Aston, Newtown and Lozells Area Action Plan

Travel Demand Report

August 2011

Notice

This document and its contents have been prepared and are intended solely for *Birmingham City Council's* information and use in relation to *Aston, Newtown and Lozells Area Action Plan Scoping Report to Assess Travel Demand.*

Document History

JOB NUMBER:			DOCUMENT REF:			
3	Final	NG	MN	PE	MN	04.08.11
2	Final	NG	MN	PE	MN	19.07.11
1	Draft	NG	MN	PE	MN	12.05.11
Revision	Purpose Description	Originated	Checked	Reviewed	Authorised	Date

Contents

Appendices

1. Introduction

1.1 Birmingham City Council (BCC) has developed an Area Action Plan (AAP) for Aston, Newtown & Lozells.

1.2 BCC produced an initial transport report for the AAP area titled 'Scoping Report to Assess Travel Demand' (December 2010), which assessed the capacity of the highway network and its key junctions, and considered the traffic impact of proposed development in the AAP area on its operational performance. The report considered:

- A baseline assessment of the highway network;
- An initial assessment of the performance of the network and its ability to accommodate the development proposals, and;
- Identification of potential infrastructure improvements to mitigate impact and accommodate increased vehicular demand.

1.3 The following report builds upon the Scoping Report to provide an evidence base to calculate the multi-modal travel demand and the impact on the highway network. A copy of the 'Scoping Report to Assess Travel Demand' is provided in **Appendix A**

Background information

1.4 The AAP area, of over 900 hectares, lies immediately to the north of Birmingham City Centre and is defined at its northern boundary by the One-Stop Shopping Centre, Birmingham City University and the M6 Motorway. The western boundary is broadly defined by Hamstead Road in Lozells, and the eastern boundary by the Birmingham and Fazeley Canal and Lichfield Road in Aston.

1.5 The AAP area largely includes 7 sub-areas which comprise:

- East Aston/Regional Investment Site (RIS);
- South Aston;
- Tame Road;
- Newtown;
- Lozells;
- Perry Barr/Birchfield; and
- Central Aston.

1.6 However these 7 zones have been grouped into three larger zones for the purpose of trip distribution set out in the report. Development is largely concentrated around Perry Barr, Newtown and in Aston along the line of Aston Hall Road between Salford Park and Aston Park, which helps to define the three zones, the boundaries of which naturally follow ward boundaries.

1.7 The A34 Birchfield Road, A38 Aston Expressway and A5127 Lichfield Road form the key transport corridors through the area, and are radial corridors for Birmingham City Centre, which also accommodate the main bus routes. The cross-city commuter railway lines to Walsall and Sutton Coldfield serve the area at Perry Barr, Witton and Aston Railway Stations. The River Tame, Handsworth Brook, Hockley Brook, Hawthorn Brook, Tame Valley Canal, and Birmingham and Fazeley Canal traverse the area, providing alternative pedestrian and cycle routes.

Report structure

1.8 Following this introduction, the structure of this report is a follows:

- **Chapter 2** identifies the existing and proposed land uses identified within the AAP area;
- **Chapter 3** sets out the methodology and trip generation results for existing land uses and proposed AAP developments;
- **Chapter 4** sets out the methodology for identifying mode split percentages applied to person trips;
- **Chapter 5** determines the origins and destination of trips to/from the AAP area, to both internal and external locale by transport mode;
- **Chapter 6** presents trips by vehicles for existing land uses and proposed developments in order to identify the net trip generation, which reflects the 'real' level of trips that would eventually be travelling on the adjoining highway network following the full implementation of the AAP proposals;
- **Chapter 7** considers how trips would assign on the adjoining highway network in travelling between the AAP area and trip distribution zones covering the wider area. These consider primary routes, the directness of travel and congested junctions to determine route choice;
- **Chapter 8** identifies the current capacity of the highway network at key junction locations within the AAP area;
- **Chapter 9** assesses the capacity and future operation of the highway network assuming that all AAP development proposals are implemented. This chapter also considers where mitigation would be required on the highway network;
- **Chapter 10** summarises the findings and provides conclusions and recommendations.

2. AAP developments

2.1 This chapter sets out the existing land uses and proposed developments identified for each site within the AAP area, and explains how these sites have been grouped together into zones for the purposes of assessing the travel demand.

AAP sub-zones

2.2 The AAP study area is made up of seven sub-areas which comprise:

- East Aston/Regional Investment Site (RIS);
- South Aston;
- Tame Road;
- Newtown;
- Lozells;
- Perry Barr/Birchfield; and
- Central Aston.

2.3 No development is identified within the South Aston sub-area, and therefore no further reference to this area is made within the report.

AAP trip distribution zones

2.4 The AAP area has been split into three zones for the purpose of trip distribution referred to later in the report. Development is largely concentrated around Perry Barr, Newtown and in Aston along the line of Aston Hall Road between Salford Park and Aston Park, which helps to define the three zones. These boundaries naturally follow ward boundaries.

2.5 The site reference numbers and the location of developments are shown in **Figure 2.1.** Details of existing land uses and proposed developments are shown below.

Existing & proposed AAP developments

2.6 Tables 2.1 to 2.6 summarise the existing and proposed land uses of sites identified in the AAP by sub-area, including site areas in square metres (sqm).

Table 2.1: Existing and proposed land use schedule (East Aston/RIS)

Sub-Area	Site Ref.	Existing Use	Proposed Use
East Aston/RIS	E1A Regional Investment Site	48,075sqm Light Industry 4,900sqm Leisure 620sqm Pub	1800sqm Food Retail 900sqm Restaurant / Café 29,822sqm Office 27,075sqm Research & Dev 11,560sqm Light Industry 5,415sqm General Industry 6000sqm Hotel & Guest House 6,263sqm Leisure 1000sqm Conferencing
	LC6 Aston Local Centre	1,190sqm Local Shops	6,100sqm Local Shops

Table 2.2: Existing and proposed land use schedule (Tame Road)

Sub-Area	Site Ref.	Existing Use	Proposed Use
Tame Road	Site 3 – Former Siemens Site	N/A	91 Private Houses 39 Affordable Houses
	Site 11 – Tame Road	N/A	14 Private Houses 6 Affordable Houses
	Site 19 – Westwood Road/Dulverton Road	N/A	7 Private Houses 13 Private Flats 3 Affordable Houses 7 Affordable Flats

Table 2.3: Existing and proposed land use schedule (Newtown)

Sub-Area	Site Ref.	Existing Use	Proposed Use
Newtown	Site 2 – North Newtown	273 Private Houses	161 Private Houses 126 Affordable Houses
	Site 4 – Wheeler St	N/A	20 Private Houses 21 Affordable Houses
	H6 – Newtown	N/A	62 Private Houses 38 Affordable Houses
	E6A – New John Street West/Hockley Circus	844sqm Local Shops 190 Private Flats	1,000sqm Local Shops 190 Private Flats
	Site E6B – Farm Street/Great King Street	12,738sqm Light Industry	1,838sqm Light Industry 10,900 Indoor Football Centre
	Site E6C – New John Street West/Summer Lane	15,000sqm General Industrial	6,000sqm Offices 5,000sqm Leisure 13,000sqm Hotel 35 Private Houses 137 Private Flats 20 Affordable Houses 73 Affordable Flats
	Site LC4A – Wheeler Street Shopping Centre	7,410sqm Local Shops 1,440sqm Health Centre	1,000sqm Local Shops 2,000sqm Health Centre 8 Private Flats 8 Affordable Flats
	LC4B – Newbury Road	N/A	2,500sqm Local Shops 1,000sqm Offices 1,000sqm Leisure 500sqm Health 28 Private Flats 12 Affordable Flats

Table 2.4: Existing and proposed land use schedule (Lozells)

Sub-Area	Site Ref.	Existing Use	Proposed Use
Lozells	LC2Ai – Villa Cross North Site	1,000sqm Superstore	1,130sqm Local Shops 5 Private Houses 17 Private Flats 1 Affordable House 7 Affordable Flats
	LC2Aii – Villa Cross South	1,300sqm Community Building/Garage 13 Private Houses	1,120sqm Offices 8 Private Houses 3 Affordable Houses
	LC2Bi – Old Bank	680sqm Bank	680sqm Offices
	LC2Bii – Trinity Building	336sqm Offices	336sqm Offices
	LC2Biii – Black Cat Café	627sqm Offices	730sqm Offices 4 Private Flats 2 Affordable Flats
	Site 1 – Corner of Johnstone Street and Birchfield Road	N/A	14 Private Flats 6 Affordable Flats
	Site 6 – George's Park	N/A	18 Private Houses 7 Affordable Houses
	Site 7 – Radnor Road	N/A	9 Private Houses 3 Affordable Houses
	Site 8 – Former Clyde Tower	N/A	26 Private Flats 24 Affordable Flats
	Site 9 – Wills Street/Overmoor Close	N/A	5 Private Houses 2 Affordable Houses
	Site 10 – Nursery Road/Chruch Street	N/A	4 Private Houses 2 Affordable Houses
	Site 12 – Lozells Street	N/A	11 Private Houses 10 Affordable Houses
	Site 13 – Malthouse Gardens	N/A	5 Private Flats 1 Affordable Flat
	Site 14 – Naden Road	N/A	5 Private Houses 2 Affordable Houses
	Site 15 – Land rear of Anglesey Street/Burbury Street/Nursery Road	N/A	4 Private Houses 2 Affordable Houses
	Site 16 – Roland Road	N/A	20 Private Houses 10 Affordable Houses
	Site 17 – Carpenters Road	N/A	3 Private Houses
	Site 18 – Wretham Road/Soho Hill	N/A	10 Private Houses 5 Affordable Houses
	Site E7 – Churchill Parade	2,790sqm Local Shops 64 Student Flats	2,438sqm Local Shops 236 Student Flats

Table 2.5: Existing and proposed land use schedule (Perry Barr/Birchfield)

Sub-Area	Site Ref.	Existing Use	Proposed Use
Perry Barr/ Birchfield	Site LC1A – Greyhound Stadium	1,500sqm Greyhound Stadium	8,075sqm Non Food Retail
	Site LC1B – Gyratory Site (Gailey Park)	1,650sqm Storage/Distribution	6,500sqm Non Food Retail
	Site LC1C – Crown & Cushion Pub	1,200sqm Local Shops 2,500sqm Garage Workshops	3,500sqm Non Food Retail 49 Private Flats 21 Affordable Flats
	LC1D – Former Library and temporary shops Birchfield Road/Aston Lane	2,275sqm Local Shops 1,590sqm Library	4,000sqm Non Food Retail 49 Private Flats 21 Affordable Flats
	LC1E – 271 Birchfield Road	1,550sqm Bingo Hall	1,550sqm Leisure
	LC1F – Burton Wood Drive/Bridgelands Way	64 Private Houses 278 Prviate Flats	1,900sqm Non Food Retail 17 Private Houses 130 Private Flats 9 Affordable Houses 73 Affordable Flats
	LC1Tii – One Stop Shopping Centre	N/A	10,000sqm Offices
	LCTiii – Attwood Baker Buildings	N/A	4,500sqm Non Food Retail
	Site 20 - Penhurst Estate	60 Affordable Flats	60 Affordable Flats
	Site ED1 – BCU Campus Enhancements	N/A	N/A

Table 2.6: Existing and proposed land use schedule (Central Aston)

Sub-Area	Site Ref.	Existing Use	Proposed Use
Central Aston	Site LC3 – Witton Road Local Centre – Transport Museum	1,900sqm Museum	1,000sqm Supermarket 1,900sqm Museum

2.7 The location of the proposed developments within each sub-area was determined based on the draft 'Preferred Option Report' and accompanying proposals map

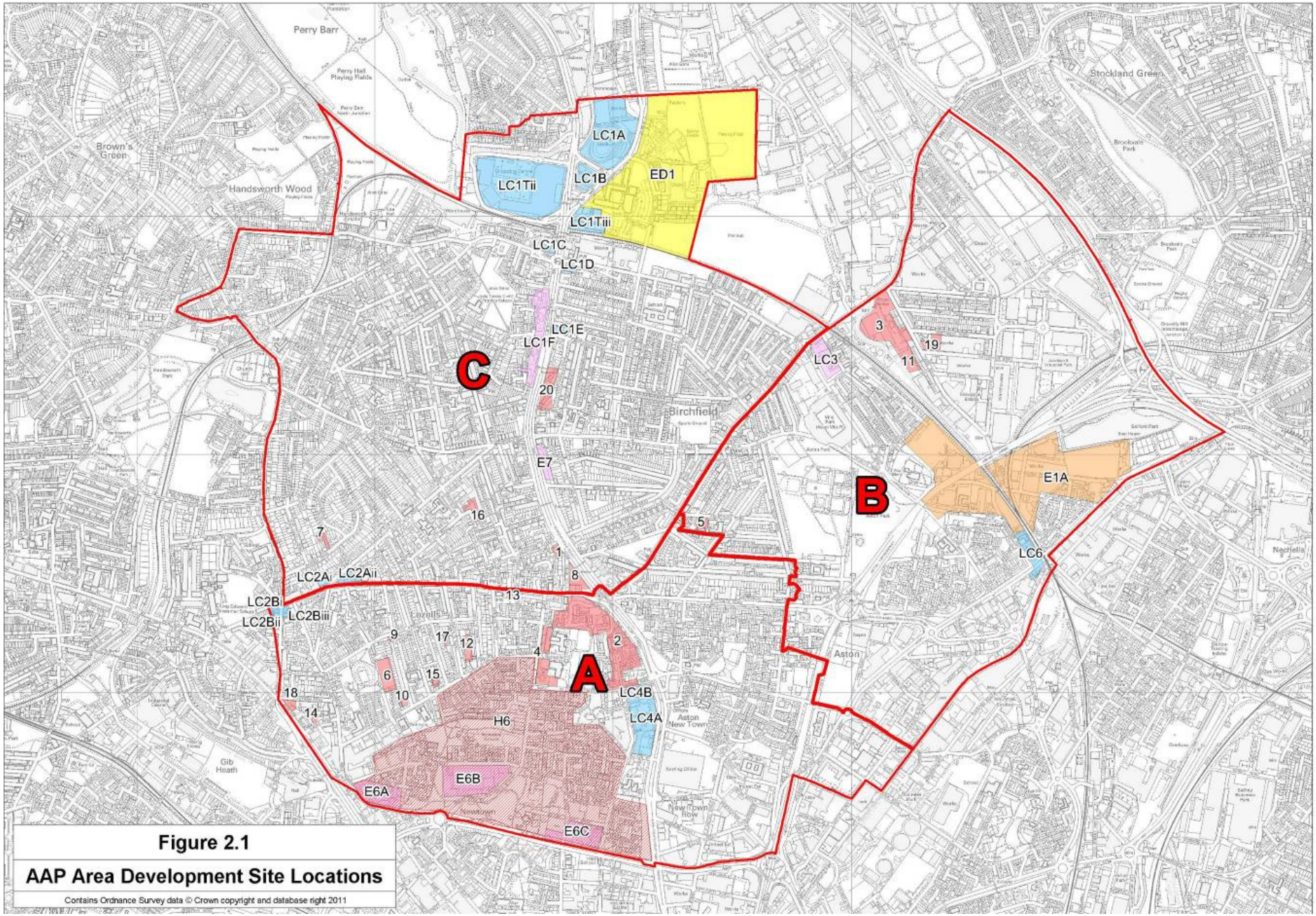


Figure 2.1

AAP Area Development Site Locations

3. Travel Demand

3.1 This chapter sets out the methodology used to calculate the number of person trips generated by each site within the AAP area.

Trip rate methodology

3.2 A person trip is a trip by one or more persons made by any mode of transport, and these have been derived using the TRICS database. These have been derived for weekday AM and PM peak hours for all existing and proposed land use types in the AAP study area. The peak hours have been defined using traffic surveys on local junctions to occur between 0800 and 0900, and 1700 and 1800.

3.3 A strict methodology for deriving trip rates has been adopted, which accords with TRICS good practice guidance. This includes:

- person trip rates are derived for all land uses;
- site selection excludes Greater London surveys, as it is not considered that these sites are representative of the study area given the level of public transport options in the capital;
- site selection location includes 'edge of town centre', 'suburban' and 'neighbourhood area;
- sites reflect the low car ownership of the study area (0.4 cars per person for the ward of Aston, Census 2001), and use the TRICS car ownership range of '0.5 or less' and 0.6 to 1' categories;
- initial survey results are excluded from the calculation if a re-survey (more up-to-date survey at the same site) is included, so as not to skew the trip rate result;
- a minimum of 5-6 sites are used for each land use;
- affordable housing and flats are represented by rented housing and flat categories, following the definition set out in the TRICS good practice guidance;
- the range of gross floor areas used is tailored to the size of developments identified in the study area, and where sufficient surveys are available then use 5-6 sites in the creation of trip rates; and
- The 'leisure' land use represents a broad range of operations. Without further details the land uses in the AAP that are defined as 'leisure' will use a trip rate that is derived from an average of bingo hall, indoor football centre and community centre, which are considered to provide the most robust trip rates compared to most other leisure uses.

Exceptions to the rule

3.4 A number of exceptions to this methodology have had to be made for deriving trip rates for some land uses, where the number of surveys contained within the database is limited. Therefore a number of secondary rules have been identified for these instances:

- the full range of car ownership categories can be used;
- edge of town sites can be included in the site selection; and
- less than 5 or 6 surveys can be used where the choice is very limited, but these must be checked to ensure that they are adequately representative of the study area land uses.

Person trip rates

3.5 The person trip rates identified for each land use are set out below in Table 2.1. TRICS outputs are provided in **Appendix B.**

Table 3.1: Land use trip rates

Land Use	Trip Rate per	AM Peak Hour		PM Peak Hour	
		Arrivals	Departures	Arrivals	Departures
Office	100sqm GFA	2.35	0.37	0.29	2.07
Light industrial unit	100sqm GFA	0.53	0.13	0.12	0.75
Private houses	per dwelling	0.20	0.89	0.65	0.35
Affordable houses	per dwelling	0.15	0.75	0.65	0.38
Private flats	per dwelling	0.08	0.48	0.37	0.15
Affordable flats	per dwelling	0.19	0.45	0.36	0.26
Indoor Football Centre	per pitch	2.10	0.64	6.94	2.52
Hotel	100sqm GFA	0.52	0.88	0.78	0.44
Health Centre	100sqm GFA	7.15	3.54	4.50	6.57
Non-Food Retail	100sqm GFA	0.55	0.30	0.76	0.89
Local Shops	100sqm GFA	0.64	9.50	10.6	10.1
Small Supermarket	100sqm GFA	31.0	30.6	42.4	42.0
Museum	100sqm GFA	0.00	0.00	0.02	0.42
General Industrial (commercial)	100sqm GFA	0.25	0.07	0.09	0.25
General Industrial (storage)	100sqm GFA	0.10	0.09	0.05	0.08
Industrial Estate	100sqm GFA	0.79	0.36	0.25	0.63
Garage Workshop*	100sqm GFA	1.17	0.62	0.52	0.88
Student Accommodation	per hectare	9.30	37.2	41.9	26.9
Bingo Hall	Seats	0.00	0.00	0.03	0.01
Public House	100sqm GFA	0.00	0.00	10.6	5.13
Library	100sqm GFA	2.27	0.59	3.95	8.10
Community Building	100sqm GFA	1.07	1.52	1.80	0.95
Greyhound Stadium	per hectare	0.00	0.00	1.94	0.81
Leisure (mix)	100sqm GFA	1.06	0.39	2.92	1.16
Restaurants & Cafes	100sqm GFA	0	0	7.02	4.53
Research & Development	per employee	0.47	0.05	0.04	0.35
Creche	100sqm GFA	5.11	2.28	1.74	5.01
Conferencing*	100sqm GFA	0.78	0.29	0.05	0.39
Gymnasium	100sqm GFA	0.68	0.90	2.43	1.32

**garage workshop and conferencing trip rates provided in vehicles as no person trip rate is available*

3.6 For those land uses where trip rate units are defined as something other than Gross Floor Area (GFA), and where the relevant information on the specific site has not been identified for the AAP, a suitable development quantum has to be assumed. These assumptions are based on averages derived using the TRICS database. Using the example of a bingo hall, where the trip rate unit is the number of seats, then TRICS can be used to derive an average number of seats in a bingo hall per 100sqm.

Person trips

3.7 Person trips have been identified for three scenarios using the trip rates identified above. These scenarios include:

- Existing developments – these are the existing land uses on the development sites identified within the AAP, that were operational at the time that traffic surveys were undertaken (between 2007 and 2010);
- Extant planning consent developments – these are sites in the AAP area that benefit from a planning consent or development quantum that has not been implemented or realised; and
- Proposed AAP developments - these are all the proposed developments identified within the AAP area.

3.8 The scenarios identified above will present a fourth scenario of 'net new trips' on the highway network. This will be undertaken for vehicle trips only, and is detailed in Chapter 6 of the report.

Existing developments

3.9 The person trips identified for existing AAP sites land uses are set out by sub-areas below in Tables 3.2 to 3.8.

Table 3.2: Existing trip generation (East Aston/RIS Sub-Area)

Site Ref	Existing Developments	AM Peak Hour		PM Peak Hour	
		Arrivals	Departures	Arrivals	Departures
E1A	48075sqm light industry	255	64	56	360
	4900sqm leisure	34	12	93	37
	620sqm public house	0	0	34	17
LC6	1190sqm local shops	96	94	105	100
Sub-Area Total		**384**	**170**	**289**	**514**

Table 3.3: Existing trip generation (Tame Road Sub-Area)

Site Ref	Existing Developments	AM Peak Hour		PM Peak Hour	
		Arrivals	Departures	Arrivals	Departures
No existing trip generation associated with the Tame Road Sub-Area					

Table 3.4: Existing trip generation (Newtown Sub-Area)

Site Ref	Existing Developments	AM Peak Hour		PM Peak Hour	
		Arrivals	Departures	Arrivals	Departures
2	273 private houses	55	244	176	94
E6A	844sqm local shops	68	67	75	71
	190 private flats	16	91	70	29
LC4A	7410sqm local shops	595	586	655	625
	1440sqm health centre	79	39	50	73
Sub-Area Total		**813**	**1027**	**1026**	**892**

Table 3.5: Existing trip generation (Lozells Sub-Area)

Site Ref	Existing Developments	AM Peak Hour		PM Peak Hour	
		Arrivals	Departures	Arrivals	Departures
LC2Ai	100sqm superstore	258	255	354	350
LC2Aii	1300sqm community building	15	8	7	11
	13 private houses	3	12	8	4
LC2Bi	680sqm bank	4	2	1	4
LC2Bii	336sqm offices	8	1	1	7
LC2Biii	627sqm offices	15	2	2	13
E7	2790sqm local shops	224	221	247	235
	64 student flats	5	21	23	15
Sub-Area Total		**532**	**522**	**643**	**639**

Table 3.6: Existing trip generation (Perry Barr/Birchfield Sub-Area)

Site Ref	Existing Developments	AM Peak Hour		PM Peak Hour	
		Arrivals	Departures	Arrivals	Departures
LC1A	1500sqm greyhound stadium	0	0	6	2
LC1B	1650sqm storage/distribution	2	1	1	1
LC1C	1200sqm local shops	96	95	106	101
	2500sqm garage workshops	29	16	13	22
LC1E	1550sqm bingo hall	0	0	16	3
LC1F	64 private houses	13	57	41	22
	278 private flats	23	133	102	42
20	60 affordable flats	11	27	22	16
Sub-Area Total		**174**	**329**	**307**	**209**

Table 3.7: Existing trip generation (Central Aston Sub-Area)

Site Ref	Existing Developments	AM Peak Hour		PM Peak Hour	
		Arrivals	Departures	Arrivals	Departures
LC3	1900sqm museum	0	0	0	4
Sub-Area Total		**0**	**0**	**0**	**4**

Table 3.8: Total existing AAP area trip generation

Sub-Area	AM Peak Hour		PM Peak Hour	
	Arrivals	Departures	Arrivals	Departures
East Aston/RIS Sub-Area	384	170	289	514
Tame Road Sub-Area	0	0	0	0
Newtown Sub-Area	813	1027	1026	892
Lozells Sub-Area	532	522	643	639
Perry Barr/Birchfield Sub-Area	174	329	307	209
Central Aston Sub-Area	0	0	0	4
AAP Total	**1903**	**2048**	**2265**	**2258**

3.10 A site visit was made in February 2011 to review the developments and the condition of the transport network in the area. As a result a number of existing AAP sites were able to be excluded from the existing trip generation calculations, as it was clear that these have been demolished or have not been operational for a number of years. These sites include:

- E6B – light industrial site;
- E6C – general industrial site; and
- LC1D – local shops and library.

3.11 The results in the above table have excluded trips generated by these three sites, and all other developments sites within the AAP that do not have any existing trip generating potential.

Extant planning consent developments

3.12 This scenario considers the trip generating potential of the sites within the AAP area, which are unoccupied or benefit from an implemented planning consent.

3.13 The person trips associated with the additional sites are shown below in Table 3.9.

Table 3.9: Extant planning consent trip generation – difference to existing trip generation

Site Ref	Existing Developments	AM Peak Hour		PM Peak Hour	
		Arrivals	Departures	Arrivals	Departures
E6B	12738sqm light industry	68	17	15	95
E6C	15000sqm genera industrial	37	11	13	37
LC1D	2275sqm local shops	219	216	241	230
	1590sqm library	36	9	63	129
Total trips		**360**	**253**	**332**	**491**

Proposed developments

3.14 The person trips identified for the proposed AAP developments are set out by sub-area below in Tables 3.10 to 3.16.

Table 3.10: Proposed development generation (East Aston/RIS Sub-Area)

Site Reference	Land Use	AM Peak Hour		PM Peak Hour	
		Arrivals	Departures	Arrivals	Departures
EA1	1800sqm Retail	558	550	764	755
	900sqm Restaurants & cafes	0	0	63	41
	29822sqm Office	699	111	87	617
	27075sqm Research & development*	410	44	35	306
	11560sqm Industrial process	61	15	14	86
	5415sqm General industrial	43	20	13	34
	6000sqm Hotel & guest house	31	53	47	26
	6263sqm Creche	320	143	109	314
	1000sqm Conference (car trips only)	8	3	0	4
	1000sqm Gymnasium	7	9	24	13
LC6	6100sqm Local shops	490	483	539	514
Sub-Area Total		**2627**	**1431**	**1695**	**2710**

**Research & Dev trips are based on employee numbers, 1 employee per 31sqm (BCC – Research & Dev land uses within Longbridge Transport Assessment 2008)*

Table 3.11: Proposed development generation (Tame Road Sub-Area)

Site Reference	Land Use	AM Peak Hour		PM Peak Hour	
		Arrivals	Departures	Arrivals	Departures
3	91 private houses	18	81	59	31
	39 affordable houses	6	29	25	15
11	14 private houses	3	13	9	5
	6 affordable houses	1	5	4	2
19	7 private houses	1	6	5	2
	13 private flats	1	6	5	2
	3 affordable houses	0	2	2	1
	7 affordable flats	1	3	3	2
Sub-Area Total		**31**	**145**	**112**	**60**

Table 3.12: Proposed development generation (Newtown Sub-Area)

Site Reference	Land Use	AM Peak Hour		PM Peak Hour	
		Arrivals	Departures	Arrivals	Departures
2	161 private houses	33	144	104	56
	126 affordable houses	19	95	82	48
4	20 private houses	4	18	13	7
	21 affordable houses	3	16	14	8
H6	63 private houses	13	56	41	22
	38 affordable houses	6	29	25	14
E6A	1000sqm local shops	80	79	88	84
	190 private flats	16	91	70	29
E6B	1838sqm light industry	10	2	2	14
	10900sqm indoor football centre	16	5	52	19
E6C	6000sqm offices	141	22	18	124
	5000sqm leisure	34	13	95	38
	13000sqm hotel	48	82	72	40
	35 private houses	7	31	23	12
	137 private flats	11	66	50	21
	20 affordable houses	3	15	13	8
	73 affordable flats	14	33	26	19
LC4A	1000sqm local shops	80	79	88	84
	2000sqm health centre	110	54	69	101
	8 private flats	1	4	3	1
	8 affordable flats	1	4	3	2
LC4B	2500sqm local shops	201	198	221	211
	1000sqm offices	23	4	3	21
	1000sqm leisure	7	3	19	8
	500sqm health	36	18	22	33
	28 private flats	2	13	10	4
	12 affordable flats	2	5	4	3
Sub-Area Total		**921**	**1179**	**1230**	**1031**

Table 3.13: Proposed development generation (Lozells Sub-Area)

Site Reference	Land Use	AM Peak Hour		PM Peak Hour	
		Arrivals	Departures	Arrivals	Departures
LC2Ai	1130sqm local shops	91	89	100	95
	5 private houses	1	4	3	2
	17 private flats	1	8	6	3
	1 affordable houses	0	1	1	0
	7 affordable flats	1	3	3	2
LC2Aii	1120sqm offices	26	4	3	23
	8 private houses	2	7	5	3
	3 affordable houses	0	2	2	1
LC2Bi	680sqm offices	16	3	2	14
LC2Bii	326sqm offices	8	1	1	7
LC2Biii	730sqm offices	17	3	2	15
	4 private flats	0	2	1	1
	2 affordable flats	0	1	1	1
1	14 private houses	1	7	5	2
	6 affordable flats	1	3	2	2
6	18 private houses	4	16	12	6
	7 affordable houses	1	5	5	3
7	9 private houses	2	8	6	3
	2 affordable houses	0	2	2	1
8	26 private flats	2	12	10	4
	24 affordable houses	4	11	9	6
9	5 private houses	1	4	3	2
	2 affordable houses	0	2	1	1
10	4 private houses	1	4	3	1
	2 affordable houses	0	2	1	1
12	11 private houses	2	10	7	4
	6 affordable houses	2	8	7	4
13	5 private flats	0	2	2	1
	1 affordable flats	0	0	0	0
14	5 private houses	1	4	3	2
	2 affordable houses	0	2	1	1
15	4 private houses	1	4	3	1
	2 affordable houses	0	2	1	1
16	20 private houses	4	18	13	7
	10 affordable houses	2	8	7	4
17	3 private houses	1	3	2	1
18	10 private houses	2	9	6	3
	5 affordable houses	1	4	3	2
E7	2438sqm local shops	196	193	215	205
	64 student flats	19	77	86	56
Sub-Area Total		**411**	**548**	**545**	**491**

Table 3.14: Proposed development generation (Perry Barr/Birchfield Sub-Area)

Site Reference	Land Use	AM Peak Hour		PM Peak Hour	
		Arrivals	Departures	Arrivals	Departures
LC1A	8075sqm non food retail	25	13	34	40
LC1B	6500sqm non food retail	20	11	27	32
LC1C	3500sqm non food retail	11	6	15	17
	49 private flats	4	23	18	7
	21 affordable flats	4	10	8	5
LC1D	4000sqm non food retail	12	7	17	20
	49 private flats	4	23	18	7
	21 affordable flats	4	10	8	5
LC1E	1550sqm Leisure	11	4	30	12
LC1F	1900sqm non food retail	6	3	8	9
	17 private houses	3	15	11	6
	130 private flats	11	62	48	20
	9 affordable houses	1	7	6	3
	73 affordable flats	14	33	26	19
LC1Tii	10000sqm offices	234	37	29	207
LC1Tiii	4500sqm Non food retail	14	7	19	22
20	60 Affordable flats	11	27	22	16
Sub-Area Total		**389**	**298**	**344**	**447**

Table 3.15: Proposed development generation (Central Aston Sub-Area)

Site Reference	Land Use	AM Peak Hour		PM Peak Hour	
		Arrivals	Departures	Arrivals	Departures
LC3	1000sqm supermarket	258	255	354	350
	1900sqm museum	0	0	0	4
Sub-Area Total		**258**	**255**	**354**	**354**

Table 3.16: Total proposed AAP development trip generation (person trips)

Sub-Area	AM Peak Hour		PM Peak Hour	
	Arrivals	Departures	Arrivals	Departures
East Aston/RIS Sub-Area	2627	1431	1695	2710
Tame Road Sub-Area	31	145	112	60
Newtown Sub-Area	921	1179	1230	1031
Lozells Sub-Area	411	548	545	491
Perry Barr/Birchfield Sub-Area	389	298	344	447
Central Aston Sub-Area	258	255	354	354
AAP Total	**4637**	**3856**	**4280**	**5093**

3.15 Site observations identified one site proposed within the AAP area that was built and operational prior to traffic surveys being undertaken. This site is LC1E which is identified as a proposed leisure use within the AAP, and this site has been highlighted in the above table. On this basis, the traffic generated by this development will already have been included within the traffic surveys undertaken, and therefore has been omitted from the trip generation calculations in the Travel Demand Model (TDM). A spreadsheet showing all analysis undertaken in relation to the AAP, including trip generation, distribution and assignment is provided in **Appendix C.**

4. Mode choice

4.1 This chapter sets out the methodology to calculate the mode choice of people travelling to and from development sites within the AAP area.

Mode split for residential and employment uses

4.2 Mode splits for residential and employment land uses have been derived using 'journey from work' and 'journey to work' data (Census 2001) for established output areas in Aston, Newtown and Lozells. 'Journey *from* Work' data relates to trips generated by employment sites within the AAP area. 'Journey *to* Work' data relates to trips generated by residential sites within the AAP area.

4.3 For the purposes of assessing the traffic impact of development, a separate mode split has been derived for journeys from each development site to each output area within 60 miles of the AAP area. These have been aggregated to the internal and external distribution zones.

4.4 The average mode split used for employment and residential sites within the AAP area are shown in the following table.

Table 4.1: Mode split derived from Census

Land Use	Walk	Cycle	MCycle	Bus	Metro	Rail	Car dr.	Taxi	Car pax
Employment	6%	1%	1%	21%	0.15%	2%	62%	1%	7%
Residential	13%	1%	0.3%	32%	0.15%	2%	44%	1%	6%

4.5 The car driver and taxi trips represent the vehicular trips to each site. It could be said that car passengers do not represent any new vehicle trips, as these are already travelling as passengers with the car driver, however it is likely that some passengers are dropped off/picked up from work. There is little evidence to support this but some consideration should be given so as not to underestimate the vehicular trip generation. Therefore 50% of the passenger trips are assumed to represent drop offs and account for additional car trips on the highway network.

4.6 This calculation works out for employment vehicular trips as 66%, made up of 62% (car driver) plus 1% (taxi) plus 3% (half of all car passengers rounded down). Residential vehicular trip mode split would then be 48%, made up of 44% (car driver) plus 1% (taxi) plus 3% (half of all car passengers).

Mode split for other land uses

4.7 The TRICS database presents mode split in four categories including public transport, cycle, walk and vehicle occupants. The surveys in TRICS count vehicle occupants and the number of vehicles, which enables a further dissection of the data to derive car drivers and car passengers as shown in Table 4.2.

Table 4.2: Car occupancy rates from TRICS

Land Use	Vehicle mode split	Occupancy rate
Bingo hall	96%	1.7
Community building	55%	1.3
Greyhound Stadium	59%	1
Health centre	68%	1.3
Indoor Football Centre	76%	1.6
Library	63%	1.3
Museum	54%	1.8
Non-food retail	92%	1.8
Pub	34%	1.9
Student Accommodation	23%	1.3
Hotel	52%	1.4
Food retail	20%	1.2
Restaurant & Cafe	43%	1.7
Creche	50%	1.2
Conference (car trips only)	100%	-
Gymnasium	68%	1.2
Leisure	49%	1.5

4.8 Based on the mode splits derived from the TRICS database, the following mode splits set out in Table 4.3 identify those trips that would be travelling to/from the AAP area by car.

Table 4.3: Mode split(%) derived from the TRICS database

Land Use	Walk	Cycle	Bus	Rail	Car dr.	Car pax
Local shops	77	1	2	0	17	3
Supermarket	77	1	2	0	17	3
Non-food retail	6	1	1	0	51	41
Bank	77	1	2	0	17	3
Greyhound stadium	40	1	0	0	59	0
Museum	18	1	28	0	30	24
Community building	40	0	5	0	42	13
Library	32	0	5	0	48	29
Public house	58	2	6	0	18	16
Bingo hall	2	0	2	0	56	40
Garage workshop	0	0	0	0	100	0
Student accommodation	70	0	7	0	18	5
Indoor football	17	1	6	0	48	29
Hotel	40	1	7	0	37	15
Health centre	27	0	5	0	52	16
General leisure	20	0	4	0	49	26
Restaurant & Cafe	23	0	4	0	43	30
Creche	35	2	1	0	50	12
Gymnasium	14	1	4	0	68	13

Potential for mode shift

4.9 Within the previous transport scoping reports, reference is given to a number of measures that are to be implemented in the AAP area, that have the potential to create a mode shift away from car use to alternative modes. The potential for mode shift has been identified as a result of:

- New developments will be required to implement a Travel Plan (subject to the size and nature of the development as identified in the DfT 'Guidance for Transport Assessments, March 2007), and therefore will collectively provide a package of measures aimed at encouraging sustainable travel where possible. For the larger sites such as the Regional Investment Site (RIS), a Travel Plan Coordinator would be appointed, and this site would be expected to provide measures in isolation capable of achieving a high modal share of pedestrian, cyclist and public transport trips.
- The potential A34 rapid transit route linking the city centre to Great Barr (Varsity North line) will help improve public transport provision within the AAP area, with a bus rapid transit (BRT) operation likely within the timeframe of this plan;
- Improvements to the local rail network – including improved pedestrian access and upgraded passenger facilities at Perry Barr, Aston and Witton Stations will be investigated and an improved network of bus routes, connections and services considered. These measures include:
    - Improved bus services, including circular routes and longer distance services to serve the proposed Regional Investment Site.
    - Improved radial routes linking to adjoining areas.
    - Improvements to the pedestrian and bus access to the One Stop Shopping Centre at Perry Barr.
- A network of accessible pedestrian and cycle routes is proposed along routes along the River Tame, the Tame Valley Canal and Birmingham & Fazeley Canal.
- Existing cycle routes to Perry Barr and cycle lanes on the A34 and A5127 will be improved as part of corridor congestion management strategies.
- Pedestrian and cycle routes are to be linked into the proposed RIS at East Aston.

4.10 Whilst these measures have the potential to achieve a mode shift in car trips to alternative modes, for the purpose of the analysis, it has been assumed that all trips generated by the AAP proposals will be on the basis of existing mode split percentages identified by Census or TRICS data. It is therefore considered that a robust assumption of mode splits (in terms of car journeys) has been adopted.

5. Trip distribution

5.1 This chapter identifies the origin and destination of trips associated with existing land uses and proposed developments. Distribution has been determined to zones within and outside the AAP area. Consideration has been given to the modal split to each distribution zone, which is affected by journey distance and the modal choices available.

5.2 Census 2001 Journey to Work and Journey from Work information has been used to derive person trip distribution for the residential and employment land uses. Census 2001 ward and super output area population data has been used to inform a population and distance based gravity model for all other uses.

Distribution zones

5.3 Many trips will have an origin and destination within the AAP area. Others may travel into the area to shop or to work, and travel out of the area for the same purpose. These journey purposes are taken into account as part of the TDM.

5.4 For the purposes of the TDM, an internal trip is defined to be a trip whose origin and destination lies within the 7 sub-areas that make up the AAP area, but these AAP areas have been separated further into 12 internal zones, just for the purpose of trip distribution. These zones are defined by infrastructure or by land use type. For instance zone B1 is largely an employment area, and contained by railway infrastructure; whereas zone C5 represents the One Stop shopping centre. The distribution of trips from each site is calculated to each internal zone. These zones are shown in **Figure 5.1.**

5.5 An external trip has an origin or destination outside the boundary of the AAP area up to a distance of 60 miles. This is defined for the residential and employment land uses on the basis that people are likely to travel no more than one hour to get to work. This area includes the West Midlands metropolitan area and Derby, Coventry, Leicester, Stratford-upon-Avon and Worcester. It is also assumed that people will travel less than 10 miles (around 25 minutes locally) to get to leisure, local shops and healthcare uses in the AAP area.

5.6 External areas have been split into 16 zones, which are defined by infrastructure and regional route choices based upon relative journey times. The external distribution zones are shown in **Figure 5.2.**

Residential trips

5.7 The residential development traffic has been distributed using 2001 Census ‘journey to work’ data, for established residential land uses in the local area. These trip destinations have been identified to output areas up to 60 miles from the AAP area. Distribution is given for person trips to each output area and an appropriate mode split to each area can also be derived. To assess the performance of the highway network, vehicular trips will be distributed in accordance with the ‘Journey to Work’ car driver distribution to each output area and aggregated into the distribution zones.

5.8 Trip distribution zones and vehicular distribution percentages are provided in **Appendix D.**

Employment trips

5.9 Employment trips, including those generated by office and industrial developments have been distributed on ‘journey from work’ census data. Distribution percentages have again been identified by mode choice. To assess the performance of the highway network, vehicular trips will be distributed in accordance with the ‘Journey from Work’ car driver distribution to each output area and aggregated into the distribution zones.

Other land use trips

5.10 The category of 'other trips' includes all other land uses not grouped into the employment and residential categories, and include leisure, community, health, hotel and retail land uses. A gravity model has been created, analysing the population by super output areas up to 10 miles from the AAP area. Distance to each SOA has been calculated 'as the crow flies' from the centre of each internal zone. The gravity model then calculates the relative attractiveness of each SOA by applying the formula: (Population of SOA) / (Distance to SOA)^2. The power of 2 is representative for gravity models used elsewhere for these type of land uses (including for the Longbridge AAP TDM), which predicts that nearer residential areas are more attractive. The results of these calculations for each SOA are then aggregated to the distribution zones and are used as a proxy for trip distribution purposes in the TDM.

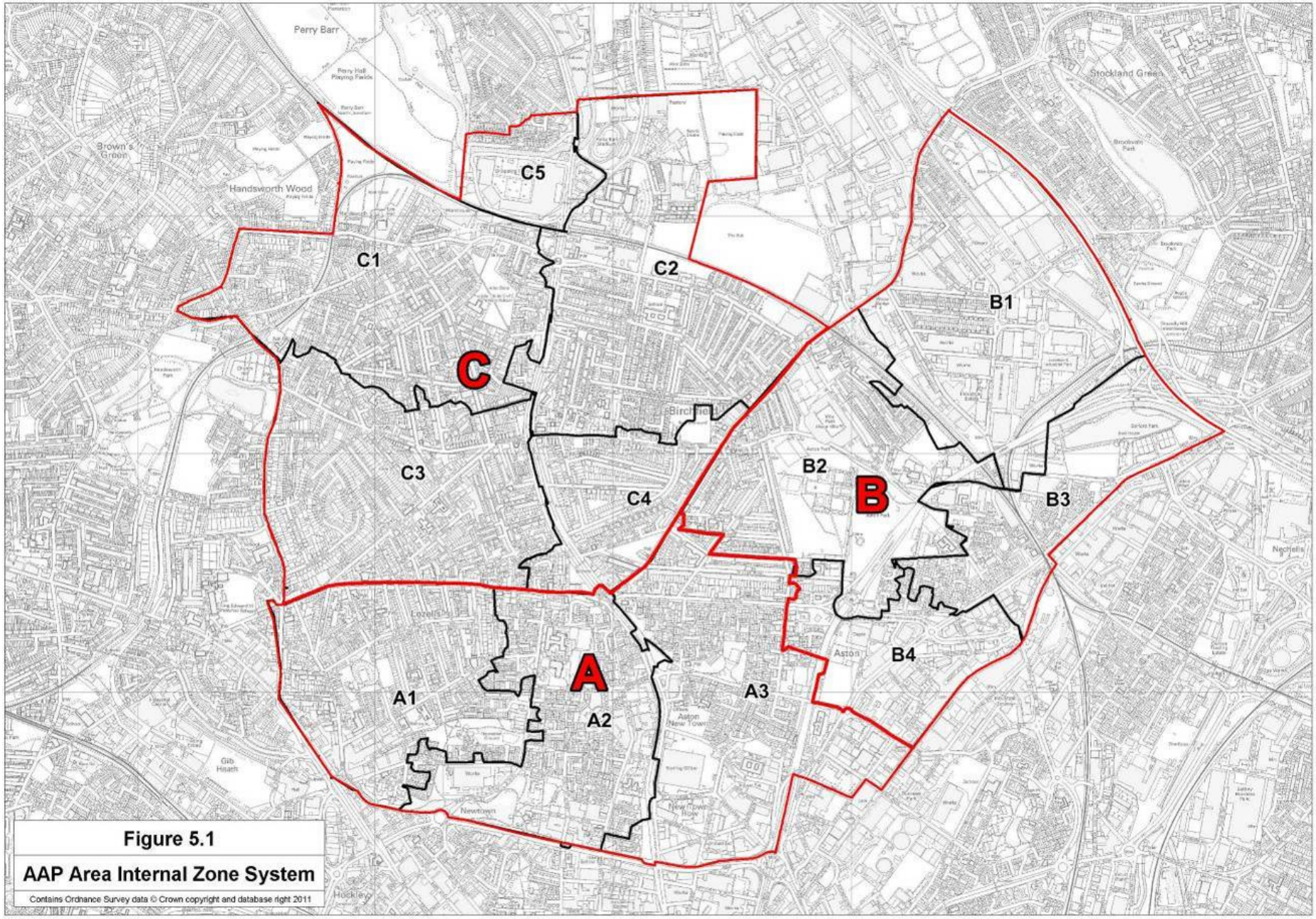


Figure 5.1

AAP Area Internal Zone System

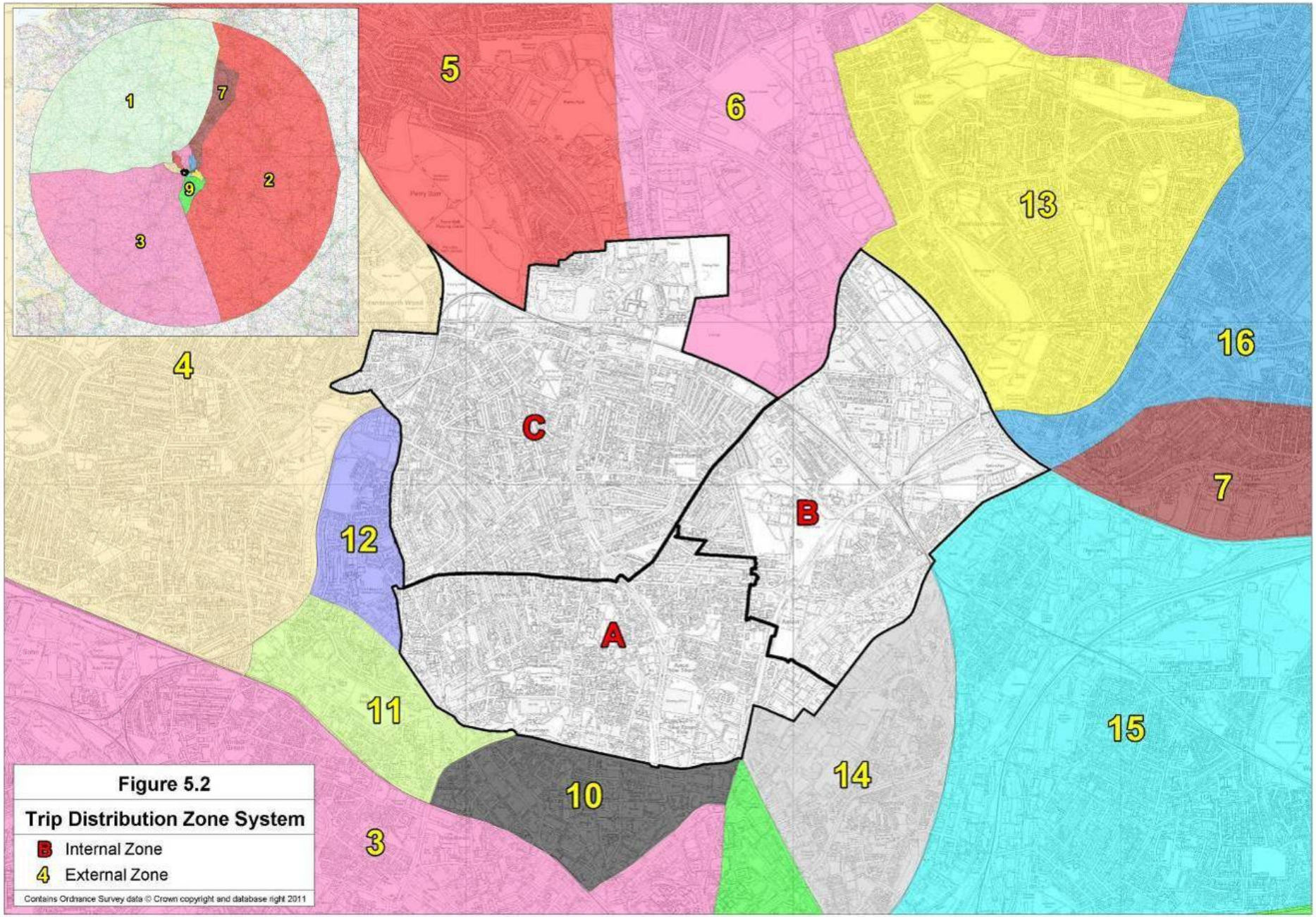


Figure 5.2

Trip Distribution Zone System

B Internal Zone

4 External Zone

6. Vehicle trips

6.1 The assessment of development on the performance of the highway network requires that vehicle trips numbers are derived for existing land uses and proposed developments. This chapter identifies the 'net' future vehicle trips that would be generated and assign on to the highway network, after the potential for trip deductions associated with specific land uses has been taken into account.

6.2 Whilst the AAP development proposals will generate new trips, it is considered that not all trips will be new to the highway network, especially in the case of retail land uses. In identifying these, trip types first need to be clarified. These apply to trips made by all mode users, but car trips are the main focus in terms of highway network capacity. Trip types include:

- Pass-by trips;
- New trips on the highway network.

Pass-by trips

6.3 Pass-by trips are generally defined as the trips visiting new retail development without making significant diversion (or no diversion at all) i.e. accessing the site to/from a point on the highway network that is their existing route. Pass-by trips should be considered as a major component of total trips visiting developments, depending upon the nature of the development. It is very important to distinguish the features of the new development site as well as its type in applying the pass-by trips.

6.4 The percentages of the defined trips depend upon the factors and are summarised as (DETR, 1998):

- Type of store; i.e. food retailer, non-food retailer, etc;
- The location of the development is important in defining the trip types. These are namely:
  - In-the-centre stores (town/city centre);
  - Edge-of-the centre stores; and
  - Out-of centre-stores.
- Competing-opportunities. Extent to which stores compete in towns or district centres;
- Standing of stores, i.e. free standing, anchors to rest (in a retail park), etc;
- The distance and the physical linkage between the linked trips;
- Relative size of the centre compared to the store;
- Accessibility, parking and the orientation of the food-store (i.e. free standing store); and
- The linked-trips in town centres are defined to be more, while it is less for edge-of-centre and least for out-of-centre.

6.5 Considering these effects the pass-by trips are therefore found in the region of 6-26%.Kamali, (1990); Dickinson, (1990); MacIver, (1992); Stokes, (1993) have also indicated the pass-by trips can be seen in the region of 30%[1]

6.6 The lower end pass-by percentages can be attributed to developments which attract minimal pass-by trips due to their type, or location (other site related features), such as retailers where located in mainly suburban areas. However, the higher end of the pass-by trips are likely to be occupied by retailers and leisure centres, which are more likely to be found in accessible locations on commuter routes.

6.7 Within the AAP area, retail sites are situated in highly accessible locations, along busy routes, and with a good degree of visibility from the highway network. For this reason, a pass-by percentage of 30% applied to vehicle trips has been identified for retail land uses. This percentage has been applied to retail developments whether existing or proposed within the AAP area.

New vehicle trips

6.8 Once the pass-by trips have been identified and deducted from retail trip generation, the remaining trips are considered to be new trips on the highway network.

6.9 In order to assess the impact of these new development trips on the network, the trips generated by existing land uses must be taken into account. This calculation is called trip netting, which refers to the actual volume of trips that will be observed travelling on the highway network, once the full AAP proposals have been implemented and are operational. Net trips are those generated by the proposed land uses, less the trips that the existing developments sites (being redeveloped) currently generate. The difference in trip levels, are those that will be seen on the highway network.

6.10 A detailed breakdown of net vehicle trips identified for each site is set out below in Tables 6.1 to 6.6 for each AAP sub-area.

Table 6.1: Net trip generation by AAP site (East Aston/RIS Sub-Area)

Site Reference	AM Peak Hour		PM Peak Hour	
	Arrivals	Departures	Arrivals	Departures
E1A	909	273	228	765
LC6	53	52	58	55
Sub-Area Total	**+962**	**+325**	**+286**	**+820**

i) [1] Kamali, F. (1990). Trip Patterns at Newly Developed Commercial Centres: Do These Off-Centre Retail Developments Increase The Total Trips Or Simply Re-distribute Them.

Department of Environment, Transport and Regions (DETR), (1998). The Governments White Paper on The Future of Transport: A New Deal For Transport: Better For Everyone. July 1998.

Dickinson, K. W. and A. MacIver. (1990). The Effect Of trip Types In Traffic Impact Analysis. Paper Presented in the 2nd Annual TRICS Conference, Imperial College London, September 1990.

MacIver, A. and K. W. Dickinson, (1992). A Before and After Study of Four New Sainsbury's food stores. Traffic Engineering and Control, July/August 1992.

Stokes G. (1993). "Changes in the amount of car travel following the opening of new superstores: Evidence from a household survey in Swindon". Traffic Engineering + Control, Vol. 35, No 5, pp: 247-52. May 1993.

Table 6.2: Net trip generation by AAP site (Tame Road Sub-Area)

Site Reference	AM Peak Hour		PM Peak Hour	
	Arrivals	Departures	Arrivals	Departures
3	12	53	41	22
11	2	8	6	3
19	2	9	7	4
Sub-Area Total	**+16**	**+70**	**+54**	**+29**

Table 6.3: Net trip generation by AAP site (Newtown Sub-Area)

Site Reference	AM Peak Hour		PM Peak Hour	
	Arrivals	Departures	Arrivals	Departures
2	-2	-3	5	4
4	4	16	13	7
H6	9	41	32	17
E6A	2	2	2	2
E6B	18	5	41	23
E6C	161	137	175	160
LC4A	-47	-54	-60	-51
LC4B	74	52	86	73
Sub-Area Total	**+219**	**+196**	**+276**	**+236**

Table 6.4: Net trip generation by AAP site (Lozells Sub-Area)

Site Reference	AM Peak Hour		PM Peak Hour	
	Arrivals	Departures	Arrivals	Departures
LC2Ai	-20	-14	-28	-31
LC2Aii	2	-6	-5	4
LC2Bi	-1	0	0	0
LC2Bii	0	0	0	0
LC2Biii	2	2	1	2
1	1	5	4	2
6	2	10	8	4
7	1	5	5	2
8	3	11	9	5
9	1	3	2	1
10	1	2	2	1
12	2	8	7	4
13	0	1	1	0
14	1	3	2	1
15	1	2	2	1
16	3	12	9	5
17	0	1	1	0
18	1	6	5	3
E7	-1	9	10	5
Sub-Area Total	**-1**	**+63**	**+33**	**+10**

Table 6.5: Net trip generation by AAP site (Perry Barr/Birchfield Sub-Area)

Site Reference	AM Peak Hour		PM Peak Hour	
	Arrivals	Departures	Arrivals	Departures
LC1A	15	8	17	23
LC1B	11	6	16	9
LC1C	-32	-9	-6	-19
LC1D	11	20	23	18
LC1E	8	3	7	6
LC1F	0	-33	-21	-2
LC1Tii	155	25	19	136
LC1Tiii	8	5	12	14
20	0	0	0	0
ED1				
Sub-Area Total	**+177**	**+24**	**+68**	**+195**

Table 6.6: Net trip generation by AAP site (Central Aston Sub-Area)

Site Reference	AM Peak Hour		PM Peak Hour	
	Arrivals	Departures	Arrivals	Departures
LC3	34	34	47	47
Sub-Area Total	**+34**	**+34**	**+47**	**+47**

Table 6.7: Total net trip generation

Sub-Area	AM Peak Hour		PM Peak Hour	
	Arrivals	Departures	Arrivals	Departures
East Aston/RIS Sub-Area	+962	+325	+286	+820
Tame Road Sub-Area	+16	+70	+54	+29
Newtown Sub-Area	+219	+196	+276	+236
Lozells Sub-Area	-1	+62	+33	+10
Perry Barr/Birchfield Sub-Area	+177	+24	+68	+195
Central Aston Sub-Area	+34	+34	+47	+47
AAP Total	**+1407**	**+711**	**+764**	**+1337**

6.11 The above table shows that the AAP proposals generate more trips than the existing developments, but this is to be expected as many sites that are vacant at present, become developed as part of the AAP proposals. Of the development proposals, the RIS site is shown to account for a significant amount of additional vehicle trip generation during the peak hours.

6.12 Table 6.7 sets out the AAP net development traffic by sub-area that has been added to the highway network for the purpose of undertaking junction capacity assessments for a future year scenario. A full breakdown of the trips is provided in **Appendix E.**

7. Trip assignment

7.1 Trip assignment refers to routes that traffic will take to reach a particular destination, taking into account the layout of the highway network, and other factors such as time of travel and known congestion locations. This chapter sets out the methodology of how traffic has been assigned to the highway network.

Assignment methodology

7.2 The vehicular trip generation is used with the trip distribution percentages to identify the number of vehicles travelling to/from each development site to all other areas. Between these locations, vehicular trips are assigned over the highway network via primary routes connecting origins to destinations. This assignment of trips is undertaken manually, taking into account the location of the site access and the provision of one-way roads. Routes are selected starting with the shortest route, giving consideration to known congestion hotspots and alternative faster routes.

7.3 Where drivers have the option of using two or three different routes to access a particular location, all possible route options are taken into account, with weightings to reflect the most likely route choice.

7.4 All major junctions have been identified on the highway network in the AAP area, which connect the primary routes to internal and external trip distribution zones. These junctions have been given a reference number (1 to 36) and each turning movement a separate reference to identify 'route strings' through the network for each site to zone trip. The junction references together with primary routes are shown in **Figure 7.1.**

7.5 A series of key junctions have been selected for weekday peak hour capacity assessments, which are those most affected by development traffic. These were identified in the 'Scoping Report to Assess Travel Demand' report (December 2010), but junctions 35 and 36 have been added to take account of a significant amount of trips using Tame Road and Electric Avenue.

7.6 The key junctions by AAP sub-area include:

Junction East Aston / RIS Sub-Area Junctions

- Junction 11 – Witton Lane / Aston Hall Road / Queens Road Junction
- Junction 12 – Lichfield Road / Aston Hall Road Junction
- Junction 13 – Lichfield Road / Cuckoo Road Junction
- Junction 14 – Lichfield Road / Grosvenor Road Junction
- Junction 15 – Lichfield Road / Church Road Junction
- Junction 16 – Church Road / Thimble Mill Lane / Lynton Road Junction
- Junction 17 – Lichfield Road / Lynton Road / Waterlinks Boulevard Junction
- Junction 33 – Salford Circus

Tame Road Sub-Area Junctions

- Junction 35 – Aston Hall Road/Electric Avenue Junction
- Junction 36 - Witton Road/Tame Road Junction

Newtown Sub-Area Junctions

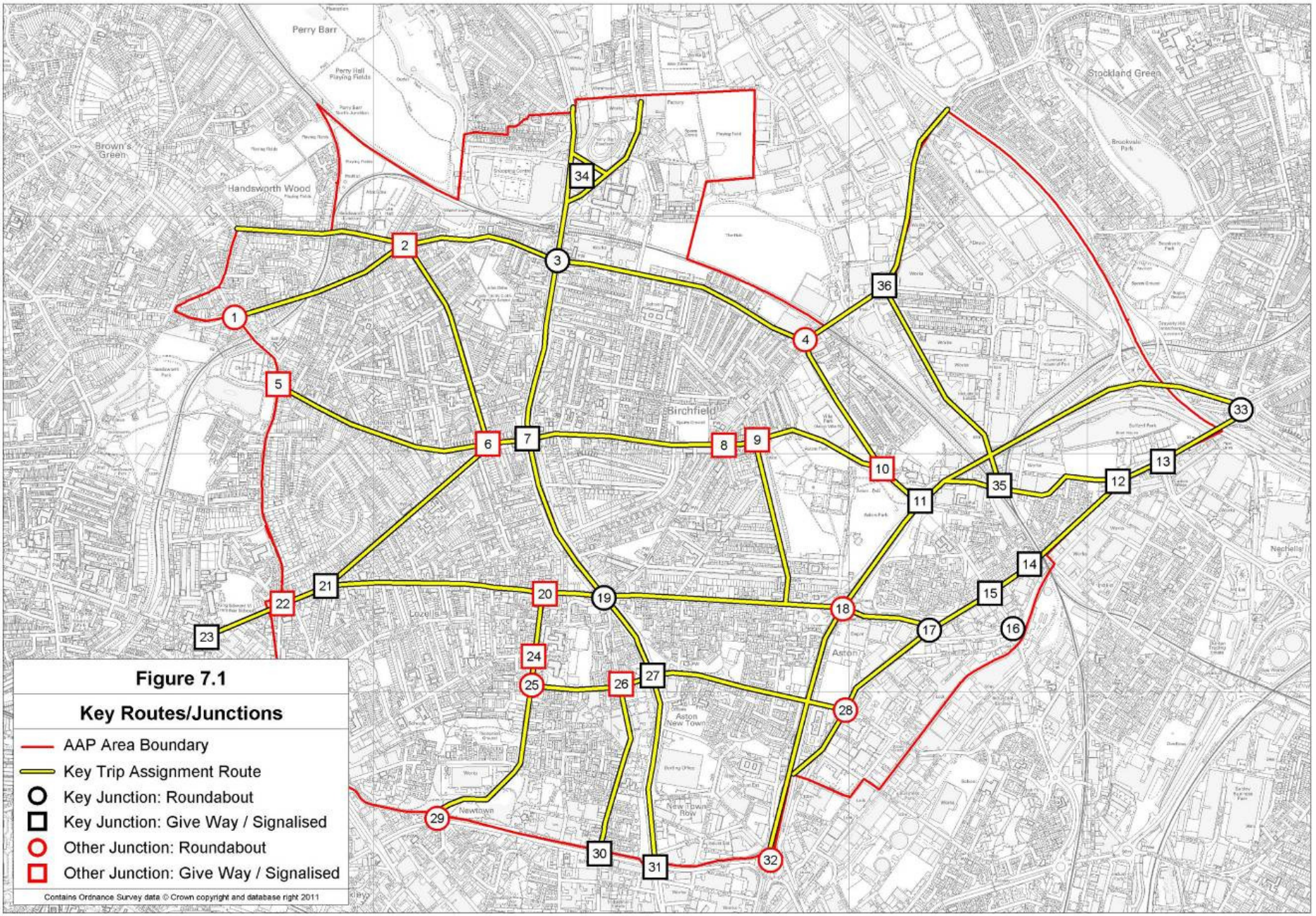
- Junction 27 – High Street / Park Lane / Newbury Road Junction
- Junction 30 – New John Street West / Summer Row Junction
- Junction 31 – New John Street West / Newtown Row Junction

Lozells Sub-Area Junctions

- Junction 19 – Six Ways Roundabout Junction
- Junction 21 – Villa Road / Lozells Road / Heathfield Road / Barker Street Junction
- Junction 23 – Soho Road / Villa Road Junction

Perry Barr/Birchfield Sub-Area Junctions

- Junction 3 – Birchfield Road / Wellington Road / Aston Lane Junction
- Junction 7 – Birchfield Road / Heathfield Road / Trinity Road Junction
- Junction 34 – Walsall Road /Aldridge Road Junction


Perry Barr
Perry Hall Playing Fields
Brown's Green
Handsworth Wood
Stockland Green
Brookvale Park
Birchfield
Lozells
Aston
Aston New Town
New Town Row
Newtown
Nechells
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
Figure 7.1
Key Routes/Junctions
AAP Area Boundary
Key Trip Assignment Route
Key Junction: Roundabout
Key Junction: Give Way / Signalised
Other Junction: Roundabout
Other Junction: Give Way / Signalised
Contains Ordnance Survey data © Crown copyright and database right 2011

8. Network Capacity

8.1 This chapter identifies the baseline capacity of key junctions on the highway network within the AAP study area.

Assessment methodology

8.2 The baseline assessment of the highway network has been taken from the 'Scoping Report to Assess Travel Demand' report (December 2010), traffic models have then been updated for the 'with AAP development traffic' scenarios.

8.3 The key junctions have been assessed during weekday peak hours using empirical modelling software such as ARCADY, PICADY and LinSig for two traffic scenarios. These models have retained the parameters used to create the baseline models. Only signal timings (where provided) have been optimised in each model, before mitigation measures are considered. The traffic scenarios include:

- Base traffic in the year 2010 (used to calibrate each model);
- Base and AAP development for the year 2026

8.4 The following assumptions with regard to traffic modelling have been made:

- The modelling approach does not include a "phased" development scenario nor does it include an intermediate assessment year;
- LinSig models have been based on existing signal timings data (i.e. phase delays/stages/intergreens) as provided by BCC. LinSig models were then optimised for each junction and each scenario; and
- Where LinSig models include pedestrian crossing phases that are completely controlled by the pedestrian push button, a robust view has been assumed where the pedestrian phase is called every other cycle unless site observations, anecdotal evidence or delay/queue data suggest otherwise.

Baseline traffic flows

8.5 Existing traffic data has been extracted (where available) from Spectrum. For junctions with existing traffic count data collected prior to 2007, new traffic counts have been commissioned to enable a sufficient level of validation. An AM and PM peak hour specific to each junction has been used in order to provide a robust view on capacity.

8.6 Traffic flows have been factored up to 2010 levels (baseline year) using TEMPRO factors identified for the local area. As agreed with BCC, no background traffic growth has been assumed between the years 2010 and 2026.

8.7 For the Tame Road/Witton Road Junction (36) a traffic turning count was surveyed on Tuesday 22nd March 2011, but these traffic figures have not been factored back to the baseline year. For the Electric Avenue/Aston Hall Road Junction (35), BCC undertook a traffic survey on Tuesday 8th March 2011.

8.8 Traffic count data is provided in **Appendix F.**

Junction capacity validation

8.9 Site investigations have been undertaken in the peak hours in the weeks commencing the 6th September 2010, 13th September 2010 and 1st March 2011 (on neutral days of the week – Tuesday, Wednesday and Thursday) to determine any constraints, existing capacity issues, local highway conditions/issues, existing queue length observations and existing geometry of the highway network.

8.10 For the Tame Road/Witton Road Junction (36) and Electric Avenue/Aston Hall Road Junction (35), junction operation observations were undertaken on 15th March 2011.

Baseline modelling

8.11 2010 Base year models have been set up to assess the current operation of the junctions, and have been validated using queue length data and onsite observations of junction operation. These base models have been calibrated to match existing site conditions in terms of queuing and delay. These calibrations have been carried out by adjusting saturation flow and intercept values.

8.12 Generally an RFC (Ratio of Flow to Capacity) below 0.85 (for roundabouts and priority junctions) and a degree of saturation of below 90% (for signal controlled junctions) indicates that a junction operates within capacity for the assessed flows.

8.13 Junction capacity assessment results are provided in **Appendix G.**

East Aston / RIS Sub-Area Junctions

Junction 11 – Witton Lane / Aston Hall Road / Queens Road Junction

8.14 This three-arm signalised junction has been assessed in LINSIG for the weekday peak hours, with the results set out below in Table 8.1

Table 8.1 – Junction 11 - Witton Lane / Aston hall Road / Queens Road Junction

Arm	Movement	AM			PM		
		%Sat	Queue	Delay	%Sat	Queue	Delay
Witton Lane	Left	27	2	14	26	3	11
	Ahead	56	7	17	27	4	10
Aston Hall Road	Right & Left	41	4	16	65	8	35
Queens Road	Ahead & Right	58	6	17	73	15	17
Cycle Time		60			85		
Total Delay (pcuHr)		7.03			9.3		
PRC (%)		54.7			23.2		

KEY (LinSig)
***%Sat** - Degree of Saturation (90% or above is considered to be the point at which a junction is at capacity)*
***Queue** - Mean maximum queue in Passenger Car Vehicles (PCUs)*
***Delay** – In seconds per PCU*
***PRC** – It the Practical Reserve Capacity, and reflects the capacity of the junction as a whole*

8.15 The above junction operates within capacity in both peak hours with minimal queuing observed on the majority of junction approaches.

Junction 12 – Lichfield Road / Aston Hall Road Junction and Junction 13 – Lichfield Road / Cuckoo Road Junction

8.16 The LINSIG model for these junctions has been combined to reflect the interaction of these two junctions and the effect of an upstream junction creating platoon traffic flows. The results are set out below in Table 8.2.

Table 8.2 – Junction 12 - Lichfield Road / Aston Hall Road Junction / Junction 13 - Lichfield Road / Cuckoo Road Junction

Arm	Movement	AM			PM		
		%Sat	Queue	Delay	%Sat	Queue	Delay
Lichfield Road (Northbound)	Left & Ahead	71	8	27	94	16	53
Aston Hall Road	Ahead	45	6	15	60	9	17
Lichfield Road Link Road (Southbound)	Ahead	26	0	1	19	0	1
	Ahead	56	13	18	53	11	13
Lichfield Road (Southbound)	Left	47	7	17	38	5	18
	Ahead	69	13	50	69	10	57
Cuckoo Road	Left	31	5	21	30	4	17
	Right	59	7	61	62	9	59
	Right	62	8	61	64	10	59
Lichfield Road (Northbound)	Ahead	32	6	24	44	10	28
	Ahead	29	6	23	45	9	26
	Right	69	7	58	62	8	49
Cycle Time		130			130		
Total Delay (pcuHr)		39.78			46.21		
PRC (%)		27.0			-3.9		

8.17 The results show that the junctions operate within capacity in the AM peak, but over capacity in the PM peak. The largest queue is shown to occur on the Lichfield Road (northbound) approach in the PM peak.

Junction 14 – Lichfield Road / Grosvenor Road Junction

8.18 The LINSIG model for this junction was combined and assessed with the neighbouring junction 15 (Lichfield Road / Church Road), and the results are set out in Table 8.3.

Table 8.3 – Junction 14 - Lichfield Road / Grosvenor Road Junction

Arm	Movement	AM			PM		
		%Sat	Queue	Delay	%Sat	Queue	Delay
Grosvenor Road	Right & Left	87	18	64	101	27	168
Lichfield Road (westbound)	Ahead	21	4	14	14	3	10
	Right	86	21	49	107	45	259
Lichfield Road_Link Road (eastbound)	Left & Ahead	47	13	12	76	32	21
Cycle Time		120			120		
Total Delay (pcuHr)		18.83			55.91		
PRC (%)		3.5			-18.6		

8.19 The results show that this junction operates at capacity in the PM peak hour. Queues in the PM peak are shown to be significant on three of four approaches.

Junction 15 – Lichfield Road / Church Road Junction

8.20 This four-arm signalised crossroads junction has been assessed together with junction 14 (Lichfield Road / Grosvenor Road Junction), and the results are set out below in Table 8.4.

Table 8.4 – Junction 15 - Lichfield Road / Church Road Junction

Arm	Movement	AM			PM		
		%Sat	Queue	Delay	%Sat	Queue	Delay
Lichfield Road (westbound)	Ahead	57	14	10	50	11	15
Church Road (northbound)	Left & Right	40	6	36	80	18	47
Lichfield Road (eastbound)	Left & Ahead	43	9	20	74	25	33
Church Road (southbound)	Right & Left	53	9	40	20	3	28
Cycle Time		120			120		
Total Delay (pcuHr)		9.76			16.57		
PRC (%)		59.4			12.5		

8.21 This junction operates within capacity, although queues can be significant on the Lichfield Road eastbound approach in the PM peak hour. Queues of 25 and 40 vehicles are shown to occur on Church Road.

Junction 16 – Church Road / Thimble Mill Lane / Lynton Road Junction

8.22 This four-arm priority roundabout junction has been assessed using ARCADY 7 for the peak hours for a base year (2010). The results are set out below in Table 8.5.

Table 8.5 – Junction 16 - Church Road / Thimble Mill Lane / Lynton Road

Movement	AM			PM		
	RFC	Queue	Delay	RFC	Queue	Delay
Thimble Mill Lane N	0.28	0	0.05	0.20	0	0.05
Thimble Mill Lane S	0.28	0	0.05	0.49	1	0.07
Lynton Road	0.20	0	0.03	0.29	0	0.04
Church Road	0.01	0	0.05	0.01	0	0.05

KEY (ARCADY / PICADY)
RFC – *Ratio of flow to capacity (at 0.85 or above the junction is considered to be at capacity)*
Queue *- Mean maximum queue in vehicles*
Delay *– In minutes per vehicle*

8.23 This junction operates within capacity in both peak hours with no queues or delays.

Junction 17 – Lichfield Road / Lynton Road / Waterlinks Boulevard Junction

Table 8.6 – Junction 17 - Lichfield Road / Lynton Road / Waterlinks Boulevard

Movement	AM			PM		
	RFC	Queue	Delay	RFC	Queue	Delay
A5127 Lichfield Road North	0.86	6	0.48	0.49	1	0.08
B4132 Lynton Road	0.78	3	0.81	0.62	2	0.18
A5127 Lichfield Road South	0.19	0	0.03	0.90	8	0.56
Waterlinks Boulevard	0.67	2	0.14	0.49	1	0.15

8.24 This junction is shown to operate within capacity, with queues emerging in the PM peak. Site observations revealed that these queues quickly dissipated, and only occurred occasionally when platoons of vehicles arrived from upstream junctions.

Junction 33 – Salford Circus

8.25 This five-arm priority roundabout junction has been assessed using ARCADY, and the results are set out in Table 8.7.

Table 8.7 – Junction 33 - Salford Circus

Movement	AM			PM		
	RFC	Queue	Delay	RFC	Queue	Delay
Slade Road	1.03	27	1.64	0.76	3	0.32
Gravelly Hill	1.04	19	1.86	0.76	3	0.34
Tyburn Road	1.07	39	2.26	0.84	5	0.23
A5127 Lichfield Road	0.91	9	0.51	0.96	15	0.68
M6 Slip Road	0.89	7	0.26	0.96	15	0.59

8.26 This junction is operating at capacity in both peak hours, with excessive queues shown on the Tyburn Road approach in the AM peak hour. In the PM peak hour, the junction operates better with smaller queues and delays.

Tame Road Sub-Area Junctions

Junction 35 – Electric Avenue / Aston Hall Road Junction

8.27 This junction has been assessed in PICADY during the weekday peak hours, and the results are set out below in Table 8.8.

Table 8.8 Electric Avenue/ Aston Hall Road

Arm	Movement	AM			PM		
		RFC	Queue	Delay	RFC	Queue	Delay
Aston Hall Road	Left	0.212	0	0.16	0.290	0	0.18
Aston Hall Road	Right	0.631	2	0.35	0.596	1	0.30
Electric Avenue	Right	0.705	3	0.45	0.305	0	0.20

8.28 The results show the junction to operate within capacity in both the AM and PM peak hours, with a maximum queue of 3 vehicles shown to occur on Electric Avenue in the AM peak hour.

Junction 36 – Witton Road / Tame Road Junction

8.29 This junction has been assessed in PICADY during the weekday peak hours, and the results are set out below in Table 8.9.

Table 8.9 Witton Road/Tame Road

Arm	Movement	AM			PM		
		RFC	Queue	Delay	RFC	Queue	Delay
Witton Road	Right	0.200	0	0.18	0.145	0	0.15
Tame Road	All	0.666	2	0.42	0.890	6	0.69

8.30 This junction is shown to operate within capacity in the AM peak hour, and at capacity on Tame Road in the PM peak, although queues still remain at minimal levels.

Newtown Sub-Area Junctions

Junction 27 – High Street / Park Lane / Newbury Road Junction

8.31 This four-arm signalised crossroads junction has been assessed in LINSIG for the peak hour periods, with result set out in Table 8.10.

Table 8.10 – Junction 27 - High Street / Park Lane / Newbury Road Junction

Arm	Movement	AM			PM		
		%Sat	Queue	Delay	%Sat	Queue	Delay
High Street (southbound)	Left	67.8	5	9.4	37.9	0	4.5
	Ahead	79.2	27	20.9	47.1	11	11.7
	Ahead	81.1	29	21.9	45.8	10	11.5
	Right	81.6	14	46.9	86.4	7	94.4
Park Lane	Left	24.2	2	19.9	16.2	1	6.0
	Ahead	74.0	8	57.9	84.3	11	69.5
High Street (northbound)	Ahead & Left	2.1	0	31.0	1.3	0	13.3
	Ahead	82.4	19	51.8	95.4	47	50.1
	Ahead	82.4	20	51.6	95.0	43	48.3
Newbury Road	Left	21.1	2	14.1	82.6	16	50.0
	Ahead	80.8	12	70.5	89.5	14	90.6
Pedestrian Crossings							
Park Lane (eastbound)	Ahead	36.8	11	1.8	27.3	10	1.7
Park Lane (westbound)	Inside Lane	4.0	0	1.0	4.1	0	1.0
	Outside Lane	18.0	0	1.1	19.2	0	1.1
High Street (southbound)	Inside Lane	53.3	1	1.9	33.6	0	1.3
	Outside Lane	55.7	1	1.9	32.7	0	1.3
High Street (northbound)	Inside Lane	29.5	0	1.3	59.1	1	2.3
	Outside Lane	27.4	0	1.2	55.0	1	1.9
Newbury Road (eastbound)	Inside Lane	12.4	0	1.1	29.4	0	1.0
	Outside Lane	15.3	0	1.1	15.4	0	1.4
Cycle Time		120			120		
Total Delay (pcuHr)		55.67			-6.0		
PRC (%)		9.2			68.2		

8.32 This junction operates within capacity in the AM peak hour, but at capacity on two junction approaches in the PM peak hour, where queues are shown to be over 40 vehicles.

Junction 30 – New John Street West / Summer Row Junction

8.33 The results of this junction assessment are set out in Table 8.11.

Table 8.11 – Junction 30 - New John Street West / Summer Row Junction

Arm	Movement	AM			PM		
		%Sat	Queue	Delay	%Sat	Queue	Delay
New John Street West (westbound)	Left & Ahead	68	10	27	66	22	45
	Ahead & Right	73	26	21	68	24	45
Summer Lane (northbound)	All	29	5	33	76	18	46
New John Street West (eastbound)	Left & Ahead	56	16	30	50	13	28
	Ahead & Right	67	21	32	54	16	28
Summer Lane (southbound)	All	88.1	27	58	35	5	34
Cycle Time		130			130		
Total Delay (pcuHr)		31.18			32.65		
PRC (%)		2.2			19.1		

8.34 The results show that the junction operates within capacity on all arms in both the AM and PM peak hours, with moderate queues generated on the majority of junction approaches.

Junction 31 – New John Street West / Newtown Row Junction

8.35 This junction has been assessed in the same LINSIG model as the New John Street West / Summer Row Junction given its close proximity, and the results are set out below in Table 8.12.

Table 8.12 – Junction 31 - New John St West / Newtown Row Junction

Arm	Movement	AM			PM		
		%Sat	Queue	Delay	%Sat	Queue	Delay
Newtown Row (southbound)	Left & Ahead	110	110	260	83	23	40
	Right & Ahead	110	110	265	80	11	49
New St John Street (westbound)	Ahead & Left	96	32	84	106	60	198
	Right & Ahead	99	28	112	120	92	428
Newtown Row (northbound)	Ahead & left	62	15	38	119	124	426
	Ahead & Right	62	15	43	120	127	440
New St John Street (eastbound)	Left & Ahead	107	47	226	89	21	72
	Ahead & Right	108	62	235	89	23	70
New John Street Link (westbound)	Inside Lane	34	0	1	40	0	2
	Outside Lane	31	0	1	24	0	1
Newtown Row (S) (southbound)	Inside Lane	35	7	2	28	7	1
	Outside Lane	43	0	2	19	0	1
Cycle Time		130			130		
Total Delay (pcuHr)		283.03			373.7		
PRC (%)		-21.9			-33.8		

8.36 The results show this junction to be operating at capacity in both peak periods.

Lozells Sub-Area Junctions

Junction 19 – Six Ways Roundabout Junction

8.37 The capacity assessment results are set out below in Table 8.13.

Table 8.13 – Junction 19 – Six Ways - Lozells Road / High Street / Birchfield Road / Victoria Road / Witton Road

Movement	AM			PM		
	RFC	Queue	Delay	RFC	Queue	Delay
A34 Birchfield Road	0.74	3	0.15	0.75	3	0.26
Witton Road	0.89	6	1.07	0.95	11	1.40
B4144 Victoria Road	0.77	4	0.38	1.04	28	2..26
A34 High Street	0.17	0	0.06	0.64	2	0.36
B4144 Lozells Road	0.68	2	0.16	0.87	7	0.39

8.38 The results show that the junction operates within capacity on all arms in the AM peak and on most arms in the PM peak. Queues range from 11 to 28 vehicles. The Victoria Road delay of 2.26 minutes replicates the delay observed on site during the queue validation process.

Junction 21 – Villa Road / Lozells Road / Heathfield Road / Barker Street Junction

8.39 The assessment results are set out below in Table 8.14.

Table 8.14 – Junction 21 - Villa Road / Lozells Road / Heathfield Road / Barker Street Junction

Arm	Movement	AM			PM		
		%Sat	Queue	Delay	%Sat	Queue	Delay
Car Park	All	0	0	44	0	0	0
Heathfield Road	All	67	11	43	65	6	46
Lozells Road	All	65	8	29	56	9	40
Barker Street	All	29	3	29	59	7	38
Villa Road	All	66	8	42	66	12	40
Cycle Time		90			90		
Total Delay (pcuHr)		12.71			13.69		
PRC (%)		34.6			36.9		

8.40 This junction is shown to operate within capacity in both peak hours with minimal queues.

Junction 23 – Soho Road / Villa Road Junction

8.41 The capacity assessment results for this junction are set out below in Table 8.15.

Table 8.15 – Junction 23 - Soho Road / Villa Road Junction

Arm	Movement	AM			PM		
		%Sat	Queue	Delay	%Sat	Queue	Delay
Soho Road	Left & Ahead	61	10	25.7	45	8	24
	Ahead	63	12	25.7	51	10	24
Villa Road	All	63	9	32.7	51	8	30
Soho Hill	Left & Ahead	56	9	24.5	41	7	23
	Right & Ahead	44	2	45.1	48	8	27
St Michaels Road	All	49	7	29.8	49	8	29
Cycle Time		90			90		
Total Delay (pcuHr)		17.41			15.05		
PRC (%)		42.2			75.9		

8.42 This junction is shown to operate within capacity in both peak hours with minimal queues.

Perry Barr/Birchfield Sub-Area Junctions

Junction 3 – Birchfield Road / Wellington Road / Aston Lane

8.43 This junction has been assessed below in Table 8.16.

Table 8.16 – Junction 3 – Birchfield Road / Wellington Road / Aston Lane

Movement	AM			PM		
	RFC	Queue	Delay	RFC	Queue	Delay
A34 Walsall Road	0.81	4	0.36	0.92	9	0.68
A4040 Aston Lane	0.67	2	0.32	0.99	14	1.70
A34 Birchfield Road	0.74	3	0.33	1.11	35	3.17
A4040 Wellington Road	1.07	41	2.34	1.09	43	3.45

8.44 This junction operates at capacity in both the AM and PM peaks. During the AM peak only Wellington Road has significant queues, whilst in the PM peak all arms have an RFC above 0.85. Significant queues build up on Birchfield Road and Wellington Road.

Junction 7 – Birchfield Road / Heathfield Road / Trinity Road Junction

8.45 This junction has been assessed in LINSIG for the peak hours, with the results set out below in Table 8.17.

Table 8.17 – Junction 7 - Birchfield Road / Heathfield Road / Trinity Road Junction

Arm	Movement	AM			PM		
		%Sat	Queue	Delay	%Sat	Queue	Delay
Birchfield Road (North)	Left & Ahead	48.5	5	36.7	29.5	4	23.1
	Right	79.2	9	56.1	37.6	3	43.2
Trinity Road	All	51.3	7	31.3	77.8	10	48.3
Birchfield Road (South)	Left & Ahead	54.2	6	38.9	106.2	48	173.5
	Right	32.4	3	37.3	105.5	22	203.4
Heathfield Road	All	81.2	12	38.8	104.8	31	167.8
Cycle Time		90			90		
Total Delay (pcuHr)		20.22			85.53		
PRC (%)		10.8			-18.0		

8.46 This junction operates marginally at capacity with large queues forming on the Birchfield Road south arm and the Heathfield Road arm of the junction. On site observations during the PM peak highlight that the queues and delays fluctuate considerably. At times during the PM peak the junction was observed to operate within capacity with vehicles on all arms clearing the junction within one cycle.

Junction 34 – Walsall Road / Aldridge Road Junction

8.47 Vehicles travelling north on the A453 Walsall road are required to merge with northbound traffic on the A34 to the north of the One-Stop Shopping Centre to continue north through Aston, although are required to route under the A34 via the A453, and follow the one way system to the Aldridge Road in order to travel southbound. This requires vehicles to travel through a signal controlled junction to the south of the Perry Bar Greyhound Stadium.

8.48 For vehicles travelling south on the A453 Aldridge Road, these are required to u-turn at the Birchfield Road roundabout to gain access to the One-Stop Shopping Centre, taking access of the northbound Walsall Road carriageway. Southbound Aldridge Road traffic is also required to merge onto the A34 to continue southbound, avoiding the Birchfield Road roundabout via an underpass.

8.49 Junction assessment results are presented below in Table 8.18.

Table 8.18 – Junction 34 - Walsall Road / Aldridge Road Junction

Arm	Movement	AM			PM		
		%Sat	Queue	Delay	%Sat	Queue	Delay
Walsall Road / One Stop Shopping Centre Junction							
Walsall Road	Ahead	37	2	6	63	5	10
Walsall Road	Ahead	24	2	7	55	6	12
One Stop Egress	Left	37	3	22	61	7	20
One Stop Egress	Ped Crossing	12	1	4	28	3	5
Cycle Time		90			90		
Total Delay (pcuHr)		2.78			6.79		
PRC (%)		143.8			43.5		
Aldridge Road / Wellhead Road Junction							
Aldridge Road (northbound)	Ahead	20	3	9	54	13	14
	Ahead	30	5	9	59	16	15
Link Road	Left	77	11	93	63	9	70
	Left	76	10	91	62	9	69
	Right	75	10	92	77	11	81
	Right	75	10	92	77	11	81
Aldridge Road (southbound)	Ahead & Left	100	64	89	74	20	50
	Ahead	100	67	88	75	21	50
Wellhead Lane	Left & Right	100	13	219.8	76	14	75
Aldridge Road Link (northbound link road)	Ahead	33	7	10	73	26	29
	Ahead & Right	45	13	22	77	31	31
Aldridge Road Link (southbound link road)	Ahead	64	3	6	35	1	4
	Ahead	78	5	8	44	1	4
Cycle Time		145			145		
Total Delay (pcuHr)		89.62			61.42		
PRC (%)		-10.7			16.9		

8.50 The results show that the Walsall Road / One Stop Shopping Centre Junction operates well within capacity during both peak periods. During the AM peak the number of vehicles accessing and exiting the One Stop Centre is limited as the majority of shops are not open at that time in the morning, and the main One Stop entrance is located to the north of this junction.

8.51 Table 8.18 shows that the Aldridge Road / Wellhead Road junction operates at capacity in the PM peak period but within capacity during the AM peak period. During the AM peak large queues are shown to occur on the Aldridge Road southbound arm. In the AM & PM peak noteworthy queues exist on Wellhead Lane. In addition, excessive queues are also noted in the PM peak on the Aldridge Road northbound link road. The queues shown in the base model results exceed the physical length of the link road traffic lanes. On site observations show that vehicles queuing on the northbound link road prevent some northbound vehicles on the western link road getting through the junction. In reality, larger queues develop on the western link road than reported by the LINSIG base model during the PM peak.

9. Future year modelling

9.1 As undertaken in Chapter 8, the key junctions have again been assessed in this chapter with the inclusion of net AAP development traffic.

9.2 Assessment results for each junction are presented below. Some results have been grouped together in a single table, as the proximity of these junctions has dictated that they be modelled in conjunction. Where this has occurred, two junctions have been included in a single model.

East Aston / RIS Sub-Area Junctions

Junction 11 – Witton Lane / Aston Hall Road / Queens Road Junction

9.3 The 2026 base and net AAP development traffic capacity assessment results for this junction are set out below in Table 9.1

Table 9.1 – Junction 11 - Witton Lane / Aston Hall Road / Queens Road Junction

Arm	Movement	AM			PM		
		%Sat	Queue	Delay	%Sat	Queue	Delay
Witton Lane	Left	80.1	10	27	43.7	6	17
	Ahead	69.3	9	20	38.5	6	16
Aston Hall Road	Right & Left	58.8	6	19	95.3	22	63
Queens Road	Ahead & Right	69.1	8	22	97.1	32	56
Cycle Time		60			85		
Total Delay (pcuHr)		14.09			30.8		
PRC (%)		12.3			-7.9		

9.4 The junction is shown to operate within capacity in both peak hours in the baseline (2010). With the addition of development traffic, the future year traffic model shows the junction to be operating within capacity in the AM peak hour, but over capacity on two arms in the PM peak hour.

Junction 12 – Lichfield Road / Aston Hall Road Junction & Junction 13 – Lichfield Road / Cuckoo Road Junction

Table 9.2 – Junction 12 - Lichfield Road / Aston Hall Road Junction / Junction 13 - Lichfield Road / Cuckoo Road Junction

Arm	Movement	AM			PM		
		%Sat	Queue	Delay	%Sat	Queue	Delay
Lichfield Road (Northbound)	Left & Ahead	77.5	10	31	97.7	21	74
Aston Hall Road	Ahead	47.5	7	16	67.9	11	19
Lichfield Road Link Road (Southbound)	Ahead	27.4	0	1	19.3	0	1
	Ahead	63.6	8	10	55.0	12	15
Lichfield Road (Southbound)	Left	47.3	7	17	37.9	5	18
	Ahead	76.7	15	52	69.3	10	57
Cuckoo Road	Left	32.0	4	22	29.4	4	17
	Right	68.6	8	69	67.8	9	63
	Right	63.4	8	65	62.9	9	60
Lichfield Road (Northbound)	Ahead	29.0	7	26	45.7	10	27
	Ahead	31.1	7	26	49.2	11	27
	Right	70.3	7	66	68.3	8	54
Cycle Time		130			130		
Total Delay (pcuHr)		43.6			52.99		
PRC (%)		16.1			-8.5		

9.5 These two junctions have again been modelled together to reflect the close proximity of the junctions on the highway network, and the possibility of queues from one junction influencing the capacity of the other.

9.6 The results show the junction will operate within capacity in the AM peak hour, with queues of up to 10 vehicles on the Lichfield Road northbound approach arm, and 15 on the southbound approach. In the PM peak, the junction is shown to be operating at capacity with the largest queue forming on Lichfield Road northbound approach, which shows a queue of 21 vehicles and a corresponding increase in delays.

9.7 Whilst a single arm in the PM peak shows a queue of 21 vehicles, all other approaches are largely unaffected in terms of queues and delay, and are shown to be operating within capacity. Therefore no mitigation has been identified for this junction.

Junction 14 – Lichfield Road / Grosvenor Road Junction - Junction 15 – Lichfield Road / Church Road Junction

Table 9.3 – Junction 14 & 15 - Lichfield Road / Grosvenor Road / Church Road Junction

Arm	Movement	AM			PM		
		%Sat	Queue	Delay	%Sat	Queue	Delay
Grosvenor Road	Right & Left	132.2	140	683	165.7	233	1089
Lichfield Road (westbound)	Ahead	20.0	6	14	15.3	3	11
	Right	132.0	122	672	167.3	143	1080
Lichfield Road_Link Road (eastbound)	Left & Ahead	72.2	27	27	89.4	33	25
Lichfield Road (westbound)	Ahead	47.9	11	20	50.7	15	32
Church Road (northbound)	Left & Right	50.7	8	47	81.2	21	49
Lichfield Road (eastbound)	Left & Ahead	64.3	21	21	84.8	31	39
Church Road (southbound)	Right & Left	68.1	12	58	21.8	4	30
Cycle Time		355			360		
Total Delay (pcuHr)		249.13			374.46		
PRC (%)		-46.9			-85.8		

9.8 There is a traffic impact here as a result of development, with some significant changes to the queues reported at these junctions. At junction 14, the capacity is significantly reduced, with large queues forming on the Lichfield Road (westbound) and the Grosvenor Road approaches, suggesting mitigation is a requirement here.

Junction 16 – Church Road / Thimble Mill Lane / Lynton Road Junction

Table 9.4. Junction 16 – Church Road/Thimble Mill Lane/Lynton Road

Arm	Movement	AM			PM		
		RFC	Queue	Delay (min)	RFC	Queue	Delay (min)
Thimble Mill Lane N	All	0.28	0	0.05	0.20	0	0.05
Thimble Mill Lane S	All	0.29	0	0.05	0.49	1	0.07
Lynton Road	All	0.20	0	0.03	0.15	0	0.03
Church Road	All	0.01	0	0.05	0.01	0	0.05

9.9 This junction is shown to operating within capacity with minimal queues and delays.

Junction 17 – Lichfield Road / Lynton Road / Waterlinks Boulevard Junction

Table 9.5. Junction 17 – Lichfield Road/Lynton Road/Waterlinks Boulevard

Arm	Movement	AM			PM		
		RFC	Queue	Delay (min)	RFC	Queue	Delay
A5127 Lichfield Road North	All	1.06	36	2.18	0.60	2	0.1
B4132 Lynton Road	All	1.09	15	3.54	0.69	2	0.26
A5127 Lichfield Road South	All	0.30	0	0.04	1.00	22	1.32
Waterlinks Boulevard	All	0.89	5	0.35	0.57	1	0.19

9.10 This junction operates within capacity in the baseline, but is now shown to be operating over capacity in both peak hours with the addition of development traffic. The impact is largely focused on Lichfield Road (north) and Lynton Road approaches in the AM peak, and on Lichfield Road (south) in the PM peak.

Junction 33 – Salford Circus

Table 9.6. Junction 33 – Salford Circus

Arm	Movement	AM			PM		
		RFC	Queue	Delay (min)	RFC	Queue	Delay (min)
Slade Road	All	1.09	46	2.59	0.82	4	0.42
Gravelly Hill	All	1.16	44	3.74	0.83	4	0.49
Tyburn Road	All	1.10	68	4.71	0.85	5	0.25
A5127 Lichfield Road	All	0.88	6	0.36	1.02	33	1.27
M6 Slip Road	All	0.92	10	0.34	1.00	26	0.94

9.11 This junction operates at capacity in both peak hours. Development traffic is shown to make queues and delays worse.

Tame Road Sub-Area Junctions

Junction 35 – Electric Avenue / Aston Hall Road Junction

Table 9.7 - Electric Avenue/ Aston Hall Road

Arm	Movement	AM			PM		
		RFC	Queue	Delay	RFC	Queue	Delay
Aston Hall Road	Left	1.072	8	2.32	0.729	2	0.38
Aston Hall Road	Right	1.141	23	1.92	0.881	6	0.55
Electric Avenue	Right	0.902	12	0.94	0.326	1	0.21

9.12 The junction is now shown to be operating at capacity in the AM peak with significant queues.

Junction 36 – Witton Road / Tame Road Junction

Table 9.8 - Witton Road//Tame Road

Arm	Movement	AM			PM		
		RFC	Queue	Delay	RFC	Queue	Delay
Tame Road	Right	0.935	7	0.82	1.246	38	3.32
Witton Road	All	0.293	0	0.21	0.273	0	0.17

9.13 The junction is shown to be operating at capacity in the PM peak with significant queues.

Newtown Sub-Area Junctions

Junction 27 – High Street / Park Lane / Newbury Road Junction

Table 9.9 – Junction 27 - High Street / Park Lane / Newbury Road Junction

Arm	Movement	AM			PM		
		%Sat	Queue	Delay	%Sat	Queue	Delay
High Street (southbound)	Left	68.4	5	9.8	38.4	0	4.5
	Ahead	80.8	29	21.7	46.7	13	12.4
	Ahead	80.7	29	21.7	46.7	13	12.4
	Right	87.6	17	51.4	89.1	10	105.5
Park Lane	Left	23.7	2	19.4	16.1	1	6.3
	Ahead	73.0	8	57.0	86.8	14	84.8
High Street (northbound)	Ahead & Left	2.4	0	31.7	1.7	0	15.3
	Ahead	87.9	22	59.5	94.4	51	51.2
	Ahead	88.4	22	60.1	94.4	52	51.0
Newbury Road	Left	24.6	2	13.9	94.0	28	80.4
	Ahead	88.0	14	82.3	90.5	17	104.0
Park Lane (eastbound)	Ahead	38.1	12	1.9	28.2	14	2.0
Park Lane (westbound)	Inside Lane	4.0	0	1.0	4.0	0	1.0
	Outside Lane	18.2	0	1.1	19.6	0	1.1
High Street (southbound)	Inside Lane	55.0	1	1.9	34.5	0	1.3
	Outside Lane	54.9	1	1.9	34.5	0	1.3
High Street (northbound)	Inside Lane	30.7	0	1.3	60.0	1	2.3
	Outside Lane	28.6	0	1.2	56.0	1	2.0
Newbury Road (eastbound)	Inside Lane	14.7	0	1.1	33.6	0	1.5
	Outside Lane	16.6	0	1.1	16.2	0	1.1
Cycle Time		120			120		
Total Delay (pcuHr)		63.20			83.35		
PRC (%)		1.8			-4.9		

9.14 This junction is shown to operate within capacity in the AM peak hour and at capacity on both High Street northbound and Newbury Road approaches in the PM peak hour. The capacity of this junction is largely unaffected by development traffic. In the PM peak the junction operates at capacity, with significant queues on only one approach.

Junction 30 – New John Street West / Summer Row Junction

Table 9.10 – Junction 30 - New John Street West / Summer Row Junction

Arm	Movement	AM			PM		
		%Sat	Queue	Delay	%Sat	Queue	Delay
New John Street West (westbound)	Left & Ahead	87.2	17	36.2	75.8	40	38.2
	Ahead & Right	59.6	8	21.2	66.4	21	32.1
Summer Lane (northbound)	All	29.8	4	33.1	84.5	21	59.8
New John Street West (eastbound)	Left & Ahead	65.7	18	32.0	57.1	17	27.5
	Ahead & Right	65.1	18	30.5	54.2	17	25.7
Summer Lane (southbound)	All	92.8	28	68.0	45.4	7	39.5
Cycle Time		260			260		
Total Delay (pcuHr)		36.44			34.41		
PRC (%)		-3.1			6.4		

9.15 This junction is shown to operate at capacity in the AM peak, but within capacity during the PM peak. The queues at this junction are very similar to the baseline, and have even improved on a number of approaches as a result of re-optimising the signal timings.

Junction 31 – New John Street West / Newtown Row Junction

Table 9.11 – Junction 31 - New John St West / Newtown Row Junction

Arm	Movement	AM			PM		
		%Sat	Queue	Delay	%Sat	Queue	Delay
Newtown Row (southbound)	Left & Ahead	122.9	197	473.8	78.0	19	38.4
	Right & Ahead	104.5	75	164.6	98.5	26	97.4
New St John Street (westbound)	Ahead & Left	81.2	20	52.6	85.8	26	51.3
	Right & Ahead	95.0	30	86.1	127.8	167	534.9
Newtown Row (northbound)	Ahead & left	71.3	18	47.0	128.4	157	572.8
	Ahead & Right	67.5	16	49.9	129.1	168	586.9
New St John Street (eastbound)	Left & Ahead	121.7	96	469.6	94.7	25	76.0
	Ahead & Right	105.4	52	182.7	92.6	26	61.3
Pedestrian Crossing Exit Arms2							
New John Street Link (westbound)	Inside Lane	34.6	0	1.4	41.2	0	1.6
	Outside Lane	33.4	0	1.3	32.3	0	1.3
Newtown Row (S) (southbound)	Inside Lane	36.4	7	1.6	24.4	7	1.4
	Outside Lane	39.0	0	1.4	22.5	0	1.1
Cycle Time		260			260		
Total Delay (pcuHr)		363.23			491.42		
PRC (%)		-36.6			-43.5		

9.16 This junction is shown to operate at capacity in the baseline, and this is exacerbated as a result of AAP development traffic.

Lozells Sub-Area Junctions

Junction 19 – Six Ways Roundabout Junction

Table 9.12 Jct 19 Six Ways – Lozells Road/High Street/Birchfield Road/Victoria Road/Witton Road

Arm	Movement	AM			PM		
		RFC	Queue	Delay (min)	RFC	Queue	Delay (min)
A34 Birchfield Road	All	0.78	4	0.19	0.82	5	0.39
Witton Road	All	1.15	33	4.20	1.12	35	3.71
B4144 Victoria Road	All	0.79	4	0.40	1.07	34	2.71
A34 High Street	All	0.18	0	0.06	0.72	3	0.46
B4144 Lozells Road	All	0.79	4	0.24	0.96	15	0.81

9.17 This junction is operating within capacity in the AM peak hour, but at capacity in the PM peak hour. This is the same as for the baseline, but queues in the PM peak are shown to increase as a result of AAP traffic. Queues on Witton Road increased by approximately 20 vehicles, but those on Victoria Road have reduced by a similar amount.

Junction 21 – Villa Road / Lozells Road / Heathfield Road / Barker Street Junction

Table 9.13 Junction 21 – Heathfield Road/Lozells Road/Barker Street/Villa Road

Arm	Movement	AM			PM		
		% Sat	Queue	Delay	% Sat	Queue	Delay
Car Park Exit	Left/Right	0.0	0	0.0	0.0	0	0.0
Heathfield Road	All	66.1	11	43.1	66.0	6	47.4
Lozells Road	All	66.8	8	43.8	51.9	7	34.3
Barker Street	All	28.4	3	28.8	60.3	7	39.9
Villa Road	All	65.7	8	42.2	65.2	10	35.7
Cycle Time		180			180		
Total Delay (pcuHr)		12.83			12.90		
PRC (%)		34.6			36.3		

9.18 The above results show this junction to be operating to within capacity in both peak hours.

Junction 23 – Soho Road / Villa Road Junction

Table 9.15 Junction 23 – Soho Road/Villa Road/Soho Hill/St Michaels Road

Arm	Movement	AM			PM		
		% Sat	Queue	Delay	% Sat	Queue	Delay
Soho Road	Left/Ahead	63.7	11	26	51.0	8	25
Soho Road	Right	58.3	11	24	46.1	7	23
Villa Road	All	64.4	9	34	50.6	7	29
Soho Road	Left	33.0	5	20	43.8	6	23
Soho Road	Ahead/Right	44.7	5	26	46.7	6	27
St Michaels Road	All	49.6	7	30	48.3	7	28
Cycle Time		180			180		
Total Delay (pcuHr)		16.72			14.85		
PRC (%)		39.7			76.5		

9.19 The above results show this junction to be operating to within capacity in both peak hours.

Perry Barr/Birchfield Sub-Area Junctions

Junction 3 – Birchfield Road / Wellington Road / Aston Lane

Table 9.14 Junction 3 – Birchfield Road/Wellington Road/Aston Lane

Arm	Movement	AM			PM		
		RFC	Queue	Delay	RFC	Queue	Delay
A34 Walsall Road	All	0.93	11	0.76	1.11	61	3.46
A4040 Aston Lane	All	0.98	14	1.49	1.55	179	19.82
A34 Birchfield Road	All	1.22	59	5.08	1.35	122	14.82
A4040 Wellington Road	All	1.51	304	23.06	1.22	102	8.18

9.20 This junction is shown to be operating over capacity in both peak hours with considerable queues forming on most approaches. Queues range from 11 to 304 vehicles and generate long delays for vehicles exiting this junction.

Junction 7 – Birchfield Road / Heathfield Road / Trinity Road Junction

Table 9.15 Junction 7 – Birchfield Road/Trinity Road/Heathfield Road

Arm	Movement	AM			PM		
		% Sat	Queue	Delay	% Sat	Queue	Delay
Birchfield Road North	Left/Ahead	50.0	5	37.1	31.7	4	23.4
Birchfield Road North	Right	97.6	15	120.4	45.5	3	45.1
Trinity Road	All	54.0	7	29.7	101.5	26	128.2
Birchfield Road South	Left/Ahead	54.2	6	38.9	106.4	48	176.3
Birchfield Road South	Right	38.4	3	42.1	105.5	22	203.4
Heathfield Road	All	97.0	25	69.8	109.0	42	227.0
Cycle Time		90			90		
Total Delay (pcuHr)		34.48			111.32		
PRC (%)		-8.4			-21.1		

9.21 The junction is shown to operate at borderline capacity in the AM peak, with a PRC percentage of -6.4 but with a significant queue provided on Heathfield Road. In the PM peak, large queues are shown to occur on several approaches, generating a reduced overall performance in this peak hour. On this basis, mitigation should be considered for this junction.

Junction 34 – Walsall Road / Aldridge Road Junction

Table 9.16 – Junction 34 - Walsall Road / Aldridge Road Junction

Arm	Movement	AM			PM		
		%Sat	Queue	Delay	%Sat	Queue	Delay
Walsall Road / One Stop Shopping Centre Junction							
Walsall Road	Ahead	47.2	4	6.6	78.6%	9	15.1
Walsall Road	Ahead	26.0	2	7.7	56.7%	6	13.4
One Stop Egress	Left	46.7	5	25.0	76.8%	10	23.0
One Stop Egress	Ped Crossing	17.3	2	4.5	38.2%	5	6.1
Cycle Time		90			90		
Total Delay (pcuHr)		4.07			10.13		
PRC (%)		90.7			14.5		
Aldridge Road / Wellhead Road Junction							
Aldridge Road (northbound)	Ahead	28.3	5	10	67.3	19	22
	Ahead	26.2	5	10	62.2	18	20
Link Road	Left	77.5	12	89	50.5	9	56
	Left	76.7	12	88	50.0	9	56
	Right	104.9	28	255	86.9	18	83
	Right	105.4	29	263	87.4	18	84
Aldridge Road (southbound)	Ahead & Left	105.8	96	195	87.6	25	68
	Ahead	100.3	68	97	83.0	24	61
Wellhead Lane	Left & Right	104.4	16	290	86.9	16	96
Aldridge Road Link (northbound link road)	Ahead	40.7	10	10	78.7	32	32
	Ahead & Right	42.7	12	21	72.7	30	29
Aldridge Road Link (southbound link road)	Ahead	64.9	3	7	42.7	2	6
	Ahead	78.7	5	9	48.4	2	5
Cycle Time		290			290		
Total Delay (pcuHr)		158.85			77.34		
PRC (%)		-17.6			2.8		

9.22 The Walsall Road / One Stop Shopping Centre Junction operates well within capacity in 2010, and this continues to be the case with the inclusion of AAP net development traffic.

9.23 The Aldridge Road / Wellhead Road junction operates at capacity in 2010 and in the future year the development has an impact on its operation.

10. M6 traffic impact

10.1 This chapter provides a methodology overview for how trips impacting upon the Strategic Road Network (SRN) we identified, and identifies the trips that would be impacting on the SRN for each traffic scenario.

Trip generation

10.2 Person trip rates were derived from TRICS for each land use using a strict methodology that tailored the TRICS surveys as best a possible to the nature / location of the AAP sites (see para 3.3.)

10.3 Person trips (all modes) were identified for the extant and proposed AAP developments (see Chapter 3). The extant land uses are predicted to generate 3951 two-way person trips in the morning peak hour compared with 8493 for the proposed AAP land uses. In the evening peak the extant land uses generate 4523 two-way person trips compared to 9373 for proposed AAP land uses.

Vehicle trips

10.4 The modal split was identified using 2001 Census 'journey to work' and 'journey from work' data sets from Super Output Areas in Aston. The data set revealed that 62% of people who work in Aston are car drivers and 7% are car passengers. Only 44% of Aston residents drive to work and 6% travel as passengers.

10.5 For land uses other than residential and employment, modal splits were identified using TRICS multi-modal surveys.

10.6 Pass-by trips have been identified for retail land uses situated in highly accessible locations, along busy routes, and with a good degree of visibility from the highway network. A pass-by percentage of 30% has been applied (para.6.3).

10.7 The net vehicle travel demand for the AAP area was identified, which equates to 2118 additional two-way car trips in the morning peak, and 2101 two-way car trips in the evening peak hour. The figures are included in 6.7 of the AAP report, and are repeated below.

Table 10.1: Total net trip generation

Sub-Area	AM Peak Hour		PM Peak Hour	
	Arrivals	Departures	Arrivals	Departures
B: East Aston/RIS Sub-Area	+962	+325	+286	+820
B: Tame Road Sub-Area	+16	+70	+54	+29
A: Newtown Sub-Area	+219	+196	+276	+236
A: Lozells Sub-Area	-1	+62	+33	+10
C: Perry Barr/Birchfield Sub-Area	+177	+24	+68	+195
C: Central Aston Sub-Area	+34	+34	+47	+47
AAP Total	**+1407**	**+711**	**+764**	**+1337**

Trip distribution

10.8 The AAP is split into three areas A, B and C, and for the purposes of this assessment these are again split into seven sub-areas. Distribution was calculated for each sub area for origins/destination both outside the AAP area, and within the sub-areas. These are shown below.

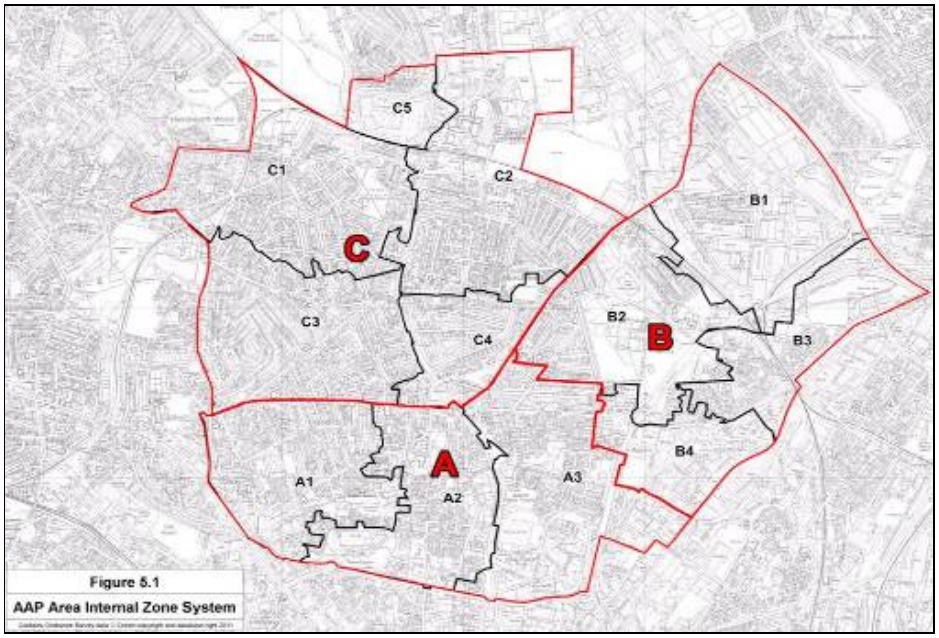


Figure 10.1: AAP Area Internal Sub-Areas

10.9 16 external distribution zones were identified in order to group origins and destinations, within a journey distance of 60 miles. Each distribution zone is identified by a major transport route, and the zone boundary defined by journey distance or major infrastructure that creates natural severance between zones, such as waterways or railway lines.

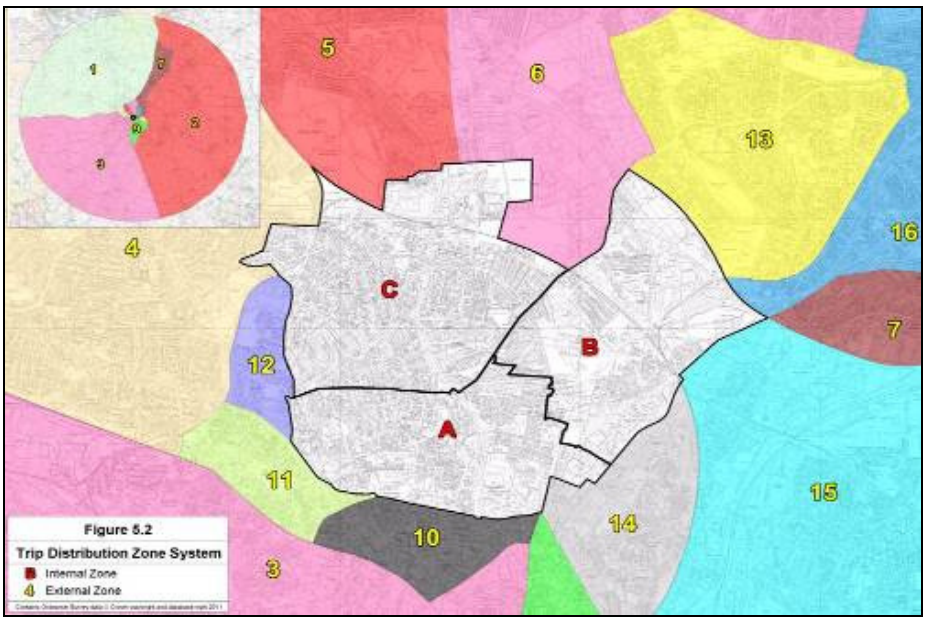


Figure 10.2: Trip Distribution Zone System

10.10 Employment and residential trips were distributed from each internal sub-area to other sub-areas and to wider external distribution zones, using representative 2001 Census 'Journey to Work' data sets from the local area. On this basis, the impact of trips on junctions internal to the AAP area and wider area were considered.

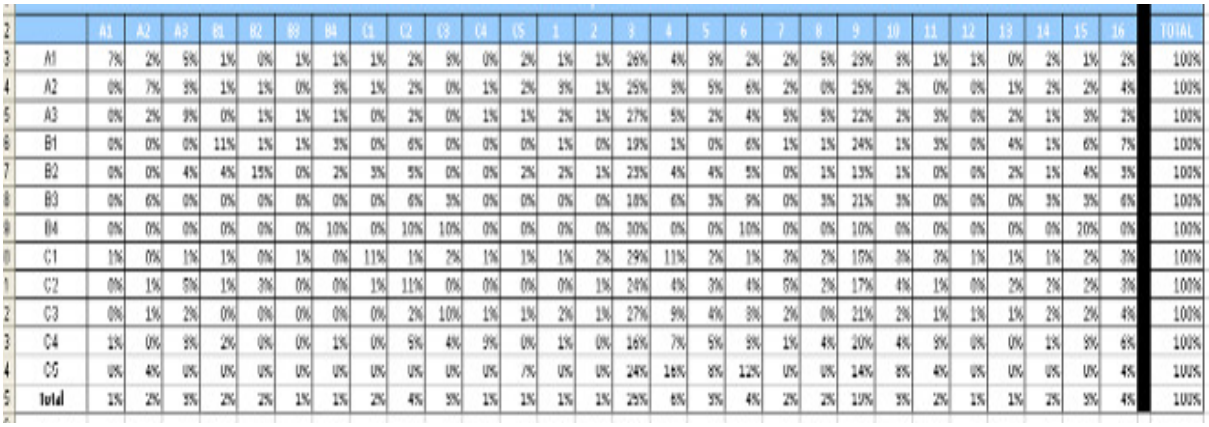
10.11 Leisure, local retail, health and all other land uses were distributed over the adjoining highway network based on a population and distance based gravity model, using population figures for the same sub-areas and external zones. People are unlikely to travel any further than 10 miles to access these facilities in the AAP area (see para. 5.10), which is represented in the population data set used for this model.

10.12 External trip distribution Zone 1 represents o/d's accessible via M6 north, on the presumption that o/d's accessible via the local road network, such as Walsall via the A34, are excluded from this zone. O/d's such as Wednesdbury, Wolverhampton, Cannock, Stafford and Telford are included in this zone. Consideration has been given to the likely route choice to/from M6 north, in that developments in Internal Zone C are more likely to use the A34 and Junction 7, rather than Junction 6, and developments in Zone A are more likely to use Victoria Road and the Aston Expressway.

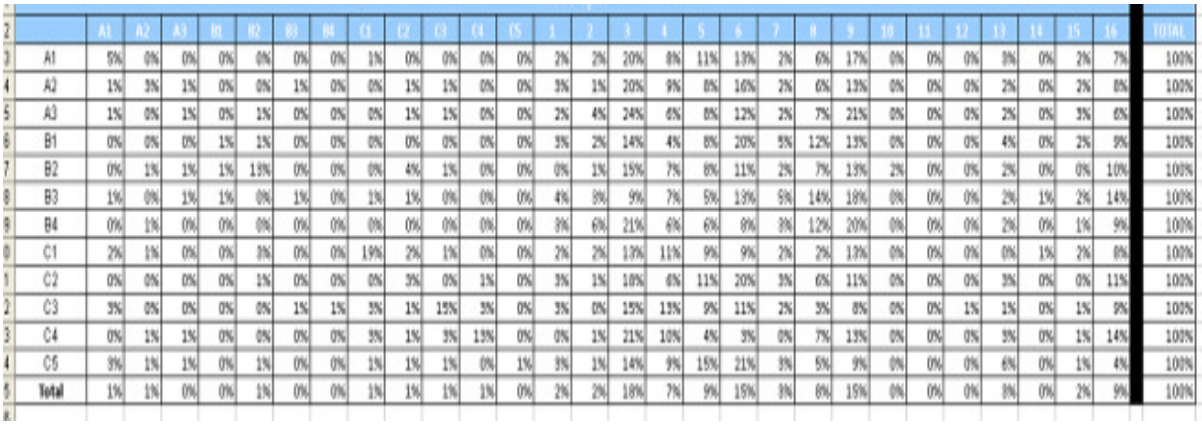
10.13 External trip distribution Zone 2 represents o/d's accessible via M6 south, on the presumption that o/d's accessible via the local road network, such as Walmley, Sutton Coldfield and Litchfield via the A38, and Chelmsley Wood, Small Heath, Acocks Green, and Shirley via the Collector Road, Coventry Road and Stratford Road, are excluded from this zone. The first points of exit/entry to the Motorway network to the east are some distance from the Aston area (M42 J9, M42 J5 Birmingham Airport and M6 J4 Coventry), and logically these areas are less likely to attract a substantial amount of trips.

10.14 External trip distribution Zone 3 represents o/d's to the south west of Birmingham and the Black Country, including Harborne, Kings Heath, Northfield, Halesowen, Redditch, Bromsgrove and all locations off the M5. Whilst it is conceivable that some people may choose to use the M6 motorway to access the M5, it has been assumed that local traffic will know better to use the local road network of the A41 to M5 J1, the A456 to M5 J3 or the A38 to M5 J4. No differentiation has been calculated between M5 traffic and local traffic, so this has not been considered any further.

10.15 The extract below shows the distribution of vehicular trips for residential developments in the Aston area. What is overwhelmingly clear from this is that 65% of Aston residents who drive to work, travel less than three or four miles, and that a third of these work within the Aston area. A further 25% work in Zone 3 (Birmingham and south), and another 8% in other Zones, but only 2% will use the M6 motorway.



10.16 The following extract shows the distribution of vehicular trips for employment developments in the Aston area. Census tells us that only 8% of people who drive to a job in Aston, live in the AAP area but around 50% live three or four miles away. 4% of employees who work in Aston will use the M6 motorway.



10.17 It is clear then that there is a propensity for short and medium journeys to be made to work by car, and that longer distance journeys, requiring the use of the motorway network, are relatively few. This evidence demonstrates that there is a very good opportunity for the AAP Transport Strategy to have a significant effect on the modal choice of employees and residents, given that such as large number of journeys made are over a short distance.

Trip assignment

10.18 Vehicle trips were assigned over the adjoining highway network between sub-areas (internal assignment) and external zones (external assignment). The route that vehicles were assumed to use was identified based on the most direct route between the origin and destination points, taking into account the location of the site access and the provision of one-way roads. Consideration was also given to known congestion hotspots and alternative faster routes.

10.19 Trips will impact on the SRN in four locations, with the majority of these being via Salford Circus, due to this being the closest junction to some of the larger generating developments within the AAP area. The junctions affected to a lesser degree include:

- Gravelly Hill Junction (M6 Junction 6)
- Dartmouth Circus
- Park Circus
- M6 Junction 7 via the A34

10.20 The total trip impact on the SRN has been identified by direction of travel for extant, proposed and net AAP development traffic. Traffic impacting on the M6 to and from a north-westbound direction is set out below.

Table 10.2: M6 north-west bound trips

Traffic Scenario (NW-bound)	ARR	DEP	ARR	DEP
Extant AAP Development Traffic	9	8	8	12
Proposed AAP Development Traffic	34	19	18	34
Net AAP Development Traffic	**25**	**11**	**10**	**23**

10.21 AAP development traffic impacting on the M6 to and from a south-eastbound direction is set out below.

Table 10.3: M6 south-east bound trips

Traffic Scenario (SE-bound)	ARR	DEP	ARR	DEP
Extant AAP Development Traffic	1	4	3	2
Proposed AAP Development Traffic	3	9	7	5
Net AAP Development Traffic	2	4	4	3

10.22 Total impact irrespective of direction is set out below.

Table 10.4: M6 two-way trips

Traffic Scenario	ARR	DEP	ARR	DEP
Extant AAP Development Traffic	10	13	12	14
Proposed AAP Development Traffic	38	28	26	39
Net AAP Development Traffic	28	15	14	25

10.23 In terms of the net trips that will impact on the SRN via Salford Circus (junction 33 accessing the SRN most affected by AAP development traffic) is set out below:

Table 10.5: M6 net impact trips only

M6 Direction	Net trips AM		Net trips PM		Two-way Percentage
	ARR	DEP	ARR	DEP	
To/from M6 northwest	11	4	6	10	65%
To/from M6 southeast	6	2	3	4	35%

M6 Junction 6 assessment

10.24 The impact of AAP development traffic on M6 Junction 6 has been assessed separately using the Highways Agencies VISSIM model, developed for the Birmingham Box Managed Motorways Phase 3 scheme. Details of this modelling work is provided separately to this document

11. Infrastructure Strategy

11.1 The strategy for infrastructure improvement is defined using a multi-criteria approach of assessing each junction on the network. This is a direct function of measured capacity and development related traffic increases, together with an engineering judgement of whether the physical constraints can be overcome to bring forward the requisite improvement.

11.2 Definition has been given to those improvements required on the local road network, and those required on strategic roads. Strategic roads include the A34 Birchfield Road, A5127 Lichfield Road, and the A34 and A47 'Middleway'.

Mitigation scoring rules

11.3 The capacity of each junction has been scored on a value between 1 and 4 based on its peak hour capacity for a future year scenario that includes both background and AAP development traffic. The scores identify a junction operating at a certain threshold of capacity that include:

- Score of 1 - 0 to 84% of capacity
- Score of 2 - 85% to 94% of capacity
- Score of 3 - 95% to 104% of capacity
- Score of 4 - 105% capacity and higher

11.4 The impact at each junction from development traffic has been identified by the Travel Demand Model. Junctions have been scored on a value between 1 and 4 based on the percentage impact of traffic that the junction receives, however consideration is also given to the scale of background flows using the junction that generate the percentage impact. The scoring includes:

- Score of 1 – 0% to 4% impact
- Score of 2 – 5% to 9% impact
- Score of 3 – 10% to 14% impact
- Score of 4 – 15% impact and above

The opportunities and constraints to provide improvements at each junction have to be taken into account. It is accepted that whilst some junctions will act as a bottleneck, the opportunity to make improvements is limited by land ownership, geometrical, topographical or environmental constraints. It is appropriate therefore to remove obvious locations matching this criteria from the transport strategy at an early stage. This is scored as 1 where there are clear opportunities for improvement and 0 for a junction where improvements would have to overcome unnecessarily difficult constraints.

Table 11.1 – Multi-criteria improvement assessment

Junction	Operational Capacity	Traffic impact	Improvement deliverability	Improvement scale
1	3	3	1	Moderate
2	3	3	1	Moderate
3	4	4	1	Significant
4	3	4	1	Moderate
5	1	4	1	Minor
6	1	3	0	

7	4	4	1	Significant
8	3	4	1	Moderate
9	2	4	0	
10	1	4	0	
11	1	4	0	
12	3	3	1	Moderate
13	1	3	1	Minor
14	4	4	1	Significant
15	1	3	0	
16	1	1	0	
17	3	3	1	Moderate
18	2	2	1	Minor
19	4	3	1	Moderate
20	3	2	1	Minor
21	1	2	0	
22	3	3	1	Moderate
23	1	1	0	
24	2	4	1	Moderate
25	3	3	1	Moderate
26	3	3	0	
27	3	2	1	Minor
28	3	3	1	Moderate
29	2	2	1	Minor
30	4	3	0	
31	4	3	0	
32	4	3	1	Moderate
33	4	3	1	Moderate
34	4	4	1	Significant
35	4	4	1	Significant
36	4	3	1	Moderate

East Aston / RIS Sub-Area Junctions

Table 11.2 – Mitigation requirements by area

Junction no.	Junction name	Improvement scale	Road type
28	Aston Road/Rocky Lane	Moderate	Strategic
12	Lichfield Road/Aston Hall Road	Moderate	Strategic
13	Lichfield Road/Cuckoo Road	Minor	Strategic
14	Lichfield Road/Grosvenor Road	Significant	Strategic
17	Lichfield Road/Waterlinks Boulevard	Moderate	Strategic
33	Salford Circus	Moderate	Strategic
35	Aston Hall Rd/Electric Avenue	Significant	Local
18	Park Circus	Minor	Local

Tame Road Sub-Area Junctions

Table 11.3 – Mitigation requirements and costs

Junction no.	Junction name	Improvement scale	Road type
36	Witton Road/Tame Road	Moderate	Local

Newtown Sub-Area Junctions

Table 11.4 – Mitigation requirements and costs

Junction no.	Junction name	Improvement scale	Road type
27	A34 High Street/Park Lane	Minor	Strategic
32	Dartmouth Circus	Moderate	Strategic
29	New John Street West/Boulton Middleway	Minor	Strategic
19	Six Ways Aston	Moderate	Strategic
25	Wheeler Street/Clifford Street	Moderate	Local
24	Wheeler Street/Gerrard Street	Moderate	Local

Lozells Sub-Area Junctions

Table 11.5 – Mitigation requirements and costs

Junction no.	Junction name	Improvement scale	Road type
22	Lozells Road/Villa Road	Moderate	Local
20	Lozells Road/Wheeler Street	Minor	Local

Perry Bar / Birchfield Sub-Area Junctions

Table 11.6 – Mitigation requirements and costs

Junction no.	Junction name	Improvement scale	Road type
3	Birchfield Road/Aston Lane	Significant	Strategic
7	Birchfield Road/Heathfield Road	Significant	Strategic
34	Walsall Road/Aldridge Road	Significant	Strategic
4	Aston Lane/Witton Lane	Moderate	Local
5	Hamstead Road/Church Hill Road	Minor	Local
1	Wellington Road/Church Road	Moderate	Local
2	Wellington Road/Westminster Road	Moderate	Local
8	Witton Road/Trinity Road	Moderate	Local

11.5 It is estimated that this infrastructure strategy could cost between £12m and £18m.

Further mitigation considerations

11.6 Whilst this chapter has identified an infrastructure strategy for junctions in and around the AAP area, these have been identified using broad assumptions and are subject to detailed checks. The mitigation should only be considered as a guide at this stage, with further detail considered as AAP sites come forward at a planning application stage. Final mitigation costs would be subject to:

- Utility diversions
- Land ownerships
- Detail highway design
- Road Safety Audits

BCC identified mitigation proposals

11.7 The AAP makes reference to a number of opportunities and mitigation proposals that have already been identified for the local area, which may have an impact on the capacity of some junctions.

11.8 The first set of schemes / proposals provide improvements for modes of travel other than by private use, and include:

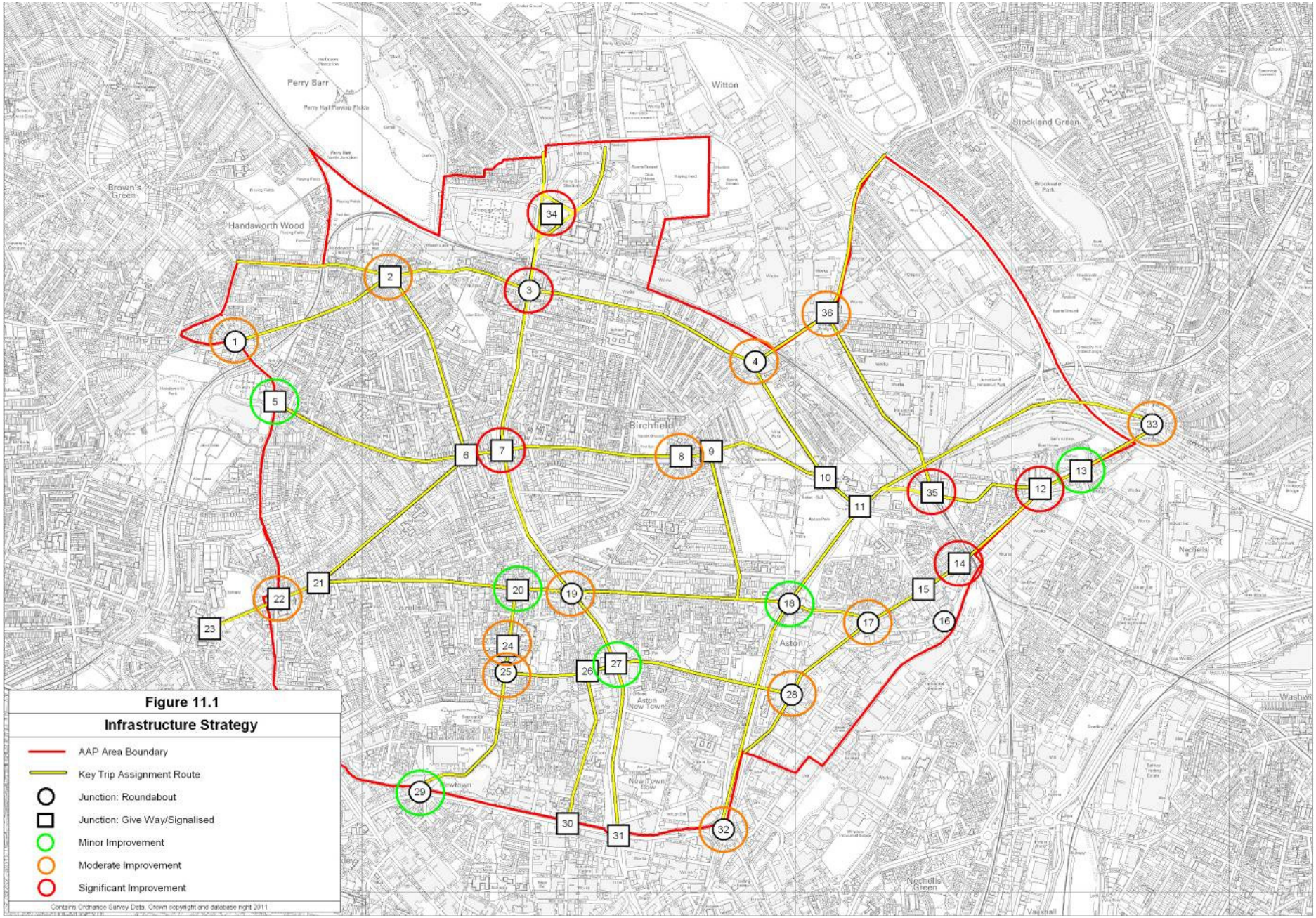
- Under the proposals for a Mixed Use Urban Boulevard along the A34, junctions would be improved to give priority to pedestrians and cyclists and introducing at grade crossings on the A34 in place of subways where possible. The boulevard will also need to incorporate land required for a possible extension of the Midland Metro along the A34, and improved bus lanes and stops.
- Highway improvements on the A5127 Lichfield Road – comprising highway and new junction/ junction improvements to enable access to the proposed Regional Investment Site as indicated on the Transport Strategy Plan. These measures to include signal controlled junctions, bus priority measures, access points, landscaping, tree planting, pedestrian, bus and cycle facilities as appropriate.

11.9 The larger scale transport initiatives that BCC are aware of or have contributed to include:

- Perry Barr – Improvements to access One Stop Shopping Centre. A new access/junction is planned to enable a right turn into the One Stop Shopping Centre when approaching from the north. This will reduce the number of vehicles having to 'U turn' at the junction of Birchfield Road, Wellington Road and Aston Lane.
- Potential Metro Route along length of A34 within the study area.
- Bus Showcase along A34 within the study area
- Aspiration to remove Hockley Flyover and provide an at grade junction
- Electric Avenue Bridge. Currently it is restricted to one lane (controlled by traffic signals) because of the retaining structure supports. Improvements to the bridge (i.e. accommodated two-way flow of traffic on a new structure) required.

AAP mitigation options

11.10 A number of junctions and schemes were identified for mitigation in the 'Scoping Report to Assess Travel Demand' report which is provided as an appendix to this report.


Perry Barr
Witton
Stockland Green
Brown's Green
Handsworth Wood
Birchfield
Aston
Nechells
Washwood
Vauxhall
Figure 11.1
Infrastructure Strategy
AAP Area Boundary
Key Trip Assignment Route
Junction: Roundabout
Junction: Give Way/Signalised
Minor Improvement
Moderate Improvement
Significant Improvement
Contains Ordnance Survey Data Crown copyright and database right 2011

12. Summary

12.1 Birmingham City Council (BCC) is developing an Area Action Plan (AAP) for Aston, Newtown & Lozells. The AAP is due to be adopted by the City Council in 2011.

12.2 Atkins working with BCC produced an initial transport report for the AAP area titled 'Scoping Report to Assess Travel Demand' (December 2010), which considered the operation of the existing highway network and its key junctions, and the affect on these junctions from additional traffic generated by the AAP development proposals.

12.3 Following the outcomes of this report, BCC required the initial scoping analysis to be revisited in greater detail, and a more site specific assessment undertaken that can be supported by an evidence base appropriate for Examination in Public.

12.4 For the purpose of this study, the AAP study area is made up of sub-areas which include:

- East Aston/RIS;
- Tame Road;
- Newtown;
- Lozells;
- Perry Barr/Birchfield; and
- Central Aston.

12.5 Trip rates have been derived using the TRICS database to identify weekday AM and PM peak hour *person* trips for all land uses included in the AAP study area, for both existing and proposed land uses. This has been undertaken using a strict methodology that considers the location of the site and TRICS good practice guidance.

12.6 Mode choice has been defined using 2001 Census Journey to Work data for residential and employment land uses, and the TRICS database has been used for other land uses.

12.7 Distribution for residential and employment trips has been identified using 2001 Census Journey to Work data, whereas other land uses such as leisure, hotel, retail, has been calculated using a 2001 Census population based gravity model, including data from output areas within 10 miles of the AAP area.

12.8 Assignment is based on the shortest route to destination taking into account the location of the site access, one-way systems, and alternative routes are identified to avoid congestion hotspots or to use faster routes.

12.9 A series of key junctions have been selected for weekday peak hour capacity assessments, and include all junctions most affected by AAP development traffic travelling on the highway network. Junction models were first developed for these junctions for a 2010 baseline scenario, and validated using queue length surveys.

12.10 Future year junction assessments (2026 – assuming no growth) have included the 'net' development traffic flows, and presents results demonstrating their impact on the operation of the junctions. Where there is a significant effect, consideration has been given to mitigation.

Conclusion and recommendations

12.11 It is concluded that the developments within the AAP area will generate around 1500 two way vehicle trips in the peak hours. These trips have an impact on the performance of the highway network. Junctions have been identified where infrastructure improvements could be made to accommodate the additional traffic. It is estimated that this package of infrastructure works could cost between £12m and £18m.

12.12 It is recommended that further consideration is given to the detail of the infrastructure improvements, in order to fully identify costs and risks. It is also recommended that junctions where schemes have already been identified and where there are clear deliverable solutions, these should be prioritised and funds generated by development should be apportioned accordingly.

12.13 Finally it is recommended that a collaborative and community supported approach to travel planning is promoted by the City Council and developers in order to ensure that developer travel plans are effective and that residents and visitors are given a viable alternative modal choice that that of the single occupied private car.

12.14 The conclusions and recommendations of this Travel Demand Model report have been used to develop the Aston, Newtown and Lozells 'Transport Strategy', which accompanies the Aston, Newtown and Lozells Area Action Plan.

Appendix A – Scoping Report to Assess Travel Demand

Appendix B – TRICS Outputs

Appendix C – Excel Spreadsheet Network Model

Appendix D – Distribution Percentages

Appendix E – Net Development Trips

Appendix F – Traffic Count Data

Appendix G - Junction Capacity Assessments