

Sharon Holman
Wrexham Council
Environment & Planning
16 Lord Street
Wrexham
LL11 1LG

17 January 2018

david.colley@sandersonassociates.co.uk
By Email only

Our ref : 10104/DJC/001

Dear Sharon

Outline Planning Application P/2017/0527 for Roadside Services Land West of Wrexham Golf Club, Holt Road, Llanpwl, Wrexham

I refer to receipt of a copy of highway comments dated 16 October 2017 regarding the above planning application. We have reviewed the comments and would wish to make the following comments.

With regard to visibility splays for the existing Wrexham Golf Course access, this is not changed as part of the proposals and the visibility splays are shown on the attached drawing 10104/001. As indicated in the highway comments a splay of 2.4m x tangent is shown to the north east where approaching vehicles can be seen in excess of 33m from the access junction and visibility to the south west is shown to the central island since traffic is unlikely to enter the side arm from the roundabout on the wrong side of the island.

A new traffic count has been undertaken of the roundabout on the Thursday 16 November 2017 and the peak hour traffic flows are shown on the attached Figure 6A. The traffic flows on the A5156 northern arm of the roundabout are higher in comparison to the previous traffic count from May 2016 in the morning peak as well as smaller changes on Holt Road and the A534. There are also small differences in the PM peak period. This data has been used to review the traffic capacity modelling of the roundabout.

We have used the new traffic count data from November 2017 and then used the latest growth factors from TEMPRO version 7.2, NTEM Dataset 7.2 Table AF15 to consider a future year scenario in 5 years (2022). The growth factor in the AM peak period is 1.0473 and in the PM peak 1.047 for 2017 to 2022. In this case no allowance for the committed development traffic previously included has been made as it is believed that this is now operational and would already be within the latest count data.

The capacity of the A5156 roundabout junction has been tested using the computer programme ARCADY using the direct method of inputting traffic flows. The results are summarised in tables 1 to 3 below and the ARCADY outputs are attached.

Looking at the assessment for 2017 traffic flows shows that one arm (A5156 north) of the junction is operating at its practical theoretical capacity. The ratio of flow to capacity (RFC) is taken as an indicator of the likely performance of a junction at the design year. A ratio of 0.85 is typically taken as the practical theoretical capacity of a link. Junctions which exceed 85% RFC are generally

considered to be exceeding maximum practical capacity but may still be within absolute theoretical capacity (100%). The RFC for the A5156 north arm is 0.913 with a predicted queue of 8.9 vehicles over two lanes (see Table 1). The other three arms of the roundabout are within capacity. The roundabout junction operates within capacity in the PM peak in all scenarios.

As might be expected when growth to the future year of 2022 is considered the RFC increases in the AM peak for the A5156 north arm to 0.959 with a predicted queue of 15 vehicles (see Table 2). When development traffic is considered at 2022 (see Table 3) the RFC ratio for the A5156 north arm is 0.969 with a predicted queue of 17.1 vehicles.

Arm A = A5156 (north)

Arm B = site access / Wrexham Golf Club

Arm C = A534 (east)

Arm D = Holt Road

	AM Peak 0730–0830		PM Peak 1615–17150	
	Max RFC	Max Queue	Max RFC	Max Queue
Arm A	0.913	8.9	0.375	0.6
Arm B	0.013	0.0	0.072	0.1
Arm C	0.289	0.4	0.632	1.7
Arm D	0.546	1.2	0.526	0.7

Table 1: 2017 Base

	AM Peak 0730–0830		PM Peak 1615–17150	
	Max RFC	Max Queue	Max RFC	Max Queue
Arm A	0.959	15.0	0.393	0.6
Arm B	0.016	0.0	0.077	0.1
Arm C	0.303	0.4	0.665	2.0
Arm D	0.573	1.3	0.565	1.3

Table 2: 2022 Base

	AM Peak 0730–0830		PM Peak 1615–1715	
	Max RFC	Max Queue	Max RFC	Max Queue
Arm A	0.969	17.1	0.401	0.7
Arm B	0.504	1.0	0.270	0.4
Arm C	0.400	0.7	0.668	2.0
Arm D	0.580	1.4	0.587	1.4

Table 3: 2022 Base with Development New & Passby

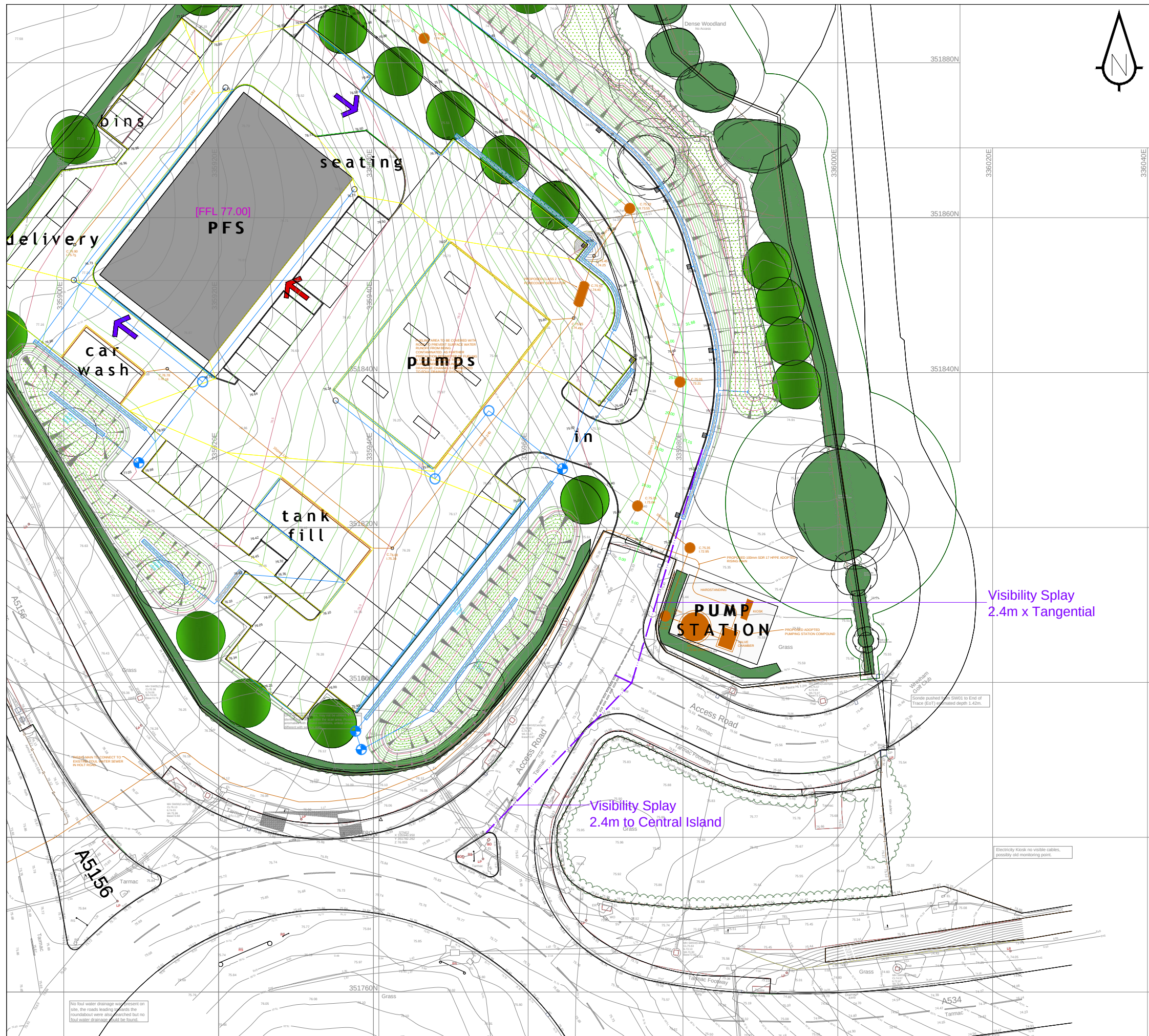
From this assessment a conclusion can be drawn that the most influential factor surrounding the operation of the roundabout junction is not the introduction of development traffic, but the anticipated level of base traffic growth to 2022. With reference to Figure 9 of the Transport

Assessment and considering the composition of the traffic accessing the development proposals, only 7 new trips are added to this arm of the roundabout. The largest proportion of trips accessing the development are considered to be already using the junction given the nature of the proposed use catering for motorists passing on the main A5156 / A534 route. It is considered that the development traffic flows would not result in a material change to the operational characteristics of the roundabout junction.

Yours sincerely



David Colley BEng MCIHT
Associate Director



Rev	Amendment	Drawn	Date	Checked
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Project Name
Proposed Road Side Services
Holt Road, Wrexham

Drawing Title
Visibility Splay from
The Wrexham Golf Course Access

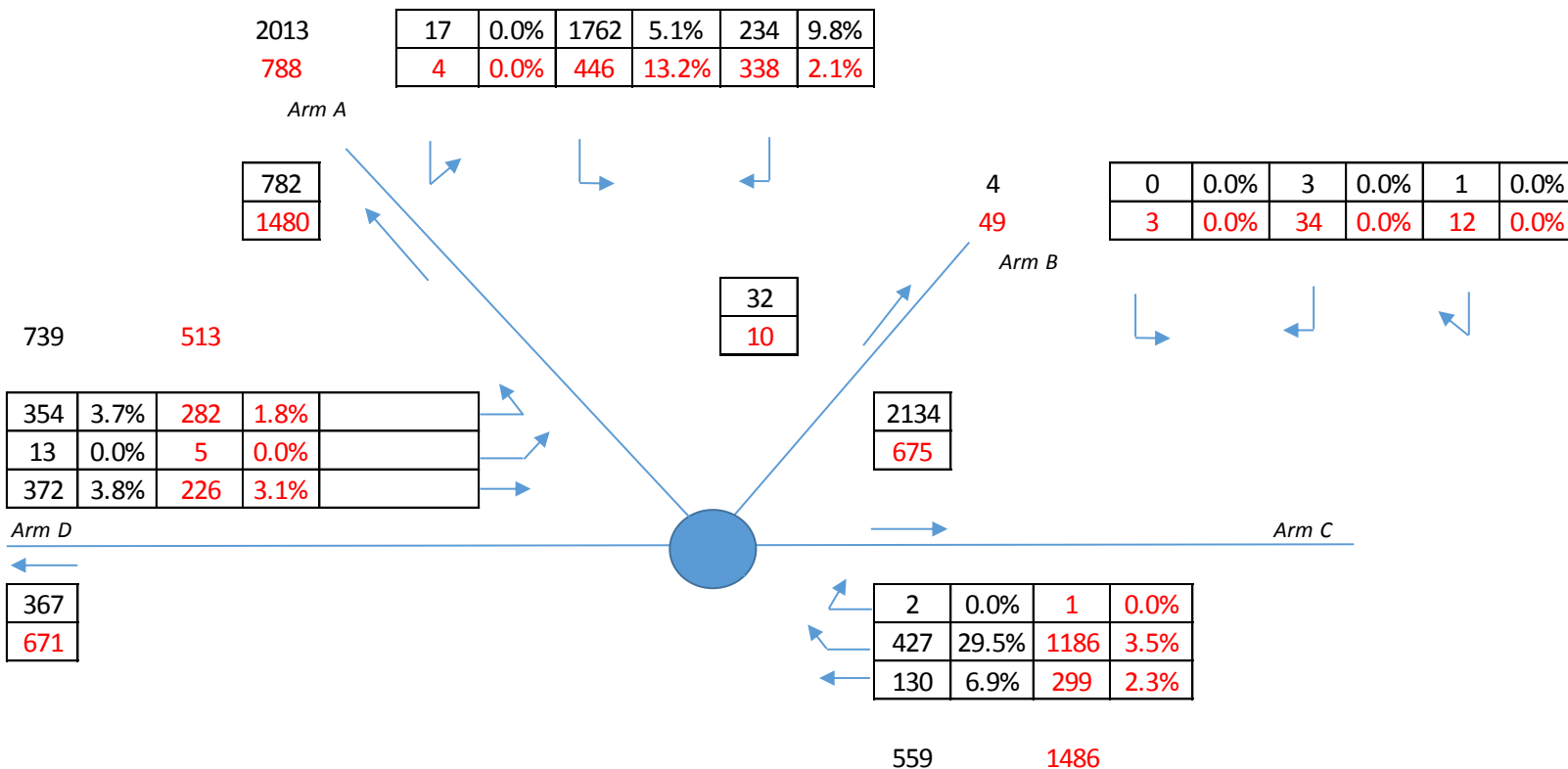
Scale	1:500 @ A3	Drawn By	LOB
Drawing Size	A3	Checked By	DJC
Date	17.01.2017	Approved By	DJC

 ISO 9001 REGISTERED FIRM	Drawing Number 10104/001	Rev
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Key		Veh HGV %	
AM	07:30 - 08:30	0	0%
PM	16:15 - 17:15	0	0%

Arm A	A5156
Arm B	Site / Wrexham Golf Club
Arm C	A534 (East)
Arm D	Holt Road A534

Survey 16 November 2017



A R C A D Y 6

ASSESSMENT OF ROUNDABOUT CAPACITY AND DELAY

Analysis Program: Release 7.0 (FEBRUARY 2010)

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Wokingham, Berks.	Web: www.trlsoftware.co.uk
RG40 3GA, UK	

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Run with file:-
"j:\10000\10100\10104_LandAtHoltRoadWrexha\engineering\Traffic_Programs\Arcady\January 2018\DIRECT\
A5156 - A534 Roundabout AM Direct.vai"
(drive-on-the-left) at 14:28:27 on Friday, 12 January 2018

FILE PROPERTIES

RUN TITLE: A534 Holt Road - A5156
LOCATION: Wrexham
DATE: 24/05/16
CLIENT:
ENUMERATOR: ashley.armitage [PC114]
JOB NUMBER: 9301
STATUS: Preliminary
DESCRIPTION:

INPUT DATA

ARM A - A5156
ARM B - Site Access
ARM C - A534 East
ARM D - A534 Holt Road

GEOMETRIC DATA

T5																			
I	ARM	I	V (M)	I	E (M)	I	L (M)	I	R (M)	I	D (M)	I	PHI (DEG)	I	SLOPE	I	INTERCEPT (PCU/MIN)	I	
I	ARM	A	I	7.50	I	10.40	I	11.00	I	30.00	I	90.00	I	44.0	I	0.586	I	44.340	I
I	ARM	B	I	3.50	I	5.00	I	5.00	I	17.00	I	90.00	I	33.0	I	0.391	I	21.130	I
I	ARM	C	I	7.50	I	9.70	I	22.50	I	40.00	I	90.00	I	28.0	I	0.629	I	47.792	I
I	ARM	D	I	3.80	I	7.70	I	17.00	I	25.00	I	90.00	I	32.0	I	0.476	I	30.634	I

V = approach half-width	L = effective flare length	D = inscribed circle diameter
E = entry width	R = entry radius	PHI = entry angle

TRAFFIC DEMAND DATA

Only sets included in the current run are shown

SCALING FACTORS

T13

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I ARM I FLOW SCALE(%) I
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I A I 100 I
I B I 100 I
I C I 100 I
I D I 100 I
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TIME PERIOD BEGINS(07.30)AND ENDS(08.30)

LENGTH OF TIME PERIOD -(60) MINUTES

LENGTH OF TIME SEGMENT - (15) MINUTES

DEMAND FLOW PROFILES ARE INPUT DIRECTLY.

DEMAND SET TITLE: 2017 AM Base

DEMAND SET TITLE: 2017 AM Base

T33

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I I TURNING PROPORTIONS I
I I TURNING COUNTS I
I I (PERCENTAGE OF H.V.S) I
-----
I TIME I FROM/T I ARM A I ARM B I ARM C I ARM D I
-----
I 07.30 - 08.30 I I I I I I
I I ARM A I 0.000 I 0.010 I 0.870 I 0.120 I
I I I 0.0 I 1.0 I 87.0 I 12.0 I
I I I ( 0.0)I ( 0.0)I ( 5.1)I ( 9.8)I
I I I I I I
I I ARM B I 0.250 I 0.000 I 0.000 I 0.750 I
I I I 25.0 I 0.0 I 0.0 I 75.0 I
I I I ( 0.0)I ( 0.0)I ( 0.0)I ( 0.0)I
I I I I I I
I I ARM C I 0.760 I 0.010 I 0.000 I 0.230 I
I I I 76.0 I 1.0 I 0.0 I 23.0 I
I I I ( 29.5)I ( 0.0)I ( 0.0)I ( 6.9)I
I I I I I I
I I ARM D I 0.480 I 0.020 I 0.500 I 0.000 I
I I I 48.0 I 2.0 I 50.0 I 0.0 I
I I I ( 3.7)I ( 0.0)I ( 3.8)I ( 0.0)I
I I I I I I
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QUEUE AND DELAY INFORMATION FOR EACH 15 MIN TIME SEGMENT

T70

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I TIME DEMAND CAPACITY DEMAND/ PEDESTRIAN START END DELAY GEOMETRIC DELAY AVERAGE DELAY I
I (VEH/MIN) (VEH/MIN) CAPACITY FLOW QUEUE QUEUE (VEH.MIN/ (VEH.MIN/ PER ARRIVING I
I (RFC) (PEDS/MIN) (VEHS) (VEHS) TIME SEGMENT) TIME SEGMENT) VEHICLE (MIN) I
-----
I 07.30-07.45 I
I ARM A 33.20 38.41 0.864 - - - 0.0 5.9 76.7 - 0.168 I
I ARM B 0.00 19.71 0.000 - - - 0.0 0.0 0.0 - 0.000 I
I ARM C 6.93 36.35 0.191 - - - 0.0 0.2 3.5 - 0.034 I
I ARM D 11.87 26.39 0.450 - - - 0.0 0.8 11.8 - 0.068 I
I I
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I TIME DEMAND CAPACITY DEMAND/ PEDESTRIAN START END DELAY GEOMETRIC DELAY AVERAGE DELAY I
I (VEH/MIN) (VEH/MIN) CAPACITY FLOW QUEUE QUEUE (VEH.MIN/ (VEH.MIN/ PER ARRIVING I
I (RFC) (PEDS/MIN) (VEHS) (VEHS) TIME SEGMENT) TIME SEGMENT) VEHICLE (MIN) I
-----
I 07.45-08.00 I
I ARM A 34.53 37.83 0.913 - - - 5.9 8.9 119.6 - 0.268 I
I ARM B 0.20 16.00 0.013 - - - 0.0 0.0 0.2 - 0.063 I
I ARM C 9.60 36.24 0.265 - - - 0.2 0.4 5.3 - 0.038 I
I ARM D 13.73 25.16 0.546 - - - 0.8 1.2 17.3 - 0.087 I
I I
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I	TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)	I
I	08.00-08.15										I
I	ARM A	31.93	38.47	0.830	- -	8.9	5.1	83.9	-	0.165	I
I	ARM B	0.00	20.86	0.000	- -	0.0	0.0	0.0	-	0.000	I
I	ARM C	10.53	36.39	0.289	- -	0.4	0.4	6.0	-	0.039	I
I	ARM D	11.53	24.74	0.466	- -	1.2	0.9	13.5	-	0.076	I
I											I

I	TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)	I
I	08.15-08.30										I
I	ARM A	34.60	38.30	0.903	- -	5.1	8.2	109.3	-	0.242	I
I	ARM B	0.07	17.07	0.004	- -	0.0	0.0	0.1	-	0.059	I
I	ARM C	10.20	36.24	0.281	- -	0.4	0.4	5.9	-	0.038	I
I	ARM D	12.13	24.89	0.487	- -	0.9	0.9	14.0	-	0.078	I
I											I

QUEUE AT ARM A

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
07.45	5.9 *****
08.00	8.9 *****
08.15	5.1 *****
08.30	8.2 *****

QUEUE AT ARM B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
07.45	0.0
08.00	0.0
08.15	0.0
08.30	0.0

QUEUE AT ARM C

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
07.45	0.2
08.00	0.4
08.15	0.4
08.30	0.4

QUEUE AT ARM D

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
07.45	0.8 *
08.00	1.2 *
08.15	0.9 *
08.30	0.9 *

QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

T75										
I	ARM	I	TOTAL	DEMAND	I	* QUEUEING *	I	* INCLUSIVE QUEUEING *	I	I
I	I	I			I	* DELAY *	I	* DELAY *	I	I
I	I	I			I		I		I	I
I	I	I	(VEH)	(VEH/H)	I	(MIN)	(MIN/VEH)	I	(MIN)	(MIN/VEH)
I	A	I	2013.9	I 2013.9	I	389.5	I 0.19	I	390.4	I 0.19
I	B	I	1.1	I 1.1	I	0.2	I 0.23	I	0.2	I 0.23
I	C	I	558.9	I 558.9	I	20.8	I 0.04	I	20.8	I 0.04
I	D	I	738.9	I 738.9	I	56.6	I 0.08	I	56.6	I 0.08
I	ALL	I	3312.8	I 3312.8	I	467.1	I 0.14	I	468.0	I 0.14

* DELAY IS THAT OCCURRING ONLY WITHIN THE TIME PERIOD.
* INCLUSIVE DELAY INCLUDES DELAY SUFFERED BY VEHICLES WHICH ARE STILL QUEUEING AFTER THE END OF THE TIME PERIOD.
* THESE WILL ONLY BE SIGNIFICANTLY DIFFERENT IF THERE IS A LARGE QUEUE REMAINING AT THE END OF THE TIME PERIOD.

END OF JOB

===== end of file =====

Printed at 14:28:52 on 12/01/2018]

A R C A D Y 6

ASSESSMENT OF ROUNDABOUT CAPACITY AND DELAY

Analysis Program: Release 7.0 (FEBRUARY 2010)

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Run with file:-
"j:\10000\10100\10104_LandAtHoltRoadWrexha\engineering\Traffic_Programs\Arcady\January 2018\DIRECT\
A5156 - A534 Roundabout PM Direct.vai"
(drive-on-the-left) at 14:29:22 on Friday, 12 January 2018

FILE PROPERTIES

RUN TITLE: A534 Holt Road - A5156
LOCATION: Wrexham
DATE: 24/05/16
CLIENT:
ENUMERATOR: ashley.armitage [PC114]
JOB NUMBER: 9301
STATUS: Preliminary
DESCRIPTION:

INPUT DATA

ARM A - A5156
ARM B - Site Access
ARM C - A534 East
ARM D - A534 Holt Road

GEOMETRIC DATA

T5																			
I	ARM	I	V (M)	I	E (M)	I	L (M)	I	R (M)	I	D (M)	I	PHI (DEG)	I	SLOPE	I	INTERCEPT (PCU/MIN)	I	
I	ARM	A	I	7.50	I	10.40	I	11.00	I	30.00	I	90.00	I	44.0	I	0.586	I	44.340	I
I	ARM	B	I	3.50	I	5.00	I	5.00	I	17.00	I	90.00	I	33.0	I	0.391	I	21.130	I
I	ARM	C	I	7.50	I	9.70	I	22.50	I	40.00	I	90.00	I	28.0	I	0.629	I	47.792	I
I	ARM	D	I	3.80	I	7.70	I	17.00	I	25.00	I	90.00	I	32.0	I	0.476	I	30.634	I

V = approach half-width	L = effective flare length	D = inscribed circle diameter
E = entry width	R = entry radius	PHI = entry angle

TRAFFIC DEMAND DATA

Only sets included in the current run are shown

SCALING FACTORS

T13

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-----
I ARM I FLOW SCALE(%) I
-----
I A I 100 I
I B I 100 I
I C I 100 I
I D I 100 I
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TIME PERIOD BEGINS(16.15)AND ENDS(17.15)

LENGTH OF TIME PERIOD -(60) MINUTES

LENGTH OF TIME SEGMENT - (15) MINUTES

DEMAND FLOW PROFILES ARE INPUT DIRECTLY.

DEMAND SET TITLE: 2017 PM Base

DEMAND SET TITLE: 2017 PM Base

T33

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-----
I I TURNING PROPORTIONS I
I I TURNING COUNTS I
I I (PERCENTAGE OF H.V.S) I
I I ----- I
I I TIME I FROM/T I ARM A I ARM B I ARM C I ARM D I
I I ----- I
I 16.15 - 17.15 I I I I I I I
I I ARM A I 0.000 I 0.005 I 0.566 I 0.429 I
I I I 0.0 I 0.5 I 56.6 I 42.9 I
I I I ( 0.0)I ( 0.0)I ( 13.2)I ( 2.1)I
I I I I I I I
I I ARM B I 0.244 I 0.000 I 0.061 I 0.695 I
I I I 24.4 I 0.0 I 6.1 I 69.4 I
I I I ( 0.0)I ( 0.0)I ( 0.0)I ( 0.0)I
I I I I I I I
I I ARM C I 0.798 I 0.001 I 0.000 I 0.201 I
I I I 79.8 I 0.1 I 0.0 I 20.1 I
I I I ( 3.5)I ( 0.0)I ( 0.0)I ( 2.3)I
I I I I I I I
I I ARM D I 0.550 I 0.010 I 0.440 I 0.000 I
I I I 55.0 I 1.0 I 44.0 I 0.0 I
I I I ( 1.8)I ( 0.0)I ( 3.1)I ( 0.0)I
I I I I I I I
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QUEUE AND DELAY INFORMATION FOR EACH 15 MIN TIME SEGMENT

T70

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I TIME DEMAND CAPACITY DEMAND/ PEDESTRIAN START END DELAY GEOMETRIC DELAY AVERAGE DELAY I
I (VEH/MIN) (VEH/MIN) CAPACITY FLOW QUEUE QUEUE (VEH.MIN/ (VEH.MIN/ PER ARRIVING I
I (RFC) (PEDS/MIN) (VEHS) (VEHS) TIME SEGMENT) TIME SEGMENT) VEHICLE (MIN) I
I ----- I
I 16.15-16.30 I
I ARM A 14.67 39.12 0.375 - - - 0.0 0.6 8.8 - 0.041 I
I ARM B 0.73 13.70 0.053 - - - 0.0 0.1 0.8 - 0.077 I
I ARM C 23.20 41.97 0.553 - - - 0.0 1.2 17.9 - 0.053 I
I ARM D 7.13 20.95 0.340 - - - 0.0 0.5 7.5 - 0.072 I
I ----- I

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I TIME DEMAND CAPACITY DEMAND/ PEDESTRIAN START END DELAY GEOMETRIC DELAY AVERAGE DELAY I
I (VEH/MIN) (VEH/MIN) CAPACITY FLOW QUEUE QUEUE (VEH.MIN/ (VEH.MIN/ PER ARRIVING I
I (RFC) (PEDS/MIN) (VEHS) (VEHS) TIME SEGMENT) TIME SEGMENT) VEHICLE (MIN) I
I ----- I
I 16.30-16.45 I
I ARM A 11.30 38.32 0.295 - - - 0.6 0.4 6.4 - 0.037 I
I ARM B 0.67 14.54 0.046 - - - 0.1 0.0 0.7 - 0.072 I
I ARM C 26.60 42.89 0.620 - - - 1.2 1.6 23.7 - 0.061 I
I ARM D 10.33 19.63 0.526 - - - 0.5 1.1 15.8 - 0.107 I
I ----- I

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I	TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)	I
I	16.45-17.00										I
I	ARM A	13.40	38.77	0.346	- -	0.4	0.5	7.8	-	0.039	I
I	ARM B	1.00	13.98	0.072	- -	0.0	0.1	1.1	-	0.077	I
I	ARM C	22.53	42.14	0.535	- -	1.6	1.2	17.7	-	0.051	I
I	ARM D	8.47	21.13	0.401	- -	1.1	0.7	10.4	-	0.079	I
I											I

I	TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)	I
I	17.00-17.15										I
I	ARM A	13.13	38.83	0.338	- -	0.5	0.5	7.7	-	0.039	I
I	ARM B	0.87	14.13	0.062	- -	0.1	0.1	1.0	-	0.075	I
I	ARM C	26.73	42.29	0.632	- -	1.2	1.7	24.8	-	0.064	I
I	ARM D	8.27	19.56	0.423	- -	0.7	0.7	10.7	-	0.089	I
I											I

QUEUE AT ARM A

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
16.30	0.6	*
16.45	0.4	
17.00	0.5	*
17.15	0.5	*

QUEUE AT ARM B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
16.30	0.1	
16.45	0.0	
17.00	0.1	
17.15	0.1	

QUEUE AT ARM C

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
16.30	1.2	*
16.45	1.6	**
17.00	1.2	*
17.15	1.7	**

QUEUE AT ARM D

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
16.30	0.5	*
16.45	1.1	*
17.00	0.7	*
17.15	0.7	*

QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

T75										
I	ARM	I	TOTAL	DEMAND	I	* QUEUEING *	I	* INCLUSIVE QUEUEING *	I	I
I	I	I			I	* DELAY *	I	* DELAY *	I	I
I	I	I			I		I		I	I
I	I	I	(VEH)	(VEH/H)	I	(MIN)	(MIN/VEH)	I	(MIN)	(MIN/VEH)
I	A	I	787.5	I 787.5	I	30.7	I 0.04	I	30.7	I 0.04
I	B	I	49.1	I 49.1	I	3.7	I 0.08	I	3.7	I 0.08
I	C	I	1485.9	I 1485.9	I	84.0	I 0.06	I	84.1	I 0.06
I	D	I	513.0	I 513.0	I	44.4	I 0.09	I	44.4	I 0.09
I	ALL	I	2835.4	I 2835.4	I	162.8	I 0.06	I	162.9	I 0.06

* DELAY IS THAT OCCURRING ONLY WITHIN THE TIME PERIOD.
* INCLUSIVE DELAY INCLUDES DELAY SUFFERED BY VEHICLES WHICH ARE STILL QUEUEING AFTER THE END OF THE TIME PERIOD.
* THESE WILL ONLY BE SIGNIFICANTLY DIFFERENT IF THERE IS A LARGE QUEUE REMAINING AT THE END OF THE TIME PERIOD.

END OF JOB

===== end of file =====

A R C A D Y 6

ASSESSMENT OF ROUNDABOUT CAPACITY AND DELAY

Analysis Program: Release 7.0 (FEBRUARY 2010)

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Crowthorne House Fax: +44 (0) 1344 770356
Nine Mile Ride Email: software@trl.co.uk
Wokingham, Berks. Web: www.trlsoftware.co.uk
RG40 3GA, UK

THE USER OF THIS COMPUTER PROGRAM FOR THE SOLUTION OF AN ENGINEERING PROBLEM IS
IN NO WAY RELIEVED OF THEIR RESPONSIBILITY FOR THE CORRECTNESS OF THE SOLUTION

Run with file:-
"j:\10000\10100\10104_LandAtHoltRoadWrexha\engineering\Traffic_Programs\Arcady\January 2018\DIRECT\
A5156 - A534 Roundabout AM Direct.vai"
(drive-on-the-left) at 10:46:24 on Friday, 12 January 2018

FILE PROPERTIES

RUN TITLE: A534 Holt Road - A5156
LOCATION: Wrexham
DATE: 24/05/16
CLIENT:
ENUMERATOR: ashley.armitage [PC114]
JOB NUMBER: 9301
STATUS: Preliminary
DESCRIPTION:

INPUT DATA

ARM A - A5156
ARM B - Site Access
ARM C - A534 East
ARM D - A534 Holt Road

GEOMETRIC DATA

T5																			
I	ARM	I	V (M)	I	E (M)	I	L (M)	I	R (M)	I	D (M)	I	PHI (DEG)	I	SLOPE	I	INTERCEPT (PCU/MIN)	I	
I	ARM	A	I	7.50	I	10.40	I	11.00	I	30.00	I	90.00	I	44.0	I	0.586	I	44.340	I
I	ARM	B	I	3.50	I	5.00	I	5.00	I	17.00	I	90.00	I	33.0	I	0.391	I	21.130	I
I	ARM	C	I	7.50	I	9.70	I	22.50	I	40.00	I	90.00	I	28.0	I	0.629	I	47.792	I
I	ARM	D	I	3.80	I	7.70	I	17.00	I	25.00	I	90.00	I	32.0	I	0.476	I	30.634	I

V = approach half-width L = effective flare length D = inscribed circle diameter
E = entry width R = entry radius PHI = entry angle

TRAFFIC DEMAND DATA

Only sets included in the current run are shown

SCALING FACTORS

T13

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-----
I ARM I FLOW SCALE(%) I
-----
I A I 100 I
I B I 100 I
I C I 100 I
I D I 100 I
-----

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TIME PERIOD BEGINS(07.30)AND ENDS(08.30)

LENGTH OF TIME PERIOD -(60) MINUTES

LENGTH OF TIME SEGMENT - (15) MINUTES

DEMAND FLOW PROFILES ARE INPUT DIRECTLY.

DEMAND SET TITLE: 2022 AM Base inc Dev New and Passby

DEMAND SET TITLE: 2022 AM Base inc Dev New and Passby

T33

```

-----
I I TURNING PROPORTIONS I
I I TURNING COUNTS I
I I (PERCENTAGE OF H.V.S) I
I I ----- I
I I TIME I FROM/T I ARM A I ARM B I ARM C I ARM D I
I I ----- I
I 07.30 - 08.30 I I I I I I I
I I ARM A I 0.000 I 0.043 I 0.845 I 0.112 I
I I I 0.0 I 4.3 I 84.5 I 11.2 I
I I I ( 0.0)I ( 0.0)I ( 5.1)I ( 9.8)I
I I I I I I I
I I ARM B I 0.246 I 0.000 I 0.627 I 0.127 I
I I I 24.6 I 0.0 I 62.7 I 12.7 I
I I I ( 0.0)I ( 0.0)I ( 0.0)I ( 0.0)I
I I I I I I I
I I ARM C I 0.738 I 0.037 I 0.000 I 0.225 I
I I I 73.8 I 3.7 I 0.0 I 22.5 I
I I I ( 29.5)I ( 0.0)I ( 0.0)I ( 6.9)I
I I I I I I I
I I ARM D I 0.461 I 0.053 I 0.486 I 0.000 I
I I I 46.1 I 5.3 I 48.6 I 0.0 I
I I I ( 3.7)I ( 0.0)I ( 3.8)I ( 0.0)I
I I I I I I I
I I I I I I I
-----

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QUEUE AND DELAY INFORMATION FOR EACH 15 MIN TIME SEGMENT

T70

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-----
I TIME DEMAND CAPACITY DEMAND/ PEDESTRIAN START END DELAY GEOMETRIC DELAY AVERAGE DELAY I
I (VEH/MIN) (VEH/MIN) CAPACITY FLOW QUEUE QUEUE (VEH.MIN/ (VEH.MIN/ PER ARRIVING I
I (RFC) (PEDS/MIN) (VEHS) (VEHS) TIME SEGMENT) TIME SEGMENT) VEHICLE (MIN) I
I ----- I
I 07.30-07.45 I
I ARM A 34.89 37.92 0.920 - - - 0.0 9.4 113.8 - 0.242 I
I ARM B 1.90 5.14 0.369 - - - 0.0 0.6 7.8 - 0.302 I
I ARM C 14.49 36.25 0.400 - - - 0.0 0.7 9.7 - 0.046 I
I ARM D 12.51 22.78 0.549 - - - 0.0 1.2 17.2 - 0.096 I
I I
-----

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-----
I TIME DEMAND CAPACITY DEMAND/ PEDESTRIAN START END DELAY GEOMETRIC DELAY AVERAGE DELAY I
I (VEH/MIN) (VEH/MIN) CAPACITY FLOW QUEUE QUEUE (VEH.MIN/ (VEH.MIN/ PER ARRIVING I
I (RFC) (PEDS/MIN) (VEHS) (VEHS) TIME SEGMENT) TIME SEGMENT) VEHICLE (MIN) I
I ----- I
I 07.45-08.00 I
I ARM A 36.25 37.42 0.969 - - - 9.4 17.1 210.3 - 0.471 I
I ARM B 2.11 4.19 0.504 - - - 0.6 1.0 13.3 - 0.470 I
I ARM C 10.08 36.12 0.279 - - - 0.7 0.4 5.9 - 0.038 I
I ARM D 14.35 24.74 0.580 - - - 1.2 1.4 20.0 - 0.096 I
I I
-----

```

I	TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)	I
I	08.00-08.15										I
I	ARM A	33.52	38.09	0.880	- -	17.1	8.1	142.7	-	0.280	I
I	ARM B	1.90	5.26	0.361	- -	1.0	0.6	9.3	-	0.302	I
I	ARM C	11.03	36.25	0.304	- -	0.4	0.4	6.5	-	0.040	I
I	ARM D	12.09	24.33	0.497	- -	1.4	1.0	15.4	-	0.082	I
I											I

I	TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)	I
I	08.15-08.30										I
I	ARM A	36.36	37.91	0.959	- -	8.1	15.0	186.1	-	0.412	I
I	ARM B	1.97	4.44	0.444	- -	0.6	0.8	10.9	-	0.401	I
I	ARM C	10.71	36.13	0.296	- -	0.4	0.4	6.4	-	0.039	I
I	ARM D	12.72	24.47	0.520	- -	1.0	1.1	15.8	-	0.085	I
I											I

QUEUE AT ARM A

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
07.45	9.4	*****
08.00	17.1	*****
08.15	8.1	*****
08.30	15.0	*****

QUEUE AT ARM B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
07.45	0.6	*
08.00	1.0	*
08.15	0.6	*
08.30	0.8	*

QUEUE AT ARM C

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
07.45	0.7	*
08.00	0.4	
08.15	0.4	
08.30	0.4	

QUEUE AT ARM D

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
07.45	1.2	*
08.00	1.4	*
08.15	1.0	*
08.30	1.1	*

QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

											T75
I	ARM	I	TOTAL	DEMAND	I	* QUEUEING *	I	* INCLUSIVE QUEUEING *	I		
I	I	I			I	* DELAY *	I	* DELAY *	I		
I	I	I			I		I		I		
I	I	I	(VEH)	(VEH/H)	I	(MIN)	(MIN/VEH)	I	(MIN)	(MIN/VEH)	I
I	A	I	2115.3	I 2115.3	I	652.8	I 0.31	I	655.8	I 0.31	I
I	B	I	118.2	I 118.2	I	41.3	I 0.35	I	41.3	I 0.35	I
I	C	I	694.7	I 694.7	I	28.5	I 0.04	I	28.5	I 0.04	I
I	D	I	775.1	I 775.1	I	68.5	I 0.09	I	68.5	I 0.09	I
I	ALL	I	3703.2	I 3703.2	I	791.0	I 0.21	I	794.1	I 0.21	I

* DELAY IS THAT OCCURRING ONLY WITHIN THE TIME PERIOD.
 * INCLUSIVE DELAY INCLUDES DELAY SUFFERED BY VEHICLES WHICH ARE STILL QUEUEING AFTER THE END OF THE TIME PERIOD.
 * THESE WILL ONLY BE SIGNIFICANTLY DIFFERENT IF THERE IS A LARGE QUEUE REMAINING AT THE END OF THE TIME PERIOD.

END OF JOB

===== end of file =====

Printed at 10:46:37 on 12/01/2018]

A R C A D Y 6

ASSESSMENT OF ROUNDABOUT CAPACITY AND DELAY

Analysis Program: Release 7.0 (FEBRUARY 2010)

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RG40 3GA, UK	

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IN NO WAY RELIEVED OF THEIR RESPONSIBILITY FOR THE CORRECTNESS OF THE SOLUTION

Run with file:-
"j:\10000\10100\10104_LandAtHoltRoadWrexha\engineering\Traffic_Programs\Arcady\January 2018\DIRECT\
A5156 - A534 Roundabout AM Direct.vai"
(drive-on-the-left) at 10:30:46 on Friday, 12 January 2018

FILE PROPERTIES

RUN TITLE: A534 Holt Road - A5156
LOCATION: Wrexham
DATE: 24/05/16
CLIENT:
ENUMERATOR: ashley.armitage [PC114]
JOB NUMBER: 9301
STATUS: Preliminary
DESCRIPTION:

INPUT DATA

ARM A - A5156
ARM B - Site Access
ARM C - A534 East
ARM D - A534 Holt Road

GEOMETRIC DATA

T5																		
I	ARM	I	V (M)	I	E (M)	I	L (M)	I	R (M)	I	D (M)	I	PHI (DEG)	I	SLOPE	I	INTERCEPT (PCU/MIN)	I
I	ARM A	I	7.50	I	10.40	I	11.00	I	30.00	I	90.00	I	44.0	I	0.586	I	44.340	I
I	ARM B	I	3.50	I	5.00	I	5.00	I	17.00	I	90.00	I	33.0	I	0.391	I	21.130	I
I	ARM C	I	7.50	I	9.70	I	22.50	I	40.00	I	90.00	I	28.0	I	0.629	I	47.792	I
I	ARM D	I	3.80	I	7.70	I	17.00	I	25.00	I	90.00	I	32.0	I	0.476	I	30.634	I

V = approach half-width	L = effective flare length	D = inscribed circle diameter
E = entry width	R = entry radius	PHI = entry angle

TRAFFIC DEMAND DATA

Only sets included in the current run are shown

SCALING FACTORS

T13

```

-----
I ARM I FLOW SCALE(%) I
-----
I A I 100 I
I B I 100 I
I C I 100 I
I D I 100 I
-----

```

TIME PERIOD BEGINS(07.30)AND ENDS(08.30)

LENGTH OF TIME PERIOD -(60) MINUTES

LENGTH OF TIME SEGMENT - (15) MINUTES

DEMAND FLOW PROFILES ARE INPUT DIRECTLY.

DEMAND SET TITLE: 2022 AM Base

DEMAND SET TITLE: 2022 AM Base

T33

```

-----
I I TURNING PROPORTIONS I
I I TURNING COUNTS I
I I (PERCENTAGE OF H.V.S) I
I I ----- I
I I TIME I FROM/T I ARM A I ARM B I ARM C I ARM D I
I I ----- I
I 07.30 - 08.30 I I I I I I I
I I ARM A I 0.000 I 0.010 I 0.870 I 0.120 I
I I I 0.0 I 1.0 I 87.0 I 12.0 I
I I I ( 0.0)I ( 0.0)I ( 5.1)I ( 9.8)I
I I I I I I I
I I ARM B I 0.250 I 0.000 I 0.000 I 0.750 I
I I I 25.0 I 0.0 I 0.0 I 75.0 I
I I I ( 0.0)I ( 0.0)I ( 0.0)I ( 0.0)I
I I I I I I I
I I ARM C I 0.760 I 0.010 I 0.000 I 0.230 I
I I I 76.0 I 1.0 I 0.0 I 23.0 I
I I I ( 29.5)I ( 0.0)I ( 0.0)I ( 6.9)I
I I I I I I I
I I ARM D I 0.480 I 0.020 I 0.500 I 0.000 I
I I I 48.0 I 2.0 I 50.0 I 0.0 I
I I I ( 3.7)I ( 0.0)I ( 3.8)I ( 0.0)I
I I I I I I I
I I I I I I I
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QUEUE AND DELAY INFORMATION FOR EACH 15 MIN TIME SEGMENT

T70

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-----
I TIME DEMAND CAPACITY DEMAND/ PEDESTRIAN START END DELAY GEOMETRIC DELAY AVERAGE DELAY I
I (VEH/MIN) (VEH/MIN) CAPACITY FLOW QUEUE QUEUE (VEH.MIN/ (VEH.MIN/ PER ARRIVING I
I (RFC) (PEDS/MIN) (VEHS) (VEHS) TIME SEGMENT) TIME SEGMENT) VEHICLE (MIN) I
I ----- I
I 07.30-07.45 I
I ARM A 34.77 38.24 0.909 - - - 0.0 8.5 104.9 - 0.223 I
I ARM B 0.00 16.54 0.000 - - - 0.0 0.0 0.0 - 0.000 I
I ARM C 7.23 36.26 0.199 - - - 0.0 0.2 3.7 - 0.034 I
I ARM D 12.46 26.25 0.475 - - - 0.0 0.9 13.0 - 0.072 I
I I
-----

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```

-----
I TIME DEMAND CAPACITY DEMAND/ PEDESTRIAN START END DELAY GEOMETRIC DELAY AVERAGE DELAY I
I (VEH/MIN) (VEH/MIN) CAPACITY FLOW QUEUE QUEUE (VEH.MIN/ (VEH.MIN/ PER ARRIVING I
I (RFC) (PEDS/MIN) (VEHS) (VEHS) TIME SEGMENT) TIME SEGMENT) VEHICLE (MIN) I
I ----- I
I 07.45-08.00 I
I ARM A 36.13 37.66 0.959 - - - 8.5 15.0 188.4 - 0.419 I
I ARM B 0.21 13.02 0.016 - - - 0.0 0.0 0.2 - 0.078 I
I ARM C 10.05 36.15 0.278 - - - 0.2 0.4 5.7 - 0.038 I
I ARM D 14.30 24.96 0.573 - - - 0.9 1.3 19.2 - 0.093 I
I I
-----

```

I	TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)	I
I	08.00-08.15										I
I	ARM A	33.40	38.32	0.872	- -	15.0	7.4	127.3	-	0.248	I
I	ARM B	0.00	17.22	0.000	- -	0.0	0.0	0.0	-	0.000	I
I	ARM C	11.00	36.27	0.303	- -	0.4	0.4	6.4	-	0.040	I
I	ARM D	12.04	24.52	0.491	- -	1.3	1.0	15.0	-	0.080	I
I											I

I	TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)	I
I	08.15-08.30										I
I	ARM A	36.24	38.14	0.950	- -	7.4	13.4	168.8	-	0.373	I
I	ARM B	0.07	13.97	0.005	- -	0.0	0.0	0.1	-	0.072	I
I	ARM C	10.68	36.14	0.295	- -	0.4	0.4	6.3	-	0.039	I
I	ARM D	12.67	24.67	0.514	- -	1.0	1.0	15.5	-	0.083	I
I											I

QUEUE AT ARM A

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
07.45	8.5	*****
08.00	15.0	*****
08.15	7.4	*****
08.30	13.4	*****

QUEUE AT ARM B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
07.45	0.0	
08.00	0.0	
08.15	0.0	
08.30	0.0	

QUEUE AT ARM C

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
07.45	0.2	
08.00	0.4	
08.15	0.4	
08.30	0.4	

QUEUE AT ARM D

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
07.45	0.9	*
08.00	1.3	*
08.15	1.0	*
08.30	1.0	*

QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

T75										
I	ARM	I	TOTAL	DEMAND	I	* QUEUEING *	I	* INCLUSIVE QUEUEING *	I	I
I	I	I			I	* DELAY *	I	* DELAY *	I	I
I	I	I			I		I		I	I
I	I	I	(VEH)	(VEH/H)	I	(MIN)	(MIN/VEH)	I	(MIN)	(MIN/VEH)
I	A	I	2108.1	I 2108.1	I	589.4	I 0.28	I	591.8	I 0.28
I	B	I	1.2	I 1.2	I	0.3	I 0.27	I	0.3	I 0.27
I	C	I	584.4	I 584.4	I	22.1	I 0.04	I	22.1	I 0.04
I	D	I	772.0	I 772.0	I	62.7	I 0.08	I	62.7	I 0.08
I	ALL	I	3465.7	I 3465.7	I	674.5	I 0.19	I	676.9	I 0.20

* DELAY IS THAT OCCURRING ONLY WITHIN THE TIME PERIOD.
* INCLUSIVE DELAY INCLUDES DELAY SUFFERED BY VEHICLES WHICH ARE STILL QUEUEING AFTER THE END OF THE TIME PERIOD.
* THESE WILL ONLY BE SIGNIFICANTLY DIFFERENT IF THERE IS A LARGE QUEUE REMAINING AT THE END OF THE TIME PERIOD.

END OF JOB

===== end of file =====

Printed at 10:31:13 on 12/01/2018]

A R C A D Y 6

ASSESSMENT OF ROUNDABOUT CAPACITY AND DELAY

Analysis Program: Release 7.0 (FEBRUARY 2010)

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Nine Mile Ride Email: software@trl.co.uk
Wokingham, Berks. Web: www.trlsoftware.co.uk
RG40 3GA, UK

THE USER OF THIS COMPUTER PROGRAM FOR THE SOLUTION OF AN ENGINEERING PROBLEM IS
IN NO WAY RELIEVED OF THEIR RESPONSIBILITY FOR THE CORRECTNESS OF THE SOLUTION

Run with file:-
"j:\10000\10100\10104_LandAtHoltRoadWrexha\engineering\Traffic_Programs\Arcady\January 2018\DIRECT\
A5156 - A534 Roundabout PM Direct.vai"
(drive-on-the-left) at 11:22:12 on Friday, 12 January 2018

FILE PROPERTIES

RUN TITLE: A534 Holt Road - A5156
LOCATION: Wrexham
DATE: 24/05/16
CLIENT:
ENUMERATOR: ashley.armitage [PC114]
JOB NUMBER: 9301
STATUS: Preliminary
DESCRIPTION:

INPUT DATA

ARM A - A5156
ARM B - Site Access
ARM C - A534 East
ARM D - A534 Holt Road

GEOMETRIC DATA

T5																			
I	ARM	I	V (M)	I	E (M)	I	L (M)	I	R (M)	I	D (M)	I	PHI (DEG)	I	SLOPE	I	INTERCEPT (PCU/MIN)	I	
I	ARM	A	I	7.50	I	10.40	I	11.00	I	30.00	I	90.00	I	44.0	I	0.586	I	44.340	I
I	ARM	B	I	3.50	I	5.00	I	5.00	I	17.00	I	90.00	I	33.0	I	0.391	I	21.130	I
I	ARM	C	I	7.50	I	9.70	I	22.50	I	40.00	I	90.00	I	28.0	I	0.629	I	47.792	I
I	ARM	D	I	3.80	I	7.70	I	17.00	I	25.00	I	90.00	I	32.0	I	0.476	I	30.634	I

V = approach half-width L = effective flare length D = inscribed circle diameter
E = entry width R = entry radius PHI = entry angle

TRAFFIC DEMAND DATA

Only sets included in the current run are shown

SCALING FACTORS

T13

I	ARM	I	FLOW	SCALE(%)	I
I	A	I	100		I
I	B	I	100		I
I	C	I	100		I
I	D	I	100		I

TIME PERIOD BEGINS(16.15)AND ENDS(17.15)

LENGTH OF TIME PERIOD -(60) MINUTES

LENGTH OF TIME SEGMENT - (15) MINUTES

DEMAND FLOW PROFILES ARE INPUT DIRECTLY.

DEMAND SET TITLE: 2022 PM Base inc Dev New and Passby

DEMAND SET TITLE: 2022 PM Base inc Dev New and Passby

T33

		TURNING PROPORTIONS									
		TURNING COUNTS									
		(PERCENTAGE OF H.V.S)									
		FROM/T		ARM A		ARM B		ARM C		ARM D	
TIME											
16.15 - 17.15											
I	ARM A	I	0.000	I	0.051	I	0.540	I	0.409	I	I
I	ARM B	I	0.448	I	0.000	I	0.191	I	0.361	I	I
I	ARM C	I	0.762	I	0.046	I	0.000	I	0.192	I	I
I	ARM D	I	0.525	I	0.054	I	0.421	I	0.000	I	I

QUEUE AND DELAY INFORMATION FOR EACH 15 MIN TIME SEGMENT

T70

I	TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)	I
I	16.15-16.30										I
I	ARM A	15.43	38.47	0.401	- -	0.0	0.7	9.8	-	0.043	I
I	ARM B	3.70	13.68	0.270	- -	0.0	0.4	5.3	-	0.100	I
I	ARM C	24.82	40.62	0.611	- -	0.0	1.6	22.5	-	0.062	I
I	ARM D	7.50	19.58	0.383	- -	0.0	0.6	8.9	-	0.082	I

I	TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)	I
I	16.30-16.45										I
I	ARM A	11.90	37.51	0.317	- -	0.7	0.5	7.1	-	0.039	I
I	ARM B	2.88	14.51	0.199	- -	0.4	0.2	3.8	-	0.086	I
I	ARM C	27.97	41.89	0.668	- -	1.6	2.0	28.9	-	0.072	I
I	ARM D	10.85	18.49	0.587	- -	0.6	1.4	19.8	-	0.129	I

I	TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)	I
I	16.45-17.00										I
I	ARM A	14.10	38.10	0.370	- -	0.5	0.6	8.7	-	0.042	I
I	ARM B	3.23	13.95	0.232	- -	0.2	0.3	4.4	-	0.093	I
I	ARM C	23.71	41.17	0.576	- -	2.0	1.4	21.1	-	0.058	I
I	ARM D	8.90	20.05	0.444	- -	1.4	0.8	12.5	-	0.090	I
I											I

I	TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)	I
I	17.00-17.15										I
I	ARM A	13.82	38.06	0.363	- -	0.6	0.6	8.6	-	0.041	I
I	ARM B	3.09	14.10	0.219	- -	0.3	0.3	4.3	-	0.091	I
I	ARM C	28.11	41.31	0.681	- -	1.4	2.1	30.4	-	0.075	I
I	ARM D	8.69	18.40	0.472	- -	0.8	0.9	13.0	-	0.103	I
I											I

QUEUE AT ARM A

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
16.30	0.7	*
16.45	0.5	
17.00	0.6	*
17.15	0.6	*

QUEUE AT ARM B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
16.30	0.4	
16.45	0.2	
17.00	0.3	
17.15	0.3	

QUEUE AT ARM C

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
16.30	1.6	**
16.45	2.0	**
17.00	1.4	*
17.15	2.1	**

QUEUE AT ARM D

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
16.30	0.6	*
16.45	1.4	*
17.00	0.8	*
17.15	0.9	*

QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

T75										
I	ARM	I	TOTAL	DEMAND	I	* QUEUEING *	I	* INCLUSIVE QUEUEING *	I	I
I	I	I			I	* DELAY *	I	* DELAY *	I	I
I	I	I	(VEH)	(VEH/H)	I	(MIN)	(MIN/VEH)	I	(MIN)	(MIN/VEH)
I	A	I	828.8	I 828.8	I	34.2	I 0.04	I	34.2	I 0.04
I	B	I	193.5	I 193.5	I	17.8	I 0.09	I	17.8	I 0.09
I	C	I	1569.1	I 1569.1	I	102.8	I 0.07	I	102.9	I 0.07
I	D	I	539.1	I 539.1	I	54.3	I 0.10	I	54.4	I 0.10
I	ALL	I	3130.5	I 3130.5	I	209.2	I 0.07	I	209.3	I 0.07

* DELAY IS THAT OCCURRING ONLY WITHIN THE TIME PERIOD.
* INCLUSIVE DELAY INCLUDES DELAY SUFFERED BY VEHICLES WHICH ARE STILL QUEUEING AFTER THE END OF THE TIME PERIOD.
* THESE WILL ONLY BE SIGNIFICANTLY DIFFERENT IF THERE IS A LARGE QUEUE REMAINING AT THE END OF THE TIME PERIOD.

END OF JOB

===== end of file =====

Printed at 11:22:22 on 12/01/2018]

A R C A D Y 6

ASSESSMENT OF ROUNDABOUT CAPACITY AND DELAY

Analysis Program: Release 7.0 (FEBRUARY 2010)

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THE USER OF THIS COMPUTER PROGRAM FOR THE SOLUTION OF AN ENGINEERING PROBLEM IS
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Run with file:-
"j:\10000\10100\10104_LandAtHoltRoadWrexha\engineering\Traffic_Programs\Arcady\January 2018\DIRECT\
A5156 - A534 Roundabout PM Direct.vai"
(drive-on-the-left) at 11:21:42 on Friday, 12 January 2018

FILE PROPERTIES

RUN TITLE: A534 Holt Road - A5156
LOCATION: Wrexham
DATE: 24/05/16
CLIENT:
ENUMERATOR: ashley.armitage [PC114]
JOB NUMBER: 9301
STATUS: Preliminary
DESCRIPTION:

INPUT DATA

ARM A - A5156
ARM B - Site Access
ARM C - A534 East
ARM D - A534 Holt Road

GEOMETRIC DATA

T5																			
I	ARM	I	V (M)	I	E (M)	I	L (M)	I	R (M)	I	D (M)	I	PHI (DEG)	I	SLOPE	I	INTERCEPT (PCU/MIN)	I	
I	ARM	A	I	7.50	I	10.40	I	11.00	I	30.00	I	90.00	I	44.0	I	0.586	I	44.340	I
I	ARM	B	I	3.50	I	5.00	I	5.00	I	17.00	I	90.00	I	33.0	I	0.391	I	21.130	I
I	ARM	C	I	7.50	I	9.70	I	22.50	I	40.00	I	90.00	I	28.0	I	0.629	I	47.792	I
I	ARM	D	I	3.80	I	7.70	I	17.00	I	25.00	I	90.00	I	32.0	I	0.476	I	30.634	I

V = approach half-width L = effective flare length D = inscribed circle diameter
E = entry width R = entry radius PHI = entry angle

TRAFFIC DEMAND DATA

Only sets included in the current run are shown

SCALING FACTORS

T13

I	ARM	I	FLOW	SCALE(%)	I
I	A	I	100		I
I	B	I	100		I
I	C	I	100		I
I	D	I	100		I

TIME PERIOD BEGINS(16.15)AND ENDS(17.15)

LENGTH OF TIME PERIOD -(60) MINUTES

LENGTH OF TIME SEGMENT - (15) MINUTES

DEMAND FLOW PROFILES ARE INPUT DIRECTLY.

DEMAND SET TITLE: 2022 PM Base

DEMAND SET TITLE: 2022 PM Base

T33

		TURNING PROPORTIONS										
		TURNING COUNTS										
		(PERCENTAGE OF H.V.S)										
TIME		FROM/T	ARM A	ARM B	ARM C	ARM D						
16.15 - 17.15		ARM A	0.000	0.005	0.566	0.429						
			0.0	0.5	56.6	42.9						
			(0.0)	(0.0)	(13.2)	(2.1)						
		ARM B	0.244	0.000	0.061	0.695						
			24.4	0.0	6.1	69.4						
			(0.0)	(0.0)	(0.0)	(0.0)						
		ARM C	0.798	0.001	0.000	0.201						
			79.8	0.1	0.0	20.1						
			(3.5)	(0.0)	(0.0)	(2.3)						
		ARM D	0.550	0.010	0.440	0.000						
			55.0	1.0	44.0	0.0						
			(1.8)	(0.0)	(3.1)	(0.0)						

QUEUE AND DELAY INFORMATION FOR EACH 15 MIN TIME SEGMENT

T70

I	TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)	I
I	16.15-16.30										I
I	ARM A	15.36	39.04	0.393	- -	0.0	0.6	9.5	-	0.042	I
I	ARM B	0.76	13.36	0.057	- -	0.0	0.1	0.9	-	0.079	I
I	ARM C	24.29	41.77	0.582	- -	0.0	1.4	20.0	-	0.057	I
I	ARM D	7.47	20.53	0.364	- -	0.0	0.6	8.3	-	0.076	I

I	TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)	I
I	16.30-16.45										I
I	ARM A	11.83	38.20	0.310	- -	0.6	0.5	6.8	-	0.038	I
I	ARM B	0.70	14.23	0.049	- -	0.1	0.1	0.8	-	0.074	I
I	ARM C	27.85	42.73	0.652	- -	1.4	1.8	27.0	-	0.067	I
I	ARM D	10.82	19.14	0.565	- -	0.6	1.3	18.3	-	0.119	I

I	TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)	I
I	16.45-17.00										I
I	ARM A	14.03	38.67	0.363	- -	0.5	0.6	8.4	-	0.041	I
I	ARM B	1.05	13.64	0.077	- -	0.1	0.1	1.2	-	0.079	I
I	ARM C	23.59	41.95	0.562	- -	1.8	1.3	19.9	-	0.055	I
I	ARM D	8.87	20.72	0.428	- -	1.3	0.8	11.7	-	0.085	I
I											I

I	TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)	I
I	17.00-17.15										I
I	ARM A	13.75	38.73	0.355	- -	0.6	0.6	8.3	-	0.040	I
I	ARM B	0.91	13.80	0.066	- -	0.1	0.1	1.1	-	0.078	I
I	ARM C	27.99	42.10	0.665	- -	1.3	2.0	28.4	-	0.070	I
I	ARM D	8.66	19.07	0.454	- -	0.8	0.8	12.2	-	0.096	I
I											I

QUEUE AT ARM A

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
16.30	0.6	*
16.45	0.5	
17.00	0.6	*
17.15	0.6	*

QUEUE AT ARM B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
16.30	0.1	
16.45	0.1	
17.00	0.1	
17.15	0.1	

QUEUE AT ARM C

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
16.30	1.4	*
16.45	1.8	**
17.00	1.3	*
17.15	2.0	**

QUEUE AT ARM D

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
16.30	0.6	*
16.45	1.3	*
17.00	0.8	*
17.15	0.8	*

QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

T75										
I	ARM	I	TOTAL	DEMAND	I	* QUEUEING *	I	* INCLUSIVE QUEUEING *	I	I
I	I	I			I	* DELAY *	I	* DELAY *	I	I
I	I	I			I		I		I	I
I	I	I	(VEH)	(VEH/H)	I	(MIN)	(MIN/VEH)	I	(MIN)	(MIN/VEH)
I	A	I	824.5	I 824.5	I	33.1	I 0.04	I	33.1	I 0.04
I	B	I	51.3	I 51.3	I	4.0	I 0.08	I	4.0	I 0.08
I	C	I	1555.8	I 1555.8	I	95.3	I 0.06	I	95.4	I 0.06
I	D	I	537.3	I 537.3	I	50.4	I 0.09	I	50.4	I 0.09
I	ALL	I	2969.0	I 2969.0	I	182.7	I 0.06	I	182.8	I 0.06

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END OF JOB

===== end of file =====