



Technical Note

To: **Ravensbourne Investments Ltd**
From: **Iceni Projects Ltd**
Date: **27.04.2020**
Title: **Folkestone Gateway, Park Farm Road, Folkestone, Kent**

FOLKESTONE GATEWAY, PARK FARM ROAD, FOLKESTONE, KENT – TECHNICAL NOTE

a. Introduction

1. Iceni Projects Ltd have been appointed by Ravensbourne Investments Ltd (The Client), to prepare a Technical Note (TN) to support a Section 73 planning application at the former Silver Spring site in Folkestone, Kent (the 'Site').
2. The Site received planning permission in June 2018 for the *"Redevelopment of the site to provide a hotel (4,979sqm GIA) (Use Class C1), restaurant and café floorspace (847sqm GIA (Use Class A3) and two 'drive through' units (total 451sqm GIA) together with a new vehicular and pedestrian access from Park Farm Road, parking, servicing and all hard and soft landscaping"* (Planning Reference: Y18/0066/SH). This is known as Phase 1 of the proposals on-site.
3. This TN focuses on the proposed changes to the consented scheme which result in an extra 29 rooms within the consented built envelope (taking the total up to 160 rooms) with no changes to the drive through units. However, in anticipation for the potential to accommodate additional accommodation through subsequent applications, we have tested the situation that results in an increase of 49 bedrooms to the 131-bedroom hotel to provide a 180-bedroom hotel and then 194 bedroom hotel with no changes proposed to the drive-thru units. There are a total of 232 car parking spaces permitted across the site already.
4. This is to provide a robust assessment with the development of up to 160 rooms having a reduced impact. An overall Masterplan of the site is included in **Appendix A1** with detailed drawings submitted as part of the application.

b. Trip Generation Assessment

5. The previous trip generation assessment for the proposed hotel (weekday) has been extracted from the Transport Assessment (TA) which accompanied the previous planning application ref: Y18/0066/SH and is summarised in **Table 1**.

Table 1 – Previously Agreed Vehicle Trip Generation (Weekday)

Period	Trip Rate (Per Bedroom)			Flows (Based on 131 Bedrooms)		
	Arrive	Depart	2-way	Arrive	Depart	2-way
08:00-09:00	0.155	0.335	0.490	20	44	64
17:00-18:00	0.248	0.126	0.374	32	17	49
Daily	2.482	2.544	5.026	325	333	658

Note: Figures subject to rounding

6. **Table 2** has applied the previously agreed weekday trip rates (Table 1) to the proposed additional rooms for both scenarios.

Table 2 – Proposed Vehicle Trip Generation (Weekday)

Period	Flows (Based on 180 Bedrooms)			Flows (Based on 194 Bedrooms)		
	Arrive	Depart	2-way	Arrive	Depart	2-way
08:00-09:00	28	60	88	30	65	95
17:00-18:00	45	23	67	48	24	73
Daily	447	458	905	482	494	975

Note: Figures subject to rounding

7. **Table 2** demonstrates that the 63 additional bedrooms will result in an additional 31 and 24 two-way vehicle trips in the AM and PM peak periods which equates to approximately one additional vehicle every two minutes.
8. **Table 3** summarises the previously agreed vehicle trip rates and resultant flows associated with the weekend.

Table 3 – Previously Agreed Vehicle Trip Generation (Weekend)

Period	Trip Rate (Per Bedroom)			Flows (Based on 131 Bedrooms)		
	Arrive	Depart	2-way	Arrive	Depart	2-way
13:00-14:00	0.114	0.112	0.226	15	15	30
Daily	1.751	1.570	3.321	228	204	432

Note: Figures subject to rounding

9. **Table 4** has applied the previously agreed weekend trip rates (Table 3) to the proposed additional rooms for both scenarios.

Table 4 – Proposed Vehicle Trip Generation (Weekend)

Period	Flows (Based on 180 Bedrooms)			Flows (Based on 194 Bedrooms)		
	Arrive	Depart	2-way	Arrive	Depart	2-way
13:00-14:00	21	20	41	22	22	44
Daily	315	283	598	340	305	644

Note: Figures subject to rounding

10. **Table 4** demonstrates that the 63 additional bedrooms will generate an additional 14 two-way vehicle trips during the weekend peak.

11. It is pertinent to note that the original planning consent included an 820sqm restaurant which generated vehicle trips also. The restaurant was subsequently removed from the proposed development through an application approved in December 2018 (Planning Reference: Y18/1043/FH), as such, the trips associated with this use can be discounted from the assessment in Tables 2 and 4.
12. The restaurant vehicle trip rates are included within Table 5.11 of the TA previously submitted which highlighted no additional vehicle trips during the AM peak, 21 additional two-way vehicle trips in the weekday PM peak and 41 additional two-way vehicle trips in the weekend peak. Once these rates are subtracted from the proposed impact shown in Tables 2 and 4, the expected impact of the additional hotel rooms will be an additional 31 two-way vehicle trips in the AM peak period with an additional three two-way vehicle movements in the weekday PM peak and weekend peak, when compared to the previously agreed overall impact.
13. Based on the above, the potential impact on the local highway network will be assessed for the AM peak period as the impact of three additional trips across the weekday PM peak and weekend peak periods is expected to be negligible.

c. Traffic Impact Assessment

14. The potential impact on the AM peak has been assessed on the local highway network with the following distribution applied, which was previously agreed as part of the TA:
 - 30% M20 west;
 - 20% M20 east (A20);
 - 15% Churchill Avenue;
 - 10% Cherry Garden Avenue;
 - 10% Radnor Park Road South; and
 - 5% Radnor Park Road South West.
15. The distribution suggests that 85% of traffic will arrive/depart to/from the site to the north on Park Farm with 15% arriving/departing to/from the site southbound on Park Farm Road. The additional 31 two-way vehicle trips in the AM peak would therefore equate to circa 17-18 vehicles travelling northbound and circa 4-5 travelling southbound. Based on this, vehicles arriving/departing from the south have been discounted from the assessment.
16. Junction capacity assessments have been undertaken at the following three junctions as a result of 70-85% of the additional traffic generated by the hotel travelling through these junctions, which were previously highlighted to be close to their theoretical capacity:
 - Park Farm Road / Sainsbury's roundabout;
 - Park Farm Road / A259 Churchill Avenue roundabout; and
 - Castle Hill Interchange (A259 Churchill Avenue / A20 / A2034 roundabout).
17. The previous scenarios were modelled as well as including an additional scenario to reflect the additional hotel rooms with the previous distribution applied.

18. The junction capacity assessment has considered the junctions in context of practical capacity (RFC of 0.85) and theoretical capacity (RFC of 1.00) with the queue lengths analysed in PCUs (Passenger Car Units).

Park Farm Road / Sainsbury's Roundabout

19. The Park Farm Road / Sainsbury's roundabout has been assessed, as 85% of the additional traffic associated with the hotel is expected to pass through this junction. A summary of the results is provided in **Table 5** with the full output results attached at **Appendix A2**.

Table 5 – Park Farm Road / Sainsbury's Roundabout Assessment

AM Peak	2017		2027+C		2027+C+D		2027+C+D+D	
	RFC	Queue	RFC	Queue	RFC	Queue	RFC	Queue
Park Farm Rd (N)	0.87	6.6	1.00	26.7	0.99	24.5	1.00	27.0
Park Farm Rd (E)	0.62	1.7	0.74	3.0	0.76	3.2	0.78	3.6
Sainsbury's	0.32	0.5	0.37	0.6	0.37	0.6	0.37	0.6
Park Farm Rd (W)	0.06	0.1	0.08	0.1	0.08	0.1	0.08	0.1

Note: 2017 = Baseline, 2027+C = Future Year + Committed Development, 2027+C+D = Future Year + Committed Development + Development, 2027+C+D+D = Future Year + Committed Development + Development + Additional Rooms

20. **Table 5** shows that the junction is predicted to be at the theoretical capacity during the AM peak. This is a similar position to the 2027 without development flows scenario added with queues increasing by 0.3 and RFC remaining the same. As such, this level of impact is not considered to be significant and would not result in a severe impact.

Park Farm Road / Churchill Avenue Roundabout

21. The Park Farm Road / Churchill Avenue roundabout previously operated within capacity during the AM peak. Notwithstanding, it has been reassessed as 85% of the additional traffic associated with the hotel is expected to pass through this junction. A summary of the results is provided in **Table 6** with the full output results attached at **Appendix A3**.

Table 6 – Park Farm Road / Churchill Avenue Roundabout Assessment

AM Peak	2017		2027+C		2027+C+D		2027+C+D+D	
	RFC	Queue	RFC	Queue	RFC	Queue	RFC	Queue
Churchill Ave (W)	0.63	1.8	0.73	2.8	0.73	2.7	0.73	2.8
Churchill Ave (E)	0.64	1.8	0.75	3.0	0.75	3.0	0.75	3.0
Park Farm Road	0.54	1.2	0.66	2.0	0.66	2.0	0.67	2.1

Note: 2017 = Baseline, 2027+C = Future Year + Committed Development, 2027+C+D = Future Year + Committed Development + Development, 2027+C+D+D = Future Year + Committed Development + Development + Additional Rooms

22. **Table 6** demonstrates that the junction will continue to operate within its practical capacity with a 0.01 RFC increase on Park Farm Road, as such, the additional hotel rooms will not create a material impact on this junction.

Churchill Avenue / Cherry Garden Avenue / M20 Overbridge Roundabout

23. The Churchill Avenue / Cherry Garden Avenue / M20 Overbridge roundabout has been assessed as 70% of the additional traffic associated with the hotel is expected to pass through this junction. A summary of the results is provided in **Table 7** with the full output results attached at **Appendix A4**.

Table 7 – Churchill Ave / Charry Garden Ave / M20 Overbridge Roundabout Assessment

AM Peak	2017		2027+C		2027+C+D		2027+C+D+D	
	RFC	Queue	RFC	Queue	RFC	Queue	RFC	Queue
Churchill Ave	0.80	4.0	0.96	15.1	0.97	16.0	0.98	18.6
Cherry Garden Av	0.48	0.9	0.56	1.3	0.56	1.3	0.56	1.3
Castle Hill Bridge	0.63	1.7	0.73	2.7	0.72	2.6	0.72	2.7
A20 Off Slip	0.47	0.9	0.60	1.5	0.59	1.5	0.60	1.5

Note: 2017 = Baseline, 2027+C = Future Year + Committed Development, 2027+C+D = Future Year + Committed Development + Development, 2027+C+D+D = Future Year + Committed Development + Development + Additional Rooms

24. **Table 7** shows that the junction operates within practical capacity in 2017, however for the other three scenarios the junction is over the practical capacity but still within the theoretical capacity. The impact between the previously approved scheme and the additional trips is minimal with queue lengths increasing by 2.6 PCUs with RFC increasing by 0.01 and therefore this impact is expected to be negligible.

Summary

25. Based on the results of the junction capacity assessments, the additional trips generated in the AM peak is not expected to create a material impact on the local highway network and certainly not severe. As such, the previous conclusions from TA remain valid.

d. Parking Review

Provision

26. The proposed layout provides 232 car parking spaces, of which 14 are accessible bays. There are 12 motorcycle parking spaces and 30 cycle parking spaces proposed. The total provision of parking is in accordance with Kent's Vehicle Parking Standards 2006.
27. There is also a service yard associated with the hotel and 10 caravan parking spaces.

Accumulation Assessment

28. The previous TA undertook a parking accumulation assessment assuming that there were 130 vehicles parked in the car park overnight which assumed a maximum hotel occupancy of 100%. This was considered to be overly robust and that a 75% occupancy rate would be more applicable.
29. When applied to the total number of proposed hotel rooms (194), 75% would represent 146 vehicles parked overnight. **Table 8** provides a summary of the parking accumulation based on the trip generation included within the original TA.

Table 8 – Proposed Weekday Parking Accumulation (75% Overnight Occupancy)

Period	Parking Accumulation
05:00-06:00	146
06:00-07:00	148
07:00-08:00	117
08:00-09:00	85
09:00-10:00	102
10:00-11:00	116
11:00-12:00	105
12:00-13:00	125
13:00-14:00	119
14:00-15:00	97
15:00-16:00	89
16:00-17:00	108
17:00-18:00	147
18:00-19:00	200
19:00-20:00	213
20:00-21:00	221
21:00-22:00	198
22:00-23:00	170
23:00-24:00	142

30. The parking accumulation assessment in **Table 8** assumes that all of the trips associated with the drive through element of the development park up within the car park; although in reality this would not be the case. Furthermore, the assessment included trips associated with the previously proposed restaurant use. If the trips associated with the restaurants use are removed from the assessment and it is assumed that the hotel would be at 100% occupancy overnight, the peak parking demand would still be below the proposed 232 car parking spaces, as shown in **Table 9**.

Table 9 – Proposed Weekday Parking Accumulation (100% Overnight Occupancy)

Period	Parking Accumulation
05:00-06:00	194
06:00-07:00	197
07:00-08:00	165
08:00-09:00	133
09:00-10:00	151
10:00-11:00	162
11:00-12:00	144
12:00-13:00	146
13:00-14:00	141
14:00-15:00	130
15:00-16:00	123
16:00-17:00	139
17:00-18:00	165
18:00-19:00	191
19:00-20:00	195
20:00-21:00	199
21:00-22:00	187
22:00-23:00	184
23:00-24:00	182

31. **Table 9** represents a 'worst-case' scenario with the car park able to accommodate expected demand with approximately 33 available spaces, whilst also restricting car parking to a level to encourage sustainable travel by staff.
32. **Table 10** provides a parking accumulation assessment based on the weekend trip rates and including the additional 63 hotel rooms. As mentioned previously, it is unrealistic to assume that the hotel will be 100% occupied and therefore the assessment provides varying levels of occupancy.

Table 10 – Proposed Weekday Parking Accumulation (Varying Occupancies)

Period	75% Overnight Occu.	90% Overnight Occu.	100% Overnight Occu.
05:00-06:00	146	175	194
06:00-07:00	159	188	208
07:00-08:00	161	190	210
08:00-09:00	172	201	221
09:00-10:00	182	211	231
10:00-11:00	174	203	222
11:00-12:00	188	217	236
12:00-13:00	204	233	252
13:00-14:00	201	230	250
14:00-15:00	206	235	255
15:00-16:00	204	233	253
16:00-17:00	195	224	244
17:00-18:00	198	227	246
18:00-19:00	200	229	248
19:00-20:00	201	230	249
20:00-21:00	204	233	253
21:00-22:00	201	231	250
22:00-23:00	192	221	240
23:00-24:00	185	214	234

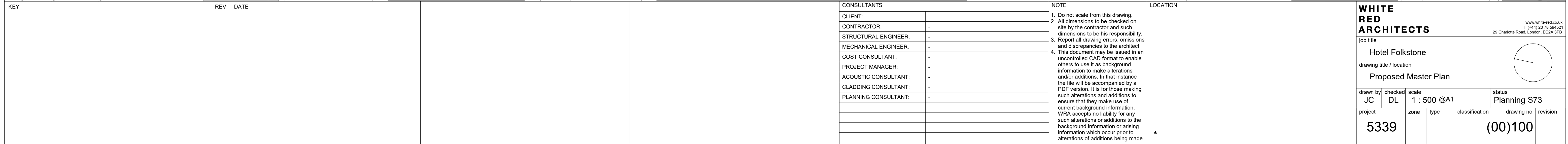
33. Based on the above, if the hotel was to be at 100% occupancy then parking demand would exceed the proposed level of parking. As mentioned previously, the assessment also assumes that all drive through trips result in parking when in reality the whole purpose of a drive-thru is so that you can pick up your food and go.
34. If a more robust approach of a 90% hotel occupancy rate, the total demand will exceed parking by approximately three spaces. It should be noted that the proposals also include 10 additional spaces within the service yard and could therefore be used as overspill parking. Furthermore, a Travel Plan with strong measures will be implemented in order to encourage staff to travel to the hotel and drive-thru units sustainably, thus reducing the level of parking requirement over the lifetime of the plan.
35. If required, additional parking spaces could be provided along the access route towards the servicing yard for staff members.

e. Summary

36. In light of this Technical Note, it is concluded that the additional 63 bedrooms associated with the hotel in comparison to the consented scheme is acceptable in traffic and transport terms with no material impact on the local highway network. Furthermore, the proposed level of car parking can meet the expected demand whilst also being restrictive thus promoting sustainable transport. This is based on a 194-bedroom hotel whereas this S73 Application focuses on a 160-bedroom hotel and therefore the impacts would be reduced further.

37. The conclusions of the TA from the previous scheme remain valid and therefore there should be no transport related reason why this application should be refused.

A1. PROPOSED SITE LAYOUT



A2. JUNCTION CAPACITY RESULTS – PARK FARM ROAD / SAINSBURY'S

Junctions 9			
ARCADY 9 - Roundabout Module			
Version: 9.5.0.6896 © Copyright TRL Limited, 2018			
For sales and distribution information, program advice and maintenance, contact TRL: +44 (0)1344 379777 software@trl.co.uk 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: (new file)

Path:

Report generation date: 08/04/2020 16:09:08

»2017, AM

»2027 + C, AM

»2027 + C + D, AM

»2027 + C + D + D, AM

Summary of junction performance

	AM		
	Queue (PCU)	Delay (s)	RFC
2017			
Arm A	6.6	19.40	0.87
Arm B	1.7	9.42	0.62
Arm C	0.5	5.41	0.32
Arm D	0.1	3.41	0.06
2027 + C			
Arm A	24.0	60.46	0.99
Arm B	2.9	13.68	0.74
Arm C	0.6	6.14	0.37
Arm D	0.1	3.71	0.08
2027 + C + D			
Arm A	22.5	57.44	0.99
Arm B	3.1	14.31	0.75
Arm C	0.6	6.20	0.37
Arm D	0.1	3.74	0.08
2027 + C + D + D			
Arm A	24.7	62.02	0.99
Arm B	3.4	15.40	0.77
Arm C	0.6	6.30	0.37
Arm D	0.1	3.79	0.08

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	Park Fram Road / Sainsbury
Location	Folkestone
Site number	
Date	08/04/2020
Version	
Status	(new file)
Identifier	
Client	Ravensbourne Investments Ltd
Jobnumber	20-T034
Enumerator	ICENIPROJECTS\mbacon
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	PCU	PCU	perHour	s	-Min	perMin

Analysis Options

Vehicle length (m)	Calculate Queue Percentiles	Calculate detailed queueing delay	Calculate residual capacity	RFC Threshold	Average Delay threshold (s)	Queue threshold (PCU)
5.75				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)	Run automatically
D1	2017	AM	ONE HOUR	07:45	09:15	15	✓
D2	2027 + C	AM	ONE HOUR	07:45	09:15	15	✓
D3	2027 + C + D	AM	ONE HOUR	07:45	09:15	15	✓
D4	2027 + C + D + D	AM	ONE HOUR	07:45	09:15	15	✓

Analysis Set Details

ID	Include in report	Network flow scaling factor (%)	Network capacity scaling factor (%)
A1	✓	100.000	100.000

2017, AM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
1	Sainsbury's	Standard Roundabout		A, B, C, D	14.15	B

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Name	Description
A	Park Farm Road (N)	
B	Park Farm Road (E)	
C	Sanisbury's	
D	Park Farm Road (W)	

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
A	3.80	7.10	18.0	13.0	40.0	22.0	
B	3.60	6.15	6.0	39.0	40.0	15.0	
C	5.50	6.00	15.0	13.0	40.0	25.0	
D	3.80	7.00	13.0	25.0	40.0	21.0	

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Arm	Final slope	Final intercept (PCU/hr)
A	0.659	1784
B	0.630	1526
C	0.657	1787
D	0.667	1763

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

Arm Capacity Adjustments

Arm	Type	Reason	Percentage capacity adjustment (%)
A	Percentage	Unequal Lane Usage	85.49
B	Percentage	Unequal Lane Usage	81.16
C	Percentage	Unequal Lane Usage	72.34

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)	Run automatically
D1	2017	AM	ONE HOUR	07:45	09:15	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A		ONE HOUR	✓	1168	100.000
B		ONE HOUR	✓	606	100.000
C		ONE HOUR	✓	288	100.000
D		ONE HOUR	✓	70	100.000

Origin-Destination Data

Demand (PCU/hr)

	To				
	A	B	C	D	
From	A	0	883	232	53
	B	481	0	103	22
	C	219	64	0	5
	D	46	15	9	0

Vehicle Mix

Heavy Vehicle Percentages

	To				
	A	B	C	D	
From	A	0	3	1	2
	B	7	0	3	5
	C	2	7	0	0
	D	10	0	1	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
A	0.87	19.40	6.6	C	1072	1608
B	0.62	9.42	1.7	A	556	834
C	0.32	5.41	0.5	A	264	396
D	0.06	3.41	0.1	A	64	96

Main Results for each time segment

07:45 - 08:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
A	879	220	66	1488	0.591	874	558	0.0	1.5	5.952	A
B	456	114	220	1126	0.405	453	720	0.0	0.7	5.663	A
C	217	54	416	1095	0.198	216	257	0.0	0.3	4.213	A
D	53	13	572	1382	0.038	53	60	0.0	0.0	2.883	A

08:00 - 08:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
A	1050	263	79	1481	0.709	1046	669	1.5	2.4	8.418	A
B	545	136	263	1104	0.494	544	862	0.7	1.0	6.812	A
C	259	65	499	1056	0.245	259	308	0.3	0.3	4.649	A
D	63	16	686	1306	0.048	63	72	0.0	0.1	3.083	A

08:15 - 08:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
A	1286	321	97	1471	0.874	1271	819	2.4	6.2	17.281	C
B	667	167	320	1075	0.621	665	1048	1.0	1.7	9.261	A
C	317	79	609	1003	0.316	317	375	0.3	0.5	5.394	A
D	77	19	838	1204	0.064	77	87	0.1	0.1	3.401	A

08:30 - 08:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
A	1286	321	97	1471	0.874	1284	821	6.2	6.6	19.405	C
B	667	167	323	1073	0.622	667	1058	1.7	1.7	9.416	A
C	317	79	612	1002	0.316	317	378	0.5	0.5	5.413	A
D	77	19	841	1202	0.064	77	88	0.1	0.1	3.406	A

08:45 - 09:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
A	1050	263	79	1481	0.709	1066	673	6.6	2.6	9.231	A
B	545	136	268	1101	0.495	547	877	1.7	1.1	6.938	A
C	259	65	503	1054	0.246	259	313	0.5	0.3	4.672	A
D	63	16	689	1303	0.048	63	73	0.1	0.1	3.092	A

09:00 - 09:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
A	879	220	66	1488	0.591	884	563	2.6	1.5	6.151	A
B	456	114	222	1125	0.406	458	728	1.1	0.7	5.745	A
C	217	54	420	1093	0.198	217	260	0.3	0.3	4.235	A
D	53	13	577	1379	0.038	53	60	0.1	0.0	2.890	A

2027 + C, AM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
1	Sainsbury's	Standard Roundabout		A, B, C, D	37.86	E

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)	Run automatically
D2	2027 + C	AM	ONE HOUR	07:45	09:15	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A		ONE HOUR	✓	1319	100.000
B		ONE HOUR	✓	709	100.000
C		ONE HOUR	✓	316	100.000
D		ONE HOUR	✓	77	100.000

Origin-Destination Data

Demand (PCU/hr)

	To				
	A	B	C	D	
From	A	0	1005	255	59
	B	569	0	115	25
	C	241	70	0	5
	D	51	16	10	0

Vehicle Mix

Heavy Vehicle Percentages

	To				
	A	B	C	D	
From	A	0	3	1	2
	B	7	0	3	5
	C	2	7	0	0
	D	10	0	1	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
A	0.99	60.46	24.0	F	1210	1816
B	0.74	13.68	2.9	B	651	976
C	0.37	6.14	0.6	A	290	435
D	0.08	3.71	0.1	A	71	106

Main Results for each time segment

07:45 - 08:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
A	993	248	72	1485	0.669	985	644	0.0	2.0	7.276	A
B	534	133	242	1115	0.479	530	815	0.0	1.0	6.500	A
C	238	59	488	1061	0.224	237	284	0.0	0.3	4.493	A
D	58	14	658	1324	0.044	58	66	0.0	0.0	3.028	A

08:00 - 08:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
A	1186	296	86	1477	0.803	1178	772	2.0	3.9	12.060	B
B	637	159	289	1090	0.585	635	975	1.0	1.5	8.370	A
C	284	71	585	1015	0.280	284	340	0.3	0.4	5.070	A
D	69	17	789	1237	0.056	69	80	0.0	0.1	3.284	A

08:15 - 08:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
A	1452	363	105	1466	0.991	1397	943	3.9	17.6	37.899	E
B	781	195	344	1063	0.735	775	1159	1.5	2.8	13.072	B
C	348	87	712	955	0.364	347	407	0.4	0.6	6.098	A
D	85	21	964	1120	0.076	85	95	0.1	0.1	3.703	A

08:30 - 08:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
A	1452	363	106	1466	0.991	1427	948	17.6	24.0	60.455	F
B	781	195	351	1059	0.737	780	1182	2.8	2.9	13.676	B
C	348	87	718	952	0.365	348	413	0.6	0.6	6.139	A
D	85	21	969	1117	0.076	85	97	0.1	0.1	3.714	A

08:45 - 09:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
A	1186	296	86	1477	0.803	1263	779	24.0	4.5	22.445	C
B	637	159	310	1080	0.590	643	1040	2.9	1.6	8.851	A
C	284	71	595	1010	0.281	285	358	0.6	0.4	5.119	A
D	69	17	796	1232	0.056	69	84	0.1	0.1	3.300	A

09:00 - 09:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
A	993	248	72	1484	0.669	1003	650	4.5	2.1	7.809	A
B	534	133	246	1112	0.480	536	829	1.6	1.0	6.662	A
C	238	59	494	1058	0.225	238	288	0.4	0.3	4.527	A
D	58	14	665	1320	0.044	58	68	0.1	0.0	3.039	A

2027 + C + D, AM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
1	Sainsbury's	Standard Roundabout		A, B, C, D	36.26	E

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)	Run automatically
D3	2027 + C + D	AM	ONE HOUR	07:45	09:15	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A		ONE HOUR	✓	1313	100.000
B		ONE HOUR	✓	720	100.000
C		ONE HOUR	✓	316	100.000
D		ONE HOUR	✓	77	100.000

Origin-Destination Data

Demand (PCU/hr)

	To				
	A	B	C	D	
From	A	0	999	255	59
	B	580	0	115	25
	C	241	70	0	5
	D	51	16	10	0

Vehicle Mix

Heavy Vehicle Percentages

	To				
	A	B	C	D	
From	A	0	3	1	2
	B	7	0	3	5
	C	2	7	0	0
	D	10	0	1	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
A	0.99	57.44	22.5	F	1205	1807
B	0.75	14.31	3.1	B	661	991
C	0.37	6.20	0.6	A	290	435
D	0.08	3.74	0.1	A	71	106

Main Results for each time segment

07:45 - 08:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
A	988	247	72	1485	0.666	981	652	0.0	2.0	7.211	A
B	542	136	242	1115	0.486	538	810	0.0	1.0	6.592	A
C	238	59	496	1057	0.225	237	284	0.0	0.3	4.514	A
D	58	14	666	1319	0.044	58	66	0.0	0.0	3.041	A

08:00 - 08:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
A	1180	295	86	1477	0.799	1173	782	2.0	3.8	11.867	B
B	647	162	289	1090	0.594	645	970	1.0	1.5	8.552	A
C	284	71	595	1010	0.281	284	340	0.3	0.4	5.102	A
D	69	17	799	1230	0.056	69	80	0.0	0.1	3.302	A

08:15 - 08:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
A	1446	361	105	1466	0.986	1394	955	3.8	16.8	36.673	E
B	793	198	344	1062	0.746	787	1155	1.5	3.0	13.612	B
C	348	87	724	949	0.367	347	407	0.4	0.6	6.155	A
D	85	21	976	1113	0.076	85	95	0.1	0.1	3.731	A

08:30 - 08:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
A	1446	361	106	1466	0.986	1423	960	16.8	22.5	57.443	F
B	793	198	351	1059	0.749	792	1177	3.0	3.1	14.305	B
C	348	87	730	946	0.368	348	414	0.6	0.6	6.198	A
D	85	21	981	1109	0.076	85	97	0.1	0.1	3.743	A

08:45 - 09:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
A	1180	295	86	1477	0.799	1253	789	22.5	4.4	20.906	C
B	647	162	309	1081	0.599	653	1031	3.1	1.6	9.066	A
C	284	71	605	1005	0.283	285	357	0.6	0.4	5.151	A
D	69	17	806	1225	0.056	69	83	0.1	0.1	3.319	A

09:00 - 09:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
A	988	247	72	1484	0.666	998	659	4.4	2.1	7.726	A
B	542	136	246	1112	0.487	544	824	1.6	1.0	6.765	A
C	238	59	502	1054	0.226	238	288	0.4	0.3	4.547	A
D	58	14	673	1314	0.044	58	68	0.1	0.0	3.052	A

2027 + C + D + D, AM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
1	Sainsbury's	Standard Roundabout		A, B, C, D	38.99	E

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)	Run automatically
D4	2027 + C + D + D	AM	ONE HOUR	07:45	09:15	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A		ONE HOUR	✓	1322	100.000
B		ONE HOUR	✓	738	100.000
C		ONE HOUR	✓	316	100.000
D		ONE HOUR	✓	77	100.000

Origin-Destination Data

Demand (PCU/hr)

		To			
From		A	B	C	D
	A	0	1008	255	59
	B	598	0	115	25
	C	241	70	0	5
	D	51	16	10	0

Vehicle Mix

Heavy Vehicle Percentages

		To			
From		A	B	C	D
	A	0	3	1	2
	B	7	0	3	5
	C	2	7	0	0
	D	10	0	1	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
A	0.99	62.02	24.7	F	1213	1820
B	0.77	15.40	3.4	C	677	1016
C	0.37	6.30	0.6	A	290	435
D	0.08	3.79	0.1	A	71	106

Main Results for each time segment

07:45 - 08:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
A	995	249	72	1485	0.670	987	666	0.0	2.0	7.307	A
B	556	139	242	1115	0.498	551	817	0.0	1.0	6.745	A
C	238	59	510	1051	0.226	237	284	0.0	0.3	4.549	A
D	58	14	680	1310	0.044	58	66	0.0	0.0	3.063	A

08:00 - 08:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
A	1188	297	86	1477	0.805	1181	798	2.0	4.0	12.161	B
B	663	166	289	1090	0.608	661	977	1.0	1.6	8.866	A
C	284	71	611	1003	0.283	284	340	0.3	0.4	5.154	A
D	69	17	815	1220	0.057	69	80	0.0	0.1	3.333	A

08:15 - 08:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
A	1456	364	105	1466	0.993	1399	974	4.0	18.1	38.526	E
B	813	203	343	1063	0.765	806	1161	1.6	3.2	14.541	B
C	348	87	743	940	0.370	347	406	0.4	0.6	6.249	A
D	85	21	995	1100	0.077	85	95	0.1	0.1	3.778	A

08:30 - 08:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
A	1456	364	106	1466	0.993	1429	979	18.1	24.7	62.017	F
B	813	203	350	1059	0.767	812	1184	3.2	3.4	15.400	C
C	348	87	749	937	0.371	348	413	0.6	0.6	6.296	A
D	85	21	1000	1096	0.077	85	97	0.1	0.1	3.792	A

08:45 - 09:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
A	1188	297	87	1477	0.805	1269	806	24.7	4.6	23.304	C
B	663	166	310	1080	0.615	670	1045	3.4	1.7	9.484	A
C	284	71	622	997	0.285	285	358	0.6	0.4	5.213	A
D	69	17	823	1214	0.057	69	84	0.1	0.1	3.352	A

09:00 - 09:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
A	995	249	72	1484	0.670	1005	673	4.6	2.1	7.855	A
B	556	139	246	1112	0.499	558	831	1.7	1.1	6.936	A
C	238	59	516	1048	0.227	238	288	0.4	0.3	4.584	A
D	58	14	687	1305	0.044	58	68	0.1	0.0	3.077	A

A3. JUNCTION CAPACITY RESULTS – PARK FARM ROAD / CHURCHILL AVENUE

Junctions 9	
ARCADY 9 - Roundabout Module	
Version: 9.5.0.6896 © Copyright TRL Limited, 2018	
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Filename: PFR_CHA_NOT_CKD.j9

Path: P:\Transport\Projects\20-T034 - Ravensbourne Investments Ltd - Folkestone Gateway\03. CALCS\02. TRAFFIC MODELS

Report generation date: 09/04/2020 09:25:02

-
- »2017 AM - 2017, AM
 - »2027 + C - 2027 + C, AM
 - »2027 + C + D - 2027 + C + D, AM
 - »2027 + C + D + D - 2027 + C + D + D, AM

Summary of junction performance

	AM		
	Queue (PCU)	Delay (s)	RFC
	2017 AM - 2017		
Arm A	1.8	5.40	0.63
Arm B	1.8	6.12	0.64
Arm C	1.2	5.48	0.54

	AM		
	Queue (PCU)	Delay (s)	RFC
	2027 + C - 2027 + C		
Arm A	2.8	7.39	0.73
Arm B	3.0	9.28	0.75
Arm C	2.0	7.66	0.66

	AM		
	Queue (PCU)	Delay (s)	RFC
	2027 + C + D - 2027 + C + D		
Arm A	2.7	7.30	0.73
Arm B	3.0	9.21	0.75
Arm C	2.0	7.65	0.66

	AM		
	Queue (PCU)	Delay (s)	RFC
	2027 + C + D + D - 2027 + C + D + D		
Arm A	2.8	7.44	0.73
Arm B	3.0	9.39	0.75
Arm C	2.1	7.96	0.67

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	Churchill Avenue
Location	Folkestone
Site number	
Date	08/04/2020
Version	
Status	(new file)
Identifier	
Client	Ravensbourne Investments Ltd
Jobnumber	20-T034
Enumerator	ICENIPROJECTS\mbacon
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	PCU	PCU	perHour	s	-Min	perMin

Analysis Options

Vehicle length (m)	Calculate Queue Percentiles	Calculate detailed queueing delay	Calculate residual capacity	RFC Threshold	Average Delay threshold (s)	Queue threshold (PCU)
5.75				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)	Run automatically
D1	2017	AM	ONE HOUR	07:45	09:15	15	✓
D2	2027 + C	AM	ONE HOUR	07:45	09:15	15	✓
D3	2027 + C + D	AM	ONE HOUR	07:45	09:15	15	✓
D4	2027 + C + D + D	AM	ONE HOUR	07:45	09:15	15	✓

2017 AM - 2017, AM

Data Errors and Warnings

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

Analysis Set Details

ID	Name	Include in report	Use specific Demand Set(s)	Specific Demand Set(s)	Network flow scaling factor (%)	Network capacity scaling factor (%)
A1	2017 AM	✓	✓	D1	100.000	100.000

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
1	Churchill Avenue / Park Farm Road	Standard Roundabout		A, B, C	5.67	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Name	Description
A	A259 Churchill Avenue (W)	
B	A259 Churchill Avenue (E)	
C	Park Farm 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
A	3.50	8.50	35.0	28.0	50.0	40.0	
B	4.00	8.50	20.0	40.0	50.0	12.0	
C	3.60	9.00	15.0	16.0	50.0	22.5	

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Arm	Final slope	Final intercept (PCU/hr)
A	0.670	2057
B	0.724	2179
C	0.646	1877

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

Arm Capacity Adjustments

Arm	Type	Reason	Percentage capacity adjustment (%)
C	Percentage	Unequal Lane Usage	97.15

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)	Run automatically
D1	2017	AM	ONE HOUR	07:45	09:15	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A		ONE HOUR	✓	1086	100.000
B		ONE HOUR	✓	954	100.000
C		ONE HOUR	✓	746	100.000

Origin-Destination Data

Demand (PCU/hr)

	To			
		A	B	C
	A	0	427	659
	B	445	0	509
	C	513	233	0

Vehicle Mix

Heavy Vehicle Percentages

	To			
		A	B	C
	A	0	4	3
	B	2	0	3
	C	6	5	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
A	0.63	5.40	1.8	A	997	1495
B	0.64	6.12	1.8	A	875	1313
C	0.54	5.48	1.2	A	685	1027

Main Results for each time segment

07:45 - 08:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
A	818	204	175	1940	0.422	815	718	0.0	0.7	3.301	A
B	718	180	494	1821	0.394	716	495	0.0	0.7	3.330	A
C	562	140	334	1614	0.348	559	876	0.0	0.6	3.601	A

08:00 - 08:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
A	976	244	209	1916	0.509	975	860	0.7	1.1	3.949	A
B	858	214	592	1751	0.490	856	593	0.7	1.0	4.122	A
C	671	168	399	1573	0.426	670	1049	0.6	0.8	4.210	A

08:15 - 08:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
A	1196	299	256	1885	0.634	1193	1052	1.1	1.8	5.356	A
B	1050	263	724	1655	0.635	1047	725	1.0	1.8	6.044	A
C	821	205	489	1517	0.542	820	1283	0.8	1.2	5.443	A

08:30 - 08:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
A	1196	299	257	1885	0.634	1196	1055	1.8	1.8	5.401	A
B	1050	263	726	1654	0.635	1050	727	1.8	1.8	6.116	A
C	821	205	490	1516	0.542	821	1286	1.2	1.2	5.478	A

08:45 - 09:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
A	976	244	210	1916	0.510	979	864	1.8	1.1	3.985	A
B	858	214	594	1749	0.490	861	595	1.8	1.0	4.170	A
C	671	168	401	1571	0.427	672	1053	1.2	0.8	4.242	A

09:00 - 09:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
A	818	204	176	1939	0.422	819	722	1.1	0.8	3.328	A
B	718	180	497	1819	0.395	720	498	1.0	0.7	3.362	A
C	562	140	336	1613	0.348	563	881	0.8	0.6	3.625	A

2027 + C - 2027 + C, AM

Data Errors and Warnings

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

Analysis Set Details

ID	Name	Include in report	Use specific Demand Set(s)	Specific Demand Set(s)	Network flow scaling factor (%)	Network capacity scaling factor (%)
A2	2027 + C	✓	✓	D2	100.000	100.000

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
1	Churchill Avenue / Park Farm Road	Standard Roundabout		A, B, C	8.10	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Name	Description
A	A259 Churchill Avenue (W)	
B	A259 Churchill Avenue (E)	
C	Park Farm 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
A	3.50	8.50	35.0	28.0	50.0	40.0	
B	4.00	8.50	20.0	40.0	50.0	12.0	
C	3.60	9.00	15.0	16.0	50.0	22.5	

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Arm	Final slope	Final intercept (PCU/hr)
A	0.670	2057
B	0.724	2179
C	0.646	1877

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

Arm Capacity Adjustments

Arm	Type	Reason	Percentage capacity adjustment (%)
C	Percentage	Unequal Lane Usage	95.39

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)	Run automatically
D2	2027 + C	AM	ONE HOUR	07:45	09:15	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A		ONE HOUR	✓	1238	100.000
B		ONE HOUR	✓	1070	100.000
C		ONE HOUR	✓	861	100.000

Origin-Destination Data

Demand (PCU/hr)

	To			
		A	B	C
	A	0	480	758
	B	510	0	560
	C	603	258	0

Vehicle Mix

Heavy Vehicle Percentages

	To			
		A	B	C
	A	0	4	3
	B	2	0	3
	C	6	5	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
A	0.73	7.39	2.8	A	1136	1704
B	0.75	9.28	3.0	A	982	1473
C	0.66	7.66	2.0	A	790	1185

Main Results for each time segment

07:45 - 08:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
A	932	233	193	1927	0.484	928	834	0.0	1.0	3.713	A
B	806	201	568	1767	0.456	802	553	0.0	0.9	3.812	A
C	648	162	382	1555	0.417	645	988	0.0	0.7	4.171	A

08:00 - 08:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
A	1113	278	232	1902	0.585	1111	999	1.0	1.4	4.697	A
B	962	240	680	1686	0.570	960	662	0.9	1.3	5.068	A
C	774	194	458	1508	0.513	773	1183	0.7	1.1	5.163	A

08:15 - 08:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
A	1363	341	283	1867	0.730	1358	1220	1.4	2.7	7.240	A
B	1178	295	831	1577	0.747	1172	810	1.3	2.9	8.974	A
C	948	237	559	1446	0.656	945	1445	1.1	2.0	7.534	A

08:30 - 08:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
A	1363	341	284	1866	0.730	1363	1225	2.7	2.8	7.385	A
B	1178	295	834	1575	0.748	1178	812	2.9	3.0	9.283	A
C	948	237	561	1444	0.656	948	1451	2.0	2.0	7.660	A

08:45 - 09:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
A	1113	278	233	1901	0.586	1118	1006	2.8	1.5	4.788	A
B	962	240	685	1683	0.571	968	666	3.0	1.4	5.208	A
C	774	194	462	1506	0.514	777	1191	2.0	1.1	5.248	A

09:00 - 09:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
A	932	233	195	1926	0.484	934	840	1.5	1.0	3.760	A
B	806	201	572	1765	0.456	808	557	1.4	0.9	3.865	A
C	648	162	385	1553	0.417	650	995	1.1	0.8	4.219	A

2027 + C + D - 2027 + C + D, AM

Data Errors and Warnings

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

Analysis Set Details

ID	Name	Include in report	Use specific Demand Set(s)	Specific Demand Set(s)	Network flow scaling factor (%)	Network capacity scaling factor (%)
A3	2027 + C + D	✓	✓	D3	100.000	100.000

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
1	Churchill Avenue / Park Farm Road	Standard Roundabout		A, B, C	8.04	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Name	Description
A	A259 Churchill Avenue (W)	
B	A259 Churchill Avenue (E)	
C	Park Farm 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
A	3.50	8.50	35.0	28.0	50.0	40.0	
B	4.00	8.50	20.0	40.0	50.0	12.0	
C	3.60	9.00	15.0	16.0	50.0	22.5	

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Arm	Final slope	Final intercept (PCU/hr)
A	0.670	2057
B	0.724	2179
C	0.646	1877

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

Arm Capacity Adjustments

Arm	Type	Reason	Percentage capacity adjustment (%)
C	Percentage	Unequal Lane Usage	96.18

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)	Run automatically
D3	2027 + C + D	AM	ONE HOUR	07:45	09:15	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A		ONE HOUR	✓	1227	100.000
B		ONE HOUR	✓	1075	100.000
C		ONE HOUR	✓	871	100.000

Origin-Destination Data

Demand (PCU/hr)

	To			
		A	B	C
	A	0	480	747
	B	510	0	565
	C	605	266	0

Vehicle Mix

Heavy Vehicle Percentages

	To			
		A	B	C
	A	0	4	3
	B	2	0	3
	C	6	5	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
A	0.73	7.30	2.7	A	1126	1689
B	0.75	9.21	3.0	A	986	1480
C	0.66	7.65	2.0	A	799	1199

Main Results for each time segment

07:45 - 08:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
A	924	231	199	1923	0.480	920	836	0.0	0.9	3.697	A
B	809	202	560	1773	0.456	806	559	0.0	0.9	3.803	A
C	656	164	382	1567	0.418	653	984	0.0	0.8	4.147	A

08:00 - 08:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
A	1103	276	239	1897	0.582	1101	1000	0.9	1.4	4.667	A
B	966	242	670	1694	0.571	964	669	0.9	1.3	5.049	A
C	783	196	458	1521	0.515	782	1177	0.8	1.1	5.139	A

08:15 - 08:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
A	1351	338	292	1861	0.726	1346	1222	1.4	2.7	7.154	A
B	1184	296	819	1586	0.746	1177	818	1.3	2.9	8.906	A
C	959	240	559	1458	0.658	955	1438	1.1	2.0	7.520	A

08:30 - 08:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
A	1351	338	293	1860	0.726	1351	1227	2.7	2.7	7.295	A
B	1184	296	822	1583	0.747	1183	821	2.9	3.0	9.207	A
C	959	240	561	1456	0.659	959	1444	2.0	2.0	7.645	A

08:45 - 09:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
A	1103	276	240	1896	0.582	1108	1008	2.7	1.5	4.754	A
B	966	242	675	1690	0.572	973	674	3.0	1.4	5.188	A
C	783	196	461	1518	0.516	787	1186	2.0	1.1	5.223	A

09:00 - 09:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
A	924	231	201	1922	0.481	926	841	1.5	1.0	3.741	A
B	809	202	564	1771	0.457	811	563	1.4	0.9	3.854	A
C	656	164	385	1566	0.419	657	990	1.1	0.8	4.194	A

2027 + C + D + D - 2027 + C + D + D, AM

Data Errors and Warnings

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

Analysis Set Details

ID	Name	Include in report	Use specific Demand Set (s)	Specific Demand Set (s)	Network flow scaling factor (%)	Network capacity scaling factor (%)
A4	2027 + C + D + D	✓	✓	D4	100.000	100.000

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
1	Churchill Avenue / Park Farm Road	Standard Roundabout		A, B, C	8.24	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Name	Description
A	A259 Churchill Avenue (W)	
B	A259 Churchill Avenue (E)	
C	Park Farm 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
A	3.50	8.50	35.0	28.0	50.0	40.0	
B	4.00	8.50	20.0	40.0	50.0	12.0	
C	3.60	9.00	15.0	16.0	50.0	22.5	

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Arm	Final slope	Final intercept (PCU/hr)
A	0.670	2057
B	0.724	2179
C	0.646	1877

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

Arm Capacity Adjustments

Arm	Type	Reason	Percentage capacity adjustment (%)
C	Percentage	Unequal Lane Usage	96.18

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)	Run automatically
D4	2027 + C + D + D	AM	ONE HOUR	07:45	09:15	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A		ONE HOUR	✓	1234	100.000
B		ONE HOUR	✓	1077	100.000
C		ONE HOUR	✓	889	100.000

Origin-Destination Data

Demand (PCU/hr)

	To			
		A	B	C
	A	0	480	754
	B	510	0	567
	C	620	269	0

Vehicle Mix

Heavy Vehicle Percentages

	To			
		A	B	C
	A	0	4	3
	B	2	0	3
	C	6	5	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
A	0.73	7.44	2.8	A	1132	1699
B	0.75	9.39	3.0	A	988	1482
C	0.67	7.96	2.1	A	816	1224

Main Results for each time segment

07:45 - 08:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
A	929	232	202	1922	0.483	925	847	0.0	1.0	3.722	A
B	811	203	565	1770	0.458	807	561	0.0	0.9	3.822	A
C	669	167	382	1567	0.427	666	990	0.0	0.8	4.208	A

08:00 - 08:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
A	1109	277	241	1895	0.585	1107	1014	1.0	1.4	4.715	A
B	968	242	677	1689	0.573	966	672	0.9	1.4	5.092	A
C	799	200	458	1521	0.526	798	1185	0.8	1.2	5.252	A

08:15 - 08:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
A	1359	340	295	1859	0.731	1354	1238	1.4	2.7	7.290	A
B	1186	296	827	1580	0.750	1179	822	1.4	3.0	9.067	A
C	979	245	558	1458	0.671	975	1448	1.2	2.1	7.816	A

08:30 - 08:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
A	1359	340	296	1858	0.731	1358	1244	2.7	2.8	7.440	A
B	1186	296	830	1578	0.752	1186	825	3.0	3.0	9.390	A
C	979	245	561	1456	0.672	979	1454	2.1	2.1	7.962	A

08:45 - 09:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
A	1109	277	243	1894	0.586	1114	1022	2.8	1.5	4.808	A
B	968	242	681	1686	0.574	975	676	3.0	1.4	5.236	A
C	799	200	462	1518	0.526	803	1194	2.1	1.2	5.349	A

09:00 - 09:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
A	929	232	203	1921	0.484	931	853	1.5	1.0	3.770	A
B	811	203	569	1767	0.459	813	565	1.4	0.9	3.876	A
C	669	167	385	1566	0.427	671	997	1.2	0.8	4.260	A

A4. JUNCTION CAPACITY RESULTS – CHURCHILL AVENUE / CHERRY GARDEN AVENUE / M20 OVERBRIDGE

Junctions 9	
ARCADY 9 - Roundabout Module	
Version: 9.5.0.6896 © Copyright TRL Limited, 2018	
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Filename: CH_INT_NOT_CKD.j9

Path: P:\Transport\Projects\20-T034 - Ravensbourne Investments Ltd - Folkestone Gateway\03. CALCS\02. TRAFFIC MODELS

Report generation date: 09/04/2020 12:49:41

-
- »2017 AM - 2017, AM
 - »2027 + C - 2027 + C, AM
 - »2027 + C + D - 2027 + C + D, AM
 - »2027 + C + D + D - 2027 + C + D + D, AM

Summary of junction performance

	AM		
	Queue (PCU)	Delay (s)	RFC
	2017 AM - 2017		
Arm A	4.0	14.62	0.80
Arm B	0.9	4.82	0.48
Arm D	1.7	5.38	0.63
Arm E	0.9	4.92	0.47

	AM		
	Queue (PCU)	Delay (s)	RFC
	2027 + C - 2027 + C		
Arm A	15.1	48.24	0.96
Arm B	1.3	5.99	0.56
Arm D	2.7	7.54	0.73
Arm E	1.5	7.15	0.60

	AM		
	Queue (PCU)	Delay (s)	RFC
	2027 + C + D - 2027 + C + D		
Arm A	16.0	50.74	0.97
Arm B	1.3	6.00	0.56
Arm D	2.6	7.35	0.72
Arm E	1.5	7.00	0.59

	AM		
	Queue (PCU)	Delay (s)	RFC
	2027 + C + D + D - 2027 + C + D + D		
Arm A	18.6	57.61	0.98
Arm B	1.3	6.07	0.56
Arm D	2.7	7.40	0.72
Arm E	1.5	7.09	0.60

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	Castle Hill Interchange
Location	Folkestone
Site number	
Date	08/04/2020
Version	
Status	(new file)
Identifier	
Client	Ravensbourne Investments Ltd
Jobnumber	20-T034
Enumerator	ICENIPROJECTS\mbacon
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	PCU	PCU	perHour	s	-Min	perMin

Analysis Options

Vehicle length (m)	Calculate Queue Percentiles	Calculate detailed queueing delay	Calculate residual capacity	RFC Threshold	Average Delay threshold (s)	Queue threshold (PCU)
5.75				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)	Run automatically
D1	2017	AM	ONE HOUR	07:45	09:15	15	✓
D2	2027 + C	AM	ONE HOUR	07:45	09:15	15	✓
D3	2027 + C + D	AM	ONE HOUR	07:45	09:15	15	✓
D4	2027 + C + D + D	AM	ONE HOUR	07:45	09:15	15	✓

2017 AM - 2017, AM

Data Errors and Warnings

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

Analysis Set Details

ID	Name	Include in report	Use specific Demand Set(s)	Specific Demand Set(s)	Network flow scaling factor (%)	Network capacity scaling factor (%)
A1	2017 AM	✓	✓	D1	100.000	100.000

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
1	Churchill Avenue / Cheery Garden Avenue / M20 On Slip / Castle Hill Bridge / A20 Off Slip	Standard Roundabout		A, B, C, D, E	7.47	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Name	Description
A	Churchill Avenue	
B	Cherry Garden Avenue	
C	M20 On Slip (Exit)	
D	Cattle Hill Bridge	
E	A20 Off Slip	

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
A	3.50	9.65	62.0	23.0	58.0	51.0	
B	3.55	8.00	18.5	22.0	58.0	41.0	
C							✓
D	6.65	9.15	29.0	18.0	58.0	37.0	
E	6.30	10.45	23.0	15.0	58.0	41.0	

Bypass

Arm	Arm has bypass	Bypass utilisation (%)
A		
B	✓	100
C		
D		
E		

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Arm	Final slope	Final intercept (PCU/hr)
A	0.658	2310
B	0.572	1776
C		
D	0.707	2531
E	0.705	2559

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

Arm Capacity Adjustments

Arm	Type	Reason	Percentage capacity adjustment (%)
A	Percentage	Unequal Lane Usage	78.99
C			
D	Percentage	Unequal Lane Usage	84.07

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)	Run automatically
D1	2017	AM	ONE HOUR	07:45	09:15	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A		ONE HOUR	✓	927	100.000
B		ONE HOUR	✓	1080	100.000
C					
D		ONE HOUR	✓	1063	100.000
E		ONE HOUR	✓	614	100.000

Origin-Destination Data

Demand (PCU/hr)

	To					
		A	B	C	D	E
From	A	0	403	481	43	0
	B	386	8	456	230	0
	C	Exit-only	Exit-only	Exit-only	Exit-only	Exit-only
	D	586	477	0	0	0
	E	133	478	3	0	0

Vehicle Mix

Heavy Vehicle Percentages

	To					
From		A	B	C	D	E
	A	0	2	4	1	0
	B	1	0	5	2	0
	C	Exit-only	Exit-only	Exit-only	Exit-only	Exit-only
	D	5	4	0	0	0
	E	2	3	0	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
A	0.80	14.62	4.0	B	851	1276
B	0.48	4.82	0.9	A	991	859
C						
D	0.63	5.38	1.7	A	975	1463
E	0.47	4.92	0.9	A	563	845

Main Results for each time segment

07:45 - 08:00

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
A	698	698	174	0	0	725	1448	0.482	694	829	0.0	0.9	4.892	A
B	813	470	117	343	0	395	1550	0.303	468	1024	0.0	0.4	3.367	A
C						500				362				
D	800	800	200	0	0	296	1952	0.410	797	205	0.0	0.7	3.251	A
E	462	462	116	0	0	1093	1788	0.259	461	0	0.0	0.4	2.786	A

08:00 - 08:15

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
A	833	833	208	0	0	867	1374	0.607	831	992	0.9	1.6	6.794	A
B	971	561	140	410	0	472	1505	0.373	560	1226	0.4	0.6	3.859	A
C						599				434				
D	956	956	239	0	0	354	1918	0.498	954	245	0.7	1.0	3.903	A
E	552	552	138	0	0	1308	1636	0.337	551	0	0.4	0.5	3.409	A

08:15 - 08:30

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
A	1021	1021	255	0	0	1061	1273	0.802	1011	1214	1.6	3.9	13.696	B
B	1189	687	172	502	0	575	1446	0.475	686	1498	0.6	0.9	4.789	A
C						733				528				
D	1170	1170	293	0	0	433	1871	0.626	1168	300	1.0	1.7	5.333	A
E	676	676	169	0	0	1601	1430	0.473	674	0	0.5	0.9	4.889	A

08:30 - 08:45

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
A	1021	1021	255	0	0	1064	1272	0.802	1020	1217	3.9	4.0	14.623	B
B	1189	687	172	502	0	580	1444	0.476	687	1504	0.9	0.9	4.822	A
C						734				533				
D	1170	1170	293	0	0	434	1870	0.626	1170	301	1.7	1.7	5.378	A
E	676	676	169	0	0	1604	1427	0.474	676	0	0.9	0.9	4.924	A

08:45 - 09:00

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
A	833	833	208	0	0	871	1372	0.607	843	996	4.0	1.6	7.125	A
B	971	561	140	410	0	479	1501	0.374	562	1235	0.9	0.6	3.891	A
C						601				440				
D	956	956	239	0	0	355	1917	0.499	958	246	1.7	1.0	3.938	A
E	552	552	138	0	0	1313	1632	0.338	554	0	0.9	0.5	3.436	A

09:00 - 09:15

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
A	698	698	174	0	0	728	1446	0.483	701	833	1.6	1.0	4.989	A
B	813	470	117	343	0	398	1548	0.304	470	1031	0.6	0.4	3.391	A
C						503				366				
D	800	800	200	0	0	297	1951	0.410	802	206	1.0	0.7	3.276	A
E	462	462	116	0	0	1099	1784	0.259	463	0	0.5	0.4	2.803	A

2027 + C - 2027 + C, AM

Data Errors and Warnings

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

Analysis Set Details

ID	Name	Include in report	Use specific Demand Set(s)	Specific Demand Set(s)	Network flow scaling factor (%)	Network capacity scaling factor (%)
A2	2027 + C	✓	✓	D2	100.000	100.000

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
1	Churchill Avenue / Cheery Garden Avenue / M20 On Slip / Castle Hill Bridge / A20 Off Slip	Standard Roundabout		A, B, C, D, E	17.50	C

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Name	Description
A	Churchill Avenue	
B	Cherry Garden Avenue	
C	M20 On Slip (Exit)	
D	Cattle Hill Bridge	
E	A20 Off Slip	

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
A	3.50	9.65	62.0	23.0	58.0	51.0	
B	3.55	8.00	18.5	22.0	58.0	41.0	
C							✓
D	6.65	9.15	29.0	18.0	58.0	37.0	
E	6.30	10.45	23.0	15.0	58.0	41.0	

Bypass

Arm	Arm has bypass	Bypass utilisation (%)
A		
B	✓	100
C		
D		
E		

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Arm	Final slope	Final intercept (PCU/hr)
A	0.658	2310
B	0.572	1776
C		
D	0.707	2531
E	0.705	2559

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

Arm Capacity Adjustments

Arm	Type	Reason	Percentage capacity adjustment (%)
A	Percentage	Unequal Lane Usage	80.64
C			
D	Percentage	Unequal Lane Usage	82.94

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)	Run automatically
D2	2027 + C	AM	ONE HOUR	07:45	09:15	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A		ONE HOUR	✓	1077	100.000
B		ONE HOUR	✓	1209	100.000
C					
D		ONE HOUR	✓	1199	100.000
E		ONE HOUR	✓	702	100.000

Origin-Destination Data

Demand (PCU/hr)

	To					
		A	B	C	D	E
From	A	0	443	563	71	0
	B	426	9	510	264	0
	C	Exit-only	Exit-only	Exit-only	Exit-only	Exit-only
	D	670	529	0	0	0
	E	164	535	3	0	0

Vehicle Mix

Heavy Vehicle Percentages

	To					
From		A	B	C	D	E
	A	0	2	4	1	0
	B	1	0	5	2	0
	C	Exit-only	Exit-only	Exit-only	Exit-only	Exit-only
	D	5	4	0	0	0
	E	2	3	0	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
A	0.96	48.24	15.1	E	988	1482
B	0.56	5.99	1.3	A	1109	962
C						
D	0.73	7.54	2.7	A	1100	1650
E	0.60	7.15	1.5	A	644	966

Main Results for each time segment

07:45 - 08:00

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
A	811	811	203	0	0	807	1435	0.565	806	945	0.0	1.3	5.845	A
B	910	526	132	384	0	476	1503	0.350	524	1136	0.0	0.5	3.721	A
C						577				423				
D	903	903	226	0	0	326	1908	0.473	899	251	0.0	0.9	3.716	A
E	529	529	132	0	0	1225	1695	0.312	527	0	0.0	0.5	3.161	A

08:00 - 08:15

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
A	968	968	242	0	0	966	1351	0.717	963	1131	1.3	2.5	9.458	A
B	1087	628	157	458	0	570	1449	0.434	627	1359	0.5	0.8	4.435	A
C						691				506				
D	1078	1078	269	0	0	390	1870	0.576	1076	300	0.9	1.4	4.727	A
E	631	631	158	0	0	1466	1524	0.414	630	0	0.5	0.7	4.132	A

08:15 - 08:30

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
A	1186	1186	296	0	0	1180	1237	0.959	1148	1383	2.5	12.0	32.846	D
B	1331	770	192	562	0	679	1387	0.555	768	1649	0.8	1.2	5.876	A
C						843				603				
D	1320	1320	330	0	0	478	1819	0.726	1315	366	1.4	2.7	7.391	A
E	773	773	193	0	0	1793	1294	0.597	770	0	0.7	1.5	7.010	A

08:30 - 08:45

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
A	1186	1186	296	0	0	1185	1234	0.961	1174	1387	12.0	15.1	48.237	E
B	1331	770	192	562	0	694	1378	0.558	770	1664	1.2	1.3	5.993	A
C						847				617				
D	1320	1320	330	0	0	479	1818	0.726	1320	368	2.7	2.7	7.543	A
E	773	773	193	0	0	1799	1290	0.599	773	0	1.5	1.5	7.151	A

08:45 - 09:00

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
A	968	968	242	0	0	972	1347	0.719	1018	1137	15.1	2.7	12.843	B
B	1087	628	157	458	0	602	1431	0.439	630	1388	1.3	0.8	4.568	A
C						697				535				
D	1078	1078	269	0	0	392	1869	0.577	1083	305	2.7	1.4	4.817	A
E	631	631	158	0	0	1475	1518	0.416	634	0	1.5	0.7	4.199	A

09:00 - 09:15

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
A	811	811	203	0	0	812	1432	0.566	816	951	2.7	1.4	6.070	A
B	910	526	132	384	0	483	1499	0.351	527	1145	0.8	0.6	3.760	A
C						581				429				
D	903	903	226	0	0	328	1907	0.473	905	253	1.4	0.9	3.762	A
E	529	529	132	0	0	1233	1689	0.313	530	0	0.7	0.5	3.192	A

2027 + C + D - 2027 + C + D, AM

Data Errors and Warnings

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

Analysis Set Details

ID	Name	Include in report	Use specific Demand Set(s)	Specific Demand Set(s)	Network flow scaling factor (%)	Network capacity scaling factor (%)
A3	2027 + C + D	✓	✓	D3	100.000	100.000

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
1	Churchill Avenue / Cheery Garden Avenue / M20 On Slip / Castle Hill Bridge / A20 Off Slip	Standard Roundabout		A, B, C, D, E	18.10	C

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Name	Description
A	Churchill Avenue	
B	Cherry Garden Avenue	
C	M20 On Slip (Exit)	
D	Cattle Hill Bridge	
E	A20 Off Slip	

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
A	3.50	9.65	62.0	23.0	58.0	51.0	
B	3.55	8.00	18.5	22.0	58.0	41.0	
C							✓
D	6.65	9.15	29.0	18.0	58.0	37.0	
E	6.30	10.45	23.0	15.0	58.0	41.0	

Bypass

Arm	Arm has bypass	Bypass utilisation (%)
A		
B	✓	100
C		
D		
E		

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Arm	Final slope	Final intercept (PCU/hr)
A	0.658	2310
B	0.572	1776
C		
D	0.707	2531
E	0.705	2559

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

Arm Capacity Adjustments

Arm	Type	Reason	Percentage capacity adjustment (%)
A	Percentage	Unequal Lane Usage	80.39
C			
D	Percentage	Unequal Lane Usage	83.32

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)	Run automatically
D3	2027 + C + D	AM	ONE HOUR	07:45	09:15	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A		ONE HOUR	✓	1079	100.000
B		ONE HOUR	✓	1213	100.000
C					
D		ONE HOUR	✓	1192	100.000
E		ONE HOUR	✓	694	100.000

Origin-Destination Data

Demand (PCU/hr)

	To					
		A	B	C	D	E
From	A	0	450	561	68	0
	B	430	9	510	264	0
	C	Exit-only	Exit-only	Exit-only	Exit-only	Exit-only
	D	663	529	0	0	0
	E	156	535	3	0	0

Vehicle Mix

Heavy Vehicle Percentages

	To					
From		A	B	C	D	E
	A	0	2	4	1	0
	B	1	0	5	2	0
	C	Exit-only	Exit-only	Exit-only	Exit-only	Exit-only
	D	5	4	0	0	0
	E	2	3	0	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
A	0.97	50.74	16.0	F	990	1485
B	0.56	6.00	1.3	A	1113	968
C						
D	0.72	7.35	2.6	A	1094	1641
E	0.59	7.00	1.5	A	637	955

Main Results for each time segment

07:45 - 08:00

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
A	812	812	203	0	0	807	1430	0.568	807	937	0.0	1.3	5.899	A
B	913	529	132	384	0	473	1505	0.352	527	1141	0.0	0.5	3.724	A
C						578				422				
D	897	897	224	0	0	329	1915	0.469	894	249	0.0	0.9	3.671	A
E	522	522	131	0	0	1223	1696	0.308	521	0	0.0	0.5	3.143	A

08:00 - 08:15

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
A	970	970	242	0	0	966	1346	0.720	965	1121	1.3	2.6	9.599	A
B	1090	632	158	458	0	565	1452	0.435	631	1366	0.5	0.8	4.441	A
C						692				504				
D	1072	1072	268	0	0	394	1877	0.571	1070	298	0.9	1.4	4.654	A
E	624	624	156	0	0	1464	1526	0.409	623	0	0.5	0.7	4.091	A

08:15 - 08:30

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
A	1188	1188	297	0	0	1180	1233	0.964	1148	1371	2.6	12.6	33.958	D
B	1336	774	194	562	0	673	1391	0.557	772	1656	0.8	1.3	5.883	A
C						844				600				
D	1312	1312	328	0	0	482	1825	0.719	1307	362	1.4	2.6	7.206	A
E	764	764	191	0	0	1790	1296	0.589	761	0	0.7	1.4	6.873	A

08:30 - 08:45

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
A	1188	1188	297	0	0	1185	1231	0.965	1174	1375	12.6	16.0	50.736	F
B	1336	774	194	562	0	688	1382	0.560	774	1671	1.3	1.3	6.001	A
C						848				614				
D	1312	1312	328	0	0	483	1824	0.719	1312	365	2.6	2.6	7.347	A
E	764	764	191	0	0	1796	1292	0.591	764	0	1.4	1.5	7.001	A

08:45 - 09:00

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
A	970	970	242	0	0	972	1343	0.722	1023	1127	16.0	2.8	13.377	B
B	1090	632	158	458	0	599	1433	0.441	634	1396	1.3	0.8	4.579	A
C						698				534				
D	1072	1072	268	0	0	396	1876	0.571	1077	302	2.6	1.4	4.737	A
E	624	624	156	0	0	1472	1520	0.410	627	0	1.5	0.7	4.154	A

09:00 - 09:15

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
A	812	812	203	0	0	812	1428	0.569	818	942	2.8	1.4	6.135	A
B	913	529	132	384	0	479	1501	0.353	530	1151	0.8	0.6	3.760	A
C						582				428				
D	897	897	224	0	0	331	1914	0.469	899	251	1.4	0.9	3.716	A
E	522	522	131	0	0	1230	1691	0.309	524	0	0.7	0.5	3.171	A

2027 + C + D + D - 2027 + C + D + D, AM

Data Errors and Warnings

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

Analysis Set Details

ID	Name	Include in report	Use specific Demand Set (s)	Specific Demand Set (s)	Network flow scaling factor (%)	Network capacity scaling factor (%)
A4	2027 + C + D + D	✓	✓	D4	100.000	100.000

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
1	Churchhill Avenue / Cheery Garden Avenue / M20 On Slip / Castle Hill Bridge / A20 Off Slip	Standard Roundabout		A, B, C, D, E	20.04	C

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Name	Description
A	Churchill Avenue	
B	Cherry Garden Avenue	
C	M20 On Slip (Exit)	
D	Cattle Hill Bridge	
E	A20 Off Slip	

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
A	3.50	9.65	62.0	23.0	58.0	51.0	
B	3.55	8.00	18.5	22.0	58.0	41.0	
C							✓
D	6.65	9.15	29.0	18.0	58.0	37.0	
E	6.30	10.45	23.0	15.0	58.0	41.0	

Bypass

Arm	Arm has bypass	Bypass utilisation (%)
A		
B	✓	100
C		
D		
E		

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Arm	Final slope	Final intercept (PCU/hr)
A	0.658	2310
B	0.572	1776
C		
D	0.707	2531
E	0.705	2559

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

Arm Capacity Adjustments

Arm	Type	Reason	Percentage capacity adjustment (%)
A	Percentage	Unequal Lane Usage	80.39
C			
D	Percentage	Unequal Lane Usage	83.32

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)	Run automatically
D4	2027 + C + D + D	AM	ONE HOUR	07:45	09:15	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A		ONE HOUR	✓	1093	100.000
B		ONE HOUR	✓	1214	100.000
C					
D		ONE HOUR	✓	1195	100.000
E		ONE HOUR	✓	697	100.000

Origin-Destination Data

Demand (PCU/hr)

	To					
		A	B	C	D	E
From	A	0	452	567	74	0
	B	431	9	510	264	0
	C	Exit-only	Exit-only	Exit-only	Exit-only	Exit-only
	D	666	529	0	0	0
	E	159	535	3	0	0

Vehicle Mix

Heavy Vehicle Percentages

	To					
From		A	B	C	D	E
	A	0	2	4	1	0
	B	1	0	5	2	0
	C	Exit-only	Exit-only	Exit-only	Exit-only	Exit-only
	D	5	4	0	0	0
	E	2	3	0	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
A	0.98	57.61	18.6	F	1003	1504
B	0.56	6.07	1.3	A	1114	969
C						
D	0.72	7.40	2.7	A	1097	1645
E	0.60	7.09	1.5	A	640	959

Main Results for each time segment

07:45 - 08:00

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
A	823	823	206	0	0	807	1430	0.575	817	942	0.0	1.4	5.996	A
B	914	530	133	384	0	482	1500	0.353	528	1143	0.0	0.6	3.746	A
C						583				426				
D	900	900	225	0	0	330	1915	0.470	896	253	0.0	0.9	3.681	A
E	525	525	131	0	0	1226	1694	0.310	523	0	0.0	0.5	3.159	A

08:00 - 08:15

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
A	983	983	246	0	0	966	1346	0.730	977	1127	1.4	2.7	9.906	A
B	1091	633	158	458	0	576	1446	0.438	632	1367	0.6	0.8	4.479	A
C						698				510				
D	1074	1074	269	0	0	395	1876	0.573	1072	303	0.9	1.4	4.672	A
E	627	627	157	0	0	1467	1524	0.411	626	0	0.5	0.7	4.115	A

08:15 - 08:30

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
A	1203	1203	301	0	0	1180	1233	0.976	1158	1378	2.7	14.1	36.814	E
B	1337	775	194	562	0	682	1385	0.560	773	1656	0.8	1.3	5.945	A
C						852				604				
D	1316	1316	329	0	0	483	1824	0.721	1311	368	1.4	2.6	7.259	A
E	767	767	192	0	0	1794	1293	0.593	764	0	0.7	1.5	6.953	A

08:30 - 08:45

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
A	1203	1203	301	0	0	1185	1231	0.978	1185	1383	14.1	18.6	57.615	F
B	1337	775	194	562	0	698	1376	0.563	775	1671	1.3	1.3	6.072	A
C						855				618				
D	1316	1316	329	0	0	484	1824	0.722	1316	371	2.6	2.7	7.404	A
E	767	767	192	0	0	1800	1289	0.595	767	0	1.5	1.5	7.086	A

08:45 - 09:00

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
A	983	983	246	0	0	972	1343	0.732	1045	1134	18.6	2.9	14.955	B
B	1091	633	158	458	0	616	1423	0.445	635	1401	1.3	0.8	4.641	A
C						706				545				
D	1074	1074	269	0	0	397	1875	0.573	1079	309	2.7	1.4	4.757	A
E	627	627	157	0	0	1476	1518	0.413	630	0	1.5	0.7	4.181	A

09:00 - 09:15

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
A	823	823	206	0	0	812	1428	0.576	829	948	2.9	1.4	6.249	A
B	914	530	133	384	0	488	1496	0.354	531	1152	0.8	0.6	3.787	A
C						587				432				
D	900	900	225	0	0	332	1913	0.470	902	255	1.4	0.9	3.726	A
E	525	525	131	0	0	1233	1689	0.311	526	0	0.7	0.5	3.185	A