Isle of Wight Council

Isle of Wight Junction Assessment and Design

Junction Feasibility Study – Newport Road / Sandown Road

A090129-99

January 2018

Document Information

Prepared for	Isle of Wight Council
Project Name	Isle of Wight Junction Assessment and Design
File Reference	Feasibilty Study Report - Newport Road Sandown Road (Jct 13)
Project Number	A090129-99
Publication Date	January 2018

Contact Information

WYG Environment Planning Transport Ltd

11th Floor, 1 Angel Court
London
United Kingdom
EC2R 7HJ

+44 (0)20 7250 7500
london@wyg.com
www.wyg.com

Registered in England & Wales Number 3050297
Registered office: Arndale Court, Headingley, Leeds, LS6 2UJ

Document Control

Version	Date	Prepared by	Reviewed by	Approved by	Approver Signature
D1	29.01.2018	London	GS	NW	
Description	Draft for client review				
Description					
Description					
Description					
Description					
Description					

Limitations

Contents

Tables

Figures

Appendices

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

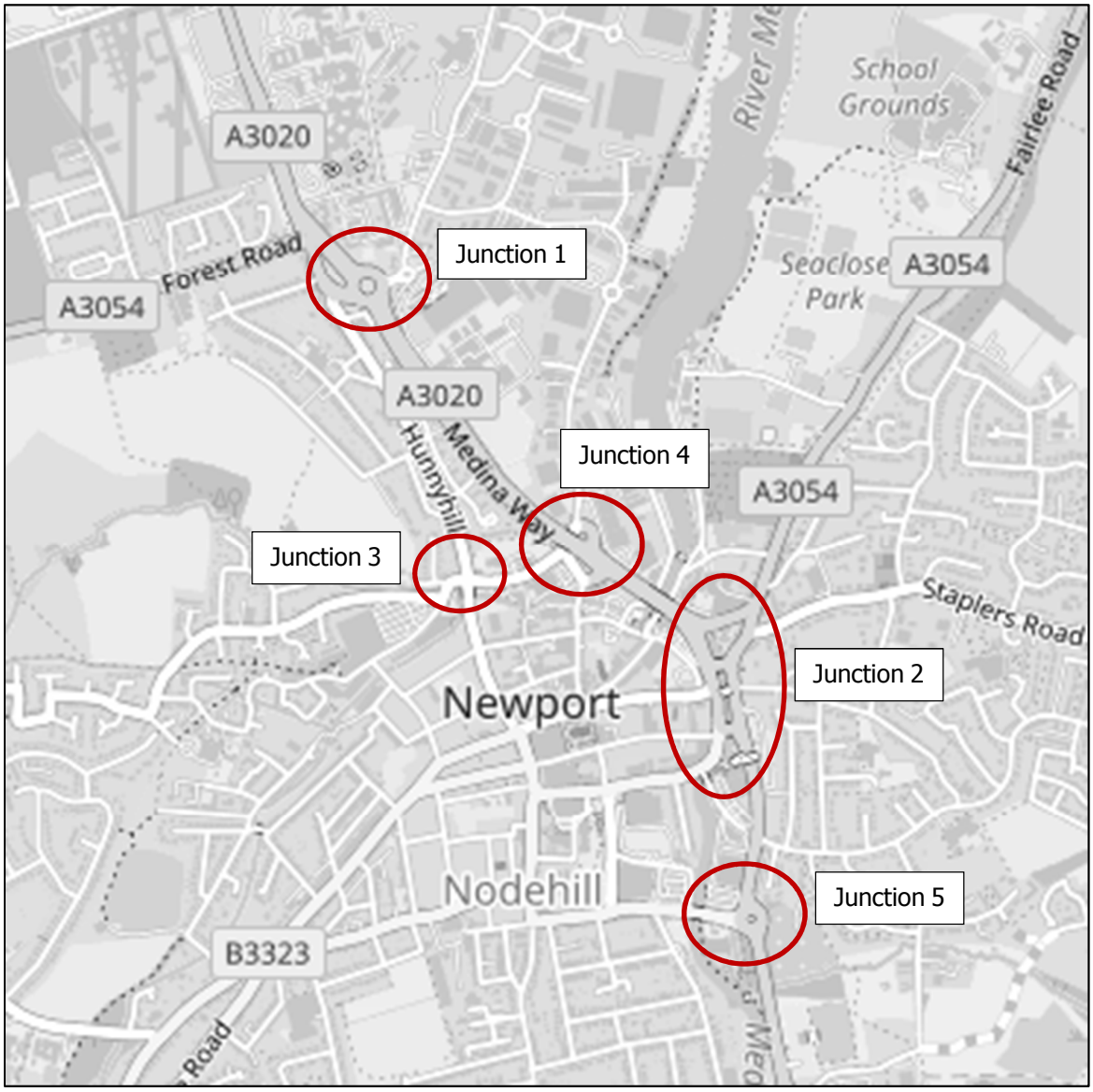
1.4 The Isle of Wight is an island located in the English Channel, approximately 6km off the Hampshire coast. The towns of Newport, Ryde, Shanklin and Sandown comprise the project study area for this feasibility study.

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.

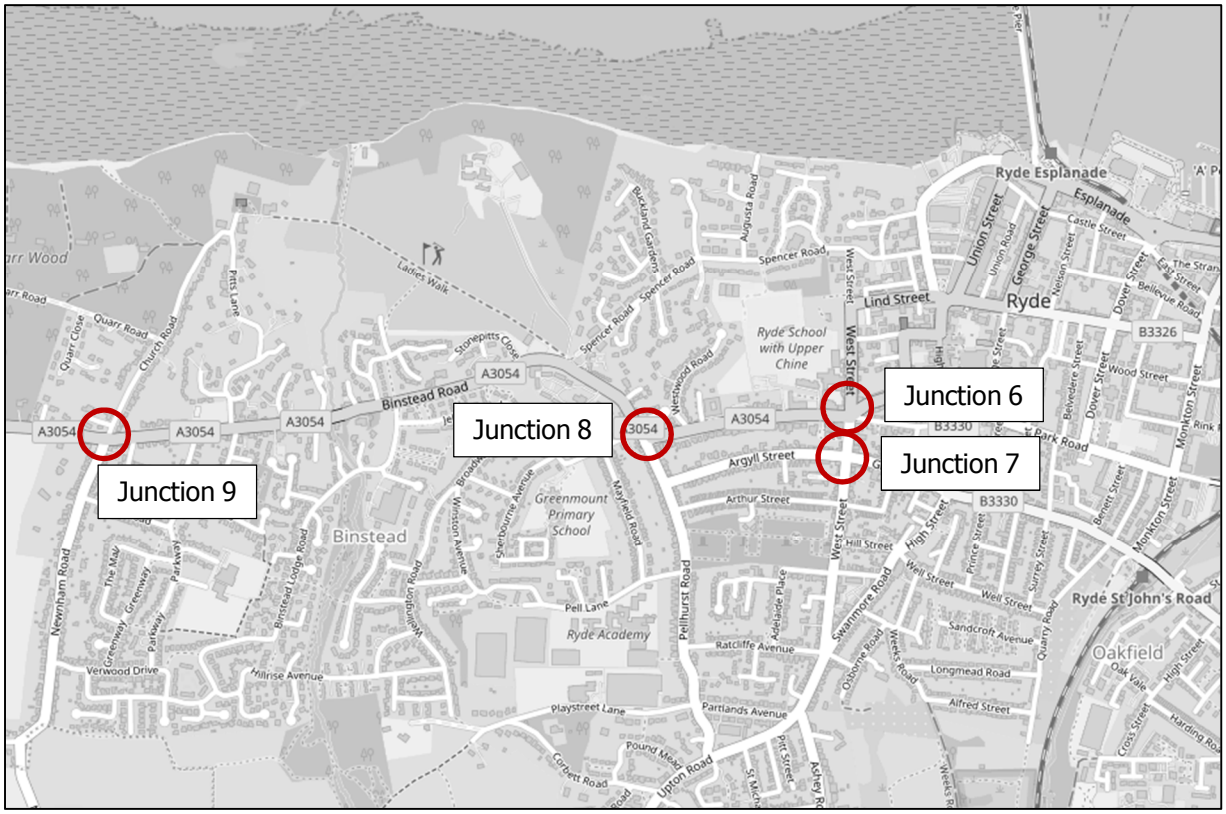
1.7 **Figures 1.1 – 1.3** presents the locations of all 15 junctions within Newport, Ryde and Shanklin & Sandown, which comprise the feasibility study area.

Figure 1.1 Feasibility Study Area – Newport Junctions



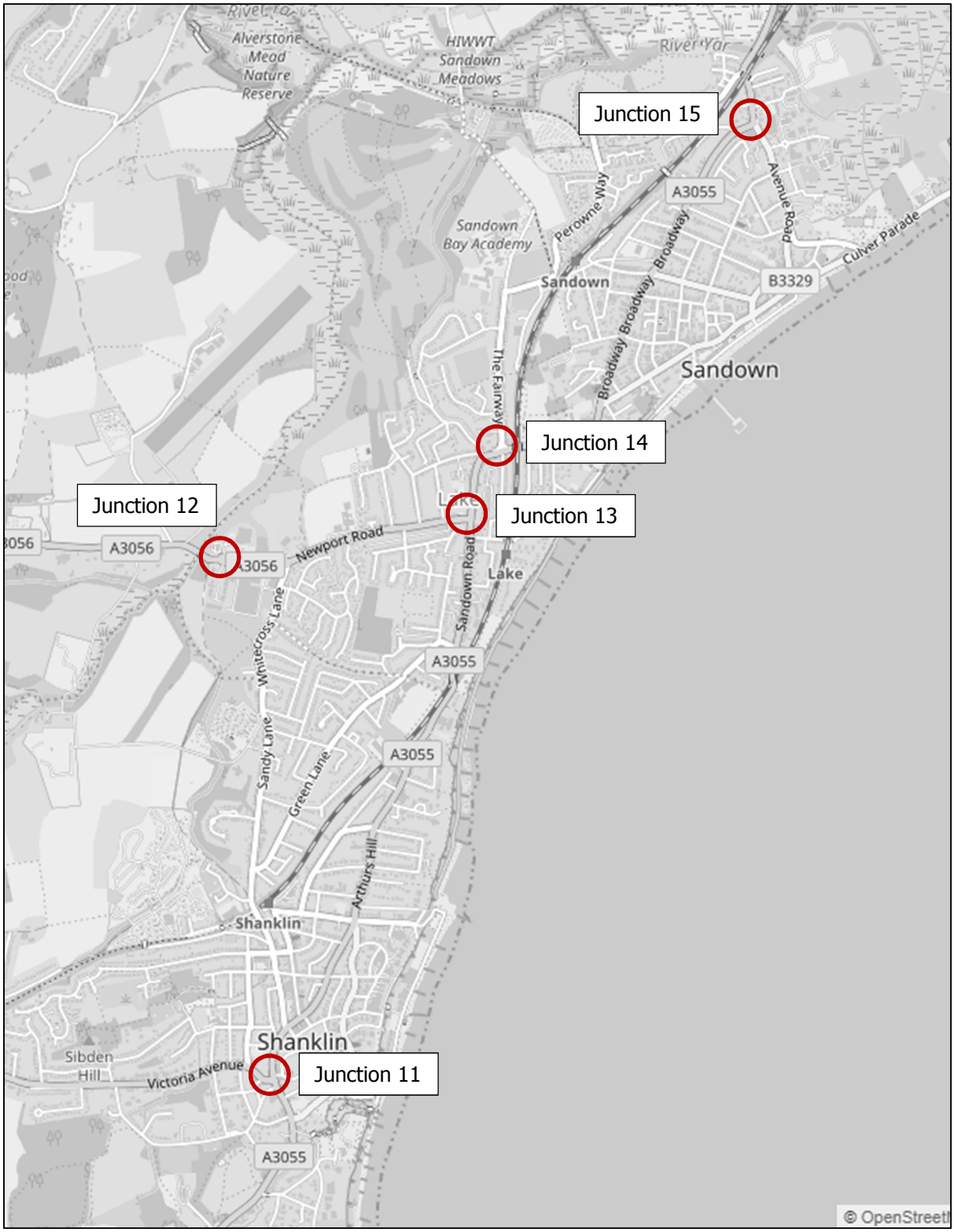
Source: OpenStreetMap with WYG Annotations, September 2017

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 12, the highway junction of A3056 Newport Road / Sandown Road which comprises a three-arm signalised junction in Sandown.

1.9 **Figure 1.2** 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: Preferred Scheme** - detailing the preferred scheme for highway improvements at the junction and their expected outcome; and
- **Chapter 5: 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 currently 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 four-arm roundabout junction at A3056 Newport Road / Sandown Road 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
- Traffic video 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 signal timing data.

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 A3056 Newport Road / Sandown Road three-arm signalised junction is located in the area of Lake, equal distance between Sandown to the north and Shanklin to the south. The A3056 Newport Road forms the western arm, whilst Sandown Road forms the northern and southern arms.

2.8 The junction provides access to Sandown to the north, Shanklin to the south and Newport to the west via the A3056. A location plan of the junction is provided in **Figure 2.1**.

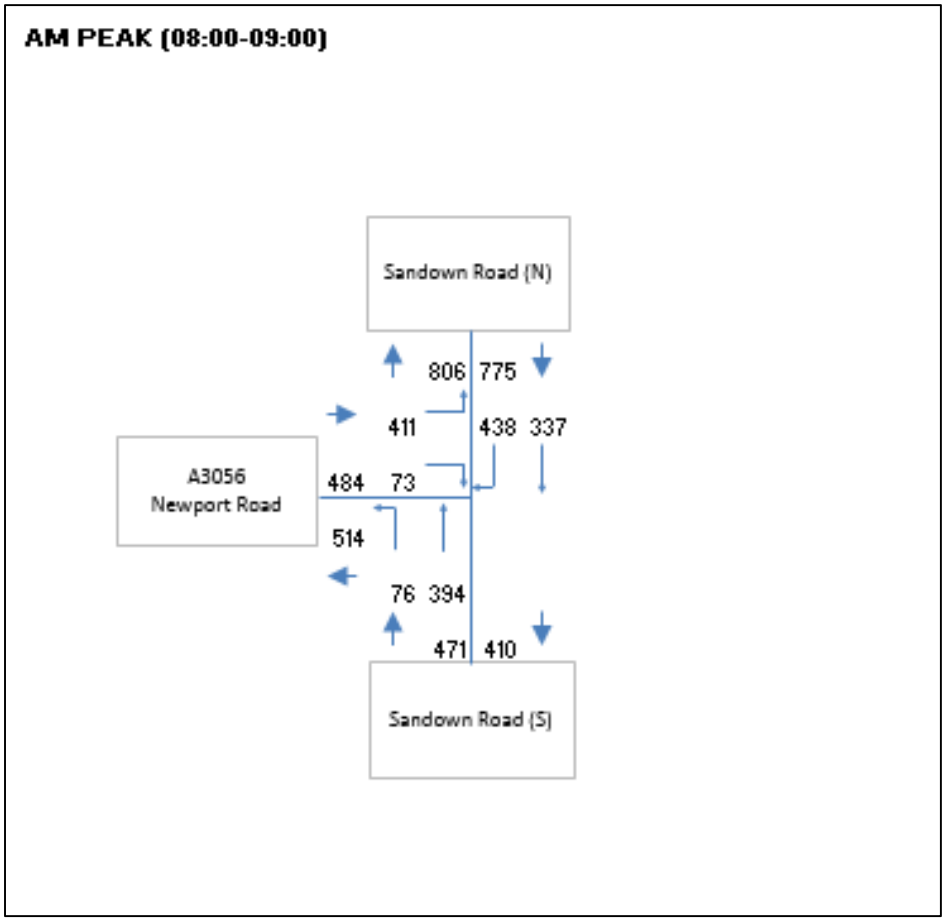
Figure 2.1 Junction Location Plan

Source: Google Satellite Image, August 2017

Base Traffic Flows

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

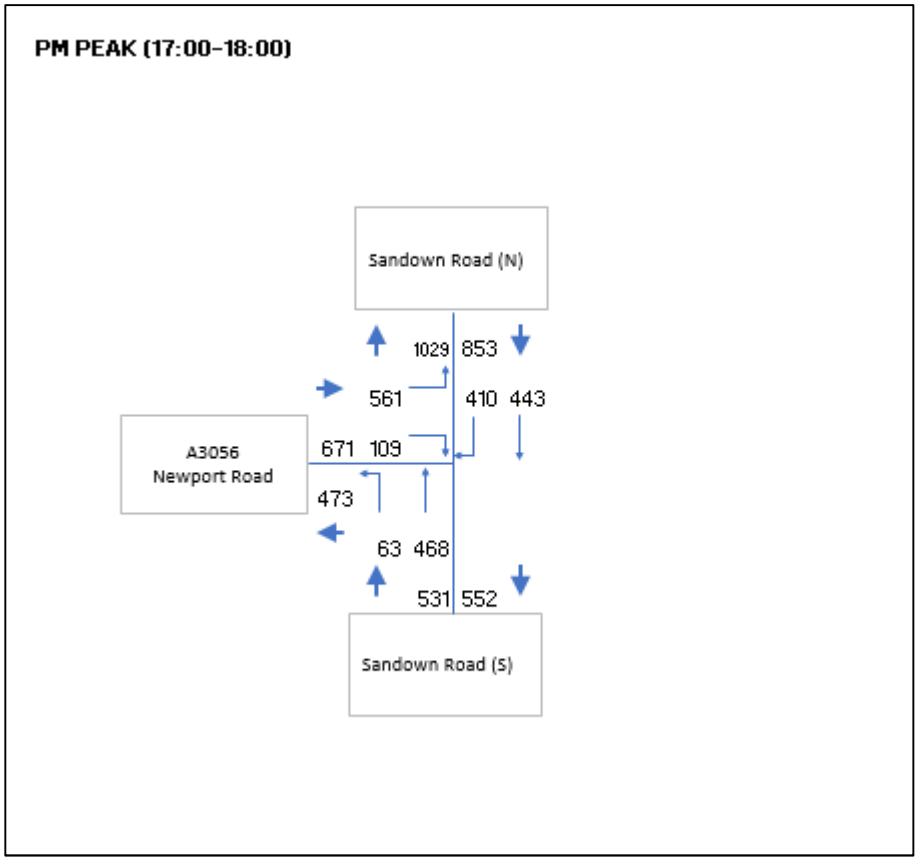
Figure 2.2 AM Traffic Flows (PCUs)



2.10 As shown in Figure 2.2, the highest traffic flows are those travelling westbound from Sandown Road (N) to A3056 Newport Road (right-turners) in the AM Peak (08:00-09:00), with 438 PCUs undertaking this movement. These flows are also similar travelling in the opposite direction (left-turners), with 411 PCUs recorded. Northbound and southbound flows along Sandown Road are broadly similar, with 394 PCUs travelling northbound and 337 PCUs travelling southbound.

2.11 The most significant queuing occurs on Sandown Road (N) and (S), with the highest queues recorded on the southern arm, recorded at a maximum of 17 vehicles. On the northern arm, queue lengths are similar with a maximum of 14 vehicles, in the right-turn lane. Queues of up to 11 vehicles are recorded on Newport Road, in the left-turn lane. **Figure 2.3** below shows the traffic flows for the PM Peak (17:00-18:00).

Figure 2.3 PM Traffic Flows (PCUs)



2.12 As shown in **Figure 2.3**, the highest traffic flows are those travelling from Newport Road to Sandown Road (N) (left-turners) in the PM Peak (17:00-18:00), with 561 PCUs undertaking this movement. These flows are also similar travelling in the opposite direction (right-turners), with 410 PCUs recorded. Northbound and southbound flows along Sandown Road are broadly similar, with 468 PCUs travelling northbound and 443 PCUs travelling southbound.

2.13 The longest queues occur on Sandown Road (N) and (S). The highest maximum queues were recorded on Sandown Road (S) with a maximum observed queue of 17 vehicles. Maximum queues of 14 vehicles were recorded on Sandown Road (N) in the right-turn lane, whilst queues of up to 11 vehicles were recorded in the left-turn lane on Newport Road.

Existing Traffic Issues

2.14 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 particularly evident on both arms of Sandown Road.

A3055 Sandown Road

2.15 The A3055 Sandown Road forms both the northern and southern arms of the three-arm signalised junction. On the northern arm, there is a significant proportion of right-turning vehicles onto Newport Road in both the AM (08:00-09:00) and PM (17:00-18:00) Peaks. On the southern arm, the principal flow is straight ahead. Queuing regularly occurs on both the northern and southern arms. It has been observed from the video surveys that vehicles struggle to pass through the junction efficiently within the green time allocated.

A3056 Newport Road

2.16 The A3056 Newport Road forms the western arm of the three-arm signalised junction. This arm experiences a high number of vehicles turning left onto Newport Road (N) in both the AM and PM Peaks, which results in queuing in the left-turn lane in particular.

Local Highway Network

A3055 Sandown Road

2.17 The A3055 Sandown Road is a two-way single carriageway road and forms a strategic road on the island, providing a link between Shanklin, Sandown and Ryde. The road is subject to a 30mph speed limit. Pelican crossings are provided on Sandown Road at the junction across the northern and southern arms. Footways are provided on either side.

A3056 Newport Road

2.18 The A3056 Newport Road is a two-way single carriageway road and forms a strategic road on the island, providing a link between Shanklin, Sandown and Newport. The road is subject to a 30mph speed limit, a pedestrian pelican crossing is also provided across the carriageway. Footways are provided on either side

Utilities Assessment

2.19 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:

- Isle of Wight Council
- Openreach – (British Telecommunications)
- Scottish and Southern Electricity – Gas
- Scottish and Southern Electricity – High Voltage
- Scottish and Southern Electricity – Low Voltage
- SGN – Southern Gas Networks
- Southern Water – Sewer
- Southern Water – Water

3 Modelling Methodology

Introduction

3.1 Traffic modelling has been undertaken as part of the feasibility study, identifying how the local highway network on the Isle of Wight currently operates and how it might operate following the proposed improvements to the identified junctions. 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 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. 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 was collected as part of the surveys was compared to the base year outputs to match modelled flows and queue patterns to those observed, within acceptable variations. The results for the A3056 Newport Road / Sandown Road junction are summarised in **Table 3.1**, with full output results included in **Appendix B**.

LinSig Modelling Results – 2017 Base Year

Table 3.1 2017 Base Year Assessment: Existing Junction

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+1/2 – Sandown Road (N)	53.4% : 53.4%	3.2	9.8	56.4% : 56.4%	3.6	10.1
2/1 – Sandown Road (S)	59.3%	9.9	26.2	74.6%	13.0	34.7
3/1+3/2 – Newport Road	58.0% : 58.0%	8.1	24.4	73.6% : 74.3%	12.9	26.8
PRC	51.8%			20.6%		
Total Delay (pcu/hr)	8.81			12.5		

3.7 The base year results as shown in **Table 3.1** indicate that the junction operates within recommended capacity during the AM and PM Peaks. The highest queues are experienced on the southern arm of Sandown Road (Lane 2/1), with 10 PCUs in the AM peak and 13.0 PCUs in the PM Peak, as well as on Newport Road, with 8.1 PCUs in the AM peak and 13 PCUs in the PM peak. In general, queues and average delays per PCU are moderate, with the junction operating with a PRC of 51.8% in the AM and a PRC of 20.6% in the PM, therefore demonstrating that the junction generally performs well in the 2017 Base Year.

LinSig Modelling Results – 2034 Future Year

Table 3.2 2034 Future Year Assessment: Existing Junction

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+1/2 – Sandown Road (N)	72.2% : 72.2%	11.1	15.5	78.0%	10.9	16.1
2/1 – Sandown Road (S)	73.6%	13.5	30.8	92.2%	20.7	54.8
3/1+3/2 – Newport Road	72.0% : 72.0%	11.9	28.4	91.1% : 92.0%	22.1	42.1
PRC	22.4%			-2.5%		
Total Delay (pcu/hr)	13.88			24.41		

3.8 As can be observed in **Table 3.2**, the junction is expected to operate within capacity during the AM peak, for the Future Year 2034. However, during the PM Peak, the junction is expected to operate over capacity, with particular capacity issues recorded on the southern arm of Sandown Road (Lane 2/1) and Newport Road (Lanes 3/1 and 3/2) with a DoS at 92.2% and 92.0% respectively. Therefore, queues and delays are predicted to increase, reaching the highest values in the PM Peak. The PRC is

forecast to significantly reduce in both the AM and PM peaks, recorded as 22.4% in the AM and -2.5% in the PM peak.

Proposed Scheme

3.9 The scheme that has been developed for this three-arm signalised junction includes widening the northern (Sandown Road N) and western (Newport Road) arms. The northern arm is to be widened to two lanes for a distance of 86 metres from the stopline, at present the arm comprises a two-lane approach for a distance of 30 metres. In order to widen the carriageway on this arm, the bus layby is to be incorporated into the carriageway.

3.10 The western arm is to be widened to two lanes for a distance of 36 metres, at present the arm comprises a two-lane approach for a distance of 20 metres, this will be achieved via realignment of road markings. Other parts of the scheme include realigning the kerbline on the southern corner of Newport Road, positioned at the junction.

3.11 This scheme is shown in **Figure 3.1** below.

Figure 3.1 Proposed Junction Design

Source: WYG Drawing A090129-99-005

3.12 At present, the junction has little signage and therefore it is proposed that signage, clear road markings and advisory information should be included as part of the design. It is anticipated that this will encourage correct lane discipline amongst drivers, on their approach to the junction. Signs and clear road markings directing drivers to destinations is likely to improve the efficiency and flow of traffic through the junction.

Forecast/Future Year Modelling

3.13 Forecast or Future Year modelling was undertaken using the proposed highway design for the junction, as shown in Figure 3.2, to ascertain the effectiveness and feasibility of the design. 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.

3.14 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.

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

Table 3.3 2017-2034 TEMPRO Growth Factors – All Urban Road Types

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

3.16 The Future Year results for the proposed junction design are summarised in **Table 3.2**, with full output results included in **Appendix B**.

LinSig Modelling Results – Future Year/Proposals

Table 3.4 2034 Future Year Assessment: Proposed Junction

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+1/2 – Sandown Road (N)	71.7 : 71.7%	11.2	15.5	71.2 : 71.2%	10.7	15.0
2/1 – Sandown Road (S)	71.6%	13.2	29.2	89.5%	19.2	47.6
3/1+3/2 – Newport Road	69.7 : 69.7%	10.8	28.0	88.1 : 88.1%	19.3	36.6
PRC	25.6%			0.5%		
Total Delay (pcu/hr)	13.55			21.51		

3.17 The proposed junction design is expected to provide some benefit to junction capacity, in comparison to the existing junction. For the AM peak, there is a slight improvement in the DoS and PRC, with a PRC of 25.6%, which equates to a 3.2% increase in capacity compared to the existing junction design. For the PM peak, there is a similar improvement with a 3.0% increase in capacity recorded. Queues are predicted to marginally improve, however, these improvements are not considered significant enough to provide any noticeable difference, when compared to the existing junction. Despite the improvements shown as a whole, these do not completely address the capacity issues which by in large still remain.

Outcome / Conclusions

3.18 As indicated by the Base Year scenario, the existing junction currently performs well and within capacity. However, when tested in the Future Year scenario, capacity issues are expected in the Future Year scenario, particularly in the PM peak, whereby the junction is expected to go over capacity. The junction still performs fairly well and within capacity in the AM peak. It has been found that proposed junction layout does provide some benefit in comparison to the existing junction, and thus it is recommended that the proposed scheme is implemented. Although, it is noted that capacity issues are not fully resolved by the proposed scheme but overall it does provide some mitigation of capacity issues.

4 Proposed Scheme

General

4.1 This chapter considers the preferred improvement option for the A3056 Newport Road / Sandown Road signalised junction. Drawings of the proposals are additionally included in **Appendix A**.

Proposed Junction Improvements

Junction Issues

4.2 Current issues specific to the A3056 Newport Road / Sandown Road three-arm signalised junction include congestion and queuing on all arms.

Opportunities

4.3 The opportunities to improve the three-arm signalised junction are primarily focused on:

- Improving the flow of traffic through the junction, in particular for those vehicles turning left from Newport Road onto Sandown Road (northbound) and vice versa;
- Improving the flow of traffic northbound and southbound through the junction;
- Reducing existing traffic congestion, queuing and delays.

Proposals

4.4 The scheme that has been developed for this three-arm signalised junction includes widening the northern (Sandown Road N) and western (Newport Road) arms. The northern arm is to be widened to two lanes for a distance of 86 metres from the stopline, at present the arm comprises a two-lane approach for a distance of 30 metres. In order to widen the carriageway on this arm, the bus layby is to be incorporated into the carriageway.

4.5 The western arm is to be widened to two lanes for a distance of 36 metres, at present the arm comprises a two-lane approach for a distance of 20 metres, this will be achieved via realignment of road markings. Other parts of the scheme include realigning the kerbline on the southern corner of Newport Road, positioned at the junction.

4.6 The proposed layout is presented below in **Figure 4.1**. The 1:250 drawing is included at **Appendix A**.

Figure 4.1 Proposed Junction Design

Source: WYG Drawing A090129-99-005

4.7 At present, the junction has little signage and therefore it is proposed that signage, clear road markings and advisory information should be included as part of the design. It is anticipated that this will encourage correct lane discipline amongst drivers, on their approach to the junction. Signs and clear road markings directing drivers to destinations is likely to improve the efficiency and flow of traffic through the junction.

Outcome

4.8 With the proposed junction design tested as part of the modelling, it was found that the physical alterations to the junction did provide some benefit to the operation of the junction, due to the lengthening of the two-lane approaches on Sandown Road (N) and Newport Road. Therefore, in comparison, the proposed junction design performed better than the existing junction in the Future Year scenario.

Costs

4.9 This section of the feasibility study sets out an indication of the costs of the proposals at each section of the study area. The costs are based on appraisal of construction prices from SPONS and WYG's understanding of similar schemes developed for other local authorities. The cost estimate is identified in **Table 4.1**.

A3056 – Newport Road

4.10 The scope of improvements includes the following:

a) Realignment of road markings, old markings to be removed and new markings to be implemented.

b) Radius on the southern kerbline to be realigned, construction of new carriageway.

Sandown Road

4.11 The scope of improvements includes the following:

a) Bus layby to be reinstated as carriageway.

b) New traffic signs where applicable.

c) New road markings where applicable.

Summary

4.12 **Table 4.1** sets out a summary of the indicative estimated costs for the proposals within the study area.

Table 4.1 Cost Estimate of Proposals – Summary

Proposal	Cost Estimate
Construction Estimate	£55,000
Risk Variables (Statutory Undertakers, Safety Audit requirements)	£14,300
Design Administration and TRO Fees	£5,500
Total	**£74,800**

WYG, December 2017

Conclusion and Recommendations

Conclusions

4.13 There are existing issues related to queuing and congestion on all arms at the junction, which is largely due to the high traffic flows through the junction. In particular, there is a heavy flow of traffic from Newport Road onto Sandown Road (northbound) and vice versa. Improvements have therefore been predominately focused on the Newport Road and Sandown Road (N) arms, as detailed above.

Recommendations

4.14 It is therefore recommended that the two-lane approaches on Newport Road and Sandown Road (N) are lengthened, as stated in paragraphs 4.4 and 4.5. This provides an improvement in junction capacity in comparison to the existing junction layout.

Cost/Time Savings Analysis

4.15 A cost savings analysis has been undertaken for the junction based on the delay/time savings as a result of the proposed alterations to the junction. 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.

4.16 To calculate the total cost savings, 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 to both the AM (07:00-10:00) and PM Peak periods (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 Peak period, for an average weekday. For the annual cost savings, the total AM and PM Peak 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 4.2** below.

Table 4.2 Estimated Cost/Time Savings Analysis of Junction 13

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
AM Peak (07:00-10:00)	13.88	13.55	0.3	3	1507	14,91.93	£14.73	£3,727.40
PM Peak (16:00-19:00)	24	22	3	3	1908	16,599.6	£163.92	£41,472.03
TOTAL						**18,091.53**	**£178.65**	**£45,199.43**

4.17 As shown in Table 4.2, the estimated cost savings per peak period were £14.73 in the AM Peak and £163.92 in the PM Peak, and thus the overall annual fuel cost savings was estimated to be £45,199.43.

5 Summary and Conclusions

Summary

5.1 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.

5.2 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.

5.3 The A3056 Newport Road / Sandown Road three-arm signalised junction is located in the area of Lake, equal distance between Sandown to the north and Shanklin to the south. The A3056 Newport Road forms the western arm, whilst Sandown Road forms the northern and southern arms.

5.4 The junction provides access to Sandown to the north, Shanklin to the south and Newport to the west via the A3056. 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 particularly evident on both arms of Sandown Road.

5.5 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. However, capacity issues are more predominate in the PM peak, with a PRC of 20.6% recorded, compared to 51.8% recorded in the AM peak. The majority of queuing occurs on the Sandown Road (S) and Newport Road arms.

5.6 As a result, improvements to the signalised junction have been focused around reducing queuing and congestion at the junction. Therefore, the proposed junction design involves widening the northern and western arms to two lanes, for a distance of 86 metres on the Sandown Road (N) and for a distance of 30 metres on Newport Road. This would be achieved via the realignment of road markings. It deemed that this will allow traffic to flow more efficiently through the junction, therefore mitigating some of the queuing and congestion.

5.7 With the proposed junction design tested, the results indicate that it provides some benefit to junction capacity, in comparison to the existing junction. For instance, there is a 3.0% increase in capacity in both the AM and PM peaks as a result. There is however not much of an improvement in queuing, but this is largely due to high traffic flows going through the junction, and queuing at the junction is something that is not easily resolved.

Conclusions

5.8 As part of this feasibility study, it can be concluded that the improvements brought forward address the some of the existing capacity issues related to congestion and queuing at the junction. It has been shown from the traffic modelling results that there is some improvement in capacity on the southern and western arms, and thus will allow the junction to operate more efficiently as a whole.

Appendix A
1:250 DRAWINGS

Bus layby incorporated into new carriageway

New kerbline

Existing traffic signals and pedestrian crossing with tactile paving and dropped kerbs

Existing traffic signals

Existing traffic signals

Existing traffic signals

Existing pedestrian refuge with dropped kerbs and tactile paving

New kerbline

Existing traffic signals and pedestrian crossing with tactile paving and dropped kerbs

A3056 - Newport Road

Sandown Road

15.5m

88.2

Notes:

General

1. Do not scale from drawing.
2. All dimensions are in metres, unless stated otherwise.
3. This drawing is to be read & printed in colour.
4. This drawing is for illustrative purposes only.

Disclaimer

1. The information contained in this drawing is based on a combination of OS and data provided by others and WYG shall not be liable for any inaccuracies or deficiencies.

KEY:

- Extent of highway boundary
- Existing carriageway
- Existing footway / public realm
- Existing road marking
- Proposed road marking
- New carriageway construction

INDICATIVE

REV	DETAILS	DRAWN BY	CHECKED BY	DATE

CLIENT: Isle of Wight Council

PROJECT: IOW

DRAWING TITLE: Junction 13 Sandown

SCALES: 1:250 | SHEET SIZE: A1

DRAWN: Initials | CHECKED: Initials | DATE: Date

WYG Transport
part of WYG group
11th Floor 1 Angel Court London EC2R 7HJ
t: 0207 250 7500 f: 0207 250 7501 e: transport@wyg.com

DRAWING NUMBER: A090129-99-005 | REVISION: Rev

Appendix B
MODELLING OUTPUT RESULTS

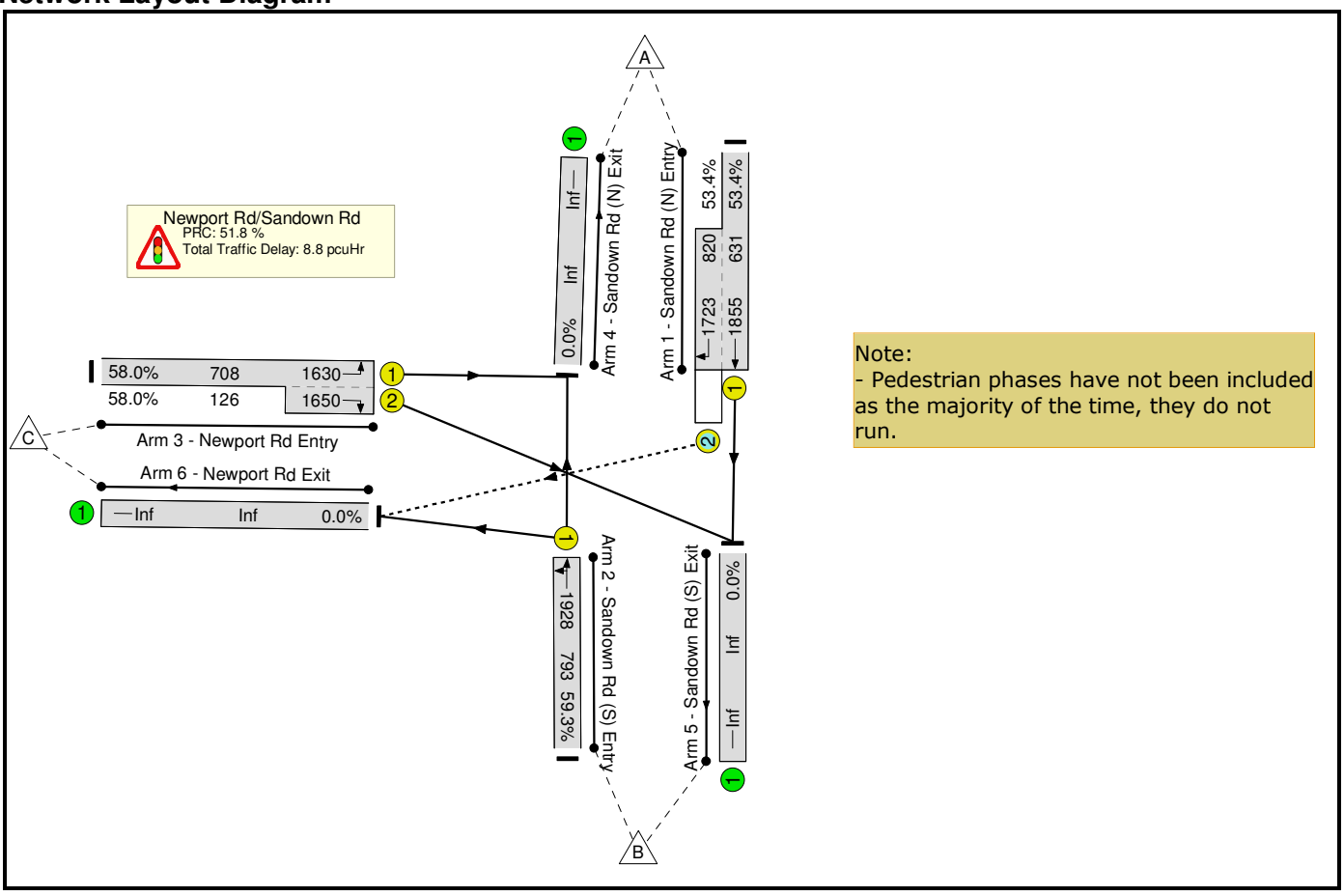
Basic Results Summary

User and Project Details

Project:	**A090129-60**
Title:	**HCA Tender IoW**
Location:	
Additional detail:	
File name:	Junction 13 - Newport Rd Sandown Rd - Survey Flows - JS.lsg3x
Author:	
Company:	
Address:	

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

Network Layout Diagram



Basic Results Summary

Network Results

Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network: HCA Tender IoW	**-**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**59.3%**	**204**	**219**	**15**	**8.8**	**-**	**-**
Newport Rd/Sandown Rd	**-**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**59.3%**	**204**	**219**	**15**	**8.8**	**-**	**-**
1/1+1/2	Sandown Rd (N) Entry Ahead Right	U+O	A	B	1	73	73	775	1855:1723	631+820	53.4 : 53.4%	204	219	15	2.1 (0.4+1.7)	9.8 (4.4:13.9)	3.2
2/1	Sandown Rd (S) Entry Ahead Left	U	C		1	36	-	470	1928	793	59.3%	-	-	-	3.4	26.2	9.9
3/1+3/2	Newport Rd Entry Left Right	U	D E		1	43:7	-	484	1630:1650	708+126	58.0 : 58.0%	-	-	-	3.3 (2.4+0.9)	24.4 (20.9:44.2)	8.1

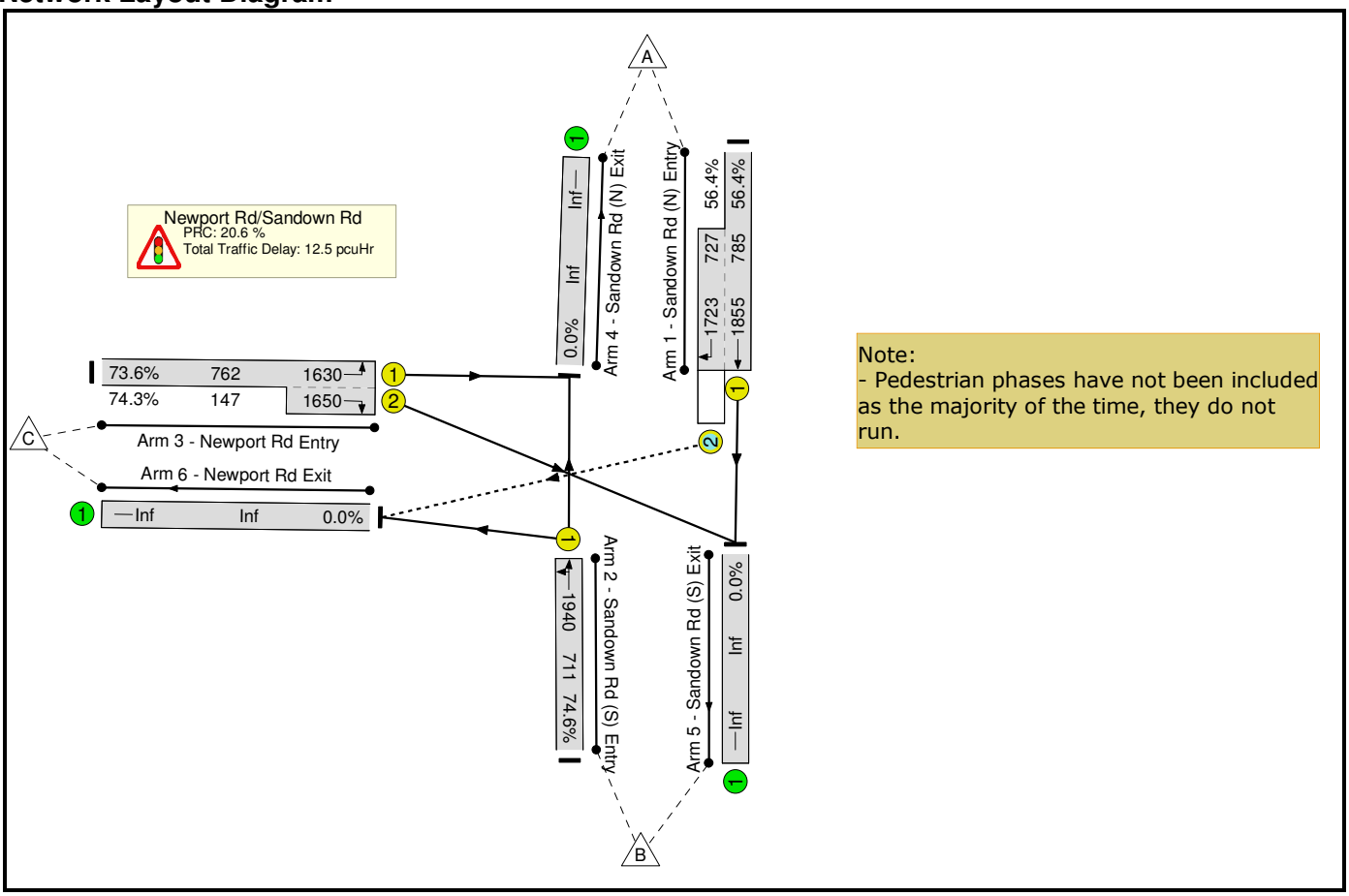
C1

PRC for Signalled Lanes (%): 51.8
PRC Over All Lanes (%): 51.8

Total Delay for Signalled Lanes (pcuHr): 8.81
Total Delay Over All Lanes(pcuHr): 8.81

Cycle Time (s): 90

Basic Results Summary
Scenario 2: '2017 PM' (FG2: '2017 - PM', Plan 1: 'Network Control Plan 1')
Network Layout Diagram



Note:
- Pedestrian phases have not been included as the majority of the time, they do not run.

Basic Results Summary

Network Results

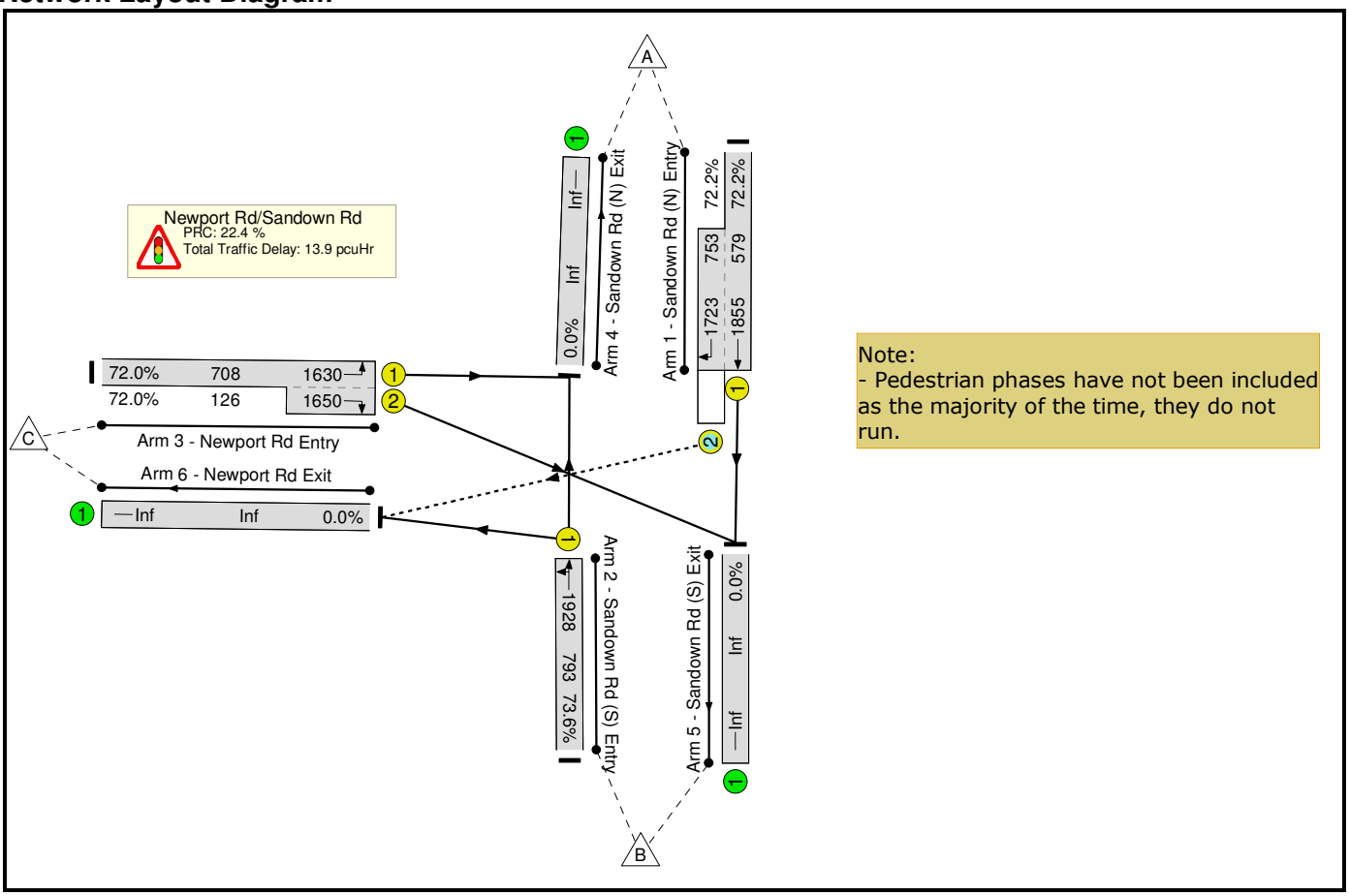
Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network: HCA Tender IoW	**-**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**74.6%**	**106**	**290**	**14**	**12.5**	**-**	**-**
Newport Rd/Sandown Rd	**-**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**74.6%**	**106**	**290**	**14**	**12.5**	**-**	**-**
1/1+1/2	Sandown Rd (N) Entry Ahead Right	U+O	A	B	1	73	73	853	1855:1723	785+727	56.4 : 56.4%	106	290	14	2.4 (0.6+1.8)	10.1 (4.6:16.1)	3.6
2/1	Sandown Rd (S) Entry Ahead Left	U	C		1	32	-	531	1940	711	74.6%	-	-	-	5.1	34.7	13.0
3/1+3/2	Newport Rd Entry Left Right	U	D E		1	47:7	-	670	1630:1650	762+147	73.6 : 74.3%	-	-	-	5.0 (3.6+1.4)	26.8 (22.8:47.5)	12.9

C1 PRC for Signalled Lanes (%): 20.6 Total Delay for Signalled Lanes (pcuHr): 12.50 Cycle Time (s): 90
PRC Over All Lanes (%): 20.6 Total Delay Over All Lanes(pcuHr): 12.50

Basic Results Summary

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

Network Layout Diagram



Basic Results Summary

Network Results

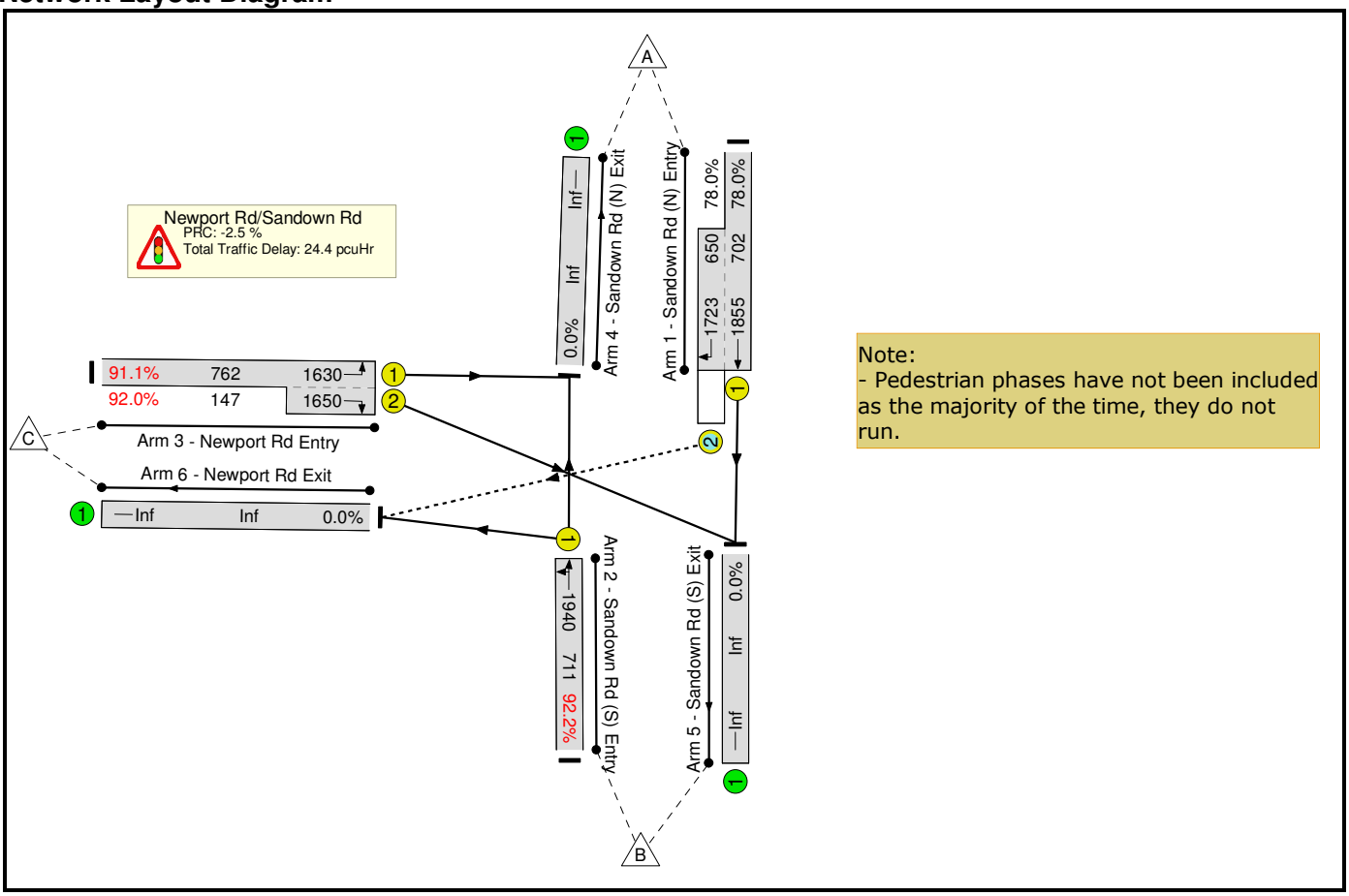
Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network: HCA Tender IoW	**-**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**73.6%**	**125**	**400**	**18**	**13.9**	**-**	**-**
Newport Rd/Sandown Rd	**-**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**73.6%**	**125**	**400**	**18**	**13.9**	**-**	**-**
1/1+1/2	Sandown Rd (N) Entry Ahead Right	U+O	A	B	1	73	73	961	1855:1723	579+753	72.2 : 72.2%	125	400	18	4.1 (0.8+3.4)	15.5 (6.7:22.3)	11.1
2/1	Sandown Rd (S) Entry Ahead Left	U	C		1	36	-	583	1928	793	73.6%	-	-	-	5.0	30.8	13.5
3/1+3/2	Newport Rd Entry Left Right	U	D E		1	43:7	-	601	1630:1650	708+126	72.0 : 72.0%	-	-	-	4.7 (3.5+1.2)	28.4 (25.1:47.2)	11.9

C1 PRC for Signalled Lanes (%): 22.4 Total Delay for Signalled Lanes (pcuHr): 13.88 Cycle Time (s): 90
PRC Over All Lanes (%): 22.4 Total Delay Over All Lanes(pcuHr): 13.88

Basic Results Summary

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

Network Layout Diagram



Note:
- Pedestrian phases have not been included as the majority of the time, they do not run.

Basic Results Summary

Network Results

Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network: HCA Tender IoW	**-**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**92.2%**	**30**	**460**	**17**	**24.4**	**-**	**-**
Newport Rd/Sandown Rd	**-**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**92.2%**	**30**	**460**	**17**	**24.4**	**-**	**-**
1/1+1/2	Sandown Rd (N) Entry Ahead Right	U+O	A	B	1	73	73	1054	1855:1723	702+650	78.0 : 78.0%	30	460	17	4.7 (1.2+3.5)	16.1 (8.0:24.9)	10.9
2/1	Sandown Rd (S) Entry Ahead Left	U	C		1	32	-	656	1940	711	92.2%	-	-	-	10.0	54.8	20.7
3/1+3/2	Newport Rd Entry Left Right	U	D E		1	47:7	-	829	1630:1650	762+147	91.1 : 92.0%	-	-	-	9.7 (7.4+2.3)	42.1 (38.4:60.9)	22.1

C1

PRC for Signalled Lanes (%): -2.5
PRC Over All Lanes (%): -2.5

Total Delay for Signalled Lanes (pcuHr): 24.41
Total Delay Over All Lanes(pcuHr): 24.41

Cycle Time (s): 90

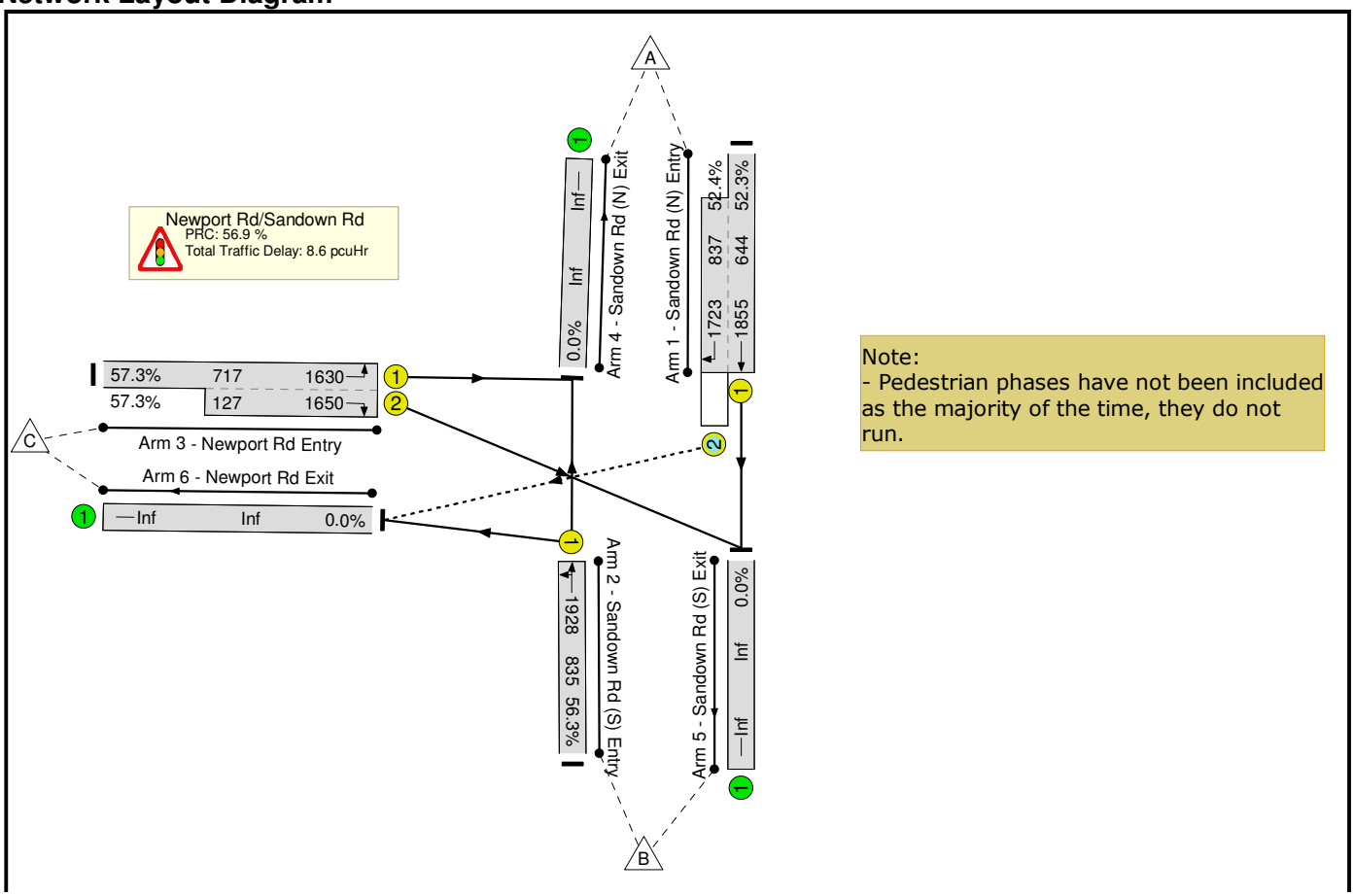
Basic Results Summary

User and Project Details

Project:	**A090129-60**
Title:	**HCA Tender IoW**
Location:	
Additional detail:	
File name:	Junction 13 - Newport Rd Sandown Rd - (PROPOSED) 23.01.2018.lsg3x
Author:	
Company:	
Address:	

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

Network Layout Diagram



Basic Results Summary

Network Results

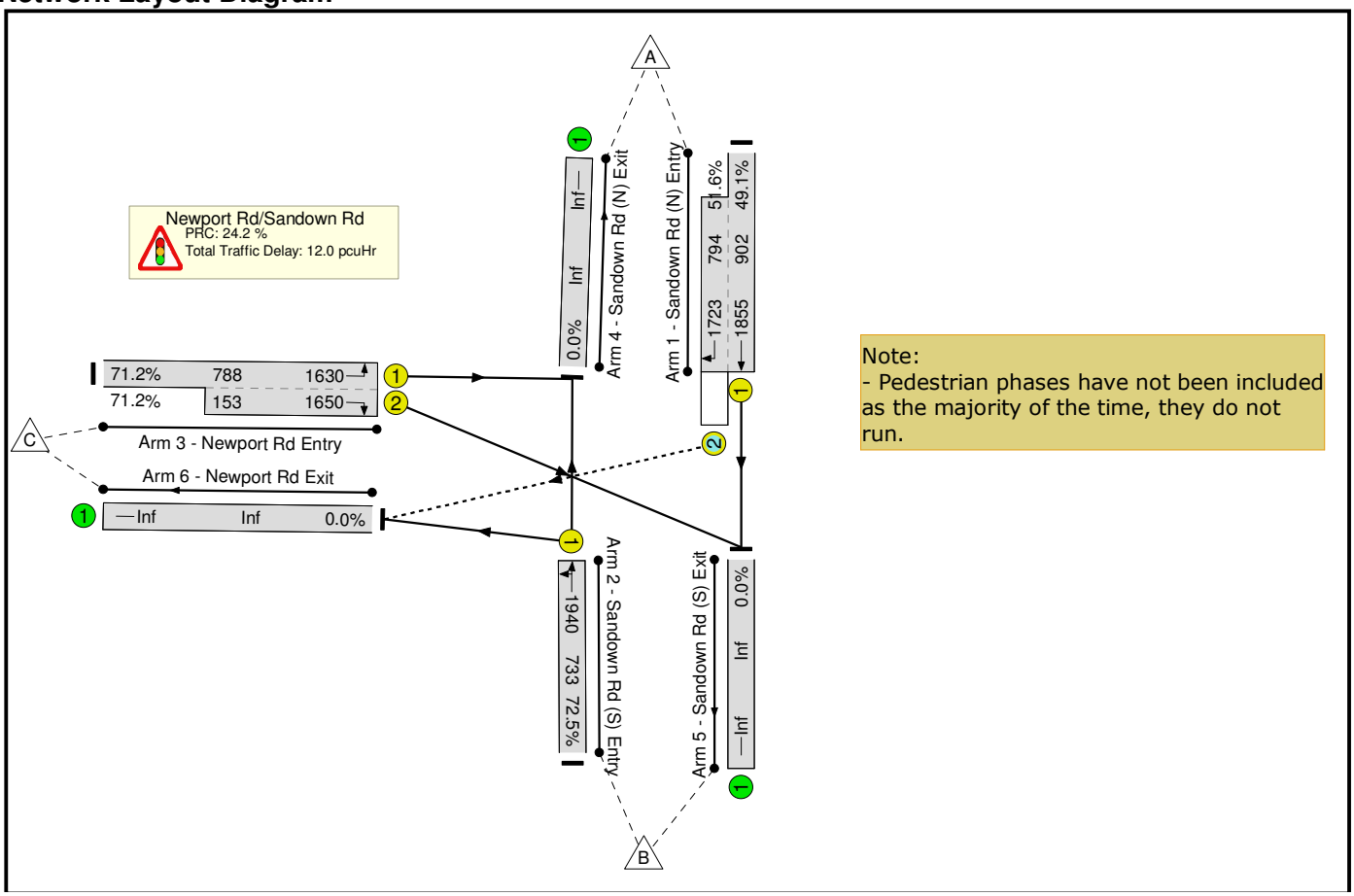
Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network: HCA Tender IoW	-	-	-		-	-	-	-	-	-	**57.3%**	**229**	**194**	**15**	**8.6**	-	-
Newport Rd/Sandown Rd	-	-	-		-	-	-	-	-	-	**57.3%**	**229**	**194**	**15**	**8.6**	-	-
1/1+1/2	Sandown Rd (N) Entry Ahead Right	U+O	A	B	1	73	73	775	1855:1723	644+837	52.3 : 52.4%	229	194	15	2.1 (0.4+1.7)	9.6 (4.3:13.7)	3.1
2/1	Sandown Rd (S) Entry Ahead Left	U	C		1	38	-	470	1928	835	56.3%	-	-	-	3.1	24.0	9.4
3/1+3/2	Newport Rd Entry Left Right	U	D E		1	41:7	-	484	1630:1650	717+127	57.3 : 57.3%	-	-	-	3.4 (2.5+0.9)	25.4 (22.1:44.1)	8.0

C1 PRC for Signalled Lanes (%): 56.9 Total Delay for Signalled Lanes (pcuHr): 8.62 Cycle Time (s): 90
PRC Over All Lanes (%): 56.9 Total Delay Over All Lanes(pcuHr): 8.62

Basic Results Summary

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

Network Layout Diagram



Note:
- Pedestrian phases have not been included as the majority of the time, they do not run.

Basic Results Summary

Network Results

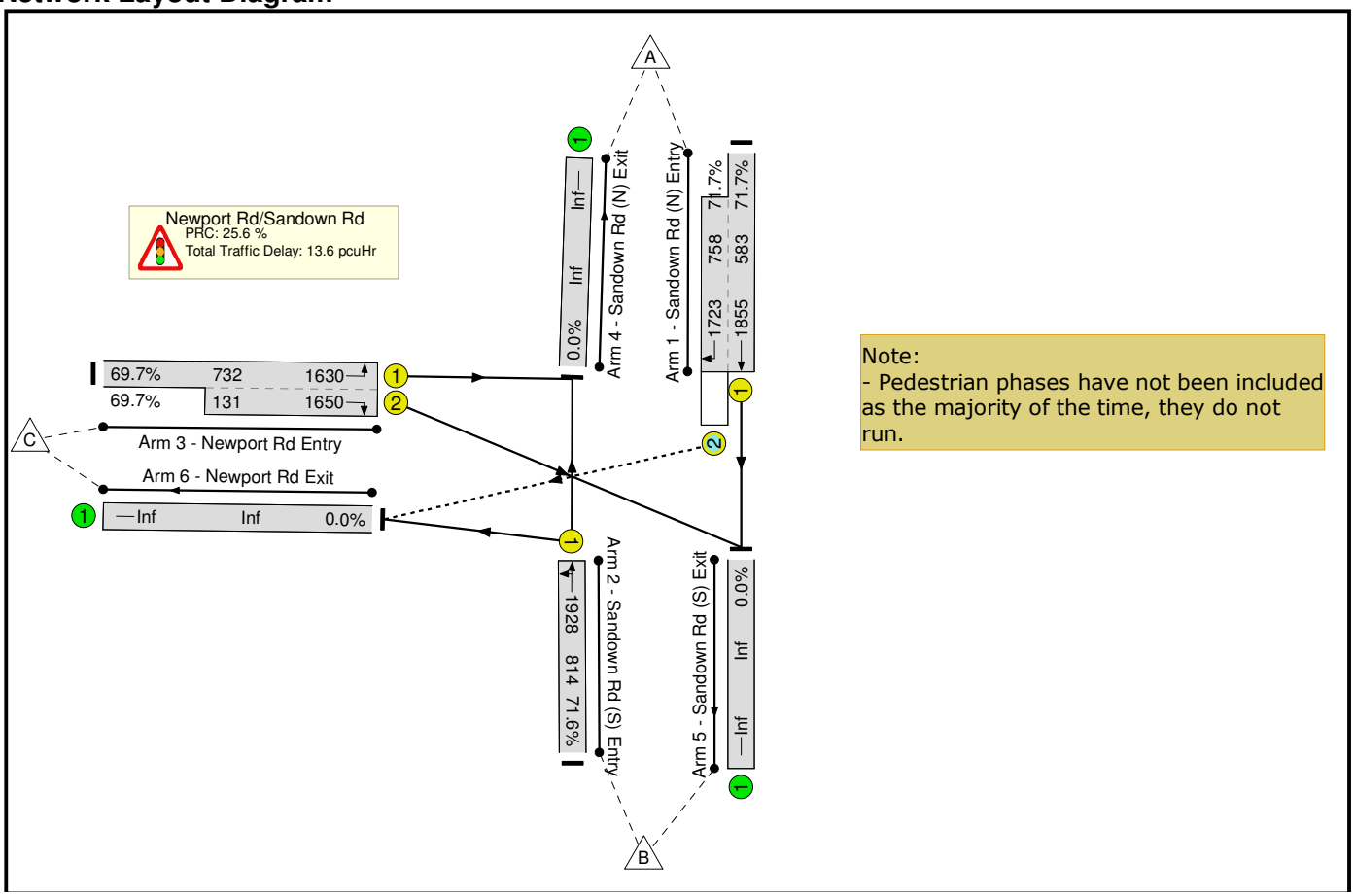
Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network: HCA Tender IoW	-	-	-		-	-	-	-	-	-	**72.5%**	**122**	**274**	**14**	**12.0**	-	-
Newport Rd/Sandown Rd	-	-	-		-	-	-	-	-	-	**72.5%**	**122**	**274**	**14**	**12.0**	-	-
1/1+1/2	Sandown Rd (N) Entry Ahead Right	U+O	A	B	1	72	72	853	1855:1723	902+794	49.1 : 51.6%	122	274	14	2.3 (0.5+1.8)	9.9 (4.2:16.0)	3.7
2/1	Sandown Rd (S) Entry Ahead Left	U	C		1	33	-	531	1940	733	72.5%	-	-	-	4.8	32.8	12.7
3/1+3/2	Newport Rd Entry Left Right	U	D E		1	46:8	-	670	1630:1650	788+153	71.2 : 71.2%	-	-	-	4.8 (3.5+1.4)	26.0 (22.2:45.6)	11.4

C1 PRC for Signalled Lanes (%): 24.2 Total Delay for Signalled Lanes (pcuHr): 12.02 Cycle Time (s): 90
PRC Over All Lanes (%): 24.2 Total Delay Over All Lanes(pcuHr): 12.02

Basic Results Summary

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

Network Layout Diagram



Basic Results Summary

Network Results

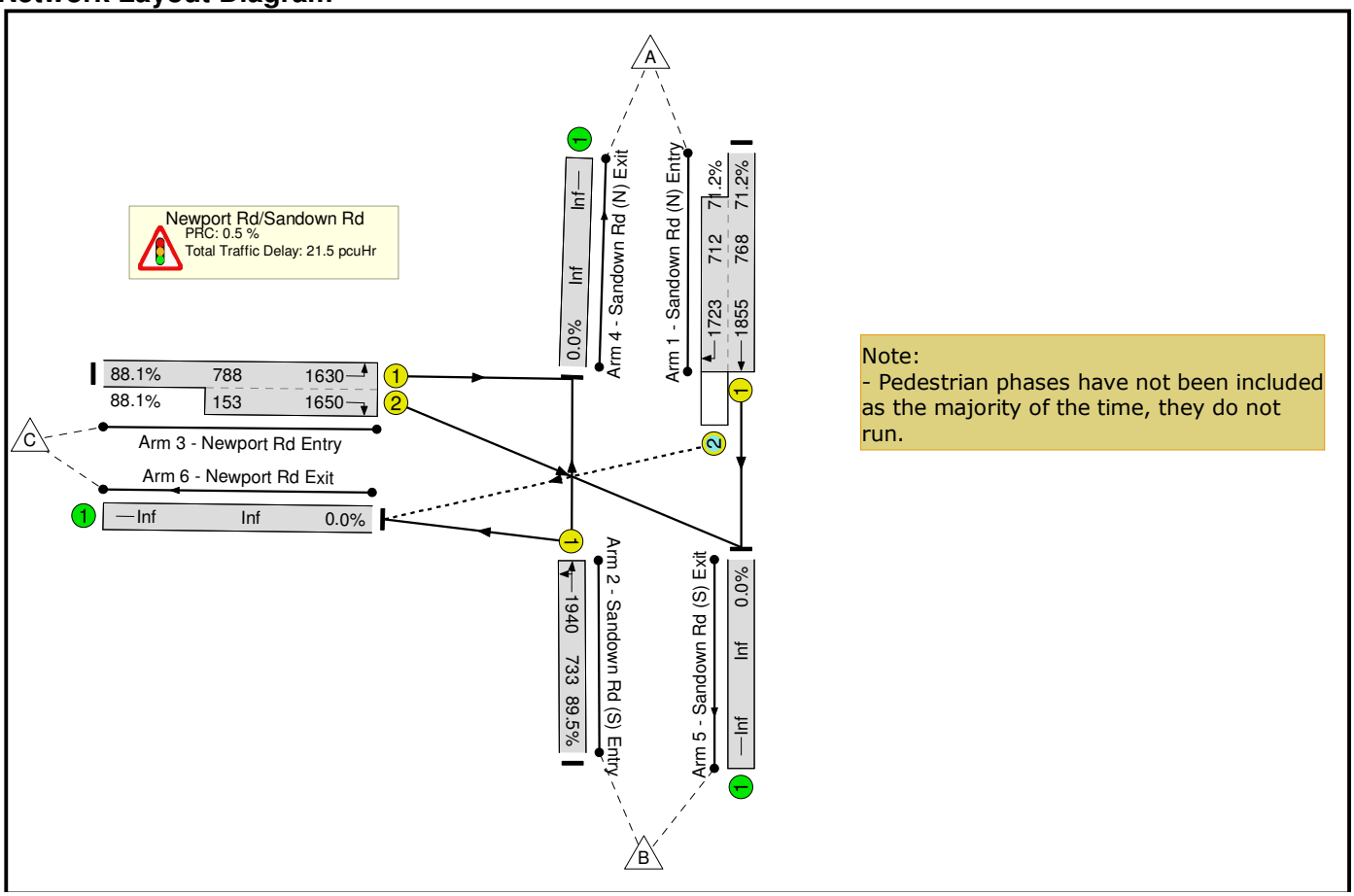
Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network: HCA Tender IoW	-	-	-		-	-	-	-	-	-	**71.7%**	**134**	**391**	**18**	**13.6**	-	-
Newport Rd/Sandown Rd	-	-	-		-	-	-	-	-	-	**71.7%**	**134**	**391**	**18**	**13.6**	-	-
1/1+1/2	Sandown Rd (N) Entry Ahead Right	U+O	A	B	1	73	73	961	1855:1723	583+758	71.7 : 71.7%	134	391	18	4.1 (0.8+3.4)	15.5 (6.5:22.5)	11.2
2/1	Sandown Rd (S) Entry Ahead Left	U	C		1	37	-	583	1928	814	71.6%	-	-	-	4.7	29.2	13.2
3/1+3/2	Newport Rd Entry Left Right	U	D E		1	42:7	-	601	1630:1650	732+131	69.7 : 69.7%	-	-	-	4.7 (3.5+1.2)	28.0 (24.7:46.4)	10.8

C1 PRC for Signalled Lanes (%): 25.6 Total Delay for Signalled Lanes (pcuHr): 13.55 Cycle Time (s): 90
PRC Over All Lanes (%): 25.6 Total Delay Over All Lanes(pcuHr): 13.55

Basic Results Summary

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

Network Layout Diagram



Basic Results Summary

Network Results

Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network: HCA Tender IoW	**-**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**89.5%**	**40**	**450**	**17**	**21.5**	**-**	**-**
Newport Rd/Sandown Rd	**-**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**89.5%**	**40**	**450**	**17**	**21.5**	**-**	**-**
1/1+1/2	Sandown Rd (N) Entry Ahead Right	U+O	A	B	1	72	72	1054	1855:1723	768+712	71.2 : 71.2%	40	450	17	4.4 (1.0+3.4)	15.0 (6.5:24.3)	10.7
2/1	Sandown Rd (S) Entry Ahead Left	U	C		1	33	-	656	1940	733	89.5%	-	-	-	8.7	47.6	19.2
3/1+3/2	Newport Rd Entry Left Right	U	D E		1	46:8	-	829	1630:1650	788+153	88.1 : 88.1%	-	-	-	8.4 (6.4+2.1)	36.6 (33.1:54.8)	19.3

C1 PRC for Signalled Lanes (%): 0.5 Total Delay for Signalled Lanes (pcuHr): 21.51 Cycle Time (s): 90
PRC Over All Lanes (%): 0.5 Total Delay Over All Lanes(pcuHr): 21.51