Appendix 11
TN6: M1 Junction 15A Technical Note

M1J15 NORTHAMPTON GATEWAY
STRATEGIC RAIL FREIGHT INTERCHANGE

TECHNICAL NOTE 6: M1 JUNCTION 15a

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project number: ADC1475			report reference: ADC1475 TN6
version	date	author	comments
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2	25/08/17	Mark Higgins	Issued to TWG

CONTENTS

DRAWINGS

NGW-BWB-GEN-XX-SK-C-SK21-S3-P2

APPENDICES

1.0 INTRODUCTION

1.1 ADC Infrastructure Ltd is commissioned by Roxhill (Junction 15) Ltd to provide transport advice with regards to their Nationally Significant Infrastructure Project (NSIP) for the development of a Strategic Rail Freight Interchange (SRFI) facility adjacent to M1 Junction 15 in Northamptonshire (known as Northampton Gateway SRFI).

1.2 It was agreed at the Transport Working Group[1] meeting held on 07 July 2016 that the transport impacts of the Northampton Gateway SRFI development be modelled using the Northamptonshire Strategic Transport Model (NSTM2), which is maintained by WSP on NCC's behalf.

1.3 Full details of the modelling methodology and the NSTM2 scenarios to be tested are provided at Technical Note 1(ref. ADC1475 TN1 v2). The outputs of the NSTM2 are being analysed to identify the impacts of the proposed development and judge the requirements for mitigation across the transport network.

1.4 This Technical Note therefore presents a summary of the analysis of M1 Junction 15a (referred to as M1 J15a from this point forward), based on initial traffic data from the NSTM2[2] for model scenarios 2031 D1 (reference case), 2031 G1 (development case no mitigation) and 2031 J1a (development case with M1 J15, A508 dualling and Roade Bypass mitigation).

1.5 Please note that the traffic data used will change following further iterations of the NSTM2 and/or the availability of the 02/2013 Circular compliant assessment scenarios. Therefore, this document is intended to remain 'live' during the period of the Environmental Impact Assessment for the development, detailing the interactive refinement of the design.

[1] The Transport Working Group comprises Highways England and their consultants Aecom, Northamptonshire County Council (NCC), ADC Infrastructure Ltd, Lawrence Walker Engineering, and BWB Consulting Ltd.
[2] WSP have subsequently updated the NSTM2 to include for a correction to the trip distribution for background HGV traffic and other more minor amendments.

2.0 EXISTING JUNCTION

General arrangement and operation

2.1 The existing M1 J15a is a grade-separated 'dumb-bell' interchange with northern and southern roundabouts connected by a dual carriageway link road which passes underneath the M1 mainline, as shown on **Figure 1**. M1 J15a connects the A43 to the south and the A5123 to the north, which provides access to Northampton. M1 J15a also provides access to the Swan Valley industrial estate and the Northampton Service Station via a series of connected roundabouts.

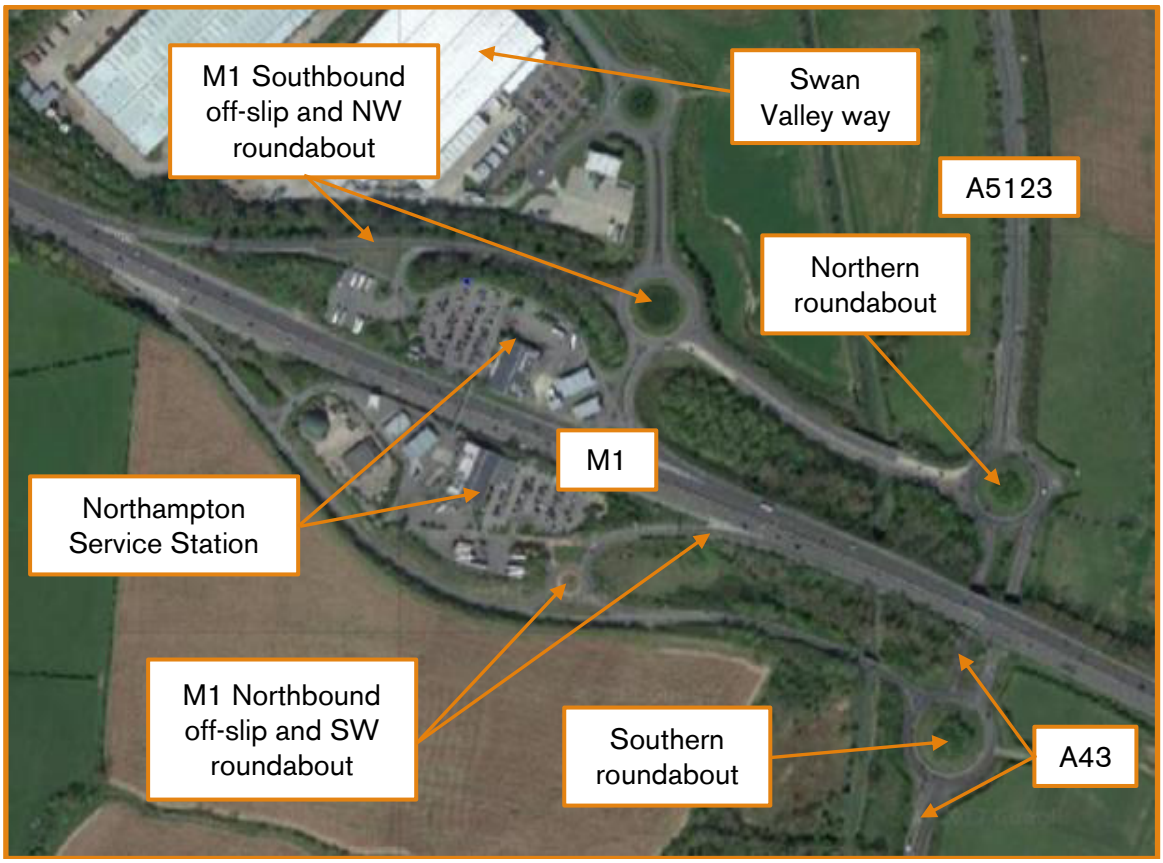


Figure 1: M1 Junction 15a

2.2 The northern roundabout has three approaches and has an inscribed circle diameter (ICD) of 80 metres. All approaches to the northern roundabout have two lanes and are priority controlled. There is also a stub arm to the east which was provided as a potential access to the Milton Ham development site, which does not currently have a valid planning permission.

2.3 The southern roundabout also has three approaches but is slightly larger with an ICD of 90 metres. The M1 northbound off-slip approach has a single lane and is subject to priority control. The A4 3 north and south approaches have two lanes and are also priority controlled. There is a gated access to agricultural land to the east of the southern roundabout.

2.4 Whilst the junction is not considered to be under significant pressure, at peak times the M1 northbound and southbound off-slips are susceptible to congestion, with queueing and delay experienced on the M1 northbound off-slip especially. Traffic and queue surveys were undertaken on 10 March 2016[3] which showed that average queue lengths on the M1 northbound off-slip approach reach approximately 160 to 200 metres in the evening peak

[3] As provided to ADC by Aecom on behalf of Highways England

period. Queuing on the A5123 and A43 approaches were shown to be less significant in both peak periods.

2016 M1 J15a model

2.5 2016 Arcady models (Junctions 8) were built of the northern and southern roundabouts at M1 J15a using 2016 survey traffic flows so that the base year conditions can be adequately understood. The geometrical parameters and on-site observations have been incorporated into the existing layout model and the results are provided at **Appendix A** and summarised in **Table 1** below.

Northern Roundabout				
scenario		A43 South	M1 S'bnd Off-slip	A5123
2016 base - AM	RFC	61%	44%	77%
	queue (veh)	1.53	0.78	3.31
	delay (secs)	3.89	4.73	6.55
2016 base - PM	RFC	74%	57%	45%
	queue (veh)	2.74	1.29	0.80
	delay (secs)	5.30	6.42	2.71

Southern Roundabout				
scenario		A43 North	A43 South	M1 N'bnd Off-slip
2016 base - AM	RFC	80%	66%	80%
	queue (veh)	3.81	1.94	3.85
	delay (secs)	7.74	4.45	24.14
2016 base - PM	RFC	57%	85%	98%
	queue (veh)	1.34	5.49	14.90
	delay (secs)	3.58	9.63	84.96

Table 1: M1 J15a 2016 Arcady results

2.6 The results show that the northern roundabout operates satisfactorily with all approaches operating within 85% of their maximum capacity in both the morning and evening peak hours. The southern roundabout also operates satisfactorily in the morning peak hour. However, the results provided at **Table 1** show that the M1 northbound off-slip approach is operating at 98% of its maximum capacity in the evening peak, above the acceptable 85% threshold. Further, **Table 1** also shows that the A43 Northbound approach is operating at 85% of its capacity and is therefore on the threshold of what is considered acceptable performance.

3.0 DEVELOPMENT IMPACT

2031 NSTM2 analysis

3.1 As stated in Section 1.2, the NSTM2 is being used to assess the transport impact of the proposed development on the highway network. The strategic modelling work is ongoing, following an iterative approach with outputs being used to identify impacts and appropriate mitigation schemes. The mitigation schemes are then returned to the NSTM2 to ensure that they are having the desired outcome.

3.2 To date all assessment work has been based on the 2031 assessment year. This is a robust position to adopt as this scenario has the greatest traffic growth and therefore represents the scenario when highway capacity is at its least and when the development has greatest potential to impact upon the operation of the highway network. The impact of the development and the mitigation proposals will also be assessed in the 02/2013 Circular compliant 2021 assessment year when the NSTM2 data is available.

3.3 Traffic data from the initial run of the NSTM2 for the 2031 reference case (scenario D1 – no development and no mitigation) and 2031 development case (scenario G1 – with development and no mitigation) was provided by WSP at all junctions of interest within the current study area of the development. Also provided are:

- volume to capacity (VC) assessment plots
- flow difference plots
- traffic reassignment plots.

3.4 This data (provided at **Appendix B**) was interrogated to determine the scale, location and cause of impacts due to the development. The VC plots for the 2031 D1 reference case scenario (extract provided at **Figure 2** below) show the M1 J15a would be operating above its capacity in both the morning and evening peak hours. Specifically, the M1 northbound and southbound off-slip approaches are shown to be operating over capacity.

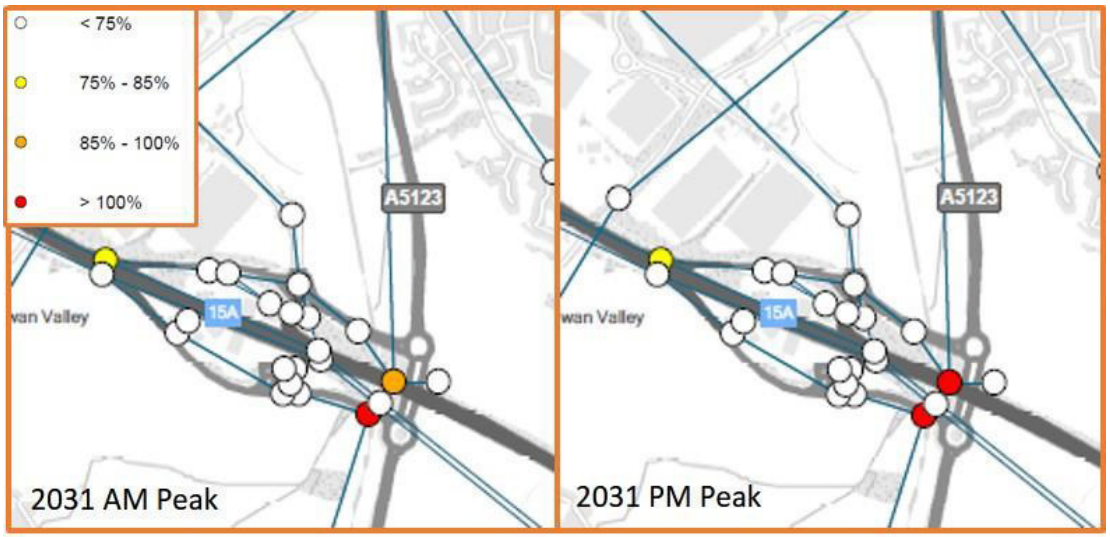


Figure 2: extracts from 2031 D1 VC Plots

3.5 The VC plots for the 2031 G1 development case scenario (extract provided at **Figure 3**) also show that M1 J15a would be operating above its capacity in both the morning and evening peak hours with s similar scale of congestion on the M1 northbound and southbound approaches.

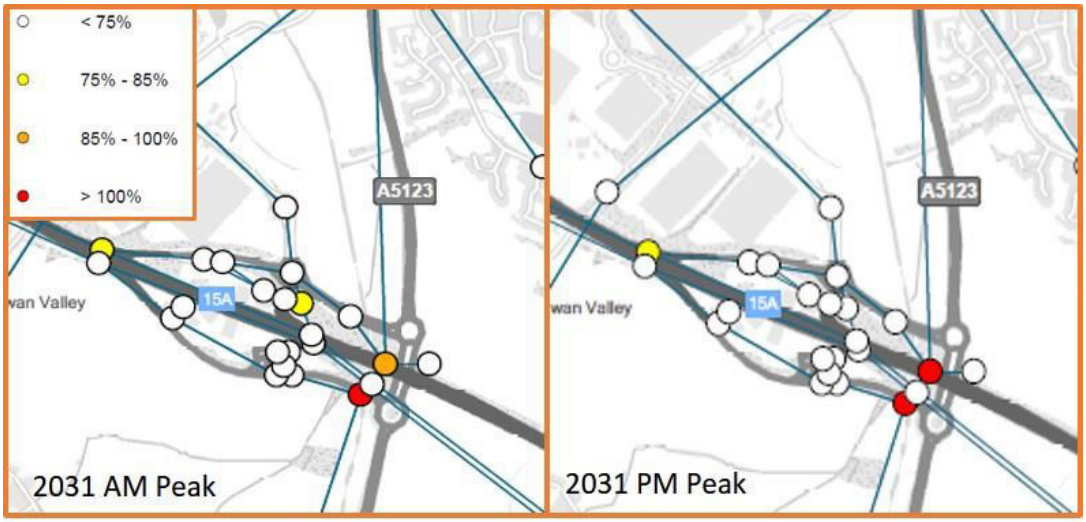


Figure 3: extracts from 2031 G1 VC Plots

3.6 Further to the above, if the flow difference between scenario 2031 D1 reference case and scenario 2031 G1 development case is considered, it is seen that there is an increase in traffic on the M1 mainline of 150 vehicles southbound in the morning peak as traffic arrives at the site and 121 vehicles northbound in the evening peak as traffic departs the site. However, we only see modest increases in traffic at M1 J15a on the A5123 and M1 southbound approaches.

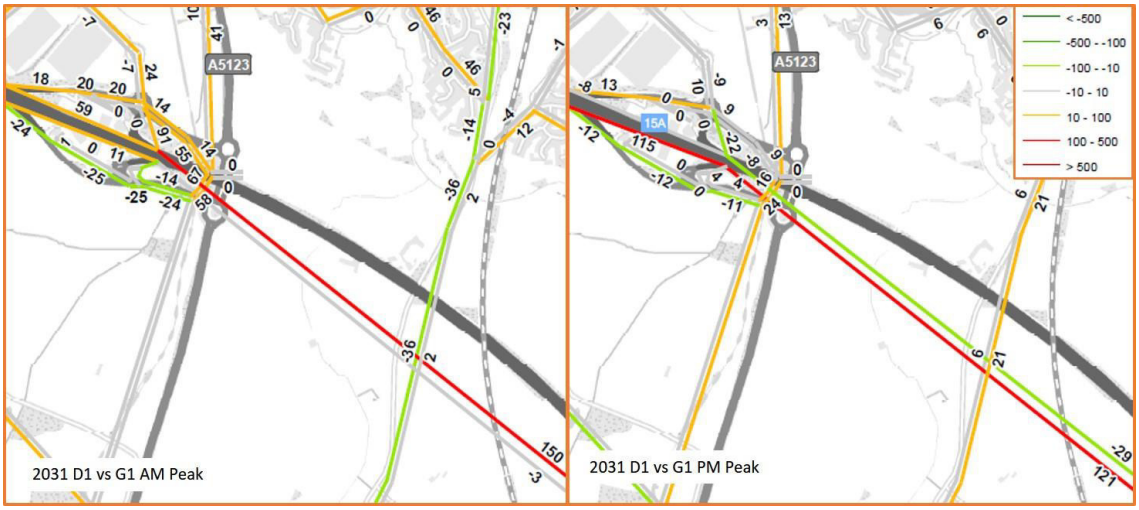


Figure 4: extracts from 2031 D1 vs G1 flow difference plots

3.7 Whilst the above analysis indicates that the development would not significantly increase traffic flows through M1 J15a, which is operating over capacity, Technical Note 5 (ref. ADC1475 TN5 v4) determines that a comprehensive mitigation scheme at M1 J15 is a prerequisite of the development proposals and therefore it is important to take this scheme into account (in terms of traffic reassignment) when considering the impact of the development at M1 J15a.

3.8 The 2031 J1a development case scenario includes the M1 J15 mitigation scheme presented in Technical Note 5 and comparing this scenario with the 2031 D1 reference case scenario helps to provides clarity on some of the issues effecting M1 J15a.

3.9 Traffic reassignment plots comparing scenarios 2031 D1 reference case and 2031 J1a development case with mitigation (M1 J15, A508 dualling and the Roade Bypass) are provided at **Appendix B**. These plots (extracts provided at **Figure 5** below) show that in the 2031 J1a development case with mitigation scenario, traffic reassigns away from the M1 mainline between junctions 15 and 15a and chooses to use other routes, as indicated by the amount of red and orange shown for both the morning and evening peaks.

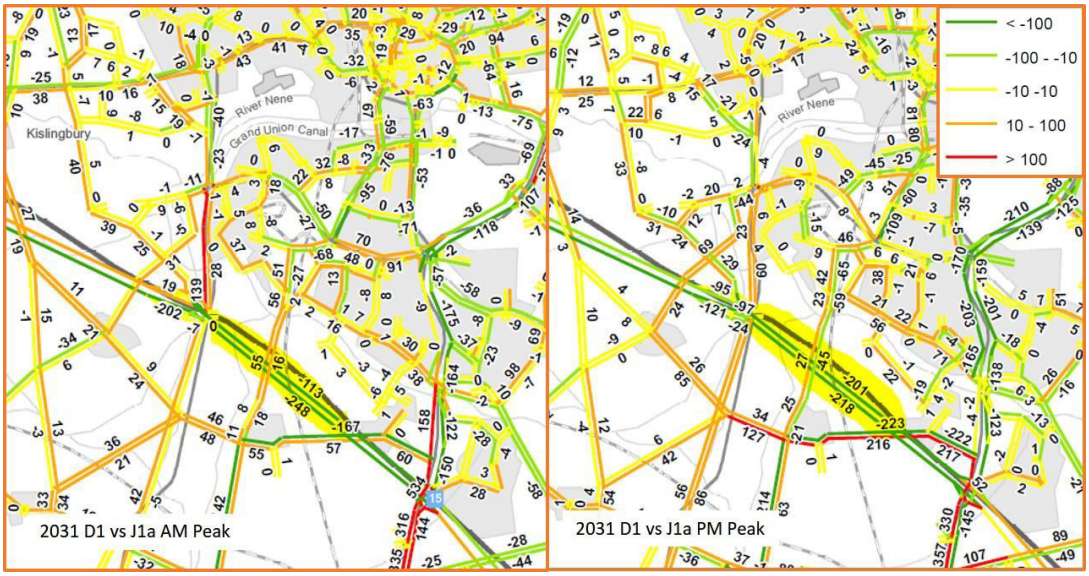


Figure 5: extracts from 2031 D1 vs J1a flow reassignment plots

3.10 Logically, once a major capacity bottleneck such as M1 J15 is released, it would be expected that traffic would reassign back onto the M1 which is the principle road in the area. However, what we see in **Figure 5** is that once the capacity bottleneck at M1 J15 is released, traffic choses to avoid this section of the of the M1 and M1 J15a, indicating that there are unresolved capacity issues in this region of the network and other routes are now favourable, particularly as the scheme at M1 J15 makes alternate routes more accessible.

VISSIM modelling

3.11 Technical Note 5 establishes that a mitigation scheme at M1 J15 is a prerequisite for the development. It details the assessment methodology for that scheme, which has been designed primarily using LinSig as the assessment tool. However, HE's validated and calibrated 2016 M1J15 & M1J15a VISSIM model has also been used to demonstrate the suitability of the proposed mitigation at M1 J15. This model also includes M1 J15a and therefore its performance in the assessment scenarios can be analysed.

3.12 The VISSIM model was run with traffic flows extracted from NSTM2 for the initial 2031 D1 reference case scenario. It became immediately clear that there was a major issue at M1 J15a, revealing the cause of the traffic reassignment away from the M1 mainline between junctions 15 and 15a as shown on **Figure 5** and described above.

3.13 The VISSIM model for the 2031 D1 reference case scenario showed that queues begin to develop on the M1 northbound and M1 southbound approaches to M1 J15a and these queues quickly propagate back to the mainline, causing significant delay in both peak hours, but especially in the evening peak hour. Screenshots taken of the 2031 D1 reference case VISSIM model have been taken for both peak hours and these are presented in **Appendix C**.

3.14 The VISSIM screenshots provided at **Appendix C** show that not only does the queuing from M1 J15a reach the M1 mainline in both directions, but it is significant enough to cause blockages to through traffic, with northbound queueing almost reaching back to M1 J15. It should be noted that this queueing occurs despite the implementation of the Smart Motorway program which increases the M1 mainline to four lanes in each direction.

3.15 Clearly, the queueing issue at M1 J15a is not caused by the proposed development as it is evident in the 2031 D1 reference case VISSIM model. However, as shown at **Figure 5**, the presence of development traffic causes further reassignment onto alternate routes as a result of this issue at M1 J15a, potentially leading to impacts at other locations. Based on this

evidence, it is therefore appropriate that a mitigation scheme should be developed at M1 J15a to remove the requirement for traffic to reassign away from the M1.

Existing junction assessment

3.16 The 2016 base Arcady model discussed in Section 2 has been run with the 2031 D1 reference case and 2031 J1a development case traffic flows and the results are presented in **Appendix D** and summarised in **Table 2** below.

Northern Roundabout				
scenario		A43 S Link	M1 S'bnd Off-slip	A5123
2031 reference D1 - AM	RFC	58%	74%	86%
	max queue (veh)	1.5	2.91	5.39
	max delay (secs)	3.52	9.85	9.27
2031 reference D1 - PM	RFC	72%	87%	61%
	max queue (veh)	2.72	6.48	1.57
	max delay (secs)	5.05	22.56	3.88
2031 development J1a - AM	RFC	63%	67%	86%
	max queue (veh)	1.83	2.08	5.94
	max delay (secs)	4.06	8.02	9.91
2031 development J1a - PM	RFC	75%	92%	67%
	max queue (veh)	3.16	9.61	2.06
	max delay (secs)	5.65	33.53	4.54

Southern Roundabout				
scenario		A43 N Link	A43	M1 N'bnd Off-slip
2031 reference D1 - AM	RFC	96%	86%	121%
	max queue (veh)	17.22	6.11	72.87
	max delay (secs)	28.60	11.25	311.79
2031 reference D1 - PM	RFC	75%	85%	143%
	max queue (veh)	2.91	5.68	135.72
	max delay (secs)	5.62	9.84	664.30
2031 development J1a - AM	RFC	94%	87%	123%
	max queue (veh)	12.32	6.39	76.54
	max delay (secs)	21.11	11.83	335.62
2031 development J1a - PM	RFC	79%	87%	155%
	max queue (veh)	3.68	6.45	191.58
	max delay (secs)	6.74	11.12	962.07

Table 2: 2031 existing junction Arcady results

3.17 The results show that both the northern and southern roundabouts would operate over capacity in the morning peak hour, with the M1 northbound off-slip approach to the southern roundabout suffering from significant delay and queueing in the 2031 D1 reference case. However, the results in **Table 2** show that the impact of the development on the performance of the junction is not significant, with the highest increase in queueing of just 4 vehicles seen on the M1 northbound off-slip approach to the southern roundabout.

3.18 However, in the evening peak hour the junction, and in particular the M1 northbound off-slip approach, is operating significantly over capacity in both the 2031 reference case and development case scenarios. In the 2031 D1 reference case the M1 northbound off-slip approach is predicted to have a queue of 136 vehicles, which corresponds with the significant queueing reported in the VISSIM modelling, as discussed in Section 3. The impact of the

development causes this queue to grow to 192 vehicles, an increase of 56 vehicles from the 2031 D1 reference case scenario.

3.19 Therefore, considering the analysis of the strategic model data and the initial feedback from the VISSIM modelling discussed in Section 3, along with the established impacts to junction performance in the 2031 evening peak hour summarised above, the requirement for a mitigation scheme at M1 J15a has been established.

4.0 PROPOSED MITIGATION

Constraints

4.1 The existing M1 J15a consists of a grade-separated 'dumbell' arrangement with roundabouts either side of a single carriageway link which passes under over the motorway. Traffic exiting the M1 on both the northbound off-slip and the southbound off-slip has to pass through the minor northwest and southwest roundabouts, respectively, before arriving at the main junction.

4.2 For the southbound off-slip, right-turning traffic from the A43 and the A5123 wishing to access the Swan Valley industrial estate at the northwest roundabout contributes to delay on the off-slip. Once at the northern roundabout, the M1 southbound off-slip traffic is opposed by a substantial flow from the A43.

4.3 The M1 northbound off-slip approach to M1 J15a is a single lane approach to the southern roundabout with the opportunity for widening limited by the narrow canal bridge. Traffic on this approach is also opposed by a significant flow from the A43 heading north to Northampton.

4.4 The Arcady and VISSIM modelling of the existing junction in the 2031 D1 reference case scenario show that the M1 northbound off-slip suffers from significant congestion, whilst the VISSIM model also shows that the M1 southbound off-slip also suffers from congestion and queueing back to the M1 mainline.

4.5 Therefore, the design philosophy for the mitigation has been focused on avoiding queues on the northbound and southbound M1 off-slips from reaching the M1 mainline, without adversely affecting the performance of the A43 and A5123 approaches to the junction.

Initial mitigation option

4.6 The initial strategy for the mitigation at M1 J15a was to signalise the A43 and M1 northbound off-slip approaches to the southern roundabout to increase the opportunity for M1 off-slip traffic to enter the junction. By signalising these approaches, northbound platoons would be formed at the northern roundabout which would in turn create breaks in the controlling flow at the M1 southbound approach to the northern roundabout, improving its performance.

4.7 A LinSig model of the southern roundabout at M1 J15a was developed and used to arrive at the initial mitigation option shown in **Figure 6** below, which provides the following:

- Widening on the A43 approach to provide 3 lanes.
- Signalising the A43 approach
- Provision of three circulating lanes.
- Signalising and widening of the M1 northbound off-slip.

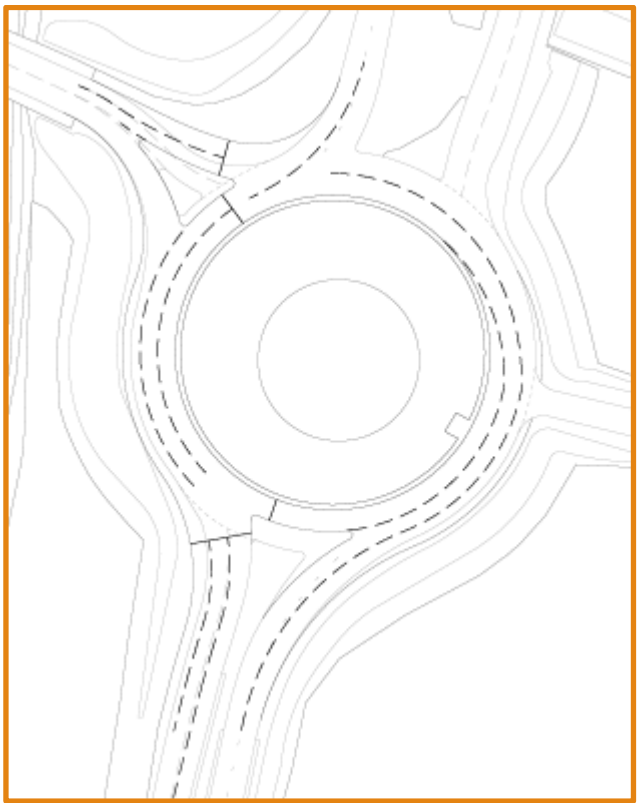


Figure 6: M1 J15a initial mitigation option

4.8 The LinSig modelling results for the M1 J15a southern roundabout layout detailed above for the 2031 J1a development case scenario are provided at **Appendix E** and summarised in **Table 3** below.

Arm	Degree of Saturation		Mean Max. Queue	
	AM	PM	AM	PM
A43 southbound	87.0%	73.4%	11.1	1.4
A43 northbound	86.1%	82.9%	13.5	11.7
M1 northbound off-slip	89.0%	100.8%	11.9	27.6

Table 3: Summary of junction performance with initial mitigation option

4.9 Comparing **Table 3** with **Table 2** (existing layout) shows that the proposed scheme would provide significant betterment to the operation of the M1 northbound off-slip approach. With the proposed mitigation in place it would operate below 90% saturation in the morning peak hour and with significant reductions in queueing. Further, the A43 northbound approach would operate within 90% of its capacity with no significant queueing.

4.10 The proposed mitigation scheme was incorporated into the 2031 J1a development case VISSIM model which showed that queues for the M1 northbound off-slip could be contained within the approach to the southwest roundabout in both peaks. However, the modelling showed that the M1 southbound off-slip continued to queue back to the mainline in the PM peak, as shown on **Figure 7** below.

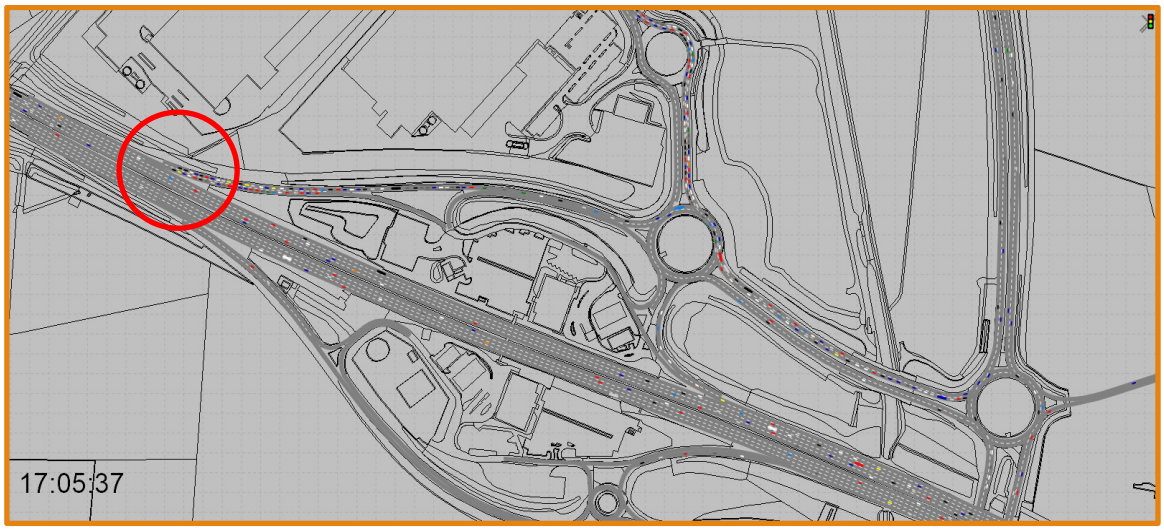


Figure 7: Screenshot taken from VISSIM for the initial mitigation option

Second mitigation option

4.11 Whilst the initial mitigation option appeared to resolve the queueing issue on the M1 northbound off-slip approach to the southern roundabout, it did not resolve the issue at the northern roundabout and therefore a more comprehensive scheme was considered necessary.

4.12 To minimise the scale of the physical works required, and provide sufficient time for vehicles on the M1 southbound off-slip approach to clear the give-way line at the northern roundabout, the signalisation of the A43 northbound link approach to the northern roundabout was considered.

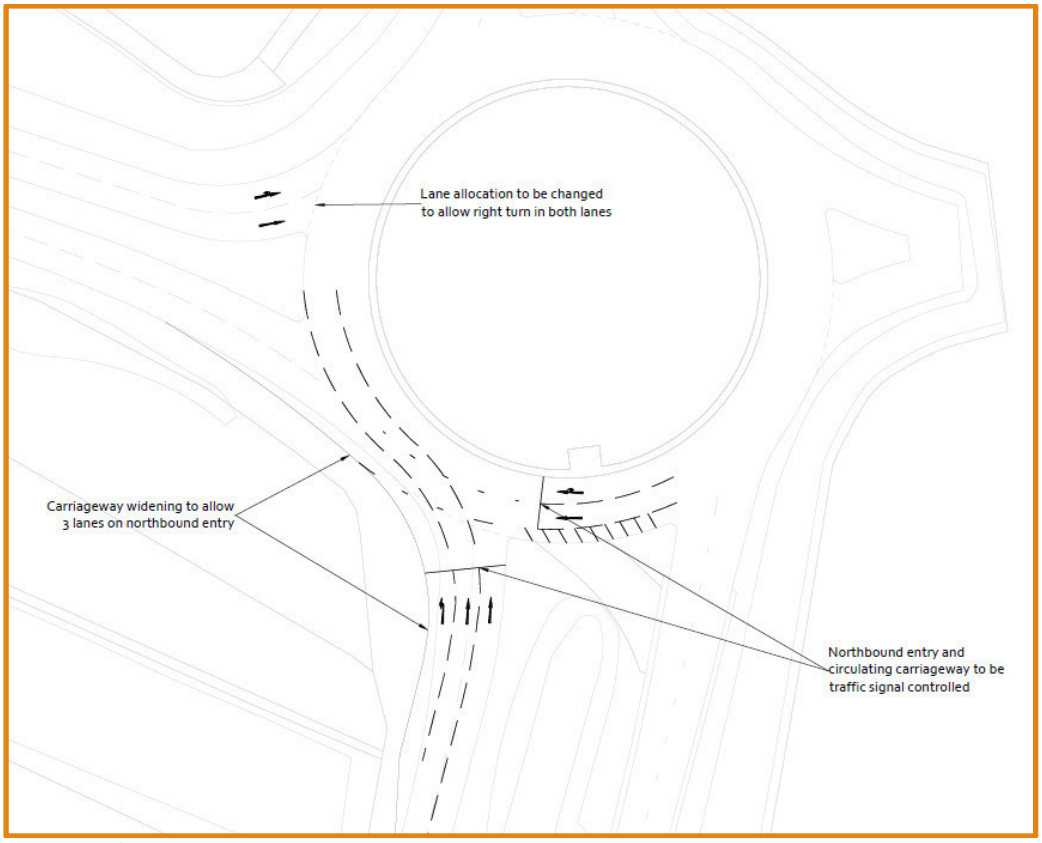


Figure 8: Saxon Avenue right-turn

4.13 This option would require widening on the A43 north bound approach to the northern roundabout to provide three lanes at the stopline as shown on **Figure 8** above. The signals at

the northern and southern roundabout would also require coordinating through a linked MOVA control system. The LinSig model output for the option in **Figure 8** is provided at **Appendix F** and a summary of the results are shown in **Table 4**.

Arm	Degree of Saturation		Mean Max. Queue	
	AM	PM	AM	PM
Southern Roundabout				
A43 southbound	85.0%	75.1%	9.9	6.0
A43 northbound	85.0%	87.7%	12.9	14.1
M1 northbound off-slip	90.2%	97.6%	13.6	21.5
Northern Roundabout				
A5123	88.3%	70.7%	4.4	1.2
A43 northbound	73.7%	82.4%	3.4	6.8
M1 southbound off-slip	60.6%	78.1%	4.1	6.9

Table 4: Summary of junction performance for the second mitigation iteration

4.14 **Table 4** shows that the proposed scheme would provide significant betterment to the operation of the M1 northbound off-slip approach, with the approach operating less than 90% saturated in the morning peak hour and with significant reductions in queueing when compared to the results shown in **Table 2** for the exiting layout in both peak hours. Further, the LinSig results show that the M1 southbound off-slip approach to the northern roundabout would operate comfortably below 90% saturated in the both the morning and evening peak hours.

4.15 The second iteration of the proposed mitigation scheme was incorporated into the 2031 J1a development case VISSIM model which showed that queues for the M1 northbound off-slip and the M1 southbound offslip could be contained within the available stacking space in both peaks. However, the modelling showed that the A5123 approach had a significant increase in queueing in the morning peak hour. This was thought to be a result of unlocking the right-turn from the M1 southbound off-slip to the A43. **Figure 9** below shows the queueing on the A5123 approach in the morning peak, and also demonstrates the reduction in queueing on the M1 off-slip approaches.

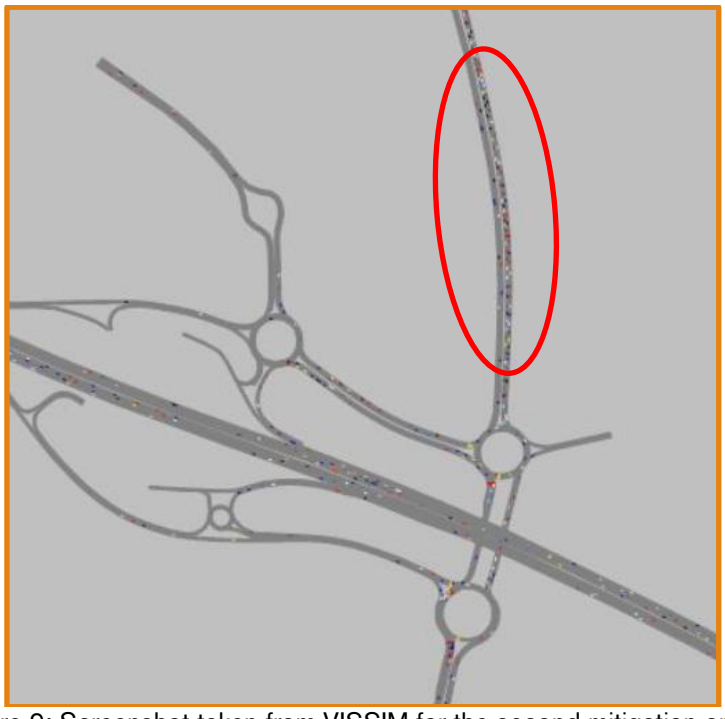


Figure 9: Screenshot taken from VISSIM for the second mitigation option

Preferred mitigation option

4.16 Whilst the second iteration of the mitigation scheme successfully resolved the queueing issues at the M1 off-slip approaches to M1 J15a, releasing this traffic that had previously been unable to enter the junction led to capacity problems at the A5123 approach. This is clearly an undesirable consequence and therefore a further iteration to the proposed mitigation was considered.

4.17 Several options were considered, including additional signalisation of either the A5123 approach or the M1 southbound off-slip approach. However, the most appropriate solution was to provide a flared third lane on the A5123 approach at the northern roundabout as shown on **Figure 10** below.

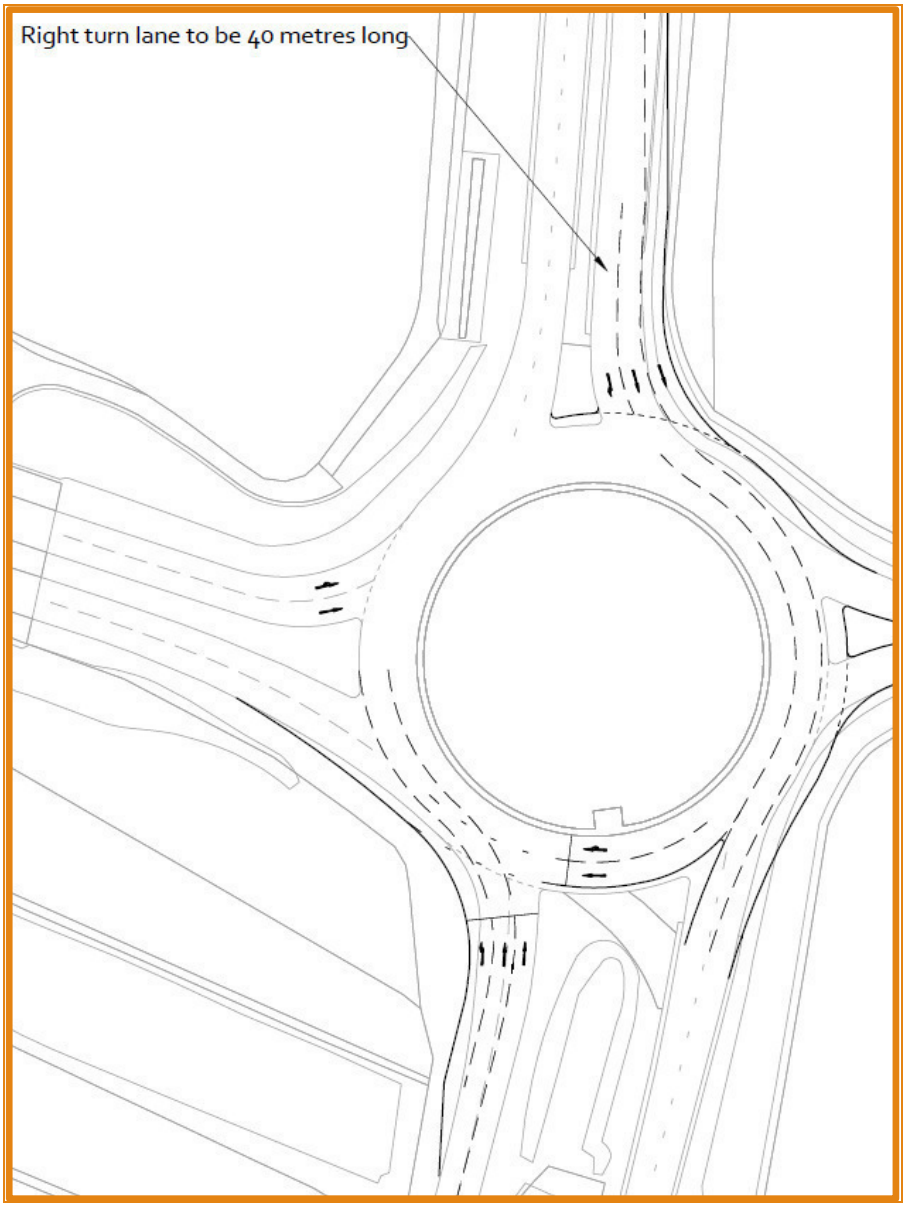


Figure 10: Preferred mitigation proposal at the northern roundabout

4.18 The result proposed mitigation scheme is shown at BWB drawing number **NGW-BWB-GEN-XX-SK-C-SK20-S3-P2**.

4.19 The VISSIM model for the 2031 J1a development case scenario was updated for the third iteration of the mitigation scheme and the results showed that all queueing on the M1 northbound and M1 southbound off-slips could be contained within the available carriageway

without queues reaching the M1 mainline, and no significant capacity issues were recorded on the A43 or A5123 approaches to the junction. Full details of the VISSIM modelling and an analysis of the results will be provided in the Transport Assessment.

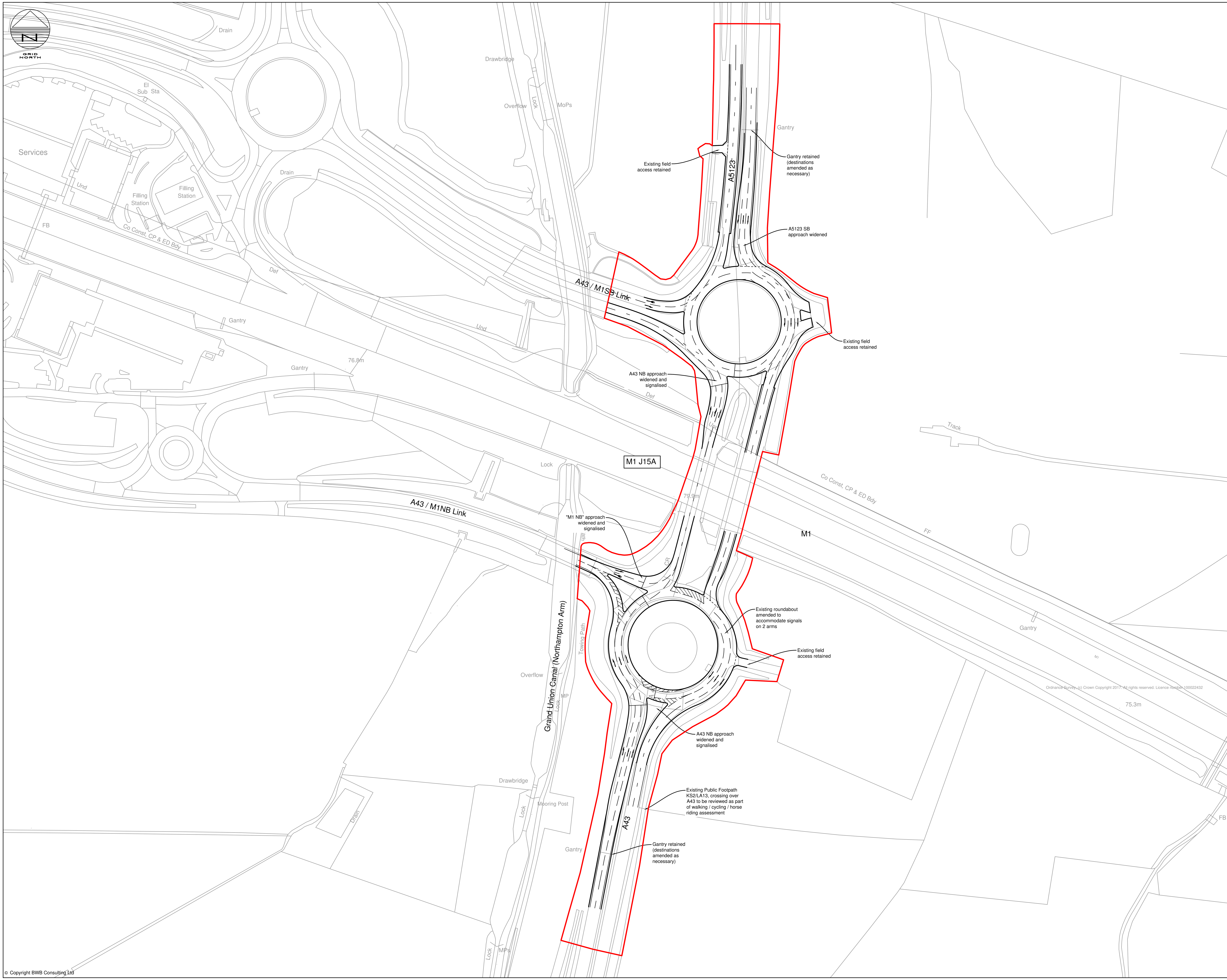
4.20 The LinSig model of the proposed mitigation scheme is provided at **Appendix G** and is summarised at **Table 5** which shows that the proposed scheme would provide significant betterment when compared to the reference case scenarios (**Table 2**).

Southern Roundabout				
Arm	Degree of Saturation		Mean Max. Queue	
	AM	PM	AM	PM
A43 southbound	78.2%	82.8%	10.4	7.9
A43 northbound	90.0%	87.7%	13.6	14.1
M1 northbound off-slip	93.4%	97.6%	15.6	21.5
Northern Roundabout				
A5123	85.7%	74.5%	2.9	2.8
A43 northbound	76.5%	82.4%	3.7	6.9
M1 southbound off-slip	76.0%	81.3%	7.7	9.7

Table 5: Summary of junction performance for the third mitigation iteration

4.21 The proposed mitigation model will be coded into the NSTM2 and a revised set of data will be provided. The LinSig and VISSIM modelling will be updated with the revised NSTM2 data when available to confirm that the mitigation is functioning as intended.

DRAWINGS



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.

Legend

Order Limits

Rev	Date	Details of issue / revision	Drw	Rev
P2	16.08.17	Order limits added	PG	PG
P1	26.07.17	Preliminary Issue	SRH	SRH

Issues & Revisions

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Client

ROXHILL

Project Title

NORTHAMPTON GATEWAY RAIL FREIGHT INTERCHANGE

Drawing Title

M1 J15A (A43/A5123) GENERAL ARRANGEMENT

Drawn:	S. Hilditch	Reviewed:	S. Hilditch
BWB Ref:	NTH 2315	Date: 26.07.17	Scale@A1: 1:1250

Drawing Status

FOR COMMENT

Project - Originator - Zone - Level - Type - Role - Number	Status	Rev
NGW-BWB-GEN-XX-SK-C-SK20	S3	P2

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APPENDIX A

2016 ARCADY MODELLING RESULTS

Junctions 8

ARCADY 8 - Roundabout Module

Version: 8.0.4.487 [15039,24/03/2014]

For sales and distribution information, program advice and maintenance, contact TRL:
Tel: +44 (0)1344 770758 email: software@trl.co.uk Web: http://www.trlsoftware.co.uk

Filename: M1 Jct 15a (North) ARCADY Model - 2016 Base.arc8
Path: C:\Users\ADCteam\Dropbox\~ JN8 TEMP\ADC1475
Report generation date: 24/08/2017 13:45:36

Summary of junction performance

	AM			PM		
	Queue (Veh)	Delay (s)	RFC	Queue (Veh)	Delay (s)	RFC
	NSTM Traffic Flows - 2016 Base					
Arm 1	1.53	3.89	0.61	2.74	5.30	0.74
Arm 2	0.78	4.73	0.44	1.29	6.42	0.57
Arm 3	3.31	6.55	0.77	0.80	2.71	0.45

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle.

"D1 - 2016 Base, AM " model duration: 08:00 - 09:30
"D2 - 2016 Base, PM" model duration: 17:00 - 18:30

Run using Junctions 8.0.4.487 at 24/08/2017 13:45:34

File summary

Title	M1 Jct 15a (North)
Location	Northampton
Site Number	
Date	12/06/2017
Version	v1
Status	Preliminary
Identifier	M Tatler
Client	Roxhill
Jobnumber	ADC1475
Enumerator	M Tatler
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	RFC Threshold	Average Delay Threshold (s)	Queue Threshold (PCU)
5.75			N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	Veh	Veh	perHour	s	-Min	perMin

NSTM Traffic Flows - 2016 Base, AM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set (s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
NSTM Traffic Flows	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
2016 Base, AM	2016 Base	AM		ONE HOUR	08:00	09:30	90	15				✓		

Junction Network

Junctions

Junction	Name	Junction Type	Arm Order	Grade Separated	Large Roundabout	Do Geometric Delay	Junction Delay (s)	Junction LOS
1	M1 Jct 15a (North)	Roundabout	1,2,3				5.26	A

Junction Network Options

Driving Side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Arm	Name	Description
1	1	A43 S Link	
2	2	M1 Sbnd Offslip	
3	3	A5123 N	

Capacity Options

Arm	Minimum Capacity (PCU/hr)	Maximum Capacity (PCU/hr)	Assume Flat Start Profile	Initial Queue (PCU)
1	0.00	99999.00		0.00
2	0.00	99999.00		0.00
3	0.00	99999.00		0.00

Roundabout Geometry

Arm	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
1	7.40	11.10	20.10	19.20	80.00	32.00	
2	7.20	8.50	6.00	18.00	80.00	62.00	
3	8.10	10.00	15.20	18.70	80.00	26.00	

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Arm	Enter slope and intercept directly	Entered slope	Entered intercept (PCU/hr)	Final Slope	Final Intercept (PCU/hr)
1		(calculated)	(calculated)	0.650	2921.251
2		(calculated)	(calculated)	0.510	2133.026
3		(calculated)	(calculated)	0.650	2895.546

The slope and intercept shown above include any corrections and adjustments.

Arm Capacity Adjustments

Arm	Type	Reason	Direct Capacity Adjustment (PCU/hr)	Percentage Capacity Adjustment (%)
1	None			
2	Direct		0.00	
3	None			

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCU Factor for a HV (PCU)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	HV Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Arm	Profile Type	Use Turning Counts	Average Demand Flow (Veh/hr)	Flow Scaling Factor (%)
1	ONE HOUR	✓	1292.00	100.000
2	ONE HOUR	✓	538.00	100.000
3	ONE HOUR	✓	1676.00	100.000

Turning Proportions

Turning Counts / Proportions (Veh/hr) - Junction 1 (for whole period)

		To		
		1	2	3
From	1	0.000	443.000	849.000
	2	457.000	0.000	81.000
	3	1183.000	493.000	0.000

Turning Proportions (Veh) - Junction 1 (for whole period)

		To		
		1	2	3
From	1	0.00	0.34	0.66
	2	0.85	0.00	0.15
	3	0.71	0.29	0.00

Vehicle Mix

Average PCU Per Vehicle - Junction 1 (for whole period)

		To		
		1	2	3
From	1	1.000	1.137	1.062
	2	1.210	1.000	1.160
	3	1.046	1.040	1.000

Heavy Vehicle Percentages - Junction 1 (for whole period)

		To		
		1	2	3
From	1	0.0	13.7	6.2
	2	21.0	0.0	16.0
	3	4.6	4.0	0.0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Junction Arrivals (Veh)	Total Queueing Delay (Veh-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (Veh-min/min)	Inclusive Total Queueing Delay (Veh-min)	Inclusive Average Queueing Delay (s)
1	0.61	3.89	1.53	A	1185.56	1778.34	92.59	3.12	1.03	92.59	3.12
2	0.44	4.73	0.78	A	493.68	740.52	49.46	4.01	0.55	49.46	4.01
3	0.77	6.55	3.31	A	1537.92	2306.88	172.99	4.50	1.92	173.00	4.50

Main Results for each time segment

Main results: (08:00-08:15)

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Entry Flow (Veh/hr)	Exit Flow (Veh/hr)	Circulating Flow (Veh/hr)	Pedestrian Demand (Ped/hr)	Capacity (Veh/hr)	Saturation Capacity (Veh/hr)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
1	972.68	243.17	970.07	1230.59	369.98	0.00	2455.88	2306.66	0.396	0.00	0.65	2.419	A
2	405.04	101.26	403.55	702.60	637.46	0.00	1486.81	1091.29	0.272	0.00	0.37	3.319	A
3	1261.77	315.44	1257.77	698.21	342.79	0.00	2514.64	2074.55	0.502	0.00	1.00	2.854	A

Main results: (08:15-08:30)

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Entry Flow (Veh/hr)	Exit Flow (Veh/hr)	Circulating Flow (Veh/hr)	Pedestrian Demand (Ped/hr)	Capacity (Veh/hr)	Saturation Capacity (Veh/hr)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
1	1161.48	290.37	1160.39	1472.30	442.54	0.00	2410.81	2306.66	0.482	0.65	0.92	2.876	A
2	483.65	120.91	483.11	840.42	762.52	0.00	1430.49	1091.29	0.338	0.37	0.51	3.798	A
3	1506.68	376.67	1504.45	835.26	410.37	0.00	2463.73	2074.55	0.612	1.00	1.56	3.745	A

Main results: (08:30-08:45)

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Entry Flow (Veh/hr)	Exit Flow (Veh/hr)	Circulating Flow (Veh/hr)	Pedestrian Demand (Ped/hr)	Capacity (Veh/hr)	Saturation Capacity (Veh/hr)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
1	1422.51	355.63	1420.14	1799.98	540.80	0.00	2349.78	2306.66	0.605	0.92	1.52	3.862	A
2	592.35	148.09	591.30	1027.74	933.21	0.00	1353.62	1091.29	0.438	0.51	0.77	4.715	A
3	1845.30	461.33	1838.49	1022.23	502.27	0.00	2394.50	2074.55	0.771	1.56	3.26	6.398	A

Main results: (08:45-09:00)

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Entry Flow (Veh/hr)	Exit Flow (Veh/hr)	Circulating Flow (Veh/hr)	Pedestrian Demand (Ped/hr)	Capacity (Veh/hr)	Saturation Capacity (Veh/hr)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
1	1422.51	355.63	1422.48	1805.52	542.74	0.00	2348.58	2306.66	0.606	1.52	1.53	3.887	A
2	592.35	148.09	592.33	1030.48	934.74	0.00	1352.93	1091.29	0.438	0.77	0.78	4.732	A
3	1845.30	461.33	1845.10	1023.92	503.15	0.00	2393.83	2074.55	0.771	3.26	3.31	6.554	A

Main results: (09:00-09:15)

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Entry Flow (Veh/hr)	Exit Flow (Veh/hr)	Circulating Flow (Veh/hr)	Pedestrian Demand (Ped/hr)	Capacity (Veh/hr)	Saturation Capacity (Veh/hr)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
1	1161.48	290.37	1163.84	1480.07	445.22	0.00	2409.15	2306.66	0.482	1.53	0.94	2.897	A
2	483.65	120.91	484.69	844.28	764.79	0.00	1429.47	1091.29	0.338	0.78	0.51	3.813	A
3	1506.68	376.67	1513.56	837.76	411.72	0.00	2462.71	2074.55	0.612	3.31	1.59	3.821	A

Main results: (09:15-09:30)

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Entry Flow (Veh/hr)	Exit Flow (Veh/hr)	Circulating Flow (Veh/hr)	Pedestrian Demand (Ped/hr)	Capacity (Veh/hr)	Saturation Capacity (Veh/hr)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
1	972.68	243.17	973.79	1236.78	371.84	0.00	2454.72	2306.66	0.396	0.94	0.66	2.434	A
2	405.04	101.26	405.59	705.73	639.90	0.00	1485.71	1091.29	0.273	0.51	0.38	3.333	A
3	1261.77	315.44	1264.09	700.96	344.52	0.00	2513.34	2074.55	0.502	1.59	1.01	2.888	A

Queueing Delay Results for each time segment

Queueing Delay results: (08:00-08:15)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
1	9.61	0.64	2.419	A	A
2	5.47	0.36	3.319	A	A
3	14.64	0.98	2.854	A	A

Queueing Delay results: (08:15-08:30)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
1	13.61	0.91	2.876	A	A
2	7.48	0.50	3.798	A	A
3	22.72	1.51	3.745	A	A

Queueing Delay results: (08:30-08:45)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
1	22.11	1.47	3.862	A	A
2	11.28	0.75	4.715	A	A
3	45.94	3.06	6.398	A	A

Queueing Delay results: (08:45-09:00)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
1	22.86	1.52	3.887	A	A
2	11.60	0.77	4.732	A	A
3	49.37	3.29	6.554	A	A

Queueing Delay results: (09:00-09:15)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
1	14.36	0.96	2.897	A	A
2	7.88	0.53	3.813	A	A
3	24.76	1.65	3.821	A	A

Queueing Delay results: (09:15-09:30)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
1	10.04	0.67	2.434	A	A
2	5.74	0.38	3.333	A	A
3	15.55	1.04	2.888	A	A

NSTM Traffic Flows - 2016 Base, PM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set (s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
NSTM Traffic Flows	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
2016 Base, PM	2016 Base	PM		ONE HOUR	17:00	18:30	90	15				✓		

Junction Network

Junctions

Junction	Name	Junction Type	Arm Order	Grade Separated	Large Roundabout	Do Geometric Delay	Junction Delay (s)	Junction LOS
1	M1 Jct 15a (North)	Roundabout	1,2,3				4.80	A

Junction Network Options

Driving Side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Arm	Name	Description
1	1	A43 S Link	
2	2	M1 Sbnd Offslip	
3	3	A5123 N	

Capacity Options

Arm	Minimum Capacity (PCU/hr)	Maximum Capacity (PCU/hr)	Assume Flat Start Profile	Initial Queue (PCU)
1	0.00	99999.00		0.00
2	0.00	99999.00		0.00
3	0.00	99999.00		0.00

Roundabout Geometry

Arm	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
1	7.40	11.10	20.10	19.20	80.00	32.00	
2	7.20	8.50	6.00	18.00	80.00	62.00	
3	8.10	10.00	15.20	18.70	80.00	26.00	

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Arm	Enter slope and intercept directly	Entered slope	Entered intercept (PCU/hr)	Final Slope	Final Intercept (PCU/hr)
1		(calculated)	(calculated)	0.650	2921.251
2		(calculated)	(calculated)	0.510	2133.026
3		(calculated)	(calculated)	0.650	2895.546

The slope and intercept shown above include any corrections and adjustments.

Arm Capacity Adjustments

Arm	Type	Reason	Direct Capacity Adjustment (PCU/hr)	Percentage Capacity Adjustment (%)
1	None			
2	Direct		0.00	
3	None			

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCU Factor for a HV (PCU)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	HV Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Arm	Profile Type	Use Turning Counts	Average Demand Flow (Veh/hr)	Flow Scaling Factor (%)
1	ONE HOUR	✓	1711.00	100.000
2	ONE HOUR	✓	662.00	100.000
3	ONE HOUR	✓	971.00	100.000

Turning Proportions

Turning Counts / Proportions (Veh/hr) - Junction 1 (for whole period)

		To		
		1	2	3
From	1	0.000	512.000	1199.000
	2	512.000	0.000	150.000
	3	700.000	271.000	0.000

Turning Proportions (Veh) - Junction 1 (for whole period)

		To		
		1	2	3
From	1	0.00	0.30	0.70
	2	0.77	0.00	0.23
	3	0.72	0.28	0.00

Vehicle Mix

Average PCU Per Vehicle - Junction 1 (for whole period)

		To		
		1	2	3
From	1	1.000	1.137	1.028
	2	1.144	1.000	1.027
	3	1.027	1.048	1.000

Heavy Vehicle Percentages - Junction 1 (for whole period)

		To		
		1	2	3
From	1	0.0	13.7	2.8
	2	14.4	0.0	2.7
	3	2.7	4.8	0.0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Junction Arrivals (Veh)	Total Queueing Delay (Veh-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (Veh-min/min)	Inclusive Total Queueing Delay (Veh-min)	Inclusive Average Queueing Delay (s)
1	0.74	5.30	2.74	A	1570.04	2355.06	152.39	3.88	1.69	152.40	3.88
2	0.57	6.42	1.29	A	607.46	911.19	74.96	4.94	0.83	74.96	4.94
3	0.45	2.71	0.80	A	891.01	1336.51	52.41	2.35	0.58	52.41	2.35

Main Results for each time segment

Main results: (17:00-17:15)

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Entry Flow (Veh/hr)	Exit Flow (Veh/hr)	Circulating Flow (Veh/hr)	Pedestrian Demand (Ped/hr)	Capacity (Veh/hr)	Saturation Capacity (Veh/hr)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
1	1288.13	322.03	1284.29	909.74	203.57	0.00	2623.62	2364.96	0.491	0.00	0.96	2.680	A
2	498.39	124.60	496.38	587.88	899.98	0.00	1486.62	1131.41	0.335	0.00	0.50	3.627	A
3	731.02	182.76	729.40	1012.45	383.91	0.00	2526.98	2173.32	0.289	0.00	0.41	2.001	A

Main results: (17:15-17:30)

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Entry Flow (Veh/hr)	Exit Flow (Veh/hr)	Circulating Flow (Veh/hr)	Pedestrian Demand (Ped/hr)	Capacity (Veh/hr)	Saturation Capacity (Veh/hr)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
1	1538.15	384.54	1536.23	1088.46	243.47	0.00	2598.01	2364.96	0.592	0.96	1.44	3.385	A
2	595.12	148.78	594.21	703.18	1076.53	0.00	1403.81	1131.41	0.424	0.50	0.73	4.442	A
3	872.91	218.23	872.36	1211.17	459.57	0.00	2472.50	2173.32	0.353	0.41	0.54	2.250	A

Main results: (17:30-17:45)

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Entry Flow (Veh/hr)	Exit Flow (Veh/hr)	Circulating Flow (Veh/hr)	Pedestrian Demand (Ped/hr)	Capacity (Veh/hr)	Saturation Capacity (Veh/hr)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
1	1883.84	470.96	1878.73	1332.01	298.09	0.00	2562.96	2364.96	0.735	1.44	2.72	5.221	A
2	728.88	182.22	726.69	860.29	1316.54	0.00	1291.23	1131.41	0.564	0.73	1.28	6.353	A
3	1069.09	267.27	1068.07	1481.20	562.03	0.00	2398.71	2173.32	0.446	0.54	0.80	2.704	A

Main results: (17:45-18:00)

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Entry Flow (Veh/hr)	Exit Flow (Veh/hr)	Circulating Flow (Veh/hr)	Pedestrian Demand (Ped/hr)	Capacity (Veh/hr)	Saturation Capacity (Veh/hr)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
1	1883.84	470.96	1883.72	1334.39	298.37	0.00	2562.77	2364.96	0.735	2.72	2.74	5.299	A
2	728.88	182.22	728.82	862.06	1320.04	0.00	1289.59	1131.41	0.565	1.28	1.29	6.419	A
3	1069.09	267.27	1069.08	1485.18	563.68	0.00	2397.53	2173.32	0.446	0.80	0.80	2.709	A

Main results: (18:00-18:15)

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Entry Flow (Veh/hr)	Exit Flow (Veh/hr)	Circulating Flow (Veh/hr)	Pedestrian Demand (Ped/hr)	Capacity (Veh/hr)	Saturation Capacity (Veh/hr)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
1	1538.15	384.54	1543.27	1091.98	243.91	0.00	2597.73	2364.96	0.592	2.74	1.46	3.432	A
2	595.12	148.78	597.30	705.72	1081.46	0.00	1401.50	1131.41	0.425	1.29	0.74	4.488	A
3	872.91	218.23	873.93	1216.80	461.96	0.00	2470.77	2173.32	0.353	0.80	0.55	2.257	A

Main results: (18:15-18:30)

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Entry Flow (Veh/hr)	Exit Flow (Veh/hr)	Circulating Flow (Veh/hr)	Pedestrian Demand (Ped/hr)	Capacity (Veh/hr)	Saturation Capacity (Veh/hr)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
1	1288.13	322.03	1290.10	913.59	204.18	0.00	2623.23	2364.96	0.491	1.46	0.97	2.703	A
2	498.39	124.60	499.33	590.23	904.06	0.00	1484.71	1131.41	0.336	0.74	0.51	3.658	A
3	731.02	182.76	731.58	1017.20	386.19	0.00	2525.34	2173.32	0.289	0.55	0.41	2.008	A

Queueing Delay Results for each time segment

Queueing Delay results: (17:00-17:15)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
1	14.05	0.94	2.680	A	A
2	7.34	0.49	3.627	A	A
3	6.00	0.40	2.001	A	A

Queueing Delay results: (17:15-17:30)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
1	21.04	1.40	3.385	A	A
2	10.70	0.71	4.442	A	A
3	8.05	0.54	2.250	A	A

Queueing Delay results: (17:30-17:45)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
1	38.79	2.59	5.221	A	A
2	18.40	1.23	6.353	A	A
3	11.79	0.79	2.704	A	A

Queueing Delay results: (17:45-18:00)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
1	41.00	2.73	5.299	A	A
2	19.26	1.28	6.419	A	A
3	12.02	0.80	2.709	A	A

Queueing Delay results: (18:00-18:15)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
1	22.65	1.51	3.432	A	A
2	11.49	0.77	4.488	A	A
3	8.35	0.56	2.257	A	A

Queueing Delay results: (18:15-18:30)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
1	14.85	0.99	2.703	A	A
2	7.78	0.52	3.658	A	A
3	6.20	0.41	2.008	A	A

Junctions 8

ARCADY 8 - Roundabout Module

Version: 8.0.4.487 [15039,24/03/2014]

For sales and distribution information, program advice and maintenance, contact TRL:
Tel: +44 (0)1344 770758 email: software@trl.co.uk Web: http://www.trlsoftware.co.uk

Filename: M1 Jct 15a (South) ARCADY Model - 2016 Base.arc8
Path: C:\Users\ADCteam\Dropbox\~ JN8 TEMP\ADC1475
Report generation date: 24/08/2017 13:57:49

Summary of junction performance

	AM			PM		
	Queue (Veh)	Delay (s)	RFC	Queue (Veh)	Delay (s)	RFC
	NSTM Traffic Flows - 2016 Base					
Arm 1	3.81	7.74	0.80	1.34	3.58	0.57
Arm 2	1.94	4.45	0.66	5.49	9.63	0.85
Arm 3	3.85	24.14	0.80	14.90	84.96	0.98

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle.

"D1 - 2016 Base, AM " model duration: 08:00 - 09:30
"D2 - 2016 Base, PM" model duration: 17:00 - 18:30

Run using Junctions 8.0.4.487 at 24/08/2017 13:57:47

File summary

Title	M1 Jct 15a (South)
Location	Northampton
Site Number	
Date	12/06/2017
Version	v1
Status	Preliminary
Identifier	M Tatler
Client	Roxhill
Jobnumber	ADC1475
Enumerator	M Tatler
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	RFC Threshold	Average Delay Threshold (s)	Queue Threshold (PCU)
5.75			N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	Veh	Veh	perHour	s	-Min	perMin

NSTM Traffic Flows - 2016 Base, AM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set (s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
NSTM Traffic Flows	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
2016 Base, AM	2016 Base	AM		ONE HOUR	08:00	09:30	90	15				✓		

Junction Network

Junctions

Junction	Name	Junction Type	Arm Order	Grade Separated	Large Roundabout	Do Geometric Delay	Junction Delay (s)	Junction LOS
1	M1 Jct 15a (South)	Roundabout	1,2,3				9.04	A

Junction Network Options

Driving Side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Arm	Name	Description
1	1	A43 N Link	
2	2	A43 S	
3	3	M1 Nbnd Offslip	

Capacity Options

Arm	Minimum Capacity (PCU/hr)	Maximum Capacity (PCU/hr)	Assume Flat Start Profile	Initial Queue (PCU)
1	0.00	99999.00		0.00
2	0.00	99999.00		0.00
3	0.00	99999.00		0.00

Roundabout Geometry

Arm	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
1	9.80	9.80	0.00	17.00	92.00	55.00	
2	8.30	10.40	8.80	28.50	92.00	50.00	
3	4.60	5.20	1.00	19.70	92.00	56.00	

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Arm	Enter slope and intercept directly	Entered slope	Entered intercept (PCU/hr)	Final Slope	Final Intercept (PCU/hr)
1		(calculated)	(calculated)	0.573	2686.180
2		(calculated)	(calculated)	0.587	2718.056
3		(calculated)	(calculated)	0.382	1323.610

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCU Factor for a HV (PCU)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	HV Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Arm	Profile Type	Use Turning Counts	Average Demand Flow (Veh/hr)	Flow Scaling Factor (%)
1	ONE HOUR	✓	1639.00	100.000
2	ONE HOUR	✓	1432.00	100.000
3	ONE HOUR	✓	546.00	100.000

Turning Proportions

Turning Counts / Proportions (Veh/hr) - Junction 1 (for whole period)

		To		
		1	2	3
From	1	0.000	1459.000	180.000
	2	1032.000	0.000	400.000
	3	253.000	293.000	0.000

Turning Proportions (Veh) - Junction 1 (for whole period)

		To		
		1	2	3
From	1	0.00	0.89	0.11
	2	0.72	0.00	0.28
	3	0.46	0.54	0.00

Vehicle Mix

Average PCU Per Vehicle - Junction 1 (for whole period)

		To		
		1	2	3
From	1	1.000	1.093	1.072
	2	1.073	1.000	1.125
	3	1.150	1.147	1.000

Heavy Vehicle Percentages - Junction 1 (for whole period)

		To		
		1	2	3
From	1	0.0	9.3	7.2
	2	7.3	0.0	12.5
	3	15.0	14.7	0.0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Junction Arrivals (Veh)	Total Queueing Delay (Veh-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (Veh-min/min)	Inclusive Total Queueing Delay (Veh-min)	Inclusive Average Queueing Delay (s)
1	0.80	7.74	3.81	A	1503.98	2255.97	195.81	5.21	2.18	195.83	5.21
2	0.66	4.45	1.94	A	1314.02	1971.03	115.47	3.52	1.28	115.48	3.52
3	0.80	24.14	3.85	C	501.02	751.53	176.21	14.07	1.96	176.24	14.07

Main Results for each time segment

Main results: (08:00-08:15)

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Entry Flow (Veh/hr)	Exit Flow (Veh/hr)	Circulating Flow (Veh/hr)	Pedestrian Demand (Ped/hr)	Capacity (Veh/hr)	Saturation Capacity (Veh/hr)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
1	1233.93	308.48	1229.46	963.50	218.72	0.00	2330.96	2285.67	0.529	0.00	1.12	3.255	A
2	1078.08	269.52	1074.89	1313.16	135.02	0.00	2421.23	2354.17	0.445	0.00	0.80	2.667	A
3	411.06	102.76	407.58	435.27	774.64	0.00	876.31	547.50	0.469	0.00	0.87	7.625	A

Main results: (08:15-08:30)

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Entry Flow (Veh/hr)	Exit Flow (Veh/hr)	Circulating Flow (Veh/hr)	Pedestrian Demand (Ped/hr)	Capacity (Veh/hr)	Saturation Capacity (Veh/hr)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
1	1473.43	368.36	1470.90	1153.13	262.17	0.00	2304.76	2285.67	0.639	1.12	1.75	4.304	A
2	1287.33	321.83	1285.96	1571.53	161.54	0.00	2405.90	2354.17	0.535	0.80	1.14	3.210	A
3	490.84	122.71	488.56	520.75	926.76	0.00	822.06	547.50	0.597	0.87	1.44	10.719	B

Main results: (08:30-08:45)

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Entry Flow (Veh/hr)	Exit Flow (Veh/hr)	Circulating Flow (Veh/hr)	Pedestrian Demand (Ped/hr)	Capacity (Veh/hr)	Saturation Capacity (Veh/hr)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
1	1804.58	451.14	1796.70	1408.47	317.87	0.00	2271.18	2285.68	0.795	1.75	3.72	7.465	A
2	1576.65	394.16	1573.53	1917.25	197.32	0.00	2385.22	2354.17	0.661	1.14	1.92	4.418	A
3	601.16	150.29	592.34	636.85	1134.00	0.00	748.15	547.50	0.804	1.44	3.65	21.955	C

Main results: (08:45-09:00)

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Entry Flow (Veh/hr)	Exit Flow (Veh/hr)	Circulating Flow (Veh/hr)	Pedestrian Demand (Ped/hr)	Capacity (Veh/hr)	Saturation Capacity (Veh/hr)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
1	1804.58	451.14	1804.24	1414.39	322.15	0.00	2268.60	2285.68	0.795	3.72	3.81	7.738	A
2	1576.65	394.16	1576.60	1928.23	198.15	0.00	2384.74	2354.17	0.661	1.92	1.94	4.454	A
3	601.16	150.29	600.32	638.54	1136.21	0.00	747.36	547.50	0.804	3.65	3.85	24.139	C

Main results: (09:00-09:15)

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Entry Flow (Veh/hr)	Exit Flow (Veh/hr)	Circulating Flow (Veh/hr)	Pedestrian Demand (Ped/hr)	Capacity (Veh/hr)	Saturation Capacity (Veh/hr)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
1	1473.43	368.36	1481.44	1161.74	268.39	0.00	2301.01	2285.67	0.640	3.81	1.80	4.435	A
2	1287.33	321.83	1290.44	1587.13	162.70	0.00	2405.23	2354.17	0.535	1.94	1.16	3.237	A
3	490.84	122.71	500.14	523.15	929.99	0.00	820.91	547.50	0.598	3.85	1.53	11.528	B

Main results: (09:15-09:30)

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Entry Flow (Veh/hr)	Exit Flow (Veh/hr)	Circulating Flow (Veh/hr)	Pedestrian Demand (Ped/hr)	Capacity (Veh/hr)	Saturation Capacity (Veh/hr)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
1	1233.93	308.48	1236.60	969.60	221.94	0.00	2329.01	2285.67	0.530	1.80	1.14	3.302	A
2	1078.08	269.52	1079.49	1322.73	135.81	0.00	2420.78	2354.17	0.445	1.16	0.81	2.688	A
3	411.06	102.76	413.58	437.34	777.96	0.00	875.13	547.50	0.470	1.53	0.90	7.841	A

Queueing Delay Results for each time segment

Queueing Delay results: (08:00-08:15)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
1	16.27	1.08	3.255	A	A
2	11.72	0.78	2.667	A	A
3	12.41	0.83	7.625	A	A

Queueing Delay results: (08:15-08:30)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
1	25.41	1.69	4.304	A	A
2	16.77	1.12	3.210	A	A
3	20.46	1.36	10.719	B	B

Queueing Delay results: (08:30-08:45)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
1	51.85	3.46	7.465	A	A
2	27.83	1.86	4.418	A	A
3	47.58	3.17	21.955	C	C

Queueing Delay results: (08:45-09:00)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
1	56.59	3.77	7.738	A	A
2	28.97	1.93	4.454	A	A
3	56.56	3.77	24.139	C	C

Queueing Delay results: (09:00-09:15)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
1	28.23	1.88	4.435	A	A
2	17.85	1.19	3.237	A	A
3	25.11	1.67	11.528	B	B

Queueing Delay results: (09:15-09:30)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
1	17.46	1.16	3.302	A	A
2	12.33	0.82	2.688	A	A
3	14.09	0.94	7.841	A	A

NSTM Traffic Flows - 2016 Base, PM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set (s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
NSTM Traffic Flows	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
2016 Base, PM	2016 Base	PM		ONE HOUR	17:00	18:30	90	15				✓		

Junction Network

Junctions

Junction	Name	Junction Type	Arm Order	Grade Separated	Large Roundabout	Do Geometric Delay	Junction Delay (s)	Junction LOS
1	M1 Jct 15a (South)	Roundabout	1,2,3				19.65	C

Junction Network Options

Driving Side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Arm	Name	Description
1	1	A43 N Link	
2	2	A43 S	
3	3	M1 Nbnd Offslip	

Capacity Options

Arm	Minimum Capacity (PCU/hr)	Maximum Capacity (PCU/hr)	Assume Flat Start Profile	Initial Queue (PCU)
1	0.00	99999.00		0.00
2	0.00	99999.00		0.00
3	0.00	99999.00		0.00

Roundabout Geometry

Arm	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
1	9.80	9.80	0.00	17.00	92.00	55.00	
2	8.30	10.40	8.80	28.50	92.00	50.00	
3	4.60	5.20	1.00	19.70	92.00	56.00	

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Arm	Enter slope and intercept directly	Entered slope	Entered intercept (PCU/hr)	Final Slope	Final Intercept (PCU/hr)
1		(calculated)	(calculated)	0.573	2686.180
2		(calculated)	(calculated)	0.587	2718.056
3		(calculated)	(calculated)	0.382	1323.610

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCU Factor for a HV (PCU)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	HV Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Arm	Profile Type	Use Turning Counts	Average Demand Flow (Veh/hr)	Flow Scaling Factor (%)
1	ONE HOUR	✓	1232.00	100.000
2	ONE HOUR	✓	1915.00	100.000
3	ONE HOUR	✓	589.00	100.000

Turning Proportions

Turning Counts / Proportions (Veh/hr) - Junction 1 (for whole period)

		To		
		1	2	3
From	1	0.000	1144.000	88.000
	2	1366.000	0.000	549.000
	3	374.000	215.000	0.000

Turning Proportions (Veh) - Junction 1 (for whole period)

		To		
		1	2	3
From	1	0.00	0.93	0.07
	2	0.71	0.00	0.29
	3	0.63	0.37	0.00

Vehicle Mix

Average PCU Per Vehicle - Junction 1 (for whole period)

		To		
		1	2	3
From	1	1.000	1.072	1.114
	2	1.056	1.000	1.107
	3	1.078	1.104	1.000

Heavy Vehicle Percentages - Junction 1 (for whole period)

		To		
		1	2	3
From	1	0.0	7.2	11.4
	2	5.6	0.0	10.7
	3	7.8	10.4	0.0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Junction Arrivals (Veh)	Total Queueing Delay (Veh-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (Veh-min/min)	Inclusive Total Queueing Delay (Veh-min)	Inclusive Average Queueing Delay (s)
1	0.57	3.58	1.34	A	1130.50	1695.76	84.50	2.99	0.94	84.50	2.99
2	0.85	9.63	5.49	A	1757.24	2635.86	262.36	5.97	2.92	262.39	5.97
3	0.98	84.96	14.90	F	540.48	810.72	438.03	32.42	4.87	438.08	32.42

Main Results for each time segment

Main results: (17:00-17:15)

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Entry Flow (Veh/hr)	Exit Flow (Veh/hr)	Circulating Flow (Veh/hr)	Pedestrian Demand (Ped/hr)	Capacity (Veh/hr)	Saturation Capacity (Veh/hr)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
1	927.51	231.88	925.01	1303.30	160.25	0.00	2404.42	2375.55	0.386	0.00	0.63	2.429	A
2	1441.71	360.43	1436.30	1019.20	66.07	0.00	2498.45	2435.21	0.577	0.00	1.35	3.373	A
3	443.43	110.86	439.02	477.84	1024.54	0.00	837.38	573.28	0.530	0.00	1.10	8.943	A

Main results: (17:15-17:30)

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Entry Flow (Veh/hr)	Exit Flow (Veh/hr)	Circulating Flow (Veh/hr)	Pedestrian Demand (Ped/hr)	Capacity (Veh/hr)	Saturation Capacity (Veh/hr)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
1	1107.54	276.89	1106.60	1559.12	191.74	0.00	2385.88	2375.55	0.464	0.63	0.86	2.813	A
2	1721.55	430.39	1718.15	1219.30	79.04	0.00	2490.53	2435.22	0.691	1.35	2.20	4.640	A
3	529.50	132.37	525.28	571.61	1225.58	0.00	762.87	573.28	0.694	1.10	2.16	14.889	B

Main results: (17:30-17:45)

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Entry Flow (Veh/hr)	Exit Flow (Veh/hr)	Circulating Flow (Veh/hr)	Pedestrian Demand (Ped/hr)	Capacity (Veh/hr)	Saturation Capacity (Veh/hr)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
1	1356.46	339.11	1354.58	1884.81	224.04	0.00	2366.86	2375.56	0.573	0.86	1.33	3.550	A
2	2108.46	527.11	2095.97	1481.86	96.76	0.00	2479.72	2435.21	0.850	2.20	5.32	9.097	A
3	648.50	162.13	613.77	697.64	1495.09	0.00	662.97	573.28	0.978	2.16	10.84	53.225	F

Main results: (17:45-18:00)

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Entry Flow (Veh/hr)	Exit Flow (Veh/hr)	Circulating Flow (Veh/hr)	Pedestrian Demand (Ped/hr)	Capacity (Veh/hr)	Saturation Capacity (Veh/hr)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
1	1356.46	339.11	1356.42	1904.98	230.79	0.00	2362.89	2375.56	0.574	1.33	1.34	3.576	A
2	2108.46	527.11	2107.79	1490.31	96.89	0.00	2479.64	2435.21	0.850	5.32	5.49	9.633	A
3	648.50	162.13	632.26	701.16	1503.52	0.00	659.85	573.28	0.983	10.84	14.90	84.961	F

Main results: (18:00-18:15)

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Entry Flow (Veh/hr)	Exit Flow (Veh/hr)	Circulating Flow (Veh/hr)	Pedestrian Demand (Ped/hr)	Capacity (Veh/hr)	Saturation Capacity (Veh/hr)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
1	1107.54	276.89	1109.39	1604.98	211.44	0.00	2374.28	2375.55	0.466	1.34	0.88	2.849	A
2	1721.55	430.39	1734.40	1241.58	79.24	0.00	2490.41	2435.22	0.691	5.49	2.28	4.841	A
3	529.50	132.37	579.24	576.47	1237.18	0.00	758.57	573.28	0.698	14.90	2.47	24.998	C

Main results: (18:15-18:30)

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Entry Flow (Veh/hr)	Exit Flow (Veh/hr)	Circulating Flow (Veh/hr)	Pedestrian Demand (Ped/hr)	Capacity (Veh/hr)	Saturation Capacity (Veh/hr)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
1	927.51	231.88	928.51	1315.86	163.77	0.00	2402.34	2375.55	0.386	0.88	0.63	2.445	A
2	1441.71	360.43	1445.31	1025.96	66.32	0.00	2498.29	2435.21	0.577	2.28	1.38	3.429	A
3	443.43	110.86	448.67	480.67	1030.96	0.00	835.00	573.28	0.531	2.47	1.16	9.441	A

Queueing Delay Results for each time segment

Queueing Delay results: (17:00-17:15)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
1	9.20	0.61	2.429	A	A
2	19.65	1.31	3.373	A	A
3	15.57	1.04	8.943	A	A

Queueing Delay results: (17:15-17:30)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
1	12.70	0.85	2.813	A	A
2	31.80	2.12	4.640	A	A
3	29.75	1.98	14.889	B	B

Queueing Delay results: (17:30-17:45)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
1	19.46	1.30	3.550	A	A
2	72.17	4.81	9.097	A	A
3	114.24	7.62	53.225	F	D

Queueing Delay results: (17:45-18:00)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
1	20.05	1.34	3.576	A	A
2	81.36	5.42	9.633	A	A
3	195.31	13.02	84.961	F	F

Queueing Delay results: (18:00-18:15)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
1	13.46	0.90	2.849	A	A
2	36.14	2.41	4.841	A	A
3	64.74	4.32	24.998	C	C

Queueing Delay results: (18:15-18:30)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
1	9.62	0.64	2.445	A	A
2	21.24	1.42	3.429	A	A
3	18.41	1.23	9.441	A	A

APPENDIX B

NSTM2 TRAFFICDATA

Drawn By: ukrsc003

File: Q:\WSP_UK\WSP_D\Basing\Northants Multi Modal Transport Model\Analysis\Map Documents\Northampton Gateway\DM\Do Minimum VC Local Area.mxd

Key

2031 Scenario D1

Junction V/C (%) AM Peak

- < 75%
- 75% - 85%
- 85% - 100%
- > 100%

Shelfleys
A5076
Merefield
Hardingstone
A5123
Swan Valley
15A
Blacky More
A45
Rothersthorpe
Wootton
Collingtree
A45
A45
Collingtree
A45
B526
A45
Milton Malsor
Preston Deanery
Hackleton
Grange Park
15
Churchill's
Alamein
A508
Miller's
Quinton
Blisworth
The Moors
The Wake Knot
A43
Roade Cutting
Courteenhall
M1
Hollow Quarter
The Green
Roade
A43

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0 0.5 1 Kilometers

DRAWING STATUS:

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Website: www.wspgroup.co.uk

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ARCHITECT:

PROJECT:

NORTHAMPTON M1 GATEWAY

TITLE:

LOCAL AREA

SCALE @ A	CHECKED:	APPROVED:
1:0	CHK	APP
CAD FILE:	**DESIGN-DRAWN:**	**DATE:**
WSP - A2 Landscape	USER	DATE
PROJECT No:	**DRAWING No:**	**REV:**
NUMBER	NUMBER	

Drawn By: ukrsc003

File: Q:\WSP_UK\WSP_D\Basing\Northants Multi Modal Transport Model\Analysis\Map Documents\Northampton Gateway\DM\Do Minimum VC Local Area.mxd

Key

2031 Scenario D1

Junction V/C (%) PM Peak

- < 75%
- 75% - 85%
- 85% - 100%
- > 100%

Shelfleys
A5076
Merefield
Hardingstone
A5123
Swan Valley
15A
Blacky More
A45
Rothersthorpe
Wootton
Collingtree
A45
A45
Collingtree
B526
A45
Milton Malsor
Preston Deanery
Hackleton
Grange Park
15
Churchill's
Alamein
A508
Miller's
Quinton
Blisworth
The Moors
The Wake Knot
A43
Roade Cutting
Courteenhall
M1
Hollow Quarter
The Green
Roade
A43

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0 0.5 1 Kilometers

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ARCHITECT:

PROJECT: NORTHAMPTON M1 GATEWAY

TITLE: LOCAL AREA

SCALE @ A1	CHECKED:	APPROVED:
1:0	CHK	APP
CAD FILE: WSP - A2 Landscape	DESIGN-DRAWN: USER	DATE: DATE
PROJECT No: NUMBER	DRAWING No: NUMBER	REV:

Drawn By: ukrsc003

File: Q:\WSP_UK\WSP_D\Basing\Northants Multi Modal Transport Model\Analysis\Map Documents\Northampton Gateway\DS\Do Something VC Local Area.mxd

Key

2031 Scenario G1

Junction V/C (%) AM Peak

- < 75%
- 75% - 85%
- 85% - 100%
- > 100%

Shelfleys
A5076
Merefield
Hardingstone
A5123
Swan Valley
15A
Blacky More
A45
Rothersthorpe
Wootton
Collingtree
A45
A45
Collingtree
B526
A45
Milton Malsor
Preston Deanery
Hackleton
Grange Park
15
Churchill's
Alamein
A508
Miller's
Quinton
Blisworth
The Moors
The Wake Knot
A43
Roade Cutting
Courteenhall
M1
Hollow Quarter
The Green
Roade
A43

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0 0.5 1 Kilometers

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ARCHITECT:

PROJECT: NORTHAMPTON M1 GATEWAY

TITLE: LOCAL AREA

SCALE @ A	CHECKED:	APPROVED:
1:0	CHK	APP
CAD FILE:	**DESIGN-DRAWN:**	**DATE:**
WSP - A2 Landscape	USER	DATE
PROJECT No:	**DRAWING No:**	**REV:**
NUMBER	NUMBER	

Drawn By: ukrsc003

File: Q:\WSP_UK\WSP_D\Basing\Northants Multi Modal Transport Model\Analysis\Map Documents\Northampton Gateway\DS\Do Something VC Local Area.mxd

Key

2031 Scenario G1

Junction V/C (%) PM Peak

- < 75%
- 75% - 85%
- 85% - 100%
- > 100%

Shelfleys
A5076
Merefield
Hardingstone
A5123
Swan Valley
15A
Blacky More
A45
Rothersthorpe
Wootton
Collingtree
A45
A45
Collingtree
B526
A45
Milton Malsor
Preston Deanery
Hackleton
Grange Park
15
Churchill's
Alamein
A508
Miller's
Quinton
Bliswor
The Moors
The Wake Knot
A43
Courteenhall
Roade Cutting
M1
Hollow Quarter
Three Bri
The Green
Roade
A43

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0 0.5 1 Kilometers

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CLIENT:

ARCHITECT:

PROJECT: NORTHAMPTON M1 GATEWAY

TITLE: LOCAL AREA

SCALE @ A1	CHECKED:	APPROVED:
1:0	CHK	APP
CAD FILE:	**DESIGN-DRAWN:**	**DATE:**
WSP - A2 Landscape	USER	DATE
PROJECT No:	**DRAWING No:**	**REV:**
NUMBER	NUMBER	

Drawn By: ukrsc003

File: Q:\WSP_UK\WSP_D\Basing\Northants Multi Modal Transport Model\Analysis\Map Documents\Northampton Gateway\Difference Plots\Actual Flow Local Area.mxd

Key

G1 vs D1 (AM Peak)

Actual Flow Difference (Veh)

- < -500
- -500 - -100
- -100 - -10
- -10 - 10
- 10 - 100
- 100 - 500
- > 500

Rothersthorpe
Swan Valley
Blacky More
Hardingstone
Collingtree
Milton Malsor
Churchill's
Alamein
Miller's
Quinton
The Moors
The Wake Knot
Roade Cutting
Courteenhall
Preston Deanery
Hollow Quarter
Three Bri

A5123 A5076 A45 A45 A45 B526 A508 A43 M1

0 0.5 1 Kilometers

DRAWING STATUS:

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Website: www.wspgroup.co.uk

CLIENT:

ARCHITECT:

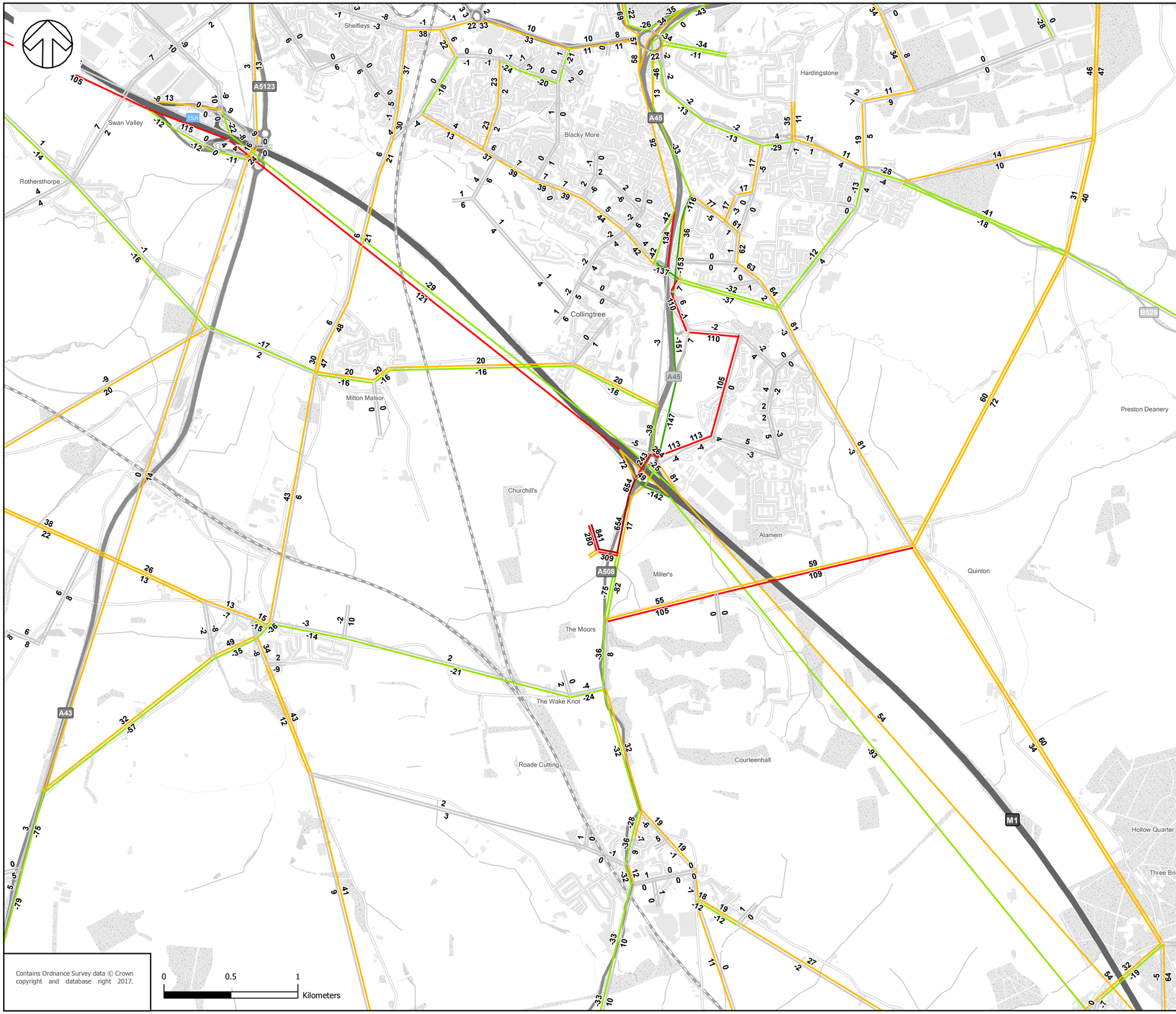
PROJECT: NORTHAMPTON M1 GATEWAY

TITLE: LOCAL AREA

SCALE @ A	CHECKED:	APPROVED:
1:0	CHK	APP
CAD FILE:	**DESIGN-DRAWN:**	**DATE:**
WSP - A2 Landscape	USER	DATE
PROJECT No:	**DRAWING No:**	**REV:**
NUMBER	NUMBER	

Drawn By: ukrsc003

File: Q:\WSP_UK\WSP_D\Basing\Northants Multi Modal Transport Model\Analysis\Map Documents\Northampton Gateway\Difference Plots\Actual Flow Local Area.mxd



Key

G1 vs D1 (PM Peak)

Actual Flow Difference (Veh)

- < -500
- -500 - -100
- -100 - -10
- -10 - 10
- 10 - 100
- 100 - 500
- > 500

0 0.5 1 Kilometers

DRAWING STATUS:

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Website: www.wspgroup.co.uk

CLIENT:

ARCHITECT:

PROJECT: NORTHAMPTON M1 GATEWAY

TITLE: LOCAL AREA

SCALE @ A	CHECKED:	APPROVED:
1:0	CHK	APP
CAD FILE:	**DESIGN-DRAWN:**	**DATE:**
WSP - A2 Landscape	USER	DATE

PROJECT No:	DRAWING No:	REV:
NUMBER	NUMBER	

Drawn By: ukrsc003

File: Q:\WSP_UK\WSP_D\Basing\Northants Multi Modal Transport Model\Analysis\Map Documents\Northampton Gateway\Difference Plots\Actual Flow Reassign Wider Area.mxd

Key

J1a vs D1 (AM Peak)

Actual Flow Reassign (Veh)

- < -100
- -100 - -10
- -10 -10
- 10 - 100
- > 100

0 0.5 1 1.5 2 2.5 3 Kilometres

DRAWING STATUS:

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Website: www.wsp.com

CLIENT:

ARCHITECT:

PROJECT: NORTHAMPTON M1 GATEWAY

TITLE: WIDER AREA

SCALE @ A	CHECKED:	APPROVED:
1:0	CHK	APP
CAD FILE: WSP - A2 Landscape	DESIGN-DRAWN: USER	DATE: DATE
PROJECT No: NUMBER	DRAWING No: NUMBER	REV:

Drawn By: ukrsc003

File: Q:\WSP_UK\WSP_D\Basing\Northants Multi Modal Transport Model\Analysis\Map Documents\Northampton Gateway\Difference Plots\Actual Flow Reassign Wider Area.mxd

Key

J1a vs D1 (PM Peak)

Actual Flow Reassign (Veh)

- < -100
- -100 - -10
- -10 -10
- 10 - 100
- > 100

0 0.5 1 1.5 2 2.5 3 Kilometres

DRAWING STATUS:

wsp
Enter Office Address
Tel: +44 (0)xxx
Fax: +44 (0)xxx
Website: www.wsp.com

CLIENT:

ARCHITECT:

PROJECT: NORTHAMPTON M1 GATEWAY

TITLE: WIDER AREA

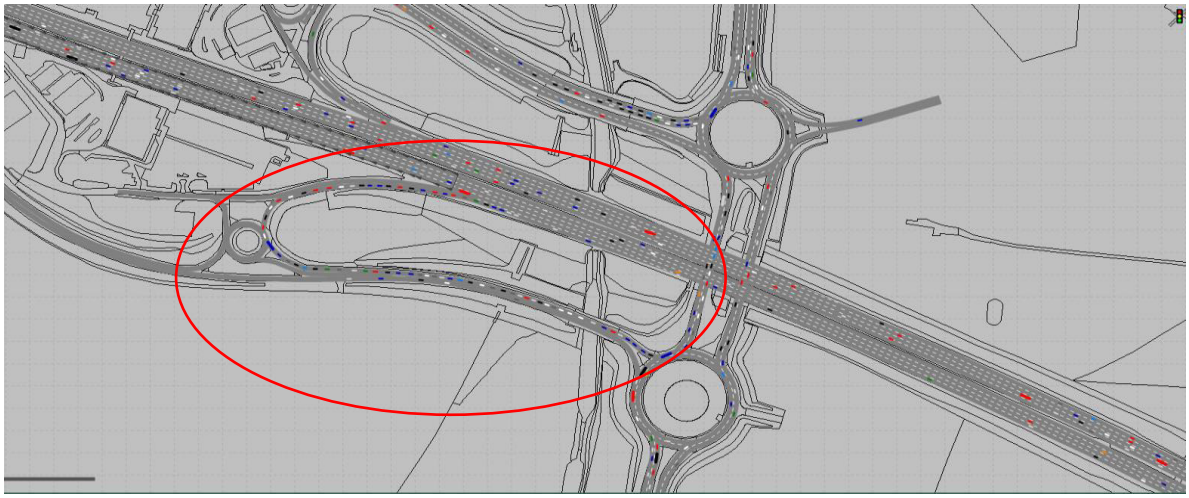
SCALE @ A	CHECKED:	APPROVED:
1:0	CHK	APP
CAD FILE: WSP - A2 Landscape	DESIGN-DRAWN: USER	DATE: DATE
PROJECT No: NUMBER	DRAWING No: NUMBER	REV:

APPENDIX C

VISSIM SCREENSHOTS

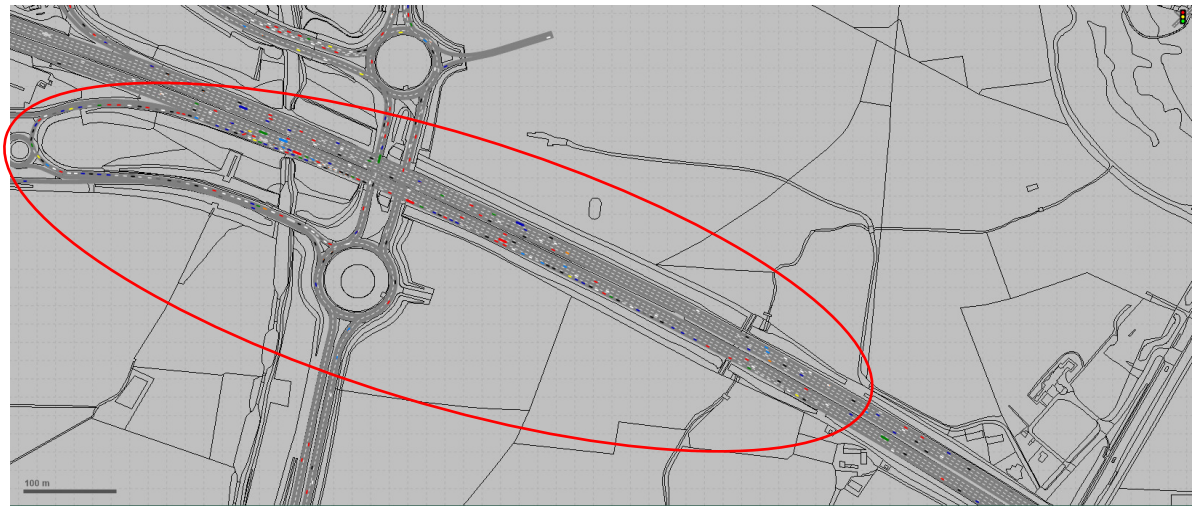
2031 REF CASE

AM – 0735



M1 J15a – Queues back to M1 from A43/M1 junction

AM – 0800

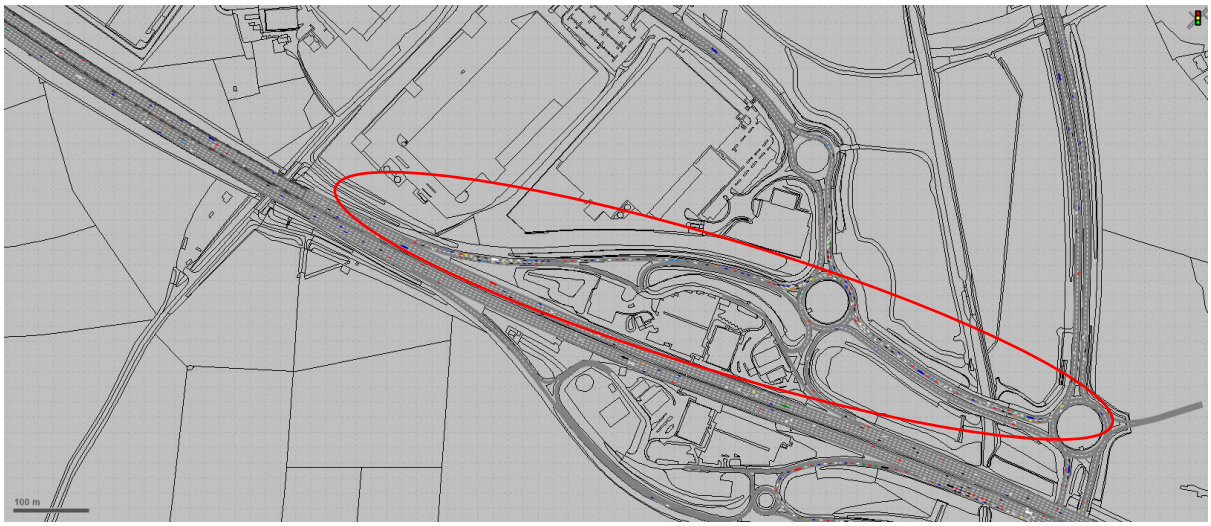


M1 J15a – Extent of queues on M1 from A43/M1 roundabout

M1 J15a – Queues from A43 / Swan Valley and A43 / A5123 roundabouts

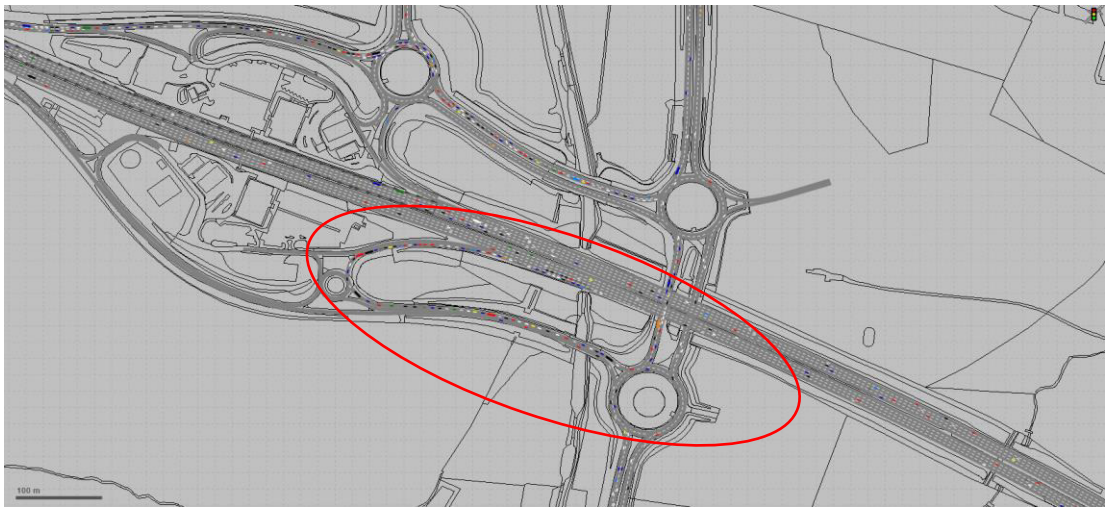
AM - 0830

M1 J15a – Extent of queues on M1 from A43/M1 roundabout



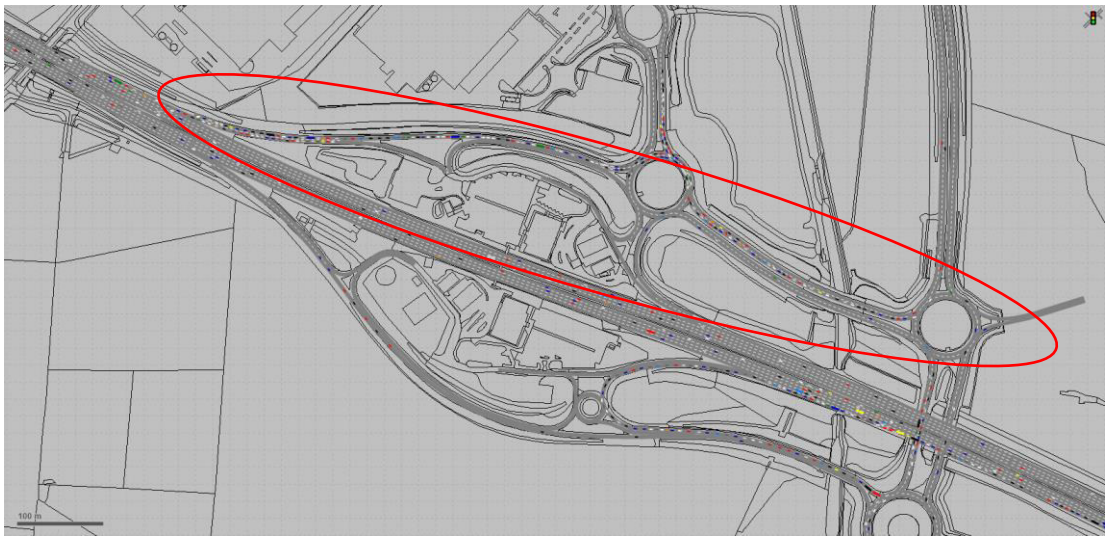
M1 J15a – Extent of queues from A43 / Swan Valley and A43 / A5123 roundabouts

PM – 1620



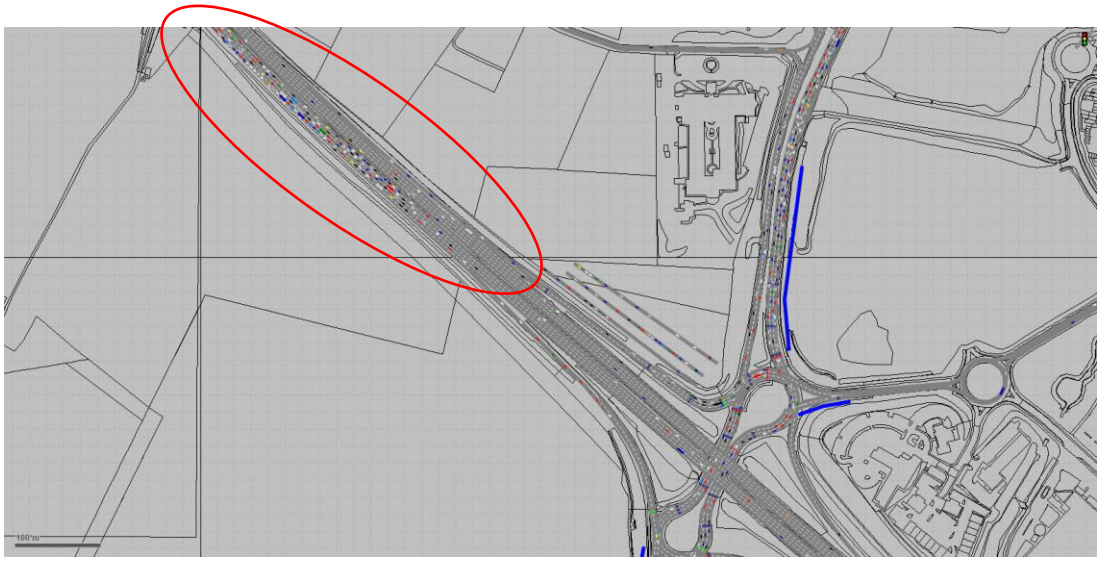
M1 J15a – Queues reaching M1 from M1 / A43 roundabout

PM – 1625



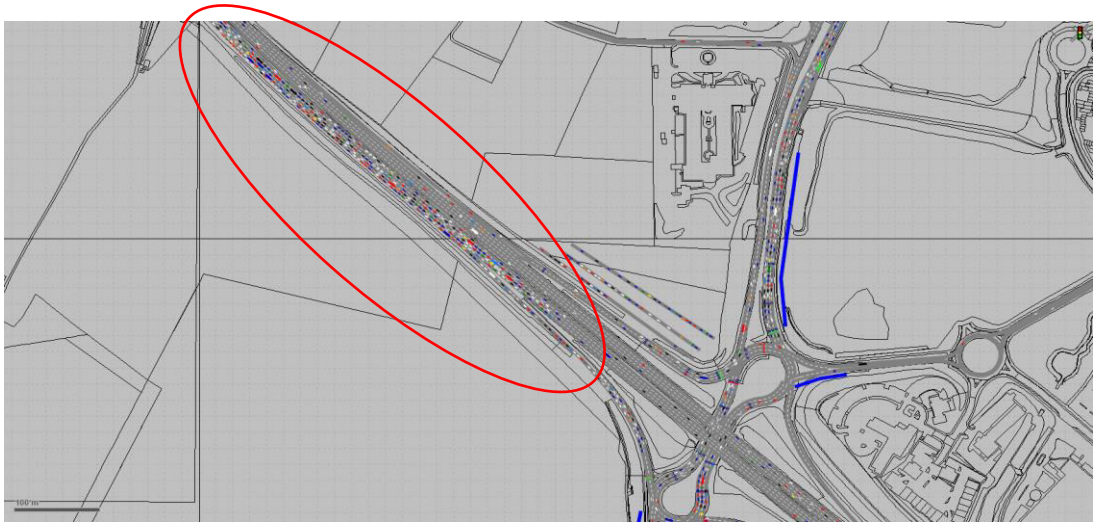
M1 J15a – Queues reaching M1 from A43 / Swan Valley and A43 / A5123 roundabouts

PM - 1730



M1 J15a – Extent of queues from M1 / A43 roundabout causing disruption on M1, which has almost reached M1 J15.

2031 REF CASE – PM – 1735



Queues affecting M1 J15 NB on-slip

2031 REF CASE – PM – 1745

Queuing back affecting M1 J15 performance and NB off-slip

M1 J15a – Queues from A43 / Swan Valley and A43 / A5123 affecting M1

APPENDIX D

2031 EXISTING JUNCTION ARCADY MODELLING RESULTS

Junctions 8

ARCADY 8 - Roundabout Module

Version: 8.0.4.487 [15039,24/03/2014]

For sales and distribution information, program advice and maintenance, contact TRL:
Tel: +44 (0)1344 770758 email: software@trl.co.uk Web: http://www.trlsoftware.co.uk

Filename: M1 Jct 15a (North) ARCADY Model.arc8
Path: C:\Users\ADCteam\Dropbox\~ JN8 TEMP\ADC1475
Report generation date: 24/08/2017 13:13:15

Summary of junction performance

	AM			PM		
	Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)	RFC
	NSTM Traffic Flows - 2031 D1					
Arm 1	1.50	3.52	0.58	2.72	5.05	0.72
Arm 2	2.91	9.85	0.74	6.48	22.56	0.87
Arm 3	5.39	9.27	0.85	1.57	3.88	0.61
	NSTM Traffic Flows - 2031 J1a					
Arm 1	1.83	4.06	0.63	3.16	5.65	0.75
Arm 2	2.08	8.02	0.67	9.61	33.53	0.92
Arm 3	5.94	9.91	0.86	2.06	4.54	0.67

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle.

"D1 - 2031 D1, AM " model duration: 08:00 - 09:30
"D2 - 2031 D1, PM" model duration: 17:00 - 18:30
"D3 - 2031 J1a, AM" model duration: 08:00 - 09:30
"D4 - 2031 J1a, PM" model duration: 17:00 - 18:30

Run using Junctions 8.0.4.487 at 24/08/2017 13:13:10

File summary

Title	M1 Jct 15a (North)
Location	Northampton
Site Number	
Date	12/06/2017
Version	v1
Status	Preliminary
Identifier	M Tatler
Client	Roxhill
Jobnumber	ADC1475
Enumerator	M Tatler
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	RFC Threshold	Average Delay Threshold (s)	Queue Threshold (PCU)
5.75			N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCU	PCU	perHour	s	-Min	perMin

NSTM Traffic Flows - 2031 D1, AM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set (s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
NSTM Traffic Flows	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
2031 D1, AM	2031 D1	AM		ONE HOUR	08:00	09:30	90	15				✓		

Junction Network

Junctions

Junction	Name	Junction Type	Arm Order	Grade Separated	Large Roundabout	Do Geometric Delay	Junction Delay (s)	Junction LOS
1	M1 Jct 15a (North)	Roundabout	1,2,3				7.55	A

Junction Network Options

Driving Side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Arm	Name	Description
1	1	A43 S Link	
2	2	M1 Sbnd Offslip	
3	3	A5123 N	

Capacity Options

Arm	Minimum Capacity (PCU/hr)	Maximum Capacity (PCU/hr)	Assume Flat Start Profile	Initial Queue (PCU)
1	0.00	99999.00		0.00
2	0.00	99999.00		0.00
3	0.00	99999.00		0.00

Roundabout Geometry

Arm	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
1	7.40	11.10	20.10	19.20	80.00	32.00	
2	7.20	8.50	6.00	18.00	80.00	62.00	
3	8.10	10.00	15.20	18.70	80.00	26.00	

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Arm	Enter slope and intercept directly	Entered slope	Entered intercept (PCU/hr)	Final Slope	Final Intercept (PCU/hr)
1		(calculated)	(calculated)	0.650	2921.251
2		(calculated)	(calculated)	0.510	2133.026
3		(calculated)	(calculated)	0.650	2895.546

The slope and intercept shown above include any corrections and adjustments.

Arm Capacity Adjustments

Arm	Type	Reason	Direct Capacity Adjustment (PCU/hr)	Percentage Capacity Adjustment (%)
1	None			
2	Direct		0.00	
3	None			

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCU Factor for a HV (PCU)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	HV Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Arm	Profile Type	Use Turning Counts	Average Demand Flow (PCU/hr)	Flow Scaling Factor (%)
1	ONE HOUR	✓	1395.00	100.000
2	ONE HOUR	✓	983.00	100.000
3	ONE HOUR	✓	1954.00	100.000

Turning Proportions

Turning Counts / Proportions (PCU/hr) - Junction 1 (for whole period)

		To		
		1	2	3
From	1	0.000	202.000	1193.000
	2	493.000	0.000	490.000
	3	1554.000	400.000	0.000

Turning Proportions (PCU) - Junction 1 (for whole period)

		To		
		1	2	3
From	1	0.00	0.14	0.86
	2	0.50	0.00	0.50
	3	0.80	0.20	0.00

Vehicle Mix

Average PCU Per Vehicle - Junction 1 (for whole period)

		To		
		1	2	3
From	1	1.000	1.025	1.085
	2	1.019	1.000	1.071
	3	1.017	1.003	1.000

Heavy Vehicle Percentages - Junction 1 (for whole period)

		To		
		1	2	3
From	1	0.0	2.5	8.5
	2	1.9	0.0	7.1
	3	1.7	0.3	0.0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)	Total Queueing Delay (PCU-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCU-min/min)	Inclusive Total Queueing Delay (PCU-min)	Inclusive Average Queueing Delay (s)
1	0.58	3.52	1.50	A	1280.08	1920.11	92.59	2.89	1.03	92.60	2.89
2	0.74	9.85	2.91	A	902.02	1353.03	147.30	6.53	1.64	147.31	6.53
3	0.85	9.27	5.39	A	1793.02	2689.54	252.24	5.63	2.80	252.26	5.63

Main Results for each time segment

Main results: (08:00-08:15)

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Exit Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	Saturation Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (s)	LOS
1	1050.23	262.56	1047.54	1535.47	300.12	0.00	2726.30	2579.94	0.385	0.00	0.67	2.302	A
2	740.05	185.01	736.78	451.80	895.86	0.00	1676.24	1008.03	0.442	0.00	0.82	3.988	A
3	1471.07	367.77	1466.07	1263.12	369.51	0.00	2655.31	2566.87	0.554	0.00	1.25	3.058	A

Main results: (08:15-08:30)

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Exit Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	Saturation Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (s)	LOS
1	1254.08	313.52	1253.02	1836.67	358.93	0.00	2688.10	2579.92	0.467	0.67	0.94	2.697	A
2	883.70	220.92	881.79	540.37	1071.58	0.00	1586.64	1008.04	0.557	0.82	1.30	5.320	A
3	1756.61	439.15	1753.36	1511.13	442.24	0.00	2608.03	2566.87	0.674	1.25	2.06	4.255	A

Main results: (08:30-08:45)

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Exit Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	Saturation Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (s)	LOS
1	1535.92	383.98	1533.72	2240.63	437.82	0.00	2636.85	2579.92	0.582	0.94	1.49	3.502	A
2	1082.30	270.58	1076.10	659.91	1311.63	0.00	1464.24	1008.04	0.739	1.30	2.85	9.536	A
3	2151.39	537.85	2138.76	1848.04	539.69	0.00	2544.67	2566.87	0.845	2.06	5.22	8.733	A

Main results: (08:45-09:00)

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Exit Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	Saturation Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (s)	LOS
1	1535.92	383.98	1535.89	2253.13	440.27	0.00	2635.26	2579.92	0.583	1.49	1.50	3.520	A
2	1082.30	270.58	1082.06	662.67	1313.49	0.00	1463.29	1008.04	0.740	2.85	2.91	9.848	A
3	2151.39	537.85	2150.71	1852.87	542.68	0.00	2542.73	2566.87	0.846	5.22	5.39	9.270	A

Main results: (09:00-09:15)

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Exit Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	Saturation Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (s)	LOS
1	1254.08	313.52	1256.27	1853.75	362.26	0.00	2685.93	2579.92	0.467	1.50	0.95	2.711	A
2	883.70	220.92	889.99	544.18	1074.36	0.00	1585.22	1008.04	0.557	2.91	1.33	5.456	A
3	1756.61	439.15	1769.66	1517.99	446.35	0.00	2605.36	2566.87	0.674	5.39	2.13	4.434	A

Main results: (09:15-09:30)

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Exit Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	Saturation Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (s)	LOS
1	1050.23	262.56	1051.31	1544.82	301.84	0.00	2725.18	2579.94	0.385	0.95	0.68	2.314	A
2	740.05	185.01	742.05	454.08	899.08	0.00	1674.60	1008.03	0.442	1.33	0.83	4.041	A
3	1471.07	367.77	1474.51	1268.97	372.16	0.00	2653.60	2566.87	0.554	2.13	1.27	3.106	A

Queueing Delay Results for each time segment

Queueing Delay results: (08:00-08:15)

Arm	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
1	9.88	0.66	2.302	A	A
2	11.93	0.80	3.988	A	A
3	18.23	1.22	3.058	A	A

Queueing Delay results: (08:15-08:30)

Arm	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
1	13.80	0.92	2.697	A	A
2	18.81	1.25	5.320	A	A
3	29.87	1.99	4.255	A	A

Queueing Delay results: (08:30-08:45)

Arm	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
1	21.73	1.45	3.502	A	A
2	39.61	2.64	9.536	A	A
3	70.96	4.73	8.733	A	A

Queueing Delay results: (08:45-09:00)

Arm	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
1	22.38	1.49	3.520	A	A
2	43.23	2.88	9.848	A	A
3	79.90	5.33	9.270	A	A

Queueing Delay results: (09:00-09:15)

Arm	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
1	14.49	0.97	2.711	A	A
2	20.89	1.39	5.456	A	A
3	33.73	2.25	4.434	A	A

Queueing Delay results: (09:15-09:30)

Arm	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
1	10.31	0.69	2.314	A	A
2	12.83	0.86	4.041	A	A
3	19.56	1.30	3.106	A	A

NSTM Traffic Flows - 2031 D1, PM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set (s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
NSTM Traffic Flows	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
2031 D1, PM	2031 D1	PM		ONE HOUR	17:00	18:30	90	15				✓		

Junction Network

Junctions

Junction	Name	Junction Type	Arm Order	Grade Separated	Large Roundabout	Do Geometric Delay	Junction Delay (s)	Junction LOS
1	M1 Jct 15a (North)	Roundabout	1,2,3				8.89	A

Junction Network Options

Driving Side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Arm	Name	Description
1	1	A43 S Link	
2	2	M1 Sbnd Offslip	
3	3	A5123 N	

Capacity Options

Arm	Minimum Capacity (PCU/hr)	Maximum Capacity (PCU/hr)	Assume Flat Start Profile	Initial Queue (PCU)
1	0.00	99999.00		0.00
2	0.00	99999.00		0.00
3	0.00	99999.00		0.00

Roundabout Geometry

Arm	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
1	7.40	11.10	20.10	19.20	80.00	32.00	
2	7.20	8.50	6.00	18.00	80.00	62.00	
3	8.10	10.00	15.20	18.70	80.00	26.00	

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Arm	Enter slope and intercept directly	Entered slope	Entered intercept (PCU/hr)	Final Slope	Final Intercept (PCU/hr)
1		(calculated)	(calculated)	0.650	2921.251
2		(calculated)	(calculated)	0.510	2133.026
3		(calculated)	(calculated)	0.650	2895.546

The slope and intercept shown above include any corrections and adjustments.

Arm Capacity Adjustments

Arm	Type	Reason	Direct Capacity Adjustment (PCU/hr)	Percentage Capacity Adjustment (%)
1	None			
2	Direct		0.00	
3	None			

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCU Factor for a HV (PCU)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	HV Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Arm	Profile Type	Use Turning Counts	Average Demand Flow (PCU/hr)	Flow Scaling Factor (%)
1	ONE HOUR	✓	1780.00	100.000
2	ONE HOUR	✓	990.00	100.000
3	ONE HOUR	✓	1334.00	100.000

Turning Proportions

Turning Counts / Proportions (PCU/hr) - Junction 1 (for whole period)

		To		
		1	2	3
From	1	0.000	206.000	1574.000
	2	678.000	0.000	312.000
	3	1042.000	292.000	0.000

Turning Proportions (PCU) - Junction 1 (for whole period)

		To		
		1	2	3
From	1	0.00	0.12	0.88
	2	0.68	0.00	0.32
	3	0.78	0.22	0.00

Vehicle Mix

Average PCU Per Vehicle - Junction 1 (for whole period)

		To		
		1	2	3
From	1	1.000	1.032	1.059
	2	1.027	1.000	1.066
	3	1.014	1.021	1.000

Heavy Vehicle Percentages - Junction 1 (for whole period)

		To		
		1	2	3
From	1	0.0	3.2	5.9
	2	2.7	0.0	6.6
	3	1.4	2.1	0.0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)	Total Queueing Delay (PCU-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCU-min/min)	Inclusive Total Queueing Delay (PCU-min)	Inclusive Average Queueing Delay (s)
1	0.72	5.05	2.72	A	1633.36	2450.04	152.97	3.75	1.70	152.98	3.75
2	0.87	22.56	6.48	C	908.44	1362.66	254.80	11.22	2.83	254.82	11.22
3	0.61	3.88	1.57	A	1224.10	1836.15	93.98	3.07	1.04	93.98	3.07

Main Results for each time segment

Main results: (17:00-17:15)

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Exit Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	Saturation Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (s)	LOS
1	1340.08	335.02	1336.17	1290.20	219.26	0.00	2778.82	2571.18	0.482	0.00	0.98	2.628	A
2	745.32	186.33	741.42	373.90	1181.53	0.00	1530.58	973.73	0.487	0.00	0.98	4.718	A
3	1004.31	251.08	1001.70	1415.19	507.76	0.00	2565.44	2462.00	0.391	0.00	0.65	2.334	A

Main results: (17:15-17:30)

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Exit Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	Saturation Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (s)	LOS
1	1600.18	400.05	1598.27	1543.29	262.26	0.00	2750.89	2571.18	0.582	0.98	1.46	3.291	A
2	889.99	222.50	886.96	447.23	1413.30	0.00	1412.40	973.73	0.630	0.98	1.73	7.077	A
3	1199.24	299.81	1198.12	1692.83	607.43	0.00	2500.64	2462.00	0.480	0.65	0.93	2.804	A

Main results: (17:30-17:45)

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Exit Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	Saturation Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (s)	LOS
1	1959.82	489.95	1954.86	1880.15	320.95	0.00	2712.77	2571.18	0.722	1.46	2.70	4.982	A
2	1090.01	272.50	1072.99	547.19	1728.62	0.00	1251.62	973.73	0.871	1.73	5.99	19.355	C
3	1468.76	367.19	1466.26	2066.78	734.84	0.00	2417.81	2462.00	0.607	0.93	1.55	3.832	A

Main results: (17:45-18:00)

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Exit Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	Saturation Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (s)	LOS
1	1959.82	489.95	1959.71	1892.37	321.48	0.00	2712.42	2571.18	0.723	2.70	2.72	5.047	A
2	1090.01	272.50	1088.06	548.28	1732.91	0.00	1249.43	973.73	0.872	5.99	6.48	22.556	C
3	1468.76	367.19	1468.69	2075.82	745.16	0.00	2411.10	2462.00	0.609	1.55	1.57	3.879	A

Main results: (18:00-18:15)

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Exit Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	Saturation Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (s)	LOS
1	1600.18	400.05	1605.14	1560.95	263.05	0.00	2750.38	2571.18	0.582	2.72	1.48	3.334	A
2	889.99	222.50	908.62	448.81	1419.38	0.00	1409.30	973.73	0.632	6.48	1.82	7.738	A
3	1199.24	299.81	1201.73	1705.73	622.27	0.00	2490.99	2462.00	0.481	1.57	0.95	2.840	A

Main results: (18:15-18:30)

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Exit Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	Saturation Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (s)	LOS
1	1340.08	335.02	1342.05	1298.06	220.09	0.00	2778.29	2571.18	0.482	1.48	0.99	2.649	A
2	745.32	186.33	748.60	375.40	1186.73	0.00	1527.92	973.73	0.488	1.82	1.00	4.820	A
3	1004.31	251.08	1005.47	1422.65	512.68	0.00	2562.24	2462.00	0.392	0.95	0.66	2.349	A

Queueing Delay Results for each time segment

Queueing Delay results: (17:00-17:15)

Arm	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
1	14.34	0.96	2.628	A	A
2	14.13	0.94	4.718	A	A
3	9.58	0.64	2.334	A	A

Queueing Delay results: (17:15-17:30)

Arm	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
1	21.32	1.42	3.291	A	A
2	24.82	1.65	7.077	A	A
3	13.71	0.91	2.804	A	A

Queueing Delay results: (17:30-17:45)

Arm	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
1	38.63	2.58	4.982	A	A
2	75.66	5.04	19.355	C	B
3	22.65	1.51	3.832	A	A

Queueing Delay results: (17:45-18:00)

Arm	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
1	40.67	2.71	5.047	A	A
2	94.19	6.28	22.556	C	C
3	23.49	1.57	3.879	A	A

Queueing Delay results: (18:00-18:15)

Arm	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
1	22.88	1.53	3.334	A	A
2	30.49	2.03	7.738	A	A
3	14.54	0.97	2.840	A	A

Queueing Delay results: (18:15-18:30)

Arm	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
1	15.13	1.01	2.649	A	A
2	15.49	1.03	4.820	A	A
3	10.01	0.67	2.349	A	A

NSTM Traffic Flows - 2031 J1a, AM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set (s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
NSTM Traffic Flows	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
2031 J1a, AM	2031 J1a	AM		ONE HOUR	08:00	09:30	90	15				✓		

Junction Network

Junctions

Junction	Name	Junction Type	Arm Order	Grade Separated	Large Roundabout	Do Geometric Delay	Junction Delay (s)	Junction LOS
1	M1 Jct 15a (North)	Roundabout	1,2,3				7.55	A

Junction Network Options

Driving Side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Arm	Name	Description
1	1	A43 S Link	
2	2	M1 Sbnd Offslip	
3	3	A5123 N	

Capacity Options

Arm	Minimum Capacity (PCU/hr)	Maximum Capacity (PCU/hr)	Assume Flat Start Profile	Initial Queue (PCU)
1	0.00	99999.00		0.00
2	0.00	99999.00		0.00
3	0.00	99999.00		0.00

Roundabout Geometry

Arm	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
1	7.40	11.10	20.10	19.20	80.00	32.00	
2	7.20	8.50	6.00	18.00	80.00	62.00	
3	8.10	10.00	15.20	18.70	80.00	26.00	

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Arm	Enter slope and intercept directly	Entered slope	Entered intercept (PCU/hr)	Final Slope	Final Intercept (PCU/hr)
1		(calculated)	(calculated)	0.650	2921.251
2		(calculated)	(calculated)	0.510	2133.026
3		(calculated)	(calculated)	0.650	2895.546

The slope and intercept shown above include any corrections and adjustments.

Arm Capacity Adjustments

Arm	Type	Reason	Direct Capacity Adjustment (PCU/hr)	Percentage Capacity Adjustment (%)
1	None			
2	Direct		0.00	
3	None			

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCU Factor for a HV (PCU)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	HV Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Arm	Profile Type	Use Turning Counts	Average Demand Flow (PCU/hr)	Flow Scaling Factor (%)
1	ONE HOUR	✓	1486.00	100.000
2	ONE HOUR	✓	860.00	100.000
3	ONE HOUR	✓	2016.00	100.000

Turning Proportions

Turning Counts / Proportions (PCU/hr) - Junction 1 (for whole period)

		To		
		1	2	3
From	1	0.000	220.000	1266.000
	2	431.000	0.000	429.000
	3	1555.000	461.000	0.000

Turning Proportions (PCU) - Junction 1 (for whole period)

		To		
		1	2	3
From	1	0.00	0.15	0.85
	2	0.50	0.00	0.50
	3	0.77	0.23	0.00

Vehicle Mix

Average PCU Per Vehicle - Junction 1 (for whole period)

		To		
		1	2	3
From	1	1.000	1.033	1.087
	2	1.021	1.000	1.101
	3	1.023	1.011	1.000

Heavy Vehicle Percentages - Junction 1 (for whole period)

		To		
		1	2	3
From	1	0.0	3.3	8.7
	2	2.1	0.0	10.1
	3	2.3	1.1	0.0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)	Total Queueing Delay (PCU-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCU-min/min)	Inclusive Total Queueing Delay (PCU-min)	Inclusive Average Queueing Delay (s)
1	0.63	4.06	1.83	A	1363.58	2045.37	109.73	3.22	1.22	109.74	3.22
2	0.67	8.02	2.08	A	789.15	1183.73	112.39	5.70	1.25	112.40	5.70
3	0.86	9.91	5.94	A	1849.92	2774.88	272.43	5.89	3.03	272.45	5.89

Main Results for each time segment

Main results: (08:00-08:15)

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Exit Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	Saturation Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (s)	LOS
1	1118.74	279.68	1115.70	1489.74	345.86	0.00	2696.59	2540.96	0.415	0.00	0.76	2.451	A
2	647.45	161.86	644.73	511.04	950.52	0.00	1648.37	1029.23	0.393	0.00	0.68	3.791	A
3	1517.75	379.44	1512.49	1272.13	323.12	0.00	2685.48	2560.20	0.565	0.00	1.32	3.117	A

Main results: (08:15-08:30)

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Exit Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	Saturation Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (s)	LOS
1	1335.88	333.97	1334.58	1781.96	413.63	0.00	2652.56	2540.96	0.504	0.76	1.09	2.942	A
2	773.12	193.28	771.69	611.21	1137.00	0.00	1553.28	1029.23	0.498	0.68	1.04	4.871	A
3	1812.34	453.09	1808.85	1521.94	386.74	0.00	2644.11	2560.20	0.685	1.32	2.19	4.378	A

Main results: (08:30-08:45)

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Exit Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	Saturation Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (s)	LOS
1	1636.12	409.03	1633.18	2173.67	504.33	0.00	2593.65	2540.96	0.631	1.09	1.82	4.029	A
2	946.88	236.72	942.83	746.12	1391.39	0.00	1423.57	1029.23	0.665	1.04	2.05	7.868	A
3	2219.66	554.91	2205.50	1861.71	472.51	0.00	2588.35	2560.20	0.858	2.19	5.73	9.267	A

Main results: (08:45-09:00)

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Exit Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	Saturation Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (s)	LOS
1	1636.12	409.03	1636.06	2185.93	507.38	0.00	2591.66	2540.96	0.631	1.82	1.83	4.061	A
2	946.88	236.72	946.76	749.60	1393.85	0.00	1422.32	1029.23	0.666	2.05	2.08	8.015	A
3	2219.66	554.91	2218.84	1866.12	474.48	0.00	2587.07	2560.20	0.858	5.73	5.94	9.914	A

Main results: (09:00-09:15)

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Exit Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	Saturation Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (s)	LOS
1	1335.88	333.97	1338.81	1798.75	417.79	0.00	2649.86	2540.96	0.504	1.83	1.10	2.966	A
2	773.12	193.28	777.19	616.00	1140.60	0.00	1551.45	1029.23	0.498	2.08	1.06	4.953	A
3	1812.34	453.09	1827.03	1528.29	389.50	0.00	2642.32	2560.20	0.686	5.94	2.26	4.584	A

Main results: (09:15-09:30)

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Exit Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	Saturation Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (s)	LOS
1	1118.74	279.68	1120.08	1498.76	347.91	0.00	2695.26	2540.96	0.415	1.10	0.77	2.465	A
2	647.45	161.86	648.94	513.74	954.25	0.00	1646.46	1029.23	0.393	1.06	0.69	3.828	A
3	1517.75	379.44	1521.45	1277.97	325.23	0.00	2684.11	2560.20	0.565	2.26	1.34	3.170	A

Queueing Delay Results for each time segment

Queueing Delay results: (08:00-08:15)

Arm	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
1	11.19	0.75	2.451	A	A
2	9.94	0.66	3.791	A	A
3	19.16	1.28	3.117	A	A

Queueing Delay results: (08:15-08:30)

Arm	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
1	15.99	1.07	2.942	A	A
2	15.16	1.01	4.871	A	A
3	31.65	2.11	4.378	A	A

Queueing Delay results: (08:30-08:45)

Arm	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
1	26.46	1.76	4.029	A	A
2	29.12	1.94	7.868	A	A
3	77.19	5.15	9.267	A	A

Queueing Delay results: (08:45-09:00)

Arm	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
1	27.43	1.83	4.061	A	A
2	31.05	2.07	8.015	A	A
3	87.81	5.85	9.914	A	A

Queueing Delay results: (09:00-09:15)

Arm	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
1	16.93	1.13	2.966	A	A
2	16.52	1.10	4.953	A	A
3	36.01	2.40	4.584	A	A

Queueing Delay results: (09:15-09:30)

Arm	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
1	11.72	0.78	2.465	A	A
2	10.61	0.71	3.828	A	A
3	20.61	1.37	3.170	A	A

NSTM Traffic Flows - 2031 J1a, PM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set (s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
NSTM Traffic Flows	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
2031 J1a, PM	2031 J1a	PM		ONE HOUR	17:00	18:30	90	15				✓		

Junction Network

Junctions

Junction	Name	Junction Type	Arm Order	Grade Separated	Large Roundabout	Do Geometric Delay	Junction Delay (s)	Junction LOS
1	M1 Jct 15a (North)	Roundabout	1,2,3				11.69	B

Junction Network Options

Driving Side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Arm	Name	Description
1	1	A43 S Link	
2	2	M1 Sbnd Offslip	
3	3	A5123 N	

Capacity Options

Arm	Minimum Capacity (PCU/hr)	Maximum Capacity (PCU/hr)	Assume Flat Start Profile	Initial Queue (PCU)
1	0.00	99999.00		0.00
2	0.00	99999.00		0.00
3	0.00	99999.00		0.00

Roundabout Geometry

Arm	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
1	7.40	11.10	20.10	19.20	80.00	32.00	
2	7.20	8.50	6.00	18.00	80.00	62.00	
3	8.10	10.00	15.20	18.70	80.00	26.00	

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Arm	Enter slope and intercept directly	Entered slope	Entered intercept (PCU/hr)	Final Slope	Final Intercept (PCU/hr)
1		(calculated)	(calculated)	0.650	2921.251
2		(calculated)	(calculated)	0.510	2133.026
3		(calculated)	(calculated)	0.650	2895.546

The slope and intercept shown above include any corrections and adjustments.

Arm Capacity Adjustments

Arm	Type	Reason	Direct Capacity Adjustment (PCU/hr)	Percentage Capacity Adjustment (%)
1	None			
2	Direct		0.00	
3	None			

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCU Factor for a HV (PCU)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	HV Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Arm	Profile Type	Use Turning Counts	Average Demand Flow (PCU/hr)	Flow Scaling Factor (%)
1	ONE HOUR	✓	1847.00	100.000
2	ONE HOUR	✓	1001.00	100.000
3	ONE HOUR	✓	1498.00	100.000

Turning Proportions

Turning Counts / Proportions (PCU/hr) - Junction 1 (for whole period)

		To		
		1	2	3
From	1	0.000	185.000	1662.000
	2	621.000	0.000	380.000
	3	1197.000	301.000	0.000

Turning Proportions (PCU) - Junction 1 (for whole period)

		To		
		1	2	3
From	1	0.00	0.10	0.90
	2	0.62	0.00	0.38
	3	0.80	0.20	0.00

Vehicle Mix

Average PCU Per Vehicle - Junction 1 (for whole period)

		To		
		1	2	3
From	1	1.000	1.045	1.058
	2	1.034	1.000	1.060
	3	1.011	1.025	1.000

Heavy Vehicle Percentages - Junction 1 (for whole period)

		To		
		1	2	3
From	1	0.0	4.5	5.8
	2	3.4	0.0	6.0
	3	1.1	2.5	0.0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)	Total Queueing Delay (PCU-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCU-min/min)	Inclusive Total Queueing Delay (PCU-min)	Inclusive Average Queueing Delay (s)
1	0.75	5.65	3.16	A	1694.84	2542.26	171.96	4.06	1.91	171.97	4.06
2	0.92	33.53	9.61	D	918.54	1377.80	332.42	14.48	3.69	332.44	14.48
3	0.67	4.54	2.06	A	1374.59	2061.89	118.29	3.44	1.31	118.29	3.44

Main Results for each time segment

Main results: (17:00-17:15)

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Exit Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	Saturation Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (s)	LOS
1	1390.52	347.63	1386.30	1363.61	225.98	0.00	2774.46	2592.97	0.501	0.00	1.06	2.733	A
2	753.61	188.40	749.42	364.84	1247.44	0.00	1496.97	943.32	0.503	0.00	1.05	4.998	A
3	1127.77	281.94	1124.67	1531.94	464.93	0.00	2593.28	2515.08	0.435	0.00	0.78	2.480	A

Main results: (17:15-17:30)

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Exit Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	Saturation Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (s)	LOS
1	1660.42	415.10	1658.23	1630.96	270.30	0.00	2745.67	2592.97	0.605	1.06	1.60	3.490	A
2	899.88	224.97	896.30	436.39	1492.14	0.00	1372.20	943.32	0.656	1.05	1.94	7.835	A
3	1346.67	336.67	1345.21	1832.39	556.05	0.00	2534.04	2515.08	0.531	0.78	1.14	3.066	A

Main results: (17:30-17:45)

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Exit Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	Saturation Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (s)	LOS
1	2033.58	508.40	2027.52	1982.86	330.69	0.00	2706.44	2592.97	0.751	1.60	3.12	5.553	A
2	1102.12	275.53	1076.40	533.78	1824.44	0.00	1202.76	943.32	0.916	1.94	8.37	25.787	D
3	1649.33	412.33	1645.78	2233.06	667.78	0.00	2461.40	2515.08	0.670	1.14	2.03	4.455	A

Main results: (17:45-18:00)

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Exit Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	Saturation Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (s)	LOS
1	2033.58	508.40	2033.43	1998.49	331.38	0.00	2705.99	2592.97	0.752	3.12	3.16	5.652	A
2	1102.12	275.53	1097.18	535.06	1829.76	0.00	1200.05	943.32	0.918	8.37	9.61	33.531	D
3	1649.33	412.33	1649.20	2246.27	680.67	0.00	2453.02	2515.08	0.672	2.03	2.06	4.539	A

Main results: (18:00-18:15)

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Exit Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	Saturation Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (s)	LOS
1	1660.42	415.10	1666.51	1655.92	271.31	0.00	2745.01	2592.97	0.605	3.16	1.63	3.545	A
2	899.88	224.97	930.07	438.23	1499.58	0.00	1368.40	943.32	0.658	9.61	2.06	9.139	A
3	1346.67	336.67	1350.23	1852.66	577.00	0.00	2520.42	2515.08	0.534	2.06	1.17	3.128	A

Main results: (18:15-18:30)

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Exit Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	Saturation Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (s)	LOS
1	1390.52	347.63	1392.78	1372.36	226.92	0.00	2773.85	2592.97	0.501	1.63	1.07	2.758	A
2	753.61	188.40	757.54	366.42	1253.27	0.00	1493.99	943.32	0.504	2.06	1.07	5.129	A
3	1127.77	281.94	1129.32	1540.85	469.96	0.00	2590.01	2515.08	0.435	1.17	0.79	2.503	A

Queueing Delay Results for each time segment

Queueing Delay results: (17:00-17:15)

Arm	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
1	15.45	1.03	2.733	A	A
2	15.11	1.01	4.998	A	A
3	11.41	0.76	2.480	A	A

Queueing Delay results: (17:15-17:30)

Arm	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
1	23.40	1.56	3.490	A	A
2	27.60	1.84	7.835	A	A
3	16.77	1.12	3.066	A	A

Queueing Delay results: (17:30-17:45)

Arm	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
1	44.34	2.96	5.553	A	A
2	99.25	6.62	25.787	D	C
3	29.32	1.95	4.455	A	A

Queueing Delay results: (17:45-18:00)

Arm	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
1	47.11	3.14	5.652	A	A
2	136.29	9.09	33.531	D	C
3	30.75	2.05	4.539	A	A

Queueing Delay results: (18:00-18:15)

Arm	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
1	25.30	1.69	3.545	A	A
2	37.47	2.50	9.139	A	A
3	18.03	1.20	3.128	A	A

Queueing Delay results: (18:15-18:30)

Arm	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
1	16.36	1.09	2.758	A	A
2	16.70	1.11	5.129	A	A
3	11.99	0.80	2.503	A	A

Junctions 8

ARCADY 8 - Roundabout Module

Version: 8.0.4.487 [15039,24/03/2014]

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Filename: M1 Jct 15a (South) ARCADY Model.arc8
Path: C:\Users\ADCteam\Dropbox\~ JN8 TEMP\ADC1475
Report generation date: 24/08/2017 13:19:10

Summary of junction performance

	AM			PM		
	Queue (Veh)	Delay (s)	RFC	Queue (Veh)	Delay (s)	RFC
	NSTM Traffic Flows - 2031 D1					
Arm 1	17.22	28.60	0.96	2.91	5.62	0.75
Arm 2	6.11	11.25	0.86	5.68	9.84	0.85
Arm 3	72.87	311.79	1.21	135.72	664.30	1.43
	NSTM Traffic Flows - 2031 J1a					
Arm 1	12.32	21.11	0.94	3.68	6.74	0.79
Arm 2	6.39	11.83	0.87	6.45	11.12	0.87
Arm 3	76.54	335.62	1.23	191.58	962.07	1.55

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle.

"D1 - 2031 D1, AM " model duration: 08:00 - 09:30
"D2 - 2031 D1, PM" model duration: 17:00 - 18:30
"D3 - 2031 J1a, AM" model duration: 08:00 - 09:30
"D4 - 2031 J1a, PM" model duration: 17:00 - 18:30

Run using Junctions 8.0.4.487 at 24/08/2017 13:19:06

File summary

Title	M1 Jct 15a (South)
Location	Northampton
Site Number	
Date	12/06/2017
Version	v1
Status	Preliminary
Identifier	M Tatler
Client	Roxhill
Jobnumber	ADC1475
Enumerator	M Tatler
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	RFC Threshold	Average Delay Threshold (s)	Queue Threshold (PCU)
5.75			N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	Veh	Veh	perHour	s	-Min	perMin

NSTM Traffic Flows - 2031 D1, AM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set (s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
NSTM Traffic Flows	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
2031 D1, AM	2031 D1	AM		ONE HOUR	08:00	09:30	90	15				✓		

Junction Network

Junctions

Junction	Name	Junction Type	Arm Order	Grade Separated	Large Roundabout	Do Geometric Delay	Junction Delay (s)	Junction LOS
1	M1 Jct 15a (South)	Roundabout	1,2,3				64.47	F

Junction Network Options

Driving Side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Arm	Name	Description
1	1	A43 N Link	
2	2	A43 S	
3	3	M1 Nbnd Offslip	

Capacity Options

Arm	Minimum Capacity (PCU/hr)	Maximum Capacity (PCU/hr)	Assume Flat Start Profile	Initial Queue (PCU)
1	0.00	99999.00		0.00
2	0.00	99999.00		0.00
3	0.00	99999.00		0.00

Roundabout Geometry

Arm	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
1	9.80	9.80	0.00	17.00	92.00	55.00	
2	8.30	10.40	8.80	28.50	92.00	50.00	
3	4.60	5.20	1.00	19.70	92.00	56.00	

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Arm	Enter slope and intercept directly	Entered slope	Entered intercept (PCU/hr)	Final Slope	Final Intercept (PCU/hr)
1		(calculated)	(calculated)	0.573	2686.180
2		(calculated)	(calculated)	0.587	2718.056
3		(calculated)	(calculated)	0.382	1323.610

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCU Factor for a HV (PCU)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	HV Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Arm	Profile Type	Use Turning Counts	Average Demand Flow (Veh/hr)	Flow Scaling Factor (%)
1	ONE HOUR	✓	2090.00	100.000
2	ONE HOUR	✓	1837.00	100.000
3	ONE HOUR	✓	710.00	100.000

Turning Proportions

Turning Counts / Proportions (Veh/hr) - Junction 1 (for whole period)

		To		
		1	2	3
From	1	0.000	1737.000	353.000
	2	1465.000	0.000	372.000
	3	280.000	430.000	0.000

Turning Proportions (Veh) - Junction 1 (for whole period)

		To		
		1	2	3
From	1	0.00	0.83	0.17
	2	0.80	0.00	0.20
	3	0.39	0.61	0.00

Vehicle Mix

Average PCU Per Vehicle - Junction 1 (for whole period)

		To		
		1	2	3
From	1	1.000	1.014	1.075
	2	1.071	1.000	1.006
	3	1.033	1.022	1.000

Heavy Vehicle Percentages - Junction 1 (for whole period)

		To		
		1	2	3
From	1	0.0	1.4	7.5
	2	7.1	0.0	0.6
	3	3.3	2.2	0.0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Junction Arrivals (Veh)	Total Queueing Delay (Veh-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (Veh-min/min)	Inclusive Total Queueing Delay (Veh-min)	Inclusive Average Queueing Delay (s)
1	0.96	28.60	17.22	D	1917.83	2876.74	591.04	12.33	6.57	591.09	12.33
2	0.86	11.25	6.11	B	1685.66	2528.49	277.61	6.59	3.08	277.63	6.59
3	1.21	311.79	72.87	F	651.51	977.26	2351.25	144.36	26.12	2351.36	144.36

Main Results for each time segment

Main results: (08:00-08:15)

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Entry Flow (Veh/hr)	Exit Flow (Veh/hr)	Circulating Flow (Veh/hr)	Pedestrian Demand (Ped/hr)	Capacity (Veh/hr)	Saturation Capacity (Veh/hr)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
1	1573.47	393.37	1566.29	1306.90	319.78	0.00	2439.53	2431.47	0.645	0.00	1.79	4.089	A
2	1382.99	345.75	1377.66	1621.52	264.55	0.00	2411.76	2324.67	0.573	0.00	1.33	3.462	A
3	534.52	133.63	528.01	543.53	1098.68	0.00	852.03	551.21	0.627	0.00	1.63	10.903	B

Main results: (08:15-08:30)

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Entry Flow (Veh/hr)	Exit Flow (Veh/hr)	Circulating Flow (Veh/hr)	Pedestrian Demand (Ped/hr)	Capacity (Veh/hr)	Saturation Capacity (Veh/hr)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
1	1878.87	469.72	1872.22	1561.65	380.08	0.00	2405.03	2431.48	0.781	1.79	3.46	6.672	A
2	1651.42	412.86	1647.85	1936.09	316.22	0.00	2380.97	2324.67	0.694	1.33	2.22	4.885	A
3	638.27	159.57	627.58	649.91	1314.16	0.00	766.20	551.21	0.833	1.63	4.30	24.284	C

Main results: (08:30-08:45)

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Entry Flow (Veh/hr)	Exit Flow (Veh/hr)	Circulating Flow (Veh/hr)	Pedestrian Demand (Ped/hr)	Capacity (Veh/hr)	Saturation Capacity (Veh/hr)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
1	2301.14	575.28	2256.98	1854.94	389.27	0.00	2399.78	2431.48	0.959	3.46	14.50	20.738	C
2	2022.57	505.64	2008.12	2265.05	381.20	0.00	2342.23	2324.67	0.864	2.22	5.84	10.352	B
3	781.72	195.43	642.74	787.85	1601.47	0.00	651.76	551.21	1.199	4.30	39.05	137.303	F

Main results: (08:45-09:00)

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Entry Flow (Veh/hr)	Exit Flow (Veh/hr)	Circulating Flow (Veh/hr)	Pedestrian Demand (Ped/hr)	Capacity (Veh/hr)	Saturation Capacity (Veh/hr)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
1	2301.14	575.28	2290.24	1867.07	391.50	0.00	2398.50	2431.48	0.959	14.50	17.22	28.605	D
2	2022.57	505.64	2021.50	2294.93	386.82	0.00	2338.89	2324.67	0.865	5.84	6.11	11.247	B
3	781.72	195.43	646.43	796.18	1612.14	0.00	647.51	551.21	1.207	39.05	72.87	311.791	F

Main results: (09:00-09:15)

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Entry Flow (Veh/hr)	Exit Flow (Veh/hr)	Circulating Flow (Veh/hr)	Pedestrian Demand (Ped/hr)	Capacity (Veh/hr)	Saturation Capacity (Veh/hr)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
1	1878.87	469.72	1931.57	1624.84	454.21	0.00	2362.63	2431.48	0.795	17.22	4.05	9.305	A
2	1651.42	412.86	1666.55	2059.54	326.24	0.00	2374.99	2324.67	0.695	6.11	2.32	5.186	A
3	638.27	159.57	749.97	663.72	1329.07	0.00	760.26	551.21	0.840	72.87	44.95	281.848	F

Main results: (09:15-09:30)

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Entry Flow (Veh/hr)	Exit Flow (Veh/hr)	Circulating Flow (Veh/hr)	Pedestrian Demand (Ped/hr)	Capacity (Veh/hr)	Saturation Capacity (Veh/hr)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
1	1573.47	393.37	1581.71	1384.84	428.21	0.00	2377.51	2431.47	0.662	4.05	1.99	4.569	A
2	1382.99	345.75	1386.85	1742.76	267.15	0.00	2410.21	2324.67	0.574	2.32	1.36	3.532	A
3	534.52	133.63	707.04	547.99	1106.01	0.00	849.11	551.21	0.630	44.95	1.82	59.921	F

Queueing Delay Results for each time segment

Queueing Delay results: (08:00-08:15)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
1	25.82	1.72	4.089	A	A
2	19.35	1.29	3.462	A	A
3	22.58	1.51	10.903	B	B

Queueing Delay results: (08:15-08:30)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
1	48.64	3.24	6.672	A	A
2	32.06	2.14	4.885	A	A
3	55.11	3.67	24.284	C	C

Queueing Delay results: (08:30-08:45)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
1	166.35	11.09	20.738	C	C
2	77.95	5.20	10.352	B	B
3	333.42	22.23	137.303	F	F

Queueing Delay results: (08:45-09:00)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
1	240.55	16.04	28.605	D	C
2	90.02	6.00	11.247	B	B
3	839.76	55.98	311.791	F	F

Queueing Delay results: (09:00-09:15)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
1	78.58	5.24	9.305	A	A
2	37.24	2.48	5.186	A	A
3	883.62	58.91	281.848	F	F

Queueing Delay results: (09:15-09:30)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
1	31.09	2.07	4.569	A	A
2	20.98	1.40	3.532	A	A
3	216.75	14.45	59.921	F	E

NSTM Traffic Flows - 2031 D1, PM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set (s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
NSTM Traffic Flows	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
2031 D1, PM	2031 D1	PM		ONE HOUR	17:00	18:30	90	15				✓		

Junction Network

Junctions

Junction	Name	Junction Type	Arm Order	Grade Separated	Large Roundabout	Do Geometric Delay	Junction Delay (s)	Junction LOS
1	M1 Jct 15a (South)	Roundabout	1,2,3				125.47	F

Junction Network Options

Driving Side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Arm	Name	Description
1	1	A43 N Link	
2	2	A43 S	
3	3	M1 Nbnd Offslip	

Capacity Options

Arm	Minimum Capacity (PCU/hr)	Maximum Capacity (PCU/hr)	Assume Flat Start Profile	Initial Queue (PCU)
1	0.00	99999.00		0.00
2	0.00	99999.00		0.00
3	0.00	99999.00		0.00

Roundabout Geometry

Arm	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
1	9.80	9.80	0.00	17.00	92.00	55.00	
2	8.30	10.40	8.80	28.50	92.00	50.00	
3	4.60	5.20	1.00	19.70	92.00	56.00	

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Arm	Enter slope and intercept directly	Entered slope	Entered intercept (PCU/hr)	Final Slope	Final Intercept (PCU/hr)
1		(calculated)	(calculated)	0.573	2686.180
2		(calculated)	(calculated)	0.587	2718.056
3		(calculated)	(calculated)	0.382	1323.610

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCU Factor for a HV (PCU)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	HV Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Arm	Profile Type	Use Turning Counts	Average Demand Flow (Veh/hr)	Flow Scaling Factor (%)
1	ONE HOUR	✓	1714.00	100.000
2	ONE HOUR	✓	1941.00	100.000
3	ONE HOUR	✓	761.00	100.000

Turning Proportions

Turning Counts / Proportions (Veh/hr) - Junction 1 (for whole period)

		To		
		1	2	3
From	1	0.000	1489.000	225.000
	2	1607.000	0.000	334.000
	3	496.000	265.000	0.000

Turning Proportions (Veh) - Junction 1 (for whole period)

		To		
		1	2	3
From	1	0.00	0.87	0.13
	2	0.83	0.00	0.17
	3	0.65	0.35	0.00

Vehicle Mix

Average PCU Per Vehicle - Junction 1 (for whole period)

		To		
		1	2	3
From	1	1.000	1.014	1.032
	2	1.030	1.000	1.014
	3	1.104	1.010	1.000

Heavy Vehicle Percentages - Junction 1 (for whole period)

		To		
		1	2	3
From	1	0.0	1.4	3.2
	2	3.0	0.0	1.4
	3	10.4	1.0	0.0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Junction Arrivals (Veh)	Total Queueing Delay (Veh-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (Veh-min/min)	Inclusive Total Queueing Delay (Veh-min)	Inclusive Average Queueing Delay (s)
1	0.75	5.62	2.91	A	1572.79	2359.18	164.16	4.18	1.82	164.18	4.18
2	0.85	9.84	5.68	A	1781.09	2671.63	266.53	5.99	2.96	266.55	5.99
3	1.43	664.30	135.72	F	698.30	1047.46	5942.77	340.41	66.03	6184.58	354.26

Main Results for each time segment

Main results: (17:00-17:15)

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Entry Flow (Veh/hr)	Exit Flow (Veh/hr)	Circulating Flow (Veh/hr)	Pedestrian Demand (Ped/hr)	Capacity (Veh/hr)	Saturation Capacity (Veh/hr)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
1	1290.38	322.60	1286.25	1572.45	196.10	0.00	2532.07	2546.29	0.510	0.00	1.03	2.880	A
2	1461.28	365.32	1455.94	1313.51	168.85	0.00	2546.46	2449.00	0.574	0.00	1.34	3.285	A
3	572.92	143.23	563.13	419.38	1205.41	0.00	793.17	491.44	0.722	0.00	2.45	15.073	C

Main results: (17:15-17:30)

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Entry Flow (Veh/hr)	Exit Flow (Veh/hr)	Circulating Flow (Veh/hr)	Pedestrian Demand (Ped/hr)	Capacity (Veh/hr)	Saturation Capacity (Veh/hr)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
1	1540.84	385.21	1538.71	1866.92	227.12	0.00	2514.38	2546.29	0.613	1.03	1.57	3.682	A
2	1744.91	436.23	1741.47	1563.84	201.99	0.00	2526.94	2449.00	0.691	1.34	2.20	4.563	A
3	684.12	171.03	652.23	501.66	1441.81	0.00	706.42	491.44	0.968	2.45	10.42	49.603	E

Main results: (17:30-17:45)

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Entry Flow (Veh/hr)	Exit Flow (Veh/hr)	Circulating Flow (Veh/hr)	Pedestrian Demand (Ped/hr)	Capacity (Veh/hr)	Saturation Capacity (Veh/hr)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
1	1887.14	471.79	1881.88	2141.85	204.87	0.00	2527.07	2546.29	0.747	1.57	2.88	5.534	A
2	2137.07	534.27	2123.87	1839.72	247.04	0.00	2500.39	2449.00	0.855	2.20	5.50	9.252	A
3	837.87	209.47	588.31	612.51	1758.41	0.00	590.22	491.44	1.420	10.42	72.81	269.210	F

Main results: (17:45-18:00)

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Entry Flow (Veh/hr)	Exit Flow (Veh/hr)	Circulating Flow (Veh/hr)	Pedestrian Demand (Ped/hr)	Capacity (Veh/hr)	Saturation Capacity (Veh/hr)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
1	1887.14	471.79	1887.01	2150.83	204.15	0.00	2527.48	2546.29	0.747	2.88	2.91	5.617	A
2	2137.07	534.27	2136.34	1843.46	247.71	0.00	2500.00	2449.00	0.855	5.50	5.68	9.845	A
3	837.87	209.47	586.25	615.33	1768.73	0.00	586.44	491.44	1.429	72.81	135.72	605.154	F

Main results: (18:00-18:15)

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Entry Flow (Veh/hr)	Exit Flow (Veh/hr)	Circulating Flow (Veh/hr)	Pedestrian Demand (Ped/hr)	Capacity (Veh/hr)	Saturation Capacity (Veh/hr)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
1	1540.84	385.21	1546.04	1909.65	242.40	0.00	2505.68	2546.29	0.615	2.91	1.61	3.770	A
2	1744.91	436.23	1758.56	1585.49	202.95	0.00	2526.37	2449.00	0.691	5.68	2.27	4.770	A
3	684.12	171.03	696.09	505.56	1455.96	0.00	701.22	491.44	0.976	135.72	132.72	664.303	F

Main results: (18:15-18:30)

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Entry Flow (Veh/hr)	Exit Flow (Veh/hr)	Circulating Flow (Veh/hr)	Pedestrian Demand (Ped/hr)	Capacity (Veh/hr)	Saturation Capacity (Veh/hr)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
1	1290.38	322.60	1292.50	1724.18	273.20	0.00	2488.13	2546.29	0.519	1.61	1.08	3.017	A
2	1461.28	365.32	1464.92	1396.03	169.67	0.00	2545.98	2449.00	0.574	2.27	1.36	3.340	A
3	572.92	143.23	784.53	421.75	1212.85	0.00	790.44	491.44	0.725	132.72	79.82	489.385	F

Queueing Delay Results for each time segment

Queueing Delay results: (17:00-17:15)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
1	15.10	1.01	2.880	A	A
2	19.42	1.29	3.285	A	A
3	32.71	2.18	15.073	C	B

Queueing Delay results: (17:15-17:30)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
1	22.86	1.52	3.682	A	A
2	31.71	2.11	4.563	A	A
3	112.53	7.50	49.603	E	D

Queueing Delay results: (17:30-17:45)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
1	41.04	2.74	5.534	A	A
2	74.24	4.95	9.252	A	A
3	626.11	41.74	269.210	F	F

Queueing Delay results: (17:45-18:00)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
1	43.50	2.90	5.617	A	A
2	84.11	5.61	9.845	A	A
3	1564.03	104.27	605.154	F	F

Queueing Delay results: (18:00-18:15)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
1	25.02	1.67	3.770	A	A
2	36.10	2.41	4.770	A	A
3	2013.30	134.22	664.303	F	F

Queueing Delay results: (18:15-18:30)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
1	16.63	1.11	3.017	A	A
2	20.95	1.40	3.340	A	A
3	1594.08	106.27	489.385	F	F

NSTM Traffic Flows - 2031 J1a, AM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set (s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
NSTM Traffic Flows	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
2031 J1a, AM	2031 J1a	AM		ONE HOUR	08:00	09:30	90	15				✓		

Junction Network

Junctions

Junction	Name	Junction Type	Arm Order	Grade Separated	Large Roundabout	Do Geometric Delay	Junction Delay (s)	Junction LOS
1	M1 Jct 15a (South)	Roundabout	1,2,3				66.28	F

Junction Network Options

Driving Side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Arm	Name	Description
1	1	A43 N Link	
2	2	A43 S	
3	3	M1 Nbnd Offslip	

Capacity Options

Arm	Minimum Capacity (PCU/hr)	Maximum Capacity (PCU/hr)	Assume Flat Start Profile	Initial Queue (PCU)
1	0.00	99999.00		0.00
2	0.00	99999.00		0.00
3	0.00	99999.00		0.00

Roundabout Geometry

Arm	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
1	9.80	9.80	0.00	17.00	92.00	55.00	
2	8.30	10.40	8.80	28.50	92.00	50.00	
3	4.60	5.20	1.00	19.70	92.00	56.00	

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Arm	Enter slope and intercept directly	Entered slope	Entered intercept (PCU/hr)	Final Slope	Final Intercept (PCU/hr)
1		(calculated)	(calculated)	0.573	2686.180
2		(calculated)	(calculated)	0.587	2718.056
3		(calculated)	(calculated)	0.382	1323.610

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCU Factor for a HV (PCU)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	HV Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Arm	Profile Type	Use Turning Counts	Average Demand Flow (Veh/hr)	Flow Scaling Factor (%)
1	ONE HOUR	✓	2029.00	100.000
2	ONE HOUR	✓	1832.00	100.000
3	ONE HOUR	✓	699.00	100.000

Turning Proportions

Turning Counts / Proportions (Veh/hr) - Junction 1 (for whole period)

		To		
		1	2	3
From	1	0.000	1651.000	378.000
	2	1455.000	0.000	377.000
	3	287.000	412.000	0.000

Turning Proportions (Veh) - Junction 1 (for whole period)

		To		
		1	2	3
From	1	0.00	0.81	0.19
	2	0.79	0.00	0.21
	3	0.41	0.59	0.00

Vehicle Mix

Average PCU Per Vehicle - Junction 1 (for whole period)

		To		
		1	2	3
From	1	1.000	1.019	1.076
	2	1.074	1.000	1.006
	3	1.047	1.074	1.000

Heavy Vehicle Percentages - Junction 1 (for whole period)

		To		
		1	2	3
From	1	0.0	1.9	7.6
	2	7.4	0.0	0.6
	3	4.7	7.4	0.0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Junction Arrivals (Veh)	Total Queueing Delay (Veh-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (Veh-min/min)	Inclusive Total Queueing Delay (Veh-min)	Inclusive Average Queueing Delay (s)
1	0.94	21.11	12.32	C	1861.85	2792.77	470.85	10.12	5.23	470.89	10.12
2	0.87	11.83	6.39	B	1681.08	2521.61	286.22	6.81	3.18	286.24	6.81
3	1.23	335.62	76.54	F	641.41	962.12	2574.62	160.56	28.61	2574.76	160.57

Main Results for each time segment

Main results: (08:00-08:15)

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Entry Flow (Veh/hr)	Exit Flow (Veh/hr)	Circulating Flow (Veh/hr)	Pedestrian Demand (Ped/hr)	Capacity (Veh/hr)	Saturation Capacity (Veh/hr)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
1	1527.54	381.89	1520.82	1304.40	306.16	0.00	2426.68	2418.66	0.629	0.00	1.68	3.945	A
2	1379.23	344.81	1373.85	1543.66	283.33	0.00	2395.76	2296.21	0.576	0.00	1.34	3.504	A
3	526.24	131.56	519.44	566.04	1091.13	0.00	824.70	542.16	0.638	0.00	1.70	11.552	B

Main results: (08:15-08:30)

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Entry Flow (Veh/hr)	Exit Flow (Veh/hr)	Circulating Flow (Veh/hr)	Pedestrian Demand (Ped/hr)	Capacity (Veh/hr)	Saturation Capacity (Veh/hr)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
1	1824.03	456.01	1818.27	1558.28	363.45	0.00	2392.42	2418.66	0.762	1.68	3.12	6.206	A
2	1646.93	411.73	1643.27	1842.97	338.74	0.00	2362.78	2296.21	0.697	1.34	2.26	4.977	A
3	628.39	157.10	616.63	676.90	1305.11	0.00	742.17	542.16	0.847	1.70	4.64	26.496	D

Main results: (08:30-08:45)

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Entry Flow (Veh/hr)	Exit Flow (Veh/hr)	Circulating Flow (Veh/hr)	Pedestrian Demand (Ped/hr)	Capacity (Veh/hr)	Saturation Capacity (Veh/hr)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
1	2233.97	558.49	2202.31	1846.21	368.09	0.00	2389.65	2418.67	0.935	3.12	11.04	16.932	C
2	2017.07	504.27	2001.73	2160.10	410.29	0.00	2320.20	2296.21	0.869	2.26	6.10	10.817	B
3	769.61	192.40	624.50	822.22	1589.80	0.00	632.36	542.16	1.217	4.64	40.92	147.370	F

Main results: (08:45-09:00)

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Entry Flow (Veh/hr)	Exit Flow (Veh/hr)	Circulating Flow (Veh/hr)	Pedestrian Demand (Ped/hr)	Capacity (Veh/hr)	Saturation Capacity (Veh/hr)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
1	2233.97	558.49	2228.82	1858.53	369.64	0.00	2388.72	2418.67	0.935	11.04	12.32	21.111	C
2	2017.07	504.27	2015.88	2183.24	415.23	0.00	2317.26	2296.21	0.870	6.10	6.39	11.830	B
3	769.61	192.40	627.12	830.06	1601.04	0.00	628.03	542.16	1.225	40.92	76.54	335.617	F

Main results: (09:00-09:15)

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Entry Flow (Veh/hr)	Exit Flow (Veh/hr)	Circulating Flow (Veh/hr)	Pedestrian Demand (Ped/hr)	Capacity (Veh/hr)	Saturation Capacity (Veh/hr)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
1	1824.03	456.01	1859.09	1619.17	428.27	0.00	2353.66	2418.66	0.775	12.32	3.56	7.765	A
2	1646.93	411.73	1663.07	1941.02	346.35	0.00	2358.25	2296.21	0.698	6.39	2.36	5.296	A
3	628.39	157.10	726.61	688.58	1320.83	0.00	736.10	542.16	0.854	76.54	51.98	315.782	F

Main results: (09:15-09:30)

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Entry Flow (Veh/hr)	Exit Flow (Veh/hr)	Circulating Flow (Veh/hr)	Pedestrian Demand (Ped/hr)	Capacity (Veh/hr)	Saturation Capacity (Veh/hr)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
1	1527.54	381.89	1534.28	1396.75	428.11	0.00	2353.75	2418.66	0.649	3.56	1.87	4.428	A
2	1379.23	344.81	1383.17	1676.56	285.83	0.00	2394.27	2296.21	0.576	2.36	1.37	3.576	A
3	526.24	131.56	726.33	570.47	1098.53	0.00	821.84	542.16	0.640	51.98	1.96	91.728	F

Queueing Delay Results for each time segment

Queueing Delay results: (08:00-08:15)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
1	24.22	1.61	3.945	A	A
2	19.52	1.30	3.504	A	A
3	23.48	1.57	11.552	B	B

Queueing Delay results: (08:15-08:30)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
1	44.20	2.95	6.206	A	A
2	32.53	2.17	4.977	A	A
3	58.65	3.91	26.496	D	C

Queueing Delay results: (08:30-08:45)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
1	133.85	8.92	16.932	C	B
2	80.90	5.39	10.817	B	B
3	348.99	23.27	147.370	F	F

Queueing Delay results: (08:45-09:00)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
1	176.77	11.78	21.111	C	C
2	94.13	6.28	11.830	B	B
3	881.26	58.75	335.617	F	F

Queueing Delay results: (09:00-09:15)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
1	62.56	4.17	7.765	A	A
2	37.95	2.53	5.296	A	A
3	963.94	64.26	315.782	F	F

Queueing Delay results: (09:15-09:30)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
1	29.24	1.95	4.428	A	A
2	21.18	1.41	3.576	A	A
3	298.30	19.89	91.728	F	F

NSTM Traffic Flows - 2031 J1a, PM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set (s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
NSTM Traffic Flows	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
2031 J1a, PM	2031 J1a	PM		ONE HOUR	17:00	18:30	90	15				✓		

Junction Network

Junctions

Junction	Name	Junction Type	Arm Order	Grade Separated	Large Roundabout	Do Geometric Delay	Junction Delay (s)	Junction LOS
1	M1 Jct 15a (South)	Roundabout	1,2,3				189.29	F

Junction Network Options

Driving Side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Arm	Name	Description
1	1	A43 N Link	
2	2	A43 S	
3	3	M1 Nbnd Offslip	

Capacity Options

Arm	Minimum Capacity (PCU/hr)	Maximum Capacity (PCU/hr)	Assume Flat Start Profile	Initial Queue (PCU)
1	0.00	99999.00		0.00
2	0.00	99999.00		0.00
3	0.00	99999.00		0.00

Roundabout Geometry

Arm	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
1	9.80	9.80	0.00	17.00	92.00	55.00	
2	8.30	10.40	8.80	28.50	92.00	50.00	
3	4.60	5.20	1.00	19.70	92.00	56.00	

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Arm	Enter slope and intercept directly	Entered slope	Entered intercept (PCU/hr)	Final Slope	Final Intercept (PCU/hr)
1		(calculated)	(calculated)	0.573	2686.180
2		(calculated)	(calculated)	0.587	2718.056
3		(calculated)	(calculated)	0.382	1323.610

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCU Factor for a HV (PCU)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	HV Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Arm	Profile Type	Use Turning Counts	Average Demand Flow (Veh/hr)	Flow Scaling Factor (%)
1	ONE HOUR	✓	1811.00	100.000
2	ONE HOUR	✓	1961.00	100.000
3	ONE HOUR	✓	824.00	100.000

Turning Proportions

Turning Counts / Proportions (Veh/hr) - Junction 1 (for whole period)

		To		
		1	2	3
From	1	0.000	1547.000	264.000
	2	1588.000	0.000	373.000
	3	549.000	275.000	0.000

Turning Proportions (Veh) - Junction 1 (for whole period)

		To		
		1	2	3
From	1	0.00	0.85	0.15
	2	0.81	0.00	0.19
	3	0.67	0.33	0.00

Vehicle Mix

Average PCU Per Vehicle - Junction 1 (for whole period)

		To		
		1	2	3
From	1	1.000	1.015	1.023
	2	1.028	1.000	1.017
	3	1.109	1.053	1.000

Heavy Vehicle Percentages - Junction 1 (for whole period)

		To		
		1	2	3
From	1	0.0	1.5	2.3
	2	2.8	0.0	1.7
	3	10.9	5.3	0.0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Junction Arrivals (Veh)	Total Queueing Delay (Veh-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (Veh-min/min)	Inclusive Total Queueing Delay (Veh-min)	Inclusive Average Queueing Delay (s)
1	0.79	6.74	3.68	A	1661.80	2492.70	197.25	4.75	2.19	197.27	4.75
2	0.87	11.12	6.45	B	1799.45	2699.18	291.48	6.48	3.24	291.51	6.48
3	1.55	962.07	191.58	F	756.12	1134.18	8587.33	454.29	95.41	9474.88	501.24

Main Results for each time segment

Main results: (17:00-17:15)

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Entry Flow (Veh/hr)	Exit Flow (Veh/hr)	Circulating Flow (Veh/hr)	Pedestrian Demand (Ped/hr)	Capacity (Veh/hr)	Saturation Capacity (Veh/hr)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
1	1363.41	340.85	1358.74	1595.28	202.49	0.00	2523.00	2543.21	0.540	0.00	1.17	3.079	A
2	1476.35	369.09	1470.81	1363.17	198.07	0.00	2533.11	2432.17	0.583	0.00	1.38	3.371	A
3	620.35	155.09	606.74	477.83	1191.04	0.00	784.99	504.82	0.790	0.00	3.40	18.973	C

Main results: (17:15-17:30)

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Entry Flow (Veh/hr)	Exit Flow (Veh/hr)	Circulating Flow (Veh/hr)	Pedestrian Demand (Ped/hr)	Capacity (Veh/hr)	Saturation Capacity (Veh/hr)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
1	1628.05	407.01	1625.42	1874.71	225.49	0.00	2509.34	2543.21	0.649	1.17	1.82	4.060	A
2	1762.90	440.73	1759.17	1613.96	236.95	0.00	2510.38	2432.17	0.702	1.38	2.32	4.768	A
3	740.76	185.19	675.64	571.55	1424.56	0.00	700.96	504.82	1.057	3.40	19.68	79.052	F

Main results: (17:30-17:45)

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Entry Flow (Veh/hr)	Exit Flow (Veh/hr)	Circulating Flow (Veh/hr)	Pedestrian Demand (Ped/hr)	Capacity (Veh/hr)	Saturation Capacity (Veh/hr)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
1	1993.94	498.49	1986.76	2127.75	196.30	0.00	2526.68	2543.21	0.789	1.82	3.62	6.579	A
2	2159.11	539.78	2143.61	1893.44	289.62	0.00	2479.59	2432.17	0.871	2.32	6.19	10.271	B
3	907.24	226.81	588.19	697.36	1735.87	0.00	588.92	504.82	1.541	19.68	99.45	377.968	F

Main results: (17:45-18:00)

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Entry Flow (Veh/hr)	Exit Flow (Veh/hr)	Circulating Flow (Veh/hr)	Pedestrian Demand (Ped/hr)	Capacity (Veh/hr)	Saturation Capacity (Veh/hr)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
1	1993.94	498.49	1993.72	2137.10	195.11	0.00	2527.39	2543.21	0.789	3.62	3.68	6.737	A
2	2159.11	539.78	2158.08	1898.19	290.64	0.00	2479.00	2432.17	0.871	6.19	6.45	11.123	B
3	907.24	226.81	584.61	701.12	1747.59	0.00	584.70	504.82	1.552	99.45	180.11	798.829	F

Main results: (18:00-18:15)

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Entry Flow (Veh/hr)	Exit Flow (Veh/hr)	Circulating Flow (Veh/hr)	Pedestrian Demand (Ped/hr)	Capacity (Veh/hr)	Saturation Capacity (Veh/hr)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
1	1628.05	407.01	1635.23	1903.65	231.90	0.00	2505.52	2543.21	0.650	3.68	1.88	4.169	A
2	1762.90	440.73	1779.09	1628.76	238.38	0.00	2509.55	2432.17	0.702	6.45	2.40	5.035	A
3	740.76	185.19	694.87	576.77	1440.69	0.00	695.15	504.82	1.066	180.11	191.58	962.069	F

Main results: (18:15-18:30)

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Entry Flow (Veh/hr)	Exit Flow (Veh/hr)	Circulating Flow (Veh/hr)	Pedestrian Demand (Ped/hr)	Capacity (Veh/hr)	Saturation Capacity (Veh/hr)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
1	1363.41	340.85	1366.05	1717.20	259.70	0.00	2489.01	2543.21	0.548	1.88	1.22	3.212	A
2	1476.35	369.09	1480.32	1426.62	199.14	0.00	2532.49	2432.17	0.583	2.40	1.41	3.433	A
3	620.35	155.09	778.16	480.71	1198.75	0.00	782.22	504.82	0.793	191.58	152.12	795.773	F

Queueing Delay Results for each time segment

Queueing Delay results: (17:00-17:15)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
1	17.02	1.13	3.079	A	A
2	20.11	1.34	3.371	A	A
3	43.78	2.92	18.973	C	B

Queueing Delay results: (17:15-17:30)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
1	26.51	1.77	4.060	A	A
2	33.39	2.23	4.768	A	A
3	187.34	12.49	79.052	F	E

Queueing Delay results: (17:30-17:45)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
1	50.86	3.39	6.579	A	A
2	82.42	5.49	10.271	B	B
3	894.13	59.61	377.968	F	F

Queueing Delay results: (17:45-18:00)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
1	54.80	3.65	6.737	A	A
2	95.21	6.35	11.123	B	B
3	2096.68	139.78	798.829	F	F

Queueing Delay results: (18:00-18:15)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
1	29.29	1.95	4.169	A	A
2	38.58	2.57	5.035	A	A
3	2787.63	185.84	962.069	F	F

Queueing Delay results: (18:15-18:30)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
1	18.77	1.25	3.212	A	A
2	21.78	1.45	3.433	A	A
3	2577.77	171.85	795.773	F	F

APPENDIX E

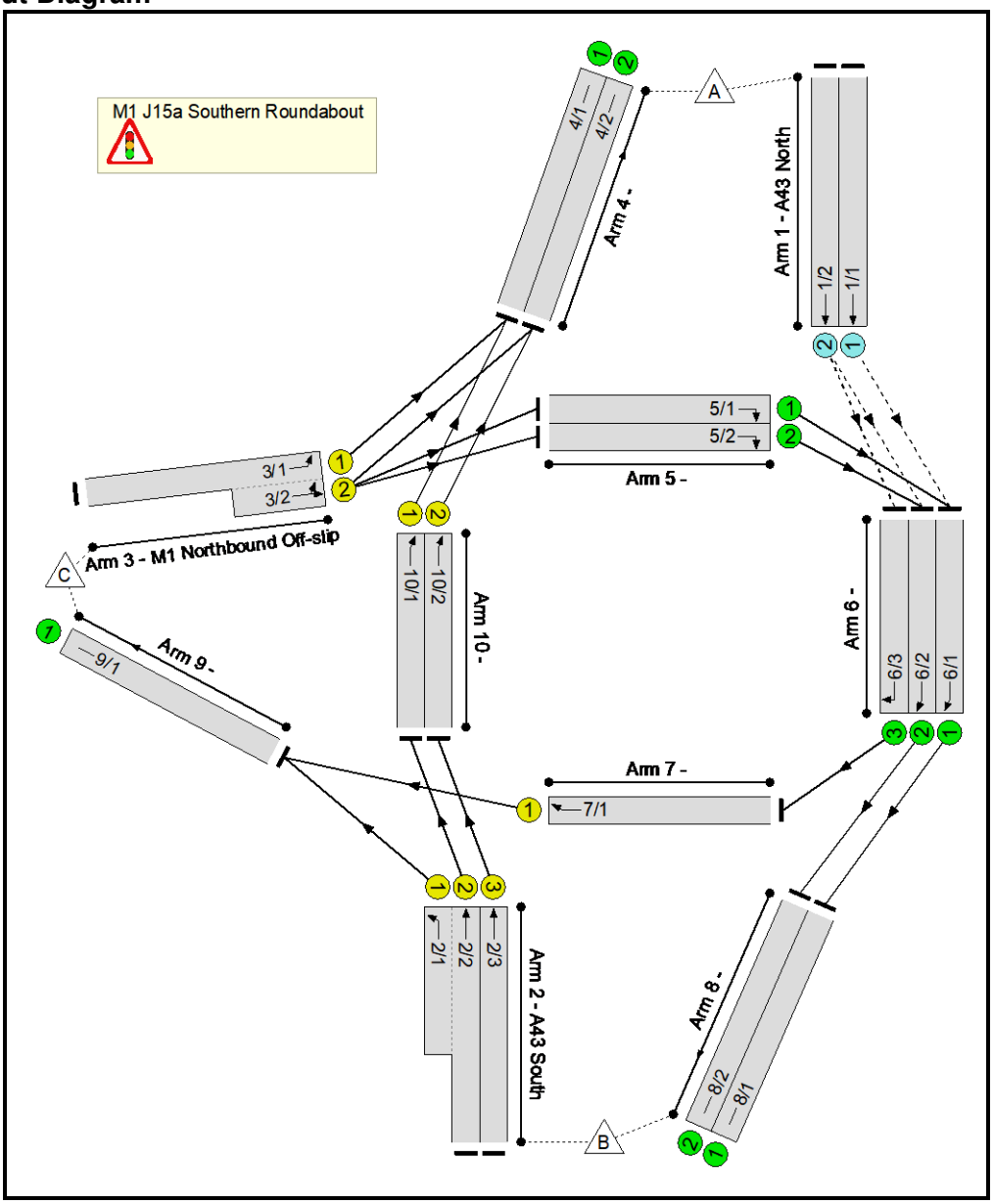
2031 INITIAL MITIGATION ARRANGEMENT MODELLING RESULTS

Full Input Data And Results

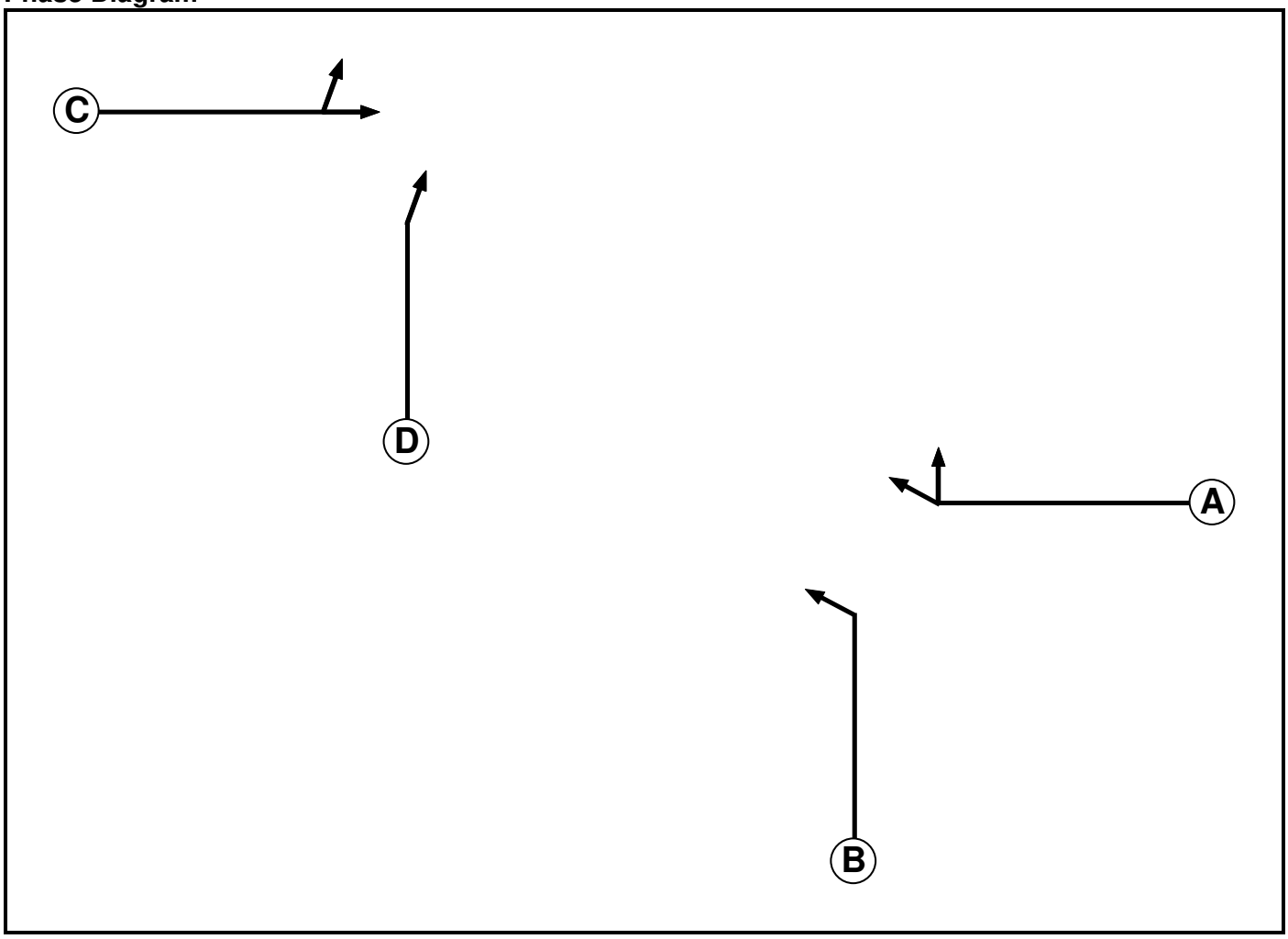
User and Project Details

Project:	**Northampton Gateway SRFI**
Title:	**M1 J15a Initial Mitigation Arrangement**
Location:	
File name:	170614 Mitigation.lsg3x
Author:	Mark Higgins
Company:	ADC Infrastructure
Address:	Nottingham
Notes:	2031 J1a Flows

Network Layout Diagram



Phase Diagram



Phase Input Data

Phase Name	Phase Type	Stage Stream	Assoc. Phase	Street Min	Cont Min
A	Traffic	1		7	7
B	Traffic	1		7	7
C	Traffic	2		7	7
D	Traffic	2		7	7

Phase Intergreens Matrix

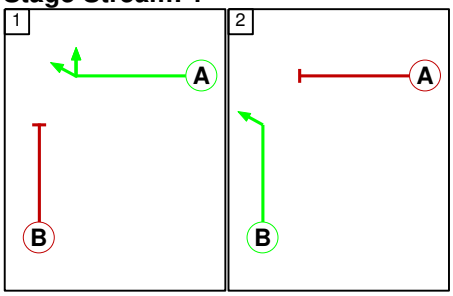
	Starting Phase			
Terminating Phase	A	B	C	D
A		6	-	-
B	6		-	-
C	-	-		6
D	-	-	6	

Phases in Stage

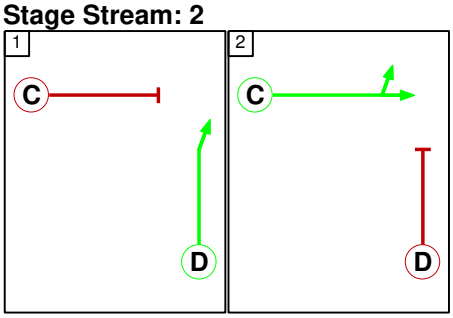
Stream	Stage No.	Phases in Stage
1	1	A
1	2	B
2	1	D
2	2	C

Stage Diagram

Stage Stream: 1



Stage Stream: 2



Phase Delays

Stage Stream: 1

Term. Stage	Start Stage	Phase	Type	Value	Cont value
There are no Phase Delays defined					

Stage Stream: 2

Term. Stage	Start Stage	Phase	Type	Value	Cont value
There are no Phase Delays defined					

Prohibited Stage Change

Stage Stream: 1

From Stage \ To Stage		1	2
	1		6
	2	6	

Stage Stream: 2

From Stage \ To Stage		1	2
	1		6
	2	6	

Give-Way Lane Input Data

Junction: M1 J15a Southern Roundabout											
Lane	**Movement**	**Max Flow when Giving Way (PCU/Hr)**	**Min Flow when Giving Way (PCU/Hr)**	**Opposing Lane**	**Opp. Lane Coeff.**	**Opp. Mvmnts.**	**Right Turn Storage (PCU)**	**Non-Blocking Storage (PCU)**	**RTF**	**Right Turn Move up (s)**	**Max Turns in Intergreen (PCU)**
1/1 (A43 North)	6/1 (Ahead)	1343	0	5/1	0.29	All	-	-	-	-	-
				5/2	0.29	All					
1/2 (A43 North)	6/2 (Ahead)	1343	0	5/1	0.29	All	-	-	-	-	-
				5/2	0.29	All					
	6/3 (Ahead)	1343	0	5/1	0.29	All					
				5/2	0.29	All					

Lane Input Data

Junction: M1 J15a Southern Roundabout												
Lane	**Lane Type**	**Phases**	**Start Disp.**	**End Disp.**	**Physical Length (PCU)**	**Sat Flow Type**	**Def User Saturation Flow (PCU/Hr)**	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Turns**	**Turning Radius (m)**
1/1 (A43 North)	O		2	3	60.0	Inf	-	-	-	-	-	-
1/2 (A43 North)	O		2	3	60.0	Inf	-	-	-	-	-	-
2/1 (A43 South)	U	A	2	3	8.0	User	1900	-	-	-	-	-
2/2 (A43 South)	U	A	2	3	60.0	User	1900	-	-	-	-	-
2/3 (A43 South)	U	A	2	3	60.0	User	1900	-	-	-	-	-
3/1 (M1 Northbound Off-slip)	U	C	2	3	60.0	User	1900	-	-	-	-	-
3/2 (M1 Northbound Off-slip)	U	C	2	3	5.0	User	1900	-	-	-	-	-
4/1	U		2	3	3.0	Inf	-	-	-	-	-	-
4/2	U		2	3	3.0	Inf	-	-	-	-	-	-
5/1	U		2	3	8.7	Inf	-	-	-	-	-	-
5/2	U		2	3	8.7	Inf	-	-	-	-	-	-
6/1	U		2	3	16.5	Inf	-	-	-	-	-	-
6/2	U		2	3	16.5	Inf	-	-	-	-	-	-
6/3	U		2	3	16.5	Inf	-	-	-	-	-	-
7/1	U	B	2	3	4.3	User	1900	-	-	-	-	-
8/1	U		2	3	3.0	Inf	-	-	-	-	-	-
8/2	U		2	3	3.0	Inf	-	-	-	-	-	-
9/1	U		2	3	3.0	Inf	-	-	-	-	-	-
10/1	U	D	2	3	12.2	User	1900	-	-	-	-	-
10/2	U	D	2	3	12.2	User	1900	-	-	-	-	-

Traffic Flow Groups

Flow Group	Start Time	End Time	Duration	Formula
1: '2031 AM Peak J1a'	08:00	09:00	01:00	
2: '2031 PM Peak J1a'	17:00	18:00	01:00	

Scenario 1: '2031 AM Peak J1a' (FG1: '2031 AM Peak J1a', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination			
		A	B	C	Tot.
Origin	A	0	1692	416	2108
	B	1594	0	380	1974
	C	305	452	0	757
	Tot.	1899	2144	796	4839

Traffic Lane Flows

Lane	Scenario 1: 2031 AM Peak J1a
Junction: M1 J15a Southern Roundabout	
1/1	1054
1/2	1054
2/1 (short)	380
2/2 (with short)	1138(In) 758(Out)
2/3	836
3/1 (with short)	757(In) 305(Out)
3/2 (short)	452
4/1	1063
4/2	836
5/1	226
5/2	226
6/1	1280
6/2	864
6/3	416
7/1	416
8/1	1280
8/2	864
9/1	796
10/1	758
10/2	836

Lane Saturation Flows

Junction: M1 J15a Southern Roundabout								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (A43 North Lane 1)	Infinite Saturation Flow						Inf	Inf
1/2 (A43 North Lane 2)	Infinite Saturation Flow						Inf	Inf
2/1 (A43 South Lane 1)	This lane uses a directly entered Saturation Flow						1900	1900
2/2 (A43 South Lane 2)	This lane uses a directly entered Saturation Flow						1900	1900
2/3 (A43 South Lane 3)	This lane uses a directly entered Saturation Flow						1900	1900
3/1 (M1 Northbound Off-slip Lane 1)	This lane uses a directly entered Saturation Flow						1900	1900
3/2 (M1 Northbound Off-slip Lane 2)	This lane uses a directly entered Saturation Flow						1900	1900
4/1	Infinite Saturation Flow						Inf	Inf
4/2	Infinite Saturation Flow						Inf	Inf
5/1	Infinite Saturation Flow						Inf	Inf
5/2	Infinite Saturation Flow						Inf	Inf
6/1	Infinite Saturation Flow						Inf	Inf
6/2	Infinite Saturation Flow						Inf	Inf
6/3	Infinite Saturation Flow						Inf	Inf
7/1	This lane uses a directly entered Saturation Flow						1900	1900
8/1	Infinite Saturation Flow						Inf	Inf
8/2	Infinite Saturation Flow						Inf	Inf
9/1	Infinite Saturation Flow						Inf	Inf
10/1	This lane uses a directly entered Saturation Flow						1900	1900
10/2	This lane uses a directly entered Saturation Flow						1900	1900

Scenario 2: '2031 PM Peak J1a' (FG2: '2031 PM Peak J1a', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination			
		A	B	C	Tot.
Origin	A	0	1577	271	1848
	B	1647	0	381	2028
	C	627	294	0	921
	Tot.	2274	1871	652	4797

Traffic Lane Flows

Lane	Scenario 2: 2031 PM Peak J1a
Junction: M1 J15a Southern Roundabout	
1/1	924
1/2	924
2/1 (short)	381
2/2 (with short)	1189(In) 808(Out)
2/3	839
3/1 (with short)	921(In) 458(Out)
3/2 (short)	463
4/1	1266
4/2	1008
5/1	147
5/2	147
6/1	1071
6/2	800
6/3	271
7/1	271
8/1	1071
8/2	800
9/1	652
10/1	808
10/2	839

Lane Saturation Flows

Junction: M1 J15a Southern Roundabout								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (A43 North Lane 1)	Infinite Saturation Flow						Inf	Inf
1/2 (A43 North Lane 2)	Infinite Saturation Flow						Inf	Inf
2/1 (A43 South Lane 1)	This lane uses a directly entered Saturation Flow						1900	1900
2/2 (A43 South Lane 2)	This lane uses a directly entered Saturation Flow						1900	1900
2/3 (A43 South Lane 3)	This lane uses a directly entered Saturation Flow						1900	1900
3/1 (M1 Northbound Off-slip Lane 1)	This lane uses a directly entered Saturation Flow						1900	1900
3/2 (M1 Northbound Off-slip Lane 2)	This lane uses a directly entered Saturation Flow						1900	1900
4/1	Infinite Saturation Flow						Inf	Inf
4/2	Infinite Saturation Flow						Inf	Inf
5/1	Infinite Saturation Flow						Inf	Inf
5/2	Infinite Saturation Flow						Inf	Inf
6/1	Infinite Saturation Flow						Inf	Inf
6/2	Infinite Saturation Flow						Inf	Inf
6/3	Infinite Saturation Flow						Inf	Inf
7/1	This lane uses a directly entered Saturation Flow						1900	1900
8/1	Infinite Saturation Flow						Inf	Inf
8/2	Infinite Saturation Flow						Inf	Inf
9/1	Infinite Saturation Flow						Inf	Inf
10/1	This lane uses a directly entered Saturation Flow						1900	1900
10/2	This lane uses a directly entered Saturation Flow						1900	1900

Scenario 1: '2031 AM Peak J1a' (FG1: '2031 AM Peak J1a', Plan 1: 'Network Control Plan 1')

Stage Timings

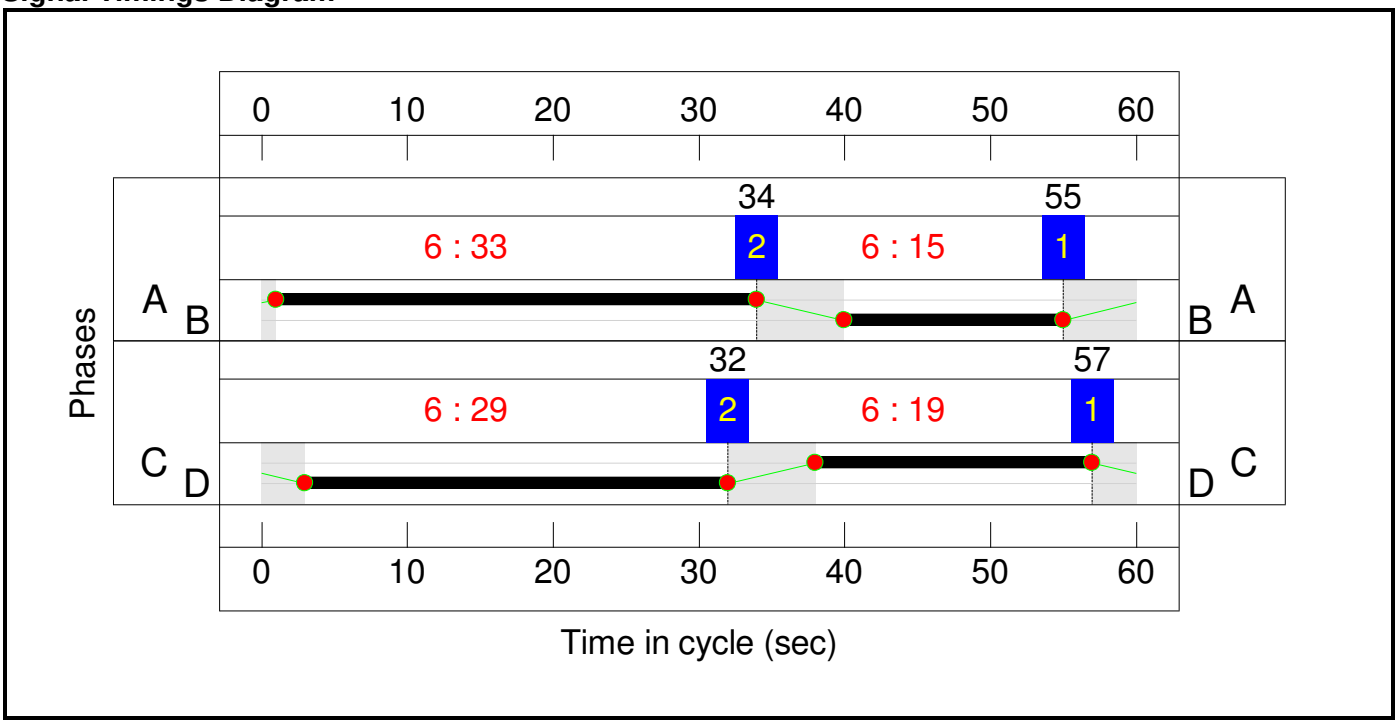
Stage Stream: 1

Stage	1	2
Duration	33	15
Change Point	55	34

Stage Stream: 2

Stage	1	2
Duration	29	19
Change Point	57	32

Signal Timings Diagram



Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network: M1 J15a Initial Mitigation Arrangement	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**89.0%**
M1 J15a Southern Roundabout	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**89.0%**
1/1	A43 North Ahead	O	N/A	N/A	-		-	-	-	1054	Inf	1212	87.0%
1/2	A43 North Ahead	O	N/A	N/A	-		-	-	-	1054	Inf	1212	87.0%
2/2+2/1	A43 South Left Ahead	U	1	N/A	A		1	33	-	1138	1900:1900	881+442	86.1 : 86.1%
2/3	A43 South Ahead	U	1	N/A	A		1	33	-	836	1900	1077	77.6%
3/1+3/2	M1 Northbound Off-slip Left Ahead	U	2	N/A	C		1	19	-	757	1900:1900	343+508	89.0 : 89.0%
7/1	Ahead	U	1	N/A	B		1	15	-	416	1900	507	82.1%
10/1	Ahead	U	2	N/A	D		1	29	-	758	1900	950	79.8%
10/2	Ahead	U	2	N/A	D		1	29	-	836	1900	950	88.0%

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network: M1 J15a Initial Mitigation Arrangement	**-**	**-**	**2108**	**0**	**0**	**13.1**	**22.4**	**0.0**	**35.6**	**-**	**-**	**-**	**-**
M1 J15a Southern Roundabout	**-**	**-**	**2108**	**0**	**0**	**13.1**	**22.4**	**0.0**	**35.6**	**-**	**-**	**-**	**-**
1/1	1054	1054	1054	0	0	0.2	3.2	-	3.4	11.7	7.9	3.2	11.1
1/2	1054	1054	1054	0	0	0.2	3.2	-	3.4	11.7	7.9	3.2	11.1
2/2+2/1	1138	1138	-	-	-	2.7	3.0	-	5.7	18.2	10.5	3.0	13.5
2/3	836	836	-	-	-	2.3	1.7	-	4.0	17.4	10.7	1.7	12.4
3/1+3/2	757	757	-	-	-	3.6	3.7	-	7.4	35.0	8.2	3.7	11.9
7/1	416	416	-	-	-	2.4	2.2	-	4.5	39.3	6.5	2.2	8.7
10/1	758	758	-	-	-	0.8	1.9	-	2.7	12.9	1.7	1.9	3.6
10/2	836	836	-	-	-	0.9	3.5	-	4.3	18.6	1.9	3.5	5.3

C1 Stream: 1 PRC for Signalled Lanes (%): 4.6 Total Delay for Signalled Lanes (pcuHr): 14.33 Cycle Time (s): 60
C1 Stream: 2 PRC for Signalled Lanes (%): 1.1 Total Delay for Signalled Lanes (pcuHr): 14.39 Cycle Time (s): 60
PRC Over All Lanes (%): 1.1 Total Delay Over All Lanes(pcuHr): 35.58

Scenario 2: '2031 PM Peak J1a' (FG2: '2031 PM Peak J1a', Plan 1: 'Network Control Plan 1')

Stage Timings

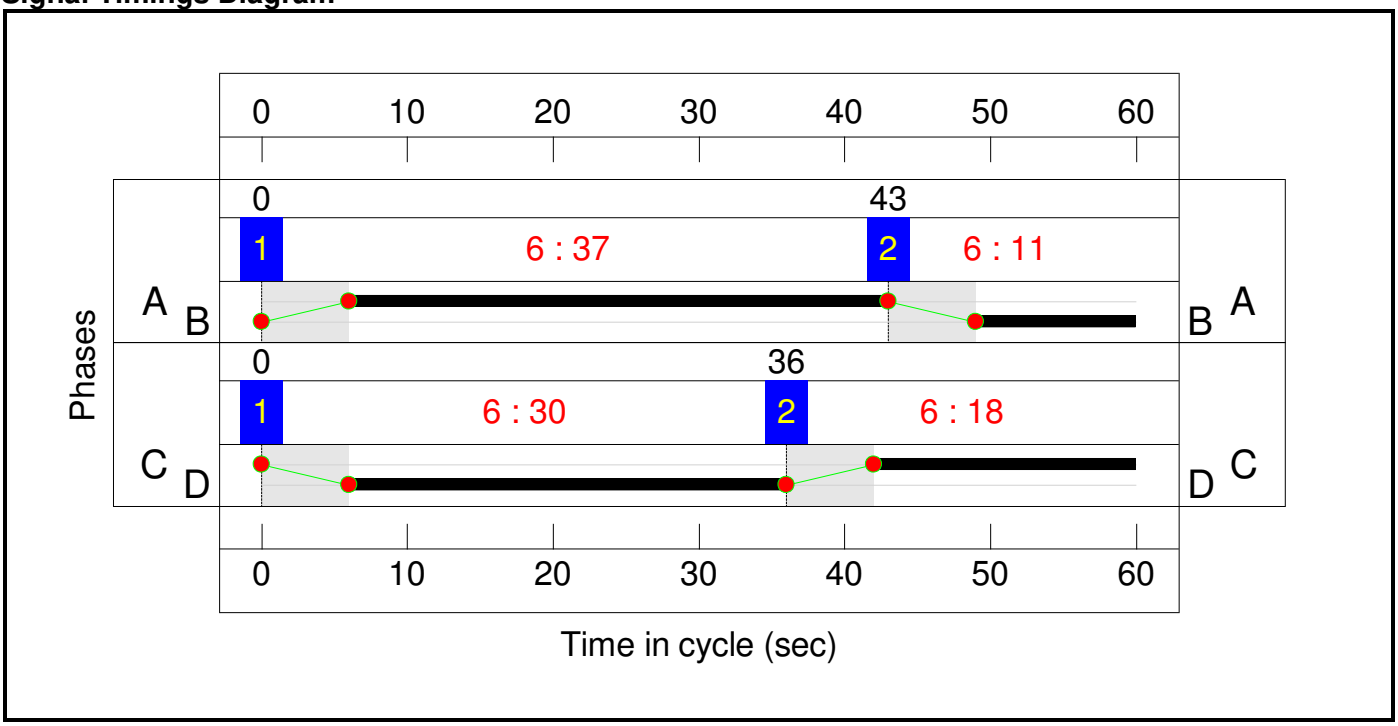
Stage Stream: 1

Stage	1	2
Duration	37	11
Change Point	0	43

Stage Stream: 2

Stage	1	2
Duration	30	18
Change Point	0	36

Signal Timings Diagram



Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network: M1 J15a Initial Mitigation Arrangement	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**100.8%**
M1 J15a Southern Roundabout	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**100.8%**
1/1	A43 North Ahead	O	N/A	N/A	-		-	-	-	924	Inf	1258	73.4%
1/2	A43 North Ahead	O	N/A	N/A	-		-	-	-	924	Inf	1258	73.4%
2/2+2/1	A43 South Left Ahead	U	1	N/A	A		1	37	-	1189	1900:1900	975+460	82.9 : 82.9%
2/3	A43 South Ahead	U	1	N/A	A		1	37	-	839	1900	1203	69.7%
3/1+3/2	M1 Northbound Off-slip Left Ahead	U	2	N/A	C		1	18	-	921	1900:1900	454+459	100.8 : 100.8%
7/1	Ahead	U	1	N/A	B		1	11	-	271	1900	380	71.3%
10/1	Ahead	U	2	N/A	D		1	30	-	808	1900	982	82.3%
10/2	Ahead	U	2	N/A	D		1	30	-	839	1900	982	85.5%

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network: M1 J15a Initial Mitigation Arrangement	**-**	**-**	**1848**	**0**	**0**	**13.0**	**29.8**	**0.0**	**42.7**	**-**	**-**	**-**	**-**
M1 J15a Southern Roundabout	**-**	**-**	**1848**	**0**	**0**	**13.0**	**29.8**	**0.0**	**42.7**	**-**	**-**	**-**	**-**
1/1	924	924	924	0	0	0.0	1.4	-	1.4	5.3	0.0	1.4	1.4
1/2	924	924	924	0	0	0.0	1.4	-	1.4	5.3	0.0	1.4	1.4
2/2+2/1	1189	1189	-	-	-	2.1	2.4	-	4.5	13.6	9.3	2.4	11.7
2/3	839	839	-	-	-	1.7	1.1	-	2.8	12.1	9.1	1.1	10.2
3/1+3/2	921	913	-	-	-	5.0	17.2	-	22.2	86.7	10.4	17.2	27.6
7/1	271	271	-	-	-	1.7	1.2	-	2.9	38.5	4.1	1.2	5.4
10/1	808	808	-	-	-	1.2	2.3	-	3.5	15.6	2.9	2.3	5.2
10/2	839	839	-	-	-	1.3	2.8	-	4.1	17.6	3.0	2.8	5.9

C1 Stream: 1 PRC for Signalled Lanes (%): 8.6 Total Delay for Signalled Lanes (pcuHr): 10.22 Cycle Time (s): 60
C1 Stream: 2 PRC for Signalled Lanes (%): -12.0 Total Delay for Signalled Lanes (pcuHr): 29.78 Cycle Time (s): 60
PRC Over All Lanes (%): -12.0 Total Delay Over All Lanes(pcuHr): 42.74

APPENDIX F

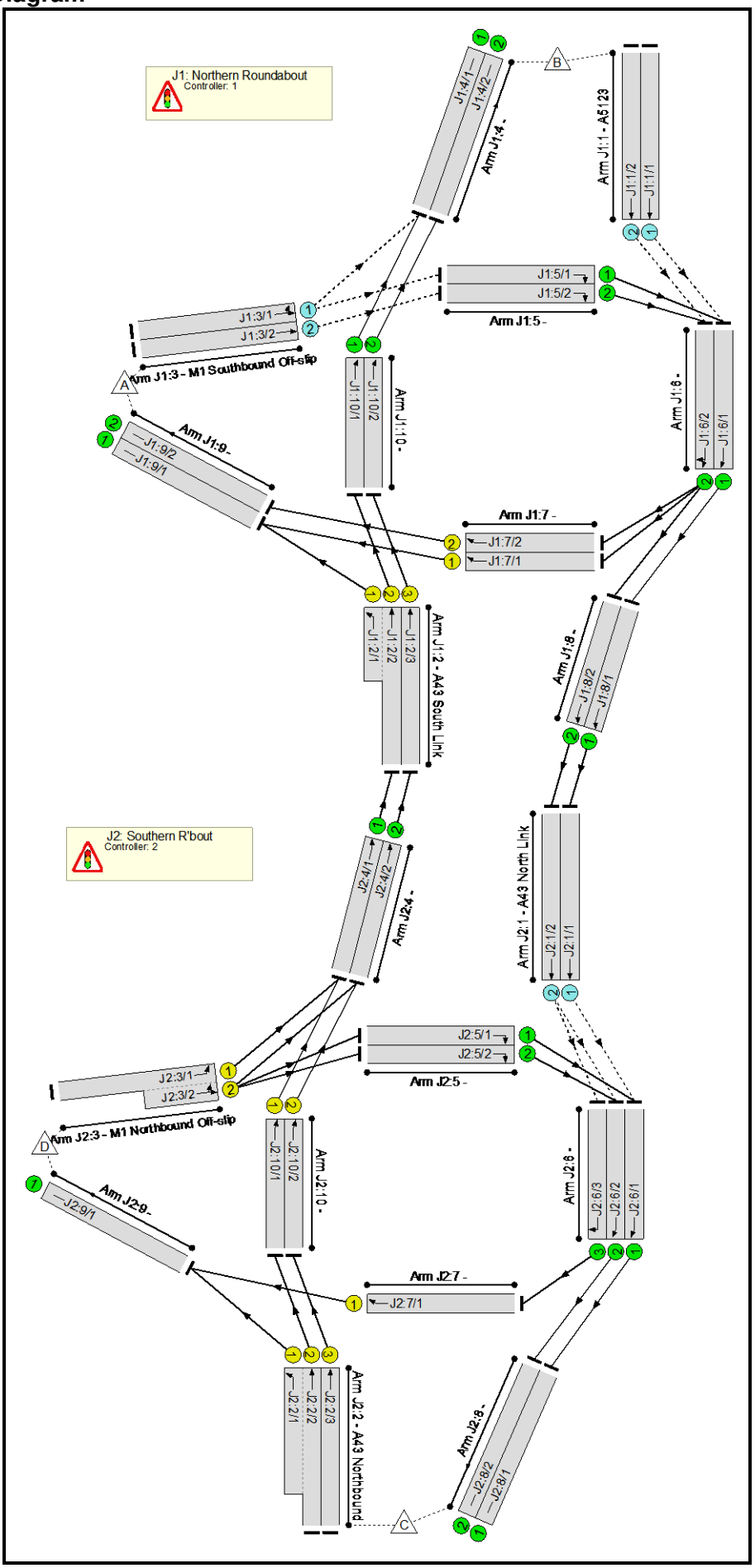
2031 SECOND MITIGATION ARRANGEMENT MODELLING RESULTS

Full Input Data And Results

User and Project Details

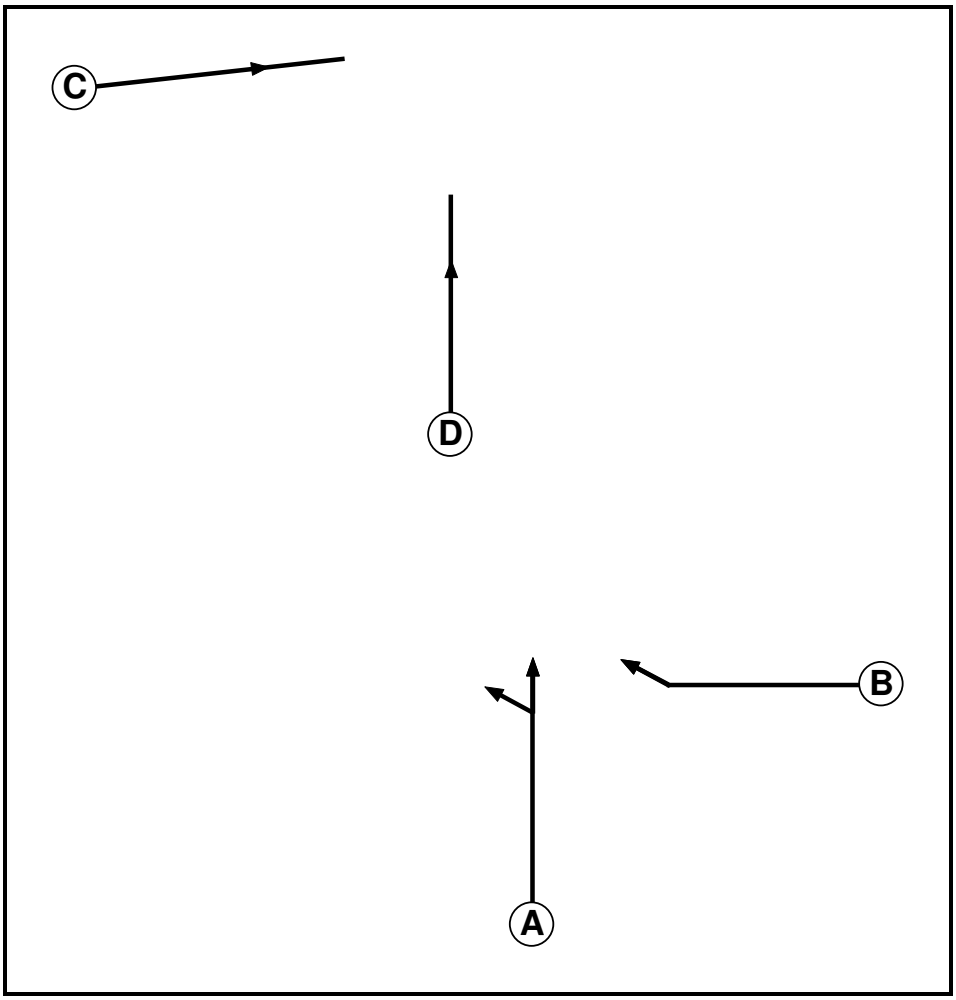
Project:	**Northampton Gateway SRFI**
Title:	**2031 Secong Mitigation Arrangement**
Location:	
File name:	170614 M1 J15a Mitigation.lsg3x
Author:	Mark Higgins
Company:	ADC Infrastructure
Address:	Nottingham
Notes:	2031 J1a Flow set

Network Layout Diagram



C1

Phase Diagram



Phase Input Data

Phase Name	Phase Type	Stage Stream	Assoc. Phase	Street Min	Cont Min
A	Traffic	1		7	7
B	Traffic	1		7	7
C	Traffic			7	7
D	Traffic			7	7

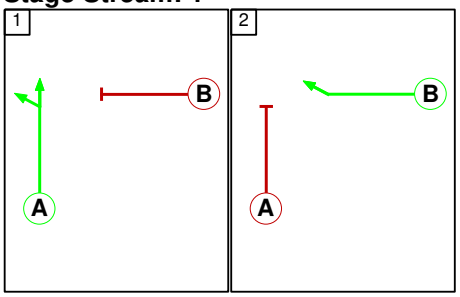
Phase Intergreens Matrix

		Starting Phase			
		A	B	C	D
Terminating Phase	A		6	-	-
	B	6		-	-
	C	-	-		6
	D	-	-	6	

Phases in Stage

Stream	Stage No.	Phases in Stage
1	1	A
1	2	B

Stage Diagram
Stage Stream: 1



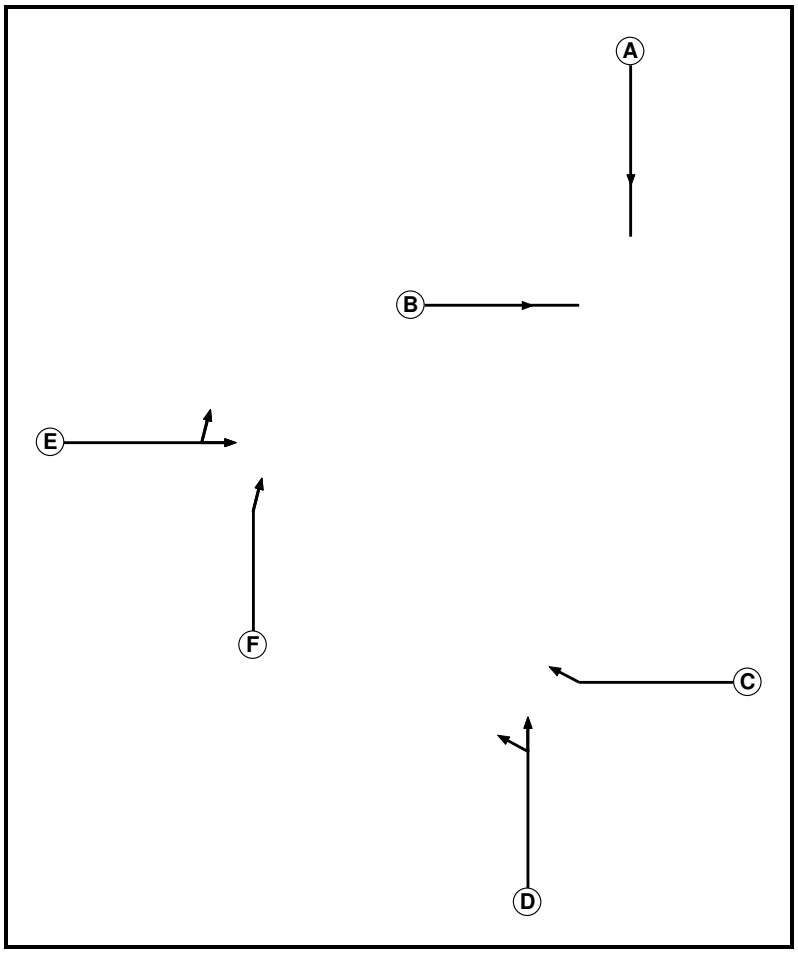
Phase Delays
Stage Stream: 1

Term. Stage	Start Stage	Phase	Type	Value	Cont value
There are no Phase Delays defined					

Prohibited Stage Change
Stage Stream: 1

	To Stage		
		1	2
From Stage	1		6
	2	6	

C2
Phase Diagram



Phase Input Data

Phase Name	Phase Type	Stage Stream	Assoc. Phase	Street Min	Cont Min
A	Traffic			7	7
B	Traffic			7	7
C	Traffic	1		7	7
D	Traffic	1		7	7
E	Traffic	2		7	7
F	Traffic	2		7	7

Phase Intergreens Matrix

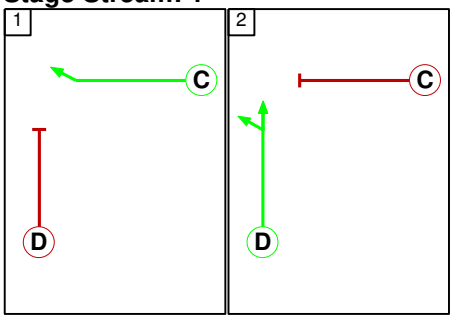
		Starting Phase					
		A	B	C	D	E	F
Terminating Phase	A		6	-	-	-	-
	B	6		-	-	-	-
	C	-	-		6	-	-
	D	-	-	6		-	-
	E	-	-	-	-		6
	F	-	-	-	-	6	

Phases in Stage

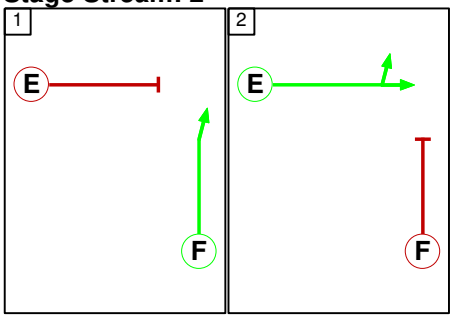
Stream	Stage No.	Phases in Stage
1	1	C
1	2	D
2	1	F
2	2	E

Stage Diagram

Stage Stream: 1



Stage Stream: 2



Phase Delays

Stage Stream: 1

Term. Stage	Start Stage	Phase	Type	Value	Cont value
There are no Phase Delays defined					

Stage Stream: 2

Term. Stage	Start Stage	Phase	Type	Value	Cont value
There are no Phase Delays defined					

Prohibited Stage Change

Stage Stream: 1

	To Stage		
From Stage		1	2
	1		6
	2	6	

Stage Stream: 2

	To Stage		
From Stage		1	2
	1		6
	2	6	

Give-Way Lane Input Data

Junction: J1: Northern Roundabout

Lane	Movement	Max Flow when Giving Way (PCU/Hr)	Min Flow when Giving Way (PCU/Hr)	Opposing Lane	Opp. Lane Coeff.	Opp. Mvmnts.	Right Turn Storage (PCU)	Non-Blocking Storage (PCU)	RTF	Right Turn Move up (s)	Max Turns in Intergreen (PCU)
J1:1/1 (A5123)	J1:6/1 (Ahead)	1308	0	J1:5/1	0.29	All	-	-	-	-	-
				J1:5/2	0.29	All					
J1:1/2 (A5123)	J1:6/2 (Ahead)	1308	0	J1:5/1	0.29	All	-	-	-	-	-
				J1:5/2	0.29	All					
J1:3/1 (M1 Southbound Off-slip)	J1:4/1 (Left)	1274	0	J1:10/1	0.29	All	-	-	-	-	-
				J1:10/2	0.29	All					
	J1:5/1 (Ahead)	1274	0	J1:10/1	0.29	All					
				J1:10/2	0.29	All					
J1:3/2 (M1 Southbound Off-slip)	J1:5/2 (Ahead)	1274	0	J1:10/1	0.29	All	-	-	-	-	-
				J1:10/2	0.29	All					

Junction: J2: Southern R'bout

Lane	Movement	Max Flow when Giving Way (PCU/Hr)	Min Flow when Giving Way (PCU/Hr)	Opposing Lane	Opp. Lane Coeff.	Opp. Mvmnts.	Right Turn Storage (PCU)	Non-Blocking Storage (PCU)	RTF	Right Turn Move up (s)	Max Turns in Intergreen (PCU)
J2:1/1 (A43 North Link)	J2:6/1 (Ahead)	1343	0	J2:5/1	0.29	All	-	-	-	-	-
				J2:5/2	0.29	All					
J2:1/2 (A43 North Link)	J2:6/2 (Ahead)	1343	0	J2:5/1	0.29	All	-	-	-	-	-
				J2:5/2	0.29	All					
	J2:6/3 (Ahead)	1343	0	J2:5/1	0.29	All					
				J2:5/2	0.29	All					

Lane Input Data

Junction: J1: Northern Roundabout												
Lane	**Lane Type**	**Phases**	**Start Disp.**	**End Disp.**	**Physical Length (PCU)**	**Sat Flow Type**	**Def User Saturation Flow (PCU/Hr)**	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Turns**	**Turning Radius (m)**
J1:1/1 (A5123)	O		2	3	60.0	Inf	-	-	-	-	-	-
J1:1/2 (A5123)	O		2	3	60.0	Inf	-	-	-	-	-	-
J1:2/1 (A43 South Link)	U	A	2	3	6.0	User	1900	-	-	-	-	-
J1:2/2 (A43 South Link)	U	A	2	3	24.3	User	1900	-	-	-	-	-
J1:2/3 (A43 South Link)	U	A	2	3	24.3	User	1900	-	-	-	-	-
J1:3/1 (M1 Southbound Off-slip)	O		2	3	60.0	User	1800	-	-	-	-	-
J1:3/2 (M1 Southbound Off-slip)	O		2	3	60.0	Inf	-	-	-	-	-	-
J1:4/1	U		2	3	3.0	Inf	-	-	-	-	-	-
J1:4/2	U		2	3	3.0	Inf	-	-	-	-	-	-
J1:5/1	U		2	3	8.7	Inf	-	-	-	-	-	-
J1:5/2	U		2	3	8.7	Inf	-	-	-	-	-	-
J1:6/1	U		2	3	16.5	Inf	-	-	-	-	-	-
J1:6/2	U		2	3	16.5	Inf	-	-	-	-	-	-
J1:7/1	U	B	2	3	4.3	User	1900	-	-	-	-	-
J1:7/2	U	B	2	3	4.3	User	1900	-	-	-	-	-
J1:8/1	U		2	3	3.0	Inf	-	-	-	-	-	-
J1:8/2	U		2	3	3.0	Inf	-	-	-	-	-	-
J1:9/1	U		2	3	3.0	Inf	-	-	-	-	-	-
J1:9/2	U		2	3	3.0	Inf	-	-	-	-	-	-
J1:10/1	U		2	3	12.2	Inf	-	-	-	-	-	-
J1:10/2	U		2	3	12.2	Inf	-	-	-	-	-	-

Junction: J2: Southern R'bout												
Lane	Lane Type	Phases	Start Disp.	End Disp.	Physical Length (PCU)	Sat Flow Type	Def User Saturation Flow (PCU/Hr)	Lane Width (m)	Gradient	Nearside Lane	Turns	Turning Radius (m)
J2:1/1 (A43 North Link)	O		2	3	24.3	Inf	-	-	-	-	-	-
J2:1/2 (A43 North Link)	O		2	3	24.3	Inf	-	-	-	-	-	-
J2:2/1 (A43 Northbound)	U	D	2	3	12.0	User	1900	-	-	-	-	-
J2:2/2 (A43 Northbound)	U	D	2	3	60.0	User	1900	-	-	-	-	-
J2:2/3 (A43 Northbound)	U	D	2	3	60.0	User	1900	-	-	-	-	-
J2:3/1 (M1 Northbound Off-slip)	U	E	2	3	60.0	User	1900	-	-	-	-	-
J2:3/2 (M1 Northbound Off-slip)	U	E	2	3	6.0	User	1900	-	-	-	-	-
J2:4/1	U		2	3	3.0	Inf	-	-	-	-	-	-
J2:4/2	U		2	3	3.0	Inf	-	-	-	-	-	-
J2:5/1	U		2	3	8.7	Inf	-	-	-	-	-	-
J2:5/2	U		2	3	8.7	Inf	-	-	-	-	-	-
J2:6/1	U		2	3	16.5	Inf	-	-	-	-	-	-
J2:6/2	U		2	3	16.5	Inf	-	-	-	-	-	-
J2:6/3	U		2	3	16.5	Inf	-	-	-	-	-	-
J2:7/1	U	C	2	3	4.3	User	1900	-	-	-	-	-
J2:8/1	U		2	3	3.0	Inf	-	-	-	-	-	-
J2:8/2	U		2	3	3.0	Inf	-	-	-	-	-	-
J2:9/1	U		2	3	3.0	Inf	-	-	-	-	-	-
J2:10/1	U	F	2	3	12.2	User	1900	-	-	-	-	-
J2:10/2	U	F	2	3	12.2	User	1900	-	-	-	-	-

Traffic Flow Groups

Flow Group	Start Time	End Time	Duration	Formula
1: '2031 AM Peak J1a'	08:00	09:00	01:00	
2: '2031 PM Peak J1a'	17:00	18:00	01:00	

Scenario 1: '2031 AM Peak J1a' (FG1: '2031 AM Peak J1a', Plan 1: '2031 AM Peak J1a')

Traffic Flows, Desired

Desired Flow :

		Destination				
		A	B	C	D	Tot.
Origin	A	0	485	355	88	928
	B	468	0	1378	224	2070
	C	195	1399	0	380	1974
	D	79	226	452	0	757
	Tot.	742	2110	2185	692	5729

Traffic Lane Flows

Lane	Scenario 1: 2031 AM Peak J1a
Junction: J1: Northern Roundabout	
J1:1/1	1029
J1:1/2	1041
J1:2/1 (short)	274
J1:2/2 (with short)	996(In) 722(Out)
J1:2/3	903
J1:3/1	486
J1:3/2	442
J1:4/1	1207
J1:4/2	903
J1:5/1	1
J1:5/2	442
J1:6/1	1030
J1:6/2	1483
J1:7/1	234
J1:7/2	234
J1:8/1	1030
J1:8/2	1015
J1:9/1	508
J1:9/2	234
J1:10/1	722
J1:10/2	903
Junction: J2: Southern R'bout	
J2:1/1	1030
J2:1/2	1015
J2:2/1 (short)	380
J2:2/2 (with short)	1174(In) 794(Out)
J2:2/3	800
J2:3/1 (with short)	757(In) 202(Out)
J2:3/2 (short)	555
J2:4/1	996
J2:4/2	903
J2:5/1	226
J2:5/2	226
J2:6/1	1256
J2:6/2	929
J2:6/3	312
J2:7/1	312

J2:8/1	1256
J2:8/2	929
J2:9/1	692
J2:10/1	794
J2:10/2	800

Lane Saturation Flows

Junction: J1: Northern Roundabout								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
J1:1/1 (A5123 Lane 1)	Infinite Saturation Flow						Inf	Inf
J1:1/2 (A5123 Lane 2)	Infinite Saturation Flow						Inf	Inf
J1:2/1 (A43 South Link Lane 1)	This lane uses a directly entered Saturation Flow						1900	1900
J1:2/2 (A43 South Link Lane 2)	This lane uses a directly entered Saturation Flow						1900	1900
J1:2/3 (A43 South Link Lane 3)	This lane uses a directly entered Saturation Flow						1900	1900
J1:3/1 (M1 Southbound Off-slip Lane 1)	This lane uses a directly entered Saturation Flow						1800	1800
J1:3/2 (M1 Southbound Off-slip Lane 2)	Infinite Saturation Flow						Inf	Inf
J1:4/1	Infinite Saturation Flow						Inf	Inf
J1:4/2	Infinite Saturation Flow						Inf	Inf
J1:5/1	Infinite Saturation Flow						Inf	Inf
J1:5/2	Infinite Saturation Flow						Inf	Inf
J1:6/1	Infinite Saturation Flow						Inf	Inf
J1:6/2	Infinite Saturation Flow						Inf	Inf
J1:7/1	This lane uses a directly entered Saturation Flow						1900	1900
J1:7/2	This lane uses a directly entered Saturation Flow						1900	1900
J1:8/1	Infinite Saturation Flow						Inf	Inf
J1:8/2	Infinite Saturation Flow						Inf	Inf
J1:9/1	Infinite Saturation Flow						Inf	Inf
J1:9/2	Infinite Saturation Flow						Inf	Inf
J1:10/1	Infinite Saturation Flow						Inf	Inf
J1:10/2	Infinite Saturation Flow						Inf	Inf

Junction: J2: Southern R'bout								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
J2:1/1 (A43 North Link Lane 1)	Infinite Saturation Flow						Inf	Inf
J2:1/2 (A43 North Link Lane 2)	Infinite Saturation Flow						Inf	Inf
J2:2/1 (A43 Northbound Lane 1)	This lane uses a directly entered Saturation Flow						1900	1900
J2:2/2 (A43 Northbound Lane 2)	This lane uses a directly entered Saturation Flow						1900	1900
J2:2/3 (A43 Northbound Lane 3)	This lane uses a directly entered Saturation Flow						1900	1900
J2:3/1 (M1 Northbound Off-slip Lane 1)	This lane uses a directly entered Saturation Flow						1900	1900
J2:3/2 (M1 Northbound Off-slip Lane 2)	This lane uses a directly entered Saturation Flow						1900	1900
J2:4/1	Infinite Saturation Flow						Inf	Inf
J2:4/2	Infinite Saturation Flow						Inf	Inf
J2:5/1	Infinite Saturation Flow						Inf	Inf
J2:5/2	Infinite Saturation Flow						Inf	Inf
J2:6/1	Infinite Saturation Flow						Inf	Inf
J2:6/2	Infinite Saturation Flow						Inf	Inf
J2:6/3	Infinite Saturation Flow						Inf	Inf
J2:7/1	This lane uses a directly entered Saturation Flow						1900	1900
J2:8/1	Infinite Saturation Flow						Inf	Inf
J2:8/2	Infinite Saturation Flow						Inf	Inf
J2:9/1	Infinite Saturation Flow						Inf	Inf
J2:10/1	This lane uses a directly entered Saturation Flow						1900	1900
J2:10/2	This lane uses a directly entered Saturation Flow						1900	1900

Scenario 2: '2031 PM Peak J1a' (FG2: '2031 PM Peak J1a', Plan 1: '2031 AM Peak J1a')

Traffic Flows, Desired

Desired Flow :

		Destination				
		A	B	C	D	Tot.
Origin	A	0	410	554	95	1059
	B	311	0	1081	133	1525
	C	160	1487	0	381	2028
	D	90	537	294	0	921
	Tot.	561	2434	1929	609	5533

Traffic Lane Flows

Lane	Scenario 2: 2031 PM Peak J1a
Junction: J1: Northern Roundabout	
J1:1/1	792
J1:1/2	733
J1:2/1 (short)	250
J1:2/2 (with short)	1185(In) 935(Out)
J1:2/3	1089
J1:3/1	536
J1:3/2	523
J1:4/1	1345
J1:4/2	1089
J1:5/1	126
J1:5/2	523
J1:6/1	918
J1:6/2	1256
J1:7/1	155
J1:7/2	156
J1:8/1	918
J1:8/2	945
J1:9/1	405
J1:9/2	156
J1:10/1	935
J1:10/2	1089
Junction: J2: Southern R'bout	
J2:1/1	918
J2:1/2	945
J2:2/1 (short)	381
J2:2/2 (with short)	1202(In) 821(Out)
J2:2/3	826
J2:3/1 (with short)	921(In) 364(Out)
J2:3/2 (short)	557
J2:4/1	1185
J2:4/2	1089
J2:5/1	147
J2:5/2	147
J2:6/1	1065
J2:6/2	864
J2:6/3	228
J2:7/1	228

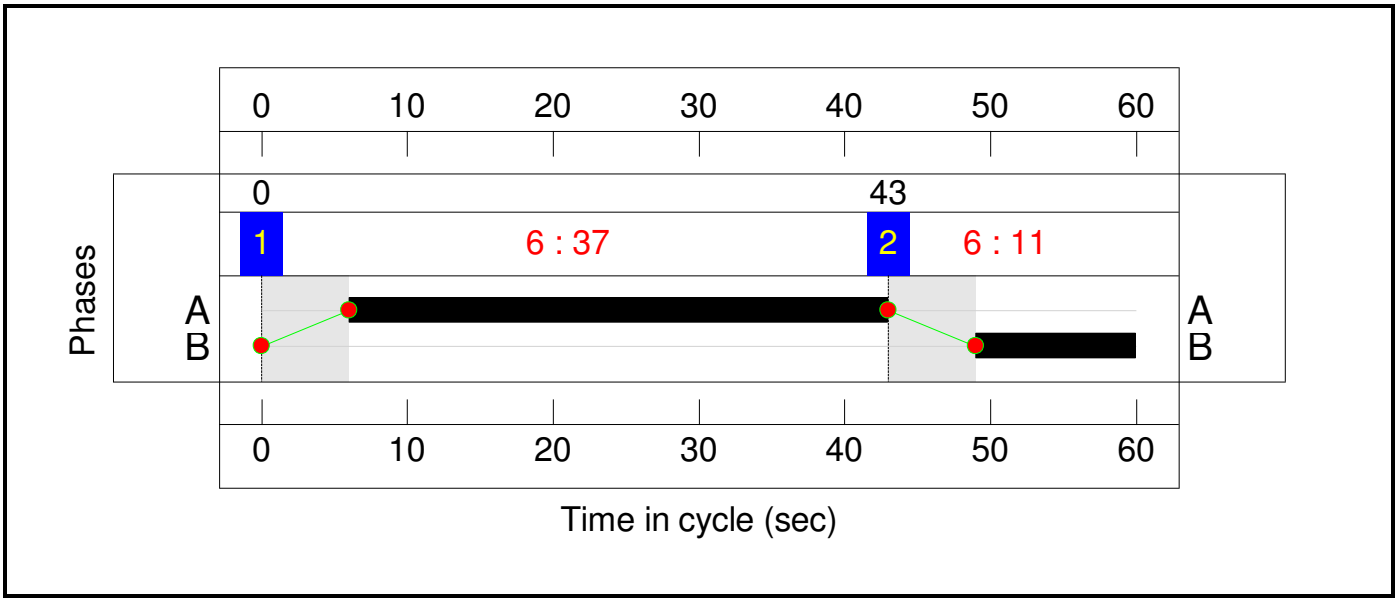
J2:8/1	1065
J2:8/2	864
J2:9/1	609
J2:10/1	821
J2:10/2	826

Lane Saturation Flows

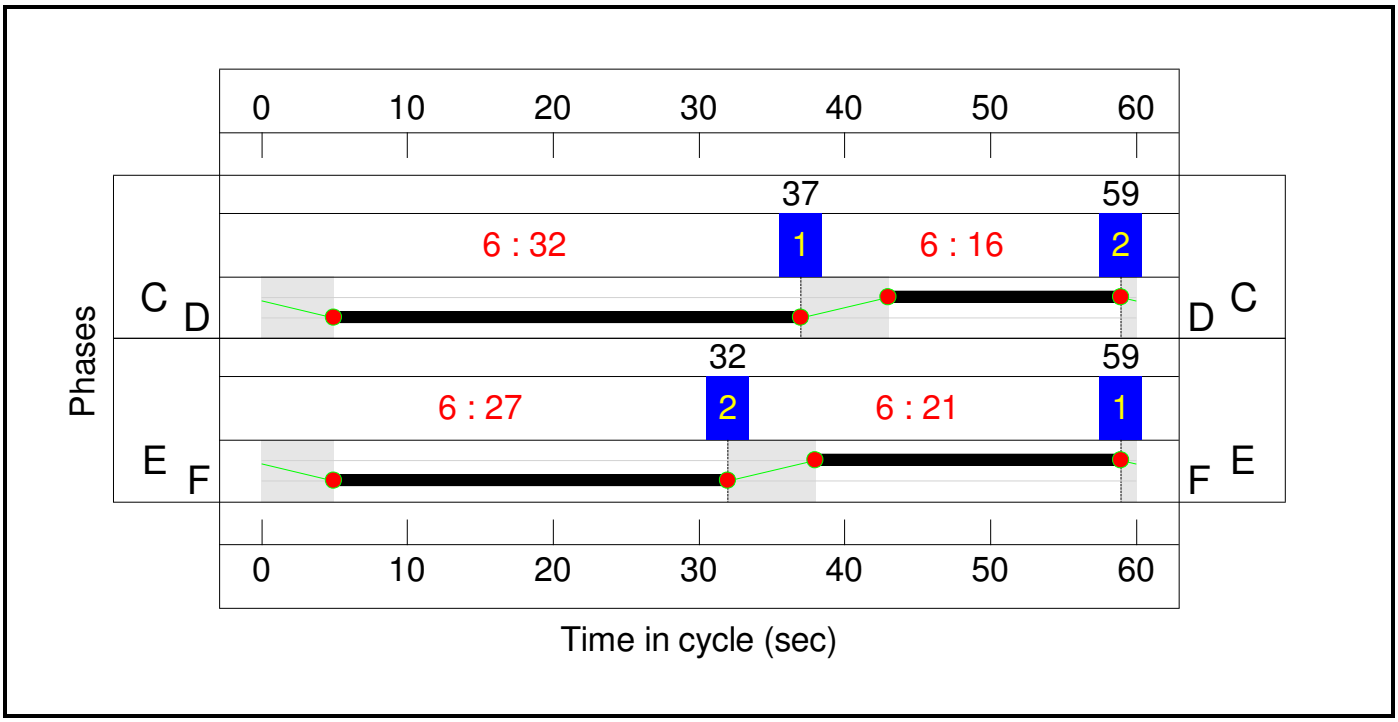
Junction: J1: Northern Roundabout								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
J1:1/1 (A5123 Lane 1)	Infinite Saturation Flow						Inf	Inf
J1:1/2 (A5123 Lane 2)	Infinite Saturation Flow						Inf	Inf
J1:2/1 (A43 South Link Lane 1)	This lane uses a directly entered Saturation Flow						1900	1900
J1:2/2 (A43 South Link Lane 2)	This lane uses a directly entered Saturation Flow						1900	1900
J1:2/3 (A43 South Link Lane 3)	This lane uses a directly entered Saturation Flow						1900	1900
J1:3/1 (M1 Southbound Off-slip Lane 1)	This lane uses a directly entered Saturation Flow						1800	1800
J1:3/2 (M1 Southbound Off-slip Lane 2)	Infinite Saturation Flow						Inf	Inf
J1:4/1	Infinite Saturation Flow						Inf	Inf
J1:4/2	Infinite Saturation Flow						Inf	Inf
J1:5/1	Infinite Saturation Flow						Inf	Inf
J1:5/2	Infinite Saturation Flow						Inf	Inf
J1:6/1	Infinite Saturation Flow						Inf	Inf
J1:6/2	Infinite Saturation Flow						Inf	Inf
J1:7/1	This lane uses a directly entered Saturation Flow						1900	1900
J1:7/2	This lane uses a directly entered Saturation Flow						1900	1900
J1:8/1	Infinite Saturation Flow						Inf	Inf
J1:8/2	Infinite Saturation Flow						Inf	Inf
J1:9/1	Infinite Saturation Flow						Inf	Inf
J1:9/2	Infinite Saturation Flow						Inf	Inf
J1:10/1	Infinite Saturation Flow						Inf	Inf
J1:10/2	Infinite Saturation Flow						Inf	Inf

Junction: J2: Southern R'bout								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
J2:1/1 (A43 North Link Lane 1)	Infinite Saturation Flow						Inf	Inf
J2:1/2 (A43 North Link Lane 2)	Infinite Saturation Flow						Inf	Inf
J2:2/1 (A43 Northbound Lane 1)	This lane uses a directly entered Saturation Flow						1900	1900
J2:2/2 (A43 Northbound Lane 2)	This lane uses a directly entered Saturation Flow						1900	1900
J2:2/3 (A43 Northbound Lane 3)	This lane uses a directly entered Saturation Flow						1900	1900
J2:3/1 (M1 Northbound Off-slip Lane 1)	This lane uses a directly entered Saturation Flow						1900	1900
J2:3/2 (M1 Northbound Off-slip Lane 2)	This lane uses a directly entered Saturation Flow						1900	1900
J2:4/1	Infinite Saturation Flow						Inf	Inf
J2:4/2	Infinite Saturation Flow						Inf	Inf
J2:5/1	Infinite Saturation Flow						Inf	Inf
J2:5/2	Infinite Saturation Flow						Inf	Inf
J2:6/1	Infinite Saturation Flow						Inf	Inf
J2:6/2	Infinite Saturation Flow						Inf	Inf
J2:6/3	Infinite Saturation Flow						Inf	Inf
J2:7/1	This lane uses a directly entered Saturation Flow						1900	1900
J2:8/1	Infinite Saturation Flow						Inf	Inf
J2:8/2	Infinite Saturation Flow						Inf	Inf
J2:9/1	Infinite Saturation Flow						Inf	Inf
J2:10/1	This lane uses a directly entered Saturation Flow						1900	1900
J2:10/2	This lane uses a directly entered Saturation Flow						1900	1900

Signal Timings Diagram
Scenario 1: '2031 AM Peak J1a' (FG1: '2031 AM Peak J1a', Plan 1: '2031 AM Peak J1a')
C1



C2



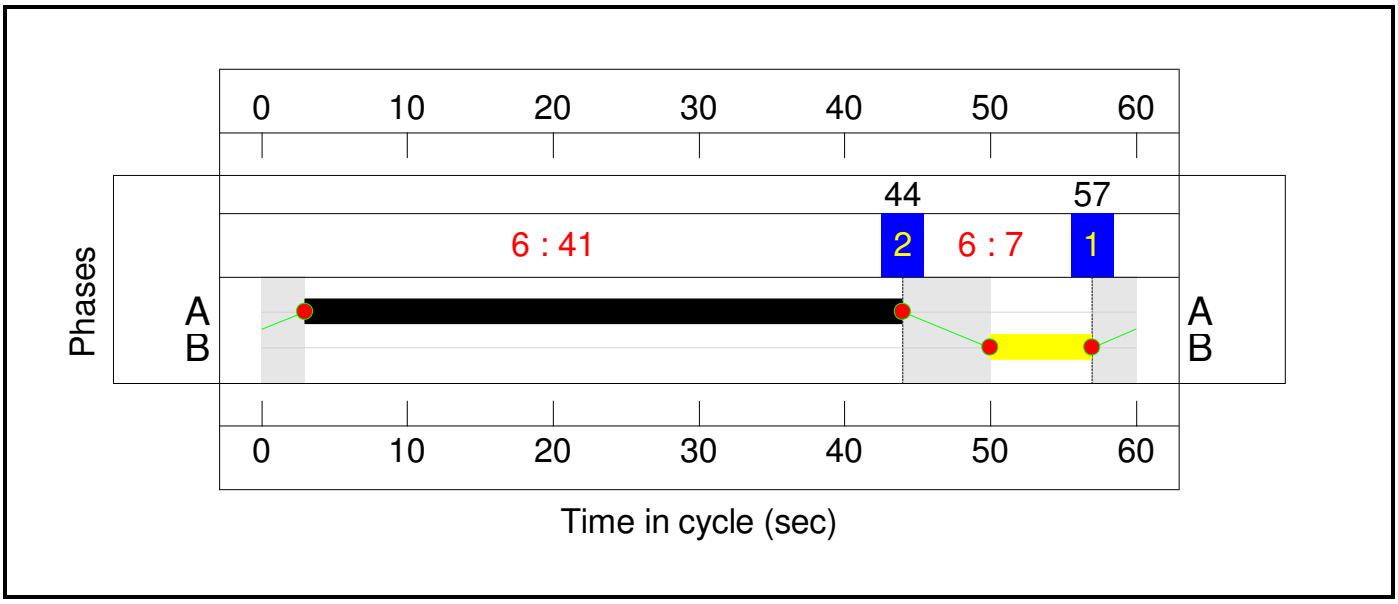
Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network: 2031 Secong Mitigation Arrangement	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**90.2%**
J1: Northern Roundabout	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**88.3%**
1/1	A5123 Ahead	O	N/A	N/A	-		-	-	-	1029	Inf	1179	87.2%
1/2	A5123 Ahead	O	N/A	N/A	-		-	-	-	1041	Inf	1179	88.3%
2/2+2/1	A43 South Link Left Ahead	U	1:1	N/A	C1:A		1	37	-	996	1900:1900	980+372	73.7 : 73.7%
2/3	A43 South Link Ahead	U	1:1	N/A	C1:A		1	37	-	903	1900	1203	75.0%
3/1	M1 Southbound Off-slip Left Ahead	O	N/A	N/A	-		-	-	-	486	1800	802	60.6%
3/2	M1 Southbound Off-slip Ahead	O	N/A	N/A	-		-	-	-	442	Inf	802	55.1%
7/1	Ahead	U	1:1	N/A	C1:B		1	11	-	234	1900	380	61.6%
7/2	Ahead	U	1:1	N/A	C1:B		1	11	-	234	1900	380	61.6%
J2: Southern R'bout	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**90.2%**
1/1	A43 North Link Ahead	O	N/A	N/A	-		-	-	-	1030	Inf	1212	85.0%
1/2	A43 North Link Ahead	O	N/A	N/A	-		-	-	-	1015	Inf	1212	83.8%
2/2+2/1	A43 Northbound Left Ahead	U	2:1	N/A	C2:D		1	32	-	1174	1900:1900	934+447	85.0 : 85.0%
2/3	A43 Northbound Ahead	U	2:1	N/A	C2:D		1	32	-	800	1900	1045	76.6%
3/1+3/2	M1 Northbound Off-slip Left Ahead	U	2:2	N/A	C2:E		1	21	-	757	1900:1900	224+615	90.2 : 90.2%
7/1	Ahead	U	2:1	N/A	C2:C		1	16	-	312	1900	538	58.0%
10/1	Ahead	U	2:2	N/A	C2:F		1	27	-	794	1900	887	89.5%
10/2	Ahead	U	2:2	N/A	C2:F		1	27	-	800	1900	887	90.2%

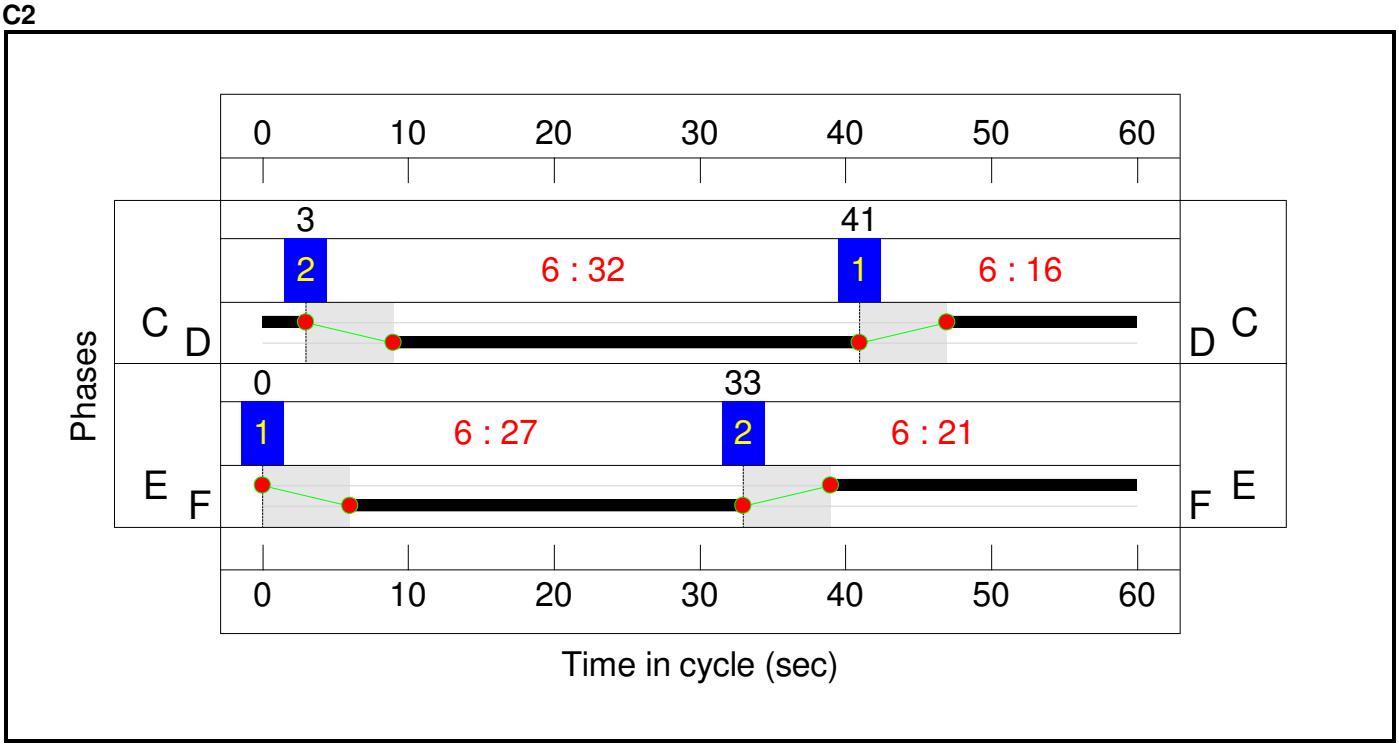
Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network: 2031 Secong Mitigation Arrangement	**-**	**-**	**5043**	**0**	**0**	**17.2**	**35.3**	**0.0**	**52.6**	**-**	**-**	**-**	**-**
J1: Northern Roundabout	**-**	**-**	**2998**	**0**	**0**	**4.2**	**12.7**	**0.0**	**16.9**	**-**	**-**	**-**	**-**
1/1	1029	1029	1029	0	0	0.0	3.3	-	3.3	11.5	0.9	3.3	4.1
1/2	1041	1041	1041	0	0	0.0	3.6	-	3.6	12.4	0.9	3.6	4.4
2/2+2/1	996	996	-	-	-	0.7	1.4	-	2.1	7.4	2.0	1.4	3.4
2/3	903	903	-	-	-	0.3	1.5	-	1.8	7.0	1.7	1.5	3.1
3/1	486	486	486	0	0	0.2	0.8	-	1.0	7.4	3.4	0.8	4.1
3/2	442	442	442	0	0	0.2	0.6	-	0.8	6.3	2.8	0.6	3.4
7/1	234	234	-	-	-	1.4	0.8	-	2.2	34.1	3.5	0.8	4.3
7/2	234	234	-	-	-	1.4	0.8	-	2.2	34.1	3.5	0.8	4.3
J2: Southern R'bout	**-**	**-**	**2045**	**0**	**0**	**13.0**	**22.6**	**0.0**	**35.7**	**-**	**-**	**-**	**-**
1/1	1030	1030	1030	0	0	0.1	2.8	-	2.9	10.1	7.2	2.8	9.9
1/2	1015	1015	1015	0	0	0.1	2.5	-	2.6	9.2	4.7	2.5	7.3
2/2+2/1	1174	1174	-	-	-	3.1	2.8	-	5.9	18.0	10.1	2.8	12.9
2/3	800	800	-	-	-	2.3	1.6	-	3.9	17.7	10.2	1.6	11.8
3/1+3/2	757	757	-	-	-	3.5	4.2	-	7.6	36.4	9.4	4.2	13.6
7/1	312	312	-	-	-	1.6	0.7	-	2.3	26.3	4.4	0.7	5.1
10/1	794	794	-	-	-	1.2	3.9	-	5.1	23.2	2.4	3.9	6.4
10/2	800	800	-	-	-	1.2	4.2	-	5.4	24.2	2.4	4.2	6.7

C1	Stream: 1 PRC for Signalled Lanes (%):	19.9	Total Delay for Signalled Lanes (pcuHr):	8.25	Cycle Time (s): 60
C2	Stream: 1 PRC for Signalled Lanes (%):	5.9	Total Delay for Signalled Lanes (pcuHr):	12.08	Cycle Time (s): 60
C2	Stream: 2 PRC for Signalled Lanes (%):	-0.3	Total Delay for Signalled Lanes (pcuHr):	18.14	Cycle Time (s): 60
	PRC Over All Lanes (%):	-0.3	Total Delay Over All Lanes(pcuHr):	52.57	

Signal Timings Diagram
Scenario 2: '2031 PM Peak J1a' (FG2: '2031 PM Peak J1a', Plan 1: '2031 AM Peak J1a')
C1



C2



Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network: 2031 Secong Mitigation Arrangement	-	-	**N/A**	-	-		-	-	-	-	-	-	**97.6%**
J1: Northern Roundabout	-	-	**N/A**	-	-		-	-	-	-	-	-	**82.4%**
1/1	A5123 Ahead	O	N/A	N/A	-		-	-	-	792	Inf	1120	70.7%
1/2	A5123 Ahead	O	N/A	N/A	-		-	-	-	733	Inf	1120	65.5%
2/2+2/1	A43 South Link Left Ahead	U	1:1	N/A	C1:A		1	41	-	1185	1900:1900	1135+303	82.4 : 82.4%
2/3	A43 South Link Ahead	U	1:1	N/A	C1:A		1	41	-	1089	1900	1330	81.9%
3/1	M1 Southbound Off-slip Left Ahead	O	N/A	N/A	-		-	-	-	536	1800	687	78.1%
3/2	M1 Southbound Off-slip Ahead	O	N/A	N/A	-		-	-	-	523	Inf	687	76.2%
7/1	Ahead	U	1:1	N/A	C1:B		1	7	-	155	1900	253	61.2%
7/2	Ahead	U	1:1	N/A	C1:B		1	7	-	156	1900	253	61.6%
J2: Southern R'bout	-	-	**N/A**	-	-		-	-	-	-	-	-	**97.6%**
1/1	A43 North Link Ahead	O	N/A	N/A	-		-	-	-	918	Inf	1258	73.0%
1/2	A43 North Link Ahead	O	N/A	N/A	-		-	-	-	945	Inf	1258	75.1%
2/2+2/1	A43 Northbound Left Ahead	U	2:1	N/A	C2:D		1	32	-	1202	1900:1900	936+435	87.7 : 87.7%
2/3	A43 Northbound Ahead	U	2:1	N/A	C2:D		1	32	-	826	1900	1045	79.0%
3/1+3/2	M1 Northbound Off-slip Left Ahead	U	2:2	N/A	C2:E		1	21	-	921	1900:1900	373+571	97.6 : 97.6%
7/1	Ahead	U	2:1	N/A	C2:C		1	16	-	228	1900	538	42.4%
10/1	Ahead	U	2:2	N/A	C2:F		1	27	-	821	1900	887	92.6%
10/2	Ahead	U	2:2	N/A	C2:F		1	27	-	826	1900	887	93.2%

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network: 2031 Secong Mitigation Arrangement	**-**	**-**	**4447**	**0**	**0**	**19.3**	**41.7**	**0.0**	**60.9**	**-**	**-**	**-**	**-**
J1: Northern Roundabout	**-**	**-**	**2584**	**0**	**0**	**4.4**	**11.5**	**0.0**	**16.0**	**-**	**-**	**-**	**-**
1/1	792	792	792	0	0	0.0	1.2	-	1.2	5.5	0.0	1.2	1.2
1/2	733	733	733	0	0	0.0	0.9	-	0.9	4.6	0.0	0.9	0.9
2/2+2/1	1185	1185	-	-	-	0.9	2.3	-	3.2	9.6	4.5	2.3	6.8
2/3	1089	1089	-	-	-	0.6	2.2	-	2.8	9.2	4.3	2.2	6.5
3/1	536	536	536	0	0	0.5	1.7	-	2.2	14.8	5.2	1.7	6.9
3/2	523	523	523	0	0	0.4	1.6	-	2.0	13.7	4.9	1.6	6.5
7/1	155	155	-	-	-	1.1	0.8	-	1.8	42.6	2.4	0.8	3.2
7/2	156	156	-	-	-	1.1	0.8	-	1.9	42.8	2.4	0.8	3.2
J2: Southern R'bout	**-**	**-**	**1863**	**0**	**0**	**14.8**	**30.1**	**0.0**	**45.0**	**-**	**-**	**-**	**-**
1/1	918	918	918	0	0	0.0	1.3	-	1.3	5.3	0.6	1.3	1.9
1/2	945	945	945	0	0	0.1	1.5	-	1.6	6.1	4.5	1.5	6.0
2/2+2/1	1202	1202	-	-	-	3.2	3.4	-	6.7	20.0	10.7	3.4	14.1
2/3	826	826	-	-	-	2.5	1.9	-	4.3	18.8	10.8	1.9	12.6
3/1+3/2	921	921	-	-	-	4.3	10.5	-	14.9	58.1	10.9	10.5	21.5
7/1	228	228	-	-	-	1.1	0.4	-	1.5	22.9	3.0	0.4	3.3
10/1	821	821	-	-	-	1.8	5.4	-	7.2	31.4	3.7	5.4	9.0
10/2	826	826	-	-	-	1.8	5.7	-	7.6	32.9	3.7	5.7	9.5

C1	Stream: 1 PRC for Signalled Lanes (%):	9.2	Total Delay for Signalled Lanes (pcuHr):	9.65	Cycle Time (s): 60
C2	Stream: 1 PRC for Signalled Lanes (%):	2.6	Total Delay for Signalled Lanes (pcuHr):	12.44	Cycle Time (s): 60
C2	Stream: 2 PRC for Signalled Lanes (%):	-8.5	Total Delay for Signalled Lanes (pcuHr):	29.58	Cycle Time (s): 60
	PRC Over All Lanes (%):	-8.5	Total Delay Over All Lanes(pcuHr):	60.94	

APPENDIX G

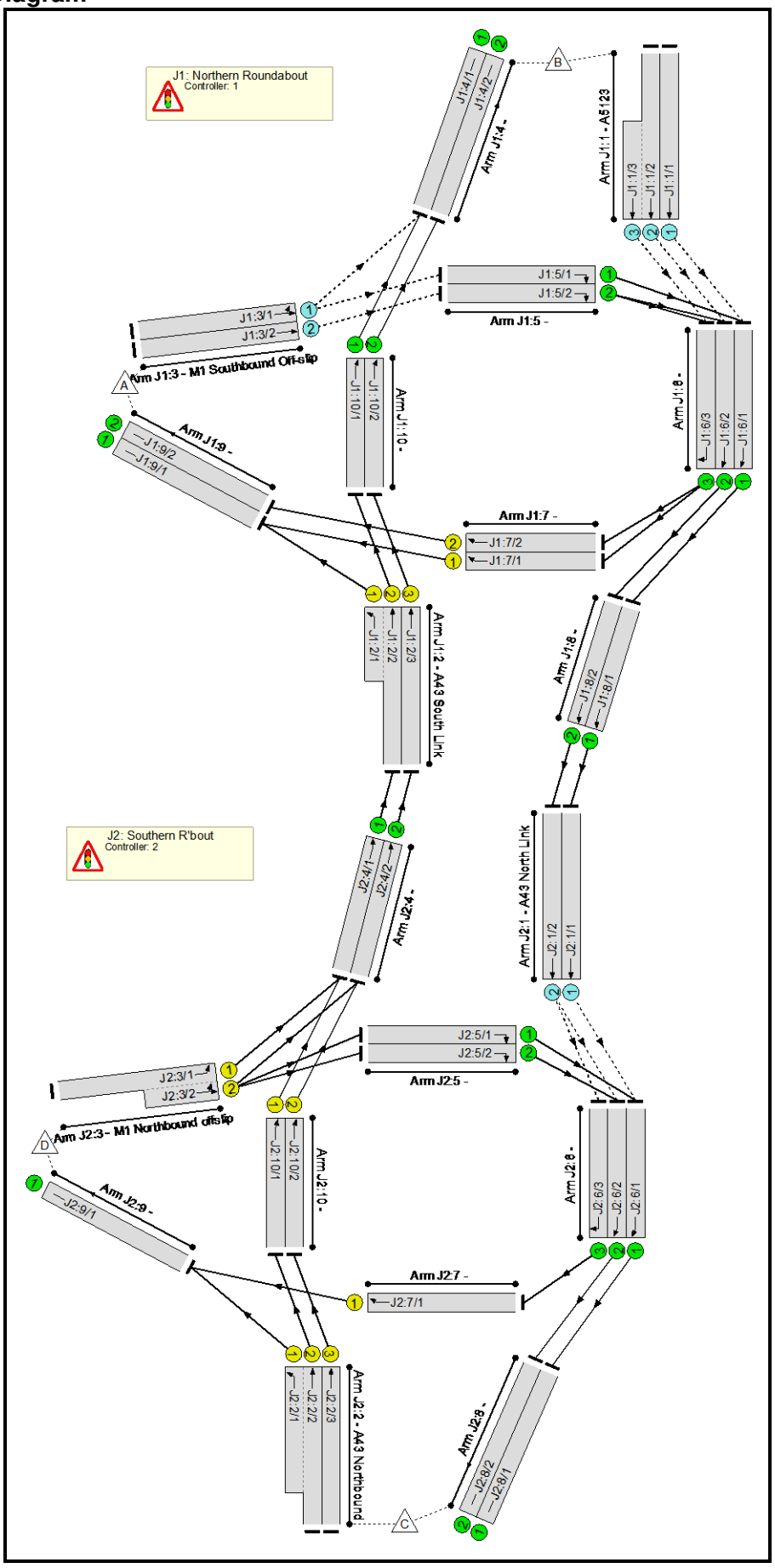
2031 THIRD MITIGATION ARRANGEMENT MODELLING RESULTS

Full Input Data And Results

User and Project Details

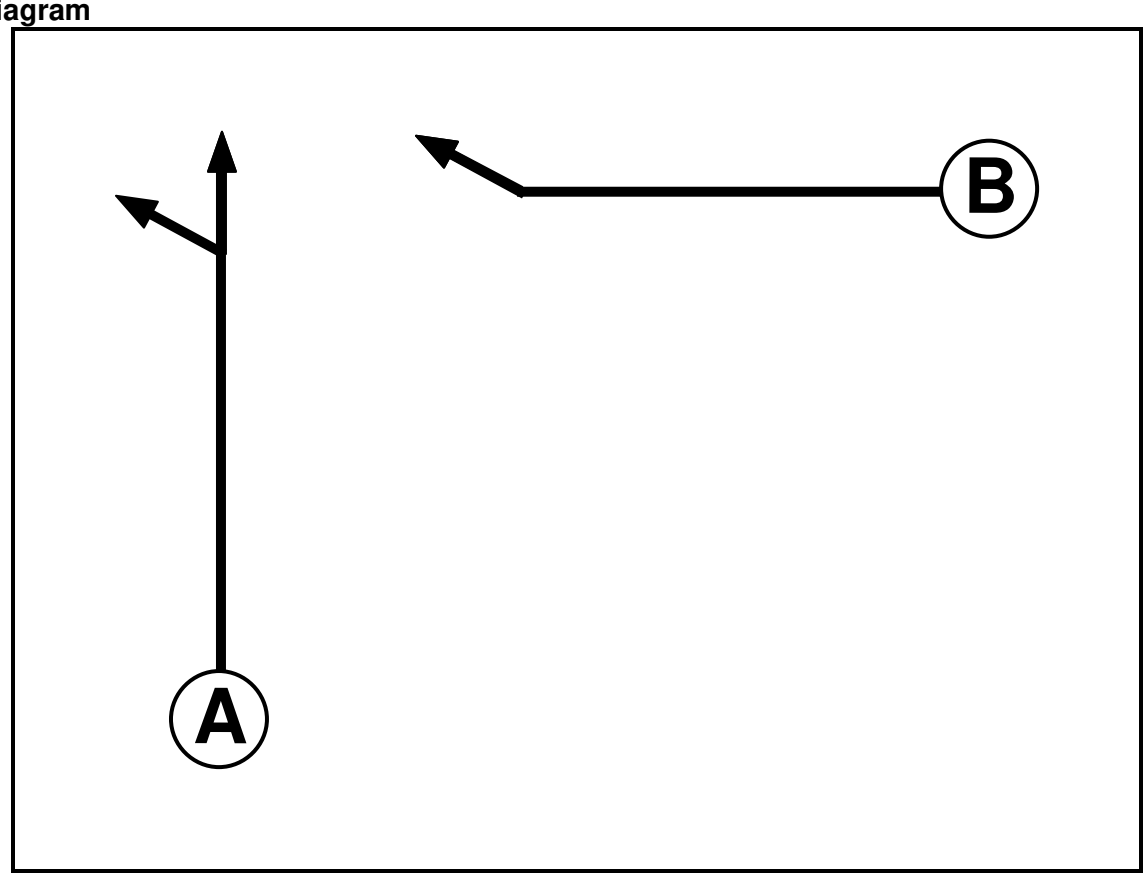
Project:	**Northampton Gateway SRFI**
Title:	**M1 J15a Third iteration of mitigation**
Location:	
File name:	170718 M1 J15a Mitigation alt 2.lsg3x
Author:	Mark Higgins
Company:	ADC Infrastructure
Address:	Nottingham
Notes:	Modelled with 2031 J1a

Network Layout Diagram



C1

Phase Diagram



Phase Input Data

Phase Name	Phase Type	Stage Stream	Assoc. Phase	Street Min	Cont Min
A	Traffic	1		7	7
B	Traffic	1		7	7

Phase Intergreens Matrix

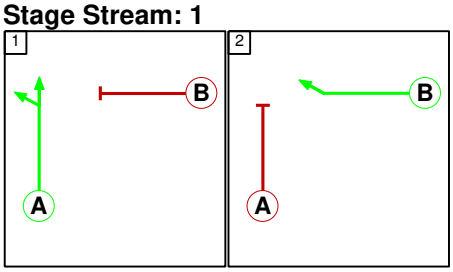
	Starting Phase		
Terminating Phase		A	B
	A		6
	B	6	

Phases in Stage

Stream	Stage No.	Phases in Stage
1	1	A
1	2	B

Stage Diagram

Stage Stream: 1



Phase Delays

Stage Stream: 1

Term. Stage	Start Stage	Phase	Type	Value	Cont value
There are no Phase Delays defined					

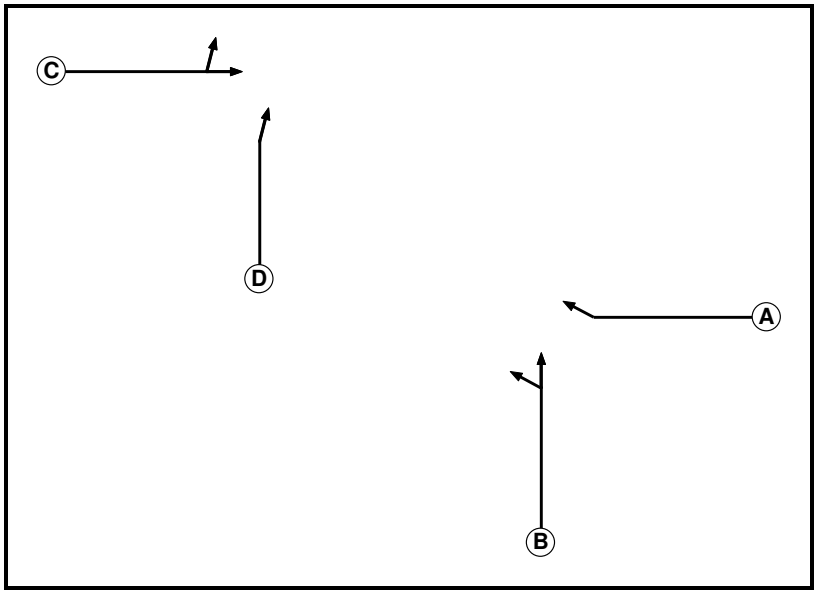
Prohibited Stage Change

Stage Stream: 1

	To Stage		
		1	2
From Stage	1		6
	2	6	

C2

Phase Diagram



Phase Input Data

Phase Name	Phase Type	Stage Stream	Assoc. Phase	Street Min	Cont Min
A	Traffic	1		7	7
B	Traffic	1		7	7
C	Traffic	2		7	7
D	Traffic	2		7	7

Phase Intergreens Matrix

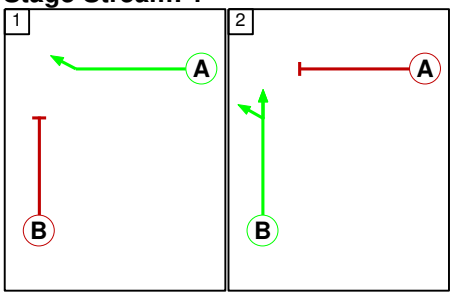
	Starting Phase			
Terminating Phase	A	B	C	D
A		6	-	-
B	6		-	-
C	-	-		6
D	-	-	6	

Phases in Stage

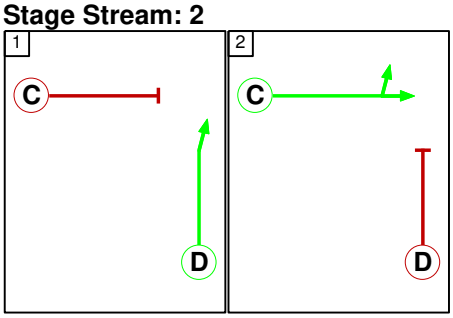
Stream	Stage No.	Phases in Stage
1	1	A
1	2	B
2	1	D
2	2	C

Stage Diagram

Stage Stream: 1



Stage Stream: 2



Phase Delays

Stage Stream: 1

Term. Stage	Start Stage	Phase	Type	Value	Cont value
There are no Phase Delays defined					

Stage Stream: 2

Term. Stage	Start Stage	Phase	Type	Value	Cont value
There are no Phase Delays defined					

Prohibited Stage Change

Stage Stream: 1

From Stage \ To Stage		1	2
	1		6
	2	6	

Stage Stream: 2

From Stage \ To Stage		1	2
	1		6
	2	6	

Give-Way Lane Input Data

Junction: J1: Northern Roundabout											
Lane	**Movement**	**Max Flow when Giving Way (PCU/Hr)**	**Min Flow when Giving Way (PCU/Hr)**	**Opposing Lane**	**Opp. Lane Coeff.**	**Opp. Mvmnts.**	**Right Turn Storage (PCU)**	**Non-Blocking Storage (PCU)**	**RTF**	**Right Turn Move up (s)**	**Max Turns in Intergreen (PCU)**
J1:1/1 (A5123)	J1:6/1 (Ahead)	1100	0	J1:5/1	0.30	All	-	-	-	-	-
				J1:5/2	0.30	All					
J1:1/2 (A5123)	J1:6/2 (Ahead)	1100	0	J1:5/1	0.30	All	-	-	-	-	-
				J1:5/2	0.30	All					
J1:1/3 (A5123)	J1:6/3 (Ahead)	1100	0	J1:5/1	0.30	All	-	-	-	-	-
				J1:5/2	0.30	All					
J1:3/1 (M1 Southbound Off-slip)	J1:4/1 (Left)	1274	0	J1:10/1	0.29	All	-	-	-	-	-
				J1:10/2	0.29	All					
	J1:5/1 (Ahead)	1274	0	J1:10/1	0.29	All					
				J1:10/2	0.29	All					
J1:3/2 (M1 Southbound Off-slip)	J1:5/2 (Ahead)	1274	0	J1:10/1	0.29	All	-	-	-	-	-
				J1:10/2	0.29	All					

Junction: J2: Southern R'bout											
Lane	**Movement**	**Max Flow when Giving Way (PCU/Hr)**	**Min Flow when Giving Way (PCU/Hr)**	**Opposing Lane**	**Opp. Lane Coeff.**	**Opp. Mvmnts.**	**Right Turn Storage (PCU)**	**Non-Blocking Storage (PCU)**	**RTF**	**Right Turn Move up (s)**	**Max Turns in Intergreen (PCU)**
J2:1/1 (A43 North Link)	J2:6/1 (Ahead)	1343	0	J2:5/1	0.29	All	-	-	-	-	-
				J2:5/2	0.29	All					
J2:1/2 (A43 North Link)	J2:6/2 (Ahead)	1343	0	J2:5/1	0.29	All	-	-	-	-	-
				J2:5/2	0.29	All					
	J2:6/3 (Ahead)	1343	0	J2:5/1	0.29	All					
				J2:5/2	0.29	All					

Lane Input Data

Junction: J1: Northern Roundabout												
Lane	**Lane Type**	**Phases**	**Start Disp.**	**End Disp.**	**Physical Length (PCU)**	**Sat Flow Type**	**Def User Saturation Flow (PCU/Hr)**	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Turns**	**Turning Radius (m)**
J1:1/1 (A5123)	O		2	3	60.0	Inf	-	-	-	-	-	-
J1:1/2 (A5123)	O		2	3	60.0	Inf	-	-	-	-	-	-
J1:1/3 (A5123)	O		2	3	8.0	Inf	-	-	-	-	-	-
J1:2/1 (A43 South Link)	U	A	2	3	6.0	User	1900	-	-	-	-	-
J1:2/2 (A43 South Link)	U	A	2	3	24.3	User	1900	-	-	-	-	-
J1:2/3 (A43 South Link)	U	A	2	3	24.3	User	1900	-	-	-	-	-
J1:3/1 (M1 Southbound Off-slip)	O		2	3	60.0	User	1800	-	-	-	-	-
J1:3/2 (M1 Southbound Off-slip)	O		2	3	60.0	Inf	-	-	-	-	-	-
J1:4/1	U		2	3	3.0	Inf	-	-	-	-	-	-
J1:4/2	U		2	3	3.0	Inf	-	-	-	-	-	-
J1:5/1	U		2	3	8.7	Inf	-	-	-	-	-	-
J1:5/2	U		2	3	8.7	Inf	-	-	-	-	-	-
J1:6/1	U		2	3	16.5	Inf	-	-	-	-	-	-
J1:6/2	U		2	3	16.5	Inf	-	-	-	-	-	-
J1:6/3	U		2	3	60.0	Inf	-	-	-	-	-	-
J1:7/1	U	B	2	3	4.3	User	1900	-	-	-	-	-
J1:7/2	U	B	2	3	4.3	User	1900	-	-	-	-	-
J1:8/1	U		2	3	3.0	Inf	-	-	-	-	-	-
J1:8/2	U		2	3	3.0	Inf	-	-	-	-	-	-
J1:9/1	U		2	3	3.0	Inf	-	-	-	-	-	-
J1:9/2	U		2	3	3.0	Inf	-	-	-	-	-	-
J1:10/1	U		2	3	12.2	Inf	-	-	-	-	-	-
J1:10/2	U		2	3	12.2	Inf	-	-	-	-	-	-

Junction: J2: Southern R'bout												
Lane	Lane Type	Phases	Start Disp.	End Disp.	Physical Length (PCU)	Sat Flow Type	Def User Saturation Flow (PCU/Hr)	Lane Width (m)	Gradient	Nearside Lane	Turns	Turning Radius (m)
J2:1/1 (A43 North Link)	O		2	3	24.3	Inf	-	-	-	-	-	-
J2:1/2 (A43 North Link)	O		2	3	24.3	Inf	-	-	-	-	-	-
J2:2/1 (A43 Northbound)	U	B	2	3	12.0	User	1900	-	-	-	-	-
J2:2/2 (A43 Northbound)	U	B	2	3	60.0	User	1900	-	-	-	-	-
J2:2/3 (A43 Northbound)	U	B	2	3	60.0	User	1900	-	-	-	-	-
J2:3/1 (M1 Northbound offslip)	U	C	2	3	60.0	User	1900	-	-	-	-	-
J2:3/2 (M1 Northbound offslip)	U	C	2	3	6.0	User	1900	-	-	-	-	-
J2:4/1	U		2	3	3.0	Inf	-	-	-	-	-	-
J2:4/2	U		2	3	3.0	Inf	-	-	-	-	-	-
J2:5/1	U		2	3	8.7	Inf	-	-	-	-	-	-
J2:5/2	U		2	3	8.7	Inf	-	-	-	-	-	-
J2:6/1	U		2	3	16.5	Inf	-	-	-	-	-	-
J2:6/2	U		2	3	16.5	Inf	-	-	-	-	-	-
J2:6/3	U		2	3	16.5	Inf	-	-	-	-	-	-
J2:7/1	U	A	2	3	4.3	User	1900	-	-	-	-	-
J2:8/1	U		2	3	3.0	Inf	-	-	-	-	-	-
J2:8/2	U		2	3	3.0	Inf	-	-	-	-	-	-
J2:9/1	U		2	3	3.0	Inf	-	-	-	-	-	-
J2:10/1	U	D	2	3	12.2	User	1900	-	-	-	-	-
J2:10/2	U	D	2	3	12.2	User	1900	-	-	-	-	-

Traffic Flow Groups

Flow Group	Start Time	End Time	Duration	Formula
1: '2031 AM Peak J1a'	08:00	09:00	01:00	
2: '2031 PM Peak J1a'	17:00	18:00	01:00	

Scenario 1: '2031 AM Peak J1a' (FG1: '2031 AM Peak J1a', Plan 1: '2031 AM Peak J1a')

Traffic Flows, Desired

Desired Flow :

		Destination				
		A	B	C	D	Tot.
Origin	A	0	485	355	88	928
	B	468	0	1378	224	2070
	C	195	1399	0	380	1974
	D	79	226	452	0	757
	Tot.	742	2110	2185	692	5729

Traffic Lane Flows

Lane	Scenario 1: 2031 AM Peak J1a
Junction: J1: Northern Roundabout	
J1:1/1	829
J1:1/2 (with short)	1241(In) 773(Out)
J1:1/3 (short)	468
J1:2/1 (short)	274
J1:2/2 (with short)	1003(In) 729(Out)
J1:2/3	896
J1:3/1	610
J1:3/2	318
J1:4/1	1214
J1:4/2	896
J1:5/1	125
J1:5/2	318
J1:6/1	954
J1:6/2	1091
J1:6/3	468
J1:7/1	234
J1:7/2	234
J1:8/1	954
J1:8/2	1091
J1:9/1	508
J1:9/2	234
J1:10/1	729
J1:10/2	896
Junction: J2: Southern R'bout	
J2:1/1	954
J2:1/2	1091
J2:2/1 (short)	380
J2:2/2 (with short)	1178(In) 798(Out)
J2:2/3	796
J2:3/1 (with short)	757(In) 205(Out)
J2:3/2 (short)	552
J2:4/1	1003
J2:4/2	896
J2:5/1	226
J2:5/2	226
J2:6/1	1180

J2:6/2	1005
J2:6/3	312
J2:7/1	312
J2:8/1	1180
J2:8/2	1005
J2:9/1	692
J2:10/1	798
J2:10/2	796

Lane Saturation Flows

Junction: J1: Northern Roundabout

Lane	Lane Width (m)	Gradient	Nearside Lane	Allowed Turns	Turning Radius (m)	Turning Prop.	Sat Flow (PCU/Hr)	Flared Sat Flow (PCU/Hr)
J1:1/1 (A5123 Lane 1)	Infinite Saturation Flow						Inf	Inf
J1:1/2 (A5123 Lane 2)	Infinite Saturation Flow						Inf	Inf
J1:1/3 (A5123 Lane 3)	Infinite Saturation Flow						Inf	Inf
J1:2/1 (A43 South Link Lane 1)	This lane uses a directly entered Saturation Flow						1900	1900
J1:2/2 (A43 South Link Lane 2)	This lane uses a directly entered Saturation Flow						1900	1900
J1:2/3 (A43 South Link Lane 3)	This lane uses a directly entered Saturation Flow						1900	1900
J1:3/1 (M1 Southbound Off-slip Lane 1)	This lane uses a directly entered Saturation Flow						1800	1800
J1:3/2 (M1 Southbound Off-slip Lane 2)	Infinite Saturation Flow						Inf	Inf
J1:4/1	Infinite Saturation Flow						Inf	Inf
J1:4/2	Infinite Saturation Flow						Inf	Inf
J1:5/1	Infinite Saturation Flow						Inf	Inf
J1:5/2	Infinite Saturation Flow						Inf	Inf
J1:6/1	Infinite Saturation Flow						Inf	Inf
J1:6/2	Infinite Saturation Flow						Inf	Inf
J1:6/3	Infinite Saturation Flow						Inf	Inf
J1:7/1	This lane uses a directly entered Saturation Flow						1900	1900
J1:7/2	This lane uses a directly entered Saturation Flow						1900	1900
J1:8/1	Infinite Saturation Flow						Inf	Inf
J1:8/2	Infinite Saturation Flow						Inf	Inf
J1:9/1	Infinite Saturation Flow						Inf	Inf
J1:9/2	Infinite Saturation Flow						Inf	Inf
J1:10/1	Infinite Saturation Flow						Inf	Inf
J1:10/2	Infinite Saturation Flow						Inf	Inf

Junction: J2: Southern R'bout								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
J2:1/1 (A43 North Link Lane 1)	Infinite Saturation Flow						Inf	Inf
J2:1/2 (A43 North Link Lane 2)	Infinite Saturation Flow						Inf	Inf
J2:2/1 (A43 Northbound Lane 1)	This lane uses a directly entered Saturation Flow						1900	1900
J2:2/2 (A43 Northbound Lane 2)	This lane uses a directly entered Saturation Flow						1900	1900
J2:2/3 (A43 Northbound Lane 3)	This lane uses a directly entered Saturation Flow						1900	1900
J2:3/1 (M1 Northbound offslip Lane 1)	This lane uses a directly entered Saturation Flow						1900	1900
J2:3/2 (M1 Northbound offslip Lane 2)	This lane uses a directly entered Saturation Flow						1900	1900
J2:4/1	Infinite Saturation Flow						Inf	Inf
J2:4/2	Infinite Saturation Flow						Inf	Inf
J2:5/1	Infinite Saturation Flow						Inf	Inf
J2:5/2	Infinite Saturation Flow						Inf	Inf
J2:6/1	Infinite Saturation Flow						Inf	Inf
J2:6/2	Infinite Saturation Flow						Inf	Inf
J2:6/3	Infinite Saturation Flow						Inf	Inf
J2:7/1	This lane uses a directly entered Saturation Flow						1900	1900
J2:8/1	Infinite Saturation Flow						Inf	Inf
J2:8/2	Infinite Saturation Flow						Inf	Inf
J2:9/1	Infinite Saturation Flow						Inf	Inf
J2:10/1	This lane uses a directly entered Saturation Flow						1900	1900
J2:10/2	This lane uses a directly entered Saturation Flow						1900	1900

Scenario 2: '2031 PM Peak J1a' (FG2: '2031 PM Peak J1a', Plan 1: '2031 AM Peak J1a')

Traffic Flows, Desired

Desired Flow :

		Destination				
		A	B	C	D	Tot.
Origin	A	0	410	554	95	1059
	B	311	0	1081	133	1525
	C	160	1487	0	381	2028
	D	90	537	294	0	921
	Tot.	561	2434	1929	609	5533

Traffic Lane Flows

Lane	Scenario 2: 2031 PM Peak J1a
Junction: J1: Northern Roundabout	
J1:1/1	674
J1:1/2 (with short)	851(In) 540(Out)
J1:1/3 (short)	311
J1:2/1 (short)	250
J1:2/2 (with short)	1185(In) 935(Out)
J1:2/3	1089
J1:3/1	558
J1:3/2	501
J1:4/1	1345
J1:4/2	1089
J1:5/1	148
J1:5/2	501
J1:6/1	822
J1:6/2	1041
J1:6/3	311
J1:7/1	155
J1:7/2	156
J1:8/1	822
J1:8/2	1041
J1:9/1	405
J1:9/2	156
J1:10/1	935
J1:10/2	1089
Junction: J2: Southern R'bout	
J2:1/1	822
J2:1/2	1041
J2:2/1 (short)	381
J2:2/2 (with short)	1202(In) 821(Out)
J2:2/3	826
J2:3/1 (with short)	921(In) 364(Out)
J2:3/2 (short)	557
J2:4/1	1185
J2:4/2	1089
J2:5/1	147
J2:5/2	147
J2:6/1	969

J2:6/2	960
J2:6/3	228
J2:7/1	228
J2:8/1	969
J2:8/2	960
J2:9/1	609
J2:10/1	821
J2:10/2	826

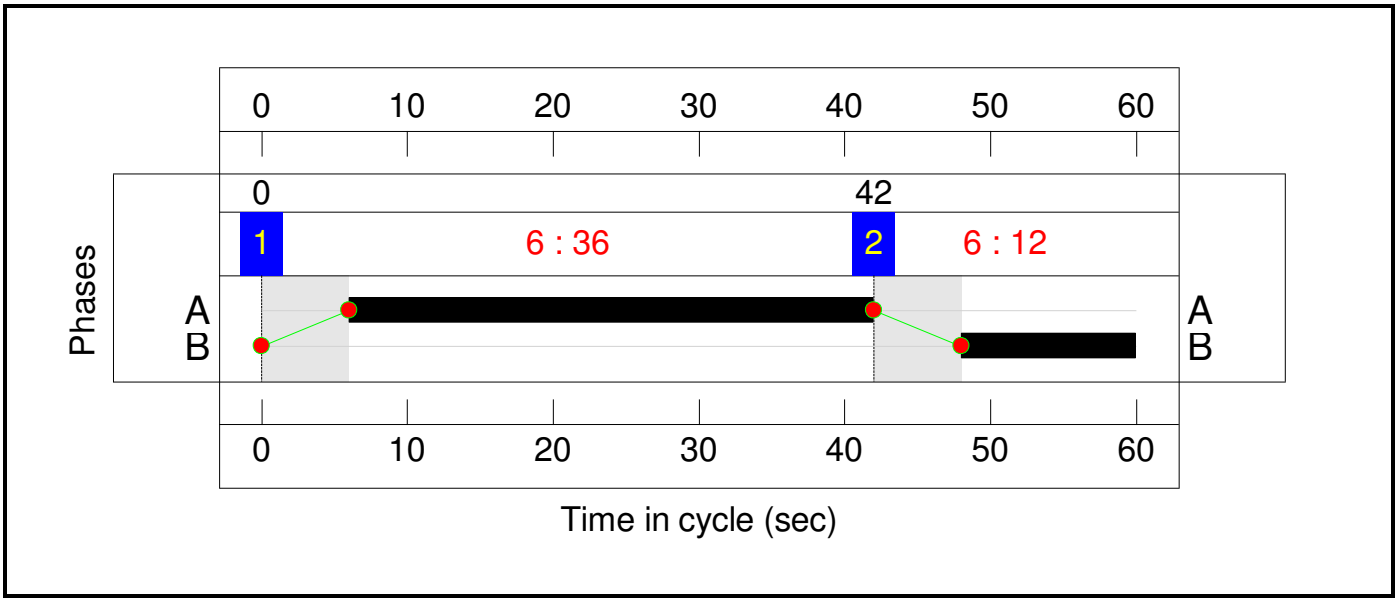
Lane Saturation Flows

Junction: J1: Northern Roundabout

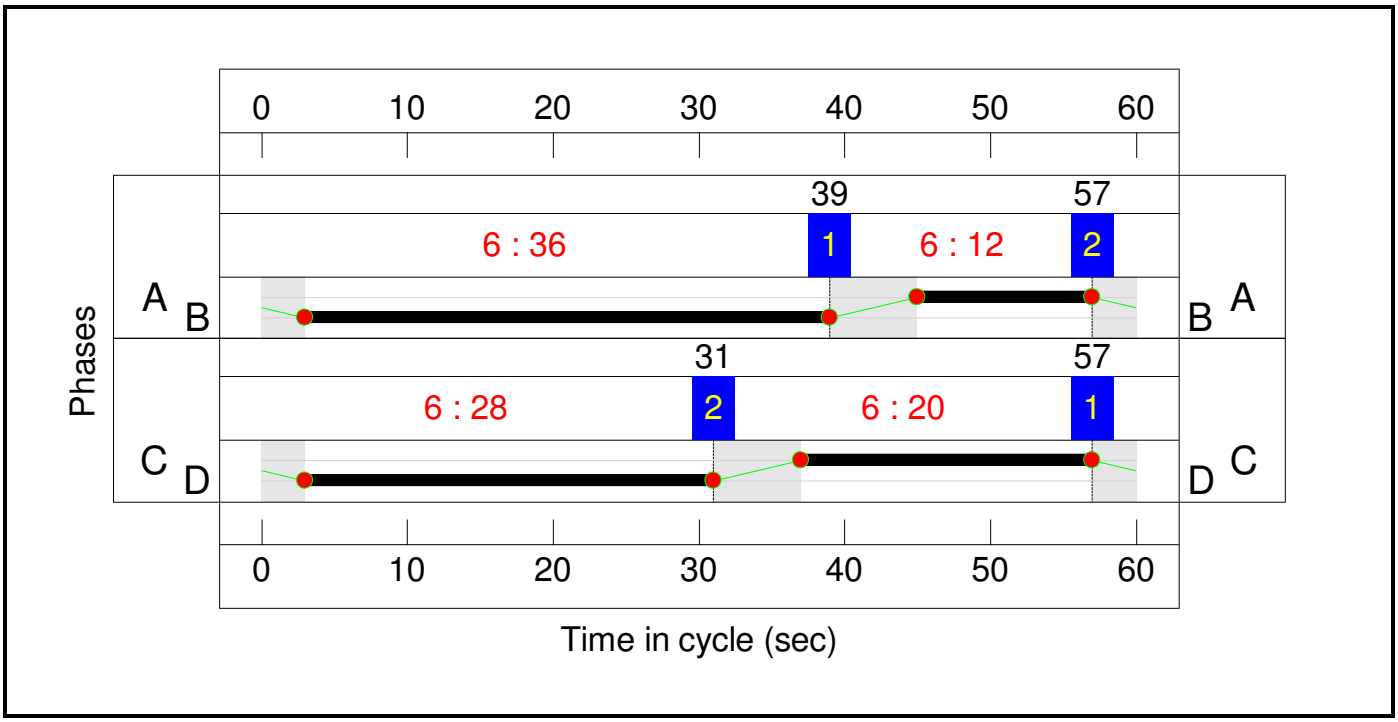
Lane	Lane Width (m)	Gradient	Nearside Lane	Allowed Turns	Turning Radius (m)	Turning Prop.	Sat Flow (PCU/Hr)	Flared Sat Flow (PCU/Hr)
J1:1/1 (A5123 Lane 1)	Infinite Saturation Flow						Inf	Inf
J1:1/2 (A5123 Lane 2)	Infinite Saturation Flow						Inf	Inf
J1:1/3 (A5123 Lane 3)	Infinite Saturation Flow						Inf	Inf
J1:2/1 (A43 South Link Lane 1)	This lane uses a directly entered Saturation Flow						1900	1900
J1:2/2 (A43 South Link Lane 2)	This lane uses a directly entered Saturation Flow						1900	1900
J1:2/3 (A43 South Link Lane 3)	This lane uses a directly entered Saturation Flow						1900	1900
J1:3/1 (M1 Southbound Off-slip Lane 1)	This lane uses a directly entered Saturation Flow						1800	1800
J1:3/2 (M1 Southbound Off-slip Lane 2)	Infinite Saturation Flow						Inf	Inf
J1:4/1	Infinite Saturation Flow						Inf	Inf
J1:4/2	Infinite Saturation Flow						Inf	Inf
J1:5/1	Infinite Saturation Flow						Inf	Inf
J1:5/2	Infinite Saturation Flow						Inf	Inf
J1:6/1	Infinite Saturation Flow						Inf	Inf
J1:6/2	Infinite Saturation Flow						Inf	Inf
J1:6/3	Infinite Saturation Flow						Inf	Inf
J1:7/1	This lane uses a directly entered Saturation Flow						1900	1900
J1:7/2	This lane uses a directly entered Saturation Flow						1900	1900
J1:8/1	Infinite Saturation Flow						Inf	Inf
J1:8/2	Infinite Saturation Flow						Inf	Inf
J1:9/1	Infinite Saturation Flow						Inf	Inf
J1:9/2	Infinite Saturation Flow						Inf	Inf
J1:10/1	Infinite Saturation Flow						Inf	Inf
J1:10/2	Infinite Saturation Flow						Inf	Inf

Junction: J2: Southern R'bout								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
J2:1/1 (A43 North Link Lane 1)	Infinite Saturation Flow						Inf	Inf
J2:1/2 (A43 North Link Lane 2)	Infinite Saturation Flow						Inf	Inf
J2:2/1 (A43 Northbound Lane 1)	This lane uses a directly entered Saturation Flow						1900	1900
J2:2/2 (A43 Northbound Lane 2)	This lane uses a directly entered Saturation Flow						1900	1900
J2:2/3 (A43 Northbound Lane 3)	This lane uses a directly entered Saturation Flow						1900	1900
J2:3/1 (M1 Northbound offslip Lane 1)	This lane uses a directly entered Saturation Flow						1900	1900
J2:3/2 (M1 Northbound offslip Lane 2)	This lane uses a directly entered Saturation Flow						1900	1900
J2:4/1	Infinite Saturation Flow						Inf	Inf
J2:4/2	Infinite Saturation Flow						Inf	Inf
J2:5/1	Infinite Saturation Flow						Inf	Inf
J2:5/2	Infinite Saturation Flow						Inf	Inf
J2:6/1	Infinite Saturation Flow						Inf	Inf
J2:6/2	Infinite Saturation Flow						Inf	Inf
J2:6/3	Infinite Saturation Flow						Inf	Inf
J2:7/1	This lane uses a directly entered Saturation Flow						1900	1900
J2:8/1	Infinite Saturation Flow						Inf	Inf
J2:8/2	Infinite Saturation Flow						Inf	Inf
J2:9/1	Infinite Saturation Flow						Inf	Inf
J2:10/1	This lane uses a directly entered Saturation Flow						1900	1900
J2:10/2	This lane uses a directly entered Saturation Flow						1900	1900

Signal Timings Diagram
Scenario 1: '2031 AM Peak J1a' (FG1: '2031 AM Peak J1a', Plan 1: '2031 AM Peak J1a')
C1



C2



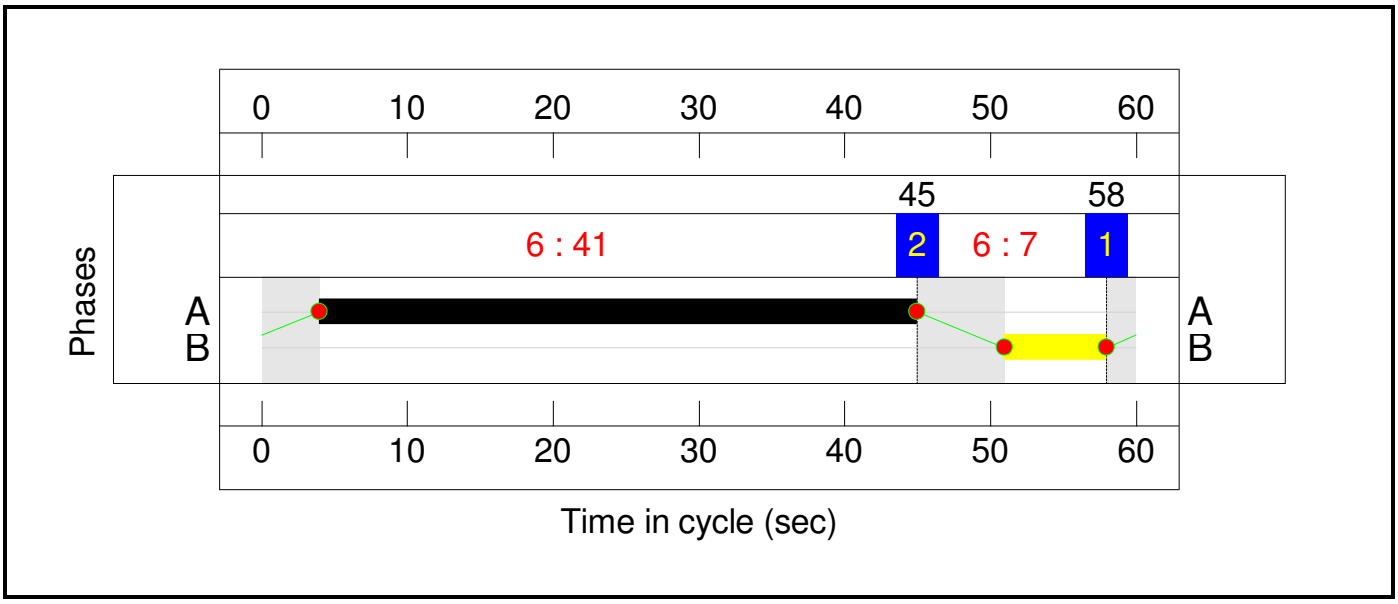
Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network: M1 J15a Third iteration of mitigation	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**93.4%**
J1: Northern Roundabout	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**85.7%**
1/1	A5123 Ahead	O	N/A	N/A	-		-	-	-	829	Inf	967	85.7%
1/2+1/3	A5123 Ahead	O	N/A	N/A	-		-	-	-	1241	Inf : Inf	967+585	79.9 : 79.9%
2/2+2/1	A43 South Link Left Ahead	U	1:1	N/A	C1:A		1	36	-	1003	1900:1900	958+360	76.1 : 76.1%
2/3	A43 South Link Ahead	U	1:1	N/A	C1:A		1	36	-	896	1900	1172	76.5%
3/1	M1 Southbound Off-slip Left Ahead	O	N/A	N/A	-		-	-	-	610	1800	802	76.0%
3/2	M1 Southbound Off-slip Ahead	O	N/A	N/A	-		-	-	-	318	Inf	802	39.6%
7/1	Ahead	U	1:1	N/A	C1:B		1	12	-	234	1900	412	56.8%
7/2	Ahead	U	1:1	N/A	C1:B		1	12	-	234	1900	412	56.8%
J2: Southern R'bout	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**93.4%**
1/1	A43 North Link Ahead	O	N/A	N/A	-		-	-	-	954	Inf	1212	78.7%
1/2	A43 North Link Ahead	O	N/A	N/A	-		-	-	-	1091	Inf	1212	90.0%
2/2+2/1	A43 Northbound Left Ahead	U	2:1	N/A	C2:B		1	36	-	1178	1900:1900	1020+486	78.2 : 78.2%
2/3	A43 Northbound Ahead	U	2:1	N/A	C2:B		1	36	-	796	1900	1172	67.9%
3/1+3/2	M1 Northbound offslip Left Ahead	U	2:2	N/A	C2:C		1	20	-	757	1900:1900	219+591	93.4 : 93.4%
7/1	Ahead	U	2:1	N/A	C2:A		1	12	-	312	1900	412	75.8%
10/1	Ahead	U	2:2	N/A	C2:D		1	28	-	798	1900	918	86.9%
10/2	Ahead	U	2:2	N/A	C2:D		1	28	-	796	1900	918	86.7%

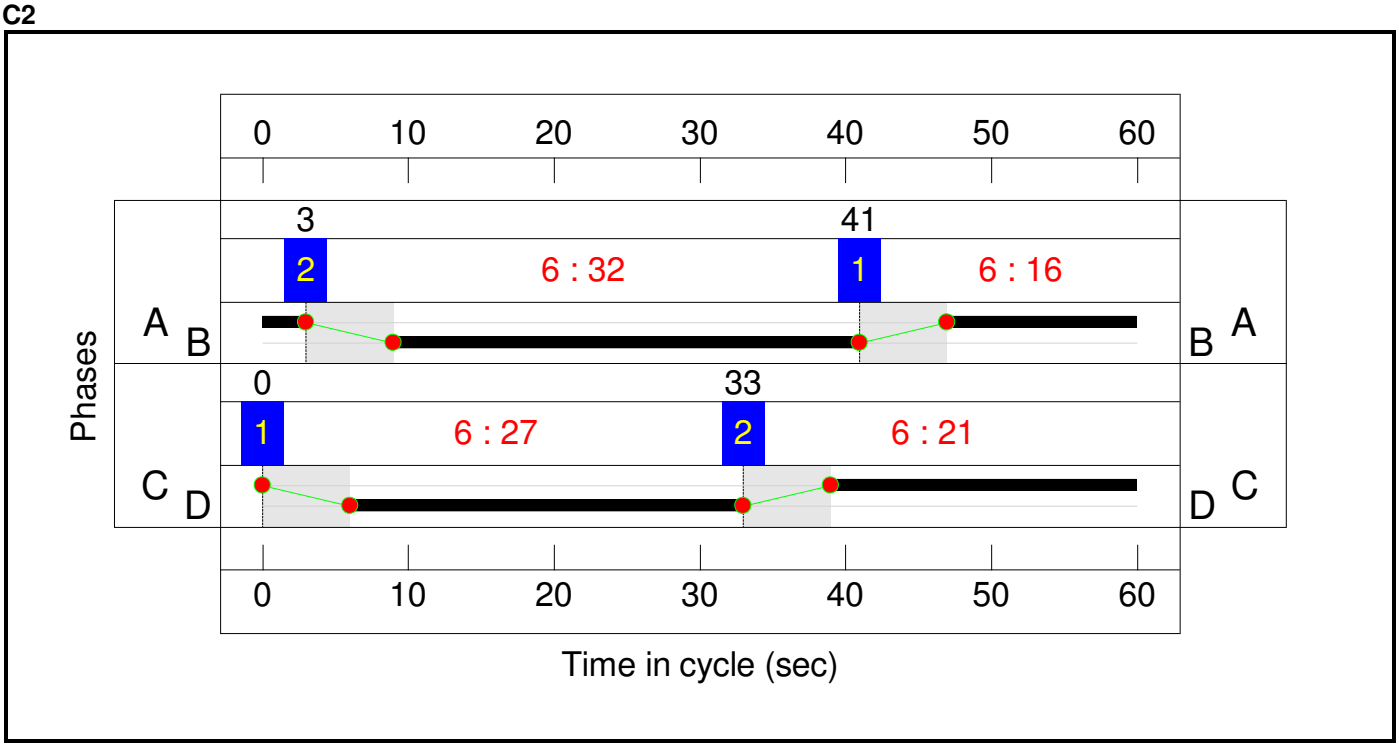
Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network: M1 J15a Third iteration of mitigation	**-**	**-**	**6284**	**0**	**0**	**17.0**	**33.7**	**0.0**	**50.7**	**-**	**-**	**-**	**-**
J1: Northern Roundabout	**-**	**-**	**4239**	**0**	**0**	**4.4**	**11.2**	**0.0**	**15.6**	**-**	**-**	**-**	**-**
1/1	829	829	829	0	0	0.0	2.9	-	2.9	12.5	0.0	2.9	2.9
1/2+1/3	1241	1241	2482	0	0	0.0	2.0	-	2.0	5.7	0.0	2.0	2.0
2/2+2/1	1003	1003	-	-	-	0.7	1.6	-	2.3	8.3	2.1	1.6	3.7
2/3	896	896	-	-	-	0.3	1.6	-	1.9	7.6	1.7	1.6	3.3
3/1	610	610	610	0	0	0.6	1.6	-	2.2	13.0	6.1	1.6	7.7
3/2	318	318	318	0	0	0.0	0.3	-	0.3	3.9	1.4	0.3	1.7
7/1	234	234	-	-	-	1.4	0.7	-	2.0	31.1	3.4	0.7	4.1
7/2	234	234	-	-	-	1.4	0.7	-	2.0	31.1	3.4	0.7	4.1
J2: Southern R'bout	**-**	**-**	**2045**	**0**	**0**	**12.5**	**22.5**	**0.0**	**35.0**	**-**	**-**	**-**	**-**
1/1	954	954	954	0	0	0.0	1.8	-	1.8	6.9	3.3	1.8	5.1
1/2	1091	1091	1091	0	0	0.2	4.2	-	4.5	14.7	9.4	4.2	13.6
2/2+2/1	1178	1178	-	-	-	2.3	1.8	-	4.0	12.4	8.6	1.8	10.4
2/3	796	796	-	-	-	1.7	1.1	-	2.7	12.4	8.6	1.1	9.7
3/1+3/2	757	757	-	-	-	3.7	5.8	-	9.5	45.1	9.8	5.8	15.6
7/1	312	312	-	-	-	1.9	1.5	-	3.4	39.6	4.9	1.5	6.4
10/1	798	798	-	-	-	1.4	3.2	-	4.5	20.5	3.1	3.2	6.3
10/2	796	796	-	-	-	1.4	3.1	-	4.5	20.3	3.1	3.1	6.2

C1	Stream: 1 PRC for Signalled Lanes (%):	17.7	Total Delay for Signalled Lanes (pcuHr):	8.25	Cycle Time (s):	60
C2	Stream: 1 PRC for Signalled Lanes (%):	15.1	Total Delay for Signalled Lanes (pcuHr):	10.21	Cycle Time (s):	60
C2	Stream: 2 PRC for Signalled Lanes (%):	-3.8	Total Delay for Signalled Lanes (pcuHr):	18.51	Cycle Time (s):	60
	PRC Over All Lanes (%):	-3.8	Total Delay Over All Lanes(pcuHr):	50.65		

Signal Timings Diagram
Scenario 2: '2031 PM Peak J1a' (FG2: '2031 PM Peak J1a', Plan 1: '2031 AM Peak J1a')
C1



C2



Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network: M1 J15a Third iteration of mitigation	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**97.6%**
J1: Northern Roundabout	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**82.4%**
1/1	A5123 Ahead	O	N/A	N/A	-		-	-	-	674	Inf	905	74.5%
1/2+1/3	A5123 Ahead	O	N/A	N/A	-		-	-	-	851	Inf : Inf	905+521	59.7 : 59.7%
2/2+2/1	A43 South Link Left Ahead	U	1:1	N/A	C1:A		1	41	-	1185	1900:1900	1135+303	82.4 : 82.4%
2/3	A43 South Link Ahead	U	1:1	N/A	C1:A		1	41	-	1089	1900	1330	81.9%
3/1	M1 Southbound Off-slip Left Ahead	O	N/A	N/A	-		-	-	-	558	1800	687	81.3%
3/2	M1 Southbound Off-slip Ahead	O	N/A	N/A	-		-	-	-	501	Inf	687	73.0%
7/1	Ahead	U	1:1	N/A	C1:B		1	7	-	155	1900	253	61.2%
7/2	Ahead	U	1:1	N/A	C1:B		1	7	-	156	1900	253	61.6%
J2: Southern R'bout	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**97.6%**
1/1	A43 North Link Ahead	O	N/A	N/A	-		-	-	-	822	Inf	1258	65.4%
1/2	A43 North Link Ahead	O	N/A	N/A	-		-	-	-	1041	Inf	1258	82.8%
2/2+2/1	A43 Northbound Left Ahead	U	2:1	N/A	C2:B		1	32	-	1202	1900:1900	936+435	87.7 : 87.7%
2/3	A43 Northbound Ahead	U	2:1	N/A	C2:B		1	32	-	826	1900	1045	79.0%
3/1+3/2	M1 Northbound offslip Left Ahead	U	2:2	N/A	C2:C		1	21	-	921	1900:1900	373+571	97.6 : 97.6%
7/1	Ahead	U	2:1	N/A	C2:A		1	16	-	228	1900	538	42.4%
10/1	Ahead	U	2:2	N/A	C2:D		1	27	-	821	1900	887	92.6%
10/2	Ahead	U	2:2	N/A	C2:D		1	27	-	826	1900	887	93.2%

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network: M1 J15a Third iteration of mitigation	**-**	**-**	**5298**	**0**	**0**	**19.6**	**42.3**	**0.0**	**61.8**	**-**	**-**	**-**	**-**
J1: Northern Roundabout	**-**	**-**	**3435**	**0**	**0**	**4.6**	**11.7**	**0.0**	**16.3**	**-**	**-**	**-**	**-**
1/1	674	674	674	0	0	0.0	1.4	-	1.4	7.7	1.3	1.4	2.8
1/2+1/3	851	851	1702	0	0	0.0	0.7	-	0.7	3.1	0.0	0.7	0.7
2/2+2/1	1185	1185	-	-	-	1.0	2.3	-	3.3	9.9	4.6	2.3	6.9
2/3	1089	1089	-	-	-	0.6	2.2	-	2.9	9.5	4.4	2.2	6.6
3/1	558	558	558	0	0	0.5	2.1	-	2.6	17.0	7.6	2.1	9.7
3/2	501	501	501	0	0	0.4	1.3	-	1.7	12.1	4.6	1.3	5.9
7/1	155	155	-	-	-	1.1	0.8	-	1.8	42.6	2.4	0.8	3.2
7/2	156	156	-	-	-	1.1	0.8	-	1.9	42.8	2.4	0.8	3.2
J2: Southern R'bout	**-**	**-**	**1863**	**0**	**0**	**14.9**	**30.6**	**0.0**	**45.5**	**-**	**-**	**-**	**-**
1/1	822	822	822	0	0	0.0	0.9	-	0.9	4.1	0.0	0.9	0.9
1/2	1041	1041	1041	0	0	0.2	2.4	-	2.5	8.8	5.6	2.4	7.9
2/2+2/1	1202	1202	-	-	-	3.2	3.4	-	6.7	20.0	10.7	3.4	14.1
2/3	826	826	-	-	-	2.5	1.9	-	4.3	18.8	10.8	1.9	12.6
3/1+3/2	921	921	-	-	-	4.3	10.5	-	14.9	58.1	10.9	10.5	21.5
7/1	228	228	-	-	-	1.1	0.4	-	1.5	23.4	3.0	0.4	3.4
10/1	821	821	-	-	-	1.8	5.4	-	7.2	31.4	3.7	5.4	9.0
10/2	826	826	-	-	-	1.8	5.7	-	7.6	32.9	3.7	5.7	9.5

C1	Stream: 1 PRC for Signalled Lanes (%):	9.2	Total Delay for Signalled Lanes (pcuHr):	9.82	Cycle Time (s): 60
C2	Stream: 1 PRC for Signalled Lanes (%):	2.6	Total Delay for Signalled Lanes (pcuHr):	12.47	Cycle Time (s): 60
C2	Stream: 2 PRC for Signalled Lanes (%):	-8.5	Total Delay for Signalled Lanes (pcuHr):	29.58	Cycle Time (s): 60
	PRC Over All Lanes (%):	-8.5	Total Delay Over All Lanes(pcuHr):	61.84	