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Data Input Table – Do Not Delete

Item	Location	Bookmark name	X ^{1,2}	Record of input ^{3,4}
Report Title – first line	Pages i and ii	T1		Dudley Cordon 1998
Report Title – second line	Pages i and ii	T2		
Report Title – third line	Pages i and ii	T3		
Report Title or Heading – first line	Left aligned in headers	HL1		Dudley Corodn Report 1998
Report Title or Heading – second line	Left aligned in headers	HL2		
Group Name	Right aligned in headers – first line	HR1		Jdt, jdt, Mott MacDonald
Client/Associate (where applicable)	Right aligned in headers – second line	HR2		
Project Number	Footers	PRJNR		47995/022
Report Number	Footers	RPTNR		BA07
Revision Letter	Issue and Revision Record on page ii and footers	REV		A
Date of issue or report	Page i, Issue and Revision Record on page ii and footers	DATE		January 2000
Initials of word processor	Footers	INI		JTB

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⁴ If you delete a 'Bookmark Reference', you will need to recreate it in the same place with the same name using 'Insert + Fields + Links and References + Ref'. The help locate a reference (or any other 'Field Code') highlight the codes using 'Tools + Options + Field shading + Always'.

⁵ Do not insert 'Carriage Returns' to split 'Bookmark references' in the report titles on pages i and ii, otherwise the title will not display correctly. Where a title line is too long, shorten it by changing the appropriate 'Bookmark' entry.

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Issue and Revision Record

Rev	Date	Originator (Print) (Signature)	Checker (Print) (Signature)	Approver (Print) (Signature)	Description
A	January 2000				First Issue

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Summary

The following is a summary of the information contained in this report. Estimates of people have only been calculated for the inbound morning peak period and the outbound evening peak period. The estimates are calculated using manual surveys. The extent of these surveys defines the extent of information available. For details on methodology and a breakdown of the time periods, see the main report.

0730-0930 inbound

total vehicles	23,299
estimated pedal cycles	60
estimated bus	401
estimated light vehicles	20,605
estimated goods vehicles	2,235
estimated people (light vehs)	25,193
estimated people (goods vehs)	2,501

1000-1200 inbound

total vehicles	15,530
estimated pedal cycles	3
estimated bus	385
estimated light vehicles	12,870
estimated goods vehicles	2,273

1630-1830 inbound

total vehicles	19,021
estimated pedal cycles	71
estimated bus	311
estimated light vehicles	17,983
estimated goods vehicles	655

0730-0930 outbound

total vehicles	18,645
estimated pedal cycles	103
estimated bus	287
estimated light vehicles	16,732
estimated goods vehicles	1,528
estimated people (light vehs)	20,222
estimated people (goods vehs)	1,812

1000-1200 outbound

total vehicles	15,216
estimated pedal cycles	0
estimated bus	217
estimated light vehicles	13,353
estimated goods vehicles	1,646

1630-1830 outbound

total vehicles	23,438
estimated pedal cycles	134
estimated bus	280
estimated light vehicles	22,098
estimated goods vehicles	926

1 Introduction

This report is being undertaken as part of the Package monitoring process. The purpose of the report is to give an indication of the level of vehicular activity in the town centre, to indicate existing and future levels of transport demand and to monitor the effects of transport policy. The surveys and analysis have been undertaken by the jdt.

2 Methodology

The most effective method of obtaining the necessary data to monitor traffic flows is to monitor traffic crossing a cordon around the town centre. Sites are positioned on all the main roads. Sites on some of the minor roads so as to obtain a close 'closed' cordon then supplement this network. The idea is to capture all vehicles entering the town centre.

The counters used record the vehicles automatically. In this way, data for a full week is collected, enabling 24 hr average weekday data to be presented.

Four sites are also surveyed manually by Dudley M.B.C. staff. This data is used to estimate the modal split of the automatic data and also to estimate the number of people travelling into the town centre by vehicle.

A complimentary bus cordon survey is undertaken by CENTRO, which this report feeds into.

Results of the 1998 Dudley Cordon Survey are presented on the following pages. Comparison figures with 1996 are given where appropriate.

3 Background

Collection of the data took place in the week beginning Monday 16th November. It is important to avoid school holidays and the Christmas shopping season. The last survey, in 1996, took place during the week beginning 18th November and the intention will be to keep to the same week each year.

The exact position of the automatic counts can be seen in Appendix 1. Again, the intention will be to use the same sites for this monitoring purpose each time the cordon survey is carried out.

4 Results

In Table 1 the figures for the number of vehicles crossing the cordon line in the morning peak period are presented. Traditionally, the morning peak period has been considered as being 07.30-09.30. The figures show a decrease in the number of vehicles counted inbound during the this time period in 1998 when compared with 1996 but a small increase in the outbound figures.

Table 1 Number of vehicles crossing the cordon in the Morning Peak Period (07.30 - 09.30)

	1996	1998
Inbound Total	24,704	23,299
Outbound Total	18,460	18,645

Table 2 shows the number of vehicles crossing the cordon line in the traditional off-peak morning period (10.00-12.00). This time period shows decreases in both directions when compared with the data collected two years ago.

Table 2 Number of vehicles crossing the cordon in the Morning Off-Peak Period (10.00-12.00)

	1996	1998
Inbound Total	16,657	15,530
Outbound Total	15,386	15,216

The figures in Table 3 show that around 17.2% of traffic flowing into the town centre on a typical weekday is crossing the cordon line between the hours of 7.30a.m. and 9.30a.m. This corresponds to the figure outbound in the evening peak period (4p.m. to 6p.m.), which is 16.9%. Around 80% of an average day's traffic is crossing the cordon during the main 12hr day. The figures in this table show that, for all time periods except one (outbound morning peak), the numbers of vehicles counted were lower in 1998 than in 1996.

Whilst the net figure over 24 hours might be expected to be zero, the figures are an average of the flow characteristics over five weekdays and the net figure is within the expected level of accuracy of automatic counts.

Table 3 Total Vehicles by Time Period on an Average Weekday

	07.30 - 09.30	10.00 - 12.00	16.00 - 18.00	07.00 – 1900 (12 hour)	00.00 –24.00 (24 hour)
1996					
Inbound	24,704	16,657	20,596	114,999	142,240
% of 24 hr	17.4	11.7	14.5	80.8	100
Outbound	18,460	15,386	23,988	111,636	140,235
% of 24 hr	13.2	11.0	17.1	79.6	100
NET	6,244	1,271	-3,392	3,363	2,005
1998					
Inbound	23,299	15,530	19,563	108,544	135,194
% of 24hr	17.2	13.8	14.5	80.3	100
Outbound	18,645	15,216	23,726	110,654	140,135
% of 24hr	13.3	10.9	16.9	79.0	100
NET	4,654	314	-4,163	-2,110	-4,941

Figure 1 Inbound Morning Peak Period: Vehicle Volumes by Quarter Hour

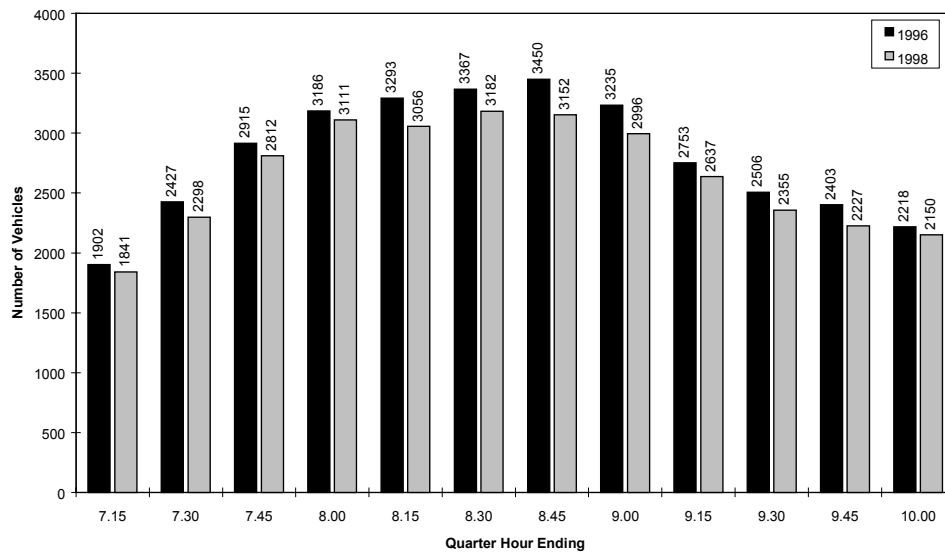


Figure 1 and Figure 2 show the two main peak periods by quarter hour. The morning figures are given from 7a.m. until 10a.m. and the evening from 4p.m. to 7p.m. These time periods are wider than those presented in previous tables. This allows a check on the traditional time periods as peak spreading may be seen on these graphs. The figures in Figure 1 show a decrease in every ¼ hour period when compared with data collected in 1996. Figure 2 shows a similar trend outside the peak period but the hour 5-6p.m. shows similar or slightly higher figures than those presented for 1996.

Figure 2 Outbound Evening Peak Period: Vehicle Volumes by Quarter Hour

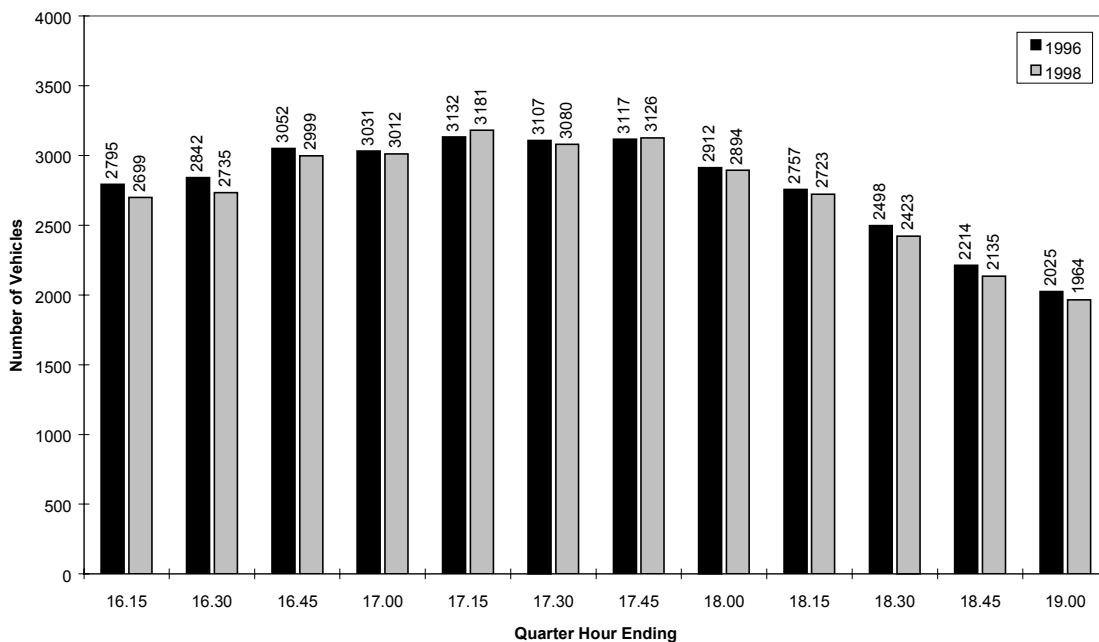


Figure 3 Inbound levels of vehicles, by hour

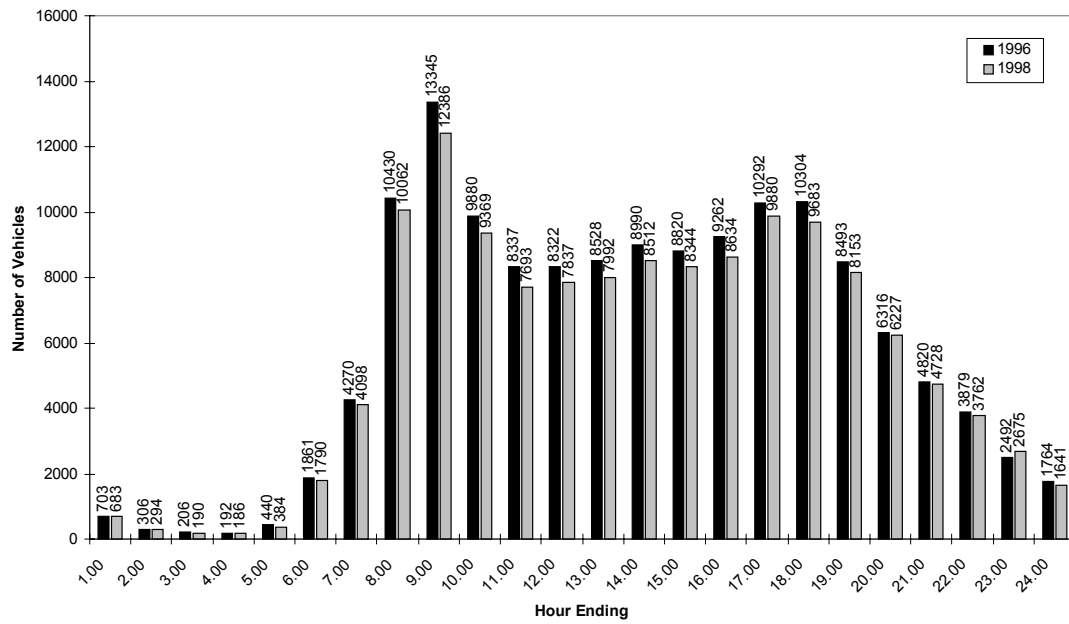
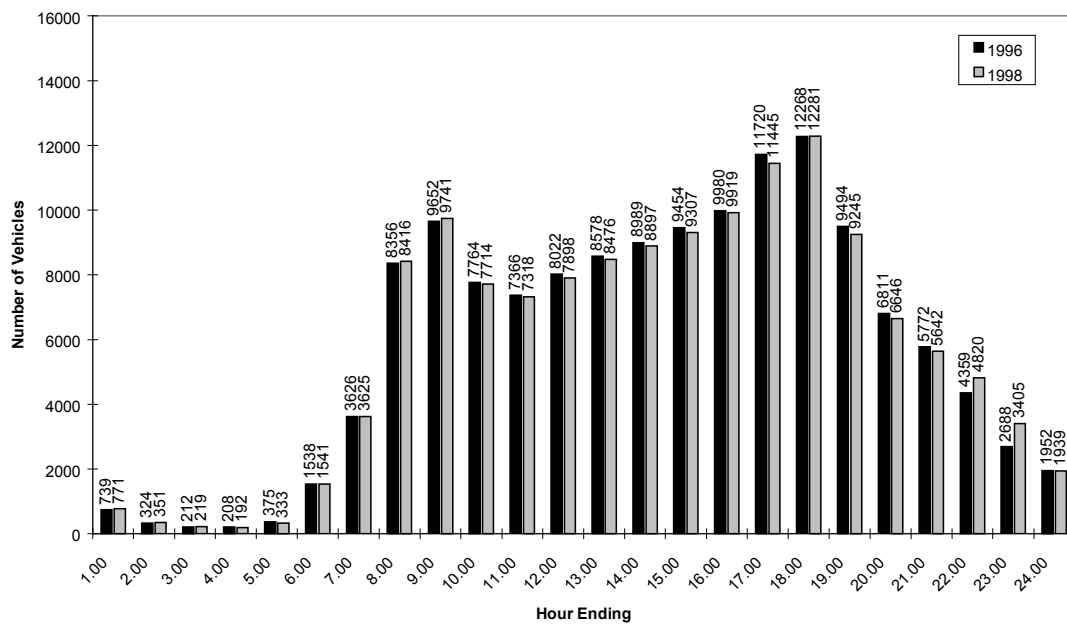


Figure 4 Outbound levels of vehicles, by hour



4.1 Daily and Hourly Variations

The figures in Table 4 give the proportions that each day contributes to an average week day (Mon-Fri) for each of the traditional time periods. These figures can be used to factor a count taken on any particular day to an average week day. The figures also show which days have the heaviest flows during each time period.

Table 4 Variations in traffic flow, by time of day 1998

	Mon.	Tues.	Wed.	Thur.	Fri.	Sat.	Sun.
Inbound							
07.30 - 09.30	0.999	1.000	1.006	0.997	0.999	0.486	0.153
10.00 - 12.00	0.979	0.991	0.997	0.998	1.045	1.101	0.936
16.00 - 18.00	0.993	0.998	1.002	1.014	0.993	0.680	0.545
07.00 - 19.00	0.986	0.989	0.993	1.003	1.028	0.802	0.591
00.00 - 24.00	0.971	0.982	0.990	1.016	1.042	0.822	0.613
Outbound							
07.30 - 09.30	1.002	1.003	1.023	0.992	0.982	0.472	0.172
10.00 - 12.00	1.007	0.972	0.983	0.996	1.042	1.058	0.738
16.00 - 18.00	1.025	0.998	1.004	1.003	0.971	0.692	0.584
07.00 - 19.00	0.998	0.989	1.000	0.995	1.018	0.809	0.588
00.00 - 24.00	0.979	0.981	0.997	1.013	1.030	0.825	0.610

Figure 5 and Figure 6 show the gain in vehicles to the cordon by hour and the total accumulation of vehicles to the cordon. The figures used in these graphs are given in Table 5.

Table 5 Net loss / gain and accumulation in vehicles crossing the cordon, by hour

Hour ending	Inbound	Outbound	Net	Cum
1 00	683	771	-88	-88
2 00	294	351	-57	-145
3 00	190	219	-29	-174
4 00	186	192	-6	-180
5 00	384	333	51	-129
6 00	1790	1541	249	120
7 00	4098	3625	473	593
8 00	10062	8416	1646	2239
9 00	12386	9741	2645	4884
10 00	9369	7714	1655	6539
11 00	7693	7318	375	6914
12 00	7837	7898	-61	6853
13 00	7992	8476	-484	6369
14 00	8512	8897	-385	5984
15 00	8344	9307	-963	5021
16 00	8634	9919	-1285	3736
17 00	9880	11445	-1565	2171
18 00	9683	12281	-2598	-427
19 00	8153	9245	-1092	-1519
20 00	6227	6646	-419	-1938
21 00	4728	5642	-914	-2852
22 00	3762	4820	-1058	-3910
23 00	2675	3405	-730	-4640
24 00	1641	1939	-298	-4938

Figure 5 Net loss / gain in vehicles crossing the cordon, by hour

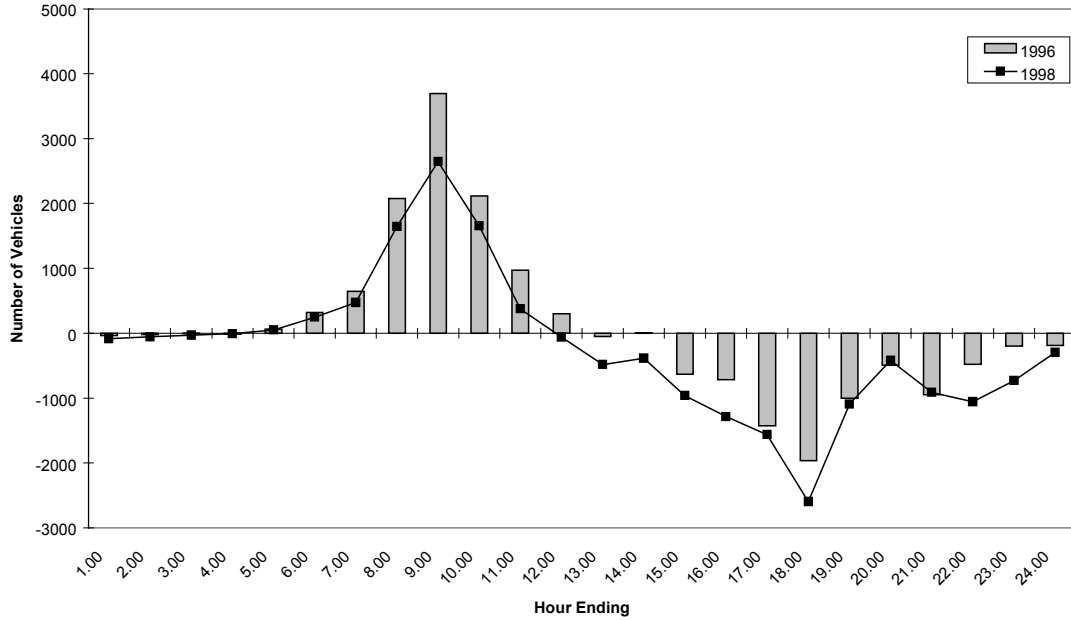
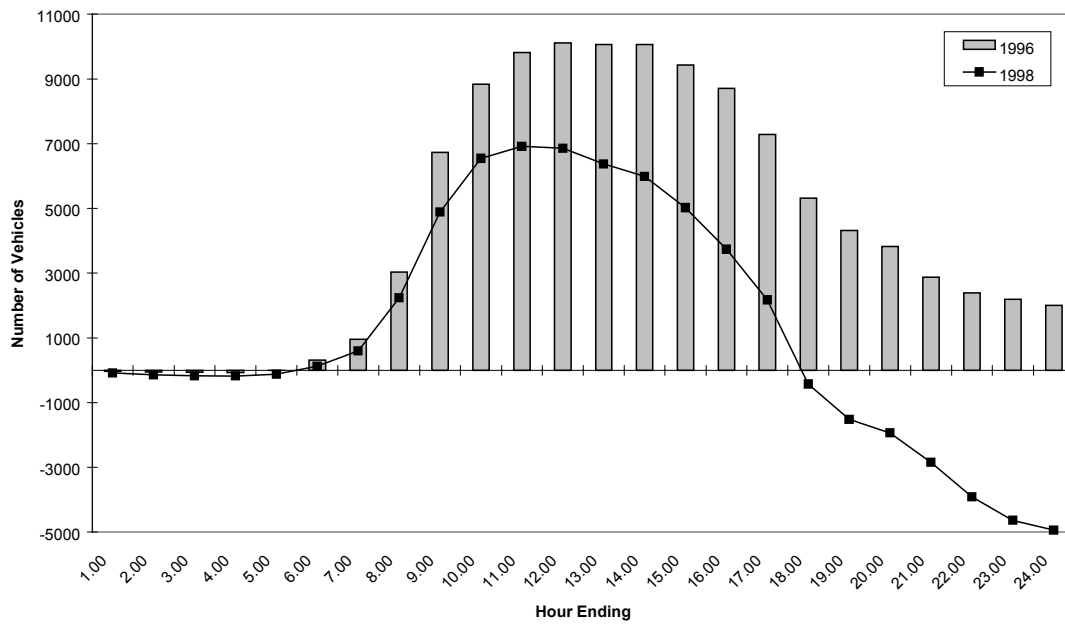


Figure 6 Net accumulation of vehicles, by hour



4.2 Patterns of Travel

The figures in Table 6 show the number of vehicles travelling into and out of the town centre by each individual site on an average week day. By examining these figures, some patterns of travel may be evident. For example, people may prefer to use a particular road inbound in the morning, but choose a different route for their outward evening journey.

Table 6 Net loss / gain in vehicles on an average weekday, by site

Site	Location	Inbound 1996	Inbound 1998	Outbound 1996	Outbound 1998	Net loss / gain 1998
DU01	Tipton Road	8,559	7,527	7,615	6788	739
DU02	Birmingham Road	20,266	17,797	21,801	19,480	-1683
DU04	Priory Road	9,715	9,874	8,935	9,122	752
DU05	The Broadway	4,789	4,667	4,004	3,922	745
DU08	Himley Road	10,265	9,757	10,854	10,472	-715
DU10	High Street Pensnett	11,511	11,402	15,214	15,095	-3693
DU11	Stourbridge Road	11,152	11,110	10,708	11,222	-112
DU12	Pedmore Road	14,705	11,895	12,793	12,681	-786
DU13	Peartree Lane	5,076	4,462	4,641	4,073	389
DU14	Cinder Bank	13,733	13,650	12,335	12,290	1360
DU16	New Rowley Road	5,543	5,101	4,576	5,871	-770
DU17	Buffery Road	8,326	7,108	6,276	7,231	-123
DU18	Oakham Road	4,342	5,230	6,255	6,420	-1190
DU19	Highland Road	10,521	11,280	11,491	12,117	-837
DU20	Dibdale Street	613	738	649	819	-81
DU21	St. Johns Road	531	1,241	93	173	1068
DU22	Lister Road	2,701	2,360	2,003	2,367	-7

The figures in Table 6 confirm that the drop in traffic levels between the two sets of data is fairly consistent between sites. There is no one site that is showing a large drop in traffic levels and therefore influencing the overall total figures.

4.3 Mode of travel

The four manual surveys give us an indication of mode of travel data.

Table 7 summarises the data recorded at the four manual sites. For the purpose of this table, 'light vehicles' includes motorcycles, cars, taxis and light vans less than 1.5T. The Heavy goods category includes all vehicles over 1.5T. These are the usual categories for light and heavy vehicles. The data in 1996 was collected with all vans included in the 'heavy goods vehicle' category. Therefore, the figures for 1998 light vehicles will be greater than those in 1996 and the figure for heavy vehicles smaller.

In Table 7 the percentage each vehicle category contributes to the total vehicles in that hour is given in brackets. In Table 8 these percentages are multiplied by the number of vehicles counted by the automatic counters, giving an estimate of the number of vehicles of that type crossing the cordon line in that hour.

Table 7 Summary of Inbound mode of transport data from manual surveys

TIME STARTING	TOTAL VEH	PEDAL CYC	BUS & COACH	Light Vehs	Heavy Vehs	% pedal cycle	% bus	% light	% goods
7.00	3919	16	52	3557	294	0.0041	0.0133	0.9076	0.0750
8.00	4418	11	77	3930	400	0.0025	0.0174	0.8895	0.0905
9.00	3454	4	78	2854	518	0.0012	0.0226	0.8263	0.1500
10.00	2972	0	73	2479	420	0.0000	0.0246	0.8341	0.1413
11.00	3000	1	75	2470	454	0.0003	0.0250	0.8233	0.1513
12.00	3317	4	70	2779	464	0.0012	0.0211	0.8378	0.1399
13.00	3539	10	71	3040	418	0.0028	0.0201	0.8590	0.1181
14.00	3699	3	68	3148	480	0.0008	0.0184	0.8510	0.1298
15.00	3814	5	79	3297	433	0.0013	0.0207	0.8644	0.1135
16.00	4417	18	82	4044	273	0.0041	0.0186	0.9156	0.0618
17.00	4623	16	67	4391	149	0.0035	0.0145	0.9498	0.0322
18.00	3772	16	98	3567	91	0.0042	0.0260	0.9457	0.0241
0730-0930	8548	22	147	7559	820	0.0026	0.0172	0.8843	0.0959
1000-1200	5972	1	148	4949	874	0.0002	0.0248	0.8287	0.1463
1630-1830	9056	34	148	8562	312	0.0038	0.0163	0.9455	0.0345
0700-1230	19458	35	390	16692	2341	0.0018	0.0200	0.8578	0.1203

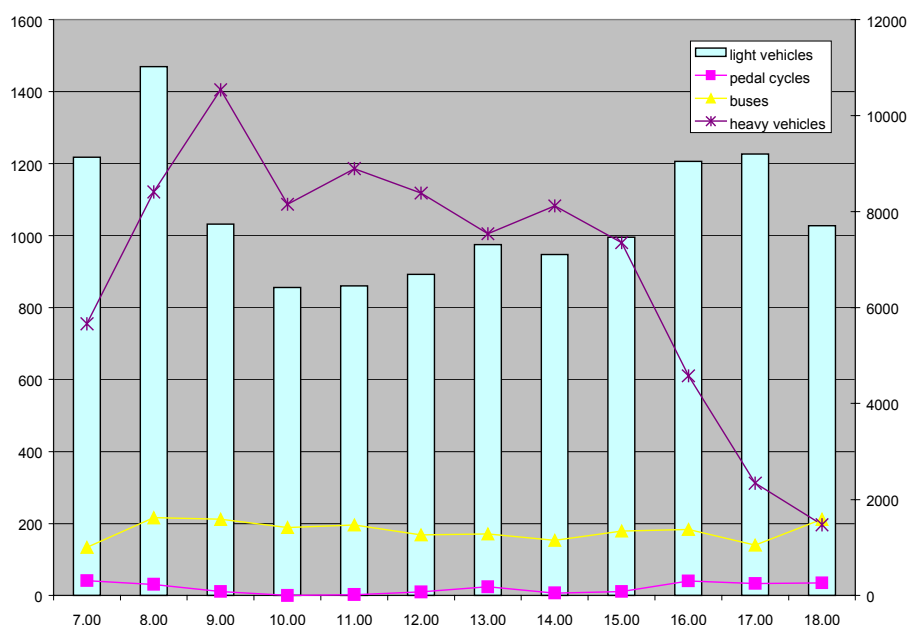
Table 8 Estimated Inbound mode of transport figures

TIME STARTING	number of automatic vehs	estimated ped cyc	estimated bus	estimated light	estimated heavy
7.00	10062	41	134	9133	755
8.00	12386	31	216	11018	1121
9.00	9369	11	212	7741	1405
10.00	7693	0	189	6417	1087
11.00	7837	3	196	6452	1186
12.00	7992	10	169	6696	1118
13.00	8512	24	171	7312	1005
14.00	8344	7	153	7101	1083
15.00	8634	11	179	7464	980
16.00	9880	40	183	9046	611
17.00	9683	34	140	9197	312
18.00	8153	35	212	7710	197
0730-0930	23301	60	401	20605	2235
1000-1200	15530	3	385	12870	2273
1630-1830	19021	71	311	17983	655
0700-1230	51343	92	1029	44044	6177

The figures in Table 7 and Table 8 are represented in Figure 7. As the numbers for Light Vehicles are so much higher than the other categories, the light vehicles are read from the

right hand axis and all the other categories form the left hand axis.

Figure 7 Estimated Inbound mode of transport figures



The summary for outbound modes from the manual data can be found in Table 9 with the estimated outbound in Table 10 and the graph representing these figures in Figure 8. The figures collected in the manual surveys can be found in Appendix 2.

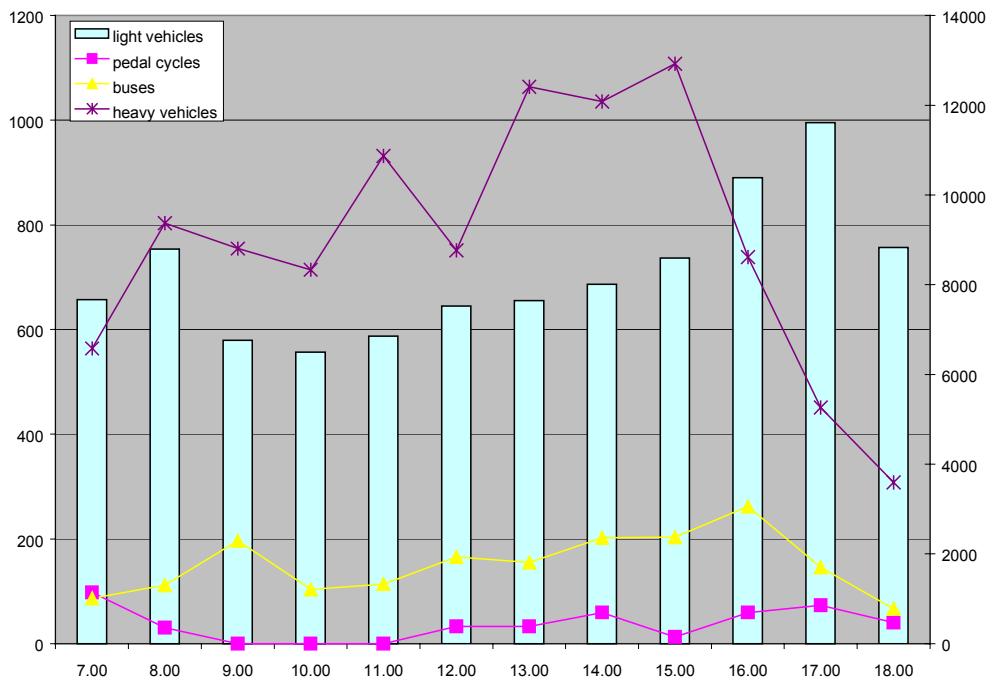
Table 9 Summary of Outbound mode of transport data from manual surveys

TIME STARTING	TOTAL VEH	PEDAL CYC	BUS & COACH	Light Vehs	Heavy Vehs	% pedal cycle	% bus	% light	% goods
7.00	776	9	8	707	52	0.0116	0.0103	0.9111	0.0670
8.00	958	3	11	865	79	0.0031	0.0115	0.9029	0.0825
9.00	746	0	19	654	73	0.0000	0.0255	0.8767	0.0979
10.00	707	0	10	628	69	0.0000	0.0141	0.8883	0.0976
11.00	763	0	11	662	90	0.0000	0.0144	0.8676	0.1180
12.00	767	3	15	681	68	0.0039	0.0196	0.8879	0.0887
13.00	803	3	14	690	96	0.0037	0.0174	0.8593	0.1196
14.00	782	5	17	673	87	0.0064	0.0217	0.8606	0.1113
15.00	779	1	16	675	87	0.0013	0.0205	0.8665	0.1117
16.00	961	5	22	872	62	0.0052	0.0229	0.9074	0.0645
17.00	1007	6	12	952	37	0.0060	0.0119	0.9454	0.0367
18.00	690	3	5	659	23	0.0043	0.0072	0.9551	0.0333
0730-0930	1819	10	28	1632	149	0.0055	0.0154	0.8972	0.0819
1000-1200	1470	0	21	1290	159	0.0000	0.0143	0.8776	0.1082
1630-1830	1924	11	23	1814	76	0.0057	0.0120	0.9428	0.0395
0700-1230	4317	14	67	3833	403	0.0032	0.0155	0.8879	0.0934

Table 10 Estimated Outbound mode of transport figures

TIME	No. auto vehs.	estimated ped cyc	estimated bus	estimated light	estimated goods
STARTING					
7.00	8416	98	87	7668	564
8.00	9741	31	112	8795	803
9.00	7714	0	196	6763	755
10.00	7318	0	104	6500	714
11.00	7898	0	114	6853	932
12.00	8476	33	166	7526	751
13.00	8897	33	155	7645	1064
14.00	9307	60	202	8010	1035
15.00	9919	13	204	8595	1108
16.00	11445	60	262	10385	738
17.00	12281	73	146	11610	451
18.00	9245	40	67	8830	308
0730-0930	18649	103	287	16732	1528
1000-1200	15216	0	217	13353	1646
1630-1830	23438	134	280	22098	926
0700-1230	45325	147	703	40243	4231

Figure 8 Estimated Outbound mode of transport figures

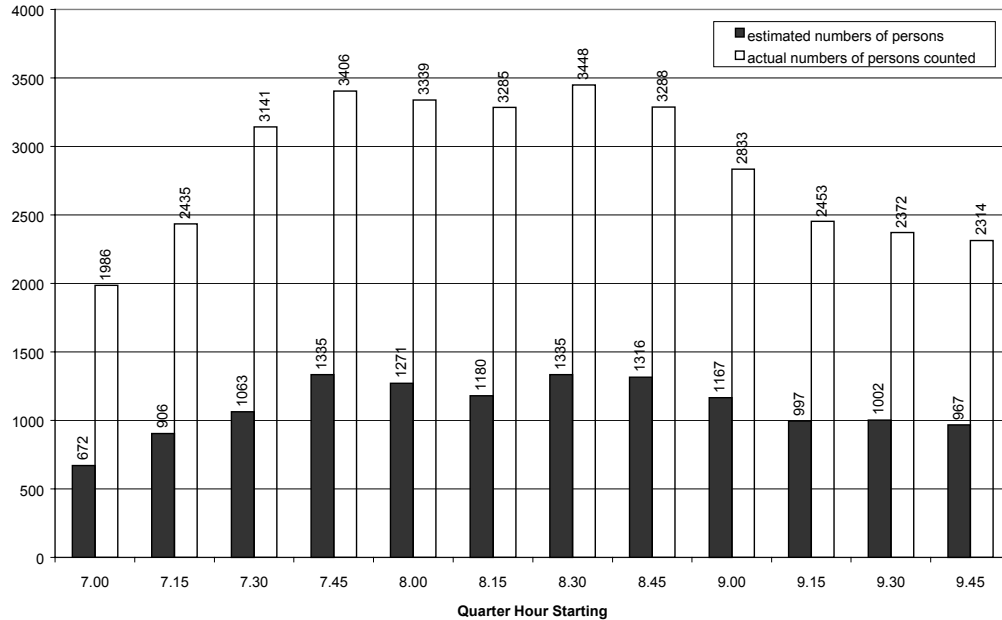


4.4 Occupancy Levels

Figure 9 and Figure 11 show the numbers of people counted in vehicles at the four manual sites. Using the average occupancy figures and number of vehicles counted automatically per time period, these figures are factored up to give an estimate of the number of people

travelling across the cordon.

Figure 9 Estimates of persons Inbound Morning Peak Period - LIGHT VEHICLES (categories 2,3 5)



As the automatic surveys collect data in quarter hour periods for 7.00-10.00 and 16.00-19.00, these are the figures presented here. However, traditionally the morning peak period is considered to be 07.30-09.30. In this two hour period the estimate for the number of people travelling in Light Vehicles is a total of 25,193, and for goods vehicles is 2,501 people, giving a total of 27,694 people.

Figure 10 Estimates of people Inbound Morning Peak Period - GOODS VEHICLES (categories 6-12)

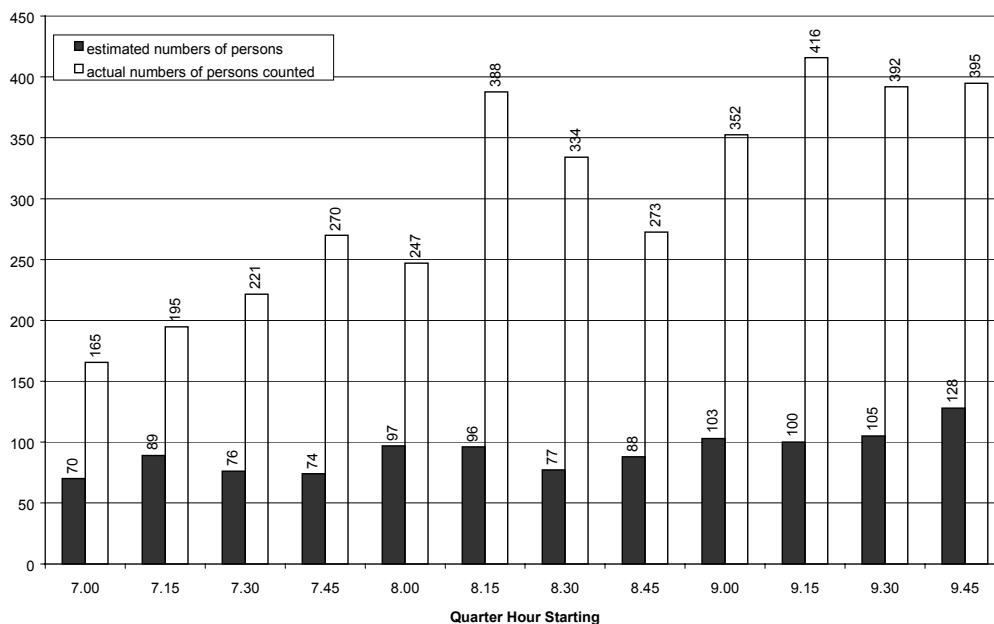
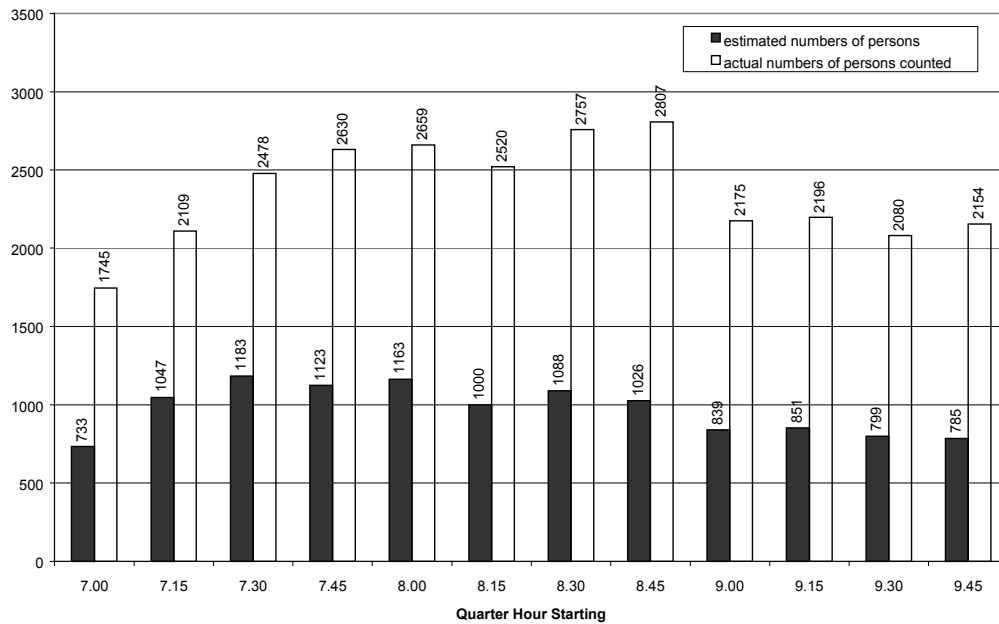
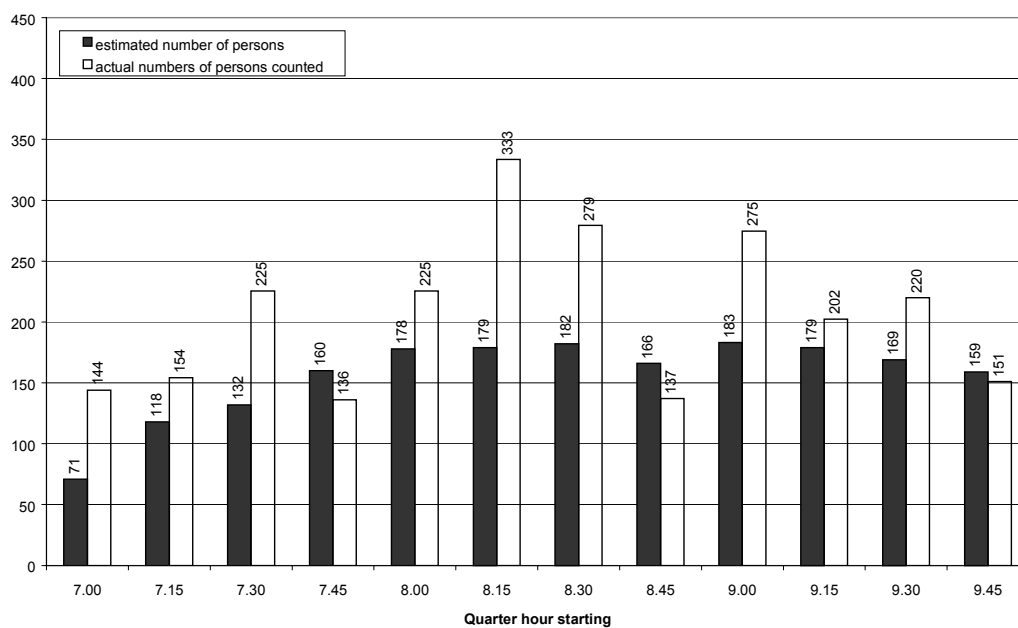


Figure 11 Estimates of people Outbound Morning Peak Period - LIGHT VEHICLES (categories 2,3,5)



The outbound evening peak period of 16.30-18.30 gives an estimate of the number of people travelling in Light Vehicles of 20,222, and 1,812 people in Goods vehicles, giving a total of 22,034 people.

Figure 12 Estimates of people Outbound Morning Peak Period - GOODS VEHICLES (categories 6-12)



5 Appendix 1 Position of Cordon Sites

Table 11 Automatic count sites

Site	Location	Exact Position
DU01	Tipton Road	North of Castle Hill
DU02	Birmingham Road	opposite Arras Road
DU04	Priory Road	west of New Birmingham Road
DU05	The Broadway	south of Limepit Lane
DU08	Himley Road	east of Milking Bank
DU10	High Street Pensnett	west of Kingswinford Road
DU11	Stourbridge Road	north of Holly Street
DU12	Pedmore Road	south of Cochrane Road
DU13	Peartree Lane	west of Cinder Bank
DU14	Cinder Bank	south of Jubilee Terrace
DU16	New Rowley Road	south of Oakham Avenue
DU17	Buffery Road	between Lister Road and School Drive
DU18	Oakham Road	between Bennetts Hill and Oakham Avenue
DU19	Highland Road	between Dibdale Road and Nith Place
DU20	Dibdale Street	between Newey Street and Corser Street
DU21	St. Johns Road	between Price Street and Alton Grove
DU22	Lister Road	between Buffery Road and Fairfield Road

Table 12 Manual Count sites

DU02	Birmingham Road	between Arras Rd and Highfield Rd
DU04	Priory Road	north of Mayfield Rd
DU10	High St. Pensnett	West of Kingswinford Rd
DU14	Cinder Bank	between Hall Lane and Swan Street

6 Appendix 2 Comparison of Manual and Automatic Data

		<u>INBOUND 1996</u>		<u>INBOUND 1998</u>	
		Manual	Automatic	Manual	Automatic
DU02	Tuesday 26		Tuesday 26	Tuesday 17	Tuesday 17
0730-0930	2554		2754	2360	2322
1000-1200	2482		2465	1996	2081
1630-1830	3120		2884	2781	2614
0700-1900	15.820		15.969	13.159	13.760
DU04	Monday 18		Monday 25	Wednesday 18	Wednesday 18
0730-0930	1454		1517	1537	1550
1000-1200	986		1140	1076	1105
1630-1830	1649		1751	1748	1804
0700-1900	7371		8152	7976	8146
DU10	Wednesday 20		Wednesday 27	Wednesday 18	Wednesday 18
0730-0930	2413		2444	2694	2303
1000-1200	1269		1312	1593	1219
1630-1830	1297		1307	1726	1366
0700-1900	8988		9087	11424	9034
DU14	Wednesday 20		Wednesday 27	Thursday 19	Thursday 19
0730-0930	2049		2332	2232	2286
1000-1200	1312		1450	1475	1520
1630-1830	2542		2463	2434	2376
0700-1900	10841		11373	11008	11332
		<u>OUTBOUND 1996</u>		<u>OUTBOUND 1998</u>	
		Manual	Automatic	Manual	Automatic
DU02	Tuesday 26		Tuesday 26	Tuesday 17	Tuesday 17
0730-0930	3329		3147	2889	2618
1000-1200	2495		2509	2132	2136
1630-1830	2802		2853	2458	2468
0700-1900	16.535		16.663	15.001	14.566
DU04	Monday 18		Monday 25	Wednesday 18	Wednesday 18
0730-0930	1476		1514	1668	1546
1000-1200	813		869	886	859
1630-1830	1628		1643	1687	1640
0700-1900	6872		7126	7464	7291
DU10	Wednesday 20		Wednesday 27	Wednesday 18	Wednesday 18
0730-0930	1575		1629	1759	1762
1000-1200	1556		1673	1479	1622
1630-1830	2837		2727	2477	2542
0700-1900	11716		12235	11471	11987
DU14	Wednesday 20		Wednesday 27	Thursday 19	Thursday 19
0730-0930	1806		1868	1819	1809
1000-1200	1377		1423	1470	1502
1630-1830	2133		2042	1924	2012
0700-1900	10007		10101	9739	10007

7 Appendix 3 Passage Count Data

Inbound

TIME STARTING	TOTAL VEH	PEDAL CYC	BUS & COACH		Light Vehs	Heavy Vehs	% pedal cycle	% bus	% light	% goods	TIME			
			automatic	vehs							estimated ped cyc	estimated bus	estimated light	estimated heavy
7.00	3919	16	52	3557	294	0.4%	1.3%	90.8%	7.5%	10062	41	134	9133	755
8.00	4418	11	77	3930	400	0.2%	1.7%	89.0%	9.1%	12386	31	216	11018	1121
9.00	3454	4	78	2854	518	0.1%	2.3%	82.6%	15.0%	9369	11	212	7741	1405
10.00	2972	0	73	2479	420	0.0%	2.5%	83.4%	14.1%	7693	0	189	6417	1087
11.00	3000	1	75	2470	454	0.0%	2.5%	82.3%	15.1%	7837	3	196	6452	1186
12.00	3317	4	70	2779	464	0.1%	2.1%	83.8%	14.0%	7992	10	169	6696	1118
13.00	3539	10	71	3040	418	0.3%	2.0%	85.9%	11.8%	8512	24	171	7312	1005
14.00	3699	3	68	3148	480	0.1%	1.8%	85.1%	13.0%	8344	7	153	7101	1083
15.00	3814	5	79	3297	433	0.1%	2.1%	86.4%	11.4%	8634	11	179	7464	980
16.00	4417	18	82	4044	273	0.4%	1.9%	91.6%	6.2%	9880	40	183	9046	611
17.00	4623	16	67	4391	149	0.3%	1.4%	95.0%	3.2%	9683	34	140	9197	312
18.00	3772	16	98	3567	91	0.4%	2.6%	94.6%	2.4%	8153	35	212	7710	197
0730-0930	8548	22	147	7559	820	0.3%	1.7%	88.4%	9.6%	23301	60	401	20605	2235
1000-1200	5972	1	148	4949	874	0.0%	2.5%	82.9%	14.6%	15530	3	385	12870	2273
1630-1830	9056	34	148	8562	312	0.4%	1.6%	94.5%	3.4%	19021	71	311	17983	655
0700-1230	19458	35	390	16692	2341	0.2%	2.0%	85.8%	12.0%	51343	92	1029	44044	6177

Outbound

TIME STARTING	TOTAL VEH	PEDAL CYC	BUS & COACH	Light VEHs	Heavy VEHs	% pedal cy % bus	% light	% goods	No. auto vehs.	estimated ped cyc	estimated bus	estimated light	estimated goods
STARTING	TIME	STARTING	STARTING	STARTING	STARTING	STARTING	STARTING	STARTING	STARTING	STARTING	STARTING	STARTING	STARTING
7.00	776	9	8	707	52	1.2%	91.1%	6.7%	8416	98	87	7668	564
8.00	958	3	11	865	79	0.3%	90.3%	8.2%	9741	31	112	8795	803
9.00	746	0	19	654	73	0.0%	87.7%	9.8%	7714	0	196	6763	755
10.00	707	0	10	628	69	0.0%	88.8%	9.8%	7318	0	104	6500	714
11.00	763	0	11	662	90	0.0%	86.8%	11.8%	7898	0	114	6853	932
12.00	767	3	15	681	68	0.4%	88.8%	8.9%	8476	33	166	7526	751
13.00	803	3	14	690	96	0.4%	85.9%	12.0%	8897	33	155	7645	1064
14.00	782	5	17	673	87	0.6%	86.1%	11.1%	9307	60	202	8010	1035
15.00	779	1	16	675	87	0.1%	86.6%	11.2%	9919	13	204	8595	1108
16.00	961	5	22	872	62	0.5%	90.7%	6.5%	11445	60	262	10385	738
17.00	1007	6	12	952	37	0.6%	94.5%	3.7%	12281	73	146	11610	451
18.00	690	3	5	659	23	0.4%	95.5%	3.3%	9245	40	67	8830	308
0730-0930	1819	10	28	1632	149	0.5%	89.7%	8.2%	18649	103	287	16732	1528
1000-1200	1470	0	21	1290	159	0.0%	87.8%	10.8%	15216	0	217	13353	1646
1630-1830	1924	11	23	1814	76	0.6%	94.3%	4.0%	23438	134	280	22098	926
0700-1230	4317	14	67	3833	403	0.3%	88.8%	9.3%	45325	147	703	40243	4231

Appendix 4 Occupancy data

Start Time	Number of vehicles with shown number of occupants					5 Total Veh	Total Pass Ave Occupancy	estimated light vehicles in light vehicles	estimated people in light vehicles
	1	2	3	4	5				
7.00	449	100	6	0	1	556	672	1644	1986
7.15	658	111	6	2	0	777	906	2089	2435
7.30	713	143	14	3	2	875	1063	2586	3141
7.45	901	179	21	2	1	1104	1335	2816	3406
8.00	878	147	26	4	1	1056	1271	2774	3339
8.15	839	138	20	0	1	998	1180	2778	3285
8.30	870	165	28	9	3	1075	1335	2777	3448
8.45	877	160	28	5	3	1073	1316	2681	3288
9.00	735	167	30	2	0	934	1167	2268	2833
9.15	601	157	13	7	3	781	997	1921	2453
9.30	558	181	20	3	2	764	1002	1809	2372
9.45	536	160	30	4	1	731	967	1749	2314
10.00	467	143	30	3	1	644	860		
10.15	423	171	28	7	0	629	877		
10.30	504	158	29	6	3	700	946		
10.45	453	152	28	6	3	642	880	estimated people in light vehicles 0700-1000	34300
11.00	423	156	26	5	0	610	833		
11.15	443	164	22	3	2	634	859		
11.30	495	165	27	8	1	696	943	estimated people in light vehicles 0730-0930	25192
11.45	414	161	30	7	0	612	854		
12.00	461	171	36	7	1	676	944		
12.15	466	143	31	1	2	643	859		
12.30	499	156	18	7	2	682	903		
12.45	520	130	30	9	3	692	921		
0730-0930						7896	9664		
1000-1200						5167	7052		
0700-1230						17210	22066		

Light Vehicles (2,3,5) outbound

Start Time	Number of vehicles with shown number of occupnats					5 Total Veh	Total Pass	Ave occupancy	estimated estimated people	
	1	2	3	4	5				light vehicles in light vehicles	light vehicles
7.00	503	103	4	3	0	613	733	1.20	1459	1745
7.15	755	129	10	1	0	895	1047	1.17	1803	2109
7.30	852	148	9	2	0	1011	1183	1.17	2118	2478
7.45	850	109	14	2	1	976	1123	1.15	2286	2630
8.00	846	133	13	3	0	995	1163	1.17	2275	2659
8.15	709	110	19	1	2	841	1000	1.19	2119	2520
8.30	685	142	26	9	1	863	1088	1.26	2187	2757
8.45	648	135	28	6	0	817	1026	1.26	2236	2807
9.00	572	103	19	1	0	695	839	1.21	1801	2175
9.15	522	135	11	4	2	674	851	1.26	1740	2196
9.30	466	128	17	4	2	617	799	1.29	1606	2080
9.45	437	145	14	4	0	600	785	1.31	1647	2154
10.00	464	114	22	6	1	607	787	1.30		
10.15	455	146	24	4	0	629	835	1.33		
10.30	451	115	17	4	0	587	748	1.27		
10.45	454	134	19	6	2	615	813	1.32	estimated people in	light vehicles 0700-1000
11.00	508	158	21	4	3	694	918	1.32		
11.15	444	133	30	2	1	610	813	1.33	estimated people in	light vehicles 0730-0930
11.30	429	167	20	8	2	626	865	1.38		
11.45	427	158	15	5	0	605	808	1.34		
12.00	490	169	16	5	3	683	911	1.33		
12.15	421	158	18	12	4	613	859	1.40		
12.30	522	156	23	5	1	707	928	1.31		
12.45	534	134	28	4	1	701	907	1.29		
0730-0930						6872	8273	1.20		
1000-1200						4973	6587	1.32		
0700-1230						15866	19994	1.26		

Heavy vehicles (6-12) inbound												
Start Time	Number of vehicles with shown number of occupants					5 Total Veh	Total Pass Ave Occupancy	estimated heavy vehicles	estimated people in heavy vehicles	estimated people in heavy vehicles	estimated people in heavy vehicles	estimated people in heavy vehicles
	1	2	3	4	4							
7.00	58	6	0	0	0	64	70	151	165	151	165	
7.15	76	5	1	0	0	82	89	179	195	179	195	
7.30	47	13	1	0	0	61	76	178	221	178	221	
7.45	61	5	1	0	0	67	74	244	270	244	270	
8.00	76	6	3	0	0	85	97	216	247	216	247	
8.15	75	9	1	0	0	85	96	343	388	343	388	
8.30	69	4	0	0	0	73	77	317	334	317	334	
8.45	76	6	0	0	0	82	88	254	273	254	273	
9.00	85	6	2	0	0	93	103	318	352	318	352	
9.15	79	9	1	0	0	89	100	370	416	370	416	
9.30	86	8	1	0	0	95	105	355	392	355	392	
9.45	103	11	1	0	0	115	128	355	395	355	395	
10.00	86	12	0	1	0	99	114					
10.15	105	10	0	1	1	116	129	estimated people in heavy vehicles 0700-1000	3648			
10.30	97	13	1	0	1	112	131					
10.45	120	12	2	1	0	135	154	estimated people in heavy vehicles 0730-0930	2501			
11.00	135	9	3	0	0	147	162					
11.15	137	9	1	0	0	147	158					
11.30	135	15	1	0	0	151	168					
11.45	101	13	0	0	0	114	127					
12.00	125	13	2	0	0	140	157					
12.15	119	13	2	0	1	135	156					
12.30	109	14	1	1	1	126	149					
12.45	111	14	1	0	0	126	142					

Heavy vehicles (6-12) outbound										
Start Time	Number of vehicles with shown number of occupants								5 Total Veh	Total Pass Ave Occupancy
	1	2	3	4	5	6	7	8		
7.00	54	2	3	1	0	60	71	1.18	122	144
7.15	91	12	1	0	0	104	118	1.13	136	154
7.30	81	21	3	0	0	105	132	1.26	179	225
7.45	107	19	5	0	0	131	160	1.22	112	136
8.00	114	29	2	0	0	145	178	1.23	184	225
8.15	116	21	3	3	0	143	179	1.25	266	333
8.30	112	29	4	0	0	145	182	1.26	223	279
8.45	117	20	3	0	0	140	166	1.19	116	137
9.00	128	22	1	2	0	153	183	1.20	230	275
9.15	128	24	1	0	0	153	179	1.17	173	202
9.30	128	19	1	0	0	148	169	1.14	193	220
9.45	124	13	3	0	0	140	159	1.14	193	220
10.00	71	9	2	0	0	82	95	1.16	133	151
10.15	87	7	2	0	0	96	107	1.11		
10.30	99	13	2	0	0	114	131	1.15	estimated people in heavy vehicles 07.00-10.00	2483
10.45	86	12	5	1	0	104	129	1.24		
11.00	116	8	2	1	0	127	142	1.12	estimated people in heavy vehicles 07.30-09.30	1814
11.15	107	10	0	0	2	119	137	1.15		
11.30	88	9	1	0	0	98	109	1.11		
11.45	94	10	0	0	1	105	119	1.13		
12.00	98	10	2	0	0	110	124	1.13		
12.15	113	8	0	1	1	123	138	1.12		
12.30	104	12	2	0	0	118	134	1.14		
12.45	82	8	0	1	0	91	102	1.12		