Stantec

Bristol Airport Expansion to 12 million passengers per annum Planning Appeal

Rebuttal Proof of Scott Witchalls

On behalf of **Bristol Airport Limited**

Bristol Airport
Amazing journeys start here

Project Ref: 332110139/5502 | Rev: - | Date: July 2021

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1 Introduction

1.1.1 This rebuttal evidence provides a response to issues raised by Rule 6 (R6) parties with regard to surface access (including parking) as part of the public inquiry for the Bristol Airport expansion to 12mppa. The document is structured as follows:

- **Section 2** deals with matters raised in the Proof of Evidence (PoE) of Tim Colles prepared on behalf of North Somerset Council (NSC), with regard to:
    - Policy, Standards and Guidance
    - Surface Access Infrastructure, including:
        - Traffic Data
        - Junction Capacity Testing Results
        - A38 Proposed Mitigation Drawing
        - Swept path analysis
        - Road Safety Audit (RSA)
        - Collision analysis
        - Walking, Cycling and Horse Riding Assessment and Review (WCHAR)
        - Growth Scenarios
        - Outstanding technical concerns with regard to junction capacity analysis
    - Parking
    - Public Transport
- **Section 3** deals with matters raised in the PoE of Amanda Sutherland from Sutherland Property & Legal Services Ltd prepared on behalf of Mr Michael Pearce;
- **Section 4** deals with matters raised by the British Airline Pilots Association (BALPA) in the PoEs of:
    - John Hatton, on staff parking
    - Simon William, on remote parking and flight safety
- **Section 5** deals with matters raised in the PoE of Liz Beth, prepared on behalf of Extinction Rebellion Elders Group (XRE), with regard to sustainable transport provision.

- **Section 6** deals with matters raised by the Parish Council's Airport Association (PCAA) in the PoEs of:
    - Barrow Gurney Parish Council
    - Cleeve Parish Council
    - Churchill Parish Council

2 Matters raised by Tim Colles

2.1 Policy, Standards and Guidance

2.1.1 In terms of general policy matters, I have explained in my PoE (Planning Appeal Document BAL/4/2) how the Appeal Proposals accord with national, regional and local policy.

2.1.2 In terms of standards and guidance, Mr Colles states (para. 3.4.1) that *"The technical concerns identified in my PoE primarily relate to junctions with the A38. The A38 is a primary route serving Bristol and the South West and although not locally part of Highways England's Strategic Road network, given its strategic and significant function, it is considered that Design Manual for Roads and Bridges ("DMRB") is the appropriate design standard for the proposed mitigation."*

2.1.3 DMRB contains information about current standards relating to the design, assessment and operation of *motorway and all-purpose trunk roads* (my emphasis) in the United Kingdom. The A38 is not motorway or a trunk road, which means that the standards within the DMRB are not mandatory at this location. However, given the 'A' classification of the A38, the designer considered it appropriate to refer to the DMRB as a design guide document for the proposed highway arrangements, which I believe is the correct approach.

2.1.4 With regard to cycle standards, Mr Coles refers to Local Transport Note 1/20 (LTN 1/20 in CD 7.15). That note provides *guidance* to local authorities on delivering high quality cycle infrastructure, not mandatory standards. The design of the scheme was also developed to its current level prior to LTN 1/20 being published in July 2020.

2.1.5 In relation to the application of guidance and standards to the A38 Highway improvement scheme (the Scheme), I would reinforce that this has been taken through a rigorous design development process and agreed with NSC, which is also described in my CPO Proof (Planning Appeal Document BAL/W4/4) regarding scheme development, which is summarised in the 'A38 Proposed Mitigation Drawing' section below.

2.1.6 Similarly, other documents referenced in Tim Colles's PoE i.e. North Somerset Highways Development Design Guide (October 2020), Manual for Streets (MfS), Manual for Streets 2 (MfS 2), TfL Traffic Modelling Guidelines Version 3 and IStrucE Design recommendations for multi-storey and underground car park (Fourth edition, March 2011) provide parameters for good practice, which should be considered in the development of new schemes but are not a mandatory requirement.

2.1.7 Mr Colles quotes TfL Traffic Modelling Guidelines in his conclusions regarding junction operation, concluding that *'Any junction performing in excess of a DoS of 90% for signalised* *junctions or 85% for unsignalized junctions would therefore be unacceptable'* and that *'It is therefore necessary for junctions to operate within a DoS of 90% for signalised junctions or within an RFC of 0.85 for unsignalised junctions to ensure there aren't significant increases in delay and the impacts don't become severe.'*

2.1.8 The TfL guidelines do not draw those conclusions anywhere, or state that junctions operating in excess of those thresholds are unacceptable. In fact, it is common for junctions to operate close to full capacity in peak periods. The use of those Degree of Saturation (DoS) thresholds is a guideline to understand how a junction may operate, but the actual junction modelling results (as included in the TAA) provide a good indication of the forecast queues and delays for scheme evaluation and comparison purposes to determine impacts.

2.1.9 The TRL Junctions 10 user Guide, to which Mr Colles refers also notes that *'typically an RFC of less than 0.85 is considered to indicate satisfactory performance. This depends however on the context of the study and so the user's own judgement is also required*.'

2.2 Surface Access Infrastructure

Traffic Data

2.2.1 Mr Colles states (para. 4.3.1) states that *"traffic flow turning movements were not provided in the TAA therefore it could not be determined if the base traffic flows and trip generation have been correctly applied and incorporated into the junction capacity models."*

2.2.2 Mr Colles fails to acknowledge that the base traffic flows are unchanged from the TA and are taken from the 2018 surveys provided in the TA (CD2.9.1 Appendix E). In addition, the traffic turning movements are included as input to the junction assessments that are contained in the TAA (CD 2.20.3 Appendices C-K). The traffic flow diagrams associated with these tests were provided to NSC on 8th June 2021 and are included in my Planning Appeal PoE (see Planning Appeal Document BAL/4/2). They demonstrate that the flows were correctly applied and incorporated into the junction capacity models.

2.2.3 Mr Colles (para. 4.4.1) states: *"It is understood that queue length surveys were undertaken for all the junctions at the same time as the traffic turning flow counts but the information has only been provided for Junction 13"* and para. 4.4.2 states: *"In the absence of the queue length survey data within the TA or the TAA, I do not consider that the conclusions of the TA or TAA can relied upon as they have not been interrogated."*

2.2.4 TfL's Traffic Modelling Guidelines Version 3.0 (referenced by Mr Colles) sets out model validation criteria, stating in para. 5.4.2.5 that *'Queue survey data, whilst not a validation criterion, is useful when determining bottlenecks within the network.'*

2.2.5 However, a validation of the models against surveyed queues was carried out as part of the junction model development process along with other checks of geometry and signal phases – these were shared with NSC and their advisors.

2.2.6 NSC's professional advisors, initially WSP (evidenced by WSP Technical note 'A38/Downside Road Design Review, 7th June 2018 – **Appendix A**), and latterly Jacobs consultancy, undertook that detailed checking and review alongside NSC officers. WSP and Jacobs are experienced consultancies with a large pool of specialist transport staff to draw upon.

2.2.7 The various technical notes (CD 3.4.2, 3.6.9 and 3.6.12) and TASD (CD 3.6.13) submitted with the application set out the junction checking and validation process, as outlined in the 'ongoing dialogue and Regulations 25 submissions' section of my Planning Appeal PoE (BAL/4/2). Technical Notes on Model Validation submitted to NSC and Jacobs, amongst others, include:

- TN011 – Response to Modelling Comments (22nd January 2019) – CD 3.4.2 pg. 20
- TN016 – Model Validation Report (February 2019) – CD 3.4.2 pg. 421
- TN027 – Response to Jacobs Modelling Comments (22nd July 2019) – CD 3.6.9 pg. 8
- TN029 – Model Validation Report on A38/ A368 Signalised Junction (October 2019) – CD 3.6.12

2.2.8 I am of the view that the models are robust, and that view was supported by NSC officers and their advisors at that time. The assessment process and analysis fully accords with policy requirements, no concerns regarding junction validation were raised or noted in the NSC committee report, and this was not cited as a Reason for Refusal by NSC.

A38 Proposed Mitigation Drawing

2.2.9 Mr Colles states (paras. 4.5.2 and 4.5.3), *'Appropriate drawings were provided by BAL on 8th June 2021 but there has not been sufficient time to review them for inclusion in my PoE.'*

and suggests that

'it has not been demonstrated that the development complies with NPPF or policies CS10, CS23.''

2.2.10 In fact, the current A38 improvement scheme drawing was issued to NSC in April 2019, and was the current drawing at the time of the Committee (Mr Colles was issued with a CAD version of the drawing on 8th June 2021, which is more than sufficient time to check any measurements in my view. Inclusion of any such measurements in his rebuttal will not allow me the opportunity to check they have been measured correctly.

2.2.11 Notwithstanding this, it is possible to check measurements from the previously available drawings by reference to the dimensions shown on the drawing submitted with the application (CD 2.9.1 Drawing C1124-SK-A38-010 in Appendix D), and the correspondence between NSC officers and BAL (**Appendix B**).

2.2.12 Importantly, it should be noted that the design of the A38 improvements is not a Reason for Refusal for the Appeal Proposal.

2.2.13 I respond to specific comments made by Mr Colles regarding the scheme below, but I am clear that the design process and scheme layout is in full compliance with NPPF, CS10 and CS23 since, post mitigation, it represents a substantial improvement in capacity, reliability and safety for all road users.

2.2.14 I would also note that the scheme has been through a rigorous audit process with NSC officers and their acceptance of the scheme design is confirmed both in the Committee Report (Issue 10 'Highway Works' CD 4.11) and, much earlier, in an email from Frankie Mann (NSC) to Liz Higgins (BAL) of 13th May 2019, including accompanying NSC Note dated 28th March 2019, updated 8th May 2019 by NSC, and email from Colin Medus (NSC) to Simon Earles (BAL) (**Appendix C**) dated 15th May 2019 stating:

'1. Agreeing a final outline scheme for the A38 junction improvement
I understand that we have now agreed the A38 mitigation package, subject to detailed design, and Frankie Mann has emailed Paul Baker and Alex Melling to let them know this is now complete and that we are satisfied with the proposals. I trust that you are now able to progress your CPO workstream. '

Swept Path Analysis

2.2.15 Mr Colles states (para. 4.6.1) that swept path analysis did not include all possible turning movements at all the junctions within the mitigation scheme.

2.2.16 I would note that C-TAS, (BAL appointed designer for the Scheme), provided swept path analysis for the current improvement scheme layout, following a meeting with NSC officers in April 2018, where they requested specifically that tracking of combine harvesters was carried out at the Downside Road Junction, with subsequent comments received in writing from NSC officers (**Appendix C**). The drawing prepared by C-TAS (C1124-SK-A38-011, dated 26th September 2018) demonstrates that movements at the junction with Downside Road can be accommodated and will not require any additional land take or retaining walls beyond those included in the design. It is acknowledged that not all of the swept path turning movements were included in the TA or TAA.

2.2.17 I therefore requested that C-TAS provide swept path analysis drawings for all movements (produced by C-TAS in March 2021), and these are included Appendix D of my Planning Appeal PoE (see Planning Appeal Document BAL/4/2). These drawings demonstrate that all movements at the A38/ Bristol Airport roundabout (Junction 1) and Downside Road/West Lane junctions can be safely accommodated, or that minor modifications, that are a typical part of the detailed design development process, can be made to ensure this is the case.

2.2.18 It has therefore been demonstrated that that the Proposed Development is acceptable for the purposes of NPPF paragraph 108. c) and policies CS10 and CS23 of the Core Strategy, contrary to the opinion of Mr Colles.

Road Safety Audit

2.2.19 In Section 4.7 of his evidence, Mr Colles states that the scheme has changed significantly from the audited version (Revision 8) to require the Road Safety Audit (RSA) to be updated to ensure there are no safety issues that cannot be addressed in Revision 11 and to ensure compliance with NPPF, CS10 and CS23.

2.2.20 I agree that an updated road safety audit will be required as part of the detailed design process. However, the changes made to the scheme are an improvement to Revision 8, responding to the RSA and NSC officers have checked and agreed to the changes.

2.2.21 It is also clear comparing Revision 8 with Revision 11 that the changes to the scheme (a typical part of scheme development) have been relatively minor (shown in Appendix A). The only noticeable change is the removal of the left turn filter lane for traffic existing the airport as a response to the RSA to improve safety.

2.2.22 As I outlined in para. 4.4.3 of my CPO PoE (see Planning Appeal Document BAL/W4/4), potential safety issues identified in the RSA prepared for Revision 8, as audited, were addressed by means of alterations developed as part of the design development process, as follows:

- New Airport Tavern Access – concern over levels difference and visibility splays. Sufficient land is proposed to be acquired to regrade the access to ensure safe access and sightlines can be achieved.
- Concern over relocation of pedestrian crossing at the Airport roundabout – this is no longer proposed to be relocated, so this concern has been removed.

- Concern over level differences to properties on east side of A38 – these are existing level differences, and no changes are proposed in this location. Accident analysis did not show any incidents relating to this. NSC agreed that these existing accesses do not need to be changed. Any significant level differences at the southern end of the scheme (adjacent to the Airport access roundabout) would be assessed as part of the detailed design process, and suitable vehicle restraint system installed, if required.

- Check requirement of forward visibility on A38 to West Lane in southbound direction. 85th percentile speed checks were undertaken and sight line is in accordance with DMRB requirements.

- Indiscriminate parking alongside A38 blocking footway/cycleway. This is an existing situation where no changes are proposed. Parking enforcement is a matter for NSC where this falls in the public highway as is believed to be the case alongside the Forge. New double yellow lines are proposed where possible (e.g. Downside Road) to reinforce parking restrictions to prevent sightlines being affected. This was agreed with NSC and the proposed draft S106 enforcement contribution could be used to reduce this risk.

- Concern over skidding resistance of cattle grid on West Lane, an existing issue that the scheme can help address. Proposed to introduce high skid resistant surface on approaches on either side to cattle grid.

- No controlled pedestrian crossing on West Lane. Proposed to introduce an ‘on demand’ crossing signal at this location. At present, no controlled pedestrian crossing is available across West Lane.

- Clarity over pedestrian/cycle lanes and markings for continuity. These have been incorporated into the current design.

- Concern over buses using southbound bus layby overhanging into carriageway. This may require some changes to lining in the final scheme. There is clear width of c.7m at this point plus a 3m hatched area, and very few buses stop at this location.

- Right turn ban out of West Lane could lead to abuse. Very low flows undertake this movement (13 vehicles in the AM and 9 vehicles in the PM, as observed in the traffic surveys carried out in 2018). Improved layout will mean U-turn via Airport roundabout will not add to delays. Island to be aligned and extended to prevent abuse.

- Check width of West Lane right turn island for traffic signals. Confirmed island could accommodate primary signals within 1.5m width, subject to detailed design and stage 2 RSA.

- Need to provide suitable scheme lighting. Agreed to be developed as part of detailed design.

- Forward visibility to West Lane signals blocked by vegetation. Need to cut back vegetation acknowledged in addition to checking vehicle approach speeds and actual forward visibility suitable for c 30mph speed.

2.2.23 The above changes, reflected in Revision 11, are expected to resolve the majority of points raised in the RSA, improving both capacity and safety at the junction, but with a number of minor points to be picked up at the detailed design stage. All issues can be resolved within the CPO site and red line boundary, or have been agreed with NSC as acceptable.

2.2.24 The safety of the scheme was confirmed by NSC officers, as reflected in the Committee Report, Issue 10 Highway Works, page 135 (CD4.11):

'It is considered that these works would improve traffic flow and safety in the immediate vicinity of the airport and are proportionate mitigation in relation to the projected impacts arising from the proposed development. The detailed drawings submitted with the application showing the proposed highway works are acceptable, although some final specifications will need to be agreed before works can commence. This can be controlled by planning condition.'

2.2.25 The above 'final specifications' refer to the detailed design and Technical Approval process where it is common for design refinements to arise e.g. slight amendments to geometries, change of materials, signage specification, etc. These are typically small in magnitude and will not affect the CPO process or planning requirements for the improvements and will not affect the land required for the Order. I have included an example of potential changes in para. 2.2.74 below. A new road safety audit will be procured at the next stage of scheme design.

2.2.26 I disagree that the scheme has changed to any degree that warrants any suggestion that that there is no longer compliance with NPPF, CS10 and CS23. It is the changed scheme (Rev 11) that was the basis for the officer recommendation above.

Collision Analysis

2.2.27 Mr Colles notes that he cannot draw any conclusions regarding accident analysis since the updated collision analysis was provided on 8th June 2021, noting that he will consider this updated analysis when preparing his rebuttal PoE. This will not allow me the opportunity to check his analysis has been completed correctly.

2.2.28 It should be noted that, in spite of chasing NSC, the data required to complete the analysis was not provided to BAL until 28th May 2021. Even then, it was not in the format usually provided (excel file) making it very difficult to analyse. However, BAL was able to complete the assessment and issue the data back NSC on 8th June 2021 in good time to incorporate into Proofs of Evidence.

2.2.29 A review of personal Injury Collision (PIC) data was carried out as part of the original TA (see Planning Appeal Document CD2.20.3), which suggested that there were no significant safety issues with regard to the geometric road layout of the existing local highway network.

2.2.30 A summary of the updated collision data analysis carried out for the most recent 5-year period of available data provided by NSC and Bristol City Council (BCC) shows no increase in the number of collisions involving vulnerable road users in comparison with the analysis undertaken as part of the original Transport Assessment (TA) (see Planning Appeal Document CD2.9.1).

2.2.31 Due to the short timescales between the issue of data by NSC (28th May 2021) and deadline for submission of the Planning Appeal PoE, a full review could not be undertaken at the time, however I have now included a junction cluster review in **Appendix D**. The results of this analysis confirm that there are no specific concerns regarding the geometric design and road layout of the local highway network.

Walking, Cycling and Horse Riding Assessment and Review (WCHAR)

2.2.32 In para. 4.8.1, Tim Colles notes that a WCHAR was only undertaken for Option 10 Revision 9 and therefore does not provide a review of the proposed scheme in Revision 11.

2.2.33 The WCHAR prepared by C-TAS and included in Appendix D of the original TA (see Planning Appeal Document CD2.9.1) explored in detail the existing facilities for pedestrians, cyclists and equestrians in the local area, and provided background information that has been referred to throughout the design process to date and will be a source of reference for the detailed design stage. The report also identified the improvements for vulnerable users provided by the proposed highway scheme.

2.2.34 In my view, minor alterations in the design of the scheme since Revision 9 will not have any impact on the results of the WCHAR. The only amendments affecting pedestrian, cycling and equestrian provision since Revision 9 were with regard to clarity on pedestrian/cycle lanes and markings, and the decision not to relocate the crossing facility at the Airport northern roundabout, both of which are improvements agreed with NSC.

2.2.35 I conclude that is it is not necessary to undertake an updated WCHAR at this stage, and if even deemed necessary, would be undertaken as part of the detailed design process.

Growth Scenarios

2.2.36 Tim Colles states in para. 4.10.1 that the Slower Growth Scenario considered in the Transport Assessment Addendum (TAA) (see Section 2.4 of Planning Appeal Document CD.2.20.4) will result in additional background traffic growth which will worsen the performance of junctions, and that an assessment is required to ensure the surface access infrastructure is adequate.

2.2.37 I have demonstrated as part of the TA and TAA that junctions were already tested under worst case assumptions in the Core Scenario (eg double counting of airport traffic as a result of adding background traffic and development traffic, busiest time of the year, lower passenger group size, mode share for development traffic assumed at 17.5% when CAA shows that this is closer to 22%).

2.2.38 I have also demonstrated that the Slower Growth scenario would only have a very small, almost negligible, impact on traffic flows (a c.1% increase in AM and PM peak hour flows). I do not believe this warrants any further testing, especially since I have already tested a series of worst case assumptions meeting the requirements of NPPF and the NSC core strategy.

Outstanding technical concerns

A38/ Bristol Airport Northern Roundabout (Junction 1)

2.2.39 Mr Colles suggests that (para. 4.12.2) that the width of pedestrian/cycle routes appears to be substandard on either side of the A38 and would not facilitate the increased walking and cycling mode share ambition, and *‘would raise safety concerns as there wouldn't be sufficient room for pedestrian and cyclists to pass safely.”*

2.2.40 The scheme in fact provides a new 3.5m shared footway/cycleway on the western side of the A38 between the airport roundabout and Downside Road. Although no improvements can be made on the eastern side due to physical constraints and existing property boundaries, there is an existing foot/cycleway in that location. Whilst the existing facility would not meet updated guidelines in terms of width, I am satisfied that the scheme does not raise safety concerns and is more than adequate to facilitate increased walking and cycling. This is because:

- Pedestrian and cycle flows are very low in this location (no more than 10 pedestrians and 0 cyclists per hour observed during the busiest peak time – see **Appendix E**) meaning that there would be ample room for pedestrians and cyclists to pass safely;
- The new pedestrian/cycleway is 3.5m wide, above the recommended width in LTN 1/20 and connects all the way through to Downside Road.

- The existing pedestrian/cycleway along the eastern edge of the A38 would be very difficult to widen, but in itself, is of adequate width for the flows experienced and will benefit from the complementary new facility on the western side which does not currently exist

2.2.41 Mr Colles also states (para. 4.12.3) that *"It has not been demonstrated that level differences can be achieved either using retaining walls or embankments. Without this level of detail, it cannot be determined if the scheme is deliverable and therefore the impact of the Proposed Development may not be adequately mitigated.*"

2.2.42 A topographic survey was undertaken to establish exiting levels and the scheme design was based on an understanding of these differences. These levels are included in the CAD drawing provided to Mr Colles on 8th June 2021.

2.2.43 The design incorporates an allowance for embankments and retaining structures, as necessary. There is a maximum c. 2m level difference between the widened roundabout and cycleway in the northwest corner of the junction, and the Airport car park land. Whilst the scheme drawing does not show the detail of embankment levels (since these will be fully worked up at the next stage of detailed design), this is shown indicatively as 'proposed soft landscaping' on the Scheme drawing, and allows for a min c.6m embankment at a 1 in 3 slope, which will be more than sufficient to ensure the scheme is deliverable. This land is also entirely within adopted highway or Airport land.

2.2.44 Mr Colles states (para. 4.12.5) *"Capacity results in Table 5.1 of the TAA confirm that the A38 exceeds acceptable capacity thresholds on the A38 Northern and Southern approaches. The northern arm operates with an RFC of 0.94 and the southern arm with an RFC of 0.89."*

2.2.45 I have explained why in paras 2.1.8 and 2.1.9 that 'acceptable capacity thresholds' are subjective and must take account of other circumstances, such as the worst case traffic forecast assumptions made in the TAA, and the fact that the Core Scenario Test Case 2030 is for the busiest month of the year for passengers (August) applied to a busier background traffic month (June), and also allows for a peaked traffic profile within the peak hour. Therefore, any predicted queues or delays will be lower for the vast majority of the time.

2.2.46 The Core Scenario Test Case presented in the TAA reflects these worst case conditions, and even then, only shows a maximum queue in part of one peak (PM) on one arm of the junction (A38(N)) of 14 vehicles across 2 lanes (Table 5.2), with significant reserve capacity shown in the AM and IP periods.

2.2.47 Mr Colles also fails to acknowledge that the widening of the northbound A38 exit at the roundabout from one lane to two lanes will significantly improve capacity for the through traffic on the A38.

2.2.48 The test undertaken also assumes that a large proportion of airport traffic continues to use J1 for car park and other access. In reality, by the time 12mppa is reached the proposed additional passenger car parking will be needed in Silver Zone (accessed via J2), along with all of the staff parking, thereby reducing the flows through J1. A revised assessment of the likely proportion of traffic and updated junction capacity assessment to account for this redistribution, but still applying the worst case assumptions, is included in paras. 5.6.16 - 5.6.18 of my Planning Appeal PoE (see Planning Appeal Document BAL/4/2). These show that the junction would operate well within capacity in the AM and IP peak periods, and with the A38(N) queue reduced to under 4 vehicles in the PM peak period.

2.2.49 By way of example, I have further tested the junction after removing the 'double counting' effect of growthing up existing airport traffic, and rather than only presenting the worst case, the results would have shown a reduction in RFC and queues as summarised in Table 2.1 below, with all approaches well within capacity (RFC below 0.85). Full outputs have been included in Appendix F.

Table 2.1 – Updated J9 Results (A38/ Bristol Airport Roundabout Improved Layout)

Arm	**AM**			**IP**			**PM**		
	Queue (PCU)	Delay (s)	RFC (%)	Queue (PCU)	Delay (s)	RFC (%)	Queue (PCU)	Delay (s)	RFC (%)
A38 (N)	1.1	3.09	0.52	1.3	3.55	0.56	2.7	5.52	0.73
Easirent Car Hire Access	0.0	5.11	0.02	0.0	6.07	0.03	0.1	10.07	0.06
A38 (S)	2.4	6.89	0.7	1.8	5.98	0.63	5.1	14.14	0.84
Bristol Airport Access	0.4	3.74	0.24	1.1	4.55	0.5	1.3	6.02	0.56

2.2.50 This clearly demonstrates that, considering the range of possible future scenarios and resulting junction assessment outputs, the proposals accord with NPPF, CS10 and CS23.

A38/ Downside Road (J4a)

2.2.51 Mr. Colles makes the same points as those made regarding Junction 1 (para. 4.13.1)

2.2.52 As previously noted, the proposed pedestrian/cycle route width is 3.5m on the western side of the A38 between Downside Road and the Airport roundabout, and along Downside Road until it re-joins the carriageway, exceeding the LTN1/20 guidelines and providing a c. 350m long new facility. The width remains as existing on the eastern side of the A38 to maintain the existing facility, although improvements to signage and vegetation clearance are proposed. NSC officers agreed that widening of the A38 eastern side route was not required.

2.2.53 The provision of new crossing Toucan points at the A38/Downside Road junction that do not exist today create a completely new pedestrian / cycle connection for those wishing to access the airport representing a substantial improvement over the current situation.

2.2.54 The proposed width of the footway to the north of Downside Road is 1.8m, which exceeds the minimum footway width of 1.5m set out in Inclusive Mobility.

2.2.55 Whilst the signal crossing widths shown on the drawing are slightly lower than the DMRB recommended widths for toucan crossings (2.4m vs 3.0m), the pedestrian and cycle flows at this junction are exceptionally low (5 pedestrians and 0 cyclists crossed the A38 in the PM peak, the busiest of the peak hours surveyed (see **Appendix C**). In addition, the widths could be increased as part of the detailed design process, if required.

2.2.56 I am satisfied that the scheme does not raise safety concerns and is more than adequate to facilitate increased walking and cycling.

2.2.57 In terms of the level differences and constructability of the Scheme (Colles 4.13.2), the scheme design has been developed using a topographic survey base, hence the level differences have been taken into account.

2.2.58 The eastern carriageway of the A38 is not being altered, so these levels will remain as per existing, (as previously agreed with NSC officers – **Appendix C**).

2.2.59 The western carriageway will be widened and this will require the demolition and reprovision of the retaining wall between Downside Road and West Lane, where existing level differences of up to c 1.5m arise, the adjacent land being lower than the road. The indicative extent of the replacement wall is shown on the Scheme drawing. This lies well within the red line boundary and the proposed land to be acquired as part of the associated CPO.

2.2.60 To the south of Downside Road the adjacent land to the west is up to 1.0m higher than the carriageway, hence a small cutting will need to be provided, as illustrated on the Scheme drawing. This lies well within the red line boundary and the proposed land to be acquired as part of the associated CPO.

2.2.61 Sufficient land is also proposed to be acquired as part of the CPO to regrade the Airport Tavern access to ensure a safer new access.

2.2.62 In each of the above cases additional land to facilitate access for construction is also allowed for. It is clear to me that the level differences can be achieved through appropriate provision of retaining walls, cuttings and embankments and that the scheme is deliverable.

2.2.63 Mr. Colles states (para. 4.13.3) that with regard to Access to Lilac Cottages, *"this manoeuvre appears to be very tight and there is no swept path analysis to demonstrate if this manoeuvre can be made."*

2.2.64 It is proposed to maintain access to the properties at Lilac Cottages, on the east side of the A38, as per the existing arrangements including restricted the turns, with a minor improvement to the kerbline where possible. This has been previously accepted by NSC (**Appendix C**).

2.2.65 Mr. Colles states (para. 4.13.4) that *"Junction capacity results for the PM in Table 5.7 of the TAA confirm that the A38 (N) is very close to a PRC of 90%. Main pedestrian and cycle crossing facilities from east to west not accounted for in the operation of the signals. Addition of pedestrian crossing facilities is likely to result in the junction exceeding the acceptable PRC and experiencing long queues and delays."*

2.2.66 I would reiterate that the Scheme delivers a substantial reduction in queues and delays comparing the Core Scenario Reference Case (no development) with the Test Case (with development and improvement). Even though it is approaching capacity in the worst case Test Case in one peak period (PM peak only), for the vast majority of the time it will be operating well within capacity.

2.2.67 In terms of modelling pedestrian crossing facilities, the junction testing methodology was agreed with NSC and Jacobs TN011, Para 1.2.1 (CD 3.4.2 pg. 20).

> *'Modelled staging sequence omits pedestrian stage, although, again, given infrequent usage. This is acceptable;'*

2.2.68 The peak observed pedestrian flow at this crossing was 5 people in the PM peak hour in 3 groups (ie that crossing stage was 'called up' 3 times in the hour). Notwithstanding the above, I have updated the worst-case PM peak assessments to allow for the crossing being called up between 5 and 6 times per hour. The results of this assessment demonstrate that the junction would still operate within capacity. Full modelling outputs are included in **Appendix G**.

2.2.69 I have made clear in my PoE that the improvement scheme already delivers a significant increase in capacity compared with the 'no development' Reference Case tests including a substantial reduction in both queues and delays. The junction operates with reserve capacity in all peak periods for the Revised assessment Test Case. This is the case, even accounting for the robust traffic flow forecasts applied, and the junction would clearly continue to demonstrate a substantial increase in capacity under the Slower Growth Scenario. This is based on the fact that the slower growth would only increase flows by 1.0% (AM), 1.7% (IP) and 1.1% (PM).

2.2.70 I conclude that the junction has been designed in accordance with standards and that any minor changes can be made at the detailed design stage. The scheme is readily deliverable within land that is subject to the associated CPO, and it complies with NPPF and the NSC Core Strategy.

A38/ West Lane (J4b)

2.2.71 Mr. Colles makes the same points as those made regarding Junction 1 (para. 4.14.1).

2.2.72 A 1.8m wide pedestrian footpath is to be provided between Downside Road and the West Lane junction on the western side of the A38 where it will meet a new signal controlled pedestrian crossing point to the north of West Lane. A 1.8m wide pedestrian footpath will then be provided to the north of West Lane as part of the Scheme. These widths meet the guidelines for pedestrian facilities.

2.2.73 Mr. Colles states (para. 4.14.5) that *“Sufficient length is required to merge two ahead lanes into a single lane - merge lane has been measures to be approx. 60 m (a third short than required).”*

2.2.74 I have measured the distance from the end of the intervisibility zone and point at which the A38 returns to a single lane width (Ref 4.14.4 of Mr Coles evidence) on the Scheme CAD drawing. This is shown to be over 100m, in accordance with standards (para. 7.10.1 of CD 7.3.4). I have also indicated (**Appendix H**) how a minor ‘detailed design’ modification to the scheme could be made to clarify this for drivers, whilst also extending the length of the two-lane southbound approach to increase the two-lane section to c.85m. This modification is well within the red line and CPO extents. In terms of lane usage, the assessment already assumes the majority of ‘straight- ahead’ traffic will use the nearside lane at the signals.

2.2.75 Mr. Colles states (para. 4.14.6) that *“Splitter islands seem to be substandard and not sufficient to accommodate signal heads or to allow the safe maintenance of signal heads.*

2.2.76 The central splitter islands (on the A38) are between 1.3m – 1.5m width, which can accommodate the required signal heads and is in accordance with standards.

2.2.77 Mr Colles states (para. 4.14.7) that *"Splitter island in the centre of West Lane appears to be along the alignment of the A38 kerb line but is required to be set back by 1.5m to ensure vehicles don't collide with it."*

2.2.78 I agree that the West Lane island will either need to be set back as part of the detailed design process, or an alternative location for the signal head found, if required (either a cantilever pole mounted or the A38 central island).

2.2.79 Mr. Colles states (para. 4.14.10) that *"Junction capacity results for the PM in Table 5.7 of the TAA confirm that the A38 (N) is very close to a PRC of 90%. Main pedestrian and cycle crossing facilities from east to west not accounted for in the operation of the signals. Addition of pedestrian crossing facilities is likely to result in the junction exceeding the acceptable PRC and experiencing long queues and delays."*

2.2.80 As noted above in para. 2.2.67, NSC (and Jacobs) agreed that it was not necessary to model pedestrian stages due to the very low observed flows. Maximum peak hour pedestrian crossing flows of 2 people were observed at West Lane in a single group. This would require the stage to be 'called up' once in an hour, effectively reducing the 'green time' available to traffic by c.13 seconds in an hour.

2.2.81 Notwithstanding the above, I have updated the worst-case PM peak assessments to allow for the crossing being called up between 5 and 6 times per hour (based on the **Appendix H** minor modification). The results of this assessment demonstrate that the junction would still operate within capacity (**Appendix F**).

2.2.82 Mr. Colles states (para. 4.14.11) that *"Demonstration of the operational performance of the junction under the Slower Growth Scenario is required."*

2.2.83 For the reasons stated in 2.2.37 and 2.2.38, I do not believe this is necessary

2.2.84 I conclude that the junction has been designed in accordance with standards and that any minor changes can be made at the detailed design stage, as agreed with NSC officers and reported in the Committee Report, the scheme is readily deliverable within land that is subject to the associated CPO, and that it complies with NPPF and the NSC Core Strategy.

A38/ Barrow Street (J5)

2.2.85 Mr. Colles states (para. 4.15.1) *"No justification as to why user defined saturation flows have been entered instead of default saturation flow calculation based on geometry (RR67)."*

2.2.86 The model parameters were agreed with NSC and Jacobs. TN016 'Model Validation Report, prepared and submitted to NSC in February 2019, included justification and calculations for the use of user-defined saturation flows at this junction. Where sufficient queuing was observed on the main junction approaches, the saturation flows have been measured, otherwise RR67 has been utilised. The geometric measurements for RR67 were taken from the OS mapping of the junction. A summary of the RR67 and observed saturation flows at this junction was included in Table 3 of TN016, these are also shown in Table 2.2 below:

Table 2.2 – Junction 5 Saturation Flows

Arm	Lane	RR67				Measured SatFlow	Used in Model
		Width	**Nearside**	**Radius**	**Sat Flow**		
A38 West	1/1	4.00m	Yes	10m (L)	1752	Insufficient data	**1752**
	1/2	3.00m	Yes	-	1915	2240	**2240**
	1/3	3.00m	No	-	2055	2440	**2440**
B3130 Barrow St	2/1	3.80m	Yes	10m (L) 20m (R)	1758	Insufficient data	**1758**
A38 East	3/1	3.50m	Yes	-	1965	2250	**2250**
	3/2	3.50m	No	-	2105	2440	**2440**
	3/3	3.40m	No	10m (R)	1822	Insufficient data	**1822**

2.2.87 The approach taken and results presented demonstrate compliance with NPPF and NSC CS10 and CS23.

A38/ Barrow Lane (J6)

2.2.88 Mr. Colles notes that this junction is over capacity, but does not acknowledge that this is an existing situation, or that the airport will not add any traffic to Barrow Lane.

2.2.89 As I indicated in para. 5.7.5 of the TAA (see Planning Appeal Document CD2.20.3), any capacity improvements to Barrow Lane could lead to negative outcomes by promoting rat running on this route and increased delays to A38 strategic traffic. Some traffic using this route is more likely to reassign to an alternative route if such long queues actually arose.

2.2.90 NSC officers agreed that no improvements were necessary at this junction in the knowledge that there could be long queues on Barrow Lane in both the Reference Case and Test Case.

"This junction operates slightly above capacity in the 2018 baseline PM peak period. With additional of growth up to the 10 mppa baseline the junction is expected to operate over its capacity in all three modelled periods, with some queueing likely. In 2026 at 12 mppa further

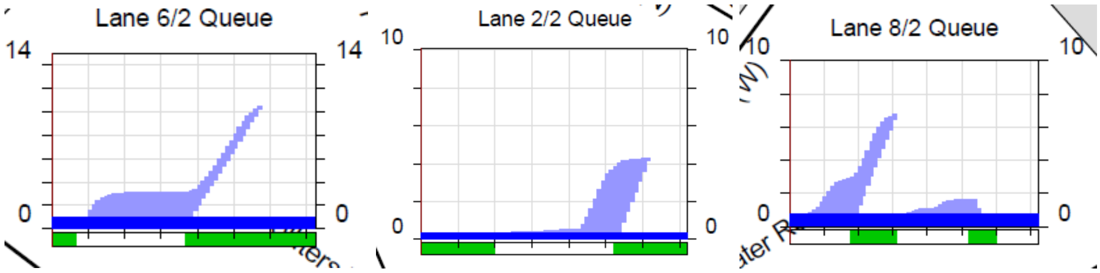
queueing is expected, although platooning of traffic on the A38 would result in additional gaps for Barrow Lane traffic to make use of. On balance, no mitigation of this junction is necessary."

A38/ A4174 South Bristol Link (J7)

2.2.91 Mr. Colles states (para. 4.17.1) that *"The results provided in Appendix J show that in the AM and PM peak hours, internal queues exceed the lane lengths on several arms. The signalised roundabout would therefore become blocked and not operate within capacity. The junction capacity analysis therefore needs to be corrected which is expected to demonstrate the junction does not work within capacity and would therefore be contrary to policies NPPF Paragraph 108. c), CS10 and CS23 and would result in an unstable network affecting journey time reliability resulting in unacceptable queues and delays."*

2.2.92 The LinSig models were set up agreed with NSC and Jacobs. A more detailed examination of the LinSig output clearly shows that that the maximum queues Mr Colles states would block the roundabout are simply 'moving queues' of traffic discharging during a green wave on the roundabout. The peak queues are there for a matter of seconds and are fully discharged (cleared) during each green wave. Entry and circulating green phases are synchronised to ensure that main traffic flows are not arriving at internal stoplines when a red signal is displayed, so no blocking will occur (**Appendix I**).

Figure 2.1 – LinSig Queue Charts (2030 Test Case – PM Peak Period)



A38/ A368 (J13)

2.2.93 Mr. Colles states (para. 4.18.1) that *"Capacity results in Table 5.11 of the TAA confirm that the A38 Bristol Road, A38 New Road and A368 Bath Road exceed the PRC with maximum DoS of 99.8% and queues of 35 vehicles/ PCUs."*

2.2.94 I have reported that the operation of this junction is marginally affected by the airport traffic associated with the 12mppa application based on the relatively low predicted increases in queues and delays compared with the Reference Case. This was supported by NSC officers as set out in the Committee Report (see Planning Appeal Document CD4.11), which states:

"This junction is currently operating at its operational capacity, but the modelling results project that the extra impacts arising from this proposal is insignificant."

2.2.95 Mr. Colles states (para. 4.18.2) that *"No justification as to why the Bonus Green feature has been used to increase performance. Without this, it is expected that the junction would exceed capacity."*

2.2.96 Mr Colles appears to have misunderstood the use of this feature. The adjustment (termed bonus green in LinSig, but actually applying a reduction per cycle of green time) was agreed with NSC and Jacobs. The rationale for this adjustment was provided in TN029 'A38/ A368 Model Validation' Report, prepared and submitted to NSC in October 2019 (CD 3.6.12).

2.2.97 The adjustment made (-1 sec) and the loss of green time to the traffic phases is to reflect the occasional 'call up' of pedestrian phases. This is an established modelling method of dealing with demand activated crossings which are not called up regularly in the model period. The -1 sec loss every cycle time for the traffic phases equates to the lost time that they would have experienced and is based on the actual video footage of the junction. TfL guidance, to which Mr Colles refers, recommends the use of this methodology as part of their Model Auditing Process (MAP).

2.3 Parking

2.3.1 This section outlines issues raised by Tim Colles in Section 5 of his PoE, together with my responses to these.

2.3.2 Mr Colles makes a series of policy points (5.1.3) suggesting that parking needs to be restricted to promote more sustainable travel. I have set out in my PoE that the parking levels proposed by BAL already reflect a constrained level of provision relative to demand. I would also note that NPPG, to which Mr Colles refers (3.1.5) states that:

'While Travel Plans are intended to promote the most sustainable forms of transport, such as active travel, they should not be used to justify penalising motorists – for instance through higher parking charges, tougher enforcement or reduced parking provision (which can simply lead to more on street parking)…... Maximum parking standards can lead to poor quality development and congested streets, local planning authorities should seek to ensure parking provision is appropriate to the needs of the development and not reduced below a level that could be considered reasonable.'

2.3.3 Mr Colles asserts that (5.1.4) *'The parking studies have assumed no change in the provision of unofficial offsite airport parking'* and that *'…unofficial offsite car parking will always be able to undercut on site airport parking and therefore there will remain a demand for it and it will continue to be provided'*

2.3.4 The parking studies do assume demand for off-site parking will continue to be a factor, as acknowledged and accounted for in the Teneo parking demand forecasts (set out in the PDS update) showing a total peak demand of some 30.2k spaces in the 2030 Test Case (Fig 15), of which only 22.2k is BAL parking (Table 5).

2.3.5 Mr Colles is incorrect to state that (5.2.3) *'The parking provision is based on applying a historic ratio of supply to demand at the airport'.* Teneo has stated that the parking demand is based on actual usage (demand/occupancy ratios), not available supply (PDS para 1.6).

2.3.6 Mr Colles asserts that the PDS update does not take account of the latest CAA data on mode share resulting in overforecasting parking demand. The PDS 2020 makes it clear that the data has been updated based on 2018/19 parking data and the 2019 CAA data (Para 1.2 of PDSU) which will include the impact (amongst other things) of mode share on 'likelihood to park', Table 1 of PDSU.

2.3.7 Mr Colles is also wrong to state that (para 5.2.5) the PDS 2020 is based on a 17.5% PT mode share. The paragraph of the PDS 2020 to which Mr Colles refers clearly relates to the historic bus ticket data approach, but goes on in the following paragraphs to set out that the PDS update applied an uplift of 2.5% in PT mode share relative to the 2019 level (para 5.3 and 5.5), not 17.5%

2.3.8 Mr Colles asserts further *'deficiencies'* in the PDS, which I address below.

Operational Utilisation

2.3.9 Mr. Colles states (para. 5.3.3) that "*An operational utilisation of 95% is not justified in the Parking Demand Study but is considered in IStrucE's Design recommendations for Multi-storey car parks and underground car parks, dependant on the size and turnover of the car park. This is generally appropriate for, and related to, a high turnover car park of 100% vehicle turnover in an hour, as confirmed by paragraph 3.1.2 of IStrucE's Design Recommendations."*

2.3.10 The design recommendations mainly relate to design considerations such as structural layout, bay and aisle widths, ramp widths and configurations etc, and only relate to multi-storey and underground car parks, not large, long stay, surface car parks, such as those at Bristol airport. However, Mr. Colles is correct that the above recommendations include capacity guidance for self-parking high turnover car parks, such as busy short stay shopping centre car parks in town centres where people are regularly entering and leaving spaces. In these circumstances, it is deemed relatively easy to find a space (100% turnover of spaces assumed in an hour), but even then, the guidance recommends a 5% reserve to allow for people missing vacated spaces.

2.3.11 The management of long stay valet block parking is however completely different. Turnover is per space is low but there needs to be sufficient flexibility to allow for cars to be accessed at any time should flights be delayed, or passengers return early. The regular maintenance of bays also needs to be taken into account.

2.3.12 In any event, the Teneo forecasts for 2030 at 12mppa, show a peak demand of 22.2k spaces against a proposed supply of 22.3k spaces (PDS 2020, Table 5). This is less than a 0.5% operational reserve, so this factor clearly hasn't been applied or relied upon in assessing future parking need.

Demand to Capacity Ratio

2.3.13 Mr. Colles states (para. 5.3.8) that *"The maximum parking demand is quoted as 15,000 cars in 2017 (Parking Demand Study, section 1.3) when the capacity was 16,800 spaces (Parking Demand Study, fig. 6). This equates to an operational utilisation of 89%. If this operational utilisation was applied to the proposed demand, it will result in a further significant overprovision in spaces."*

2.3.14 The operational utilisation (demand/supply) is not used at all to establish forecast peak demand, so the above assessment and Mr Colles calculations in his Appendix A are flawed.

2.3.15 The parking model produces a monthly forecast demand for parking. A baseline model validation check is carried out to ensure that the 'modelled' monthly demand is a close match to the actual monthly demand (**Appendix J**). This shows (for the 2017 dataset) that forecast monthly demands are typically withing a few percent (+ or -) relative to actual demand.

2.3.16 The model is then growthed up using passenger forecast and distribution data in the way set out in the PDS.

2.3.17 The peak forecast demand (max daily accumulation of parking spaces used) is then based on the ratio of peak occupancy (actual spaces used) to monthly total demand (monthly cars parking). This is the OD ratio that is taken from the observed data.

2.3.18 An example of how this occupancy to demand ratio (OD) used in the PDS and PDS Update is calculated as shown in Table 2.3 using September 2017 data. The annual dataset is included in **Appendix J** along with equivalent modelled data.

Table 2.3 – O/D Calculation Steps

Year / Peak month	2017 / September	Calculation step
Actual Peak occupancy (cars)	15.16k	Take peak occupancy for each month, based upon daily on-site car count. Exclude areas not relevant to park & fly, such as staff, visitor and hotel
Actual Demand (P&F only; cars)	67.29k	Establish the monthly total number of cars parking on the BAL site from ticket barrier data/sales (again, excluding areas not relevant to park & fly) - this represents total demand
O/D ratio calculated (peak spaces/monthly cars)	23.0%	Therefore calculate the peak O/D ratio for the month. This represents the ratio applied to monthly demand to derive the number of spaces required to be able to satisfy peak daily parking space accumulation in the month

2.3.19 A validation check was undertaken to check that peak forecasts are within 5% of actual data.

2.3.20 This factor of 23% (for September) is then applied to the modelled future year forecast monthly demand for spaces to derive a peak daily accumulation (ie minimum number of spaces needed to accommodate demand).

Growth in Parking Provision Relative to Passenger Numbers

2.3.21 BAL is proposing a gradual reduction in parking spaces per passenger over time. There will be peaks and troughs within this provision year on year as new parking facilities are opened or changes to operational layout affect supply. In 2019, the airport provided 17,700 spaces for 8.96M passengers, which equates to 1975 spaces per 1M passengers. By 2030, it is proposed to provide 22,300 spaces for 12M passengers which equates to 1858 spaces per 1M passengers. This is a reduction of 6% overall.

2.3.22 The 18,100 spaces Mr Colles refers to applies to a point in time in working towards the full provision (at 10mppa in 2024) if the 12mppa consent is granted (shown in Table 4 of the PDS 2020 update). It shows how the trajectory towards 22,220 would be achieved allowing for other internal airport masterplan layout and operational changes. At that point in time, a deficit (undersupply) of spaces of 900 is also shown (Table 5 of the PDS 2020 update in CD 2.23).

2.3.23 In reality, and as reported by NSC in the Committee Report (page 32 in CD 4.11), the airport actually has planning permission for 18,700 spaces for 10mppa which it would be expected to implement. This equates to 1870 spaces per 1M passengers. This is a reduction of 5% compared with the 2019 provision.

Sustainable Transport Mode Share

2.3.24 Mr. Colles states (para. 5.3.11) that "The Parking Demand Studies are based upon a Sustainable Transport Mode Share of 12.5% with a sensitivity test of an increase to 15% (Parking Demand Study 2018, section 1.8).

2.3.25 Mr Colles is incorrect to imply that this applies to the 2020 update report. The PDS update uses 2019 as its base year including updated parking data and CAA data for that year. As I described in 2.3.5 and 2.3.6 above, The update applies an uplift of 2.5% to the PT mode share inherent at the time the new baseline data was collected (ie 2019). This therefore reflects the CAA PT mode share of 21.8%.

2.3.26 Furthermore, the increase in public transport mode share is not necessarily reflected in a similar reduction in car parking demand. BAL is committed to the introduction of measures aimed at reducing the proportion of car trips to Bristol Airport, on the basis of the hierarchy set out in 4.5.1 and 4.5.2 of my evidence. This means that a proportion of the additional PT trips will have previously been drop-off or taxi trips.

2.3.27 Mr. Colles states (para. 5.3.12) that *"The Parking Demand Study considers a 'super sensitivity' scenario in Section 1.8 where a sustainable transport mode share of 29% would result in the Silver Zone Extension Phase 2 not being required. The Parking Demand Study considers a 29% sustainable transport mode share to be an unrealistic scenario but the latest CAA data of a 21.8% mode share shows that it could be achievable if sustainable mode share is maximised, resulting in the Silver Zone Extension Phase 2 not being required."*

2.3.28 The 2018 PDS assumed a baseline PT mode share of 12.5%, therefore the 'super sensitivity' scenario that is considered unrealistic reflected a 16.5% increase in PT mode share, which I do believe is unrealistic. I have set out in my PoE, para 6.5.17 (BAL/4/2), that that the Airport could theoretically achieve up to a 2.9% increase in public transport share as a result of the successful implementation of all of the proposed Airport Surface Access Strategy (ASAS) strategy measures. I believe a target of even 7% is unrealistic.

Inconsistencies with Transport Assessment

2.3.29 Mr. Colles states (para. 5.3.13) that *"The Parking Demand Study states in section 1.2 that 'One of the key reasons why the parking demand has increased at the airport is the introduction of new airline routes and higher frequencies, attracting passengers from a wider catchment area. Customers drawn from beyond the immediate Bristol area are considerably more likely to drive to the airport due to the comparative availability of direct parking transport links.' This is at odds with the TAA (2.3.6) which has assumed the increase in passenger numbers will have an increased sustainable mode share. It is my opinion that passengers will be attracted from a wider catchment area as the airport grows and therefore less likely to benefit from sustainable transport opportunities and this should be reflected in the TAA."*

2.3.30 The statement in the PDS is not at odds with the TAA at all. Section 1.2 of the PDS refers to historic trends at the airport, explaining why the extended catchment might increase the propensity to park.

2.3.31 The statement Mr Colles makes also contradicts that made in relation to parking where he suggests that that a much higher PT mode share target (29%) could be achieved. Notwithstanding this contradiction, the TAA has been assessed on the basis of a 17.5% PT mode share for the uplift in passengers from 9.6 to 12mppa only. This is actually a reduction in PT mode share compared with CAA data, therefore reflecting a robust highways impact assessment, and is in no way inconsistent with the approach taken in the parking study. The TAA simply reflects worst case highways impact (based on the approach agreed with NSC officers), and the other a conservative assessment of parking demand.

2.3.32 Mr Colles ultimately suggests a much lower parking demand forecast than that shown in the PDS 2020 update forecast. In summary, Mr Colles revised forecast (Appendix A) is flawed because:

- The current CAA mode share (c.21.8%) is inherent in the parking forecasts with an additional 2.5% shift assumed, so no adjustment should be made to reflect increased PT use
- The proposed supply exceeds forecast demand by less than 0.5%, so no adjustment to allow for near 100% utilisation is necessary
- The demand to capacity ratio is not used in the way he assumes at all in the forecasts, so no adjustment should be made to reflect this
- The growth in parking numbers per passenger is lower than at present, and lower than the consented provision at 10mppa, so no adjustment should be made to reflect this
- The sustainable transport mode share increase of 2.5% has already been applied to the parking forecasts, and in any event, a 1% increase in PT share does not translate into a 1% reduction in parking demand, since a significant proportion will be a switch from taxi and drop-off trips

2.4 Public Transport

2.4.1 Mr Colles States (para. 5.1.3) that '*BAL have not updated their ASAS as part of the application but state it would be secured through the proposed Section 106 Agreement. This does not convey ambition to maximise sustainable mode share and is a missed opportunity to demonstrate their commitment. It also doesn't meet the policy requirements of the APF and Aviation 2050 to have an up to date surface access strategy.'*

2.4.2 Whilst BAL hasn't published an updated surface access strategy, it has shown significant commitment to maximise PT mode share, and has acted positively to secure and implement the type of measures that an ASAS would include. An example of these is summarised in **Table 2.4** overleaf, but this is not the full list of measures BAL has undertaken.

Table 2.4 – ASAS Implemented Measures

ASAS Measure	2016	2017	2018	2019
Service Improvements on BAL Services (A1,A2,A3)	BRS installed ticket vending totem and real time bus info with an aim to raise awareness of public transport and drive ticket sales. Remainder of contribution towards MetroBus and South Bristol Link paid.	New A1 flyer contract. A1 vehicle type changed from single to double decker to a higher spec providing additional capacity and comfort. Frequency of 10 minutes on A1 has increased the number of seats per hour. A2 was introduced to provide a direct service to and from the airport for intermediate stops between Bedminster and the Airport. Additional two A2 buses per hour serving the Aiport and journeys to include and accommodate Airport staff. Introduced A3 service to link WSM and Bristol Aiport directly.	Metrobus starts. New A1 Direct route. A2 begins to replace old route and provide service for staff. Signage upgraded at the airport, Temple Meads and Bus Station. Timetable review to enable more regular buses and stops. A2 introduced to cover old route A1 route. Extra Forecourt Totem installed to encourage passengers to book quickly and hassle free before boarding. Agreed a pupil discount with Weston College to encourage students to travel by bus from the local area and reduce car journeys travelling to and from. A2 buses were introduced at a higher spec.	Rewards emails with promo codes to encourage public service travel. Screens in baggage reclaim and landside showing available routes, timetables and advertising services. Voice recordings of stops and instructions added to A1 and A3 services. Installed a totem in the baggage reclaim area so encourage passengers to book onward transport.
Service Improvements for Bath service and long-distance journeys	Bath Bus Company started upgrade of fleet in 2016 with an aim to have all higher spec vehicles on the road by 2019. This equates to 2 new buses per year on the road running a 30-minute frequency.			Bath Bus Company vehicles in the fleet are now euro 6, so clean air compliant.
Public transport serving local communities (e.g. 121, A5)	£100,000 annual payment (index linked) started for the Public Transport Fund.	£350,000 one-off Section 106 payment public transport infrastructure investment	A5 local bus service amended slightly to reflect the level of demand on the service and at better integration with the onward journey connections, particularly to Weston on the A3 route.	

			Following two parking summits an 8-point action plan developed with stakeholders. £100,000 paid to B&NES in support of the Chew Valley Transport Study	
Drop-off Charges				Drop-off car park fees for 0-10mins increased from £1 to £3.
Concessionary Fare Improvements (e.g. more postcodes added)	Increased postcode reach for concessionary travel on Flyer services.			
Workplace Travel Plan	A survey was undertaken in 2015 and a new Travel Plan was published in January 2016.		Draft Workplace Travel Plan produced in December 2018 as an update to the 2016 version and to inform the 12mppa planning application.	
Airport Transport Forum	Meeting held 11/05/2016	Meetings held 22/01/2017 and 10/05/2017	Meetings held 01/2018, 15/08/2018, 11/12/2018.	Meetings held 24/01/2019, 15/05/2019, 21/11/2019
Steering Group	Meetings held: 25/01/2016, 03/03/2016, 04/04/2016, 11/07/2016	Meetings held: 05/2017	Meetings held: 14/05/2018	Meetings held: 19/07/2019

2.4.3 I believe NPPF, PPG, APF and DM26 objectives in terms of travel plan commitments have been met by BAL.

2.4.4 In addition to an updated ASAS, BAL has committed to the delivery of a whole range of new sustainable travel measures as outlined in Section 4.5 of my evidence including delivery of the PTI as part of phase 1 of the Development.

2.4.5 Mr. Colles states (para. 5.2.5) that *"When considering the above opportunities to improve and enhance existing services, increase bus frequency, catchment, patronage, PTI, pricing and walking and cycle facilities, it is my opinion that a mode share increase of at least an additional 5% could be achieved. This is a qualitative judgement as BAL have not provided a quantitative assessment or sensitivity test for the proposed or potential measures, which is a significant failing in BAL's approach to this issue, but nevertheless, I consider this judgment to be sound in the context of the existing mode share and the potential for improvement. To mitigate the impact of the forecast passenger growth to 2030, BAL should target at least a 1% annual increase in mode share."*

2.4.6 A detailed analysis of the likely effects of the proposed ASAS on public transport share and targets has been presented in Section 6.5 of my PoE (Document BAL/4/2). This demonstrates that the Airport could theoretically achieve up to a 2.9% increase in public transport share as a result of the successful implementation of all of the proposed Airport Surface Access Strategy (ASAS) strategy measures by the time 12mppa is reached. It is unlikely that all of the service improvements considered will be as effective as assumed, so there will need to be some flexibility of specific future service delivery based on potential demand. The 2.5% increase in PT is therefore considered a stretch target (but potentially achievable), whereas the target of 5% proposed by Mr Colles is not and would be unrealistic. Similarly, a 1% annual increase target is unrealistic, since it will take several years to build up all of the measures needed to achieve the 2.5% increase BAL proposes.

2.5 Proposed Condition 9

2.5.1 Proposed Draft Condition 9 is not practical or realistic in the context of existing parking pressures let alone future demand. It currently reads:

"Multi-Storey Car Park 3 shall be completed and it shall brought in to use:

- *before the year-round use of the seasonal car park (known as 'Cogloop 1') commences; and*
- *before the construction of the extension to the 'Silver Zone' car park (known as 'Cogloop 2') commences."*

2.5.2 BAL is proposing an alternative Monitor and Manage approach to ensure a balanced approach to growth is achieved in accordance with policy aims. The draft wording of this is:

“To provide a ‘Parking Demand and Capacity Report’ within 12 months of commencement of development and annually thereafter. The report will include:

- *A review of parking demand in the previous 12 months both overall and by product type (including drop-off), including identifying the peak periods of demand, the length of stay and when demand is at or exceeds 95% of existing capacity for more than 4 weeks;*
- *A review of parking capacity on-site, including a projection for the next 12 months;*
- *A review of passenger throughput in the previous 12 months and average percentage growth;*
- *Engaging with NSC to provide a review of parking capacity off-site, including an aerial survey in the month of September;*
- *Identification of any other proposals for airport car parking through monitoring of planning applications to North Somerset Council, Bristol City Council and Bath and North East Somerset Council;*
- *A review on the occupancy of the Staff Car Park;*
- *A review of infrastructure options to accommodate forecast demand over the next 12 months;*
- *Identification of the preferred option to deliver parking capacity.*

This report will be submitted to North Somerset Council for agreement.

Reason: To ensure parking is brought forward in line with demand. To ensure that car parking does not undermine agreed public transport modal share targets. This is in accordance with Policy DM12 of the Development Management Policies Sites and Policies Plan Part 1 2016 and Policy CS10 of the North Somerset Core Strategy.”

3 Sutherland Property & Legal Services Ltd

3.1.1 I deal below with issues raised in Ms Amanda Sutherland's PoE prepared on behalf of Sutherland Property & Legal Services Ltd, with regard to parking.

3.1.2 Ms Sutherland states (para. 9) that *"the 2012 CAA Passenger survey indicated that between 5 and 10% of passengers may be using OACP. The BAL Parking Demand Survey 2018/2019 and recent update all refer to OACP not being within their knowledge but the BAL need assessment purports to include off site provision numbers"* and that *"BAL also assume a reduction of OACP availability in the winter. No evidence to support these assumptions has been disclosed. OACP would operate 24/7 year-round as the airport does."*

3.1.3 The PDS Update 2020 (CD2.23) does not assume any significant reduction in the proportion of off-site parking, since the model allows for competing sites to draw some demand for parking, as shown in Figure 12 of the PDS, suggesting that over 20% of demand will be accommodated by off-airport car park (OACP) providers. The monthly proportion of off-airport parking used in the forecast model is set out below:

Table 3.1 – Monthly proportion of off-site parking (OACP)

Month	% OACP (2019)
January	18.70%
February	20.70%
March	21.70%
April	21.70%
May	23.70%
June	24.70%
July	28.70%
August	28.70%
September	23.70%
October	21.70%
November	21.70%
December	25.70%

3.1.4 As can be seen above, no significant reduction is assumed to the proportion of off-site parking in winter.

4 BALPA

4.1.1 I deal below with issues raised by Mr John Hatton's PoE with regard to staff car parking. Issues with regard to remote parking and flight safety raised in Mr Simon William's PoE have been dealt with in section 4.3.25 onwards of Mr Alex Melling's Rebuttal.

4.2 Additional journey time/ length

4.2.1 Mr John Hatton states (para. 10) that "*Parking in the southside staff car park requires the majority of staff, and all aircrew, to wait for a bus to transfer them to a terminal northside. The transfer takes approximately 7 minutes. Before the current situation, buses used to run every 10 minutes at peak times, reverting to a less frequent service late at night. Crew report times do not take the bus timetable into account, hence crew can be forced to aim for a bus which will get them to work too early. The same problem arises at the end of the working day, so crews often endure a frustrating wait, especially after returning from a long day, in the small hours when buses run less frequently.*"

4.2.2 My position is that, whilst potentially inconvenient, it is not untypical for Airport staff parking to be more remote from terminal buildings that that for passengers, and for staff and aircrew to adjust their travel times accordingly. This is the case, for example, at Stansted (Cooper Ends car park), which is provided with a large staff car park connected to the terminal via a bus that runs every 15 minutes. Mr Melling has included further evidence of this in relation to other UK airports.

4.3 Relocation of Staff Parking to North Side

4.3.1 Mr Hatton states (para. 16) that *"Measuring the spaces and aisles [within the staff car park] it can be seen that each aisle is equal in length to approximately 1.33 standard bays – this makes sense so that cars can be safely manoeuvred into and out of spaces. Removal of three aisles (leaving one for block parking access) means that in contrast to each column in the staff car park accommodating 8 cars, a further 4 cars could be parked (1.33x3), making a total of 12 cars which could be parked per column were the area to be used for block parking, a 50% increase."*

4.3.2 Mr Hatton also states (para. 17) that *"In addition, the area currently used for the staff waiting building and bus turning circle would account for more lost spaces, perhaps an additional 50, were the area to be used for block parking."* and that (para. 18) that *"It follows, that in my view, an additional 40% parking capacity could easily be achieved were the staff car park to revert to Silver Zone parking."* Mr Hatton also states (para. 20) that *"there was an average of 458* *empty spaces in June and 540 empty spaces in July. The MSCP was only 45-53% occupied over these two months."*

4.3.3 It is clear from the parking demand forecast that, whilst there were spaces available in 2019 at 8.9mppa, some 22,200 passenger parking spaces will be need in 2030 for 12mppa. This means that parking is needed across Silver Zone and through the provision of MSCP 2 and MSCP 3 to the north of the terminal. There would be insufficient space for staff to park in the MSCP.

4.4 Revenue Considerations

4.4.1 Mr John Hatton states (para. 29) that *"A BALPA analysis of BAL parking prices during the summer of 2018 indicates that the price charged for northside long stay parking was 1.4x the price charged in the silver zone long stay car park. It has been argued above that at least 1.4 (40%) more cars could be block parked in the Silver Zone were the staff car park area to be reverted to public parking. However, this ratio shows there is no difference in the parking revenue potentially lost to BAL when comparing staff parking in the northside car park and staff parking in an area that could otherwise be used for Silver Zone block parking."*

4.4.2 Demand for the northside, higher cost MSCPs will continue to rise as passenger numbers increase. BAL needs to ensure that balanced customer demand for these premium car parks can be met, allowing for the objective to increase travel to the airport by public transport. I do not believe it would be possible or practical to reduce northside passenger parking, since residual customer demand (allowing for a shift to PT) could not be met.

4.5 Effects on Climate Change

4.5.1 Mr Hatton states (para. 29) that *"A survey of BALPA members showed that 65% approach the airport from the North (survey results attached, Appendix E). The attached map indicates that 65% of staff will need to drive an additional 1.2 miles (0.6 each way – see map, Appendix F) to and from the Southern airport roundabout every time they go to work, 35% approaching from the South will save 1.2 miles per day, the net effect being 30% of airline staff driving extra mileage and creating additional emissions due to the staff car park move."*

4.5.2 Whilst there would be a reduced travel distance for some staff, this would need to be offset by the additional distance travelled by passengers who would otherwise have parked in the northern car parks. The net impact on emissions is therefore likely to be very small.

4.5.3 BAL is also committed to the implementation of a Workplace Travel Plan, which includes measures to achieve a 70% non-Single Occupancy Vehicle (SOV) travel by staff at the airport.

Considering the current SOV share of staff at the airport, which is estimated at 84%, the Workplace Travel Plan target of 70% SOV will lead to a reduction of emissions.

4.6 Unrealistic Targets

4.6.1 Mr Hatton states (para. 29) that *"BAL's public policy is to significantly reduce the number of journeys to work by private car, however given the airport's location and very poor public transport links (despite recent improvements) it is difficult to see how this is a realistic goal for those working shifts with an early start or late finish with no viable public transport route."*

4.6.2 BAL is committed to exploring ways to make it possible for staff to travel to the airport by public transport. This includes a review of staff home locations and shift patterns to explore the potential for new services (including demand responsive shuttle services) in order to improve viability of public transport.

4.7 Impracticality of Car Sharing

4.7.1 Mr Hatton states (para. 32) that *"Travel by sustainable means is a challenge for aircrew. Airline crew will report for flying duties at a different time every day, finish work at a different time every day and work with different people every day. Furthermore duties are often changed at the last minute or flights delayed. These factors make car sharing impractical, indeed even husbands and wives who both work for the same airline will generally avoid sharing a car because of the uncertainty around finish times."*

4.7.2 The staff travel plan co-ordinator will work with all staff to seek to implement a more practical car sharing scheme, potentially including options such as 'guaranteed ride home' if last minute changes arise.

4.8 Low public transport provision

4.8.1 Mr Hatton states (para. 32) that *"There is only one public transport service - the airport flyer - which runs at high frequency from Bristol city centre to the airport that is suitable for airline staff, but very few live close enough to the very limited number of bus stops to make this a viable option. Airline staff live all over the South West and Wales, a survey of the largest airline based in Bristol showed that 36% of pilots and 48% of cabin crew live more than 1 hour away by car (Appendices A and B). Single occupancy vehicle is the only mode of transport that is practical for most airline crew, and the facility to park as close as possible to place of work is obvious."*

4.8.2 Public transport improvements are proposed to be delivered as part of the 12mppa ASAS, which includes the implementation of Weston Flyer improvements, new public transport services to Clevedon and Nailsea, enhanced frequencies to coach services, and integration with rail and the Metrobus network. A high proportion of staff are predicted to live within the areas served by these bus services (1,235 out of the 2,523 staff forecast to working at the airport on any one day by the time it reaches 12mppa – see Table 6.9 of my Planning Appeal PoE in BAL/4/2).

4.9 Health and Safety

4.9.1 Issues with regard to remote parking and flight safety raised in Mr Simon William's PoE have been dealt with in section 4.3.25 onwards of Mr Alex Melling's Rebuttal.

5 XRE

5.1.1 This chapter deals with Ms Liz Beth's PoE prepared on behalf of XRE, providing a response to key issues raised with regard to staff car parking. Issues with regard to remote parking and flight safety raised in Mr Simon William's PoE have been dealt with in section 4.3.25 onwards of Mr Alex Melling's Rebuttal.

5.2 Growth in parking contrary to sustainable transport policies

5.2.1 Ms Beth states (para. 4.1) that *"Providing yet more parking that perpetuates this situation, and with no proposals for a robust public transport infrastructure and pricing mechanism that would significantly improve the situation is not acceptable and contrary to the NPPF (para 103) and the NSCS policies CS1 and CS10."*

5.2.2 My PoE set out the raft of public transport improvements that BAL is proposing (Sect 4.5 and 6). These provide a balanced approach to surface access, but there will still be a need for additional parking. The NSC Committee Report concluded that "the proposed level of on-site car parking at the airport is the minimum required to meet the needs arising from the proposed increase in passenger numbers after the level of public transport use has increased."

5.3 No clear commitment to public transport fare review

5.3.1 Ms Beth states (para. 4.1) that *"There is no firm commitment to a reduction in fares, only that BAL will 'consider the fare structure'. Bus services to the airport are relatively expensive, which mitigates against their greater use, and fare reduction should be a priority for real promotion of modal switch to public transport. The Heads of Terms of the proposed legal agreement to the Application mention a sum of £625,000 for public transport improvements (iv p225) and another sum of £500,000 (vi p226). There is a commitment to continue the underwriting of existing services under the terms of the previous expansion permission and a feasibility study into Metrobus integration, but no commitment. The sums proposed are very small, seen in the context of the extra number of journeys resulting from a 2.5% increase in public transport use (about 600,000 extra public transport journeys a year)."*

5.3.2 BAL proposes to undertake a multi-modal pricing review within 6 months following consent with the scope and methodology to be agreed with NSC. The aim is to ensure options higher up the modal hierarchy (see 4.5 of my PoE) are supported and enabled financially through cost comparison analysis. Furthermore, as part of the Metrobus Service Integration and Network Improvements, BAL will consider a two-zone fare structure with a central zone aligned with Metrobus fares and an Airport fare zone.

5.3.3 It should be noted that the 2.5% increase in PT mode share equates to 300,000 trips (2.5% of 12mppa). The basis for my assessment was to establish whether this increase could be achieved (Sect 6 of mu PoE) based on a series of improvements to/provision of new services. The funding proposed is sufficient to deliver the proposed improvements to PT services assessed.

5.3.4 The public transport improvement funds are, of course, in addition to fare revenue from new services, so will not need to cover the gross cost of services if they are successful. It is also important to stress that many PT services are commercial operations and fares are not under BAL control.

5.4 No clear commitment to deliver PTI

5.4.1 Ms Beth states (para. 4.2) that *"The proposed legal agreement details that a PTI is to be constructed subject to necessary approvals, but there would appear to be no penalty clauses compelling this to be agreed, and construction begun, before other aspects of the permission are allowed to commence."*

5.4.2 The delivery of the PTI will be secured via a S106 planning obligation. BAL commits to delivery of the PTI in phase 1 of the Development along with a phased implementation of the proposed car parking.

5.5 Insufficient work on Parking Pricing

5.5.1 Ms Beth states (para. 4.3) "*Pricing is a crucial component of modal travel choice, and the Officer Report acknowledges that provision of more (relatively) cheap parking could adversely impact on the popularity of public transport (p90 quoted below). However despite this, the provision of more (relatively) cheap parking has been allowed and given first priority. No detailed viability assessment has tested the reasonableness of the current parking strategy and pricing prior to accepting green belt construction as the first priority. This is contrary to the NPPF expectation that development on brownfield land should be preferred (para 117); that all options should be considered before a change to Green Belt boundaries is made (para136 - the extension is effectively a boundary change); and that harm to the Green Belt needs to be clearly justified (para144). The requirement in local and national policy that sustainable transport and genuine modal choice be promoted also required a more rigorous justification for the parking strategy (NPPF para103 and NSCS CS10). The requirements of sustainable development (NPPF para7) require a better transport solution."*

5.5.2 Parking prices vary depending on type, location, time of booking and space availability. I carried out a brief analysis of typical low cost parking prices against bus and coach fares, which was included in paras. 9.4.28 to 9.4.32 of my Planning Appeal PoE (see Planning

Appeal Document BAL/4/2). This suggested that, for the average passenger group size, where public transport was a viable option, this would be cheaper than driving and parking at the airport.

5.6 Need for mechanism for removal of parking provision

5.6.1 Ms Beth states (para. 4.6) that *"There is a statement in the Officer Report (p90) that should BAL fail to deliver the required public transport modal share, they 'would be required to remove parking spaces from use'. The draft legal agreement sets out a proposal for doing this, but it requires mutual consent and offers 'other modifications' besides a reduction in consented parking spaces. It is not certain that parking spaces could be removed from use, and if the development had occurred in the Green Belt, then needless harm would have already been caused to the Green Belt."*

5.6.2 In response to the above, the PDS and PDS Update (see Planning Appeal Documents CD2.11 and CD2.23) identified a requirement for additional car parking provision as part of the Appeal Proposal, which takes into account a 2.5% increase in public transport use by the time the airport reaches 12mppa. BAL is also proposing a Monitor and Manage approach to ensure there is unnecessary provision of parking.

5.7 Impacts of over provision

5.7.1 Ms Beth states (para. 4.6) that *"There are clear indications that the proposed increase in parking is designed to generate a surplus of places that will draw custom from the current unauthorised providers (Parking Demand Survey 2018 paras 6.3 and 7.6). Such over-provision is likely, as admitted indirectly by the Officer Report quoted above, to encourage use of private cars over public transport for journeys to the Airport."*

5.7.2 Car parking forecasts presented in the PDS and PDS Update (see Planning Appeal Documents CD2.11 and CD2.23) show that there will be no surplus of parking provision by the time 12mppa is reached. A Monitor and Manage approach to any new provision is proposed to ensure that a surplus is not generated.

5.8 Alternative to low-cost parking rationale

5.8.1 Ms Beth states (para. 4.6) that *"The discouragement of unauthorised parking in the local area and Green Belt is the main justification for prioritising low-cost parking given by BAL (for example in the Parking Strategy: Wood 2018: para 2.6.13). There is a problem of unauthorised parking operations in the surrounding countryside and green belt, demand for which could be reduced with better and cheaper public transport provision to the Airport."*

5.8.2 It is accepted by BAL that some reduction in demand for parking could be achieved with better, affordable PT provision, and indeed that is reflected in the ASAS hierarchy. However, unless further official planned car parking is delivered to cater for the next hierarchy tier down from PT, then the growing demand for surface parking from passengers will be met by unauthorised car parking in the Green Belt. Issues with regard to unauthorised car parking were raised by NSC officers in the Committee Report (see Planning Appeal Document CD4.11) which states:

"The scale of unauthorised and unofficial off-airport car parking remains a significant planning issue. The Council has been successful in defending planning appeals for unauthorised airport car parking and closing down a number of unauthorised car parks, but it is an ongoing and resource-intensive problem. Typically, the closure of one unauthorised site, often results in another car park sites being set up nearby. Targeted enforcement measures and resources are being secured to deal with this problem more effectively."

6 PCAA

6.1.1 This chapter deals with:

- Nick Tyrell's PoE on behalf of Barrow Gurney Parish Council (BGPC)
- Ronnie Morley's PoE on behalf of Cleeve Parish Council (ClPC)
- Robin Jeacocke's PoE on behalf of Churchill Parish Council (ChPC)
- Peter Longden's PoE on behalf of Winford Parish Council (WPC)

6.1.2 The following sections provide a summary of issues raised by the above with regard to surface access and a response to these.

6.2 Nick Tyrell (BGPC)

Traffic Impacts

6.2.1 Mr Tyrell states (Para. 9) that *"BA state that much of the original Environmental Statement remains valid. A major concern of BGPC throughout its consideration of the expansion proposals has been the impact of the airport's growth on traffic passing through Barrow Gurney village, in terms of congestion, pedestrian safety, air quality and general disturbance. In normal times traffic starts passing through the village as early as 4.00am in association with the high volume of early morning flight departures. We have consistently argued that the road network across North Somerset is overloaded and that expansion proposals will lead to even more traffic using rat-runs through the many rural communities in the area to try to find quicker routes to the airport that avoid the often congested main routes. The principal reason for this is the exceptionally high percentage of people accessing the airport by private car or taxi. The proposals for expansion rely heavily on increased car parking at the airport, much of it on green belt land in its ownership, because the airport relies very heavily on the revenue generated by car parking charges. This will inevitably lead to more rat-running and even greater detrimental impact on Barrow Gurney and numerous other North Somerset villages."*

6.2.2 Detailed traffic forecast and junction testing was undertaken to support the application on the basis of an approach agreed with NSC and Highways England as set out in Section 5 of my PoE. Where necessary, mitigation measures have been proposed and agreed. This was endorsed by NSC officers, who concluded in Issue 9 'Vehicle Trips Numbers and Impact' of the Committee Report (see Planning Appeal Document CD4.11) the following:

"Overall, it is therefore concluded that the proposed development would not have an unacceptable effect in terms of vehicle trip numbers and impacts, subject to the mitigation outlined above. This accords with policy CS10 of the CS and DM24 of the DMP."

6.3 Need for rail link and P&R

6.3.1 Mr Tyrell states (Para. 10) that *"What is needed is an alternative strategy: that is significantly more reliant upon access to the airport from Bristol and other centres by public transport (modal share currently 12.5%). Even at 17.5% (BA's target for future growth) this is paltry compared with most other regional airports; that promotes a Park and Ride facility on the M5 to cater for traffic from the SW, Wales and the Midlands, with a sustainable electric or biofuel shuttle bus link to the airport. This should be on land in the vicinity of J21 that lies outside the green belt."*

6.3.2 The proposed ASAS contains a package of sustainable access measures to reduce reliance on car trips and increase public transport use, as demonstrated in the Draft S106 HoTs summarised in Section 4.5 of my Planning Appeal PoE (see Section 6.5 Planning Appeal Document BAL/4/2).

6.3.3 In addition, PT mode share at Bristol Airport is similar to or better than other regional airports with rail links, as demonstrated in **Section 6.4** of my PoE.

6.3.4 Mr Tyrell states (Para. 11) that *"Public transport from Bristol to the airport is at present exclusively by bus along the A38, which is largely single carriageway road. There is little scope to increase the intensity of the service as a result. The dualling of the carriageway is almost certainly a non-starter owing to the presence of the Barrow Tanks (the large reservoirs that supply water to Bristol) which abut the road on either side along approximately 1 mile of the route. All land adjoining the A38 between Bristol and the airport is green belt, meaning that any road improvements to expand its width would be likely to cause environmental harm. Any proposals to further intensify traffic movements along the A38 would be strongly opposed by Barrow Gurney PC, in particular in view of the impact upon the Naish Lane community, but also owing to the inevitable increase in the associated congestion that already occurs regularly at the peak aircraft arrival and departure times and the tailbacks that would occur on Barrow Street at its junction with the A38."*

6.3.5 Mr Tyrell also states (Para. 12) that *"In our view, if the airport is to expand beyond 10mppa some form of rail link from Bristol is required in order to increase the proportion of people travelling by sustainable public transport to an acceptable level. This again would be highly unlikely to be constructed on account of the topography and the associated cost."*

6.3.6 My Planning Appeal PoE (see Section 6.5 Planning Appeal Document BAL/4/2) has demonstrated that there is scope to increase the proportion of people travelling by public transport and that, inherently, a rail link is not necessary to mitigate the impacts of the 12mppa proposals.

6.3.7 A rail link is also not a practical or cost-effective solution for the 12mppa application - see Paragraph 110 of the NPPF (see Planning Appeal Document CD5.8), noting that developments should 'so far as possible' facilitate access to high quality public transport services. BAL is preparing to meet this requirement.

6.3.8 In addition, public transport mode share at Bristol Airport is similar to or better than other regional airports with rail links, as demonstrated in **Section 6.4** of my Planning Appeal PoE (see Planning Appeal Document BAL/4/2).

6.3.9 Mr Tyrell states (Para. 11) that *"Proposals to increase the amount of parking adjacent to the motorway (and thus off site) have been opposed by the airport in the past. BGPC wrote in strong support of such a proposal by Mead Realisations (Application 19/P/0704/FUL) in September 2019. Whilst this application was subsequently withdrawn we understand that a new application for a similar facility to provide more than 3,000 car parking spaces on land outside the green belt has been submitted (the Heathfield Park Development). NSC has requested a detailed Environmental Statement for this. Subject to the findings of the ES Barrow Gurney PC would be likely to support such a provision in order to reduce the amount of traffic passing through the village, allowing passengers from the South-West, Wales and the Midlands to park in close proximity to the motorway and travel by sustainable bus link to the airport, rather than using the network of smaller rural roads."*

6.3.10 BAL is aware that NSC's Highways & Transport officers have, on the basis of the information submitted with the application to-date, objected to the scheme. They raise several areas of concern (in addition to the demand point noted above), including in respect of:

- the suitability of the proposed junction design from a highways safety perspective;
- a need for further assessment of junction capacity;
- provision for staff travel including walking and cycling;
- provision for electric vehicle charging;
- impacts on existing public transport services;
- the absence of detailed proposals to appoint a suitable bus operator; and
- the impact of additional buses on the road network.

6.4 Technical Concerns

Mr Tyrell states (Para. 14) that *"In the past we have been critical of the data provided by the Airport's transport consultants in support of its expansion proposals. Several examples of their simplistic and erroneous assumptions are given in our response to the Additional Information to 18/P/5118/OUT submitted in November 2019. Further evidence of their inaccurate forecasting skills is exemplified on page 31 of the Transport chapter of the Addendum ES Main Report where they forecast that the proportion of HGV traffic on Barrow Street in 2030 will be 3.2% (roughly comparable with other roads in the study area). They fail to take account of the fact that there is a ban on HGV's in place on Barrow Street and a 7.5ton weight limit. Once again we find we can have no confidence in the data produced."*

6.4.1 As I demonstrated in my Planning Appeal PoE (see Table 9.7 of Planning Appeal Document BAL/4/2) Automatic Traffic Counts (ATCs) undertaken along Barrow Street show that there are existing HGV trips on Barrow Street. Barrow Street has a 7.5t weight limit 'except for access', so this may be why there is some existing use by HGVs.

Table 6.1 – Barrow Street ATC Results

Vehicle Type	**Time Period**			
	07-19	06-22	06-00	00-00
Cycle	32	38	38	40
MotorCycle	29	36	37	37
Car	2,224	2,514	2,604	2,757
LGV	1,553	1,783	1,846	1,970
2 Axled Rigid	113	118	118	125
3 Axled Rigid	5	5	5	5
4 Axled Rigid	1	2	2	2
3 Axled Artic	25	27	27	28
4 Axled Artic	0	0	0	0
5+ Axled Artic	2	2	2	2
Bus	1	1	1	1
Total HGV	147	154	155	162
Total	**3,984**	**4,526**	**4,680**	**4,967**

6.4.2 The traffic forecasts used in the TAA and ESA do not add any new HGV trips to Barrow Street, but merely reflect the fact that there are already some HGVs using the road. This is therefore consistent with the values presented in Table 6.3 of the ESA.

6.5 Ronnie Morley (CIPC)

6.5.1 Concerns raised by Ronnie Morley on behalf of CIPC relate to traffic impacts:

6.5.2 Mr Morley states that *"As part of growth to 10 mppa, car parking for the Airport has become a problem in Cleeve. This came into play with the commencement of the bus service from Weston super Mare to the Airport. The A370 is a main route to the Airport from the M5 Junction 21. There are many car movements both to and from the Airport that pass through the village. The bus service from Weston to the Airport stops in Cleeve. Air passengers now park their cars for free in Cleeve on small roads such as Millier Road causing considerable distress to residents. We believe that under growth to 12 mppa car parking will spread beyond Millier Road to other roads in the vicinity of the bus stop."* (para.8.1)

6.5.3 BAL is supportive of appropriate parking enforcement measures to ensure that local communities are not adversely affected through delivery of the Parking Summit Action Plan, with BAL providing funding, resourcing and coordinating discussions with local parish councils and stakeholders. BAL also proposes to contribute £225,000 to fund a new, dedicated NSC airport parking and enforcement officer over 5 years.

6.5.4 Mr Morley states that *"Traffic will inevitably increase as the airport grows to 10 mppa from a level of approximately 9 mppa in 2019. There will then be a further increase in traffic movements to 12 mppa. Currently the modal split for public transport is 12.5%. The modal split for public transport at 12mppa is very ambitiously set at 17.5%. But this still means that 82.5% of all journeys to and from the Airport will be by car at 12 mppa. The impact to residents will be immense and will lead to increased use of rural roads to access the Airport."* (para. 8.2)

6.5.5 2019 CAA survey data, which has been agreed by NSC to be the most reliable source of data to measure mode share at the airport, shows that public transport share accounted for 21.8% of trips as of 2019 (main mode). As I demonstrated in Section 6.5 of my Planning Appeal PoE (see Planning Appeal Document BAL/4/2) the proposed 2.5% increase in public transport use is an ambitious but realistic target that can be achieved with the delivery of the proposed ASAS. The traffic impact assessment has demonstrated that the additional trips can be accommodated on the network.

6.6 Robin Jeacocke (ChPC)

Traffic Impacts

6.6.1 Mr Jeacocke states that *"The A38 around Churchill becomes severely congested during peak holiday periods. At the traffic-light controlled intersection with A368, lengthy traffic queues develop both north and south-bound; with traffic stacking up as far back as Havyatt Green. The same applies in the opposite direction heading north towards Bristol Airport. Now that there is a new group of houses adjacent to the A38, pollution could be an issue at such times."* (para. 3.2.1)

6.6.2 Traffic forecast and junction testing was undertaken to support the application on the basis of an approach agreed with NSC and Highways England as set out in Section 5 of my PoE. Where necessary, mitigation measures have been proposed and agreed. The results of the junction capacity analysis carried out as part of the original TA (see Planning Appeal Document CD2.9.1) and TAA (see Planning Appeal Document CD2.20.3) show that the impact of the additional Development trips would be relatively minor at the Churchill Crossroads. This was endorsed by NSC officers, who concluded in Issue 9 'Vehicle Trips Numbers and Impact' of the Committee Report (see Planning Appeal Document CD4.11) the following:

'This junction is currently operating at its operational capacity, but the modelling results project that the extra impacts arising from this proposal is insignificant.'

6.6.3 Mr Jeacocke states that *"Some vehicles approaching the congested junction between A38 and B3133 now take an alternative route short-cut along Langford Road through Lower Langford in order to avoid the delays on the A38. This road runs through the Langford Conservation area."* (para. 3.2.2).

On-street airport parking

6.6.4 Mr Jeacocke states that *"Recently cars have started appearing e.g. in Hilliers Lane, Churchill which again becomes heavily congested as it is also used by School buses and is a through route to Churchill Academy. This road is approx. 300m long yet when the schools come out it can take up to 20 minutes to traverse it partly because it is used obstructed by the (parked) school buses. When cars are inappropriately parked sometimes even close to the junction on the opposite side to the parked cars and buses, it can take even longer. Some of these cars parked on the wrong side of the road are believed to belong to travellers using Bristol Airport. There is a Falcon Coach that stops at Churchill traffic lights to take passengers on to Bristol Airport."* (para. 3.3.1)

6.6.5 As detailed in the proposed 12mppa ASAS (summarised in Section 4.5 of my Planning Appeal PoE in BAL/4/2) BAL would enter an ongoing commitment to deliver the Parking Summit Action Plan, with BAL providing funding, resourcing and coordinating discussions with local parish councils and stakeholders. BAL also proposes to contribute £225,000 to fund a new, dedicated NSC airport parking and enforcement officer over 5 years.

Unreliable Public Transport

6.6.6 Mr Jeacocke states that *"The Falcon Coach is unreliable as a method of transport as it starts its journey in Plymouth so is subject to motorway delays and closures."* (para. 3.3.2)

6.6.7 The CAA passenger survey data suggests that the current bus mode share of passengers travelling along the Falcon bus service corridor (Bridgwater, Taunton, Cullompton, Exeter and Plymouth) is already higher than bus patronage of passengers travelling from Greater Bristol and comparable to the bus patronage of passengers travelling between Worle/ Milton and the airport (estimated at 37%). As such, I consider that whilst there may be some reliability issues with such long distance services, this service is worthwhile. Furthermore, as part of the proposed 12mppa ASAS, BAL intends to improve the frequency of the Falcon bus route to half-hourly services. An increase from 35% to 46% bus share for passengers between Plymouth and the airport is possible as a result of the proposed enhancements, with similar effects on bus patronage from passengers travelling from other areas along the route.

MSCP 2

6.6.8 Mr Jeacocke states that *"Bristol Airport has not constructed the multi-storey Car Park which was one of the conditions of the previous planning consent. Instead, its present operating policy for parking effectively litters the countryside with additional impromptu car parking on Green Belt land."* (para. 3.3.3)

6.6.9 BAL is committing to a phased implementation of the proposed car parking to be brought forward under the 12mppa Application, which includes the delivery of MSCP2 as part of Phase 2.

6.7 Peter Longden (WPC)

Off-Airport Parking

6.7.1 Mr Jeacocke states that *"Our three rural villages of Felton, Winford and Regil are increasingly commercialised with B&Bs, 'Park in my Drive' houses, Meet & Greet parking operations, plus some organised parking in fields. We also get casual airport parking by Airport users who just* *leave cars around the village roads, and surrounding lanes or on Felton Common."* (issue no. 1).

6.7.2 Mr Jeacocke also states that *"Felton Common which is next to the Airport's eastern boundary is very popular for walking and has parking areas for visitors. The most used is the parking area near the A38 at Lulsgate by Felton Church. When the Airport is operating this frequently gets overwhelmed by the airport's waiting taxis and private cars. Unfortunately, drivers have frequently been reported using the nearby hedge by the Church for a toilet!*

This parking area is used despite the Airport's free 1 hr waiting area, probably because that is away on the South side and many just do not know about it. Also, the Airport's one hour free parking there is limiting as waiting times can be very variable. These taxi drivers and other waiting drivers are the Airport's travel partners and the airport should be more generous with the free parking time at the Waiting Area to make this area more useful. This would take pressure off our Felton Common car park and the other waiting sites." (issue no. 5)

6.7.3 As detailed in the proposed 12mppa ASAS (summarised in Section 4.5 of my Planning Appeal PoE in BAL/4/2) BAL would enter an ongoing commitment to deliver the Parking Summit Action Plan, with BAL providing funding, resourcing and coordinating discussions with local parish councils and stakeholders. BAL also proposes to contribute £225,000 to fund a new, dedicated NSC airport parking and enforcement officer over 5 years. BAL also has a level of service agreement with its contracted taxi operator to ensure such practices would not arise if the official provider is used.

Local Impacts

6.7.4 Mr Jeacocke states that *"There is an unclassified road from the A38 at Lulsgate to the East called West Lane and Felton Lane to Winford. This has become overloaded with airport passenger vehicles, large commercial vehicles and Airport supply vehicles going through Winford and Felton villages."* (issue no. 3)

6.7.5 As part of the highway mitigation package, BAL will deliver the A38 Highway improvement scheme, which involves widening the A38 carriageway and signalisation of the West Lane junction, as shown in Appendix E of my Planning Appeal PoE in BAL/4/2). The proposed scheme is predicted to improve performance of the junction and local highway network.

6.7.6 Whilst not explicitly shown, the TAA (Section 5.5 of Planning Appeal Document CD2.20.3) also effectively assessed the traffic impacts to Winford since these trips are all assumed to emerge at the West Lane Junction. At this point, the highest peak hour flow increase (PM) is 62, or around 1 vehicle per minute 2 way. This is less than a 10% increase in the 2030 forecast (with 10mppa) flow (9.5%) and will also disperse the further east you go towards

Chew Valley. AM and IP flow increases are 19 (3.8%) and 44 (8.9%) trips, so will have a lower impact.

7 Conclusions

7.1.1 My responses in this rebuttal have provided further evidence, where appropriate, in response to points raise by Mr Colles with regard to :

- A38 Scheme Design and Deliverability
- Junction Testing
- Public Transport Mode Share and Targets
- Parking Demand Forecasts

7.1.2 My additional evidence has demonstrated that the matters raised by Mr Colles are either incorrect, misinterpreted or can be overcome through usual post consent design development.

7.1.3 My responses to the other Rule 6 Parties mainly draw upon evidence already presented in my PoE with respect to parking demand, impact on communities, sustainable transport and traffic impact.

7.1.4 I remain of the view that the transport assessment methodology and conclusions are robust, reflecting a worst-case impact, and that the impacts of the development have been mitigated or are not severe.

7.1.5 Overall I continue to believe that surface access and transport reasons for refusal cannot be sustained, and that the inspectors issues of sustainable transport, highways impact and parking provision have been fully addressed.

7.1.6 I continue to be of the conclusion that the proposals comply with the NPPF requirements and policies CS1, CS10 and CS23 of the North Somerset Core Strategy 2017.

Appendix A A38 Highway Improvement Scheme WSP Comments (7th June 2018)

TECHNICAL NOTE

DATE	**07 June 2018**	**CONFIDENTIALITY**	**Internal**
SUBJECT	**A38/Downside Road Design Review**		
PROJECT: BSWEL	**AUTHOR: FR & TA**	**CHECKED: SB**	**APPROVED: KB**
Project no.: 70036480			

1. INTRODUCTION

1.1. WSP has been commissioned by North Somerset Council (NSC) to undertake a review of a proposed improvement to the A38 at Downside Road to the north of Bristol Airport. The documents provided for review are included in Appendix A.

2. ROLE OF THIS DOCUMENT

2.1. The instruction was received in an email from NSC dated 25 May 2018:

> "This is the proposal from the Airport in support of their forthcoming planning application to raise the passenger cap from the current 10mppa to 12mppa. It follows various Airport/NSC meetings where different configurations have been discussed including roundabout at the A38/Downside and in discussing the interaction of the link road to West Lane. Additionally it looks at minimising third part land and the use of CPO (where it does encroach third party land, the Airport has already advanced its discussions so should secure the land).
>
> "Some form of high level light touch TA would seem appropriate in analysing both the alignment proposed and the supporting LINSIG and traffic flow files – is the supporting data robust?
>
> "Please also assess in view of the BSWEL proposals for the short and long term aspirations/requirements – do the proposal sufficiently 'future-proof' the project?"

2.2. The following provides WSP's review of the scheme by civil engineering and transport planning colleagues respectively.

3. ENGINEERING CONSIDERATIONS

3.1. The plan in Appendix A forms part of Bristol Airport's forthcoming planning application to increase the annual passenger cap from 10 million passengers per annum to 12 million. In line with North Somerset Council's request, below is a brief review of the proposals considering how they might link with BSWEL options and also includes a high level desktop engineering review, broadly considering the following:

- Adjacent ground levels
- Bus stops
- Pedestrians
- Land
- Access

3.2. A full design review, including a review of the proposals against TD50, has not been carried out. It is recommended that a Stage 1 Road Safety Audit undertaken prior to further development of the design. Although the proposals do not raise fundamental safety concerns, the residential access onto the A38 at the Downside Road junction may need some consideration.

FUTUREPROOFING

3.3. The BSWEL study considers online widening of the A38 north of the airport to four lanes as an option for improved connectivity to Bristol. Another option is a new offline route, also four lanes wide, and in this scenario the existing A38 would then become a less trafficked route.

3.4. The airport's proposals widen the existing A38 to four running lanes, with additional turning lanes and hatching separating the northbound and southbound lanes, creating a wide highway footprint and good visibility. These proposals are more detailed than those produced at present for the BSWEL project but fit with the four lane cross section and leave scope for continued widening of the A38 north towards Bristol.

3.5. An alternative option considered as part of the BSWEL study is a new offline four lane carriageway between the airport and the South Bristol Link Road (A4174). Currently, alignments for this offline link connect into the A38 south of the airport's proposals and therefore traffic volumes on the existing A38 north of the airport would be reduced. Since the airport's proposals are aimed at increasing capacity of the A38, an offline improvement under the BSWEL study would limit the timeframe over which the airport's proposals would be beneficial.

3.6. However, there is a potential aspiration to combine a new offline highway with a tram-train link to the airport, therefore the proposed alignments may be adjusted as a result of this to provide better connection for the tram-train to connect to the airport near the existing terminal.

4. HIGHWAY ENGINEERING OBSERVATIONS

4.1. The junction proposals presented by the airport are considered an outline plan and therefore engineering detail they include is understandably limited. However, from information that is included, and knowledge of the area, the following observations have been made.

ADJACENT GROUND LEVELS

4.2. Left turn into Downside Road – the land to the south of Downside Road appears to follow the same gradient as the A38. Therefore widening into this area, to create a wider A38 and left turn lane, is likely to require a retaining structure to avoid adverse camber on the left turn into Downside Road. Alternatively, increased land take would be required for an earthwork solution.

4.3. Widening of the A38 in front of 'The Airport Tavern' public house – the ground profile between the existing road and the building appears to be of a relatively steep gradient. Widening of the carriageway to the west with a suitable road crossfall would result in a level difference that would require consideration. This may hinder access to the building and would remove parking currently available on the private land.

4.4. Widening of the A38 north of 'The Airport Tavern' public house – adjacent ground west of the A38 between the public house and the residential property to the north is low lying. It would appear that the existing A38 is raised above adjacent ground level at this point and widening of the carriageway to the west would require further structural consideration.

4.5. 'The Airport Tavern' Car park access – treatment of the car park access on to the A38 is not clear. If maintained, this access may present some disruption to the amended junction. It is noted that a new access is provided off of Downside Road and therefore detailed proposals may remove the existing access to the A38.

BUS STOPS

4.6. The current proposals appear to place the northbound bus stop in lane one of the A38. Whilst visibility is good, and there is an additional lane for vehicles to pass a stationary bus at the stop, the bus is likely to cause disruption, particularly during periods of higher traffic flows. The southbound bus stop remains in the existing layby, causing minimal impact on A38 traffic. Since land take and widening is already proposed on the west side of the A38, increasing this to include a layby for the northbound bus stop would minimise disruption on the A38.

SIGNALISED CROSSING

4.7. The existing junction layout integrates a signal controlled crossing of the A38. Whilst it is noted in the accompanying document that during a survey the crossing was little used, it is not clear if proposals are removing the signal controlled crossing provision or whether this detail is to be developed further and added to the proposals.

LAND

4.8. It would appear that proposed land take is mainly on the west side of the A38 and includes land:

- Forming edge of Airport car park
- At the rear of residential properties
- South of Downside Road
- In front of The Airport Tavern
- West of A38 to point opposite West Lane

ACCESS TO PROPERTIES ON EAST SIDE OF JUNCTION

4.9. Vehicular assess to Lilac Cottages is integrated into the proposed signal controlled junction, replicating the existing layout. The proposals indicate minor kerb amendments but there may be an opportunity to further improve access to these properties and reduce disruption to traffic on the A38.

RIGHT TURN FROM WEST LANE REMOVED

4.10. Banning the right turn movements from West Lane onto the A38 reduces disruption to the flow of traffic on the A38, in particular northbound traffic would not need to be interrupted at the West Lane junction. Vehicles wishing to emerge from West Lane and travel northbound on the A38 from West Lane are required to turn left (southbound) and make a U-turn at the first roundabout. Whilst this is not a lengthy diversion, vehicles may re-route to join the A38 at the next opportunity, therefore consideration should be given to any impact this may have on the local road network.

PEDESTRIAN IMPLICATIONS

4.11. The footway on to west side of the A38, from the airport to Downside Road, is shown approximately 2.5m wide, this is wider than in other areas, possibly to account for use by cyclists. The minimum width for a shared cycle/footway is 2.5m however a width of 3m is normally used in order to provide a white line, offset 0.5m from the kerb, as a safety buffer. The other lengths of proposed footway are 2m wide. Whilst this is an acceptable general minimum, widths should be increased to a minimum of 3m at bus stops to account for waiting passengers.

RIGHT TURN OUT OF DOWNSIDE ROAD

4.12. Large / long vehicles turning right out of Downside Road may find the turn difficult due to the position of the island on the A38 to the south side of the junction. Swept path analysis may indicate that HGVs will need to straddle lanes on Downside Road, disrupting right turn traffic, to make the manoeuvre. To mitigate this, it may be possible to adjust the size or position of the island on the A38 however this is likely driven by the position of accesses on the east side of the A38 and the need to provide a staggered pedestrian crossing.

NEW PUB ACCESS RIGHT TURN LANE WIDTH SUB-STANDARD

4.13. The right turn lane provided on Downside Road for the new access is of sub-standard width, however assuming it is just access to the public house for patrons and deliveries, the number of turning movements will be low providing justification for the departure.

5. JUNCTION MODEL

5.1. The attached traffic flow diagrams and junction modelling outputs forms part of Bristol Airport's forthcoming planning application to increase the annual passenger cap from 10 million passengers per annum to 12 million. In line with North Somerset Council's request, below is a brief review of the information provided which broadly considers the following:

- Traffic data and growth projections used; and

- Junction modelling outputs;

TRAFFIC DATA AND GROWTH PROJECTIONS

5.2. The Traffic flow data and Growth Factors used to undertake the operational assessment are presented in the document "A38 Improvements – Traffic flows". These were previously developed by Capita for Bristol Airport and provided to C-TAS for further development.

5.3. The baseline traffic data was collected during neutral months in 2017 and are considered broadly appropriate for use. The surveys have been disaggregated into Airport Origin / Destination traffic and background traffic. It would be useful to see the background data to confirm that the peak hours selected are representative of the actual peak on the network.

5.4. The growth factors used to extrapolate the 2017 flows to 2027 are broadly consistent with TEMPRO 7.2 growth factors for North Somerset and are considered appropriate for use.

5.5. The airport has an aspiration to grow from 8mppa to 12.5mppa, an increase in passenger numbers of 56.25%. The airport traffic growth factor which has been used is 53.25% (equivalent to 12.25mppa). This approach assumes no change in airport trip modal share over the next 9 years and makes the assumption that demand for the airport will grow in the same linear fashion. It would be useful to understand a bit more background to these assumptions to confirm whether they are realistic.

6. JUNCTION MODELLING OUTPUTS

LAYOUT

6.1. C-TAS Drawing C1124-SK-A38-010 sets out the outline junction proposals presented by the airport; covering the A38 / West Lane and A38 / Downside Road junctions. The airport's proposals widen the existing A38 to four running lanes, with additional turning lanes at both junctions and hatching separating the northbound and southbound lanes.

6.2. The drawing shows that all existing vehicle movements at the A38 / Downside Road junction are retained, although no pedestrian crossing facilities are apparent.

6.3. The proposals include the signalisation of the A38 / West Lane junction. As part of the signalisation, traffic from West Lane can only turn left; the right turn is banned so traffic towards Bristol must perform a U-turn at the airport roundabout to the south and then return north. As with the A38 / Downside Road junction, no pedestrian crossing facilities are apparent at this location.

MODELLING OUTPUTS

6.4. The C-TAS document "Bristol Airport A38 Junction Improvements LINSIG Results" set outs the LINSIG network diagram and network result tables for the proposals presented in C1124-SK-A38-010. The LINSIG result tables provide information on Degree of Saturation (DoS), delay and queuing for 2027 future year AM and PM peak scenarios.

6.5. No information on the current junction configuration, its operation in 2017 or 2027 is provided as a comparison within any of the information provided.

6.6. The LINSIG network diagram does not include any pedestrian crossing phases, or the minor arm opposite Downside Road. Whilst it is noted in the accompanying traffic flow document that both the crossing and minor arm were only called once during the peak hours, there is no explanatory information as to why these have not been included within the modelling assessment.

6.7. The LINSIG network outputs provided suggest that the layout would operate well within capacity in both peak hours. However, no detailed modelling outputs have been included within the report; consequently it is not possible to confirm that the model accurately represents the layout.

6.8. The level of information provided about the LINSIG modelling is not sufficient to determine its appropriateness / robustness. It is recommended that further information is provided on the LINSIG models to allow further review

7. SUMMARY

7.1. The following additional information is suggested from the design consultant to enable clarification of the proposed scheme:

- Ground levels at edge of carriageway and structures;
- Changes to the Airport Tavern car park access;
- Justification/evidence base for the removal of a formal pedestrian crossings and why none are provided in the proposed scheme at either Downside Road or West Lane;
- Land ownership/confirmation all land is public highway or under control of Bristol Airport;
- Access to Lilac Cottages;
- Justification/evidence base for the right turn ban out of West Lane;
- Footway widths;
- Tracking for large vehicles turning right out of Downside Road;
- Proposed width for the right turn lane into the new Airport Tavern car park access from Downside Road;
- More understanding of current and future traffic patterns
- Modelled or operational data for the existing junction arrangements to enable a comparison with the operation of the proposed scheme;
- Linsig model input and output data (model files and pdf formats) to enable confirmation of results quoted in the note.

Appendix A – Information Provided

Appendix A – Information Provided

DO NOT SCALE FROM THIS DRAWING

KEY:

- HIGHWAYS ENGLAND COMPANY LTD BOUNDARY
- ADOPTED PUBLIC HIGHWAY - NORTH SOMERSET DISTRICT COUNCIL

Rev	Description	Drawn	DATE	Auth
2.0	FUTURE HOTEL ACCESS AMENDED	MW	13/04/18	CC
1.0	FIRST ISSUE	MW	13/04/18	CC

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Client
Bristol Airport

Project
Bristol Airport 12MPPA Masterplan

Title
A38 Junction Improvements
Option 10

Original Scale	Drawn By	Date	Checked By		Auth	
1:500@A1	TO	13/04/18	DR		CC	

Drawing Number: C1124-SK-A38-010
REF:
Rev: 2.0

Bristol Airport
A38 Junction Improvements
Traffic flows for LINSIG analysis

c-tas

Traffic Flows for LINSIG analysis

C-TAS were appointed by Bristol Airport to undertake further development of the between the airport and West Lane. The Airport supplied original design information / data prepared by Capita, which included traffic flows.

Automated Traffic Counts were undertaken for the airport between 29th June and 27th July 2017, plus again between 25th August and 21st September 2017.

Full turning counts with queue measurements were also taken on the 19th and 20th July 2017, plus again on the 13th and 19th October 2017.

The airports examining the opportunity to expand from a passenger through put of just of 8 million in 2017 to 12.5 million in 2027

To develop the future counts Capita used 1.1729 and 1.1732 for the background traffic growth in the 2027 AM and PM peaks (respectively). For the airport traffic they used a factor of 1.534

All movements were growthed by a similar a similar amount.

Observations made during the traffic counts indicated that the existing pedestrian crossing and Lilac Cottage stages we called only once during the peak periods

Appendix A provides the 2017 and 2027 traffic flow diagrams prepared by Capita used for the LINSIG analyses. It shows traffic flows for a network which the two junctions A38 / Downside Road and A38 / West Lane are subsets of. The 2027 flows are for a full movement junction at Downside Road

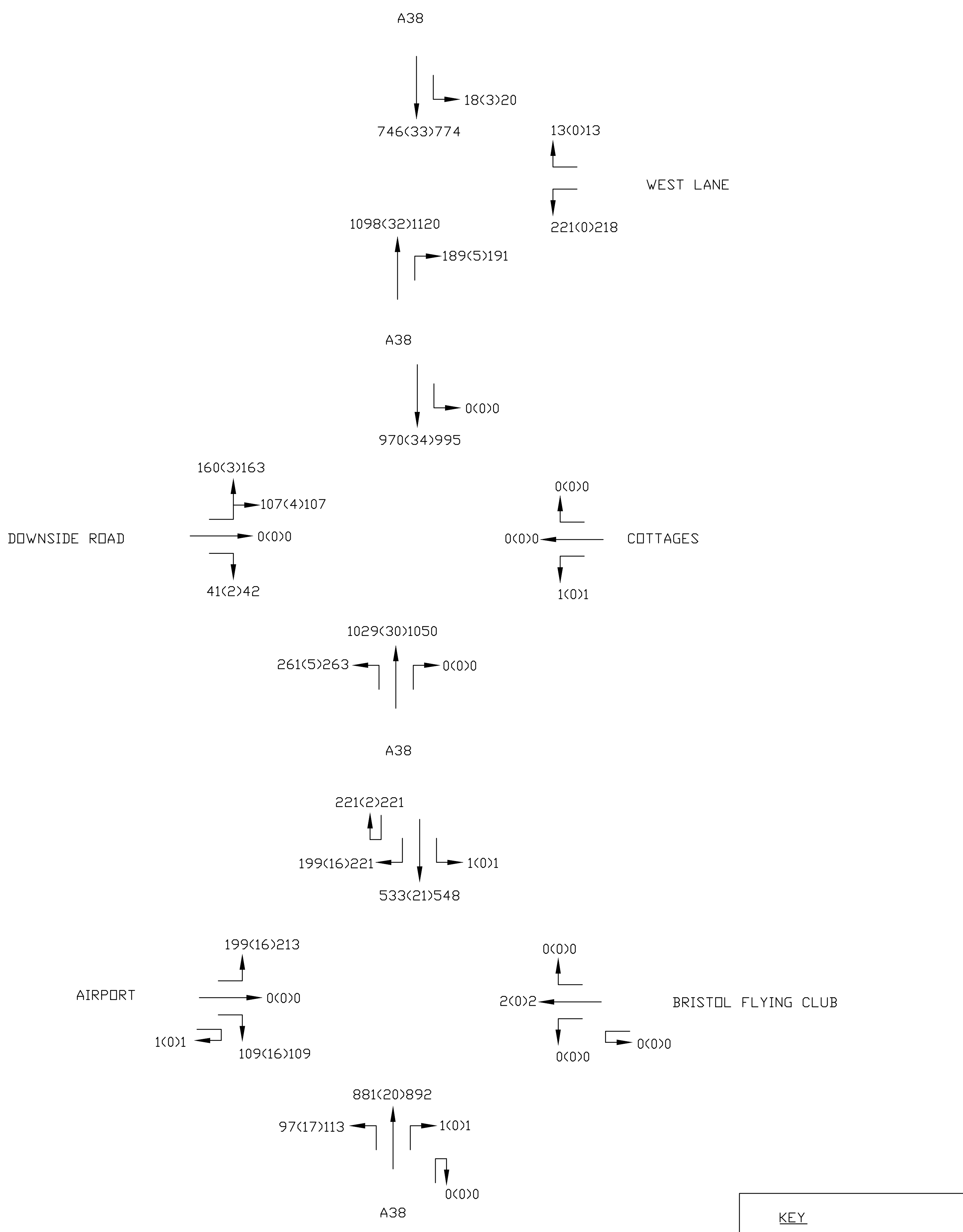
Appendix B shows the traffic flows for C-TAS Option 10, with the right turn traffic for Downside Road remaining on the A38 and U turning at the Airport Roundabout.

APPENDIX A

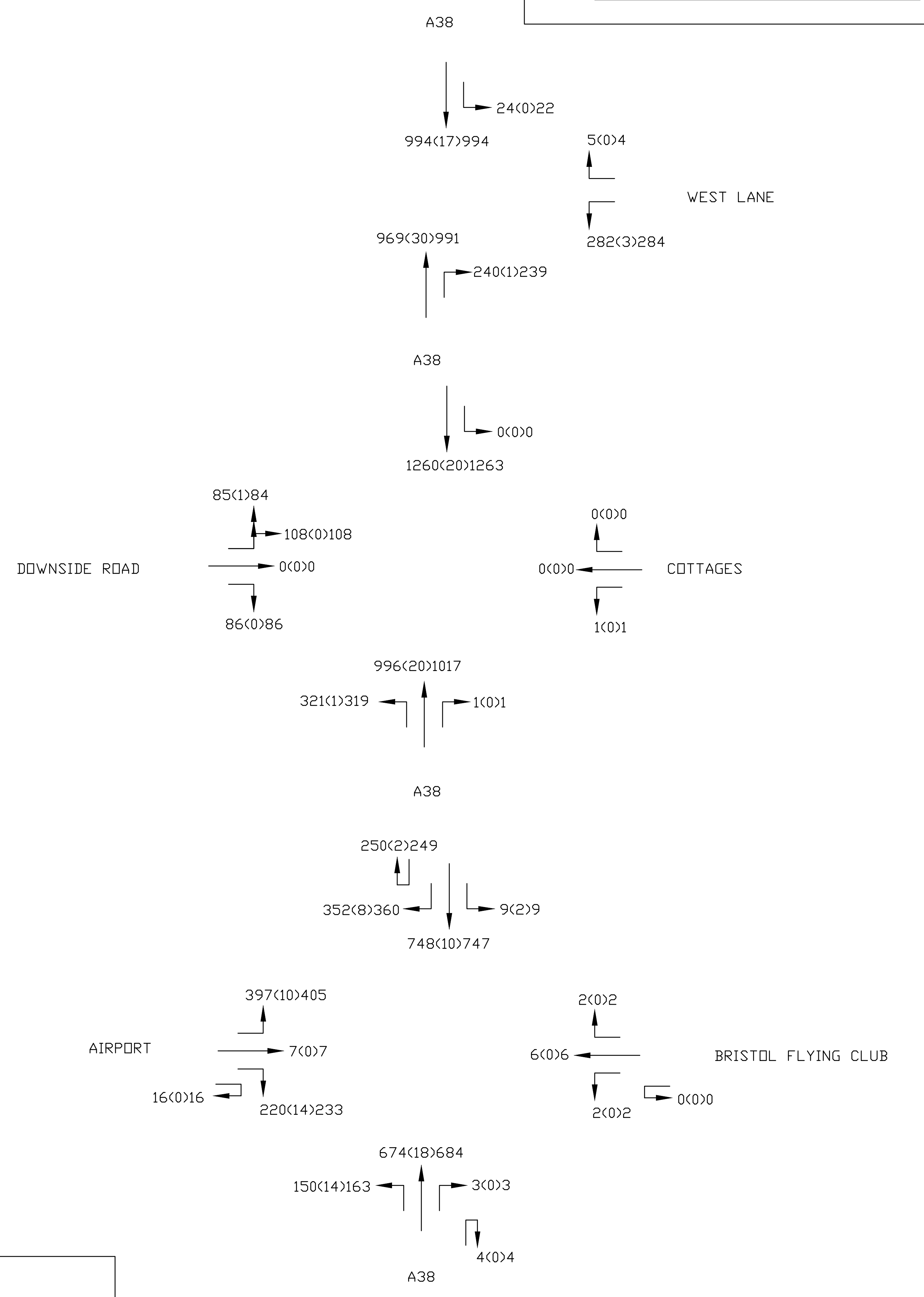
2017 EXISTING AM AND PM PEAK HOUR TRAFFIC FLOWS

TRAFFIC FLOW DIAGRAM No. 1

EXISTING 2017 AM PEAK PERIOD
07:15 TO 08:15 HOURS
19th JULY 2017



EXISTING 2017 PM PEAK PERIOD
16:45 TO 17:45 HOURS
20th JULY 2017



KEY

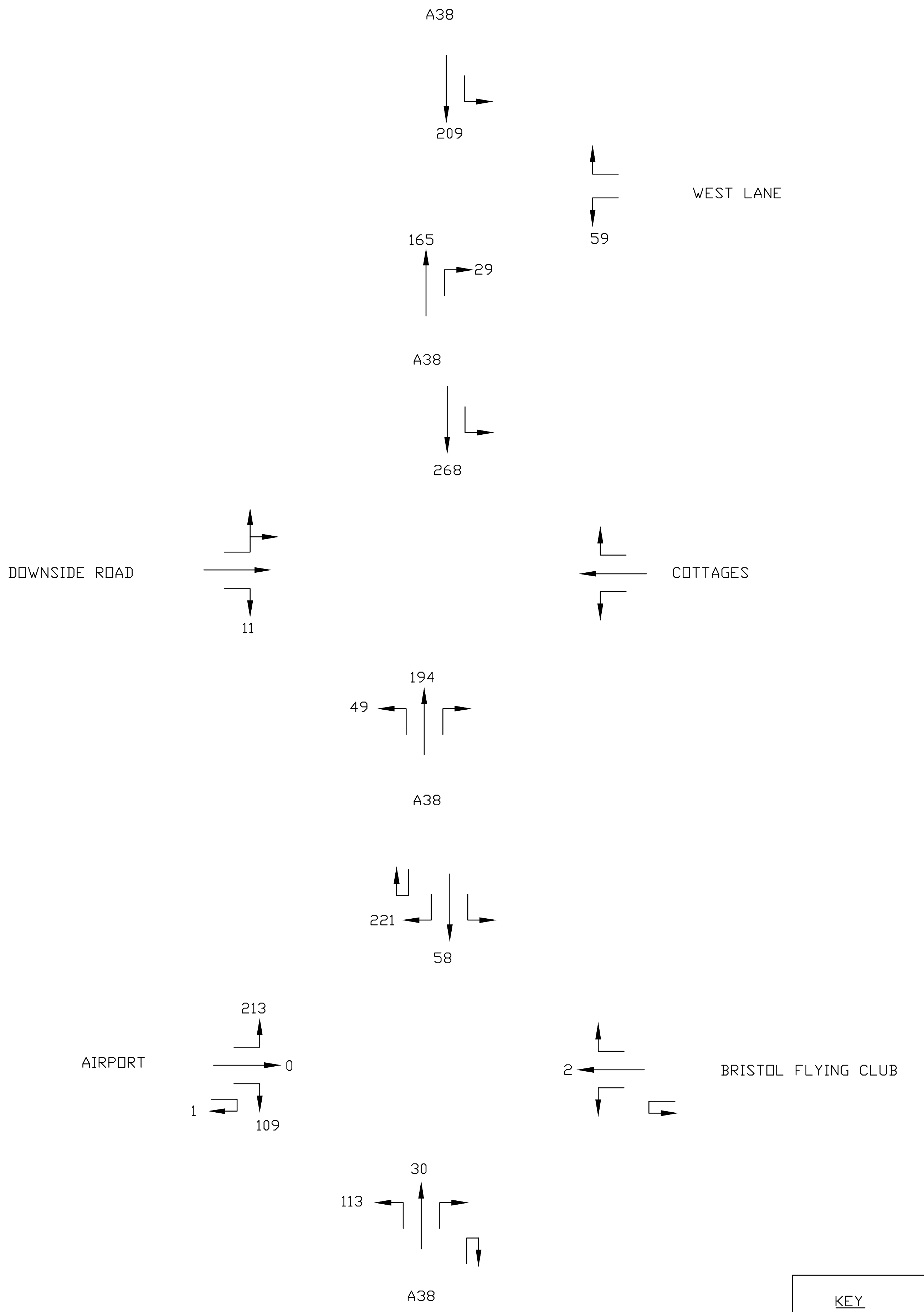
397(10)400 = TOTAL TRAFFIC
(OF WHICH OGV1, OGV2 & PSV)PCU

FILE: P:\SCHEMES_CS\CS0925XX\CS092540\03 DELIVERY\04 TRANSPORT\01 CAD\TEMP\EXISTING\TRAFFIC FLOW DIAGRAM 1 2017 EXISTING TRAFFIC FLOWS.DWG

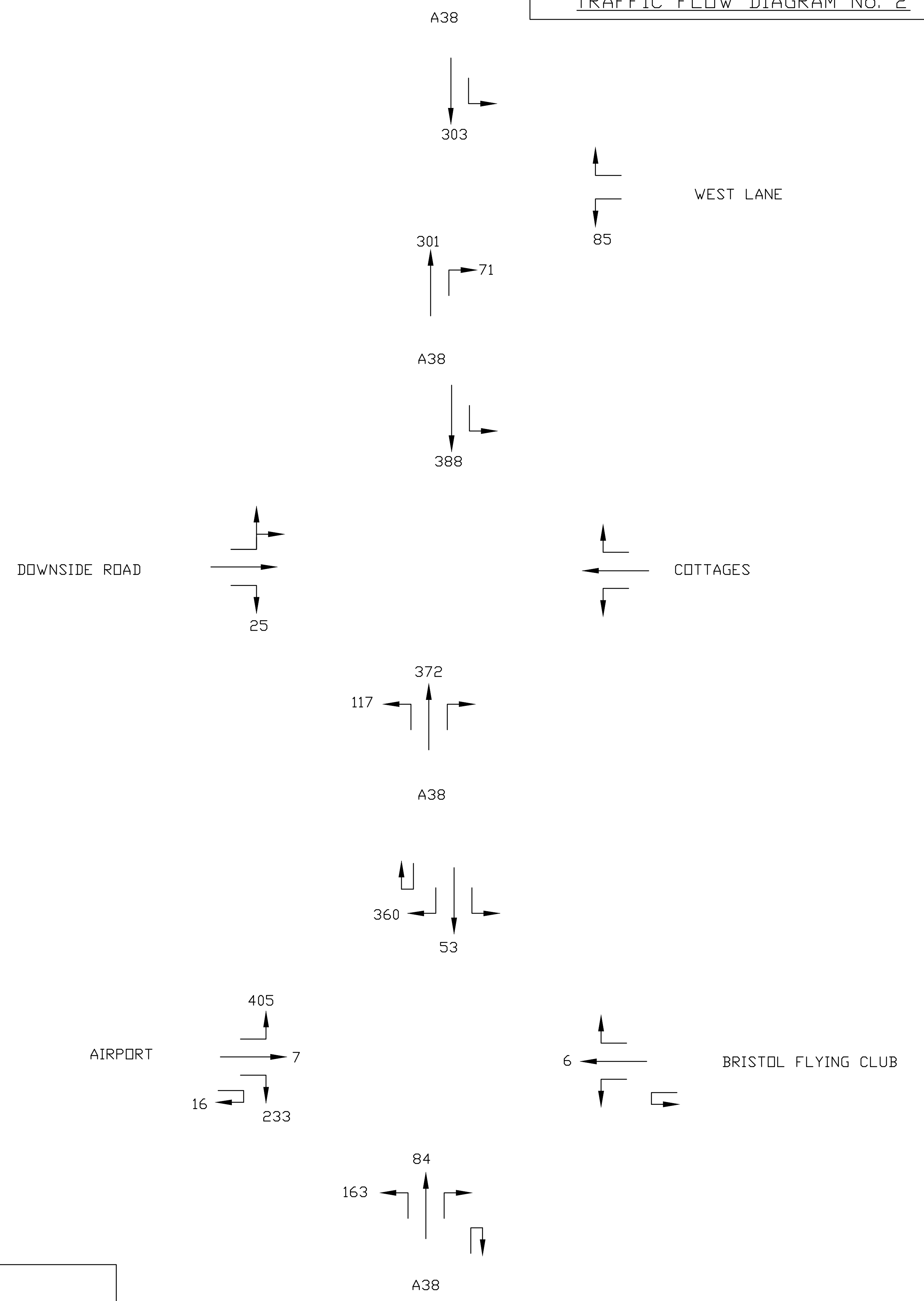
2017 EXISTING AM AND PM AIRPORT TRAFFIC PEAK HOUR TRAFFIC FLOWS

TRAFFIC FLOW DIAGRAM No. 2

EXISTING 2017 AM PEAK PERIOD
07:15 TO 08:15 HOURS
19th JULY 2017



EXISTING 2017 PM PEAK PERIOD
16:45 TO 17:45 HOURS
20th JULY 2017



KEY

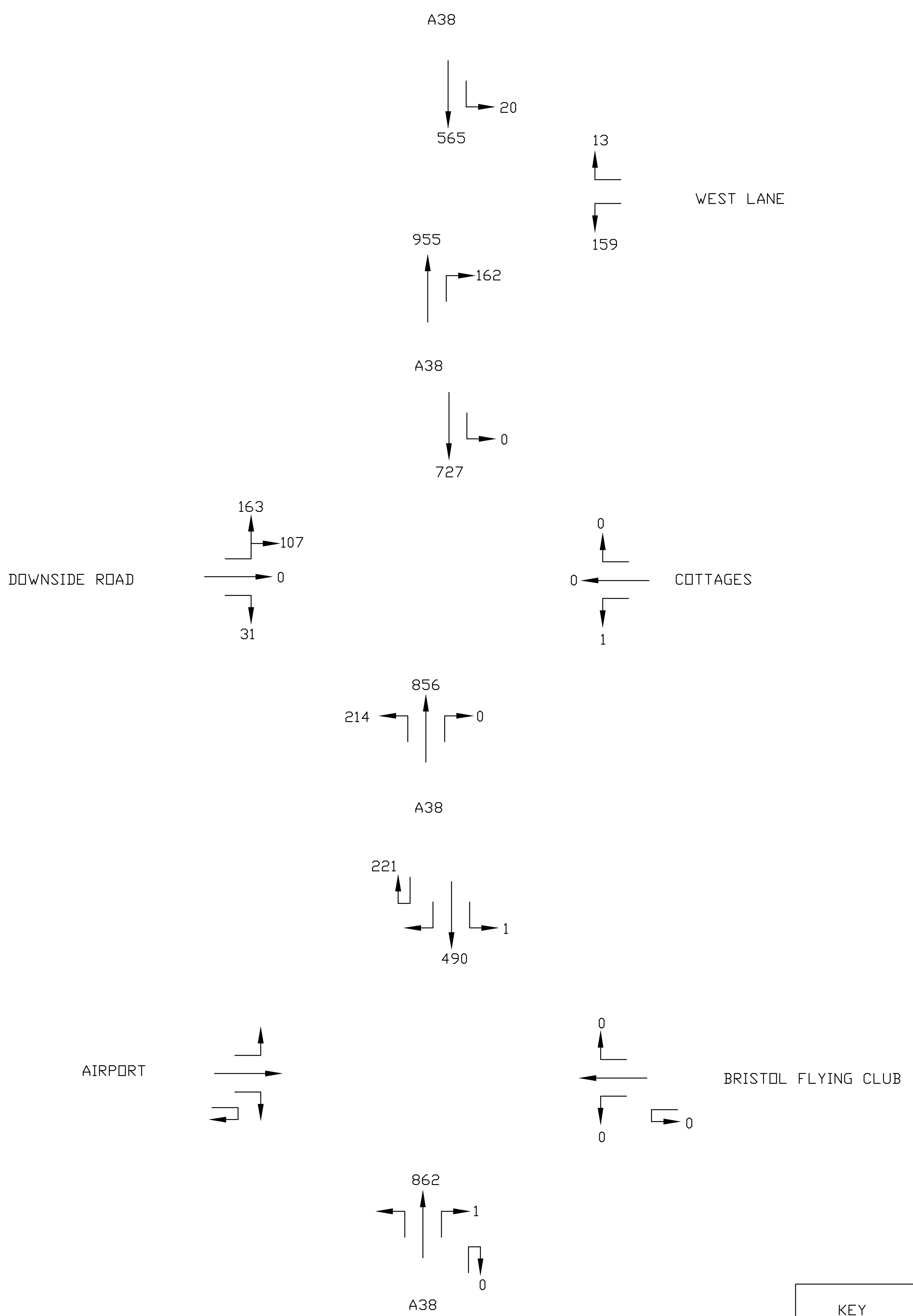
397 = TOTAL TRAFFIC IN PCU

FILE: P:\SCHEMES_CS\CS0925XX\CS092540\03 DELIVERY\04 TRANSPORT\01 CAD\TEMP\EXISTING\TRAFFIC FLOW DIAGRAM 2 2017 EXISTING AIRPORT TRAFFIC.DWG

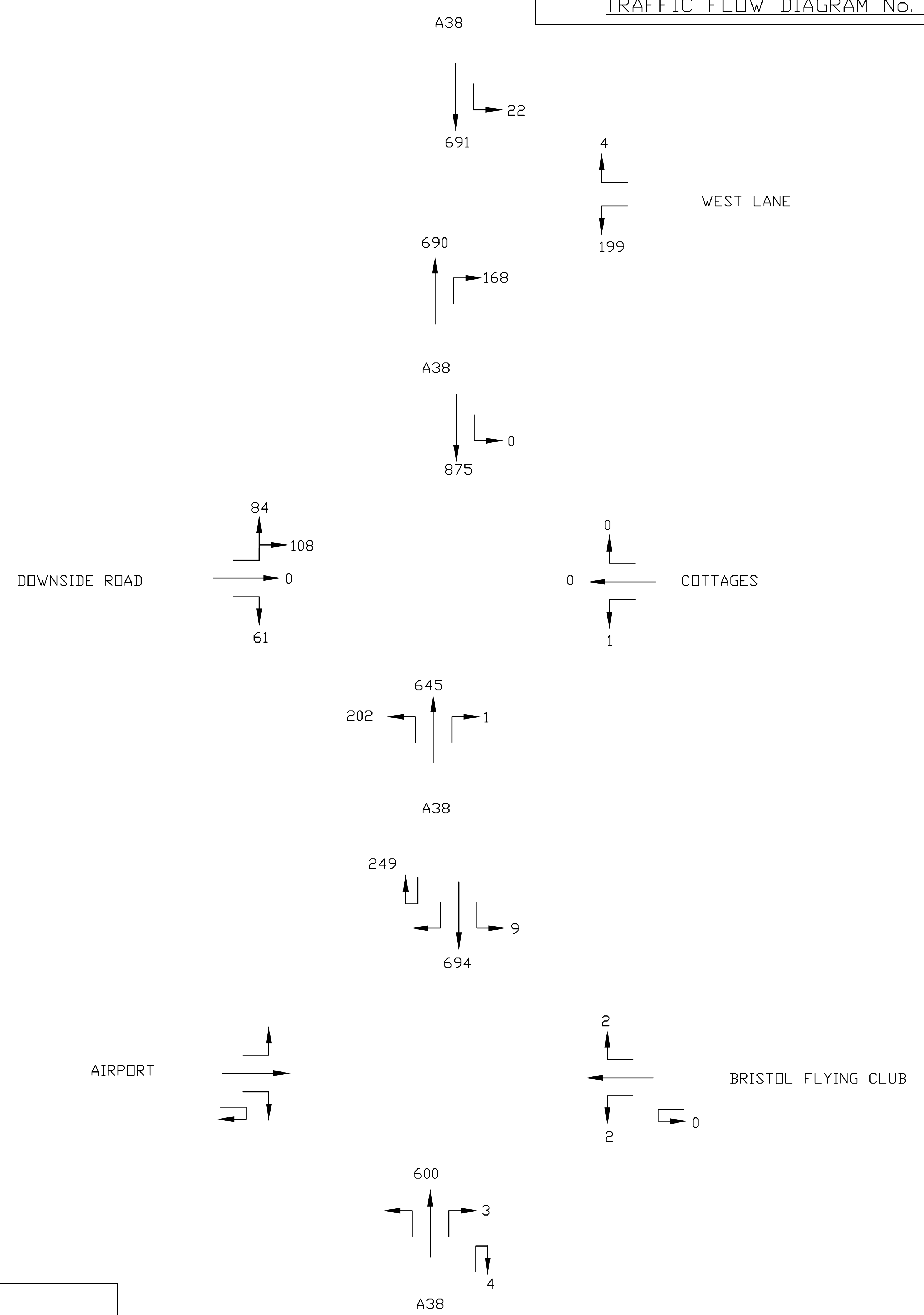
2017 EXISTING AM AND PM
PEAK HOUR TRAFFIC FLOWS
NON AIRPORT TRAFFIC

TRAFFIC FLOW DIAGRAM No. 3

EXISTING 2017 AM PEAK PERIOD
07:15 TO 08:15 HOURS
19th JULY 2017



EXISTING 2017 PM PEAK PERIOD
16:45 TO 17:45 HOURS
20th JULY 2017



KEY

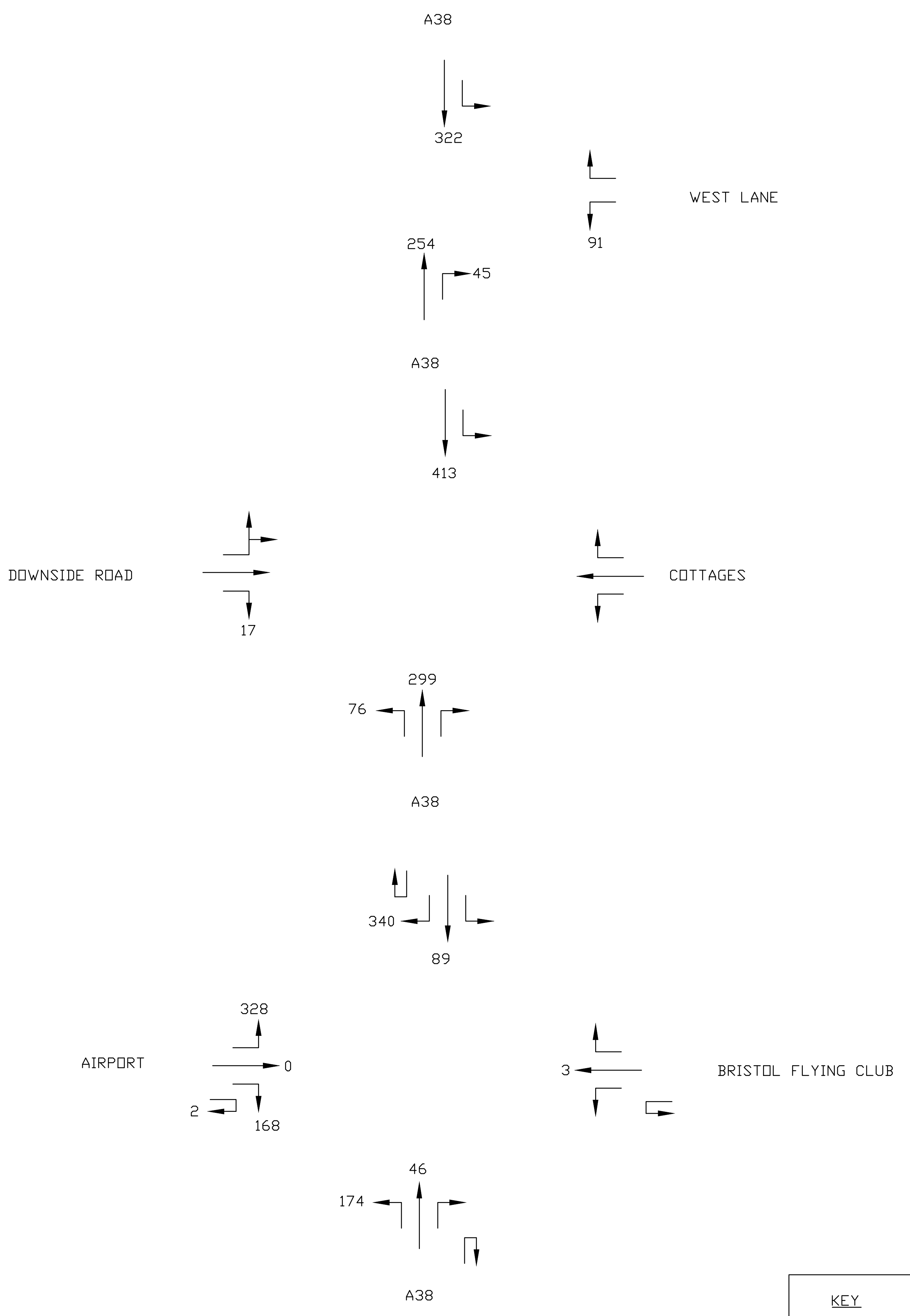
397 = TOTAL TRAFFIC IN PCU

FILE: P:\SCHEMES_CS\CS0925XX\CS092540\03 DELIVERY\04 TRANSPORT\01 CAD\TEMP\EXISTING\TRAFFIC FLOW DIAGRAM 3 2017 EXISTING NON AIRPORT TRAFFIC.DWG

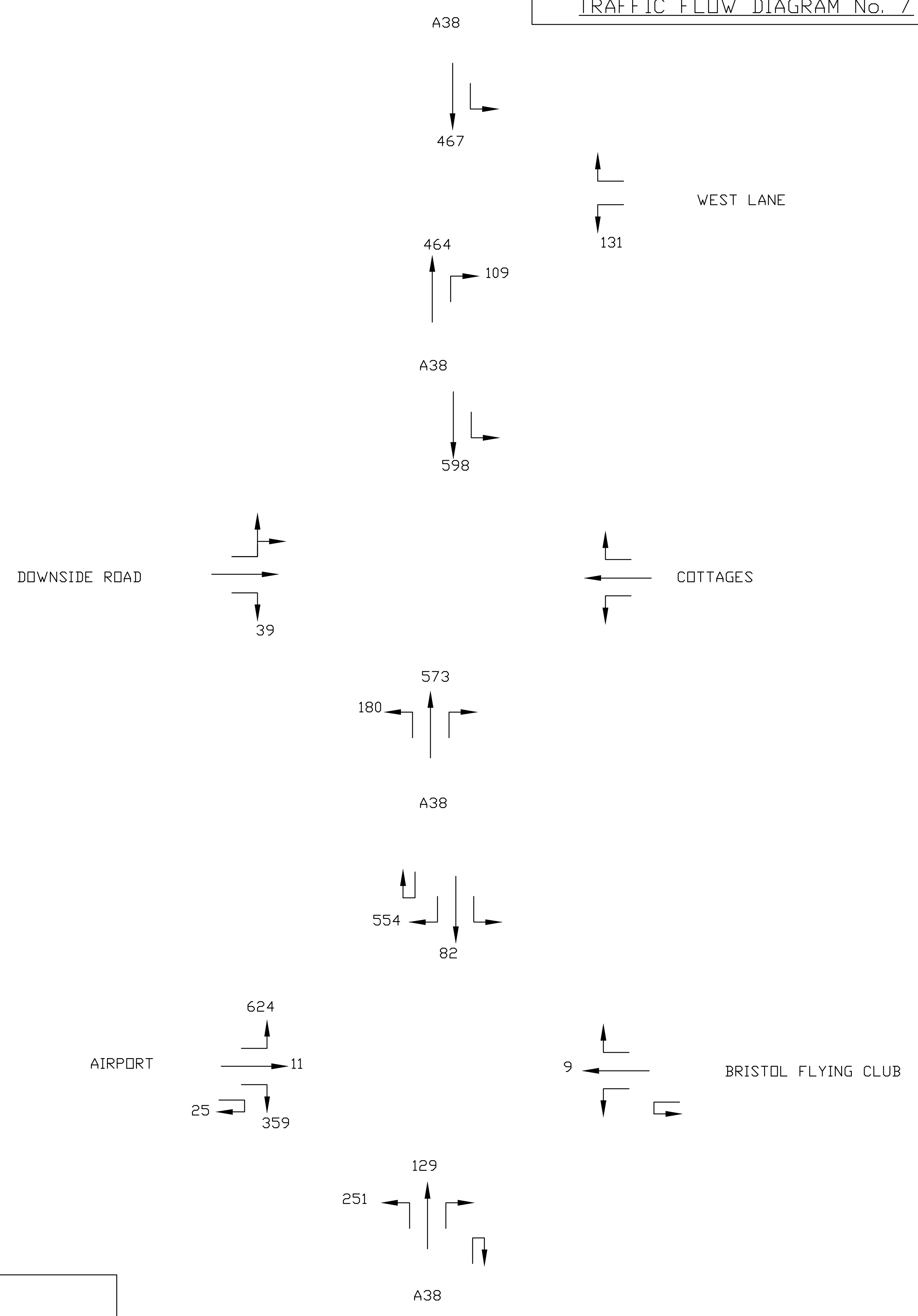
2027 AM AND PM GROWTHED AIRPORT TRAFFIC PEAK HOUR TRAFFIC FLOWS

TRAFFIC FLOW DIAGRAM No. 7

2027 AM PEAK PERIOD
07:15 TO 08:15 HOURS
19th JULY 2017



2027 PM PEAK PERIOD
16:45 TO 17:45 HOURS
20th JULY 2017



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397 = TOTAL TRAFFIC IN PCU

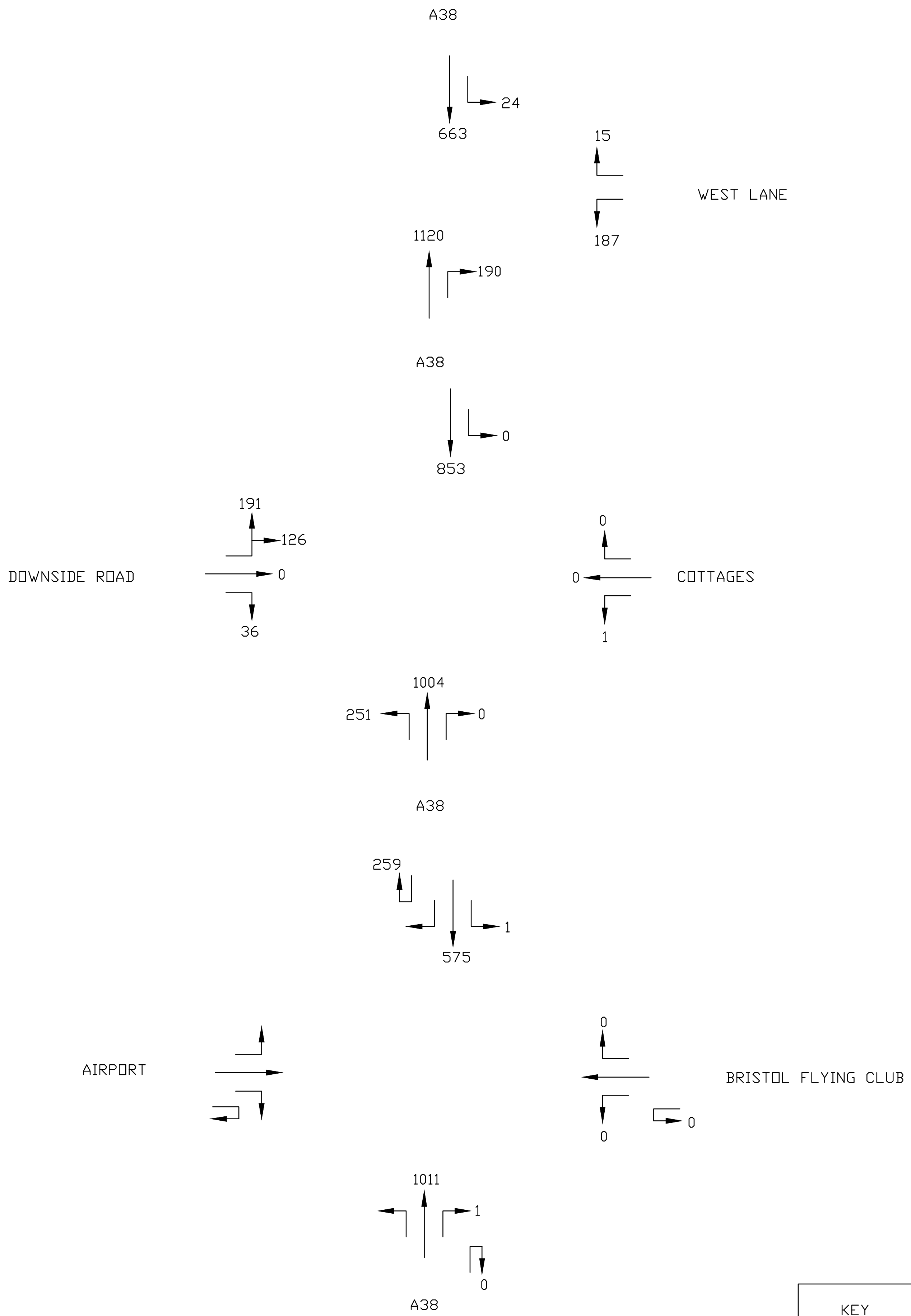
FILE: P:\SCHEMES_CS\CS0925XX\CS092540\03 DELIVERY\04 TRANSPORT\01 CAD\EXISTING\TRAFFIC FLOW DIAGRAM 7A 2027 GROWTHED AIRPORT TRAFFIC.DWG

2027 AM AND PM PEAK HOUR TRAFFIC FLOWS NON AIRPORT TRAFFIC

TRAFFIC FLOW DIAGRAM No. 8

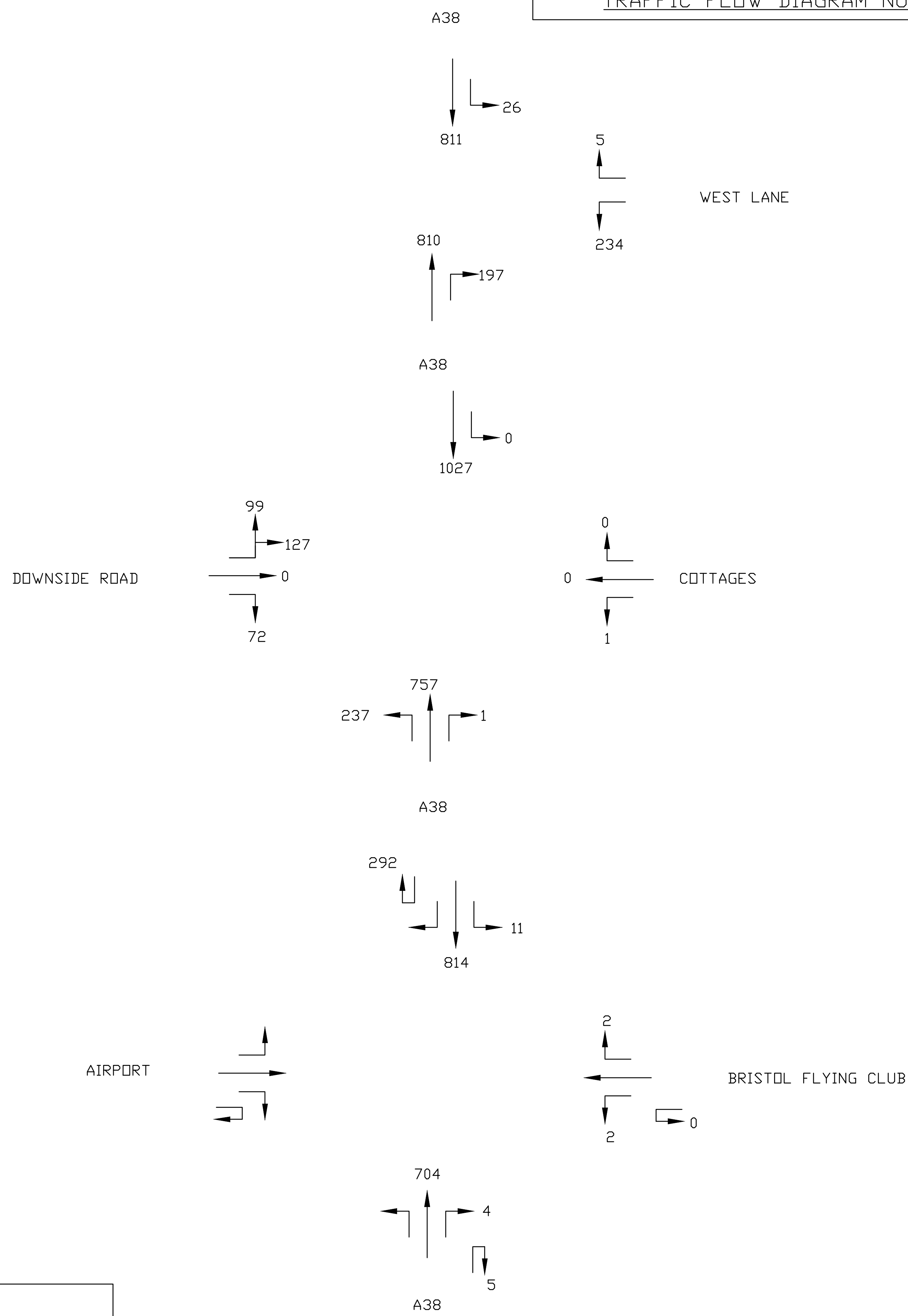
2027 AM PEAK PERIOD
07:15 TO 08:15 HOURS

GROWTH FACTOR = 1.1729



2027 PM PEAK PERIOD
16:45 TO 17:45 HOURS

GROWTH FACTOR = 1.1732



KEY

397 = TOTAL TRAFFIC IN PCU

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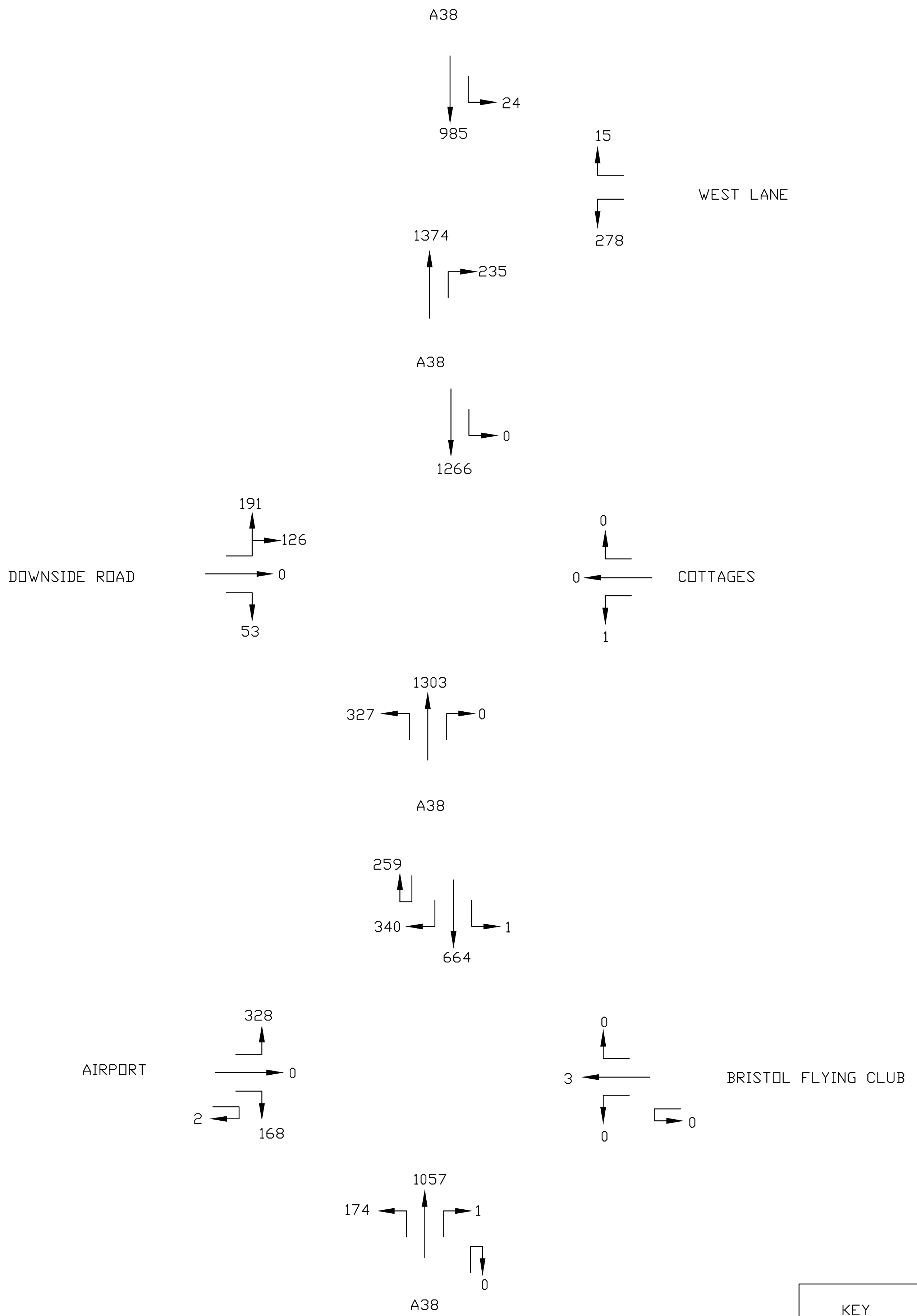
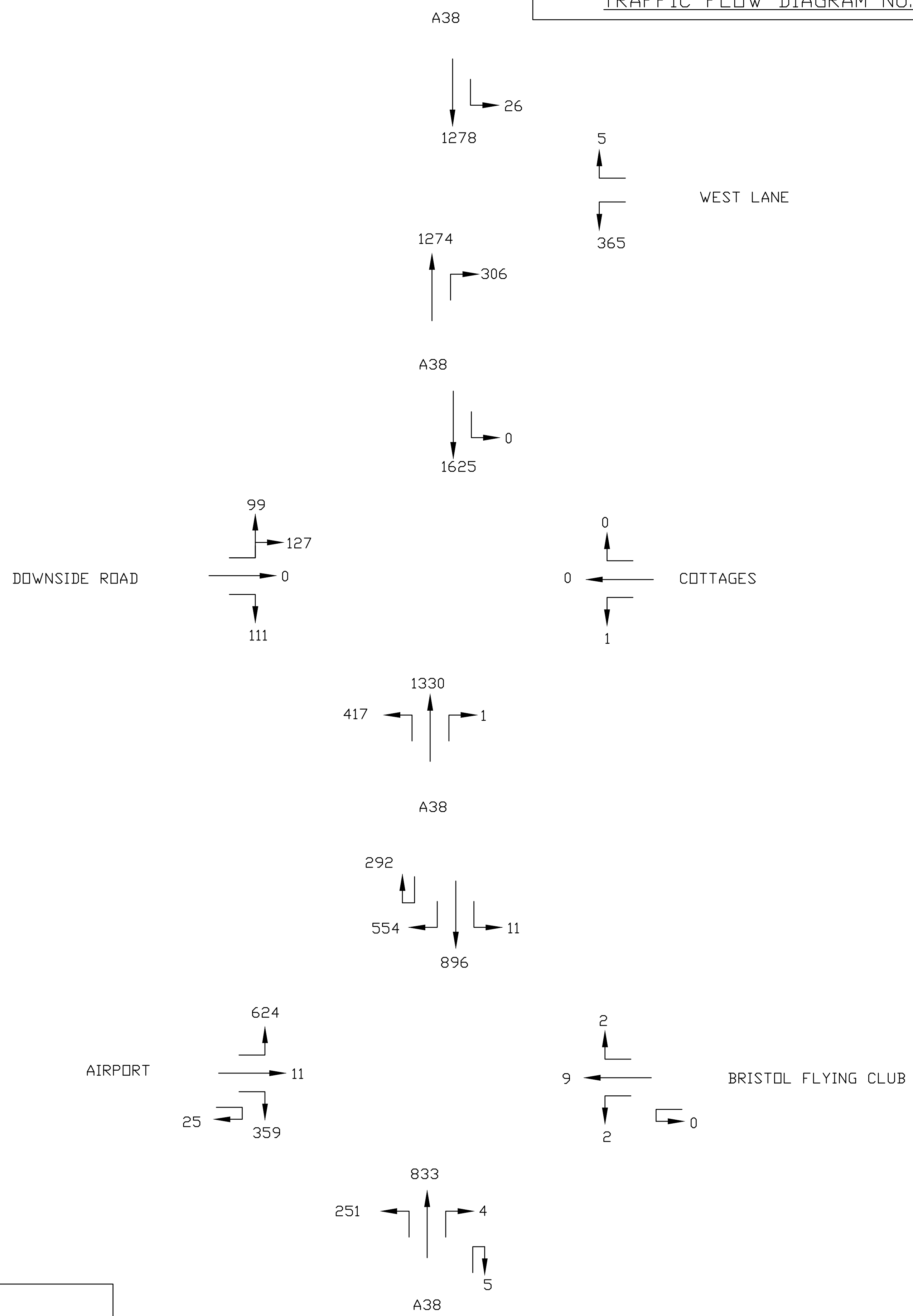
2027 (WITH 2026 AIRPORT TRAFFIC) AM AND PM PEAK HOUR TRAFFIC FLOWS

TRAFFIC FLOW DIAGRAM No. 9A

2027 AM PEAK PERIOD
07:15 TO 08:15 HOURS



2027 PM PEAK PERIOD
16:45 TO 17:45 HOURS

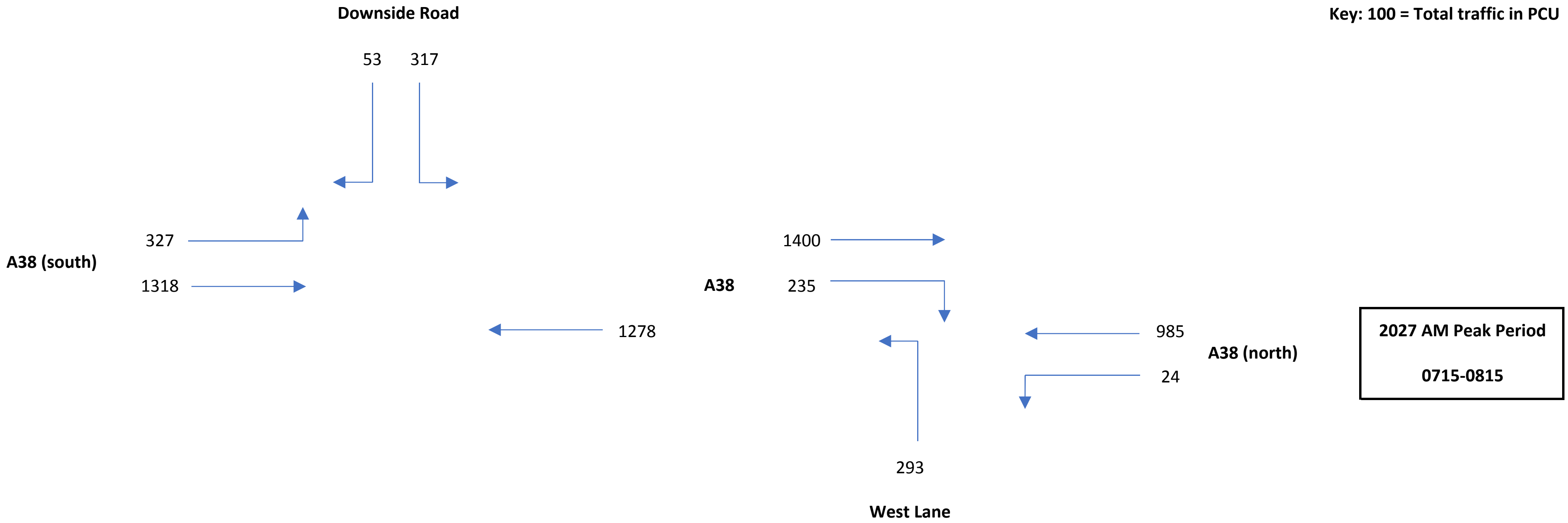


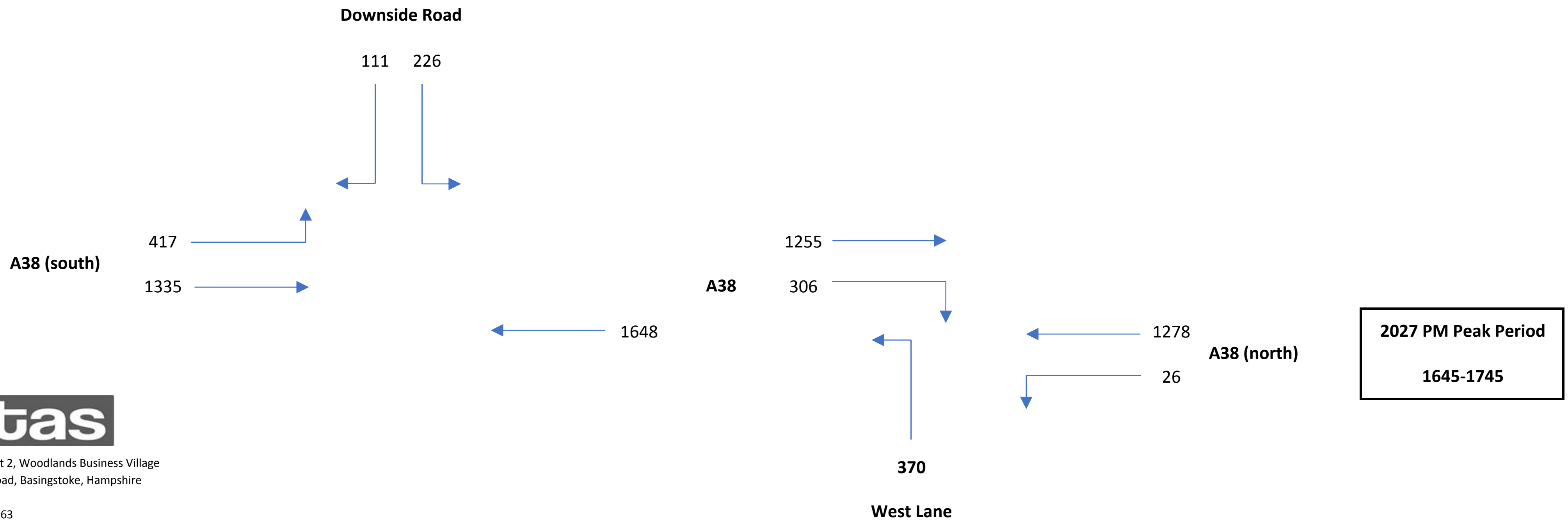
KEY

397 = TOTAL TRAFFIC IN PCU

APPENDIX B

Key: 100 = Total traffic in PCU





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Bristol Airport
A38 Junction Improvements
LINSIG Results

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KEY:

HIGHWAYS ENGLAND COMPANY LTD BOUNDARY

ADOPTED PUBLIC HIGHWAY - NORTH SOMERSET DISTRICT COUNCIL

Rev	Description	Drawn	DATE	Auth
2.0	FUTURE HOTEL ACCESS AMENDED	MW	13/04/18	CC
1.0	FIRST ISSUE	MW	13/04/18	CC

c-tas

Unit 2, First Floor, Woodlands Business Village
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Project
Bristol Airport 12MPPA Masterplan

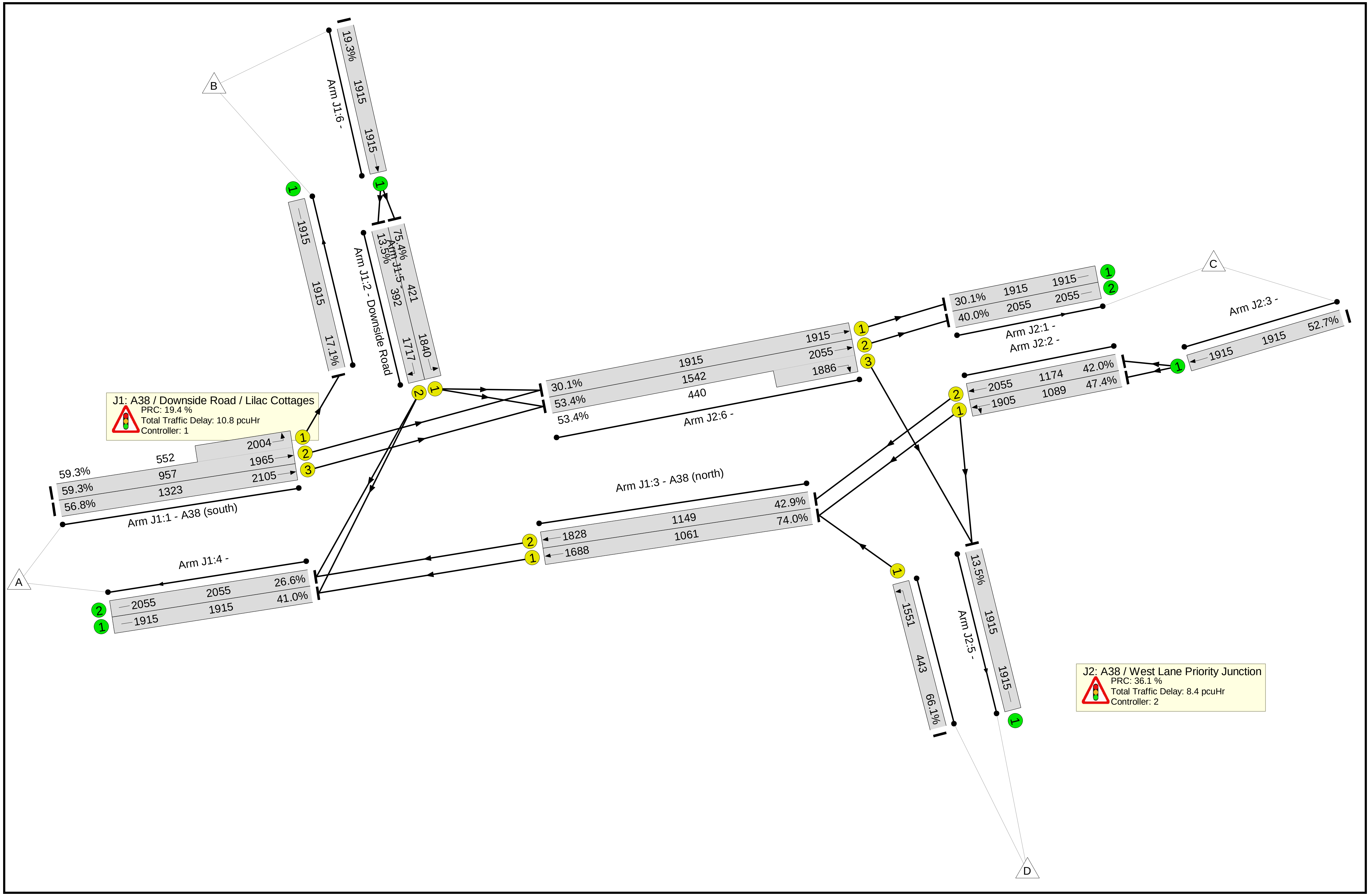
Title
A38 Junction Improvements
Option 10

Original Scale	Drawn By	Date	Checked By		Auth	
1:500@A1	TO	13/04/18	DR		CC	

Drawing Number: C1124-SK-A38-010
REF:
Rev: 2.0

2027 AM 19.08 with 2027

Network Layout Diagram



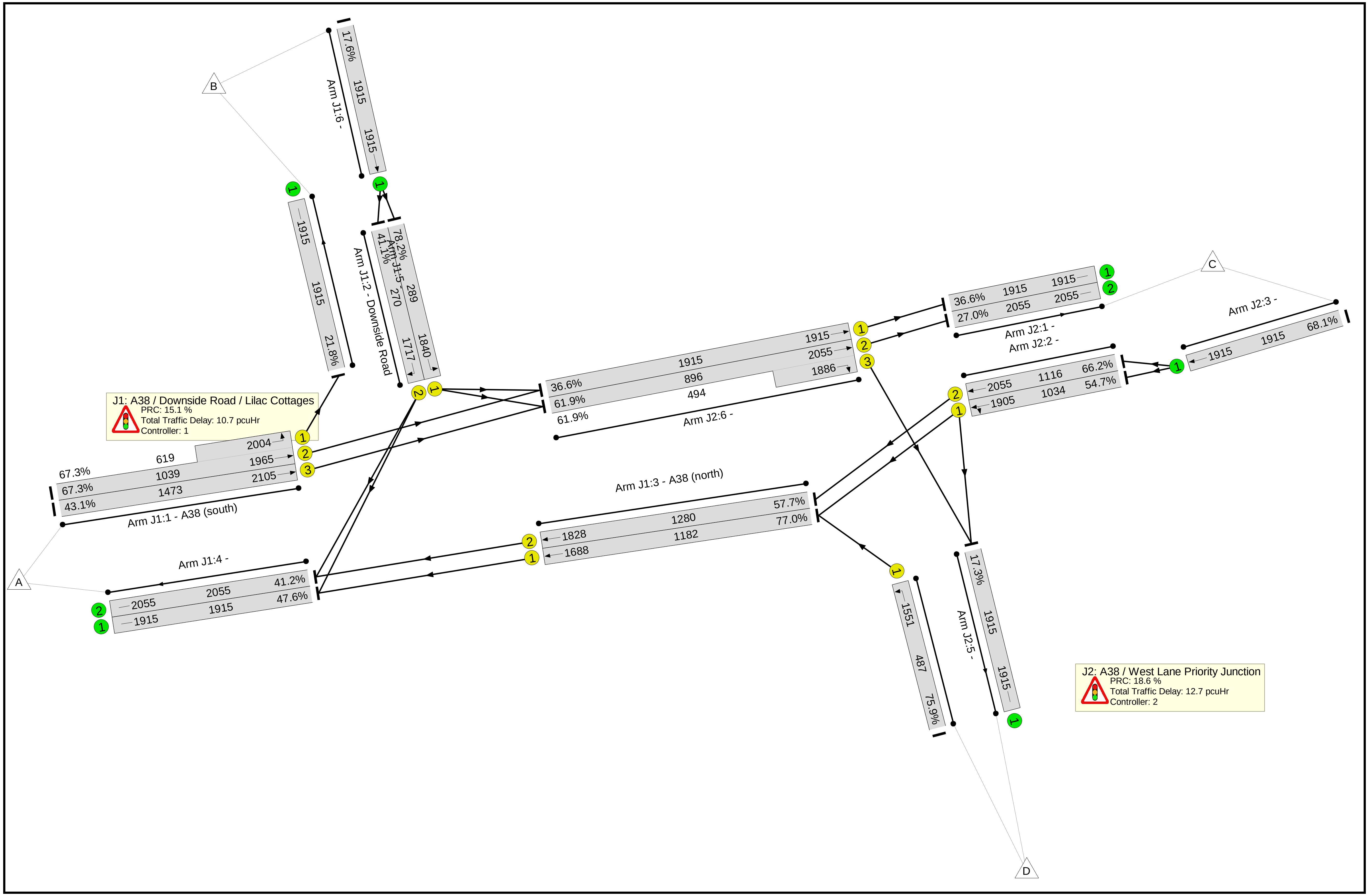
Network Results

Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network	-	-	-		-	-	-	-	-	-	**75.4%**	**0**	**0**	**0**	**19.2**	-	-
J1: A38 / Downside Road / Lilac Cottages	-	-	-		-	-	-	-	-	-	**75.4%**	**0**	**0**	**0**	**10.8**	-	-
1/2+1/1	A38 (south) Left Ahead	U	C1:A C1:E		1	43:70	-	894	1965:2004	957+552	59.3 : 59.3%	-	-	-	1.8	7.2	6.4
1/3	A38 (south) Ahead	U	C1:A		1	43	-	751	2105	1323	56.8%	-	-	-	2.2	10.6	9.0
2/1	Downside Road Left	U	C1:D		1	15	-	317	1840	421	75.4%	-	-	-	3.7	42.1	7.2
2/2	Downside Road Right	U	C1:C		1	15	-	53	1717	392	13.5%	-	-	-	0.4	26.8	0.9
3/1	A38 (north) Ahead	U	C1:B		1	43	-	785	1688	1061	74.0%	-	-	-	1.1	5.1	8.2
3/2	A38 (north) Ahead	U	C1:B		1	43	-	493	1828	1149	42.9%	-	-	-	0.9	6.4	3.5
4/1		U	-		-	-	-	785	1915	1915	41.0%	-	-	-	0.3	1.6	0.3
4/2		U	-		-	-	-	546	2055	2055	26.6%	-	-	-	0.2	1.2	0.2
5/1		U	-		-	-	-	327	1915	1915	17.1%	-	-	-	0.1	1.1	0.1
6/1	Ahead	U	-		-	-	-	370	1915	1915	19.3%	-	-	-	0.1	1.2	0.1
J2: A38 / West Lane Priority Junction	-	-	-		-	-	-	-	-	-	**66.1%**	**0**	**0**	**0**	**8.4**	-	-
1/1		U	-		-	-	-	577	1915	1915	30.1%	-	-	-	0.2	1.3	0.2
1/2		U	-		-	-	-	823	2055	2055	40.0%	-	-	-	0.3	1.5	0.3
2/1	Ahead Left	U	C2:B		1	39	-	516	1905	1089	47.4%	-	-	-	1.7	12.0	6.3
2/2	Ahead	U	C2:B		1	39	-	493	2055	1174	42.0%	-	-	-	1.5	11.1	5.7
3/1	Ahead	U	-		-	-	-	1009	1915	1915	52.7%	-	-	-	0.6	2.0	0.6
4/1	Left	U	C2:C		1	19	-	293	1551	443	66.1%	-	-	-	2.8	33.9	5.9
5/1		U	-		-	-	-	259	1915	1915	13.5%	-	-	-	0.1	1.1	0.1
6/1	Ahead	U	C2:A		1	70	-	577	1915	1915	30.1%	-	-	-	0.2	1.3	0.2
6/2+6/3	Ahead Right	U	C2:A C2:D		1	70:21	-	1058	2055:1886	1542+440	53.4 : 53.4%	-	-	-	1.0	3.4	8.6

C1 PRC for Signalled Lanes (%): 19.4 Total Delay for Signalled Lanes (pcuHr): 10.09 Cycle Time (s): 70
C2 PRC for Signalled Lanes (%): 36.1 Total Delay for Signalled Lanes (pcuHr): 7.19 Cycle Time (s): 70
PRC Over All Lanes (%): 19.4 Total Delay Over All Lanes(pcuHr): 19.22

2027 PM 20.08 with 2027

Network Layout Diagram



Network Results

Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network	-	-	-		-	-	-	-	-	-	**78.2%**	**0**	**0**	**0**	**23.4**	-	-
J1: A38 / Downside Road / Lilac Cottages	-	-	-		-	-	-	-	-	-	**78.2%**	**0**	**0**	**0**	**10.7**	-	-
1/2+1/1	A38 (south) Left Ahead	U	C1:A C1:E		1	48:70	-	1117	1965:2004	1039+619	67.3 : 67.3%	-	-	-	2.0	6.4	7.2
1/3	A38 (south) Ahead	U	C1:A		1	48	-	635	2105	1473	43.1%	-	-	-	1.2	6.7	5.7
2/1	Downside Road Left	U	C1:D		1	10	-	226	1840	289	78.2%	-	-	-	3.5	55.4	5.9
2/2	Downside Road Right	U	C1:C		1	10	-	111	1717	270	41.1%	-	-	-	1.2	37.9	2.3
3/1	A38 (north) Ahead	U	C1:B		1	48	-	910	1688	1182	77.0%	-	-	-	0.8	3.3	9.0
3/2	A38 (north) Ahead	U	C1:B		1	48	-	738	1828	1280	57.7%	-	-	-	1.0	4.9	6.2
4/1		U	-		-	-	-	912	1915	1915	47.6%	-	-	-	0.5	1.8	0.5
4/2		U	-		-	-	-	847	2055	2055	41.2%	-	-	-	0.4	1.5	0.4
5/1		U	-		-	-	-	417	1915	1915	21.8%	-	-	-	0.1	1.2	0.1
6/1	Ahead	U	-		-	-	-	337	1915	1915	17.6%	-	-	-	0.1	1.1	0.1
J2: A38 / West Lane Priority Junction	-	-	-		-	-	-	-	-	-	**75.9%**	**0**	**0**	**0**	**12.7**	-	-
1/1		U	-		-	-	-	700	1915	1915	36.6%	-	-	-	0.3	1.5	0.3
1/2		U	-		-	-	-	555	2055	2055	27.0%	-	-	-	0.2	1.2	0.2
2/1	Ahead Left	U	C2:B		1	37	-	566	1905	1034	54.7%	-	-	-	2.2	14.2	7.7
2/2	Ahead	U	C2:B		1	37	-	738	2055	1116	66.2%	-	-	-	3.3	16.2	11.0
3/1	Ahead	U	-		-	-	-	1304	1915	1915	68.1%	-	-	-	1.1	2.9	1.1
4/1	Left	U	C2:C		1	21	-	370	1551	487	75.9%	-	-	-	3.8	36.5	8.0
5/1		U	-		-	-	-	332	1915	1915	17.3%	-	-	-	0.1	1.1	0.1
6/1	Ahead	U	C2:A		1	70	-	700	1915	1915	36.6%	-	-	-	0.3	1.5	0.3
6/2+6/3	Ahead Right	U	C2:A C2:D		1	70:23	-	861	2055:1886	896+494	61.9 : 61.9%	-	-	-	1.5	6.2	3.8

C1 PRC for Signalled Lanes (%): 15.1 Total Delay for Signalled Lanes (pcuHr): 9.63 Cycle Time (s): 70
C2 PRC for Signalled Lanes (%): 18.6 Total Delay for Signalled Lanes (pcuHr): 11.07 Cycle Time (s): 70
PRC Over All Lanes (%): 15.1 Total Delay Over All Lanes(pcuHr): 23.40

Appendix B A38 Highway Improvement Scheme BAL/ NSC Correspondence

Martinez, Milena

To: Witchalls, Scott
Subject: RE: Bristol Airport - 12mppa Planning Application - Transport

From: Colin Medus <Colin.Medus@n-somerset.gov.uk>
Sent: 15 May 2019 16:50
To: Simon Earles <SEarles@bristolairport.com>
Cc: Richard Kent <Richard.Kent@n-somerset.gov.uk>; Neil Underhay <Neil.Underhay@n-somerset.gov.uk>; Elizabeth Higgins <ehiggins@bristolairport.com>; Paul Baker <PBaker@bristolairport.com>; Bella Fortune <Bella.Fortune@n-somerset.gov.uk>; Frankie Mann <Frankie.Mann@n-somerset.gov.uk>
Subject: RE: Bristol Airport - 12mppa Planning Application - Transport

Dear Simon

Thank you for your email. I can confirm that we are continuing to apply significant resources to work through your application. Addressing the key issues that you raised in order;

1. Agreeing a final outline scheme for the A38 junction improvement
I understand that we have now agreed the A38 mitigation package, subject to detailed design, and Frankie Mann has emailed Paul Baker and Alex Melling to let them know this is now complete and that we are satisfied with the proposals. I trust that you are now able to progress your CPO workstream.

2. Finalising comments on the TA and traffic impacts
We agree that this work should be concluded urgently. Bella Fortune was meeting with Jacobs again this afternoon following the handover from Simon Shapland, who leaves Jacobs this week. Following this meeting we will be able to confirm if all data requested has been received by Jacobs from PBA and yourselves, and dates for acceptance/analysis forthwith.

3. Surface Access comments relating to sustainable transport
We will not be able to conclude our Surface Access recommendations until we have received further work packages and analyses from Jacobs. We continue to actively progress finalisation of our formal comments in recognition of the importance of this application and will complete it as soon as possible. I have conveyed the importance of getting this complete as soon as possible

Kind Regards

Colin Medus
Head of Transport and Infrastructure
Development & Environment
North Somerset Council

Tel: 01934 426498 or 07584607221
E-Mail: Colin.Medus@n-somerset.gov.uk

Post: Town Hall, Walliscote Grove Road, Weston-super-Mare, BS23 1UJ
Web: www.n-somerset.gov.uk

From: Simon Earles <SEarles@bristolairport.com>
Sent: Wednesday, May 15, 2019 10:34 AM
To: Colin Medus <Colin.Medus@n-somerset.gov.uk>
Cc: Richard Kent <Richard.Kent@n-somerset.gov.uk>; Neil Underhay <Neil.Underhay@n-somerset.gov.uk>; Elizabeth Higgins <ehiggins@bristolairport.com>; Paul Baker <PBaker@bristolairport.com>
Subject: Bristol Airport - 12mppa Planning Application - Transport

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Colin,

I would appreciate an update on how officers are progressing the traffic and transport work relating to the planning application. In a number of meetings in recent months we have been trying to cover off three main issues:

1. Agreeing a final outline scheme for the A38 junction improvement
2. Finalising comments on the TA and traffic impacts
3. Surface Access comments relating to sustainable transport

Whilst we have made some progress, there would seem to be a significant amount to be done pre-Committee. I would welcome your commitment to resolving these matters as soon as practicable.

As you know, point 1 is really critical now as we need to push ahead with the CPO process. We are just waiting for final sign off on the outline scheme and I believe this is with Frankie and Mike O'Sullivan. For us to commence the CPO proceedings we need Board approval (which is on 22nd May). If this deadline is missed we will lose another month to the next Board, time we cannot afford. It would be helpful to get all matters resolved this week.

Point 2 is being processed with work between PBA and Jacobs, I believe we are nearly there but an update would be helpful. Signing off the TA is also a critical dependency for some of the environmental sections of the ES.

We are also still awaiting your formal comments on surface access. This is also becoming critical now as we really need these in order to finalise our mitigation proposals. Whilst we have had conversations in meetings which have given us some indication of officers' thoughts, we really need to see the formal comments to get this process moving and move on to the really important stage of agreeing financial sums for some of the mitigation items.

I look forward to an update, and of course you have our commitment at Bristol Airport to work through these issues so that the Officer's report on our application can be completed as soon as possible.

Many thanks

Regards,

Simon

Simon Earles
Planning & Sustainability Director
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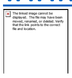

Martinez, Milena

To:	Witchalls, Scott
Subject:	RE: MOS comments - Highway Mitigation Interim Comments Bristol 12 mppa - with CTAS comments 190423

From: Frankie Mann <Frankie.Mann@n-somerset.gov.uk>
Sent: 13 May 2019 15:00
To: Neil Underhay <Neil.Underhay@n-somerset.gov.uk>; Paul Baker <PBaker@bristolairport.com>
Cc: Elizabeth Higgins <ehiggins@bristolairport.com>; alex.melling@woodplc.com
Subject: RE: MOS comments - Highway Mitigation Interim Comments Bristol 12 mppa - with CTAS comments 190423

Hi all,

I have forwarded on to Mike to request this is now signed off subject to detailed design.

Paul- many thanks.

Thanks,

Frankie

Frankie Mann
Sustainable Travel and Road Safety Manager
Development & Environment
North Somerset Council

Tel: 01275888904
E-Mail: Frankie.Mann@n-somerset.gov.uk
Post: Town Hall, Walliscote Grove Road, Weston-super-Mare, BS23 1UJ
Web: www.n-somerset.gov.uk

From: Neil Underhay
Sent: Monday, May 13, 2019 2:24 PM
To: PBaker@bristolairport.com; Frankie Mann <Frankie.Mann@n-somerset.gov.uk>
Cc: ehiggins@bristolairport.com; alex.melling@woodplc.com
Subject: FW: MOS comments - Highway Mitigation Interim Comments Bristol 12 mppa - with CTAS comments 190423

Dear Paul / Frankie,

Thanks for copying me in. I will leave it to highways officers to give technical feedback, but please ensure that finalised drawings are sent to me so that they can be added to the public file.

Thanks

Neil

Neil Underhay
Principal Planning Officer
Development & Environment
North Somerset Council

Tel: 01275 888811
Web: www.n-somerset.gov.uk

Submitting planning applications
From 1st October 2018 planning applications that can be submitted using the Planning Portal will not be accepted by email. You can find out how to send planning applications to us on our website

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Contact service (get a response within five working days)
Building Control (get independent oversight of the key stages of construction - a local service backed by national expertise)

From: Paul Baker <PBaker@bristolairport.com>
Sent: Monday, May 13, 2019 1:35 PM
To: Frankie Mann <Frankie.Mann@n-somerset.gov.uk>
Cc: Rob Holloway <rholloway@peterbrett.com>; Chris Cowle <chris@c-tas.co.uk>; Elizabeth Higgins <ehiggins@bristolairport.com>; Melling, Alex <alex.melling@woodplc.com>; Neil Underhay <Neil.Underhay@n-somerset.gov.uk>; Richard Kent <Richard.Kent@n-somerset.gov.uk>; Bella Fortune <Bella.Fortune@n-somerset.gov.uk>; Steve Thorne <Steve.Thorne@n-somerset.gov.uk>; Simon Earles <SEarles@bristolairport.com>
Subject: RE: MOS comments - Highway Mitigation Interim Comments Bristol 12 mppa - with CTAS comments 190423

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Hi Frankie,

Thanks for providing the comments from Mike in relation to the A38 scheme. We have been through these and can provide the following response (blue text):

13. Risk of overtaking and side swipe type accidents
The merge NE bound looks to be approx. 50m in length which is likely to be under used or encourage aggressive overtaking/merging manoeuvres, which could result in side swipe type accidents. It is required to increase the length of the merge as much as possible (preferably 100m in length) to give vehicles more time to merge safely. If this is not possible then merge signage should be considered.
The two-lane section of the A38 extend 67m beyond the stop line with West Lane junction this then tapes back to the main carriageway over a further 50m. The total merge area is therefore longer then 100m. The requirement for signage can be reviewed at the detailed design stage.
At what distance from the stop line does the carriageway width reduce below 4.5m within the taper?
The current proposal indicates the road narrows to 4.5m at 106m from the stop line. The centre of the road is currently hatched so this figure might be able to be slightly increased as part of the detailed design

14. If extra traffic will be using the airport roundabout to 'u 'turn is there enough capacity, are there any safety issues? A safety audit is required.
The supporting traffic assessment (TA) indicates traffic flows and junction performance.
Could not find, please summarise.
The results of the junction capacity assessment of the roundabout are shown in section 11.2.5 of the Transport Assessment. The results indicate that the junction would operate with sufficient spare capacity at peak periods.

1.4 General comments

The left only out of West Lane is likely to put additional traffic onto Currells Lane, Newditch Lane or Dial Lane junctions with the A38, potentially creating collisions problems at these sites.
Changes to the local traffic routes and the impact on adjacent junctions in included within the transport assessment (TA).
Could not find, please summarise.
The traffic flow forecast for 2027 indicates 15 vehicles in the AM peak and 5 in the PM peak would be affected by implementing the banned turn. This level of traffic would not have a material impact upon the operation of adjacent junctions.

Visibility splays to signal heads are not shown, these need to meet DMRB standards.
There is good visibility provided to all signal heads. The location of the heads can be finalised as part of detailed design stage.
Please provide a plan showing visi splays
A plan will be provided as part of the detailed design pack as the positioning of the signal heads would also form part of the detailed design. Design would be in accordance with DMRB standards.

I trust that this covers all of the outstanding issues relating to the A38 scheme design prior to the detailed design stage. I would be grateful if you could confirm this at your earliest opportunity, allowing us to move forward with the associated CPO works.

Regards,

Paul

From: Frankie Mann <Frankie.Mann@n-somerset.gov.uk>
Sent: 09 May 2019 10:35
To: Elizabeth Higgins <ehiggins@bristolairport.com>; Simon Earles <SEarles@bristolairport.com>; Paul Baker

<PBaker@bristolairport.com>
Cc: Neil Underhay <Neil.Underhay@n-somerset.gov.uk>; Richard Kent <Richard.Kent@n-somerset.gov.uk>; Steve Thorne <Steve.Thorne@n-somerset.gov.uk>; Bella Fortune <Bella.Fortune@n-somerset.gov.uk>
Subject: MOS comments - Highway Mitigation Interim Comments Bristol 12 mppa - with CTAS comments 190423
Importance: High

Hi Paul/Liz/ Simon,

As discussed at yesterday's meeting please find attached the highway comments from Mike O'Sullivan, who Paul and I met a few weeks ago. These are in response to C-TAS comments on the A38 mitigation package. There are only two remaining sections (13 & 14), once these are addressed by PBA/BAL these comments can be signed off until post consent/detailed design and road safety audit stage.

As you can see there are no further comments against the lighting section as it is believed these can all be addressed post consent.

Therefore once these are received, you will be able to progress any CPO discussions as a matter of urgency.

Many thanks,

Frankie

Elizabeth Higgins
Planning Manager
Bristol Airport,
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01275 473499
07468 701828
www.bristolairport.co.uk

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Appendix C A38 Highway Improvement Scheme NSC Comments (March 2019)

MOS comments shown in green made on behalf of NSC road safety engineering team on 08/05/2019.
C-TAS comments shown in red made on behalf of Bristol Airport, updated following meeting with NSC on 12th April 2019.

INTERNAL MEMORANDUM

FROM: D&E HIGHWAYS & TRANSPORT INTERIM COMMENTS

Date: 28th March 2019

Development Control Case Officer: Neil Underhay

Application No: 18/P/1518/OUT
Location: Bristol Airport North Side Road Felton Wrington BS48 3DP
Proposal : Outline planning application (with reserved matters details for some elements included and some elements reserved for subsequent approval) for the development of Bristol Airport to enable a throughput of 12 million terminal passengers in any 12 month calendar period, comprising: 2no. extensions to the terminal building and canopies over the forecourt of the main terminal building; erection of new east walkway and pier with vertical circulation cores and pre-board zones; 5m high acoustic timber fence; construction of a new service yard directly north of the western walkway; erection of a multi-storey car park north west of the terminal building with five levels providing approximately 2,150 spaces and wind turbines atop; enhancement to the internal road system including gyratory road with internal surface car parking and layout changes; enhancements to airside infrastructure including construction of new eastern taxiway link and taxiway widening (and fillets) to the southern edge of Taxiway GOLF; the year-round use of the existing Silver Zone car park extension (Phase 1) with associated permanent (fixed) lighting and CCTV; extension to the Silver Zone car park to provide approximately 2,700 spaces (Phase 2); improvements to the A38; operating within a rolling annualised cap of 4,000 night flights between the hours of 23:30 and 06:00 with no seasonal restrictions; revision to the operation of Stands 38 and 39; and landscaping and associated works.

1. Highway Mitigation Measures

Highways has reviewed the proposed improvement scheme to Downside Road/A38 junction and provides further comments below.

1.1 Road Safety Comments

These comments have been provided to identify potential issues that could occur to all road users following the proposed changes at Downside road. The Road Safety Engineering Team carried out a desktop study of the site and drawing proposals on the 22 January 2019. The Road Safety Engineering Team have assessed the changes based on drawing no. C1124-SK-A38-010 - A38 Junction Improvements, Option 10.

Although the proposals were assessed based on the principles of GG119 and by members qualified to carry out Road Safety Audits, the Road Safety Engineering Team has not carried out an official Road Safety Audit, therefore this report has been produced. Whilst it is recognised that some of these issues could be dealt with at the detailed design stage, a designer's response to these concerns must be provided by the applicant.

1.2 Accident History:

CrashMap indicates there have been 9 slight accidents and 1 fatal accident in the last 3 years 2015-2017 within the vicinity of the junction improvement scheme.

1.3 Comments:

1. Risk of side swipe and merge type accidents

The layout gives priority to vehicles leaving the airport which will result in weaving of vehicles travelling from the A38 to Downside Road. The merge off the roundabout is very short and does not allow much time for vehicles to merge (which is existing), but with the additional lane coming from the airport the merging and weaving will increase. The dedicated exit from the airport could result in squeezing vehicles exiting the roundabout, should there be a give way on the airport exit.
In addition, cyclists travelling along the A38 towards Bristol will end up in lane 2 and must merge into lane 1, crossing the path of faster moving vehicles.
It is required that the arrangement is redesigned so airport traffic must give way to A38 traffic which will reduce the merging and weaving risk of accidents.
BAL have examined a number of alternative layouts which seek to address the issues raised by NSC. Drawing C1124-SK-A38-010 rev 11.0 indicates a revised design for the A38 / Airport access roundabout. The layout provides two lanes leaving the airport which widen to three at the roundabout. This layout provides sufficient capacity to support BAL's proposals. The new layout retains more of the current boundary planting and keeps the existing pedestrian crossing point on the A38 north arm.
Accepted

2. Risk of pedestrian accidents
There are proposals for a refuge island to be provided to replace the crossing facility lost at the roundabout. Currently use of these facilities is likely to be minimal, however there are proposals for 49 rooms at The Forge hotel and on the old primary

school site. (Some are replacing existing rooms). The proposed refuge will become a primary route for pedestrian access to the airport, crossing is slower whilst carrying luggage, which could increase the risk of pedestrian accidents.
It is required that a crossing assessment is carried out to ensure the correct facility and appropriate widths are provided. If this layout is deemed acceptable the pedestrian island on the A38 approach to the airport needs to be a minimum width of 2.00 metres.
The existing pedestrian crossing point closer to the A38 / Airport Access junction is retained as part of the response to point 1 above. The additional island closer to the Forge is therefore no longer required and has therefore been removed.
A crossing assessment should still be carried out on the existing crossing point to ensure suitability, and the visibility to the crossings should be improved. This can be undertaken post consent.

3. Risk of ‘nose to tail’ and ‘side junction to main road merge’ type collisions.
The proposed right turn lane into School lane will serve both the hotel proposals and current School Lane access. The right turn lane is approx. 40m in length for School Lane, however the access into the proposed hotel is approx. 20-25m from the start of the right turn lane. This will result in harsher braking and the potential for a following vehicle heading to School Lane colliding into the rear of the vehicle turning

into the hotel access. There is also a risk of vehicles entering the main road injudiciously across the 5 lanes when turning right.
It is required that the right turn lane is redesigned to consider the 2 access points and that the accesses are left out only to avoid vehicles crossing multiple lanes.
Examining both applications in detail, it appears the developers have proposed to operate the access points as left in / left out. It is understood from the meeting that NSC will undertake further reviews of these third party access proposals as necessary and will advise what measures the developers will be asked to provide now that the comprehensive airport scheme has been developed. BAL can add these proposals to their plans once they have been agreed and supplied in sufficient detail. In the meantime, the number of gaps within the hatch area have been reduced to one, catering for access into School Lane.
Accepted – the proposed hatching width should be maintained at 2.5m or more to future proof for any right turn proposals.

4. Risk of cyclist accidents
The lane widths through the site vary from 3.0m-3.5m which could cause overtaking vehicles to squeeze cyclists, particularly around the 3.5m width and whilst travelling uphill.
It is required that lane 1 in both directions are widened as much as possible (ideally to 4.25m or above) to keep a consistent approach and take account of slower moving cyclists, particularly uphill. Where widths are not possible 3m running lanes will suffice meaning drivers must make a conscious decision to overtake and will slow until there is an opportunity to do so.
BAL are not proposing to change the position of the Eastern kerb of the A38 other than the section north of west Lane. There are constraints posed by land ownership and dwellings which prevent further road widening. The removal of the additional traffic island on the A38 between Downside Road and Airport Access (point 2 above) has allowed the hatching between the north and south bound lanes to be reduced. The nearside southbound lane (uphill) has been widened to 3.9m to provide additional width for vehicle to pass cyclists. It should be noted that there is also a shared cycle track over this section of the A38.
Although the lane widths aren't ideal and are inconsistent, the area that can be improved has been as much as possible within the physical highway constraints.

5. Risk of side swipe accidents
It is not fully understood how vehicles are expected to access Lilac Cottages and whether they are left in left out only. Vehicles turning left in might swing out wide into lane 2 due to the acute angle which could result in a side swipe/nose to tail with the vehicle overtaking in lane 2. There is also a risk that drivers might turn right in/out in between the islands into the path of another vehicle. There are also no dropped kerbs/tactiles for pedestrians/cyclists crossing the 'bell-mouth'.
It is required that this access is looked at in more detail to fully understand vehicle movements and that track runs are carried out. Dropped kerbs/tactiles should also be provided.
While additional lanes have been added to the A38 in both directions, access to / from Lilac Cottages remains unchanged from the current situation.
Accepted

6. Risk of pedestrian accidents

There are not any dropped kerbs/tactiles shown on the new access into the Airport Tavern, this could result in pedestrian trips or fall.
It is required to review the pedestrian flows and installed dropped kerbs and tactile paving at this junction**.**
Drop kerbs and tactile paving have been added to the junction layout drawing. To be confirmed as part of the detailed design.
Accepted

7. Risk of cyclist accidents
Cyclist could ride out into the path of vehicles heading NE on Downside Road where they are told to re-join the carriageway.
It is required to improve the signing and lining in this area to ensure it is clear to cyclists that they do not have priority and they are to give way at this location.
The Northeast bound carriageway has been locally widened and giveway markings added to the latest drawing. Traffic signs will be added and can be confirmed as part of the detailed design.
Accepted

8. Risk of overtake and side swipe accidents
Due to the busy nature of the A38 and the multiple lanes there is an increased risk of side swipe type accidents caused by vehicles overtaking a bus at the bus stop.
It is required to locate the bus stop within a layby to reduce the risk of overtake / side swipe accidents.
The provision of online bus stops is common place and prevents buses having to wait to re-join the main carriageway. This arrangement is the preference of the bus operators. The provision of a lay-by in this location would also require additional land.
Reasons are understood but there is still concern for overtake accidents during busy periods this should be addressed in any road safety audit post consent.

9. Risk of pedestrian and cyclist accidents
The existing shared footway/cycleway is very narrow for shared use which could result in cyclists colliding with pedestrians or riding into the road to avoid pedestrians.
It is required to widen this shared footway/cycleway to a minimum of 2.5m to avoid pedestrian and cyclist conflicts. (This is subject to NSC Area Officer checks on condition and width of the facility)
The share cycle track to the eastern side of the A38 is an existing facility. It is understood that NSC are looking to remove the existing undergrowth which extended from the common therefore narrowing the footway / cycleway which will maximise its width. It would not be possible to provide any additional width as this would require land from the common, or moving the road further west impacting on additional third party dwellings / land.
Accepted – signing and lining should be improved to raise awareness that it is a shared facility. See photo example below:

10. Risk of pedestrian accidents
Pedestrians could be injured whilst trying to cross West Lane due to there being no refuge island or pedestrian phase on the signals.
It is required that a crossing assessment is carried out to ensure the correct facility is provided.
No pedestrian movements were counted at this junction during the survey period. The revised junction drawing does indicate an implied crossing point with lowered kerbs either side of the junction. To aid users the stop line on West Lane is also pulled further back slightly and realigned. Provisions for pedestrians at this point can be confirmed at the detailed design stage.
Accepted – facilities should be improved as much as reasonably practical.

11. Risk of accidents from debris in the road
The traffic island looks to be around 1.0m wide with 3 signal heads on it, if enough clearance is not provided there is a risk that high sided vehicles could hit the signal heads and they fall into the path of a vehicle or motorcycle.
It is required that the island is redesigned so it can accommodate all 3 signal heads whilst providing sufficient clearance from vehicles.
The latest layout indicates a wider traffic island and the signals separated on to 3 separate posts. The information will be provided as part of the detailed design.
Accepted

12. Risk of accidents from U-turns
With the banned right turn from West Lane there is a risk that drivers might turn right in/out in between the islands or do a U-turn around the NW island into the path of another vehicle.
It is required that the islands are designed to reduce the risk of vehicles turning right or carrying out U-turns as much as possible.
Traffic using the A38 is likely to prevent traffic attempting to U turn at this point. The revised drawing shows a slightly extended traffic island further west to provide an increased physical deterrent.
Accepted – island should be extended as much as reasonably practical.

13. Risk of overtaking and side swipe type accidents

The merge NE bound looks to be approx. 50m in length which is likely to be under used or encourage aggressive overtaking/merging manoeuvres, which could result in side swipe type accidents. It is required to increase the length of the merge as much as possible (preferably 100m in length) to give vehicles more time to merge safely. If this is not possible then merge signage should be considered.
The two-lane section of the A38 extend 67m beyond the stop line with West Lane junction this then tapes back to the main carriageway over a further 50m. The total merge area is therefore longer then 100m. The requirement for signage can be reviewed at the detailed design stage.
At what distance from the stop line does the carriageway width reduce below 4.5m within the taper?

14. If extra traffic will be using the airport roundabout to ‘u ‘turn is there enough capacity, are there any safety issues? A safety audit is required.
The supporting traffic assessment (TA) indicates traffic flows and junction performance.
Could not find, please summarise.

15. Right turn out of Downside appears tight. It is required splays are tracked, or confirmation of tracking should be provided by BAL.
The junction layout enables access for normal road going vehicles as well as road legal farm equipment. The supporting traffic assessment (TA) indicates the vehicle swept path analysis which has been undertaken.
Accepted – could not find all the track runs.

16. Tactiles are required across the highway access into the Airport Tavern on the desire line, as well as tactiles across the West Lane bell-mouth on the desire line.
Point 6 above addresses these observations.
Accepted

17. Planning has been granted for 2 new developments 16/P/1581/F (School site) 17/P/1245/F (The Forge) these have not been incorporated into the drawings, can the 4th leg of the roundabout be used? (right turns in / out should be a banned movements).
Point 3 above partially covers this item. The new access arrangements can be added to the proposed layout once suitably approved detailed drawings have been received from NSC. The eastern side of A38 / Airport Access roundabout remains unchanged from existing.
Accepted

1.4 General comments

Design Standards to be as per DMRB due to the road being one of North Somerset’s principle ‘A’ roads. There is an existing problem with vehicles parking and blocking the shared footway/ cycleway outside the Forge Motel. This should be enforced to maintain the width using TRO’s.
Enforcement of existing parking offences in this location is currently the responsibility of NSC. However, the measures proposed as part of the wider S106 package would include a contribution towards ensuring dedicated resources for the purpose of enforcement.
Accepted

The two signalised junctions need to be linked together properly to maximise traffic flows using MOVA etc.
This is the proposed operation, the details of which will be provided as part of detailed design
Accepted

A yellow box marking would be required on the A38 where traffic enters from Downside Road to ensure NE bound traffic heading towards Bristol is not blocked between light sequences.
Traffic modelling indicates this road marking is not required. However, it could be added and this can be confirmed as part of the detailed design stage.
OK – can be reviewed

The left only out of West Lane is likely to put additional traffic onto Currells Lane, Newditch Lane or Dial Lane junctions with the A38, potentially creating collisions problems at these sites.
Changes to the local traffic routes and the impact on adjacent junctions in included within the transport assessment (TA).
Could not find, please summarise.

Visibility splays to signal heads are not shown, these need to meet DMRB standards.
There is good visibility provided to all signal heads. The location of the heads can be finalised as part of detailed design stage.
Please provide a plan showing visi splays.

- Section 278 required to include ,2 x commuted sums required for the signals,
- Inspection fee 4% of the bond.
- Full Technical approval package required to be approved
- AIP required for the pubs new retaining wall

These requirements will form part of S278 negotiations

1.5 Highways & Electrical Comments (Lighting/Signals)

The 'Design and access statement – Part 4 – 6.2.3' refers to the external lighting strategy. To confirm that the ULR should be <2.5% for an E2 environment and not <5% as suggested.
This point is noted. Lighting issues will be addressed in full as part of the detailed design stage.

The 'Lighting assessment – Part 1 – 3.3.1' refers to 6m columns, however all the lighting columns on the A38 adjacent to the airport are 10m, with no lighting on Downside Rd, so we seek clarification as to what this is referring to.
The A38 will continue to have street lighting which will be extended to cover the additional carriageway and footway. The street lighting will be extended along Downside Road to the end of the proposed cycle track. The nature of the lighting will be agreed as part of detailed design.

The ‘Lighting assessment – Part 1 – 4.4.1’ makes recommendations for additional mitigation. I would propose that the A38 lighting has back shielding implemented to further reduce light spill onto the woodland area.
Bats have been found to frequent the abandoned quarry alongside Downside Road. Suitable mitigating measures are therefore required and will be agreed as part of detailed design.

The ‘Lighting assessment – Part 1 – 4.4.1’ again suggests a ULR of <5% when it should <2.5% for a E2 environmental zone.
This point is noted. Lighting issues will be addressed in full as part of the detailed design stage.

The ‘lighting assessment’ indicates that an initial lighting design proposal has been carried out, but the lux contour plans for these have not been included. These will need to be provided to ensure that parameters are met, along with prescribed design levels and mitigation calculations to meet the requirements of ILP GN01:2011 and requirements for bats.
Plans including location of columns will be provided as part of detailed design.

‘Lighting assessment – Part 2 – Appendix D – Plan 09194-HYD-XX-GF-DR-E-9013’ gives an indication of the proposed lighting at the Junction of Downside Rd with the A38. It is a requirement that for detailed design that the proposed lighting for Downside Rd is extended further to take in the further lane split and provided adequate lighting on approach to the conflict area. Similar foresight needs to be given to West Lane and appropriate lighting including on the West lane approach to the proposed traffic signal junction.
Plans including location of columns will be provided as part of detailed design.

1.6 Traffic Signals – Proposed Improvements

Given the extent of the works proposed to the existing traffic signal junction, is banning the right turn into Downside Rd still the best solution for optimising traffic flows? A number of revisions leading to the proposed design have been carried, what are the alternatives and the benefits/dis-benefits that have led to this being the best solution?
The Design and Access Statement contained within the TA describes the other options considered as part of the junction improvement scheme development process.

Need to further understand the decision to ban right turn movements out of West Lane as this will increase traffic on the roundabout at the main entrance of the airport or redistribute traffic to other un-signalised junctions along the A38, which may increase safety concerns etc.
The effect on the roundabout and other local roads is described and analysed as part of the TA.

Concerns with ingress/egress from various properties along the A38 adjacent to the traffic signals, waiting areas in hatched areas, right turn movements across multiple lanes, lilac cottages access (space is inadequate as a waiting area).
This comment is addressed as part of points covered earlier in this document.

Requirement to further understand the need for traffic signals at the A38/West Lane part of the proposal. The TA indicates that the proposal for the crossing is to allow pedestrians using the bus lane to cross the A38 to West Lane. Given that the numbers of pedestrians would be minimal, it could be argued a refuge island would be sufficient. If this is the case and the right turn out is banned from West Lane with minimal interactions, has a proposal been considered without this node signalised?
The performance of West Lane is described within the TA.

Confirmation as to whether the front access to the Airport Tavern will be shut with the new proposed entrance in place.
The scheme includes the closure of the existing Airport Tavern access from the A38 frontage, with a new access provided from Downside Road.

The queue for Downside Rd is indicated as 8.3 at its worse approx. 50m of cars which would take it past the new entrance for the Airport Tavern. Without information on the number of users entering the site, some concerns with vehicles turn right into the new entrance impeding the flow of traffic for those turning left into Downside Road from the A38.
A keep clear marking has been provided on the revised layout drawing.

The proposals indicate rough positions of the traffic loops proposed to manage the operation of the traffic through the signals, however nothing indicated for West Lane. Will need to understand what this will look like and how it will be designed given the presence of a cattle grid.
Traffic signal loops to be developed as part of detailed design. We discussed the ongoing requirement for the cattle grid and NSC agreed to review if it was still required now the A38 has been de-trunked.

The queue for traffic turning right is indicated as 15.7 approx. 90m of cars. Unsure if this is split across both lanes or the resultant queue for vehicles waiting to turn right. This does raise concerns of traffic backing up into the next node, even more so if a bus as waiting at the bus stop.
The queue is split and the signal timings will prevent blocking back. The details of which form part of the TA.

Need to ensure adequate width on West Lane turning left between the kerb and the island is wide enough for larger vehicles to make the movement and to ensure the island is sufficient in size for the proposed traffic signal.
The vehicle swept path is contained within the TA.

Stop line detection will need to be installed on many approaches as it is likely some residents joining the A38 will have joined beyond the proposed MOVA loops and

would end up stuck if the lights have reverted to all red, with no other demands for those approaches.
Not all traffic loops are shown at this stage, final layout will be developed as part of detailed design.

If the proposed layout is taken forward consideration should be made for the A38/West Lane junction to operate dual stream, separating the A38 BA to Bristol and its associated crossing from the rest of the staging.
This will be agreed as part of detailed design.

Consideration should be made as to whether the left turn into Downside Rd and its associated crossing could be separately streamed from the rest of the junction.
This can be undertaken but slip lane is relatively short so full benefit might not be realised. This will be agreed as part of detailed design.

Confirmation as to whether the Downside Rd right turn movement is also to allow vehicles to enter Lilac Cottages. If they are allowed, then consideration of the road marking and signalisation need to be considered.
This movement is not permitted as part of the design, in line with the current operation.

There is no indication of maintenance bay provision for engineers carrying out maintenance of the traffic signals. Presume this will be indicated in the detailed design along with controller positions?
Location of controller and maintenance bay can be agreed as part of detailed design.

We will need to understand the co-ordination between the two junctions to ensure that they will operate without internal lock up, so ensuring that internal approaches clear effectively each cycle.
This is covered as part of the Transport Assessment.

In addition to the improvement scheme identified at Downside Road, North Somerset Council and Bristol City Council has requested BAL provide further information and data on the following locations:

- SBL junction with A370 (BCC)
- Dundry Lane junction with A38

This is covered as part of the Transport Assessment and separate ongoing discussions.

Depending on the conclusions of the data provided, further contributions to mitigation and design at these locations may be required. It is not expected the airport would pay for the mitigation works in entirety, rather contribute to feasibility and/or a residual contribution to the scheme based on its proportion of passenger use at these specific locations.
This is covered as part of the Transport Assessment and separate ongoing discussions.

From reviewing the responses to the BAL application for 12 mppa, a proportion of residents and stakeholders have requested the scale of the application and expansion warrants providing mass transit post 10 mppa. Although a contribution for this would be merited for feasibility/design, this is to ensure mass transit could be progressed to meet the changing and future requirements of passengers to the airport, it is not envisaged by officers a contribution would be for providing mass transit solution at this stage. Instead we would wish to see this come forward as a residual contribution within the major project S106 contribution within the heads of terms.
This is covered as part of the Transport Assessment and separate ongoing discussions.

Appendix D Junction Cluster Review

TECHNICAL NOTE

Job Name: Bristol Airport Appeal

Job No: 48889

Note No: TN033

Date: 07/06/2021

Prepared By: Charlie Eadle/ Thea Harland/ Jaydan Churchill

Subject: **Personal Injury Collision Review**

1. Introduction

1.1. This note has been prepared as an update to the personal injury collision (PIC) data review prepared as part of the original TA for the expansion of Bristol Airport to 12mppa.

1.2. A PIC data review was carried out as part of the original TA for two agreed study areas in North Somerset Council (NSC), for the period between 1st January 2014 to 30th June 2018, and Bristol City Council (BCC), for the period 1st October 2013 to 30th September 2019. No undue concerns with regard to highway safety were identified as part of that review.

1.3. Updated PIC data for the same study areas has been obtained and analysed for the most recent period of available data in order to identify whether there have been any changes to highway safety issues informed by recorded incident data since the original PIC review was carried out.

1.4. The collisions are classed into three categories: slight, serious, and fatal as defined below:

- **Slight Injury**: Injuries of a minor nature, such as sprains, bruises, or cuts not judged to be severe, or slight shock requiring only roadside attention (medical treatment is not a prerequisite for an injury to be defined as slight).
- **Serious Injury**: Injuries for which a person is detained in hospital, as an in-patient, or any of the following injuries (whether a person is detained in hospital); fractures, concussion, internal injuries, severe cuts and lacerations, severe general shock requiring medical treatment and injuries which result in death 30 days after the accident. The serious category, therefore, covers a very broad range of injuries.
- **Fatal Injury**: Injuries which cause death either immediately or any time up to 30 days after the collision.

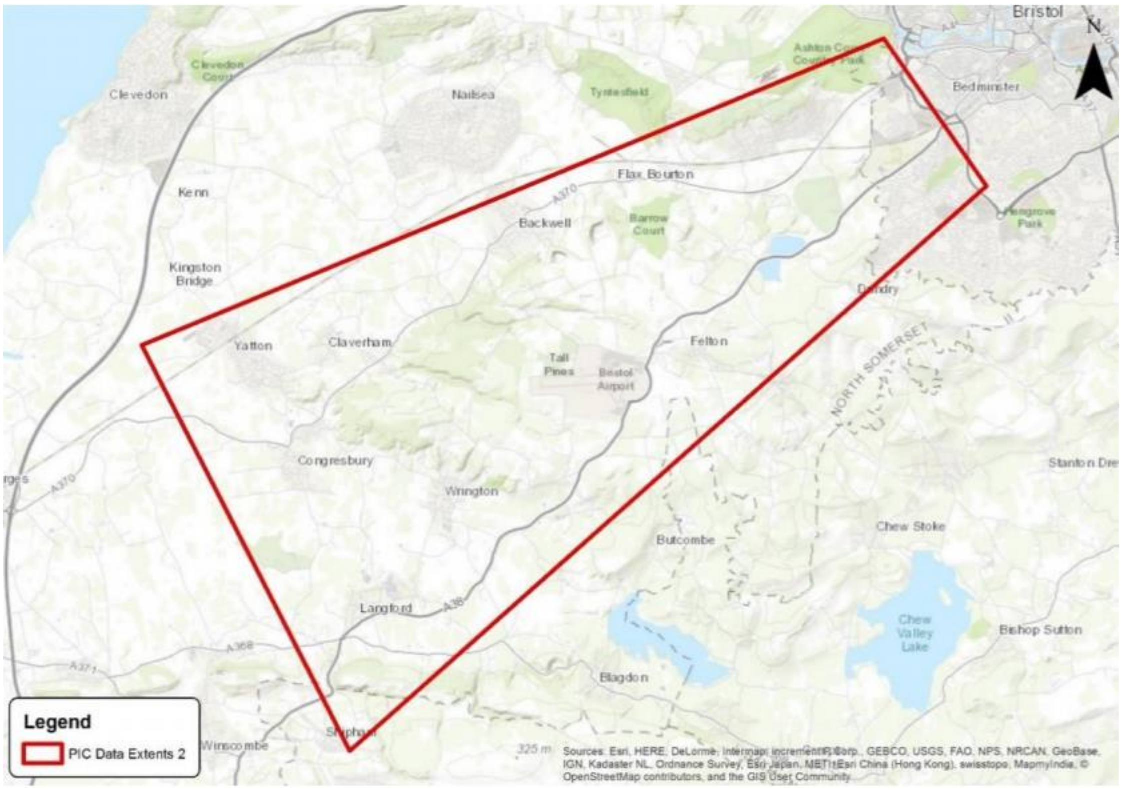
DOCUMENT ISSUE RECORD

Technical Note No	Rev	Date	Prepared	Checked	Reviewed (Discipline Lead)	Approved (Project Director)
48889/5502/TN033	-	07/06/21	CE/TH	MM	MM	SW
48889/5502/TN033	A	06/07/21	JC	MM	MM	SW

2. North Somerset Council – Study Area

2.1. The latest available 66-month of PIC data has been obtained for the agreed study area within NSC as shown in **Figure 1.0.** The PIC records cover a 66-month period from 01/01/2015 to the 30/06/2020.

Figure 2.1 NSC PIC Data Study Area



Collision Summary

2.2. A summary of the annual rolling 66-month collision data (01/01/2015 to 30/06/2020) within the study area is provided within **Table 1.0**. The table is disaggregated to show the total collisions and the vulnerable road users (pedal cyclists and pedestrians) involved in the collisions. The five rolling years are as follows;

- Year 1 - 01/01/2015 – 31/12/2015
- Year 2 – 01/01/2016 – 31/12/2016
- Year 3 - 01/01/2017 – 31/12/2017
- Year 4 – 01/01/2018 – 31/12/2018
- Year 5 – 01/01/2019 – 31/12/2019
- Year 6 – 01/01/2020 – 30/06/2020

Table 2.1: Summary of Collisions (01/01/2015 – 30/06/2020)

Collisions	Injury Severity	Year 1	2	3	4	5	6	Total
Total	Fatal	1	0	3	0	0	0	4
	Serious	9	10	19	10	8	1	57
	Slight	57	53	67	68	62	17	324
	Sub Total	67	63	89	78	70	18	385
Pedestrian	Fatal	0	0	2	0	0	0	2
	Serious	2	4	1	1	0	0	8
	Slight	2	8	4	5	4	4	27
	Sub Total	4	12	7	6	4	4	37
Cyclist	Fatal	0	0	0	0	0	0	0
	Serious	1	2	3	2	0	0	8
	Slight	7	5	10	11	7	0	40
	Sub Total	8	7	13	13	7	0	48

2.3. During the 66-month period between the 1st January 2015 to 30th June 2020, there were 385 collisions resulting in 4 (1%) fatal collisions, 57 (15%) serious collisions and 324 (84%) slight collisions. This compares with 321 collisions (5 fatal, 50 serious, 266 slight) in the 54-month period between 1st January 2014 and 30th June 2018, analysed as part of the original TA.

2.4. The 6 months data for 2020 suggests a significant reduction in overall accident rates, but with a higher proportion of pedestrian casualties. This overall reduction is likely to be almost entirely a result of the substantially reduced traffic flows during the first COVID-19 lockdown period, although the dataset is too small to draw definitive conclusions.

2.5. Over the entire period, 22% (85) of the recorded collisions involved a vulnerable road user (pedestrian or cyclists) resulting in 2 fatal collisions, 16 serious collisions and 67 slight collisions. For the individual years, the proportion of collisions involving either cyclists or pedestrians are as follows:

- 2015: 14% (12),
- 2016: 22% (19),
- 2017: 24% (20),
- 2018: 22% (19),
- 2019: 13% (11),
- 2020: 5% (4).

2.6. No increase in the maximum number of cyclist or pedestrian annual collisions was observed in comparison with the previous PIC review.

Casualties Summary

2.7. A summary of the casualties across the 66-month period are provided in **Table 1.1**. The table is disaggregated to show casualties including vulnerable road users (pedestrians and cyclists).

Table 2.2: Summary of Casualties (01/01/2015 – 30/06/2020)

Collisions	Injury Severity	Year						Total
		1	2	3	4	5	6	
Total	Fatal	1	0	3	0	0	0	4
	Serious	9	10	23	10	8	1	61
	Slight	71	76	95	101	100	24	467
	Sub Total	81	86	121	111	108	25	532
Pedestrian	Fatal	0	0	2	0	0	0	2
	Serious	2	4	1	1	0	0	8
	Slight	2	8	4	5	5	4	28
	Sub Total	4	12	7	6	5	4	38
Cyclist	Fatal	0	0	0	0	0	0	0
	Serious	1	2	3	2	0	0	8
	Slight	7	5	9	12	7	0	40
	Sub Total	8	7	12	14	7	0	48

2.8. During the 66-month period between 1st January 2015 and 30th June 2020, there were 532 casualties resulting in 4 (1%) fatal injuries, 61 (11%) serious injuries and 467 (88%) slight injuries. This compares with 448 casualties (5 fatal, 53 serious, 390 slight) in the 54-month period analysed as part of the original TA.

2.9. Over the entire 66-month period, 16% (86) of casualties involved a pedestrian or cyclist, 7% (38) were pedestrians and 9% (48) cyclists. There were 2 fatalities involving a vulnerable road user and 16 serious casualties. This compares with 73 casualties (2 fatal, 14 serious, 57 slight) recorded over the 54-month period analysed in the original TA.

2.10. The Full PIC assessment for the agreed study area in North Somerset Council is provided within **Appendix A.**

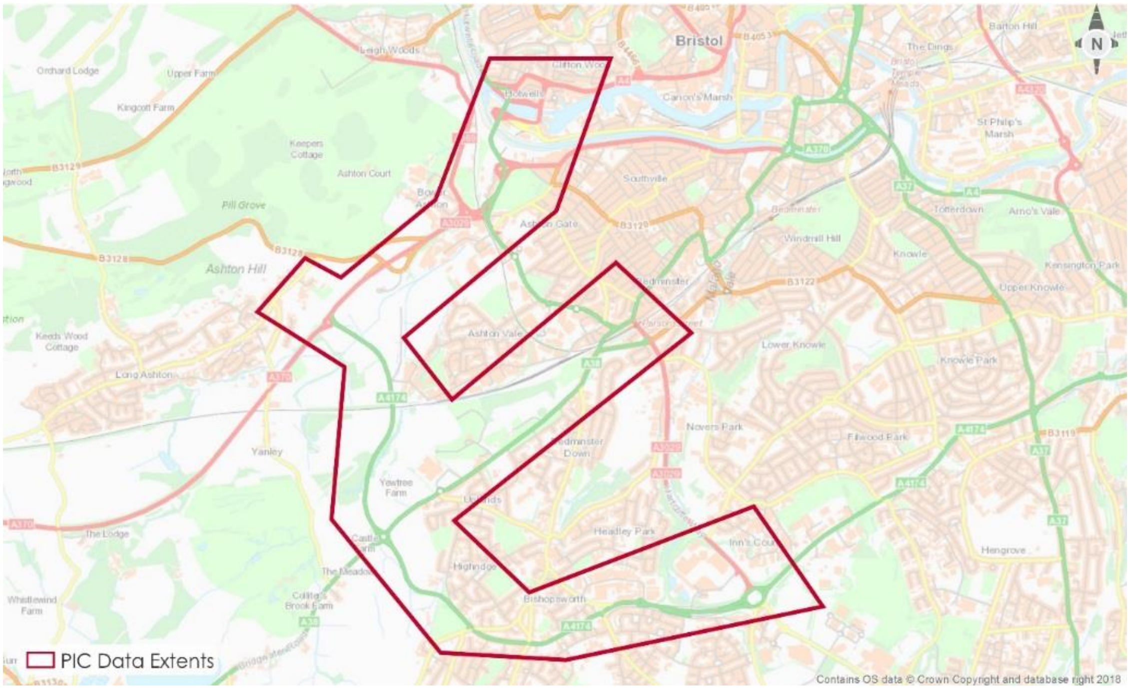
3. Bristol City Council – Study Area

3.1. The latest available 60-months of PIC data has been obtained for the agreed study area within Bristol City Council (BCC) as shown in **Figure 1.2**. The PIC records are from 01/10/2015 to the 30/09/2020. Take note that the Year 5 consists of 9 months of data to June 2020 since there is no data in the set provided by BCC for 01/07/2020 and 30/09/2020.

- Year 1: 01/10/2015 – 30/09/2016;
- Year 2: 01/10/2016 – 30/09/2017;
- Year 3: 01/10/2017 – 30/09/2018;
- Year 4: 01/10/2018 – 30/09/2019;

- Year 5: 01/10/2019 – 30/09/2020.

Figure 3.1: BCC PIC data study area



Collision Summary

3.2. A summary of annual rolling 60-month collision data (01/10/2015 to 30/09/2020) within the study area is provided within **Table 1.2**. This is broken down to show the total collisions and additionally the vulnerable road users (pedal cyclists and pedestrians) involved in the collisions.

Table 3.1: Summary of Collisions (01/10/2015 – 30/09/2020)

Collisions	Injury Severity	Year					Total
		1	2	3	4	5	
Total	Fatal	0	1	1	1	0	3
	Serious	6	4	3	2	2	17
	Slight	36	41	36	49	27	189
	Sub Total	42	46	40	52	29	209
Pedestrian	Fatal	0	1	1	1	0	3
	Serious	3	1	0	0	2	6
	Slight	6	6	4	4	3	23
	Sub Total	9	8	5	5	5	32
Cyclist	Fatal	0	0	0	0	0	0
	Serious	2	1	0	0	0	3
	Slight	7	7	11	11	10	46
	Sub Total	9	8	11	11	10	49

3.3. During the 60-month period between the 1st October 2015 and the 30th September 2020, there were 209 collisions. This has resulted in 3 (1%) fatal collisions, 17 (8%) serious collisions and 189 (90%) slight collision. This compares with 235 collisions (3 fatal, 22 serious and 210 slight) recorded over the 60-month period analysed as part of the original TA.

3.4. Over the 60-month period, 81 (39%) of the recorded collisions involved a vulnerable road user (pedestrian or cyclists) which resulted in 3 collisions, 9 serious collisions and 69 slight collisions. For the individual years, the proportion of collisions involving either cyclists or pedestrians are displayed below:

- Year 1: 18 (22%);
- Year 2: 16 (20%);
- Year 3: 16 (20%);
- Year 4: 16 (20%)
- Year 5: 16 (20%);
- Year 6: 15 (19%).

3.5. No increase in the maximum number of cyclist or pedestrian annual collisions was observed in comparison with the previous PIC review.

4. Junction Cluster Review

4.1. A summary of the junction cluster review can be found in **Table 3.1** below.

4.2. Originally a junction cluster review was undertaken at key junctions within the study area. The defining radius around each junction that has been considered for a detailed assessment has been set at approximately 50metres. A minimum of 5 collisions at a junction has been used to define a cluster of collisions exceptions have been made for a location in which there is a concentration of serious fatal injuries.

4.3. A review of the updated 5-year accident data was undertaken, and a comparison of the data can be found below. Junctions with less than 5 accidents recorded are not considered to be clusters but have been included to verify the number of accidents on important junctions to the network.

Table 4.1: Junction Cluster comparison

Ref	Junction	Period	Severity of Injury				Road User				
			Fatal	Serious	Slight	Total	Pedestrian	Cyclist	Motorcycle	Vehicles only	Total
1	A38 / Bristol Airport N Rbt	Original	-	-	-	-	-	-	-	-	-
		21 Review	0	1	3	4	0	0	3	1	4
		Comparison									
2	A38 / Bristol Airport S Rbt	Original	-	-	-	-	-	-	-	-	-
		21 Review	0	0	2	2	0	0	1	1	2
		Comparison									
3	Downside Road / Bristol Airport Service Access	Original	-	-	-	-	-	-	-	-	-
		21 Review	0	0	3	3	1	1	0	1	3
		Comparison									
4	A38 / Downside Road / West Lane	Original	1	0	8	9	0	1	1	7	9
		21 Review	1	1	8	10	0	1	1	8	10
		Comparison	0	1	0	1	0	0	0	1	1
5	A38 / Barrow Lane / Hobbs Lane	Original	0	1	7	8	0	1	3	4	8
		21 Review	0	1	7	8	0	1	2	5	8
		Comparison	0	0	0	0	0	0	-1	1	0
6	A38 / Barrow Street	Original	-	-	-	-	-	-	-	-	-
		21 Review	0	0	2	2	0	0	1	1	2
		Comparison									
7	A38 / A4174 South Bristol Link Road	Original	-	-	-	-	-	-	-	-	-
		21 Review	0	1	4	5	1	1	0	3	5
		Comparison									
8	A370 / A4174	Original	-	-	-	-	-	-	-	-	-
		21 Review	0	0	3	3	0	0	2	1	3
		Comparison									
9	A370 / Brockley Combe Road / Brockley Lane	Original	-	-	-	-	-	-	-	-	-
		21 Review	0	0	3	3	0	0	0	3	3
		Comparison									
10	West Town Road / Station Road / Dark Lane	Original	0	2	10	12	1	0	0	11	12
		21 Review	0	0	2	2	1	0	1	0	2
		Comparison	0	-2	-8	-10	0	0	1	-11	-10
11	Smallway / B3169 / Bristol Road	Original	0	2	11	13	1	1	0	11	13
		21 Review	0	3	8	11	1	0	1	9	11
		Comparison	0	1	-3	-2	0	-1	1	-2	-2
12	Bristol Road / High Street	Original	0	2	5	7	1	0	0	6	7
		21 Review	0	3	9	12	1	1	1	9	12
		Comparison	0	1	4	5	0	1	1	3	5

13	**Bristol Road / Langford Road**	**Original**	0	1	4	5	0	0	0	6	6
		Original	0	1	4	5	0	0	0	5	5
		Comparison	0	0	0	0	0	0	0	-1	-1
14	**A38 / Dundry Lane**	**Original**	0	1	4	5	0	0	1	4	5
		21 Review	0	0	3	3	0	0	0	3	3
		Comparison	0	-1	-1	-2	0	0	-1	-1	-2
15	**Longwood Lane / B3128 / Providence Lane**	**Original**	0	0	9	9	0	2	3	4	9
		21 Review	0	0	7	7	0	2	2	3	7
		Comparison	0	0	-2	-2	0	0	-1	-1	-2
16	**Station Road / Clevedon Road**	**Original**	0	1	7	8	1	1	0	6	8
		21 Review	0	1	0	1	0	1	0	0	1
		Comparison	0	0	-7	-7	-1	0	0	-6	-7
17	**Bristol Road / Wood Hill / Wrington Road**	**Original**	-	-	-	-	-	-	-	-	-
		21 Review	0	0	5	5	0	1	1	3	5
		Comparison									

4.4. As can be identified in the data of the 9 sites which were originally reviewed, only 2 junctions have had an increase in accidents across a 5-year period:

- Junction 4 (A38 / Downside Road / West Lane) recorded an increase of 1 accident, the accident was classified as serious, involving a cyclist, and had identified the causation as due to factor 301 – (Disobeyed automatic traffic signal) and factor 405 – (Failed to look properly) and as such is not considered an issue with the junction geometry or road layout. This junction would be subject to a substantial improvement in capacity, reliability and safety for all road users as part of the A38 Highway Improvement Scheme.

- Junction 12 (Bristol Road / High Street) recorded an increase of 5 accidents, an increase of 1 serious accident, and 4 slight accidents from the original data. Contributory factors for the slight accidents include: Disobeyed automatic traffic signal, Weather (rain), Deposit on road (mud), and Failure to look properly. The Serious accident involved 3 vehicles at 23:35, and the causation factor involved a driver impaired by alcohol. As part of the original TA, it was identified that the proposed expansion of the airport would not have a material impact on this junction. Therefore, it is not expected that the proposed development would have any impact on road safety at this junction.

4.5. There are no changes to the conclusions drawn from the PIC review carried out as part of the original TA. There are no specific concerns regarding the geometric design and road layout of the local highway network.

Appendix A – PIC data provided by NSC and BCC

Appendix E A38/ Downside Road/ West Lane Pedestrian Flows and Stage Sequence

Stage sequence - pedestrian phases: Observations of the video footage demonstrated that there was limited use of the pedestrian crossing at the A38 / Downside Road junction. It was also observed that there was a limited number of pedestrians crossing both at the A38 / Downside Road and West Lane junction at uncontrolled points. At the proposed A38 / Downside road junction the signalised crossing of Downside Road and the Northbound side of the A38 are able to run with traffic in stages 1 and 2. Phase F the pedestrian crossing on the Southbound side of the A38 would run in Stage 3. Based on the observations in the AM peak there were 2 instances where the A38 was crossed, 2 times in the Interpeak and 5 times in the PM peak. Stage 3 has therefore been omitted in the stage sequence of the model and an adjustment of -1 second bonus green has been used to reflect the onsite conditions. This time has been calculated from the proportion of times the stage has been called.

At the proposed A38 / West Lane junction the signalised crossings run in an all-pedestrian Stage 3. Based on the observations in the AM peak there were 1 instance where West Lane was crossed, 0 times in the Interpeak and 2 time in the PM peak. Stage 3 has therefore been omitted in the stage sequence of the model and an adjustment of -1 second bonus green has been used to reflect the onsite conditions. This time has been calculated from the proportion of times the stage has been called. The Tables below sets out the adjusted bonus green time of the signal phases.

Junction 1 – A38 / Downside Road

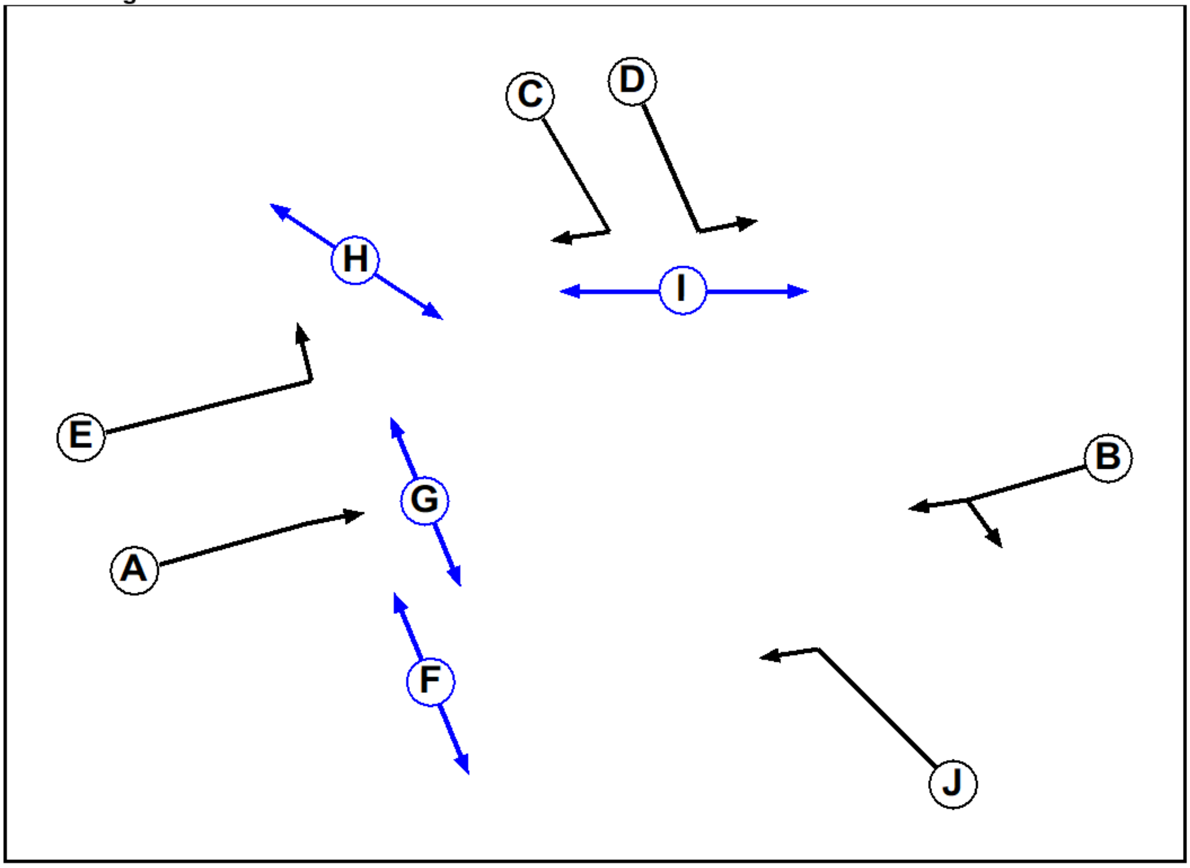
Phase	No. of call-ups	Adjusted Bonus Green Time (secs)
	AM Peak – 08:00 – 09:00	
Phase F Pedestrian	2 out of 60 cycles (full stage time 13 secs)	-1 sec to phase B -1 sec to phase C
	Inter Peak – 13:00 – 14:00	
Phase F Pedestrian	2 out of 60 cycles (full stage time 13 secs)	-1 sec to phase B -1 sec to phase C
	PM Peak – 17:00 – 18:00	
Phase F Pedestrian	5 out of 60 cycles (full stage time 13 secs)	-1 sec to phase B -1 sec to phase C

Junction 2 - A38 West Lane

Phase	No. of call-ups	Adjusted Bonus Green Time (secs)
	AM Peak – 08:00 – 09:00	
Phase E Pedestrian Phase F Pedestrian Phase G Pedestrian	1 out of 60 cycles (full stage time 13 secs)	-1 sec to phase A -1 sec to phase B -1 sec to phase C -1 sec to phase D
	Inter Peak – 13:00 – 14:00	
Phase E Pedestrian Phase F Pedestrian Phase G Pedestrian	0 out of 60 cycles (full stage time 13 secs)	-1 sec to phase A -1 sec to phase B -1 sec to phase C -1 sec to phase D
	PM Peak – 17:00 – 18:00	
Phase E Pedestrian Phase F Pedestrian Phase G Pedestrian	1 out of 60 cycles (full stage time 13 secs)	-1 sec to phase A -1 sec to phase B -1 sec to phase C -1 sec to phase D

Junction 1

C1
Phase Diagram



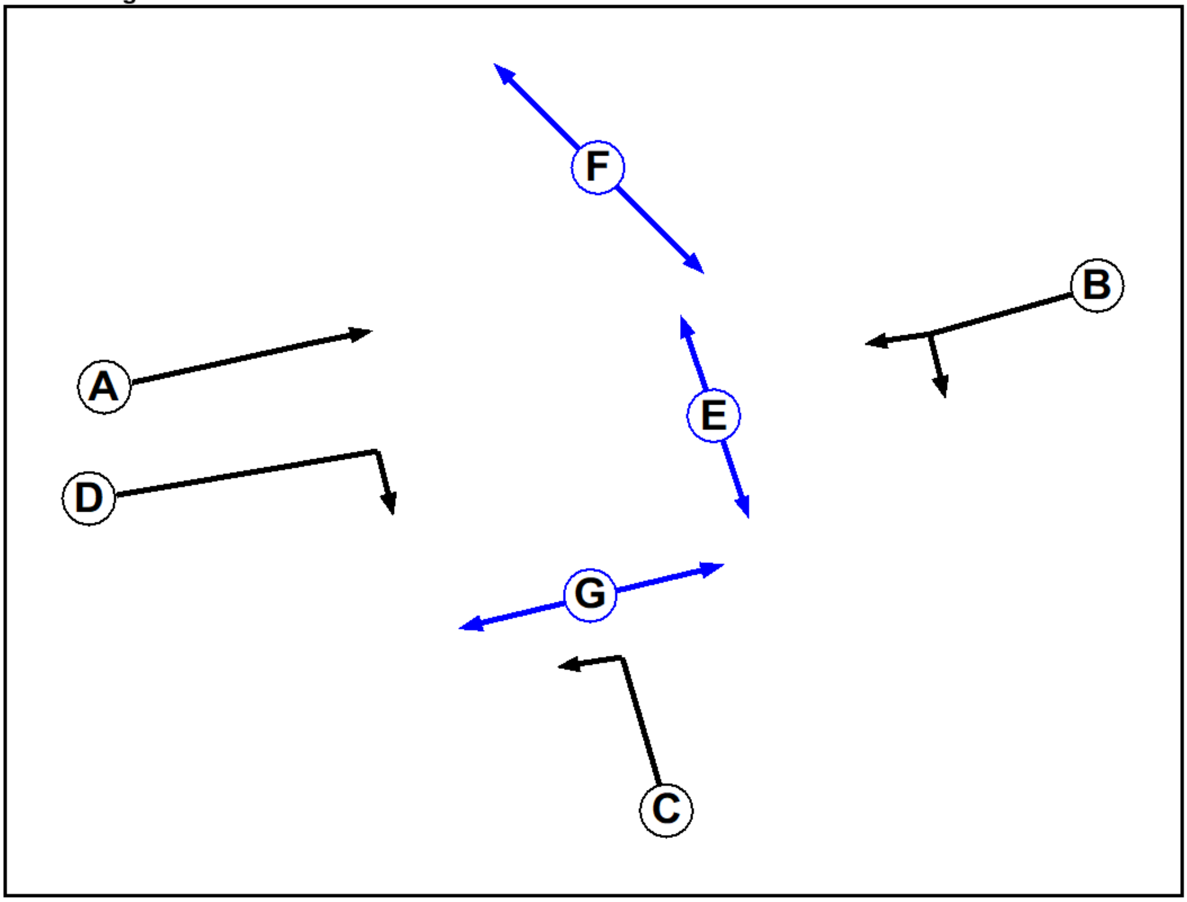
I = 40 seconds every cycle

H = 10 seconds every cycle

G = 10 seconds every cycle

Junction 2

C2
Phase Diagram



A38 / Downside
10/07/2018

AM	Time	Road	Number of people		Inter	Time	Road	Number of people		PM	Time	Road	Number of people	
	08:01:00	A38	1	Cycle		13:20:24	A38	2	Not at crossing		17:01:49	Downside	1	
	08:05:43	Downside	1			13:22:21	A38	1	Not at crossing		17:03:13	A38	1	Not at crossing
	08:11:11	Downside	1			13:32:30	Downside	1			17:05:31	A38	3	
	08:12:59	Downside	1			13:33:23	Downside	1			17:06:26	Downside	3	
	08:18:59	Downside	2			13:58:24	Downside	1			17:11:18	Downside	3	
	08:20:38	Downside	2			13:58:24	Downside	1			17:26:06	Downside	1	
	08:24:07	Downside	2								17:32:20	A38	1	Not at crossing
	08:33:19	Downside	2								17:33:28	Downside	2	
	08:46:14	A38	2								17:48:43	A38	2	
											17:52:48	A38	1	Not at crossing
											17:54:03	Downside	1	

	Downside Road	A38		Total
		Crossing	Not at Crossing (between downside and West lane)	
AM	7	2	0	9
Inter	4	0	2	6
PM	6	2	3	11
Total	17	4	5	26
		9		

Crossing Road between Airport and Downside Lane
10/07/2018

AM	Time	Road	Number of people		Inter	Time	Road	Number of people	PM	Time	Road	Number of people
	08:34:54	A38	1	Crossed back at 08:34:02		13:31:36	A38	1		17:08:45	A38	1
										17:35:52	A38	1

	Crossing Road between Airport and Downside Lane	Total
AM	1	1
Inter	1	1
PM	2	2
Total	4	4

West Lane
10/07/2018

AM	Time	Road	Number of people	Inter	Time	Road	Number of people	PM	Time	Road	Number of people
	08:12:50	West lane	1		No Movemens recorded				17:28:45	West Lane	2

	West Lane	A38	Total
AM	1	0	1
Inter	0	0	0
PM	1	0	1
Total	2	0	2

Airport Roundabout
10/07/2018

AM	Time	Road	Number of people	Inter	Time	Road	Number of people	PM	Time	Road	Number of people
	08:10:43	at junction	2		13:05:53	at junction	6		17:03:19	at junction	4
	08:19:21	at junction	2		13:53:04	at junction	1				
	08:20:50	at junction	1								
	08:27:35	at junction	1								
	08:27:35	at junction	3								
	08:46:33	at junction	1								

	Airport Rb	Total
AM	6	6
Inter	2	2
PM	1	1
Total	9	9

Appendix F Updated A38/ Bristol Airport Modelling Outputs

Junctions 10

ARCADY 10 - Roundabout Module

Filename: J1_J2_North&South Airport Access Rbt - Proposed_v3.j10
Path: J:\48889 - Bristol Airport Appeal\Transport\Working Documents\Junction Modelling\Junction Models_ARCADY
Report generation date: 05/07/2021 16:36:58

Summary of junction performance

	AM				IP				PM			
	Queue (PCU)	Delay (s)	RFC	LOS	Queue (PCU)	Delay (s)	RFC	LOS	Queue (PCU)	Delay (s)	RFC	LOS
	2030 12 MPPA											
Junction 1 - Arm A	1.1	3.09	0.52	A	1.3	3.55	0.56	A	2.7	5.52	0.73	A
Junction 1 - Arm B	0.0	5.11	0.02	A	0.0	6.07	0.03	A	0.1	10.07	0.06	B
Junction 1 - Arm C	2.4	6.89	0.70	A	1.8	5.98	0.63	A	5.1	14.14	0.84	B
Junction 1 - Arm D	0.4	3.74	0.24	A	1.1	4.55	0.50	A	1.3	6.02	0.56	A
Junction 2 - Arm A	0.7	2.87	0.39	A	0.8	3.28	0.43	A	1.2	3.88	0.54	A
Junction 2 - Arm B	1.2	3.71	0.55	A	0.5	2.69	0.34	A	1.0	3.56	0.50	A
Junction 2 - Arm C	0.3	6.67	0.20	A	1.0	6.70	0.49	A	1.2	8.50	0.52	A

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.

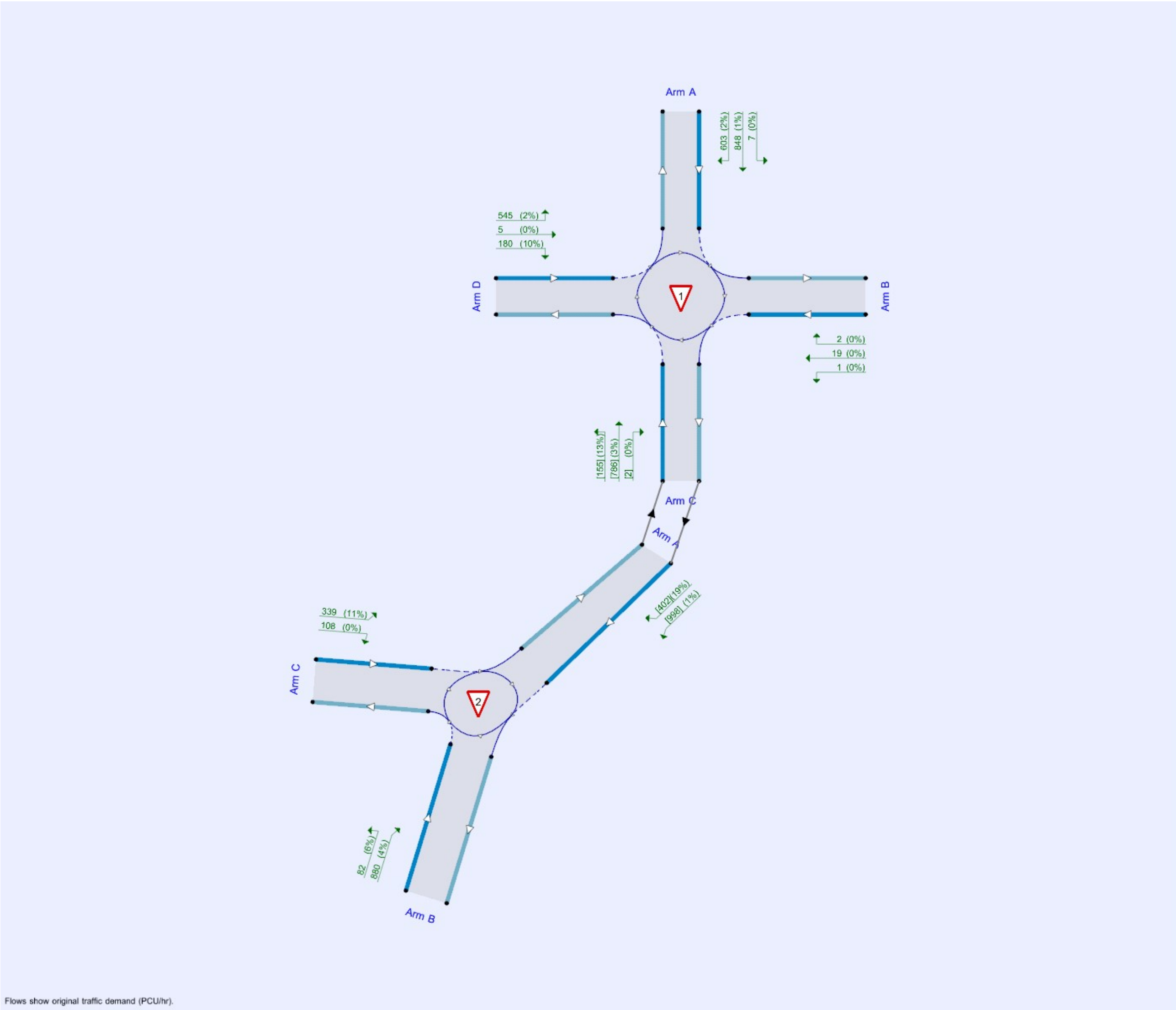
File summary

File Description

Title	North & South Airport Access Roundabouts
Location	Bristol
Site number	1/2
Date	20/10/2020
Version	
Status	For Information
Identifier	
Client	
Jobnumber	48889
Enumerator	Stantec\proose
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

Demand Set Summary

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D10	2030 12 MPPA	AM	ONE HOUR	07:45	09:15	15	✓
D11	2030 12 MPPA	IP	ONE HOUR	12:45	14:15	15	✓
D12	2030 12 MPPA	PM	ONE HOUR	16:45	18:15	15	✓

Analysis Set Details

ID	Include in report	Network flow scaling factor (%)	Network capacity scaling factor (%)
A1	✓	100.000	100.000

2030 12 MPPA, AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Geometry	Junction 1 - Arm C - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	Junction 2 - Arm A - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	Junction 2 - Arm B - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Linked Roundabout	Junction 1 - Arm C	If the distance between linked junctions is small, results should be treated with caution. The linked junctions will be modelled as separate junctions, but the real behaviour may be that of a complex system with interactions that cannot be modelled.
Warning	Linked Roundabout	Junction 2 - Arm A	If the distance between linked junctions is small, results should be treated with caution. The linked junctions will be modelled as separate junctions, but the real behaviour may be that of a complex system with interactions that cannot be modelled.

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
1	untitled	Standard Roundabout		A, B, C, D	4.83	A
2	untitled	Standard Roundabout		A, B, C	3.61	A

Junction Network

Driving side	Lighting	Network delay (s)	Network LOS
Left	Normal/unknown	4.30	A

Arms

Arms

Junction	Arm	Name	Description	No give-way line
1	A	A38 North		
	B	Easirent Car Hire Access		
	C	A38 South		
	D	Bristol Airport Access		
2	A	A38 North		
	B	A38 South		
	C	Bristol Airport Access		

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	7.00	9.90	13.0	35.0	48.0	37.0		
	B	3.90	5.60	13.3	16.6	48.0	24.0		
	C	4.08	7.70	92.6	30.0	48.0	30.0		
	D	7.36	9.50	8.3	21.8	48.0	54.0		
2	A	4.30	7.10	87.9	40.1	40.0	19.0		
	B	5.00	7.90	36.3	50.0	40.0	18.0		
	C	4.50	5.30	4.0	23.0	40.0	24.0		

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Junction	Arm	Final slope	Final intercept (PCU/hr)
1	A	0.793	2625
	B	0.594	1564
	C	0.727	2247
	D	0.724	2380
2	A	0.761	2203
	B	0.798	2372
	C	0.621	1552

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

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D10	2030 12 MPPA	AM	ONE HOUR	07:45	09:15	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	A	Simple (vertical queueing)	Normal	0	100.00	
2	A	1	C	Simple (vertical queueing)	Normal	0	100.00	

Demand overview (Traffic)

Junction	Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1	A		ONE HOUR	✓	1183	100.000
	B		ONE HOUR	✓	14	100.000
	C	✓				
	D		ONE HOUR	✓	308	100.000
2	A	✓				
	B		ONE HOUR	✓	1100	100.000
	C		ONE HOUR	✓	152	100.000

Origin-Destination Data

Demand (PCU/hr)

Junction 1

		To			
		A	B	C	D
From	A	229	5	659	290
	B	2	0	5	7
	C	904	1	0	155
	D	188	6	113	1

Junction 2

Demand (PCU/hr)

		To		
		A	B	C
From	A	0	667	197
	B	1019	1	80
	C	139	13	0

Vehicle Mix

Junction 1

Heavy Vehicle Percentages

		To			
		A	B	C	D
From	A	2	0	5	6
	B	0	0	0	0
	C	4	0	0	13
	D	10	0	14	0

Junction 2

Heavy Vehicle Percentages

		To		
		A	B	C
From	A	0	5	12
	B	4	0	0
	C	27	33	0

Results

Results Summary for whole modelled period

Junction	Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1	A	0.52	3.09	1.1	A	1086	1628
	B	0.02	5.11	0.0	A	13	19
	C	0.70	6.89	2.4	A	1062	1593
	D	0.24	3.74	0.4	A	283	424
2	A	0.39	2.87	0.7	A	713	1069
	B	0.55	3.71	1.2	A	1009	1514
	C	0.20	6.67	0.3	A	139	209

Main Results for each time segment

07:45 - 08:00

Junction	Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	A	891	223	91	2553	0.349	888	1053	0.0	0.6	2.260	A
	B	11	3	970	988	0.011	10	9	0.0	0.0	3.683	A
	C	869	217	397	1959	0.444	866	583	0.0	0.8	3.456	A
	D	232	58	913	1719	0.135	231	350	0.0	0.2	2.688	A
2	A	583	146	10	2195	0.266	582	869	0.0	0.4	2.375	A
	B	828	207	133	2266	0.365	826	460	0.0	0.6	2.587	A
	C	114	29	766	1077	0.106	114	193	0.0	0.2	4.761	A

08:00 - 08:15

Junction	Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	A	1063	266	109	2539	0.419	1063	1262	0.6	0.8	2.550	A
	B	13	3	1161	875	0.014	13	11	0.0	0.0	4.175	A
	C	1040	260	475	1902	0.547	1038	698	0.8	1.3	4.377	A
	D	277	69	1094	1588	0.174	277	420	0.2	0.2	3.052	A
2	A	698	174	13	2193	0.318	698	1040	0.4	0.5	2.564	A
	B	989	247	159	2245	0.440	988	551	0.6	0.8	2.968	A
	C	137	34	916	984	0.139	136	231	0.2	0.2	5.415	A

08:15 - 08:30

Junction	Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	A	1303	326	133	2519	0.517	1301	1543	0.8	1.1	3.087	A
	B	15	4	1421	720	0.021	15	13	0.0	0.0	5.108	A
	C	1273	318	582	1824	0.698	1269	855	1.3	2.4	6.761	A
	D	339	85	1337	1412	0.240	339	513	0.2	0.3	3.727	A
2	A	855	214	15	2191	0.390	854	1273	0.5	0.7	2.866	A
	B	1211	303	195	2217	0.546	1209	674	0.8	1.2	3.699	A
	C	167	42	1121	856	0.195	167	283	0.2	0.3	6.652	A

08:30 - 08:45

Junction	Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	A	1303	326	133	2519	0.517	1302	1549	1.1	1.1	3.095	A
	B	15	4	1422	719	0.021	15	13	0.0	0.0	5.115	A
	C	1275	319	582	1824	0.699	1275	855	2.4	2.4	6.893	A
	D	339	85	1343	1408	0.241	339	515	0.3	0.4	3.744	A
2	A	855	214	15	2191	0.390	855	1275	0.7	0.7	2.870	A
	B	1211	303	195	2216	0.546	1211	676	1.2	1.2	3.712	A
	C	167	42	1123	855	0.196	167	283	0.3	0.3	6.669	A

08:45 - 09:00

Junction	Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	A	1063	266	109	2538	0.419	1065	1271	1.1	0.8	2.560	A
	B	13	3	1163	873	0.014	13	11	0.0	0.0	4.183	A
	C	1043	261	476	1901	0.549	1047	699	2.4	1.3	4.461	A
	D	277	69	1102	1582	0.175	277	421	0.4	0.2	3.068	A
2	A	699	175	13	2193	0.319	700	1043	0.7	0.5	2.569	A
	B	989	247	160	2245	0.441	991	553	1.2	0.8	2.979	A
	C	137	34	919	982	0.139	137	232	0.3	0.2	5.431	A

09:00 - 09:15

Junction	Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	A	891	223	91	2553	0.349	891	1062	0.8	0.6	2.268	A
	B	11	3	974	986	0.011	11	9	0.0	0.0	3.693	A
	C	873	218	399	1958	0.446	875	585	1.3	0.9	3.505	A
	D	232	58	921	1713	0.135	232	352	0.2	0.2	2.703	A
2	A	585	146	11	2195	0.267	586	873	0.5	0.4	2.383	A
	B	828	207	134	2265	0.366	829	463	0.8	0.6	2.601	A
	C	114	29	769	1075	0.106	115	194	0.2	0.2	4.778	A

2030 12 MPPA, IP

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Geometry	Junction 1 - Arm C - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	Junction 2 - Arm A - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	Junction 2 - Arm B - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Linked Roundabout	Junction 1 - Arm C	If the distance between linked junctions is small, results should be treated with caution. The linked junctions will be modelled as separate junctions, but the real behaviour may be that of a complex system with interactions that cannot be modelled.
Warning	Linked Roundabout	Junction 2 - Arm A	If the distance between linked junctions is small, results should be treated with caution. The linked junctions will be modelled as separate junctions, but the real behaviour may be that of a complex system with interactions that cannot be modelled.
Warning	Linked roundabouts	Junction 2	U-turns on linked arms may cause sporadic locking up of junctions and/or unreliable results.

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
1	untitled	Standard Roundabout		A, B, C, D	4.62	A
2	untitled	Standard Roundabout		A, B, C	3.94	A

Junction Network

Driving side	Lighting	Network delay (s)	Network LOS
Left	Normal/unknown	4.35	A

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D11	2030 12 MPPA	IP	ONE HOUR	12:45	14:15	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	A	Simple (vertical queueing)	Normal	0	100.00	
2	A	1	C	Simple (vertical queueing)	Normal	0	100.00	

Demand overview (Traffic)

Junction	Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1	A		ONE HOUR	✓	1219	100.000
	B		ONE HOUR	✓	17	100.000
	C	✓				
	D		ONE HOUR	✓	765	100.000
2	A	✓				
	B		ONE HOUR	✓	669	100.000
	C		ONE HOUR	✓	504	100.000

Origin-Destination Data

Junction 1

Demand (PCU/hr)

		To			
		A	B	C	D
From	A	158	12	580	469
	B	5	0	0	12
	C	523	5	0	200
	D	513	3	247	2

Junction 2

Demand (PCU/hr)

		To		
		A	B	C
From	A	2	782	349
	B	596	0	73
	C	387	117	0

Vehicle Mix

Junction 1

Heavy Vehicle Percentages

		To			
		A	B	C	D
From	A	0	0	5	5
	B	0	0	0	0
	C	5	0	0	15
	D	4	0	11	0

Junction 2

Heavy Vehicle Percentages

		To		
		A	B	C
From	A	0	5	19
	B	6	0	0
	C	13	0	0

Results

Results Summary for whole modelled period

Junction	Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1	A	0.56	3.55	1.3	A	1119	1678
	B	0.03	6.07	0.0	A	16	23
	C	0.63	5.98	1.8	A	903	1354
	D	0.50	4.55	1.1	A	702	1053
2	A	0.43	3.28	0.8	A	759	1138
	B	0.34	2.69	0.5	A	614	921
	C	0.49	6.70	1.0	A	462	694

Main Results for each time segment

12:45 - 13:00

Junction	Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	A	918	229	194	2471	0.371	915	1036	0.0	0.6	2.406	A
	B	13	3	1093	915	0.014	13	16	0.0	0.0	3.991	A
	C	739	185	485	1895	0.390	736	621	0.0	0.7	3.335	A
	D	576	144	656	1905	0.302	574	565	0.0	0.5	2.867	A
2	A	621	155	88	2136	0.291	619	739	0.0	0.4	2.583	A
	B	504	126	192	2219	0.227	502	515	0.0	0.3	2.208	A
	C	379	95	449	1274	0.298	378	246	0.0	0.5	4.397	A

13:00 - 13:15

Junction	Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	A	1096	274	232	2441	0.449	1095	1241	0.6	0.8	2.788	A
	B	15	4	1308	787	0.019	15	20	0.0	0.0	4.662	A
	C	884	221	580	1826	0.484	883	743	0.7	1.0	4.102	A
	D	688	172	787	1811	0.380	687	676	0.5	0.6	3.399	A
2	A	743	186	105	2123	0.350	742	884	0.4	0.6	2.838	A
	B	601	150	230	2189	0.275	601	617	0.3	0.4	2.388	A
	C	453	113	537	1219	0.372	452	294	0.5	0.6	5.145	A

13:15 - 13:30

Junction	Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	A	1342	336	284	2399	0.559	1340	1518	0.8	1.3	3.538	A
	B	19	5	1601	613	0.031	19	24	0.0	0.0	6.054	A
	C	1082	271	710	1731	0.625	1079	909	1.0	1.8	5.911	A
	D	842	211	962	1684	0.500	841	828	0.6	1.1	4.524	A
2	A	909	227	128	2105	0.432	908	1082	0.6	0.8	3.273	A
	B	737	184	281	2148	0.343	736	755	0.4	0.5	2.684	A
	C	555	139	657	1144	0.485	553	360	0.6	1.0	6.663	A

13:30 - 13:45

Junction	Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	A	1342	336	285	2399	0.559	1342	1523	1.3	1.3	3.551	A
	B	19	5	1603	612	0.031	19	24	0.0	0.0	6.068	A
	C	1084	271	711	1730	0.626	1084	911	1.8	1.8	5.984	A
	D	842	211	966	1681	0.501	842	830	1.1	1.1	4.554	A
2	A	911	228	129	2105	0.433	911	1084	0.8	0.8	3.283	A
	B	737	184	282	2147	0.343	737	757	0.5	0.5	2.687	A
	C	555	139	658	1144	0.485	555	361	1.0	1.0	6.701	A

13:45 - 14:00

Junction	Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	A	1096	274	233	2440	0.449	1098	1248	1.3	0.9	2.800	A
	B	15	4	1311	785	0.019	15	20	0.0	0.0	4.677	A
	C	887	222	582	1824	0.486	890	745	1.8	1.0	4.155	A
	D	688	172	792	1807	0.381	689	679	1.1	0.7	3.423	A
2	A	745	186	106	2122	0.351	746	887	0.8	0.6	2.850	A
	B	601	150	231	2188	0.275	602	620	0.5	0.4	2.391	A
	C	453	113	538	1219	0.372	455	295	1.0	0.7	5.179	A

14:00 - 14:15

Junction	Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	A	918	229	195	2470	0.372	919	1044	0.9	0.6	2.422	A
	B	13	3	1097	912	0.014	13	16	0.0	0.0	4.002	A
	C	742	186	487	1893	0.392	743	623	1.0	0.7	3.371	A
	D	576	144	662	1901	0.303	577	568	0.7	0.5	2.886	A
2	A	623	156	88	2136	0.292	624	742	0.6	0.5	2.594	A
	B	504	126	193	2218	0.227	504	519	0.4	0.3	2.212	A
	C	379	95	450	1273	0.298	380	247	0.7	0.5	4.427	A

2030 12 MPPA, PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Geometry	Junction 1 - Arm C - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	Junction 2 - Arm A - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	Junction 2 - Arm B - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Linked Roundabout	Junction 1 - Arm C	If the distance between linked junctions is small, results should be treated with caution. The linked junctions will be modelled as separate junctions, but the real behaviour may be that of a complex system with interactions that cannot be modelled.
Warning	Linked Roundabout	Junction 2 - Arm A	If the distance between linked junctions is small, results should be treated with caution. The linked junctions will be modelled as separate junctions, but the real behaviour may be that of a complex system with interactions that cannot be modelled.
Warning	Linked roundabouts	Junction 2	U-turns on linked arms may cause sporadic locking up of junctions and/or unreliable results.

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
1	untitled	Standard Roundabout		A, B, C, D	8.56	A
2	untitled	Standard Roundabout		A, B, C	4.60	A

Junction Network

Driving side	Lighting	Network delay (s)	Network LOS
Left	Normal/unknown	6.96	A

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D12	2030 12 MPPA	PM	ONE HOUR	16:45	18:15	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	A	Simple (vertical queueing)	Normal	0	100.00	
2	A	1	C	Simple (vertical queueing)	Normal	0	100.00	

Demand overview (Traffic)

Junction	Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1	A		ONE HOUR	✓	1634	100.000
	B		ONE HOUR	✓	22	100.000
	C	✓				
	D		ONE HOUR	✓	731	100.000
2	A	✓				
	B		ONE HOUR	✓	962	100.000
	C		ONE HOUR	✓	447	100.000

Origin-Destination Data

Junction 1

Demand (PCU/hr)

		To			
		A	B	C	D
From	A	176	7	848	603
	B	2	0	1	19
	C	786	2	0	155
	D	545	5	180	1

Junction 2

Demand (PCU/hr)

		To		
		A	B	C
From	A	2	998	402
	B	880	0	82
	C	339	108	0

Vehicle Mix

Junction 1

Heavy Vehicle Percentages

		To			
		A	B	C	D
From	A	1	0	1	2
	B	0	0	0	0
	C	3	0	0	13
	D	2	0	10	0

Junction 2

Heavy Vehicle Percentages

		To		
		A	B	C
From	A	0	1	19
	B	4	0	6
	C	11	0	0

Results

Results Summary for whole modelled period

Junction	Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1	A	0.73	5.52	2.7	A	1499	2249
	B	0.06	10.07	0.1	B	20	30
	C	0.84	14.14	5.1	B	1119	1679
	D	0.56	6.02	1.3	A	671	1006
2	A	0.54	3.88	1.2	A	944	1416
	B	0.50	3.56	1.0	A	883	1324
	C	0.52	8.50	1.2	A	410	615

Main Results for each time segment

16:45 - 17:00

Junction	Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	A	1230	308	141	2513	0.490	1226	1302	0.0	1.0	2.829	A
	B	17	4	1357	758	0.022	16	11	0.0	0.0	4.854	A
	C	916	229	601	1810	0.506	911	772	0.0	1.1	4.166	A
	D	550	138	895	1732	0.318	548	617	0.0	0.5	3.152	A
2	A	772	193	81	2141	0.361	770	916	0.0	0.6	2.767	A
	B	724	181	222	2195	0.330	722	629	0.0	0.5	2.543	A
	C	337	84	662	1142	0.295	335	282	0.0	0.4	4.813	A

17:00 - 17:15

Junction	Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	A	1469	367	169	2491	0.590	1467	1560	1.0	1.4	3.559	A
	B	20	5	1623	600	0.033	20	13	0.0	0.0	6.204	A
	C	1096	274	719	1725	0.635	1093	924	1.1	1.8	5.929	A
	D	657	164	1073	1603	0.410	656	739	0.5	0.7	3.943	A
2	A	924	231	97	2129	0.434	923	1096	0.6	0.8	3.150	A
	B	865	216	266	2160	0.400	864	754	0.5	0.7	2.892	A
	C	402	100	792	1061	0.379	401	338	0.4	0.7	5.890	A

17:15 - 17:30

Junction	Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	A	1799	450	207	2461	0.731	1794	1901	1.4	2.7	5.432	A
	B	24	6	1985	385	0.063	24	16	0.0	0.1	9.972	A
	C	1341	335	879	1608	0.834	1329	1130	1.8	4.8	12.942	B
	D	805	201	1306	1435	0.561	802	902	0.7	1.3	5.892	A
2	A	1130	282	118	2113	0.535	1128	1341	0.8	1.2	3.854	A
	B	1059	265	325	2113	0.501	1058	922	0.7	1.0	3.550	A
	C	492	123	969	951	0.518	490	414	0.7	1.1	8.414	A

17:30 - 17:45

Junction	Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	A	1799	450	208	2460	0.731	1799	1915	2.7	2.7	5.516	A
	B	24	6	1990	382	0.063	24	16	0.1	0.1	10.068	B
	C	1344	336	882	1606	0.836	1343	1133	4.8	5.1	14.136	B
	D	805	201	1318	1426	0.565	805	907	1.3	1.3	6.017	A
2	A	1133	283	119	2112	0.536	1133	1344	1.2	1.2	3.880	A
	B	1059	265	326	2112	0.502	1059	925	1.0	1.0	3.562	A
	C	492	123	970	950	0.518	492	415	1.1	1.2	8.496	A

17:45 - 18:00

Junction	Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	A	1469	367	170	2490	0.590	1474	1580	2.7	1.5	3.608	A
	B	20	5	1631	595	0.033	20	13	0.1	0.0	6.257	A
	C	1100	275	723	1722	0.639	1113	928	5.1	1.9	6.301	A
	D	657	164	1090	1591	0.413	660	745	1.3	0.7	4.026	A
2	A	928	232	98	2128	0.436	930	1100	1.2	0.8	3.174	A
	B	865	216	268	2158	0.401	866	759	1.0	0.7	2.904	A
	C	402	100	794	1060	0.379	404	340	1.2	0.7	5.950	A

18:00 - 18:15

Junction	Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	A	1230	308	142	2512	0.490	1232	1315	1.5	1.0	2.854	A
	B	17	4	1363	754	0.022	17	11	0.0	0.0	4.882	A
	C	920	230	604	1808	0.509	923	776	1.9	1.1	4.267	A
	D	550	138	906	1724	0.319	551	622	0.7	0.5	3.191	A
2	A	776	194	82	2141	0.362	777	920	0.8	0.6	2.790	A
	B	724	181	224	2193	0.330	725	634	0.7	0.5	2.554	A
	C	337	84	664	1140	0.295	337	285	0.7	0.5	4.855	A

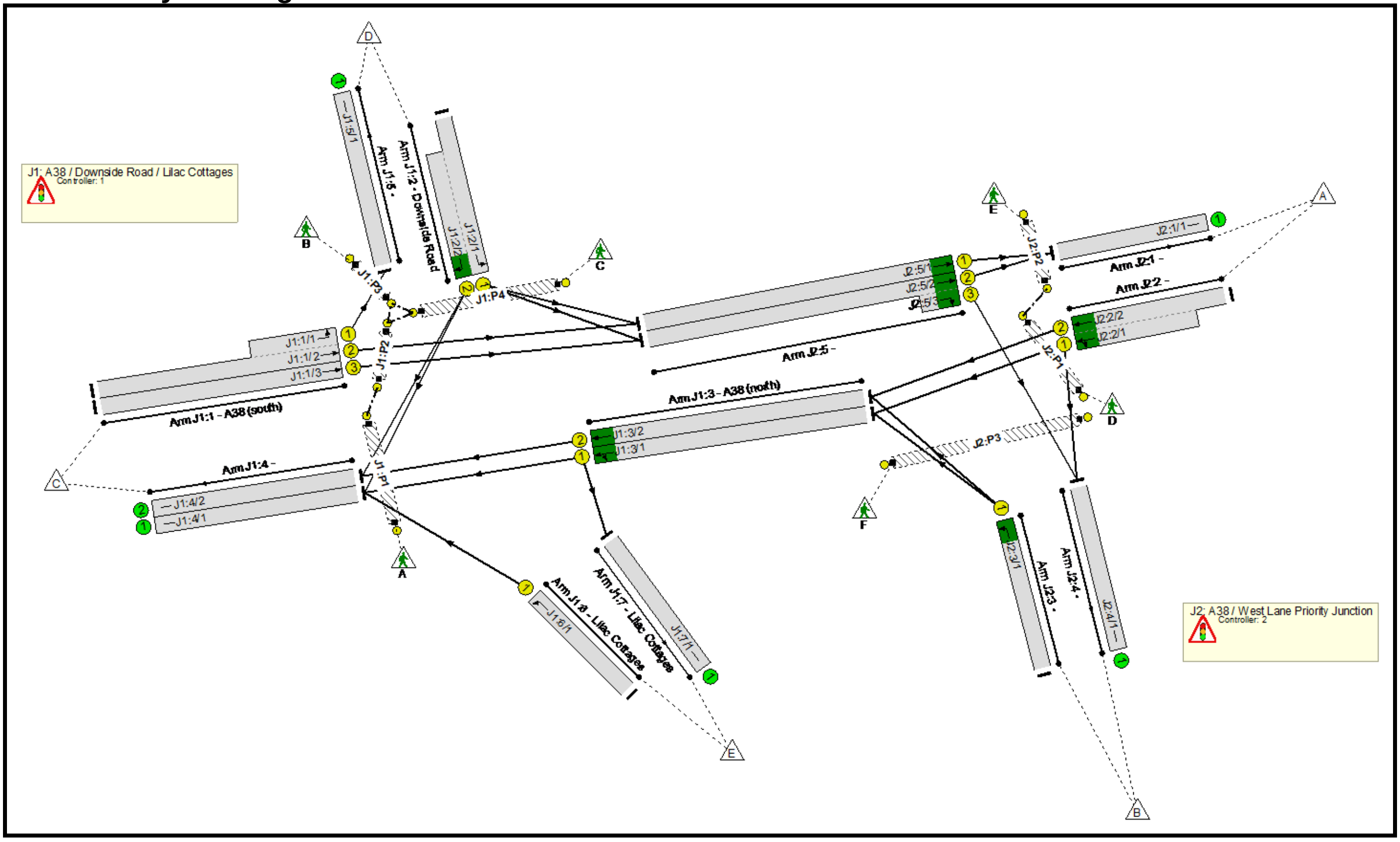
Appendix G Revised A38 Highway Improvement Scheme Modelling Outputs

Full Input Data And Results

User and Project Details

Project:	**Bristol Airport**
Title:	**Junction 4 – A38 / Downside Road / West Lane**
Location:	Bristol
Additional detail:	Extended two lane section A38 (n)
File name:	J4_Downside Road_A38_West Lane_Signalised Junction Proposed_V2.1_ A38(n) Extend.lsg3x
Author:	
Company:	Stantec
Address:	RG1 8DN

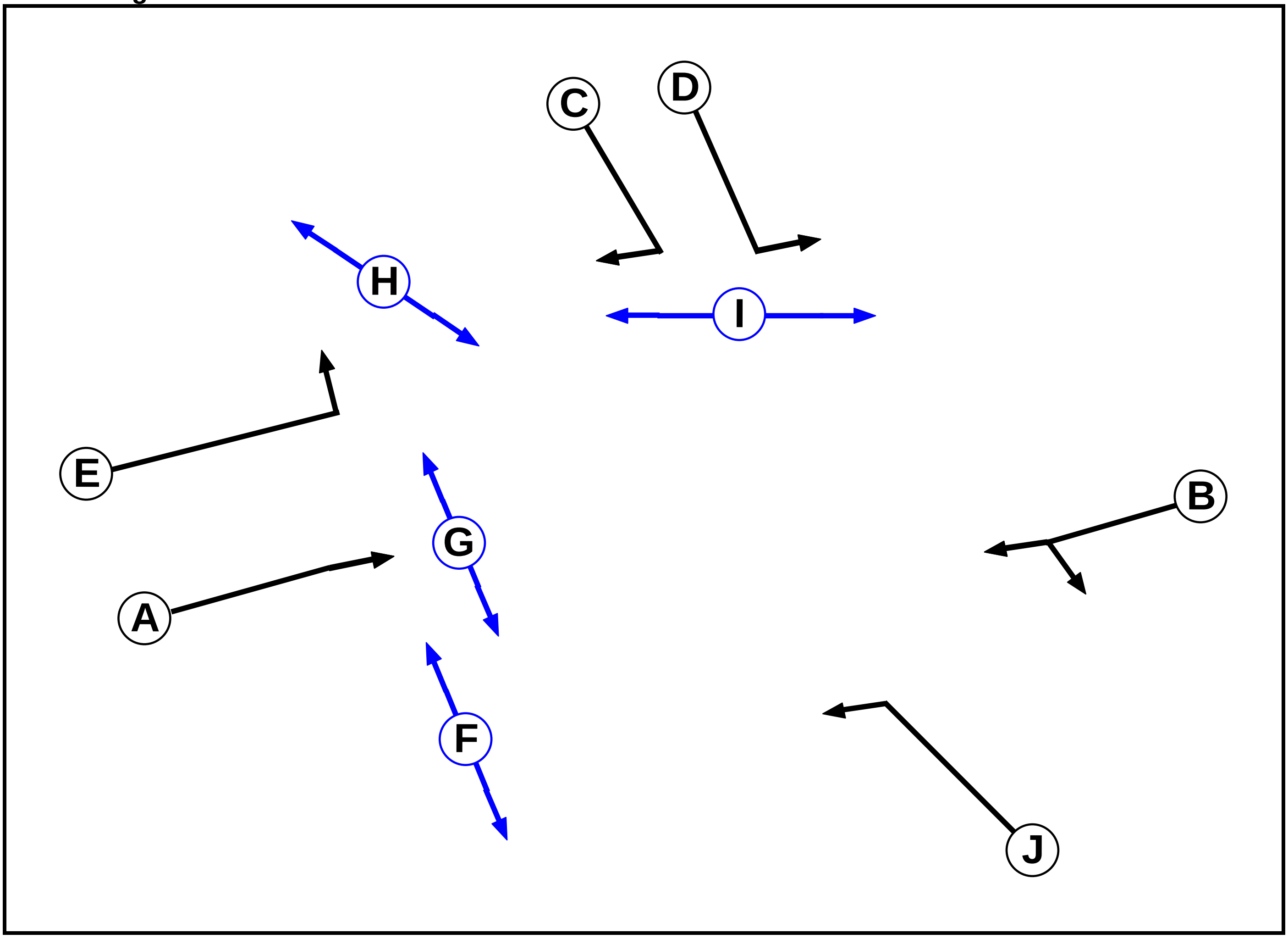
Network Layout Diagram



Full Input Data And Results

C1

Phase Diagram



Phase Input Data

Phase Name	Phase Type	Assoc. Phase	Street Min	Cont Min
A	Traffic		7	7
B	Traffic		7	7
C	Traffic		7	7
D	Traffic		7	7
E	Traffic		7	7
F	Pedestrian		6	6
G	Pedestrian		6	6
H	Pedestrian		6	6
I	Pedestrian		6	6
J	Traffic		7	7

Full Input Data And Results

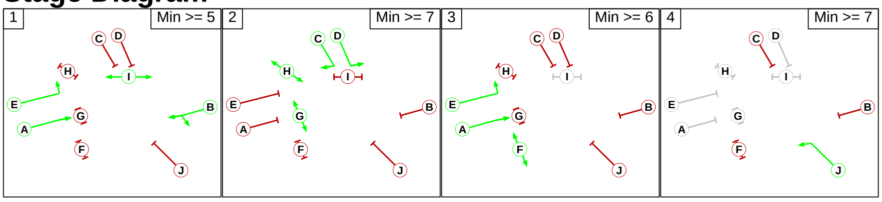
Phase Intergreens Matrix

	Starting Phase										
		A	B	C	D	E	F	G	H	I	J
Terminating Phase	A		-	5	5	-	-	5	-	-	-
	B	-		5	-	-	8	-	-	-	5
	C	5	6		-	-	8	-	-	5	5
	D	5	-	-		-	-	-	-	5	-
	E	-	-	-	-		-	-	5	-	-
	F	-	8	8	-	-		-	-	-	7
	G	8	-	-	-	-	-		-	-	-
	H	-	-	-	-	8	-	-		-	-
	I	-	-	7	7	-	-	-	-		-
	J	-	5	5	-	-	10	-	-	-	

Phases in Stage

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

Stage Diagram



Phase Delays

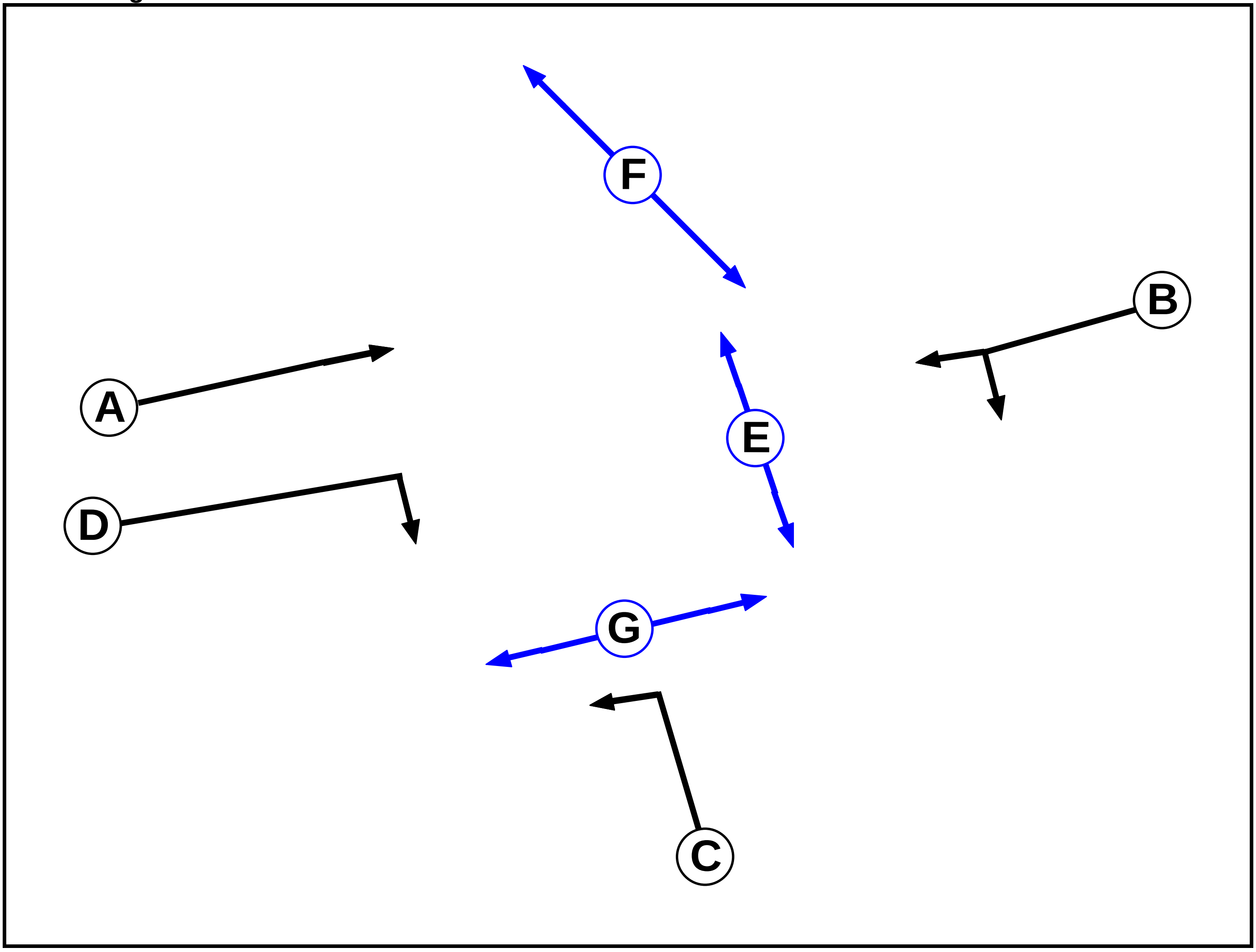
Term. Stage	Start Stage	Phase	Type	Value	Cont value
1	2	B	Losing	2	2

Prohibited Stage Change

	To Stage				
		1	2	3	4
From Stage	1		7	8	5
	2	8		8	5
	3	8	8		7
	4	5	5	10	

C2

Phase Diagram



Phase Input Data

Phase Name	Phase Type	Assoc. Phase	Street Min	Cont Min
A	Traffic		7	7
B	Traffic		7	7
C	Traffic		7	7
D	Traffic		7	7
E	Pedestrian		6	6
F	Pedestrian		6	6
G	Pedestrian		6	6

Full Input Data And Results

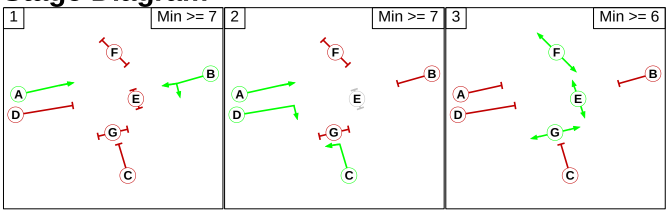
Phase Intergreens Matrix

		Starting Phase						
		A	B	C	D	E	F	G
Terminating Phase	A		-	-	-	-	7	-
	B	-		6	5	5	-	6
	C	-	5		-	-	-	5
	D	-	5	-		-	-	7
	E	-	7	-	-		-	-
	F	8	-	-	-	-		-
	G	-	10	10	10	-	-	

Phases in Stage

Stage No.	Phases in Stage
1	A B
2	A C D
3	E F G

Stage Diagram



Phase Delays

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

Prohibited Stage Change

		To Stage		
		1	2	3
From Stage	1		6	7
	2	5		7
	3	10	10	

Full Input Data And Results

Give-Way Lane Input Data

Junction: J1: A38 / Downside Road / Lilac Cottages
There are no Opposed Lanes in this Junction

Junction: J2: A38 / West Lane Priority Junction
There are no Opposed Lanes in this Junction

Full Input Data And Results

Lane Input Data

Junction: J1: A38 / Downside Road / Lilac Cottages												
Lane	**Lane Type**	**Phases**	**Start Disp.**	**End Disp.**	**Physical Length (PCU)**	**Sat Flow Type**	**Def User Saturation Flow (PCU/Hr)**	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Turns**	**Turning Radius (m)**
J1:1/1 (A38 (south))	U	E	2	3	7.8	Geom	-	3.50	0.00	Y	Arm J1:5 Left	14.00
J1:1/2 (A38 (south))	U	A	2	3	34.8	Geom	-	3.50	0.00	Y	Arm J2:5 Ahead	Inf
J1:1/3 (A38 (south))	U	A	2	3	34.8	Geom	-	3.50	0.00	N	Arm J2:5 Ahead	Inf
J1:2/1 (Downside Road)	U	D	2	3	60.0	Geom	-	3.00	0.00	Y	Arm J2:5 Left	15.00
J1:2/2 (Downside Road)	U	C	2	3	12.5	Geom	-	3.00	0.00	Y	Arm J1:4 Right	13.00
J1:3/1 (A38 (north))	U	B	2	3	20.3	Geom	-	3.25	6.00	Y	Arm J1:4 Ahead	Inf
											Arm J1:7 Left	2.00
J1:3/2 (A38 (north))	U	B	2	3	20.3	Geom	-	3.25	6.00	N	Arm J1:4 Ahead	Inf
J1:4/1	U		2	3	31.3	Inf	-	-	-	-	-	-
J1:4/2	U		2	3	31.3	Inf	-	-	-	-	-	-
J1:5/1	U		2	3	60.0	Inf	-	-	-	-	-	-
J1:6/1 (Lilac Cottages)	U	J	2	3	9.6	Geom	-	3.25	0.00	Y	Arm J1:4 Left	5.00
J1:7/1 (Lilac Cottages)	U		2	3	9.6	Geom	-	3.25	0.00	Y		

Junction: J2: A38 / West Lane Priority Junction												
Lane	**Lane Type**	**Phases**	**Start Disp.**	**End Disp.**	**Physical Length (PCU)**	**Sat Flow Type**	**Def User Saturation Flow (PCU/Hr)**	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Turns**	**Turning Radius (m)**
J2:1/1	U		2	3	17.4	Inf	-	-	-	-	-	-
J2:2/1	U	B	2	3	14.8	Geom	-	3.00	0.00	Y	Arm J1:3 Ahead	Inf
											Arm J2:4 Left	12.00
J2:2/2	U	B	2	3	60.0	Geom	-	3.00	0.00	N	Arm J1:3 Ahead	Inf
J2:3/1	U	C	2	3	60.0	Geom	-	3.80	6.00	Y	Arm J1:3 Left	10.00
J2:4/1	U		2	3	60.0	Inf	-	-	-	-	-	-
J2:5/1	U	A	2	3	20.9	Geom	-	3.00	6.00	Y	Arm J2:1 Ahead	Inf
J2:5/2	U	A	2	3	20.9	Geom	-	3.00	6.00	N	Arm J2:1 Ahead	Inf
J2:5/3	U	D	2	3	3.5	Geom	-	3.00	0.00	Y	Arm J2:4 Right	6.00

Traffic Flow Groups

Flow Group	Start Time	End Time	Duration	Formula
1: '2030 12 MPPA AM'	08:00	09:00	01:00	
2: '2030 12 MPPA Inter Peak'	13:00	14:00	01:00	
3: '2030 12 MPPA PM'	17:00	18:00	01:00	

Scenario 1: '2030 12 MPPA - AM' (FG1: '2030 12 MPPA AM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

	Destination						
Origin		A	B	C	D	E	Tot.
	A	0	25	989	0	0	1014
	B	0	0	283	0	0	283
	C	953	167	0	323	0	1443
	D	245	42	66	0	0	353
	E	0	0	0	0	0	0
	Tot.	1198	234	1338	323	0	3093

Traffic Lane Flows

Lane	Scenario 1: 2030 12 MPPA - AM
Junction: J1: A38 / Downside Road / Lilac Cottages	
J1:1/1 (short)	323
J1:1/2 (with short)	323(In) 0(Out)
J1:1/3	560
J1:2/1 (with short)	230(In) 164(Out)
J1:2/2 (short)	66
J1:3/1	624
J1:3/2	648
J1:4/1	657
J1:4/2	681
J1:5/1	323
J1:6/1	0
J1:7/1	0
Junction: J2: A38 / West Lane Priority Junction	
J2:1/1	515
J2:2/1 (short)	507
J2:2/2 (with short)	1014(In) 507(Out)
J2:3/1	283
J2:4/1	234
J2:5/1	0
J2:5/2 (with short)	724(In) 515(Out)
J2:5/3 (short)	209

Lane Saturation Flows

Junction: J1: A38 / Downside Road / Lilac Cottages								
Lane	Lane Width (m)	Gradient	Nearside Lane	Allowed Turns	Turning Radius (m)	Turning Prop.	Sat Flow (PCU/Hr)	Flared Sat Flow (PCU/Hr)
J1:1/1 (A38 (south))	3.50	0.00	Y	Arm J1:5 Left	14.00	100.0 %	1775	1775
J1:1/2 (A38 (south))	3.50	0.00	Y	Arm J2:5 Ahead	Inf	0.0 %	1965	1965
J1:1/3 (A38 (south))	3.50	0.00	N	Arm J2:5 Ahead	Inf	100.0 %	2105	2105
J1:2/1 (Downside Road)	3.00	0.00	Y	Arm J2:5 Left	15.00	100.0 %	1741	1741
J1:2/2 (Downside Road)	3.00	0.00	Y	Arm J1:4 Right	13.00	100.0 %	1717	1717
J1:3/1 (A38 (north))	3.25	6.00	Y	Arm J1:4 Ahead	Inf	100.0 %	1688	1688
				Arm J1:7 Left	2.00	0.0 %		
J1:3/2 (A38 (north))	3.25	6.00	N	Arm J1:4 Ahead	Inf	100.0 %	1828	1828
J1:4/1	Infinite Saturation Flow						Inf	Inf
J1:4/2	Infinite Saturation Flow						Inf	Inf
J1:5/1	Infinite Saturation Flow						Inf	Inf
J1:6/1 (Lilac Cottages)	3.25	0.00	Y	Arm J1:4 Left	5.00	0.0 %	1940	1940
J1:7/1 (Lilac Cottages)	3.25	0.00	Y				1940	1940

Junction: J2: A38 / West Lane Priority Junction								
Lane	Lane Width (m)	Gradient	Nearside Lane	Allowed Turns	Turning Radius (m)	Turning Prop.	Sat Flow (PCU/Hr)	Flared Sat Flow (PCU/Hr)
J2:1/1	Infinite Saturation Flow						Inf	Inf
J2:2/1	3.00	0.00	Y	Arm J1:3 Ahead	Inf	95.1 %	1903	1903
				Arm J2:4 Left	12.00	4.9 %		
J2:2/2	3.00	0.00	N	Arm J1:3 Ahead	Inf	100.0 %	2055	2055
J2:3/1	3.80	6.00	Y	Arm J1:3 Left	10.00	100.0 %	1516	1516
J2:4/1	Infinite Saturation Flow						Inf	Inf
J2:5/1	3.00	6.00	Y	Arm J2:1 Ahead	Inf	0.0 %	1663	1663
J2:5/2	3.00	6.00	N	Arm J2:1 Ahead	Inf	100.0 %	1803	1803
J2:5/3	3.00	0.00	Y	Arm J2:4 Right	6.00	100.0 %	1532	1532

Scenario 2: '2030 12 MPPA - Inter Peak' (FG2: '2030 12 MPPA Inter Peak', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination					
		A	B	C	D	E	Tot.
Origin	A	0	39	1132	0	0	1171
	B	0	0	275	0	0	275
	C	1087	198	0	233	0	1518
	D	143	26	135	0	0	304
	E	0	0	0	0	0	0
	Tot.	1230	263	1542	233	0	3268

Traffic Lane Flows

Lane	Scenario 2: 2030 12 MPPA - Inter Peak
Junction: J1: A38 / Downside Road / Lilac Cottages	
J1:1/1 (short)	233
J1:1/2 (with short)	233(In) 0(Out)
J1:1/3	643
J1:2/1 (with short)	232(In) 97(Out)
J1:2/2 (short)	135
J1:3/1	685
J1:3/2	722
J1:4/1	753
J1:4/2	789
J1:5/1	233
J1:6/1	0
J1:7/1	0
Junction: J2: A38 / West Lane Priority Junction	
J2:1/1	516
J2:2/1 (short)	586
J2:2/2 (with short)	1171(In) 585(Out)
J2:3/1	275
J2:4/1	263
J2:5/1	0
J2:5/2 (with short)	740(In) 516(Out)
J2:5/3 (short)	224

Lane Saturation Flows

Junction: J1: A38 / Downside Road / Lilac Cottages

Lane	Lane Width (m)	Gradient	Nearside Lane	Allowed Turns	Turning Radius (m)	Turning Prop.	Sat Flow (PCU/Hr)	Flared Sat Flow (PCU/Hr)
J1:1/1 (A38 (south))	3.50	0.00	Y	Arm J1:5 Left	14.00	100.0 %	1775	1775
J1:1/2 (A38 (south))	3.50	0.00	Y	Arm J2:5 Ahead	Inf	0.0 %	1965	1965
J1:1/3 (A38 (south))	3.50	0.00	N	Arm J2:5 Ahead	Inf	100.0 %	2105	2105
J1:2/1 (Downside Road)	3.00	0.00	Y	Arm J2:5 Left	15.00	100.0 %	1741	1741
J1:2/2 (Downside Road)	3.00	0.00	Y	Arm J1:4 Right	13.00	100.0 %	1717	1717
J1:3/1 (A38 (north))	3.25	6.00	Y	Arm J1:4 Ahead	Inf	100.0 %	1688	1688
				Arm J1:7 Left	2.00	0.0 %		
J1:3/2 (A38 (north))	3.25	6.00	N	Arm J1:4 Ahead	Inf	100.0 %	1828	1828
J1:4/1	Infinite Saturation Flow						Inf	Inf
J1:4/2	Infinite Saturation Flow						Inf	Inf
J1:5/1	Infinite Saturation Flow						Inf	Inf
J1:6/1 (Lilac Cottages)	3.25	0.00	Y	Arm J1:4 Left	5.00	0.0 %	1940	1940
J1:7/1 (Lilac Cottages)	3.25	0.00	Y				1940	1940

Junction: J2: A38 / West Lane Priority Junction

Lane	Lane Width (m)	Gradient	Nearside Lane	Allowed Turns	Turning Radius (m)	Turning Prop.	Sat Flow (PCU/Hr)	Flared Sat Flow (PCU/Hr)
J2:1/1	Infinite Saturation Flow						Inf	Inf
J2:2/1	3.00	0.00	Y	Arm J1:3 Ahead	Inf	93.3 %	1899	1899
				Arm J2:4 Left	12.00	6.7 %		
J2:2/2	3.00	0.00	N	Arm J1:3 Ahead	Inf	100.0 %	2055	2055
J2:3/1	3.80	6.00	Y	Arm J1:3 Left	10.00	100.0 %	1516	1516
J2:4/1	Infinite Saturation Flow						Inf	Inf
J2:5/1	3.00	6.00	Y	Arm J2:1 Ahead	Inf	0.0 %	1663	1663
J2:5/2	3.00	6.00	N	Arm J2:1 Ahead	Inf	100.0 %	1803	1803
J2:5/3	3.00	0.00	Y	Arm J2:4 Right	6.00	100.0 %	1532	1532

Full Input Data And Results

Scenario 3: '2030 12 MPPA - PM' (FG3: '2030 12 MPPA PM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination					
		A	B	C	D	E	Tot.
Origin	A	0	13	1637	0	0	1650
	B	0	0	397	0	0	397
	C	1178	270	0	365	0	1813
	D	170	37	163	0	0	370
	E	0	0	0	0	0	0
	Tot.	1348	320	2197	365	0	4230

Traffic Lane Flows

Lane	Scenario 3: 2030 12 MPPA - PM
Junction: J1: A38 / Downside Road / Lilac Cottages	
J1:1/1 (short)	365
J1:1/2 (with short)	1089(In) 724(Out)
J1:1/3	724
J1:2/1 (with short)	370(In) 207(Out)
J1:2/2 (short)	163
J1:3/1	1011
J1:3/2	1023
J1:4/1	1093
J1:4/2	1104
J1:5/1	365
J1:6/1	0
J1:7/1	0
Junction: J2: A38 / West Lane Priority Junction	
J2:1/1	1348
J2:2/1 (short)	825
J2:2/2 (with short)	1650(In) 825(Out)
J2:3/1	397
J2:4/1	320
J2:5/1	809
J2:5/2 (with short)	846(In) 539(Out)
J2:5/3 (short)	307

Lane Saturation Flows

Junction: J1: A38 / Downside Road / Lilac Cottages

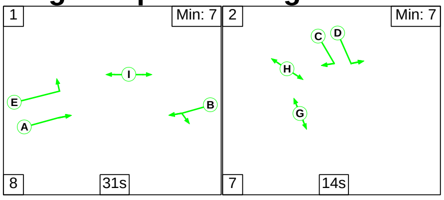
Lane	Lane Width (m)	Gradient	Nearside Lane	Allowed Turns	Turning Radius (m)	Turning Prop.	Sat Flow (PCU/Hr)	Flared Sat Flow (PCU/Hr)
J1:1/1 (A38 (south))	3.50	0.00	Y	Arm J1:5 Left	14.00	100.0 %	1775	1775
J1:1/2 (A38 (south))	3.50	0.00	Y	Arm J2:5 Ahead	Inf	100.0 %	1965	1965
J1:1/3 (A38 (south))	3.50	0.00	N	Arm J2:5 Ahead	Inf	100.0 %	2105	2105
J1:2/1 (Downside Road)	3.00	0.00	Y	Arm J2:5 Left	15.00	100.0 %	1741	1741
J1:2/2 (Downside Road)	3.00	0.00	Y	Arm J1:4 Right	13.00	100.0 %	1717	1717
J1:3/1 (A38 (north))	3.25	6.00	Y	Arm J1:4 Ahead	Inf	100.0 %	1688	1688
				Arm J1:7 Left	2.00	0.0 %		
J1:3/2 (A38 (north))	3.25	6.00	N	Arm J1:4 Ahead	Inf	100.0 %	1828	1828
J1:4/1	Infinite Saturation Flow						Inf	Inf
J1:4/2	Infinite Saturation Flow						Inf	Inf
J1:5/1	Infinite Saturation Flow						Inf	Inf
J1:6/1 (Lilac Cottages)	3.25	0.00	Y	Arm J1:4 Left	5.00	0.0 %	1940	1940
J1:7/1 (Lilac Cottages)	3.25	0.00	Y				1940	1940

Junction: J2: A38 / West Lane Priority Junction

Lane	Lane Width (m)	Gradient	Nearside Lane	Allowed Turns	Turning Radius (m)	Turning Prop.	Sat Flow (PCU/Hr)	Flared Sat Flow (PCU/Hr)
J2:1/1	Infinite Saturation Flow						Inf	Inf
J2:2/1	3.00	0.00	Y	Arm J1:3 Ahead	Inf	98.4 %	1911	1911
				Arm J2:4 Left	12.00	1.6 %		
J2:2/2	3.00	0.00	N	Arm J1:3 Ahead	Inf	100.0 %	2055	2055
J2:3/1	3.80	6.00	Y	Arm J1:3 Left	10.00	100.0 %	1516	1516
J2:4/1	Infinite Saturation Flow						Inf	Inf
J2:5/1	3.00	6.00	Y	Arm J2:1 Ahead	Inf	100.0 %	1663	1663
J2:5/2	3.00	6.00	N	Arm J2:1 Ahead	Inf	100.0 %	1803	1803
J2:5/3	3.00	0.00	Y	Arm J2:4 Right	6.00	100.0 %	1532	1532

Full Input Data And Results

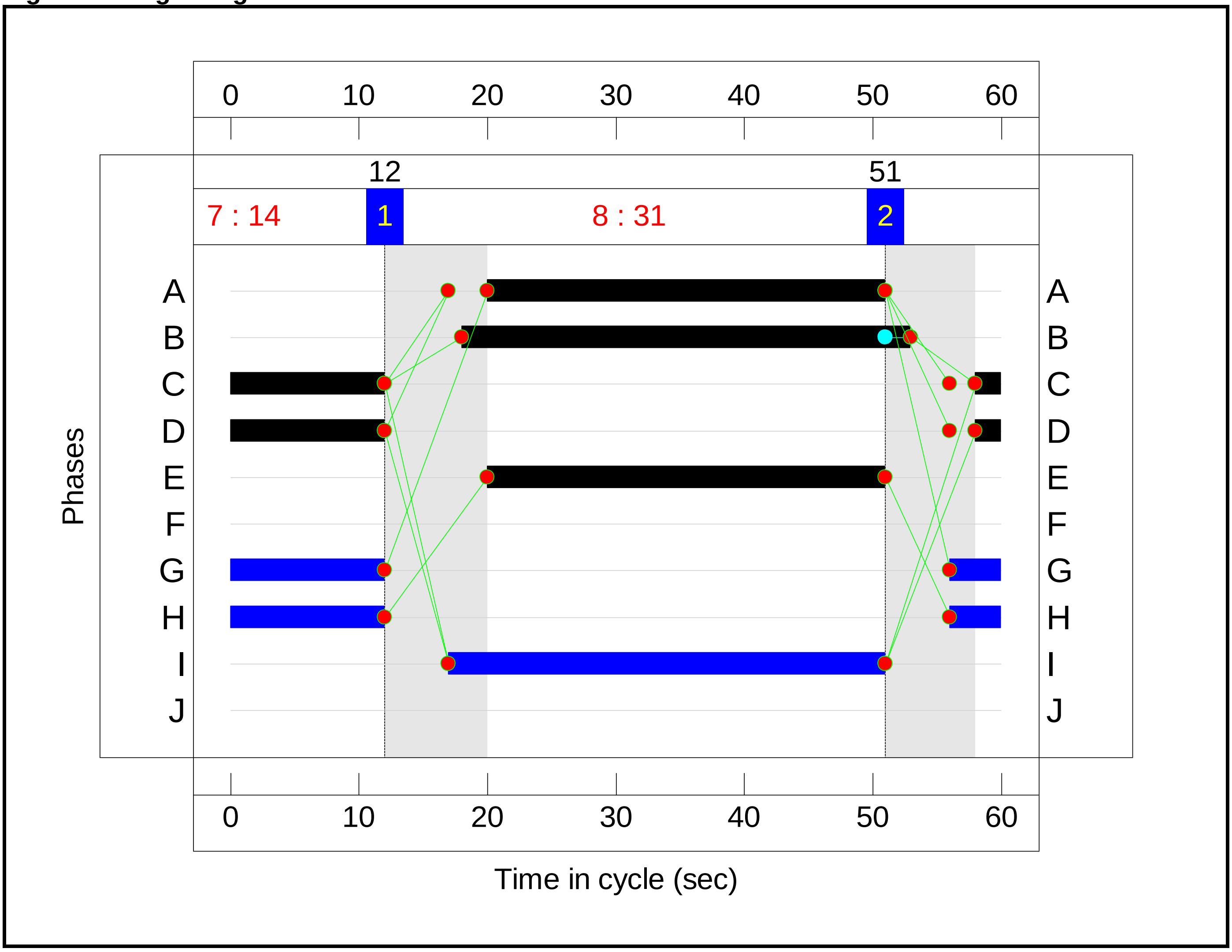
Scenario 1: '2030 12 MPPA - AM' (FG1: '2030 12 MPPA AM', Plan 1: 'Network Control Plan 1')
C1
Stage Sequence Diagram



Stage Timings

Stage	1	2
Duration	31	14
Change Point	12	51

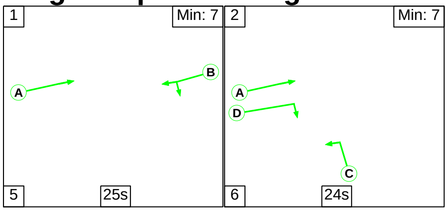
Signal Timings Diagram



Full Input Data And Results

C2

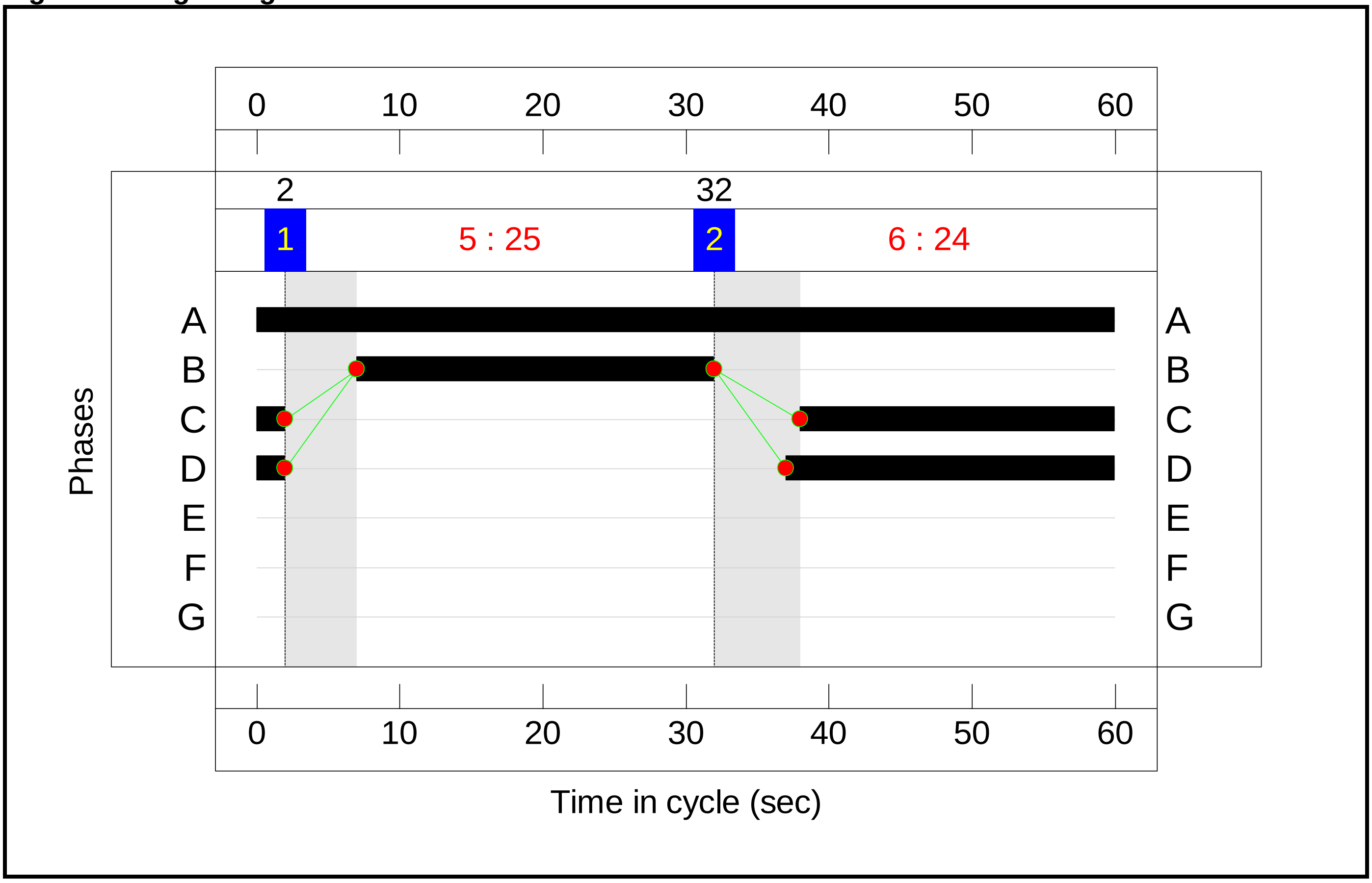
Stage Sequence Diagram



Stage Timings

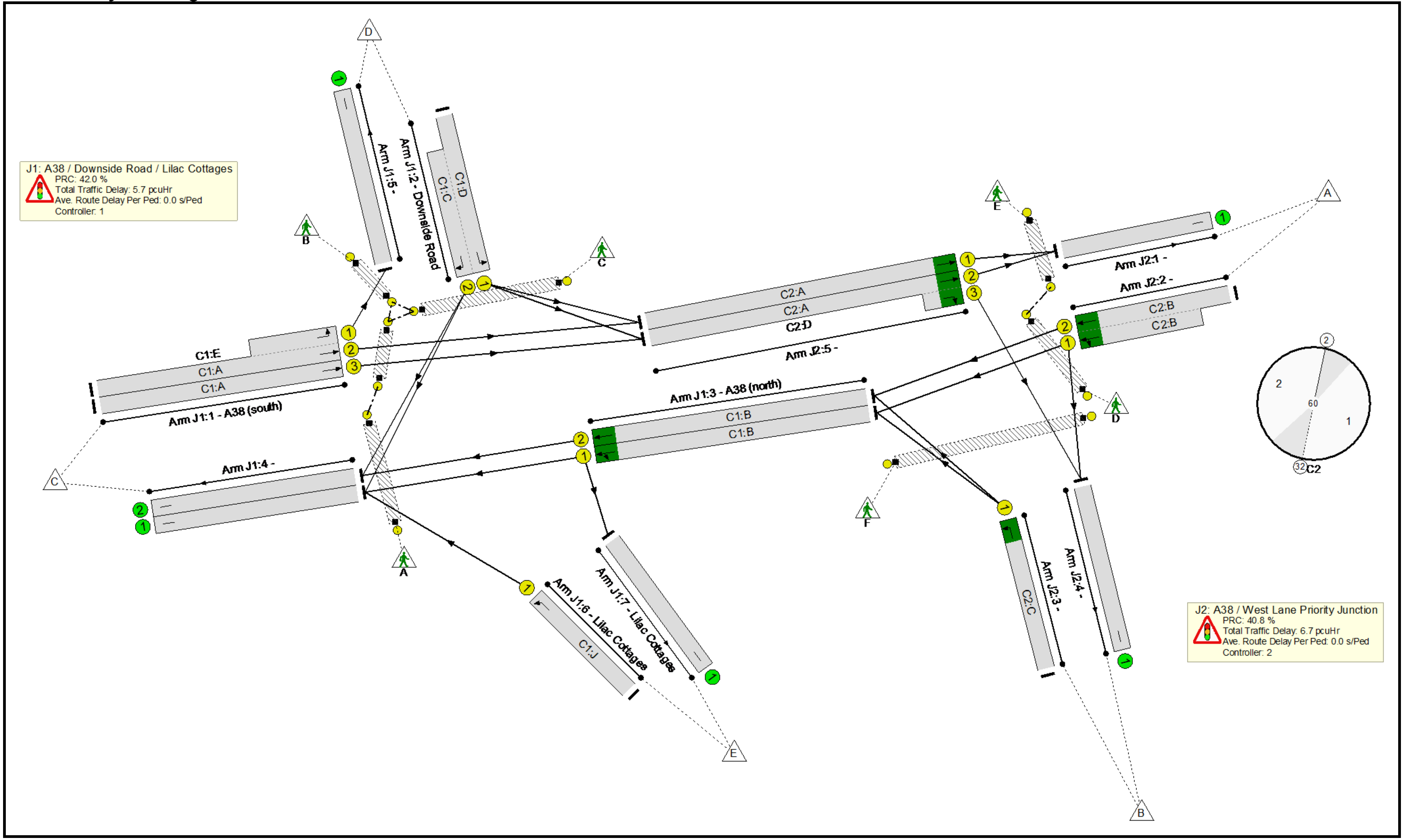
Stage	1	2
Duration	25	24
Change Point	2	32

Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram



Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**63.9%**
J1: A38 / Downside Road / Lilac Cottages	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**63.4%**
1/2+1/1	A38 (south) Left Ahead	U	N/A	N/A	C1:A C1:E		1	31	-	323	1965:1775	0+947	0.0 : 34.1%
1/3	A38 (south) Ahead	U	N/A	N/A	C1:A		1	31	-	560	2105	1123	49.9%
2/1+2/2	Downside Road Right Left	U	N/A	N/A	C1:D C1:C		1	14	-	230	1741:1717	435+175	37.7 : 37.7%
3/1	A38 (north) Ahead Left	U	N/A	N/A	C1:B		1	35	-	624	1688	985	63.4%
3/2	A38 (north) Ahead	U	N/A	N/A	C1:B		1	35	-	648	1828	1066	60.8%
4/1		U	N/A	N/A	-		-	-	-	657	Inf	Inf	0.0%
4/2		U	N/A	N/A	-		-	-	-	681	Inf	Inf	0.0%
5/1		U	N/A	N/A	-		-	-	-	323	Inf	Inf	0.0%
6/1	Lilac Cottages Left	U	N/A	N/A	C1:J		0	0	-	0	1940	0	0.0%
7/1	Lilac Cottages	U	N/A	N/A	-		-	-	-	0	1940	1940	0.0%
Ped Link: P1	Unnamed Ped Link	-	N/A	-	C1:F		0	0	-	0	-	0	0.0%
Ped Link: P2	Unnamed Ped Link	-	N/A	-	C1:G		1	16	-	0	-	19200	0.0%
Ped Link: P3	Unnamed Ped Link	-	N/A	-	C1:H		1	16	-	0	-	19200	0.0%
Ped Link: P4	Unnamed Ped Link	-	N/A	-	C1:I		1	34	-	0	-	40800	0.0%
J2: A38 / West Lane Priority Junction	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**63.9%**
1/1		U	N/A	N/A	-		-	-	-	515	Inf	Inf	0.0%

Full Input Data And Results

2/2+2/1	Ahead Left	U	N/A	N/A	C2:B		1	25	-	1014	2055:1903	808+793	62.7 : 63.9%
3/1	Left	U	N/A	N/A	C2:C		1	24	-	283	1516	606	46.7%
4/1		U	N/A	N/A	-		-	-	-	234	Inf	Inf	0.0%
5/1	Ahead	U	N/A	N/A	C2:A		1	60	-	0	1663	1663	0.0%
5/2+5/3	Ahead Right	U	N/A	N/A	C2:A C2:D		1	60:25	-	724	1803:1532	879+357	58.6 : 58.6%
Ped Link: P1	Unnamed Ped Link	-	N/A	-	C2:E		0	0	-	0	-	0	0.0%
Ped Link: P2	Unnamed Ped Link	-	N/A	-	C2:F		0	0	-	0	-	0	0.0%
Ped Link: P3	Unnamed Ped Link	-	N/A	-	C2:G		0	0	-	0	-	0	0.0%

Full Input Data And Results

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**0**	**0**	**0**	**10.0**	**2.4**	**0.0**	**12.4**	**-**	**-**	**-**	**-**
J1: A38 / Downside Road / Lilac Cottages	**-**	**-**	**0**	**0**	**0**	**4.7**	**1.1**	**0.0**	**5.7**	**-**	**-**	**-**	**-**
1/2+1/1	323	323	-	-	-	0.7	0.3	-	1.0	10.9	3.1	0.3	3.3
1/3	560	560	-	-	-	1.4	0.5	-	1.9	12.1	5.9	0.5	6.4
2/1+2/2	230	230	-	-	-	1.2	0.3	-	1.5	23.1	2.2	0.3	2.5
3/1	624	624	-	-	-	0.7	0.0	-	0.7	4.0	2.9	0.0	2.9
3/2	648	648	-	-	-	0.7	0.0	-	0.7	3.8	2.7	0.0	2.7
4/1	657	657	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
4/2	681	681	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	323	323	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	0	0	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	0	0	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
Ped Link: P1	0	0	-	-	-	-	-	-	Inf	Inf	-	-	Inf
Ped Link: P2	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P3	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P4	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
J2: A38 / West Lane Priority Junction	**-**	**-**	**0**	**0**	**0**	**5.4**	**1.3**	**0.0**	**6.7**	**-**	**-**	**-**	**-**
1/1	515	515	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
2/2+2/1	1014	1014	-	-	-	3.9	0.9	-	4.7	16.8	6.6	0.9	7.5
3/1	283	283	-	-	-	1.0	0.4	-	1.5	18.8	3.5	0.4	3.9
4/1	234	234	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	0	0	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/2+5/3	724	724	-	-	-	0.4	0.0	-	0.4	2.2	6.4	0.0	6.4
Ped Link: P1	0	0	-	-	-	-	-	-	Inf	Inf	-	-	Inf
Ped Link: P2	0	0	-	-	-	-	-	-	Inf	Inf	-	-	Inf

Full Input Data And Results

Ped Link: P3	0	0	-	-	-	-	-	-	Inf	Inf	-	-	Inf

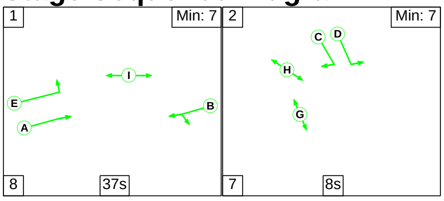
C1	PRC for Signalled Lanes (%):	42.0	Total Delay for Signalled Lanes (pcuHr):	5.71	Cycle Time (s):	60
C2	PRC for Signalled Lanes (%):	40.8	Total Delay for Signalled Lanes (pcuHr):	6.65	Cycle Time (s):	60
	PRC Over All Lanes (%):	40.8	Total Delay Over All Lanes(pcuHr):	12.36		

Full Input Data And Results

Scenario 2: '2030 12 MPPA - Inter Peak' (FG2: '2030 12 MPPA Inter Peak', Plan 1: 'Network Control Plan 1')

C1

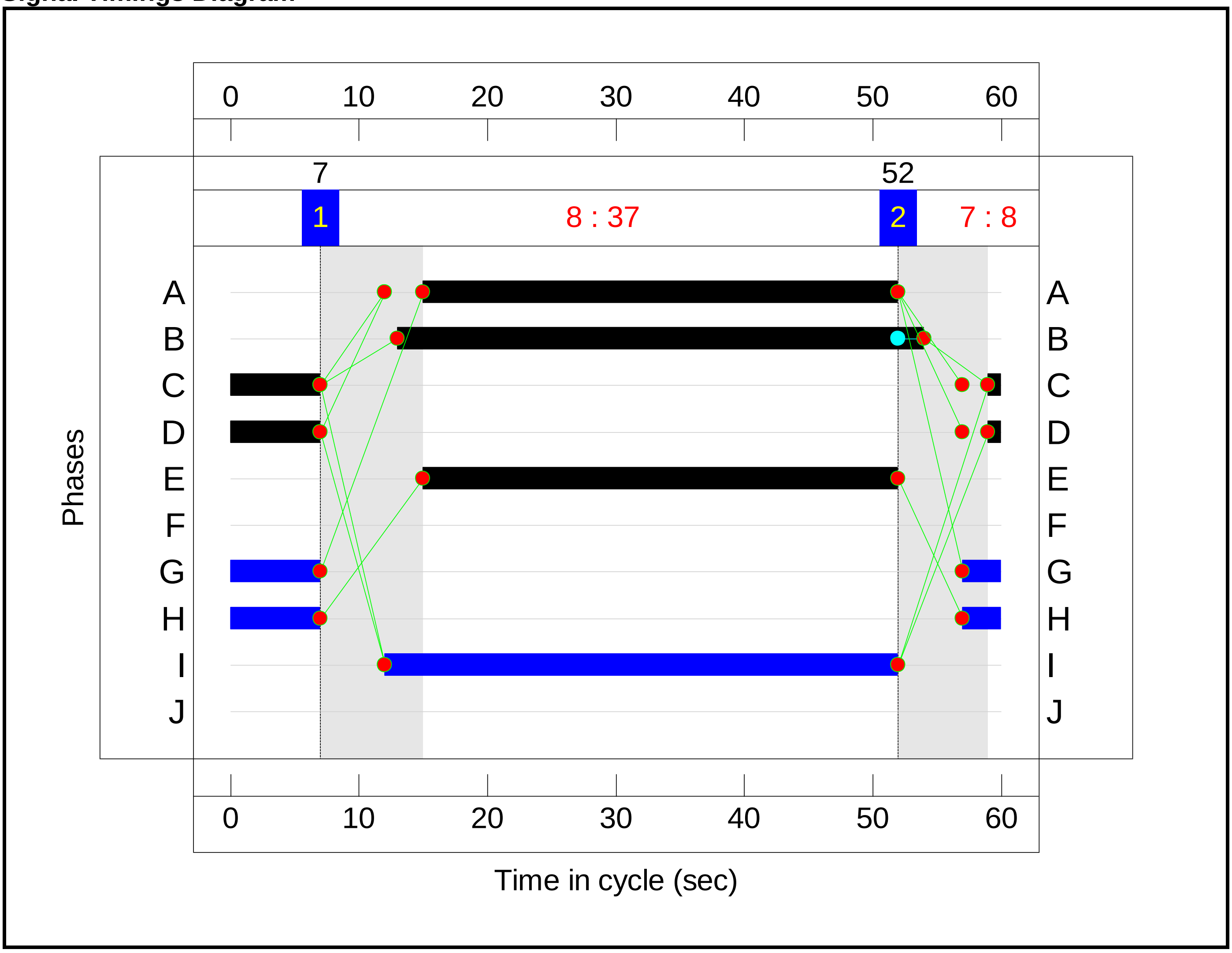
Stage Sequence Diagram



Stage Timings

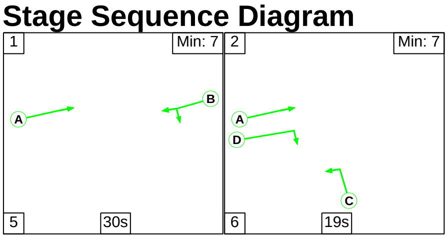
Stage	1	2
Duration	37	8
Change Point	7	52

Signal Timings Diagram



C2

Stage Sequence Diagram

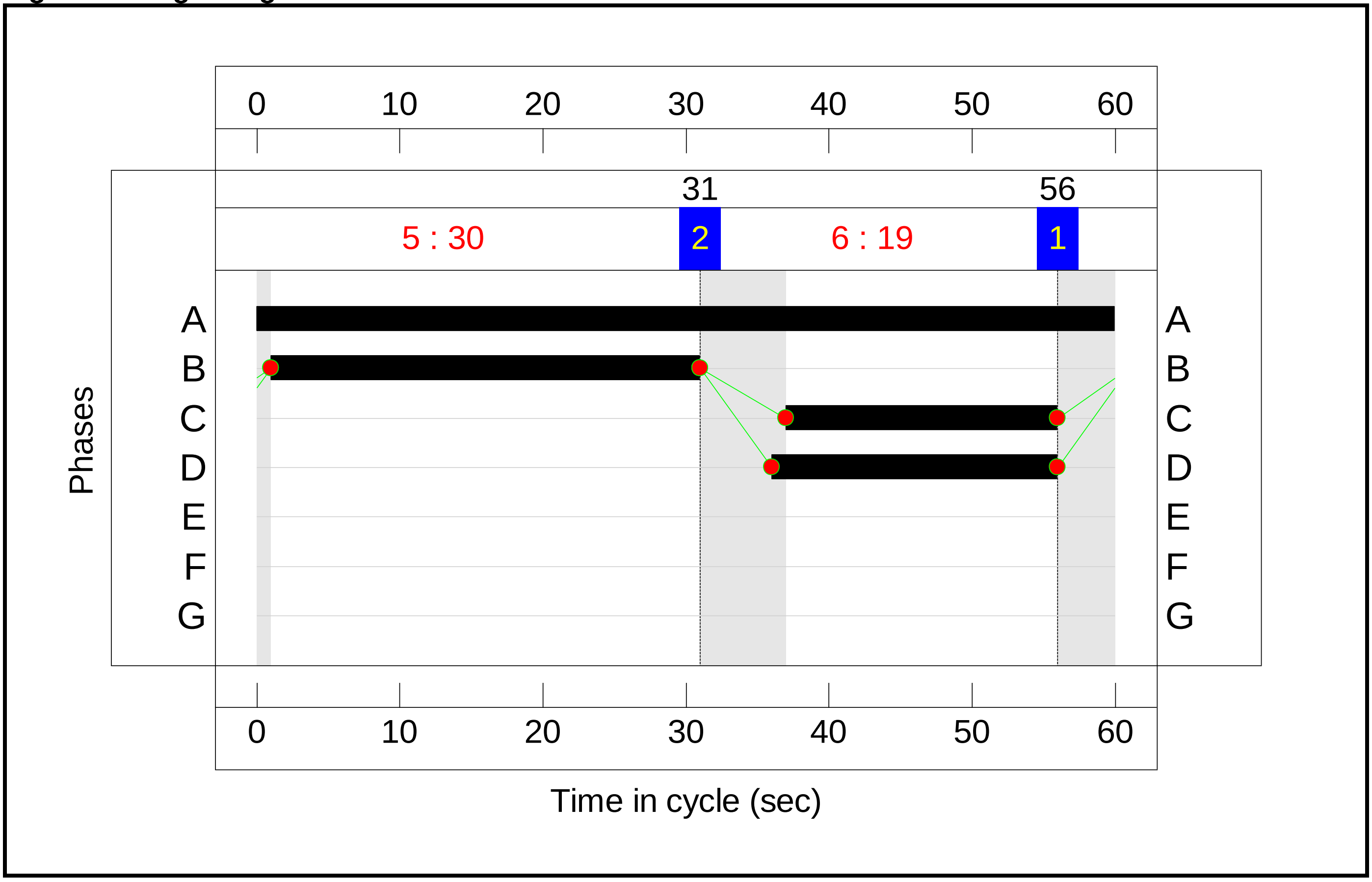


Full Input Data And Results

Stage Timings

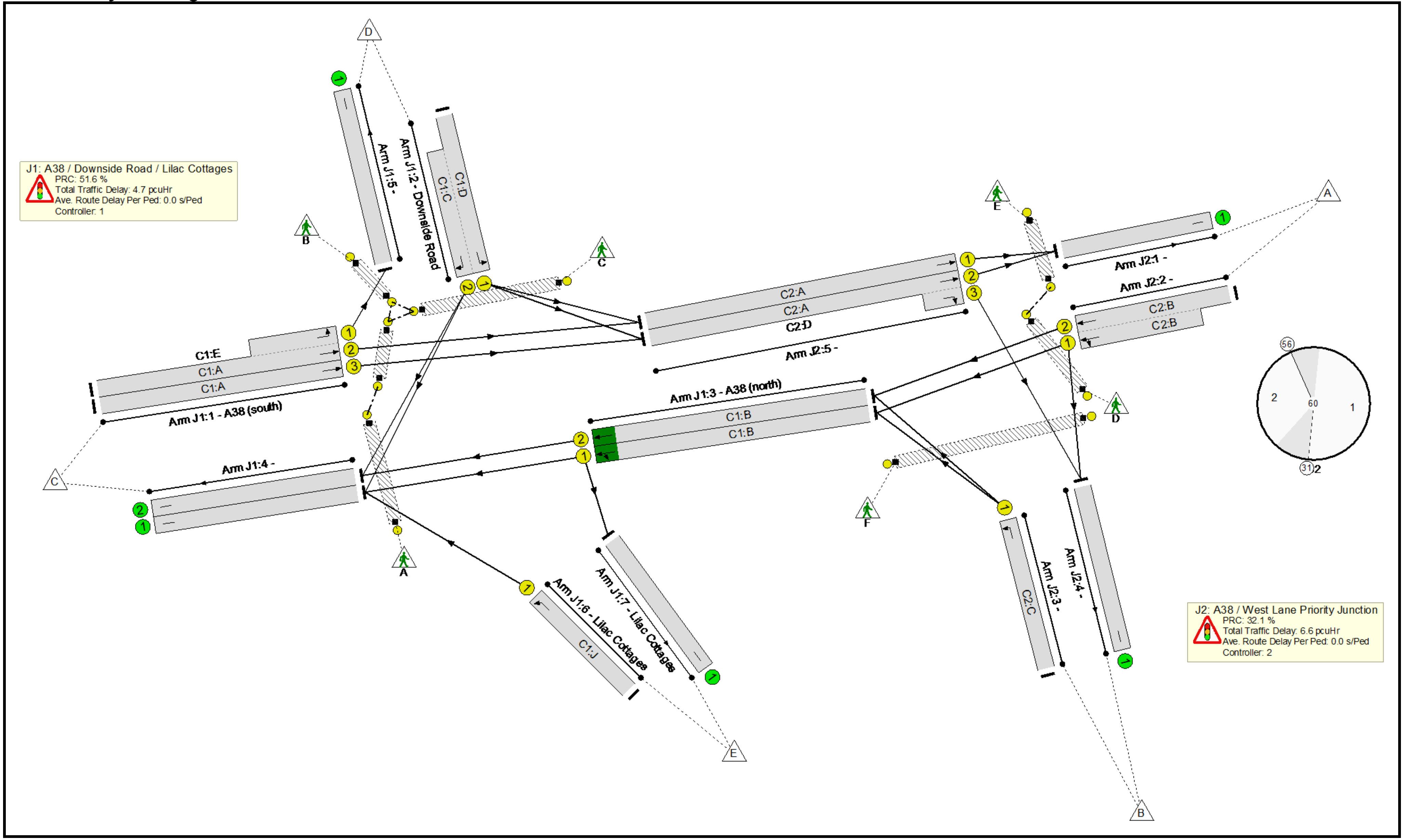
Stage	1	2
Duration	30	19
Change Point	56	31

Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram



Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**68.1%**
J1: A38 / Downside Road / Lilac Cottages	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**59.4%**
1/2+1/1	A38 (south) Left Ahead	U	N/A	N/A	C1:A C1:E		1	37	-	233	1965:1775	0+1124	0.0 : 20.7%
1/3	A38 (south) Ahead	U	N/A	N/A	C1:A		1	37	-	643	2105	1333	48.2%
2/1+2/2	Downside Road Right Left	U	N/A	N/A	C1:D C1:C		1	8	-	232	1741:1717	261+258	37.1 : 52.4%
3/1	A38 (north) Ahead Left	U	N/A	N/A	C1:B		1	41	-	685	1688	1153	59.4%
3/2	A38 (north) Ahead	U	N/A	N/A	C1:B		1	41	-	722	1828	1249	57.8%
4/1		U	N/A	N/A	-		-	-	-	753	Inf	Inf	0.0%
4/2		U	N/A	N/A	-		-	-	-	789	Inf	Inf	0.0%
5/1		U	N/A	N/A	-		-	-	-	233	Inf	Inf	0.0%
6/1	Lilac Cottages Left	U	N/A	N/A	C1:J		0	0	-	0	1940	0	0.0%
7/1	Lilac Cottages	U	N/A	N/A	-		-	-	-	0	1940	1940	0.0%
Ped Link: P1	Unnamed Ped Link	-	N/A	-	C1:F		0	0	-	0	-	0	0.0%
Ped Link: P2	Unnamed Ped Link	-	N/A	-	C1:G		1	10	-	0	-	12000	0.0%
Ped Link: P3	Unnamed Ped Link	-	N/A	-	C1:H		1	10	-	0	-	12000	0.0%
Ped Link: P4	Unnamed Ped Link	-	N/A	-	C1:I		1	40	-	0	-	48000	0.0%
J2: A38 / West Lane Priority Junction	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**68.1%**
1/1		U	N/A	N/A	-		-	-	-	516	Inf	Inf	0.0%

Full Input Data And Results

2/2+2/1	Ahead Left	U	N/A	N/A	C2:B		1	30	-	1171	2055:1899	941+943	62.2 : 62.2%
3/1	Left	U	N/A	N/A	C2:C		1	19	-	275	1516	505	54.4%
4/1		U	N/A	N/A	-		-	-	-	263	Inf	Inf	0.0%
5/1	Ahead	U	N/A	N/A	C2:A		1	60	-	0	1663	1663	0.0%
5/2+5/3	Ahead Right	U	N/A	N/A	C2:A C2:D		1	60:20	-	740	1803:1532	757+329	68.1 : 68.1%
Ped Link: P1	Unnamed Ped Link	-	N/A	-	C2:E		0	0	-	0	-	0	0.0%
Ped Link: P2	Unnamed Ped Link	-	N/A	-	C2:F		0	0	-	0	-	0	0.0%
Ped Link: P3	Unnamed Ped Link	-	N/A	-	C2:G		0	0	-	0	-	0	0.0%

Full Input Data And Results

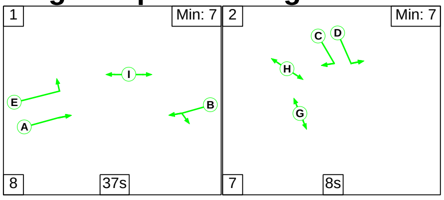
Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**0**	**0**	**0**	**8.9**	**2.4**	**0.0**	**11.3**	**-**	**-**	**-**	**-**
J1: A38 / Downside Road / Lilac Cottages	**-**	**-**	**0**	**0**	**0**	**3.7**	**1.0**	**0.0**	**4.7**	**-**	**-**	**-**	**-**
1/2+1/1	233	233	-	-	-	0.3	0.1	-	0.4	6.7	1.6	0.1	1.7
1/3	643	643	-	-	-	1.0	0.5	-	1.5	8.4	5.5	0.5	6.0
2/1+2/2	232	232	-	-	-	1.5	0.4	-	1.9	29.6	2.1	0.4	2.5
3/1	685	685	-	-	-	0.4	0.0	-	0.4	2.3	2.5	0.0	2.5
3/2	722	722	-	-	-	0.4	0.0	-	0.4	2.1	2.6	0.0	2.6
4/1	753	753	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
4/2	789	789	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	233	233	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	0	0	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	0	0	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
Ped Link: P1	0	0	-	-	-	-	-	-	Inf	Inf	-	-	Inf
Ped Link: P2	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P3	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P4	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
J2: A38 / West Lane Priority Junction	**-**	**-**	**0**	**0**	**0**	**5.2**	**1.4**	**0.0**	**6.6**	**-**	**-**	**-**	**-**
1/1	516	516	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
2/2+2/1	1171	1171	-	-	-	3.2	0.8	-	4.1	12.5	6.7	0.8	7.5
3/1	275	275	-	-	-	1.2	0.6	-	1.8	24.1	3.7	0.6	4.3
4/1	263	263	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	0	0	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/2+5/3	740	740	-	-	-	0.7	0.0	-	0.7	3.3	6.0	0.0	6.0
Ped Link: P1	0	0	-	-	-	-	-	-	Inf	Inf	-	-	Inf
Ped Link: P2	0	0	-	-	-	-	-	-	Inf	Inf	-	-	Inf

Full Input Data And Results

Ped Link: P3	0	0	-	-	-	-	-	-	Inf	Inf	-	-	Inf

C1	PRC for Signalled Lanes (%):	51.6	Total Delay for Signalled Lanes (pcuHr):	4.70	Cycle Time (s):	60
C2	PRC for Signalled Lanes (%):	32.1	Total Delay for Signalled Lanes (pcuHr):	6.57	Cycle Time (s):	60
	PRC Over All Lanes (%):	32.1	Total Delay Over All Lanes(pcuHr):	11.27		

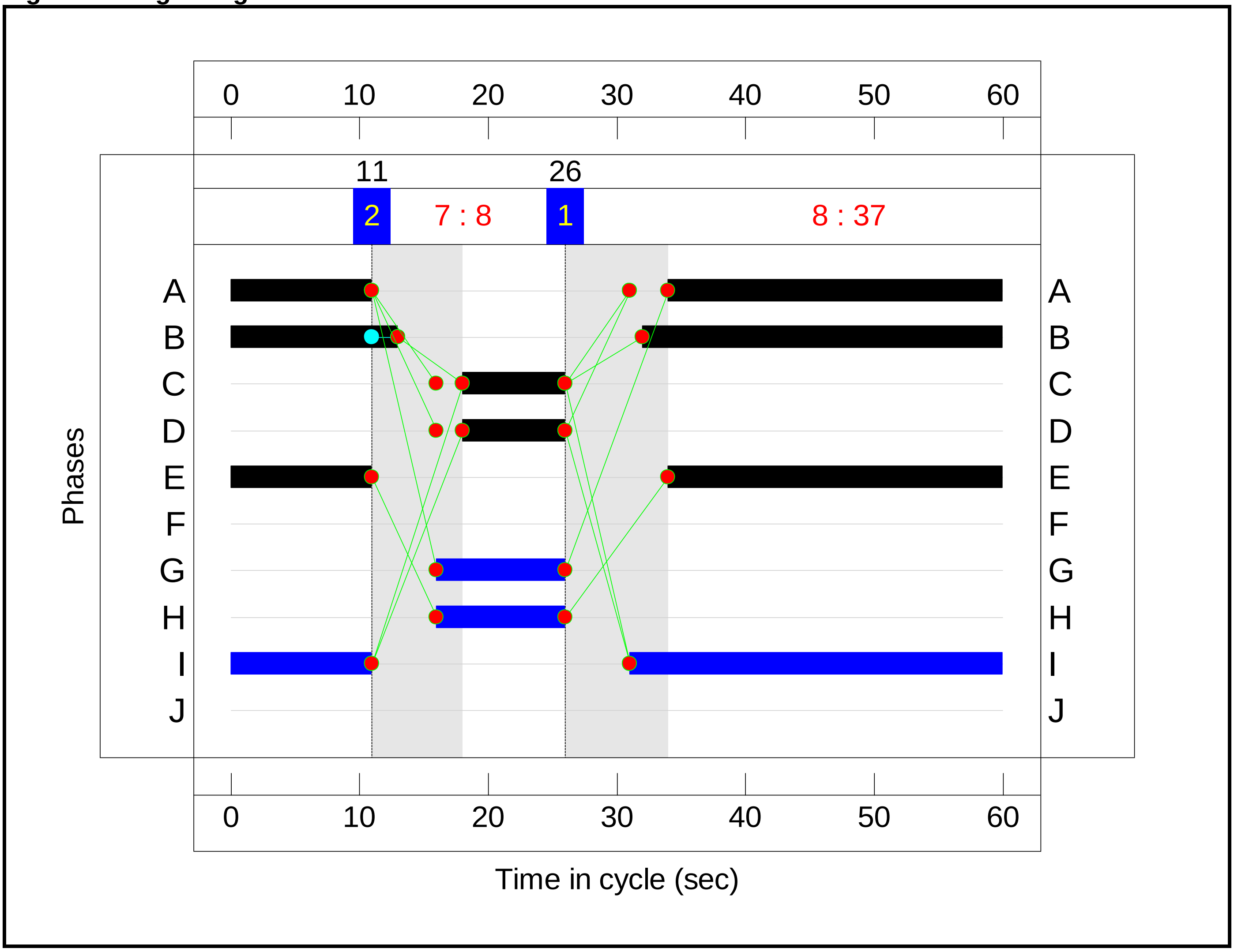
Full Input Data And Results
Scenario 3: '2030 12 MPPA - PM' (FG3: '2030 12 MPPA PM', Plan 1: 'Network Control Plan 1')
C1
Stage Sequence Diagram



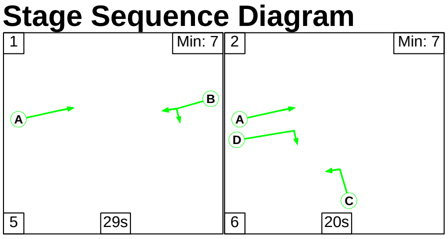
Stage Timings

Stage	1	2
Duration	37	8
Change Point	26	11

Signal Timings Diagram



C2
Stage Sequence Diagram

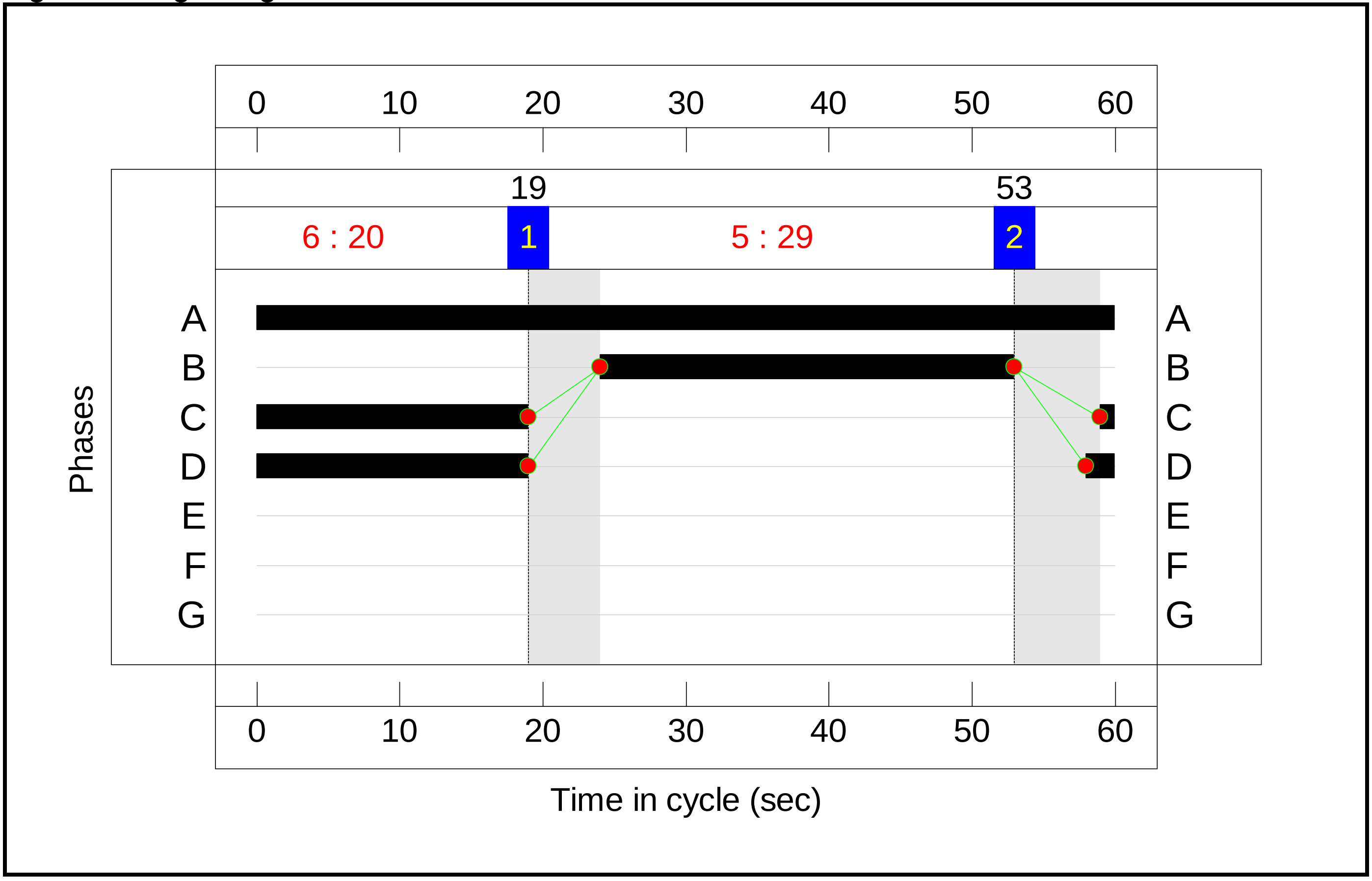


Full Input Data And Results

Stage Timings

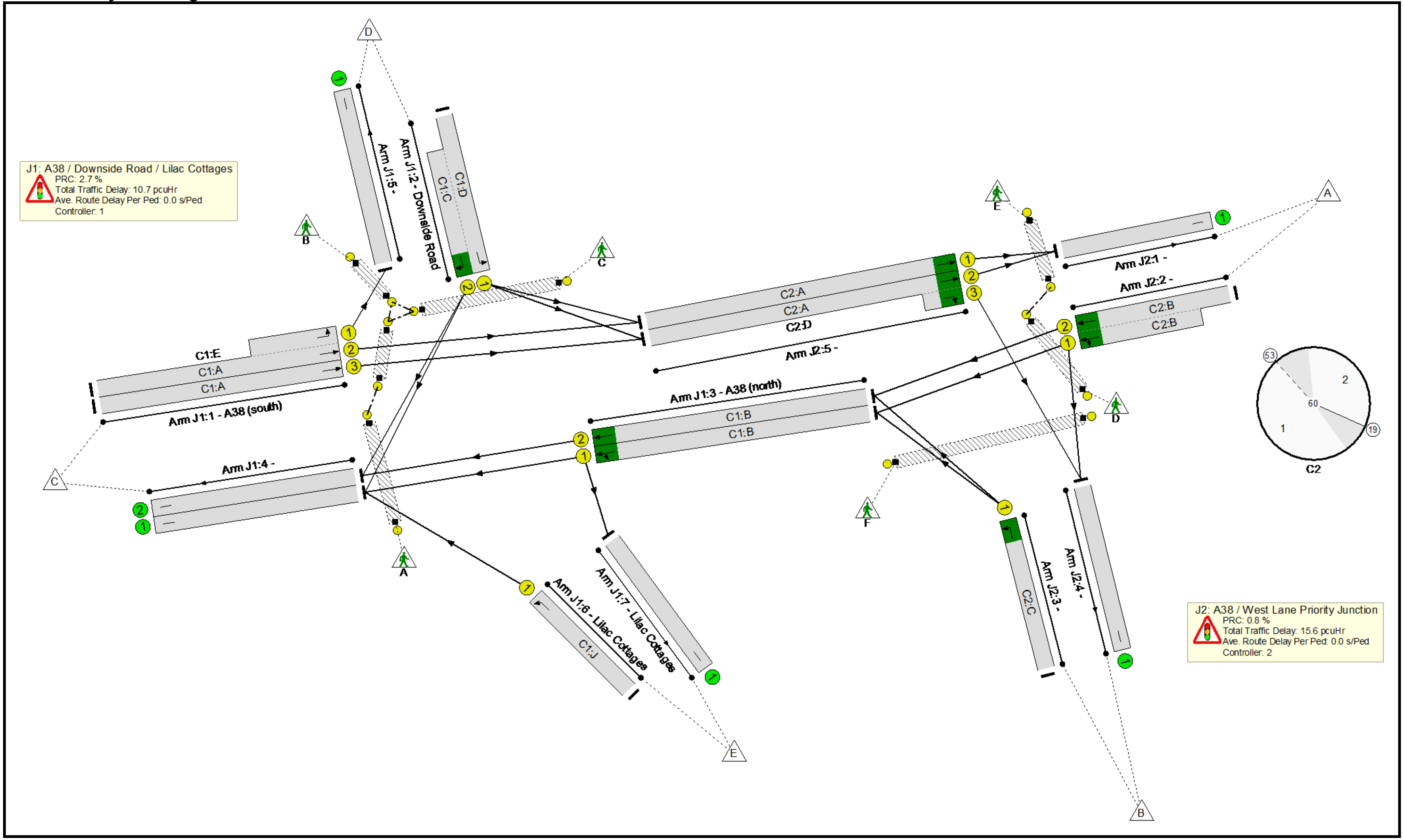
Stage	1	2
Duration	29	20
Change Point	19	53

Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram



Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**89.3%**
J1: A38 / Downside Road / Lilac Cottages	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**87.6%**
1/2+1/1	A38 (south) Left Ahead	U	N/A	N/A	C1:A C1:E		1	37	-	1089	1965:1775	978+493	74.0 : 74.0%
1/3	A38 (south) Ahead	U	N/A	N/A	C1:A		1	37	-	724	2105	1333	54.3%
2/1+2/2	Downside Road Right Left	U	N/A	N/A	C1:D C1:C		1	8	-	370	1741:1717	261+229	79.3 : 71.2%
3/1	A38 (north) Ahead Left	U	N/A	N/A	C1:B		1	41	-	1011	1688	1153	87.6%
3/2	A38 (north) Ahead	U	N/A	N/A	C1:B		1	41	-	1023	1828	1249	81.9%
4/1		U	N/A	N/A	-		-	-	-	1093	Inf	Inf	0.0%
4/2		U	N/A	N/A	-		-	-	-	1104	Inf	Inf	0.0%
5/1		U	N/A	N/A	-		-	-	-	365	Inf	Inf	0.0%
6/1	Lilac Cottages Left	U	N/A	N/A	C1:J		0	0	-	0	1940	0	0.0%
7/1	Lilac Cottages	U	N/A	N/A	-		-	-	-	0	1940	1940	0.0%
Ped Link: P1	Unnamed Ped Link	-	N/A	-	C1:F		0	0	-	0	-	0	0.0%
Ped Link: P2	Unnamed Ped Link	-	N/A	-	C1:G		1	10	-	0	-	12000	0.0%
Ped Link: P3	Unnamed Ped Link	-	N/A	-	C1:H		1	10	-	0	-	12000	0.0%
Ped Link: P4	Unnamed Ped Link	-	N/A	-	C1:I		1	40	-	0	-	48000	0.0%
J2: A38 / West Lane Priority Junction	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**89.3%**
1/1		U	N/A	N/A	-		-	-	-	1348	Inf	Inf	0.0%

Full Input Data And Results

2/2+2/1	Ahead Left	U	N/A	N/A	C2:B		1	29	-	1650	2055:1911	924+924	89.3 : 89.3%
3/1	Left	U	N/A	N/A	C2:C		1	20	-	397	1516	505	78.6%
4/1		U	N/A	N/A	-		-	-	-	320	Inf	Inf	0.0%
5/1	Ahead	U	N/A	N/A	C2:A		1	60	-	809	1663	1663	48.6%
5/2+5/3	Ahead Right	U	N/A	N/A	C2:A C2:D		1	60:21	-	846	1803:1532	615+351	87.6 : 87.6%
Ped Link: P1	Unnamed Ped Link	-	N/A	-	C2:E		0	0	-	0	-	0	0.0%
Ped Link: P2	Unnamed Ped Link	-	N/A	-	C2:F		0	0	-	0	-	0	0.0%
Ped Link: P3	Unnamed Ped Link	-	N/A	-	C2:G		0	0	-	0	-	0	0.0%

Full Input Data And Results

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**0**	**0**	**0**	**16.6**	**9.8**	**0.0**	**26.4**	**-**	**-**	**-**	**-**
J1: A38 / Downside Road / Lilac Cottages	**-**	**-**	**0**	**0**	**0**	**7.2**	**3.5**	**0.0**	**10.7**	**-**	**-**	**-**	**-**
1/2+1/1	1089	1089	-	-	-	1.8	1.4	-	3.2	10.6	6.8	1.4	8.3
1/3	724	724	-	-	-	1.2	0.6	-	1.8	9.1	6.6	0.6	7.2
2/1+2/2	370	370	-	-	-	2.5	1.5	-	4.0	39.4	3.3	1.5	4.8
3/1	1011	1011	-	-	-	0.9	0.0	-	0.9	3.0	8.1	0.0	8.1
3/2	1023	1023	-	-	-	0.8	0.0	-	0.8	2.8	7.7	0.0	7.7
4/1	1093	1093	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
4/2	1104	1104	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	365	365	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	0	0	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	0	0	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
Ped Link: P1	0	0	-	-	-	-	-	-	Inf	Inf	-	-	Inf
Ped Link: P2	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P3	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P4	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
J2: A38 / West Lane Priority Junction	**-**	**-**	**0**	**0**	**0**	**9.4**	**6.3**	**0.0**	**15.6**	**-**	**-**	**-**	**-**
1/1	1348	1348	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
2/2+2/1	1650	1650	-	-	-	6.3	4.0	-	10.3	22.5	12.4	4.0	16.4
3/1	397	397	-	-	-	2.0	1.8	-	3.8	34.2	6.0	1.8	7.7
4/1	320	320	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	809	809	-	-	-	0.0	0.5	-	0.5	2.1	2.8	0.5	3.3
5/2+5/3	846	846	-	-	-	1.1	0.0	-	1.1	4.6	9.7	0.0	9.7
Ped Link: P1	0	0	-	-	-	-	-	-	Inf	Inf	-	-	Inf
Ped Link: P2	0	0	-	-	-	-	-	-	Inf	Inf	-	-	Inf

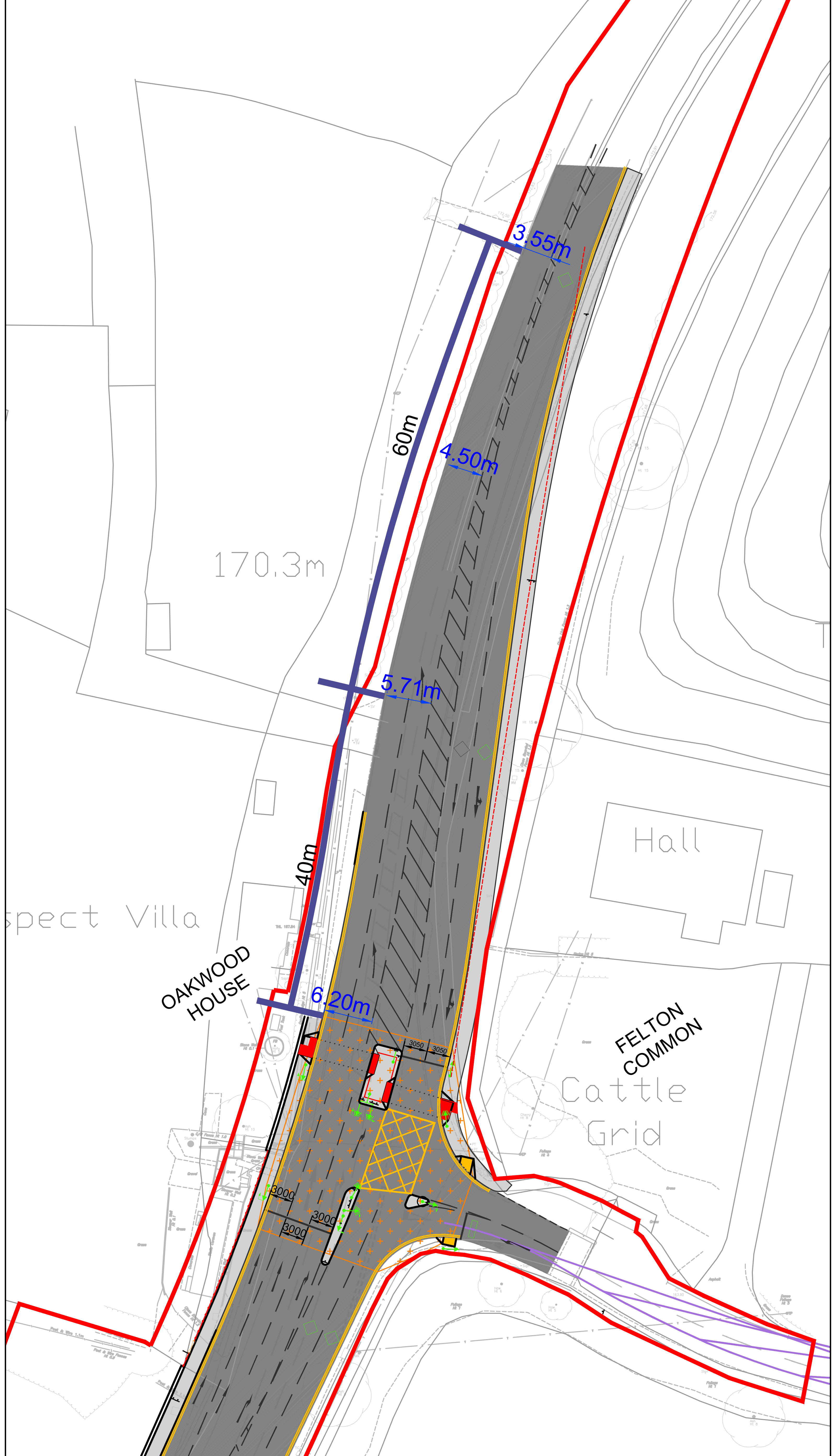
Full Input Data And Results

Ped Link: P3	0	0	-	-	-	-	-	-	Inf	Inf	-	-	Inf

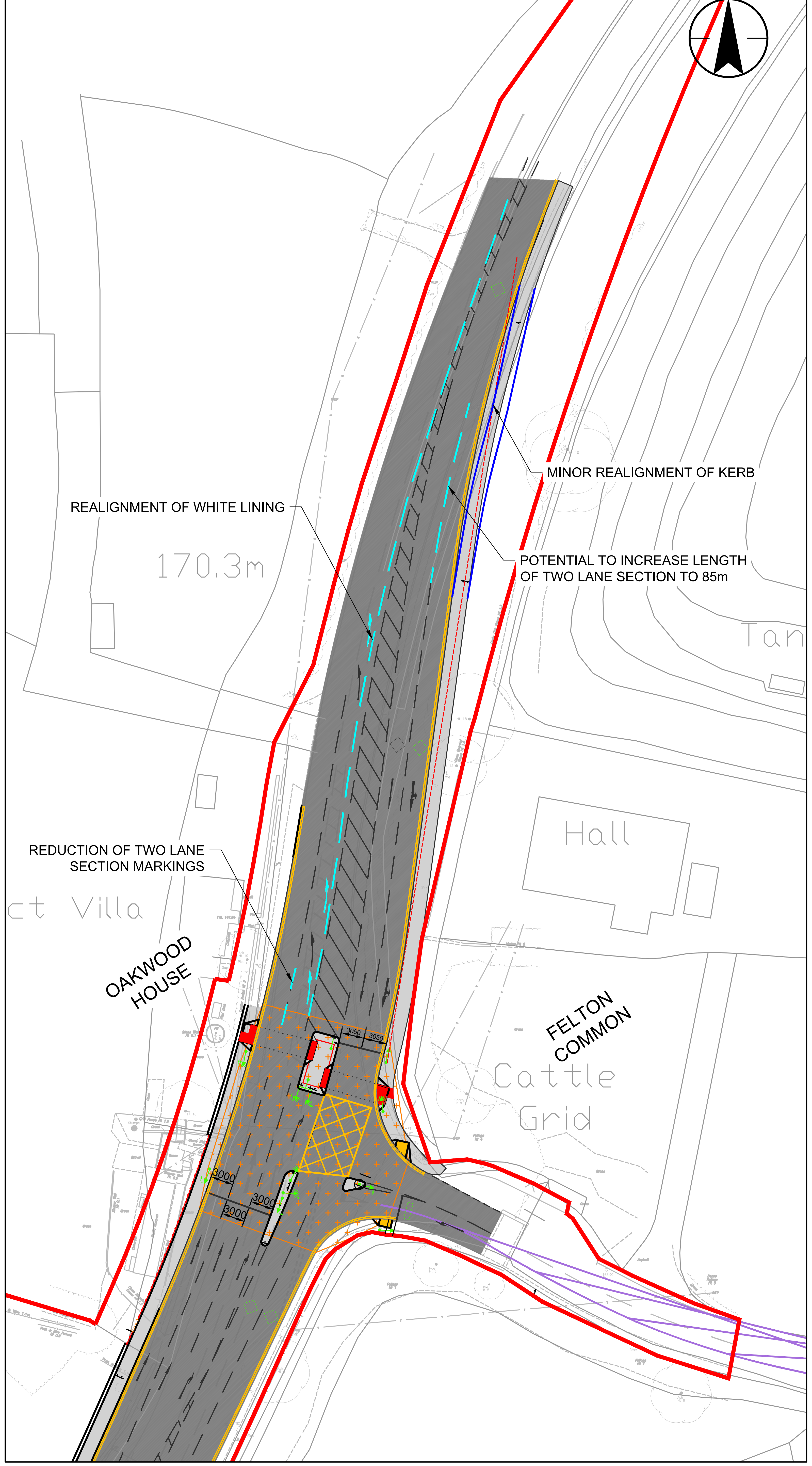
C1	PRC for Signalled Lanes (%):	2.7	Total Delay for Signalled Lanes (pcuHr):	10.74	Cycle Time (s):	60
C2	PRC for Signalled Lanes (%):	0.8	Total Delay for Signalled Lanes (pcuHr):	15.64	Cycle Time (s):	60
	PRC Over All Lanes (%):	0.8	Total Delay Over All Lanes(pcuHr):	26.38		

Appendix H A38/ West Lane Minor Alterations

CURRENT PROPOSED ARRANGEMENT



POSSIBLE MINOR AMENDMENTS



Stantec

Stantec UK Limited
READING
Caversham Bridge House, Waterman Place, Reading,
Berkshire RG1 8DN
Tel: +44 1189 500 761
www.stantec.com/uk

Notes

UTILITIES NOTE: The position of any existing public or private sewers, utility services, plant or apparatus shown on this drawing is believed to be correct, but no warranty to this is expressed or implied. Other such plant or apparatus may also be present but not shown. The Contractor is therefore advised to undertake their own investigation where the presence of any existing sewers, services, plant or apparatus may affect their operations.

Issued/Revision	By	Appd	YYYY.MM.DD
P01 -	-	-	-

	Dwn.	Dsgn.	Chkd.	YYYY.MM.DD
	RC	-	SW	2021.07.05

Issue Status

FOR INFORMATION

This document is suitable only for the purpose noted above.
Use of this document for any other purpose is not permitted.

Client/Project Logo

Client/Project

BRISTOL AIRPORT APPEAL

BRISTOL

Title

A38 NORTH OF WEST LANE

Project No.	Scale
48889	1:500

Revision	Drawing No.
-	48889/5502/SK003

Plotted: 05.07.2021 2021.07.05 11:39:52 AM By: Cox, Ryan
ORIGINAL SHEET - ISO A2

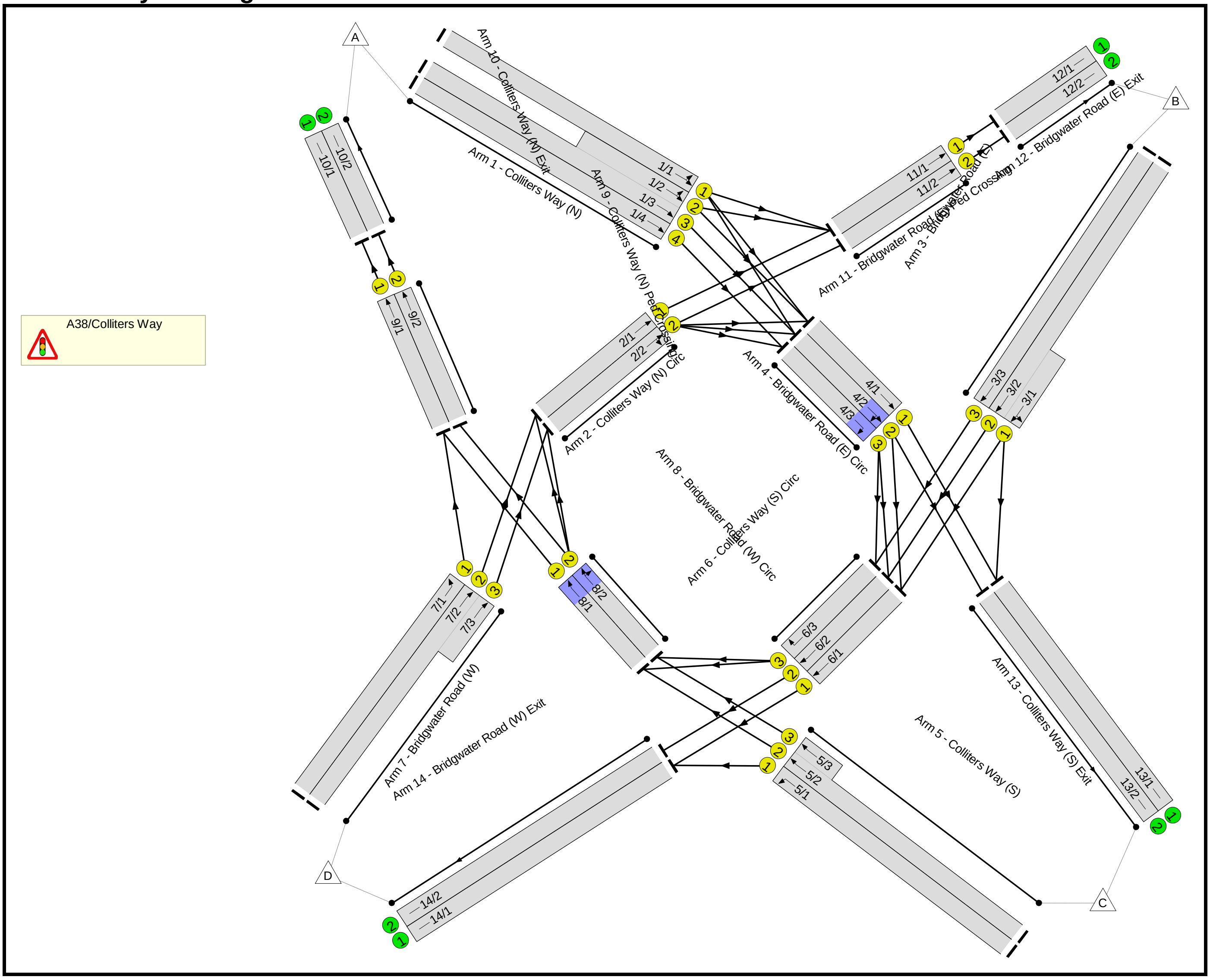
Appendix I A38/ A4174 SBL Modelling Outputs

Full Input Data And Results

User and Project Details

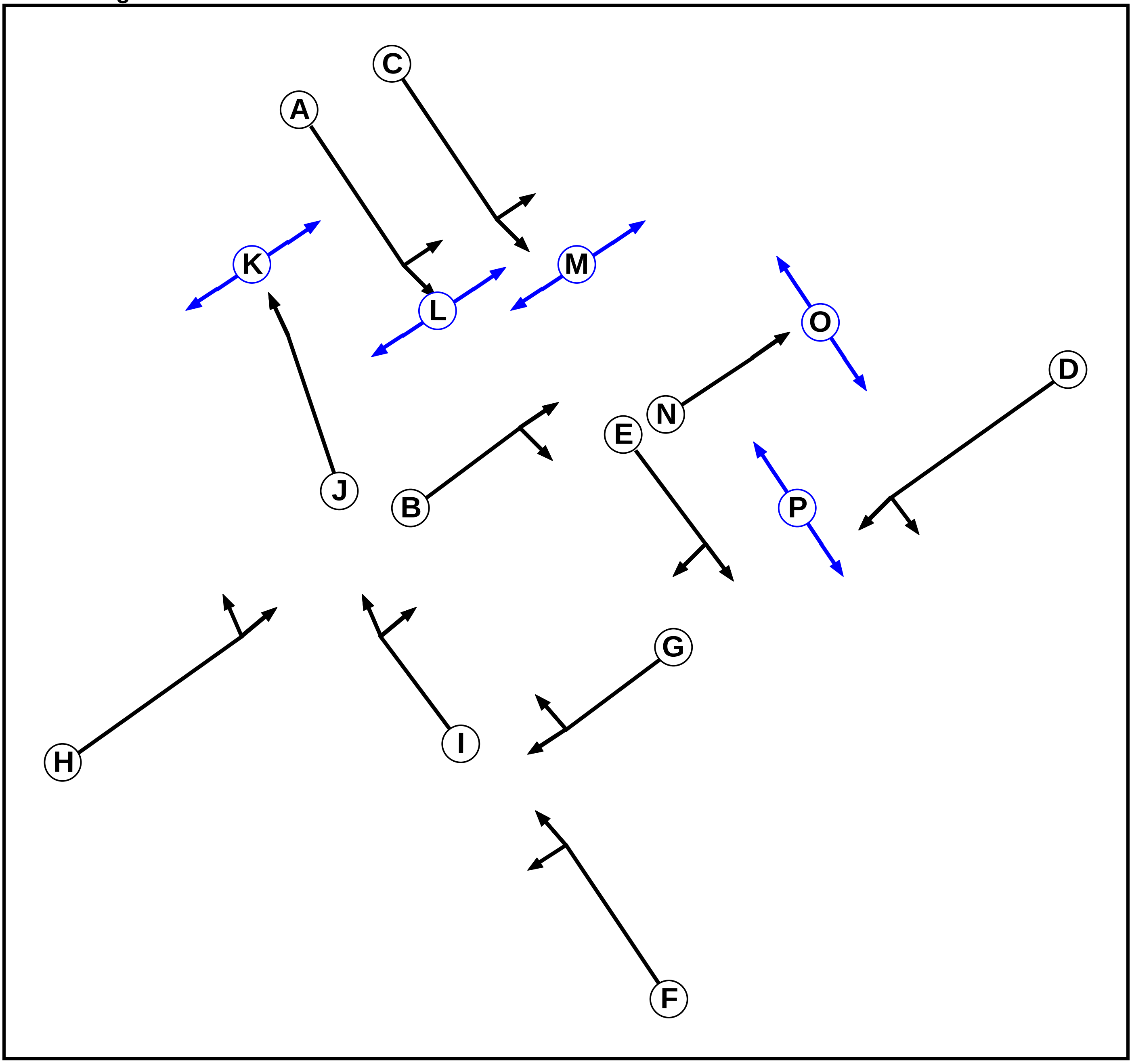
Project:	**Bristol Airport**
Title:	**A38/Colliters Way**
Location:	Bristol
Additional detail:	Updated model flows
File name:	J7_A38_Colliters Way_Sig Rbt_v1.1.lsg3x
Author:	Stantec/proose
Company:	Stantec
Address:	RG1 8DN

Network Layout Diagram



Full Input Data And Results

Phase Diagram



Phase Input Data

Phase Name	Phase Type	Stage Stream	Assoc. Phase	Street Min	Cont Min
A	Traffic	1		-9999	7
B	Traffic	1		-9999	7
C	Traffic	1		-9999	7
D	Traffic	1		-9999	7
E	Traffic	1		-9999	7
F	Traffic	1		-9999	7
G	Traffic	1		-9999	7
H	Traffic	1		-9999	7
I	Traffic	1		-9999	7
J	Traffic	2		-9999	7
K	Pedestrian	2		-9999	5
L	Pedestrian	1		-9999	5
M	Pedestrian	1		-9999	5
N	Traffic	3		-9999	7
O	Pedestrian	3		-9999	5
P	Pedestrian	1		-9999	5

Full Input Data And Results

Phase Intergreens Matrix

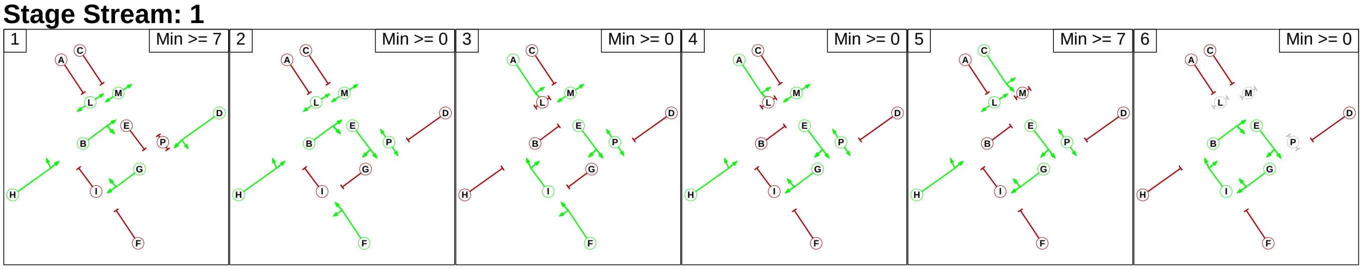
	Starting Phase																
Terminating Phase		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
	A		5	5	-	-	-	-	-	-	-	-	5	-	-	-	-
	B	5		5	-	-	-	-	-	-	-	-	-	-	-	-	-
	C	5	5		-	-	-	-	-	-	-	-	-	5	-	-	-
	D	-	-	-		5	-	-	-	-	-	-	-	-	-	-	5
	E	-	-	-	5		-	-	-	-	-	-	-	-	-	-	-
	F	-	-	-	-	-		5	-	-	-	-	-	-	-	-	-
	G	-	-	-	-	-	5		-	-	-	-	-	-	-	-	-
	H	-	-	-	-	-	-	-		5	-	-	-	-	-	-	-
	I	-	-	-	-	-	-	-	5		-	-	-	-	-	-	-
	J	-	-	-	-	-	-	-	-	-		5	-	-	-	-	-
	K	-	-	-	-	-	-	-	-	-	12		-	-	-	-	-
	L	12	-	-	-	-	-	-	-	-	-	-		-	-	-	-
	M	-	-	12	-	-	-	-	-	-	-	-	-		-	-	-
	N	-	-	-	-	-	-	-	-	-	-	-	-	-		5	-
	O	-	-	-	-	-	-	-	-	-	-	-	-	-	12		-
	P	-	-	-	12	-	-	-	-	-	-	-	-	-	-	-	

Phases in Stage

Stream	Stage No.	Phases in Stage
1	1	B D G H L M
1	2	B E F H L M P
1	3	A E F I M P
1	4	A E G H M P
1	5	C E G H L P
1	6	B E G I
2	1	J
2	2	K
3	1	N
3	2	O

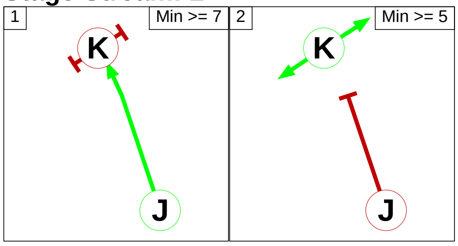
Stage Diagram

Stage Stream: 1

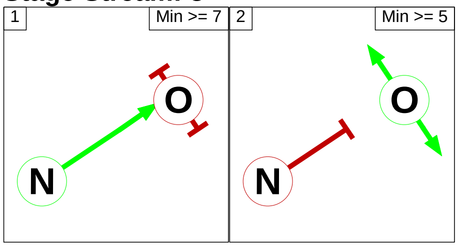


Full Input Data And Results

Stage Stream: 2



Stage Stream: 3



Phase Delays

Stage Stream: 1

Term. Stage	Start Stage	Phase	Type	Value	Cont value
1	3	B	Losing	7	7
1	4	B	Losing	7	7
1	5	B	Losing	7	7
2	1	E	Losing	7	7
2	3	B	Losing	7	7
2	4	B	Losing	7	7
2	5	B	Losing	7	7
3	1	E	Losing	7	7
4	1	E	Losing	7	7
5	1	E	Losing	7	7

Stage Stream: 2

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

Stage Stream: 3

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

Full Input Data And Results

Prohibited Stage Change

Stage Stream: 1

	To Stage						
From Stage		1	2	3	4	5	6
	1		5	12	12	12	5
	2	12		12	12	12	5
	3	12	5		5	12	5
	4	12	5	5		12	5
	5	12	5	12	12		5
	6	5	5	5	5	5	

Stage Stream: 2

	To Stage		
From Stage		1	2
	1		5
	2	12	

Stage Stream: 3

	To Stage		
From Stage		1	2
	1		5
	2	12	

Full Input Data And Results

Give-Way Lane Input Data

Junction: A38/Colliters Way
There are no Opposed Lanes in this Junction

Full Input Data And Results

Lane Input Data

Junction: A38/Colliters Way												
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 (Colliters Way (N))	U	C	2	3	60.0	Geom	-	4.90	0.00	Y	Arm 4 Ahead	Inf
											Arm 11 Left	32.70
1/2 (Colliters Way (N))	U	A	2	3	9.9	Geom	-	3.50	0.00	Y	Arm 4 Ahead	58.60
											Arm 11 Left	183.60
1/3 (Colliters Way (N))	U	A	2	3	60.0	Geom	-	3.50	0.00	N	Arm 4 Ahead	58.60
1/4 (Colliters Way (N))	U	A	2	3	60.0	Geom	-	3.40	0.00	N	Arm 4 Ahead	58.60
2/1 (Colliters Way (N) Circ)	U	B	2	3	3.5	Geom	-	4.00	0.00	Y	Arm 11 Ahead	69.20
2/2 (Colliters Way (N) Circ)	U	B	2	3	3.5	Geom	-	4.20	0.00	Y	Arm 4 Right	41.50
											Arm 11 Ahead	69.20
3/1 (Bridgwater Road (E))	U	D	2	3	6.8	Geom	-	3.10	0.00	Y	Arm 6 Ahead	94.60
											Arm 13 Left	94.60
3/2 (Bridgwater Road (E))	U	D	2	3	60.0	Geom	-	3.10	0.00	N	Arm 6 Ahead	94.60
3/3 (Bridgwater Road (E))	U	D	2	3	60.0	Geom	-	3.30	0.00	N	Arm 6 Ahead	94.60
4/1 (Bridgwater Road (E) Circ)	U	E	2	3	2.5	Geom	-	4.60	0.00	Y	Arm 13 Ahead	34.90
4/2 (Bridgwater Road (E) Circ)	U	E	2	3	2.5	Geom	-	4.40	0.00	Y	Arm 6 Right	34.90
											Arm 13 Ahead	34.90
4/3 (Bridgwater Road (E) Circ)	U	E	2	3	2.5	Geom	-	4.40	0.00	Y	Arm 6 Right	34.90
5/1 (Colliters Way (S))	U	F	2	3	60.0	Geom	-	3.40	0.00	Y	Arm 14 Left	70.10
5/2 (Colliters Way (S))	U	F	2	3	6.4	Geom	-	3.40	0.00	N	Arm 8 Ahead	207.60

5/3 (Colliters Way (S))	U	F	2	3	3.8	Geom	-	3.40	0.00	N	Arm 8 Ahead	207.60
6/1 (Colliters Way (S) Circ)	U	G	2	3	3.1	Geom	-	4.10	0.00	Y	Arm 14 Ahead	42.70
6/2 (Colliters Way (S) Circ)	U	G	2	3	3.1	Geom	-	4.10	0.00	Y	Arm 14 Ahead	42.70
6/3 (Colliters Way (S) Circ)	U	G	2	3	3.1	Geom	-	4.10	0.00	Y	Arm 8 Right	28.40
7/1 (Bridgwater Road (W))	U	H	2	3	60.0	Geom	-	4.00	0.00	Y	Arm 9 Left	60.80
7/2 (Bridgwater Road (W))	U	H	2	3	9.0	Geom	-	3.10	0.00	N	Arm 2 Ahead	86.30
7/3 (Bridgwater Road (W))	U	H	2	3	5.7	Geom	-	3.80	0.00	N	Arm 2 Ahead	86.30
8/1 (Bridgwater Road (W) Circ)	U	I	2	3	3.1	Geom	-	4.80	0.00	Y	Arm 9 Ahead	78.00
8/2 (Bridgwater Road (W) Circ)	U	I	2	3	3.1	Geom	-	4.70	0.00	Y	Arm 2 Right Arm 9 Ahead	40.00 78.00
9/1 (Colliters Way (N) Ped Crossing)	U	J	2	3	3.8	Geom	-	4.50	0.00	Y	Arm 10 Ahead	Inf
9/2 (Colliters Way (N) Ped Crossing)	U	J	2	3	3.8	Geom	-	4.50	0.00	N	Arm 10 Ahead	Inf
10/1 (Colliters Way (N) Exit)	U		2	3	60.0	Inf	-	-	-	-	-	-
10/2 (Colliters Way (N) Exit)	U		2	3	60.0	Inf	-	-	-	-	-	-
11/1 (Bridgwater Road (E) Ped Crossing)	U	N	2	3	1.8	Geom	-	4.40	0.00	Y	Arm 12 Ahead	Inf
11/2 (Bridgwater Road (E) Ped Crossing)	U	N	2	3	1.8	Geom	-	4.40	0.00	N	Arm 12 Ahead	Inf
12/1 (Bridgwater Road (E) Exit)	U		2	3	60.0	Inf	-	-	-	-	-	-
12/2 (Bridgwater Road (E) Exit)	U		2	3	60.0	Inf	-	-	-	-	-	-

13/1 (Colliters Way (S) Exit)	U		2	3	60.0	Inf	-	-	-	-	-	-
13/2 (Colliters Way (S) Exit)	U		2	3	60.0	Inf	-	-	-	-	-	-
14/1 (Bridgwater Road (W) Exit)	U		2	3	60.0	Inf	-	-	-	-	-	-
14/2 (Bridgwater Road (W) Exit)	U		2	3	60.0	Inf	-	-	-	-	-	-

Traffic Flow Groups

Flow Group	Start Time	End Time	Duration	Formula
1: '2018 Baseline AM'	08:00	09:00	01:00	
2: '2018 Baseline Interpeak'	13:00	14:00	01:00	
3: '2018 Baseline PM'	17:00	18:00	01:00	
4: '2030 Baseline AM'	08:00	09:00	01:00	
5: '2030 Baseline Interpeak'	13:00	14:00	01:00	
6: '2030 Baseline PM'	17:00	18:00	01:00	
7: '2030 10 MPPA AM'	08:00	09:00	01:00	
8: '2030 10 MPPA Interpeak'	13:00	14:00	01:00	
9: '2030 10 MPPA PM'	17:00	18:00	01:00	
10: '2030 12 MPPA AM'	08:00	09:00	01:00	
11: '2030 12 MPPA Interpeak'	13:00	14:00	01:00	
12: '2030 12 MPPA PM'	17:00	18:00	01:00	

Scenario 1: '2018 Baseline AM' (FG1: '2018 Baseline AM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

	Destination					
Origin		A	B	C	D	Tot.
	A	3	168	428	282	881
	B	106	1	19	300	426
	C	564	8	0	289	861
	D	403	440	243	0	1086
	Tot.	1076	617	690	871	3254

Full Input Data And Results

Traffic Lane Flows

Lane	Scenario 1: 2018 Baseline AM
Junction: A38/Colliters Way	
1/1	0
1/2 (short)	361
1/3 (with short)	713(In) 352(Out)
1/4	168
2/1	309
2/2	383
3/1 (short)	156
3/2 (with short)	319(In) 163(Out)
3/3	107
4/1	333
4/2	455
4/3	168
5/1	289
5/2 (with short)	572(In) 275(Out)
5/3 (short)	297
6/1	254
6/2	328
6/3	110
7/1	403
7/2 (with short)	683(In) 306(Out)
7/3 (short)	377
8/1	316
8/2	366
9/1	719
9/2	357
10/1	719
10/2	357
11/1	477
11/2	140
12/1	477
12/2	140
13/1	352
13/2	338
14/1	543

Full Input Data And Results

14/2	328

Lane Saturation Flows

Junction: A38/Colliters Way								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Colliters Way (N))	4.90	0.00	Y	Arm 4 Ahead	Inf	0.0 %	2105	2105
				Arm 11 Left	32.70	0.0 %		
1/2 (Colliters Way (N))	3.50	0.00	Y	Arm 4 Ahead	58.60	53.5 %	1931	1931
				Arm 11 Left	183.60	46.5 %		
1/3 (Colliters Way (N))	3.50	0.00	N	Arm 4 Ahead	58.60	100.0 %	2052	2052
1/4 (Colliters Way (N))	3.40	0.00	N	Arm 4 Ahead	58.60	100.0 %	2043	2043
2/1 (Colliters Way (N) Circ)	4.00	0.00	Y	Arm 11 Ahead	69.20	100.0 %	1972	1972
2/2 (Colliters Way (N) Circ)	4.20	0.00	Y	Arm 4 Right	41.50	63.4 %	1974	1974
				Arm 11 Ahead	69.20	36.6 %		
3/1 (Bridgwater Road (E))	3.10	0.00	Y	Arm 6 Ahead	94.60	87.8 %	1895	1895
				Arm 13 Left	94.60	12.2 %		
3/2 (Bridgwater Road (E))	3.10	0.00	N	Arm 6 Ahead	94.60	100.0 %	2033	2033
3/3 (Bridgwater Road (E))	3.30	0.00	N	Arm 6 Ahead	94.60	100.0 %	2052	2052
4/1 (Bridgwater Road (E) Circ)	4.60	0.00	Y	Arm 13 Ahead	34.90	100.0 %	1989	1989
4/2 (Bridgwater Road (E) Circ)	4.40	0.00	Y	Arm 6 Right	34.90	25.7 %	1970	1970
				Arm 13 Ahead	34.90	74.3 %		
4/3 (Bridgwater Road (E) Circ)	4.40	0.00	Y	Arm 6 Right	34.90	100.0 %	1970	1970
5/1 (Colliters Way (S))	3.40	0.00	Y	Arm 14 Left	70.10	100.0 %	1914	1914
5/2 (Colliters Way (S))	3.40	0.00	N	Arm 8 Ahead	207.60	100.0 %	2080	2080
5/3 (Colliters Way (S))	3.40	0.00	N	Arm 8 Ahead	207.60	100.0 %	2080	2080
6/1 (Colliters Way (S) Circ)	4.10	0.00	Y	Arm 14 Ahead	42.70	100.0 %	1956	1956
6/2 (Colliters Way (S) Circ)	4.10	0.00	Y	Arm 14 Ahead	42.70	100.0 %	1956	1956
6/3 (Colliters Way (S) Circ)	4.10	0.00	Y	Arm 8 Right	28.40	100.0 %	1923	1923
7/1 (Bridgwater Road (W))	4.00	0.00	Y	Arm 9 Left	60.80	100.0 %	1966	1966
7/2 (Bridgwater Road (W))	3.10	0.00	N	Arm 2 Ahead	86.30	100.0 %	2030	2030

7/3 (Bridgwater Road (W))	3.80	0.00	N	Arm 2 Ahead	86.30	100.0 %	2099	2099
8/1 (Bridgwater Road (W) Circ)	4.80	0.00	Y	Arm 9 Ahead	78.00	100.0 %	2055	2055
8/2 (Bridgwater Road (W) Circ)	4.70	0.00	Y	Arm 2 Right	40.00	2.5 %	2045	2045
				Arm 9 Ahead	78.00	97.5 %		
9/1 (Colliters Way (N) Ped Crossing)	4.50	0.00	Y	Arm 10 Ahead	Inf	100.0 %	2065	2065
9/2 (Colliters Way (N) Ped Crossing)	4.50	0.00	N	Arm 10 Ahead	Inf	100.0 %	2205	2205
10/1 (Colliters Way (N) Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
10/2 (Colliters Way (N) Exit Lane 2)	Infinite Saturation Flow						Inf	Inf
11/1 (Bridgwater Road (E) Ped Crossing)	4.40	0.00	Y	Arm 12 Ahead	Inf	100.0 %	2055	2055
11/2 (Bridgwater Road (E) Ped Crossing)	4.40	0.00	N	Arm 12 Ahead	Inf	100.0 %	2195	2195
12/1 (Bridgwater Road (E) Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
12/2 (Bridgwater Road (E) Exit Lane 2)	Infinite Saturation Flow						Inf	Inf
13/1 (Colliters Way (S) Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
13/2 (Colliters Way (S) Exit Lane 2)	Infinite Saturation Flow						Inf	Inf
14/1 (Bridgwater Road (W) Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
14/2 (Bridgwater Road (W) Exit Lane 2)	Infinite Saturation Flow						Inf	Inf

Scenario 2: '2018 Baseline Interpeak' (FG2: '2018 Baseline Interpeak', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

	Destination					
Origin		A	B	C	D	Tot.
	A	0	73	368	308	749
	B	56	1	17	247	321
	C	318	20	0	195	533
	D	368	289	184	4	845
	Tot.	742	383	569	754	2448

Traffic Lane Flows

Lane	Scenario 2: 2018 Baseline Interpeak
Junction: A38/Colliters Way	
1/1	0
1/2 (short)	280
1/3 (with short)	570(In) 290(Out)
1/4	179
2/1	218
2/2	280
3/1 (short)	129
3/2 (with short)	264(In) 135(Out)
3/3	57
4/1	319
4/2	365
4/3	180
5/1	195
5/2 (with short)	338(In) 162(Out)
5/3 (short)	176
6/1	244
6/2	315
6/3	57
7/1	368
7/2 (with short)	477(In) 213(Out)
7/3 (short)	264
8/1	174
8/2	221
9/1	542
9/2	200
10/1	542
10/2	200
11/1	291
11/2	92
12/1	291
12/2	92
13/1	336
13/2	233
14/1	439

Full Input Data And Results

14/2	315

Lane Saturation Flows

Junction: A38/Colliters Way								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Colliters Way (N))	4.90	0.00	Y	Arm 4 Ahead	Inf	0.0 %	2105	2105
				Arm 11 Left	32.70	0.0 %		
1/2 (Colliters Way (N))	3.50	0.00	Y	Arm 4 Ahead	58.60	73.9 %	1924	1924
				Arm 11 Left	183.60	26.1 %		
1/3 (Colliters Way (N))	3.50	0.00	N	Arm 4 Ahead	58.60	100.0 %	2052	2052
1/4 (Colliters Way (N))	3.40	0.00	N	Arm 4 Ahead	58.60	100.0 %	2043	2043
2/1 (Colliters Way (N) Circ)	4.00	0.00	Y	Arm 11 Ahead	69.20	100.0 %	1972	1972
2/2 (Colliters Way (N) Circ)	4.20	0.00	Y	Arm 4 Right	41.50	67.1 %	1973	1973
				Arm 11 Ahead	69.20	32.9 %		
3/1 (Bridgwater Road (E))	3.10	0.00	Y	Arm 6 Ahead	94.60	86.8 %	1895	1895
				Arm 13 Left	94.60	13.2 %		
3/2 (Bridgwater Road (E))	3.10	0.00	N	Arm 6 Ahead	94.60	100.0 %	2033	2033
3/3 (Bridgwater Road (E))	3.30	0.00	N	Arm 6 Ahead	94.60	100.0 %	2052	2052
4/1 (Bridgwater Road (E) Circ)	4.60	0.00	Y	Arm 13 Ahead	34.90	100.0 %	1989	1989
4/2 (Bridgwater Road (E) Circ)	4.40	0.00	Y	Arm 6 Right	34.90	36.2 %	1970	1970
				Arm 13 Ahead	34.90	63.8 %		
4/3 (Bridgwater Road (E) Circ)	4.40	0.00	Y	Arm 6 Right	34.90	100.0 %	1970	1970
5/1 (Colliters Way (S))	3.40	0.00	Y	Arm 14 Left	70.10	100.0 %	1914	1914
5/2 (Colliters Way (S))	3.40	0.00	N	Arm 8 Ahead	207.60	100.0 %	2080	2080
5/3 (Colliters Way (S))	3.40	0.00	N	Arm 8 Ahead	207.60	100.0 %	2080	2080
6/1 (Colliters Way (S) Circ)	4.10	0.00	Y	Arm 14 Ahead	42.70	100.0 %	1956	1956
6/2 (Colliters Way (S) Circ)	4.10	0.00	Y	Arm 14 Ahead	42.70	100.0 %	1956	1956
6/3 (Colliters Way (S) Circ)	4.10	0.00	Y	Arm 8 Right	28.40	100.0 %	1923	1923
7/1 (Bridgwater Road (W))	4.00	0.00	Y	Arm 9 Left	60.80	100.0 %	1966	1966
7/2 (Bridgwater Road (W))	3.10	0.00	N	Arm 2 Ahead	86.30	100.0 %	2030	2030

7/3 (Bridgwater Road (W))	3.80	0.00	N	Arm 2 Ahead	86.30	100.0 %	2099	2099
8/1 (Bridgwater Road (W) Circ)	4.80	0.00	Y	Arm 9 Ahead	78.00	100.0 %	2055	2055
8/2 (Bridgwater Road (W) Circ)	4.70	0.00	Y	Arm 2 Right	40.00	9.5 %	2042	2042
				Arm 9 Ahead	78.00	90.5 %		
9/1 (Colliters Way (N) Ped Crossing)	4.50	0.00	Y	Arm 10 Ahead	Inf	100.0 %	2065	2065
9/2 (Colliters Way (N) Ped Crossing)	4.50	0.00	N	Arm 10 Ahead	Inf	100.0 %	2205	2205
10/1 (Colliters Way (N) Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
10/2 (Colliters Way (N) Exit Lane 2)	Infinite Saturation Flow						Inf	Inf
11/1 (Bridgwater Road (E) Ped Crossing)	4.40	0.00	Y	Arm 12 Ahead	Inf	100.0 %	2055	2055
11/2 (Bridgwater Road (E) Ped Crossing)	4.40	0.00	N	Arm 12 Ahead	Inf	100.0 %	2195	2195
12/1 (Bridgwater Road (E) Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
12/2 (Bridgwater Road (E) Exit Lane 2)	Infinite Saturation Flow						Inf	Inf
13/1 (Colliters Way (S) Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
13/2 (Colliters Way (S) Exit Lane 2)	Infinite Saturation Flow						Inf	Inf
14/1 (Bridgwater Road (W) Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
14/2 (Bridgwater Road (W) Exit Lane 2)	Infinite Saturation Flow						Inf	Inf

Scenario 3: '2018 Baseline PM' (FG3: '2018 Baseline PM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

	Destination					
Origin		A	B	C	D	Tot.
	A	0	123	480	475	1078
	B	166	0	19	422	607
	C	441	8	0	279	728
	D	303	340	262	0	905
	Tot.	910	471	761	1176	3318

Traffic Lane Flows

Lane	Scenario 3: 2018 Baseline PM
Junction: A38/Colliters Way	
1/1	0
1/2 (short)	388
1/3 (with short)	782(In) 394(Out)
1/4	296
2/1	263
2/2	347
3/1 (short)	219
3/2 (with short)	441(In) 222(Out)
3/3	166
4/1	423
4/2	498
4/3	296
5/1	279
5/2 (with short)	449(In) 222(Out)
5/3 (short)	227
6/1	379
6/2	518
6/3	166
7/1	303
7/2 (with short)	602(In) 262(Out)
7/3 (short)	340
8/1	291
8/2	324
9/1	594
9/2	316
10/1	594
10/2	316
11/1	386
11/2	85
12/1	386
12/2	85
13/1	442
13/2	319
14/1	658

Full Input Data And Results

14/2	518

Lane Saturation Flows

Junction: A38/Colliters Way								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Colliters Way (N))	4.90	0.00	Y	Arm 4 Ahead	Inf	0.0 %	2105	2105
				Arm 11 Left	32.70	0.0 %		
1/2 (Colliters Way (N))	3.50	0.00	Y	Arm 4 Ahead	58.60	68.3 %	1926	1926
				Arm 11 Left	183.60	31.7 %		
1/3 (Colliters Way (N))	3.50	0.00	N	Arm 4 Ahead	58.60	100.0 %	2052	2052
1/4 (Colliters Way (N))	3.40	0.00	N	Arm 4 Ahead	58.60	100.0 %	2043	2043
2/1 (Colliters Way (N) Circ)	4.00	0.00	Y	Arm 11 Ahead	69.20	100.0 %	1972	1972
2/2 (Colliters Way (N) Circ)	4.20	0.00	Y	Arm 4 Right	41.50	75.5 %	1971	1971
				Arm 11 Ahead	69.20	24.5 %		
3/1 (Bridgwater Road (E))	3.10	0.00	Y	Arm 6 Ahead	94.60	91.3 %	1895	1895
				Arm 13 Left	94.60	8.7 %		
3/2 (Bridgwater Road (E))	3.10	0.00	N	Arm 6 Ahead	94.60	100.0 %	2033	2033
3/3 (Bridgwater Road (E))	3.30	0.00	N	Arm 6 Ahead	94.60	100.0 %	2052	2052
4/1 (Bridgwater Road (E) Circ)	4.60	0.00	Y	Arm 13 Ahead	34.90	100.0 %	1989	1989
4/2 (Bridgwater Road (E) Circ)	4.40	0.00	Y	Arm 6 Right	34.90	35.9 %	1970	1970
				Arm 13 Ahead	34.90	64.1 %		
4/3 (Bridgwater Road (E) Circ)	4.40	0.00	Y	Arm 6 Right	34.90	100.0 %	1970	1970
5/1 (Colliters Way (S))	3.40	0.00	Y	Arm 14 Left	70.10	100.0 %	1914	1914
5/2 (Colliters Way (S))	3.40	0.00	N	Arm 8 Ahead	207.60	100.0 %	2080	2080
5/3 (Colliters Way (S))	3.40	0.00	N	Arm 8 Ahead	207.60	100.0 %	2080	2080
6/1 (Colliters Way (S) Circ)	4.10	0.00	Y	Arm 14 Ahead	42.70	100.0 %	1956	1956
6/2 (Colliters Way (S) Circ)	4.10	0.00	Y	Arm 14 Ahead	42.70	100.0 %	1956	1956
6/3 (Colliters Way (S) Circ)	4.10	0.00	Y	Arm 8 Right	28.40	100.0 %	1923	1923
7/1 (Bridgwater Road (W))	4.00	0.00	Y	Arm 9 Left	60.80	100.0 %	1966	1966
7/2 (Bridgwater Road (W))	3.10	0.00	N	Arm 2 Ahead	86.30	100.0 %	2030	2030

7/3 (Bridgwater Road (W))	3.80	0.00	N	Arm 2 Ahead	86.30	100.0 %	2099	2099
8/1 (Bridgwater Road (W) Circ)	4.80	0.00	Y	Arm 9 Ahead	78.00	100.0 %	2055	2055
8/2 (Bridgwater Road (W) Circ)	4.70	0.00	Y	Arm 2 Right	40.00	2.5 %	2045	2045
				Arm 9 Ahead	78.00	97.5 %		
9/1 (Colliters Way (N) Ped Crossing)	4.50	0.00	Y	Arm 10 Ahead	Inf	100.0 %	2065	2065
9/2 (Colliters Way (N) Ped Crossing)	4.50	0.00	N	Arm 10 Ahead	Inf	100.0 %	2205	2205
10/1 (Colliters Way (N) Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
10/2 (Colliters Way (N) Exit Lane 2)	Infinite Saturation Flow						Inf	Inf
11/1 (Bridgwater Road (E) Ped Crossing)	4.40	0.00	Y	Arm 12 Ahead	Inf	100.0 %	2055	2055
11/2 (Bridgwater Road (E) Ped Crossing)	4.40	0.00	N	Arm 12 Ahead	Inf	100.0 %	2195	2195
12/1 (Bridgwater Road (E) Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
12/2 (Bridgwater Road (E) Exit Lane 2)	Infinite Saturation Flow						Inf	Inf
13/1 (Colliters Way (S) Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
13/2 (Colliters Way (S) Exit Lane 2)	Infinite Saturation Flow						Inf	Inf
14/1 (Bridgwater Road (W) Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
14/2 (Bridgwater Road (W) Exit Lane 2)	Infinite Saturation Flow						Inf	Inf

Scenario 4: '2030 Baseline AM' (FG4: '2030 Baseline AM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination				
		A	B	C	D	Tot.
Origin	A	3	199	506	333	1041
	B	125	1	23	354	503
	C	666	9	0	341	1016
	D	477	520	288	0	1285
	Tot.	1271	729	817	1028	3845

Full Input Data And Results

Traffic Lane Flows

Lane	Scenario 4: 2030 Baseline AM
Junction: A38/Colliters Way	
1/1	0
1/2 (short)	409
1/3 (with short)	815(In) 406(Out)
1/4	226
2/1	363
2/2	455
3/1 (short)	186
3/2 (with short)	377(In) 191(Out)
3/3	126
4/1	380
4/2	524
4/3	226
5/1	341
5/2 (with short)	675(In) 325(Out)
5/3 (short)	350
6/1	273
6/2	414
6/3	129
7/1	477
7/2 (with short)	808(In) 360(Out)
7/3 (short)	448
8/1	372
8/2	432
9/1	849
9/2	422
10/1	849
10/2	422
11/1	562
11/2	167
12/1	562
12/2	167
13/1	403
13/2	414
14/1	614

Full Input Data And Results

14/2	414

Lane Saturation Flows

Junction: A38/Colliters Way								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Colliters Way (N))	4.90	0.00	Y	Arm 4 Ahead	Inf	0.0 %	2105	2105
				Arm 11 Left	32.70	0.0 %		
1/2 (Colliters Way (N))	3.50	0.00	Y	Arm 4 Ahead	58.60	51.3 %	1932	1932
				Arm 11 Left	183.60	48.7 %		
1/3 (Colliters Way (N))	3.50	0.00	N	Arm 4 Ahead	58.60	100.0 %	2052	2052
1/4 (Colliters Way (N))	3.40	0.00	N	Arm 4 Ahead	58.60	100.0 %	2043	2043
2/1 (Colliters Way (N) Circ)	4.00	0.00	Y	Arm 11 Ahead	69.20	100.0 %	1972	1972
2/2 (Colliters Way (N) Circ)	4.20	0.00	Y	Arm 4 Right	41.50	63.3 %	1974	1974
				Arm 11 Ahead	69.20	36.7 %		
3/1 (Bridgwater Road (E))	3.10	0.00	Y	Arm 6 Ahead	94.60	87.6 %	1895	1895
				Arm 13 Left	94.60	12.4 %		
3/2 (Bridgwater Road (E))	3.10	0.00	N	Arm 6 Ahead	94.60	100.0 %	2033	2033
3/3 (Bridgwater Road (E))	3.30	0.00	N	Arm 6 Ahead	94.60	100.0 %	2052	2052
4/1 (Bridgwater Road (E) Circ)	4.60	0.00	Y	Arm 13 Ahead	34.90	100.0 %	1989	1989
4/2 (Bridgwater Road (E) Circ)	4.40	0.00	Y	Arm 6 Right	34.90	21.0 %	1970	1970
				Arm 13 Ahead	34.90	79.0 %		
4/3 (Bridgwater Road (E) Circ)	4.40	0.00	Y	Arm 6 Right	34.90	100.0 %	1970	1970
5/1 (Colliters Way (S))	3.40	0.00	Y	Arm 14 Left	70.10	100.0 %	1914	1914
5/2 (Colliters Way (S))	3.40	0.00	N	Arm 8 Ahead	207.60	100.0 %	2080	2080
5/3 (Colliters Way (S))	3.40	0.00	N	Arm 8 Ahead	207.60	100.0 %	2080	2080
6/1 (Colliters Way (S) Circ)	4.10	0.00	Y	Arm 14 Ahead	42.70	100.0 %	1956	1956
6/2 (Colliters Way (S) Circ)	4.10	0.00	Y	Arm 14 Ahead	42.70	100.0 %	1956	1956
6/3 (Colliters Way (S) Circ)	4.10	0.00	Y	Arm 8 Right	28.40	100.0 %	1923	1923
7/1 (Bridgwater Road (W))	4.00	0.00	Y	Arm 9 Left	60.80	100.0 %	1966	1966
7/2 (Bridgwater Road (W))	3.10	0.00	N	Arm 2 Ahead	86.30	100.0 %	2030	2030

7/3 (Bridgwater Road (W))	3.80	0.00	N	Arm 2 Ahead	86.30	100.0 %	2099	2099
8/1 (Bridgwater Road (W) Circ)	4.80	0.00	Y	Arm 9 Ahead	78.00	100.0 %	2055	2055
8/2 (Bridgwater Road (W) Circ)	4.70	0.00	Y	Arm 2 Right	40.00	2.3 %	2045	2045
				Arm 9 Ahead	78.00	97.7 %		
9/1 (Colliters Way (N) Ped Crossing)	4.50	0.00	Y	Arm 10 Ahead	Inf	100.0 %	2065	2065
9/2 (Colliters Way (N) Ped Crossing)	4.50	0.00	N	Arm 10 Ahead	Inf	100.0 %	2205	2205
10/1 (Colliters Way (N) Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
10/2 (Colliters Way (N) Exit Lane 2)	Infinite Saturation Flow						Inf	Inf
11/1 (Bridgwater Road (E) Ped Crossing)	4.40	0.00	Y	Arm 12 Ahead	Inf	100.0 %	2055	2055
11/2 (Bridgwater Road (E) Ped Crossing)	4.40	0.00	N	Arm 12 Ahead	Inf	100.0 %	2195	2195
12/1 (Bridgwater Road (E) Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
12/2 (Bridgwater Road (E) Exit Lane 2)	Infinite Saturation Flow						Inf	Inf
13/1 (Colliters Way (S) Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
13/2 (Colliters Way (S) Exit Lane 2)	Infinite Saturation Flow						Inf	Inf
14/1 (Bridgwater Road (W) Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
14/2 (Bridgwater Road (W) Exit Lane 2)	Infinite Saturation Flow						Inf	Inf

Scenario 5: '2030 Baseline Interpeak' (FG5: '2030 Baseline Interpeak', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

	Destination					
		A	B	C	D	Tot.
Origin	A	0	88	447	375	910
	B	68	1	21	301	391
	C	387	24	0	237	648
	D	447	351	223	5	1026
	Tot.	902	464	691	918	2975

Traffic Lane Flows

Lane	Scenario 5: 2030 Baseline Interpeak
Junction: A38/Colliters Way	
1/1	0
1/2 (short)	334
1/3 (with short)	676(In) 342(Out)
1/4	234
2/1	268
2/2	336
3/1 (short)	157
3/2 (with short)	322(In) 165(Out)
3/3	69
4/1	380
4/2	436
4/3	234
5/1	237
5/2 (with short)	411(In) 201(Out)
5/3 (short)	210
6/1	282
6/2	399
6/3	69
7/1	447
7/2 (with short)	579(In) 263(Out)
7/3 (short)	316
8/1	215
8/2	265
9/1	662
9/2	240
10/1	662
10/2	240
11/1	356
11/2	108
12/1	356
12/2	108
13/1	401
13/2	290
14/1	519

Full Input Data And Results

14/2	399

Lane Saturation Flows

Junction: A38/Colliters Way								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Colliters Way (N))	4.90	0.00	Y	Arm 4 Ahead	Inf	0.0 %	2105	2105
				Arm 11 Left	32.70	0.0 %		
1/2 (Colliters Way (N))	3.50	0.00	Y	Arm 4 Ahead	58.60	73.7 %	1925	1925
				Arm 11 Left	183.60	26.3 %		
1/3 (Colliters Way (N))	3.50	0.00	N	Arm 4 Ahead	58.60	100.0 %	2052	2052
1/4 (Colliters Way (N))	3.40	0.00	N	Arm 4 Ahead	58.60	100.0 %	2043	2043
2/1 (Colliters Way (N) Circ)	4.00	0.00	Y	Arm 11 Ahead	69.20	100.0 %	1972	1972
2/2 (Colliters Way (N) Circ)	4.20	0.00	Y	Arm 4 Right	41.50	67.9 %	1973	1973
				Arm 11 Ahead	69.20	32.1 %		
3/1 (Bridgwater Road (E))	3.10	0.00	Y	Arm 6 Ahead	94.60	86.6 %	1895	1895
				Arm 13 Left	94.60	13.4 %		
3/2 (Bridgwater Road (E))	3.10	0.00	N	Arm 6 Ahead	94.60	100.0 %	2033	2033
3/3 (Bridgwater Road (E))	3.30	0.00	N	Arm 6 Ahead	94.60	100.0 %	2052	2052
4/1 (Bridgwater Road (E) Circ)	4.60	0.00	Y	Arm 13 Ahead	34.90	100.0 %	1989	1989
4/2 (Bridgwater Road (E) Circ)	4.40	0.00	Y	Arm 6 Right	34.90	33.5 %	1970	1970
				Arm 13 Ahead	34.90	66.5 %		
4/3 (Bridgwater Road (E) Circ)	4.40	0.00	Y	Arm 6 Right	34.90	100.0 %	1970	1970
5/1 (Colliters Way (S))	3.40	0.00	Y	Arm 14 Left	70.10	100.0 %	1914	1914
5/2 (Colliters Way (S))	3.40	0.00	N	Arm 8 Ahead	207.60	100.0 %	2080	2080
5/3 (Colliters Way (S))	3.40	0.00	N	Arm 8 Ahead	207.60	100.0 %	2080	2080
6/1 (Colliters Way (S) Circ)	4.10	0.00	Y	Arm 14 Ahead	42.70	100.0 %	1956	1956
6/2 (Colliters Way (S) Circ)	4.10	0.00	Y	Arm 14 Ahead	42.70	100.0 %	1956	1956
6/3 (Colliters Way (S) Circ)	4.10	0.00	Y	Arm 8 Right	28.40	100.0 %	1923	1923
7/1 (Bridgwater Road (W))	4.00	0.00	Y	Arm 9 Left	60.80	100.0 %	1966	1966
7/2 (Bridgwater Road (W))	3.10	0.00	N	Arm 2 Ahead	86.30	100.0 %	2030	2030

7/3 (Bridgwater Road (W))	3.80	0.00	N	Arm 2 Ahead	86.30	100.0 %	2099	2099
8/1 (Bridgwater Road (W) Circ)	4.80	0.00	Y	Arm 9 Ahead	78.00	100.0 %	2055	2055
8/2 (Bridgwater Road (W) Circ)	4.70	0.00	Y	Arm 2 Right	40.00	9.4 %	2042	2042
				Arm 9 Ahead	78.00	90.6 %		
9/1 (Colliters Way (N) Ped Crossing)	4.50	0.00	Y	Arm 10 Ahead	Inf	100.0 %	2065	2065
9/2 (Colliters Way (N) Ped Crossing)	4.50	0.00	N	Arm 10 Ahead	Inf	100.0 %	2205	2205
10/1 (Colliters Way (N) Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
10/2 (Colliters Way (N) Exit Lane 2)	Infinite Saturation Flow						Inf	Inf
11/1 (Bridgwater Road (E) Ped Crossing)	4.40	0.00	Y	Arm 12 Ahead	Inf	100.0 %	2055	2055
11/2 (Bridgwater Road (E) Ped Crossing)	4.40	0.00	N	Arm 12 Ahead	Inf	100.0 %	2195	2195
12/1 (Bridgwater Road (E) Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
12/2 (Bridgwater Road (E) Exit Lane 2)	Infinite Saturation Flow						Inf	Inf
13/1 (Colliters Way (S) Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
13/2 (Colliters Way (S) Exit Lane 2)	Infinite Saturation Flow						Inf	Inf
14/1 (Bridgwater Road (W) Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
14/2 (Bridgwater Road (W) Exit Lane 2)	Infinite Saturation Flow						Inf	Inf

Scenario 6: '2030 Baseline PM' (FG6: '2030 Baseline PM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

	Destination					
Origin		A	B	C	D	Tot.
	A	0	145	568	562	1275
	B	197	0	23	500	720
	C	522	9	0	330	861
	D	359	402	311	0	1072
	Tot.	1078	556	902	1392	3928

Full Input Data And Results

Traffic Lane Flows

Lane	Scenario 6: 2030 Baseline PM
Junction: A38/Colliters Way	
1/1	0
1/2 (short)	452
1/3 (with short)	906(In) 454(Out)
1/4	369
2/1	317
2/2	405
3/1 (short)	260
3/2 (with short)	523(In) 263(Out)
3/3	197
4/1	487
4/2	585
4/3	369
5/1	330
5/2 (with short)	531(In) 268(Out)
5/3 (short)	263
6/1	430
6/2	632
6/3	197
7/1	359
7/2 (with short)	713(In) 316(Out)
7/3 (short)	397
8/1	347
8/2	381
9/1	706
9/2	372
10/1	706
10/2	372
11/1	462
11/2	94
12/1	462
12/2	94
13/1	510
13/2	392
14/1	760

Full Input Data And Results

14/2	632

Lane Saturation Flows

Junction: A38/Colliters Way								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Colliters Way (N))	4.90	0.00	Y	Arm 4 Ahead	Inf	0.0 %	2105	2105
				Arm 11 Left	32.70	0.0 %		
1/2 (Colliters Way (N))	3.50	0.00	Y	Arm 4 Ahead	58.60	67.9 %	1926	1926
				Arm 11 Left	183.60	32.1 %		
1/3 (Colliters Way (N))	3.50	0.00	N	Arm 4 Ahead	58.60	100.0 %	2052	2052
1/4 (Colliters Way (N))	3.40	0.00	N	Arm 4 Ahead	58.60	100.0 %	2043	2043
2/1 (Colliters Way (N) Circ)	4.00	0.00	Y	Arm 11 Ahead	69.20	100.0 %	1972	1972
2/2 (Colliters Way (N) Circ)	4.20	0.00	Y	Arm 4 Right	41.50	76.8 %	1970	1970
				Arm 11 Ahead	69.20	23.2 %		
3/1 (Bridgwater Road (E))	3.10	0.00	Y	Arm 6 Ahead	94.60	91.2 %	1895	1895
				Arm 13 Left	94.60	8.8 %		
3/2 (Bridgwater Road (E))	3.10	0.00	N	Arm 6 Ahead	94.60	100.0 %	2033	2033
3/3 (Bridgwater Road (E))	3.30	0.00	N	Arm 6 Ahead	94.60	100.0 %	2052	2052
4/1 (Bridgwater Road (E) Circ)	4.60	0.00	Y	Arm 13 Ahead	34.90	100.0 %	1989	1989
4/2 (Bridgwater Road (E) Circ)	4.40	0.00	Y	Arm 6 Right	34.90	33.0 %	1970	1970
				Arm 13 Ahead	34.90	67.0 %		
4/3 (Bridgwater Road (E) Circ)	4.40	0.00	Y	Arm 6 Right	34.90	100.0 %	1970	1970
5/1 (Colliters Way (S))	3.40	0.00	Y	Arm 14 Left	70.10	100.0 %	1914	1914
5/2 (Colliters Way (S))	3.40	0.00	N	Arm 8 Ahead	207.60	100.0 %	2080	2080
5/3 (Colliters Way (S))	3.40	0.00	N	Arm 8 Ahead	207.60	100.0 %	2080	2080
6/1 (Colliters Way (S) Circ)	4.10	0.00	Y	Arm 14 Ahead	42.70	100.0 %	1956	1956
6/2 (Colliters Way (S) Circ)	4.10	0.00	Y	Arm 14 Ahead	42.70	100.0 %	1956	1956
6/3 (Colliters Way (S) Circ)	4.10	0.00	Y	Arm 8 Right	28.40	100.0 %	1923	1923
7/1 (Bridgwater Road (W))	4.00	0.00	Y	Arm 9 Left	60.80	100.0 %	1966	1966
7/2 (Bridgwater Road (W))	3.10	0.00	N	Arm 2 Ahead	86.30	100.0 %	2030	2030

7/3 (Bridgwater Road (W))	3.80	0.00	N	Arm 2 Ahead	86.30	100.0 %	2099	2099
8/1 (Bridgwater Road (W) Circ)	4.80	0.00	Y	Arm 9 Ahead	78.00	100.0 %	2055	2055
8/2 (Bridgwater Road (W) Circ)	4.70	0.00	Y	Arm 2 Right	40.00	2.4 %	2045	2045
				Arm 9 Ahead	78.00	97.6 %		
9/1 (Colliters Way (N) Ped Crossing)	4.50	0.00	Y	Arm 10 Ahead	Inf	100.0 %	2065	2065
9/2 (Colliters Way (N) Ped Crossing)	4.50	0.00	N	Arm 10 Ahead	Inf	100.0 %	2205	2205
10/1 (Colliters Way (N) Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
10/2 (Colliters Way (N) Exit Lane 2)	Infinite Saturation Flow						Inf	Inf
11/1 (Bridgwater Road (E) Ped Crossing)	4.40	0.00	Y	Arm 12 Ahead	Inf	100.0 %	2055	2055
11/2 (Bridgwater Road (E) Ped Crossing)	4.40	0.00	N	Arm 12 Ahead	Inf	100.0 %	2195	2195
12/1 (Bridgwater Road (E) Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
12/2 (Bridgwater Road (E) Exit Lane 2)	Infinite Saturation Flow						Inf	Inf
13/1 (Colliters Way (S) Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
13/2 (Colliters Way (S) Exit Lane 2)	Infinite Saturation Flow						Inf	Inf
14/1 (Bridgwater Road (W) Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
14/2 (Bridgwater Road (W) Exit Lane 2)	Infinite Saturation Flow						Inf	Inf

Scenario 7: '2030 10 MPPA AM' (FG7: '2030 10 MPPA AM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

	Destination					
Origin		A	B	C	D	Tot.
	A	3	199	506	345	1053
	B	125	1	23	362	511
	C	666	9	0	341	1016
	D	488	530	288	0	1306
	Tot.	1282	739	817	1048	3886

Full Input Data And Results

Traffic Lane Flows

Lane	Scenario 7: 2030 10 MPPA AM
Junction: A38/Colliters Way	
1/1	0
1/2 (short)	408
1/3 (with short)	812(In) 404(Out)
1/4	241
2/1	361
2/2	467
3/1 (short)	191
3/2 (with short)	385(In) 194(Out)
3/3	126
4/1	379
4/2	522
4/3	241
5/1	341
5/2 (with short)	675(In) 326(Out)
5/3 (short)	349
6/1	275
6/2	432
6/3	129
7/1	488
7/2 (with short)	818(In) 359(Out)
7/3 (short)	459
8/1	360
8/2	444
9/1	848
9/2	434
10/1	848
10/2	434
11/1	560
11/2	179
12/1	560
12/2	179
13/1	402
13/2	415
14/1	616

Full Input Data And Results

14/2	432

Lane Saturation Flows

Junction: A38/Colliters Way								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Colliters Way (N))	4.90	0.00	Y	Arm 4 Ahead	Inf	0.0 %	2105	2105
				Arm 11 Left	32.70	0.0 %		
1/2 (Colliters Way (N))	3.50	0.00	Y	Arm 4 Ahead	58.60	51.2 %	1932	1932
				Arm 11 Left	183.60	48.8 %		
1/3 (Colliters Way (N))	3.50	0.00	N	Arm 4 Ahead	58.60	100.0 %	2052	2052
1/4 (Colliters Way (N))	3.40	0.00	N	Arm 4 Ahead	58.60	100.0 %	2043	2043
2/1 (Colliters Way (N) Circ)	4.00	0.00	Y	Arm 11 Ahead	69.20	100.0 %	1972	1972
2/2 (Colliters Way (N) Circ)	4.20	0.00	Y	Arm 4 Right	41.50	61.7 %	1975	1975
				Arm 11 Ahead	69.20	38.3 %		
3/1 (Bridgwater Road (E))	3.10	0.00	Y	Arm 6 Ahead	94.60	88.0 %	1895	1895
				Arm 13 Left	94.60	12.0 %		
3/2 (Bridgwater Road (E))	3.10	0.00	N	Arm 6 Ahead	94.60	100.0 %	2033	2033
3/3 (Bridgwater Road (E))	3.30	0.00	N	Arm 6 Ahead	94.60	100.0 %	2052	2052
4/1 (Bridgwater Road (E) Circ)	4.60	0.00	Y	Arm 13 Ahead	34.90	100.0 %	1989	1989
4/2 (Bridgwater Road (E) Circ)	4.40	0.00	Y	Arm 6 Right	34.90	20.5 %	1970	1970
				Arm 13 Ahead	34.90	79.5 %		
4/3 (Bridgwater Road (E) Circ)	4.40	0.00	Y	Arm 6 Right	34.90	100.0 %	1970	1970
5/1 (Colliters Way (S))	3.40	0.00	Y	Arm 14 Left	70.10	100.0 %	1914	1914
5/2 (Colliters Way (S))	3.40	0.00	N	Arm 8 Ahead	207.60	100.0 %	2080	2080
5/3 (Colliters Way (S))	3.40	0.00	N	Arm 8 Ahead	207.60	100.0 %	2080	2080
6/1 (Colliters Way (S) Circ)	4.10	0.00	Y	Arm 14 Ahead	42.70	100.0 %	1956	1956
6/2 (Colliters Way (S) Circ)	4.10	0.00	Y	Arm 14 Ahead	42.70	100.0 %	1956	1956
6/3 (Colliters Way (S) Circ)	4.10	0.00	Y	Arm 8 Right	28.40	100.0 %	1923	1923
7/1 (Bridgwater Road (W))	4.00	0.00	Y	Arm 9 Left	60.80	100.0 %	1966	1966
7/2 (Bridgwater Road (W))	3.10	0.00	N	Arm 2 Ahead	86.30	100.0 %	2030	2030

7/3 (Bridgwater Road (W))	3.80	0.00	N	Arm 2 Ahead	86.30	100.0 %	2099	2099
8/1 (Bridgwater Road (W) Circ)	4.80	0.00	Y	Arm 9 Ahead	78.00	100.0 %	2055	2055
8/2 (Bridgwater Road (W) Circ)	4.70	0.00	Y	Arm 2 Right	40.00	2.3 %	2045	2045
				Arm 9 Ahead	78.00	97.7 %		
9/1 (Colliters Way (N) Ped Crossing)	4.50	0.00	Y	Arm 10 Ahead	Inf	100.0 %	2065	2065
9/2 (Colliters Way (N) Ped Crossing)	4.50	0.00	N	Arm 10 Ahead	Inf	100.0 %	2205	2205
10/1 (Colliters Way (N) Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
10/2 (Colliters Way (N) Exit Lane 2)	Infinite Saturation Flow						Inf	Inf
11/1 (Bridgwater Road (E) Ped Crossing)	4.40	0.00	Y	Arm 12 Ahead	Inf	100.0 %	2055	2055
11/2 (Bridgwater Road (E) Ped Crossing)	4.40	0.00	N	Arm 12 Ahead	Inf	100.0 %	2195	2195
12/1 (Bridgwater Road (E) Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
12/2 (Bridgwater Road (E) Exit Lane 2)	Infinite Saturation Flow						Inf	Inf
13/1 (Colliters Way (S) Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
13/2 (Colliters Way (S) Exit Lane 2)	Infinite Saturation Flow						Inf	Inf
14/1 (Bridgwater Road (W) Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
14/2 (Bridgwater Road (W) Exit Lane 2)	Infinite Saturation Flow						Inf	Inf

Scenario 8: '2030 10 MPPA Interpeak' (FG8: '2030 10 MPPA Interpeak', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

	Destination					
Origin		A	B	C	D	Tot.
	A	0	88	447	433	968
	B	68	1	21	346	436
	C	387	24	0	237	648
	D	508	396	223	5	1132
	Tot.	963	509	691	1021	3184

Traffic Lane Flows

Lane	Scenario 8: 2030 10 MPPA Interpeak
Junction: A38/Colliters Way	
1/1	0
1/2 (short)	352
1/3 (with short)	712(In) 360(Out)
1/4	256
2/1	278
2/2	371
3/1 (short)	180
3/2 (with short)	367(In) 187(Out)
3/3	69
4/1	397
4/2	454
4/3	257
5/1	237
5/2 (with short)	411(In) 197(Out)
5/3 (short)	214
6/1	340
6/2	444
6/3	69
7/1	508
7/2 (with short)	624(In) 275(Out)
7/3 (short)	349
8/1	205
8/2	275
9/1	713
9/2	250
10/1	713
10/2	250
11/1	366
11/2	143
12/1	366
12/2	143
13/1	418
13/2	273
14/1	577

Full Input Data And Results

14/2	444

Lane Saturation Flows

Junction: A38/Colliters Way								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Colliters Way (N))	4.90	0.00	Y	Arm 4 Ahead	Inf	0.0 %	2105	2105
				Arm 11 Left	32.70	0.0 %		
1/2 (Colliters Way (N))	3.50	0.00	Y	Arm 4 Ahead	58.60	75.0 %	1924	1924
				Arm 11 Left	183.60	25.0 %		
1/3 (Colliters Way (N))	3.50	0.00	N	Arm 4 Ahead	58.60	100.0 %	2052	2052
1/4 (Colliters Way (N))	3.40	0.00	N	Arm 4 Ahead	58.60	100.0 %	2043	2043
2/1 (Colliters Way (N) Circ)	4.00	0.00	Y	Arm 11 Ahead	69.20	100.0 %	1972	1972
2/2 (Colliters Way (N) Circ)	4.20	0.00	Y	Arm 4 Right	41.50	61.5 %	1975	1975
				Arm 11 Ahead	69.20	38.5 %		
3/1 (Bridgwater Road (E))	3.10	0.00	Y	Arm 6 Ahead	94.60	88.3 %	1895	1895
				Arm 13 Left	94.60	11.7 %		
3/2 (Bridgwater Road (E))	3.10	0.00	N	Arm 6 Ahead	94.60	100.0 %	2033	2033
3/3 (Bridgwater Road (E))	3.30	0.00	N	Arm 6 Ahead	94.60	100.0 %	2052	2052
4/1 (Bridgwater Road (E) Circ)	4.60	0.00	Y	Arm 13 Ahead	34.90	100.0 %	1989	1989
4/2 (Bridgwater Road (E) Circ)	4.40	0.00	Y	Arm 6 Right	34.90	39.9 %	1970	1970
				Arm 13 Ahead	34.90	60.1 %		
4/3 (Bridgwater Road (E) Circ)	4.40	0.00	Y	Arm 6 Right	34.90	100.0 %	1970	1970
5/1 (Colliters Way (S))	3.40	0.00	Y	Arm 14 Left	70.10	100.0 %	1914	1914
5/2 (Colliters Way (S))	3.40	0.00	N	Arm 8 Ahead	207.60	100.0 %	2080	2080
5/3 (Colliters Way (S))	3.40	0.00	N	Arm 8 Ahead	207.60	100.0 %	2080	2080
6/1 (Colliters Way (S) Circ)	4.10	0.00	Y	Arm 14 Ahead	42.70	100.0 %	1956	1956
6/2 (Colliters Way (S) Circ)	4.10	0.00	Y	Arm 14 Ahead	42.70	100.0 %	1956	1956
6/3 (Colliters Way (S) Circ)	4.10	0.00	Y	Arm 8 Right	28.40	100.0 %	1923	1923
7/1 (Bridgwater Road (W))	4.00	0.00	Y	Arm 9 Left	60.80	100.0 %	1966	1966
7/2 (Bridgwater Road (W))	3.10	0.00	N	Arm 2 Ahead	86.30	100.0 %	2030	2030

7/3 (Bridgwater Road (W))	3.80	0.00	N	Arm 2 Ahead	86.30	100.0 %	2099	2099
8/1 (Bridgwater Road (W) Circ)	4.80	0.00	Y	Arm 9 Ahead	78.00	100.0 %	2055	2055
8/2 (Bridgwater Road (W) Circ)	4.70	0.00	Y	Arm 2 Right	40.00	9.1 %	2042	2042
				Arm 9 Ahead	78.00	90.9 %		
9/1 (Colliters Way (N) Ped Crossing)	4.50	0.00	Y	Arm 10 Ahead	Inf	100.0 %	2065	2065
9/2 (Colliters Way (N) Ped Crossing)	4.50	0.00	N	Arm 10 Ahead	Inf	100.0 %	2205	2205
10/1 (Colliters Way (N) Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
10/2 (Colliters Way (N) Exit Lane 2)	Infinite Saturation Flow						Inf	Inf
11/1 (Bridgwater Road (E) Ped Crossing)	4.40	0.00	Y	Arm 12 Ahead	Inf	100.0 %	2055	2055
11/2 (Bridgwater Road (E) Ped Crossing)	4.40	0.00	N	Arm 12 Ahead	Inf	100.0 %	2195	2195
12/1 (Bridgwater Road (E) Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
12/2 (Bridgwater Road (E) Exit Lane 2)	Infinite Saturation Flow						Inf	Inf
13/1 (Colliters Way (S) Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
13/2 (Colliters Way (S) Exit Lane 2)	Infinite Saturation Flow						Inf	Inf
14/1 (Bridgwater Road (W) Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
14/2 (Bridgwater Road (W) Exit Lane 2)	Infinite Saturation Flow						Inf	Inf

Scenario 9: '2030 10 MPPA PM' (FG9: '2030 10 MPPA PM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination				
		A	B	C	D	Tot.
Origin	A	0	145	568	636	1349
	B	197	0	23	558	778
	C	522	9	0	330	861
	D	408	440	311	0	1159
	Tot.	1127	594	902	1524	4147

Full Input Data And Results

Traffic Lane Flows

Lane	Scenario 9: 2030 10 MPPA PM
Junction: A38/Colliters Way	
1/1	0
1/2 (short)	467
1/3 (with short)	932(In) 465(Out)
1/4	417
2/1	331
2/2	429
3/1 (short)	293
3/2 (with short)	581(In) 288(Out)
3/3	197
4/1	502
4/2	596
4/3	417
5/1	330
5/2 (with short)	531(In) 283(Out)
5/3 (short)	248
6/1	489
6/2	705
6/3	197
7/1	408
7/2 (with short)	751(In) 330(Out)
7/3 (short)	421
8/1	342
8/2	386
9/1	750
9/2	377
10/1	750
10/2	377
11/1	476
11/2	118
12/1	476
12/2	118
13/1	525
13/2	377
14/1	819

Full Input Data And Results

14/2	705

Lane Saturation Flows

Junction: A38/Colliters Way

Lane	Lane Width (m)	Gradient	Nearside Lane	Allowed Turns	Turning Radius (m)	Turning Prop.	Sat Flow (PCU/Hr)	Flared Sat Flow (PCU/Hr)
1/1 (Colliters Way (N))	4.90	0.00	Y	Arm 4 Ahead	Inf	0.0 %	2105	2105
				Arm 11 Left	32.70	0.0 %		
1/2 (Colliters Way (N))	3.50	0.00	Y	Arm 4 Ahead	58.60	69.0 %	1926	1926
				Arm 11 Left	183.60	31.0 %		
1/3 (Colliters Way (N))	3.50	0.00	N	Arm 4 Ahead	58.60	100.0 %	2052	2052
1/4 (Colliters Way (N))	3.40	0.00	N	Arm 4 Ahead	58.60	100.0 %	2043	2043
2/1 (Colliters Way (N) Circ)	4.00	0.00	Y	Arm 11 Ahead	69.20	100.0 %	1972	1972
2/2 (Colliters Way (N) Circ)	4.20	0.00	Y	Arm 4 Right	41.50	72.5 %	1972	1972
				Arm 11 Ahead	69.20	27.5 %		
3/1 (Bridgwater Road (E))	3.10	0.00	Y	Arm 6 Ahead	94.60	92.2 %	1895	1895
				Arm 13 Left	94.60	7.8 %		
3/2 (Bridgwater Road (E))	3.10	0.00	N	Arm 6 Ahead	94.60	100.0 %	2033	2033
3/3 (Bridgwater Road (E))	3.30	0.00	N	Arm 6 Ahead	94.60	100.0 %	2052	2052
4/1 (Bridgwater Road (E) Circ)	4.60	0.00	Y	Arm 13 Ahead	34.90	100.0 %	1989	1989
4/2 (Bridgwater Road (E) Circ)	4.40	0.00	Y	Arm 6 Right	34.90	36.7 %	1970	1970
				Arm 13 Ahead	34.90	63.3 %		
4/3 (Bridgwater Road (E) Circ)	4.40	0.00	Y	Arm 6 Right	34.90	100.0 %	1970	1970
5/1 (Colliters Way (S))	3.40	0.00	Y	Arm 14 Left	70.10	100.0 %	1914	1914
5/2 (Colliters Way (S))	3.40	0.00	N	Arm 8 Ahead	207.60	100.0 %	2080	2080
5/3 (Colliters Way (S))	3.40	0.00	N	Arm 8 Ahead	207.60	100.0 %	2080	2080
6/1 (Colliters Way (S) Circ)	4.10	0.00	Y	Arm 14 Ahead	42.70	100.0 %	1956	1956
6/2 (Colliters Way (S) Circ)	4.10	0.00	Y	Arm 14 Ahead	42.70	100.0 %	1956	1956
6/3 (Colliters Way (S) Circ)	4.10	0.00	Y	Arm 8 Right	28.40	100.0 %	1923	1923
7/1 (Bridgwater Road (W))	4.00	0.00	Y	Arm 9 Left	60.80	100.0 %	1966	1966
7/2 (Bridgwater Road (W))	3.10	0.00	N	Arm 2 Ahead	86.30	100.0 %	2030	2030

7/3 (Bridgwater Road (W))	3.80	0.00	N	Arm 2 Ahead	86.30	100.0 %	2099	2099
8/1 (Bridgwater Road (W) Circ)	4.80	0.00	Y	Arm 9 Ahead	78.00	100.0 %	2055	2055
8/2 (Bridgwater Road (W) Circ)	4.70	0.00	Y	Arm 2 Right	40.00	2.3 %	2045	2045
				Arm 9 Ahead	78.00	97.7 %		
9/1 (Colliters Way (N) Ped Crossing)	4.50	0.00	Y	Arm 10 Ahead	Inf	100.0 %	2065	2065
9/2 (Colliters Way (N) Ped Crossing)	4.50	0.00	N	Arm 10 Ahead	Inf	100.0 %	2205	2205
10/1 (Colliters Way (N) Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
10/2 (Colliters Way (N) Exit Lane 2)	Infinite Saturation Flow						Inf	Inf
11/1 (Bridgwater Road (E) Ped Crossing)	4.40	0.00	Y	Arm 12 Ahead	Inf	100.0 %	2055	2055
11/2 (Bridgwater Road (E) Ped Crossing)	4.40	0.00	N	Arm 12 Ahead	Inf	100.0 %	2195	2195
12/1 (Bridgwater Road (E) Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
12/2 (Bridgwater Road (E) Exit Lane 2)	Infinite Saturation Flow						Inf	Inf
13/1 (Colliters Way (S) Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
13/2 (Colliters Way (S) Exit Lane 2)	Infinite Saturation Flow						Inf	Inf
14/1 (Bridgwater Road (W) Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
14/2 (Bridgwater Road (W) Exit Lane 2)	Infinite Saturation Flow						Inf	Inf

Scenario 10: '2030 12 MPPA AM' (FG10: '2030 12 MPPA AM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination				
		A	B	C	D	Tot.
Origin	A	3	199	506	369	1077
	B	125	1	23	376	525
	C	666	9	0	341	1016
	D	505	546	288	0	1339
	Tot.	1299	755	817	1086	3957

Full Input Data And Results

Traffic Lane Flows

Lane	Scenario 10: 2030 12 MPPA AM
Junction: A38/Colliters Way	
1/1	0
1/2 (short)	416
1/3 (with short)	825(In) 409(Out)
1/4	252
2/1	369
2/2	475
3/1 (short)	198
3/2 (with short)	399(In) 201(Out)
3/3	126
4/1	387
4/2	527
4/3	252
5/1	341
5/2 (with short)	675(In) 323(Out)
5/3 (short)	352
6/1	295
6/2	450
6/3	129
7/1	505
7/2 (with short)	834(In) 366(Out)
7/3 (short)	468
8/1	355
8/2	449
9/1	860
9/2	439
10/1	860
10/2	439
11/1	568
11/2	187
12/1	568
12/2	187
13/1	410
13/2	407
14/1	636

Full Input Data And Results

14/2	450

Lane Saturation Flows

Junction: A38/Colliters Way								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Colliters Way (N))	4.90	0.00	Y	Arm 4 Ahead	Inf	0.0 %	2105	2105
				Arm 11 Left	32.70	0.0 %		
1/2 (Colliters Way (N))	3.50	0.00	Y	Arm 4 Ahead	58.60	52.2 %	1932	1932
				Arm 11 Left	183.60	47.8 %		
1/3 (Colliters Way (N))	3.50	0.00	N	Arm 4 Ahead	58.60	100.0 %	2052	2052
1/4 (Colliters Way (N))	3.40	0.00	N	Arm 4 Ahead	58.60	100.0 %	2043	2043
2/1 (Colliters Way (N) Circ)	4.00	0.00	Y	Arm 11 Ahead	69.20	100.0 %	1972	1972
2/2 (Colliters Way (N) Circ)	4.20	0.00	Y	Arm 4 Right	41.50	60.6 %	1975	1975
				Arm 11 Ahead	69.20	39.4 %		
3/1 (Bridgwater Road (E))	3.10	0.00	Y	Arm 6 Ahead	94.60	88.4 %	1895	1895
				Arm 13 Left	94.60	11.6 %		
3/2 (Bridgwater Road (E))	3.10	0.00	N	Arm 6 Ahead	94.60	100.0 %	2033	2033
3/3 (Bridgwater Road (E))	3.30	0.00	N	Arm 6 Ahead	94.60	100.0 %	2052	2052
4/1 (Bridgwater Road (E) Circ)	4.60	0.00	Y	Arm 13 Ahead	34.90	100.0 %	1989	1989
4/2 (Bridgwater Road (E) Circ)	4.40	0.00	Y	Arm 6 Right	34.90	22.8 %	1970	1970
				Arm 13 Ahead	34.90	77.2 %		
4/3 (Bridgwater Road (E) Circ)	4.40	0.00	Y	Arm 6 Right	34.90	100.0 %	1970	1970
5/1 (Colliters Way (S))	3.40	0.00	Y	Arm 14 Left	70.10	100.0 %	1914	1914
5/2 (Colliters Way (S))	3.40	0.00	N	Arm 8 Ahead	207.60	100.0 %	2080	2080
5/3 (Colliters Way (S))	3.40	0.00	N	Arm 8 Ahead	207.60	100.0 %	2080	2080
6/1 (Colliters Way (S) Circ)	4.10	0.00	Y	Arm 14 Ahead	42.70	100.0 %	1956	1956
6/2 (Colliters Way (S) Circ)	4.10	0.00	Y	Arm 14 Ahead	42.70	100.0 %	1956	1956
6/3 (Colliters Way (S) Circ)	4.10	0.00	Y	Arm 8 Right	28.40	100.0 %	1923	1923
7/1 (Bridgwater Road (W))	4.00	0.00	Y	Arm 9 Left	60.80	100.0 %	1966	1966
7/2 (Bridgwater Road (W))	3.10	0.00	N	Arm 2 Ahead	86.30	100.0 %	2030	2030

7/3 (Bridgwater Road (W))	3.80	0.00	N	Arm 2 Ahead	86.30	100.0 %	2099	2099
8/1 (Bridgwater Road (W) Circ)	4.80	0.00	Y	Arm 9 Ahead	78.00	100.0 %	2055	2055
8/2 (Bridgwater Road (W) Circ)	4.70	0.00	Y	Arm 2 Right	40.00	2.2 %	2045	2045
				Arm 9 Ahead	78.00	97.8 %		
9/1 (Colliters Way (N) Ped Crossing)	4.50	0.00	Y	Arm 10 Ahead	Inf	100.0 %	2065	2065
9/2 (Colliters Way (N) Ped Crossing)	4.50	0.00	N	Arm 10 Ahead	Inf	100.0 %	2205	2205
10/1 (Colliters Way (N) Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
10/2 (Colliters Way (N) Exit Lane 2)	Infinite Saturation Flow						Inf	Inf
11/1 (Bridgwater Road (E) Ped Crossing)	4.40	0.00	Y	Arm 12 Ahead	Inf	100.0 %	2055	2055
11/2 (Bridgwater Road (E) Ped Crossing)	4.40	0.00	N	Arm 12 Ahead	Inf	100.0 %	2195	2195
12/1 (Bridgwater Road (E) Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
12/2 (Bridgwater Road (E) Exit Lane 2)	Infinite Saturation Flow						Inf	Inf
13/1 (Colliters Way (S) Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
13/2 (Colliters Way (S) Exit Lane 2)	Infinite Saturation Flow						Inf	Inf
14/1 (Bridgwater Road (W) Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
14/2 (Bridgwater Road (W) Exit Lane 2)	Infinite Saturation Flow						Inf	Inf

Scenario 11: '2030 12 MPPA Interpeak' (FG11: '2030 12 MPPA Interpeak', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

	Destination					
		A	B	C	D	Tot.
Origin	A	0	88	447	498	1033
	B	68	1	21	377	467
	C	387	24	0	237	648
	D	588	422	223	5	1238
	Tot.	1043	535	691	1117	3386

Traffic Lane Flows

Lane	Scenario 11: 2030 12 MPPA Interpeak
Junction: A38/Colliters Way	
1/1	0
1/2 (short)	372
1/3 (with short)	751(In) 379(Out)
1/4	282
2/1	292
2/2	383
3/1 (short)	195
3/2 (with short)	398(In) 203(Out)
3/3	69
4/1	417
4/2	474
4/3	282
5/1	237
5/2 (with short)	411(In) 191(Out)
5/3 (short)	220
6/1	395
6/2	485
6/3	69
7/1	588
7/2 (with short)	650(In) 289(Out)
7/3 (short)	361
8/1	196
8/2	284
9/1	784
9/2	259
10/1	784
10/2	259
11/1	380
11/2	155
12/1	380
12/2	155
13/1	438
13/2	253
14/1	632

Full Input Data And Results

14/2	485

Lane Saturation Flows

Junction: A38/Colliters Way								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Colliters Way (N))	4.90	0.00	Y	Arm 4 Ahead	Inf	0.0 %	2105	2105
				Arm 11 Left	32.70	0.0 %		
1/2 (Colliters Way (N))	3.50	0.00	Y	Arm 4 Ahead	58.60	76.3 %	1924	1924
				Arm 11 Left	183.60	23.7 %		
1/3 (Colliters Way (N))	3.50	0.00	N	Arm 4 Ahead	58.60	100.0 %	2052	2052
1/4 (Colliters Way (N))	3.40	0.00	N	Arm 4 Ahead	58.60	100.0 %	2043	2043
2/1 (Colliters Way (N) Circ)	4.00	0.00	Y	Arm 11 Ahead	69.20	100.0 %	1972	1972
2/2 (Colliters Way (N) Circ)	4.20	0.00	Y	Arm 4 Right	41.50	59.5 %	1975	1975
				Arm 11 Ahead	69.20	40.5 %		
3/1 (Bridgwater Road (E))	3.10	0.00	Y	Arm 6 Ahead	94.60	89.2 %	1895	1895
				Arm 13 Left	94.60	10.8 %		
3/2 (Bridgwater Road (E))	3.10	0.00	N	Arm 6 Ahead	94.60	100.0 %	2033	2033
3/3 (Bridgwater Road (E))	3.30	0.00	N	Arm 6 Ahead	94.60	100.0 %	2052	2052
4/1 (Bridgwater Road (E) Circ)	4.60	0.00	Y	Arm 13 Ahead	34.90	100.0 %	1989	1989
4/2 (Bridgwater Road (E) Circ)	4.40	0.00	Y	Arm 6 Right	34.90	46.6 %	1970	1970
				Arm 13 Ahead	34.90	53.4 %		
4/3 (Bridgwater Road (E) Circ)	4.40	0.00	Y	Arm 6 Right	34.90	100.0 %	1970	1970
5/1 (Colliters Way (S))	3.40	0.00	Y	Arm 14 Left	70.10	100.0 %	1914	1914
5/2 (Colliters Way (S))	3.40	0.00	N	Arm 8 Ahead	207.60	100.0 %	2080	2080
5/3 (Colliters Way (S))	3.40	0.00	N	Arm 8 Ahead	207.60	100.0 %	2080	2080
6/1 (Colliters Way (S) Circ)	4.10	0.00	Y	Arm 14 Ahead	42.70	100.0 %	1956	1956
6/2 (Colliters Way (S) Circ)	4.10	0.00	Y	Arm 14 Ahead	42.70	100.0 %	1956	1956
6/3 (Colliters Way (S) Circ)	4.10	0.00	Y	Arm 8 Right	28.40	100.0 %	1923	1923
7/1 (Bridgwater Road (W))	4.00	0.00	Y	Arm 9 Left	60.80	100.0 %	1966	1966
7/2 (Bridgwater Road (W))	3.10	0.00	N	Arm 2 Ahead	86.30	100.0 %	2030	2030

7/3 (Bridgwater Road (W))	3.80	0.00	N	Arm 2 Ahead	86.30	100.0 %	2099	2099
8/1 (Bridgwater Road (W) Circ)	4.80	0.00	Y	Arm 9 Ahead	78.00	100.0 %	2055	2055
8/2 (Bridgwater Road (W) Circ)	4.70	0.00	Y	Arm 2 Right	40.00	8.8 %	2042	2042
				Arm 9 Ahead	78.00	91.2 %		
9/1 (Colliters Way (N) Ped Crossing)	4.50	0.00	Y	Arm 10 Ahead	Inf	100.0 %	2065	2065
9/2 (Colliters Way (N) Ped Crossing)	4.50	0.00	N	Arm 10 Ahead	Inf	100.0 %	2205	2205
10/1 (Colliters Way (N) Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
10/2 (Colliters Way (N) Exit Lane 2)	Infinite Saturation Flow						Inf	Inf
11/1 (Bridgwater Road (E) Ped Crossing)	4.40	0.00	Y	Arm 12 Ahead	Inf	100.0 %	2055	2055
11/2 (Bridgwater Road (E) Ped Crossing)	4.40	0.00	N	Arm 12 Ahead	Inf	100.0 %	2195	2195
12/1 (Bridgwater Road (E) Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
12/2 (Bridgwater Road (E) Exit Lane 2)	Infinite Saturation Flow						Inf	Inf
13/1 (Colliters Way (S) Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
13/2 (Colliters Way (S) Exit Lane 2)	Infinite Saturation Flow						Inf	Inf
14/1 (Bridgwater Road (W) Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
14/2 (Bridgwater Road (W) Exit Lane 2)	Infinite Saturation Flow						Inf	Inf

Scenario 12: '2030 12 MPPA PM' (FG12: '2030 12 MPPA PM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

	Destination					
Origin		A	B	C	D	Tot.
	A	0	145	568	731	1444
	B	197	0	23	615	835
	C	522	9	0	330	861
	D	489	471	311	0	1271
	Tot.	1208	625	902	1676	4411

Full Input Data And Results

Traffic Lane Flows

Lane	Scenario 12: 2030 12 MPPA PM
Junction: A38/Colliters Way	
1/1	0
1/2 (short)	493
1/3 (with short)	987(In) 494(Out)
1/4	457
2/1	346
2/2	445
3/1 (short)	324
3/2 (with short)	638(In) 314(Out)
3/3	197
4/1	529
4/2	624
4/3	457
5/1	330
5/2 (with short)	531(In) 286(Out)
5/3 (short)	245
6/1	575
6/2	771
6/3	197
7/1	489
7/2 (with short)	782(In) 345(Out)
7/3 (short)	437
8/1	333
8/2	395
9/1	822
9/2	386
10/1	822
10/2	386
11/1	491
11/2	134
12/1	491
12/2	134
13/1	552
13/2	350
14/1	905

Full Input Data And Results

14/2	771

Lane Saturation Flows

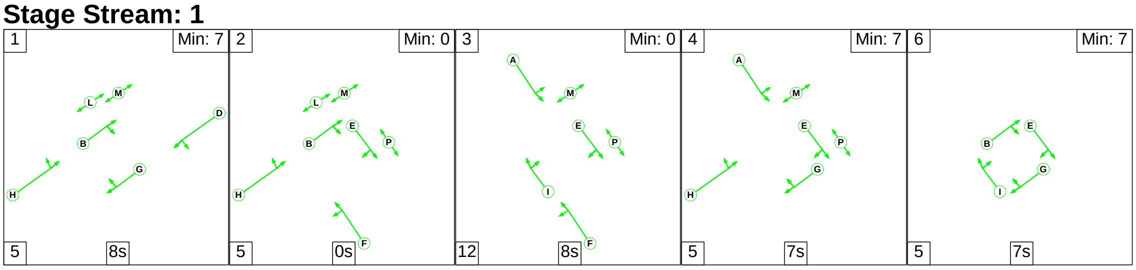
Junction: A38/Colliters Way								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Colliters Way (N))	4.90	0.00	Y	Arm 4 Ahead	Inf	0.0 %	2105	2105
				Arm 11 Left	32.70	0.0 %		
1/2 (Colliters Way (N))	3.50	0.00	Y	Arm 4 Ahead	58.60	70.6 %	1926	1926
				Arm 11 Left	183.60	29.4 %		
1/3 (Colliters Way (N))	3.50	0.00	N	Arm 4 Ahead	58.60	100.0 %	2052	2052
1/4 (Colliters Way (N))	3.40	0.00	N	Arm 4 Ahead	58.60	100.0 %	2043	2043
2/1 (Colliters Way (N) Circ)	4.00	0.00	Y	Arm 11 Ahead	69.20	100.0 %	1972	1972
2/2 (Colliters Way (N) Circ)	4.20	0.00	Y	Arm 4 Right	41.50	69.9 %	1972	1972
				Arm 11 Ahead	69.20	30.1 %		
3/1 (Bridgwater Road (E))	3.10	0.00	Y	Arm 6 Ahead	94.60	92.9 %	1895	1895
				Arm 13 Left	94.60	7.1 %		
3/2 (Bridgwater Road (E))	3.10	0.00	N	Arm 6 Ahead	94.60	100.0 %	2033	2033
3/3 (Bridgwater Road (E))	3.30	0.00	N	Arm 6 Ahead	94.60	100.0 %	2052	2052
4/1 (Bridgwater Road (E) Circ)	4.60	0.00	Y	Arm 13 Ahead	34.90	100.0 %	1989	1989
4/2 (Bridgwater Road (E) Circ)	4.40	0.00	Y	Arm 6 Right	34.90	43.9 %	1970	1970
				Arm 13 Ahead	34.90	56.1 %		
4/3 (Bridgwater Road (E) Circ)	4.40	0.00	Y	Arm 6 Right	34.90	100.0 %	1970	1970
5/1 (Colliters Way (S))	3.40	0.00	Y	Arm 14 Left	70.10	100.0 %	1914	1914
5/2 (Colliters Way (S))	3.40	0.00	N	Arm 8 Ahead	207.60	100.0 %	2080	2080
5/3 (Colliters Way (S))	3.40	0.00	N	Arm 8 Ahead	207.60	100.0 %	2080	2080
6/1 (Colliters Way (S) Circ)	4.10	0.00	Y	Arm 14 Ahead	42.70	100.0 %	1956	1956
6/2 (Colliters Way (S) Circ)	4.10	0.00	Y	Arm 14 Ahead	42.70	100.0 %	1956	1956
6/3 (Colliters Way (S) Circ)	4.10	0.00	Y	Arm 8 Right	28.40	100.0 %	1923	1923
7/1 (Bridgwater Road (W))	4.00	0.00	Y	Arm 9 Left	60.80	100.0 %	1966	1966
7/2 (Bridgwater Road (W))	3.10	0.00	N	Arm 2 Ahead	86.30	100.0 %	2030	2030

7/3 (Bridgwater Road (W))	3.80	0.00	N	Arm 2 Ahead	86.30	100.0 %	2099	2099
8/1 (Bridgwater Road (W) Circ)	4.80	0.00	Y	Arm 9 Ahead	78.00	100.0 %	2055	2055
8/2 (Bridgwater Road (W) Circ)	4.70	0.00	Y	Arm 2 Right	40.00	2.3 %	2045	2045
				Arm 9 Ahead	78.00	97.7 %		
9/1 (Colliters Way (N) Ped Crossing)	4.50	0.00	Y	Arm 10 Ahead	Inf	100.0 %	2065	2065
9/2 (Colliters Way (N) Ped Crossing)	4.50	0.00	N	Arm 10 Ahead	Inf	100.0 %	2205	2205
10/1 (Colliters Way (N) Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
10/2 (Colliters Way (N) Exit Lane 2)	Infinite Saturation Flow						Inf	Inf
11/1 (Bridgwater Road (E) Ped Crossing)	4.40	0.00	Y	Arm 12 Ahead	Inf	100.0 %	2055	2055
11/2 (Bridgwater Road (E) Ped Crossing)	4.40	0.00	N	Arm 12 Ahead	Inf	100.0 %	2195	2195
12/1 (Bridgwater Road (E) Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
12/2 (Bridgwater Road (E) Exit Lane 2)	Infinite Saturation Flow						Inf	Inf
13/1 (Colliters Way (S) Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
13/2 (Colliters Way (S) Exit Lane 2)	Infinite Saturation Flow						Inf	Inf
14/1 (Bridgwater Road (W) Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
14/2 (Bridgwater Road (W) Exit Lane 2)	Infinite Saturation Flow						Inf	Inf

Scenario 1: '2018 Baseline AM' (FG1: '2018 Baseline AM', Plan 1: 'Network Control Plan 1')

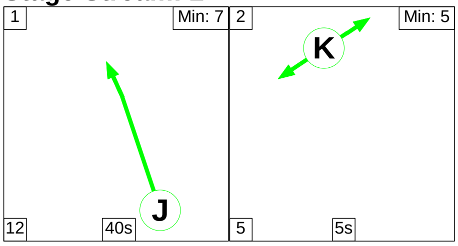
Stage Sequence Diagram

Stage Stream: 1

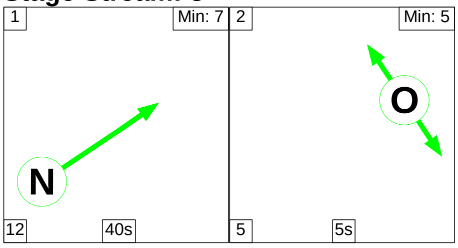


Full Input Data And Results

Stage Stream: 2



Stage Stream: 3



Stage Timings

Stage Stream: 1

Stage	1	2	3	4	6
Duration	8	0	8	7	7
Change Point	40	53	58	16	28

Stage Stream: 2

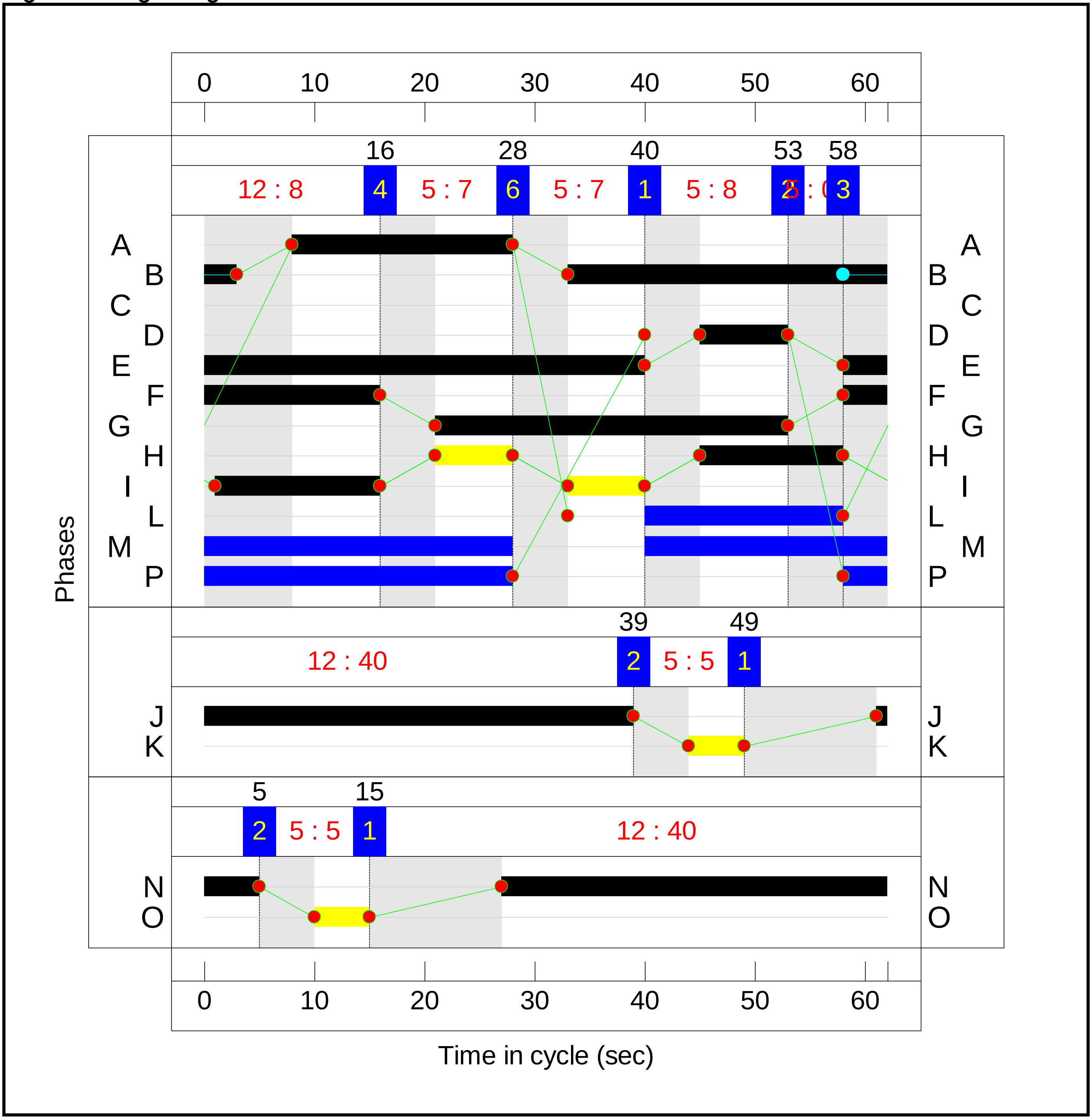
Stage	1	2
Duration	40	5
Change Point	49	39

Stage Stream: 3

Stage	1	2
Duration	40	5
Change Point	15	5

Full Input Data And Results

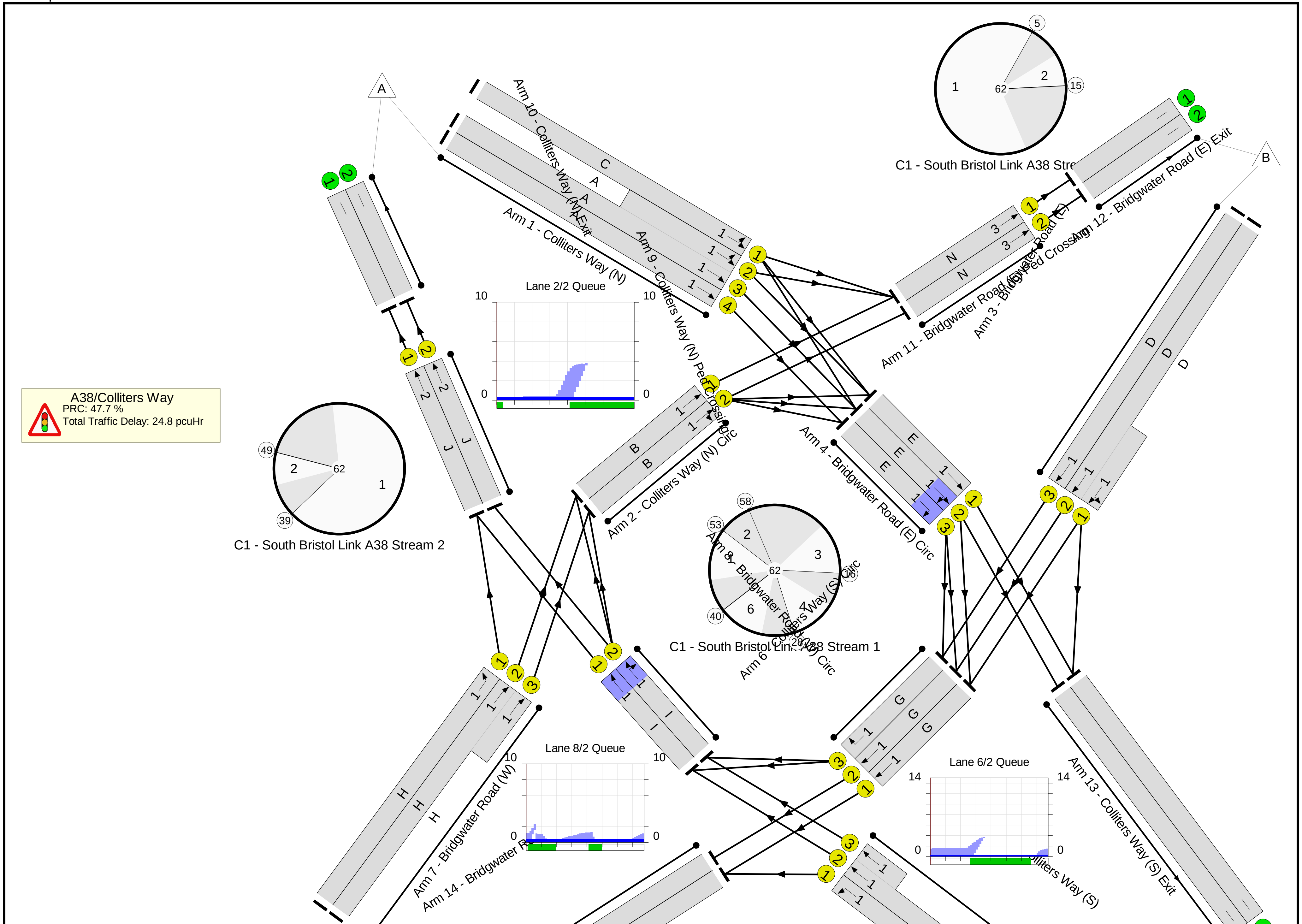
Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram

Full Input Data And Results



Full Input Data And Results

Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network: A38/Colliters Way	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**60.9%**
A38/Colliters Way	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**60.9%**
1/1	Colliters Way (N) Ahead Left	U	1	N/A	C		0	0	-	0	2105	0	0.0%
1/3+1/2	Colliters Way (N) Ahead Left	U	1	N/A	A		1	20	-	713	2052:1931	611+626	57.6 : 57.6%
1/4	Colliters Way (N) Ahead	U	1	N/A	A		1	20	-	168	2043	692	24.3%
2/1	Colliters Way (N) Circ Ahead	U	1	N/A	B		1	32	-	309	1972	1050	29.4%
2/2	Colliters Way (N) Circ Right Ahead	U	1	N/A	B		1	32	-	383	1974	1051	36.5%
3/2+3/1	Bridgwater Road (E) Ahead Left	U	1	N/A	D		1	8	-	319	2033:1895	295+275	55.2 : 56.7%
3/3	Bridgwater Road (E) Ahead	U	1	N/A	D		1	8	-	107	2052	298	35.9%
4/1	Bridgwater Road (E) Circ Ahead	U	1	N/A	E		1	44	-	333	1989	1444	23.1%
4/2	Bridgwater Road (E) Circ Right Ahead	U	1	N/A	E		1	44	-	455	1970	1430	31.8%
4/3	Bridgwater Road (E) Circ Right	U	1	N/A	E		1	44	-	168	1970	1430	11.7%
5/1	Colliters Way (S) Left	U	1	N/A	F		1	20	-	289	1914	648	44.6%
5/2+5/3	Colliters Way (S) Ahead	U	1	N/A	F		1	20	-	572	2080:2080	451+488	60.9 : 60.9%
6/1	Colliters Way (S) Circ Ahead	U	1	N/A	G		1	32	-	254	1956	1041	24.4%

Full Input Data And Results

6/2	Colliters Way (S) Circ Ahead	U	1	N/A	G		1	32	-	328	1956	1041	31.5%
6/3	Colliters Way (S) Circ Right	U	1	N/A	G		1	32	-	110	1923	1024	10.7%
7/1	Bridgwater Road (W) Left	U	1	N/A	H		2	20	-	403	1966	698	57.8%
7/2+7/3	Bridgwater Road (W) Ahead	U	1	N/A	H		2	20	-	683	2030:2099	555+684	55.2 : 55.2%
8/1	Bridgwater Road (W) Circ Ahead	U	1	N/A	I		2	22	-	316	2055	795	39.7%
8/2	Bridgwater Road (W) Circ Right Ahead	U	1	N/A	I		2	22	-	366	2045	792	46.2%
9/1	Colliters Way (N) Ped Crossing Ahead	U	2	N/A	J		1	40	-	719	2065	1366	52.7%
9/2	Colliters Way (N) Ped Crossing Ahead	U	2	N/A	J		1	40	-	357	2205	1458	24.5%
10/1	Colliters Way (N) Exit	U	N/A	N/A	-		-	-	-	719	Inf	Inf	0.0%
10/2	Colliters Way (N) Exit	U	N/A	N/A	-		-	-	-	357	Inf	Inf	0.0%
11/1	Bridgwater Road (E) Ped Crossing Ahead	U	3	N/A	N		1	40	-	477	2055	1359	35.1%
11/2	Bridgwater Road (E) Ped Crossing Ahead	U	3	N/A	N		1	40	-	140	2195	1452	9.6%
12/1	Bridgwater Road (E) Exit	U	N/A	N/A	-		-	-	-	477	Inf	Inf	0.0%
12/2	Bridgwater Road (E) Exit	U	N/A	N/A	-		-	-	-	140	Inf	Inf	0.0%
13/1	Colliters Way (S) Exit	U	N/A	N/A	-		-	-	-	352	Inf	Inf	0.0%
13/2	Colliters Way (S) Exit	U	N/A	N/A	-		-	-	-	338	Inf	Inf	0.0%

Full Input Data And Results

14/1	Bridgwater Road (W) Exit	U	N/A	N/A	-		-	-	-	543	Inf	Inf	0.0%
14/2	Bridgwater Road (W) Exit	U	N/A	N/A	-		-	-	-	328	Inf	Inf	0.0%

Full Input Data And Results

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network: A38/Colliters Way	**-**	**-**	**0**	**0**	**0**	**17.4**	**7.4**	**0.0**	**24.8**	**-**	**-**	**-**	**-**
A38/Colliters Way	**-**	**-**	**0**	**0**	**0**	**17.4**	**7.4**	**0.0**	**24.8**	**-**	**-**	**-**	**-**
1/1	0	0	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
1/3+1/2	713	713	-	-	-	3.3	0.7	-	4.0 (1.9+2.0)	20.0 (19.8:20.1)	5.0	0.7	5.7
1/4	168	168	-	-	-	0.7	0.2	-	0.9	18.2	2.1	0.2	2.2
2/1	309	309	-	-	-	0.3	0.2	-	0.5	6.1	2.8	0.2	3.0
2/2	383	383	-	-	-	0.4	0.3	-	0.7	6.6	3.5	0.3	3.8
3/2+3/1	319	319	-	-	-	2.2	0.6	-	2.8 (1.4+1.4)	31.8 (31.8:31.8)	2.6	0.6	3.2
3/3	107	107	-	-	-	0.7	0.3	-	1.0	33.3	1.6	0.3	1.9
4/1	333	333	-	-	-	0.2	0.1	-	0.4	3.9	1.4	0.1	1.6
4/2	455	455	-	-	-	0.2	0.2	-	0.4	3.1	0.9	0.2	1.1
4/3	168	168	-	-	-	0.0	0.1	-	0.1	1.4	0.0	0.1	0.1
5/1	289	289	-	-	-	1.3	0.4	-	1.7	21.0	3.9	0.4	4.3
5/2+5/3	572	572	-	-	-	2.5	0.8	-	3.3 (1.6+1.7)	20.6 (20.5:20.7)	4.0	0.8	4.7
6/1	254	254	-	-	-	0.6	0.2	-	0.7	10.2	2.0	0.2	2.1
6/2	328	328	-	-	-	0.7	0.2	-	1.0	10.6	3.4	0.2	3.7
6/3	110	110	-	-	-	0.3	0.1	-	0.3	10.8	0.6	0.1	0.7
7/1	403	403	-	-	-	0.9	0.7	-	1.6	14.5	3.4	0.7	4.0
7/2+7/3	683	683	-	-	-	1.5	0.6	-	2.1 (0.9+1.2)	11.3 (11.1:11.4)	3.0	0.6	3.7
8/1	316	316	-	-	-	0.2	0.3	-	0.5	6.0	0.7	0.3	1.0
8/2	366	366	-	-	-	0.3	0.4	-	0.7	7.1	1.9	0.4	2.3

Full Input Data And Results

9/1	719	719	-	-	-	0.6	0.6	-	1.1	5.6	3.5	0.6	4.1
9/2	357	357	-	-	-	0.1	0.2	-	0.2	2.3	0.2	0.2	0.4
10/1	719	719	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
10/2	357	357	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
11/1	477	477	-	-	-	0.4	0.3	-	0.7	5.4	2.9	0.3	3.1
11/2	140	140	-	-	-	0.0	0.1	-	0.1	1.9	0.1	0.1	0.1
12/1	477	477	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
12/2	140	140	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
13/1	352	352	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
13/2	338	338	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
14/1	543	543	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
14/2	328	328	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

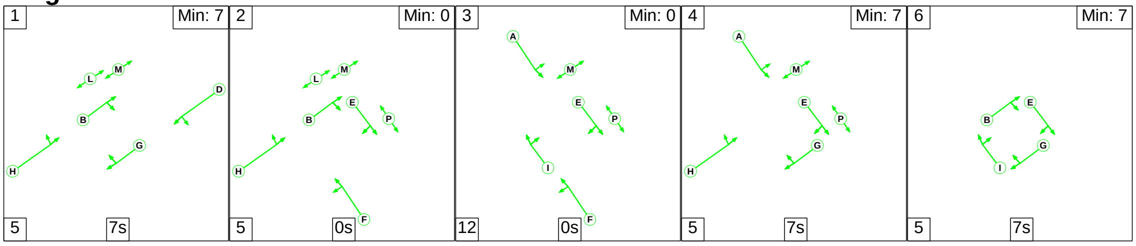
C1 - South Bristol Link A38 Stream: 1 PRC for Signalled Lanes (%): 47.7 Total Delay for Signalled Lanes (pcuHr): 22.66 Cycle Time (s): 62
C1 - South Bristol Link A38 Stream: 2 PRC for Signalled Lanes (%): 70.9 Total Delay for Signalled Lanes (pcuHr): 1.34 Cycle Time (s): 62
C1 - South Bristol Link A38 Stream: 3 PRC for Signalled Lanes (%): 156.4 Total Delay for Signalled Lanes (pcuHr): 0.79 Cycle Time (s): 62
PRC Over All Lanes (%): 47.7 Total Delay Over All Lanes(pcuHr): 24.79

Full Input Data And Results

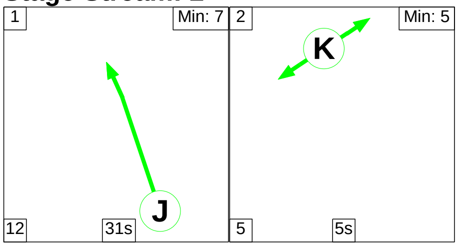
Scenario 2: '2018 Baseline Interpeak' (FG2: '2018 Baseline Interpeak', Plan 1: 'Network Control Plan 1')

Stage Sequence Diagram

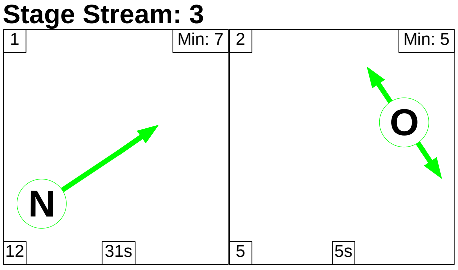
Stage Stream: 1



Stage Stream: 2



Stage Stream: 3



Stage Timings

Stage Stream: 1

Stage	1	2	3	4	6
Duration	7	0	0	7	7
Change Point	51	10	15	27	39

Stage Stream: 2

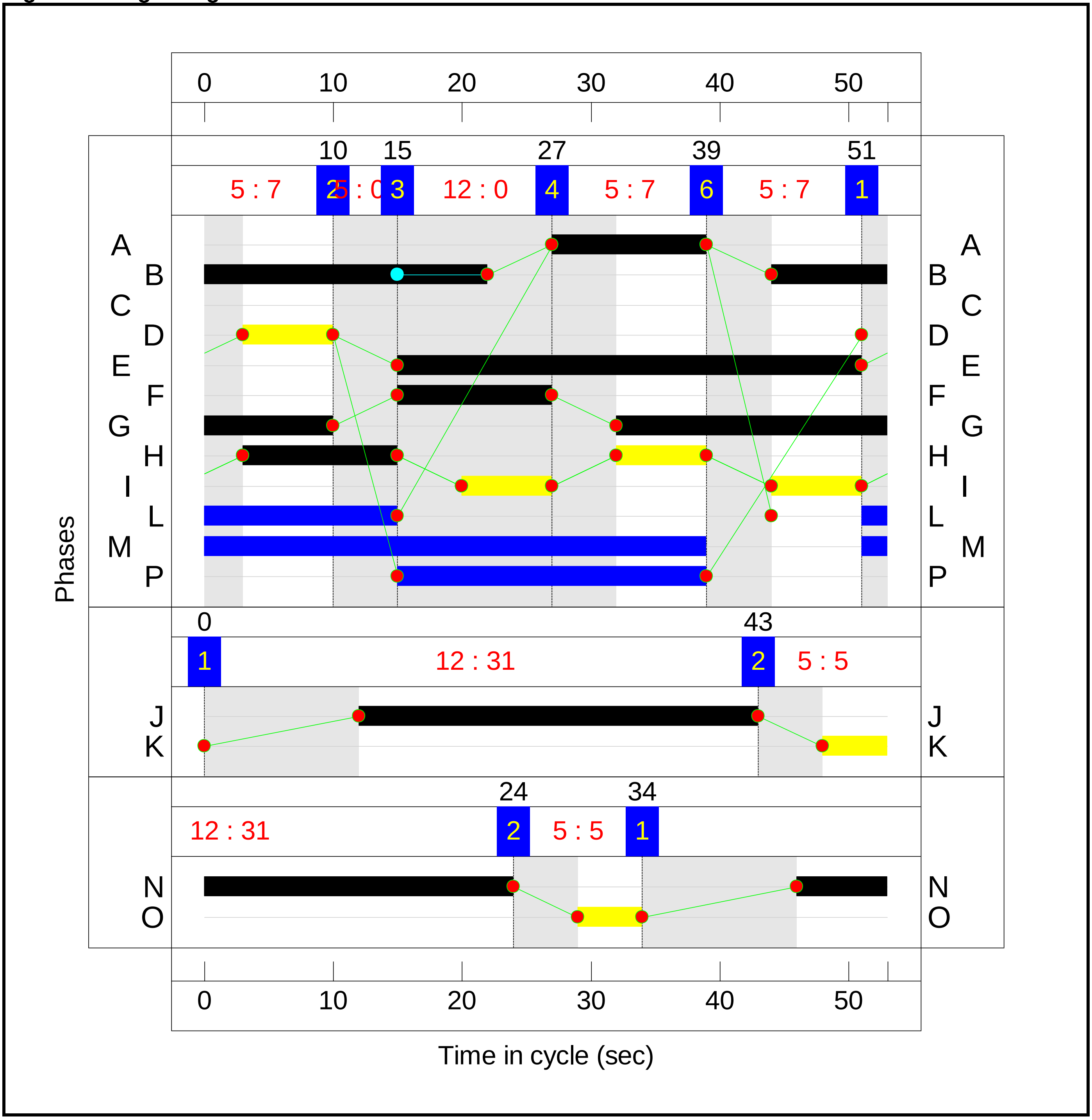
Stage	1	2
Duration	31	5
Change Point	0	43

Stage Stream: 3

Stage	1	2
Duration	31	5
Change Point	34	24

Full Input Data And Results

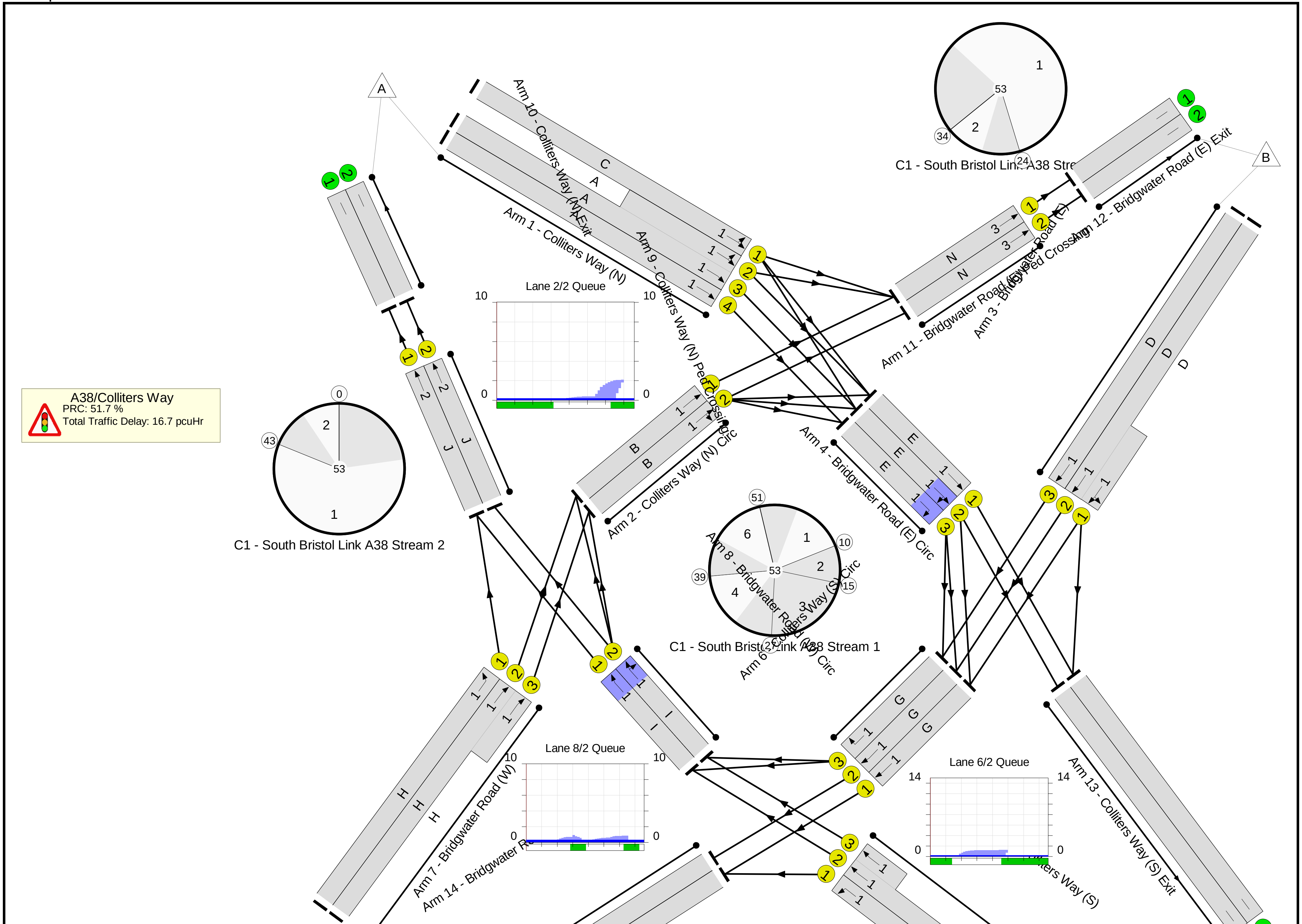
Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram

Full Input Data And Results



Full Input Data And Results

Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network: A38/Colliters Way	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**59.3%**
A38/Colliters Way	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**59.3%**
1/1	Colliters Way (N) Ahead Left	U	1	N/A	C		0	0	-	0	2105	0	0.0%
1/3+1/2	Colliters Way (N) Ahead Left	U	1	N/A	A		1	12	-	570	2052:1924	503+472	57.6 : 59.3%
1/4	Colliters Way (N) Ahead	U	1	N/A	A		1	12	-	179	2043	501	35.7%
2/1	Colliters Way (N) Circ Ahead	U	1	N/A	B		1	31	-	218	1972	1191	18.3%
2/2	Colliters Way (N) Circ Right Ahead	U	1	N/A	B		1	31	-	280	1973	1191	23.5%
3/2+3/1	Bridgwater Road (E) Ahead Left	U	1	N/A	D		1	7	-	264	2033:1895	307+286	44.0 : 45.1%
3/3	Bridgwater Road (E) Ahead	U	1	N/A	D		1	7	-	57	2052	310	18.4%
4/1	Bridgwater Road (E) Circ Ahead	U	1	N/A	E		1	36	-	319	1989	1389	23.0%
4/2	Bridgwater Road (E) Circ Right Ahead	U	1	N/A	E		1	36	-	365	1970	1375	26.5%
4/3	Bridgwater Road (E) Circ Right	U	1	N/A	E		1	36	-	180	1970	1375	13.1%
5/1	Colliters Way (S) Left	U	1	N/A	F		1	12	-	195	1914	469	41.5%
5/2+5/3	Colliters Way (S) Ahead	U	1	N/A	F		1	12	-	338	2080:2080	375+408	43.2 : 43.2%
6/1	Colliters Way (S) Circ Ahead	U	1	N/A	G		1	31	-	244	1956	1181	20.7%

Full Input Data And Results

6/2	Colliters Way (S) Circ Ahead	U	1	N/A	G		1	31	-	315	1956	1181	26.7%
6/3	Colliters Way (S) Circ Right	U	1	N/A	G		1	31	-	57	1923	1161	4.9%
7/1	Bridgwater Road (W) Left	U	1	N/A	H		2	19	-	368	1966	779	47.2%
7/2+7/3	Bridgwater Road (W) Ahead	U	1	N/A	H		2	19	-	477	2030:2099	628+778	33.9 : 33.9%
8/1	Bridgwater Road (W) Circ Ahead	U	1	N/A	I		2	14	-	174	2055	620	28.0%
8/2	Bridgwater Road (W) Circ Right Ahead	U	1	N/A	I		2	14	-	221	2042	616	35.9%
9/1	Colliters Way (N) Ped Crossing Ahead	U	2	N/A	J		1	31	-	542	2065	1247	43.5%
9/2	Colliters Way (N) Ped Crossing Ahead	U	2	N/A	J		1	31	-	200	2205	1331	15.0%
10/1	Colliters Way (N) Exit	U	N/A	N/A	-		-	-	-	542	Inf	Inf	0.0%
10/2	Colliters Way (N) Exit	U	N/A	N/A	-		-	-	-	200	Inf	Inf	0.0%
11/1	Bridgwater Road (E) Ped Crossing Ahead	U	3	N/A	N		1	31	-	291	2055	1241	23.5%
11/2	Bridgwater Road (E) Ped Crossing Ahead	U	3	N/A	N		1	31	-	92	2195	1325	6.9%
12/1	Bridgwater Road (E) Exit	U	N/A	N/A	-		-	-	-	291	Inf	Inf	0.0%
12/2	Bridgwater Road (E) Exit	U	N/A	N/A	-		-	-	-	92	Inf	Inf	0.0%
13/1	Colliters Way (S) Exit	U	N/A	N/A	-		-	-	-	336	Inf	Inf	0.0%
13/2	Colliters Way (S) Exit	U	N/A	N/A	-		-	-	-	233	Inf	Inf	0.0%

Full Input Data And Results

14/1	Bridgwater Road (W) Exit	U	N/A	N/A	-		-	-	-	439	Inf	Inf	0.0%
14/2	Bridgwater Road (W) Exit	U	N/A	N/A	-		-	-	-	315	Inf	Inf	0.0%

Full Input Data And Results

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network: A38/Colliters Way	**-**	**-**	**0**	**0**	**0**	**11.7**	**5.1**	**0.0**	**16.7**	**-**	**-**	**-**	**-**
A38/Colliters Way	**-**	**-**	**0**	**0**	**0**	**11.7**	**5.1**	**0.0**	**16.7**	**-**	**-**	**-**	**-**
1/1	0	0	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
1/3+1/2	570	570	-	-	-	2.8	0.7	-	3.5 (1.8+1.7)	22.1 (22.0:22.1)	3.7	0.7	4.4
1/4	179	179	-	-	-	0.8	0.3	-	1.1	22.1	2.1	0.3	2.4
2/1	218	218	-	-	-	0.2	0.1	-	0.3	5.0	1.5	0.1	1.6
2/2	280	280	-	-	-	0.3	0.2	-	0.4	5.7	2.0	0.2	2.1
3/2+3/1	264	264	-	-	-	1.5	0.4	-	1.9 (1.0+0.9)	26.0 (25.9:26.0)	1.8	0.4	2.2
3/3	57	57	-	-	-	0.3	0.1	-	0.4	26.8	0.7	0.1	0.8
4/1	319	319	-	-	-	0.1	0.1	-	0.2	2.6	0.7	0.1	0.8
4/2	365	365	-	-	-	0.1	0.2	-	0.2	2.3	0.4	0.2	0.6
4/3	180	180	-	-	-	0.0	0.1	-	0.1	1.5	0.0	0.1	0.1
5/1	195	195	-	-	-	0.9	0.4	-	1.3	23.4	2.4	0.4	2.7
5/2+5/3	338	338	-	-	-	1.5	0.4	-	1.9 (0.9+1.0)	20.5 (20.4:20.5)	2.1	0.4	2.5
6/1	244	244	-	-	-	0.3	0.1	-	0.5	6.7	0.9	0.1	1.0
6/2	315	315	-	-	-	0.4	0.2	-	0.6	6.4	1.0	0.2	1.2
6/3	57	57	-	-	-	0.1	0.0	-	0.1	8.5	0.3	0.0	0.3
7/1	368	368	-	-	-	0.6	0.4	-	1.1	10.3	1.9	0.4	2.4
7/2+7/3	477	477	-	-	-	0.7	0.3	-	1.0 (0.4+0.5)	7.4 (7.3:7.5)	1.3	0.3	1.6
8/1	174	174	-	-	-	0.1	0.2	-	0.3	6.1	0.4	0.2	0.5
8/2	221	221	-	-	-	0.2	0.3	-	0.5	7.5	0.7	0.3	0.9

Full Input Data And Results

9/1	542	542	-	-	-	0.4	0.4	-	0.8	5.0	3.0	0.4	3.4
9/2	200	200	-	-	-	0.1	0.1	-	0.2	4.3	0.5	0.1	0.6
10/1	542	542	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
10/2	200	200	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
11/1	291	291	-	-	-	0.2	0.2	-	0.4	4.7	1.2	0.2	1.3
11/2	92	92	-	-	-	0.0	0.0	-	0.1	2.0	0.0	0.0	0.1
12/1	291	291	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
12/2	92	92	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
13/1	336	336	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
13/2	233	233	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
14/1	439	439	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
14/2	315	315	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

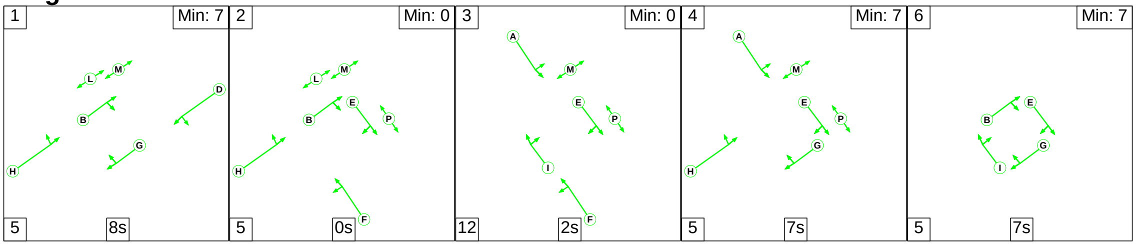
C1 - South Bristol Link A38 Stream: 1 PRC for Signalled Lanes (%): 51.7 Total Delay for Signalled Lanes (pcuHr): 15.33 Cycle Time (s): 53
C1 - South Bristol Link A38 Stream: 2 PRC for Signalled Lanes (%): 107.0 Total Delay for Signalled Lanes (pcuHr): 0.99 Cycle Time (s): 53
C1 - South Bristol Link A38 Stream: 3 PRC for Signalled Lanes (%): 283.7 Total Delay for Signalled Lanes (pcuHr): 0.43 Cycle Time (s): 53
PRC Over All Lanes (%): 51.7 Total Delay Over All Lanes(pcuHr): 16.75

Full Input Data And Results

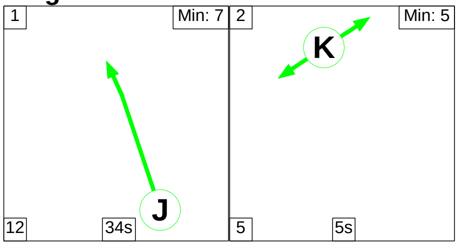
Scenario 3: '2018 Baseline PM' (FG3: '2018 Baseline PM', Plan 1: 'Network Control Plan 1')

Stage Sequence Diagram

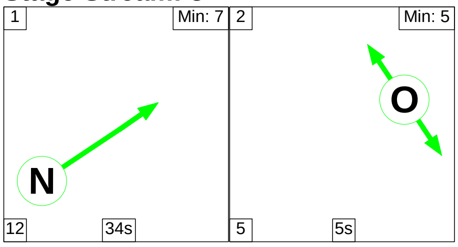
Stage Stream: 1



Stage Stream: 2



Stage Stream: 3



Stage Timings

Stage Stream: 1

Stage	1	2	3	4	6
Duration	8	0	2	7	7
Change Point	44	1	6	20	32

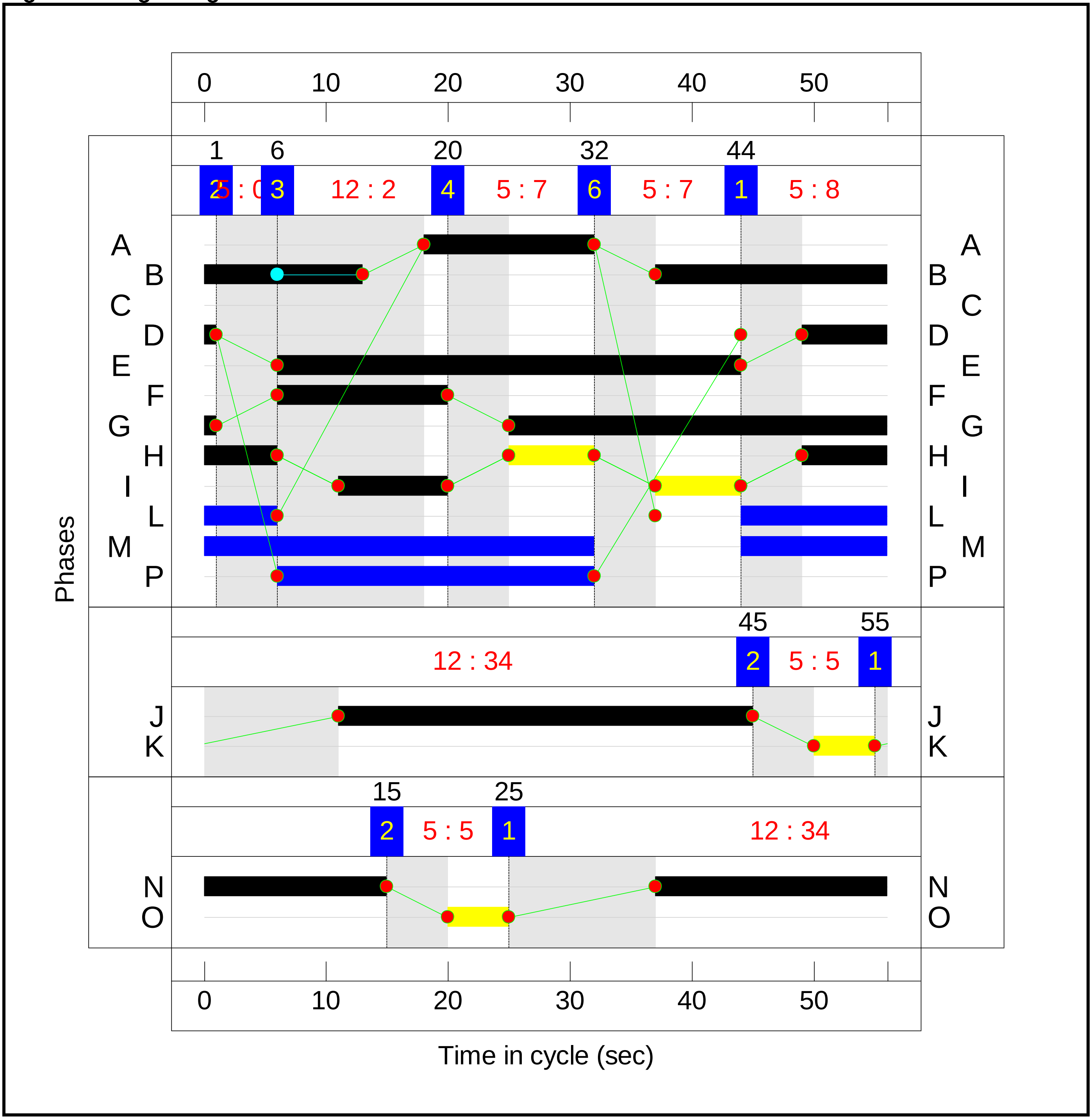
Stage Stream: 2

Stage	1	2
Duration	34	5
Change Point	55	45

Stage Stream: 3

Stage	1	2
Duration	34	5
Change Point	25	15

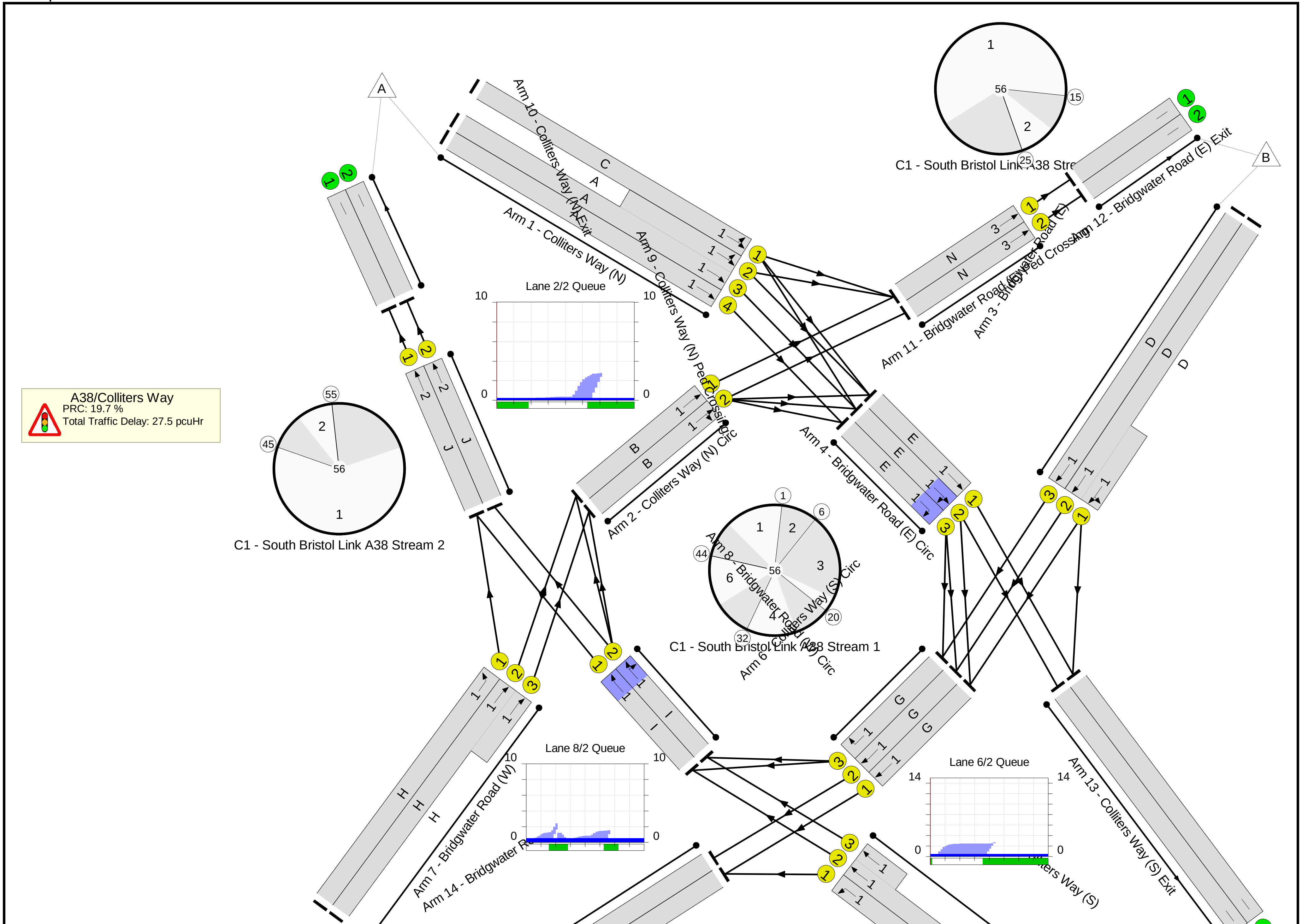
Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram

Full Input Data And Results



Full Input Data And Results

Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network: A38/Colliters Way	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**75.2%**
A38/Colliters Way	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**75.2%**
1/1	Colliters Way (N) Ahead Left	U	1	N/A	C		0	0	-	0	2105	0	0.0%
1/3+1/2	Colliters Way (N) Ahead Left	U	1	N/A	A		1	14	-	782	2052:1926	550+516	71.7 : 75.2%
1/4	Colliters Way (N) Ahead	U	1	N/A	A		1	14	-	296	2043	547	54.1%
2/1	Colliters Way (N) Circ Ahead	U	1	N/A	B		1	32	-	263	1972	1162	22.6%
2/2	Colliters Way (N) Circ Right Ahead	U	1	N/A	B		1	32	-	347	1971	1161	29.9%
3/2+3/1	Bridgwater Road (E) Ahead Left	U	1	N/A	D		1	8	-	441	2033:1895	327+305	67.9 : 71.9%
3/3	Bridgwater Road (E) Ahead	U	1	N/A	D		1	8	-	166	2052	330	50.3%
4/1	Bridgwater Road (E) Circ Ahead	U	1	N/A	E		1	38	-	423	1989	1385	30.5%
4/2	Bridgwater Road (E) Circ Right Ahead	U	1	N/A	E		1	38	-	498	1970	1372	36.3%
4/3	Bridgwater Road (E) Circ Right	U	1	N/A	E		1	38	-	296	1970	1372	21.6%
5/1	Colliters Way (S) Left	U	1	N/A	F		1	14	-	279	1914	513	54.4%
5/2+5/3	Colliters Way (S) Ahead	U	1	N/A	F		1	14	-	449	2080:2080	409+418	54.3 : 54.3%
6/1	Colliters Way (S) Circ Ahead	U	1	N/A	G		1	32	-	379	1956	1153	32.9%

Full Input Data And Results

6/2	Colliters Way (S) Circ Ahead	U	1	N/A	G		1	32	-	518	1956	1153	44.9%
6/3	Colliters Way (S) Circ Right	U	1	N/A	G		1	32	-	166	1923	1133	14.6%
7/1	Bridgwater Road (W) Left	U	1	N/A	H		2	20	-	303	1966	772	39.2%
7/2+7/3	Bridgwater Road (W) Ahead	U	1	N/A	H		2	20	-	602	2030:2099	585+759	44.8 : 44.8%
8/1	Bridgwater Road (W) Circ Ahead	U	1	N/A	I		2	16	-	291	2055	661	44.1%
8/2	Bridgwater Road (W) Circ Right Ahead	U	1	N/A	I		2	16	-	324	2045	657	49.3%
9/1	Colliters Way (N) Ped Crossing Ahead	U	2	N/A	J		1	34	-	594	2065	1291	46.0%
9/2	Colliters Way (N) Ped Crossing Ahead	U	2	N/A	J		1	34	-	316	2205	1378	22.9%
10/1	Colliters Way (N) Exit	U	N/A	N/A	-		-	-	-	594	Inf	Inf	0.0%
10/2	Colliters Way (N) Exit	U	N/A	N/A	-		-	-	-	316	Inf	Inf	0.0%
11/1	Bridgwater Road (E) Ped Crossing Ahead	U	3	N/A	N		1	34	-	386	2055	1284	30.1%
11/2	Bridgwater Road (E) Ped Crossing Ahead	U	3	N/A	N		1	34	-	85	2195	1372	6.2%
12/1	Bridgwater Road (E) Exit	U	N/A	N/A	-		-	-	-	386	Inf	Inf	0.0%
12/2	Bridgwater Road (E) Exit	U	N/A	N/A	-		-	-	-	85	Inf	Inf	0.0%
13/1	Colliters Way (S) Exit	U	N/A	N/A	-		-	-	-	442	Inf	Inf	0.0%
13/2	Colliters Way (S) Exit	U	N/A	N/A	-		-	-	-	319	Inf	Inf	0.0%

Full Input Data And Results

14/1	Bridgwater Road (W) Exit	U	N/A	N/A	-		-	-	-	658	Inf	Inf	0.0%
14/2	Bridgwater Road (W) Exit	U	N/A	N/A	-		-	-	-	518	Inf	Inf	0.0%

Full Input Data And Results

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network: A38/Colliters Way	**-**	**-**	**0**	**0**	**0**	**18.5**	**9.0**	**0.0**	**27.5**	**-**	**-**	**-**	**-**
A38/Colliters Way	**-**	**-**	**0**	**0**	**0**	**18.5**	**9.0**	**0.0**	**27.5**	**-**	**-**	**-**	**-**
1/1	0	0	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
1/3+1/2	782	782	-	-	-	4.1	1.4	-	5.4 (2.7+2.7)	25.0 (24.9:25.1)	5.5	1.4	6.9
1/4	296	296	-	-	-	1.4	0.6	-	2.0	24.7	3.9	0.6	4.5
2/1	263	263	-	-	-	0.2	0.1	-	0.4	5.1	1.9	0.1	2.0
2/2	347	347	-	-	-	0.3	0.2	-	0.5	5.6	2.6	0.2	2.8
3/2+3/1	441	441	-	-	-	2.7	1.1	-	3.9 (1.9+1.9)	31.6 (31.5:31.7)	3.2	1.1	4.4
3/3	166	166	-	-	-	1.0	0.5	-	1.5	32.4	2.4	0.5	2.9
4/1	423	423	-	-	-	0.2	0.2	-	0.4	3.4	1.3	0.2	1.5
4/2	498	498	-	-	-	0.1	0.3	-	0.4	2.9	0.7	0.3	1.0
4/3	296	296	-	-	-	0.0	0.1	-	0.1	1.7	0.0	0.1	0.1
5/1	279	279	-	-	-	1.4	0.6	-	2.0	25.2	3.6	0.6	4.2
5/2+5/3	449	449	-	-	-	2.1	0.6	-	2.7 (1.3+1.4)	21.6 (21.5:21.6)	2.9	0.6	3.5
6/1	379	379	-	-	-	0.7	0.2	-	1.0	9.4	1.9	0.2	2.2
6/2	518	518	-	-	-	0.8	0.4	-	1.2	8.4	2.3	0.4	2.7
6/3	166	166	-	-	-	0.4	0.1	-	0.5	11.3	1.1	0.1	1.2
7/1	303	303	-	-	-	0.5	0.3	-	0.8	10.0	1.8	0.3	2.1
7/2+7/3	602	602	-	-	-	1.0	0.4	-	1.4 (0.6+0.8)	8.5 (8.4:8.6)	2.0	0.4	2.4
8/1	291	291	-	-	-	0.2	0.4	-	0.6	8.0	0.8	0.4	1.2
8/2	324	324	-	-	-	0.3	0.5	-	0.8	9.0	1.9	0.5	2.4

Full Input Data And Results

9/1	594	594	-	-	-	0.5	0.4	-	0.9	5.7	2.6	0.4	3.0
9/2	316	316	-	-	-	0.0	0.1	-	0.2	2.1	0.1	0.1	0.2
10/1	594	594	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
10/2	316	316	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
11/1	386	386	-	-	-	0.3	0.2	-	0.5	5.1	2.0	0.2	2.2
11/2	85	85	-	-	-	0.0	0.0	-	0.0	2.0	0.0	0.0	0.1
12/1	386	386	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
12/2	85	85	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
13/1	442	442	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
13/2	319	319	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
14/1	658	658	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
14/2	518	518	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

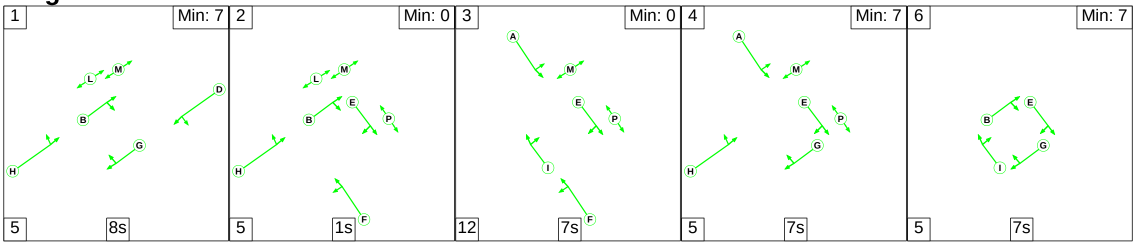
C1 - South Bristol Link A38 Stream: 1 PRC for Signalled Lanes (%): 19.7 Total Delay for Signalled Lanes (pcuHr): 25.75 Cycle Time (s): 56
C1 - South Bristol Link A38 Stream: 2 PRC for Signalled Lanes (%): 95.5 Total Delay for Signalled Lanes (pcuHr): 1.12 Cycle Time (s): 56
C1 - South Bristol Link A38 Stream: 3 PRC for Signalled Lanes (%): 199.5 Total Delay for Signalled Lanes (pcuHr): 0.59 Cycle Time (s): 56
PRC Over All Lanes (%): 19.7 Total Delay Over All Lanes(pcuHr): 27.46

Full Input Data And Results

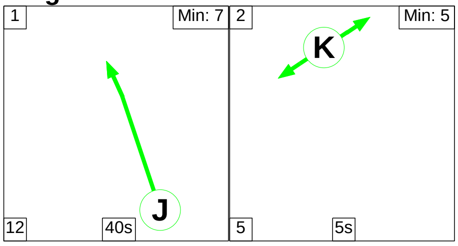
Scenario 4: '2030 Baseline AM' (FG4: '2030 Baseline AM', Plan 1: 'Network Control Plan 1')

Stage Sequence Diagram

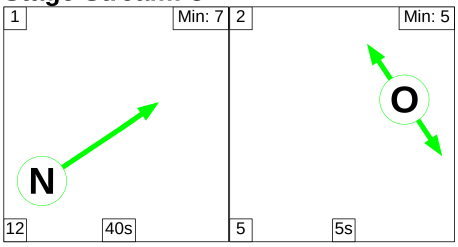
Stage Stream: 1



Stage Stream: 2



Stage Stream: 3



Stage Timings

Stage Stream: 1

Stage	1	2	3	4	6
Duration	8	1	7	7	7
Change Point	42	55	61	18	30

Stage Stream: 2

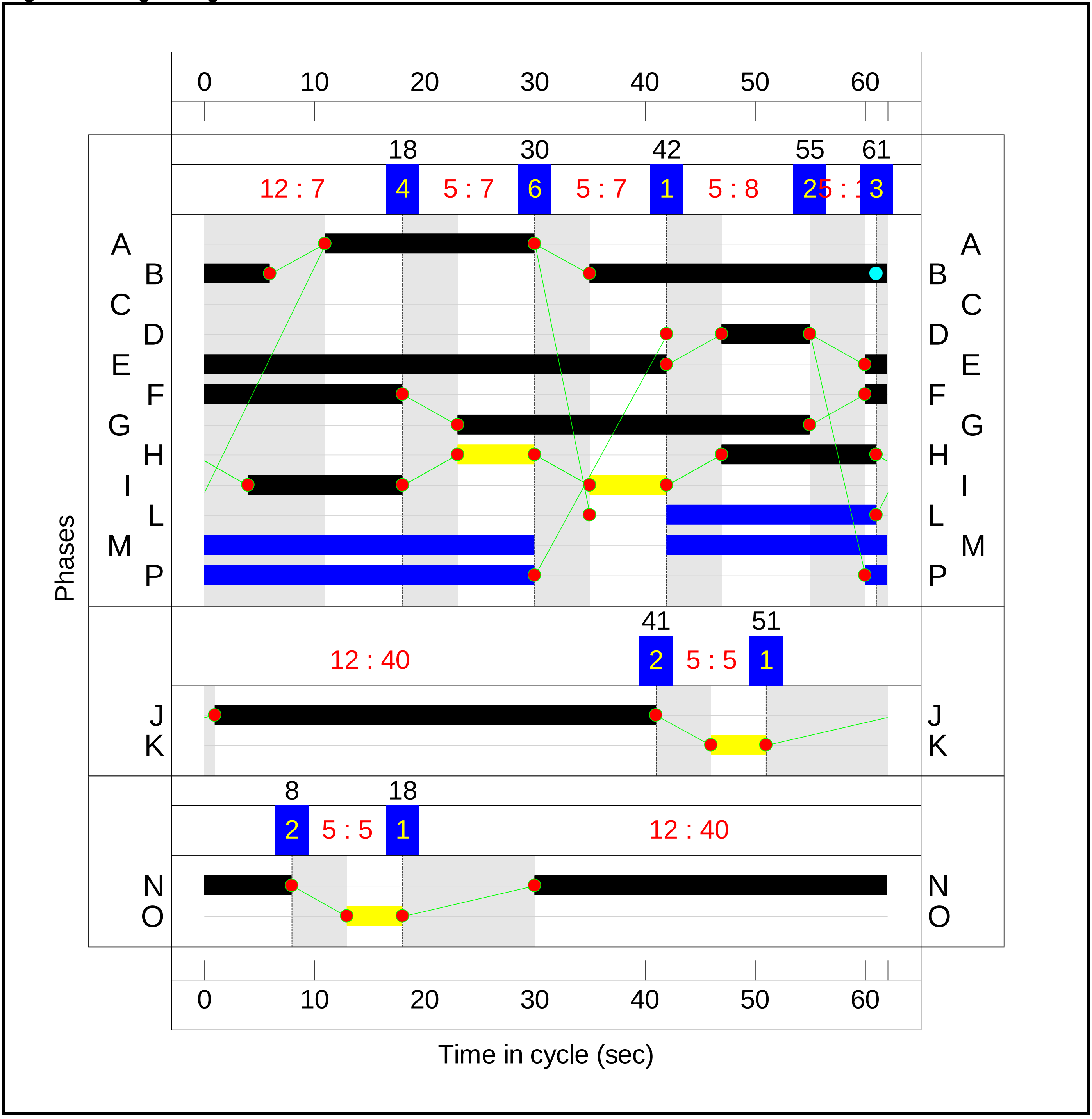
Stage	1	2
Duration	40	5
Change Point	51	41

Stage Stream: 3

Stage	1	2
Duration	40	5
Change Point	18	8

Full Input Data And Results

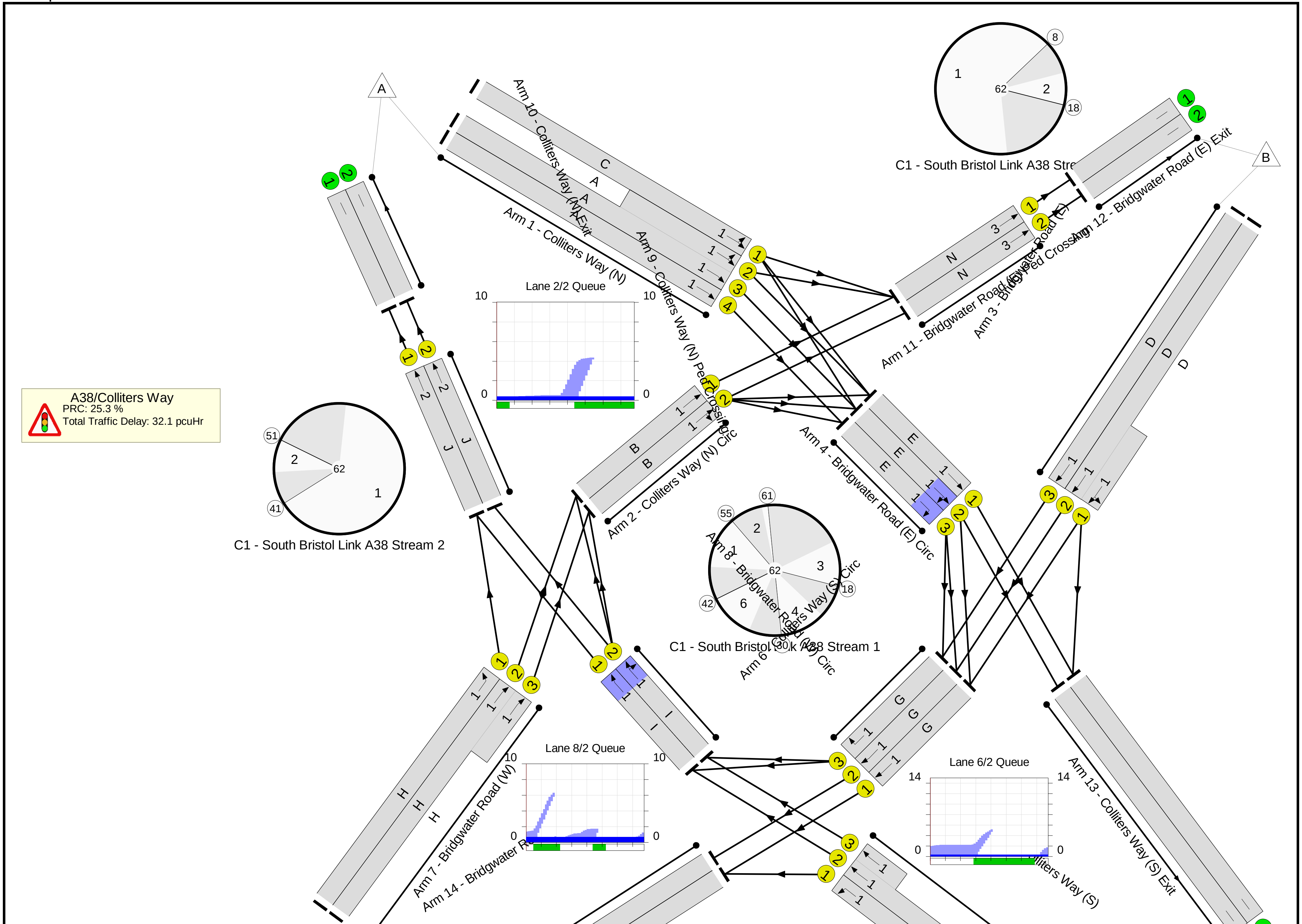
Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram

Full Input Data And Results



Full Input Data And Results

Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network: A38/Colliters Way	-	-	**N/A**	-	-		-	-	-	-	-	-	**71.8%**
A38/Colliters Way	-	-	**N/A**	-	-		-	-	-	-	-	-	**71.8%**
1/1	Colliters Way (N) Ahead Left	U	1	N/A	C		0	0	-	0	2105	0	0.0%
1/3+1/2	Colliters Way (N) Ahead Left	U	1	N/A	A		1	19	-	815	2052:1932	605+610	67.1 : 67.1%
1/4	Colliters Way (N) Ahead	U	1	N/A	A		1	19	-	226	2043	659	34.3%
2/1	Colliters Way (N) Circ Ahead	U	1	N/A	B		1	33	-	363	1972	1081	33.6%
2/2	Colliters Way (N) Circ Right Ahead	U	1	N/A	B		1	33	-	455	1974	1083	42.0%
3/2+3/1	Bridgwater Road (E) Ahead Left	U	1	N/A	D		1	8	-	377	2033:1895	295+275	64.7 : 67.6%
3/3	Bridgwater Road (E) Ahead	U	1	N/A	D		1	8	-	126	2052	298	42.3%
4/1	Bridgwater Road (E) Circ Ahead	U	1	N/A	E		1	44	-	380	1989	1444	26.3%
4/2	Bridgwater Road (E) Circ Right Ahead	U	1	N/A	E		1	44	-	524	1970	1430	36.6%
4/3	Bridgwater Road (E) Circ Right	U	1	N/A	E		1	44	-	226	1970	1430	15.8%
5/1	Colliters Way (S) Left	U	1	N/A	F		1	20	-	341	1914	648	52.6%
5/2+5/3	Colliters Way (S) Ahead	U	1	N/A	F		1	20	-	675	2080:2080	452+487	71.8 : 71.8%
6/1	Colliters Way (S) Circ Ahead	U	1	N/A	G		1	32	-	273	1956	1041	26.2%

Full Input Data And Results

6/2	Colliters Way (S) Circ Ahead	U	1	N/A	G		1	32	-	414	1956	1041	39.8%
6/3	Colliters Way (S) Circ Right	U	1	N/A	G		1	32	-	129	1923	1024	12.6%
7/1	Bridgwater Road (W) Left	U	1	N/A	H		2	21	-	477	1966	729	65.4%
7/2+7/3	Bridgwater Road (W) Ahead	U	1	N/A	H		2	21	-	808	2030:2099	564+702	63.8 : 63.8%
8/1	Bridgwater Road (W) Circ Ahead	U	1	N/A	I		2	21	-	372	2055	762	48.8%
8/2	Bridgwater Road (W) Circ Right Ahead	U	1	N/A	I		2	21	-	432	2045	759	56.9%
9/1	Colliters Way (N) Ped Crossing Ahead	U	2	N/A	J		1	40	-	849	2065	1366	62.2%
9/2	Colliters Way (N) Ped Crossing Ahead	U	2	N/A	J		1	40	-	422	2205	1458	28.9%
10/1	Colliters Way (N) Exit	U	N/A	N/A	-		-	-	-	849	Inf	Inf	0.0%
10/2	Colliters Way (N) Exit	U	N/A	N/A	-		-	-	-	422	Inf	Inf	0.0%
11/1	Bridgwater Road (E) Ped Crossing Ahead	U	3	N/A	N		1	40	-	562	2055	1359	41.4%
11/2	Bridgwater Road (E) Ped Crossing Ahead	U	3	N/A	N		1	40	-	167	2195	1452	11.5%
12/1	Bridgwater Road (E) Exit	U	N/A	N/A	-		-	-	-	562	Inf	Inf	0.0%
12/2	Bridgwater Road (E) Exit	U	N/A	N/A	-		-	-	-	167	Inf	Inf	0.0%
13/1	Colliters Way (S) Exit	U	N/A	N/A	-		-	-	-	403	Inf	Inf	0.0%
13/2	Colliters Way (S) Exit	U	N/A	N/A	-		-	-	-	414	Inf	Inf	0.0%

Full Input Data And Results

14/1	Bridgwater Road (W) Exit	U	N/A	N/A	-		-	-	-	614	Inf	Inf	0.0%
14/2	Bridgwater Road (W) Exit	U	N/A	N/A	-		-	-	-	414	Inf	Inf	0.0%

Full Input Data And Results

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network: A38/Colliters Way	**-**	**-**	**0**	**0**	**0**	**21.6**	**10.6**	**0.0**	**32.1**	**-**	**-**	**-**	**-**
A38/Colliters Way	**-**	**-**	**0**	**0**	**0**	**21.6**	**10.6**	**0.0**	**32.1**	**-**	**-**	**-**	**-**
1/1	0	0	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
1/3+1/2	815	815	-	-	-	4.1	1.0	-	5.1 (2.5+2.6)	22.4 (22.2:22.5)	6.0	1.0	7.0
1/4	226	226	-	-	-	1.0	0.3	-	1.3	20.2	3.0	0.3	3.2
2/1	363	363	-	-	-	0.4	0.3	-	0.6	6.1	3.2	0.3	3.4
2/2	455	455	-	-	-	0.5	0.4	-	0.8	6.7	4.0	0.4	4.4
3/2+3/1	377	377	-	-	-	2.6	1.0	-	3.6 (1.8+1.8)	34.3 (34.2:34.4)	3.1	1.0	4.0
3/3	126	126	-	-	-	0.8	0.4	-	1.2	34.6	2.0	0.4	2.3
4/1	380	380	-	-	-	0.3	0.2	-	0.5	4.3	1.8	0.2	2.0
4/2	524	524	-	-	-	0.2	0.3	-	0.5	3.2	1.2	0.3	1.5
4/3	226	226	-	-	-	0.0	0.1	-	0.1	1.5	0.0	0.1	0.1
5/1	341	341	-	-	-	1.6	0.6	-	2.1	22.3	4.6	0.6	5.2
5/2+5/3	675	675	-	-	-	3.0	1.3	-	4.3 (2.1+2.2)	23.0 (22.9:23.1)	5.8	1.3	7.1
6/1	273	273	-	-	-	0.8	0.2	-	0.9	12.3	2.3	0.2	2.4
6/2	414	414	-	-	-	1.0	0.3	-	1.3	11.7	4.9	0.3	5.2
6/3	129	129	-	-	-	0.4	0.1	-	0.4	12.1	0.8	0.1	0.9
7/1	477	477	-	-	-	1.1	0.9	-	2.0	15.4	4.0	0.9	4.9
7/2+7/3	808	808	-	-	-	1.8	0.9	-	2.7 (1.2+1.5)	11.8 (11.6:12.0)	3.6	0.9	4.5
8/1	372	372	-	-	-	0.3	0.5	-	0.8	7.5	2.1	0.5	2.5
8/2	432	432	-	-	-	0.5	0.7	-	1.1	9.3	5.6	0.7	6.3

Full Input Data And Results

9/1	849	849	-	-	-	0.7	0.8	-	1.5	6.5	4.3	0.8	5.1
9/2	422	422	-	-	-	0.1	0.2	-	0.3	2.5	0.3	0.2	0.5
10/1	849	849	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
10/2	422	422	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
11/1	562	562	-	-	-	0.5	0.4	-	0.9	5.6	3.5	0.4	3.8
11/2	167	167	-	-	-	0.0	0.1	-	0.1	1.9	0.1	0.1	0.1
12/1	562	562	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
12/2	167	167	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
13/1	403	403	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
13/2	414	414	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
14/1	614	614	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
14/2	414	414	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

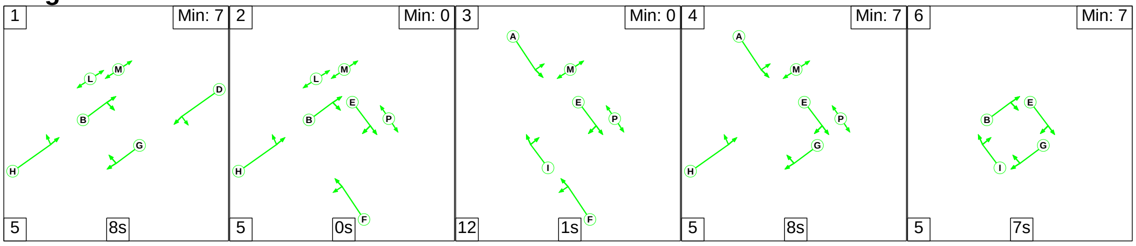
C1 - South Bristol Link A38	Stream: 1	PRC for Signalled Lanes (%):	25.3	Total Delay for Signalled Lanes (pcuHr):	29.35	Cycle Time (s):	62
C1 - South Bristol Link A38	Stream: 2	PRC for Signalled Lanes (%):	44.8	Total Delay for Signalled Lanes (pcuHr):	1.82	Cycle Time (s):	62
C1 - South Bristol Link A38	Stream: 3	PRC for Signalled Lanes (%):	117.6	Total Delay for Signalled Lanes (pcuHr):	0.97	Cycle Time (s):	62
		PRC Over All Lanes (%):	25.3	Total Delay Over All Lanes(pcuHr):	32.14		

Full Input Data And Results

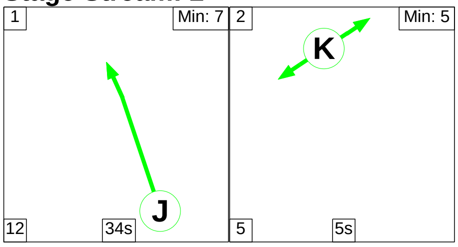
Scenario 5: '2030 Baseline Interpeak' (FG5: '2030 Baseline Interpeak', Plan 1: 'Network Control Plan 1')

Stage Sequence Diagram

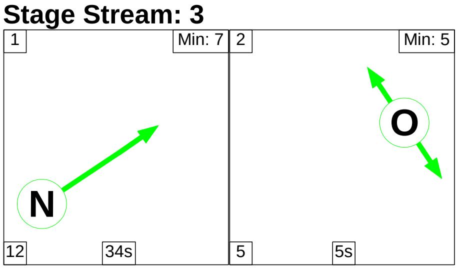
Stage Stream: 1



Stage Stream: 2



Stage Stream: 3



Stage Timings

Stage Stream: 1

Stage	1	2	3	4	6
Duration	8	0	1	8	7
Change Point	53	10	15	28	41

Stage Stream: 2

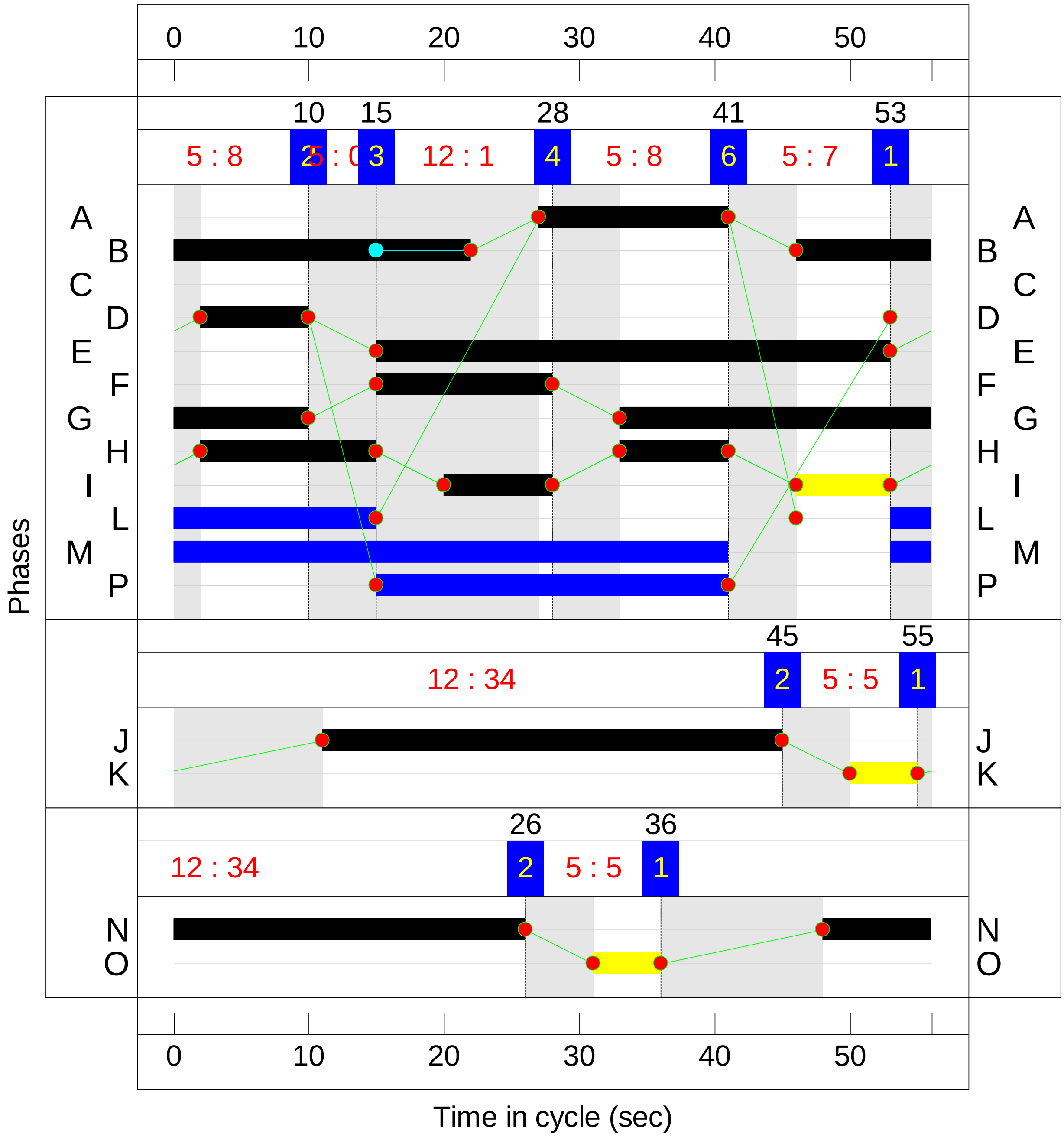
Stage	1	2
Duration	34	5
Change Point	55	45

Stage Stream: 3

Stage	1	2
Duration	34	5
Change Point	36	26

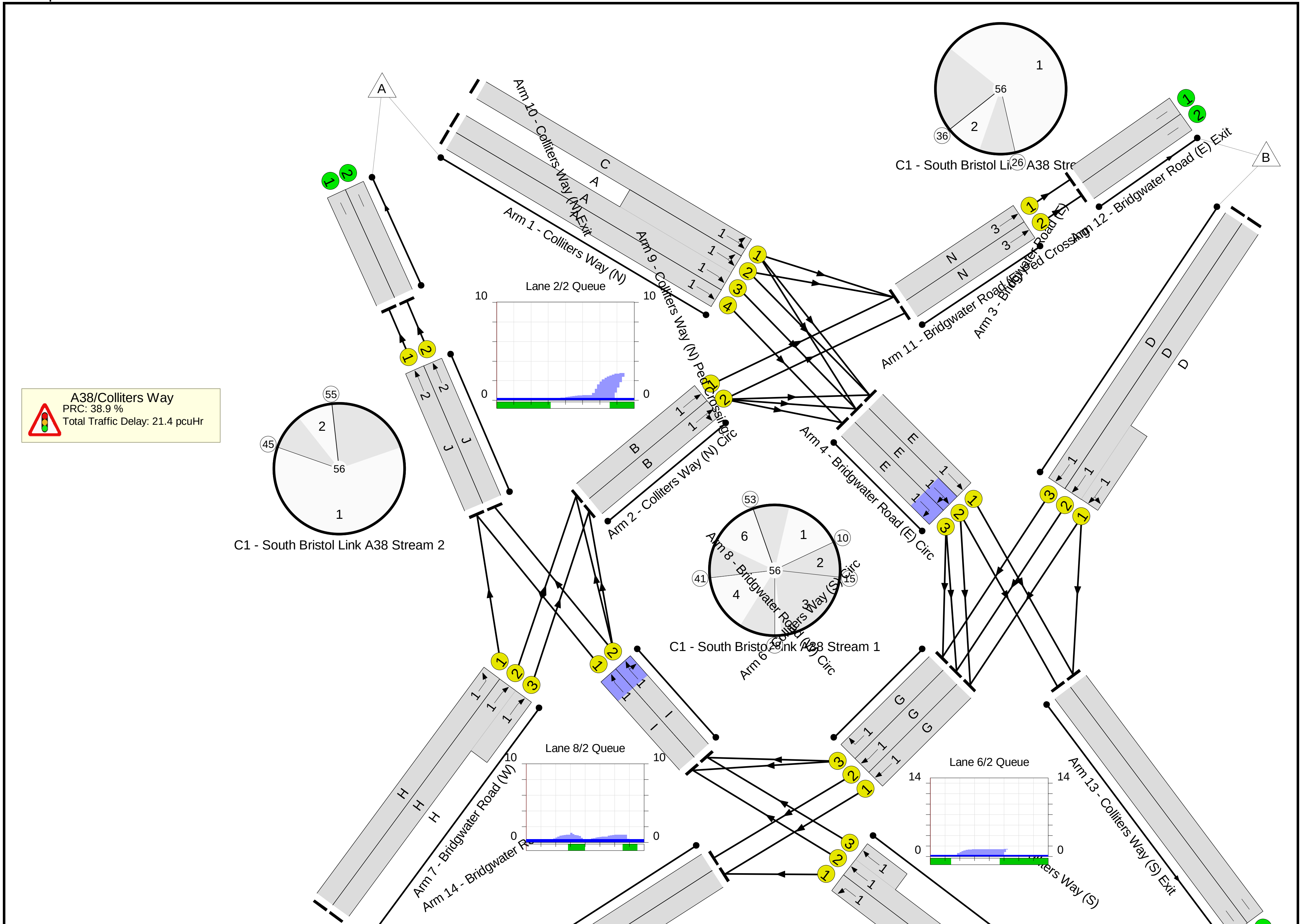
Full Input Data And Results

Signal Timings Diagram



Full Input Data And Results
Network Layout Diagram

Full Input Data And Results



Full Input Data And Results

Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network: A38/Colliters Way	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**64.8%**
A38/Colliters Way	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**64.8%**
1/1	Colliters Way (N) Ahead Left	U	1	N/A	C		0	0	-	0	2105	0	0.0%
1/3+1/2	Colliters Way (N) Ahead Left	U	1	N/A	A		1	14	-	676	2052:1925	550+516	62.2 : 64.8%
1/4	Colliters Way (N) Ahead	U	1	N/A	A		1	14	-	234	2043	547	42.8%
2/1	Colliters Way (N) Circ Ahead	U	1	N/A	B		1	32	-	268	1972	1162	23.1%
2/2	Colliters Way (N) Circ Right Ahead	U	1	N/A	B		1	32	-	336	1973	1163	28.9%
3/2+3/1	Bridgwater Road (E) Ahead Left	U	1	N/A	D		1	8	-	322	2033:1895	327+305	50.5 : 51.6%
3/3	Bridgwater Road (E) Ahead	U	1	N/A	D		1	8	-	69	2052	330	20.9%
4/1	Bridgwater Road (E) Circ Ahead	U	1	N/A	E		1	38	-	380	1989	1385	27.4%
4/2	Bridgwater Road (E) Circ Right Ahead	U	1	N/A	E		1	38	-	436	1970	1372	31.8%
4/3	Bridgwater Road (E) Circ Right	U	1	N/A	E		1	38	-	234	1970	1372	17.1%
5/1	Colliters Way (S) Left	U	1	N/A	F		1	13	-	237	1914	479	49.5%
5/2+5/3	Colliters Way (S) Ahead	U	1	N/A	F		1	13	-	411	2080:2080	385+402	52.3 : 52.3%
6/1	Colliters Way (S) Circ Ahead	U	1	N/A	G		1	33	-	282	1956	1188	23.7%

Full Input Data And Results

6/2	Colliters Way (S) Circ Ahead	U	1	N/A	G		1	33	-	399	1956	1188	33.6%
6/3	Colliters Way (S) Circ Right	U	1	N/A	G		1	33	-	69	1923	1168	5.9%
7/1	Bridgwater Road (W) Left	U	1	N/A	H		2	21	-	447	1966	807	55.4%
7/2+7/3	Bridgwater Road (W) Ahead	U	1	N/A	H		2	21	-	579	2030:2099	660+793	39.8 : 39.8%
8/1	Bridgwater Road (W) Circ Ahead	U	1	N/A	I		2	15	-	215	2055	624	34.5%
8/2	Bridgwater Road (W) Circ Right Ahead	U	1	N/A	I		2	15	-	265	2042	620	42.7%
9/1	Colliters Way (N) Ped Crossing Ahead	U	2	N/A	J		1	34	-	662	2065	1291	51.3%
9/2	Colliters Way (N) Ped Crossing Ahead	U	2	N/A	J		1	34	-	240	2205	1378	17.4%
10/1	Colliters Way (N) Exit	U	N/A	N/A	-		-	-	-	662	Inf	Inf	0.0%
10/2	Colliters Way (N) Exit	U	N/A	N/A	-		-	-	-	240	Inf	Inf	0.0%
11/1	Bridgwater Road (E) Ped Crossing Ahead	U	3	N/A	N		1	34	-	356	2055	1284	27.7%
11/2	Bridgwater Road (E) Ped Crossing Ahead	U	3	N/A	N		1	34	-	108	2195	1372	7.9%
12/1	Bridgwater Road (E) Exit	U	N/A	N/A	-		-	-	-	356	Inf	Inf	0.0%
12/2	Bridgwater Road (E) Exit	U	N/A	N/A	-		-	-	-	108	Inf	Inf	0.0%
13/1	Colliters Way (S) Exit	U	N/A	N/A	-		-	-	-	401	Inf	Inf	0.0%
13/2	Colliters Way (S) Exit	U	N/A	N/A	-		-	-	-	290	Inf	Inf	0.0%

Full Input Data And Results

14/1	Bridgwater Road (W) Exit	U	N/A	N/A	-		-	-	-	519	Inf	Inf	0.0%
14/2	Bridgwater Road (W) Exit	U	N/A	N/A	-		-	-	-	399	Inf	Inf	0.0%

Full Input Data And Results

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network: A38/Colliters Way	**-**	**-**	**0**	**0**	**0**	**14.7**	**6.7**	**0.0**	**21.4**	**-**	**-**	**-**	**-**
A38/Colliters Way	**-**	**-**	**0**	**0**	**0**	**14.7**	**6.7**	**0.0**	**21.4**	**-**	**-**	**-**	**-**
1/1	0	0	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
1/3+1/2	676	676	-	-	-	3.4	0.9	-	4.3 (2.1+2.1)	22.7 (22.6:22.8)	4.7	0.9	5.5
1/4	234	234	-	-	-	1.1	0.4	-	1.5	22.7	3.0	0.4	3.4
2/1	268	268	-	-	-	0.3	0.1	-	0.4	5.6	2.0	0.1	2.1
2/2	336	336	-	-	-	0.4	0.2	-	0.6	6.6	2.6	0.2	2.8
3/2+3/1	322	322	-	-	-	1.9	0.5	-	2.4 (1.3+1.2)	27.3 (27.3:27.3)	2.3	0.5	2.9
3/3	69	69	-	-	-	0.4	0.1	-	0.5	27.4	0.9	0.1	1.1
4/1	380	380	-	-	-	0.2	0.2	-	0.3	3.3	1.1	0.2	1.3
4/2	436	436	-	-	-	0.1	0.2	-	0.3	2.8	0.7	0.2	0.9
4/3	234	234	-	-	-	0.0	0.1	-	0.1	1.6	0.0	0.1	0.1
5/1	237	237	-	-	-	1.2	0.5	-	1.7	25.4	3.1	0.5	3.6
5/2+5/3	411	411	-	-	-	2.0	0.5	-	2.5 (1.2+1.3)	22.3 (22.2:22.3)	2.7	0.5	3.2
6/1	282	282	-	-	-	0.4	0.2	-	0.5	6.6	1.0	0.2	1.2
6/2	399	399	-	-	-	0.4	0.3	-	0.7	6.0	1.1	0.3	1.4
6/3	69	69	-	-	-	0.1	0.0	-	0.1	7.2	0.3	0.0	0.3
7/1	447	447	-	-	-	0.8	0.6	-	1.4	11.3	2.7	0.6	3.3
7/2+7/3	579	579	-	-	-	0.9	0.3	-	1.2 (0.6+0.7)	7.7 (7.7:7.8)	1.8	0.3	2.1
8/1	215	215	-	-	-	0.1	0.3	-	0.4	6.5	0.4	0.3	0.7
8/2	265	265	-	-	-	0.2	0.4	-	0.6	8.3	0.8	0.4	1.2

Full Input Data And Results

9/1	662	662	-	-	-	0.4	0.5	-	1.0	5.2	3.8	0.5	4.3
9/2	240	240	-	-	-	0.2	0.1	-	0.3	3.9	0.6	0.1	0.7
10/1	662	662	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
10/2	240	240	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
11/1	356	356	-	-	-	0.3	0.2	-	0.5	4.7	1.4	0.2	1.6
11/2	108	108	-	-	-	0.0	0.0	-	0.0	1.6	0.0	0.0	0.1
12/1	356	356	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
12/2	108	108	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
13/1	401	401	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
13/2	290	290	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
14/1	519	519	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
14/2	399	399	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

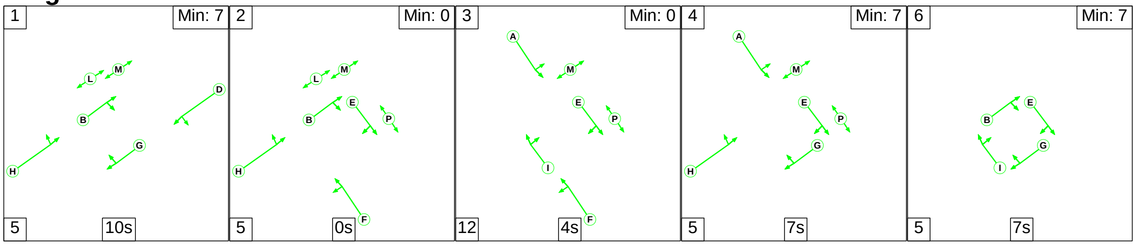
C1 - South Bristol Link A38 Stream: 1 PRC for Signalled Lanes (%): 38.9 Total Delay for Signalled Lanes (pcuHr): 19.70 Cycle Time (s): 56
C1 - South Bristol Link A38 Stream: 2 PRC for Signalled Lanes (%): 75.5 Total Delay for Signalled Lanes (pcuHr): 1.22 Cycle Time (s): 56
C1 - South Bristol Link A38 Stream: 3 PRC for Signalled Lanes (%): 224.7 Total Delay for Signalled Lanes (pcuHr): 0.51 Cycle Time (s): 56
PRC Over All Lanes (%): 38.9 Total Delay Over All Lanes(pcuHr): 21.44

Full Input Data And Results

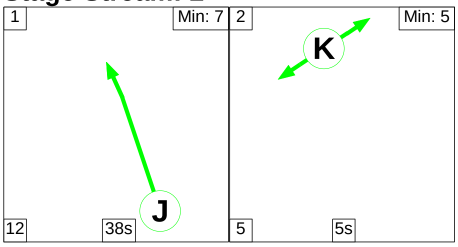
Scenario 6: '2030 Baseline PM' (FG6: '2030 Baseline PM', Plan 1: 'Network Control Plan 1')

Stage Sequence Diagram

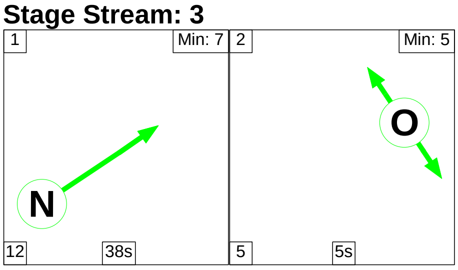
Stage Stream: 1



Stage Stream: 2



Stage Stream: 3



Stage Timings

Stage Stream: 1

Stage	1	2	3	4	6
Duration	10	0	4	7	7
Change Point	45	0	5	21	33

Stage Stream: 2

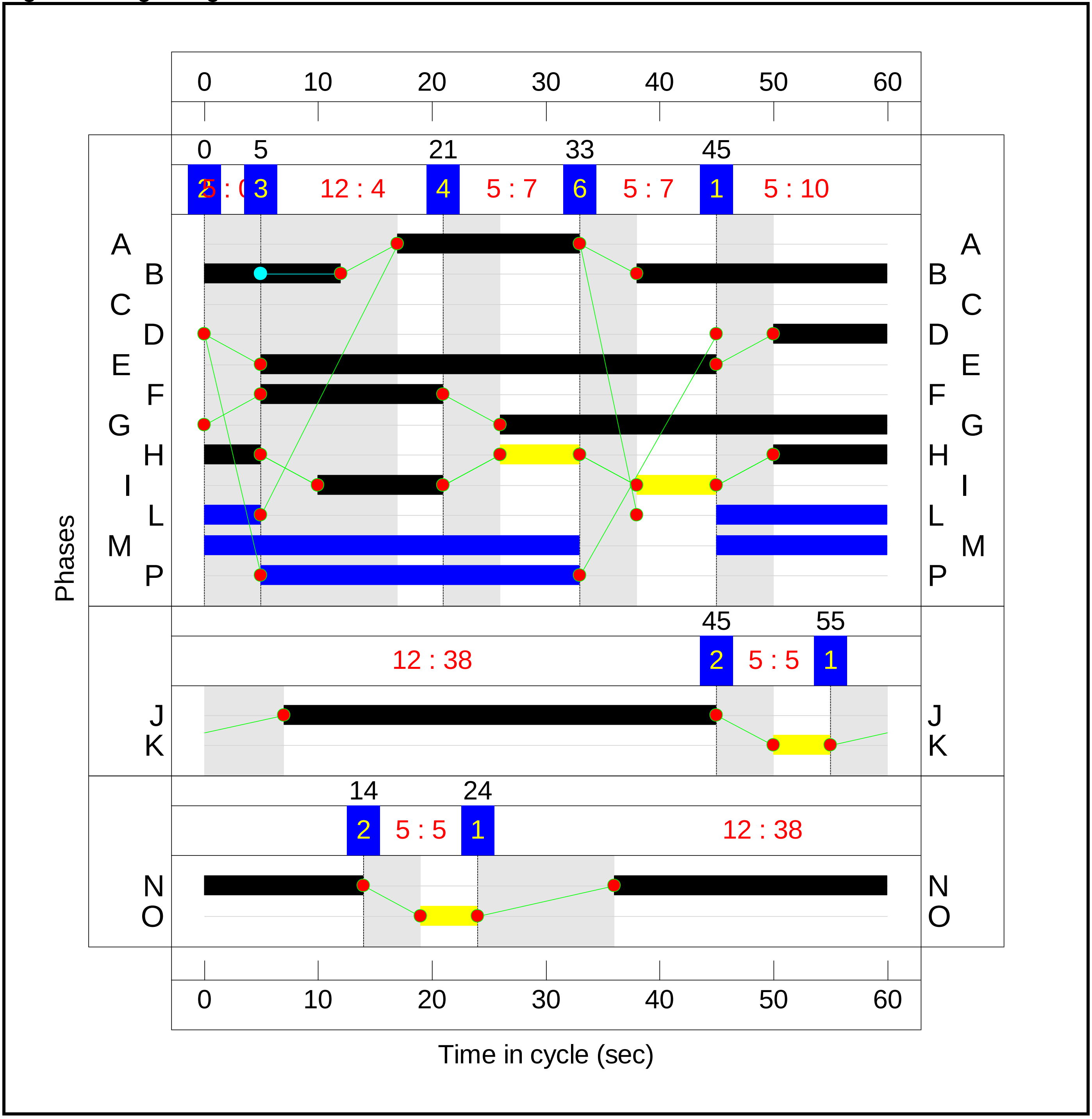
Stage	1	2
Duration	38	5
Change Point	55	45

Stage Stream: 3

Stage	1	2
Duration	38	5
Change Point	24	14

Full Input Data And Results

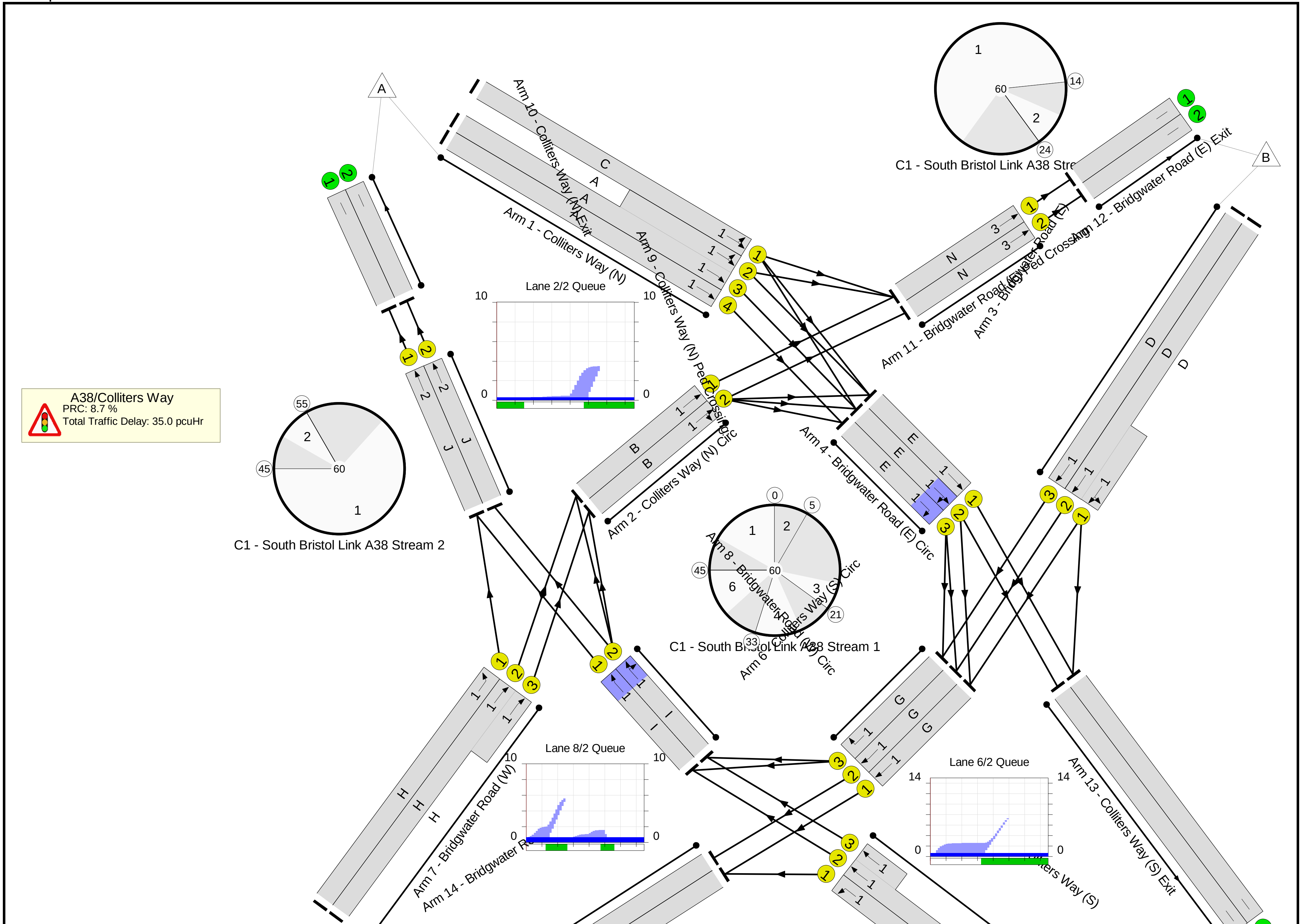
Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram

Full Input Data And Results



Full Input Data And Results

Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network: A38/Colliters Way	-	-	**N/A**	-	-		-	-	-	-	-	-	**82.8%**
A38/Colliters Way	-	-	**N/A**	-	-		-	-	-	-	-	-	**82.8%**
1/1	Colliters Way (N) Ahead Left	U	1	N/A	C		0	0	-	0	2105	0	0.0%
1/3+1/2	Colliters Way (N) Ahead Left	U	1	N/A	A		1	16	-	906	2052:1926	550+546	82.6 : 82.8%
1/4	Colliters Way (N) Ahead	U	1	N/A	A		1	16	-	369	2043	579	63.7%
2/1	Colliters Way (N) Circ Ahead	U	1	N/A	B		1	34	-	317	1972	1150	27.6%
2/2	Colliters Way (N) Circ Right Ahead	U	1	N/A	B		1	34	-	405	1970	1149	35.2%
3/2+3/1	Bridgwater Road (E) Ahead Left	U	1	N/A	D		1	10	-	523	2033:1895	373+347	70.6 : 74.8%
3/3	Bridgwater Road (E) Ahead	U	1	N/A	D		1	10	-	197	2052	376	52.4%
4/1	Bridgwater Road (E) Circ Ahead	U	1	N/A	E		1	40	-	487	1989	1359	35.8%
4/2	Bridgwater Road (E) Circ Right Ahead	U	1	N/A	E		1	40	-	585	1970	1346	43.5%
4/3	Bridgwater Road (E) Circ Right	U	1	N/A	E		1	40	-	369	1970	1346	27.4%
5/1	Colliters Way (S) Left	U	1	N/A	F		1	16	-	330	1914	542	60.9%
5/2+5/3	Colliters Way (S) Ahead	U	1	N/A	F		1	16	-	531	2080:2080	425+417	63.0 : 63.0%
6/1	Colliters Way (S) Circ Ahead	U	1	N/A	G		1	34	-	430	1956	1141	37.7%

Full Input Data And Results

6/2	Colliters Way (S) Circ Ahead	U	1	N/A	G		1	34	-	632	1956	1141	55.4%
6/3	Colliters Way (S) Circ Right	U	1	N/A	G		1	34	-	197	1923	1122	17.6%
7/1	Bridgwater Road (W) Left	U	1	N/A	H		2	22	-	359	1966	786	45.7%
7/2+7/3	Bridgwater Road (W) Ahead	U	1	N/A	H		2	22	-	713	2030:2099	593+745	53.3 : 53.3%
8/1	Bridgwater Road (W) Circ Ahead	U	1	N/A	I		2	18	-	347	2055	685	50.7%
8/2	Bridgwater Road (W) Circ Right Ahead	U	1	N/A	I		2	18	-	381	2045	682	55.9%
9/1	Colliters Way (N) Ped Crossing Ahead	U	2	N/A	J		1	38	-	706	2065	1342	52.6%
9/2	Colliters Way (N) Ped Crossing Ahead	U	2	N/A	J		1	38	-	372	2205	1433	26.0%
10/1	Colliters Way (N) Exit	U	N/A	N/A	-		-	-	-	706	Inf	Inf	0.0%
10/2	Colliters Way (N) Exit	U	N/A	N/A	-		-	-	-	372	Inf	Inf	0.0%
11/1	Bridgwater Road (E) Ped Crossing Ahead	U	3	N/A	N		1	38	-	462	2055	1336	34.6%
11/2	Bridgwater Road (E) Ped Crossing Ahead	U	3	N/A	N		1	38	-	94	2195	1427	6.6%
12/1	Bridgwater Road (E) Exit	U	N/A	N/A	-		-	-	-	462	Inf	Inf	0.0%
12/2	Bridgwater Road (E) Exit	U	N/A	N/A	-		-	-	-	94	Inf	Inf	0.0%
13/1	Colliters Way (S) Exit	U	N/A	N/A	-		-	-	-	510	Inf	Inf	0.0%
13/2	Colliters Way (S) Exit	U	N/A	N/A	-		-	-	-	392	Inf	Inf	0.0%

Full Input Data And Results

14/1	Bridgwater Road (W) Exit	U	N/A	N/A	-		-	-	-	760	Inf	Inf	0.0%
14/2	Bridgwater Road (W) Exit	U	N/A	N/A	-		-	-	-	632	Inf	Inf	0.0%

Full Input Data And Results

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network: A38/Colliters Way	**-**	**-**	**0**	**0**	**0**	**22.8**	**12.2**	**0.0**	**35.0**	**-**	**-**	**-**	**-**
A38/Colliters Way	**-**	**-**	**0**	**0**	**0**	**22.8**	**12.2**	**0.0**	**35.0**	**-**	**-**	**-**	**-**
1/1	0	0	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
1/3+1/2	906	906	-	-	-	5.0	2.3	-	7.4 (3.7+3.7)	29.2 (29.1:29.4)	7.0	2.3	9.4
1/4	369	369	-	-	-	1.9	0.9	-	2.8	27.3	5.3	0.9	6.2
2/1	317	317	-	-	-	0.3	0.2	-	0.5	5.3	2.5	0.2	2.7
2/2	405	405	-	-	-	0.4	0.3	-	0.7	6.0	3.2	0.3	3.5
3/2+3/1	523	523	-	-	-	3.4	1.3	-	4.7 (2.3+2.3)	32.1 (32.0:32.2)	4.1	1.3	5.4
3/3	197	197	-	-	-	1.2	0.5	-	1.8	32.1	3.0	0.5	3.5
4/1	487	487	-	-	-	0.3	0.3	-	0.6	4.4	1.9	0.3	2.2
4/2	585	585	-	-	-	0.2	0.4	-	0.6	3.7	1.3	0.4	1.7
4/3	369	369	-	-	-	0.0	0.2	-	0.2	1.9	0.0	0.2	0.2
5/1	330	330	-	-	-	1.7	0.8	-	2.5	27.0	4.7	0.8	5.4
5/2+5/3	531	531	-	-	-	2.6	0.8	-	3.5 (1.7+1.7)	23.4 (23.5:23.4)	3.6	0.8	4.5
6/1	430	430	-	-	-	0.7	0.3	-	1.1	8.8	2.3	0.3	2.6
6/2	632	632	-	-	-	0.8	0.6	-	1.5	8.4	6.6	0.6	7.2
6/3	197	197	-	-	-	0.4	0.1	-	0.5	8.6	0.9	0.1	1.1
7/1	359	359	-	-	-	0.7	0.4	-	1.1	10.9	2.4	0.4	2.8
7/2+7/3	713	713	-	-	-	1.3	0.6	-	1.9 (0.8+1.1)	9.5 (9.4:9.6)	2.6	0.6	3.2
8/1	347	347	-	-	-	0.3	0.5	-	0.8	8.8	2.0	0.5	2.5
8/2	381	381	-	-	-	0.5	0.6	-	1.1	10.4	4.9	0.6	5.6

Full Input Data And Results

9/1	706	706	-	-	-	0.6	0.6	-	1.1	5.6	3.3	0.6	3.8
9/2	372	372	-	-	-	0.0	0.2	-	0.2	2.2	0.1	0.2	0.3
10/1	706	706	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
10/2	372	372	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
11/1	462	462	-	-	-	0.4	0.3	-	0.6	4.8	2.5	0.3	2.8
11/2	94	94	-	-	-	0.0	0.0	-	0.0	1.9	0.0	0.0	0.1
12/1	462	462	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
12/2	94	94	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
13/1	510	510	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
13/2	392	392	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
14/1	760	760	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
14/2	632	632	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

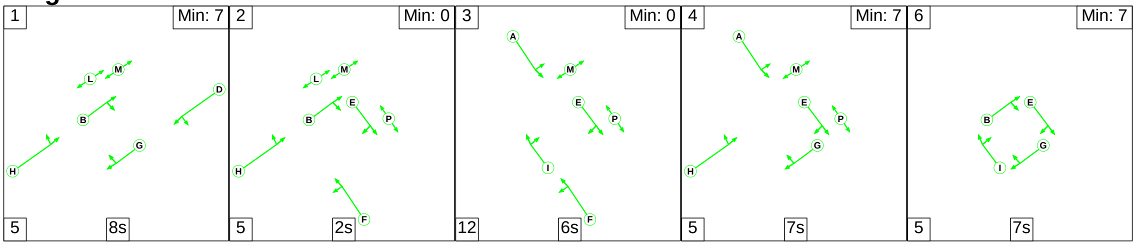
C1 - South Bristol Link A38	Stream: 1	PRC for Signalled Lanes (%):	8.7	Total Delay for Signalled Lanes (pcuHr):	32.95	Cycle Time (s):	60
C1 - South Bristol Link A38	Stream: 2	PRC for Signalled Lanes (%):	71.1	Total Delay for Signalled Lanes (pcuHr):	1.33	Cycle Time (s):	60
C1 - South Bristol Link A38	Stream: 3	PRC for Signalled Lanes (%):	160.2	Total Delay for Signalled Lanes (pcuHr):	0.67	Cycle Time (s):	60
		PRC Over All Lanes (%):	8.7	Total Delay Over All Lanes(pcuHr):	34.95		

Full Input Data And Results

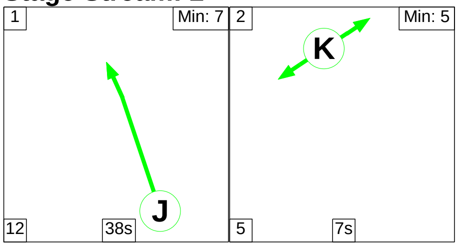
Scenario 7: '2030 10 MPPA AM' (FG7: '2030 10 MPPA AM', Plan 1: 'Network Control Plan 1')

Stage Sequence Diagram

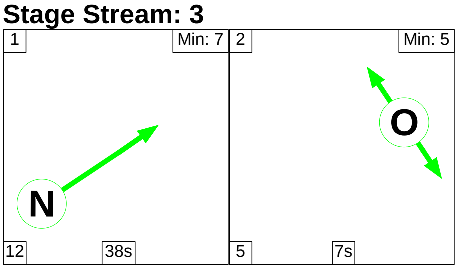
Stage Stream: 1



Stage Stream: 2



Stage Stream: 3



Stage Timings

Stage Stream: 1

Stage	1	2	3	4	6
Duration	8	2	6	7	7
Change Point	0	13	20	38	50

Stage Stream: 2

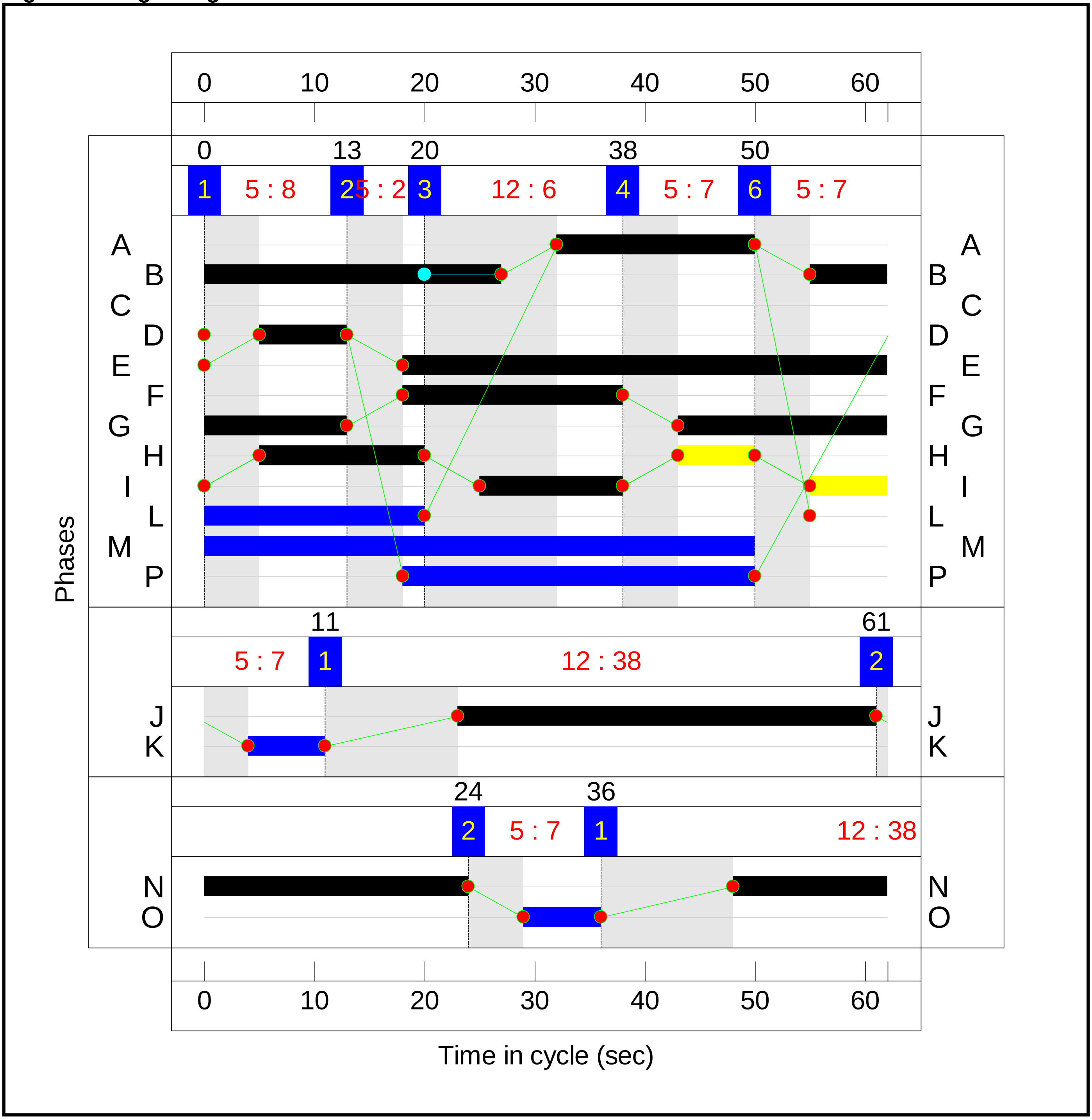
Stage	1	2
Duration	38	7
Change Point	11	61

Stage Stream: 3

Stage	1	2
Duration	38	7
Change Point	36	24

Full Input Data And Results

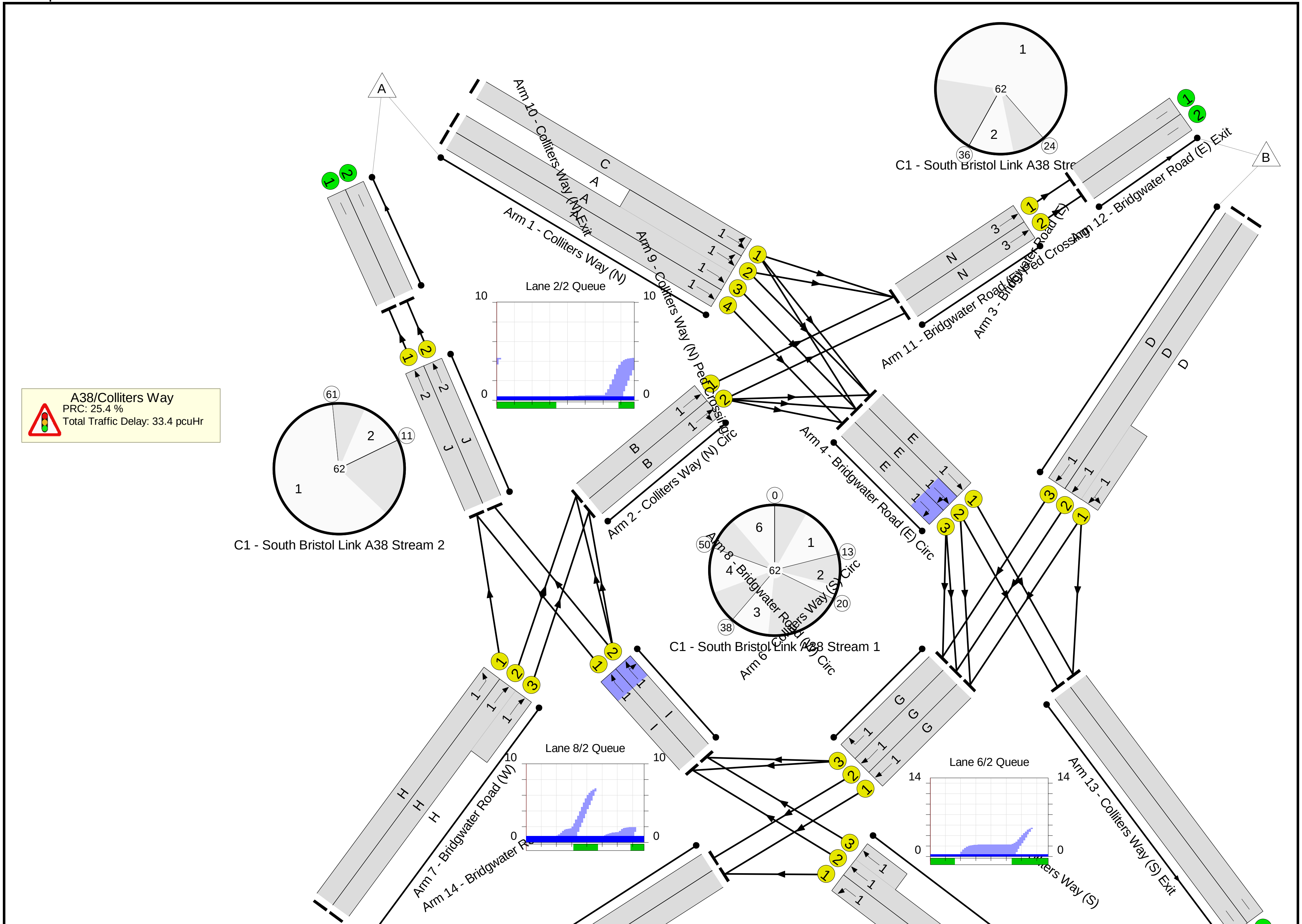
Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram

Full Input Data And Results



Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network: A38/Colliters Way	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**71.8%**
A38/Colliters Way	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**71.8%**
1/1	Colliters Way (N) Ahead Left	U	1	N/A	C		0	0	-	0	2105	0	0.0%
1/3+1/2	Colliters Way (N) Ahead Left	U	1	N/A	A		1	18	-	812	2052:1932	586+592	68.9 : 68.9%
1/4	Colliters Way (N) Ahead	U	1	N/A	A		1	18	-	241	2043	626	38.5%
2/1	Colliters Way (N) Circ Ahead	U	1	N/A	B		1	34	-	361	1972	1113	32.4%
2/2	Colliters Way (N) Circ Right Ahead	U	1	N/A	B		1	34	-	467	1975	1115	41.9%
3/2+3/1	Bridgwater Road (E) Ahead Left	U	1	N/A	D		1	8	-	385	2033:1895	295+275	65.7 : 69.4%
3/3	Bridgwater Road (E) Ahead	U	1	N/A	D		1	8	-	126	2052	298	42.3%
4/1	Bridgwater Road (E) Circ Ahead	U	1	N/A	E		1	44	-	379	1989	1444	26.3%
4/2	Bridgwater Road (E) Circ Right Ahead	U	1	N/A	E		1	44	-	522	1970	1430	36.5%
4/3	Bridgwater Road (E) Circ Right	U	1	N/A	E		1	44	-	241	1970	1430	16.9%
5/1	Colliters Way (S) Left	U	1	N/A	F		1	20	-	341	1914	648	52.6%
5/2+5/3	Colliters Way (S) Ahead	U	1	N/A	F		1	20	-	675	2080:2080	454+486	71.8 : 71.8%
6/1	Colliters Way (S) Circ Ahead	U	1	N/A	G		1	32	-	275	1956	1041	26.4%

Full Input Data And Results

6/2	Colliters Way (S) Circ Ahead	U	1	N/A	G		1	32	-	432	1956	1041	41.5%
6/3	Colliters Way (S) Circ Right	U	1	N/A	G		1	32	-	129	1923	1024	12.6%
7/1	Bridgwater Road (W) Left	U	1	N/A	H		2	22	-	488	1966	761	64.1%
7/2+7/3	Bridgwater Road (W) Ahead	U	1	N/A	H		2	22	-	818	2030:2099	565+722	63.5 : 63.5%
8/1	Bridgwater Road (W) Circ Ahead	U	1	N/A	I		2	20	-	360	2055	729	49.4%
8/2	Bridgwater Road (W) Circ Right Ahead	U	1	N/A	I		2	20	-	444	2045	726	61.2%
9/1	Colliters Way (N) Ped Crossing Ahead	U	2	N/A	J		1	38	-	848	2065	1299	65.3%
9/2	Colliters Way (N) Ped Crossing Ahead	U	2	N/A	J		1	38	-	434	2205	1387	31.3%
10/1	Colliters Way (N) Exit	U	N/A	N/A	-		-	-	-	848	Inf	Inf	0.0%
10/2	Colliters Way (N) Exit	U	N/A	N/A	-		-	-	-	434	Inf	Inf	0.0%
11/1	Bridgwater Road (E) Ped Crossing Ahead	U	3	N/A	N		1	38	-	560	2055	1293	43.3%
11/2	Bridgwater Road (E) Ped Crossing Ahead	U	3	N/A	N		1	38	-	179	2195	1381	13.0%
12/1	Bridgwater Road (E) Exit	U	N/A	N/A	-		-	-	-	560	Inf	Inf	0.0%
12/2	Bridgwater Road (E) Exit	U	N/A	N/A	-		-	-	-	179	Inf	Inf	0.0%
13/1	Colliters Way (S) Exit	U	N/A	N/A	-		-	-	-	402	Inf	Inf	0.0%
13/2	Colliters Way (S) Exit	U	N/A	N/A	-		-	-	-	415	Inf	Inf	0.0%

Full Input Data And Results

14/1	Bridgwater Road (W) Exit	U	N/A	N/A	-		-	-	-	616	Inf	Inf	0.0%
14/2	Bridgwater Road (W) Exit	U	N/A	N/A	-		-	-	-	432	Inf	Inf	0.0%

Full Input Data And Results

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network: A38/Colliters Way	**-**	**-**	**0**	**0**	**0**	**22.4**	**11.0**	**0.0**	**33.4**	**-**	**-**	**-**	**-**
A38/Colliters Way	**-**	**-**	**0**	**0**	**0**	**22.4**	**11.0**	**0.0**	**33.4**	**-**	**-**	**-**	**-**
1/1	0	0	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
1/3+1/2	812	812	-	-	-	4.2	1.1	-	5.3 (2.6+2.7)	23.6 (23.5:23.8)	6.1	1.1	7.2
1/4	241	241	-	-	-	1.1	0.3	-	1.4	21.6	3.2	0.3	3.5
2/1	361	361	-	-	-	0.3	0.2	-	0.6	5.8	3.0	0.2	3.3
2/2	467	467	-	-	-	0.5	0.4	-	0.8	6.5	4.0	0.4	4.3
3/2+3/1	385	385	-	-	-	2.7	1.0	-	3.7 (1.9+1.8)	34.7 (34.7:34.8)	3.1	1.0	4.2
3/3	126	126	-	-	-	0.8	0.4	-	1.2	34.6	2.0	0.4	2.3
4/1	379	379	-	-	-	0.3	0.2	-	0.4	4.2	1.8	0.2	2.0
4/2	522	522	-	-	-	0.2	0.3	-	0.5	3.2	1.2	0.3	1.5
4/3	241	241	-	-	-	0.0	0.1	-	0.1	1.5	0.0	0.1	0.1
5/1	341	341	-	-	-	1.6	0.6	-	2.1	22.3	4.6	0.6	5.2
5/2+5/3	675	675	-	-	-	3.0	1.3	-	4.3 (2.1+2.2)	23.0 (22.9:23.0)	5.8	1.3	7.1
6/1	275	275	-	-	-	0.8	0.2	-	1.0	12.6	2.2	0.2	2.4
6/2	432	432	-	-	-	1.0	0.4	-	1.4	11.3	5.1	0.4	5.4
6/3	129	129	-	-	-	0.4	0.1	-	0.4	12.1	0.8	0.1	0.9
7/1	488	488	-	-	-	1.1	0.9	-	2.0	14.5	3.9	0.9	4.8
7/2+7/3	818	818	-	-	-	1.7	0.9	-	2.6 (1.1+1.5)	11.3 (11.1:11.5)	3.6	0.9	4.4
8/1	360	360	-	-	-	0.3	0.5	-	0.8	8.2	4.6	0.5	5.1
8/2	444	444	-	-	-	0.6	0.8	-	1.4	11.2	6.1	0.8	6.8

Full Input Data And Results

9/1	848	848	-	-	-	0.9	0.9	-	1.8	7.8	8.8	0.9	9.7
9/2	434	434	-	-	-	0.1	0.2	-	0.3	2.8	0.3	0.2	0.5
10/1	848	848	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
10/2	434	434	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
11/1	560	560	-	-	-	0.6	0.4	-	1.0	6.2	3.9	0.4	4.2
11/2	179	179	-	-	-	0.1	0.1	-	0.2	3.6	0.3	0.1	0.4
12/1	560	560	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
12/2	179	179	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
13/1	402	402	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
13/2	415	415	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
14/1	616	616	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
14/2	432	432	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

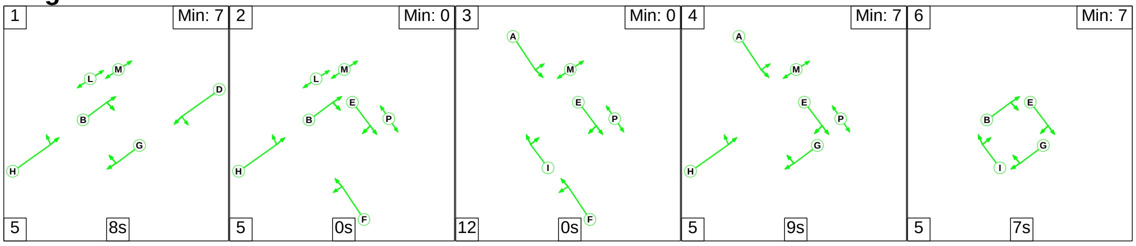
C1 - South Bristol Link A38	Stream: 1	PRC for Signalled Lanes (%):	25.4	Total Delay for Signalled Lanes (pcuHr):	30.07	Cycle Time (s):	62
C1 - South Bristol Link A38	Stream: 2	PRC for Signalled Lanes (%):	37.9	Total Delay for Signalled Lanes (pcuHr):	2.18	Cycle Time (s):	62
C1 - South Bristol Link A38	Stream: 3	PRC for Signalled Lanes (%):	107.7	Total Delay for Signalled Lanes (pcuHr):	1.15	Cycle Time (s):	62
		PRC Over All Lanes (%):	25.4	Total Delay Over All Lanes(pcuHr):	33.40		

Full Input Data And Results

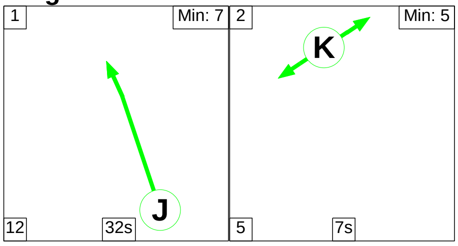
Scenario 8: '2030 10 MPPA Interpeak' (FG8: '2030 10 MPPA Interpeak', Plan 1: 'Network Control Plan 1')

Stage Sequence Diagram

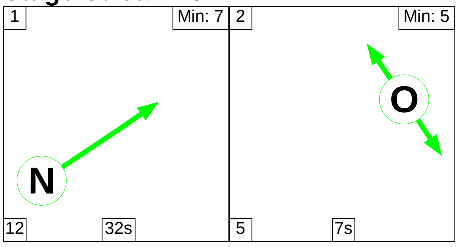
Stage Stream: 1



Stage Stream: 2



Stage Stream: 3



Stage Timings

Stage Stream: 1

Stage	1	2	3	4	6
Duration	8	0	0	9	7
Change Point	15	28	33	45	3

Stage Stream: 2

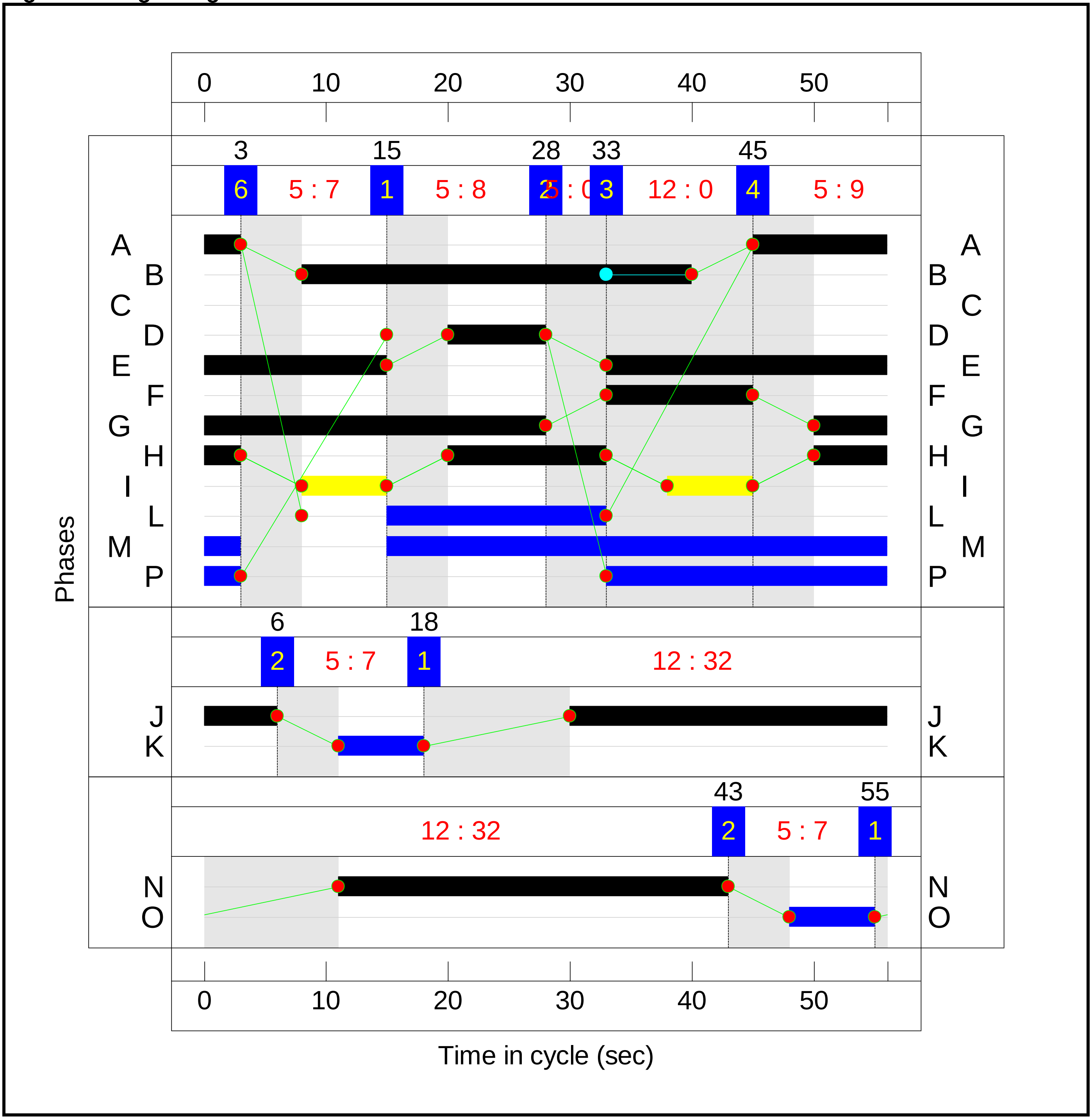
Stage	1	2
Duration	32	7
Change Point	18	6

Stage Stream: 3

Stage	1	2
Duration	32	7
Change Point	55	43

Full Input Data And Results

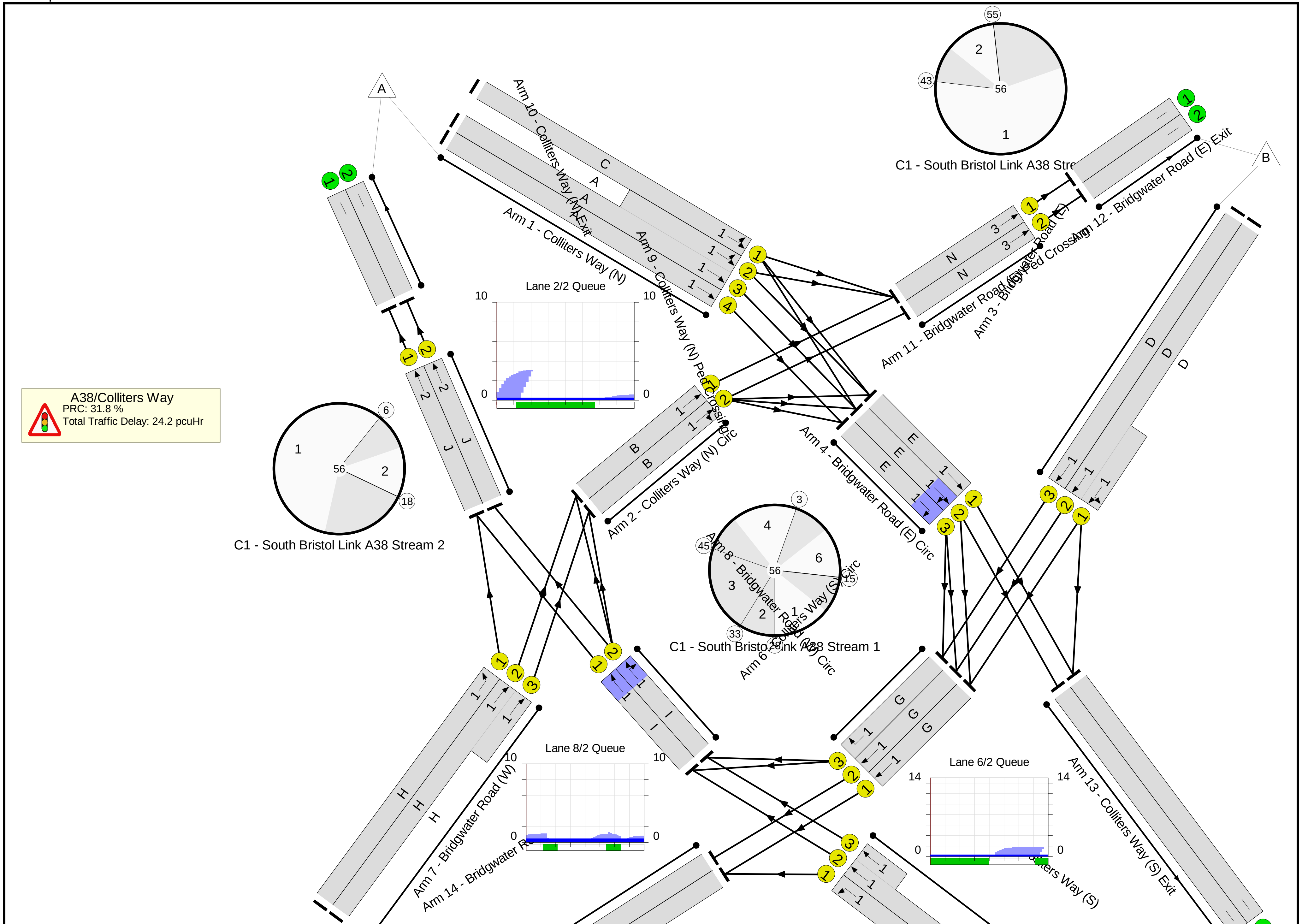
Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram

Full Input Data And Results



Full Input Data And Results

Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network: A38/Colliters Way	-	-	**N/A**	-	-		-	-	-	-	-	-	**68.3%**
A38/Colliters Way	-	-	**N/A**	-	-		-	-	-	-	-	-	**68.3%**
1/1	Colliters Way (N) Ahead Left	U	1	N/A	C		0	0	-	0	2105	0	0.0%
1/3+1/2	Colliters Way (N) Ahead Left	U	1	N/A	A		1	14	-	712	2052:1924	550+515	65.5 : 68.3%
1/4	Colliters Way (N) Ahead	U	1	N/A	A		1	14	-	256	2043	547	46.8%
2/1	Colliters Way (N) Circ Ahead	U	1	N/A	B		1	32	-	278	1972	1162	23.9%
2/2	Colliters Way (N) Circ Right Ahead	U	1	N/A	B		1	32	-	371	1975	1164	31.9%
3/2+3/1	Bridgwater Road (E) Ahead Left	U	1	N/A	D		1	8	-	367	2033:1895	327+305	57.2 : 59.1%
3/3	Bridgwater Road (E) Ahead	U	1	N/A	D		1	8	-	69	2052	330	20.9%
4/1	Bridgwater Road (E) Circ Ahead	U	1	N/A	E		1	38	-	397	1989	1385	28.7%
4/2	Bridgwater Road (E) Circ Right Ahead	U	1	N/A	E		1	38	-	454	1970	1372	33.1%
4/3	Bridgwater Road (E) Circ Right	U	1	N/A	E		1	38	-	257	1970	1372	18.7%
5/1	Colliters Way (S) Left	U	1	N/A	F		1	12	-	237	1914	444	53.3%
5/2+5/3	Colliters Way (S) Ahead	U	1	N/A	F		1	12	-	411	2080:2080	355+386	55.4 : 55.4%
6/1	Colliters Way (S) Circ Ahead	U	1	N/A	G		1	34	-	340	1956	1222	27.8%

Full Input Data And Results

6/2	Colliters Way (S) Circ Ahead	U	1	N/A	G		1	34	-	444	1956	1222	36.3%
6/3	Colliters Way (S) Circ Right	U	1	N/A	G		1	34	-	69	1923	1202	5.7%
7/1	Bridgwater Road (W) Left	U	1	N/A	H		2	22	-	508	1966	843	60.3%
7/2+7/3	Bridgwater Road (W) Ahead	U	1	N/A	H		2	22	-	624	2030:2099	656+833	41.9 : 41.9%
8/1	Bridgwater Road (W) Circ Ahead	U	1	N/A	I		2	14	-	205	2055	587	34.9%
8/2	Bridgwater Road (W) Circ Right Ahead	U	1	N/A	I		2	14	-	275	2042	583	47.1%
9/1	Colliters Way (N) Ped Crossing Ahead	U	2	N/A	J		1	32	-	713	2065	1217	58.6%
9/2	Colliters Way (N) Ped Crossing Ahead	U	2	N/A	J		1	32	-	250	2205	1299	19.2%
10/1	Colliters Way (N) Exit	U	N/A	N/A	-		-	-	-	713	Inf	Inf	0.0%
10/2	Colliters Way (N) Exit	U	N/A	N/A	-		-	-	-	250	Inf	Inf	0.0%
11/1	Bridgwater Road (E) Ped Crossing Ahead	U	3	N/A	N		1	32	-	366	2055	1211	30.2%
11/2	Bridgwater Road (E) Ped Crossing Ahead	U	3	N/A	N		1	32	-	143	2195	1293	11.1%
12/1	Bridgwater Road (E) Exit	U	N/A	N/A	-		-	-	-	366	Inf	Inf	0.0%
12/2	Bridgwater Road (E) Exit	U	N/A	N/A	-		-	-	-	143	Inf	Inf	0.0%
13/1	Colliters Way (S) Exit	U	N/A	N/A	-		-	-	-	418	Inf	Inf	0.0%
13/2	Colliters Way (S) Exit	U	N/A	N/A	-		-	-	-	273	Inf	Inf	0.0%

Full Input Data And Results

14/1	Bridgwater Road (W) Exit	U	N/A	N/A	-		-	-	-	577	Inf	Inf	0.0%
14/2	Bridgwater Road (W) Exit	U	N/A	N/A	-		-	-	-	444	Inf	Inf	0.0%

Full Input Data And Results

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network: A38/Colliters Way	**-**	**-**	**0**	**0**	**0**	**16.3**	**7.8**	**0.0**	**24.2**	**-**	**-**	**-**	**-**
A38/Colliters Way	**-**	**-**	**0**	**0**	**0**	**16.3**	**7.8**	**0.0**	**24.2**	**-**	**-**	**-**	**-**
1/1	0	0	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
1/3+1/2	712	712	-	-	-	3.6	1.0	-	4.6 (2.3+2.3)	23.4 (23.3:23.4)	4.9	1.0	5.9
1/4	256	256	-	-	-	1.2	0.4	-	1.7	23.3	3.3	0.4	3.7
2/1	278	278	-	-	-	0.3	0.2	-	0.5	5.9	2.0	0.2	2.2
2/2	371	371	-	-	-	0.5	0.2	-	0.7	7.0	2.9	0.2	3.1
3/2+3/1	367	367	-	-	-	2.2	0.7	-	2.9 (1.5+1.4)	28.5 (28.5:28.6)	2.6	0.7	3.3
3/3	69	69	-	-	-	0.4	0.1	-	0.5	27.4	0.9	0.1	1.1
4/1	397	397	-	-	-	0.2	0.2	-	0.4	3.4	1.2	0.2	1.4
4/2	454	454	-	-	-	0.1	0.2	-	0.4	2.9	0.7	0.2	0.9
4/3	257	257	-	-	-	0.0	0.1	-	0.1	1.6	0.0	0.1	0.1
5/1	237	237	-	-	-	1.2	0.6	-	1.8	27.5	3.2	0.6	3.8
5/2+5/3	411	411	-	-	-	2.1	0.6	-	2.7 (1.3+1.4)	23.8 (23.7:23.8)	2.8	0.6	3.4
6/1	340	340	-	-	-	0.5	0.2	-	0.7	6.9	1.3	0.2	1.5
6/2	444	444	-	-	-	0.5	0.3	-	0.8	6.6	1.5	0.3	1.8
6/3	69	69	-	-	-	0.1	0.0	-	0.1	6.9	0.3	0.0	0.3
7/1	508	508	-	-	-	0.9	0.8	-	1.6	11.5	3.0	0.8	3.7
7/2+7/3	624	624	-	-	-	0.9	0.4	-	1.3 (0.6+0.7)	7.5 (7.4:7.6)	1.8	0.4	2.2
8/1	205	205	-	-	-	0.1	0.3	-	0.4	6.9	0.4	0.3	0.7
8/2	275	275	-	-	-	0.3	0.4	-	0.7	9.5	0.9	0.4	1.4

Full Input Data And Results

9/1	713	713	-	-	-	0.7	0.7	-	1.4	6.9	4.8	0.7	5.6
9/2	250	250	-	-	-	0.2	0.1	-	0.3	4.3	0.6	0.1	0.7
10/1	713	713	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
10/2	250	250	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
11/1	366	366	-	-	-	0.3	0.2	-	0.5	5.3	2.9	0.2	3.1
11/2	143	143	-	-	-	0.0	0.1	-	0.1	1.9	0.0	0.1	0.1
12/1	366	366	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
12/2	143	143	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
13/1	418	418	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
13/2	273	273	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
14/1	577	577	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
14/2	444	444	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

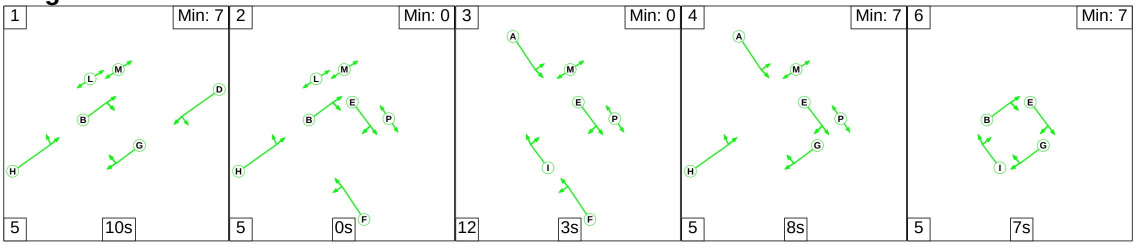
C1 - South Bristol Link A38 Stream: 1 PRC for Signalled Lanes (%): 31.8 Total Delay for Signalled Lanes (pcuHr): 21.91 Cycle Time (s): 56
C1 - South Bristol Link A38 Stream: 2 PRC for Signalled Lanes (%): 53.6 Total Delay for Signalled Lanes (pcuHr): 1.67 Cycle Time (s): 56
C1 - South Bristol Link A38 Stream: 3 PRC for Signalled Lanes (%): 197.8 Total Delay for Signalled Lanes (pcuHr): 0.61 Cycle Time (s): 56
PRC Over All Lanes (%): 31.8 Total Delay Over All Lanes(pcuHr): 24.20

Full Input Data And Results

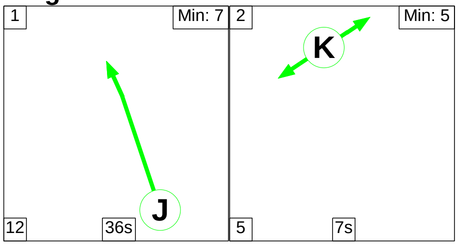
Scenario 9: '2030 10 MPPA PM' (FG9: '2030 10 MPPA PM', Plan 1: 'Network Control Plan 1')

Stage Sequence Diagram

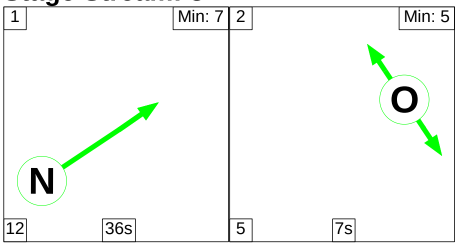
Stage Stream: 1



Stage Stream: 2



Stage Stream: 3



Stage Timings

Stage Stream: 1

Stage	1	2	3	4	6
Duration	10	0	3	8	7
Change Point	0	15	20	35	48

Stage Stream: 2

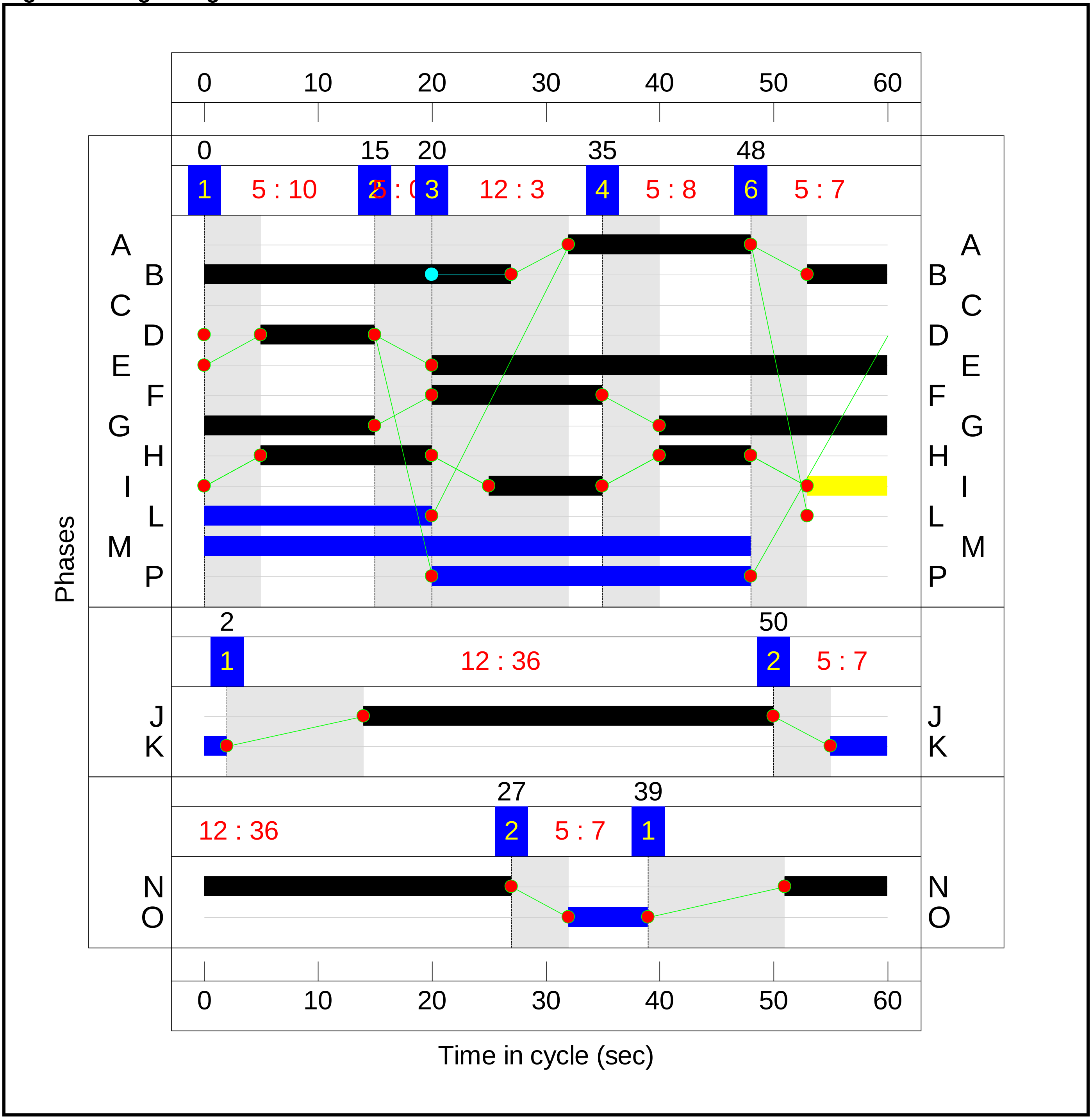
Stage	1	2
Duration	36	7
Change Point	2	50

Stage Stream: 3

Stage	1	2
Duration	36	7
Change Point	39	27

Full Input Data And Results

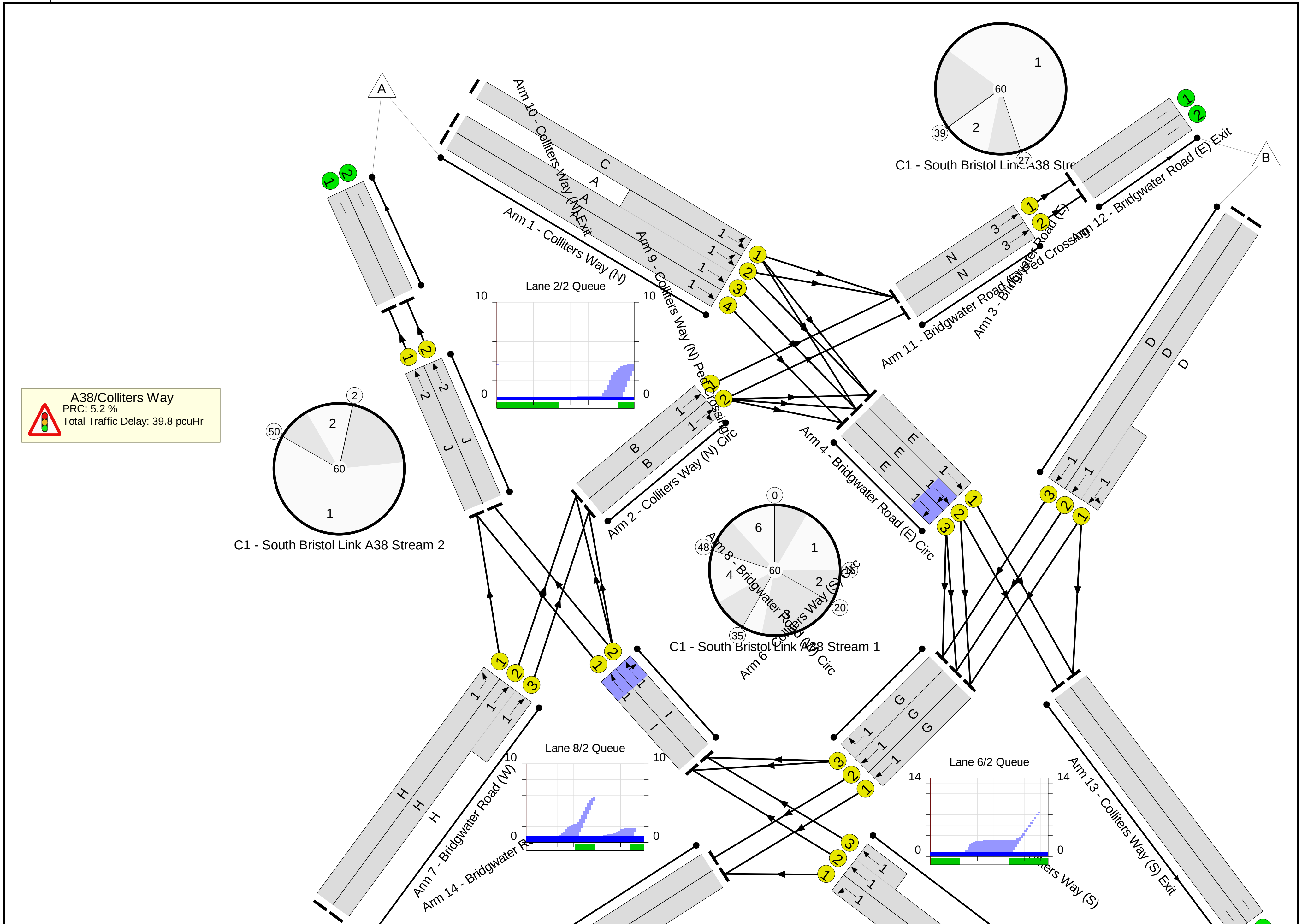
Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram

Full Input Data And Results



Full Input Data And Results

Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network: A38/Colliters Way	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**85.6%**
A38/Colliters Way	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**85.6%**
1/1	Colliters Way (N) Ahead Left	U	1	N/A	C		0	0	-	0	2105	0	0.0%
1/3+1/2	Colliters Way (N) Ahead Left	U	1	N/A	A		1	16	-	932	2052:1926	543+546	85.6 : 85.6%
1/4	Colliters Way (N) Ahead	U	1	N/A	A		1	16	-	417	2043	579	72.0%
2/1	Colliters Way (N) Circ Ahead	U	1	N/A	B		1	34	-	331	1972	1150	28.8%
2/2	Colliters Way (N) Circ Right Ahead	U	1	N/A	B		1	34	-	429	1972	1150	37.3%
3/2+3/1	Bridgwater Road (E) Ahead Left	U	1	N/A	D		1	10	-	581	2033:1895	370+347	77.9 : 84.3%
3/3	Bridgwater Road (E) Ahead	U	1	N/A	D		1	10	-	197	2052	376	52.4%
4/1	Bridgwater Road (E) Circ Ahead	U	1	N/A	E		1	40	-	502	1989	1359	36.9%
4/2	Bridgwater Road (E) Circ Right Ahead	U	1	N/A	E		1	40	-	596	1970	1346	44.3%
4/3	Bridgwater Road (E) Circ Right	U	1	N/A	E		1	40	-	417	1970	1346	31.0%
5/1	Colliters Way (S) Left	U	1	N/A	F		1	15	-	330	1914	510	64.7%
5/2+5/3	Colliters Way (S) Ahead	U	1	N/A	F		1	15	-	531	2080:2080	419+367	67.6 : 67.6%
6/1	Colliters Way (S) Circ Ahead	U	1	N/A	G		1	35	-	489	1956	1174	41.7%

Full Input Data And Results

6/2	Colliters Way (S) Circ Ahead	U	1	N/A	G		1	35	-	705	1956	1174	60.1%
6/3	Colliters Way (S) Circ Right	U	1	N/A	G		1	35	-	197	1923	1154	17.1%
7/1	Bridgwater Road (W) Left	U	1	N/A	H		2	23	-	408	1966	819	49.8%
7/2+7/3	Bridgwater Road (W) Ahead	U	1	N/A	H		2	23	-	751	2030:2099	612+781	53.9 : 53.9%
8/1	Bridgwater Road (W) Circ Ahead	U	1	N/A	I		2	17	-	342	2055	651	52.6%
8/2	Bridgwater Road (W) Circ Right Ahead	U	1	N/A	I		2	17	-	386	2045	648	59.6%
9/1	Colliters Way (N) Ped Crossing Ahead	U	2	N/A	J		1	36	-	750	2065	1273	58.9%
9/2	Colliters Way (N) Ped Crossing Ahead	U	2	N/A	J		1	36	-	377	2205	1360	27.7%
10/1	Colliters Way (N) Exit	U	N/A	N/A	-		-	-	-	750	Inf	Inf	0.0%
10/2	Colliters Way (N) Exit	U	N/A	N/A	-		-	-	-	377	Inf	Inf	0.0%
11/1	Bridgwater Road (E) Ped Crossing Ahead	U	3	N/A	N		1	36	-	476	2055	1267	37.6%
11/2	Bridgwater Road (E) Ped Crossing Ahead	U	3	N/A	N		1	36	-	118	2195	1354	8.7%
12/1	Bridgwater Road (E) Exit	U	N/A	N/A	-		-	-	-	476	Inf	Inf	0.0%
12/2	Bridgwater Road (E) Exit	U	N/A	N/A	-		-	-	-	118	Inf	Inf	0.0%
13/1	Colliters Way (S) Exit	U	N/A	N/A	-		-	-	-	525	Inf	Inf	0.0%
13/2	Colliters Way (S) Exit	U	N/A	N/A	-		-	-	-	377	Inf	Inf	0.0%

Full Input Data And Results

14/1	Bridgwater Road (W) Exit	U	N/A	N/A	-		-	-	-	819	Inf	Inf	0.0%
14/2	Bridgwater Road (W) Exit	U	N/A	N/A	-		-	-	-	705	Inf	Inf	0.0%

Full Input Data And Results

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network: A38/Colliters Way	**-**	**-**	**0**	**0**	**0**	**24.9**	**14.9**	**0.0**	**39.8**	**-**	**-**	**-**	**-**
A38/Colliters Way	**-**	**-**	**0**	**0**	**0**	**24.9**	**14.9**	**0.0**	**39.8**	**-**	**-**	**-**	**-**
1/1	0	0	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
1/3+1/2	932	932	-	-	-	5.2	2.9	-	8.1 (4.0+4.1)	31.2 (31.0:31.4)	7.3	2.9	10.1
1/4	417	417	-	-	-	2.2	1.3	-	3.5	30.3	6.3	1.3	7.5
2/1	331	331	-	-	-	0.3	0.2	-	0.5	5.8	2.6	0.2	2.8
2/2	429	429	-	-	-	0.5	0.3	-	0.8	6.5	3.4	0.3	3.7
3/2+3/1	581	581	-	-	-	3.8	2.1	-	5.9 (2.9+3.0)	36.3 (36.1:36.5)	4.6	2.1	6.7
3/3	197	197	-	-	-	1.2	0.5	-	1.8	32.1	3.0	0.5	3.5
4/1	502	502	-	-	-	0.3	0.3	-	0.6	4.4	1.9	0.3	2.2
4/2	596	596	-	-	-	0.2	0.4	-	0.6	3.8	1.4	0.4	1.8
4/3	417	417	-	-	-	0.0	0.2	-	0.2	2.0	0.1	0.2	0.3
5/1	330	330	-	-	-	1.8	0.9	-	2.7	29.4	4.9	0.9	5.8
5/2+5/3	531	531	-	-	-	2.7	1.0	-	3.8 (2.0+1.7)	25.5 (25.7:25.3)	4.1	1.0	5.1
6/1	489	489	-	-	-	0.9	0.4	-	1.3	9.5	2.8	0.4	3.2
6/2	705	705	-	-	-	1.0	0.7	-	1.7	8.8	7.7	0.7	8.5
6/3	197	197	-	-	-	0.3	0.1	-	0.5	8.2	0.9	0.1	1.0
7/1	408	408	-	-	-	0.7	0.5	-	1.2	10.9	2.6	0.5	3.1
7/2+7/3	751	751	-	-	-	1.3	0.6	-	1.9 (0.8+1.1)	9.1 (8.9:9.2)	2.7	0.6	3.3
8/1	342	342	-	-	-	0.3	0.6	-	0.9	9.0	0.9	0.6	1.5
8/2	386	386	-	-	-	0.5	0.7	-	1.3	12.0	5.1	0.7	5.8

Full Input Data And Results

9/1	750	750	-	-	-	0.7	0.7	-	1.4	6.7	4.3	0.7	5.0
9/2	377	377	-	-	-	0.3	0.2	-	0.5	4.4	1.0	0.2	1.2
10/1	750	750	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
10/2	377	377	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
11/1	476	476	-	-	-	0.4	0.3	-	0.7	5.5	2.7	0.3	3.0
11/2	118	118	-	-	-	0.0	0.0	-	0.1	2.6	0.1	0.0	0.2
12/1	476	476	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
12/2	118	118	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
13/1	525	525	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
13/2	377	377	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
14/1	819	819	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
14/2	705	705	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

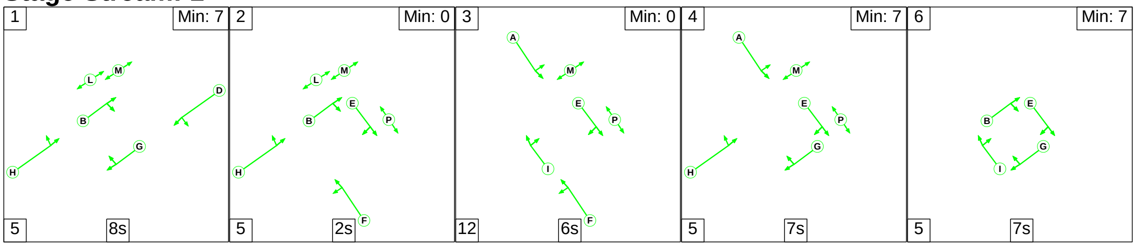
C1 - South Bristol Link A38	Stream: 1 PRC for Signalled Lanes (%):	5.2	Total Delay for Signalled Lanes (pcuHr):	37.16	Cycle Time (s):	60
C1 - South Bristol Link A38	Stream: 2 PRC for Signalled Lanes (%):	52.8	Total Delay for Signalled Lanes (pcuHr):	1.85	Cycle Time (s):	60
C1 - South Bristol Link A38	Stream: 3 PRC for Signalled Lanes (%):	139.6	Total Delay for Signalled Lanes (pcuHr):	0.81	Cycle Time (s):	60
	PRC Over All Lanes (%):	5.2	Total Delay Over All Lanes(pcuHr):	39.82		

Full Input Data And Results

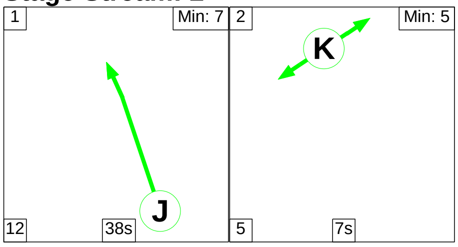
Scenario 10: '2030 12 MPPA AM' (FG10: '2030 12 MPPA AM', Plan 1: 'Network Control Plan 1')

Stage Sequence Diagram

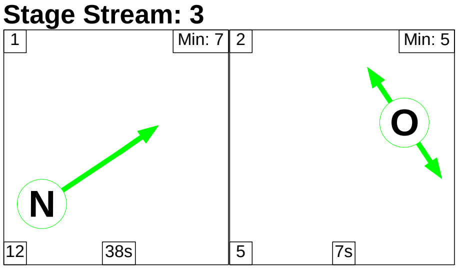
Stage Stream: 1



Stage Stream: 2



Stage Stream: 3



Stage Timings

Stage Stream: 1

Stage	1	2	3	4	6
Duration	8	2	6	7	7
Change Point	0	13	20	38	50

Stage Stream: 2

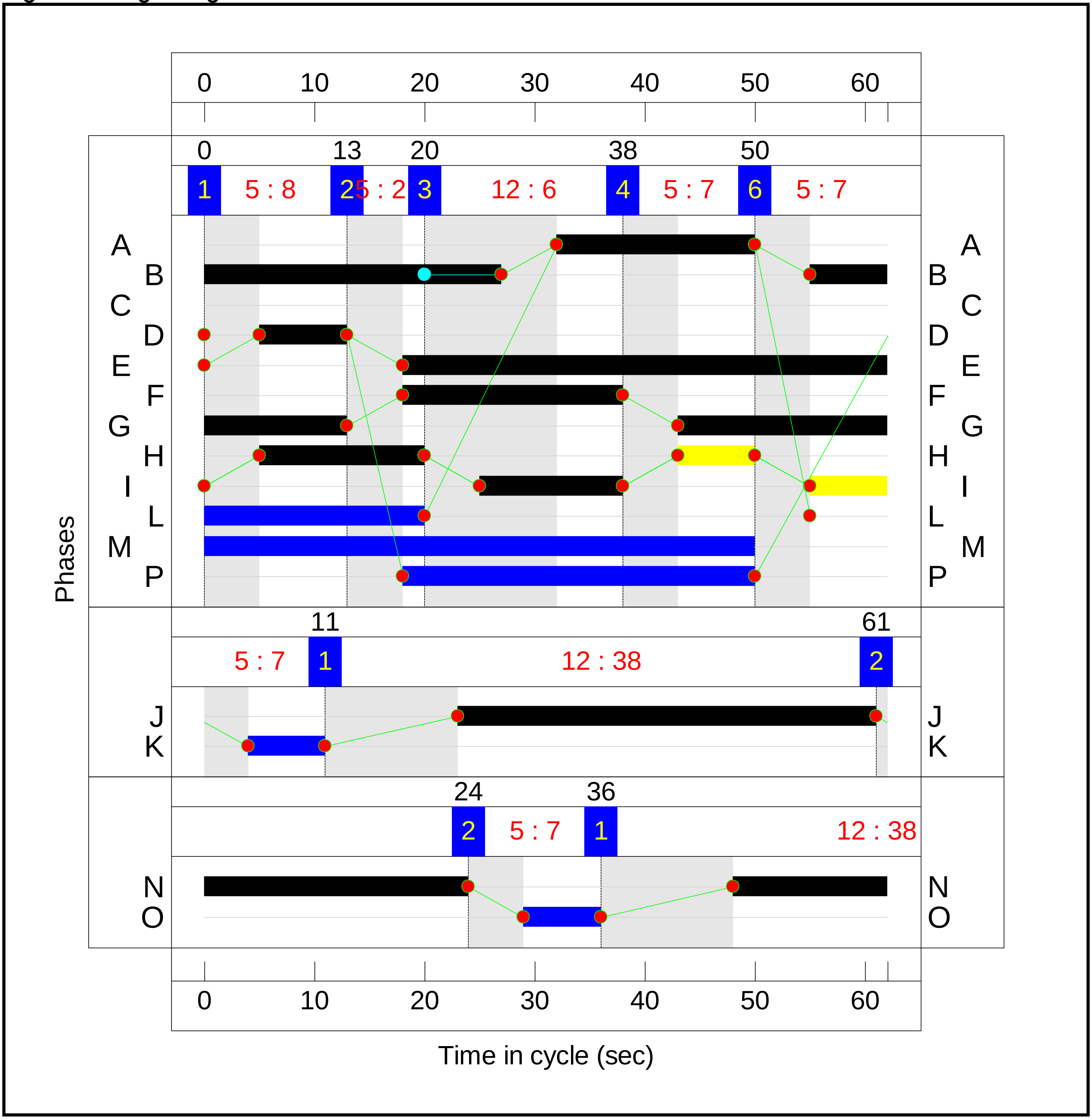
Stage	1	2
Duration	38	7
Change Point	11	61

Stage Stream: 3

Stage	1	2
Duration	38	7
Change Point	36	24

Full Input Data And Results

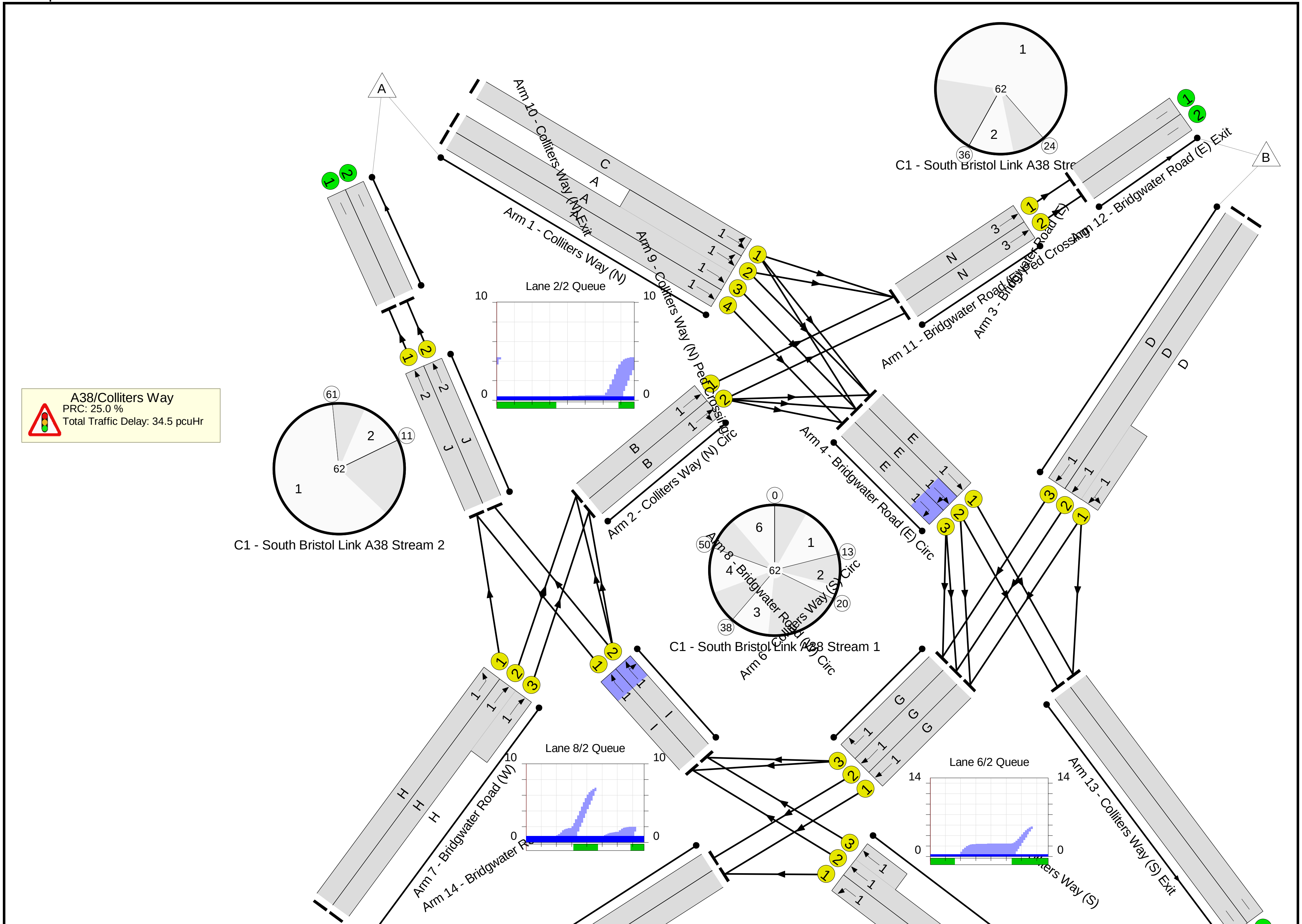
Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram

Full Input Data And Results



Full Input Data And Results

Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network: A38/Colliters Way	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**72.0%**
A38/Colliters Way	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**72.0%**
1/1	Colliters Way (N) Ahead Left	U	1	N/A	C		0	0	-	0	2105	0	0.0%
1/3+1/2	Colliters Way (N) Ahead Left	U	1	N/A	A		1	18	-	825	2052:1932	582+592	70.3 : 70.3%
1/4	Colliters Way (N) Ahead	U	1	N/A	A		1	18	-	252	2043	626	40.3%
2/1	Colliters Way (N) Circ Ahead	U	1	N/A	B		1	34	-	369	1972	1113	33.1%
2/2	Colliters Way (N) Circ Right Ahead	U	1	N/A	B		1	34	-	475	1975	1115	42.6%
3/2+3/1	Bridgwater Road (E) Ahead Left	U	1	N/A	D		1	8	-	399	2033:1895	295+275	68.1 : 72.0%
3/3	Bridgwater Road (E) Ahead	U	1	N/A	D		1	8	-	126	2052	298	42.3%
4/1	Bridgwater Road (E) Circ Ahead	U	1	N/A	E		1	44	-	387	1989	1444	26.8%
4/2	Bridgwater Road (E) Circ Right Ahead	U	1	N/A	E		1	44	-	527	1970	1430	36.9%
4/3	Bridgwater Road (E) Circ Right	U	1	N/A	E		1	44	-	252	1970	1430	17.6%
5/1	Colliters Way (S) Left	U	1	N/A	F		1	20	-	341	1914	648	52.6%
5/2+5/3	Colliters Way (S) Ahead	U	1	N/A	F		1	20	-	675	2080:2080	448+489	72.0 : 72.0%
6/1	Colliters Way (S) Circ Ahead	U	1	N/A	G		1	32	-	295	1956	1041	28.3%

Full Input Data And Results

6/2	Colliters Way (S) Circ Ahead	U	1	N/A	G		1	32	-	450	1956	1041	43.2%
6/3	Colliters Way (S) Circ Right	U	1	N/A	G		1	32	-	129	1923	1024	12.6%
7/1	Bridgwater Road (W) Left	U	1	N/A	H		2	22	-	505	1966	761	66.4%
7/2+7/3	Bridgwater Road (W) Ahead	U	1	N/A	H		2	22	-	834	2030:2099	565+722	64.8 : 64.8%
8/1	Bridgwater Road (W) Circ Ahead	U	1	N/A	I		2	20	-	355	2055	729	48.7%
8/2	Bridgwater Road (W) Circ Right Ahead	U	1	N/A	I		2	20	-	449	2045	726	61.9%
9/1	Colliters Way (N) Ped Crossing Ahead	U	2	N/A	J		1	38	-	860	2065	1299	66.2%
9/2	Colliters Way (N) Ped Crossing Ahead	U	2	N/A	J		1	38	-	439	2205	1387	31.7%
10/1	Colliters Way (N) Exit	U	N/A	N/A	-		-	-	-	860	Inf	Inf	0.0%
10/2	Colliters Way (N) Exit	U	N/A	N/A	-		-	-	-	439	Inf	Inf	0.0%
11/1	Bridgwater Road (E) Ped Crossing Ahead	U	3	N/A	N		1	38	-	568	2055	1293	43.9%
11/2	Bridgwater Road (E) Ped Crossing Ahead	U	3	N/A	N		1	38	-	187	2195	1381	13.5%
12/1	Bridgwater Road (E) Exit	U	N/A	N/A	-		-	-	-	568	Inf	Inf	0.0%
12/2	Bridgwater Road (E) Exit	U	N/A	N/A	-		-	-	-	187	Inf	Inf	0.0%
13/1	Colliters Way (S) Exit	U	N/A	N/A	-		-	-	-	410	Inf	Inf	0.0%
13/2	Colliters Way (S) Exit	U	N/A	N/A	-		-	-	-	407	Inf	Inf	0.0%

Full Input Data And Results

14/1	Bridgwater Road (W) Exit	U	N/A	N/A	-		-	-	-	636	Inf	Inf	0.0%
14/2	Bridgwater Road (W) Exit	U	N/A	N/A	-		-	-	-	450	Inf	Inf	0.0%

Full Input Data And Results

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network: A38/Colliters Way	**-**	**-**	**0**	**0**	**0**	**22.9**	**11.6**	**0.0**	**34.5**	**-**	**-**	**-**	**-**
A38/Colliters Way	**-**	**-**	**0**	**0**	**0**	**22.9**	**11.6**	**0.0**	**34.5**	**-**	**-**	**-**	**-**
1/1	0	0	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
1/3+1/2	825	825	-	-	-	4.3	1.2	-	5.5 (2.7+2.8)	23.9 (23.8:24.1)	6.2	1.2	7.4
1/4	252	252	-	-	-	1.2	0.3	-	1.5	21.8	3.4	0.3	3.8
2/1	369	369	-	-	-	0.4	0.2	-	0.6	5.9	3.1	0.2	3.4
2/2	475	475	-	-	-	0.5	0.4	-	0.9	6.5	4.0	0.4	4.4
3/2+3/1	399	399	-	-	-	2.8	1.1	-	3.9 (2.0+2.0)	35.6 (35.5:35.7)	3.2	1.1	4.4
3/3	126	126	-	-	-	0.8	0.4	-	1.2	34.6	2.0	0.4	2.3
4/1	387	387	-	-	-	0.3	0.2	-	0.4	4.2	1.8	0.2	2.0
4/2	527	527	-	-	-	0.2	0.3	-	0.5	3.2	1.2	0.3	1.5
4/3	252	252	-	-	-	0.0	0.1	-	0.1	1.5	0.0	0.1	0.1
5/1	341	341	-	-	-	1.6	0.6	-	2.1	22.3	4.6	0.6	5.2
5/2+5/3	675	675	-	-	-	3.0	1.3	-	4.3 (2.1+2.3)	23.1 (23.0:23.2)	5.9	1.3	7.2
6/1	295	295	-	-	-	0.8	0.2	-	1.0	12.7	2.4	0.2	2.6
6/2	450	450	-	-	-	1.1	0.4	-	1.5	11.7	5.5	0.4	5.8
6/3	129	129	-	-	-	0.4	0.1	-	0.4	12.1	0.8	0.1	0.9
7/1	505	505	-	-	-	1.1	1.0	-	2.1	15.0	4.1	1.0	5.0
7/2+7/3	834	834	-	-	-	1.7	0.9	-	2.7 (1.1+1.5)	11.5 (11.3:11.6)	3.6	0.9	4.6
8/1	355	355	-	-	-	0.3	0.5	-	0.8	8.1	4.5	0.5	5.0
8/2	449	449	-	-	-	0.6	0.8	-	1.4	11.4	6.1	0.8	6.9

Full Input Data And Results

9/1	860	860	-	-	-	1.0	1.0	-	1.9	8.1	9.2	1.0	10.2
9/2	439	439	-	-	-	0.1	0.2	-	0.3	2.8	0.3	0.2	0.6
10/1	860	860	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
10/2	439	439	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
11/1	568	568	-	-	-	0.6	0.4	-	1.0	6.2	3.9	0.4	4.3
11/2	187	187	-	-	-	0.1	0.1	-	0.2	3.7	0.3	0.1	0.4
12/1	568	568	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
12/2	187	187	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
13/1	410	410	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
13/2	407	407	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
14/1	636	636	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
14/2	450	450	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

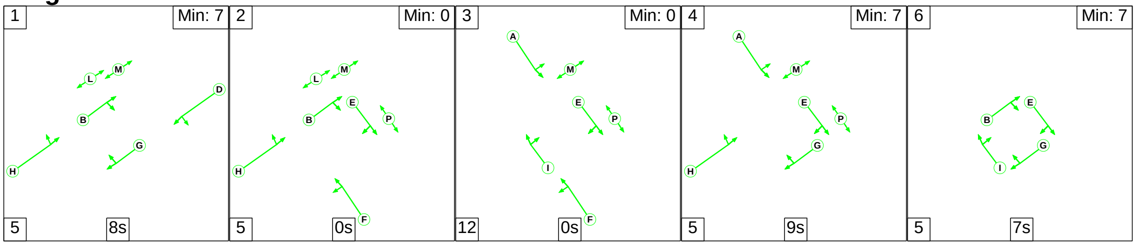
C1 - South Bristol Link A38	Stream: 1	PRC for Signalled Lanes (%):	25.0	Total Delay for Signalled Lanes (pcuHr):	31.02	Cycle Time (s):	62
C1 - South Bristol Link A38	Stream: 2	PRC for Signalled Lanes (%):	35.9	Total Delay for Signalled Lanes (pcuHr):	2.28	Cycle Time (s):	62
C1 - South Bristol Link A38	Stream: 3	PRC for Signalled Lanes (%):	104.8	Total Delay for Signalled Lanes (pcuHr):	1.17	Cycle Time (s):	62
		PRC Over All Lanes (%):	25.0	Total Delay Over All Lanes(pcuHr):	34.47		

Full Input Data And Results

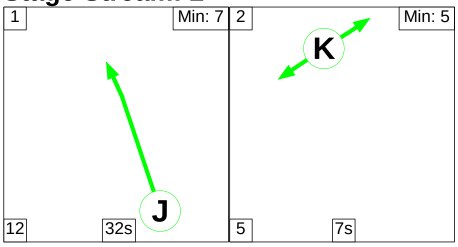
Scenario 11: '2030 12 MPPA Interpeak' (FG11: '2030 12 MPPA Interpeak', Plan 1: 'Network Control Plan 1')

Stage Sequence Diagram

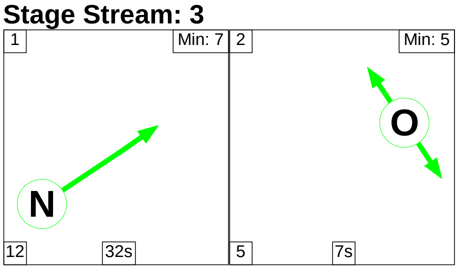
Stage Stream: 1



Stage Stream: 2



Stage Stream: 3



Stage Timings

Stage Stream: 1

Stage	1	2	3	4	6
Duration	8	0	0	9	7
Change Point	15	28	33	45	3

Stage Stream: 2

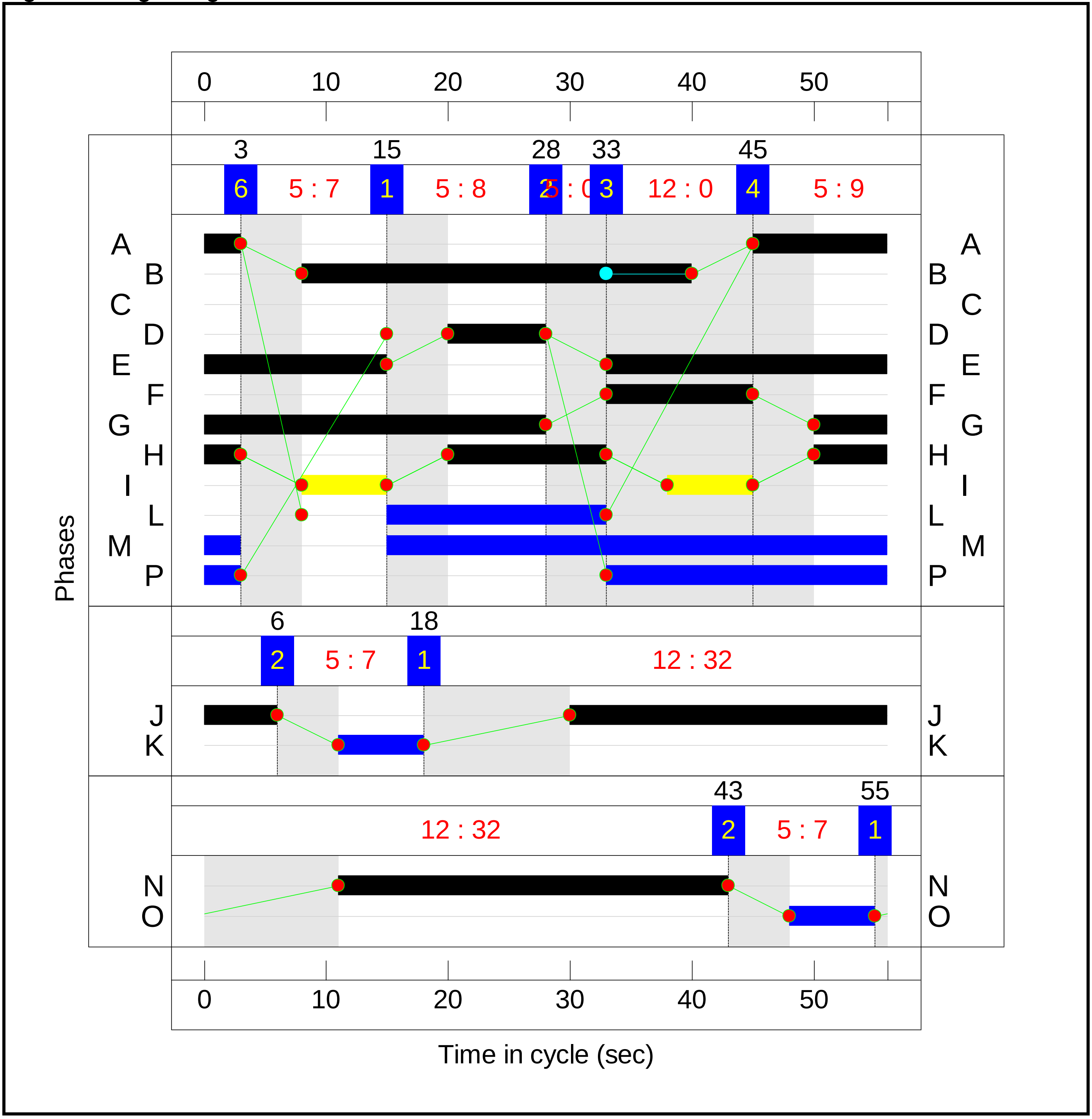
Stage	1	2
Duration	32	7
Change Point	18	6

Stage Stream: 3

Stage	1	2
Duration	32	7
Change Point	55	43

Full Input Data And Results

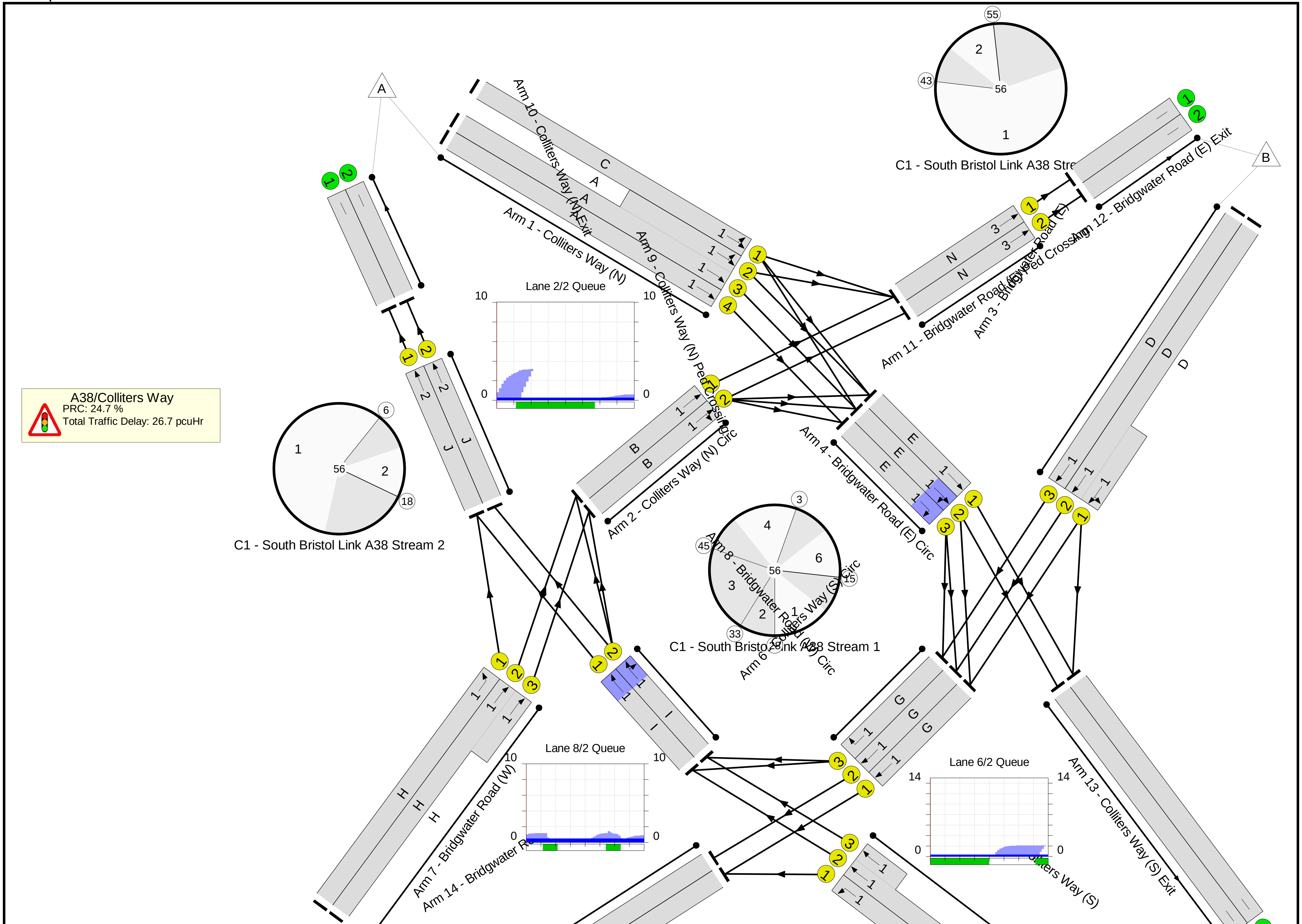
Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram

Full Input Data And Results



Full Input Data And Results

Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network: A38/Colliters Way	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**72.2%**
A38/Colliters Way	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**72.2%**
1/1	Colliters Way (N) Ahead Left	U	1	N/A	C		0	0	-	0	2105	0	0.0%
1/3+1/2	Colliters Way (N) Ahead Left	U	1	N/A	A		1	14	-	751	2052:1924	550+515	69.0 : 72.2%
1/4	Colliters Way (N) Ahead	U	1	N/A	A		1	14	-	282	2043	547	51.5%
2/1	Colliters Way (N) Circ Ahead	U	1	N/A	B		1	32	-	292	1972	1162	25.1%
2/2	Colliters Way (N) Circ Right Ahead	U	1	N/A	B		1	32	-	383	1975	1164	32.9%
3/2+3/1	Bridgwater Road (E) Ahead Left	U	1	N/A	D		1	8	-	398	2033:1895	327+305	62.1 : 64.0%
3/3	Bridgwater Road (E) Ahead	U	1	N/A	D		1	8	-	69	2052	330	20.9%
4/1	Bridgwater Road (E) Circ Ahead	U	1	N/A	E		1	38	-	417	1989	1385	30.1%
4/2	Bridgwater Road (E) Circ Right Ahead	U	1	N/A	E		1	38	-	474	1970	1372	34.5%
4/3	Bridgwater Road (E) Circ Right	U	1	N/A	E		1	38	-	282	1970	1372	20.6%
5/1	Colliters Way (S) Left	U	1	N/A	F		1	12	-	237	1914	444	53.3%
5/2+5/3	Colliters Way (S) Ahead	U	1	N/A	F		1	12	-	411	2080:2080	338+390	56.4 : 56.4%
6/1	Colliters Way (S) Circ Ahead	U	1	N/A	G		1	34	-	395	1956	1222	32.3%

Full Input Data And Results

6/2	Colliters Way (S) Circ Ahead	U	1	N/A	G		1	34	-	485	1956	1222	39.7%
6/3	Colliters Way (S) Circ Right	U	1	N/A	G		1	34	-	69	1923	1202	5.7%
7/1	Bridgwater Road (W) Left	U	1	N/A	H		2	22	-	588	1966	843	69.8%
7/2+7/3	Bridgwater Road (W) Ahead	U	1	N/A	H		2	22	-	650	2030:2099	666+832	43.4 : 43.4%
8/1	Bridgwater Road (W) Circ Ahead	U	1	N/A	I		2	14	-	196	2055	587	33.4%
8/2	Bridgwater Road (W) Circ Right Ahead	U	1	N/A	I		2	14	-	284	2042	583	48.7%
9/1	Colliters Way (N) Ped Crossing Ahead	U	2	N/A	J		1	32	-	784	2065	1217	64.4%
9/2	Colliters Way (N) Ped Crossing Ahead	U	2	N/A	J		1	32	-	259	2205	1299	19.9%
10/1	Colliters Way (N) Exit	U	N/A	N/A	-		-	-	-	784	Inf	Inf	0.0%
10/2	Colliters Way (N) Exit	U	N/A	N/A	-		-	-	-	259	Inf	Inf	0.0%
11/1	Bridgwater Road (E) Ped Crossing Ahead	U	3	N/A	N		1	32	-	380	2055	1211	31.4%
11/2	Bridgwater Road (E) Ped Crossing Ahead	U	3	N/A	N		1	32	-	155	2195	1293	12.0%
12/1	Bridgwater Road (E) Exit	U	N/A	N/A	-		-	-	-	380	Inf	Inf	0.0%
12/2	Bridgwater Road (E) Exit	U	N/A	N/A	-		-	-	-	155	Inf	Inf	0.0%
13/1	Colliters Way (S) Exit	U	N/A	N/A	-		-	-	-	438	Inf	Inf	0.0%
13/2	Colliters Way (S) Exit	U	N/A	N/A	-		-	-	-	253	Inf	Inf	0.0%

Full Input Data And Results

14/1	Bridgwater Road (W) Exit	U	N/A	N/A	-		-	-	-	632	Inf	Inf	0.0%
14/2	Bridgwater Road (W) Exit	U	N/A	N/A	-		-	-	-	485	Inf	Inf	0.0%

Full Input Data And Results

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network: A38/Colliters Way	**-**	**-**	**0**	**0**	**0**	**17.5**	**9.1**	**0.0**	**26.7**	**-**	**-**	**-**	**-**
A38/Colliters Way	**-**	**-**	**0**	**0**	**0**	**17.5**	**9.1**	**0.0**	**26.7**	**-**	**-**	**-**	**-**
1/1	0	0	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
1/3+1/2	751	751	-	-	-	3.9	1.2	-	5.0 (2.5+2.5)	24.2 (24.1:24.3)	5.3	1.2	6.5
1/4	282	282	-	-	-	1.4	0.5	-	1.9	24.2	3.7	0.5	4.2
2/1	292	292	-	-	-	0.3	0.2	-	0.5	5.9	2.1	0.2	2.3
2/2	383	383	-	-	-	0.5	0.2	-	0.7	7.0	2.9	0.2	3.2
3/2+3/1	398	398	-	-	-	2.4	0.8	-	3.3 (1.7+1.6)	29.6 (29.6:29.7)	2.9	0.8	3.8
3/3	69	69	-	-	-	0.4	0.1	-	0.5	27.4	0.9	0.1	1.1
4/1	417	417	-	-	-	0.2	0.2	-	0.4	3.4	1.2	0.2	1.4
4/2	474	474	-	-	-	0.1	0.3	-	0.4	2.9	0.7	0.3	1.0
4/3	282	282	-	-	-	0.0	0.1	-	0.1	1.7	0.0	0.1	0.1
5/1	237	237	-	-	-	1.2	0.6	-	1.8	27.5	3.2	0.6	3.8
5/2+5/3	411	411	-	-	-	2.1	0.6	-	2.7 (1.3+1.5)	24.0 (23.9:24.1)	2.9	0.6	3.6
6/1	395	395	-	-	-	0.5	0.2	-	0.8	7.1	1.6	0.2	1.8
6/2	485	485	-	-	-	0.6	0.3	-	0.9	7.0	1.7	0.3	2.1
6/3	69	69	-	-	-	0.1	0.0	-	0.1	6.9	0.3	0.0	0.3
7/1	588	588	-	-	-	1.1	1.1	-	2.2	13.5	3.6	1.1	4.7
7/2+7/3	650	650	-	-	-	1.0	0.4	-	1.4 (0.6+0.8)	7.6 (7.5:7.7)	1.9	0.4	2.3
8/1	196	196	-	-	-	0.1	0.3	-	0.4	6.6	0.4	0.3	0.6
8/2	284	284	-	-	-	0.3	0.5	-	0.8	9.8	0.9	0.5	1.4

Full Input Data And Results

9/1	784	784	-	-	-	0.8	0.9	-	1.7	7.8	5.7	0.9	6.6
9/2	259	259	-	-	-	0.2	0.1	-	0.3	4.4	0.6	0.1	0.8
10/1	784	784	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
10/2	259	259	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
11/1	380	380	-	-	-	0.3	0.2	-	0.5	5.2	2.9	0.2	3.2
11/2	155	155	-	-	-	0.0	0.1	-	0.1	1.9	0.0	0.1	0.1
12/1	380	380	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
12/2	155	155	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
13/1	438	438	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
13/2	253	253	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
14/1	632	632	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
14/2	485	485	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

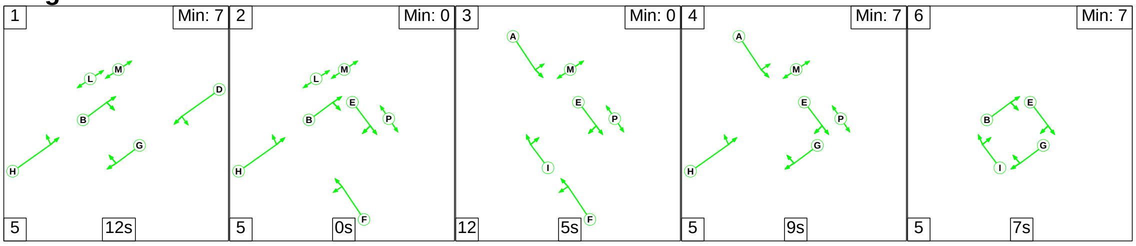
C1 - South Bristol Link A38	Stream: 1 PRC for Signalled Lanes (%):	24.7	Total Delay for Signalled Lanes (pcuHr):	24.00	Cycle Time (s):	56
C1 - South Bristol Link A38	Stream: 2 PRC for Signalled Lanes (%):	39.7	Total Delay for Signalled Lanes (pcuHr):	2.02	Cycle Time (s):	56
C1 - South Bristol Link A38	Stream: 3 PRC for Signalled Lanes (%):	186.8	Total Delay for Signalled Lanes (pcuHr):	0.63	Cycle Time (s):	56
	PRC Over All Lanes (%):	24.7	Total Delay Over All Lanes(pcuHr):	26.65		

Full Input Data And Results

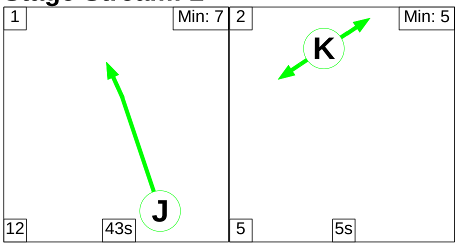
Scenario 12: '2030 12 MPPA PM' (FG12: '2030 12 MPPA PM', Plan 1: 'Network Control Plan 1')

Stage Sequence Diagram

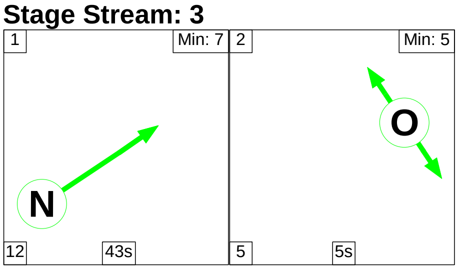
Stage Stream: 1



Stage Stream: 2



Stage Stream: 3



Stage Timings

Stage Stream: 1

Stage	1	2	3	4	6
Duration	12	0	5	9	7
Change Point	54	6	11	28	42

Stage Stream: 2

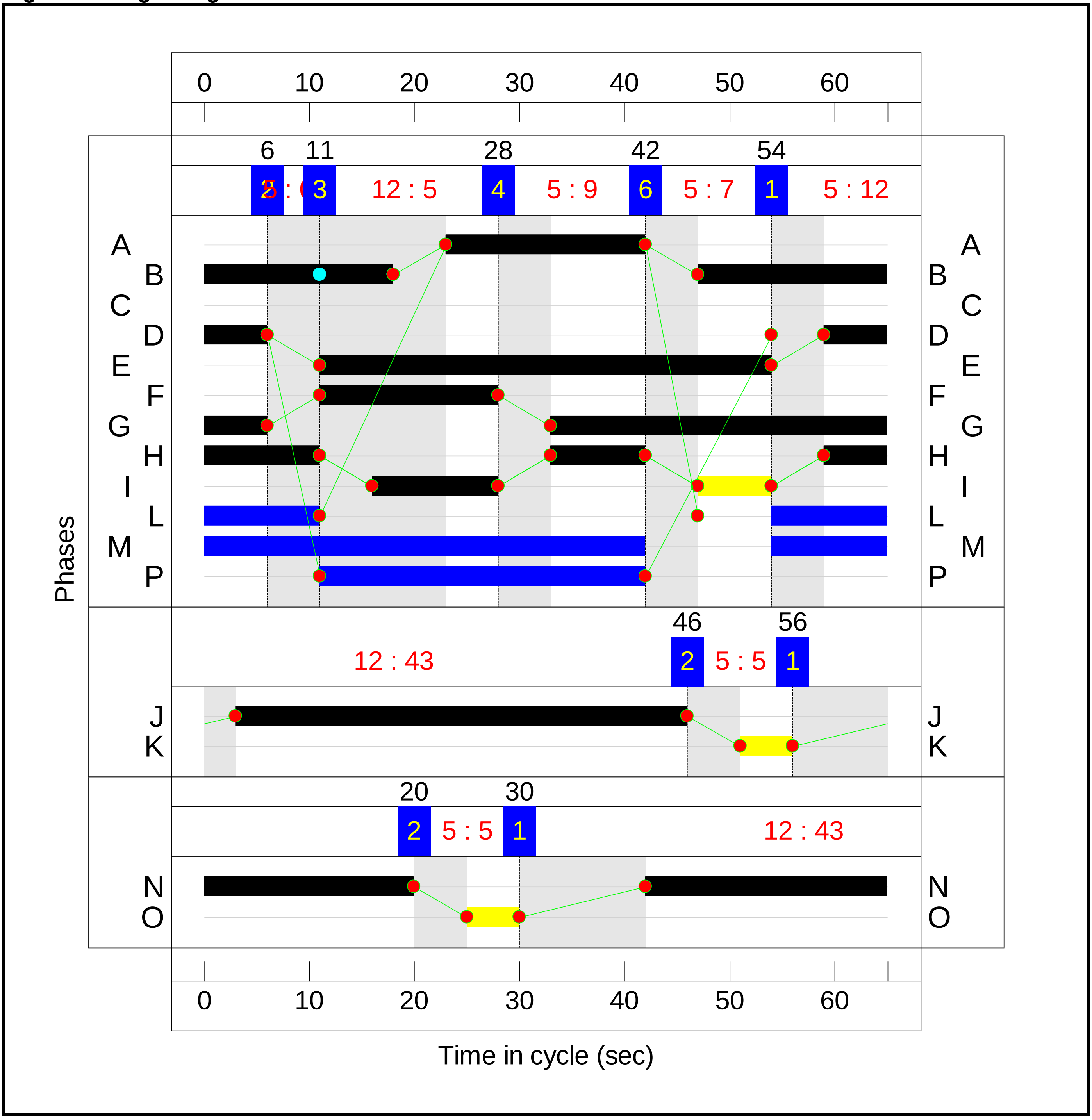
Stage	1	2
Duration	43	5
Change Point	56	46

Stage Stream: 3

Stage	1	2
Duration	43	5
Change Point	30	20

Full Input Data And Results

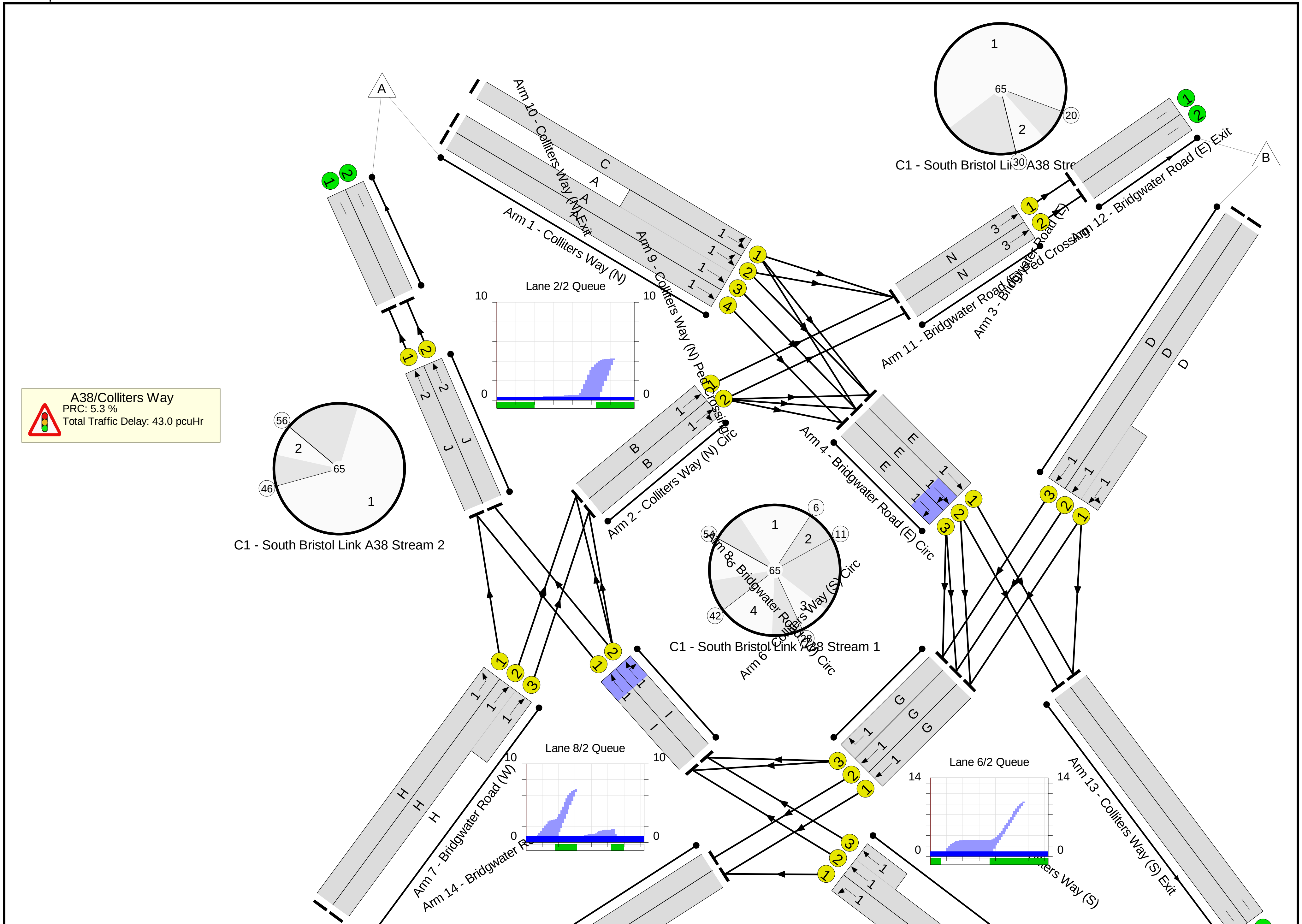
Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram

Full Input Data And Results



Full Input Data And Results

Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network: A38/Colliters Way	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**85.5%**
A38/Colliters Way	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**85.5%**
1/1	Colliters Way (N) Ahead Left	U	1	N/A	C		0	0	-	0	2105	0	0.0%
1/3+1/2	Colliters Way (N) Ahead Left	U	1	N/A	A		1	19	-	987	2052:1926	583+582	84.8 : 84.8%
1/4	Colliters Way (N) Ahead	U	1	N/A	A		1	19	-	457	2043	629	72.7%
2/1	Colliters Way (N) Circ Ahead	U	1	N/A	B		1	36	-	346	1972	1123	30.8%
2/2	Colliters Way (N) Circ Right Ahead	U	1	N/A	B		1	36	-	445	1972	1123	39.6%
3/2+3/1	Bridgwater Road (E) Ahead Left	U	1	N/A	D		1	12	-	638	2033:1895	367+379	85.4 : 85.5%
3/3	Bridgwater Road (E) Ahead	U	1	N/A	D		1	12	-	197	2052	410	48.0%
4/1	Bridgwater Road (E) Circ Ahead	U	1	N/A	E		1	43	-	529	1989	1346	39.3%
4/2	Bridgwater Road (E) Circ Right Ahead	U	1	N/A	E		1	43	-	624	1970	1334	46.8%
4/3	Bridgwater Road (E) Circ Right	U	1	N/A	E		1	43	-	457	1970	1334	34.3%
5/1	Colliters Way (S) Left	U	1	N/A	F		1	17	-	330	1914	530	62.3%
5/2+5/3	Colliters Way (S) Ahead	U	1	N/A	F		1	17	-	531	2080:2080	423+362	67.7 : 67.7%
6/1	Colliters Way (S) Circ Ahead	U	1	N/A	G		1	38	-	575	1956	1174	49.0%

Full Input Data And Results

6/2	Colliters Way (S) Circ Ahead	U	1	N/A	G		1	38	-	771	1956	1174	65.7%
6/3	Colliters Way (S) Circ Right	U	1	N/A	G		1	38	-	197	1923	1154	17.1%
7/1	Bridgwater Road (W) Left	U	1	N/A	H		2	26	-	489	1966	847	57.7%
7/2+7/3	Bridgwater Road (W) Ahead	U	1	N/A	H		2	26	-	782	2030:2099	623+789	55.4 : 55.4%
8/1	Bridgwater Road (W) Circ Ahead	U	1	N/A	I		2	19	-	333	2055	664	50.2%
8/2	Bridgwater Road (W) Circ Right Ahead	U	1	N/A	I		2	19	-	395	2045	661	59.8%
9/1	Colliters Way (N) Ped Crossing Ahead	U	2	N/A	J		1	43	-	822	2065	1398	58.8%
9/2	Colliters Way (N) Ped Crossing Ahead	U	2	N/A	J		1	43	-	386	2205	1493	25.9%
10/1	Colliters Way (N) Exit	U	N/A	N/A	-		-	-	-	822	Inf	Inf	0.0%
10/2	Colliters Way (N) Exit	U	N/A	N/A	-		-	-	-	386	Inf	Inf	0.0%
11/1	Bridgwater Road (E) Ped Crossing Ahead	U	3	N/A	N		1	43	-	491	2055	1391	35.3%
11/2	Bridgwater Road (E) Ped Crossing Ahead	U	3	N/A	N		1	43	-	134	2195	1486	9.0%
12/1	Bridgwater Road (E) Exit	U	N/A	N/A	-		-	-	-	491	Inf	Inf	0.0%
12/2	Bridgwater Road (E) Exit	U	N/A	N/A	-		-	-	-	134	Inf	Inf	0.0%
13/1	Colliters Way (S) Exit	U	N/A	N/A	-		-	-	-	552	Inf	Inf	0.0%
13/2	Colliters Way (S) Exit	U	N/A	N/A	-		-	-	-	350	Inf	Inf	0.0%

Full Input Data And Results

14/1	Bridgwater Road (W) Exit	U	N/A	N/A	-		-	-	-	905	Inf	Inf	0.0%
14/2	Bridgwater Road (W) Exit	U	N/A	N/A	-		-	-	-	771	Inf	Inf	0.0%

Full Input Data And Results

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network: A38/Colliters Way	**-**	**-**	**0**	**0**	**0**	**27.0**	**16.0**	**0.0**	**43.0**	**-**	**-**	**-**	**-**
A38/Colliters Way	**-**	**-**	**0**	**0**	**0**	**27.0**	**16.0**	**0.0**	**43.0**	**-**	**-**	**-**	**-**
1/1	0	0	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
1/3+1/2	987	987	-	-	-	5.7	2.7	-	8.4 (4.2+4.2)	30.6 (30.4:30.8)	8.2	2.7	10.9
1/4	457	457	-	-	-	2.5	1.3	-	3.9	30.4	7.2	1.3	8.5
2/1	346	346	-	-	-	0.4	0.2	-	0.6	6.4	3.0	0.2	3.2
2/2	445	445	-	-	-	0.6	0.3	-	0.9	7.2	3.9	0.3	4.3
3/2+3/1	638	638	-	-	-	4.4	2.8	-	7.2 (3.5+3.7)	40.6 (40.4:40.9)	5.6	2.8	8.4
3/3	197	197	-	-	-	1.3	0.5	-	1.7	31.4	3.1	0.5	3.6
4/1	529	529	-	-	-	0.4	0.3	-	0.7	5.0	2.3	0.3	2.6
4/2	624	624	-	-	-	0.3	0.4	-	0.7	4.2	1.6	0.4	2.0
4/3	457	457	-	-	-	0.0	0.3	-	0.3	2.1	0.1	0.3	0.4
5/1	330	330	-	-	-	1.9	0.8	-	2.7	29.5	5.1	0.8	6.0
5/2+5/3	531	531	-	-	-	2.9	1.0	-	3.9 (2.1+1.8)	26.6 (26.7:26.3)	4.7	1.0	5.7
6/1	575	575	-	-	-	1.0	0.5	-	1.4	9.0	3.9	0.5	4.4
6/2	771	771	-	-	-	1.1	1.0	-	2.0	9.4	9.5	1.0	10.4
6/3	197	197	-	-	-	0.2	0.1	-	0.3	6.2	0.6	0.1	0.7
7/1	489	489	-	-	-	1.0	0.7	-	1.7	12.2	3.7	0.7	4.3
7/2+7/3	782	782	-	-	-	1.4	0.6	-	2.1 (0.9+1.2)	9.5 (9.3:9.6)	3.2	0.6	3.8
8/1	333	333	-	-	-	0.3	0.5	-	0.8	8.5	0.9	0.5	1.4
8/2	395	395	-	-	-	0.7	0.7	-	1.4	13.0	6.0	0.7	6.7

Full Input Data And Results

9/1	822	822	-	-	-	0.5	0.7	-	1.2	5.3	4.6	0.7	5.4
9/2	386	386	-	-	-	0.2	0.2	-	0.4	3.5	0.9	0.2	1.0
10/1	822	822	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
10/2	386	386	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
11/1	491	491	-	-	-	0.3	0.3	-	0.6	4.3	2.6	0.3	2.8
11/2	134	134	-	-	-	0.0	0.0	-	0.1	1.8	0.1	0.0	0.1
12/1	491	491	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
12/2	134	134	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
13/1	552	552	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
13/2	350	350	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
14/1	905	905	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
14/2	771	771	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1 - South Bristol Link A38	Stream: 1	PRC for Signalled Lanes (%):	5.3	Total Delay for Signalled Lanes (pcuHr):	40.76	Cycle Time (s):	65
C1 - South Bristol Link A38	Stream: 2	PRC for Signalled Lanes (%):	53.0	Total Delay for Signalled Lanes (pcuHr):	1.59	Cycle Time (s):	65
C1 - South Bristol Link A38	Stream: 3	PRC for Signalled Lanes (%):	155.0	Total Delay for Signalled Lanes (pcuHr):	0.65	Cycle Time (s):	65
		PRC Over All Lanes (%):	5.3	Total Delay Over All Lanes(pcuHr):	43.01		

Appendix J Car Park Model Validation

Application of O/D ratio & validation

Summary calculation

This sheet shows an aggregated version of the calculation of number of car parking spaces required for BRS passengers by applying the Occupancy to Demand ratio to the number of cars arriving at the airport per month
Note: this data excludes foreign (non-UK based) passengers, as well as inbound passengers

PDS model calculations and output	Year	2017	2017	2017	2017	2017	2017	2017	2017	2017	2017	2017	2017
	Month	1	2	3	4	5	6	7	8	9	10	11	12
	Date	**Jan 17**	**Feb 17**	**Mar 17**	**Apr 17**	**May 17**	**Jun 17**	**Jul 17**	**Aug 17**	**Sep 17**	**Oct 17**	**Nov 17**	**Dec 17**
Passengers													
Total BRS Pax Demand Forecast (annual)	x(k)	8233.4											
Total Pax (excl. Foreign & Inbound Travellers)	x(k)	182.2	186.5	248.8	252.0	318.7	354.7	375.6	386.0	323.4	306.9	182.6	189.6
Pax Arriving by Car (excl. Drop-Off)	x(k)	87.4	89.6	120.7	121.3	154.3	171.4	181.6	188.0	156.2	147.5	88.5	91.7
Cars													
Average Group Size	x(k)	1.48	1.76	1.66	1.95	1.92	1.85	2.07	2.12	1.79	1.84	1.63	1.67
Cars Parked by Passengers (excl. Drop-Off)	x(k)	59.6	51.2	73.0	62.4	80.6	93.0	87.9	88.9	87.3	80.2	54.5	55.0
Competition													
Proportion Parking on the BRS Site	%	80%	78%	77%	77%	75%	74%	70%	70%	75%	77%	77%	73%
Cars Parked by Passengers @ BRS (excl. Drop-Off)	x(k)	47.6	39.9	56.2	48.1	60.5	68.8	61.5	62.2	65.4	61.8	42.0	40.2
Parking spaces required at peak													
Occupancy to Demand Ratio	%	19%	19%	18%	19%	22%	22%	23%	24%	23%	20%	17%	25%
Capacity Required (excl. drop-off)	x(k)	9.1	7.6	10.1	9.1	13.3	15.1	14.1	14.9	15.1	12.4	7.1	10.0

Validation

BAL car park transaction data	Year	2017	2017	2017	2017	2017	2017	2017	2017	2017	2017	2017	2017
	Month	1	2	3	4	5	6	7	8	9	10	11	12
	Date	**Jan 17**	**Feb 17**	**Mar 17**	**Apr 17**	**May 17**	**Jun 17**	**Jul 17**	**Aug 17**	**Sep 17**	**Oct 17**	**Nov 17**	**Dec 17**
Long Stay	x(k)	17.4	17.6	20.0	19.4	20.0	19.7	18.6	17.7	20.1	19.7	19.6	15.9
Meet and Greet	x(k)	1.1	1.3	1.4	1.4	1.8	2.0	1.8	2.1	2.7	3.0	1.5	1.2
Silver Zone	x(k)	15.0	15.7	20.8	22.0	32.9	37.3	33.8	33.2	38.2	36.9	15.2	14.3
Multistorey	x(k)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Premier	x(k)	4.7	5.0	5.9	4.5	4.8	5.1	4.3	4.1	4.6	4.0	4.2	3.8
Short Stay	x(k)	16.1	14.5	17.7	22.2	22.4	24.4	28.4	26.1	21.4	21.9	15.3	19.8
Express Drop Off & Pick Up	x(k)	87.6	85.1	99.3	113.7	131.9	143.5	149.4	148.5	153.3	136.3	93.1	104.6
Visitor	x(k)	0.4	0.4	0.4	0.4	0.5	0.6	0.6	0.6	0.6	0.4	0.4	0.3
Hotel	x(k)	0.0	0.0	0.7	1.0	1.0	1.0	1.3	1.3	1.3	1.0	0.9	1.0
Total	x(k)	142.3	139.6	166.2	184.5	215.2	233.5	238.1	233.6	242.2	223.1	150.3	160.9
Proportion of Short Stay that Park & Fly	%	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%
Total Park & Fly Demand	x(k)	39.6	40.7	49.5	49.0	61.2	66.1	60.8	59.2	67.29	65.3	41.8	36.8
Model validation; variance to transactions	%	(17%)	2%	(12%)	2%	1%	(4%)	(1%)	(5%)	3%	6%	(0%)	(8%)

Note: model validated to within 5% for peak months

Car park peak occupancy	7,841	7,459	8,127	9,238	13,736	14,546	13,569	14,302	15,163	13,084	6,828	9,087
Model validation; variance to transactions	15.45%	1.63%	24.50%	-1.11%	-3.16%	4.11%	4.27%	4.45%	-0.73%	-5.56%	4.47%	10.52%

End