CAPITA SYMONDS

Planning, Environment & Design

NW Haverhill Development

Transport Assessment Addendum

April 2013

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Quality Management

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1. Executive Summary

1.1 Overview

1.1.1 This Transport Assessment Addendum (TAA) responds to a number of issues raised by Suffolk County Council in relation to the 2009 TA and Travel Plan as outlined in their Northwest Haverhill Reports synopsis referenced herein as Figure 1 (see Appendix A).

1.1.2 Fundamentally, this additional work required the refresh of the traffic information relating to the Cangle Junction and the assessment of the junction assuming a first phase of residential development was completed and occupied prior to the completion of the NW Haverhill Relief Road.

1.1.3 This eventuality would cause additional westbound traffic to use Wratting Road, the Cangle Junction and Withersfield Road for a period of time whilst the Relief Road was completed. There was a concern that this additional traffic would cause over-capacity issues at the Junction.

1.1.4 Thus an assessment has been carried out to show that the Cangle Junction is able to sustain the predicted additional traffic arising from Phase 1 of the development, without suffering over-capacity or unacceptable queuing.

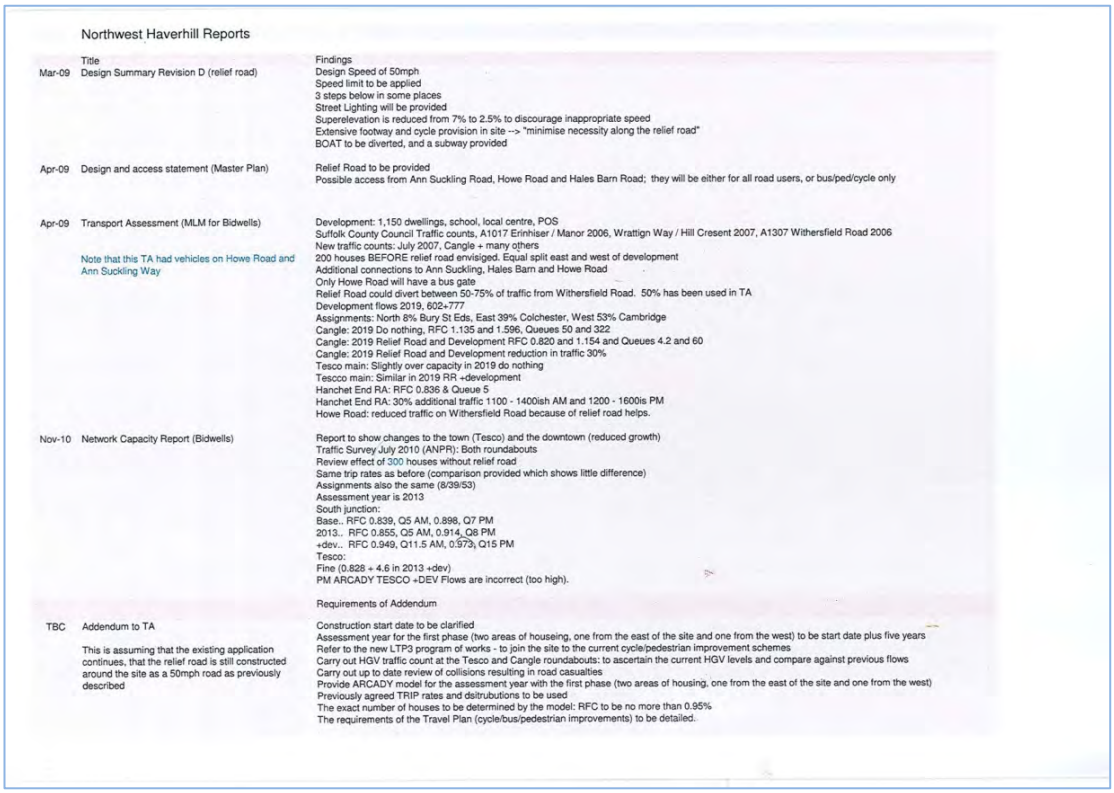
1.1.5 Furthermore, the TAA provides further detail of how the development relates to surrounding residential areas and provides for and enhances aspirations arising from the SCC LTP3 (2011-2031) in respect of sustainable travel and accessibility and permeability by non-motorised users.

1.1.6 Finally, the TAA reviews the current accident situation and refreshes the conclusions reached in the 2009 TA with respect to the key access points at Ann Suckling Road and Howe Road. The accident assessment shows that the current situation, as informed by the most recent accident statistics for Haverhill is no worse or better than that reported in the 2009 TA.

2. Introduction

2.1 Background

2.1.1 This report is an Addendum to the Transport Assessment carried out by MLM in April 2009. The content of the report is as agreed with Suffolk County Council and is outlined, broadly, in their synopsis of the work carried out to date and the reports generated in support of the planning application for the development as shown in Figure 1.



Northwest Haverhill Reports

	Title	Findings
Mar-09	Design Summary Revision D (relief road)	Design Speed of 50mph Speed limit to be applied 3 steps below in some places Street Lighting will be provided Superelevation is reduced from 7% to 2.5% to discourage inappropriate speed Extensive footway and cycle provision in site --> "minimise necessity along the relief road" BOAT to be diverted, and a subway provided
Apr-09	Design and access statement (Master Plan)	Relief Road to be provided Possible access from Ann Suckling Road, Howe Road and Hales Barn Road; they will be either for all road users, or bus/ped/cycle only
Apr-09	Transport Assessment (MLM for Bidwells) Note that this TA had vehicles on Howe Road and Ann Suckling Way	Development: 1,150 dwellings, school, local centre, POS Suffolk County Council Traffic counts, A1017 Erinhiser / Manor 2006, Wrattign Way / Hill Cresent 2007, A1307 Withersfield Road 2006 New traffic counts: July 2007, Cangle + many others 200 houses BEFORE relief road envisiged. Equal split east and west of development Additional connections to Ann Suckling, Hales Barn and Howe Road Only Howe Road will have a bus gate Relief Road could divert between 50-75% of traffic from Withersfield Road. 50% has been used in TA Development flows 2019, 602+777 Assignments: North 8% Bury St Eds, East 39% Colchester, West 53% Cambridge Cangle: 2019 Do nothing, RFC 1.135 and 1.596, Queues 50 and 322 Cangle: 2019 Relief Road and Development RFC 0.820 and 1.154 and Queues 4.2 and 60 Cangle: 2019 Relief Road and Development reduction in traffic 30% Tesco main: Slightly over capacity in 2019 do nothing Tesco main: Similar in 2019 RR +development Hanchet End RA: RFC 0.836 & Queue 5 Hanchet End RA: 30% additional traffic 1100 - 1400ish AM and 1200 - 1600is PM Howe Road: reduced traffic on Withersfield Road because of relief road helps.
Nov-10	Network Capacity Report (Bidwells)	Report to show changes to the town (Tesco) and the downtown (reduced growth) Traffic Survey July 2010 (ANPR): Both roundabouts Review effect of 300 houses without relief road Same trip rates as before (comparison provided which shows little difference) Assignments also the same (8/39/53) Assessment year is 2013 South junction: Base.. RFC 0.839, Q5 AM, 0.898, Q7 PM 2013.. RFC 0.855, Q5 AM, 0.914, Q8 PM +dev.. RFC 0.949, Q11.5 AM, 0.972, Q15 PM Tesco: Fine (0.828 + 4.6 in 2013 +dev) PM ARCADY TESCO +DEV Flows are incorrect (too high).
		Requirements of Addendum
TBC	Addendum to TA This is assuming that the existing application continues, that the relief road is still constructed around the site as a 50mph road as previously described	Construction start date to be clarified Assessment year for the first phase (two areas of houseing, one from the east of the site and one from the west) to be start date plus five years Refer to the new LTP3 program of works - to join the site to the current cycle/pedestrian improvement schemes Carry out HGV traffic count at the Tesco and Cangle roundabouts: to ascertain the current HGV levels and compare against previous flows Carry out up to date review of collisions resulting in road casualties Provide ARCADY model for the assessment year with the first phase (two areas of housing, one from the east of the site and one from the west) Previously agreed TRIP rates and dsitrubutions to be used The exact number of houses to be determined by the model: RFC to be no more than 0.95% The requirements of the Travel Plan (cycle/bus/pedestrian improvements) to be detailed.

Figure 1 : SCC Synopsis

2.1.2 This synopsis is reproduced in *Appendix A*.

2.1.3 In summary, the primary purpose of this report is to update the operational assessment of the Cangle roundabouts to confirm the level of traffic that these junctions can sustain prior to completion of the NW Haverhill Relief Road.

2.1.4 It is agreed that the scale of development in Phase 1 shall be such that the flow to capacity ratio (RFC) on any arm of the Cangle junction should not exceed 0.95 in any time period at a time five years post the start of construction.

2.1.5 It is proposed that the development be constructed in two phases. The first phase will be served wholly from Wratting Road and include the construction of the eastern half of the relief road. The phase is shown schematically in Figure 2. The plot sizes and build-out percentages are indicative at this time.

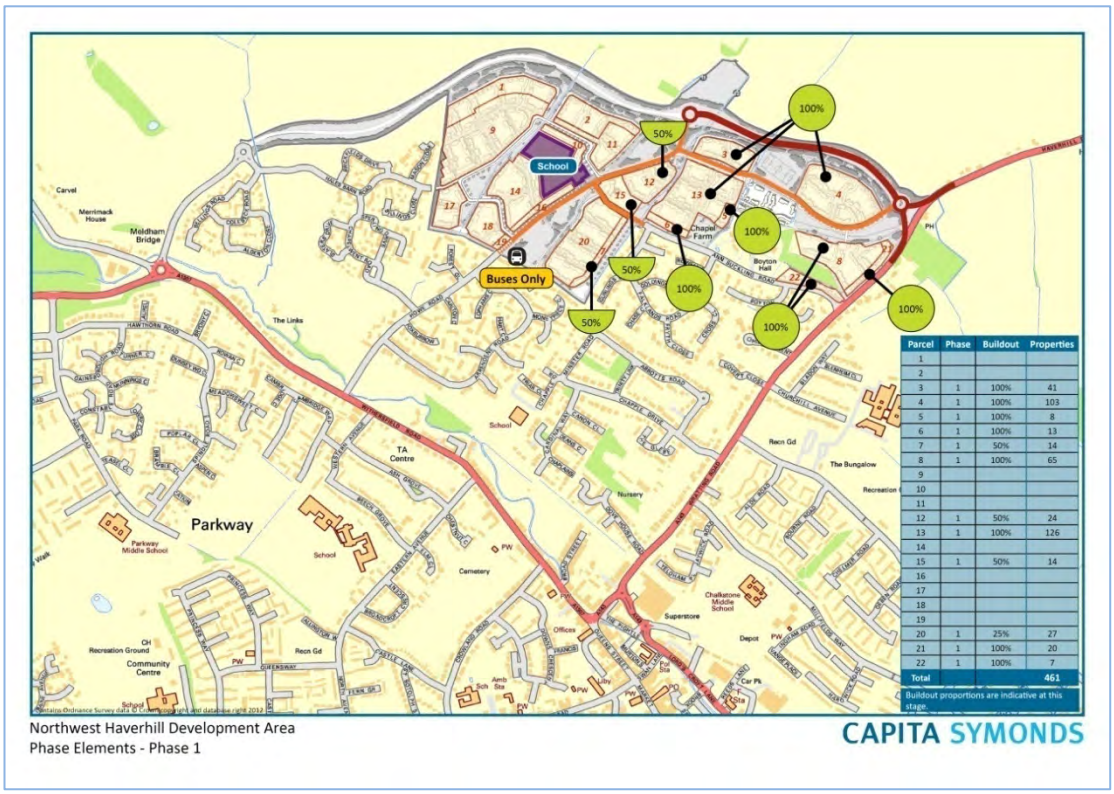


Figure 2 : NW Haverhill Development - Phase 1

2.1.6 The phasing diagrams are reproduced in *Appendix B*.

2.1.7 As shown on Figure 2, Phase 1 comprises the development of a number of parcels of land and the supporting infrastructure, together with the local centre and primary school.

2.1.8 Phase 1 also includes the link to Howe Road and the provision of a bus-only gateway allowing for the potential reconfiguring of bus services or the introduction of new services as appropriate, in line with aspirations within the SCC Local Transport Plan.

2.1.9 The work is supported and informed by a new manual classified turning count traffic survey of the Cangle junctions carried out in September 2012.

2.1.10 Additionally, this report undertakes a contemporary review of road traffic accidents to update the work carried out in 2009 and it also draws together certain aspects of the sustainable travel features of the development including linkages to offsite pedestrian and cycle facilities.

2.1.11 Finally, the report draws together the transport assessment and residential framework travel plan to demonstrate the linkages between the sustainable transport measures proposed in the TA and the targets embodied within the travel plan.

3. Data Collection

3.1 Traffic Count Data

3.1.1 To provide an up-to-date basis for the junction assessment work the 2007 traffic count at the Cangle junction was repeated on 27th September 2012.

3.1.2 This count was conducted using high level video recording of the north and south roundabouts with later extraction of full turning movement data of the AM and PM peak periods, 0700-1000hrs and 1600 to 1900hrs. Count summaries were provided at 15 minute intervals to enable the peak hour to be identified within each period.

3.1.3 The junction is analysed using the TRL software suite Junctions-8. It is normal practice to model the peak 90 minutes to ensure that the shoulders of the peak period are also represented. Analysis of the data shows the AM and PM peak periods to be 0745-0915hrs and 1645-1815hrs, respectively.

3.1.4 Although the 2007 and 2012 counts are not directly comparable, owing to the reconfiguration of the highway network at the time the Tesco store was constructed, it is possible to compare traffic inflows on the main approaches to the junction, as follows:

Table 1 : Traffic Flow Comparison : 2007 to 2012

Approach	AM2007	AM2012	PM2007	PM2012
Wratting Road	**1114**	**1224**	**890**	**998**
The Pightle (2007) / Lords Croft Way (2012)	**498**	**534**	**860**	**1064**
Queen Street	**262**	**226**	**462**	**347**
Withersfield Road	**761**	**834**	**1112**	**1096**

3.1.5 This comparison shows that, with a small number of exceptions, traffic flows around the Cangle junction have increased over the five years with total inflows increasing by 6.9% in the AM period and 5.4% in the PM period.

3.1.6 A further important consideration is the change in HGV proportions over the intervening period (2007 to 2012). In addition to the overall vehicle count comparison, a check has also been made on the change in HGV numbers and proportions between 2007 and 2012.

Table 2 : HGV Flow Comparison : 2007 vs 2012 – Flow (%age)

Approach	AM2007	AM2012	PM2007	PM2012
Wratting Road (Northbound)	**33 (5.0%)**	**35 (4.5%)**	**13 (1.2%)**	**22 (1.8%)**

Approach	AM2007	AM2012	PM2007	PM2012
Wratting Road (Southbound)	**44 (4.0%)**	**39 (3.2%)**	**19 (2.2%)**	**8 (0.8%)**
The Pightle (2007) / Lords Croft Way (2012) - Wb	**25 (5.0%)**	**33 (6.3%)**	**7 (0.8%)**	**14 (1.3%)**
The Pightle (2007) / Lords Croft Way (2012) - Eb	**36 (3.7%)**	**42 (3.9%)**	**15 (1.5%)**	**8 (0.8%)**
Withersfield Road - Westbound	**34 (3.8%)**	**35 (3.8%)**	**21 (1.9%)**	**8 (0.7%)**
Withersfield Road - Eastbound	**27 (3.6%)**	**32 (3.8%)**	**17 (1.6%)**	**16 (1.5%)**

3.1.7 Table 2 demonstrates that HGV flows have changed very little in the intervening period and whilst there are some detail changes on certain arms there is no particular trend showing a significant increase or decrease since 2007.

3.1.8 Queue length surveys were also carried out during the September 2012 surveys to provide a benchmark against which to calibrate the junction models in the existing situation. Observed queues around the Cangle junction were slight during the surveys and are provided in the following table (mean values and standard deviation (SD)).

Table 3 : Observed Queue Lengths : Cangle Junction 2012

Approach	AM Peak Ave	AM Peak SD	PM Peak Ave	PM Peak SD
Wratting Road (both lanes)	**1.83**	**2.27**	**2.08**	**1.24**
Lords Croft Way	**1.58**	**1.64**	**2.33**	**1.60**
Queen Street	**1.67**	**1.14**	**1.00**	**0.82**
Withersfield Road	**1.92**	**2.35**	**2.42**	**1.84**
Cangle Junction	**0.33**	**0.47**	**0.33**	**0.47**
Minor Access	**0**	**0**	**0.33**	**0.75**
Internal Link Nb (both lanes)	**2.33**	**1.37**	**5.50**	**2.29**
Internal Link Sb	**1.42**	**0.84**	**1.17**	**0.69**

3.1.9 The above table serves to show that the mean queue length observed at the Cangle junction during the surveys is very low on any arm. Thus it can be concluded that the current junction arrangement is operating within capacity at the current time. The standard deviation of the queue length observations is also low which indicated relatively low variability in the queue length data.

3.1.10 To assist with the Air Quality investigations, additional traffic surveys were conducted in March 2013, utilising automatic traffic counters (ATC) in six locations, one on each of the main approaches to the north and south Cangle roundabouts. These counters collected data in hourly summaries over 24hr periods between 8th and 14th March 2013.

3.1.11 These data have been used in the AQ assessment to provide a base for the determination of the effect of increasing traffic flows through the Cangle AQMA resulting from the implementation of Phase 1 of the NW Haverhill development area.

3.1.12 Additionally, they have been used as a sense check to provide a degree of independent validation for the one day manual classified count used in the junction assessment. The following table shows the comparison for the AM Peak hour (0800-0900) and the PM Peak hour (1700-1800) between the manual classified count and the upper and lower range of the ATC.

Table 4 : Traffic Flow Comparison : 2012 Manual vs 2012 ATC

Approach (inbound to junction)	AM Peak			PM Peak		
	ATC Min	Manual Count	ATC Max	ATC Min	Manual Count	ATC Max
Wratting Road	**760**	**878**	**841**	**549**	**589**	**635**
Lords Croft Way	**352**	**357**	**455**	**658**	**764**	**741**
Queen Street *	**32**	**166**	**53**	**35**	**222**	**50**
Withersfield Road	**601**	**608**	**627**	**660**	**742**	**751**
Cangle Junction	*Not observed by ATC*					
Minor Access	*Not observed by ATC*					
Internal Link Nb	**644**	**725**	**705**	**797**	**908**	**922**
Internal Link Sb	**520**	**601**	**555**	**532**	**653**	**642**

3.1.13 The comparison above shows that the manual count lies either within or above the range of the traffic flows observed using the ATC. Thus the manual counts used in the current and future year junction evaluation can be seen to present a robust picture in terms of current traffic flows around the Cangle junction.

3.1.14 On Queen St., the ATC was actually located on Lower Downs Slade and thus did not pick up the westbound service traffic using the otherwise pedestrianised Queen Street outside of the hours of 1000hrs and 1600hrs (nb – between the hours of 1000 and 1600 Queen Street is closed to all traffic). The information used in the AQ assessment has been adjusted to take account of the 'missing' traffic in the ATC data.

3.2 Accident Data

3.2.1 Contemporary road traffic accident data was obtained from Suffolk County Council for the latest five years for roads within Haverhill. This data was used to provide comparison with the original RTA data used in the TA and to identify any significant change in accident risk between the two datasets.

3.2.2 The 2009 TA considered the most recent three years of data and focussed specifically on the area around the Wratting Road/ Ann Suckling Road junction and the Withersfield Road/ Howe Road junction. The assessment in this TAA replicates this method for the current dataset and draws conclusions about any changes in accident characteristics over this time.

3.2.3 The 2009 TA concluded that the data showed no significant trends and stated that '... there are no repetitive types of accidents that are apparent or could be resolved by introducing specific measures.'

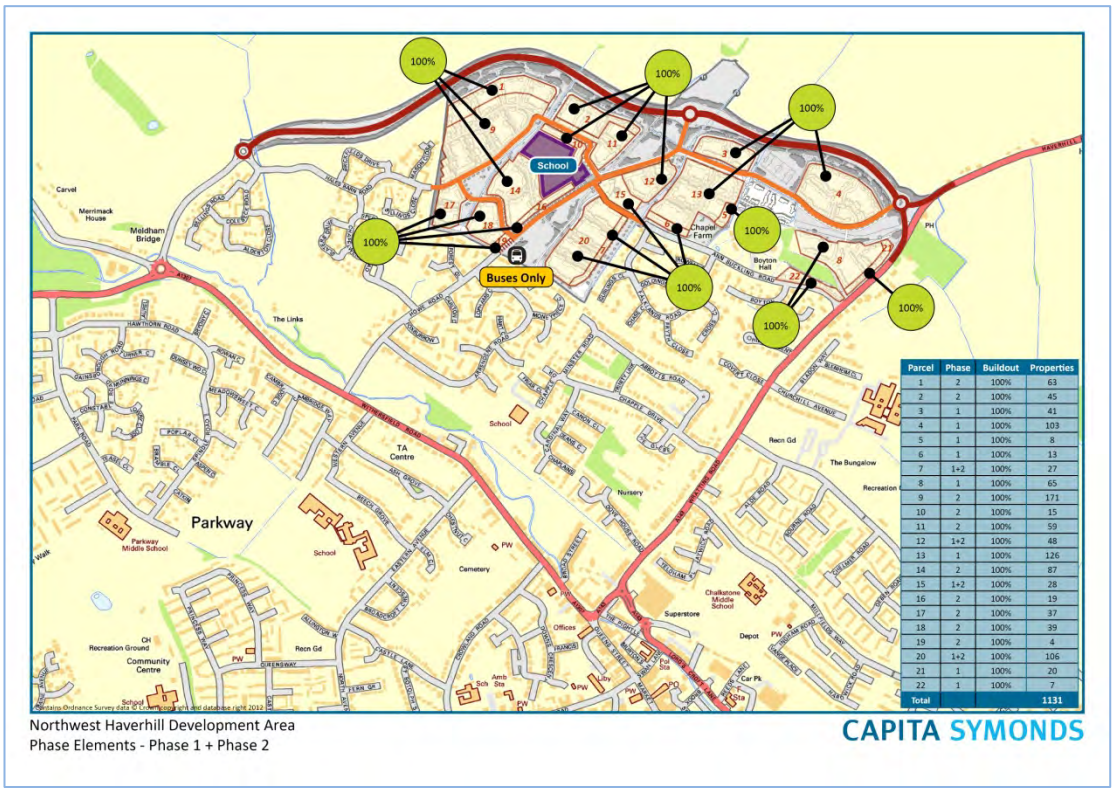
3.2.4 Accidents are discussed further in Section 7 below.

4. Development Phasing

4.1 Development Overview

4.1.1 The NW Haverhill development area comprises a primarily residential development of some 1150 units, plus a single form entry Primary School and village centre development with small scale retail units.

4.1.2 The development is largely serviced via Wratting Rd in the east and Withersfield Rd in the west and access is further enhance through the provision of a NW Haverhill Relief Road linking the west and east connection points. The development masterplan is shown schematically on Figure 3.



Parcel	Phase	Buildout	Properties
1	2	100%	63
2	2	100%	45
3	1	100%	41
4	1	100%	103
5	1	100%	8
6	1	100%	13
7	1+2	100%	27
8	1	100%	65
9	2	100%	171
10	2	100%	15
11	2	100%	59
12	1+2	100%	48
13	1	100%	126
14	2	100%	87
15	1+2	100%	28
16	2	100%	19
17	2	100%	37
18	2	100%	39
19	2	100%	4
20	1+2	100%	106
21	1	100%	20
22	1	100%	7
Total			1131

Figure 3 : Development Masterplan - Schematic

4.1.3 The development also enjoys full all-mode access via Hales Barn Road and Ann Suckling Road and car free access via Howe Road. The Howe Road access provides gated access for buses and open access for pedestrians and cyclists.

4.2 Development Phasing

4.2.1 It is proposed to phase development of both the residential area and the Relief Road and where the proposed phasing is still subject to debate and finalisation, it is assumed in this TAA that the first phase of the development will comprise development to the east together with the eastern part of the Relief Road, from Wratting Road to the intermediate roundabout.

4.2.2 The proposed phasing plan is shown schematically in Figure 2.

4.2.3 The first phase of development will comprise, it is proposed, the construction and occupation of approximately 460 dwellings, together with the Primary School and the village centre. These properties will be served via Wratting Road, either through use of the secondary development streets, Ann Suckling Road or the new eastern section of the NW Haverhill Relief Road.

4.2.4 In addition to the all-mode accesses listed above there will also be bus-only access via a gated link to Howe Road. Additionally, there will be a number of pedestrian and cycle access points to facilitate linkages to the existing and proposed town-wide infrastructure proposed as part of the Implementation Plan for Suffolk CC's Local Transport Plan (2011 to 2031). An extract of this document is shown at Figure 4.

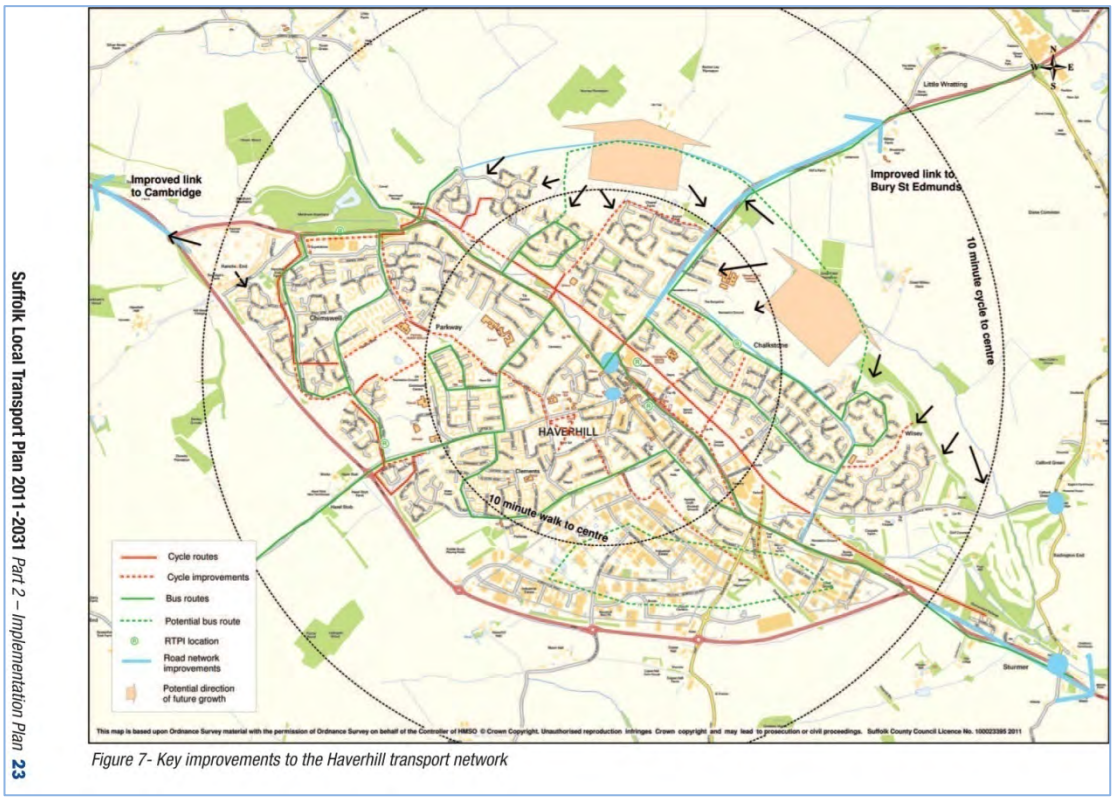


Figure 4 : Extract SCC LTP3 - Haverhill Implementation Plan

4.2.5 Proposed inter-connecting points are shown as black arrows on the plan at Figure 4. These represent pedestrian and/or cycle links between proposed development areas and the existing (or proposed) infrastructure. These links and others are discussed in later sections.

5. Sustainable Travel

5.1 Existing Infrastructure

Public Transport

5.1.1 Existing public transport facilities in Haverhill are identified on <table??>>. The main routes, shown schematically, are shown on Figure 5, extracted from the Suffolk CC Bus Timetable Leaflet for Haverhill.

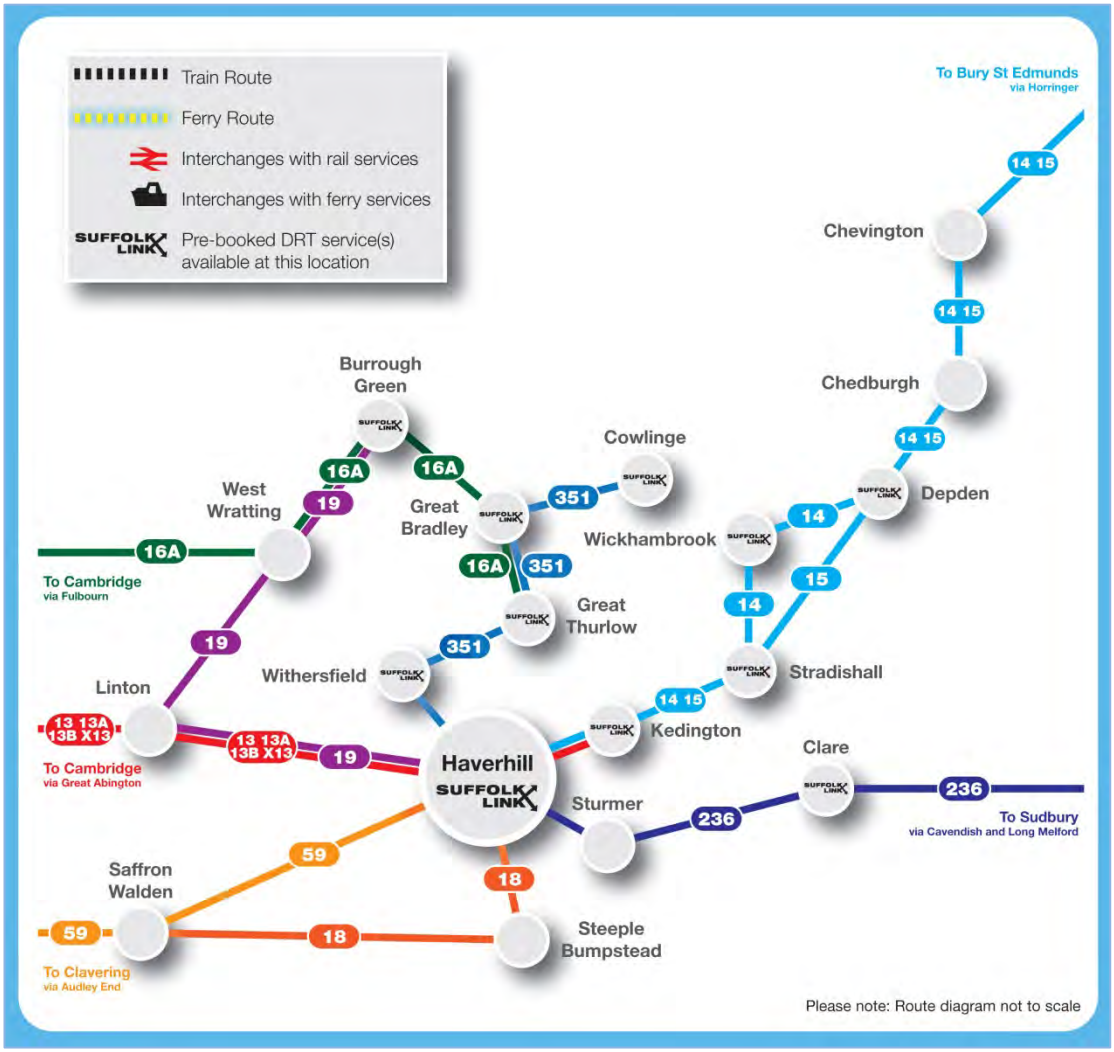


Figure 5 : Haverhill - Main Bus Routes and Services

5.1.2 Of these trunk services only the 13 (and derivatives), 351, 14 and 15 pass close to the development site, meaning that longer distance direct services are only practicable to and from Cambridge and intermediate locations and Bury St. Edmunds and intermediate locations. All other destinations require an interchange.

5.1.3 Nonetheless, these and other intra-town services in proximity to the development do provide access to a wide range of destinations within Haverhill itself including shopping, leisure, education and employment locations. These include, particularly, the 348 and 350 services, serving the town centre and Abbotts Road and Howe Road, respectively.

5.1.4 These and other bus routes within Haverhill are shown on Figure 6.

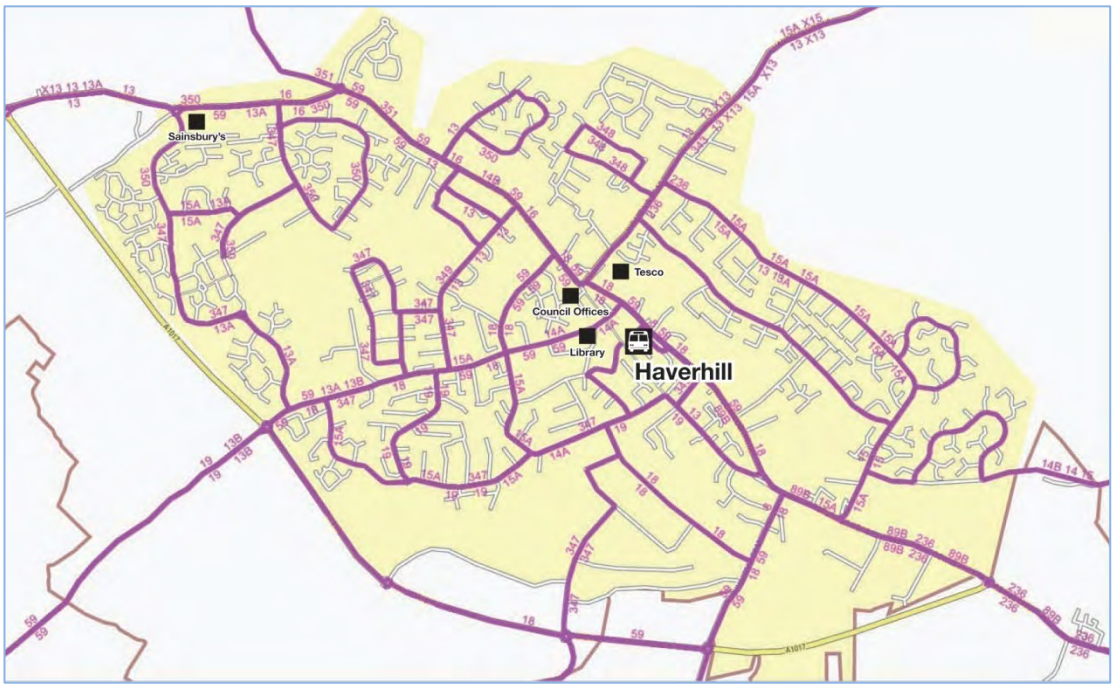


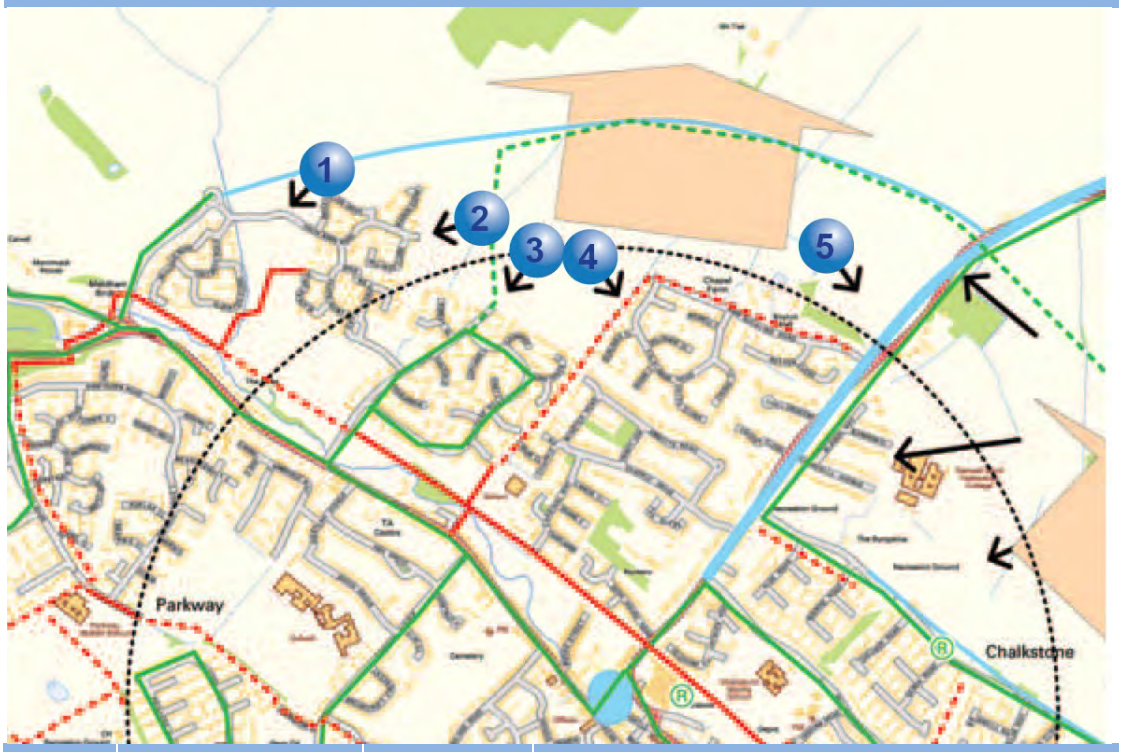
Figure 6 : Bus routes and services within Haverhill

5.1.5 In combination, these existing bus services provide a broad ranging opportunity for bus use in the vicinity of the development. Connections provided for bus movement into the development, via Howe Road, will enable direct access to bus services from much of the residential area. Additionally, pedestrian access between the development and surrounding areas, enable access to peripheral bus routes on Abbotts Rd and Wratting Road (see following paragraphs).

Pedestrian and Cycle Facilities

5.1.6 The following table draws on the aspirations of the Suffolk CC LTP3 implementation plan and demonstrates that the expectations of the County Council can be met by the development proposals in all respects.

Extract from Suffolk CC LTP3 (2011-2031) Implementation Plan



Link	Connected to?	By mode?	Comments
1	Hales Barn Road (HBR)	None	Outside scope of development
2	Hales Barn Road	Cycle, Peds	NMU modes only
3	Howe Road	Bus, Cycle, Peds	Bus gate (rising bollard?) and NMU modes only
4	Ann Suckling Road (ASR)	All	Direct street link to ASR for all movements
5	Wratting Road (WR)	All	Link via new development streets to WR for all movements.

5.1.7 In addition, the preliminary masterplan allows for several additional pedestrian and cycle connections into the surrounding developed areas to support and improve permeability through and into the new development.

5.1.8 These additional links include for the continuation of the foot/cycleway between Sperlings Drive and Howe Road, the maintenance of the footways leading from Ganwick Close, Abbotts Road and Gurlings Close and continued inter-connectivity with links adjoining Ann Suckling Road.

5.1.9 These linkages, together with existing and proposed SCC LTP3 schemes are shown on Figure 7.

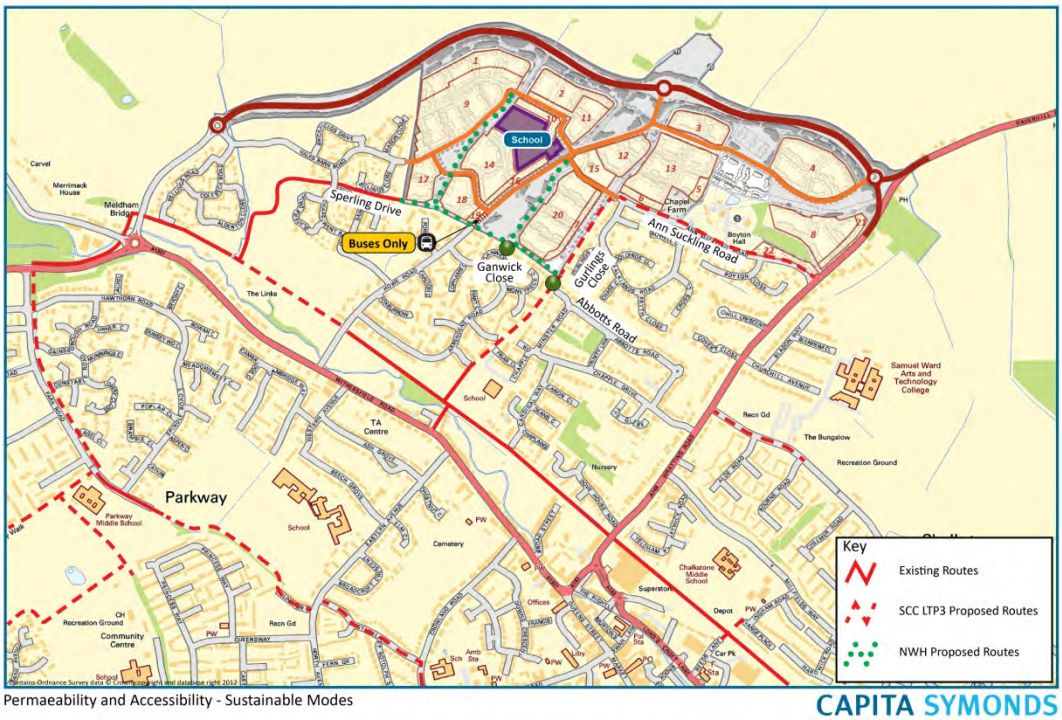


Figure 7 : Permeability and Accessibility for Sustainable Modes

5.1.10 Together with the existing routes and those promoted under LTP3 (2011-2031) the proposed routes provide a comprehensive network of east-west and north-south pedestrian and cycle routes for both existing communities and for the new development.

6. Junction Assessment

6.1 Overview

6.1.1 As outlined in the introduction to this report, the quantum of development within Phase 1 of the NW Haverhill development is, broadly, set by the ability of the Cangle junction to accommodate additional traffic, prior to the completion of the NW Haverhill Relief Road.

6.1.2 The assessment of the Cangle junction(s) – both north and south roundabouts – is based on the calculation of operational capacity of the junction using the TRL software analysis tool ARCADY8. In discussion with Suffolk County Council is was agreed that the northern junction should be considered as a standard roundabout, whereas the southern junction should be regarded as a mini-roundabout (unkerbed island).

6.1.3 In order to gauge the level of development possible, ARCADY8 was to be run successively until the maximum RFC (the ratio of flow to capacity of any one roundabout arm) reached and yet was no greater than 0.95; i.e. displayed at least 5% spare capacity.

6.1.4 The base traffic information was derived from the contemporary manual classified count undertaken on 27th September 2012 – see section 3.1 and Appendix <?>.

6.1.5 The geometric parameters of the junction were obtained from direct measurement from the OS Mastermap baseplans showing the current configuration of the Cangle mini-roundabout (the southern roundabout) and the Tesco small roundabout (the northern roundabout).

6.1.6 The trip generation and trip distribution of the proposed NW Haverhill development to be used in the TAA are the same as those used and agreed in the 2009 TA. This is confirmed by reference to Figure 1.

6.1.7 These factors have been applied incrementally to a range of housing configurations to derive the final traffic flows generated by Phase 1 of the development as previously described.

6.1.8 This has used a provisional yet realistic range of building densities, parcel sizes and buildout rates that accord with the preliminary masterplan that forms part of the Planning Application.

6.1.9 These features are described in further detail below.

6.2 Junction Geometric Parameters

6.2.1 The geometric parameters of the two roundabouts under scrutiny have been agreed with Suffolk County Council and are shown below.

6.2.2 These parameters are entered directly into ARCADY8 and form the basis of the uncalibrated capacity calculations for each arm of each junction.

6.2.3 For the northern roundabout (standard configuration) the geometric parameters are referenced to six key measurements relating to the junction as a whole and individual arms, as follows:

- The entry width (E), perpendicular to the direction of traffic flow;
- The approach half-width (v), being half the width of each approaching arm;
- The flare length (l'), a measure of the distance over which the widening (v) to (E) takes place;
- The inscribed circle diameter (D), the diameter of the roundabout at the entry point;
- The entry radius (r), the radius of the kerbline at the entry point into the roundabout; and
- Φ (Greek PHI); the angle of entry into the roundabout.

Table 5 : Cangle North Geometric Parameters (standard roundabout)

Arm	v	E	l'	r	D	PHI Φ	Exit Only
A	3.50	7.20	8.60	20.00	29.00	9.00	False
B	3.80	5.50	5.50	15.00	29.00	23.00	False
C	6.30	6.50	3.00	15.00	28.00	40.00	False

6.2.4 For the southern roundabout (mini-roundabout configuration), the geometric parameters are different from those used in the standard configuration and comprise:

- The approach half-width (v), being half the width of each approaching arm;
- The entry width (E), as above;
- The minimum approach half width (V_m), is the narrowest section of lane on the approach within 100m of the junction;
- The effective flare length (l'_m), as above but from (V_m) to (E);
- The distance to the next arm (A_n), the physical distance between central splitter islands from one arm to the next;
- The entry corner kerbline distance (K), measured along the kerb line between the entry point and the next exit; and
- The approach gradient (G_{50}), the average gradient on the last 50m of approach to the junction.

Table 6 : Cangle South Geometric Parameters (mini-roundabout)

Arm	v	V_m	E	l'_m	A_n	K	G_{50}	Kerbed island
A	5.50	5.50	5.50	0.00	18.00	10.00	0.00	False
B	3.70	3.70	3.70	0.00	16.00	11.00	0.00	False
C	3.00	3.00	4.50	13.00	17.00	10.00	0.00	False

6.3 Base Traffic Flow Data

6.3.1 As described previously, the base traffic information was obtained from a manual classified turning count of the two Cangle junctions carried out on our behalf on 27th September 2012. The junction and the arms observed are shown in Figure 8. Clearly the base image (taken from Google by the survey contractor) shows the situation during construction of the Tesco roundabout. Whilst The Pightle is identified as a live arm on the image it is evident from the data that it is no longer in use at the time of the survey.

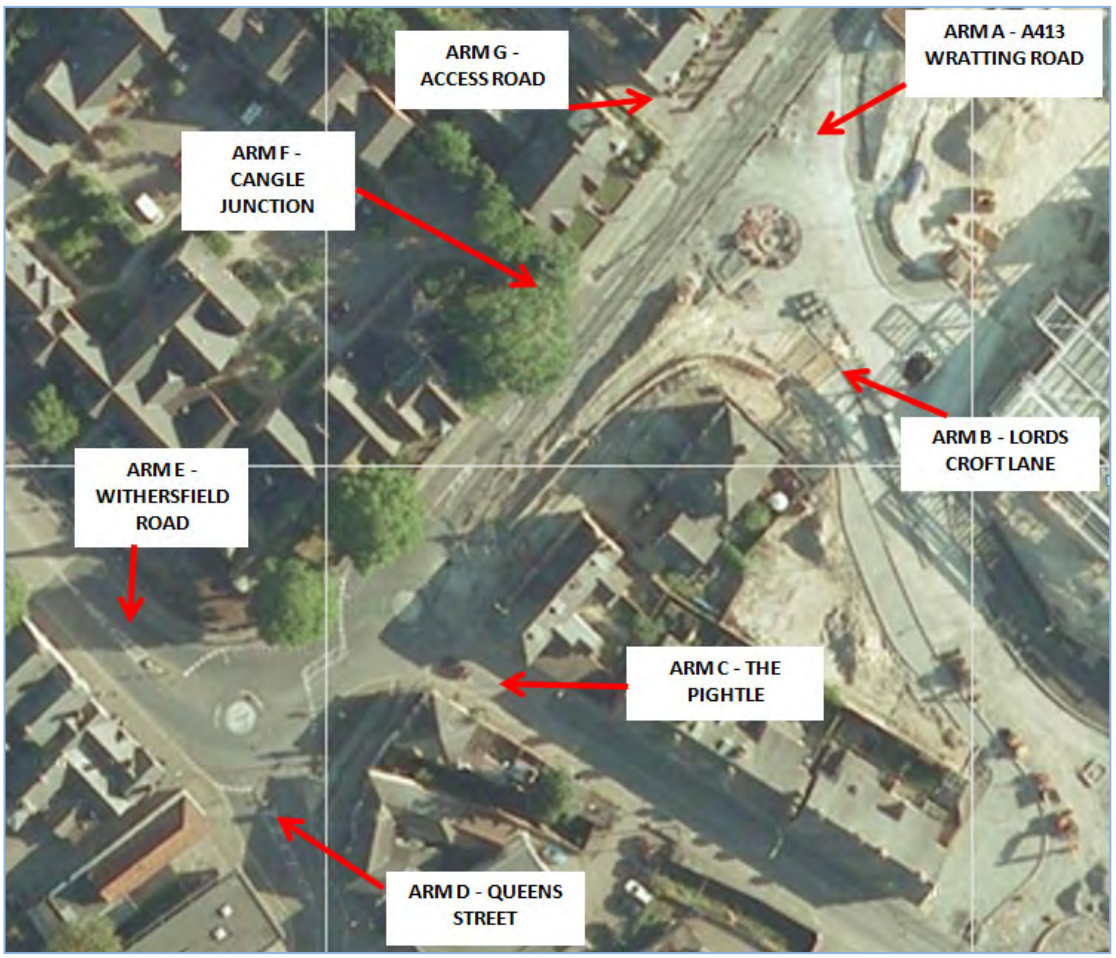


Figure 8 : Cangle Junction Turning Count - Arm Designation

6.3.2 The data was summarised in 15 minute time periods to enable the traffic flows to be input into ARCADY8 in what is termed 'Direct' mode.

6.3.3 The traffic flow observations are summarised in Table 5, below and this table shows the junction inflow from each arm of the roundabout for each 15 minute time segment.

Table 7 : Cangle Observed Traffic Flows

	Recorded Vehicles From Each Arm							
Time Period	A	B	C	D	E	F	G	Total
0700-0715	117	65	0	18	43	1	0	244
0715-0730	129	78	0	29	48	0	2	286
0730-0745	164	84	0	23	117	4	1	393
0745-0800	188	104	0	28	105	3	4	432
0800-0815	183	63	0	35	122	1	2	406
0815-0830	219	95	0	51	165	0	1	531
0830-0845	252	110	1	34	149	2	0	548
0845-0900	224	89	0	46	172	1	1	533
0900-0915	158	103	0	32	121	2	1	417
0915-0930	150	106	0	30	133	2	2	423
0930-0945	146	98	0	45	140	1	1	431
0945-1000	113	95	0	33	132	0	0	373
AM Total	2043	1090	1	404	1447	17	15	5017
1600-1615	145	132	0	36	186	2	1	502
1615-1630	129	130	0	47	168	1	2	477
1630-1645	140	169	0	62	179	1	1	552
1645-1700	188	142	0	53	206	2	0	591
1700-1715	144	217	0	72	183	4	1	621
1715-1730	126	187	0	62	180	4	2	561
1730-1745	152	188	0	65	180	1	2	588
1745-1800	167	172	0	50	199	2	1	591
1800-1815	221	158	0	45	172	2	0	598
1815-1830	119	132	0	40	167	4	0	462
1830-1845	156	126	0	60	186	3	0	531
1845-1900	123	113	0	54	195	2	2	489
PM Total	1810	1866	0	646	2201	28	12	6563

6.3.4 Analysis of the data shows the AM and PM peak periods to be 0745-0915hrs and 1645-1815hrs, respectively.

6.3.5 Review of the data shows that, whilst there is a general increase in traffic flow during each of the peak periods as compared to the three hour observation, there is no identifiable peak within the peak. Rather, the traffic flow fluctuates throughout the peak period and peaks on the various arms do not necessarily coincide.

6.3.6 This is an important consideration when translating the data for input into ARCADY, as ARCADY, by default, assumes that the traffic flow profile over the peak period has an internal peak. This can overestimate the demands on the roundabout if the flow profile is substantially different from this default pattern, as in this case.

6.4 Base Year Assessment (2012) and Calibration

6.4.1 The junction parameters, the geometric data and the base year (2012) traffic data was input into ARCADY8 and run to obtain initial output against which observed queue lengths could be compared. This provides a degree of calibration to illustrate that the base ARCADY geometry reproduced comparable queues when run with current traffic data.

6.4.2 Note that observed queues at the Cangle junction were slight on the day of the survey and that the survey day counts have been independently validated against the later ATCs and found to be representative. Thus, we were not expecting the ARCADY results to demonstrate any significant queues using observed 2012 traffic flows. It is our view that the queuing witnessed at the Cangle junction on the survey day was no more than would be expected at any similar junction operating within capacity.

6.4.3 The results of the base year assessment (2012) for each of the north and south junctions are shown in Table 6 and Table 7.

Table 8 : North Junction queue length calibration

North Junction						
Arm	AM RFC	AM Q	Obs Q	PM RFC	PM Q	Obs Q
Wratting Road *	72%	2.5	0.9	65%	1.8	1.0
Lords Croft Lane	39%	0.6	1.6	70%	2.3	2.3
NB Link *	49%	1.0	1.1	62%	1.6	2.7
* per lane						

Table 9 : South Junction queue length calibration (prior to adjustment)

South Junction						
Arm	AM RFC	AM Q	Obs Q	PM RFC	PM Q	Obs Q
Withersfield Road	83%	4.3	1.9	97%	11.0	2.4

South Junction						
SB Link	104%	17.6	1.4	111%	32.1	1.2
Queen Street	42%	0.7	1.7	66%	1.8	0.8

6.4.4 The above comparison demonstrates that the ARCADY northern junction model (standard roundabout) is performing reasonably well in reproducing queuing at the junction. With such small queues and a system operating within capacity as this junction seems to be, it is considered unreasonable to expect any greater degree of similarity in the results.

6.4.5 However, the southern junction model (mini-roundabout) calibration is poor with queuing, particularly on the southbound link between the roundabouts, where modelled queues are far in excess of those observed during the surveys. This discrepancy is also apparent on the eastbound Withersfield Rd arm.

6.4.6 A junction model so far out of calibration is not suitable for the accurate assessment of future year flows, without some adjustment to entry capacity. ARCADY allows capacity corrections to be made to enable the modelled data to more accurately reflect observed behaviour. These factors are applied globally to ensure that all periods modelled are subject to the same adjustment.

6.4.7 It has been found (through repeated adjustment) that the following capacity correction factors, equally applied to AM and PM period models, produce results that are far closer to observed results than is the case with the unadjusted model.

Table 10 : Cangle South - Calibration Adjustment

Arm	Capacity Adjustment (pcu.min)
Withersfield Road	4.0
SB Link	9.0
Queens Street	2.0

6.4.8 The revised (calibration adjusted) models were rerun with the same traffic inputs and geometric parameters and the following results obtained. It can be seen that the adjusted model calibration is much closer to observed queues than was previously the case.

Table 11 : South Junction queue length calibration (with adjustment)

South Junction						
Arm	AM RFC	AM Q	Obs Q	PM RFC	PM Q	Obs Q
Withersfield Road	65%	1.8	1.9	76%	3.0	2.4
SB Link	59%	1.4	1.4	63%	1.6	1.2

Queen Street	34%	0.5	1.7	54%	1.2	0.8

6.4.9 Given this assessment, it is deemed that the ARCADY models are suitable for the assessment of future year delays and queues at the Cangle junction either with or without added development related traffic.

6.5 Future Year (2103 & 2018) Assessment

6.5.1 In carrying out future year assessments the base year 2012 background traffic flows need to be 'growthed' to each respective future year. In addition, development related traffic needs to be assessed for 2018 to provide data for the 'with development' scenario.

Background Traffic Growth

6.5.2 Background traffic growth is determined by reference to TEMPRO – a national traffic growth model managed by the Department for Transport to enable district level growth to be estimated and applied to observed traffic.

6.5.3 TEMPRO 6.2 was used to derive average weekday origin-destination growth for Haverhill (car driver only) and this was found to be 1.0043 for 2013 and 1.0660 for 2018, when adjusted to accord with the NTM (National Traffic Model) forecast (as recommended).

6.5.4 These factors were applied to the 2012 observed traffic flows to derive future year background traffic flows in each case.

Development Traffic Flows

6.5.5 A review of the SCC synopsis (Figure 1) shows that it has been agreed that, for consistency, trip generation and distribution for the proposed development should be in line with those used in the 2009 TA.

6.5.6 Reference to the 2009 TA shows that trip generation is based on a multi-modal traffic count of the development served by Ann Suckling Road. These trip rates are shown in Table 10.

Table 12 : Development Trip Rates (2009 TA - para 7.11))

Peak Period	Inbound	Outbound	Total
AM peak (0800-0900)	0.123	0.400	0.523
PM Peak (1700-1800)	0.430	0.247	0.677

6.5.7 Trip Distribution is similarly outlined in the 2009 TA and is shown in Table 11.

Table 13 : Trip Distribution (2009 TA - para 7.15)

Destination	Percentage
North via Haverhill Road Bury St. Edmunds and local)	8%

Destination	Percentage
East via The Pightle (sic)/ Lords Croft Lane (Colchester and local)	39%
West via A1307 (Cambridge, Haverhill South)	53%
Total	100%
Note 1. The same assignment is assumed for inbound traffic to the Development	

6.5.8 These trip rates and trip distributions have been applied to the phase 1 development to determine inbound and outbound traffic generations accordingly, for input into the future year (2018) with development ARCADY assessment. These traffic flows are shown in Figure 9 for each of the three main links surrounding the Cangle junction.

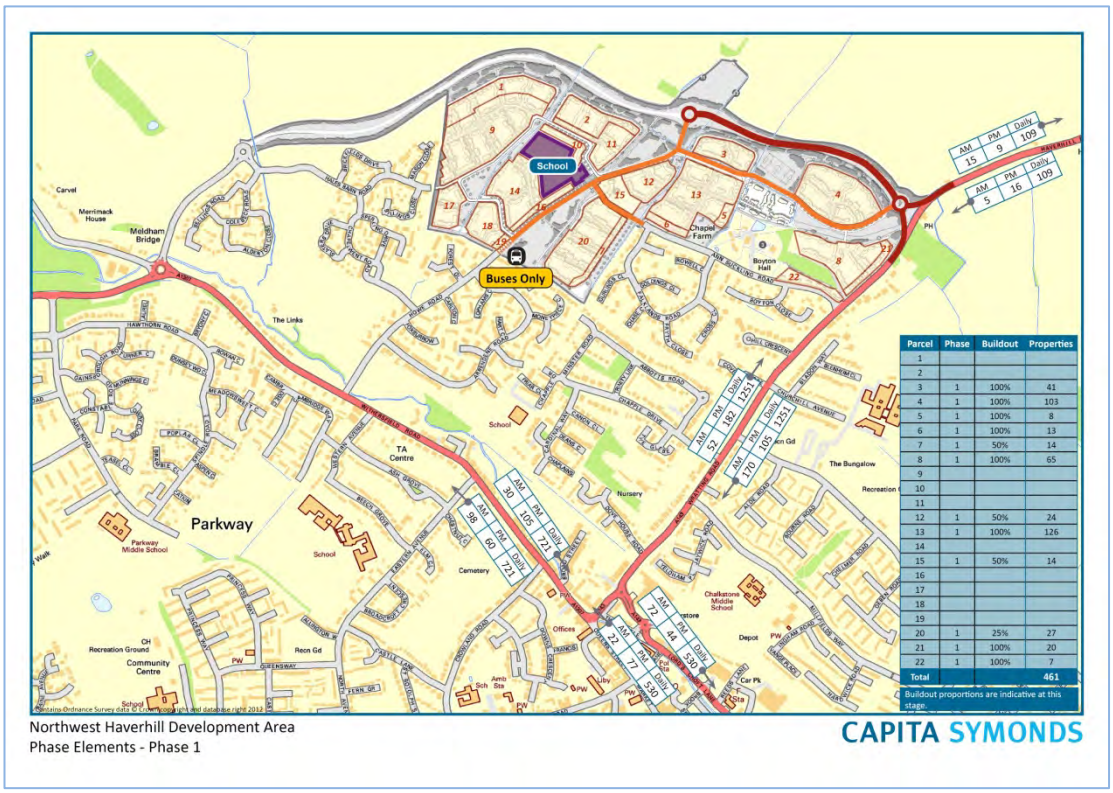


Figure 9 : Traffic Generation - Haverhill Phase 1

6.5.9 The above data was combined and input into future year ARCADY assessments and the results are shown in Table 12 and Table 13.

Table 14 : North Junction - Future Year ARCADY Assessments

North Roundabout		Wratting Road		Lords Croft Lane		NB Link	
Scenario	***Metric***	***AM***	***PM***	***AM***	***PM***	***AM***	***PM***
2013	RFC	73%	65%	40%	71%	50%	62%
	Queue	2.6	1.8	0.6	2.3	1.0	1.6
2018 : without development	RFC	78%	70%	43%	76%	53%	66%
	Queue	3.3	2.3	0.7	3.0	1.1	2.0
2018 : with development	RFC	90%	78%	48%	85%	51%	76%
	Queue	7.5	3.3	0.9	5.0	1.0	3.1

Table 15 : South Junction - Future Year ARCADY Assessments

South Roundabout		Withersfield Road		SB Link		Queen Street	
Scenario	***Metric***	***AM***	***PM***	***AM***	***PM***	***AM***	***PM***
2013	RFC	65%	76%	59%	63%	34%	55%
	Queue	1.9	3.0	1.4	1.7	0.5	1.2
2018 : without development	RFC	70%	81%	63%	67%	37%	61%
	Queue	2.2	4.0	1.6	1.9	0.6	1.5
2018 : with development	RFC	73%	84%	70%	75%	41%	68%
	Queue	2.5	4.7	2.2	2.8	0.7	2.0

6.5.10 The above two tables show that in all scenario the ratio of flow to capacity (RFC) of any arm does not exceed 90% compared with the maximum allowable short-term value of 0.95 requested/ advised by Suffolk County Council.

6.5.11 The analysis thus demonstrates that the Cangle junctions are able to accommodate the expected background traffic plus the generated traffic from Phase 1 of the NW Haverhill development up to and including 5 years post commencement of the development (2013 to 2018).

7. Accident Analysis

7.1 Data Source

7.1.1 Suffolk CC have provided details of the most recent three years of accidents on the roads within Haverhill. The objective is to compare the most recent situation with that reported in the 2009TA to identify whether any significant changes in causation have taken place.

7.1.2 The 2009 TA addressed specifically the junctions of Wratting Road and Ann Suckling Road and Withersfield Road and Howe Road. Accidents were extracted from the then most recent three years of data for any accidents that had occurred within 300m of each junction.

7.1.3 In addition, the TA also sought to compare the local accident rate with that reported in the DfT Transport Statistics publication.

7.1.4 A summary plan, showing all reported accident locations, provided by SCC is shown in Figure 10.

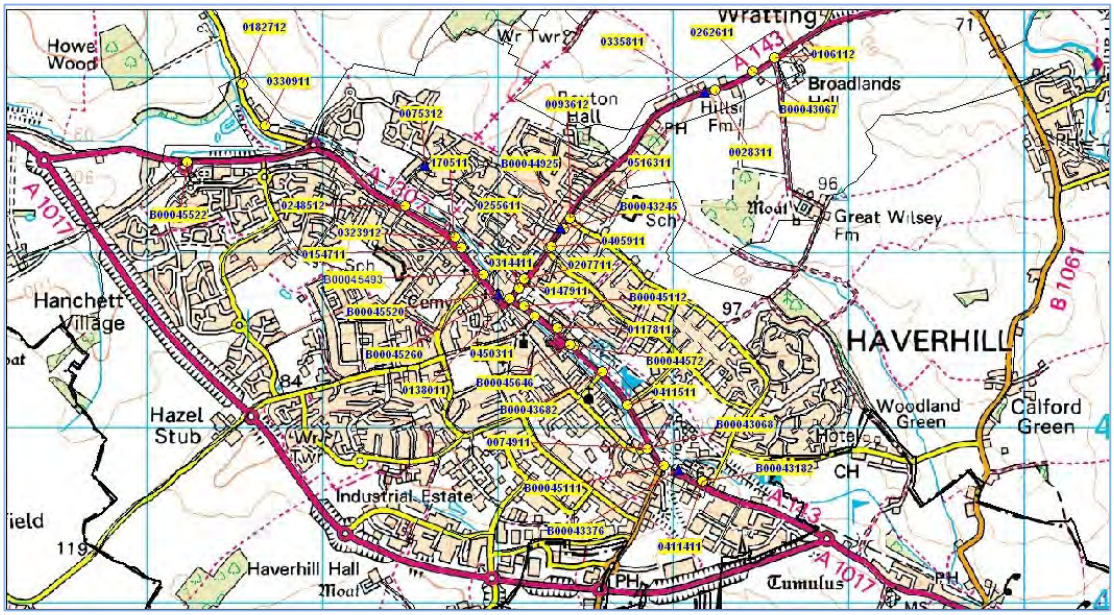


Figure 10 : SCC Reported Accidents Sept 2009 and Aug 2012

7.2 Wratting Road / Ann Suckling Road

7.2.1 Reference to Figure 10 reveals that between Sept 2009 and Aug 2012 no RTA were reported within 300m of the Wratting Road and Ann Suckling Road junction.

7.2.2 The nearest accidents occur at Chalkstone Way, to the south, some 415m distant and adjacent to the property 'Clearview', to the north, some 485m distant.

7.2.3 However for comparison purposes, these accidents have been extracted to provide some indication of the changes between 2009 and the date of this report.

Table 16 : Summary of Accidents at Wratting Road/ Ann Suckling Road Junction

Accident Record No/ Severity	Date	Location	Vehicles	Weather	Description
516311 Slight	12 Dec 2011	U6840 Chalkstone Way Junction with Wratting Road A143	2 Cars	Light Wet	The Driver pulled out of School and collided with a passing vehicle causing minor damage to both Vehicles.
93612 Slight	09 March 2012	Junction of Wratting Rd & Chalkstone Way	Goods <3.5t Car	Dark Dry	Veh 1 was travelling up Wratting Rd, Heading away from Haverhill Town Centre as Veh 1 approached the junction with Chalkstone Way. The driver of Veh 1 had mistaken the Pelican Crossing Green Light Signal for a Traffic Light Controlling a Junction. Veh 1 thought it had priority and went to turn into Chalkstone Way Colliding with Veh 2 which was driving down Wratting Rd heading in the opposite direction to Veh 1.
B00043245 Slight	29 Sept 2009	A143 Wratting Rd S/B, J/W Chapple Drive (U0014)	Car Bus/ Coach	Light Dry	Veh 2 (Bus) travg s.w. on Wratting Rd TwdS Town Centre, Followed by Veh1. Veh2 Slowed down as it approached j/w Chapple drive o/s and ahead. Driver of Veh1 was distracted and failed to see that Veh 2 had slowed down until it was too late. Veh1 braked but hit the rear of Veh 2.
B00044925 Serious	14 May 2010	Chapple Drive (U0015) NR J/W A143 Wratting Rd	M/C >500cc	Light Dry	Veh 1 (m/cycle) travg along Wratting Rd Twds J/w Chapple Drive. Veh1 turned onto Chapple Drive & clipped the n/s kerb causing loss of control. Veh1 went down onto its side trapping the rider's right foot. Rider of Veh1 suffered a broken bone to the Rt ankle.
28311 Slight	19 Jan 2011	A143 Haverhill Rd Approx 45M N.E. of Property Clearview	Goods <3.5t	Light Frost/Ice	Veh1 (Van) Travg s.w. on A143 Twds Haverhill. Veh1 lost control on a right-hand. bend on an icy surface. Veh1 Skidded, Hit the n/s bank, Left the n/s c/way, rolled onto its side, hit a Crash Barrier

Accident Record No/ Severity	Date	Location	Vehicles	Weather	Description
					and came to rest in a field approx 45m n.e. of Property Clearview.
335811 Serious	19 Aug 2011	A143 Haverhill Road Opposite Property Clearview.	Car	Dark Dry	Vehicle1 Travelling along A143 Haverhill Rd, Little Wratting Towards Haverhill and has left the road at the nearside opposite house called Clearview. v1 has gone through a fence and into a field. V1 Driver Provided a Positive Test. V1 Driver suffered serious arm injury that may require amputation.

7.2.4 Reference to the data shows no significant change in accident patterns between the 2009 TA and the 2013 TAA. The absence of report accidents within the 300m area of interest within the current data set simply reflects the normal variability in accidents where there is no specific underlying causation factor.

7.2.5 However, closer inspection of the 2009 data reveals that only one of the four reported accidents in the TA occurred within the 300m area of interest. As with the current data, the others were more distant, in the vicinity of the 30mph sign, to the north, or Chalkstone Way, to the south.

7.3 Withersfield Road / Howe Road

7.3.1 Reference to Figure 10 reveals that between Sept 2009 and Aug 2012 only two RTA were reported within 300m of the Withersfield Road and Howe Road junction. These were accident reference numbers 245512 and 75312 shown in Table 15.

7.3.2 Beyond these, the nearest other accidents occur at Eastern Avenue and beyond, to the east, some 395m distant. There are no report accidents to the west of the Howe Road junction.

7.3.3 However for comparison purposes, these other accidents have been included to provide some indication of the changes between 2009 and the date of this report. These other accidents are highlighted PINK in the following table.

Table 17 : Summary of Accidents at Withersfield Road/ Howe Road Junction

Accident Record No/ Severity	Date	Location	Vehicles	Weather	Description
248512 Slight	25 Jun 2012	At the Junction of Withersfield Rd & Western Avenue	2 Cars	Light Dry	Vehicle 3 was Indicating to turn right into Western Av. Vehicle 2 slowed & stopped but didn't react in time & collided into the rear of V2.Slight injuries were suffered by Driver of V2.
75312 Serious	23 Feb 2012	The U6740 Howe Rd Close to J/w the U6740 Foxburrow Close in Haverhill	Car	Light Wet	Casualty 1 ran out behind witness vehicle in front of Vehicle1 & was struck. Casualty suffered serious injury
323912 Slight	16 Aug 2012	At the Junction of Withersfield Rd, Eastern Avenue	P-Cycle Car	Light Dry	Cyclist was cycling along footpath of Eastern Avenue and at the junction of Eastern Avenue & Withersfield rd, he failed to stop. Vehicle 2 was travg along Withersfield Rd heading towards Cambridge. Cyclist came off path and went into the side of Veh 2
170511 Slight	01 May 2011	Junction of Withersfield Rd & Eastern Avenue	2 Cars	Light Dry	Veh 2 was travelling on Withersfield Rd towards town, Veh 1 was travelling along the same road out of town. Veh 2 slowed to a near stop to pull into Eastern Avenue, which is right, across oncoming traffic. Veh 2 failed to see Veh 1 & collided into the front Offside of Veh 1.
154711 Slight	18 Apr 2011	Withersfield Rd, Haverhill	P-Cycle Car	Light Dry	Vehicle1 A 12 yr old Cyclist, Cycled off Pavement straight into road without looking or warning in front of n/s of v2 which was trvg along Withersfield rd towards Cambridge colliding together. Vehicle 1 driver suffered minor injury to left ankle

7.3.4 Reference to the data shows no specific causation factor that relate the accidents. A significant improvement since 2009 has been the noticeable reduction in pedestrian accidents involving crossing manoeuvres. The 2009 data two of the five accidents recorded involved crossing pedestrians whereas no such accidents have been witnessed in the current dataset.

7.4 Observations

7.4.1 It is apparent from the data that there is no historic evidence to support the existence of any form of accident risk at the Wratting Road/ Ann Suckling Road junction. There have been no reported accidents at this location in either dataset reported in the 2009 TA or the 2013 TAA.

7.4.2 Travelling towards Haverhill there are a number of minor accidents associated with other junctions (Chalkstone Way, Chapple Drive, etc.) but none of these points to any underlying common location specific causation factor.

7.4.3 The 2009 data demonstrated that the accident risk on Wratting Road was lower than the national average for this type of road when compared against national statistics. The current data shows no increase in accident likelihood and this situation therefore pertains.

7.4.4 The data relating to Withersfield Road/ Howe Road shows, if anything , an improving situation with a general reduction in the numbers of accidents, particularly those involving pedestrians, between the 2009 assessment and the 2013 assessment.

7.4.5 Again the local accident rate on Withersfield Road has been found to be lower than the national average in the 2009 TA and this situation is unchanged or marginally improved in the 2013 TAA.

8. Conclusions

8.1.1 The traffic flow data collected as part of the work leading to the production of this TAA has shown that the traffic volumes in Haverhill in the vicinity of the Cangle junction have increased only marginally in the five years between the two traffic counts. The data comparison shows a 6.9% increase in the AM period and a 5.4% increase in the PM period.

8.1.2 The data collected in 2012 shows that the peak periods do not display any significant peakiness in the data. Rather the traffic flows fluctuate throughout the 90 minute peak periods modelled by the assessment software. This has the effect of 'flattening' the traffic flow profile over the modelled period.

8.1.3 The queue length data collected in 2012 shows no significant queuing at the time of the survey. The manual count has been compared with independent automatic traffic count data and found to be representative, lying within the spread of the ATC data or above it. The manual count data is therefore deemed to be robust.

8.1.4 The ARCADY base year (2012) assessment has been calibrated against observed queues and is considered suitable for use in the assessment of future year traffic flows, both with and without additional development traffic.

8.1.5 The ARCADY models have been run for a future year scenario five years post assumed start of construction (2018) and the Cangle junctions have been found to operate satisfactorily under all scenario.

8.1.6 The peak RFC (ratio of flow to capacity) on any arm has been shown to be less (maximum of 90% - Northern junction, Wratting Road, AM Peak 2018 with development) than the target maximum figure of 0.95 (95%) that has been agreed as the benchmark against which the future performance of the junction should be judged.

8.1.7 The future year with development scenario (in 2018) is based upon the construction and occupation of approximately 460 units all served via Wratting Road. The traffic generation and trip distribution has been based on parameters and statistics within the 2009 TA as agreed.

8.1.8 Background traffic growth has been based on the National Trip End Model (TEMPRO v6.2) for Haverhill (adjusted to accord with the national Traffic Model (NTM)). Background traffic growth has been calculated to be 1.0660 between 2012 and 2018.

8.1.9 Recent accident data has been obtained from SCC for routes within Haverhill and compared with that in the 2009 TA. The 2009 TA undertook comparisons at Wratting Road/ Ann Suckling Way and Withersfield Road/ Howe Road. In either case, the current accident situation is improved upon that recorded in 2009. Thus the conclusions reached in the 2009 TA remain valid.

8.1.10 The 2013 TAA has reviewed the SCC LTP3 (2011-2031) implementation plan and demonstrated that the proposed sustainable travel measures proposed for the NW Haverhill Development Area align with and enhance those aspirations embodied in LTP3. The development provides for significant inter-linkage of pedestrian and cycle improvement measures and brings benefit to both the new proposed development and existing surrounding residential areas.

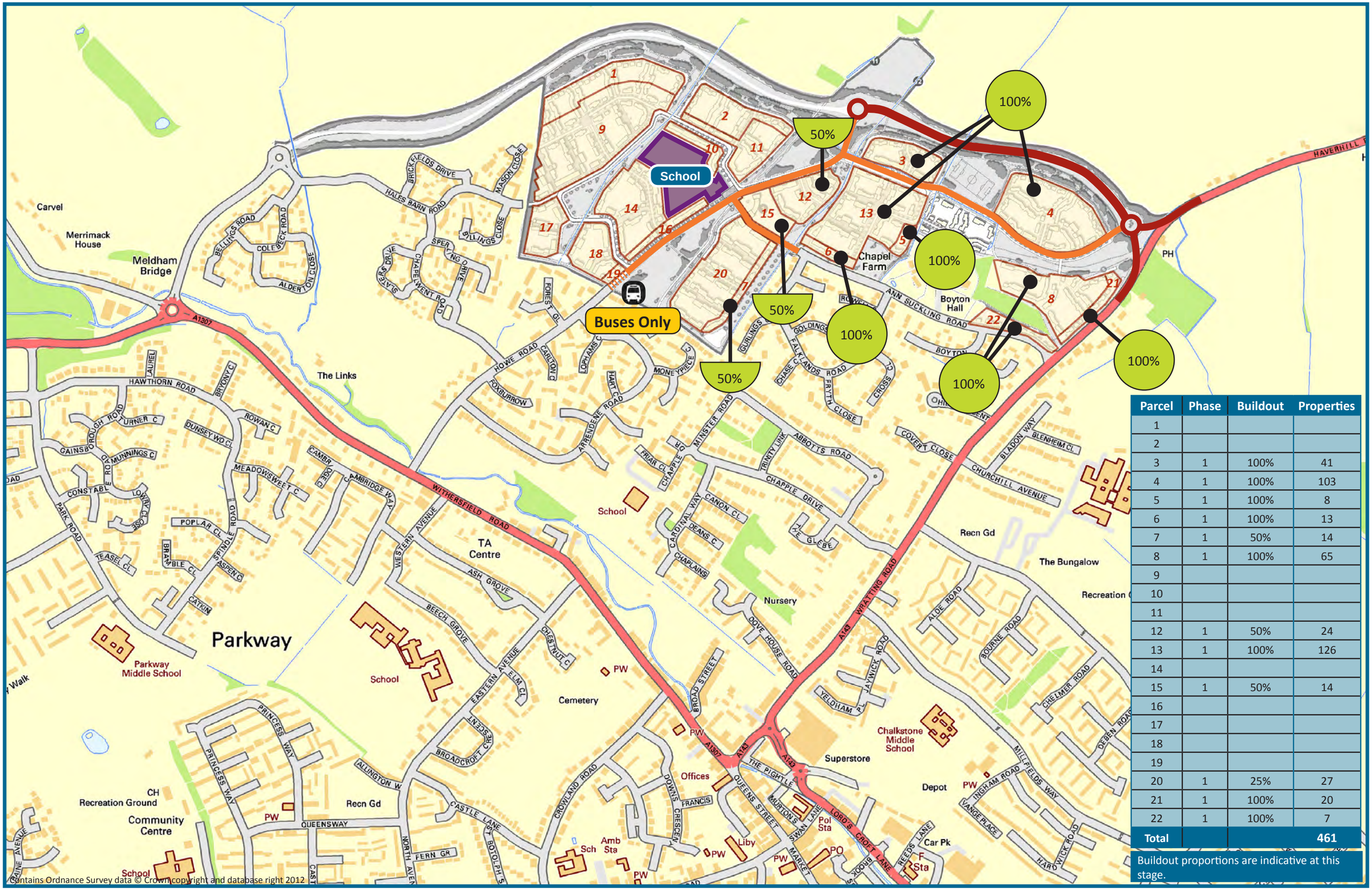
8.1.11 The 2013 TAA also shows that potential bus integration with the development is provided through direct linkage for bus services and by providing enhanced pedestrian movement between the development and existing public transport corridors.

Appendix A
Suffolk CC TAA Requirements

Northwest Haverhill Reports

	Title	Findings
Mar-09	Design Summary Revision D (relief road)	Design Speed of 50mph Speed limit to be applied 3 steps below in some places Street Lighting will be provided Superelevation is reduced from 7% to 2.5% to discourage inappropriate speed Extensive footway and cycle provision in site --> "minimise necessity along the relief road" BOAT to be diverted, and a subway provided
Apr-09	Design and access statement (Master Plan)	Relief Road to be provided Possible access from Ann Suckling Road, Howe Road and Hales Barn Road; they will be either for all road users, or bus/ped/cycle only
Apr-09	Transport Assessment (MLM for Bidwells) Note that this TA had vehicles on Howe Road and Ann Suckling Way	Development: 1,150 dwellings, school, local centre, POS Suffolk County Council Traffic counts, A1017 Erinhiser / Manor 2006, Wrattign Way / Hill Cresent 2007, A1307 Withersfield Road 2006 New traffic counts: July 2007, Cangle + many others 200 houses BEFORE relief road envisiged. Equal split east and west of development Additional connections to Ann Suckling, Hales Barn and Howe Road Only Howe Road will have a bus gate Relief Road could divert between 50-75% of traffic from Withersfield Road. 50% has been used in TA Development flows 2019, 602+777 Assignments: North 8% Bury St Eds, East 39% Colchester, West 53% Cambridge Cangle: 2019 Do nothing, RFC 1.135 and 1.596, Queues 50 and 322 Cangle: 2019 Relief Road and Development RFC 0.820 and 1.154 and Queues 4.2 and 60 Cangle: 2019 Relief Road and Development reduction in traffic 30% Tesco main: Slightly over capacity in 2019 do nothing Tescco main: Similar in 2019 RR +development Hanchet End RA: RFC 0.836 & Queue 5 Hanchet End RA: 30% additional traffic 1100 - 1400ish AM and 1200 - 1600is PM Howe Road: reduced traffic on Withersfield Road because of relief road helps.
Nov-10	Network Capacity Report (Bidwells)	Report to show changes to the town (Tesco) and the downtown (reduced growth) Traffic Survey July 2010 (ANPR): Both roundabouts Review effect of 300 houses without relief road Same trip rates as before (comparison provided which shows little difference) Assignments also the same (8/39/53) Assessment year is 2013 South junction: Base.. RFC 0.839, Q5 AM, 0.898, Q7 PM 2013.. RFC 0.855, Q5 AM, 0.914, Q8 PM +dev.. RFC 0.949, Q11.5 AM, 0.973, Q15 PM Tesco: Fine (0.828 + 4.6 in 2013 +dev) PM ARCADY TESCO +DEV Flows are incorrect (too high).
		Requirements of Addendum
TBC	Addendum to TA This is assuming that the existing application continues, that the relief road is still constructed around the site as a 50mph road as previously described	Construction start date to be clarified Assessment year for the first phase (two areas of houseing, one from the east of the site and one from the west) to be start date plus five years Refer to the new LTP3 program of works - to join the site to the current cycle/pedestrian improvement schemes Carry out HGV traffic count at the Tesco and Cangle roundabouts: to ascertain the current HGV levels and compare against previous flows Carry out up to date review of collisions resulting in road casualties Provide ARCADY model for the assessment year with the first phase (two areas of housing, one from the east of the site and one from the west) Previously agreed TRIP rates and dsitrubutions to be used The exact number of houses to be determined by the model: RFC to be no more than 0.95% The requirements of the Travel Plan (cycle/bus/pedestrian improvements) to be detailed.

Appendix B
NW Haverhill Development Phasing

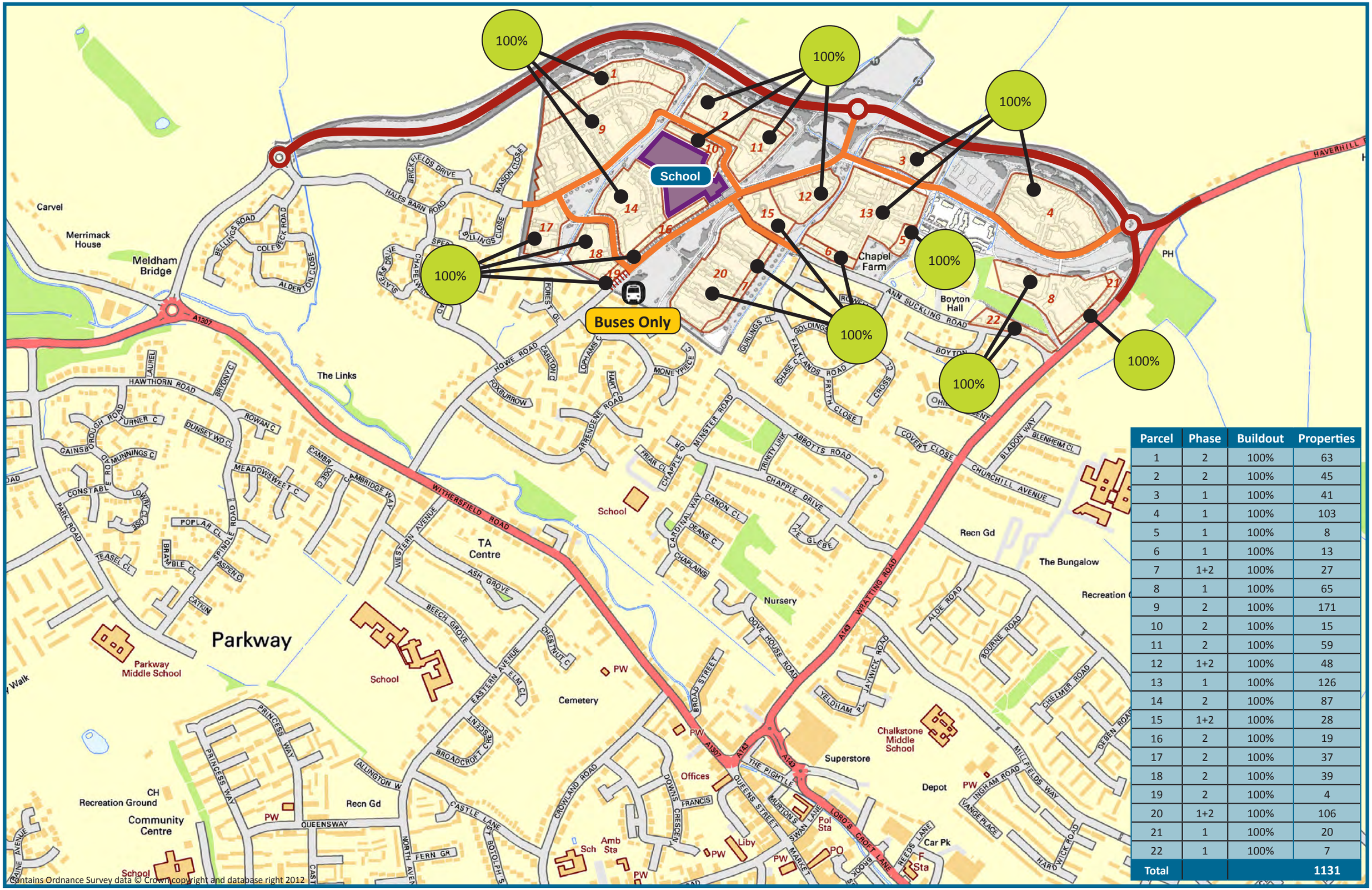


Parcel	Phase	Buildout	Properties
1			
2			
3	1	100%	41
4	1	100%	103
5	1	100%	8
6	1	100%	13
7	1	50%	14
8	1	100%	65
9			
10			
11			
12	1	50%	24
13	1	100%	126
14			
15	1	50%	14
16			
17			
18			
19			
20	1	25%	27
21	1	100%	20
22	1	100%	7
Total			**461**

Buildout proportions are indicative at this stage.

Northwest Haverhill Development Area
Phase Elements - Phase 1

CAPITA SYMONDS



Parcel	Phase	Buildout	Properties
1	2	100%	63
2	2	100%	45
3	1	100%	41
4	1	100%	103
5	1	100%	8
6	1	100%	13
7	1+2	100%	27
8	1	100%	65
9	2	100%	171
10	2	100%	15
11	2	100%	59
12	1+2	100%	48
13	1	100%	126
14	2	100%	87
15	1+2	100%	28
16	2	100%	19
17	2	100%	37
18	2	100%	39
19	2	100%	4
20	1+2	100%	106
21	1	100%	20
22	1	100%	7
Total			1131

Northwest Haverhill Development Area
Phase Elements - Phase 1 + Phase 2

CAPITA SYMONDS

Appendix C
ARCADY Output

Junctions 8

ARCADY 8 - Roundabout Module

Version: 8.0.2.316 [14 Feb 2013]

Filename: Cangle North Standard - AM.arc8
Path: Z:\Projects\CS059139 - NW Haverhill SUE, Savills obo NW Haverhill Consortium\A5 - Technical\Arcady\Direct 90 mins\Arc8 - Revised Assessment May 2013
Report generation date: 03/06/2013 08:12:19

» (Default Analysis Set) - 2012 Existing, AM
» (Default Analysis Set) - 2013 Existing, AM
» (Default Analysis Set) - 2018 Existing, AM
» (Default Analysis Set) - 2018 Existing + Dev, AM

Summary of junction performance

	AM				
	Queue (Veh)	Delay (s)	RFC	LOS	Network Residual Capacity
	A1 - 2012 Existing				
Arm A	2.50	9.28	0.72	A	27 %
Arm B	0.63	5.34	0.39	A	
Arm C	0.98	4.33	0.49	A	[Arm A]

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Network Residual Capacity indicates the amount by which network flow could be increased before a user-definable threshold (see Analysis Options) is met.

'D1 - 2012 Existing, AM " model duration: 07:45 - 09:15
'D2 - 2013 Existing, AM" model duration: 07:45 - 09:15
'D3 - 2018 Existing, AM" model duration: 07:45 - 09:15
'D4 - 2018 Existing + Dev, AM" model duration: 07:45 - 09:15

Run using Junctions 8.0.2.316 at 03/06/2013 08:12:16

File summary

File Description

Title	Haverhill Northern junction - SCC Geometry
Location	
Site Number	
Date	15/11/2012
Version	
Status	
Identifier	
Client	
Jobnumber	
Enumerator	Gus Bradford
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	RFC Threshold	Average Delay Threshold (s)	Queue Threshold (PCU)
10.00		✓	Delay	0.85	36.00	20.00

Units

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

(Default Analysis Set) - 2012 Existing, AM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set (s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
2012 Existing, AM	2012 Existing	AM		Varies by Arm	07:45	09:15	90	15				✓		

Junction Network

Junctions

Name	Junction Type	Arm Order	Grade Separated	Large Roundabout	Do Geometric Delay	Junction Delay (s)	Junction LOS
Cangle North	Roundabout	A,B,C				6.70	A

Junction Network Options

Driving Side	Lighting	Network Residual Capacity (%)	First Arm Reaching Threshold
Left	Normal/unknown	27	Arm A

Arms

Arms

Arm	Name	Description
A	Arm A	Wratting Road
B	Arm B	Lords Croft Lane
C	Arm NB	NB Link

Capacity Options

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

Roundabout Geometry

Arm	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
A	3.50	7.20	8.60	20.00	29.00	9.00	
B	3.80	5.50	5.50	15.00	29.00	23.00	
C	6.30	6.50	3.00	15.00	28.00	40.00	

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

Pedestrian Crossings

Arm	Crossing Type
A	None
B	None
C	None

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Arm	Enter slope and intercept directly	Entered slope	Entered intercept (PCU/min)	Final Slope	Final Intercept (PCU/min)
A		(calculated)	(calculated)	0.670	27.397
B		(calculated)	(calculated)	0.604	23.694
C		(calculated)	(calculated)	0.677	30.982

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

Traffic Flows

Demand Set Data Options

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

Entry Flows

General Flows Data

Arm	Profile Type	Use Turning Counts	Average Demand Flow (Veh/min)	Flow Scaling Factor (%)
A	DIRECT		N/A	100.000
B	DIRECT		N/A	100.000
C	DIRECT		N/A	100.000

Turning Proportions

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

		To		
		A	B	C
From	A	0.000	625.000	590.000
	B	274.000	0.000	290.000
	C	535.000	455.000	0.000

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

		To		
		A	B	C
From	A	0.00	0.51	0.49
	B	0.49	0.00	0.51
	C	0.54	0.46	0.00

Vehicle Mix

Average PCU Per Vehicle - Junction 1 - (07:45-08:00)

		To		
		A	B	C
From	A	1.000	1.054	1.032
	B	1.098	1.000	1.075
	C	1.029	1.018	1.000

Heavy Vehicle Percentages - Junction 1 - (07:45-08:00)

		To		
		A	B	C
From	A	0.000	5.400	3.200
	B	9.800	0.000	7.500
	C	2.900	1.800	0.000

Average PCU Per Vehicle - Junction 1 - (08:00-08:15)

		To		
		A	B	C
From	A	1.000	1.060	1.041
	B	1.118	1.000	1.000
	C	1.034	1.018	1.000

Heavy Vehicle Percentages - Junction 1 - (08:00-08:15)

		To		
		A	B	C
From	A	0.000	6.000	4.100
	B	11.800	0.000	0.000
	C	3.400	1.800	0.000

Average PCU Per Vehicle - Junction 1 - (08:15-08:30)

		To		
		A	B	C
From	A	1.000	1.033	1.021
	B	1.059	1.000	1.091
	C	1.024	1.082	1.000

Heavy Vehicle Percentages - Junction 1 - (08:15-08:30)

		To		
		A	B	C
From	A	0.000	3.300	2.100
	B	5.900	0.000	9.100
	C	2.400	8.200	0.000

Average PCU Per Vehicle - Junction 1 - (08:30-08:45)

		To		
		A	B	C
From	A	1.000	1.024	1.016
	B	1.018	1.000	1.000
	C	1.019	1.056	1.000

Heavy Vehicle Percentages - Junction 1 - (08:30-08:45)

		To		
		A	B	C
From	A	0.000	2.400	1.600
	B	1.800	0.000	0.000
	C	1.900	5.600	0.000

Average PCU Per Vehicle - Junction 1 - (08:45-09:00)

		To		
		A	B	C
From	A	1.000	1.042	1.029
	B	1.100	1.000	1.041
	C	1.071	1.034	1.000

Heavy Vehicle Percentages - Junction 1 - (08:45-09:00)

		To		
		A	B	C
From	A	0.000	4.200	2.900
	B	10.000	0.000	4.100
	C	7.100	3.400	0.000

Average PCU Per Vehicle - Junction 1 - (09:00-09:15)

		To		
		A	B	C
From	A	1.000	1.072	1.042
	B	1.122	1.000	1.129
	C	1.050	1.038	1.000

Heavy Vehicle Percentages - Junction 1 - (09:00-09:15)

		To		
		A	B	C
From	A	0.000	7.200	4.200
	B	12.200	0.000	12.900
	C	5.000	3.800	0.000

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (Veh)	Max LOS	Average Demand (Veh/min)	Total Junction Arrivals (Veh)	Total Queueing Delay (Veh-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (Veh-min/min)	Inclusive Total Queueing Delay (Veh-min)	Inclusive Average Queueing Delay (s)
A	0.72	9.28	2.50	A	13.50	1214.86	138.47	6.84	1.54	138.48	6.84
B	0.39	5.34	0.63	A	6.27	563.88	46.77	4.98	0.52	46.78	4.98
C	0.49	4.33	0.98	A	11.00	990.15	61.10	3.70	0.68	61.10	3.70

Main Results for each time segment

Main results: (07:45-08:00)

Arm	Total Demand (Veh/min)	Junction Arrivals (Veh)	Entry Flow (Veh/min)	Exit Flow (Veh/min)	Circulating Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	Saturation Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
A	12.40	186.00	12.33	7.91	3.88	0.00	23.72	18.92	0.523	0.00	1.08	5.233	A
B	6.93	103.95	6.89	10.22	5.99	0.00	18.38	16.54	0.377	0.00	0.60	5.206	A
C	8.47	127.05	8.44	9.53	3.35	0.00	27.83	24.43	0.304	0.00	0.44	3.091	A

Main results: (08:00-08:15)

Arm	Total Demand (Veh/min)	Junction Arrivals (Veh)	Entry Flow (Veh/min)	Exit Flow (Veh/min)	Circulating Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	Saturation Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
A	12.13	181.95	12.13	7.27	4.44	0.00	23.19	18.88	0.523	1.08	1.09	5.423	A
B	4.20	63.00	4.22	10.68	5.89	0.00	18.90	16.95	0.222	0.60	0.29	4.094	A
C	9.67	145.05	9.67	8.06	2.05	0.00	28.67	24.11	0.337	0.44	0.51	3.157	A

Main results: (08:15-08:30)

Arm	Total Demand (Veh/min)	Junction Arrivals (Veh)	Entry Flow (Veh/min)	Exit Flow (Veh/min)	Circulating Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	Saturation Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
A	14.53	217.95	14.48	10.22	6.09	0.00	22.38	18.91	0.649	1.09	1.81	7.553	A
B	6.33	94.95	6.31	13.54	7.03	0.00	18.00	16.76	0.352	0.29	0.54	5.127	A
C	13.27	199.05	13.24	10.28	3.07	0.00	27.40	23.94	0.484	0.51	0.93	4.229	A

Main results: (08:30-08:45)

Arm	Total Demand (Veh/min)	Junction Arrivals (Veh)	Entry Flow (Veh/min)	Exit Flow (Veh/min)	Circulating Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	Saturation Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
A	16.73	250.95	16.68	9.94	5.43	0.00	23.09	19.16	0.725	1.81	2.54	9.285	A
B	7.33	109.95	7.32	14.01	8.10	0.00	18.55	17.83	0.395	0.54	0.65	5.339	A
C	11.80	177.00	11.81	11.87	3.56	0.00	27.54	24.15	0.428	0.93	0.76	3.817	A

Main results: (08:45-09:00)

Arm	Total Demand (Veh/min)	Junction Arrivals (Veh)	Entry Flow (Veh/min)	Exit Flow (Veh/min)	Circulating Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	Saturation Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
A	14.93	223.95	14.96	10.19	6.21	0.00	22.30	19.18	0.670	2.54	2.08	8.211	A
B	5.93	88.95	5.94	13.91	7.27	0.00	17.93	16.74	0.331	0.65	0.50	5.005	A
C	13.53	202.95	13.52	10.32	2.89	0.00	27.36	23.65	0.495	0.76	0.97	4.329	A

Main results: (09:00-09:15)

Arm	Total Demand (Veh/min)	Junction Arrivals (Veh)	Entry Flow (Veh/min)	Exit Flow (Veh/min)	Circulating Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	Saturation Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
A	10.27	154.05	10.35	8.36	4.27	0.00	23.10	18.65	0.445	2.08	0.81	4.735	A
B	6.87	103.05	6.86	9.60	5.03	0.00	18.24	15.98	0.377	0.50	0.60	5.269	A
C	9.27	139.05	9.30	8.56	3.33	0.00	27.24	24.02	0.340	0.97	0.52	3.349	A

Queueing Delay Results for each time segment

Queueing Delay results: (07:45-08:00)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
A	15.58	1.04	5.233	A	A
B	8.70	0.58	5.206	A	A
C	6.39	0.43	3.091	A	A

Queueing Delay results: (08:00-08:15)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
A	16.30	1.09	5.423	A	A
B	4.41	0.29	4.094	A	A
C	7.50	0.50	3.157	A	A

Queueing Delay results: (08:15-08:30)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
A	25.87	1.72	7.553	A	A
B	7.85	0.52	5.127	A	A
C	13.59	0.91	4.229	A	A

Queueing Delay results: (08:30-08:45)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
A	36.17	2.41	9.285	A	A
B	9.52	0.63	5.339	A	A
C	11.54	0.77	3.817	A	A

Queueing Delay results: (08:45-09:00)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
A	32.30	2.15	8.211	A	A
B	7.63	0.51	5.005	A	A
C	14.23	0.95	4.329	A	A

Queueing Delay results: (09:00-09:15)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
A	12.60	0.84	4.735	A	A
B	8.81	0.59	5.269	A	A
C	7.95	0.53	3.349	A	A

(Default Analysis Set) - 2013 Existing, AM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set (s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
2013 Existing, AM	2013 Existing	AM		Varies by Arm	07:45	09:15	90	15				✓		

Junction Network

Junctions

Name	Junction Type	Arm Order	Grade Separated	Large Roundabout	Do Geometric Delay	Junction Delay (s)	Junction LOS
Cangle North	Roundabout	A,B,C				6.77	A

Junction Network Options

Driving Side	Lighting	Network Residual Capacity (%)	First Arm Reaching Threshold
Left	Normal/unknown	26	Arm A

Arms

Arms

Arm	Name	Description
A	Arm A	Wratting Road
B	Arm B	Lords Croft Lane
C	Arm NB	NB Link

Capacity Options

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

Roundabout Geometry

Arm	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
A	3.50	7.20	8.60	20.00	29.00	9.00	
B	3.80	5.50	5.50	15.00	29.00	23.00	
C	6.30	6.50	3.00	15.00	28.00	40.00	

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

Pedestrian Crossings

Arm	Crossing Type
A	None
B	None
C	None

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Arm	Enter slope and intercept directly	Entered slope	Entered intercept (PCU/min)	Final Slope	Final Intercept (PCU/min)
A		(calculated)	(calculated)	0.670	27.397
B		(calculated)	(calculated)	0.604	23.694
C		(calculated)	(calculated)	0.677	30.982

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

Traffic Flows

Demand Set Data Options

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

Entry Flows

General Flows Data

Arm	Profile Type	Use Turning Counts	Average Demand Flow (Veh/min)	Flow Scaling Factor (%)
A	DIRECT		N/A	100.000
B	DIRECT		N/A	100.000
C	DIRECT		N/A	100.000

Turning Proportions

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

		To		
		A	B	C
From	A	0.000	628.000	593.000
	B	275.000	0.000	291.000
	C	537.000	457.000	0.000

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

		To		
		A	B	C
From	A	0.00	0.51	0.49
	B	0.49	0.00	0.51
	C	0.54	0.46	0.00

Vehicle Mix

Average PCU Per Vehicle - Junction 1 - (07:45-08:00)

		To		
		A	B	C
From	A	1.000	1.054	1.032
	B	1.098	1.000	1.075
	C	1.029	1.018	1.000

Heavy Vehicle Percentages - Junction 1 - (07:45-08:00)

		To		
		A	B	C
From	A	0.000	5.400	3.200
	B	9.800	0.000	7.500
	C	2.900	1.800	0.000

Average PCU Per Vehicle - Junction 1 - (08:00-08:15)

		To		
		A	B	C
From	A	1.000	1.060	1.041
	B	1.118	1.000	1.000
	C	1.034	1.018	1.000

Heavy Vehicle Percentages - Junction 1 - (08:00-08:15)

		To		
		A	B	C
From	A	0.000	6.000	4.100
	B	11.800	0.000	0.000
	C	3.400	1.800	0.000

Average PCU Per Vehicle - Junction 1 - (08:15-08:30)

		To		
		A	B	C
From	A	1.000	1.033	1.021
	B	1.059	1.000	1.091
	C	1.024	1.082	1.000

Heavy Vehicle Percentages - Junction 1 - (08:15-08:30)

		To		
		A	B	C
From	A	0.000	3.300	2.100
	B	5.900	0.000	9.100
	C	2.400	8.200	0.000

Average PCU Per Vehicle - Junction 1 - (08:30-08:45)

		To		
		A	B	C
From	A	1.000	1.024	1.016
	B	1.018	1.000	1.000
	C	1.019	1.056	1.000

Heavy Vehicle Percentages - Junction 1 - (08:30-08:45)

		To		
		A	B	C
From	A	0.000	2.400	1.600
	B	1.800	0.000	0.000
	C	1.900	5.600	0.000

Average PCU Per Vehicle - Junction 1 - (08:45-09:00)

		To		
		A	B	C
From	A	1.000	1.042	1.029
	B	1.100	1.000	1.041
	C	1.071	1.034	1.000

Heavy Vehicle Percentages - Junction 1 - (08:45-09:00)

		To		
		A	B	C
From	A	0.000	4.200	2.900
	B	10.000	0.000	4.100
	C	7.100	3.400	0.000

Average PCU Per Vehicle - Junction 1 - (09:00-09:15)

		To		
		A	B	C
From	A	1.000	1.072	1.042
	B	1.122	1.000	1.129
	C	1.050	1.038	1.000

Heavy Vehicle Percentages - Junction 1 - (09:00-09:15)

		To		
		A	B	C
From	A	0.000	7.200	4.200
	B	12.200	0.000	12.900
	C	5.000	3.800	0.000

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (Veh)	Max LOS	Average Demand (Veh/min)	Total Junction Arrivals (Veh)	Total Queueing Delay (Veh-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (Veh-min/min)	Inclusive Total Queueing Delay (Veh-min)	Inclusive Average Queueing Delay (s)
A	0.73	9.42	2.55	A	13.56	1220.42	140.52	6.91	1.56	140.53	6.91
B	0.40	5.37	0.63	A	6.29	566.43	47.17	5.00	0.52	47.18	5.00
C	0.50	4.35	0.99	A	11.05	994.20	61.58	3.72	0.68	61.58	3.72

Main Results for each time segment

Main results: (07:45-08:00)

Arm	Total Demand (Veh/min)	Junction Arrivals (Veh)	Entry Flow (Veh/min)	Exit Flow (Veh/min)	Circulating Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	Saturation Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
A	12.45	186.75	12.38	7.94	3.89	0.00	23.71	18.92	0.525	0.00	1.09	5.259	A
B	6.96	104.40	6.92	10.26	6.01	0.00	18.36	16.54	0.379	0.00	0.60	5.226	A
C	8.50	127.50	8.47	9.57	3.36	0.00	27.82	24.43	0.306	0.00	0.44	3.097	A

Main results: (08:00-08:15)

Arm	Total Demand (Veh/min)	Junction Arrivals (Veh)	Entry Flow (Veh/min)	Exit Flow (Veh/min)	Circulating Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	Saturation Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
A	12.19	182.85	12.19	7.30	4.46	0.00	23.18	18.88	0.526	1.09	1.10	5.459	A
B	4.22	63.30	4.24	10.73	5.92	0.00	18.88	16.95	0.223	0.60	0.29	4.103	A
C	9.71	145.65	9.71	8.10	2.06	0.00	28.66	24.11	0.339	0.44	0.51	3.165	A

Main results: (08:15-08:30)

Arm	Total Demand (Veh/min)	Junction Arrivals (Veh)	Entry Flow (Veh/min)	Exit Flow (Veh/min)	Circulating Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	Saturation Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
A	14.60	219.00	14.55	10.26	6.11	0.00	22.36	18.91	0.653	1.10	1.84	7.637	A
B	6.36	95.40	6.34	13.59	7.07	0.00	17.98	16.76	0.354	0.29	0.54	5.149	A
C	13.32	199.80	13.29	10.33	3.08	0.00	27.39	23.93	0.486	0.51	0.94	4.247	A

Main results: (08:30-08:45)

Arm	Total Demand (Veh/min)	Junction Arrivals (Veh)	Entry Flow (Veh/min)	Exit Flow (Veh/min)	Circulating Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	Saturation Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
A	16.81	252.15	16.76	9.98	5.45	0.00	23.07	19.16	0.729	1.84	2.59	9.422	A
B	7.36	110.40	7.35	14.07	8.14	0.00	18.53	17.83	0.397	0.54	0.65	5.365	A
C	11.85	177.75	11.86	11.92	3.57	0.00	27.53	24.15	0.430	0.94	0.76	3.834	A

Main results: (08:45-09:00)

Arm	Total Demand (Veh/min)	Junction Arrivals (Veh)	Entry Flow (Veh/min)	Exit Flow (Veh/min)	Circulating Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	Saturation Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
A	15.00	225.00	15.03	10.23	6.24	0.00	22.28	19.18	0.673	2.59	2.11	8.315	A
B	5.96	89.40	5.97	13.97	7.30	0.00	17.91	16.74	0.333	0.65	0.50	5.029	A
C	13.59	203.85	13.58	10.37	2.90	0.00	27.35	23.65	0.497	0.76	0.98	4.351	A

Main results: (09:00-09:15)

Arm	Total Demand (Veh/min)	Junction Arrivals (Veh)	Entry Flow (Veh/min)	Exit Flow (Veh/min)	Circulating Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	Saturation Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
A	10.31	154.65	10.40	8.40	4.29	0.00	23.09	18.65	0.447	2.11	0.81	4.757	A
B	6.90	103.50	6.89	9.64	5.05	0.00	18.23	15.98	0.379	0.50	0.60	5.288	A
C	9.31	139.65	9.34	8.59	3.35	0.00	27.23	24.02	0.342	0.98	0.52	3.361	A

Queueing Delay Results for each time segment

Queueing Delay results: (07:45-08:00)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
A	15.72	1.05	5.259	A	A
B	8.77	0.58	5.226	A	A
C	6.43	0.43	3.097	A	A

Queueing Delay results: (08:00-08:15)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
A	16.47	1.10	5.459	A	A
B	4.45	0.30	4.103	A	A
C	7.55	0.50	3.165	A	A

Queueing Delay results: (08:15-08:30)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
A	26.25	1.75	7.637	A	A
B	7.92	0.53	5.149	A	A
C	13.69	0.91	4.247	A	A

Queueing Delay results: (08:30-08:45)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
A	36.83	2.46	9.422	A	A
B	9.60	0.64	5.365	A	A
C	11.63	0.78	3.834	A	A

Queueing Delay results: (08:45-09:00)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
A	32.89	2.19	8.315	A	A
B	7.70	0.51	5.029	A	A
C	14.36	0.96	4.351	A	A

Queueing Delay results: (09:00-09:15)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
A	12.70	0.85	4.757	A	A
B	8.88	0.59	5.288	A	A
C	8.01	0.53	3.361	A	A

(Default Analysis Set) - 2018 Existing, AM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set (s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
2018 Existing, AM	2018 Existing	AM		Varies by Arm	07:45	09:15	90	15				✓		

Junction Network

Junctions

Name	Junction Type	Arm Order	Grade Separated	Large Roundabout	Do Geometric Delay	Junction Delay (s)	Junction LOS
Cangle North	Roundabout	A,B,C				7.93	A

Junction Network Options

Driving Side	Lighting	Network Residual Capacity (%)	First Arm Reaching Threshold
Left	Normal/unknown	19	Arm A

Arms

Arms

Arm	Name	Description
A	Arm A	Wratting Road
B	Arm B	Lords Croft Lane
C	Arm NB	NB Link

Capacity Options

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

Roundabout Geometry

Arm	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
A	3.50	7.20	8.60	20.00	29.00	9.00	
B	3.80	5.50	5.50	15.00	29.00	23.00	
C	6.30	6.50	3.00	15.00	28.00	40.00	

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

Pedestrian Crossings

Arm	Crossing Type
A	None
B	None
C	None

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Arm	Enter slope and intercept directly	Entered slope	Entered intercept (PCU/min)	Final Slope	Final Intercept (PCU/min)
A		(calculated)	(calculated)	0.670	27.397
B		(calculated)	(calculated)	0.604	23.694
C		(calculated)	(calculated)	0.677	30.982

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

Traffic Flows

Demand Set Data Options

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

Entry Flows

General Flows Data

Arm	Profile Type	Use Turning Counts	Average Demand Flow (Veh/min)	Flow Scaling Factor (%)
A	DIRECT		N/A	100.000
B	DIRECT		N/A	100.000
C	DIRECT		N/A	100.000

Turning Proportions

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

		To		
		A	B	C
From	A	0.000	666.000	629.000
	B	292.000	0.000	309.000
	C	570.000	485.000	0.000

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

		To		
		A	B	C
From	A	0.00	0.51	0.49
	B	0.49	0.00	0.51
	C	0.54	0.46	0.00

Vehicle Mix

Average PCU Per Vehicle - Junction 1 - (07:45-08:00)

		To		
		A	B	C
From	A	1.000	1.054	1.032
	B	1.098	1.000	1.075
	C	1.029	1.018	1.000

Heavy Vehicle Percentages - Junction 1 - (07:45-08:00)

		To		
		A	B	C
From	A	0.000	5.400	3.200
	B	9.800	0.000	7.500
	C	2.900	1.800	0.000

Average PCU Per Vehicle - Junction 1 - (08:00-08:15)

		To		
		A	B	C
From	A	1.000	1.060	1.041
	B	1.118	1.000	1.000
	C	1.034	1.018	1.000

Heavy Vehicle Percentages - Junction 1 - (08:00-08:15)

		To		
		A	B	C
From	A	0.000	6.000	4.100
	B	11.800	0.000	0.000
	C	3.400	1.800	0.000

Average PCU Per Vehicle - Junction 1 - (08:15-08:30)

		To		
		A	B	C
From	A	1.000	1.033	1.021
	B	1.059	1.000	1.091
	C	1.024	1.082	1.000

Heavy Vehicle Percentages - Junction 1 - (08:15-08:30)

		To		
		A	B	C
From	A	0.000	3.300	2.100
	B	5.900	0.000	9.100
	C	2.400	8.200	0.000

Average PCU Per Vehicle - Junction 1 - (08:30-08:45)

		To		
		A	B	C
From	A	1.000	1.024	1.016
	B	1.018	1.000	1.000
	C	1.019	1.056	1.000

Heavy Vehicle Percentages - Junction 1 - (08:30-08:45)

		To		
		A	B	C
From	A	0.000	2.400	1.600
	B	1.800	0.000	0.000
	C	1.900	5.600	0.000

Average PCU Per Vehicle - Junction 1 - (08:45-09:00)

		To		
		A	B	C
From	A	1.000	1.042	1.029
	B	1.100	1.000	1.041
	C	1.071	1.034	1.000

Heavy Vehicle Percentages - Junction 1 - (08:45-09:00)

		To		
		A	B	C
From	A	0.000	4.200	2.900
	B	10.000	0.000	4.100
	C	7.100	3.400	0.000

Average PCU Per Vehicle - Junction 1 - (09:00-09:15)

		To		
		A	B	C
From	A	1.000	1.072	1.042
	B	1.122	1.000	1.129
	C	1.050	1.038	1.000

Heavy Vehicle Percentages - Junction 1 - (09:00-09:15)

		To		
		A	B	C
From	A	0.000	7.200	4.200
	B	12.200	0.000	12.900
	C	5.000	3.800	0.000

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (Veh)	Max LOS	Average Demand (Veh/min)	Total Junction Arrivals (Veh)	Total Queueing Delay (Veh-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (Veh-min/min)	Inclusive Total Queueing Delay (Veh-min)	Inclusive Average Queueing Delay (s)
A	0.78	11.64	3.33	B	14.39	1295.12	172.89	8.01	1.92	172.91	8.01
B	0.43	5.75	0.71	A	6.68	601.23	52.88	5.28	0.59	52.89	5.28
C	0.53	4.68	1.13	A	11.73	1055.40	69.11	3.93	0.77	69.11	3.93

Main Results for each time segment

Main results: (07:45-08:00)

Arm	Total Demand (Veh/min)	Junction Arrivals (Veh)	Entry Flow (Veh/min)	Exit Flow (Veh/min)	Circulating Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	Saturation Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
A	13.22	198.30	13.14	8.43	4.14	0.00	23.56	18.92	0.561	0.00	1.26	5.713	A
B	7.39	110.85	7.34	10.89	6.38	0.00	18.15	16.54	0.407	0.00	0.68	5.529	A
C	9.03	135.45	9.00	10.16	3.57	0.00	27.67	24.43	0.326	0.00	0.48	3.208	A

Main results: (08:00-08:15)

Arm	Total Demand (Veh/min)	Junction Arrivals (Veh)	Entry Flow (Veh/min)	Exit Flow (Veh/min)	Circulating Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	Saturation Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
A	12.93	193.95	12.93	7.75	4.73	0.00	23.00	18.88	0.562	1.26	1.27	5.955	A
B	4.48	67.20	4.50	11.38	6.28	0.00	18.67	16.95	0.240	0.68	0.32	4.242	A
C	10.30	154.50	10.29	8.60	2.19	0.00	28.57	24.11	0.361	0.48	0.56	3.283	A

Main results: (08:15-08:30)

Arm	Total Demand (Veh/min)	Junction Arrivals (Veh)	Entry Flow (Veh/min)	Exit Flow (Veh/min)	Circulating Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	Saturation Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
A	15.49	232.35	15.42	10.89	6.48	0.00	22.09	18.91	0.701	1.27	2.27	8.905	A
B	6.75	101.25	6.73	14.42	7.49	0.00	17.73	16.76	0.381	0.32	0.61	5.442	A
C	14.14	212.10	14.11	10.95	3.27	0.00	27.26	23.94	0.519	0.56	1.07	4.549	A

Main results: (08:30-08:45)

Arm	Total Demand (Veh/min)	Junction Arrivals (Veh)	Entry Flow (Veh/min)	Exit Flow (Veh/min)	Circulating Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	Saturation Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
A	17.84	267.60	17.77	10.60	5.79	0.00	22.84	19.16	0.781	2.27	3.38	11.640	B
B	7.82	117.30	7.81	14.93	8.63	0.00	18.23	17.83	0.429	0.61	0.74	5.754	A
C	12.58	188.70	12.59	12.64	3.79	0.00	27.38	24.15	0.459	1.07	0.86	4.063	A

Main results: (08:45-09:00)

Arm	Total Demand (Veh/min)	Junction Arrivals (Veh)	Entry Flow (Veh/min)	Exit Flow (Veh/min)	Circulating Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	Saturation Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
A	15.92	238.80	15.97	10.86	6.63	0.00	22.03	19.18	0.723	3.38	2.70	9.983	A
B	6.32	94.80	6.33	14.84	7.75	0.00	17.65	16.74	0.358	0.74	0.56	5.308	A
C	14.43	216.45	14.41	11.01	3.08	0.00	27.23	23.65	0.530	0.86	1.12	4.675	A

Main results: (09:00-09:15)

Arm	Total Demand (Veh/min)	Junction Arrivals (Veh)	Entry Flow (Veh/min)	Exit Flow (Veh/min)	Circulating Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	Saturation Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
A	10.94	164.10	11.06	8.91	4.56	0.00	22.92	18.65	0.477	2.70	0.92	5.109	A
B	7.32	109.80	7.31	10.25	5.37	0.00	18.05	15.98	0.406	0.56	0.68	5.584	A
C	9.88	148.20	9.92	9.13	3.55	0.00	27.08	24.02	0.365	1.12	0.58	3.502	A

Queueing Delay Results for each time segment

Queueing Delay results: (07:45-08:00)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
A	18.07	1.20	5.713	A	A
B	9.83	0.66	5.529	A	A
C	7.07	0.47	3.208	A	A

Queueing Delay results: (08:00-08:15)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
A	19.03	1.27	5.955	A	A
B	4.89	0.33	4.242	A	A
C	8.30	0.55	3.283	A	A

Queueing Delay results: (08:15-08:30)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
A	32.08	2.14	8.905	A	A
B	8.87	0.59	5.442	A	A
C	15.52	1.03	4.549	A	A

Queueing Delay results: (08:30-08:45)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
A	47.32	3.15	11.640	B	B
B	10.90	0.73	5.754	A	A
C	13.12	0.87	4.063	A	A

Queueing Delay results: (08:45-09:00)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
A	42.38	2.83	9.983	A	A
B	8.64	0.58	5.308	A	A
C	16.33	1.09	4.675	A	A

Queueing Delay results: (09:00-09:15)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
A	14.53	0.97	5.109	A	A
B	9.93	0.66	5.584	A	A
C	8.87	0.59	3.502	A	A

(Default Analysis Set) - 2018 Existing + Dev, AM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set (s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
2018 Existing + Dev, AM	2018 Existing + Dev	AM		Varies by Arm	07:45	09:15	90	15				✓		

Junction Network

Junctions

Name	Junction Type	Arm Order	Grade Separated	Large Roundabout	Do Geometric Delay	Junction Delay (s)	Junction LOS
Cangle North	Roundabout	A,B,C				13.25	B

Junction Network Options

Driving Side	Lighting	Network Residual Capacity (%)	First Arm Reaching Threshold
Left	Normal/unknown	5	Arm A

Arms

Arms

Arm	Name	Description
A	Arm A	Wratting Road
B	Arm B	Lords Croft Lane
C	Arm NB	NB Link

Capacity Options

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

Roundabout Geometry

Arm	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
A	3.50	7.20	8.60	20.00	29.00	9.00	
B	3.80	5.50	5.50	15.00	29.00	23.00	
C	6.30	6.50	3.00	15.00	28.00	40.00	

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

Pedestrian Crossings

Arm	Crossing Type
A	None
B	None
C	None

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Arm	Enter slope and intercept directly	Entered slope	Entered intercept (PCU/min)	Final Slope	Final Intercept (PCU/min)
A		(calculated)	(calculated)	0.670	27.397
B		(calculated)	(calculated)	0.604	23.694
C		(calculated)	(calculated)	0.677	30.982

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

Traffic Flows

Demand Set Data Options

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

Entry Flows

General Flows Data

Arm	Profile Type	Use Turning Counts	Average Demand Flow (Veh/min)	Flow Scaling Factor (%)
A	DIRECT		N/A	100.000
B	DIRECT		N/A	100.000
C	DIRECT		N/A	100.000

Turning Proportions

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

		To		
		A	B	C
From	A	0.000	684.000	779.000
	B	3.280	0.000	309.000
	C	618.000	485.000	0.000

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

		To		
		A	B	C
From	A	0.00	0.47	0.53
	B	0.01	0.00	0.99
	C	0.56	0.44	0.00

Vehicle Mix

Average PCU Per Vehicle - Junction 1 - (07:45-08:00)

		To		
		A	B	C
From	A	1.000	1.046	1.026
	B	1.088	1.000	1.075
	C	1.026	1.018	1.000

Heavy Vehicle Percentages - Junction 1 - (07:45-08:00)

		To		
		A	B	C
From	A	0.000	4.600	2.600
	B	8.800	0.000	7.500
	C	2.600	1.800	0.000

Average PCU Per Vehicle - Junction 1 - (08:00-08:15)

		To		
		A	B	C
From	A	1.000	1.060	1.033
	B	1.101	1.000	1.000
	C	1.031	1.018	1.000

Heavy Vehicle Percentages - Junction 1 - (08:00-08:15)

		To		
		A	B	C
From	A	0.000	6.000	3.300
	B	10.100	0.000	0.000
	C	3.100	1.800	0.000

Average PCU Per Vehicle - Junction 1 - (08:15-08:30)

		To		
		A	B	C
From	A	1.000	1.033	1.017
	B	1.053	1.000	1.091
	C	1.022	1.082	1.000

Heavy Vehicle Percentages - Junction 1 - (08:15-08:30)

		To		
		A	B	C
From	A	0.000	3.300	1.700
	B	5.300	0.000	9.100
	C	2.200	8.200	0.000

Average PCU Per Vehicle - Junction 1 - (08:30-08:45)

		To		
		A	B	C
From	A	1.000	1.024	1.013
	B	1.016	1.000	1.000
	C	1.018	1.056	1.000

Heavy Vehicle Percentages - Junction 1 - (08:30-08:45)

		To		
		A	B	C
From	A	0.000	2.400	1.300
	B	1.600	0.000	0.000
	C	1.800	5.600	0.000

Average PCU Per Vehicle - Junction 1 - (08:45-09:00)

		To		
		A	B	C
From	A	1.000	1.042	1.024
	B	1.088	1.000	1.041
	C	1.065	1.034	1.000

Heavy Vehicle Percentages - Junction 1 - (08:45-09:00)

		To		
		A	B	C
From	A	0.000	4.200	2.400
	B	8.800	0.000	4.100
	C	6.500	3.400	0.000

Average PCU Per Vehicle - Junction 1 - (09:00-09:15)

		To		
		A	B	C
From	A	1.000	1.072	1.032
	B	1.107	1.000	1.129
	C	1.044	1.038	1.000

Heavy Vehicle Percentages - Junction 1 - (09:00-09:15)

		To		
		A	B	C
From	A	0.000	7.200	3.200
	B	10.700	0.000	12.900
	C	4.400	3.800	0.000

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (Veh)	Max LOS	Average Demand (Veh/min)	Total Junction Arrivals (Veh)	Total Queueing Delay (Veh-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (Veh-min/min)	Inclusive Total Queueing Delay (Veh-min)	Inclusive Average Queueing Delay (s)
A	0.90	22.49	7.45	C	17.21	1548.46	337.05	13.06	3.75	337.10	13.06
B	0.48	6.78	0.88	A	7.05	634.54	63.89	6.04	0.71	63.91	6.04
C	0.51	4.13	1.03	A	12.23	1100.40	64.33	3.51	0.71	64.34	3.51

Main Results for each time segment

Main results: (07:45-08:00)

Arm	Total Demand (Veh/min)	Junction Arrivals (Veh)	Entry Flow (Veh/min)	Exit Flow (Veh/min)	Circulating Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	Saturation Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
A	16.05	240.75	15.91	5.40	4.18	0.00	23.71	17.72	0.677	0.00	2.04	7.570	A
B	7.76	116.40	7.71	11.62	8.47	0.00	17.15	16.60	0.452	0.00	0.82	6.318	A
C	9.53	142.95	9.50	16.10	0.08	0.00	30.24	30.18	0.315	0.00	0.46	2.889	A

Main results: (08:00-08:15)

Arm	Total Demand (Veh/min)	Junction Arrivals (Veh)	Entry Flow (Veh/min)	Exit Flow (Veh/min)	Circulating Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	Saturation Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
A	15.67	235.05	15.67	6.10	4.75	0.00	23.11	17.57	0.678	2.04	2.08	8.058	A
B	4.85	72.75	4.88	12.07	8.34	0.00	18.45	17.83	0.263	0.82	0.36	4.432	A
C	10.80	162.00	10.79	13.17	0.05	0.00	30.18	30.08	0.358	0.46	0.55	3.095	A

Main results: (08:15-08:30)

Arm	Total Demand (Veh/min)	Junction Arrivals (Veh)	Entry Flow (Veh/min)	Exit Flow (Veh/min)	Circulating Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	Saturation Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
A	18.32	274.80	18.17	8.26	6.42	0.00	22.19	17.58	0.825	2.08	4.35	14.380	B
B	7.12	106.80	7.09	14.92	9.67	0.00	16.28	16.45	0.438	0.36	0.77	6.512	A
C	14.64	219.60	14.61	16.69	0.07	0.00	29.50	29.44	0.496	0.55	0.98	4.022	A

Main results: (08:30-08:45)

Arm	Total Demand (Veh/min)	Junction Arrivals (Veh)	Entry Flow (Veh/min)	Exit Flow (Veh/min)	Circulating Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	Saturation Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
A	20.67	310.05	20.46	7.42	5.76	0.00	22.91	17.80	0.902	4.35	7.56	22.488	C
B	8.19	122.85	8.18	15.32	10.89	0.00	17.01	17.89	0.481	0.77	0.92	6.782	A
C	13.08	196.20	13.09	18.99	0.09	0.00	29.88	29.82	0.438	0.98	0.78	3.575	A

Main results: (08:45-09:00)

Arm	Total Demand (Veh/min)	Junction Arrivals (Veh)	Entry Flow (Veh/min)	Exit Flow (Veh/min)	Circulating Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	Saturation Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
A	18.75	281.25	18.85	8.43	6.56	0.00	22.14	17.88	0.847	7.56	6.04	18.858	C
B	6.69	100.35	6.71	15.37	10.04	0.00	16.79	17.09	0.399	0.92	0.67	5.959	A
C	14.93	223.95	14.91	16.67	0.07	0.00	29.42	29.34	0.507	0.78	1.02	4.132	A

Main results: (09:00-09:15)

Arm	Total Demand (Veh/min)	Junction Arrivals (Veh)	Entry Flow (Veh/min)	Exit Flow (Veh/min)	Circulating Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	Saturation Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
A	13.77	206.55	14.07	5.91	4.58	0.00	23.06	17.45	0.598	6.04	1.51	6.897	A
B	7.69	115.35	7.68	11.16	7.49	0.00	16.86	15.86	0.456	0.67	0.83	6.527	A
C	10.38	155.70	10.41	15.09	0.08	0.00	29.69	29.63	0.350	1.02	0.54	3.118	A

Queueing Delay Results for each time segment

Queueing Delay results: (07:45-08:00)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
A	28.62	1.91	7.570	A	A
B	11.73	0.78	6.318	A	A
C	6.73	0.45	2.889	A	A

Queueing Delay results: (08:00-08:15)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
A	30.94	2.06	8.058	A	A
B	5.54	0.37	4.432	A	A
C	8.20	0.55	3.095	A	A

Queueing Delay results: (08:15-08:30)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
A	58.31	3.89	14.380	B	B
B	11.11	0.74	6.512	A	A
C	14.27	0.95	4.022	A	A

Queueing Delay results: (08:30-08:45)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
A	98.28	6.55	22.488	C	C
B	13.41	0.89	6.782	A	A
C	11.97	0.80	3.575	A	A

Queueing Delay results: (08:45-09:00)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
A	96.88	6.46	18.858	C	B
B	10.32	0.69	5.959	A	A
C	14.98	1.00	4.132	A	A

Queueing Delay results: (09:00-09:15)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
A	25.26	1.68	6.897	A	A
B	12.11	0.81	6.527	A	A
C	8.28	0.55	3.118	A	A

Junctions 8

ARCADY 8 - Roundabout Module

Filename: Cangle North Standard - PM.arc8
Path: Z:\Projects\CS059139 - NW Haverhill SUE, Savills obo NW Haverhill Consortium\A5 - Technical\Arcady\Direct 90 mins\Arc8 - Revised Assessment May 2013
Report generation date: 03/06/2013 08:19:25

» (Default Analysis Set) - 2012 PM existing, PM
» (Default Analysis Set) - 2013 PM Existing, PM
» (Default Analysis Set) - 2018 PM Existing, PM
» (Default Analysis Set) - 2018 PM Existing + Dev, PM

Summary of junction performance

	PM				
	Queue (Veh)	Delay (s)	RFC	LOS	Network Residual Capacity
	A1 - 2012 PM existing				
Arm A	1.80	7.40	0.65	A	31 %
Arm B	2.28	9.60	0.70	A	
Arm C	1.58	6.12	0.62	A	[Arm B]

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Network Residual Capacity indicates the amount by which network flow could be increased before a user-definable threshold (see Analysis Options) is met.

"D1 - 2012 PM existing, PM" model duration: 16:45 - 18:15
"D2 - 2013 PM Existing, PM" model duration: 16:45 - 18:15
"D3 - 2018 PM Existing, PM" model duration: 16:45 - 18:15
"D4 - 2018 PM Existing + Dev, PM" model duration: 16:45 - 18:15

Run using Junctions 8.0.2.316 at 03/06/2013 08:19:21

File summary

File Description

Title	Haverhill Northern junction - SCC Geometry
Location	
Site Number	
Date	15/11/2012
Version	
Status	
Identifier	
Client	
Jobnumber	
Enumerator	Gus Bradford
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	RFC Threshold	Average Delay Threshold (s)	Queue Threshold (PCU)
5.75		✓	Delay	0.85	36.00	20.00

Units

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

(Default Analysis Set) - 2012 PM existing, PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	DemandSets	D1 - 2012 PM existing, PM	Demand Set 1: Scenario Name includes Time Period Name ('PM'). Are you sure this is correct?
Warning	DemandSets	D2 - 2013 PM Existing, PM	Demand Set 2: Scenario Name includes Time Period Name ('PM'). Are you sure this is correct?
Warning	DemandSets	D3 - 2018 PM Existing, PM	Demand Set 3: Scenario Name includes Time Period Name ('PM'). Are you sure this is correct?
Warning	DemandSets	D4 - 2018 PM Existing + Dev, PM	Demand Set 4: Scenario Name includes Time Period Name ('PM'). Are you sure this is correct?

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set (s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
2012 PM existing, PM	2012 PM existing	PM		Varies by Arm	16:45	18:15	90	15				✓		

Junction Network

Junctions

Name	Junction Type	Arm Order	Grade Separated	Large Roundabout	Do Geometric Delay	Junction Delay (s)	Junction LOS
Cangle North	Roundabout	A,B,C				7.58	A

Junction Network Options

Driving Side	Lighting	Network Residual Capacity (%)	First Arm Reaching Threshold
Left	Normal/unknown	31	Arm B

Arms

Arms

Arm	Name	Description
A	Arm A	Wratting Road
B	Arm B	Lords Croft Lane
C	Arm NB	NB Link

Capacity Options

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

Roundabout Geometry

Arm	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
A	3.50	7.20	8.60	20.00	29.00	9.00	
B	3.80	5.50	5.50	15.00	29.00	23.00	
C	6.30	6.50	3.00	15.00	28.00	40.00	

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

Pedestrian Crossings

Arm	Crossing Type
A	None
B	None
C	None

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Arm	Enter slope and intercept directly	Entered slope	Entered intercept (PCU/min)	Final Slope	Final Intercept (PCU/min)
A		(calculated)	(calculated)	0.670	27.397
B		(calculated)	(calculated)	0.604	23.694
C		(calculated)	(calculated)	0.677	30.982

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

Traffic Flows

Demand Set Data Options

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

Entry Flows

General Flows Data

Arm	Profile Type	Use Turning Counts	Average Demand Flow (Veh/min)	Flow Scaling Factor (%)
A	DIRECT		N/A	100.000
B	DIRECT		N/A	100.000
C	DIRECT		N/A	100.000

Turning Proportions

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

		To		
		A	B	C
From	A	0.000	489.000	506.000
	B	556.000	0.000	506.000
	C	721.000	626.000	0.000

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

		To		
		A	B	C
From	A	0.00	0.49	0.51
	B	0.52	0.00	0.48
	C	0.54	0.46	0.00

Vehicle Mix

Average PCU Per Vehicle - Junction 1 - (16:45-17:00)

		To		
		A	B	C
From	A	1.000	1.031	1.022
	B	1.015	1.000	1.013
	C	1.017	1.017	1.000

Heavy Vehicle Percentages - Junction 1 - (16:45-17:00)

		To		
		A	B	C
From	A	0.000	3.100	2.200
	B	1.500	0.000	1.300
	C	1.700	1.700	0.000

Average PCU Per Vehicle - Junction 1 - (17:00-17:15)

		To		
		A	B	C
From	A	1.000	1.016	1.000
	B	1.009	1.000	1.019
	C	1.021	1.011	1.000

Heavy Vehicle Percentages - Junction 1 - (17:00-17:15)

		To		
		A	B	C
From	A	0.000	1.600	0.000
	B	0.900	0.000	1.900
	C	2.100	1.100	0.000

Average PCU Per Vehicle - Junction 1 - (17:15-17:30)

		To		
		A	B	C
From	A	1.000	1.017	1.015
	B	1.030	1.000	1.012
	C	1.032	1.010	1.000

Heavy Vehicle Percentages - Junction 1 - (17:15-17:30)

		To		
		A	B	C
From	A	0.000	1.700	1.500
	B	3.000	0.000	1.200
	C	3.200	1.000	0.000

Average PCU Per Vehicle - Junction 1 - (17:30-17:45)

		To		
		A	B	C
From	A	1.000	1.013	1.013
	B	1.018	1.000	1.000
	C	1.010	1.000	1.000

Heavy Vehicle Percentages - Junction 1 - (17:30-17:45)

		To		
		A	B	C
From	A	0.000	1.300	1.300
	B	1.800	0.000	0.000
	C	1.000	0.000	0.000

Average PCU Per Vehicle - Junction 1 - (17:45-18:00)

		To		
		A	B	C
From	A	1.000	1.056	1.000
	B	1.047	1.000	1.000
	C	1.000	1.017	1.000

Heavy Vehicle Percentages - Junction 1 - (17:45-18:00)

		To		
		A	B	C
From	A	0.000	5.600	0.000
	B	4.700	0.000	0.000
	C	0.000	1.700	0.000

Average PCU Per Vehicle - Junction 1 - (18:00-18:15)

		To		
		A	B	C
From	A	1.000	1.038	1.000
	B	1.036	1.000	1.013
	C	1.026	1.000	1.000

Heavy Vehicle Percentages - Junction 1 - (18:00-18:15)

		To		
		A	B	C
From	A	0.000	3.800	0.000
	B	3.600	0.000	1.300
	C	2.600	0.000	0.000

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (Veh)	Max LOS	Average Demand (Veh/min)	Total Junction Arrivals (Veh)	Total Queueing Delay (Veh-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (Veh-min/min)	Inclusive Total Queueing Delay (Veh-min)	Inclusive Average Queueing Delay (s)
A	0.65	7.40	1.80	A	11.05	994.95	92.08	5.55	1.02	92.15	5.56
B	0.70	9.60	2.28	A	11.80	1062.01	134.14	7.58	1.49	134.19	7.58
C	0.62	6.12	1.58	A	14.97	1347.15	118.92	5.30	1.32	118.94	5.30

Main Results for each time segment

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

Arm	Total Demand (Veh/min)	Junction Arrivals (Veh)	Entry Flow (Veh/min)	Exit Flow (Veh/min)	Circulating Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	Saturation Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
A	12.53	187.95	12.44	13.33	7.30	0.00	21.85	19.19	0.574	0.00	1.32	6.324	A
B	9.47	142.05	9.41	13.41	6.33	0.00	19.51	17.42	0.485	0.00	0.93	5.904	A
C	15.80	237.00	15.71	10.81	4.93	0.00	27.14	24.31	0.582	0.00	1.37	5.208	A

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

Arm	Total Demand (Veh/min)	Junction Arrivals (Veh)	Entry Flow (Veh/min)	Exit Flow (Veh/min)	Circulating Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	Saturation Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
A	9.53	142.95	9.57	15.87	7.28	0.00	22.29	19.58	0.427	1.32	0.75	4.731	A
B	14.40	216.00	14.31	11.98	4.87	0.00	20.47	17.44	0.703	0.93	2.29	9.600	A
C	15.67	235.05	15.66	11.68	7.49	0.00	25.45	24.35	0.616	1.37	1.58	6.116	A

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

Arm	Total Demand (Veh/min)	Junction Arrivals (Veh)	Entry Flow (Veh/min)	Exit Flow (Veh/min)	Circulating Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	Saturation Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
A	8.40	126.00	8.41	14.49	6.92	0.00	22.36	19.49	0.376	0.75	0.61	4.303	A
B	12.40	186.00	12.45	11.05	4.28	0.00	20.63	17.25	0.601	2.29	1.54	7.378	A
C	14.87	223.05	14.88	10.21	6.52	0.00	25.88	24.16	0.575	1.58	1.37	5.466	A

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

Arm	Total Demand (Veh/min)	Junction Arrivals (Veh)	Entry Flow (Veh/min)	Exit Flow (Veh/min)	Circulating Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	Saturation Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
A	10.07	151.05	10.06	14.20	6.64	0.00	22.66	19.50	0.444	0.61	0.79	4.757	A
B	12.53	187.95	12.53	11.58	5.11	0.00	20.37	17.46	0.615	1.54	1.58	7.647	A
C	14.27	214.05	14.28	11.08	6.56	0.00	26.32	24.56	0.542	1.37	1.20	4.988	A

Main results: (17:45-18:00)

Arm	Total Demand (Veh/min)	Junction Arrivals (Veh)	Entry Flow (Veh/min)	Exit Flow (Veh/min)	Circulating Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	Saturation Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
A	11.07	166.05	11.06	14.35	7.24	0.00	21.86	19.16	0.506	0.79	1.01	5.543	A
B	11.47	172.05	11.48	12.68	5.62	0.00	19.81	17.38	0.579	1.58	1.40	7.214	A
C	15.60	234.00	15.59	11.09	6.01	0.00	26.52	24.35	0.588	1.20	1.41	5.480	A

Main results: (18:00-18:15)

Arm	Total Demand (Veh/min)	Junction Arrivals (Veh)	Entry Flow (Veh/min)	Exit Flow (Veh/min)	Circulating Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	Saturation Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
A	14.73	220.95	14.68	12.81	6.33	0.00	22.73	19.47	0.648	1.01	1.80	7.402	A
B	10.53	157.95	10.54	13.55	7.46	0.00	18.71	17.28	0.563	1.40	1.31	7.345	A
C	13.60	204.00	13.62	12.48	5.52	0.00	26.74	24.30	0.509	1.41	1.04	4.581	A

Queueing Delay Results for each time segment

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

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
A	18.88	1.26	6.324	A	A
B	13.39	0.89	5.904	A	A
C	19.73	1.32	5.208	A	A

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

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
A	11.65	0.78	4.731	A	A
B	31.97	2.13	9.600	A	A
C	23.09	1.54	6.116	A	A

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

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
A	9.27	0.62	4.303	A	A
B	24.07	1.60	7.378	A	A
C	20.99	1.40	5.466	A	A

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

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
A	11.63	0.78	4.757	A	A
B	23.44	1.56	7.647	A	A
C	18.32	1.22	4.988	A	A

Queueing Delay results: (17:45-18:00)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
A	14.82	0.99	5.543	A	A
B	21.47	1.43	7.214	A	A
C	20.65	1.38	5.480	A	A

Queueing Delay results: (18:00-18:15)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
A	25.70	1.71	7.402	A	A
B	19.92	1.33	7.345	A	A
C	16.09	1.07	4.581	A	A

(Default Analysis Set) - 2013 PM Existing, PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	DemandSets	D1 - 2012 PM existing, PM	Demand Set 1: Scenario Name includes Time Period Name ('PM'). Are you sure this is correct?
Warning	DemandSets	D2 - 2013 PM Existing, PM	Demand Set 2: Scenario Name includes Time Period Name ('PM'). Are you sure this is correct?
Warning	DemandSets	D3 - 2018 PM Existing, PM	Demand Set 3: Scenario Name includes Time Period Name ('PM'). Are you sure this is correct?
Warning	DemandSets	D4 - 2018 PM Existing + Dev, PM	Demand Set 4: Scenario Name includes Time Period Name ('PM'). Are you sure this is correct?

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set (s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
2013 PM Existing, PM	2013 PM Existing	PM		Varies by Arm	16:45	18:15	90	15				✓		

Junction Network

Junctions

Name	Junction Type	Arm Order	Grade Separated	Large Roundabout	Do Geometric Delay	Junction Delay (s)	Junction LOS
Cangle North	Roundabout	A,B,C				7.66	A

Junction Network Options

Driving Side	Lighting	Network Residual Capacity (%)	First Arm Reaching Threshold
Left	Normal/unknown	31	Arm B

Arms

Arms

Arm	Name	Description
A	Arm A	Wratting Road
B	Arm B	Lords Croft Lane
C	Arm NB	NB Link

Capacity Options

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

Roundabout Geometry

Arm	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
A	3.50	7.20	8.60	20.00	29.00	9.00	
B	3.80	5.50	5.50	15.00	29.00	23.00	
C	6.30	6.50	3.00	15.00	28.00	40.00	

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

Pedestrian Crossings

Arm	Crossing Type
A	None
B	None
C	None

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Arm	Enter slope and intercept directly	Entered slope	Entered intercept (PCU/min)	Final Slope	Final Intercept (PCU/min)
A		(calculated)	(calculated)	0.670	27.397
B		(calculated)	(calculated)	0.604	23.694
C		(calculated)	(calculated)	0.677	30.982

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

Traffic Flows

Demand Set Data Options

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

Entry Flows

General Flows Data

Arm	Profile Type	Use Turning Counts	Average Demand Flow (Veh/min)	Flow Scaling Factor (%)
A	DIRECT		N/A	100.000
B	DIRECT		N/A	100.000
C	DIRECT		N/A	100.000

Turning Proportions

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

		To		
		A	B	C
From	A	0.000	491.000	508.000
	B	558.000	0.000	508.000
	C	724.000	629.000	0.000

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

		To		
		A	B	C
From	A	0.00	0.49	0.51
	B	0.52	0.00	0.48
	C	0.54	0.46	0.00

Vehicle Mix

Average PCU Per Vehicle - Junction 1 - (16:45-17:00)

		To		
		A	B	C
From	A	1.000	1.031	1.022
	B	1.015	1.000	1.013
	C	1.017	1.017	1.000

Heavy Vehicle Percentages - Junction 1 - (16:45-17:00)

		To		
		A	B	C
From	A	0.000	3.100	2.200
	B	1.500	0.000	1.300
	C	1.700	1.700	0.000

Average PCU Per Vehicle - Junction 1 - (17:00-17:15)

		To		
		A	B	C
From	A	1.000	1.016	1.000
	B	1.009	1.000	1.019
	C	1.021	1.011	1.000

Heavy Vehicle Percentages - Junction 1 - (17:00-17:15)

		To		
		A	B	C
From	A	0.000	1.600	0.000
	B	0.900	0.000	1.900
	C	2.100	1.100	0.000

Average PCU Per Vehicle - Junction 1 - (17:15-17:30)

		To		
		A	B	C
From	A	1.000	1.017	1.015
	B	1.030	1.000	1.012
	C	1.032	1.010	1.000

Heavy Vehicle Percentages - Junction 1 - (17:15-17:30)

		To		
		A	B	C
From	A	0.000	1.700	1.500
	B	3.000	0.000	1.200
	C	3.200	1.000	0.000

Average PCU Per Vehicle - Junction 1 - (17:30-17:45)

		To		
		A	B	C
From	A	1.000	1.013	1.013
	B	1.018	1.000	1.000
	C	1.010	1.000	1.000

Heavy Vehicle Percentages - Junction 1 - (17:30-17:45)

		To		
		A	B	C
From	A	0.000	1.300	1.300
	B	1.800	0.000	0.000
	C	1.000	0.000	0.000

Average PCU Per Vehicle - Junction 1 - (17:45-18:00)

		To		
		A	B	C
From	A	1.000	1.056	1.000
	B	1.047	1.000	1.000
	C	1.010	1.000	1.000

Heavy Vehicle Percentages - Junction 1 - (17:45-18:00)

		To		
		A	B	C
From	A	0.000	5.600	0.000
	B	4.700	0.000	0.000
	C	1.000	0.000	0.000

Average PCU Per Vehicle - Junction 1 - (18:00-18:15)

		To		
		A	B	C
From	A	1.000	1.038	1.000
	B	1.036	1.000	1.013
	C	1.026	1.000	1.000

Heavy Vehicle Percentages - Junction 1 - (18:00-18:15)

		To		
		A	B	C
From	A	0.000	3.800	0.000
	B	3.600	0.000	1.300
	C	2.600	0.000	0.000

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (Veh)	Max LOS	Average Demand (Veh/min)	Total Junction Arrivals (Veh)	Total Queueing Delay (Veh-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (Veh-min/min)	Inclusive Total Queueing Delay (Veh-min)	Inclusive Average Queueing Delay (s)
A	0.65	7.48	1.83	A	11.10	999.30	93.03	5.59	1.03	93.10	5.59
B	0.71	9.71	2.32	A	11.85	1066.66	135.87	7.64	1.51	135.92	7.65
C	0.62	6.17	1.60	A	15.03	1352.86	120.17	5.33	1.34	120.19	5.33

Main Results for each time segment

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

Arm	Total Demand (Veh/min)	Junction Arrivals (Veh)	Entry Flow (Veh/min)	Exit Flow (Veh/min)	Circulating Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	Saturation Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
A	12.59	188.85	12.50	13.39	7.33	0.00	21.82	19.19	0.577	0.00	1.34	6.378	A
B	9.51	142.65	9.45	13.48	6.36	0.00	19.49	17.42	0.488	0.00	0.94	5.936	A
C	15.87	238.05	15.78	10.86	4.95	0.00	27.13	24.31	0.585	0.00	1.39	5.246	A

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

Arm	Total Demand (Veh/min)	Junction Arrivals (Veh)	Entry Flow (Veh/min)	Exit Flow (Veh/min)	Circulating Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	Saturation Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
A	9.57	143.55	9.61	15.93	7.31	0.00	22.27	19.57	0.430	1.34	0.76	4.753	A
B	14.46	216.90	14.37	12.03	4.89	0.00	20.46	17.44	0.707	0.94	2.33	9.706	A
C	15.73	235.95	15.72	11.73	7.52	0.00	25.43	24.35	0.618	1.39	1.60	6.166	A

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

Arm	Total Demand (Veh/min)	Junction Arrivals (Veh)	Entry Flow (Veh/min)	Exit Flow (Veh/min)	Circulating Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	Saturation Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
A	8.44	126.60	8.45	14.54	6.95	0.00	22.34	19.48	0.378	0.76	0.61	4.324	A
B	12.45	186.75	12.50	11.10	4.30	0.00	20.62	17.25	0.604	2.33	1.55	7.440	A
C	14.93	223.95	14.94	10.25	6.54	0.00	25.86	24.17	0.577	1.60	1.38	5.505	A

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

Arm	Total Demand (Veh/min)	Junction Arrivals (Veh)	Entry Flow (Veh/min)	Exit Flow (Veh/min)	Circulating Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	Saturation Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
A	10.11	151.65	10.10	14.26	6.67	0.00	22.64	19.50	0.447	0.61	0.80	4.780	A
B	12.59	188.85	12.59	11.63	5.13	0.00	20.36	17.46	0.618	1.55	1.60	7.717	A
C	14.33	214.95	14.34	11.13	6.59	0.00	26.30	24.56	0.545	1.38	1.21	5.021	A

Main results: (17:45-18:00)

Arm	Total Demand (Veh/min)	Junction Arrivals (Veh)	Entry Flow (Veh/min)	Exit Flow (Veh/min)	Circulating Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	Saturation Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
A	11.11	166.65	11.10	14.41	7.28	0.00	21.92	19.26	0.507	0.80	1.02	5.535	A
B	11.52	172.80	11.53	12.73	5.64	0.00	19.80	17.35	0.582	1.60	1.42	7.268	A
C	15.67	235.05	15.66	11.14	6.04	0.00	26.57	24.42	0.590	1.21	1.42	5.493	A

Main results: (18:00-18:15)

Arm	Total Demand (Veh/min)	Junction Arrivals (Veh)	Entry Flow (Veh/min)	Exit Flow (Veh/min)	Circulating Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	Saturation Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
A	14.80	222.00	14.75	12.86	6.36	0.00	22.71	19.46	0.652	1.02	1.83	7.483	A
B	10.58	158.70	10.59	13.61	7.50	0.00	18.69	17.28	0.566	1.42	1.32	7.409	A
C	13.66	204.90	13.68	12.54	5.54	0.00	26.73	24.30	0.511	1.42	1.06	4.608	A

Queueing Delay Results for each time segment

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

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
A	19.12	1.27	6.378	A	A
B	13.52	0.90	5.936	A	A
C	19.95	1.33	5.246	A	A

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

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
A	11.75	0.78	4.753	A	A
B	32.43	2.16	9.706	A	A
C	23.36	1.56	6.166	A	A

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

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
A	9.35	0.62	4.324	A	A
B	24.37	1.62	7.440	A	A
C	21.23	1.42	5.505	A	A

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

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
A	11.73	0.78	4.780	A	A
B	23.75	1.58	7.717	A	A
C	18.53	1.24	5.021	A	A

Queueing Delay results: (17:45-18:00)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
A	14.85	0.99	5.535	A	A
B	21.74	1.45	7.268	A	A
C	20.79	1.39	5.493	A	A

Queueing Delay results: (18:00-18:15)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
A	26.08	1.74	7.483	A	A
B	20.19	1.35	7.409	A	A
C	16.26	1.08	4.608	A	A

(Default Analysis Set) - 2018 PM Existing, PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	DemandSets	D1 - 2012 PM existing, PM	Demand Set 1: Scenario Name includes Time Period Name ('PM'). Are you sure this is correct?
Warning	DemandSets	D2 - 2013 PM Existing, PM	Demand Set 2: Scenario Name includes Time Period Name ('PM'). Are you sure this is correct?
Warning	DemandSets	D3 - 2018 PM Existing, PM	Demand Set 3: Scenario Name includes Time Period Name ('PM'). Are you sure this is correct?
Warning	DemandSets	D4 - 2018 PM Existing + Dev, PM	Demand Set 4: Scenario Name includes Time Period Name ('PM'). Are you sure this is correct?

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set (s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
2018 PM Existing, PM	2018 PM Existing	PM		Varies by Arm	16:45	18:15	90	15				✓		

Junction Network

Junctions

Name	Junction Type	Arm Order	Grade Separated	Large Roundabout	Do Geometric Delay	Junction Delay (s)	Junction LOS
Cangle North	Roundabout	A,B,C				8.97	A

Junction Network Options

Driving Side	Lighting	Network Residual Capacity (%)	First Arm Reaching Threshold
Left	Normal/unknown	23	Arm B

Arms

Arms

Arm	Name	Description
A	Arm A	Wratting Road
B	Arm B	Lords Croft Lane
C	Arm NB	NB Link

Capacity Options

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

Roundabout Geometry

Arm	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
A	3.50	7.20	8.60	20.00	29.00	9.00	
B	3.80	5.50	5.50	15.00	29.00	23.00	
C	6.30	6.50	3.00	15.00	28.00	40.00	

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

Pedestrian Crossings

Arm	Crossing Type
A	None
B	None
C	None

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Arm	Enter slope and intercept directly	Entered slope	Entered intercept (PCU/min)	Final Slope	Final Intercept (PCU/min)
A		(calculated)	(calculated)	0.670	27.397
B		(calculated)	(calculated)	0.604	23.694
C		(calculated)	(calculated)	0.677	30.982

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

Traffic Flows

Demand Set Data Options

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

Entry Flows

General Flows Data

Arm	Profile Type	Use Turning Counts	Average Demand Flow (Veh/min)	Flow Scaling Factor (%)
A	DIRECT		N/A	100.000
B	DIRECT		N/A	100.000
C	DIRECT		N/A	100.000

Turning Proportions

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

		To		
		A	B	C
From	A	0.000	521.000	539.000
	B	593.000	0.000	539.000
	C	769.000	667.000	0.000

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

		To		
		A	B	C
From	A	0.00	0.49	0.51
	B	0.52	0.00	0.48
	C	0.54	0.46	0.00

Vehicle Mix

Average PCU Per Vehicle - Junction 1 - (16:45-17:00)

		To		
		A	B	C
From	A	1.000	1.031	1.022
	B	1.015	1.000	1.013
	C	1.017	1.017	1.000

Heavy Vehicle Percentages - Junction 1 - (16:45-17:00)

		To		
		A	B	C
From	A	0.000	3.100	2.200
	B	1.500	0.000	1.300
	C	1.700	1.700	0.000

Average PCU Per Vehicle - Junction 1 - (17:00-17:15)

		To		
		A	B	C
From	A	1.000	1.016	1.000
	B	1.009	1.000	1.019
	C	1.021	1.011	1.000

Heavy Vehicle Percentages - Junction 1 - (17:00-17:15)

		To		
		A	B	C
From	A	0.000	1.600	0.000
	B	0.900	0.000	1.900
	C	2.100	1.100	0.000

Average PCU Per Vehicle - Junction 1 - (17:15-17:30)

		To		
		A	B	C
From	A	1.000	1.017	1.015
	B	1.030	1.000	1.012
	C	1.032	1.010	1.000

Heavy Vehicle Percentages - Junction 1 - (17:15-17:30)

		To		
		A	B	C
From	A	0.000	1.700	1.500
	B	3.000	0.000	1.200
	C	3.200	1.000	0.000

Average PCU Per Vehicle - Junction 1 - (17:30-17:45)

		To		
		A	B	C
From	A	1.000	1.013	1.013
	B	1.018	1.000	1.000
	C	1.010	1.000	1.000

Heavy Vehicle Percentages - Junction 1 - (17:30-17:45)

		To		
		A	B	C
From	A	0.000	1.300	1.300
	B	1.800	0.000	0.000
	C	1.000	0.000	0.000

Average PCU Per Vehicle - Junction 1 - (17:45-18:00)

		To		
		A	B	C
From	A	1.000	1.056	1.000
	B	1.047	1.000	1.000
	C	1.010	1.000	1.000

Heavy Vehicle Percentages - Junction 1 - (17:45-18:00)

		To		
		A	B	C
From	A	0.000	5.600	0.000
	B	4.700	0.000	0.000
	C	1.000	0.000	0.000

Average PCU Per Vehicle - Junction 1 - (18:00-18:15)

		To		
		A	B	C
From	A	1.000	1.038	1.000
	B	1.036	1.000	1.013
	C	1.026	1.000	1.000

Heavy Vehicle Percentages - Junction 1 - (18:00-18:15)

		To		
		A	B	C
From	A	0.000	3.800	0.000
	B	3.600	0.000	1.300
	C	2.600	0.000	0.000

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (Veh)	Max LOS	Average Demand (Veh/min)	Total Junction Arrivals (Veh)	Total Queueing Delay (Veh-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (Veh-min/min)	Inclusive Total Queueing Delay (Veh-min)	Inclusive Average Queueing Delay (s)
A	0.70	8.71	2.26	A	11.79	1060.65	109.26	6.18	1.21	109.38	6.19
B	0.76	11.60	2.95	B	12.58	1132.07	164.38	8.71	1.83	164.44	8.72
C	0.66	7.08	1.95	A	15.96	1435.95	142.72	5.96	1.59	142.75	5.96

Main Results for each time segment

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

Arm	Total Demand (Veh/min)	Junction Arrivals (Veh)	Entry Flow (Veh/min)	Exit Flow (Veh/min)	Circulating Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	Saturation Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
A	13.36	200.40	13.25	14.21	7.77	0.00	21.53	19.20	0.620	0.00	1.60	7.159	A
B	10.09	151.35	10.02	14.29	6.74	0.00	19.26	17.42	0.524	0.00	1.08	6.441	A
C	16.84	252.60	16.73	11.51	5.25	0.00	26.92	24.30	0.626	0.00	1.64	5.827	A

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

Arm	Total Demand (Veh/min)	Junction Arrivals (Veh)	Entry Flow (Veh/min)	Exit Flow (Veh/min)	Circulating Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	Saturation Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
A	10.16	152.40	10.21	16.91	7.75	0.00	21.97	19.58	0.462	1.60	0.87	5.120	A
B	15.35	230.25	15.23	12.77	5.19	0.00	20.28	17.44	0.757	1.08	2.96	11.601	B
C	16.70	250.50	16.68	12.44	7.98	0.00	25.13	24.35	0.665	1.64	1.94	7.082	A

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

Arm	Total Demand (Veh/min)	Junction Arrivals (Veh)	Entry Flow (Veh/min)	Exit Flow (Veh/min)	Circulating Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	Saturation Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
A	8.95	134.25	8.96	15.46	7.37	0.00	22.06	19.49	0.406	0.87	0.69	4.585	A
B	13.22	198.30	13.29	11.78	4.56	0.00	20.46	17.25	0.646	2.96	1.87	8.452	A
C	15.85	237.75	15.87	10.89	6.96	0.00	25.58	24.16	0.620	1.94	1.66	6.196	A

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

Arm	Total Demand (Veh/min)	Junction Arrivals (Veh)	Entry Flow (Veh/min)	Exit Flow (Veh/min)	Circulating Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	Saturation Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
A	10.73	160.95	10.72	15.15	7.07	0.00	22.37	19.50	0.480	0.69	0.91	5.142	A
B	13.36	200.40	13.36	12.34	5.45	0.00	20.17	17.46	0.662	1.87	1.93	8.801	A
C	15.21	228.15	15.23	11.81	7.00	0.00	26.02	24.55	0.584	1.66	1.43	5.565	A

Main results: (17:45-18:00)

Arm	Total Demand (Veh/min)	Junction Arrivals (Veh)	Entry Flow (Veh/min)	Exit Flow (Veh/min)	Circulating Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	Saturation Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
A	11.80	177.00	11.78	15.31	7.72	0.00	21.63	19.27	0.545	0.91	1.18	6.079	A
B	12.22	183.30	12.24	13.51	5.99	0.00	19.59	17.35	0.624	1.93	1.69	8.174	A
C	16.63	249.45	16.61	11.82	6.41	0.00	26.30	24.42	0.632	1.43	1.69	6.180	A

Main results: (18:00-18:15)

Arm	Total Demand (Veh/min)	Junction Arrivals (Veh)	Entry Flow (Veh/min)	Exit Flow (Veh/min)	Circulating Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	Saturation Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
A	15.71	235.65	15.64	13.67	6.75	0.00	22.46	19.47	0.700	1.18	2.26	8.710	A
B	11.23	168.45	11.24	14.44	7.95	0.00	18.43	17.28	0.609	1.69	1.59	8.355	A
C	14.50	217.50	14.53	13.30	5.89	0.00	26.49	24.30	0.547	1.69	1.22	5.032	A

Queueing Delay Results for each time segment

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

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
A	22.64	1.51	7.159	A	A
B	15.51	1.03	6.441	A	A
C	23.40	1.56	5.827	A	A

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

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
A	13.48	0.90	5.120	A	A
B	40.47	2.70	11.601	B	B
C	28.25	1.88	7.082	A	A

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

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
A	10.55	0.70	4.585	A	A
B	29.59	1.97	8.452	A	A
C	25.52	1.70	6.196	A	A

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

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
A	13.35	0.89	5.142	A	A
B	28.62	1.91	8.801	A	A
C	21.90	1.46	5.565	A	A

Queueing Delay results: (17:45-18:00)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
A	17.24	1.15	6.079	A	A
B	26.08	1.74	8.174	A	A
C	24.67	1.64	6.180	A	A

Queueing Delay results: (18:00-18:15)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
A	31.84	2.12	8.710	A	A
B	24.25	1.62	8.355	A	A
C	18.91	1.26	5.032	A	A

(Default Analysis Set) - 2018 PM Existing + Dev, PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	DemandSets	D1 - 2012 PM existing, PM	Demand Set 1: Scenario Name includes Time Period Name ('PM'). Are you sure this is correct?
Warning	DemandSets	D2 - 2013 PM Existing, PM	Demand Set 2: Scenario Name includes Time Period Name ('PM'). Are you sure this is correct?
Warning	DemandSets	D3 - 2018 PM Existing, PM	Demand Set 3: Scenario Name includes Time Period Name ('PM'). Are you sure this is correct?
Warning	DemandSets	D4 - 2018 PM Existing + Dev, PM	Demand Set 4: Scenario Name includes Time Period Name ('PM'). Are you sure this is correct?

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set (s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
2018 PM Existing + Dev, PM	2018 PM Existing + Dev	PM		Varies by Arm	16:45	18:15	90	15				✓		

Junction Network

Junctions

Name	Junction Type	Arm Order	Grade Separated	Large Roundabout	Do Geometric Delay	Junction Delay (s)	Junction LOS
Cangle North	Roundabout	A,B,C				12.99	B

Junction Network Options

Driving Side	Lighting	Network Residual Capacity (%)	First Arm Reaching Threshold
Left	Normal/unknown	11	Arm B

Arms

Arms

Arm	Name	Description
A	Arm A	Wratting Road
B	Arm B	Lords Croft Lane
C	Arm NB	NB Link

Capacity Options

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

Roundabout Geometry

Arm	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
A	3.50	7.20	8.60	20.00	29.00	9.00	
B	3.80	5.50	5.50	15.00	29.00	23.00	
C	6.30	6.50	3.00	15.00	28.00	40.00	

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

Pedestrian Crossings

Arm	Crossing Type
A	None
B	None
C	None

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Arm	Enter slope and intercept directly	Entered slope	Entered intercept (PCU/min)	Final Slope	Final Intercept (PCU/min)
A		(calculated)	(calculated)	0.670	27.397
B		(calculated)	(calculated)	0.604	23.694
C		(calculated)	(calculated)	0.677	30.982

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

Traffic Flows

Demand Set Data Options

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

Entry Flows

General Flows Data

Arm	Profile Type	Use Turning Counts	Average Demand Flow (Veh/min)	Flow Scaling Factor (%)
A	DIRECT		N/A	100.000
B	DIRECT		N/A	100.000
C	DIRECT		N/A	100.000

Turning Proportions

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

		To		
		A	B	C
From	A	0.000	532.000	629.000
	B	707.000	0.000	539.000
	C	925.000	667.000	0.000

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

		To		
		A	B	C
From	A	0.00	0.46	0.54
	B	0.57	0.00	0.43
	C	0.58	0.42	0.00

Vehicle Mix

Average PCU Per Vehicle - Junction 1 - (16:45-17:00)

		To		
		A	B	C
From	A	1.000	1.028	1.019
	B	1.012	1.000	1.013
	C	1.014	1.017	1.000

Heavy Vehicle Percentages - Junction 1 - (16:45-17:00)

		To		
		A	B	C
From	A	0.000	2.800	1.900
	B	1.200	0.000	1.300
	C	1.400	1.700	0.000

Average PCU Per Vehicle - Junction 1 - (17:00-17:15)

		To		
		A	B	C
From	A	1.000	1.016	1.000
	B	1.008	1.000	1.019
	C	1.018	1.011	1.000

Heavy Vehicle Percentages - Junction 1 - (17:00-17:15)

		To		
		A	B	C
From	A	0.000	1.600	0.000
	B	0.800	0.000	1.900
	C	1.800	1.100	0.000

Average PCU Per Vehicle - Junction 1 - (17:15-17:30)

		To		
		A	B	C
From	A	1.000	1.017	1.012
	B	1.025	1.000	1.012
	C	1.027	1.010	1.000

Heavy Vehicle Percentages - Junction 1 - (17:15-17:30)

		To		
		A	B	C
From	A	0.000	1.700	1.200
	B	2.500	0.000	1.200
	C	2.700	1.000	0.000

Average PCU Per Vehicle - Junction 1 - (17:30-17:45)

		To		
		A	B	C
From	A	1.000	1.013	1.011
	B	1.016	1.000	1.000
	C	1.008	1.000	1.000

Heavy Vehicle Percentages - Junction 1 - (17:30-17:45)

		To		
		A	B	C
From	A	0.000	1.300	1.100
	B	1.600	0.000	0.000
	C	0.800	0.000	0.000

Average PCU Per Vehicle - Junction 1 - (17:45-18:00)

		To		
		A	B	C
From	A	1.000	1.056	1.000
	B	1.039	1.000	1.000
	C	1.000	1.017	1.000

Heavy Vehicle Percentages - Junction 1 - (17:45-18:00)

		To		
		A	B	C
From	A	0.000	5.600	0.000
	B	3.900	0.000	0.000
	C	0.000	1.700	0.000

Average PCU Per Vehicle - Junction 1 - (18:00-18:15)

		To		
		A	B	C
From	A	1.000	1.038	1.000
	B	1.030	1.000	1.013
	C	1.022	1.000	1.000

Heavy Vehicle Percentages - Junction 1 - (18:00-18:15)

		To		
		A	B	C
From	A	0.000	3.800	0.000
	B	3.000	0.000	1.300
	C	2.200	0.000	0.000

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (Veh)	Max LOS	Average Demand (Veh/min)	Total Junction Arrivals (Veh)	Total Queueing Delay (Veh-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (Veh-min/min)	Inclusive Total Queueing Delay (Veh-min)	Inclusive Average Queueing Delay (s)
A	0.78	11.56	3.33	B	13.53	1218.15	152.28	7.50	1.69	152.53	7.51
B	0.85	18.01	5.04	C	13.86	1247.26	256.41	12.33	2.85	256.59	12.34
C	0.76	10.14	3.05	B	17.71	1593.45	212.97	8.02	2.37	213.03	8.02

Main Results for each time segment

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

Arm	Total Demand (Veh/min)	Junction Arrivals (Veh)	Entry Flow (Veh/min)	Exit Flow (Veh/min)	Circulating Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	Saturation Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
A	15.11	226.65	14.96	17.10	7.72	0.00	21.64	20.06	0.698	0.00	2.24	8.804	A
B	11.37	170.55	11.27	14.58	8.11	0.00	18.47	16.79	0.615	0.00	1.56	8.212	A
C	18.59	278.85	18.43	12.98	6.39	0.00	26.21	24.09	0.709	0.00	2.37	7.572	A

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

Arm	Total Demand (Veh/min)	Junction Arrivals (Veh)	Entry Flow (Veh/min)	Exit Flow (Veh/min)	Circulating Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	Saturation Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
A	11.91	178.65	11.98	20.00	7.71	0.00	22.01	20.40	0.541	2.24	1.20	6.023	A
B	16.63	249.45	16.40	13.20	6.49	0.00	19.52	16.80	0.852	1.56	5.06	18.009	C
C	18.45	276.75	18.41	13.58	9.30	0.00	24.27	24.12	0.760	2.37	3.04	10.136	B

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

Arm	Total Demand (Veh/min)	Junction Arrivals (Veh)	Entry Flow (Veh/min)	Exit Flow (Veh/min)	Circulating Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	Saturation Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
A	10.70	160.50	10.72	18.56	7.39	0.00	22.08	20.31	0.485	1.20	0.95	5.285	A
B	14.50	217.50	14.65	12.30	5.81	0.00	19.76	16.64	0.734	5.06	2.88	12.036	B
C	17.60	264.00	17.63	12.14	8.31	0.00	24.73	23.96	0.712	3.04	2.54	8.498	A

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

Arm	Total Demand (Veh/min)	Junction Arrivals (Veh)	Entry Flow (Veh/min)	Exit Flow (Veh/min)	Circulating Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	Saturation Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
A	12.48	187.20	12.46	18.17	7.12	0.00	22.36	20.33	0.558	0.95	1.24	6.047	A
B	14.64	219.60	14.63	12.83	6.75	0.00	19.39	16.81	0.755	2.88	2.99	12.564	B
C	16.96	254.40	16.99	13.08	8.30	0.00	25.15	24.31	0.674	2.54	2.12	7.377	A

Main results: (17:45-18:00)

Arm	Total Demand (Veh/min)	Junction Arrivals (Veh)	Entry Flow (Veh/min)	Exit Flow (Veh/min)	Circulating Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	Saturation Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
A	13.55	203.25	13.52	18.34	7.69	0.00	21.61	20.00	0.627	1.24	1.65	7.396	A
B	13.50	202.50	13.52	13.89	7.33	0.00	18.85	16.78	0.716	2.99	2.61	11.331	B
C	18.38	275.70	18.35	13.18	7.67	0.00	25.41	24.12	0.723	2.12	2.54	8.461	A

Main results: (18:00-18:15)

Arm	Total Demand (Veh/min)	Junction Arrivals (Veh)	Entry Flow (Veh/min)	Exit Flow (Veh/min)	Circulating Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	Saturation Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
A	17.46	261.90	17.35	16.57	6.83	0.00	22.43	20.28	0.778	1.65	3.33	11.558	B
B	12.51	187.65	12.52	14.78	9.40	0.00	17.62	16.68	0.710	2.61	2.52	11.796	B
C	16.25	243.75	16.30	14.81	7.10	0.00	25.71	24.08	0.632	2.54	1.75	6.415	A

Queueing Delay Results for each time segment

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

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
A	31.10	2.07	8.804	A	A
B	21.99	1.47	8.212	A	A
C	33.09	2.21	7.572	A	A

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

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
A	18.69	1.25	6.023	A	A
B	65.03	4.34	18.009	C	B
C	43.41	2.89	10.136	B	B

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

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
A	14.61	0.97	5.285	A	A
B	46.61	3.11	12.036	B	B
C	39.52	2.63	8.498	A	A

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

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
A	18.13	1.21	6.047	A	A
B	44.18	2.95	12.564	B	B
C	32.82	2.19	7.377	A	A

Queueing Delay results: (17:45-18:00)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
A	23.81	1.59	7.396	A	A
B	40.55	2.70	11.331	B	B
C	36.70	2.45	8.461	A	A

Queueing Delay results: (18:00-18:15)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
A	45.72	3.05	11.558	B	B
B	38.24	2.55	11.796	B	B
C	27.35	1.82	6.415	A	A

Junctions 8

ARCADY 8 - Roundabout Module

Version: 8.0.2.316 [14 Feb 2013]

Filename: Cangle South Mini (calibrated) - AM.arc8
Path: Z:\Projects\CS059139 - NW Haverhill SUE, Savills obo NW Haverhill Consortium\A5 - Technical\Arcady\Direct 90 mins\Arc8 - Revised Assessment May 2013
Report generation date: 03/06/2013 08:21:27

» mini-roundabout - 2012 No Dev, AM
» mini-roundabout - 2013 No Dev, AM
» mini-roundabout - 2018 No Dev, AM
» mini-roundabout - 2018 With Dev, AM

Summary of junction performance

	AM				
	Queue (Veh)	Delay (s)	RFC	LOS	Network Residual Capacity
	mini-roundabout - 2012 No Dev				
Arm A	1.82	9.62	0.65	A	40 %
Arm B	1.35	7.07	0.59	A	
Arm C	0.49	9.48	0.34	A	[Arm A]

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Network Residual Capacity indicates the amount by which network flow could be increased before a user-definable threshold (see Analysis Options) is met.

'D1 - 2012 No Dev, AM " model duration: 07:45 - 09:15
'D2 - 2013 No Dev, AM" model duration: 07:45 - 09:15
'D3 - 2018 No Dev, AM" model duration: 07:45 - 09:15
'D4 - 2018 With Dev, AM" model duration: 07:45 - 09:15

Run using Junctions 8.0.2.316 at 03/06/2013 08:21:23

File summary

File Description

Title	Haverhill Southern junction - SCC Geometry
Location	
Site Number	
Date	15/11/2012
Version	
Status	
Identifier	
Client	
Jobnumber	
Enumerator	Gus Bradford
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	RFC Threshold	Average Delay Threshold (s)	Queue Threshold (PCU)
10.00		✓	Delay	0.85	36.00	20.00

Units

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

mini-roundabout - 2012 No Dev, AM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set (s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
mini-roundabout	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
2012 No Dev, AM	2012 No Dev	AM		Varies by Arm	07:45	09:15	90	15				✓		

Junction Network

Junctions

Name	Junction Type	Arm Order	Junction Delay (s)	Junction LOS
Cangle South - Mini	Mini-roundabout	A,B,C	8.45	A

Junction Network Options

Driving Side	Lighting	Road Surface	In London	Network Residual Capacity (%)	First Arm Reaching Threshold
Left	Normal/unknown	Normal/unknown		40	Arm A

Arms

Arms

Arm	Name	Description
A	Arm E	Withersfield Road
B	Arm SB	SB Link
C	Arm D	Queens Street

Capacity Options

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

Mini Roundabout Geometry

Arm	Approach road half-width (m)	Minimum approach road half-width (m)	Entry width (m)	Effective flare length (m)	Distance to next arm (m)	Entry corner kerb line distance (m)	Gradient over 50m (%)	Kerbed central island
A	5.50	5.50	5.50	0.00	18.00	10.00	0.00	
B	3.70	3.70	3.70	0.00	16.00	11.00	0.00	
C	3.00	3.00	4.50	13.00	17.00	10.00	0.00	

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

Pedestrian Crossings

Arm	Crossing Type
A	None
B	None
C	None

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Arm	Enter slope and intercept directly	Entered slope	Entered intercept (PCU/min)	Final Slope	Final Intercept (PCU/min)
A		(calculated)	(calculated)	0.633	15.984
B		(calculated)	(calculated)	0.545	11.672
C		(calculated)	(calculated)	0.563	13.568

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

Arm Capacity Adjustments

Arm	Type	Reason	Direct Capacity Adjustment (PCU/min)	Percentage Capacity Adjustment (%)
A	Direct		4.00	
B	Direct		9.00	
C	Direct		2.00	

Traffic Flows

Demand Set Data Options

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

Entry Flows

General Flows Data

Arm	Profile Type	Use Turning Counts	Average Demand Flow (Veh/min)	Flow Scaling Factor (%)
A	DIRECT		N/A	100.000
B	DIRECT		N/A	100.000
C	DIRECT		N/A	100.000

Turning Proportions

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

		To		
		A	B	C
From	A	0.000	821.000	13.000
	B	853.000	0.000	26.000
	C	56.000	170.000	0.000

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

		To		
		A	B	C
From	A	0.00	0.98	0.02
	B	0.97	0.00	0.03
	C	0.25	0.75	0.00

Vehicle Mix

Average PCU Per Vehicle - Junction 1 - (07:45-08:00)

		To		
		A	B	C
From	A	1.000	1.029	1.000
	B	1.042	1.000	1.333
	C	1.000	1.000	1.000

Heavy Vehicle Percentages - Junction 1 - (07:45-08:00)

		To		
		A	B	C
From	A	0.000	2.900	0.000
	B	4.200	0.000	33.300
	C	0.000	0.000	0.000

Average PCU Per Vehicle - Junction 1 - (08:00-08:15)

		To		
		A	B	C
From	A	1.000	1.034	1.000
	B	1.032	1.000	1.000
	C	1.250	1.000	1.000

Heavy Vehicle Percentages - Junction 1 - (08:00-08:15)

		To		
		A	B	C
From	A	0.000	3.400	0.000
	B	3.200	0.000	0.000
	C	25.000	0.000	0.000

Average PCU Per Vehicle - Junction 1 - (08:15-08:30)

		To		
		A	B	C
From	A	1.000	1.049	1.000
	B	1.043	1.000	1.000
	C	1.000	1.026	1.000

Heavy Vehicle Percentages - Junction 1 - (08:15-08:30)

		To		
		A	B	C
From	A	0.000	4.900	0.000
	B	4.300	0.000	0.000
	C	0.000	2.600	0.000

Average PCU Per Vehicle - Junction 1 - (08:30-08:45)

		To		
		A	B	C
From	A	1.000	1.041	1.000
	B	1.012	1.000	1.000
	C	1.125	1.000	1.000

Heavy Vehicle Percentages - Junction 1 - (08:30-08:45)

		To		
		A	B	C
From	A	0.000	4.100	0.000
	B	1.200	0.000	0.000
	C	12.500	0.000	0.000

Average PCU Per Vehicle - Junction 1 - (08:45-09:00)

		To		
		A	B	C
From	A	1.000	1.047	1.000
	B	1.034	1.000	1.000
	C	1.000	1.059	1.000

Heavy Vehicle Percentages - Junction 1 - (08:45-09:00)

		To		
		A	B	C
From	A	0.000	4.700	0.000
	B	3.400	0.000	0.000
	C	0.000	5.900	0.000

Average PCU Per Vehicle - Junction 1 - (09:00-09:15)

		To		
		A	B	C
From	A	1.000	1.034	1.000
	B	1.086	1.000	1.000
	C	1.000	1.087	1.000

Heavy Vehicle Percentages - Junction 1 - (09:00-09:15)

		To		
		A	B	C
From	A	0.000	3.400	0.000
	B	8.600	0.000	0.000
	C	0.000	8.700	0.000

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (Veh)	Max LOS	Average Demand (Veh/min)	Total Junction Arrivals (Veh)	Total Queueing Delay (Veh-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (Veh-min/min)	Inclusive Total Queueing Delay (Veh-min)	Inclusive Average Queueing Delay (s)
A	0.65	9.62	1.82	A	9.27	833.99	101.09	7.27	1.12	101.11	7.27
B	0.59	7.07	1.35	A	9.77	879.04	88.39	6.03	0.98	88.41	6.03
C	0.34	9.48	0.49	A	2.51	226.06	31.69	8.41	0.35	31.69	8.41

Main Results for each time segment

Main results: (07:45-08:00)

Arm	Total Demand (Veh/min)	Junction Arrivals (Veh)	Entry Flow (Veh/min)	Exit Flow (Veh/min)	Circulating Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	Saturation Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
A	7.00	105.00	6.96	9.78	1.40	0.00	18.57	17.37	0.377	0.00	0.60	5.150	A
B	9.67	145.05	9.61	8.25	0.11	0.00	19.62	19.54	0.493	0.00	0.96	5.954	A
C	1.87	28.05	1.86	0.39	9.32	0.00	10.10	4.45	0.185	0.00	0.22	7.261	A

Main results: (08:00-08:15)

Arm	Total Demand (Veh/min)	Junction Arrivals (Veh)	Entry Flow (Veh/min)	Exit Flow (Veh/min)	Circulating Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	Saturation Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
A	8.13	121.95	8.12	8.87	1.75	0.00	18.27	17.45	0.445	0.60	0.79	5.904	A
B	8.53	127.95	8.54	9.74	0.13	0.00	19.98	19.91	0.427	0.96	0.75	5.254	A
C	2.33	34.95	2.33	0.38	8.29	0.00	10.13	4.10	0.230	0.22	0.30	7.683	A

Main results: (08:15-08:30)

Arm	Total Demand (Veh/min)	Junction Arrivals (Veh)	Entry Flow (Veh/min)	Exit Flow (Veh/min)	Circulating Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	Saturation Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
A	11.00	165.00	10.94	9.83	2.55	0.00	17.49	17.08	0.629	0.79	1.65	9.088	A
B	9.27	139.05	9.26	13.32	0.17	0.00	19.76	19.70	0.469	0.75	0.87	5.712	A
C	3.40	51.00	3.39	0.44	8.99	0.00	10.09	4.26	0.337	0.30	0.50	8.927	A

Main results: (08:30-08:45)

Arm	Total Demand (Veh/min)	Junction Arrivals (Veh)	Entry Flow (Veh/min)	Exit Flow (Veh/min)	Circulating Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	Saturation Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
A	9.93	148.95	9.96	12.11	1.71	0.00	18.16	17.27	0.547	1.65	1.23	7.340	A
B	11.93	178.95	11.90	11.52	0.16	0.00	20.35	20.29	0.586	0.87	1.39	7.068	A
C	2.27	34.05	2.28	0.51	11.54	0.00	8.73	4.23	0.260	0.50	0.36	9.323	A

Main results: (08:45-09:00)

Arm	Total Demand (Veh/min)	Junction Arrivals (Veh)	Entry Flow (Veh/min)	Exit Flow (Veh/min)	Circulating Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	Saturation Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
A	11.47	172.05	11.43	10.68	2.30	0.00	17.63	17.09	0.651	1.23	1.81	9.621	A
B	10.20	153.00	10.22	13.56	0.18	0.00	19.92	19.87	0.512	1.39	1.06	6.199	A
C	3.07	46.05	3.06	0.48	9.92	0.00	9.38	4.16	0.327	0.36	0.48	9.479	A

Main results: (09:00-09:15)

Arm	Total Demand (Veh/min)	Junction Arrivals (Veh)	Entry Flow (Veh/min)	Exit Flow (Veh/min)	Circulating Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	Saturation Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
A	8.07	121.05	8.14	9.27	1.61	0.00	18.26	17.30	0.442	1.81	0.80	5.966	A
B	9.00	135.00	9.01	9.62	0.13	0.00	19.02	18.94	0.473	1.06	0.91	6.001	A
C	2.13	31.95	2.14	0.39	8.74	0.00	9.60	4.07	0.222	0.48	0.29	8.057	A

Queueing Delay Results for each time segment

Queueing Delay results: (07:45-08:00)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
A	8.70	0.58	5.150	A	A
B	13.79	0.92	5.954	A	A
C	3.25	0.22	7.261	A	A

Queueing Delay results: (08:00-08:15)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
A	11.59	0.77	5.904	A	A
B	11.56	0.77	5.254	A	A
C	4.32	0.29	7.683	A	A

Queueing Delay results: (08:15-08:30)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
A	23.37	1.56	9.088	A	A
B	12.85	0.86	5.712	A	A
C	7.24	0.48	8.927	A	A

Queueing Delay results: (08:30-08:45)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
A	19.07	1.27	7.340	A	A
B	20.04	1.34	7.068	A	A
C	5.53	0.37	9.323	A	A

Queueing Delay results: (08:45-09:00)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
A	25.82	1.72	9.621	A	A
B	16.44	1.10	6.199	A	A
C	6.96	0.46	9.479	A	A

Queueing Delay results: (09:00-09:15)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
A	12.52	0.83	5.966	A	A
B	13.94	0.93	6.001	A	A
C	4.47	0.30	8.057	A	A

mini-roundabout - 2013 No Dev, AM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set (s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
mini-roundabout	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
2013 No Dev, AM	2013 No Dev	AM		Varies by Arm	07:45	09:15	90	15				✓		

Junction Network

Junctions

Name	Junction Type	Arm Order	Junction Delay (s)	Junction LOS
Cangle South - Mini	Mini-roundabout	A,B,C	8.51	A

Junction Network Options

Driving Side	Lighting	Road Surface	In London	Network Residual Capacity (%)	First Arm Reaching Threshold
Left	Normal/unknown	Normal/unknown		39	Arm A

Arms

Arms

Arm	Name	Description
A	Arm E	Withersfield Road
B	Arm SB	SB Link
C	Arm D	Queens Street

Capacity Options

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

Mini Roundabout Geometry

Arm	Approach road half-width (m)	Minimum approach road half-width (m)	Entry width (m)	Effective flare length (m)	Distance to next arm (m)	Entry corner kerb line distance (m)	Gradient over 50m (%)	Kerbed central island
A	5.50	5.50	5.50	0.00	18.00	10.00	0.00	
B	3.70	3.70	3.70	0.00	16.00	11.00	0.00	
C	3.00	3.00	4.50	13.00	17.00	10.00	0.00	

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

Pedestrian Crossings

Arm	Crossing Type
A	None
B	None
C	None

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Arm	Enter slope and intercept directly	Entered slope	Entered intercept (PCU/min)	Final Slope	Final Intercept (PCU/min)
A		(calculated)	(calculated)	0.633	15.984
B		(calculated)	(calculated)	0.545	11.672
C		(calculated)	(calculated)	0.563	13.568

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

Arm Capacity Adjustments

Arm	Type	Reason	Direct Capacity Adjustment (PCU/min)	Percentage Capacity Adjustment (%)
A	Direct		4.00	
B	Direct		9.00	
C	Direct		2.00	

Traffic Flows

Demand Set Data Options

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

Entry Flows

General Flows Data

Arm	Profile Type	Use Turning Counts	Average Demand Flow (Veh/min)	Flow Scaling Factor (%)
A	DIRECT		N/A	100.000
B	DIRECT		N/A	100.000
C	DIRECT		N/A	100.000

Turning Proportions

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

		To		
		A	B	C
From	A	0.000	825.000	13.000
	B	857.000	0.000	26.000
	C	56.000	171.000	0.000

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

		To		
		A	B	C
From	A	0.00	0.98	0.02
	B	0.97	0.00	0.03
	C	0.25	0.75	0.00

Vehicle Mix

Average PCU Per Vehicle - Junction 1 - (07:45-08:00)

		To		
		A	B	C
From	A	1.000	1.029	1.000
	B	1.042	1.000	1.333
	C	1.000	1.000	1.000

Heavy Vehicle Percentages - Junction 1 - (07:45-08:00)

		To		
		A	B	C
From	A	0.000	2.900	0.000
	B	4.200	0.000	33.300
	C	0.000	0.000	0.000

Average PCU Per Vehicle - Junction 1 - (08:00-08:15)

		To		
		A	B	C
From	A	1.000	1.034	1.000
	B	1.032	1.000	1.000
	C	1.250	1.000	1.000

Heavy Vehicle Percentages - Junction 1 - (08:00-08:15)

		To		
		A	B	C
From	A	0.000	3.400	0.000
	B	3.200	0.000	0.000
	C	25.000	0.000	0.000

Average PCU Per Vehicle - Junction 1 - (08:15-08:30)

		To		
		A	B	C
From	A	1.000	1.049	1.000
	B	1.043	1.000	1.000
	C	1.000	1.026	1.000

Heavy Vehicle Percentages - Junction 1 - (08:15-08:30)

		To		
		A	B	C
From	A	0.000	4.900	0.000
	B	4.300	0.000	0.000
	C	0.000	2.600	0.000

Average PCU Per Vehicle - Junction 1 - (08:30-08:45)

		To		
		A	B	C
From	A	1.000	1.041	1.000
	B	1.012	1.000	1.000
	C	1.125	1.000	1.000

Heavy Vehicle Percentages - Junction 1 - (08:30-08:45)

		To		
		A	B	C
From	A	0.000	4.100	0.000
	B	1.200	0.000	0.000
	C	12.500	0.000	0.000

Average PCU Per Vehicle - Junction 1 - (08:45-09:00)

		To		
		A	B	C
From	A	1.000	1.047	1.000
	B	1.034	1.000	1.000
	C	1.000	1.059	1.000

Heavy Vehicle Percentages - Junction 1 - (08:45-09:00)

		To		
		A	B	C
From	A	0.000	4.700	0.000
	B	3.400	0.000	0.000
	C	0.000	5.900	0.000

Average PCU Per Vehicle - Junction 1 - (09:00-09:15)

		To		
		A	B	C
From	A	1.000	1.034	1.000
	B	1.086	1.000	1.000
	C	1.000	1.087	1.000

Heavy Vehicle Percentages - Junction 1 - (09:00-09:15)

		To		
		A	B	C
From	A	0.000	3.400	0.000
	B	8.600	0.000	0.000
	C	0.000	8.700	0.000

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (Veh)	Max LOS	Average Demand (Veh/min)	Total Junction Arrivals (Veh)	Total Queueing Delay (Veh-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (Veh-min/min)	Inclusive Total Queueing Delay (Veh-min)	Inclusive Average Queueing Delay (s)
A	0.65	9.71	1.85	A	9.31	837.75	102.21	7.32	1.14	102.23	7.32
B	0.59	7.11	1.37	A	9.81	882.79	89.14	6.06	0.99	89.17	6.06
C	0.34	9.53	0.50	A	2.52	226.81	31.94	8.45	0.35	31.95	8.45

Main Results for each time segment

Main results: (07:45-08:00)

Arm	Total Demand (Veh/min)	Junction Arrivals (Veh)	Entry Flow (Veh/min)	Exit Flow (Veh/min)	Circulating Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	Saturation Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
A	7.03	105.45	6.99	9.82	1.40	0.00	18.57	17.37	0.379	0.00	0.60	5.164	A
B	9.71	145.65	9.65	8.28	0.11	0.00	19.62	19.54	0.495	0.00	0.97	5.977	A
C	1.87	28.05	1.85	0.39	9.36	0.00	10.08	4.45	0.186	0.00	0.23	7.281	A

Main results: (08:00-08:15)

Arm	Total Demand (Veh/min)	Junction Arrivals (Veh)	Entry Flow (Veh/min)	Exit Flow (Veh/min)	Circulating Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	Saturation Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
A	8.17	122.55	8.16	8.91	1.76	0.00	18.26	17.45	0.447	0.60	0.80	5.931	A
B	8.57	128.55	8.58	9.79	0.13	0.00	19.98	19.91	0.429	0.97	0.76	5.273	A
C	2.34	35.10	2.34	0.38	8.33	0.00	10.11	4.10	0.232	0.23	0.30	7.712	A

Main results: (08:15-08:30)

Arm	Total Demand (Veh/min)	Junction Arrivals (Veh)	Entry Flow (Veh/min)	Exit Flow (Veh/min)	Circulating Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	Saturation Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
A	11.05	165.75	10.99	9.87	2.56	0.00	17.48	17.08	0.632	0.80	1.67	9.165	A
B	9.31	139.65	9.30	13.38	0.17	0.00	19.76	19.71	0.471	0.76	0.88	5.734	A
C	3.41	51.15	3.40	0.44	9.03	0.00	10.07	4.26	0.339	0.30	0.50	8.970	A

Main results: (08:30-08:45)

Arm	Total Demand (Veh/min)	Junction Arrivals (Veh)	Entry Flow (Veh/min)	Exit Flow (Veh/min)	Circulating Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	Saturation Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
A	9.98	149.70	10.01	12.16	1.72	0.00	18.16	17.27	0.550	1.67	1.24	7.388	A
B	11.98	179.70	11.94	11.58	0.16	0.00	20.35	20.29	0.589	0.88	1.41	7.111	A
C	2.28	34.20	2.29	0.51	11.59	0.00	8.70	4.23	0.262	0.50	0.36	9.376	A

Main results: (08:45-09:00)

Arm	Total Demand (Veh/min)	Junction Arrivals (Veh)	Entry Flow (Veh/min)	Exit Flow (Veh/min)	Circulating Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	Saturation Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
A	11.52	172.80	11.48	10.72	2.31	0.00	17.62	17.09	0.654	1.24	1.83	9.707	A
B	10.24	153.60	10.26	13.62	0.18	0.00	19.92	19.87	0.514	1.41	1.07	6.225	A
C	3.08	46.20	3.07	0.48	9.96	0.00	9.36	4.16	0.329	0.36	0.48	9.529	A

Main results: (09:00-09:15)

Arm	Total Demand (Veh/min)	Junction Arrivals (Veh)	Entry Flow (Veh/min)	Exit Flow (Veh/min)	Circulating Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	Saturation Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
A	8.10	121.50	8.17	9.31	1.62	0.00	18.25	17.30	0.444	1.83	0.81	5.987	A
B	9.04	135.60	9.05	9.66	0.13	0.00	19.02	18.94	0.475	1.07	0.92	6.025	A
C	2.14	32.10	2.15	0.39	8.78	0.00	9.58	4.07	0.223	0.48	0.29	8.095	A

Queueing Delay Results for each time segment

Queueing Delay results: (07:45-08:00)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
A	8.76	0.58	5.164	A	A
B	13.90	0.93	5.977	A	A
C	3.26	0.22	7.281	A	A

Queueing Delay results: (08:00-08:15)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
A	11.70	0.78	5.931	A	A
B	11.65	0.78	5.273	A	A
C	4.36	0.29	7.712	A	A

Queueing Delay results: (08:15-08:30)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
A	23.66	1.58	9.165	A	A
B	12.95	0.86	5.734	A	A
C	7.29	0.49	8.970	A	A

Queueing Delay results: (08:30-08:45)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
A	19.31	1.29	7.388	A	A
B	20.23	1.35	7.111	A	A
C	5.58	0.37	9.376	A	A

Queueing Delay results: (08:45-09:00)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
A	26.15	1.74	9.707	A	A
B	16.58	1.11	6.225	A	A
C	7.02	0.47	9.529	A	A

Queueing Delay results: (09:00-09:15)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
A	12.62	0.84	5.987	A	A
B	14.06	0.94	6.025	A	A
C	4.52	0.30	8.095	A	A

mini-roundabout - 2018 No Dev, AM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set (s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
mini-roundabout	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
2018 No Dev, AM	2018 No Dev	AM		Varies by Arm	07:45	09:15	90	15				✓		

Junction Network

Junctions

Name	Junction Type	Arm Order	Junction Delay (s)	Junction LOS
Cangle South - Mini	Mini-roundabout	A,B,C	9.50	A

Junction Network Options

Driving Side	Lighting	Road Surface	In London	Network Residual Capacity (%)	First Arm Reaching Threshold
Left	Normal/unknown	Normal/unknown		31	Arm A

Arms

Arms

Arm	Name	Description
A	Arm E	Withersfield Road
B	Arm SB	SB Link
C	Arm D	Queens Street

Capacity Options

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

Mini Roundabout Geometry

Arm	Approach road half-width (m)	Minimum approach road half-width (m)	Entry width (m)	Effective flare length (m)	Distance to next arm (m)	Entry corner kerb line distance (m)	Gradient over 50m (%)	Kerbed central island
A	5.50	5.50	5.50	0.00	18.00	10.00	0.00	
B	3.70	3.70	3.70	0.00	16.00	11.00	0.00	
C	3.00	3.00	4.50	13.00	17.00	10.00	0.00	

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

Pedestrian Crossings

Arm	Crossing Type
A	None
B	None
C	None

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Arm	Enter slope and intercept directly	Entered slope	Entered intercept (PCU/min)	Final Slope	Final Intercept (PCU/min)
A		(calculated)	(calculated)	0.633	15.984
B		(calculated)	(calculated)	0.545	11.672
C		(calculated)	(calculated)	0.563	13.568

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

Arm Capacity Adjustments

Arm	Type	Reason	Direct Capacity Adjustment (PCU/min)	Percentage Capacity Adjustment (%)
A	Direct		4.00	
B	Direct		9.00	
C	Direct		2.00	

Traffic Flows

Demand Set Data Options

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

Entry Flows

General Flows Data

Arm	Profile Type	Use Turning Counts	Average Demand Flow (Veh/min)	Flow Scaling Factor (%)
A	DIRECT		N/A	100.000
B	DIRECT		N/A	100.000
C	DIRECT		N/A	100.000

Turning Proportions

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

		To		
		A	B	C
From	A	0.000	875.000	14.000
	B	909.000	0.000	28.000
	C	60.000	181.000	0.000

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

		To		
		A	B	C
From	A	0.00	0.98	0.02
	B	0.97	0.00	0.03
	C	0.25	0.75	0.00

Vehicle Mix

Average PCU Per Vehicle - Junction 1 - (07:45-08:00)

		To		
		A	B	C
From	A	1.000	1.029	1.000
	B	1.042	1.000	1.333
	C	1.000	1.000	1.000

Heavy Vehicle Percentages - Junction 1 - (07:45-08:00)

		To		
		A	B	C
From	A	0.000	2.900	0.000
	B	4.200	0.000	33.300
	C	0.000	0.000	0.000

Average PCU Per Vehicle - Junction 1 - (08:00-08:15)

		To		
		A	B	C
From	A	1.000	1.034	1.000
	B	1.032	1.000	1.000
	C	1.250	1.000	1.000

Heavy Vehicle Percentages - Junction 1 - (08:00-08:15)

		To		
		A	B	C
From	A	0.000	3.400	0.000
	B	3.200	0.000	0.000
	C	25.000	0.000	0.000

Average PCU Per Vehicle - Junction 1 - (08:15-08:30)

		To		
		A	B	C
From	A	1.000	1.049	1.000
	B	1.043	1.000	1.000
	C	1.000	1.026	1.000

Heavy Vehicle Percentages - Junction 1 - (08:15-08:30)

		To		
		A	B	C
From	A	0.000	4.900	0.000
	B	4.300	0.000	0.000
	C	0.000	2.600	0.000

Average PCU Per Vehicle - Junction 1 - (08:30-08:45)

		To		
		A	B	C
From	A	1.000	1.041	1.000
	B	1.012	1.000	1.000
	C	1.125	1.000	1.000

Heavy Vehicle Percentages - Junction 1 - (08:30-08:45)

		To		
		A	B	C
From	A	0.000	4.100	0.000
	B	1.200	0.000	0.000
	C	12.500	0.000	0.000

Average PCU Per Vehicle - Junction 1 - (08:45-09:00)

		To		
		A	B	C
From	A	1.000	1.047	1.000
	B	1.034	1.000	1.000
	C	1.000	1.059	1.000

Heavy Vehicle Percentages - Junction 1 - (08:45-09:00)

		To		
		A	B	C
From	A	0.000	4.700	0.000
	B	3.400	0.000	0.000
	C	0.000	5.900	0.000

Average PCU Per Vehicle - Junction 1 - (09:00-09:15)

		To		
		A	B	C
From	A	1.000	1.034	1.000
	B	1.086	1.000	1.000
	C	1.000	1.087	1.000

Heavy Vehicle Percentages - Junction 1 - (09:00-09:15)

		To		
		A	B	C
From	A	0.000	3.400	0.000
	B	8.600	0.000	0.000
	C	0.000	8.700	0.000

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (Veh)	Max LOS	Average Demand (Veh/min)	Total Junction Arrivals (Veh)	Total Queueing Delay (Veh-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (Veh-min/min)	Inclusive Total Queueing Delay (Veh-min)	Inclusive Average Queueing Delay (s)
A	0.70	11.07	2.23	B	9.88	889.05	118.91	8.02	1.32	118.93	8.03
B	0.63	7.79	1.59	A	10.41	936.94	101.01	6.47	1.12	101.04	6.47
C	0.37	10.40	0.57	B	2.68	240.91	36.51	9.09	0.41	36.52	9.10

Main Results for each time segment

Main results: (07:45-08:00)

Arm	Total Demand (Veh/min)	Junction Arrivals (Veh)	Entry Flow (Veh/min)	Exit Flow (Veh/min)	Circulating Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	Saturation Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
A	7.46	111.90	7.42	10.41	1.48	0.00	18.52	17.37	0.403	0.00	0.67	5.383	A
B	10.30	154.50	10.23	8.78	0.12	0.00	19.61	19.53	0.525	0.00	1.09	6.345	A
C	1.99	29.85	1.97	0.42	9.92	0.00	9.75	4.46	0.204	0.00	0.25	7.699	A

Main results: (08:00-08:15)

Arm	Total Demand (Veh/min)	Junction Arrivals (Veh)	Entry Flow (Veh/min)	Exit Flow (Veh/min)	Circulating Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	Saturation Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
A	8.67	130.05	8.65	9.46	1.87	0.00	18.19	17.45	0.477	0.67	0.90	6.279	A
B	9.10	136.50	9.12	10.38	0.14	0.00	19.97	19.90	0.456	1.09	0.85	5.533	A
C	2.49	37.35	2.48	0.41	8.84	0.00	9.82	4.10	0.254	0.25	0.34	8.168	A

Main results: (08:15-08:30)

Arm	Total Demand (Veh/min)	Junction Arrivals (Veh)	Entry Flow (Veh/min)	Exit Flow (Veh/min)	Circulating Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	Saturation Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
A	11.73	175.95	11.66	10.47	2.71	0.00	17.39	17.08	0.675	0.90	2.00	10.336	B
B	9.88	148.20	9.87	14.18	0.18	0.00	19.75	19.70	0.500	0.85	0.99	6.067	A
C	3.62	54.30	3.60	0.48	9.58	0.00	9.76	4.27	0.371	0.34	0.58	9.726	A

Main results: (08:30-08:45)

Arm	Total Demand (Veh/min)	Junction Arrivals (Veh)	Entry Flow (Veh/min)	Exit Flow (Veh/min)	Circulating Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	Saturation Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
A	10.59	158.85	10.63	12.90	1.83	0.00	18.10	17.28	0.585	2.00	1.44	8.074	A
B	12.72	190.80	12.68	12.29	0.17	0.00	20.34	20.29	0.625	0.99	1.63	7.785	A
C	2.42	36.30	2.43	0.55	12.30	0.00	8.31	4.23	0.291	0.58	0.42	10.228	B

Main results: (08:45-09:00)

Arm	Total Demand (Veh/min)	Junction Arrivals (Veh)	Entry Flow (Veh/min)	Exit Flow (Veh/min)	Circulating Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	Saturation Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
A	12.22	183.30	12.17	11.38	2.45	0.00	17.53	17.09	0.697	1.44	2.21	11.071	B
B	10.87	163.05	10.90	14.43	0.19	0.00	19.91	19.87	0.546	1.63	1.22	6.676	A
C	3.27	49.05	3.26	0.52	10.57	0.00	9.02	4.17	0.363	0.42	0.56	10.399	B

Main results: (09:00-09:15)

Arm	Total Demand (Veh/min)	Junction Arrivals (Veh)	Entry Flow (Veh/min)	Exit Flow (Veh/min)	Circulating Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	Saturation Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
A	8.60	129.00	8.69	9.88	1.72	0.00	18.19	17.30	0.473	2.21	0.91	6.368	A
B	9.59	143.85	9.60	10.27	0.14	0.00	19.02	18.94	0.504	1.22	1.03	6.383	A
C	2.27	34.05	2.29	0.42	9.32	0.00	9.28	4.07	0.245	0.56	0.33	8.602	A

Queueing Delay Results for each time segment

Queueing Delay results: (07:45-08:00)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
A	9.67	0.64	5.383	A	A
B	15.60	1.04	6.345	A	A
C	3.66	0.24	7.699	A	A

Queueing Delay results: (08:00-08:15)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
A	13.10	0.87	6.279	A	A
B	13.02	0.87	5.533	A	A
C	4.90	0.33	8.168	A	A

Queueing Delay results: (08:15-08:30)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
A	28.03	1.87	10.336	B	B
B	14.51	0.97	6.067	A	A
C	8.36	0.56	9.726	A	A

Queueing Delay results: (08:30-08:45)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
A	22.51	1.50	8.074	A	A
B	23.36	1.56	7.785	A	A
C	6.49	0.43	10.228	B	B

Queueing Delay results: (08:45-09:00)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
A	31.26	2.08	11.071	B	B
B	18.94	1.26	6.676	A	A
C	8.11	0.54	10.399	B	B

Queueing Delay results: (09:00-09:15)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
A	14.30	0.95	6.368	A	A
B	15.84	1.06	6.383	A	A
C	5.11	0.34	8.602	A	A

mini-roundabout - 2018 With Dev, AM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set (s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
mini-roundabout	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
2018 With Dev, AM	2018 With Dev	AM		Varies by Arm	07:45	09:15	90	15				✓		

Junction Network

Junctions

Name	Junction Type	Arm Order	Junction Delay (s)	Junction LOS
Cangle South - Mini	Mini-roundabout	A,B,C	11.01	B

Junction Network Options

Driving Side	Lighting	Road Surface	In London	Network Residual Capacity (%)	First Arm Reaching Threshold
Left	Normal/unknown	Normal/unknown		26	Arm A

Arms

Arms

Arm	Name	Description
A	Arm E	Withersfield Road
B	Arm SB	SB Link
C	Arm D	Queens Street

Capacity Options

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

Mini Roundabout Geometry

Arm	Approach road half-width (m)	Minimum approach road half-width (m)	Entry width (m)	Effective flare length (m)	Distance to next arm (m)	Entry corner kerb line distance (m)	Gradient over 50m (%)	Kerbed central island
A	5.50	5.50	5.50	0.00	18.00	10.00	0.00	
B	3.70	3.70	3.70	0.00	16.00	11.00	0.00	
C	3.00	3.00	4.50	13.00	17.00	10.00	0.00	

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

Pedestrian Crossings

Arm	Crossing Type
A	None
B	None
C	None

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Arm	Enter slope and intercept directly	Entered slope	Entered intercept (PCU/min)	Final Slope	Final Intercept (PCU/min)
A		(calculated)	(calculated)	0.633	15.984
B		(calculated)	(calculated)	0.545	11.672
C		(calculated)	(calculated)	0.563	13.568

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

Arm Capacity Adjustments

Arm	Type	Reason	Direct Capacity Adjustment (PCU/min)	Percentage Capacity Adjustment (%)
A	Direct		4.00	
B	Direct		9.00	
C	Direct		2.00	

Traffic Flows

Demand Set Data Options

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

Entry Flows

General Flows Data

Arm	Profile Type	Use Turning Counts	Average Demand Flow (Veh/min)	Flow Scaling Factor (%)
A	DIRECT		N/A	100.000
B	DIRECT		N/A	100.000
C	DIRECT		N/A	100.000

Turning Proportions

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

		To		
		A	B	C
From	A	0.000	883.000	14.000
	B	999.000	0.000	28.000
	C	60.000	181.000	0.000

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

		To		
		A	B	C
From	A	0.00	0.98	0.02
	B	0.97	0.00	0.03
	C	0.25	0.75	0.00

Vehicle Mix

Average PCU Per Vehicle - Junction 1 - (07:45-08:00)

		To		
		A	B	C
From	A	1.000	1.027	1.000
	B	1.036	1.000	1.333
	C	1.000	1.000	1.000

Heavy Vehicle Percentages - Junction 1 - (07:45-08:00)

		To		
		A	B	C
From	A	0.000	2.700	0.000
	B	3.600	0.000	33.300
	C	0.000	0.000	0.000

Average PCU Per Vehicle - Junction 1 - (08:00-08:15)

		To		
		A	B	C
From	A	1.000	1.034	1.000
	B	1.027	1.000	1.000
	C	1.250	1.000	1.000

Heavy Vehicle Percentages - Junction 1 - (08:00-08:15)

		To		
		A	B	C
From	A	0.000	3.400	0.000
	B	2.700	0.000	0.000
	C	25.000	0.000	0.000

Average PCU Per Vehicle - Junction 1 - (08:15-08:30)

		To		
		A	B	C
From	A	1.000	1.049	1.000
	B	1.037	1.000	1.000
	C	1.000	1.026	1.000

Heavy Vehicle Percentages - Junction 1 - (08:15-08:30)

		To		
		A	B	C
From	A	0.000	4.900	0.000
	B	3.700	0.000	0.000
	C	0.000	2.600	0.000

Average PCU Per Vehicle - Junction 1 - (08:30-08:45)

		To		
		A	B	C
From	A	1.000	1.041	1.000
	B	1.010	1.000	1.000
	C	1.125	1.000	1.000

Heavy Vehicle Percentages - Junction 1 - (08:30-08:45)

		To		
		A	B	C
From	A	0.000	4.100	0.000
	B	1.000	0.000	0.000
	C	12.500	0.000	0.000

Average PCU Per Vehicle - Junction 1 - (08:45-09:00)

		To		
		A	B	C
From	A	1.000	1.047	1.000
	B	1.029	1.000	1.000
	C	1.000	1.059	1.000

Heavy Vehicle Percentages - Junction 1 - (08:45-09:00)

		To		
		A	B	C
From	A	0.000	4.700	0.000
	B	2.900	0.000	0.000
	C	0.000	5.900	0.000

Average PCU Per Vehicle - Junction 1 - (09:00-09:15)

		To		
		A	B	C
From	A	1.000	1.034	1.000
	B	1.073	1.000	1.000
	C	1.000	1.087	1.000

Heavy Vehicle Percentages - Junction 1 - (09:00-09:15)

		To		
		A	B	C
From	A	0.000	3.400	0.000
	B	7.300	0.000	0.000
	C	0.000	8.700	0.000

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (Veh)	Max LOS	Average Demand (Veh/min)	Total Junction Arrivals (Veh)	Total Queueing Delay (Veh-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (Veh-min/min)	Inclusive Total Queueing Delay (Veh-min)	Inclusive Average Queueing Delay (s)
A	0.73	12.15	2.54	B	10.38	934.04	133.84	8.60	1.49	133.87	8.60
B	0.70	9.75	2.24	A	12.04	1083.64	139.79	7.74	1.55	139.84	7.74
C	0.41	12.24	0.66	B	2.68	240.91	42.18	10.50	0.47	42.19	10.51

Main Results for each time segment

Main results: (07:45-08:00)

Arm	Total Demand (Veh/min)	Junction Arrivals (Veh)	Entry Flow (Veh/min)	Exit Flow (Veh/min)	Circulating Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	Saturation Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
A	7.96	119.40	7.91	12.00	1.48	0.00	18.55	17.42	0.429	0.00	0.74	5.612	A
B	11.93	178.95	11.83	9.27	0.12	0.00	19.73	19.66	0.605	0.00	1.50	7.500	A
C	1.99	29.85	1.97	0.45	11.51	0.00	8.86	4.42	0.225	0.00	0.29	8.689	A

Main results: (08:00-08:15)

Arm	Total Demand (Veh/min)	Junction Arrivals (Veh)	Entry Flow (Veh/min)	Exit Flow (Veh/min)	Circulating Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	Saturation Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
A	9.17	137.55	9.15	11.08	1.87	0.00	18.20	17.46	0.504	0.74	1.00	6.625	A
B	10.73	160.95	10.75	10.88	0.14	0.00	20.06	20.00	0.535	1.50	1.17	6.461	A
C	2.49	37.35	2.48	0.44	10.46	0.00	8.97	4.07	0.278	0.29	0.38	9.240	A

Main results: (08:15-08:30)

Arm	Total Demand (Veh/min)	Junction Arrivals (Veh)	Entry Flow (Veh/min)	Exit Flow (Veh/min)	Circulating Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	Saturation Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
A	12.23	183.45	12.15	12.08	2.70	0.00	17.39	17.09	0.703	1.00	2.28	11.259	B
B	11.51	172.65	11.50	14.66	0.19	0.00	19.86	19.81	0.580	1.17	1.36	7.166	A
C	3.62	54.30	3.60	0.50	11.18	0.00	8.87	4.24	0.408	0.38	0.68	11.349	B

Main results: (08:30-08:45)

Arm	Total Demand (Veh/min)	Junction Arrivals (Veh)	Entry Flow (Veh/min)	Exit Flow (Veh/min)	Circulating Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	Saturation Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
A	11.09	166.35	11.13	14.50	1.83	0.00	18.10	17.29	0.613	2.28	1.62	8.675	A
B	14.35	215.25	14.29	12.79	0.17	0.00	20.38	20.33	0.704	1.36	2.30	9.750	A
C	2.42	36.30	2.43	0.56	13.90	0.00	7.44	4.20	0.325	0.68	0.49	12.015	B

Main results: (08:45-09:00)

Arm	Total Demand (Veh/min)	Junction Arrivals (Veh)	Entry Flow (Veh/min)	Exit Flow (Veh/min)	Circulating Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	Saturation Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
A	12.72	190.80	12.66	13.01	2.45	0.00	17.53	17.11	0.725	1.62	2.53	12.150	B
B	12.50	187.50	12.54	14.91	0.20	0.00	20.00	19.96	0.625	2.30	1.70	8.082	A
C	3.27	49.05	3.26	0.54	12.20	0.00	8.15	4.14	0.401	0.49	0.66	12.245	B

Main results: (09:00-09:15)

Arm	Total Demand (Veh/min)	Junction Arrivals (Veh)	Entry Flow (Veh/min)	Exit Flow (Veh/min)	Circulating Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	Saturation Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
A	9.10	136.50	9.20	11.50	1.72	0.00	18.19	17.31	0.500	2.53	1.02	6.747	A
B	11.22	168.30	11.24	10.78	0.14	0.00	19.24	19.16	0.584	1.70	1.43	7.520	A
C	2.27	34.05	2.29	0.45	10.93	0.00	8.42	4.05	0.270	0.66	0.37	9.810	A

Queueing Delay Results for each time segment

Queueing Delay results: (07:45-08:00)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
A	10.74	0.72	5.612	A	A
B	21.16	1.41	7.500	A	A
C	4.11	0.27	8.689	A	A

Queueing Delay results: (08:00-08:15)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
A	14.58	0.97	6.625	A	A
B	18.04	1.20	6.461	A	A
C	5.52	0.37	9.240	A	A

Queueing Delay results: (08:15-08:30)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
A	31.59	2.11	11.259	B	B
B	19.82	1.32	7.166	A	A
C	9.67	0.64	11.349	B	B

Queueing Delay results: (08:30-08:45)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
A	25.43	1.70	8.675	A	A
B	32.42	2.16	9.750	A	A
C	7.66	0.51	12.015	B	B

Queueing Delay results: (08:45-09:00)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
A	35.40	2.36	12.150	B	B
B	26.64	1.78	8.082	A	A
C	9.48	0.63	12.245	B	B

Queueing Delay results: (09:00-09:15)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
A	16.06	1.07	6.747	A	A
B	22.03	1.47	7.520	A	A
C	5.85	0.39	9.810	A	A

Junctions 8

ARCADY 8 - Roundabout Module

Filename: Cangle South Mini (calibrated) - PM.arc8
Path: Z:\Projects\CS059139 - NW Haverhill SUE, Savills obo NW Haverhill Consortium\A5 - Technical\Arcady\Direct 90 mins\Arc8 - Revised Assessment May 2013
Report generation date: 03/06/2013 08:24:17

Summary of junction performance

	PM				
	Queue (Veh)	Delay (s)	RFC	LOS	Network Residual Capacity
	Mini Roundabout - 2012 No Dev				
Arm A	2.97	12.66	0.76	B	23 %
Arm B	1.63	7.76	0.63	A	
Arm C	1.15	14.55	0.54	B	[Arm C]

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Network Residual Capacity indicates the amount by which network flow could be increased before a user-definable threshold (see Analysis Options) is met.

'D1 - 2012 No Dev, PM " model duration: 16:45 - 18:15
'D2 - 2013 No Dev, PM" model duration: 16:45 - 18:15
'D3 - 2018 No Dev, PM" model duration: 16:45 - 18:15
'D4 - 2018 With Dev, PM" model duration: 16:45 - 18:15

Run using Junctions 8.0.2.316 at 03/06/2013 08:24:14

File summary

File Description

Title	Haverhill Southern junction - SCC Geometry
Location	
Site Number	
Date	15/11/2012
Version	
Status	
Identifier	
Client	
Jobnumber	
Enumerator	Gus Bradford
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	RFC Threshold	Average Delay Threshold (s)	Queue Threshold (PCU)
1.00		✓	Delay	0.85	36.00	20.00

Units

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

Mini Roundabout - 2012 No Dev, PM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set (s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
Mini Roundabout	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
2012 No Dev, PM	2012 No Dev	PM		Varies by Arm	16:45	18:15	90	15				✓		

Junction Network

Junctions

Name	Junction Type	Arm Order	Junction Delay (s)	Junction LOS
untitled	Mini-roundabout	A,B,C	10.93	B

Junction Network Options

Driving Side	Lighting	Road Surface	In London	Network Residual Capacity (%)	First Arm Reaching Threshold
Left	Normal/unknown	Normal/unknown		23	Arm C

Arms

Arms

Arm	Name	Description
A	Arm E	Withersfield Road
B	Arm SB	SB Link
C	Arm D	Queens Street

Capacity Options

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

Mini Roundabout Geometry

Arm	Approach road half-width (m)	Minimum approach road half-width (m)	Entry width (m)	Effective flare length (m)	Distance to next arm (m)	Entry corner kerb line distance (m)	Gradient over 50m (%)	Kerbed central island
A	5.50	5.50	5.50	0.00	18.00	10.00	0.00	
B	3.70	3.70	3.70	0.00	16.00	11.00	0.00	
C	3.00	3.00	4.50	13.00	17.00	10.00	0.00	

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

Pedestrian Crossings

Arm	Crossing Type
A	None
B	None
C	None

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Arm	Enter slope and intercept directly	Entered slope	Entered intercept (PCU/min)	Final Slope	Final Intercept (PCU/min)
A		(calculated)	(calculated)	0.633	15.984
B		(calculated)	(calculated)	0.545	11.672
C		(calculated)	(calculated)	0.563	13.568

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

Arm Capacity Adjustments

Arm	Type	Reason	Direct Capacity Adjustment (PCU/min)	Percentage Capacity Adjustment (%)
A	Direct		4.00	
B	Direct		9.00	
C	Direct		2.00	

Traffic Flows

Demand Set Data Options

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

Entry Flows

General Flows Data

Arm	Profile Type	Use Turning Counts	Average Demand Flow (Veh/min)	Flow Scaling Factor (%)
A	DIRECT		N/A	100.000
B	DIRECT		N/A	100.000
C	DIRECT		N/A	100.000

Turning Proportions

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

		To		
		A	B	C
From	A	0.000	999.000	18.000
	B	992.000	0.000	15.000
	C	106.000	241.000	0.000

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

		To		
		A	B	C
From	A	0.00	0.98	0.02
	B	0.99	0.00	0.01
	C	0.31	0.69	0.00

Vehicle Mix

Average PCU Per Vehicle - Junction 1 - (16:45-17:00)

		To		
		A	B	C
From	A	1.000	1.020	1.000
	B	1.018	1.000	1.000
	C	1.000	1.000	1.000

Heavy Vehicle Percentages - Junction 1 - (16:45-17:00)

		To		
		A	B	C
From	A	0.000	2.000	0.000
	B	1.800	0.000	0.000
	C	0.000	0.000	0.000

Average PCU Per Vehicle - Junction 1 - (17:00-17:15)

		To		
		A	B	C
From	A	1.000	1.022	1.000
	B	1.011	1.000	1.000
	C	1.000	1.000	1.000

Heavy Vehicle Percentages - Junction 1 - (17:00-17:15)

		To		
		A	B	C
From	A	0.000	2.200	0.000
	B	1.100	0.000	0.000
	C	0.000	0.000	0.000

Average PCU Per Vehicle - Junction 1 - (17:15-17:30)

		To		
		A	B	C
From	A	1.000	1.028	1.000
	B	1.013	1.000	1.000
	C	1.000	1.000	1.000

Heavy Vehicle Percentages - Junction 1 - (17:15-17:30)

		To		
		A	B	C
From	A	0.000	2.800	0.000
	B	1.300	0.000	0.000
	C	0.000	0.000	0.000

Average PCU Per Vehicle - Junction 1 - (17:30-17:45)

		To		
		A	B	C
From	A	1.000	1.006	1.000
	B	1.007	1.000	1.000
	C	1.000	1.000	1.000

Heavy Vehicle Percentages - Junction 1 - (17:30-17:45)

		To		
		A	B	C
From	A	0.000	0.600	0.000
	B	0.700	0.000	0.000
	C	0.000	0.000	0.000

Average PCU Per Vehicle - Junction 1 - (17:45-18:00)

		To		
		A	B	C
From	A	1.000	1.010	1.000
	B	1.000	1.000	1.000
	C	1.000	1.000	1.000

Heavy Vehicle Percentages - Junction 1 - (17:45-18:00)

		To		
		A	B	C
From	A	0.000	1.000	0.000
	B	0.000	0.000	0.000
	C	0.000	0.000	0.000

Average PCU Per Vehicle - Junction 1 - (18:00-18:15)

		To		
		A	B	C
From	A	1.000	1.018	1.000
	B	1.005	1.000	1.000
	C	1.000	1.000	1.000

Heavy Vehicle Percentages - Junction 1 - (18:00-18:15)

		To		
		A	B	C
From	A	0.000	1.800	0.000
	B	0.500	0.000	0.000
	C	0.000	0.000	0.000

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (Veh)	Max LOS	Average Demand (Veh/min)	Total Junction Arrivals (Veh)	Total Queueing Delay (Veh-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (Veh-min/min)	Inclusive Total Queueing Delay (Veh-min)	Inclusive Average Queueing Delay (s)
A	0.76	12.66	2.97	B	12.45	1120.05	205.15	10.99	2.28	205.23	10.99
B	0.63	7.76	1.63	A	11.19	1006.94	108.77	6.48	1.21	108.83	6.48
C	0.54	14.55	1.15	B	3.85	346.80	64.17	11.10	0.71	64.18	11.10

Main Results for each time segment

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

Arm	Total Demand (Veh/min)	Junction Arrivals (Veh)	Entry Flow (Veh/min)	Exit Flow (Veh/min)	Circulating Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	Saturation Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
A	13.73	205.95	13.53	11.95	2.42	0.00	18.09	17.79	0.759	0.00	2.97	12.659	B
B	11.13	166.95	11.05	15.72	0.24	0.00	20.18	20.14	0.551	0.00	1.21	6.512	A
C	3.53	52.95	3.49	0.40	10.88	0.00	9.33	4.20	0.378	0.00	0.60	10.200	B

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

Arm	Total Demand (Veh/min)	Junction Arrivals (Veh)	Entry Flow (Veh/min)	Exit Flow (Veh/min)	Circulating Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	Saturation Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
A	12.20	183.00	12.24	13.26	3.31	0.00	17.51	17.75	0.697	2.97	2.38	11.471	B
B	12.00	180.00	11.99	15.33	0.22	0.00	20.33	20.28	0.590	1.21	1.42	7.174	A
C	4.80	72.00	4.76	0.40	11.81	0.00	8.85	4.20	0.542	0.60	1.15	14.549	B

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

Arm	Total Demand (Veh/min)	Junction Arrivals (Veh)	Entry Flow (Veh/min)	Exit Flow (Veh/min)	Circulating Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	Saturation Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
A	12.00	180.00	12.01	11.41	2.89	0.00	17.67	17.65	0.679	2.38	2.18	10.640	B
B	10.27	154.05	10.30	14.69	0.21	0.00	20.30	20.24	0.506	1.42	1.04	6.014	A
C	4.13	61.95	4.16	0.37	10.14	0.00	9.79	4.20	0.422	1.15	0.74	10.707	B

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

Arm	Total Demand (Veh/min)	Junction Arrivals (Veh)	Entry Flow (Veh/min)	Exit Flow (Veh/min)	Circulating Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	Saturation Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
A	12.00	180.00	12.01	11.37	3.01	0.00	17.97	18.03	0.668	2.18	2.06	10.085	B
B	10.20	153.00	10.20	14.80	0.21	0.00	20.41	20.36	0.500	1.04	1.01	5.876	A
C	4.33	64.95	4.33	0.36	10.05	0.00	9.87	4.21	0.439	0.74	0.77	10.814	B

Main results: (17:45-18:00)

Arm	Total Demand (Veh/min)	Junction Arrivals (Veh)	Entry Flow (Veh/min)	Exit Flow (Veh/min)	Circulating Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	Saturation Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
A	13.27	199.05	13.24	11.59	2.32	0.00	18.33	17.96	0.724	2.06	2.52	11.689	B
B	10.73	160.95	10.73	15.33	0.23	0.00	20.54	20.50	0.522	1.01	1.08	6.108	A
C	3.33	49.95	3.35	0.39	10.57	0.00	9.62	4.21	0.346	0.77	0.54	9.580	A

Main results: (18:00-18:15)

Arm	Total Demand (Veh/min)	Junction Arrivals (Veh)	Entry Flow (Veh/min)	Exit Flow (Veh/min)	Circulating Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	Saturation Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
A	11.47	172.05	11.52	13.49	2.08	0.00	18.34	17.82	0.625	2.52	1.71	8.869	A
B	12.80	192.00	12.76	13.40	0.20	0.00	20.46	20.40	0.626	1.08	1.63	7.757	A
C	3.00	45.00	3.00	0.39	12.57	0.00	8.46	4.20	0.355	0.54	0.54	10.988	B

Queueing Delay Results for each time segment

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

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
A	39.76	2.65	12.659	B	B
B	17.27	1.15	6.512	A	A
C	8.48	0.57	10.200	B	B

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

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
A	37.39	2.49	11.471	B	B
B	20.67	1.38	7.174	A	A
C	16.09	1.07	14.549	B	B

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

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
A	33.45	2.23	10.640	B	B
B	16.06	1.07	6.014	A	A
C	11.69	0.78	10.707	B	B

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

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
A	31.40	2.09	10.085	B	B
B	15.25	1.02	5.876	A	A
C	11.42	0.76	10.814	B	B

Queueing Delay results: (17:45-18:00)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
A	36.13	2.41	11.689	B	B
B	15.97	1.06	6.108	A	A
C	8.37	0.56	9.580	A	A

Queueing Delay results: (18:00-18:15)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
A	26.95	1.80	8.869	A	A
B	23.46	1.56	7.757	A	A
C	8.12	0.54	10.988	B	B

Mini Roundabout - 2013 No Dev, PM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set (s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
Mini Roundabout	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
2013 No Dev, PM	2013 No Dev	PM		Varies by Arm	16:45	18:15	90	15				✓		

Junction Network

Junctions

Name	Junction Type	Arm Order	Junction Delay (s)	Junction LOS
untitled	Mini-roundabout	A,B,C	11.06	B

Junction Network Options

Driving Side	Lighting	Road Surface	In London	Network Residual Capacity (%)	First Arm Reaching Threshold
Left	Normal/unknown	Normal/unknown		22	Arm C

Arms

Arms

Arm	Name	Description
A	Arm E	Withersfield Road
B	Arm SB	SB Link
C	Arm D	Queens Street

Capacity Options

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

Mini Roundabout Geometry

Arm	Approach road half-width (m)	Minimum approach road half-width (m)	Entry width (m)	Effective flare length (m)	Distance to next arm (m)	Entry corner kerb line distance (m)	Gradient over 50m (%)	Kerbed central island
A	5.50	5.50	5.50	0.00	18.00	10.00	0.00	
B	3.70	3.70	3.70	0.00	16.00	11.00	0.00	
C	3.00	3.00	4.50	13.00	17.00	10.00	0.00	

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

Pedestrian Crossings

Arm	Crossing Type
A	None
B	None
C	None

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Arm	Enter slope and intercept directly	Entered slope	Entered intercept (PCU/min)	Final Slope	Final Intercept (PCU/min)
A		(calculated)	(calculated)	0.633	15.984
B		(calculated)	(calculated)	0.545	11.672
C		(calculated)	(calculated)	0.563	13.568

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

Arm Capacity Adjustments

Arm	Type	Reason	Direct Capacity Adjustment (PCU/min)	Percentage Capacity Adjustment (%)
A	Direct		4.00	
B	Direct		9.00	
C	Direct		2.00	

Traffic Flows

Demand Set Data Options

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

Entry Flows

General Flows Data

Arm	Profile Type	Use Turning Counts	Average Demand Flow (Veh/min)	Flow Scaling Factor (%)
A	DIRECT		N/A	100.000
B	DIRECT		N/A	100.000
C	DIRECT		N/A	100.000

Turning Proportions

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

		To		
		A	B	C
From	A	0.000	999.000	18.000
	B	996.000	0.000	15.000
	C	106.000	242.000	0.000

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

		To		
		A	B	C
From	A	0.00	0.98	0.02
	B	0.99	0.00	0.01
	C	0.30	0.70	0.00

Vehicle Mix

Average PCU Per Vehicle - Junction 1 - (16:45-17:00)

		To		
		A	B	C
From	A	1.000	1.020	1.000
	B	1.018	1.000	1.000
	C	1.000	1.000	1.000

Heavy Vehicle Percentages - Junction 1 - (16:45-17:00)

		To		
		A	B	C
From	A	0.000	2.000	0.000
	B	1.800	0.000	0.000
	C	0.000	0.000	0.000

Average PCU Per Vehicle - Junction 1 - (17:00-17:15)

		To		
		A	B	C
From	A	1.000	1.022	1.000
	B	1.011	1.000	1.000
	C	1.000	1.000	1.000

Heavy Vehicle Percentages - Junction 1 - (17:00-17:15)

		To		
		A	B	C
From	A	0.000	2.200	0.000
	B	1.100	0.000	0.000
	C	0.000	0.000	0.000

Average PCU Per Vehicle - Junction 1 - (17:15-17:30)

		To		
		A	B	C
From	A	1.000	1.028	1.000
	B	1.013	1.000	1.000
	C	1.000	1.000	1.000

Heavy Vehicle Percentages - Junction 1 - (17:15-17:30)

		To		
		A	B	C
From	A	0.000	2.800	0.000
	B	1.300	0.000	0.000
	C	0.000	0.000	0.000

Average PCU Per Vehicle - Junction 1 - (17:30-17:45)

		To		
		A	B	C
From	A	1.000	1.006	1.000
	B	1.007	1.000	1.000
	C	1.000	1.000	1.000

Heavy Vehicle Percentages - Junction 1 - (17:30-17:45)

		To		
		A	B	C
From	A	0.000	0.600	0.000
	B	0.700	0.000	0.000
	C	0.000	0.000	0.000

Average PCU Per Vehicle - Junction 1 - (17:45-18:00)

		To		
		A	B	C
From	A	1.000	1.010	1.000
	B	1.000	1.000	1.000
	C	1.000	1.000	1.000

Heavy Vehicle Percentages - Junction 1 - (17:45-18:00)

		To		
		A	B	C
From	A	0.000	1.000	0.000
	B	0.000	0.000	0.000
	C	0.000	0.000	0.000

Average PCU Per Vehicle - Junction 1 - (18:00-18:15)

		To		
		A	B	C
From	A	1.000	1.018	1.000
	B	1.005	1.000	1.000
	C	1.000	1.000	1.000

Heavy Vehicle Percentages - Junction 1 - (18:00-18:15)

		To		
		A	B	C
From	A	0.000	1.800	0.000
	B	0.500	0.000	0.000
	C	0.000	0.000	0.000

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (Veh)	Max LOS	Average Demand (Veh/min)	Total Junction Arrivals (Veh)	Total Queueing Delay (Veh-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (Veh-min/min)	Inclusive Total Queueing Delay (Veh-min)	Inclusive Average Queueing Delay (s)
A	0.76	12.83	3.03	B	12.50	1124.70	208.39	11.12	2.32	208.47	11.12
B	0.63	7.82	1.65	A	11.24	1011.29	109.82	6.52	1.22	109.89	6.52
C	0.55	14.72	1.16	B	3.87	348.45	65.03	11.20	0.72	65.05	11.20

Main Results for each time segment

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

Arm	Total Demand (Veh/min)	Junction Arrivals (Veh)	Entry Flow (Veh/min)	Exit Flow (Veh/min)	Circulating Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	Saturation Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
A	13.79	206.85	13.59	12.00	2.44	0.00	18.08	17.79	0.763	0.00	3.02	12.830	B
B	11.18	167.70	11.10	15.79	0.24	0.00	20.18	20.14	0.554	0.00	1.22	6.549	A
C	3.55	53.25	3.51	0.41	10.93	0.00	9.31	4.20	0.382	0.00	0.61	10.283	B

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

Arm	Total Demand (Veh/min)	Junction Arrivals (Veh)	Entry Flow (Veh/min)	Exit Flow (Veh/min)	Circulating Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	Saturation Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
A	12.25	183.75	12.29	13.31	3.33	0.00	17.50	17.75	0.700	3.02	2.42	11.614	B
B	12.05	180.75	12.04	15.40	0.22	0.00	20.33	20.28	0.593	1.22	1.43	7.218	A
C	4.82	72.30	4.78	0.40	11.86	0.00	8.82	4.20	0.546	0.61	1.16	14.716	B

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

Arm	Total Demand (Veh/min)	Junction Arrivals (Veh)	Entry Flow (Veh/min)	Exit Flow (Veh/min)	Circulating Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	Saturation Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
A	12.05	180.75	12.06	11.45	2.90	0.00	17.66	17.65	0.682	2.42	2.21	10.756	B
B	10.31	154.65	10.34	14.76	0.21	0.00	20.30	20.24	0.508	1.43	1.05	6.041	A
C	4.15	62.25	4.18	0.37	10.18	0.00	9.76	4.20	0.425	1.16	0.75	10.792	B

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

Arm	Total Demand (Veh/min)	Junction Arrivals (Veh)	Entry Flow (Veh/min)	Exit Flow (Veh/min)	Circulating Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	Saturation Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
A	12.05	180.75	12.06	11.41	3.02	0.00	17.96	18.03	0.671	2.21	2.09	10.189	B
B	10.24	153.60	10.24	14.87	0.21	0.00	20.41	20.36	0.502	1.05	1.02	5.899	A
C	4.35	65.25	4.35	0.37	10.09	0.00	9.85	4.20	0.442	0.75	0.78	10.897	B

Main results: (17:45-18:00)

Arm	Total Demand (Veh/min)	Junction Arrivals (Veh)	Entry Flow (Veh/min)	Exit Flow (Veh/min)	Circulating Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	Saturation Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
A	13.32	199.80	13.29	11.64	2.34	0.00	18.32	17.96	0.727	2.09	2.56	11.826	B
B	10.78	161.70	10.78	15.39	0.24	0.00	20.54	20.50	0.525	1.02	1.09	6.140	A
C	3.35	50.25	3.37	0.40	10.62	0.00	9.60	4.21	0.349	0.78	0.54	9.657	A

Main results: (18:00-18:15)

Arm	Total Demand (Veh/min)	Junction Arrivals (Veh)	Entry Flow (Veh/min)	Exit Flow (Veh/min)	Circulating Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	Saturation Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
A	11.52	172.80	11.57	13.55	2.09	0.00	18.34	17.82	0.628	2.56	1.73	8.944	A
B	12.86	192.90	12.82	13.46	0.20	0.00	20.46	20.40	0.629	1.09	1.65	7.815	A
C	3.01	45.15	3.01	0.40	12.63	0.00	8.43	4.20	0.357	0.54	0.55	11.076	B

Queueing Delay Results for each time segment

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

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
A	40.44	2.70	12.830	B	B
B	17.44	1.16	6.549	A	A
C	8.59	0.57	10.283	B	B

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

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
A	38.03	2.54	11.614	B	B
B	20.87	1.39	7.218	A	A
C	16.33	1.09	14.716	B	B

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

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
A	33.99	2.27	10.756	B	B
B	16.19	1.08	6.041	A	A
C	11.84	0.79	10.792	B	B

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

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
A	31.88	2.13	10.189	B	B
B	15.37	1.02	5.899	A	A
C	11.57	0.77	10.897	B	B

Queueing Delay results: (17:45-18:00)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
A	36.66	2.44	11.826	B	B
B	16.12	1.07	6.140	A	A
C	8.48	0.57	9.657	A	A

Queueing Delay results: (18:00-18:15)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
A	27.31	1.82	8.944	A	A
B	23.74	1.58	7.815	A	A
C	8.22	0.55	11.076	B	B

Mini Roundabout - 2018 No Dev, PM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set (s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
Mini Roundabout	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
2018 No Dev, PM	2018 No Dev	PM		Varies by Arm	16:45	18:15	90	15				✓		

Junction Network

Junctions

Name	Junction Type	Arm Order	Junction Delay (s)	Junction LOS
untitled	Mini-roundabout	A,B,C	13.08	B

Junction Network Options

Driving Side	Lighting	Road Surface	In London	Network Residual Capacity (%)	First Arm Reaching Threshold
Left	Normal/unknown	Normal/unknown		15	Arm C

Arms

Arms

Arm	Name	Description
A	Arm E	Withersfield Road
B	Arm SB	SB Link
C	Arm D	Queens Street

Capacity Options

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

Mini Roundabout Geometry

Arm	Approach road half-width (m)	Minimum approach road half-width (m)	Entry width (m)	Effective flare length (m)	Distance to next arm (m)	Entry corner kerb line distance (m)	Gradient over 50m (%)	Kerbed central island
A	5.50	5.50	5.50	0.00	18.00	10.00	0.00	
B	3.70	3.70	3.70	0.00	16.00	11.00	0.00	
C	3.00	3.00	4.50	13.00	17.00	10.00	0.00	

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

Pedestrian Crossings

Arm	Crossing Type
A	None
B	None
C	None

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Arm	Enter slope and intercept directly	Entered slope	Entered intercept (PCU/min)	Final Slope	Final Intercept (PCU/min)
A		(calculated)	(calculated)	0.633	15.984
B		(calculated)	(calculated)	0.545	11.672
C		(calculated)	(calculated)	0.563	13.568

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

Arm Capacity Adjustments

Arm	Type	Reason	Direct Capacity Adjustment (PCU/min)	Percentage Capacity Adjustment (%)
A	Direct		4.00	
B	Direct		9.00	
C	Direct		2.00	

Traffic Flows

Demand Set Data Options

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

Entry Flows

General Flows Data

Arm	Profile Type	Use Turning Counts	Average Demand Flow (Veh/min)	Flow Scaling Factor (%)
A	DIRECT		N/A	100.000
B	DIRECT		N/A	100.000
C	DIRECT		N/A	100.000

Turning Proportions

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

		To		
		A	B	C
From	A	0.000	999.000	19.000
	B	999.000	0.000	16.000
	C	113.000	257.000	0.000

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

		To		
		A	B	C
From	A	0.00	0.98	0.02
	B	0.98	0.00	0.02
	C	0.31	0.69	0.00

Vehicle Mix

Average PCU Per Vehicle - Junction 1 - (16:45-17:00)

		To		
		A	B	C
From	A	1.000	1.020	1.000
	B	1.018	1.000	1.000
	C	1.000	1.000	1.000

Heavy Vehicle Percentages - Junction 1 - (16:45-17:00)

		To		
		A	B	C
From	A	0.000	2.000	0.000
	B	1.800	0.000	0.000
	C	0.000	0.000	0.000

Average PCU Per Vehicle - Junction 1 - (17:00-17:15)

		To		
		A	B	C
From	A	1.000	1.022	1.000
	B	1.011	1.000	1.000
	C	1.000	1.000	1.000

Heavy Vehicle Percentages - Junction 1 - (17:00-17:15)

		To		
		A	B	C
From	A	0.000	2.200	0.000
	B	1.100	0.000	0.000
	C	0.000	0.000	0.000

Average PCU Per Vehicle - Junction 1 - (17:15-17:30)

		To		
		A	B	C
From	A	1.000	1.028	1.000
	B	1.013	1.000	1.000
	C	1.000	1.000	1.000

Heavy Vehicle Percentages - Junction 1 - (17:15-17:30)

		To		
		A	B	C
From	A	0.000	2.800	0.000
	B	1.300	0.000	0.000
	C	0.000	0.000	0.000

Average PCU Per Vehicle - Junction 1 - (17:30-17:45)

		To		
		A	B	C
From	A	1.000	1.006	1.000
	B	1.007	1.000	1.000
	C	1.000	1.000	1.000

Heavy Vehicle Percentages - Junction 1 - (17:30-17:45)

		To		
		A	B	C
From	A	0.000	0.600	0.000
	B	0.700	0.000	0.000
	C	0.000	0.000	0.000

Average PCU Per Vehicle - Junction 1 - (17:45-18:00)

		To		
		A	B	C
From	A	1.000	1.010	1.000
	B	1.000	1.000	1.000
	C	1.000	1.000	1.000

Heavy Vehicle Percentages - Junction 1 - (17:45-18:00)

		To		
		A	B	C
From	A	0.000	1.000	0.000
	B	0.000	0.000	0.000
	C	0.000	0.000	0.000

Average PCU Per Vehicle - Junction 1 - (18:00-18:15)

		To		
		A	B	C
From	A	1.000	1.018	1.000
	B	1.005	1.000	1.000
	C	1.000	1.000	1.000

Heavy Vehicle Percentages - Junction 1 - (18:00-18:15)

		To		
		A	B	C
From	A	0.000	1.800	0.000
	B	0.500	0.000	0.000
	C	0.000	0.000	0.000

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (Veh)	Max LOS	Average Demand (Veh/min)	Total Junction Arrivals (Veh)	Total Queueing Delay (Veh-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (Veh-min/min)	Inclusive Total Queueing Delay (Veh-min)	Inclusive Average Queueing Delay (s)
A	0.81	15.60	3.98	C	13.26	1193.85	264.07	13.27	2.93	264.19	13.28
B	0.67	8.69	1.94	A	11.92	1073.25	126.22	7.06	1.40	126.32	7.06
C	0.61	17.66	1.48	C	4.11	370.05	78.31	12.70	0.87	78.34	12.70

Main Results for each time segment

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

Arm	Total Demand (Veh/min)	Junction Arrivals (Veh)	Entry Flow (Veh/min)	Exit Flow (Veh/min)	Circulating Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	Saturation Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
A	14.64	219.60	14.38	12.73	2.59	0.00	17.99	17.78	0.814	0.00	3.97	15.604	C
B	11.87	178.05	11.78	16.69	0.27	0.00	20.17	20.13	0.589	0.00	1.40	7.074	A
C	3.77	56.55	3.72	0.45	11.59	0.00	8.93	4.22	0.422	0.00	0.71	11.424	B

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

Arm	Total Demand (Veh/min)	Junction Arrivals (Veh)	Entry Flow (Veh/min)	Exit Flow (Veh/min)	Circulating Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	Saturation Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
A	13.01	195.15	13.07	14.12	3.52	0.00	17.38	17.75	0.749	3.97	3.13	14.106	B
B	12.79	191.85	12.77	16.34	0.24	0.00	20.32	20.27	0.629	1.40	1.66	7.931	A
C	5.12	76.80	5.07	0.45	12.57	0.00	8.42	4.22	0.608	0.71	1.48	17.655	C

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

Arm	Total Demand (Veh/min)	Junction Arrivals (Veh)	Entry Flow (Veh/min)	Exit Flow (Veh/min)	Circulating Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	Saturation Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
A	12.79	191.85	12.81	12.16	3.09	0.00	17.55	17.65	0.729	3.13	2.79	12.751	B
B	10.94	164.10	10.97	15.66	0.24	0.00	20.28	20.23	0.539	1.66	1.19	6.468	A
C	4.41	66.15	4.45	0.41	10.80	0.00	9.41	4.22	0.468	1.48	0.90	12.178	B

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

Arm	Total Demand (Veh/min)	Junction Arrivals (Veh)	Entry Flow (Veh/min)	Exit Flow (Veh/min)	Circulating Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	Saturation Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
A	12.79	191.85	12.80	12.11	3.21	0.00	17.84	18.02	0.717	2.79	2.61	11.948	B
B	10.87	163.05	10.87	15.77	0.24	0.00	20.40	20.35	0.533	1.19	1.15	6.301	A
C	4.62	69.30	4.62	0.41	10.70	0.00	9.50	4.22	0.486	0.90	0.93	12.270	B

Main results: (17:45-18:00)

Arm	Total Demand (Veh/min)	Junction Arrivals (Veh)	Entry Flow (Veh/min)	Exit Flow (Veh/min)	Circulating Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	Saturation Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
A	14.14	212.10	14.10	12.34	2.48	0.00	18.24	17.95	0.775	2.61	3.26	14.304	B
B	11.44	171.60	11.43	16.31	0.26	0.00	20.53	20.49	0.557	1.15	1.24	6.594	A
C	3.55	53.25	3.57	0.44	11.25	0.00	9.24	4.22	0.384	0.93	0.64	10.627	B

Main results: (18:00-18:15)

Arm	Total Demand (Veh/min)	Junction Arrivals (Veh)	Entry Flow (Veh/min)	Exit Flow (Veh/min)	Circulating Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	Saturation Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
A	12.22	183.30	12.30	14.36	2.22	0.00	18.26	17.81	0.669	3.26	2.09	10.197	B
B	13.64	204.60	13.59	14.29	0.23	0.00	20.45	20.39	0.667	1.24	1.95	8.692	A
C	3.20	48.00	3.20	0.44	13.38	0.00	8.00	4.22	0.400	0.64	0.66	12.480	B

Queueing Delay Results for each time segment

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

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
A	51.47	3.43	15.604	C	B
B	19.92	1.33	7.074	A	A
C	10.07	0.67	11.424	B	B

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

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
A	49.64	3.31	14.106	B	B
B	24.20	1.61	7.931	A	A
C	20.45	1.36	17.655	C	B

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

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
A	43.28	2.89	12.751	B	B
B	18.46	1.23	6.468	A	A
C	14.29	0.95	12.178	B	B

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

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
A	40.03	2.67	11.948	B	B
B	17.45	1.16	6.301	A	A
C	13.81	0.92	12.270	B	B

Queueing Delay results: (17:45-18:00)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
A	46.30	3.09	14.304	B	B
B	18.32	1.22	6.594	A	A
C	9.94	0.66	10.627	B	B

Queueing Delay results: (18:00-18:15)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
A	33.24	2.22	10.197	B	B
B	27.77	1.85	8.692	A	A
C	9.74	0.65	12.480	B	B

Mini Roundabout - 2018 With Dev, PM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set (s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
Mini Roundabout	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
2018 With Dev, PM	2018 With Dev	PM		Varies by Arm	16:45	18:15	90	15				✓		

Junction Network

Junctions

Name	Junction Type	Arm Order	Junction Delay (s)	Junction LOS
untitled	Mini-roundabout	A,B,C	15.66	C

Junction Network Options

Driving Side	Lighting	Road Surface	In London	Network Residual Capacity (%)	First Arm Reaching Threshold
Left	Normal/unknown	Normal/unknown		7	Arm C

Arms

Arms

Arm	Name	Description
A	Arm E	Withersfield Road
B	Arm SB	SB Link
C	Arm D	Queens Street

Capacity Options

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

Mini Roundabout Geometry

Arm	Approach road half-width (m)	Minimum approach road half-width (m)	Entry width (m)	Effective flare length (m)	Distance to next arm (m)	Entry corner kerb line distance (m)	Gradient over 50m (%)	Kerbed central island
A	5.50	5.50	5.50	0.00	18.00	10.00	0.00	
B	3.70	3.70	3.70	0.00	16.00	11.00	0.00	
C	3.00	3.00	4.50	13.00	17.00	10.00	0.00	

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

Pedestrian Crossings

Arm	Crossing Type
A	None
B	None
C	None

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Arm	Enter slope and intercept directly	Entered slope	Entered intercept (PCU/min)	Final Slope	Final Intercept (PCU/min)
A		(calculated)	(calculated)	0.633	15.984
B		(calculated)	(calculated)	0.545	11.672
C		(calculated)	(calculated)	0.563	13.568

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

Arm Capacity Adjustments

Arm	Type	Reason	Direct Capacity Adjustment (PCU/min)	Percentage Capacity Adjustment (%)
A	Direct		4.00	
B	Direct		9.00	
C	Direct		2.00	

Traffic Flows

Demand Set Data Options

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

Entry Flows

General Flows Data

Arm	Profile Type	Use Turning Counts	Average Demand Flow (Veh/min)	Flow Scaling Factor (%)
A	DIRECT		N/A	100.000
B	DIRECT		N/A	100.000
C	DIRECT		N/A	100.000

Turning Proportions

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

		To		
		A	B	C
From	A	0.000	999.000	19.000
	B	999.000	0.000	16.000
	C	113.000	257.000	0.000

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

		To		
		A	B	C
From	A	0.00	0.98	0.02
	B	0.98	0.00	0.02
	C	0.31	0.69	0.00

Vehicle Mix

Average PCU Per Vehicle - Junction 1 - (16:45-17:00)

		To		
		A	B	C
From	A	1.000	1.019	1.000
	B	1.016	1.000	1.000
	C	1.000	1.000	1.000

Heavy Vehicle Percentages - Junction 1 - (16:45-17:00)

		To		
		A	B	C
From	A	0.000	1.900	0.000
	B	1.600	0.000	0.000
	C	0.000	0.000	0.000

Average PCU Per Vehicle - Junction 1 - (17:00-17:15)

		To		
		A	B	C
From	A	1.000	1.022	1.000
	B	1.010	1.000	1.000
	C	1.000	1.000	1.000

Heavy Vehicle Percentages - Junction 1 - (17:00-17:15)

		To		
		A	B	C
From	A	0.000	2.200	0.000
	B	1.000	0.000	0.000
	C	0.000	0.000	0.000

Average PCU Per Vehicle - Junction 1 - (17:15-17:30)

		To		
		A	B	C
From	A	1.000	1.028	1.000
	B	1.011	1.000	1.000
	C	1.000	1.000	1.000

Heavy Vehicle Percentages - Junction 1 - (17:15-17:30)

		To		
		A	B	C
From	A	0.000	2.800	0.000
	B	1.100	0.000	0.000
	C	0.000	0.000	0.000

Average PCU Per Vehicle - Junction 1 - (17:30-17:45)

		To		
		A	B	C
From	A	1.000	1.006	1.000
	B	1.006	1.000	1.000
	C	1.000	1.000	1.000

Heavy Vehicle Percentages - Junction 1 - (17:30-17:45)

		To		
		A	B	C
From	A	0.000	0.600	0.000
	B	0.600	0.000	0.000
	C	0.000	0.000	0.000

Average PCU Per Vehicle - Junction 1 - (17:45-18:00)

		To		
		A	B	C
From	A	1.000	1.010	1.000
	B	1.000	1.000	1.000
	C	1.000	1.000	1.000

Heavy Vehicle Percentages - Junction 1 - (17:45-18:00)

		To		
		A	B	C
From	A	0.000	1.000	0.000
	B	0.000	0.000	0.000
	C	0.000	0.000	0.000

Average PCU Per Vehicle - Junction 1 - (18:00-18:15)

		To		
		A	B	C
From	A	1.000	1.018	1.000
	B	1.005	1.000	1.000
	C	1.000	1.000	1.000

Heavy Vehicle Percentages - Junction 1 - (18:00-18:15)

		To		
		A	B	C
From	A	0.000	1.800	0.000
	B	0.500	0.000	0.000
	C	0.000	0.000	0.000

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (Veh)	Max LOS	Average Demand (Veh/min)	Total Junction Arrivals (Veh)	Total Queueing Delay (Veh-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (Veh-min/min)	Inclusive Total Queueing Delay (Veh-min)	Inclusive Average Queueing Delay (s)
A	0.84	17.56	4.71	C	13.35	1201.80	273.20	13.64	3.04	273.32	13.65
B	0.75	11.35	2.84	B	13.59	1223.39	177.83	8.72	1.98	178.02	8.73
C	0.68	23.78	1.99	C	4.11	370.05	97.56	15.82	1.08	97.61	15.83

Main Results for each time segment

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

Arm	Total Demand (Veh/min)	Junction Arrivals (Veh)	Entry Flow (Veh/min)	Exit Flow (Veh/min)	Circulating Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	Saturation Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
A	15.17	227.55	14.86	14.32	2.58	0.00	18.02	17.80	0.842	0.00	4.70	17.564	C
B	13.53	202.95	13.40	17.16	0.28	0.00	20.20	20.17	0.670	0.00	1.97	8.661	A
C	3.77	56.55	3.71	0.49	13.19	0.00	8.03	4.22	0.470	0.00	0.86	13.727	B

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

Arm	Total Demand (Veh/min)	Junction Arrivals (Veh)	Entry Flow (Veh/min)	Exit Flow (Veh/min)	Circulating Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	Saturation Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
A	13.01	195.15	13.11	15.75	3.50	0.00	17.39	17.75	0.748	4.70	3.13	14.365	B
B	14.46	216.90	14.43	16.37	0.24	0.00	20.34	20.29	0.711	1.97	2.38	10.104	B
C	5.12	76.80	5.04	0.47	14.21	0.00	7.50	4.22	0.683	0.86	1.99	23.779	C

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

Arm	Total Demand (Veh/min)	Junction Arrivals (Veh)	Entry Flow (Veh/min)	Exit Flow (Veh/min)	Circulating Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	Saturation Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
A	12.79	191.85	12.81	13.82	3.10	0.00	17.54	17.64	0.729	3.13	2.80	12.773	B
B	12.61	189.15	12.66	15.68	0.24	0.00	20.32	20.27	0.621	2.38	1.67	7.877	A
C	4.41	66.15	4.47	0.44	12.46	0.00	8.48	4.22	0.520	1.99	1.12	15.160	C

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

Arm	Total Demand (Veh/min)	Junction Arrivals (Veh)	Entry Flow (Veh/min)	Exit Flow (Veh/min)	Circulating Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	Saturation Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
A	12.79	191.85	12.80	13.76	3.21	0.00	17.84	18.02	0.717	2.80	2.61	11.952	B
B	12.54	188.10	12.54	15.77	0.24	0.00	20.42	20.37	0.614	1.67	1.62	7.625	A
C	4.62	69.30	4.62	0.44	12.35	0.00	8.58	4.22	0.538	1.12	1.14	15.130	C

Main results: (17:45-18:00)

Arm	Total Demand (Veh/min)	Junction Arrivals (Veh)	Entry Flow (Veh/min)	Exit Flow (Veh/min)	Circulating Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	Saturation Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
A	14.14	212.10	14.10	13.99	2.48	0.00	18.23	17.95	0.776	2.61	3.26	14.313	B
B	13.11	196.65	13.10	16.32	0.26	0.00	20.53	20.49	0.639	1.62	1.73	8.068	A
C	3.55	53.25	3.58	0.47	12.90	0.00	8.31	4.22	0.427	1.14	0.76	12.734	B

Main results: (18:00-18:15)

Arm	Total Demand (Veh/min)	Junction Arrivals (Veh)	Entry Flow (Veh/min)	Exit Flow (Veh/min)	Circulating Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	Saturation Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
A	12.22	183.30	12.30	15.97	2.22	0.00	18.26	17.81	0.669	3.26	2.09	10.198	B
B	15.31	229.65	15.24	14.29	0.23	0.00	20.45	20.39	0.749	1.73	2.85	11.346	B
C	3.20	48.00	3.20	0.47	15.00	0.00	7.09	4.22	0.451	0.76	0.80	15.399	C

Queueing Delay Results for each time segment

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

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
A	59.52	3.97	17.564	C	B
B	27.46	1.83	8.661	A	A
C	11.97	0.80	13.727	B	B

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

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
A	50.61	3.37	14.365	B	B
B	34.30	2.29	10.104	B	B
C	26.73	1.78	23.779	C	C

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

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
A	43.34	2.89	12.773	B	B
B	26.20	1.75	7.877	A	A
C	17.95	1.20	15.160	C	B

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

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
A	40.06	2.67	11.952	B	B
B	24.49	1.63	7.625	A	A
C	17.01	1.13	15.130	C	B

Queueing Delay results: (17:45-18:00)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
A	46.33	3.09	14.313	B	B
B	25.53	1.70	8.068	A	A
C	12.02	0.80	12.734	B	B

Queueing Delay results: (18:00-18:15)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
A	33.24	2.22	10.198	B	B
B	39.73	2.65	11.346	B	B
C	11.88	0.79	15.399	C	B

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