Technical Note

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Project title	Barry Waterfront	Job number	122374
cc	Rob Thomas Richard Keogh Gareth Williams Andy Cockett	File reference	4-70
Prepared by	Roddy Beynon (Cardiff)	Date	21 June 2011
Subject	Response to comments received from Capita Symonds Audit and Vale of Glamorgan Council in response to Technical Note dated 5 October 2010		

1. Introduction

In August 2009 a Transport Assessment prepared by Arup for the Barry Waterfront site was submitted to the Vale of Glamorgan Council as part of an outline planning application for the site promoted by a development consortium comprising Persimmon Homes, Taylor Wimpey and Barratt Homes.

In November 2009 the Vale of Glamorgan Council commissioned Capita Symonds to complete a review of the Transport Assessment. This audit was completed and an audit report issued in February 2010. A meeting was subsequently held on 26 February 2010 between Arup, Capita Symonds and the Vale of Glamorgan Council to discuss the issues arising. During the meeting some fundamental issues were discussed including trip generation and the effectiveness of minor mitigation works at a number of junctions.

Following this meeting Arup submitted a Revision A Transport Assessment on behalf of the development consortium in June 2010. This revised Transport Assessment now forms part of the planning application.

An audit of the revised Transport Assessment was undertaken by Capita Symonds in August 2010 and a second audit report was subsequently issued in August 2010.

Arup issued a Technical Note on 4 October 2010 in response to points raised in the second audit report. That Technical Note corrected several minor typographical errors and documented a number of traffic modelling tests. The findings of these tests were not considered to have a material bearing on the results and outcomes presented in Revision A of the Transport Assessment.

Capita Symonds reviewed the October 2010 Technical Note and a third audit report was issued to Arup on 16 May 2011. Whilst the review highlighted a number of ongoing issues there was also confirmation that a number of the issues previously raised were now considered to be resolved. Upon issue to Arup the Vale of Glamorgan Council also instructed the consortium that the Council did not require further investigation in relation to mitigation works at the Port Road/Barry Docks Link Road roundabout as the proposed off-site highway contribution would not extend to funding works at this junction.

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Further to the Capita Symonds response the Vale of Glamorgan Council also issued a number of comments separately on 20 May 2011. These comments were mainly in relation to the arrangement of signalised junctions and cycle facilities within the development site area.

A meeting was held on 26 May 2011 between the Vale of Glamorgan Council, Capita, Arup and Nathaniel Litchfield and Partners (the consortium's planning agent and co-ordinators) in order to discuss the remaining issues. This Technical Note also considers the matters discussed during that meeting and agreements reached in terms of how to proceed upon the requests for further information arising from it.

As agreed during the 26 May meeting this Technical Note, combined with the Transport Assessment Revision A, the Technical Note dated 5 October 2010 and the letter to the Vale of Glamorgan Council dated 19 May 2011 will form the transportation related documents on which the planning application will be determined.

It should be noted that having received the last Technical Note in early October and issued responses on 16 and 20 May 2011 the Vale of Glamorgan has requested a response from Arup on behalf of the consortium by early June 2011. Whilst best efforts have been made to respond to all matters agreed as appropriate the time constraints imposed have in some cases precluded some of the complex traffic modelling work suggested in the most recent Capita Symonds audit. Given the minor impact likely to result from such changes this Technical Note is considered to provide an appropriate level of detail in order inform the report under preparation for planning committee.

2. Resolved issues and those deemed by Vale of Glamorgan Council not to warrant further investigation

The May 2011 Capita Symonds audit acknowledged that the October 2010 Technical Note had sufficiently clarified or resolved a number of issues. Further to this the Vale of Glamorgan Council has instructed the consortium not to investigate further a number of locations where mitigation is not possible without requiring third party land and where the Council has no current plans to rectify existing problems. For clarity the references from the Capita Symonds note are used in Table 1.1 to identify these points.

Table 1.1: Agreed or resolved issues/sections from Capita Symonds May 2011 audit

Section/Reference	Notes
2.2.1-2.2.3	Minor typographical error regarding mitigation works, correction accepted.
2.4.1-2.4.3	Outdated reference to policy document status, correction accepted.
2.7.4-2.7.6	Port Road/Barry Dock Link Road – The Vale of Glamorgan Council has instructed that further design input is not warranted at this junction as funding of improvement measures at this location is not available.
2.7.10-2.7.12	Minor typographical error regarding vehicle queue lengths, correction accepted.
2.7.16-2.7.18 and 2.8.7	Issues regarding junction capacity at Biglis Roundabout and Palmerston Road junctions. The Vale of Glamorgan Council has instructed that further design input is not warranted at this junction since improvements are unlikely in the near future. The meeting considered that the use of third party land may be able to resolve capacity issues and, in the case of the Palmerston Road junction, improve access for the third party land owners.
2.10-2.10.5	Issues regarding rail capacity being able to accommodate demand from Barry Waterfront have been agreed.
2.11-2.11.4	Issues regarding bus capacity and effect of service alterations as a result of the development have been agreed.
2.14-2.14.3	Typographical error regarding modal split target, corrections accepted.

In summary, from the most recent correspondence received during May 2011 it is now considered that as a result of the process detailed in section 1 the majority of the Transport Assessment content is now approved and agreed by the Vale of Glamorgan Council and their advisors Capita Symonds:

1. Introduction	APPROVED
2. Existing Site	APPROVED
3. Development History	APPROVED
4. Policy Context	APPROVED
5. The Masterplan and Transport Strategy	APPROVED
6. Trip Making	APPROVED
7. Highway Assessment	OUTSTANDING ISSUES
8. Parking Assessment	OUTSTANDING ISSUES
9. Rail Assessment	APPROVED
10. Bus Assessment	APPROVED
11. Walking and Cycling Assessment	OUTSTANDING ISSUES
12. Other Travel Considerations	APPROVED
13. Outline Travel Plan	APPROVED
14. Recommendations and Summary	OUTSTANDING ISSUES (related to sections 7, 8, 11)

3. Response to Outstanding Issues

3.1 Introduction

The remainder of this Technical Note will consider and respond to the remaining outstanding issues raised both in the Capita Symonds audit report (issued 16 May 2011) and separately issued Vale of Glamorgan Council correspondence (issued 20 May 2011).

A letter has previously been issued by Arup (dated 19 May, sent via e-mail) in response to the Highways department response (received by e-mail from Yvonne Pritchard on 12 April 2011) and so these issues will not be reconsidered here, the letter is included as Appendix A.

3.2 Gladstone Bridge/Ffordd y Mileniwm

The following response is in relation to sections 2.7.13-2.7.15 of the Capita Symonds review and also considers discussions during the meeting held on 26 May 2011. It is acknowledged by all parties that the proposed mitigation works utilise all available highway land and deliver the best solution possible within these constraints. Concerns remain over the effectiveness of the proposed mitigation works which are difficult to model as a result of the limitations of the modelling software (ARCADY 6/7).

Arup has now completed the suggested sensitivity test using the heaviest turning movement on each arm in combination with the total flow on all other arms. The full results are included in Appendix B and the 2020 PM Peak and development results are summarised in Table 3.1 in comparison to those presented in the Transport Assessment Revision A.

Table 3.1: ARCADY sensitivity test results compared to initial results.

	RFC		**Queue**	
	TA Revision A	**Sensitivity Test**	**TA Revision A**	**Sensitivity Test**
Ffordd Y Mileniwm E	0.864	0.95	4	13
Ffordd Y Mileniwm W	0.563	0.80	1	4
Gladstone Bridge	0.777	0.96	10.9	14

The sensitivity test confirms that lane useage is not even and so the queues experienced are likely to be greater than those forecast using the standard means of modelling capacity using the ARCADY software but that these increased queues are unlikely to exceed the available adjacent link lengths.

The Gladstone Bridge arm of the roundabout is forecast to experience the most significant queuing. The length of this arm is approximately 200m to the adjacent Gladstone Bridge/Broad Street roundabout junction to the north, therefore this link can accommodate over 30 PCUs before blocking occurs. Given that the heaviest movement is forecast to generate a 14 vehicle queue it is not anticipated that the development would result in blocking back effects during peak hours.

Similarly, on Ffordd y Mileniwm (East) there is sufficient length for approximately 25 vehicles to queue between junctions, compared with a queue of 13 forecast for the dominant movement.

Thus even under this rigorous sensitivity analysis, the junction operates satisfactorily. This indicates that the proposed improvements to the junction are adequate given the constraints of the highway land.

3.5 Merrie Harrier Junction

The following response is in relation to sections 2.8.2-2.8.4 of the Capita Symonds review. The analyses for the Merrie Harrier junction have been revised in line with Capita Symonds' recommendations to alter link 8/2 to give way to links 5/2 and 5/3 in addition to 5/1. The capacity assessment results before and after the changes are summarised in Table 3.2 according to the four stage grading process used in the Transport Assessment. Full results are included in Appendix C.

Table 3.2: Revised capacity analysis results for Merrie Harrier junction compared to TA Rev A results.

	Transport Assessment Revision A						**Revised Analysis**					
	2008 Base		**2020 Base**		**2020 with Dev**		**2008 Base**		**2020 Base**		**2020 with Dev**	
	AM	**PM**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**
Merrie Harrier Signals Junction	3	2	3	2	4	2	3	2	3	2	4	3

1 - Within Capacity	**2** - Approaching Practical Capacity	**3** - Over Practical Capacity, Approaching Theoretical Capacity	**4** - Over Theoretical Capacity
Priority RFC <0.75 Signals RFC <0.80	Priority RFC >0.75, <0.85 Signals RFC >0.80, <0.90	Priority RFC >0.85, <1.00 Signals RFC >0.90, <1.00	Priority RFC >1.00 Signals RFC >1.00

The changes have had a marginal effect on the capacity analysis results in the '2020 PM Peak with Development' scenario which now indicates some increased capacity issues.

3.6 Murch Crossroads

The following response is in relation to sections 2.8.5-2.8.6 of the Capita Symonds review. The analyses for this junction have been revised in line with Capita Symonds comments by introducing turn radii for links 1/1 and 4/1. The capacity assessment results before and after the changes are summarised in Table 3.3. Full results are included in Appendix D.

Table 3.3: Revised capacity analysis results for Murch Crossroads compared to TA Rev A results.

	Transport Assessment Revision A						Revised Analysis					
	2008 Base		2020 Base		2020 with Dev		2008 Base		2020 Base		2020 with Dev	
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
Murch Crossroads	1	1	2	3	3	4	1	2	2	3	3	4

The capacity analysis amendments have had a marginal effect on the model results, most notably in the 2008 PM Peak which represents existing conditions.

3.7 Hood Road/Broad Street Junction

The following response is in relation to section 2.8.8 of the Capita Symonds review. The analyses for the Hood Road/Broad Street junction have been revised in line with Capita Symonds comments that the modelling of the right turn movements from Hood Road and Island Road North should give these turns giving way to other movements. The results before and after the changes are summarised in Table 3.4. Full results are included in Appendix E.

Table 3.4: Revised capacity analysis for Hood Road/Broad Street junction compared to initial results.

	Transport Assessment Revision A						Revised Analysis					
	2008 Base		2020 Base		2020 with Dev		2008 Base		2020 Base		2020 with Dev	
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
Broad Street / Hood Road Signals	1	2	1	3	1	2	1	2	1	3	1	2

In this case the revisions have had a negligible effect that has not registered as a change according to the capacity grading system used for the Transport Assessment.

3.8 Harbour Road/Station Approach Road

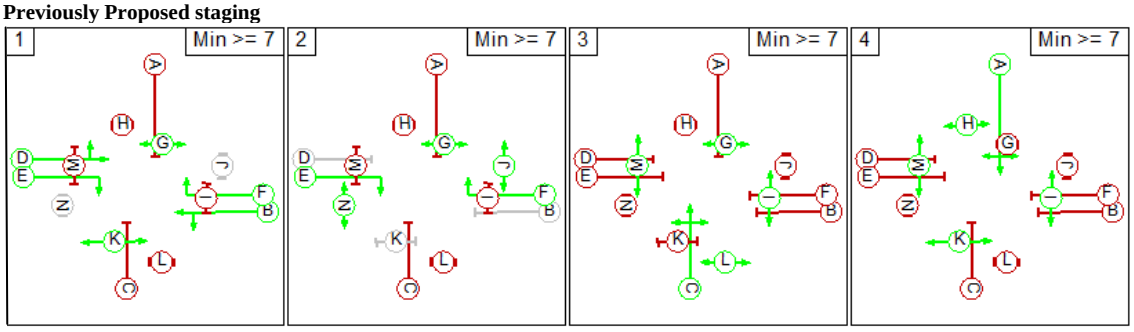
The following response is in relation to section 2.8.9 of the Capita Symonds review. In relation to these comments it is accepted that high volumes of pedestrian movement may affect capacity however it is considered that such situations would only occur in peak tourism scenarios and for short durations. At all other times it is considered that the analysis presented is representative of the likely situation.

3.9 Barry Waterfront Internal Junctions

The following response is in relation to sections 2.8.11-2.8.19 and issues raised in the Vale of Glamorgan May 2011 correspondence. The Vale of Glamorgan Council has now confirmed that the proposed signal staging at internal junctions i (internal northern) and viii (internal South Quay junction) is not considered acceptable.

In a meeting held on 26 May 2011 the Council also confirmed that they do not consider it appropriate to provide additional highway space at these locations in order to increase capacity and therefore an alternative staging with lower capacity using the same junction layout was considered the appropriate way forward. The previous and revised staging at the junctions is indicated in Figure 3.1.

Previously Proposed staging



Revised Staging

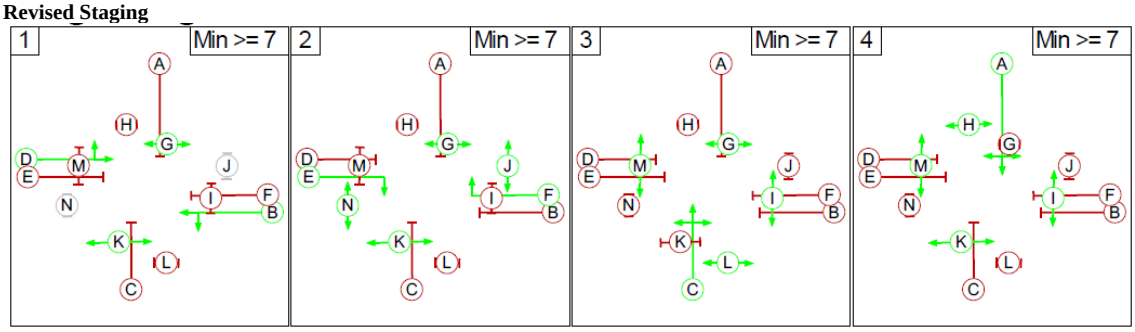


Figure 3.1: Comparison of traffic signal staging at internal northern junction i, (similar at junction viii)

The full capacity assessment for the revised staging is included in Appendices F and G for junctions i and viii respectively and the results are summarised in Tables 3.5 and 3.6.

Table 3.5: Revised junction capacity analysis results for internal Northern junction i

Lane Description	TA Revision A 2020 PM Peak		Revised Analysis 2020 PM Peak	
	Deg Sat (%)	Mean Max Queue (pcu)	Deg Sat (%)	Mean Max Queue (pcu)
Steam Railway	94.9%	8.0	87.0%	6.1
Ffordd Y Mileniwm	95.0%	43.6	112.8%	115.1
Mole Access	92.5%	7.9	95.4%	8.2
Development Link Road	71.8%	20.2	85.2%	25.4

Table 3.6: Revised junction capacity analysis results for internal South Quay junction viii

Lane Description	TA Revision A 2020 PM Peak		Revised Analysis 2020 PM Peak	
	Deg Sat (%)	Mean Max Queue (pcu)	Deg Sat (%)	Mean Max Queue (pcu)
BILR - From S'market	89.3%	29.0	108.5%	70.6
SQH1&2 Area	85.4%	7.8	100.4%	12.7
BILR - From Barry Island	54.1%	12.0	65.4%	14.6
BISCP Area	56.1%	2.7	56.1%	2.7

The results for these junctions indicate that the revised staging has a significantly lower capacity than the previous analysis and that as a result queuing on certain arms may increase, assuming all traffic still tried to follow the same route. The greatest increase in queues occurs on the through roads where the traffic volumes are greatest as these arms are the most affected by the reduction in capacity. On the other arms the queues remain comparable to those of the previous analysis.

It should be noted that the analysis for all the internal junctions is based on a set amount of vehicles reassigning to use the internal link road, as set out in the Transport Assessment – this is a 'static' analysis of what is really a dynamic situation. If the signal staging is such that is restricts capacity, then the total volume of traffic using the link road as a through route is likely to diminish as this through traffic has the option to utilise other routes and drivers will generally seek to minimise journey time. Therefore, it is highly unlikely

that the queuing issues that are stated in the above analysis will materialise to the extent suggested by the analysis.

In light of the forecast capacity issues at these two junctions (assuming traffic signals with standard control equipment) the consortium will commit to the installation of MOVA control equipment at these two locations. Whilst it is not possible to model the effects of this proprietary control system previous studies have shown that this advanced control system leads to an improvement in both delays and overall junction capacity.

It should be noted that these internal junctions also form the subject of a detailed planning application for the Barry Island Link Road which has been submitted separately by the consortium.

3.10 Summary of Junction and Traffic capacity related issues (3.2-3.11)

With regard to the issues relating to junction capacity it should be noted that the comments which are outstanding are predominantly issues of detail based on traffic forecasts which:

- assume a development consisting of 2,000 residential units as opposed to the current illustrative masterplan development of 1,700-1,800 units. Given the current market conditions it is now likely the consortium will implement a development with this reduced number of dwellings;
- assume previous DfT traffic growth forecasts between 2008-2020 of 16.5/16.3% for the AM and PM periods which have subsequently been downgraded as a result of economic and fuel cost considerations to 13.6%/14.5%;
- assume no change in levels of traffic to the Morrisons superstore (which is considered to be overtrading) despite the presence of a nearby competing superstore on the Barry Waterfront site.
- assume trip rates based on sites which do not benefit from the same level of Public Transport provision as the Barry Waterfront site; and
- assume no allowance for the alteration of traffic habits (either by changing times of journeys, route of journey or mode of transport) in relation to traffic conditions.

As a result of these assumptions it is now considered that the 2020 forecasts represent a worst case scenario and that the levels of congestion and delay are likely to be lower than suggested by these forecasts and analysis. Observations in congested networks elsewhere also indicate that congestion itself can act as a form of demand management leading to journeys being made at different times of the day (peak spreading) or a change in mode of transport (mode shift) as the current time benefits of the private car deteriorate.

With regard to comments on signalised junctions the Capita Symonds audit report acknowledges that the points raised are generally of a very detailed nature which are unlikely to change the overall results presented in the Transport Assessment. Section 2.8.20 of the audit report states that *"....comments on traffic signals are minor in nature and won't result in significant changes to the results of the Linsig analysis"*

3.11 Car Parking

The following response is in relation to sections 2.9.1-2.9.4 of the Capita Symonds audit report. The report refers to a then pending decision by the Vale of Glamorgan Council on parking standards which was subsequently confirmed for the first time as part of the e-mail dated 12 April (to which a response has already been issued). The standards to be applied were defined as:

- **Car Parking:** *'Parking Guidelines – Policy in South Wales[1] and Manual for Streets'*
- **Cycle Parking:** ***'***_UDP Policy Tran. 9 Cycling Development Standing Conference on Regional Policy in South Wales Guidelines for provision of facilities for cyclists'_[2]

[1] Taken to be the 2001 Addendum to South Wales Parking Guidelines (1993)

[2] Taken to be an indirect reference to Table 6, Appendix 6 of the Vale of Glamorgan Adopted Unitary Development Plan 1996-2011

Whilst it is accepted that the South Wales Parking Guidelines form the current adopted guidance, the Transport Assessment puts forward a number of factors, including the prime location of the site, which suggest that the County Surveyors Society (CSS) parking standards are better suited to the site than the outdated South Wales Parking Guidelines, which do not take account of site location or surrounding public transport provision. A comparison to both standards was included in Section 8 of the Transport Assessment, which indicated a shortfall against the South Wales Guidelines and a close match to the CSS standards.

The provision of parking is also acknowledged as a form of demand management; in order to achieve higher levels of public transport use, walking and cycling, it is considered that the relationship with the availability of parking should be taken into account. This is supported by the suggested guidance in Manual for Streets: *"8.3.6 Provision below demand can work successfully when adequate on-street parking controls are present and where it is possible for residents to reach day-to-day destinations such as jobs, schools and shops without the use of a car"*. Given the presence of employment, education and retail land uses on the Barry Waterfront site together with the proximity of local rail and bus services, the site would seem to represent an ideal location to apply this method of demand restraint.

The current UDP cycle parking standards table (Table 6, Appendix 6) does not provide detailed standards for residential uses, although the previous UDP recommended a provision of one space per dwelling, the consortium would be agreeable to this level of provision as a planning condition.

With regard to cycle parking elsewhere Table 8.4 of the Transport Assessment assessed the requirement of the different land uses against UDP standards to be 51 spaces. The consortium will consider this to be a minimum for cycle parking provision across the completed site. Cycle parking provisions associated with these land uses will be predominantly through the provision of Sheffield Stands.

In addition to cycle parking within the site the consortium has also made a commitment to the provision of additional cycle parking at the local railway stations as part of improvement packages for several local routes (see section 11.4 of Transport Assessment Rev A).

3.12 Walking and Cycling

The following response is in relation to sections 2.12.1-2.12.6 of the Capita Symonds review and issues raised in the Vale of Glamorgan May 2011 correspondence.

It is agreed that the route between the various areas of the site and the railway stations are important. The consortium has committed to improve these routes through a number of measures detailed in the Transport Assessment.

The Capita Symonds audit report again raises the connection between the district centre and Barry railway station. As previously stated the Masterplan for Barry Waterfront has been designed to accommodate a direct route to Barry station utilising a new crossing of the heritage railway lines and providing a direct link to Powell Duffryn Way. However as a result of the lease of the lines to Cambrian Transport (which is understood to have occurred after the allocation of the Barry Waterfront site in the UDP) and the resistance to establishing a level crossing at this location from Cambrian Transport (despite the heritage railway operating for only 33 days[3] in 2011) and associated lack of support from the Vale of Glamorgan Council, it will not be possible to provide the ideal route at this point. For this reason the consortium will protect the route within the site for the future when an at-grade crossing can be achieved whilst providing improvements to the existing route via Hood Road.

The nature of improvement works is also raised in the Capita Symonds response. As acknowledged it is considered appropriate to discuss the final detail after the outline planning application has been determined.

[3] Source: Barry Tourist Railway Guide and Timetable 2011 leaflet

The consortium remains open to alternative measures as appropriate within the funding value of the proposed Section 106 offer.

The recent Vale of Glamorgan Council correspondence indicates that there are concerns over the provision for cyclists along the Barry Island Link Road. These comments relate to the spatial provision (either on or off-highway) for cyclists and relate particularly to the approach to signalised junctions where the design for the Barry Island Link Road (produced by Healer Associates) indicates advance stop lines for cyclists.

It should be noted that several of these comments are in contradiction with guidance issued at the outset of the project (meeting minutes April 2008), when council officers stated that a cycling link away from the main link road was preferred. Despite this the consortium has reviewed the Masterplan design and considers there is flexibility to provide further facilities for cyclists along the link road. The design of the Barry Island Link Road is the subject of a separate detailed planning application which is being progressed and it is therefore considered more appropriate to tackle these issues in connection with the detailed application than the outline application.

4. Summary

This Technical Note has considered the Capita Symonds audit report to the Arup October 2010 Technical Note as well as additional comments received from the Vale of Glamorgan Council both via e-mail and at a meeting held on 26 May 2011. The response provided has included technical analysis where appropriate and agreed at the 26 May 2011 meeting. It is considered that the additional tests presented here represent additional clarification and sensitivity testing on the overall results and outcomes presented in the Transport Assessment Revision A and Environmental Statement which remain representative.

Due to the limited time provided in which to respond in advance of the planning committee meeting the focus of this technical note has been those matters raised during the meeting held on 26 May 2011and central to the Capita Symonds audit report. As a result it is considered the information presented is an appropriate level of detail to reach a conclusion on these matters. Considering the content of the Transport Assessment it is clear that differences are now limited to a significantly smaller set of issues than at the start of the review process and that a significant proportion of the Transport Assessment can now be considered common ground. Where differences remain these are often limited to areas where the consortium has an ongoing interest, such as the provision of a route to Barry railway station, or those of a technical nature which would have minimal material impact on the eventual operation of the site.

It is now considered that the traffic capacity analysis represents an extreme scenario that is unlikely to be realised as a result of changes in the likely number of residential units and the reduction in traffic growth forecasts. This outlook is further supported by the improvements to the local walking, cycling and public transport network which include improvements proposed by the consortium.

DOCUMENT CHECKING (not mandatory for File Note)

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Appendix A

Appendix A

Response Letter to Vale of Glamorgan Highways Department

Our ref 122374/RB
File ref 5.45

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Yvonne Prichard
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19 May 2011

Dear Yvonne,

Barry Waterfront
Response to Vale of Glamorgan Council Highways Comments

We have reviewed the recent comments from the Vale of Glamorgan Council Highways department and consider it to be unfortunate that this response has taken so long to be forthcoming and that a number of the points put forward contradict statements previously made on the trip rates in the original Transport Assessment (dated August 2009) which considered a more sustainable mode share for travel to and from the site.

With regard to the points raised for refusal the following comments are raised:

1. ***The proposed development will create traffic hazards and congestion to the detriment of highway safety***

Whilst it is accepted that if the Council take no action to mitigate current and background growth related traffic issues the development would add to congestion these current and background growth situations are not the responsibility of the consortium. The consortium has put forward a significant s106 offer for mitigation works related to development traffic. The council has put forward no evidence to substantiate any 'detriment to highway safety'. In the case of increased congestion it is likely traffic will move more slowly but any claim that this will lead to safety issues should be justified.

2. ***The Barry Waterfront Site is in a prime location close to good existing public transport facilities and public attractions. The development as proposed fails to demonstrate that it will deliver adequate sustainable travel opportunities and facilities for all modes of transport as outlined in the Approved Barry Waterfront Principles Document (July 2009)***

The Transport Assessment covers all modes of transport to the site in significant detail and proposes a commercially viable diversion to an existing frequent bus service. Connections and associated improvements to a number of key destinations (including all three nearby railway stations) are proposed. The prime location of the site, its mixed use nature, the connections to the transport facilities, committed improvements to the railway service and

the Travel Plan with commitment to mode share targets are all significant factors that will encourage a lower total trip generation with a balanced mode share.

In direct contradiction to this reason the Vale of Glamorgan Council has requested that the development is tested with pessimistic vehicle generation rates (which are higher than those of comparable sites from the widely accepted TRICS database) as well as higher levels of car parking which has an acknowledged relationship with the demand for car-based trips. The existing residential areas in the Waterfront areas already have trip generation of around the level tested despite locations which are less well connected to public transport and designs which do little to encourage public transport, walking and cycling.

In response to the other points raised:

1. Parking

- The Transport Assessment put forward a number of factors including the prime location which means it is considered that the CSS parking standards are better suited to the site than the outdated South Wales Parking guidelines. Notwithstanding this a comparison to both standards was included in the Transport Assessment and a close match to the CSS standards was presented. Despite requests at a number of meetings the Vale of Glamorgan Council did not confirm the appropriate standard for the development to accord with during the preparation of the Transport Assessment.
- The provision of parking is also widely acknowledged as a form of demand management; in order to achieve higher levels of public transport use, walking and cycling it is considered that this relationship with the availability of parking should be considered.
- The dual use of parking areas in the district centre reflects the nature of the mixed use development and likelihood of linked trips and ensures that parking does not dominate the development. Mermaid Quay in Cardiff Bay is a good example where parking is shared between different parts of a development; there a small multi-storey car park provides parking for a number of eating/drinking, leisure and retail businesses.
- Cycle parking is included throughout the development and is considered to be in accordance with the guidelines. This is also the first time at which the Council has confirmed the relevant standard for cycle parking.

2. Highway Proposals

- The consortium has reviewed their contractual obligations and it is acknowledged that there is a requirement to provide a 6.5m access to both the South Quay and Mole areas. Appropriate amendments will be made to the Masterplan at the detailed design stage which is possible through the flexibility within the outline planning application parameters. These alterations will improve conditions for the operation of public service vehicles. Notwithstanding this it is considered that as a no through road the South Quay access road would be an unattractive route to operate standard public service vehicles on. If access to Barry Island were to be opened up it is also likely that public transport operators would deem the gradient of Dock Road to be unacceptable to operate a standard vehicle on.
- The access to the Mole has been designed to allow access for vehicles towing leisure craft. The Barry Waterfront Consortium will not develop the Mole area itself and therefore the specific highway arrangements are subject to design by a third party

3. Density of Development and Traffic Generation

- Comments regarding density of development and impacts of traffic generation have been ongoing throughout the Transport Assessment process however the site has been allocated in the UDP since 2006 and considered in the 2009 Development Principles Document. In the interim period since the UDP allocation there have been no significant actions from the Council to tackle existing or background traffic growth issues either by demand management or highway improvements; thus all the issues have been left for the site promoter to address which is clearly an untenable position. It is therefore considered inappropriate to question the deliverability of a long standing strategic allocation on these grounds at such a late stage.
- The traffic capacity assessment has indicated that the surrounding highway network suffers existing and forecast traffic congestion which cannot be considered the responsibility of the Waterfront development. The Waterfront development will generate a significant amount of additional traffic however a package of mitigation measures to improve to nil-detriment impacts related to development traffic where possible within highway land was previously proposed. This was rejected by the council who requested funding to tackle all traffic issues (baseline, future and development related) at a smaller number of junctions. The consortium has since proposed a revised offer for s106 works.

4. Travel Plan

- The Outline Travel Plan included with the Transport Assessment forms part of the Outline Planning Application. It is not accepted that this Travel Plan is vague or generic. The Travel Plan measures have been prepared specifically to provide a framework for the Waterfront site and include a number of measures which take account of the surrounding facilities but also measures which Arup has experience of achieving real mode shift in similar sites elsewhere.
- The Travel Plan includes mode share targets. These are significant overarching targets that will drive the development of final Travel Plans and that the Council/developer should use to monitor the plan on opening of the development.

5. Public Transport (General)

- The Barry Island Link road has been planned to facilitate the easy movement of all vehicles including Public Service vehicles, large vehicles accessing the Mole and HGV deliveries to the retail area. Elsewhere access has been planned for appropriate vehicles, in line with emerging best practise from documents such as Manual for Streets. The intention in these predominantly residential areas has been to avoid the highway dominating what will be primarily residential area.

In summary the grounds for highways objection are often in contradiction with the requests and comments of various members of the Highways department during the preparation of the Transport Assessment which we find particularly frustrating. Given the allocation of the site and the Council's own development principles the reasons put forward for objection are considered difficult to support.

We understand that planning applications are being reported to Planning Committee on the 23 June and that these issues will be considered in the balance alongside other material considerations, in particular the delivery of a strategic site and the extensive regeneration benefits which would be realised. We have also received further comments from Capita on behalf of the Council which we are currently considering and a further response will follow in due course.

Yours sincerely

Roddy Beynon
Senior Engineer | Transport Consulting

cc Rob Thomas
Vicky Abraham

Appendix B

Gladstone Bridge/Ffordd y Mileniwm roundabout sensitivity tests

ARCADY 7

Version: 7.0.1.130 [12 March 2010]

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File: J:\122000\122374-00\4 Internal Project Data\4-40 Calculations\Transport\Junction Assessments\Alterations -May2011\21.Gladstone_Ffordd y Mileniwm\With Improvements\Gladstone_Mileniwm_North.arc7
Report generation date: 31/05/2011 09:57:48

Summary of roundabout performance

	AM			
	Queue (Veh)	Delay (min)	RFC	LOS
	(Default Analysis Set) - AM 2008 Base			
Arm A	0.39	0.04	0.28	A
Arm B	0.12	0.04	0.11	A
Arm C	3.36	0.25	0.78	C
	(Default Analysis Set) - AM 2020 Base			
Arm A	0.49	0.04	0.33	A
Arm B	0.15	0.04	0.13	A
Arm C	8.77	0.59	0.91	E
	(Default Analysis Set) - AM 2020 With Development			
Arm A	0.84	0.05	0.46	A
Arm B	1.53	0.10	0.61	A
Arm C	27.14	1.99	1.03	F
	(Default Analysis Set) - PM 2008 Base			
Arm A	1.07	0.06	0.52	A
Arm B	0.13	0.05	0.11	A
Arm C	2.29	0.19	0.70	B
	(Default Analysis Set) - PM 2020 Base			
Arm A	1.51	0.07	0.60	A
Arm B	0.16	0.05	0.14	A
Arm C	4.38	0.32	0.82	C
	(Default Analysis Set) - PM 2020 With Development			
Arm A	3.47	0.12	0.78	A
Arm B	1.28	0.10	0.56	A
Arm C	13.50	1.08	0.96	F
	(Default Analysis Set) - PM 2020 With Development+Tourism			
Arm A	4.66	0.15	0.83	A

Arm B	1.83	0.12	0.65	A
Arm C	29.58	2.15	1.04	F

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

AM 2008 Base - AM runs from 16:15:00 to 17:45:00
PM 2008 Base - AM runs from 16:15:00 to 17:45:00
AM 2020 Base - AM runs from 16:15:00 to 17:45:00
PM 2020 Base - AM runs from 16:15:00 to 17:45:00
AM 2020 With Development - AM runs from 16:15:00 to 17:45:00
PM 2020 With Development - AM runs from 16:15:00 to 17:45:00
PM 2020 With Development+Tourism - AM runs from 16:15:00 to 17:45:00

File summary

File Description

Title	Gladstone Bridge_Ffordd Y Mileniwm
Date	16/07/2009
Status	On-going
Jobnumber	122374
Enumerator	Roddy.Beynon [WACPC145]
Results Upto Date	True

Analysis Options

RFC Threshold	Vehicle Length (m)	Do Queue Variations
0.85	5.75	

Sorting and Display

Show Arm Names	Arm Grouping	Sorting Direction	Sorting Type	Data Matrix Style	Time Style
	Order	Ascending	Numerical	By Destination	Absolute Time

Units

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

A1 - (Default Analysis Set) - D1 - AM 2008 Base, AM

Data Errors and Warnings

Severity	Area	Description
Warning	Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.

Analysis Set Details

Name	Description	Include In Report	Use Specific Demand Set	Demand Set	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)		Yes		(D1)		100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Locked	Run Automatically	Use Relationship	Relationship	Start Time (HH:mm)	Finish Time (HH:mm)	Time Period Length (min)	Time Segment Length (min)	Traffic Profile Type
AM 2008 Base,	AM 2008 Base	AM			Yes			16:15	17:45	90	15	Varies by Arm

AM												

Roundabout Network

Roundabout Type(s)

ID	Name	Arm Order	Roundabout Type	Grade Separated	Large Roundabout	Do Geometric Delay
1	(untitled)	A,B,C	Standard			

Roundabout Network Options

Driving Side	Lighting	Road Surface	In London
Left	Normal/unknown	((Mini-roundabouts only))	

Arms

Arms

ID	Name	Description
A	Ffordd Y Mileniwm (E)	
B	Ffordd Y Mileniwm (W)	
C	Gladstone Bridge	

Capacity Options

Arm	Minimum Capacity (PCU/min)	Maximum Capacity (PCU/min)	Assume Flat Start Profile	Initial Queue (PCU)
A	0.00	1666.65		0.00
B	0.00	1666.65		0.00
C	0.00	1666.65		0.00

Standard Geometry

Arm	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
A	3.70	8.66	30.00	30.00	45.00	11.00	
B	3.64	7.50	44.00	20.00	45.00	40.00	
C	3.58	3.58	0.00	20.00	45.00	8.00	

Pedestrian Crossings

Arm	Crossing Type
A	None
B	None
C	None

Arm Slope/ Intercept and Capacity

Slope and Intercept used in model

Arm	Enter Directly	Slope	Intercept (PCU/min)	Final Slope	Final Intercept (PCU/min)
A		((calculated))	((calculated))	0.765	37.950
B		((calculated))	((calculated))	0.666	32.436
C		((calculated))	((calculated))	0.546	19.459

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

Traffic Flows

Demand Set Data Options

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

Entry Flows

General Flows Data

Arm	Profile Type	Use Turning Counts	Average Demand Flow (Veh/min)	Flow Scaling Factor (%)	PHF
A	ONE HOUR	Yes	9.10	100.000	N/A
B	ONE HOUR	Yes	2.57	100.000	N/A
C	ONE HOUR	Yes	12.37	100.000	N/A

Direct/Resultant Flows

Direct Flows Data

Time Segment	Arm	Direct Demand Entry Flow (Veh/min)	DirectDemandEntryFlowInPCU (PCU/min)	Direct Demand Exit Flow (Veh/min)	Direct Demand Pedestrian Flow (Ped/min)
16:15-16:30	A	6.85	7.31	N/A	N/A
16:15-16:30	B	1.93	1.95	N/A	N/A
16:15-16:30	C	9.31	9.78	N/A	N/A
16:30-16:45	A	8.18	8.73	N/A	N/A
16:30-16:45	B	2.31	2.32	N/A	N/A
16:30-16:45	C	11.12	11.67	N/A	N/A
16:45-17:00	A	10.02	10.69	N/A	N/A
16:45-17:00	B	2.83	2.85	N/A	N/A
16:45-17:00	C	13.62	14.30	N/A	N/A
17:00-17:15	A	10.02	10.69	N/A	N/A
17:00-17:15	B	2.83	2.85	N/A	N/A
17:00-17:15	C	13.62	14.30	N/A	N/A
17:15-17:30	A	8.18	8.73	N/A	N/A
17:15-17:30	B	2.31	2.32	N/A	N/A
17:15-17:30	C	11.12	11.67	N/A	N/A
17:30-17:45	A	6.85	7.31	N/A	N/A
17:30-17:45	B	1.93	1.95	N/A	N/A
17:30-17:45	C	9.31	9.78	N/A	N/A

Turning Proportions

Turning Counts or Proportions (Veh/min) - Roundabout 1 (for whole period)

		To		
		A	B	C
From	A	0.00	1.92	7.18
	B	1.75	0.00	0.82
	C	12.37	0.00	0.00

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

		To		
		A	B	C

From	A	0.00	0.21	0.79
	B	0.68	0.00	0.32
	C	1.00	0.00	0.00

Vehicle Mix

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

		To		
		A	B	C
From	A	1.00	1.02	1.08
	B	1.01	1.00	1.00
	C	1.05	1.00	1.00

Heavy Vehicle Percentages - Roundabout 1 (for whole period)

		To		
		A	B	C
From	A	0.00	2.00	8.00
	B	1.00	0.00	0.00
	C	5.00	0.00	0.00

Results

Results Summary

Arm	Max RFC	Max Delay (min)	Max Queue (Veh)	Max LOS	Total Demand (Veh/min)	Total Arrivals (Veh)	Total Queueing Delay (Veh-min)	Average Queueing Delay (min)	Rate Of Queueing Delay (Veh-min/min)	Inclusive Queueing Total Delay (Veh-min)	Inclusive Queueing Average Delay (min)	Slope	Intercept (PCU/min)
A	0.28	0.04	0.39	A	8.35	751.53	27.79	0.04	0.31	27.79	0.04	0.765	37.950
B	0.11	0.04	0.12	A	2.36	211.97	8.47	0.04	0.09	8.47	0.04	0.666	32.436
C	0.78	0.25	3.36	C	11.35	1021.31	177.96	0.17	1.98	177.99	0.17	0.546	19.459

Main Results

Main results: (16:15-16:30)

Arm	Demand (Veh/min)	Arrivals (Veh)	Entry Flow (Veh/min)	Exit Flow (Veh/min)	Circulating Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	Saturation Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)
A	6.85	102.76	6.84	10.55	0.00	0.00	35.55	35.55	0.193	0.00	0.24
B	1.93	28.98	1.93	1.44	5.40	0.00	28.36	12.18	0.068	0.00	0.07
C	9.31	139.65	9.24	6.01	1.31	0.00	17.84	14.17	0.522	0.00	1.07

Main results: (16:30-16:45)

Arm	Demand (Veh/min)	Arrivals (Veh)	Entry Flow (Veh/min)	Exit Flow (Veh/min)	Circulating Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	Saturation Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)
A	8.18	122.71	8.18	12.65	0.00	0.00	35.55	35.55	0.230	0.24	0.30
B	2.31	34.61	2.31	1.72	6.45	0.00	27.61	12.18	0.084	0.07	0.09
C	11.12	166.76	11.08	7.19	1.57	0.00	17.71	14.17	0.628	1.07	1.64

Main results: (16:45-17:00)

Arm	Demand (Veh/min)	Arrivals (Veh)	Entry Flow (Veh/min)	Exit Flow (Veh/min)	Circulating Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	Saturation Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)
A	10.02	150.29	10.01	15.43	0.00	0.00	35.55	35.55	0.282	0.30	0.39
B	2.83	42.39	2.82	2.11	7.90	0.00	26.57	12.18	0.106	0.09	0.12

C	13.62	204.24	13.51	8.80	1.93	0.00	17.52	14.17	0.777	1.64	3.26

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

Arm	Demand (Veh/min)	Arrivals (Veh)	Entry Flow (Veh/min)	Exit Flow (Veh/min)	Circulating Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	Saturation Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)
A	10.02	150.29	10.02	15.54	0.00	0.00	35.55	35.55	0.282	0.39	0.39
B	2.83	42.39	2.83	2.11	7.91	0.00	26.57	12.18	0.106	0.12	0.12
C	13.62	204.24	13.61	8.81	1.93	0.00	17.52	14.17	0.777	3.26	3.36

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

Arm	Demand (Veh/min)	Arrivals (Veh)	Entry Flow (Veh/min)	Exit Flow (Veh/min)	Circulating Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	Saturation Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)
A	8.18	122.71	8.19	12.80	0.00	0.00	35.55	35.55	0.230	0.39	0.30
B	2.31	34.61	2.31	1.72	6.46	0.00	27.60	12.18	0.084	0.12	0.09
C	11.12	166.76	11.23	7.20	1.57	0.00	17.70	14.17	0.628	3.36	1.73

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

Arm	Demand (Veh/min)	Arrivals (Veh)	Entry Flow (Veh/min)	Exit Flow (Veh/min)	Circulating Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	Saturation Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)
A	6.85	102.76	6.86	10.67	0.00	0.00	35.55	35.55	0.193	0.30	0.24
B	1.93	28.98	1.93	1.44	5.41	0.00	28.35	12.18	0.068	0.09	0.07
C	9.31	139.65	9.35	6.03	1.32	0.00	17.84	14.17	0.522	1.73	1.11

Queueing Delay Results

Queueing Delay results: (16:15-16:30)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (min)	Unsignalised Level Of Service	Signalised Level Of Service
A	3.52	0.23	0.035	A	A
B	1.08	0.07	0.038	A	A
C	15.33	1.02	0.115	A	A

Queueing Delay results: (16:30-16:45)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (min)	Unsignalised Level Of Service	Signalised Level Of Service
A	4.42	0.29	0.037	A	A
B	1.35	0.09	0.040	A	A
C	23.50	1.57	0.150	A	A

Queueing Delay results: (16:45-17:00)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (min)	Unsignalised Level Of Service	Signalised Level Of Service
A	5.80	0.39	0.039	A	A
B	1.76	0.12	0.042	A	A
C	44.36	2.96	0.243	B	B

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

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (min)	Unsignalised Level Of Service	Signalised Level Of Service
A	5.87	0.39	0.039	A	A
B	1.78	0.12	0.042	A	A
C	49.84	3.32	0.254	C	B

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

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (min)	Unsignalised Level Of Service	Signalised Level Of Service
A	4.55	0.30	0.037	A	A
B	1.39	0.09	0.040	A	A
C	27.61	1.84	0.157	A	A

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

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (min)	Unsignalised Level Of Service	Signalised Level Of Service
A	3.63	0.24	0.035	A	A
B	1.11	0.07	0.038	A	A
C	17.32	1.15	0.118	A	A

Overview: Standard Roundabout Geometry

Standard Geometry

Arm	V - Approach road half-width (m)	E - Entry width (m)	I' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only	Final Slope	Final Intercept (PCU/min)
A	3.70	8.66	30.00	30.00	45.00	11.00		0.765	37.950
B	3.64	7.50	44.00	20.00	45.00	40.00		0.666	32.436
C	3.58	3.58	0.00	20.00	45.00	8.00		0.546	19.459

Overview: Time Segment Results

Time Segment Results

Time Segment	Arm	Demand (Veh/min)	Capacity (Veh/min)	RFC	Pedestrian Demand (Ped/min)	Start Queue (Veh)	End Queue (Veh)	Queueing Total Delay (Veh-min)	Geometric Total Delay (Veh-min)	Average Delay Per Arriving Vehicle (min)
16:15-16:30	A	6.85	35.55	0.193	0.00	0.00	0.24	3.52	(0.00)	0.035
16:15-16:30	B	1.93	28.36	0.068	0.00	0.00	0.07	1.08	(0.00)	0.038
16:15-16:30	C	9.31	17.84	0.522	0.00	0.00	1.07	15.33	(0.00)	0.115
16:30-16:45	A	8.18	35.55	0.230	0.00	0.24	0.30	4.42	(0.00)	0.037
16:30-16:45	B	2.31	27.61	0.084	0.00	0.07	0.09	1.35	(0.00)	0.040
16:30-16:45	C	11.12	17.71	0.628	0.00	1.07	1.64	23.50	(0.00)	0.150
16:45-17:00	A	10.02	35.55	0.282	0.00	0.30	0.39	5.80	(0.00)	0.039
16:45-17:00	B	2.83	26.57	0.106	0.00	0.09	0.12	1.76	(0.00)	0.042
16:45-17:00	C	13.62	17.52	0.777	0.00	1.64	3.26	44.36	(0.00)	0.243
17:00-17:15	A	10.02	35.55	0.282	0.00	0.39	0.39	5.87	(0.00)	0.039
17:00-17:15	B	2.83	26.57	0.106	0.00	0.12	0.12	1.78	(0.00)	0.042
17:00-17:15	C	13.62	17.52	0.777	0.00	3.26	3.36	49.84	(0.00)	0.254
17:15-17:30	A	8.18	35.55	0.230	0.00	0.39	0.30	4.55	(0.00)	0.037
17:15-17:30	B	2.31	27.60	0.084	0.00	0.12	0.09	1.39	(0.00)	0.040
17:15-17:30	C	11.12	17.70	0.628	0.00	3.36	1.73	27.61	(0.00)	0.157
17:30-17:45	A	6.85	35.55	0.193	0.00	0.30	0.24	3.63	(0.00)	0.035
17:30-17:45	B	1.93	28.35	0.068	0.00	0.09	0.07	1.11	(0.00)	0.038
17:30-17:45	C	9.31	17.84	0.522	0.00	1.73	1.11	17.32	(0.00)	0.118

ARCADY 7

Version: 7.0.1.130 [12 March 2010]

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File: J:\122000\122374-00\4 Internal Project Data\4-40 Calculations\Transport\Junction Assessments\Alterations -May2011\21.Gladstone_Ffordd y Mileniwm\With Improvements\Gladstone_Mileniwm_East_Arm.arc7
Report generation date: 31/05/2011 09:54:27

Summary of roundabout performance

	AM			
	Queue (Veh)	Delay (min)	RFC	LOS
	(Default Analysis Set) - AM 2008 Base			
Arm A	0.76	0.10	0.43	A
Arm B	0.12	0.04	0.11	A
Arm C	1.07	0.07	0.52	A
	(Default Analysis Set) - AM 2020 Base			
Arm A	1.01	0.11	0.50	A
Arm B	0.15	0.04	0.13	A
Arm C	1.54	0.09	0.61	A
	(Default Analysis Set) - AM 2020 With Development			
Arm A	1.11	0.13	0.53	A
Arm B	1.53	0.10	0.61	A
Arm C	3.06	0.19	0.76	B
	(Default Analysis Set) - PM 2008 Base			
Arm A	2.31	0.18	0.70	B
Arm B	0.13	0.05	0.11	A
Arm C	0.89	0.07	0.47	A
	(Default Analysis Set) - PM 2020 Base			
Arm A	4.33	0.29	0.82	C
Arm B	0.16	0.05	0.14	A
Arm C	1.23	0.08	0.55	A
	(Default Analysis Set) - PM 2020 With Development			
Arm A	13.16	0.84	0.95	F
Arm B	0.71	0.05	0.41	A
Arm C	3.39	0.19	0.78	B
	(Default Analysis Set) - PM 2020 With Development+Tourism			
Arm A	43.45	2.18	1.06	F

Arm B	0.91	0.06	0.48	A
Arm C	4.46	0.26	0.82	C

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

AM 2008 Base - AM runs from 16:15:00 to 17:45:00
PM 2008 Base - AM runs from 16:15:00 to 17:45:00
AM 2020 Base - AM runs from 16:15:00 to 17:45:00
PM 2020 Base - AM runs from 16:15:00 to 17:45:00
AM 2020 With Development - AM runs from 16:15:00 to 17:45:00
PM 2020 With Development - AM runs from 16:15:00 to 17:45:00
PM 2020 With Development+Tourism - AM runs from 16:15:00 to 17:45:00

File summary

File Description

Title	Gladstone Bridge_Ffordd Y Mileniwm
Date	16/07/2009
Status	On-going
Jobnumber	122374
Enumerator	Roddy.Beynon [WACPC145]
Results Upto Date	True

Analysis Options

RFC Threshold	Vehicle Length (m)	Do Queue Variations
0.85	5.75	

Sorting and Display

Show Arm Names	Arm Grouping	Sorting Direction	Sorting Type	Data Matrix Style	Time Style
	Order	Ascending	Numerical	By Destination	Absolute Time

Units

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

A1 - (Default Analysis Set) - D1 - AM 2008 Base, AM

Data Errors and Warnings

Severity	Area	Description
Warning	Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.

Analysis Set Details

Name	Description	Include In Report	Use Specific Demand Set	Demand Set	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)		Yes		(D1)		100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Locked	Run Automatically	Use Relationship	Relationship	Start Time (HH:mm)	Finish Time (HH:mm)	Time Period Length (min)	Time Segment Length (min)	Traffic Profile Type
AM 2008 Base,	AM 2008 Base	AM			Yes			16:15	17:45	90	15	Varies by Arm

AM												

Roundabout Network

Roundabout Type(s)

ID	Name	Arm Order	Roundabout Type	Grade Separated	Large Roundabout	Do Geometric Delay
1	(untitled)	A,B,C	Standard			

Roundabout Network Options

Driving Side	Lighting	Road Surface	In London
Left	Normal/unknown	((Mini-roundabouts only))	

Arms

Arms

ID	Name	Description
A	Ffordd Y Mileniwm (E)	
B	Ffordd Y Mileniwm (W)	
C	Gladstone Bridge	

Capacity Options

Arm	Minimum Capacity (PCU/min)	Maximum Capacity (PCU/min)	Assume Flat Start Profile	Initial Queue (PCU)
A	0.00	1666.65		0.00
B	0.00	1666.65		0.00
C	0.00	1666.65		0.00

Standard Geometry

Arm	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
A	3.70	3.70	0.00	30.00	45.00	11.00	
B	3.64	7.50	44.00	20.00	45.00	40.00	
C	3.58	6.57	19.60	20.00	45.00	8.00	

Pedestrian Crossings

Arm	Crossing Type
A	None
B	None
C	None

Arm Slope/ Intercept and Capacity

Slope and Intercept used in model

Arm	Enter Directly	Slope	Intercept (PCU/min)	Final Slope	Final Intercept (PCU/min)
A		((calculated))	((calculated))	0.557	20.221
B		((calculated))	((calculated))	0.666	32.436
C		((calculated))	((calculated))	0.674	30.380

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

Traffic Flows

Demand Set Data Options

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

Entry Flows

General Flows Data

Arm	Profile Type	Use Turning Counts	Average Demand Flow (Veh/min)	Flow Scaling Factor (%)	PHF
A	ONE HOUR	Yes	7.18	100.000	N/A
B	ONE HOUR	Yes	2.57	100.000	N/A
C	ONE HOUR	Yes	13.07	100.000	N/A

Direct/Resultant Flows

Direct Flows Data

Time Segment	Arm	Direct Demand Entry Flow (Veh/min)	DirectDemandEntryFlowInPCU (PCU/min)	Direct Demand Exit Flow (Veh/min)	Direct Demand Pedestrian Flow (Ped/min)
16:15-16:30	A	5.41	5.84	N/A	N/A
16:15-16:30	B	1.93	1.95	N/A	N/A
16:15-16:30	C	9.84	10.30	N/A	N/A
16:30-16:45	A	6.46	6.97	N/A	N/A
16:30-16:45	B	2.31	2.32	N/A	N/A
16:30-16:45	C	11.75	12.30	N/A	N/A
16:45-17:00	A	7.91	8.54	N/A	N/A
16:45-17:00	B	2.83	2.85	N/A	N/A
16:45-17:00	C	14.39	15.07	N/A	N/A
17:00-17:15	A	7.91	8.54	N/A	N/A
17:00-17:15	B	2.83	2.85	N/A	N/A
17:00-17:15	C	14.39	15.07	N/A	N/A
17:15-17:30	A	6.46	6.97	N/A	N/A
17:15-17:30	B	2.31	2.32	N/A	N/A
17:15-17:30	C	11.75	12.30	N/A	N/A
17:30-17:45	A	5.41	5.84	N/A	N/A
17:30-17:45	B	1.93	1.95	N/A	N/A
17:30-17:45	C	9.84	10.30	N/A	N/A

Turning Proportions

Turning Counts or Proportions (Veh/min) - Roundabout 1 (for whole period)

		To		
		A	B	C
From	A	0.00	0.00	7.18
	B	1.75	0.00	0.82
	C	12.37	0.70	0.00

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

		To		
		A	B	C

From	A	0.00	0.00	1.00
	B	0.68	0.00	0.32
	C	0.95	0.05	0.00

Vehicle Mix

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

		To		
		A	B	C
From	A	1.00	1.02	1.08
	B	1.01	1.00	1.00
	C	1.05	1.00	1.00

Heavy Vehicle Percentages - Roundabout 1 (for whole period)

		To		
		A	B	C
From	A	0.00	2.00	8.00
	B	1.00	0.00	0.00
	C	5.00	0.00	0.00

Results

Results Summary

Arm	Max RFC	Max Delay (min)	Max Queue (Veh)	Max LOS	Total Demand (Veh/min)	Total Arrivals (Veh)	Total Queueing Delay (Veh-min)	Average Queueing Delay (min)	Rate Of Queueing Delay (Veh-min/min)	Inclusive Queueing Total Delay (Veh-min)	Inclusive Queueing Average Delay (min)	Slope	Intercept (PCU/min)
A	0.43	0.10	0.76	A	6.59	593.24	50.92	0.09	0.57	50.92	0.09	0.557	20.221
B	0.11	0.04	0.12	A	2.36	211.97	8.47	0.04	0.09	8.47	0.04	0.666	32.436
C	0.52	0.07	1.07	A	11.99	1079.12	69.41	0.06	0.77	69.42	0.06	0.674	30.380

Main Results

Main results: (16:15-16:30)

Arm	Demand (Veh/min)	Arrivals (Veh)	Entry Flow (Veh/min)	Exit Flow (Veh/min)	Circulating Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	Saturation Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)
A	5.41	81.12	5.38	10.59	0.53	0.00	18.45	18.16	0.293	0.00	0.41
B	1.93	28.98	1.93	0.53	5.38	0.00	28.37	19.25	0.068	0.00	0.07
C	9.84	147.56	9.80	5.99	1.31	0.00	28.15	20.47	0.349	0.00	0.53

Main results: (16:30-16:45)

Arm	Demand (Veh/min)	Arrivals (Veh)	Entry Flow (Veh/min)	Exit Flow (Veh/min)	Circulating Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	Saturation Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)
A	6.46	96.87	6.45	12.68	0.63	0.00	18.40	18.16	0.351	0.41	0.54
B	2.31	34.61	2.31	0.63	6.45	0.00	27.61	19.25	0.084	0.07	0.09
C	11.75	176.20	11.73	7.18	1.57	0.00	27.98	20.47	0.420	0.53	0.72

Main results: (16:45-17:00)

Arm	Demand (Veh/min)	Arrivals (Veh)	Entry Flow (Veh/min)	Exit Flow (Veh/min)	Circulating Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	Saturation Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)
A	7.91	118.63	7.89	15.52	0.77	0.00	18.33	18.16	0.432	0.54	0.75
B	2.83	42.39	2.82	0.77	7.89	0.00	26.58	19.25	0.106	0.09	0.12

C	14.39	215.80	14.36	8.79	1.93	0.00	27.76	20.47	0.518	0.72	1.07

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

Arm	Demand (Veh/min)	Arrivals (Veh)	Entry Flow (Veh/min)	Exit Flow (Veh/min)	Circulating Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	Saturation Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)
A	7.91	118.63	7.91	15.54	0.77	0.00	18.33	18.16	0.432	0.75	0.76
B	2.83	42.39	2.83	0.77	7.91	0.00	26.57	19.25	0.106	0.12	0.12
C	14.39	215.80	14.39	8.81	1.93	0.00	27.75	20.47	0.518	1.07	1.07

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

Arm	Demand (Veh/min)	Arrivals (Veh)	Entry Flow (Veh/min)	Exit Flow (Veh/min)	Circulating Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	Saturation Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)
A	6.46	96.87	6.47	12.71	0.63	0.00	18.40	18.16	0.351	0.76	0.55
B	2.31	34.61	2.31	0.63	6.47	0.00	27.60	19.25	0.084	0.12	0.09
C	11.75	176.20	11.77	7.21	1.57	0.00	27.98	20.47	0.420	1.07	0.73

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

Arm	Demand (Veh/min)	Arrivals (Veh)	Entry Flow (Veh/min)	Exit Flow (Veh/min)	Circulating Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	Saturation Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)
A	5.41	81.12	5.42	10.64	0.53	0.00	18.45	18.16	0.293	0.55	0.42
B	1.93	28.98	1.93	0.53	5.42	0.00	28.35	19.25	0.068	0.09	0.07
C	9.84	147.56	9.85	6.03	1.32	0.00	28.15	20.47	0.349	0.73	0.54

Queueing Delay Results

Queueing Delay results: (16:15-16:30)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (min)	Unsignalised Level Of Service	Signalised Level Of Service
A	6.00	0.40	0.076	A	A
B	1.08	0.07	0.038	A	A
C	7.83	0.52	0.054	A	A

Queueing Delay results: (16:30-16:45)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (min)	Unsignalised Level Of Service	Signalised Level Of Service
A	7.88	0.53	0.084	A	A
B	1.35	0.09	0.040	A	A
C	10.57	0.70	0.062	A	A

Queueing Delay results: (16:45-17:00)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (min)	Unsignalised Level Of Service	Signalised Level Of Service
A	10.97	0.73	0.096	A	A
B	1.76	0.12	0.042	A	A
C	15.56	1.04	0.075	A	A

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

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (min)	Unsignalised Level Of Service	Signalised Level Of Service
A	11.30	0.75	0.096	A	A
B	1.78	0.12	0.042	A	A
C	16.03	1.07	0.075	A	A

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

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (min)	Unsignalised Level Of Service	Signalised Level Of Service
A	8.38	0.56	0.084	A	A
B	1.39	0.09	0.040	A	A
C	11.17	0.74	0.062	A	A

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

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (min)	Unsignalised Level Of Service	Signalised Level Of Service
A	6.39	0.43	0.077	A	A
B	1.11	0.07	0.038	A	A
C	8.24	0.55	0.055	A	A

Overview: Standard Roundabout Geometry

Standard Geometry

Arm	V - Approach road half-width (m)	E - Entry width (m)	I' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only	Final Slope	Final Intercept (PCU/min)
A	3.70	3.70	0.00	30.00	45.00	11.00		0.557	20.221
B	3.64	7.50	44.00	20.00	45.00	40.00		0.666	32.436
C	3.58	6.57	19.60	20.00	45.00	8.00		0.674	30.380

Overview: Time Segment Results

Time Segment Results

Time Segment	Arm	Demand (Veh/min)	Capacity (Veh/min)	RFC	Pedestrian Demand (Ped/min)	Start Queue (Veh)	End Queue (Veh)	Queueing Total Delay (Veh-min)	Geometric Total Delay (Veh-min)	Average Delay Per Arriving Vehicle (min)
16:15-16:30	A	5.41	18.45	0.293	0.00	0.00	0.41	6.00	(0.00)	0.076
16:15-16:30	B	1.93	28.37	0.068	0.00	0.00	0.07	1.08	(0.00)	0.038
16:15-16:30	C	9.84	28.15	0.349	0.00	0.00	0.53	7.83	(0.00)	0.054
16:30-16:45	A	6.46	18.40	0.351	0.00	0.41	0.54	7.88	(0.00)	0.084
16:30-16:45	B	2.31	27.61	0.084	0.00	0.07	0.09	1.35	(0.00)	0.040
16:30-16:45	C	11.75	27.98	0.420	0.00	0.53	0.72	10.57	(0.00)	0.062
16:45-17:00	A	7.91	18.33	0.432	0.00	0.54	0.75	10.97	(0.00)	0.096
16:45-17:00	B	2.83	26.58	0.106	0.00	0.09	0.12	1.76	(0.00)	0.042
16:45-17:00	C	14.39	27.76	0.518	0.00	0.72	1.07	15.56	(0.00)	0.075
17:00-17:15	A	7.91	18.33	0.432	0.00	0.75	0.76	11.30	(0.00)	0.096
17:00-17:15	B	2.83	26.57	0.106	0.00	0.12	0.12	1.78	(0.00)	0.042
17:00-17:15	C	14.39	27.75	0.518	0.00	1.07	1.07	16.03	(0.00)	0.075
17:15-17:30	A	6.46	18.40	0.351	0.00	0.76	0.55	8.38	(0.00)	0.084
17:15-17:30	B	2.31	27.60	0.084	0.00	0.12	0.09	1.39	(0.00)	0.040
17:15-17:30	C	11.75	27.98	0.420	0.00	1.07	0.73	11.17	(0.00)	0.062
17:30-17:45	A	5.41	18.45	0.293	0.00	0.55	0.42	6.39	(0.00)	0.077
17:30-17:45	B	1.93	28.35	0.068	0.00	0.09	0.07	1.11	(0.00)	0.038
17:30-17:45	C	9.84	28.15	0.349	0.00	0.73	0.54	8.24	(0.00)	0.055

ARCADY 7

Version: 7.0.1.130 [12 March 2010]

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File: J:\122000\122374-00\4 Internal Project Data\4-40 Calculations\Transport\Junction Assessments\Alterations -May2011\21.Gladstone_Ffordd y Mileniwm\With Improvements\Gladstone_Mileniwm_West_Arm.arc7
Report generation date: 31/05/2011 09:55:10

Summary of roundabout performance

	AM			
	Queue (Veh)	Delay (min)	RFC	LOS
	(Default Analysis Set) - AM 2008 Base			
Arm A	0.40	0.04	0.29	A
Arm B	0.17	0.09	0.14	A
Arm C	1.07	0.07	0.52	A
	(Default Analysis Set) - AM 2020 Base			
Arm A	0.50	0.04	0.33	A
Arm B	0.22	0.10	0.18	A
Arm C	1.54	0.09	0.61	A
	(Default Analysis Set) - AM 2020 With Development			
Arm A	0.97	0.06	0.49	A
Arm B	5.45	0.52	0.86	D
Arm C	3.04	0.19	0.76	B
	(Default Analysis Set) - PM 2008 Base			
Arm A	1.11	0.06	0.53	A
Arm B	0.21	0.11	0.18	A
Arm C	0.89	0.07	0.47	A
	(Default Analysis Set) - PM 2020 Base			
Arm A	1.59	0.07	0.62	A
Arm B	0.30	0.13	0.23	A
Arm C	1.23	0.08	0.55	A
	(Default Analysis Set) - PM 2020 With Development			
Arm A	6.06	0.22	0.86	B
Arm B	3.74	0.43	0.80	D
Arm C	3.37	0.19	0.78	B
	(Default Analysis Set) - PM 2020 With Development+Tourism			
Arm A	9.84	0.34	0.92	C

Arm B	14.44	1.35	0.98	F
Arm C	4.26	0.24	0.82	B

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

AM 2008 Base - AM runs from 16:15:00 to 17:45:00
PM 2008 Base - AM runs from 16:15:00 to 17:45:00
AM 2020 Base - AM runs from 16:15:00 to 17:45:00
PM 2020 Base - AM runs from 16:15:00 to 17:45:00
AM 2020 With Development - AM runs from 16:15:00 to 17:45:00
PM 2020 With Development - AM runs from 16:15:00 to 17:45:00
PM 2020 With Development+Tourism - AM runs from 16:15:00 to 17:45:00

File summary

File Description

Title	Gladstone Bridge_Ffordd Y Mileniwm
Date	16/07/2009
Status	On-going
Jobnumber	122374
Enumerator	Roddy.Beynon [WACPC145]
Results Upto Date	True

Analysis Options

RFC Threshold	Vehicle Length (m)	Do Queue Variations
0.85	5.75	

Sorting and Display

Show Arm Names	Arm Grouping	Sorting Direction	Sorting Type	Data Matrix Style	Time Style
	Order	Ascending	Numerical	By Destination	Absolute Time

Units

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

A1 - (Default Analysis Set) - D1 - AM 2008 Base, AM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Description	Include In Report	Use Specific Demand Set	Demand Set	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)		Yes		(D1)		100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Locked	Run Automatically	Use Relationship	Relationship	Start Time (HH:mm)	Finish Time (HH:mm)	Time Period Length (min)	Time Segment Length (min)	Traffic Profile Type
AM 2008 Base, AM	AM 2008 Base	AM			Yes			16:15	17:45	90	15	Varies by Arm

Roundabout Network

Roundabout Type(s)

ID	Name	Arm Order	Roundabout Type	Grade Separated	Large Roundabout	Do Geometric Delay
1	(untitled)	A,B,C	Standard			

Roundabout Network Options

Driving Side	Lighting	Road Surface	In London
Left	Normal/unknown	((Mini-roundabouts only))	

Arms

Arms

ID	Name	Description
A	Ffordd Y Mileniwm (E)	
B	Ffordd Y Mileniwm (W)	
C	Gladstone Bridge	

Capacity Options

Arm	Minimum Capacity (PCU/min)	Maximum Capacity (PCU/min)	Assume Flat Start Profile	Initial Queue (PCU)
A	0.00	1666.65		0.00
B	0.00	1666.65		0.00
C	0.00	1666.65		0.00

Standard Geometry

Arm	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
A	3.70	8.66	30.00	30.00	45.00	11.00	
B	3.64	3.64	0.00	20.00	45.00	40.00	
C	3.58	6.57	19.60	20.00	45.00	8.00	

Pedestrian Crossings

Arm	Crossing Type
A	None
B	None
C	None

Arm Slope/ Intercept and Capacity

Slope and Intercept used in model

Arm	Enter Directly	Slope	Intercept (PCU/min)	Final Slope	Final Intercept (PCU/min)
A		((calculated))	((calculated))	0.765	37.950
B		((calculated))	((calculated))	0.493	17.744
C		((calculated))	((calculated))	0.674	30.380

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

Traffic Flows

Demand Set Data Options

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

Entry Flows

General Flows Data

Arm	Profile Type	Use Turning Counts	Average Demand Flow (Veh/min)	Flow Scaling Factor (%)	PHF
A	ONE HOUR	Yes	9.10	100.000	N/A
B	ONE HOUR	Yes	1.75	100.000	N/A
C	ONE HOUR	Yes	13.07	100.000	N/A

Direct/Resultant Flows

Direct Flows Data

Time Segment	Arm	Direct Demand Entry Flow (Veh/min)	DirectDemandEntryFlowInPCU (PCU/min)	Direct Demand Exit Flow (Veh/min)	Direct Demand Pedestrian Flow (Ped/min)
16:15-16:30	A	6.85	7.31	N/A	N/A
16:15-16:30	B	1.32	1.33	N/A	N/A
16:15-16:30	C	9.84	10.30	N/A	N/A
16:30-16:45	A	8.18	8.73	N/A	N/A
16:30-16:45	B	1.57	1.59	N/A	N/A
16:30-16:45	C	11.75	12.30	N/A	N/A
16:45-17:00	A	10.02	10.69	N/A	N/A
16:45-17:00	B	1.93	1.95	N/A	N/A
16:45-17:00	C	14.39	15.07	N/A	N/A
17:00-17:15	A	10.02	10.69	N/A	N/A
17:00-17:15	B	1.93	1.95	N/A	N/A
17:00-17:15	C	14.39	15.07	N/A	N/A
17:15-17:30	A	8.18	8.73	N/A	N/A
17:15-17:30	B	1.57	1.59	N/A	N/A
17:15-17:30	C	11.75	12.30	N/A	N/A
17:30-17:45	A	6.85	7.31	N/A	N/A
17:30-17:45	B	1.32	1.33	N/A	N/A
17:30-17:45	C	9.84	10.30	N/A	N/A

Turning Proportions

Turning Counts or Proportions (Veh/min) - Roundabout 1 (for whole period)

		To		
		A	B	C
From	A	0.00	1.92	7.18
	B	1.75	0.00	0.00
	C	12.37	0.70	0.00

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

	To		
	A	B	C

From	A	0.00	0.21	0.79
	B	1.00	0.00	0.00
	C	0.95	0.05	0.00

Vehicle Mix

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

		To		
		A	B	C
From	A	1.00	1.02	1.08
	B	1.01	1.00	1.00
	C	1.05	1.00	1.00

Heavy Vehicle Percentages - Roundabout 1 (for whole period)

		To		
		A	B	C
From	A	0.00	2.00	8.00
	B	1.00	0.00	0.00
	C	5.00	0.00	0.00

Results

Results Summary

Arm	Max RFC	Max Delay (min)	Max Queue (Veh)	Max LOS	Total Demand (Veh/min)	Total Arrivals (Veh)	Total Queueing Delay (Veh-min)	Average Queueing Delay (min)	Rate Of Queueing Delay (Veh-min/min)	Inclusive Queueing Total Delay (Veh-min)	Inclusive Queueing Average Delay (min)	Slope	Intercept (PCU/min)
A	0.29	0.04	0.40	A	8.35	751.50	28.28	0.04	0.31	28.29	0.04	0.765	37.950
B	0.14	0.09	0.17	A	1.61	144.52	11.66	0.08	0.13	11.66	0.08	0.493	17.744
C	0.52	0.07	1.07	A	11.99	1079.12	69.41	0.06	0.77	69.42	0.06	0.674	30.380

Main Results

Main results: (16:15-16:30)

Arm	Demand (Veh/min)	Arrivals (Veh)	Entry Flow (Veh/min)	Exit Flow (Veh/min)	Circulating Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	Saturation Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)
A	6.85	102.76	6.83	10.59	0.53	0.00	35.18	34.52	0.195	0.00	0.24
B	1.32	19.76	1.31	1.96	5.40	0.00	14.72	3.19	0.089	0.00	0.10
C	9.84	147.56	9.80	5.40	1.31	0.00	28.15	26.93	0.349	0.00	0.53

Main results: (16:30-16:45)

Arm	Demand (Veh/min)	Arrivals (Veh)	Entry Flow (Veh/min)	Exit Flow (Veh/min)	Circulating Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	Saturation Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)
A	8.18	122.71	8.18	12.68	0.63	0.00	35.10	34.52	0.233	0.24	0.30
B	1.57	23.60	1.57	2.35	6.45	0.00	14.16	3.19	0.111	0.10	0.12
C	11.75	176.20	11.73	6.45	1.57	0.00	27.99	26.93	0.420	0.53	0.72

Main results: (16:45-17:00)

Arm	Demand (Veh/min)	Arrivals (Veh)	Entry Flow (Veh/min)	Exit Flow (Veh/min)	Circulating Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	Saturation Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)
A	10.02	150.28	10.01	15.52	0.77	0.00	35.00	34.52	0.286	0.30	0.40
B	1.93	28.90	1.92	2.88	7.90	0.00	13.40	3.19	0.144	0.12	0.17

C	14.39	215.80	14.36	7.90	1.92	0.00	27.76	26.93	0.518	0.72	1.07

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

Arm	Demand (Veh/min)	Arrivals (Veh)	Entry Flow (Veh/min)	Exit Flow (Veh/min)	Circulating Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	Saturation Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)
A	10.02	150.28	10.02	15.54	0.77	0.00	35.00	34.52	0.286	0.40	0.40
B	1.93	28.90	1.93	2.88	7.91	0.00	13.40	3.19	0.144	0.17	0.17
C	14.39	215.80	14.39	7.91	1.93	0.00	27.75	26.93	0.518	1.07	1.07

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

Arm	Demand (Veh/min)	Arrivals (Veh)	Entry Flow (Veh/min)	Exit Flow (Veh/min)	Circulating Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	Saturation Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)
A	8.18	122.71	8.19	12.71	0.63	0.00	35.10	34.52	0.233	0.40	0.30
B	1.57	23.60	1.58	2.35	6.46	0.00	14.16	3.19	0.111	0.17	0.13
C	11.75	176.20	11.77	6.46	1.58	0.00	27.98	26.93	0.420	1.07	0.73

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

Arm	Demand (Veh/min)	Arrivals (Veh)	Entry Flow (Veh/min)	Exit Flow (Veh/min)	Circulating Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	Saturation Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)
A	6.85	102.76	6.85	10.64	0.53	0.00	35.18	34.52	0.195	0.30	0.24
B	1.32	19.76	1.32	1.97	5.41	0.00	14.71	3.19	0.090	0.13	0.10
C	9.84	147.56	9.85	5.41	1.32	0.00	28.15	26.93	0.349	0.73	0.54

Queueing Delay Results

Queueing Delay results: (16:15-16:30)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (min)	Unsignalised Level Of Service	Signalised Level Of Service
A	3.57	0.24	0.035	A	A
B	1.43	0.10	0.075	A	A
C	7.83	0.52	0.054	A	A

Queueing Delay results: (16:30-16:45)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (min)	Unsignalised Level Of Service	Signalised Level Of Service
A	4.50	0.30	0.037	A	A
B	1.83	0.12	0.079	A	A
C	10.57	0.70	0.062	A	A

Queueing Delay results: (16:45-17:00)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (min)	Unsignalised Level Of Service	Signalised Level Of Service
A	5.92	0.39	0.040	A	A
B	2.46	0.16	0.087	A	A
C	15.56	1.04	0.075	A	A

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

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (min)	Unsignalised Level Of Service	Signalised Level Of Service
A	6.00	0.40	0.040	A	A
B	2.51	0.17	0.087	A	A
C	16.03	1.07	0.075	A	A

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

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (min)	Unsignalised Level Of Service	Signalised Level Of Service
A	4.63	0.31	0.037	A	A
B	1.92	0.13	0.079	A	A
C	11.17	0.74	0.062	A	A

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

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (min)	Unsignalised Level Of Service	Signalised Level Of Service
A	3.68	0.25	0.035	A	A
B	1.51	0.10	0.075	A	A
C	8.25	0.55	0.055	A	A

Overview: Standard Roundabout Geometry

Standard Geometry

Arm	V - Approach road half-width (m)	E - Entry width (m)	I' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only	Final Slope	Final Intercept (PCU/min)
A	3.70	8.66	30.00	30.00	45.00	11.00		0.765	37.950
B	3.64	3.64	0.00	20.00	45.00	40.00		0.493	17.744
C	3.58	6.57	19.60	20.00	45.00	8.00		0.674	30.380

Overview: Time Segment Results

Time Segment Results

Time Segment	Arm	Demand (Veh/min)	Capacity (Veh/min)	RFC	Pedestrian Demand (Ped/min)	Start Queue (Veh)	End Queue (Veh)	Queueing Total Delay (Veh-min)	Geometric Total Delay (Veh-min)	Average Delay Per Arriving Vehicle (min)
16:15-16:30	A	6.85	35.18	0.195	0.00	0.00	0.24	3.57	(0.00)	0.035
16:15-16:30	B	1.32	14.72	0.089	0.00	0.00	0.10	1.43	(0.00)	0.075
16:15-16:30	C	9.84	28.15	0.349	0.00	0.00	0.53	7.83	(0.00)	0.054
16:30-16:45	A	8.18	35.10	0.233	0.00	0.24	0.30	4.50	(0.00)	0.037
16:30-16:45	B	1.57	14.16	0.111	0.00	0.10	0.12	1.83	(0.00)	0.079
16:30-16:45	C	11.75	27.99	0.420	0.00	0.53	0.72	10.57	(0.00)	0.062
16:45-17:00	A	10.02	35.00	0.286	0.00	0.30	0.40	5.92	(0.00)	0.040
16:45-17:00	B	1.93	13.40	0.144	0.00	0.12	0.17	2.46	(0.00)	0.087
16:45-17:00	C	14.39	27.76	0.518	0.00	0.72	1.07	15.56	(0.00)	0.075
17:00-17:15	A	10.02	35.00	0.286	0.00	0.40	0.40	6.00	(0.00)	0.040
17:00-17:15	B	1.93	13.40	0.144	0.00	0.17	0.17	2.51	(0.00)	0.087
17:00-17:15	C	14.39	27.75	0.518	0.00	1.07	1.07	16.03	(0.00)	0.075
17:15-17:30	A	8.18	35.10	0.233	0.00	0.40	0.30	4.63	(0.00)	0.037
17:15-17:30	B	1.57	14.16	0.111	0.00	0.17	0.13	1.92	(0.00)	0.079
17:15-17:30	C	11.75	27.98	0.420	0.00	1.07	0.73	11.17	(0.00)	0.062
17:30-17:45	A	6.85	35.18	0.195	0.00	0.30	0.24	3.68	(0.00)	0.035
17:30-17:45	B	1.32	14.71	0.090	0.00	0.13	0.10	1.51	(0.00)	0.075
17:30-17:45	C	9.84	28.15	0.349	0.00	0.73	0.54	8.25	(0.00)	0.055

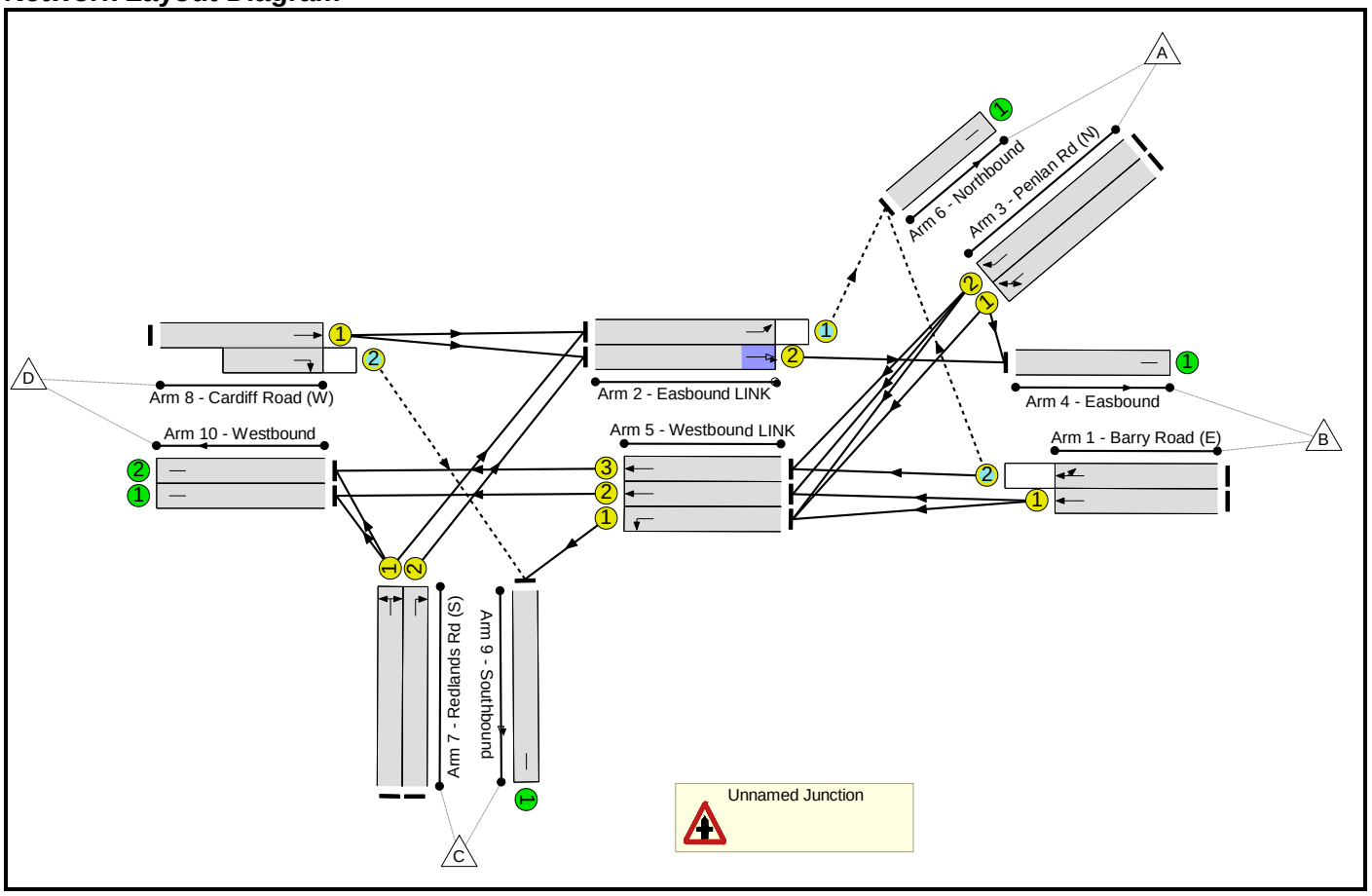
Appendix C
Revised Modelling output for Merrie Harrier Junction

Full Input Data And Results

User and Project Details

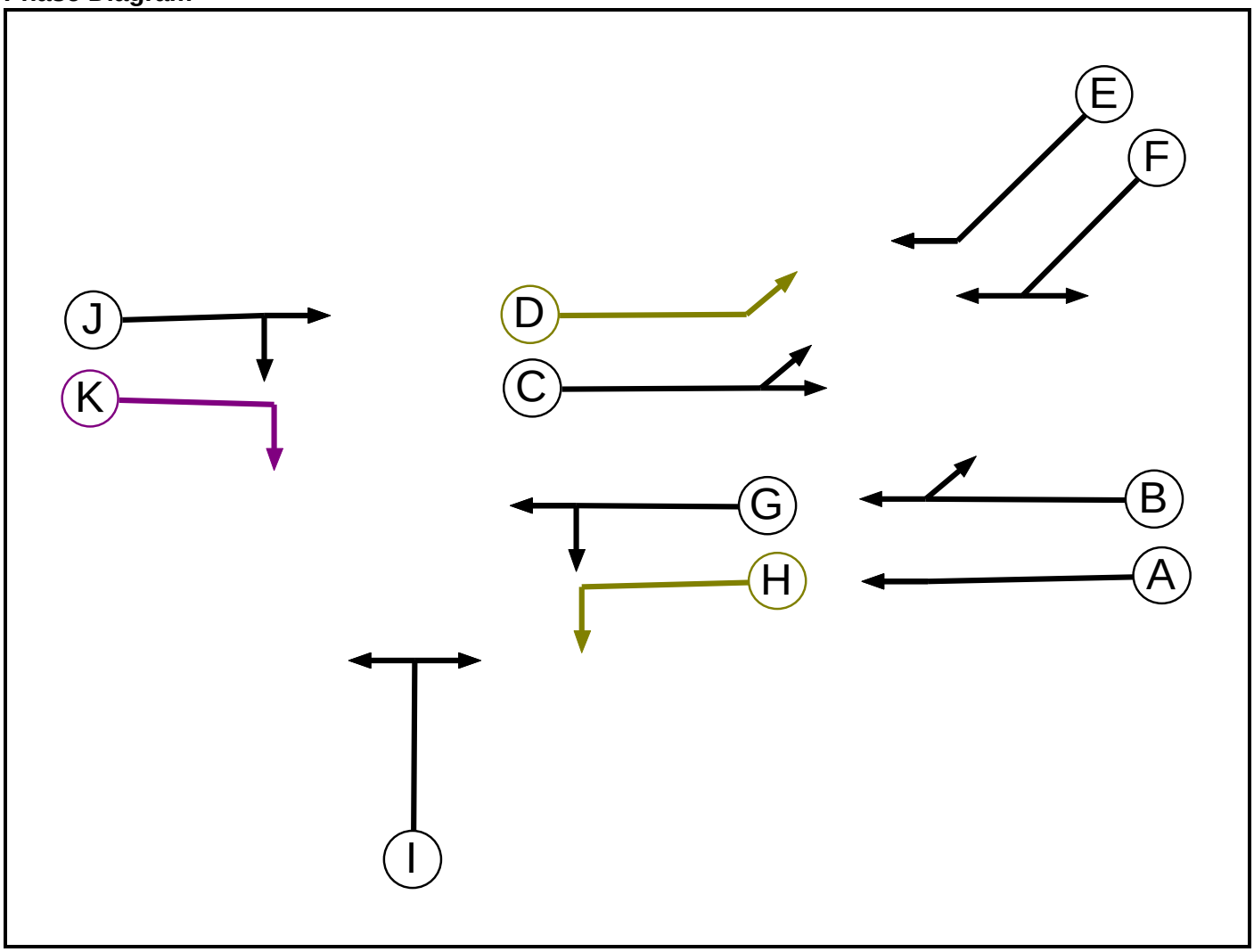
Project:	**Waterfront Barry**
Title:	
Location:	Merrie Harrier, Vale of Glamorgan
File name:	post2009_Merrie Harrier.lsg3x
Author:	Ryan Hopkins
Company:	Arup
Address:	
Notes:	

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		7	7
B	Traffic	1		7	7
C	Traffic	1		7	7
D	Filter	1	C	4	0
E	Traffic	1		7	7
F	Traffic	1		7	7
G	Traffic	2		7	7
H	Filter	2	G	4	0
I	Traffic	2		7	7
J	Traffic	2		7	7
K	Ind. Arrow	2	J	4	4

Full Input Data And Results

Phase Intergreens Matrix

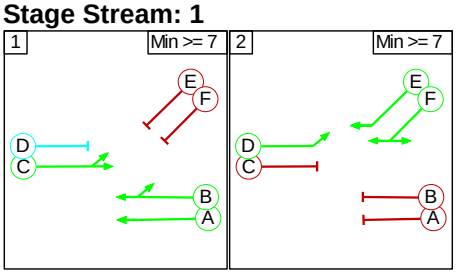
Terminating Phase \ Starting Phase	A	B	C	D	E	F	G	H	I	J	K
A		-	-	-	7	7	-	-	-	-	-
B	-		-	-	7	7	-	-	-	-	-
C	-	-		-	8	8	-	-	-	-	-
D	-	-	-		-	-	-	-	-	-	-
E	7	7	7	-		-	-	-	-	-	-
F	7	7	7	-	-		-	-	-	-	-
G	-	-	-	-	-	-		-	7	-	-
H	-	-	-	-	-	-	-		-	-	-
I	-	-	-	-	-	-	7	-		8	6
J	-	-	-	-	-	-	-	-	8		-
K	-	-	-	-	-	-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

Phases in Stage

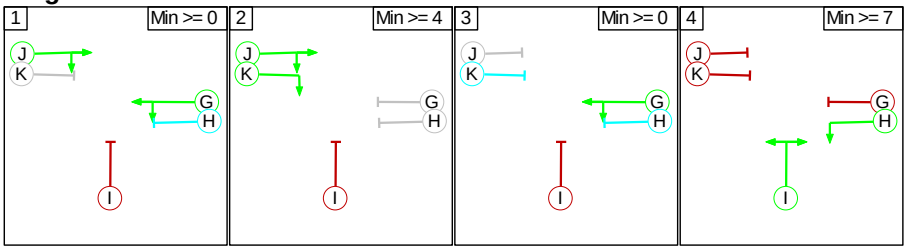
Stream	Stage No.	Phases in Stage
1	1	A B C
1	2	D E F
2	1	G J
2	2	J K
2	3	G
2	4	H I

Stage Diagram

Stage Stream: 1



Stage Stream: 2



Phase Delays

Stage Stream: 1

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

Full Input Data And Results

Stage Stream: 2

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

Prohibited Stage Changes

Stage Stream: 1

From Stage \ To Stage	1	2
1		8
2	7	

Stage Stream: 2

From Stage \ To Stage	1	2	3	4
1		0	0	8
2	2		2	8
3	2	X		7
4	8	X	7	

Full Input Data And Results

Give-Way Lane Input Data

Junction: Unnamed Junction

Lane	Movement	Max Flow when Giving Way (PCU/Hr)	Opposing Lane	Opp. Lane Coeff.	Opp. Mvmnts.	Right Turn Storage (PCU)	Non-Blocking Storage (PCU)	RTF	Right Turn Move up (s)	Max Turns in Intergreen (PCU)
1/2 (Barry Road (E))	6/1 (U-Turn)	1440	2/2	1.09	2/2	3.00	-	0.50	3	3.00
2/1 (Easbound LINK)	6/1 (Ahead)	1440	1/2	1.09	1/2	2.00	-	0.50	2	2.00
8/2 (Cardiff Road (W))	9/1 (Right)	1439	5/1	1.09	5/1	2.00	-	0.50	2	2.00
			5/2	1.09	5/2					
			5/3	1.09	5/3					

Full Input Data And Results

Lane Input Data

Junction: Unnamed 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)
1/1 (Barry Road (E))	U	A	2	3	60.0	Geom	-	3.00	0.00	Y	Arm 5 Ahead	Inf
1/2 (Barry Road (E))	O	B	2	3	60.0	Geom	-	3.00	0.00	N	Arm 5 Ahead	Inf
											Arm 6 U-Turn	12.00
2/1 (Easbound LINK)	O	C D	2	3	6.0	Geom	-	3.65	0.00	Y	Arm 6 Ahead	Inf
2/2 (Easbound LINK)	U	C	2	3	6.0	Geom	-	3.65	0.00	N	Arm 4 Ahead	Inf
3/1 (Penlan Rd (N))	U	F	2	3	60.0	Geom	-	3.00	0.00	Y	Arm 4 U-Turn	10.00
											Arm 5 Ahead	Inf
3/2 (Penlan Rd (N))	U	E	2	3	60.0	Geom	-	3.00	0.00	N	Arm 5 Ahead	Inf
4/1 (Easbound)	U		2	3	60.0	Inf	-	-	-	-	-	-
5/1 (Westbound LINK)	U	G H	2	3	6.0	Geom	-	3.25	0.00	Y	Arm 9 Left	13.00
5/2 (Westbound LINK)	U	G	2	3	60.0	Geom	-	3.25	0.00	N	Arm 10 Ahead	Inf
5/3 (Westbound LINK)	U	G	2	3	6.0	Geom	-	3.25	0.00	N	Arm 10 Ahead	Inf
6/1 (Northbound)	U		2	3	60.0	Inf	-	-	-	-	-	-
7/1 (Redlands Rd (S))	U	I	2	3	60.0	Geom	-	3.00	0.00	Y	Arm 2 Right	17.00
											Arm 10 Left	14.00
7/2 (Redlands Rd (S))	U	I	2	3	60.0	Geom	-	3.00	0.00	N	Arm 2 Right	20.00
8/1 (Cardiff Road (W))	U	J	2	3	60.0	Geom	-	3.25	0.00	Y	Arm 2 Ahead	Inf
8/2 (Cardiff Road (W))	O	J K	2	3	6.0	Geom	-	3.25	0.00	N	Arm 9 Right	20.00
9/1 (Southbound)	U		2	3	60.0	Inf	-	-	-	-	-	-
10/1 (Westbound)	U		2	3	60.0	Inf	-	-	-	-	-	-

10/2 (Westbound)	U		2	3	60.0	Inf	-	-	-	-	-	-

Traffic Flow Groups

Flow Group	Start Time	End Time	Duration	Formula
1: 'AM 2008 Base'	08:30	09:30	01:00	
2: 'PM 2008 Base'	16:30	17:30	01:00	
3: 'AM 2020 Base'	08:30	09:30	01:00	
4: 'PM 2020 Base'	16:30	17:30	01:00	
5: 'AM 2020 with Dev'	08:30	09:30	01:00	
6: 'PM 2020 with Dev'	16:30	17:30	01:00	
7: '2020 with Dev + Tourism'	16:30	17:30	01:00	

Traffic Lane Flows

Lane	Scenario 1: AM Base 2008
Junction: Unnamed Junction	
1/1	514
1/2	208
2/1	501
2/2	1033
3/1	164
3/2	196
4/1	1128
5/1	383
5/2	323
5/3	106
6/1	676
7/1	402
7/2	618
8/1 (with short)	726(In) 616(Out)
8/2 (short)	110
9/1	493
10/1	422
10/2	109

Full Input Data And Results

Scenario 1: 'AM Base 2008' (FG1: 'AM 2008 Base', Plan 1: 'Staging Plan No. 1')

Traffic Lane Flows

Junction: Unnamed Junction

Lane	Lane Width (m)	Gradient	Nearside Lane	Allowed Turns	Turning Radius (m)	Turning Prop.	Sat flow (PCU/Hr)
1/1 (Barry Road (E))	3.00	0.00	Y	Arm 5 Ahead	Inf	100.0 %	1915
1/2 (Barry Road (E))	3.00	0.00	N	Arm 5 Ahead	Inf	15.9 %	1859
				Arm 6 U-Turn	12.00	84.1 %	
2/1 (Easbound LINK)	3.65	0.00	Y	Arm 6 Ahead	Inf	100.0 %	1980
2/2 (Easbound LINK)	3.65	0.00	N	Arm 4 Ahead	Inf	100.0 %	2120
3/1 (Penlan Rd (N))	3.00	0.00	Y	Arm 4 U-Turn	10.00	57.9 %	1762
				Arm 5 Ahead	Inf	42.1 %	
3/2 (Penlan Rd (N))	3.00	0.00	N	Arm 5 Ahead	Inf	100.0 %	2055
4/1 (Easbound Lane 1)	Infinite Saturation Flow						Inf
5/1 (Westbound LINK)	3.25	0.00	Y	Arm 9 Left	13.00	100.0 %	1739
5/2 (Westbound LINK)	3.25	0.00	N	Arm 10 Ahead	Inf	100.0 %	2080
5/3 (Westbound LINK)	3.25	0.00	N	Arm 10 Ahead	Inf	100.0 %	2080
6/1 (Northbound Lane 1)	Infinite Saturation Flow						Inf
7/1 (Redlands Rd (S))	3.00	0.00	Y	Arm 2 Right	17.00	74.6 %	1752
				Arm 10 Left	14.00	25.4 %	
7/2 (Redlands Rd (S))	3.00	0.00	N	Arm 2 Right	20.00	100.0 %	1912
8/1 (Cardiff Road (W))	3.25	0.00	Y	Arm 2 Ahead	Inf	100.0 %	1940
8/2 (Cardiff Road (W))	3.25	0.00	N	Arm 9 Right	20.00	100.0 %	1935
9/1 (Southbound Lane 1)	Infinite Saturation Flow						Inf
10/1 (Westbound Lane 1)	Infinite Saturation Flow						Inf
10/2 (Westbound Lane 2)	Infinite Saturation Flow						Inf

Traffic Lane Flows

Lane	Scenario 2: PM Base 2008
Junction: Unnamed Junction	
1/1	756
1/2	331
2/1	289
2/2	739
3/1	303
3/2	369
4/1	878
5/1	739
5/2	412
5/3	376
6/1	382
7/1	236
7/2	311
8/1 (with short)	696(In) 595(Out)
8/2 (short)	101
9/1	840
10/1	516
10/2	386

Full Input Data And Results

Scenario 2: 'PM Base 2008' (FG2: 'PM 2008 Base', Plan 1: 'Staging Plan No. 1')

Traffic Lane Flows

Junction: Unnamed Junction

Lane	Lane Width (m)	Gradient	Nearside Lane	Allowed Turns	Turning Radius (m)	Turning Prop.	Sat flow (PCU/Hr)
1/1 (Barry Road (E))	3.00	0.00	Y	Arm 5 Ahead	Inf	100.0 %	1915
1/2 (Barry Road (E))	3.00	0.00	N	Arm 5 Ahead	Inf	71.9 %	1985
				Arm 6 U-Turn	12.00	28.1 %	
2/1 (Easbound LINK)	3.65	0.00	Y	Arm 6 Ahead	Inf	100.0 %	1980
2/2 (Easbound LINK)	3.65	0.00	N	Arm 4 Ahead	Inf	100.0 %	2120
3/1 (Penlan Rd (N))	3.00	0.00	Y	Arm 4 U-Turn	10.00	45.9 %	1792
				Arm 5 Ahead	Inf	54.1 %	
3/2 (Penlan Rd (N))	3.00	0.00	N	Arm 5 Ahead	Inf	100.0 %	2055
4/1 (Easbound Lane 1)	Infinite Saturation Flow						Inf
5/1 (Westbound LINK)	3.25	0.00	Y	Arm 9 Left	13.00	100.0 %	1739
5/2 (Westbound LINK)	3.25	0.00	N	Arm 10 Ahead	Inf	100.0 %	2080
5/3 (Westbound LINK)	3.25	0.00	N	Arm 10 Ahead	Inf	100.0 %	2080
6/1 (Northbound Lane 1)	Infinite Saturation Flow						Inf
7/1 (Redlands Rd (S))	3.00	0.00	Y	Arm 2 Right	17.00	51.7 %	1745
				Arm 10 Left	14.00	48.3 %	
7/2 (Redlands Rd (S))	3.00	0.00	N	Arm 2 Right	20.00	100.0 %	1912
8/1 (Cardiff Road (W))	3.25	0.00	Y	Arm 2 Ahead	Inf	100.0 %	1940
8/2 (Cardiff Road (W))	3.25	0.00	N	Arm 9 Right	20.00	100.0 %	1935
9/1 (Southbound Lane 1)	Infinite Saturation Flow						Inf
10/1 (Westbound Lane 1)	Infinite Saturation Flow						Inf
10/2 (Westbound Lane 2)	Infinite Saturation Flow						Inf

Full Input Data And Results

Traffic Lane Flows

Lane	Scenario 3: AM Base 2020
Junction: Unnamed Junction	
1/1	634
1/2	209
2/1	584
2/2	1205
3/1	193
3/2	227
4/1	1316
5/1	447
5/2	407
5/3	93
6/1	789
7/1	468
7/2	721
8/1 (with short)	847(In) 719(Out)
8/2 (short)	128
9/1	575
10/1	524
10/2	95

Full Input Data And Results

Scenario 3: 'AM Base 2020' (FG3: 'AM 2020 Base', Plan 1: 'Staging Plan No. 1')

Traffic Lane Flows

Junction: Unnamed Junction

Lane	Lane Width (m)	Gradient	Nearside Lane	Allowed Turns	Turning Radius (m)	Turning Prop.	Sat flow (PCU/Hr)
1/1 (Barry Road (E))	3.00	0.00	Y	Arm 5 Ahead	Inf	100.0 %	1915
1/2 (Barry Road (E))	3.00	0.00	N	Arm 5 Ahead	Inf	1.9 %	1831
				Arm 6 U-Turn	12.00	98.1 %	
2/1 (Easbound LINK)	3.65	0.00	Y	Arm 6 Ahead	Inf	100.0 %	1980
2/2 (Easbound LINK)	3.65	0.00	N	Arm 4 Ahead	Inf	100.0 %	2120
3/1 (Penlan Rd (N))	3.00	0.00	Y	Arm 4 U-Turn	10.00	57.5 %	1763
				Arm 5 Ahead	Inf	42.5 %	
3/2 (Penlan Rd (N))	3.00	0.00	N	Arm 5 Ahead	Inf	100.0 %	2055
4/1 (Easbound Lane 1)	Infinite Saturation Flow						Inf
5/1 (Westbound LINK)	3.25	0.00	Y	Arm 9 Left	13.00	100.0 %	1739
5/2 (Westbound LINK)	3.25	0.00	N	Arm 10 Ahead	Inf	100.0 %	2080
5/3 (Westbound LINK)	3.25	0.00	N	Arm 10 Ahead	Inf	100.0 %	2080
6/1 (Northbound Lane 1)	Infinite Saturation Flow						Inf
7/1 (Redlands Rd (S))	3.00	0.00	Y	Arm 2 Right	17.00	74.6 %	1752
				Arm 10 Left	14.00	25.4 %	
7/2 (Redlands Rd (S))	3.00	0.00	N	Arm 2 Right	20.00	100.0 %	1912
8/1 (Cardiff Road (W))	3.25	0.00	Y	Arm 2 Ahead	Inf	100.0 %	1940
8/2 (Cardiff Road (W))	3.25	0.00	N	Arm 9 Right	20.00	100.0 %	1935
9/1 (Southbound Lane 1)	Infinite Saturation Flow						Inf
10/1 (Westbound Lane 1)	Infinite Saturation Flow						Inf
10/2 (Westbound Lane 2)	Infinite Saturation Flow						Inf

Full Input Data And Results

Traffic Lane Flows

Lane	Scenario 4: PM Base 2020
Junction: Unnamed Junction	
1/1	1053
1/2	212
2/1	337
2/2	860
3/1	362
3/2	420
4/1	1022
5/1	859
5/2	646
5/3	271
6/1	446
7/1	274
7/2	362
8/1 (with short)	811(In) 693(Out)
8/2 (short)	118
9/1	977
10/1	772
10/2	277

Full Input Data And Results

Scenario 4: 'PM Base 2020' (FG4: 'PM 2020 Base', Plan 1: 'Staging Plan No. 1')

Traffic Lane Flows

Junction: Unnamed Junction							
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat flow (PCU/Hr)**
1/1 (Barry Road (E))	3.00	0.00	Y	Arm 5 Ahead	Inf	100.0 %	1915
1/2 (Barry Road (E))	3.00	0.00	N	Arm 5 Ahead	Inf	48.6 %	1931
				Arm 6 U-Turn	12.00	51.4 %	
2/1 (Easbound LINK)	3.65	0.00	Y	Arm 6 Ahead	Inf	100.0 %	1980
2/2 (Easbound LINK)	3.65	0.00	N	Arm 4 Ahead	Inf	100.0 %	2120
3/1 (Penlan Rd (N))	3.00	0.00	Y	Arm 4 U-Turn	10.00	44.8 %	1795
				Arm 5 Ahead	Inf	55.2 %	
3/2 (Penlan Rd (N))	3.00	0.00	N	Arm 5 Ahead	Inf	100.0 %	2055
4/1 (Easbound Lane 1)	Infinite Saturation Flow						Inf
5/1 (Westbound LINK)	3.25	0.00	Y	Arm 9 Left	13.00	100.0 %	1739
5/2 (Westbound LINK)	3.25	0.00	N	Arm 10 Ahead	Inf	100.0 %	2080
5/3 (Westbound LINK)	3.25	0.00	N	Arm 10 Ahead	Inf	100.0 %	2080
6/1 (Northbound Lane 1)	Infinite Saturation Flow						Inf
7/1 (Redlands Rd (S))	3.00	0.00	Y	Arm 2 Right	17.00	51.8 %	1745
				Arm 10 Left	14.00	48.2 %	
7/2 (Redlands Rd (S))	3.00	0.00	N	Arm 2 Right	20.00	100.0 %	1912
8/1 (Cardiff Road (W))	3.25	0.00	Y	Arm 2 Ahead	Inf	100.0 %	1940
8/2 (Cardiff Road (W))	3.25	0.00	N	Arm 9 Right	20.00	100.0 %	1935
9/1 (Southbound Lane 1)	Infinite Saturation Flow						Inf
10/1 (Westbound Lane 1)	Infinite Saturation Flow						Inf
10/2 (Westbound Lane 2)	Infinite Saturation Flow						Inf

Full Input Data And Results

Traffic Lane Flows

Lane	Scenario 5: AM 2020 with Dev
Junction: Unnamed Junction	
1/1	658
1/2	209
2/1	597
2/2	1339
3/1	196
3/2	230
4/1	1450
5/1	447
5/2	435
5/3	95
6/1	802
7/1	452
7/2	740
8/1 (with short)	998(In) 866(Out)
8/2 (short)	132
9/1	579
10/1	556
10/2	96

Full Input Data And Results

Scenario 5: 'AM 2020 with Dev' (FG5: 'AM 2020 with Dev', Plan 1: 'Staging Plan No. 1')

Traffic Lane Flows

Junction: Unnamed Junction

Lane	Lane Width (m)	Gradient	Nearside Lane	Allowed Turns	Turning Radius (m)	Turning Prop.	Sat flow (PCU/Hr)
1/1 (Barry Road (E))	3.00	0.00	Y	Arm 5 Ahead	Inf	100.0 %	1915
1/2 (Barry Road (E))	3.00	0.00	N	Arm 5 Ahead	Inf	1.9 %	1831
				Arm 6 U-Turn	12.00	98.1 %	
2/1 (Easbound LINK)	3.65	0.00	Y	Arm 6 Ahead	Inf	100.0 %	1980
2/2 (Easbound LINK)	3.65	0.00	N	Arm 4 Ahead	Inf	100.0 %	2120
3/1 (Penlan Rd (N))	3.00	0.00	Y	Arm 4 U-Turn	10.00	56.6 %	1765
				Arm 5 Ahead	Inf	43.4 %	
3/2 (Penlan Rd (N))	3.00	0.00	N	Arm 5 Ahead	Inf	100.0 %	2055
4/1 (Easbound Lane 1)	Infinite Saturation Flow						Inf
5/1 (Westbound LINK)	3.25	0.00	Y	Arm 9 Left	13.00	100.0 %	1739
5/2 (Westbound LINK)	3.25	0.00	N	Arm 10 Ahead	Inf	100.0 %	2080
5/3 (Westbound LINK)	3.25	0.00	N	Arm 10 Ahead	Inf	100.0 %	2080
6/1 (Northbound Lane 1)	Infinite Saturation Flow						Inf
7/1 (Redlands Rd (S))	3.00	0.00	Y	Arm 2 Right	17.00	73.0 %	1752
				Arm 10 Left	14.00	27.0 %	
7/2 (Redlands Rd (S))	3.00	0.00	N	Arm 2 Right	20.00	100.0 %	1912
8/1 (Cardiff Road (W))	3.25	0.00	Y	Arm 2 Ahead	Inf	100.0 %	1940
8/2 (Cardiff Road (W))	3.25	0.00	N	Arm 9 Right	20.00	100.0 %	1935
9/1 (Southbound Lane 1)	Infinite Saturation Flow						Inf
10/1 (Westbound Lane 1)	Infinite Saturation Flow						Inf
10/2 (Westbound Lane 2)	Infinite Saturation Flow						Inf

Full Input Data And Results

Traffic Lane Flows

Lane	Scenario 6: PM 2020 with Dev
Junction: Unnamed Junction	
1/1	1178
1/2	226
2/1	344
2/2	891
3/1	369
3/2	424
4/1	1053
5/1	858
5/2	769
5/3	299
6/1	453
7/1	276
7/2	363
8/1 (with short)	854(In) 732(Out)
8/2 (short)	122
9/1	980
10/1	899
10/2	305

Full Input Data And Results

Scenario 6: 'PM 2020 with Dev' (FG6: 'PM 2020 with Dev', Plan 1: 'Staging Plan No. 1')

Traffic Lane Flows

Junction: Unnamed Junction

Lane	Lane Width (m)	Gradient	Nearside Lane	Allowed Turns	Turning Radius (m)	Turning Prop.	Sat flow (PCU/Hr)
1/1 (Barry Road (E))	3.00	0.00	Y	Arm 5 Ahead	Inf	100.0 %	1915
1/2 (Barry Road (E))	3.00	0.00	N	Arm 5 Ahead	Inf	51.8 %	1938
				Arm 6 U-Turn	12.00	48.2 %	
2/1 (Easbound LINK)	3.65	0.00	Y	Arm 6 Ahead	Inf	100.0 %	1980
2/2 (Easbound LINK)	3.65	0.00	N	Arm 4 Ahead	Inf	100.0 %	2120
3/1 (Penlan Rd (N))	3.00	0.00	Y	Arm 4 U-Turn	10.00	43.9 %	1797
				Arm 5 Ahead	Inf	56.1 %	
3/2 (Penlan Rd (N))	3.00	0.00	N	Arm 5 Ahead	Inf	100.0 %	2055
4/1 (Easbound Lane 1)	Infinite Saturation Flow						Inf
5/1 (Westbound LINK)	3.25	0.00	Y	Arm 9 Left	13.00	100.0 %	1739
5/2 (Westbound LINK)	3.25	0.00	N	Arm 10 Ahead	Inf	100.0 %	2080
5/3 (Westbound LINK)	3.25	0.00	N	Arm 10 Ahead	Inf	100.0 %	2080
6/1 (Northbound Lane 1)	Infinite Saturation Flow						Inf
7/1 (Redlands Rd (S))	3.00	0.00	Y	Arm 2 Right	17.00	50.7 %	1745
				Arm 10 Left	14.00	49.3 %	
7/2 (Redlands Rd (S))	3.00	0.00	N	Arm 2 Right	20.00	100.0 %	1912
8/1 (Cardiff Road (W))	3.25	0.00	Y	Arm 2 Ahead	Inf	100.0 %	1940
8/2 (Cardiff Road (W))	3.25	0.00	N	Arm 9 Right	20.00	100.0 %	1935
9/1 (Southbound Lane 1)	Infinite Saturation Flow						Inf
10/1 (Westbound Lane 1)	Infinite Saturation Flow						Inf
10/2 (Westbound Lane 2)	Infinite Saturation Flow						Inf

Full Input Data And Results

Traffic Lane Flows

Lane	Scenario 7: PM 2020 with Dev + tourism
Junction: Unnamed Junction	
1/1	1330
1/2	175
2/1	345
2/2	1004
3/1	369
3/2	424
4/1	1166
5/1	858
5/2	910
5/3	259
6/1	454
7/1	265
7/2	375
8/1 (with short)	967(In) 845(Out)
8/2 (short)	122
9/1	980
10/1	1040
10/2	265

Full Input Data And Results

Scenario 7: 'PM 2020 with Dev + tourism' (FG7: '2020 with Dev + Tourism', Plan 1: 'Staging Plan No. 1')

Traffic Lane Flows

Junction: Unnamed Junction							
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat flow (PCU/Hr)**
1/1 (Barry Road (E))	3.00	0.00	Y	Arm 5 Ahead	Inf	100.0 %	1915
1/2 (Barry Road (E))	3.00	0.00	N	Arm 5 Ahead	Inf	37.7 %	1907
				Arm 6 U-Turn	12.00	62.3 %	
2/1 (Easbound LINK)	3.65	0.00	Y	Arm 6 Ahead	Inf	100.0 %	1980
2/2 (Easbound LINK)	3.65	0.00	N	Arm 4 Ahead	Inf	100.0 %	2120
3/1 (Penlan Rd (N))	3.00	0.00	Y	Arm 4 U-Turn	10.00	43.9 %	1797
				Arm 5 Ahead	Inf	56.1 %	
3/2 (Penlan Rd (N))	3.00	0.00	N	Arm 5 Ahead	Inf	100.0 %	2055
4/1 (Easbound Lane 1)	Infinite Saturation Flow						Inf
5/1 (Westbound LINK)	3.25	0.00	Y	Arm 9 Left	13.00	100.0 %	1739
5/2 (Westbound LINK)	3.25	0.00	N	Arm 10 Ahead	Inf	100.0 %	2080
5/3 (Westbound LINK)	3.25	0.00	N	Arm 10 Ahead	Inf	100.0 %	2080
6/1 (Northbound Lane 1)	Infinite Saturation Flow						Inf
7/1 (Redlands Rd (S))	3.00	0.00	Y	Arm 2 Right	17.00	48.7 %	1744
				Arm 10 Left	14.00	51.3 %	
7/2 (Redlands Rd (S))	3.00	0.00	N	Arm 2 Right	20.00	100.0 %	1912
8/1 (Cardiff Road (W))	3.25	0.00	Y	Arm 2 Ahead	Inf	100.0 %	1940
8/2 (Cardiff Road (W))	3.25	0.00	N	Arm 9 Right	20.00	100.0 %	1935
9/1 (Southbound Lane 1)	Infinite Saturation Flow						Inf
10/1 (Westbound Lane 1)	Infinite Saturation Flow						Inf
10/2 (Westbound Lane 2)	Infinite Saturation Flow						Inf

Full Input Data And Results

Traffic Lane Flows

Lane	Scenario 8: PM 2020 Base + tourism
Junction: Unnamed Junction	
1/1	1115
1/2	251
2/1	336
2/2	973
3/1	364
3/2	419
4/1	1135
5/1	859
5/2	707
5/3	312
6/1	445
7/1	261
7/2	374
8/1 (with short)	924(In) 806(Out)
8/2 (short)	118
9/1	977
10/1	824
10/2	327

Full Input Data And Results

Scenario 8: 'PM 2020 Base + tourism' (FG10: 'PM 2020 Base + Tourism', Plan 1: 'Staging Plan No. 1')

Traffic Lane Flows

Junction: Unnamed Junction

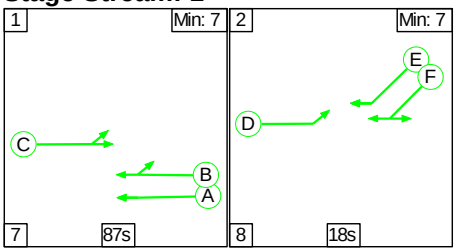
Lane	Lane Width (m)	Gradient	Nearside Lane	Allowed Turns	Turning Radius (m)	Turning Prop.	Sat flow (PCU/Hr)
1/1 (Barry Road (E))	3.00	0.00	Y	Arm 5 Ahead	Inf	100.0 %	1915
1/2 (Barry Road (E))	3.00	0.00	N	Arm 5 Ahead	Inf	56.6 %	1949
				Arm 6 U-Turn	12.00	43.4 %	
2/1 (Easbound LINK)	3.65	0.00	Y	Arm 6 Ahead	Inf	100.0 %	1980
2/2 (Easbound LINK)	3.65	0.00	N	Arm 4 Ahead	Inf	100.0 %	2120
3/1 (Penlan Rd (N))	3.00	0.00	Y	Arm 4 U-Turn	10.00	44.5 %	1795
				Arm 5 Ahead	Inf	55.5 %	
3/2 (Penlan Rd (N))	3.00	0.00	N	Arm 5 Ahead	Inf	100.0 %	2055
4/1 (Easbound Lane 1)	Infinite Saturation Flow						Inf
5/1 (Westbound LINK)	3.25	0.00	Y	Arm 9 Left	13.00	100.0 %	1739
5/2 (Westbound LINK)	3.25	0.00	N	Arm 10 Ahead	Inf	100.0 %	2080
5/3 (Westbound LINK)	3.25	0.00	N	Arm 10 Ahead	Inf	100.0 %	2080
6/1 (Northbound Lane 1)	Infinite Saturation Flow						Inf
7/1 (Redlands Rd (S))	3.00	0.00	Y	Arm 2 Right	17.00	49.4 %	1744
				Arm 10 Left	14.00	50.6 %	
7/2 (Redlands Rd (S))	3.00	0.00	N	Arm 2 Right	20.00	100.0 %	1912
8/1 (Cardiff Road (W))	3.25	0.00	Y	Arm 2 Ahead	Inf	100.0 %	1940
8/2 (Cardiff Road (W))	3.25	0.00	N	Arm 9 Right	20.00	100.0 %	1935
9/1 (Southbound Lane 1)	Infinite Saturation Flow						Inf
10/1 (Westbound Lane 1)	Infinite Saturation Flow						Inf
10/2 (Westbound Lane 2)	Infinite Saturation Flow						Inf

Full Input Data And Results

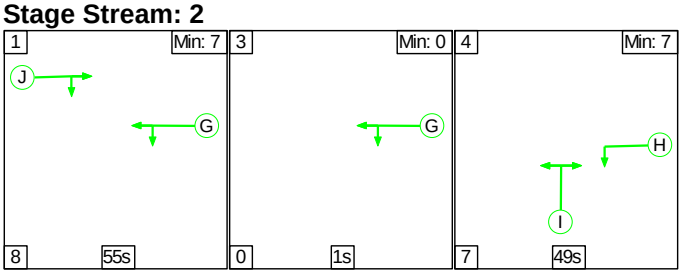
Scenario 1: 'AM Base 2008' (FG1: 'AM 2008 Base', Plan 1: 'Staging Plan No. 1')

Stage Sequence Diagram

Stage Stream: 1



Stage Stream: 2



Stage Timings

Stage Stream: 1

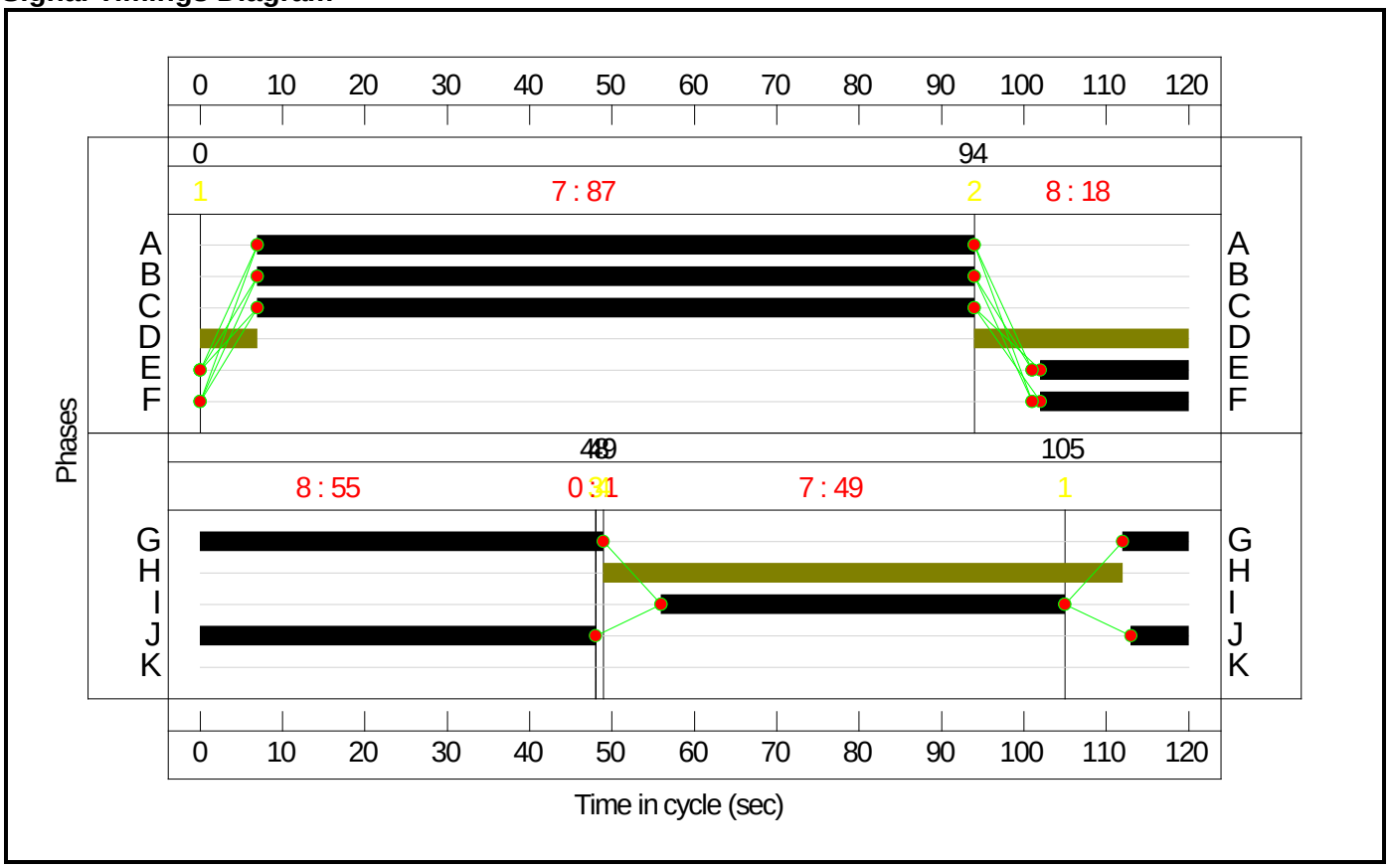
Stage	1	2
Duration	87	18
Change Point	0	94

Stage Stream: 2

Stage	1	3	4
Duration	55	1	49
Change Point	105	48	49

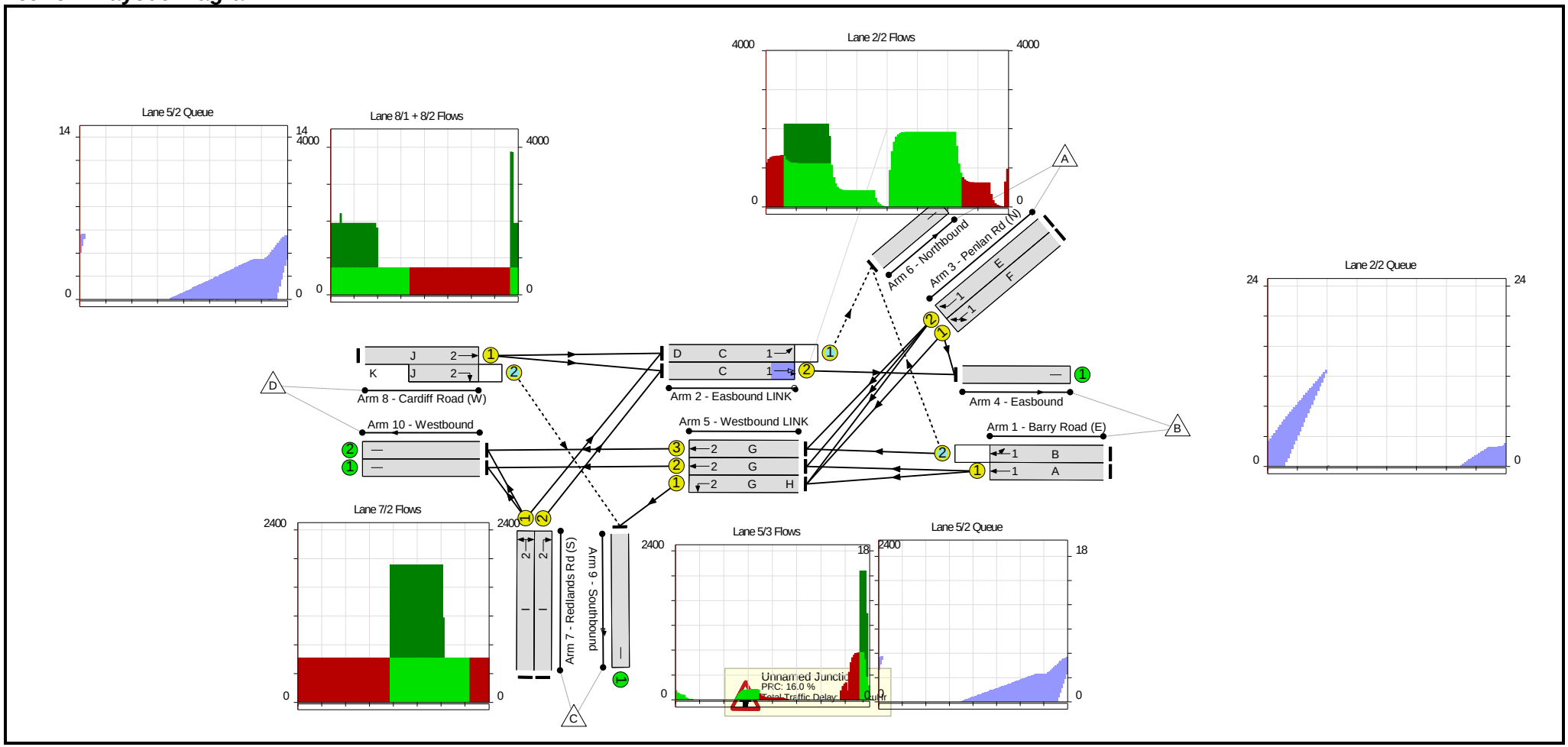
Full Input Data And Results

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**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**77.6%**
Unnamed Junction	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**77.6%**
1/1	Barry Road (E) Ahead	U	1	N/A	A		1	87	-	514	1915	1404	36.6%
1/2	Barry Road (E) Ahead U-Turn	O	1	N/A	B		1	87	-	208	1859	361	57.7%
2/1	Easbound LINK Ahead	O	1	N/A	C	D	1	120	33	501	1980	1392	36.0%
2/2	Easbound LINK Ahead	U	1	N/A	C		1	87	-	1033	2120	1555	66.4%
3/1	Penlan Rd (N) U-Turn Ahead	U	1	N/A	F		1	18	-	164	1762	279	58.8%
3/2	Penlan Rd (N) Ahead	U	1	N/A	E		1	18	-	196	2055	325	60.2%
4/1	Easbound	U	N/A	N/A	-		-	-	-	1128	Inf	Inf	0.0%
5/1	Westbound LINK Left	U	2	N/A	G	H	1	120	63	383	1739	1739	22.0%
5/2	Westbound LINK Ahead	U	2	N/A	G		1	57	-	323	2080	1005	32.1%
5/3	Westbound LINK Ahead	U	2	N/A	G		1	57	-	106	2080	1005	10.5%
6/1	Northbound	U	N/A	N/A	-		-	-	-	676	Inf	Inf	0.0%
7/1	Redlands Rd (S) Right Left	U	2	N/A	I		1	49	-	402	1752	730	55.1%
7/2	Redlands Rd (S) Right	U	2	N/A	I		1	49	-	618	1912	797	77.6%
8/1+8/2	Cardiff Road (W) Ahead Right	U+O	2	N/A	J	K	1	55	-	726	1940:1935	939	77.3%
9/1	Southbound	U	N/A	N/A	-		-	-	-	493	Inf	Inf	0.0%
10/1	Westbound	U	N/A	N/A	-		-	-	-	422	Inf	Inf	0.0%
10/2	Westbound	U	N/A	N/A	-		-	-	-	109	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	**-**	**-**	**654**	**80**	**52**	**21.9**	**8.1**	**1.0**	**31.0**	**-**	**-**	**-**	**-**
Unnamed Junction	**-**	**-**	**654**	**80**	**52**	**21.9**	**8.1**	**1.0**	**31.0**	**-**	**-**	**-**	**-**
1/1	514	514	-	-	-	0.8	0.3	-	1.1	7.9	6.1	0.3	6.4
1/2	208	208	122	0	52	0.3	0.7	0.8	1.8	30.6	2.1	0.7	2.8
2/1	501	501	421	80	0	0.0	0.3	0.0	0.3	2.1	0.0	0.3	0.3
2/2	1033	1033	-	-	-	1.3	1.0	-	2.3	8.0	12.8	1.0	13.8
3/1	164	164	-	-	-	2.1	0.7	-	2.8	62.3	5.1	0.7	5.8
3/2	196	196	-	-	-	2.6	0.7	-	3.3	60.7	6.0	0.7	6.8
4/1	1128	1128	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	383	383	-	-	-	0.0	0.1	-	0.1	1.3	0.0	0.1	0.1
5/2	323	323	-	-	-	1.3	0.2	-	1.6	17.4	5.6	0.2	5.9
5/3	106	106	-	-	-	0.2	0.1	-	0.2	8.1	2.6	0.1	2.7
6/1	676	676	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	402	402	-	-	-	3.0	0.6	-	3.6	32.0	10.1	0.6	10.7
7/2	618	618	-	-	-	5.2	1.7	-	6.9	40.1	17.7	1.7	19.4
8/1+8/2	726	726	110	0	0	5.2	1.7	0.2	7.0	34.8	18.7	1.7	20.4
9/1	493	493	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
10/1	422	422	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
10/2	109	109	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

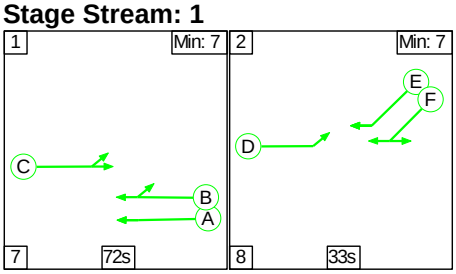
C1 Stream: 1 PRC for Signalled Lanes (%): 35.5 Total Delay for Signalled Lanes (pcuHr): 11.61
C1 Stream: 2 PRC for Signalled Lanes (%): 16.0 Total Delay for Signalled Lanes (pcuHr): 19.39
PRC Over All Lanes (%): 16.0 Total Delay Over All Lanes(pcuHr): 31.00 Cycle Time (s): 120

Full Input Data And Results

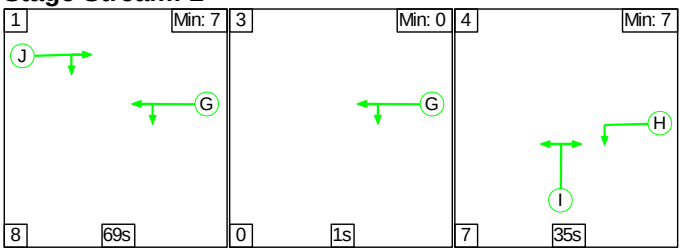
Scenario 2: 'PM Base 2008' (FG2: 'PM 2008 Base', Plan 1: 'Staging Plan No. 1')

Stage Sequence Diagram

Stage Stream: 1



Stage Stream: 2



Stage Timings

Stage Stream: 1

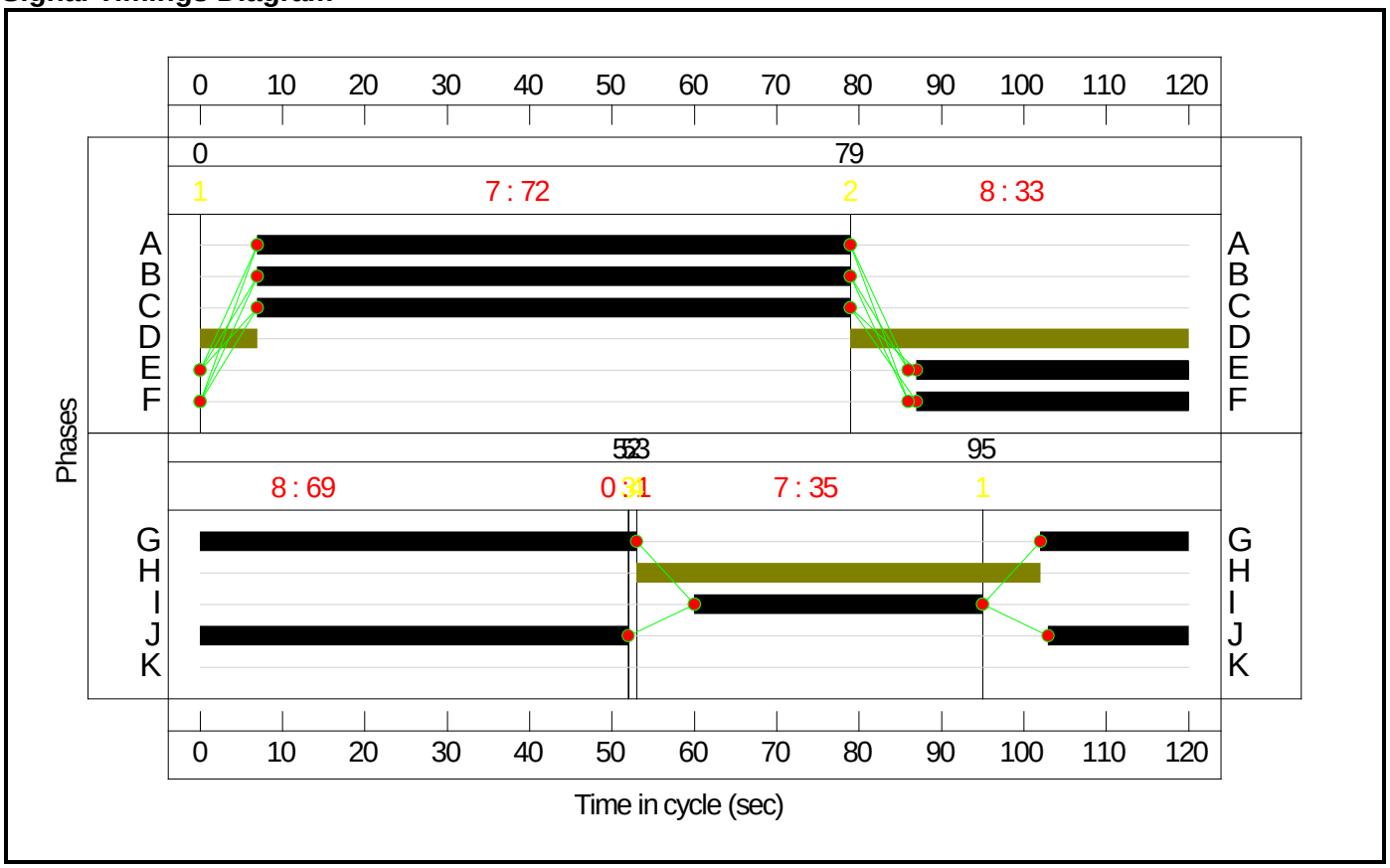
Stage	1	2
Duration	72	33
Change Point	0	79

Stage Stream: 2

Stage	1	3	4
Duration	69	1	35
Change Point	95	52	53

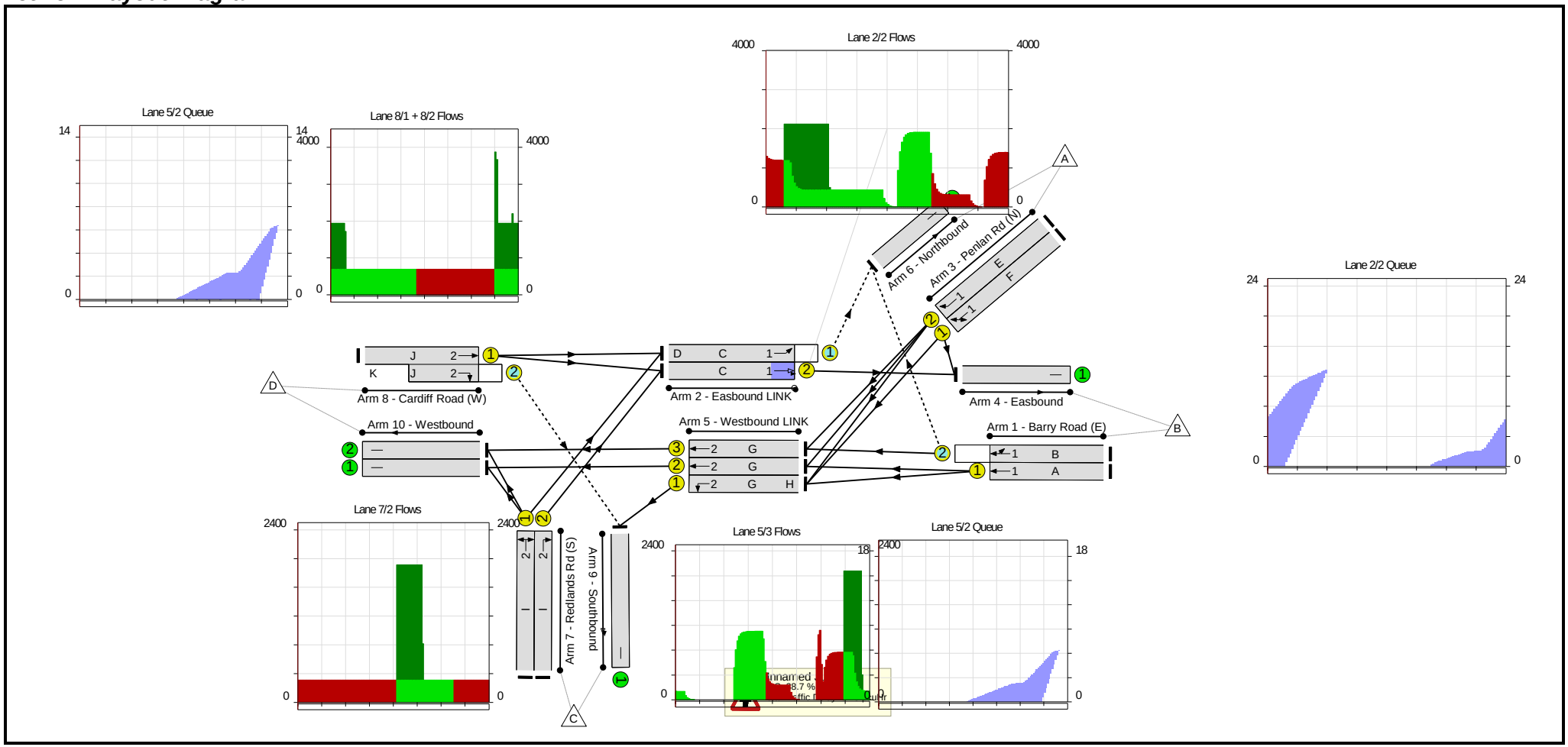
Full Input Data And Results

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**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**64.9%**
Unnamed Junction	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**64.9%**
1/1	Barry Road (E) Ahead	U	1	N/A	A		1	72	-	756	1915	1165	64.9%
1/2	Barry Road (E) Ahead U-Turn	O	1	N/A	B		1	72	-	331	1985	546	60.6%
2/1	Easbound LINK Ahead	O	1	N/A	C	D	1	120	48	289	1980	1344	21.5%
2/2	Easbound LINK Ahead	U	1	N/A	C		1	72	-	739	2120	1290	57.3%
3/1	Penlan Rd (N) U-Turn Ahead	U	1	N/A	F		1	33	-	303	1792	508	59.7%
3/2	Penlan Rd (N) Ahead	U	1	N/A	E		1	33	-	369	2055	582	63.4%
4/1	Easbound	U	N/A	N/A	-		-	-	-	878	Inf	Inf	0.0%
5/1	Westbound LINK Left	U	2	N/A	G	H	1	120	49	739	1739	1739	42.5%
5/2	Westbound LINK Ahead	U	2	N/A	G		1	71	-	412	2080	1248	33.0%
5/3	Westbound LINK Ahead	U	2	N/A	G		1	71	-	376	2080	1248	30.1%
6/1	Northbound	U	N/A	N/A	-		-	-	-	382	Inf	Inf	0.0%
7/1	Redlands Rd (S) Right Left	U	2	N/A	I		1	35	-	236	1745	524	45.1%
7/2	Redlands Rd (S) Right	U	2	N/A	I		1	35	-	311	1912	574	54.2%
8/1+8/2	Cardiff Road (W) Ahead Right	U+O	2	N/A	J	K	1	69	-	696	1940:1935	1164	59.8%
9/1	Southbound	U	N/A	N/A	-		-	-	-	840	Inf	Inf	0.0%
10/1	Westbound	U	N/A	N/A	-		-	-	-	516	Inf	Inf	0.0%
10/2	Westbound	U	N/A	N/A	-		-	-	-	386	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	**-**	**-**	**371**	**98**	**13**	**24.0**	**6.7**	**0.6**	**31.3**	**-**	**-**	**-**	**-**
Unnamed Junction	**-**	**-**	**371**	**98**	**13**	**24.0**	**6.7**	**0.6**	**31.3**	**-**	**-**	**-**	**-**
1/1	756	756	-	-	-	3.2	0.9	-	4.1	19.6	16.2	0.9	17.1
1/2	331	331	80	0	13	1.6	0.8	0.2	2.6	28.3	7.5	0.8	8.3
2/1	289	289	191	98	0	0.0	0.1	0.1	0.2	2.8	0.0	0.1	0.1
2/2	739	739	-	-	-	2.2	0.7	-	2.9	14.0	13.0	0.7	13.6
3/1	303	303	-	-	-	3.1	0.7	-	3.9	45.8	8.7	0.7	9.4
3/2	369	369	-	-	-	3.9	0.9	-	4.7	45.9	10.7	0.9	11.5
4/1	878	878	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	739	739	-	-	-	0.0	0.4	-	0.4	1.8	0.0	0.4	0.4
5/2	412	412	-	-	-	1.0	0.2	-	1.2	10.6	6.4	0.2	6.6
5/3	376	376	-	-	-	0.9	0.2	-	1.1	10.4	6.4	0.2	6.6
6/1	382	382	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	236	236	-	-	-	2.2	0.4	-	2.6	40.2	6.4	0.4	6.8
7/2	311	311	-	-	-	3.0	0.6	-	3.6	41.9	8.6	0.6	9.2
8/1+8/2	696	696	101	0	0	2.9	0.7	0.3	4.0	20.7	13.3	0.7	14.0
9/1	840	840	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
10/1	516	516	-	-	-	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

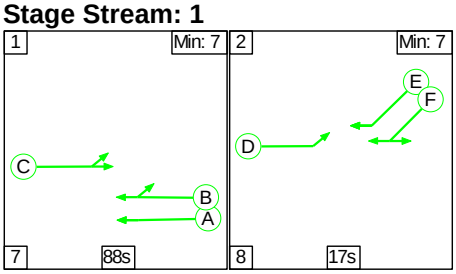
C1 Stream: 1 PRC for Signalled Lanes (%): 38.7 Total Delay for Signalled Lanes (pcuHr): 18.38
C1 Stream: 2 PRC for Signalled Lanes (%): 50.5 Total Delay for Signalled Lanes (pcuHr): 12.94
PRC Over All Lanes (%): 38.7 Total Delay Over All Lanes(pcuHr): 31.32 Cycle Time (s): 120

Full Input Data And Results

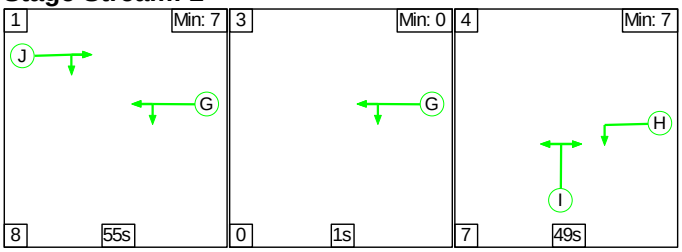
Scenario 3: 'AM Base 2020' (FG3: 'AM 2020 Base', Plan 1: 'Staging Plan No. 1')

Stage Sequence Diagram

Stage Stream: 1



Stage Stream: 2



Stage Timings

Stage Stream: 1

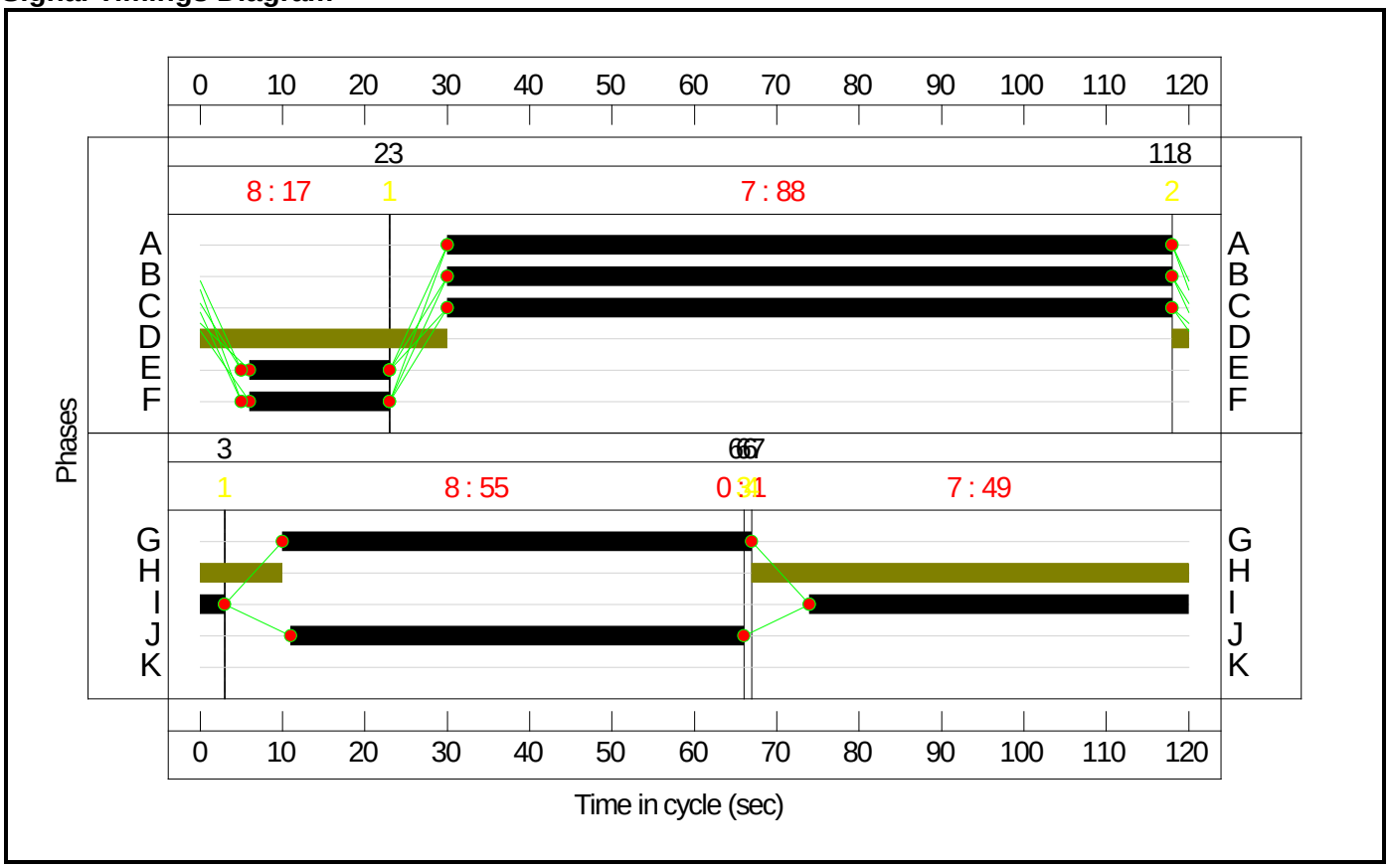
Stage	1	2
Duration	88	17
Change Point	23	118

Stage Stream: 2

Stage	1	3	4
Duration	55	1	49
Change Point	3	66	67

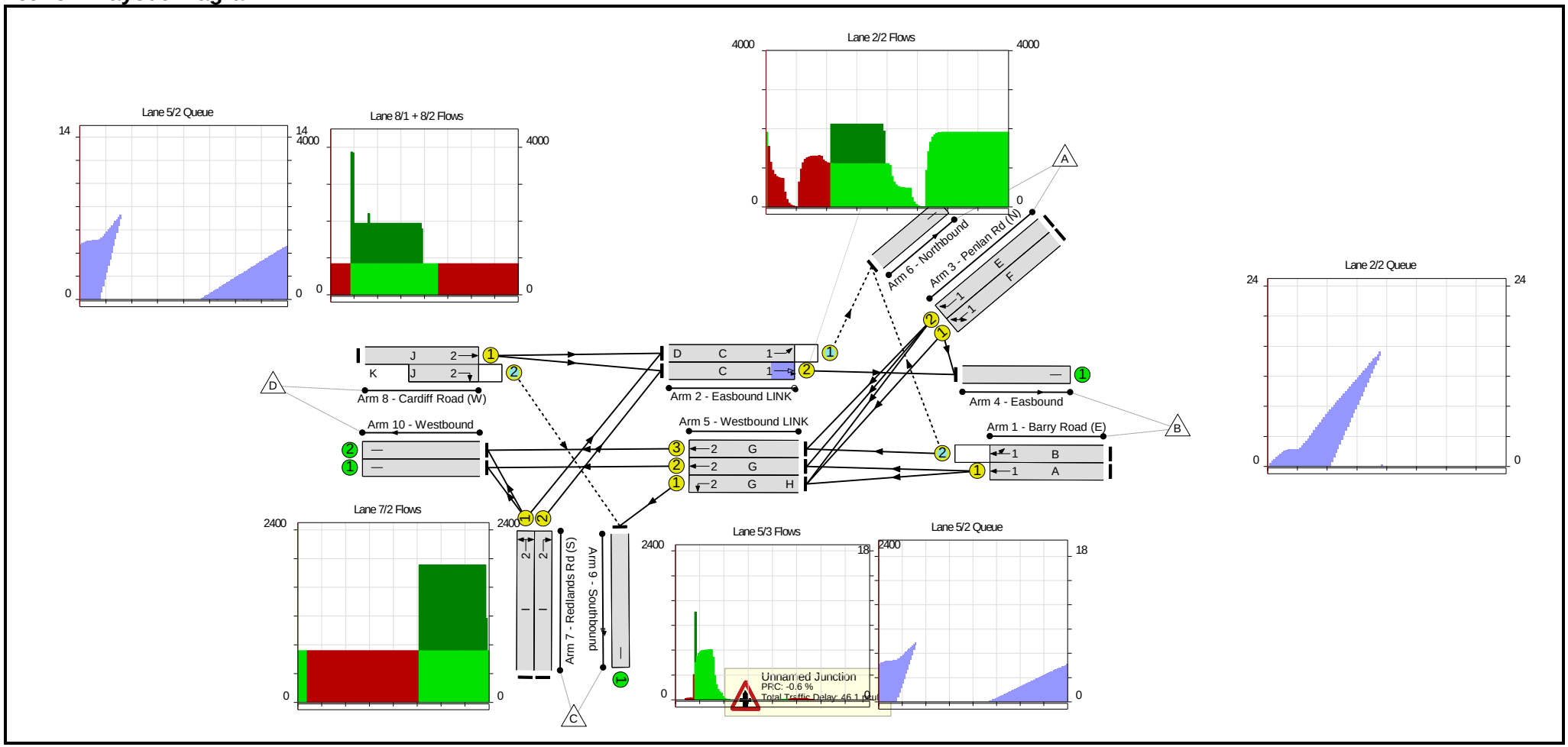
Full Input Data And Results

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**	-	-		-	-	-	-	-	-	**90.5%**
Unnamed Junction	-	-	**N/A**	-	-		-	-	-	-	-	-	**90.5%**
1/1	Barry Road (E) Ahead	U	1	N/A	A		1	88	-	634	1915	1420	44.6%
1/2	Barry Road (E) Ahead U-Turn	O	1	N/A	B		1	88	-	209	1831	251	83.3%
2/1	Easbound LINK Ahead	O	1	N/A	C	D	1	120	32	584	1980	1400	41.7%
2/2	Easbound LINK Ahead	U	1	N/A	C		1	88	-	1205	2120	1572	76.6%
3/1	Penlan Rd (N) U-Turn Ahead	U	1	N/A	F		1	17	-	193	1763	264	73.0%
3/2	Penlan Rd (N) Ahead	U	1	N/A	E		1	17	-	227	2055	308	73.6%
4/1	Easbound	U	N/A	N/A	-		-	-	-	1316	Inf	Inf	0.0%
5/1	Westbound LINK Left	U	2	N/A	G	H	1	120	63	447	1739	1739	25.7%
5/2	Westbound LINK Ahead	U	2	N/A	G		1	57	-	407	2080	1005	40.5%
5/3	Westbound LINK Ahead	U	2	N/A	G		1	57	-	93	2080	1005	9.3%
6/1	Northbound	U	N/A	N/A	-		-	-	-	789	Inf	Inf	0.0%
7/1	Redlands Rd (S) Right Left	U	2	N/A	I		1	49	-	468	1752	730	64.1%
7/2	Redlands Rd (S) Right	U	2	N/A	I		1	49	-	721	1912	797	90.5%
8/1+8/2	Cardiff Road (W) Ahead Right	U+O	2	N/A	J	K	1	55	-	847	1940:1935	939	90.2%
9/1	Southbound	U	N/A	N/A	-		-	-	-	575	Inf	Inf	0.0%
10/1	Westbound	U	N/A	N/A	-		-	-	-	524	Inf	Inf	0.0%
10/2	Westbound	U	N/A	N/A	-		-	-	-	95	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	**-**	**-**	**752**	**94**	**72**	**27.4**	**17.2**	**1.5**	**46.1**	**-**	**-**	**-**	**-**
Unnamed Junction	**-**	**-**	**752**	**94**	**72**	**27.4**	**17.2**	**1.5**	**46.1**	**-**	**-**	**-**	**-**
1/1	634	634	-	-	-	1.1	0.4	-	1.5	8.3	8.1	0.4	8.5
1/2	209	209	133	0	72	0.3	2.3	1.2	3.8	65.2	2.0	2.3	4.2
2/1	584	584	490	94	0	0.0	0.4	0.0	0.4	2.2	0.0	0.4	0.4
2/2	1205	1205	-	-	-	1.7	1.6	-	3.3	9.9	15.2	1.6	16.9
3/1	193	193	-	-	-	2.6	1.3	-	3.9	73.0	6.1	1.3	7.4
3/2	227	227	-	-	-	3.1	1.4	-	4.4	70.2	7.2	1.4	8.5
4/1	1316	1316	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	447	447	-	-	-	0.0	0.2	-	0.2	1.4	0.0	0.2	0.2
5/2	407	407	-	-	-	1.7	0.3	-	2.1	18.4	7.3	0.3	7.6
5/3	93	93	-	-	-	0.0	0.1	-	0.1	3.4	0.2	0.1	0.3
6/1	789	789	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	468	468	-	-	-	3.6	0.9	-	4.5	34.7	12.3	0.9	13.2
7/2	721	721	-	-	-	6.6	4.3	-	10.8	54.1	22.4	4.3	26.7
8/1+8/2	847	847	128	0	0	6.7	4.2	0.3	11.2	47.5	24.6	4.2	28.8
9/1	575	575	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
10/1	524	524	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
10/2	95	95	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

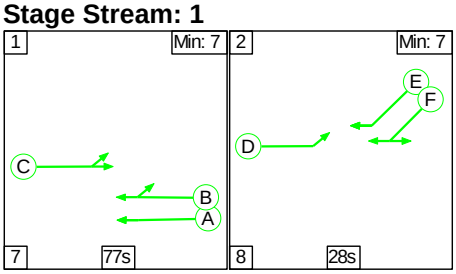
C1 Stream: 1 PRC for Signalled Lanes (%): 8.0 Total Delay for Signalled Lanes (pcuHr): 17.27
C1 Stream: 2 PRC for Signalled Lanes (%): -0.6 Total Delay for Signalled Lanes (pcuHr): 28.87
PRC Over All Lanes (%): -0.6 Total Delay Over All Lanes(pcuHr): 46.13 Cycle Time (s): 120

Full Input Data And Results

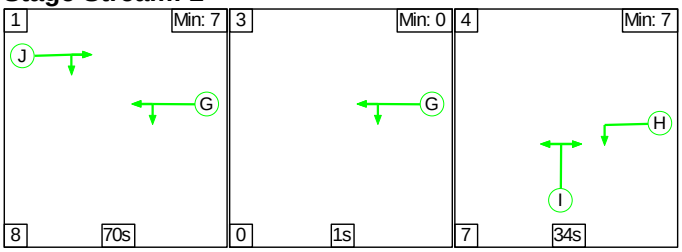
Scenario 4: 'PM Base 2020' (FG4: 'PM 2020 Base', Plan 1: 'Staging Plan No. 1')

Stage Sequence Diagram

Stage Stream: 1



Stage Stream: 2



Stage Timings

Stage Stream: 1

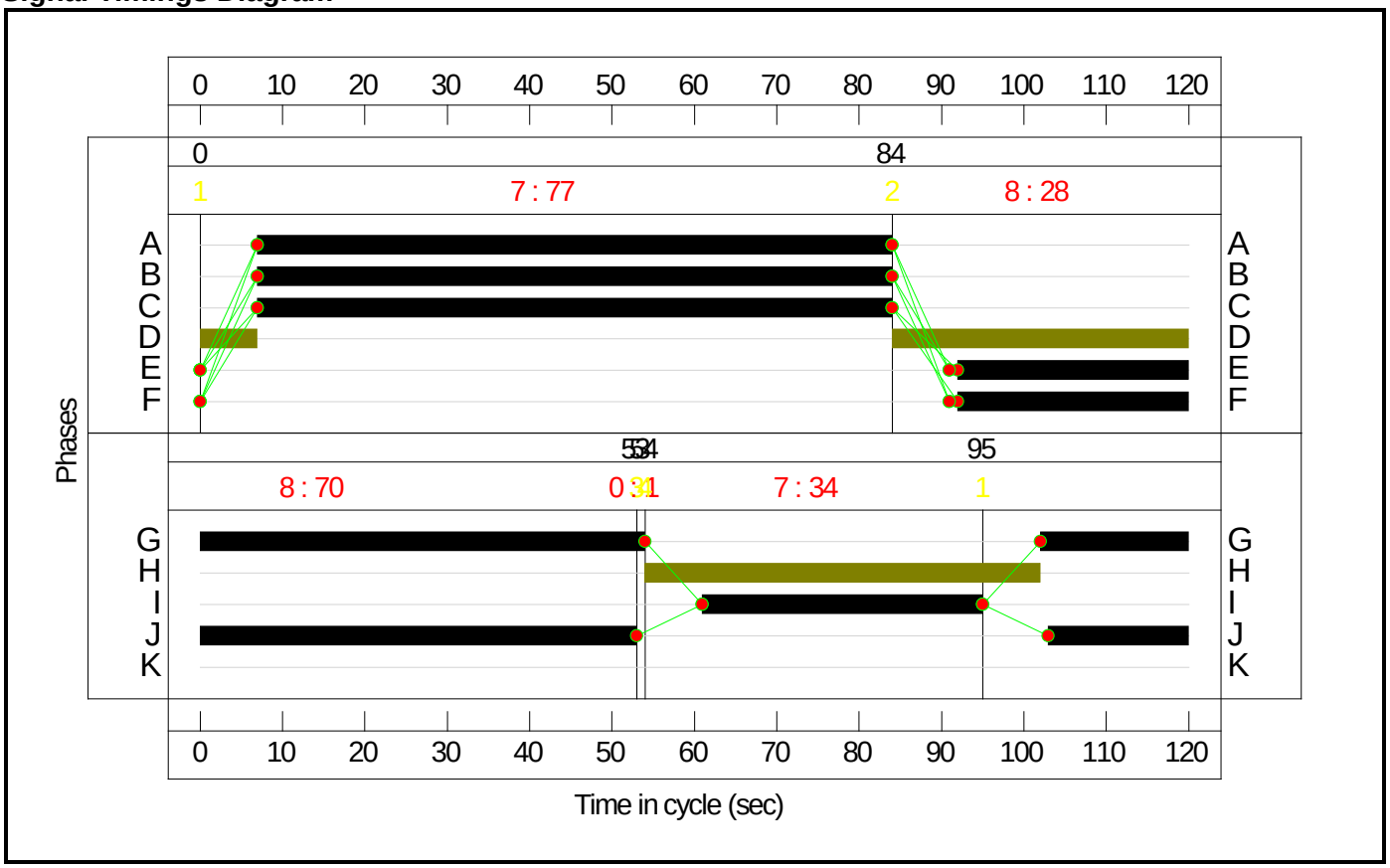
Stage	1	2
Duration	77	28
Change Point	0	84

Stage Stream: 2

Stage	1	3	4
Duration	70	1	34
Change Point	95	53	54

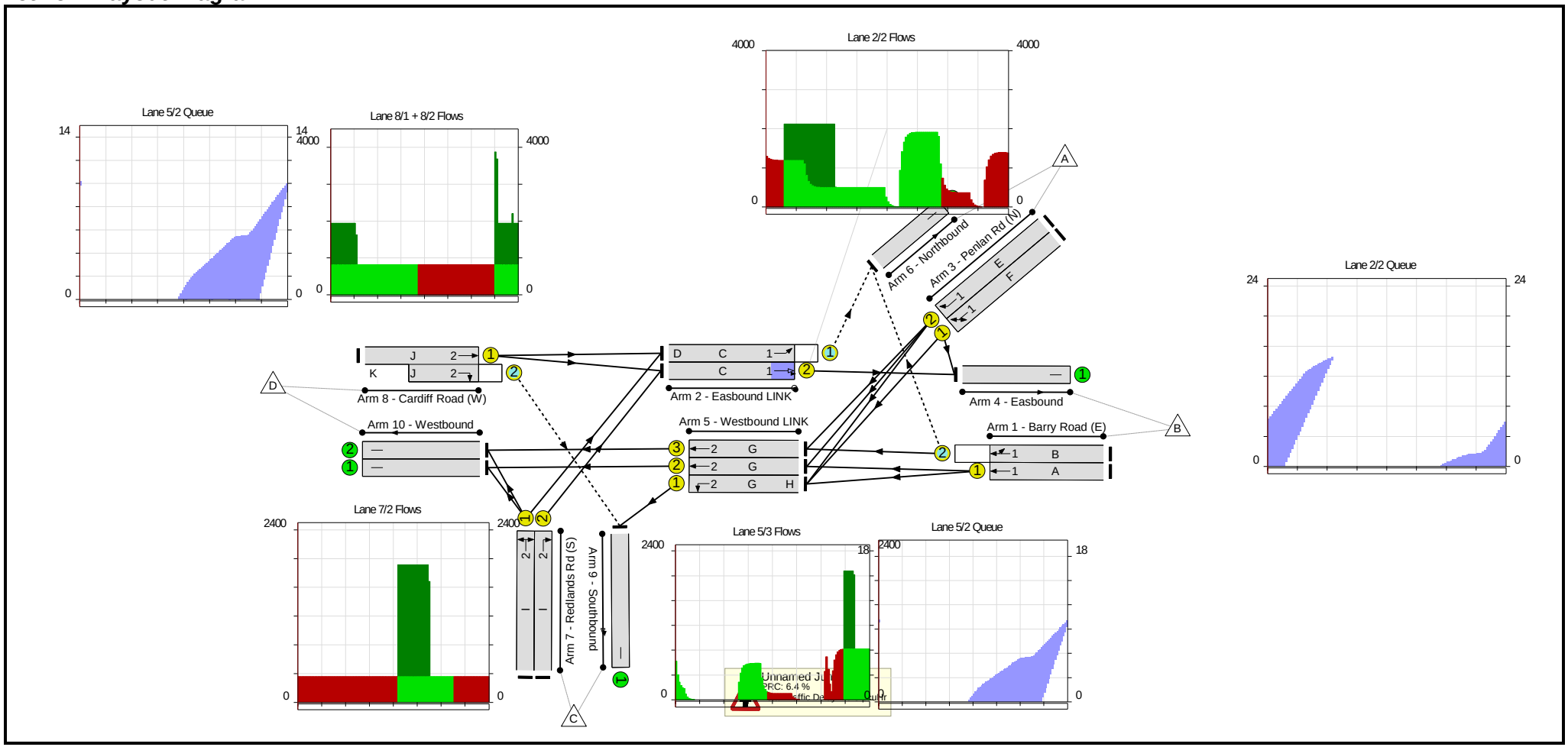
Full Input Data And Results

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**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**84.6%**
Unnamed Junction	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**84.6%**
1/1	Barry Road (E) Ahead	U	1	N/A	A		1	77	-	1053	1915	1245	84.6%
1/2	Barry Road (E) Ahead U-Turn	O	1	N/A	B		1	77	-	212	1931	441	48.1%
2/1	Easbound LINK Ahead	O	1	N/A	C	D	1	120	43	337	1980	1405	24.0%
2/2	Easbound LINK Ahead	U	1	N/A	C		1	77	-	860	2120	1378	62.4%
3/1	Penlan Rd (N) U-Turn Ahead	U	1	N/A	F		1	28	-	362	1795	434	83.5%
3/2	Penlan Rd (N) Ahead	U	1	N/A	E		1	28	-	420	2055	497	84.6%
4/1	Easbound	U	N/A	N/A	-		-	-	-	1022	Inf	Inf	0.0%
5/1	Westbound LINK Left	U	2	N/A	G	H	1	120	48	859	1739	1739	49.4%
5/2	Westbound LINK Ahead	U	2	N/A	G		1	72	-	646	2080	1265	51.1%
5/3	Westbound LINK Ahead	U	2	N/A	G		1	72	-	271	2080	1265	21.4%
6/1	Northbound	U	N/A	N/A	-		-	-	-	446	Inf	Inf	0.0%
7/1	Redlands Rd (S) Right Left	U	2	N/A	I		1	34	-	274	1745	509	53.8%
7/2	Redlands Rd (S) Right	U	2	N/A	I		1	34	-	362	1912	558	64.9%
8/1+8/2	Cardiff Road (W) Ahead Right	U+O	2	N/A	J	K	1	70	-	811	1940:1935	1156	70.2%
9/1	Southbound	U	N/A	N/A	-		-	-	-	977	Inf	Inf	0.0%
10/1	Westbound	U	N/A	N/A	-		-	-	-	772	Inf	Inf	0.0%
10/2	Westbound	U	N/A	N/A	-		-	-	-	277	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	**-**	**-**	**449**	**96**	**19**	**29.3**	**12.9**	**1.1**	**43.3**	**-**	**-**	**-**	**-**
Unnamed Junction	**-**	**-**	**449**	**96**	**19**	**29.3**	**12.9**	**1.1**	**43.3**	**-**	**-**	**-**	**-**
1/1	1053	1053	-	-	-	4.8	2.7	-	7.4	25.5	27.2	2.7	29.9
1/2	212	212	90	0	19	0.6	0.5	0.4	1.5	25.1	2.8	0.5	3.2
2/1	337	337	241	96	0	0.0	0.2	0.0	0.2	1.9	0.0	0.2	0.2
2/2	860	860	-	-	-	2.2	0.8	-	3.0	12.7	14.7	0.8	15.6
3/1	362	362	-	-	-	4.3	2.4	-	6.7	66.7	11.4	2.4	13.7
3/2	420	420	-	-	-	5.1	2.6	-	7.6	65.4	13.3	2.6	15.9
4/1	1022	1022	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	859	859	-	-	-	0.0	0.5	-	0.5	2.0	0.0	0.5	0.5
5/2	646	646	-	-	-	2.0	0.5	-	2.5	14.1	10.2	0.5	10.7
5/3	271	271	-	-	-	0.3	0.1	-	0.4	5.9	3.8	0.1	3.9
6/1	446	446	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	274	274	-	-	-	2.7	0.6	-	3.3	43.3	7.6	0.6	8.2
7/2	362	362	-	-	-	3.7	0.9	-	4.7	46.3	10.5	0.9	11.4
8/1+8/2	811	811	118	0	0	3.6	1.2	0.6	5.4	23.9	17.0	1.2	18.2
9/1	977	977	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
10/1	772	772	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
10/2	277	277	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

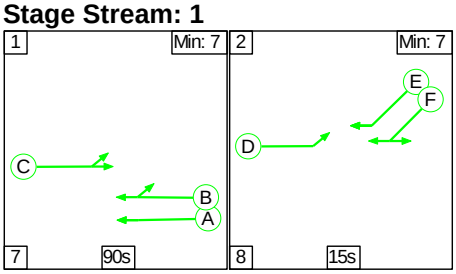
C1 Stream: 1 PRC for Signalled Lanes (%): 6.4 Total Delay for Signalled Lanes (pcuHr): 26.47
C1 Stream: 2 PRC for Signalled Lanes (%): 28.3 Total Delay for Signalled Lanes (pcuHr): 16.79
PRC Over All Lanes (%): 6.4 Total Delay Over All Lanes(pcuHr): 43.26 Cycle Time (s): 120

Full Input Data And Results

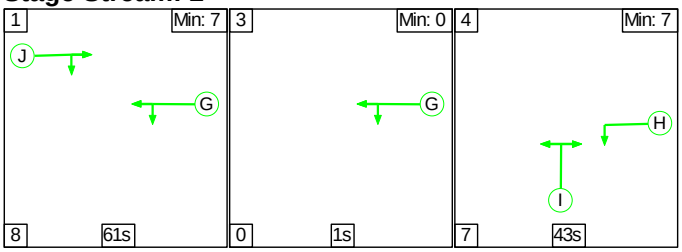
Scenario 5: 'AM 2020 with Dev' (FG5: 'AM 2020 with Dev', Plan 1: 'Staging Plan No. 1')

Stage Sequence Diagram

Stage Stream: 1



Stage Stream: 2



Stage Timings

Stage Stream: 1

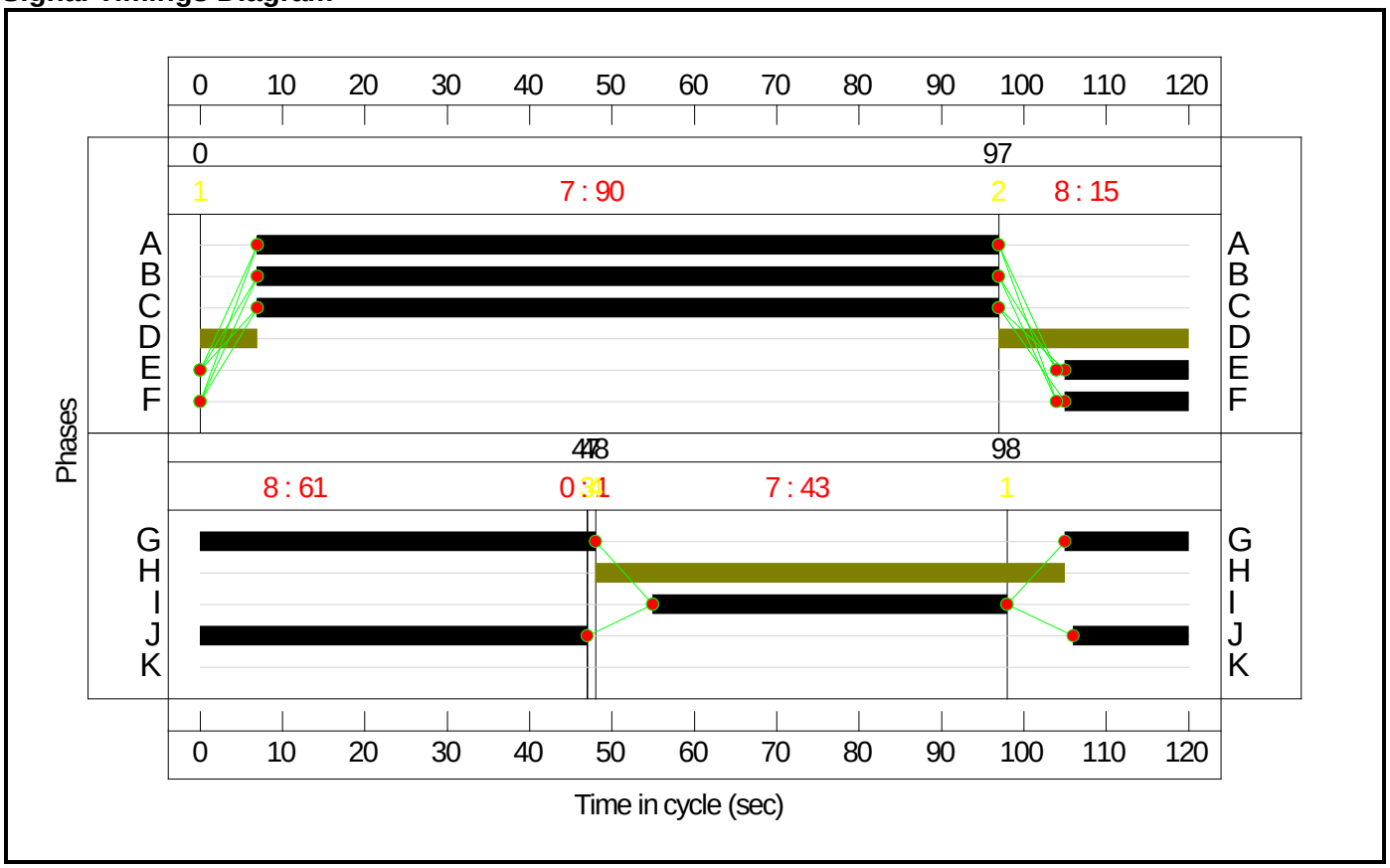
Stage	1	2
Duration	90	15
Change Point	0	97

Stage Stream: 2

Stage	1	3	4
Duration	61	1	43
Change Point	98	47	48

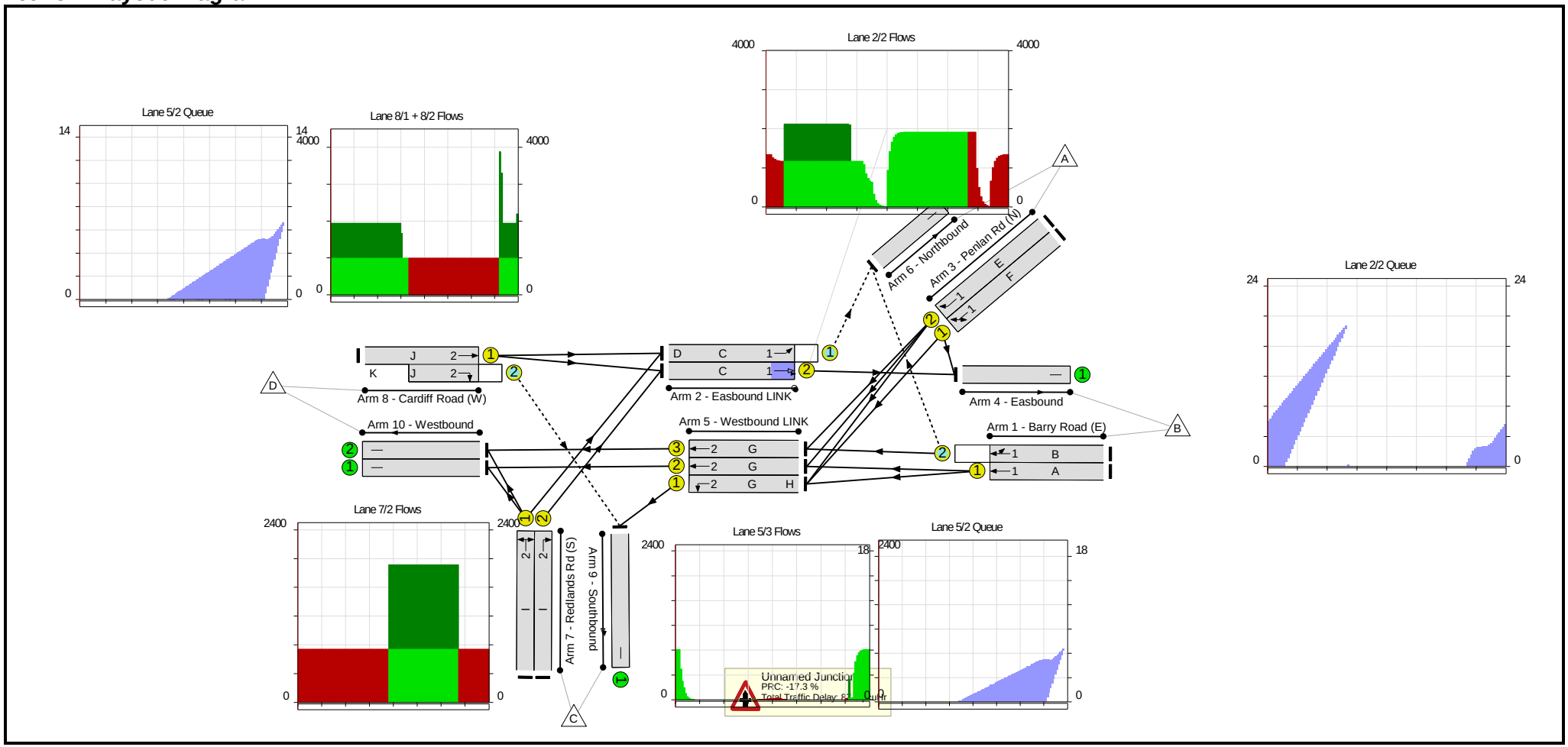
Full Input Data And Results

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**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**105.6%**
Unnamed Junction	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**105.6%**
1/1	Barry Road (E) Ahead	U	1	N/A	A		1	90	-	658	1915	1452	45.3%
1/2	Barry Road (E) Ahead U-Turn	O	1	N/A	B		1	90	-	209	1831	205	101.9%
2/1	Easbound LINK Ahead	O	1	N/A	C	D	1	120	30	597	1980	1416	42.2%
2/2	Easbound LINK Ahead	U	1	N/A	C		1	90	-	1339	2120	1608	80.9%
3/1	Penlan Rd (N) U-Turn Ahead	U	1	N/A	F		1	15	-	196	1765	235	83.3%
3/2	Penlan Rd (N) Ahead	U	1	N/A	E		1	15	-	230	2055	274	83.9%
4/1	Easbound	U	N/A	N/A	-		-	-	-	1450	Inf	Inf	0.0%
5/1	Westbound LINK Left	U	2	N/A	G	H	1	120	57	447	1739	1739	25.7%
5/2	Westbound LINK Ahead	U	2	N/A	G		1	63	-	435	2080	1109	39.2%
5/3	Westbound LINK Ahead	U	2	N/A	G		1	63	-	95	2080	1109	8.6%
6/1	Northbound	U	N/A	N/A	-		-	-	-	802	Inf	Inf	0.0%
7/1	Redlands Rd (S) Right Left	U	2	N/A	I		1	43	-	452	1752	642	70.4%
7/2	Redlands Rd (S) Right	U	2	N/A	I		1	43	-	740	1912	701	105.6%
8/1+8/2	Cardiff Road (W) Ahead Right	U+O	2	N/A	J	K	1	61	-	998	1940:1935	1032	96.7%
9/1	Southbound	U	N/A	N/A	-		-	-	-	579	Inf	Inf	0.0%
10/1	Westbound	U	N/A	N/A	-		-	-	-	556	Inf	Inf	0.0%
10/2	Westbound	U	N/A	N/A	-		-	-	-	96	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	**-**	**-**	**755**	**86**	**88**	**32.3**	**53.4**	**2.1**	**87.8**	**-**	**-**	**-**	**-**
Unnamed Junction	**-**	**-**	**755**	**86**	**88**	**32.3**	**53.4**	**2.1**	**87.8**	**-**	**-**	**-**	**-**
1/1	658	658	-	-	-	1.0	0.4	-	1.4	7.6	8.0	0.4	8.5
1/2	209	205	113	0	88	0.4	8.3	1.7	10.4	179.9	2.0	8.3	10.3
2/1	597	597	511	86	0	0.0	0.4	0.0	0.4	2.4	0.0	0.4	0.4
2/2	1300	1300	-	-	-	2.2	2.1	-	4.3	12.0	18.8	2.1	20.9
3/1	196	196	-	-	-	2.8	2.2	-	5.0	91.8	6.3	2.2	8.6
3/2	230	230	-	-	-	3.2	2.4	-	5.6	87.7	7.5	2.4	9.8
4/1	1411	1411	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	447	447	-	-	-	0.0	0.2	-	0.2	1.4	0.0	0.2	0.2
5/2	435	435	-	-	-	1.5	0.3	-	1.8	15.2	6.6	0.3	6.9
5/3	95	95	-	-	-	0.0	0.0	-	0.1	2.8	0.1	0.0	0.1
6/1	798	798	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	452	452	-	-	-	4.1	1.2	-	5.2	41.8	12.8	1.2	14.0
7/2	740	701	-	-	-	9.6	26.5	-	36.0	175.2	26.0	26.5	52.4
8/1+8/2	998	998	132	0	0	7.5	9.5	0.3	17.3	62.4	31.0	9.5	40.4
9/1	579	579	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
10/1	556	556	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
10/2	96	96	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

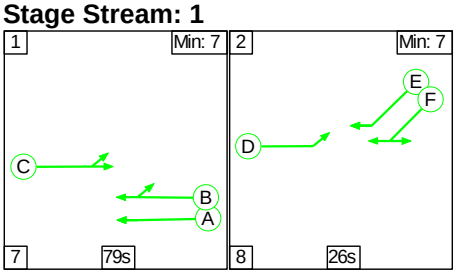
C1 Stream: 1 PRC for Signalled Lanes (%): -13.2 Total Delay for Signalled Lanes (pcuHr): 27.15
C1 Stream: 2 PRC for Signalled Lanes (%): -17.3 Total Delay for Signalled Lanes (pcuHr): 60.64
PRC Over All Lanes (%): -17.3 Total Delay Over All Lanes(pcuHr): 87.79 Cycle Time (s): 120

Full Input Data And Results

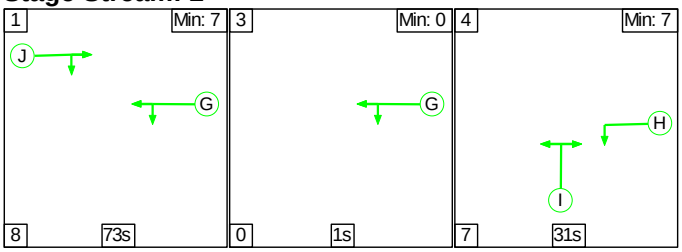
Scenario 6: 'PM 2020 with Dev' (FG6: 'PM 2020 with Dev', Plan 1: 'Staging Plan No. 1')

Stage Sequence Diagram

Stage Stream: 1



Stage Stream: 2



Stage Timings

Stage Stream: 1

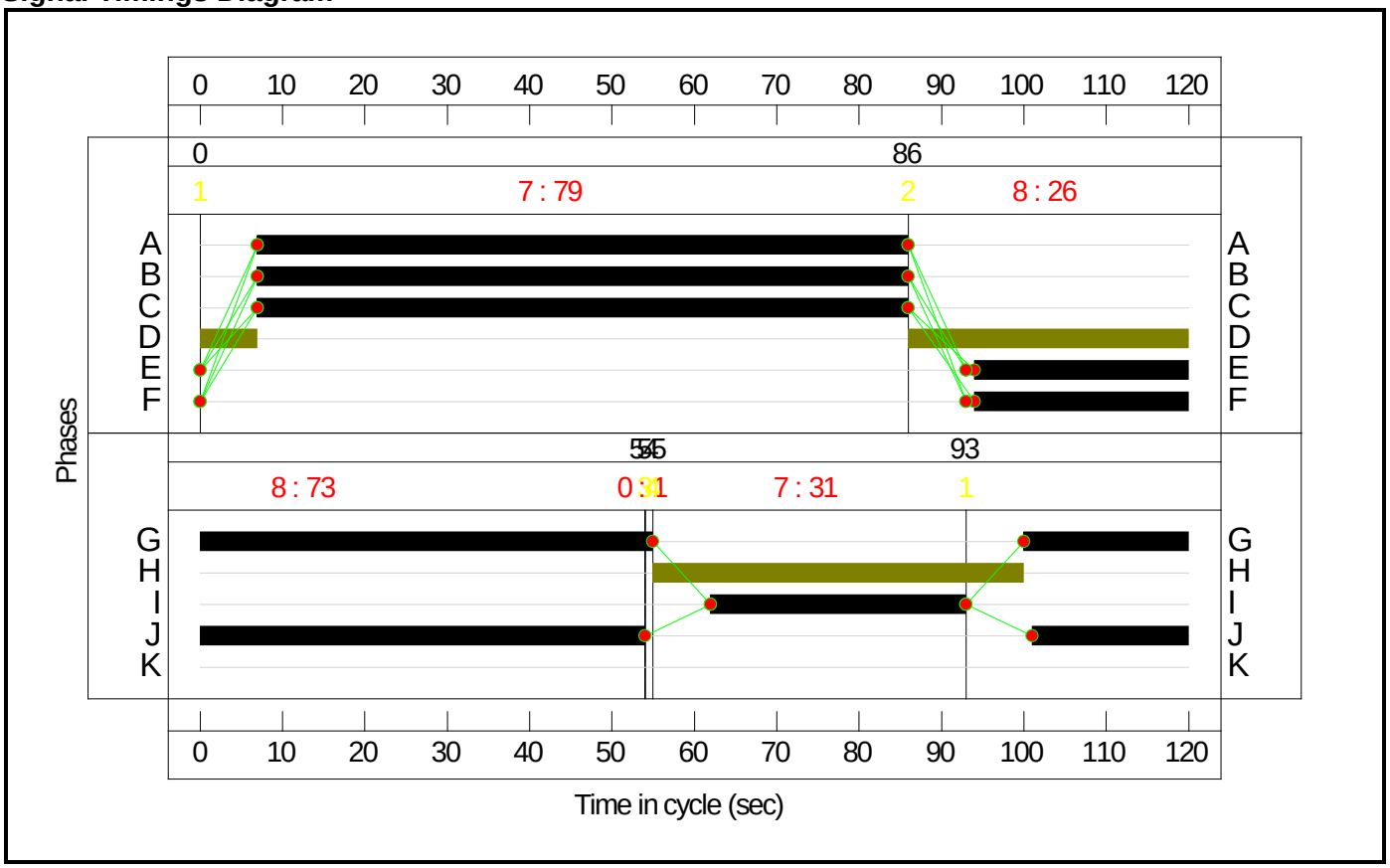
Stage	1	2
Duration	79	26
Change Point	0	86

Stage Stream: 2

Stage	1	3	4
Duration	73	1	31
Change Point	93	54	55

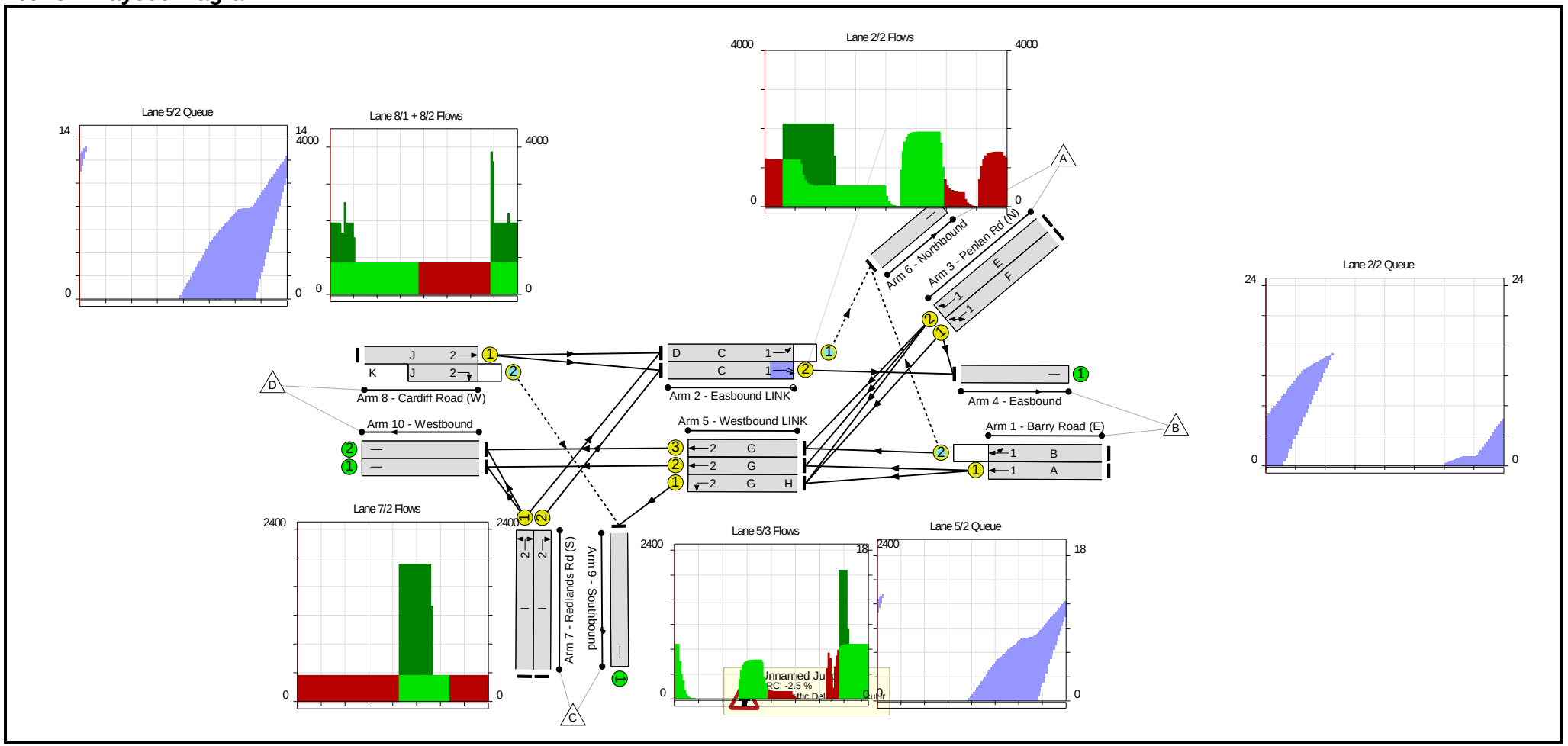
Full Input Data And Results

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**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**92.3%**
Unnamed Junction	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**92.3%**
1/1	Barry Road (E) Ahead	U	1	N/A	A		1	79	-	1178	1915	1277	92.3%
1/2	Barry Road (E) Ahead U-Turn	O	1	N/A	B		1	79	-	226	1938	442	51.1%
2/1	Easbound LINK Ahead	O	1	N/A	C	D	1	120	41	344	1980	1386	24.8%
2/2	Easbound LINK Ahead	U	1	N/A	C		1	79	-	891	2120	1413	63.0%
3/1	Penlan Rd (N) U-Turn Ahead	U	1	N/A	F		1	26	-	369	1797	404	91.3%
3/2	Penlan Rd (N) Ahead	U	1	N/A	E		1	26	-	424	2055	462	91.7%
4/1	Easbound	U	N/A	N/A	-		-	-	-	1053	Inf	Inf	0.0%
5/1	Westbound LINK Left	U	2	N/A	G	H	1	120	45	858	1739	1739	49.3%
5/2	Westbound LINK Ahead	U	2	N/A	G		1	75	-	769	2080	1317	58.4%
5/3	Westbound LINK Ahead	U	2	N/A	G		1	75	-	299	2080	1317	22.7%
6/1	Northbound	U	N/A	N/A	-		-	-	-	453	Inf	Inf	0.0%
7/1	Redlands Rd (S) Right Left	U	2	N/A	I		1	31	-	276	1745	465	59.3%
7/2	Redlands Rd (S) Right	U	2	N/A	I		1	31	-	363	1912	510	71.2%
8/1+8/2	Cardiff Road (W) Ahead Right	U+O	2	N/A	J	K	1	73	-	854	1940:1935	1182	72.3%
9/1	Southbound	U	N/A	N/A	-		-	-	-	980	Inf	Inf	0.0%
10/1	Westbound	U	N/A	N/A	-		-	-	-	899	Inf	Inf	0.0%
10/2	Westbound	U	N/A	N/A	-		-	-	-	305	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	**-**	**-**	**457**	**98**	**20**	**31.8**	**20.2**	**1.2**	**53.3**	**-**	**-**	**-**	**-**
Unnamed Junction	**-**	**-**	**457**	**98**	**20**	**31.8**	**20.2**	**1.2**	**53.3**	**-**	**-**	**-**	**-**
1/1	1178	1178	-	-	-	5.7	5.4	-	11.1	33.8	33.7	5.4	39.1
1/2	226	226	89	0	20	0.6	0.5	0.4	1.6	24.8	2.8	0.5	3.3
2/1	344	344	246	98	0	0.0	0.2	0.0	0.2	2.0	0.0	0.2	0.2
2/2	891	891	-	-	-	2.2	0.9	-	3.1	12.5	14.9	0.9	15.8
3/1	369	369	-	-	-	4.6	4.2	-	8.9	86.5	12.0	4.2	16.2
3/2	424	424	-	-	-	5.3	4.5	-	9.8	83.4	13.8	4.5	18.3
4/1	1053	1053	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	858	858	-	-	-	0.0	0.5	-	0.5	2.0	0.0	0.5	0.5
5/2	769	769	-	-	-	2.7	0.7	-	3.4	15.8	13.2	0.7	13.9
5/3	299	299	-	-	-	0.2	0.1	-	0.4	4.7	3.0	0.1	3.1
6/1	453	453	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	276	276	-	-	-	2.9	0.7	-	3.7	47.8	8.0	0.7	8.7
7/2	363	363	-	-	-	4.0	1.2	-	5.2	51.9	10.9	1.2	12.1
8/1+8/2	854	854	122	0	0	3.4	1.3	0.8	5.5	23.3	17.5	1.3	18.8
9/1	980	980	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
10/1	899	899	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
10/2	305	305	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

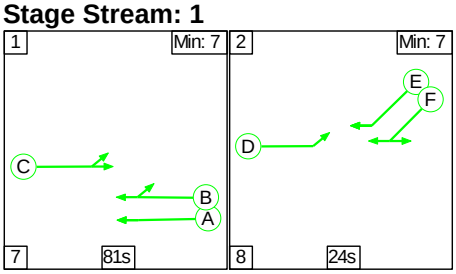
C1	Stream: 1 PRC for Signalled Lanes (%):	-2.5	Total Delay for Signalled Lanes (pcuHr):	34.59	
C1	Stream: 2 PRC for Signalled Lanes (%):	24.5	Total Delay for Signalled Lanes (pcuHr):	18.67	
	PRC Over All Lanes (%):	-2.5	Total Delay Over All Lanes(pcuHr):	53.25	Cycle Time (s): 120

Full Input Data And Results

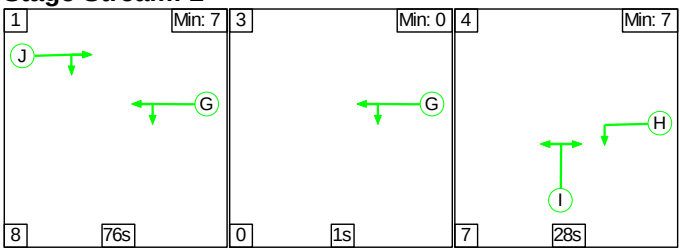
Scenario 7: 'PM 2020 with Dev + tourism' (FG7: '2020 with Dev + Tourism', Plan 1: 'Staging Plan No. 1')

Stage Sequence Diagram

Stage Stream: 1



Stage Stream: 2



Stage Timings

Stage Stream: 1

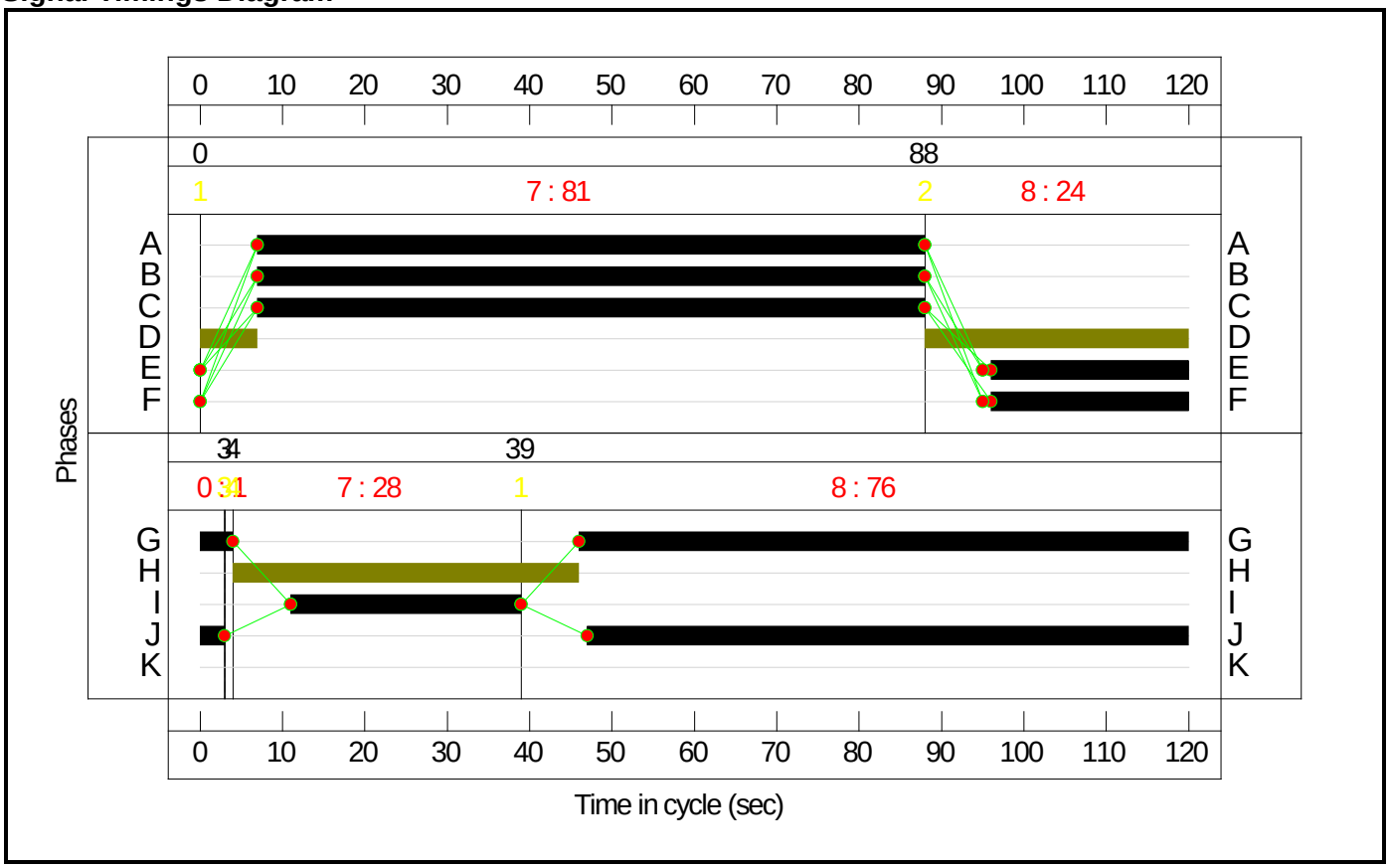
Stage	1	2
Duration	81	24
Change Point	0	88

Stage Stream: 2

Stage	1	3	4
Duration	76	1	28
Change Point	39	3	4

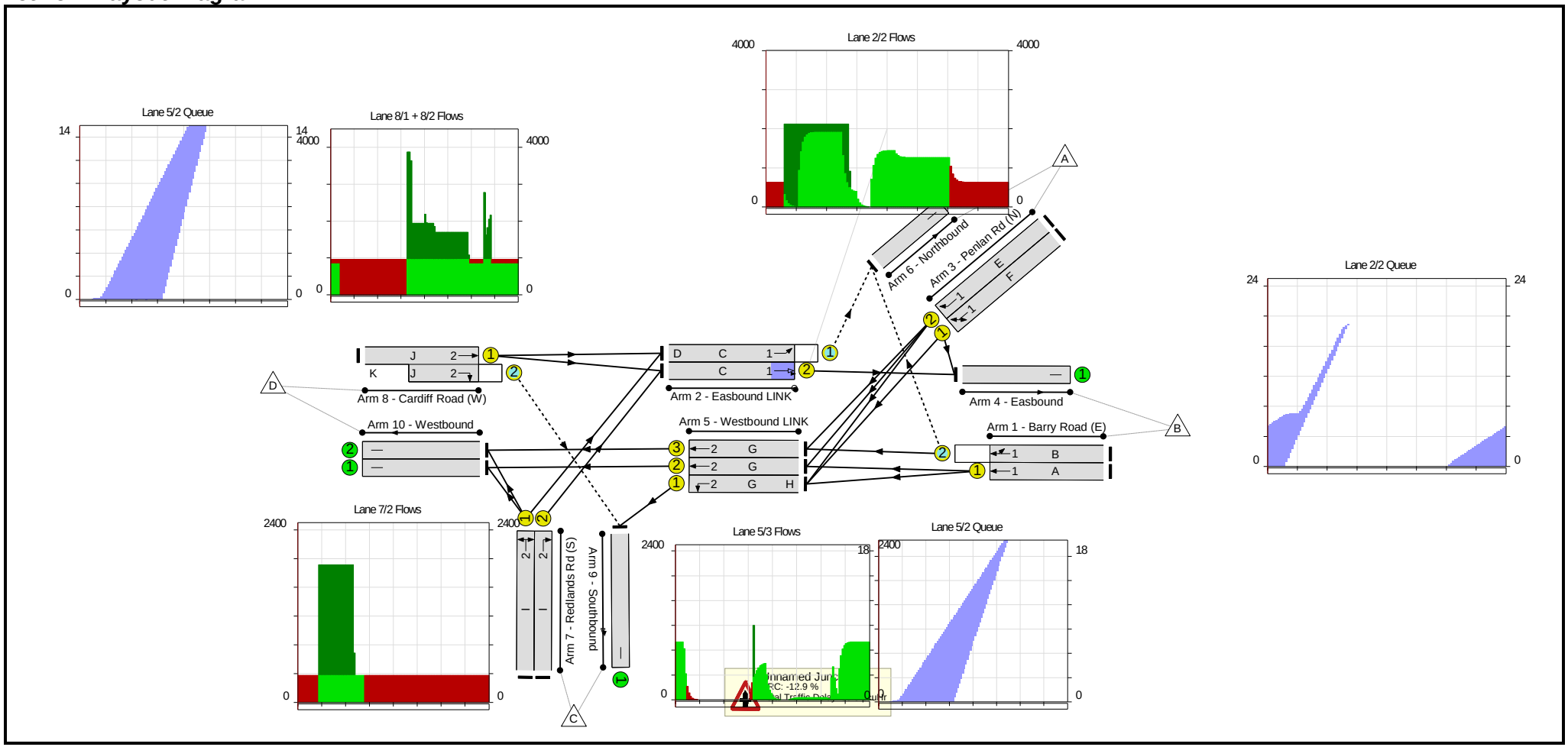
Full Input Data And Results

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**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**101.6%**
Unnamed Junction	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**101.6%**
1/1	Barry Road (E) Ahead	U	1	N/A	A		1	81	-	1330	1915	1309	101.6%
1/2	Barry Road (E) Ahead U-Turn	O	1	N/A	B		1	81	-	175	1907	246	71.2%
2/1	Easbound LINK Ahead	O	1	N/A	C	D	1	120	39	345	1980	1437	24.0%
2/2	Easbound LINK Ahead	U	1	N/A	C		1	81	-	1004	2120	1449	69.3%
3/1	Penlan Rd (N) U-Turn Ahead	U	1	N/A	F		1	24	-	369	1797	374	98.6%
3/2	Penlan Rd (N) Ahead	U	1	N/A	E		1	24	-	424	2055	428	99.0%
4/1	Easbound	U	N/A	N/A	-		-	-	-	1166	Inf	Inf	0.0%
5/1	Westbound LINK Left	U	2	N/A	G	H	1	120	42	858	1739	1739	48.8%
5/2	Westbound LINK Ahead	U	2	N/A	G		1	78	-	910	2080	1369	65.6%
5/3	Westbound LINK Ahead	U	2	N/A	G		1	78	-	259	2080	1369	18.9%
6/1	Northbound	U	N/A	N/A	-		-	-	-	454	Inf	Inf	0.0%
7/1	Redlands Rd (S) Right Left	U	2	N/A	I		1	28	-	265	1744	421	62.9%
7/2	Redlands Rd (S) Right	U	2	N/A	I		1	28	-	375	1912	462	81.2%
8/1+8/2	Cardiff Road (W) Ahead Right	U+O	2	N/A	J	K	1	76	-	967	1940:1935	1224	79.0%
9/1	Southbound	U	N/A	N/A	-		-	-	-	980	Inf	Inf	0.0%
10/1	Westbound	U	N/A	N/A	-		-	-	-	1040	Inf	Inf	0.0%
10/2	Westbound	U	N/A	N/A	-		-	-	-	265	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	**-**	**-**	**477**	**67**	**22**	**35.8**	**50.8**	**1.8**	**88.5**	**-**	**-**	**-**	**-**
Unnamed Junction	**-**	**-**	**477**	**67**	**22**	**35.8**	**50.8**	**1.8**	**88.5**	**-**	**-**	**-**	**-**
1/1	1330	1309	-	-	-	8.2	24.4	-	32.5	88.0	45.0	24.4	69.4
1/2	175	175	87	0	22	0.4	1.2	0.6	2.2	44.5	2.0	1.2	3.2
2/1	345	345	278	67	0	0.0	0.2	0.0	0.2	1.7	0.0	0.2	0.2
2/2	1004	1004	-	-	-	1.8	1.1	-	2.9	10.3	19.0	1.1	20.1
3/1	369	369	-	-	-	4.9	8.4	-	13.2	128.8	12.2	8.4	20.6
3/2	424	424	-	-	-	5.6	9.3	-	14.9	126.5	14.0	9.3	23.3
4/1	1166	1166	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	848	848	-	-	-	0.0	0.5	-	0.5	2.0	0.0	0.5	0.5
5/2	898	898	-	-	-	3.2	0.9	-	4.1	16.4	21.1	0.9	22.0
5/3	259	259	-	-	-	0.0	0.1	-	0.2	2.2	0.2	0.1	0.3
6/1	454	454	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	265	265	-	-	-	3.0	0.8	-	3.8	52.1	7.9	0.8	8.7
7/2	375	375	-	-	-	4.5	2.1	-	6.5	62.7	11.8	2.1	13.8
8/1+8/2	967	957	112	0	0	4.5	1.9	1.2	7.6	28.2	21.2	1.9	23.0
9/1	960	960	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
10/1	1028	1028	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
10/2	265	265	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1 Stream: 1 PRC for Signalled Lanes (%): -12.9
C1 Stream: 2 PRC for Signalled Lanes (%): 10.9
PRC Over All Lanes (%): -12.9

Total Delay for Signalled Lanes (pcuHr): 65.81
Total Delay for Signalled Lanes (pcuHr): 22.68
Total Delay Over All Lanes(pcuHr): 88.49

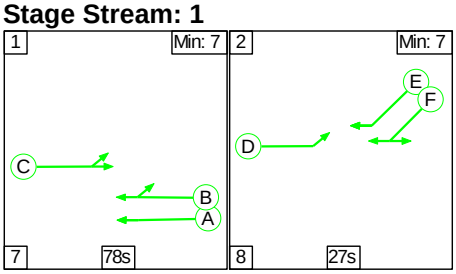
Cycle Time (s): 120

Full Input Data And Results

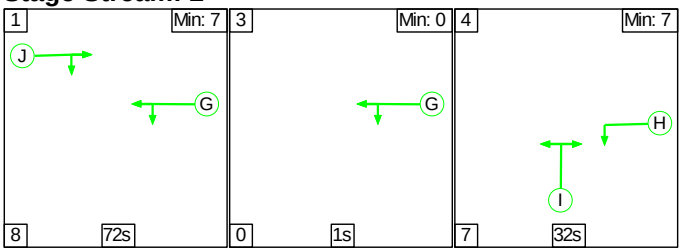
Scenario 8: 'PM 2020 Base + tourism' (FG10: 'PM 2020 Base + Tourism', Plan 1: 'Staging Plan No. 1')

Stage Sequence Diagram

Stage Stream: 1



Stage Stream: 2



Stage Timings

Stage Stream: 1

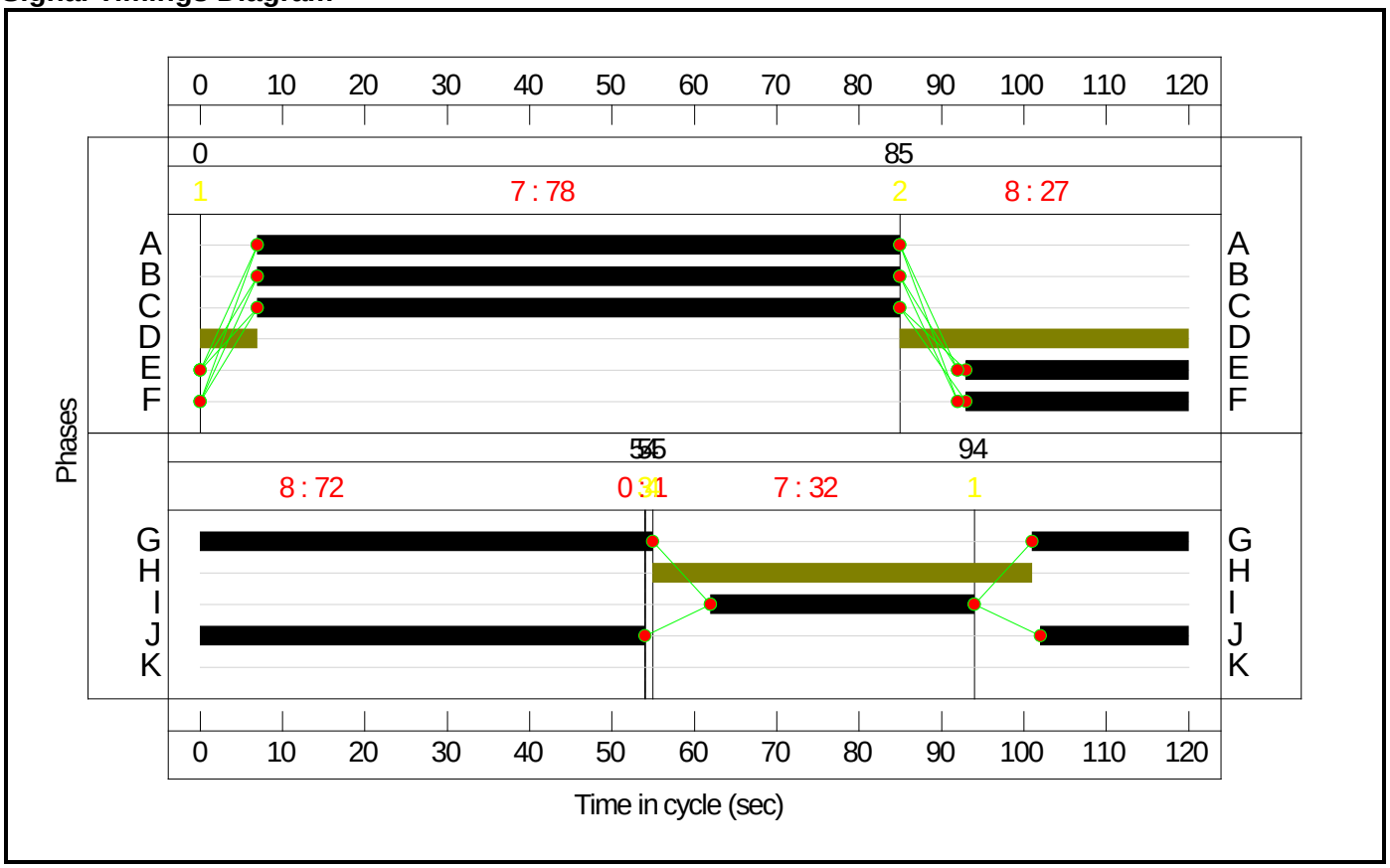
Stage	1	2
Duration	78	27
Change Point	0	85

Stage Stream: 2

Stage	1	3	4
Duration	72	1	32
Change Point	94	54	55

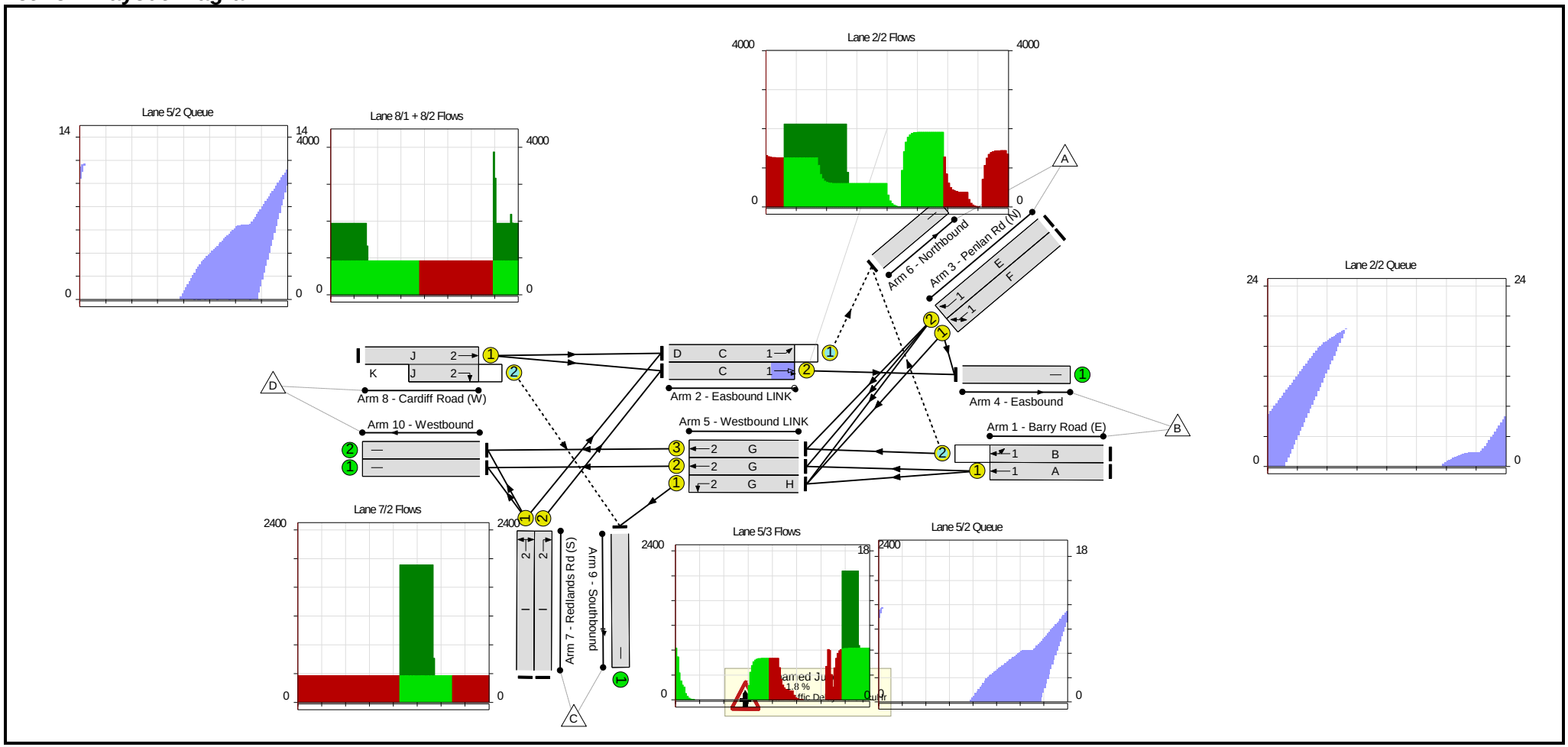
Full Input Data And Results

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**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**88.4%**
Unnamed Junction	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**88.4%**
1/1	Barry Road (E) Ahead	U	1	N/A	A		1	78	-	1115	1915	1261	88.4%
1/2	Barry Road (E) Ahead U-Turn	O	1	N/A	B		1	78	-	251	1949	386	65.0%
2/1	Easbound LINK Ahead	O	1	N/A	C	D	1	120	42	336	1980	1366	24.6%
2/2	Easbound LINK Ahead	U	1	N/A	C		1	78	-	973	2120	1396	69.7%
3/1	Penlan Rd (N) U-Turn Ahead	U	1	N/A	F		1	27	-	364	1795	419	86.9%
3/2	Penlan Rd (N) Ahead	U	1	N/A	E		1	27	-	419	2055	479	87.4%
4/1	Easbound	U	N/A	N/A	-		-	-	-	1135	Inf	Inf	0.0%
5/1	Westbound LINK Left	U	2	N/A	G	H	1	120	46	859	1739	1739	49.4%
5/2	Westbound LINK Ahead	U	2	N/A	G		1	74	-	707	2080	1300	54.4%
5/3	Westbound LINK Ahead	U	2	N/A	G		1	74	-	312	2080	1300	24.0%
6/1	Northbound	U	N/A	N/A	-		-	-	-	445	Inf	Inf	0.0%
7/1	Redlands Rd (S) Right Left	U	2	N/A	I		1	32	-	261	1744	480	54.4%
7/2	Redlands Rd (S) Right	U	2	N/A	I		1	32	-	374	1912	526	71.1%
8/1+8/2	Cardiff Road (W) Ahead Right	U+O	2	N/A	J	K	1	72	-	924	1940:1935	1192	77.5%
9/1	Southbound	U	N/A	N/A	-		-	-	-	977	Inf	Inf	0.0%
10/1	Westbound	U	N/A	N/A	-		-	-	-	824	Inf	Inf	0.0%
10/2	Westbound	U	N/A	N/A	-		-	-	-	327	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	**-**	**-**	**455**	**89**	**19**	**32.5**	**16.7**	**1.2**	**50.5**	**-**	**-**	**-**	**-**
Unnamed Junction	**-**	**-**	**455**	**89**	**19**	**32.5**	**16.7**	**1.2**	**50.5**	**-**	**-**	**-**	**-**
1/1	1115	1115	-	-	-	5.2	3.6	-	8.8	28.5	30.4	3.6	34.0
1/2	251	251	90	0	19	0.9	0.9	0.5	2.3	33.3	5.7	0.9	6.6
2/1	336	336	247	89	0	0.0	0.2	0.0	0.2	2.0	0.0	0.2	0.2
2/2	973	973	-	-	-	2.7	1.1	-	3.9	14.3	18.3	1.1	19.5
3/1	364	364	-	-	-	4.5	3.0	-	7.5	73.8	11.6	3.0	14.6
3/2	419	419	-	-	-	5.2	3.1	-	8.3	71.3	13.4	3.1	16.5
4/1	1135	1135	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	859	859	-	-	-	0.0	0.5	-	0.5	2.0	0.0	0.5	0.5
5/2	707	707	-	-	-	2.3	0.6	-	2.9	14.6	11.7	0.6	12.3
5/3	312	312	-	-	-	0.8	0.2	-	0.9	10.9	5.8	0.2	5.9
6/1	445	445	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	261	261	-	-	-	2.7	0.6	-	3.3	45.3	7.4	0.6	8.0
7/2	374	374	-	-	-	4.1	1.2	-	5.3	50.9	11.2	1.2	12.4
8/1+8/2	924	924	118	0	0	4.2	1.7	0.7	6.6	25.9	21.2	1.7	22.9
9/1	977	977	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
10/1	824	824	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
10/2	327	327	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1 Stream: 1 PRC for Signalled Lanes (%): 1.8 Total Delay for Signalled Lanes (pcuHr): 30.98
C1 Stream: 2 PRC for Signalled Lanes (%): 16.1 Total Delay for Signalled Lanes (pcuHr): 19.51
PRC Over All Lanes (%): 1.8 Total Delay Over All Lanes(pcuHr): 50.49 Cycle Time (s): 120

Appendix D

Revised Modelling output for Murch Crossroads Junction

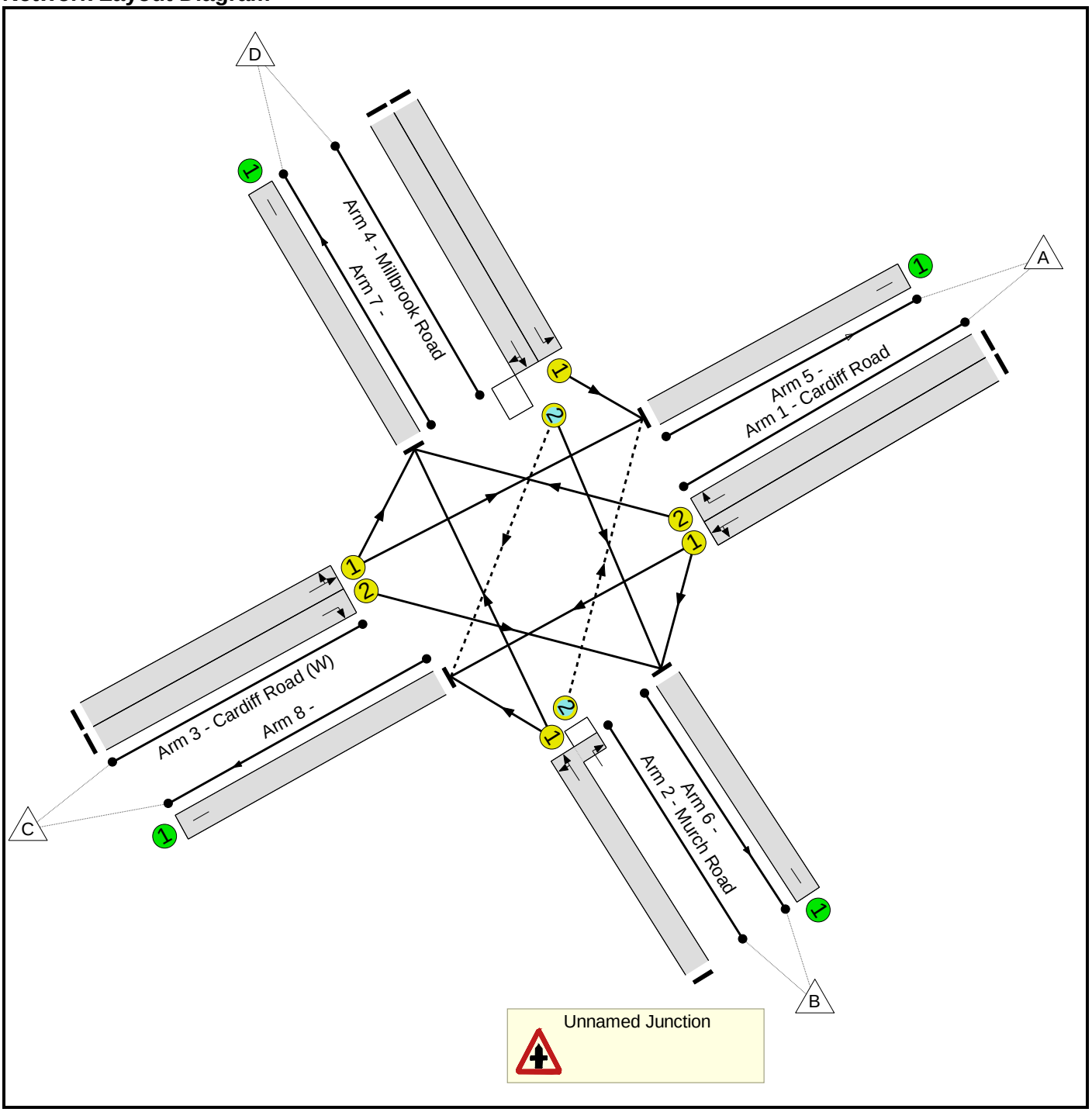
Full Input Data And Results

User and Project Details

Project:	**Waterfront Barry**
Title:	**Exisiting Situation**
Location:	Murch Crossroads, Dinas Powys
File name:	Base Murch Crossroads.lsg3x
Author:	Roddy Beynon
Company:	
Address:	
Notes:	

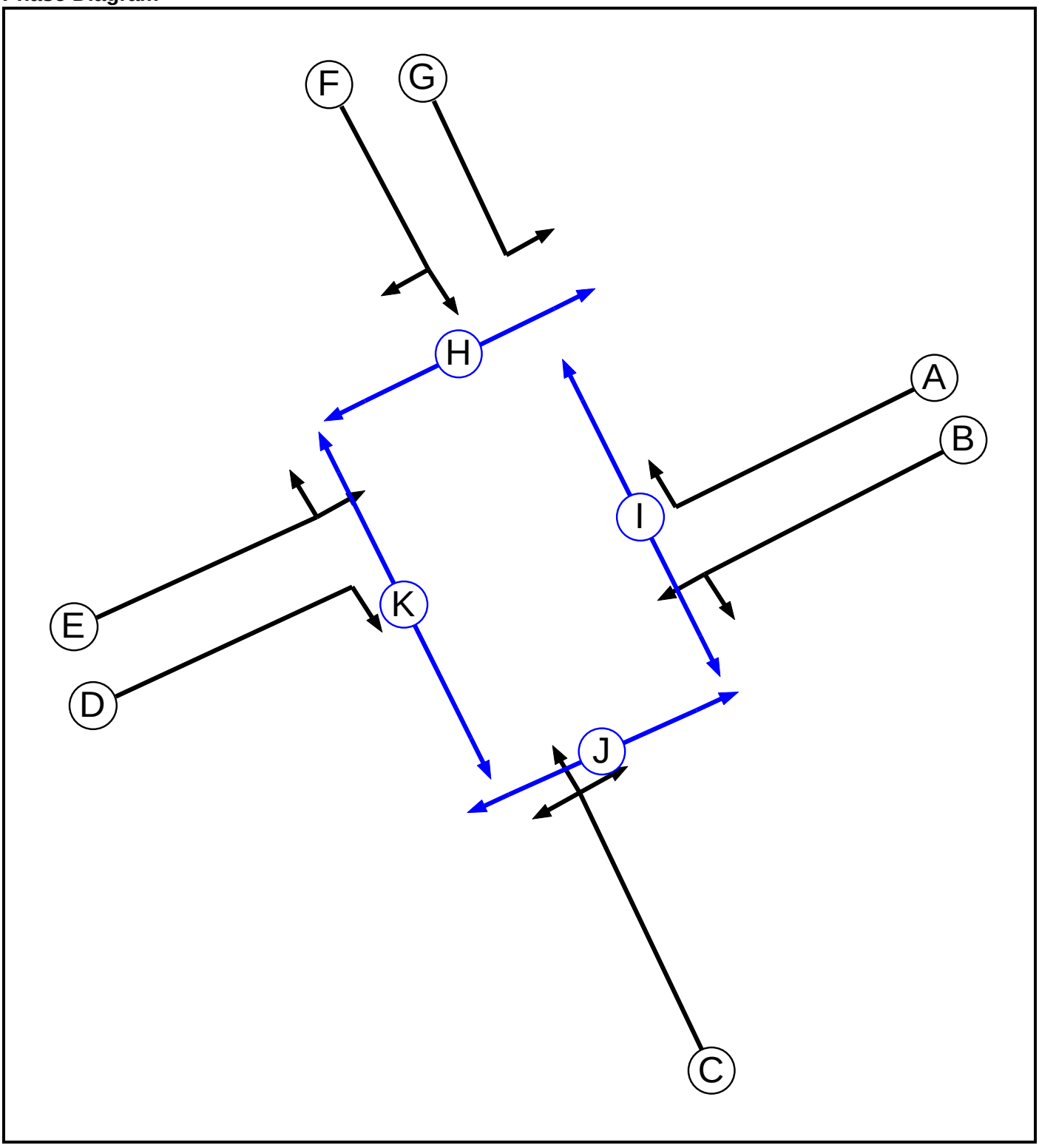
Full Input Data And Results

Network Layout Diagram



Full Input Data And Results

Phase Diagram



Full Input Data And Results

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	Traffic		7	7
G	Traffic		7	7
H	Pedestrian		10	10
I	Pedestrian		11	11
J	Pedestrian		8	8
K	Pedestrian		11	11

Phase Intergreens Matrix

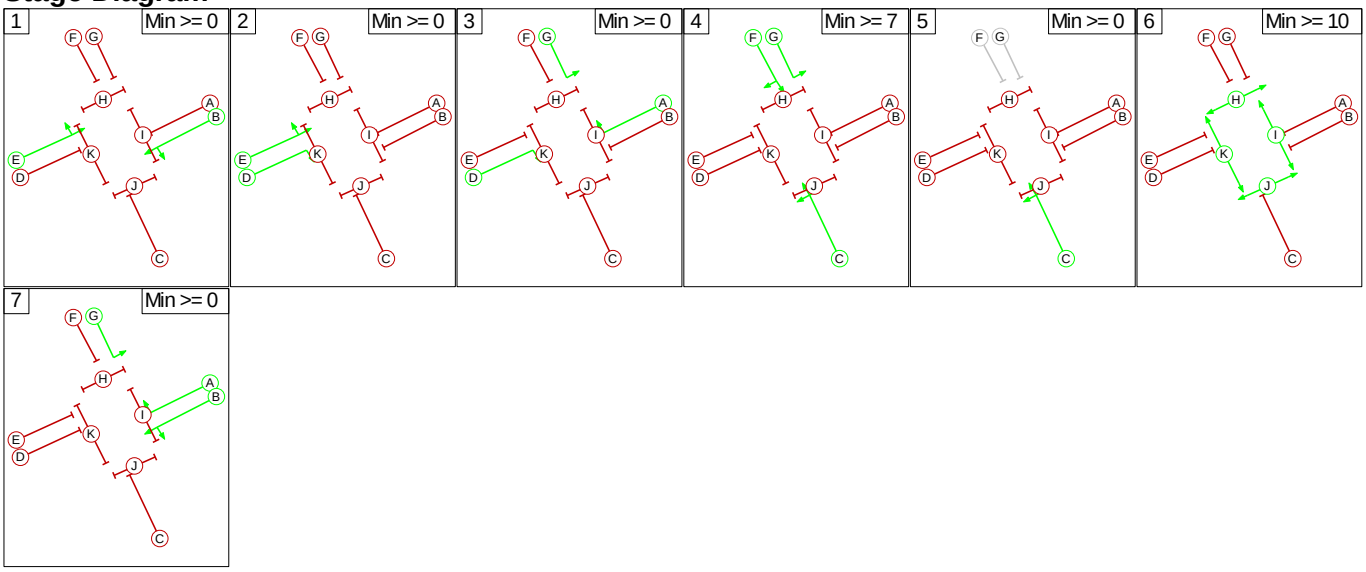
		Starting Phase										
		A	B	C	D	E	F	G	H	I	J	K
Terminating Phase	A		-	5	-	5	5	-	8	5	-	-
	B	-		5	5	-	5	-	-	5	7	8
	C	6	5		5	5	-	-	9	8	5	7
	D	-	5	5		-	5	-	-	-	7	5
	E	6	-	5	-		5	5	8	8	-	5
	F	5	6	-	7	5		-	5	-	8	9
	G	-	-	-	-	9	-		5	7	-	-
	H	10	-	10	-	10	10	10		-	-	-
	I	12	12	12	-	12	-	12	-		-	-
	J	-	7	7	7	-	7	-	-	-		-
	K	-	9	9	9	9	9	-	-	-	-	

Phases in Stage

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

Full Input Data And Results

Stage Diagram



Phase Delays

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

Prohibited Stage Changes

		To Stage						
		1	2	3	4	5	6	7
From Stage	1		5	6	X	X	X	6
	2	X		6	X	X	X	6
	3	X	X		5	X	X	5
	4	X	X	X		0	X	6
	5	5	X	X	X		9	6
	6	12	X	X	X	X		12
	7	9	9	5	5	5	8	

Full Input Data And Results

Give-Way Lane Input Data

Junction: Unnamed Junction

Lane	Movement	Max Flow when Giving Way (PCU/Hr)	Opposing Lane	Opp. Lane Coeff.	Opp. Mvmnts.	Right Turn Storage (PCU)	Non-Blocking Storage (PCU)	RTF	Right Turn Move up (s)	Max Turns in Intergreen (PCU)
2/2 (Murch Road)	5/1 (Right)	1400	4/2	1.10	4/2	1.00	-	0.50	1	2.00
			4/1	1.10	4/1					
4/2 (Millbrook Road)	8/1 (Right)	1440	2/1	1.09	2/1	2.00	2.00	0.50	2	2.00

Full Input Data And Results

Lane Input Data

Junction: Unnamed 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)
1/1 (Cardiff Road)	U	B	2	3	60.0	Geom	-	3.70	0.00	Y	Arm 6 Left	8.50
											Arm 8 Ahead	Inf
1/2 (Cardiff Road)	U	A	2	3	60.0	Geom	-	3.25	0.00	N	Arm 7 Right	20.00
2/1 (Murch Road)	U	C	2	3	60.0	Geom	-	3.70	0.00	Y	Arm 7 Ahead	Inf
											Arm 8 Left	13.50
2/2 (Murch Road)	O	C	2	3	1.0	Geom	-	3.70	0.00	Y	Arm 5 Right	19.00
3/1 (Cardiff Road (W))	U	E	2	3	60.0	Geom	-	3.30	0.00	Y	Arm 5 Ahead	Inf
											Arm 7 Left	6.20
3/2 (Cardiff Road (W))	U	D	2	3	60.0	Geom	-	3.00	0.00	N	Arm 6 Right	14.75
4/1 (Millbrook Road)	U	G	2	3	60.0	Geom	-	3.20	0.00	Y	Arm 5 Left	15.00
4/2 (Millbrook Road)	O	F	2	3	60.0	Geom	-	3.10	0.00	N	Arm 6 Ahead	Inf
											Arm 8 Right	16.00
5/1	U		2	3	60.0	Inf	-	-	-	-	-	-
6/1	U		2	3	60.0	Inf	-	-	-	-	-	-
7/1	U		2	3	60.0	Inf	-	-	-	-	-	-
8/1	U		2	3	60.0	Inf	-	-	-	-	-	-

Traffic Flow Groups

Flow Group	Start Time	End Time	Duration	Formula
1: '2008 AM Base'	08:30	09:30	01:00	
2: '2008 PM Base'	17:30	18:30	01:00	
3: '2020 AM Base'	08:30	09:30	01:00	
4: '2020 PM Base'	17:30	18:30	01:00	
5: '2020 AM Dev + BI'	08:30	09:30	01:00	
6: '2020 PM Dev + BI'	17:30	18:30	01:00	
7: '2020 PM Dev + BI + Tourism'	17:30	18:30	01:00	
8: '2020 PM Base + Tourism'	17:30	18:30	01:00	

Traffic Lane Flows

Lane	Scenario 1: 2008 AM Base
Junction: Unnamed Junction	
1/1	584
1/2	31
2/1 (with short)	288(In) 153(Out)
2/2 (short)	135
3/1	629
3/2	39
4/1	101
4/2	61
5/1	855
6/1	152
7/1	114
8/1	612

Full Input Data And Results

Scenario 1: '2008 AM Base' (FG1: '2008 AM Base', Plan 1: 'AM Staging')

Traffic Lane Flows

Junction: Unnamed Junction							
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat flow (PCU/Hr)**
1/1 (Cardiff Road)	3.70	0.00	Y	Arm 6 Left	8.50	12.3 %	1943
				Arm 8 Ahead	Inf	87.7 %	
1/2 (Cardiff Road)	3.25	0.00	N	Arm 7 Right	20.00	100.0 %	1935
2/1 (Murch Road)	3.70	0.00	Y	Arm 7 Ahead	Inf	47.7 %	1876
				Arm 8 Left	13.50	52.3 %	
2/2 (Murch Road)	3.70	0.00	Y	Arm 5 Right	19.00	100.0 %	1840
3/1 (Cardiff Road (W))	3.30	0.00	Y	Arm 5 Ahead	Inf	98.4 %	1938
				Arm 7 Left	6.20	1.6 %	
3/2 (Cardiff Road (W))	3.00	0.00	N	Arm 6 Right	14.75	100.0 %	1865
4/1 (Millbrook Road)	3.20	0.00	Y	Arm 5 Left	15.00	100.0 %	1759
4/2 (Millbrook Road)	3.10	0.00	N	Arm 6 Ahead	Inf	67.2 %	2003
				Arm 8 Right	16.00	32.8 %	
5/1	Infinite Saturation Flow						Inf
6/1	Infinite Saturation Flow						Inf
7/1	Infinite Saturation Flow						Inf
8/1	Infinite Saturation Flow						Inf

Traffic Lane Flows

Lane	Scenario 2: 2008 PM Base
Junction: Unnamed Junction	
1/1	866
1/2	27
2/1 (with short)	165(In) 68(Out)
2/2 (short)	97
3/1	602
3/2	34
4/1	64
4/2	167
5/1	757
6/1	295
7/1	58
8/1	815

Full Input Data And Results

Scenario 2: '2008 PM Base' (FG2: '2008 PM Base', Plan 2: 'PM Staging')

Traffic Lane Flows

Junction: Unnamed Junction							
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat flow (PCU/Hr)**
1/1 (Cardiff Road)	3.70	0.00	Y	Arm 6 Left	8.50	16.4 %	1929
				Arm 8 Ahead	Inf	83.6 %	
1/2 (Cardiff Road)	3.25	0.00	N	Arm 7 Right	20.00	100.0 %	1935
2/1 (Murch Road)	3.70	0.00	Y	Arm 7 Ahead	Inf	36.8 %	1855
				Arm 8 Left	13.50	63.2 %	
2/2 (Murch Road)	3.70	0.00	Y	Arm 5 Right	19.00	100.0 %	1840
3/1 (Cardiff Road (W))	3.30	0.00	Y	Arm 5 Ahead	Inf	99.0 %	1940
				Arm 7 Left	6.20	1.0 %	
3/2 (Cardiff Road (W))	3.00	0.00	N	Arm 6 Right	14.75	100.0 %	1865
4/1 (Millbrook Road)	3.20	0.00	Y	Arm 5 Left	15.00	100.0 %	1759
4/2 (Millbrook Road)	3.10	0.00	N	Arm 6 Ahead	Inf	71.3 %	2011
				Arm 8 Right	16.00	28.7 %	
5/1	Infinite Saturation Flow						Inf
6/1	Infinite Saturation Flow						Inf
7/1	Infinite Saturation Flow						Inf
8/1	Infinite Saturation Flow						Inf

Traffic Lane Flows

Lane	Scenario 3: 2020 AM Base
Junction: Unnamed Junction	
1/1	681
1/2	36
2/1 (with short)	335(In) 178(Out)
2/2 (short)	157
3/1	733
3/2	46
4/1	117
4/2	71
5/1	995
6/1	178
7/1	133
8/1	713

Full Input Data And Results

Scenario 3: '2020 AM Base' (FG3: '2020 AM Base', Plan 1: 'AM Staging')

Traffic Lane Flows

Junction: Unnamed Junction							
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat flow (PCU/Hr)**
1/1 (Cardiff Road)	3.70	0.00	Y	Arm 6 Left	8.50	12.3 %	1943
				Arm 8 Ahead	Inf	87.7 %	
1/2 (Cardiff Road)	3.25	0.00	N	Arm 7 Right	20.00	100.0 %	1935
2/1 (Murch Road)	3.70	0.00	Y	Arm 7 Ahead	Inf	47.8 %	1876
				Arm 8 Left	13.50	52.2 %	
2/2 (Murch Road)	3.70	0.00	Y	Arm 5 Right	19.00	100.0 %	1840
3/1 (Cardiff Road (W))	3.30	0.00	Y	Arm 5 Ahead	Inf	98.4 %	1937
				Arm 7 Left	6.20	1.6 %	
3/2 (Cardiff Road (W))	3.00	0.00	N	Arm 6 Right	14.75	100.0 %	1865
4/1 (Millbrook Road)	3.20	0.00	Y	Arm 5 Left	15.00	100.0 %	1759
4/2 (Millbrook Road)	3.10	0.00	N	Arm 6 Ahead	Inf	67.6 %	2004
				Arm 8 Right	16.00	32.4 %	
5/1	Infinite Saturation Flow						Inf
6/1	Infinite Saturation Flow						Inf
7/1	Infinite Saturation Flow						Inf
8/1	Infinite Saturation Flow						Inf

Traffic Lane Flows

Lane	Scenario 4: 2020 PM Base
Junction: Unnamed Junction	
1/1	1007
1/2	31
2/1 (with short)	191(In) 79(Out)
2/2 (short)	112
3/1	700
3/2	39
4/1	74
4/2	195
5/1	879
6/1	343
7/1	67
8/1	948

Full Input Data And Results

Scenario 4: '2020 PM Base' (FG4: '2020 PM Base', Plan 2: 'PM Staging')

Traffic Lane Flows

Junction: Unnamed Junction							
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat flow (PCU/Hr)**
1/1 (Cardiff Road)	3.70	0.00	Y	Arm 6 Left	8.50	16.4 %	1929
				Arm 8 Ahead	Inf	83.6 %	
1/2 (Cardiff Road)	3.25	0.00	N	Arm 7 Right	20.00	100.0 %	1935
2/1 (Murch Road)	3.70	0.00	Y	Arm 7 Ahead	Inf	36.7 %	1855
				Arm 8 Left	13.50	63.3 %	
2/2 (Murch Road)	3.70	0.00	Y	Arm 5 Right	19.00	100.0 %	1840
3/1 (Cardiff Road (W))	3.30	0.00	Y	Arm 5 Ahead	Inf	99.0 %	1940
				Arm 7 Left	6.20	1.0 %	
3/2 (Cardiff Road (W))	3.00	0.00	N	Arm 6 Right	14.75	100.0 %	1865
4/1 (Millbrook Road)	3.20	0.00	Y	Arm 5 Left	15.00	100.0 %	1759
4/2 (Millbrook Road)	3.10	0.00	N	Arm 6 Ahead	Inf	71.3 %	2011
				Arm 8 Right	16.00	28.7 %	
5/1	Infinite Saturation Flow						Inf
6/1	Infinite Saturation Flow						Inf
7/1	Infinite Saturation Flow						Inf
8/1	Infinite Saturation Flow						Inf

Traffic Lane Flows

Lane	Scenario 5: 2020 AM Dev + BI
Junction: Unnamed Junction	
1/1	713
1/2	36
2/1 (with short)	338(In) 181(Out)
2/2 (short)	157
3/1	887
3/2	48
4/1	117
4/2	73
5/1	1147
6/1	180
7/1	135
8/1	750

Full Input Data And Results

Scenario 5: '2020 AM Dev + BI' (FG5: '2020 AM Dev + BI', Plan 1: 'AM Staging')

Traffic Lane Flows

Junction: Unnamed Junction							
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat flow (PCU/Hr)**
1/1 (Cardiff Road)	3.70	0.00	Y	Arm 6 Left	8.50	11.8 %	1945
				Arm 8 Ahead	Inf	88.2 %	
1/2 (Cardiff Road)	3.25	0.00	N	Arm 7 Right	20.00	100.0 %	1935
2/1 (Murch Road)	3.70	0.00	Y	Arm 7 Ahead	Inf	47.0 %	1875
				Arm 8 Left	13.50	53.0 %	
2/2 (Murch Road)	3.70	0.00	Y	Arm 5 Right	19.00	100.0 %	1840
3/1 (Cardiff Road (W))	3.30	0.00	Y	Arm 5 Ahead	Inf	98.4 %	1938
				Arm 7 Left	6.20	1.6 %	
3/2 (Cardiff Road (W))	3.00	0.00	N	Arm 6 Right	14.75	100.0 %	1865
4/1 (Millbrook Road)	3.20	0.00	Y	Arm 5 Left	15.00	100.0 %	1759
4/2 (Millbrook Road)	3.10	0.00	N	Arm 6 Ahead	Inf	65.8 %	2001
				Arm 8 Right	16.00	34.2 %	
5/1	Infinite Saturation Flow						Inf
6/1	Infinite Saturation Flow						Inf
7/1	Infinite Saturation Flow						Inf
8/1	Infinite Saturation Flow						Inf

Traffic Lane Flows

Lane	Scenario 6: 2020 PM Dev + BI
Junction: Unnamed Junction	
1/1	1162
1/2	31
2/1 (with short)	194(In) 82(Out)
2/2 (short)	112
3/1	746
3/2	43
4/1	74
4/2	198
5/1	922
6/1	347
7/1	70
8/1	1109

Full Input Data And Results

Scenario 6: '2020 PM Dev + BI' (FG6: '2020 PM Dev + BI', Plan 2: 'PM Staging')

Traffic Lane Flows

Junction: Unnamed Junction							
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat flow (PCU/Hr)**
1/1 (Cardiff Road)	3.70	0.00	Y	Arm 6 Left	8.50	14.2 %	1936
				Arm 8 Ahead	Inf	85.8 %	
1/2 (Cardiff Road)	3.25	0.00	N	Arm 7 Right	20.00	100.0 %	1935
2/1 (Murch Road)	3.70	0.00	Y	Arm 7 Ahead	Inf	35.4 %	1852
				Arm 8 Left	13.50	64.6 %	
2/2 (Murch Road)	3.70	0.00	Y	Arm 5 Right	19.00	100.0 %	1840
3/1 (Cardiff Road (W))	3.30	0.00	Y	Arm 5 Ahead	Inf	98.7 %	1939
				Arm 7 Left	6.20	1.3 %	
3/2 (Cardiff Road (W))	3.00	0.00	N	Arm 6 Right	14.75	100.0 %	1865
4/1 (Millbrook Road)	3.20	0.00	Y	Arm 5 Left	15.00	100.0 %	1759
4/2 (Millbrook Road)	3.10	0.00	N	Arm 6 Ahead	Inf	70.2 %	2009
				Arm 8 Right	16.00	29.8 %	
5/1	Infinite Saturation Flow						Inf
6/1	Infinite Saturation Flow						Inf
7/1	Infinite Saturation Flow						Inf
8/1	Infinite Saturation Flow						Inf

Traffic Lane Flows

Lane	Scenario 7: 2020 PM Dev + BI + Tourism
Junction: Unnamed Junction	
1/1	1264
1/2	31
2/1 (with short)	194(In) 82(Out)
2/2 (short)	112
3/1	860
3/2	43
4/1	74
4/2	198
5/1	1036
6/1	347
7/1	70
8/1	1211

Full Input Data And Results

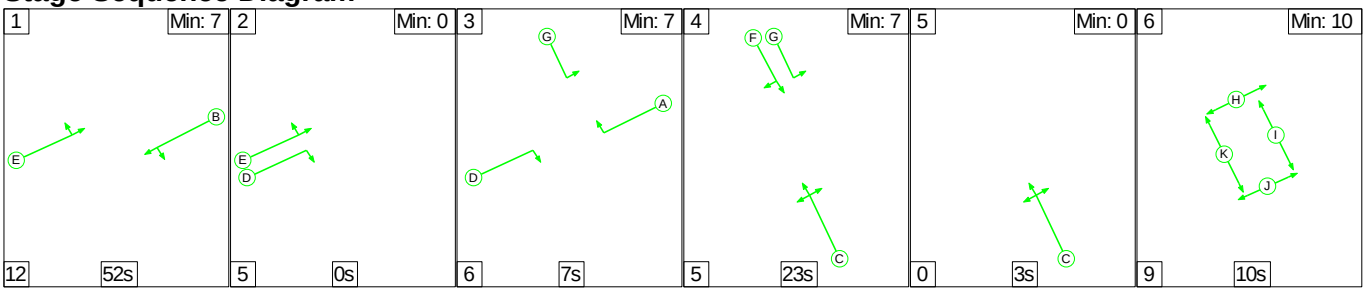
Scenario 7: '2020 PM Dev + BI + Tourism' (FG7: '2020 PM Dev + BI + Tourism', Plan 2: 'PM Staging')

Traffic Lane Flows

Junction: Unnamed Junction							
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat flow (PCU/Hr)**
1/1 (Cardiff Road)	3.70	0.00	Y	Arm 6 Left	8.50	13.1 %	1940
				Arm 8 Ahead	Inf	86.9 %	
1/2 (Cardiff Road)	3.25	0.00	N	Arm 7 Right	20.00	100.0 %	1935
2/1 (Murch Road)	3.70	0.00	Y	Arm 7 Ahead	Inf	35.4 %	1852
				Arm 8 Left	13.50	64.6 %	
2/2 (Murch Road)	3.70	0.00	Y	Arm 5 Right	19.00	100.0 %	1840
3/1 (Cardiff Road (W))	3.30	0.00	Y	Arm 5 Ahead	Inf	98.8 %	1940
				Arm 7 Left	6.20	1.2 %	
3/2 (Cardiff Road (W))	3.00	0.00	N	Arm 6 Right	14.75	100.0 %	1865
4/1 (Millbrook Road)	3.20	0.00	Y	Arm 5 Left	15.00	100.0 %	1759
4/2 (Millbrook Road)	3.10	0.00	N	Arm 6 Ahead	Inf	70.2 %	2009
				Arm 8 Right	16.00	29.8 %	
5/1	Infinite Saturation Flow						Inf
6/1	Infinite Saturation Flow						Inf
7/1	Infinite Saturation Flow						Inf
8/1	Infinite Saturation Flow						Inf

Scenario 1: '2008 AM Base' (FG1: '2008 AM Base', Plan 1: 'AM Staging')

Stage Sequence Diagram

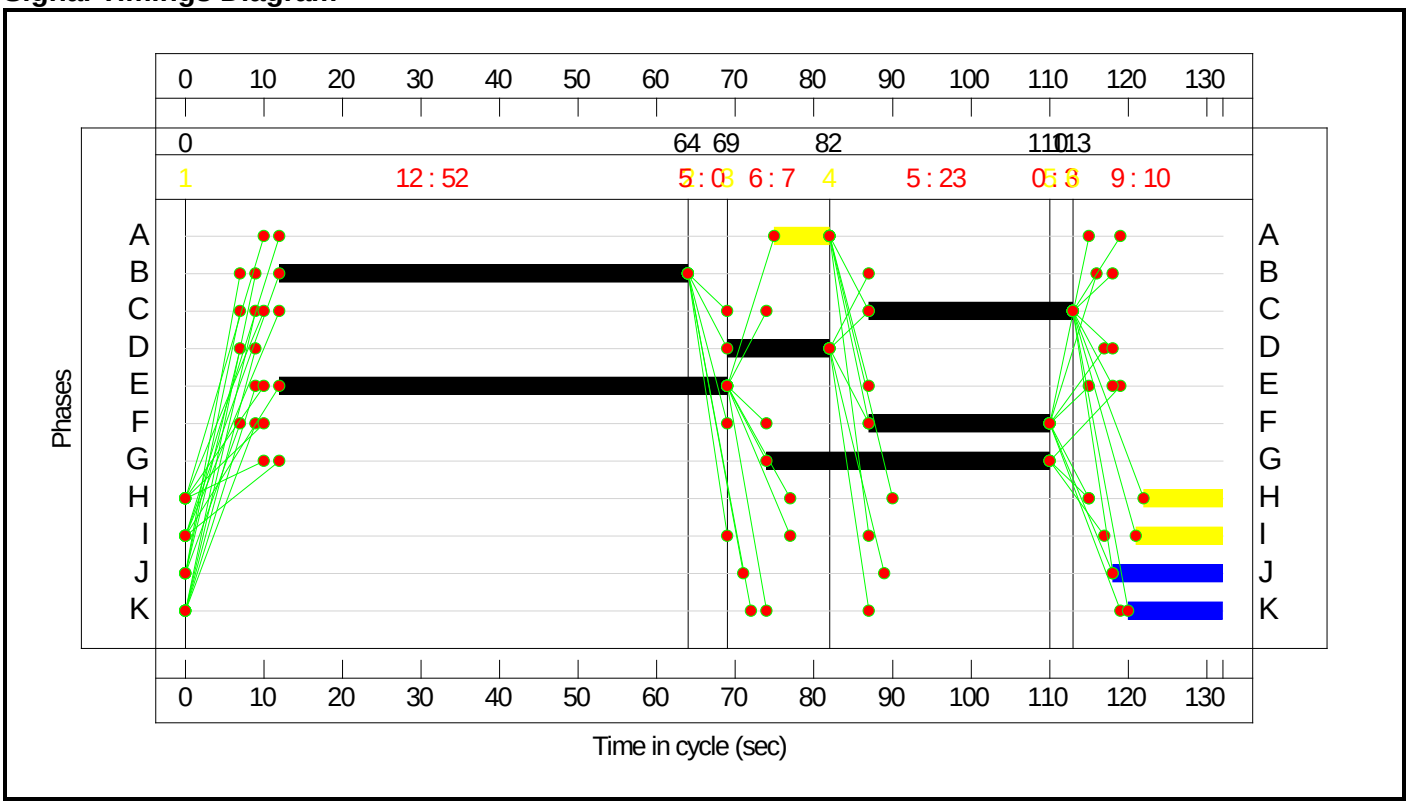


Stage Timings

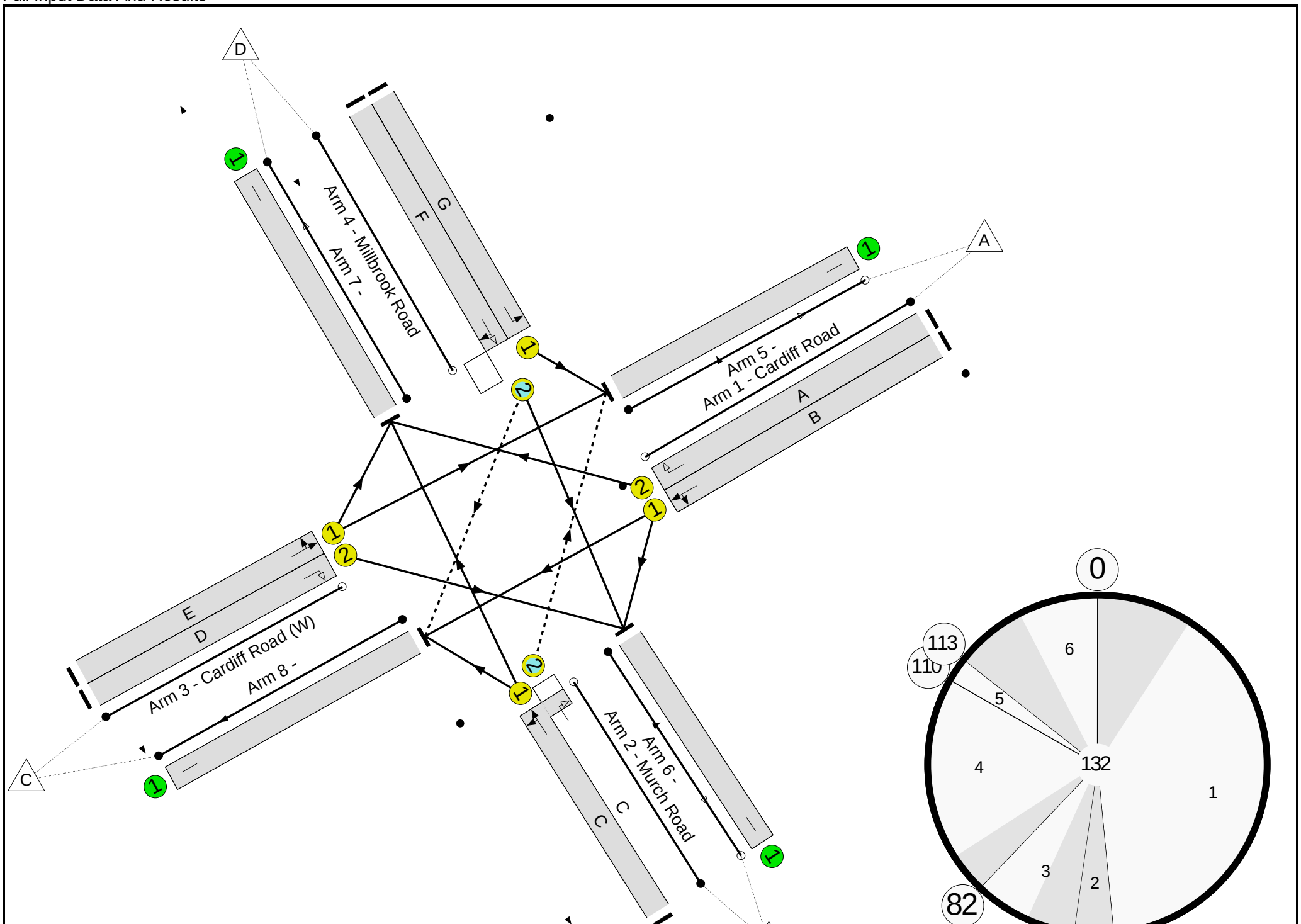
Stage	1	2	3	4	5	6
Duration	52	0	7	23	3	10
Change Point	0	64	69	82	110	113

Full Input Data And Results

Signal Timings 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: Exisiting Situation	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**74.9%**
Unnamed Junction	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**74.9%**
1/1	Cardiff Road Left Ahead	U	N/A	N/A	B		1	52	-	584	1943	780	74.9%
1/2	Cardiff Road Right	U	N/A	N/A	A		1	7	-	31	1935	117	26.4%
2/1+2/2	Murch Road Right Ahead Left	U+O	N/A	N/A	C		1	26	-	288	1876:1840	402	71.7%
3/1	Cardiff Road (W) Ahead Left	U	N/A	N/A	E		1	57	-	629	1938	852	73.9%
3/2	Cardiff Road (W) Right	U	N/A	N/A	D		1	13	-	39	1865	198	19.7%
4/1	Millbrook Road Left	U	N/A	N/A	G		1	36	-	101	1759	493	20.5%
4/2	Millbrook Road Ahead Right	O	N/A	N/A	F		1	23	-	61	2003	355	17.2%
5/1		U	N/A	N/A	-		-	-	-	855	Inf	Inf	0.0%
6/1		U	N/A	N/A	-		-	-	-	152	Inf	Inf	0.0%
7/1		U	N/A	N/A	-		-	-	-	114	Inf	Inf	0.0%
8/1		U	N/A	N/A	-		-	-	-	612	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: Exisiting Situation	**-**	**-**	**153**	**1**	**1**	**17.6**	**4.6**	**0.1**	**22.3**	**-**	**-**	**-**	**-**
Unnamed Junction	**-**	**-**	**153**	**1**	**1**	**17.6**	**4.6**	**0.1**	**22.3**	**-**	**-**	**-**	**-**
1/1	584	584	-	-	-	5.5	1.5	-	6.9	42.8	18.2	1.5	19.6
1/2	31	31	-	-	-	0.5	0.2	-	0.7	80.0	1.1	0.2	1.3
2/1+2/2	288	288	133	1	1	3.9	1.2	0.1	5.1	64.3	8.9	1.2	10.1
3/1	629	629	-	-	-	5.4	1.4	-	6.8	38.7	19.0	1.4	20.4
3/2	39	39	-	-	-	0.6	0.1	-	0.7	65.2	1.3	0.1	1.4
4/1	101	101	-	-	-	1.0	0.1	-	1.1	40.9	2.8	0.1	2.9
4/2	61	61	20	0	0	0.8	0.1	0.0	0.9	52.7	1.9	0.1	2.0
5/1	855	855	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	152	152	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	114	114	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
8/1	612	612	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1

PRC for Signalled Lanes (%): 20.2
PRC Over All Lanes (%): 20.2

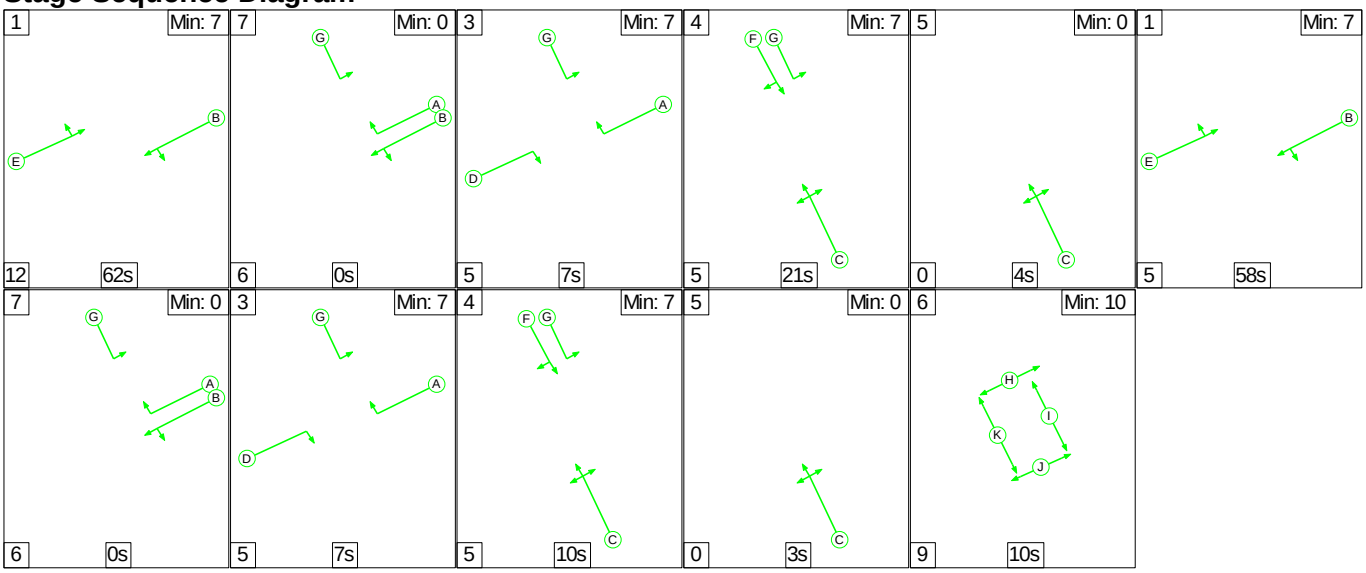
Total Delay for Signalled Lanes (pcuHr): 22.29
Total Delay Over All Lanes(pcuHr): 22.29

Cycle Time (s): 132

Full Input Data And Results

Scenario 2: '2008 PM Base' (FG2: '2008 PM Base', Plan 2: 'PM Staging')

Stage Sequence Diagram

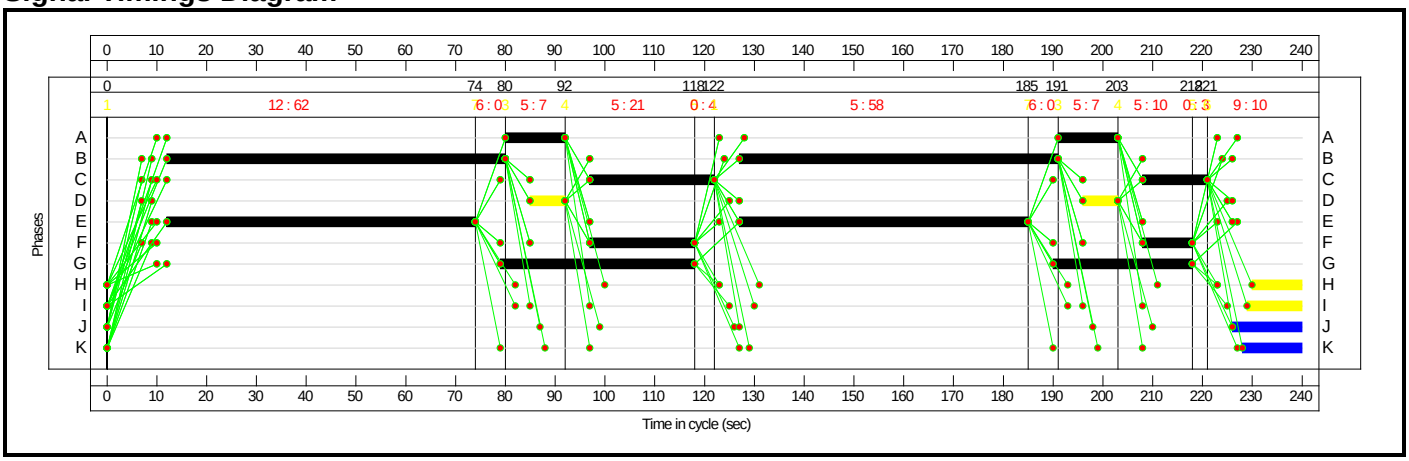


Stage Timings

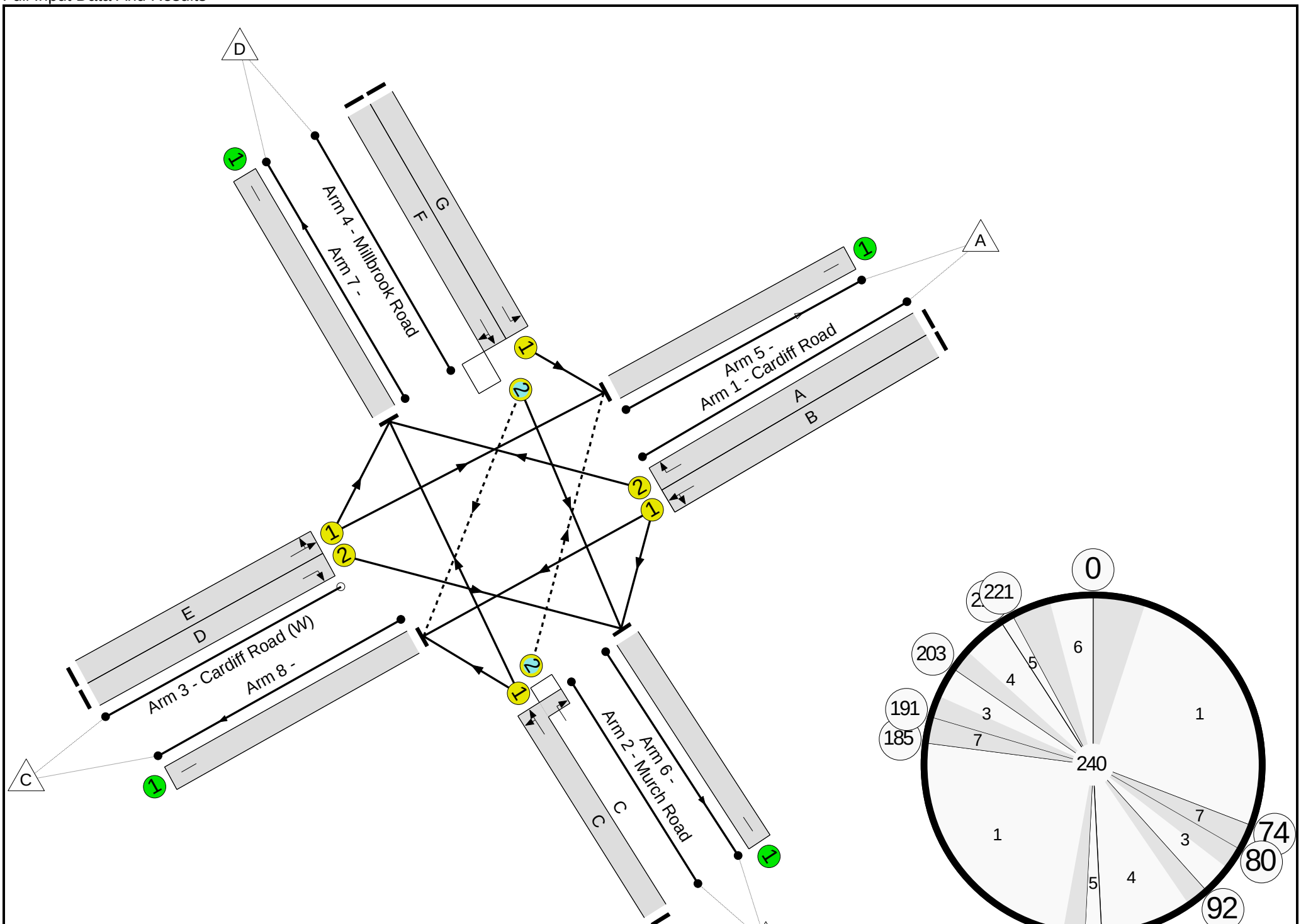
Stage	1	7	3	4	5	1	7	3	4	5
Duration	62	0	7	21	4	58	0	7	10	3
Change Point	0	74	80	92	118	122	185	191	203	218

Stage	6									
Duration	10									
Change Point	221									

Signal Timings 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: Exisiting Situation	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**80.4%**
Unnamed Junction	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**80.4%**
1/1	Cardiff Road Left Ahead	U	N/A	N/A	B		2	132	-	866	1929	1077	80.4%
1/2	Cardiff Road Right	U	N/A	N/A	A		2	24	-	27	1935	210	12.9%
2/1+2/2	Murch Road Right Ahead Left	U+O	N/A	N/A	C		2	38	-	165	1855:1840	213	77.4%
3/1	Cardiff Road (W) Ahead Left	U	N/A	N/A	E		2	120	-	602	1940	986	61.0%
3/2	Cardiff Road (W) Right	U	N/A	N/A	D		2	14	-	34	1865	124	27.3%
4/1	Millbrook Road Left	U	N/A	N/A	G		2	67	-	64	1759	506	12.7%
4/2	Millbrook Road Ahead Right	O	N/A	N/A	F		2	31	-	167	2011	277	60.4%
5/1		U	N/A	N/A	-		-	-	-	757	Inf	Inf	0.0%
6/1		U	N/A	N/A	-		-	-	-	295	Inf	Inf	0.0%
7/1		U	N/A	N/A	-		-	-	-	58	Inf	Inf	0.0%
8/1		U	N/A	N/A	-		-	-	-	815	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: Exisiting Situation	**-**	**-**	**124**	**8**	**13**	**14.8**	**5.5**	**0.1**	**20.4**	**-**	**-**	**-**	**-**
Unnamed Junction	**-**	**-**	**124**	**8**	**13**	**14.8**	**5.5**	**0.1**	**20.4**	**-**	**-**	**-**	**-**
1/1	866	866	-	-	-	5.2	2.0	-	7.2	30.0	26.0	2.0	28.0
1/2	27	27	-	-	-	0.4	0.1	-	0.4	58.6	0.9	0.1	1.0
2/1+2/2	165	165	76	8	13	2.2	1.6	0.1	4.0	86.4	5.4	1.6	7.0
3/1	602	602	-	-	-	3.6	0.8	-	4.3	26.0	15.9	0.8	16.7
3/2	34	34	-	-	-	0.5	0.2	-	0.7	73.5	1.2	0.2	1.3
4/1	64	64	-	-	-	0.6	0.1	-	0.7	36.6	1.8	0.1	1.9
4/2	167	167	48	0	0	2.3	0.8	0.0	3.1	66.0	5.9	0.8	6.7
5/1	757	757	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	295	295	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	58	58	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
8/1	815	815	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1

PRC for Signalled Lanes (%): 11.9
PRC Over All Lanes (%): 11.9

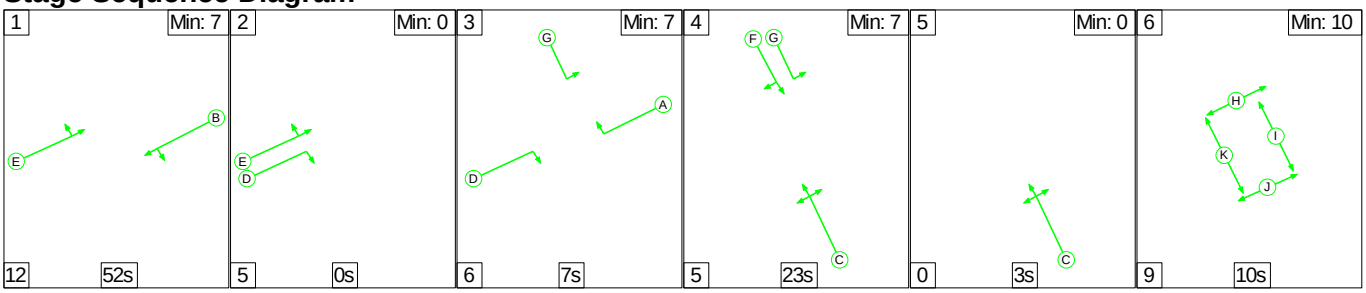
Total Delay for Signalled Lanes (pcuHr): 20.36
Total Delay Over All Lanes(pcuHr): 20.36

Cycle Time (s): 240

Full Input Data And Results

Scenario 3: '2020 AM Base' (FG3: '2020 AM Base', Plan 1: 'AM Staging')

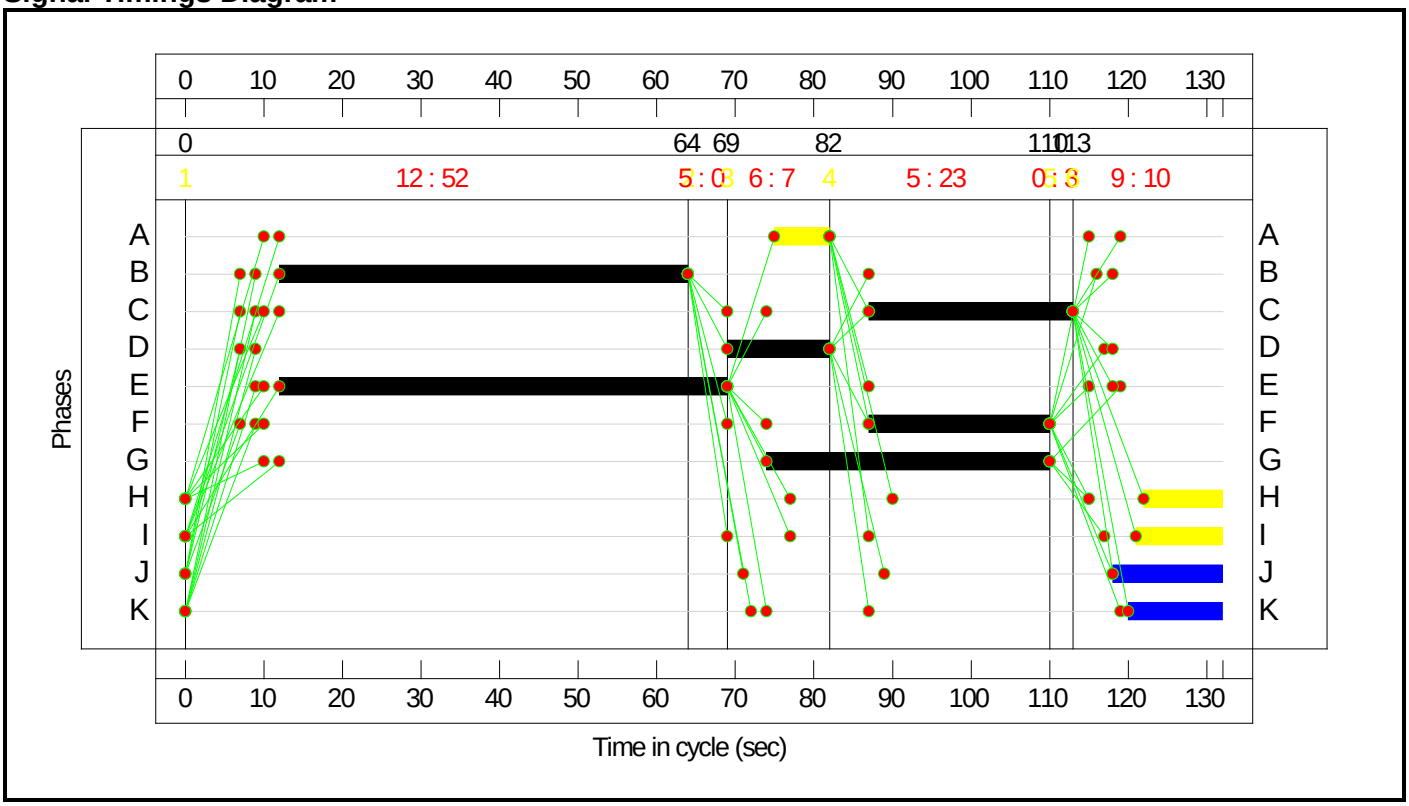
Stage Sequence Diagram



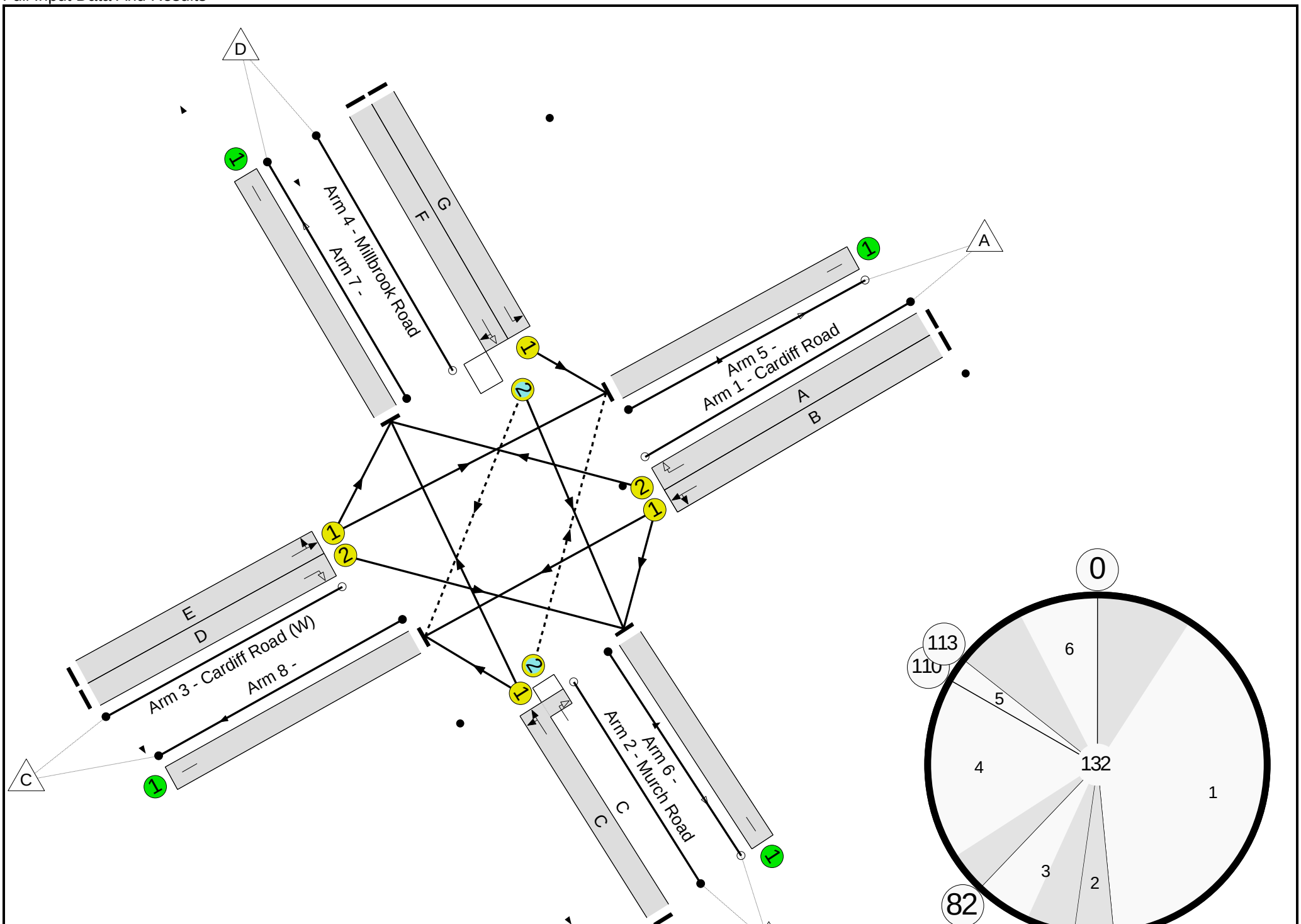
Stage Timings

Stage	1	2	3	4	5	6
Duration	52	0	7	23	3	10
Change Point	0	64	69	82	110	113

Signal Timings 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: Exisiting Situation	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**87.3%**
Unnamed Junction	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**87.3%**
1/1	Cardiff Road Left Ahead	U	N/A	N/A	B		1	52	-	681	1943	780	87.3%
1/2	Cardiff Road Right	U	N/A	N/A	A		1	7	-	36	1935	117	30.7%
2/1+2/2	Murch Road Right Ahead Left	U+O	N/A	N/A	C		1	26	-	335	1876:1840	391	85.6%
3/1	Cardiff Road (W) Ahead Left	U	N/A	N/A	E		1	57	-	733	1937	851	86.1%
3/2	Cardiff Road (W) Right	U	N/A	N/A	D		1	13	-	46	1865	198	23.3%
4/1	Millbrook Road Left	U	N/A	N/A	G		1	36	-	117	1759	493	23.7%
4/2	Millbrook Road Ahead Right	O	N/A	N/A	F		1	23	-	71	2004	347	20.4%
5/1		U	N/A	N/A	-		-	-	-	995	Inf	Inf	0.0%
6/1		U	N/A	N/A	-		-	-	-	178	Inf	Inf	0.0%
7/1		U	N/A	N/A	-		-	-	-	133	Inf	Inf	0.0%
8/1		U	N/A	N/A	-		-	-	-	713	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: Exisiting Situation	**-**	**-**	**178**	**1**	**1**	**21.7**	**9.6**	**0.1**	**31.3**	**-**	**-**	**-**	**-**
Unnamed Junction	**-**	**-**	**178**	**1**	**1**	**21.7**	**9.6**	**0.1**	**31.3**	**-**	**-**	**-**	**-**
1/1	681	681	-	-	-	6.9	3.2	-	10.1	53.4	22.9	3.2	26.1
1/2	36	36	-	-	-	0.6	0.2	-	0.8	81.4	1.3	0.2	1.5
2/1+2/2	335	335	155	1	1	4.7	2.7	0.1	7.4	79.8	10.8	2.7	13.6
3/1	733	733	-	-	-	6.8	3.0	-	9.7	47.9	24.2	3.0	27.2
3/2	46	46	-	-	-	0.7	0.2	-	0.8	65.9	1.5	0.2	1.7
4/1	117	117	-	-	-	1.2	0.2	-	1.3	41.4	3.3	0.2	3.4
4/2	71	71	23	0	0	0.9	0.1	0.0	1.1	53.3	2.2	0.1	2.3
5/1	995	995	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	178	178	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	133	133	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
8/1	713	713	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1

PRC for Signalled Lanes (%): 3.1
PRC Over All Lanes (%): 3.1

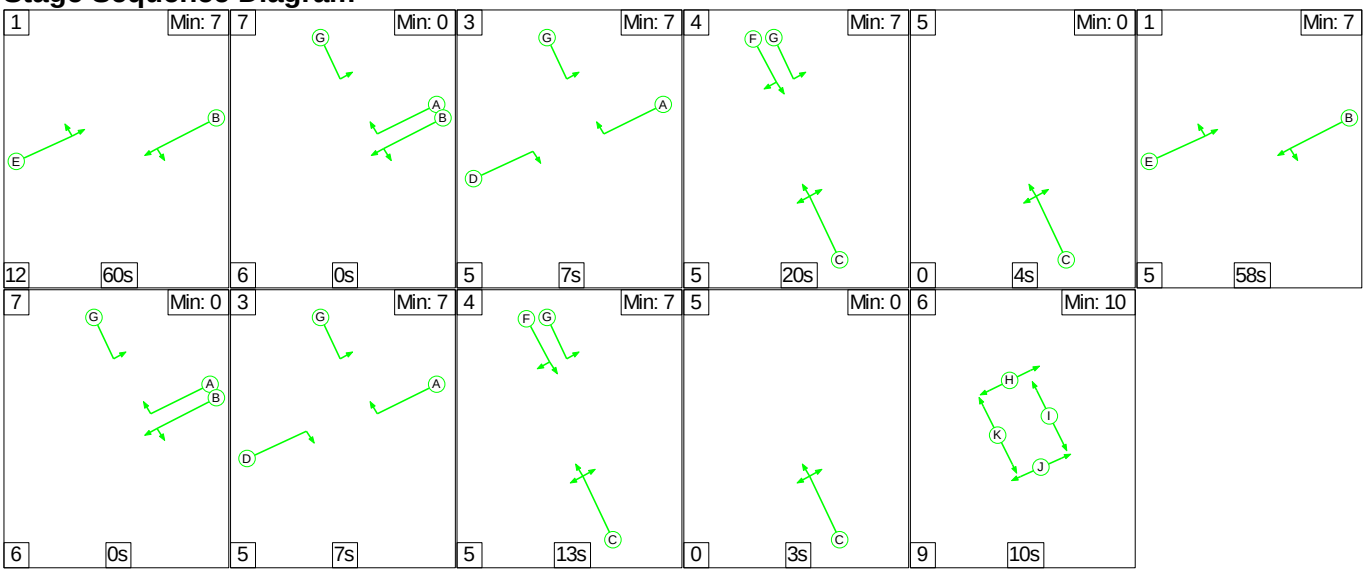
Total Delay for Signalled Lanes (pcuHr): 31.34
Total Delay Over All Lanes(pcuHr): 31.34

Cycle Time (s): 132

Full Input Data And Results

Scenario 4: '2020 PM Base' (FG4: '2020 PM Base', Plan 2: 'PM Staging')

Stage Sequence Diagram

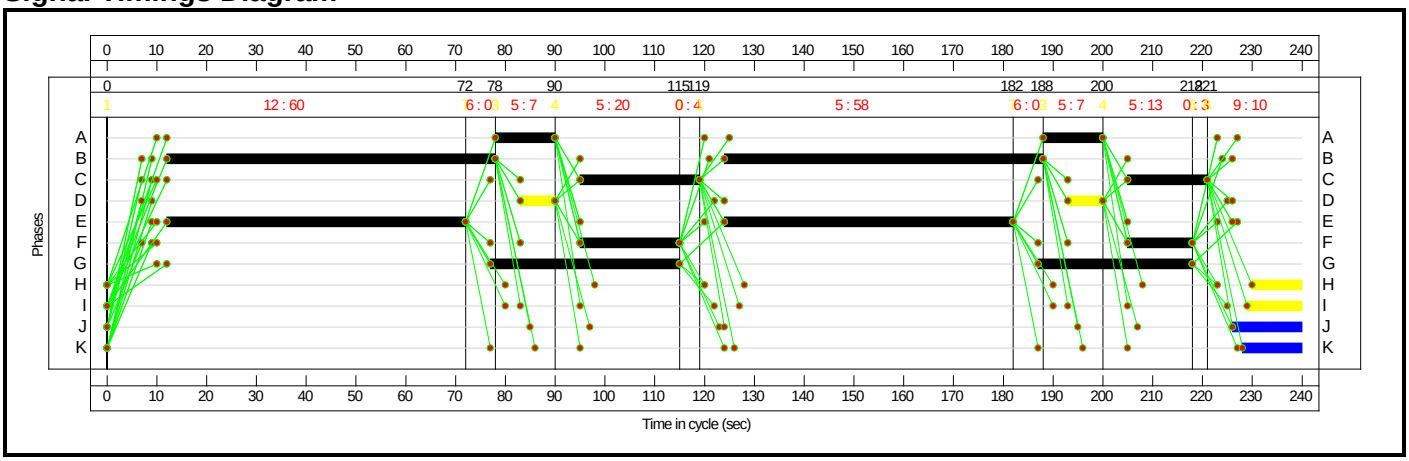


Stage Timings

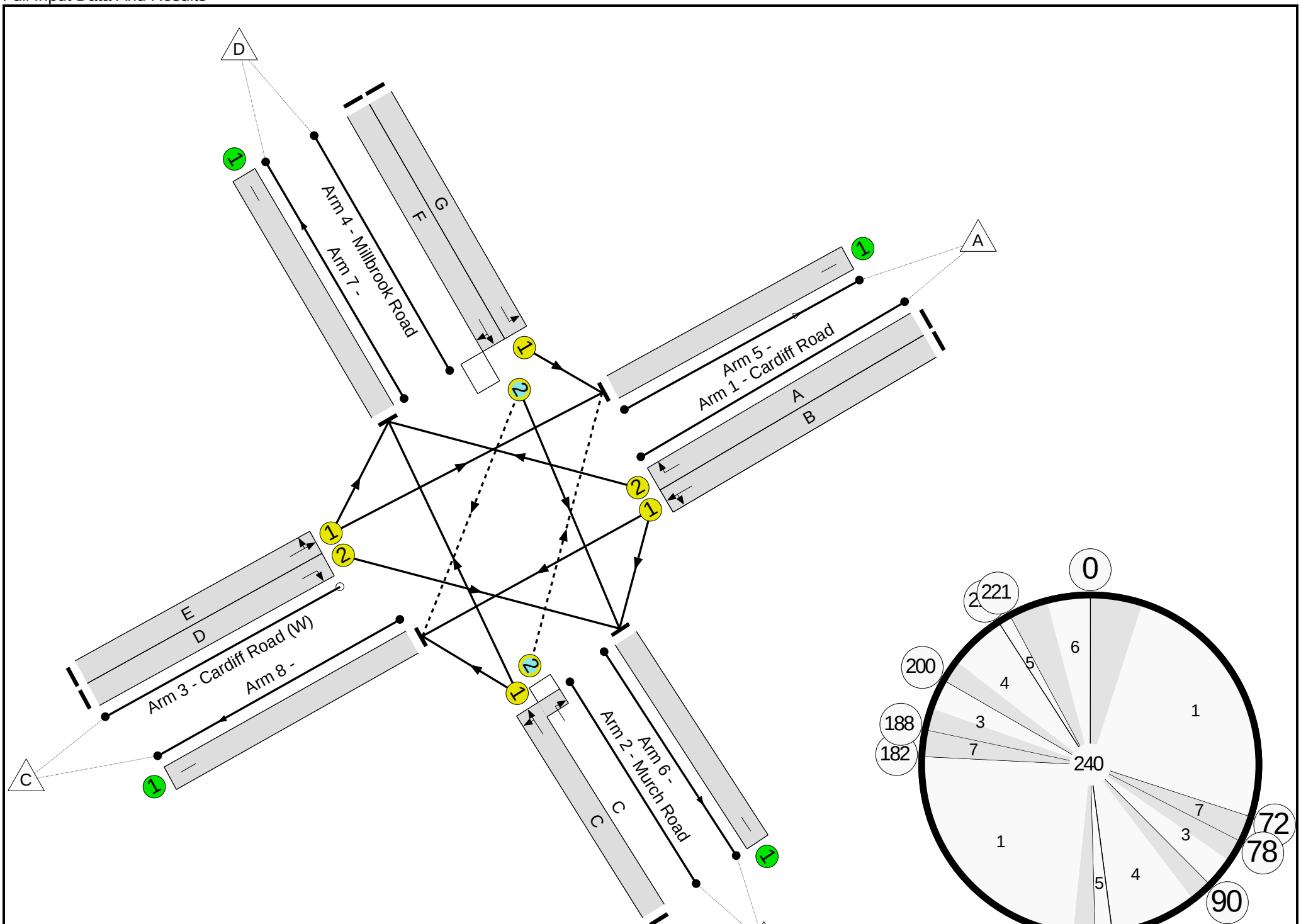
Stage	1	7	3	4	5	1	7	3	4	5
Duration	60	0	7	20	4	58	0	7	13	3
Change Point	0	72	78	90	115	119	182	188	200	218

Stage	6									
Duration	10									
Change Point	221									

Signal Timings 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: Exisiting Situation	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**94.9%**
Unnamed Junction	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**94.9%**
1/1	Cardiff Road Left Ahead	U	N/A	N/A	B		2	130	-	1007	1929	1061	94.9%
1/2	Cardiff Road Right	U	N/A	N/A	A		2	24	-	31	1935	210	14.8%
2/1+2/2	Murch Road Right Ahead Left	U+O	N/A	N/A	C		2	40	-	191	1855:1840	206	92.9%
3/1	Cardiff Road (W) Ahead Left	U	N/A	N/A	E		2	118	-	700	1940	970	72.2%
3/2	Cardiff Road (W) Right	U	N/A	N/A	D		2	14	-	39	1865	124	31.4%
4/1	Millbrook Road Left	U	N/A	N/A	G		2	69	-	74	1759	520	14.2%
4/2	Millbrook Road Ahead Right	O	N/A	N/A	F		2	33	-	195	2011	293	66.5%
5/1		U	N/A	N/A	-		-	-	-	879	Inf	Inf	0.0%
6/1		U	N/A	N/A	-		-	-	-	343	Inf	Inf	0.0%
7/1		U	N/A	N/A	-		-	-	-	67	Inf	Inf	0.0%
8/1		U	N/A	N/A	-		-	-	-	948	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: Exisiting Situation	**-**	**-**	**129**	**23**	**16**	**19.1**	**14.1**	**0.1**	**33.4**	**-**	**-**	**-**	**-**
Unnamed Junction	**-**	**-**	**129**	**23**	**16**	**19.1**	**14.1**	**0.1**	**33.4**	**-**	**-**	**-**	**-**
1/1	1007	1007	-	-	-	7.5	7.3	-	14.8	53.0	36.4	7.3	43.7
1/2	31	31	-	-	-	0.4	0.1	-	0.5	59.0	1.0	0.1	1.1
2/1+2/2	191	191	73	23	16	2.7	4.2	0.1	6.9	130.9	6.5	4.2	10.7
3/1	700	700	-	-	-	4.7	1.3	-	6.0	30.6	20.8	1.3	22.1
3/2	39	39	-	-	-	0.6	0.2	-	0.8	74.8	1.3	0.2	1.6
4/1	74	74	-	-	-	0.7	0.1	-	0.7	35.9	2.1	0.1	2.2
4/2	195	195	56	0	0	2.7	1.0	0.0	3.7	67.4	6.9	1.0	7.9
5/1	879	879	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	343	343	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	67	67	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
8/1	948	948	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1

PRC for Signalled Lanes (%): -5.5
PRC Over All Lanes (%): -5.5

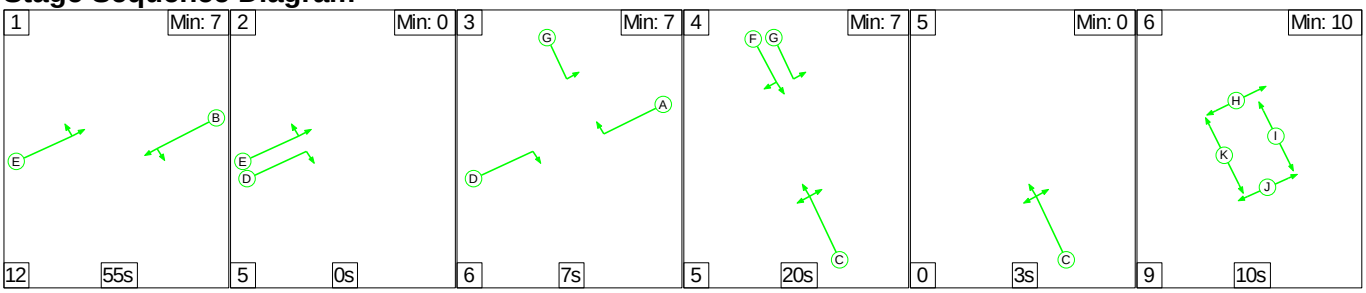
Total Delay for Signalled Lanes (pcuHr): 33.43
Total Delay Over All Lanes(pcuHr): 33.43

Cycle Time (s): 240

Full Input Data And Results

Scenario 5: '2020 AM Dev + BI' (FG5: '2020 AM Dev + BI', Plan 1: 'AM Staging')

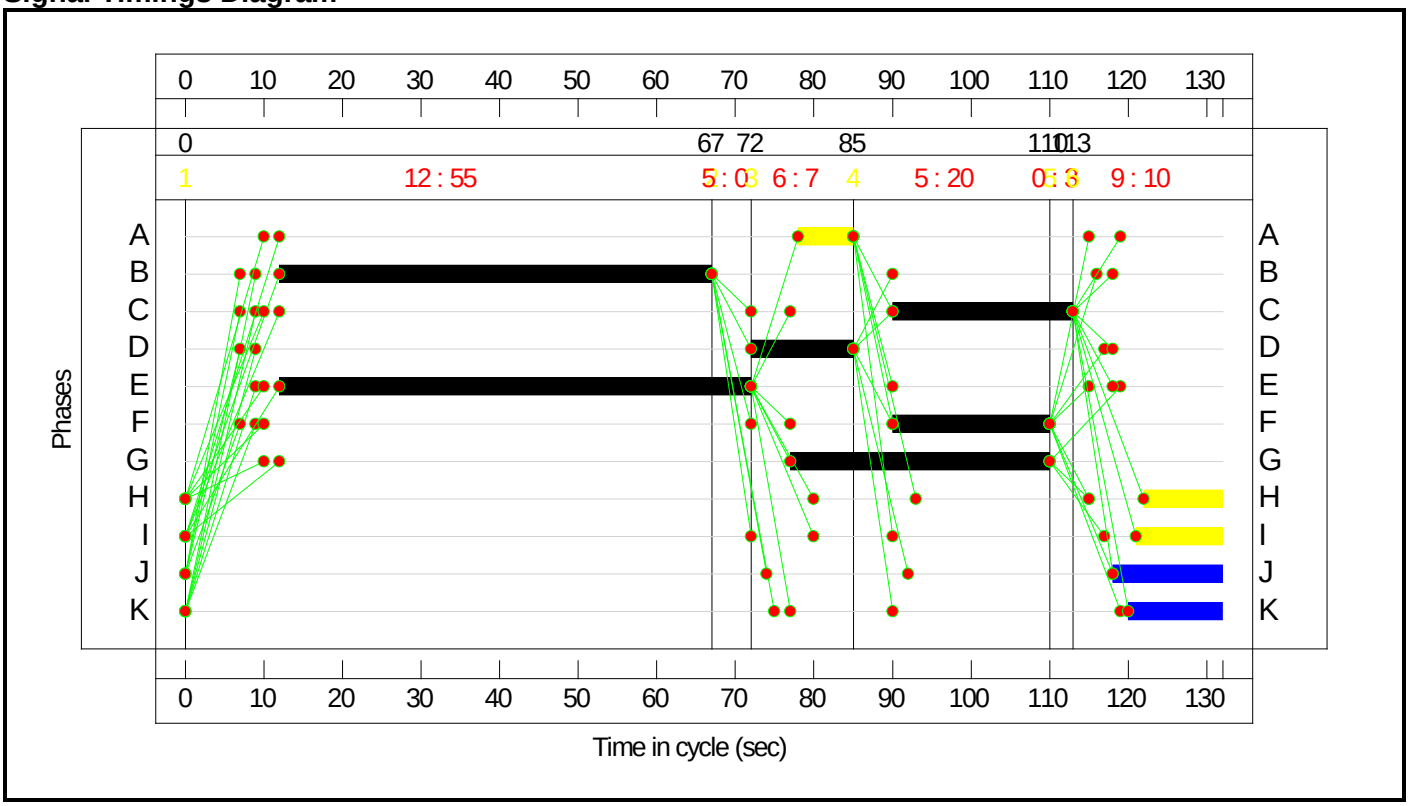
Stage Sequence Diagram



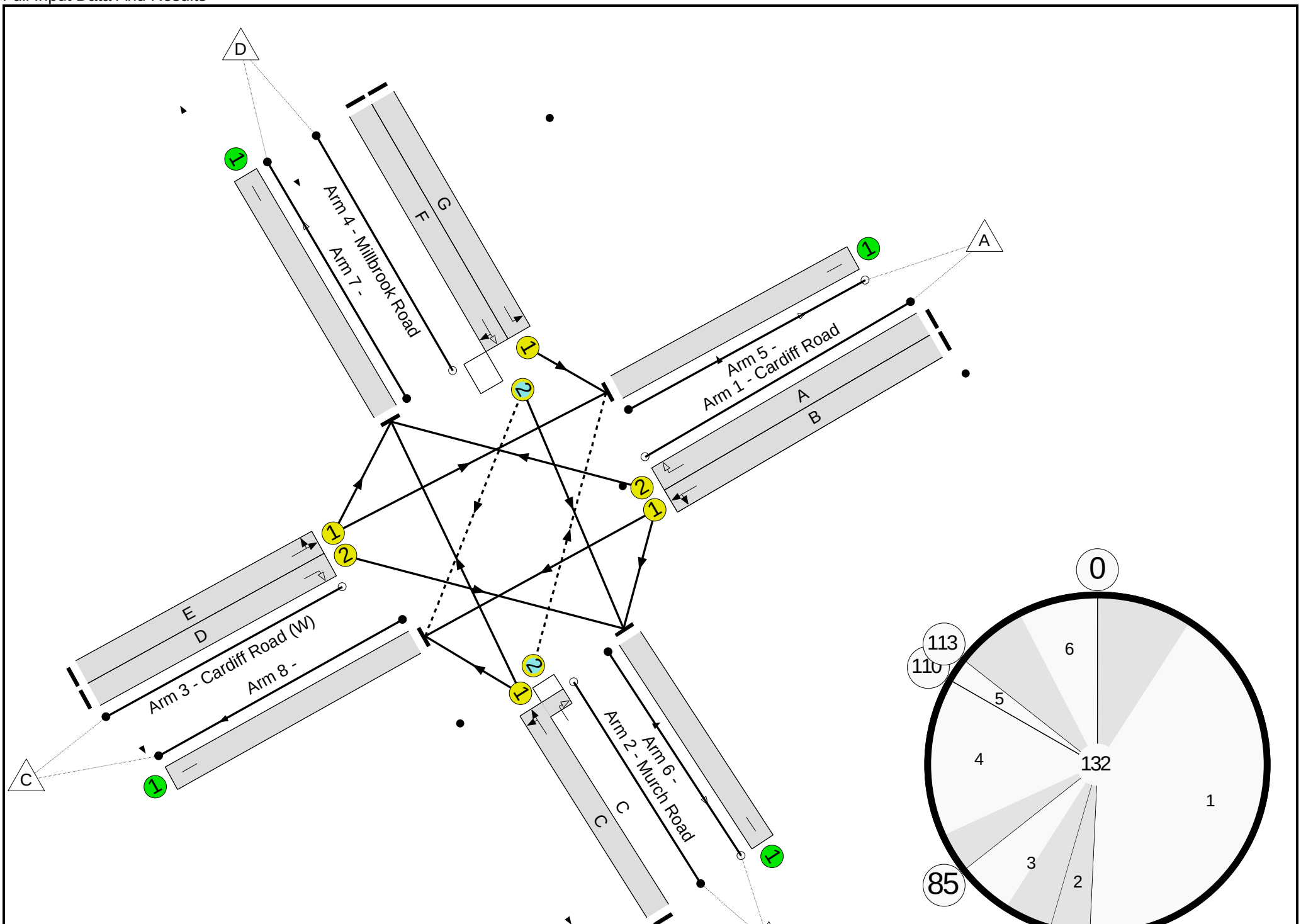
Stage Timings

Stage	1	2	3	4	5	6
Duration	55	0	7	20	3	10
Change Point	0	67	72	85	110	113

Signal Timings 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: Exisiting Situation	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**99.0%**
Unnamed Junction	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**99.0%**
1/1	Cardiff Road Left Ahead	U	N/A	N/A	B		1	55	-	713	1945	825	86.4%
1/2	Cardiff Road Right	U	N/A	N/A	A		1	7	-	36	1935	117	30.7%
2/1+2/2	Murch Road Right Ahead Left	U+O	N/A	N/A	C		1	23	-	338	1875:1840	350	96.6%
3/1	Cardiff Road (W) Ahead Left	U	N/A	N/A	E		1	60	-	887	1938	896	99.0%
3/2	Cardiff Road (W) Right	U	N/A	N/A	D		1	13	-	48	1865	198	24.3%
4/1	Millbrook Road Left	U	N/A	N/A	G		1	33	-	117	1759	453	25.8%
4/2	Millbrook Road Ahead Right	O	N/A	N/A	F		1	20	-	73	2001	300	24.4%
5/1		U	N/A	N/A	-		-	-	-	1147	Inf	Inf	0.0%
6/1		U	N/A	N/A	-		-	-	-	180	Inf	Inf	0.0%
7/1		U	N/A	N/A	-		-	-	-	135	Inf	Inf	0.0%
8/1		U	N/A	N/A	-		-	-	-	750	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: Exisiting Situation	**-**	**-**	**176**	**5**	**1**	**24.1**	**23.3**	**0.1**	**47.4**	**-**	**-**	**-**	**-**
Unnamed Junction	**-**	**-**	**176**	**5**	**1**	**24.1**	**23.3**	**0.1**	**47.4**	**-**	**-**	**-**	**-**
1/1	713	713	-	-	-	6.8	3.0	-	9.9	49.8	23.6	3.0	26.6
1/2	36	36	-	-	-	0.6	0.2	-	0.8	81.4	1.3	0.2	1.5
2/1+2/2	338	338	151	5	1	5.0	6.7	0.1	11.7	124.7	11.3	6.7	18.0
3/1	887	887	-	-	-	8.7	12.9	-	21.6	87.6	32.0	12.9	44.9
3/2	48	48	-	-	-	0.7	0.2	-	0.9	66.1	1.6	0.2	1.8
4/1	117	117	-	-	-	1.3	0.2	-	1.4	44.3	3.4	0.2	3.6
4/2	73	73	25	0	0	1.0	0.2	0.0	1.2	57.5	2.3	0.2	2.5
5/1	1147	1147	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	180	180	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	135	135	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
8/1	750	750	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1

PRC for Signalled Lanes (%): -10.0
PRC Over All Lanes (%): -10.0

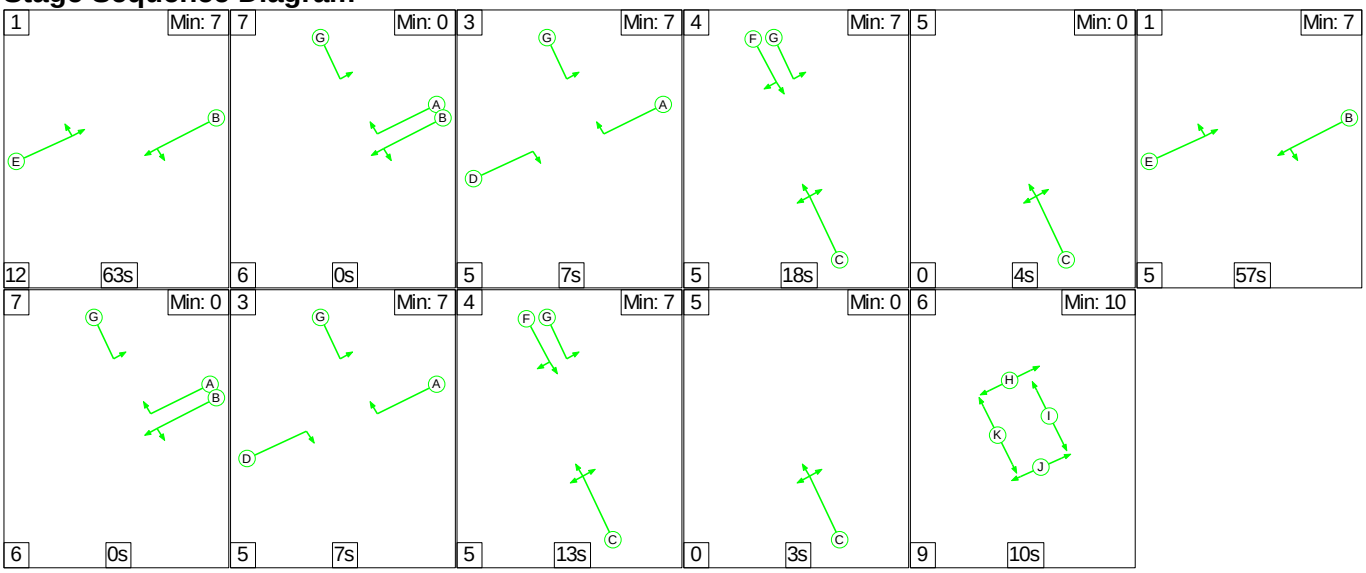
Total Delay for Signalled Lanes (pcuHr): 47.44
Total Delay Over All Lanes(pcuHr): 47.44

Cycle Time (s): 132

Full Input Data And Results

Scenario 6: '2020 PM Dev + BI' (FG6: '2020 PM Dev + BI', Plan 2: 'PM Staging')

Stage Sequence Diagram

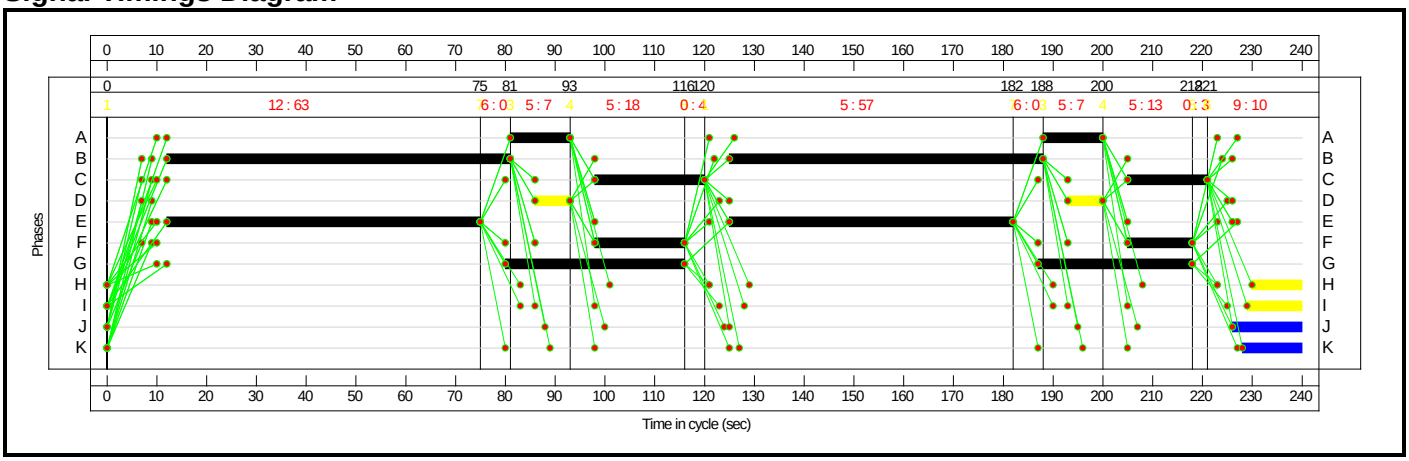


Stage Timings

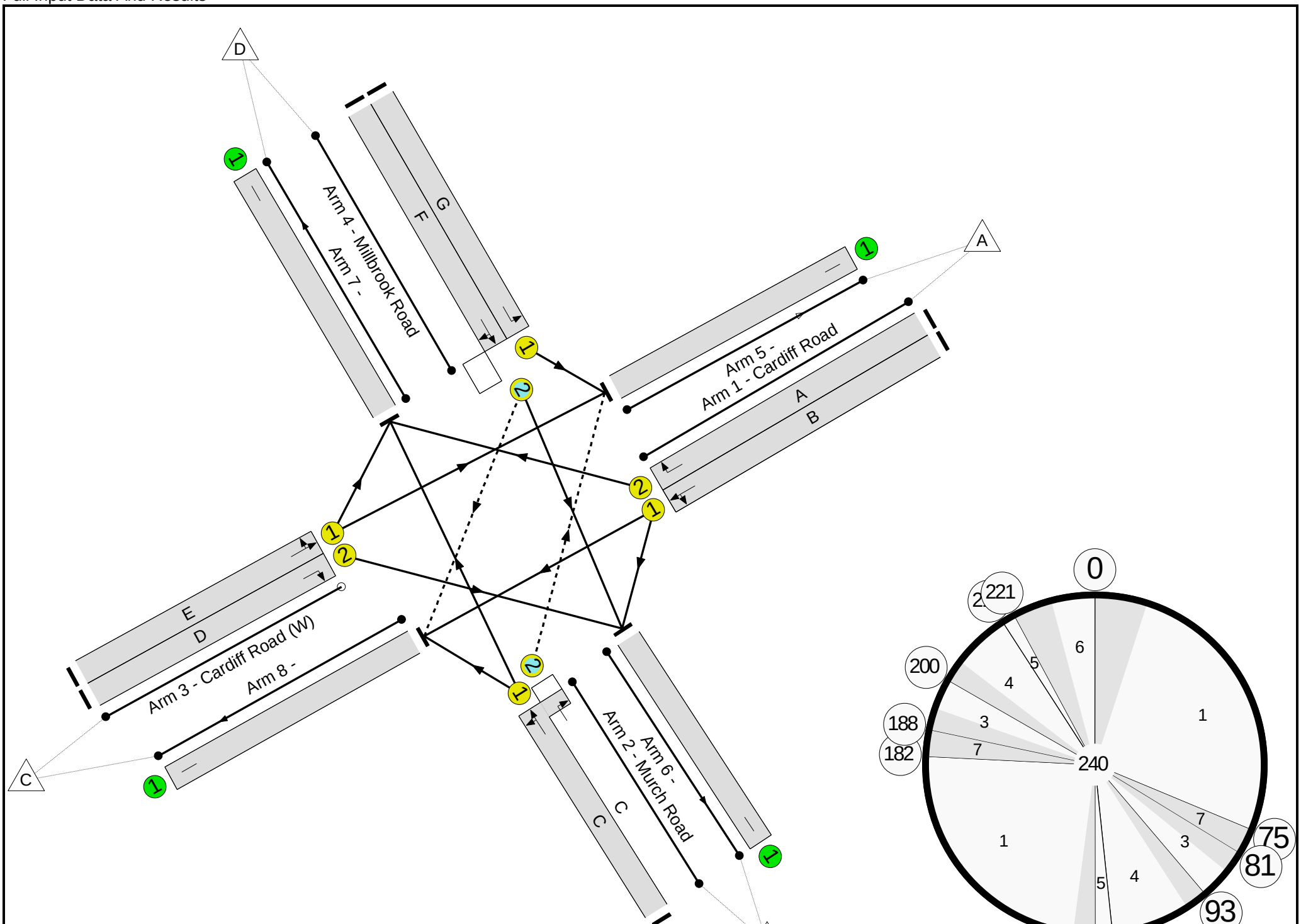
Stage	1	7	3	4	5	1	7	3	4	5
Duration	63	0	7	18	4	57	0	7	13	3
Change Point	0	75	81	93	116	120	182	188	200	218

Stage	6									
Duration	10									
Change Point	221									

Signal Timings 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: Exisiting Situation	-	-	**N/A**	-	-		-	-	-	-	-	-	**107.5%**
Unnamed Junction	-	-	**N/A**	-	-		-	-	-	-	-	-	**107.5%**
1/1	Cardiff Road Left Ahead	U	N/A	N/A	B		2	132	-	1162	1936	1081	107.5%
1/2	Cardiff Road Right	U	N/A	N/A	A		2	24	-	31	1935	210	14.8%
2/1+2/2	Murch Road Right Ahead Left	U+O	N/A	N/A	C		2	38	-	194	1852:1840	184	105.2%
3/1	Cardiff Road (W) Ahead Left	U	N/A	N/A	E		2	120	-	746	1939	986	75.7%
3/2	Cardiff Road (W) Right	U	N/A	N/A	D		2	14	-	43	1865	124	34.6%
4/1	Millbrook Road Left	U	N/A	N/A	G		2	67	-	74	1759	506	14.6%
4/2	Millbrook Road Ahead Right	O	N/A	N/A	F		2	31	-	198	2009	276	71.7%
5/1		U	N/A	N/A	-		-	-	-	922	Inf	Inf	0.0%
6/1		U	N/A	N/A	-		-	-	-	347	Inf	Inf	0.0%
7/1		U	N/A	N/A	-		-	-	-	70	Inf	Inf	0.0%
8/1		U	N/A	N/A	-		-	-	-	1109	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: Exisiting Situation	**-**	**-**	**120**	**23**	**23**	**31.9**	**59.7**	**0.1**	**91.7**	**-**	**-**	**-**	**-**
Unnamed Junction	**-**	**-**	**120**	**23**	**23**	**31.9**	**59.7**	**0.1**	**91.7**	**-**	**-**	**-**	**-**
1/1	1162	1081	-	-	-	18.5	46.7	-	65.3	202.2	48.5	46.7	95.2
1/2	31	31	-	-	-	0.4	0.1	-	0.5	59.3	1.0	0.1	1.1
2/1+2/2	194	184	61	23	23	3.8	9.7	0.1	13.7	253.9	7.4	9.7	17.2
3/1	746	746	-	-	-	5.0	1.5	-	6.6	31.7	23.2	1.5	24.7
3/2	43	43	-	-	-	0.6	0.3	-	0.9	76.2	1.5	0.3	1.8
4/1	74	74	-	-	-	0.7	0.1	-	0.8	37.0	2.2	0.1	2.2
4/2	198	198	59	0	0	2.8	1.2	0.0	4.0	73.1	7.3	1.2	8.5
5/1	916	916	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	335	335	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	69	69	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
8/1	1037	1037	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1

PRC for Signalled Lanes (%): -19.4
PRC Over All Lanes (%): -19.4

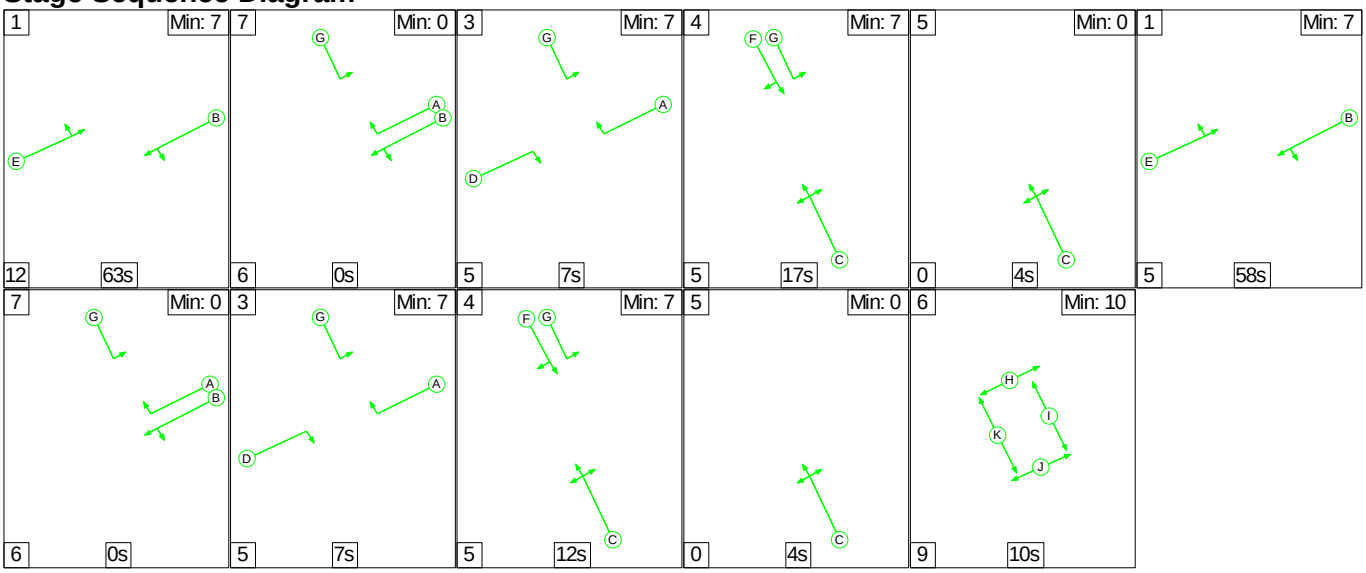
Total Delay for Signalled Lanes (pcuHr): 91.71
Total Delay Over All Lanes(pcuHr): 91.71

Cycle Time (s): 240

Full Input Data And Results

Scenario 7: '2020 PM Dev + BI + Tourism' (FG7: '2020 PM Dev + BI + Tourism', Plan 2: 'PM Staging')

Stage Sequence Diagram

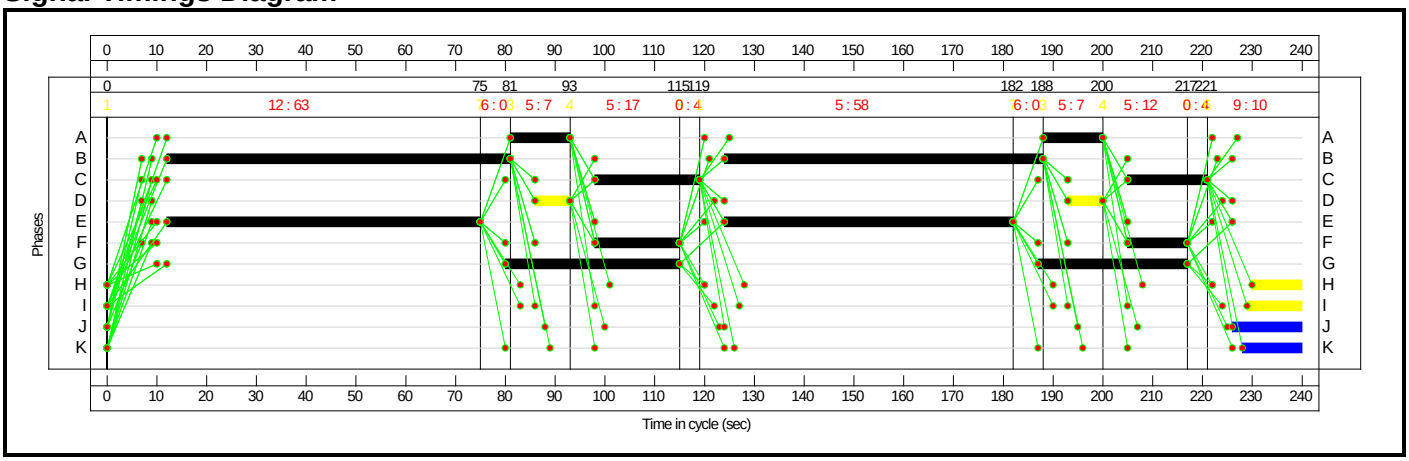


Stage Timings

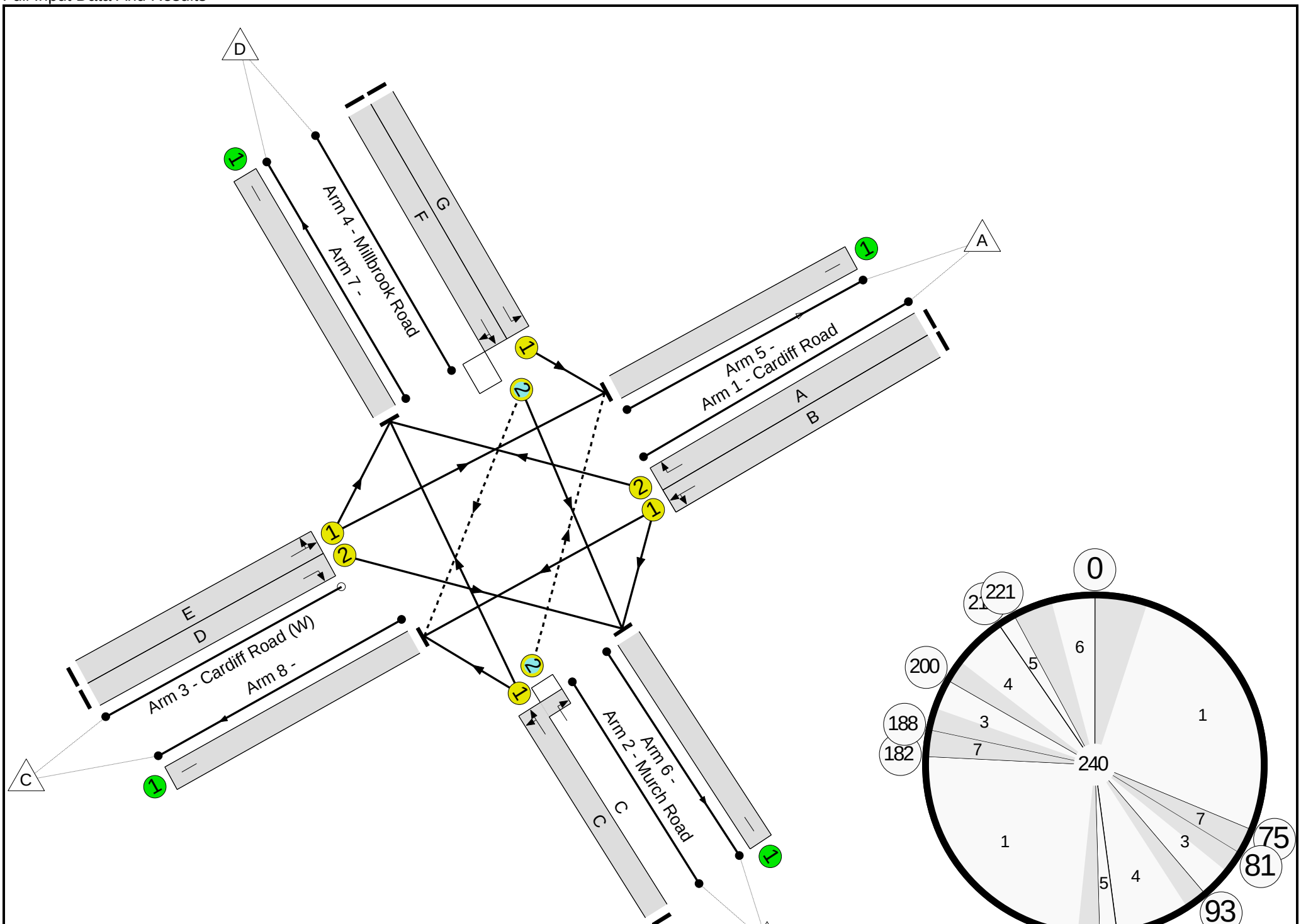
Stage	1	7	3	4	5	1	7	3	4	5
Duration	63	0	7	17	4	58	0	7	12	4
Change Point	0	75	81	93	115	119	182	188	200	217

Stage	6									
Duration	10									
Change Point	221									

Signal Timings 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: Exisiting Situation	-	-	**N/A**	-	-		-	-	-	-	-	-	**115.8%**
Unnamed Junction	-	-	**N/A**	-	-		-	-	-	-	-	-	**115.8%**
1/1	Cardiff Road Left Ahead	U	N/A	N/A	B		2	133	-	1264	1940	1091	115.8%
1/2	Cardiff Road Right	U	N/A	N/A	A		2	24	-	31	1935	210	14.8%
2/1+2/2	Murch Road Right Ahead Left	U+O	N/A	N/A	C		2	37	-	194	1852:1840	177	109.7%
3/1	Cardiff Road (W) Ahead Left	U	N/A	N/A	E		2	121	-	860	1940	994	86.5%
3/2	Cardiff Road (W) Right	U	N/A	N/A	D		2	14	-	43	1865	124	34.6%
4/1	Millbrook Road Left	U	N/A	N/A	G		2	65	-	74	1759	491	15.1%
4/2	Millbrook Road Ahead Right	O	N/A	N/A	F		2	29	-	198	2009	259	76.3%
5/1		U	N/A	N/A	-		-	-	-	1036	Inf	Inf	0.0%
6/1		U	N/A	N/A	-		-	-	-	347	Inf	Inf	0.0%
7/1		U	N/A	N/A	-		-	-	-	70	Inf	Inf	0.0%
8/1		U	N/A	N/A	-		-	-	-	1211	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: Exisiting Situation	**-**	**-**	**109**	**31**	**22**	**47.2**	**107.4**	**0.1**	**154.8**	**-**	**-**	**-**	**-**
Unnamed Junction	**-**	**-**	**109**	**31**	**22**	**47.2**	**107.4**	**0.1**	**154.8**	**-**	**-**	**-**	**-**
1/1	1264	1091	-	-	-	31.5	89.9	-	121.4	345.7	60.8	89.9	150.6
1/2	31	31	-	-	-	0.4	0.1	-	0.5	59.3	1.0	0.1	1.1
2/1+2/2	194	177	50	31	22	4.8	12.5	0.1	17.4	323.4	8.1	12.5	20.6
3/1	860	860	-	-	-	6.3	3.1	-	9.4	39.3	29.4	3.1	32.4
3/2	43	43	-	-	-	0.6	0.3	-	0.9	76.2	1.5	0.3	1.8
4/1	74	74	-	-	-	0.7	0.1	-	0.8	37.9	2.2	0.1	2.3
4/2	198	198	59	0	0	2.8	1.5	0.0	4.4	79.6	7.3	1.5	8.8
5/1	1026	1026	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	324	324	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	67	67	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
8/1	1056	1056	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1

PRC for Signalled Lanes (%): -28.7
PRC Over All Lanes (%): -28.7

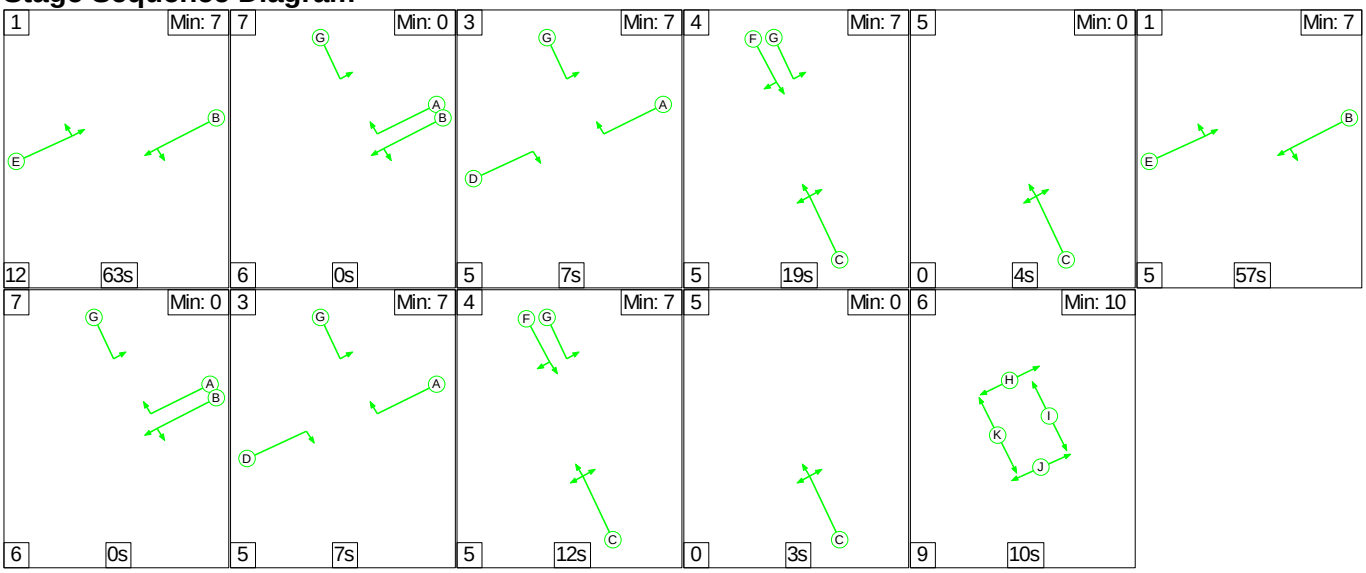
Total Delay for Signalled Lanes (pcuHr): 154.78
Total Delay Over All Lanes(pcuHr): 154.78

Cycle Time (s): 240

Full Input Data And Results

Scenario 8: '2020 PM Base + Tourism' (FG8: '2020 PM Base + Tourism', Plan 2: 'PM Staging')

Stage Sequence Diagram

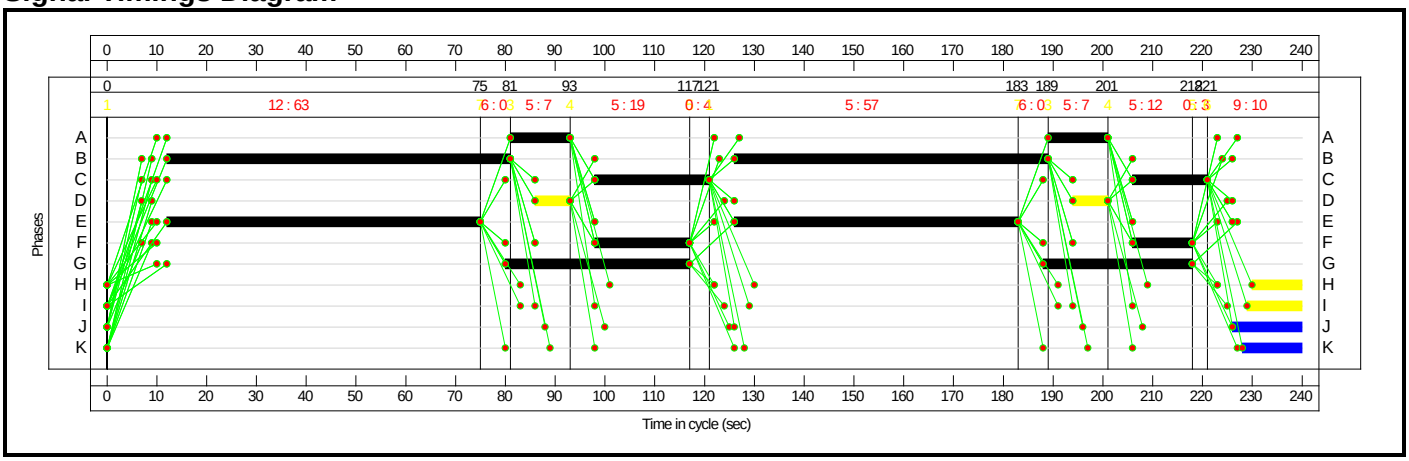


Stage Timings

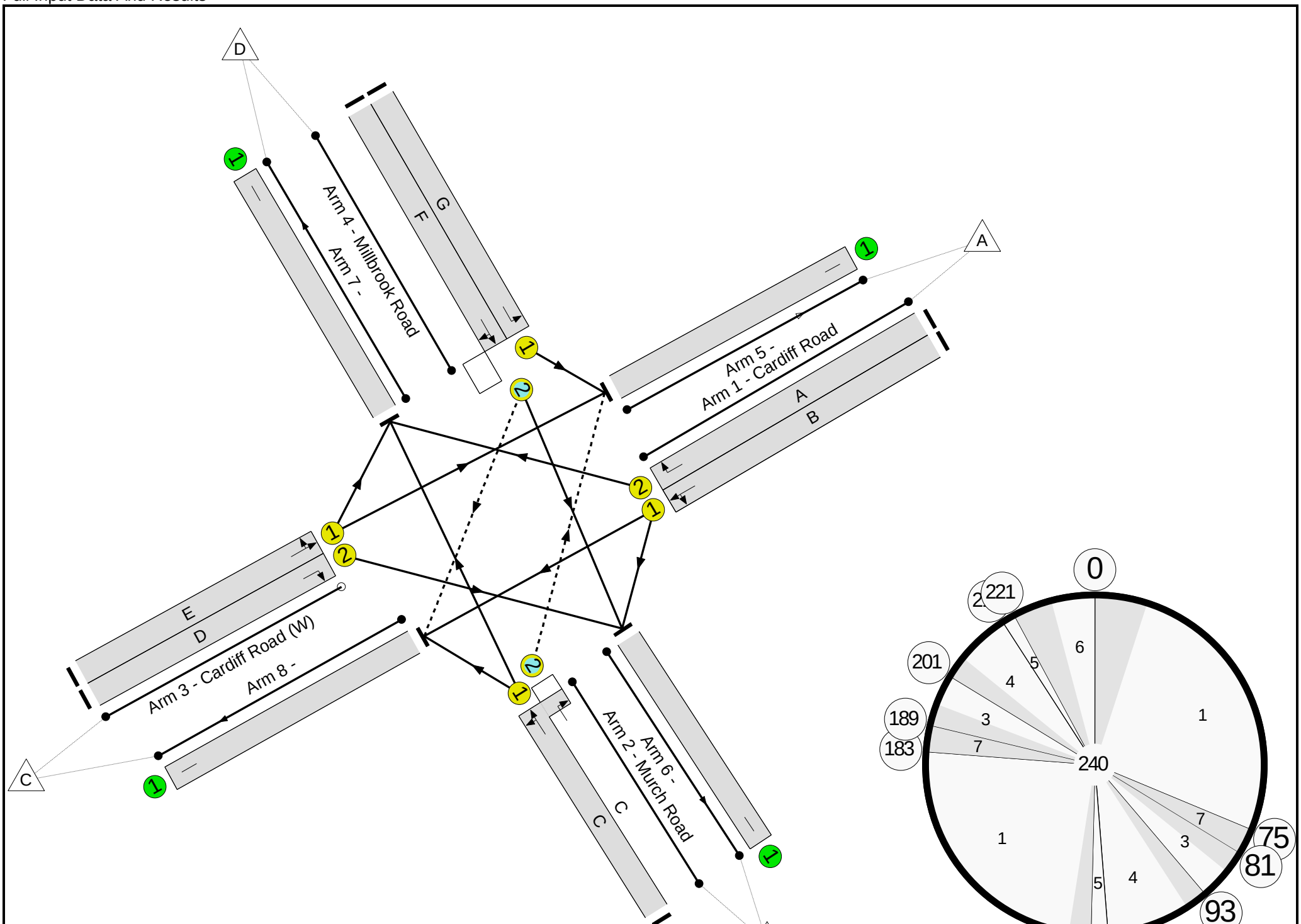
Stage	1	7	3	4	5	1	7	3	4	5
Duration	63	0	7	19	4	57	0	7	12	3
Change Point	0	75	81	93	117	121	183	189	201	218

Stage	6									
Duration	10									
Change Point	221									

Signal Timings 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: Exisiting Situation	-	-	**N/A**	-	-		-	-	-	-	-	-	**102.7%**
Unnamed Junction	-	-	**N/A**	-	-		-	-	-	-	-	-	**102.7%**
1/1	Cardiff Road Left Ahead	U	N/A	N/A	B		2	132	-	1109	1934	1080	102.7%
1/2	Cardiff Road Right	U	N/A	N/A	A		2	24	-	31	1935	210	14.8%
2/1+2/2	Murch Road Right Ahead Left	U+O	N/A	N/A	C		2	38	-	191	1855:1840	190	100.4%
3/1	Cardiff Road (W) Ahead Left	U	N/A	N/A	E		2	120	-	814	1941	987	82.5%
3/2	Cardiff Road (W) Right	U	N/A	N/A	D		2	14	-	39	1865	124	31.4%
4/1	Millbrook Road Left	U	N/A	N/A	G		2	67	-	74	1759	506	14.6%
4/2	Millbrook Road Ahead Right	O	N/A	N/A	F		2	31	-	195	2011	277	70.5%
5/1		U	N/A	N/A	-		-	-	-	993	Inf	Inf	0.0%
6/1		U	N/A	N/A	-		-	-	-	343	Inf	Inf	0.0%
7/1		U	N/A	N/A	-		-	-	-	67	Inf	Inf	0.0%
8/1		U	N/A	N/A	-		-	-	-	1050	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: Exisiting Situation	**-**	**-**	**118**	**23**	**27**	**25.5**	**36.4**	**0.1**	**62.0**	**-**	**-**	**-**	**-**
Unnamed Junction	**-**	**-**	**118**	**23**	**27**	**25.5**	**36.4**	**0.1**	**62.0**	**-**	**-**	**-**	**-**
1/1	1109	1080	-	-	-	12.3	25.5	-	37.8	122.7	42.6	25.5	68.1
1/2	31	31	-	-	-	0.4	0.1	-	0.5	59.2	1.0	0.1	1.1
2/1+2/2	191	190	62	23	27	2.9	7.1	0.1	10.2	191.5	7.0	7.1	14.1
3/1	814	814	-	-	-	5.8	2.3	-	8.1	35.7	26.5	2.3	28.8
3/2	39	39	-	-	-	0.6	0.2	-	0.8	75.0	1.4	0.2	1.6
4/1	74	74	-	-	-	0.7	0.1	-	0.8	37.0	2.2	0.1	2.2
4/2	195	195	56	0	0	2.7	1.2	0.0	3.9	72.1	7.1	1.2	8.3
5/1	993	993	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	339	339	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	67	67	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
8/1	1025	1025	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1

PRC for Signalled Lanes (%): -14.1
PRC Over All Lanes (%): -14.1

Total Delay for Signalled Lanes (pcuHr): 62.02
Total Delay Over All Lanes(pcuHr): 62.02

Cycle Time (s): 240

Appendix E

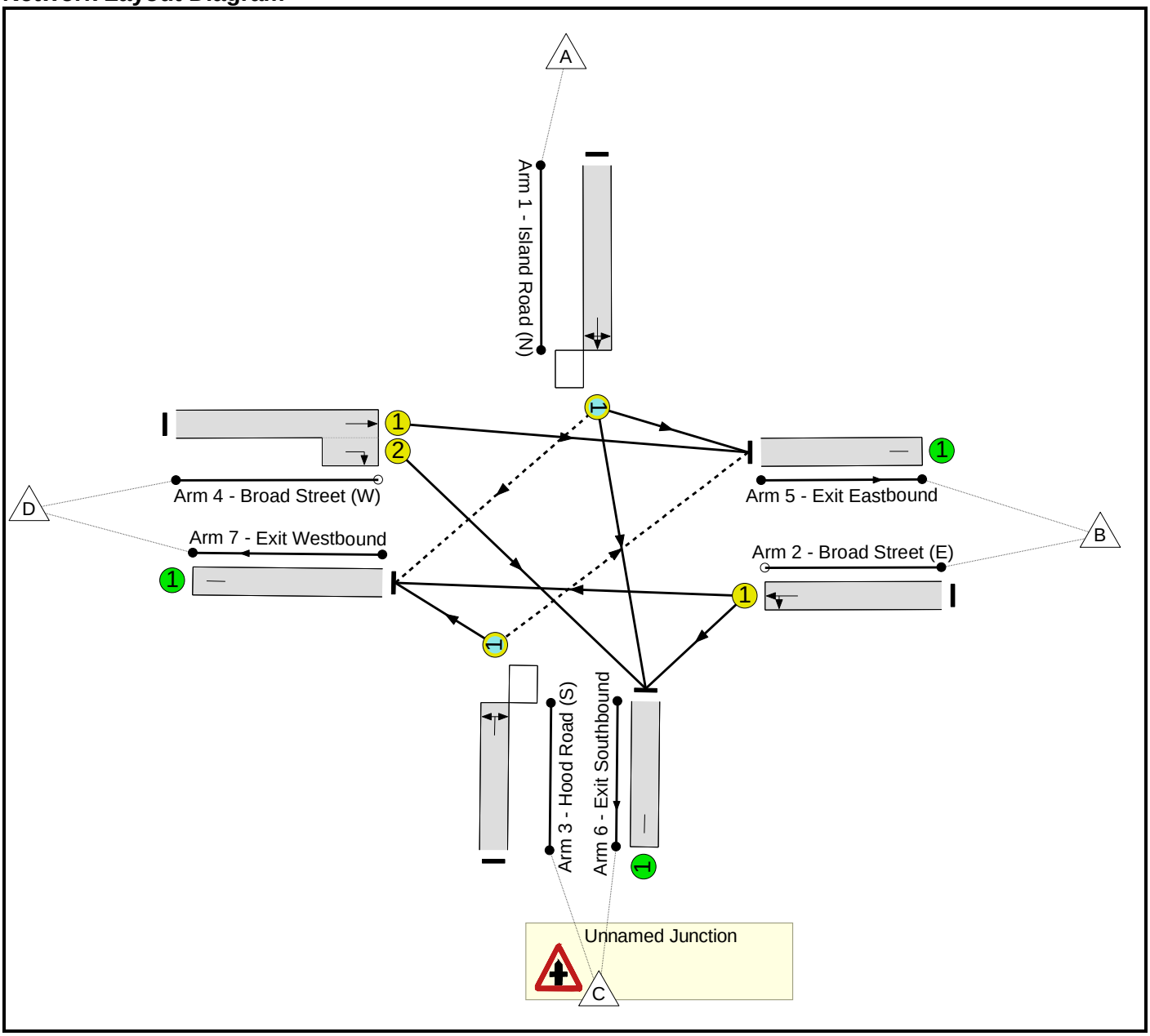
Revised Modelling output for Hood Road/Broad Street Junction

Full Input Data And Results

User and Project Details

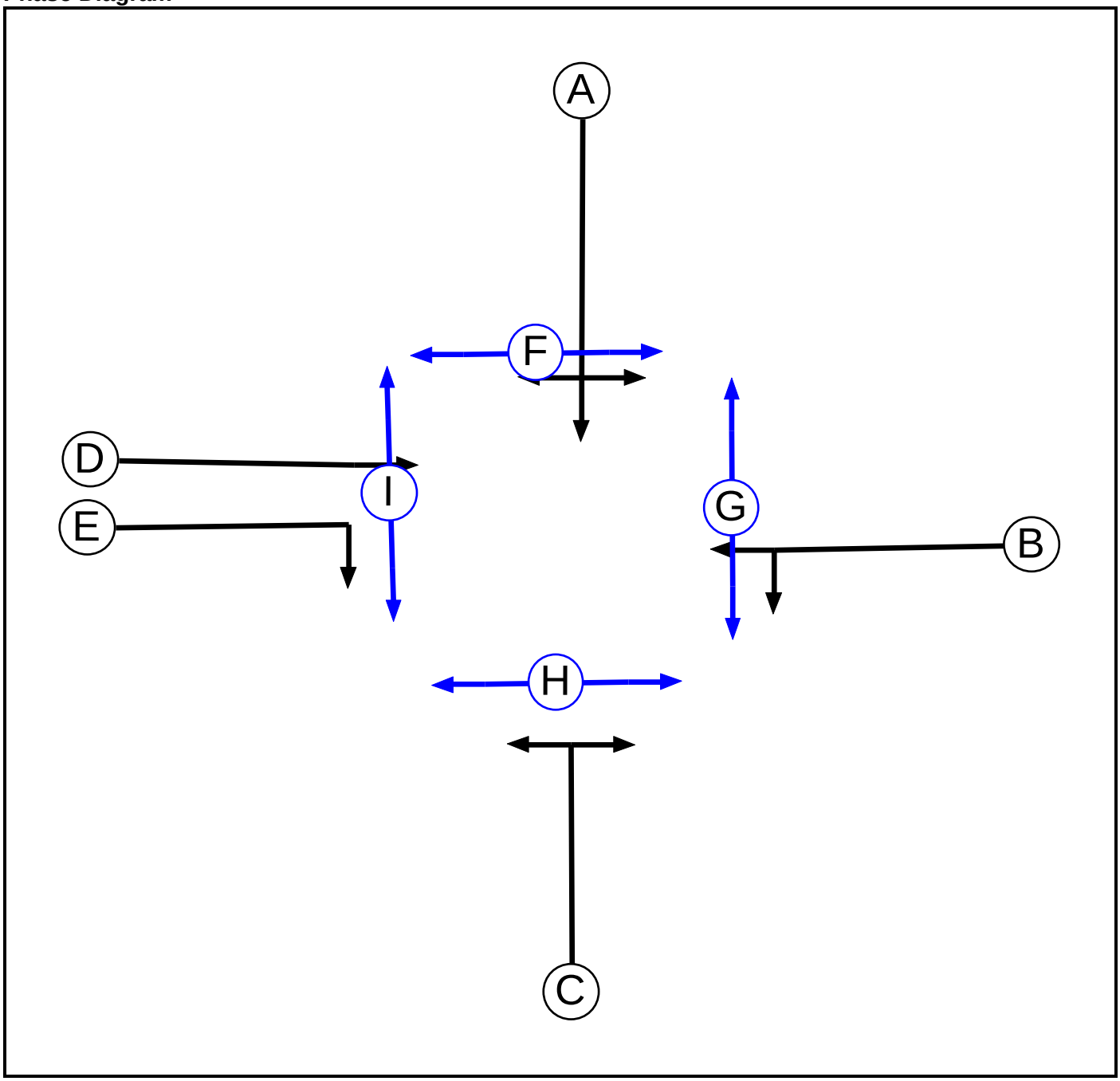
Project:	**Waterfront Barry**
Title:	
Location:	Broad Street / Hood Road, Barry
File name:	Broad Street_Hood Road.lsg3x
Author:	Ryan Hopkins
Company:	Arup
Address:	
Notes:	

Network Layout Diagram



Full Input Data And Results

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		7	7
G	Pedestrian		7	7
H	Pedestrian		7	7
I	Pedestrian		7	7

Full Input Data And Results

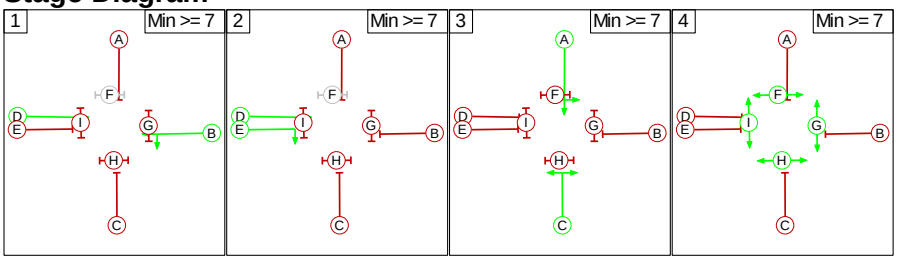
Phase Intergreens Matrix

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

Phases in Stage

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

Stage Diagram



Phase Delays

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

Prohibited Stage Changes

From Stage \ To Stage	1	2	3	4
1		6	6	8
2	6		6	8
3	6	6		8
4	8	8	8	

Full Input Data And Results

Give-Way Lane Input Data

Junction: Unnamed Junction

Lane	Movement	Max Flow when Giving Way (PCU/Hr)	Opposing Lane	Opp. Lane Coeff.	Opp. Mvmnts.	Right Turn Storage (PCU)	Non-Blocking Storage (PCU)	RTF	Right Turn Move up (s)	Max Turns in Intergreen (PCU)
1/1 (Island Road (N))	7/1 (Right)	1439	3/1	1.09	3/1	2.00	2.00	0.50	2	2.00
3/1 (Hood Road (S))	5/1 (Right)	1439	1/1	1.09	1/1	2.00	2.00	0.50	2	2.00

Full Input Data And Results

Lane Input Data

Junction: Unnamed 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)
1/1 (Island Road (N))	O	A	2	3	60.0	Geom	-	3.70	0.00	Y	Arm 5 Left	7.00
											Arm 6 Ahead	Inf
											Arm 7 Right	16.50
2/1 (Broad Street (E))	U	B	2	3	60.0	Geom	-	4.30	0.00	Y	Arm 6 Left	7.90
											Arm 7 Ahead	Inf
3/1 (Hood Road (S))	O	C	2	3	60.0	Geom	-	3.15	0.00	Y	Arm 5 Right	15.30
											Arm 7 Left	10.12
4/1 (Broad Street (W))	U	D	2	3	60.0	Geom	-	3.05	0.00	Y	Arm 5 Ahead	Inf
4/2 (Broad Street (W))	U	E	2	3	3.0	Geom	-	3.05	0.00	Y	Arm 6 Right	14.00
5/1 (Exit Eastbound)	U		2	3	60.0	Inf	-	-	-	-	-	-
6/1 (Exit Southbound)	U		2	3	60.0	Inf	-	-	-	-	-	-
7/1 (Exit Westbound)	U		2	3	60.0	Inf	-	-	-	-	-	-

Traffic Flow Groups

Flow Group	Start Time	End Time	Duration	Formula
1: 'AM 2008 Base'	08:30	09:30	01:00	
2: 'PM 2008 Base'	16:30	17:30	01:00	
3: 'AM 2020 Base'	08:30	09:30	01:00	
4: 'PM 2020 Base'	16:30	17:30	01:00	
5: 'AM 2020 Dev + BI'	08:30	09:30	01:00	
6: 'PM 2020 Dev + BI'	16:30	17:30	01:00	
7: '2020 Dev + Tour'	16:30	17:30	01:00	

Traffic Lane Flows

Lane	Scenario 1: AM 2008 Base
Junction: Unnamed Junction	
1/1	68
2/1	419
3/1	107
4/1 (with short)	697(In) 633(Out)
4/2 (short)	64
5/1	658
6/1	93
7/1	540

Scenario 1: 'AM 2008 Base' (FG1: 'AM 2008 Base', Plan 1: 'Staging Plan No. 1')

Traffic Lane Flows

Junction: Unnamed Junction							
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat flow (PCU/Hr)**
1/1 (Island Road (N))	3.70	0.00	Y	Arm 5 Left	7.00	27.9 %	1816
				Arm 6 Ahead	Inf	35.3 %	
				Arm 7 Right	16.50	36.8 %	
2/1 (Broad Street (E))	4.30	0.00	Y	Arm 6 Left	7.90	1.2 %	2040
				Arm 7 Ahead	Inf	98.8 %	
3/1 (Hood Road (S))	3.15	0.00	Y	Arm 5 Right	15.30	5.6 %	1685
				Arm 7 Left	10.12	94.4 %	
4/1 (Broad Street (W))	3.05	0.00	Y	Arm 5 Ahead	Inf	100.0 %	1920
4/2 (Broad Street (W))	3.05	0.00	Y	Arm 6 Right	14.00	100.0 %	1734
5/1 (Exit Eastbound Lane 1)	Infinite Saturation Flow						Inf
6/1 (Exit Southbound Lane 1)	Infinite Saturation Flow						Inf
7/1 (Exit Westbound Lane 1)	Infinite Saturation Flow						Inf

Full Input Data And Results

Traffic Lane Flows

Lane	Scenario 2: PM 2008 Base
Junction: Unnamed Junction	
1/1	75
2/1	640
3/1	305
4/1 (with short)	585(In) 529(Out)
4/2 (short)	56
5/1	562
6/1	82
7/1	961

Scenario 2: 'PM 2008 Base' (FG2: 'PM 2008 Base', Plan 1: 'Staging Plan No. 1')

Traffic Lane Flows

Junction: Unnamed Junction							
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat flow (PCU/Hr)**
1/1 (Island Road (N))	3.70	0.00	Y	Arm 5 Left	7.00	37.3 %	1778
				Arm 6 Ahead	Inf	22.7 %	
				Arm 7 Right	16.50	40.0 %	
2/1 (Broad Street (E))	4.30	0.00	Y	Arm 6 Left	7.90	1.4 %	2040
				Arm 7 Ahead	Inf	98.6 %	
3/1 (Hood Road (S))	3.15	0.00	Y	Arm 5 Right	15.30	1.6 %	1682
				Arm 7 Left	10.12	98.4 %	
4/1 (Broad Street (W))	3.05	0.00	Y	Arm 5 Ahead	Inf	100.0 %	1920
4/2 (Broad Street (W))	3.05	0.00	Y	Arm 6 Right	14.00	100.0 %	1734
5/1 (Exit Eastbound Lane 1)	Infinite Saturation Flow						Inf
6/1 (Exit Southbound Lane 1)	Infinite Saturation Flow						Inf
7/1 (Exit Westbound Lane 1)	Infinite Saturation Flow						Inf

Full Input Data And Results

Traffic Lane Flows

Lane	Scenario 3: AM 2020 Base
Junction: Unnamed Junction	
1/1	79
2/1	488
3/1	124
4/1 (with short)	811(In) 737(Out)
4/2 (short)	74
5/1	766
6/1	108
7/1	628

Scenario 3: 'AM 2020 Base' (FG3: 'AM 2020 Base', Plan 1: 'Staging Plan No. 1')

Traffic Lane Flows

Junction: Unnamed Junction							
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat flow (PCU/Hr)**
1/1 (Island Road (N))	3.70	0.00	Y	Arm 5 Left	7.00	27.8 %	1816
				Arm 6 Ahead	Inf	35.4 %	
				Arm 7 Right	16.50	36.7 %	
2/1 (Broad Street (E))	4.30	0.00	Y	Arm 6 Left	7.90	1.2 %	2040
				Arm 7 Ahead	Inf	98.8 %	
3/1 (Hood Road (S))	3.15	0.00	Y	Arm 5 Right	15.30	5.6 %	1685
				Arm 7 Left	10.12	94.4 %	
4/1 (Broad Street (W))	3.05	0.00	Y	Arm 5 Ahead	Inf	100.0 %	1920
4/2 (Broad Street (W))	3.05	0.00	Y	Arm 6 Right	14.00	100.0 %	1734
5/1 (Exit Eastbound Lane 1)	Infinite Saturation Flow						Inf
6/1 (Exit Southbound Lane 1)	Infinite Saturation Flow						Inf
7/1 (Exit Westbound Lane 1)	Infinite Saturation Flow						Inf

Full Input Data And Results

Traffic Lane Flows

Lane	Scenario 4: PM 2020 Base
Junction: Unnamed Junction	
1/1	87
2/1	745
3/1	354
4/1 (with short)	680(In) 615(Out)
4/2 (short)	65
5/1	654
6/1	95
7/1	1117

Scenario 4: 'PM 2020 Base' (FG4: 'PM 2020 Base', Plan 1: 'Staging Plan No. 1')

Traffic Lane Flows

Junction: Unnamed Junction							
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat flow (PCU/Hr)**
1/1 (Island Road (N))	3.70	0.00	Y	Arm 5 Left	7.00	37.9 %	1776
				Arm 6 Ahead	Inf	21.8 %	
				Arm 7 Right	16.50	40.2 %	
2/1 (Broad Street (E))	4.30	0.00	Y	Arm 6 Left	7.90	1.5 %	2039
				Arm 7 Ahead	Inf	98.5 %	
3/1 (Hood Road (S))	3.15	0.00	Y	Arm 5 Right	15.30	1.7 %	1682
				Arm 7 Left	10.12	98.3 %	
4/1 (Broad Street (W))	3.05	0.00	Y	Arm 5 Ahead	Inf	100.0 %	1920
4/2 (Broad Street (W))	3.05	0.00	Y	Arm 6 Right	14.00	100.0 %	1734
5/1 (Exit Eastbound Lane 1)	Infinite Saturation Flow						Inf
6/1 (Exit Southbound Lane 1)	Infinite Saturation Flow						Inf
7/1 (Exit Westbound Lane 1)	Infinite Saturation Flow						Inf

Full Input Data And Results

Traffic Lane Flows

Lane	Scenario 5: AM 2020 Dev + BI
Junction: Unnamed Junction	
1/1	79
2/1	401
3/1	161
4/1 (with short)	646(In) 548(Out)
4/2 (short)	98
5/1	577
6/1	132
7/1	578

Scenario 5: 'AM 2020 Dev + BI' (FG5: 'AM 2020 Dev + BI', Plan 1: 'Staging Plan No. 1')

Traffic Lane Flows

Junction: Unnamed Junction							
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat flow (PCU/Hr)**
1/1 (Island Road (N))	3.70	0.00	Y	Arm 5 Left	7.00	27.8 %	1816
				Arm 6 Ahead	Inf	35.4 %	
				Arm 7 Right	16.50	36.7 %	
2/1 (Broad Street (E))	4.30	0.00	Y	Arm 6 Left	7.90	1.5 %	2039
				Arm 7 Ahead	Inf	98.5 %	
3/1 (Hood Road (S))	3.15	0.00	Y	Arm 5 Right	15.30	4.3 %	1684
				Arm 7 Left	10.12	95.7 %	
4/1 (Broad Street (W))	3.05	0.00	Y	Arm 5 Ahead	Inf	100.0 %	1920
4/2 (Broad Street (W))	3.05	0.00	Y	Arm 6 Right	14.00	100.0 %	1734
5/1 (Exit Eastbound Lane 1)	Infinite Saturation Flow						Inf
6/1 (Exit Southbound Lane 1)	Infinite Saturation Flow						Inf
7/1 (Exit Westbound Lane 1)	Infinite Saturation Flow						Inf

Full Input Data And Results

Traffic Lane Flows

Lane	Scenario 6: PM 2020 Dev + BI
Junction: Unnamed Junction	
1/1	87
2/1	524
3/1	387
4/1 (with short)	598(In) 494(Out)
4/2 (short)	104
5/1	533
6/1	134
7/1	929

Scenario 6: 'PM 2020 Dev + BI' (FG6: 'PM 2020 Dev + BI', Plan 1: 'Staging Plan No. 1')

Traffic Lane Flows

Junction: Unnamed Junction							
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat flow (PCU/Hr)**
1/1 (Island Road (N))	3.70	0.00	Y	Arm 5 Left	7.00	37.9 %	1776
				Arm 6 Ahead	Inf	21.8 %	
				Arm 7 Right	16.50	40.2 %	
2/1 (Broad Street (E))	4.30	0.00	Y	Arm 6 Left	7.90	2.1 %	2037
				Arm 7 Ahead	Inf	97.9 %	
3/1 (Hood Road (S))	3.15	0.00	Y	Arm 5 Right	15.30	1.6 %	1682
				Arm 7 Left	10.12	98.4 %	
4/1 (Broad Street (W))	3.05	0.00	Y	Arm 5 Ahead	Inf	100.0 %	1920
4/2 (Broad Street (W))	3.05	0.00	Y	Arm 6 Right	14.00	100.0 %	1734
5/1 (Exit Eastbound Lane 1)	Infinite Saturation Flow						Inf
6/1 (Exit Southbound Lane 1)	Infinite Saturation Flow						Inf
7/1 (Exit Westbound Lane 1)	Infinite Saturation Flow						Inf

Full Input Data And Results

Traffic Lane Flows

Lane	Scenario 7: PM 2020 Dev + Tourism
Junction: Unnamed Junction	
1/1	87
2/1	524
3/1	387
4/1 (with short)	598(In) 494(Out)
4/2 (short)	104
5/1	533
6/1	134
7/1	929

Scenario 7: 'PM 2020 Dev + Tourism' (FG7: '2020 Dev + Tour', Plan 1: 'Staging Plan No. 1')

Traffic Lane Flows

Junction: Unnamed Junction							
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat flow (PCU/Hr)**
1/1 (Island Road (N))	3.70	0.00	Y	Arm 5 Left	7.00	37.9 %	1776
				Arm 6 Ahead	Inf	21.8 %	
				Arm 7 Right	16.50	40.2 %	
2/1 (Broad Street (E))	4.30	0.00	Y	Arm 6 Left	7.90	2.1 %	2037
				Arm 7 Ahead	Inf	97.9 %	
3/1 (Hood Road (S))	3.15	0.00	Y	Arm 5 Right	15.30	1.6 %	1682
				Arm 7 Left	10.12	98.4 %	
4/1 (Broad Street (W))	3.05	0.00	Y	Arm 5 Ahead	Inf	100.0 %	1920
4/2 (Broad Street (W))	3.05	0.00	Y	Arm 6 Right	14.00	100.0 %	1734
5/1 (Exit Eastbound Lane 1)	Infinite Saturation Flow						Inf
6/1 (Exit Southbound Lane 1)	Infinite Saturation Flow						Inf
7/1 (Exit Westbound Lane 1)	Infinite Saturation Flow						Inf

Full Input Data And Results

Traffic Lane Flows

Lane	Scenario 8: PM 2020 Base + Tourism
Junction: Unnamed Junction	
1/1	87
2/1	846
3/1	354
4/1 (with short)	795(In) 730(Out)
4/2 (short)	65
5/1	769
6/1	95
7/1	1218

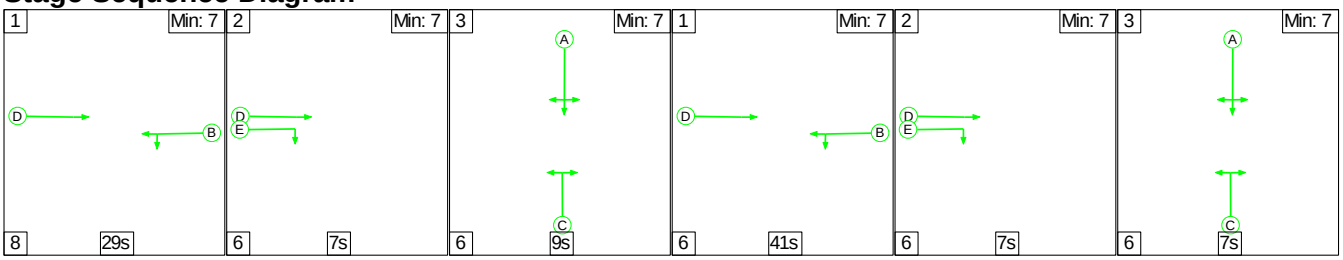
Scenario 8: 'PM 2020 Base + Tourism' (FG8: 'PM 2020 Base + Tourism', Plan 1: 'Staging Plan No. 1')

Traffic Lane Flows

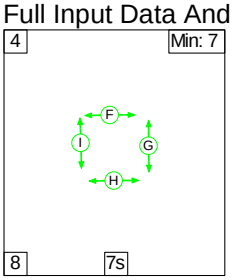
Junction: Unnamed Junction							
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat flow (PCU/Hr)**
1/1 (Island Road (N))	3.70	0.00	Y	Arm 5 Left	7.00	37.9 %	1776
				Arm 6 Ahead	Inf	21.8 %	
				Arm 7 Right	16.50	40.2 %	
2/1 (Broad Street (E))	4.30	0.00	Y	Arm 6 Left	7.90	1.3 %	2040
				Arm 7 Ahead	Inf	98.7 %	
3/1 (Hood Road (S))	3.15	0.00	Y	Arm 5 Right	15.30	1.7 %	1682
				Arm 7 Left	10.12	98.3 %	
4/1 (Broad Street (W))	3.05	0.00	Y	Arm 5 Ahead	Inf	100.0 %	1920
4/2 (Broad Street (W))	3.05	0.00	Y	Arm 6 Right	14.00	100.0 %	1734
5/1 (Exit Eastbound Lane 1)	Infinite Saturation Flow						Inf
6/1 (Exit Southbound Lane 1)	Infinite Saturation Flow						Inf
7/1 (Exit Westbound Lane 1)	Infinite Saturation Flow						Inf

Scenario 1: 'AM 2008 Base' (FG1: 'AM 2008 Base', Plan 1: 'Staging Plan No. 1')

Stage Sequence Diagram



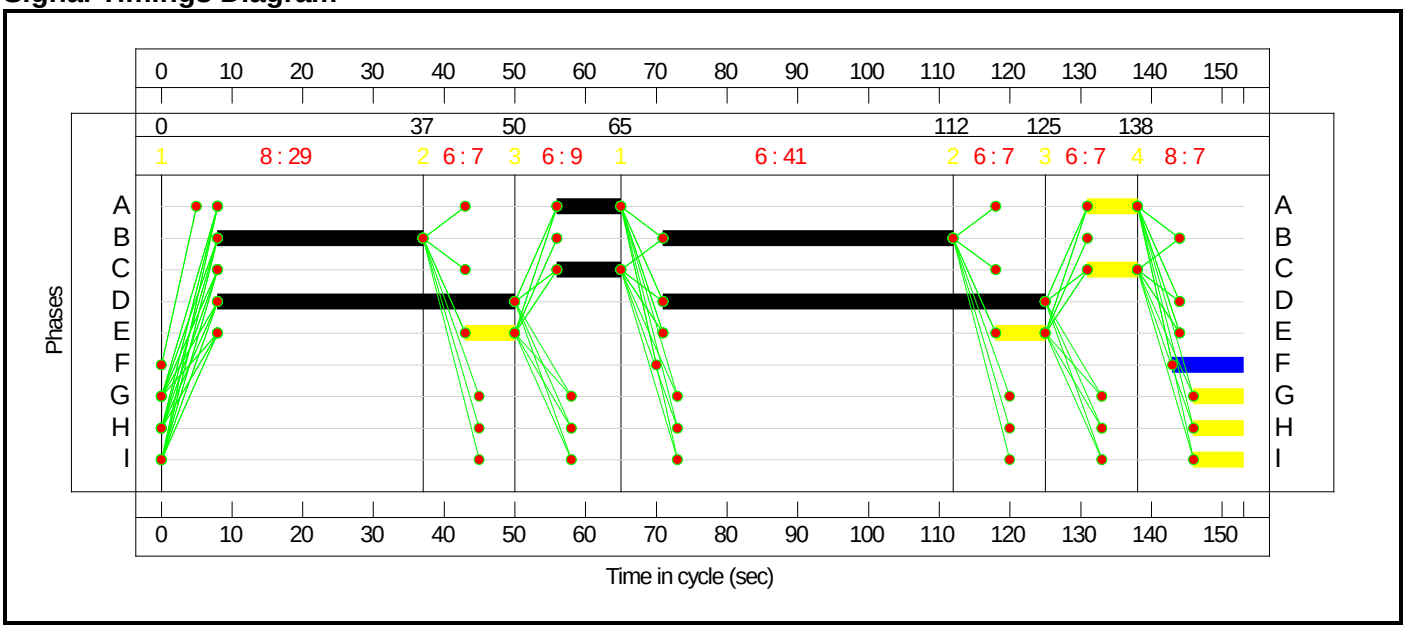
Full Input Data And Results

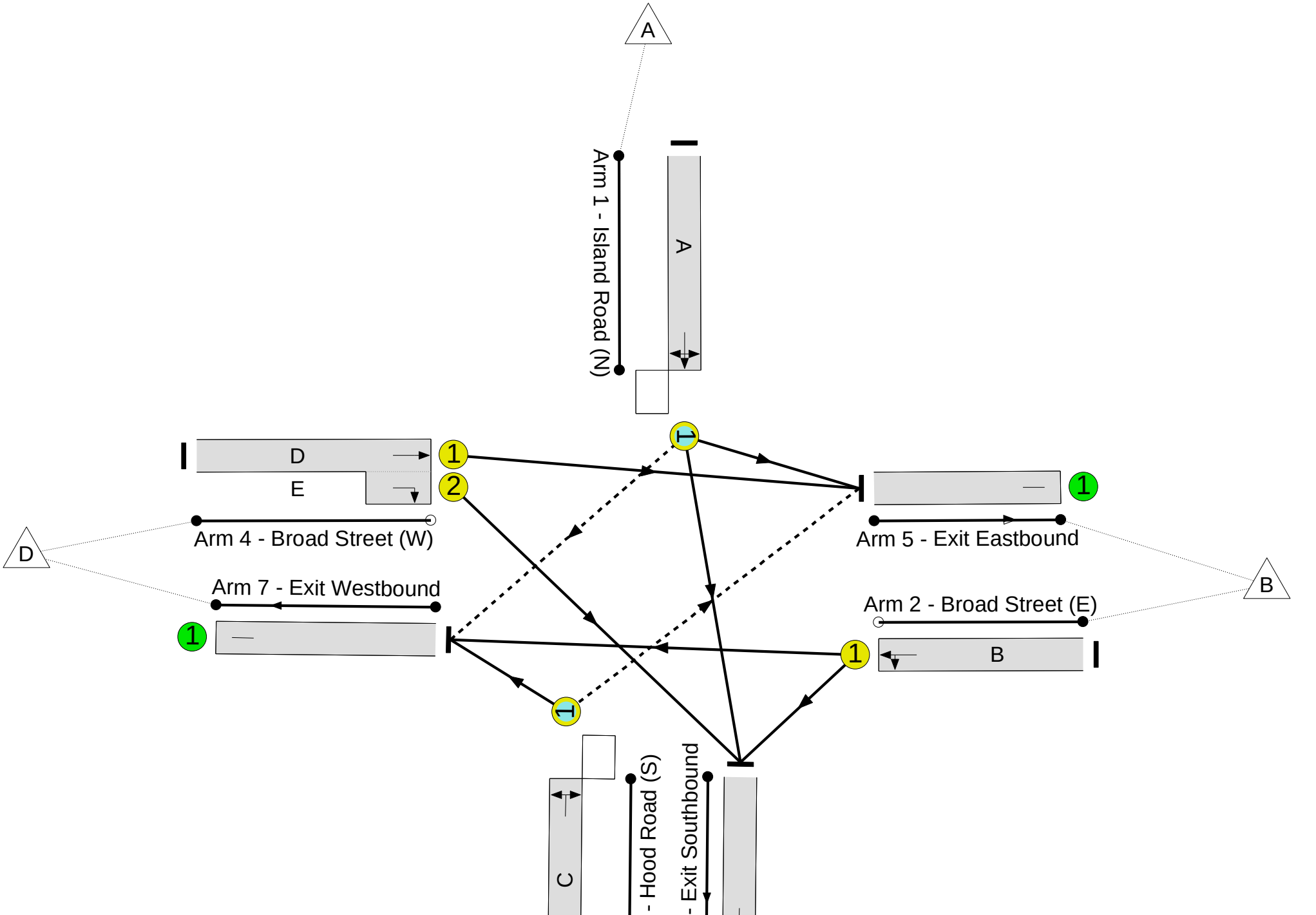


Stage Timings

Stage	1	2	3	1	2	3	4
Duration	29	7	9	41	7	7	7
Change Point	0	37	50	65	112	125	138

Signal Timings Diagram




A
Arm 1 - Island Road (N)
A
D
E
1
2
1
Arm 4 - Broad Street (W)
Arm 5 - Exit Eastbound
1
D
B
Arm 7 - Exit Westbound
Arm 2 - Broad Street (E)
1
1
B
1
C
- Hood Road (S)
- Exit Southbound

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**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**56.9%**
Unnamed Junction	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**56.9%**
1/1	Island Road (N) Left Ahead Right	O	N/A	N/A	A		2	16	-	68	1816	214	31.8%
2/1	Broad Street (E) Left Ahead	U	N/A	N/A	B		2	70	-	419	2040	960	43.6%
3/1	Hood Road (S) Right Left	O	N/A	N/A	C		2	16	-	107	1685	198	54.0%
4/1+4/2	Broad Street (W) Ahead Right	U	N/A	N/A	D E		2	96:14	-	697	1920:1734	1224	56.9%
5/1	Exit Eastbound	U	N/A	N/A	-		-	-	-	658	Inf	Inf	0.0%
6/1	Exit Southbound	U	N/A	N/A	-		-	-	-	93	Inf	Inf	0.0%
7/1	Exit Westbound	U	N/A	N/A	-		-	-	-	540	Inf	Inf	0.0%

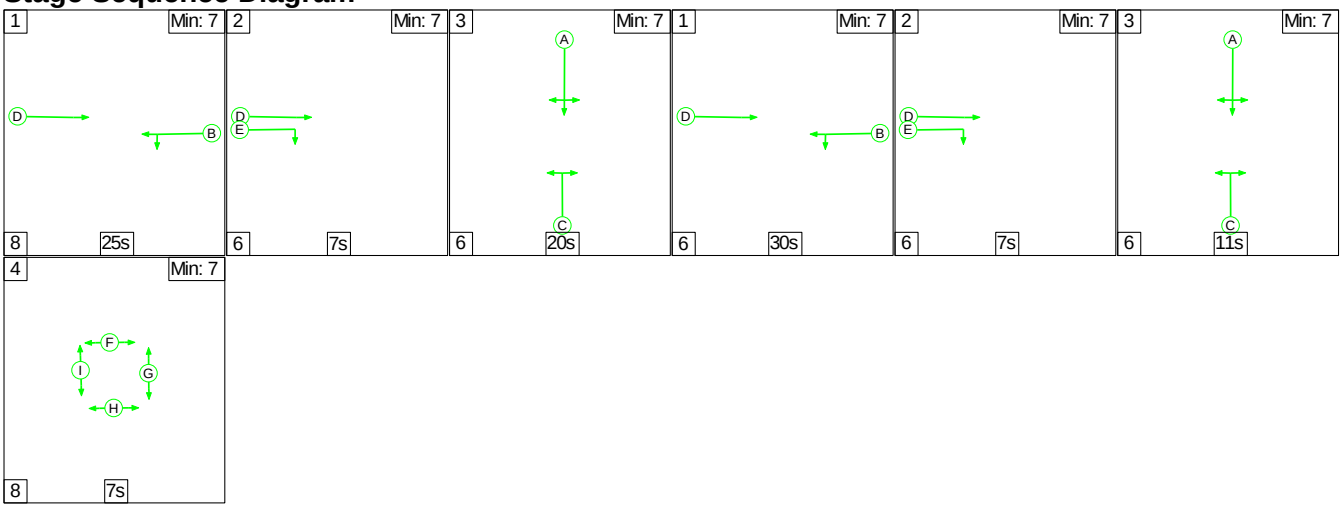
Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**31**	**0**	**0**	**5.2**	**1.9**	**0.0**	**7.1**	**-**	**-**	**-**	**-**
Unnamed Junction	**-**	**-**	**31**	**0**	**0**	**5.2**	**1.9**	**0.0**	**7.1**	**-**	**-**	**-**	**-**
1/1	68	68	25	0	0	0.6	0.2	0.0	0.8	44.8	1.4	0.2	1.6
2/1	419	419	-	-	-	1.6	0.4	-	2.0	17.3	7.0	0.4	7.4
3/1	107	107	6	0	0	0.9	0.6	0.0	1.5	51.3	2.2	0.6	2.8
4/1+4/2	697	697	-	-	-	2.0	0.7	-	2.7	13.8	10.2	0.7	10.8
5/1	658	658	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	93	93	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	540	540	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1 PRC for Signalled Lanes (%): 58.1 Total Delay for Signalled Lanes (pcuHr): 7.06
PRC Over All Lanes (%): 58.1 Total Delay Over All Lanes(pcuHr): 7.06 Cycle Time (s): 153

Full Input Data And Results

Scenario 2: 'PM 2008 Base' (FG2: 'PM 2008 Base', Plan 1: 'Staging Plan No. 1')

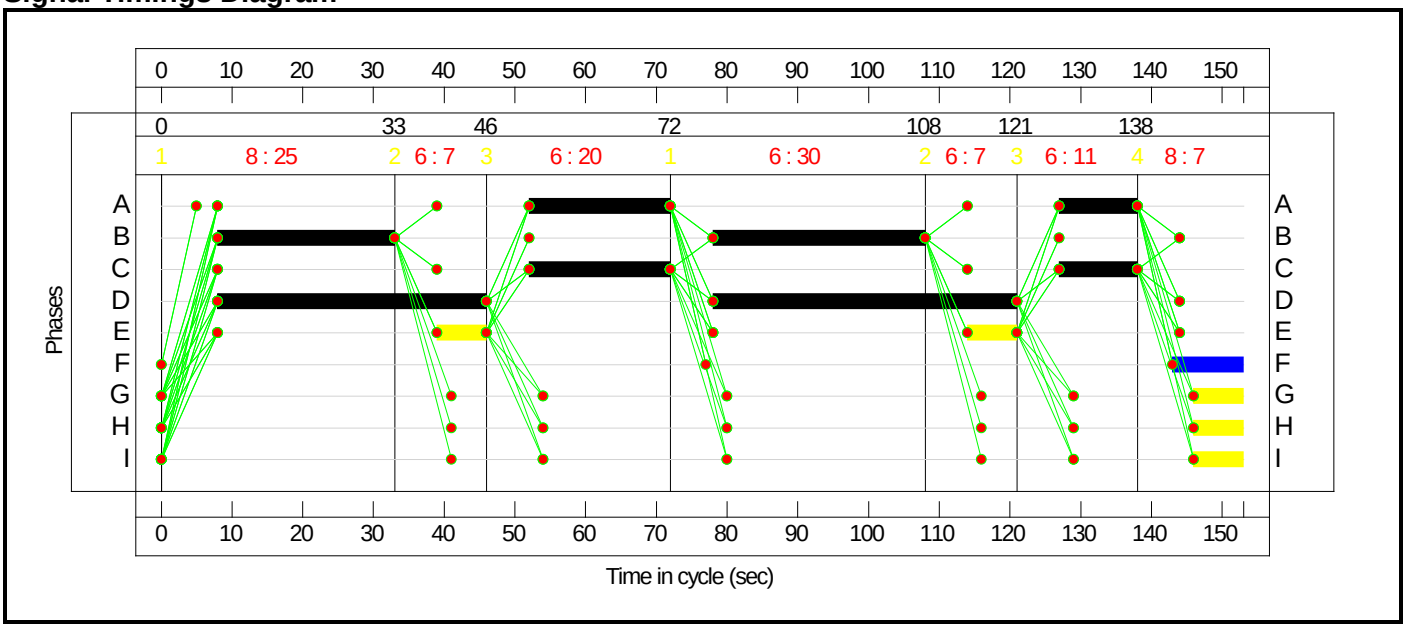
Stage Sequence Diagram

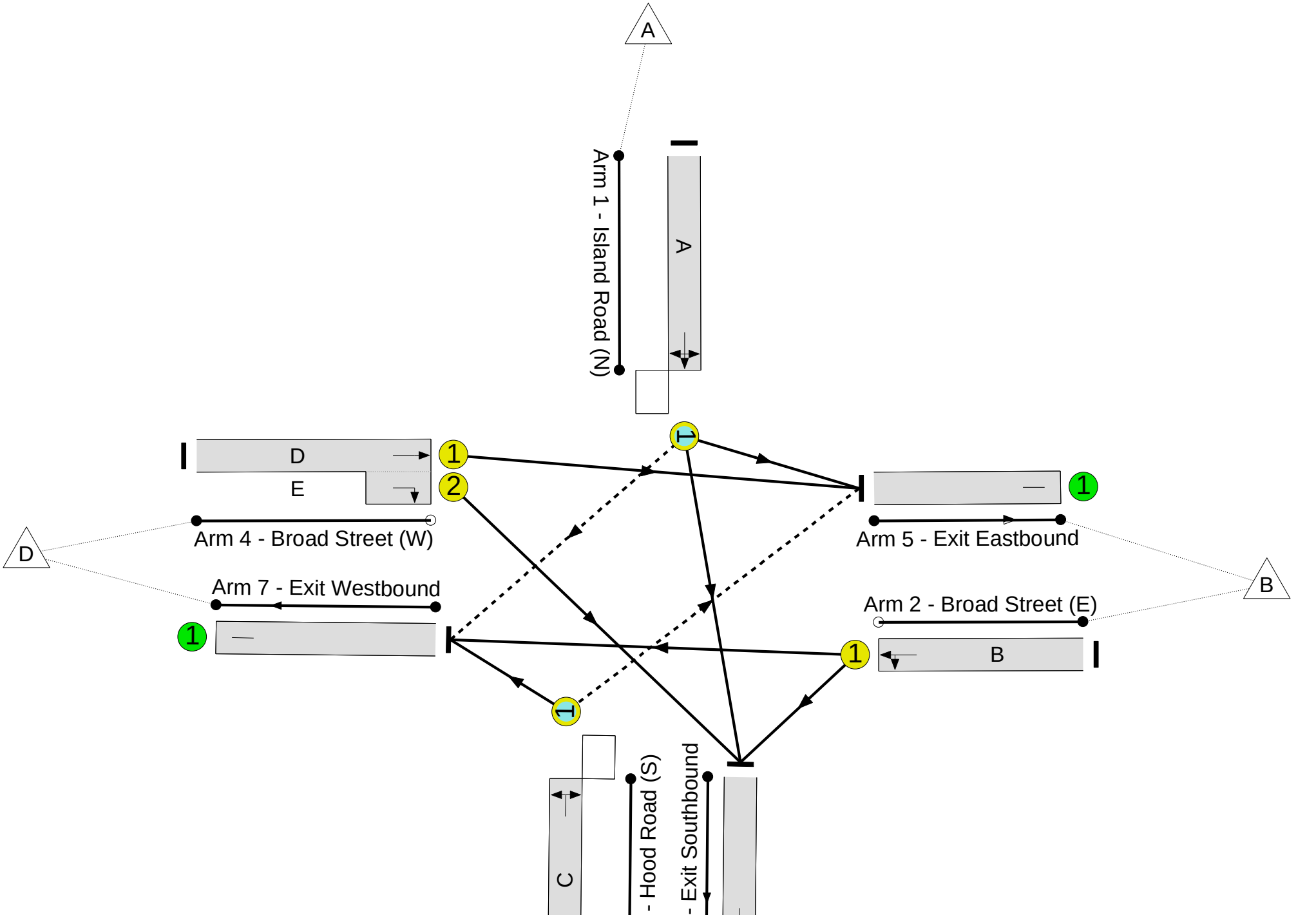


Stage Timings

Stage	1	2	3	1	2	3	4
Duration	25	7	20	30	7	11	7
Change Point	0	33	46	72	108	121	138

Signal Timings Diagram




A
Arm 1 - Island Road (N)
A
D
E
1
2
1
Arm 4 - Broad Street (W)
Arm 5 - Exit Eastbound
1
D
B
Arm 7 - Exit Westbound
Arm 2 - Broad Street (E)
1
1
B
1
C
- Hood Road (S)
- Exit Southbound

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**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**84.2%**
Unnamed Junction	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**84.2%**
1/1	Island Road (N) Left Ahead Right	O	N/A	N/A	A		2	31	-	75	1778	270	27.8%
2/1	Broad Street (E) Left Ahead	U	N/A	N/A	B		2	55	-	640	2040	760	84.2%
3/1	Hood Road (S) Right Left	O	N/A	N/A	C		2	31	-	305	1682	363	84.1%
4/1+4/2	Broad Street (W) Ahead Right	U	N/A	N/A	D E		2	81:14	-	585	1920:1734	1038	56.4%
5/1	Exit Eastbound	U	N/A	N/A	-		-	-	-	562	Inf	Inf	0.0%
6/1	Exit Southbound	U	N/A	N/A	-		-	-	-	82	Inf	Inf	0.0%
7/1	Exit Westbound	U	N/A	N/A	-		-	-	-	961	Inf	Inf	0.0%

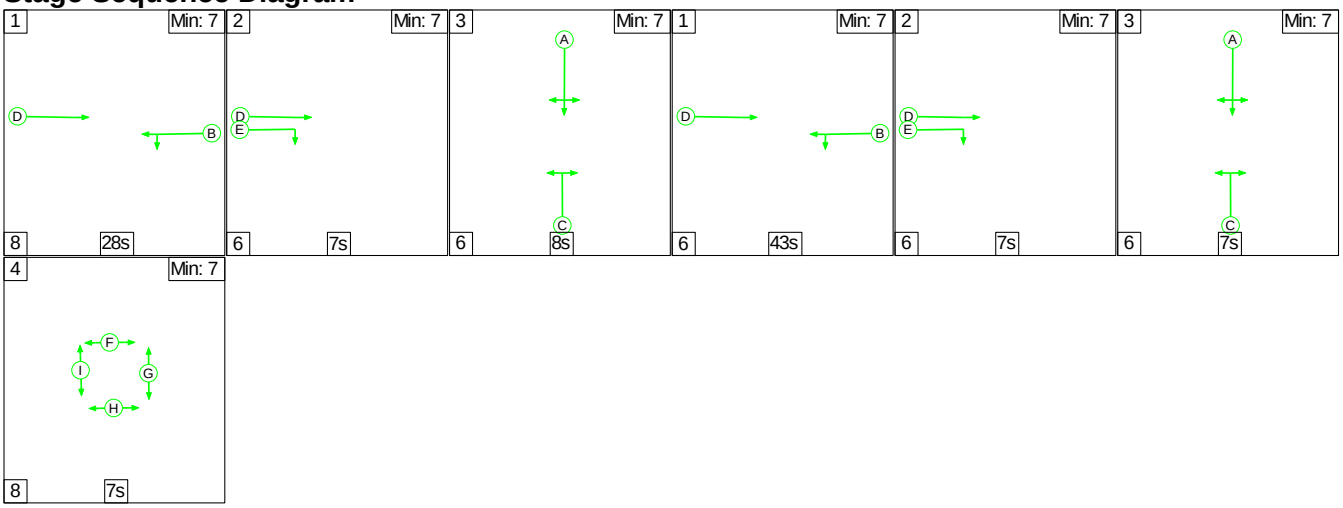
Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**22**	**0**	**13**	**9.1**	**5.8**	**0.1**	**15.0**	**-**	**-**	**-**	**-**
Unnamed Junction	**-**	**-**	**22**	**0**	**13**	**9.1**	**5.8**	**0.1**	**15.0**	**-**	**-**	**-**	**-**
1/1	75	75	17	0	13	0.5	0.2	0.1	0.8	38.7	1.4	0.2	1.6
2/1	640	640	-	-	-	3.9	2.6	-	6.5	36.5	13.3	2.6	15.9
3/1	305	305	5	0	0	2.5	2.4	0.0	4.9	57.8	6.8	2.4	9.2
4/1+4/2	585	585	-	-	-	2.2	0.6	-	2.8	17.4	8.6	0.6	9.3
5/1	562	562	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	82	82	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	961	961	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1 PRC for Signalled Lanes (%): 6.9 Total Delay for Signalled Lanes (pcuHr): 15.02
PRC Over All Lanes (%): 6.9 Total Delay Over All Lanes(pcuHr): 15.02 Cycle Time (s): 153

Full Input Data And Results

Scenario 3: 'AM 2020 Base' (FG3: 'AM 2020 Base', Plan 1: 'Staging Plan No. 1')

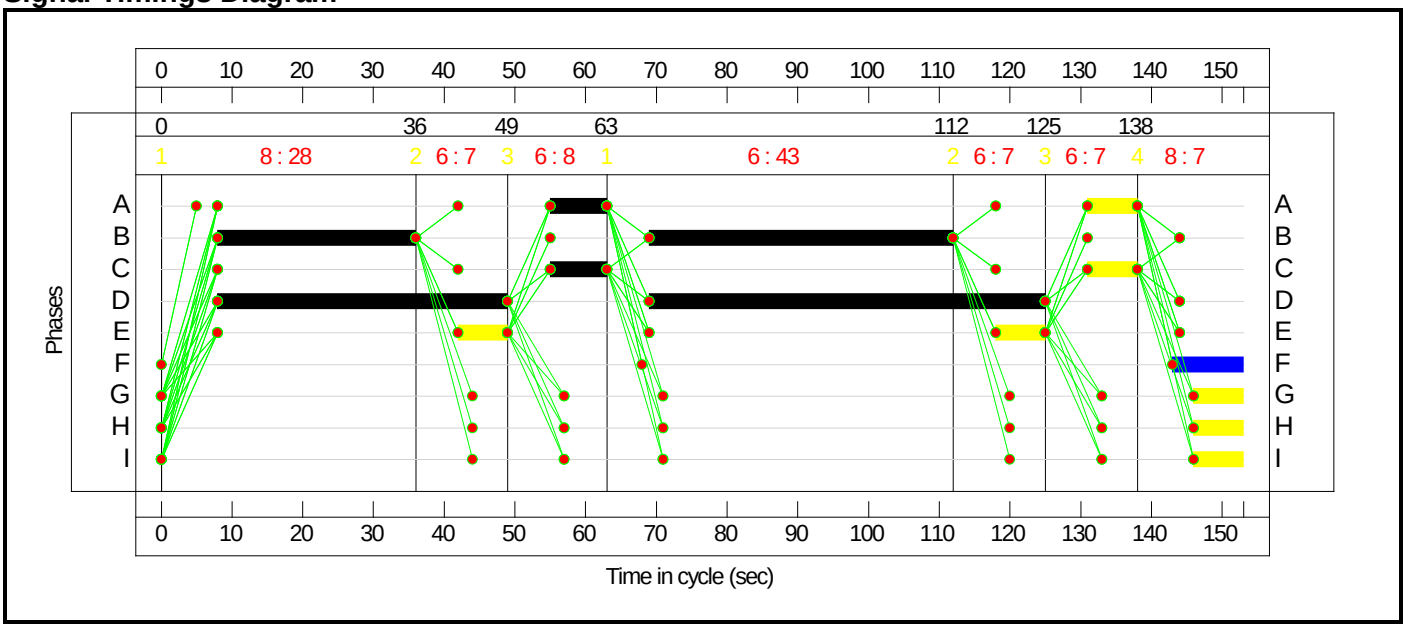
Stage Sequence Diagram

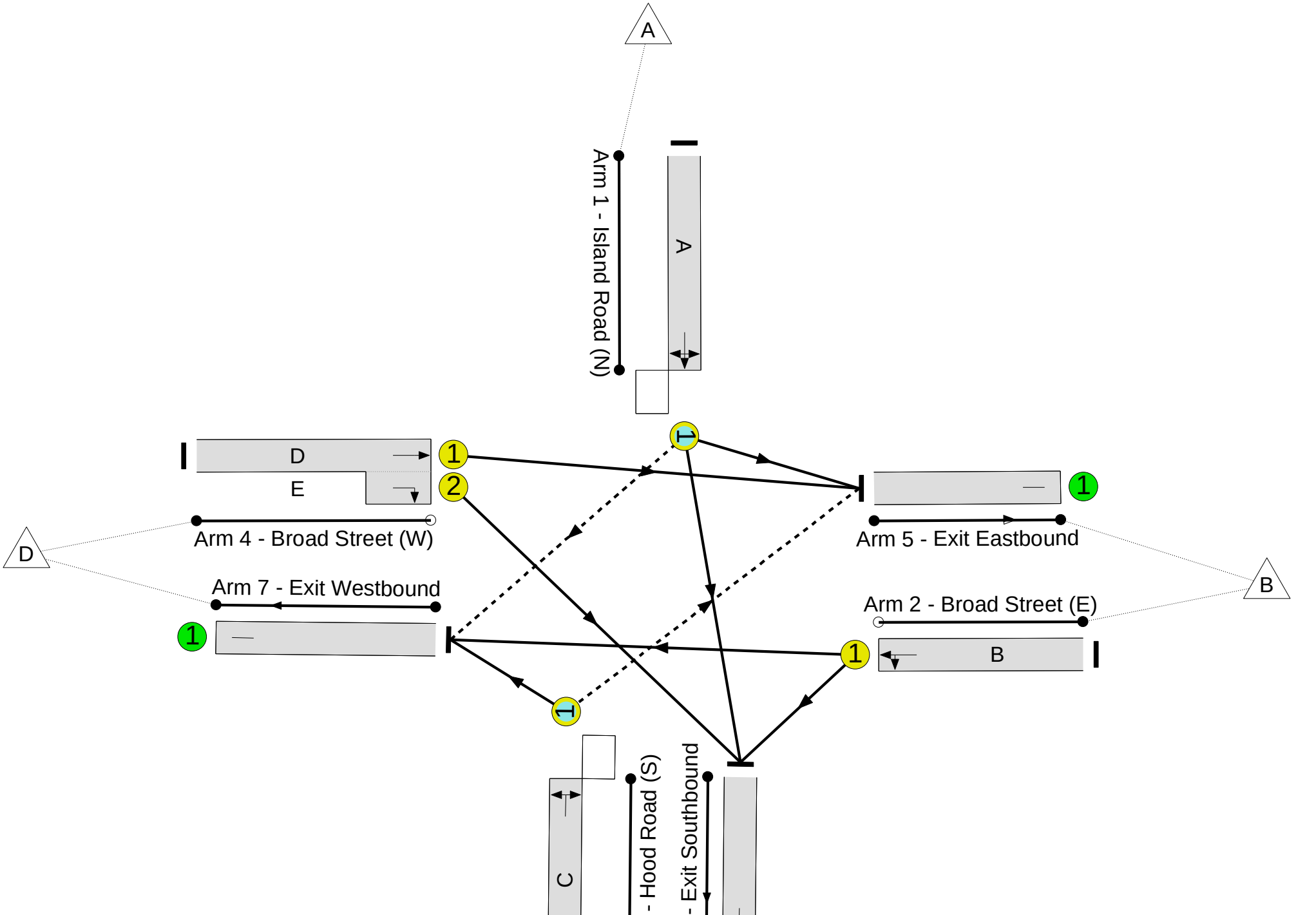


Stage Timings

Stage	1	2	3	1	2	3	4
Duration	28	7	8	43	7	7	7
Change Point	0	36	49	63	112	125	138

Signal Timings Diagram




A
Arm 1 - Island Road (N)
A
D
E
1
2
1
Arm 4 - Broad Street (W)
Arm 5 - Exit Eastbound
1
D
B
Arm 7 - Exit Westbound
Arm 2 - Broad Street (E)
1
1
B
1
C
- Hood Road (S)
- Exit Southbound

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**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**66.2%**
Unnamed Junction	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**66.2%**
1/1	Island Road (N) Left Ahead Right	O	N/A	N/A	A		2	15	-	79	1816	197	40.1%
2/1	Broad Street (E) Left Ahead	U	N/A	N/A	B		2	71	-	488	2040	973	50.1%
3/1	Hood Road (S) Right Left	O	N/A	N/A	C		2	15	-	124	1685	187	66.2%
4/1+4/2	Broad Street (W) Ahead Right	U	N/A	N/A	D E		2	97:14	-	811	1920:1734	1236	65.6%
5/1	Exit Eastbound	U	N/A	N/A	-		-	-	-	766	Inf	Inf	0.0%
6/1	Exit Southbound	U	N/A	N/A	-		-	-	-	108	Inf	Inf	0.0%
7/1	Exit Westbound	U	N/A	N/A	-		-	-	-	628	Inf	Inf	0.0%

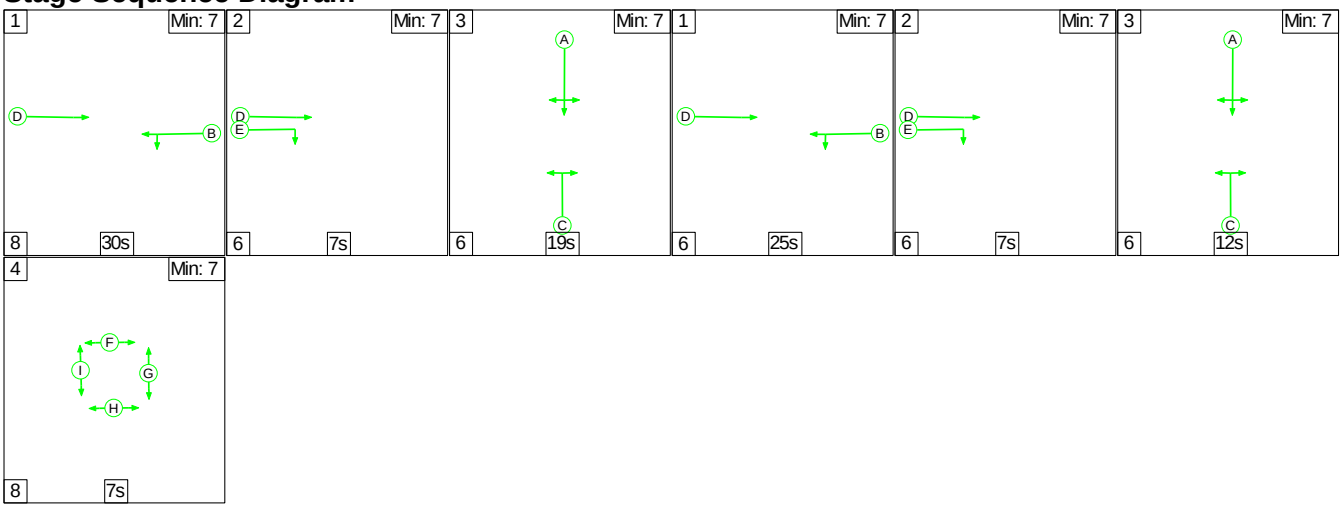
Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**36**	**0**	**0**	**6.2**	**2.7**	**0.0**	**9.0**	**-**	**-**	**-**	**-**
Unnamed Junction	**-**	**-**	**36**	**0**	**0**	**6.2**	**2.7**	**0.0**	**9.0**	**-**	**-**	**-**	**-**
1/1	79	79	29	0	0	0.7	0.3	0.0	1.1	48.5	1.6	0.3	1.9
2/1	488	488	-	-	-	1.9	0.5	-	2.4	18.0	8.5	0.5	9.0
3/1	124	124	7	0	0	1.1	1.0	0.0	2.1	60.3	2.5	1.0	3.5
4/1+4/2	811	811	-	-	-	2.5	0.9	-	3.4	15.2	13.2	0.9	14.2
5/1	766	766	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	108	108	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	628	628	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1 PRC for Signalled Lanes (%): 35.9 Total Delay for Signalled Lanes (pcuHr): 9.01
PRC Over All Lanes (%): 35.9 Total Delay Over All Lanes(pcuHr): 9.01 Cycle Time (s): 153

Full Input Data And Results

Scenario 4: 'PM 2020 Base' (FG4: 'PM 2020 Base', Plan 1: 'Staging Plan No. 1')

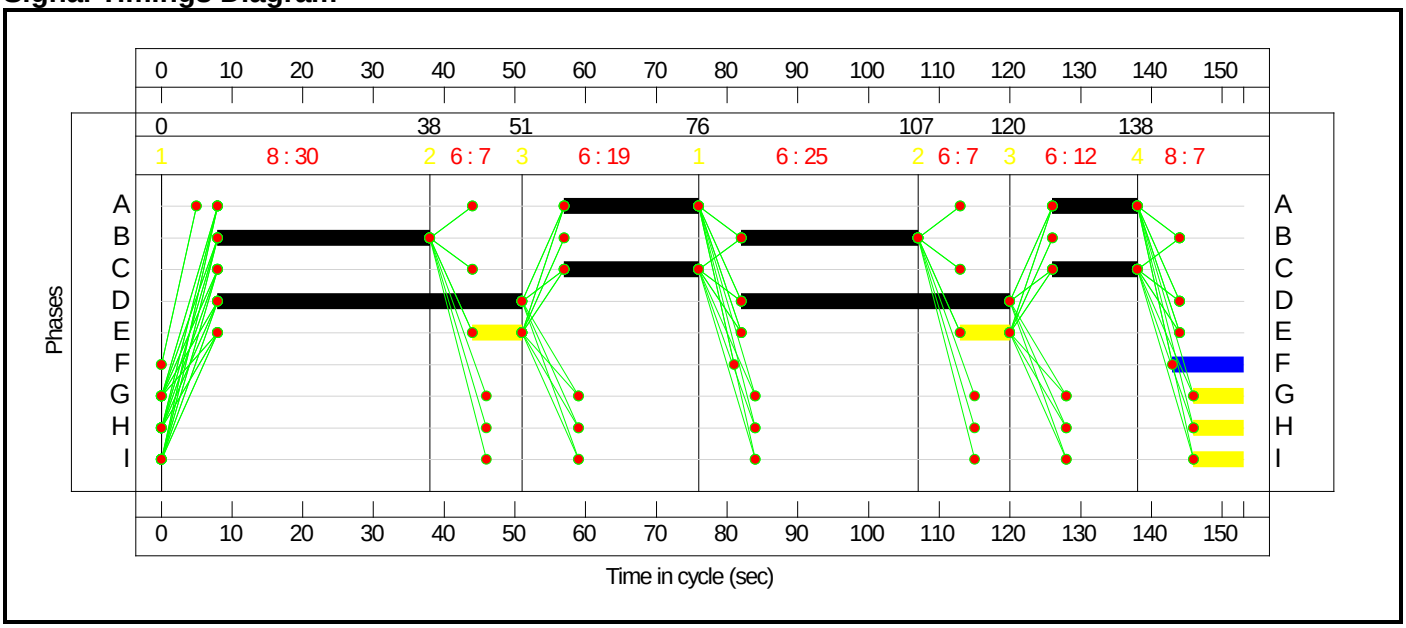
Stage Sequence Diagram

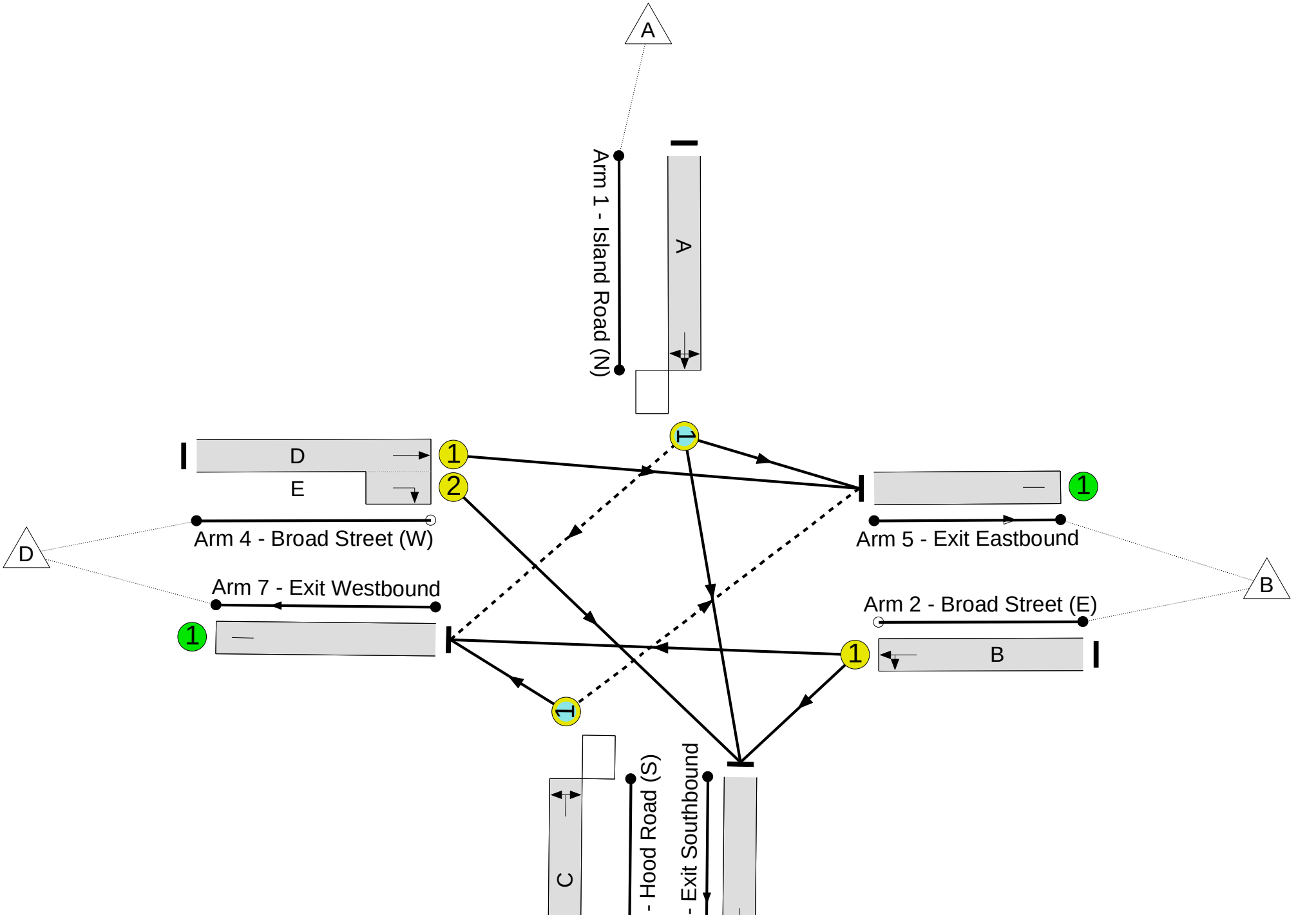


Stage Timings

Stage	1	2	3	1	2	3	4
Duration	30	7	19	25	7	12	7
Change Point	0	38	51	76	107	120	138

Signal Timings Diagram




A
Arm 1 - Island Road (N)
A
D
E
1
2
1
Arm 4 - Broad Street (W)
Arm 5 - Exit Eastbound
1
D
B
Arm 7 - Exit Westbound
Arm 2 - Broad Street (E)
1
1
B
1
C
- Hood Road (S)
- Exit Southbound

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**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**98.1%**
Unnamed Junction	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**98.1%**
1/1	Island Road (N) Left Ahead Right	O	N/A	N/A	A		2	31	-	87	1776	234	37.2%
2/1	Broad Street (E) Left Ahead	U	N/A	N/A	B		2	55	-	745	2039	760	98.1%
3/1	Hood Road (S) Right Left	O	N/A	N/A	C		2	31	-	354	1682	363	97.6%
4/1+4/2	Broad Street (W) Ahead Right	U	N/A	N/A	D E		2	81:14	-	680	1920:1734	1038	65.5%
5/1	Exit Eastbound	U	N/A	N/A	-		-	-	-	654	Inf	Inf	0.0%
6/1	Exit Southbound	U	N/A	N/A	-		-	-	-	95	Inf	Inf	0.0%
7/1	Exit Westbound	U	N/A	N/A	-		-	-	-	1117	Inf	Inf	0.0%

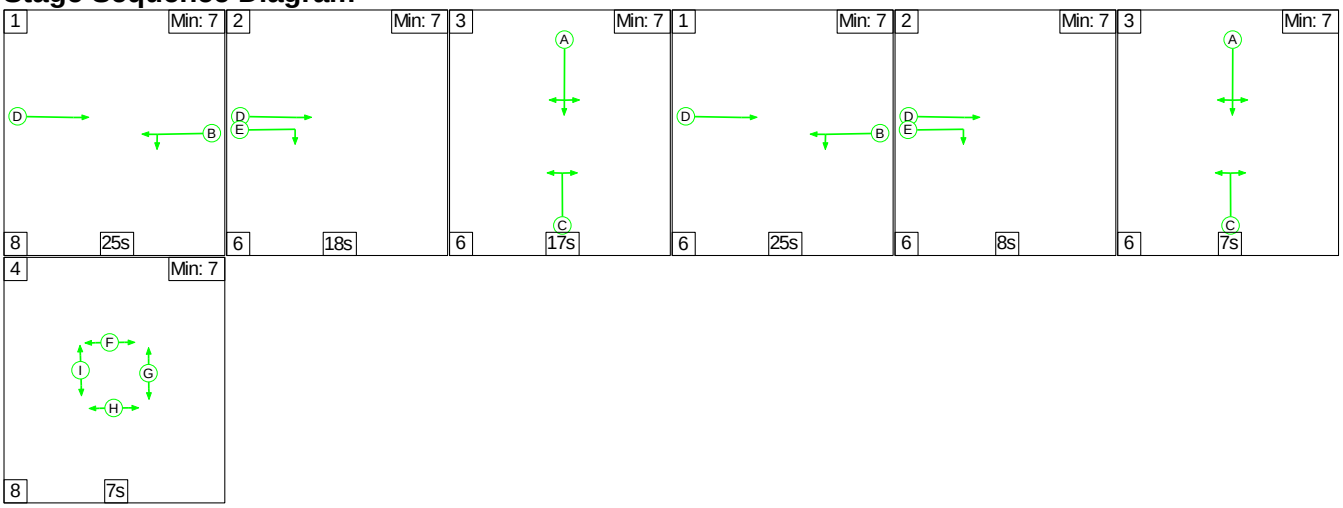
Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**13**	**0**	**28**	**11.3**	**19.2**	**0.1**	**30.7**	**-**	**-**	**-**	**-**
Unnamed Junction	**-**	**-**	**13**	**0**	**28**	**11.3**	**19.2**	**0.1**	**30.7**	**-**	**-**	**-**	**-**
1/1	87	87	7	0	28	0.6	0.3	0.1	1.1	43.6	1.8	0.3	2.1
2/1	745	745	-	-	-	5.0	10.5	-	15.4	74.6	17.2	10.5	27.6
3/1	354	354	6	0	0	3.0	7.5	0.0	10.5	106.8	8.8	7.5	16.2
4/1+4/2	680	680	-	-	-	2.7	0.9	-	3.7	19.4	11.2	0.9	12.1
5/1	654	654	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	95	95	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	1117	1117	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1 PRC for Signalled Lanes (%): -9.0 Total Delay for Signalled Lanes (pcuHr): 30.66
PRC Over All Lanes (%): -9.0 Total Delay Over All Lanes(pcuHr): 30.66 Cycle Time (s): 153

Full Input Data And Results

Scenario 5: 'AM 2020 Dev + BI' (FG5: 'AM 2020 Dev + BI', Plan 1: 'Staging Plan No. 1')

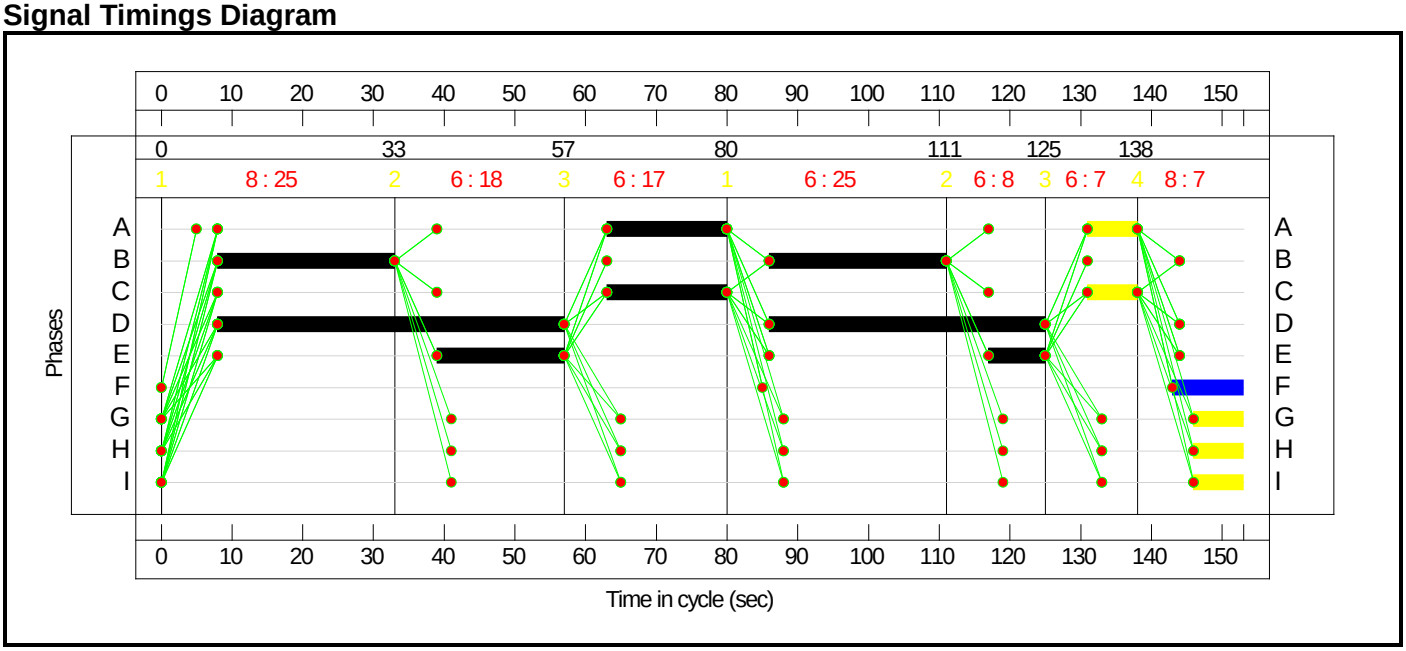
Stage Sequence Diagram

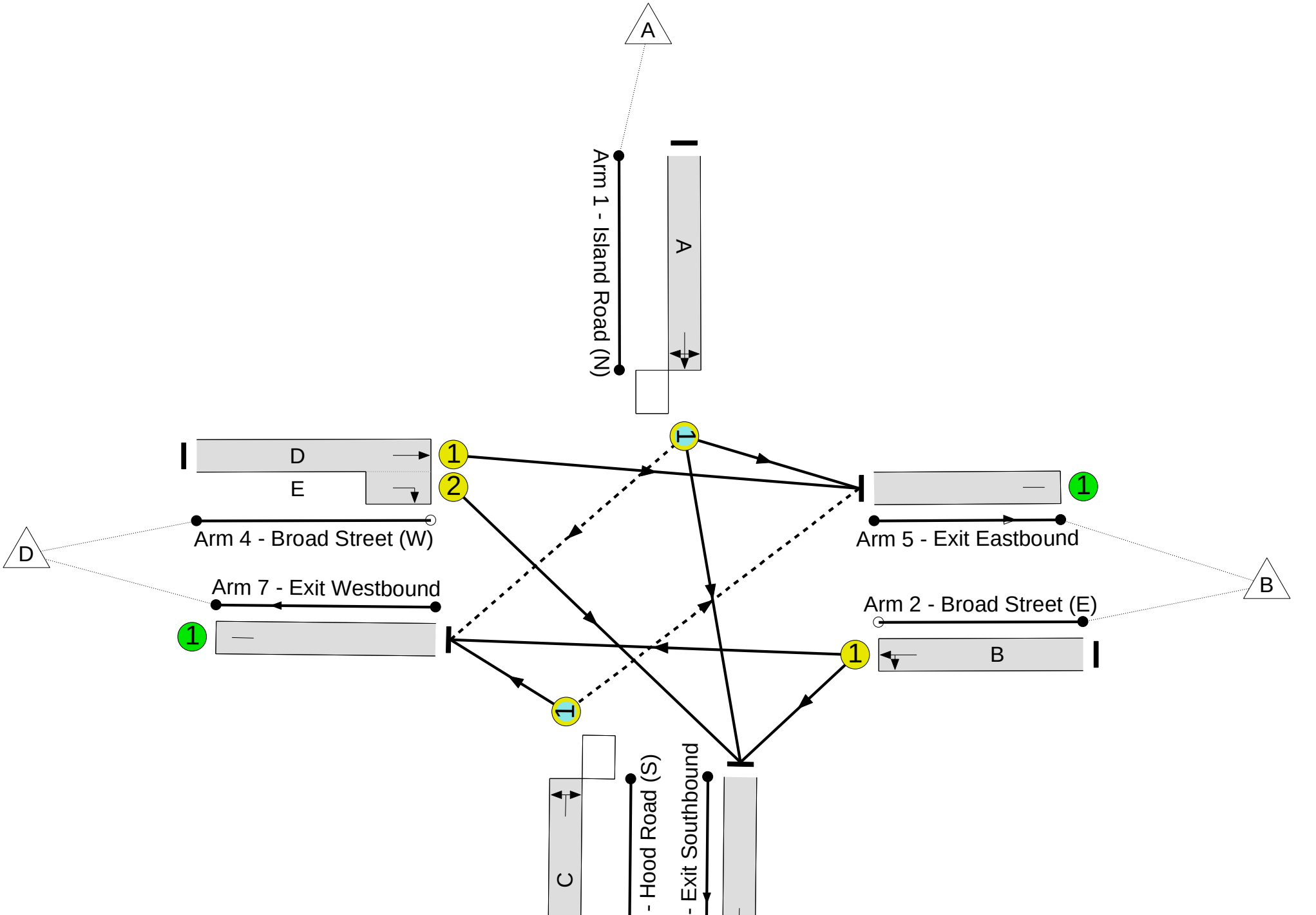


Stage Timings

Stage	1	2	3	1	2	3	4
Duration	25	18	17	25	8	7	7
Change Point	0	33	57	80	111	125	138

Signal Timings Diagram




A
Arm 1 - Island Road (N)
A
D
E
1
2
1
Arm 4 - Broad Street (W)
Arm 5 - Exit Eastbound
1
D
B
Arm 7 - Exit Westbound
Arm 2 - Broad Street (E)
1
1
B
1
C
- Hood Road (S)
- Exit Southbound

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**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**58.1%**
Unnamed Junction	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**58.1%**
1/1	Island Road (N) Left Ahead Right	O	N/A	N/A	A		2	24	-	79	1816	287	27.5%
2/1	Broad Street (E) Left Ahead	U	N/A	N/A	B		2	50	-	401	2039	693	57.9%
3/1	Hood Road (S) Right Left	O	N/A	N/A	C		2	24	-	161	1684	286	56.3%
4/1+4/2	Broad Street (W) Ahead Right	U	N/A	N/A	D E		2	88:26	-	646	1920:1734	1113	58.1%
5/1	Exit Eastbound	U	N/A	N/A	-		-	-	-	577	Inf	Inf	0.0%
6/1	Exit Southbound	U	N/A	N/A	-		-	-	-	132	Inf	Inf	0.0%
7/1	Exit Westbound	U	N/A	N/A	-		-	-	-	578	Inf	Inf	0.0%

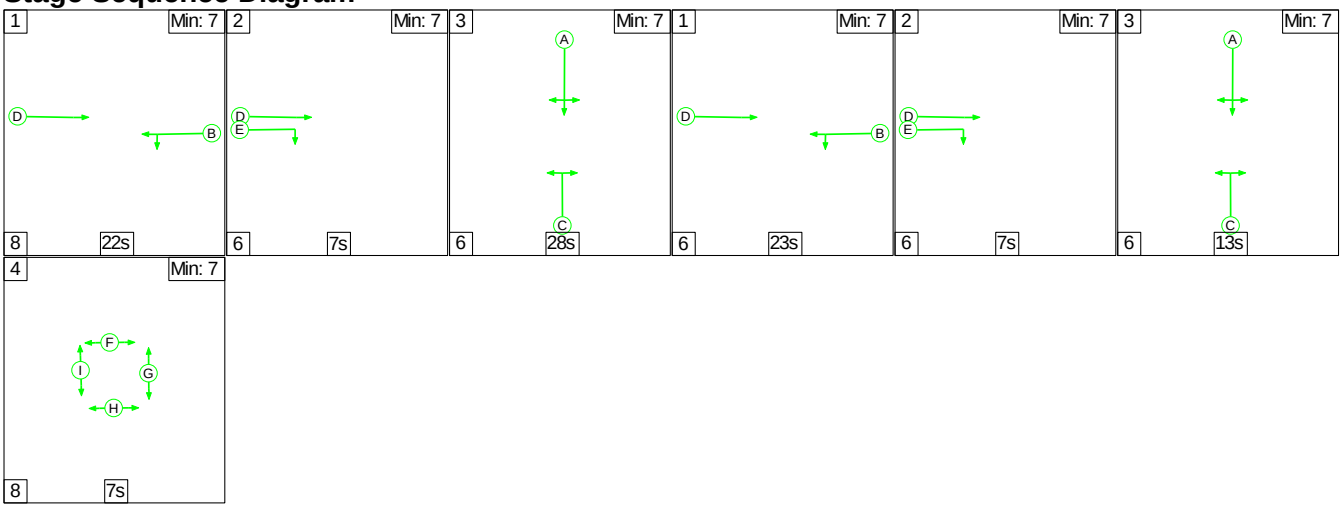
Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**36**	**0**	**0**	**6.5**	**2.2**	**0.0**	**8.8**	**-**	**-**	**-**	**-**
Unnamed Junction	**-**	**-**	**36**	**0**	**0**	**6.5**	**2.2**	**0.0**	**8.8**	**-**	**-**	**-**	**-**
1/1	79	79	29	0	0	0.6	0.2	0.0	0.9	39.6	1.8	0.2	1.9
2/1	401	401	-	-	-	2.3	0.7	-	3.0	26.9	7.1	0.7	7.8
3/1	161	161	7	0	0	1.4	0.6	0.0	2.0	44.7	3.8	0.6	4.4
4/1+4/2	646	646	-	-	-	2.2	0.7	-	2.9	16.1	8.8	0.7	9.5
5/1	577	577	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	132	132	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	578	578	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1 PRC for Signalled Lanes (%): 55.0 Total Delay for Signalled Lanes (pcuHr): 8.75
PRC Over All Lanes (%): 55.0 Total Delay Over All Lanes(pcuHr): 8.75 Cycle Time (s): 153

Full Input Data And Results

Scenario 6: 'PM 2020 Dev + BI' (FG6: 'PM 2020 Dev + BI', Plan 1: 'Staging Plan No. 1')

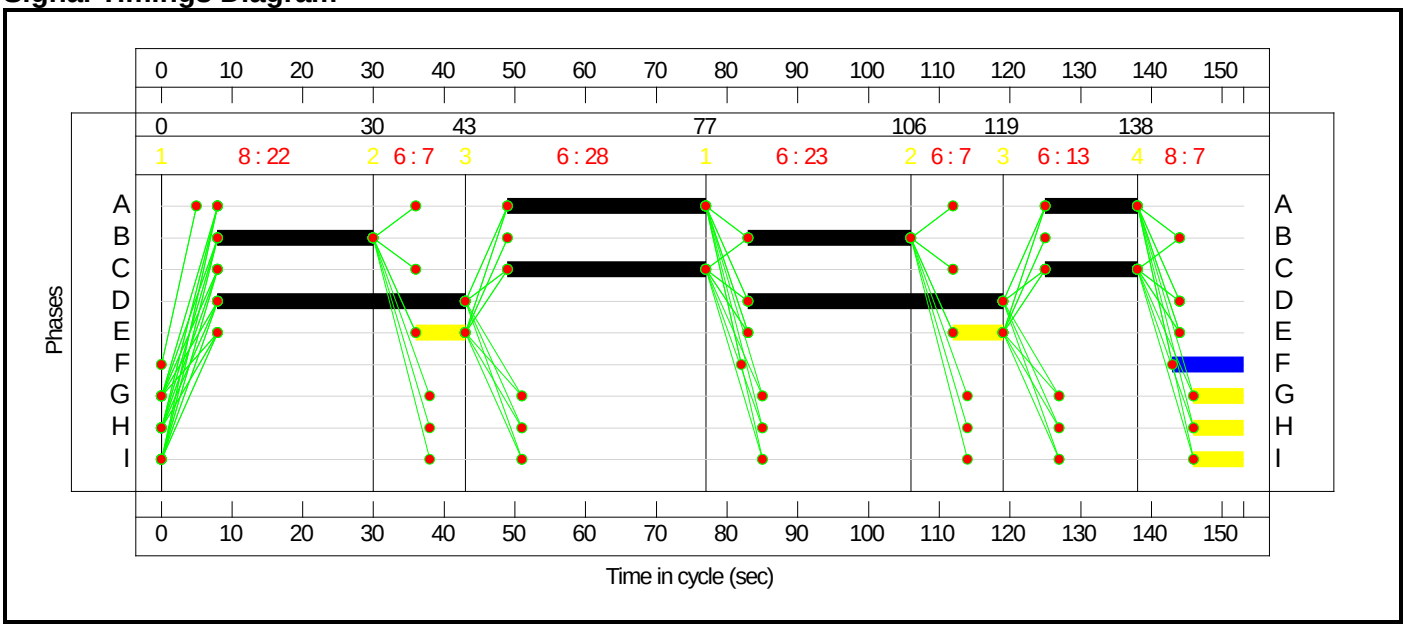
Stage Sequence Diagram

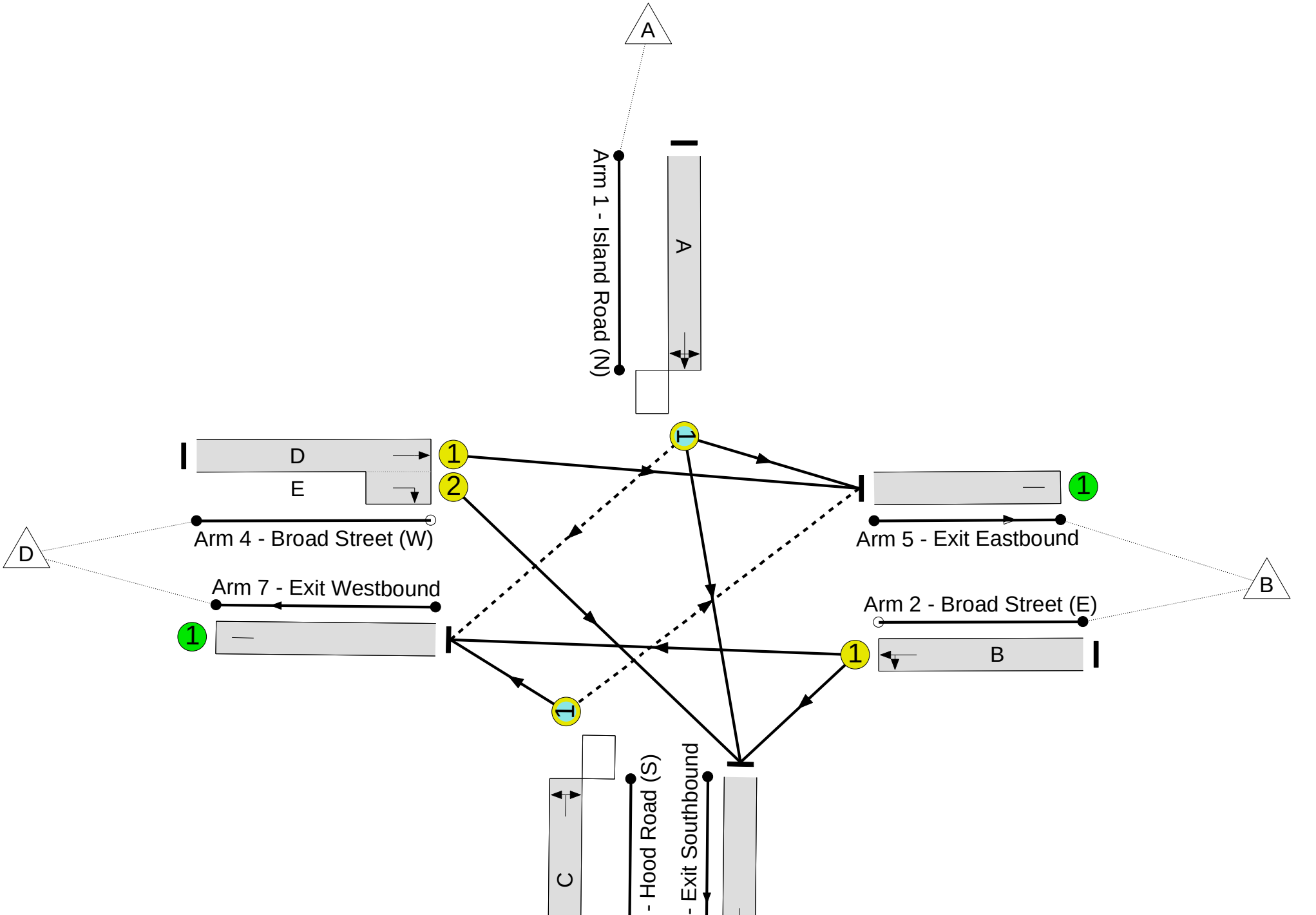


Stage Timings

Stage	1	2	3	1	2	3	4
Duration	22	7	28	23	7	13	7
Change Point	0	30	43	77	106	119	138

Signal Timings Diagram




A
Arm 1 - Island Road (N)
A
D
E
1
2
1
Arm 4 - Broad Street (W)
Arm 5 - Exit Eastbound
1
D
B
Arm 7 - Exit Westbound
Arm 2 - Broad Street (E)
1
1
B
1
C
- Hood Road (S)
- Exit Southbound

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**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**83.7%**
Unnamed Junction	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**83.7%**
1/1	Island Road (N) Left Ahead Right	O	N/A	N/A	A		2	41	-	87	1776	304	28.7%
2/1	Broad Street (E) Left Ahead	U	N/A	N/A	B		2	45	-	524	2037	626	83.7%
3/1	Hood Road (S) Right Left	O	N/A	N/A	C		2	41	-	387	1682	473	81.9%
4/1+4/2	Broad Street (W) Ahead Right	U	N/A	N/A	D E		2	71:14	-	598	1920:1734	862	69.4%
5/1	Exit Eastbound	U	N/A	N/A	-		-	-	-	533	Inf	Inf	0.0%
6/1	Exit Southbound	U	N/A	N/A	-		-	-	-	134	Inf	Inf	0.0%
7/1	Exit Westbound	U	N/A	N/A	-		-	-	-	929	Inf	Inf	0.0%

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**27**	**0**	**14**	**9.9**	**5.9**	**0.1**	**16.0**	**-**	**-**	**-**	**-**
Unnamed Junction	**-**	**-**	**27**	**0**	**14**	**9.9**	**5.9**	**0.1**	**16.0**	**-**	**-**	**-**	**-**
1/1	87	87	21	0	14	0.5	0.2	0.1	0.8	35.2	1.6	0.2	1.8
2/1	524	524	-	-	-	3.6	2.5	-	6.1	41.6	10.5	2.5	12.9
3/1	387	387	6	0	0	2.8	2.1	0.0	5.0	46.3	8.7	2.1	10.9
4/1+4/2	598	598	-	-	-	3.0	1.1	-	4.1	24.6	9.0	1.1	10.1
5/1	533	533	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	134	134	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	929	929	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1 PRC for Signalled Lanes (%): 7.5 Total Delay for Signalled Lanes (pcuHr): 15.97
PRC Over All Lanes (%): 7.5 Total Delay Over All Lanes(pcuHr): 15.97 Cycle Time (s): 153

Appendix F

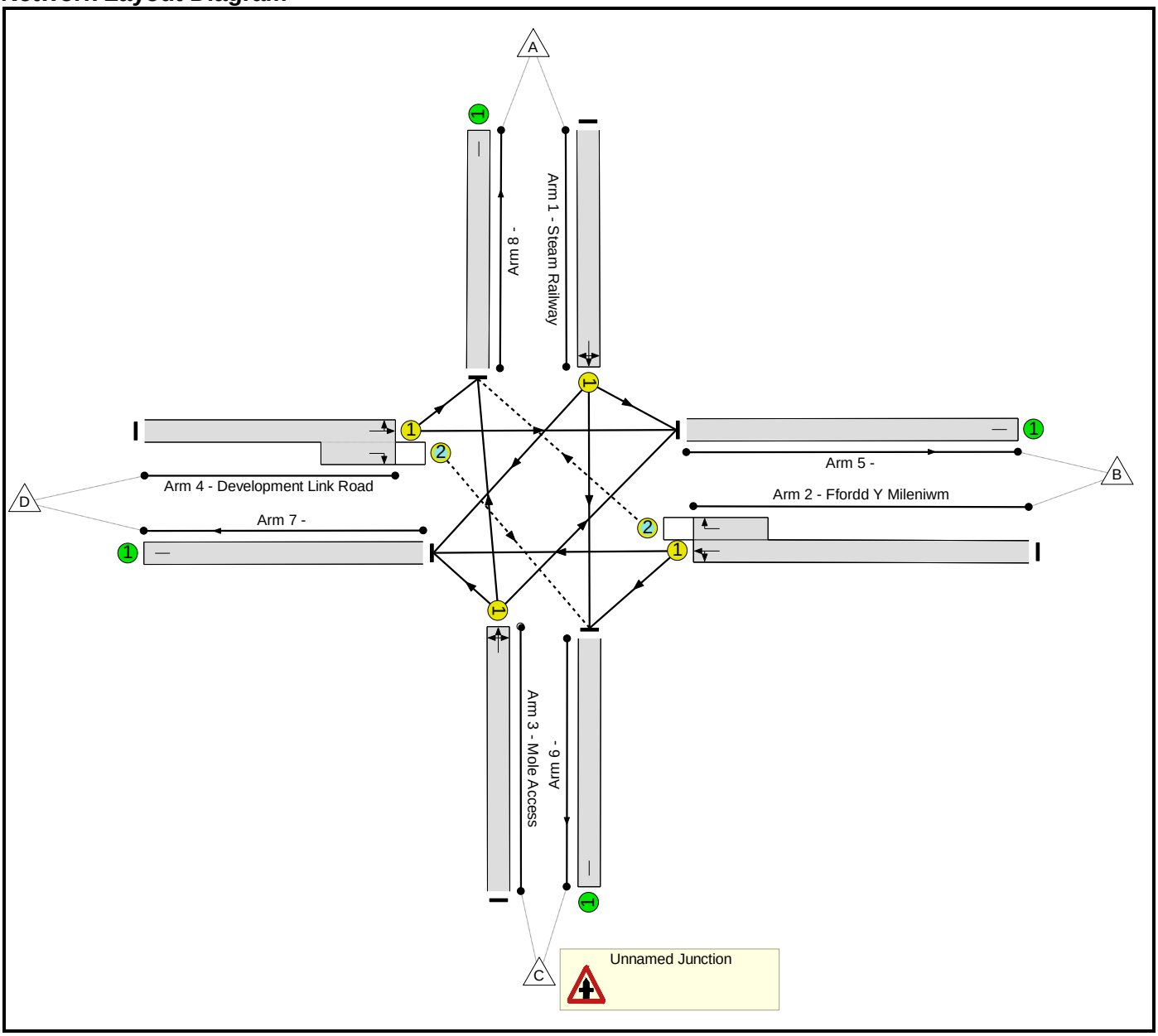
Revised Modelling output for internal junction i (Northern)

Full Input Data And Results

User and Project Details

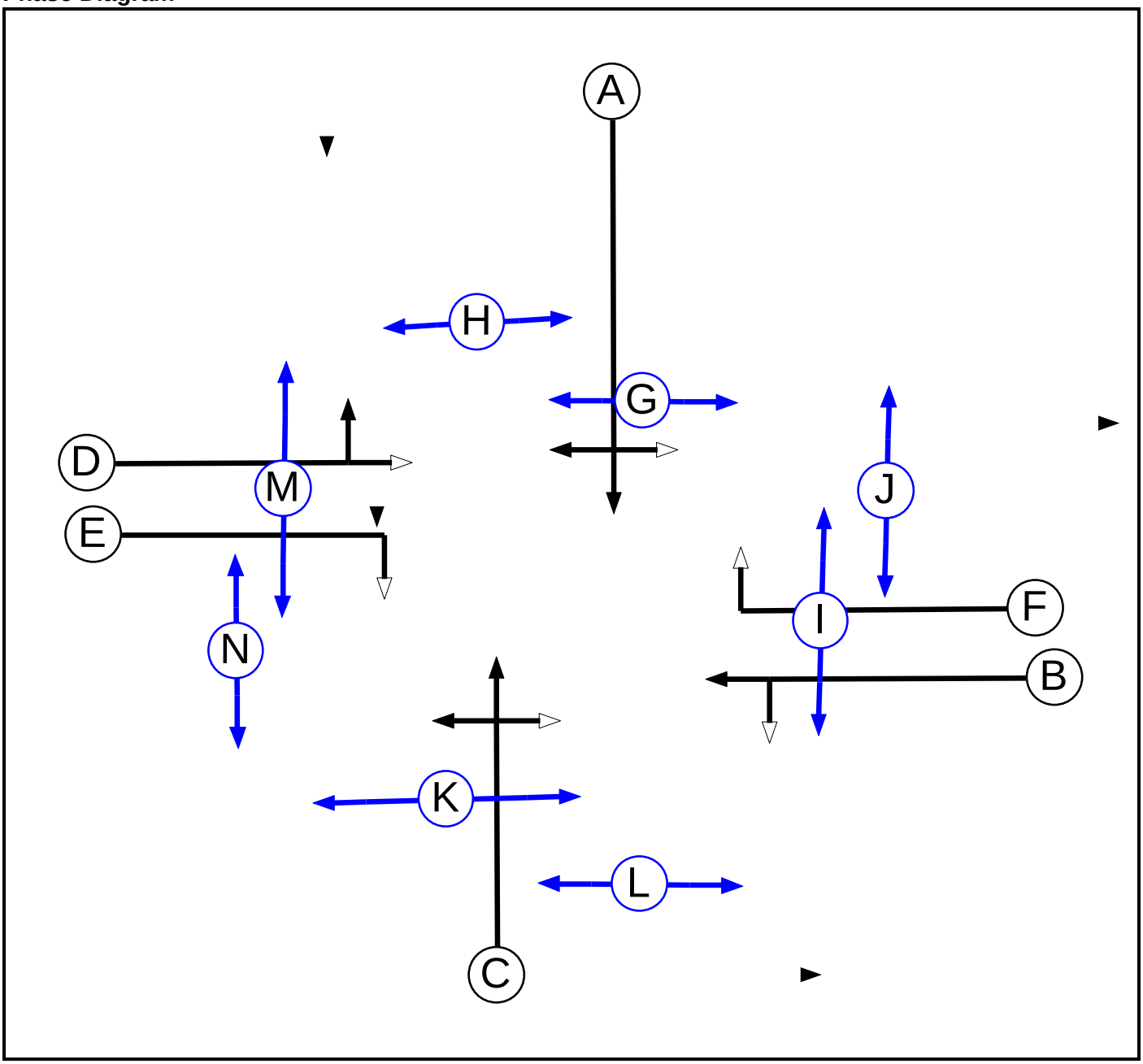
Project:	**Waterfront Barry**
Title:	
Location:	Internal Northern Junction
File name:	May 2011 - N Junction staggered ped crossings.lsg3x
Author:	Roddy Beynon
Company:	Arup
Address:	
Notes:	

Network Layout Diagram



Full Input Data And Results

Phase Diagram



Full Input Data And Results

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	Traffic		7	7
G	Pedestrian		7	7
H	Pedestrian		7	7
I	Pedestrian		7	7
J	Pedestrian		7	7
K	Pedestrian		7	7
L	Pedestrian		7	7
M	Pedestrian		7	7
N	Pedestrian		7	7

Phase Intergreens Matrix

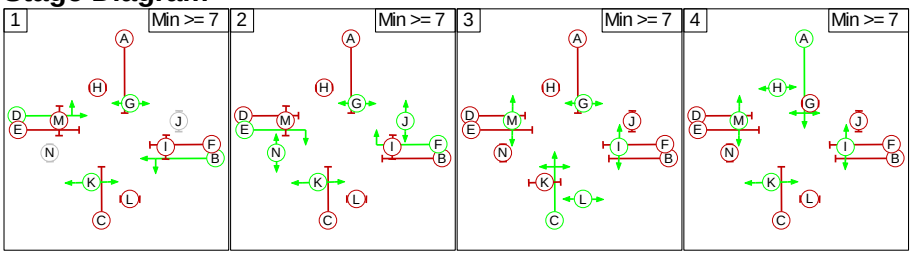
		Starting Phase														
		A	B	C	D	E	F	G	H	I	J	K	L	M	N
Terminating Phase	A		7	-	7	7	7	7	-	-	7	-	7	-	7
	B	7		7	-	7	-	-	7	7	-	-	7	-	-
	C	-	7		7	7	7	-	7	-	7	7	-	-	7
	D	7	-	7		-	7	-	7	-	-	-	7	7	-
	E	7	7	7	-		-	-	-	-	-	-	7	7	-
	F	7	-	7	7	-		-	7	7	-	-	-	-	-
	G	5	-	-	-	-	-		-	-	-	-	-	-	-
	H	-	7	7	7	-	7	-		-	-	-	-	-	-
	I	-	7	-	-	-	7	-	-		-	-	-	-	-
	J	7	-	7	-	-	-	-	-	-		-	-	-	-
	K	-	-	7	-	-	-	-	-	-	-		-	-	-
	L	7	7	-	7	7	-	-	-	-	-	-		-	-
	M	-	-	-	7	7	-	-	-	-	-	-	-		-
	N	7	-	7	-	-	-	-	-	-	-	-	-	-	

Phases in Stage

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

Full Input Data And Results

Stage Diagram



Phase Delays

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

Prohibited Stage Changes

From Stage \ To Stage	1	2	3	4
1		7	7	7
2	7		7	7
3	7	7		7
4	7	7	7	

Full Input Data And Results

Give-Way Lane Input Data

Junction: Unnamed Junction

Lane	Movement	Max Flow when Giving Way (PCU/Hr)	Opposing Lane	Opp. Lane Coeff.	Opp. Mvmnts.	Right Turn Storage (PCU)	Non-Blocking Storage (PCU)	RTF	Right Turn Move up (s)	Max Turns in Intergreen (PCU)
2/2 (Ffordd Y Mileniwm)	8/1 (Right)	1440	4/1	1.09	4/1	2.00	-	0.50	2	2.00
4/2 (Development Link Road)	6/1 (Right)	1440	2/1	1.09	2/1	2.00	-	0.50	2	2.00

Full Input Data And Results

Lane Input Data

Junction: Unnamed 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)
1/1 (Steam Railway)	U	A	2	3	60.0	Geom	-	3.64	0.00	Y	Arm 5 Left	18.00
											Arm 6 Ahead	Inf
											Arm 7 Right	30.00
2/1 (Ffordd Y Mileniwm)	U	B	2	3	60.0	Geom	-	3.10	0.00	Y	Arm 6 Left	30.00
											Arm 7 Ahead	Inf
2/2 (Ffordd Y Mileniwm)	O	F	2	3	5.0	Geom	-	3.10	0.00	N	Arm 8 Right	20.00
3/1 (Mole Access)	U	C	2	3	60.0	Geom	-	3.65	0.00	Y	Arm 5 Right	40.00
											Arm 7 Left	15.00
											Arm 8 Ahead	Inf
4/1 (Development Link Road)	U	D	2	3	60.0	Geom	-	3.00	0.00	Y	Arm 5 Ahead	Inf
											Arm 8 Left	40.00
4/2 (Development Link Road)	O	E	2	3	5.0	Geom	-	3.00	0.00	N	Arm 6 Right	25.00
5/1	U		2	3	60.0	Inf	-	-	-	-	-	-
6/1	U		2	3	60.0	Inf	-	-	-	-	-	-
7/1	U		2	3	60.0	Inf	-	-	-	-	-	-
8/1	U		2	3	60.0	Inf	-	-	-	-	-	-

Traffic Flow Groups

Flow Group	Start Time	End Time	Duration	Formula
3: '2020 AM Peak PCU'	08:00	09:00	01:00	F1*1.05
4: '2020 PM Peak PCU'	16:30	17:30	01:00	F2*1.02

Full Input Data And Results

Traffic Lane Flows

Lane	Scenario 1: AM 2020
Junction: Unnamed Junction	
1/1	110
2/1 (with short)	646(In) 583(Out)
2/2 (short)	63
3/1	92
4/1 (with short)	890(In) 843(Out)
4/2 (short)	47
5/1	852
6/1	90
7/1	639
8/1	157

Scenario 1: 'AM 2020' (FG3: '2020 AM Peak PCU', Plan 1: 'with dedicated R turns')

Traffic Lane Flows

Junction: Unnamed Junction							
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat flow (PCU/Hr)**
1/1 (Steam Railway)	3.64	0.00	Y	Arm 5 Left	18.00	48.2 %	1859
				Arm 6 Ahead	Inf	2.7 %	
				Arm 7 Right	30.00	49.1 %	
2/1 (Ffordd Y Mileniwm)	3.10	0.00	Y	Arm 6 Left	30.00	6.9 %	1918
				Arm 7 Ahead	Inf	93.1 %	
2/2 (Ffordd Y Mileniwm)	3.10	0.00	N	Arm 8 Right	20.00	100.0 %	1921
3/1 (Mole Access)	3.65	0.00	Y	Arm 5 Right	40.00	50.0 %	1860
				Arm 7 Left	15.00	45.7 %	
				Arm 8 Ahead	Inf	4.3 %	
4/1 (Development Link Road)	3.00	0.00	Y	Arm 5 Ahead	Inf	89.3 %	1907
				Arm 8 Left	40.00	10.7 %	
4/2 (Development Link Road)	3.00	0.00	N	Arm 6 Right	25.00	100.0 %	1939
5/1	Infinite Saturation Flow						Inf
6/1	Infinite Saturation Flow						Inf
7/1	Infinite Saturation Flow						Inf
8/1	Infinite Saturation Flow						Inf

Full Input Data And Results

Traffic Lane Flows

Lane	Scenario 2: PM 2020
Junction: Unnamed Junction	
1/1	118
2/1 (with short)	1217(In) 1031(Out)
2/2 (short)	186
3/1	129
4/1 (with short)	900(In) 840(Out)
4/2 (short)	60
5/1	743
6/1	133
7/1	1095
8/1	393

Scenario 2: 'PM 2020' (FG4: '2020 PM Peak PCU', Plan 1: 'with dedicated R turns')

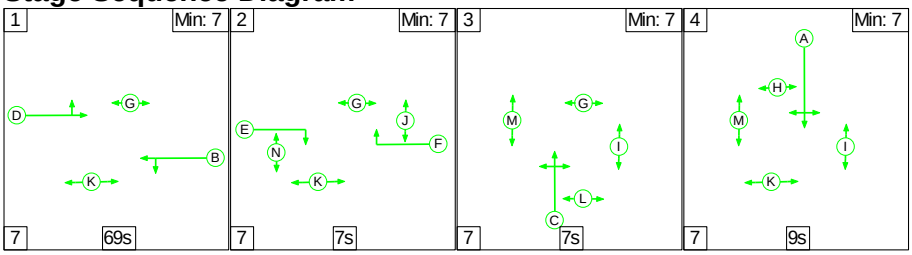
Traffic Lane Flows

Junction: Unnamed Junction							
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat flow (PCU/Hr)**
1/1 (Steam Railway)	3.64	0.00	Y	Arm 5 Left	18.00	38.1 %	1865
				Arm 6 Ahead	Inf	3.4 %	
				Arm 7 Right	30.00	58.5 %	
2/1 (Ffordd Y Mileniwm)	3.10	0.00	Y	Arm 6 Left	30.00	6.7 %	1919
				Arm 7 Ahead	Inf	93.3 %	
2/2 (Ffordd Y Mileniwm)	3.10	0.00	N	Arm 8 Right	20.00	100.0 %	1921
3/1 (Mole Access)	3.65	0.00	Y	Arm 5 Right	40.00	41.9 %	1859
				Arm 7 Left	15.00	49.6 %	
				Arm 8 Ahead	Inf	8.5 %	
4/1 (Development Link Road)	3.00	0.00	Y	Arm 5 Ahead	Inf	76.7 %	1898
				Arm 8 Left	40.00	23.3 %	
4/2 (Development Link Road)	3.00	0.00	N	Arm 6 Right	25.00	100.0 %	1939
5/1	Infinite Saturation Flow						Inf
6/1	Infinite Saturation Flow						Inf
7/1	Infinite Saturation Flow						Inf
8/1	Infinite Saturation Flow						Inf

Full Input Data And Results

Scenario 1: 'AM 2020' (FG3: '2020 AM Peak PCU', Plan 1: 'with dedicated R turns')

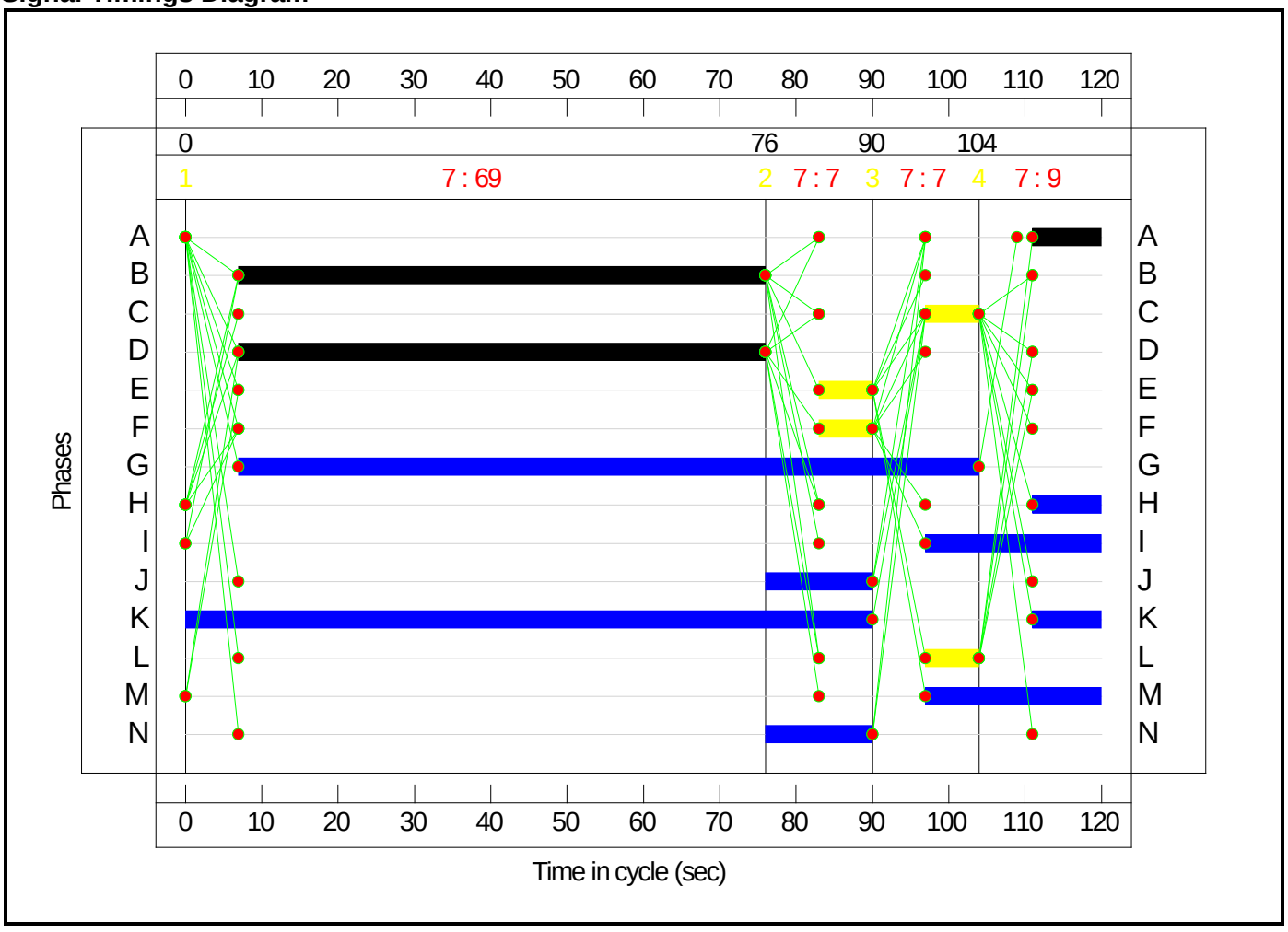
Stage Sequence Diagram



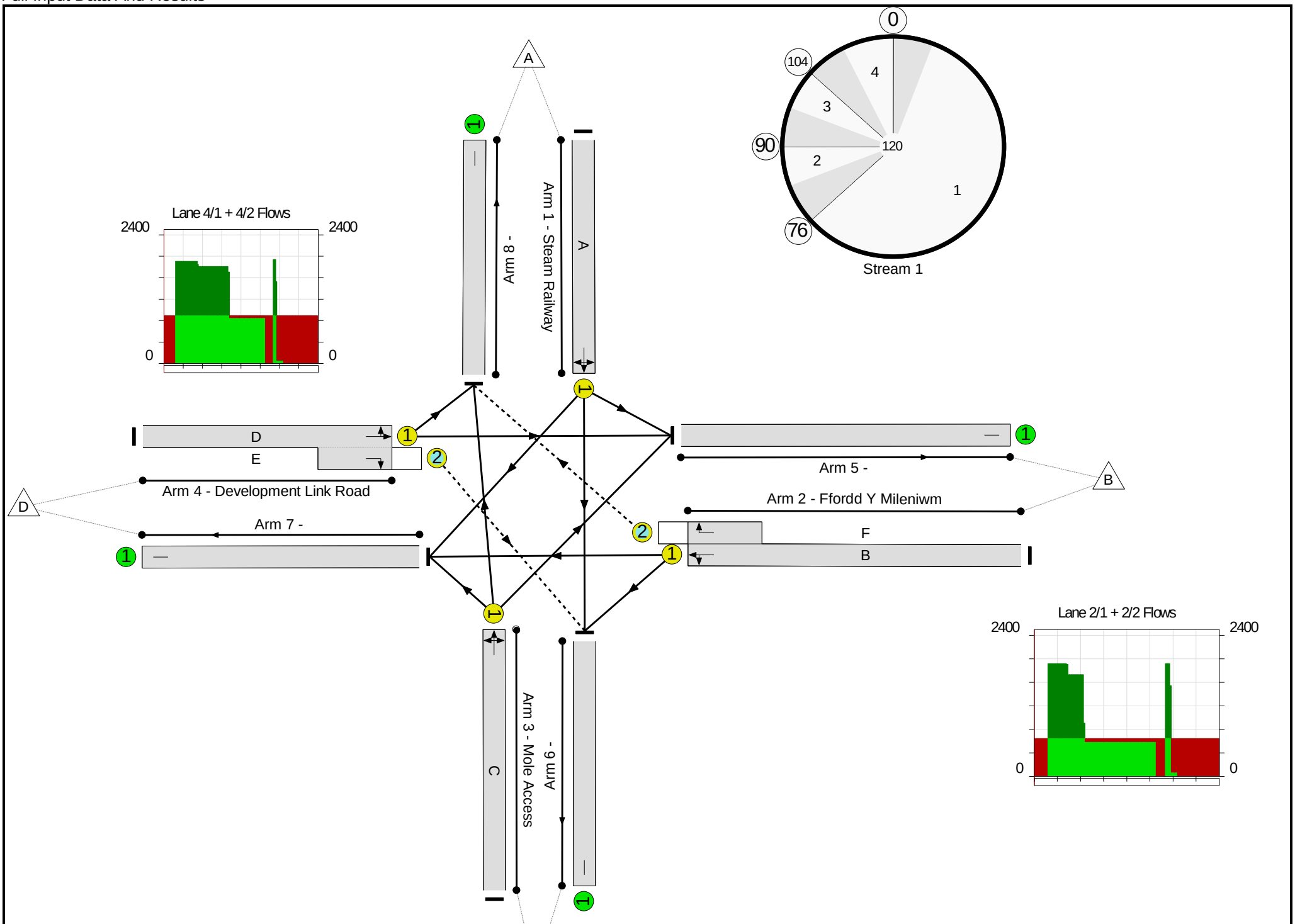
Stage Timings

Stage	1	2	3	4
Duration	69	7	7	9
Change Point	0	76	90	104

Signal Timings 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	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**78.9%**
Unnamed Junction	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**78.9%**
1/1	Steam Railway Left Ahead Right	U	N/A	N/A	A		1	9	-	110	1859	155	71.0%
2/1+2/2	Ffordd Y Mileniwm Left Ahead Right	U+O	N/A	N/A	B F		1	69:7	-	646	1918:1921	1141	56.6%
3/1	Mole Access Right Left Ahead	U	N/A	N/A	C		1	7	-	92	1860	124	74.2%
4/1+4/2	Development Link Road Ahead Right Left	U+O	N/A	N/A	D E		1	69:7	-	890	1907:1939	1129	78.9%
5/1		U	N/A	N/A	-		-	-	-	852	Inf	Inf	0.0%
6/1		U	N/A	N/A	-		-	-	-	90	Inf	Inf	0.0%
7/1		U	N/A	N/A	-		-	-	-	639	Inf	Inf	0.0%
8/1		U	N/A	N/A	-		-	-	-	157	Inf	Inf	0.0%

Full Input Data And Results

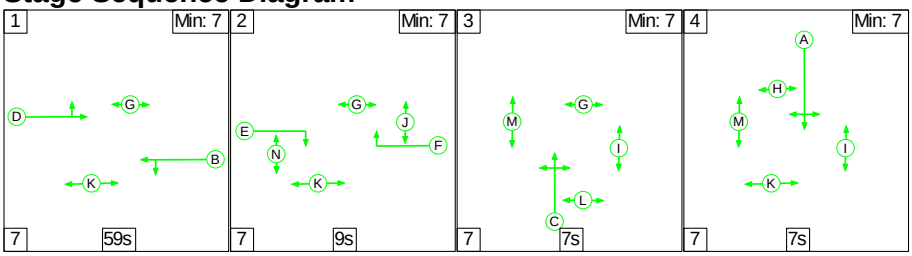
Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**2**	**108**	**0**	**11.6**	**5.0**	**0.0**	**16.6**	**-**	**-**	**-**	**-**
Unnamed Junction	**-**	**-**	**2**	**108**	**0**	**11.6**	**5.0**	**0.0**	**16.6**	**-**	**-**	**-**	**-**
1/1	110	110	-	-	-	1.6	1.2	-	2.8	91.7	3.5	1.2	4.7
2/1+2/2	646	646	1	62	0	3.4	0.7	0.0	4.1	22.6	12.6	0.7	13.2
3/1	92	92	-	-	-	1.4	1.3	-	2.7	106.9	3.0	1.3	4.3
4/1+4/2	890	890	1	46	0	5.1	1.8	0.0	7.0	28.2	22.2	1.8	24.1
5/1	852	852	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	90	90	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	639	639	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
8/1	157	157	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1 PRC for Signalled Lanes (%): 14.1 Total Delay for Signalled Lanes (pcuHr): 16.58
PRC Over All Lanes (%): 14.1 Total Delay Over All Lanes(pcuHr): 16.58 Cycle Time (s): 120

Full Input Data And Results

Scenario 2: 'PM 2020' (FG4: '2020 PM Peak PCU', Plan 1: 'with dedicated R turns')

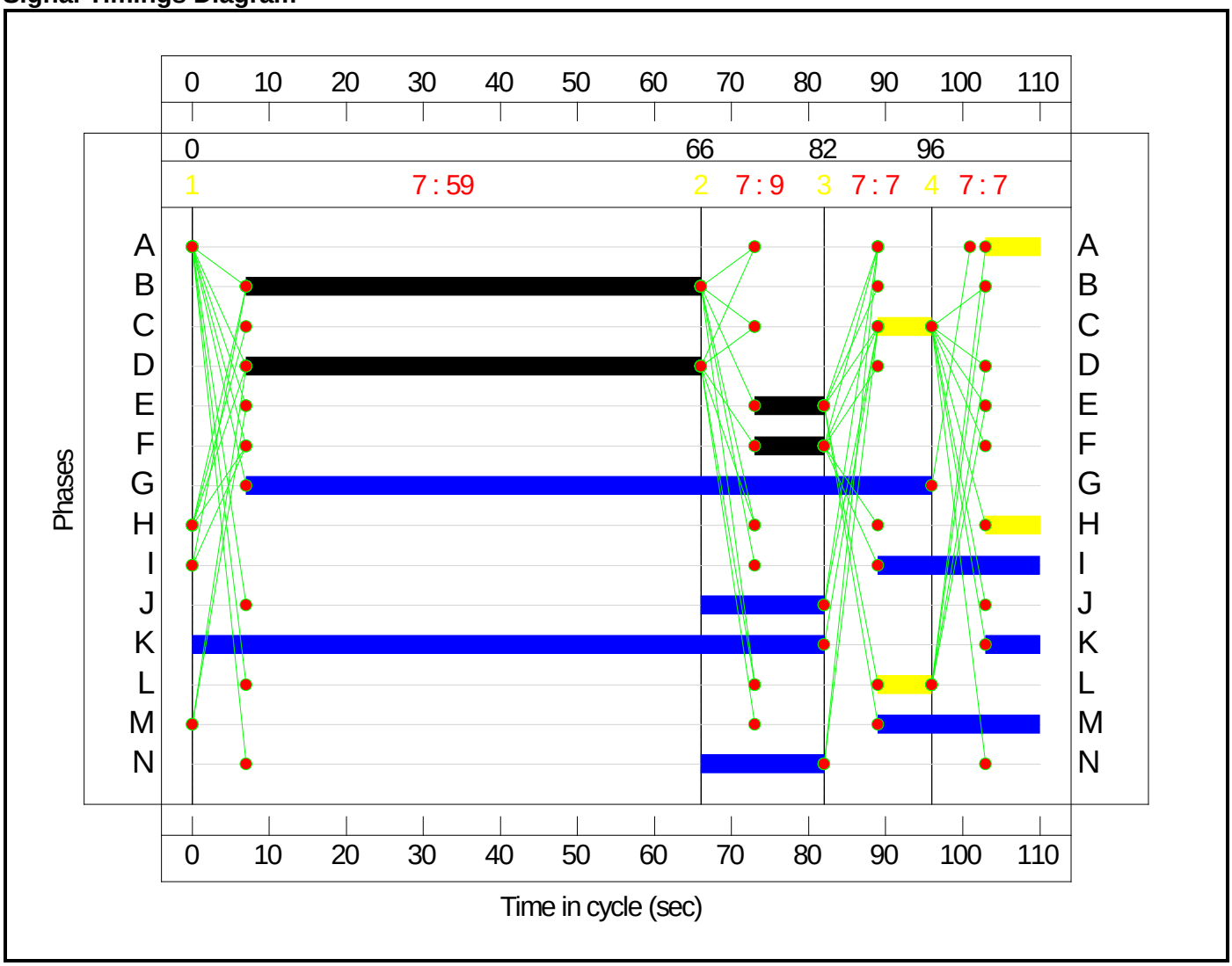
Stage Sequence Diagram



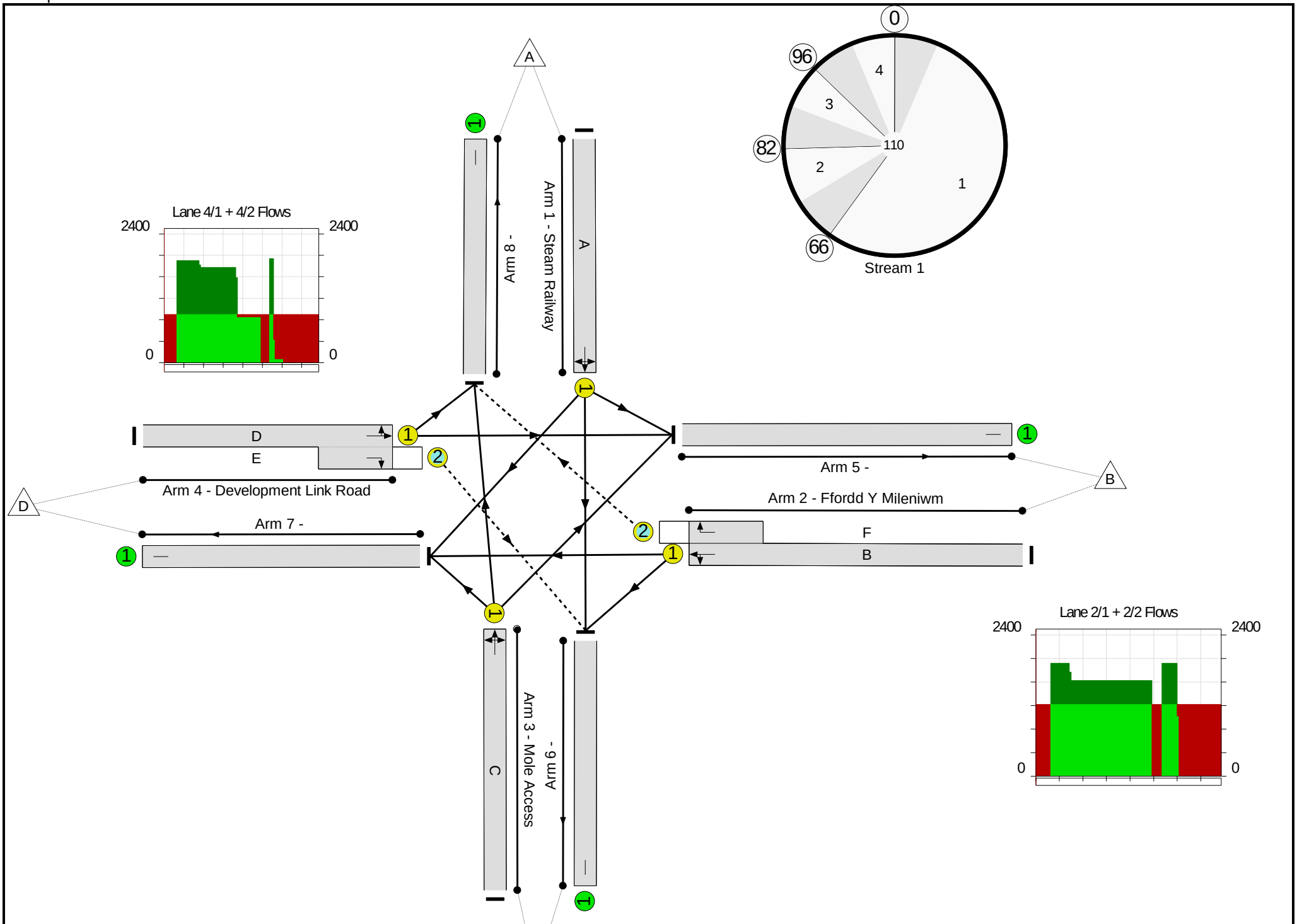
Stage Timings

Stage	1	2	3	4
Duration	59	9	7	7
Change Point	0	66	82	96

Signal Timings 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	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**112.8%**
Unnamed Junction	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**112.8%**
1/1	Steam Railway Left Ahead Right	U	N/A	N/A	A		1	7	-	118	1865	136	87.0%
2/1+2/2	Ffordd Y Mileniwm Left Ahead Right	U+O	N/A	N/A	B F		1	59:9	-	1217	1919:1921	1079	112.8%
3/1	Mole Access Right Left Ahead	U	N/A	N/A	C		1	7	-	129	1859	135	95.4%
4/1+4/2	Development Link Road Ahead Right Left	U+O	N/A	N/A	D E		1	59:9	-	900	1898:1939	1057	85.2%
5/1		U	N/A	N/A	-		-	-	-	743	Inf	Inf	0.0%
6/1		U	N/A	N/A	-		-	-	-	133	Inf	Inf	0.0%
7/1		U	N/A	N/A	-		-	-	-	1095	Inf	Inf	0.0%
8/1		U	N/A	N/A	-		-	-	-	393	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	**-**	**-**	**27**	**199**	**1**	**25.1**	**83.1**	**0.6**	**108.8**	**-**	**-**	**-**	**-**
Unnamed Junction	**-**	**-**	**27**	**199**	**1**	**25.1**	**83.1**	**0.6**	**108.8**	**-**	**-**	**-**	**-**
1/1	118	118	-	-	-	1.7	2.6	-	4.2	129.4	3.5	2.6	6.1
2/1+2/2	1217	1084	27	140	0	16.0	73.4	0.6	90.0	266.2	41.7	73.4	115.1
3/1	129	129	-	-	-	1.8	4.3	-	6.2	171.9	3.9	4.3	8.2
4/1+4/2	900	900	0	59	1	5.6	2.8	0.0	8.4	33.8	22.6	2.8	25.4
5/1	743	743	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	125	125	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	989	989	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
8/1	373	373	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1

PRC for Signalled Lanes (%): -25.4
PRC Over All Lanes (%): -25.4

Total Delay for Signalled Lanes (pcuHr): 108.83
Total Delay Over All Lanes(pcuHr): 108.83

Cycle Time (s): 110

Appendix G

Revised Modelling output for internal junction viii (South Quay)

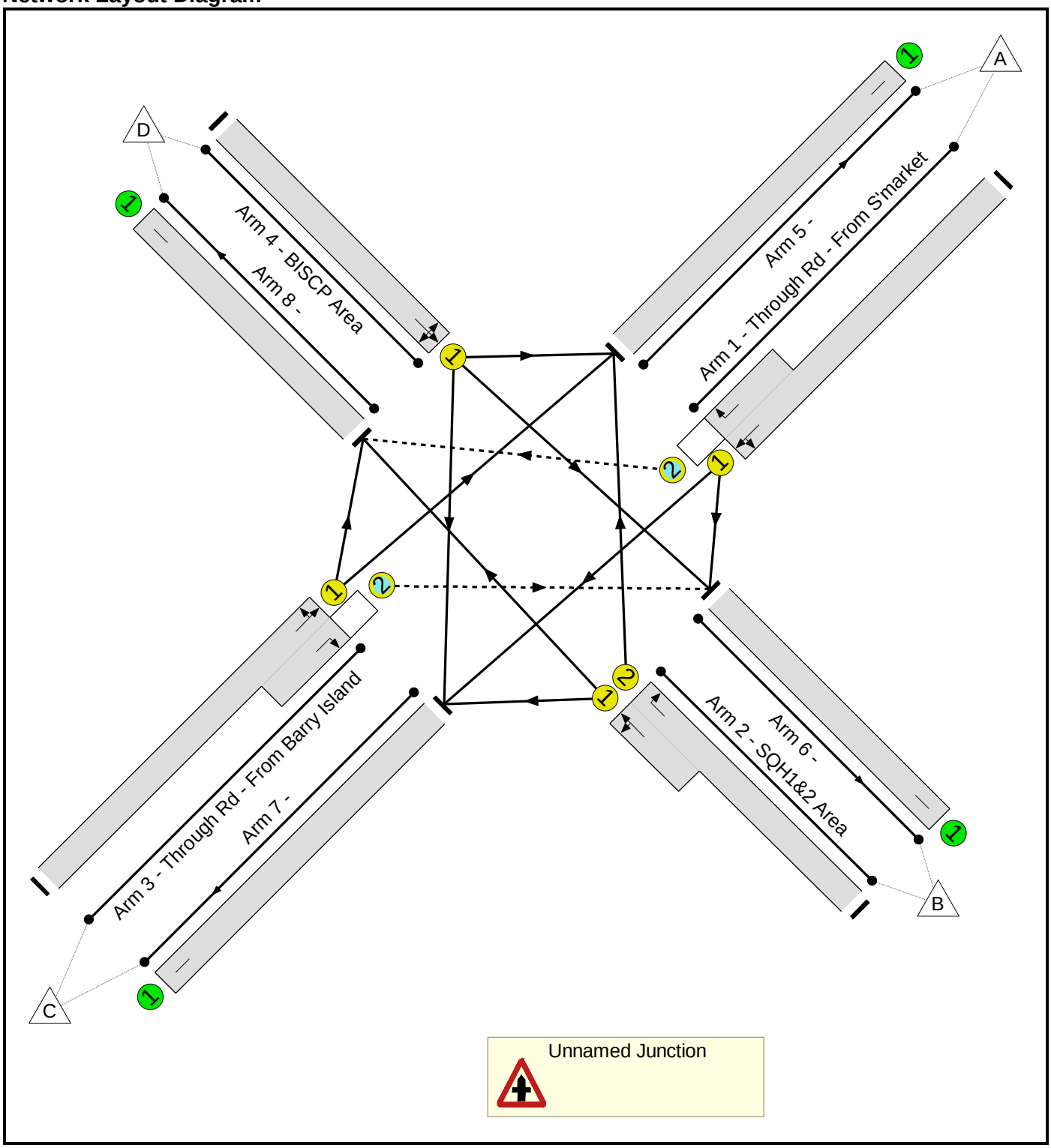
Full Input Data And Results

User and Project Details

Project:	**Waterfront Barry**
Title:	
Location:	Internal Southern Quay Junction, Barry
File name:	May 2011 - SQ Signals - with right turn.lsg3x
Author:	Roddy Beynon
Company:	Arup
Address:	
Notes:	

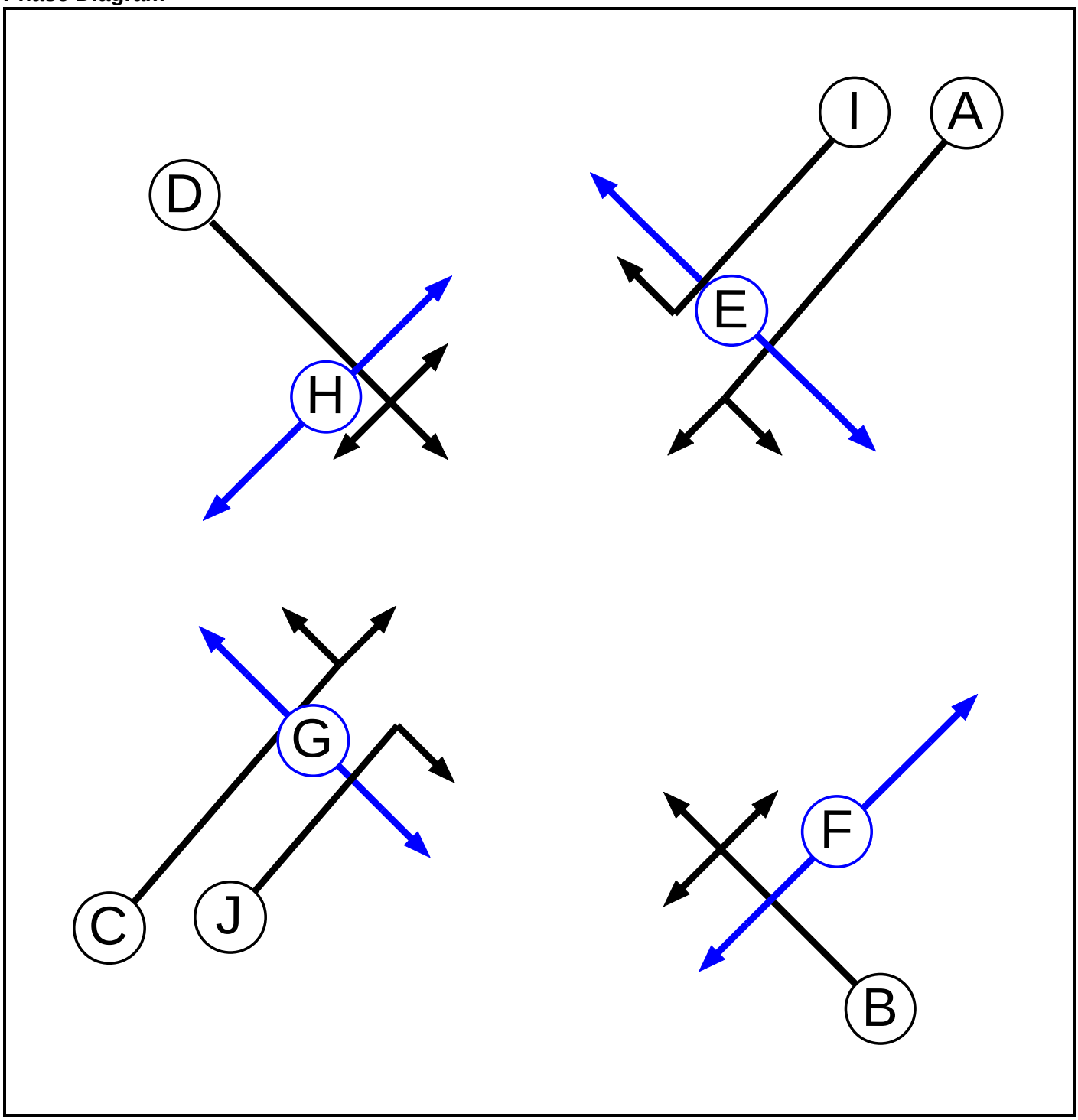
Full Input Data And Results

Network Layout Diagram



Full Input Data And Results

Phase Diagram



Full Input Data And Results

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		7	7
F	Pedestrian		7	7
G	Pedestrian		7	7
H	Pedestrian		7	7
I	Traffic		7	7
J	Traffic		7	7

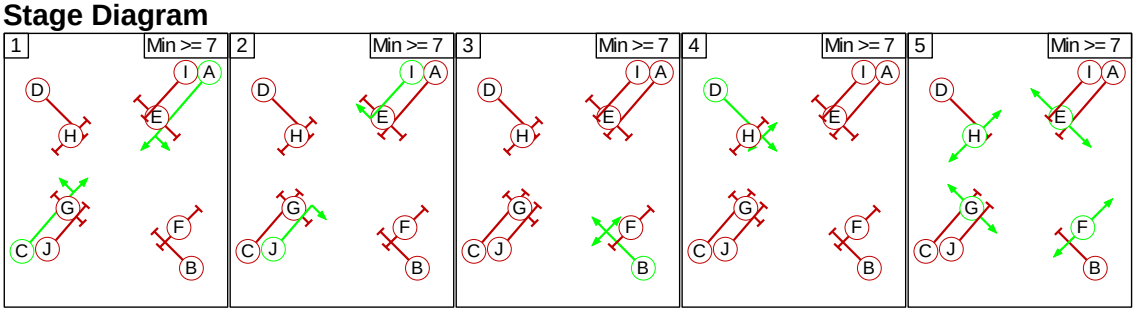
Phase Intergreens Matrix

		Starting Phase									
		A	B	C	D	E	F	G	H	I	J
Terminating Phase	A		6	-	5	5	8	9	-	-	6
	B	5		5	6	8	5	7	9	6	5
	C	-	5		6	9	-	5	7	6	-
	D	6	6	5		7	9	9	5	5	6
	E	13	13	13	13		-	-	-	13	13
	F	12	12	-	12	-		-	-	-	12
	G	12	12	12	12	-	-		-	-	12
	H	-	12	12	12	-	-	-		12	-
	I	-	5	6	6	5	-	-	8		-
	J	6	6	-	5	8	8	5	-	-	

Phases in Stage

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

Stage Diagram



Full Input Data And Results

Phase Delays

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

Prohibited Stage Changes

		To Stage				
		1	2	3	4	5
From Stage	1		6	6	6	9
	2	6		6	6	8
	3	5	6		6	9
	4	6	6	6		9
	5	13	13	13	13	

Full Input Data And Results

Give-Way Lane Input Data

Junction: Unnamed Junction

Lane	Movement	Max Flow when Giving Way (PCU/Hr)	Opposing Lane	Opp. Lane Coeff.	Opp. Mvmnts.	Right Turn Storage (PCU)	Non-Blocking Storage (PCU)	RTF	Right Turn Move up (s)	Max Turns in Intergreen (PCU)
1/2 (Through Rd - From S'market)	8/1 (Right)	1440	3/1	1.09	3/1	2.00	-	0.50	2	2.00
3/2 (Through Rd - From Barry Island)	6/1 (Right)	1440	1/1	1.09	1/1	2.00	-	0.50	2	2.00

Full Input Data And Results

Lane Input Data

Junction: Unnamed 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)
1/1 (Through Rd - From S'market)	U	A	2	3	60.0	Geom	-	3.00	0.00	Y	Arm 6 Left	12.50
											Arm 7 Ahead	Inf
1/2 (Through Rd - From S'market)	O	I	2	3	5.0	Geom	-	3.00	0.00	N	Arm 8 Right	20.00
2/1 (SQH1&2 Area)	U	B	2	3	5.0	Geom	-	3.00	0.00	Y	Arm 7 Left	12.50
											Arm 8 Ahead	Inf
2/2 (SQH1&2 Area)	U	B	2	3	60.0	Geom	-	3.00	0.00	N	Arm 5 Right	20.00
3/1 (Through Rd - From Barry Island)	U	C	2	3	60.0	Geom	-	3.00	0.00	Y	Arm 5 Ahead	Inf
											Arm 8 Left	12.50
3/2 (Through Rd - From Barry Island)	O	J	2	3	5.0	Geom	-	3.00	0.00	N	Arm 6 Right	20.00
4/1 (BISCP Area)	U	D	2	3	60.0	Geom	-	3.00	0.00	Y	Arm 5 Left	12.50
											Arm 6 Ahead	Inf
											Arm 7 Right	20.00
5/1	U		2	3	60.0	Inf	-	-	-	-	-	-
6/1	U		2	3	60.0	Inf	-	-	-	-	-	-
7/1	U		2	3	60.0	Inf	-	-	-	-	-	-
8/1	U		2	3	60.0	Inf	-	-	-	-	-	-

Traffic Flow Groups

Flow Group	Start Time	End Time	Duration	Formula
3: '2020 AM Flows Lrg Smarket through junc viii - PCU'	08:00	09:00	01:00	F1*1.02
4: '2020 PM Flows Lrg Smarket through junc viii - PCU '	16:30	17:30	01:00	F2*1.05

Full Input Data And Results

Traffic Lane Flows

Lane	Scenario 1: 2020 AM
Junction: Unnamed Junction	
1/1 (with short)	470(In) 459(Out)
1/2 (short)	11
2/1 (short)	71
2/2 (with short)	362(In) 291(Out)
3/1 (with short)	425(In) 403(Out)
3/2 (short)	22
4/1	30
5/1	714
6/1	109
7/1	448
8/1	16

Scenario 1: '2020 AM' (FG3: '2020 AM Flows Lrg Smarket through junc viii - PCU', Plan 1: 'Staging Plan No. 1')

Traffic Lane Flows

Junction: Unnamed Junction							
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat flow (PCU/Hr)**
1/1 (Through Rd - From S'market)	3.00	0.00	Y	Arm 6 Left Arm 7 Ahead	12.50 Inf	18.7 % 81.3 %	1873
1/2 (Through Rd - From S'market)	3.00	0.00	N	Arm 8 Right	20.00	100.0 %	1912
2/1 (SQH1&2 Area)	3.00	0.00	Y	Arm 7 Left Arm 8 Ahead	12.50 Inf	97.2 % 2.8 %	1715
2/2 (SQH1&2 Area)	3.00	0.00	N	Arm 5 Right	20.00	100.0 %	1912
3/1 (Through Rd - From Barry Island)	3.00	0.00	Y	Arm 5 Ahead Arm 8 Left	Inf 12.50	99.3 % 0.7 %	1913
3/2 (Through Rd - From Barry Island)	3.00	0.00	N	Arm 6 Right	20.00	100.0 %	1912
4/1 (BISCP Area)	3.00	0.00	Y	Arm 5 Left Arm 6 Ahead Arm 7 Right	12.50 Inf 20.00	76.7 % 3.3 % 20.0 %	1730
5/1	Infinite Saturation Flow						Inf
6/1	Infinite Saturation Flow						Inf
7/1	Infinite Saturation Flow						Inf
8/1	Infinite Saturation Flow						Inf

Full Input Data And Results

Traffic Lane Flows

Lane	Scenario 2: 2020 PM
Junction: Unnamed Junction	
1/1 (with short)	856(In) 810(Out)
1/2 (short)	46
2/1 (short)	40
2/2 (with short)	200(In) 160(Out)
3/1 (with short)	547(In) 489(Out)
3/2 (short)	58
4/1	65
5/1	688
6/1	329
7/1	593
8/1	58

Scenario 2: '2020 PM' (FG4: '2020 PM Flows Lrg Smarket through junc viii - PCU ', Plan 1: 'Staging Plan No. 1')

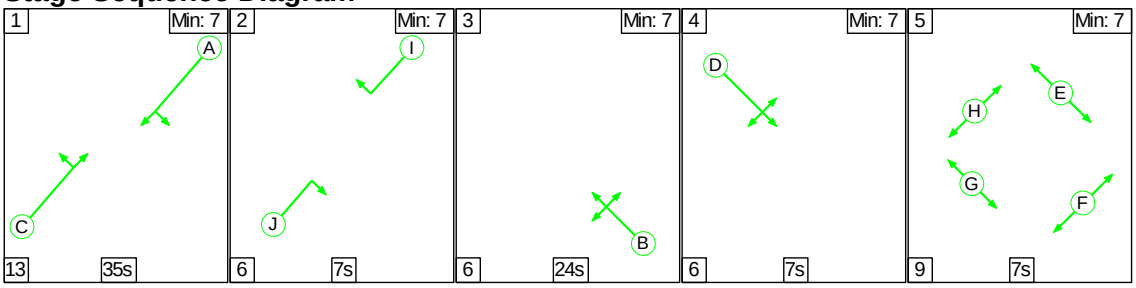
Traffic Lane Flows

Junction: Unnamed Junction							
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat flow (PCU/Hr)**
1/1 (Through Rd - From S'market)	3.00	0.00	Y	Arm 6 Left	12.50	32.8 %	1842
				Arm 7 Ahead	Inf	67.2 %	
1/2 (Through Rd - From S'market)	3.00	0.00	N	Arm 8 Right	20.00	100.0 %	1912
2/1 (SQH1&2 Area)	3.00	0.00	Y	Arm 7 Left	12.50	92.5 %	1724
				Arm 8 Ahead	Inf	7.5 %	
2/2 (SQH1&2 Area)	3.00	0.00	N	Arm 5 Right	20.00	100.0 %	1912
3/1 (Through Rd - From Barry Island)	3.00	0.00	Y	Arm 5 Ahead	Inf	98.2 %	1911
				Arm 8 Left	12.50	1.8 %	
3/2 (Through Rd - From Barry Island)	3.00	0.00	N	Arm 6 Right	20.00	100.0 %	1912
4/1 (BISCP Area)	3.00	0.00	Y	Arm 5 Left	12.50	73.8 %	1737
				Arm 6 Ahead	Inf	7.7 %	
				Arm 7 Right	20.00	18.5 %	
5/1	Infinite Saturation Flow						Inf
6/1	Infinite Saturation Flow						Inf
7/1	Infinite Saturation Flow						Inf
8/1	Infinite Saturation Flow						Inf

Full Input Data And Results

Scenario 1: '2020 AM' (FG3: '2020 AM Flows Lrg Smarket through junc viii - PCU', Plan 1: 'Staging Plan No. 1')

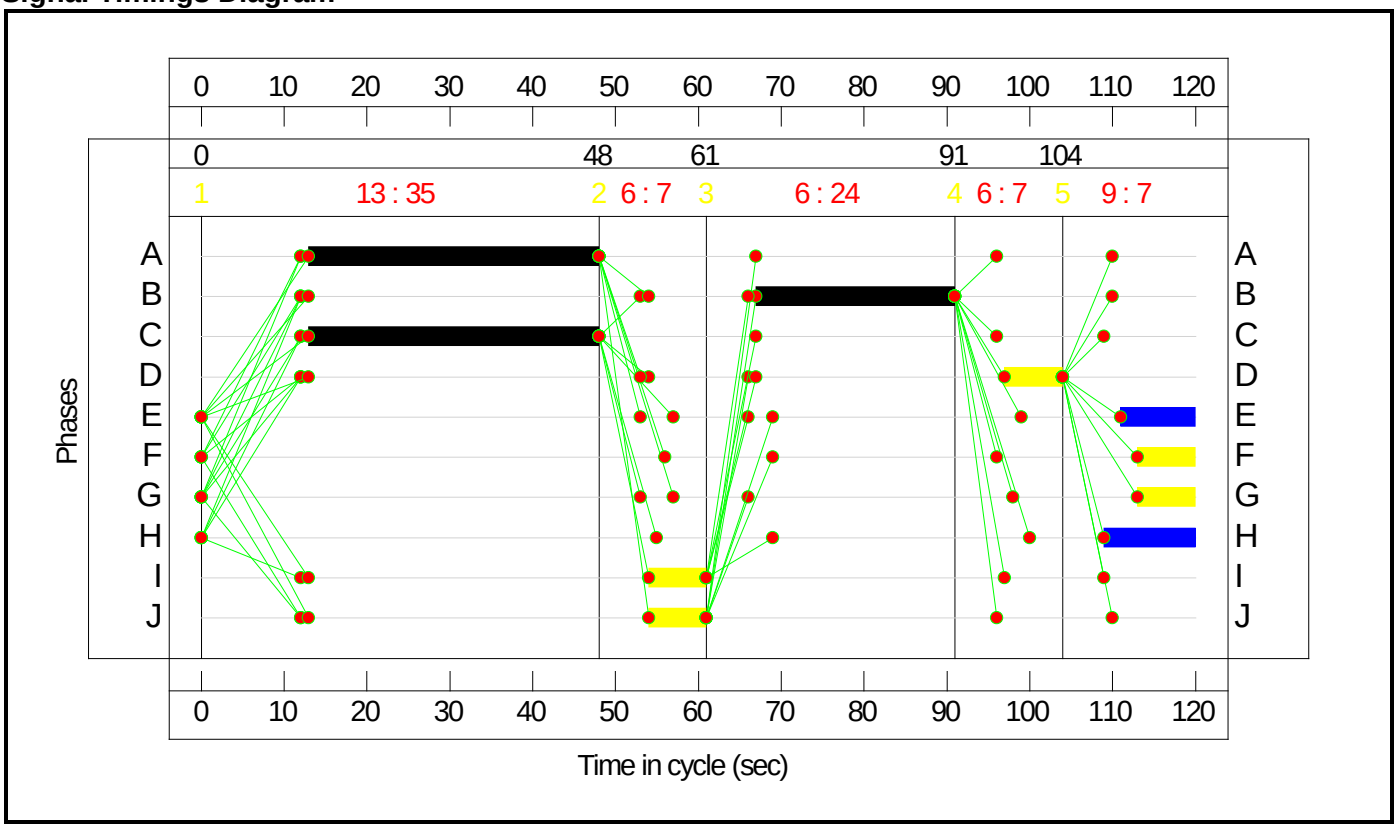
Stage Sequence Diagram



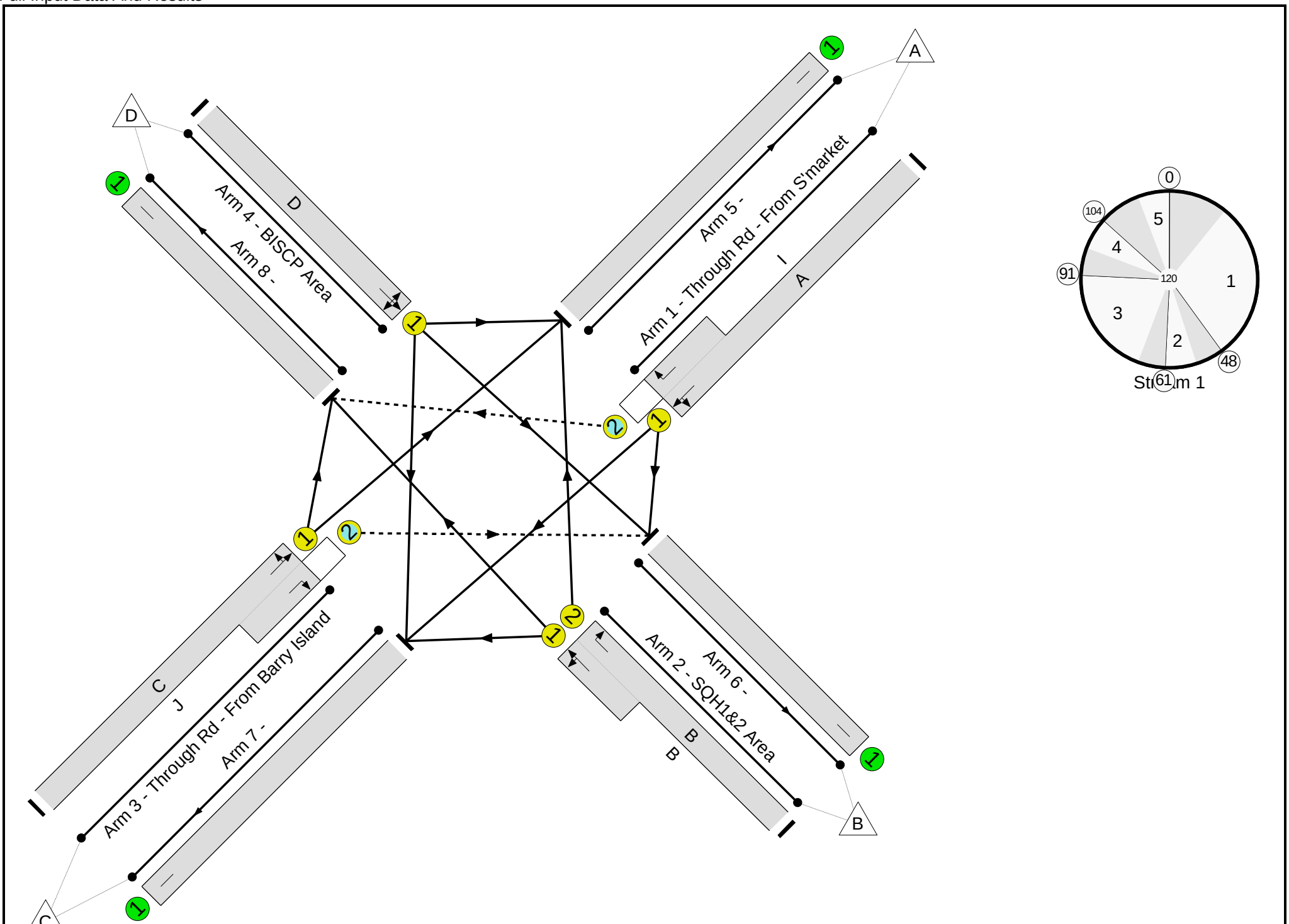
Stage Timings

Stage	1	2	3	4	5
Duration	35	7	24	7	7
Change Point	0	48	61	91	104

Signal Timings 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	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**84.0%**
Unnamed Junction	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**84.0%**
1/1+1/2	Through Rd - From S'market Left Ahead Right	U+O	N/A	N/A	A I		1	35:7	-	470	1873:1912	560	84.0%
2/2+2/1	SQH1&2 Area Right Left Ahead	U	N/A	N/A	B		1	24	-	362	1912:1715	436	83.0%
3/1+3/2	Through Rd - From Barry Island Ahead Right Left	U+O	N/A	N/A	C J		1	35:7	-	425	1913:1912	589	72.2%
4/1	BISCP Area Left Ahead Right	U	N/A	N/A	D		1	7	-	30	1730	115	26.0%
5/1		U	N/A	N/A	-		-	-	-	714	Inf	Inf	0.0%
6/1		U	N/A	N/A	-		-	-	-	109	Inf	Inf	0.0%
7/1		U	N/A	N/A	-		-	-	-	448	Inf	Inf	0.0%
8/1		U	N/A	N/A	-		-	-	-	16	Inf	Inf	0.0%

Full Input Data And Results

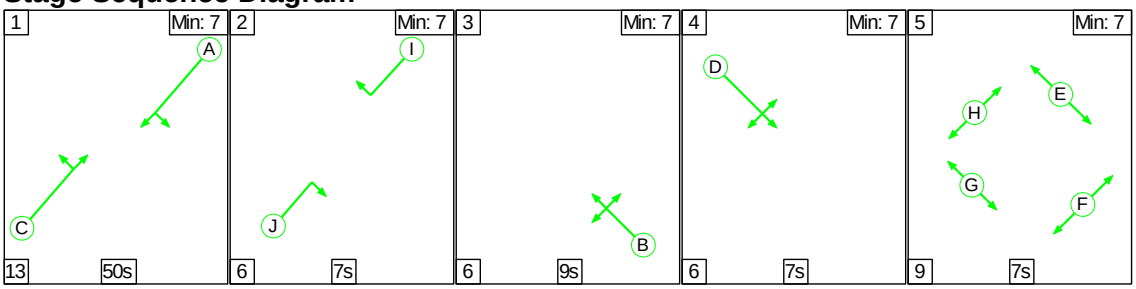
Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**1**	**32**	**0**	**14.6**	**6.2**	**0.0**	**20.8**	**-**	**-**	**-**	**-**
Unnamed Junction	**-**	**-**	**1**	**32**	**0**	**14.6**	**6.2**	**0.0**	**20.8**	**-**	**-**	**-**	**-**
1/1+1/2	470	470	0	11	0	5.2	2.5	0.0	7.7	58.7	14.5	2.5	17.0
2/2+2/1	362	362	-	-	-	4.5	2.3	-	6.8	67.3	10.2	2.3	12.5
3/1+3/2	425	425	0	22	0	4.5	1.3	0.0	5.8	49.0	12.2	1.3	13.5
4/1	30	30	-	-	-	0.4	0.2	-	0.6	74.2	0.9	0.2	1.1
5/1	714	714	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	109	109	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	448	448	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
8/1	16	16	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1 PRC for Signalled Lanes (%): 7.2 Total Delay for Signalled Lanes (pcuHr): 20.83
PRC Over All Lanes (%): 7.2 Total Delay Over All Lanes(pcuHr): 20.83 Cycle Time (s): 120

Full Input Data And Results

Scenario 2: '2020 PM' (FG4: '2020 PM Flows Lrg Smarket through junc viii - PCU ', Plan 1: 'Staging Plan No. 1')

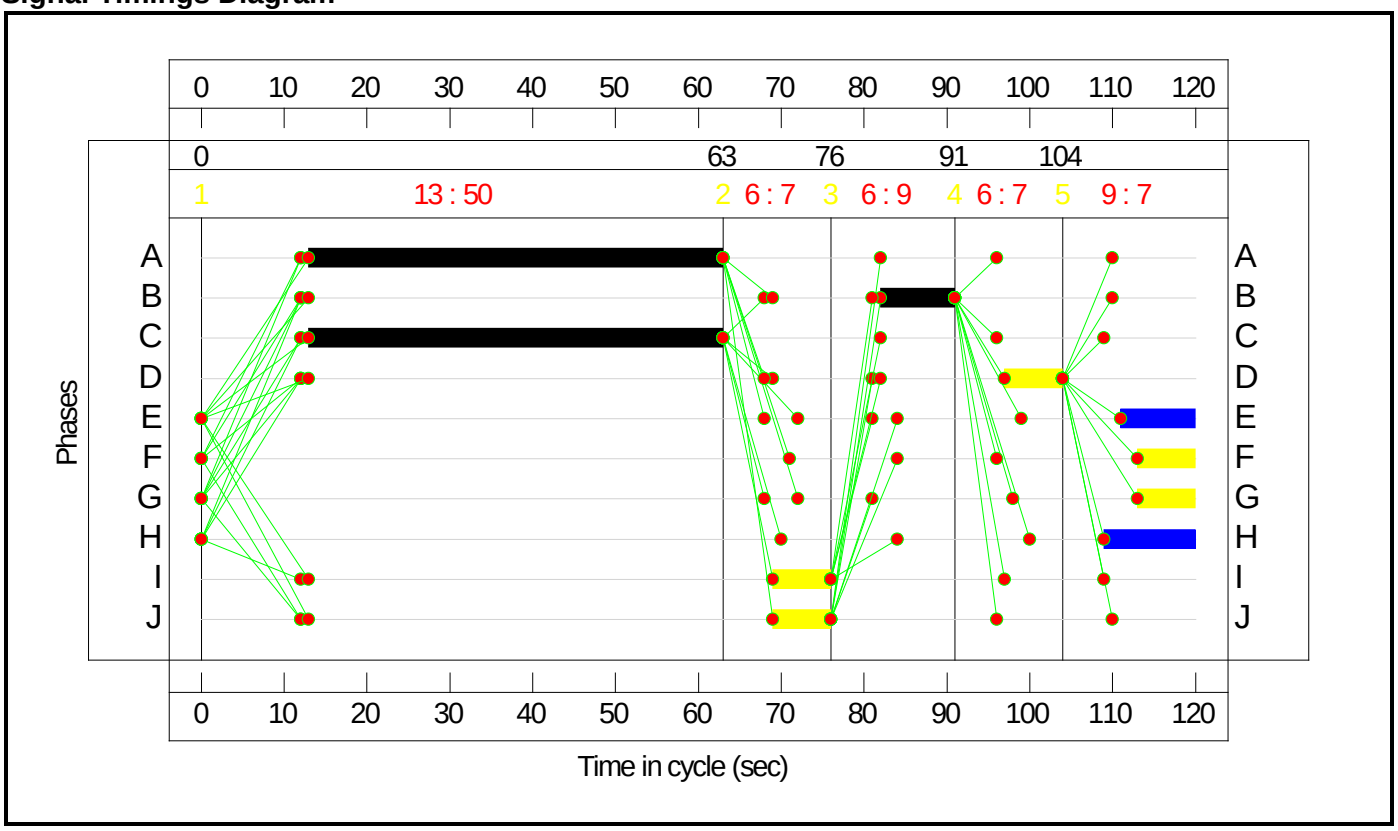
Stage Sequence Diagram



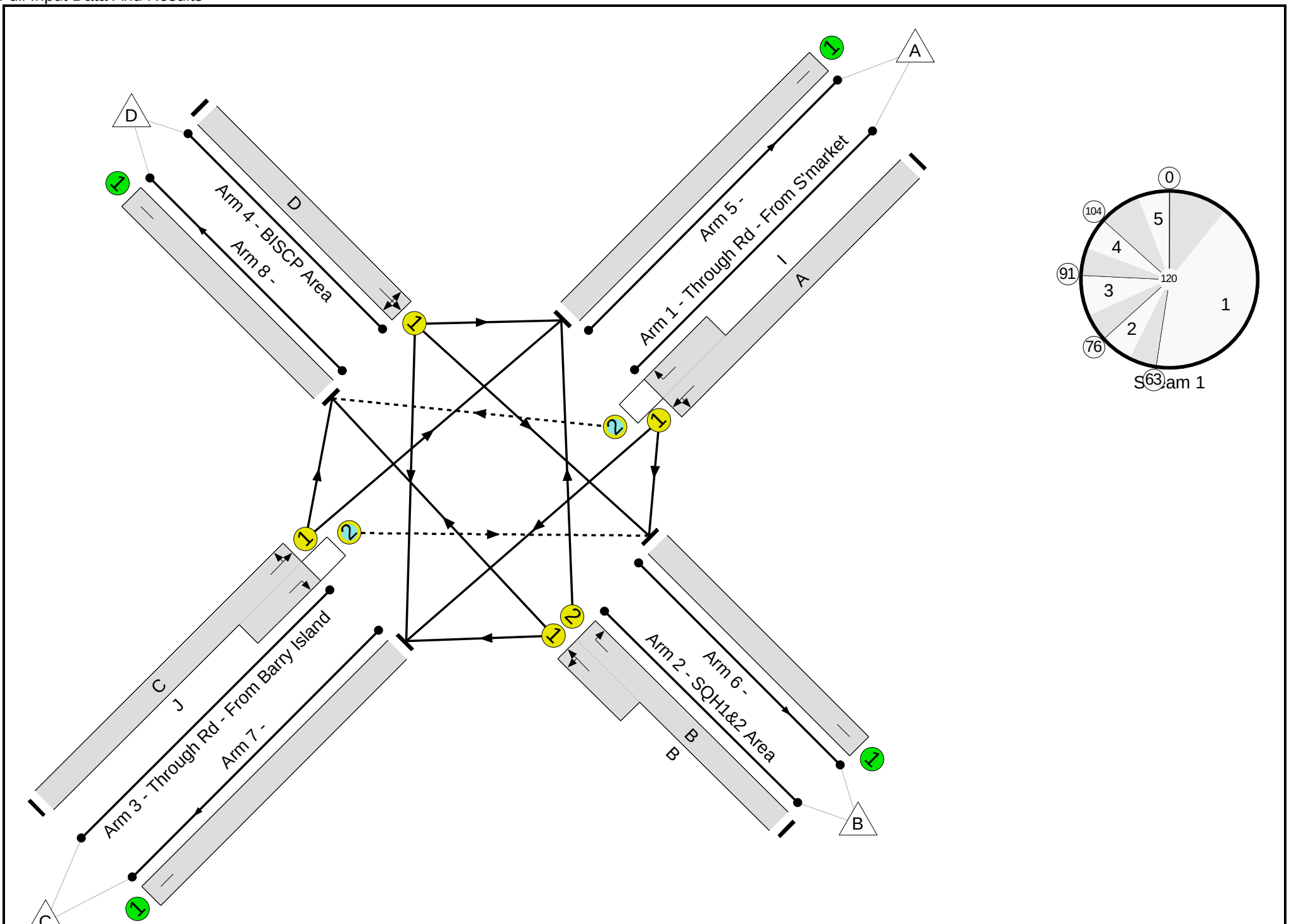
Stage Timings

Stage	1	2	3	4	5
Duration	50	7	9	7	7
Change Point	0	63	76	91	104

Signal Timings 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	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**108.5%**
Unnamed Junction	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**108.5%**
1/1+1/2	Through Rd - From S'market Left Ahead Right	U+O	N/A	N/A	A I		1	50:7	-	856	1842:1912	789	108.5%
2/2+2/1	SQH1&2 Area Right Left Ahead	U	N/A	N/A	B		1	9	-	200	1912:1724	199	100.4%
3/1+3/2	Through Rd - From Barry Island Ahead Right Left	U+O	N/A	N/A	C J		1	50:7	-	547	1911:1912	837	65.4%
4/1	BISCP Area Left Ahead Right	U	N/A	N/A	D		1	7	-	65	1737	116	56.1%
5/1		U	N/A	N/A	-		-	-	-	688	Inf	Inf	0.0%
6/1		U	N/A	N/A	-		-	-	-	329	Inf	Inf	0.0%
7/1		U	N/A	N/A	-		-	-	-	593	Inf	Inf	0.0%
8/1		U	N/A	N/A	-		-	-	-	58	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	**-**	**-**	**0**	**99**	**1**	**20.6**	**47.8**	**0.0**	**68.4**	**-**	**-**	**-**	**-**
Unnamed Junction	**-**	**-**	**0**	**99**	**1**	**20.6**	**47.8**	**0.0**	**68.4**	**-**	**-**	**-**	**-**
1/1+1/2	856	789	0	42	0	12.0	38.9	0.0	50.9	214.2	31.7	38.9	70.6
2/2+2/1	200	199	-	-	-	3.1	7.3	-	10.4	187.2	5.4	7.3	12.7
3/1+3/2	547	547	0	57	1	4.5	0.9	0.0	5.5	36.1	13.7	0.9	14.6
4/1	65	65	-	-	-	1.0	0.6	-	1.6	88.9	2.1	0.6	2.7
5/1	687	687	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	308	308	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	550	550	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
8/1	55	55	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1

PRC for Signalled Lanes (%): -20.5
PRC Over All Lanes (%): -20.5

Total Delay for Signalled Lanes (pcuHr): 68.43
Total Delay Over All Lanes(pcuHr): 68.43

Cycle Time (s): 120