Fenland District Council
Cambridgeshire County Council
March Area Transport Study

Data Collection Report
11 February 2011

ATKINS

Plan Design Enable

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March Area Transport Study

The market town of March is the second largest settlement in Fenland District. The aim of the March Area Transport Study is to build and interpret a transport model that can provide forecasts for the future land use planning for March and its surrounding area.

This document is the Data Collection Report.

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Chapters

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Glossary of Abbreviations Used in this Report

Automatic Traffic Count	ATC
Cambridgeshire County Council	CCC
Direction	Dir
Employers' Business	EB
Fenland District Council	FDC
Global Positioning System	GPS
Heavy Goods Vehicle (OGV1 & OGV2)	HGV
Home-Based Education	HBEd
Home-Based Work	HBW
Inter Peak	IP
Journey to Work data	JTW
Level Crossing	LC
Light Goods Vehicle	LGV
Light Vehicle (Cars, LGV & MC)	LV
Local Model Validation Report	LMVR
March Area Transport Study	MATS
Motorcycle	MC
Manual Classified Count	MCC
Manual Classified Turning Count	MCTC
Other Goods Vehicle Class 1 (Medium Goods Vehicle)	OGV1
Other Goods Vehicle Class 2 (Heavy Goods Vehicle)	OGV2
Other Trip Purpose	OTP
Ordnance Survey	OS
Passenger Car Unit	PCU
Passenger Service Vehicle	PSV
Roadside Interview	RSI
Simulation and Assignment of Traffic in Urban Road Networks	SATURN
Standard Deviation	St Dev

1. Introduction

This document is the March Area Transport Study Data Collection Report. It describes the scope of the existing traffic data and the additional traffic data obtained from surveys completed as part of the study.

Introduction

Background

1.1. Atkins Transport Planning & Management was commissioned by Cambridgeshire County Council (CCC) and Fenland District Council (FDC) in July 2010 to undertake a transport study and produce a transport model for the market town of March.

1.2. The March Area Transport Study (MATS) sets out to review existing transport problems and issues and will examine a range of proposed measures and policies to improve the current transport system as well as meet the demand expected from future growth in the study area.

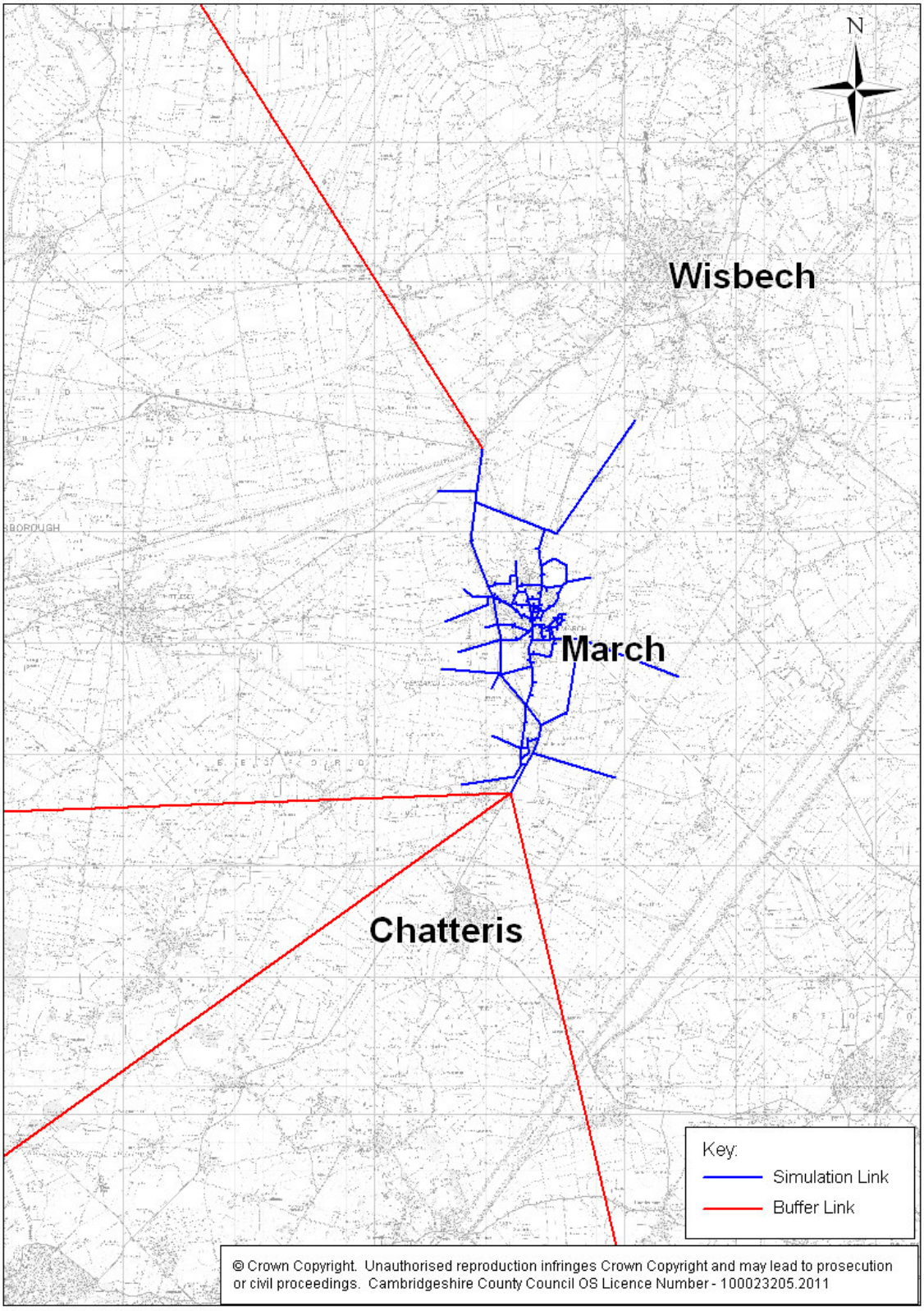
1.3. Traffic and travel data has been collected to establish the existing patterns of demand for travel in and around March. The study has also identified several existing sources of data, which have been made available by the relevant highway authorities for use in this study.

The Study Area

1.4. The study area comprises the market town of March, with the principal roads of A141, B1101 and B1099. The study area extends to the A141/A605 junction in the north and the A141/A1093 junction in the south.

1.5. The extent of the study area is shown in Figure 1.1. The blue links, which are the simulation links, highlight the study area. A larger version of Figure 1.1 can also be found in Appendix C which provides more detailed network structure for March.

Figure 1.1 – MATS Network/Study Area



Scope and Structure of this Report

1.6. This document is the Data Collection Report (DCR). It describes the scope of the existing traffic data and the additional data obtained from surveys completed as part of this study.

Existing Data

1.7. Data from CCC's annual town monitoring programme gives details of traffic flows within March. Other existing traffic data within the study area have been also identified. This following bullet points outline all existing traffic data identified for this study:

- CCC's annual town traffic monitoring programme for March;
- CCC's education database for Cambridgeshire;
- 2001 Journey to Work (JTW) National Census data;
- TrafficMaster data;
- Bus route and timetable information; and
- Traffic signal timing data from CCC.

2010 March Data Collection

1.8. To complement the available datasets and provide accurate traffic information for the development of the MATS SATURN highway model, the following additional traffic surveys were undertaken:

- Roadside interview (RSI) surveys (with associated manual classified count (MCC) and automatic traffic count (ATC) surveys);
- Manual classified turning count (MCTC) surveys;
- Level crossing surveys;
- Journey time surveys; and
- Queue length surveys.

Survey Dates (Traffic Count Surveys)

1.9. The dates upon which each of the traffic count surveys were undertaken are shown below, and also summarised in Table 1.1:

- Existing MCC data from CCC annual town monitoring programmes;
  - Site E-1, Tuesday 19th October 2010;
  - Site E-2, Tuesday 19th October 2010;
  - Site E-3, Tuesday 19th October 2010;
  - Site E-4, Tuesday 19th October 2010;
  - Site E-5, Tuesday 19th October 2010;
  - Site E-6, Tuesday 19th October 2010;
  - Site E-7, Tuesday 19th October 2010;
  - Site E-8, Tuesday 19th October 2010;
  - Site E-9, Tuesday 19th October 2010;
  - Site E-10, Tuesday 2nd November 2010; and
  - Site E-11, Tuesday 2nd November 2010.
- RSI and RSI MCC;
  - Site R-1, Tuesday 12th October 2010;
  - Site R-2, Tuesday 19th October 2010;
  - Site R-3, Tuesday 19th October 2010;

  - Site R-4, Thursday 21st October 2010 (MCC only);
  - Site R-5, Tuesday 12th October 2010; and
  - Site R-6, Thursday 21st October 2010 (RSI postcard only; equivalent count data collected as TC-21).
- RSI ATC;
  - Site R-1, from Monday 11th to Sunday 24th October 2010;
  - Site R-2, from Monday 11th to Sunday 24th October 2010;
  - Site R-3, from Monday 11th to Sunday 24th October 2010;
  - Site R-4, from Monday 11th to Sunday 24th October 2010; and
  - Site R-5, from Monday 11th to Sunday 24th October 2010.
- MCTC;
  - Site TC-1, Thursday 21st October 2010;
  - Site TC-4, Thursday 21st October 2010;
  - Site TC-5, Thursday 21st October 2010;
  - Site TC-6, Thursday 14th October 2010;
  - Site TC-7, Thursday 21st October 2010;
  - Site TC-8, Thursday 14th October 2010;
  - Site TC-9, Thursday 21st October 2010;
  - Site TC-10, Thursday 21st October 2010;
  - Site TC-11, Thursday 14th October 2010;
  - Site TC-12, Thursday 21st October 2010;
  - Site TC-13, Thursday 21st October 2010;
  - Site TC-14, Thursday 14th October 2010;
  - Site TC-15, Thursday 21st October 2010;
  - Site TC-16, Thursday 21st October 2010;
  - Site TC-17, Thursday 21st October 2010;
  - Site TC-18, Thursday 14th October 2010;
  - Site TC-19, Thursday 14th October 2010;
  - Site TC-20, Thursday 21st October 2010;
  - Site TC-21, Thursday 21st October 2010;
  - Site TC-22, Thursday 21st October 2010;
  - Site TC-23, Thursday 21st October 2010;
  - Site TC-24, Thursday 21st October 2010;
  - Site TC-25, Thursday 21st October 2010;
  - Site TC-26, Thursday 21st October 2010; and
  - Site TC-27, Thursday 21st October 2010.
- Level Crossing MCC
  - Site LC-1, Thursday 14th October 2010.

Table 1.1 – Traffic Count Survey Dates

	Site ID	Location	Count Type	2010 Survey Dates				
				12Oct (Tue)	14Oct (Thu)	19Oct (Tue)	21Oct (Thu)	2Nov (Tue)
CCC Annual Town Monitoring	E-1	Wisbech Rd	MCC			✓		
	E-2	Norwood Rd	MCC			✓		
	E-3	Elm Rd	MCC			✓		
	E-4	Creek Rd	MCC			✓		
	E-5	Upwell Rd	MCC			✓		
	E-6	Wimblington Rd	MCC			✓		
	E-7	Knights End Rd	MCC			✓		
	E-8	Burrowmoor Rd	MCC			✓		
	E-9	Gaul Rd	MCC			✓		
	E-10	A141 March Bypass	MCC					✓
	E-11	Town Bridge	MCC					✓
2010 March Data Collection	R-1	B1101 Elm Rd	RSI & MCC	✓				
	R-2	B1099 Upwell Rd	RSI & MCC			✓		
	R-3	B1101 Wimblington Rd	RSI & MCC			✓		
	R-4*	A141 Isle of Ely Way	MCC				✓	
	R-5	A141 Wisbech Rd	RSI & MCC	✓				
	R-6**	B1101 Station Rd/B1101 Broad St/B1099 Dartford Rd	RSI p'card				✓	
	TC-1	B1101 Elm Rd/Estover Rd/Norwood Rd	MCTC				✓	
	TC-4	A141/Manea Rd	MCTC				✓	
	TC-5	A141/King St	MCTC				✓	
	TC-6	A141/B1101 Wimblington Rd	MCTC		✓			
	TC-7	B1101 Wimblington Rd/Jobs Ln	MCTC				✓	
	TC-8	A141/Knights End Rd	MCTC		✓			
	TC-9	A141/Burrowmoor Rd	MCTC				✓	
	TC-10	A141/Gaul Rd	MCTC				✓	
	TC-11	A141/B1099 Wisbech Rd	MCTC		✓			
	TC-12	A141/A605	MCTC				✓	
	TC-13	B1101 High St/Burrowmoor Rd	MCTC				✓	
	TC-14	B1101 High Stt/St Peters Rd	MCTC		✓			
	TC-15	A141/Hostmoor Ave	MCTC				✓	
	TC-16	A141/B1093 Doddington Rd	MCTC				✓	
	TC-17	B1101 Elm Rd/Twenty Foot Rd	MCTC				✓	
	TC-18	B1101 Station Rd/County Rd	MCTC		✓			
	TC-19	B1099 Wisbech Rd/Norwood Rd	MCTC		✓			
	TC-20	B1101 Station Rd/Creek Rd	MCTC				✓	
	TC-21	B1101 Station Rd/B1101 Broad St/B1099 Dartford Rd	MCTC				✓	
	TC-22	B1101 High St/Elwyn Rd/Market Pl	MCTC				✓	
	TC-23	B1099 Upwell Rd/Elwyn Rd	MCTC				✓	
	TC-24	Hundreds Rd/Norwood Rd	MCTC				✓	
	TC-25	Hundreds Rd/Melbourne Ave	MCTC				✓	
	TC-26	Estover Rd/Creek Rd	MCTC				✓	
	TC-27	Burrowmoor Rd/Gaul Rd	MCTC				✓	
	LC-1	B1101 Station Rd level crossing	MCC		✓			

* RSI was not undertaken at Site R-4 due to site restriction and safety. See Paragraph 3.8.
**RSI postcard survey only; equivalent count data was collected as TC-21.

1.13. All traffic flow data collected for the purpose of this study, as outlined above, has been collected with the following vehicle classifications:

- **Cars** including taxis, estate cars, 'people carriers' and other passenger vehicles (for example, minibuses and camper vans) with a gross vehicle weight of less than 3.5 tonnes, normally ones which can accommodate not more than 15 seats. Cars towing caravans or trailers are counted as one vehicle;
- **Light Goods Vehicles (LGV)** which are all goods vehicles up to 3.5 tonnes gross vehicle weight, including those towing a trailer or caravan. This includes all car derived vans and those of the next larger carrying capacity such as transit vans. Included here are small pickup vans and milk floats. Most of this group are delivery vans;
- **Other Goods Vehicles Class 1 (OGV1)** which are all rigid vehicles over 3.5 tonnes gross vehicle weight with two or three axles. This also includes larger ambulances, tractors (without trailers), road rollers for tarmac pressing, box vans and similar large vans. A two or three axle motor tractive unit without a trailer is also included;
- **Other Goods Vehicles Class 2 (OGV2)** which are all rigid vehicles with four or more axles and all articulated vehicles. Also included in this class are OGV1 towing a caravan or trailer;
- **Passenger Service Vehicles (PSV)** (buses and coaches) which include all public service vehicles and work buses with a gross vehicle weight of 3.5 tonnes or more, usually vehicles with more than 16 seats; and
- **Motorcycles (MC)** which includes all two wheeled mechanically propelled vehicles.

1.14. For this report, the use of the term Light Vehicle (LV) has been applied to define Cars, LGV and MC as one; and the use of the term Heavy Goods Vehicle (HGV) has been applied to define both OGV1 and OGV2 as one.

This Report

1.15. The remainder of this report is broken into four main sectors:

- Chapter 2 provides a summary of the existing traffic data available for this study;
- Chapter 3 to 6 describe and summarise the 2010 traffic data collected as part of this study;
- Chapter 7 draws conclusions from these findings; and
- The appendices, which provide JTW sector-to-sector movements from 2001 Census data, an example of the postcard used for RSI Site R-6, flow profile and sector-to-sector movement analysis for the RSI survey data and larger version of the MATS network and sector system plots.

2. Existing Traffic Data

This study aims to make the best use of existing transport related data, where possible, throughout the study.

Existing Traffic Data

2.1. Existing traffic data within the study area have been identified. A number of key data sources have been considered, including:

- CCC's annual traffic monitoring programmes for the local road network;
- CCC's education database for all local schools; and
- 2001 JTW Census data.

2.2. This chapter provides a summary of the above traffic datasets.

Cambridgeshire County Council Annual Town Monitoring Data

2.3. Traffic data from CCC's annual town traffic monitoring programme for 2010 has been made available for this study. As part of the monitoring programme, 12-hour (0700-1900) MCC traffic, pedestrian and cyclist count data has been collected for the local network in March. The survey sites are listed in Table 2.1, and the location of the sites is shown in Figure 2.1.

2.4. Table 2.2 to Table 2.4 provide a summary of the 2010 traffic, pedestrian and cyclist data.

Table 2.1 – CCC Annual Town Monitoring Locations

Site ID	Location	Easting	Northing
E-1	Wisbech Road	540,366	297,555
E-2	Norwood Road	541,133	297,924
E-3	Elm Road	541,980	297,881
E-4	Creek Road	542,514	294,040
E-5	Upwell Road	542,963	296,120
E-6	Wimblington Road	541,583	294,125
E-7	Knights End Road	540,745	294,885
E-8	Burrowmoor Road	540,898	296,100
E-9	Gaul Road	540,566	296,707
E-10	A141 March Bypass	540,221	297,313
E-11	Town Bridge	541,678	296,702
E-12*	Marylebone Road	541,306	296,866
E-13*	Wigstones Road	542,116	297,039

*Sites E-12 and E-13 are pedestrian and cyclist count locations only.

Figure 2.1 – Existing CCC Annual Town Monitoring MCC Locations

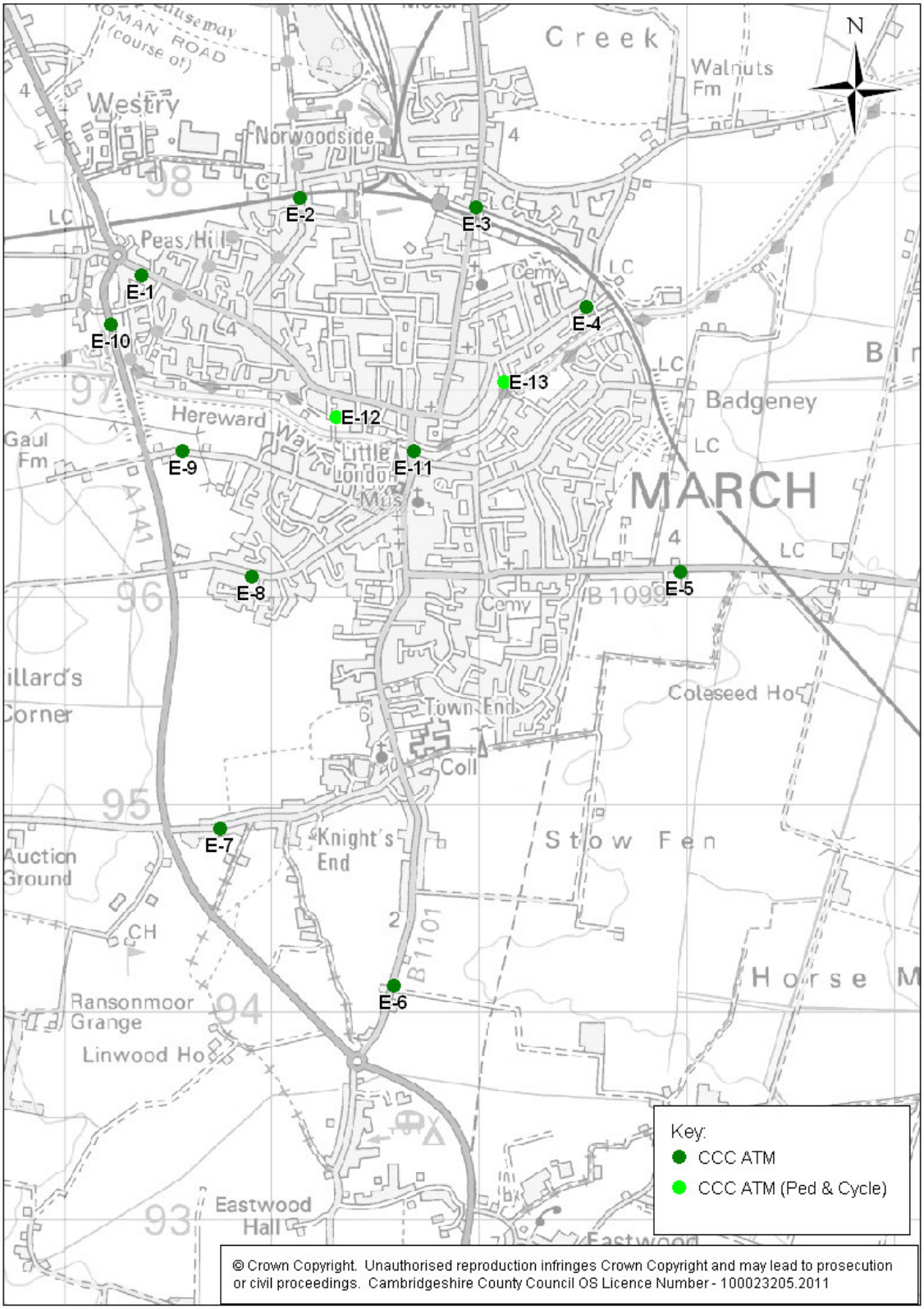


Table 2.2 – CCC Annual Town Monitoring MCC Data Summary (2010)

Site ID	Dir	Traffic Flow (Veh)				Dir	Traffic Flow (Veh)			
		AM	IP	PM	12hr		AM	IP	PM	12hr
E-1	EB	368	361	461	4,253	WB	553	436	514	5,407
E-2	NB	173	127	110	1,529	SB	181	147	212	1,776
E-3	NB	251	206	259	2,670	SB	333	224	274	2,902
E-4	EB	32	39	40	462	WB	31	42	56	464
E-5	EB	70	67	94	882	WB	124	77	121	1,062
E-6	NB	332	256	433	3,456	SB	433	272	321	3,580
E-7	EB	174	64	128	927	WB	91	40	47	566
E-8	EB	142	78	144	1,052	WB	102	74	65	868
E-9	EB	103	84	154	1,114	WB	62	53	54	684
E-10	NB	675	512	699	6,694	SB	801	575	772	7,326
E-11	NB	745	621	696	7,780	SB	535	541	695	6,471

Table 2.3 – CCC Annual Town Monitoring MCC Pedestrian Data Summary (2010)

Site ID	Dir	Pedestrian Flow				Dir	Pedestrian Flow			
		AM	IP	PM	12hr		AM	IP	PM	12hr
E-1	EB	3	6	6	68	WB	3	7	5	79
E-2	NB	4	8	6	87	SB	30	9	9	119
E-3	NB	17	16	15	248	SB	61	16	5	188
E-4	EB	14	6	5	87	WB	2	5	1	43
E-5	EB	0	1	0	4	WB	0	1	0	5
E-6	NB	0	0	0	7	SB	3	0	0	6
E-7	EB	0	0	0	0	WB	0	0	0	0
E-8	EB	0	0	0	1	WB	0	0	0	1
E-9	EB	0	0	0	2	WB	0	0	0	1
E-10	NB	1	0	0	5	SB	0	0	0	1
E-11	NB	144	354	114	3,112	SB	178	218	135	2,070
E-12	NB	36	22	8	238	SB	85	21	11	290
E-13	NB	27	26	18	294	SB	36	27	32	329

Table 2.4 – CCC Annual Town Monitoring MCC Cyclist Data Summary (2010)

Site ID	Dir	Cyclist Flow				Dir	Cyclist Flow			
		AM	IP	PM	12hr		AM	IP	PM	12hr
E-1	EB	0	3	1	34	WB	1	2	2	29
E-2	NB	8	8	11	110	SB	17	15	17	170
E-3	NB	1	7	4	69	SB	29	7	8	117
E-4	EB	2	4	4	46	WB	2	3	2	24
E-5	EB	4	1	0	9	WB	0	1	0	5
E-6	NB	2	1	4	15	SB	2	1	2	16
E-7	EB	0	0	0	1	WB	0	0	0	1
E-8	EB	0	0	0	0	WB	0	0	0	1
E-9	EB	0	0	0	0	WB	0	0	1	1
E-10	NB	0	0	0	2	SB	0	0	0	1
E-11	NB	18	31	23	284	SB	57	18	21	332
E-12	NB	14	5	4	65	SB	36	4	6	84
E-13	NB	17	13	14	171	SB	26	16	16	188

Cambridgeshire County Council Education Database

2.5. 2010 education trip data (by MATS SATURN zones) was provided by CCC, which gives home to school journey data for all state funded primary and secondary schools in Cambridgeshire. Eight schools have been identified within the study area; Seven of which are primary schools, and one is a secondary school. The location of the schools is shown in Figure 2.2.

2.6. Table 2.5 shows the mode split for pupils' home to school trips by school and mode, and Table 2.6 shows the average home to school (crow-fly) distance (based on MATS SATURN zone to zone distance) by school and mode. It should be noted that average home to school distance for Lionel Walden School (Doddington) and Thomas Eaton C.P. School (Wimblington) have been excluded as the zoning structure for this area is too coarse for any meaningful home zone to school zone distance calculation.

Figure 2.2 – Schools within MATS study area

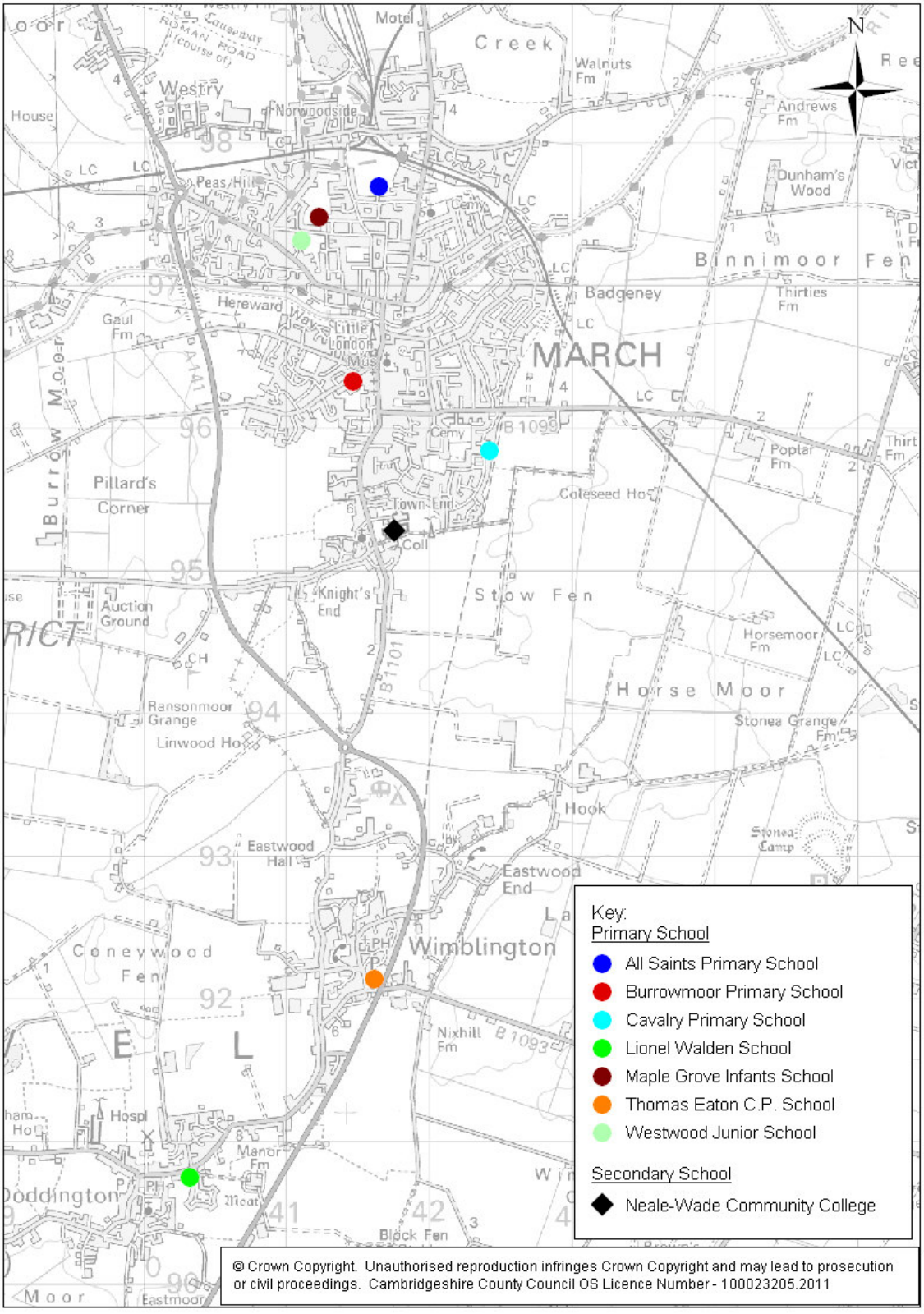


Table 2.5 – Mode Split for Pupils' Home to School Journeys by School (2010)

School *(no. of pupils)*	Car or Taxi	Bus	Cycle	Walk	Other	Total
Primary School						
All Saints Primary School *(206)*	54%	0%	6%	39%	0%	100%
Burrowmoor Primary School *(385)*	32%	1%	5%	61%	0%	100%
Cavalry Primary School *(306)*	46%	2%	2%	51%	0%	100%
Lionel Walden School *(235)*	34%	0%	0%	66%	0%	100%
Maple Grove Infants School *(263)*	32%	0%	11%	57%	0%	100%
Thomas Eaton C.P. School *(176)*	41%	5%	5%	49%	0%	100%
Westwood Junior School *(354)*	40%	0%	12%	49%	0%	100%
Secondary School						
Neale-Wade Community College *(1713)*	20%	15%	18%	37%	10%	100%

Table 2.6 – Average Home to School (Crow-Fly) Distance by School and Mode (2010)

School	Average Home to School (Crow-Fly) Distance (km)					
	Car or Taxi	Bus	Cycle	Walk	Other	All
Primary School						
All Saints Primary School	1.8	-	0.9	0.6	-	1.3
Burrowmoor Primary School	2.7	9.9	0.9	1.1	-	1.6
Cavalry Primary School	1.9	2.4	0.7	0.9	-	1.4
Lionel Walden School	-	-	-	-	-	-
Maple Grove Infants School	2.6	-	0.9	0.8	-	1.4
Thomas Eaton C.P. School	-	-	-	-	-	-
Westwood Junior School	3.1	-	0.9	0.8	-	1.7
Secondary School						
Neale-Wade Community College	6.1	10.7	2.5	1.9	12.4	5.2

2.7. Table 2.5 shows that for all schools within the MATS study area, the main modes of travel for home to schools trips are by car and walking.

2.8. Table 2.6 shows that the average home to school distances for all primary schools are much shorter than the secondary school as might be expected. The average home to school distance for all primary schools is less than 2km, whereas for Neale-Wade Community College, which is only secondary within the MATS study area, the average distance is approximately 5km.

2.9. As well as identifying the origins (i.e. home) and destinations (i.e. school) for all pupil trips for the eight schools within the MATS study area, all pupil trips with origins in March (i.e. Sector 1 to Sector 3), but destinations outside the study area have also been identified (i.e. pupils who live within the study area but go to schools outside the study area). These trips are generally made by secondary school pupils, and majority of them are going to Cromwell Community College, which is in neighbouring town of Chatteris. Table 2.7 shows the data by home to school (crow-fly) distance ranges.

Table 2.7 – Home to School (Crow-Fly) Distance Distribution (for internal to external pupil trips) (2010)

Home to School (Crow-Fly) Distance (km)	Number of Pupil Trips
0 to 10	3
10 to 20	75
20 to 30	-
30 to 40	1
> 40	1
Total	80

2.10. The education trip data will be used to complement the RSI data during the model demand matrix build process. Certain internal to internal movements are not expected to be captured by the RSI surveys, and the education trip data can be utilised to infill these movements.

2001 Journey to Work National Census Data

2.11. The 2001 National Census recorded, amongst other things, the home and employment location of individuals and the travel mode which individuals use for their journey to work (JTW). This data is provided for the whole day and for the outbound work journey only. The following bullet points list the modes that are included in the 2001 Census data. For this study, it was assumed that car driver trips are equivalent to vehicle trips.

- Work From Home;
- Underground;
- Train;
- Bus;
- Taxi;
- Car Driver;
- Car Passenger;
- Motorcycle;
- Pedal Cycle;
- Walk; and
- Other.

2.12. For the purpose of this study, 2001 JTW car driver trip data relating to the journeys to and from all counties in the UK were extracted. Table 2.8 shows this data, in the MATS 8 sector system, and the MATS sectors are shown in Figure 2.3.

2.13. The MATS sector system is based on the existing boundaries. For example, Sector 1 to Sector 3 follow the existing ward boundaries for March; and Sector 4 to Sector 7 follow the existing district and county boundaries for Cambridgeshire. It should be noted that the sector system was derived as a means of keeping track of the basic movements within the study area, and for

basic trip distribution checks within the model only. The more detailed zone plan was used for the modelling work which is discussed further in the MATS Local Model Validation Report (LMVR).

2.14. It was also recognised that while the River Nene forms a natural boundary for the traffic movements in March, the ward boundary follows the B1099 Dartford Road and B1101 Station Road which most North-South traffic movements within March would use. As such, it was decided that the sectoring system would follow the existing ward boundary rather than the natural boundary. However, when deriving the more detailed zone plan (discussed further in the MATS LMVR), the boundary created by River Nene was used to ensure the North-South traffic movements are accurately modelled.

2.15. The 2001 JTW car driver trip data will be used to assist infilling of the traffic movements that are not captured by the RSI surveys. It should be noted that the data presented in Table 2.8 includes all movements, including external to external movements that do not pass through the MATS study area. The data will be masked to exclude these external to external movements before it will be used for further demand matrix development.

Table 2.8 – Sector-to-Sector JTW Movements from 2001 Census Data (Car Driver)

	1	2	3	4	5	6	7	8	Total
1	231	97	97	261	6	173	399	189	1,453
2	130	240	123	373	6	248	413	171	1,704
3	134	105	293	328	9	196	473	159	1,697
4	228	114	135	6,901	21	308	4,511	2,527	14,745
5	6	3	18	67	45	25	81	51	296
6	145	104	140	488	12	1,421	2,611	456	5,377
7	188	120	123	1,829	9	531	153,604	31,983	188,387
8	201	84	87	4,146	25	222	44,953	13,164,114	13,213,832
Total	1,263	867	1,016	14,393	133	3,124	207,045	13,199,650	13,427,491

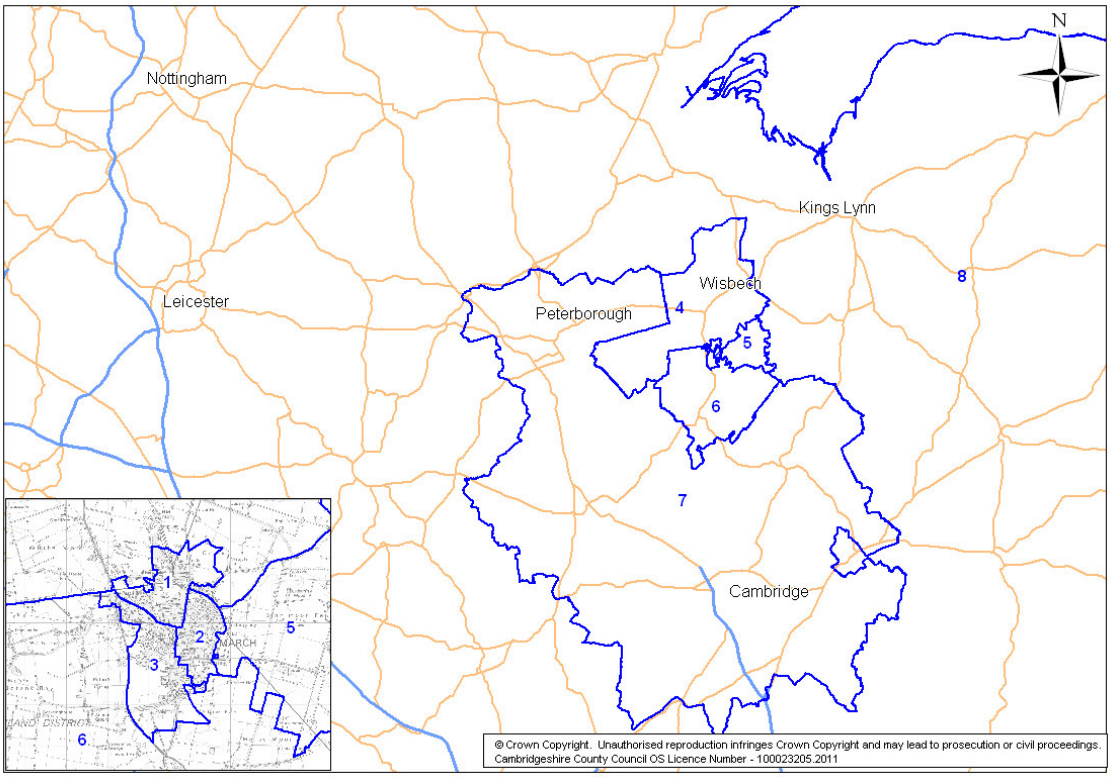
2.16. The 2001 JTW car driver trip data shows that for movements within March (i.e. Sector 1, 2 & 3), there are large proportions of intra-sectoral movements. The data also shows that Sector 4, which contains the neighbouring market town of Wisbech, is a popular workplace destination for the March residents. There are very few JTW car driver trips to and from Sector 5, confirming that this sector contains mainly rural areas.

2.17. In addition to the car driver trips, other modes have also been analysed: some workers travel by train to Peterborough, Cambridge and London; and many trips within March are made on foot or pedal cycle as shown in Table 2.9. Full sector-to-sector JTW movements for walk and cycle are included in Appendix A.

Table 2.9 – JTW Movements within March by Mode from 2001 Census Data

Mode	Total JTW Trips within March (i.e. Movements between Sector 1, 2 & 3)
Car Driver	1,450 (43%)
Pedal Cycle	543 (16%)
Walk	486 (15%)
Other	861 (26%)
All	3,340 (100%)

Figure 2.3 – MATS Sector System



See Appendix C for a larger figure of the MATS Sector System.

- 1 – March North;
- 2 – March East;
- 3 – March West;
- 4 – Fenland North;
- 5 – Fenland East;
- 6 – Fenland South;
- 7 – Rest of Cambridgeshire and Peterborough; and
- 8 – Rest of Country.

Highway Network Inventory

2.18. To develop the MATS SATURN highway network, various data sources have been used. Ordnance Survey (OS) mapping was used as a basis to build the basic structure of the model network and to ensure the co-ordinates of junctions are accurate.

2.19. Online aerial and street-view photography was used to ascertain the majority of junction types (e.g. priority junctions, roundabouts) and layouts (e.g. number of approach lanes, lane allocations). Link attributes, such as speed limit and number of lanes, were also obtained from online resources. Any additional information required was obtained through site visits as required.

2.20. Areas of weight restrictions were obtained from the CCC's heavy commercial vehicle information map, which can be accessed through the CCC website. Figure 2.4 shows the areas of March with weight restrictions.

2.21. Other network attributes (such as traffic calming measures and on-street parked cars) were also recorded during site visits. The impacts of these attributes will be considered during the network calibration stage and incorporated into the model where appropriate. Figure 2.5 shows the traffic calming measure on Upwell Road (between Green Street and Morton Avenue).

Figure 2.4 – Areas with Weight Restrictions

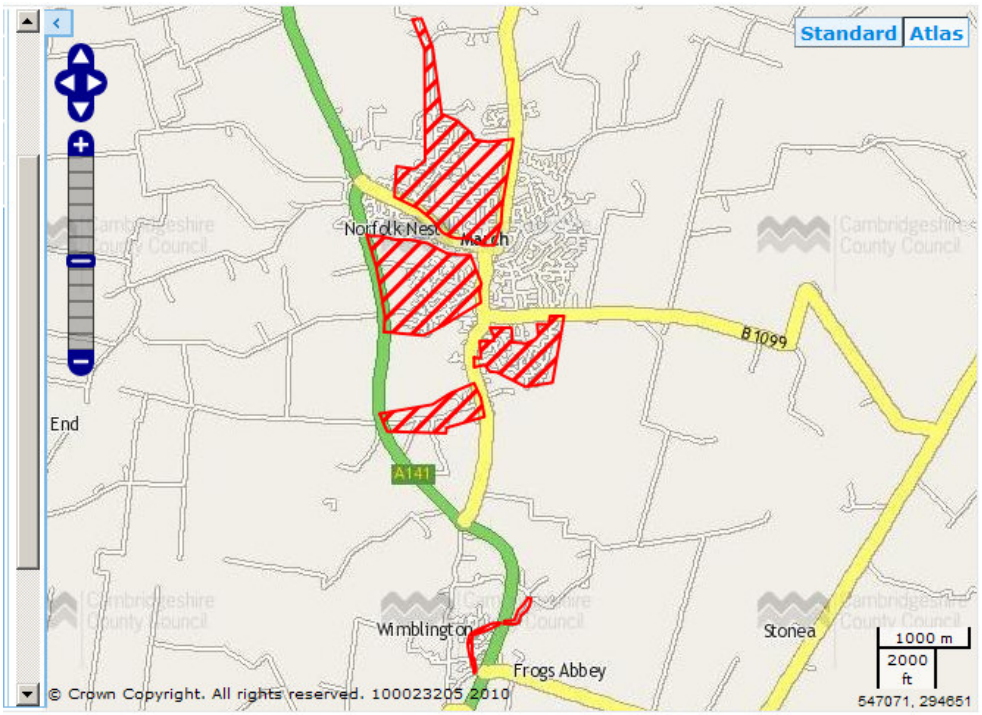


Figure 2.5 – Upwell Road Traffic Calming Measure

TrafficMaster Data

2.22. TrafficMaster data for March was provided by CCC for this study. The TrafficMaster data provides observed speed data for September 2008 to July 2009 for the AM and PM peaks. The majority of the road links in March are within the TrafficMaster data network, and the data is provided for both travel directions.

2.23. The TrafficMaster data will be used to assist the calibration and validation of the model, and ensuring the area and extent of congestion within the model is representative.

2.24. Figure 2.6 and Figure 2.7 show the TrafficMaster data for the AM and PM peak respectively. The data shows that slow speed and delay can be expected in the High Street area. The

average speeds for most access roads to residential, commercial and leisure areas (e.g. Mill View, March Trading Park, City Road) are also low as might be expected.

Figure 2.6 – TrafficMaster Data (AM) (2008/2009)

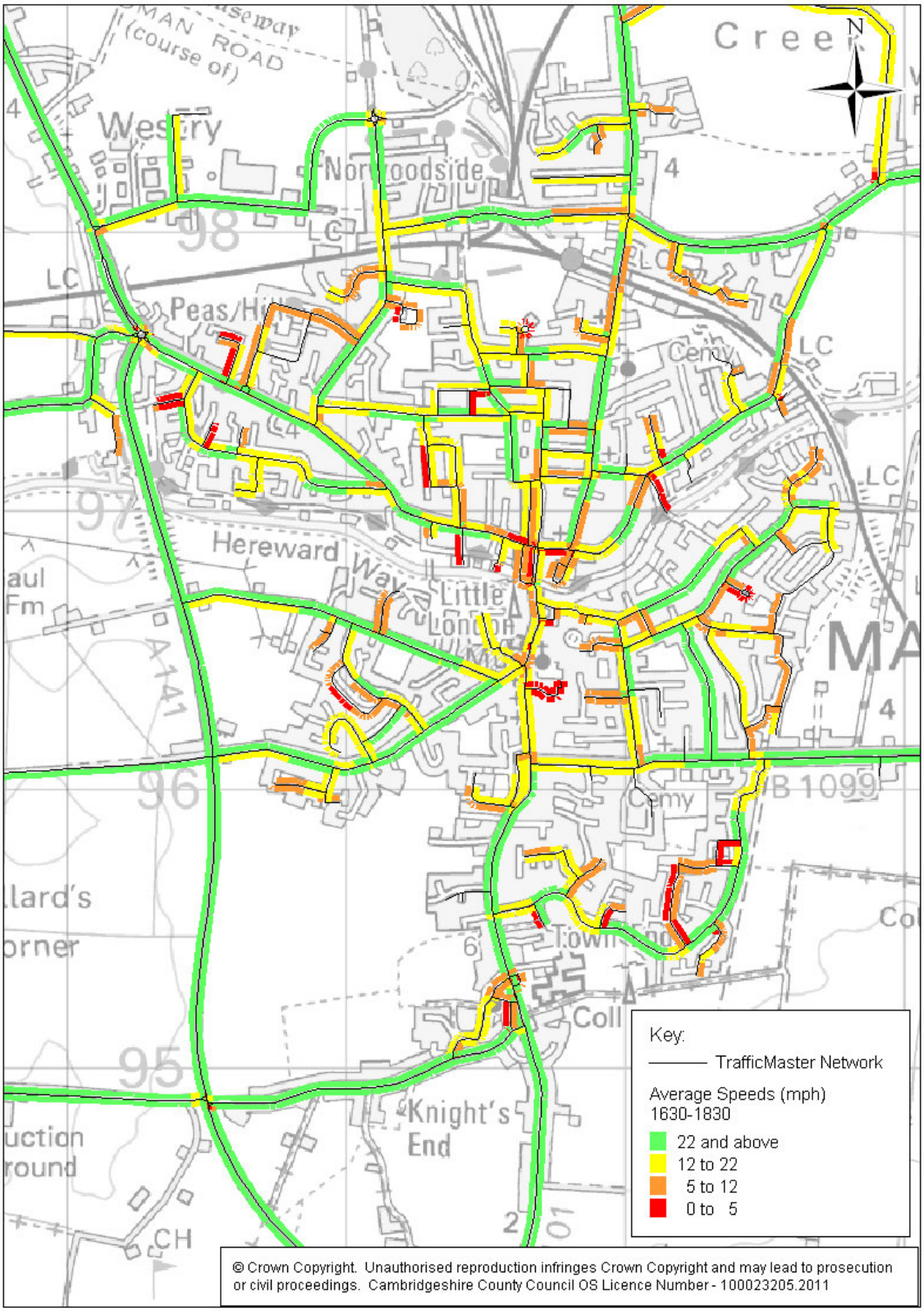
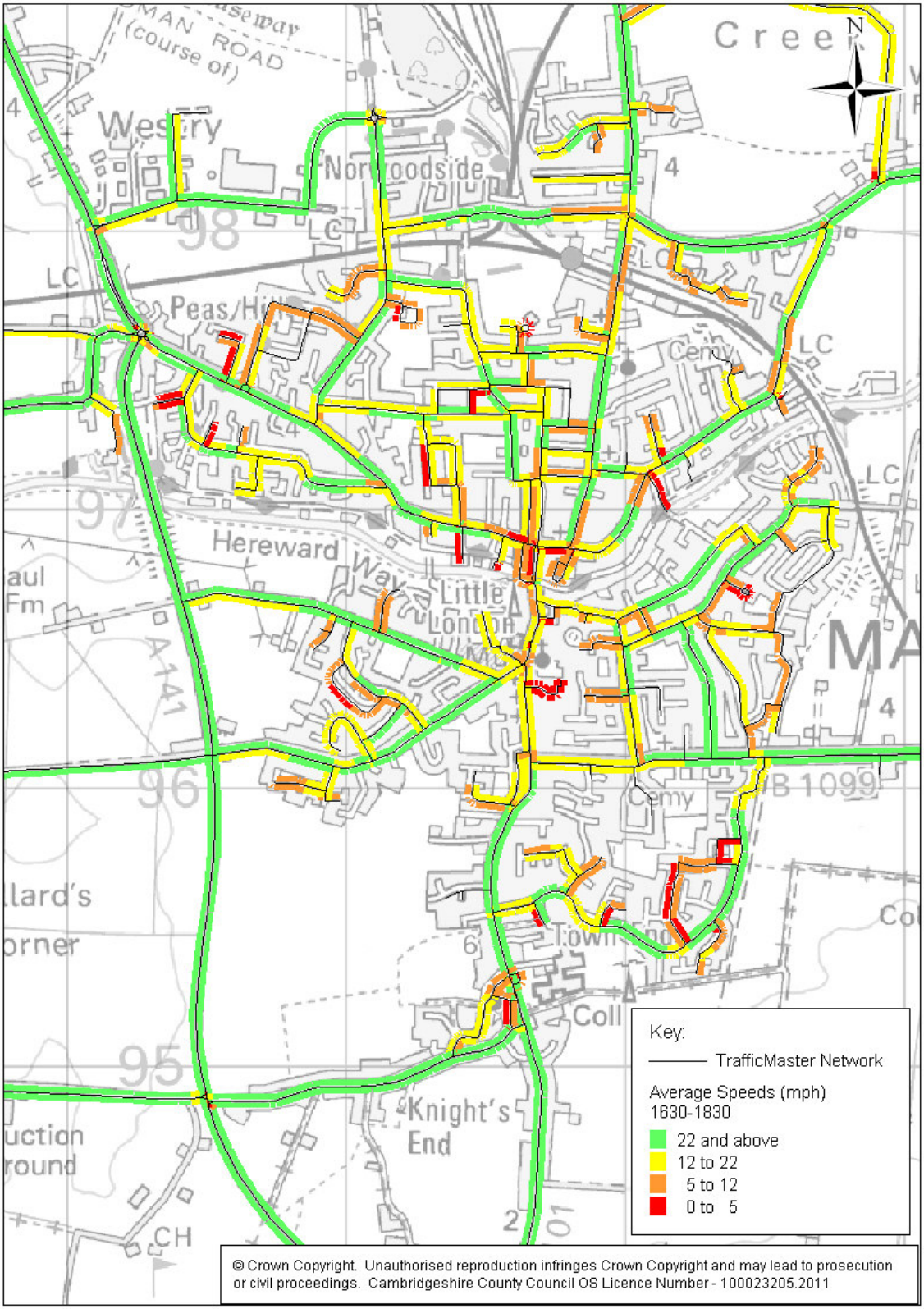


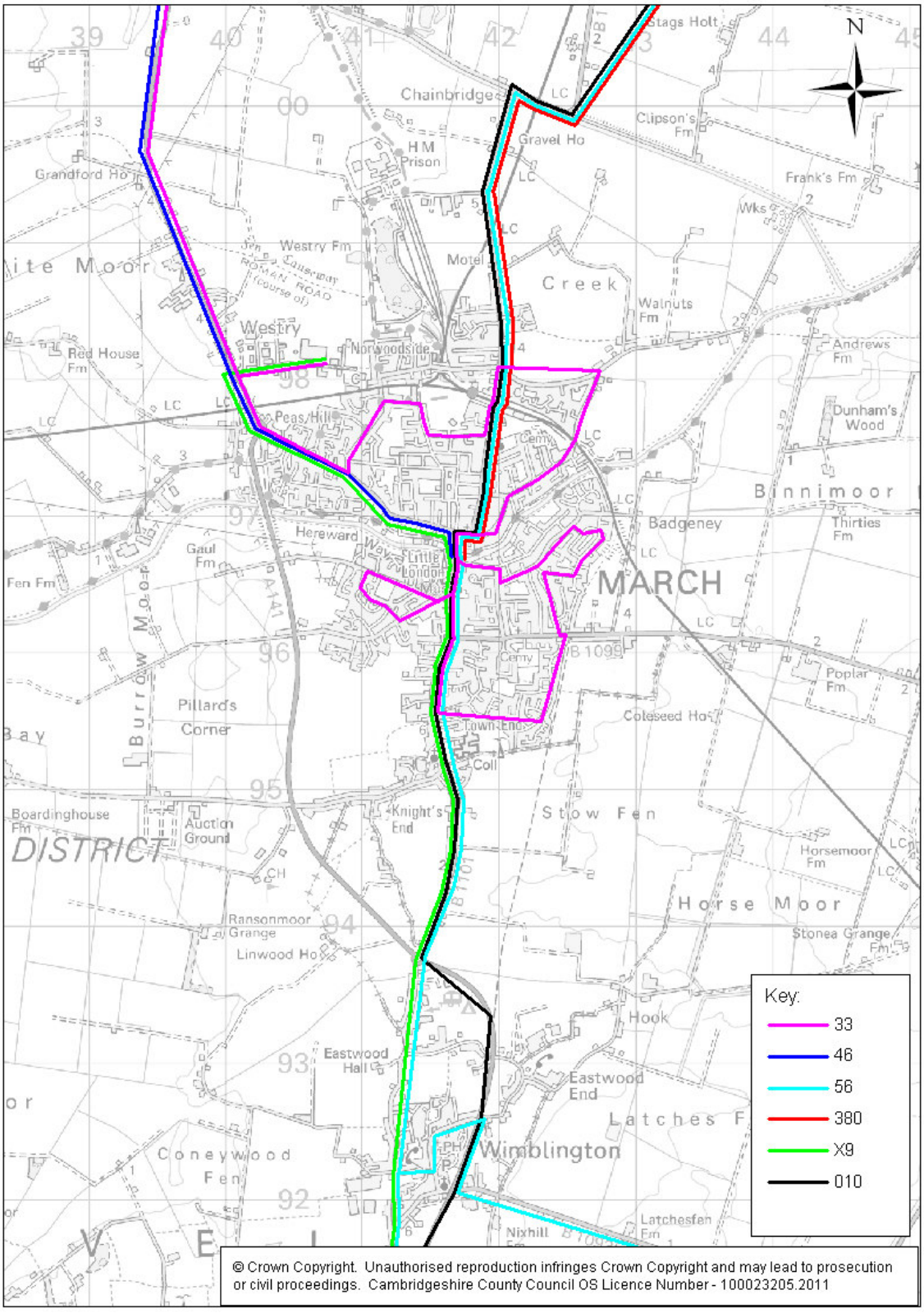
Figure 2.7 – TrafficMaster Data (PM) (2008/2009)



Bus Route and Timetable Information

2.25. Figure 2.8 highlights the bus routes in March and the surrounding area. Bus route and timetable information was obtained from the CCC website and has subsequently been added to the MATS SATURN highway model.

Figure 2.8 – March Major Bus Routes



2.26. Table 2.10 summarises the number of buses for each service that pass through the area of the model within the peak hour modelled for each time period. This does not indicate the frequency of the services, but simply the number of services within the modelled area for each of the modelled hours.

Table 2.10 – March Bus Service Frequencies

Route	Description	Dir	Number of Buses within the modelled area per hour			Comments
			AM	IP	PM	
33	Peterborough – Whittlesey – March	NB	0	1	1	See Note 1
		SB	1	1	1	
46	Kings Lynn – Wisbech – March	NB	1	1	1	
		SB	1	1	1	
56	Wisbech – March – Benwick Or Manea	NB	1	1	1	
		SB	1	1	0	See Note 2
380	Wisbech – Friday Bridge – March	NB	1	1	1	
		SB	0	1	0	See Note 3
X9	Littleport – Ely – Cambridge	NB	1	1	1	
		SB	0	1	1	See Note 4
010	Kings Lynn – London Victoria	SB	1	0	0	See Note 5

Note 1 – The Northbound AM peak services operate between 0704 and 0758 within the modelled area. There is no service operating between 0800 and 0900 within the modelled area, therefore a service is not included in the AM peak model.

Note 2 – The latest southbound service terminates at March Station Road at 1702. Since the majority of the journey is before the modelled hour, the service is not included in the PM peak model.

Note 3 – AM services do not enter the modelled area until 0906, while PM services do not enter the modelled area between 1635 and 1801. Therefore there are not services included for the AM and PM peak models.

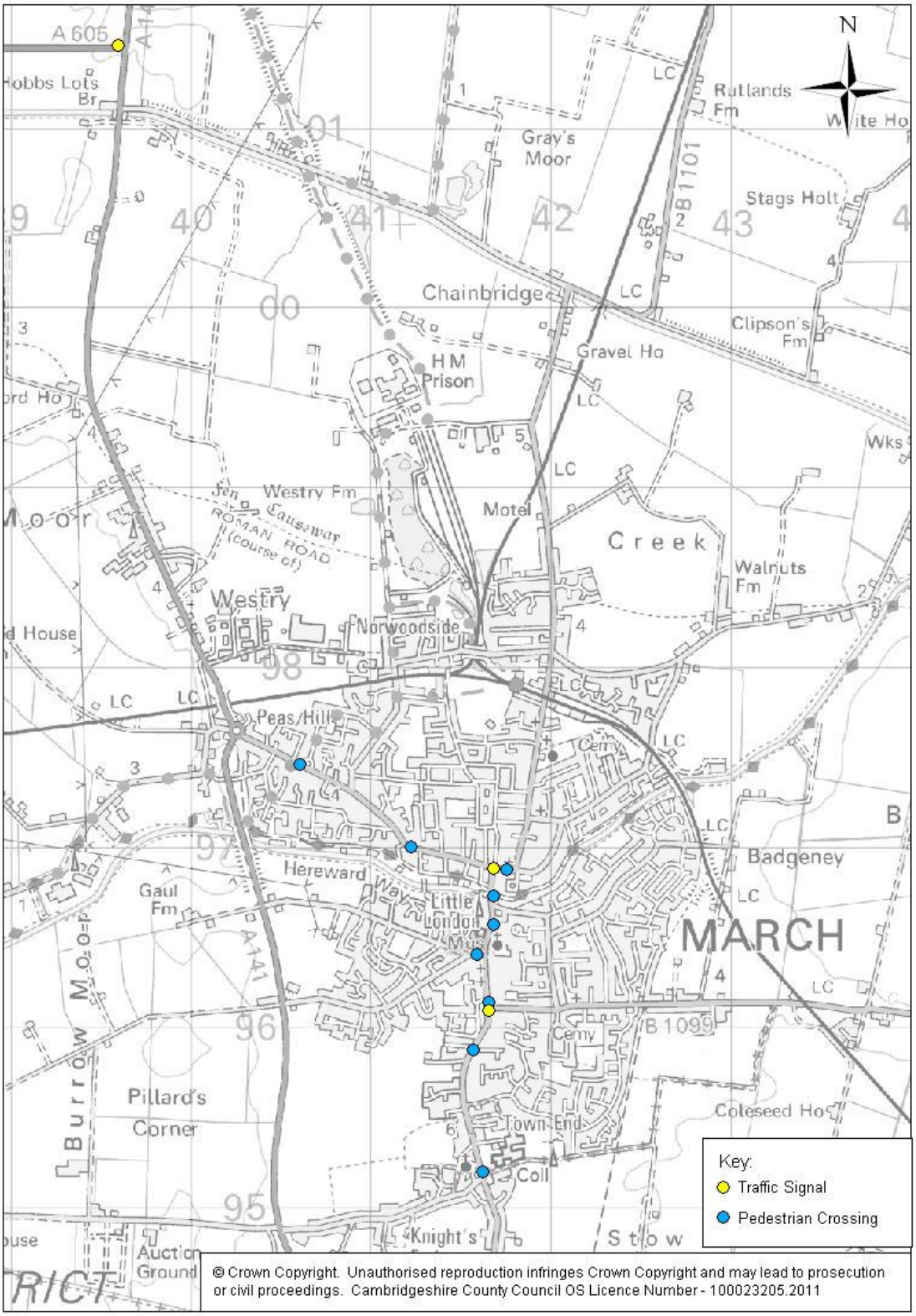
Note 4 – Southbound AM services leave the modelled area at 0741, with the next service not entering the modelled area until 0922. Therefore no AM peak hour service is included.

Note 5 – One Southbound service starts in Kings Lynn and stops in March at 0835. All other southbound services originate in Cambridge, and do not pass through the modelled area. Only one northbound service passes through the modelled area at 2055, and as such no northbound services are included.

Traffic Signal Data

2.27. Traffic signal staging, phasing and timing data was provided by CCC to allow the accurate representation of signalised junctions within the MATS SATURN highway model. Figure 2.9 shows the locations of all signalised junctions (except level crossings) within the MATS study area.

Figure 2.9 – March Signalised Junctions



3. Origin/Destination Surveys

As part of this study, Roadside Interview surveys were undertaken to provide trip origin/destination data for the major radial routes into March. A postcard survey for a major town centre junction was also undertaken to capture local trip information.

Origin/Destination Surveys

Roadside Interview Surveys

3.1. Four RSI surveys were undertaken in October 2010 at strategic points within the study area to provide an up-to-date and detailed picture of the current demand along each route. The RSI surveys were carried out for the inbound direction to March, and the RSI survey locations are:

- Site R-1 – B1101 Elm Road Southbound, just south of Flaggrass Hill Road between Coldham and March;
- Site R-2 – B1099 Upwell Road Westbound, just east of Cavalry Drive;
- Site R-3 – B1101 Wimblington Road Northbound, just south of Jobs Lane; and
- Site R-5 – A141 Wisbech Road Southbound, just north of Gipsy Lane.

3.2. Figure 3.1 shows the RSI survey locations and directions.

3.3. The RSI surveys were carried out over a 12-hour period, from 0700 to 1900. Motorists were asked to provide origin and destination information for their trips, their trip purposes and give details of where they intended to park in March if applicable. Vehicle type and occupancy were also recorded by the enumerators during the interviews. The RSI purposes are shown in Table 3.1.

Table 3.1 – RSI Purpose Definitions

ID	Description
1	Home
2	Tourism/Holiday Home
3	Work
4	Employers' Business
5	Education
6	Shopping
7	Personal Business
8	Visit Friends/Family
9	Recreation/Leisure
10	Other

Postcard RSI Survey

3.4. A single town centre location has been identified for postcard RSI survey:

- Site R-6 – B1101 Station Road/ B1101 Broad Street/B1099 Dartford Road.
  (Site R-6A: B1101 Station Road (WB) Approach;
  Site R-6B: B1099 Broad Street (NB) Approach; and
  Site R-6C: B1099 Dartford Road (EB) Approach.)

3.5. Postcards were given to motorists during the red phase of the signal by the enumerators as the vehicles approached the junction. The postcard requests the same information from the motorists as the RSI interview surveys. Figure 3.1 shows the postcard RSI survey location (Site R-6) and Appendix B.1 shows a sample of the postcard.

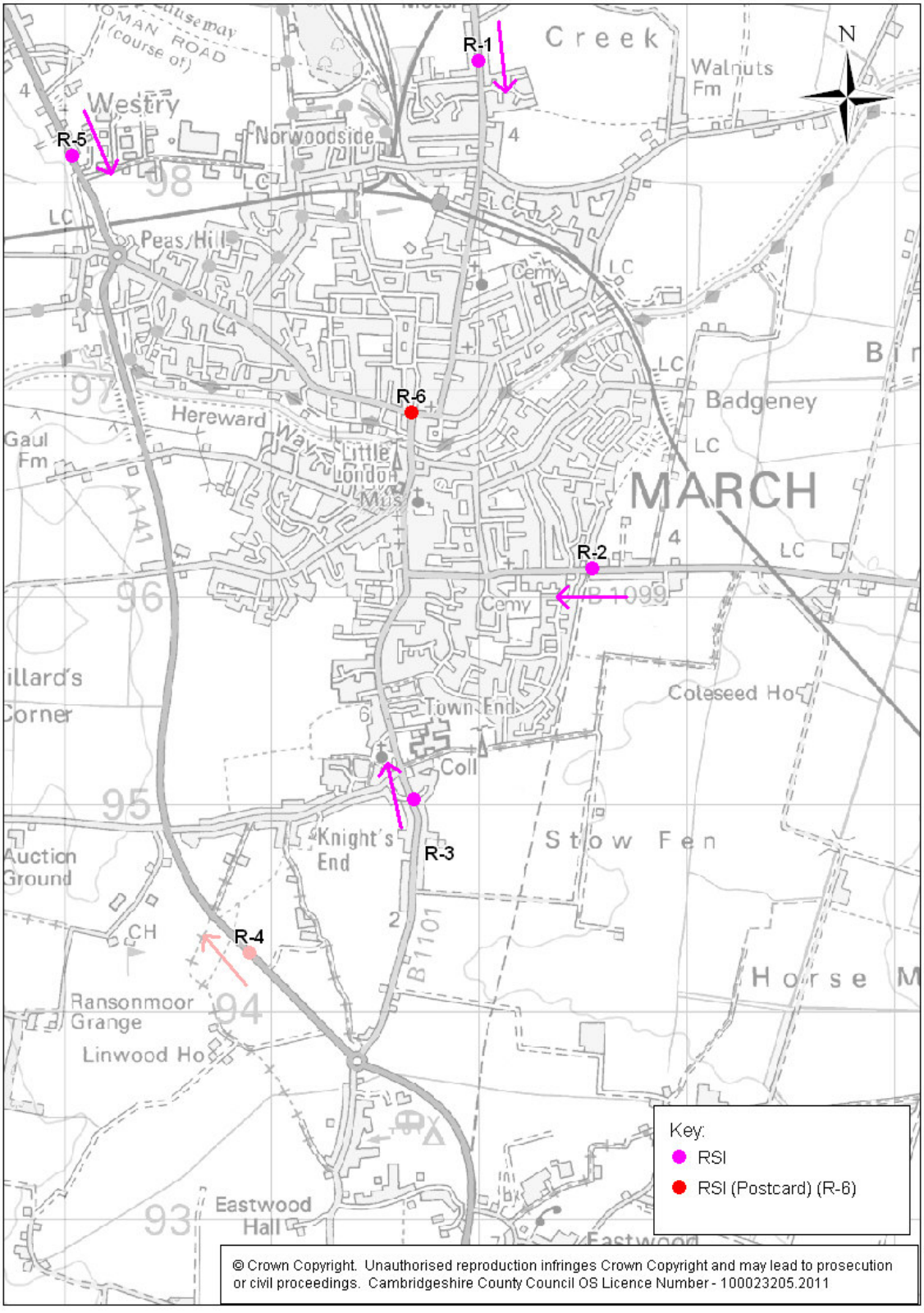
MCC and ATC Surveys

3.6. In addition to the 12-hour RSIs, for all RSI sites except Site R-6, 16-hour MCCs were carried out in both directions on the survey day, and ATCs were undertaken continuously over a two-week period, from the 11th to the 24th of October 2010. For Site R-6, MCTC survey was undertaken instead of MCC on the RSI survey day, and due to the presence of on-street parking an ATC survey could not be carried out at this location.

3.7. The MCC and MCTC data is provided at 15-minute intervals and is used to calculate expansion factors for the RSI data and assess RSI sample rate. The purpose of the ATC data is to detect any unusual variations in the traffic volumes and to ensure the RSI survey day is representative of a typical weekday. The ATC data is provided in 1-hour intervals.

3.8. In addition to the RSI survey locations listed in Paragraph 3.1, MCC and ATC surveys were also carried out on the A141 Isle of Ely Way, just north of the A141/B1101 roundabout. This location was originally identified as a RSI survey site (Site R-4), however a suitable and safe stretch of the A141 for the RSI site is not available and RSI survey could not be undertaken. The location of this site is also shown in Figure 3.1 as Site R-4.

Figure 3.1 – RSI Locations



RSI Sample Rates

3.9. Table 3.2 summarises the 12-hour flow from the MCC surveys and the number of interviews undertaken. The interview sample rates ranged between 14% and 52% for the conventional RSI survey sites (i.e. Site R-1, R-2, R-3 and R-5). As expected, overall higher sample rates are achieved where traffic flows are lower.

3.10. In general, the RSI target sample rate is 15% which is achieved by RSI Site R-1, R-2 and R-3. For RSI Site R-5, the sample rate is 14% which is 1% lower than the target, however this is considered to be acceptable as the traffic flow at this site is high, and therefore difficult to achieve a high sample rate.

3.11. For RSI Site R-6, which is a postcard RSI site, the sample rates for all three approaches to the junction are less than 10%. A low sample rate is generally expected for postcard surveys. Although every effort has been made to distribute postcards to all passing motorists, not all motorists have received a postcard. Also, for people that pass through the RSI site multiple times during the interview period, they might refuse to receive multiple postcards and have provided information for one journey only. In addition, a much lower number of postcards were returned than were distributed.

Table 3.2 – Summary of RSI MCC Counts and Interviews

RSI Site	12hr MCC Flow	RSI Sample (No. of Interviews)	Sample Rate
R-1	2,216	746	34%
R-2	1,078	556	52%
R-3	3,904	708	18%
R-5	6,817	913	14%
R-6A (B1101 Station Road Approach)	4,879	239	5%
R-6B (B1099 Broad Street Approach)	7,376	577	8%
R-6C (B1101 Dartford Road Approach)	4,288	238	6%

3.12. Table 3.3 provides the funnelled sample rate analysis by period and vehicle type for the RSI surveys. Funnelling ensures that the greatest amount of survey data is used within the building of the matrices. This process assumes that the trip patterns observed throughout the peak periods remain constant.

3.13. The funnelling process takes into account the interview data over the whole time period and concentrates it to the MCC count of the peak 1-hour modelled period. For each time period, this occurs as shown below:

- AM peak period (0700-1000) interviews are scaled to the count between 0800 and 0900;
- Inter peak period (1000-1600) interviews are scaled to the average hourly count between 1000 and 1600; and
- PM peak period (1600-1900) interviews are scaled to the count between 1700 and 1800.

3.14. Taking the AM peak period as an example, all interviews that were conducted between 0700 and 1000 are used to produce the origin/destination movements for the AM peak hour by scaling to the traffic count of the 0800 to 0900 peak hour.

3.15. The funnelling process provides a wider range of observed origin/destination data and allows all RSI data to be used. Figure 3.2 below illustrates the funnelled RSI sample rate calculation.

Figure 3.2 – RSI Funnelling (Sample Rate Calculation)

$$AM\ Funnelled\ Sample\ Rate = \frac{Total\ No.of\ RSI\ observaitions\ between\ 0700\ and\ 1000}{MCC\ Flow\ between\ 0800\ and\ 0900}$$

$$IP\ Funnelled\ Sample\ Rate = \frac{Total\ No.of\ RSI\ observaitions\ between\ 1000\ and\ 1600}{Average\ hourly\ MCC\ Flow\ between\ 1000\ and\ 1600}$$

$$PM\ Funnelled\ Sample\ Rate = \frac{Total\ No.of\ RSI\ observaitions\ between\ 1600\ and\ 1900}{MCC\ Flow\ between\ 1700\ and\ 1800}$$

Table 3.3 – Funnelled Sample Rates by Period and Vehicle Type

RSI Site		AM			IP			PM		
		LV	HGV	Total	LV	HGV	Total	LV	HGV	Total
R-1	MCC Flow	228	11	239	149	4	153	261	2	263
	RSI Sample	187	7	194	326	2	328	220	4	224
	Sample Rate	82%	64%	81%	219%	52%	215%	84%	200%	85%
R-2	MCC Flow	85	2	87	80	4	84	96	9	105
	RSI Sample	160	0	160	268	8	276	117	3	120
	Sample Rate	188%	0%	184%	335%	218%	330%	122%	33%	114%
R-3	MCC Flow	447	12	459	284	7	292	346	4	350
	RSI Sample	173	3	176	357	8	365	165	0	165
	Sample Rate	39%	25%	38%	126%	109%	125%	48%	0%	47%
R-5	MCC Flow	653	59	712	433	73	507	708	40	748
	RSI Sample	253	0	253	432	0	432	228	0	228
	Sample Rate	39%	0%	36%	100%	0%	85%	32%	0%	30%
R-6A	MCC Flow	342	9	351	408	8	415	474	1	475
	RSI Sample	107	0	107	94	0	94	36	0	36
	Sample Rate	31%	0%	30%	23%	0%	23%	8%	0%	8%

RSI Site		AM			IP			PM		
		LV	HGV	Total	LV	HGV	Total	LV	HGV	Total
R-6B	MCC Flow	680	10	690	574	5	579	709	2	711
	RSI Sample	218	0	218	292	0	292	66	0	66
	Sample Rate	32%	0%	32%	51%	0%	50%	9%	0%	9%
R-6C	MCC Flow	332	8	340	354	6	360	416	0	416
	RSI Sample	76	0	76	126	0	126	36	0	36
	Sample Rate	23%	0%	22%	36%	0%	35%	9%	n/a	9%

3.16. As expected, the funnelled sample rates are highest in the inter peak for most RSI sites. For LVs, the sample rates are generally good for all sites and time periods; however for HGVs, the sample rates are lower and for Site R-5, no HGVs were interviewed. Most of the RSI sites were situated on narrow roads, and to interview HGVs, the enumerators had to stand on the driver side of the vehicles which was deemed to be unsafe for most sites. Also, for Site R-6, no postcard data was returned for HGVs.

ATC Adjustment Factors

3.17. As discussed in Paragraph 3.6, ATC surveys were undertaken at the same locations as the RSI surveys over a two-week period to detect any variation in the traffic volumes due to the interviews being undertaken. Flow profile analysis of the ATC data shows that the flows on the RSI survey days were generally consistent with other non-RSI days, except that the flow levels were generally slightly lower as might be expected due to the additional delay caused by the RSI surveys. Adjustment factors, by vehicle type and time period, were calculated to factor the flow on the RSI days to an average non-RSI weekday. Appendix B.2 shows the flow profile graph for all RSI sites (except Site R-6) by direction.

3.18. Only data from non-RSI Tuesdays and Thursdays were used to calculate the average flow. Flows on Mondays and Fridays are generally lower and as Wednesday is Market Day in March, it was also excluded. Table 3.4 below provides the RSI day to average weekday factors for all RSI sites by direction and time period; and Table 3.5 shows the ATC adjusted traffic flow data for all RSI sites (including Site R-4).

3.19. No flow adjustment was undertaken for Site R-6 as ATC data is not available for this site. Also the distribution of postcard was undertaken during the red-phase of the traffic signal and the survey did not cause any additional delay, therefore the traffic volumes through this site are not expected to be affected by the postcard RSI survey. The traffic flow data (with no ATC adjustment) for Site R-6 has been also been included in Table 3.5 for completeness.

Table 3.4 – RSI Day to Average Weekday Factors

RSI Site	Direction	RSI Day to Average Weekday Factors			
		AM	IP	PM	12hr
R-1	SB (Interview)	1.12	1.03	1.15	1.05
	NB (Non-Interview)	0.98	1.07	1.02	1.05
R-2	WB (Interview)	1.12	1.07	1.10	1.08
	EB (Non-Interview)	1.02	1.00	0.95	1.04
R-3	NB (Interview)	0.97	1.11	1.08	1.07
	SB (Non-Interview)	1.04	1.06	1.10	1.06
R-4	NB	0.98	0.98	1.03	0.98
	SB	0.98	0.97	0.99	0.99
R-5	SB (Interview)	1.08	1.07	1.03	1.06
	NB (Non-Interview)	1.08	1.08	1.01	1.06

Table 3.5 – RSI Sites MCC Data Summary (ATC Adjusted except Site R-6*)

RSI Site	Direction	Traffic Flow (veh)			
		AM	IP	PM	12hr
R-1	SB (Interview)	280	161	304	2365
	NB (Non-Interview)	187	164	217	2242
R-2	WB (Interview)	93	91	118	1195
	EB (Non-Interview)	133	92	128	1281
R-3	NB (Interview)	458	349	381	4188
	SB (Non-Interview)	424	326	582	3564
R-4	NB	600	409	707	5816
	SB	587	407	573	5408
R-5	SB (Interview)	771	534	774	7081
	NB (Non-Interview)	716	534	794	7162
R-6A*	WB (Interview)	355	418	478	4879
	EB (Non-Interview)	321	374	408	4505

RSI Site	Direction	Traffic Flow (veh)			
		AM	IP	PM	12hr
R-6B*	NB (Interview)	695	583	717	7364
	SB (Non-Interview)	559	556	725	6810
R-6C*	EB (Interview)	343	362	419	4288
	WB (Non-Interview)	459	408	448	4895

*No ATC adjustment was undertaken for Site R-6 (i.e. R-6A, R-6B & R-6C) MCC flow data. See Paragraph 3.19.

Flow Profile Analysis

3.20. To ensure the proposed modelled AM (0800-0900) and PM (1700-1800) peak hours are the busiest hours for March, flow profile analysis for all RSI sites was undertaken. Figure 3.3 shows the hourly flow (two-way combined) and Figure 3.4 shows the normalised daily traffic flow profile for all RSI sites. These figures confirm that 0800 to 0900 is the busiest hour in the AM. For the PM, 1700 to 1800 is the busiest hour for all sites except Site R-2; however, as Site R-2 has the lowest flow volumes, it is considered acceptable that the PM modelled hour was defined as 1700 to 1800.

3.21. Figure 3.3 and Figure 3.4 also show that the flow profile for the inter peak is generally consistent for most sites with no significant peaks observed at any particular inter peak hours, therefore for the inter peak period (1000-1600), an average inter peak hour was modelled.

Figure 3.3 – Flow Profile (RSI ATC Sites)

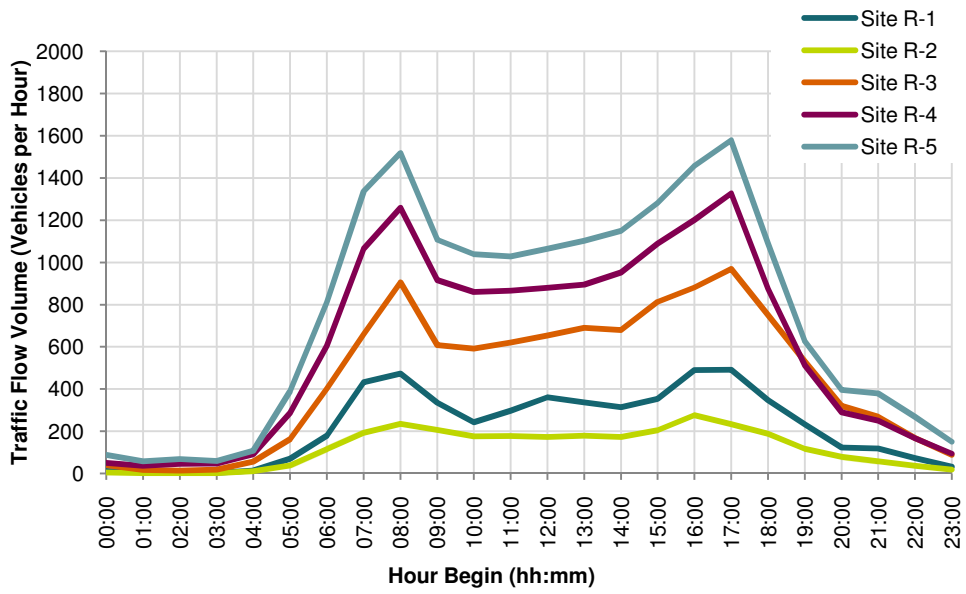
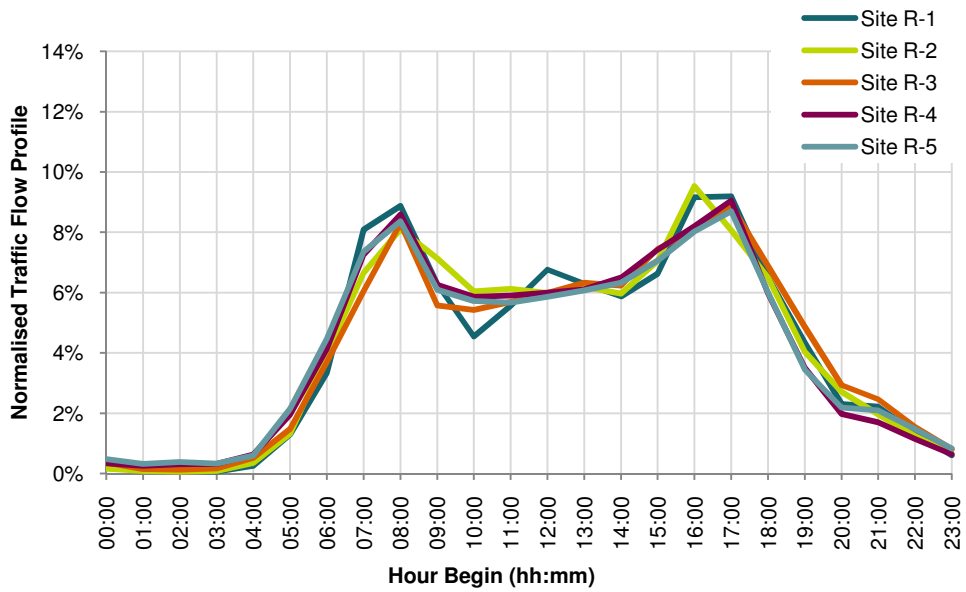


Figure 3.4 – Normalised Flow Profile (RSI ATC Sites)



3.22. March Market operates throughout the year on a Wednesday and the potential impact of the March Market on traffic levels was also considered. Appendix B.2 shows the flow profile of Wednesdays compared to average Tuesdays and Thursdays. The flow profiles show that for all surveyed sites, there is no evidence to suggest that Market Day will have any significant impact on the traffic flow volumes and profiles.

3.23. For Site R-6, B1101 Station Road/B1101 Broad Street/B1099 Dartford Road, ATC data is not available but Figure 3.5 and Figure 3.6 shows hourly junction entry flow by arm and the total hourly junction entry flow for Site R-6 from the MCTC data respectively. These figures show that for Site R-6, the flow profile is different to the other RSI sites (Figure 3.3 & Figure 3.4) that the flow volume for the AM and inter peak is similar, and highest in the PM peak. The high flow volume in the inter peak shows that there is a high proportion of discretionary trips (e.g. shopping) at this site as might be expected.

Figure 3.5 – Site R-6 Flow Profile (by Junction Entry Arm)

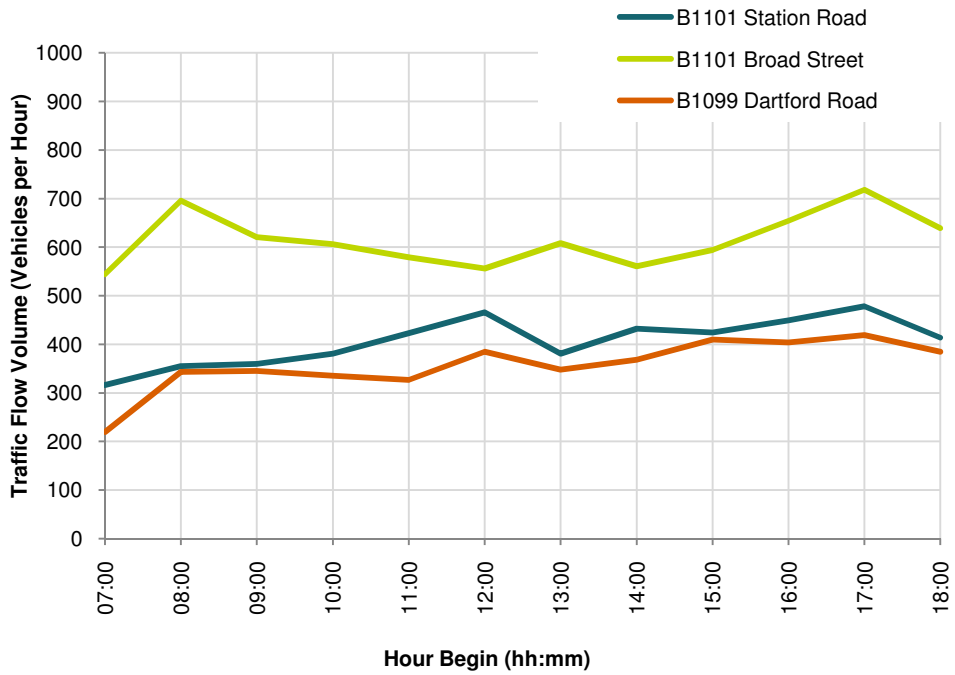
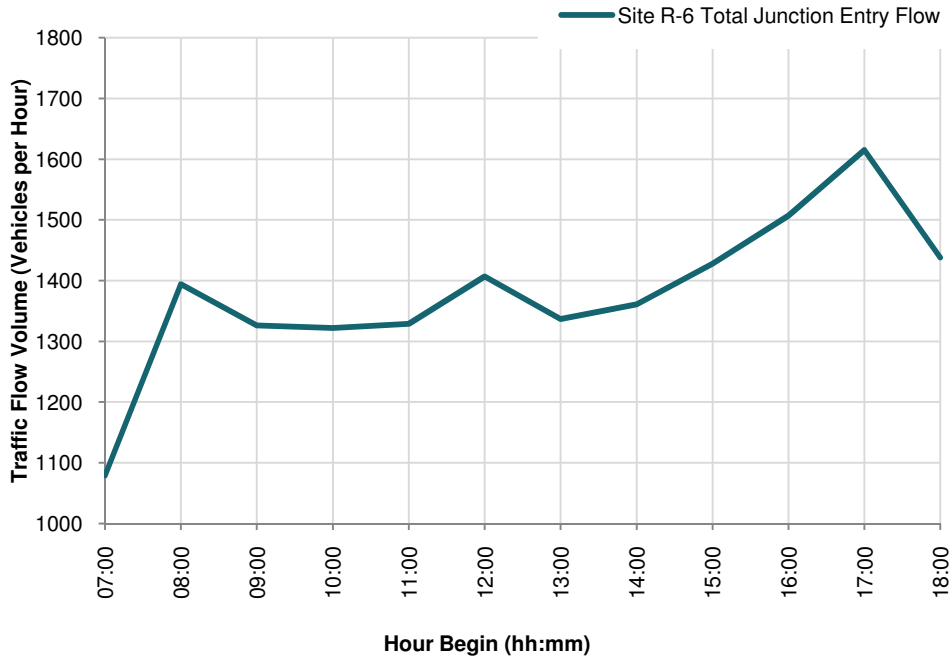


Figure 3.6 – Site R-6 Flow Profile (Total Junction Entry Flow)



RSI Sector Analysis

3.24. Origin and destination totals have been summarised by site using the MATS sector system to gain an initial understanding of the trip pattern at each of the RSI site. Figure 2.3 in Chapter 2 shows the MATS sector system; and Table 3.6 to Table 3.12 below show the origin and destination totals by time period for each RSI site. Due to the location of the RSI survey sites, it would be very unlikely for certain sector movements to pass through the RSI site and therefore no or only very few trips from/to certain sectors were observed for each RSI site. These sectors have been highlighted in the tables for information.

3.25. It should be noted that the trip totals presented in Table 3.6 to Table 3.12 might not match the flow data presented in Table 3.5 exactly because:

- The figures in Table 3.5 include PSV flows whereas the figures in Table 3.6 to Table 3.12 do not. PSV trips do not form part of the demand matrices and have been coded in as fixed trips (as bus routes);
- Of rounding errors; and
- There is a lack of interview data for HGVs for RSI Site R-5 and Site R-6. This means that expansion factors could not be calculated for HGV trips for these sites, and the sector matrices currently only include LV trips. The HGV movements will be infilled using other sources and this will be discussed in the MATS LMVR.

3.26. For Site R-1, B1101 Elm Road southbound, the RSI data shows that majority of the trips that passed through this site have destinations in March (i.e. Sector 1 to 3), in particular the northern part of March (i.e. Sector 1). The origins of the Site R-1 trips are mainly from north of March, with over half coming from Sector 4, Fenland North, which includes the market town of Wisbech.

3.27. For Site R-2, B1099 Upwell Road westbound, the RSI data shows that most of the trips are from Sector 5 and Sector 8, and going to March (i.e. Sector 1 to 3).

3.28. For Site R-3, B1101 Wimblington Road northbound, the RSI data shows that most of the trips that passed through this site are going to March from the south. The data shows the over 85% of the trips that pass through this site have destinations in March, and over 75% are coming from Sector 6, Fenland South (which includes Chatteris), and Sector 7, rest of Cambridgeshire, for all time periods.

3.29. The RSI data shows that most of the inbound traffic for RSI Site R-1, R-2 and R-3 are trips with destinations in March. The origins of these trips are mostly within the county (i.e.

Cambridgeshire), suggesting that these routes are generally used by local traffic with very few through trips.

3.30. For Site R-5, A141 Wisbech Road southbound, the RSI data shows that trip pattern for this RSI site is different to the other RSI sites that approximately 40% to 60% (depending on time period) of the trips that pass through this site are through trips (i.e. do not begin or end their journeys in March). These are mostly regional through trips with either origins or destinations in Cambridgeshire. The number of Sector 8 to 8 through trips is negligible, suggesting that A141 does not attract strategic long distance through trips. For the trips that end their journeys in March (35% to 60% of the trips depending on time period), they are mostly originated from Sector 4, Fenland North which includes Wisbech, and Sector 7, west of Cambridgeshire which includes Peterborough.

3.31. For Site R-6 (i.e. Site R-6A, R-6B & R-6C), majority of the traffic either begin or end their journeys in March. The full sector-to-sector movements (See Appendix B) show that approximately 40% of all trips that pass through Site R-6 are internal movements within March (i.e. between Sector 1, 2 &3), and less than 10% of all trips observed were through trips (i.e. between Sector 4, 5, 6, 7 & 8).

3.32. Full sector-to-sector movements by time period for all RSI sites are included in Appendix B.

Table 3.6 – Origin and Destination Totals by Sector (RSI Site R-1) (ATC Adjusted; excl. PSV)

Sector	AM		IP		PM	
	From	To	From	To	From	To
1	5 *(2%)*	144 *(52%)*	4 *(3%)*	70 *(44%)*	8 *(3%)*	136 *(45%)*
2	0 *(0%)*	52 *(19%)*	0 *(0%)*	33 *(21%)*	0 *(0%)*	79 *(26%)*
3	0 *(0%)*	29 *(10%)*	0 *(0%)*	23 *(14%)*	0 *(0%)*	38 *(12%)*
4	168 *(61%)*	16 *(6%)*	108 *(68%)*	14 *(9%)*	187 *(62%)*	10 *(3%)*
5	0 *(0%)*	1 *(0%)*	0 *(0%)*	4 *(3%)*	3 *(1%)*	1 *(0%)*
6	0 *(0%)*	17 *(6%)*	0 *(0%)*	8 *(5%)*	0 *(0%)*	25 *(8%)*
7	26 *(9%)*	15 *(5%)*	16 *(10%)*	6 *(4%)*	44 *(15%)*	6 *(2%)*
8	77 *(28%)*	3 *(1%)*	30 *(19%)*	2 *(1%)*	59 *(20%)*	8 *(3%)*
Total	276 *(100%)*	276 *(100%)*	159 *(100%)*	159 *(100%)*	302 *(100%)*	302 *(100%)*

*Highlighted sectors indicate sector movements that are not likely to pass through RSI Site R-1.

Table 3.7 – Origin and Destination Totals by Sector (RSI Site R-2) (ATC Adjusted; excl. PSV)

Sector	AM		IP		PM	
	From	To	From	To	From	To
1	0 (0%)	23 (25%)	0 (0%)	17 (19%)	0 (0%)	23 (20%)
2	0 (0%)	17 (19%)	0 (0%)	31 (34%)	0 (0%)	33 (28%)
3	0 (0%)	19 (21%)	0 (0%)	16 (17%)	0 (0%)	26 (22%)
4	0 (0%)	15 (16%)	0 (0%)	12 (14%)	2 (2%)	15 (13%)
5	47 (50%)	1 (1%)	44 (49%)	1 (1%)	45 (38%)	1 (1%)
6	7 (8%)	6 (7%)	8 (9%)	5 (5%)	12 (11%)	6 (5%)
7	11 (12%)	10 (11%)	8 (9%)	5 (5%)	12 (10%)	4 (4%)
8	27 (30%)	2 (2%)	30 (33%)	4 (5%)	46 (40%)	8 (7%)
Total	93 (100%)	93 (100%)	90 (100%)	90 (100%)	117 (100%)	117 (100%)

*Highlighted sectors indicate sector movements that are not likely to pass through RSI Site R-2.

Table 3.8 – Origin and Destination Totals by Sector (RSI Site R-3) (ATC Adjusted; excl. PSV)

Sector	AM		IP		PM	
	From	To	From	To	From	To
1	0 (0%)	129 (28%)	2 (1%)	66 (19%)	0 (0%)	100 (26%)
2	0 (0%)	110 (24%)	0 (0%)	124 (35%)	0 (0%)	136 (36%)
3	22 (5%)	145 (34%)	15 (4%)	127 (37%)	13 (3%)	107 (28%)
4	11 (2%)	54 (12%)	5 (1%)	21 (6%)	0 (0%)	20 (5%)
5	0 (0%)	3 (1%)	1 (0%)	8 (2%)	0 (0%)	10 (3%)
6	289 (62%)	0 (0%)	206 (59%)	1 (0%)	164 (43%)	3 (1%)
7	105 (25%)	0 (0%)	87 (25%)	0 (0%)	156 (41%)	0 (0%)
8	24 (5%)	10 (2%)	33 (9%)	2 (1%)	47 (12%)	3 (1%)
Total	450 (100%)	450 (100%)	349 (100%)	349 (100%)	379 (100%)	379 (100%)

*Highlighted sectors indicate sector movements that are not likely to pass through RSI Site R-3.

Table 3.9 – Origin and Destination Totals by Sector (RSI Site R-5) (ATC Adjusted; excl. PSV and HGV)

Sector	AM		IP		PM	
	From	To	From	To	From	To
1	0 (0%)	105 (15%)	0 (0%)	68 (15%)	0 (0%)	156 (22%)
2	0 (0%)	48 (7%)	0 (0%)	54 (12%)	0 (0%)	101 (14%)
3	0 (0%)	103 (15%)	0 (0%)	69 (15%)	0 (0%)	150 (21%)
4	411 (59%)	103 (15%)	271 (58%)	85 (18%)	323 (45%)	32 (5%)
5	0 (0%)	5 (1%)	0 (0%)	6 (1%)	0 (0%)	6 (1%)
6	0 (0%)	144 (21%)	0 (0%)	77 (17%)	0 (0%)	138 (19%)
7	69 (10%)	130 (19%)	80 (17%)	80 (17%)	194 (27%)	95 (13%)
8	216 (31%)	59 (8%)	115 (25%)	27 (6%)	193 (27%)	31 (4%)
Total	697 (100%)	697 (100%)	465 (100%)	465 (100%)	711 (100%)	711 (100%)

*Highlighted sectors indicate sector movements that are not likely to pass through RSI Site R-5.

Table 3.10 – Origin and Destination Totals by Sector (RSI Site R-6A) (excl. PSV and HGV)

Sector	AM		IP		PM	
	From	To	From	To	From	To
1	107 (31%)	41 (12%)	168 (41%)	55 (13%)	185 (39%)	79 (17%)
2	133 (39%)	59 (17%)	150 (37%)	96 (24%)	168 (36%)	79 (17%)
3	0 (0%)	81 (24%)	4 (1%)	77 (19%)	0 (0%)	117 (25%)
4	84 (25%)	17 (5%)	73 (18%)	31 (8%)	119 (25%)	38 (8%)
5	0 (0%)	3 (1%)	4 (1%)	8 (2%)	0 (0%)	25 (5%)
6	3 (1%)	32 (9%)	4 (1%)	110 (27%)	0 (0%)	53 (11%)
7	0 (0%)	72 (21%)	0 (0%)	24 (6%)	0 (0%)	53 (11%)
8	15 (4%)	37 (11%)	7 (2%)	8 (2%)	0 (0%)	26 (6%)
Total	342 (100%)	342 (100%)	410 (100%)	410 (100%)	471 (100%)	471 (100%)

*Highlighted sectors indicate sector movements that are not likely to pass through RSI Site R-6A.

Table 3.11 – Origin and Destination Totals by Sector (RSI Site R-6B) (excl. PSV and HGV)

Sector	AM		IP		PM	
	From	To	From	To	From	To
1	6 (1%)	283 (42%)	0 (0%)	193 (33%)	0 (0%)	376 (54%)
2	288 (42%)	142 (21%)	164 (28%)	171 (30%)	203 (29%)	217 (31%)
3	176 (26%)	65 (10%)	204 (35%)	30 (5%)	196 (28%)	20 (3%)
4	0 (0%)	146 (21%)	2 (0%)	142 (25%)	23 (3%)	49 (7%)
5	24 (3%)	0 (0%)	22 (4%)	0 (0%)	29 (4%)	0 (0%)
6	116 (17%)	12 (2%)	105 (18%)	2 (0%)	98 (14%)	10 (1%)
7	56 (8%)	9 (1%)	59 (10%)	17 (3%)	88 (13%)	29 (4%)
8	15 (2%)	24 (3%)	22 (4%)	23 (4%)	62 (9%)	0 (0%)
Total	680 (100%)	680 (100%)	577 (100%)	577 (100%)	701 (100%)	701 (100%)

*Highlighted sectors indicate sector movements that are not likely to pass through RSI Site R-6B.

Table 3.12 – Origin and Destination Totals by Sector (RSI Site R-6C) (excl. PSV and HGV)

Sector	AM		IP		PM	
	From	To	From	To	From	To
1	128 (39%)	75 (23%)	129 (36%)	51 (15%)	130 (31%)	11 (3%)
2	4 (1%)	117 (35%)	0 (0%)	180 (51%)	0 (0%)	242 (58%)
3	119 (36%)	53 (16%)	83 (24%)	68 (19%)	76 (18%)	87 (21%)
4	53 (16%)	19 (6%)	98 (28%)	5 (2%)	119 (29%)	11 (3%)
5	0 (0%)	11 (3%)	0 (0%)	14 (4%)	0 (0%)	11 (3%)
6	8 (2%)	26 (8%)	5 (2%)	22 (6%)	11 (3%)	32 (8%)
7	8 (2%)	15 (5%)	27 (8%)	5 (2%)	69 (17%)	0 (0%)
8	11 (3%)	15 (5%)	11 (3%)	8 (2%)	11 (3%)	22 (5%)
Total	331 (100%)	331 (100%)	354 (100%)	354 (100%)	416 (100%)	416 (100%)

*Highlighted sectors indicate sector movements that are not likely to pass through RSI Site R-6C.

Pedestrian and Cyclist Interview Surveys

3.33. Pedestrian and cyclist interview surveys were undertaken at Site R-6. Similar to the vehicle interview surveys, origin and destination information was requested from the interviewees. Due to the nature of the slow modes, no pre-defined movement direction was specified for the survey, and the enumerators were instructed to roam and conduct interviews on all arms and directions at the survey site. The purpose of this survey was to gain a snapshot picture of the origin/destination information of pedestrians and cyclists in the centre of March. Pedestrian and cyclist counts were not undertaken, therefore expansion factors for the pedestrian and cyclist interview surveys were not available.

3.34. 262 (pedestrian: 258 & cycle: 4) complete records were collected. During the data analysis stage, it was found that there are 70 pedestrian records with unrealistically long travel distance for walking trips (i.e. > 10 km). It was believed that for these records, the interviewees would have driven and parked their cars in March or taken a bus to March and walked the rest of their journeys, but have reported their ultimate origins or destinations rather than just the walking portion.

Pedestrian and Cyclists Trip Distance Analysis

3.35. For the following trip distance analysis, only the 188 pedestrian records with realistic travel distance have been included.

3.36. There are four cyclist records and the average crow-fly distance for cycle trips is approximately 1km. For the pedestrian trips, the average crow-fly trip distance was 0.87km. As expected, the observed walking trips were shorted than the cycling trips.

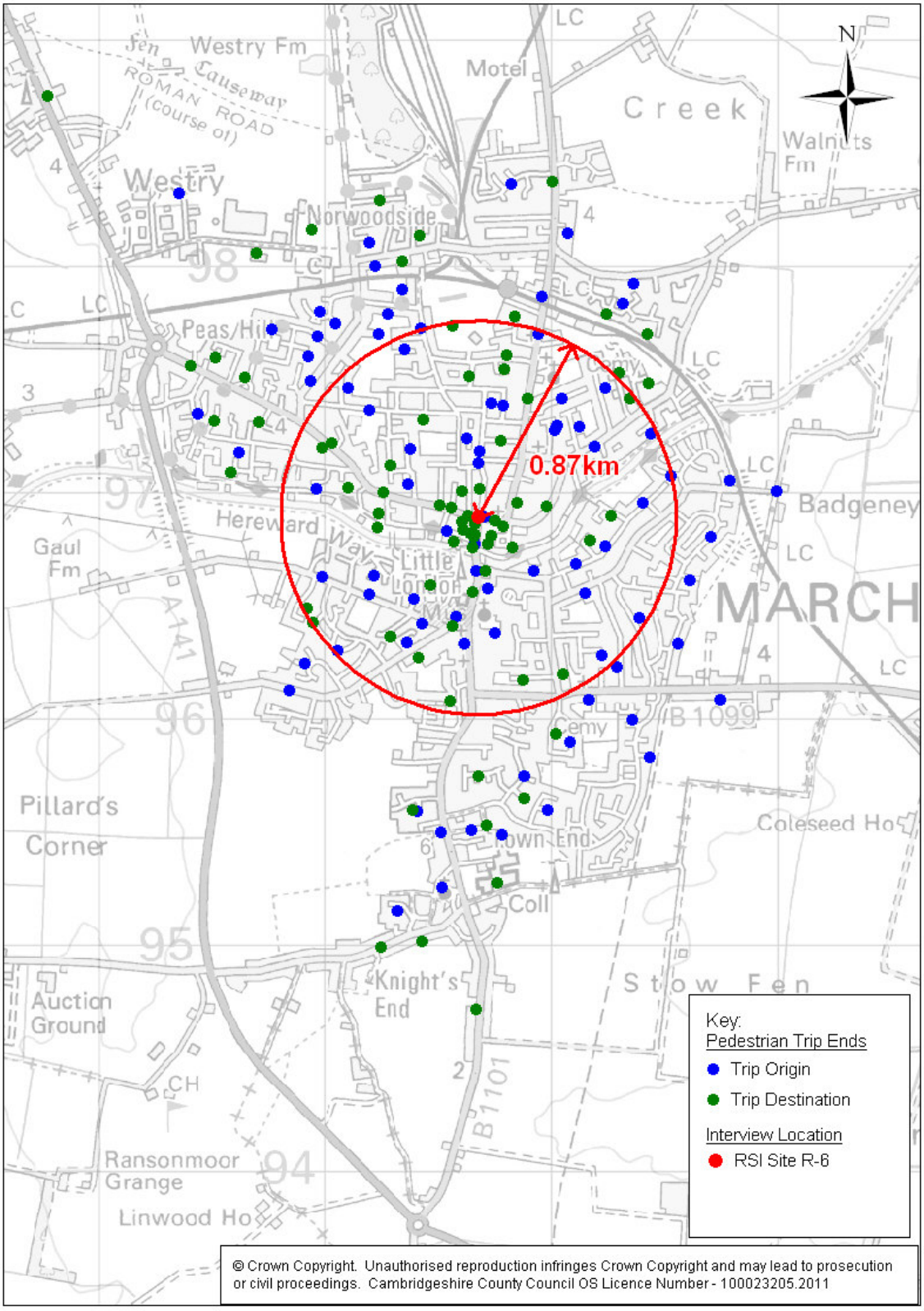
3.37. Trip purpose analysis shows that majority of the pedestrian trips were classified as Other Trip Purpose (OTP) (88%), which includes shopping and other personal business trips. For the rest of the trips, 10% were Home-Based Work (HBW) trips and the remaining 2% made up of Home-Based Education (HBEd) and Employers' Business (EB). Table 3.13 shows this data in more detail, giving a breakdown of average crow-fly distance by trip purpose.

3.38. Figure 3.7 shows the distribution of trip ends of the pedestrians that were interviewed. As expected, the majority of walking trips take place in the centre of March, with fewer trip ends in zones further away from the centre.

Table 3.13 – Summary of Pedestrian Interview Data

Purpose	Sample Size	Average Crow-Fly Distance (km)
HBW	18 (10%)	1.21
HBEd	2 (1%)	2.04
EB	2 (1%)	0.13
OTP	166 (88%)	0.82
All	188 (100%)	0.87

Figure 3.7 – Spread of Pedestrian Movements in March



Multi-Modal Trips (Origin and Destination Analysis)

3.39. As discussed in Paragraph 3.34, 70 pedestrian survey records have unrealistically long travel distance. It is believed that these are multi-modal trips (i.e. driving and walking or public transport and walking) rather than pure walking trips, but the interviewees have reported their ultimate origins or destinations rather than just the walking portion. For these records, analysis shows that these trips either originate or end their journeys in March and Table 3.14 below summarises the trip ends of these trips.

Table 3.14 – Summary of the Multi-Modal Trips

		Trip Origin	Trip Destination
Cambridgeshire	March	23	50
	Rest of Fenland	37	13
	Cambridge City	1	1
	East Cambridgeshire	0	0
	South Cambridgeshire	0	0
	Huntingdonshire	0	2
Outside Cambridgeshire		9	4
Total		70	70

4. Manual Classified Turning Counts

Turning count data was collected for the key junctions in the study area for the purpose of calibrating and validating the MATS SATURN highway model.

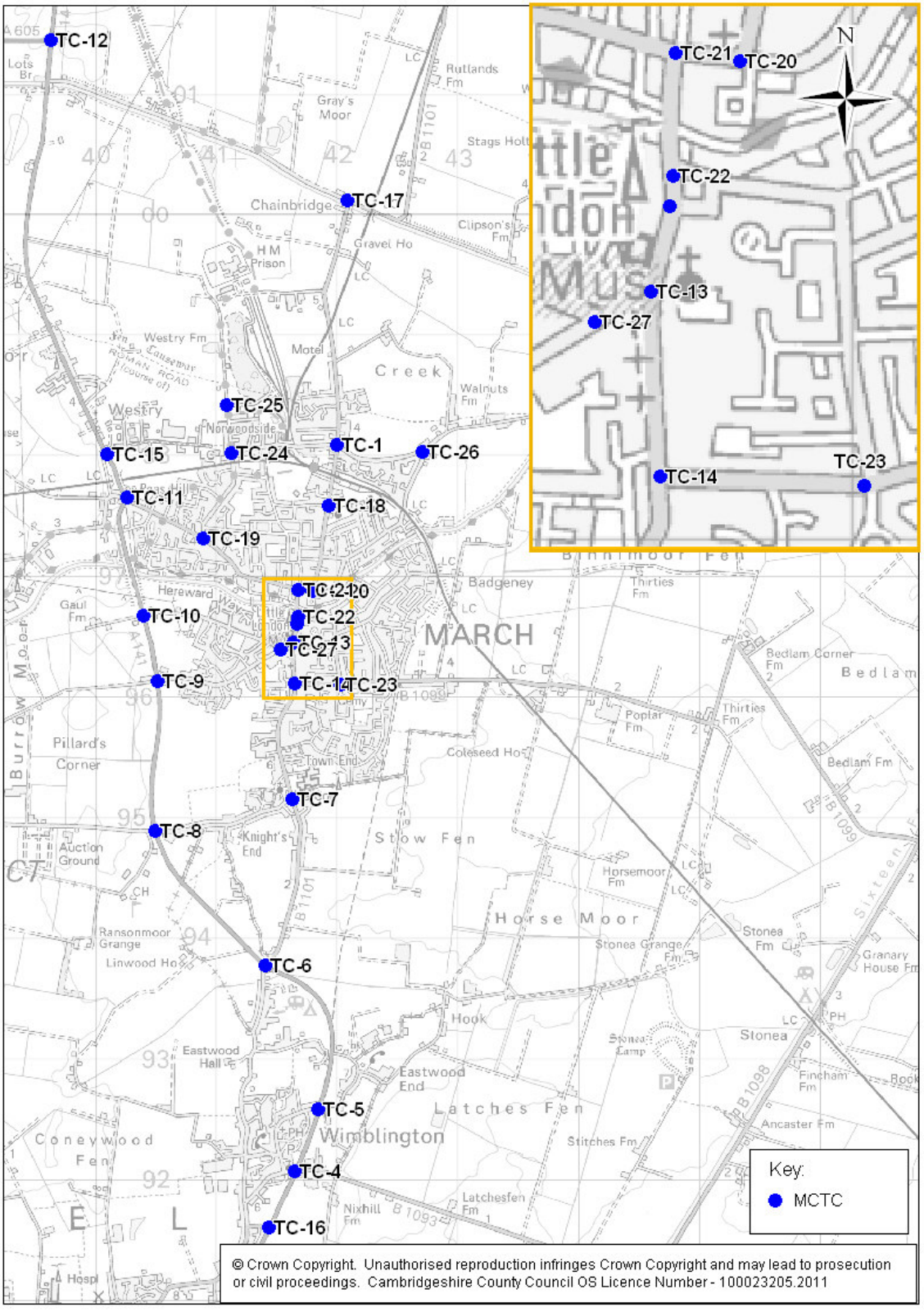
Manual Classified Turning Counts

4.1. For the purpose of calibrating and validating the MATS SATURN highway model, traffic counts were carried out for 25 key junctions in the study area. Table 4.1 lists the MCTC survey sites undertaken and Figure 4.1 is a location plan of the MCTC survey sites.

Table 4.1 – MCTC Locations

Site ID	Location	Easting	Northing
TC-1	B1101 Elm Road/Estover Road/Norwood Road	541,995	298,096
TC-4	A141/Manea Road	541,648	292,068
TC-5	A141/King Street	541,841	292,582
TC-6	A141/B1101 Wimblington Road	541,403	293,770
TC-7	B1101 Wimblington Road/Jobs Lane	541,620	295,156
TC-8	A141/Knights End Road	540,488	294,888
TC-9	A141/Burrowmoor Road	540,507	296,132
TC-10	A141/Gaul Road	540,394	296,674
TC-11	A141/B1099 Wisbech Road	540,253	297,655
TC-12	A141/A605	539,626	301,450
TC-13	B1101 High Street/Burrowmoor Road	541,630	296,454
TC-14	B1101 High Street/St Peters Road	541,647	296,117
TC-15	A141/Hostmoor Avenue	540,091	298,017
TC-16	A141/B1093 Doddington Road	541,430	291,596
TC-17	B1101 Elm Road/Twenty Foot Road	542,084	300,121
TC-18	B1101 Station Road/County Road	541,920	297,583
TC-19	B1099 Wisbech Road/Norwood Road	540,883	297,319
TC-20	B1101 Station Road/Creek Road	541,793	296,876
TC-21	B1101 Station Road/B1101 Broad Street/B1099 Dartford Road	541,675	296,890
TC-22	B1101 High Street/Elwyn Road/Market Place	541,670	296,665
TC-23	B1099 Upwell Road/Elwyn Road	542,019	296,098
TC-24	Hundreds Road/Norwood Road	541,117	298,025
TC-25	Hundreds Road/Melbourne Avenue	541,076	298,422
TC-26	Estover Road/Creek Road	542,701	298,035
TC-27	Burrowmoor Road/Gaul Road	541,527	296,399

Figure 4.1 – MCTC Locations



4.2. The surveys were undertaken over a 12-hour period (0700-1900). The counts were collected in 15-minute intervals and were fully classified as outlined in Paragraph 1.13. The MCTC data has been summarised by junction entry flow in Table 4.2.

Table 4.2 – MCTC Data Summary (Junction Entry Flow)

Site ID	Junction Entry Arm	Traffic Flow (Veh)			
		AM	IP	PM	12hr
TC-1	B1101 Elm Road (N)	393	230	338	3,165
	Estover Road	93	65	57	798
	B1101 Elm Road (S)	234	213	258	2,689
	Norwood Road	102	110	164	1,353
TC-4	A141 (N)	756	477	595	6,472
	Manea Road	169	106	130	1,394
	A141 (S)	567	485	857	6,797
TC-5	A141 (N)	750	487	621	6,589
	A141 (S)	552	493	829	6,746
	King Street	50	30	32	412
TC-6	B1101 Wimblington Road	447	309	330	3,932
	A141 (E)	511	470	924	6,548
	March Road	251	226	264	2,753
	A141 (W)	607	433	629	5,749
TC-7	B1101 Wimblington Road (N)	510	317	361	4,174
	B1101 Wimblington Road (S)	336	288	451	3,753
	Jobs Lane	143	75	129	988
TC-8	A141 (N)	752	507	723	6,710
	Knights End Road (E)	95	47	49	618
	A141 (S)	576	449	741	6,048
	Knights End Road (W)	44	51	62	579
TC-9	A141 (N)	803	549	749	7,013
	Burrowmoor Road (E)	107	65	47	796
	A141 (S)	717	518	755	6,936
	Burrowmoor Road (W)	3	5	7	53
TC-10	A141 (N)	882	627	890	8,002
	Gaul Road (E)	70	67	39	767
	A141 (S)	691	511	714	6,750
	Gaul Road (W)	3	2	3	26
TC-11	A141 (N)	800	801	1075	9,909
	Retail Park	12	89	75	795
	B1099 Wisbech Road	568	451	525	5,704
	A141 (S)	667	518	760	6,777
	Whittlesey Road	79	73	107	863

Site ID	Junction Entry Arm	Traffic Flow (Veh)			
		AM	IP	PM	12hr
TC-12	A141 (N)	831	520	816	7,249
	A141 (S)	761	552	908	7,690
	A605	220	153	228	2,112
TC-13	B1101 High Street (N)	428	396	493	4,874
	B1101 High Street (S)	554	427	517	5,656
	Burrowmoor Road	299	197	256	2,589
	City Road	33	119	133	1,199
TC-14	B1101 High Street (N)	350	387	445	4,536
	St Peters Road	291	188	207	2,475
	B1101 High Street (S)	405	393	513	4,885
TC-15	A141 (N)	779	542	783	7,220
	Hostmoor Avenue	231	434	453	4,555
	A141 (S)	954	849	1,093	10,606
TC-16	A141 (N)	787	455	561	6,345
	A141 (S)	544	478	882	6,771
	B1093 Doddington Road	64	56	69	695
TC-17	B1101 Elm Road (E)	216	103	133	1,490
	B1101 Elm Road (S)	153	139	290	1,975
	Twenty Foot Road	155	78	127	1,208
TC-18	B1101 Station Road (N)	331	247	329	3,198
	B1101 Station Road (S)	314	235	285	3,073
	County Road	83	82	126	1,014
TC-19	Norwood Road	316	192	283	2,601
	B1099 Wisbech Road (E)	387	382	425	4,473
	B1099 Wisbech Road (W)	386	346	407	4,197
TC-20	B1101 Station Road (N)	283	314	370	3,559
	Creek Road	133	246	182	2,485
	B1101 Station Road (W)	317	370	402	4,461
TC-21	B1101 Station Road	351	415	475	4,847
	B1101 Broad Street	689	578	710	7,296
	B1099 Dartford Road	340	360	416	4,254
TC-22	B1101 High Street (N)	571	551	738	6,816
	Market Place	305	265	253	3,066
	B1101 High Street (S)	622	500	649	6,412
TC-23	Elwyn Road	161	112	131	1,457
	B1099 Upwell Road (E)	264	170	177	2,177
	B1099 Upwell Road (W)	126	138	182	1,623

Site ID	Junction Entry Arm	Traffic Flow (Veh)			
		AM	IP	PM	12hr
TC-24	Hundreds Road	114	175	271	1,975
	Norwood Road (E)	183	114	123	1,436
	Norwood Road (S)	163	142	154	1,697
TC-25	Hundreds Road (N)	10	35	6	262
	Hundreds Road (S)	135	133	113	1,417
	Melbourne Avenue	96	150	215	1,688
TC-26	Creek Road (E)	15	14	21	172
	Creek Road (S)	31	31	30	368
	Estover Road	27	38	53	421
TC-27	Burrowmoor Road (NE)	171	153	195	1,885
	Burrowmoor Road (SW)	179	102	128	1,357
	Gaul Road	156	106	147	1,350

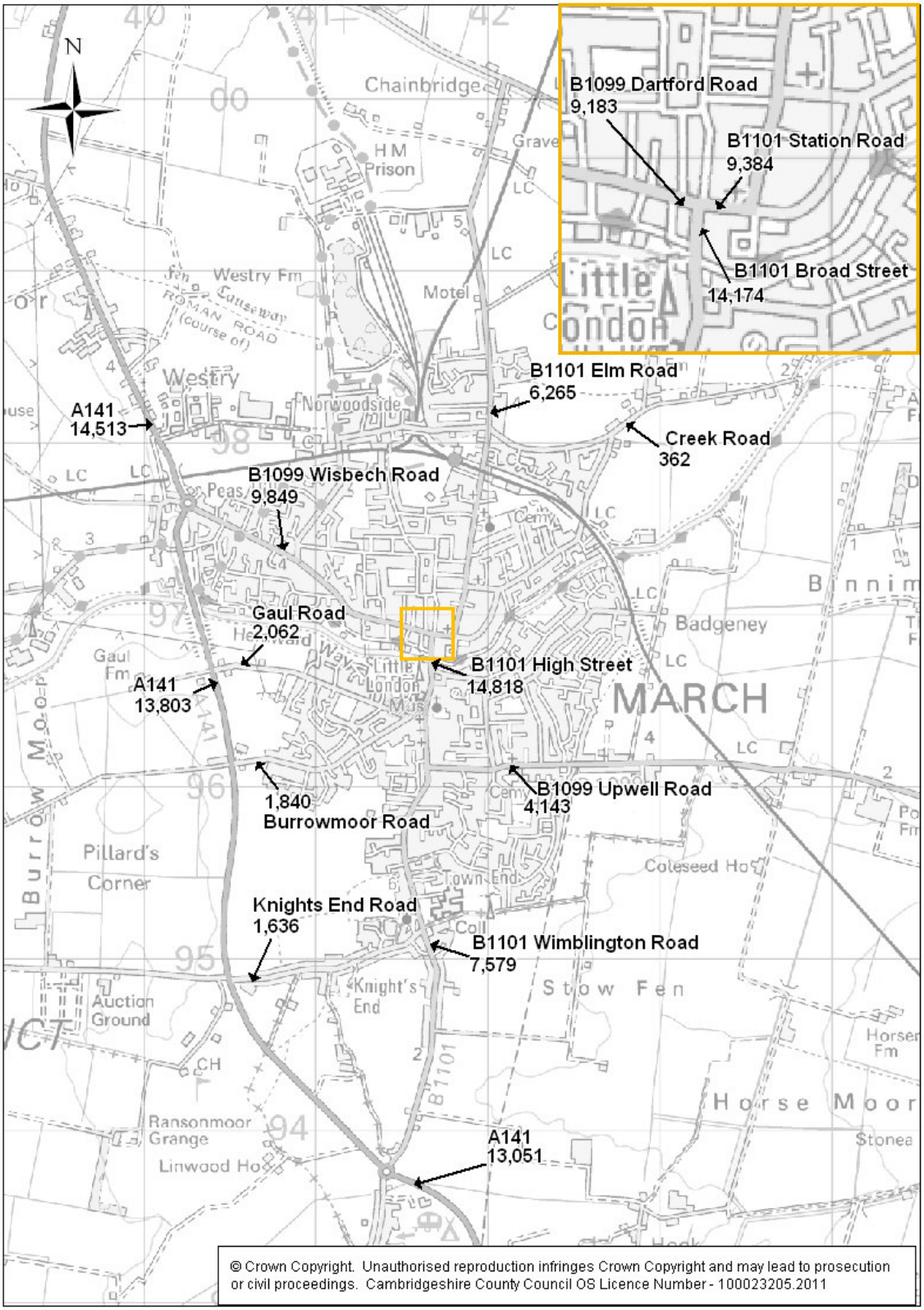
4.3. To further understand the key traffic movements into March, two-way 12-hour flows for the key radial routes into March have been summarised, as shown in Figure 4.2.

4.4. Of the radial routes feeding in March, the data shows that over a 12-hour period, B1099 Wisbech Road has the greatest two-way flow of 9,800 vehicles, followed by B1101 Wimblington Road at 7,600 vehicles and B1101 Elm Road at 6,300 vehicles.

4.5. Other radial routes, such as Knights End Road, Burrowmoor Road, Gaul Road and B1099 Upwell Road, have fairly low traffic volume, suggesting that these routes are generally used by local traffic only.

4.6. Figure 4.2 also shows that the two-way traffic flow for B1101 Broad Street in the centre of March is in the region of 14,000 vehicles over a 12-hour period, which is a similar level to the A141 March Bypass.

Figure 4.2 – Two-way 12-hour Traffic Flow Data for All Key Radial Routes into March



Comparing Traffic Data from Multiple Independent Data Sources

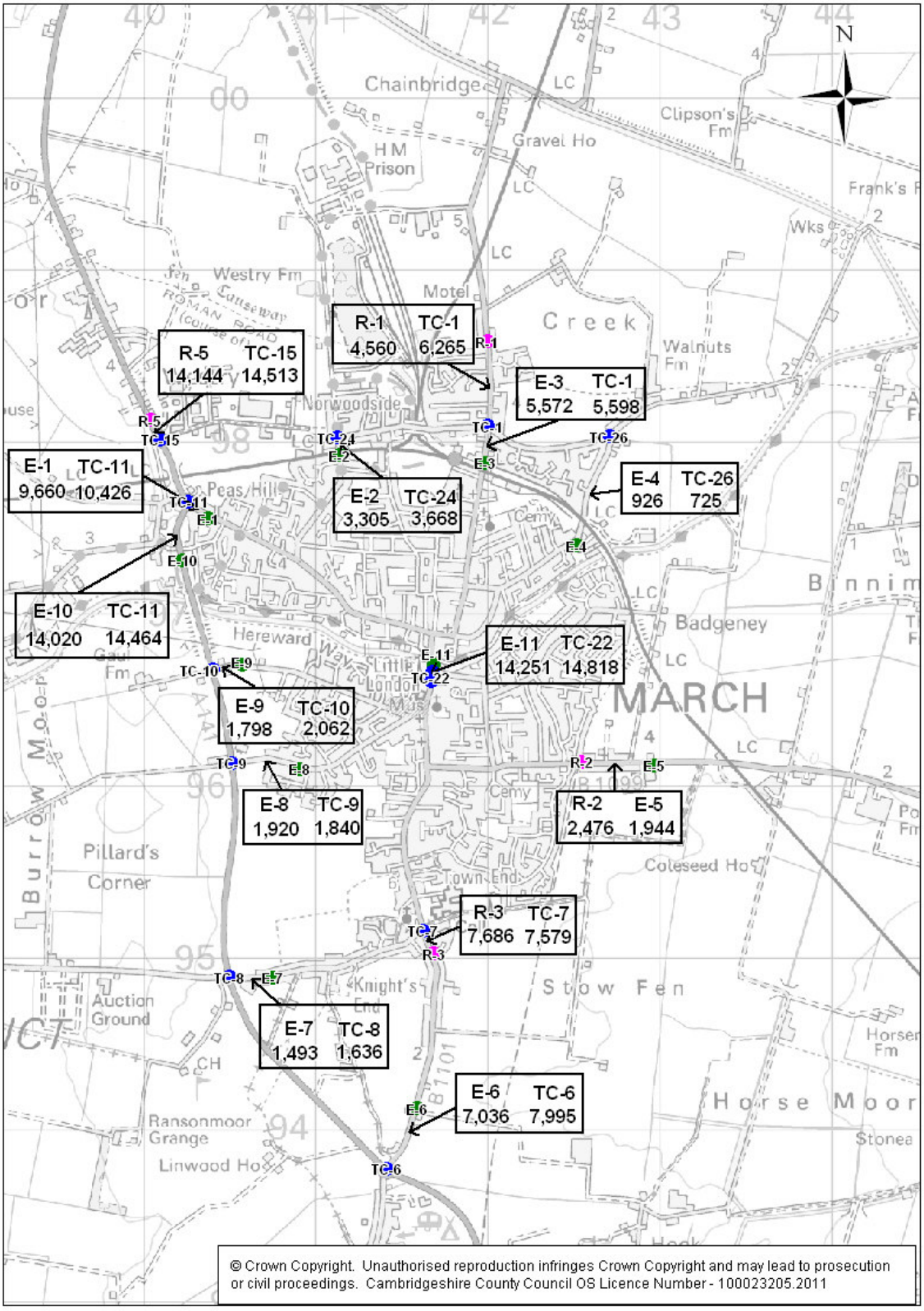
4.7. Two-way 12-hour flow comparison between the MCTC data, CCC annual town monitoring data and RSI MCC data was undertaken as an additional check. These surveys were undertaken independently to each other, and by comparing data from different sources, it will ensure that all traffic data used for this study is consistent and robust.

4.8. Figure 4.3 below shows the two-way 12-hour flow data comparison for all CCC annual town monitoring sites, RSI Site R-1, R-2, R-3 and R-5, and the MCTC sites (when applicable). For the MCTC data, the junction entry and exit flows have been derived from the turning counts.

4.9. Figure 4.3 shows that the flow difference for the two road links with the highest flow volumes (i.e. A141 (Site E-10) and Town Bridge (Site E-11)) are less than 4%. For the other sites where flow volumes are generally lower, there are more variation in traffic flow between the different surveys as might be expected. It should also be noted that for Site R-1, the corresponding Site TC-1 is not located immediately adjacently and there are residential and commercial properties between the two sites which would result in more significant flow differences.

4.10. Overall, the flow data from the different surveys generally compares well, suggesting that all traffic data are robust and can be used with confidence for MATS traffic modelling work.

Figure 4.3 – Flow Comparison between Different Data Sources (Two-way 12-hour Flow)



5. Level Crossing Surveys

Surveys were undertaken to provide information on the impact of the B1101 Station Road level crossing on the highway network. Barrier closure time and queue length data was collected.

Level Crossing Surveys

5.1. Data for the B1101 Station Road level crossing was collected. The B1101 Station Road level crossing is approximately 1 mile north of March High Street and its located on one of the main radial routes into March. Figure 5.1 shows location of the B1101 Station Road level crossing.

5.2. The following information was collected:

- The durations of the level crossing barrier closures and the number of passing trains each time the barrier was closed between 0700 and 1900;
- MCC traffic survey between 0700 and 1900; and
- Maximum traffic queue lengths whilst the level crossing barrier was closed, also for 0700 to 1900.

5.3. Table 5.1 summarises the level crossing barrier closure duration by hour and modelled time period. The average barrier closure duration is 11 minutes (18%) per hour for the surveyed period. The hour with the smallest proportion of barrier closures is between 0800 and 0900, for which the barrier was closed for approximately 7 minutes (11%) only. The hour between 1600 and 1700 was surveyed to have the greatest proportion of barrier closures and the barrier was recorded to be closed for 15.5-minutes (26%) within this hour.

5.4. For the MATS SATURN highway model, barrier closure data for 0800 to 0900 and 1700 to 1800 will be used for the AM and PM peak model. For the inter peak model, average barrier closure duration for the inter peak period (1000-1600) will be used. Table 5.1 shows the barrier closure duration for each modelled time period.

5.5. It should be noted that there is no distinction between passenger and freight trains within the survey data. This will obviously have an impact on the length of barrier closure, since freight trains are generally longer and slower moving compared to passenger trains.

5.6. Table 5.2 shows the MCC data. As expected, the traffic flow is higher in the AM and PM peak when compared to the inter peak. The data also shows that southbound is the predominant travel direction in the AM peak, whilst for the inter and PM peak, the traffic flows for both directions are similar.

5.7. As an additional check, two-way 12-hour flow from the CCC annual town monitoring Site E-3 was compared to the level crossing MCC data to ensure robustness of the traffic flow data. The two-way 12-hour flow from the level crossing MCC data is 5,558 vehicles whereas the corresponding flow from the CCC annual town monitoring Site E-3 is 5,572 vehicles (see Table 2.2). The flow difference from the two independent surveys is less than 1%, suggesting that both sets of data are robust.

5.8. Maximum queue lengths while the barrier was closed for both southbound and northbound approaches to the B1101 Station Road level crossing were recorded. Figure 5.2 and Figure 5.3 shows the relationship between the barrier closure durations and the maximum queue lengths for the approaches to the level crossing, while Figure 5.4 displays the length of the maximum queue graphically. The queue lengths are generally proportional to the barrier closure durations. For the AM and PM peaks, the data shows that the queue lengths are slightly longer than the inter peak for the same barrier closure duration in most cases. This might be expected, as the traffic flow volumes in the AM and PM peaks are higher (as shown by the MCC data) and so the queues are expected to build up faster during these peak periods.

Figure 5.1 – Level Crossing Survey

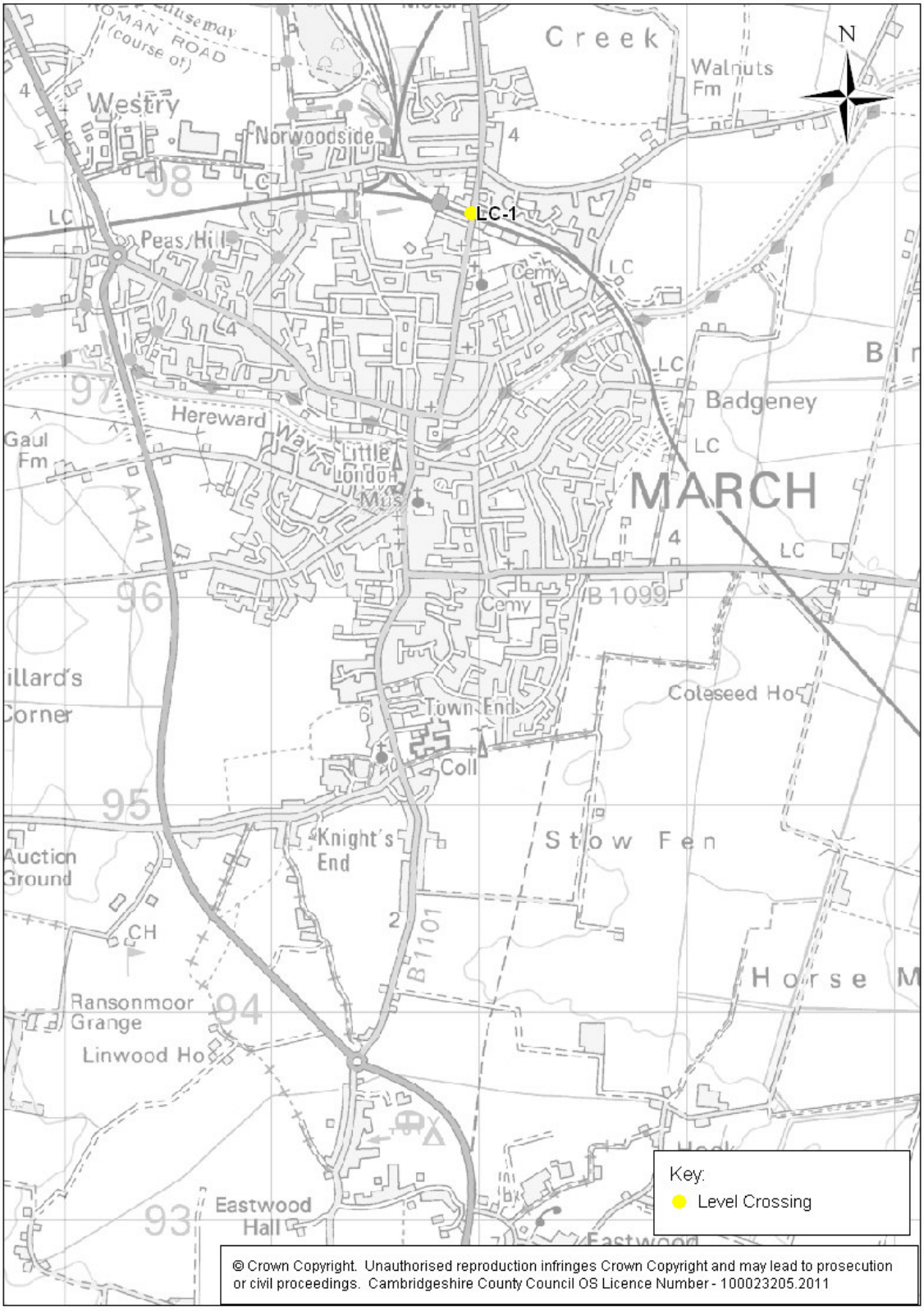


Table 5.1 – B1101 Station Road Level Crossing Closure Data Summary

Hour Begin	No. of Closures	Mean Closure Time (mm:ss)	Total Closure Time (mm:ss)	No. of 1-Train Closures	No. of 2-Train Closures
7	6	01:40	09:59	6	0
8	4	01:40	06:42	4	0
9	4	02:45	10:59	2	2
10	6	02:03	12:16	5	1
11	5	01:42	08:31	5	0
12	7	01:58	13:43	7	0
13	5	01:48	09:02	5	0
14	6	02:04	12:26	5	1
15	6	02:25	14:30	5	1
16	8	01:56	15:25	7	1
17	4	02:23	09:32	3	1
18	5	01:48	09:00	5	0
Average	5.5	-	11:00	-	-
By modelled time period					
AM (0800-09900)	4	01:40	06:42	4	0
IP (Ave hour (1000-1600))	5.8	02:00	11:45	5.3	0.5
PM (1700-1800)	4	02:23	09:32	3	1

Table 5.2 – B1101 Station Road Level Crossing MCC Data Summary

Site ID	Direction	Traffic Flow (Veh)			
		AM	IP	PM	12hr
LC-1	B1101 Station Road Level Crossing (NB)	241	214	266	2,692
	B1101 Station Road Level Crossing (SB)	328	224	279	2,866

Figure 5.2 – B1101 Station Road Level Crossing Southbound Queue Length Data Summary

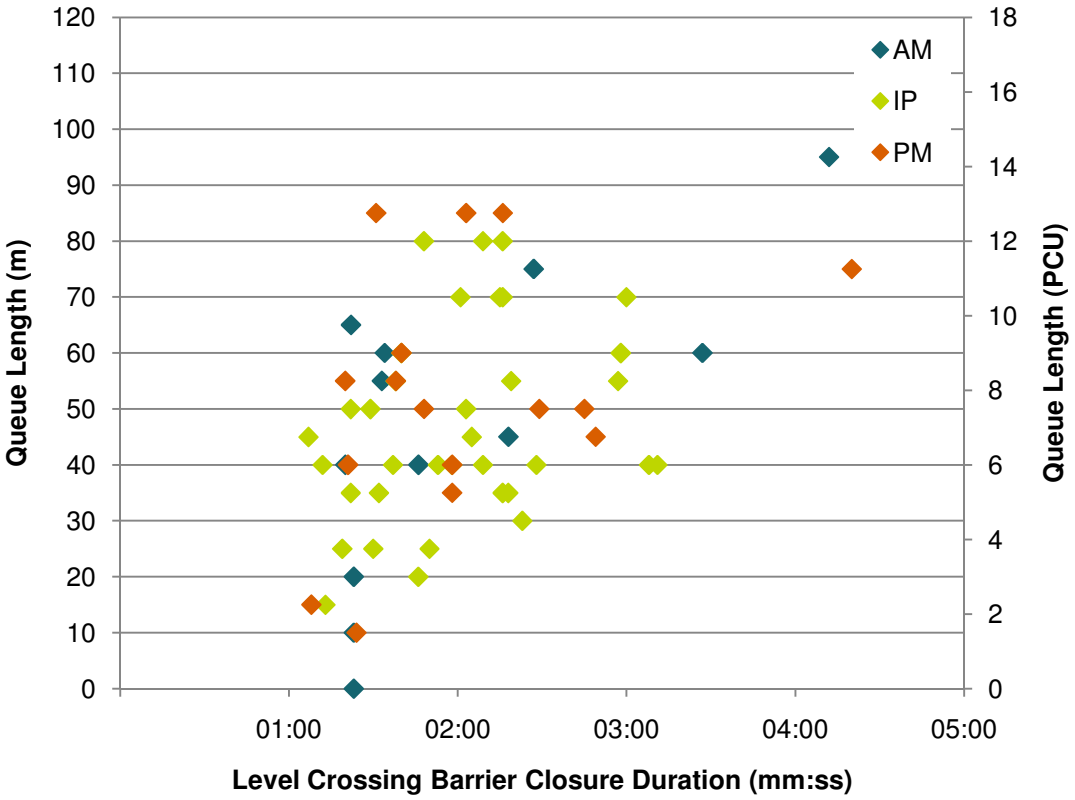


Figure 5.3 – B1101 Station Road Level Crossing Northbound Queue Length Data Summary

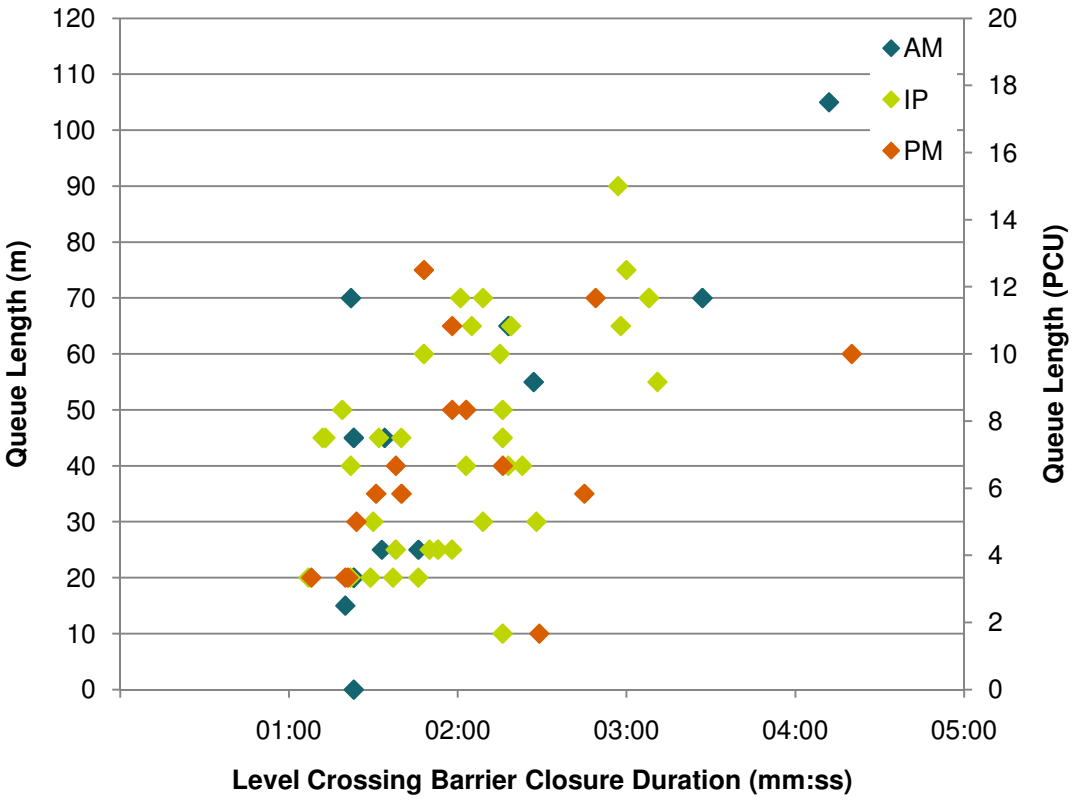
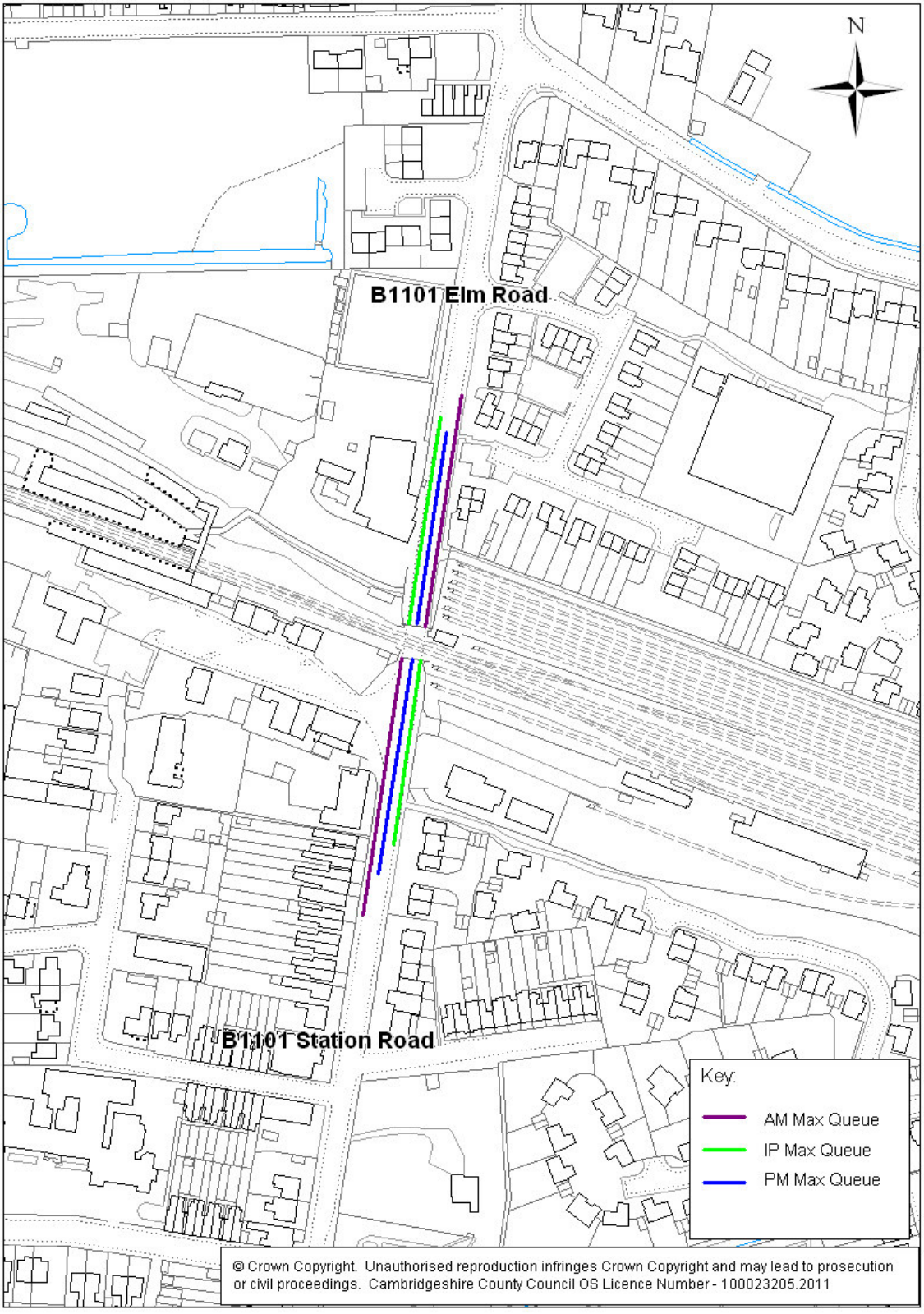


Figure 5.4 - B1101 Station Road Level Crossing Maximum Queue Length per Time Period



6. Journey Time and Queue Length Surveys

Journey time and queue length data provides information about the existing traffic conditions and is integral to the development and validation of the MATS SATURN highway model.

Journey Time and Queue Length Surveys

Journey Time Surveys

6.1. A number of journey time surveys were carried out across the study area. The detailed journey time data is key to understanding present conditions and is integral to the development and validation of the MATS SATURN highway model. Four journey time survey routes have been identified as shown in Table 6.1, and illustrated in Figure 6.1.

6.2. The journey time surveys were undertaken using in-car GPS data loggers. One enumerator was required for each journey time route and he/she was instructed to drive the survey vehicle at the average speed of the general traffic along the predefined route on the survey day. The GPS logger recorded the position and time of the survey vehicle at two second intervals, which would then be downloaded and analysed using a map-based system to provide the required journey time analysis statistics.

6.3. For each journey time route, timing points are used to split the route into shorter sections. This enables the different characteristics of the rural and urban sections of the journey time routes and areas of delay and congestion to be identified.

6.4. Table 6.2 shows the average journey times along each route in the surveyed peak periods (AM peak period (0730-0930); Inter peak period (1000-1600); and PM peak period (1630-1830)). Each route was surveyed in both directions.

Table 6.1 – Journey Time Routes

Route	From	To
Pink	A141/B1101 Wimblington Road	A141/A47
Blue	A141/B1099 Wisbech Road	B1099 Upwell Road/B1098 Sixteen Foot Bank
Green	B1101 Wimblington Road/Lambs Hill Drove	Robin Goodfellows Lane/Norwood Road
Red	A141/B1101 Wimblington Road	B1101 Elm Road/Coldham Bank

Figure 6.1 – Journey Time Survey Routes

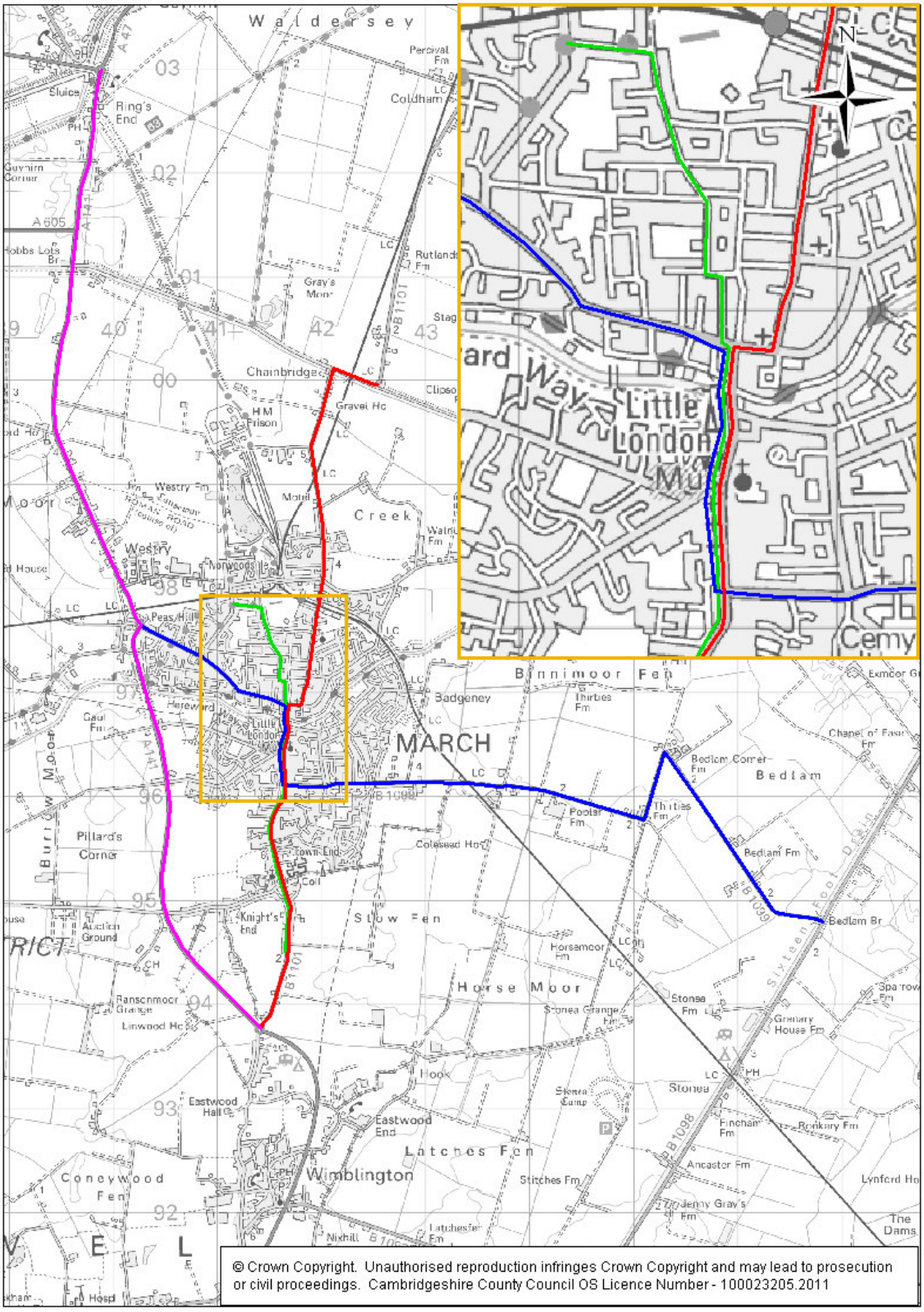


Table 6.2 – Journey Time Data Summary

Route	Period	Dir	Runs	Distance (km)	Journey Time (mm:ss)				Average Speed (kph)
					Ave	St Dev	Min	Max	
Pink	AM	Northbound	5	9.86	09:15	00:36	08:37	09:58	64.0
	IP		10		10:38	01:49	08:24	13:20	55.6
	PM		5		09:24	00:56	08:25	10:56	62.9
	AM	Southbound	5	9.86	08:46	00:37	08:04	09:22	67.5
	IP		10		09:33	01:23	08:10	12:27	61.9
	PM		5		08:52	00:52	07:54	10:16	66.7
Blue	AM	Northbound	5	9.00	12:57	02:28	09:47	16:03	41.7
	IP		10		11:34	00:46	10:30	12:53	46.7
	PM		5		12:14	01:34	10:06	14:04	44.1
	AM	Southbound	4	9.00	12:14	00:42	11:20	13:02	44.1
	IP		10		11:58	01:46	10:02	15:50	45.1
	PM		5		11:12	01:15	10:26	13:24	48.2
Green	AM	Northbound	7	3.70	07:22	01:08	05:44	08:48	30.1
	IP		15		07:06	00:56	06:08	10:00	31.3
	PM		7		07:08	01:08	05:50	08:46	31.1
	AM	Southbound	7	3.70	08:06	01:22	06:18	10:22	27.4
	IP		15		07:23	00:47	06:03	08:34	30.1
	PM		7		07:32	01:22	06:04	10:26	29.5
Red	AM	Northbound	5	7.20	11:17	00:35	10:46	12:06	38.3
	IP		10		11:41	01:06	10:24	13:54	37.0
	PM		5		11:51	00:45	10:58	12:46	36.5
	AM	Southbound	4	7.20	11:22	01:57	10:12	14:18	38.0
	IP		10		11:07	01:00	09:42	12:48	38.9
	PM		5		11:03	00:40	10:10	11:40	39.1

Congestion Points

6.5. As the GPS loggers recorded the survey vehicle position and time at two second interval, the stretches of the route where delay and congestion occurred could be identified. Figure 6.2 and Figure 6.3 show the locations where the survey vehicles were travelling at below 10 mph in one or more time periods. The congestion points for all time periods are generally consistent, although the duration of the delay and queue length might vary.

6.6. It should be noted that Figure 6.2 and Figure 6.3 only show the locations where one or more of the survey vehicles had been travelling at below 10mph. It does *not* mean that average vehicle speed for the highlighted stretch of the road is below 10mph.

6.7. The apparent change in thickness of the data points simply correlates to the slightly different vehicle positions at the time at which the speed was recorded to be less than 10 mph. At slower speeds, the GPS data become more intensive, hence giving the apparent thickness to the line of points.

6.8. The main congestion area for March (for the surveyed journey time routes only) is the High Street area. This is expected as there are several pedestrian crossings on the High Street which cause delay to the highway traffic. Delay is also expected on all approaches to the following signalised junctions:

- B1101 High Street/ B1099 Dartford Road/ B1101 Station Road; and
- B1101 High Street/B1099 St Peters Road.

6.9. Other areas where slow observed travel speeds were recorded include the approaches to A141/B1099 Wisbech Road roundabout and the approaches to the B1101 Station Road level crossing.

Figure 6.2 – Locations of Congestion and Delay (Northbound and Westbound)

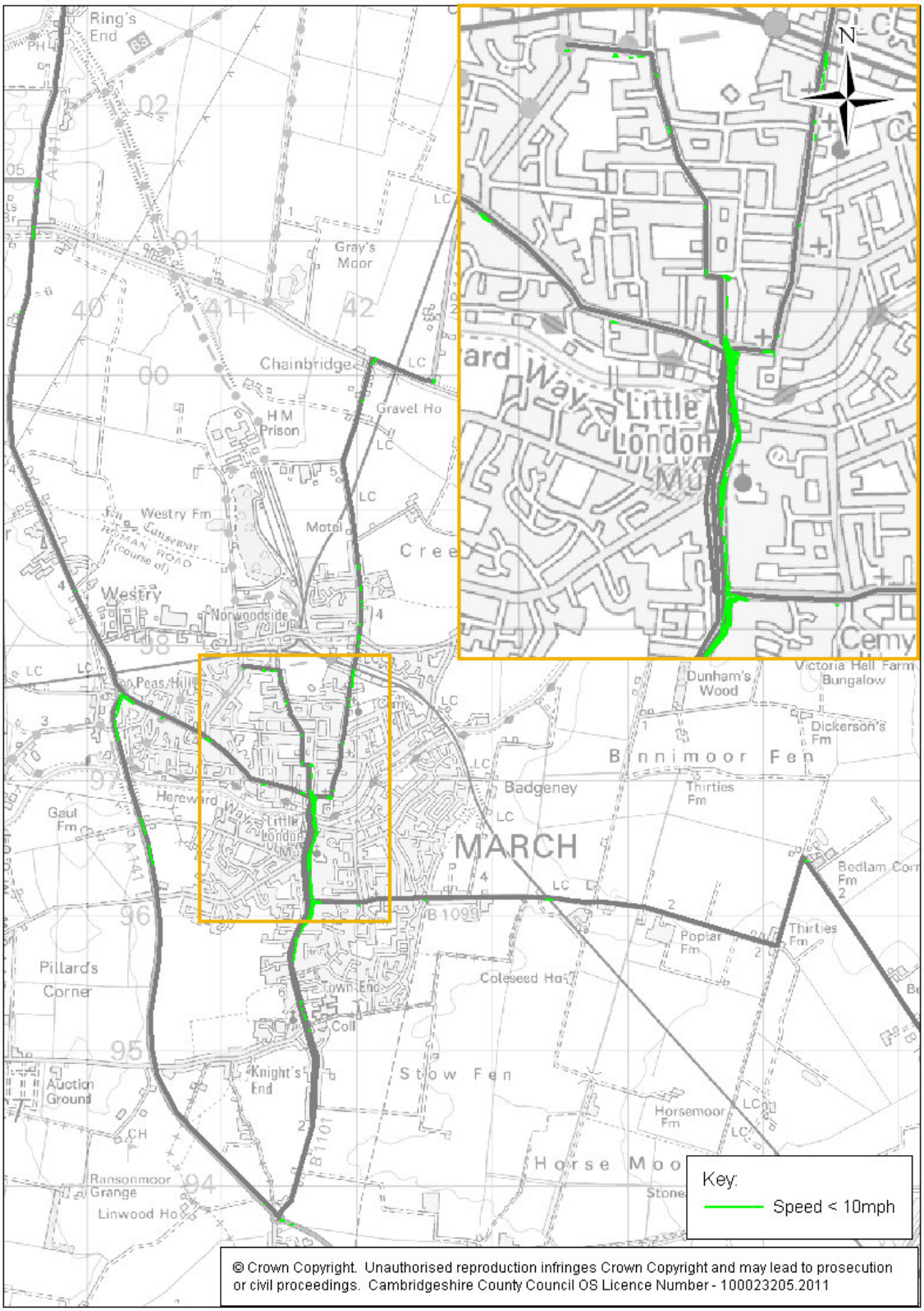
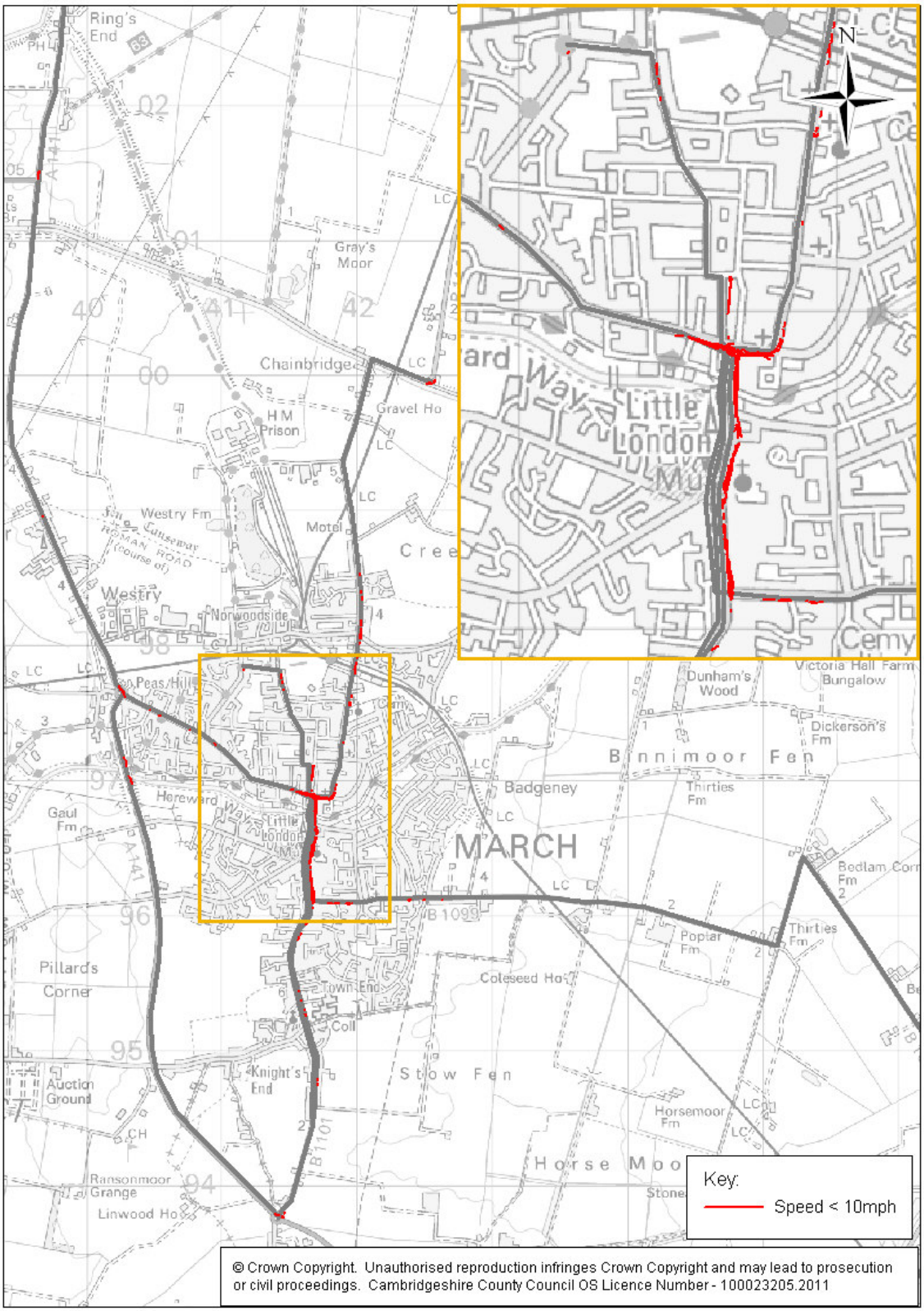


Figure 6.3 – Locations of Congestion and Delay (Southbound and Eastbound)



Queue Length Surveys

6.10. Queue length surveys were undertaken for several key junctions within the study area. The queue length data will mainly be used to assist the calibration of the MATS SATURN model.

6.11. Queue lengths by lane on each approach arm to the junctions were recorded at 5-minute intervals for the 12-hour period from 0700 to 1900. Table 6.3 lists the locations of the queue length surveys, and Table 6.4 and Figure 6.4 show observed maximum queue length by approach arm (all lanes combined) and time period. The queue lengths presented in numbers of PCUs have been rounded to the nearest whole PCU.

6.12. Similar to the TrafficMaster data (Figure 2.6 & Figure 2.7) and journey time congestion point data (Figure 6.2 & Figure 6.3), the queue length data also shows that the approaches to B1101 Station Road/B1101 Broad Street/B1099 Dartford Road (TC-21) and B1101 High Street/St Peters Road (TC-14) signalised junctions are the busiest and most congested area in March. The extents of maximum queue by time period for these sites are shown in Figure 6.5 and Figure 6.6.

6.13. For entry arms that have 2 or more lanes, the values reported are the sum of the queue lengths from each lane to give a total length of queuing traffic on that arm. This therefore cannot be taken as the maximum length that queuing traffic extends from the stopline.

Table 6.3 – Queue Length Survey Locations

Site ID	Location	Easting	Northing
TC-6	A141/B1101 Wimblington Road	541,403	293,770
TC-13	B1101 High Street/Burrowmoor Road	541,630	296,454
TC-14	B1101 High Street/St Peters Road	541,647	296,117
TC-15	A141/Hostmoor Avenue	540,091	298,017
TC-20	B1101 Station Road/Creek Road/Mill Road	541,793	296,876
TC-21	B1101 Station Road/B1101 Broad Street/B1099 Dartford Road	541,675	296,890
TC-22	B1101 High Street/Elwyn Road/Market Place	541,670	296,665

Table 6.4 - Queue Length Data Summary

Site ID	Junction Entry Arm	Maximum Queue Length (m)			Maximum Queue Length (PCUs)		
		AM	IP	PM	AM	IP	PM
TC-6	B1101 Wimblington Road	20	55	10	3	10	2
	A141 (E)	50	30	35	9	5	6
	March Road	30	45	20	5	8	3
	A141 (W)	10	40	30	2	7	5
TC-11	A141 (N)	55	45	60	10	8	10
	B1099 Wisbech Road	40	60	60	7	10	10
	A141 (S)	85	75	70	15	13	12
TC-13	B1101 High Street (N)	5	20	30	1	3	5
	B1101 High Street (S)	85	45	20	15	8	3
	Burrowmoor Road	35	40	25	6	7	4
	City Road	10	15	20	2	3	3
TC-14	B1101 High Street (N)	70	90	60	12	16	10
	St Peters Road	25	40	50	4	7	9
	B1101 High Street (S)	90	90	70	16	16	12
TC-20	Creek Road	25	30	20	4	5	3
TC-21	B1101 Station Road	90	85	105	16	15	18
	B1101 Broad Street	125	135	110	22	23	19
	B1099 Dartford Road	160	90	110	28	16	19
TC-22	Market Place	60	40	60	10	7	10
	B1101 High Street (S)	10	25	10	2	4	2

Figure 6.4 – Queue Length Survey Locations

Figure 6.5 – Maximum Queue Length (Site TC-14)

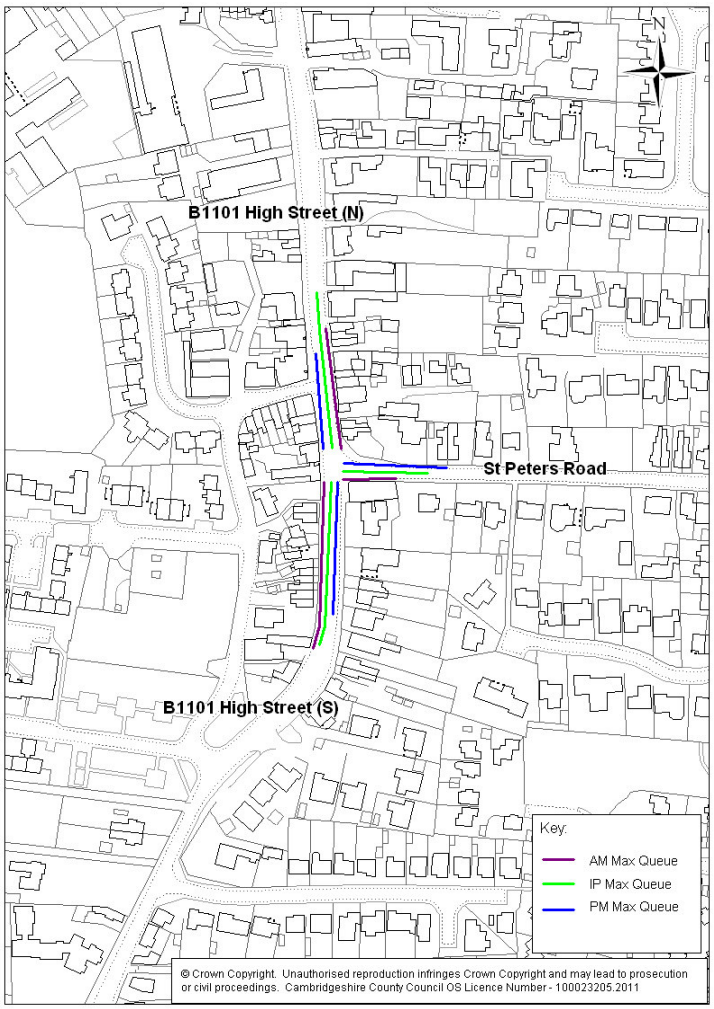
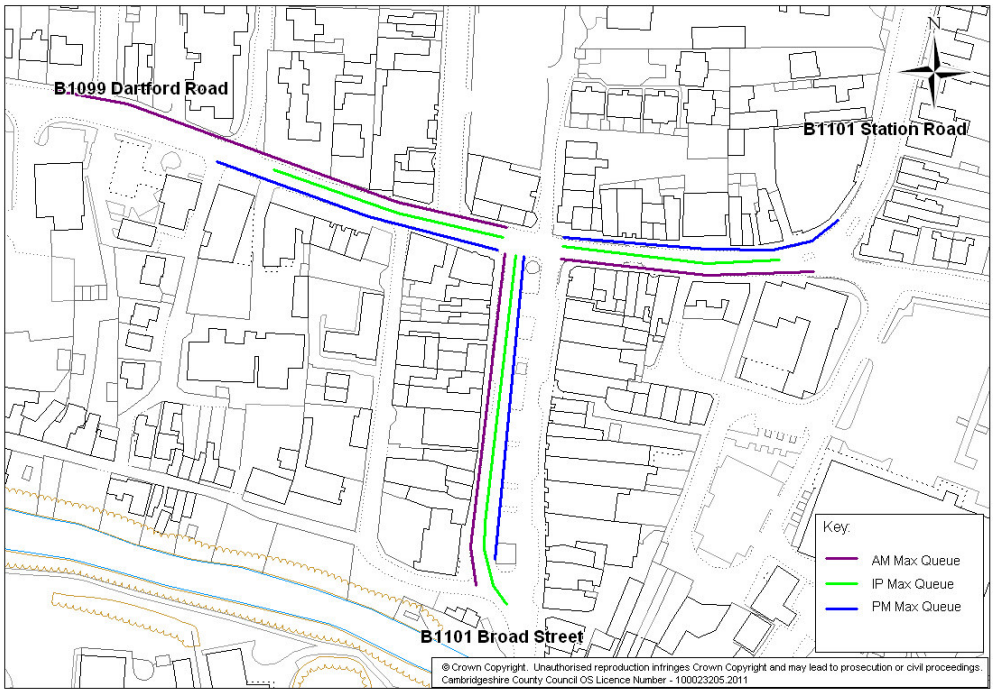


Figure 6.6 – Maximum Queue Length (Site TC-21)



7. Conclusions

Conclusions

7.1. The main findings from an initial examination of the survey data show that the data is robust and can be used with confidence to establish the existing patterns of demand for travel in the MATS study area.

7.2. As part of this exercise, several existing sources of traffic and travel data were identified and the data has been made available by the relevant highway authorities for use in this study.

7.3. All of the additional traffic and travel surveys identified for this study to supplement the existing data were undertaken in October 2010. These surveys were completed and the survey data processed. These surveys capture all major traffic movements in the study area and are considered significant and relevant to this study. The data provides information on the travel patterns, travel levels and journey time data in the study area.

7.4. For the RSI surveys, the interview sample rate ranged between 14% and 52%, which overall compares well against a general target of 15%. As expected, higher sample rates were achieved where traffic flows were lower (i.e. RSI Site R-1 and Site R-2).

7.5. For the postcard RSI survey site (Site R-6), the sample rates ranged between 5% and 8%. Due to the nature of postcard survey, it was considered that the low sample rate is acceptable and the data provides observed internal to internal movements within March.

Key Findings

7.6. The traffic flow data shows that the two-way traffic flow for B1101 Broad Street in the centre of March is in the region of 14,000 vehicles over a 12-hour period, which is a similar level to the A141 March Bypass.

7.7. The queue length and journey time data shows that the stretch of B1101 High Street between B1099 St Peters Road and B1099 Dartford Road is the most congested section of road in March.

7.8. Sector-to-sector movement analysis shows that majority of the trips in March are not through trips. For trips that pass through Site R-6 (B1101 Station Road/B1101 Broad Street/B1099 Dartford Road), approximately 40% of the all trips are internal movements within March.

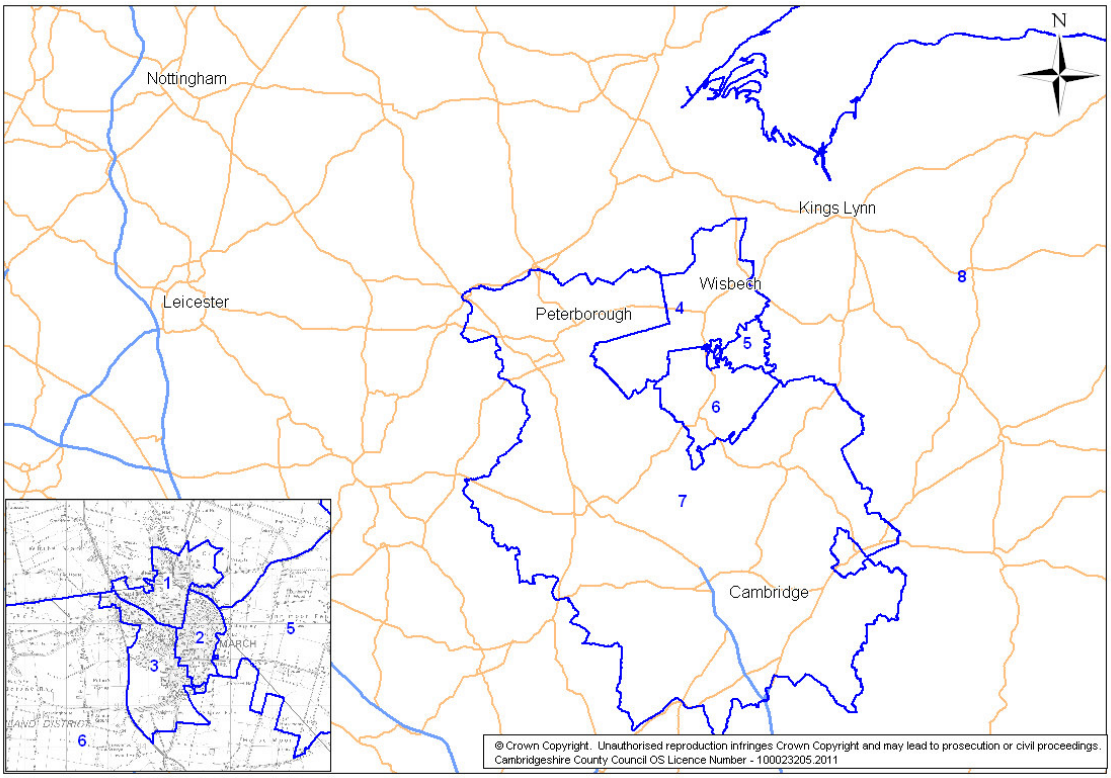
A. 2001 Journey to Work Census Data

This appendix includes 2001 JTW Census sector-to-sector movement matrices for car driver, walk and cycle trips.

2001 Journey to Work Census Data

A.1 Table A.1 to Table A.4 below show the sector-to-sector Journey to Work (JTW) movements from 2001 Census Data for trips made by all modes, car driver, cycling and walking trips respectively. The sector-to-sector movements within March have been highlighted.

Figure A.1 – MATS Sector System



- 1 – March North;
- 2 – March East;
- 3 – March West;
- 4 – Fenland North;
- 5 – Fenland East;
- 6 – Fenland South;
- 7 – Rest of Cambridgeshire and Peterborough; and
- 8 – Rest of Country.

Table A.1 – Sector-to-Sector JTW Movements from 2001 Census Data (All Modes)

		Destination								
		1	2	3	4	5	6	7	8	Total
Origin	1	648	196	220	432	6	242	492	234	2,470
	2	241	616	276	544	9	335	497	231	2,749
	3	209	210	724	441	9	277	563	198	2,631
	4	264	132	165	13,076	27	407	5,559	3,100	22,730
	5	9	9	18	73	136	31	102	63	441
	6	169	134	170	569	15	3,013	3,004	579	7,653
	7	212	123	132	2,262	12	621	269,459	43,502	316,323
	8	219	93	96	4,762	31	251	52,997	23,521,013	23,579,462
	Total	1,971	1,513	1,801	22,159	245	5,177	332,673	23,568,920	23,934,459

Table A.2 – Sector-to-Sector JTW Movements from 2001 Census Data (Car Driver)

		Destination								
		1	2	3	4	5	6	7	8	Total
Origin	1	231	97	97	261	6	173	399	189	1,453
	2	130	240	123	373	6	248	413	171	1,704
	3	134	105	293	328	9	196	473	159	1,697
	4	228	114	135	6,901	21	308	4,511	2,527	14,745
	5	6	3	18	67	45	25	81	51	296
	6	145	104	140	488	12	1,421	2,611	456	5,377
	7	188	120	123	1,829	9	531	153,604	31,983	188,387
	8	201	84	87	4,146	25	222	44,953	13,164,114	13,213,832
	Total	1,263	867	1,016	14,393	133	3,124	207,045	13,199,650	13,427,491

Table A.3 – Sector-to-Sector JTW Movements from 2001 Census Data (Pedal Cycle)

		Destination								
		1	2	3	4	5	6	7	8	Total
Origin	1	74	47	66	96	0	6	12	0	301
	2	66	42	63	83	0	12	6	3	275
	3	51	50	84	45	0	15	3	0	248
	4	12	12	12	1,203	3	21	84	75	1,422
	5	0	0	0	0	0	0	6	0	6
	6	0	9	15	18	0	271	33	6	352
	7	3	3	6	84	3	6	27,620	577	28,302
	8	3	0	0	82	0	0	447	620,299	620,831
	Total	209	163	246	1,611	6	331	28,211	620,960	651,737

Table A.4 – Sector-to-Sector JTW Movements from 2001 Census Data (Walk)

		Destination								
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**Total**
Origin	**1**	105	40	30	15	0	3	0	3	196
	2	30	85	51	15	0	3	3	12	199
	3	12	43	90	3	0	3	12	3	166
	4	6	0	3	1,443	0	9	66	75	1,602
	5	0	0	0	3	0	0	0	0	3
	6	3	6	0	18	0	297	12	9	345
	7	3	0	0	85	0	21	23,749	718	24,576
	8	0	0	0	21	0	0	750	2,210,717	2,211,488
	Total	159	174	174	1,603	0	336	24,592	2,211,537	2,238,575

B. RSI

This appendix includes a sample of the postcard used for Site R-6, RSI ATC flow profile graphs and sector-to-sector movement matrices for the RSI data.

Sample of the RSI Site R-6 Postcard

Figure B.1 below shows a sample of the RSI Site R-6 postcard.

Figure B.1 – RSI Site R-6 Postcard Sample

March Traffic Survey

Fenland District Council & Cambridgeshire County Council are conducting traffic surveys in and around March. This information will give a comprehensive and up to date picture of travel patterns, which will be used to plan and improve transport requirements in the March area. As part of this we need details of individual journeys including the exact address of where people are travelling to and from. **Please complete the questionnaire in relation to the journey you were making when you received this form** and place back in the envelope with the FREEPOST address showing through the window. To ensure total confidentiality the results of the survey will contain no details of or reference to any individual journey.
Your participation is greatly appreciated, many thanks.

Thursday 21st October 2010 ***OFFICE USE*** *Site:* *Postcard Ref:* *Half Hour Start:*

ORIGIN

Q1 - WHAT METHOD OF TRANSPORT WERE YOU USING?

1 - Motorcycle
2 - Car
3 - Light Goods Vehicle
4 - HGV 2 or 3 axle RIGID
5 - HGV 4 or more axles and ALL articulated
6 - Bus/Coach
7 - Cycling

Q2 - IF USING A VEHICLE, PLEASE SPECIFY NO. of OCCUPANTS IN THE VEHICLE (incl. driver / rider)

Q3 - PLEASE PROVIDE THE FULL ADDRESS YOU HAD JUST COME FROM (i.e. your previous stop or origin)

Firm / House No.
Street
Town
County
Postcode

Q4 - WHAT WAS YOUR REASON FOR BEING THERE?

1 - Home
2 - Holiday Home
3 - Work
4 - Employers Business
5 - Education
6 - Shopping
7 - Personal Business
8 - Visit Friends
9 - Recreation / Leisure
10 - Other (please state)

Q5 - IF YOUR ORIGIN WAS IN **MARCH**, WHERE DID YOU PARK?

Please specify type and location of parking

1 - Private Parking
2 - On Street
3 - Public Parking
4 - Not Applicable

Location:

DESTINATION

Q6 - PLEASE PROVIDE THE FULL ADDRESS YOU WERE GOING TO (i.e your next stop or destination)

Firm / House No.
Street
Town
County
Postcode

Q7 - WHAT WAS YOUR REASON FOR GOING THERE?

1 - Home
2 - Holiday Home
3 - Work
4 - Employers Business
5 - Education
6 - Shopping
7 - Personal Business
8 - Visit Friends
9 - Recreation / Leisure
10 - Other (please state)

Q8 - IF YOUR DESTINATION WAS IN **MARCH**, WHERE DID YOU PARK?

Please specify type and location of parking

1 - Private Parking
2 - On Street
3 - Public Parking
4 - Not Applicable

Location:

Q9 - DID YOU MAKE A RETURN JOURNEY IN THE OPPOSITE DIRECTION USING THIS ROAD?

1 - Yes
2 - No

If YES, please specify time of return journey

1 - 07:00 - 10:00
2 - 10:00 - 13:00
3 - 13:00 - 16:00
4 - 16:00 - 19:00
5 - 19:00 - 07:00

RSI ATC Flow Profile

B.2 Figure B.2 to Figure B.11 below shows the RSI ATC flow profile analysis for RSI Site R-1, R-2, R-3, R-4 and R-5.

Figure B.2 – RSI Site R-1 Southbound (Interview direction) ATC Flow Profile

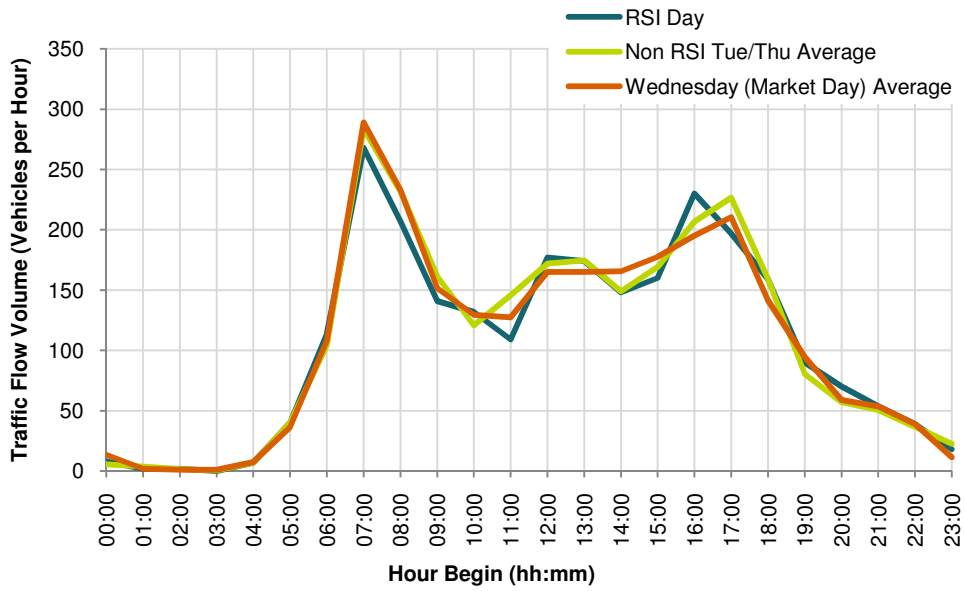


Figure B.3 – RSI Site R-1 Northbound (Non-Interview Direction) ATC Flow Profile

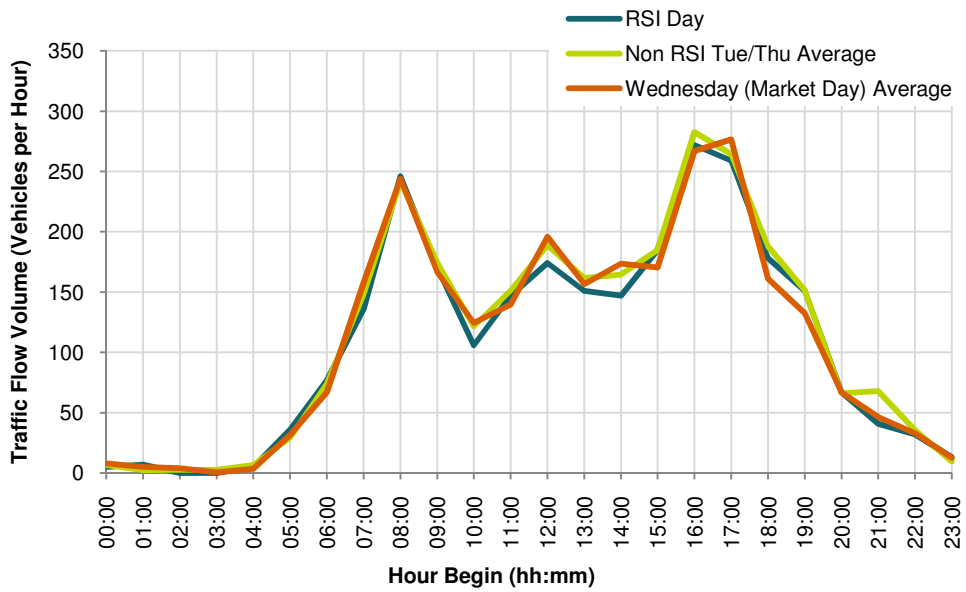


Figure B.4 – RSI Site R-2 Westbound (Interview Direction) ATC Flow Profile

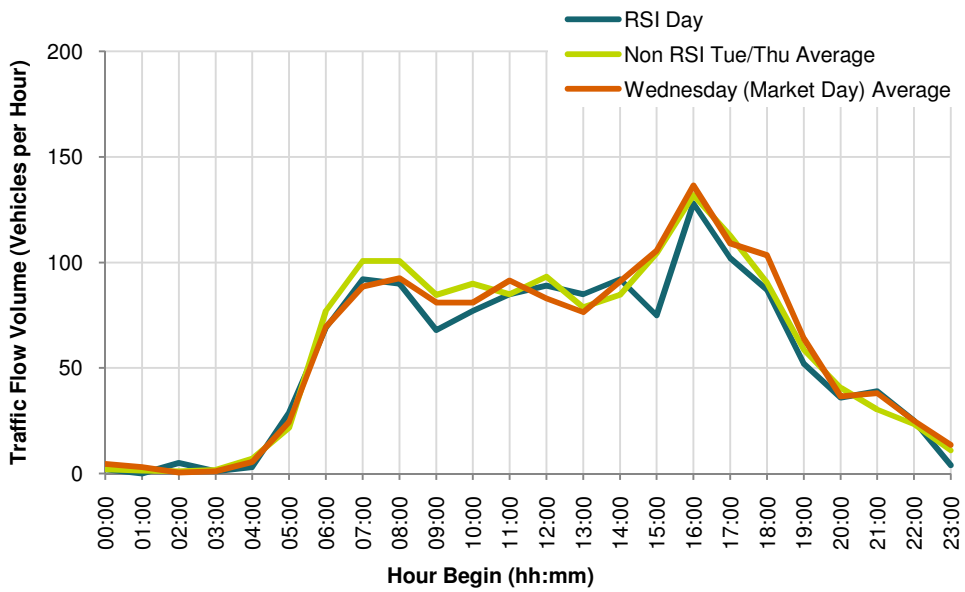


Figure B.5 – RSI Site R-2 Eastbound (Non-Interview Direction) ATC Flow Profile

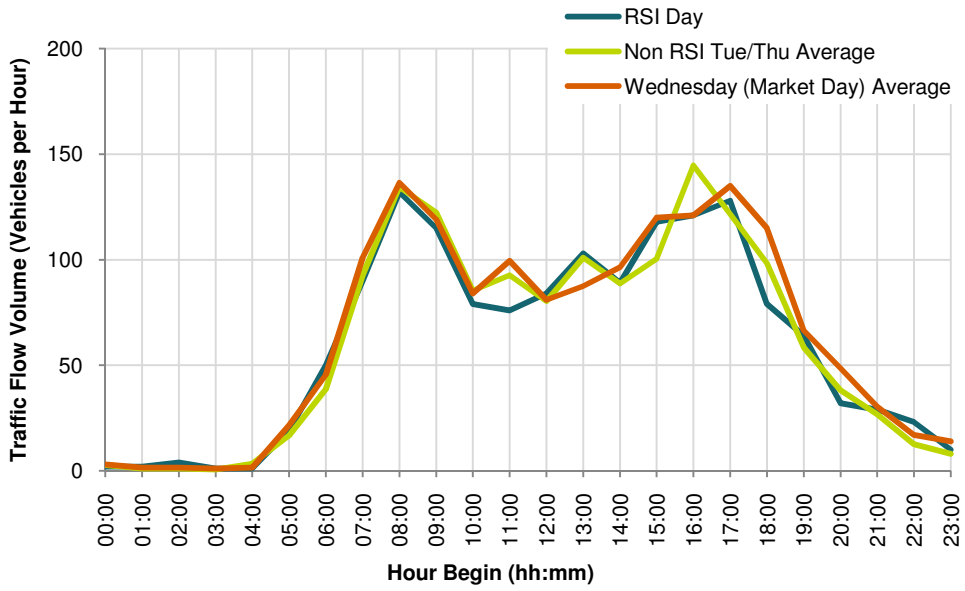


Figure B.6 – RSI Site R-3 Northbound (Interview Direction) ATC Flow Profile

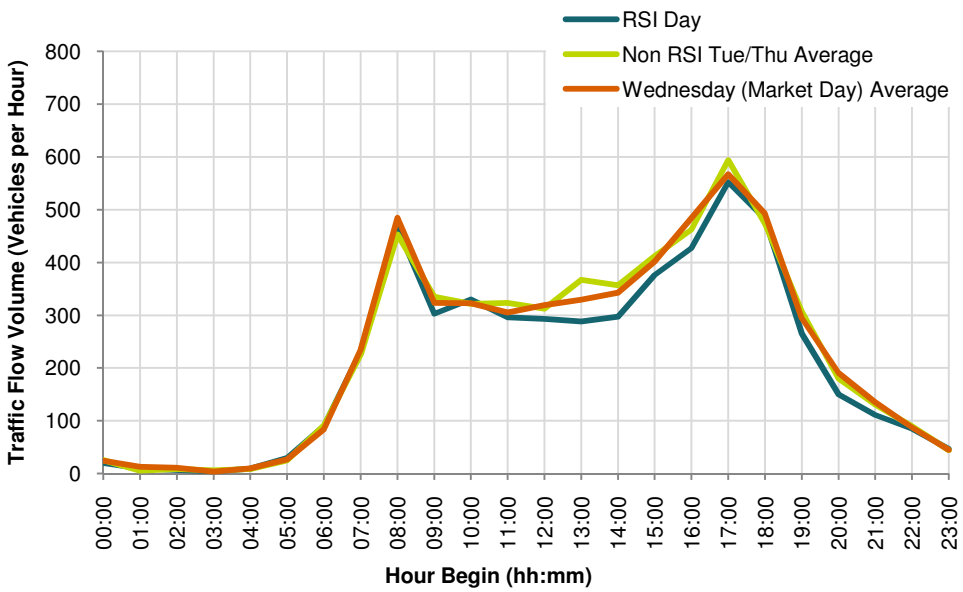


Figure B.7 – RSI Site R-3 Southbound (Non-Interview Direction) ATC Flow Profile

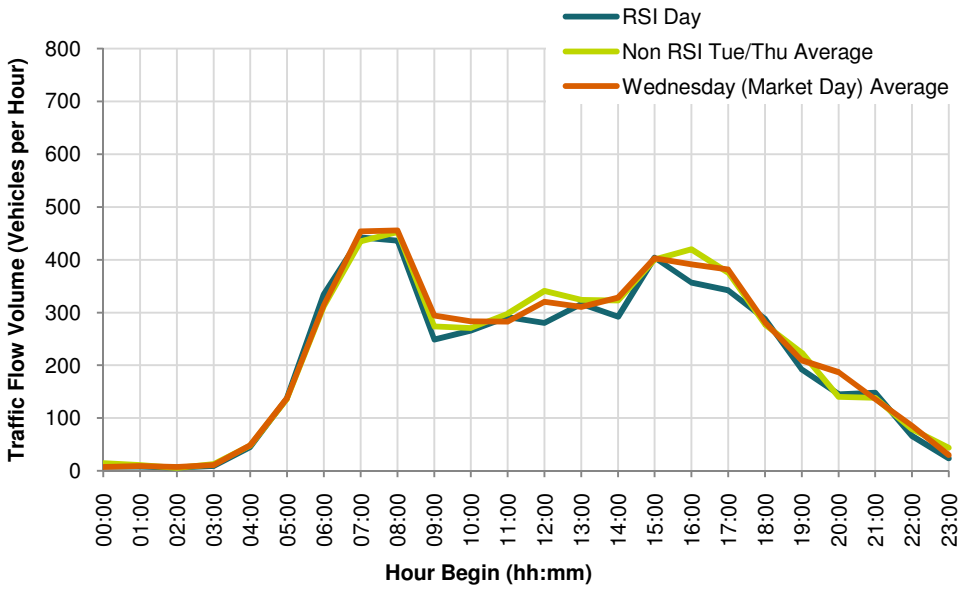


Figure B.8 – RSI R-Site 4 Northbound ATC Flow Profile

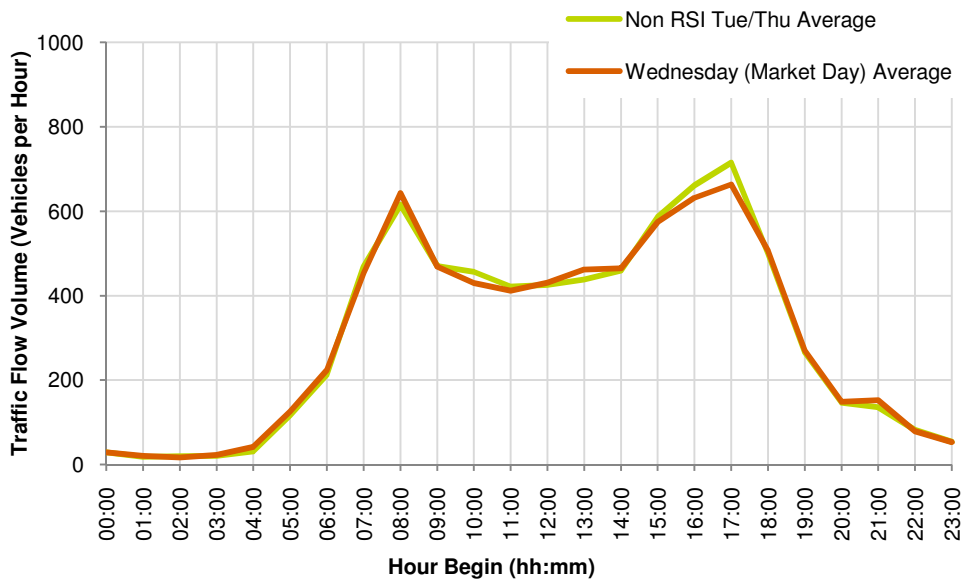


Figure B.9 – RSI Site R-4 Southbound ATC Flow Profile

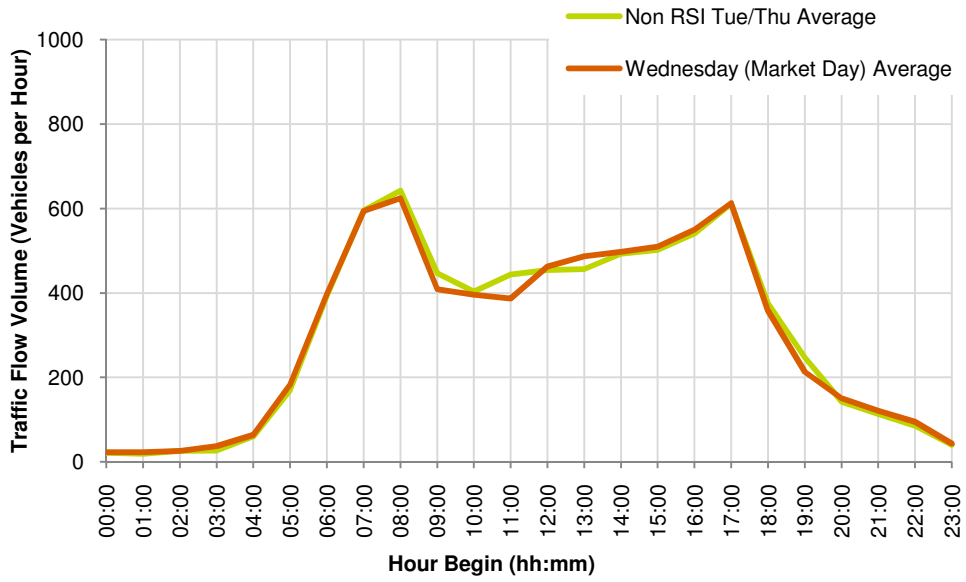


Figure B.10 – RSI Site R-5 Southbound (Interview Direction) ATC Flow Profile

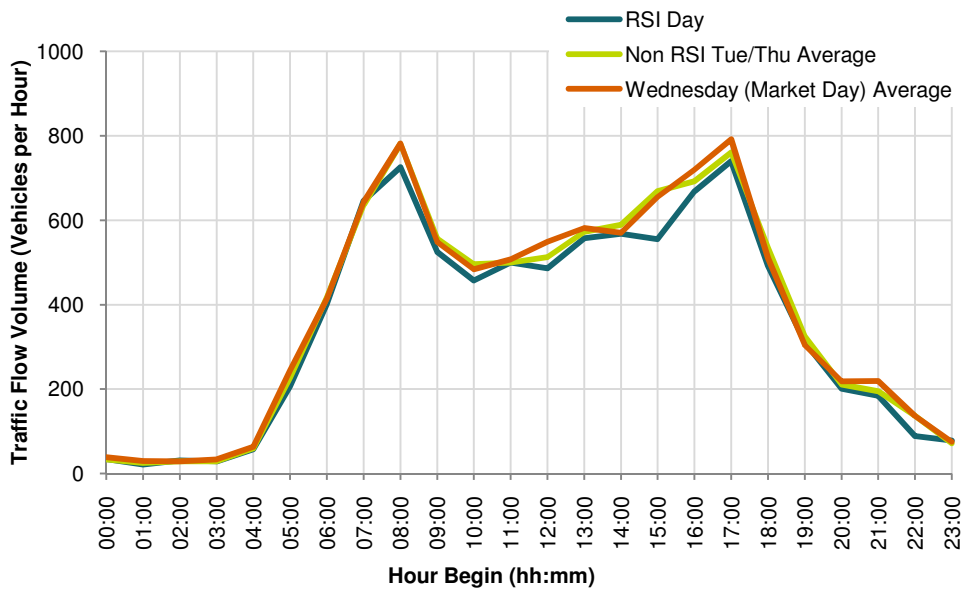
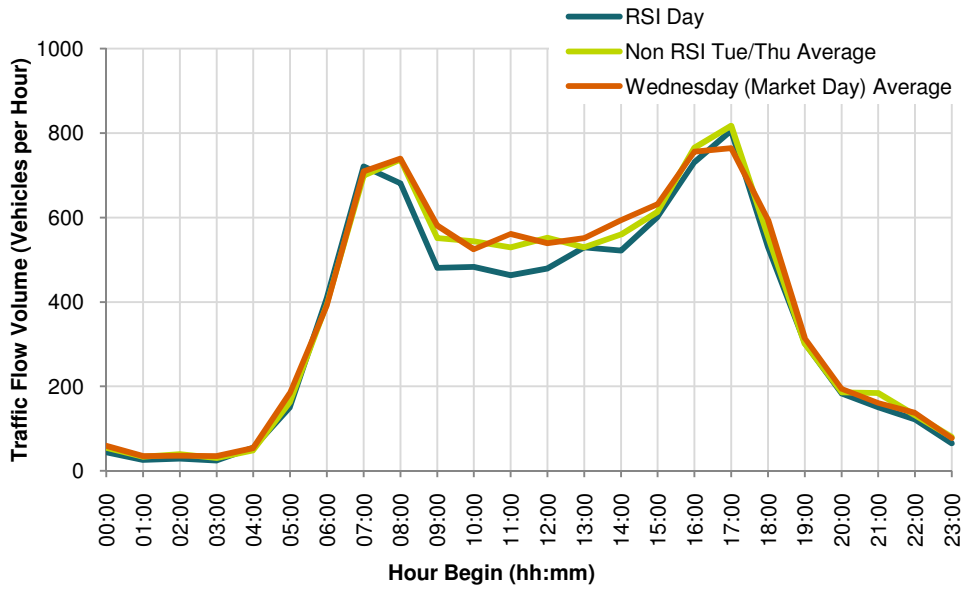


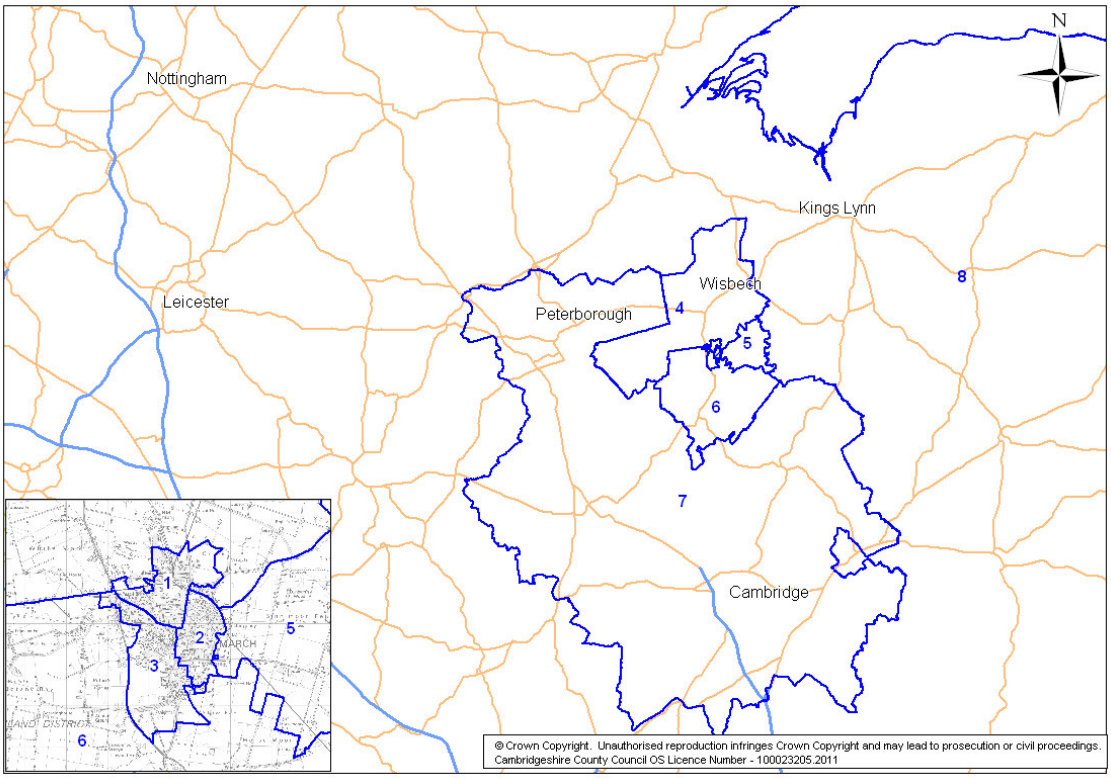
Figure B.11 – RSI Site R-5 Northbound (Non-Interview Direction) ATC Flow Profile



RSI Sector-to-Sector Movements

B.3 Table B.1 to Table B.24 shows the sector-to-sector movement matrices for AM, inter and PM peaks for all RSI sites. Sector 1, 2 and 3 are March sectors which have been highlighted.

Figure B.12 – MATS Sector System



- 1 – March North;
- 2 – March East;
- 3 – March West;
- 4 – Fenland North;
- 5 – Fenland East;
- 6 – Fenland South;
- 7 – Rest of Cambridgeshire and Peterborough; and
- 8 – Rest of Country.

Table B.1 – RSI Site R-1 (AM)

		Destination								
		1	2	3	4	5	6	7	8	Total
Origin	1	0	1	1	1	0	0	1	0	5
	2	0	0	0	0	0	0	0	0	0
	3	0	0	0	0	0	0	0	0	0
	4	80	26	21	9	1	15	13	3	168
	5	0	0	0	0	0	0	0	0	0
	6	0	0	0	0	0	0	0	0	0
	7	22	4	0	0	0	0	0	0	26
	8	43	20	7	5	0	3	0	0	77
	Total	144	52	29	16	1	17	15	3	276

Key Movements:
- 81% (225/276) of all trips have destinations in March.
- 46% (127/276) of all trips originates from Sector 4 and go to March.

Table B.2 – RSI Site R-1 (IP)

		Destination								
		1	2	3	4	5	6	7	8	Total
Origin	1	1	1	0	0	0	0	2	0	4
	2	0	0	0	0	0	0	0	0	0
	3	0	0	0	0	0	0	0	0	0
	4	44	24	18	8	4	6	4	1	108
	5	0	0	0	0	0	0	0	0	0
	6	0	0	0	0	0	0	0	0	0
	7	10	3	1	3	0	0	0	0	16
	8	15	6	4	3	0	1	0	0	30
	Total	70	33	23	14	4	8	6	2	159

Key Movements:
- 79% (126/159) of all trips have destinations in March.
- 53% (85/159) of all trips originates from Sector 4 and go to March.

Table B.3 – RSI Site R-1 (PM)

		Destination								
		1	2	3	4	5	6	7	8	Total
Origin	1	8	1	0	0	0	0	0	0	8
	2	0	0	0	0	0	0	0	0	0
	3	0	0	0	0	0	0	0	0	0
	4	79	40	26	8	1	20	6	8	187
	5	3	0	0	0	0	0	0	0	3
	6	0	0	0	0	0	0	0	0	0
	7	24	17	3	1	0	0	0	0	44
	8	22	22	9	1	0	5	0	0	59
	Total	136	79	38	10	1	25	6	8	302

Key Movements:
- 84% (253/302) of all trips have destinations in March.
- 48% (145/302) of all trips originates from Sector 4 and go to March.

Table B.4 – RSI Site R-2 (AM)

		Destination								
		1	2	3	4	5	6	7	8	Total
Origin	1	0	0	0	0	0	0	0	0	0
	2	0	0	0	0	0	0	0	0	0
	3	0	0	0	0	0	0	0	0	0
	4	0	0	0	0	0	0	0	0	0
	5	11	10	9	6	0	4	5	1	47
	6	2	2	1	2	0	0	1	0	7
	7	4	2	2	2	0	0	2	0	11
	8	6	4	7	5	1	2	2	1	27
	Total	23	17	19	15	1	6	10	2	93

Key Movements:
- 65% (60/93) of all trips have destinations in March.
- 51% (47/93) of all trips originates from either Sector 5 or 8 and go to March.

Table B.5 – RSI Site R-2 (IP)

		Destination								
		1	2	3	4	5	6	7	8	Total
Origin	1	0	0	0	0	0	0	0	0	0
	2	0	0	0	0	0	0	0	0	0
	3	0	0	0	0	0	0	0	0	0
	4	0	0	0	0	0	0	0	0	0
	5	8	13	9	5	0	4	3	2	44
	6	1	4	1	1	0	0	0	0	8
	7	2	4	1	1	0	0	0	1	8
	8	6	10	5	5	1	0	2	2	30
	Total	17	31	16	12	1	5	5	4	90

Key Movements:
- 70% (64/90) of all trips have destinations in March.
- 56% (51/90) of all trips originates from either Sector 5 or 8 and go to March.

Table B.6 – RSI Site R-2 (PM)

		Destination								
		1	2	3	4	5	6	7	8	Total
Origin	1	0	0	0	0	0	0	0	0	0
	2	0	0	0	0	0	0	0	0	0
	3	0	0	0	0	0	0	0	0	0
	4	1	0	1	0	0	0	0	0	2
	5	9	9	5	9	0	5	4	4	45
	6	2	5	3	1	1	1	0	0	12
	7	1	7	1	1	0	0	0	1	12
	8	10	12	16	4	0	0	0	4	46
	Total	23	33	26	15	1	6	4	8	117

Key Movements:
- 71% (82/117) of all trips have destinations in March.
- 53% (61/117) of all trips originates from either Sector 5 or 8 and go to March.

Table B.7 – RSI Site R-3 (AM)

		Destination								
		1	2	3	4	5	6	7	8	Total
Origin	1	0	0	0	0	0	0	0	0	0
	2	0	0	0	0	0	0	0	0	0
	3	7	7	0	5	0	0	0	2	22
	4	0	6	4	0	1	0	0	0	11
	5	0	0	0	0	0	0	0	0	0
	6	79	70	98	37	0	0	0	5	289
	7	36	19	49	10	2	0	0	2	118
	8	7	7	7	2	0	0	0	0	24
	Total	129	110	158	54	3	0	0	10	463

Key Movements:
- 86% (397/463) of all trips have destinations in March.
- 76% (351/463) of all trips originates from either Sector 6 or 7 and go to March.

Table B.8 – RSI Site R-3 (IP)

		Destination								
		1	2	3	4	5	6	7	8	Total
Origin	1	0	0	2	0	0	0	0	0	2
	2	0	0	0	0	0	0	0	0	0
	3	2	5	3	3	1	1	0	0	15
	4	0	2	2	0	1	0	0	0	5
	5	0	0	1	0	0	0	0	0	1
	6	34	77	84	8	4	0	0	2	209
	7	21	28	28	10	2	0	0	0	87
	8	10	12	10	0	0	0	0	0	33
	Total	66	124	130	21	8	1	0	2	352

Key Movements:
- 91% (320/352) of all trips have destinations in March.
- 77% (271/352) of all trips originates from either Sector 6 or 7 and go to March.

Table B.9 – RSI Site R-3 (PM)

		Destination								
		1	2	3	4	5	6	7	8	Total
Origin	1	0	0	0	0	0	0	0	0	0
	2	0	0	0	0	0	0	0	0	0
	3	5	0	3	0	3	3	0	0	13
	4	0	0	0	0	0	0	0	0	0
	5	0	0	0	0	0	0	0	0	0
	6	39	41	66	13	3	0	0	3	164
	7	43	74	32	5	3	0	0	0	156
	8	14	22	6	3	3	0	0	0	47
	Total	100	136	107	20	10	3	0	3	379

Key Movements:
- 91% (344/379) of all trips have destinations in March.
- 78% (294/379) of all trips originates from either Sector 6 or 7 and go to March.

Table B.10 – RSI Site R-5 (AM)

		Destination								
		1	2	3	4	5	6	7	8	Total
Origin	1	0	0	0	0	0	0	0	0	0
	2	0	0	0	0	0	0	0	0	0
	3	0	0	0	0	0	0	0	0	0
	4	54	31	66	61	5	87	77	30	411
	5	0	0	0	0	0	0	0	0	0
	6	0	0	0	0	0	0	0	0	0
	7	19	3	17	11	0	14	3	3	69
	8	32	14	20	31	0	43	50	26	216
	Total	105	48	103	103	5	144	130	59	697

Key Movements:
- 37% (255/697) of all trips have destinations in March.
- 22% (151/697) of all trips originates from Sector 4 and go to March.

Table B.11 – RSI Site R-5 (IP)

		Destination								
		1	2	3	4	5	6	7	8	Total
Origin	1	0	0	0	0	0	0	0	0	0
	2	0	0	0	0	0	0	0	0	0
	3	0	0	0	0	0	0	0	0	0
	4	39	30	33	64	3	44	47	10	271
	5	0	0	0	0	0	0	0	0	0
	6	0	0	0	0	0	0	0	0	0
	7	14	10	19	12	3	15	6	0	80
	8	15	14	16	9	0	18	26	17	115
	Total	68	54	69	85	6	77	80	27	465

Key Movements:
- 41% (190/465) of all trips have destinations in March.
- 22% (102/465) of all trips originates from Sector 4 and go to March.

Table B.12 – RSI Site R-5 (PM)

		Destination								
		1	2	3	4	5	6	7	8	Total
Origin	1	0	0	0	0	0	0	0	0	0
	2	0	0	0	0	0	0	0	0	0
	3	0	0	0	0	0	0	0	0	0
	4	70	41	63	29	0	56	53	12	323
	5	0	0	0	0	0	0	0	0	0
	6	0	0	0	0	0	0	0	0	0
	7	58	32	47	0	0	52	3	3	194
	8	29	28	41	3	6	30	39	16	193
	Total	156	101	150	32	6	138	95	31	711

Key Movements:
- 57% (408/711) of all trips have destinations in March.
- 24% (173/711) of all trips originates from Sector 4 and go to March.

Table B.13 – RSI Site R-6A (AM)

		Destination								
		1	2	3	4	5	6	7	8	Total
Origin	1	3	20	32	6	0	17	20	9	107
	2	20	23	17	12	3	6	46	6	133
	3	0	0	0	0	0	0	0	0	0
	4	12	13	23	0	0	9	6	22	84
	5	0	0	0	0	0	0	0	0	0
	6	3	0	0	0	0	0	0	0	3
	7	0	0	0	0	0	0	0	0	0
	8	3	3	9	0	0	0	0	0	15
	Total	41	59	81	17	3	32	72	37	342

Key Movements:
- 34% (116/342) of all trips are March internal movements (i.e. trips between Sector 1, 2 & 3).
- 11% (37/342) of all trips are through trips which have all originated from Sector 4 (i.e. Fenland North).

Table B.14 – RSI Site R-6A (IP)

		Destination								
		1	2	3	4	5	6	7	8	Total
Origin	1	11	53	24	5	8	42	15	8	168
	2	31	30	34	21	0	30	4	0	150
	3	0	0	0	0	0	4	0	0	4
	4	8	14	13	4	0	30	4	0	73
	5	0	0	0	0	0	4	0	0	4
	6	4	0	0	0	0	0	0	0	4
	7	0	0	0	0	0	0	0	0	0
	8	0	0	7	0	0	0	0	0	7
	Total	55	96	77	31	8	110	24	8	410

Key Movements:
- 44% (182/410) of all trips are March internal movements (i.e. trips between Sector 1, 2 & 3).
- 10% (42/410) of all trips are through trips which have mostly originated from Sector 4.

Table B.15 – RSI Site R-6A (PM)

		Destination								
		1	2	3	4	5	6	7	8	Total
Origin	1	0	26	66	13	0	26	40	13	185
	2	26	40	12	25	12	26	13	13	168
	3	0	0	0	0	0	0	0	0	0
	4	53	13	40	0	13	0	0	0	119
	5	0	0	0	0	0	0	0	0	0
	6	0	0	0	0	0	0	0	0	0
	7	0	0	0	0	0	0	0	0	0
	8	0	0	0	0	0	0	0	0	0
	Total	79	79	117	38	25	53	53	26	471

Key Movements:
- 36% (170/471) of all trips are March internal movements (i.e. trips between Sector 1, 2 & 3).
- 3% (13/471) of all trips are through trips which have all originated from Sector 4.

Table B.16 – RSI Site R-6B (AM)

		Destination								
		1	2	3	4	5	6	7	8	Total
Origin	1	0	0	3	3	0	0	0	0	6
	2	81	59	32	83	0	9	6	18	288
	3	72	32	21	44	0	0	3	3	176
	4	0	0	0	0	0	0	0	0	0
	5	12	0	0	6	0	3	0	3	24
	6	74	32	9	1	0	0	0	0	116
	7	38	12	0	6	0	0	0	0	56
	8	6	6	0	3	0	0	0	0	15
	Total	283	142	65	146	0	12	9	24	680

Key Movements:
- 44% (301/680) of all trips are March internal movements (i.e. trips between Sector 1, 2 & 3).
- 3% (22/680) of all trips are through trips.

Table B.17 – RSI Site R-6B (IP)

		Destination								
		1	2	3	4	5	6	7	8	Total
Origin	1	0	0	0	0	0	0	0	0	0
	2	55	31	6	53	0	2	7	10	164
	3	64	63	9	47	0	0	7	13	204
	4	0	2	0	0	0	0	0	0	2
	5	12	2	2	6	0	0	0	0	22
	6	33	42	6	23	0	0	0	0	105
	7	26	22	4	7	0	0	0	0	59
	8	2	9	4	6	0	0	2	0	22
	Total	193	171	30	142	0	2	17	23	577

Key Movements:
- 40% (229/577) of all trips are March internal movements (i.e. trips between Sector 1, 2 & 3).
- 8% (44/577) of all trips are through trips.

Table B.18 – RSI Site R-6B (PM)

		Destination								
		1	2	3	4	5	6	7	8	Total
Origin	1	0	0	0	0	0	0	0	0	0
	2	98	66	10	29	0	0	0	0	203
	3	108	49	0	20	0	10	10	0	196
	4	23	0	0	0	0	0	0	0	23
	5	0	0	10	0	0	0	20	0	29
	6	59	39	0	0	0	0	0	0	98
	7	69	20	0	0	0	0	0	0	88
	8	20	43	0	0	0	0	0	0	62
	Total	376	217	20	49	0	10	29	0	701

Key Movements:
- 47% (331/701) of all trips are March internal movements (i.e. trips between Sector 1, 2 & 3).
- 3% (20/701) of all trips are through trips.

Table B.19 – RSI Site R-6C (AM)

		Destination								
		1	2	3	4	5	6	7	8	Total
Origin	1	11	34	30	4	8	19	15	8	128
	2	4	0	0	0	0	0	0	0	4
	3	45	26	15	15	4	8	0	8	119
	4	8	42	4	0	0	0	0	0	53
	5	0	0	0	0	0	0	0	0	0
	6	8	0	0	0	0	0	0	0	8
	7	0	8	0	0	0	0	0	0	8
	8	0	8	4	0	0	0	0	0	11
	Total	75	117	53	19	11	26	15	15	331

Key Movements:
- 50% (165/331) of all trips are March internal movements (i.e. trips between Sector 1, 2 & 3).
- 0% (0/331) of all trips are through trips.

Table B.20 – RSI Site R-6C (IP)

		Destination								
		1	2	3	4	5	6	7	8	Total
Origin	1	5	52	36	0	6	19	5	5	129
	2	0	0	0	0	0	0	0	0	0
	3	16	45	14	5	0	0	0	3	83
	4	19	55	19	0	5	0	0	0	98
	5	0	0	0	0	0	0	0	0	0
	6	3	3	0	0	0	0	0	0	5
	7	3	19	0	0	3	3	0	0	27
	8	5	5	0	0	0	0	0	0	11
	Total	51	180	68	5	14	22	5	8	354

Key Movements:
- 48% (169/354) of all trips are March internal movements (i.e. trips between Sector 1, 2 & 3).
- 3% (11/354) of all trips are through trips.

Table B.21 – RSI Site R-6C (PM)

		Destination								
		1	2	3	4	5	6	7	8	Total
Origin	1	11	54	32	0	0	32	0	0	130
	2	0	0	0	0	0	0	0	0	0
	3	0	22	55	0	0	0	0	0	76
	4	0	87	0	0	11	0	0	22	119
	5	0	0	0	0	0	0	0	0	0
	6	0	11	0	0	0	0	0	0	11
	7	0	58	0	11	0	0	0	0	69
	8	0	11	0	0	0	0	0	0	11
	Total	11	242	87	11	11	32	0	22	416

Key Movements:
- 42% (174/416) of all trips are March internal movements (i.e. trips between Sector 1, 2 & 3).
- 10% (43/416) of all trips are through trips.

Table B.22 – RSI Site R-6 Combined (i.e. R-6A, R-6B & R-6C) (AM)

		Destination								
		1	2	3	4	5	6	7	8	Total
Origin	1	14	54	65	13	8	36	35	16	242
	2	105	82	50	94	3	15	52	24	424
	3	117	59	36	59	4	8	3	11	295
	4	19	54	27	0	0	9	6	22	137
	5	12	0	0	6	0	3	0	3	24
	6	84	32	9	1	0	0	0	0	127
	7	38	19	0	6	0	0	0	0	64
	8	9	16	12	3	0	0	0	0	41
	Total	399	318	199	182	14	70	96	76	1353

Key Movements:
- 43% (582/1353) of all trips are March internal movements (i.e. trips between Sector 1, 2 & 3).
- 4% (59/1353) of all trips are through trips.

Table B.23 – RSI Site R-6 Combined (i.e. R-6A, R-6B & R-6C) (IP)

		Destination								
		1	2	3	4	5	6	7	8	Total
Origin	1	16	105	59	5	14	61	21	14	297
	2	86	61	39	74	0	32	12	10	314
	3	81	109	23	53	0	4	7	16	292
	4	27	70	32	4	5	30	4	0	173
	5	12	2	2	6	0	4	0	0	26
	6	40	45	6	23	0	0	0	0	114
	7	29	41	4	7	3	3	0	0	87
	8	7	14	10	6	0	0	2	0	39
	Total	299	447	175	178	23	134	46	39	1341

Key Movements:
- 43% (580/1341) of all trips are March internal movements (i.e. trips between Sector 1, 2 & 3).
- 7% (97/1341) of all trips are through trips.

Table B.24 – RSI Site R-6 Combined (i.e. R-6A, R-6B & R-6C) (PM)

		Destination								
		1	2	3	4	5	6	7	8	Total
Origin	1	11	80	98	13	0	59	40	13	314
	2	124	106	22	55	12	26	13	13	371
	3	108	71	55	20	0	10	10	0	273
	4	76	100	40	0	24	0	0	22	261
	5	0	0	10	0	0	0	20	0	29
	6	59	50	0	0	0	0	0	0	109
	7	69	78	0	11	0	0	0	0	157
	8	20	54	0	0	0	0	0	0	73
	Total	466	538	224	98	36	95	82	48	1588

Key Movements:
- 43% (675/1588) of all trips are March internal movements (i.e. trips between Sector 1, 2 & 3).
- 5% (76/1588) of all trips are through trips.

C. MATS Network and Sector System

MATS Network

C.1 Figure C.1 and Figure C.2 below show the MATS SATURN model network.

Figure C.1 – MATS Network (Overview)

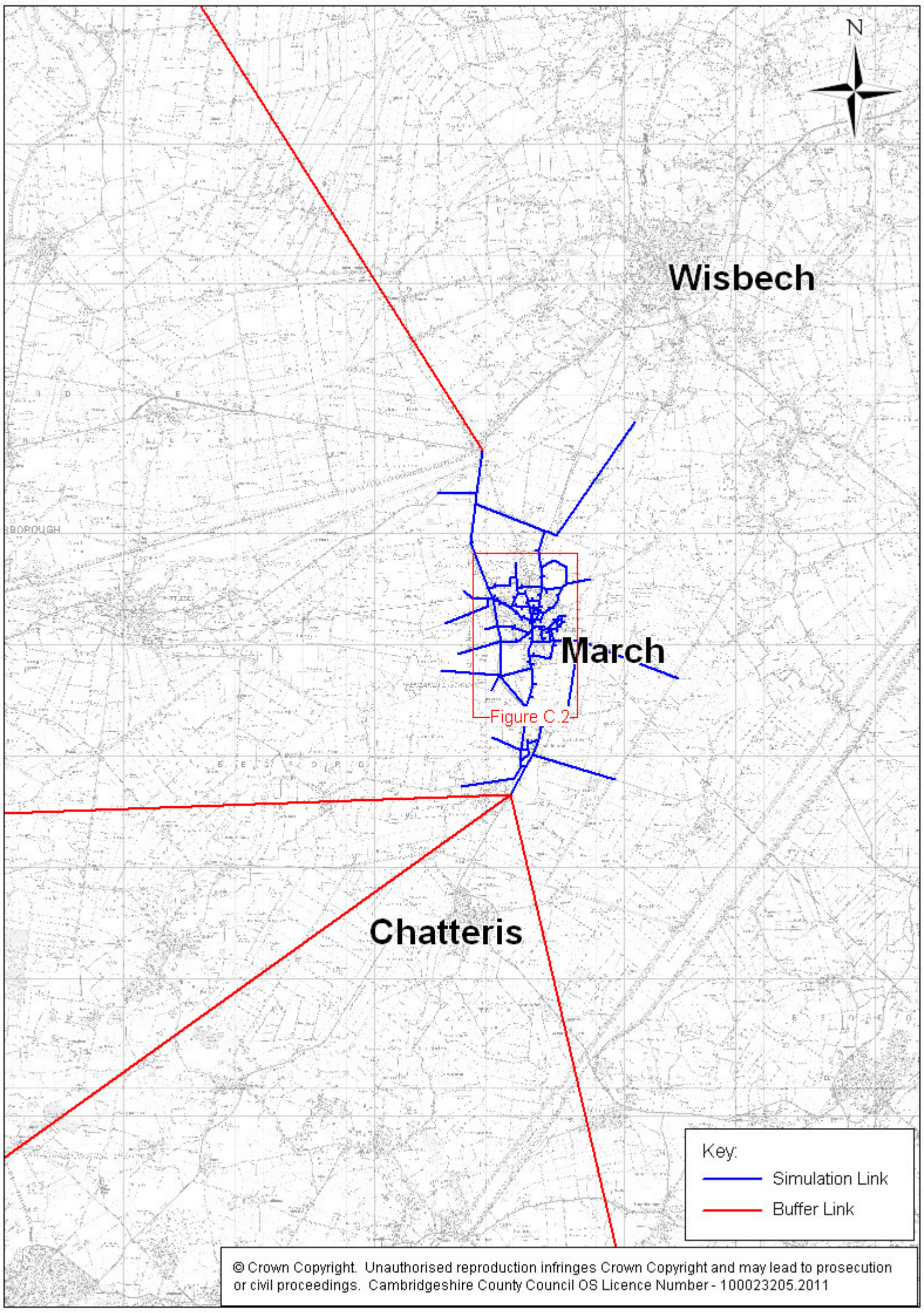
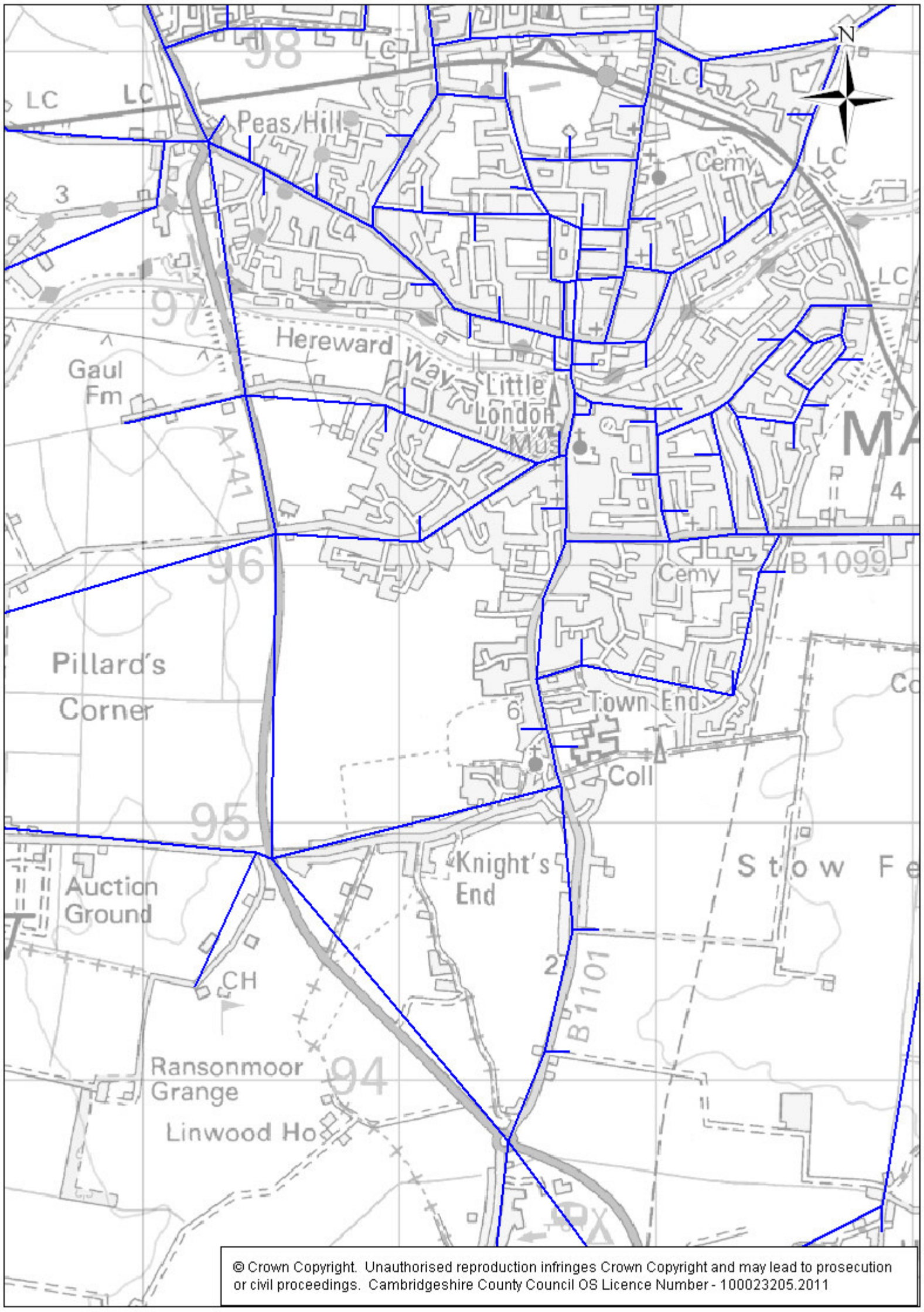


Figure C.2 – MATS Network (March)



MATS Sector System

C.2 Figure C.3 and Figure C.4 below show the MATS 8 sector system.

Figure C.3 – MATS Sector System (Overview)

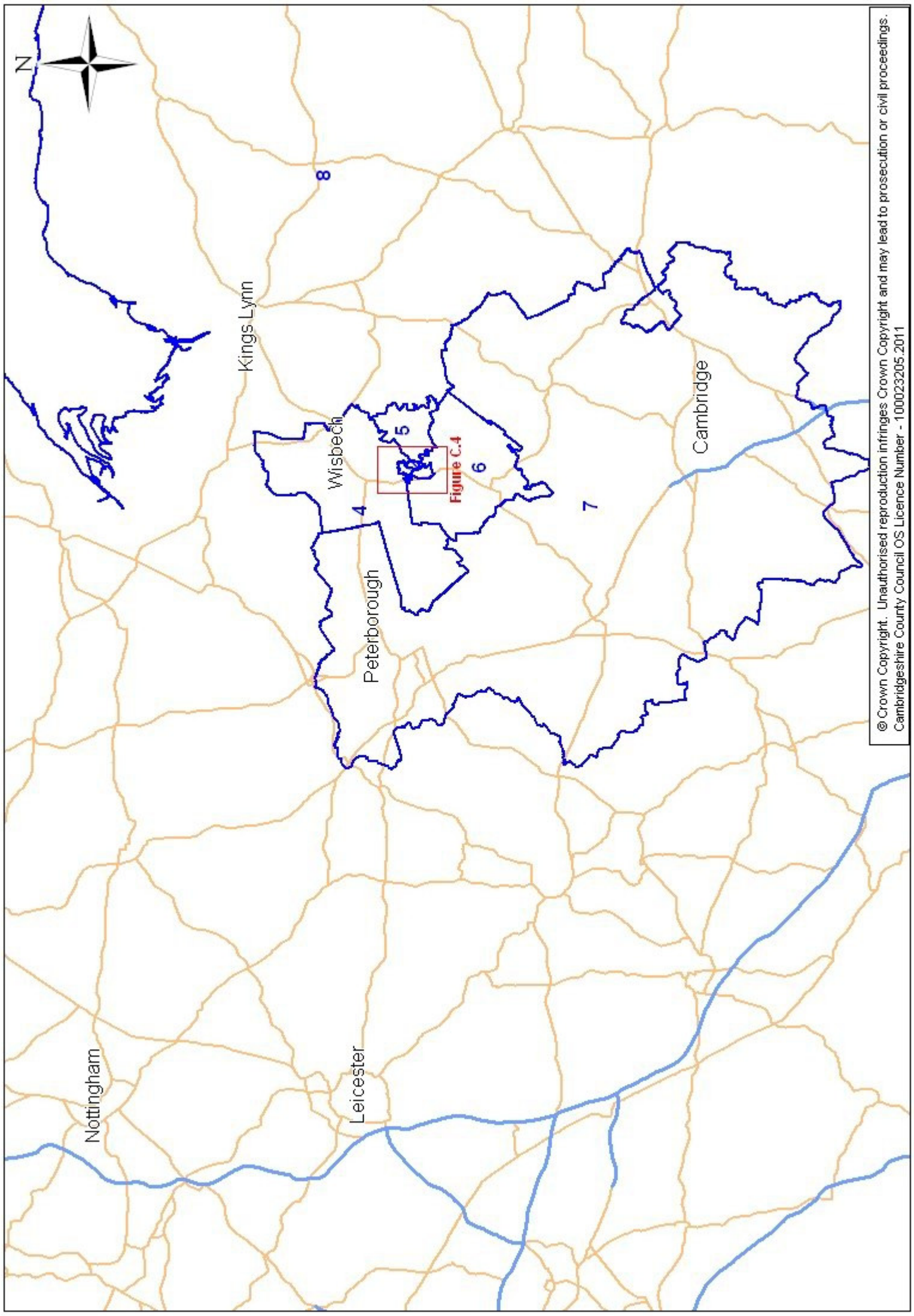
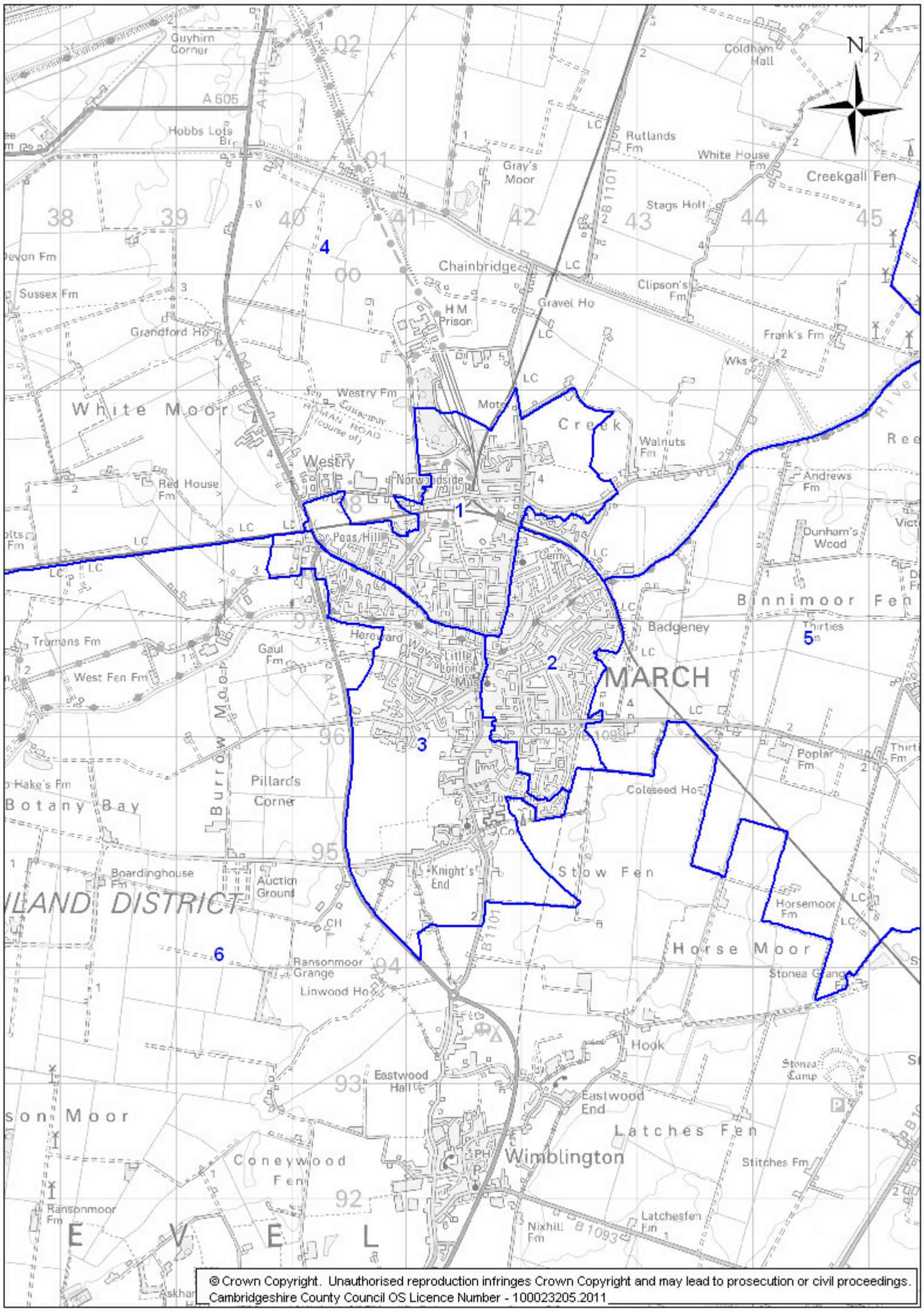


Figure C.4 – MATS Sector System (March)



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