

<h1>Junctions 8</h1>
<h2>ARCADY 8 - Roundabout Module</h2>
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Filename: J4 - Acle Roundabout - Appendix.arc8

Path: C:\Users\304111\Box Sync\PB4476 Norfolk Vanguard Offshore Wind Farm\F - TECHNICAL DATA\Transport\TD\Calcs\Junctions\J4 - Acle Roundabout

Report generation date: 06/04/2018 15:27:50

Summary of junction performance

	AM			
	Queue (PCU)	Delay (s)	RFC	LOS
Existing Layout - 2022 - Future Year				
Arm A	4.32	21.10	0.82	C
Arm B	24.58	67.88	1.00	F
Arm C	1.24	3.00	0.56	A
Arm D	1.22	11.79	0.55	B
Existing Layout - 2022 - Future Year plus Development				
Arm A	5.74	28.41	0.86	D
Arm B	54.24	127.32	1.07	F
Arm C	1.40	3.20	0.58	A
Arm D	1.41	13.65	0.59	B

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

"D3 - 2022 - Future Year, AM" model duration: 06:45 - 08:15

"D5 - 2022 - Future Year plus Development, AM" model duration: 06:45 - 08:15

Run using Junctions 8.0.6.541 at 06/04/2018 15:27:49

File summary

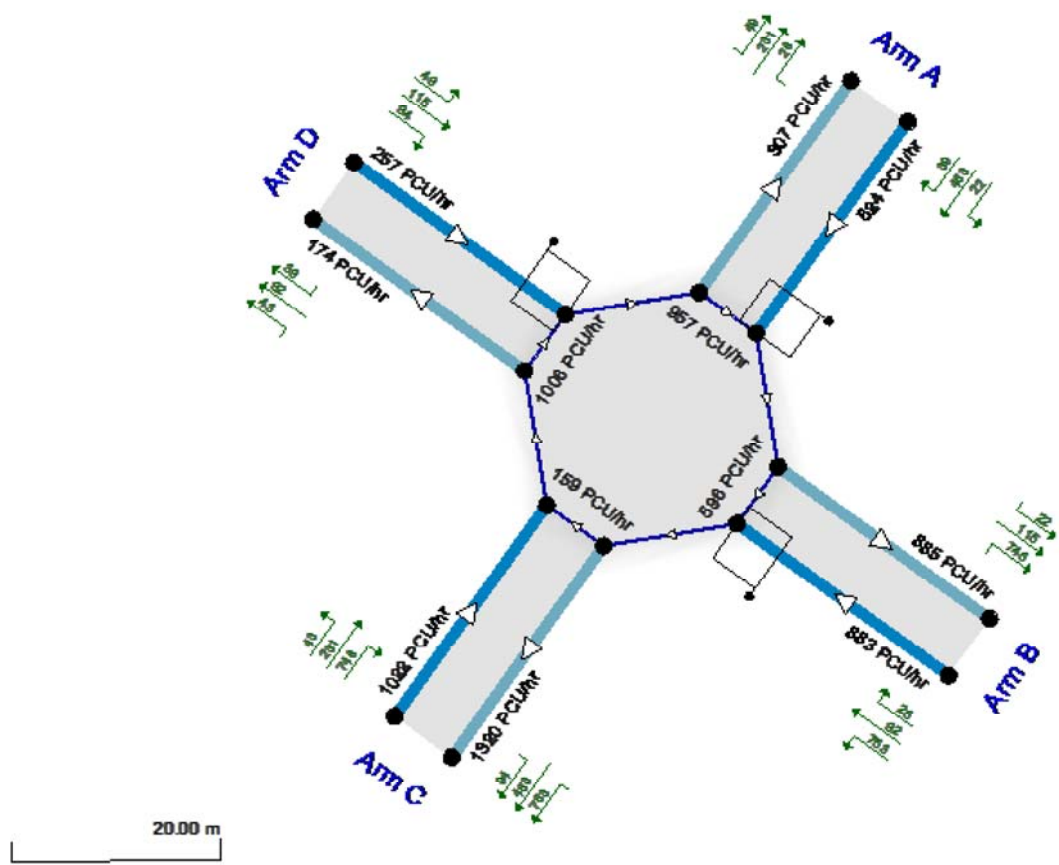
Title	Acle Roundabout
Location	
Site Number	4
Date	19/03/2018
Version	D0.1
Status	Existing
Identifier	
Client	Norfolk Vanguard
Jobnumber	PB4476
Enumerator	304111
Description	

Analysis Options

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

Units

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



Showing modelled flow through junction (PCU/hr)
 Time Segment (06:45-07:00)
 Showing Analysis Set "A1 - Existing Layout"; Demand Set "D3 - 2022 - Future Year, AM"
 The junction diagram reflects the last run of ARCADY.

Existing Layout - 2022 - Future Year, AM

Data Errors and Warnings
 No errors or warnings

Analysis Set Details

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

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
2022 - Future Year, AM	2022 - Future Year	AM		ONE HOUR	06:45	08:15	90	15				✓		

Junction Network

Junctions

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Junction	Name	Junction Type	Arm Order	Grade Separated	Large Roundabout	Do Geometric Delay	Junction Delay (s)	Junction LOS
1	(untitled)	Roundabout	A,B,C,D				28.75	D

Junction Network Options

Driving Side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Arm	Name	Description
A	A	A1064	
B	B	A47 Easr	
C	C	A47 West	
D	D	New Road	

Capacity Options

Arm	Minimum Capacity (PCU/hr)	Maximum Capacity (PCU/hr)	Assume Flat Start Profile	Initial Queue (PCU)
A	0.00	99999.00		0.00
B	0.00	99999.00		0.00
C	0.00	99999.00		0.00
D	0.00	99999.00		0.00

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	3.69	8.30	10.10	30.49	59.78	24.50	
B	3.29	10.63	12.45	25.18	59.78	25.50	
C	8.49	9.55	12.45	25.25	59.78	28.00	
D	3.60	5.92	6.69	27.15	59.78	28.00	

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Arm	Enter slope and intercept directly	Entered slope	Entered intercept (PCU/hr)	Final Slope	Final Intercept (PCU/hr)
A		(calculated)	(calculated)	0.576	1746.283
B		(calculated)	(calculated)	0.585	1812.720
C		(calculated)	(calculated)	0.767	2873.207
D		(calculated)	(calculated)	0.520	1450.871

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

Traffic Flows

Demand Set Data Options

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

Entry Flows

General Flows Data

Arm	Profile Type	Use Turning Counts	Average Demand Flow (PCU/hr)	Flow Scaling Factor (%)
A	ONE HOUR	✓	700.00	100.000
B	ONE HOUR	✓	1181.00	100.000
C	ONE HOUR	✓	1360.00	100.000
D	ONE HOUR	✓	344.00	100.000

Turning Proportions

Turning Counts / Proportions (PCU/hr) - Junction 1 (for whole period)

		To			
		A	B	C	D
From	A	0.000	30.000	618.000	52.000
	B	37.000	0.000	1021.000	123.000
	C	307.000	996.000	0.000	57.000
	D	65.000	153.000	126.000	0.000

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

		To			
		A	B	C	D
From	A	0.00	0.04	0.88	0.07
	B	0.03	0.00	0.86	0.10
	C	0.23	0.73	0.00	0.04
	D	0.19	0.44	0.37	0.00

Vehicle Mix

Average PCU Per Vehicle - Junction 1 (for whole period)

		To			
		A	B	C	D
From	A	1.000	1.000	1.001	1.000
	B	1.001	1.000	1.001	1.001
	C	1.001	1.001	1.000	1.001
	D	1.001	1.000	1.000	1.000

Heavy Vehicle Percentages - Junction 1 (for whole period)

		To			
		A	B	C	D
From	A	0.0	0.0	0.1	0.0
	B	0.1	0.0	0.1	0.1
	C	0.1	0.1	0.0	0.1
	D	0.1	0.0	0.0	0.0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max 95th percentile Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)	Total Queueing Delay (PCU-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCU-min/min)	Inclusive Total Queueing Delay (PCU-min)	Inclusive Average Queueing Delay (s)
A	0.82	21.10	4.32	15.01	C	642.33	963.50	182.58	11.37	2.03	182.60	11.37
B	1.00	67.88	24.58	87.07	F	1083.71	1625.56	684.30	25.26	7.60	684.35	25.26
C	0.56	3.00	1.24	1.00	A	1247.96	1871.94	79.04	2.53	0.88	79.04	2.53
D	0.55	11.79	1.22	2.00	B	315.66	473.49	65.01	8.24	0.72	65.02	8.24

Main Results for each time segment

Main results: (06:45-07:00)

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Exit Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	Saturation Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (s)	LOS
A	527.00	131.75	523.87	306.90	956.91	0.00	1195.33	572.28	0.441	0.00	0.78	5.340	A
B	889.12	222.28	883.04	885.06	595.72	0.00	1464.46	1473.81	0.607	0.00	1.52	6.134	A
C	1023.88	255.97	1021.52	1320.21	158.55	0.00	2751.68	2687.57	0.372	0.00	0.59	2.080	A
D	258.98	64.75	257.44	173.70	1006.37	0.00	927.33	87.29	0.279	0.00	0.38	5.364	A

Main results: (07:00-07:15)

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Exit Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	Saturation Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (s)	LOS
A	629.29	157.32	627.02	367.14	1144.88	0.00	1087.11	572.28	0.579	0.78	1.35	7.789	A
B	1061.69	265.42	1055.63	1058.79	713.11	0.00	1395.83	1473.81	0.761	1.52	3.04	10.405	B
C	1222.61	305.65	1221.74	1579.14	189.59	0.00	2727.88	2687.57	0.448	0.59	0.81	2.391	A
D	309.25	77.31	308.41	207.73	1203.61	0.00	824.72	87.29	0.375	0.38	0.59	6.964	A

Main results: (07:15-07:30)

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Exit Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	Saturation Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (s)	LOS
A	770.71	192.68	759.79	447.71	1400.57	0.00	939.89	572.28	0.820	1.35	4.08	18.958	C
B	1300.31	325.08	1244.21	1295.30	865.06	0.00	1307.00	1473.81	0.995	3.04	17.06	39.911	E
C	1497.39	374.35	1495.68	1884.27	225.00	0.00	2700.74	2687.57	0.554	0.81	1.24	2.986	A
D	378.75	94.69	376.31	248.71	1471.97	0.00	685.11	87.29	0.553	0.59	1.20	11.571	B

Main results: (07:30-07:45)

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Exit Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	Saturation Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (s)	LOS
A	770.71	192.68	769.74	449.35	1403.71	0.00	938.08	572.28	0.822	4.08	4.32	21.099	C
B	1300.31	325.08	1270.25	1298.00	875.45	0.00	1300.92	1473.81	1.000	17.06	24.58	67.882	F
C	1497.39	374.35	1497.36	1916.42	229.27	0.00	2697.47	2687.57	0.555	1.24	1.24	3.001	A
D	378.75	94.69	378.67	252.23	1474.40	0.00	683.84	87.29	0.554	1.20	1.22	11.794	B

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

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Exit Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	Saturation Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (s)	LOS
A	629.29	157.32	640.93	371.17	1149.42	0.00	1084.49	572.28	0.580	4.32	1.41	8.323	A
B	1061.69	265.42	1146.12	1062.72	727.63	0.00	1387.34	1473.81	0.765	24.58	3.47	19.791	C
C	1222.61	305.65	1224.30	1670.86	202.89	0.00	2717.69	2687.57	0.450	1.24	0.82	2.416	A
D	309.25	77.31	311.70	218.29	1208.89	0.00	821.97	87.29	0.376	1.22	0.61	7.093	A

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

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Exit Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	Saturation Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (s)	LOS
A	527.00	131.75	529.44	308.52	961.26	0.00	1192.83	572.28	0.442	1.41	0.80	5.448	A
B	889.12	222.28	896.67	888.77	601.93	0.00	1460.82	1473.81	0.609	3.47	1.58	6.468	A
C	1023.88	255.97	1024.79	1337.79	160.81	0.00	2749.95	2687.57	0.372	0.82	0.60	2.089	A
D	258.98	64.75	259.86	175.67	1009.93	0.00	925.48	87.29	0.280	0.61	0.39	5.419	A

Queueing Delay Results for each time segment**Queueing Delay results: (06:45-07:00)**

Arm	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
A	11.28	0.75	5.340	A	A
B	21.66	1.44	6.134	A	A
C	8.72	0.58	2.080	A	A
D	5.59	0.37	5.364	A	A

Queueing Delay results: (07:00-07:15)

Arm	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
A	19.33	1.29	7.789	A	A
B	42.09	2.81	10.405	B	B
C	11.96	0.80	2.391	A	A
D	8.63	0.58	6.964	A	A

Queueing Delay results: (07:15-07:30)

Arm	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
A	53.06	3.54	18.958	C	B
B	175.76	11.72	39.911	E	D
C	18.14	1.21	2.986	A	A
D	17.00	1.13	11.571	B	B

Queueing Delay results: (07:30-07:45)

Arm	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
A	63.39	4.23	21.099	C	C
B	315.65	21.04	67.882	F	E
C	18.61	1.24	3.001	A	A
D	18.23	1.22	11.794	B	B

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

Arm	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
A	23.11	1.54	8.323	A	A
B	104.08	6.94	19.791	C	B
C	12.55	0.84	2.416	A	A
D	9.53	0.64	7.093	A	A

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

Arm	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
A	12.41	0.83	5.448	A	A
B	25.06	1.67	6.468	A	A
C	9.06	0.60	2.089	A	A
D	6.04	0.40	5.419	A	A

Queue Variation Results for each time segment**Queue Variation results: (06:45-07:00)**

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
A	0.78	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
B	1.52	0.00	0.00	2.00	2.00			N/A	N/A
C	0.59	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
D	0.38	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (07:00-07:15)

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
A	1.35	0.00	0.00	2.00	4.00			N/A	N/A
B	3.04	0.00	0.00	7.01	11.01			N/A	N/A
C	0.81	0.00	0.00	1.00	1.00			N/A	N/A
D	0.59	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (07:15-07:30)

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
A	4.08	0.00	0.00	6.00	15.01			N/A	N/A
B	17.06	0.00	9.01	42.03	56.05			N/A	N/A
C	1.24	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
D	1.20	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (07:30-07:45)

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
A	4.32	0.00	0.00	2.00	13.01			N/A	N/A
B	24.58	0.00	12.01	63.05	87.07			N/A	N/A
C	1.24	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
D	1.22	0.00	0.00	0.00	2.00			N/A	N/A

Queue Variation results: (07:45-08:00)

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
A	1.41	0.00	0.00	2.00	4.00			N/A	N/A
B	3.47	0.00	0.00	7.01	13.01			N/A	N/A
C	0.82	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
D	0.61	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (08:00-08:15)

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
A	0.80	0.00	0.00	1.00	2.00			N/A	N/A
B	1.58	0.00	0.00	0.00	4.00			N/A	N/A
C	0.60	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
D	0.39	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A