Isle of Wight Council

Isle of Wight Junction Assessment and Design

Junction Feasibility Study – High Street / Victoria Avenue

A090129-99

January 2018

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Limitations

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1 Introduction

General

1.1 WYG have been appointed by the Isle of Wight (IOW) Council to undertake a feasibility study for a series of highway junctions located throughout the island, with a particular focus on the towns of Newport, Ryde, Shanklin and Sandown. The study has been carried out to identify traffic management issues impacting on all road users and develop proposals that will form part of a package of schemes to be progressed as part of the Council's Local Implementation Plan (LIP) process.

1.2 IOW Council has identified 15 highway junctions which currently experience traffic issues such as congestion and queuing. The study considers where the main issues lie in relation to traffic movement, road safety, bus operation, pedestrian and cycle provision, public realm, parking provision and servicing. Each of the 15 highway junctions are to be supplemented by a feasibility study report, with traffic modelling software used to test the various proposals in order to identify a range of measures aimed at improving the behaviour and movement of traffic at each junction.

1.3 The 15 key junctions identified are summarised in **Table 1.1** below:

Table 1.1 List of Junctions

ID Num	Junction Name	Area	Junction Type
1	St Mary's Roundabout	Newport	4 arm Roundabout
2	Coppins Bridge Gyratory	Newport	Gyratory
3	Hunnyhill/Hunnycross Way	Newport	Signalised Crossroads
4	Hunnycross Way/Riverway	Newport	3x Roundabouts
5	Medina Way/Coppins Bridge Roundabout	Newport	Gyratory
6	Queens Road/West Street	Ryde	5 arm Signalised Jct
7	Argyll St/West St	Ryde	Signalised Crossroads
8	Binstead Road/Pellhurst Road	Ryde	3 arm Signalised Jct
9	Quarr Hill/Newnham Road	Ryde	4 arm Roundabout
10	Marlborough Road/Great Preston Road	Ryde	Signalised Crossroads
11	High Street/Victoria Avenue, Shanklin	Shanklin	3 arm Signalised Jct
12	Newport Road/Industrial Way	Shanklin	4 arm Roundabout
13	Newport Road/Sandown Road	Shanklin	3 arm Signalised Jct
14	Lake Hill/The Fairway	Shanklin	Triangular 3x Priority Jcts
15	Morton Common/Perowne Way	Sandown	3 arm Signalised Jct

Site Location & Background

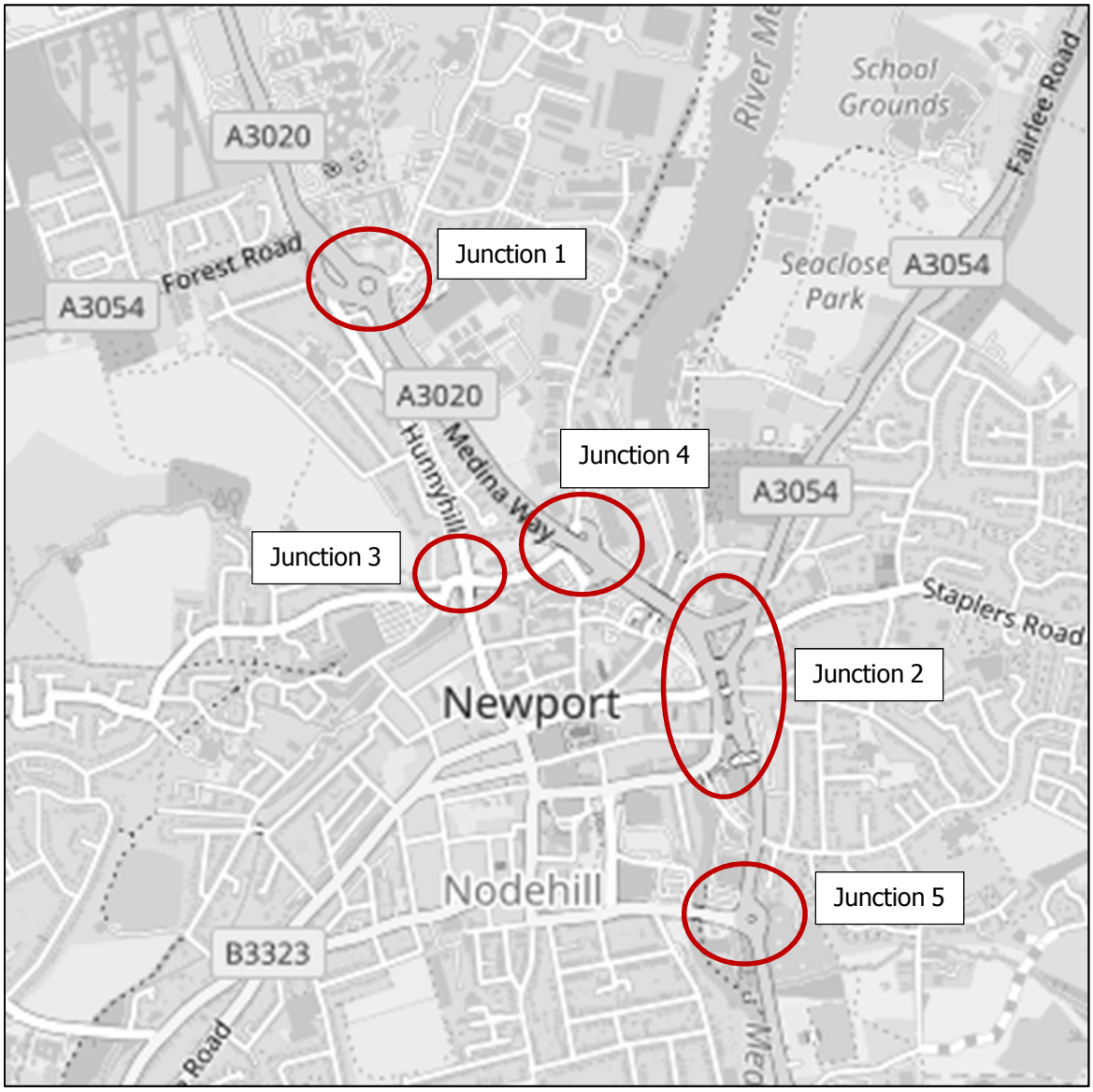
1.4 The Isle of Wight is an island located in the English Channel, approximately 6km off the Hampshire coast. The towns of Newport, Ryde, Shanklin and Sandown comprise the project study area for this feasibility study.

1.5 The town of Newport is the largest town on the IOW and is located in the centre of the island; the town of Ryde is located approximately 10km to the east of Newport, on the north-eastern coast of the island; whilst Shanklin and Sandown are located approximately 9km to the south of Ryde and 10km to the south east of Newport.

1.6 The IOW as a whole is characterised by high car ownership levels, with 77.5% of households on the island owning a car or van, as indicated by the 2011 Census. Thus, the private vehicle remains the most convenient and fastest way to travel around the island.

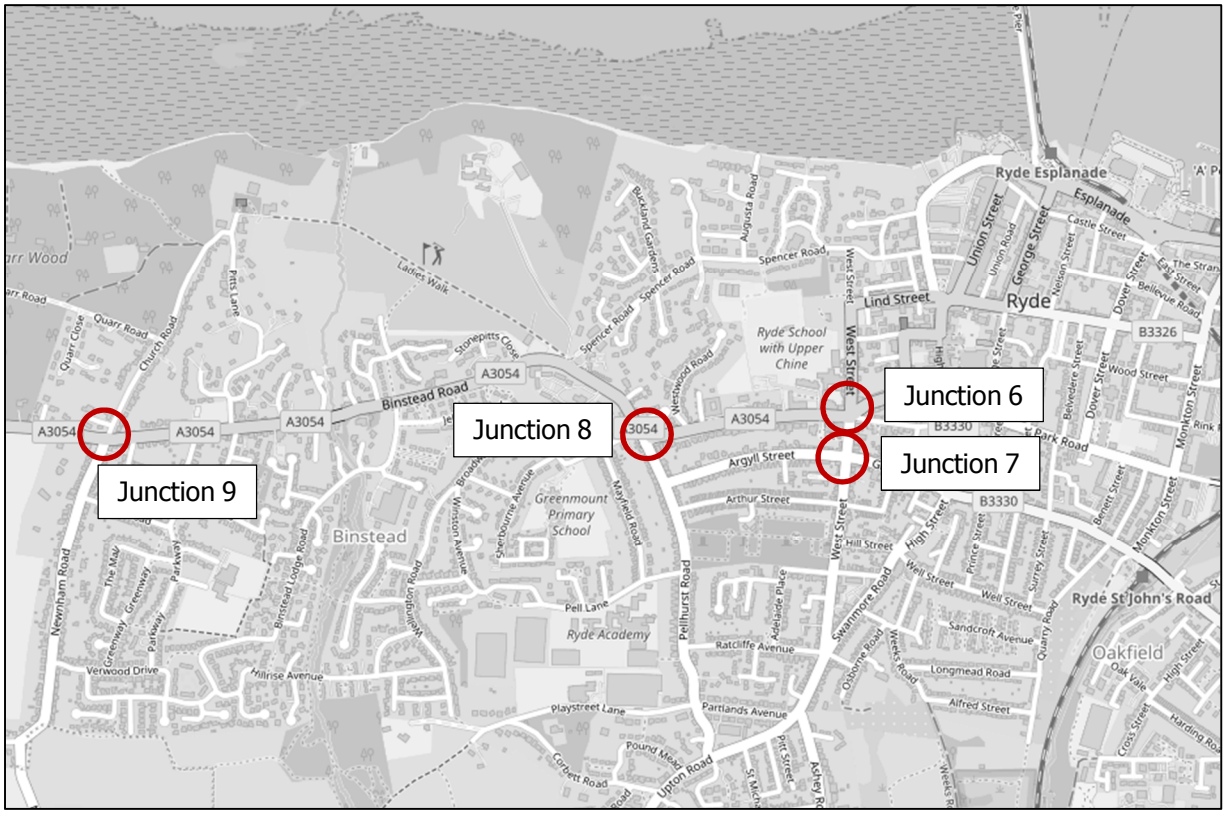
1.7 **Figures 1.1 – 1.3** presents the locations of all 15 junctions within Newport, Ryde and Shanklin & Sandown, which comprise the feasibility study area.

Figure 1.1 Feasibility Study Area – Newport Junctions



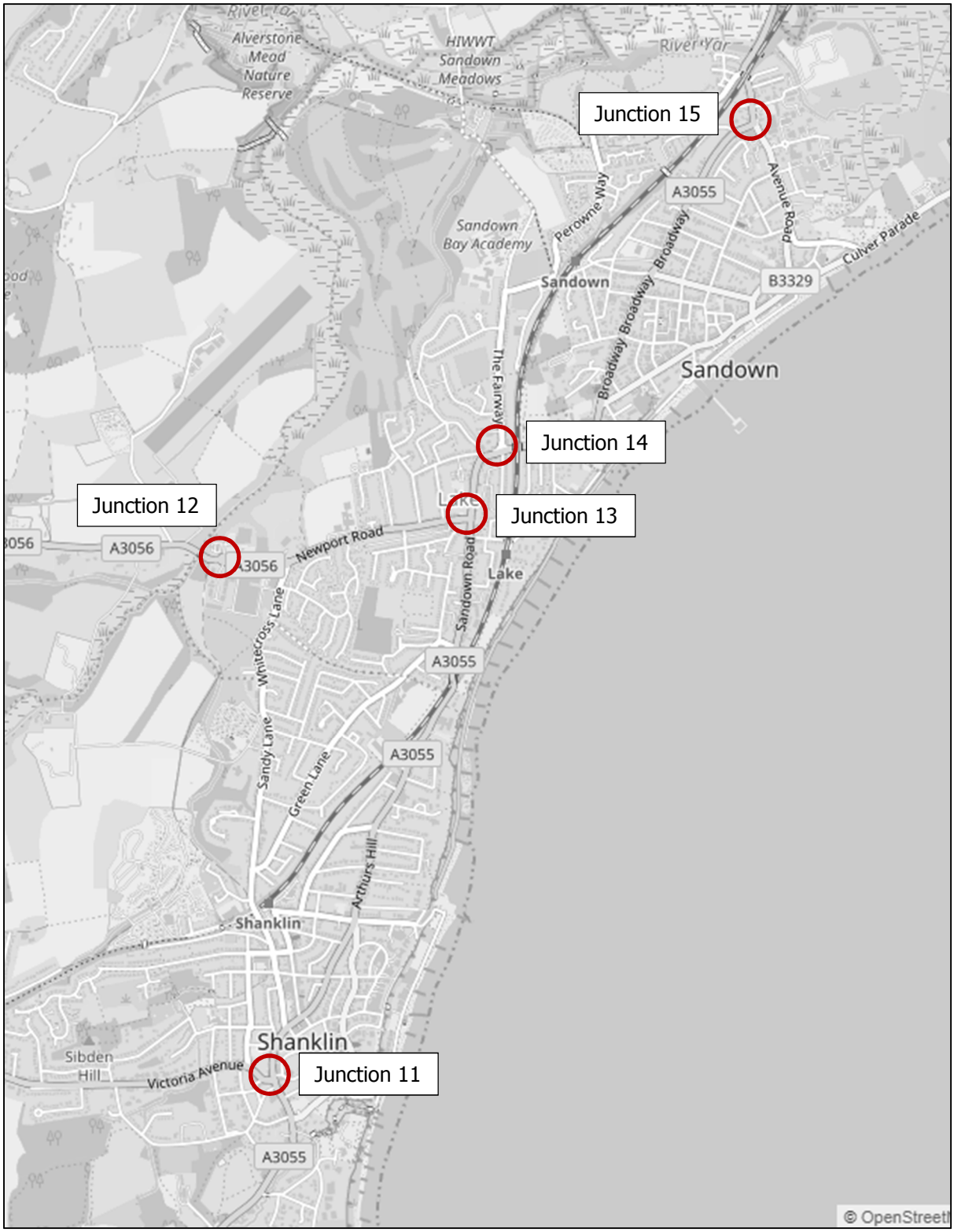
Source: OpenStreetMap with WYG Annotations, September 2017

Figure 1.2 Feasibility Study Area – Ryde Junctions



Source: OpenStreetMap, September 2017

Figure 1.3 Feasibility Study Area – Sandown & Shanklin Junctions

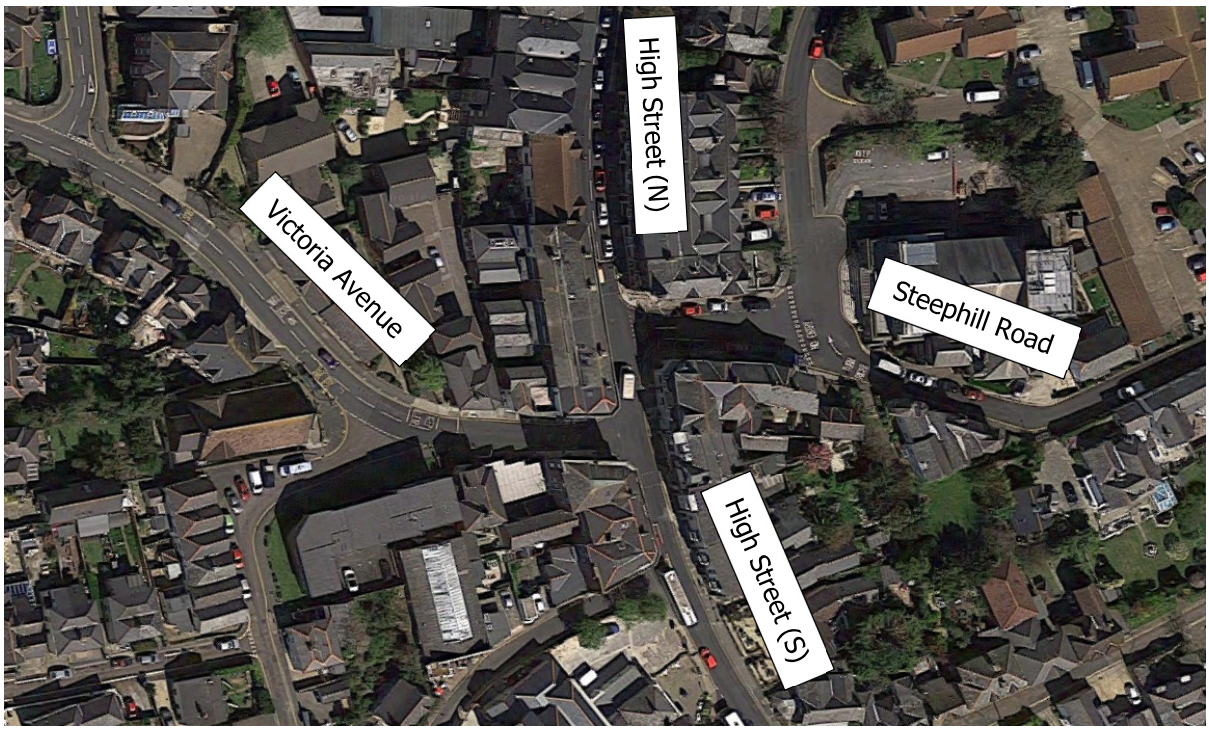


Source: OpenStreetMap, September 2017

1.8 Each of the 15 junctions are to be addressed within an individual feasibility study report. This report focuses on Junction 11, the highway junction High Street / Victoria Avenue which comprises three-arm signalised junction in Shanklin.

1.9 **Figure 1.4** presents a site location plan of the three-arm signalised junction.

Figure 1.4 Junction Location Plan



Source: Google Satellite Image, August 2017

Scope/Purpose of Study

1.10 The purpose of the study is to identify, through the use of traffic modelling software, where the main issues lie in terms of capacity, congestion and queuing at the junction; the traffic modelling will inform the type of highway improvements and design required at each junction.

Report Structure

1.11 The remainder of this document is structured as follows:

- **Chapter 2: Existing Conditions** - summarising the existing conditions at the junction, providing background to the junction, local highway network and detailing the current traffic issues experienced at the junction;
- **Chapter 3: Modelling Methodology** - setting-out details of tasks undertaken to build traffic models of the study area using specialist software, including results of option testing for the junction of interest;
- **Chapter 4: Summary and Conclusions** - summarising the feasibility study process and outlining the key findings of the assessment.

1.12 All Appendices are included at the end of this report for information.

2 Existing Conditions

General

2.1 This chapter establishes the existing, or 'baseline', highway conditions which prevail in the area surrounding the junction. It describes the existing local highway network and any traffic issues present at the junction.

2.2 Baseline studies have been informed by detailed site visits and desk-based research carried out between August and September 2017.

2.3 This report focuses on the three-arm signalised junction at High Street / Victoria Avenue in Shanklin.

Data Collection

2.4 Traffic flow surveys were undertaken by MHC Traffic Ltd on Thursday 20th July 2017 to establish the baseline traffic conditions for the local highway network on the IOW. A range of surveys were undertaken including:

- Manual Classified Counts (MCC) for turning flow information at 15 key junctions on the IOW;
- Automatic Traffic Counts (ATCs) were placed at strategic locations on the network allowing the speeds to be obtained at each of these junctions;
- Queue length surveys at stop lines of all 15 junctions; and
- Video traffic surveys at each of the 15 junctions.

2.5 The surveys allowed for the identification of turning movements at all key junctions as well as routing within the IOW. Signal timing data was additionally supplied by the IOW Council for use for the correct modelling of traffic signals.

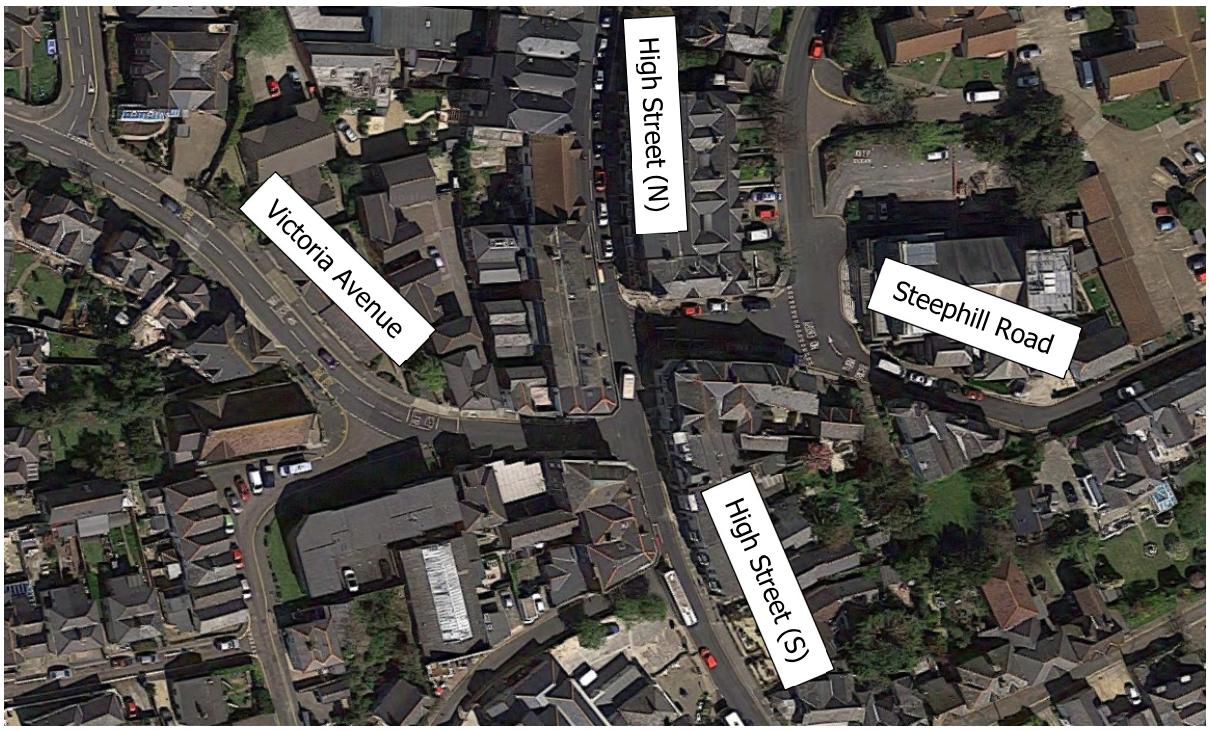
2.6 The data collected as part of the surveys was used directly for calibrating and validating the base scenario for both the Junctions 9 and LinSig models. Video footage of the surveyed junctions was additionally reviewed to ensure that the base models reflect the on-street road conditions as closely as possible.

Study Area/Junction Background

2.7 The High Street / Victoria Avenue junction is located in the centre of Shanklin, along the main high street. The High Street forms the northern and southern arms, whilst Victoria Avenue forms the eastern arm.

2.8 The junction provides access to the main High Street in Shanklin, as well as a main route between Shanklin and Sandown, forming part of the A3055. Victoria Avenue forms part of the A3020, which is one of the main routes to Newport, to the northwest. A location plan of the junction is provided in **Figure 2.1**.

Figure 2.1 Junction Location Plan

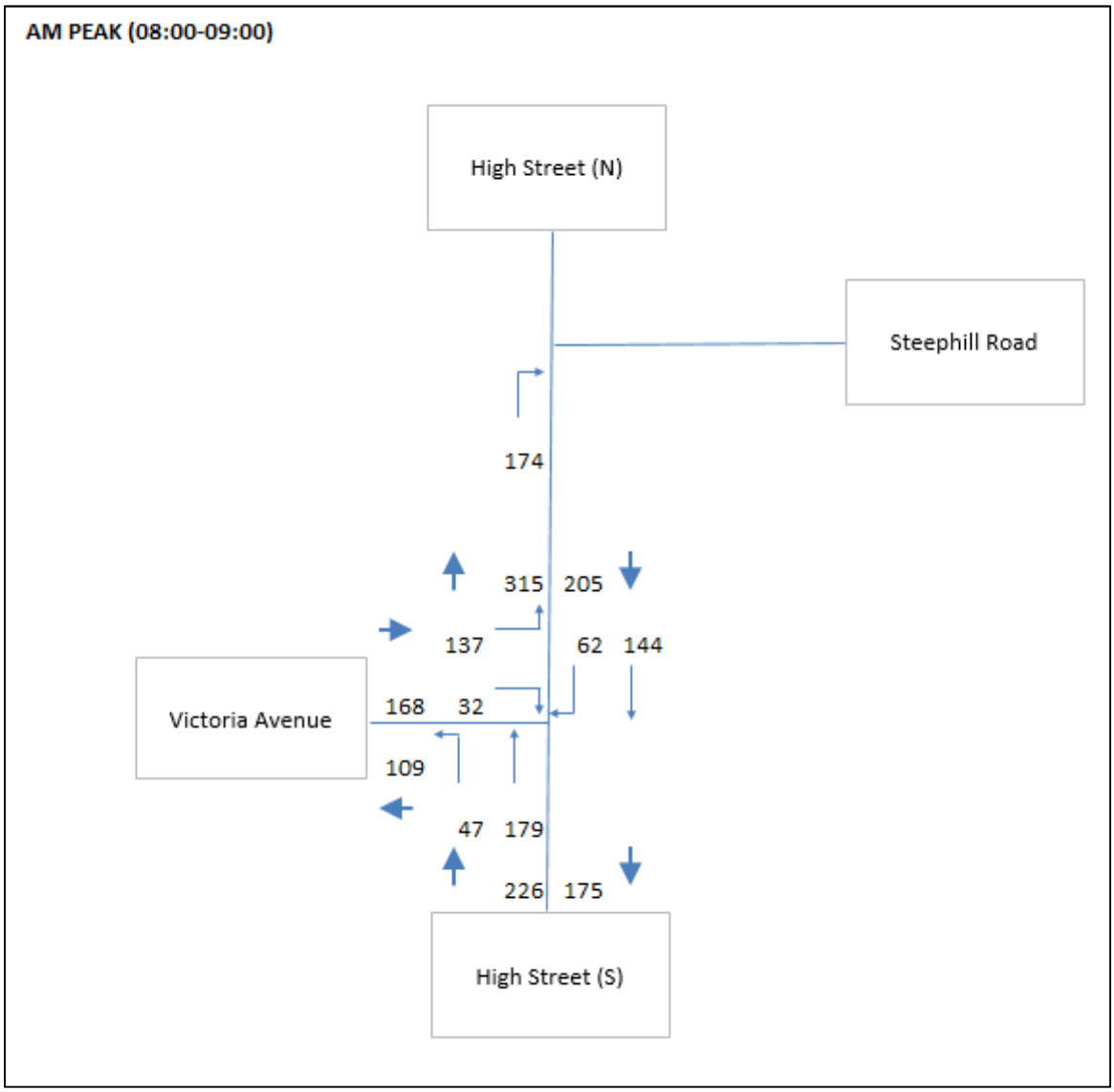


Source: Google Satellite Image, August 2017

Base Traffic Flows

2.9 This section details the current traffic flows and queuing at the junction, as recorded by the survey data. These are shown in **Figures 2.2** and **2.3**.

Figure 2.2 AM Traffic Flows (PCUs)

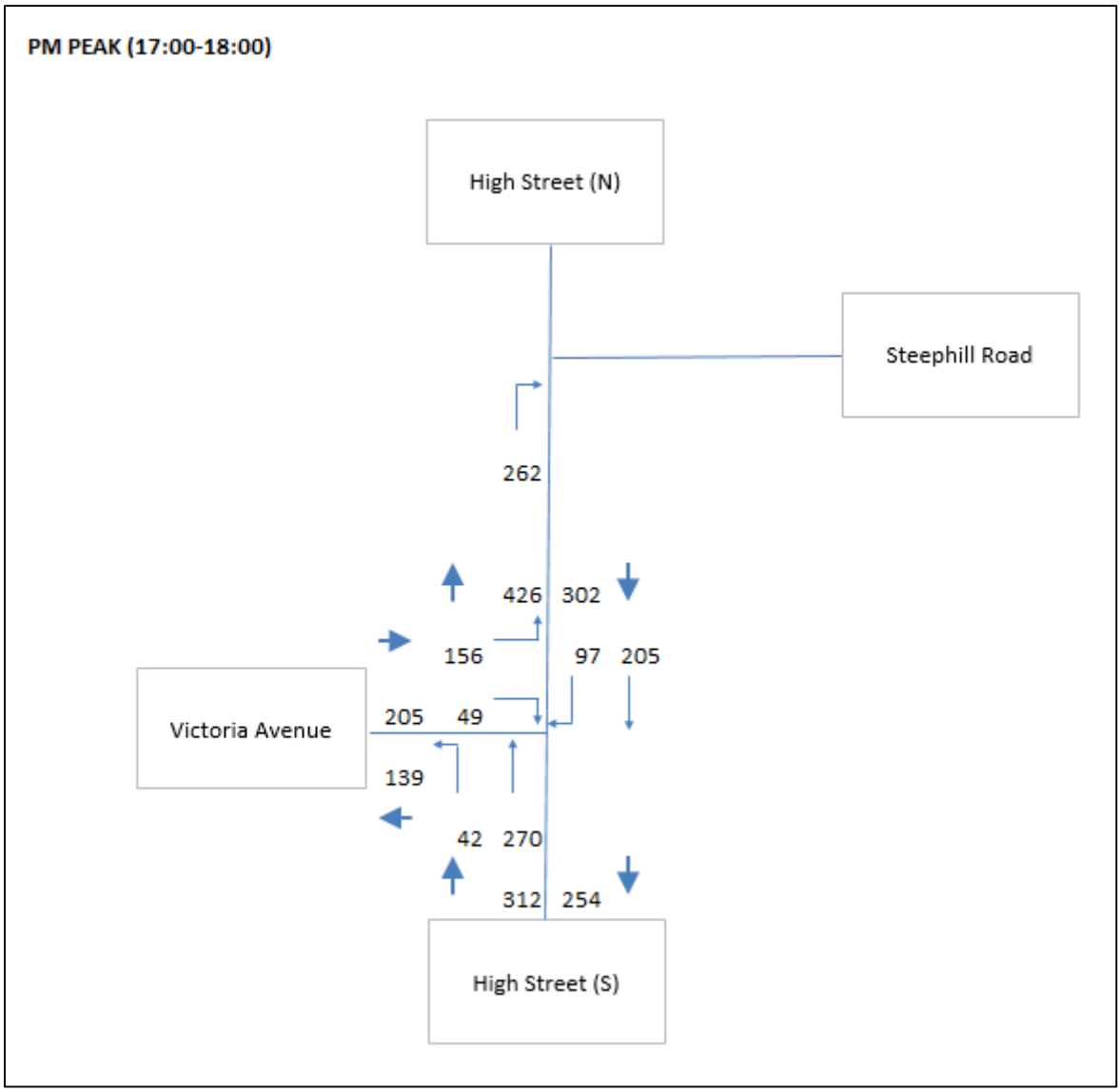


2.10 As shown in Figure 2.2, the highest traffic flows are those travelling eastbound along Steephill Road in the AM Peak (08:00-09:00) with 174 PCUs undertaking this movement. Northbound and southbound flows are also fairly high, with 142 PCUs recorded northbound and 144 southbound. The high flows along Steephill Road are likely to be associated with traffic using the road as a rat-run, avoiding the main High Street. This road can also be used as a shortcut to the seafront.

2.11 Queuing occurs on all arms in the AM Peak, with the highest queues recorded on High Street (N) with a maximum observed queue of nine vehicles. On High Street (S) and Victoria Avenue, maximum observed queues of six vehicles were recorded.

2.12 **Figure 2.3** below shows the traffic flows for the PM Peak (17:00-18:00).

Figure 2.3 PM Traffic Flows (PCUs)



2.13 As shown in **Figure 2.3**, the highest traffic flows are those travelling eastbound along Steephill Road in the PM Peak (17:00-18:00) with 262 PCUs undertaking this movement. Northbound and southbound flows are also fairly high, with 270 PCUs recorded northbound and 205 southbound.

2.14 In the PM Peak, the highest queues recorded on Victoria Avenue with a maximum observed queue of 15 vehicles. On High Street (S) and High Street (N), maximum observed queues of 13 and 11 vehicles were recorded.

Existing Traffic Issues

2.15 At present, the junction is known to experience congestion and queuing, which has been observed during site visits and traffic video surveys at the junction. It was observed that congestion and queuing is evident on all three arms at the junction, particularly during the PM Peak.

Collisions

2.16 A collision data review for the most recent five years was undertaken at the junction, using the website crashmap.co.uk. It was found that no collisions occurred within the vicinity of the junction during this

time period. It is therefore concluded that there are no significant highway safety issues in relation to the highway junction.

Local Highway Network

2.17 The three-arm signalised junction comprises the A3055 High Street, A3020 Victoria Avenue and Steephill Road. This section provides a description of each of these roads.

A3055 High Street

2.18 The A3055 High Street is a two-way single carriageway road and forms the main north-south route between Shanklin and Sandown, as well as forming the main High Street in Shanklin town centre. In the vicinity of the junction, the road is subject to a 30mph speed limit with two pedestrian pelican crossings across the carriageway. Footways are provided on both sides of the carriageway.

A3020 Victoria Avenue

2.19 The A3020 Victoria Avenue is a two-way single carriageway road and is the main route between Shanklin and Newport to the west. In the vicinity of the junction, the road is subject to a 30mph speed limit with a pelican crossing across the carriageway. Footways are provided on both sides of the carriageway.

Steephill Road

2.20 Steephill Road is a one-way single carriageway road and provides a route to the seafront and the northern residential area of Shanklin, via Prospect Road. In the vicinity of the junction, the road is subject to a 30mph speed limit with footways provided on both sides of the carriageway.

Utilities Assessment

2.21 A utilities assessment has been carried out at the junction as an indication of which utilities are present within the vicinity of the junction. The following utilities which may be affected by improvements at the junction are listed below:

- Environment Agency
- Isle of Wight Council
- LinesearchbeforeUdig
- Openreach – (British Telecommunications)
- Scottish and Southern Electricity
- SGN – Southern Gas Networks
- Southern Water

3 Modelling Methodology

Introduction

3.1 Traffic modelling has been undertaken as part of the feasibility study, identifying how the local highway network operates and how it might operate following the proposed improvements to the junction. LinSig v3 is the latest version of JCT's industry-standard software for modelling signalised junctions and urban road networks and has therefore been used to model this junction.

3.2 The modelling has been undertaken for two weekday periods determined to be the network peaks in terms of traffic volumes, with the AM peak between 08:00 and 09:00 and the PM peak between 17:00 and 18:00. These peaks were identified through analysis of traffic count data. Initially, Base Year modelling was using survey data collected in July 2017. Future Year modelling was subsequently carried out in order to test the proposed changes to the network and assess the scale of impact on road traffic.

Explanation of Results

3.3 Queue lengths at junction approaches are usually expressed in terms of 'Passenger Car Equivalent' (PCE) or 'Passenger Car Unit' (PCU). A standard car typically has a PCE/PCU value of 1.0; larger vehicles, such as goods vehicles, typically have PCE/PCU values greater than 1.0 and smaller vehicles, such as motorcycles, typically have PCE/PCU values less than 1.0.

3.4 The Degree of Saturation (DoS) is a ratio of demand to capacity on each approach to a signalised junction, with a value of 100% meaning that demand and capacity are equal and no further traffic is able to progress through the junction. Values over 85% are typically regarded as suffering from traffic congestion, with queues of vehicles beginning to form. The term Practical Reserve Capacity (PRC) is often used to refer to the available spare capacity at a junction. A negative PRC indicates that the junction is over capacity.

3.5 It is noted that a DoS of 90% or over recorded on an approach to the junction is deemed as approaching capacity and therefore a DoS of under 90% is considered acceptable.

Base Year Modelling

3.6 Data collected as part of the surveys was compared to the base year outputs in order to match modelled flows and queue patterns to those observed, within acceptable variations. The results for the A3055 High Street / Victoria Avenue junction are summarised in **Table 3.1**, with full outputs included in **Appendix A**.

LinSig Modelling Results – 2017 Base Year

Table 3.1 Base Year Assessment: LinSig Modelling Results

Arm Cycle time 90 secs	AM Peak			PM Peak		
	Deg Sat (%)	Mean Max Queue (pcu)	Av. Delay Per PCU (s/pcu)	Deg Sat (%)	Mean Max Queue (pcu)	Av. Delay Per PCU (s/pcu)
1/1 – High Street (N)	58.1%	5.3	45.3	80.7%	9.1	57.9
2/1 – High Street (S)	61.0%	5.9	42.2	78.9%	9.2	54.3
3/1 – Victoria Avenue	57.6%	4.5	47.5	78.6%	6.6	66.3
PRC	47.4%			11.6%		
Total Delay (pcu/hr)	7.66			13.34		

3.7 The base year results as shown in Table 3.1 indicate that the junction operates within capacity during the AM and PM Peaks, with a PRC of 47.4% recorded in the AM Peak and 11.6% recorded in the PM Peak. The modelled queues have been calibrated against the observed queues at the junction.

Future Year Modelling

3.8 In terms of preparing a junction design, initial proposals to relocate the stop lines were tried and tested as part of swept path analyses, from this it was found that moving the stop lines closer to the junction would compromise the swept paths of turning HGV vehicles and buses. As a result, it was concluded that physically there is little that can be done to alter the layout of the junction, subsequently, the existing junction layout was tested in the Future Year assessment.

3.9 The Future Year 2034 was assessed as part of this scenario and thus TEMPRO growth factors were applied to the 2017 traffic survey data in order to calculate the 2034 traffic flows. A comparison of TEMPRO growth factors was undertaken for each of the three study areas; Newport, Ryde, Shanklin and Sandown, using local Super Output Areas. It was found that the TEMPRO growth factors for each of the study areas were broadly similar to the TEMPRO growth factors for the Isle of Wight as a whole. As a result, the 'Isle of Wight' as a whole was selected as the geographical area. Also, as all highway junctions within the study area are located in urban areas, it has therefore been deemed more robust that only 'Urban Road Types' were selected as part of this assessment.

3.10 These TEMPRO growth factors are shown in **Table 3.2**.

Table 3.2 2017-2034 TEMPRO Growth Factors – All Urban Road Types

Time Period	TEMPRO Growth Factors (2017-2034)
AM Peak	1.2229
PM Peak	1.2188

Proposals

3.11 Due to space constraints at the junction, there is little that can be done to alter the geometry of layout of the junction; as a result the layout of the existing junction remains unchanged in the Future Year scenario. With no physical improvements possible, different cycle times have been tested as an alternative to improve junction capacity. The Future Year results at the junction are summarised in **Table 3.2**, with full output results included in **Appendix A**.

LinSig Modelling Results – Future Year

Table 3.3 Future Year Assessment: LinSig Modelling Results

Arm Cycle time 90 seconds	AM Peak			PM Peak		
	Deg Sat (%)	Mean Max Queue (pcu)	Av. Delay Per PCU (s/pcu)	Deg Sat (%)	Mean Max Queue (pcu)	Av. Delay Per PCU (s/pcu)
1/1 – High Street (N)	70.8%	7.0	51.1	98.3%	17.2	11.8
2/1 – High Street (S)	70.9%	7.6	48.5	96.4%	16.3	10.6
3/1 – Victoria Avenue	74.6%	6.3	59.8	95.9%	11.9	8.3
PRC	20.6%			-9.2%		
Total Delay (pcu/hr)	10.72			30.61		

3.12 Without any alterations to the junction, the Future Year assessment shows that the junction operates within capacity in the AM Peak, with a PRC of 20.6%. However, in the PM Peak, the junction goes over capacity with a PRC of -9.2% recorded. As a result, different cycle times (105 and 120 seconds) have been tested in the PM Peak to see if this results in any junction capacity improvements. The results are shown in **Table 3.4** and **3.5** below.

Table 3.4 PM Peak - Future Year Assessment (105 seconds)

Arm Cycle time PM - 105 seconds	PM Peak		
	Deg Sat (%)	Mean Max Queue (pcu)	Av. Delay Per PCU (s/pcu)
1/1 – High Street (N)	86.0%	13.0	66.4
2/1 – High Street (S)	89.0%	14.2	72.6
3/1 – Victoria Avenue	88.3%	10.3	87.7
PRC	1.1%		
Total Delay (pcu/hr)	20.55		

Table 3.5 PM Peak - Future Year Assessment (120 seconds)

Arm Cycle time PM - 120 seconds	PM Peak		
	Deg Sat (%)	Mean Max Queue (pcu)	Av. Delay Per PCU (s/pcu)
1/1 – High Street (N)	81.3%	13.6	63.3
2/1 – High Street (S)	81.4%	13.9	62.1
3/1 – Victoria Avenue	83.4%	10.3	79.8
PRC	7.9%		
Total Delay (pcu/hr)	18.58		

3.13 As shown in Tables 3.4, by lengthening the cycle time to 105 seconds in the PM Peak, the junction operates just within capacity with a PRC of 1.1%. The DoS on all three arms also decreases to below 90%. Lengthening the cycle time is considered an effective way of increasing junction capacity as it enables for a longer green time on all arms, allowing a greater number of vehicles to pass through the junction.

3.14 Lengthening the cycle time further to 120 seconds, shown in Table 3.5, there is a greater improvement in capacity with a PRC of 7.9% recorded. The DoS decreases further, with 81.3% recorded on High Street (N), 81.4% on High Street (S) and 83.4% on Victoria Avenue.

Cost/Time Savings Analysis

3.15 A cost savings analysis has been undertaken for the junction based on the delay/time savings gained by lengthening the junction's cycle time for the PM Peak. In order to calculate the cost savings, fuel cost values were extracted for the average car (per km) (petrol / diesel) from the Department for Transport (DfT) document 'Values of Time and Vehicle Operating Costs' Transport Analysis Guidance (TAG), January 2014. The average fuel cost for an average car was extracted as £0.79 per kilometre.

3.16 To calculate the total cost savings for the PM Peak, the average speed at the junction was recorded as 28mph (45kph) (based on ATC data collected by MHC Traffic Ltd), which was then applied to the total time savings for the whole PM period (16:00-19:00). As a result, this determined the total distance saved. The average fuel cost per kilometre was then applied to the total distance, giving a total cost saving per PM Peak period, for an average weekday. For the annual cost savings, the total PM cost savings were applied to a total of 253 days (excluding weekends and Bank Holidays), seeing as this assessment only takes into account an average weekday. The results of this assessment are summarised in **Table 3.6** below.

Table 3.6 Estimated Cost/Time Savings Analysis of Junction 11

Time Period	Average Existing Delay per PCU (secs)	Estimated Average Delay per PCU (secs)	Average Journey Time Savings (secs)	Assumed Length of Time Period (Hours)	Average No. of PCUs per hour	Time Savings for All Vehicles During Period (secs)	Value of Time Savings Per Period (£)	Value of Time Savings Per Annum
PM Peak (16:00-19:00)	31	19	12	3	300	10,827	£107.46	£27,186.87
TOTAL						**10,827**	**£107.46**	**£27,186.87**

3.17 As shown in Table 3.6, the estimated cost savings per peak period were £107.46 in the PM Peak, and thus the overall annual fuel cost savings was estimated to be £27,186.87.

Outcome / Conclusions

3.18 It is noted that there is very little that can be done by way of physical engineering works to improve capacity at the junction for the Future Year scenario. As an alternative, different cycle times were tested to see if this provided any benefits to junction capacity. From the modelling results, it was found that the AM Peak remained within capacity in the Future Year scenario with no changes to the cycle time (tested with the existing cycle time of 90 seconds).

3.19 For the PM Peak, the existing junction runs over capacity in the Future Year scenario with a 90 second cycle, which is the current cycle time at the junction. It was found that by increasing the cycle time to 105 seconds in the PM Peak, this resulted in increased capacity with the junction operating just within capacity. Further increasing the cycle time to 120 seconds results in a greater increase in capacity.

Therefore it is recommended that the cycle time should be increased to 120 seconds to allow the junction to operate efficiently in the PM Peak in the Future Year.

3.20 With no physical engineering works possible at the junction, it has been suggested that public realm improvements should be encouraged at the junction, which ideally would be in the form of a raised table, creating a more attractive environment for pedestrians and cyclists to cross.

4 Summary and Conclusions

Summary

4.1 WYG have been appointed by the Isle of Wight (IOW) Council to undertake a feasibility study for a series of highway junctions located throughout the island, with a particular focus on the towns of Newport, Ryde, Shanklin and Sandown. The study has been carried out to identify traffic management issues impacting on all road users and develop proposals that will form part of a package of schemes to be progressed as part of the Council's Local Implementation Plan (LIP) process.

4.2 IOW Council has identified 15 highway junctions which currently experience traffic issues such as congestion and queuing. The study considers where the main issues lie in relation to traffic movement, road safety, bus operation, pedestrian and cycle provision, public realm, parking provision and servicing. Each of the 15 highway junctions is subject to a feasibility study report, with traffic modelling software used to test various proposals in order to identify a range of measures aimed at improving the behaviour and movement of traffic at each junction.

4.3 The High Street / Victoria Avenue junction is located in the centre of Shanklin, along the main high street. The High Street forms the northern and southern arms, whilst Victoria Avenue forms the eastern arm. The junction provides access to the main High Street in Shanklin, as well as a main route between Shanklin and Sandown, forming part of the A3055. Victoria Avenue forms part of the A3020, which is one of the main routes to Newport, to the northwest.

4.4 At present, the junction is known to experience congestion and queuing, which has been observed during site visits and traffic video surveys at the junction. Significant congestion and queuing is evident on all three arms at the junction, particularly in the PM peak.

4.5 LinSig v3 is the latest version of JCT's industry-standard software for modelling signalised junctions and urban road networks and has therefore been used to model this junction. The modelling has been undertaken for two weekday periods considered to be the network peaks in terms of traffic volumes, with the AM peak between 08:00 and 09:00 and the PM peak between 17:00 and 18:00. The Base Year results indicate that the junction operates within recommended capacity during the AM and PM Peaks, with a PRC of 47.4% recorded in the AM Peak and 11.6% recorded in the PM Peak.

4.6 Due to very space constraints at the junction, there is little that can be done to improve the junction physically; as a result the existing junction remains unchanged in the Future Year scenario. With no physical improvements possible, different cycle times were tested as an alternative to improve junction capacity. From the modelling results, it was found that the AM Peak remained within capacity in the Future Year scenario with no changes to the cycle time (tested with the existing cycle time of 90 seconds).

4.7 For the PM Peak, the existing junction operates over capacity in the Future Year scenario with a 90 second cycle, which is the current cycle time at junction. It was found that increasing the cycle time to 105 seconds in the PM Peak resulted in increased capacity with the junction operating just within capacity. Further adjusting the cycle time to 120 seconds results in a greater increase in capacity. Therefore, as a result of the modelling, it is recommended that the cycle time be increased to 120 seconds to allow the junction to operate efficiently in the PM Peak, in the Future Year 2034.

Conclusions

4.8 As part of this feasibility study, it can be concluded that to address capacity issues in the Future Year 2034, in reference to the PM Peak, it is recommended that the cycle time is increased to 120 seconds to improve the capacity at the junction. Public realm improvements in the form of a raised table would be desirable, creating a more attractive environment for pedestrian and cyclists to cross.

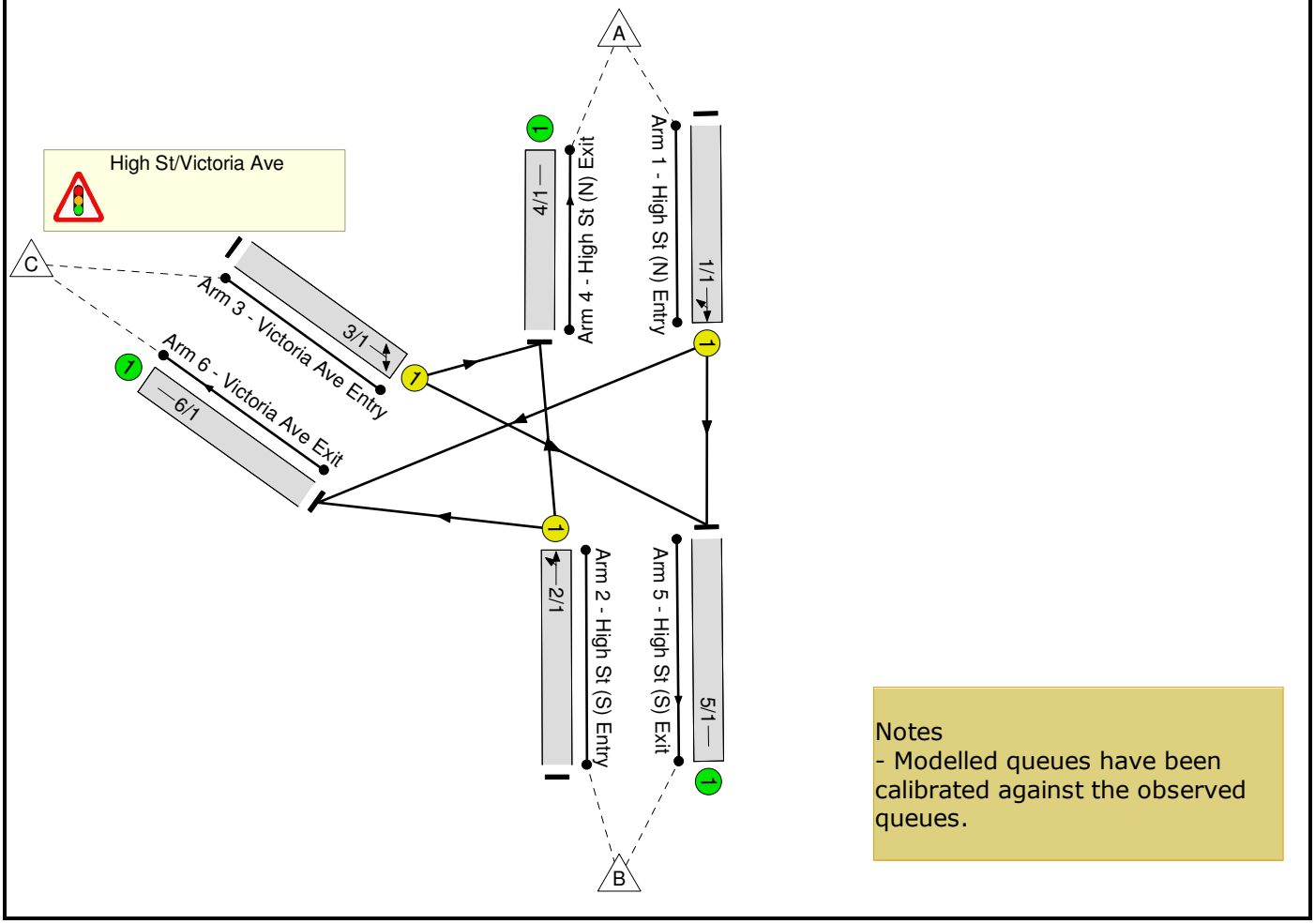
Appendix A
MODELLING OUTPUT RESULTS

Full Input Data And Results

User and Project Details

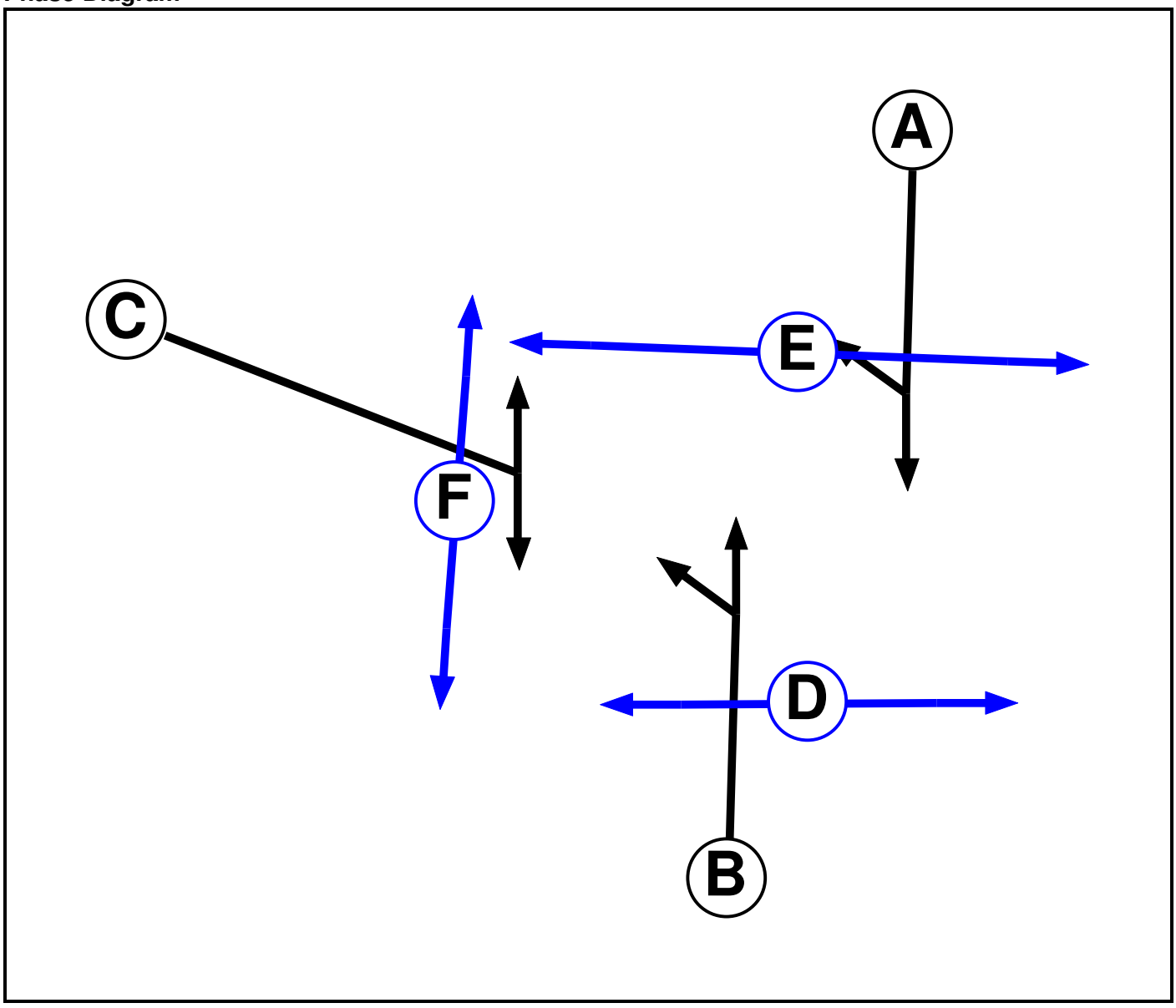
Project:	**A090129-60**
Title:	**HCA Tender IoW**
Location:	
File name:	Junction 11 - High St Victoria Ave RD.lsg3x
Author:	
Company:	
Address:	
Notes:	

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	Pedestrian		7	7
E	Pedestrian		7	7
F	Pedestrian		7	7

Full Input Data And Results

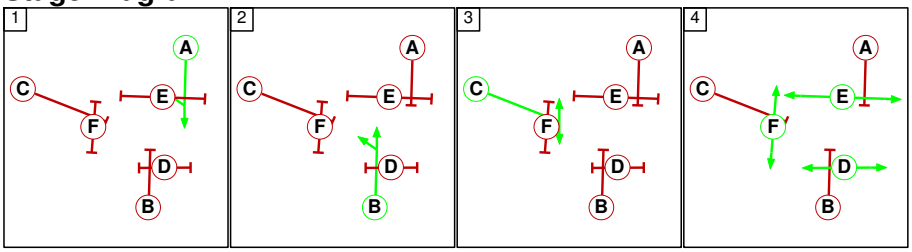
Phase Intergreens Matrix

Terminating Phase	Starting Phase						
		A	B	C	D	E	F
	A		6	10	5	9	10
	B	10		10	10	6	7
	C	9	12		16	11	9
	D	0	0	0		-	-
	E	0	0	0	-		-
	F	0	0	0	-	-	

Phases in Stage

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

Stage Diagram



Phase Delays

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

Prohibited Stage Change

From Stage	To Stage				
		1	2	3	4
	1		6	10	10
	2	10		10	10
	3	9	12		16
	4	2	2	2	

Full Input Data And Results

Give-Way Lane Input Data

Junction: High St/Victoria Ave
There are no Opposed Lanes in this Junction

Full Input Data And Results

Lane Input Data

Junction: High St/Victoria Ave												
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 (High St (N) Entry)	U	A	2	3	60.0	Geom	-	3.43	0.00	Y	Arm 5 Ahead	Inf
											Arm 6 Right	10.50
2/1 (High St (S) Entry)	U	B	2	3	60.0	Geom	-	3.00	0.00	Y	Arm 4 Ahead	Inf
											Arm 6 Left	9.00
3/1 (Victoria Ave Entry)	U	C	2	3	60.0	Geom	-	3.50	0.00	Y	Arm 4 Left	5.00
											Arm 5 Right	13.00
4/1 (High St (N) Exit)	U		2	3	60.0	Inf	-	-	-	-	-	-
5/1 (High St (S) Exit)	U		2	3	60.0	Inf	-	-	-	-	-	-
6/1 (Victoria Ave Exit)	U		2	3	60.0	Inf	-	-	-	-	-	-

Traffic Flow Groups

Flow Group	Start Time	End Time	Duration	Formula
1: '2017 AM'	08:00	09:00	01:00	
2: '2017 PM'	17:00	18:00	01:00	
3: '2034 - AM - Base'	08:00	09:00	01:00	
4: '2034 - PM - Base'	17:00	18:00	01:00	
5: '20XX - AM - DS'	08:00	09:00	01:00	
6: '20XX - PM - DS'	17:00	18:00	01:00	

Scenario 1: '2017 AM' (FG1: '2017 AM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination			
		A	B	C	Tot.
Origin	A	0	144	62	206
	B	179	0	47	226
	C	137	32	0	169
	Tot.	316	176	109	601

Full Input Data And Results

Traffic Lane Flows

Lane	Scenario 1: 2017 AM
Junction: High St/Victoria Ave	
1/1	206
2/1	226
3/1	169
4/1	316
5/1	176
6/1	109

Lane Saturation Flows

Junction: High St/Victoria Ave								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (High St (N) Entry)	3.43	0.00	Y	Arm 5 Ahead	Inf	69.9 %	1877	1877
				Arm 6 Right	10.50	30.1 %		
2/1 (High St (S) Entry)	3.00	0.00	Y	Arm 4 Ahead	Inf	79.2 %	1851	1851
				Arm 6 Left	9.00	20.8 %		
3/1 (Victoria Ave Entry)	3.50	0.00	Y	Arm 4 Left	5.00	81.1 %	1553	1553
				Arm 5 Right	13.00	18.9 %		
4/1 (High St (N) Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
5/1 (High St (S) Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
6/1 (Victoria Ave Exit Lane 1)	Infinite Saturation Flow						Inf	Inf

Scenario 2: '2017 PM ' (FG2: '2017 PM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination			
		A	B	C	Tot.
Origin	A	0	205	97	302
	B	270	0	42	312
	C	156	49	0	205
	Tot.	426	254	139	819

Full Input Data And Results

Traffic Lane Flows

Lane	Scenario 2: 2017 PM
Junction: High St/Victoria Ave	
1/1	302
2/1	312
3/1	205
4/1	426
5/1	254
6/1	139

Lane Saturation Flows

Junction: High St/Victoria Ave								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (High St (N) Entry)	3.43	0.00	Y	Arm 5 Ahead	Inf	67.9 %	1872	1872
				Arm 6 Right	10.50	32.1 %		
2/1 (High St (S) Entry)	3.00	0.00	Y	Arm 4 Ahead	Inf	86.5 %	1873	1873
				Arm 6 Left	9.00	13.5 %		
3/1 (Victoria Ave Entry)	3.50	0.00	Y	Arm 4 Left	5.00	76.1 %	1565	1565
				Arm 5 Right	13.00	23.9 %		
4/1 (High St (N) Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
5/1 (High St (S) Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
6/1 (Victoria Ave Exit Lane 1)	Infinite Saturation Flow						Inf	Inf

Scenario 3: '2034 - AM - Base' (FG3: '2034 - AM - Base', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination			
		A	B	C	Tot.
Origin	A	0	176	75	251
	B	219	0	58	277
	C	167	39	0	206
	Tot.	386	215	133	734

Full Input Data And Results

Traffic Lane Flows

Lane	Scenario 3: 2034 - AM - Base
Junction: High St/Victoria Ave	
1/1	251
2/1	277
3/1	206
4/1	386
5/1	215
6/1	133

Lane Saturation Flows

Junction: High St/Victoria Ave								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (High St (N) Entry)	3.43	0.00	Y	Arm 5 Ahead	Inf	70.1 %	1878	1878
				Arm 6 Right	10.50	29.9 %		
2/1 (High St (S) Entry)	3.00	0.00	Y	Arm 4 Ahead	Inf	79.1 %	1850	1850
				Arm 6 Left	9.00	20.9 %		
3/1 (Victoria Ave Entry)	3.50	0.00	Y	Arm 4 Left	5.00	81.1 %	1553	1553
				Arm 5 Right	13.00	18.9 %		
4/1 (High St (N) Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
5/1 (High St (S) Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
6/1 (Victoria Ave Exit Lane 1)	Infinite Saturation Flow						Inf	Inf

Scenario 4: '2034 - PM - Base' (FG4: '2034 - PM - Base', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination			
		A	B	C	Tot.
Origin	A	0	250	118	368
	B	329	0	52	381
	C	191	59	0	250
	Tot.	520	309	170	999

Full Input Data And Results

Traffic Lane Flows

Lane	Scenario 4: 2034 - PM - Base
Junction: High St/Victoria Ave	
1/1	368
2/1	381
3/1	250
4/1	520
5/1	309
6/1	170

Lane Saturation Flows

Junction: High St/Victoria Ave								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (High St (N) Entry)	3.43	0.00	Y	Arm 5 Ahead	Inf	67.9 %	1872	1872
				Arm 6 Right	10.50	32.1 %		
2/1 (High St (S) Entry)	3.00	0.00	Y	Arm 4 Ahead	Inf	86.4 %	1872	1872
				Arm 6 Left	9.00	13.6 %		
3/1 (Victoria Ave Entry)	3.50	0.00	Y	Arm 4 Left	5.00	76.4 %	1564	1564
				Arm 5 Right	13.00	23.6 %		
4/1 (High St (N) Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
5/1 (High St (S) Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
6/1 (Victoria Ave Exit Lane 1)	Infinite Saturation Flow						Inf	Inf

Scenario 5: '20XX - AM - DS' (FG5: '20XX - AM - DS', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination			
		A	B	C	Tot.
Origin	A	0	0	0	0
	B	0	0	0	0
	C	0	0	0	0
	Tot.	0	0	0	0

Full Input Data And Results

Traffic Lane Flows

Lane	Scenario 5: 20XX - AM - DS
Junction: High St/Victoria Ave	
1/1	0
2/1	0
3/1	0
4/1	0
5/1	0
6/1	0

Lane Saturation Flows

Junction: High St/Victoria Ave								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (High St (N) Entry)	3.43	0.00	Y	Arm 5 Ahead	Inf	0.0 %	1958	1958
				Arm 6 Right	10.50	0.0 %		
2/1 (High St (S) Entry)	3.00	0.00	Y	Arm 4 Ahead	Inf	0.0 %	1915	1915
				Arm 6 Left	9.00	0.0 %		
3/1 (Victoria Ave Entry)	3.50	0.00	Y	Arm 4 Left	5.00	0.0 %	1965	1965
				Arm 5 Right	13.00	0.0 %		
4/1 (High St (N) Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
5/1 (High St (S) Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
6/1 (Victoria Ave Exit Lane 1)	Infinite Saturation Flow						Inf	Inf

Scenario 6: '20XX - PM - DS' (FG6: '20XX - PM - DS', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination			
		A	B	C	Tot.
Origin	A	0	0	0	0
	B	0	0	0	0
	C	0	0	0	0
	Tot.	0	0	0	0

Full Input Data And Results

Traffic Lane Flows

Lane	Scenario 6: 20XX - PM - DS
Junction: High St/Victoria Ave	
1/1	0
2/1	0
3/1	0
4/1	0
5/1	0
6/1	0

Lane Saturation Flows

Junction: High St/Victoria Ave								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (High St (N) Entry)	3.43	0.00	Y	Arm 5 Ahead	Inf	0.0 %	1958	1958
				Arm 6 Right	10.50	0.0 %		
2/1 (High St (S) Entry)	3.00	0.00	Y	Arm 4 Ahead	Inf	0.0 %	1915	1915
				Arm 6 Left	9.00	0.0 %		
3/1 (Victoria Ave Entry)	3.50	0.00	Y	Arm 4 Left	5.00	0.0 %	1965	1965
				Arm 5 Right	13.00	0.0 %		
4/1 (High St (N) Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
5/1 (High St (S) Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
6/1 (Victoria Ave Exit Lane 1)	Infinite Saturation Flow						Inf	Inf

Scenario 7: '2034 - PM - Base (90 seconds)' (FG4: '2034 - PM - Base', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination			
		A	B	C	Tot.
Origin	A	0	250	118	368
	B	329	0	52	381
	C	191	59	0	250
	Tot.	520	309	170	999

Full Input Data And Results

Traffic Lane Flows

Lane	Scenario 7: 2034 - PM - Base (90 seconds)
Junction: High St/Victoria Ave	
1/1	368
2/1	381
3/1	250
4/1	520
5/1	309
6/1	170

Lane Saturation Flows

Junction: High St/Victoria Ave								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (High St (N) Entry)	3.43	0.00	Y	Arm 5 Ahead	Inf	67.9 %	1872	1872
				Arm 6 Right	10.50	32.1 %		
2/1 (High St (S) Entry)	3.00	0.00	Y	Arm 4 Ahead	Inf	86.4 %	1872	1872
				Arm 6 Left	9.00	13.6 %		
3/1 (Victoria Ave Entry)	3.50	0.00	Y	Arm 4 Left	5.00	76.4 %	1564	1564
				Arm 5 Right	13.00	23.6 %		
4/1 (High St (N) Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
5/1 (High St (S) Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
6/1 (Victoria Ave Exit Lane 1)	Infinite Saturation Flow						Inf	Inf

Scenario 8: '2034 - PM - Base (120 seconds)' (FG4: '2034 - PM - Base', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination			
		A	B	C	Tot.
Origin	A	0	250	118	368
	B	329	0	52	381
	C	191	59	0	250
	Tot.	520	309	170	999

Full Input Data And Results

Traffic Lane Flows

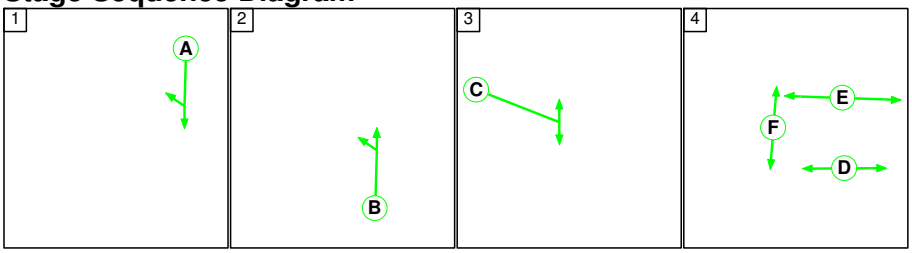
Lane	Scenario 8: 2034 - PM - Base (120 seconds)
Junction: High St/Victoria Ave	
1/1	368
2/1	381
3/1	250
4/1	520
5/1	309
6/1	170

Lane Saturation Flows

Junction: High St/Victoria Ave								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (High St (N) Entry)	3.43	0.00	Y	Arm 5 Ahead	Inf	67.9 %	1872	1872
				Arm 6 Right	10.50	32.1 %		
2/1 (High St (S) Entry)	3.00	0.00	Y	Arm 4 Ahead	Inf	86.4 %	1872	1872
				Arm 6 Left	9.00	13.6 %		
3/1 (Victoria Ave Entry)	3.50	0.00	Y	Arm 4 Left	5.00	76.4 %	1564	1564
				Arm 5 Right	13.00	23.6 %		
4/1 (High St (N) Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
5/1 (High St (S) Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
6/1 (Victoria Ave Exit Lane 1)	Infinite Saturation Flow						Inf	Inf

Scenario 1: '2017 AM' (FG1: '2017 AM', Plan 1: 'Network Control Plan 1')

Stage Sequence Diagram

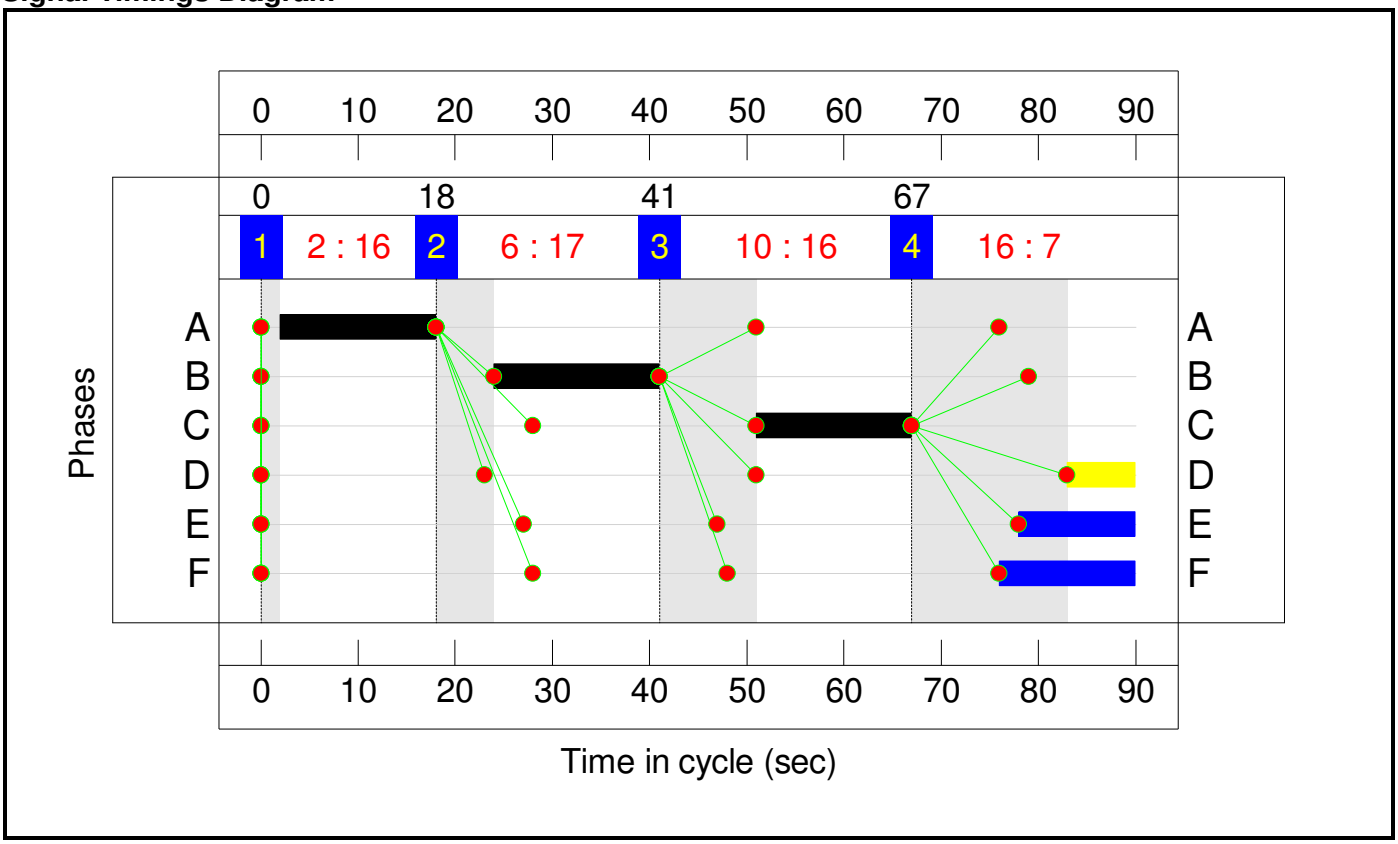


Stage Timings

Stage	1	2	3	4
Duration	16	17	16	7
Change Point	0	18	41	67

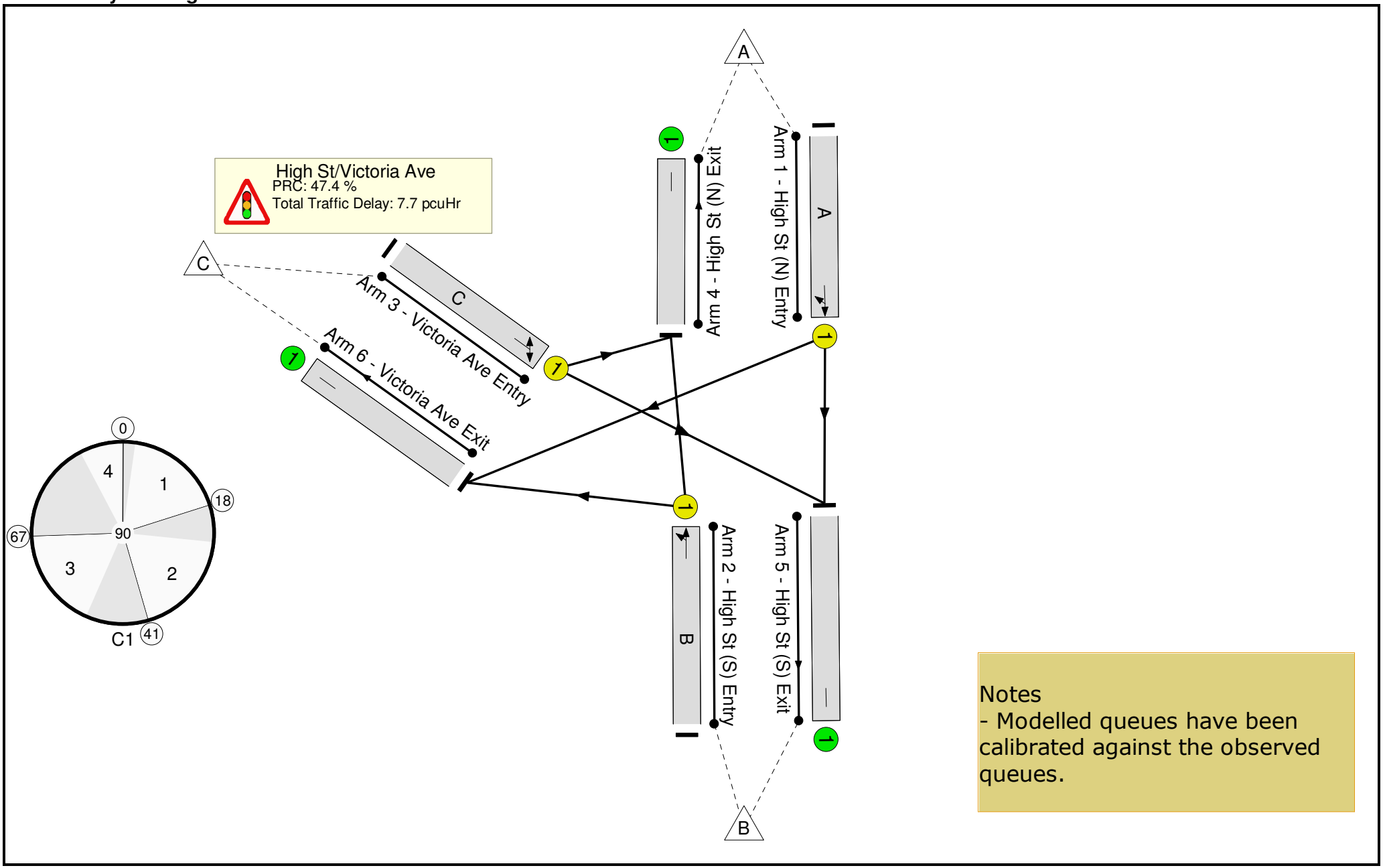
Full Input Data And Results

Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram



Notes
- Modelled queues have been calibrated against the observed queues.

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: HCA Tender IoW	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**61.0%**
High St/Victoria Ave	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**61.0%**
1/1	High St (N) Entry Ahead Right	U	N/A	N/A	A		1	16	-	206	1877	355	58.1%
2/1	High St (S) Entry Ahead Left	U	N/A	N/A	B		1	17	-	226	1851	370	61.0%
3/1	Victoria Ave Entry Left Right	U	N/A	N/A	C		1	16	-	169	1553	293	57.6%
4/1	High St (N) Exit	U	N/A	N/A	-		-	-	-	316	Inf	Inf	0.0%
5/1	High St (S) Exit	U	N/A	N/A	-		-	-	-	176	Inf	Inf	0.0%
6/1	Victoria Ave Exit	U	N/A	N/A	-		-	-	-	109	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: HCA Tender IoW	**-**	**-**	**0**	**0**	**0**	**5.5**	**2.1**	**0.0**	**7.7**	**-**	**-**	**-**	**-**
High St/Victoria Ave	**-**	**-**	**0**	**0**	**0**	**5.5**	**2.1**	**0.0**	**7.7**	**-**	**-**	**-**	**-**
1/1	206	206	-	-	-	1.9	0.7	-	2.6	45.3	4.6	0.7	5.3
2/1	226	226	-	-	-	2.1	0.8	-	2.8	45.2	5.1	0.8	5.9
3/1	169	169	-	-	-	1.6	0.7	-	2.2	47.5	3.8	0.7	4.5
4/1	316	316	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	176	176	-	-	-	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

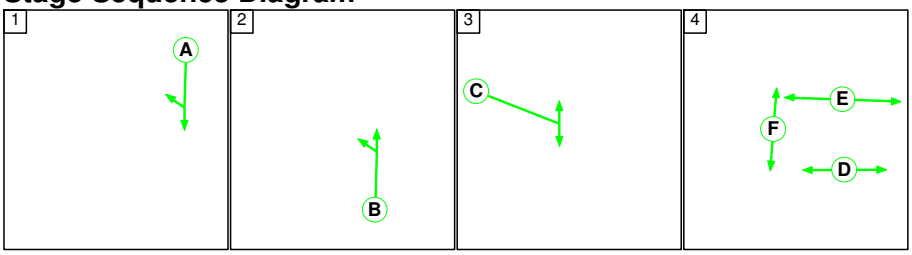
Full Input Data And Results

C1	PRC for Signalled Lanes (%):	47.4	Total Delay for Signalled Lanes (pcuHr):	7.66	Cycle Time (s):	90	
	PRC Over All Lanes (%):	47.4	Total Delay Over All Lanes(pcuHr):	7.66			

Full Input Data And Results

Scenario 2: '2017 PM ' (FG2: '2017 PM', Plan 1: 'Network Control Plan 1')

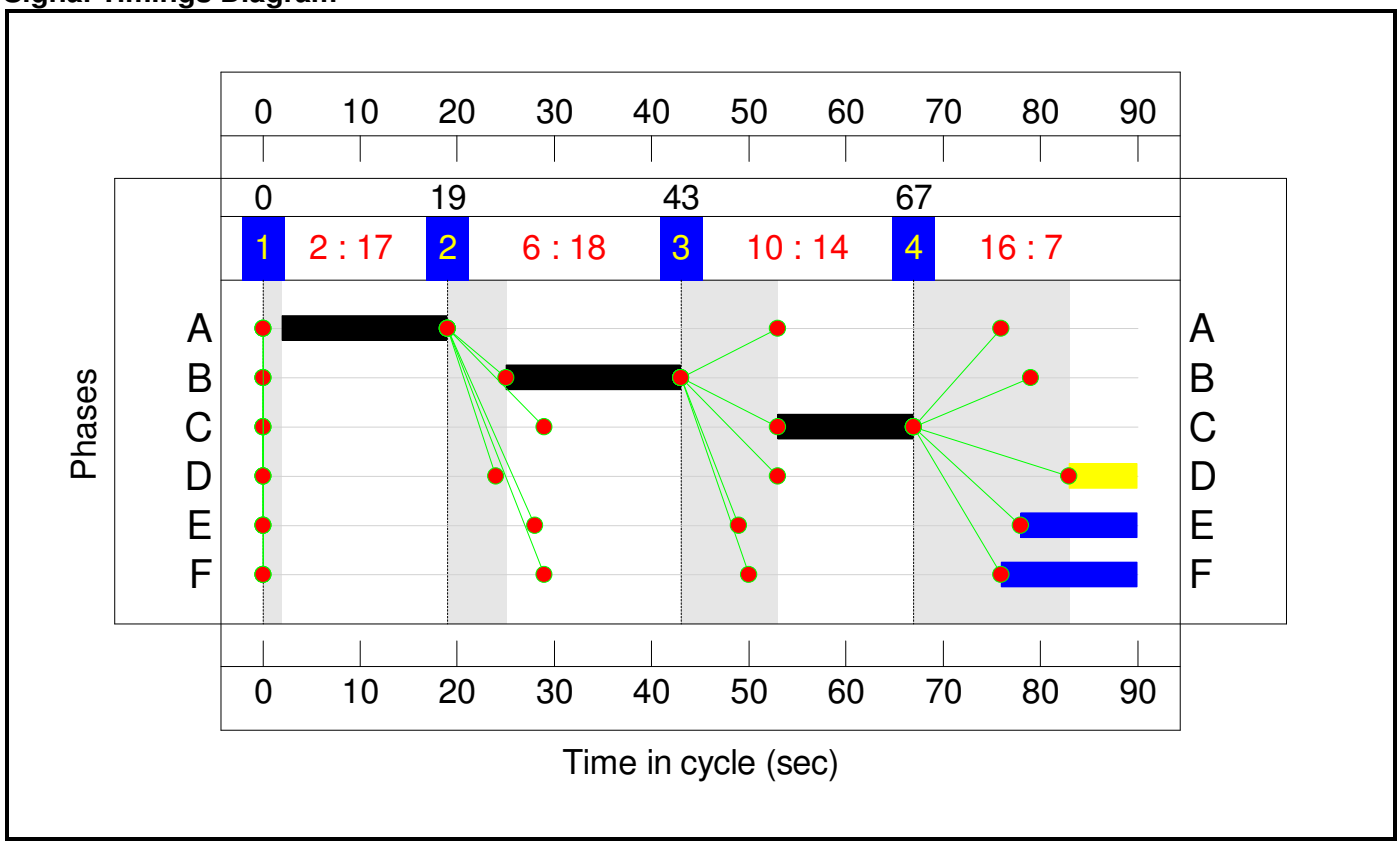
Stage Sequence Diagram



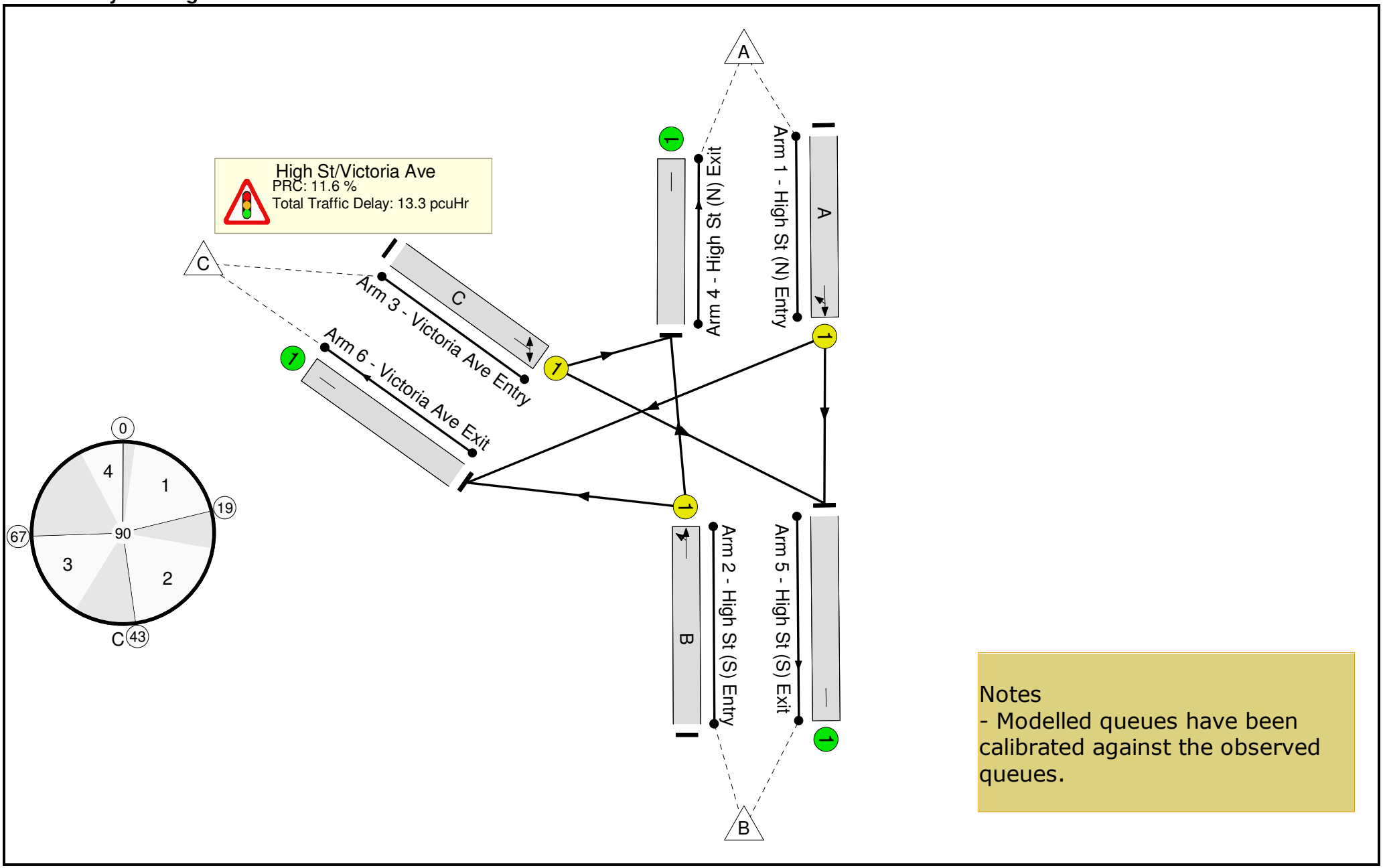
Stage Timings

Stage	1	2	3	4
Duration	17	18	14	7
Change Point	0	19	43	67

Signal Timings Diagram



Network Layout Diagram



Notes
- Modelled queues have been calibrated against the observed queues.

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: HCA Tender IoW	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**80.7%**
High St/Victoria Ave	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**80.7%**
1/1	High St (N) Entry Ahead Right	U	N/A	N/A	A		1	17	-	302	1872	374	80.7%
2/1	High St (S) Entry Ahead Left	U	N/A	N/A	B		1	18	-	312	1873	395	78.9%
3/1	Victoria Ave Entry Left Right	U	N/A	N/A	C		1	14	-	205	1565	261	78.6%
4/1	High St (N) Exit	U	N/A	N/A	-		-	-	-	426	Inf	Inf	0.0%
5/1	High St (S) Exit	U	N/A	N/A	-		-	-	-	254	Inf	Inf	0.0%
6/1	Victoria Ave Exit	U	N/A	N/A	-		-	-	-	139	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: HCA Tender IoW	**-**	**-**	**0**	**0**	**0**	**7.8**	**5.5**	**0.0**	**13.3**	**-**	**-**	**-**	**-**
High St/Victoria Ave	**-**	**-**	**0**	**0**	**0**	**7.8**	**5.5**	**0.0**	**13.3**	**-**	**-**	**-**	**-**
1/1	302	302	-	-	-	2.9	2.0	-	4.9	57.9	7.1	2.0	9.1
2/1	312	312	-	-	-	2.9	1.8	-	4.7	54.3	7.4	1.8	9.2
3/1	205	205	-	-	-	2.0	1.7	-	3.8	66.3	4.9	1.7	6.6
4/1	426	426	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	254	254	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	139	139	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

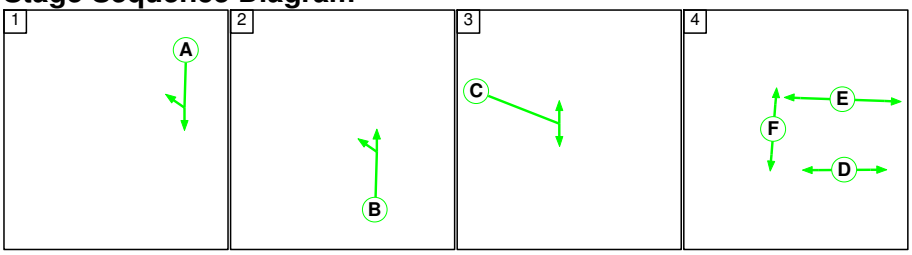
Full Input Data And Results

C1	PRC for Signalled Lanes (%):	11.6	Total Delay for Signalled Lanes (pcuHr):	13.34	Cycle Time (s):	90	
	PRC Over All Lanes (%):	11.6	Total Delay Over All Lanes(pcuHr):	13.34			

Full Input Data And Results

Scenario 3: '2034 - AM - Base' (FG3: '2034 - AM - Base', Plan 1: 'Network Control Plan 1')

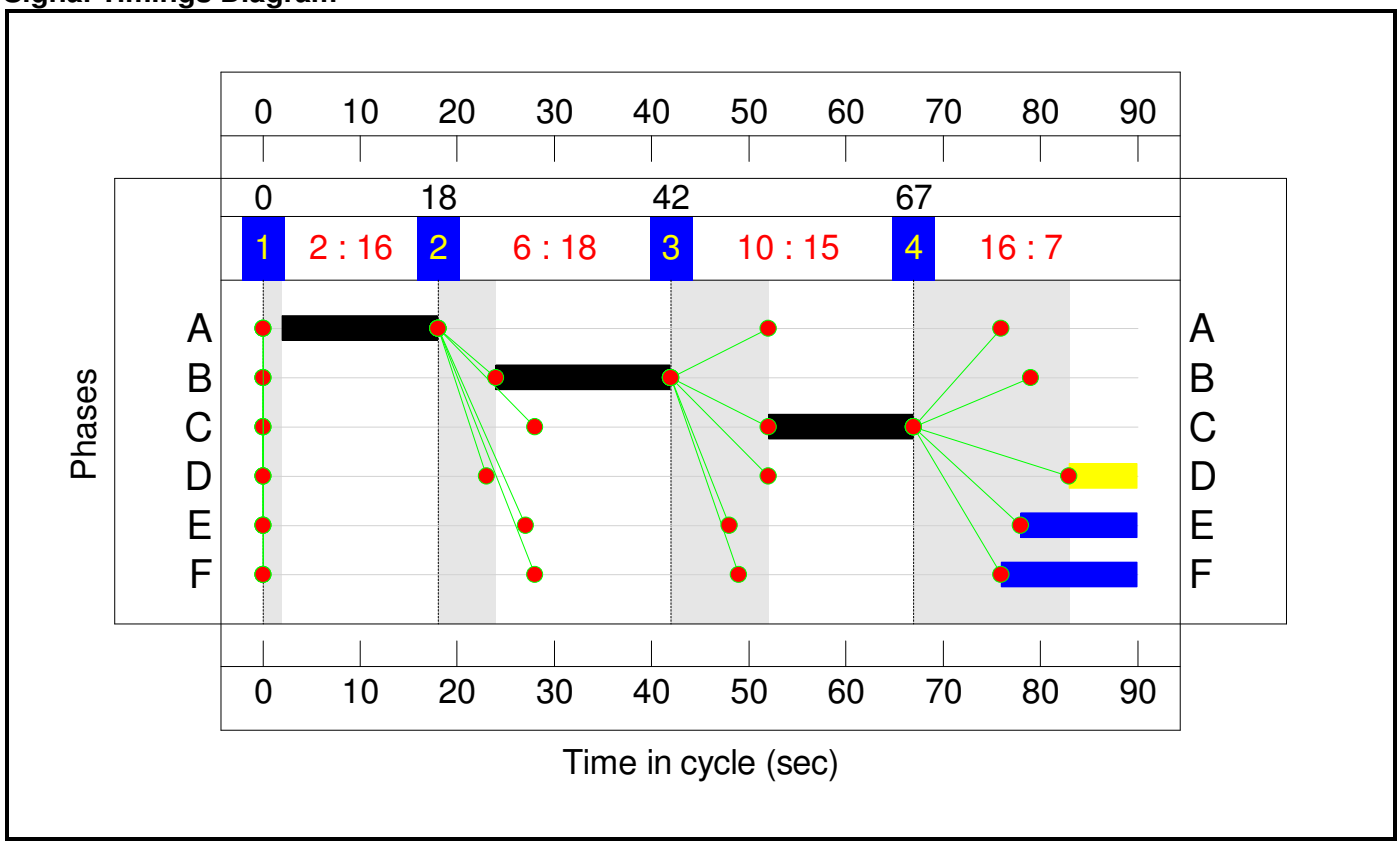
Stage Sequence Diagram



Stage Timings

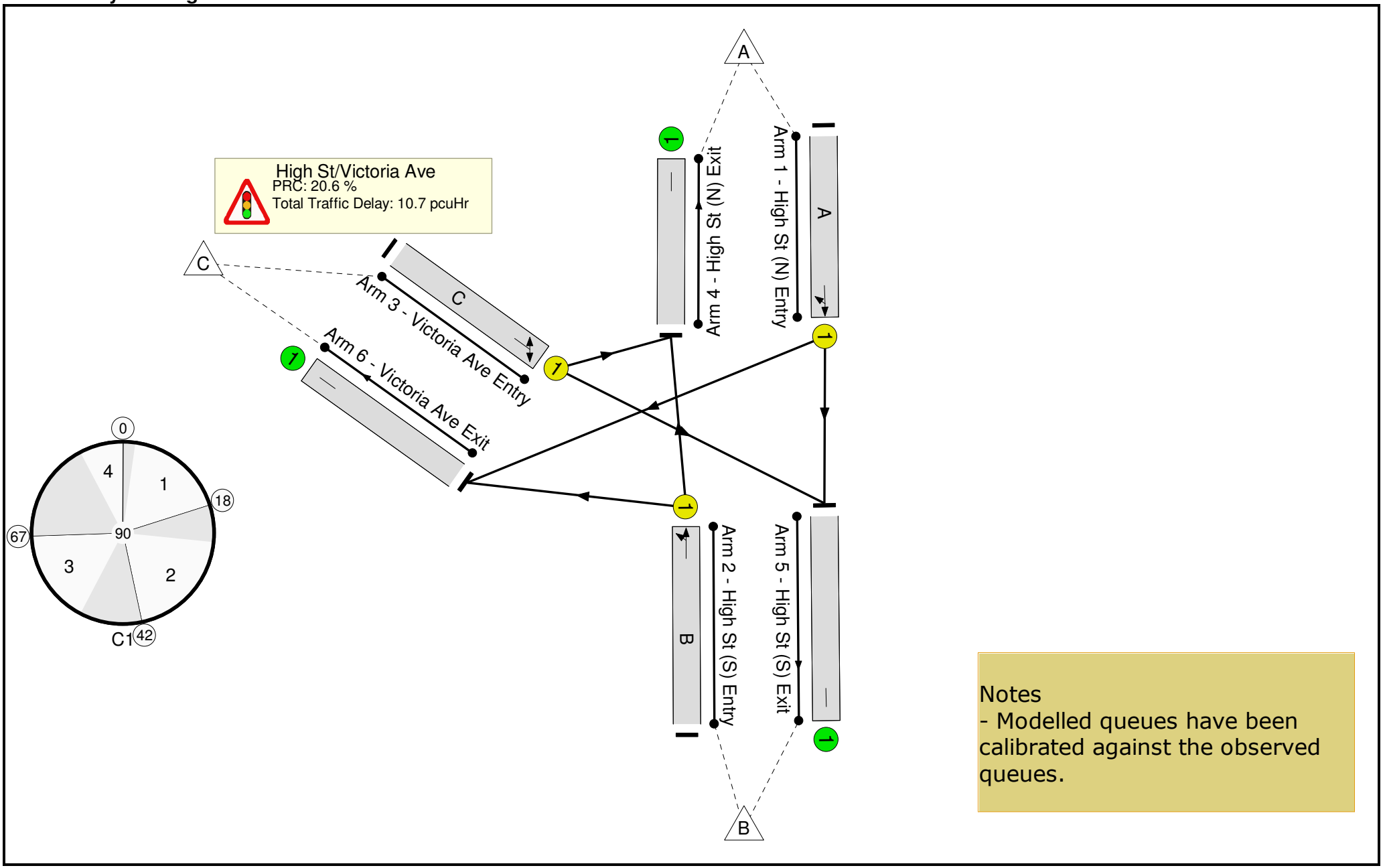
Stage	1	2	3	4
Duration	16	18	15	7
Change Point	0	18	42	67

Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram



Notes
- Modelled queues have been calibrated against the observed queues.

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: HCA Tender IoW	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**74.6%**
High St/Victoria Ave	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**74.6%**
1/1	High St (N) Entry Ahead Right	U	N/A	N/A	A		1	16	-	251	1878	355	70.8%
2/1	High St (S) Entry Ahead Left	U	N/A	N/A	B		1	18	-	277	1850	391	70.9%
3/1	Victoria Ave Entry Left Right	U	N/A	N/A	C		1	15	-	206	1553	276	74.6%
4/1	High St (N) Exit	U	N/A	N/A	-		-	-	-	386	Inf	Inf	0.0%
5/1	High St (S) Exit	U	N/A	N/A	-		-	-	-	215	Inf	Inf	0.0%
6/1	Victoria Ave Exit	U	N/A	N/A	-		-	-	-	133	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: HCA Tender IoW	**-**	**-**	**0**	**0**	**0**	**6.9**	**3.8**	**0.0**	**10.7**	**-**	**-**	**-**	**-**
High St/Victoria Ave	**-**	**-**	**0**	**0**	**0**	**6.9**	**3.8**	**0.0**	**10.7**	**-**	**-**	**-**	**-**
1/1	251	251	-	-	-	2.4	1.2	-	3.6	51.1	5.9	1.2	7.0
2/1	277	277	-	-	-	2.5	1.2	-	3.7	48.5	6.4	1.2	7.6
3/1	206	206	-	-	-	2.0	1.4	-	3.4	59.8	4.9	1.4	6.3
4/1	386	386	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	215	215	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	133	133	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

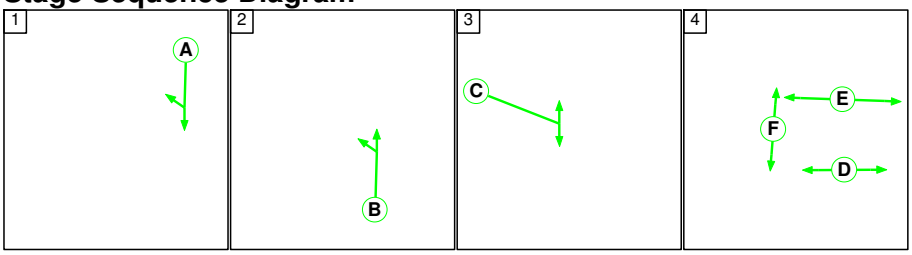
Full Input Data And Results

C1	PRC for Signalled Lanes (%):	20.6	Total Delay for Signalled Lanes (pcuHr):	10.72	Cycle Time (s):	90	
	PRC Over All Lanes (%):	20.6	Total Delay Over All Lanes(pcuHr):	10.72			

Full Input Data And Results

Scenario 4: '2034 - PM - Base' (FG4: '2034 - PM - Base', Plan 1: 'Network Control Plan 1')

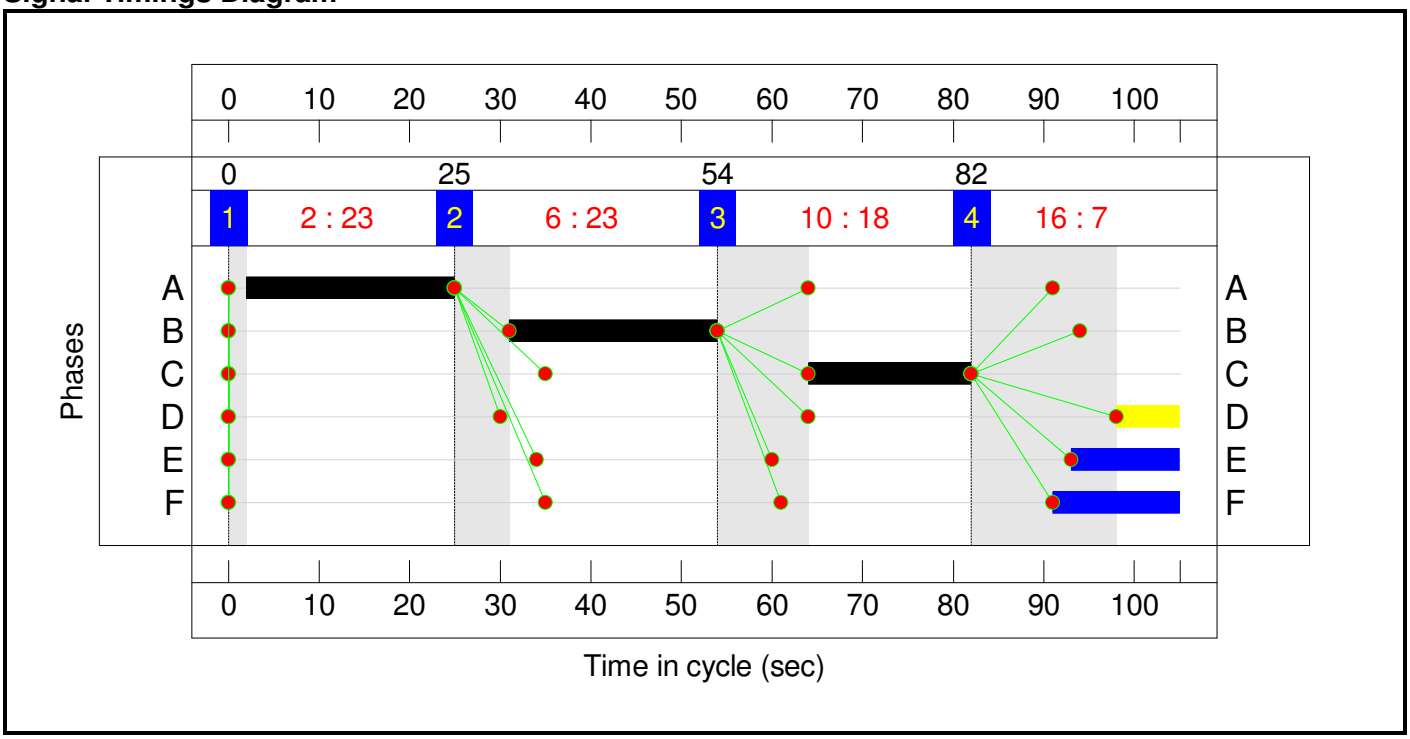
Stage Sequence Diagram



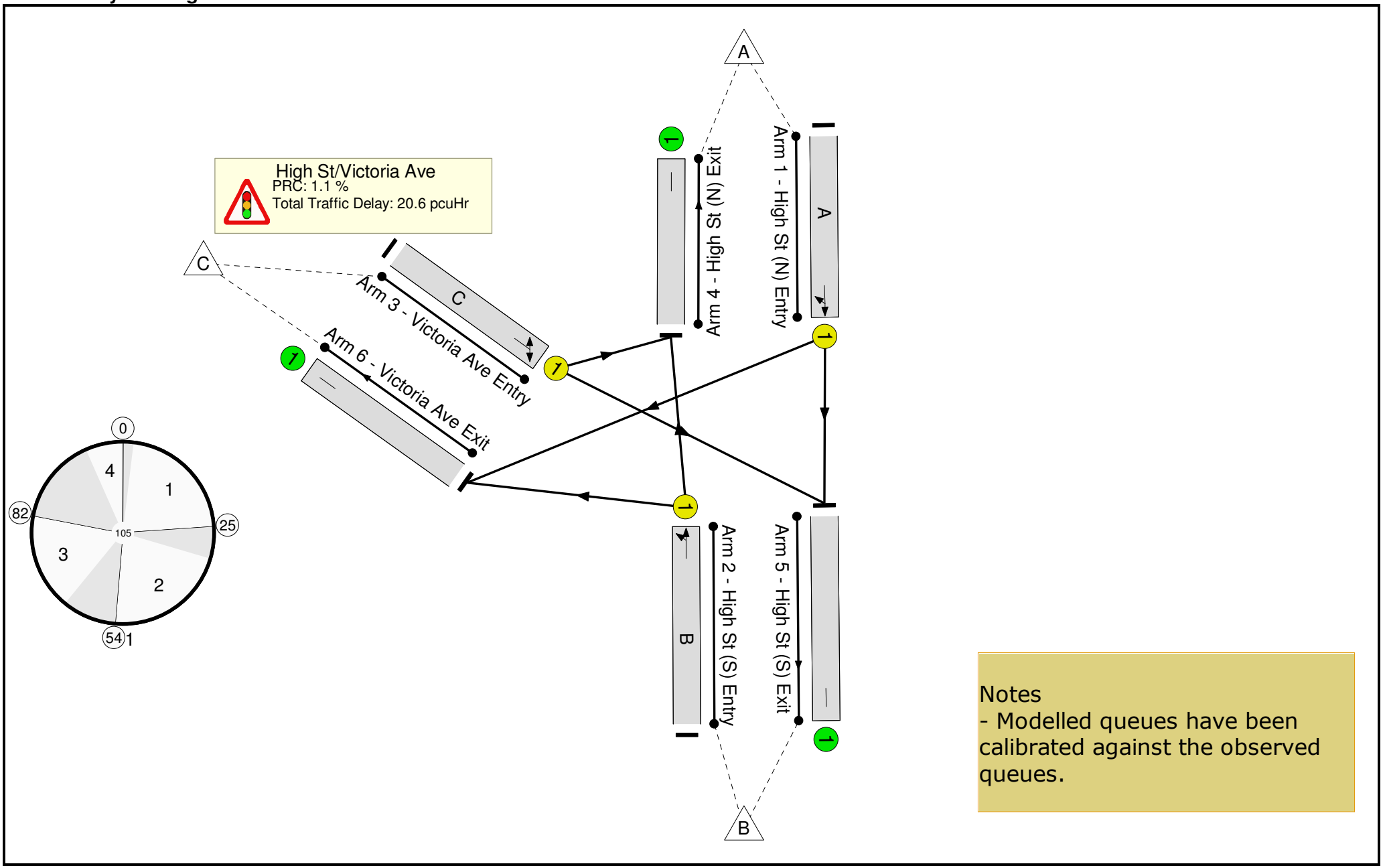
Stage Timings

Stage	1	2	3	4
Duration	23	23	18	7
Change Point	0	25	54	82

Signal Timings Diagram



Network Layout Diagram



Notes
- Modelled queues have been calibrated against the observed queues.

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: HCA Tender IoW	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**89.0%**
High St/Victoria Ave	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**89.0%**
1/1	High St (N) Entry Ahead Right	U	N/A	N/A	A		1	23	-	368	1872	428	86.0%
2/1	High St (S) Entry Ahead Left	U	N/A	N/A	B		1	23	-	381	1872	428	89.0%
3/1	Victoria Ave Entry Left Right	U	N/A	N/A	C		1	18	-	250	1564	283	88.3%
4/1	High St (N) Exit	U	N/A	N/A	-		-	-	-	520	Inf	Inf	0.0%
5/1	High St (S) Exit	U	N/A	N/A	-		-	-	-	309	Inf	Inf	0.0%
6/1	Victoria Ave Exit	U	N/A	N/A	-		-	-	-	170	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: HCA Tender IoW	**-**	**-**	**0**	**0**	**0**	**11.0**	**9.5**	**0.0**	**20.6**	**-**	**-**	**-**	**-**
High St/Victoria Ave	**-**	**-**	**0**	**0**	**0**	**11.0**	**9.5**	**0.0**	**20.6**	**-**	**-**	**-**	**-**
1/1	368	368	-	-	-	4.0	2.8	-	6.8	66.4	10.2	2.8	13.0
2/1	381	381	-	-	-	4.2	3.5	-	7.7	72.6	10.7	3.5	14.2
3/1	250	250	-	-	-	2.9	3.2	-	6.1	87.7	7.1	3.2	10.3
4/1	520	520	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	309	309	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	170	170	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

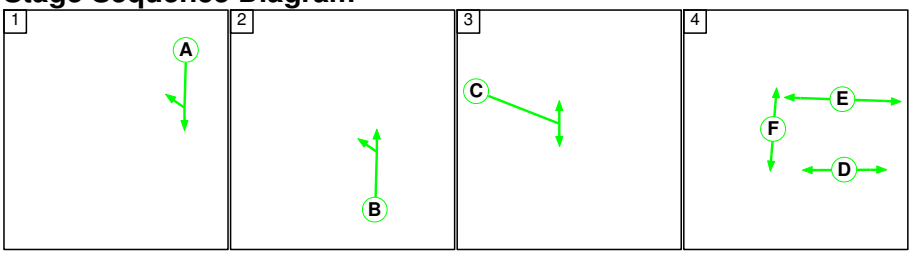
Full Input Data And Results

C1	PRC for Signalled Lanes (%):	1.1	Total Delay for Signalled Lanes (pcuHr):	20.55	Cycle Time (s):	105	
	PRC Over All Lanes (%):	1.1	Total Delay Over All Lanes(pcuHr):	20.55			

Full Input Data And Results

Scenario 5: '20XX - AM - DS' (FG5: '20XX - AM - DS', Plan 1: 'Network Control Plan 1')

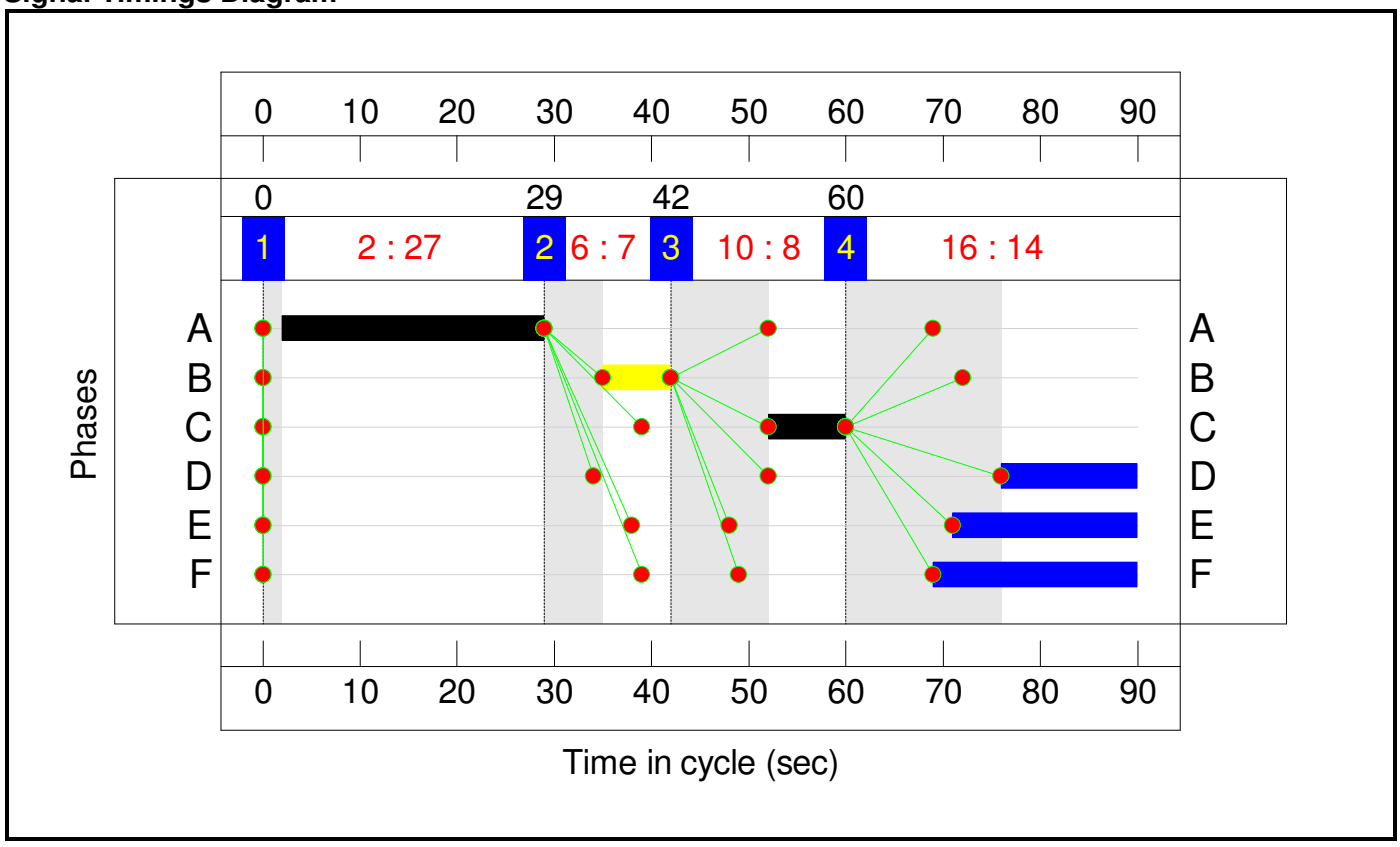
Stage Sequence Diagram



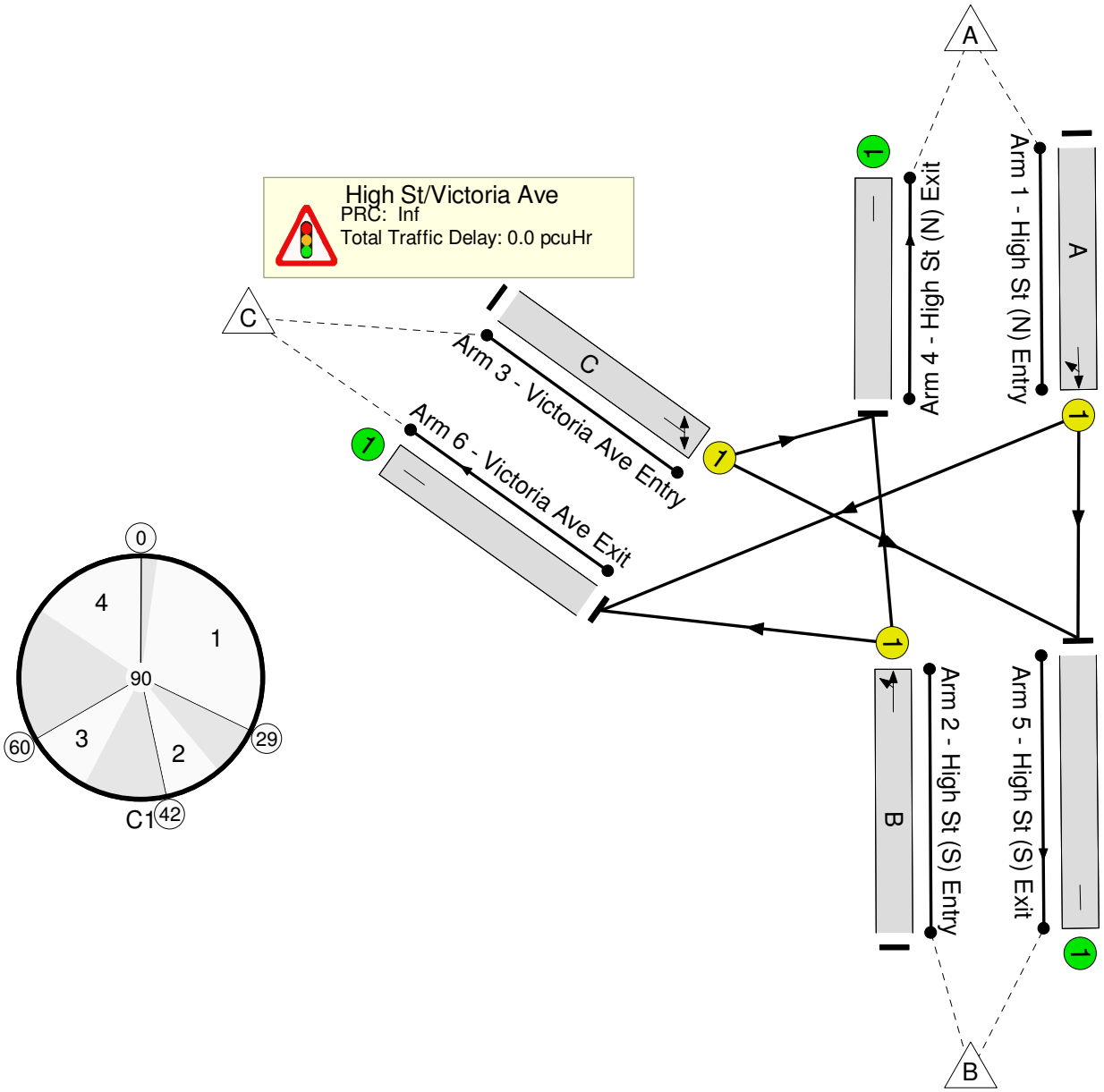
Stage Timings

Stage	1	2	3	4
Duration	27	7	8	14
Change Point	0	29	42	60

Signal Timings Diagram



Network Layout Diagram



Notes
- Modelled queues have been calibrated against the observed queues.

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: HCA Tender IoW	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**0.0%**
High St/Victoria Ave	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**0.0%**
1/1	High St (N) Entry Ahead Right	U	N/A	N/A	A		1	27	-	0	1958	609	0.0%
2/1	High St (S) Entry Ahead Left	U	N/A	N/A	B		1	7	-	0	1915	170	0.0%
3/1	Victoria Ave Entry Left Right	U	N/A	N/A	C		1	8	-	0	1965	196	0.0%
4/1	High St (N) Exit	U	N/A	N/A	-		-	-	-	0	Inf	Inf	0.0%
5/1	High St (S) Exit	U	N/A	N/A	-		-	-	-	0	Inf	Inf	0.0%
6/1	Victoria Ave Exit	U	N/A	N/A	-		-	-	-	0	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: HCA Tender IoW	**-**	**-**	**0**	**0**	**0**	**0.0**	**0.0**	**0.0**	**0.0**	**-**	**-**	**-**	**-**
High St/Victoria Ave	**-**	**-**	**0**	**0**	**0**	**0.0**	**0.0**	**0.0**	**0.0**	**-**	**-**	**-**	**-**
1/1	0	0	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
2/1	0	0	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
3/1	0	0	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
4/1	0	0	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	0	0	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	0	0	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

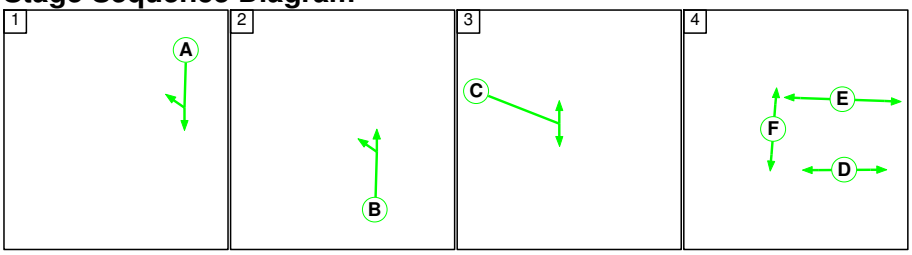
Full Input Data And Results

C1	PRC for Signalled Lanes (%):	Inf	Total Delay for Signalled Lanes (pcuHr):	0.00	Cycle Time (s):	90	
	PRC Over All Lanes (%):	Inf	Total Delay Over All Lanes(pcuHr):	0.00			

Full Input Data And Results

Scenario 6: '20XX - PM - DS' (FG6: '20XX - PM - DS', Plan 1: 'Network Control Plan 1')

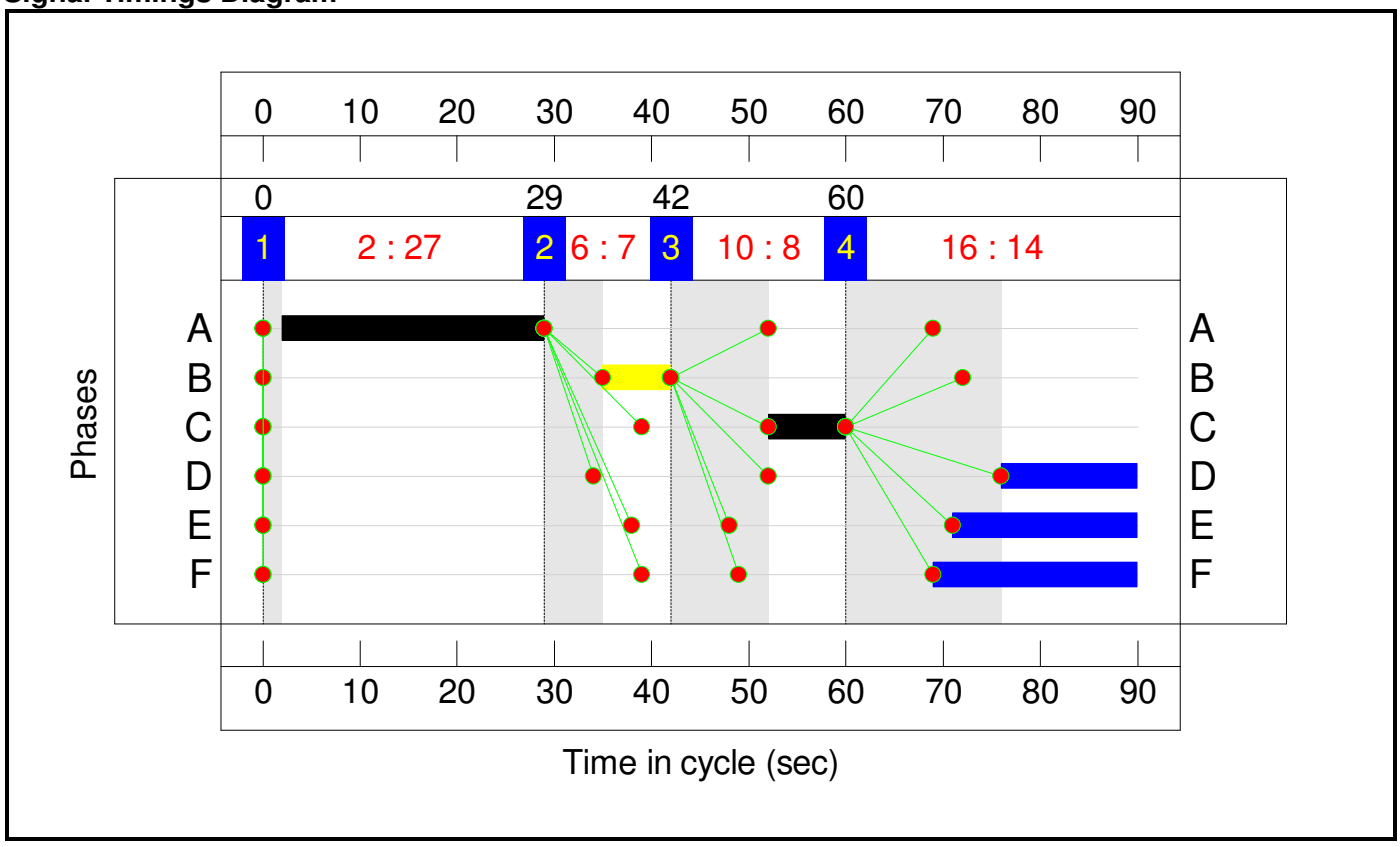
Stage Sequence Diagram



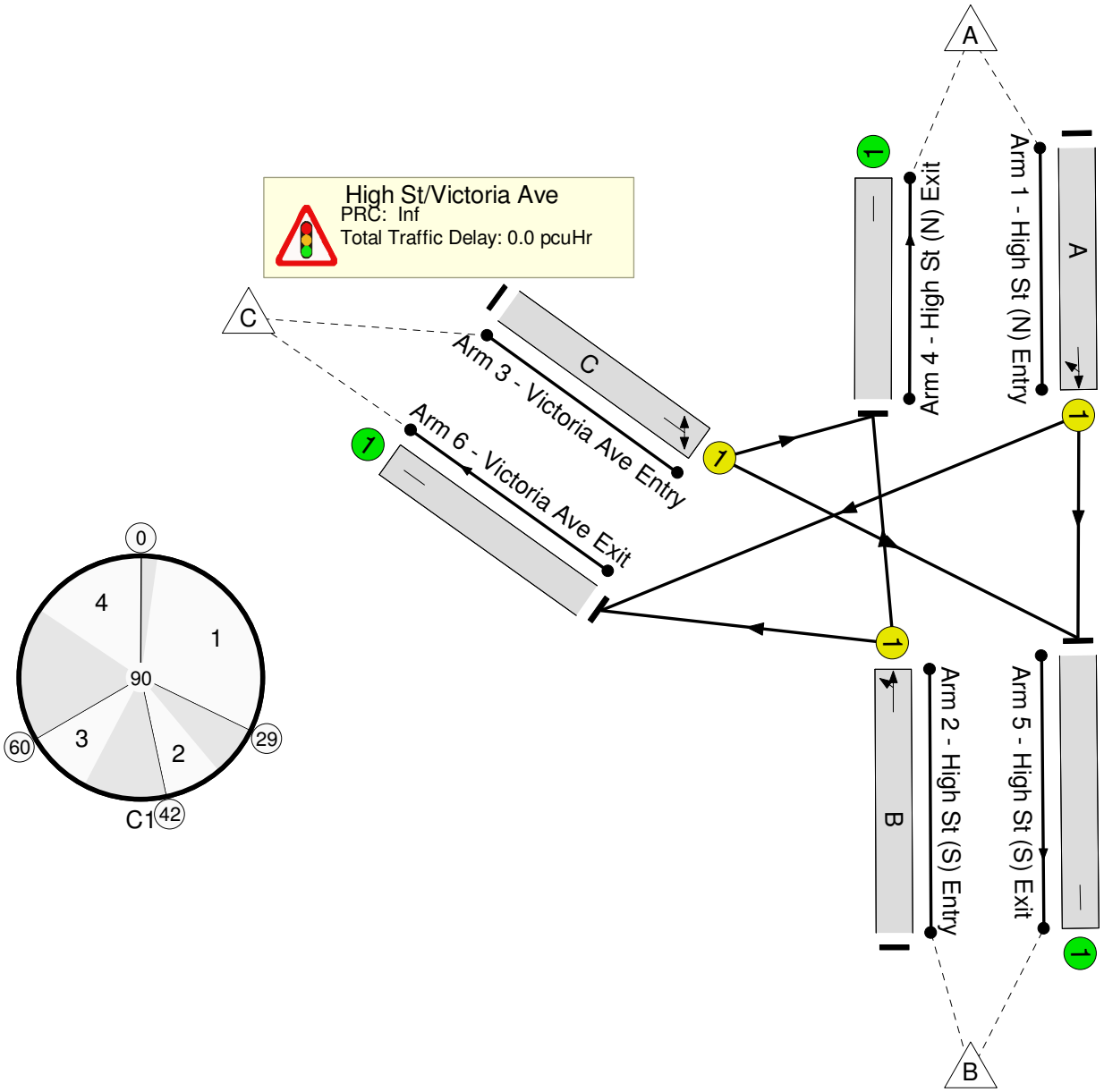
Stage Timings

Stage	1	2	3	4
Duration	27	7	8	14
Change Point	0	29	42	60

Signal Timings Diagram



Network Layout Diagram



Notes
- Modelled queues have been calibrated against the observed queues.

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: HCA Tender IoW	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**0.0%**
High St/Victoria Ave	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**0.0%**
1/1	High St (N) Entry Ahead Right	U	N/A	N/A	A		1	27	-	0	1958	609	0.0%
2/1	High St (S) Entry Ahead Left	U	N/A	N/A	B		1	7	-	0	1915	170	0.0%
3/1	Victoria Ave Entry Left Right	U	N/A	N/A	C		1	8	-	0	1965	196	0.0%
4/1	High St (N) Exit	U	N/A	N/A	-		-	-	-	0	Inf	Inf	0.0%
5/1	High St (S) Exit	U	N/A	N/A	-		-	-	-	0	Inf	Inf	0.0%
6/1	Victoria Ave Exit	U	N/A	N/A	-		-	-	-	0	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: HCA Tender IoW	**-**	**-**	**0**	**0**	**0**	**0.0**	**0.0**	**0.0**	**0.0**	**-**	**-**	**-**	**-**
High St/Victoria Ave	**-**	**-**	**0**	**0**	**0**	**0.0**	**0.0**	**0.0**	**0.0**	**-**	**-**	**-**	**-**
1/1	0	0	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
2/1	0	0	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
3/1	0	0	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
4/1	0	0	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	0	0	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	0	0	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

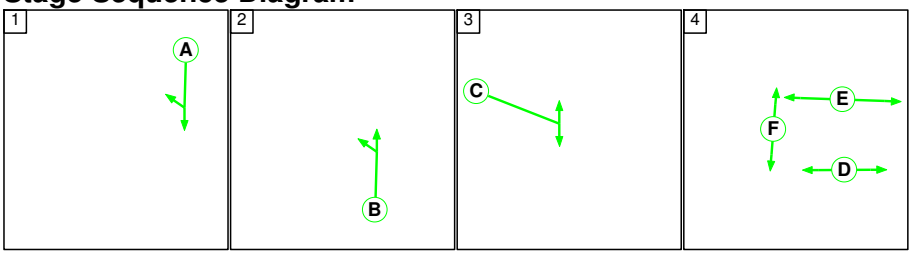
Full Input Data And Results

C1	PRC for Signalled Lanes (%):	Inf	Total Delay for Signalled Lanes (pcuHr):	0.00	Cycle Time (s):	90	
	PRC Over All Lanes (%):	Inf	Total Delay Over All Lanes(pcuHr):	0.00			

Full Input Data And Results

Scenario 7: '2034 - PM - Base (90 seconds)' (FG4: '2034 - PM - Base', Plan 1: 'Network Control Plan 1')

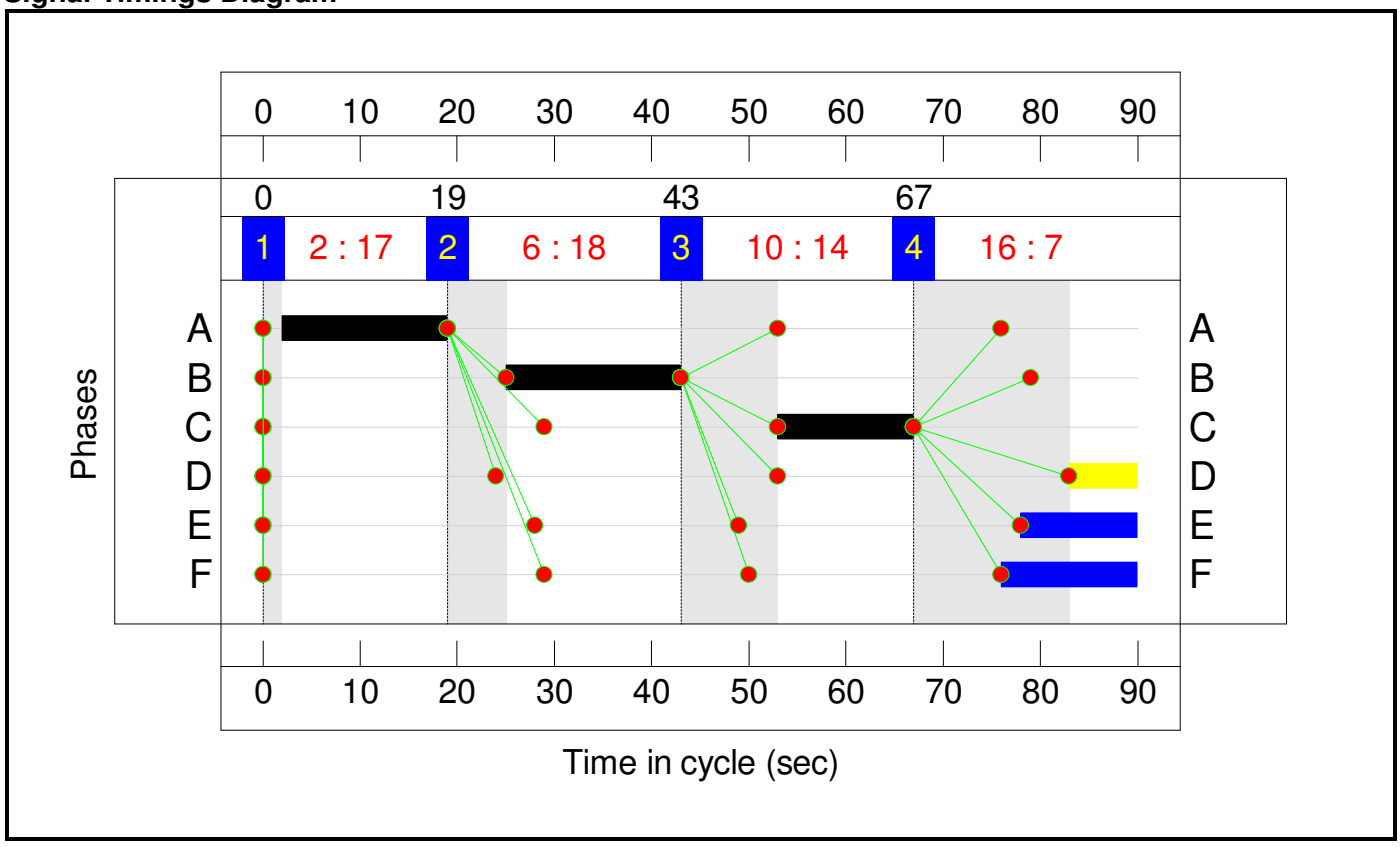
Stage Sequence Diagram



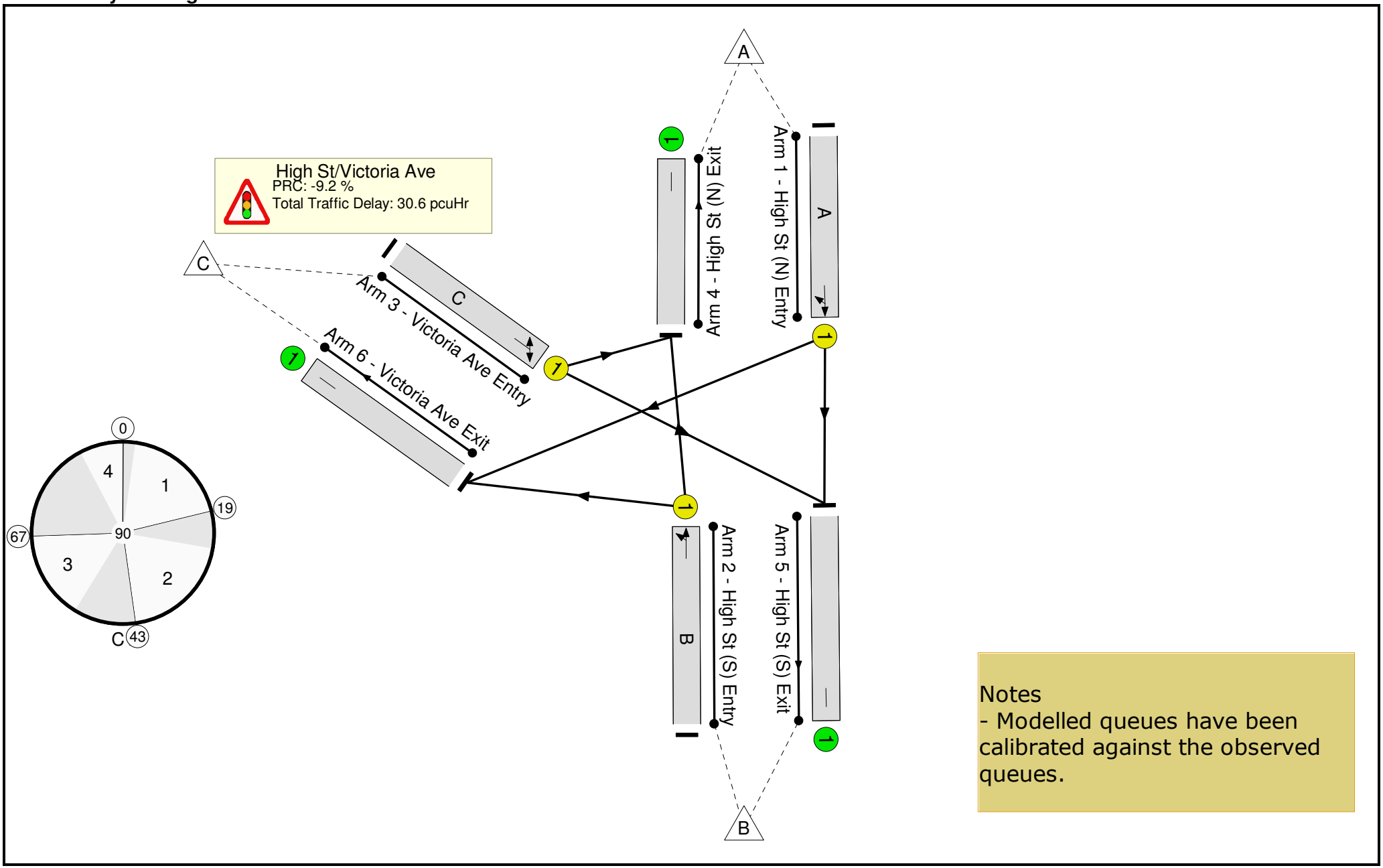
Stage Timings

Stage	1	2	3	4
Duration	17	18	14	7
Change Point	0	19	43	67

Signal Timings Diagram



Network Layout Diagram



Notes
- Modelled queues have been calibrated against the observed queues.

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: HCA Tender IoW	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**98.3%**
High St/Victoria Ave	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**98.3%**
1/1	High St (N) Entry Ahead Right	U	N/A	N/A	A		1	17	-	368	1872	374	98.3%
2/1	High St (S) Entry Ahead Left	U	N/A	N/A	B		1	18	-	381	1872	395	96.4%
3/1	Victoria Ave Entry Left Right	U	N/A	N/A	C		1	14	-	250	1564	261	95.9%
4/1	High St (N) Exit	U	N/A	N/A	-		-	-	-	520	Inf	Inf	0.0%
5/1	High St (S) Exit	U	N/A	N/A	-		-	-	-	309	Inf	Inf	0.0%
6/1	Victoria Ave Exit	U	N/A	N/A	-		-	-	-	170	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: HCA Tender IoW	**-**	**-**	**0**	**0**	**0**	**10.0**	**20.6**	**0.0**	**30.6**	**-**	**-**	**-**	**-**
High St/Victoria Ave	**-**	**-**	**0**	**0**	**0**	**10.0**	**20.6**	**0.0**	**30.6**	**-**	**-**	**-**	**-**
1/1	368	368	-	-	-	3.7	8.1	-	11.8	115.3	9.1	8.1	17.2
2/1	381	381	-	-	-	3.7	6.8	-	10.6	99.7	9.4	6.8	16.3
3/1	250	250	-	-	-	2.6	5.7	-	8.3	118.9	6.2	5.7	11.9
4/1	520	520	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	309	309	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	170	170	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

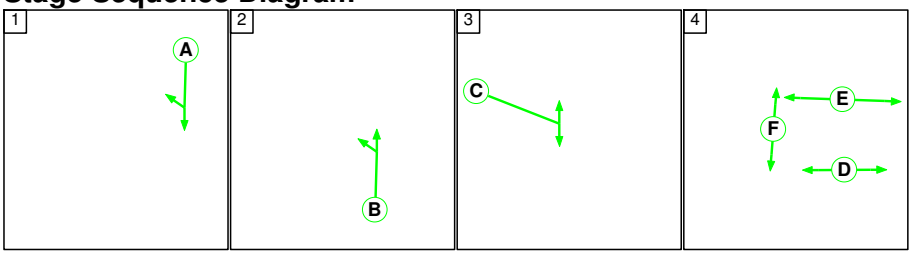
Full Input Data And Results

C1	PRC for Signalled Lanes (%):	-9.2	Total Delay for Signalled Lanes (pcuHr):	30.61	Cycle Time (s):	90	
	PRC Over All Lanes (%):	-9.2	Total Delay Over All Lanes(pcuHr):	30.61			

Full Input Data And Results

Scenario 8: '2034 - PM - Base (120 seconds)' (FG4: '2034 - PM - Base', Plan 1: 'Network Control Plan 1')

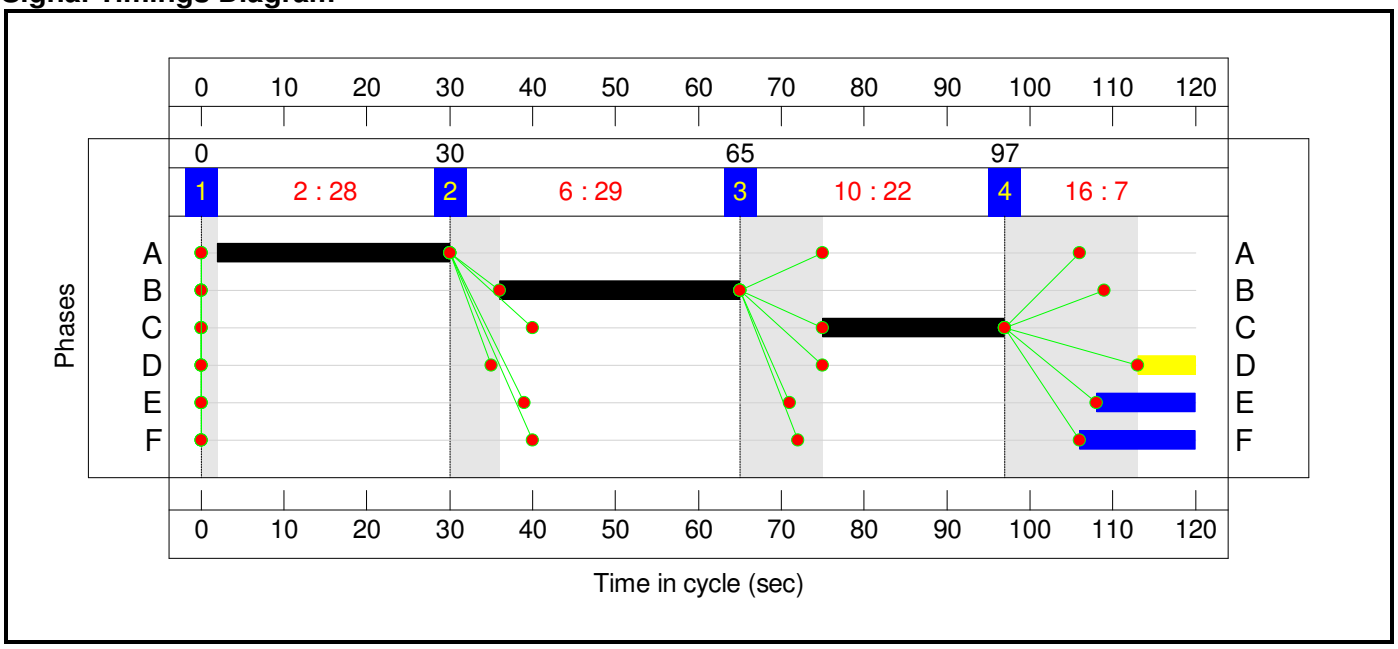
Stage Sequence Diagram



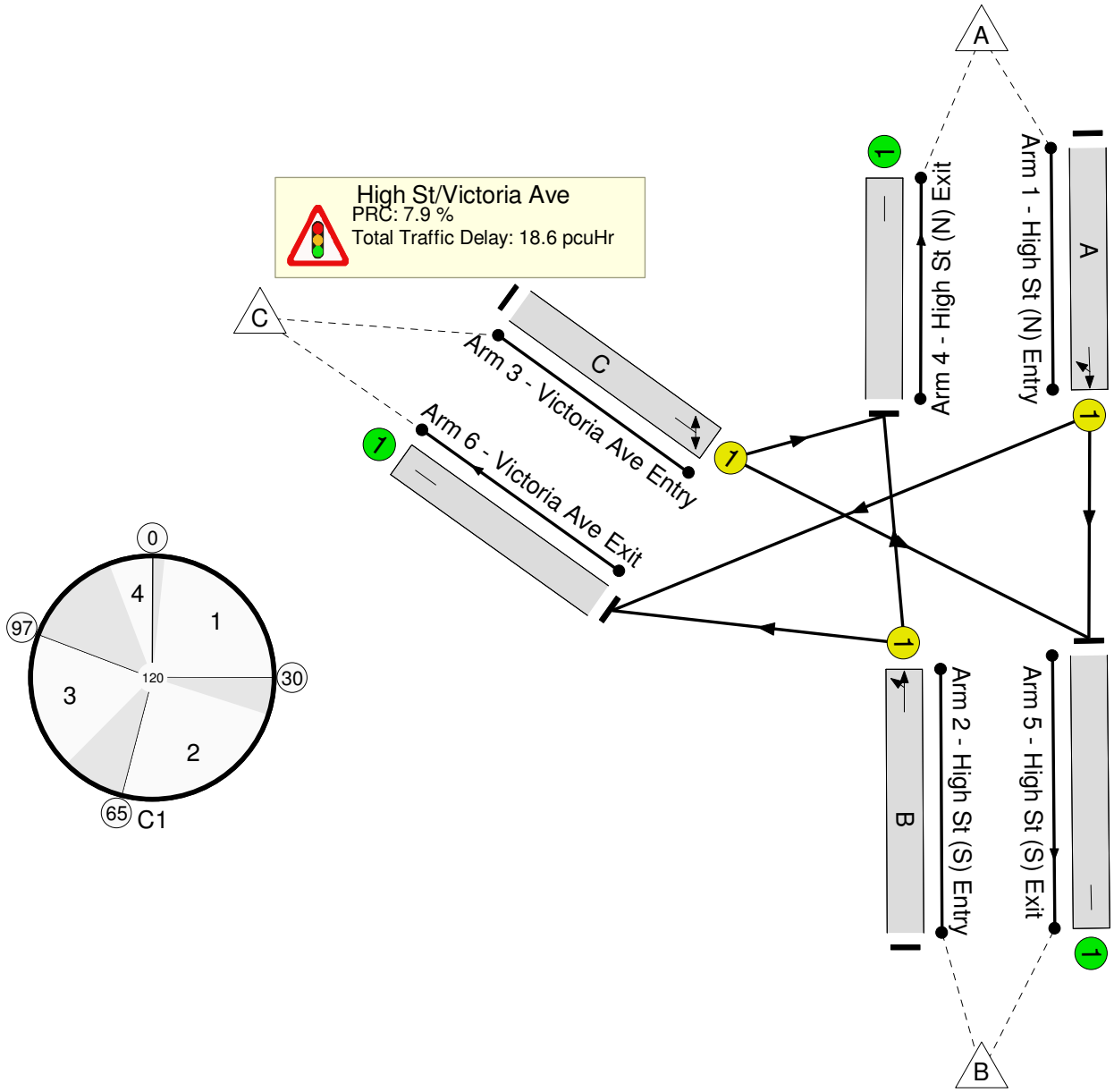
Stage Timings

Stage	1	2	3	4
Duration	28	29	22	7
Change Point	0	30	65	97

Signal Timings Diagram



Network Layout Diagram



Notes
- Modelled queues have been calibrated against the observed queues.

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: HCA Tender IoW	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**83.4%**
High St/Victoria Ave	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**83.4%**
1/1	High St (N) Entry Ahead Right	U	N/A	N/A	A		1	28	-	368	1872	452	81.3%
2/1	High St (S) Entry Ahead Left	U	N/A	N/A	B		1	29	-	381	1872	468	81.4%
3/1	Victoria Ave Entry Left Right	U	N/A	N/A	C		1	22	-	250	1564	300	83.4%
4/1	High St (N) Exit	U	N/A	N/A	-		-	-	-	520	Inf	Inf	0.0%
5/1	High St (S) Exit	U	N/A	N/A	-		-	-	-	309	Inf	Inf	0.0%
6/1	Victoria Ave Exit	U	N/A	N/A	-		-	-	-	170	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: HCA Tender IoW	**-**	**-**	**0**	**0**	**0**	**12.1**	**6.5**	**0.0**	**18.6**	**-**	**-**	**-**	**-**
High St/Victoria Ave	**-**	**-**	**0**	**0**	**0**	**12.1**	**6.5**	**0.0**	**18.6**	**-**	**-**	**-**	**-**
1/1	368	368	-	-	-	4.4	2.1	-	6.5	63.3	11.6	2.1	13.6
2/1	381	381	-	-	-	4.5	2.1	-	6.6	62.1	11.9	2.1	13.9
3/1	250	250	-	-	-	3.2	2.3	-	5.5	79.8	8.0	2.3	10.3
4/1	520	520	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	309	309	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	170	170	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

Full Input Data And Results

C1	PRC for Signalled Lanes (%):	7.9	Total Delay for Signalled Lanes (pcuHr):	18.58	Cycle Time (s):	120	
	PRC Over All Lanes (%):	7.9	Total Delay Over All Lanes(pcuHr):	18.58			