

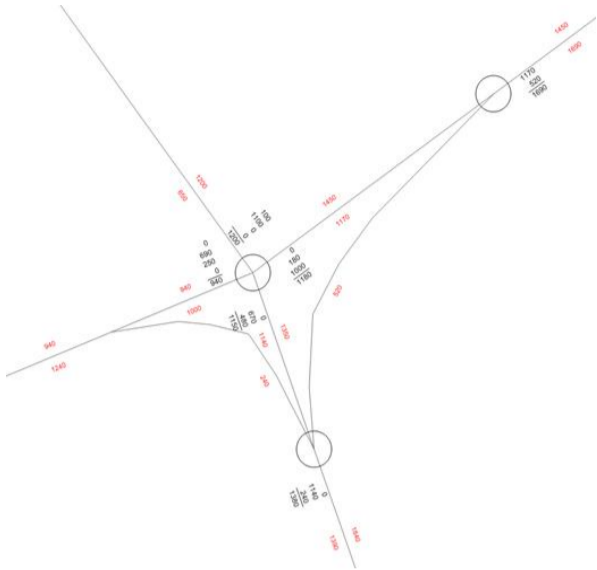
Capabilities on project:
Transportation

Appendix D – 2031 Future Year Flows

Project Name: BCC - Tyburn Roundabout
 Project Number: 60316861
 Subject: 2031 OD matrices
 Date: Mar-14

AIM:
 To understand 2031 flows from the PRISM model for Tyburn roundabout and preparing an adjustment matrix with all turning movements at the junction.

Source:
 Mott MacDonald have provided 2031 future year flows based on PRISM BDP Modelling for Tyburn Road Roundabout. We understand that these flows are based on earlier version of PRISM. The OD matrices for both AM and PM peak are calculated based on the diagrams below which are provided by Mott MacDonald.



1-A Chester Road North
 2-B A38 Kingsbury Road East
 3-C Chester Road South
 4-D A38 Kingsbury Road West

Initial AM matrix

From / to	1-A	2-B	3-C	4-D	Total
1-A	0	100	1100	0	1200
2-B	180	0	520	1000	1700
3-C	480	670	0	240	1390
4-D	0	690	250	0	940

Assumptions:
 Due to strategic modelling, the turning from zone 1 to zone 4 and from zone 4 to zone 1 is not used by the vehicles as they are travelling through a shorter route that connects these zones. In order to estimate these movements for 2031 scenario, 2009 flows turning proportions for these movements are reviewed and applied to the 2031 flows.

Adjusted AM matrix

From / to	1-A	2-B	3-C	4-D	Total
1-A	1	177	924	23	1125
2-B	180	0	520	1000	1700
3-C	480	670	0	240	1390
4-D	71	643	226	0	940

Finally, the 2009 HGV percentages are applied to the matrix to convert vehicles into PCUs

From / to	1-A	2-B	3-C	4-D	Total
1-A	1	165	1032	23	1221
2-B	187	0	583	1091	1761
3-C	515	748	0	253	1516
4-D	76	706	250	0	1032

Turning proportions for non dedicated left movements

Turning left	Total traffic in lane from TRANSYT	Percentage
1 to 2	599	0.295492
4 to 1	297	0.239057

0	239	999	24
48	611	81	2

Initial PM matrix

From / to	1-A	2-B	3-C	4-D	Total
1-A	0	310	740	0	1050
2-B	500	0	860	670	1930
3-C	900	490	0	470	1860
4-D	0	1450	60	0	1510

Assumptions:
 Due to strategic modelling, the turning from zone 1 to zone 4 and from zone 4 to zone 1 is not used by the vehicles as they are travelling through a shorter route that connects these zones. In order to estimate these movements for 2031 scenario, 2009 flows turning proportions for these movements are reviewed and applied to the 2031 flows.

Adjusted PM matrix

From / to	1-A	2-B	3-C	4-D	Total
1-A	0	199	831	20	1050
2-B	500	0	860	670	1930
3-C	800	490	0	470	1860
4-D	97	1245	164	0	1510

Finally, the 2009 HGV percentages are applied to the matrix to convert vehicles into PCUs

From / to	1-A	2-B	3-C	4-D	Total
1-A	0	203	873	20	1096
2-B	508	0	893	718	1919
3-C	627	491	0	485	1603
4-D	102	1274	173	0	1549

Turning proportions for non dedicated left movements

Turning left	Total traffic in lane from TRANSYT	Percentage
1 to 2	199	0.379048
4 to 1	97	0.202929

The 2009 OD matrices are used to calculate the turning proportions based on [U:\Bays\2001\442m2001-v10\TRM\Prac\BCC - Tyburn Roundabout\3 - Execution\Modelling\Bases model\ARCADY routes and outputs.xls](#)

Total PCUs

From / to	1-A	2-B	3-C	4-D	Total
1-A	2	201	1129	31	1363
2-B	107	0	362	501	1270
3-C	763	273	2	342	1380
4-D	64	586	206	0	857
Total	936	1060	1699	1074	4769

Turning proportions

From / to	1-A	2-B	3-C	4-D	Total
1-A	0.12%	14.74%	82.86%	2.28%	100.00%
2-B	8.44%	0.00%	28.47%	63.09%	100.00%
3-C	59.62%	21.31%	0.19%	18.89%	100.00%
4-D	7.50%	68.40%	24.08%	0.02%	100.00%
Total	78.65%	104.48%	135.60%	84.24%	400.00%

2009 HGV percentage

From / to	1-A	2-B	3-C	4-D	Total
1-A	0.00%	4.64%	3.83%	6.87%	15.34%
2-B	3.81%	-	12.05%	9.93%	25.79%
3-C	7.19%	11.60%	-	5.22%	24.01%
4-D	8.20%	9.74%	10.36%	-	28.30%

AM Peak - The trips originated from zone 1 are 1200 and from zone 4 are 940.
 PM Peak - The trips originated from zone 1 are 1050 and from zone 4 are 1510.
 Based on these values and the 2009 turning proportions, the following matrices are produced for zone 1 and 4.

2031 flows - based on 2009 turning proportions

From / to	1-A	2-B	3-C	4-D	Total
1-A	1	177	984	27	1200
4-D	71	643	226	0	940

2031 flows - PRISM model outputs

From / to	1-A	2-B	3-C	4-D	Total
1-A	0	100	1100	0	1200
4-D	0	690	250	0	940

The differences between the two matrices are illustrated below ("values of strategic modelling" - "values based on 2009 turning proportions")

AM Peak - Roundabout

From / to	1-A	2-B	3-C	4-D	Total
1-A	-1	-77	106	-27	0
4-D	-71	47	24	0	0

PM Peak - Roundabout

From / to	1-A	2-B	3-C	4-D	Total
1-A	0	111	-91	-20	0
4-D	-97	205	-104	-4	0

Prepared by: Tryfon Ampartzis 13.03.14
 Checked by: Sravani Vuppata 17.03.14

Project Name: BCC - Tyburn Roundabout
 Project Number: 60316861
 Subject: 2031 OD matrices - Sensitivity Test
 Date: Apr-14

AIM:
 To create the 2031 flows in order to be tested as a sensitivity test

2009 Flows

Total vehicles					
AM Peak - Roundabout					
From / to	1 - A	2 - B	3 - C	4 - D	Total
1 - A	0	194	1096	30	1320
2 - B	105	0	332	749	1186
3 - C	723	250	0	230	1203
4 - D	61	544	193	0	798
Total	889	988	1621	1009	4507

Total vehicles					
PM Peak - Roundabout					
From / to	1 - A	2 - B	3 - C	4 - D	Total
1 - A	0	236	961	23	1220
2 - B	185	0	476	378	1039
3 - C	786	672	0	184	1642
4 - D	46	597	78	0	721
Total	1017	1505	1515	585	4622

2031 flows

Total vehicles					
AM Peak - Roundabout					
From / to	1 - A	2 - B	3 - C	4 - D	Total
1 - A	0	100	1100	0	1200
2 - B	180	0	520	1000	1700
3 - C	480	670	0	240	1390
4 - D	0	690	250	0	940

Total vehicles					
PM Peak - Roundabout					
From / to	1 - A	2 - B	3 - C	4 - D	Total
1 - A	0	310	740	0	1050
2 - B	500	0	860	670	1930
3 - C	800	480	0	470	1750
4 - D	0	1450	60	0	1510

Difference from 2031 - 2009

Total vehicles					
AM Peak - Roundabout					
From / to	1 - A	2 - B	3 - C	4 - D	Total
1 - A	0	-94	4	-30	-120
2 - B	75	0	188	251	514
3 - C	-243	420	0	10	187
4 - D	-61	146	57	0	142

Total vehicles					
PM Peak - Roundabout					
From / to	1 - A	2 - B	3 - C	4 - D	Total
1 - A	0	74	-221	-23	-170
2 - B	315	0	364	292	971
3 - C	14	-192	0	286	108
4 - D	-46	853	-18	0	789

Uplift 2031 flows to 2009 which are highlighted in RED

Total vehicles					
AM Peak - Roundabout					
From / to	1 - A	2 - B	3 - C	4 - D	Total
1 - A	0	194	1100	30	1320
2 - B	180	0	520	1000	1700
3 - C	723	670	0	240	1633
4 - D	61	690	250	0	1001

Total vehicles					
PM Peak - Roundabout					
From / to	1 - A	2 - B	3 - C	4 - D	Total
1 - A	0	310	961	23	1294
2 - B	500	0	860	670	1930
3 - C	800	672	0	470	1942
4 - D	46	1450	78	0	1574

2009 HGV percentage

2009 HGV percentage					
AM Peak - Roundabout					
From / to	1 - A	2 - B	3 - C	4 - D	Total
1 - A	0.00%	4.64%	3.83%	6.67%	
2 - B	3.81%	0.00%	12.06%	9.08%	
3 - C	7.19%	11.60%	0.00%	5.22%	
4 - D	8.20%	9.74%	10.36%	0.00%	

2009 HGV percentage					
PM Peak - Roundabout					
From / to	1 - A	2 - B	3 - C	4 - D	Total
1 - A	0.00%	2.12%	4.99%	4.35%	
2 - B	1.82%	0.00%	3.78%	7.14%	
3 - C	3.44%	2.38%	0.00%	3.80%	
4 - D	4.35%	2.35%	5.13%	0.00%	

2031 HGV

2031 HGV					
AM Peak - Roundabout					
From / to	1 - A	2 - B	3 - C	4 - D	Total
1 - A	0	9	42	2	53
2 - B	7	0	63	91	161
3 - C	52	78	0	13	143
4 - D	5	67	28	0	100

2031 flows in PCUS - To be tested as Sensitivity Test					
AM Peak - Roundabout					
From / to	1 - A	2 - B	3 - C	4 - D	Total
1 - A	0	212	1184	34	1430
2 - B	194	0	645	1182	2021
3 - C	827	825	0	265	1917
4 - D	71	824	302	0	1397

2031 flows in PCUS - To be tested as Sensitivity Test					
PM Peak - Roundabout					
From / to	1 - A	2 - B	3 - C	4 - D	Total
1 - A	0	323	1057	25	1405
2 - B	516	0	925	766	2207
3 - C	855	704	0	506	2065
4 - D	50	1518	86	0	1654

Prepared by: Sravani Vuppala 17.04.14
 Checked by: Tryfon Ampartzis 17.04.14

Capabilities on project:
Transportation

Appendix E – 2031 Future Year Modelling Results on Chester Road Committed Scheme

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:-

"f:\TEM\Project\BCC - Tyburn Roundabout\3 - Execution\Modelling\2. 2031 ARCADY model\
2031 AM peak validated with Chester.vai"
(drive-on-the-left) at 19:20:04 on Tuesday, 15 April 2014

FILE PROPERTIES

RUN TITLE: Tyburn Roundabout - With Chester Rd Improvement

LOCATION: Birmingham

DATE: 03/03/14

CLIENT: Birmingham City Council

ENUMERATOR: ampartzist [UKBHMLPC24473]

JOB NUMBER: 60316861

STATUS: Preliminary

DESCRIPTION: 2031 AM peak. Flows are in F:\TEM\Project\BCC - Tyburn Roundabout\3
- Execution\Modelling\2031 OD matrices

INPUT DATA

ARM A - A452 Chester Rd North

ARM B - A38 Kingsbury East

ARM C - A452 Chester Rd South

ARM D - A38 Kingsbury West

 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	7.10	I	10.60	I	12.20	I	23.80	I	71.20	I	37.0	I	0.646	I	38.327	*	I
I	ARM	B	7.60	I	9.30	I	0.10	I	16.30	I	74.10	I	33.0	I	0.570	I	29.706	*	I
I	ARM	C	7.10	I	9.70	I	0.10	I	53.30	I	70.30	I	24.0	I	0.606	I	37.861		I
I	ARM	D	7.40	I	10.40	I	129.40	I	29.30	I	74.10	I	21.0	I	0.733	I	53.880		I

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

WARNING ARM D Effective flare length is outside normal range.
 Treat capacities with increasing caution.

WARNING One or more intercept values (flagged * in the table)
 have been adjusted according to local input values
 from a previous run and listed below -

				T6
I	ARM	I	ADJUSTMENT TO	I
I		I	INTERCEPT (PCU/MIN)	I
I	ARM	A	-6.000	I
I	ARM	B	-8.000	I

 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(07.15)AND ENDS(08.45)

LENGTH OF TIME PERIOD -(90) MINUTES

LENGTH OF TIME SEGMENT - (15) MINUTES

DEMAND FLOW PROFILES ARE SYNTHESISED FROM THE TURNING COUNT DATA

DEMAND SET TITLE: AM peak

										T15				
I	ARM	I	NUMBER OF MINUTES FROM START WHEN	I	RATE OF FLOW (VEH/MIN)	I				I				
I		I	FLOW STARTS	I	BEFORE	I	AT TOP	I	AFTER	I				
I		I	TO RISE	I	PEAK	I	OF PEAK	I	PEAK	I				
I		I	IS REACHED	I	FALLING	I	PEAK	I	OF PEAK	I				
I	ARM	A	15.00	I	45.00	I	75.00	I	15.57	I	23.36	I	15.57	I
I	ARM	B	15.00	I	45.00	I	75.00	I	15.98	I	23.96	I	15.98	I
I	ARM	C	15.00	I	45.00	I	75.00	I	15.79	I	23.68	I	15.79	I
I	ARM	D	15.00	I	45.00	I	75.00	I	12.90	I	19.35	I	12.90	I

DEMAND SET TITLE: AM peak

T33

		TURNING PROPORTIONS							
		TURNING COUNTS							
		(PERCENTAGE OF H.V.S)							
TIME	FROM/T	ARM A	ARM B	ARM C	ARM D				
07.15 - 08.45	ARM A	0.000	0.148	0.828	0.023				
		0.0	185.0	1032.0	29.0				
		(0.0)	(0.0)	(0.0)	(0.0)				
	ARM B	0.146	0.000	0.000	0.854				
		187.0	0.0	0.0	1091.0				
		(0.0)	(0.0)	(0.0)	(0.0)				
	ARM C	0.408	0.592	0.000	0.000				
		515.0	748.0	0.0	0.0				
		(0.0)	(0.0)	(0.0)	(0.0)				
	ARM D	0.074	0.684	0.242	0.000				
		76.0	706.0	250.0	0.0				
		(0.0)	(0.0)	(0.0)	(0.0)				

QUEUE AND DELAY INFORMATION FOR EACH 15 MIN TIME SEGMENT

T70

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)
07.15-07.30									
ARM A	15.63	24.57	0.636	--	0.0	1.7	24.3	--	0.109
ARM B	16.04	20.39	0.786	--	0.0	3.4	45.9	--	0.208
ARM C	15.85	28.06	0.565	--	0.0	1.3	18.5	--	0.081
ARM D	12.95	40.62	0.319	--	0.0	0.5	6.9	--	0.036

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)
07.30-07.45									
ARM A	18.67	21.87	0.854	--	1.7	5.2	67.1	--	0.275
ARM B	19.15	18.62	1.028	--	3.4	21.4	207.1	--	0.897
ARM C	18.92	26.72	0.708	--	1.3	2.4	33.5	--	0.126
ARM D	15.46	38.13	0.406	--	0.5	0.7	10.0	--	0.044

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)
07.45-08.00									
ARM A	22.86	18.25	1.253	--	5.2	76.2	617.9	--	2.411
ARM B	23.45	18.29	1.282	--	21.4	99.2	906.0	--	3.458
ARM C	23.18	26.54	0.873	--	2.4	6.1	78.8	--	0.260
ARM D	18.94	35.11	0.539	--	0.7	1.2	17.0	--	0.062

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)
08.00-08.15									
ARM A	22.86	18.14	1.260	--	76.2	147.1	1674.6	--	5.978
ARM B	23.45	18.29	1.282	--	99.2	176.7	2069.9	--	7.819
ARM C	23.18	26.52	0.874	--	6.1	6.4	94.5	--	0.292
ARM D	18.94	34.94	0.542	--	1.2	1.2	17.6	--	0.062

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)
08.15-08.30									
ARM A	18.67	21.71	0.860	--	147.1	103.7	1880.8	-	5.730
ARM B	19.15	17.10	1.120	--	176.7	207.5	2882.1	-	11.346
ARM C	18.92	27.19	0.696	--	6.4	2.3	38.6	-	0.129
ARM D	15.46	37.96	0.407	--	1.2	0.7	10.6	-	0.045

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)
08.30-08.45									
ARM A	15.63	24.48	0.639	--	103.7	1.9	630.1	-	1.745
ARM B	16.04	17.04	0.941	--	207.5	193.8	3009.8	-	11.831
ARM C	15.85	27.27	0.581	--	2.3	1.4	21.9	-	0.088
ARM D	12.95	40.39	0.321	--	0.7	0.5	7.2	-	0.037

QUEUE AT ARM A

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
07.30	1.7	**
07.45	5.2	*****
08.00	76.2	*****
08.15	147.1	*****
08.30	103.7	*****
08.45	1.9	**

QUEUE AT ARM B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
07.30	3.4	***
07.45	21.4	*****
08.00	99.2	*****
08.15	176.7	*****
08.30	207.5	*****
08.45	193.8	*****

QUEUE AT ARM C

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
07.30	1.3	*
07.45	2.4	**
08.00	6.1	*****
08.15	6.4	*****
08.30	2.3	**
08.45	1.4	*

 QUEUE AT ARM D

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
07.30	0.5
07.45	0.7 *
08.00	1.2 *
08.15	1.2 *
08.30	0.7 *
08.45	0.5

 QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

----- T75									
I	ARM	I	TOTAL DEMAND	I	* QUEUEING *	I	* INCLUSIVE QUEUEING *	I	I
I	I	I	I	I	* DELAY *	I	* DELAY *	I	I
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 1715.0	I 1143.4	I 4894.8	I 2.85	I 4894.9	I 2.85	I	I
I	B	I 1759.1	I 1172.7	I 9120.9	I 5.19	I 10222.9	I 5.81	I	I
I	C	I 1738.4	I 1159.0	I 285.7	I 0.16	I 285.7	I 0.16	I	I
I	D	I 1420.5	I 947.0	I 69.2	I 0.05	I 69.2	I 0.05	I	I
I	ALL	I 6633.0	I 4422.0	I 14370.6	I 2.17	I 15472.7	I 2.33	I	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 =====

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:-

"f:\TEM\Project\BCC - Tyburn Roundabout\3 - Execution\Modelling\2. 2031 ARCADY model\
2031 PM peak validated with Chester.vai"
(drive-on-the-left) at 19:20:53 on Tuesday, 15 April 2014

FILE PROPERTIES

RUN TITLE: Tyburn Roundabout - With Chester Rd Improvement
LOCATION: Birmingham
DATE: 03/03/14
CLIENT: Birmingham City Council
ENUMERATOR: ampartzist [UKBHMLPC24473]
JOB NUMBER: 60316861
STATUS: Preliminary
DESCRIPTION: 2031 PM peak. All supporting calculations are: F:\TEM\Project\BCC
- Tyburn Roundabout\3 - Execution\Modelling\2031 PM peak validated
with chester

INPUT DATA

ARM A - A452 Chester Rd North
ARM B - A38 Kingsbury East
ARM C - A452 Chester Rd South
ARM D - A38 Kingsbury West

 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	7.10	I	10.60	I	12.20	I	23.80	I	71.20	I	37.0	I	0.646	I	37.327	*	I
I	ARM	B	7.60	I	9.30	I	0.10	I	16.30	I	74.10	I	33.0	I	0.570	I	37.706		I
I	ARM	C	7.10	I	9.70	I	0.10	I	53.30	I	70.30	I	24.0	I	0.606	I	39.861	*	I
I	ARM	D	7.40	I	10.40	I	129.40	I	29.30	I	74.10	I	21.0	I	0.733	I	35.380	*	I

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

WARNING ARM D Effective flare length is outside normal range.
 Treat capacities with increasing caution.

WARNING One or more intercept values (flagged * in the table)
 have been adjusted according to local input values
 from a previous run and listed below -

				T6
I	ARM	I	ADJUSTMENT TO	I
I		I	INTERCEPT (PCU/MIN)	I
I	ARM	A	-7.000	I
I	ARM	C	2.000	I
I	ARM	D	-18.500	I

 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(17.45)

LENGTH OF TIME PERIOD -(90) MINUTES

LENGTH OF TIME SEGMENT - (15) MINUTES

DEMAND FLOW PROFILES ARE SYNTHESISED FROM THE TURNING COUNT DATA

DEMAND SET TITLE: PM peak

										T15				
I	ARM	I	NUMBER OF MINUTES FROM START WHEN	I	RATE OF FLOW (VEH/MIN)	I				I				
I		I	FLOW STARTS	I	BEFORE	I	AT TOP	I	AFTER	I				
I		I	TOP OF PEAK	I	PEAK	I	OF PEAK	I	PEAK	I				
I		I	FLOW STOPS	I	PEAK	I	OF PEAK	I	PEAK	I				
I		I	TO RISE	I	IS REACHED	I	FALLING	I	PEAK	I				
I	ARM	A	15.00	I	45.00	I	75.00	I	13.70	I	20.55	I	13.70	I
I	ARM	B	15.00	I	45.00	I	75.00	I	15.32	I	22.99	I	15.32	I
I	ARM	C	15.00	I	45.00	I	75.00	I	16.48	I	24.71	I	16.48	I
I	ARM	D	15.00	I	45.00	I	75.00	I	19.36	I	29.04	I	19.36	I

DEMAND SET TITLE: PM peak

T33

		TURNING PROPORTIONS							
		TURNING COUNTS							
		(PERCENTAGE OF H.V.S)							
TIME	FROM/T	ARM A	ARM B	ARM C	ARM D				
16.15 - 17.45	ARM A	0.000	0.185	0.797	0.018	0.0	203.0	873.0	20.0
		(0.0)	(0.0)	(0.0)	(0.0)				
	ARM B	0.414	0.000	0.000	0.586	508.0	0.0	0.0	718.0
		(0.0)	(0.0)	(0.0)	(0.0)				
	ARM C	0.627	0.373	0.000	0.000	827.0	491.0	0.0	0.0
		(0.0)	(0.0)	(0.0)	(0.0)				
	ARM D	0.066	0.822	0.112	0.000	102.0	1274.0	173.0	0.0
		(0.0)	(0.0)	(0.0)	(0.0)				

QUEUE AND DELAY INFORMATION FOR EACH 15 MIN TIME SEGMENT

T70

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)
16.15-16.30									
ARM A	13.75	22.57	0.609	--	0.0	1.5	21.7	--	0.111
ARM B	15.38	30.23	0.509	--	0.0	1.0	14.9	--	0.067
ARM C	16.54	30.43	0.544	--	0.0	1.2	17.1	--	0.071
ARM D	19.44	18.65	1.042	--	0.0	23.3	211.7	--	0.856

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)
16.30-16.45									
ARM A	16.42	23.32	0.704	--	1.5	2.3	32.9	--	0.143
ARM B	18.37	29.13	0.631	--	1.0	1.7	24.3	--	0.092
ARM C	19.75	28.57	0.691	--	1.2	2.2	31.1	--	0.112
ARM D	23.21	15.38	1.509	--	23.3	140.9	1232.2	--	6.195

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)
16.45-17.00									
ARM A	20.11	24.86	0.809	--	2.3	4.0	54.6	--	0.201
ARM B	22.50	27.70	0.812	--	1.7	4.1	55.2	--	0.181
ARM C	24.19	26.10	0.927	--	2.2	9.3	111.2	--	0.364
ARM D	28.42	11.20	2.538	--	140.9	399.3	4051.6	--	23.098

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)
17.00-17.15									
ARM A	20.11	24.97	0.806	--	4.0	4.0	60.1	--	0.206
ARM B	22.50	27.68	0.813	--	4.1	4.2	62.2	--	0.192
ARM C	24.19	26.01	0.930	--	9.3	10.8	153.0	--	0.476
ARM D	28.42	10.88	2.613	--	399.3	662.5	7963.2	--	37.897

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)
17.15-17.30									
ARM A	16.42	23.48	0.699	--	4.0	2.4	38.2	-	0.146
ARM B	18.37	29.08	0.632	--	4.2	1.7	27.7	-	0.096
ARM C	19.75	28.44	0.694	--	10.8	2.3	42.3	-	0.131
ARM D	23.21	14.85	1.563	--	662.5	787.9	10877.6	-	42.209

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)
17.30-17.45									
ARM A	13.75	22.16	0.621	--	2.4	1.7	26.1	-	0.120
ARM B	15.38	30.12	0.511	--	1.7	1.1	16.3	-	0.068
ARM C	16.54	30.36	0.545	--	2.3	1.2	18.8	-	0.073
ARM D	19.44	18.51	1.050	--	787.9	801.8	11922.7	-	43.005

QUEUE AT ARM A

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
16.30	1.5	**
16.45	2.3	**
17.00	4.0	****
17.15	4.0	****
17.30	2.4	**
17.45	1.7	**

QUEUE AT ARM B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
16.30	1.0	*
16.45	1.7	**
17.00	4.1	****
17.15	4.2	****
17.30	1.7	**
17.45	1.1	*

QUEUE AT ARM C

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
16.30	1.2	*
16.45	2.2	**
17.00	9.3	*****
17.15	10.8	*****
17.30	2.3	**
17.45	1.2	*

 QUEUE AT ARM D

TIME SEGMENT NO. OF
 ENDING VEHICLES
 IN QUEUE

16.30	23.3	*****
16.45	140.9	*****
17.00	399.3	*****
17.15	662.5	*****
17.30	787.9	*****
17.45	801.8	*****

 QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

T75

I	ARM	I	TOTAL DEMAND	I	* QUEUEING *	I	* INCLUSIVE QUEUEING *	I
I		I		I	* DELAY *	I	* DELAY *	I
I		I		I		I		I
I		I	(VEH)	I	(VEH/H)	I	(MIN)	I
I		I		I	(MIN/VEH)	I	(MIN)	I
I		I		I		I	(MIN/VEH)	I
I	A	I	1508.6	I	1005.7	I	233.6	I
I		I		I		I	0.15	I
I	B	I	1687.5	I	1125.0	I	200.5	I
I		I		I		I	0.12	I
I	C	I	1814.1	I	1209.4	I	373.5	I
I		I		I		I	0.21	I
I	D	I	2132.1	I	1421.4	I	36259.0	I
I		I		I		I	17.01	I
I		I		I		I	53628.8	I
I		I		I		I	25.15	I
I	ALL	I	7142.3	I	4761.5	I	37066.6	I
I		I		I		I	5.19	I
I		I		I		I	54436.5	I
I		I		I		I	7.62	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

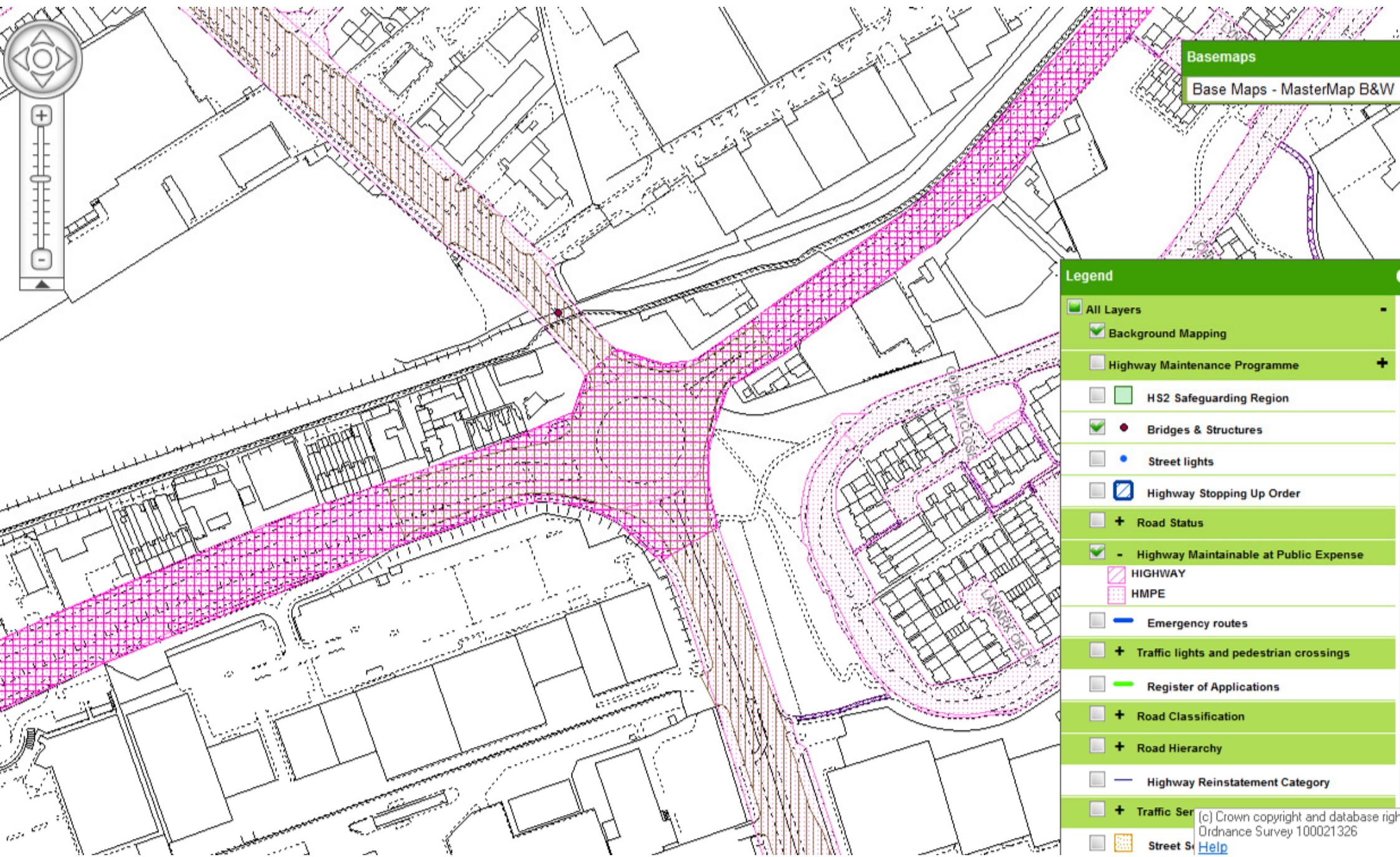
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Capabilities on project:
Transportation

Appendix F – Highway Boundary

Capabilities on project:
Transportation

Birmingham City Council has provided highway boundary information in an email dated 26th February 2014 at the Tyburn roundabout.



Basemaps
Base Maps - MasterMap B&W

Legend

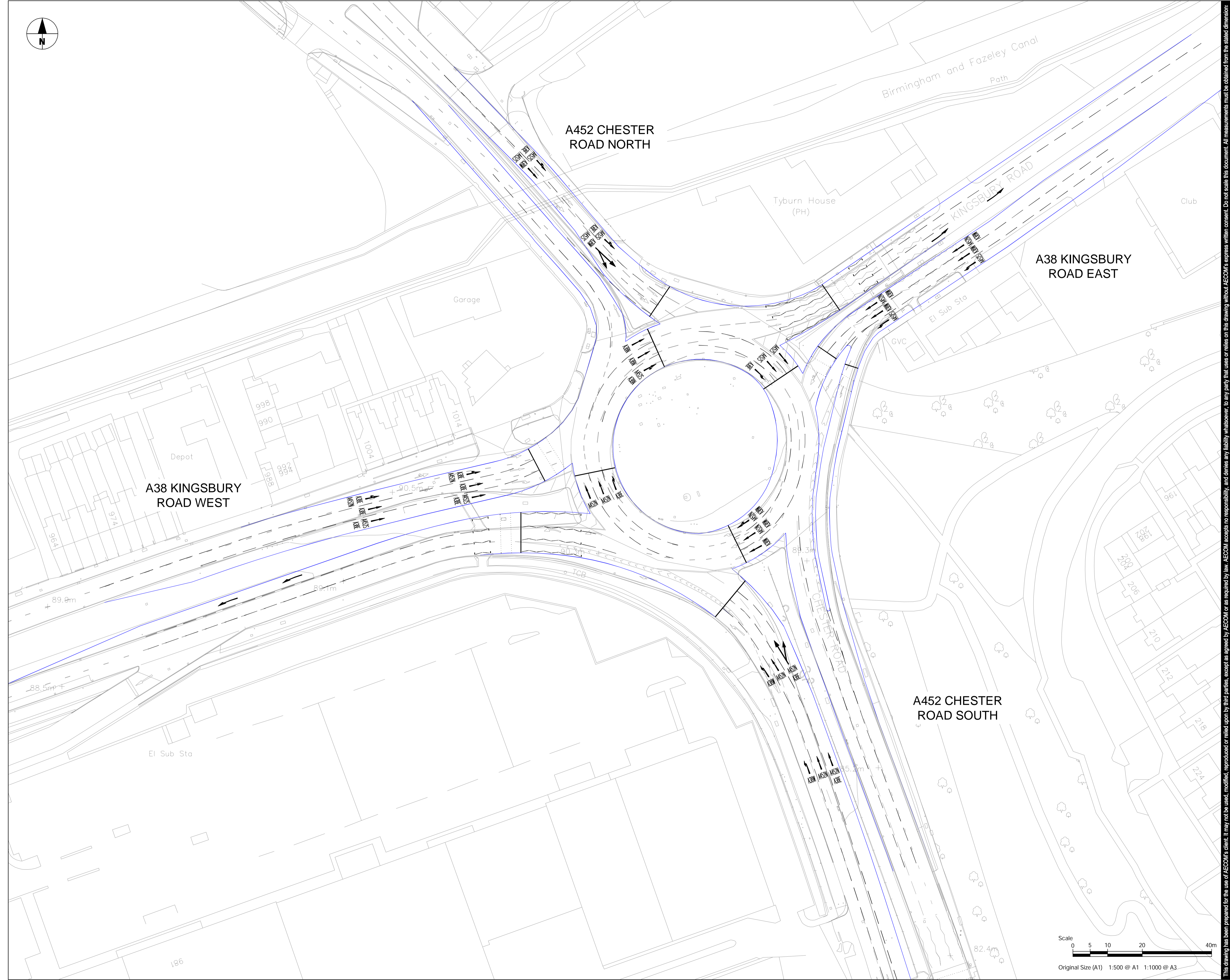
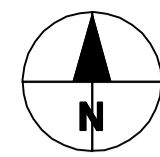
- All Layers
- Background Mapping
- Highway Maintenance Programme
- HS2 Safeguarding Region
- Bridges & Structures
- Street lights
- Highway Stopping Up Order
- + Road Status
- Highway Maintainable at Public Expense
- HIGHWAY
- HMPE
- Emergency routes
- + Traffic lights and pedestrian crossings
- Register of Applications
- + Road Classification
- + Road Hierarchy
- Highway Reinstatement Category
- + Traffic Ser
- Street S

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Ordnance Survey 100021326
[Help](#)

Capabilities on project:
Transportation

Appendix G – Preferred Option Drawing

ISO A1 594mm x 841mm
 Approved: AG
 Checked: SV
 Designer: AC
 Project Management Initials:
 Last saved by: CHILDA(2014-04-16) Last Plotted: 2014-04-16
 Filename: F:\TEMP\PROJECT\BCC - TYBURN ROUNDABOUT\13 - EXECUTION\CAD\06-MODELS\60316861-SKE-20-CT-003 SEG LEFT CHEST TO KINGS REMOVED.DWG
 Printed on 100% Post-Consumer Recycled Content Paper



PROJECT
 TYBURN
 ROUNDABOUT
 OPTIONS



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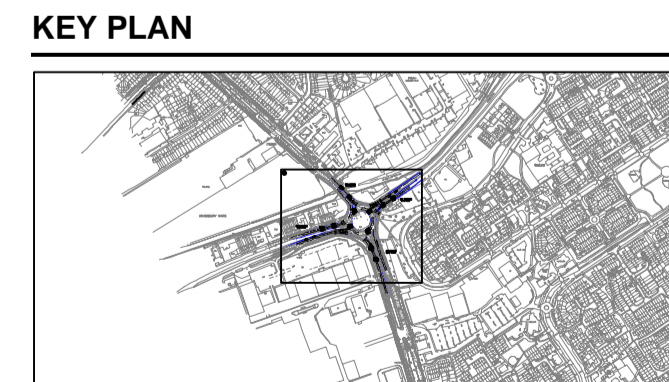
NOTES
 CDM NOTES
 1. THE CONTRACTOR SHALL DETERMINE THE LOCATION AND STATUS OF ANY STATUTORY UTILITY APPARATUS PRIOR TO THE COMMENCEMENT OF ANY WORKS.

KEY

— PROPOSED KERB LINES
 - - - PROPOSED ROAD MARKINGS

ISSUE/REVISION

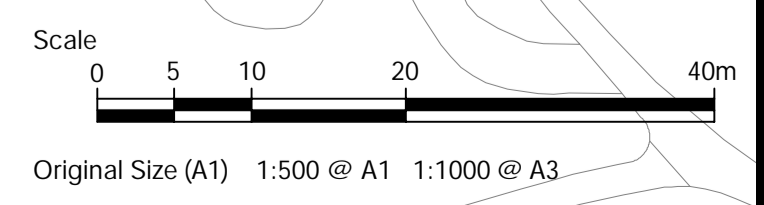
NO	DATE	DESCRIPTION
A	16/04/2014	Final Issue



PROJECT NUMBER
 60316861

SHEET TITLE
 OPTION 3
 PREFERRED OPTION

SHEET NUMBER
 60316861-SKE-20-CT-0003



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