

Project: Proposed Leisure Development, Rustington
Prepared by: James Werby
Approved by: Andrew Whittingham
Date: 12/10/2017

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1.0 Introduction

- 1.1 Motion has been instructed by Rustington Golf Centre Limited to provide transport advice in relation to a leisure development on land that forms part of the Rustington Golf Centre, located off Golfers Lane in Angmering. The site is within an area of mixed land uses including residential, commercial and open space and falls within the administrative boundaries of Arun District Council (ADC) and West Sussex County Council (WSCC).
- 1.2 This note addresses the most recent comments received by Highways England (attached at [Appendix A](#)) in respect of the planning application at Rustington Golf Centre (planning reference: A/84/17/PL). Highways England has requested that an assessment is undertaken to include the traffic impact on the A27/A280 double roundabout junctions to the north east of the site as a result of the development proposals.

2.0 Traffic Impact on the A27

- 2.1 As requested by Highways England the gross impact on the A27/A280 double roundabout junctions to the north east of the site as a result of the development proposals at Rustington Golf Course has been assessed to the end of the Local Plan period 2031.

Distribution

- 2.2 The previous assessments undertaken by Motion indicate that 14% of the traffic generated as a result of the proposed development would route to the double A27 roundabout junction to the north east of the site. It is noteworthy that Highways England are content with the junction to be modelled with this level of distribution, which equates to 43 and 51 vehicular trips at the southern roundabout in the PM and Saturday peak respectively when taking account of the gross impact of the development.
- 2.3 As part of previous assessment distribution was only taken to the southern roundabout junction (Titnore Lane/A280/A27). Therefore as part of this assessment, further analysis has been undertaken in order to establish the likely distribution through the northern roundabout (Long Furlong/A280/A27). The same methodology used to establish the distribution, which Highways England are content with, has been used and the results of this can be found in [Figure 2](#) attached to this note.

Junction Modelling

- 2.4 In order to undertake the assessment of the requested junctions, information provided by Highways England refers to modelling results undertaken as part of the Land North of Water Lane development at the double roundabout (attached at [Appendix B](#)). This document provides the basis on which this assessment has been based upon.
- 2.5 It is noted that traffic flows associated with the Saturday peak hour period have not been assessed within the Land North of Water Lane development assessment or as part of the Stage 3 Arun Transport Study. As part of previous submitted assessments by Motion, Highways England traffic counts that record the total carriageway flows along the A27 were obtained in order to provide a comparison between Friday and Saturday traffic flows. Following analysis of this data, which is attached at [Appendix C](#), it is considered that the A27 at the assessed Friday and Saturday peak hour time periods have similar total carriageway traffic flows.
- 2.6 Therefore, when modelling the requested junctions it has been assumed that the PM peak hour baseline traffic flows will be similar to Saturday peak hour flows. As a result, the 2031 baseline traffic flows for the PM peak have been used to assess both the Friday PM peak and Saturday afternoon peak hour periods.

- 2.7 It is noteworthy that the development traffic as part of the Land North of Water Lane development has also been included within the Saturday peak in the following analysis. In reality development traffic generated by the proposals would be much lower during the Saturday peak (11:45 – 12:45 hours). However, in order to provide a robust assessment the PM development traffic of the Land North of Water Lane development along with other committed developments have been included for the Saturday assessment.

ARCADY Results

- 2.8 The operation of the A280/A27 Lane southern and northern roundabout junctions have been assessed using the current version of the industry standard computer modelling software package, ARCADY (contained within Junctions 9). This package, which is produced by the Transport Research Laboratory (TRL), expresses the relationship between traffic flow and the capacity of a junction as the Ratio of Flow to Capacity (RFC). Based upon these results, the model predicts the anticipated queue lengths (Q), expressed as number of vehicles (veh) and the associated periods of delay (in seconds) likely to occur at a roundabout junction. ARCADY also provides a further performance measurement, which correlates the length of delay experienced by arriving vehicles to a scale that is referred to as the 'Level of Service' (LoS).
- 2.9 The level of service is determined on vehicle delay time. For a non-signalised junction the level of service is based on the delay times summarised in Table 2.1.

Level of Service	Non-signalised Intersection
A	≤ 10 Seconds
B	10-15 Seconds
C	15-25 Seconds
D	25-35 Seconds
E	35-50 Seconds
F	≥ 50 Seconds

Table 2.1: Level of Service Thresholds

2031 Baseline

- 2.10 The results of the 2031 Baseline capacity assessment of the A280/A27 Lane southern and northern roundabout junctions are summarised Table 2.2 and Table 2.3 below whilst the full ARCADY output results are provided at Appendix 8. The 2031 baseline figures are illustrated in Figure 2, which include committed development and the anticipated development traffic as a result of the Land North of Water Lane development.

Arm	Friday PM (also used for Saturday peak)			
	Max RFC	Queue (veh)	Delay (s)	LoS
1 – A27 Off-slip	0.73	2.5	20.73	C
2 – Titnore Lane	0.72	2.5	12.57	B
3 – A280 South West	0.66	1.9	7.44	A
5 – A280 North	0.89	7.6	16.73	C

Table 2.2: A280/A27/Titnore Lane Southern Roundabout Junction (2031 Baseline without Development, with mitigation Scenario)

Arm	Friday PM (also used for Saturday peak)			
	Max RFC	Queue (veh)	Delay (s)	LoS
1 – A280 Long Furlong	0.94	12.4	34.47	D
3 – A280 South	0.53	1.1	4.02	A
4 – A27 Off-slip	0.46	0.9	6.30	A
5 – Arundel Road	0.10	0.1	6.14	A

Table 2.3: A280/A27/Titnore Lane Northern Roundabout Junction (2031 Baseline without Development)

- 2.11 When considering the above results it is important to note that when an RFC of 1 is recorded by ARCADY, it indicates that a junction is at capacity, whilst an RFC of less than 0.85 is generally accepted as being representative of a junction operating under free flow conditions.
- 2.12 It is also noteworthy that the results in Table 2.2 above are based on proposed mitigation measures on the south western arm of the southern roundabout.
- 2.13 Taking the above into consideration, Table 2.2 and Table 2.3 indicate that both junctions work within capacity. However, arm 1 of the southern and northern roundabouts are subject to longer vehicle delays and arm 5 of the southern roundabout and arm 1 of the northern roundabout are subject to slightly longer vehicle queues.

2031 Baseline with Development

- 2.14 The anticipated development traffic after it has been distributed through the local highway network and the impact the development traffic has on the 2031 baseline flows are attached at Figures 3-6. The results of the 2031 baseline with development scenario of the A280/A27 Lane southern and northern roundabout junctions are summarised Table 2.4 and Table 2.5 below whilst the full ARCADY output results are provided at Appendix D.

Arm	Friday PM				Saturday Afternoon			
	Max RFC	Queue (veh)	Delay (s)	LoS	Max RFC	Queue (veh)	Delay (s)	LoS
1 – A27 Off-slip	0.75	2.9	23.36	C	0.76	3.0	23.96	C
2 – Titnore Lane	0.75	2.8	13.75	B	0.75	2.9	13.87	B
3 – A280 South West	0.67	2.0	7.74	A	0.67	2.0	7.77	A
5 – A280 North	0.90	8.1	17.90	C	0.90	8.3	18.17	C

Table 2.4: A280/A27/Titnore Lane Southern Roundabout Junction (2031 Baseline with Development Scenario)

Arm	Friday PM				Saturday Afternoon			
	Max RFC	Queue (veh)	Delay (s)	LoS	Max RFC	Queue (veh)	Delay (s)	LoS
1 – A280 Long Furlong	0.95	13.8	37.70	E	0.95	14.1	38.63	E
3 – A280 South	0.53	1.1	4.08	A	0.53	1.1	4.09	A
4 – A27 Off-slip	0.47	0.9	6.36	A	0.47	0.9	6.36	A
5 – Arundel Road	0.11	0.1	6.20	A	0.11	0.1	6.21	A

Table 2.5: A280/A27/Long Furlong Northern Roundabout Junction (2031 Baseline with Development Scenario)

- 2.15 When considering the above results, it is demonstrated that the development proposals will have an immaterial impact on all arms when compared to the 2031 baseline scenario. Whilst it is noted that Table 2.5 shows that the LoS on arm 1 on the northern roundabout goes from a D to an E, this is due to the delay in Table 2.3 (34.47 second) being so close to the 35-50 second threshold.

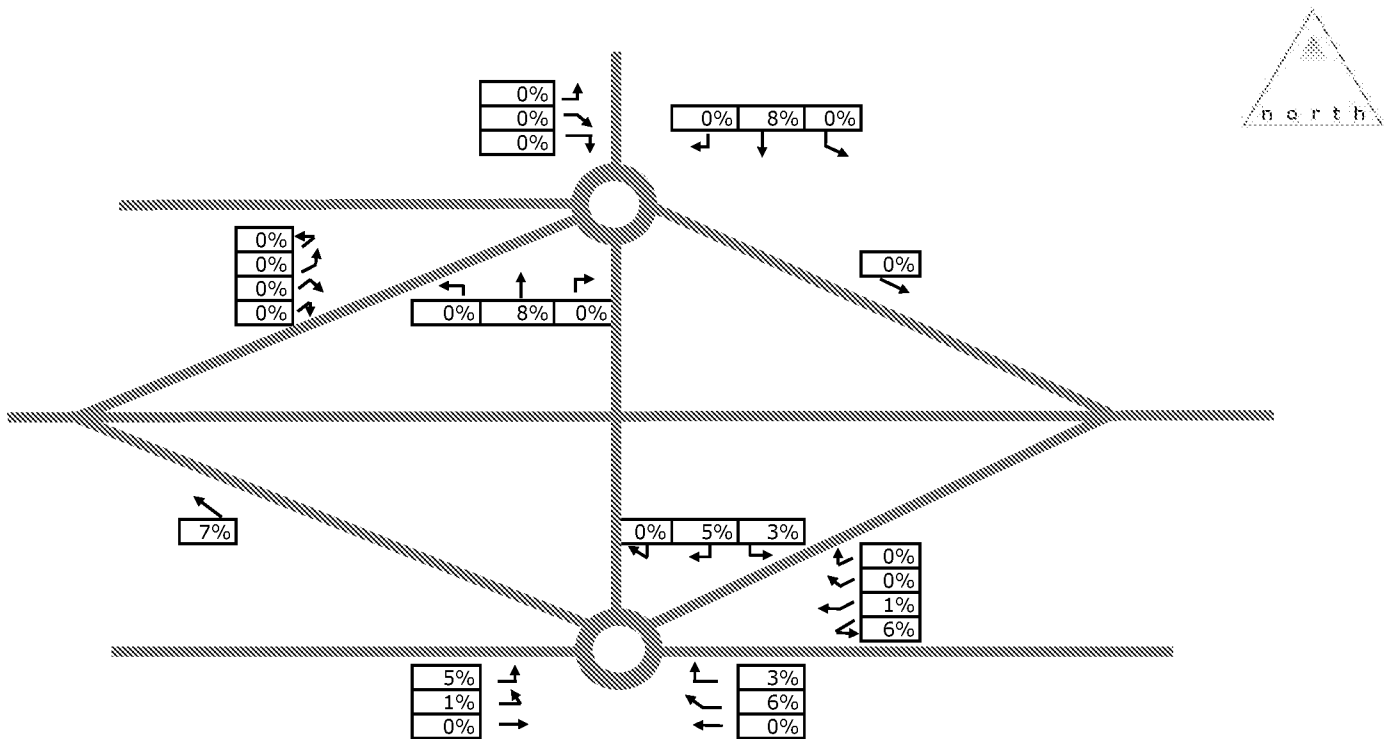
Highway Impact Summary

- 2.16 On the basis of the above, it is considered that the gross impact of the development proposals at Rustington Golf Centre will not result in any adverse disruption to the free flow of traffic on the surrounding highway network and certainly not lead to a severe impact as is outlined in the NPPF.

3.0 Summary and Conclusions

- 3.1 This Technical Note has been prepared on behalf of Rustington Golf Centre Limited in relation to the request for further information from Highways England for the proposed leisure development on land that forms part of the Rustington Golf Centre, located off Golfers Lane in Angmering (planning reference A/84/17/PL).
- 3.2 Once gross net additional trips of the retail unit have been distributed on the wider road network, the impact on the A27 to the north east is considered to be immaterial.
- 3.3 On the basis of the above, it is considered that the impact of the development will not have a detrimental effect on the surrounding road network. As such, it is considered that there is no reason why the proposals should be resisted on traffic or transportation grounds.

Figures



Friday Peak (17:00 - 18:00)

NB: same distribution assumed for Sat peak

motion

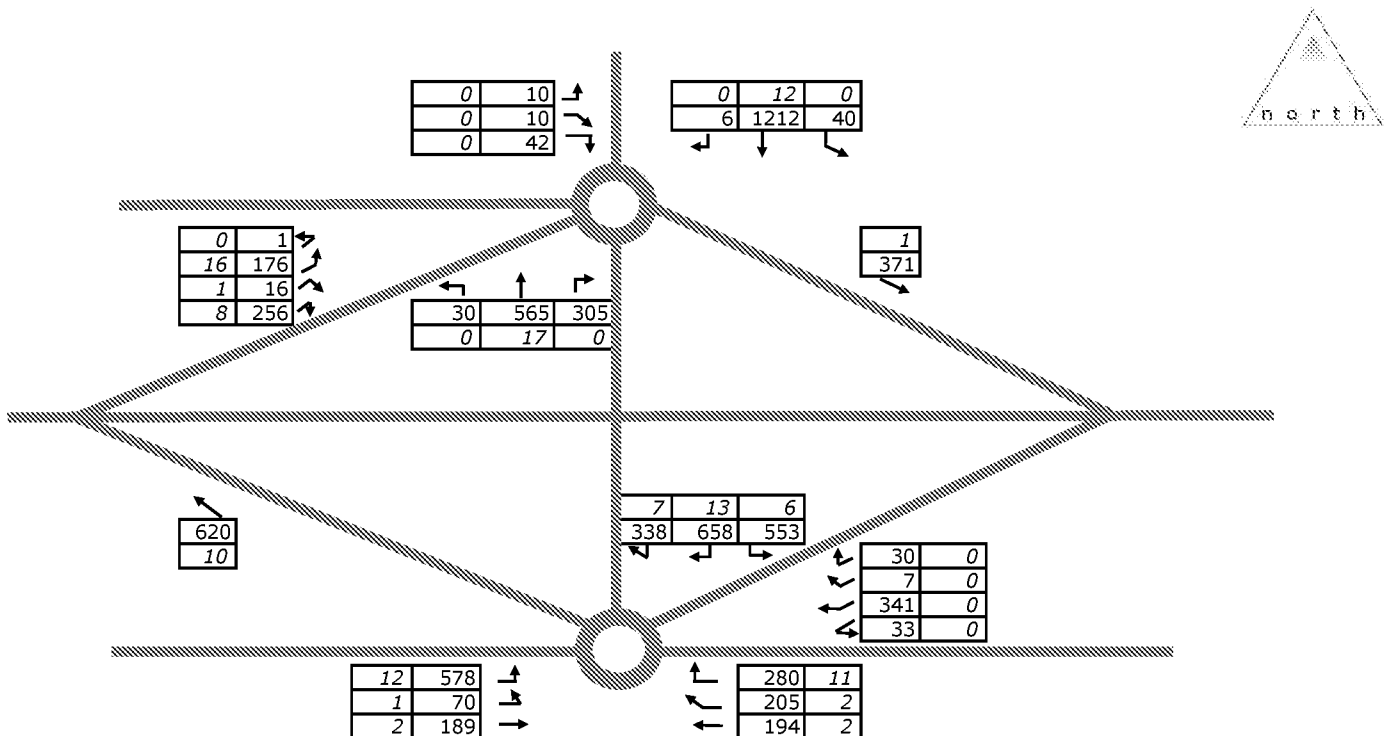
Rustington Golf Course, Angmering

Distribution

Motion Figure 1

Key:

- 5 Total Vehicles
- 0 Number of HGVs



Friday Peak (17:00 - 18:00)
NB: same flows assumed for Sat peak

motion

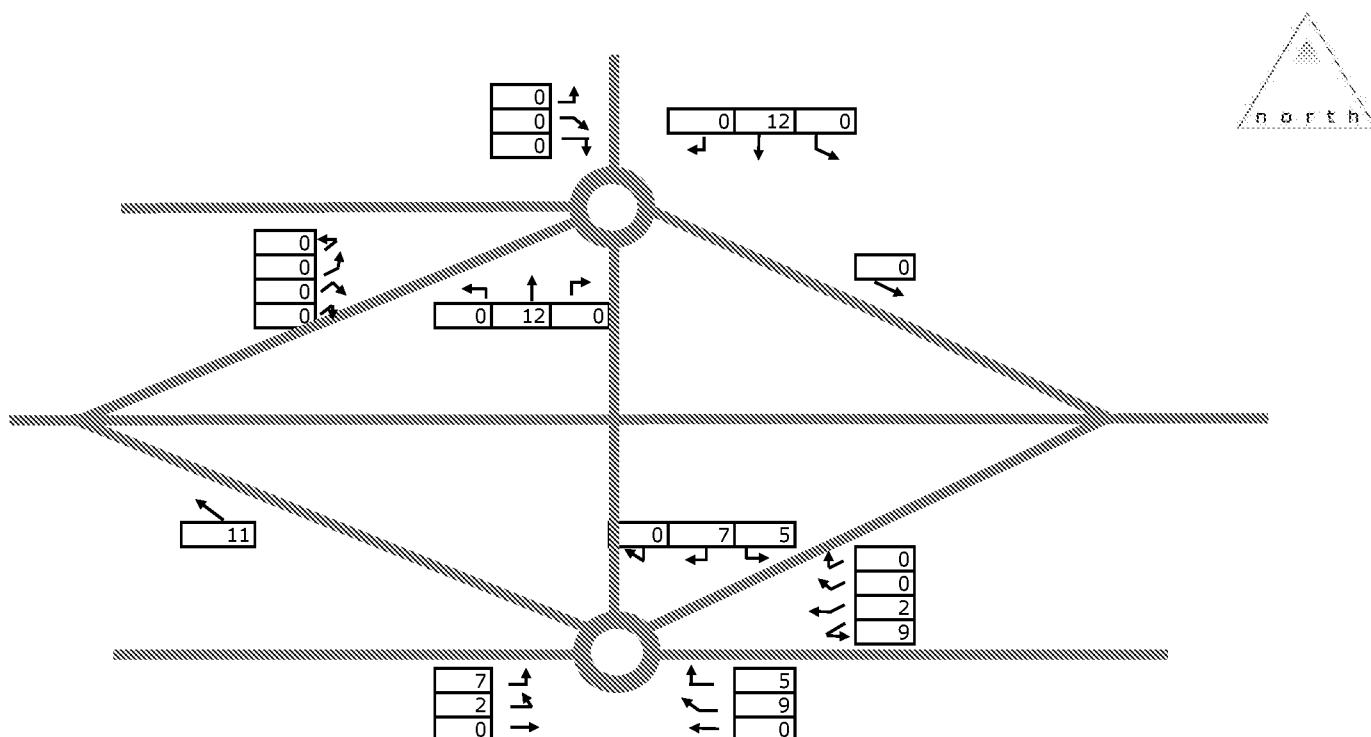
Rustington Golf Course, Angmering

2031 Baseline Data (Extracted from Land North Water Lane Development)

Motion Figure 2

Key:

- 5 Total Vehicles
- 0 Number of HGVs



Friday Peak (17:00 - 18:00)

motion

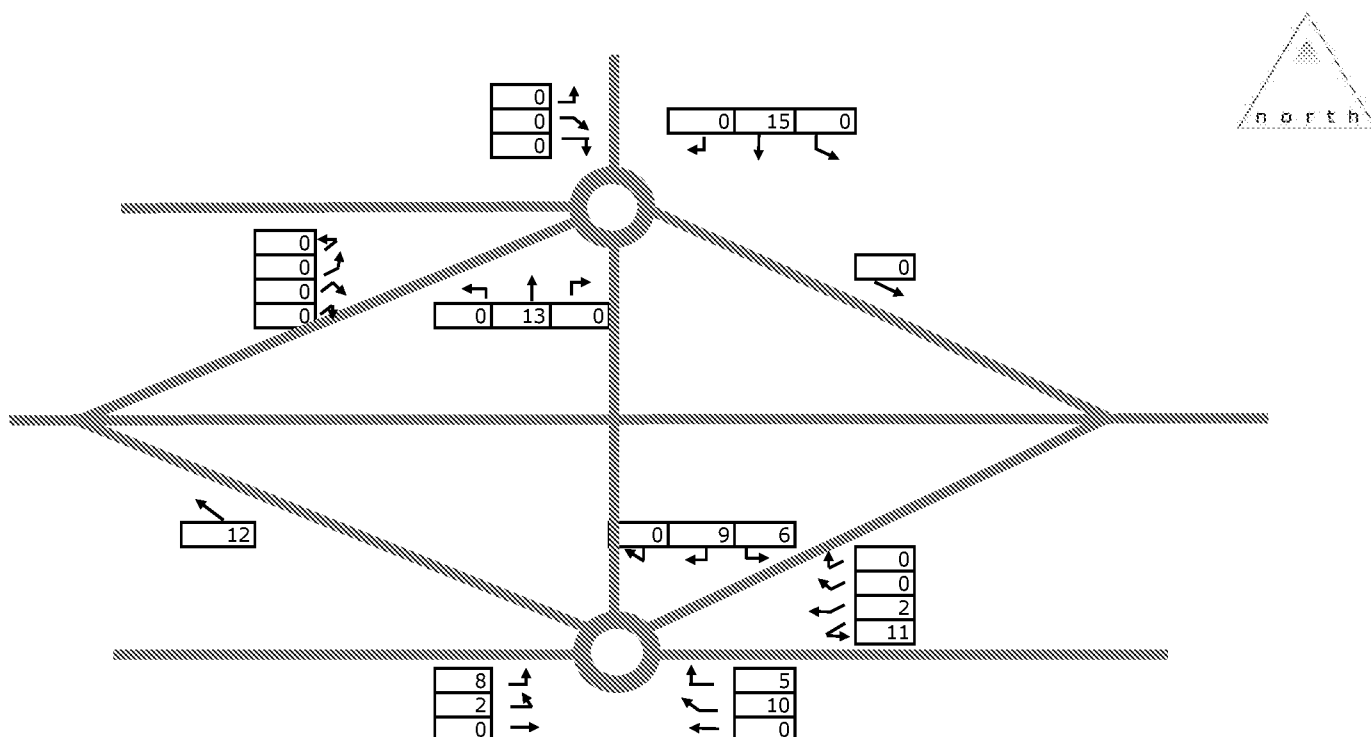
Rustington Golf Course, Angmering

Gross Development Traffic

Motion Figure 3

Key:

- 5 Total Vehicles
- 0 Number of HGVs



Saturday Peak (11:45 - 12:45)

motion

Rustington Golf Course, Angmering

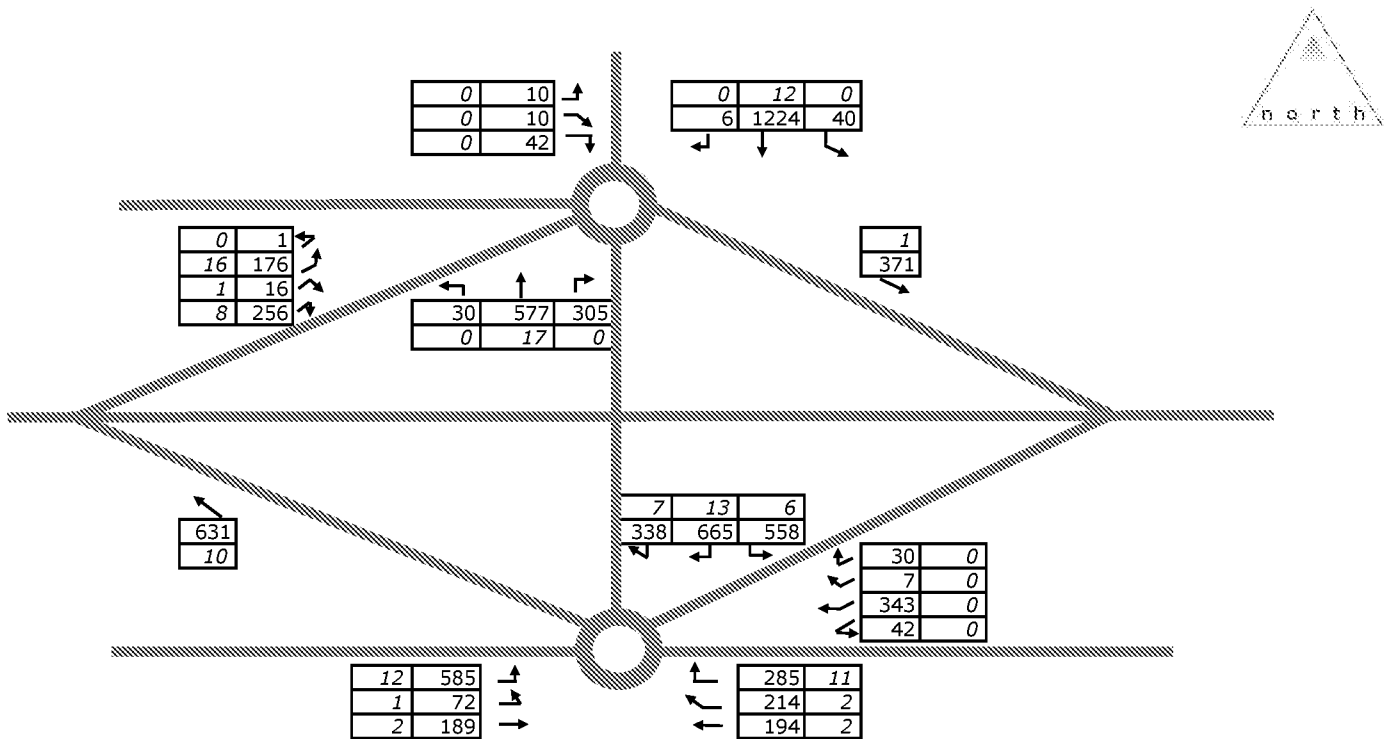
Gross Development Traffic

Motion Figure 4

Key:

5 Total Vehicles

0 Number of HGVs



Friday Peak (17:00 - 18:00)

motion

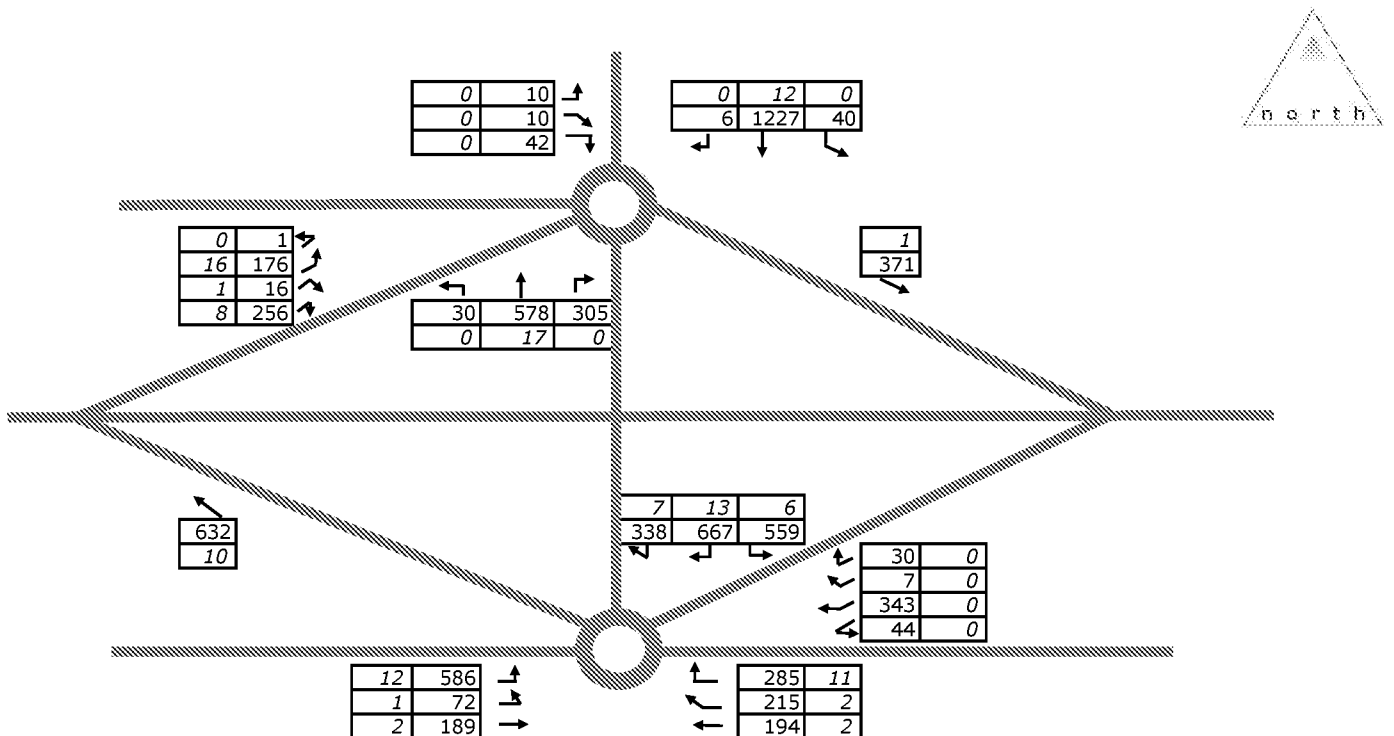
Rustington Golf Course, Angmering

2031 Baseline with Development

Motion Figure 5

Key:

- 5 Total Vehicles
- 0 Number of HGVs



Saturday Peak (11:45 - 12:45)

NB: same baseline as PM peak assumed for Sat peak

motion

Rustington Golf Course, Angmering

2031 Baseline with Development

Motion Figure 6

Key:

- 5 Total Vehicles
- 0 Number of HGVs

Appendix A

Highways England
Correspondence

From: Franklin, Richard [REDACTED]
Sent: 27 September 2017 12:49
To: James Werby
Cc: 'Michael Eastham'; Andrew Whittingham; Planning SE; Bowie, David; Cleaver, Elizabeth
Subject: RE: Rustington Golf Centre, Golfers Lane, Angmering, BN16 4NB - app no. A/ 84/ 17/ PL
Attachments: A27 North Roundabout - Scenario B.PDF; A27 South Roundabout - Scenario B - Mitigation Report.pdf

Dear James,

Thank you for your email.

Please note that on the basis that Highways England has recently released consultation on the Arundel Bypass improvements, Highways England does not require modelling of the A27 / A284 junction as the options put forward include improvements at this junction.

With regard to the A27 / A280 junction, please be advised that the Transport Assessment for the Land South of Water Lane development (Arun planning application reference A/99/17/OUT) contains information on the existing geometry. Separate to this, Highways England requested that the applicant modelled the junction for a 2031 scenario in line with the end of the Local Plan, and to also include the Land North of Water Lane development. This included mitigation on the southwest arm proposed by the developer. Please find the results of the modelling attached. This should be used as the basis for modelling the impact of the Rustington Golf Centre. Just to confirm, while Highways England believes that the proportion of trips from Rustington Golf Centre routing through this junction is low at 14%, we are content for you to model the impact on the basis of this distribution and the gross trips – i.e. 305 in the AM peak and 363 in the PM peak, equating to 43 in the AM peak and 51 at the southern roundabout. The implications of the gross trips on the northern roundabout should also be considered after distribution.

Please let us know if you have any queries.

Regards,

Sent on behalf of Elizabeth Cleaver, Assistant Spatial Planning Manager Area 4

Richard Franklin

Highways England Company Limited | Registered Office: Bridge House, 1 Walnut Tree Close, Guildford GU1 4LZ | Registered in England and Wales No. 9346363

Web: www.highwaysengland.co.uk

From: James Werby [REDACTED]
Sent: 22 September 2017 09:49
To: Franklin, Richard
Subject: RE: Rustington Golf Centre, Golfers Lane, Angmering, BN16 4NB - app no. A/84/17/PL

Richard,

Thank you for your response below in relation to the above planning application at Rustington Golf Centre. We note you are still insisting on modelling the A27/A284 junction to the west of the development and the A27/A280 to the east of the development, so in order for us to do this do you have the measurements for the junctions pre and post mitigation measures as well as baseline traffic flows for the junctions.

I look forward to hearing back from you on this matter.

Kind regards,

James Werby | Transport Planner

Address: 8 Duncannon Street, London WC2N 4JF

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From: Franklin, Richard [REDACTED]
Sent: 21 September 2017 17:29
To: James Werby [REDACTED]

Subject: RE: Rustington Golf Centre, Golfers Lane, Angmering, BN16 4NB - app no. A/ 84/ 17/ PL

Dear James,

Thank you for your email of 13th September with additional information in response to the attached email. We have reviewed the information and have the following comments:

- In relation to the trampoline centre trip generation, while there still appears to be a discrepancy in calculating the number of trips, Highways England is satisfied with the gross level of trips assessed (305 in the PM peak and 363 in the Saturday peak).
- The explanation of the distribution description in paragraph 3.1 is acknowledged, although Highways England is still concerned that the distribution underestimates the trips using the A27.
- The note provides information on the net trips in the retail trip generation section. In this respect, reference to the TA submitted with the previous planning application (A/77/16/PL) indicates that the trips associated with this application appear to be 229 in the PM peak and 156 on the Saturday in Table 7.6, which would make the net trips 76 in the PM peak and 207 in the Saturday peak. This differs to the net trips calculated in the latest TA (Table 7.9 calculates a difference of 38 and 183 for the PM and Saturday peaks respectively), which appears to be the basis for the figures in Table 1 of the 13th September letter, and therefore appears to be an underestimate of net trips.
- We note the information provided in the section "Stage 3 of the Arun Transport Study – 2016", although Highways England is not just looking for reference to this document. As outlined in the attached email, the impact on the A27 needs to be considered for the development in its entirety based on gross trips. Even if the proposed distribution is accepted (which Highways England considers low for the A27 as previously outlined), there would be 43 two way trips in the PM peak hour and 51 in the Saturday peak at the A27 / A280 junction. As such, Highways

England is still concerned that the proposed development has the potential to cause severe harm to the Strategic Road Network. As previously outlined, the cumulative impacts will require assessment (i.e. using Junctions 9) using this level of gross trips as a minimum at the end of the Local Plan period 2031 with a view to a 'no worsening' of impacted junctions (no worse in terms of delay, queue length, RFC's and safety) compared with the development proposals and mitigation proposed as part of the emerging Local Plan.

As such, as the required assessment has not been provided to date, Highways England has no option but to recommend that the application should continue not be determined (other than a refusal) until it is provided. This is consistent with other applications that we are considering within the area and elsewhere.

I trust that this is of assistance and if you require further information please contact us accordingly.

Regards,
Sent on behalf of Elizabeth Cleaver, Assistant Spatial Planning Manager Area 4

Richard Franklin
Highways England Company Limited | Registered Office: Bridge House, 1 Walnut Tree Close, Guildford GU1 4LZ | Registered in England and Wales No. 9346363
Web: www.highwaysengland.co.uk

From: James Werby [REDACTED]
Sent: 13 September 2017 15:11
To: Bowie, David
Cc: Bown, Kevin; Franklin, Richard; Andrew Whittingham
Subject: Rustington Golf Centre, Golfers Lane, Angmering, BN16 4NB - app no. A/84/17/PL

David,

Please find attached letter, sent in response to your latest set of comments dated 24 August 2017 for the above scheme.

I note that you are currently on leave, so I would appreciate if one of your colleagues could review the letter as decision date for this application is 21 September 2017.

If you have any questions in relation to the letter, please feel free to contact me.

Kind regards,

James Werby | Transport Planner
Moulton | 8 Duncannon Street, London WC2N 4JF
[REDACTED]

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Appendix B

Land North of Water Lane
ARCADY Outputs

Junctions 9										
ARCADY 9 - Roundabout Module										
Version: 9.0.1.4646 [] © Copyright TRL Limited, 2017										
For sales and distribution information, program advice and maintenance, contact TRL: Tel: +44 (0)1344 770758 email: software@trl.co.uk Web: http://www.trlsoftware.co.uk										
The users of this computer program for the solution of an engineering problem are in no way relieved of their responsibility for the correctness of the solution										

Filename: A27 South Roundabout - with mitigation - Scenario B - Flare.j9

Path: T:\Projects\9000 Series Project Numbers\9105\ITB Land at Angmering, Arun Distr, W Susx\Tech\Assessments\2031 Assessment -SH

Report generation date: 14/03/2017 14:36:47

- »2031 + Committed, AM Peak
- »2031 + Committed, PM Peak
- »2031 + Committed + Dev, AM Peak
- »2031 + Committed + Dev, PM Peak

Summary of junction performance

	AM Peak					PM Peak				
	Queue (Veh)	Delay (s)	RFC	LOS	Network Residual Capacity	Queue (Veh)	Delay (s)	RFC	LOS	Network Residual Capacity
2031 + Committed										
1 - A27 Off Slip	1.1	9.97	0.53	A	11 % [3 - A280 South West]	1.5	12.99	0.60	B	13 % [1 - A27 Off Slip]
2 - Titnore Lane	1.1	5.78	0.52	A		2.0	9.97	0.67	A	
3 - A280 South West	3.9	12.69	0.80	B		0.9	4.89	0.48	A	
5 - A280 North	2.6	7.21	0.73	A		5.3	11.82	0.85	B	
2031 + Committed + Dev										
1 - A27 Off Slip	2.7	19.30	0.74	C	3 % [3 - A280 South West]	2.5	20.73	0.73	D	5 % [1 - A27 Off Slip]
2 - Titnore Lane	1.7	8.44	0.64	A		2.5	12.57	0.72	B	
3 - A280 South West	7.6	22.75	0.88	C		1.9	7.44	0.66	A	
5 - A280 North	3.4	8.93	0.78	A		7.6	16.73	0.88	C	

There are warnings associated with one or more model runs - see the 'Data Errors and Warnings' tablet, for each Analysis or Demand Set.

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

File summary

File Description

Title	(untitled)
Location	
Site number	
Date	19/05/2016
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Enumerator	I-TRANSPORT\Hotdesk
Description	

Units

Distance units	Speed units	Traffic units input	Traffic units results	Flow units	Average delay units	Total delay units	Rate of delay units
m	kph	Veh	Veh	perHour	s	-Min	perMin

Analysis Options

Calculate Queue Percentiles	Calculate residual capacity	Residual capacity criteria type	RFC Threshold	Average Delay threshold (s)	Queue threshold (PCU)
	✓	Delay	0.85	36.00	20.00

Demand Set Summary

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D1	2031 + Committed	AM Peak	ONE HOUR	07:45	09:15	15
D2	2031 + Committed	PM Peak	ONE HOUR	16:45	18:15	15
D3	2031 + Committed + Dev	AM Peak	ONE HOUR	07:45	09:15	15
D4	2031 + Committed + Dev	PM Peak	ONE HOUR	16:45	18:15	15

Analysis Set Details

ID	Network flow scaling factor (%)
A1	100.000

2031 + Committed, AM Peak

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Geometry	1 - A27 Off Slip - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	3 - A280 South West - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.

Junction Network

Junctions

Junction	Name	Junction Type	Junction Delay (s)	Junction LOS
1	untitled	Standard Roundabout	8.99	A

Junction Network Options

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold
Left	Normal/unknown	11	3 - A280 South West

Arms

Arms

Arm	Name	Description
1	A27 Off Slip	
2	Titnore Lane	
3	A280 South West	
4	A27 On Slip	
5	A280 North	

Roundabout Geometry

Arm	V - Approach road half-width (m)	E - Entry width (m)	I' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit only
1 - A27 Off Slip	4.00	6.00	35.0	25.0	60.0	38.0	
2 - Titnore Lane	3.40	7.80	30.0	25.0	60.0	24.0	
3 - A280 South West	3.65	7.50	50.0	20.0	60.0	33.0	
4 - A27 On Slip							✓
5 - A280 North	3.70	7.80	22.0	42.0	60.0	10.0	

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Arm	Final slope	Final intercept (PCU/hr)
1 - A27 Off Slip	0.551	1693
2 - Titnore Lane	0.617	1997
3 - A280 South West	0.610	2021
4 - A27 On Slip		
5 - A280 North	0.648	2080

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

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D1	2031 + Committed	AM Peak	ONE HOUR	07:45	09:15	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1 - A27 Off Slip		✓	377	100.000
2 - Titnore Lane		✓	605	100.000
3 - A280 South West		✓	1024	100.000
4 - A27 On Slip				
5 - A280 North		✓	1203	100.000

Origin-Destination Data

Demand (Veh/hr)

		To				
From		1 - A27 Off Slip	2 - Titnore Lane	3 - A280 South West	4 - A27 On Slip	5 - A280 North
	1 - A27 Off Slip	0	29	289	0	59
	2 - Titnore Lane	0	0	91	254	260
	3 - A280 South West	0	223	0	51	750
	4 - A27 On Slip	Exit-only	Exit-only	Exit-only	Exit-only	Exit-only
	5 - A280 North	0	603	347	253	0

Vehicle Mix

Heavy Vehicles Percentages

		To				
From		1 - A27 Off Slip	2 - Titnore Lane	3 - A280 South West	4 - A27 On Slip	5 - A280 North
	1 - A27 Off Slip	0	8	1	0	2
	2 - Titnore Lane	0	0	3	4	1
	3 - A280 South West	0	1	0	5	2
	4 - A27 On Slip	Exit-only	Exit-only	Exit-only	Exit-only	Exit-only
	5 - A280 North	0	4	3	12	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (Veh)	Max LOS
1 - A27 Off Slip	0.53	9.97	1.1	A
2 - Titnore Lane	0.52	5.78	1.1	A
3 - A280 South West	0.80	12.69	3.9	B
4 - A27 On Slip				
5 - A280 North	0.73	7.21	2.6	A

Main Results for each time segment

07:45 - 08:00

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1 - A27 Off Slip	284	1069	1060	0.268	282	0.4	4.619	A
2 - Titnore Lane	455	711	1499	0.304	454	0.4	3.439	A
3 - A280 South West	771	619	1592	0.484	767	0.9	4.346	A
4 - A27 On Slip		968						
5 - A280 North	906	167	1872	0.484	902	0.9	3.698	A

08:00 - 08:15

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1 - A27 Off Slip	339	1280	941	0.360	338	0.6	5.966	A
2 - Titnore Lane	544	851	1410	0.386	543	0.6	4.147	A
3 - A280 South West	921	741	1515	0.608	918	1.5	6.007	A
4 - A27 On Slip		1159						
5 - A280 North	1081	200	1852	0.584	1080	1.4	4.652	A

08:15 - 08:30

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1 - A27 Off Slip	415	1563	780	0.532	413	1.1	9.755	A
2 - Titnore Lane	666	1039	1292	0.516	664	1.1	5.722	A
3 - A280 South West	1127	907	1411	0.799	1119	3.7	11.968	B
4 - A27 On Slip		1413						
5 - A280 North	1325	244	1824	0.726	1320	2.6	7.067	A

08:30 - 08:45

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1 - A27 Off Slip	415	1570	776	0.535	415	1.1	9.969	A
2 - Titnore Lane	666	1044	1289	0.517	666	1.1	5.780	A
3 - A280 South West	1127	909	1409	0.800	1127	3.9	12.695	B
4 - A27 On Slip		1422						
5 - A280 North	1325	245	1823	0.726	1324	2.6	7.207	A

08:45 - 09:00

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1 - A27 Off Slip	339	1289	936	0.362	341	0.6	6.080	A
2 - Titnore Lane	544	857	1407	0.387	546	0.6	4.190	A
3 - A280 South West	921	745	1513	0.609	930	1.6	6.269	A
4 - A27 On Slip		1171						
5 - A280 North	1081	202	1850	0.585	1086	1.4	4.743	A

09:00 - 09:15

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1 - A27 Off Slip	284	1076	1056	0.269	285	0.4	4.671	A
2 - Titnore Lane	455	715	1495	0.305	456	0.4	3.465	A
3 - A280 South West	771	623	1590	0.485	773	1.0	4.423	A
4 - A27 On Slip		976						
5 - A280 North	906	168	1871	0.484	908	0.9	3.742	A

2031 + Committed, PM Peak

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Geometry	1 - A27 Off Slip - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	3 - A280 South West - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.

Junction Network

Junctions

Junction	Name	Junction Type	Junction Delay (s)	Junction LOS
1	untitled	Standard Roundabout	10.24	B

Junction Network Options

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold
Left	Normal/unknown	13	1 - A27 Off Slip

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D2	2031 + Committed	PM Peak	ONE HOUR	16:45	18:15	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1 - A27 Off Slip		✓	377	100.000
2 - Titnore Lane		✓	652	100.000
3 - A280 South West		✓	606	100.000
4 - A27 On Slip				
5 - A280 North		✓	1513	100.000

Origin-Destination Data

Demand (Veh/hr)

	To					
From		1 - A27 Off Slip	2 - Titnore Lane	3 - A280 South West	4 - A27 On Slip	5 - A280 North
	1 - A27 Off Slip	0	33	307	7	30
	2 - Titnore Lane	0	0	167	205	280
	3 - A280 South West	0	114	0	33	459
	4 - A27 On Slip	Exit-only	Exit-only	Exit-only	Exit-only	Exit-only
	5 - A280 North	0	553	622	338	0

Vehicle Mix

Heavy Vehicle Percentages

From	To					
		1 - A27 Off Slip	2 - Titnore Lane	3 - A280 South West	4 - A27 On Slip	5 - A280 North
1 - A27 Off Slip		0	0	0	0	0
2 - Titnore Lane		0	0	1	1	4
3 - A280 South West		0	1	0	4	2
4 - A27 On Slip		Exit-only	Exit-only	Exit-only	Exit-only	Exit-only
5 - A280 North		0	1	2	2	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (Veh)	Max LOS
1 - A27 Off Slip	0.60	12.99	1.5	E
2 - Titnore Lane	0.67	9.97	2.0	A
3 - A280 South West	0.48	4.89	0.9	A
4 - A27 On Slip				
5 - A280 North	0.85	11.82	5.3	E

Main Results for each time segment

16:45 - 17:00

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1 - A27 Off Slip	284	1219	1011	0.281	282	0.4	4.929	A
2 - Titnore Lane	491	977	1359	0.361	489	0.6	4.126	A
3 - A280 South West	456	644	1587	0.287	455	0.4	3.175	A
4 - A27 On Slip		662						
5 - A280 North	1139	86	1993	0.571	1134	1.3	4.164	A

17:00 - 17:15

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1 - A27 Off Slip	339	1459	877	0.386	338	0.6	6.668	A
2 - Titnore Lane	586	1169	1241	0.472	585	0.9	5.475	A
3 - A280 South West	545	771	1510	0.361	544	0.6	3.727	A
4 - A27 On Slip		793						
5 - A280 North	1360	102	1982	0.686	1357	2.1	5.723	A

17:15 - 17:30

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1 - A27 Off Slip	415	1779	698	0.595	412	1.4	12.467	B
2 - Titnore Lane	718	1425	1084	0.662	714	1.9	9.615	A
3 - A280 South West	667	941	1406	0.475	666	0.9	4.855	A
4 - A27 On Slip		969						
5 - A280 North	1666	125	1968	0.847	1654	5.1	11.072	E

17:30 - 17:45

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1 - A27 Off Slip	415	1791	692	0.600	415	1.5	12.989	B
2 - Titnore Lane	718	1435	1078	0.666	718	2.0	9.972	A
3 - A280 South West	667	947	1403	0.476	667	0.9	4.895	A
4 - A27 On Slip		972						
5 - A280 North	1666	126	1968	0.847	1665	5.3	11.824	B

17:45 - 18:00

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1 - A27 Off Slip	339	1475	868	0.390	342	0.6	6.886	A
2 - Titnore Lane	586	1183	1233	0.476	590	0.9	5.642	A
3 - A280 South West	545	779	1505	0.362	546	0.6	3.759	A
4 - A27 On Slip		797						
5 - A280 North	1360	103	1982	0.686	1372	2.2	6.017	A

18:00 - 18:15

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1 - A27 Off Slip	284	1229	1006	0.282	285	0.4	4.998	A
2 - Titnore Lane	491	985	1354	0.363	492	0.6	4.184	A
3 - A280 South West	456	649	1584	0.288	457	0.4	3.197	A
4 - A27 On Slip		666						
5 - A280 North	1139	86	1993	0.572	1143	1.3	4.251	A

2031 + Committed + Dev, AM Peak

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Geometry	1 - A27 Off Slip - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	3 - A280 South West - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.

Junction Network

Junctions

Junction	Name	Junction Type	Junction Delay (s)	Junction LOS
1	untitled	Standard Roundabout	14.58	B

Junction Network Options

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold
Left	Normal/unknown	3	3 - A280 South West

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D3	2031 + Committed + Dev	AM Peak	ONE HOUR	07:45	09:15	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1 - A27 Off Slip		✓	481	100.000
2 - Titnore Lane		✓	684	100.000
3 - A280 South West		✓	1157	100.000
4 - A27 On Slip				
5 - A280 North		✓	1270	100.000

Origin-Destination Data

Demand (Veh/hr)

	To					
From		1 - A27 Off Slip	2 - Titnore Lane	3 - A280 South West	4 - A27 On Slip	5 - A280 North
	1 - A27 Off Slip	0	29	393	0	59
	2 - Titnore Lane	0	0	170	254	260
	3 - A280 South West	0	262	0	74	821
	4 - A27 On Slip	Exit-only	Exit-only	Exit-only	Exit-only	Exit-only
	5 - A280 North	0	603	414	253	0

Vehicle Mix

Heavy Vehicle Percentages

	To					
		1 - A27 Off Slip	2 - Titnore Lane	3 - A280 South West	4 - A27 On Slip	5 - A280 North
From	1 - A27 Off Slip	0	8	1	0	2
	2 - Titnore Lane	0	0	1	4	1
	3 - A280 South West	0	0	0	3	1
	4 - A27 On Slip	Exit-only	Exit-only	Exit-only	Exit-only	Exit-only
	5 - A280 North	0	4	3	12	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (Veh)	Max LOS
1 - A27 Off Slip	0.74	19.30	2.7	C
2 - Titnore Lane	0.64	8.44	1.7	A
3 - A280 South West	0.83	22.75	7.6	C
4 - A27 On Slip				
5 - A280 North	0.78	8.93	3.4	A

Main Results for each time segment

07:45 - 08:00

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1 - A27 Off Slip	362	1148	1019	0.355	360	0.5	5.445	A
2 - Titnore Lane	515	838	1427	0.361	513	0.6	3.929	A
3 - A280 South West	871	619	1608	0.542	866	1.2	4.822	A
4 - A27 On Slip		1050						
5 - A280 North	956	196	1857	0.515	952	1.1	3.960	A

08:00 - 08:15

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1 - A27 Off Slip	432	1374	891	0.485	431	0.9	7.799	A
2 - Titnore Lane	615	1003	1323	0.465	614	0.9	5.069	A
3 - A280 South West	1040	741	1531	0.679	1037	2.1	7.230	A
4 - A27 On Slip		1256						
5 - A280 North	1142	235	1833	0.623	1139	1.6	5.171	A

08:15 - 08:30

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1 - A27 Off Slip	530	1676	720	0.736	523	2.6	17.707	C
2 - Titnore Lane	753	1222	1185	0.636	750	1.7	8.210	A
3 - A280 South West	1274	905	1426	0.633	1254	6.9	19.092	C
4 - A27 On Slip		1523						
5 - A280 North	1398	284	1803	0.776	1392	3.3	8.614	A

08:30 - 08:45

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1 - A27 Off Slip	530	1686	714	0.741	529	2.7	19.299	C
2 - Titnore Lane	753	1231	1179	0.639	753	1.7	8.439	A
3 - A280 South West	1274	909	1424	0.885	1271	7.6	22.750	C
4 - A27 On Slip		1541						
5 - A280 North	1398	288	1800	0.777	1398	3.4	8.928	A

08:45 - 09:00

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1 - A27 Off Slip	432	1389	883	0.490	439	1.0	8.250	A
2 - Titnore Lane	615	1016	1315	0.468	618	0.9	5.195	A
3 - A280 South West	1040	747	1527	0.681	1062	2.2	8.087	A
4 - A27 On Slip		1283						
5 - A280 North	1142	240	1830	0.624	1149	1.7	5.337	A

09:00 - 09:15

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1 - A27 Off Slip	362	1157	1014	0.357	364	0.6	5.551	A
2 - Titnore Lane	515	845	1422	0.362	516	0.6	3.978	A
3 - A280 South West	871	624	1606	0.543	875	1.2	4.955	A
4 - A27 On Slip		1060						
5 - A280 North	956	198	1856	0.515	959	1.1	4.025	A

2031 + Committed + Dev, PM Peak

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Geometry	1 - A27 Off Slip - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	3 - A280 South West - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.

Junction Network

Junctions

Junction	Name	Junction Type	Junction Delay (s)	Junction LOS
1	untitled	Standard Roundabout	14.14	B

Junction Network Options

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold
Left	Normal/unknown	5	1 - A27 Off Slip

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D4	2031 + Committed + Dev	PM Peak	ONE HOUR	16:45	18:15	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1 - A27 Off Slip		✓	411	100.000
2 - Titnore Lane		✓	679	100.000
3 - A280 South West		✓	837	100.000
4 - A27 On Slip				
5 - A280 North		✓	1549	100.000

Origin-Destination Data

Demand (Veh/hr)

	To					
From		1 - A27 Off Slip	2 - Titnore Lane	3 - A280 South West	4 - A27 On Slip	5 - A280 North
	1 - A27 Off Slip	0	33	341	7	30
	2 - Titnore Lane	0	0	194	205	280
	3 - A280 South West	0	189	0	70	578
	4 - A27 On Slip	Exit-only	Exit-only	Exit-only	Exit-only	Exit-only
	5 - A280 North	0	553	658	338	0

Vehicle Mix

Heavy Vehicle Percentages

	To					
From		1 - A27 Off Slip	2 - Titnore Lane	3 - A280 South West	4 - A27 On Slip	5 - A280 North
	1 - A27 Off Slip	0	0	0	0	0
	2 - Titnore Lane	0	0	1	1	4
	3 - A280 South West	0	1	0	2	2
	4 - A27 On Slip	Exit-only	Exit-only	Exit-only	Exit-only	Exit-only
	5 - A280 North	0	1	2	2	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (Veh)	Max LOS
1 - A27 Off Slip	0.73	20.73	2.5	C
2 - Titnore Lane	0.72	12.57	2.5	B
3 - A280 South West	0.66	7.44	1.9	A
4 - A27 On Slip				
5 - A280 North	0.89	16.73	7.6	C

Main Results for each time segment

16:45 - 17:00

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1 - A27 Off Slip	309	1302	965	0.321	308	0.5	5.460	A
2 - Titnore Lane	511	1029	1328	0.385	509	0.6	4.382	A
3 - A280 South West	630	644	1590	0.396	628	0.7	3.733	A
4 - A27 On Slip		807						
5 - A280 North	1166	142	1957	0.596	1160	1.5	4.487	A

17:00 - 17:15

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1 - A27 Off Slip	369	1558	822	0.450	368	0.8	7.911	A
2 - Titnore Lane	610	1231	1204	0.507	609	1.0	6.035	A
3 - A280 South West	752	771	1512	0.498	751	1.0	4.724	A
4 - A27 On Slip		966						
5 - A280 North	1393	170	1939	0.718	1388	2.5	6.488	A

17:15 - 17:30

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1 - A27 Off Slip	453	1894	634	0.714	446	2.3	18.652	C
2 - Titnore Lane	748	1495	1042	0.717	742	2.4	11.782	B
3 - A280 South West	922	938	1410	0.654	918	1.8	7.273	A
4 - A27 On Slip		1180						
5 - A280 North	1705	207	1915	0.831	1687	7.1	14.749	E

17:30 - 17:45

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1 - A27 Off Slip	453	1912	624	0.725	452	2.5	20.734	C
2 - Titnore Lane	748	1511	1032	0.724	747	2.5	12.573	B
3 - A280 South West	922	946	1405	0.656	921	1.9	7.441	A
4 - A27 On Slip		1185						
5 - A280 North	1705	208	1914	0.831	1704	7.6	16.729	C

17:45 - 18:00

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1 - A27 Off Slip	369	1583	808	0.457	376	0.9	8.459	A
2 - Titnore Lane	610	1254	1190	0.513	616	1.1	6.340	A
3 - A280 South West	752	782	1505	0.500	756	1.0	4.828	A
4 - A27 On Slip		974						
5 - A280 North	1393	171	1938	0.718	1412	2.6	7.090	A

18:00 - 18:15

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1 - A27 Off Slip	309	1313	959	0.323	311	0.5	5.571	A
2 - Titnore Lane	511	1039	1322	0.387	513	0.6	4.461	A
3 - A280 South West	630	650	1586	0.397	632	0.7	3.778	A
4 - A27 On Slip		813						
5 - A280 North	1166	143	1956	0.596	1171	1.5	4.608	A

Junctions 9									
ARCADY 9 - Roundabout Module									
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Filename: A27 North Roundabout - Scenario B.j9

Path: T:\Projects\9000 Series Project Numbers\9105\ITB Land at Angmering, Arun Distr, W
Susx\Tech\Assessments\Arcady\A27 Rdbts\Full Masterplan\2031 Assessment -SH

Report generation date: 13/03/2017 15:04:25

- »2031 + Committed, AM Peak
- »2031 + Committed, PM Peak
- »2031 + Committed + Dev, AM Peak
- »2031 + Committed + Dev, PM Peak

Summary of junction performance

	AM Peak					PM Peak				
	Queue (Veh)	Delay (s)	RFC	LOS	Network Residual Capacity	Queue (Veh)	Delay (s)	RFC	LOS	Network Residual Capacity
	2031 + Committed									
1 - A280 Long Furlong	2.4	9.82	0.71	A	4 % [4 - A27 Off-Slip]	7.6	21.10	0.89	C	5 % [1 - A280 Long Furlong]
3 - A280 South	2.1	5.89	0.68	A		0.8	3.56	0.46	A	
4 - A27 Off-Slip	4.7	23.06	0.83	C		0.7	5.52	0.42	A	
5 - Arundel Road	0.2	11.92	0.17	B		0.1	5.45	0.09	A	
	2031 + Committed + Dev									
1 - A280 Long Furlong	3.1	12.72	0.76	B	-2 % [4 - A27 Off-Slip]	12.4	34.47	0.94	D	0 % [1 - A280 Long Furlong]
3 - A280 South	2.5	6.75	0.72	A		1.1	4.02	0.53	A	
4 - A27 Off-Slip	8.9	42.56	0.92	E		0.9	6.30	0.46	A	
5 - Arundel Road	0.3	14.79	0.21	B		0.1	6.14	0.10	A	

Values shown are the highest values encountered 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.

File summary

File Description

Title	A27 Roundabout North
Location	Angmering
Site number	ITB9105
Date	19/05/2016
Version	
Status	
Identifier	
Client	
Jobnumber	
Enumerator	I-TRANSPORT\Hotdesk
Description	

Units

Distance units	Speed units	Traffic units input	Traffic units results	Flow units	Average delay units	Total delay units	Rate of delay units
m	kph	Veh	Veh	perHour	s	-Min	perMin

Analysis Options

Calculate Queue Percentiles	Calculate residual capacity	Residual capacity criteria type	RFC Threshold	Average Delay threshold (s)	Queue threshold (PCU)
	✓	Delay	0.85	36.00	20.00

Demand Set Summary

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D1	2031 + Committed	AM Peak	ONE HOUR	07:45	09:15	15
D2	2031 + Committed	PM Peak	ONE HOUR	16:45	18:15	15
D3	2031 + Committed + Dev	AM Peak	ONE HOUR	07:45	09:15	15
D4	2031 + Committed + Dev	PM Peak	ONE HOUR	16:45	18:15	15

Analysis Set Details

ID	Network flow scaling factor (%)
A1	100.000

2031 + Committed, AM Peak

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Junction Delay (s)	Junction LOS
1	A27 Roundabout North	Standard Roundabout	11.66	E

Junction Network Options

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold
Left	Normal/unknown	4	4 - A27 Off-Slip

Arms

Arms

Arm	Name	Description
1	A280 Long Furlong	
2	A27 On Slip	
3	A280 South	
4	A27 Off-Slip	
5	Arundel Road	

Roundabout Geometry

Arm	V - Approach road half-width (m)	E - Entry width (m)	I' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit only
1 - A280 Long Furlong	3.65	7.30	29.0	35.0	60.0	35.0	
2 - A27 On Slip							✓
3 - A280 South	3.65	8.10	14.0	37.0	60.0	12.0	
4 - A27 Off-Slip	3.65	6.60	30.0	15.0	60.0	44.0	
5 - Arundel Road	3.65	6.30	6.5	25.0	60.0	45.0	

Slope / Intercept / Capacity

Roundabout Slope and intercept used in model

Arm	Final slope	Final intercept (PCU/hr)
1 - A280 Long Furlong	0.593	1901
2 - A27 On Slip		
3 - A280 South	0.618	1925
4 - A27 Off-Slip	0.535	1670
5 - Arundel Road	0.493	1393

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

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D1	2031 + Committed	AM Peak	ONE HOUR	07:45	09:15	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1 - A280 Long Furlong		✓	798	100.000
2 - A27 On Slip				
3 - A280 South		✓	1169	100.000
4 - A27 Off-Slip		✓	692	100.000
5 - Arundel Road		✓	58	100.000

Origin-Destination Data

Demand (Veh/hr)

		To				
From		1 - A280 Long Furlong	2 - A27 On Slip	3 - A280 South	4 - A27 Off-Slip	5 - Arundel Road
	1 - A280 Long Furlong	0	22	774	0	2
	2 - A27 On Slip	Exit-only	Exit-only	Exit-only	Exit-only	Exit-only
	3 - A280 South	808	337	0	0	24
	4 - A27 Off-Slip	204	33	455	0	0
	5 - Arundel Road	22	7	29	0	0

Vehicle Mix

Heavy Vehicle Percentages

		To				
From		1 - A280 Long Furlong	2 - A27 On Slip	3 - A280 South	4 - A27 Off-Slip	5 - Arundel Road
	1 - A280 Long Furlong	0	0	6	0	50
	2 - A27 On Slip	Exit-only	Exit-only	Exit-only	Exit-only	Exit-only
	3 - A280 South	1	1	0	0	5
	4 - A27 Off-Slip	11	11	4	0	0
	5 - Arundel Road	0	0	0	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (Veh)	Max LOS
1 - A280 Long Furlong	0.71	9.82	2.4	A
2 - A27 On Slip				
3 - A280 South	0.68	5.89	2.1	A
4 - A27 Off-Slip	0.83	23.06	4.7	C
5 - Arundel Road	0.17	11.92	0.2	B

Main Results for each time segment

07:45 - 08:00

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1 - A280 Long Furlong	601	645	1418	0.424	598	0.7	4.374	A
2 - A27 On Slip		943						
3 - A280 South	880	1	1899	0.464	877	0.9	3.511	A
4 - A27 Off-Slip	521	878	1124	0.464	518	0.9	5.903	A
5 - Arundel Road	44	1376	694	0.063	43	0.1	5.533	A

08:00 - 08:15

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1 - A280 Long Furlong	717	772	1345	0.533	716	1.1	5.707	A
2 - A27 On Slip		1129						
3 - A280 South	1051	2	1898	0.554	1049	1.2	4.232	A
4 - A27 Off-Slip	622	1051	1036	0.601	620	1.5	8.603	A
5 - Arundel Road	52	1648	556	0.094	52	0.1	7.143	A

08:15 - 08:30

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1 - A280 Long Furlong	879	939	1249	0.703	874	2.3	9.472	A
2 - A27 On Slip		1375						
3 - A280 South	1287	2	1898	0.678	1284	2.1	5.827	A
4 - A27 Off-Slip	762	1286	916	0.832	750	4.4	20.481	C
5 - Arundel Road	64	2008	373	0.171	63	0.2	11.617	B

08:30 - 08:45

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1 - A280 Long Furlong	879	947	1244	0.706	878	2.4	9.817	A
2 - A27 On Slip		1386						
3 - A280 South	1287	2	1898	0.678	1287	2.1	5.890	A
4 - A27 Off-Slip	762	1289	914	0.834	761	4.7	23.056	C
5 - Arundel Road	64	2021	366	0.175	64	0.2	11.916	B

08:45 - 09:00

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1 - A280 Long Furlong	717	784	1338	0.536	722	1.2	5.889	A
2 - A27 On Slip		1146						
3 - A280 South	1051	2	1898	0.554	1054	1.3	4.282	A
4 - A27 Off-Slip	622	1056	1033	0.602	634	1.6	9.299	A
5 - Arundel Road	52	1667	546	0.096	53	0.1	7.308	A

09:00 - 09:15

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1 - A280 Long Furlong	601	651	1414	0.425	602	0.7	4.445	A
2 - A27 On Slip		952						
3 - A280 South	880	2	1899	0.464	882	0.9	3.544	A
4 - A27 Off-Slip	521	883	1121	0.465	524	0.9	6.048	A
5 - Arundel Road	44	1387	688	0.063	44	0.1	5.588	A

2031 + Committed, PM Peak

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Junction Delay (s)	Junction LOS
1	A27 Roundabout North	Standard Roundabout	12.53	E

Junction Network Options

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold
Left	Normal/unknown	5	1 - A280 Long Furlong

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D2	2031 + Committed	PM Peak	ONE HOUR	16:45	18:15	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1 - A280 Long Furlong		✓	1239	100.000
2 - A27 On Slip				
3 - A280 South		✓	774	100.000
4 - A27 Off-Slip		✓	432	100.000
5 - Arundel Road		✓	62	100.000

Origin-Destination Data

Demand (Veh/hr)

		To				
From		1 - A280 Long Furlong	2 - A27 On Slip	3 - A280 South	4 - A27 Off-Slip	5 - Arundel Road
	1 - A280 Long Furlong	0	40	1193	0	6
	2 - A27 On Slip	Exit-only	Exit-only	Exit-only	Exit-only	Exit-only
	3 - A280 South	536	208	0	0	30
	4 - A27 Off-Slip	176	16	239	0	1
	5 - Arundel Road	10	10	42	0	0

Vehicle Mix

Heavy Vehicle Percentages

From	To					
		1 - A280 Long Furlong	2 - A27 On Slip	3 - A280 South	4 - A27 Off-Slip	5 - Arundel Road
1 - A280 Long Furlong		0	0	2	0	0
2 - A27 On Slip		Exit-only	Exit-only	Exit-only	Exit-only	Exit-only
3 - A280 South		4	1	0	0	0
4 - A27 Off-Slip		9	8	4	0	0
5 - Arundel Road		0	0	0	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (Veh)	Max LOS
1 - A280 Long Furlong	0.89	21.10	7.6	C
2 - A27 On Slip				
3 - A280 South	0.46	3.56	0.8	A
4 - A27 Off-Slip	0.42	5.52	0.7	A
5 - Arundel Road	0.09	5.45	0.1	A

Main Results for each time segment

16:45 - 17:00

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1 - A280 Long Furlong	933	386	1635	0.571	928	1.3	5.052	A
2 - A27 On Slip		1108						
3 - A280 South	583	4	1866	0.312	581	0.5	2.798	A
4 - A27 Off-Slip	325	585	1270	0.256	324	0.3	3.801	A
5 - Arundel Road	47	881	940	0.050	46	0.1	4.027	A

17:00 - 17:15

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1 - A280 Long Furlong	1114	462	1590	0.701	1110	2.3	7.445	A
2 - A27 On Slip		1326						
3 - A280 South	696	5	1866	0.373	695	0.6	3.075	A
4 - A27 Off-Slip	388	701	1210	0.321	388	0.5	4.376	A
5 - Arundel Road	56	1055	851	0.066	56	0.1	4.527	A

17:15 - 17:30

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1 - A280 Long Furlong	1364	566	1528	0.833	1345	7.0	18.105	C
2 - A27 On Slip		1611						
3 - A280 South	852	7	1864	0.457	851	0.8	3.550	A
4 - A27 Off-Slip	476	858	1128	0.422	475	0.7	5.499	A
5 - Arundel Road	68	1292	729	0.094	68	0.1	5.443	A

17:30 - 17:45

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1 - A280 Long Furlong	1364	567	1527	0.373	1362	7.6	21.100	C
2 - A27 On Slip		1627						
3 - A280 South	852	7	1864	0.457	852	0.8	3.555	A
4 - A27 Off-Slip	476	859	1128	0.422	476	0.7	5.519	A
5 - Arundel Road	68	1294	728	0.094	68	0.1	5.453	A

17:45 - 18:00

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1 - A280 Long Furlong	1114	464	1589	0.701	1134	2.4	8.268	A
2 - A27 On Slip		1351						
3 - A280 South	696	5	1865	0.373	697	0.6	3.085	A
4 - A27 Off-Slip	388	702	1209	0.321	389	0.5	4.396	A
5 - Arundel Road	56	1058	849	0.066	56	0.1	4.539	A

18:00 - 18:15

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1 - A280 Long Furlong	933	388	1634	0.571	937	1.3	5.199	A
2 - A27 On Slip		1119						
3 - A280 South	583	5	1866	0.312	583	0.5	2.810	A
4 - A27 Off-Slip	325	588	1268	0.256	326	0.3	3.822	A
5 - Arundel Road	47	886	938	0.050	47	0.1	4.041	A

2031 + Committed + Dev, AM Peak

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Junction Delay (s)	Junction LOS
1	A27 Roundabout North	Standard Roundabout	18.03	C

Junction Network Options

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold
Left	Normal/unknown	-2	4 - A27 Off-Slip

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D3	2031 + Committed + Dev	AM Peak	ONE HOUR	07:45	09:15	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1 - A280 Long Furlong		✓	827	100.000
2 - A27 On Slip				
3 - A280 South		✓	1240	100.000
4 - A27 Off-Slip		✓	731	100.000
5 - Arundel Road		✓	58	100.000

Origin-Destination Data

Demand (Veh/hr)

		To				
		1 - A280 Long Furlong	2 - A27 On Slip	3 - A280 South	4 - A27 Off-Slip	5 - Arundel Road
From	1 - A280 Long Furlong	0	22	803	0	2
	2 - A27 On Slip	Exit-only	Exit-only	Exit-only	Exit-only	Exit-only
	3 - A280 South	831	385	0	0	24
	4 - A27 Off-Slip	204	33	494	0	0
	5 - Arundel Road	22	7	29	0	0

Vehicle Mix

Heavy Vehicle Percentages

	To					
		1 - A280 Long Furlong	2 - A27 On Slip	3 - A280 South	4 - A27 Off-Slip	5 - Arundel Road
From	1 - A280 Long Furlong	0	0	6	0	50
	2 - A27 On Slip	Exit-only	Exit-only	Exit-only	Exit-only	Exit-only
	3 - A280 South	1	1	0	0	5
	4 - A27 Off-Slip	11	11	4	0	0
	5 - Arundel Road	0	0	0	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (Veh)	Max LOS
1 - A280 Long Furlong	0.76	12.72	3.1	B
2 - A27 On Slip				
3 - A280 South	0.72	6.75	2.5	A
4 - A27 Off-Slip	0.52	12.56	8.9	B
5 - Arundel Road	0.21	14.79	0.3	B

Main Results for each time segment

07:45 - 08:00

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1 - A280 Long Furlong	623	709	1381	0.451	619	0.8	4.708	A
2 - A27 On Slip		994						
3 - A280 South	934	1	1899	0.492	930	1.0	3.697	A
4 - A27 Off-Slip	550	931	1098	0.501	546	1.0	6.483	A
5 - Arundel Road	44	1458	653	0.067	43	0.1	5.907	A

08:00 - 08:15

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1 - A280 Long Furlong	743	849	1301	0.572	741	1.3	6.412	A
2 - A27 On Slip		1190						
3 - A280 South	1115	2	1899	0.587	1113	1.4	4.571	A
4 - A27 Off-Slip	657	1115	1004	0.654	654	1.8	10.168	B
5 - Arundel Road	52	1745	507	0.103	52	0.1	7.914	A

08:15 - 08:30

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1 - A280 Long Furlong	911	1025	1200	0.759	904	3.0	11.892	B
2 - A27 On Slip		1440						
3 - A280 South	1365	2	1898	0.719	1361	2.5	6.643	A
4 - A27 Off-Slip	805	1363	878	0.917	782	7.6	32.011	D
5 - Arundel Road	64	2116	319	0.200	63	0.2	14.076	B

08:30 - 08:45

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1 - A280 Long Furlong	911	1040	1192	0.764	910	3.1	12.725	B
2 - A27 On Slip		1458						
3 - A280 South	1365	2	1898	0.719	1365	2.5	6.746	A
4 - A27 Off-Slip	805	1367	875	0.919	800	8.9	42.563	E
5 - Arundel Road	64	2138	307	0.208	64	0.3	14.792	B

08:45 - 09:00

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1 - A280 Long Furlong	743	874	1287	0.578	750	1.4	6.798	A
2 - A27 On Slip		1220						
3 - A280 South	1115	2	1899	0.587	1119	1.4	4.642	A
4 - A27 Off-Slip	657	1121	1001	0.656	685	2.0	12.309	B
5 - Arundel Road	52	1782	488	0.107	53	0.1	8.288	A

09:00 - 09:15

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1 - A280 Long Furlong	623	717	1376	0.452	625	0.8	4.805	A
2 - A27 On Slip		1005						
3 - A280 South	934	2	1899	0.492	935	1.0	3.742	A
4 - A27 Off-Slip	550	937	1095	0.502	554	1.0	6.696	A
5 - Arundel Road	44	1471	646	0.068	44	0.1	5.985	A

2031 + Committed + Dev, PM Peak

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Junction Delay (s)	Junction LOS
1	A27 Roundabout North	Standard Roundabout	18.67	C

Junction Network Options

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold
Left	Normal/unknown	0	1 - A280 Long Furlong

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D4	2031 + Committed + Dev	PM Peak	ONE HOUR	16:45	18:15	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1 - A280 Long Furlong		✓	1258	100.000
2 - A27 On Slip				
3 - A280 South		✓	900	100.000
4 - A27 Off-Slip		✓	449	100.000
5 - Arundel Road		✓	62	100.000

Origin-Destination Data

Demand (Veh/hr)

	To					
		1 - A280 Long Furlong	2 - A27 On Slip	3 - A280 South	4 - A27 Off-Slip	5 - Arundel Road
From	1 - A280 Long Furlong	0	40	1212	0	6
	2 - A27 On Slip	Exit-only	Exit-only	Exit-only	Exit-only	Exit-only
	3 - A280 South	565	305	0	0	30
	4 - A27 Off-Slip	176	16	256	0	1
	5 - Arundel Road	10	10	42	0	0

Vehicle Mix

Heavy Vehicle Percentages

	To					
		1 - A280 Long Furlong	2 - A27 On Slip	3 - A280 South	4 - A27 Off-Slip	5 - Arundel Road
From	1 - A280 Long Furlong	0	0	1	0	0
	2 - A27 On Slip	Exit-only	Exit-only	Exit-only	Exit-only	Exit-only
	3 - A280 South	3	0	0	0	0
	4 - A27 Off-Slip	9	8	3	0	0
	5 - Arundel Road	0	0	0	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (Veh)	Max LOS
1 - A280 Long Furlong	0.94	34.47	12.4	D
2 - A27 On Slip				
3 - A280 South	0.53	4.02	1.1	A
4 - A27 Off-Slip	0.46	6.30	0.9	A
5 - Arundel Road	0.10	6.14	0.1	A

Main Results for each time segment

16:45 - 17:00

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1 - A280 Long Furlong	947	472	1602	0.591	941	1.4	5.407	A
2 - A27 On Slip		1135						
3 - A280 South	678	4	1887	0.359	675	0.6	2.967	A
4 - A27 Off-Slip	338	680	1229	0.275	337	0.4	4.028	A
5 - Arundel Road	47	989	890	0.052	46	0.1	4.267	A

17:00 - 17:15

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1 - A280 Long Furlong	1131	565	1546	0.731	1126	2.6	8.474	A
2 - A27 On Slip		1358						
3 - A280 South	809	5	1886	0.429	808	0.7	3.338	A
4 - A27 Off-Slip	404	814	1160	0.348	403	0.5	4.752	A
5 - Arundel Road	56	1184	791	0.070	56	0.1	4.897	A

17:15 - 17:30

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1 - A280 Long Furlong	1385	691	1471	0.942	1353	10.6	25.652	D
2 - A27 On Slip		1637						
3 - A280 South	991	6	1886	0.526	990	1.1	4.010	A
4 - A27 Off-Slip	494	996	1066	0.464	493	0.9	6.269	A
5 - Arundel Road	68	1448	656	0.104	68	0.1	6.122	A

17:30 - 17:45

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1 - A280 Long Furlong	1385	693	1470	0.942	1378	12.4	34.468	D
2 - A27 On Slip		1662						
3 - A280 South	991	7	1886	0.526	991	1.1	4.023	A
4 - A27 Off-Slip	494	997	1065	0.464	494	0.9	6.305	A
5 - Arundel Road	68	1451	655	0.104	68	0.1	6.138	A

17:45 - 18:00

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1 - A280 Long Furlong	1131	567	1545	0.732	1169	2.8	10.511	E
2 - A27 On Slip		1401						
3 - A280 South	809	6	1886	0.429	810	0.8	3.350	A
4 - A27 Off-Slip	404	816	1159	0.348	405	0.5	4.783	A
5 - Arundel Road	56	1187	789	0.071	56	0.1	4.914	A

18:00 - 18:15

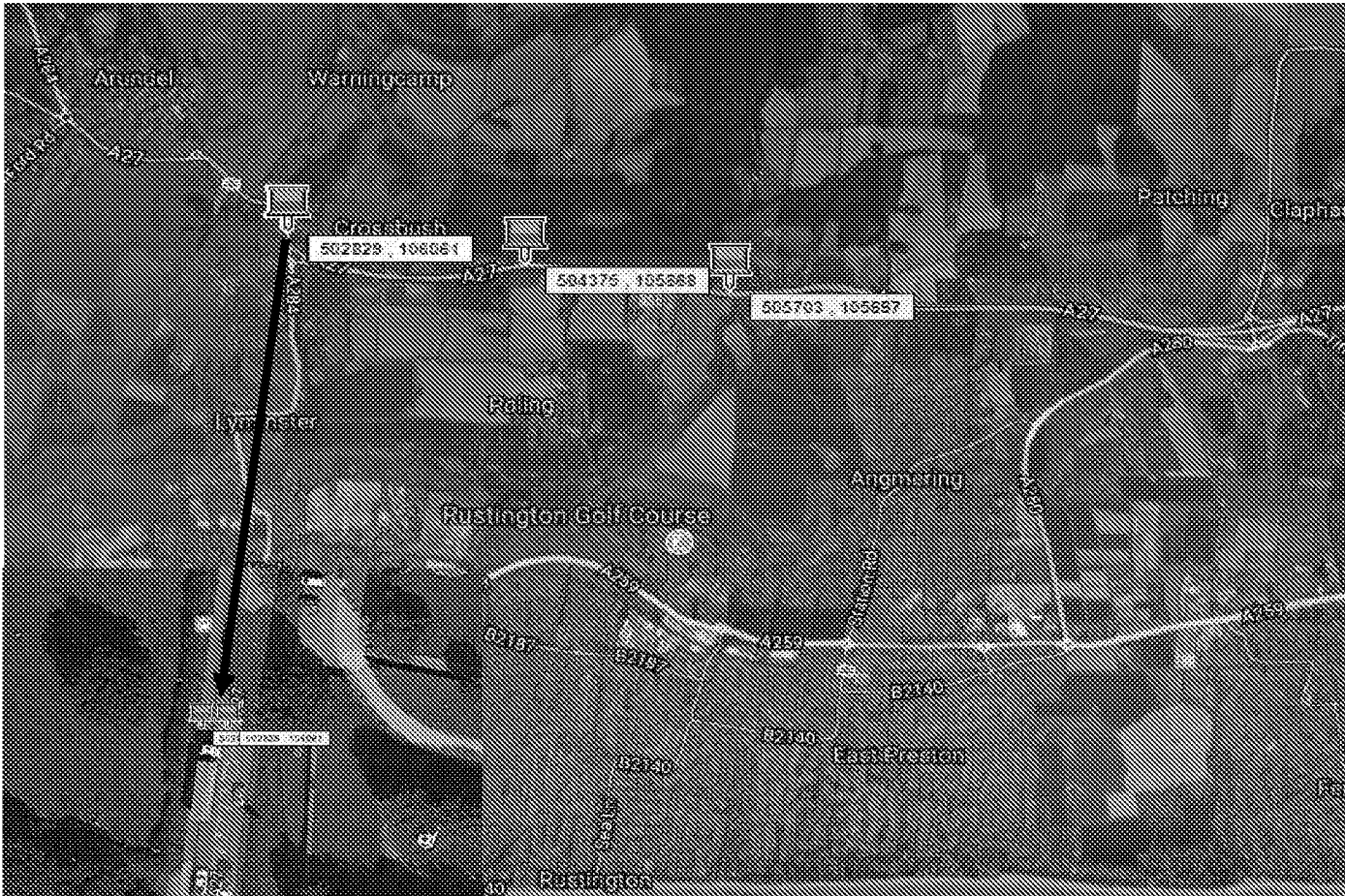
Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1 - A280 Long Furlong	947	474	1600	0.592	953	1.5	5.607	A
2 - A27 On Slip		1147						
3 - A280 South	678	5	1887	0.359	678	0.6	2.982	A
4 - A27 Off-Slip	338	683	1227	0.275	339	0.4	4.055	A
5 - Arundel Road	47	994	887	0.053	47	0.1	4.282	A

Appendix C

Highways England Traffic Flow Data Analysis

Highways England Traffic Flow Data Analysis					
TMU Site 5761/1 on link A27 westbound between A284 near Arundel (east) and A284 near Arundel (west); GPS Ref: 502824;106061; Westbound		TMU Site 5761/2 on link A27 eastbound between A284 near Arundel (west) and A284 near Arundel (east); GPS Ref: 502829;106061; Eastbound		TMU Site 5762/1 on link A27 eastbound between A284 near Arundel (east) and A280; GPS Ref: 505703;105697; Eastbound	
Friday 17:00-18:00	Saturday 11:45-12:45	Friday 17:00-18:00	Saturday 11:45-12:45	Friday 17:00-18:00	Saturday 11:45-12:45
03/04/2015	04/04/2015	03/04/2015	04/04/2015	03/04/2015	04/04/2015
203	285	304	285	276	255
225	345	305	324	245	263
231	313	265	323	236	246
234	320	274	301	225	254
10/04/2015	11/04/2015	10/04/2015	11/04/2015	10/04/2015	11/04/2015
294	314	312	286	314	282
291	339	354	315	345	253
263	299	352	328	362	281
268	319	331	331	329	326
17/04/2015	18/04/2015	17/04/2015	18/04/2015	17/04/2015	18/04/2015
293	320	330	323	330	316
270	317	331	323	314	299
241	303	356	306	302	290
280	326	350	332	329	276
24/04/2015	25/04/2015	24/04/2015	25/04/2015	24/04/2015	25/04/2015
293	335	361	264	349	237
270	295	325	286	313	268
241	337	335	306	296	272
280	291	357	300	351	268
AVG		AVG		AVG	
Friday	Saturday	Friday	Saturday	Friday	Saturday
261	316	328	308	307	274
Total Average (across the 4 counts)				AVG	
Friday				Friday	
				275	
Saturday				Saturday	
				290	

Location of Traffic Counts on A27:



Appendix D

ARCADY Outputs

Junctions 9				
ARCADY 9 - Roundabout Module				
Version: 9.0.1.4646 [] © Copyright TRL Limited, 2017				
For sales and distribution information, program advice and maintenance, contact TRL: Tel: +44 (0)1344 770758 email: software@trl.co.uk Web: http://www.trisoftware.co.uk				
The users of this computer program for the solution of an engineering problem are in no way relieved of their responsibility for the correctness of the solution				

Filename: A27 Southern Roundabout - 2031.j9

Path: N:\Projects\rgrust 170221\Analysis\Modelling\A27 Modelling

Report generation date: 12/10/2017 16:29:46

*2031 Baseline+Dev, PM

*2031 Baseline+Dev, Sat

Summary of junction performance

	PM				Sat			
	Queue (Veh)	Delay (s)	RFC	LOS	Queue (Veh)	Delay (s)	RFC	LOS
2031 Baseline+Dev								
Arm 1	2.9	23.36	0.75	C	3.0	23.96	0.76	C
Arm 2	2.8	13.75	0.75	B	2.9	13.87	0.75	B
Arm 3	2.0	7.74	0.67	A	2.0	7.77	0.67	A
Arm 5	8.1	17.90	0.90	C	8.3	18.17	0.90	C

There are warnings associated with one or more model runs - see the 'Data Errors and Warnings' tables for each Analysis or Demand Set.

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

File summary

File Description

Title	(untitled)
Location	
Site number	
Date	09/10/2017
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Enumerator	MOTION\JamesWerby
Description	

Units

Distance units	Speed units	Traffic units input	Traffic units results	Flow units	Average delay units	Total delay units	Rate of delay units
m	kph	Veh	Veh	perHour	s	-Min	perMin

Analysis Options

Calculate Queue Percentiles	Calculate residual capacity	RFC Threshold	Average Delay threshold (s)	Queue threshold (PCU)
		0.85	36.00	20.00

**Demand Set Summary**

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D2	2031 Baseline+Dev	PM	ONE HOUR	16:45	18:15	15
D3	2031 Baseline+Dev	Sat	ONE HOUR	11:30	13:00	15

Analysis Set Details

ID	Network flow scaling factor (%)
A1	100.000

2031 Baseline+Dev, PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Geometry	Arm 1 - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	Arm 3 - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.

Junction Network

Junctions

Junction	Name	Junction Type	Junction Delay (s)	Junction LOS
1	A27 Southern Roundabout	Standard Roundabout	15.28	C

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Name	Description
1	A27 Off Slip	
2	Titnore Lane	
3	A280 South West	
4	A27 On Slip	
5	A280 North	

Roundabout Geometry

Arm	V - Approach road half-width (m)	E - Entry width (m)	I' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit only
1	4.00	6.00	35.0	25.0	60.0	38.0	
2	3.40	7.80	30.0	25.0	60.0	24.0	
3	3.65	7.50	50.0	20.0	60.0	33.0	
4							✓
5	3.70	7.80	22.0	42.0	60.0	10.0	

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Arm	Final slope	Final intercept (PCU/hr)
1	0.551	1693
2	0.617	1997
3	0.610	2021
4		
5	0.648	2080

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

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D2	2031 Baseline+Dev	PM	ONE HOUR	16:45	18:15	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1		✓	422	100.000
2		✓	693	100.000
3		✓	846	100.000
4				
5		✓	1561	100.000

Origin-Destination Data

Demand (Veh/hr)

	To					
		1	2	3	4	5
From	1	0	42	343	7	30
	2	0	0	194	214	285
	3	0	189	0	72	585
	4	Exit-only	Exit-only	Exit-only	Exit-only	Exit-only
	5	0	558	665	338	0

Vehicle Mix

Heavy Vehicles Percentages

	To					
		1	2	3	4	5
From	1	0	0	0	0	0
	2	0	0	1	1	4
	3	0	1	0	2	2
	4	Exit-only	Exit-only	Exit-only	Exit-only	Exit-only
	5	0	1	2	2	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (Veh)	Max LOS
1	0.75	23.36	2.9	C
2	0.75	13.75	2.8	B
3	0.67	7.74	2.0	A
4				
5	0.90	17.90	8.1	C

Main Results for each time segment

16:45 - 17:00

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	318	1311	959	0.331	316	0.5	5.576	A
2	522	1036	1320	0.395	519	0.6	4.483	A
3	637	655	1584	0.402	634	0.7	3.779	A
4		816						
5	1175	142	1955	0.601	1169	1.5	4.547	A

17:00 - 17:15

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	379	1569	815	0.465	378	0.9	8.206	A
2	623	1239	1195	0.521	621	1.1	6.255	A
3	761	783	1505	0.505	759	1.0	4.818	A
4		977						
5	1403	170	1937	0.724	1399	2.6	6.639	A

17:15 - 17:30

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	465	1906	626	0.742	457	2.6	20.529	C
2	763	1503	1033	0.738	757	2.7	12.720	B
3	931	953	1401	0.665	928	1.9	7.546	A
4		1192						
5	1719	207	1913	0.888	1699	7.6	15.544	C

17:30 - 17:45

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	465	1925	616	0.754	464	2.9	23.362	C
2	763	1520	1023	0.746	762	2.8	13.749	B
3	931	961	1396	0.667	931	2.0	7.742	A
4		1199						
5	1719	208	1912	0.888	1716	8.1	17.901	C

17:45 - 18:00

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	379	1596	800	0.474	387	0.9	8.884	A
2	623	1264	1180	0.528	630	1.1	6.623	A
3	761	796	1497	0.508	764	1.0	4.935	A
4		986						
5	1403	171	1936	0.725	1425	2.7	7.326	A

18:00 - 18:15

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	318	1323	953	0.333	319	0.5	5.698	A
2	522	1046	1313	0.397	524	0.7	4.570	A
3	637	661	1580	0.403	638	0.7	3.829	A
4		822						
5	1175	143	1954	0.601	1180	1.5	4.677	A

2031 Baseline+Dev, Sat

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Geometry	Arm 1 - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	Arm 3 - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.

Junction Network

Junctions

Junction	Name	Junction Type	Junction Delay (s)	Junction LOS
1	A27 Southern Roundabout	Standard Roundabout	15.51	C

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D3	2031 Baseline+Dev	Sat	ONE HOUR	11:30	13:00	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1		✓	424	100.000
2		✓	694	100.000
3		✓	847	100.000
4				
5		✓	1564	100.000

Origin-Destination Data

Demand (Veh/hr)

		To				
From		1	2	3	4	5
	1	0	44	343	7	30
	2	0	0	194	215	285
	3	0	189	0	72	586
	4	Exit-only	Exit-only	Exit-only	Exit-only	Exit-only
	5	0	559	667	338	0

Vehicle Mix

Heavy Vehicle Percentages

		To				
From		1	2	3	4	5
	1	0	0	0	0	0
	2	0	0	1	1	4
	3	0	1	0	2	2
	4	Exit-only	Exit-only	Exit-only	Exit-only	Exit-only
	5	0	1	2	2	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (Veh)	Max LOS
1	0.76	23.96	3.0	C
2	0.75	13.87	2.9	B
3	0.67	7.77	2.0	A
4				
5	0.90	18.17	8.3	C

Main Results for each time segment

11:30 - 11:45

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	319	1313	958	0.333	317	0.5	5.600	A
2	522	1037	1319	0.396	520	0.7	4.492	A
3	638	655	1583	0.403	635	0.7	3.784	A
4		817						
5	1177	142	1955	0.602	1171	1.5	4.561	A

11:45 - 12:00

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	381	1571	814	0.468	380	0.9	8.266	A
2	624	1241	1194	0.523	622	1.1	6.276	A
3	761	784	1504	0.506	760	1.0	4.827	A
4		978						
5	1406	170	1937	0.726	1402	2.6	6.670	A

12:00 - 12:15

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	467	1909	625	0.747	459	2.7	20.940	C
2	764	1505	1032	0.740	758	2.7	12.813	B
3	933	954	1401	0.666	929	1.9	7.571	A
4		1194						
5	1722	207	1913	0.990	1702	7.7	15.724	C



12:15 - 12:30

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	467	1928	614	0.760	466	3.0	23.960	C
2	764	1522	1022	0.748	763	2.9	13.870	B
3	933	962	1395	0.668	932	2.0	7.772	A
4		1200						
5	1722	208	1912	0.901	1720	8.3	18.175	C

12:30 - 12:45

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	381	1599	798	0.478	389	0.9	8.973	A
2	624	1267	1178	0.529	631	1.1	6.653	A
3	761	797	1497	0.509	765	1.0	4.947	A
4		987						
5	1406	171	1936	0.726	1428	2.7	7.379	A

12:45 - 13:00

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	319	1325	952	0.335	321	0.5	5.724	A
2	522	1047	1313	0.398	524	0.7	4.580	A
3	638	661	1580	0.404	639	0.7	3.834	A
4		823						
5	1177	143	1954	0.602	1182	1.5	4.692	A

Junctions 9							
ARCADY 9 - Roundabout Module							
Version: 9.0.1.4646 [] © Copyright TRL Limited, 2017							
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Filename: A27 Northern Roundabout - 2031.j9

Path: N:\Projects\rgrust 170221\Analysis\Modelling\A27 Modelling

Report generation date: 12/10/2017 16:29:23

«2031 Baseline + Development, SAT

- »Junction Network
- »Arms
- »Traffic Demand
- »Origin-Destination Data
- »Vehicle Mix
- »Results

Summary of junction performance

	PM				SAT			
	Queue (Veh)	Delay (s)	RFC	LOS	Queue (Veh)	Delay (s)	RFC	LOS
2031 Baseline + Development								
Arm 1	13.8	37.75	0.85	E	14.1	38.63	0.85	E
Arm 3	1.1	4.08	0.53	A	1.1	4.09	0.53	A
Arm 4	0.9	6.36	0.47	A	0.9	6.36	0.47	A
Arm 5	0.1	6.20	0.11	A	0.1	6.21	0.11	A

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

File summary

File Description

Title	(untitled)
Location	
Site number	
Date	09/10/2017
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Enumerator	MOTION\JamesWerby
Description	

Units

Distance units	Speed units	Traffic units input	Traffic units results	Flow units	Average delay units	Total delay units	Rate of delay units
m	kph	Veh	Veh	perHour	s	-Min	perMin

**Analysis Options**

Calculate Queue Percentiles	Calculate residual capacity	RFC Threshold	Average Delay threshold (s)	Queue threshold (PCU)
		0.85	36.00	20.00

Analysis Set Details

ID	Network flow scaling factor (%)
A1	100.000

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D3	2031 Baseline + Development	SAT	ONE HOUR	11:30	13:00	15

2031 Baseline + Development, SAT

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Junction Delay (s)	Junction LOS
1	untitled	Standard Roundabout	20.66	D

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Name	Description
1	A280 Long Furlong	
2	A27 On Slip	
3	A280 South	
4	A27 Off Slip	
5	Arundel Road	

Roundabout Geometry

Arm	V - Approach road half-width (m)	E - Entry width (m)	I' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit only
1	3.65	7.30	29.0	35.0	60.0	35.0	
2							✓
3	3.65	8.10	14.0	37.0	60.0	12.0	
4	3.65	6.60	30.0	15.0	60.0	44.0	
5	3.65	6.30	6.5	25.0	60.0	45.0	

Slope / Intercept / Capacity

Roundabout Slope and intercept used in model

Arm	Final slope	Final intercept (PCU/hr)
1	0.593	1901
2		
3	0.618	1925
4	0.535	1670
5	0.493	1393

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

Traffic Demand

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1		✓	1273	100.000
2				
3		✓	913	100.000
4		✓	449	100.000
5		✓	62	100.000

Origin-Destination Data

Demand (Veh/hr)

	To					
		1	2	3	4	5
From	1	0	40	1227	0	6
	2	Exit-only	Exit-only	Exit-only	Exit-only	Exit-only
	3	578	305	0	0	30
	4	176	16	256	0	1
	5	10	10	42	0	0

Vehicle Mix

Heavy Vehicle Percentages

	To					
		1	2	3	4	5
From	1	0	0	1	0	0
	2	Exit-only	Exit-only	Exit-only	Exit-only	Exit-only
	3	3	0	0	0	0
	4	9	8	3	0	0
	5	0	0	0	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (Veh)	Max LOS
1	0.595	38.63	14.1	E
2				
3	0.53	4.09	1.1	A
4	0.47	6.36	0.9	A
5	0.11	6.21	0.1	A

Main Results for each time segment

11:30 - 11:45

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	958	472	1602	0.598	953	1.5	5.493	A
2		1146						
3	687	4	1886	0.364	685	0.6	2.992	A
4	338	690	1226	0.276	337	0.4	4.038	A
5	47	998	885	0.053	46	0.1	4.290	A

11:45 - 12:00

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	1144	565	1547	0.740	1139	2.7	8.726	A
2		1371						
3	821	5	1886	0.435	820	0.8	3.376	A
4	404	825	1156	0.349	403	0.5	4.774	A
5	56	1195	785	0.071	56	0.1	4.933	A

12:00 - 12:15

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	1402	691	1471	0.953	1366	11.8	27.638	C
2		1650						
3	1005	6	1885	0.533	1004	1.1	4.077	A
4	494	1010	1061	0.466	493	0.9	6.326	A
5	68	1463	649	0.105	68	0.1	6.192	A

12:15 - 12:30

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	1402	693	1471	0.953	1392	14.1	38.831	E
2		1676						
3	1005	7	1885	0.533	1005	1.1	4.090	A
4	494	1012	1060	0.466	494	0.9	6.362	A
5	68	1465	648	0.105	68	0.1	6.209	A

12:30 - 12:45

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	1144	567	1545	0.741	1189	3.0	11.299	B
2		1421						
3	821	6	1886	0.435	822	0.8	3.391	A
4	404	828	1155	0.349	405	0.5	4.808	A
5	56	1199	783	0.071	56	0.1	4.950	A

12:45 - 13:00

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	958	474	1601	0.599	964	1.5	5.706	A
2		1159						
3	687	5	1886	0.364	688	0.6	3.005	A
4	338	693	1225	0.276	339	0.4	4.064	A
5	47	1003	883	0.053	47	0.1	4.307	A