 0%
64	M40 North	M40 South	8295 m	00:04:51	3118	00:04:51	3123	00:00:00	▲ 0%
65	M40 North	B430	6991 m	00:06:29	136	-	0	-	-
66	M40 North	M40 North	10535 m	-	0	-	0	-	-
67	M40 North	B4100 West	5635 m	00:04:48	23	00:04:51	4	00:00:03	▲ 1%
68	M40 North	Ardley Rd West	5905 m	00:05:26	12	00:06:01	12	00:00:35	▲ 11%
69	M40 North	Ardley Rd East	6561 m	00:05:52	59	00:06:48	64	00:00:56	▲ 16%
70	M40 North	B430 (New)	2314 m	-	0	00:06:58	136	-	-
71	M40 North	OxSRFI (South)	1254 m	-	0	00:07:46	16	-	-
72	M40 North	OxSRFI (North)	1011 m	-	0	00:07:40	15	-	-
73	B4100 West	A43 North	1116 m	00:01:41	58	00:01:40	65	-00:00:00	▼ 0%
74	B4100 West	B4100 East	934 m	00:01:53	308	00:01:52	258	-00:00:01	▼ 1%
75	B4100 West	Cherwell Services	1759 m	-	0	-	0	-	-
76	B4100 West	M40 South	4983 m	00:05:25	55	00:05:31	37	00:00:06	▲ 2%
77	B4100 West	B430	3519 m	-	0	-	0	-	-
78	B4100 West	M40 North	7062 m	-	0	-	0	-	-
79	B4100 West	B4100 West	931 m	-	0	-	0	-	-
80	B4100 West	Ardley Rd West	2432 m	-	0	-	0	-	-
81	B4100 West	Ardley Rd East	3089 m	-	0	-	0	-	-
82	B4100 West	B430 (New)	2603 m	-	0	00:05:48	17	-	-
83	B4100 West	OxSRFI (South)	2604 m	-	0	00:06:32	4	-	-
84	B4100 West	OxSRFI (North)	2605 m	-	0	00:06:35	5	-	-
85	Ardley Rd West	A43 North	2697 m	00:03:14	4	00:03:45	4	00:00:31	▲ 16%
86	Ardley Rd West	B4100 East	2515 m	-	0	-	0	-	-
87	Ardley Rd West	Cherwell Services	1218 m	-	0	-	0	-	-
88	Ardley Rd West	M40 South	4442 m	00:04:37	12	00:04:51	17	00:00:14	▲ 5%
89	Ardley Rd West	B430	1441 m	00:01:38	7	-	0	-	-
90	Ardley Rd West	M40 North	5887 m	00:04:01	10	00:04:47	10	00:00:46	▲ 19%
91	Ardley Rd West	B4100 West	2314 m	-	0	-	0	-	-
92	Ardley Rd West	Ardley Rd West	1254 m	-	0	-	0	-	-
93	Ardley Rd West	Ardley Rd East	1011 m	00:01:07	64	00:01:29	68	00:00:22	▲ 33%
94	Ardley Rd West	B430 (New)	2615 m	-	0	00:04:03	12	-	-
95	Ardley Rd West	OxSRFI (South)	2616 m	-	0	00:04:52	2	-	-
96	Ardley Rd West	OxSRFI (North)	2617 m	-	0	00:04:49	2	-	-
97	Ardley Rd East	A43 North	3389 m	00:03:41	14	00:04:35	28	00:00:55	▲ 25%
98	Ardley Rd East	B4100 East	3207 m	-	0	-	0	-	-
99	Ardley Rd East	Cherwell Services	1910 m	-	0	-	0	-	-
100	Ardley Rd East	M40 South	5134 m	-	0	-	0	-	-
101	Ardley Rd East	B430	2030 m	00:01:57	168	00:02:32	27	00:00:34	▲ 29%
102	Ardley Rd East	M40 North	6579 m	00:04:28	115	00:05:35	229	00:01:07	▲ 25%
103	Ardley Rd East	B4100 West	3006 m	-	0	-	0	-	-
104	Ardley Rd East	Ardley Rd West	1014 m	00:00:56	23	00:01:21	30	00:00:24	▲ 43%
105	Ardley Rd East	Ardley Rd East	2602 m	-	0	-	0	-	-
106	Ardley Rd East	B430 (New)	2627 m	-	0	00:04:48	8	-	-
107	Ardley Rd East	OxSRFI (South)	2628 m	-	0	00:05:44	6	-	-
108	Ardley Rd East	OxSRFI (North)	2629 m	-	0	00:05:31	6	-	-
109	B430 (New)	A43 North	2630 m	-	0	00:04:54	100	-	-
110	B430 (New)	B4100 East	2631 m	-	0	00:05:37	8	-	-
111	B430 (New)	Cherwell Services	2632 m	-	0	-	0	-	-
112	B430 (New)	M40 South	2633 m	-	0	-	0	-	-
113	B430 (New)	B430	2634 m	-	0	-	0	-	-
114	B430 (New)	M40 North	2635 m	-	0	00:05:53	71	-	-
115	B430 (New)	B4100 West	2636 m	-	0	00:04:56	13	-	-
116	B430 (New)	Ardley Rd West	2637 m	-	0	00:02:50	8	-	-
117	B430 (New)	Ardley Rd East	2638 m	-	0	00:03:32	30	-	-
118	B430 (New)	B430 (New)	2639 m	-	0	-	0	-	-
119	B430 (New)	OxSRFI (South)	2640 m	-	0	00:01:15	46	-	-
120	B430 (New)	OxSRFI (North)	2641 m	-	0	00:01:09	46	-	-
121	OxSRFI (South)	A43 North	2642 m	-	0	00:05:42	4	-	-
122	OxSRFI (South)	B4100 East	2643 m	-	0	-	0	-	-
123	OxSRFI (South)	Cherwell Services	2644 m	-	0	-	0	-	-
124	OxSRFI (South)	M40 South	2645 m	-	0	-	0	-	-
125	OxSRFI (South)	B430	2646 m	-	0	-	0	-	-
126	OxSRFI (South)	M40 North	2647 m	-	0	-	0	-	-
127	OxSRFI (South)	B4100 West	2648 m	-	0	-	0	-	-
128	OxSRFI (South)	Ardley Rd West	2649 m	-	0	-	0	-	-
129	OxSRFI (South)	Ardley Rd East	2650 m	-	0	00:04:21	4	-	-
130	OxSRFI (South)	B430 (New)	2651 m	-	0	00:01:43	14	-	-
131	OxSRFI (South)	OxSRFI (South)	2652 m	-	0	-	0	-	-
132	OxSRFI (South)	OxSRFI (North)	2653 m	-	0	-	0	-	-
133	OxSRFI (North)	A43 North	2654 m	-	0	00:04:56	0	-	-
134	OxSRFI (North)	B4100 East	2655 m	-	0	-	0	-	-
135	OxSRFI (North)	Cherwell Services	2656 m	-	0	-	0	-	-
136	OxSRFI (North)	M40 South	2657 m	-	0	-	0	-	-
137	OxSRFI (North)	B430	2658 m	-	0	-	0	-	-
138	OxSRFI (North)	M40 North	2659 m	-	0	-	0	-	-
139	OxSRFI (North)	B4100 West	2660 m	-	0	-	0	-	-
140	OxSRFI (North)	Ardley Rd West	2661 m	-	0	-	0	-	-
141	OxSRFI (North)	Ardley Rd East	2662 m	-	0	00:04:01	0	-	-
142	OxSRFI (North)	B430 (New)	2663 m	-	0	00:01:17	2	-	-
143	OxSRFI (North)	OxSRFI (South)	2664 m	-	0	-	0	-	-
144	OxSRFI (North)	OxSRFI (North)	2665 m	-	0	-	0	-	-

MG MARKERS - FULL ORIGIN-DESTINATION MARKERS (PARKING LOT TO PARKING LOT)

HEAVY VEHICLES - AM PEAK

Marker	Route			2031 RC2A		2031 DS2A		Difference (JTs)	
No.	From	To	Dist.	Avg.	Trips	Avg.	Trips	No.	%
1	A43 North	A43 North	1600 m	-	0	-	0	-	-
2	A43 North	B4100 East	1220 m	-	0	-	0	-	-
3	A43 North	Cherwell Services	2045 m	00:03:21	3	00:03:25	3	00:00:05	▲ 2%
4	A43 North	M40 South	5269 m	00:05:31	242	00:05:41	240	00:00:10	▲ 3%
5	A43 North	B430	3805 m	00:05:12	4	-	0	-	-
6	A43 North	M40 North	7348 m	-	0	-	0	-	-
7	A43 North	B4100 West	1216 m	-	0	-	0	-	-
8	A43 North	Ardley Rd West	2718 m	-	0	-	0	-	-
9	A43 North	Ardley Rd East	3374 m	-	0	-	0	-	-
10	A43 North	B430 (New)	1298 m	-	0	00:05:47	4	-	-
11	A43 North	OxSRFI (South)	1116 m	-	0	00:06:58	2	-	-
12	A43 North	OxSRFI (North)	1744 m	-	0	00:06:44	2	-	-
13	B4100 East	A43 North	1298 m	00:02:19	16	00:02:18	16	-00:00:02	▼ 1%
14	B4100 East	B4100 East	1116 m	-	0	-	0	-	-
15	B4100 East	Cherwell Services	1744 m	-	0	-	0	-	-
16	B4100 East	M40 South	4968 m	-	0	-	0	-	-
17	B4100 East	B430	3504 m	-	0	-	0	-	-
18	B4100 East	M40 North	7047 m	-	0	-	0	-	-
19	B4100 East	B4100 West	915 m	00:02:13	12	00:02:11	12	-00:00:01	▼ 1%
20	B4100 East	Ardley Rd West	2417 m	-	0	-	0	-	-
21	B4100 East	Ardley Rd East	3073 m	-	0	-	0	-	-
22	B4100 East	B430 (New)	3597 m	-	0	-	0	-	-
23	B4100 East	OxSRFI (Sou h)	2182 m	-	0	-	0	-	-
24	B4100 East	OxSRFI (North)

MG MARKERS - FULL ORIGIN-DESTINATION MARKERS (PARKING LOT TO PARKING LOT)

ALL VEHICLES - PM PEAK

Marker	Route			2031 RC2A		2031 DS2A		Difference (JTs)	
No.	From	To	Dist.	Avg.	Trips	Avg.	Trips	No.	%
1	A43 North	A43 North	1600 m	-	0	-	0	-	-
2	A43 North	B4100 East	1220 m	00:01:23	274	00:01:23	278	00:00:01	▲ 1%
3	A43 North	Cherwell Services	2045 m	00:02:51	104	00:02:40	104	-00:00:11	▼ 6%
4	A43 North	M40 South	5269 m	00:04:49	1215	00:04:50	1231	00:00:01	▲ 0%
5	A43 North	B430	3805 m	00:04:28	117	-	0	-	-
6	A43 North	M40 North	7348 m	-	0	-	0	-	-
7	A43 North	B4100 West	1216 m	00:02:17	38	00:02:14	44	-00:00:04	▼ 3%
8	A43 North	Ardley Rd West	2718 m	00:03:34	4	00:04:17	4	00:00:42	▲ 20%
9	A43 North	Ardley Rd East	3374 m	00:03:57	16	00:04:55	12	00:00:59	▲ 25%
10	A43 North	B430 (New)	1298 m	-	0	00:04:52	76	-	-
11	A43 North	OxSRFI (South)	1116 m	-	0	00:05:53	14	-	-
12	A43 North	OxSRFI (North)	1744 m	-	0	00:05:41	14	-	-
13	B4100 East	A43 North	1298 m	00:02:48	352	00:02:29	331	-00:00:19	▼ 11%
14	B4100 East	B4100 East	1116 m	-	0	-	0	-	-
15	B4100 East	Cherwell Services	1744 m	-	0	-	0	-	-
16	B4100 East	M40 South	4968 m	00:05:17	4	00:05:09	8	-00:00:08	▼ 2%
17	B4100 East	B430	3504 m	00:05:05	4	-	0	-	-
18	B4100 East	M40 North	7047 m	00:06:52	248	00:07:16	38	00:00:24	▲ 6%
19	B4100 East	B4100 West	915 m	00:02:38	204	00:02:22	254	-00:00:16	▼ 10%
20	B4100 East	Ardley Rd West	2417 m	00:04:23	4	00:04:47	4	00:00:24	▲ 9%
21	B4100 East	Ardley Rd East	3073 m	-	0	-	0	-	-
22	B4100 East	B430 (New)	3597 m	-	0	00:05:22	4	-	-
23	B4100 East	OxSRFI (South)	2182 m	-	0	00:05:56	4	-	-
24	B4100 East	OxSRFI (North)	5726 m	-	0	00:06:10	4	-	-
25	Cherwell Services	A43 North	2062 m	00:03:14	86	00:03:17	87	00:00:03	▲ 1%
26	Cherwell Services	B4100 East	1880 m	-	0	-	0	-	-
27	Cherwell Services	Cherwell Services	583 m	-	0	-	0	-	-
28	Cherwell Services	M40 South	3597 m	00:03:05	261	00:03:16	262	00:00:11	▲ 6%
29	Cherwell Services	B430	2182 m	-	0	-	0	-	-
30	Cherwell Services	M40 North	5726 m	00:04:35	179	00:05:18	178	00:00:43	▲ 16%
31	Cherwell Services	B4100 West	1679 m	-	0	-	0	-	-
32	Cherwell Services	Ardley Rd West	1096 m	-	0	-	0	-	-
33	Cherwell Services	Ardley Rd East	1752 m	-	0	-	0	-	-
34	Cherwell Services	B430 (New)	5167 m	-	0	-	0	-	-
35	Cherwell Services	OxSRFI (South)	3927 m	-	0	-	0	-	-
36	Cherwell Services	OxSRFI (North)	4583 m	-	0	-	0	-	-
37	M40 South	A43 North	5550 m	00:05:14	1579	00:05:53	1635	00:00:39	▲ 12%
38	M40 South	B4100 East	5368 m	00:05:46	4	00:06:36	4	00:00:50	▲ 14%
39	M40 South	Cherwell Services	4071 m	00:04:03	212	00:04:21	209	00:00:18	▲ 7%
40	M40 South	M40 South	7295 m	-	0	-	0	-	-
41	M40 South	B430	5013 m	00:04:00	4	00:04:41	4	00:00:40	▲ 17%
42	M40 South	M40 North	8281 m	00:04:55	3967	00:04:54	3803	-00:00:01	▼ 0%
43	M40 South	B4100 West	5167 m	00:05:14	28	00:05:44	16	00:00:30	▲ 9%
44	M40 South	Ardley Rd West	3927 m	00:03:06	16	00:03:25	52	00:00:19	▲ 10%
45	M40 South	Ardley Rd East	4583 m	-	0	-	0	-	-
46	M40 South	B430 (New)	6018 m	-	0	00:04:10	4	-	-
47	M40 South	OxSRFI (South)	5836 m	-	0	00:06:25	15	-	-
48	M40 South	OxSRFI (North)	5231 m	-	0	00:05:18	15	-	-
49	B430	A43 Nor h	3806 m	00:04:31	139	-	0	-	-
50	B430	B4100 East	3624 m	00:05:08	4	-	0	-	-
51	B430	Cherwell Services	2327 m	-	0	-	0	-	-
52	B430	M40 South	5551 m	-	0	-	0	-	-
53	B430	B430	3450 m	-	0	-	0	-	-
54	B430	M40 North	6997 m	00:05:10	114	-	0	-	-
55	B430	B4100 West	3423 m	-	0	-	0	-	-
56	B430	Ardley Rd West	1431 m	00:01:23	101	-	0	-	-
57	B430	Ardley Rd East	2045 m	00:01:48	57	-	0	-	-
58	B430	B430 (New)	4983 m	-	0	-	0	-	-
59	B430	OxSRFI (South)	3519 m	-	0	00:07:37	2	-	-
60	B430	OxSRFI (North)	7062 m	-	0	00:06:50	2	-	-
61	M40 North	A43 Nor h	6018 m	-	0	-	0	-	-
62	M40 North	B4100 East	5836 m	00:05:44	254	00:05:45	259	00:00:00	▲ 0%
63	M40 North	Cherwell Services	5231 m	00:04:39	196	00:04:47	196	00:00:08	▲ 3%
64	M40 North	M40 South	8295 m	00:04:46	3348	00:04:46	3363	00:00:01	▲ 0%
65	M40 North	B430	6991 m	00:06:10	95	-	0	-	-
66	M40 North	M40 North	10535 m	-	0	-	0	-	-
67	M40 North	B4100 West	5635 m	00:05:00	7	00:04:49	6	-00:00:11	▼ 4%
68	M40 North	Ardley Rd West	5905 m	00:05:13	16	00:06:09	16	00:00:56	▲ 18%
69	M40 North	Ardley Rd East	6561 m	00:05:38	25	00:06:51	28	00:01:13	▲ 22%
70	M40 North	B430 (New)	2314 m	-	0	00:06:47	70	-	-
71	M40 North	OxSRFI (South)	1254 m	-	0	00:08:10	11	-	-
72	M40 North	OxSRFI (North)	1011 m	-	0	00:08:05	13	-	-
73	B4100 West	A43 Nor h	1116 m	00:01:53	46	00:01:50	44	-00:00:03	▼ 3%
74	B4100 West	B4100 East	934 m	00:02:04	140	00:02:01	141	-00:00:03	▼ 2%
75	B4100 West	Cherwell Services	1759 m	-	0	-	0	-	-
76	B4100 West	M40 South	4983 m	00:05:15	32	00:05:13	44	-00:00:02	▼ 1%
77	B4100 West	B430	3519 m	-	0	-	0	-	-
78	B4100 West	M40 North	7062 m	-	0	-	0	-	-
79	B4100 West	B4100 West	931 m	-	0	-	0	-	-
80	B4100 West	Ardley Rd West	2432 m	-	0	-	0	-	-
81	B4100 West	Ardley Rd East	3089 m	-	0	-	0	-	-
82	B4100 West	B430 (New)	2603 m	-	0	00:05:28	8	-	-
83	B4100 West	OxSRFI (South)	2604 m	-	0	00:06:21	2	-	-
84	B4100 West	OxSRFI (North)	2605 m	-	0	00:06:19	2	-	-
85	Ardley Rd West	A43 Nor h	2697 m	00:03:36	8	00:05:18	8	00:01:42	▲ 47%
86	Ardley Rd West	B4100 East	2515 m	-	0	-	0	-	-
87	Ardley Rd West	Cherwell Services	1218 m	-	0	-	0	-	-
88	Ardley Rd West	M40 South	4442 m	-	0	-	0	-	-
89	Ardley Rd West	B430	1441 m	00:01:28	47	-	0	-	-
90	Ardley Rd West	M40 North	5887 m	00:04:12	8	00:07:01	8	00:02:49	▲ 67%
91	Ardley Rd West	B4100 West	2314 m	-	0	-	0	-	-
92	Ardley Rd West	Ardley Rd West	1254 m	-	0	-	0	-	-
93	Ardley Rd West	Ardley Rd East	1011 m	00:01:02	25	00:01:28	51	00:00:26	▲ 42%
94	Ardley Rd West	B430 (New)	2615 m	-	0	00:05:17	4	-	-
95	Ardley Rd West	OxSRFI (South)	2616 m	-	0	-	0	-	-
96	Ardley Rd West	OxSRFI (North)	2617 m	-	0	-	0	-	-
97	Ardley Rd East	A43 North	3389 m	00:04:03	4	00:06:04	48	00:02:00	▲ 50%
98	Ardley Rd East	B4100 East	3207 m	-	0	-	0	-	-
99	Ardley Rd East	Cherwell Services	1910 m	-	0	-	0	-	-
100	Ardley Rd East	M40 South	5134 m	-	0	-	0	-	-
101	Ardley Rd East	B430	2030 m	00:01:49	8	00:02:34	4	00:00:45	▲ 42%
102	Ardley Rd East	M40 North	6579 m	00:04:42	54	00:07:55	273	00:03:13	▲ 69%
103	Ardley Rd East	B4100 West	3006 m	-	0	-	0	-	-
104	Ardley Rd East	Ardley Rd West	1014 m	00:00:56	35	00:01:22	45	00:00:26	▲ 47%
105	Ardley Rd East	Ardley Rd East	2602 m	-	0	-	0	-	-
106	Ardley Rd East	B430 (New)	2627 m	-	0	-	0	-	-
107	Ardley Rd East	OxSRFI (South)	2628 m	-	0	-	0	-	-
108	Ardley Rd East	OxSRFI (North)	2629 m	-	0	-	0	-	-
109	B430 (New)	A43 Nor h	2630 m	-	0	00:05:29	175	-	-
110	B430 (New)	B4100 East	2631 m	-	0	00:06:09	8	-	-
111	B430 (New)	Cherwell Services	2632 m	-	0	-	0	-	-
112	B430 (New)	M40 Sou h	2633 m	-	0	00:06:41	10	-	-
113	B430 (New)	B430	2634 m	-	0	-	0	-	-
114	B430 (New)	M40 Nor h	2635 m	-	0	00:06:10	104	-	-
115	B430 (New)	B4100 West	2636 m	-	0	00:05:24	24	-	-
116	B430 (New)	Ardley Rd West	2637 m	-	0	00:03:02	12	-	-
117	B430 (New)	Ardley Rd East	2638 m	-	0	00:03:42	21	-	-
118	B430 (New)	B430 (New)	2639 m	-	0	-	0	-	-
119	B430 (New)	OxSRFI (South)	2640 m	-	0	00:01:15	22	-	-
120	B430 (New)	OxSRFI (North)	2641 m	-	0	00:01:08	22	-	-
121	OxSRFI (South)	A43 North	2642 m	-	0	00:06:13	83	-	-
122	OxSRFI (South)	B4100 East	2643 m	-	0	00:06:56	8	-	-
123	OxSRFI (South)	Cherwell Services	2644 m	-	0	-	0	-	-
124	OxSRFI (South)	M40 Sou h	2645 m	-	0	00:07:23	24	-	-
125	OxSRFI (South)	B430	2646 m	-	0	00:05:03	14	-	-
126	OxSRFI (South)	M40 Nor h	2647 m	-	0	00:07:06	44	-	-
127	OxSRFI (South)	B4100 West	2648 m	-	0	00:06:06	11	-	-
128	OxSRFI (South)	Ardley Rd West	2649 m	-	0	00:03:49	4	-	-
129	OxSRFI (South)	Ardley Rd East	2650 m	-	0	00:04:25	21	-	-
130	OxSRFI (South)	B430 (New)	2651 m	-	0	00:01:40	112	-	-
131	OxSRFI (South)	OxSRFI (South)	2652 m	-	0	-	0	-	-
132	OxSRFI (South)	OxSRFI (North)	2653 m	-	0	-	0	-	-
133	OxSRFI (North)	A43 North	2654 m	-	0	00:05:49	10	-	-
134	OxSRFI (North)	B4100 East	2655 m	-	0	00:06:31	1	-	-
135	OxSRFI (North)	Cherwell Services	2656 m	-	0	-	0	-	-
136	OxSRFI (North)	M40 Sou h	2657 m	-	0	00:07:04	3	-	-
137	OxSRFI (North)	B430	2658 m	-	0	00:04:41	1	-	-
138	OxSRFI (North)	M40 North	2659 m	-	0	00:06:48	5	-	-
139	OxSRFI (North)	B4100 West	2660 m	-	0	00:05:24	1	-	-
140	OxSRFI (North)	Ardley Rd West	2661 m	-	0	00:03:14	0	-	-
141	OxSRFI (North)	Ardley Rd East	2662 m	-	0	00:03:56	2	-	-
142	OxSRFI (North)	B430 (New)	2663 m	-	0	00:01:16	13	-	-
143	OxSRFI (North)	OxSRFI (South)	2664 m	-	0	-	0	-	-
144	OxSRFI (North)	OxSRFI (North)	2665 m	-	0	-	0	-	-

MG MARKERS - FULL ORIGIN-DESTINATION MARKERS (PARKING LOT TO PARKING LOT)

LIGHT VEHICLES - PM PEAK

Marker	Route			2031 RC2A		2031 DS2A		Difference (JTs)	
No.	From	To	Dist	Avg.	Trips	Avg.	Trips	No.	%
1	A43 North	A43 North	1600 m	-	0	-	0	-	-
2	A43 North	B4100 East	1220 m	00:01:22	264	00:01:23	268	00:00:01	▲ 1%
3	A43 North	Cherwell Services	2045 m	00:02:51	104	00:02:40	104	-00:00:11	▼ 6%
4	A43 North	M40 South	5269 m	00:04:47	1115	00:04:48	1131	00:00:01	▲ 0%
5	A43 North	B430	3805 m	00:04:28	117	-	0	-	-
6	A43 North	M40 North	7348 m	-	0	-	0	-	-
7	A43 North	B4100 West	1216 m	00:02:17	38	00:02:14	44	-00:00:04	▼ 3%
8	A43 North	Ardley Rd West	2718 m	00:03:34	4	00:04:17	4	00:00:42	▲ 20%
9	A43 North	Ardley Rd East	3374 m	00:03:57	16	00:04:55	12	00:00:59	▲ 25%
10	A43 North	B430 (New)	1298 m	-	0	00:04:52	76	-	-
11	A43 North	OxSRFI (South)	1116 m	-	0	00:05:48	11	-	-
12	A43 North	OxSRFI (North)	1744 m	-	0	00:05:35	11	-	-
13	B4100 East	A43 North	1298 m	00:02:48	352	00:02:29	331	-00:00:19	▼ 11%
14	B4100 East	B4100 East	1116 m	-	0	-	0	-	-
15	B4100 East	Cherwell Services	1744 m	-	0	-	0	-	-
16	B4100 East	M40 South	4968 m	00:05:17	4	00:05:09	8	-00:00:08	▼ 2%
17	B4100 East	B430	3504 m	00:05:05	4	-	0	-	-
18	B4100 East	M40 North	7047 m	00:06:52	244	00:07:13	34	00:00:21	▲ 5%
19	B4100 East	B4100 West	915 m	00:02:38	204	00:02:22	254	-00:00:16	▼ 10%
20	B4100 East	Ardley Rd West	2417 m	00:04:23	4	00:04:47	4	00:00:24	▲ 9%
21	B4100 East	Ardley Rd East	3073 m	-	0	-	0	-	-
22	B4100 East	B430 (New)	3597 m	-	0	00:05:22	4	-	-
23	B4100 East	OxSRFI (South)	2182 m	-	0	00:05:56	4	-	-
24	B4100 East	OxSRFI (North)	5726 m	-	0	00:06:10	4	-	-
25	Cherwell Services	A43 North	2062 m	00:03:12	73	00:03:14	74	00:00:02	▲ 1%
26	Cherwell Services	B4100 East	1880 m	-	0	-	0	-	-
27	Cherwell Services	Cherwell Services	583 m	-	0	-	0	-	-
28	Cherwell Services	M40 South	3597 m	00:03:02	212	00:03:13	214	00:00:11	▲ 6%
29	Cherwell Services	B430	2182 m	-	0	-	0	-	-
30	Cherwell Services	M40 North	5726 m	00:04:28	140	00:05:11	139	00:00:43	▲ 16%
31	Cherwell Services	B4100 West	1679 m	-	0	-	0	-	-
32	Cherwell Services	Ardley Rd West	1096 m	-	0	-	0	-	-
33	Cherwell Services	Ardley Rd East	1752 m	-	0	-	0	-	-
34	Cherwell Services	B430 (New)	5167 m	-	0	-	0	-	-
35	Cherwell Services	OxSRFI (South)	3927 m	-	0	-	0	-	-
36	Cherwell Services	OxSRFI (North)	4583 m	-	0	-	0	-	-
37	M40 South	A43 North	5550 m	00:05:12	1452	00:05:51	1507	00:00:39	▲ 12%
38	M40 South	B4100 East	5368 m	00:05:46	4	00:06:36	4	00:00:50	▲ 14%
39	M40 South	Cherwell Services	4071 m	00:04:00	167	00:04:18	165	00:00:17	▲ 7%
40	M40 South	M40 South	7295 m	-	0	-	0	-	-
41	M40 South	B430	5013 m	00:04:00	4	00:04:41	4	00:00:40	▲ 17%
42	M40 South	M40 North	8281 m	00:04:51	3538	00:04:50	3386	-00:00:01	▼ 0%
43	M40 South	B4100 West	5167 m	00:05:14	28	00:05:44	16	00:00:30	▲ 9%
44	M40 South	Ardley Rd West	3927 m	00:03:06	16	00:03:25	52	00:00:19	▲ 10%
45	M40 South	Ardley Rd East	4583 m	-	0	-	0	-	-
46	M40 South	B430 (New)	6018 m	-	0	00:04:10	4	-	-
47	M40 South	OxSRFI (South)	5836 m	-	0	00:06:25	2	-	-
48	M40 South	OxSRFI (North)	5231 m	-	0	00:04:54	2	-	-
49	B430	A43 North	3806 m	00:04:31	139	-	0	-	-
50	B430	B4100 East	3624 m	00:05:08	4	-	0	-	-
51	B430	Cherwell Services	2327 m	-	0	-	0	-	-
52	B430	M40 South	5551 m	-	0	-	0	-	-
53	B430	B430	3450 m	-	0	-	0	-	-
54	B430	M40 North	6997 m	00:05:10	114	-	0	-	-
55	B430	B4100 West	3423 m	-	0	-	0	-	-
56	B430	Ardley Rd West	1431 m	00:01:23	101	-	0	-	-
57	B430	Ardley Rd East	2045 m	00:01:48	57	-	0	-	-
58	B430	B430 (New)	4983 m	-	0	-	0	-	-
59	B430	OxSRFI (South)	3519 m	-	0	00:07:37	2	-	-
60	B430	OxSRFI (North)	7062 m	-	0	00:06:50	2	-	-
61	M40 North	A43 Nor h	6018 m	-	0	-	0	-	-
62	M40 North	B4100 East	5836 m	00:05:44	254	00:05:45	259	00:00:00	▲ 0%
63	M40 North	Cherwell Services	5231 m	00:04:31	142	00:04:40	142	00:00:08	▲ 3%
64	M40 North	M40 South	8295 m	00:04:42	3016	00:04:43	3030	00:00:01	▲ 0%
65	M40 North	B430	6991 m	00:06:10	95	-	0	-	-
66	M40 North	M40 North	10535 m	-	0	-	0	-	-
67	M40 North	B4100 West	5635 m	00:05:00	7	00:04:49	6	-00:00:11	▼ 4%
68	M40 North	Ardley Rd West	5905 m	00:05:13	16	00:06:09	16	00:00:56	▲ 18%
69	M40 North	Ardley Rd East	6561 m	00:05:38	25	00:06:51	28	00:01:13	▲ 22%
70	M40 North	B430 (New)	2314 m	-	0	00:06:47	70	-	-
71	M40 North	OxSRFI (South)	1254 m	-	0	00:07:37	3	-	-
72	M40 North	OxSRFI (North)	1011 m	-	0	00:07:43	5	-	-
73	B4100 West	A43 North	1116 m	00:01:53	46	00:01:50	44	-00:00:03	▼ 3%
74	B4100 West	B4100 East	934 m	00:02:04	140	00:02:01	137	-00:00:03	▼ 2%
75	B4100 West	Cherwell Services	1759 m	-	0	-	0	-	-
76	B4100 West	M40 South	4983 m	00:05:15	32	00:05:13	44	-00:00:02	▼ 1%
77	B4100 West	B430	3519 m	-	0	-	0	-	-
78	B4100 West	M40 North	7062 m	-	0	-	0	-	-
79	B4100 West	B4100 West	931 m	-	0	-	0	-	-
80	B4100 West	Ardley Rd West	2432 m	-	0	-	0	-	-
81	B4100 West	Ardley Rd East	3089 m	-	0	-	0	-	-
82	B4100 West	B430 (New)	2603 m	-	0	00:05:28	8	-	-
83	B4100 West	OxSRFI (South)	2604 m	-	0	00:06:21	2	-	-
84	B4100 West	OxSRFI (North)	2605 m	-	0	00:06:19	2	-	-
85	Ardley Rd West	A43 Nor h	2697 m	00:03:36	8	00:05:18	8	00:01:42	▲ 47%
86	Ardley Rd West	B4100 East	2515 m	-	0	-	0	-	-
87	Ardley Rd West	Cherwell Services	1218 m	-	0	-	0	-	-
88	Ardley Rd West	M40 South	4442 m	-	0	-	0	-	-
89	Ardley Rd West	B430	1441 m	00:01:28	47	-	0	-	-
90	Ardley Rd West	M40 North	5887 m	00:04:12	8	00:07:01	8	00:02:49	▲ 67%
91	Ardley Rd West	B4100 West	2314 m	-	0	-	0	-	-
92	Ardley Rd West	Ardley Rd West	1254 m	-	0	-	0	-	-
93	Ardley Rd West	Ardley Rd East	1011 m	00:01:02	25	00:01:28	51	00:00:26	▲ 42%
94	Ardley Rd West	B430 (New)	2615 m	-	0	00:05:17	4	-	-
95	Ardley Rd West	OxSRFI (South)	2616 m	-	0	-	0	-	-
96	Ardley Rd West	OxSRFI (North)	2617 m	-	0	-	0	-	-
97	Ardley Rd East	A43 North	3389 m	00:04:03	4	00:06:04	48	00:02:00	▲ 50%
98	Ardley Rd East	B4100 East	3207 m	-	0	-	0	-	-
99	Ardley Rd East	Cherwell Services	1910 m	-	0	-	0	-	-
100	Ardley Rd East	M40 South	5134 m	-	0	-	0	-	-
101	Ardley Rd East	B430	2030 m	00:01:49	8	00:02:34	4	00:00:45	▲ 42%
102	Ardley Rd East	M40 North	6579 m	00:04:42	54	00:07:55	273	00:03:13	▲ 69%
103	Ardley Rd East	B4100 West	3006 m	-	0	-	0	-	-
104	Ardley Rd East	Ardley Rd West	1014 m	00:00:56	35	00:01:22	45	00:00:26	▲ 47%
105	Ardley Rd East	Ardley Rd East	2602 m	-	0	-	0	-	-
106	Ardley Rd East	B430 (New)	2627 m	-	0	-	0	-	-
107	Ardley Rd East	OxSRFI (South)	2628 m	-	0	-	0	-	-
108	Ardley Rd East	OxSRFI (North)	2629 m	-	0	-	0	-	-
109	B430 (New)	A43 Nor h	2630 m	-	0	00:05:29	175	-	-
110	B430 (New)	B4100 East	2631 m	-	0	00:06:09	8	-	-
111	B430 (New)	Cherwell Services	2632 m	-	0	-	0	-	-
112	B430 (New)	M40 Sou h	2633 m	-	0	-	0	-	-
113	B430 (New)	B430	2634 m	-	0	-	0	-	-
114	B430 (New)	M40 Nor h	2635 m	-	0	00:06:10	104	-	-
115	B430 (New)	B4100 West	2636 m	-	0	00:05:24	24	-	-
116	B430 (New)	Ardley Rd West	2637 m	-	0	00:03:02	12	-	-
117	B430 (New)	Ardley Rd East	2638 m	-	0	00:03:42	21	-	-
118	B430 (New)	B430 (New)	2639 m	-	0	-	0	-	-
119	B430 (New)	OxSRFI (South)	2640 m	-	0	00:01:14	20	-	-
120	B430 (New)	OxSRFI (North)	2641 m	-	0	00:01:08	22	-	-
121	OxSRFI (South)	A43 North	2642 m	-	0	00:06:11	80	-	-
122	OxSRFI (South)	B4100 East	2643 m	-	0	00:06:56	8	-	-
123	OxSRFI (South)	Cherwell Services	2644 m	-	0	-	0	-	-
124	OxSRFI (South)	M40 Sou h	2645 m	-	0	00:06:54	4	-	-
125	OxSRFI (South)	B430	2646 m	-	0	00:05:03	14	-	-
126	OxSRFI (South)	M40 Nor h	2647 m	-	0	00:06:52	31	-	-
127	OxSRFI (South)	B4100 West	2648 m	-	0	00:06:06	11	-	-
128	OxSRFI (South)	Ardley Rd West	2649 m	-	0	00:03:49	4	-	-
129	OxSRFI (South)	Ardley Rd East	2650 m	-	0	00:04:25	21	-	-
130	OxSRFI (South)	B430 (New)	2651 m	-	0	00:01:39	110	-	-
131	OxSRFI (South)	OxSRFI (South)	2652 m	-	0	-	0	-	-
132	OxSRFI (South)	OxSRFI (North)	2653 m	-	0	-	0	-	-
133	OxSRFI (North)	A43 North	2654 m	-	0	00:05:48	9	-	-
134	OxSRFI (North)	B4100 East	2655 m	-	0	00:06:31	1	-	-
135	OxSRFI (North)	Cherwell Services	2656 m	-	0	-	0	-	-
136	OxSRFI (North)	M40 Sou h	2657 m	-	0	00:06:20	1	-	-
137	OxSRFI (North)	B430	2658 m	-	0	00:04:41	1	-	-
138	OxSRFI (North)	M40 North	2659 m	-	0	00:06:37	4	-	-
139	OxSRFI (North)	B4100 West	2660 m	-	0	00:05:24	1	-	-
140	OxSRFI (North)	Ardley Rd West	2661 m	-	0	00:03:14	0	-	-
141	OxSRFI (North)	Ardley Rd East	2662 m	-	0	00:03:56	2	-	-
142	OxSRFI (North)	B430 (New)	2663 m	-	0	00:01:16	13	-	-
143	OxSRFI (North)	OxSRFI (South)	2664 m	-	0	-	0	-	-
144	OxSRFI (North)	OxSRFI (North)	2665 m	-	0	-	0	-	-

MG MARKERS - FULL ORIGIN-DESTINATION MARKERS (PARKING LOT TO PARKING LOT)

HEAVY VEHICLES - PM PEAK

Marker	Route			2031 RC2A		2031 DS2A		Difference (JTs)	
No.	From	To	Dist.	Avg.	Trips	Avg.	Trips	No.	%
1	A43 North	A43 North	1600 m	-	0	-	0	-	-
2	A43 North	B4100 East	1220 m	00:01:35	10	00:01:35	10	00:00:00	▲ 0%
3	A43 North	Cherwell Services	2045 m	-	0	-	0	-	-
4	A43 North	M40 South	5269 m	00:05:15	100	00:05:16	100	00:00:01	▲ 0%
5	A43 North	B430	3805 m	-	0	-	0	-	-
6	A43 North	M40 North	7348 m	-	0	-	0	-	-
7	A43 North	B4100 West	1216 m	-	0	-	0	-	-
8	A43 North	Ardley Rd West	2718 m	-	0	-	0	-	-
9	A43 North	Ardley Rd East	3374 m	-	0	-	0	-	-
10	A43 North	B430 (New)	1298 m	-	0	-	0	-	-
11	A43 North	OxSRFI (South)	1116 m	-	0	00:06:22	2	-	-
12	A43 North	OxSRFI (North)	1744 m	-	0	00:06:10	2	-	-
13	B4100 East	A43 North	1298 m	-	0	-	0	-	-
14	B4100 East	B4100 East	1116 m	-	0	-	0	-	-
15	B4100 East	Cherwell Services	1744 m	-	0	-	0	-	-
16	B4100 East	M40 South	4968 m	-	0	-	0	-	-
17	B4100 East	B430	3504 m	-	0	-	0	-	-
18	B4100 East	M40 North	7047 m	00:07:32	4	00:07:48	4	00:00:16	▲ 3%
19	B4100 East	B4100 West	915 m	-	0	-	0	-	-
20	B4100 East	Ardley Rd West	2417 m	-	0	-	0	-	-
21	B4100 East	Ardley Rd East	3073 m	-	0	-	0	-

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