14. Bus use

14.1 Introduction

This chapter primarily reviews evidence on changing patterns of bus use in the three towns. The analysis is based on bus patronage data, provided by the councils and/or the main bus operators.

In Darlington, the amount of publicly available information was limited because, up until shortly before the interviews, Stagecoach and Arriva were in competition. Consequently, it was only possible to obtain annual patronage figures, together with specific data for three particular routes.

In Peterborough, we were able to obtain two sets of monthly patronage data. One set was provided by Stagecoach, for the six main 'Citi' routes that served the town. The second data set related to the Local Link routes that were operated by the council within Peterborough.

In Worcester, the council provided monthly patronage data for all the main services within the town.

More detail about the data sets is given in each of the sections below. There was a substantial volume of correspondence, to ensure that the data provided were accurate, and to understand changes in bus provision over time. It was clearly commonplace for there to be frequent changes in services, including changes in operator, route numbering, service frequency and service routing. During analysis, a considerable amount of care was required to take these issues into account. Information about individual routes has been anonymised in order to protect commercial confidentiality. Inevitably, analysis is limited by the nature of the information available.

In this chapter, information about Darlington is presented first, followed by information about Peterborough and Worcester. In each case, the tables and graphics that inform the analysis are given at the end of the relevant section. The approach taken involved looking at both changes overall, and changes recorded on individual routes, though, in many areas, sections of routes ran in parallel (with passengers having the choice of more than one service), meaning that individual route analysis is often not straightforward. Both year-on-year changes, and changes in relation to a 2004/5 baseline have been calculated. (There is a case for using 2003/4 as the baseline year, rather than 2004/5, however, there are a number of data sets where information was not available for 2003/4, and so 2004/5 has been adopted to ensure consistency throughout.) Where possible, changes since 2004/5 are placed in the context of longer-term, historic trends. Key headline results have been tested for statistical significance.

As outlined in more detail in Chapter 17, there were some changes in population (0% in Darlington, +1.1% in Worcester and +6.1% in Peterborough between 2004 and 2007), and in employment (+9.7% in Darlington, often concentrated around the periphery, +7.5% in Peterborough, and -4.2% in Worcester, between 2004 and 2008). In terms of explaining the observed changes in bus use in the towns, we have paid particular

attention to assessing the contribution of population growth to bus growth in Peterborough[1].

Given the prominence of the personal travel planning activities in the towns' programmes, analysis was undertaken to discern specific effects from this work. This involved geographically matching data from specific bus routes with the relevant phases of personal travel planning, and then looking at changes over time (before/after personal travel planning) and comparing these with changes elsewhere. Inevitably, this is an imperfect process, not least since the bus routes were often not contained within specific areas, and even where they were, they often ran in parallel with other services that were not.

The results from the analysis are then compared briefly with the results from the household travel surveys (as already discussed in Chapter 13). It should be noted that the main results from the household travel surveys reported here exclude data for trips of more than 100km, in order to ensure consistency between the different waves of surveys in Darlington and Peterborough. However, results for trips of up to 50km are also presented in order to provide consistency with Chapter 13. Section 14.5 draws together the results about bus use from all three towns.

14.2 Darlington bus use

14.2.1 Introduction

At the beginning of Darlington's Sustainable Travel Town programme, the town's two bus companies, Stagecoach and Arriva, were operating in competition. In August 2007, Stagecoach sold its Darlington operations to Arriva. In the summer of 2008, Arriva comprehensively reorganised the bus network. Given this situation, the amount of publicly available data was limited, as described below.

14.2.2 Nature of the data

Total bus passenger boardings within the borough were available from 2001/2, based on bus company reported patronage data from ticket sales. In addition, the Tees Valley Joint Strategy Unit's Transport Monitoring Report for 2008 gives data for Stagecoach and Arriva only (i.e. the data for smaller operators are excluded). Stagecoach was also able to supply their total annual patronage figures for the relevant years, but no further information. This makes it possible to break down the overall total figures by operator. However, it should be noted that, whilst Stagecoach ran urban services only, Arriva ran services on both urban and inter-urban routes, meaning that obtaining a geographical breakdown of the information (in particularly, disaggregating data for Darlington town from data for the whole borough) is not possible. The data that are available on overall patronage are given in Table 14.2, and illustrated graphically in Figure 14.2.

In addition, Arriva supplied weekday daily ticket sales data for three routes (the 21, 22 and 23), between 1/1/04 and 31/3/08. These routes were potentially affected by the personal travel planning work, and the kilometres operated on the services remained

[1] It is clear that changes in population and employment in Darlington and Worcester would not provide the full explanation for the majority of the changes that have been observed.

constant for the period of available data. Taken together, in 2007/8, these routes accounted for at least a third of total patronage. There is some overlap between Routes 21 and 23. The routes are shown in Figure 14.1.

14.2.3 Data presentation

On subsequent pages, the following information is presented:

- Table 14.2 – details of overall borough bus patronage over time, and how this breaks down between operators;
- Figure 14.2 – a graph showing how total borough bus patronage varied over time;
- Table 14.3 – changes over time in average weekday passenger totals for different quarters on Routes 21, 22 and 23;
- Figures 14.3-5 – graphs showing changes in patronage on each of the three routes over time;
- Figure 14.6 – a graph showing changes over time in average weekday passenger totals for different quarters on Routes 21, 22 and 23;
- Figure 14.7 – a graph showing changes over time in average weekday total passengers for different quarters on Routes 21, 22 and 23, indexed against figures for the same quarters in 2004;
- Table 14.4 – analysis of the quarterly data in relation to personal travel planning work;
- Table 14.5 – household travel survey results.

14.2.4 Data analysis

Overall effects on bus patronage
Overall, annual patronage figures show a 13% decline between 2004/5 and 2008/9. This decline started prior to the Sustainable Travel Towns work. In 2006/07, there was a small increase in patronage. Patronage dropped again the following year, though it subsequently declined at a slower rate. Possible explanations include the introduction of concessionary fares, and various other initiatives, such as the upgrading of bus stops throughout the town; a number of ticketing offers; bus advertising for various ticket offers; and the development of an area bus map. The personal travel planning work may also have had an effect, as discussed further below. The difference in performance between Arriva and Stagecoach perhaps suggests that the urban services performed better than the inter-urban services, though other factors may have been involved.

Assessment of personal travel planning effects
As already highlighted, data were supplied for three routes that could potentially have been affected by the personal travel planning work. Table 14.1 shows the timings of the personal travel planning work, and the bus routes relevant to each phase of work, whilst the available data are graphically illustrated in Figures 14.3 to 14.7. Table 14.4 provides analysis of the quarterly data in relation to the personal travel planning work.

Table 14.1: Relating personal travel planning work to bus routes in Darlington

Personal travel planning phase	Bus routes potentially affected
1 – April to August 2005	22, 23
2 – April to September 2006	21, 23
3 – May to September 2007	21

The data suggest little effect from Phase 1 of the personal travel planning work. For both routes considered likely to be affected (the 22 and 23), it is possible that the work slowed the rate of declining patronage. It was not, however, sufficient to reverse it, and, if an effect did occur, it appears to have been short-term, at least on Route 23.

Phases 2 and 3 of the personal travel planning work may possibly have been more effective. In relation to Route 23, it is possible that the personal travel planning work stabilised the decline in passenger numbers, though the effect is not clear-cut. In relation to Route 21, both phases of personal travel planning work appear to have been followed by a big increase in passenger numbers (as shown by comparing results from Quarter 4 with Quarter 3), though with passenger numbers starting to drop away again over time. However, it should be noted that all three routes show some increases in patronage at these times, which could be linked to other factors such as Christmas marketing.

Comparison with the household survey data

Table 14.5 summarises the household survey data for 'all public transport' (as reported by Socialdata & Sustrans for the interim household surveys), and, separately, for bus trips (as extracted from the 2004 and 2008 datasets by us). Key results are as follows[2]:

- The pattern for public transport trips compared with (just) bus trips is broadly similar.
- In terms of impacts on the number of trips, the weighting of the data makes a difference to the conclusions drawn. The unweighted[3] data suggest an increase in trips of 12-14%. The weighted data suggest that public transport trip numbers have been static overall, with a 5% decline in bus trips.
- The data are suggesting a substantial increase in average distance travelled by bus/public transport, in the order of 30-38% (unweighted data) or 21-22% (weighted data).
- During Phase 1 and Phase 2 of the personal travel planning work, for public transport trips, the target areas performed better than control[4] areas. Results for the Phase 3 area are complex. Comparing performance between 2004 and 2007 suggests that the target area performed similarly to its control (drawn from the Phase 1 area). However, results for the target group from 2006 show that there was substantial growth between 2006 and 2007 (+15%), compared with previous decline. This indicates that, in fact, the personal travel planning activity may have had an effect.

[2] The equivalent values for bus trips of up to 50km was a change in trips of -6% to +11%, and a change in distance of +14% to +29%.

[3] The difference between weighted and unweighted data is discussed further in Chapter 13.

[4] During the different phases of personal travel planning work, Socialdata & Sustrans also conducted surveys in 'control' areas that were not affected by the activities, in order to see how travel behaviour changed amongst these households. In Darlington, by Phase 3, all areas of the city had been targeted. Therefore, the control group data were taken from the Phase 1 personal travel planning area (which had been targeted least recently).

- Although the overall change estimates from the unweighted data suggest that bus use increased, there are at least three results (Phase 1 area 05-07; Phase 3 area 04-06, Phase 2&3 area, 04-05) suggesting that public transport trips were stable or declining.

Taken at face value, these results appear to be inconsistent with the bus boarding data. In attempting to reconcile the results, first, it should be remembered that the patronage data are for boardings within Darlington, whilst the household travel survey is for trips by residents. In terms of conclusions, this has several implications:

- Part of the discrepancy may be explained, if there has been a significant decline in bus travel into and out of Darlington by people living outside the town.
- The different results from the weighted versus unweighted data imply that the groups who were underrepresented in the household travel survey are those who were most likely to have reduced their bus use. This would include those without telephones (including, presumably, those choosing to opt out using the telephone preference service) and those who were not interested in the personal travel planning activity.
- The increase in trip distance may be real, as the boarding data does not provide any insights into trip distance. Some relocation of employment to more peripheral sites may provide one explanation for the increase.
- Compared with some of the impacts on other modes emerging from the personal travel planning work, the effects on bus use recorded in the household travel survey are relatively moderate, which is consistent with the relatively subtle effects showing in the individual route data. Both data sets potentially suggest that the greatest impact occurred from the Phase 3 work and/or on Route 21.

14.2.5 Summary and conclusions about bus use in Darlington

Overall, between 2004/5 and 2008/9, data about bus boardings in Darlington suggest a 13% decline. The data from the household surveys are not unambiguous, but suggest a less negative picture, indicating that the decline may have been greatest amongst people travelling to and from Darlington (i.e. from outside the main urban area) and amongst those less willing to participate in the household travel survey and the personal travel planning activity. Meanwhile, the household travel survey suggests an increase in the average length of bus trips.

The data from bus boardings suggest that the decline in bus use stabilised in 2006, whereas this effect is not clearly evident from the household travel survey data. This effect could be due to the introduction of concessionary fares and/or the personalised travel planning work and/or various other initiatives that took place, such as the upgrading of bus stop information, the development of an area bus map and the development and promotion of various ticket offers.

In terms of the effects of the personal travel planning work, the household travel survey suggests moderate positive impacts. The data obtained for three relevant routes are inconclusive, though not inconsistent with the conclusion that the personal travel planning work may have helped to stabilise decline and/or led to short-term increases in patronage. If there have been effects, they appear to have been greatest in the Phase 3 area and/or on Route 21.

Figure 14.1: Map of bus routes in Darlington (Autumn 2007)

Table 14.2: Overall annual bus passenger boardings in Darlington, percentage changes and comparison with 2004/5

	Total boardings in Darlington (in '000s)	Arriva*	Stagecoach*
2001/02	10222	n/a	n/a
2002/03	10118	5988204	4045475
2003/04	10069	5735412	4019313
2004/05	9591	5220998	3853759
2005/06	8780	5042446	3695728
2006/07	8830	4752693	3997458
2007/08	8614	n/a	n/a
2008/09	8387	n/a	0
% change compared with the previous year			
2002/03	-1.0		
2003/04	-0.5	-4.2	-0.6
2004/05	-4.7	-9.0	-4.1
2005/06	-8.5	-3.4	-4.1
2006/07	0.6	-5.7	8.2
2007/08	-2.4	n/a	n/a
2008/09	-2.6	n/a	n/a
Index compared with 2004/5			
2001/02	106.6		
2002/03	105.5	114.7	105.0
2003/04	105.0	109.9	104.3
2004/05	100.0	100.0	100.0
2005/06	91.5	96.6	95.9
2006/07	92.1	91.0	103.7
2007/08	89.8	n/a	n/a
2008/09	87.4	n/a	n/a

Notes: Yellow indicates growth compared to the preceding year. Pink indicates that passenger boardings were greater than in 2004. Red indicates that passenger boardings were greater by 10% or more than in 2004. *Arriva operated both inter-urban and urban services. Stagecoach operated urban services only.

Figure 14.2: Changes in overall annual bus passenger boardings in Darlington

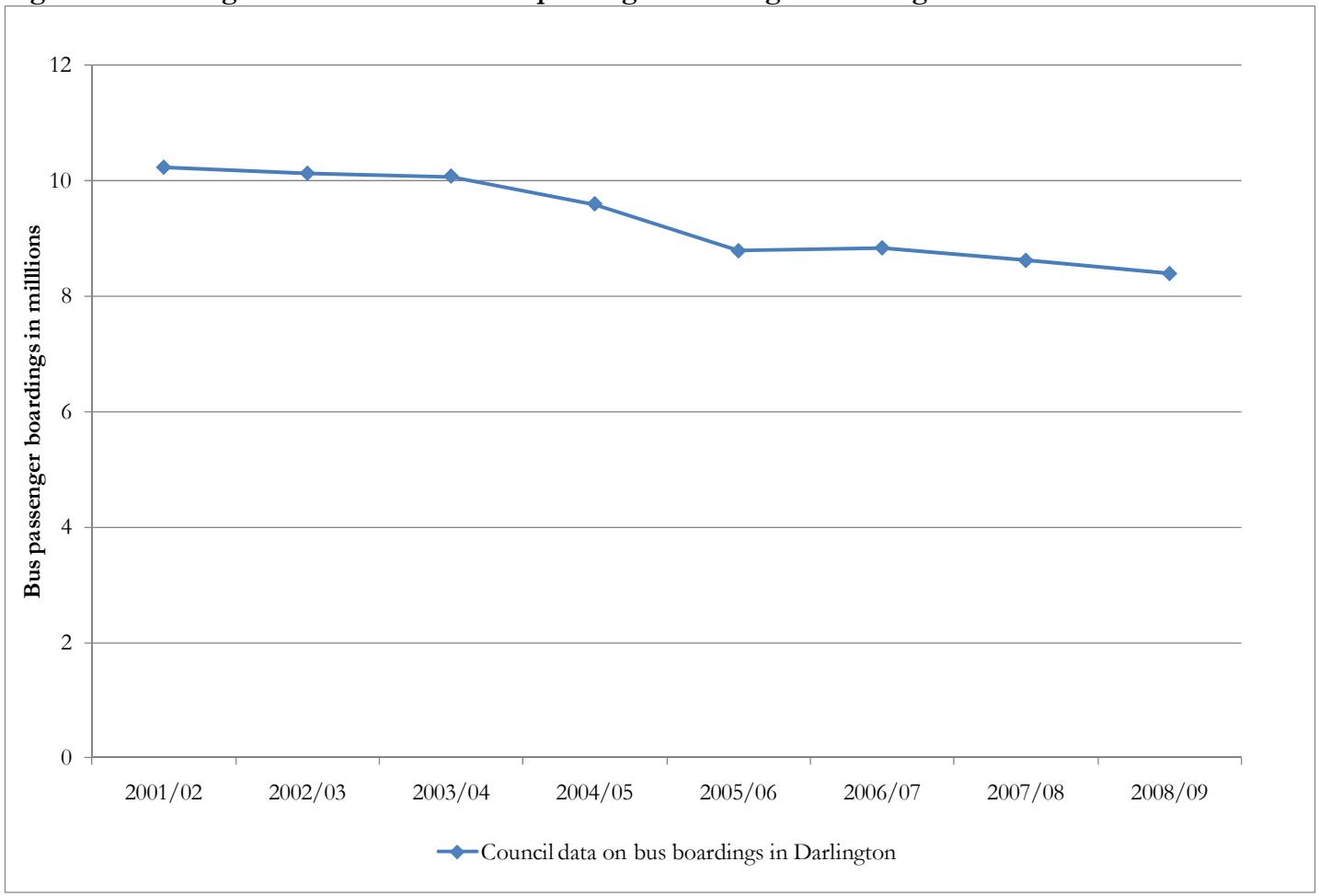
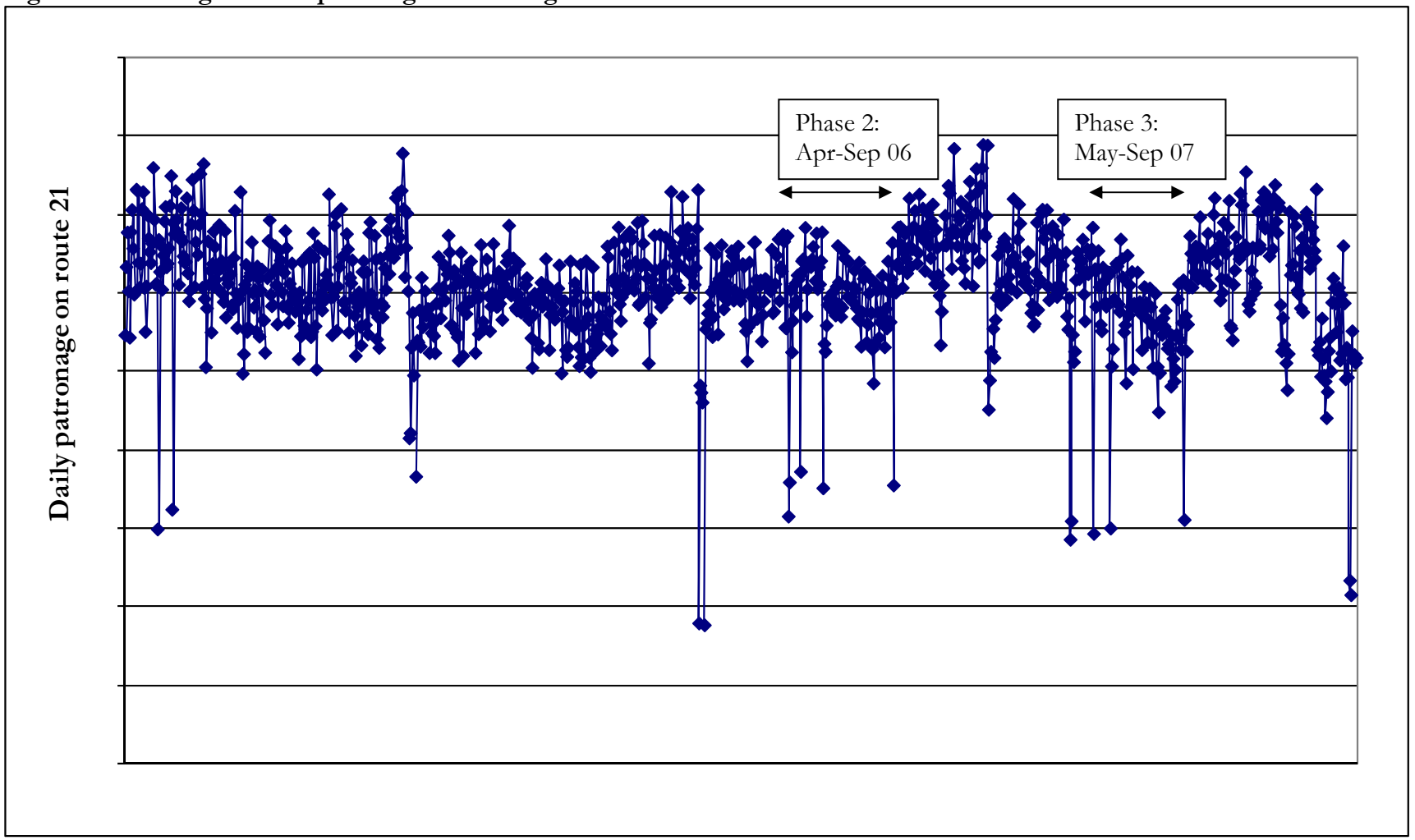


Table 14.3: Quarterly averaged weekday passenger totals for Darlington Routes 21, 22 and 23, percentage changes and comparison with 2004

	21	22	23
% change compared with relevant quarter in previous year			
Q1 2005	-9.8	-11.7	-6.5
Q2 2005	-3.1	-11.5	-5.5
Q3 2005	-4.3	-7.0	-2.6
Q4 2005	0.6	-13.5	-6.1
Q1 2006	2.2	-9.2	-3.5
Q2 2006	0.2	-9.1	-6.2
Q3 2006	4.5	-6.7	-9.9
Q4 2006	7.9	2.2	-3.1
Q1 2007	5.8	-1.5	-4.2
Q2 2007	-2.3	-2.2	-5.6
Q3 2007	-5.3	0.0	-1.5
Q4 2007	-2.0	-0.2	1.7
Q1 2008	-9.4	1.7	4.8
Index compared with relevant quarter in 2004			
Q1 2004	100.0	100.0	100.0
Q2 2004	100.0	100.0	100.0
Q3 2004	100.0	100.0	100.0
Q4 2004	100.0	100.0	100.0
Q1 2005	90.2	88.3	93.5
Q2 2005	96.9	88.5	94.5
Q3 2005	95.7	93.0	97.4
Q4 2005	100.6	86.5	93.9
Q1 2006	92.2	80.2	90.2
Q2 2006	97.0	80.4	88.6
Q3 2006	100.0	86.8	87.8
Q4 2006	108.5	88.4	91.0
Q1 2007	97.5	79.0	86.4
Q2 2007	94.8	78.7	83.7
Q3 2007	94.7	86.8	86.4
Q4 2007	106.3	88.3	92.6
Q1 2008	88.4	80.3	90.6

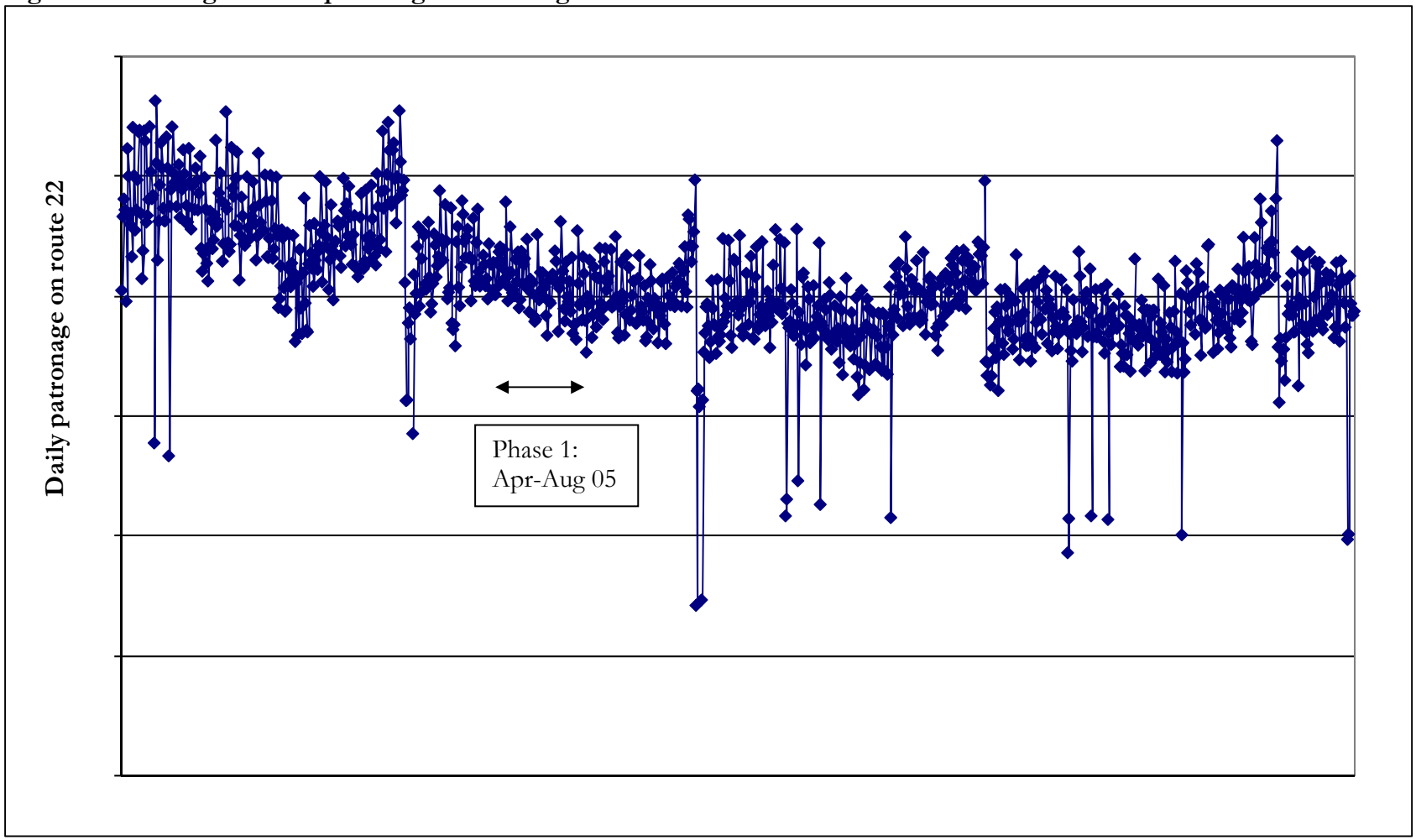
Notes: Yellow indicates growth compared to the preceding year. Orange indicates growth of 10% of more compared to the preceding year. Pink indicates that passenger boardings were greater than in 2004. Red indicates that passenger boardings were greater by 10% or more than in 2004. Periods of personal travel planning are marked with bold cell borders.

Figure 14.3: Changes in bus patronage for Darlington Route 21



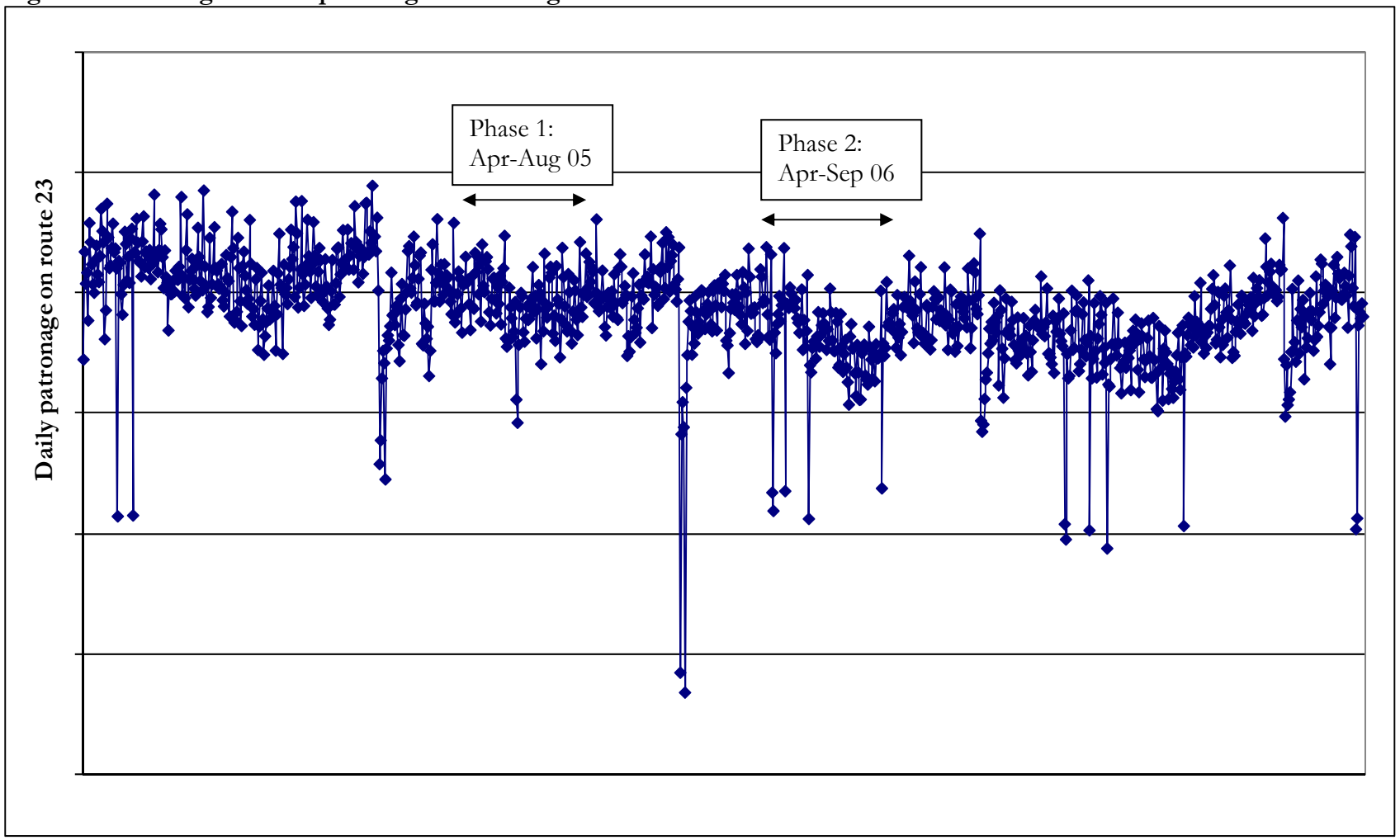
Note: Vertical scale is not shown for reasons of data confidentiality.

Figure 14.4: Changes in bus patronage for Darlington Route 22



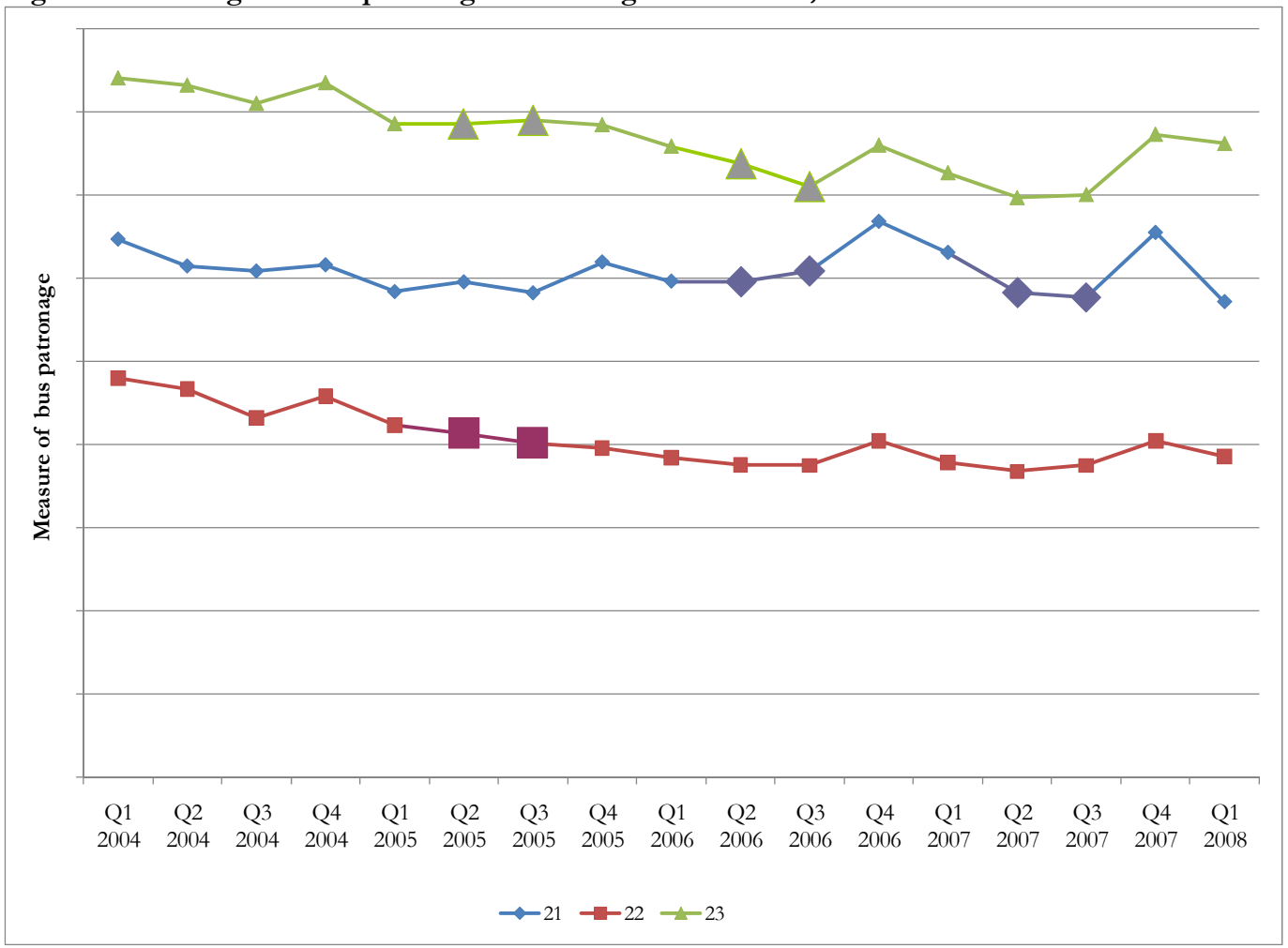
Note: Vertical scale is not shown for reasons of data confidentiality.

Figure 14.5: Changes in bus patronage for Darlington Route 23



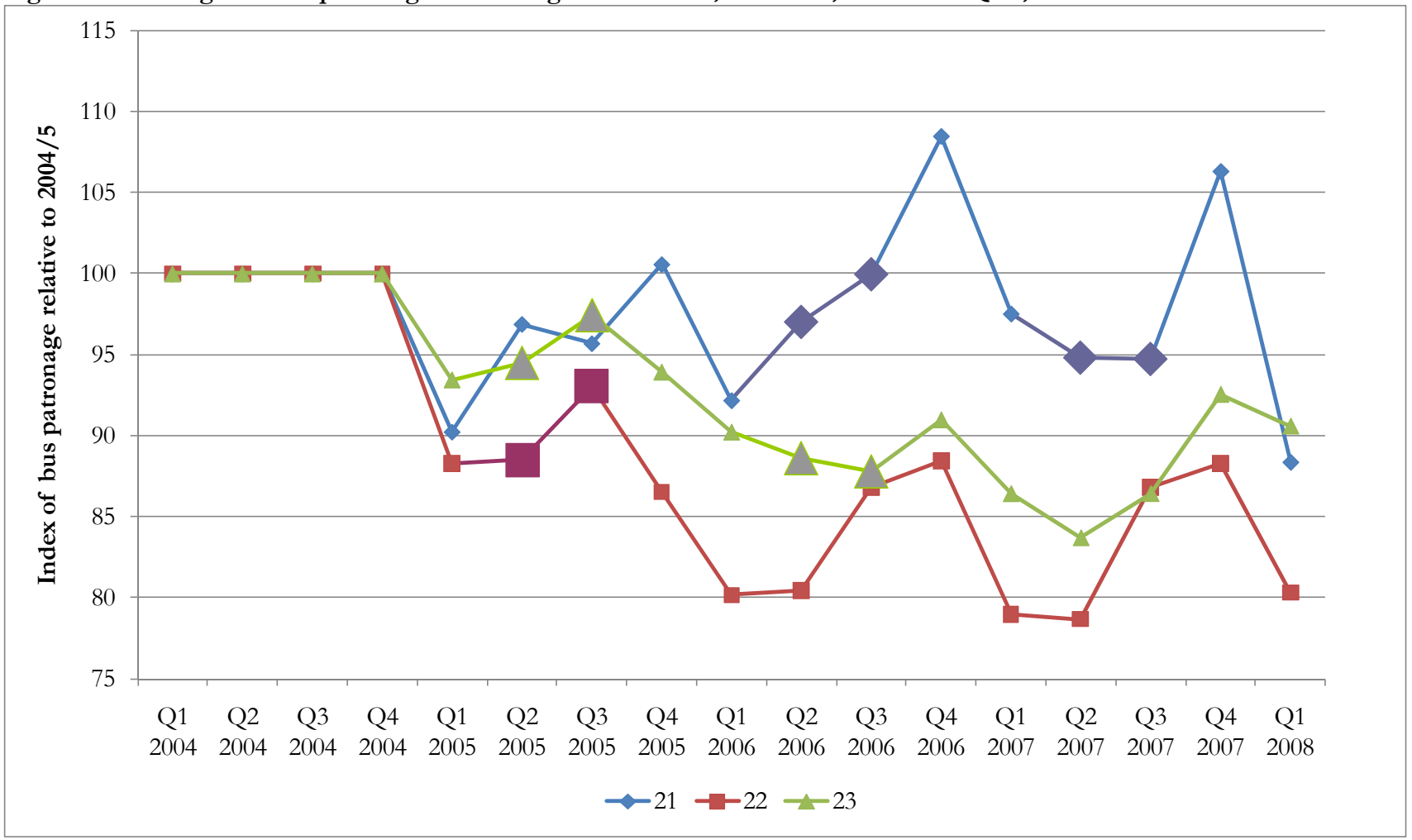
Note: Vertical scale is not shown for reasons of data confidentiality.

Figure 14.6: Changes in bus patronage for Darlington Routes 21, 22 and 23



Note: Larger symbols indicate periods when personal travel planning work took place that might have affected the routes.

Figure 14.7: Changes in bus patronage for Darlington Routes 21, 22 and 23, indexed to Q1-4, 2004



Note: Larger symbols indicate periods when personal travel planning work took place that might have affected the routes.

Table 14.4: Analysis of bus patronage quarters data in relation to personal travel planning work for Routes 21, 22 and 23

	Change in Q3 compared to Q1		Change in Q3 compared to Q3 in the previous year		Change in Q4, compared with Q3		Change in Q3 in the following year	
	Target	*Control*	*Target*	*Control*	*Target*	*Control*	*Target*	*Control*
Phase 1: Q2&3, 2005	22: -5% 23: +1%	21: 0%	22: -7% 23: -3%	21: -4%	22: -1% 23: -1%	21: +6%	22: -7% 23: -10%	21: +5%
Phase 2: Q2&3 2006	21: +2% 23: -6%	22: -3%	21: +5% 23: -10%	22: -7%	21: +10% 23: +7%	22: +8%	21: -5% 23: -2%	22: 0%
Phase 3: Q2&3 2007	21: -7%	22: -1% 23: -4%	21: -5%	22: 0% 23: -2%	21: +14%	22: +8% 23: +10%	n/a	n/a

Note: Green shading indicates where a target area outperformed a control area (though in many cases, the differences are small).

Table 14.5: Household travel survey results for public transport use and, separately, bus use in Darlington

	Phase 1 area	Phase 2 area	Phase 3 area	Phase 2 & 3 area averages	Overall change estimate	Overall change estimate (bus trips only)
Households	*11,802*	*11,675*	*14,400*	*26,075*		
Trips per person per year (unweighted data)						
Autumn 04	120	106~	108	111	113	98
Autumn 05	137			108	117	
Autumn 06		116	99		115	
Autumn 07	130		114		119	
Autumn 08					130	110
Index compared with 2004						
Autumn 05	114.2			97.3	103.3	
Autumn 06		109.4	91.7		101.5	
Autumn 07	108.3		105.6		104.8	
Autumn 08					114.4	112.1
Overall change in trips per person per year (unweighted data)					***14%***	***12%***
Overall change in trips per person per year (weighted data)					***0%***	***-5%***
Overall change in distance per person per year (unweighted data)					***30%***	***38%***
Overall change in distance per person per year (weighted data)					***22%***	***21%***

Notes: Red lines indicate the timing of personal travel planning interventions. Except for the last column, all data are for public transport, which includes bus, work/school bus, regional train, other public transport and taxi. The last column gives data for buses only (including work/school bus). Green shading indicates results from area immediately subsequent to personal travel planning. Blue shading indicates control area results (as specified by Socialdata & Sustrans). Overall change estimates for Autumn 2006 and Autumn 2007 are based on interpolation. ~ Corrected figure provided by Socialdata & Sustrans, which is different from that given in the published report. Socialdata & Sustrans results from interim surveys exclude all trips over 100km, and for consistency, this convention has been adopted for all data in this table. Results are therefore slightly different from those reported in Chapter 13 and in section 14.5, where data are given for bus trips of up to 50km.

14.3 Peterborough bus data

14.3.1 Introduction

This section analyses the data for the two main sets of bus routes that ran through Peterborough. These were the main commercial Citi services, run by Stagecoach, and the Local Link services, which were provided by the council.

14.3.2 Nature of the data

Stagecoach services
There were seven Stagecoach services serving central Peterborough, for which data were provided (Citi Routes 1-7). The Stagecoach data are divided into 13 accounting periods (rather than 12 months), so that each period covers a total of four weeks. The data can also be broken down into 'seniors' and 'others'. There was a major change in service provision in April 2004, meaning that there was no comparable data for the previous years. The data for the Stagecoach services presented here have been anonymised or presented in the form of indices, in order to respect commercial confidentiality. Stagecoach provided a full data set, such that no interpolation was needed.

The Citi 6 was launched after the beginning of the Sustainable Travel Towns project. There was an evening service called 'Citi 45' which ran until October 2006, and was then incorporated into the Citi 4 and Citi 5 routes. There were also significant increases in service provision over time (as analysed in 14.3.4). The Citi 7 route was only introduced in August 2008, and had a substantial impact on the patronage of Citi 3 and Citi 4, not least since it took over part of the Citi 3 route.

A map of the Citi services is given in Figure 14.8.

Local Link services
The Local Link services, provided by the council, covered both the city centre and surrounding villages. Monthly data were supplied for the services likely to be of relevance to the *Travelchoice* project, namely the 401, 402/404, 403, First Choice Travel (FCT) 404, 406, 407, 408, 409, 410, 411, 413, 415 and the 27.

Over time, there were a number of substantial changes to the Local Link services, including various changes of operator. Relevant information about the services is as follows:

- The 401/403 operated using the same vehicle until March 2004.
- The 401 switched to a smaller vehicle from June 2005, when there was a change in operator and school pupils were transferred to bespoke home-to-school transport. However, figures subsequently grew with additional non-entitled pupils travelling as fare-paying passengers.
- The 402/404 originally operated as two separate services, but when the 404 was withdrawn in July 2003, parts of it were incorporated into the 402. On re-tender in April 2006, the 404 was reinstated but interworked with the 402. (Also, between June 2004 and October 2004, the 402 was replaced with a free 'Village Link' service, due to delays in the operator receiving its licence, such that there were no data available.) In September 2007, a significant number of education trips were transferred onto the

402/404, as the council ended the provision of 'closed door' contract taxis for these journeys.
- The 406 expanded to include extra peak hour, evening and Sunday services from August 2004.
- The 408 underwent a change of service in February 2006. There was a large increase in fare-paying pupils travelling from September 2007, due to the closure of one school (Bretton) and the opening of another (Voyager).
- The 409/411 suffered from reliability problems in the summer of 2004, resulting in a loss of passenger confidence.
- The 409/411 split into three services (the 409, 410 and 411) from May 2006.
- The 411 was used by more pupils from September 2005, following withdrawal of a commercial bus service.
- The 27 operated on school days only, so that passenger figures are zero for August.
- The 27 and 409 were withdrawn in April 2008.
- The 413 was introduced in April 2008.
- The FCT404 was renamed '404' from April 2008, due to a change in operator.
- The 407/415 partially overlapped and were merged in April 2008 into the 407. The 415 began in September 2003 and the 407 in June 2005.

For the purposes of display and analysis, data for services 409, 410 and 411 have been added together, since these routes all fell within the same personal travel planning area, and, over time, were variations of the same service. Similarly, data for the 407 and the 415 have been combined. Data for the original 401/403 are not displayed on the graphs due to the short time periods of the data, although the patronage figures for these services are included in the overall Local Link patronage totals.

A map of the Local Link services in 2008 is given in Figure 14.9 (though it should be noted that this does not show the location of services 409, 415 or the 27, which have been established from other maps).

Other information
In addition to the detailed information about patronage for individual routes, two other sets of data were available.

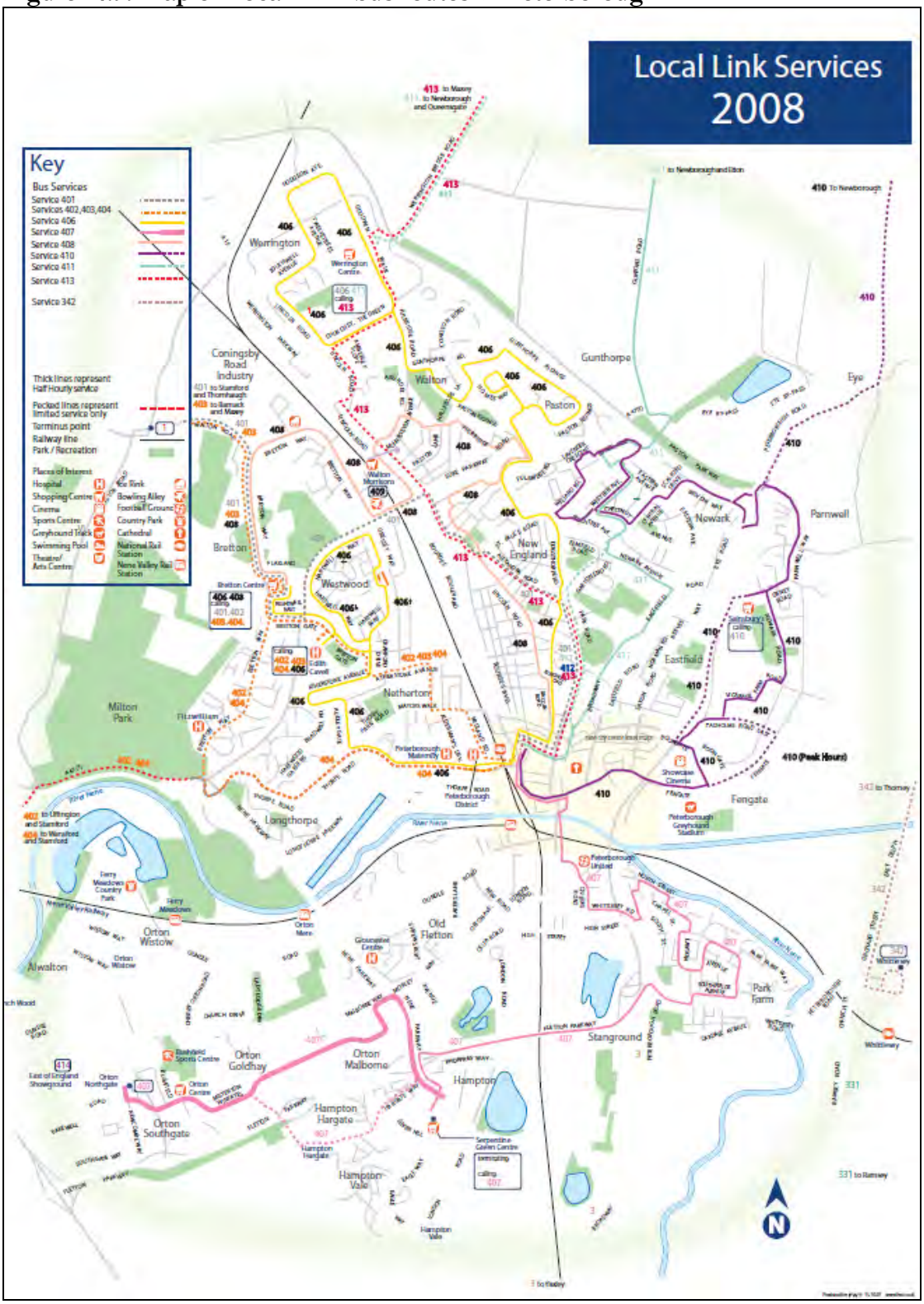
First, the council supplied information about bus service kilometres operated on the relevant Citi services and a selection of the Local Link routes. For the purposes of analysis, data for Routes 4, 5 and 45 have been added together. Information for the 14, the 409 and the 410 have not been used, since we do not have patronage data for the 14, and it is unclear that the information for the 409 and 410 can be meaningfully interpreted without accompanying information for the 411. Data for the 407 and the 415 have been combined. At the time the data were supplied, the Citi 7 was not in operation. Hence, analysis of the Citi total, Citi 3 and Citi 4 has not been possible for 2008/9.

Second, the council provided an annual estimate of the total bus passenger trips on services starting or finishing in Peterborough city centre, based on Stagecoach reported passenger figures, factored up using Queensgate bus station departure charges. It should be noted that these figures include use of services in the Peterborough hinterland, not just the town centre, and by other operators such as Kime and Delaines. However, 2008/9 data were not available to us.

Figure 14.8: Map of Citi bus routes in Peterborough

Note: Citi 6 only began operation in September 2006, and Citi 7 only began operation in August 2008, taking over part of Citi 3.

Figure 14.9: Map of Local Link bus routes in Peterborough



14.3.3 Data presentation

On subsequent pages, the following data are presented:

- Table 14.7 – changes in overall patronage;
- Figure 14.10 – a graph showing overall changes in patronage over time;
- Table 14.8 – changes in patronage on individual routes over time;
- Figures 14.11-14.16 – graphs showing changes in patronage on individual routes, based on actual patronage figures, indices of patronage compared to the first month of available data, and 12-month rolling average data. Data for the Citi routes and the Local Link routes are presented separately, because of the different time periods used to record the data;
- Table 14.9 – a breakdown of patronage data for the Citi services, divided into concessions and non-concessions;
- Figures 14.17 and 14.18 – graphs showing changes in patronage by concessions/non-concessions;
- Table 14.10 – indices of changes in patronage on individual services compared with changes in service provision;
- Figure 14.19 – a graph presenting the data from Table 14.10;
- Figure 14.20 – a graph showing changes in patronage on the individual Citi routes, compared to periods of personal travel planning work;
- Tables 14.11-14.15 – analysis of changes in patronage on individual Citi routes, for time periods relevant to the personal travel planning work;
- Table 14.16 – quarterly data for the Local Link routes;
- Figure 14.21 and 14.22 – graphs showing changes in patronage on individual Local Link routes, with periods of personal travel planning marked;
- Table 14.17 – analysis of the Local Link quarters data in relation to personal travel planning activity;
- Table 14.18 – results from the household travel survey.

14.3.4 Data analysis

Overall effects on bus patronage

As shown in Table 14.7 and Figure 14.10, prior to 2004/5, BVPI data suggests that bus patronage levels were stable or slightly declining in Peterborough. However, between 2004/5 and 2007/8, this data set suggests that bus patronage throughout Peterborough increased by approximately 25%. (2008/9 data were not available). Meanwhile, changes in total monthly patronage for the Citi and Local Link services serving the main urban area are graphically shown in Figures 14.12, 14.13, 14.15 and 14.16. For these routes, between 2004/5 and 2008/9, bus patronage increased by an extra 2.6 million trips a year, an increase of 39.8%. Growth on these urban routes was greater than the growth recorded by the BVPI data for the whole of Peterborough. The increases on the Local Link services were particularly dramatic, with passenger numbers rising from 181,000 to 406,000 over that period, an increase of 125%. Growth occurred in every year, though the greatest increase in the use of Citi services occurred between 2005/6 and 2006/7, whilst the Local Link services showed particularly dramatic growth between 2003/4 and 2004/5.

Using a paired sample, one tailed T-test to compare the 12 months of Local Link bus patronage data from 2004/5 with 2008/9 gives a p-value of 0.000, indicating that the growth in Local Link patronage can be taken as statistically significant. Using a paired sample, one tailed T-test to compare the 13 periods of Citi bus patronage data from 2004/5 with 2008/9 gives a p-value of 0.000, indicating that the growth in Citi bus service patronage can be taken as statistically significant.

Impacts on individual routes

Looking at the 16 individual routes selected as being relevant to the *Travelchoice* project (given in Table 14.8 and Figures 14.11 through to 14.16), this growth occurred relatively generally. There were only four routes where patronage was not substantially higher in 2008/09 than in 2004/5, and in all four cases, it is plausible that this was due to substitution between services. (Specifically, passengers may have swapped from the Citi 5 to the 409/10/11; from the 401 and 403 to Citi 2 and 3; and from the 27 to Citi 1).

Looking at changes on individual routes, growth has been particularly significant on Citi 6 (since its introduction) and Citi 4 (in the autumn of 2005), though the introduction of the Citi 7 in mid 2008 caused reductions in patronage on both the Citi 3 and Citi 4. For Local Link services, increases are particularly noticeable on the 402/404 from September 2007 (due to the council transferring education trips from contract taxis onto the bus service); the 408 from September 2007 (due to a large increase in fare paying pupils, caused by the closure of one school and the opening of another); and the 407/415 (at least partly due to the introduction and expansion of the services).

Assessing the impacts of concessionary fares

The national concessionary fares scheme (for free, off-peak local travel) began in April 2006, with an extension of the scheme in April 2008[5]. As shown in Table 14.9 and Figures 14.17 and 14.18, growth in 'senior tickets' on Citi services was higher between 2005/6 and 2006/7 (42%) compared with either the year prior to that (21%) or the year after (15%). However, it is notable that substantial growth in senior ticket sales was already occurring prior to the introduction of concessionary fares. Meanwhile, patronage by 'non-seniors' was increasing too, and also increased more between 2005/6 and 2006/7 (11%) than in the year before (4%) or the year after (7%). In 2008/09, growth in the seniors market was, again, greater than growth in the non-seniors market, though, in both cases, growth rates were slowing slightly, and growth in the senior market between 2007/8 and 2008/9 was less than the growth that occurred in the previous year (i.e. growth of 12.9% compared with 15.0% between 2006/7 and 2007/8). Over the entire Sustainable Travel Town period (April 2004 to March 2009) approximately 44% of the total increase in patronage on Citi services was due to growth in travel by seniors.

In other words, concessionary fares undoubtedly acted as one factor in increasing the total bus market, but it does not provide anything like the full explanation for the total increase, since growth in travel by seniors was taking place prior to its introduction, and there was also substantial growth in travel by non-seniors.

Various different estimations based on the data given above suggest that, in general, approximately 10-15% of the total growth in bus use over the Sustainable Travel Town period may be due to concessionary fares.

[5] Peterborough City Council had had a reduced fares scheme in place for many years prior to that time.

Assessing the impacts of service provision

Table 14.10 and Figure 14.19 demonstrate changes in service provision compared with changes in bus patronage. For the sample of eight routes for which data were available and the Citi total (i.e. 9 data points), the Pearson's correlation co-efficient between the index of service provision increase for 2007/8 and the index of patronage increase for 2007/8 is 0.67, indicating that some correlation exists. (2008/9 data were not available for some routes or the Citi total due to the introduction of the Citi 7.) Looking at the total for all Citi routes, between 2004/5 and 2007/8, the increase in service provision of 128.6% also matches the increase in patronage of 133.2% relatively closely. However, a closer examination of the data suggests that the increase in patronage appears to have started occurring *before* the increase in service provision took place. Moreover, for the sample of eight routes, service kilometres increased by >10% on five of the routes, however, patronage grew by >10% on all of the routes. In particular, on Citi 1, Citi 2 and the 406, changes in service provision were relatively minimal whilst patronage increased substantially. The implication is that changes in service provision may have helped to increase bus use, but also do not provide a full explanation.

Assessing the significance of population growth

Between 2004 and 2007, the population of Peterborough is estimated to have increased by 6.1% (according to council data). Clearly, this increase may have contributed to the growth in bus patronage, but will only account for a proportion of that growth. (Combined growth on the Citi and Local Link services was estimated to be 36% between 2004/5 and 2007/8, indicating that population growth might account for perhaps a sixth of this – i.e. 17%.)

Assessing the impacts of the personal travel planning work

Table 14.6 indicates the routes that were of most relevance to the personal travel planning work. Two different kinds of analysis have been undertaken on the data. Figure 14.20 and Tables 14.11 to 14.15 provide analysis of the Citi data. Meanwhile, Tables 14.16 and 14.17, and Figures 14.21 and 14.22 provide analysis of the Local Link data.

Table 14.6: Relating personal travel planning work to bus routes in Peterborough

Personal travel planning phase		
	Citi services	Local Link services
1 – September to December 2005	2, 4, 5	406, 409, 410, 411
2 – April to July 2006	1	401, 406, 408
3 – September to December 2006	2, 3	401, 402, 403, 404, 406, 408
4 – April to July 2007	1, 6	27, 407, 415
5 – September to December 2007	(1), 3, 6	407, 415

For the Citi services, examination of Figure 14.20 and Tables 14.11-14.15 suggests the following:

- Following personal travel planning activity in Phase 1, growth on Citi 2 was greater than that occurring on the 1 or the 3. Citi 4 performed especially well. The personal travel planning work may also have helped to reverse the decline that was occurring on Citi 5.

- Following activity in Phase 2, growth on the Citi 1 was greater than in the preceding year, and somewhat greater than on all other routes except the Citi 4.
- Following activity in Phase 3, growth on the Citi 3 was greater than in the preceding year, though this was also the case on other routes. (However, it is notable that all of the other routes with available data had by this stage been subject to personal travel planning activities.)
- Following activity in Phases 4 and 5, Citi 6 showed dramatic growth, though this seems to have been ongoing since the start of the service in 2005. There were no obvious effects on the other potentially affected routes.

In brief, then, this implies that the obvious effects were from Phase 1 (growth on the 2 and 4, and decline on the 5 possibly reversing); Phase 2 (on Citi 1); Phase 3 (on Citi 3), and, possibly, Phases 4 and 5 (on Citi 6, helping to sustain growth that was already occurring).

For Local Link services, examination of Tables 14.16 and 14.17, and Figures 14.21 and 14.22 suggests the following:

- Patronage on the 409/410/411 reached a small peak during the Phase 1 work.
- Compared with services elsewhere, services in the Phase 2 area generally performed better following personal travel planning work, and were still performing better than those in the control area a year later. Patronage on the 404 and 408 may have particularly benefited from the personal travel planning activity.
- A year after personal travel planning work took place, services in the Phase 3 area were performing better that those in the control area, with, potentially, another boost to the 404 and 408 services. However, there was no discernable effect immediately after personal travel planning activities.
- In the quarter following the personal travel planning work, services in the Phase 4 area were performing better than those elsewhere, though this effect was not sustained a year later.
- A year after the personal travel planning work, services in the Phase 5 area were performing better that those in the control area. (There was also a small effect on the disaggregated data for the 415 in the quarter immediately following the personal travel planning work.)

It is notable that several routes – in particular, the 27, 401 and 406 – were subject to several phases of personal travel planning work, and appear to have undergone a change in trend during the Sustainable Travel Towns period, that could be at least partially attributable to the personal travel planning activity.

It is also the case that growth was already occurring on a number of the routes affected by personal travel planning activity prior to the personal travel planning activity taking place (in particular, on the 402/404; 408; 409/410/411; and the 407/415).

Comparison with the household survey data
Evidence from the household travel surveys is given in Table 14.18.

The broad picture that emerges from these data is as follows[6]:

- Bus trips increased by 36-43% (with a slightly smaller increase, of 31-33%, for all public transport trips).
- Distance travelled by bus increased by 44-48%, and distance travelled by public transport by 47-54%.
- The greatest period of increase was probably 2007 to 2008.
- During Phases 1, 2 and 3 of the personal travel planning activity, public transport use increased more amongst the target households than amongst the control group households.

The order of magnitude of increase in bus use recorded in the household travel survey is broadly in line with that shown in the bus patronage data. The timing of the changes shown is not inconsistent with the picture of ongoing growth emerging from the patronage data (and the Local Link data do appear to have experienced particular growth from mid-2007). The patronage data also show potential effects from the personal travel planning activity.

14.3.5 Summary and conclusions about bus use in Peterborough

The following conclusions are suggested by the data:

- Between 2004/5 and 2008/9, use of Citi services grew by 37%, representing an additional 2.4 million bus trips per year, while Local Link services grew from about 180,000 to about 406,000, an increase of 125%. In total, then, intra-city bus trips grew by approximately 2.6 million per year. This level of growth is broadly consistent with the evidence from the household travel surveys.
- Concessionary fares may help to explain some of the growth, but there was significant growth in travel by non-seniors, and growth in the senior market was occurring prior to concessionary fare introduction anyway. Our calculations suggest that the introduction of concessionary fares might account for perhaps 10-15% of the total increase between 2004/5 and 2008/9.
- Analysis of increases in bus kilometres versus bus patronage shows that both increased over time, in relatively similar proportions. However, there were a number of cases where increases in patronage *pre-dated* increases in service provision, and there were also various routes where patronage increased substantially with no major increases in bus provision. This implies that, while increases in service provision may have been key to sustaining growth, they were not necessarily the trigger for growth taking place.
- It is estimated that between 2004 and 2007, population increased by 6%, which could account for 17% of the increase in bus patronage over that period.
- All phases of the personal travel planning work potentially had some effect on patronage, though disentangling those effects is not straightforward. In some cases, growth was occurring already, and the personal travel planning activity may have

[6] For bus trips of up to 50km, the change in trips was +36% to +43%, and the change in distance travelled was +54% to +56%.

helped to sustain this. In other cases, there were short-term increases in patronage in the target areas following the personal travel planning intervention, but no long-term improvements. In yet other cases, it appears that there was no short-term effect, but services in the personal travel planning area performed better than other services in the longer term. Changes in service provision may also have affected which services customers used, leading to some confounding effects.

- As well as the specific factors assessed, it is notable that Peterborough put considerable emphasis on integrated ticketing; improving the quality of vehicles and bus stops; and generally improving the quality and availability of public transport information, including the roll-out of real-time information, starting in July 2005. All of these factors may also have acted to boost patronage.

Table 14.7: Overall annual bus patronage totals in Peterborough, percentage changes and comparison with 2004/5

	Local Link services	Citi services	Total for Local Link and Citi services	BVPI data from Peterborough
% change compared with previous year				
2001/2				-2.8
2002/3				-4.4
2003/4				2.1
2004/5	176.2			15.1
2005/6	26.9	6.1	6.6	5.6
2006/7	30.2	15.6	16.1	9.7
2007/8	29.3	8.6	9.4	7.5
2008/9	5.1	3.1	3.2	n/a
Index compared to 2004/5				
2000/01				91.6
2001/2				89.0
2002/3				85.1
2003/4	36.2			86.9
2004/5	100.0	100.0	100.0	100.0
2005/6	126.9	106.1	106.6	105.6
2006/7	165.3	122.6	123.8	115.8
2007/8	213.7	133.2	135.5	124.5
2008/9	224.6	137.3	139.8	n/a

Notes: Yellow indicates growth compared to the preceding year. Orange indicates growth of 10% of more compared to the preceding year. Pink indicates that patronage was greater than in 2004/05. Red indicates that patronage was greater by 10% or more than in 2004/05.

Figure 14.10: Changes in annual bus patronage for Citi and Local Link services in Peterborough

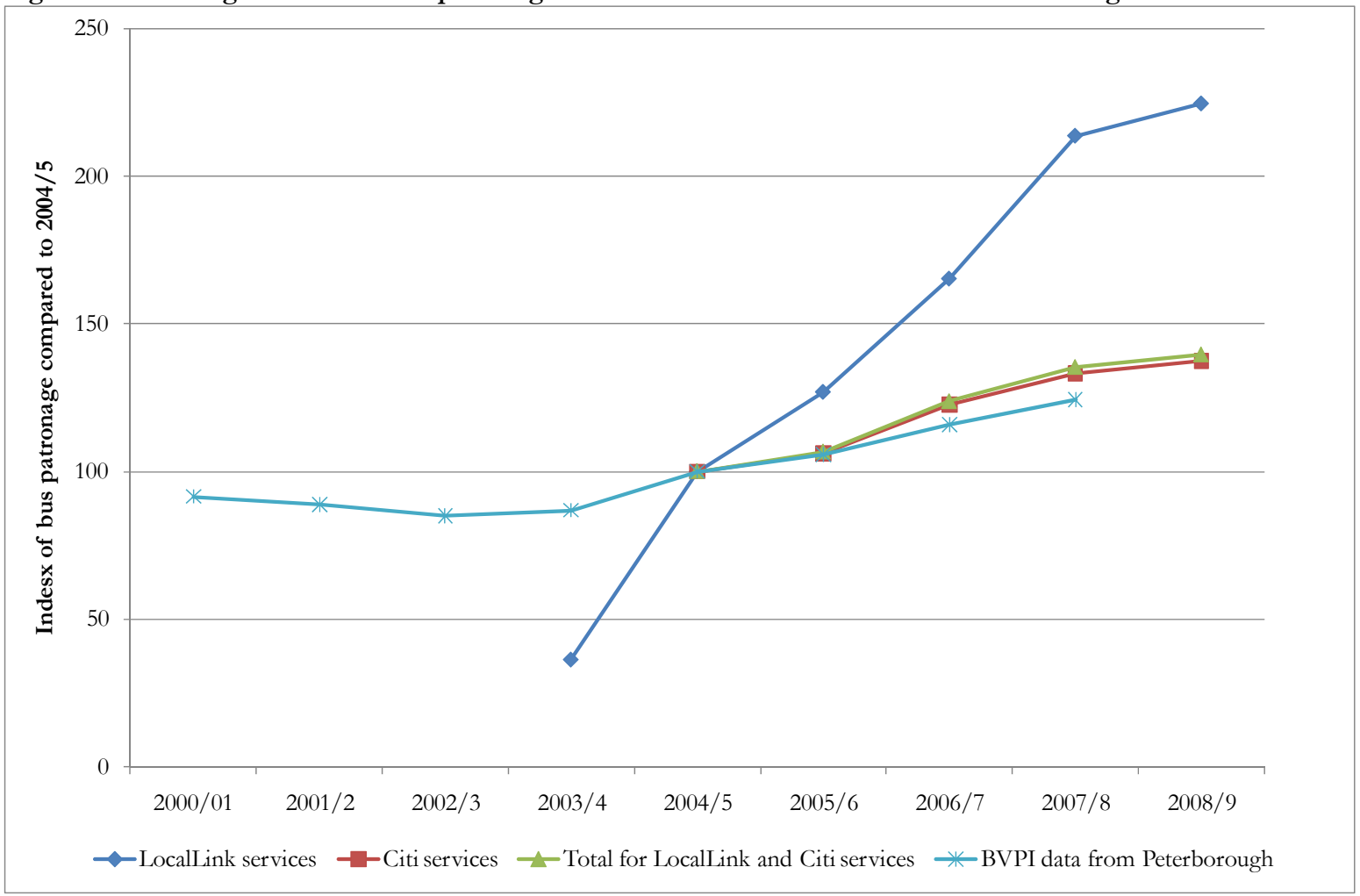


Table 14.8: Annual bus patronage totals for individual routes in Peterborough, percentage changes and comparison with 2004/5 or earliest year of data

	401	402/404	403	FCT404/404	406	407/415	408	409/410/411	27	Citi 1	Citi 2	Citi 3	Citi 4	Citi 5	Citi 6
% changed compared with the previous year															
2004/5		-51.8		59.1				30.5	139.6						
2005/6	-37.2	74.8	2.0	-4.8	-0.4	101.0	107.6	63.3	18.5	5.9	8.7	2.8	36.8	-18.1	
2006/7	-12.8	81.9	22.4	-13.4	9.6	58.4	126.8	37.8	-4.8	14.7	9.8	11.1	50.7	4.7	149.6
2007/8	38.5	51.6	-2.5	6.3	33.0	32.0	67.6	23.2	-9.0	7.8	7.0	9.0	4.8	5.9	38.6
2008/9	34.2	31.1	-62.9	30.6	8.7	16.1	24.3	-7.8		3.3	3.5	-1.1%*		4.6	19.8
Index compared with 2004/5 or earliest year of available data															
2003/4		207.5		62.9				76.6	41.7						
2004/5	100.0	100.0	100.0	100.0	100.0	100	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	
2005/6	62.8	174.8	102.0	95.2	99.6	201.0	207.6	163.3	118.5	105.9	108.7	102.8	136.8	81.9	100.0
2006/7	54.7	318.0	124.9	82.5	109.2	318.4	471.0	225.0	112.9	121.4	119.4	114.3	206.2	85.8	249.6
2007/8	75.8	481.9	121.8	87.7	145.3	420.2	789.5	277.2	102.7	130.9	127.7	124.4	216.2	90.9	346.0
2008/9	101.6	631.8	45.2	114.5	157.9	487.9	981.2	255.5		135.2	134.5	133.5*		95.1	414.5

Notes: Yellow indicates growth compared to the preceding year. Orange indicates growth of 10% of more compared to the preceding year. Pink indicates that patronage was greater than in 2004/05. Red indicates that patronage was greater by 10% or more than in 2004/05. *These figures compare the combined patronage for Citi 3, 4 and 7 in 2008/9 with the combined patronage of Citi 3 and Citi 4 in preceding years.

Figure 14.11: Changes in bus patronage for individual Citi routes in Peterborough

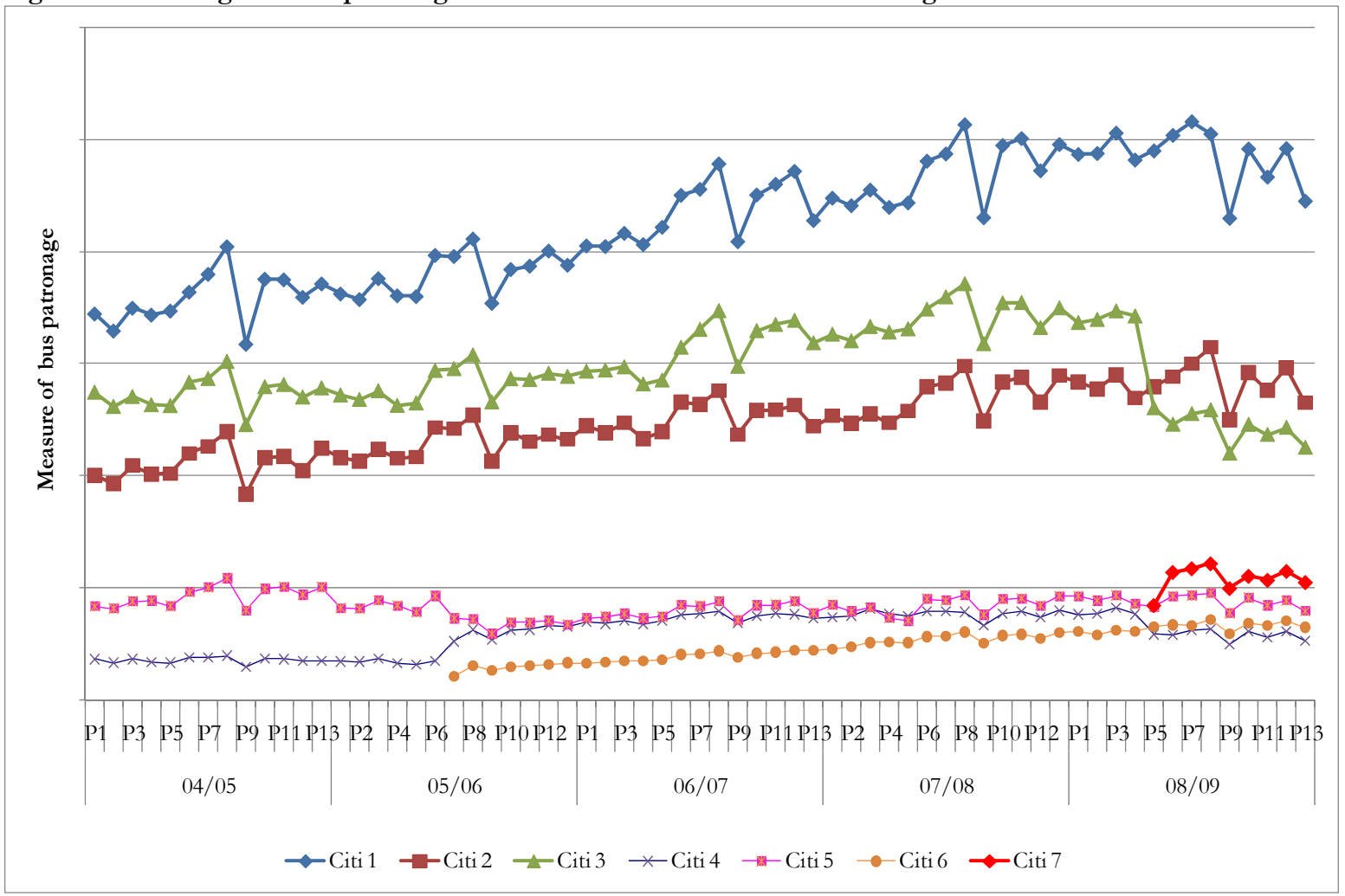


Figure 14.12: Changes in bus patronage for individual Citi routes in Peterborough, indexed to earliest month of available data

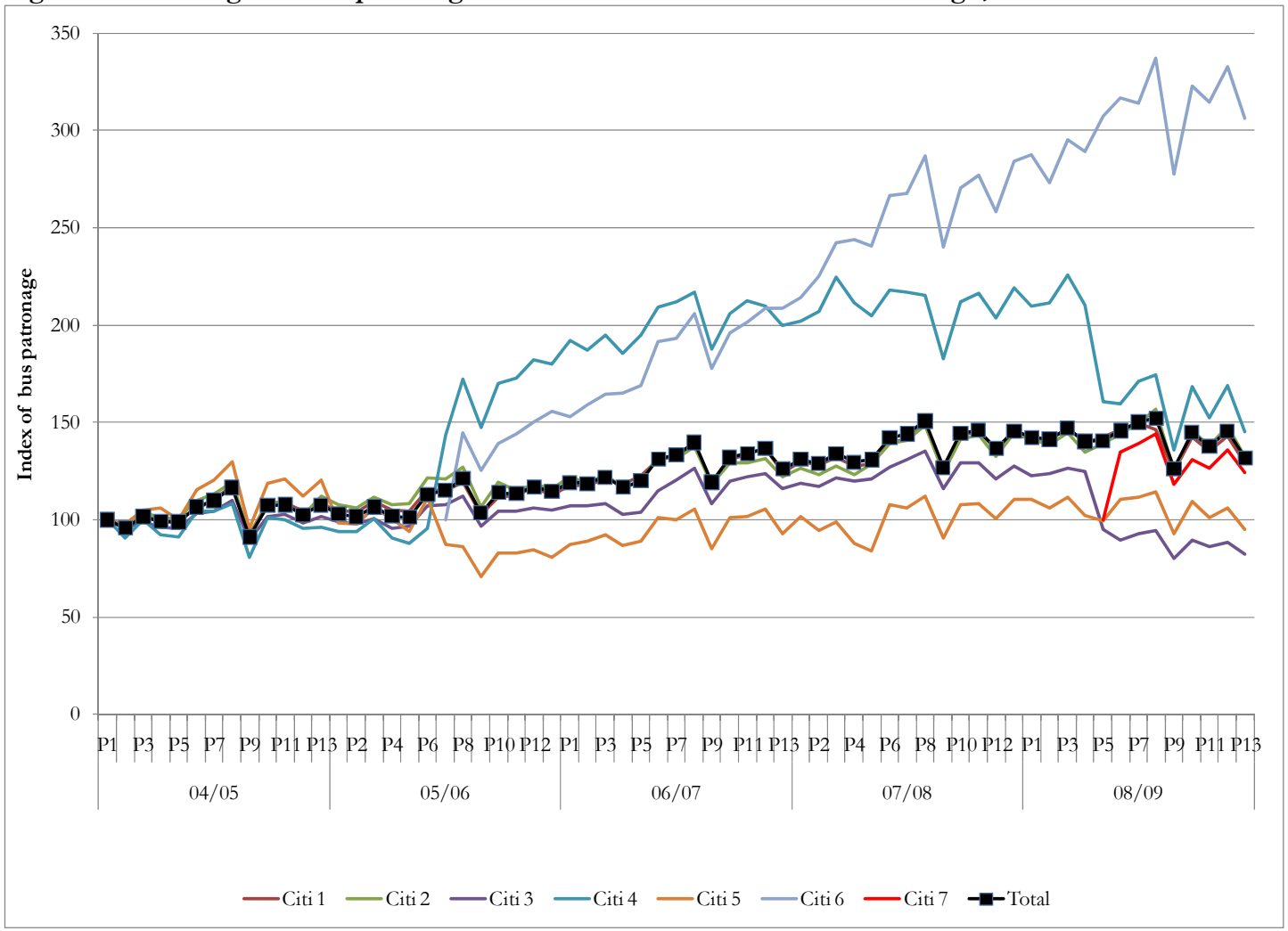
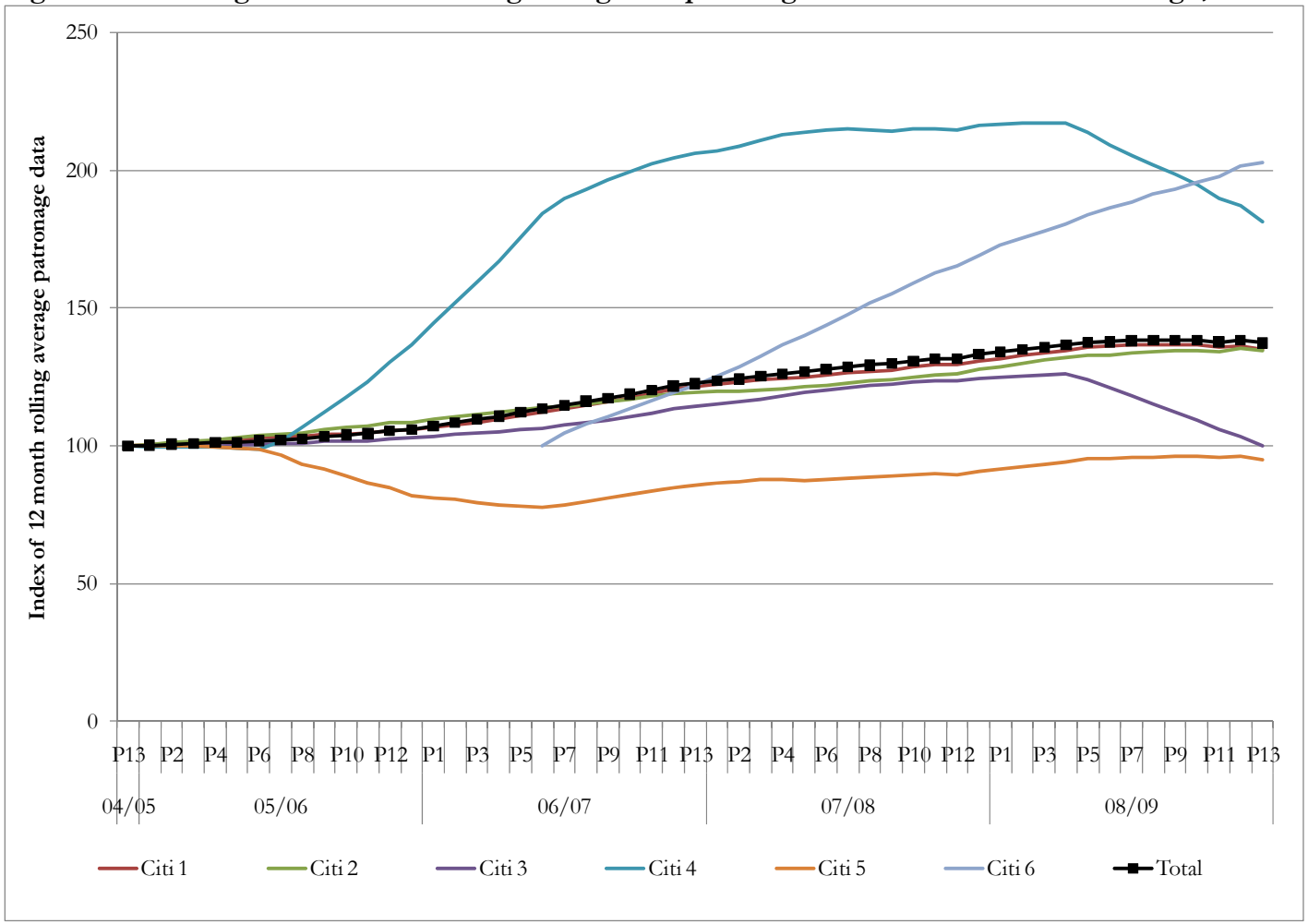
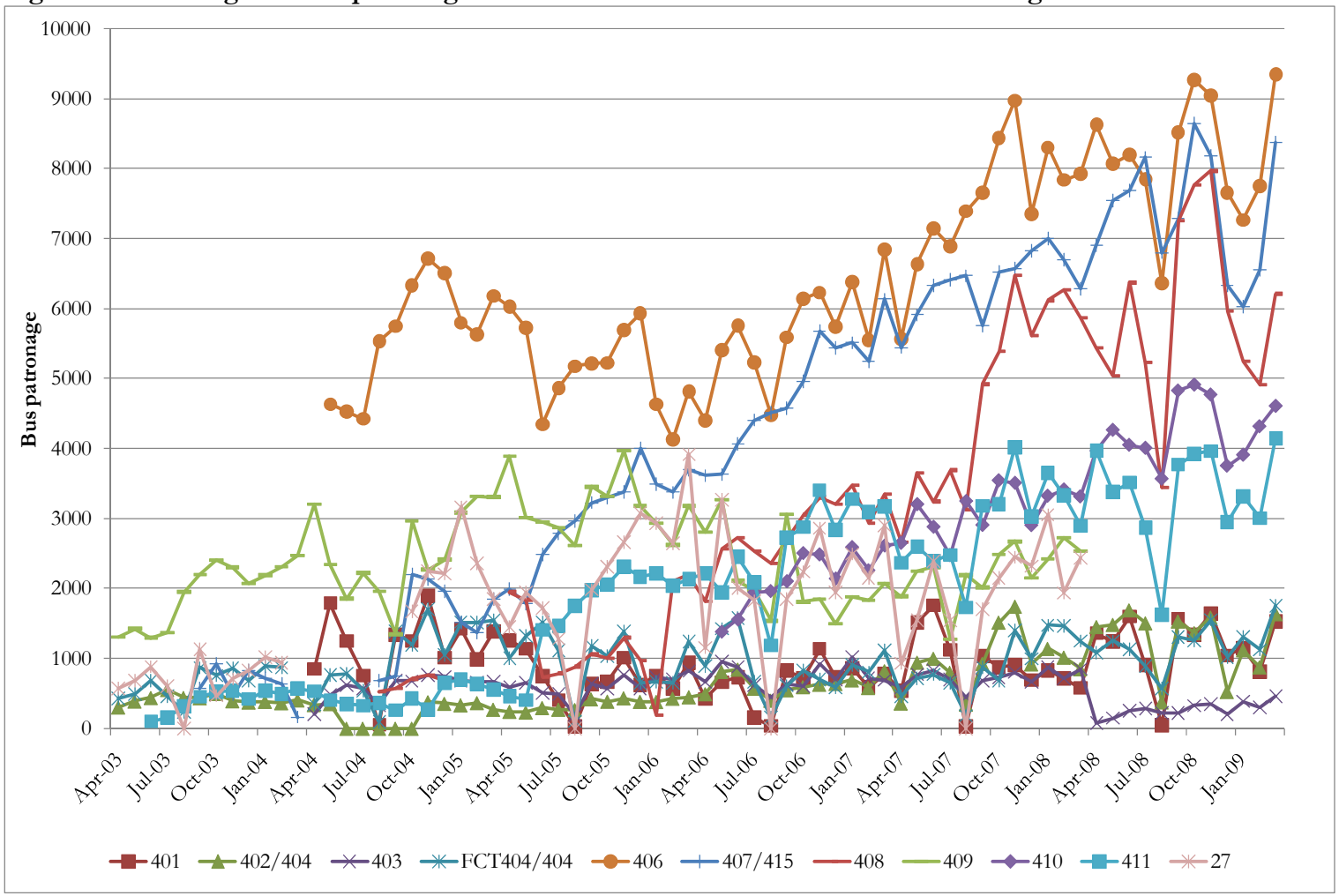


Figure 14.13: Changes in 12-month rolling average bus patronage for Citi routes in Peterborough, indexed to first period



Note: Citi 7 data are included in the total.

Figure 14.14: Changes in bus patronage for individual Local Link routes in Peterborough



Note: Graph shows data prior to any data interpolation.

Figure 14.15: Changes in bus patronage for individual Local Link routes in Peterborough, indexed to April 2004 or first month of available data

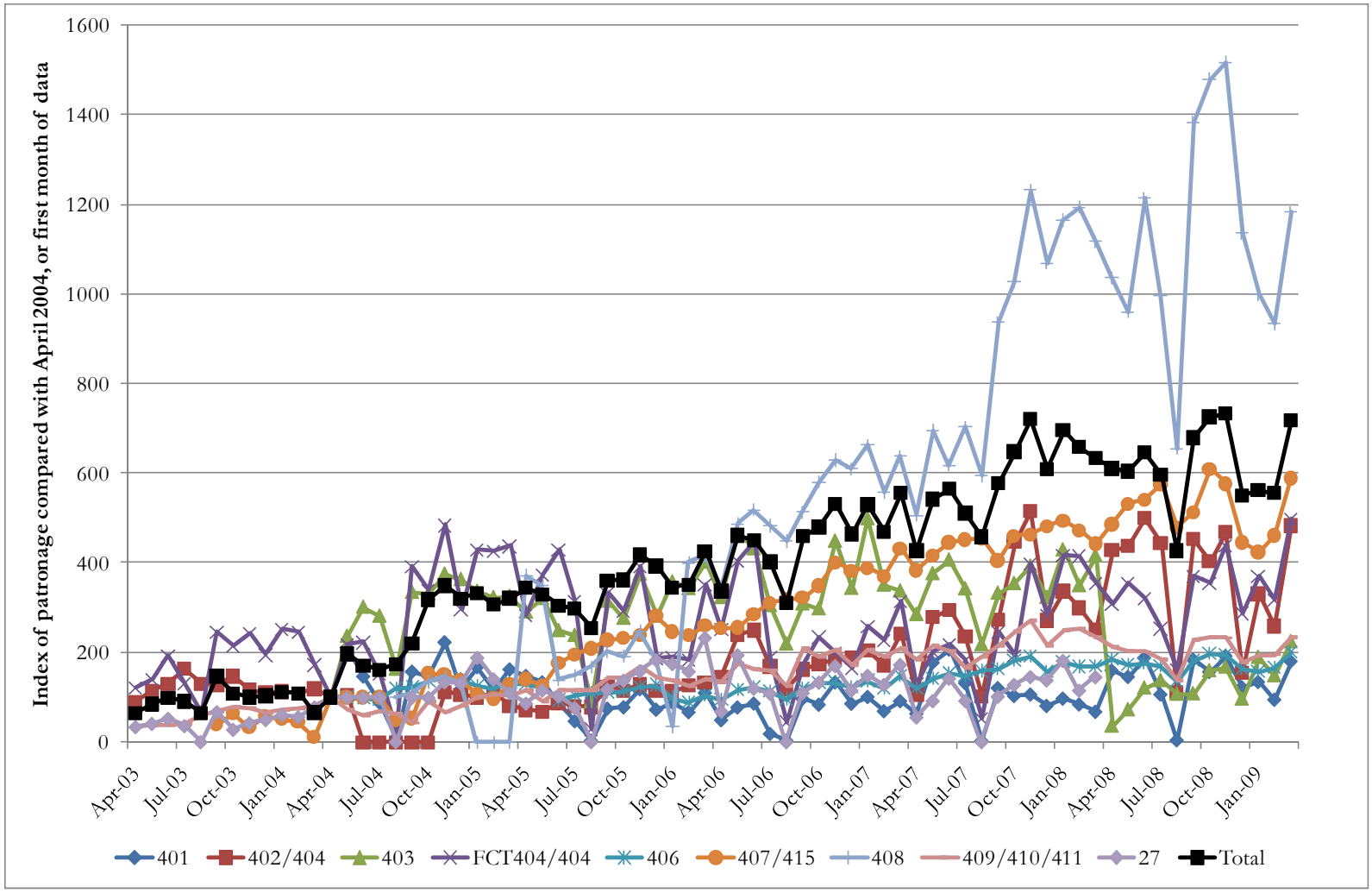


Figure 14.16: Changes in 12-month rolling average bus patronage for Local Link routes in Peterborough, indexed to first 12-month period of available data

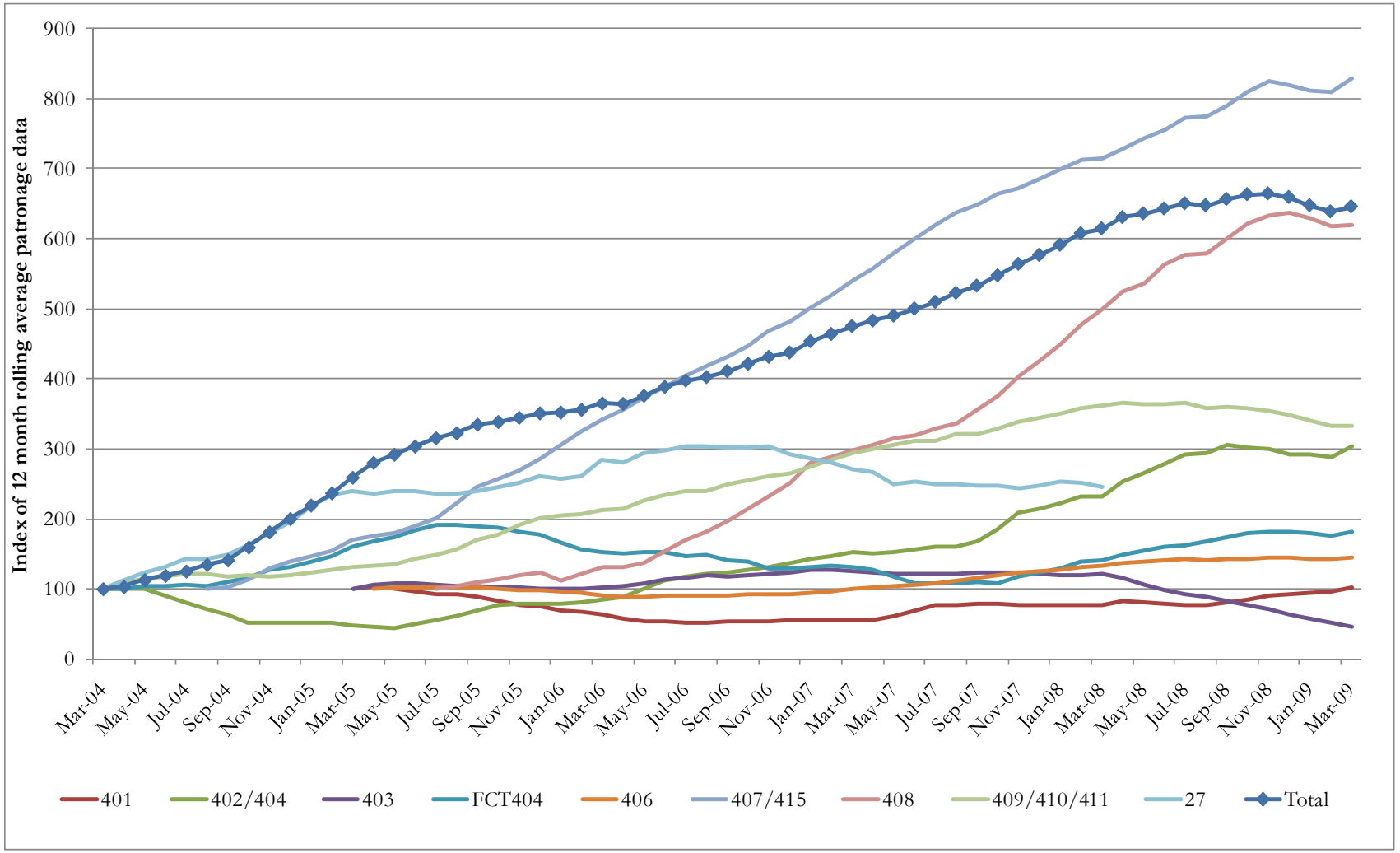


Table 14.9: Changes in total bus patronage in Peterborough, by passenger type

	Seniors	Others	Total
% change compared with preceding year			
05/06	20.7	3.8	6.1
06/07	41.5	10.9	15.6
07/08	15.0	7.2	8.6
08/09	12.9	0.6	3.1
Index compared with 2005/6			
04/05	82.8	96.4	94.3
05/06	100.0	100.0	100.0
06/07	141.5	110.9	115.6
07/08	162.8	118.9	125.6
08/09	183.8	119.6	129.5

Figure 14.17: Changes in total bus patronage in Peterborough, by passenger type

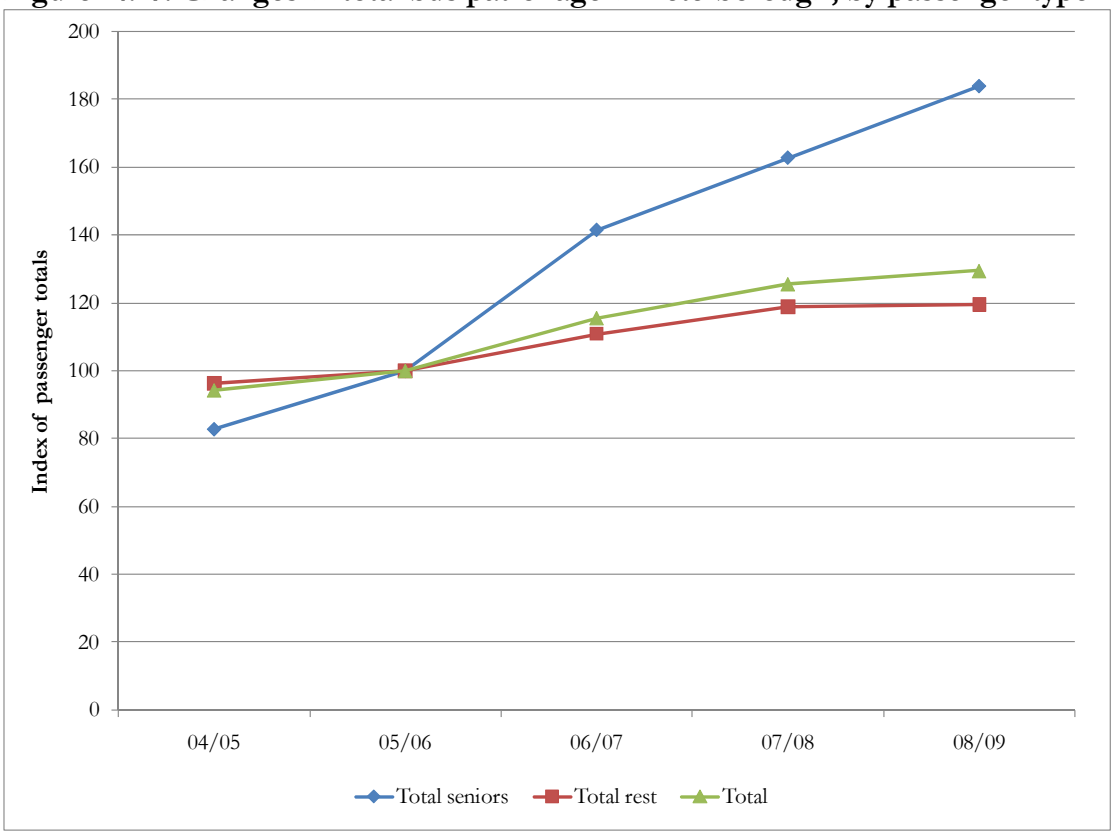
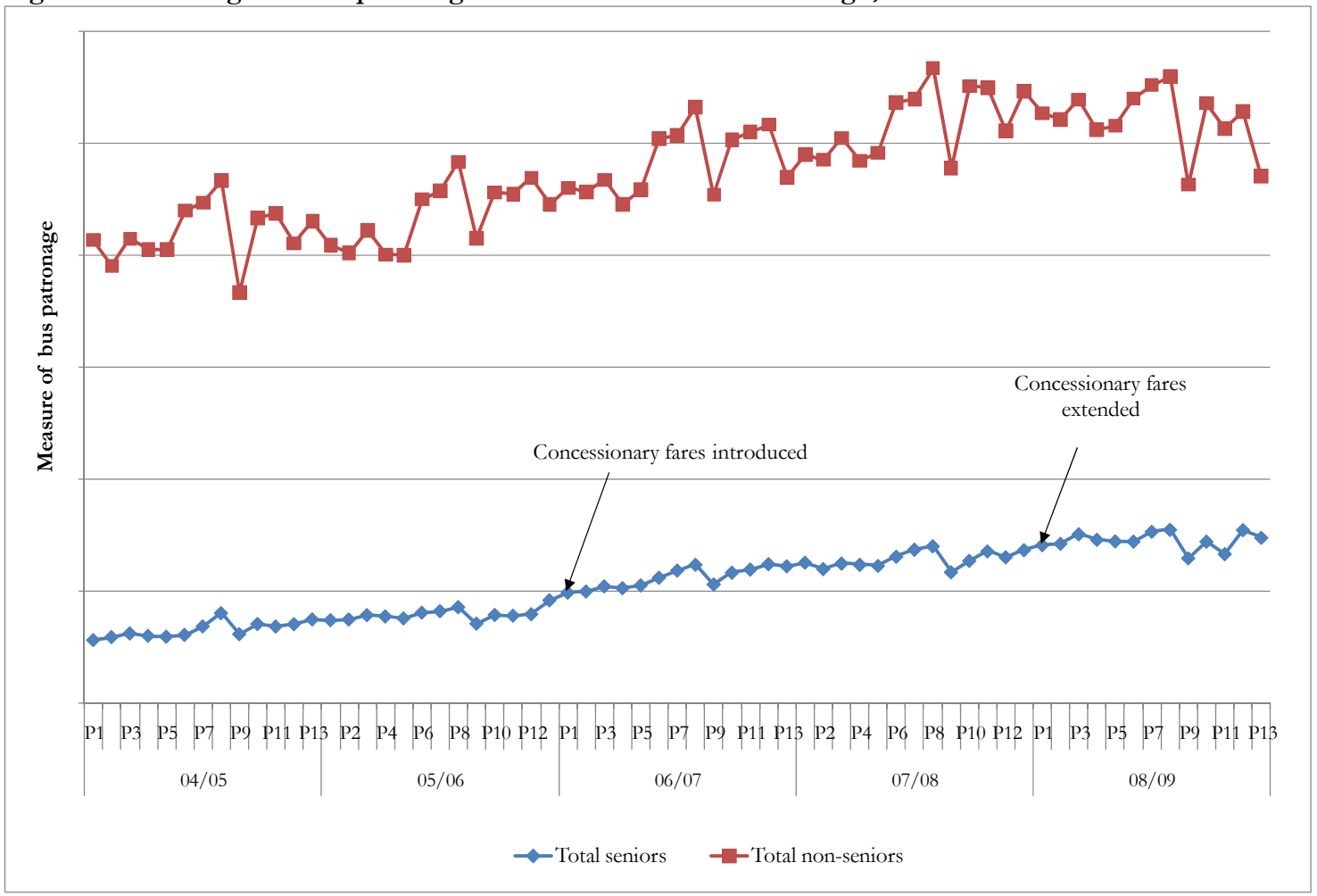


Figure 14.18: Changes in bus patronage on Citi services in Peterborough, divided into 'seniors' and 'non-seniors'



Note: Data are not stacked.

Table 14.10: Comparing increases in bus patronage with changes in service provision in Peterborough

	2004/05	2005/06	2006/07	2007/08	2008/09
Citi 1 kms	100.0	100.0	100.0	101.0	102.5
Citi 1 patronage	100.0	105.9	121.4	130.9	135.2
Citi 2 kms	100.0	100.0	100.0	102.3	104.8
Citi 2 patronage	100.0	108.7	119.4	127.7	134.5
Citi 3 kms	100.0	100.0	115.1	145.1	
Citi 3 patronage	100.0	102.8	114.2	124.4	
Citi 4, 5, 4/5 kms	100.0	100.0	125.0	172.2	
Citi 4, 5, 4/5 patronage	100.0	97.1	119.1	125.5	
Citi 6 kms		100.0	555.1	1035.4	1035.4
Citi 6 patronage		100.0	249.6	346.0	414.5
Citi total kms	100.0	100.0	110.3	128.6	
Citi total patronage	100.0	106.1	122.6	133.2	137.3
LL406 kms	100.0	124.2	110.1	110.0	107.4
LL406 patronage	100.0	99.6	109.2	145.3	157.9
LL407/415 kms	100.0	245.7	381.2	404.4	405.9
LL407/415 patronage	100.0	201.0	318.4	420.2	487.9
LL408 kms	100.0	462.8	378.9	653.1	754.7
LL 408 patronage	100.0	207.6	471.0	789.5	981.2

Notes: All data indexed to 2004/5, except for Citi 6. The gaps in the data for 2008/9 are due to the changes in routes generated by the introduction of Citi 7, which makes comparisons with earlier years problematic. At the time that service kilometre data for 2008/9 were supplied, the Citi 7 was not included in the figures.

Figure 14.19: Comparing changes in bus patronage with changes in service provision in Peterborough

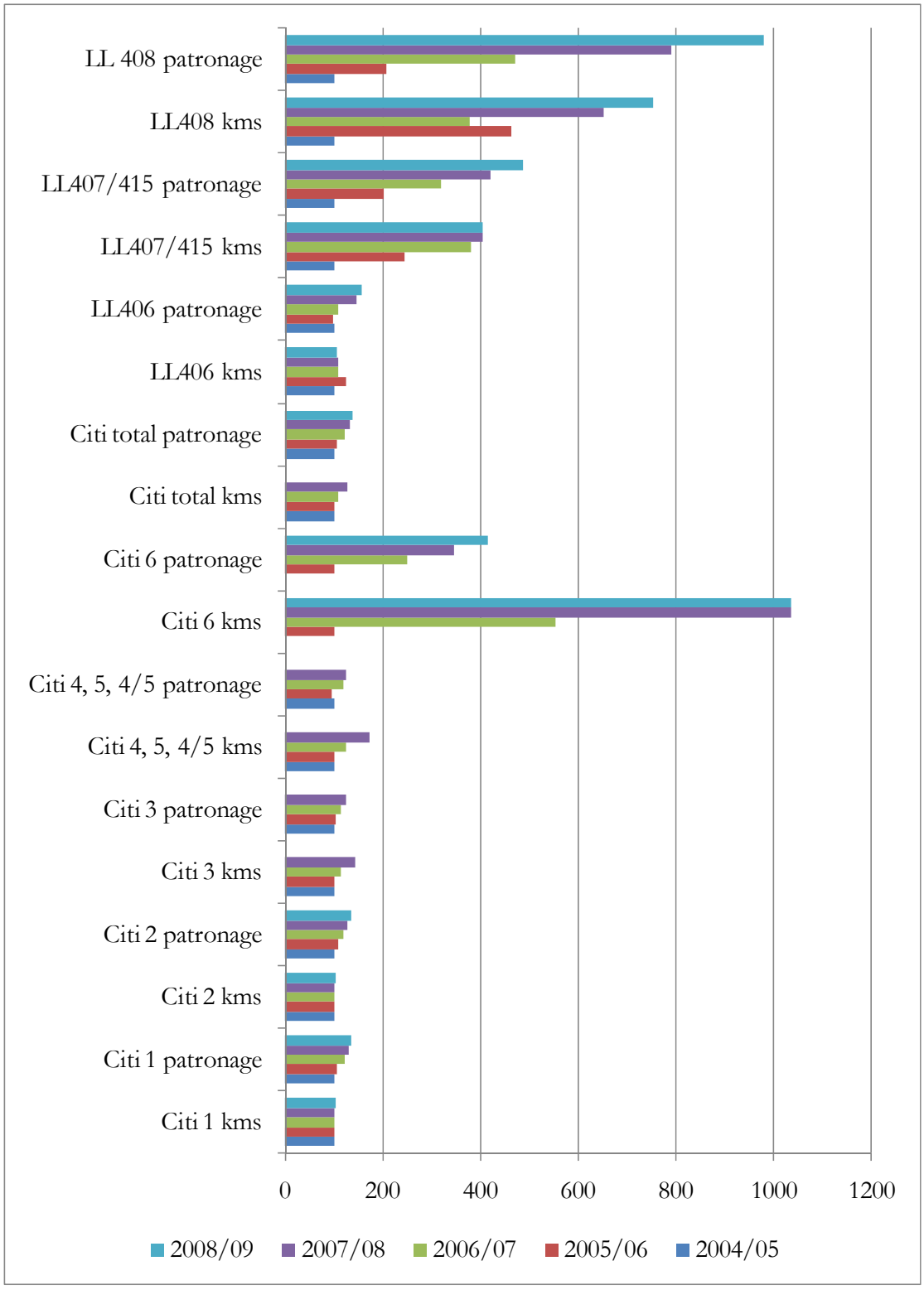
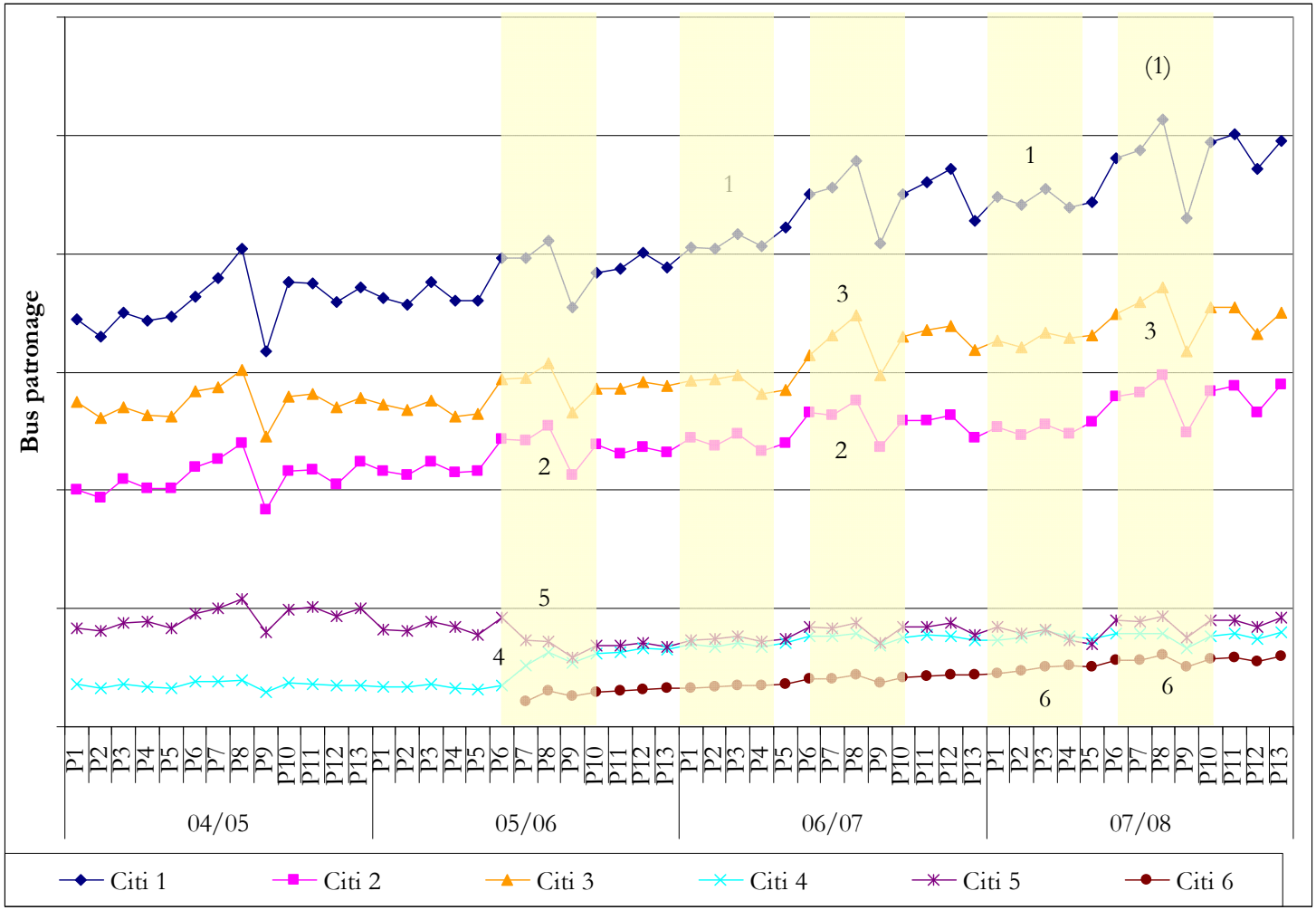


Figure 14.20: Changes in bus patronage on individual Citi routes in Peterborough, in relation to personal travel planning phases



Note: Numbers in bold indicate the routes affected in each personal travel planning phase.

Table 14.11: Citi bus patronage data relevant to personal travel planning Phase 1 in Peterborough

	24 weeks comparison, 2004-5 to 2005-6, P6-P12	52 weeks comparison, 2004-5 to 2005-6, P6-P5
	% change	%change
Citi 1	6.0	8.6
Citi 2	10.0	9.8
Citi 3	4.0	5.5
Citi 4	56.0	76.4
Citi 5	-25.5	-21.0
Citi 6	n/a	n/a
Total	7.5	10.6

Note: Personal travel planning activity started in P6, 2005. Grey shading indicates potentially affected routes.

Table 14.12: Citi bus patronage data relevant to personal travel planning Phase 2 in Peterborough

	24 weeks comparison, P1-P6, % change		52 weeks comparison, P1-P13 % change	
	2004-5	2005-6	2004/5-2005/6	2005/6-2006/7
Citi 1	6.5	13.2	5.9	14.7
Citi 2	8.3	10.5	8.7	9.8
Citi 3	1.3	7.9	2.8	11.1
Citi 4	-2.8	106.9	36.8	50.7
Citi 5	-2.7	-10.2	-18.1	4.7
Citi 6	n/a	n/a	n/a	n/a
Total	4.2	15.9	6.1	15.6

Note: Personal travel planning activity started in P1, 2006. Grey shading indicates potentially affected routes.

Table 14.13: Citi bus patronage data relevant to personal travel planning Phase 3 in Peterborough

	24-week comparison, P6-P12, % change		52-week comparison, P6-P5, % change	
	2004/5-2005/6	2005/6-2006/7	2004/5-2005/6	2005/6-2006/7
Citi 1	6.0	16.3	8.6	12.7
Citi 2	10.0	9.9	9.8	7.6
Citi 3	4.0	13.2	5.5	12.9
Citi 4	56.0	34.2	76.4	21.9
Citi 5	-25.5	15.7	-21.0	11.5
Citi 6	n/a	n/a	n/a	n/a
Total	7.5	16.2	10.6	13.2

Note: Personal travel planning activity started in P6, 2006. Grey shading indicates potentially affected routes.

Table 14.14: Citi bus patronage data relevant to personal travel planning Phase 4 in Peterborough

	24-week comparison, P1-P6, % change		52-week comparison, P1-P13, % change	
	2005-6	2006-7	2004/5-2005/6	2005/6-2006/7
Citi 1	13.2	8.1	14.7	7.8
Citi 2	10.5	4.9	9.8	7.0
Citi 3	7.9	12.6	11.1	9.0
Citi 4	106.9	9.0	50.7	4.8
Citi 5	-10.2	5.3	4.7	5.9
Citi 6	n/a	43.0	n/a	38.6
Total	15.9	9.5	15.6	8.6

Note: Personal travel planning activity started in P1, 2007. Grey shading indicates potentially affected routes.

Table 14.15: Citi bus patronage data relevant to personal travel planning Phase 5 in Peterborough

	24-week comparison, P6-P12, % change		48-week comparison, P6-P4, % change	
	2005/6-2006/7	2006/7-2007/8	2005/6-2006/7	2006/7-2007/8
Citi 1	16.3	6.4	13.4	8.3
Citi 2	9.9	6.8	7.6	9.3
Citi 3	13.2	6.4	12.6	6.0
Citi 4	34.2	0.8	23.5	1.7
Citi 5	15.7	4.7	12.9	8.4
Citi 6	n/a	35.9	56.7	31.4
Total	16.2	7.0	13.6	8.3

Notes: Personal travel planning activity started in P6, 2007. Grey shading indicates potentially affected routes. A 48-week comparison has been used, because of the start of the Citi 7 in P5 2008, which affects the data for Citi 3 and Citi 4.

Table 14.16: Quarterly bus patronage on Local Link routes in Peterborough, percentage changes and comparison with 2004/5

	401	402/404	403	FCT404	406	407/415	408	409/410 /411	27	Total
Q2-03		1132		1597				4129	2132	13629
Q3-03		1430		1560				6430	1732	16629
Q4-03		1265		2300		2234		8267	2004	17124
Q1-04		1153		2364		1521		8572	3261	15570
Q2-04	3887	692	1302	1904		4254		8696	5022	25646
Q3-04	2146	0	1590	2011	15702	2850		6475	3348	30457
Q4-04	4155	735	2183	3955	19546	6298	2160	8994	6125	54151
Q1-05	3787	973	2010	4572	17611	4739	3960	11593	7375	52660
Q2-05	3144	769	1757	3836	16104	6257	4518	12116	5114	53615
Q3-05	1072	959	1314	2386	15254	8977	2726	14136	3264	50088
Q4-05	2291	1207	1905	3072	16852	10677	3267	17000	8048	64319
Q1-06	2264	1261	2251	2557	13571	10560	4483	15130	9497	61574
Q2-06	1816	2150	2497	3895	15562	11302	7098	17723	6426	68469
Q3-06	1018	1523	1701	1433	15300	13494	7593	18575	3668	64305
Q4-06	2581	1862	2225	2111	18110	16078	9561	21390	7040	80958
Q1-07	2230	2096	2423	2825	18764	16892	9758	22781	7547	85316
Q2-07	3811	2304	2180	1939	19343	17684	9557	22528	4864	84210
Q3-07	2178	2071	1823	1701	21935	18635	11733	21498	3253	84827
Q4-07	2474	4182	2185	3083	24764	19928	17473	27507	6917	108513
Q1-08	2125	3008	2439	4190	24069	19989	18250	27594	7429	109093
Q2-08	4197	4630	469	3469	24898	22144	16854	23141		102100
Q3-08	2512	3416	721	2772	22732	22248	15931	20659		93356
Q4-08	4012	3480	866	3818	25965	23173	21699	24267		110232
Q1-09	3483	3636	1148	4189	24362	20941	16366	23292		100712
% change compared with the relevant quarter in the preceding year										
Q2-04		-38.9		19.2				110.6	135.6	88.2
Q3-04		-100.0		28.9				0.7	93.3	83.2
Q4-04		-41.9		72.0		181.9		8.8	205.6	216.2
Q1-05		-15.6		93.4		211.6		35.2	126.2	238.2
Q2-05	-19.1	11.1	34.9	101.5		47.1		39.3	1.8	109.1
Q3-05	-50.0		-17.4	18.6	-2.9	215.0		118.3	-2.5	64.5
Q4-05	-44.9	64.2	-12.7	-22.3	-13.8	69.5	51.3	89.0	31.4	18.8
Q1-06	-40.2	29.6	12.0	-44.1	-22.9	122.8	13.2	30.5	28.8	16.9
Q2-06	-42.2	179.6	42.1	1.5	-3.4	80.6	57.1	46.3	25.7	27.7
Q3-06	-5.0	58.8	29.5	-39.9	0.3	50.3	178.5	31.4	12.4	28.4
Q4-06	12.7	54.3	16.8	-31.3	7.5	50.6	192.7	25.8	-12.5	25.9
Q1-07	-1.5	66.2	7.6	10.5	38.3	60.0	117.7	50.6	-20.5	38.6
Q2-07	109.9	7.2	-12.7	-50.2	24.3	56.5	34.6	27.1	-24.3	23.0
Q3-07	113.9	36.0	7.2	18.7	43.4	38.1	54.5	15.7	-11.3	31.9
Q4-07	-4.1	124.6	-1.8	46.0	36.7	23.9	82.8	28.6	-1.7	34.0
Q1-08	-4.7	43.5	0.7	48.3	28.3	18.3	87.0	21.1	-1.6	27.9
Q2-08	10.1	101.0	-78.5	78.9	28.7	25.2	76.4	2.7		21.2
Q3-08	15.3	64.9	-60.4	63.0	3.6	19.4	35.8	-3.9		10.1
Q4-08	62.2	-16.8	-60.4	23.8	4.8	16.3	24.2	-11.8		1.6
Q1-09	63.9	20.9	-52.9	0.0	1.2	4.8	-10.3	-15.6		-7.7

Index compared with financial year 2004/5										
Q2-03		163.6		83.9				47.5	42.5	53.1
Q3-03				77.6				99.3	51.7	54.6
Q4-03		172.1		58.2		35.5		91.9	32.7	31.6
Q1-04		118.5		51.7		32.1		73.9	44.2	29.6
Q2-04	100.0	100.0	100.0	100.0		100.0		100.0	100.0	100.0
Q3-04	100.0		100.0	100.0	100.0	100.0		100.0	100.0	100.0
Q4-04	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Q1-05	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Q2-05	80.9	111.1	134.9	201.5		147.1		139.3	101.8	209.1
Q3-05	50.0		82.6	118.6	97.1	315.0		218.3	97.5	164.5
Q4-05	55.1	164.2	87.3	77.7	86.2	169.5	151.3	189.0	131.4	118.8
Q1-06	59.8	129.6	112.0	55.9	77.1	222.8	113.2	130.5	128.8	116.9
Q2-06	46.7	310.7	191.8	204.6		265.7		203.8	128.0	267.0
Q3-06	47.4		107.0	71.3	97.4	473.5		286.9	109.6	211.1
Q4-06	62.1	253.3	101.9	53.4	92.7	255.3	442.6	237.8	114.9	149.5
Q1-07	58.9	215.4	120.5	61.8	106.5	356.4	246.4	196.5	102.3	162.0
Q2-07	98.0	332.9	167.4	101.8		415.7		259.1	96.9	328.4
Q3-07	101.5		114.7	84.6	139.7	653.9		332.0	97.2	278.5
Q4-07	59.5	569.0	100.1	78.0	126.7	316.4	808.9	305.8	112.9	200.4
Q1-08	56.1	309.1	121.3	91.6	136.7	421.8	460.9	238.0	100.7	207.2
Q2-08	108.0	669.1	36.0	182.2		520.5		266.1		398.1
Q3-08	117.1		45.3	137.8	144.8	780.6		319.1		306.5
Q4-08	96.6	473.5	39.7	96.5	132.8	367.9	1004.6	269.8		203.6
Q1-09	92.0	373.7	57.1	91.6	138.3	441.9	413.3	200.9		191.2

Notes: Yellow indicates growth compared to the preceding year. Orange indicates growth of 10% of more compared to the preceding year. Pink indicates that patronage was greater than in 2004/5. Red indicates that patronage was greater by 10% or more than in 2004/5.

Figure 14.21: Quarterly bus patronage for Local Link services in Peterborough, indexed to first quarter of available data, with timings of relevant personal travel planning work marked

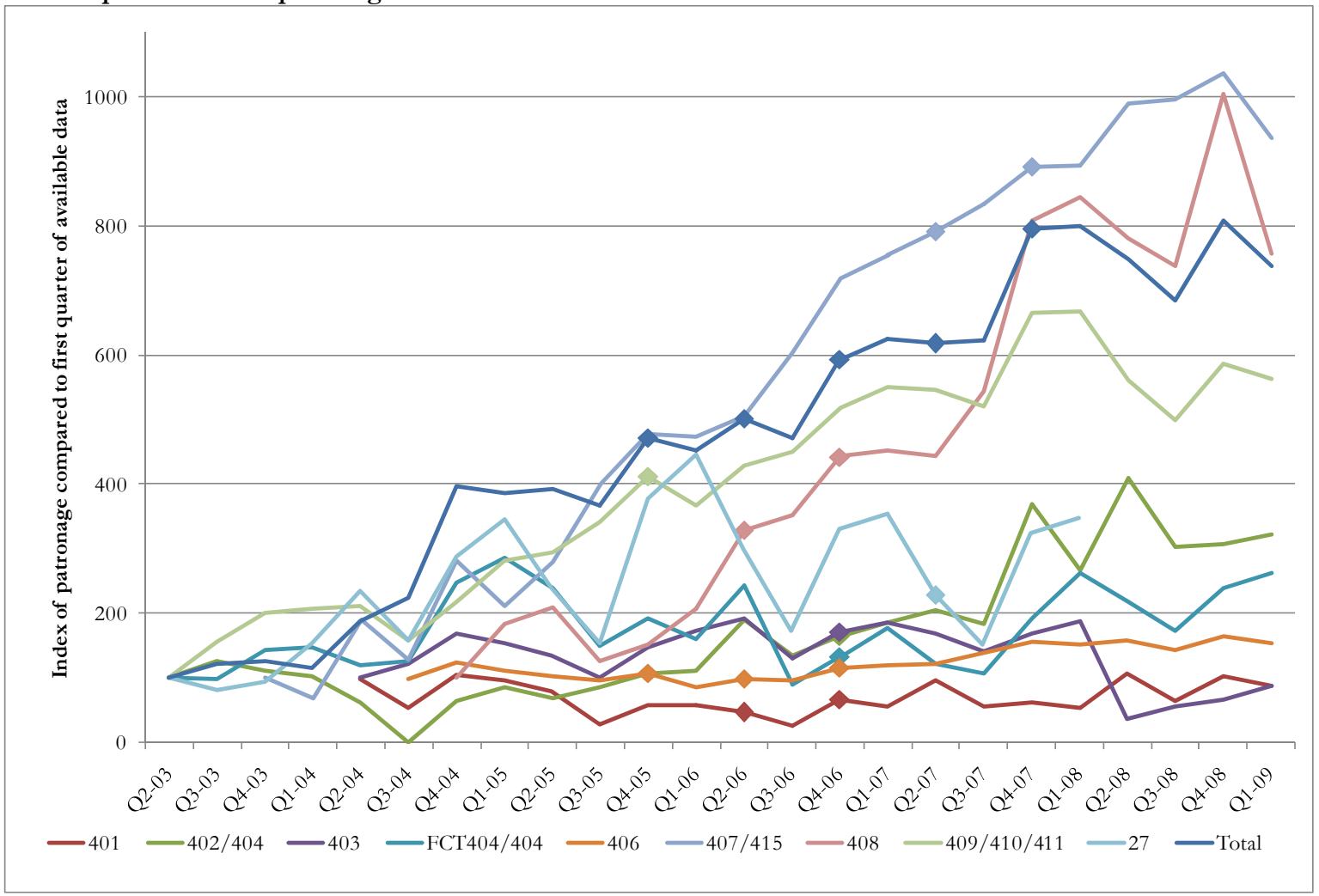


Figure 14.22: 12-month rolling average data for Local Link services in Peterborough, with relevant periods of personal travel planning marked

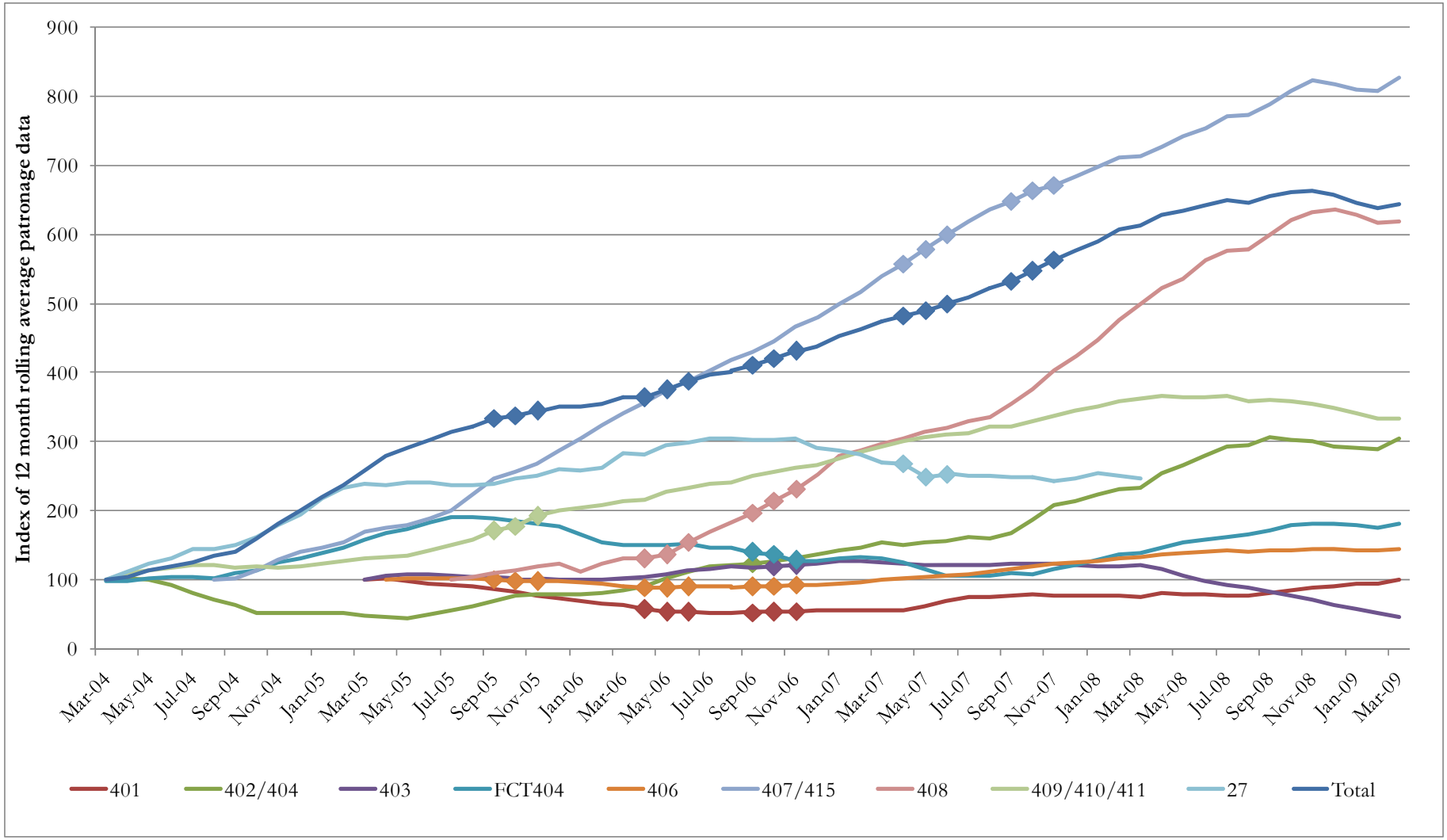


Table 14.17: Analysis of Local Link quarters data in relation to personal travel planning in Peterborough

	Change in quarter compared to the preceding quarter		Change in quarter compared to quarter in the previous year		Change in following quarter		Change in the same quarter in following year	
	Target	*Control*	*Target*	*Control*	*Target*	*Control*	*Target*	*Control*
Phase 1: Q4 2005	+15%	+47%	+19%	+19%	-15%	+8%	+17%	+36%
Phase 2: Q2 2006	-11%	+24%	-20%	+68%	+19%	-16%	+36%	+7%
Phase 3: Q4 2006	+28%	+25%	+27%	+25%	+5%	+6%	+49%	+22%
Phase 4: Q2 2007	-8%	+1%	+27%	+22%	+8%	-2%	-2%	+30%
Phase 5: Q4 2007	+7%	+34%	+24%	+37%	0%*	+1%	+16%	-2%%

Notes: The target routes for each phase are given in Table 14.3.1. Green shading indicates where the results for the target group are better than for the control group. *Patronage on the 415 only (i.e. excluding the 407) grew by 9% during this period.

Table 14.18: Household travel survey results for all public transport use, and separately, bus use, in Peterborough

	Phase 1 area	Phase 2 & 3 areas	Outside Phase 1 area	Outside Phase 2/3 area	Overall change estimate	Overall change estimate (bus trips only)
Population	*30,444*	*55,062*	*110,096*	*85,478*	*140,540*	
Trips per person per year						
Oct-04	70	60	61	65	61	51
Apr-06	78		60		62	
Apr-07		66		68	65	
Oct-08					81	72
Index compared with 2004						
Apr-06	111.4		98.4		101.2	
Apr-07		110.0		104.6	106.7	
Oct-08					132.8	141.2
Overall change in trips per person per year (unweighted data)					***33%***	***43%***
Overall change in trips per person per year (weighted data)					***31%***	***36%***
Overall change in distance per person per year (unweighted data)					***47%***	***48%***
Overall change in distance per person per year (weighted data)					***54%***	***44%***

Notes: Red line indicates timing of personal travel planning intervention. Green shading indicates results from area immediately subsequent to personal travel planning. Blue shading indicates control data (as specified by Socialdata & Sustrans). Overall change estimates for 2006 and 2007 are based on interpolation. Overall change data are for trips by main mode, whilst personal travel planning data are probably for trip stages. Control data are taken from non-target households. Socialdata & Sustrans results from interim surveys exclude all trips over 100km, and for consistency this convention has been adopted for all data in this table. Results are therefore slightly different from those reported in Chapter 13 and in section 14.5 where data are given for bus trips of up to 50km. Public transport includes bus, regional train, work/school bus, other public transport, and taxi. Bus includes bus and work/school bus.

14.4 Worcester bus data

14.4.1 Introduction

This chapter reports on data from monthly ticket sales for the main bus routes that operated within the Worcester urban area.

14.4.2 Nature of the data

The core table of data on which this analysis is based gives total passenger numbers for each month, based on operator returns (which were usually derived from ticket machine information). The data are for the bus routes that provided the majority of services for travel *within* Worcester. Routes where a significant proportion of the service operated outside Worcester are not included. A map showing bus routes within Worcester is given in Figure 14.23. More details about particular initiatives on individual routes are given in the Worcester 'public transport information and marketing' case study. Specific analysis in relation to the 44 inter-urban bus service is given in Chapter 17. It suggests that bus patronage rose significantly on that route, whilst traffic levels observably fell.

In relation to the data analysed here, we note the following points:

- For the 26 and 27, data were not available for April 2004, since these services only started in May 2004. From March 2007, service frequency on the 26/27 doubled.
- The patronage figures for the services W2, X22, W3, X23, 22, 23 and 36 have been summed together to give the 'orbital' figure, as these were all versions of the same service (i.e. they all served the same route). In practice, a 36 service became available in June 2005, and was then replaced by the others in September 2005. These included the *Project Express* services, which were a major initiative in the early part of the Sustainable Travel Town work. The orbital services stopped operating in August 2008, and were absorbed into the 31.
- The 941/942 services are not shown on the map, but were branded 'Warndon flexi' and served the Phase 1 personalised travel planning area.
- The 32 was in operation prior to August 2004, however it was not possible to obtain the data from April 2004 to July 2004.
- The 32A service started operating in January 2007.
- In August 2008, Route 30 was created, by disaggregating part of Route 33. For the analysis reported here, the data for the 30 are reported in combination with the data for the 33.

Data about bus passenger kilometres travelled were requested, but were not routinely collected by the county council.

To avoid over-estimating the increase in bus use after the first year, the missing data for the 32 (i.e. for the period April 2004 to July 2004) have been extrapolated (based on the monthly average figures for the period August-October 2004).

14.4.3 Data presentation

On subsequent pages, the following data are presented:

- Figure 14.24 – a graph showing data for each of the individual bus routes since April 2004, prior to any data interpolation. (Figures for levels of bus patronage are deliberately excluded to avoid breaching confidentiality);
- Figure 14.25 – a graph showing data for individual routes indexed to the earliest month of available data;
- Figure 14.26 – a graph showing total changes in bus patronage over time, annotated to indicate timing of various initiatives;
- Figure 14.27 – a graph showing 12-month rolling averages of the patronage data for both the individual routes and the total, indexed to the first 12-month period for which data are available;
- Figure 14.28 – a graph showing data from January 2006, giving a breakdown of concessionary versus non-concessionary fares;
- Table 14.20 – annual patronage on individual bus routes, together with a calculation of the % changes compared with the preceding year, and an index of the data compared with the data for 2004/5;
- Table 14.21 – using data summed for three-month periods, this shows the percentage change in patronage compared with the relevant quarter in the preceding year, and an index of how the patronage for that quarter relates to the relevant quarter in 2004/5. Comparison with the relevant quarter for the preceding year removes the effect of seasonal variation;
- Figure 14.29 – a graph plotting the quarterly data indices, compared to the relevant quarters in 2004/5, with periods of personal travel planning that may have affected individual bus services marked;
- Figure 14.30 – a graph plotting the quarterly data indices, compared to Quarter 2 in 2004/5, with periods of personal travel planning that may have affected individual bus services marked;
- Table 14.22 – analysis of the quarterly data in relation to personal travel planning work;
- Tables 14.23 and 14.24 – results from the household travel survey.

14.4.4 Data analysis

Overall effects on bus patronage
Bus use in Worcester grew by about 20% between 2004/5 and 2005/6. By 2008/9, it was 27% higher than in 2004/5 – an increase of approximately 760,000 trips p.a.. However, the increase peaked in mid-2006, and, after this, patronage levels were broadly stable, with a small decline between 2006/7 and 2007/8.

Using a paired sample, one-tailed T-test on the 12 months of average bus patronage in 2004/5 and comparing this with the 12 months of data for 2005/6 or 2006/7 or 2007/8 or 2008/9 gives a p-value of 0.000 in all cases. In other words, the 27% rise in bus use can be taken as a statistically significant increase.

Various factors may help to explain the changes in patronage, as illustrated in Figure 14.26. These include:

- Urban Bus Challenge work on Routes 31 and 33 at the beginning of the period (as shown, for example, in Figure 14.25);
- a fares initiative (together with new vehicles and marketing work) in July 2004;
- major marketing initiatives in Autumn 2005, July/August 2006 and September 2007, together with ongoing smaller scale marketing and information measures;
- the launch of the *Project Express* orbital services (which included free travel for younger and older people) in July 2005 (as evident, for example, in Figures 14.24 and 14.25);
- the withdrawal of free travel on *Project Express* buses for under-19s in September 2006 (which led to a reduction in patronage on the orbital service, as evident in Figure 14.24);
- the introduction of concessionary fares in April 2006 and the expansion of concessionary fares nationwide from April 2008. (Relevant data are illustrated in Figure 14.28.) It should be noted that, at both times, there was clearly a significant switch in the type of tickets being bought (from non-concessions to concessions) and overall patronage continued to grow in Quarter 2 and Quarter 3 of 2006 at the preceding rate, indicating that the introduction of concessions may have helped to sustain growth during that time. However, any stimulus to patronage seems to have been fairly short-term, since overall patronage levels were relatively stable from Quarter 4 2006 onwards.

The other factor that may have had an effect is the personal travel planning work, which is discussed further below.

Trends on individual routes

The trends on individual routes were mixed, and this may have been partly because some services acted as substitutes for each other. Specifically, patronage on Routes 37 and the 941/942 reduced over time. This was probably due to competition with other services – in particular, the *Project Express* buses, and, in the case of the 37, the improvements on the 33 service.

In contrast, patronage on all the other routes increased over time. In particular, as evident in Figure 14.29, the 39 showed ongoing growth from the middle of 2005, whilst the 26/27 grew from Spring 2007, when service frequency doubled. Following an initial high, however, use of the orbital service declined, with a further decline after the withdrawal of free travel for the under-19s.

Overall, growth appears to have occurred on bus services across the city area, rather than being concentrated in any one location.

Assessment of personal travel planning effects

Table 14.19 indicates the routes and timing that are most relevant to the personal travel planning work. Table 14.21 provides quarterly bus patronage data for the individual routes, whilst Table 14.22 analyses this data in relation to the personal travel planning work. Figures 14.29 and 14.30 display the quarterly data graphically.

Table 14.19: Relating personal travel planning work to bus routes in Worcester

Personal travel planning phase	Bus routes potentially affected
1 – September to December 2005	33, 35, 37, 39, 941&942, Orbital
2.1 – April to August 2006	31, 32, 26&27, Orbital
2.2 – Autumn 2006	32
3.1 – April to July 2007	31, 33, 39
3.2 – September to December 2007	31, 33, 39

The analysis did not reveal any clear effects from the personal travel planning work. As shown in Figure 14.26, in all phases, the personal travel planning work coincided with periods of patronage increase. However, there were often a number of other factors affecting patronage at the same time, with significant growth occurring on routes in areas where personal travel planning was not taking place.

Assessing the specific effects of Phase 1 is not possible, as the *Project Express* services were launched and promoted at the same time. These acted as an independent boost to patronage. However, Table 14.22 does indicate that all services in the Phase 1 area were performing better in Quarter 4 of 2005 than the previous year, whilst services in other areas were not.

Examining Table 14.22 also suggests that, for Phase 2.1, buses in the target area also performed better than in the previous year (and made greater improvements than services elsewhere), although again, this could be due to the confounding effect of the *Project Express* buses, which passed through the Phase 2.1 area, and were not in operation the previous year. Table 14.22 also shows that, during personal travel planning activity, services in the Phase 3.1 area performed marginally better than in the previous year (whereas patronage had declined elsewhere); and a year after the Phase 3.2 work, buses in the Phase 3.2 area were performing better than services elsewhere (though there is little evidence of an immediate boost in patronage).

Examining the graphs also provides little clear-cut evidence of effects. In Figure 14.24, patronage on the orbital services does seem to show an increase that corresponds with the timing of the Phase 2.1 of personal travel planning work. In Figure 14.29, the 31 service appears to show small peaks in use that correspond to the timing of the personal travel planning work (Phases 2.1 and 3.1, Spring, 2006 and 2007) though this may be because usage was relatively low in the spring of 2004 as the Urban Bus Challenge work was still taking effect. The 26/27 may also have benefitted from Phase 2.1.

The effects of the personal travel planning work may be particularly unclear due to all of the other factors that were encouraging bus use, in control as well as target areas. It is plausible that the personal travel planning work helped to support growth occurring for a wide variety of different reasons, but was not necessarily as important as some of the other initiatives.

Comparison with the household travel survey data
The results from the household travel survey data are given in Tables 14.23 and 14.24. These suggest that[7]:

- bus trips increased by 17-25%, (depending on whether weighted or unweighted data are used);
- public transport trips increased by 19% (slightly less than the increase in bus trips);
- distance travelled by bus increased by 33-54%;
- there was an increase in public transport use following personal travel planning in the Phase 1, 2.1 and 2.2 areas. In contrast, amongst households located elsewhere, public transport use declined slightly during Phase 1, but increased slightly during Phases 2.1 and 2.2.

The order of magnitude of increase in bus use recorded in the household travel surveys is broadly in line with that shown by the bus patronage data.

14.4.5 Summary and conclusions about bus use in Worcester

Our analysis suggests the following conclusions:

- Between 2004/5 and 2008/9, bus use within Worcester increased by about 27%, representing an increase of 760,000 trips p.a.. Growth largely occurred in the first half of this period, and stabilised after mid-2006. This is a statistically significant increase. The order of magnitude of increase in bus use recorded in the household travel surveys is broadly consistent with this.
- Several different initiatives were responsible for the growth, including the launch of a new orbital service, improvements to particular routes, fares initiatives and marketing campaigns.
- There were two routes where patronage did not grow, perhaps because they were in competition with others. However, the overall picture is that bus use grew on the majority of routes, and in all areas of the city.
- The patronage data do not show a clear effect from the phases of personal travel planning work, though, of course, it may have helped to underpin growth occurring for other reasons, and the number of different initiatives occurring makes it difficult to disaggregate effects. Growth in bus use in the Phase 1 area at the time of the personal travel planning activity was particularly dramatic, perhaps indicating the effectiveness of combining personal travel planning with the introduction of a new service. Similarly, the potential boost to the *Project Express*/orbital services during Phase 2.1 may indicate its value as a tool for promoting new services.

[7] The equivalent figures for bus trips of up to 50km were a change in the number of trips of +17% to +24% and a change in distance travelled of +30% to +46%.

Figure 14.23: Map of bus routes in Worcester

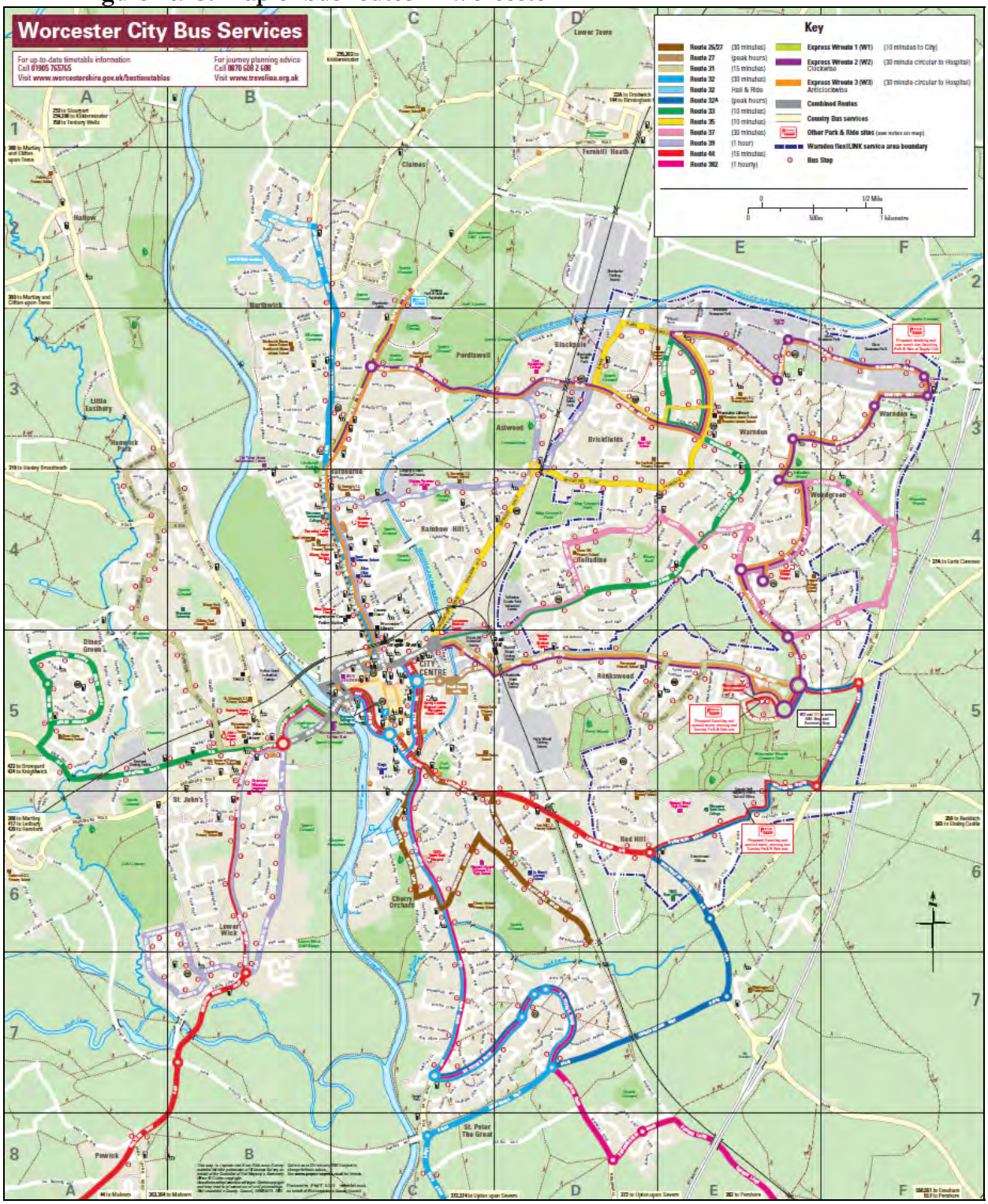


Figure 14.24: Changes in bus patronage on individual bus routes in Worcester (prior to data interpolation)

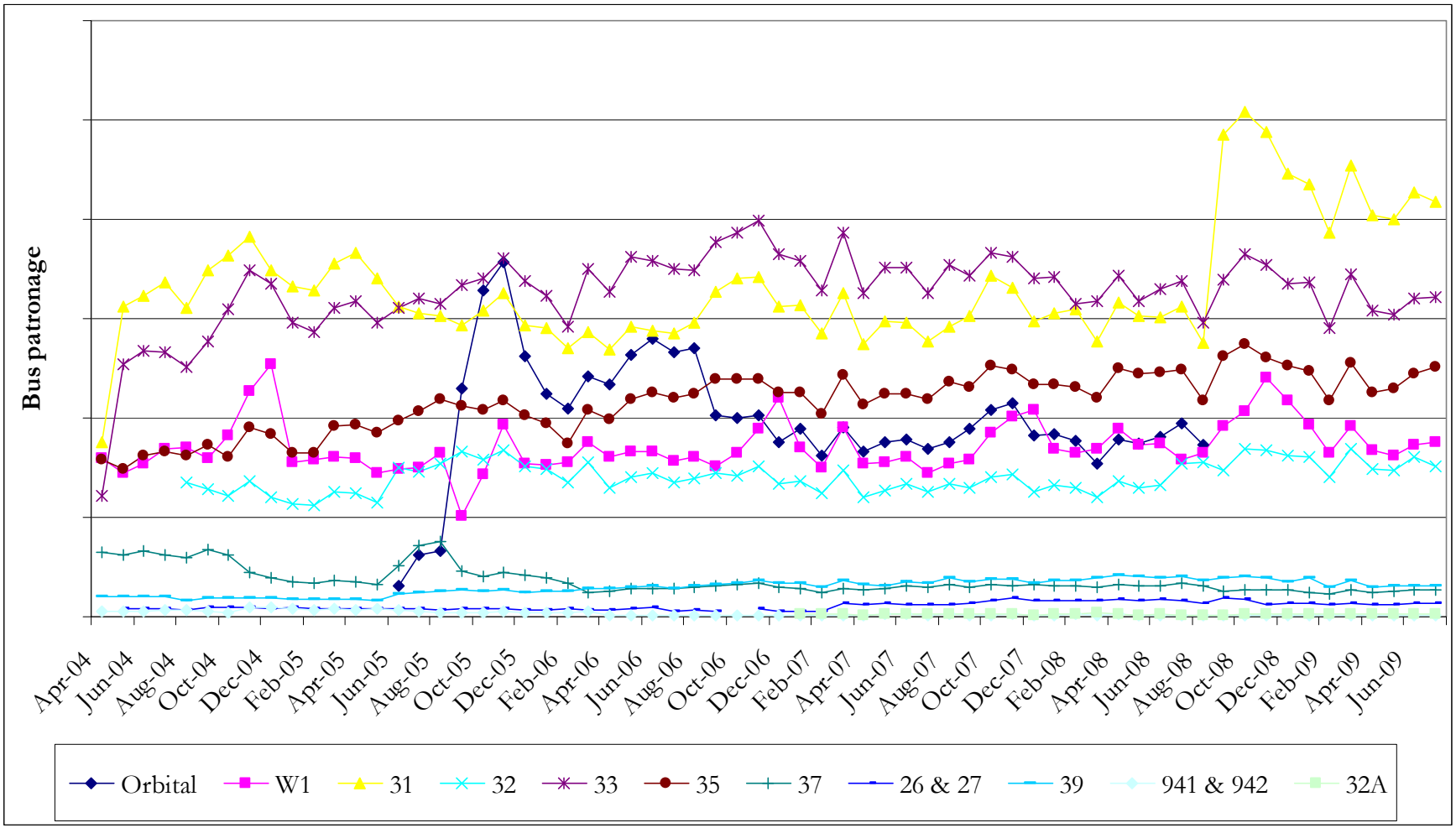
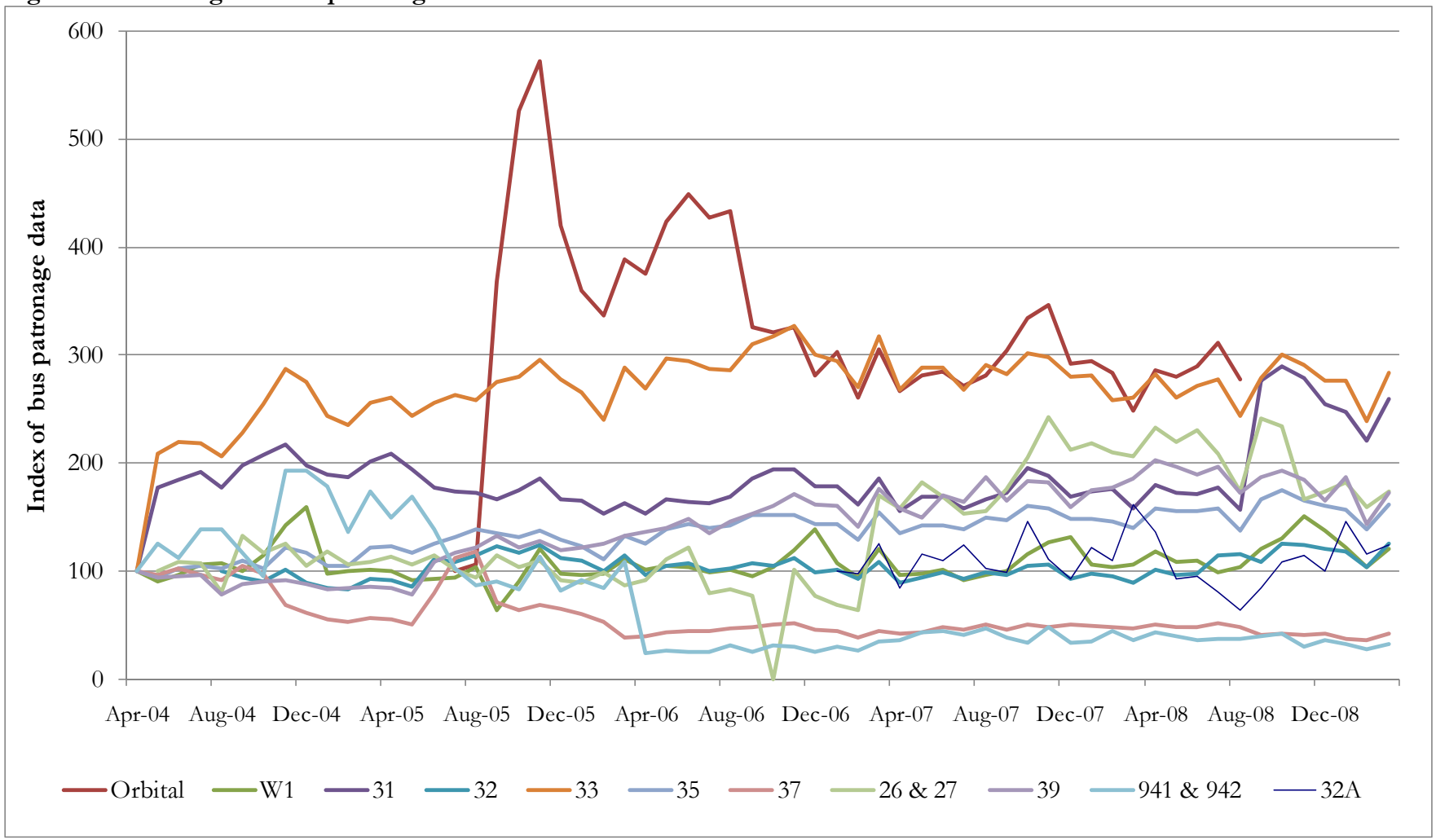


Figure 14.25: Changes in bus patronage on individual bus routes in Worcester indexed to earliest month of available data



Note: The data for the orbital service is indexed to July 2004 rather than June, because services were not fully operational in June.

Figure 14.26: Changes in overall bus patronage in Worcester in relation to campaigns and initiatives

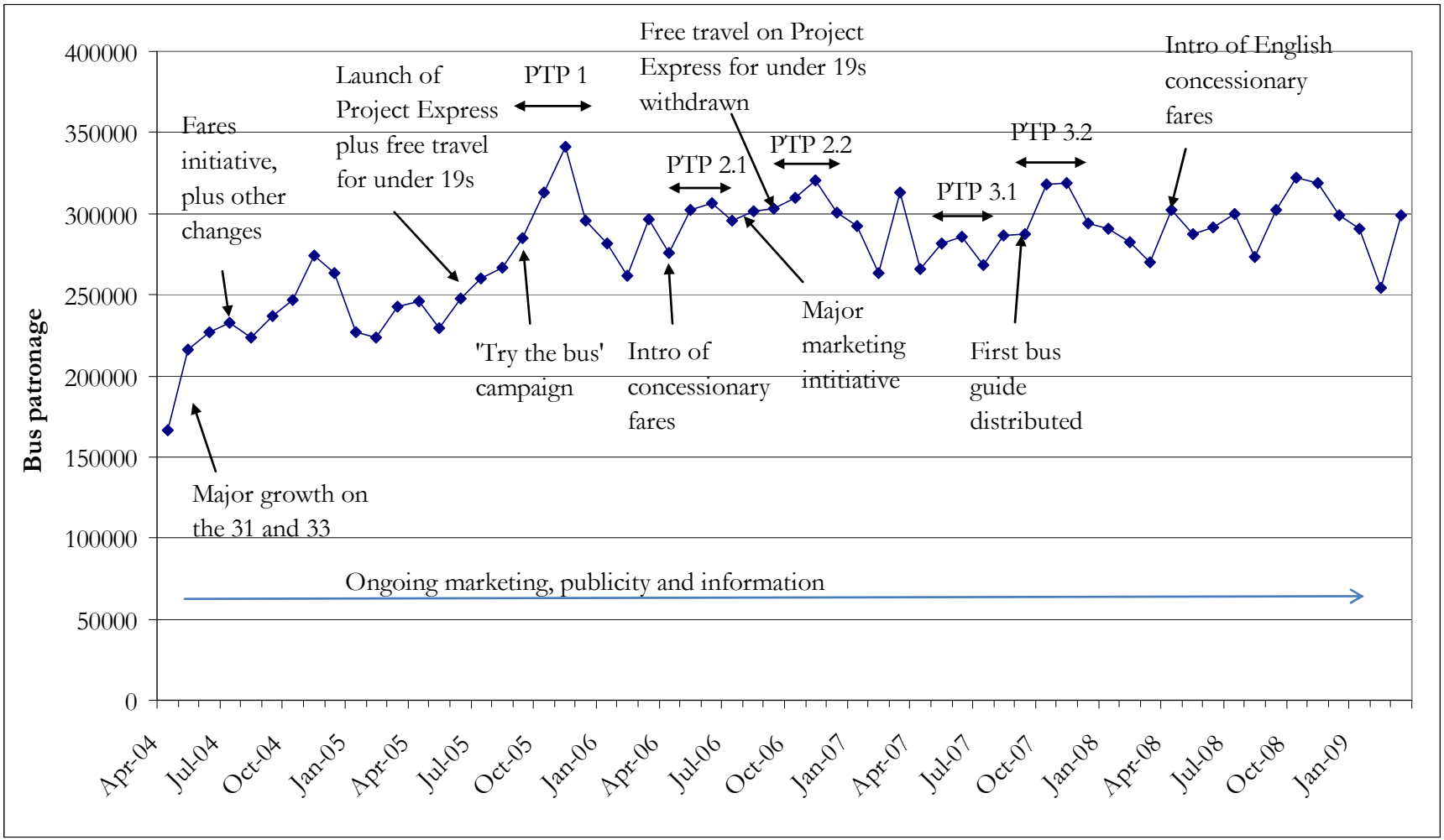
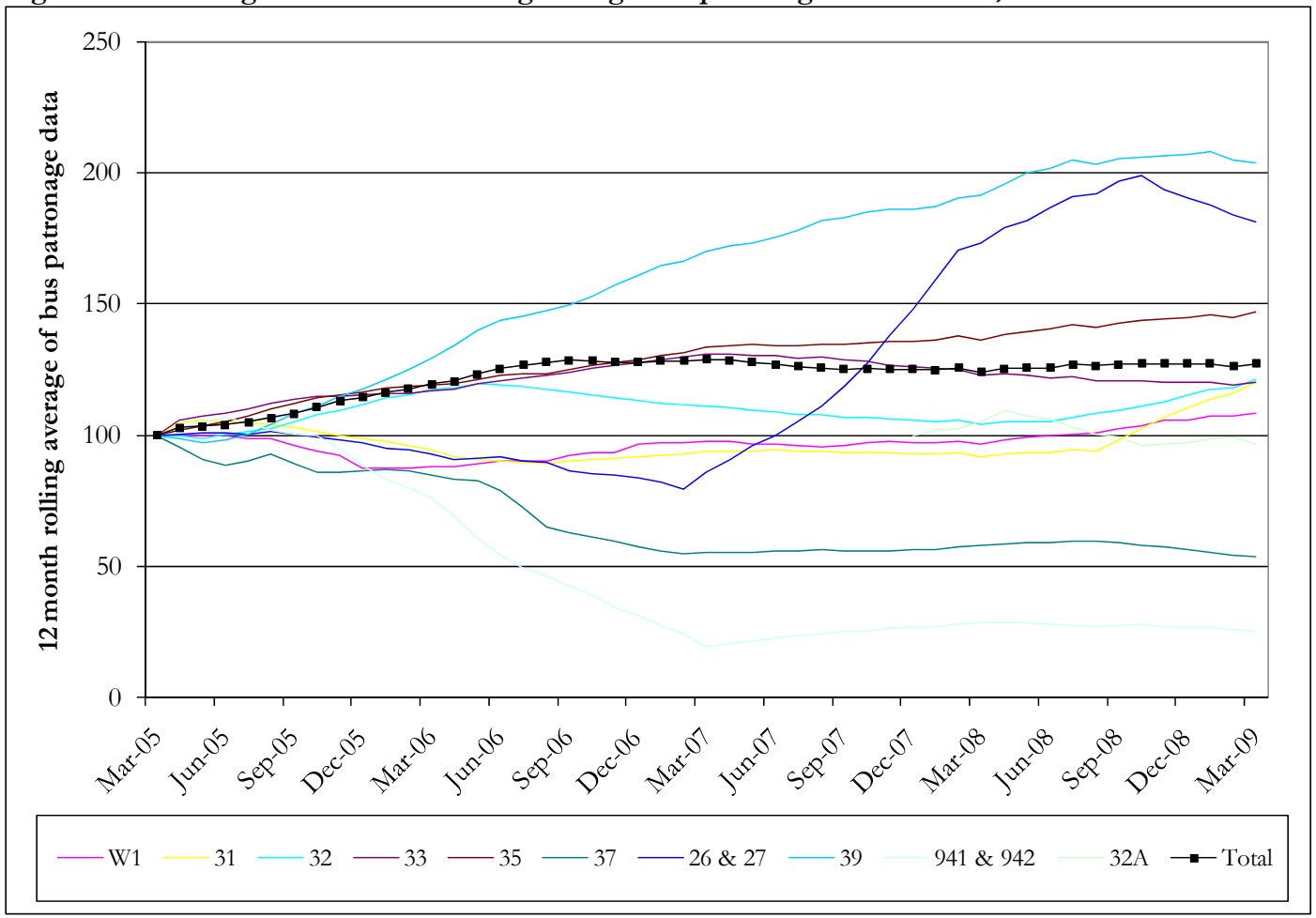


Figure 14.27: Changes in 12-month rolling average bus patronage in Worcester, indexed to first 12-month period of available data



Note: Data for the individual orbital service is excluded from the graph, since the service did not start until mid-2004, and the dramatic initial growth would also distort the chart. (However, the orbital service figures have been included in the 'total's figure.)

Figure 14.28: Breakdown of bus patronage by concessions/non-concessions in Worcester

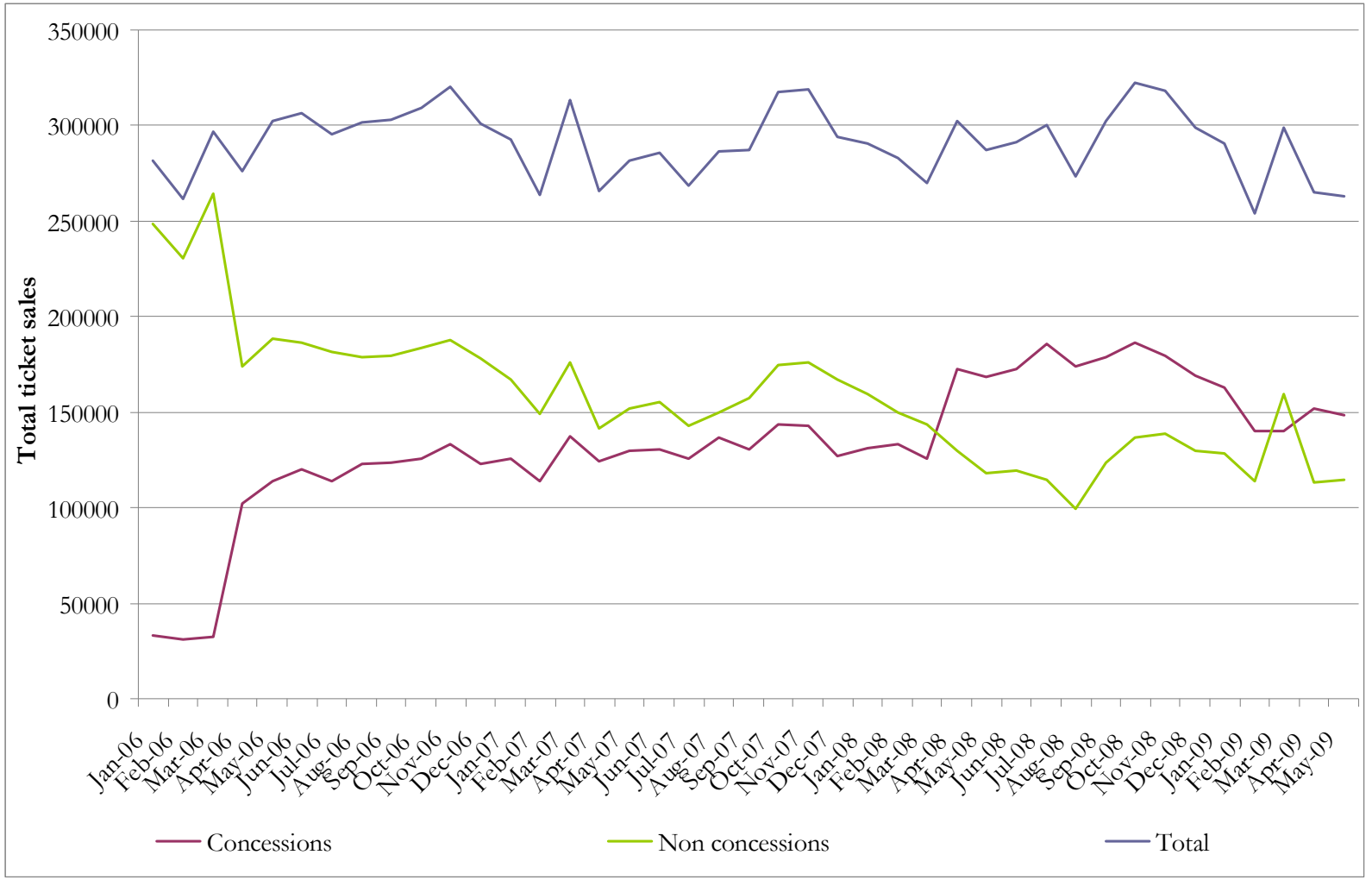


Table 14.20: Annual bus patronage for individual routes in Worcester, percentage changes and comparison with 2004/5

	Orbital	W1	31	32	33	35	37	26 & 27	39	941 & 942	32A	Total
2004/5												2780063
2005/6												3323742
2006/7												3584452
2007/8												3449349
2008/9												3539796
Percentage change compared with previous year												
2005/6		-12.0	-5.7	17.6	17.2	19.3	-15.1	1.0	29.5	-23.6		19.6
2006/7	31.2	11.1	-0.5	-5.7	11.5	11.8	-34.9	-7.3	31.5	-74.2		7.8
2007/8	-17.6	-1.1	-2.0	-6.4	-5.8	2.3	4.7	101.7	12.4	43.5	326.9	-3.8
2008/9	-58.6	11.9	30.9	16.7	-2.5	7.5	-7.4	4.7	6.4	-9.5	-8.4	2.6
Index compared with 2004/5												
2005/6		88.0	94.3	117.6	117.2	119.3	84.9	101.0	129.5	76.4		119.6
2006/7		97.8	93.9	110.9	130.7	133.4	55.3	93.7	170.2	19.7		128.9
2007/8		96.7	92.0	103.9	123.1	136.5	57.9	189.0	191.4	28.3		124.1
2008/9		108.2	120.4	121.2	120.1	146.8	53.6	197.9	203.6	25.6		127.3

Notes: Yellow indicates growth compared to the preceding year. Orange indicates growth of 10% or more compared to the preceding year. Pink indicates that bus patronage levels were higher than in 2004/5. Red indicates that bus patronage levels were greater by 10% or more than in 2004/5.

Table 14.21: Quarterly bus patronage data in Worcester, percentage changes and comparison with 2004/5

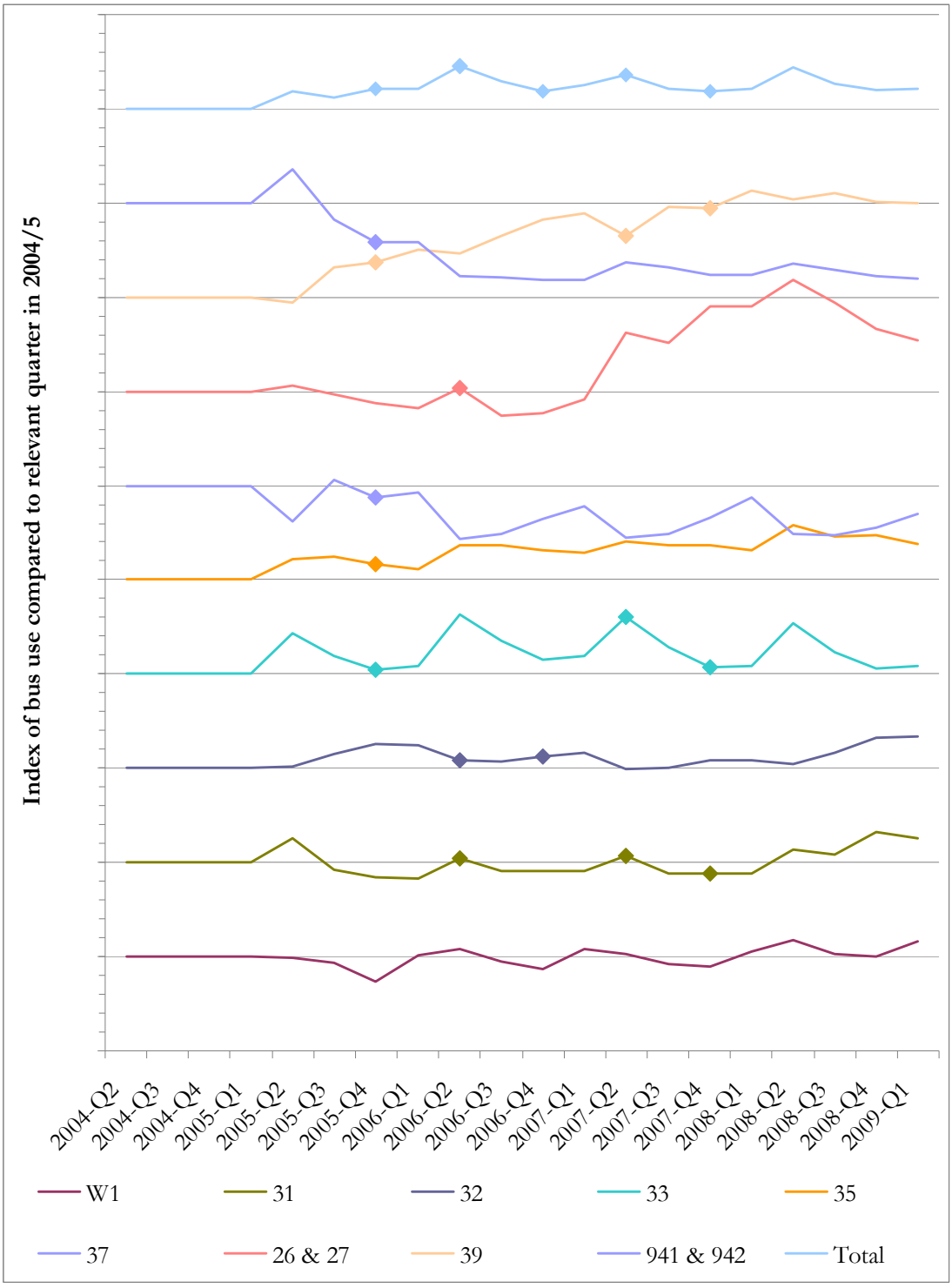
% change compared to relevant quarter in previous year												
	Orbital	W1	31.0	32.0	33.0	35.0	37.0	26 & 27	39.0	941 & 942	32A	Total
2005-Q2		-1.0	25.7	1.2	43.8	22.6	-38.2	6.3	-6.0	35.3		18.5
2005-Q3		-7.0	-7.5	15.3	19.2	24.4	5.8	-3.5	32.0	-17.0		11.8
2005-Q4		-26.0	-15.4	26.1	4.6	17.0	-13.3	-12.0	36.9	-42.0		21.2
2006-Q1		1.8	-16.6	24.6	7.8	10.8	-7.7	-17.8	50.5	-41.6		21.1
2006-Q2	722.0	8.8	-16.8	6.8	13.2	11.8	-31.0	-3.1	55.9	-83.4		22.3
2006-Q3	362.2	1.3	-1.3	-7.0	13.7	9.9	-54.6	-22.5	24.9	-75.0		16.2
2006-Q4	-38.8	17.0	7.5	-10.3	10.7	12.2	-25.4	-12.3	33.6	-69.0		-2.0
2007-Q1	-19.8	5.7	9.1	-7.0	11.1	16.4	-15.5	10.7	25.9	-68.0		3.5
2007-Q2	-33.2	-4.8	2.3	-8.2	-1.7	2.9	5.2	57.3	12.8	64.5		-5.8
2007-Q3	-27.7	-2.4	-4.1	-6.9	-4.9	0.3	0.5	102.3	19.0	54.6		-6.4
2007-Q4	4.5	3.7	-2.5	-4.2	-7.0	4.4	1.5	146.5	6.3	32.4		0.0
2008-Q1	-5.1	-1.8	-3.5	-6.2	-9.2	1.8	12.4	108.9	12.6	26.6	21.9	-3.0
2008-Q2	2.7	14.1	6.2	4.6	-3.6	11.9	9.3	34.3	22.9	-4.2	4.3	5.7
2008-Q3	3.1	12.6	23.2	17.2	-4.8	6.0	-0.9	28.5	7.6	-9.9	-29.4	4.0
2008-Q4		11.8	48.6	21.8	-1.4	7.1	-16.6	-12.9	3.4	-4.9	-7.3	1.0
2009-Q1		9.5	43.2	22.7	-0.1	5.1	-20.0	-18.9	-6.6	-19.4	-2.0	0.1
Index compared to 2004/5 financial year (i.e. Q2 2004 to Q1 2005)												
	Orbital	W1	31.0	32.0	33.0	35.0	37.0	26 & 27	39.0	941 & 942	32A	Total
2005-Q2		99.0	125.7	101.2	143.8	122.6	61.8	106.3	94.0	135.3		118.5
2005-Q3		93.0	92.5	115.3	119.2	124.4	105.8	96.5	132.0	83.0		111.8
2005-Q4		74.0	84.6	126.1	104.6	117.0	86.7	88.0	136.9	58.0		121.2
2006-Q1		101.8	83.4	124.6	107.8	110.8	92.3	82.2	150.5	58.4		121.1
2006-Q2		107.7	104.6	108.0	162.7	137.0	42.7	103.1	146.6	22.5		145.0
2006-Q3		94.2	91.3	107.3	135.5	136.8	48.1	74.8	164.8	20.8		129.9
2006-Q4		86.6	91.0	113.0	115.8	131.3	64.7	77.1	182.9	18.0		118.8

2007-Q1		107.6	91.0	115.9	119.8	128.9	78.0	91.0	189.4	18.7		125.4
2007-Q2		102.5	107.0	99.2	159.9	141.1	44.9	162.2	165.4	37.0		136.5
2007-Q3		91.9	87.6	99.8	128.8	137.2	48.3	151.3	196.1	32.1		121.5
2007-Q4		89.7	88.7	108.3	107.7	137.0	65.7	190.1	194.4	23.8		118.8
2008-Q1		105.7	87.8	108.7	108.7	131.2	87.7	190.0	213.2	23.6		121.6
2008-Q2		117.0	113.5	103.8	154.1	157.8	49.1	217.9	203.2	35.4		144.3
2008-Q3		103.4	107.9	117.0	122.7	145.5	47.9	194.4	211.1	29.0		126.4
2008-Q4		100.3	131.8	131.9	106.2	146.8	54.8	165.6	201.0	22.6		119.9
2009-Q1		115.6	125.7	133.4	108.6	138.0	70.2	154.2	199.2	19.1		121.7

Notes: Yellow indicates growth compared to the preceding year. Orange indicates growth of 10% or more compared to the preceding year. Pink indicates that bus patronage levels were higher than in 2004/5. Red indicates that bus patronage levels were greater by 10% or more than in 2004/5.

The graph below (Figure 14.29) plots the data given in the second half of Table 14.4.3 – i.e. it provides an index showing how bus levels varied compared with the relevant quarters in 2004/5. The dots on the lines indicate the times when personalised travel planning took place. Underlying seasonal variation in bus use is removed by this presentation method. Data for the *Project Express* services are not presented, since they only started in mid-2004.

Figure 14.29: Quarterly bus patronage in Worcester, indexed to 2004/5



The graph below (Figure 14.30) is also based on the quarterly data. Specifically, it gives an index of bus patronage, relative to patronage in the second quarter of 2004. The dots on the lines indicate when personalised travel planning took place. This method does not remove seasonal variation, but does make it possible to see changes in patronage in the first year. Data from the *Project Express* service is not presented, since it makes it impossible to display any of the other services in a meaningful way.

Figure 14.30: Quarterly bus patronage in Worcester, indexed to Q2, 2004

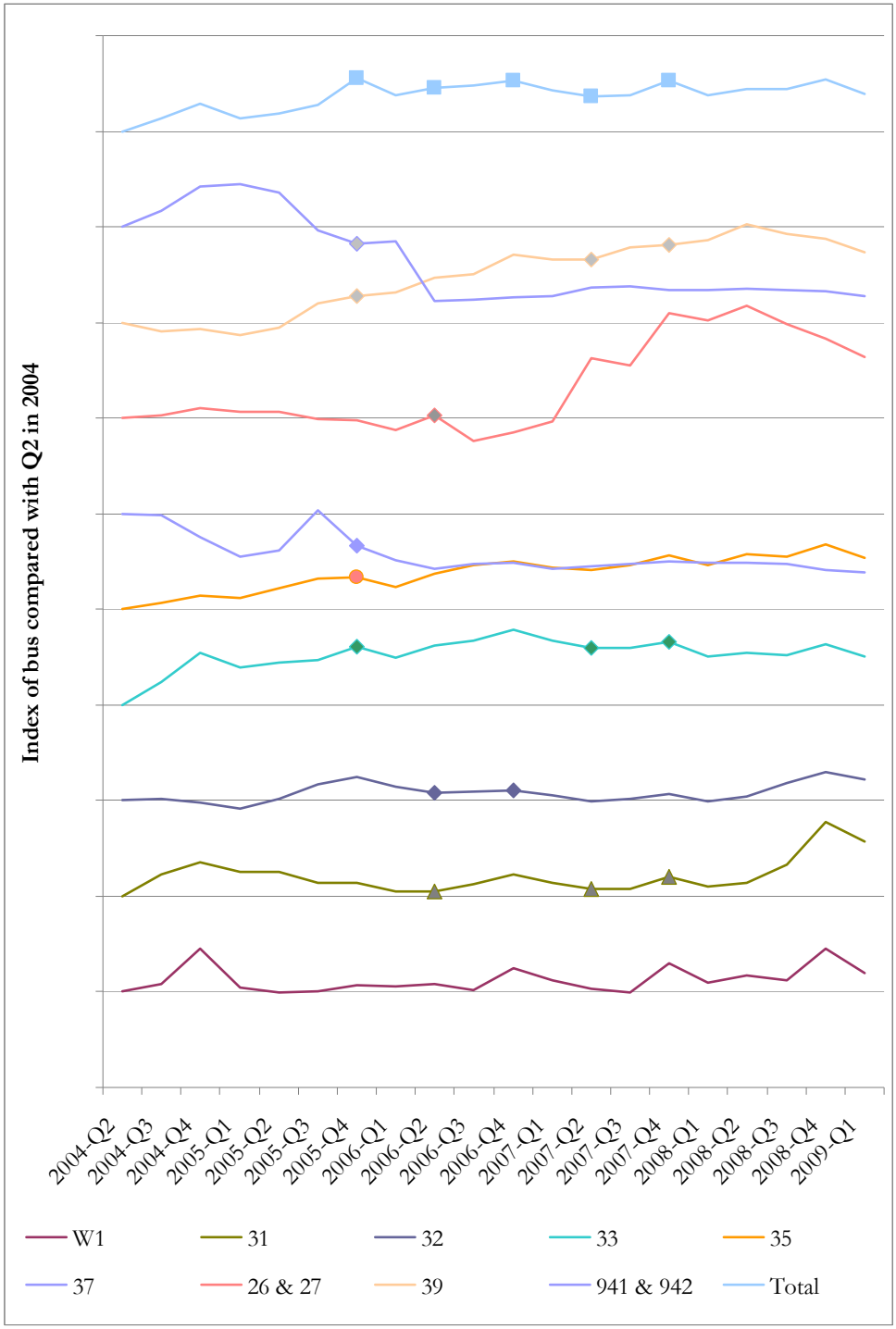


Table 14.22: Analysis of quarters data in relation to personal travel planning effects in Worcester

	Change in quarter compared to the preceding quarter		Change in quarter compared to quarter in the previous year		Change in following quarter		Change in the same quarter in following year	
	Services through target area	*Control*	*Services through target area*	*Control*	*Services through target area*	*Control*	*Services through target area*	*Control*
Phase 1: Q4 2005	+40% +1% (exc orbital)	+3%	+61% +7% (exc orbital)	-11%	-15% -8% (exc orbital)	-7%	-6% +9% (exc orbital)	+5%
Phase 2.1: Q2 2006	+4%	+6%	+35%	+13%	+1%	+2%	-10%	0%
Phase 2.2: Q4 2006	+2%	+4%	-10%	-1%	-5%	-7%	-4%	0%
Phase 3.1: Q2 2007	-5%	-4%	+1%	-11%	0%	+2%	+2%	+9%
Phase 3.2: Q4 2007	+7%	+13%	-4%	+4%	-8%	-11%	+21%	-16%

Notes: The routes relevant to each personal travel planning phase are given in Table 14.4.1. Green shading indicates where the services through the personal travel planning target area outperformed non-target area (control) services.

Table 14.23: Household travel survey results for public transport use, and separately, bus use, in Worcester

	Bus	Public transport
Trips per person per year 2004 (unweighted data)	50	60
Trips per person per year 2008 (unweighted data)	62	72
Overall change in trips per person per year based on unweighted data	**25%**	**19%**
Overall change in trips per person per year based on weighted data	**17%**	
Overall change in distance per person per year based on unweighted data	**54%**	
Overall change in distance per person per year based on weighted data	**33%**	

Notes: The bus column includes data for work/school bus. The public transport data also includes travel by regional train, other public transport and taxis. Trips of over 100km are excluded. Results are therefore slightly different from those reported in Chapter 13 and in section 14.5 where data are given for bus trips of up to 50km.

Table 14.24: Socialdata & Sustrans assessment of the first three phases of personal travel planning work in Worcester

		% people using public transport several times a month or more*		Socialdata & Sustrans estimate of difference in public transport trips per person per year between target and control
		Target	Control	
Phase 1	Autumn 2004	28	25	
	March/April 2006	35	23	
	% change	**+25%**	**-8%**	**+22%**
Phase 2.1	Autumn 2004	27	25	
	April/May 2007	36	28	
	% change	**+33%**	**+12%**	**+14%**
Phase 2.2	Autumn 2004	23	25	
	April/May 2007	31	28	
	% change	**+35%**	**+12%**	**+12%**

Notes: * The surveys actually recorded a number of categories: 'daily, several times a week; several times a month; (almost) never'. The first categories have been added together for the purposes of this table. The full range of categories was used by Socialdata & Sustrans to generate their estimates in the last column.

14.5 Comparing the results on bus use for the three towns

Table 14.25 provides a summary of the evidence about bus use for the three towns. The main conclusions that emerge are as follows:

Overall impacts

- Bus use grew substantially in Peterborough and Worcester during the period of the Sustainable Travel Town work, whereas it declined in Darlington (though the rate of decline slowed from 2006 onwards). The degree of growth in Peterborough and Worcester was dramatic: 760,000 extra trips p.a. in Worcester, and 2.6 million extra trips p.a. in Peterborough.
- Growth in Peterborough was ongoing, whereas patronage levels broadly stabilised in Worcester after mid-2006.
- In all three towns, the distance travelled by bus increased by more than the change in the number of trips, though this was less marked in Peterborough than in the other two towns.
- In Peterborough and Worcester, bus use seems to have increased in all areas of the towns. We do not have relevant data for Darlington, though there is some indication that the most beneficial effects of the town's work on buses may have been in the north east of the town (the Phase 3 personal travel planning area).

Explaining the impacts

Analysing why bus use increased as much as it did, and, in particular, understanding the contribution from each of the many initiatives to promote bus use, is quite challenging. First, it is difficult to disaggregate the effects of so many individual initiatives taking place at the same time. Second, individual bus routes often ran in parallel with each other for part of their distance (and so an increase on one route could be due in part to transfer of passengers, rather than growth). Bus routes are not confined to particular geographical areas (e.g. personal travel planning areas), so growth in boardings in one area may not be apparent. Finally, lack of route-specific data in Darlington also limited the analysis.

Despite these difficulties, we are able to draw the following conclusions:

- The data for all three towns suggest that there was some beneficial effect from the introduction of concessionary fares in 2006, but this seems to have been relatively short-term. In Worcester, it is notable that patronage stabilised from mid-2006, and most of the patronage growth took place before the introduction of concessionary fares. In Peterborough, we estimate that, at most, concessions may have led to extra growth, which would be in the order of 10-15% of the total.

- Bus services in Peterborough underwent major reorganisation in 2004, followed by significant increases in service provision. The initial reorganisation almost certainly helped create the right conditions for growth, but it cannot explain why growth was sustained for five years thereafter. Subsequent increases in service provision may also have helped to sustain and promulgate growth. However, growth on individual routes often *pre*-dated the increases in service provision, suggesting that the service enhancements were not the initial stimulus for growth. Unfortunately, we do not have the data about service provision in Worcester in order to assess whether lack of increase in service provision might explain why services did not continue to grow.

- Population increases may have been a factor in the growth in Peterborough (since the town's population increased by 6% between 2004 and 2007), but this would only account for a fraction (perhaps 17%) of the total growth that took place over that period.

- The Socialdata & Sustrans surveys suggest a short-run increase in public transport trips per person in the order of 5-15% for seven of the eight phases of personal travel planning that were evaluated through interim household surveys. (The data are somewhat ambiguous due to the complexity of allowing for the control group effects, particularly in Darlington.) The exception is Phase 1 in Worcester, where growth was more substantial, probably because it coincided with the launch of the *Project Express* buses. In broad terms, therefore, we may estimate that the 'whole town' effect of personal travel planning was to increase public transport trips by around 5-15%[8]. Analyses of patronage on relevant routes indicates that the specific effects of personal travel planning are not always easy to discern (partly due to the analytical problems described at the beginning of this section). Nonetheless, there were clear examples where personal travel planning stimulated short-term increases in patronage (as on the 21 in Darlington) or potentially helped to reduce or reverse decline on individual services (as on the 23 in Darlington, and the 27, 401, 406 and Citi 5 in Peterborough). There were also instances where routes that had previously shown a growth in patronage, continued to show growth following personal travel planning in a related area (for example, the 39 in Worcester, and the 408 and 407/415 in Peterborough). In addition, where the introduction of new services took place in conjunction with personal travel planning, the growth on those services was then very substantial (specifically, in Worcester, on the *Project Express* buses, and in Peterborough, on the Citi 6 – though the Citi 6 had been in operation for nearly two years by the time of the personal travel planning work).

In Peterborough, we may conclude that, in very rough terms, approximately 25-30% of the total bus patronage growth was due to 'external' factors: population growth and the introduction of concessionary fares. Personal travel planning in Peterborough appears to have achieved an average increase in public transport trips per person of 10.5% (or 9%, allowing for control group effects), implying that it could be responsible for about another 25% of the growth. The remaining 45-50% of the growth in bus travel may then be attributed to a combination of service restructuring, which created the right conditions for growth, followed by intensive effort to provide better public transport information and integrated tickets, and supported by regular service enhancements. Of the three towns, Peterborough had perhaps the ideal combination of 'smart' and 'hard' interventions, sustained over time, as a result of a harmonious and close relationship between the bus operator and the local authority.

In Worcester, it is possible to discern the impacts of a number of marketing and fares initiatives. These, coupled with the launch of a new orbital service and improvements to particular routes, seem to have been the main reasons for the increase in patronage between April 2004 and mid-2006. The launch of the orbital service, coupled with the first wave of personal travel planning, generated a substantial spike in bus use. Beyond that time, personal travel planning may have played a role in maintaining bus use at the

[8] In Worcester, it should be noted that only certain areas of the city received personal travel planning, but the results that were achieved were towards the high end of the range, meaning that 5-15% is probably still a fair estimate for 'whole town' effects.

new level, but was not able to generate further substantial town-wide increases in bus travel.

In Darlington, lack of cooperation between bus operators meant that it was more difficult to encourage bus use. Personal travel planning may have helped to slow the rate of decline in bus travel, and perhaps led to short-term increases in patronage on particular routes, but this and other marketing interventions were insufficient, in the absence of investment in service enhancements, to bring about a large-scale increase in bus travel.

Table 14.25: Changes in bus use during the period of Sustainable Travel Town designation

	Darlington	Peterborough	Worcester
Household surveys*			
Trips per person	-6% to + 11%	+36% to +43%	+17% to +24%
Distance per person	+14% to +29%	+54% to +56%	+30% to +46%
Bus patronage data	-13%, though rate of decline slowed since 2006.	+40%	+27%
Timing of change	No decline in 2006/7, and rate of decline reduced after that time.	Growth constant and ongoing since 2004	Most of the growth took place between 2004 and mid-2006
Location of change	Personal travel planning work seems to have been most effective at stimulating bus use in the Phase 3 area and/or on Route 21.	Growth occurred in all areas of the city.	Growth appears to have occurred in most areas of the town. There was dramatic growth in the Phase 1 personal travel planning area, and potentially on the *Project Express* buses during Phase 2.1, perhaps indicating the benefits of introducing new services and undertaking personal travel planning activities in parallel.
Possible explanations for change	The introduction of concessionary fares, improved information at bus stops, ticket offers, an area bus map, and effects from the personal travel planning work may have helped to slow the rate of decline in bus use.	Effects likely from population growth (+6% during the period); concessionary fares (10-15% of the total growth); increases in service provision; effects from personal travel planning; integrated ticketing; improvements in vehicles and bus stops; better information, including real time information; and rail offers.	Growth likely to be due to various different initiatives, including launch of *Project Express* orbital buses, improvements on particular routes, various fares initiatives, marketing campaigns and personal travel planning activity.

Notes: * Household survey figures are for ex post survey in Autumn 2008, compared to baseline survey in Autumn 2004; base = all bus trips under 50km; range shows variation between weighted and unweighted data.