Title: Howes Lane (A4095) / Bucknell Road / A4095 Junction

Technical Note 10 v8

Date: February 2023

1.0 Introduction

1.1.1 Jubb has been commissioned by Hallam Land Management Ltd (HLM) to provide highways and transportation advice in relation to a proposal for a residential-led mixed use development on land north-east of the railway line in North West Bicester 'Hawkwell Village'.

1.1.2 A planning application (Ref: 21/04275/OUT) was submitted in December 2021 for a residential led mixed use development for up to 3,100 dwellings.

1.1.3 The Site forms part of the allocated North West Bicester Eco-Town development. Historical traffic modelling of the allocation has shown a need for the implementation of the A4095 Strategic Link Road (SLR) to bypass the Howes Lane (A4095) / Bucknell Road / A4095 double junction.

1.1.4 The Howes Lane (A4095) / Bucknell Road / A4095 consists of a roundabout junction to the north of the railway line and a priority junction to the south of the railway line and currently operates over capacity.

1.1.5 Oxfordshire County Council (OCC) received funding from Homes England and the Oxfordshire Housing and Growth Deal to implement infrastructure in order to enable proposed development to come forward. The funding allocated to the SLR has enabled the completion of the rail underbridge. Unfortunately, due to time limits on spending of the allocated fund, the remaining monies have been reallocated to other strategic highway schemes in Oxfordshire. Hallam are currently in discussion with OCC and Cherwell District Council (CDC) to investigate other potential funding mechanisms for the SLR.

1.1.6 The SLR is a large strategic piece of highway infrastructure and will cost a considerable sum of money. Hawkwell Village will need to deliver and release a significant quantum of dwellings in order to be able to financially contribute its share of the s106 requirements to fund the road.

1.1.7 Therefore, this Technical Note (TN) undertakes a review of the operation of the existing Howes Lane (A4095) / Bucknell Road / A4095 junctions and promotes a signalisation scheme to mitigate the effects of the early phases of the development in the interim, before the SLR is delivered. The scheme, which offers improved active travel crossing facilities, has been designed so that it can be adjusted with minimal disruption when the SLR is delivered.

1.1.8 Following the submission of Version 6 of this TN to OCC and the return of initial comments from the Highway Officer, this version provides a redesign of the junction and subsequent remodelling to address the matters raised by OCC.

1.1.9 The Firethorn planning application (Ref: 21/01630/OUT) for 530 residential dwellings, with a recommendation by the planning officer for permission to be granted (subject to the expiry of the consultation period, conditions and subject to a s106 agreement), was considered by Councillors at the CDC Planning Committee held on 12th January 2023; the application was deferred due to the need of Councillors to consider the submission of late comments.

1.1.10 Following extensive discussions between the applicant's transport consultants and OCC Highways regarding the effect of the development on the Howes Lane (A4095) / Bucknell Road / A4095 junction, OCC have concluded **that a 50% increase in delay at the junction is not a 'severe' impact and that in "the context of an increasingly urban setting, drivers will become accustomed to congestion on all routes into and around Bicester by 2026".**

1.1.11 OCC have also given weight to the delivery of the SLR, stating "the most challenging element of the road scheme, the bridge under the railway, has already been delivered" and that "there are current development proposals on the land required for the scheme, which means the land can potentially be safeguarded". **OCC Highways conclude that the impact of the development, given the future delivery of the SLR will be temporary and is not considered to be severe.**

1.1.12 OCC removed their Highways Objection and thus a precedent has been set regardless of the result of the Planning Committee. **This decision enables a minimum of 530 dwellings in North West Bicester to be occupied with no mitigation at the Howes Lane (A4095)/Bucknell Road/A4095 junction.**

2.0 Technical Background

2.1.1 OCC have specified that the recently revalidated Bicester Transport Model (BTM) is the preferred modelling tool to assess future development and mitigation options in Bicester. It is OCC's model and the development trip generation used in this assessment is the model's trip generation i.e. not the reduced 'Vision' trip generation which has recently been discussed with OCC. Therefore, it is understood that the traffic flow movements produced by the BTM and used for the purposes of this assessment, are in accordance with the requirements of OCC. The model's trip generation is considered to offer an assessment that is a worst-case scenario and in reality, the trip generation of the development will be less.

2.1.2 Tetra Tech, custodians of the Bicester Transport Model (BTM), were commissioned by HLM to undertake SATURN model runs of the following scenarios:

- 2026 Reference Case – Base + Committed Traffic;
- 2026 Hawkwell with Development 1a – 675 dwellings; and
- 2026 Hawkwell with Development 2a – 1250 dwellings.

2.1.3 Tetra Tech provided turning movements for each scenario attached at **Appendix A**. From these turning movements, Traffic Flow Diagrams, attached at **Appendix B**, have been produced.

2.1.4 It should be noted that the revised TN uses the revised turning movements provided by Tetra Tech (26th January 2023). It is understood that an issue was identified requiring the demand model to be altered which led to the 2026 and 2031 'with development' scenarios to be rerun.

3.0 Existing Junctions

3.1.1 Using the traffic flows provided by the BTM, the '2026 Reference Case' operation of the existing junctions has been undertaken using the JUNCTIONS 10 software. Due to the proximity of the two junctions and their operation being dependent on each other, the modelling has been undertaken using 'linked lane simulation'. A summary of the results is shown in **Table 3.1** with the output report attached at **Appendix C.**

3.1.2 The roundabout is modelled as Junction 1 and the priority junction as Junction 2.

Arm	AM			PM		
	Queue (PCU)	Delay (s)	Max LOS / RFC	Queue (PCU)	Delay (s)	Max LOS / RFC
J1 – Bucknell Road (North)	1.1	14.74	B	0.7	11.40	B
J1 – A4095 (East)	184.6	622.83	F	193.5	638.13	F
J1 – Bucknell Road (South)	1.2	4.68	A	1.2	4.50	A
J2 – Bucknell Road (South)	0.2	0.68	A	0.1	0.47	A
J2 – A4095 Howes Lane (West)	53.4	291.99	F	232.6	972.07	F
J2 – Bucknell Road (North)	3.1	16.51	C	3.0	14.67	B

Table 3.1 – Summary of Junction Results for Existing Junctions – Base + Committed Development

3.1.3 The 'linked lane simulation' results indicate that the existing junctions will operate over capacity in 2026 with committed traffic. The committed development traffic is generated by the following committed development that is included in the 2026 BTM: 8,085 dwellings, 15,642sqm retail use, 308,335sqm employment use and 1,899 jobs of other employment use.

3.1.4 Queues on the A4095 East arm of Junction 1 (roundabout) are predicted to be 185 pcus in the AM peak hour and 194 pcus in the PM peak hour. In the AM peak hour queues will extend to just before the A4095 / B4100 (Banbury Road) roundabout and in the PM peak hour the queue will extend across the A4095 / B4100 (Banbury Road) roundabout.

3.1.5 Queues on the A4095 West arm of Junction 2 (priority) are predicted to be 54 pcus in the AM peak hour and 233 pcus in the PM peak hour. These queues extend across the Avonbury Business Park and Thames Valley Police junctions in the AM peak hour and to just before the A4095/ B4030 / Middleton Stoney Road roundabout in the PM peak hour.

3.1.6 **Figure 3.1** shows a visual representation of the predicted traffic queues for the '2026 Reference Case' scenario.

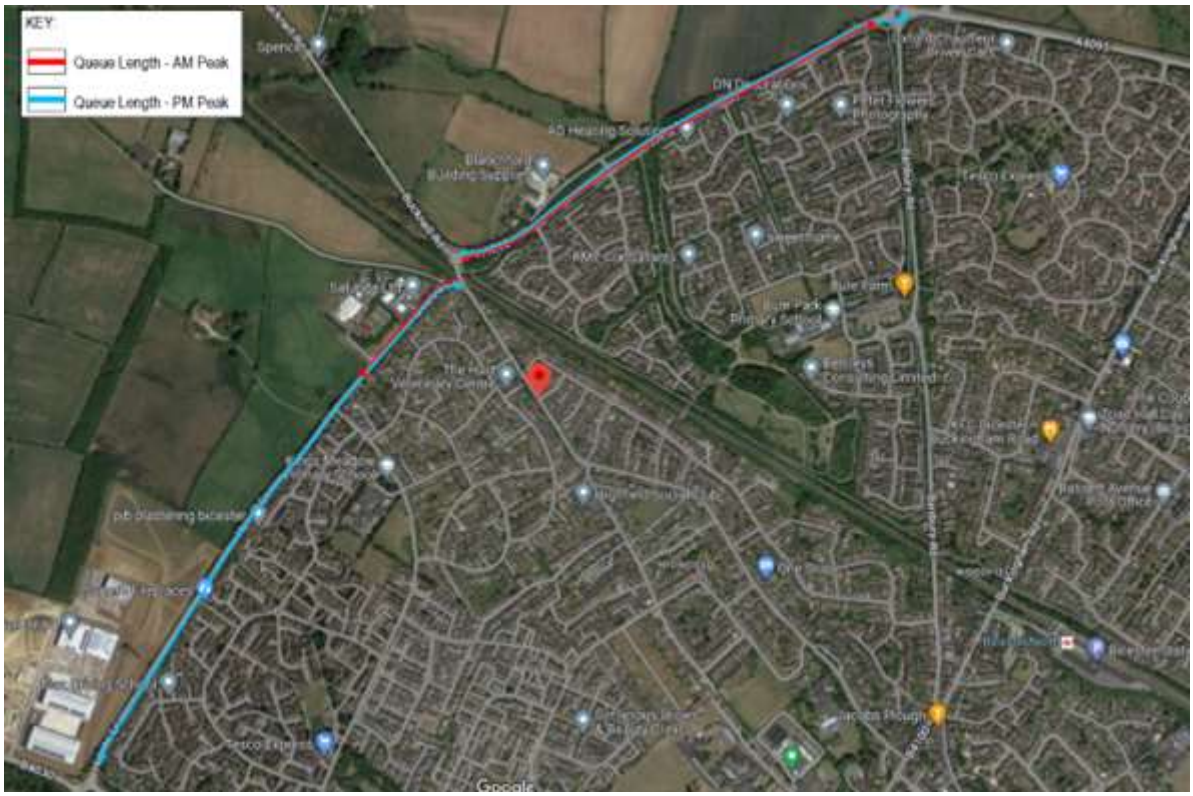


Figure 3.1 – 2026 Reference Case – Predicted Vehicle Queue Lengths

3.1.7 OCC have commented that the queues lengths reported by the '2026 Reference Case' modelling appear to be longer than modelling undertaken for other developments. As requested, the modelling has been undertaken using the BTM traffic flows and as the model provides future year traffic flows only it is not possible to undertake a validation exercise. In addition, the modelling undertaken for the Firethorn development has assessed and validated only the southern priority junction; due to the proximity of the two junctions and their obvious interaction and subsequent blocking of movements, it is considered that the presented modelling is a more accurate assessment of the junctions' performance. Finally, as shown in this report, the mitigation scheme(s) do not only mitigate the development traffic (i.e. the performance of the junction remains the same as the '2026 Reference Case' scenario) but they mitigate all traffic (i.e. background + committed) and therefore, the performance relative to the existing design is not of relevance; it is sufficient to understand that the existing junctions are operating over capacity and the mitigation scheme provides a comprehensive solution.

4.0 Proposed Interim Mitigation Scheme

4.1.1 In order to improve the junction and reduce queues and delay, it is proposed to signalise the two junctions with the added benefit of providing controlled pedestrian / cycle crossing points. The preliminary design drawing including signal head positions and swept path assessment is attached at **Appendix D.**

4.1.2 The footways around the junction are all provided with a width of 2m and includes the widening of the footway on the eastern side of Bucknell Road south of the railway. A controlled pedestrian crossing has been introduced on the Bucknell Road south arm to improve east/west pedestrian movements and increase pedestrian safety at the junction and an uncontrolled crossing with a central refuge has been introduced on Howes Lane (western arm) to maintain a route to and from the Aldershot Farm Public Right of Way.

4.1.3 The design of the junction has been undertaken to ensure a minimum of 1m clearance from the bridge structure enabling the installation of crash barriers if required by Network Rail.

4.1.4 HGVs manoeuvring through the existing priority junction, from Howes Lane turning left to Bucknell Road North, track over the opposing side of the carriageway requiring oncoming vehicles travelling southbound on Bucknell Road to give way. Additionally, HGV manoeuvring through the priority junction, turning right from Bucknell Road North to Howes Lane, require the right turn lane on Howes Lane to be free of vehicles in proximity of the give-way line. The introduction of the signals and its associated stop lines enables unfettered HGV movements through the junction, allowing free movement of all vehicles within the signal stages and improving highway safety.

4.1.5 Junction capacity modelling has been undertaken using the LINSIG software. A summary of the results is shown in **Table 4.1** with the output report attached at **Appendix E.**

4.1.6 The results indicate that with 1,250 dwellings all arms of the junction operate with a Degree of Saturation below 90%. The modelling indicates that all queued vehicles will move through the junction using an optimised 180 second cycle time.

4.1.7 The existing junction is known to be congested and this congestion at a land constrained junction is the main reason for the delivery of the SLR. The loss of the Homes England funding means that unless alternative funding is sourced, the cost of this expensive piece of infrastructure will have to be met by developments that increase traffic flows along the A4095. To enable the Hawkwell development to be able to fund its share of the SLR requires a period of house sales to be undertaken. The aim of this TN is to provide a mitigation solution that provides additional vehicle capacity until the developer is able to fund its share of the SLR; a positive of the design is that pedestrian safety can be improved through the provision of crossing facilities and the widening of an existing substandard footway. OCC have commented that 180s cycle time is too long for pedestrian phases; it should be noted that this is an interim scheme and OCC as the highway network manager are able to reduce the cycle time to improve pedestrian wait times at the expense of vehicle capacity.

Arm	Lane	AM			PM		
		DoS (%)	Queue (PCUs)	Delay s/PCU	DoS (%)	Queue (PCUs)	Delay s/PCU
2026 + Committed + 675 dwellings							
Bucknell Road (North)	-	60.5	11	77.4	62.8	12	79.4
A4095 (East)	Left	69.0	22	23.2	69.4	24	19.8
	Right	80.8	-	84.9	80.1	-	88.8
Bucknell Road (Internal Southbound)	-	83.2	9	11.2	87.4	10	9
Bucknell Road (South)	Left	83.0	-	65.5	72.6	-	55.1
	Right	83.0	23	55.8	72.6	20	45.2
A4095 (West)	Left	52.5	12	27	86.9	32	51.7
	Right	52.5	-	88.7	86.9	-	138
Bucknell Road (Internal Northbound)	Left	54.4	-	4.7	72.3	-	2.7
	Right	54.4	3	1.7	72.3	4	0.8
PRC (%)		**8.2**			**2.9**		
Cycle Time		**180s**					

Arm	Lane	AM			PM		
		DoS (%)	Queue (PCUs)	Delay s/PCU	DoS (%)	Queue (PCUs)	Delay s/PCU
2026 + Committed + 1250 dwellings							
Bucknell Road (North)	-	66.6	12	84.7	65.3	13	78.7
A4095 (East)	Left	68.8	22	21.5	69.7	24	20.9
	Right	80.5	-	84.1	81	-	89
Bucknell Road (Internal Southbound)	-	83.9	7	12.1	87.1	7	7.6
Bucknell Road (South)	Left	83.1	-	65.6	70.4	-	54.7
	Right	83.1	23	55.9	70.4	19	44.6
A4095 (West)	Left	52.3	12	26.9	86.9	32	51.9
	Right	52.3	-	88.4	86.9	-	138.1
Bucknell Road (Internal Northbound)	Left	54.3	-	4.8	74.4	-	2.9
	Right	54.3	6	2.1	74.4	3	0.9
PRC (%)		**7.3**			3.4		
Cycle Time		**180s**					

Table 4.1 – Summary of LINSIG Results for Signals Mitigation Scheme

4.1.8 The queues on the A4095 eastern arm are significantly improved. With 1,250 dwellings there is a queue of 22 vehicles in the AM peak hour and 24 pcus in the PM peak hour both peak hours effectively removing any impact on nearby junctions as the queue ends before the Trefoil Drive junction. Comparing the junction's operation in 2026 with development against the 2026 Reference Case there is a reduction in queues on this arm of 163 pcus in the AM peak hour and 170 pcus in the PM peak hour. Maximum delay reduces from 623s per pcu to 84s per pcu in the AM peak hour and from 638s per pcu to 89s per pcu in the PM peak hour, a saving of 9 minutes on travel times in the peak hours.

4.1.9 The queues on the A4095 western arm also see a significant reduction generating a queue of 12 pcus in the AM peak hour and a queue of 32 pcus in the PM peak hour with the traffic generation of 1,250 dwellings and removes any knock-on impact on nearby junctions with the exception of the Avonbury Business Park junction. Comparing the junction's operation in 2026 with development against the 2026 Reference Case there is a reduction in queues on this arm of 41 pcus in the AM peak hour and 201 pcus in the PM peak hour. Maximum delay reduces from 292s per pcu to 88s per pcu in the AM peak hour and from 972s per pcu to 138s per pcu in the PM peak hour, a saving of 4 minutes in the AM peak hour and 14 minutes in the PM peak hour.

4.1.10 The introduction of signals introduces a delay to the movements on Bucknell Road (i.e. north and south arms). However, the assessment of 1,250 dwellings, indicates a queue of 12 and 13 pcus on the Bucknell Road North arm in the AM and PM peak hours respectively and queues of 23 and 19 pcus on the Bucknell Road South arm in the AM and PM peak hours respectively. The predicted delay is considered within a normal range for a signalised junction in an urban environment and the associated vehicle queues do not affect the operation of nearby junctions.

4.1.11 **Figure 4.1** shows a visual representation of the predicted traffic queues for the '2026 Reference Case + 1250 dwellings' scenario.

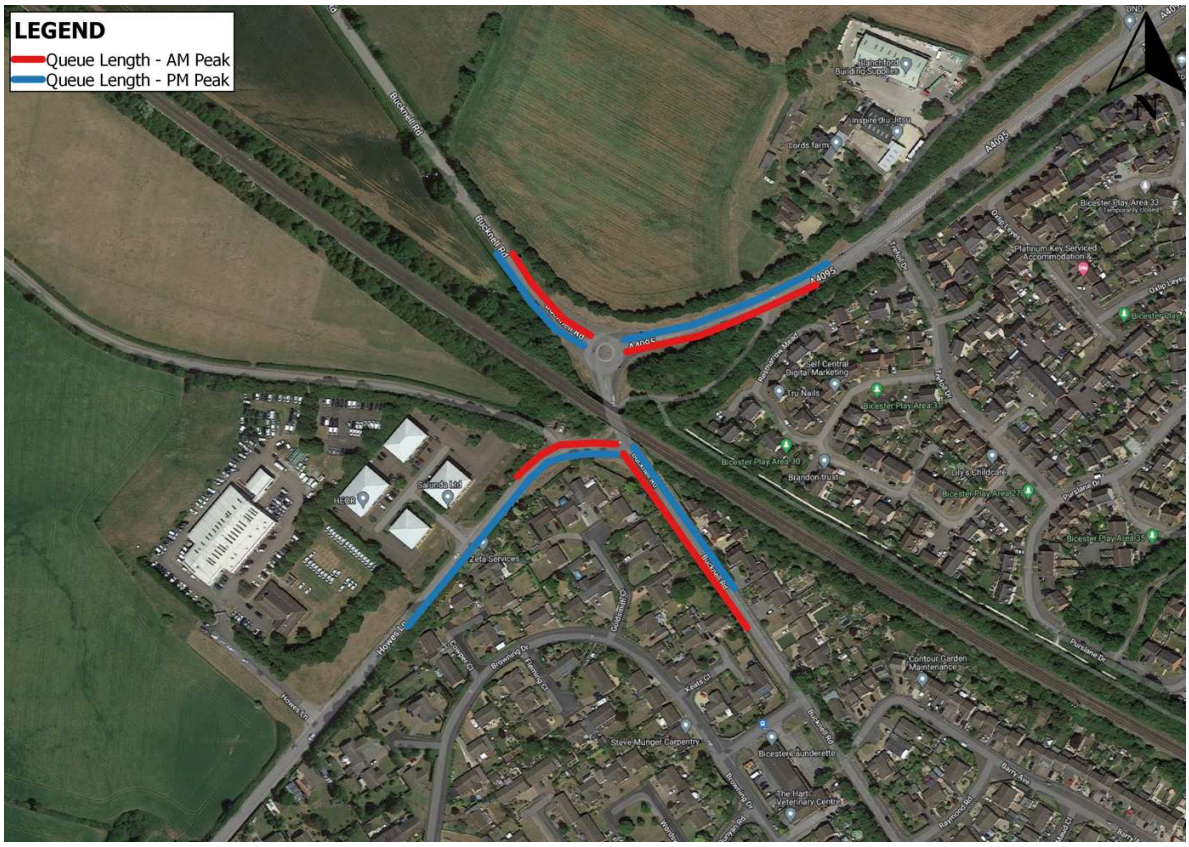


Figure 4.1 – 2026 Reference Case – Predicted Vehicle Queue Lengths

5.0 2031 Future Year Assessment with Full Development Buildout

5.1.1 Jubb received the BTM modelling outputs for the following scenarios from Tetra Tech:

- 2031 Reference Case - Base + Committed Traffic; and
- 2031 Hawkwell with Development 1a – full buildout using BTM trip generation.

5.1.2 Tetra Tech provided turning movements for each scenario attached at **Appendix A**. From these turning movements, Traffic Flow Diagrams, attached at **Appendix B**, have been produced.

5.1.3 The development is proposing to provide an all vehicle link road between the western site access and the Bucknell Road / A4095 existing roundabout junction i.e. to the south of the SLR. This link road enables the removal of the previously proposed junction on the SLR to the east of the western site access and reduces delay on the SLR. The BTM modelling did not assess this proposal and therefore, a manual adjustment of the future traffic flows through the junction has been undertaken (see **Appendix B**).

5.1.4 A 'final solution' scheme has been designed which enables the downgrade of Bucknell Road to an active travel route and the introduction of the proposed all vehicle link to the SLR. The interim scheme was designed to enable the final solution scheme to be constructed with minimal disruption.

5.1.5 This scheme introduces two controlled active travel crossings which will provide access to the existing Public Right of Way which routes alongside the northern side of the railway.

5.1.6 The preliminary design drawing including signal head positions and swept path assessment is attached at **Appendix F.**

5.1.7 Junction capacity modelling of the final solution mitigation scheme has been undertaken using the 2031 BTM turning movement outputs (modified) and LINSIG software. A summary of the results is shown in **Table 5.1** with the output report attached at **Appendix G.**

Arm	Lane	AM			PM		
		DoS (%)	Queue (PCUs)	Delay s/PCU	DoS (%)	Queue (PCUs)	Delay s/PCU
2031 Full Buildout – BTM Trip Generation							
Bucknell Road (North)	Left	53.1	4.1	40.6	52.6	4.9	29.7
	Right	53.1		39.5	52.6		30.6
A4095 (East)	Left	51.5	6.2	29.8	54.2	5.0	37.6
	Right	50.2		38.5	53.7		41.0
Bucknell Road (Internal Southbound)	-	39.9	0.5	0.3	37.2	0.3	1.5
Bucknell Road (South)	Left	17.5	1.6	30.6	20.8	1.7	31.2
	Right	17.5		19.1	20.8		18.0
A4095 (West)	Left	17.5	1.4	9.5	21.2	1.5	10.0
	Right	17.5		40.3	20.3		36.3
Bucknell Road (Internal Northbound)	Left	17.8	0.9	6.0	18.6	0.8	1.6
	Right	17.8		7.4	18.6		9.0
PRC (%)		**69.6**			**66.0**		
Cycle Time		**90s**					

5.1.8 The results indicate that with the realignment of the A4095 there will be a significant reduction in vehicles routeing through the Howes Lane / Bucknell Road / A4095 junction and the final solution mitigation scheme will perform with plenty of spare capacity operating on a 90s cycle.

6.0 Summary and Conclusion

6.1.1 The existing Howes Lane (A4095) / Bucknell Road / A4095 currently exceeds capacity. Modelling of the two junctions for a '2026 + Committed Development' scenario indicates that there will be queuing on the two A4095 arms and therefore, any further development would only increase the queues and journey times through the junction.

6.1.2 An interim mitigation scheme that signalises the two junctions and improves pedestrian severance is proposed to enable initial phases of the proposed Hawkwell Village development to come forward to enable funding of the A4095 Strategic Link Road. The scheme also improves HGV movement through the junction with HGVs accessing and egressing the Howes Lane arm no longer being reliant on the position of other vehicles. The interim scheme has been designed with a 'final solution' mitigation scheme in mind in order that minimal disruption is caused when the road network alters i.e. when the SLR is constructed.

6.1.3 Using traffic flows from the recently revalidated Bicester Transport Model and in accordance with the requirements of OCC, the junction modelling undertaken indicates that the proposed interim scheme will operate within capacity and offer a benefit to the existing configuration, to all road users in terms of queueing, journey times and crossing facilities for pedestrians, for at least 1,250 dwellings.

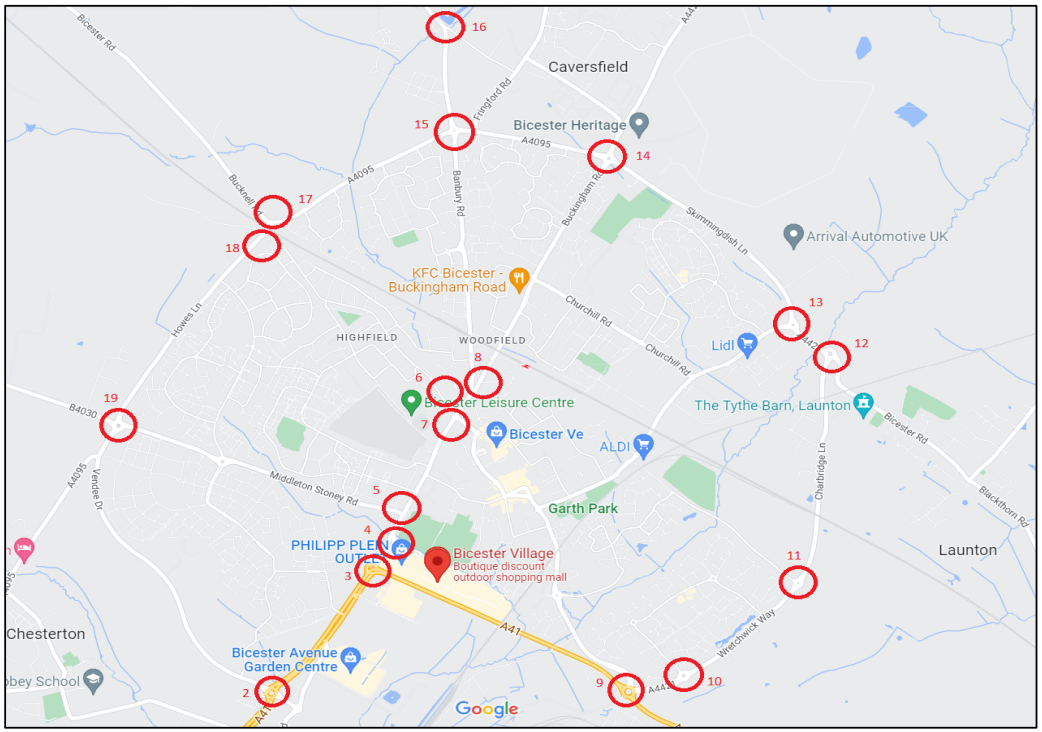
6.1.4 The reductions in terms of queues and delays at this junction would be extremely beneficial to the local transport network (both public and private modes) and the local economy and also enable the vital delivery of allocated housing at NW Bicester.

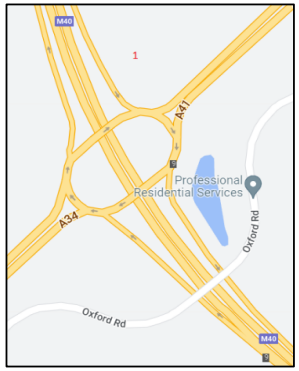
6.1.5 The proposed interim mitigation scheme should be considered by OCC as an interim scheme to accommodate at least 1,250 dwellings at Hawkwell Village until the A4095 Strategic Road Link can be funded and delivered.

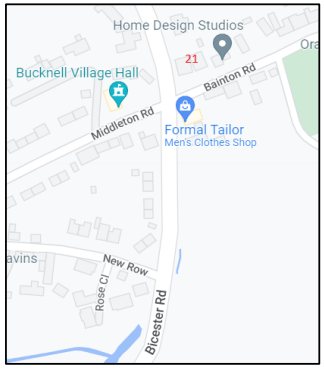
6.1.6 Junction modelling of the future 2031 with full development buildout indicates that a modified interim mitigation scheme will operate with plenty of spare capacity due to the reduction in traffic flows through the junction brought about by the realignment of the A4095. This modified scheme provides additional active travel infrastructure facilitating safe pedestrian and cycle movements across the junction to the existing Public Right of Way that routes alongside the railway.

6.1.7 Whilst interim and final solution mitigation schemes, that offer vehicle delay and active travel improvements for the junction have been presented within the TN, the decision of OCC Highways on the vehicle impact (i.e. temporary and not severe) of the Firethorn application for 530 dwellings is considered to be a material consideration on the need to mitigate for the vehicular impact of the Hawkwell Village development at the junction. Therefore, as well as a technical review of the proposed mitigation schemes, the position on the need to mitigate the temporary impact of the Hawkwell Village development traffic at the junction, is sought from OCC.

Appendix A Bicester Traffic Model Outputs







Ref No	Junction Name
1	M40 Junction 9
2	A41 / Vendee Drive roundabout
3	A41 / B4030 Oxford Road signalised roundabout
4	A41 Oxford Road / Pingle Drive signal junction
5	Middleton Stoney Road / Kings End mini roundabout
6	Field Street / Bucknell Road priority junction
7	Queens Avenue / St Johns Street mini roundabout
8	Banbury Road / Field Street mini roundabout
9	A41 / A4421 / B4100 / Gravenhill Road roundabout
10	A4421 / Peregrine Way roundabout
11	Wretchwick Way / Charbridge Lane / Gavray Dr roundabout
12	A4421 / Bicester Road roundabout

Ref No	Junction Name
13	A4421 / Launton Road / Skimmingish Lane roundabout
14	A4421 / Skimmingdish Lane / Buckingham Road / A4095 roundabout
15	B4100 Banbury Road / A4095 Lords Lane roundabout
16	B4100 / Caversfield priority junction
17	A4095 Lords Lane / Bucknell Road roundabout
18	Howes Lane / Bucknell Road priority junction
19	Howes Lane / Middleton Stoney Rd / Vendee Dr roundabout
20	M40 Junction 10
21	Middleton Road / Bainton Road priority junction
22	Sie Access (Western)
23	Site Access (Eastern)

Turning Movement Data Junction Locations and References

Junction Reference	Junction Description	From Arm	To Arm	AM Peak							Inter Peak							PM Peak						
				Car	LGV	HGV (PCU)	HGV (Veh)	Bus (Veh)	Total Veh	Total PCUs	Car	LGV	HGV (PCU)	HGV (Veh)	Bus (Veh)	Total Veh	Total PCUs	Car	LGV	HGV (PCU)	HGV (Veh)	Bus (Veh)	Total Veh	Total PCUs
17	A4095 Lords Lane / Bucknell Road roundabout	Bucknell Road (N)	A4095 (E)	130	8	39	22	0	159	177	65	5	31	17	0	87	101	112	21	25	14	0	147	158
		Bucknell Road (N)	Bucknell Road (S)	23	19	23	13	0	55	65	40	15	20	11	0	66	75	26	30	5	3	0	59	61
		Bucknell Road (N)	Bucknell Road (N)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		A4095 (E)	Bucknell Road (S)	483	60	160	89	0	632	703	586	90	115	64	0	739	790	732	48	50	28	0	808	830
		A4095 (E)	Bucknell Road (N)	142	24	0	0	0	166	166	13	7	65	36	0	56	85	30	15	49	27	0	72	94
		A4095 (E)	A4095 (E)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Bucknell Road (S)	Bucknell Road (N)	79	33	26	14	0	126	138	43	17	22	12	0	72	82	117	16	6	3	0	136	139
		Bucknell Road (S)	A4095 (E)	515	46	139	77	0	637	699	466	54	130	72	0	592	649	766	58	92	52	0	876	916
		Bucknell Road (S)	Bucknell Road (S)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18	Howes Lane / Bucknell Road prioity junction	Bucknell Road (N)	Bucknell Road (S)	135	19	0	0	0	154	154	145	23	0	0	0	167	167	240	32	0	0	0	272	272
		Bucknell Road (N)	Howes Lane (W)	420	60	183	102	0	582	663	481	82	134	75	0	638	697	518	46	54	31	0	595	619
		Bucknell Road (S)	Howes Lane (W)	213	96	12	7	0	316	321	49	4	10	6	0	59	64	170	57	10	6	0	234	238
		Bucknell Road (S)	Bucknell Road (N)	278	32	2	1	0	312	313	145	14	2	1	0	160	161	296	20	2	1	0	317	318
		Howes Lane (W)	Bucknell Road (N)	316	46	162	90	0	452	524	365	56	150	83	0	505	571	586	55	96	54	0	695	737
		Howes Lane (W)	Bucknell Road (S)	12	1	0	0	0	14	14	18	1	0	0	0	19	19	8	0	3	2	0	10	11

Bicester Transport Model Junction Turning Movements (2026 Updated Reference Case Scenario)

Junction Reference	Junction Description	From Arm	To Arm	AM Peak							Inter Peak							PM Peak						
				Car	LGV	HGV (PCU)	HGV (Veh)	Bus (Veh)	Total Veh	Total PCUs	Car	LGV	HGV (PCU)	HGV (Veh)	Bus (Veh)	Total Veh	Total PCUs	Car	LGV	HGV (PCU)	HGV (Veh)	Bus (Veh)	Total Veh	Total PCUs
17	A4095 Lords Lane / Bucknell Road roundabout	Bucknell Road (N)	A4095 (E)	114	8	39	22	0	144	161	57	5	31	17	0	79	92	121	17	25	14	0	152	164
		Bucknell Road (N)	Bucknell Road (S)	23	19	23	13	0	55	65	49	15	20	11	0	76	84	56	30	7	4	0	89	92
		Bucknell Road (N)	Bucknell Road (N)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		A4095 (E)	Bucknell Road (S)	513	57	160	89	0	660	731	530	92	110	61	0	682	731	704	42	50	28	0	775	796
		A4095 (E)	Bucknell Road (N)	128	24	0	0	0	152	152	12	7	65	36	0	56	85	30	7	49	27	0	64	85
		A4095 (E)	A4095 (E)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Bucknell Road (S)	Bucknell Road (N)	87	33	26	14	0	134	146	37	17	22	12	0	67	76	114	15	6	3	0	132	135
		Bucknell Road (S)	A4095 (E)	456	19	139	77	0	552	614	424	52	129	72	0	548	605	784	53	92	52	0	889	929
		Bucknell Road (S)	Bucknell Road (S)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18	Howes Lane / Bucknell Road prioity junction	Bucknell Road (N)	Bucknell Road (S)	153	19	0	0	0	172	172	147	21	0	0	0	168	168	249	32	0	0	0	281	281
		Bucknell Road (N)	Howes Lane (W)	430	57	183	102	0	589	670	432	86	130	72	0	590	647	511	40	56	32	0	583	608
		Bucknell Road (S)	Howes Lane (W)	218	96	12	7	0	321	326	45	0	10	6	0	51	56	119	63	10	6	0	188	192
		Bucknell Road (S)	Bucknell Road (N)	257	32	2	1	0	291	292	143	14	2	1	0	159	160	315	19	2	1	0	335	336
		Howes Lane (W)	Bucknell Road (N)	286	20	162	90	0	396	468	318	55	149	83	0	456	522	583	49	96	54	0	686	729
		Howes Lane (W)	Bucknell Road (S)	12	1	0	0	0	13	13	19	1	0	0	0	19	19	12	0	3	2	0	14	15

Bicester Transport Model Junction Turning Movements (2026 Hawkwell with Development 2a Scenario)

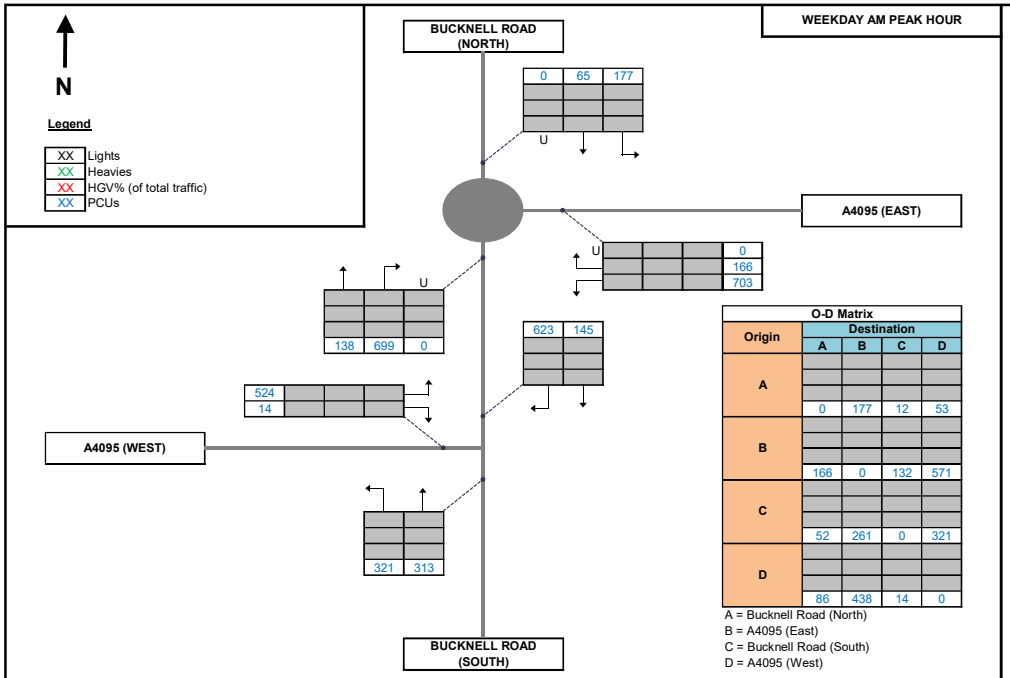
Junction Reference	Junction Description	From Arm	To Arm	AM Peak							Inter Peak							PM Peak						
				Car	LGV	HGV (PCU)	HGV (Veh)	Bus (Veh)	Total Veh	Total PCUs	Car	LGV	HGV (PCU)	HGV (Veh)	Bus (Veh)	Total Veh	Total PCUs	Car	LGV	HGV (PCU)	HGV (Veh)	Bus (Veh)	Total Veh	Total PCUs
17	A4095 Lords Lane / Bucknell Road roundabout	Bucknell Road (N)	A4095 (E)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Bucknell Road (N)	Bucknell Road (S)	0	0	0	0	6	6	12	0	0	0	0	6	6	12	0	0	0	0	6	6	12
		A4095 (E)	Bucknell Road (S)	236	15	0	0	0	250	250	145	12	0	0	0	157	157	276	13	0	0	0	289	289
		A4095 (E)	Bucknell Road (N)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Bucknell Road (S)	Bucknell Road (N)	0	0	0	0	6	6	12	0	0	0	0	6	6	12	0	0	0	0	6	6	12
		Bucknell Road (S)	A4095 (E)	159	10	2	1	0	170	171	110	0	2	1	0	111	112	251	13	2	1	0	265	266
18	Howes Lane / Bucknell Road prioity junction	Bucknell Road (N)	Bucknell Road (S)	65	0	0	0	6	71	77	34	5	0	0	6	45	51	93	0	0	0	6	99	105
		Bucknell Road (N)	Howes Lane (W)	170	14	0	0	0	185	185	111	7	0	0	0	118	118	183	13	0	0	0	196	196
		Bucknell Road (S)	Howes Lane (W)	11	0	13	7	0	18	24	26	0	11	6	0	32	37	40	0	11	6	0	46	50
		Bucknell Road (S)	Bucknell Road (N)	56	1	2	1	6	64	71	25	0	2	1	6	33	40	58	2	2	1	6	68	75
		Howes Lane (W)	Bucknell Road (N)	104	9	0	0	0	113	113	85	0	0	0	0	85	85	193	10	0	0	0	203	203
		Howes Lane (W)	Bucknell Road (S)	21	0	0	0	0	21	21	25	0	0	0	0	25	25	55	1	3	2	0	57	59

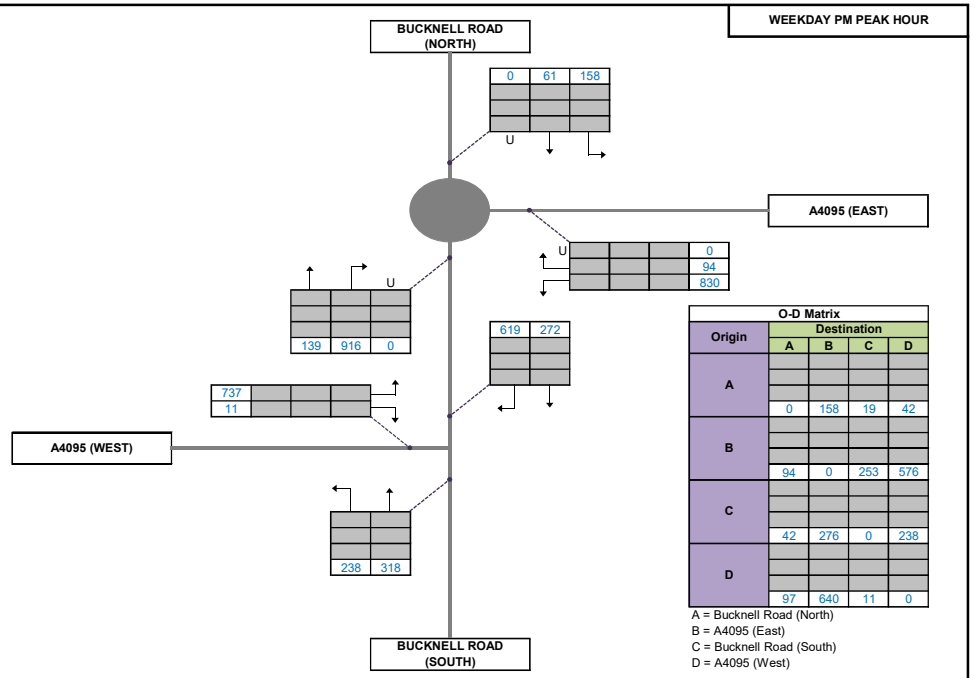
Bicester Transport Model Junction Turning Movements (2031 Hawkwell Baseline plus committed Scenario)

Junction Reference	Junction Description	From Arm	To Arm	AM Peak							PM Peak						
				Car	LGV	HGV (PCU)	HGV (Veh)	Bus (Veh)	Total Veh	Total PCUs	Car	LGV	HGV (PCU)	HGV (Veh)	Bus (Veh)	Total Veh	Total PCUs
17	A4095 Lords Lane / Bucknell Road roundabout	Bucknell Road (N)	A4095 (E)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Bucknell Road (N)	Bucknell Road (S)	0	0	0	0	6	6	12	0	0	0	0	6	6	12
		A4095 (E)	Bucknell Road (S)	285	20	0	0	0	306	306	277	13	0	0	0	290	290
		A4095 (E)	Bucknell Road (N)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Bucknell Road (S)	Bucknell Road (N)	0	0	0	0	6	6	12	0	0	0	0	6	6	12
		Bucknell Road (S)	A4095 (E)	157	10	2	1	0	168	169	253	13	2	1	0	267	268
18	Howes Lane / Bucknell Road prioity junction	Bucknell Road (N)	Bucknell Road (S)	121	0	0	0	6	127	133	98	0	0	0	6	104	110
		Bucknell Road (N)	Howes Lane (W)	165	20	0	0	0	185	185	180	13	0	0	0	192	192
		Bucknell Road (S)	Howes Lane (W)	11	0	13	7	0	18	23	38	0	11	6	0	44	48
		Bucknell Road (S)	Bucknell Road (N)	59	1	2	1	6	67	74	62	2	2	1	6	72	79
		Howes Lane (W)	Bucknell Road (N)	98	9	0	0	0	107	107	191	10	0	0	0	202	202
		Howes Lane (W)	Bucknell Road (S)	15	0	0	0	0	15	15	50	1	3	2	0	53	54

Bicester Transport Model Junction Turning Movements (2031 Hawkwell with Development 1a Scenario)

Appendix B Traffic Flow Diagrams





Notes:		Diagram No.:	Client: Hallam Land Management Ltd
Project No.: 20300	File Name: NP - 20300_Traffic Forecasts (A4095_Bucknell Road Network).xlsx		Project: North West Bicester - Land North East of the Marylebone-Birmingham Railway Line
Date: 07/12/2022	Drawn: NP / Checked: AW	Approved: MG	Title: Hawkwell Development Base and Committed - AM and PM Peak Flows

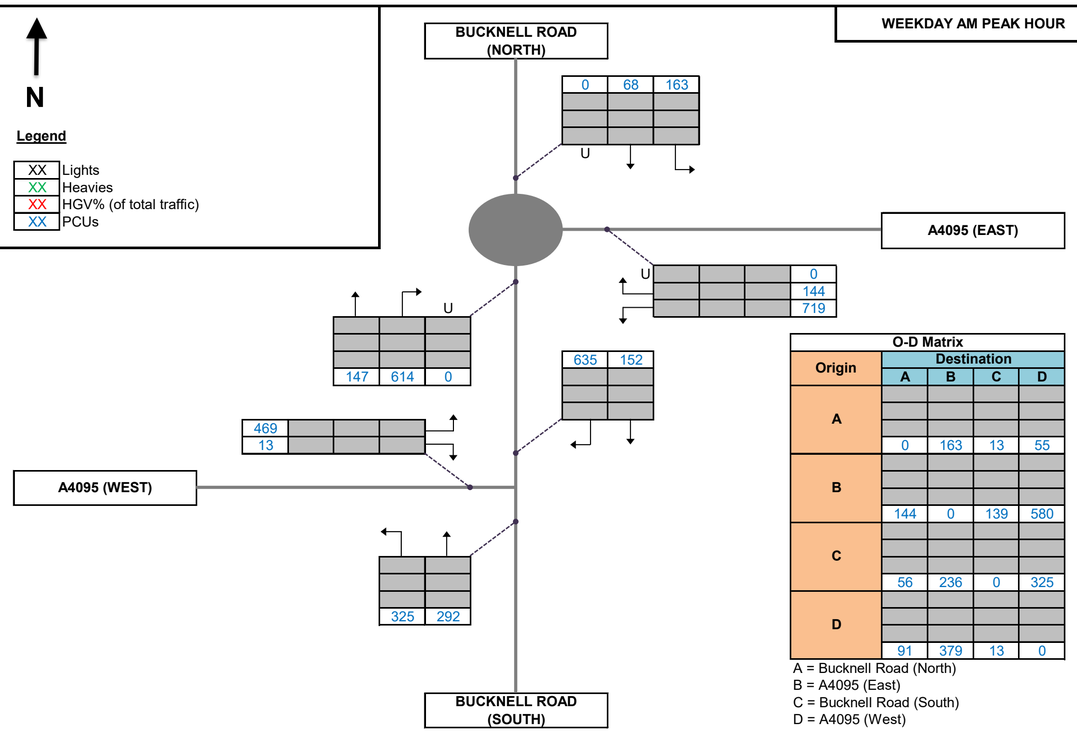
Jubb
Suite B
Ground Floor West
St James Court
St James Parade
Bristol
BS1 3LH

N

Legend

XX	Lights
XX	Heavies
XX	HGV% (of total traffic)
XX	PCUs

WEEKDAY AM PEAK HOUR

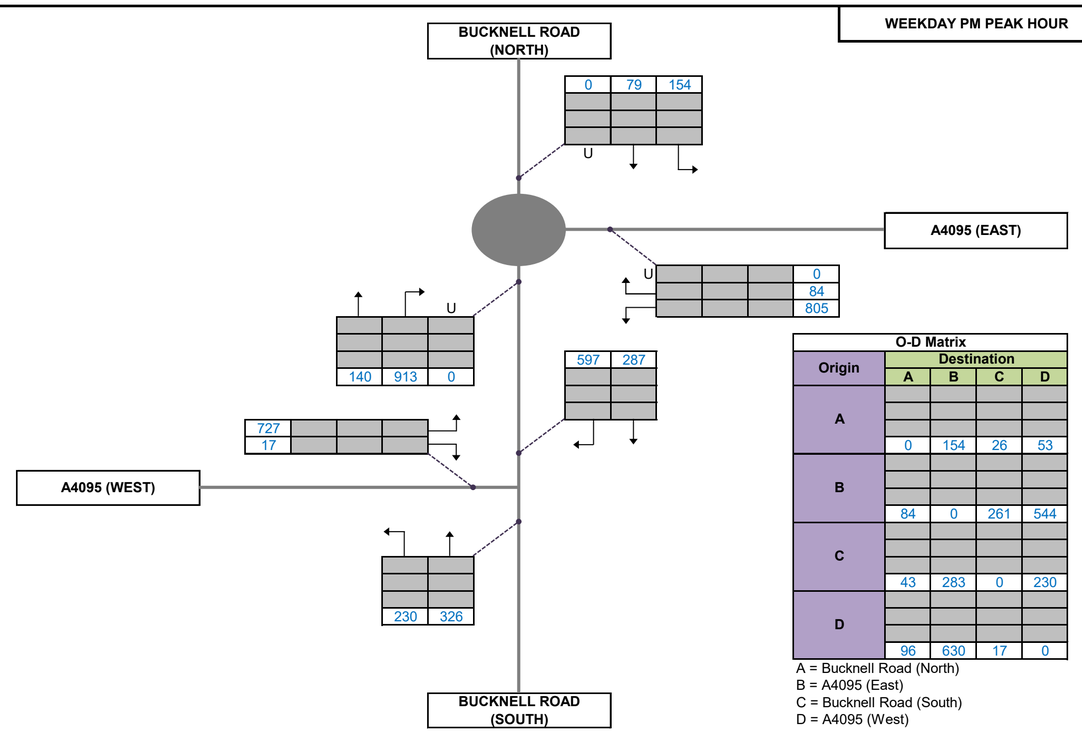


O-D Matrix

Origin	Destination A	B	C	D
A				
	0	163	13	55
B				
	144	0	139	580
C				
	56	236	0	325
D				
	91	379	13	0

A = Bucknell Road (North)
B = A4095 (East)
C = Bucknell Road (South)
D = A4095 (West)

WEEKDAY PM PEAK HOUR



O-D Matrix

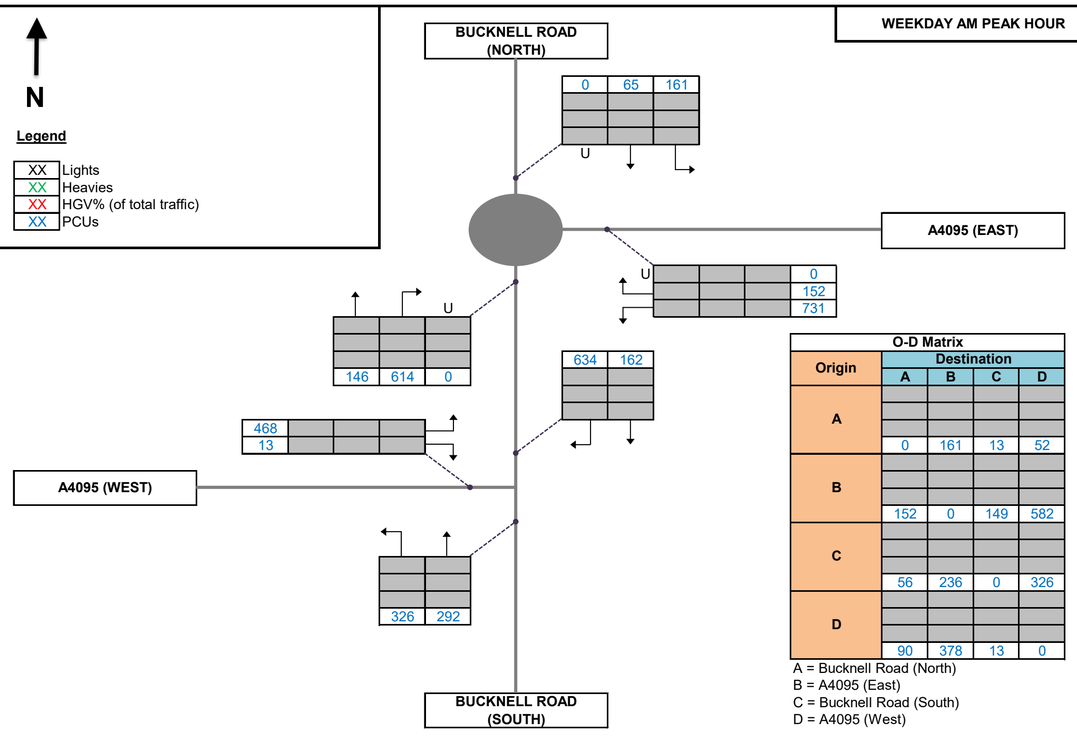
Origin	Destination A	B	C	D
A				
	0	154	26	53
B				
	84	0	261	544
C				
	43	283	0	230
D				
	96	630	17	0

A = Bucknell Road (North)
B = A4095 (East)
C = Bucknell Road (South)
D = A4095 (West)

Notes:		Diagram No.:	Client: Hallam Land Management Ltd
Project No.: 20300	File Name: 2026_Hawkwell_Dev1a_TurningMovements_and_LinkFlows_Values SR.xlsx		Project: North West Bicester - Land North East of the Marylebone-Birmingham Railway Line
Date: 27/01/2023	Drawn: NP / Checked: AW	Approved: MG	Title: Year 2026 Hawkwell Development 1a - AM and PM Peak Flows

Jubb
Suite B
Ground Floor West
St James Court
St James Parade
Bristol
BS1 3LH

WEEKDAY AM PEAK HOUR

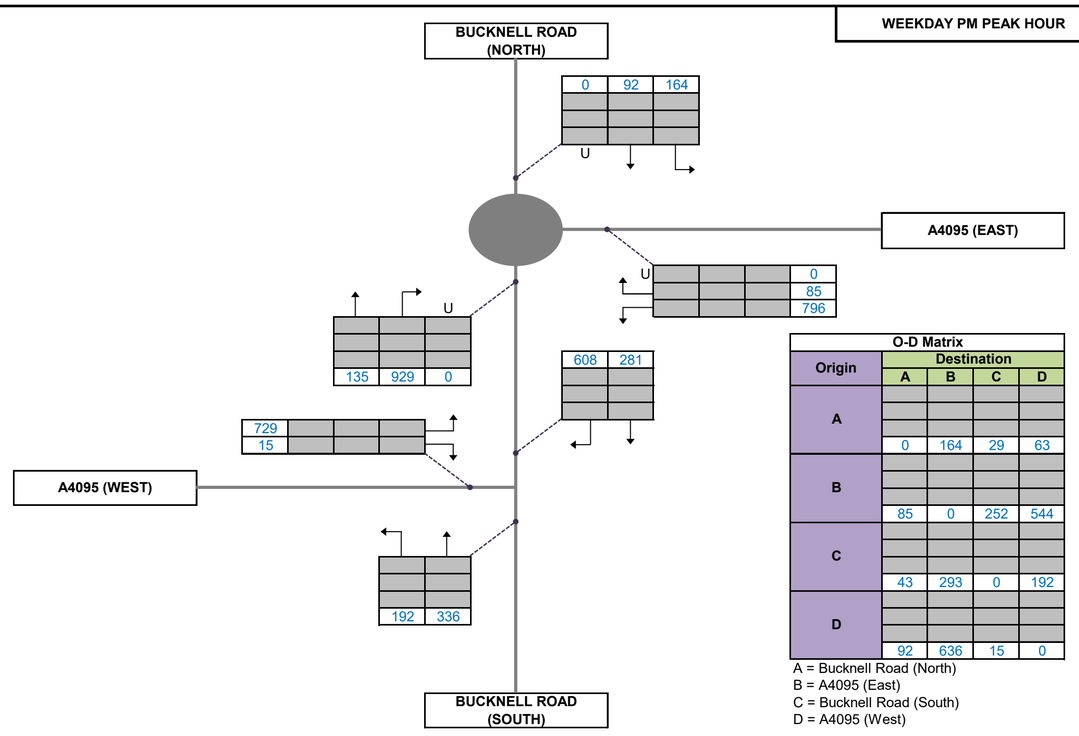


O-D Matrix

Origin	Destination A	B	C	D
A				
	0	161	13	52
B				
	152	0	149	582
C				
	56	236	0	326
D				
	90	378	13	0

A = Bucknell Road (North)
B = A4095 (East)
C = Bucknell Road (South)
D = A4095 (West)

WEEKDAY PM PEAK HOUR



O-D Matrix

Origin	Destination A	B	C	D
A				
	0	164	29	63
B				
	85	0	252	544
C				
	43	293	0	192
D				
	92	636	15	0

A = Bucknell Road (North)
B = A4095 (East)
C = Bucknell Road (South)
D = A4095 (West)

Notes:		Diagram No.:	Client: Hallam Land Management Ltd
Project No.: 20300	File Name: 2026_Hawkwell_Dev2a_TurningMovements_and_LinkFlows_Values SR.xlsx		Project: North West Bicester - Land North East of the Marylebone-Birmingham Railway Line
Date: 27/01/2023	Drawn: NP	Checked: AW	Approved: MG
			Title: Year 2026 Hawkwell Development 2a - AM and PM Peak Flows

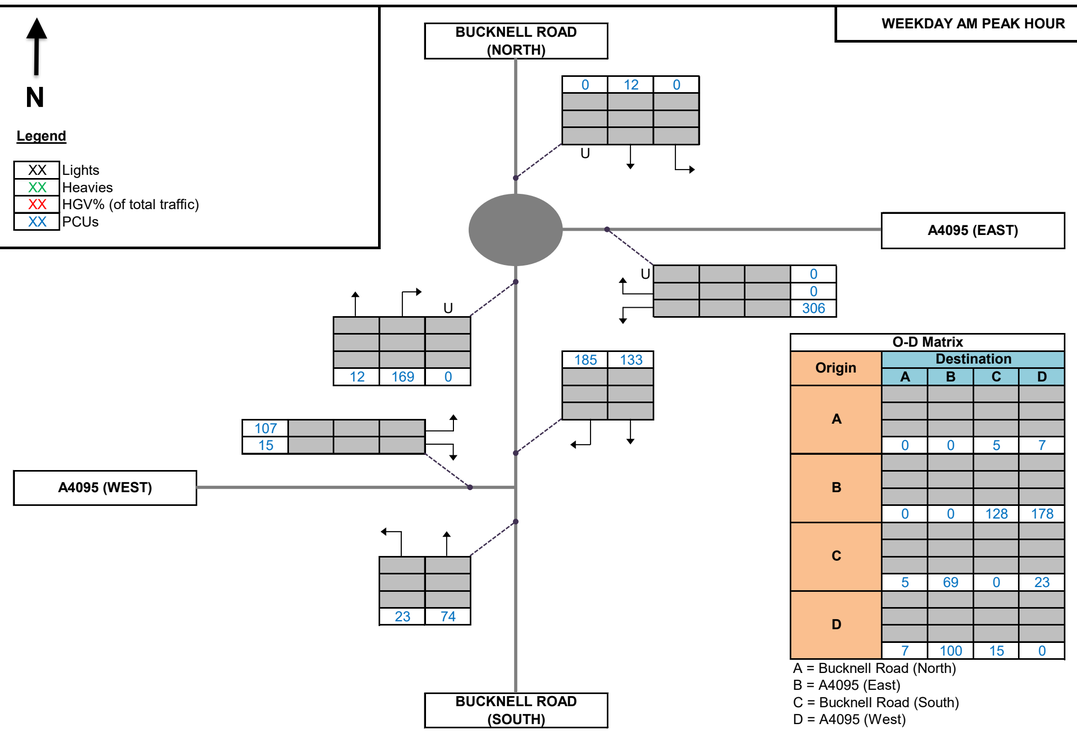
Jubb
Suite B
Ground Floor West
St James Court
St James Parade
Bristol
BS1 3LH

N

Legend

XX	Lights
XX	Heavies
XX	HGV% (of total traffic)
XX	PCUs

WEEKDAY AM PEAK HOUR

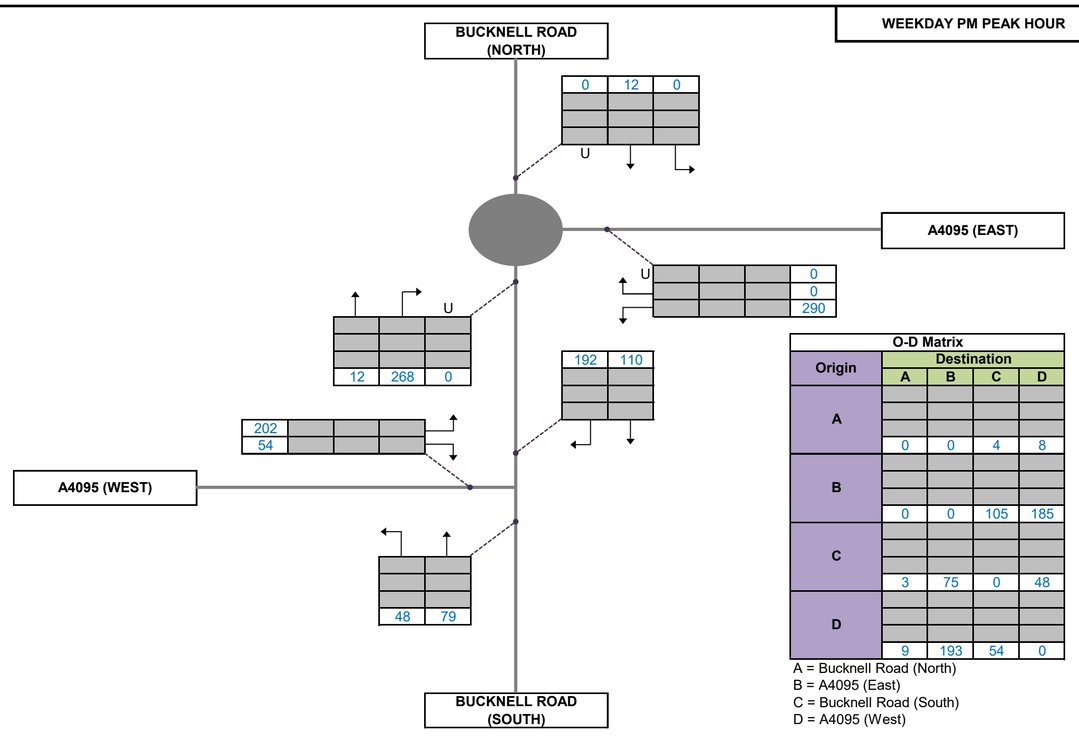


O-D Matrix

Origin	Destination A	B	C	D
A				
	0	0	5	7
B				
	0	0	128	178
C				
	5	69	0	23
D				
	7	100	15	0

A = Bucknell Road (North)
B = A4095 (East)
C = Bucknell Road (South)
D = A4095 (West)

WEEKDAY PM PEAK HOUR



O-D Matrix

Origin	Destination A	B	C	D
A				
	0	0	4	8
B				
	0	0	105	185
C				
	3	75	0	48
D				
	9	193	54	0

A = Bucknell Road (North)
B = A4095 (East)
C = Bucknell Road (South)
D = A4095 (West)

Notes:		Diagram No.:	Client: Hallam Land Management Ltd
Project No.: 20300	File Name: 2031_Hawkwell_Dev1a_TurningMovements_and_LinkFlows_Values SR.xlsx		Project: North West Bicester - Land North East of the Marylebone-Birmingham Railway Line
Date: 27/01/2023	Drawn: NP / Checked: AW	Approved: MG	Title: Year 2031 Hawkwell Development 1a - AM and PM Peak Flows

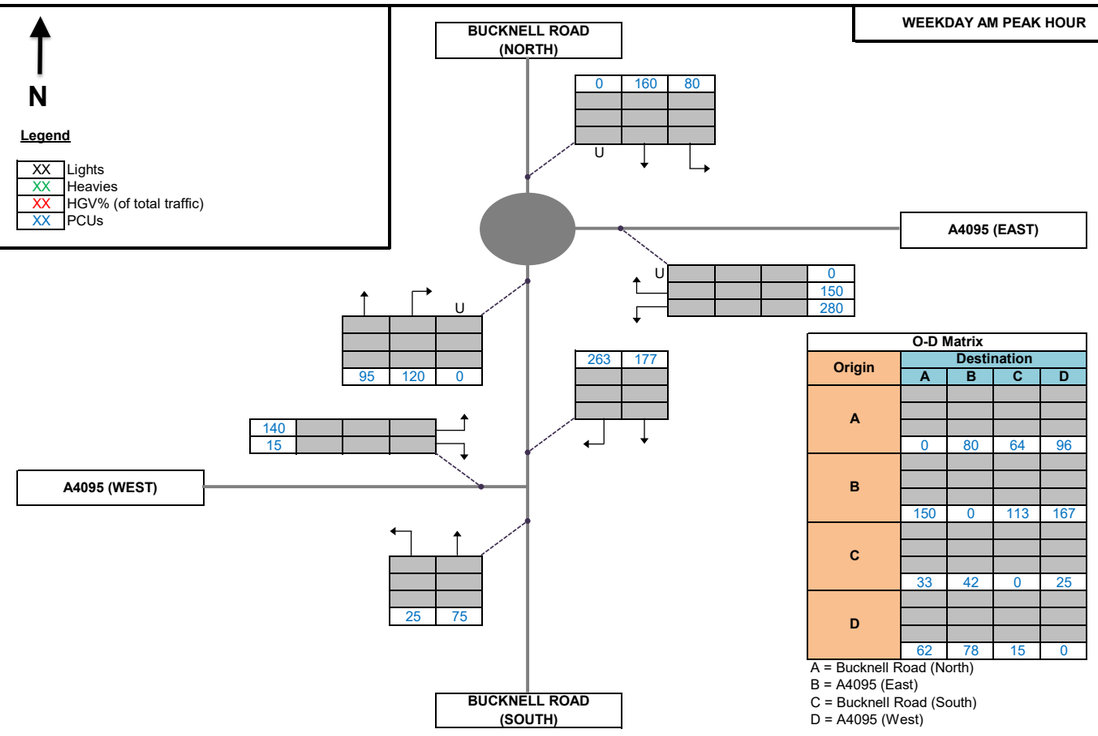
Jubb
Suite B
Ground Floor West
St James Court
St James Parade
Bristol
BS1 3LH

N

Legend

XX	Lights
XX	Heavies
XX	HGV% (of total traffic)
XX	PCUs

WEEKDAY AM PEAK HOUR

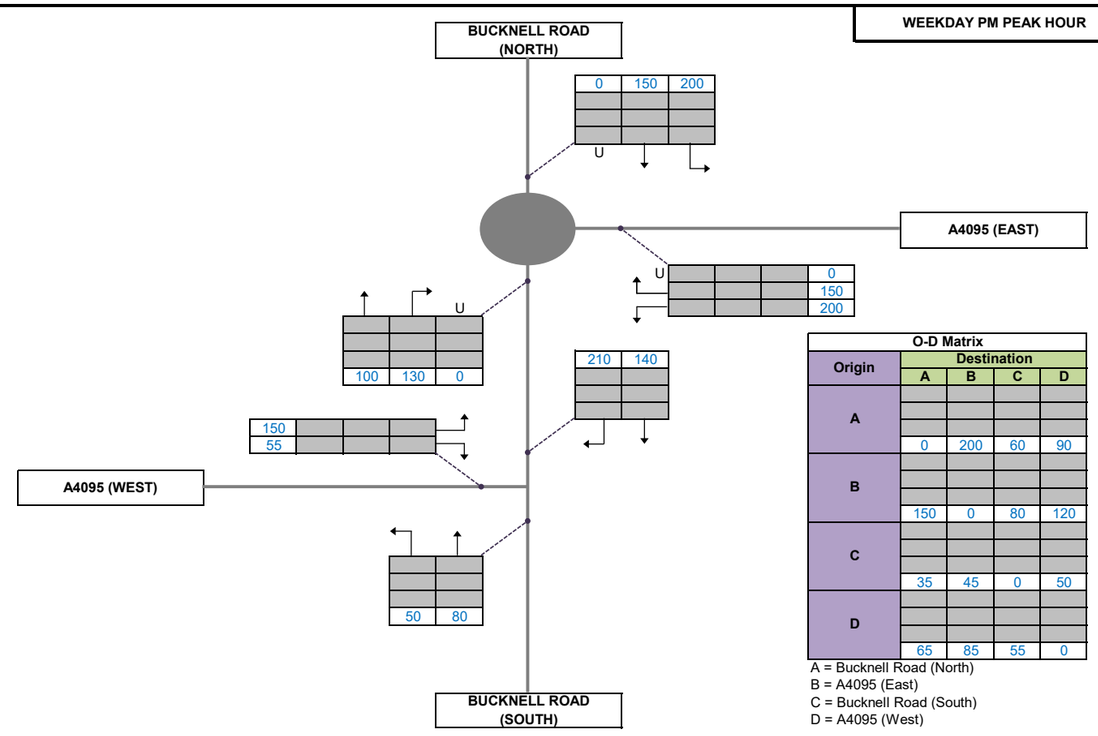


O-D Matrix

Origin	Destination A	B	C	D
A				
	0	80	64	96
B				
	150	0	113	167
C				
	33	42	0	25
D				
	62	78	15	0

A = Bucknell Road (North)
B = A4095 (East)
C = Bucknell Road (South)
D = A4095 (West)

WEEKDAY PM PEAK HOUR



O-D Matrix

Origin	Destination A	B	C	D
A				
	0	200	60	90
B				
	150	0	80	120
C				
	35	45	0	50
D				
	65	85	55	0

A = Bucknell Road (North)
B = A4095 (East)
C = Bucknell Road (South)
D = A4095 (West)

Notes:		Diagram No.:	Client: Hallam Land Management Ltd
Project No.: 20300	File Name: 2031_Hawkwell_Dev1a_AW Forecast.xlsx		Project: North West Bicester - Land North East of the Marylebone-Birmingham Railway Line
Date: 01/02/2023	Drawn: NP / Checked: AW	Approved: MG	Title: Year 2031 Hawkwell With Link Road Forecast- AM and PM Peak Flows

Jubb
Suite B
Ground Floor West
St James Court
St James Parade
Bristol
BS1 3LH

North West Bicester – Hawkwell Village

20300

Appendix C Junctions 10 Output Report – Existing Junctions

Junctions 10

ARCADY 10 - Roundabout Module
PICADY 10 - Priority Intersection Module

Version: 10.0.4.1693
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Filename: A4095_Bucknell Road Junction Network (Existing)_Strategic Model Scenarios_2022.08.12 (Linked).j10
Path: S:\PROJECT FOLDER\20300 Bicester\Calculations\Transport\Junctions 10
Report generation date: 12/08/2022 10:25:34

»Linked - Strategic Model Base + Committed, AM
»Linked - Strategic Model Base + Committed, PM

Summary of junction performance

	AM			PM		
	Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)	RFC
	Linked [Lane Simulation] - Strategic Model Base + Committed					
Junction 1 - Arm A	1.1	14.74		0.7	11.40	
Junction 1 - Arm B	184.6	622.83		193.5	638.13	
Junction 1 - Arm C	1.2	4.68		1.2	4.50	
Junction 2 - Arm A	0.2	0.68		0.1	0.47	
Junction 2 - Arm B	53.4	291.99		232.6	972.07	
Junction 2 - Arm C	3.1	16.51		3.0	14.67	

There are warnings associated with one or more model runs - see the 'Data Errors and Warnings' tables for each Analysis or Demand Set.

Values shown are the highest values encountered over all time segments. Delay is the maximum value of average delay per arriving vehicle. Arm and junction delays are averages for all movements, including movements with zero delay.

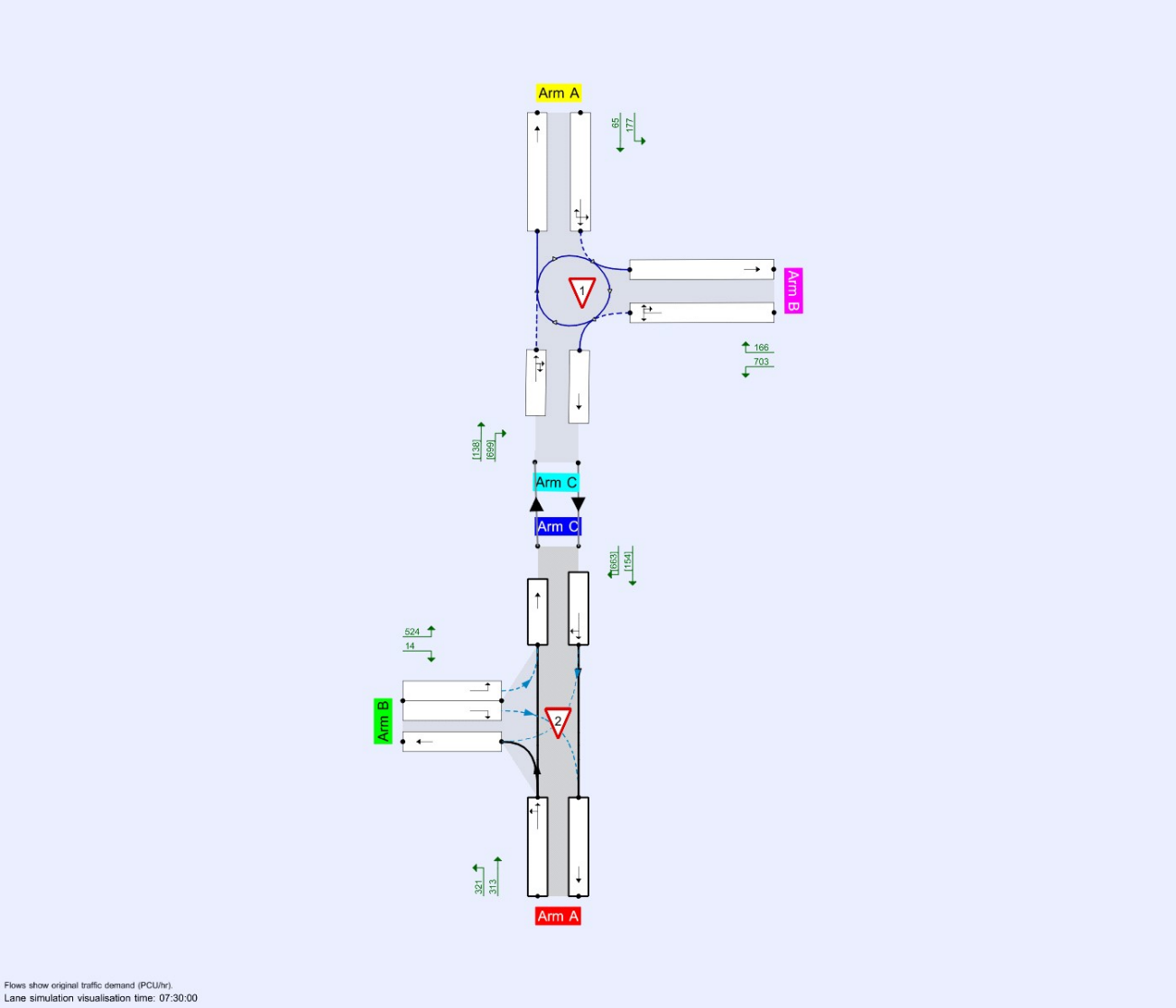
File summary

File Description

Title	A4095 / Bucknell Road Junction Network (Existing)
Location	Bicester, Oxfordshire
Site number	
Date	11/02/2022
Version	
Status	
Identifier	
Client	Hallam Land Management Ltd
Jobnumber	20300
Enumerator	JUBB\MattDavies
Description	

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



The junction diagram reflects the last run of Junctions.

Analysis Options

Vehicle length (m)	Calculate Queue Percentiles	Calculate detailed queueing delay	Show lane queues in feet / metres	Show all PICADY stream intercepts	Calculate residual capacity	RFC Threshold	Average Delay threshold (s)	Queue threshold (PCU)	Use iterations with HCM roundabouts	Max number of iterations for roundabouts
5.75						0.85	36.00	20.00		500

Lane Simulation options

Criteria type	Stop criteria (%)	Stop criteria time (s)	Stop criteria number of trials	Random seed	Results refresh speed (s)	Individual vehicle animation number of trials	Average animation capture interval (s)	Use quick response	Do flow sampling	Suppress automatic lane creation	Last run random seed	Last run number of trials	Last run time taken (s)
Delay	1.00	100000	100000	-1	3	1	60	✓			1916309826	190	16.12

Demand Set Summary

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time period length (min)	Time segment length (min)	Run automatically
D1	Strategic Model Base + Committed	AM	FLAT	07:30	08:30	60	15	✓
D2	Strategic Model Base + Committed	PM	FLAT	16:15	17:15	60	15	✓

Analysis Set Details

ID	Name	Use Lane Simulation	Include in report	Network flow scaling factor (%)	Network capacity scaling factor (%)
A2	Linked	✓	✓	100.000	100.000

Linked - Strategic Model Base + Committed, AM

Data Errors and Warnings

Severity	Area	Item	Description
Last Run	Lane Simulation	Junction 2 - Arm B - Lane Simulation	Arm B: Queue at end of modelled period is greater than 10 PCU. Delay is likely to have been underestimated.
Last Run	Lane Simulation	Junction 1 - Arm B - Lane Simulation	Arm B: Queue at end of modelled period is greater than 10 PCU. Delay is likely to have been underestimated.
Info	Lane Simulation	A2 - Linked [Lane Simulation]	This analysis set uses Lane Simulation mode. For detailed information on this mode, please see the User Guide.

Junction Network

Junctions

Junction	Name	Junction type	Arm A Direction	Arm B Direction	Arm C Direction	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
1	Bucknell Road / A4095 Roundabout	Standard Roundabout					A, B, C	288.72	F
2	Bucknell Road / A4095 Priority T-Junction	T-Junction	Two-way	Two-way	Two-way			93.00	F

Junction Network

Driving side	Lighting	Network delay (s)	Network LOS
Left	Normal/unknown	193.97	F

Arms

Arms

Junction	Arm	Name	Description	No give-way line	Arm type
1	A	Bucknell Road (North)			
	B	A4095 (East)			
	C	Bucknell Road (South)			
2	A	Bucknell Road (South)			Major
	B	A4095 Howes Lane (West)			Minor
	C	Bucknell Road (North)			Major

Roundabout Geometry

Junction	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)	Entry only	Exit only
1	A	2.97	9.00	9.2	67.9	30.0	25.0		
	B	3.70	6.00	12.5	17.6	30.0	11.0		
	C	3.50	6.80	5.7	30.7	30.0	48.0		

Major Arm Geometry

Junction	Arm	Width of carriageway (m)	Has kerbed central reserve	Has right-turn storage	Visibility for right turn (m)	Blocks?	Blocking queue (PCU)	Vehicles causing blocking (%)
2	C	7.10			250.0	✓	0.00	100

Geometries for Arm C are measured opposite Arm B. Geometries for Arm A (if relevant) are measured opposite Arm D.

Minor Arm Geometry

Junction	Arm	Minor arm type	Lane Width (Left) (m)	Lane Width (Right) (m)	Visibility to left (m)	Visibility to right (m)
2	B	Two lanes	3.76	3.60	27	38

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Junction	Arm	Final slope	Final intercept (PCU/hr)
1	A	0.646	1565
	B	0.666	1652
	C	0.572	1347

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

Priority Intersection Slopes and Intercepts

Junction	Stream	Intercept (PCU/hr)	Slope for A-B	Slope for A-C	Slope for C-A	Slope for C-B
2	B-A	535	0.091	0.229	0.144	0.327
	B-C	697	0.104	0.263	-	-
	C-B	719	0.265	0.265	-	-

The slopes and intercepts shown above include custom intercept adjustments only.

Streams may be combined, in which case capacity will be adjusted.

Values are shown for the first time segment only; they may differ for subsequent time segments.

Lane Simulation: Arm options

Junction	Arm	Lane capacity source	Traffic considering secondary lanes (%)
1	A	Evenly split	10.00
	B	Evenly split	10.00
	C	Evenly split	10.00
2	A		10.00
	B		10.00
	C		10.00

Lanes

Junction	Arm	Side	Lane level	Lane	Destination arms	Has limited storage	Storage (PCU)	Has bottleneck	Has obstruction	Minimum capacity (PCU/hr)	Maximum capacity (PCU/hr)	Signalised
1	A	Entry	1	1	A, B, C		Infinity			0	99999	
		Exit	1	1			Infinity					
	B	Entry	1	1	A, B, C		Infinity			0	99999	
		Exit	1	1			Infinity					
	C	Entry	1	1	A, B, C	✓	2.90			0	99999	
		Exit	1	1		✓	3.20					
2	A	Entry	1	1	B, C		Infinity			0	99999	
		Exit	1	1			Infinity					
	B	Entry	1	1	C		Infinity			0	99999	
				2	A		Infinity			0	99999	
		Exit	1	1			Infinity					
	C	Entry	1	1	A, B	✓	3.20			0	99999	
		Exit	1	1		✓	2.90					

Entry Lane slope and intercept

Junction	Arm	Side	Lane level	Lane	Final slope	Final intercept (PCU/hr)
1	A	Entry	1	1	0.646	1565
	B	Entry	1	1	0.666	1652
	C	Entry	1	1	0.572	1347

Summary of Entry Lane allowed movements

Junction	Arm	Lane Level	Lane	Destination arm		
				A	B	C
2	A	1	1		✓	✓
	B	1	1			✓
			2	✓		
	C	1	1	✓	✓	

Summary of Entry Lane allowed movements

Junction	Arm	Lane Level	Lane	Destination arm		
				A	B	C
1	A	1	1	✓	✓	✓
	B	1	1	✓	✓	✓
	C	1	1	✓	✓	✓

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time period length (min)	Time segment length (min)	Run automatically
D1	Strategic Model Base + Committed	AM	FLAT	07:30	08:30	60	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

Linked Arm Data

Junction	Arm	Feeding Junction	Feeding Arm	Link Type	Flow source	Uniform flow (PCU/hr)	Flow multiplier (%)	Internal storage space (PCU)
1	C	2	C	Queue limited	Normal	0	100.00	10.00
2	C	1	C	Queue limited	Normal	0	100.00	10.00

Demand overview (Traffic)

Junction	Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1	A		FLAT	✓	242	100.000
	B		FLAT	✓	869	100.000
	C	✓				
2	A		FLAT	✓	634	100.000
	B		FLAT	✓	538	100.000
	C	✓				

Origin-Destination Data

Junction 2

Demand (PCU/hr)

		To		
		A	B	C
From	A	0	321	313
	B	14	0	524
	C	154	663	0

Proportions

		To		
		A	B	C
From	A	0.00	0.51	0.49
	B	0.03	0.00	0.97
	C	0.19	0.81	0.00

Junction 1

Demand (PCU/hr)

From \ To	A	B	C
A	0	177	65
B	166	0	703
C	138	699	0

Proportions

From \ To	A	B	C
A	0.00	0.73	0.27
B	0.19	0.00	0.81
C	0.16	0.84	0.00

Vehicle Mix

Junction 2

Heavy Vehicle Percentages

From \ To	A	B	C
A	0	2	0
B	0	0	20
C	0	18	2

Average PCU Per Veh

From \ To	A	B	C
A	1.000	1.020	1.000
B	1.000	1.000	1.200
C	1.000	1.180	1.020

Junction 1

Heavy Vehicle Percentages

From \ To	A	B	C
A	0	10	5
B	0	0	14
C	11	12	0

Average PCU Per Veh

From \ To	A	B	C
A	1.000	1.100	1.050
B	1.000	1.000	1.140
C	1.110	1.120	1.000

Detailed Demand Data

Demand for each time segment

Time Segment	Junction	Arm	Demand (PCU/hr)	Demand in PCU (PCU/hr)
07:30-07:45	1	A	242	242
		B	869	869
		C	837	837
	2	A	634	634
		B	538	538
		C	817	817
07:45-08:00	1	A	242	242
		B	869	869
		C	837	837
	2	A	634	634
		B	538	538
		C	817	817
08:00-08:15	1	A	242	242
		B	869	869
		C	837	837
	2	A	634	634
		B	538	538
		C	817	817
08:15-08:30	1	A	242	242
		B	869	869
		C	837	837
	2	A	634	634
		B	538	538
		C	817	817

Results

Results Summary for whole modelled period

Junction	Arm	Max Delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1	A	14.74	1.1	B	243	243
	B	622.83	184.6	F	875	875
	C	4.68	1.2	A	795	795
2	A	0.68	0.2	A	638	638
	B	291.99	53.4	F	535	535
	C	16.51	3.1	C	622	622

Main Results for each time segment

07:30 - 07:45

Junction	Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Average throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	A	252	63	666	251	242	254	0.0	1.1	12.657	B
	B	876	219	66	686	682	850	0.0	47.1	131.186	F
	C	792	198	128	792	763	623	0.0	1.1	4.679	A
2	A	640	160		641	639	137	0.0	0.1	0.670	A
	B	533	133		480	461	832	0.0	19.6	95.782	F
	C	629	157		629	602	780	0.0	3.0	16.043	C

07:45 - 08:00

Junction	Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Average throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	A	246	61	656	248	242	262	1.1	0.8	13.513	B
	B	877	219	63	679	693	841	47.1	89.8	358.179	F
	C	784	196	130	787	793	611	1.1	1.1	4.623	A
2	A	636	159		636	640	130	0.1	0.1	0.683	A
	B	531	133		478	482	822	19.6	32.3	199.576	F
	C	616	154		617	630	780	3.0	3.0	16.457	C

08:00 - 08:15

Junction	Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Average throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	A	240	60	675	238	242	258	0.8	1.0	14.742	B
	B	872	218	63	666	682	849	89.8	136.9	603.275	F
	C	806	201	126	807	802	605	1.1	1.0	4.581	A
2	A	644	161		645	641	131	0.1	0.1	0.630	A
	B	539	135		502	496	832	32.3	44.0	281.870	F
	C	615	154		616	629	800	3.0	3.0	16.443	C

08:15 - 08:30

Junction	Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Average throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	A	235	59	669	232	243	258	1.0	1.1	13.768	B
	B	877	219	59	689	681	842	136.9	184.6	622.829	F
	C	799	200	128	799	797	617	1.0	1.2	4.595	A
2	A	633	158		632	630	132	0.1	0.2	0.654	A
	B	538	134		494	497	827	44.0	53.4	291.991	F
	C	628	157		627	623	794	3.0	3.1	16.508	C

Lane Results

Lane Level notation: Lane Level 1 is always closest to the junction.

Lanes: Main Results for each time segment

07:30 - 07:45

Junction	Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Average throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	A	Entry	1	1	A, B, C	252	1134	0.222	251	242	0.0	1.1	12.657	B
		Exit	1	1		254			254	251	0.0	0.0	0.000	A
	B	Entry	1	1	A, B, C	876	1608	0.545	686	682	0.0	47.1	131.186	F
		Exit	1	1		850			850	819	0.0	0.0	0.000	A
	C	Entry	1	1	A, B, C	792	1274	0.622	792	763	0.0	1.1	4.679	A
		Exit	1	1		624			623	608	0.0	2.3	12.158	B
2	A	Entry	1	1	B, C	640			641	639	0.0	0.1	0.670	A
		Exit	1	1		137			137	130	0.0	0.0	0.000	A
	B	Entry	1	1	C	519			466	447	0.0	19.6	98.394	F
				2	A	14			14	14	0.0	0.0	15.416	C
		Exit	1	1		832			832	810	0.0	0.0	0.000	A
	C	Entry	1	1	A, B	629			629	602	0.0	3.0	16.043	C
		Exit	1	1		780			780	760	0.0	0.4	1.878	A

07:45 - 08:00

Junction	Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Average throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	A	Entry	1	1	A, B, C	246	1141	0.216	248	242	1.1	0.8	13.513	B
		Exit	1	1		262			262	263	0.0	0.0	0.000	A
	B	Entry	1	1	A, B, C	877	1610	0.545	679	693	47.1	89.8	358.179	F
		Exit	1	1		841			841	841	0.0	0.0	0.000	A
	C	Entry	1	1	A, B, C	784	1273	0.616	787	793	1.1	1.1	4.623	A
		Exit	1	1		612			611	625	2.3	2.3	13.251	B
2	A	Entry	1	1	B, C	636			636	640	0.1	0.1	0.683	A
		Exit	1	1		130			130	134	0.0	0.0	0.000	A
	B	Entry	1	1	C	517			465	468	19.6	32.3	205.377	F
				2	A	14			14	14	0.0	0.1	17.428	C
		Exit	1	1		822			822	830	0.0	0.0	0.000	A
	C	Entry	1	1	A, B	616			617	630	3.0	3.0	16.457	C
		Exit	1	1		779			780	788	0.4	0.4	1.901	A

08:00 - 08:15

Junction	Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Average throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	A	Entry	1	1	A, B, C	240	1129	0.213	238	242	0.8	1.0	14.742	B
		Exit	1	1		258			258	262	0.0	0.0	0.000	A
	B	Entry	1	1	A, B, C	872	1610	0.541	666	682	89.8	136.9	603.275	F
		Exit	1	1		849			849	846	0.0	0.0	0.000	A
	C	Entry	1	1	A, B, C	806	1275	0.632	807	802	1.1	1.0	4.581	A
		Exit	1	1		603			605	619	2.3	2.2	13.557	B
2	A	Entry	1	1	B, C	644			645	641	0.1	0.1	0.630	A
		Exit	1	1		131			131	132	0.0	0.0	0.000	A
	B	Entry	1	1	C	525			487	482	32.3	43.9	290.399	F
				2	A	15			15	14	0.1	0.0	15.048	C
		Exit	1	1		832			832	837	0.0	0.0	0.000	A
	C	Entry	1	1	A, B	615			616	629	3.0	3.0	16.443	C
		Exit	1	1		800			800	796	0.4	0.3	1.854	A

08:15 - 08:30

Junction	Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Average throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	A	Entry	1	1	A, B, C	235	1132	0.207	232	243	1.0	1.1	13.768	B
		Exit	1	1		258			258	258	0.0	0.0	0.000	A
	B	Entry	1	1	A, B, C	877	1612	0.544	689	681	136.9	184.6	622.829	F
		Exit	1	1		842			842	847	0.0	0.0	0.000	A
	C	Entry	1	1	A, B, C	799	1274	0.627	799	797	1.0	1.2	4.595	A
		Exit	1	1		620			617	614	2.2	2.5	13.479	B
2	A	Entry	1	1	B, C	633			632	630	0.1	0.2	0.654	A
		Exit	1	1		132			132	130	0.0	0.0	0.000	A
	B	Entry	1	1	C	523			479	484	43.9	53.4	303.872	F
				2	A	15			15	14	0.0	0.1	15.713	C
		Exit	1	1		827			827	825	0.0	0.0	0.000	A
	C	Entry	1	1	A, B	628			627	623	3.0	3.1	16.508	C
		Exit	1	1		795			794	795	0.3	0.5	1.825	A

Lane movements: Main Results for each time segment

07:30 - 07:45

Junction	Arm	Side	Lane level	Lane	To Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Simulation max flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Average throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	A	Entry	1	1	A	0	0	0	0	0.000	0	0	0.0	0.0	0.000	A
					B	185	46	1565	1137	0.162	184	177	0.0	0.6	9.912	A
					C	67	17	1565	1136	0.059	66	65	0.0	0.5	19.742	C
	B	Entry	1	1	A	161	40	1652	1607	0.100	128	129	0.0	8.6	127.488	F
					B	0	0	0	0	0.000	0	0	0.0	0.0	0.000	A
					C	715	179	1652	1607	0.445	558	553	0.0	38.5	132.164	F
	C	Entry	1	1	A	127	32	1347	1274	0.100	126	121	0.0	0.3	4.704	A
					B	665	166	1347	1274	0.522	666	642	0.0	0.8	4.674	A
					C	0	0	0	0	0.000	0	0	0.0	0.0	0.000	A
2	A	Entry	1	1	A	0	0	0	0	0.000	0	0	0.0	0.0	0.000	
					B	326	81	-	-	-	326	324	0.0	0.0	0.472	A
					C	315	79	-	-	-	315	315	0.0	0.1	0.868	A
	B	Entry	1	1	A	0	0	0	0	0.000	0	0	0.0	0.0	0.000	A
					B	0	0	0	0	0.000	0	0	0.0	0.0	0.000	
					C	519	130	697	574	0.904	466	447	0.0	19.6	98.394	F
				2	A	14	4	527	246	0.058	14	14	0.0	0.0	15.416	C
					B	0	0	0	0	0.000	0	0	0.0	0.0	0.000	
					C	0	0	0	0	0.000	0	0	0.0	0.0	0.000	A
	C	Entry	1	1	A	122	30	-	-	-	122	116	0.0	0.3	11.252	B
					B	508	127	719	548	0.926	506	486	0.0	2.7	17.381	C
					C	0	0	0	0	0.000	0	0	0.0	0.0	0.000	

07:45 - 08:00

Junction	Arm	Side	Lane level	Lane	To Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Simulation max flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Average throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	A	Entry	1	1	A	0	0	0	0	0.000	0	0	0.0	0.0	0.000	A
					B	183	46	1565	1142	0.160	185	179	0.6	0.5	10.883	B
					C	63	16	1565	1144	0.055	63	63	0.5	0.3	20.628	C
	B	Entry	1	1	A	163	41	1652	1610	0.101	130	132	8.6	16.5	356.293	F
					B	0	0	0	0	0.000	0	0	0.0	0.0	0.000	A
					C	714	179	1652	1610	0.444	549	562	38.5	73.3	358.678	F
	C	Entry	1	1	A	131	33	1347	1273	0.103	131	132	0.3	0.2	4.534	A
					B	653	163	1347	1273	0.513	656	662	0.8	0.9	4.640	A
					C	0	0	0	0	0.000	0	0	0.0	0.0	0.000	A
2	A	Entry	1	1	A	0	0	0	0	0.000	0	0	0.0	0.0	0.000	
					B	322	80	-	-	-	321	321	0.0	0.1	0.454	A
					C	315	79	-	-	-	315	319	0.1	0.1	0.909	A
	B	Entry	1	1	A	0	0	0	0	0.000	0	0	0.0	0.0	0.000	A
					B	0	0	0	0	0.000	0	0	0.0	0.0	0.000	
					C	517	129	697	575	0.900	465	468	19.6	32.3	205.377	F
				2	A	14	3	524	241	0.057	14	14	0.0	0.1	17.428	C
					B	0	0	0	0	0.000	0	0	0.0	0.0	0.000	
					C	0	0	0	0	0.000	0	0	0.0	0.0	0.000	A
	C	Entry	1	1	A	116	29	-	-	-	116	120	0.3	0.5	12.017	B
					B	500	125	719	550	0.910	501	509	2.7	2.5	17.697	C
					C	0	0	0	0	0.000	0	0	0.0	0.0	0.000	

08:00 - 08:15

Junction	Arm	Side	Lane level	Lane	To Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Simulation max flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Average throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	A	Entry	1	1	A	0	0	0	0	0.000	0	0	0.0	0.0	0.000	A
					B	175	44	1565	1129	0.155	174	178	0.5	0.5	11.691	B
					C	65	16	1565	1129	0.057	63	64	0.3	0.4	22.689	C
	B	Entry	1	1	A	165	41	1652	1611	0.102	126	128	16.5	25.8	599.790	F
					B	0	0	0	0	0.000	0	0	0.0	0.0	0.000	A
					C	707	177	1652	1610	0.439	540	554	73.3	111.1	604.204	F
	C	Entry	1	1	A	131	33	1347	1276	0.103	132	135	0.2	0.1	4.526	A
					B	674	169	1347	1275	0.529	675	668	0.9	0.9	4.592	A
					C	0	0	0	0	0.000	0	0	0.0	0.0	0.000	A
2	A	Entry	1	1	A	0	0	0	0	0.000	0	0	0.0	0.0	0.000	
					B	331	83	-	-	-	332	327	0.1	0.0	0.428	A
					C	313	78	-	-	-	313	314	0.1	0.1	0.836	A
	B	Entry	1	1	A	0	0	0	0	0.000	0	0	0.0	0.0	0.000	A
					B	0	0	0	0	0.000	0	0	0.0	0.0	0.000	
					C	525	131	697	575	0.912	487	482	32.3	43.9	290.399	F
				2	A	15	4	530	244	0.061	15	14	0.1	0.0	15.048	C
					B	0	0	0	0	0.000	0	0	0.0	0.0	0.000	
					C	0	0	0	0	0.000	0	0	0.0	0.0	0.000	A
	C	Entry	1	1	A	116	29	-	-	-	116	118	0.5	0.3	11.824	B
					B	499	125	719	547	0.912	500	511	2.5	2.6	17.705	C
					C	0	0	0	0	0.000	0	0	0.0	0.0	0.000	

08:15 - 08:30

Junction	Arm	Side	Lane level	Lane	To Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Simulation max flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Average throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	A	Entry	1	1	A	0	0	0	0	0.000	0	0	0.0	0.0	0.000	A
					B	175	44	1565	1130	0.155	172	180	0.5	0.6	10.992	B
					C	60	15	1565	1131	0.053	59	62	0.4	0.5	21.421	C
	B	Entry	1	1	A	168	42	1652	1611	0.104	128	129	25.8	35.1	619.130	F
					B	0	0	0	0	0.000	0	0	0.0	0.0	0.000	A
					C	709	177	1652	1612	0.440	560	553	111.1	149.5	623.784	F
	C	Entry	1	1	A	130	32	1347	1275	0.102	129	129	0.1	0.2	4.622	A
					B	669	167	1347	1274	0.525	669	667	0.9	1.0	4.590	A
					C	0	0	0	0	0.000	0	0	0.0	0.0	0.000	A
2	A	Entry	1	1	A	0	0	0	0	0.000	0	0	0.0	0.0	0.000	
					B	317	79	-	-	-	317	318	0.0	0.1	0.442	A
					C	316	79	-	-	-	316	312	0.1	0.1	0.865	A
	B	Entry	1	1	A	0	0	0	0	0.000	0	0	0.0	0.0	0.000	A
					B	0	0	0	0	0.000	0	0	0.0	0.0	0.000	
					C	523	131	697	572	0.915	479	484	43.9	53.4	303.872	F
				2	A	15	4	515	241	0.062	15	14	0.0	0.1	15.713	C
					B	0	0	0	0	0.000	0	0	0.0	0.0	0.000	
					C	0	0	0	0	0.000	0	0	0.0	0.0	0.000	A
	C	Entry	1	1	A	117	29	-	-	-	117	116	0.3	0.4	11.955	B
					B	511	128	719	551	0.929	510	506	2.6	2.7	17.754	C
					C	0	0	0	0	0.000	0	0	0.0	0.0	0.000	

Linked - Strategic Model Base + Committed, PM

Data Errors and Warnings

Severity	Area	Item	Description
Last Run	Lane Simulation	Junction 2 - Arm B - Lane Simulation	Arm B: Queue at end of modelled period is greater than 10 PCU. Delay is likely to have been underestimated.
Last Run	Lane Simulation	Junction 1 - Arm B - Lane Simulation	Arm B: Queue at end of modelled period is greater than 10 PCU. Delay is likely to have been underestimated.
Info	Lane Simulation	A2 - Linked [Lane Simulation]	This analysis set uses Lane Simulation mode. For detailed information on this mode, please see the User Guide.

Junction Network

Junctions

Junction	Name	Junction type	Arm A Direction	Arm B Direction	Arm C Direction	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
1	Bucknell Road / A4095 Roundabout	Standard Roundabout					A, B, C	301.44	F
2	Bucknell Road / A4095 Priority T-Junction	T-Junction	Two-way	Two-way	Two-way			363.58	F

Junction Network

Driving side	Lighting	Network delay (s)	Network LOS
Left	Normal/unknown	332.77	F

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time period length (min)	Time segment length (min)	Run automatically
D2	Strategic Model Base + Committed	PM	FLAT	16:15	17:15	60	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

Linked Arm Data

Junction	Arm	Feeding Junction	Feeding Arm	Link Type	Flow source	Uniform flow (PCU/hr)	Flow multiplier (%)	Internal storage space (PCU)
1	C	2	C	Queue limited	Normal	0	100.00	10.00
2	C	1	C	Queue limited	Normal	0	100.00	10.00

Demand overview (Traffic)

Junction	Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1	A		FLAT	✓	219	100.000
	B		FLAT	✓	924	100.000
	C	✓				
2	A		FLAT	✓	556	100.000
	B		FLAT	✓	748	100.000
	C	✓				

Origin-Destination Data

Junction 2

Demand (PCU/hr)

		To		
		A	B	C
From	A	0	238	318
	B	11	0	737
	C	272	619	0

Proportions

		To		
		A	B	C
From	A	0.00	0.43	0.57
	B	0.01	0.00	0.99
	C	0.31	0.69	0.00

Junction 1

Demand (PCU/hr)

		To		
		A	B	C
From	A	0	158	61
	B	94	0	830
	C	139	916	0

Proportions

		To		
		A	B	C
From	A	0.00	0.72	0.28
	B	0.10	0.00	0.90
	C	0.13	0.87	0.00

Vehicle Mix

Junction 2

Heavy Vehicle Percentages

		To		
		A	B	C
From	A	0	2	0
	B	17	0	8
	C	0	5	0

Average PCU Per Veh

		To		
		A	B	C
From	A	1.000	1.020	1.000
	B	1.170	1.000	1.080
	C	1.000	1.050	1.000

Junction 1

Heavy Vehicle Percentages

		To		
		A	B	C
From	A	0	10	5
	B	38	0	3
	C	3	6	0

Average PCU Per Veh

		To		
		A	B	C
From	A	1.000	1.100	1.050
	B	1.380	1.000	1.030
	C	1.030	1.060	1.000

Detailed Demand Data

Demand for each time segment

Time Segment	Junction	Arm	Demand (PCU/hr)	Demand in PCU (PCU/hr)
16:15-16:30	1	A	219	219
		B	924	924
		C	1055	1055
	2	A	556	556
		B	748	748
		C	891	891
16:30-16:45	1	A	219	219
		B	924	924
		C	1055	1055
	2	A	556	556
		B	748	748
		C	891	891
16:45-17:00	1	A	219	219
		B	924	924
		C	1055	1055
	2	A	556	556
		B	748	748
		C	891	891
17:00-17:15	1	A	219	219
		B	924	924
		C	1055	1055
	2	A	556	556
		B	748	748
		C	891	891

Results

Results Summary for whole modelled period

Junction	Arm	Max Delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1	A	11.40	0.7	B	221	221
	B	638.13	193.5	F	926	926
	C	4.50	1.2	A	834	834
2	A	0.47	0.1	A	557	557
	B	972.07	232.6	F	742	742
	C	14.67	3.0	B	715	715

Main Results for each time segment

16:15 - 16:30

Junction	Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Average throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	A	217	54	723	216	214	183	0.0	0.7	9.687	A
	B	917	229	55	735	723	884	0.0	47.9	125.793	F
	C	833	208	72	834	821	713	0.0	1.0	4.472	A
2	A	563	141		564	563	223	0.0	0.0	0.397	A
	B	738	185		515	504	744	0.0	59.6	226.125	F
	C	714	179		712	687	823	0.0	3.0	14.255	B

16:30 - 16:45

Junction	Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Average throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	A	227	57	720	226	222	180	0.7	0.7	11.308	B
	B	908	227	62	714	723	884	47.9	96.4	362.649	F
	C	830	208	71	829	829	707	1.0	1.2	4.501	A
2	A	559	140		559	559	229	0.0	0.0	0.472	A
	B	741	185		512	517	727	59.6	118.9	637.069	F
	C	708	177		709	711	824	3.0	2.9	14.675	B

16:45 - 17:00

Junction	Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Average throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	A	228	57	730	227	222	183	0.7	0.6	11.404	B
	B	932	233	63	720	724	894	96.4	145.8	609.247	F
	C	838	209	77	836	825	709	1.2	1.0	4.472	A
2	A	556	139		557	547	231	0.0	0.0	0.431	A
	B	740	185		527	518	732	118.9	175.1	972.073	F
	C	713	178		714	717	835	2.9	2.9	14.483	B

17:00 - 17:15

Junction	Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Average throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	A	211	53	721	213	220	191	0.6	0.6	10.823	B
	B	946	236	61	742	727	873	145.8	193.5	638.128	F
	C	835	209	78	834	838	726	1.0	1.1	4.382	A
2	A	550	137		549	553	233	0.0	0.1	0.452	A
	B	749	187		528	522	742	175.1	232.6	760.308	F
	C	724	181		723	714	824	2.9	3.0	14.500	B

Lane Results

Lane Level notation: Lane Level 1 is always closest to the junction.

Lanes: Main Results for each time segment

16:15 - 16:30

Junction	Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Average throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	A	Entry	1	1	A, B, C	217	1098	0.198	216	214	0.0	0.7	9.687	A
		Exit	1	1		183			183	181	0.0	0.0	0.000	A
	B	Entry	1	1	A, B, C	917	1616	0.568	735	723	0.0	47.9	125.793	F
		Exit	1	1		884			884	870	0.0	0.0	0.000	A
	C	Entry	1	1	A, B, C	833	1306	0.638	834	821	0.0	1.0	4.472	A
		Exit	1	1		717			713	698	0.0	2.3	10.296	B
2	A	Entry	1	1	B, C	563			564	563	0.0	0.0	0.397	A
		Exit	1	1		223			223	219	0.0	0.0	0.000	A
	B	Entry	1	1	C	727			504	493	0.0	59.5	228.933	F
				2	A	11			11	10	0.0	0.1	17.779	C
		Exit	1	1		744			744	719	0.0	0.0	0.000	A
	C	Entry	1	1	A, B	714			712	687	0.0	3.0	14.255	B
		Exit	1	1		822			823	815	0.0	0.2	1.554	A

16:30 - 16:45

Junction	Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Average throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	A	Entry	1	1	A, B, C	227	1100	0.206	226	222	0.7	0.7	11.308	B
		Exit	1	1		180			180	183	0.0	0.0	0.000	A
	B	Entry	1	1	A, B, C	908	1610	0.564	714	723	47.9	96.4	362.649	F
		Exit	1	1		884			884	880	0.0	0.0	0.000	A
	C	Entry	1	1	A, B, C	830	1307	0.635	829	829	1.0	1.2	4.501	A
		Exit	1	1		705			707	710	2.3	2.2	11.428	B
2	A	Entry	1	1	B, C	559			559	559	0.0	0.0	0.472	A
		Exit	1	1		229			229	226	0.0	0.0	0.000	A
	B	Entry	1	1	C	729			500	506	59.5	118.8	645.701	F
				2	A	12			11	11	0.1	0.1	17.132	C
		Exit	1	1		727			727	737	0.0	0.0	0.000	A
	C	Entry	1	1	A, B	708			709	711	3.0	2.9	14.675	B
		Exit	1	1		824			824	824	0.2	0.4	1.637	A

16:45 - 17:00

Junction	Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Average throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	A	Entry	1	1	A, B, C	228	1093	0.209	227	222	0.7	0.6	11.404	B
		Exit	1	1		183			183	176	0.0	0.0	0.000	A
	B	Entry	1	1	A, B, C	932	1610	0.579	720	724	96.4	145.8	609.247	F
		Exit	1	1		894			894	881	0.0	0.0	0.000	A
	C	Entry	1	1	A, B, C	838	1304	0.643	836	825	1.2	1.0	4.472	A
		Exit	1	1		707			709	715	2.2	2.0	11.419	B
2	A	Entry	1	1	B, C	556			557	547	0.0	0.0	0.431	A
		Exit	1	1		231			231	232	0.0	0.0	0.000	A
	B	Entry	1	1	C	730			518	507	118.8	175.0	987.008	F
				2	A	10			10	12	0.1	0.1	21.300	C
		Exit	1	1		732			732	730	0.0	0.0	0.000	A
	C	Entry	1	1	A, B	713			714	717	2.9	2.9	14.483	B
		Exit	1	1		835			835	821	0.4	0.3	1.619	A

17:00 - 17:15

Junction	Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Average throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	A	Entry	1	1	A, B, C	211	1099	0.192	213	220	0.6	0.6	10.823	B
		Exit	1	1		191			191	184	0.0	0.0	0.000	A
	B	Entry	1	1	A, B, C	946	1612	0.587	742	727	145.8	193.5	638.128	F
		Exit	1	1		873			873	887	0.0	0.0	0.000	A
	C	Entry	1	1	A, B, C	835	1303	0.641	834	838	1.0	1.1	4.382	A
		Exit	1	1		724			726	713	2.0	2.2	11.239	B
2	A	Entry	1	1	B, C	550			549	553	0.0	0.1	0.452	A
		Exit	1	1		233			233	229	0.0	0.0	0.000	A
	B	Entry	1	1	C	739			516	511	175.0	232.6	847.459	F
				2	A	11			11	11	0.1	0.0	15.715	C
		Exit	1	1		742			742	733	0.0	0.0	0.000	A
	C	Entry	1	1	A, B	724			723	714	2.9	3.0	14.500	B
		Exit	1	1		824			824	827	0.3	0.3	1.557	A

Lane movements: Main Results for each time segment

16:15 - 16:30

Junction	Arm	Side	Lane level	Lane	To Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Simulation max flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Average throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	A	Entry	1	1	A	0	0	0	0	0.000	0	0	0.0	0.0	0.000	A
					B	161	40	1565	1096	0.147	161	159	0.0	0.3	7.622	A
					C	56	14	1565	1092	0.051	55	56	0.0	0.3	15.194	C
	B	Entry	1	1	A	92	23	1652	1614	0.057	72	71	0.0	4.7	121.911	F
					B	0	0	0	0	0.000	0	0	0.0	0.0	0.000	A
					C	825	206	1652	1615	0.510	662	652	0.0	43.2	126.113	F
	C	Entry	1	1	A	110	28	1347	1307	0.084	111	110	0.0	0.1	4.403	A
					B	722	181	1347	1306	0.553	723	711	0.0	0.8	4.483	A
					C	0	0	0	0	0.000	0	0	0.0	0.0	0.000	A
2	A	Entry	1	1	A	0	0	0	0	0.000	0	0	0.0	0.0	0.000	
					B	245	61	-	-	-	245	240	0.0	0.0	0.240	A
					C	318	80	-	-	-	319	323	0.0	0.0	0.512	A
	B	Entry	1	1	A	0	0	0	0	0.000	0	0	0.0	0.0	0.000	A
					B	0	0	0	0	0.000	0	0	0.0	0.0	0.000	
					C	727	182	697	579	1.256	504	493	0.0	59.5	228.933	F
				2	A	11	3	472	224	0.049	11	10	0.0	0.1	17.779	C
					B	0	0	0	0	0.000	0	0	0.0	0.0	0.000	
					C	0	0	0	0	0.000	0	0	0.0	0.0	0.000	A
	C	Entry	1	1	A	212	53	-	-	-	213	208	0.0	0.7	10.817	B
					B	502	125	719	569	0.882	499	479	0.0	2.3	15.815	C
					C	0	0	0	0	0.000	0	0	0.0	0.0	0.000	

16:30 - 16:45

Junction	Arm	Side	Lane level	Lane	To Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Simulation max flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Average throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	A	Entry	1	1	A	0	0	0	0	0.000	0	0	0.0	0.0	0.000	A
					B	166	41	1565	1103	0.150	164	161	0.3	0.5	8.925	A
					C	61	15	1565	1103	0.056	62	61	0.3	0.2	17.395	C
	B	Entry	1	1	A	83	21	1652	1611	0.052	71	74	4.7	9.1	350.243	F
					B	0	0	0	0	0.000	0	0	0.0	0.0	0.000	A
					C	825	206	1652	1610	0.512	643	649	43.2	87.3	363.701	F
	C	Entry	1	1	A	109	27	1347	1304	0.083	109	110	0.1	0.1	4.520	A
					B	722	181	1347	1307	0.553	720	719	0.8	1.1	4.498	A
					C	0	0	0	0	0.000	0	0	0.0	0.0	0.000	A
2	A	Entry	1	1	A	0	0	0	0	0.000	0	0	0.0	0.0	0.000	
					B	235	59	-	-	-	235	241	0.0	0.0	0.314	A
					C	324	81	-	-	-	324	319	0.0	0.0	0.590	A
	B	Entry	1	1	A	0	0	0	0	0.000	0	0	0.0	0.0	0.000	A
					B	0	0	0	0	0.000	0	0	0.0	0.0	0.000	
					C	729	182	697	580	1.257	500	506	59.5	118.8	645.701	F
				2	A	12	3	493	220	0.054	11	11	0.1	0.1	17.132	C
					B	0	0	0	0	0.000	0	0	0.0	0.0	0.000	
					C	0	0	0	0	0.000	0	0	0.0	0.0	0.000	A
	C	Entry	1	1	A	217	54	-	-	-	218	215	0.7	0.6	11.567	B
					B	491	123	719	570	0.860	491	496	2.3	2.3	16.082	C
					C	0	0	0	0	0.000	0	0	0.0	0.0	0.000	

16:45 - 17:00

Junction	Arm	Side	Lane level	Lane	To Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Simulation max flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Average throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	A	Entry	1	1	A	0	0	0	0	0.000	0	0	0.0	0.0	0.000	A
					B	166	41	1565	1093	0.151	164	160	0.5	0.4	8.622	A
					C	63	16	1565	1095	0.058	63	62	0.2	0.2	18.233	C
	B	Entry	1	1	A	99	25	1652	1609	0.061	77	72	9.1	14.9	612.775	F
					B	0	0	0	0	0.000	0	0	0.0	0.0	0.000	A
					C	833	208	1652	1610	0.517	644	653	87.3	130.9	608.946	F
	C	Entry	1	1	A	107	27	1347	1303	0.082	107	104	0.1	0.2	4.304	A
					B	731	183	1347	1304	0.560	730	721	1.1	0.9	4.497	A
					C	0	0	0	0	0.000	0	0	0.0	0.0	0.000	A
2	A	Entry	1	1	A	0	0	0	0	0.000	0	0	0.0	0.0	0.000	
					B	240	60	-	-	-	240	233	0.0	0.0	0.220	A
					C	317	79	-	-	-	317	314	0.0	0.0	0.583	A
	B	Entry	1	1	A	0	0	0	0	0.000	0	0	0.0	0.0	0.000	A
					B	0	0	0	0	0.000	0	0	0.0	0.0	0.000	
					C	730	182	697	577	1.264	518	507	118.8	175.0	987.008	F
				2	A	10	3	472	218	0.047	10	12	0.1	0.1	21.300	C
					B	0	0	0	0	0.000	0	0	0.0	0.0	0.000	
					C	0	0	0	0	0.000	0	0	0.0	0.0	0.000	A
	C	Entry	1	1	A	221	55	-	-	-	222	220	0.6	0.7	11.318	B
					B	492	123	719	571	0.861	492	497	2.3	2.3	15.960	C
					C	0	0	0	0	0.000	0	0	0.0	0.0	0.000	

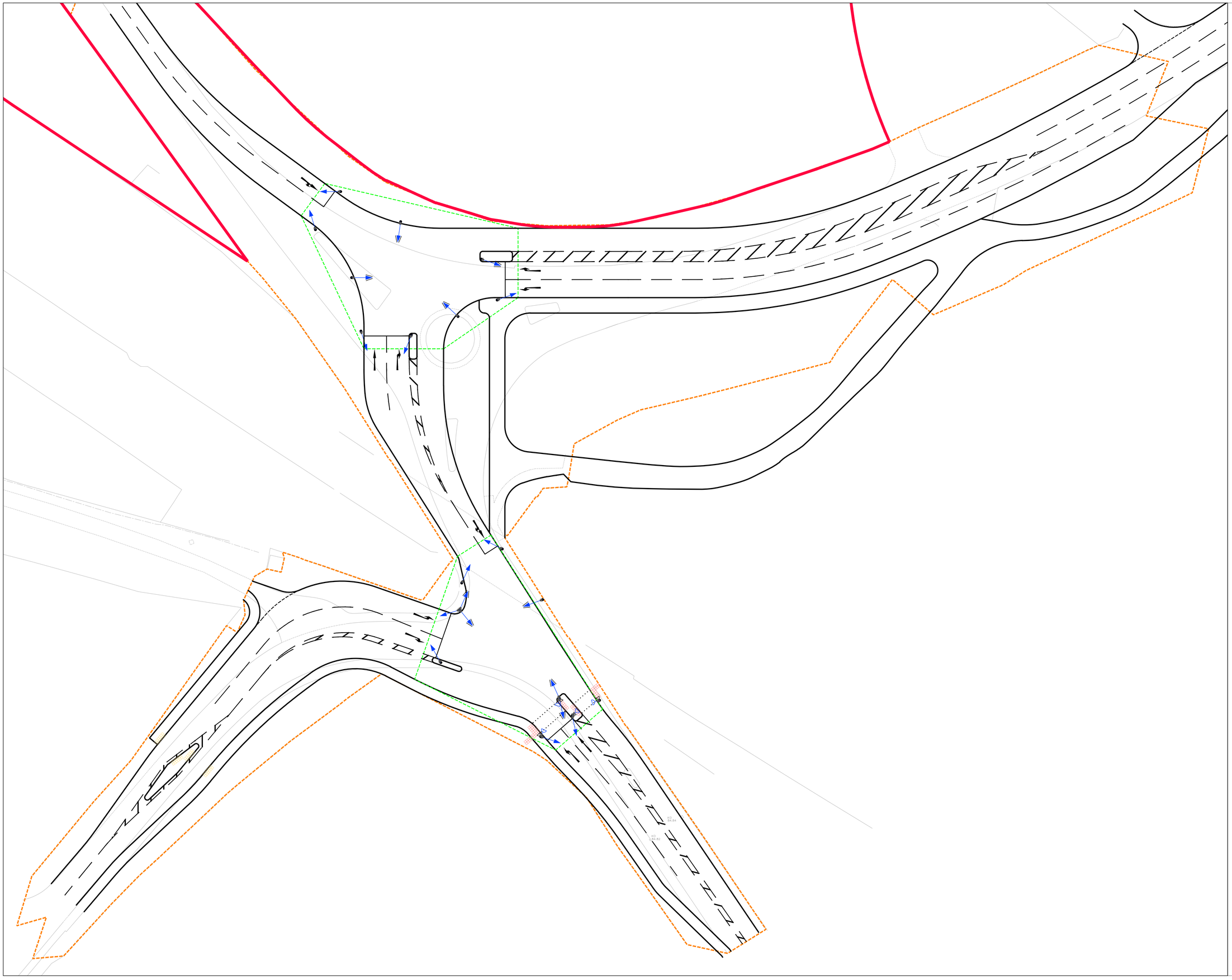
17:00 - 17:15

Junction	Arm	Side	Lane level	Lane	To Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Simulation max flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Average throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	A	Entry	1	1	A	0	0	0	0	0.000	0	0	0.0	0.0	0.000	A
					B	152	38	1565	1098	0.139	152	159	0.4	0.4	8.413	A
					C	59	15	1565	1099	0.054	61	60	0.2	0.2	16.920	C
	B	Entry	1	1	A	95	24	1652	1611	0.059	78	74	14.9	18.9	633.211	F
					B	0	0	0	0	0.000	0	0	0.0	0.0	0.000	A
					C	851	213	1652	1611	0.528	664	653	130.9	174.7	638.517	F
	C	Entry	1	1	A	112	28	1347	1304	0.086	112	110	0.2	0.1	4.369	A
					B	723	181	1347	1303	0.555	721	728	0.9	0.9	4.384	A
					C	0	0	0	0	0.000	0	0	0.0	0.0	0.000	A
2	A	Entry	1	1	A	0	0	0	0	0.000	0	0	0.0	0.0	0.000	
					B	241	60	-	-	-	241	237	0.0	0.0	0.256	A
					C	308	77	-	-	-	308	316	0.0	0.0	0.596	A
	B	Entry	1	1	A	0	0	0	0	0.000	0	0	0.0	0.0	0.000	A
					B	0	0	0	0	0.000	0	0	0.0	0.0	0.000	
					C	739	185	697	588	1.256	516	511	175.0	232.6	847.459	F
				2	A	11	3	498	235	0.046	11	11	0.1	0.0	15.715	C
					B	0	0	0	0	0.000	0	0	0.0	0.0	0.000	
					C	0	0	0	0	0.000	0	0	0.0	0.0	0.000	A
	C	Entry	1	1	A	222	55	-	-	-	221	218	0.7	0.6	11.393	B
					B	502	126	719	573	0.876	502	496	2.3	2.4	15.941	C
					C	0	0	0	0	0.000	0	0	0.0	0.0	0.000	

North West Bicester – Hawkwell Village

20300

Appendix D Proposed Signalisation Interim Mitigation Scheme



KEY

- Site Boundary
- Highway Boundary
- Intervisibility

Rev	Date	Description	By	Apvd
P1	20.12.22	Preliminary issue	MK	AW

PROJECT:
BICESTER

TITLE:
BUCKNELL ROAD -
A4095 SIGNALIZED JUNCTION

CLIENT:
HALLAM LAND MANAGEMENT

SCALE@A1:
1:375

PROJECT REF:
20300

DRAWING No: 031

REV: P1

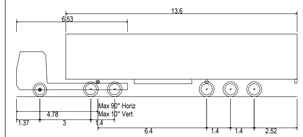
Revision Referencing
P = Preliminary A = Approval T = Tender C = Construction

Jubb
Bristol, Cardiff, Plymouth, Winchester
2A Oak Tree Court, Cardiff Gate Business Park, Cardiff
jubb.uk.com
+44(0)292 052 4444

KEY

Site Boundary

Highway Boundary



Max Legal Length (UK) Articulated Vehicle (16.5m)

Overall Length	16.500m
Overall Width	2.550m
Overall Body Height	3.681m
Min Body Ground Clearance	0.411m
Max Track Width	2.500m
Lock to lock time	6.00s
Kerb to Kerb Turning Radius	6.530m

Rev	Date	Description	By	Apvd
P1	20.12.22	Preliminary issue	MK	AW

PROJECT:
BICESTER

TITLE:
BUCKNELL ROAD - A4095 SIGNALIZED JUNCTION TRACKING

CLIENT:
HALLAM LAND MANAGEMENT

SCALE@A1:
1:500

PROJECT REF:
20300

DRAWING No:
032

REV:
P1

Revision Referencing
P = Preliminary A = Approval T = Tender C = Construction

Bristol, Cardiff, Plymouth, Winchester
2A Oak Tree Court, Cardiff Gate Business Park, Cardiff
jubb.uk.com
+44(0)292 052 4444

North West Bicester – Hawkwell Village

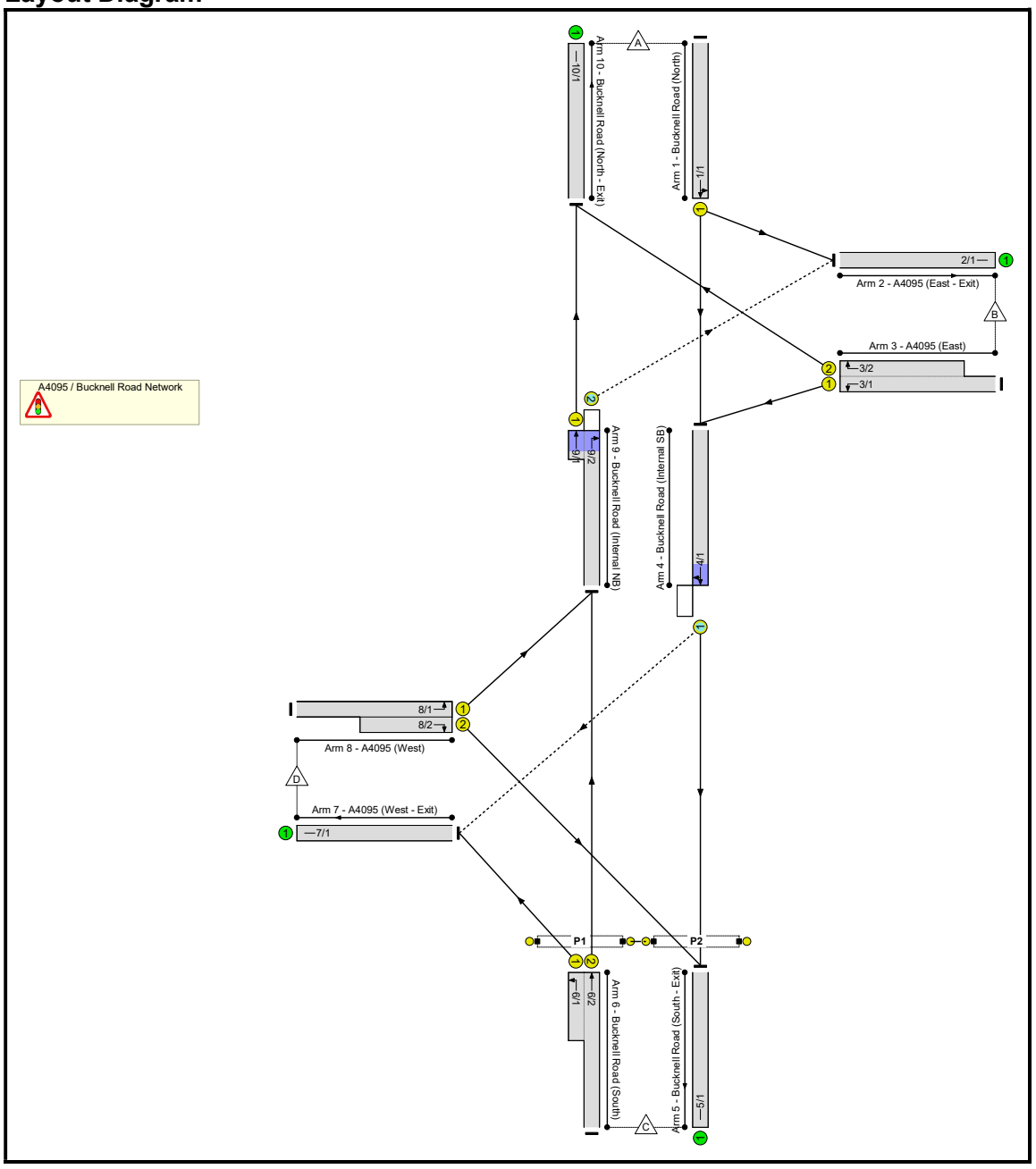
20300

Appendix E LINSIG Output Report – Proposed Interim Junction 2026

Project and User Details

Project:	**North West Bicester - Land North East of the Marylebone-Birmingham Railway Line**
Title:	**A4095 / Bucknell Road**
Location:	Bicester, Oxfordshire
Client:	Hallam Land Management Ltd
Additional detail:	Based on Drawing No. 20300-031-P1.
File name:	A4095_Bucknell Road Junction Network (Pre-Link Road Layout)_2023.01.27.lsg3x
Author:	MD / SR
Company:	Jubb
Address:	Suite B, Ground Floor West, St James Court, St James Parade, Bristol, BS1 3LH
Linsig Version:	3, 2, 44, 1

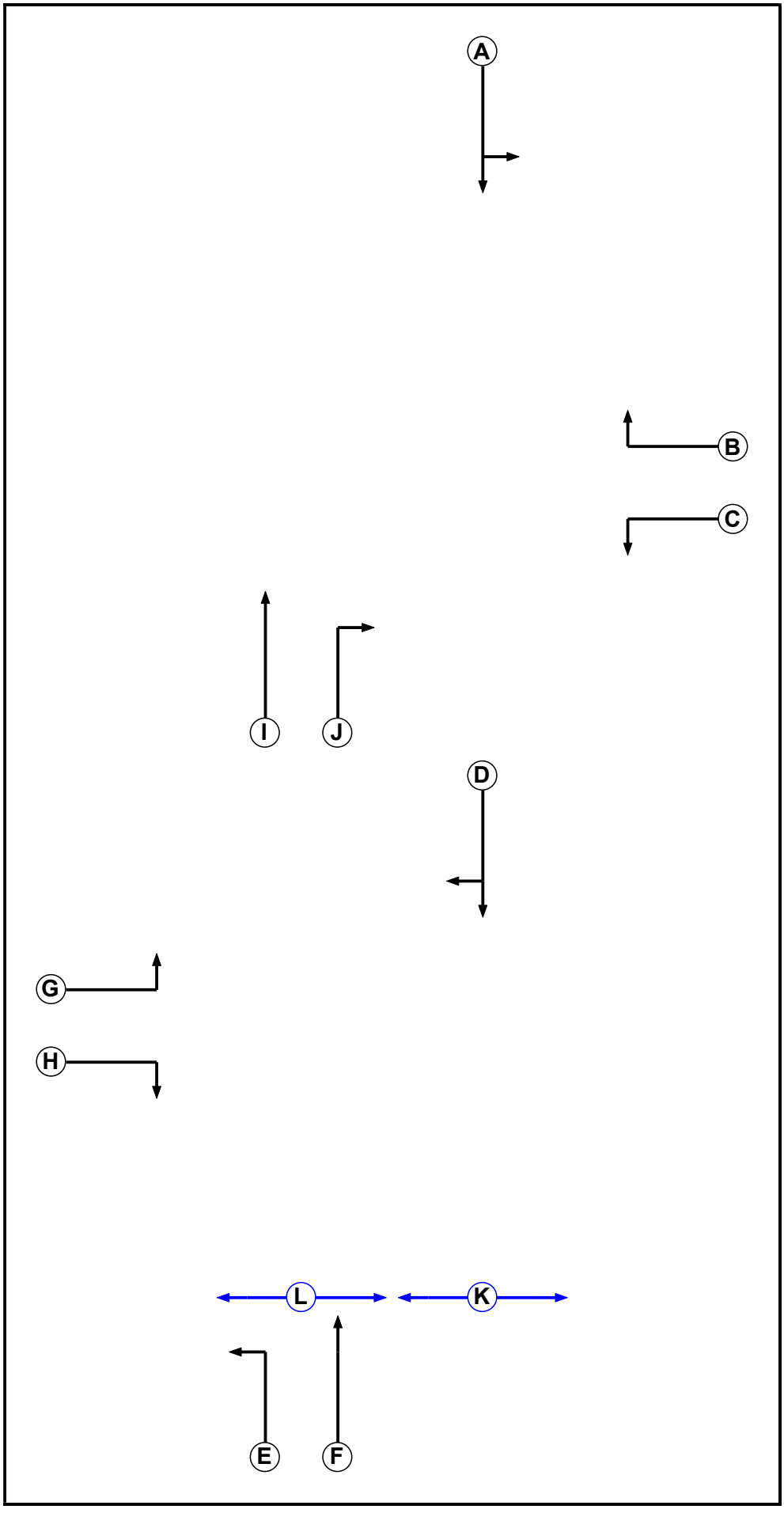
Network Layout Diagram



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	1		7	7
D	Traffic	2		7	7
E	Traffic	2		7	7
F	Traffic	2		7	7
G	Traffic	2		7	7
H	Traffic	2		7	7
I	Traffic	1		7	7
J	Traffic	1		7	7
K	Pedestrian	2		5	5
L	Pedestrian	2		5	5

Phase Diagram



Phase Intergreens Matrix

		Starting Phase											
		A	B	C	D	E	F	G	H	I	J	K	L
Terminating Phase	A		5	6	-	-	-	-	-	-	-	-	-
	B	5		-	-	-	-	-	-	5	5	-	-
	C	5	-		-	-	-	-	-	-	-	-	-
	D	-	-	-		-	-	-	5	-	-	8	-
	E	-	-	-	-		-	-	-	-	-	-	5
	F	-	-	-	-	-		6	5	-	-	-	5
	G	-	-	-	-	-	5		-	-	-	-	-
	H	-	-	-	5	-	5	-		-	-	8	-
	I	-	5	-	-	-	-	-	-		-	-	-
	J	-	5	-	-	-	-	-	-	-		-	-
	K	-	-	-	6	-	-	-	6	-	-		-
	L	-	-	-	-	8	8	-	-	-	-	-	

Phase Delays

Stage Stream: 1

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

Stage Stream: 2

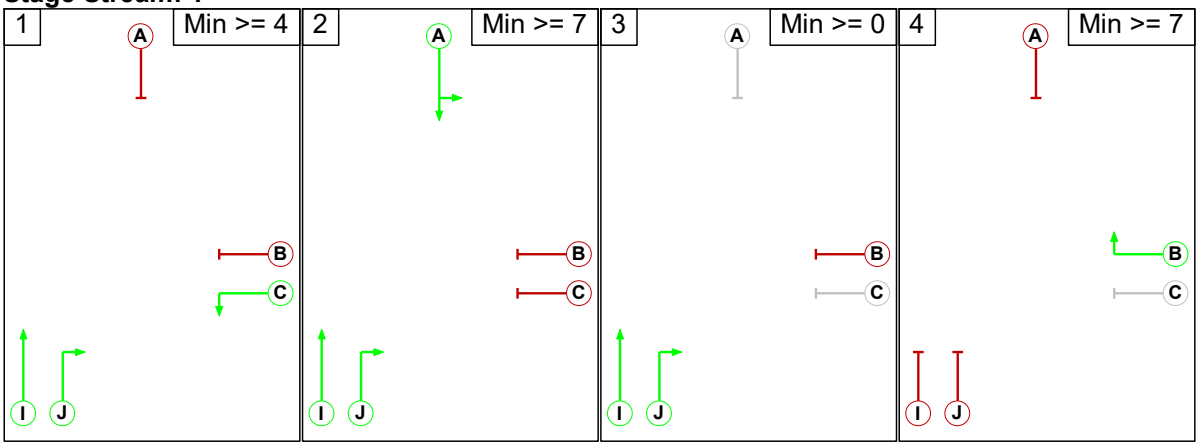
Term. Stage	Start Stage	Phase	Type	Value	Cont value
There are no Phase Delays defined					

Phases in Stage

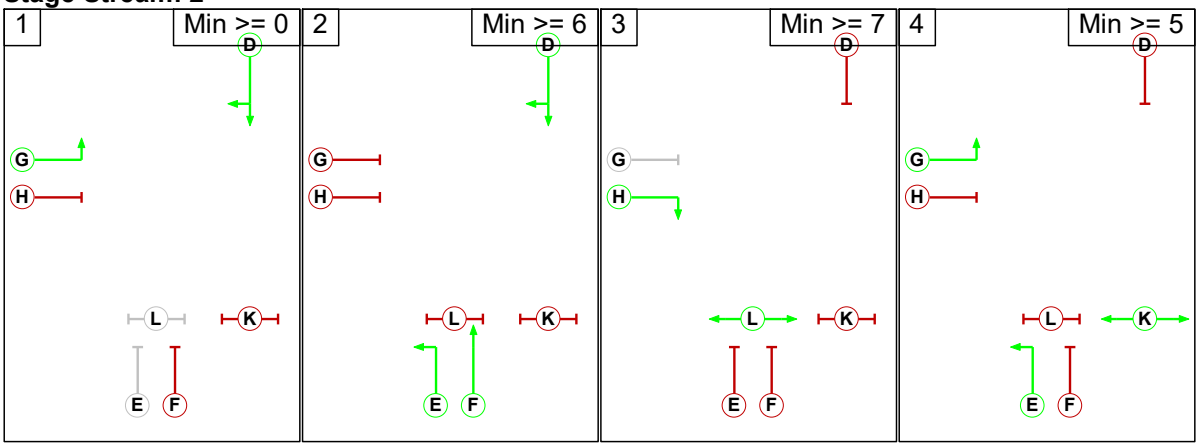
Stream	Stage No.	Phases in Stage
1	1	C I J
1	2	A I J
1	3	I J
1	4	B
2	1	D G
2	2	D E F
2	3	H L
2	4	E G K

Stage Diagram

Stage Stream: 1



Stage Stream: 2



Lane Input Data

Junction: A4095 / Bucknell Road Network												
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 (Bucknell Road (North))	U	A	2	3	60.0	Geom	-	3.80	0.00	Y	Arm 2 Left	35.00
											Arm 4 Ahead	29.00
2/1 (A4095 (East - Exit))	U		2	3	60.0	Inf	-	-	-	-	-	-
3/1 (A4095 (East))	U	C	2	3	60.0	Geom	-	3.50	0.00	Y	Arm 4 Left	12.00
3/2 (A4095 (East))	U	B	2	3	22.3	Geom	-	3.50	0.00	Y	Arm 10 Right	37.00
4/1 (Bucknell Road (Internal SB))	O	D	2	3	8.0	Geom	-	3.00	0.00	Y	Arm 5 Ahead	Inf
											Arm 7 Right	7.00
5/1 (Bucknell Road (South - Exit))	U		2	3	60.0	Inf	-	-	-	-	-	-
6/1 (Bucknell Road (South))	U	E	2	3	6.6	Geom	-	3.30	0.00	Y	Arm 7 Left	15.00
6/2 (Bucknell Road (South))	U	F	2	3	60.0	Geom	-	3.00	0.00	Y	Arm 9 Ahead	Inf
7/1 (A4095 (West - Exit))	U		2	3	60.0	Inf	-	-	-	-	-	-
8/1 (A4095 (West))	U	G	2	3	60.0	Geom	-	5.00	0.00	Y	Arm 9 Left	5.00
8/2 (A4095 (West))	U	H	2	3	8.9	Geom	-	3.75	0.00	Y	Arm 5 Right	25.00
9/1 (Bucknell Road (Internal NB))	U	I	2	3	2.8	Geom	-	4.40	0.00	Y	Arm 10 Ahead	27.00
9/2 (Bucknell Road (Internal NB))	O	J	2	3	8.2	Geom	-	4.40	0.00	Y	Arm 2 Right	14.00
10/1 (Bucknell Road (North - Exit))	U		2	3	60.0	Inf	-	-	-	-	-	-

Give-Way Lane Input Data

Junction: A4095 / Bucknell Road Network											
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)**
4/1 (Bucknell Road (Internal SB))	7/1 (Right)	1439	0	6/2	1.09	All	3.00	3.00	0.50	3	2.00
				6/1	1.09	All					
9/2 (Bucknell Road (Internal NB))	2/1 (Right)	1439	0	1/1	1.09	All	2.00	-	0.50	2	2.00

Traffic Flow Groups

Flow Group	Start Time	End Time	Duration	Formula
1: 'Strategic Model Hawkfield 2026 Development 1a - AM'	08:00	09:00	01:00	
2: 'Strategic Model Hawkfield 2026 Development 1a - PM'	17:00	18:00	01:00	
3: 'Strategic Model Hawkfield 2026 Development 2a - AM'	08:00	09:00	01:00	
4: 'Strategic Model Hawkfield 2026 Development 2a - PM'	17:00	18:00	01:00	

Traffic Flows, Desired

FG1: 'Strategic Model Hawkfield 2026 Development 1a - AM'

Desired Flow :

		Destination				
		A	B	C	D	Tot.
Origin	A	0	163	13	55	231
	B	144	0	139	580	863
	C	56	236	0	325	617
	D	91	379	13	0	483
	Tot.	291	778	165	960	2194

FG2: 'Strategic Model Hawkfield 2026 Development 1a - PM'

Desired Flow :

		Destination				
		A	B	C	D	Tot.
Origin	A	0	154	26	53	233
	B	84	0	261	544	889
	C	43	283	0	230	556
	D	96	630	17	0	743
	Tot.	223	1067	304	827	2421

FG3: 'Strategic Model Hawkfield 2026 Development 2a - AM'
Desired Flow :

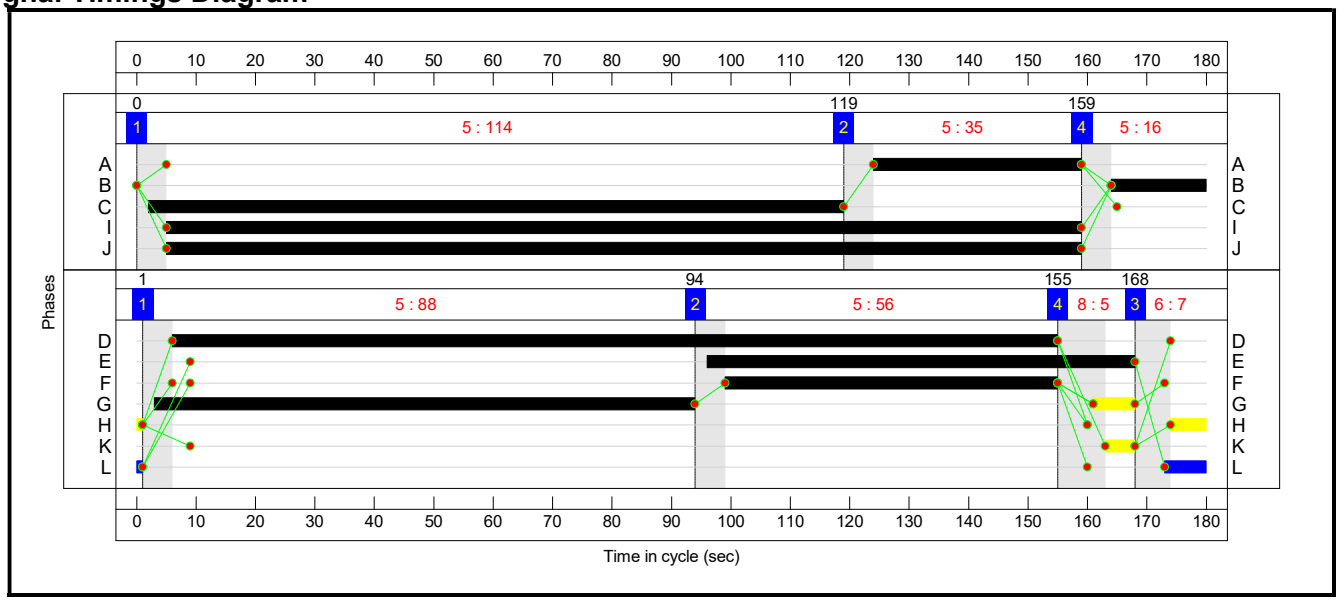
		Destination				
		A	B	C	D	Tot.
Origin	A	0	161	13	52	226
	B	152	0	149	582	883
	C	56	236	0	326	618
	D	90	378	13	0	481
	Tot.	298	775	175	960	2208

FG4: 'Strategic Model Hawkfield 2026 Development 2a - PM'
Desired Flow :

		Destination				
		A	B	C	D	Tot.
Origin	A	0	164	29	63	256
	B	85	0	252	544	881
	C	43	293	0	192	528
	D	92	636	15	0	743
	Tot.	220	1093	296	799	2408

Scenario 1: 'Strategic Model Hawkfield Development 1a - AM' (FG1: 'Strategic Model Hawkfield 2026 Development 1a - AM', Plan 1: 'Network Control Plan 1')

Signal Timings Diagram



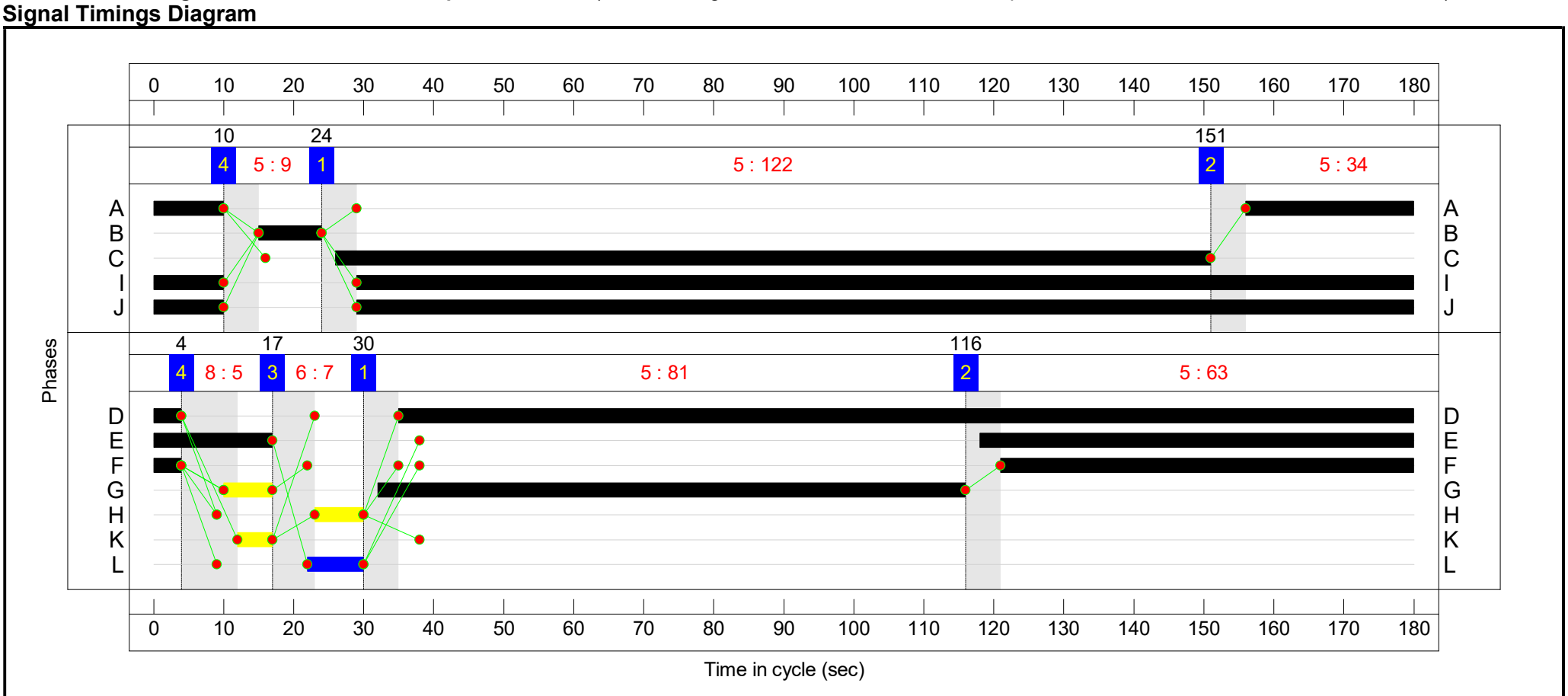
Network Results

Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Deg Sat (%)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network: A4095 / Bucknell Road	-	-	-		-	-	**83.2%**	-	-
A4095 / Bucknell Road Network	-	-	-		-	-	**83.2%**	-	-
1/1	Bucknell Road (North) Left Ahead	U	A		231	1908	60.5%	77.4	11.2
2/1	A4095 (East - Exit)	U	-		778	Inf	0.0%	0.0	0.0
3/1+3/2	A4095 (East) Left Right	U	C B		863	1747:1888	69.0 : 80.8%	33.5 (23.2:84.9)	22.2
4/1	Bucknell Road (Internal SB) Ahead Right	O	D		787	1633	83.2%	11.2	8.5
5/1	Bucknell Road (South - Exit)	U	-		165	Inf	0.0%	0.0	0.0
6/2+6/1	Bucknell Road (South) Left Ahead	U	F E		617	1915:1768	83.0 : 83.0%	60.4 (65.5:55.8)	22.6
7/1	A4095 (West - Exit)	U	-		960	Inf	0.0%	0.0	0.0
8/1+8/2	A4095 (West) Right Left	U	G H		483	1627:1877	52.5 : 52.5%	28.6 (27.0:88.7)	11.6
9/2+9/1	Bucknell Road (Internal NB) Right Ahead	O+U	J I		762	1856:1947	54.4 : 54.4%	4.1 (4.7:1.7)	3.4
10/1	Bucknell Road (North - Exit)	U	-		291	Inf	0.0%	0.0	0.0
Ped Link: P1	Pedestrians Crossing Bucknell Road Northbound	-	L		0	-	0.0%	-	-
Ped Link: P2	Pedestrians Crossing Bucknell Road Southbound	-	K		0	-	0.0%	-	-

C1 Stream: 1 PRC for Signalled Lanes (%): 11.4 Total Delay for Signalled Lanes (pcuHr): 13.86 Cycle Time (s): 180
C1 Stream: 2 PRC for Signalled Lanes (%): 8.2 Total Delay for Signalled Lanes (pcuHr): 16.64 Cycle Time (s): 180
PRC Over All Lanes (%): 8.2 Total Delay Over All Lanes(pcuHr): 30.49

Scenario 2: 'Strategic Model Hawkfield Development 1a - PM' (FG2: 'Strategic Model Hawkfield 2026 Development 1a - PM', Plan 1: 'Network Control Plan 1')

Signal Timings Diagram



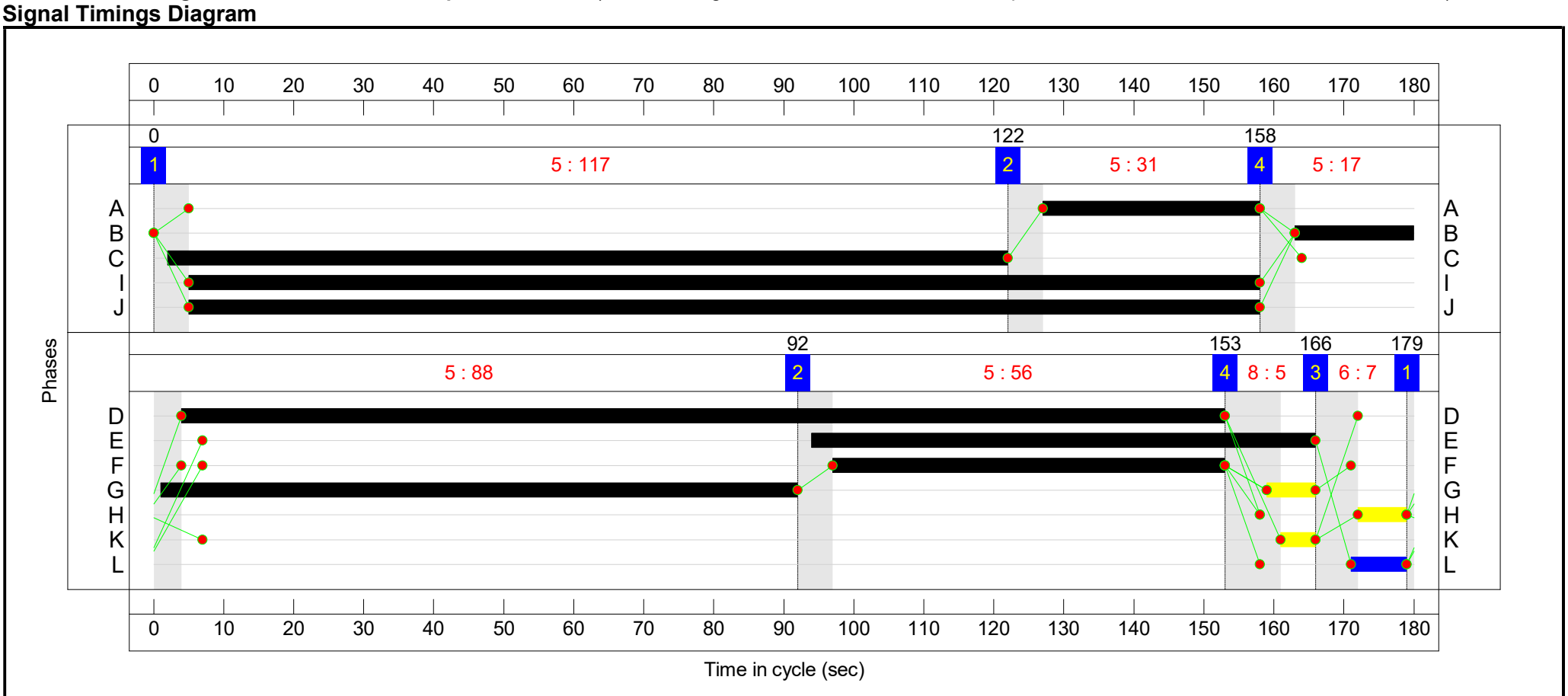
Network Results

Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Deg Sat (%)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network: A4095 / Bucknell Road	-	-	-		-	-	**87.4%**	-	-
A4095 / Bucknell Road Network	-	-	-		-	-	**87.4%**	-	-
1/1	Bucknell Road (North) Left Ahead	U	A		233	1908	62.8%	79.4	11.5
2/1	A4095 (East - Exit)	U	-		1067	Inf	0.0%	0.0	0.0
3/1+3/2	A4095 (East) Left Right	U	C B		889	1747:1888	69.4 : 80.1%	26.3 (19.8:88.8)	23.5
4/1	Bucknell Road (Internal SB) Ahead Right	O	D		884	1673	87.4%	9.0	9.5
5/1	Bucknell Road (South - Exit)	U	-		304	Inf	0.0%	0.0	0.0
6/2+6/1	Bucknell Road (South) Left Ahead	U	F E		556	1915:1768	72.6 : 72.6%	51.0 (55.1:45.2)	19.8
7/1	A4095 (West - Exit)	U	-		827	Inf	0.0%	0.0	0.0
8/1+8/2	A4095 (West) Right Left	U	G H		743	1627:1877	86.9 : 86.9%	53.7 (51.7:138.0)	31.6
9/2+9/1	Bucknell Road (Internal NB) Right Ahead	O+U	J I		1052	1856:1947	72.3 : 72.3%	2.4 (2.7:0.8)	3.5
10/1	Bucknell Road (North - Exit)	U	-		223	Inf	0.0%	0.0	0.0
Ped Link: P1	Pedestrians Crossing Bucknell Road Northbound	-	L		0	-	0.0%	-	-
Ped Link: P2	Pedestrians Crossing Bucknell Road Southbound	-	K		0	-	0.0%	-	-

C1	Stream: 1 PRC for Signalled Lanes (%):	12.4	Total Delay for Signalled Lanes (pcuHr):	12.34	Cycle Time (s):	180
C1	Stream: 2 PRC for Signalled Lanes (%):	2.9	Total Delay for Signalled Lanes (pcuHr):	21.17	Cycle Time (s):	180
	PRC Over All Lanes (%):	2.9	Total Delay Over All Lanes(pcuHr):	33.51		

Scenario 3: 'Strategic Model Hawkfield Development 2a - AM' (FG3: 'Strategic Model Hawkfield 2026 Development 2a - AM', Plan 1: 'Network Control Plan 1')

Signal Timings Diagram



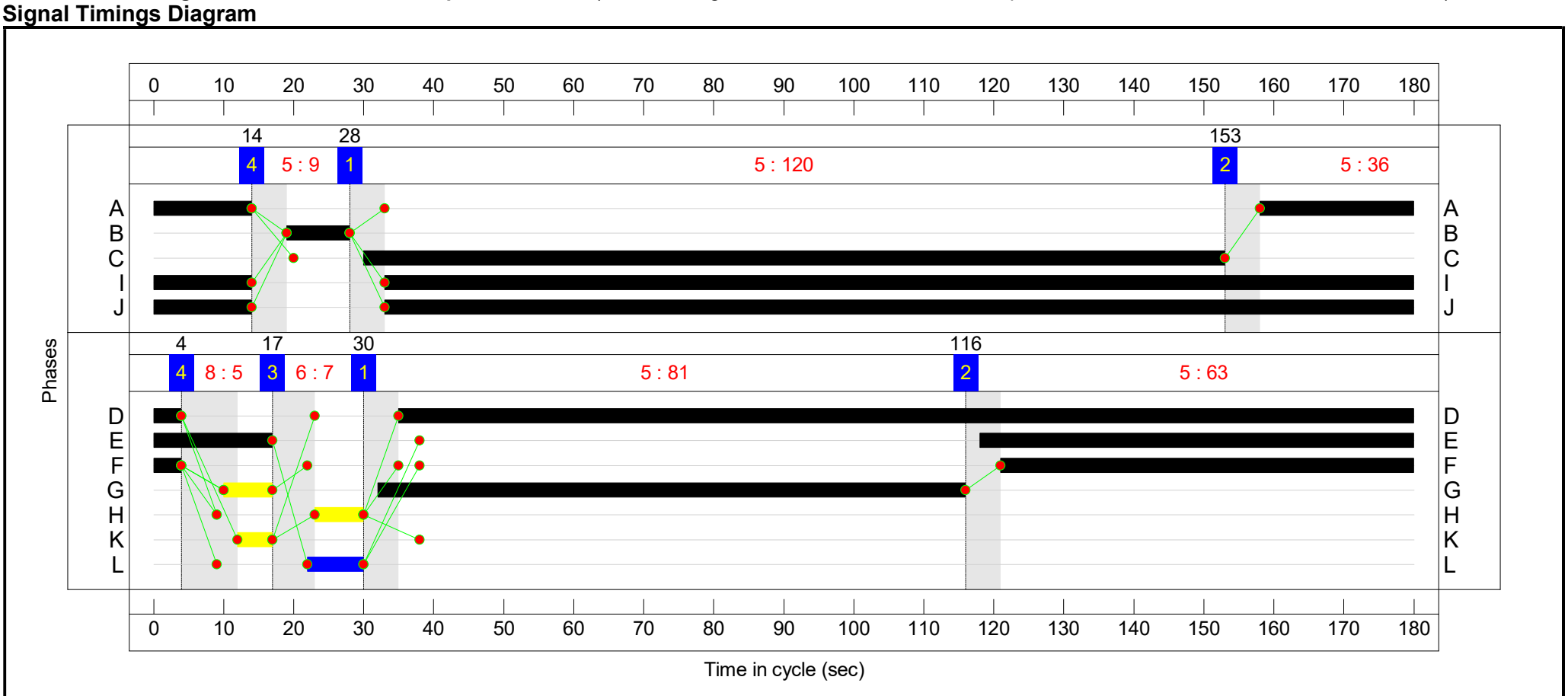
Network Results

Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Deg Sat (%)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network: A4095 / Bucknell Road	-	-	-		-	-	**83.9%**	-	-
A4095 / Bucknell Road Network	-	-	-		-	-	**83.9%**	-	-
1/1	Bucknell Road (North) Left Ahead	U	A		226	1908	66.6%	84.7	11.5
2/1	A4095 (East - Exit)	U	-		775	Inf	0.0%	0.0	0.0
3/1+3/2	A4095 (East) Left Right	U	C B		883	1747:1888	68.8 : 80.5%	32.3 (21.5:84.1)	21.7
4/1	Bucknell Road (Internal SB) Ahead Right	O	D		796	1636	83.9%	12.1	7.1
5/1	Bucknell Road (South - Exit)	U	-		175	Inf	0.0%	0.0	0.0
6/2+6/1	Bucknell Road (South) Left Ahead	U	F E		618	1915:1768	83.1 : 83.1%	60.5 (65.6:55.9)	22.6
7/1	A4095 (West - Exit)	U	-		960	Inf	0.0%	0.0	0.0
8/1+8/2	A4095 (West) Right Left	U	G H		481	1627:1877	52.3 : 52.3%	28.5 (26.9:88.4)	11.5
9/2+9/1	Bucknell Road (Internal NB) Right Ahead	O+U	J I		760	1856:1947	54.3 : 54.3%	4.3 (4.8:2.1)	6.4
10/1	Bucknell Road (North - Exit)	U	-		298	Inf	0.0%	0.0	0.0
Ped Link: P1	Pedestrians Crossing Bucknell Road Northbound	-	L		0	-	0.0%	-	-
Ped Link: P2	Pedestrians Crossing Bucknell Road Southbound	-	K		0	-	0.0%	-	-

C1	Stream: 1 PRC for Signalled Lanes (%):	11.8	Total Delay for Signalled Lanes (pcuHr):	14.13	Cycle Time (s):	180
C1	Stream: 2 PRC for Signalled Lanes (%):	7.3	Total Delay for Signalled Lanes (pcuHr):	16.87	Cycle Time (s):	180
	PRC Over All Lanes (%):	7.3	Total Delay Over All Lanes(pcuHr):	31.00		

Scenario 4: 'Strategic Model Hawkfield Development 2a - PM' (FG4: 'Strategic Model Hawkfield 2026 Development 2a - PM', Plan 1: 'Network Control Plan 1')

Signal Timings Diagram



Network Results

Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Deg Sat (%)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network: A4095 / Bucknell Road	-	-	-		-	-	**87.1%**	-	-
A4095 / Bucknell Road Network	-	-	-		-	-	**87.1%**	-	-
1/1	Bucknell Road (North) Left Ahead	U	A		256	1907	65.3%	78.7	12.7
2/1	A4095 (East - Exit)	U	-		1093	Inf	0.0%	0.0	0.0
3/1+3/2	A4095 (East) Left Right	U	C B		881	1747:1888	69.7 : 81.0%	27.5 (20.9:89.0)	23.8
4/1	Bucknell Road (Internal SB) Ahead Right	O	D		888	1670	87.1%	7.6	7.1
5/1	Bucknell Road (South - Exit)	U	-		296	Inf	0.0%	0.0	0.0
6/2+6/1	Bucknell Road (South) Left Ahead	U	F E		528	1915:1768	70.4 : 70.4%	51.0 (54.7:44.6)	19.4
7/1	A4095 (West - Exit)	U	-		799	Inf	0.0%	0.0	0.0
8/1+8/2	A4095 (West) Right Left	U	G H		743	1627:1877	86.9 : 86.9%	53.7 (51.9:138.1)	31.7
9/2+9/1	Bucknell Road (Internal NB) Right Ahead	O+U	J I		1064	1856:1947	74.4 : 74.4%	2.6 (2.9:0.9)	3.2
10/1	Bucknell Road (North - Exit)	U	-		220	Inf	0.0%	0.0	0.0
Ped Link: P1	Pedestrians Crossing Bucknell Road Northbound	-	L		0	-	0.0%	-	-
Ped Link: P2	Pedestrians Crossing Bucknell Road Southbound	-	K		0	-	0.0%	-	-

C1	Stream: 1 PRC for Signalled Lanes (%):	11.1	Total Delay for Signalled Lanes (pcuHr):	13.09	Cycle Time (s): 180
C1	Stream: 2 PRC for Signalled Lanes (%):	3.4	Total Delay for Signalled Lanes (pcuHr):	20.44	Cycle Time (s): 180
	PRC Over All Lanes (%):	3.4	Total Delay Over All Lanes(pcuHr):	33.53	

North West Bicester – Hawkwell Village

20300

Appendix F Proposed Signalisation Final Solution Mitigation Scheme

KEY

- Site Boundary
- Highway Boundary
- Intervisibility

Rev	Date	Description	By	Apvd
P1	19.12.22	Preliminary issue	MK	AW

PROJECT:
BICESTER

TITLE:
A4095 SIGNALIZED JUNCTION
FUTURE DESIGN

CLIENT:
HALLAM LAND MANAGEMENT

SCALE@A3:
1:500

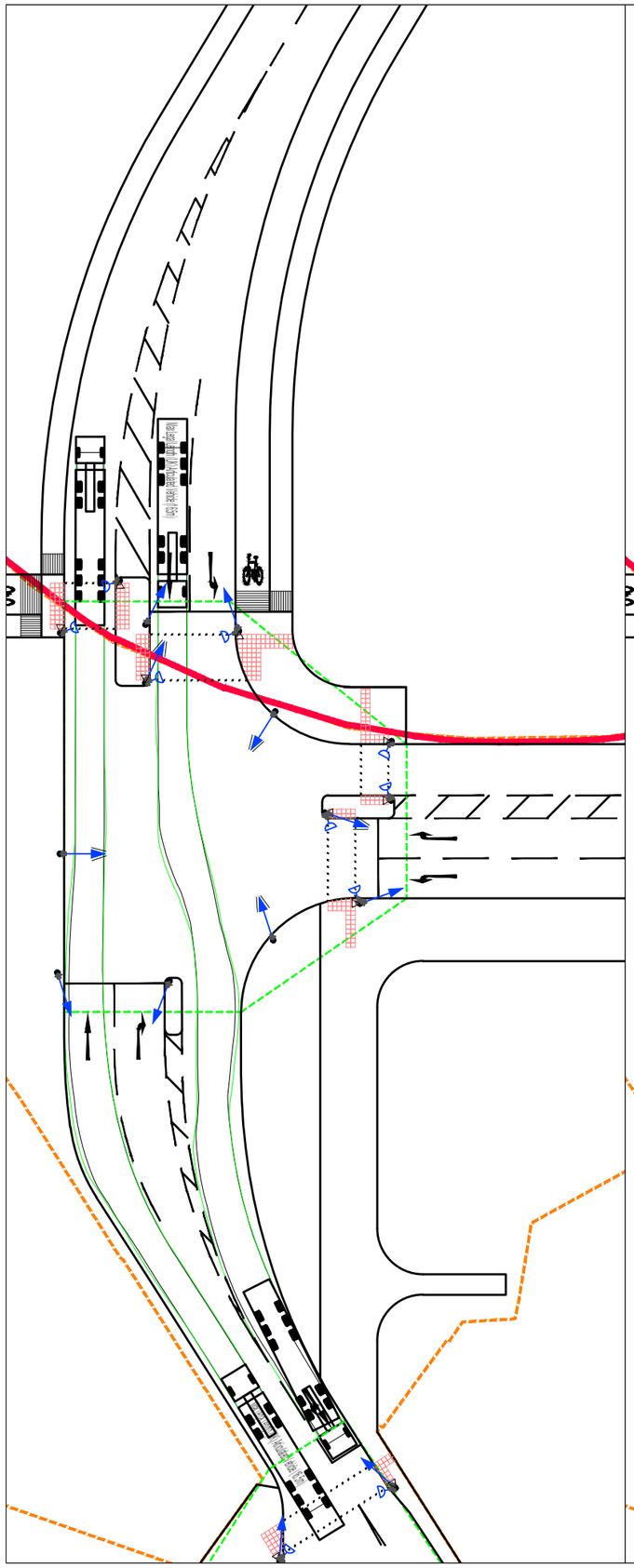
PROJECT REF:
20300

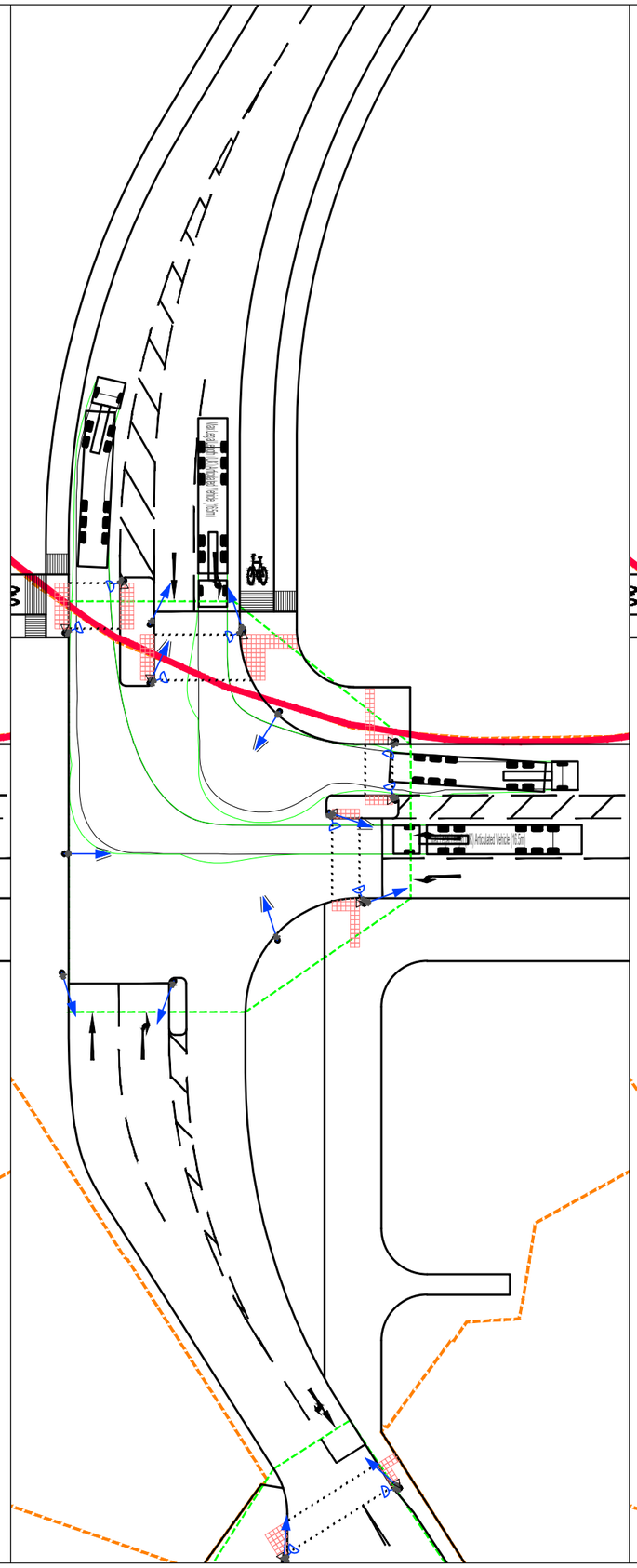
DRAWING No:
033

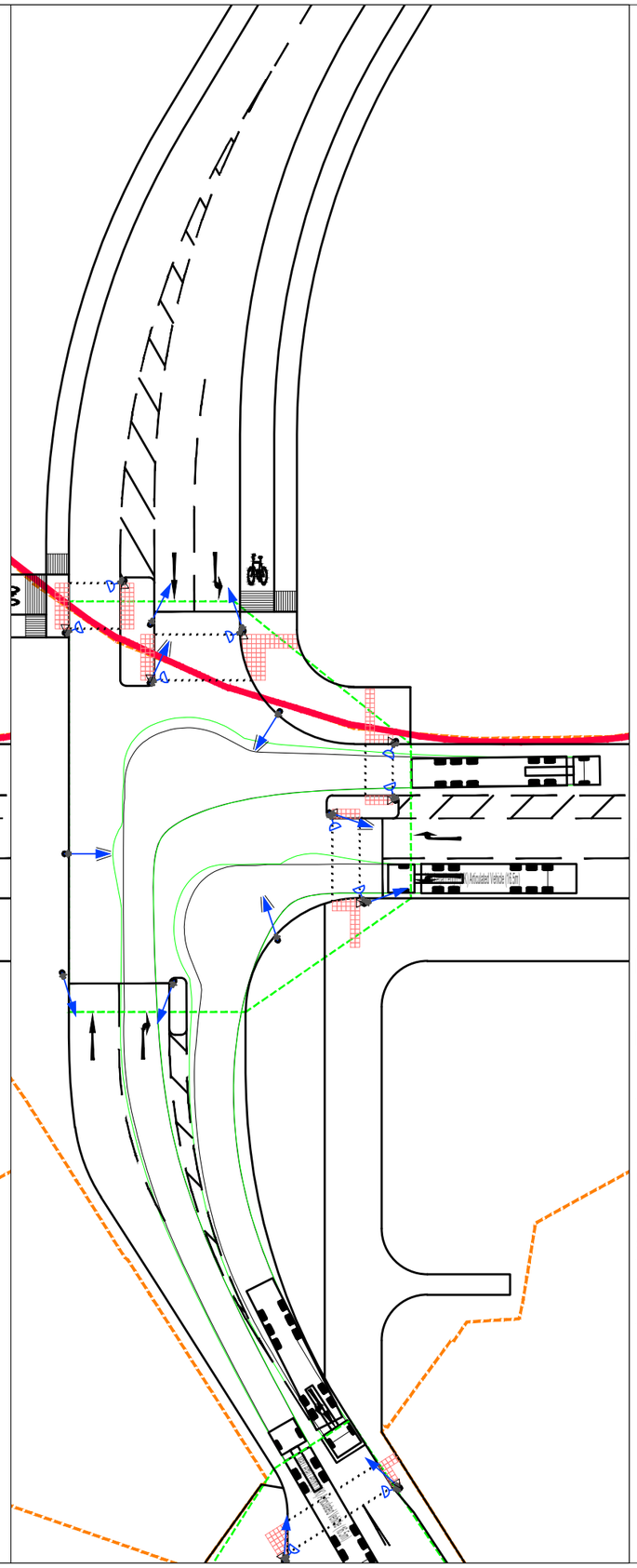
REV:
P1

Revision Referencing
P = Preliminary A = Approval T = Tender C = Construction

Bristol, Cardiff, Plymouth, Winchester
2A Oak Tree Court, Cardiff Gate Business Park, Cardiff
jubb.uk.com
+44(0)292 052 4444



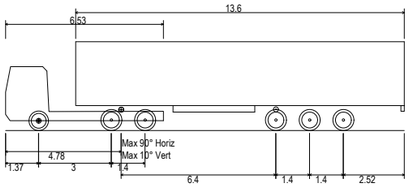




KEY

Site Boundary

Highway Boundary



Max Legal Length (UK) Articulated Vehicle (16.5m)

Overall Length	16.500m
Overall Width	2.550m
Overall Body Height	3.681m
Min Body Ground Clearance	0.411m
Max Track Width	2.500m
Lock to lock time	6.00s
Kerb to Kerb Turning Radius	6.530m

Rev	Date	Description	By	Apvd
P1	19.12.22	Preliminary Design	MK	AW

PROJECT:
BICESTER

TITLE:
A4095 SIGNALIZED JUNCTION
FUTURE DESIGN TRACKING

CLIENT:
HALLAM LAND MANAGEMENT

SCALE@A3:
1:500

PROJECT REF:
20300

DRAWING No:
034

REV:
P1

Revision Referencing
P = Preliminary A = Approval T = Tender C = Construction

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2A Oak Tree Court, Cardiff Gate Business Park, Cardiff
jubb.uk.com
+44(0)292 052 4444

North West Bicester – Hawkwell Village

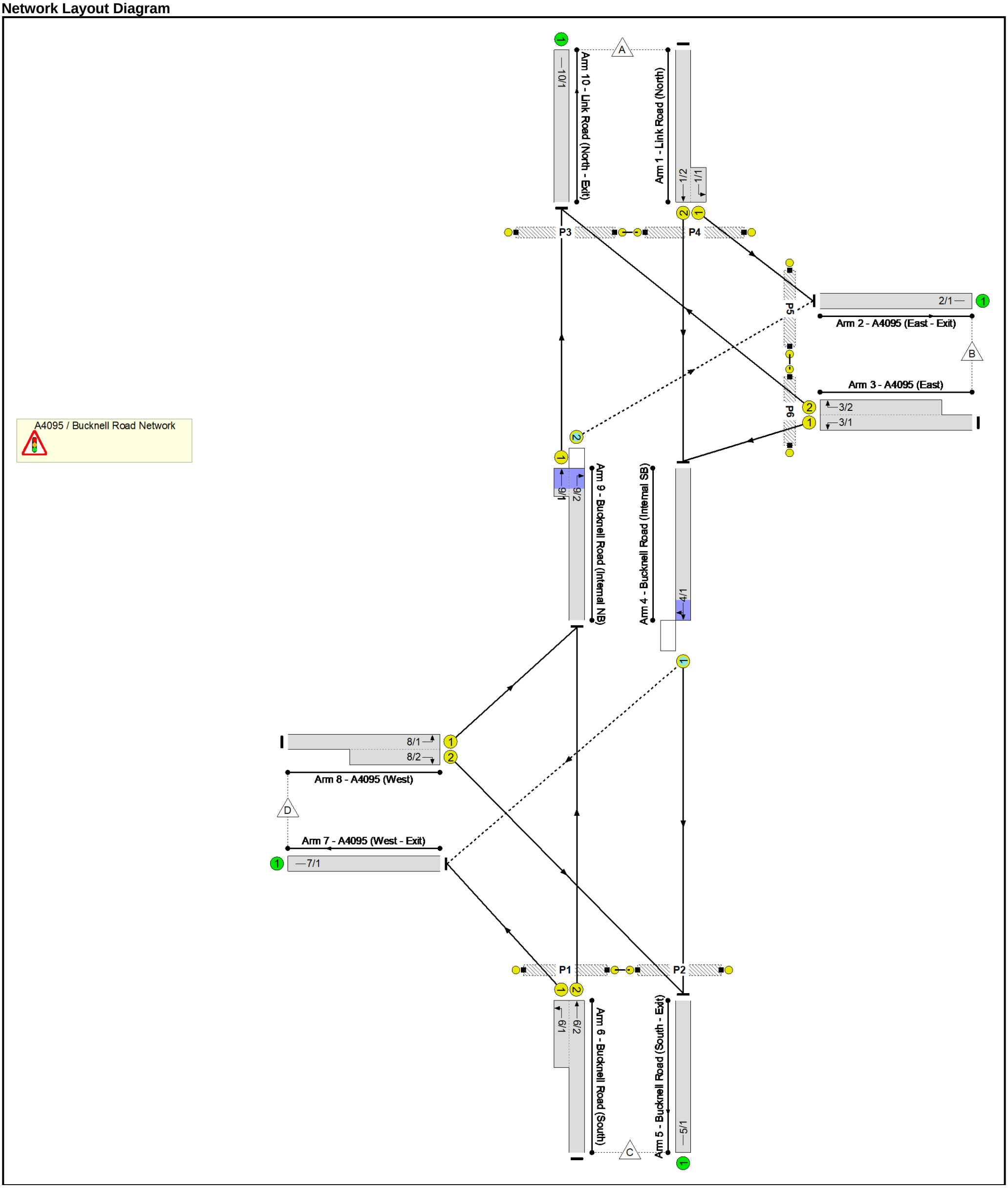
20300

Appendix G LINSIG Output Report – Proposed Junction 2031

Project and User Details

Project:	**North West Bicester - Land North East of the Marylebone-Birmingham Railway Line**
Title:	**A4095 / Bucknell Road**
Location:	Bicester, Oxfordshire
Client:	Hallam Land Management Ltd
Additional detail:	Based on Drawing No. 20300-033-P1.
File name:	A4095_Bucknell Road Junction Network (Post-Link Road Layout)_2023.02.01 AW Forecasts.lsg3x
Author:	MD / SR
Company:	Jubb
Address:	Suite B, Ground Floor West, St James Court, St James Parade, Bristol, BS1 3LH
Linsig Version:	3, 2, 44, 1

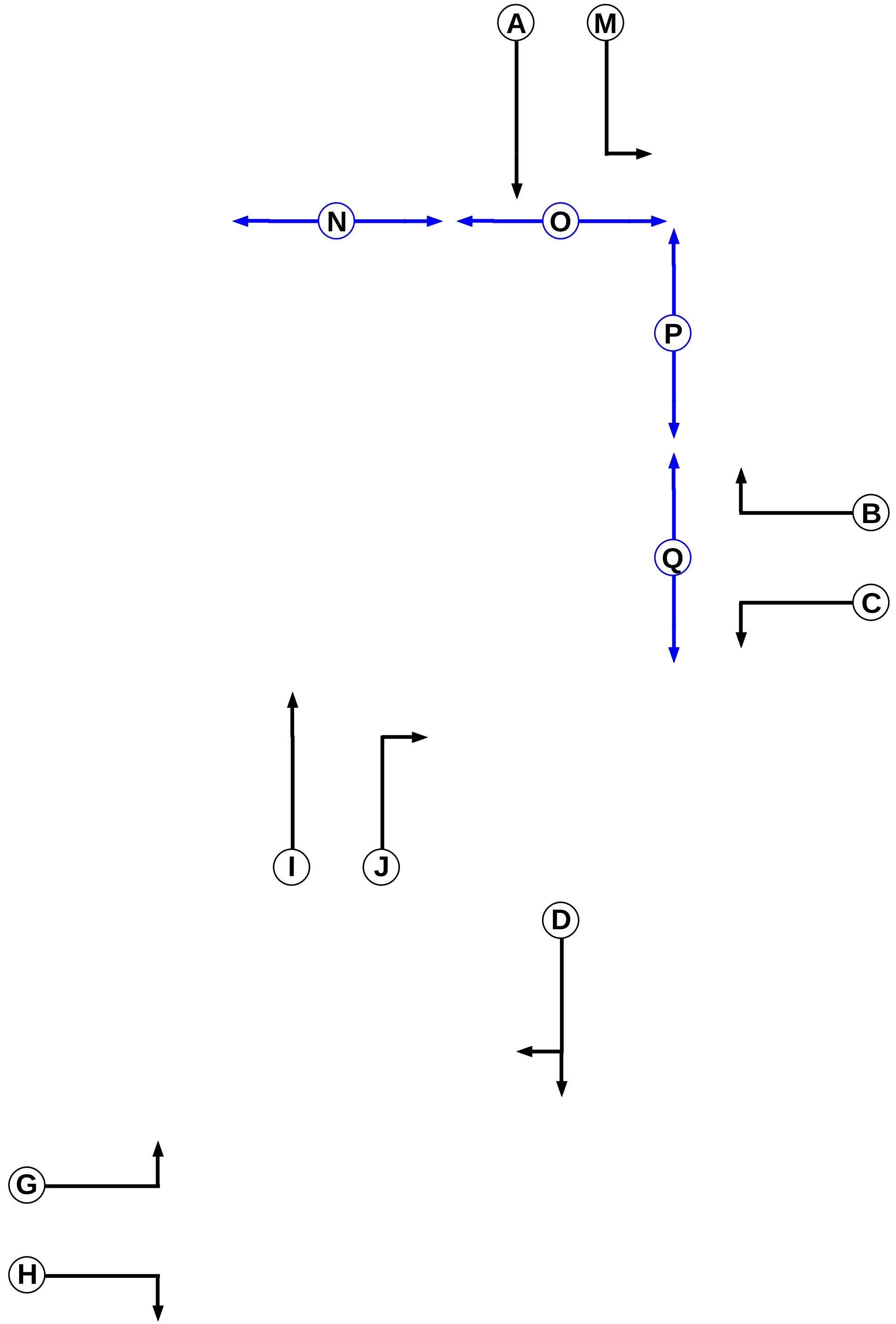
Network Layout Diagram



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	1		7	7
D	Traffic	2		7	7
E	Traffic	2		7	7
F	Traffic	2		7	7
G	Traffic	2		7	7
H	Traffic	2		7	7
I	Traffic	1		7	7
J	Traffic	1		7	7
K	Pedestrian	2		5	5
L	Pedestrian	2		5	5
M	Traffic	1		7	7
N	Pedestrian	1		7	7
O	Pedestrian	1		7	7
P	Pedestrian	1		7	7
Q	Pedestrian	1		7	7

Phase Diagram


A
M
N
O
P
Q
B
C
I
J
D
G
H

Phase Intergreens Matrix

Terminating Phase \ Starting Phase	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
A		5	6	-	-	-	-	-	-	-	-	-	-	-	5	-	-
B	5		-	-	-	-	-	-	5	5	-	-	-	9	-	-	5
C	5	-		-	-	-	-	-	-	-	-	-	-	-	-	-	5
D	-	-	-		-	-	-	5	-	-	8	-	-	-	-	-	-
E	-	-	-	-		-	-	-	-	-	-	5	-	-	-	-	-
F	-	-	-	-	-		6	5	-	-	-	5	-	-	-	-	-
G	-	-	-	-	-	5		-	-	-	-	-	-	-	-	-	-
H	-	-	-	5	-	5	-		-	-	8	-	-	-	-	-	-
I	-	5	-	-	-	-	-	-		-	-	-	-	8	-	-	-
J	-	5	-	-	-	-	-	-	-		-	-	-	-	-	8	-
K	-	-	-	6	-	-	-	6	-	-		-	-	-	-	-	-
L	-	-	-	-	8	8	-	-	-	-	-		-	-	-	-	-
M	-	-	-	-	-	-	-	-	-	-	-	-		-	5	7	-
N	-	6	-	-	-	-	-	-	6	-	-	-	-		-	-	-
O	8	-	-	-	-	-	-	-	-	-	-	-	8	-		-	-
P	-	-	-	-	-	-	-	-	-	6	-	-	6	-	-		-
Q	-	8	8	-	-	-	-	-	-	-	-	-	-	-	-	-	

Phase Delays

Stage Stream: 1

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

Stage Stream: 2

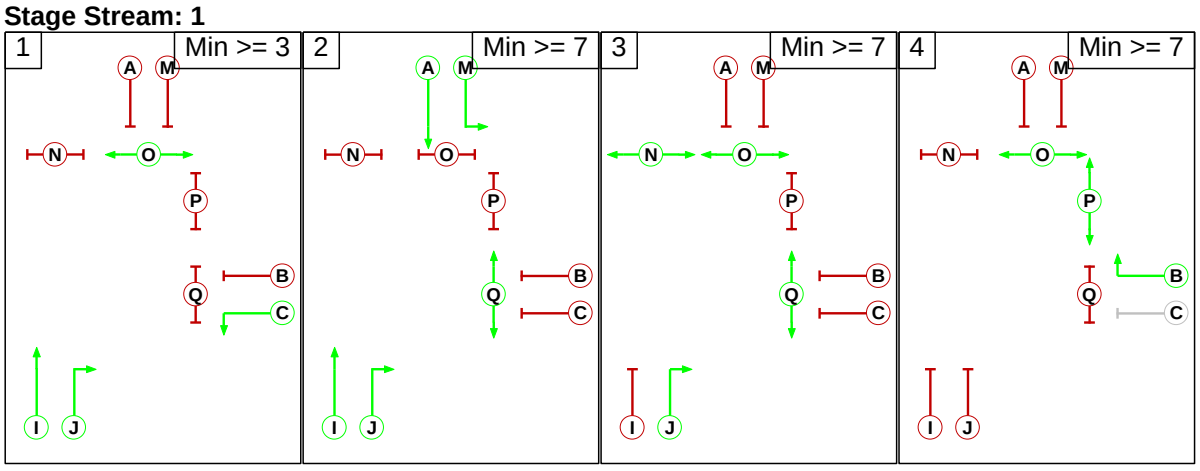
Term. Stage	Start Stage	Phase	Type	Value	Cont value
There are no Phase Delays defined					

Phases in Stage

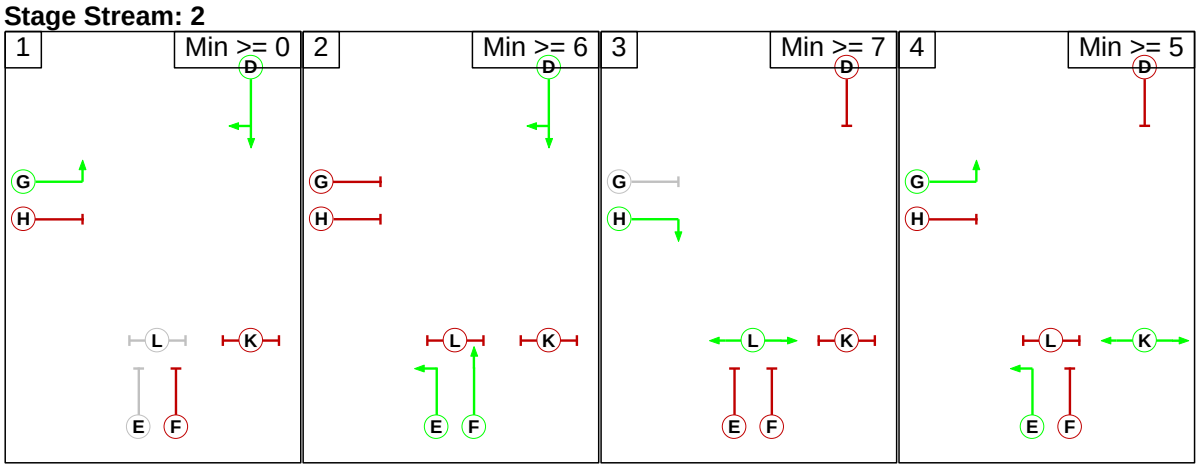
Stream	Stage No.	Phases in Stage
1	1	C I J O
1	2	A I J M Q
1	3	J N O Q
1	4	B O P
2	1	D G
2	2	D E F
2	3	H L
2	4	E G K

Stage Diagram

Stage Stream: 1



Stage Stream: 2



Lane Input Data

Junction: A4095 / Bucknell Road Network

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 (Link Road (North))	U	M	2	3	3.4	Geom	-	3.75	0.00	Y	Arm 2 Left	12.00
1/2 (Link Road (North))	U	A	2	3	60.0	Geom	-	3.75	0.00	Y	Arm 4 Ahead	Inf
2/1 (A4095 (East - Exit))	U		2	3	60.0	Inf	-	-	-	-	-	-
3/1 (A4095 (East))	U	C	2	3	60.0	Geom	-	3.50	0.00	Y	Arm 4 Left	12.00
3/2 (A4095 (East))	U	B	2	3	22.3	Geom	-	3.50	0.00	Y	Arm 10 Right	16.00
4/1 (Bucknell Road (Internal SB))	O	D	2	3	8.0	Geom	-	3.00	0.00	Y	Arm 5 Ahead	Inf
											Arm 7 Right	7.00
5/1 (Bucknell Road (South - Exit))	U		2	3	60.0	Inf	-	-	-	-	-	-
6/1 (Bucknell Road (South))	U	E	2	3	6.6	Geom	-	3.30	0.00	Y	Arm 7 Left	15.00
6/2 (Bucknell Road (South))	U	F	2	3	60.0	Geom	-	3.00	0.00	Y	Arm 9 Ahead	Inf
7/1 (A4095 (West - Exit))	U		2	3	60.0	Inf	-	-	-	-	-	-
8/1 (A4095 (West))	U	G	2	3	60.0	Geom	-	5.00	0.00	Y	Arm 9 Left	5.00
8/2 (A4095 (West))	U	H	2	3	8.9	Geom	-	3.75	0.00	Y	Arm 5 Right	25.00
9/1 (Bucknell Road (Internal NB))	U	I	2	3	2.8	Geom	-	4.40	0.00	Y	Arm 10 Ahead	Inf
9/2 (Bucknell Road (Internal NB))	O	J	2	3	8.2	Geom	-	4.40	0.00	Y	Arm 2 Right	14.00
10/1 (Link Road (North - Exit))	U		2	3	60.0	Inf	-	-	-	-	-	-

Give-Way Lane Input Data

Junction: A4095 / Bucknell Road Network

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)
4/1 (Bucknell Road (Internal SB))	7/1 (Right)	1439	0	6/2	1.09	All	3.00	3.00	0.50	3	2.00
				6/1	1.09	All					
9/2 (Bucknell Road (Internal NB))	2/1 (Right)	1439	0	1/2	1.09	All	2.00	-	0.50	2	2.00

Traffic Flow Groups

Flow Group	Start Time	End Time	Duration	Formula
1: '2031 + Dev 1a - AM'	08:00	09:00	01:00	
2: '2031 + Dev 1a - PM'	17:00	18:00	01:00	

Traffic Flows, Desired

FG1: '2031 + Dev 1a - AM'

Desired Flow :

		Destination				
		A	B	C	D	Tot.
Origin	A	0	80	64	96	240
	B	150	0	113	167	430
	C	33	42	0	25	100
	D	62	78	15	0	155
	Tot.	245	200	192	288	925

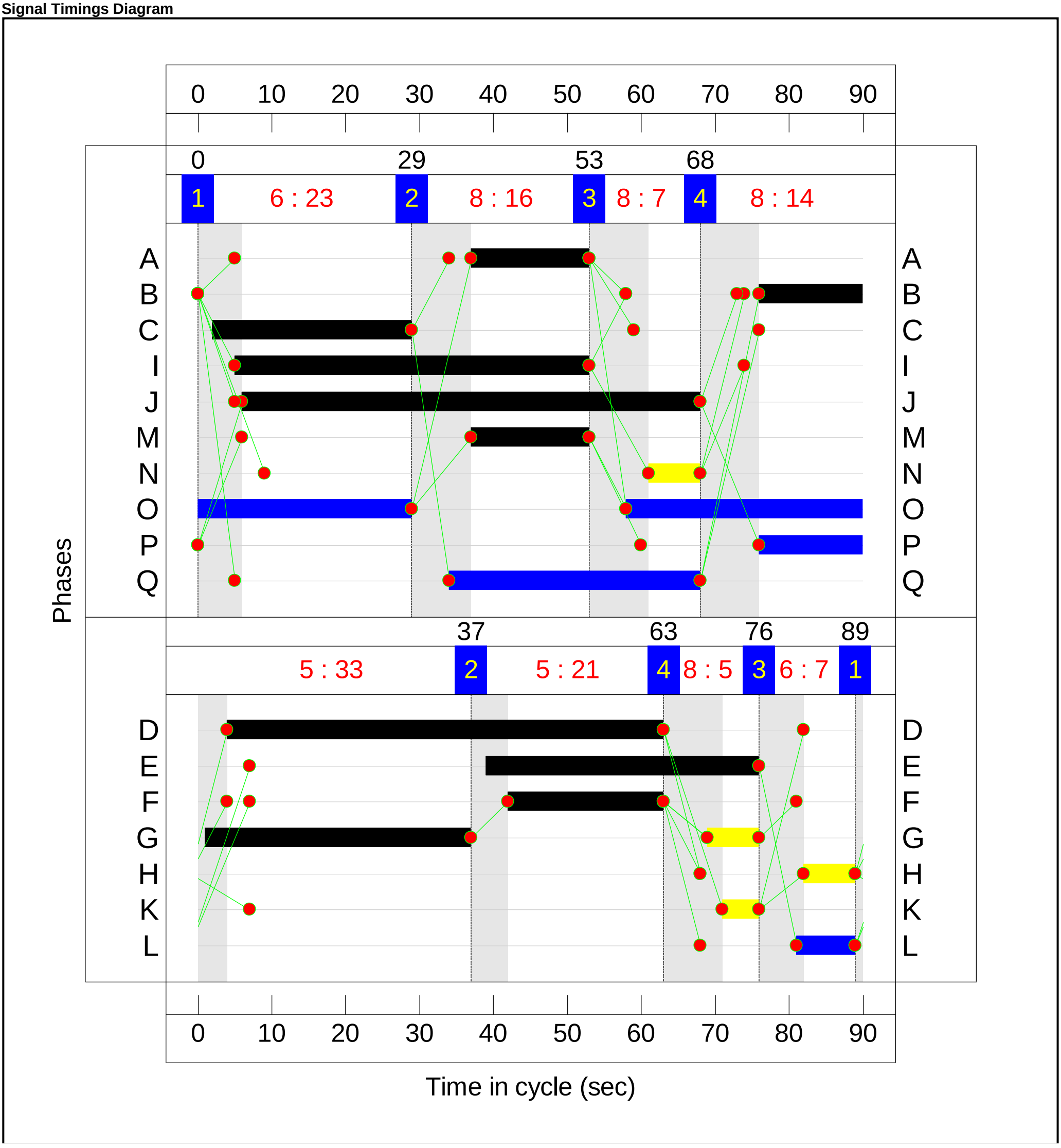
FG2: '2031 + Dev 1a - PM'

Desired Flow :

		Destination				
		A	B	C	D	Tot.
Origin	A	0	200	60	90	350
	B	150	0	80	120	350
	C	35	45	0	50	130
	D	65	85	55	0	205
	Tot.	250	330	195	260	1035

Scenario 1: '2031 + Dev 1a - AM' (FG1: '2031 + Dev 1a - AM', Plan 1: 'Network Control Plan 1')

Signal Timings Diagram



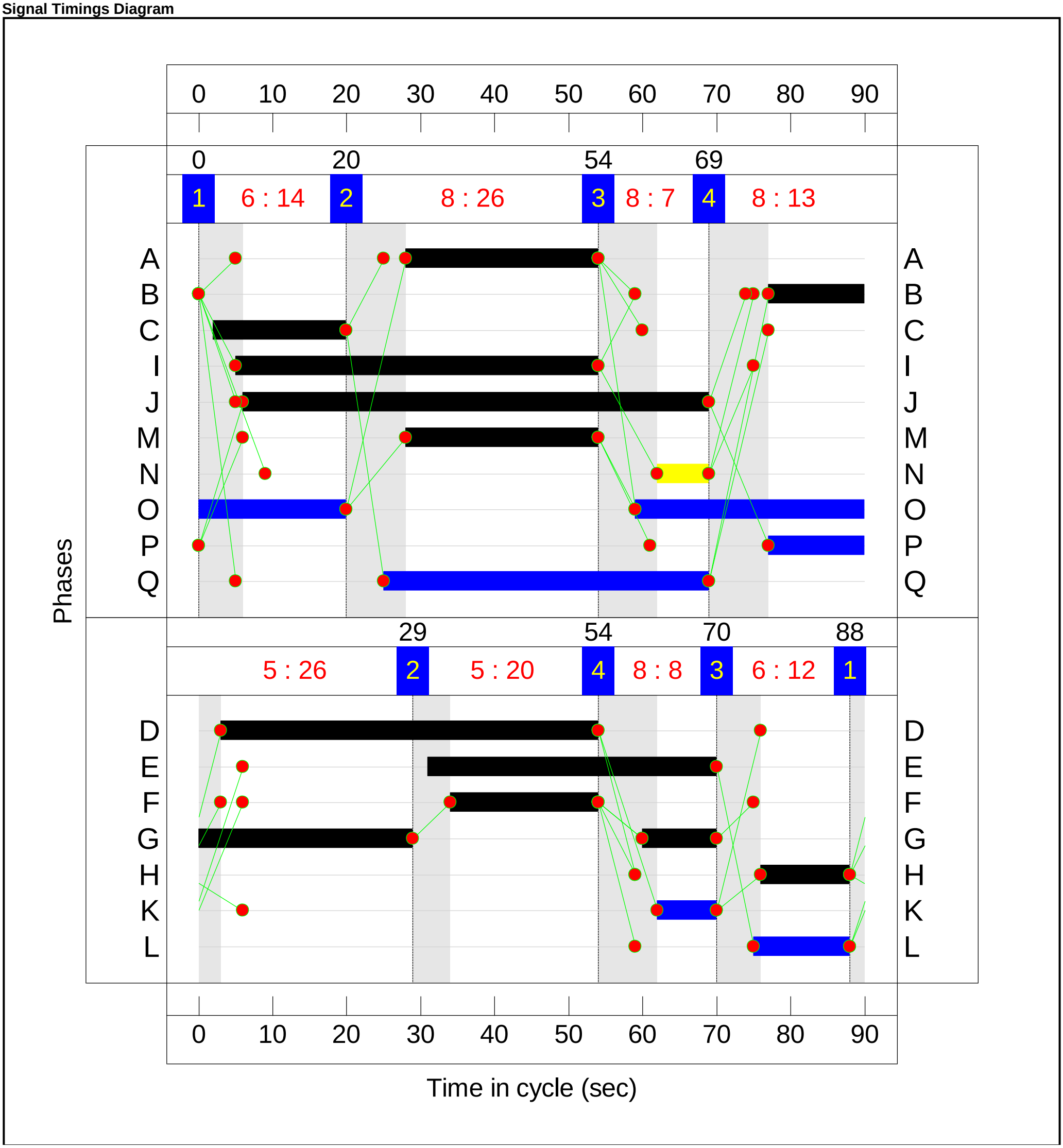
Network Results

Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Deg Sat (%)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network: A4095 / Bucknell Road	**-**	**-**	**-**		**-**	**-**	**53.1%**	**-**	**-**
A4095 / Bucknell Road Network	**-**	**-**	**-**		**-**	**-**	**53.1%**	**-**	**-**
1/2+1/1	Link Road (North) Left Ahead	U	A M		240	1990:1769	53.1 : 53.1%	40.3 (40.6:39.5)	4.1
2/1	A4095 (East - Exit)	U	-		200	Inf	0.0%	0.0	0.0
3/1+3/2	A4095 (East) Left Right	U	C B		430	1747:1797	51.5 : 50.1%	32.8 (29.8:38.5)	6.2
4/1	Bucknell Road (Internal SB) Ahead Right	O	D		440	1698	39.9%	0.3	0.5
5/1	Bucknell Road (South - Exit)	U	-		192	Inf	0.0%	0.0	0.0
6/2+6/1	Bucknell Road (South) Left Ahead	U	F E		100	1915:1768	17.5 : 17.5%	27.7 (30.6:19.1)	1.6
7/1	A4095 (West - Exit)	U	-		288	Inf	0.0%	0.0	0.0
8/1+8/2	A4095 (West) Right Left	U	G H		155	1627:1877	17.5 : 17.5%	12.5 (9.5:40.3)	1.4
9/2+9/1	Bucknell Road (Internal NB) Right Ahead	O+U	J I		215	1856:2055	17.8 : 17.8%	6.6 (6.0:7.4)	0.9
10/1	Link Road (North - Exit)	U	-		245	Inf	0.0%	0.0	0.0
Ped Link: P1	Pedestrians Crossing Bucknell Road Northbound	-	L		0	-	0.0%	-	-
Ped Link: P2	Pedestrians Crossing Bucknell Road Southbound	-	K		0	-	0.0%	-	-
Ped Link: P3	Pedestrians Crossing Link Road Northbound	-	N		0	-	0.0%	-	-
Ped Link: P4	Pedestrians Crossing Link Road Southbound	-	O		0	-	0.0%	-	-
Ped Link: P5	Pedestrians Crossing A4095 Eastbound	-	P		0	-	0.0%	-	-
Ped Link: P6	Pedestrians Crossing A4095 Westbound	-	Q		0	-	0.0%	-	-

C1 Stream: 1 PRC for Signalled Lanes (%): 69.6 Total Delay for Signalled Lanes (pcuHr): 7.00 Cycle Time (s): 90
C1 Stream: 2 PRC for Signalled Lanes (%): 125.6 Total Delay for Signalled Lanes (pcuHr): 1.34 Cycle Time (s): 90
PRC Over All Lanes (%): 69.6 Total Delay Over All Lanes(pcuHr): 8.34

Scenario 2: '2031 + Dev 1a - PM' (FG2: '2031 + Dev 1a - PM', Plan 1: 'Network Control Plan 1')

Signal Timings Diagram



Network Results

Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Deg Sat (%)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network: A4095 / Bucknell Road	**-**	**-**	**-**		**-**	**-**	**54.2%**	**-**	**-**
A4095 / Bucknell Road Network	**-**	**-**	**-**		**-**	**-**	**54.2%**	**-**	**-**
1/2+1/1	Link Road (North) Left Ahead	U	A M		350	1990:1769	52.6 : 52.6%	30.2 (29.7:30.6)	4.9
2/1	A4095 (East - Exit)	U	-		330	Inf	0.0%	0.0	0.0
3/1+3/2	A4095 (East) Left Right	U	C B		350	1747:1797	54.2 : 53.7%	39.1 (37.6:41.0)	5.0
4/1	Bucknell Road (Internal SB) Ahead Right	O	D		350	1697	37.2%	1.5	0.3
5/1	Bucknell Road (South - Exit)	U	-		195	Inf	0.0%	0.0	0.0
6/2+6/1	Bucknell Road (South) Left Ahead	U	F E		130	1915:1768	20.8 : 20.8%	26.1 (31.2:18.0)	1.7
7/1	A4095 (West - Exit)	U	-		260	Inf	0.0%	0.0	0.0
8/1+8/2	A4095 (West) Right Left	U	G H		205	1627:1877	21.2 : 20.3%	17.1 (10.0:36.3)	1.5
9/2+9/1	Bucknell Road (Internal NB) Right Ahead	O+U	J I		230	1856:2055	18.6 : 18.6%	4.8 (1.6:9.0)	0.8
10/1	Link Road (North - Exit)	U	-		250	Inf	0.0%	0.0	0.0
Ped Link: P1	Pedestrians Crossing Bucknell Road Northbound	-	L		0	-	0.0%	-	-
Ped Link: P2	Pedestrians Crossing Bucknell Road Southbound	-	K		0	-	0.0%	-	-
Ped Link: P3	Pedestrians Crossing Link Road Northbound	-	N		0	-	0.0%	-	-
Ped Link: P4	Pedestrians Crossing Link Road Southbound	-	O		0	-	0.0%	-	-
Ped Link: P5	Pedestrians Crossing A4095 Eastbound	-	P		0	-	0.0%	-	-
Ped Link: P6	Pedestrians Crossing A4095 Westbound	-	Q		0	-	0.0%	-	-

C1 Stream: 1 PRC for Signalled Lanes (%): 66.0 Total Delay for Signalled Lanes (pcuHr): 7.04 Cycle Time (s): 90
C1 Stream: 2 PRC for Signalled Lanes (%): 141.9 Total Delay for Signalled Lanes (pcuHr): 2.06 Cycle Time (s): 90
PRC Over All Lanes (%): 66.0 Total Delay Over All Lanes(pcuHr): 9.10