congestion charging
Central London






Impacts monitoring

Second Annual Report

April 2004

MAYOR OF LONDON

Transport for London

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Overview

Congestion charging was successfully introduced in central London on 17 February 2003. It contributes directly to four of the Mayor's transport priorities:

- To reduce congestion;
- To make radical improvements in bus services;
- To improve journey time reliability for car users;
- To make the distribution of goods and services more efficient.

It also generates revenues to support the Mayor's Transport Strategy more generally.

This is the second in a series of annual reports describing the impacts of congestion charging in and around central London. It supersedes, updates and extends the material previously published by Transport for London (TfL), in June and October 2003, and in February 2004.

In June 2003 TfL published the *First Annual Monitoring Report*. This described the scope of the monitoring work that had been put in place to ensure that the impacts of congestion charging were comprehensively measured. Conditions applying before charging across a range of key indicators were set out, and information given describing how and when any changes to these indicators would be measured.

Since the introduction of charging TfL has produced three shorter reports detailing key early results from the monitoring work. These were:

- *Three Months On, June 2003;*
- *Congestion Charging: Six Months On, October 2003;*
- *Update on scheme impacts and operations, February 2004*.

These reports have collectively provided a picture of the effects of the scheme to date. In general, congestion charging appears to be meeting its principal traffic and transport objectives, and the various elements of the scheme are now operating satisfactorily.

The key traffic, transport and operational outcomes are described in this report. This report also covers the business, social, economic and environmental impacts of the scheme, drawing on newly-available data from surveys undertaken in the latter part of 2003.

The remainder of this report presents a summary of available findings from across the monitoring programme. There are six sections, focusing on each of the key areas of the monitoring work in turn, together with a section updating and extending the information previously published relating to the operation of the scheme.

The story so far

- Congestion charging was introduced successfully under world-wide scrutiny and without the problems predicted by many commentators;
- New aggregate patterns of travel became established very quickly and have remained stable since;
- Congestion within the charging zone has reduced by 30 percent, and the volume of traffic in the charging zone has reduced by 15 percent (vehicles with four or more wheels);

- Public transport is successfully accommodating displaced car users;
- There have been significant improvements to bus services in the zone and more widely throughout London;
- Comparative analysis of the many influences on the central London economy throughout 2003 suggest that the direct impact of congestion charging on business activity has been small;
- There have been gains in environmental amenity, road traffic emissions and fossil fuel consumption within the charging zone;
- The operation and enforcement of the scheme are now working well; noticeable improvements in performance have followed the Supplemental Agreement with Capita, the scheme service provider.

Congestion

Congestion within the zone has reduced by 30 percent.

- Measurements of congestion within the charging zone indicate reductions in congestion averaging 30 percent since the start of congestion charging. These results are at the top end of TfL's range of prior expectation;
- Reduced congestion means that the proportion of time that drivers spend stationary or moving slowly in queues in the charging zone has reduced by up to one-third;
- This translates into more reliable and more predictable journey times, which surveys of businesses and Londoners more generally suggest are being recognised.

The Inner Ring Road continues to operate satisfactorily, despite small increases in traffic.

- Measurements on the Inner Ring Road continue to show small reductions in congestion compared to pre-charging levels, reflecting better operational management of this key route, despite slightly higher traffic flows.

Traffic patterns

Traffic adjusted rapidly and smoothly to the introduction of charging.

- Drivers adjusted rapidly to the introduction of charging and there were very few traffic operational problems. New patterns of travel became established at an early stage, and have been sustained throughout 2003 and into 2004.

Traffic entering the zone during charging hours has reduced by 18 percent; and traffic circulating within the zone has reduced by 15 percent.

- Observed reductions of 18 percent in traffic (vehicles with four or more wheels) entering the zone, and 15 percent in traffic circulating within the zone (also vehicles with four or more wheels), are towards the top end of the range of TfL's prior expectation.

As predicted, there have been small increases in traffic on the Inner Ring Road, which is being satisfactorily managed.

- Although increased traffic has been observed on the Inner Ring Road, these increases are somewhat smaller than expected and are not leading to significant operational problems on this key route.

There is no evidence of systematic increases in traffic outside the charging zone.

- There is no evidence of systematic increases in traffic outside of charging hours on weekdays or weekends in response to the introduction of the charge;
- There is no evidence of systematic increases in traffic on local roads outside the charging zone, during charging hours, in response to the introduction of the charge.

Public transport

Large scale improvements to the bus network have seen increased patronage, both in the congestion charging zone and more widely throughout London.

- A total of 106,000 passengers entered the charging zone on 560 buses during a typical weekday morning peak in Autumn 2003;
- This represents a 38 percent increase in patronage and a 23 percent increase in service provision compared with 2002. About half of the increased patronage is estimated to be due to congestion charging;
- Although average occupancies per bus have increased, the additional bus passengers are being accommodated.

The reliability of bus services has improved markedly, both within the charging zone and more widely across London.

- Within the charging zone there were marked improvements in both the main indicators of bus service reliability: additional waiting time due to service irregularity fell by 30 percent; disruption due to traffic delays fell by 60 percent;
- Overall bus speeds within the charging zone improved by 6 percent; after allowing for time spent at bus stops, this is compatible with the improved speeds of general traffic within the charging zone. The improvement within the zone is greater than that observed in other areas of London.

Travel to central London by Underground has reduced during 2003.

- The Underground has experienced a reduction in the number of passengers exiting stations in and around the charging zone, a trend reflected across the network. In the morning peak period since charging was introduced there was a reduction in the average number of station exits within the charging zone of 8 percent from 513,000 to 473,000;
- It is likely that a small shift of car users to Underground, because of charging, has been more than offset by overall reductions in Underground travel to central London for reasons unconnected with congestion charging.

Travel to central London by National Rail remained broadly static between 2002 and 2003.

- Transport for London has observed no significant net change to the number of passengers entering central London on the National Rail network between 2002 and 2003. It is possible that a shift of car users to rail, because of charging, has been masked by background changes in the use of rail for travel to central London;
- Transport for London has found no evidence of systematic increases in 'railhead' parking at rail stations in inner and outer London associated with congestion charging.

Social and behavioural impacts

Transport for London's analysis of the available data allows a provisional assessment of how people have adapted to congestion charging.

- Of the 65,000 to 70,000 car trips that are no longer made to the charging zone during charging hours: between 50 and 60 percent have transferred to public transport, 20 to 30 percent now divert around the charging zone (these being trips with both origins and destinations outside of the zone), and 15 to 25 percent have made other adaptations, such as changing the timing of trips.

Business and economic impacts

Comparative analysis of the many influences on the central London economy throughout 2003 suggest that the direct impact of congestion charging has been small.

- London's economy has been subject to a wide range of influences during 2003. Collectively, these have had a much greater impact on the central London economy than congestion charging. They have also made the task of identifying and quantifying congestion-charging-related impacts more difficult.

Key results from TfL's survey of businesses in central London are now available.

- The TfL business surveys have shown that a number of factors are at work in generating responses to the congestion charge from the business community;
- A majority of businesses in the zone or close to the boundary state that they are generally supportive.

Further analysis of the impacts of congestion charging on the retail sector confirm that the direct effect is comparatively small.

- The scale of reduced travel to central London resulting directly from congestion charging is not compatible with the scale of effects claimed by some retailers. This strongly suggests the operation of other more pervasive factors in determining the economic performance of central London during 2003;
- The apparent resurgence of the retail market at the end of 2003/early 2004 indicates congestion charging has had no long-term effect on the sector;
- Structural changes to the retail market and much broader economic and political factors have been the prime drivers affecting retail performance within the charging zone during the first half of 2003.

Accidents, amenity and the environment

The recent pattern of decreasing levels of accidents within the charging zone is continuing, and there is no evidence of detrimental change in road traffic accidents within or around the zone.

- The recent trend of overall year-on-year decreases in road traffic accidents seen across London is continuing. There is no evidence of disproportionate changes to the numbers of accidents involving two-wheeled vehicles as some had feared, and there is some evidence of an accelerated decline in accidents inside the charging zone.

Better amenity for central London.

- Surveys of Londoners 'on-street' in and around the charging zone suggest that the beneficial effects of congestion charging and other initiatives on environmental quality are being recognised.

There has been reduced emissions from road traffic inside the charging zone and little change to emissions on the Inner Ring Road.

- By reducing the overall volumes of traffic within the charging zone, and increasing the efficiency with which it circulates, congestion charging has been directly responsible for reductions of approximately 12 percent in emissions of both oxides of nitrogen (NO_x) and fine particles (PM_{10}) from road traffic (based on 24-hour annual average day);
- Traffic changes on the Inner Ring Road are estimated to have resulted in very small changes to emissions of NO_x and PM_{10} from road traffic, of less than plus/minus 2 percent respectively.

Valuable savings in greenhouse gases and fossil fuels.

- Traffic changes resulting from charging are estimated to have led to savings of 19 percent in traffic-related emissions of CO_2 and 20 percent in fuel consumed by road transport within the charging zone (based on a 24-hour annual average day).

No evidence of changes to local noise levels.

- There is no evidence from sample noise measurements in and around the charging zone of significant changes in the ambient noise climate.

Scheme operation

Approximately 550,000 congestion charge payments are made each week.

- In a typical week, there are around 400,000 non-residential payments, 90,000 residential payments and 60,000 fleet payments;
- Chargepayer preferences for different payment methods were established within the first few weeks of operation and have shown only minor changes since. However, use of the text messaging (SMS) sales channel is slowly increasing, at the expense of the retail and call centre payment channels.

The Supplemental Agreement with Capita (the primary service provider for the scheme) has resulted in real improvements to customer service and scheme operation.

- During the first few months of the scheme TfL became aware that the quality of service provided by the main contractor was below the standard required. The Supplemental Agreement with Capita defined an extensive programme of improvements across IT, management, process and staffing. Along with a tougher quality performance management regime this has resulted in an increase in performance across a number of areas, particularly in relation to performance of the call centre, the number and quality of penalty charges being issued and the end to end enforcement process.

Enforcement

The scheme is being rigorously enforced, and the effectiveness of the process has benefited from improvements following from the Supplemental Agreement with Capita.

- Representations against Penalty Charge Notices (PCNs) have reduced as the accuracy of PCNs issued has increased. Chargepayer and Capita errors in entering the correct vehicle and date of entry details have fallen and the effectiveness of the enforcement process has increased;
- Since June 2003 TfL has been pursuing outstanding debts and persistent evaders through all available channels. Several hundred vehicles have been immobilised or removed and debt recovery is being followed through for all unpaid PCNs through bailiff action.

Monitoring programme

The monitoring programme is proceeding to plan. A further comprehensive round of surveys and research are planned for 2004/5.

- This report contains summary results from all areas of the monitoring programme, reflecting one complete year of scheme operation;
- The material so far gathered is undergoing detailed analysis, and a range of technical reports will be published on the TfL website over the coming months. This will include a series of case studies;
- The future monitoring programme for 2004/5 will proceed broadly along the lines described in the *First Annual Monitoring Report*, with some minor changes of emphasis reflecting experiences since the introduction of charging.

1. Introduction

1.1 Purpose

This is the second in a series of comprehensive annual reports describing the impacts of congestion charging in central London. It sets out emerging findings from across the monitoring programme, reflecting approximately 12 months of scheme operation, and compares these to conditions applying before charging started and – where appropriate – to Transport for London's (TfL's) expectations for the scheme. It also reports on the operation and enforcement of the scheme during its first 12 months.

The Mayor and TfL are committed to a comprehensive 5 year programme, one year before and four years after, of objective monitoring covering not only the more immediate traffic and transport effects of the scheme, but also the wider social, economic and environmental impacts. The programme consolidates information from over 100 specially-designed surveys, while making use of already established surveys and data sources.

The scope and scale of the data and information now available to TfL exceed what is possible to publish in a report of this nature. This report therefore concentrates on those elements of the monitoring work that are likely to be of most general interest.

1.2 The central London congestion charging scheme

The central London congestion charging scheme was introduced on 17 February 2003. The primary aim of the scheme is to reduce traffic congestion in and around the charging zone. The scheme was expected to contribute directly to four of the Mayor's ten priorities for transport as set out in his Transport Strategy published in July 2001:

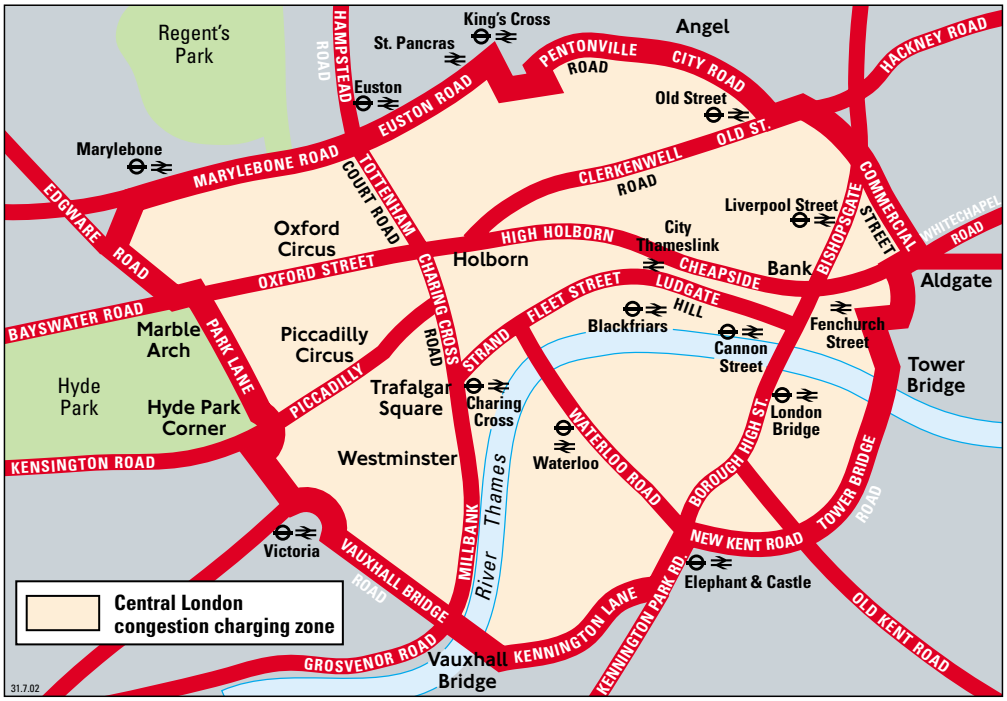
- To reduce congestion;
- To make radical improvements in bus services;
- To improve journey time reliability for car users;
- To make the distribution of goods and services more reliable, sustainable and efficient.

The scheme was also expected to generate net revenues to improve transport in London more generally.

The congestion charge is a £5 daily charge for driving or parking a vehicle on public roads within the congestion charging zone between 0700 and 1830, Monday to Friday, excluding weekends and public holidays.

The central London congestion charging zone is shown in Figure 1.1. It covers 22 square kilometres in the heart of London, including centres of government, law, business, finance and entertainment.

Figure 1.1 The congestion charging zone



The Inner Ring Road forms the boundary of the congestion charging zone, and no charge applies to vehicles using that route.

Certain categories of vehicle, notably taxis, motorcycles and buses, are exempt from the charge. Certain categories of vehicle users can register for discounts – for example residents of the congestion charging zone can register for a 90 percent discount (for a minimum weekly payment), and disabled Blue Badge holders and certain alternative fuel vehicles are eligible for a 100 percent discount.

1.3 Overview of the monitoring programme

The scope of the monitoring programme was described in detail in the *First Annual Monitoring Report*.

The monitoring programme consists of five key work streams, designed to assess the range of traffic, transport, social, economic and environmental effects.

The programme features over 100 directly-sponsored survey and research activities, designed to investigate specific issues and complement the wealth of information gathered by third-parties, such as the public transport operators, other official sources and stakeholder groups.

The work is managed by a team of permanent TfL staff, with independent contractors undertaking most of the main data collection and analysis tasks. The TfL team is supported by a number of specialist academic and professional external advisers.

1.4 Findings from the monitoring work so far

In June 2003 TfL published the *First Annual Monitoring Report*. This described the scope of the monitoring work that had been put in place to ensure that the impacts of congestion charging were robustly and comprehensively measured. Conditions applying before charging across a range of key indicators were set out, and information given describing how and when changes to these indicators would be measured.

Since the introduction of charging TfL has produced three reports detailing key early results from the monitoring work. These are:

- *Three Months On, June 2003;*
- *Congestion Charging: Six Months On, October 2003;*
- *Update on scheme impacts and operations, February 2004.*

These reports have collectively provided a picture of the early effects of the scheme. In general, congestion charging appears to be meeting its principal traffic and transport objectives, and the main elements of the scheme are operating satisfactorily.

The key traffic, transport and operational outcomes after one year are described in this report. This report also covers the business, social, economic and environmental impacts of the scheme, drawing on newly-available data from surveys undertaken in the latter part of 2003.

1.5 Report contents

The remainder of this report presents a summary of findings from across the monitoring programme. There are six sections, taking each of the key areas of the monitoring work in turn, together with a section updating and extending the information previously published relating to the operation and enforcement of the scheme:

- Congestion;
- Traffic patterns;
- Public Transport;
- Social and behavioural impacts;
- Business and economic impacts;
- Accidents, amenity and the environment;
- Scheme operation and enforcement.

Congestion charging was introduced against a backdrop of wider change to travel patterns in London, brought about by economic and social change and the implementation of the other elements of the Mayor's Transport Strategy.

All of these will have had an effect on the measurements described in this report, which in general reflect the net out-turn of a combination of traffic, transport and other effects. For example, the overall level of travel to central London by car has declined in recent years, and in 2003 there was a net decline in public transport travel to central London.

It is therefore usually not possible to precisely identify the 'congestion charging effect', although in many cases the available evidence allows a reasonable estimate.

1.6 Further information

The structure and content of the monitoring programme was fully described in the *First Annual Monitoring Report* (Appendix 3), as were the principles for access to further data and results from across the programme (Appendix 2).

During 2004 the TfL website will increasingly be used to publish a variety of technical reports and other materials from the monitoring work.

If you have any queries relating to this report or the wider impacts monitoring programme – please e-mail TfL at ccsmonitoring@tfl.gov.uk

2. Congestion

2.1 Introduction

The main objective of congestion charging was to reduce traffic congestion in and around the charging zone. Congestion charging would achieve this by reducing the amount of traffic attracted into the charging zone. This chapter examines the extent to which this objective has been achieved, drawing on the range of evidence now available from the monitoring programme.

2.2 Key findings

- Measurements of congestion within the charging zone indicate reductions in congestion averaging 30 percent since the start of congestion charging. These results are at the top end of Transport for London's (TfL) range of prior expectation;
- Measurements on the Inner Ring Road continue to show small reductions in congestion compared to pre-charging levels, despite higher traffic flows, reflecting better operational management of this key route;
- Transport for London has found no statistically significant change to congestion levels on major roads in the inner London area outside the charging zone during charging hours, although congestion on radial routes approaching the charging zone appears to have reduced by up to 20 percent;
- Decongestion means that the proportion of time that drivers spend stationary or moving slowly in queues in the charging zone has reduced by up to one-third;
- Preliminary analysis of speed and congestion data from Automatic Number Plate Recognition (ANPR) enforcement cameras tends to corroborate findings from other surveys and the cameras are a valuable new data source for monitoring traffic conditions in London;
- Panel surveys of regular drivers travelling between other parts of London and the charging zone, undertaken across the period when charging was implemented, demonstrated clear savings in journey times (averaging 14 percent) and an increase in the reliability (a measure of the variability of journey times reducing by 27 percent for outward journeys and 34 percent for return journeys);
- Reduced congestion in and around the charging zone is being recognised by businesses and Londoners more generally.

2.3 Definitions and measurement of congestion

A full definition of congestion (and the relevant indicators) was set out in the *First Annual Monitoring Report*. The approach adopted here follows that currently used by the Department for Transport. This defines 'congestion' as the 'lost' travel time experienced by vehicle users on a road network. It relates to the lost time element of travel time spent over and above that under 'uncongested' or 'free-flow' conditions. In broad terms, congestion in an urban road network equates to time spent in queues at junctions.

For London, 'uncongested' conditions are taken as being those applying during the early hours of the morning, when traffic flow is at its lightest and traffic is most able to move around the network at its 'free-flow' speed. Similar measurements taken at other times of the day, when traffic would generally be moving more slowly, are then compared to 'free-flow' conditions and the difference is considered to be congestion.

In practical terms, the measurement of congestion involves gathering data describing average speeds of travel on the road network. Network speeds, expressed in terms of kilometres per hour (km/h), can be translated directly into the corresponding travel rate minutes per kilometre (min/km) and these are the units in which congestion is most usually expressed. Congestion is therefore considered to be the difference in min/km between the measured travel rate and the night-time travel rate, i.e. the *excess* travel rate.

Traditionally, average traffic speeds in London have been measured using Moving Car Observer surveys (MCO – also known as 'Floating Car' surveys). This method consists of an instrumented car that travels around the network following a pre-defined schedule of routes and behaving in the same way as the generality of other traffic.

The routes are selected so as to be representative of traffic conditions across the network. The car records time and distance covered and, over the course of any one survey will return an average speed for traffic on the survey network along with details of the variation in speed throughout the survey. The surveys of this type that had been put in place to monitor the impacts of congestion charging were outlined in the *First Annual Monitoring Report* and a full set of results from these surveys is described below.

The MCO method has certain shortcomings in this context. The monitoring work therefore sought to strengthen the understanding of the congestion effects of the scheme by using data from two other sources. These are:

- A 'panel' survey of regular drivers, that monitored the changes in time taken for a selection of regular daily journeys between other parts of London and the charging zone;
- Data from the ANPR cameras that are used to enforce the scheme.

A summary of findings from each of these sources is presented, alongside some results from 'attitudinal' surveys of businesses and Londoners, that provide insights into the way that the reduced levels of congestion have been recognised.

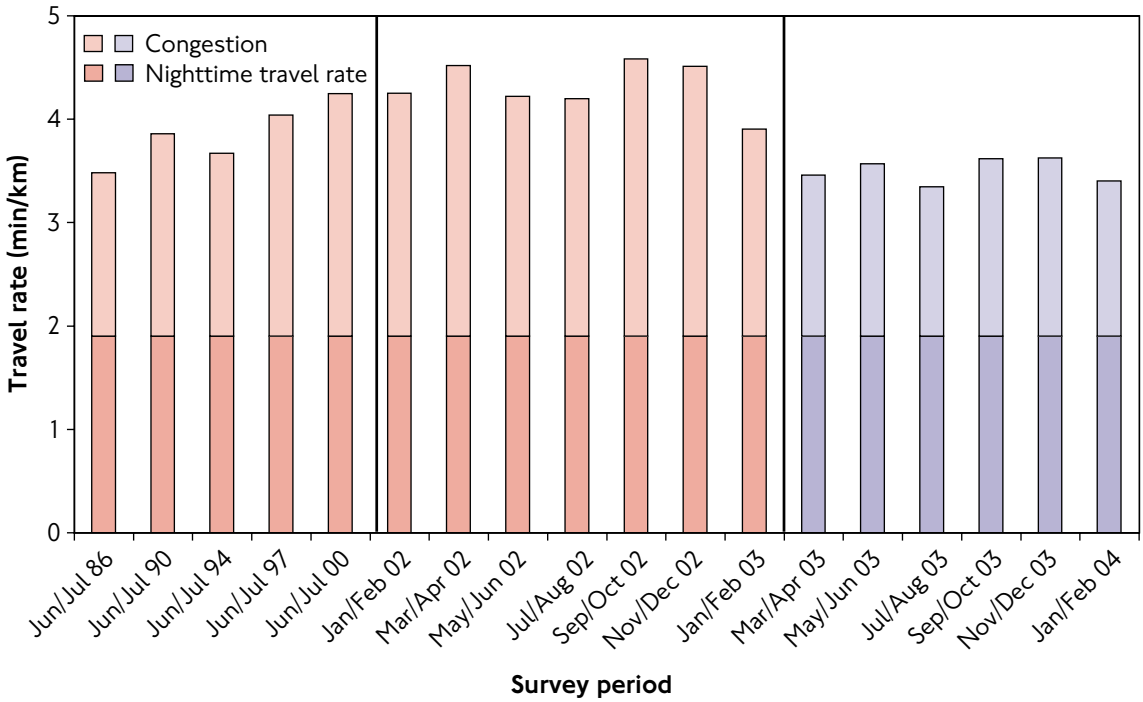
2.4 Moving car observer surveys

Congestion within the charging zone

Intensive MCO surveys have been undertaken in the charging zone since the start of 2002. These surveys directly adopted the methodology that had applied in central London since at least the mid-1980s, with the historical surveys that had been undertaken once every three years increased to bi-monthly frequency, giving effectively continuous coverage.

Figure 2.1 presents results from these surveys, up to and including the latest survey undertaken in January/February 2004. Surveys undertaken post-charging are coloured blue, and those taken pre-charging are coloured red.

Figure 2.1 Congestion levels in the charging zone during charging hours



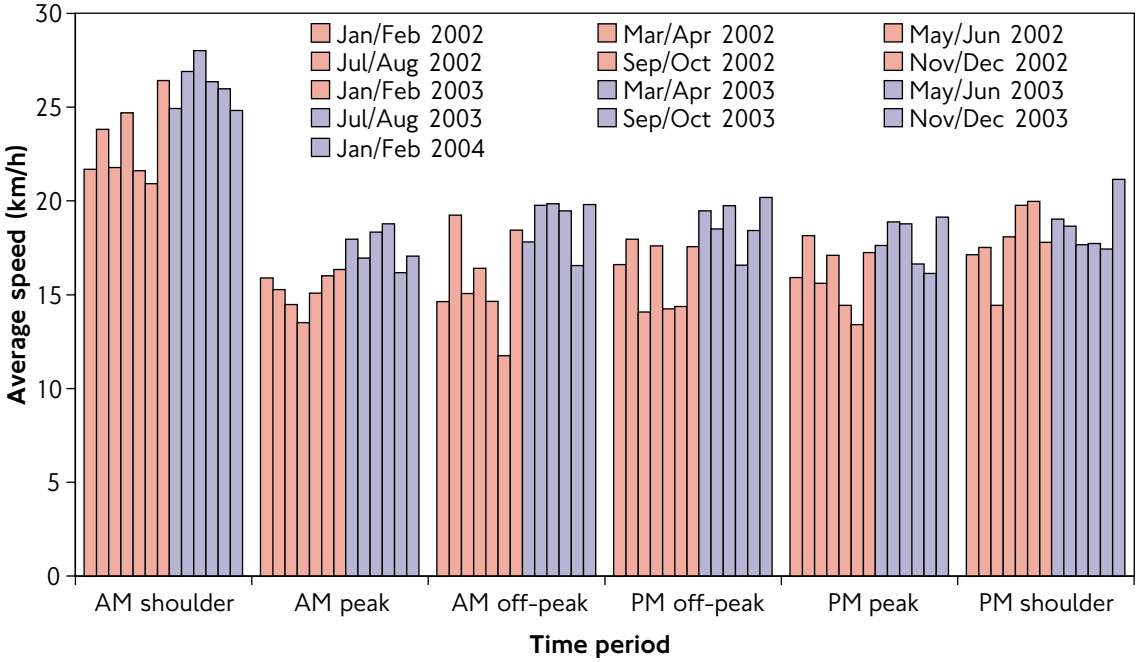
Transport for London expected a 20 to 30 percent reduction in congestion inside the charging zone during charging hours, against typical traffic delays of 2.3 min/km, estimated to have been representative of conditions before charging was introduced.

Figure 2.1 shows consistent and significant reductions in congestion, against the 2002 surveys, with typical delays in the charging zone around 1.7 min/km and average network speeds during weekday charging hours consistently around 17 km/h per hour. Taking into account the most recent survey in January/February 2004, the average reduction in congestion since charging commenced is 30 percent.

The congestion benefits seen in the early months of the scheme are therefore being sustained, with reductions in congestion consistently towards the upper end of the range of TfL's prior expectation.

Figure 2.2 shows how these improvements in congestion have been reflected by faster average journey speeds. Average travel speeds during charging hours are now around 17 km/h.

Figure 2.2 Average network speeds within the charging zone



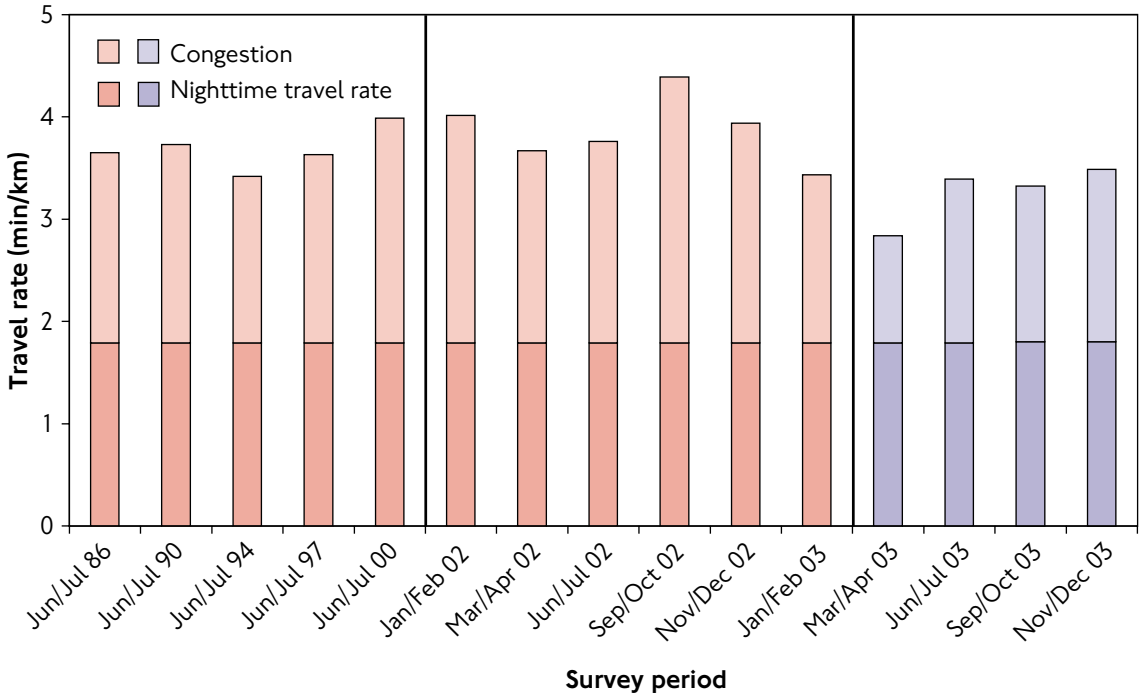
2.5 Congestion on the Inner Ring Road

The Inner Ring Road forms the boundary of the charging zone. No charge applies to vehicles using this route. Concerns were raised before the start of charging that traffic diverting on to the Inner Ring Road to avoid the charge could lead to increased congestion. Transport for London expected that with the implementation of improved traffic management arrangements, there would be no overall increase in congestion on this route.

Congestion on the Inner Ring Road has been measured by dedicated two-monthly MCO speed surveys. Four surveys have been completed following the start of charging and these can be compared with equivalent surveys conducted during 2002.

Figure 2.3 shows that observed levels of congestion have reduced since the introduction of charging. The latest three surveys all indicate a stable picture with typical all-day delays of between 1.5 and 1.7 min/km, compared to a representative pre-charging value of 1.9 min/km.

Figure 2.3 Congestion levels on the Inner Ring Road during charging hours

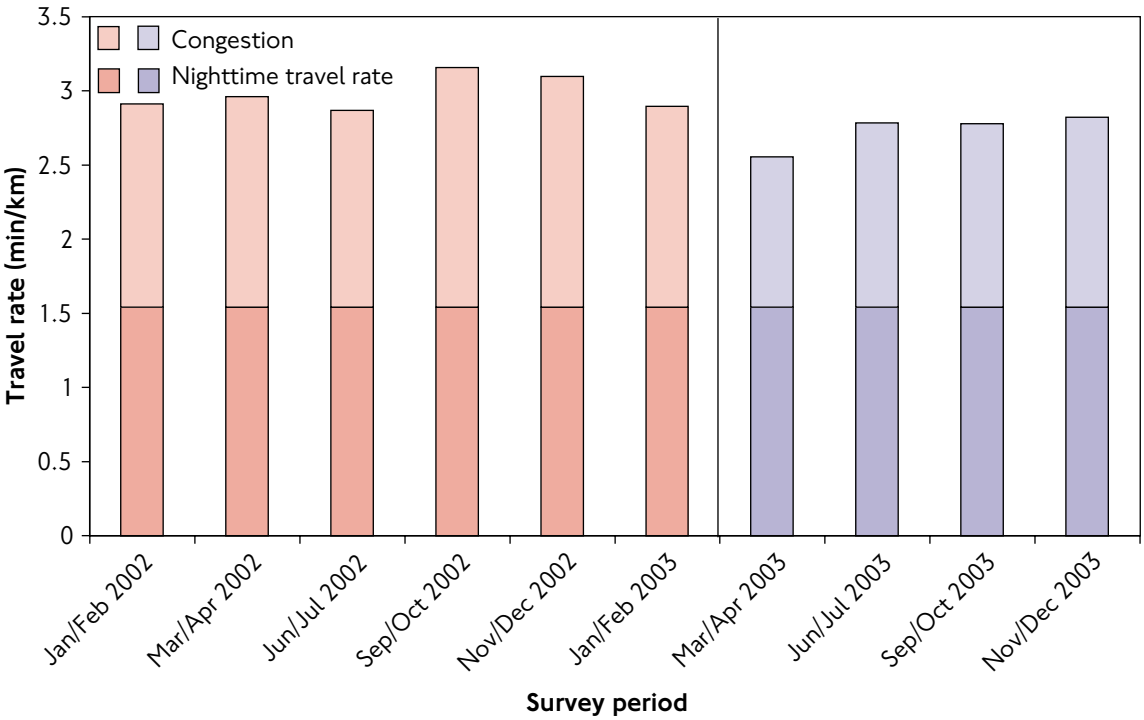


As with the charging zone, travel rates in the 2003 post-charging surveys are generally faster than during 2002. The uncongested travel rate on the Inner Ring Road is 1.8 min/km, and the actual levels of congestion experienced during 2002 fluctuated considerably throughout the year.

Measurements of traffic volumes on the Inner Ring Road suggest overall increases in traffic of about 4 percent following the introduction of charging, towards the lower end of TfL's range of expectations. It is therefore likely that the congestion improvements reflect the better operational management of this key route and to a more limited extent, the end of the disruptions connected with some roadworks around the Inner Ring Road area in 2002.

2.6 Congestion on radial routes approaching the charging zone

Figure 2.4 Congestion levels on main radial roads approaching the charging zone during charging hours



Congestion on the main radial routes approaching or leaving the charging zone has been surveyed in both directions as part of the intensified MCO survey arrangements for the Inner Ring Road (Figure 2.4). This survey covers a representative selection of radial routes up to a distance of 3 to 5 kilometres from the charging zone. For the purpose of this report the night-time travel rate for inner London of 1.5 min/km is used as a representative pre-charging value for congestion, giving an average value for congestion before charging, during charging hours, of 1.5 min/km.

The 2003 post-charging surveys have, in general, seen decreases in travel rate on the main radial approach roads during charging hours. The reduction has averaged 0.3 min/km. This means that all day levels of congestion are now averaging 1.2 min/km, a reduction of around 20 percent.

2.7 Congestion on main roads in inner London

Inner London in this context means the area outside the Inner Ring Road, but within the North and South Circular Roads. Transport for London expected small reductions in congestion in inner London outside of the charging zone. This would arise from reduced traffic volumes, reflecting lower volumes of travel to and from the charging zone.

An MCO survey of network speeds on the more major roads in inner London was conducted between March and June 2003. Transport for London estimated the representative all-day level of congestion before the introduction of charging to be 1.3 min/km on main roads in inner London. Transport for London has found no statistically significant change in congestion levels on major roads in inner London during charging hours.

It may be that reduced traffic levels across inner London resulting from congestion charging, in combination with environmental traffic management schemes on residential roads, have meant a transfer of traffic from minor to more major roads. Such roads are more likely to be covered in the congestion survey – so the survey may not reflect the full picture of congestion across inner London. Traffic management schemes on the Inner Ring Road during 2002, at Vauxhall Cross and at Shoreditch – for purposes unconnected with congestion charging – are likely to have diverted traffic to main roads in inner London and hence may have increased congestion within this survey area.

2.8 Effect of reduced congestion on driving speeds

The TfL report *Six Months On* illustrated the important point that reduced congestion in central London was mainly reflected by a reduced amount of time spent stationary or moving slowly in queues, rather than increases in driving speed. Figure 2.5 extends this analysis to look at the whole series of bi-monthly surveys from January/February 2002 to January/February 2004.

Figure 2.5 Time spent travelling at different speeds in the charging zone during charging hours

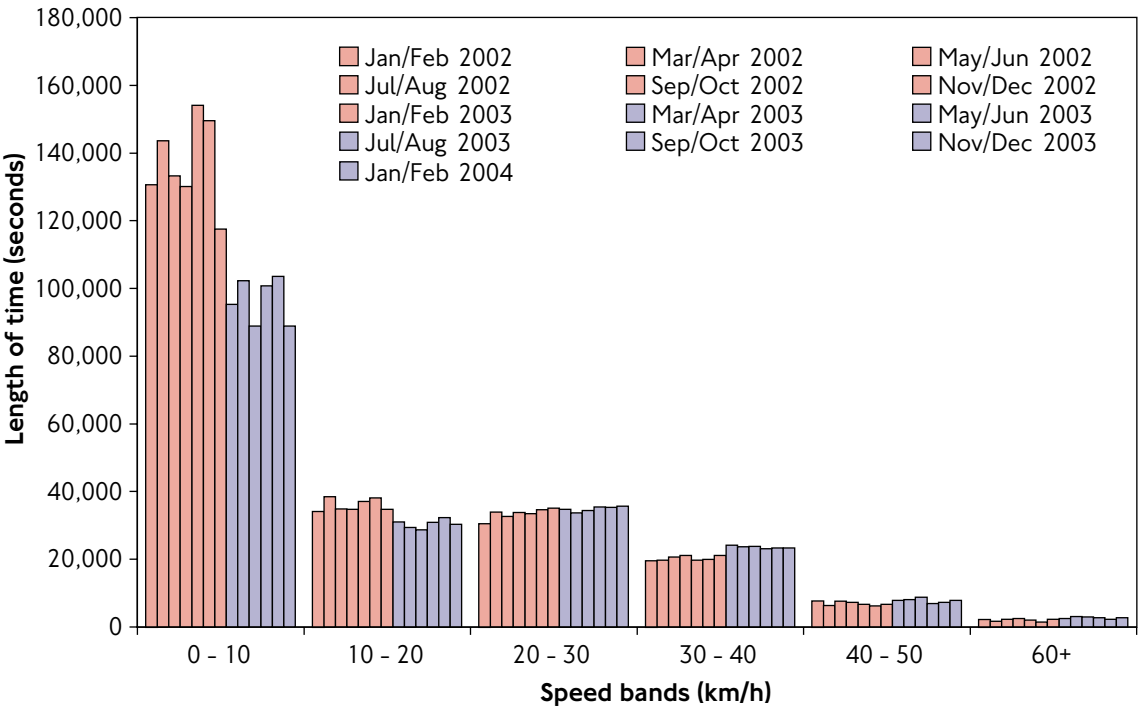


Figure 2.5 shows that decreased congestion in the charging zone is mainly reflected by a reduced amount of time spent stationary or moving slowly in queues, rather than increases in driving speed.

In all of the post charging surveys, the amount of time spent in the lowest speed band (0 to 10 km/h) has reduced by up to one third when compared to equivalent pre-charging surveys.

Whilst there are some small increases in the amount of time spent travelling at the higher speeds up to 40 km/h, the gain is overwhelmingly in terms of reduced time spent in queues. This should mean better journey time reliability as periods of temporary 'gridlock' are greatly reduced.

2.9 Congestion monitoring using ANPR cameras

The possible application of the ANPR enforcement cameras to monitoring congestion was outlined in the *First Annual Monitoring Report*. This described how traffic speeds could be monitored by matching observations of the same vehicle moving between related pairs of cameras, where the time taken and distance covered were known.

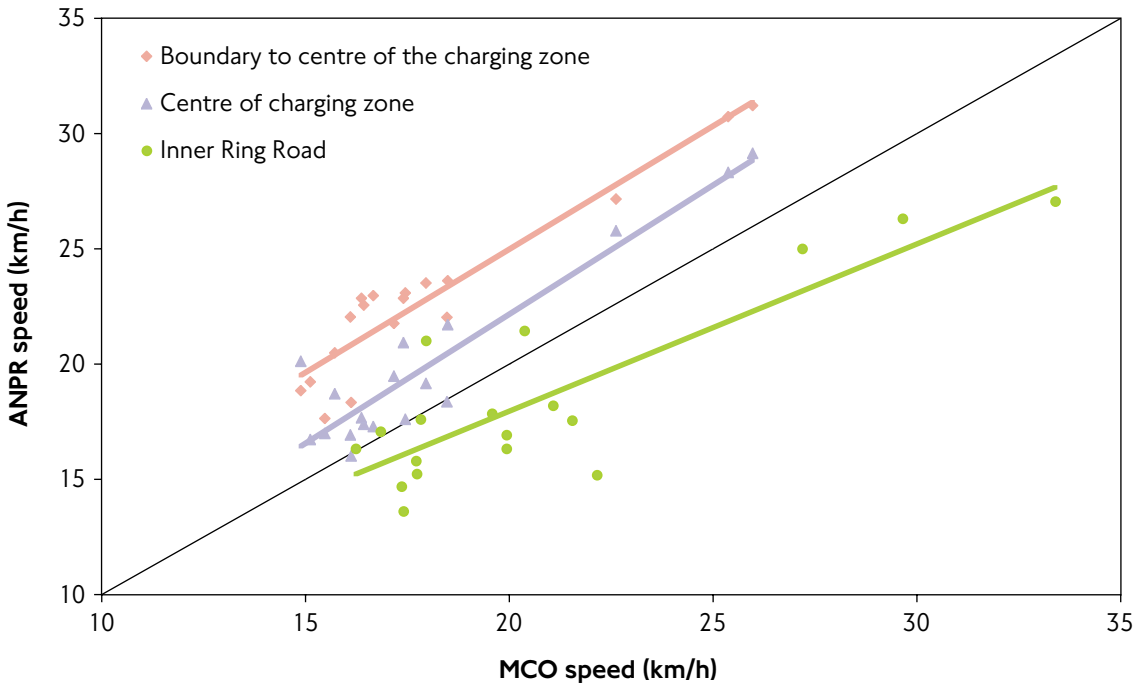
A potential benefit of this approach would be the large volumes of data arising as a by-product of the scheme enforcement process. Cameras operate continuously during charging hours. Such volumes of data would allow statistical treatment of issues such as travel time reliability (which is not currently possible using MCO data) and open up new research possibilities into various aspects of traffic behaviour.

Taking full account of Data Protection principles, a system was put in place to begin to exploit these data. Data from the cameras started coming 'on-stream' at the very start of 2003, providing a short 'pre-charging' dataset. However, since charging started, data have been accumulating continuously and some initial analyses have been undertaken.

An important consideration for the future is the extent to which data from this source are comparable to those from the MCO speed surveys. This might allow greater use of this technology as a primary measure of changes in congestion, resulting in cost savings, as well as improving the robustness of conclusions and the rapidity with which they can be produced. However, it is recognised that differences in network coverage and other factors will inevitably mean that the estimates of network speeds from each source will differ.

Figure 2.6 shows an example of the relationships between ANPR and MCO data, in this case relating to the early months of charging. For the network of cameras within the charging zone, it is seen that the estimated ANPR measurements have a tendency to produce higher speed estimates than the MCO measurements. On the Inner Ring Road, however, the reverse is true, ANPR tending to record consistently lower speeds than the MCO surveys.

Figure 2.6 Example relationship between car speeds measured by ANPR cameras and MCO surveys during the early months of charging



These differences are not unexpected, relating to differing 'samples' of congestion measured in each case. For example, within the charging zone, the network of cameras is heavily biased towards the busier, more direct routes.

The important finding here is not that the estimated average speeds are different, but that the differences appear to be reasonably consistent across different days and time periods. This suggests that it may be possible in the longer-term to develop robust methods of monitoring congestion using this technology.

2.10 Panel survey of regular drivers

Technology-based methods of measuring aggregate changes in congestion do not necessarily reflect the experience of 'real' travellers. To tackle this and provide additional information across the period during which the scheme was implemented a 'panel' survey of regular drivers was put in place over the period November 2002 through to end April 2003.

This consisted of a panel of regular commuters who kept a daily record of their journey times on their regular journeys either to/from or across the charging zone. Over 7,000 journeys were monitored in total. Their logs provide information on 'replicated' journeys, one use for which is to look at how the reliability of regular journeys has changed.

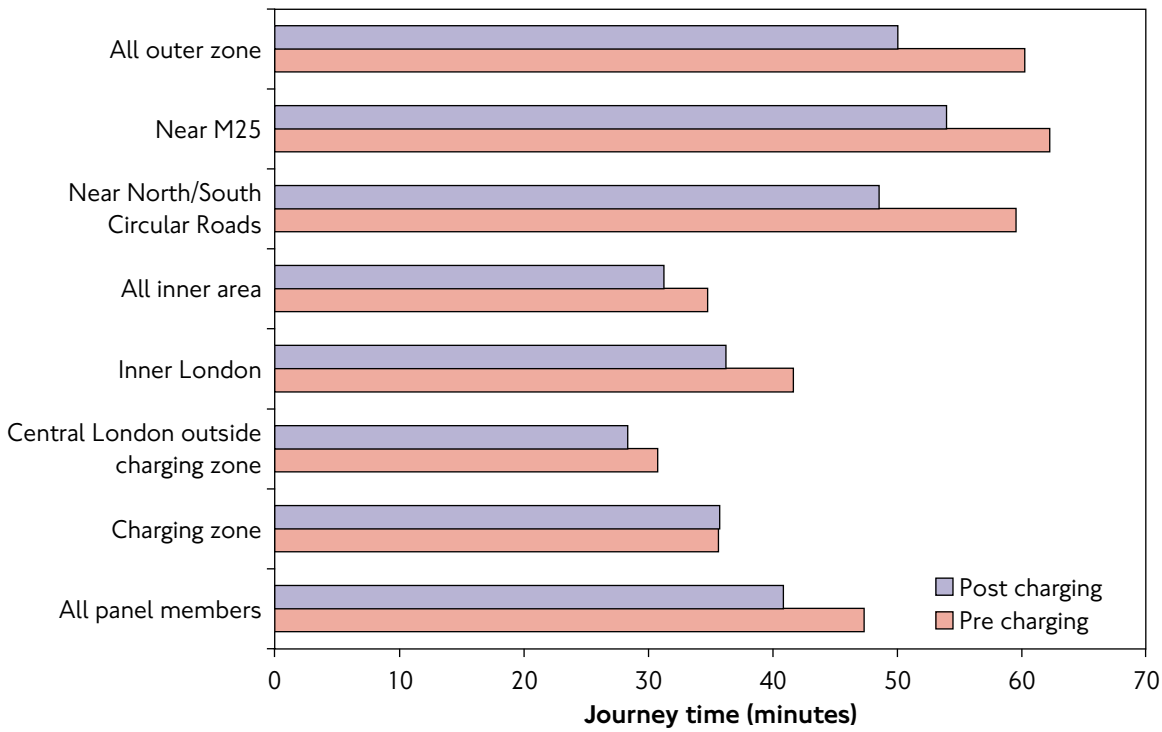
Panel members were selected from all parts of London. Their journeys were analysed in concentric zones according to the origin or destination of the journey and for 'outward' or 'return' journeys as appropriate.

Results show that both outward and return journey times each decreased by an average of 14 percent following the introduction of charging. The largest decreases in journey times were experienced by those travelling the longer distances. Summary results for 'outward' journeys (largely corresponding to the morning peak) are shown in Figure 2.7.

There were also clear indications of improved reliability for journey times, although the findings varied between the different types of journey. The standard deviation of travel times (one measure of the variability of journey times) was reduced by 27 percent for outward journeys and 34 percent for return journeys.

On a typical round-trip of 80 minutes, this could mean savings in travel time, on average, of about 10 minutes. Although these results relate to the early months of charging, the more recent trends in congestion described elsewhere in this chapter suggest that comparable gains are likely to have continued.

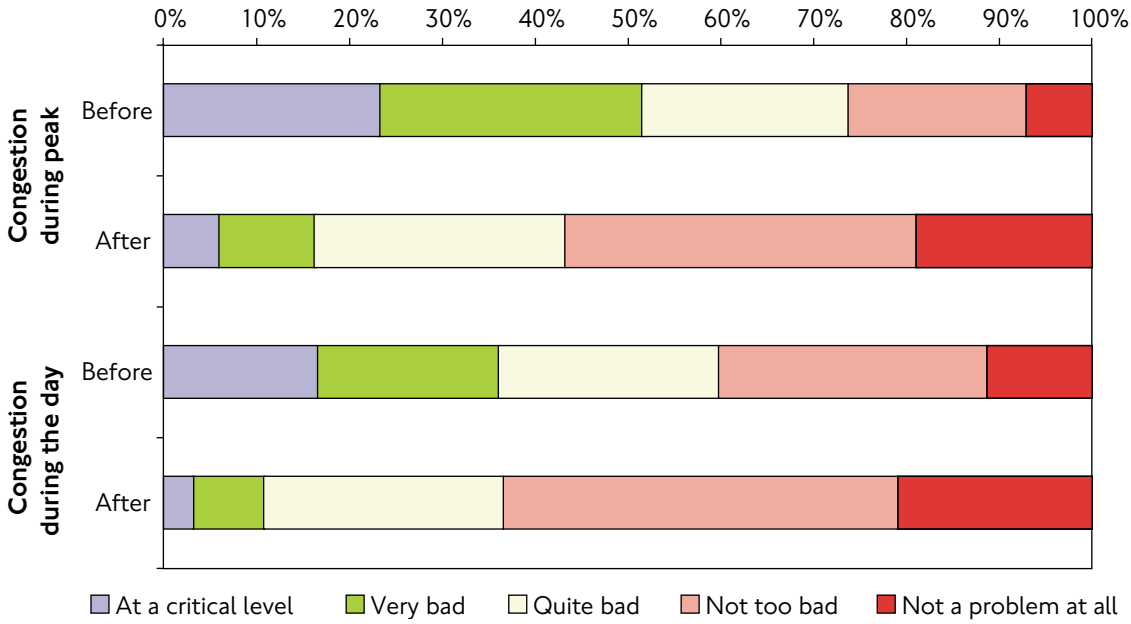
Figure 2.7 Comparison of 'outward' journey times (in minutes) for a selection of regular journeys into or across the charging zone



2.11 Perceptions of congestion

There is increasing evidence that businesses and the general public are recognising the benefits of reduced congestion in central London. Figure 2.8 shows a shift in the perception of traffic congestion among central London businesses surveyed by TfL, comparing opinions expressed in Autumn 2003 with those of Autumn 2002. There has been a noticeable reduction in the proportion of businesses categorising congestion as 'at a critical level' or 'very bad', with an associated increase in those saying it was 'not too bad' or 'not a problem at all'.

Figure 2.8 Change in perceived level of congestion by businesses in central London



Other indications of how the decongestion effects of the scheme are being perceived by Londoners are given in Chapters 5 and 7.

3. Traffic patterns

3.1 Introduction

This section describes the key changes to the volumes and characteristics of road traffic that have been observed in and around the charging zone during 2003. It builds on information already presented in earlier TfL reports, giving some further detail in respect of indicators for which headline findings have already been published, and considers other data sources that have more recently become available.

Congestion charging was expected to deliver decongestion benefits by reducing the volume of traffic entering and circulating within the charging zone during charging hours. The scheme was also expected to lead to several other changes to traffic patterns around the charging zone. The key expected traffic changes were:

- A reduction of between 10 and 15 percent in traffic circulating within the charging zone (measured as vehicle-kilometres travelled by all vehicles with four or more wheels);
- A corresponding reduction in traffic entering and leaving the charging zone across the boundary;
- Changes to the composition of traffic, as different types of vehicle are differentially attracted or deterred with respect to the charging zone;
- An increase in traffic on the Inner Ring Road, as drivers elect to avoid paying the charge by diverting around the boundary of the charging zone;
- A reduction in traffic on the radial approaches to the charging zone, reflecting reduced vehicle-trips to and from the charging zone;
- A possible small increase in orbital traffic in inner London, from drivers also seeking to avoid paying the charge by diverting around the charging zone on roads beyond the Inner Ring Road;
- Other possible changes to the pattern of trip-making, for example drivers changing the timing of their trips so as to be outside of charging hours.

Information is now available that allow all of these expected effects within the first 12 months of charging to be assessed.

3.2 Key findings

The key findings from the monitoring work are as follows:

- Traffic adjusted rapidly and with very few traffic operational problems. New patterns of travel became established at an early stage, and have been sustained throughout 2003 and into 2004;
- Observed reductions of 18 percent in traffic (vehicles with four or more wheels) entering the zone, and 15 percent in traffic circulating within the zone (also vehicles with four or more wheels), are towards the top end of the range of TfL's prior expectation;
- Responses of individual vehicle types tended to be slightly more pronounced than expected, with larger-than-expected decreases in cars, and greater than expected increases in taxis and two-wheeled vehicles;

- Although increased traffic has been observed on the Inner Ring Road, these increases are somewhat smaller than expected and are not leading to significant operational problems on this key route;
- There is no evidence of systematic increases in traffic outside of charging hours on weekdays or weekends in response to the introduction of the charge;
- There is no evidence of systematic increases in traffic on local roads outside of the charging zone in response to the introduction of the charge;
- Reductions in radial traffic approaching the charging zone in inner London are towards the low end of TfL's range of prior expectation, but interpretation of this finding is difficult in the absence of further data describing recent traffic trends more widely in inner London.

3.3 Monitoring framework

The *First Annual Monitoring Report* described the range of indicators that would be measured, and set out a range of data describing traffic conditions as they were observed in 2002 before the scheme started. This information forms the starting point for the commentary below.

Surveys of all key indicators were undertaken during 2003 following the introduction of charging, and in most cases a direct comparison with 2002 is therefore possible. These are considered under the following headings:

- Traffic entering and leaving the charging zone;
- Traffic circulating within the charging zone;
- Traffic on the Inner Ring Road;
- Orbital traffic, and traffic on local roads beyond the Inner Ring Road;
- Radial traffic approaching the zone;
- Wider traffic trends in London.

Readers should be aware that there have been many other potential influences on traffic patterns operating at the same time that congestion charging was introduced. These include longer-term 'background' trends in traffic across London, together with a variety of shorter-term temporary effects. Also pertinent are changes to the central London road network, which in some cases may affect the direct comparability of 2003 and 2002 measurements.

In the absence of longer-term information for many of the indicators that were only first measured in 2002, the following approaches have been used to ensure comparability of estimates between 2002 and 2003:

- Where surveys were done at a particular time during 2002, these have been replicated as closely as possible during 2003;
- Where estimates of annual change are required, these have been derived from an average of counts taken during the Spring and Autumn 'neutral' traffic counting periods; these being periods when traffic volumes most closely approximate to their annual average levels. These estimates are therefore not true annual averages. They are nevertheless a sound basis for measuring relative change, and are referred to as 'annualised' estimates throughout.

3.4 Settled traffic conditions

Early feedback on the traffic impacts of the scheme was available from automatic traffic counters located at a selection of major-road entry points to the charging zone. These cover approximately 40 percent of inbound traffic during charging hours, and are therefore a good indicator of overall traffic trends. However, their location on major roads may tend to under-state the overall effects of the scheme as, with reduced overall traffic levels, the relative attractiveness of the more major roads may have increased.

Figure 3.1 compares traffic levels over a complete year of charging against levels recorded in the early weeks of 2003 just before charging was introduced.

The rapidity with which traffic levels adjusted to the charge is evident, as is the relative stability of traffic levels since. Also evident from the graph is the absence of significant changes in weekend traffic corresponding with the introduction of the scheme.

Figure 3.1 Traffic entering the charging zone during charging hours on a representative selection of major entry points

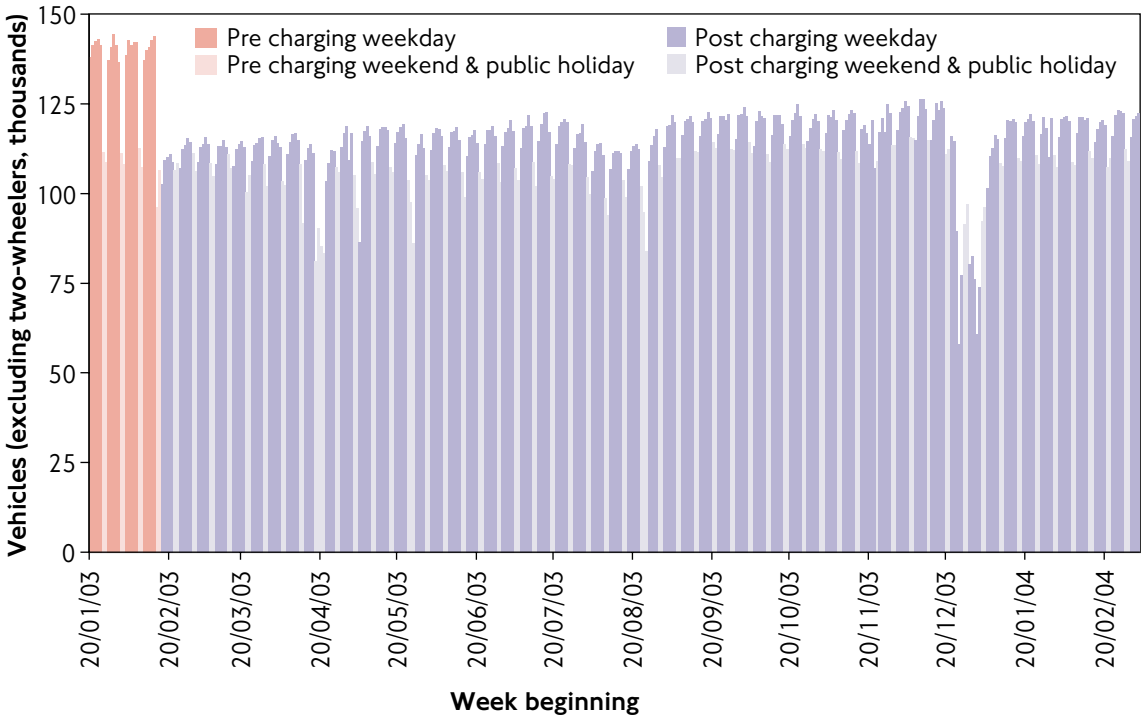


Figure 3.1 makes an interesting comparison with Figure 8.1, which shows weekly levels of charge payments over a similar timescale. Both traffic and payment trends continue to suggest the existence of stable travel patterns.

3.5 Traffic entering and leaving the charging zone

Traffic crossing the boundary of the congestion charging zone has been comprehensively counted on several occasions since the start of 2002. There are no comparable data for the period before 2002.

The results of these counts in the inbound and outbound directions during charging hours are shown in Figures 3.2 and 3.3, summarised by the main vehicle types. Counts taken after charging started are coloured blue, and those before charging started are coloured red.

Figure 3.2 Total traffic entering the charging zone during charging hours

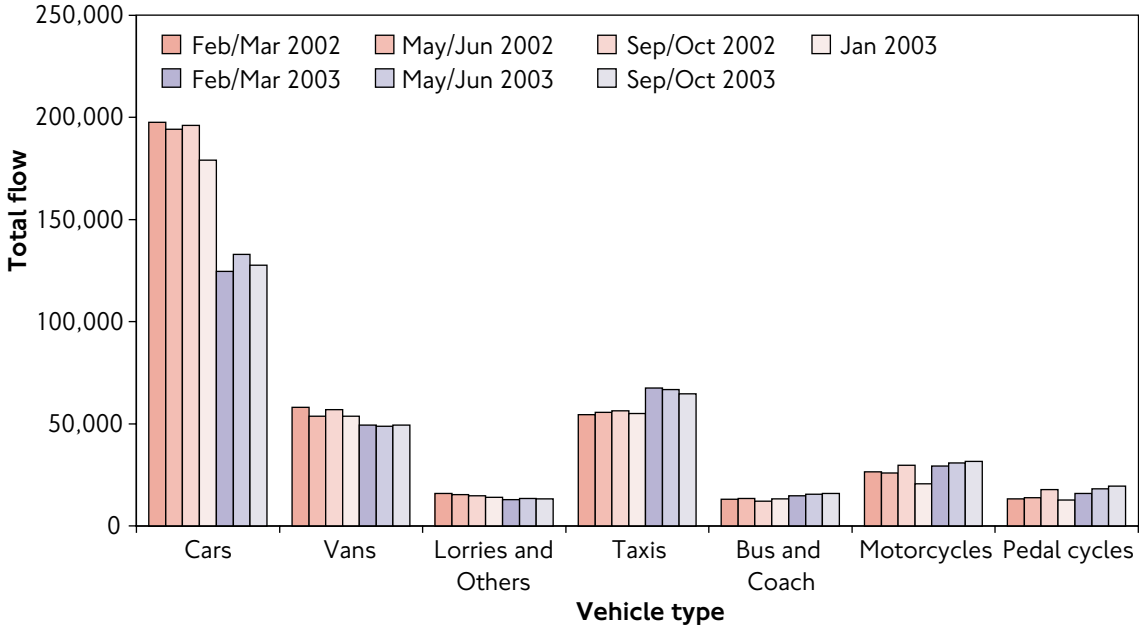
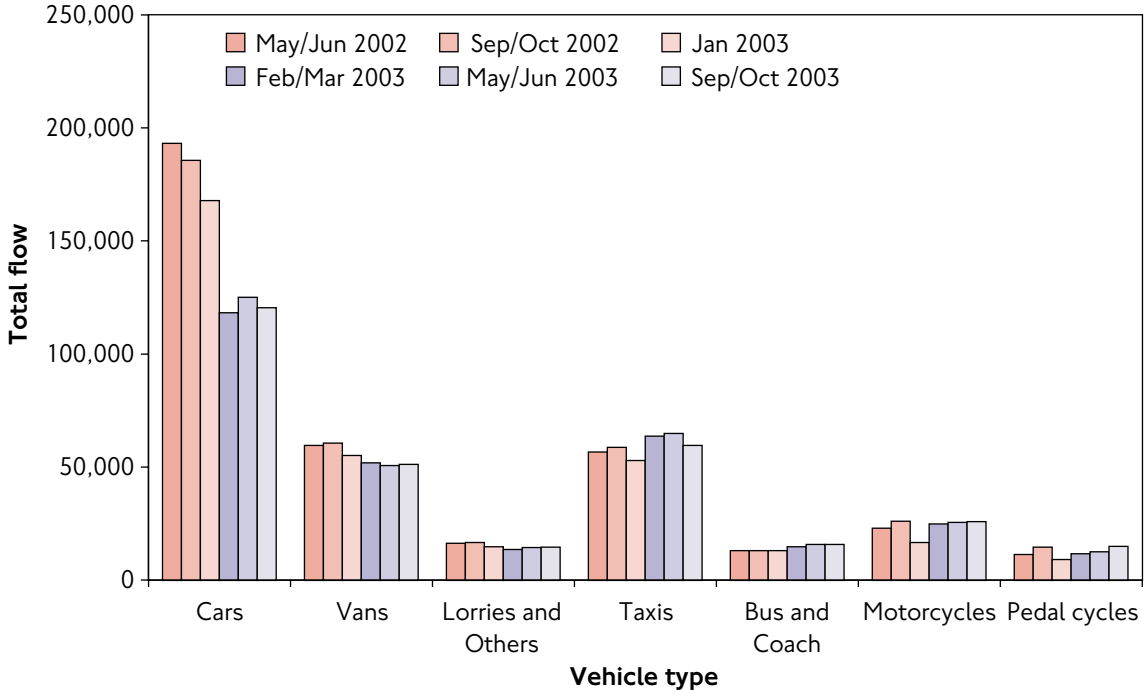


Figure 3.3 Total traffic leaving the charging zone during charging hours



It is now possible to give estimates of annualised change, by combining the results of counts taken during Spring and Autumn in both 2002 (before charging) and 2003 (after charging). Table 3.1 sets out the key comparisons.

Table 3.1 Key changes in traffic entering and leaving the charging zone during charging hours. Annualised weekday 2002 compared with 2003 (post charging)

Vehicle type	Change in inbound traffic 2003 versus 2002	Change in outbound traffic 2003 versus 2002
All vehicles	**-14%**	**-18%**
Four or more wheels	**-18%**	**-21%**
Potentially chargeable	**-27%**	**-29%**
Cars	**-33%**	**-35%**
Vans	**-11%**	**-15%**
Lorries and other	**-11%**	**-12%**
Licensed taxis	**+17%**	+8%
Buses and coaches	**+23%**	**+21%**
Two wheeled vehicles	**+15%**	+5%

Note: Changes given in bold are statistically significant at the 95 percent confidence level.

It is clear from Table 3.1 that there have been overall reductions in the volume of traffic crossing the charging zone boundary during charging hours between 2002 (before charging) and 2003 (after charging). Statistically significant reductions in total traffic, traffic with four or more wheels and potentially-chargeable vehicles (cars, vans and lorries) have been observed in both inbound and outbound directions. For the individual vehicle types, the volume of cars has reduced by about one-third, vans by between 10 and 15 percent, lorries by about 10 percent. Buses have increased by about 20 percent, and inbound two-wheelers by about 15 percent, although not all of these changes are statistically significant.

The *First Annual Monitoring Report* quoted figures of 388,000 inbound, and 377,000 outbound as an annualised estimate for all vehicles entering and leaving the charging zone for 2002. These 'starting' volumes have subsequently been revised downwards slightly, taking into account various small incompatibilities between the four survey datasets involved in the comparison. Revised figures for 2002, and the equivalent estimates for 2003, are given in Table 3.2.

Table 3.2 Total traffic entering and leaving the charging zone during charging hours

	Inbound	Outbound
2002 (before charging)	378,000	374,000
2003 (after charging)	324,000	306,000
Change (all vehicles)	**-14%**	**-18%**
Change (four or more wheels)	**-18%**	**-21%**

Note: Changes given in bold are statistically significant at the 95 percent confidence level.

In addition to periodic full manual classified counts of traffic crossing the charging zone boundary, the Automatic Traffic Count (ATC) sites referred to in Section 3.4 also provide information on traffic crossing into and out of the charging zone. Of particular interest, they allow examination of traffic changes outside charging hours that could reflect, for example, any displacement of trips to evenings or weekends to avoid liability for the charge.

Figure 3.4 Indicative hourly flow profile of traffic entering the charging zone, typical day(s) 2002 compared with 2003 (post charging)

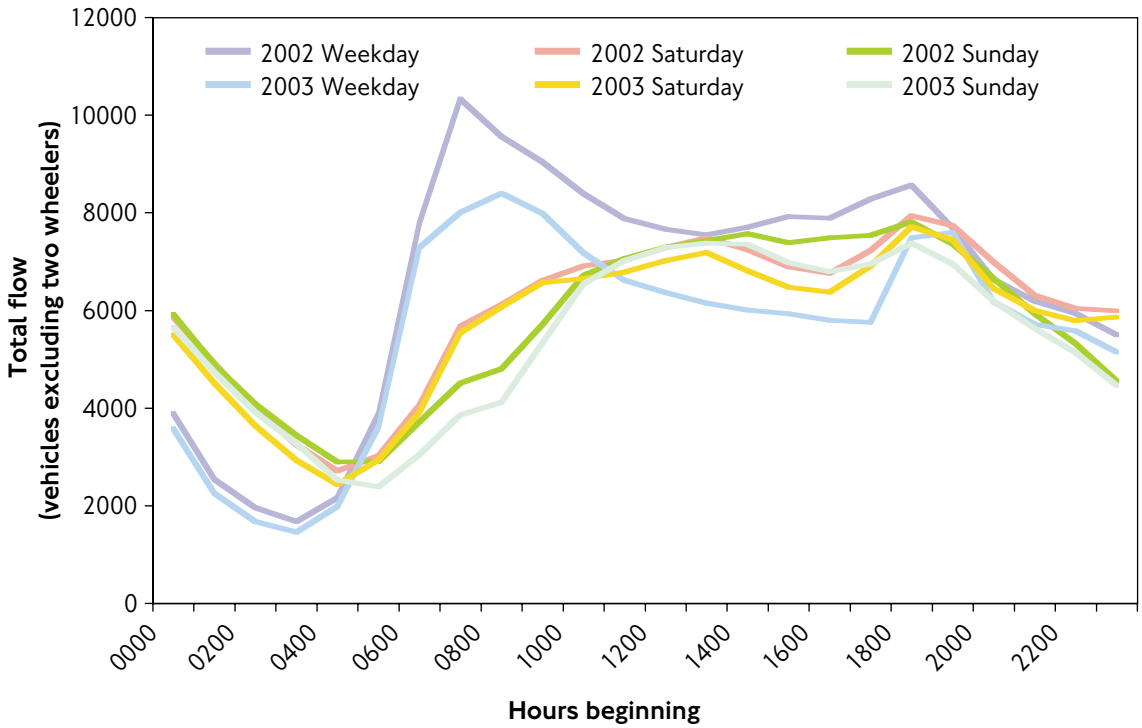


Figure 3.4 shows the hourly profile of traffic entering the charging zone at a sample of the more major entry points on weekdays and at weekends. This clearly shows the reduced flows into the charging zone during weekday charging hours.

Flows on Saturdays and Sundays in 2003 are very similar to their 2002 levels, with again some evidence of slightly lower overall flows in 2003.

There is thus no evidence from Figure 3.4 of systematic increases in traffic outside of charging hours. However, the comprehensive manual counts referred to above have suggested some increases over 2002 flows in the half-hour period immediately following the end of charging hours (see TfL's report *Six Months On*).

3.6 Traffic circulating within the charging zone

Vehicle-kilometres driven is the most appropriate measure to quantify changes to the total volume of traffic circulating within the charging zone. TfL expected a reduction of between 10 and 15 percent in the vehicle-kilometres driven by vehicles with four or more wheels (i.e. excluding two wheeled vehicles) during charging hours.

The First Annual Monitoring Report estimated a total daily charging hours figure of 1.5 million vehicle kilometres for 2002. The estimate for vehicles with four or more wheels was given as 1.3 million vehicle-kilometres. It was stated that although the absolute estimate of vehicle-kilometres would be subject to some uncertainty, a comparison between 2002 and 2003 made on the same basis should provide more precise estimates of relative change.

Again, there have been changes to the central London road network and available traffic count sites between 2002 and 2003. A computational error was also discovered in the 2002 dataset that had the effect of under-stating the absolute level of vehicle-kilometres driven in 2002. These have necessitated some adjustments to the 'starting' estimate for 2002; the net effect in this case is to revise the 2002 estimates upwards slightly from those originally published. In considering these adjustments, it is important to understand that the comparisons between 2002 and 2003 presented below have been made on a strictly like-for-like basis.

Table 3.3 Key changes in vehicle-kilometres driven within the charging zone during charging hours. Annualised weekday 2002 compared with 2003 (post-charging)

Vehicle type	2002 vkm (millions)		2003 vkm (millions)		percentage change
All vehicles	1.64	(100%)	1.45	(100%)	**-12%**
Four or more wheels	1.44	(88%)	1.23	(85%)	**-15%**
Potentially chargeable	1.13	(69%)	0.85	(58%)	**-25%**
Cars	0.77	(47%)	0.51	(35%)	**-34%**
Vans	0.29	(18%)	0.27	(19%)	-5%
Lorries and other	0.07	(4%)	0.07	(5%)	-7%
Licensed taxis	0.26	(16%)	0.31	(21%)	**+22%**
Buses and coaches	0.05	(3%)	0.07	(5%)	**+21%**
Two wheeled vehicles	0.20	(12%)	0.23	(16%)	**+14%**

Note: Changes given in bold are statistically significant at the 95 percent confidence level.
The percentage contribution to total charging zone traffic is also shown for each of 2002 and 2003.

These results are towards the top end of TfL's prior expectations, and are consistent with earlier findings previously reported, which were indicating traffic reductions within the 10 to 15 percent expected range.

When looked at in conjunction with the results for traffic entering the zone described above, they do suggest specific effects at the level of the individual vehicle type. These can be summarised as follows:

- The overall traffic decrease observed in the charging zone is of slightly smaller magnitude than that observed at the boundary. This would be expected as, for example, many vehicles already within the zone, such as residents' vehicles, are less affected by the scheme;
- The observed decrease in cars entering the zone is above the top end of the range of TfL's prior expectation;

- The observed changes to vans and lorries are broadly in-line with TfL's prior expectation. The smaller-magnitude decreases to these vehicles within the charging zone (as compared to the boundary) may be indicative of a degree of 'consolidation' of trips among these vehicles – a rational economic response to charging;
- The increases in licensed taxis of about 20 percent are higher than TfL's prior expectation, but should be seen in the context of these vehicles potentially benefiting most directly from overall increased traffic speeds;
- The increases for buses are broadly in line with enhanced service provision put in place by TfL, both to accommodate trips displaced by charging, but also as part of wider improvements to the bus network in London (see Chapter 4);
- The annualised estimates of change for two wheeled vehicles are less than previously reported, as fewer vehicles of these types were observed in the Autumn 2003 round of surveys relative to Autumn 2002. It is possible that the unusually good weather conditions prevailing at the time of the Spring 2003 counts, coupled with the 'novelty' of charging, may have influenced the relative balance between these two sets of post-charging counts.

To provide further information on traffic changes within the charging zone, secondary indicators are also available. These consist of periodic counts of traffic crossing two strategic screenlines within the charging zone – the six Thames bridges that are wholly internal to the charging zone (the 'Thames Screenline'), and a screenline running north/south between the river and the Inner Ring Road (the 'Northern Screenline'). Both of these are portions of larger screenlines that have been counted historically, and which have been recently counted as part of congestion charging monitoring arrangements. Summary results are shown in Table 3.4.

Table 3.4 Traffic changes across key screenlines within the charging zone. Annualised weekday 2002 compared with 2003 (post-charging)

Vehicle Type	Thames bridges	Northern screenline
All vehicles	**-11%**	**-11%**
Four or more wheels	**-16%**	**-12%**
Potentially chargeable	**-28%**	**-18%**
Cars	**-35%**	**-22%**
Vans	-8%	-8%
Lorries and other	-7%	**-23%**
Licensed taxis	+19%	-1%
Buses and coaches	**+19%**	**+7%**
Two wheeled vehicles	+23%	-8%

Note: Changes given in bold are statistically significant at the 95 percent confidence level.

Both of these screenlines also indicate substantial falls in total traffic within the charging zone following the introduction of charging. These can be compared with the estimate of 15 percent described above, and with TfL's prior expectation of a 10 to 15 percent decrease in traffic (vehicles with four or more wheels) within the charging zone.

However, there are some differences between the two screenlines. The estimates for the Thames Bridges are based on annualised totals, combining counts taken in Spring and Autumn in both years. Those for the northern screenline are from manual counts taken in January of each year only, and therefore are perhaps less reliable. They exclude the Inner Ring Road site on this screenline. The statistical confidence limits applying to these counts are therefore comparatively wide, and seasonal factors may have been expected to affect, for example, the numbers of two wheeled vehicles observed. The differences between the changes at the two screenlines probably also reflect the fact that much of the economic activity inside the charging zone takes place to the north of the Thames.

3.7 Traffic on the Inner Ring Road

The Inner Ring Road forms the most obvious alternative route for through traffic wishing to avoid the charging zone. TfL expected that congestion charging would lead to increases in traffic on this route, but that these increases would be dealt with by better operational management, such that overall congestion levels would remain broadly unchanged.

Table 3.5 Key changes in vehicle-kilometres driven on the Inner Ring Road during charging hours. Annualised weekday 2002 compared with 2003 post-charging

Quantity	2002 vkm (millions)	2003 vkm (millions)	percentage change
All vehicles	0.65	0.68	**+4%**
Four or more wheels	0.61	0.62	+1%
Potentially chargeable	0.51	0.50	-2%
Cars	0.37	0.35	**-7%**
Vans	0.10	0.12	**+12%**
Lorries and other	0.04	0.04	+7%
Licensed taxis	0.08	0.09	**+16%**
Buses and coaches	0.02	0.03	**+24%**
Two wheeled vehicles	0.04	0.06	**+43%**

Note: Changes given in bold are statistically significant at the 95 percent confidence level.

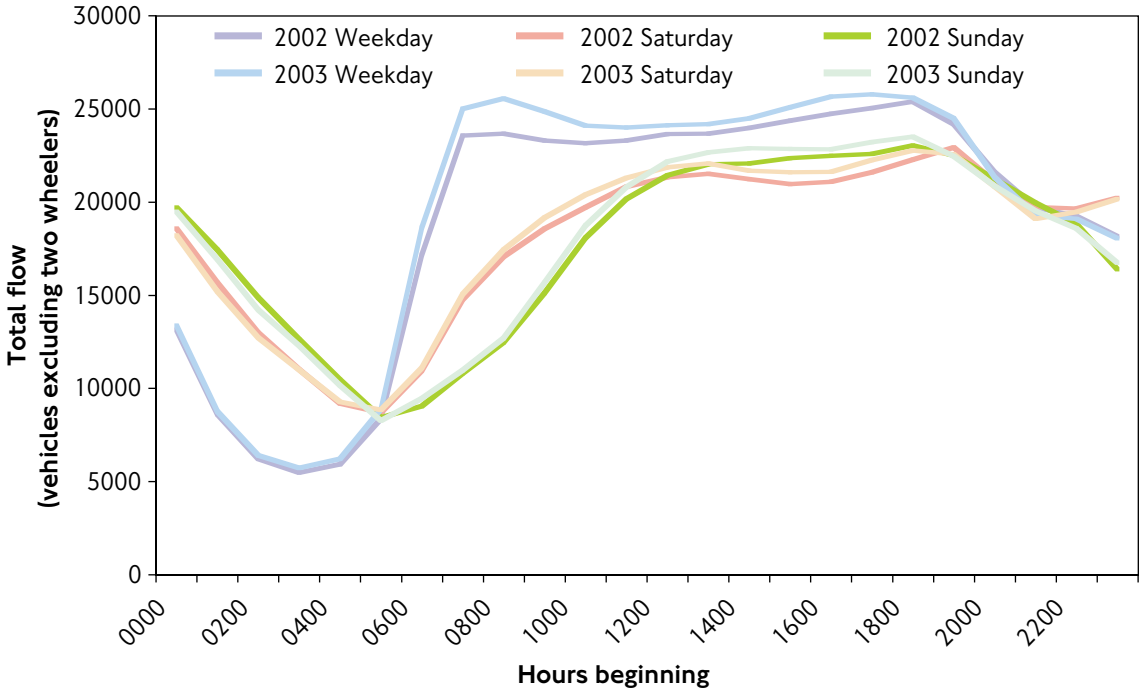
Table 3.5 shows the key changes in traffic on the Inner Ring Road between 2002 and 2003 (post charging). Total vehicle kilometres on the Inner Ring Road are estimated to have increased by 4 percent overall. For vehicles with four or more wheels, the equivalent figure is 1 percent, a change that is not statistically significant. This aggregate change comprises small reductions in cars, counterbalanced by increases in buses, taxis, commercial vehicles and two wheelers. It also takes into account changes to the Inner Ring Road in the Shoreditch area, which have had the effect of reducing the length of the clockwise alignment (only) by approximately 3 percent.

The overall magnitude of the change in total traffic is towards the lower end of TfL's prior expectation. It is also clear from Section 2 that there is no evidence that traffic conditions on the Inner Ring Road have deteriorated as a result of the additional traffic. Indeed, small reductions in congestion have been observed since charging started. These conclusions need to be seen in the context of improved traffic management on the Inner Ring Road, and the impact of traffic management and other infrastructure schemes in the vicinity of the Inner Ring Road completed before the introduction of charging.

The Inner Ring Road consists of numerous individual links of varied character, and the aggregate changes described subsume changes of larger magnitude at the more local scale. These range from site and direction specific increases of up to 40 percent to decreases of about 20 percent. 2003 has seen particular increases around Vauxhall Cross and Shoreditch, which might be expected to reflect suppressed flows during 2002 because of the road works in these two areas.

Figure 3.5 shows the daily flow profile for the Inner Ring Road from a selection of permanent automatic counting sites.

Figure 3.5 Indicative hourly flow profile of traffic on the Inner Ring Road, typical day(s) 2002 compared with 2003 (post charging)



3.8 Wider orbital traffic

Some traffic previously making through journeys across the charging zone may have elected to divert to the wider network of orbital roads in inner London following the introduction of charging. This could potentially give rise to small increases in traffic on these roads.

To measure any changes, four radial screenlines were established, extending outwards from, and including, the Inner Ring Road. These were comprehensively counted during Autumn 2002, and again at the same time in 2003. The results are summarised in Table 3.6.

Table 3.6 Traffic crossing four radial screenlines (both directions). Autumn 2002 and Autumn 2003

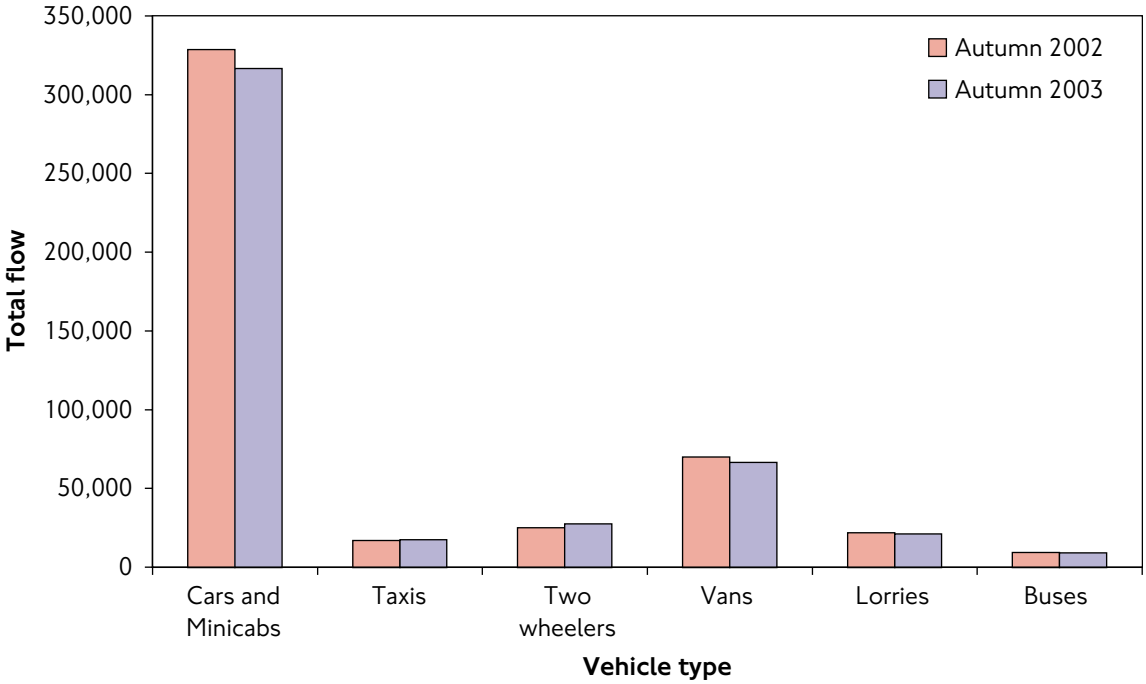
Screenline and time period	Flow 2002 (000's)		Flow 2003 (000's)		Percentage change including IRR	Percentage change excluding IRR
	Total	Using IRR	Total	Using IRR		
Northern						
0700-1830	151	35	156	39	+3%	+1%
0600-2000	177	43	181	47	+2%	0
Eastern						
0700-1830	**155**	**16**	159	19	+3%	+1%
0600-2000	**184**	**19**	189	23	+3%	+1%
Southern						
0700-1830	102	26	99	27	-3%	-6%
0600-2000	122	32	118	33	-3%	-6%
Western						
0700-1830	197	57	190	61	-3%	-8%
0600-2000	231	68	223	73	-3%	-8%

Note: Figures in bold have been revised from those published in the *First Annual Monitoring Report*

Overall, the picture is one of stable or slightly-declining traffic. There is no evidence of detrimental increases in traffic levels that might have resulted from congestion charging.

Across all four screenlines (Figure 3.6), there is very little evidence of significant change. Small reductions in cars and vans are partly balanced by a small increase in two wheeled vehicles.

Figure 3.6 Observed change across four radial screenlines outside of the charging zone (both directions) excluding the Inner Ring Road. Typical weekday, charging hours. Autumn 2002 compared with Autumn 2003



3.9 Traffic on local roads

Traffic on selected local roads surrounding the charging zone has been monitored at the request of individual boroughs. 28 sites have been monitored continuously since the end of 2002, providing reliable and comparable data, and a further 28 have been monitored periodically.

Traffic levels at sites monitored continuously have previously been compared at different times of the year, and therefore the changes that were observed may have been subject to seasonal effects. Traffic levels in January 2003 before charging and January 2004 after charging can now also be compared. This gives a more direct comparison, although only for the month of January. The results of the year-on-year comparisons are presented in Table 3.7.

Although local sites do not provide a statistically-robust indicator of total traffic within a borough they are a useful gauge when grouped on a borough-wide basis. Comparing January 2004 to January 2003, sites in the boroughs of Southwark and Kensington and Chelsea have seen no significant change overall, whereas overall reductions of 5 percent have been observed in Westminster, 11 percent in Tower Hamlets and 13 percent in Camden.

Table 3.7 Traffic change on local roads surrounding the charging zone, charging hours, vehicles with four or more wheels

	Sites	Before charging Jan/Feb 03 (1)	After charging Jan 04 (2)	Percentage change 1 and 2
Southwark	Dunton Rd	9,023	9,788	8%
	John Ruskin St	5,177	4,657	-10%
	St James's Rd	15,157	15,308	1%
	Total	**29,358**	**29,752**	**1%**
Kensington & Chelsea	Abbotsbury Rd	6,636	5,791	-13%
	Addison Rd	4,629	4,170	-10%
	Campden Hill Rd	9,358	9,917	6%
	Fulham Rd	11,280	11,210	-1%
	Holland Park Ave	24,572	25,571	4%
	Kensington Church St	11,885	12,833	8%
	Kensington High St	14,926	15,612	5%
	North Pole Rd	13,078	12,216	-7%
	Old Brompton Rd	10,727	10,242	-5%
	Total	**107,091**	**107,561**	**0%**
Tower Hamlets	Bethnal Green Rd	8,687	7,850	-10%
	Bow Common Lane	6,969	6,866	-1%
	Old Bethnal Green Rd	6,373	4,434	-30%
	Poplar High St	5,004	4,878	-3%
	Total	**27,033**	**24,027**	**-11%**
Camden	Agar Grove	9,615	9,912	3%
	Warren St	1,733	1,436	-17%
	Tavistock Place	9,866	7,113	-28%
	Prince of Wales Rd	12,407	11,617	-6%
	Prince Albert Rd	12,997	10,928	-16%
	York Way	9,483	7,863	-17%
	Total	**56,100**	**48,870**	**-13%**
Westminster	Belgrave Rd	5,312	5,359	1%
	Prince Albert Rd	15,842	14,124	-11%
	St George's Drive	4,643	4,614	-1%
	St John's Wood Rd	13,141	12,834	-2%
	Sussex Gardens	12,763	12,972	2%
	West Carriage Drive	16,902	15,388	-9%
	Total	**68,602**	**65,291**	**-5%**

Sites monitored periodically within the boroughs of Wandsworth, Lambeth and Hackney have shown decreases in traffic of up to 9 percent, as previously reported.

Although there are variations between sites, the majority of sites indicate stable or decreasing traffic levels. There is therefore no evidence of systematic increases in traffic on monitored local roads outside of the charging zone.

3.10 Radial traffic approaching the charging zone

Transport for London expected that charging would lead to a reduction in radial traffic on routes in inner London approaching the charging zone, particularly by cars. This would result from fewer journeys to and from the charging zone. Reductions in total traffic of between 4 and 8 percent were expected at the extended central London cordon during charging hours (see Appendix 5 of the *First Annual Monitoring Report* for the location of this cordon).

The basic form of this cordon, for which a lengthy time-series of data exists, lies mostly just outside of the charging zone (except for a short distance south of the Thames where it runs inside the zone). The basic cordon has been extended specifically for congestion charging monitoring to lie wholly outside of the charging zone, but the only available historical data for this modified cordon relates to 2002. All variants of this cordon were counted in both Autumn 2002 and 2003.

Table 3.8 Summary of traffic changes across the extended central London cordon. Weekday Autumn 2003 compared to Autumn 2002

Inbound	**Wholly outside CZ (% change)**
All vehicles	-5
Four or more wheels	-6
Potentially chargeable	-8
Cars	-12
Outbound	**Wholly outside CZ (% change)**
All vehicles	-5
Four or more wheels	-6
Potentially chargeable	-10
Cars	-12

Table 3.8 summarises observed traffic changes across the extended central London cordon. The net decreases in total traffic across this cordon are consistent with the expected magnitude of congestion charging impacts. However, the recent historical trend at the original cordon has been for year-on-year decreases of between 6 and 7 percent during charging hours. This finding therefore needs to be interpreted in the context of recent traffic trends in inner London.

A secondary indicator for radial traffic approaching the charging zone is the TfL Central Area Peak Count survey (CAPC). This provides a count of vehicles (alongside person-trip estimates by private and public modes) crossing a similar cordon for the AM weekday peak period (inbound) only. Comparing provisional results for Autumn 2003 with Autumn 2002, 18 percent fewer cars were observed crossing this cordon during the three hour weekday AM peak period.

3.11 Wider traffic trends in London

The *First Annual Monitoring Report*, and other reports published by TfL since the start of charging, have made reference to wider 'background' trends in traffic in London that have needed to be taken into account when interpreting the key traffic changes observed in response to the scheme.

The overall picture has been one of declining traffic over a number of years. This trend mainly affected cars, was particularly pronounced in central and inner London, and appeared to accelerate in 2002.

Comparisons of available indicators (as described in the *First Annual Monitoring Report)* suggested that traffic in the charging zone fell by about 6 percent between 2000 and 2002, and there was evidence of greater falls from traffic surveys in the inner London area outside the charging zone.

These trends probably reflected a combination of longer-term economic, road network capacity and modal shift factors, coupled with a possible temporary exaggeration caused by exceptional network conditions in and around the charging zone during 2002.

A full set of information that will show the development of these trends after the introduction of charging will not be available until Autumn 2004. There is nevertheless some evidence emerging from provisional analysis of traffic counts throughout both inner and outer London that the declines in traffic seen during 2002 were at least partly reversed during 2003.

Whatever the wider picture for traffic in London, the daily automatic traffic counts at the boundary of the charging zone have made it clear that the reductions in traffic in the charging zone directly coincided with the introduction of charging and were therefore independent of these longer-term trends.

4. Public transport

4.1 Introduction

This section summarises key changes to the public transport network in central London since the introduction of congestion charging.

Congestion charging was expected to result in a net increase in the use of public transport to and from the charging zone as ex-car users shifted to public transport. There was also expected to be some transfer from short distance Underground and rail trips to bus as bus services became more attractive as a result of increased services and reduced congestion.

4.2 Key findings

- In the morning three hour peak period in Autumn 2003 a total of 106,000 passengers were observed entering the charging zone on all TfL buses, an increase of 29,000 (38 percent) on 2002;
- A total of nearly 3,000 buses were observed entering the zone in the morning peak period during Autumn 2003, 560 (23 percent) more than 2002;
- There has been some increase in the average number of passengers observed on each bus, although these have generally been accommodated acceptably;
- The annual count of bus passengers entering central London at the Central Area Peak Count (CAPC) cordon shows an increase from 88,000 in Autumn 2002 to 104,000 in Autumn 2003 during the morning peak period, an increase of 18 percent. The lower rate of increase is explained by the geographical difference between the count sites;
- Within the charging zone there were improvements in both the main indicators of bus service reliability: additional waiting time due to service irregularity fell by 30 percent; disruption due to traffic delays fell by 60 percent;
- Overall bus speeds within the charging zone improved by 6 percent, consistent with the improved traffic speeds;
- The Underground has seen a reduction in the number of passengers exiting stations in and around the charging zone. On average, in the morning peak period since charging was introduced, there was a reduction in the number of people exiting stations of 8 percent from 513,000 to 473,000;
- There has been no significant change to the number of passengers entering central London on the National Rail network. In Spring 2003 447,000 passengers were observed at 22 stations during the morning peak period compared to 451,000 in Spring 2002;
- On average there has been a 2 percent decrease in the number of passengers exiting Docklands Light Railway (DLR) stations in the charging zone.

4.3 Background trends

Bus patronage across London, increased by over 7 percent between 2001/02 and 2002/03. Thus, there was a rising trend prior to the start of congestion charging. This background increase in passenger numbers was caused by: service enhancements; improved reliability due to investment in updated schedules; simplified fare levels, structures and ticketing arrangements; new vehicles; and better information. There have also been significant disruptions to Underground services, such as the Central line closure from January to May 2003, and the Northern line disruption in October 2003. It is possible that some of those who transferred from Underground to bus services during these periods have been retained as bus passengers.

In parallel with this there have been events such as the Iraq war, the prolonged threat of terrorism, an economic downturn and unusually warm weather which have affected the number of visitors to London and hence the patronage of the public transport network during 2003.

All these influences make it particularly difficult to separate the effects of congestion charging from other factors.

4.4 Bus patronage

Of all public transport modes the introduction of congestion charging was expected to have the greatest impact on buses. An increase was projected of up to 15,000 additional bus passengers travelling to the zone during the 3 hour morning peak period, 0700 to 1000. This compares with an expected increase of up to 5,000 additional passengers in the morning peak on Underground and rail services combined.

A detailed review of the inner London bus network was undertaken by TfL prior to the introduction of charging. This took into account the forecast increase in patronage due to charging and increases due to other causes. This resulted in frequency enhancements on 53 routes; bigger buses on 10 routes; 15 services restructured or extended; and seven new routes.

As part of the monitoring programme the number of passengers on all buses crossing the boundary of the charging zone were counted during Autumn 2002 and again in Autumn 2003.

Comparing Autumn 2003 with Autumn 2002 there has been an increase of 71,000 passengers (37 percent) observed entering the charging zone during charging hours, from 193,000 to 264,000. The number of passengers leaving the zone on buses during the same period increased by 48,000 (29 percent) from 163,000 to 211,000. The difference between the inbound and outbound figures is likely to be mainly due to passengers leaving central London after charging hours.

During the 3 hour morning peak period there were approximately 29,000 (38 percent) additional bus passengers observed, an increase from 77,000 to 106,000. This additional demand is equivalent to around 14,000 additional passengers to the charging zone in the peak hour. The peak hour capacity supplied at the cordon had been increased by 13,500 bus places by February 2003; further enhancements since then have brought the total increase in peak hour capacity to 14,500.

It is estimated that around half of this increase is due to charging and the remainder due to the factors described on the previous page. The change in bus passengers counted at each crossing point of the charging zone boundary is shown in Figures 4.1 and 4.2.

Figure 4.1 Charging zone boundary, numbers of bus passengers by location, inbound, 0700 to 1000

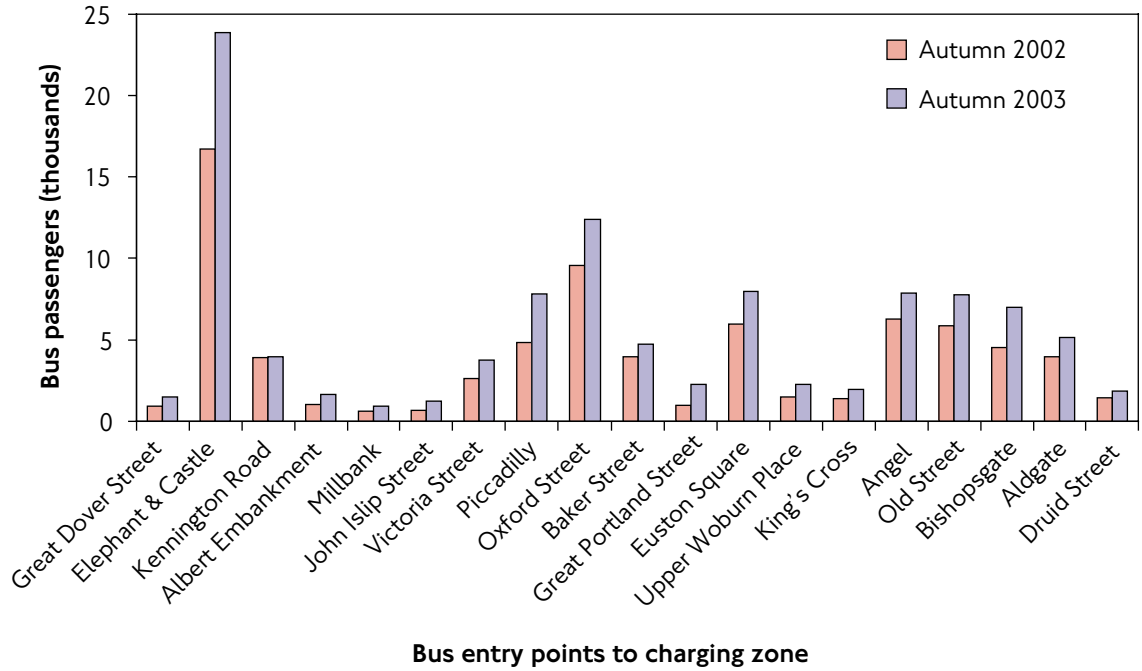
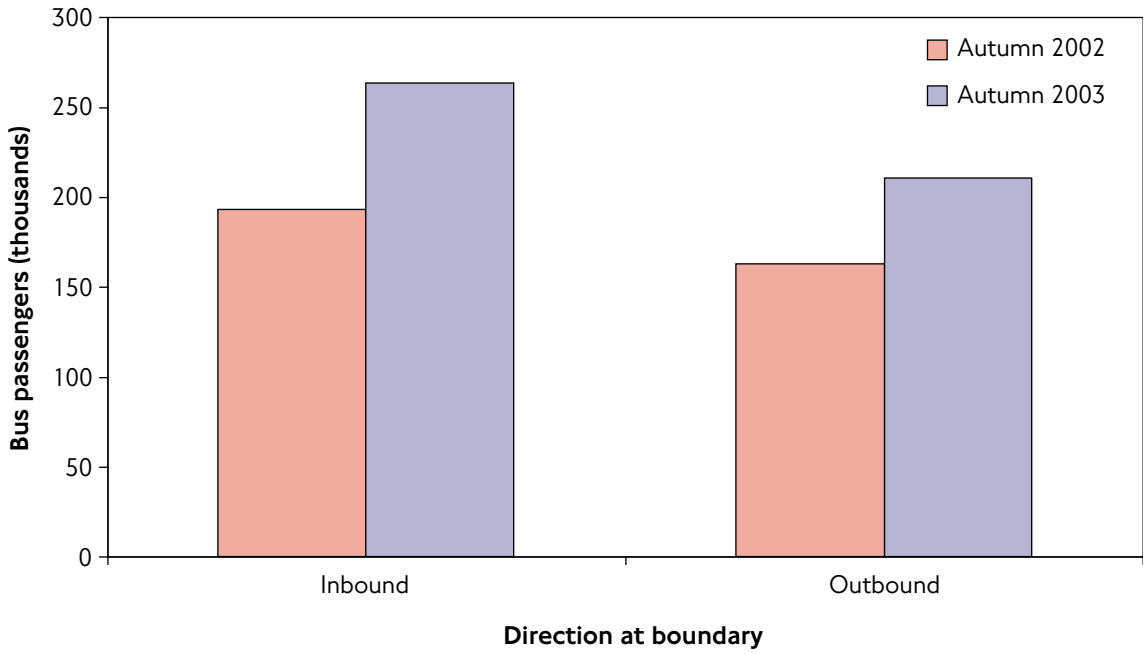


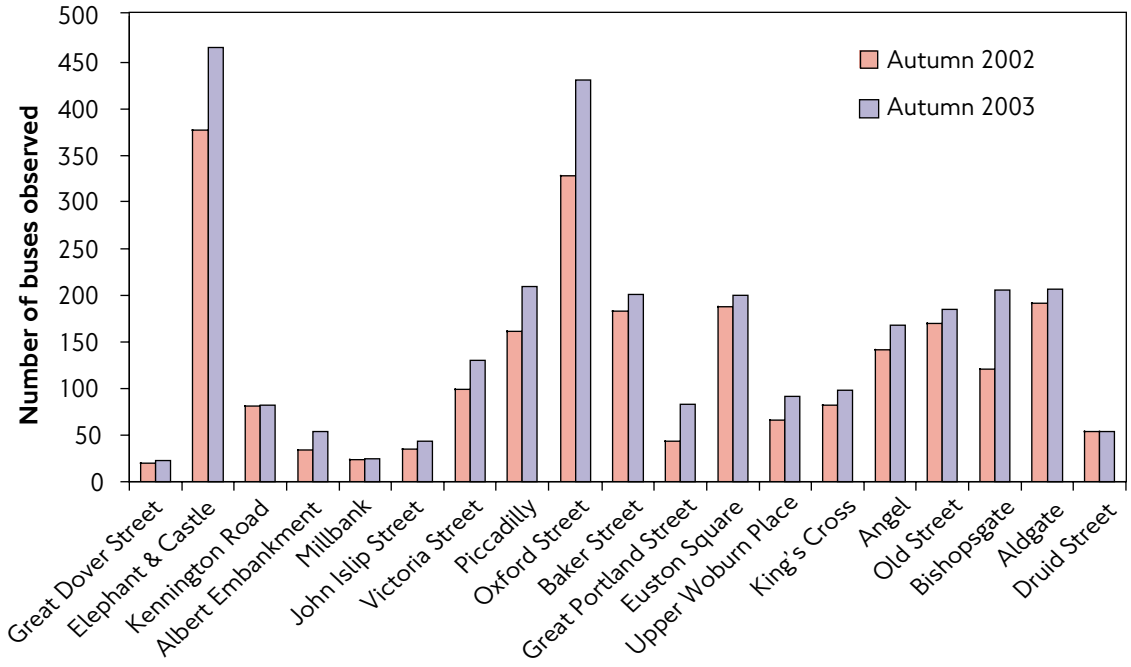
Figure 4.2 Charging zone boundary, numbers of bus passengers, inbound and outbound, 0700 to 1830



The impact of the service enhancements is apparent through the increase in the number of buses observed crossing the charging zone boundary. During charging hours in Autumn 2003 there were 10,500 TfL buses observed entering the zone, an increase of 2,230 (27 percent). There was a similar increase in buses observed leaving the zone of 2,060 (26 percent) to 9,900.

Figure 4.3 shows the change in the number of buses observed at each location during the morning peak period entering the charging zone between Autumn 2002 and Autumn 2003. There were an extra 560 buses (23 percent) entering the zone during the morning peak period, bringing the total to nearly 3,000.

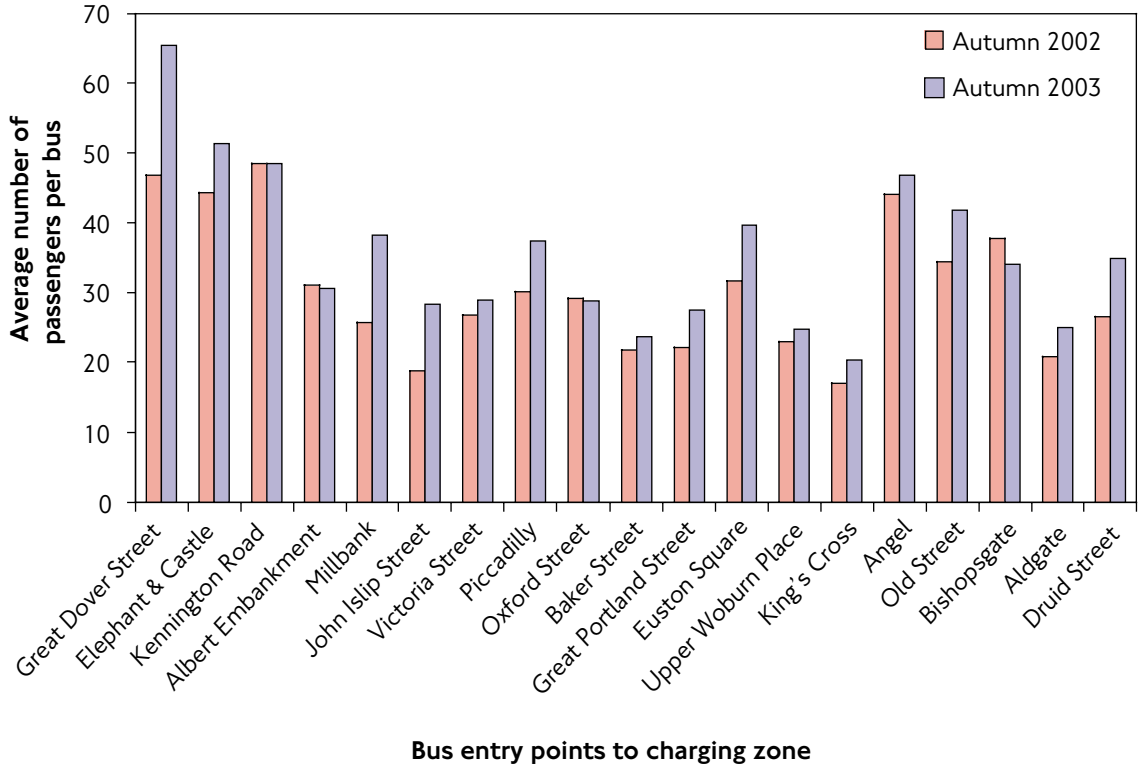
Figure 4.3 Buses observed by location, inbound, 0700 to 1000



The number of passengers on buses is another key measure of the performance of the bus network. Capacities of different buses vary. In general, the maximum capacity is 69 to 77 passengers for Routemasters, 85 to 90 passengers for other double-deck buses, 50 to 60 passengers for standard single-deck buses and approximately 140 for articulated 'bendy' buses.

In line with the trend across the whole London bus network, there has been some increase in average passengers per bus. This results from the increase in bus patronage being proportionately greater than the increase in service provision. However, in general these increases have been acceptably accommodated – see Figure 4.4. There may need to be further service enhancements if patronage continues to increase.

Figure 4.4 Average number of passengers per bus by location, inbound, 0700 to 1000



Figures 4.5 and 4.6 illustrate that during charging hours at a selection of sites there was a small increase in the average number of passengers observed on buses entering and leaving the charging zone.

Figure 4.5 Average number of passengers per bus, inbound, at a selection of sites on the charging zone boundary, charging hours, 2002 and 2003

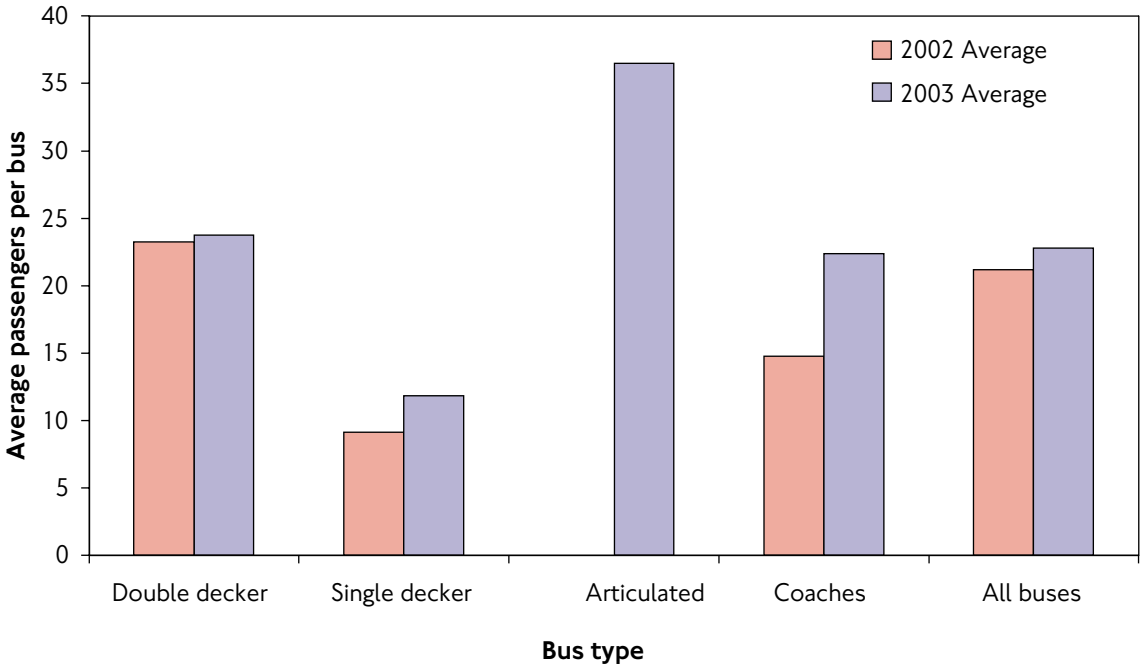
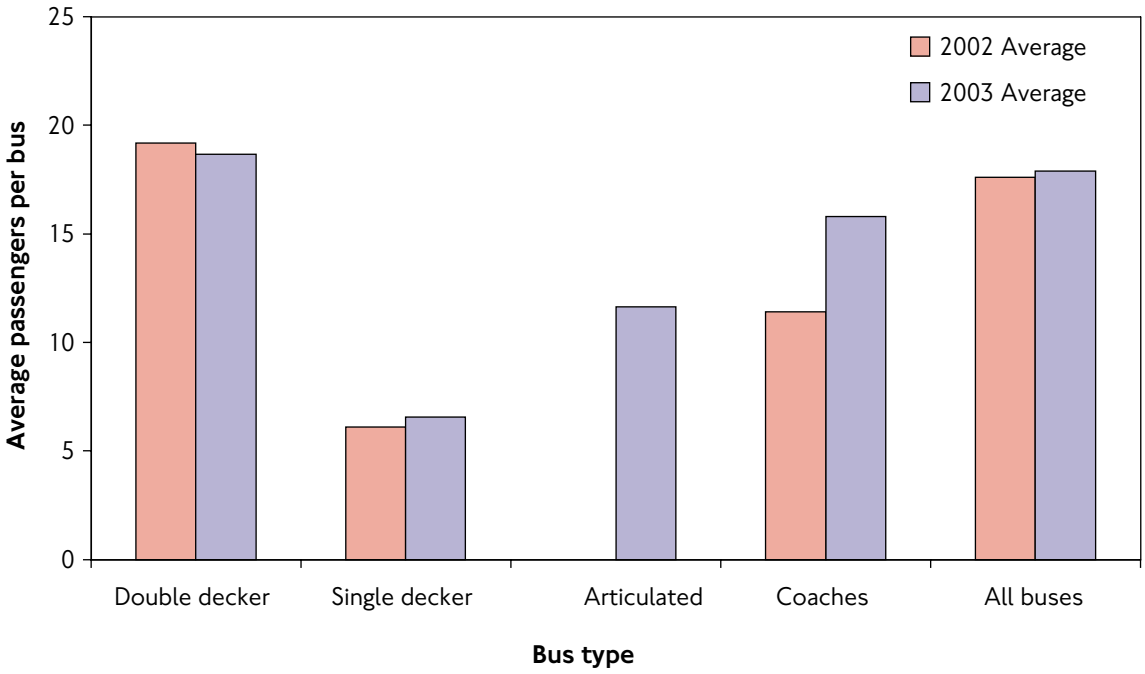
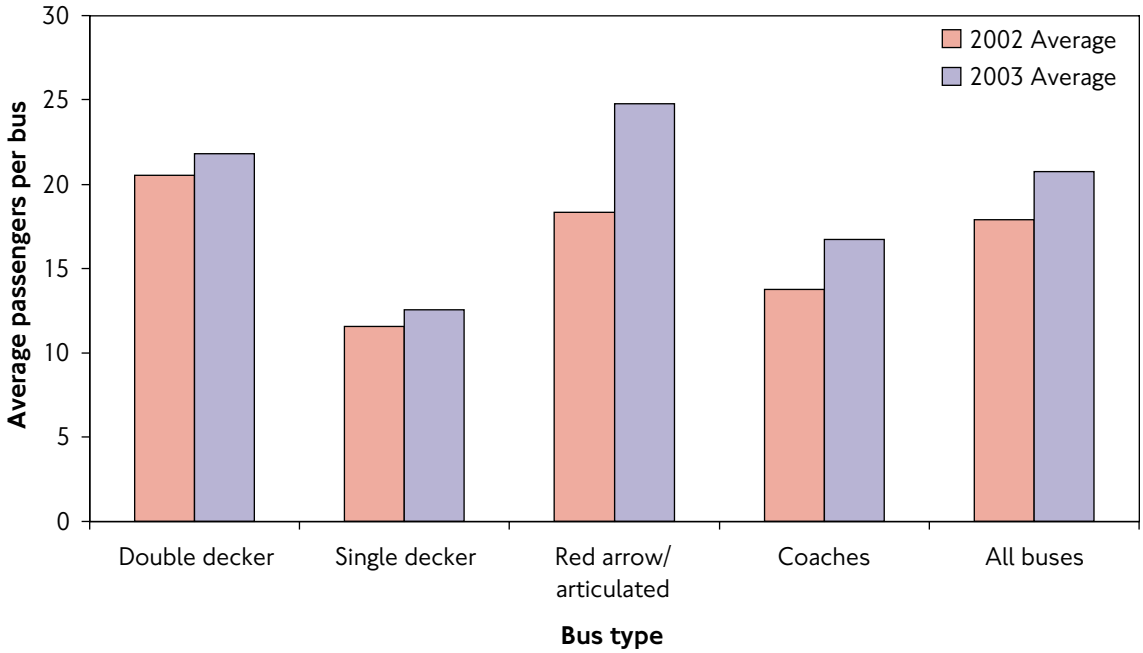


Figure 4.6 Average number of passengers per bus, outbound, at a selection of sites on the charging zone boundary, charging hours, 2002 and 2003



Bus occupancy counts were also taken at a selection of sites within the zone. The results illustrated in Figure 4.7 demonstrate that there has been some increase in the average number of passengers on buses at those sites. Again, these have been acceptably accommodated on the network and services will continue to be reviewed to determine if further service enhancements are required.

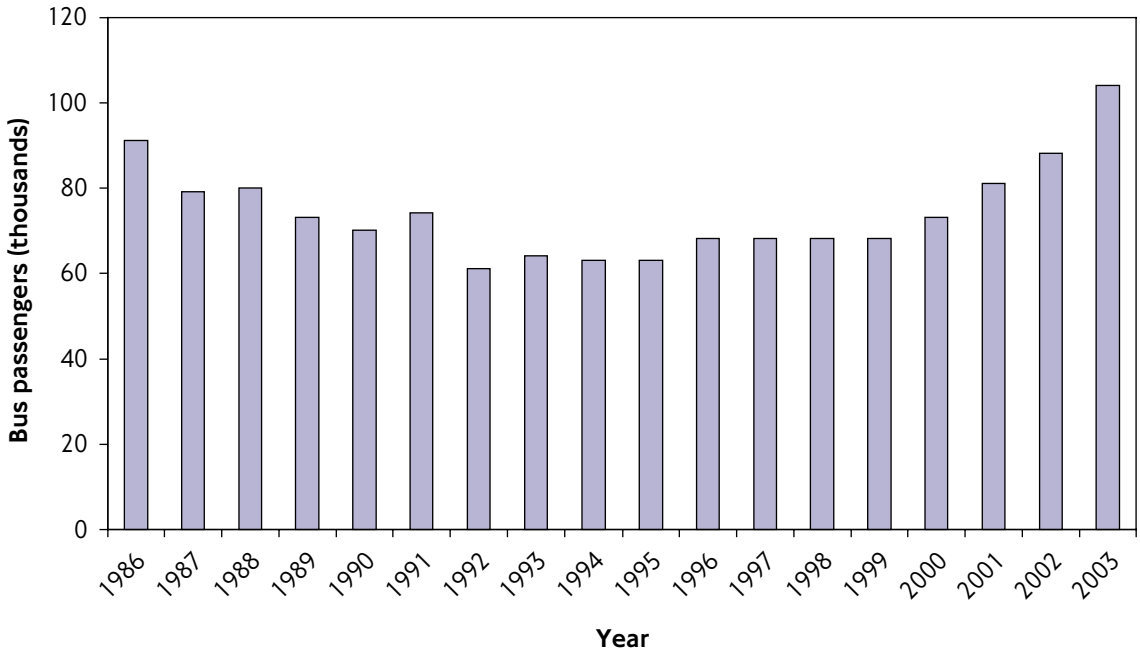
Figure 4.7 Average number of passengers on buses at selected sites within the charging zone, charging hours, 2002 and 2003



A separate count of bus passengers entering central London is undertaken by TfL annually. This is known as the Central Area Peak Count (CAPC). The results, shown in Figure 4.8, show differences between CAPC and the congestion charging cordon count.

The 2003 count indicates an increase of 16,000 bus passengers (18 percent) across the cordon in the 3 hour morning peak period, 0700 to 1000, from 88,000 to 104,000. This is substantially less than the increase recorded at the charging zone boundary. This difference is largely due to the geographical variation between the counts, particularly the location of several main rail terminals between the two count cordons. Around a quarter of all bus journeys in Greater London are passengers going to and from rail and Underground stations. It is likely that there has been increased interchange to bus for rail passengers making the final stage of their journey to the charging zone or other parts of central London.

Figure 4.8 Bus Passengers, inbound, Central Area Peak Count, 0700 to 1000, Autumn counts, 1986 to 2003



As mentioned above it is estimated that around half the increase of passengers on buses entering the zone is due to charging, and the rest to other factors. London Buses have recently undertaken research to quantify the reasons for the general increase in patronage on the bus network. Passengers cite the improved quality of the bus service together with fare levels as the key reasons for using buses more. The number of people who say they never use buses has fallen from 29 percent to 20 percent.

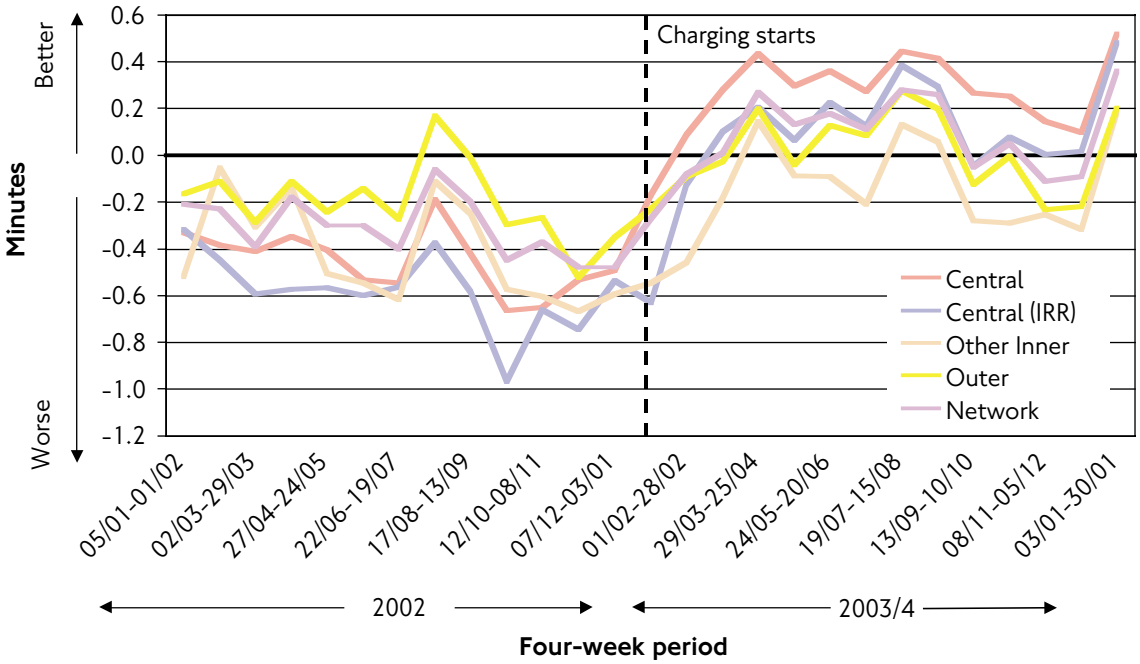
4.5 Bus journey time and reliability

In recent years improvements in reliability have been recorded across the London bus network. This has continued to be the case since the introduction of charging. These improvements are due to a variety of factors including increased investment in robust schedules, enhanced route supervision and the introduction of Quality Incentive Contracts. Congestion charging has added a further dimension to improved bus operations in London. Around a fifth of London bus services operate in or around the zone, and reduced congestion means a significant source of disruption has been lessened.

Compared to the previous year across London there has been an improvement of over 20 percent in Excess Waiting Time (EWT), the additional wait time at bus stops experienced by passengers caused by service irregularity or missing buses. For passengers in and around the charging zone the improvement is considerably greater with a reduction in EWT of over 30 percent.

London Buses sets the bus operators performance standards for EWT based on the characteristics of the route. Figure 4.9 shows decreases in actual EWT relative to the minimum standards.

Figure 4.9 Bus Excess Waiting Time (Monday to Friday, charging hours) difference between Excess Waiting Time standards and actual Excess Waiting Time



As with EWT, in the year since charging was introduced disruption to services caused by traffic congestion compared to the same periods last year has reduced by around 40 percent. Routes that operate within the charging zone have seen a greater improvement with a reduction in congestion related delays of over 60 percent. Routes serving the Inner Ring Road experienced 50 percent less disruption due to traffic delays.

As well as reliability improvements, the local reductions to traffic levels have been reflected in improvements to overall bus journey speeds in the zone. Journey times are monitored between selected points across the network, as described in the *First Annual Monitoring Report*. The results include times when buses are stationary, for example at bus stops and junctions or in traffic queues. In the 3 hour morning peak period within the charging zone there has been an overall reduction in journey times since charging began of around 6 percent, to an average journey speed of 11.6 km/h, compared to the same periods the previous year. The sampled sections of routes within the zone have seen greater improvements compared to other areas in London. Improvements on observed sections of radial and orbital roads close to the charging zone are of 3 and 4 percent respectively. There has been no overall change observed on the Inner Ring Road where, on average, speeds have remained at 13.3 km/h.

4.6 Underground patronage

The decline due to the Central line closure took some time to recover, with an estimated 2 percent revenue loss for some months after the Central line came back into service. This is in addition to the estimated 2 percent loss due to better and faster bus services. There is some indication that the hot summer resulted in a loss of patronage and also tourist numbers on the Underground were down, by about 5 percent on the previous year. All these factors would tend to bear most on passengers travelling to or in the congestion charging zone.

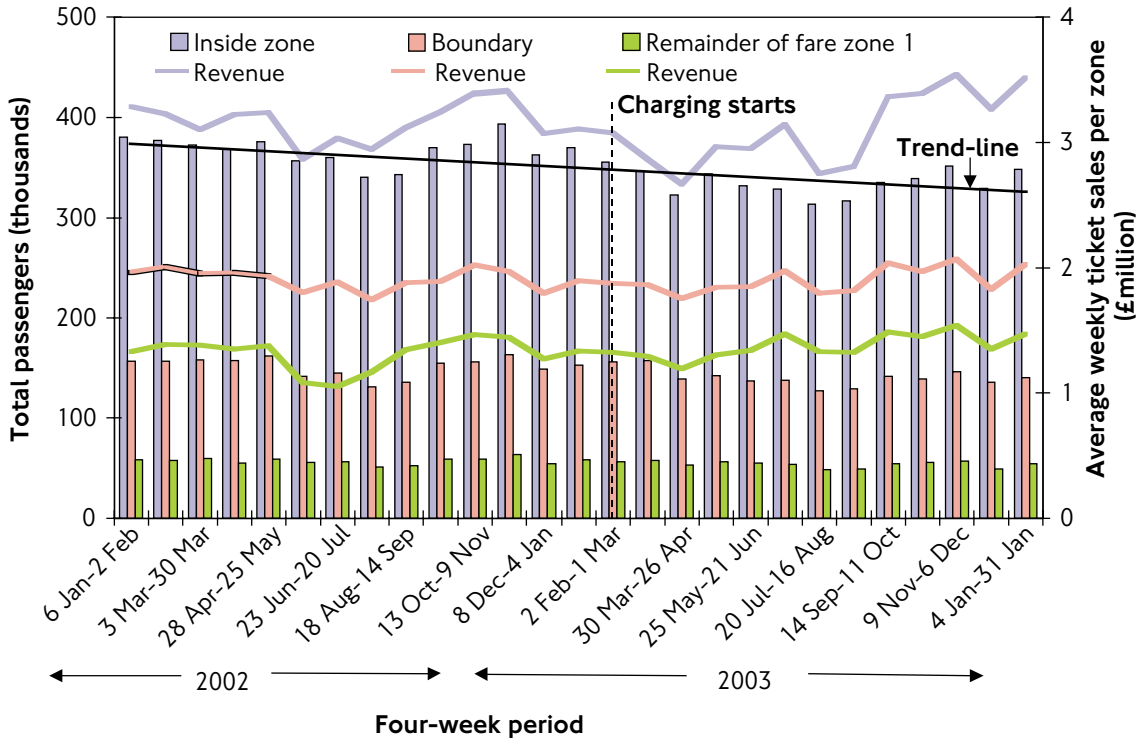
With the partial exception of reduced patronage due to improved bus services, none of these factors are related to congestion charging. Analysis undertaken by the Underground, conducted very shortly after charging started, indicated around a 1 percent increase in Underground passenger numbers initially, probably before transfer to bus took place to any magnitude. The reductions mentioned here would more than outweigh any small increases in passengers resulting directly from congestion charging.

Figure 4.10 shows estimates of passenger usage on the Underground from automatic ticket barriers as well as ticket sales at stations inside the charging zone, around the charging zone and within the rest of Fare Zone 1. Both data sources are broadly corroborative (although ticket sales data is more volatile), and patronage throughout 2003 is noticeably down on equivalent months in 2002.

Reductions in morning peak period gate-based estimates of patronage are demonstrated by the trend-line in Figure 4.10 for stations in and around the charging zone. In the 12 four-week periods since charging started, compared to the same period the previous year, the reduction in patronage of 8 percent is slightly greater than across the entire network (6 percent). Prior to charging during this period, an average of 513,000 passengers exited stations in and around the zone, compared to 473,000 in the year following the introduction of charging. During charging hours patronage has reduced from 1,275,000 passenger exits to 1,181,000 exits, a decrease of 94,000 exits (7 percent).

The change in revenue taken at stations in and around the zone varied from reductions of 15 percent to an increase of 5 percent comparing the 12 four-week periods before and after charging. The effect of the January 2004 fare rises are also visible. On average since charging started there has been a decrease of 1 percent in gross revenue taken compared to the same periods the previous year, which is comparable to the network average reduction (2 percent).

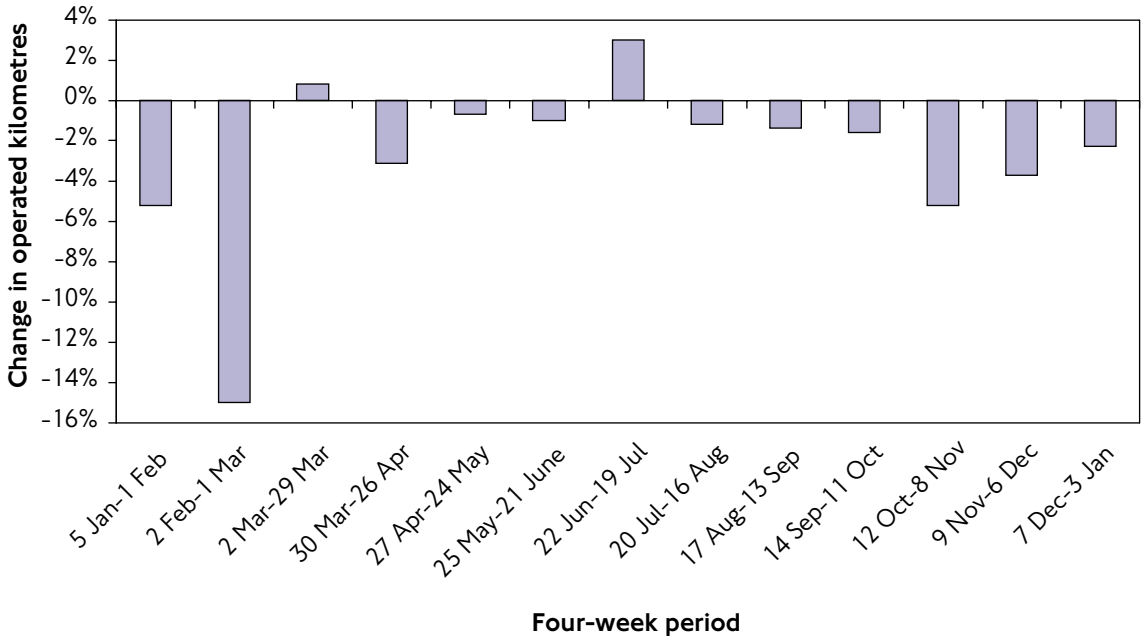
Figure 4.10 Passengers exiting Underground stations in and around the charging zone during the morning peak period (0700 to 1000)



4.7 Underground service supply and reliability

In the year since charging started there have been timetable changes to improve operations but no increases to the number of peak hour trains in operation. Year-on-year changes to the performance of the network in terms of reliability is illustrated in Figure 4.11. For the majority of the year the Underground network has not been performing as reliably as it had the previous year. This may have contributed to the reduction in passengers and encouraged shorter distance trips to transfer to the bus network.

Figure 4.11 Underground network, year-on-year change in operated kilometres as a percentage of scheduled, 2003



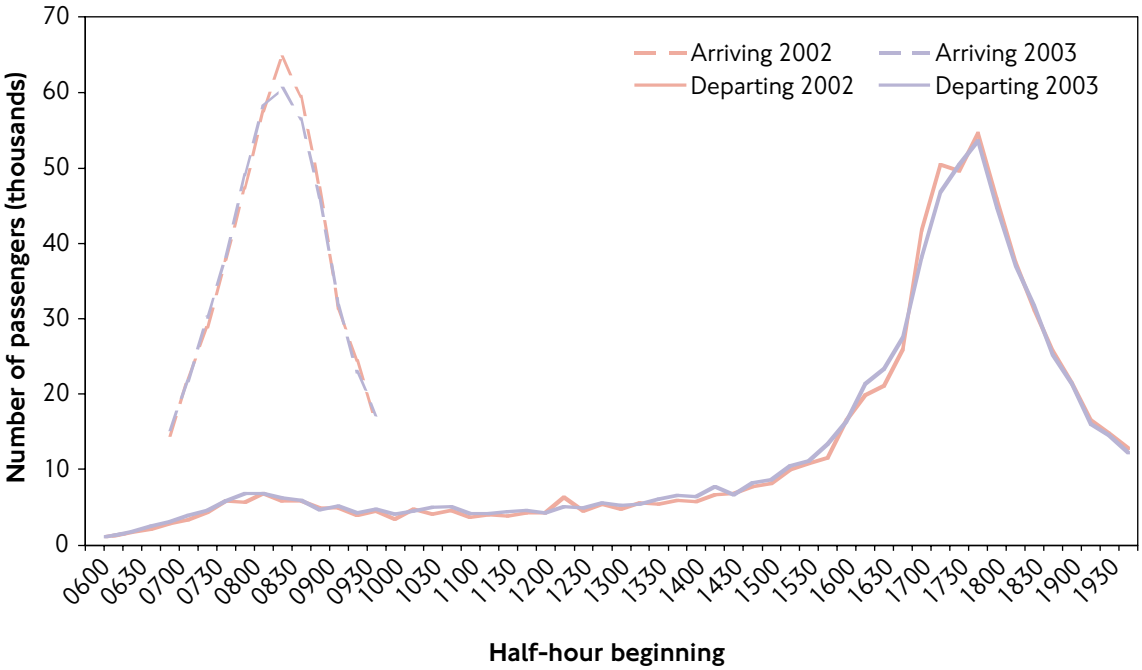
4.8 National Rail

Comprehensive passenger count surveys were undertaken at all 22 central London stations in Spring 2002 and 2003. They were intended to establish whether congestion charging was associated with any noticeable increases in rail travel.

In the 3 hour morning peak, 0700 to 1000, the number of passengers arriving by National Rail at central London stations in 2003 decreased by 1 percent compared with 2002, from 451,000 to 447,000. During charging hours there was an increase of 1 percent, from 564,000 to 573,000 passengers, departing from stations in the charging zone. These changes are not considered statistically significant. The distribution of passengers across the day is illustrated in Figure 4.12.

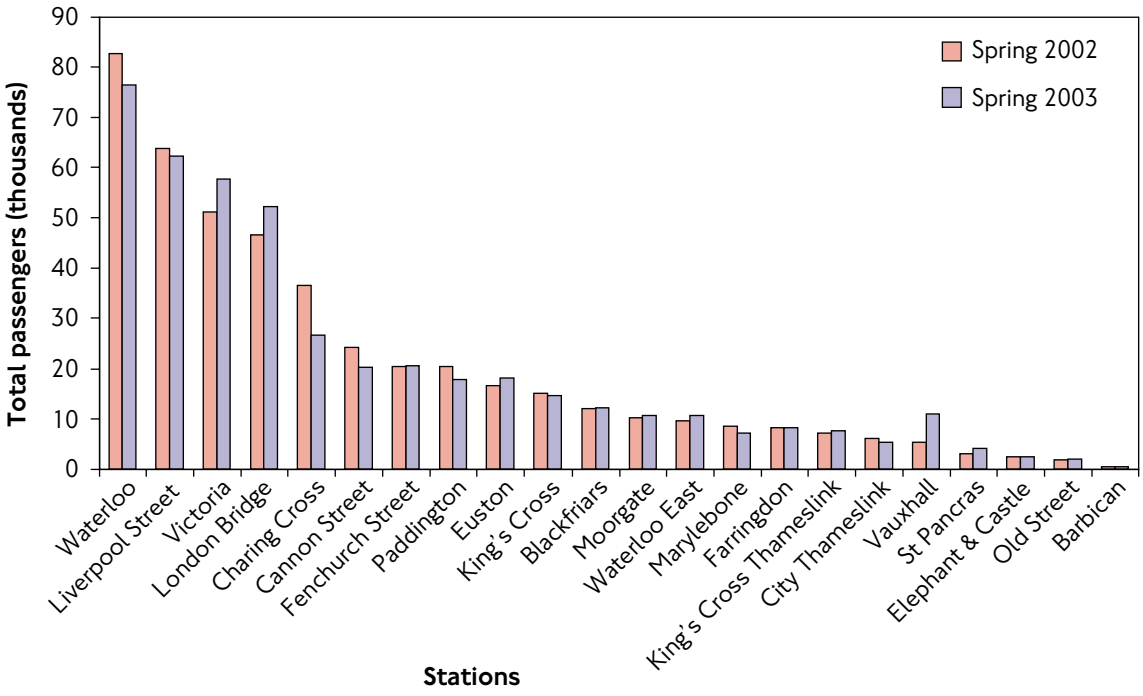
Overall there is no evidence of systematic net changes in National Rail patronage coinciding with the introduction of congestion charging.

Figure 4.12 National Rail passengers arriving at and departing from central London stations by time of day, Spring 2002 and 2003



Within the overall net stability of rail patronage across the network there are some greater variations at individual stations, as can be seen in Figure 4.13. There is no particular reason to associate this with congestion charging: for instance some of the changes are explained by partial closure of Vauxhall Station during the 2002 survey period, also affecting passenger levels at Waterloo. Likewise, increases at Victoria and London Bridge are counterbalanced by decreases at Charing Cross.

Figure 4.13 National Rail stations – morning peak passenger arrivals



4.9 Railhead parking

A possible secondary effect of congestion charging was the prospect of a significant increase in drivers avoiding the charge by diverting to rail stations outside of the charging zone, and continuing their journey by rail, i.e. 'railheading'. It was feared by some that this might result in adverse changes to parking demand, at the stations themselves and in the surrounding roads, where these were not covered by a controlled parking zone.

To test for this, surveys at a selection of stations where increased railhead parking might be feasible were undertaken in the early weeks following the introduction of charging. The results indicate that there has been little change in railheading following the introduction of congestion charging.

Of the nine stations surveyed, an overall net decrease of 1 percent in railheading was observed. Some passengers who were surveyed at these stations, and who previously drove to the charging zone, stated that they had begun railheading and mentioned congestion charging as a factor. However, these represented only 0.5 percent of passengers.

The changes observed are therefore within the range of what might be expected in the absence of charging, given the normal background 'churn' in people's daily travel patterns.

4.10 Docklands Light Railway (DLR)

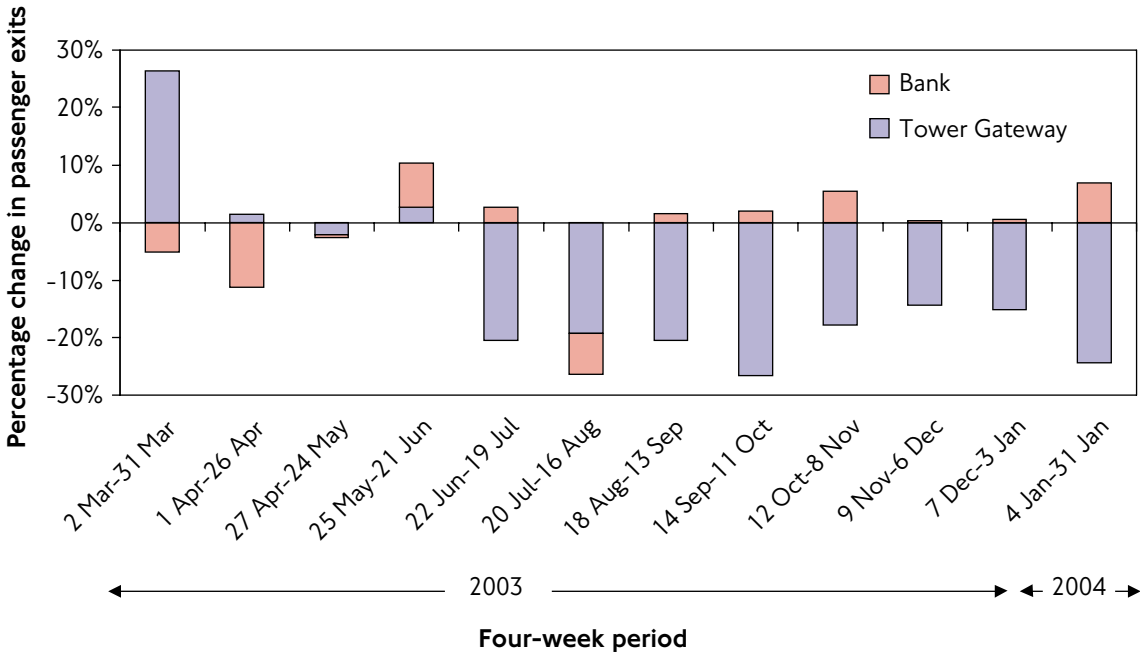
Congestion charging was not expected to significantly affect patronage on the DLR. There are two DLR stations in the charging zone, Bank and Tower Gateway.

On average in the year since charging began there was a decrease from 9,900 to 9,700 (2 percent) in the number of passengers exiting stations within the zone compared to the same periods the previous year during the morning peak period. During the charging day there was an increase from 23,400 to 23,700 (1 percent) in passengers. These changes are not considered to be significant.

At Tower Gateway in the morning peak there was an 11 percent reduction, but during charging hours a 3 percent increase. This could be due to passengers transferring to buses in the morning peak or part of a general shift in travel patterns. This is reflected in the changes at Bank station where in the morning peak there was no change but across the day there was an 8 percent reduction.

The year-on-year change in passenger exits from the two DLR stations within the zone during the morning peak period are shown in Figure 4.14. It illustrates that although there are no trends noticeable at Bank station there does appear to be a decline in usage at Tower Gateway. Nevertheless, the change in passenger numbers on the DLR is considered minor in relation to changes noted on the bus and Underground.

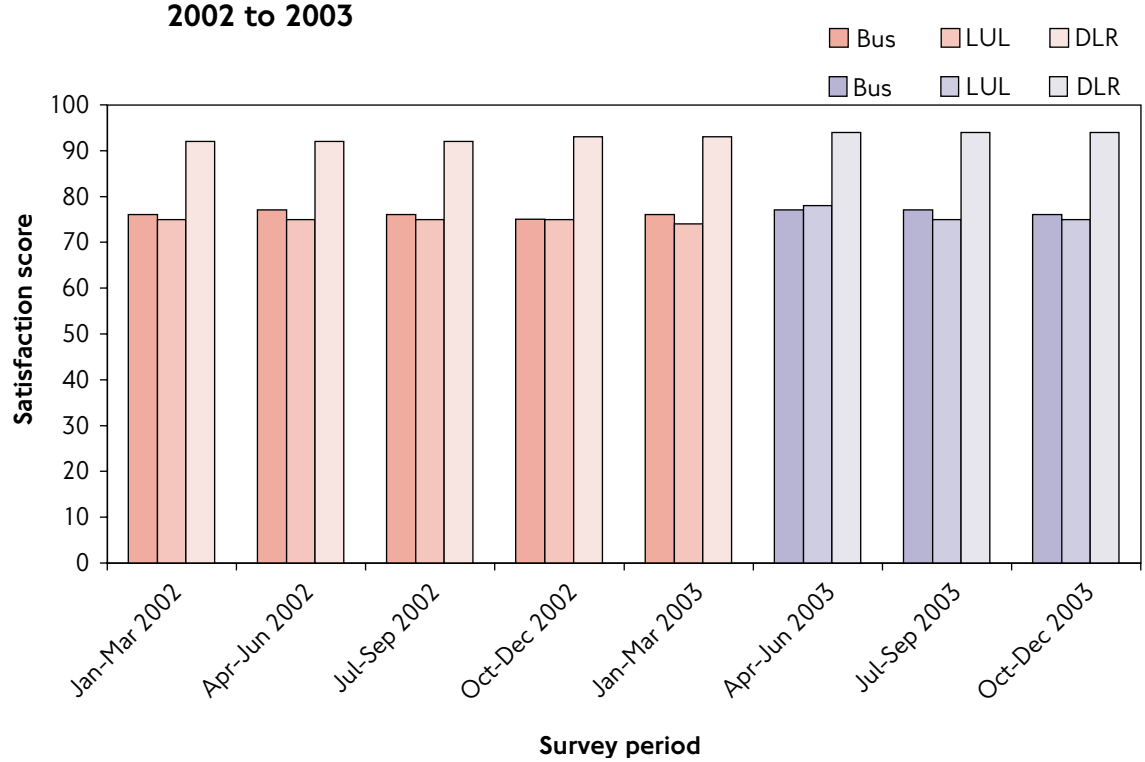
Figure 4.14 Change in average weekday passenger exits within the charging zone compared to the same period the previous year, 0700 to 1000



4.11 Passenger views

Passengers on London's public transport network are asked about their views on elements of their journey as well as their travel habits. Traditionally there is little variation in the overall results between survey periods. Figure 4.15 illustrates that there has not been a material change in the overall customer satisfaction rating across London between 2002 and 2003.

Figure 4.15 Overall customer satisfaction with public transport in London, 2002 to 2003



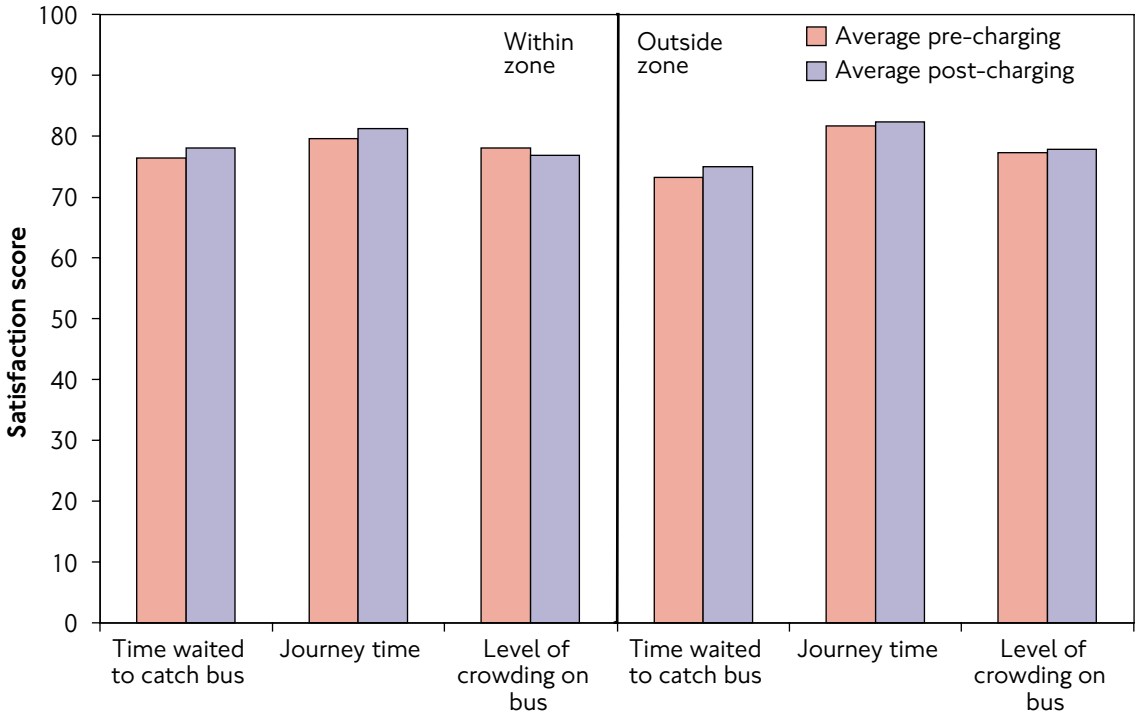
Analysis of bus passengers satisfaction rating can identify views of respondents whose trips end inside the charging zone compared to those that end elsewhere in London, shown in Table 4.1. In the majority of cases there is a slightly higher satisfaction rate for those passengers who alight inside the charging zone, although this has been the case since before charging.

Table 4.1 Overall customer satisfaction with bus services within and outside of the charging zone, 2002 to 2003

	Within charging zone	Outside charging zone
Jan-Mar 2002	77	76
Apr-Jun 2002	78	77
Jul-Sep 2002	76	76
Oct-Dec 2002	77	75
Jan-16 Feb 2003	78	76
17 Feb-Mar 2003	77	76
Apr-Jun 2003	78	77
Jul-Sep 2003	77	77
Oct-Dec 2003	77	76

Although there is little difference in the overall satisfaction of bus users in the zone compared to outside the zone there are slightly larger differences in views when identifying elements of their journey which are more likely to have been affected by congestion charging, as illustrated in Figure 4.16. However, since the introduction of charging, where there have been marginal changes they have been in the views of those passengers both in and outside of the zone.

Figure 4.16 Customer satisfaction with aspects of bus services within and outside of the charging zone, 2002 to 2003



5. Social and behavioural impacts

5.1 Introduction

People making changes, whether to their daily travel behaviour or to other aspects of their lives, lies at the heart of all of the other effects observed in relation to congestion charging. This chapter looks at preliminary findings from TfL's social impacts surveys, alongside other related TfL research, that describes the effects of congestion charging on Londoner's travel behaviour and other aspects of their lives, as well as attitudes of Londoners towards the scheme before and after charging started.

A full consideration of these surveys, which are still at an early stage of analysis, is beyond the scope of this report. Nevertheless the preliminary findings described below begin to assist wider appreciation of what congestion charging means for Londoners.

5.2 Key findings

- Of the 65,000 to 70,000 car driver trips no longer crossing into the charging zone per day, 50 to 60 percent have transferred to public transport. Between 20 and 30 percent have diverted around the charging zone and the remaining 15 to 25 percent have made a variety of other adaptations;
- London residents perceive fewer negative effects from the scheme than they expected in 2002. There is also widespread recognition of the benefits of the scheme in terms of reduced congestion and improved public transport;
- Over 40 percent of residents within the charging zone say their area as a place to live has improved since the scheme was introduced. At least 30 percent say that crossing roads, pollution, noise, reliability of public transport, availability of public transport and congestion are now better in their local area;
- Surveys of Londoner's attitudes towards congestion charging undertaken before and after the scheme was introduced show an overall shift of opinion towards favouring the scheme and its effects, with four-fifths of those who expressed an opinion considering that the scheme had been effective in achieving its primary objectives.

5.3 Structure

This chapter first looks at the evidence for travel behaviour change from across the monitoring programme. Material from the various surveys described here and other related TfL research have been assessed alongside the evidence on aggregate travel change covered in chapters 3 and 4 and used to arrive at a 'best current assessment' of the change to people's travel behaviour in response to the scheme.

It then proceeds to look at some of the effects on individuals, travel behaviour and neighbourhoods. These take each of the three study areas in turn:

- Residents within the charging zone;
- Residents within inner London;
- Residents of outer London, and those living beyond the M25.

Finally, as requested by the Mayor, attitudes of Londoners to the scheme have been surveyed periodically since December 2002 in order to compare changes over time. Some key findings from these surveys are also summarised in this section.

5.4 Survey framework

Main social impacts surveys

The methodology for the social impacts work programme was described in the *First Annual Monitoring Report*.

Two key surveys of Londoners were put in place. The first involved household-based surveys of residents of the charging zone and more widely in inner London. This survey focused on selected electoral wards, giving a strong 'neighbourhood' perspective of each survey area. The second involved a similar telephone-based interview of residents of outer London and beyond. Both involved 'before' and 'after' surveys with the aim of re-visiting the same households and individuals (i.e. a 'panel' survey).

In both cases, an attitudinal questionnaire was used to investigate the expected and revealed effects of the scheme on individual travel behaviour and the local neighbourhood. In-depth consideration was given to the types of adaptations made by individuals, and the implications of these.

Results discussed below reflect preliminary analysis of emerging results from the 'after' phase of both of these surveys compared to equivalent pre-charging surveys undertaken in 2002. Because of various causes of non-contact the total sample in 2003 compared with 2002 has been reduced and additional 'top-up' surveys are also being conducted. Results from these 'top-ups' will be analysed alongside more in-depth consideration of the totality of the results in due course.

Recall survey

Transport for London commissioned a 'recall' survey into how trips to the charging zone had changed several months after the introduction of charging. Over 4,000 telephone interviews were carried out with Londoners who had made a journey into or around the charging zone since the introduction of the scheme.

This survey provides useful insights to assist with interpretation of the observed aggregate changes to travel behaviour described elsewhere in this report.

Attitudinal tracker survey

Surveys of Londoner's attitudes towards congestion charging have been undertaken by TfL, on behalf of the Mayor. Each consisted of around 1,000 respondents, weighted so as to be representative of Londoners generally.

The surveys address behavioural change, attitudes to the scheme and knowledge of its operation. Three surveys were completed before charging started and further surveys have been conducted following the introduction of charging. Although there have been some amendments to the questionnaire across the surveys, the majority of questions remained the same to allow comparability. Some results of this survey are shown in section 5.15.

Future surveys

In addition to the analysis described below TfL will be undertaking analyses of the 2001 Census and the 2001 London Area Travel Survey in the near future – the results of which have recently become available – in order to better understand these background changes. Roadside interviews are being arranged to replicate comparable surveys prior to charging in 2001 and 2002; and further social surveys are being undertaken to strengthen the understanding of changes brought about by congestion charging.

The conclusions presented in this report, and the overview of behavioural changes set out in this section, are therefore provisional; they will be refined as further information becomes available.

5.5 Assessing travel behaviour change

Preceding chapters have considered observed changes to the volumes and patterns of travel by road or public transport to, from, or within and across the charging zone. These are net aggregate outcomes that reflect millions of individual decisions about how to optimise travel to enable the conduct of daily life. Of the aggregate changes described, congestion charging will have been only one of a wide range of contributory factors.

The scale of the changes to travel by car into the charging zone, and its close correspondence with the introduction of charging, suggest that this effect was very closely associated with charging. However, these people did not simply disappear. The majority will have made adaptations, such as using public transport, which will have provided an alternative to enable most elements of daily life to continue largely unchanged.

Those transferring to buses will be counted alongside the many others who are using buses more because of 'background' improvements to bus services London-wide. It is not straightforward to separate those new bus users who have transferred from cars because of congestion charging, from those more generally attracted to the buses (particularly from the Underground) because buses are now more attractive.

Car occupants transferring to Underground have been more than offset by reduced overall passenger numbers, resulting from a variety of 'background' local, national and international events during 2003.

In addition, over the course of any one year, a relatively high proportion of Londoners will have moved house or job, or undergone other life changes that will have altered their travel needs. Such 'churn' is a further complicating factor in any assessment.

5.6 Aggregate changes to car travel to the charging zone

Whilst it is clear that congestion charging has had a profound impact on the choice of travel to the charging zone, there have also been significant 'background' changes in travel to central London, not all of which are yet fully understood. It is nevertheless possible to construct a provisional assessment of the aggregate changes in car driver trips to the charging zone, based on traffic counts, surveys of public transport patronage, and surveys of travel behaviour. Transport for London's provisional assessment of the behavioural impact of congestion charging is summarised in Table 5.1, and described more fully below.

Table 5.1 Estimated reduction in car driver movements coming into the charging zone

Total reduction in car movements at zone boundary	65,000 to 70,000
Through car movements – diverting around the charging zone, other changes	15,000 to 20,000
Terminating car movements – transfers to bus, underground rail	35,000 to 40,000
Terminating car movements – transfers to cycle, walk, motorcycle, taxi, car share	5,000 to 10,000
Terminating car movements – travelling outside charging hours	Under 5,000
Terminating car movements – travel to other destinations, reduced frequency	Under 5,000

Surveys of traffic entering and leaving the congestion charging zone (Chapter 3) indicate that the number of car movements into the charging zone during charging hours have fallen from around 195,000 in 2002 to less than 130,000 in 2003 – a reduction of approximately 65,000 to 70,000 incoming car movements.

Through trips diverting around the charging zone

Some drivers entering the charging zone in 2002 will have been making longer-distance movements that involve crossing the charging zone, for example from Kensington to Docklands, using the relatively attractive route alongside the Thames using Millbank, Embankment and Thames Street. Other 'through' movements will have been relatively shorter, for example Baker Street to Bayswater Road, simply 'cutting through' a small section of the charging zone in the north west corner.

Although these cars were recorded as entering the future charging zone in 2002, they were not stopping at destinations within the zone – and in many cases it would have been straightforward for drivers making these trips to divert to other routes around the zone.

Prior to charging around 20-25 percent of car movements into the charging zone during charging hours were estimated to be 'through movements'. From surveys of drivers' stated intentions it was expected that 40-60 percent of these movements would divert, suggesting a possible diversion of between 15,000 and 30,000 car movements. From surveys conducted after charging and observed changes in flows of cars on the road network, TfL consider that the level of net diversion of incoming car movements to the zone during charging hours is in the range 15,000 to 20,000.

This estimate of diverted incoming car movements indicates that car driver movements to destinations within the charging zone (referred to as 'terminating' car driver movements) have reduced by some 50,000 from a pre-charging total in 2002 of around 150,000 – a reduction of about a third.

Terminating car movements – transfers to bus, underground and rail

The biggest change prompted by congestion charging is the transfer of car users to another mode of transport. Surveys indicate that for 40,000 to 45,000 terminating car movements, the drivers have transferred to another mode of transport – some 60 to 70 percent of those car movements that no longer enter or travel across the charging zone.

The recall survey suggests that 35 to 40 percent of these car drivers have transferred to bus; 45 to 50 percent have transferred to Underground or rail; and 10 to 20 percent have transferred to walk, cycle, motor cycle, taxi or minicab.

Transport for London considers that this survey understates the proportion that have transferred to bus, but nevertheless yields a reasonable estimate of the aggregate mode shift of car drivers. For public transport – bus, underground and rail – this suggests a transfer of 35,000 to 40,000 car driver movements, some 40,000 to 45,000 car occupants.

Terminating car trips – change to pedal cycle, motor cycle, walk, taxi, mini-cab, car share

The observed increase in incoming pedal cycle and motor cycles at the boundary of the charging zone amounts to about 6,000 movements during charging hours. While taxi movements into or across the zone have increased, the indications are that the numbers of taxi and mini-cab passengers to the zone have not changed significantly, probably by less than 1,000 car driver movements. These compare with an estimate of 4,000 to 8,000 additional pedal cycle, taxi, mini-cab, motor cycle and walk trips by ex-car drivers derived from the recall survey.

The occupancy of cars coming through the charging zone has increased. There are two effects here: it is likely that cars with lower occupancies have changed behaviour more than those with higher occupancies; and that some increase in car sharing has taken place in response to the charge. The data suggests that the predominant effect is a reduction in lower-occupancy cars. Surveys indicate that only small additional amounts of car sharing are taking place, perhaps equivalent to 1,000 fewer car driver movements.

Transport for London concludes that the net effect of the change to pedal cycle, motor cycle, walking, taxi, mini-cab and car share is a reduction of 5,000 to 10,000 car driver movements during charging hours.

Terminating car trips – change to travel outside of charging hours

Surveys indicate that around 10 percent of car drivers have responded to charging by changing the timing of their journey so that it is made outside charging hours. This response is more likely to apply to less-frequent trips so that the actual effect on car movements would be smaller. Assuming that 5 to 10 percent of terminating car driver movements that have changed have adapted in this way would mean 2,500 to 5,000 fewer car driver movements entering the charging zone during charging hours.

This can be indirectly confirmed by the observed increase of about 4,000 car driver movements entering the charging zone in the periods immediately before and after charging: 0600 to 0700 and 1830 to 2000. Transport for London conclude that the net switching of terminating car driver movements to outside charging hours is less than 5,000 movements per day.

Terminating car trips – change of destination; trips no longer made

Change of destination to locations outside the charging zone is the stated response of around 5 percent of car drivers who have changed their travel arrangements in response to the charge. This change is more likely to apply to less frequent trips and, assuming a figure of 3 percent of the reduced terminating car driver trips diverting to a destination outside the charging zone, yields a reduction of up to 1,500 fewer terminating car driver movements entering the zone.

Surveys suggest that the equivalent of up to 10 percent of car drivers to the zone prior to charging who have altered their travel arrangements in response to congestion charging are also making fewer journeys to the zone. Assuming that these are making only half of their previous trips yields a reduction equivalent to 5 percent in terminating car driver trips, up to 2,500 per charging day.

The combined effect of these two adaptations – diverting to destinations outside of the charging zone, or making fewer trips to destinations in the charging zone – is less than 4,000 fewer car driver movements terminating in the charging zone. This combined figure represents car drivers who no longer travel to the charging zone during charging hours on a typical charging day as a result of congestion charging. With car passengers it is equivalent to up to 5,000 fewer people coming into the zone. This assessment corresponds to the estimate of up to 4,000 people no longer travelling to the zone given previously in *Six Months On.*

Summary of changes in car movements

To summarise the conclusions of this provisional assessment:

- Diverted car trips account for 15,000 to 20,000 fewer incoming car movements, 20 to 30 percent of the overall reduction across the charging zone boundary during charging hours;
- Transfers to public transport, i.e. bus, Underground and rail, account for 35,000 to 40,000 fewer incoming car movements, 50 to 60 percent of the overall reduction across the charging zone boundary during charging hours;
- Other adaptations account for around 15 to 25 percent of the reduction;
- Within the last category, less than 5,000 car driver movements represent trips to the charging zone that, as a result of charging, are made to other destinations or no longer made at all.

Further results from the recall survey

Figure 5.1 shows – for residents of inner London – changes to the share of all personal trips by residents for various purposes to the charging zone that are made as a car driver. It is seen, for example, that before charging around 10 percent of commuter trips to the charging zone during weekday charging hours were by car drivers. Following the introduction of charging, this reduced to 7 percent. The reductions in car use can be seen for the other main trip purposes.

Figure 5.1 Proportion of trips to the charging zone as a car driver, by trip purpose, before and after the introduction of congestion charging, June/July 2003. Inner London residents

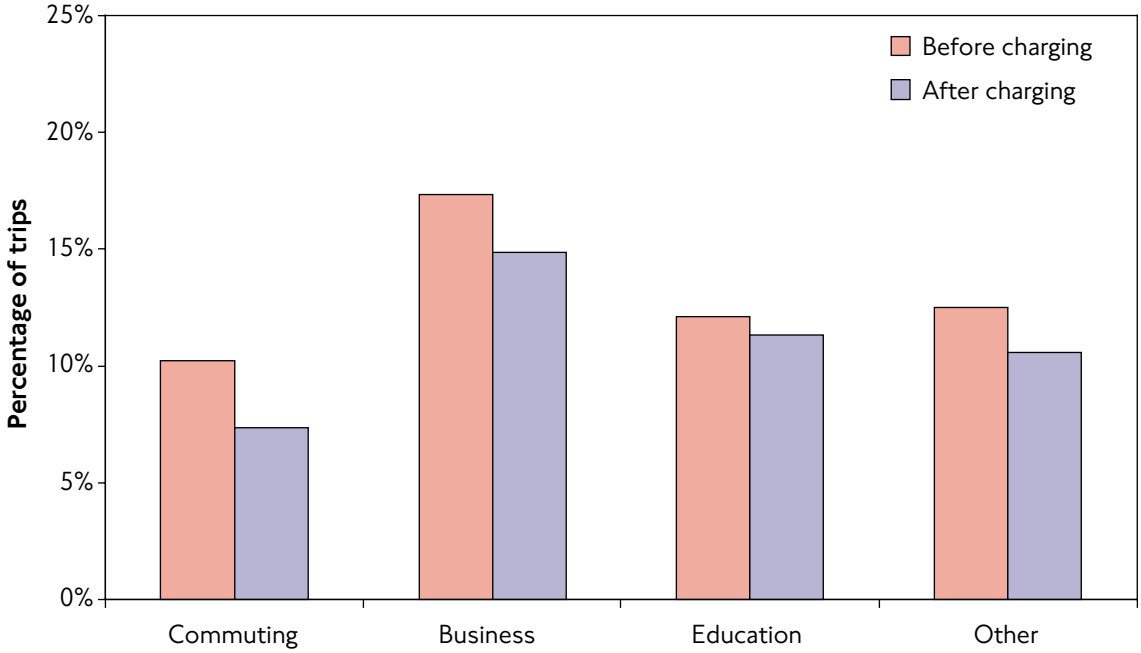
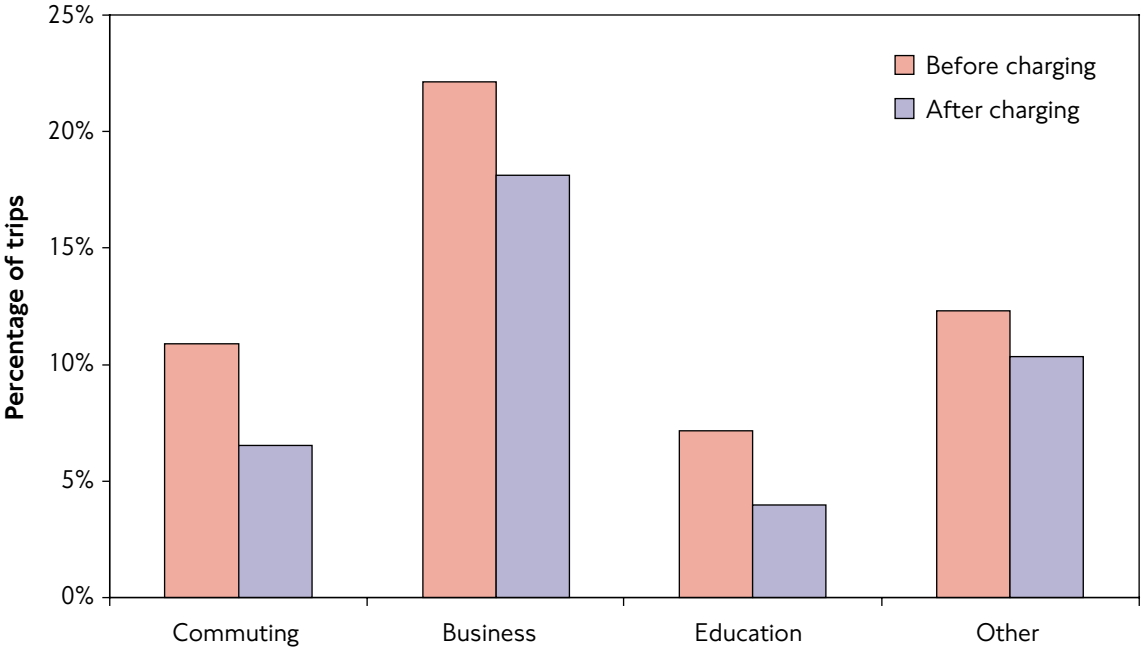


Figure 5.2, for residents of outer London, shows a similar picture, with reductions across all trip purposes in the proportion of trips that are made as car driver.

Figure 5.2 Proportion of trips to the charging zone as a car driver, by trip purpose, before and after the introduction of congestion charging, June/July 2003. Outer London residents



Further evidence of individual behavioural change is also available from the main social impacts surveys, this is described on the following pages.

5.7 Individual behavioural change: charging zone residents

The majority of charging zone residents have not changed their method of travel into or within the zone since the charging scheme was introduced. Figure 5.3 illustrates changes in travel behaviour for those charging zone residents who continue to drive in the area during charging hours, compared with charging zone residents as a whole. Of those who continue to drive in the zone, 18 percent are doing so less often. Among all charging zone residents who took part in the survey in 2003, on balance more are using buses (32 percent against 11 percent who claim to use them less), and are also walking and cycling more often.

Figure 5.3 Changed travel behaviour by charging zone residents. Travel to, from or within the charging zone: Autumn 2003

NB: Sample sizes include responses that didn't use that method of travel before and continue not to within the 'same as before' category

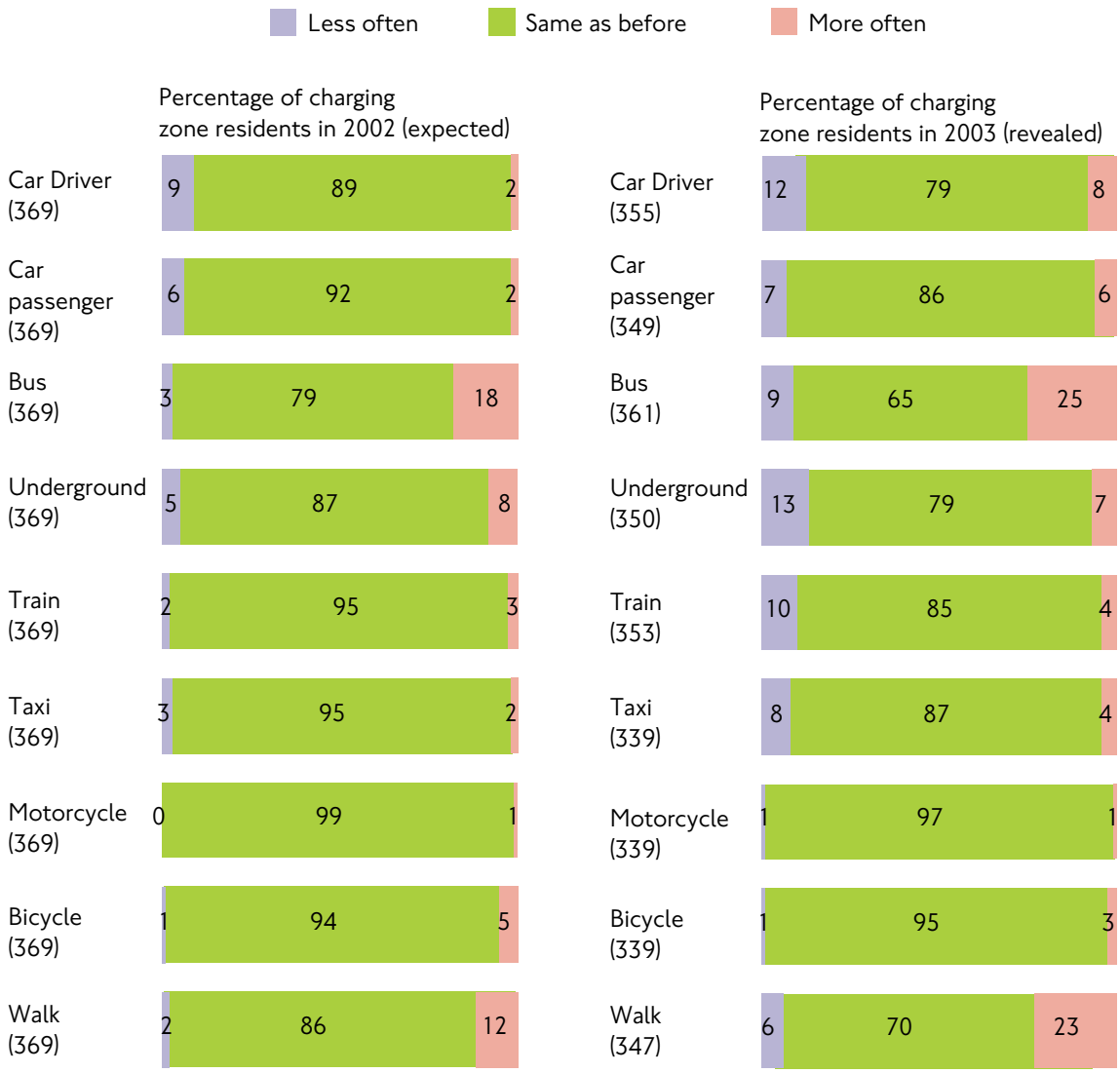
Base: All respondents who gave an answer

* CAUTION: Very small base

For changes by mode of travel for personal trips in London as a whole, Figure 5.4 compares the prior expectations of charging zone residents, as expressed in the 2002 survey with actual changes in travel behaviour as reported in the 2003 survey.

For example, whereas 18 percent of charging zone residents in 2002 expected to make more use of buses in London as a whole, 25 percent report actually doing so in 2003.

Figure 5.4 Expectations and revealed changes in travel behaviour. Charging zone residents, all trips in London as a whole, Autumn 2002 and Autumn 2003



NB: Sample sizes include responses that didn't use that method of travel before and continue not to within the 'same as before' category

Base: All respondents who gave an answer

5.8 Individual behavioural change: inner London residents

The pattern of change in travel modes is noticeably different for inner London residents. Figure 5.5 illustrates travel behaviour for inner London residents who continue to drive in the zone during charging hours, against all inner London residents who took part in the survey in 2003. Among those who are still driving in the zone, half say they now drive less often into or within this area. In contrast, a significant proportion of these drivers are using buses and the Underground more often (39 percent and 32 percent respectively). Among inner London residents as a whole (i.e. including those who continue to drive in the zone), a smaller proportion are claiming to use public transport more often. This implies that drivers are making more changes to their public transport usage than current public transport users.

Figure 5.5 Changed travel behaviour by inner London residents. Travel to, from or within charging zone: Autumn 2003

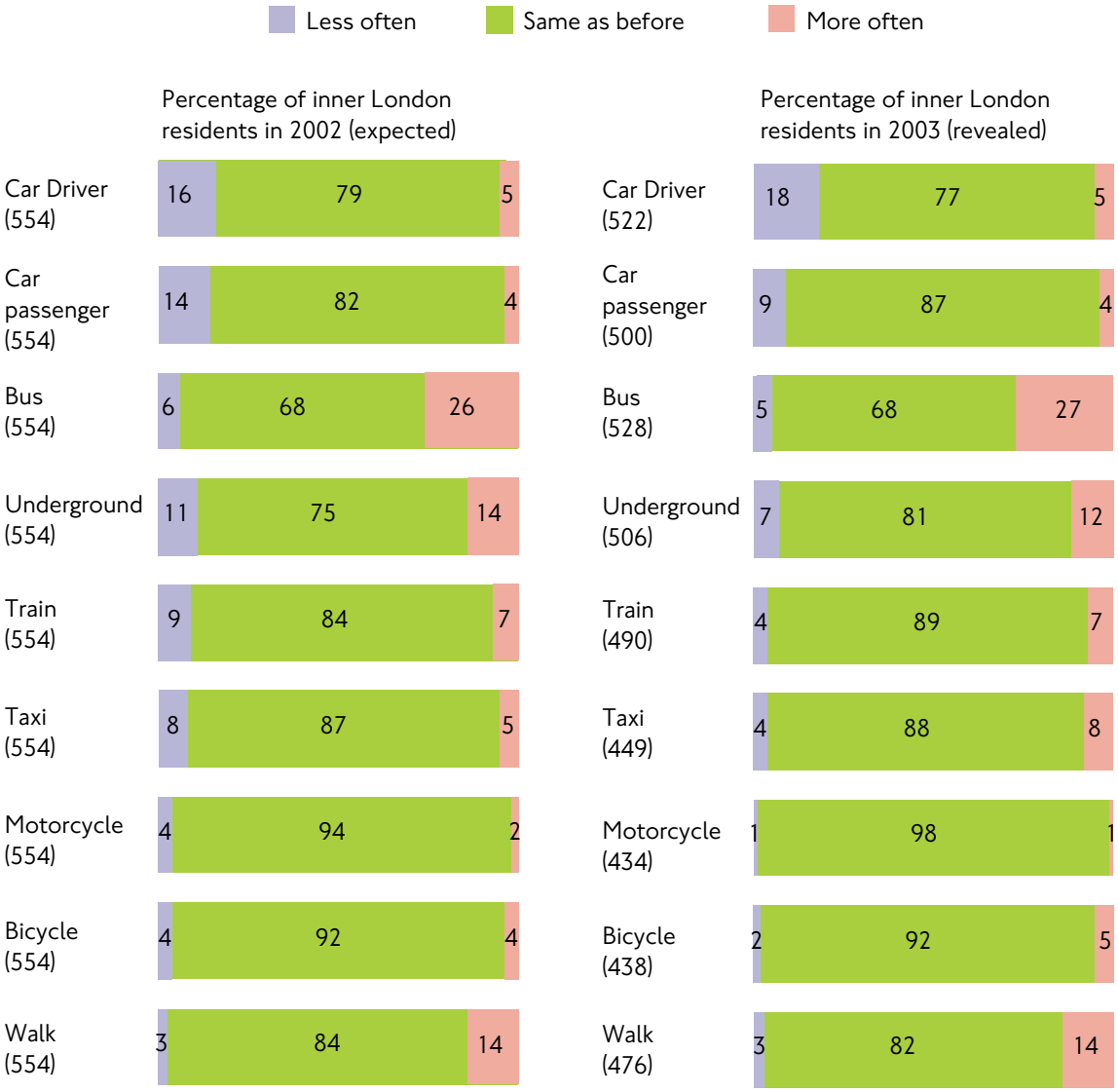
NB: Sample sizes include responses that didn't use that method of travel before and continue not to within the 'same as before' category

Base: All respondents who gave an answer

* CAUTION: Very small base

As can be seen in Figure 5.6 and in terms of travel behaviour change, respondents in inner London have generally reacted to the congestion charge as they expected to in 2002.

Figure 5.6 Expectations and revealed changes in travel behaviour. Residents of inner London, all trips in London as a whole, Autumn 2002 and Autumn 2003



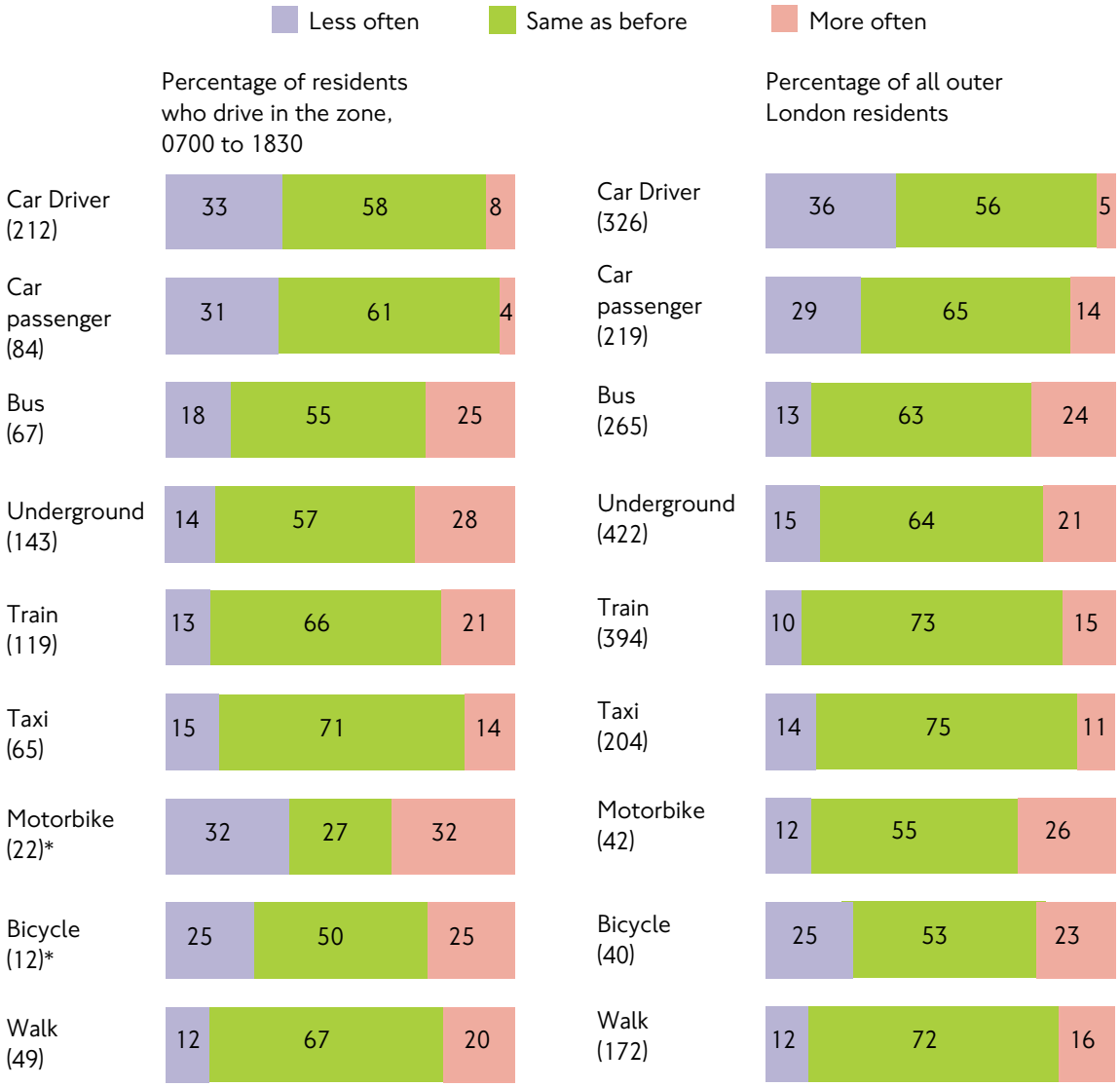
NB: Sample sizes include responses that didn't use that method of travel before and continue not to within the 'same as before' category

Base: All respondents who gave an answer

5.9 Individual behavioural change: outer London residents

Figure 5.7 illustrates changes in travel behaviour for those outer London residents who continue to drive in the charging zone during charging hours, compared with outer London residents as a whole. The pattern is fairly similar to inner London whereby a considerable, if smaller, proportion of those who are still driving into or within the zone claim to be doing so less often (33 percent). In addition, they are using the Underground, buses and trains more often (28 percent, 25 percent and 21 percent respectively).

Figure 5.7 Changed travel behaviour by outer London residents. Travel to, from or within the charging zone: Autumn 2003



NB: Sample sizes include responses that didn't use that method of travel before and continue not to within the 'same as before' category

Base: All respondents who gave an answer

* CAUTION: Very small base

5.10 Impacts on individuals, households and neighbourhoods

This section summarises how respondents living in each of the survey areas consider that aspects of their daily lives have changed since the implementation of congestion charging. Aspects considered here include: perceived accessibility to the charging zone, effects on local neighbourhoods, and changes to the travel experience. These are a sub-set of the information potentially available from the social impacts surveys, a full description of which is beyond the scope of the current report.

5.11 Charging zone residents

Accessibility

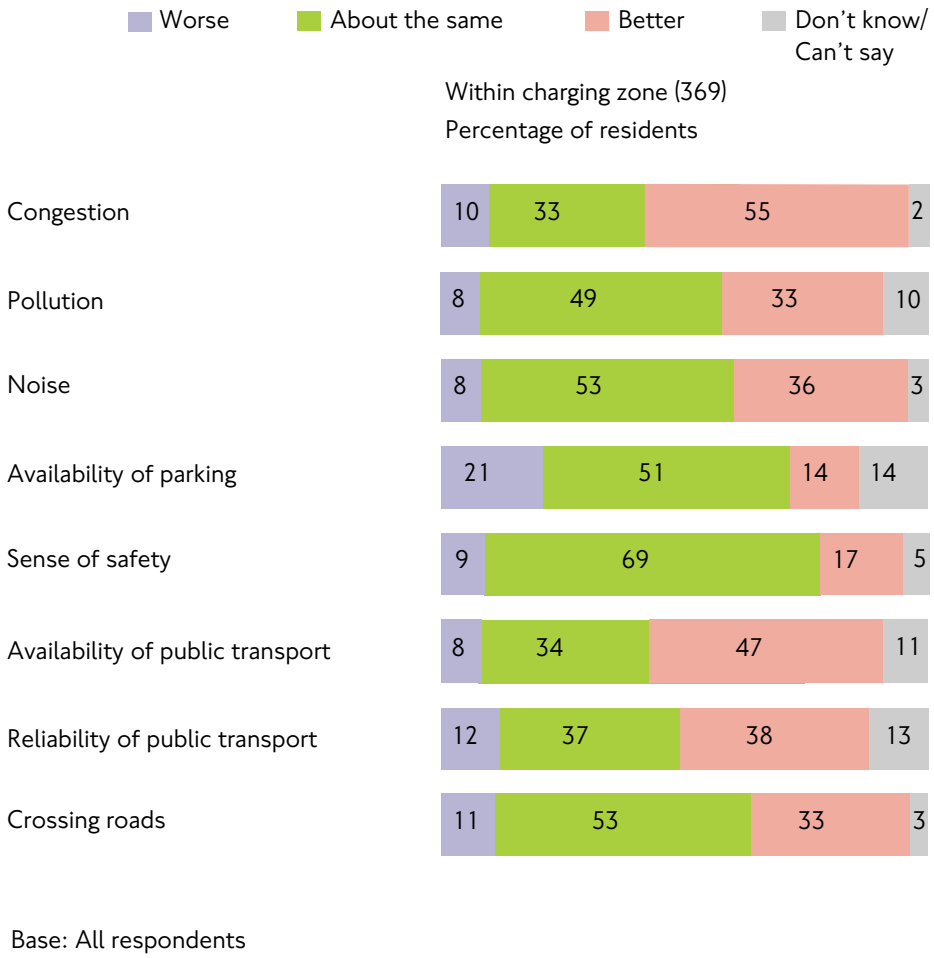
Respondents in the zone were asked in 2003 how they thought their sense of accessibility and mobility compared to conditions in 2002, before the scheme was introduced. With regard to access to shops, facilities, services and places to visit in the local area, three-quarters say that this is the same. Of those who report change, more residents in the zone believe access is better (19 percent) than worse (5 percent).

On the subject of visiting family and friends, twice as many residents expected this to be more difficult (26 percent) once the scheme was introduced rather than easier (13 percent). While the same proportion agrees that this is now easier, the proportion who feel it is more difficult is now only 12 percent. However those who felt it is now easier for family and friends to visit them within the zone is much smaller (2 percent). When asked about how their day has changed since charging, a significant proportion say they are spending less time with family and friends directly as a result of the scheme, possibly related to the fact that some people are finding it more difficult to visit them in the zone.

Local area

Over 40 percent of residents living within the charging zone say their area as a place to live has improved since the scheme was introduced, as shown in Figure 5.8. At least 30 percent say that crossing roads, pollution, noise, reliability of public transport, availability of public transport and congestion are now better in their local area.

Figure 5.8 Perceived changes to local area. Charging zone residents, Autumn 2003



Base: All respondents

Travel experience

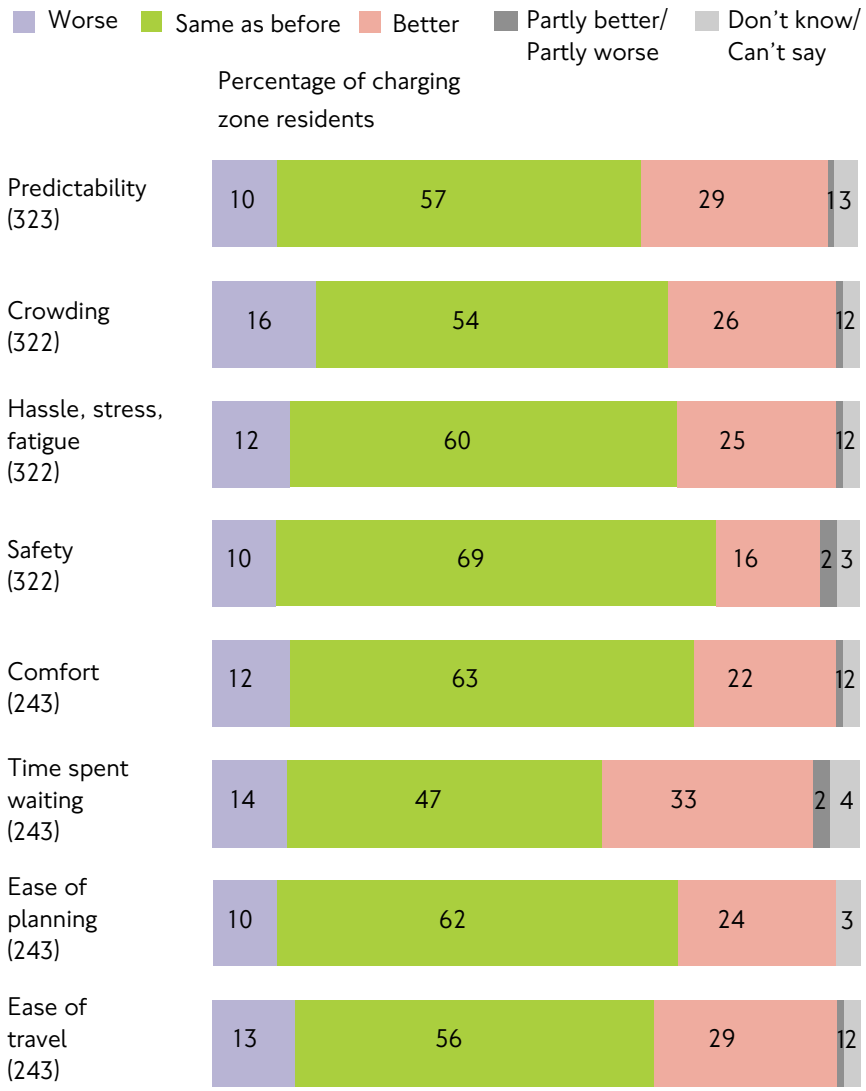
In 2002, around a third of residents within the zone expected it to be easier travelling within the zone once charging was introduced. A further third expected that it would be the same. Since charging was introduced only 5 percent of residents say travelling within the zone is actually more difficult, while the overwhelming majority have either not noticed any difference (49 percent), or say that it is easier (44 percent).

When asked about the length of time required for a specimen journey, most respondents expected that the scheme would affect the duration (34 percent thought it would take more time, 42 percent less time). In fact, for most respondents, the journey still takes around the same amount of time (62 percent). Of those who have noticed a change, 23 percent say the journey is taking less time compared to 12 percent who said it took longer. The saving claimed is generally between 5 and 10 minutes per journey.

Only 6 percent of respondents within the zone now make fewer journeys than they did before charging. Of those around 40 percent spontaneously say that it is due to the scheme and 10 percent because they have changed their working pattern.

Almost two-thirds of residents believe the scheme has been effective in reducing traffic congestion. As shown in Figure 5.9 the majority of charging zone residents believe the quality of various elements of their journey is comparable to or better than conditions before the scheme was introduced.

Figure 5.9 Perceived changes to journey experience. Charging zone residents, Autumn 2003



Base: All respondents who have travelled to or within the zone since the scheme has been introduced

5.12 Inner London residents

Accessibility

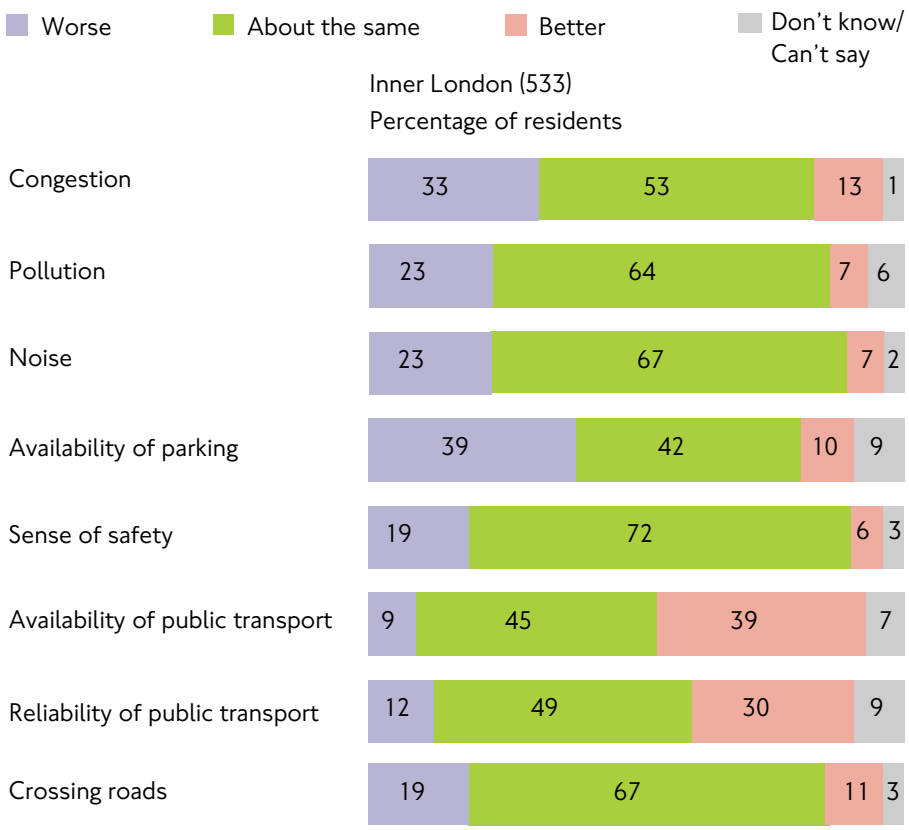
Of the respondents living in inner London, 60 percent feel that access to shops, facilities, services and places in London as a whole is the same as it was before charging in 2002. Of those who say access has changed, 14 percent feel it is better and 18 percent feel it is worse. This compares with expectations before charging when 38 percent thought that access would be the same, 27 percent better and 26 percent thought access would be worse.

Local area

Sixty percent of inner London respondents say their area as a place to live has stayed the same since charging was introduced. Twenty-two percent say that it has deteriorated, with only 12 percent saying it has improved. From a given list, respondents were asked whether certain elements of the local home environment had improved or deteriorated since the introduction of charging, as illustrated in Figure 5.10.

Inner London residents were most positive about the improvement in the reliability and availability of public transport in their local area. Fewer people reported negative effects compared to expectations before charging was introduced, particularly in relation to local congestion, availability of parking, sense of safety, trade for local business, employment, pollution and noise.

Figure 5.10 Perceived Impact on local area.
Inner London residents, Autumn 2003



Base: All respondents

Travel experience

Regarding travel to the zone over a third of inner London residents expected it to be easier, and just over a quarter expected it to be harder before charging was introduced. The perceived reality of the scheme is somewhat different, as 19 percent now say it is easier and another 19 percent now say it is harder. The softening of opinion in both directions has resulted in half of residents claiming access is the same as before, compared to just over a quarter who expected it to be the same. Encouragingly, 41 percent of inner London residents say it is now easier to travel within the zone, with a further 35 percent say that it is the same as before (Figure 5.11).

Nearly 30 percent of inner London residents travel into the zone less than they did before charging. When asked why, two thirds spontaneously say it has something to do with congestion charging and 10 percent say it has to do with change of work. This is partly counterbalanced by other residents making more trips.

Figure 5.11 Perceived changes to journey experience. Inner London residents, Autumn 2003

Base: All respondents who have travelled to or within the zone since the scheme has been introduced

5.13 Outer London residents

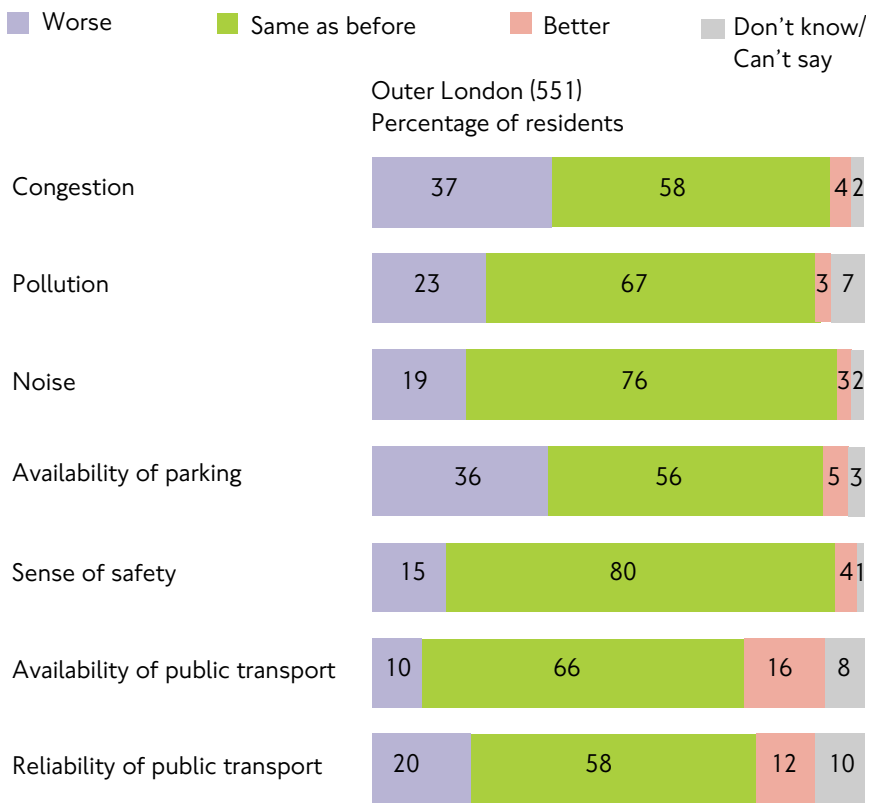
Accessibility

Overall, nearly half of respondents in outer London feel that the zone is a better place to visit since the introduction of congestion charging, with only 9 percent feeling it has deteriorated and a third saying that there has been no change. The scheme is widely acknowledged (87 percent) to be a significant factor contributing to this improvement, with 66 percent feeling that traffic congestion is better, and 23 percent acknowledging an improvement in public transport.

Local area

When asked to consider their local environment, around two-thirds believe there to have been no change compared to a year ago, as illustrated in Figure 5.12. However, 37 percent of those living in outer London feel that local congestion has got worse, and 36 percent have more difficulty in parking locally. There has been some improvement in the perception of both the availability of public transport.

Figure 5.12 Perceived impact on local area.
Outer London residents, Autumn 2003



Base: All respondents

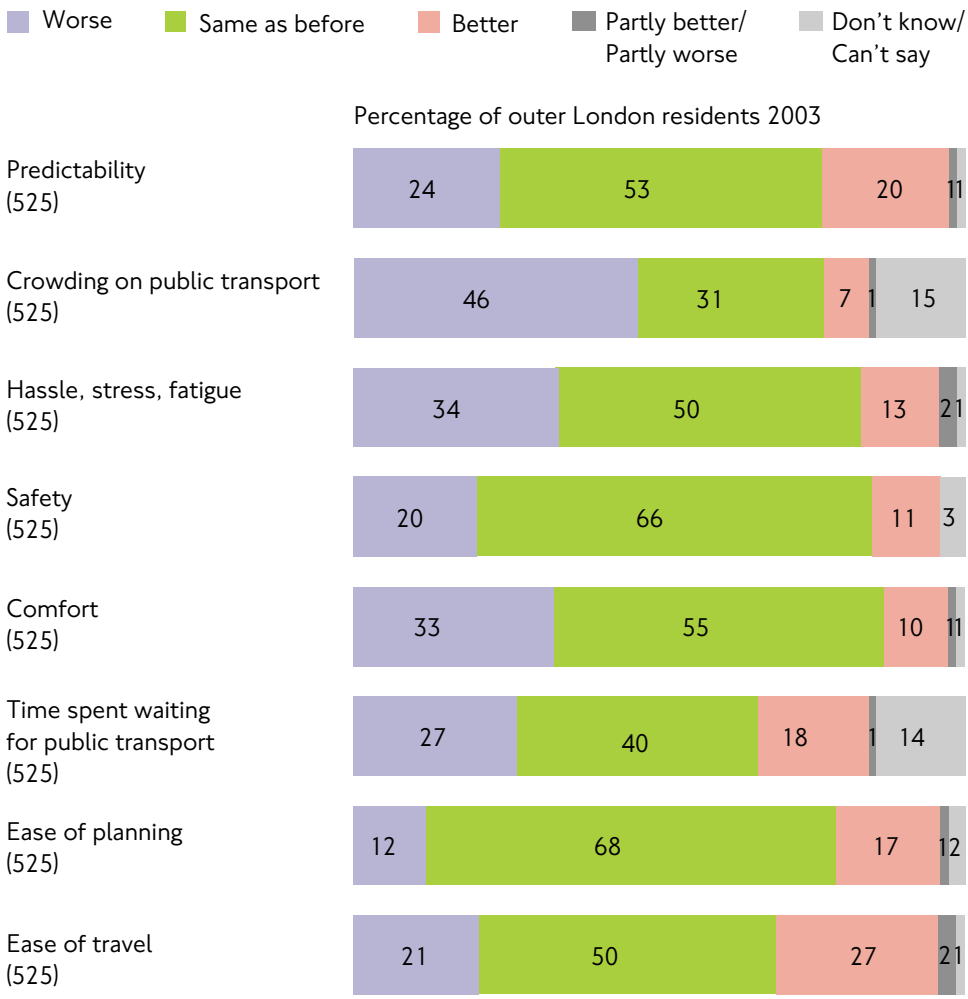
Travel experience

The majority of outer London residents (60 percent) find travelling to the zone no different than before the scheme was introduced, 19 percent find it more difficult and 20 percent easier. A third feel that journeys to and from the zone are quicker. Opinions of drivers are slightly more polarised, with a quarter stating that it is either easier or more difficult. Nearly half think that travelling within the zone itself is easier, with only 7 percent believing it to be more difficult. In particular, two thirds feel that congestion has eased and 23 percent that public transport has improved.

The majority (77 percent) make the same number of journeys to the zone as before the scheme, with 17 percent making fewer trips. Of those making fewer trips, 45 percent claim to have done so to avoid paying the congestion charge, whilst 40 percent of those making fewer trips no longer work in the charging zone. The most noticed benefit of the scheme is reduction in traffic congestion (34 percent), more than those expecting this outcome a year ago (23 percent).

Considering different aspects of their journeys, residents of outer London have seen the most benefit in terms of the general ease of travel and predictability of their journey time as shown in Figure 5.13.

Figure 5.13 Perceived changes to journey experience. Outer London residents, Autumn 2003



Base: All respondents who have travelled to or within the zone since the scheme has been introduced

5.14 Residents living beyond the M25

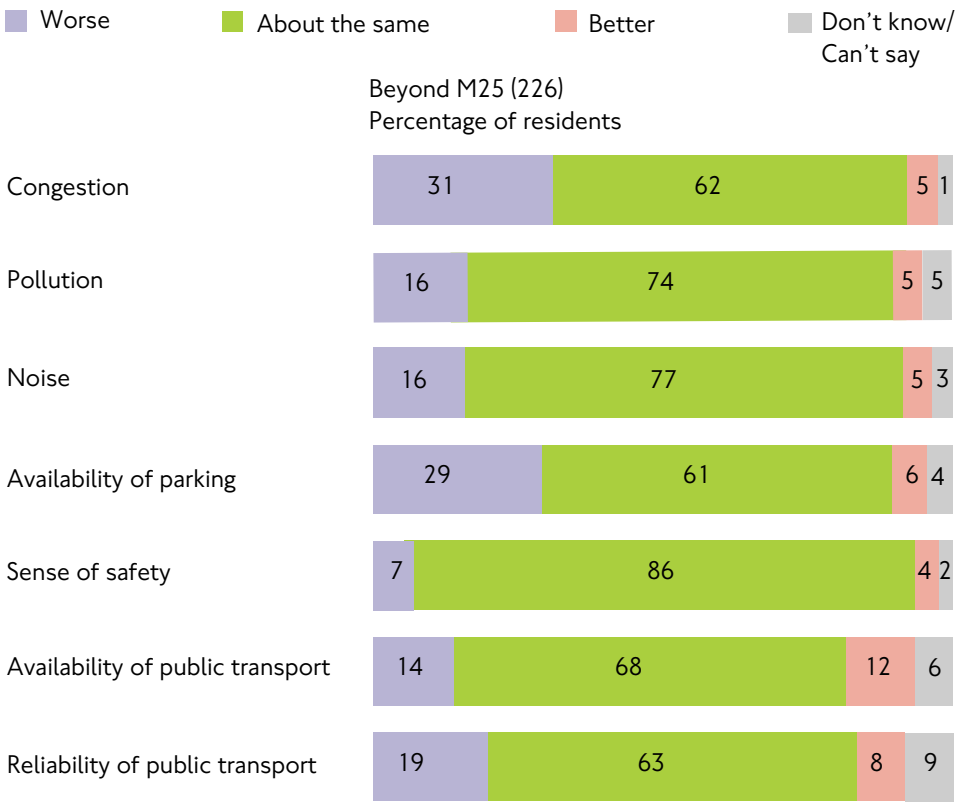
Accessibility

Around 60 percent of interviewed residents living beyond the M25 believe that travelling into the zone is the same as before, with 18 percent finding it either easier or more difficult. Travelling within the zone itself is thought to be easier by around half of respondents, with 72 percent feeling that congestion has eased and 24 percent that public transport has improved. This is in line with what respondents expected prior to the introduction of the scheme in 2002. Just over half felt that the zone is a better place to visit since the introduction of congestion charging, with only 6 percent feeling it has deteriorated and a third that there has been no change.

Local area

When asked to consider elements of their local environment, fewer residents living beyond the M25 felt that their area has deteriorated over the past year in comparison with those who live in outer London. As shown in Figure 5.14, around 30 percent of residents feel that congestion and parking has worsened in their area. The greatest improvements were seen in relation to public transport, but not to the same extent as in outer London. Experiences of those travelling into the zone from outside the M25 mirror those living in outer London, with non-drivers more likely to say it has improved (55 percent).

Figure 5.14 Perceived impact on local area.
Residents living beyond the M25, Autumn 2003

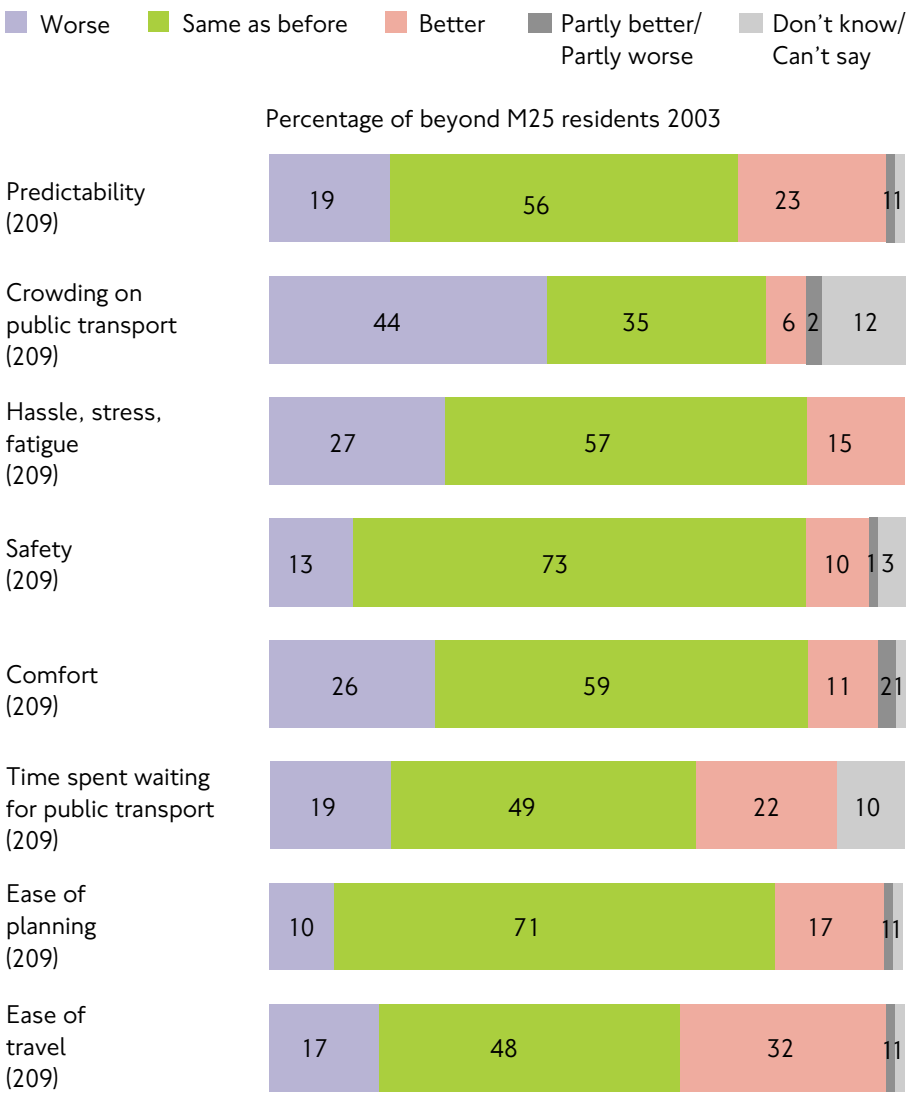


Base: All respondents

Travel experience

Three-quarters of respondents, from beyond the M25, are making the same number of journeys into the zone as before the scheme was introduced, with 20 percent making fewer trips. Of those making fewer trips, 52 percent claim to have done so to avoid paying the congestion charge, with 24 percent no longer working in the zone. Figure 5.15 shows similar patterns of charging perceptions of elements of the journey experience to residents of outer London. Whereas residents living beyond the M25 see an improvement in ease of travel and predictability they have also seen a worsening in levels of crowding on public transport.

Figure 5.15 Perceived changes to journey experience. Residents living beyond the M25, Autumn 2003



Base: All respondents who have travelled to or within the zone since the scheme has been introduced

5.15 Attitudes of Londoners to congestion charging

This section considers attitudes towards the central London congestion charge scheme by Londoners. Seven surveys have been completed at the request of the Mayor to track changes in views before and after charging. Each survey consisted of around one thousand telephone interviews of respondents selected so as to be representative of Londoners generally.

Table 5.2 shows the results of several of the questions. Overall, it is noticeable that where questions were asked before and after charging there is a shift in opinions after charging was introduced towards favouring the scheme and its effects.

Table 5.2 Selected results from the attitudinal tracker survey, December 2002 to October 2003

		Before charging			After charging			
		Dec 02	Jan 03	Feb 03	Mar 03	Apr 03	Jul 03	Oct 03
Importance of reducing congestion further in central London?* **	Important	85	81	78	81	48	57	50
	Neither	7	7	6	6	13	13	11
	Unimportant	8	10	14	11	35	27	36
Support or oppose congestion charging scheme?	Support	40	38	39	57	50	59	48
	Neither	19	16	18	26	18	15	21
	Oppose	40	43	41	27	31	24	28
Will/has the scheme affected you personally?	Yes	69	71	62	59	58	60	53
	No	30	28	35	40	42	39	46
Will/has charging been effective?*	Effective	75	73	72	76	79	83	81
	Not at all effective	18	17	18	5	5	4	6
Awareness of methods of payment?	Shop/Garage	16	21	37	57	52	57	59
	Internet	6	8	26	42	39	40	35
	Telephone	10	13	20	37	35	34	29
	Text message	0	1	16	34	26	21	14
Congestion charging will/is reducing traffic!	Agree	54	54	50	75	73	77	71
	Neither	7	9	8	6	6	7	8
	Disagree	36	34	36	16	15	11	17
Will put up with charging as long as public transport improves!	Agree	n/a	n/a	n/a	85	85	87	81
	Neither	n/a	n/a	n/a	3	3	3	6
	Disagree	n/a	n/a	n/a	11	10	8	12
Will put up with charging as long as car journeys improve!**	Agree	n/a	n/a	n/a	63	63	67	55
	Neither	n/a	n/a	n/a	11	9	13	16
	Disagree	n/a	n/a	n/a	21	20	16	22

* Results do not include 'don't knows'.

** Drivers only.

*** From April 2003 question prefaced with 'The central London congestion charging scheme has reduced traffic congestion in central London.'

6. Business and economic impacts

6.1 Introduction

This chapter considers the impacts of congestion charging on business activities in and around the charging zone and the wider economy of London. Information is presented from Transport for London's (TfL's) own surveys of businesses in central London; and this is assessed in the context of the larger body of evidence that has accumulated following the introduction of congestion charging.

It has been difficult to achieve consensus on the impact of charging on economic activity in London, particularly in view of the range of other exceptional local, national and international factors that have operated throughout 2003.

This chapter first reviews key findings from TfL's own surveys of businesses and other organisations in and immediately around the charging zone, conducted in Autumn 2003.

It then focuses on the retail sector, where various commentators have suggested that charging has been directly responsible for the downturn in activity during 2003.

It is concluded that charging has had a relatively minor effect on the London economy, albeit that there are some sectors and activities that experience negative effects. It is further concluded that the negative trends reported by certain business sectors during 2003 are largely due to wider economic factors.

6.2 Key findings

- London's economy has been subject to a variety of specific and longer-term local, national and international factors during 2003. Collectively, these have had a much greater impact on economic performance than congestion charging. They have also made more difficult the task of identifying and quantifying congestion charging related impacts;
- The TfL business surveys have shown that a number of factors are at work in generating responses to the congestion charge from the business community. Overall, the response to the charge has been neutral, with businesses in the zone or close to the boundary remaining generally supportive;
- Attitudes towards the charge vary when viewed at the business sector level. The finance and business services sector is enthusiastic about the charge, citing reduced journey times and an increased ease of movement within the zone;
- Retail and leisure suffered through the first half of 2003 for a number of reasons unrelated to congestion charging. Extracting the individual influences from the overall picture is difficult, particularly at a quantitative level;
- The magnitudes of the factors affecting retail are such that congestion charging can only have had very minor effects on sales over the first half of 2003. Furthermore, the resurgence of the retail market at the end of 2003/early 2004 indicates the influencing factors have not had a long-term effect on the sector. Structural changes to the retail market and much broader economic and political factors have been the prime drivers of retail performance during 2003.

6.3 Transport for London's business surveys

Transport for London undertook interview surveys with over 700 businesses across the congestion charging zone and the immediate area surrounding it (defined as within 500 metres of the boundary) in Autumn 2003. These can be compared with similar surveys carried out in 2002.

Despite the largely qualitative nature of these surveys, the TfL surveys have a number of attributes that distinguish them from other surveys carried out over the last 12 months:

- A comparatively large survey sample;
- A sample structure that reflects the make up of central London's economy;
- Fieldwork timed to capture a view of the effects of congestion charging after 8 months of operation;
- Response rates of approximately 40 percent for the initial contact phase of all surveys and a successful re-contact rate of nearly 80 percent for the in-depth interview survey.

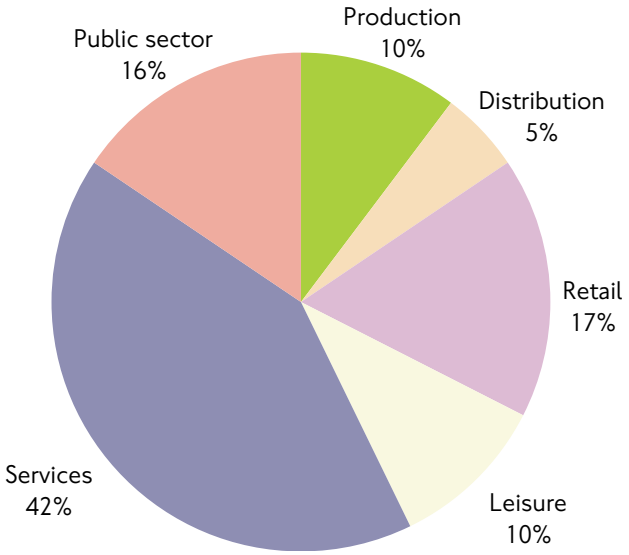
It is, however, important to consider the wealth of information published by other organisations regarding the effect of congestion charging on businesses and the London economy. For instance, the London Chamber of Commerce and Industry, the Freight Transport Association, London First and the Chartered Institute of Management Accountants are amongst those organisations that have published surveys on various aspects of congestion charging. In general these surveys do not possess the same advantages as the TfL business surveys (outlined above).

To allow analysis of the differential effects of factors such as tourism trends and congestion charging on different businesses, the respondents to the TfL surveys were split into the following six sectors:

- **Services** – essentially offices, mainly involved in financial and business services;
- **Retail** – shops and other high street sites such as travel agents, estate agents or hairdressers;
- **Leisure** – restaurants, cafes, hotels, pubs, cinemas etc.;
- **Distribution** – a small but highly relevant sector;
- **Production** – since there is almost no manufacturing activity inside central London, this is mainly the media industry plus some workshop-based activity;
- **Public Sector** – all non-commercial activities such as government offices, also includes charities.

Figure 6.1 shows central London employment by business sector. The relative importance of the various business sectors to the central London economy is reflected in the sample structure of TfL's business surveys carried out in 2002 and 2003.

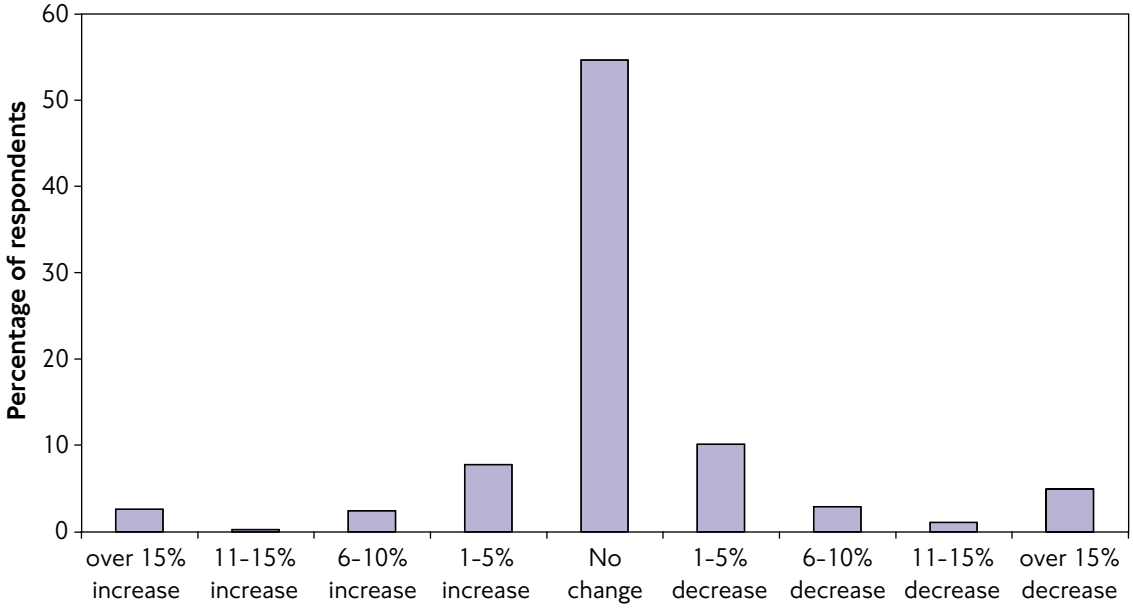
Figure 6.1 Central London employment by business sector, 2003



The following sections present some results from the 2003 surveys, with comparison to the 2002 surveys where relevant.

Business performance

Figure 6.2 Overall business performance as measured by change in sales

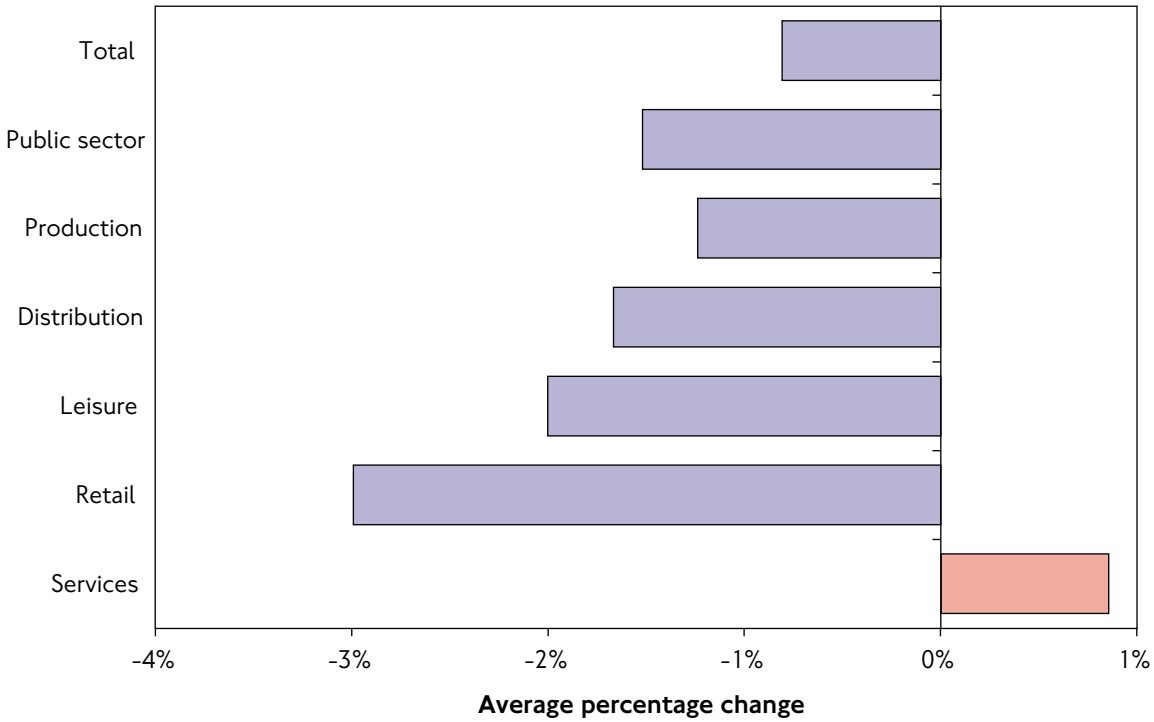


Note: 14 percent of respondents replied 'don't know' or refused to answer the question.

Figure 6.2 shows that the majority of respondents reported little or no change to overall business performance in the first half of 2003 when compared to the same period in 2002. Marginally more respondents saw a decrease in performance than saw growth, indicative of a relatively weak economic performance overall during the period in question.

Viewing the average change in sales by sector Figure 6.3 reveals the difference between the services sector, which grew by an average of 1 percent, and the retail, leisure and distribution sectors, which reported a decline of up to 3 percent (retail) in the same period.

Figure 6.3 Average business performance during the first half of 2003 by business sector



This is consistent with the broader economic picture across the UK in 2003, a relatively poor year for certain sectors balanced by a resurgent financial services industry. The magnitudes of the reported changes however are relatively small.

When asked what had influenced business performance over the period in question, a number of key factors were identified. General economic factors were cited in 46 percent of responses, with tourism trends representing a further 10 percent, seasonal factors 15 percent and the congestion charge receiving a mention in 12 percent of responses.

Comparing the responses to the question across the six sectors once again reveals a significant difference in perception across sectors. Figure 6.4 below illustrates the differences when comparing retail responses to those in the services sector.

Figure 6.4 Perceived influences on business performance in the retail sector

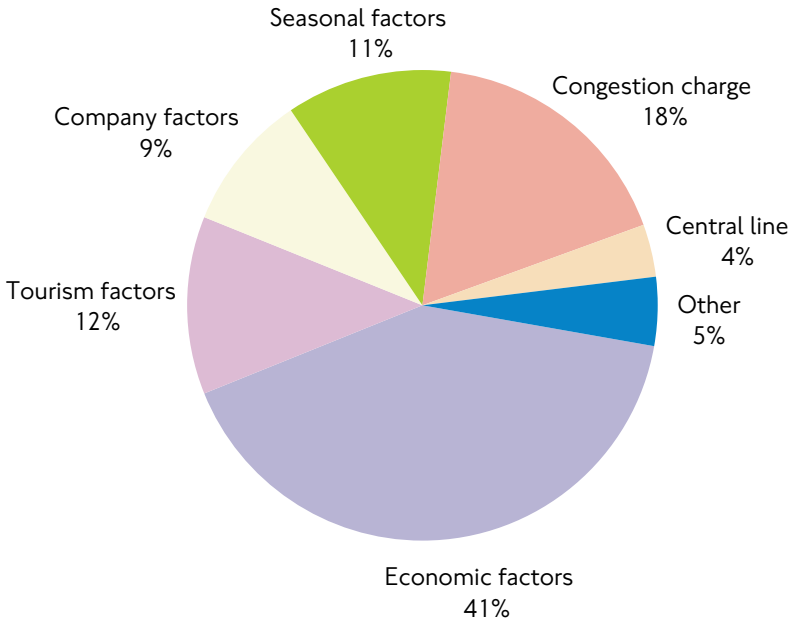
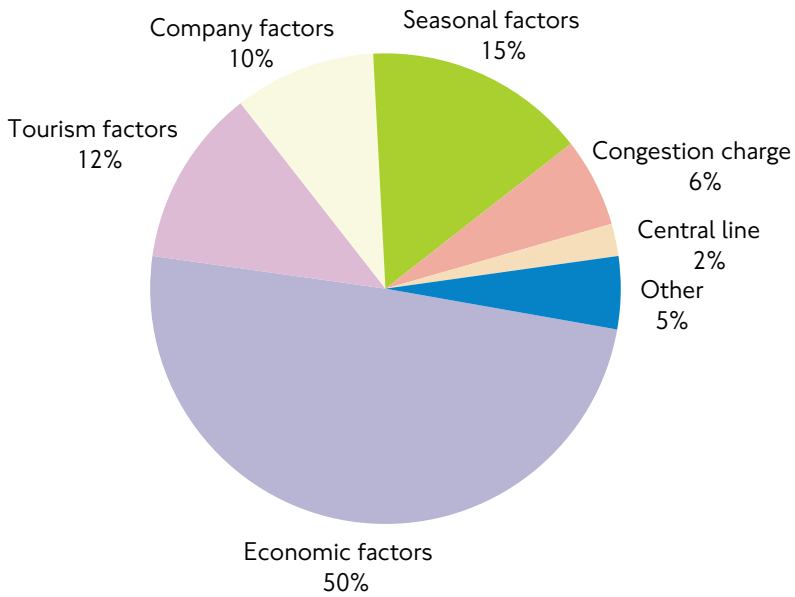


Figure 6.5 Perceived influences on business performance in the service sector

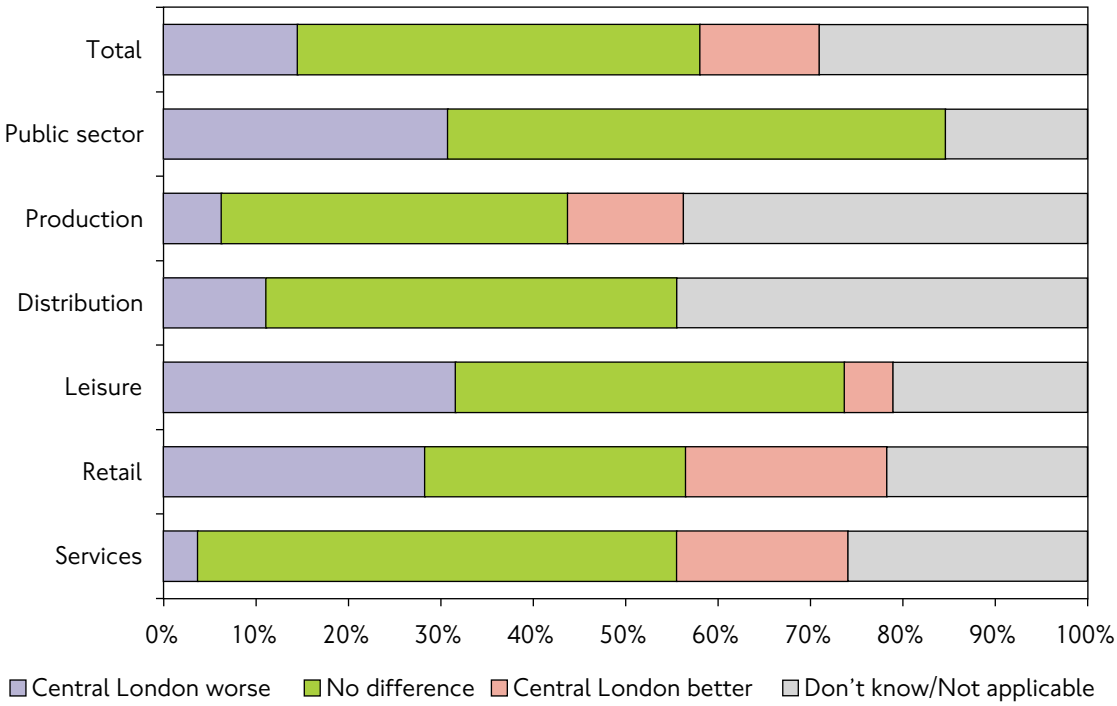


Given the relative performances of the sectors in question, Figures 6.4 and 6.5 reveal a different attitude towards congestion charging. Most influences are viewed consistently across the two sectors, the only real differences being congestion charging and economic factors. Eighteen percent of retailers regarded congestion charging as an influence on their businesses that have, on average, declined by 3 percent over the period concerned.

With services, 6 percent of respondents cite the congestion charge as an influence on their business while the sector has, on average, experienced growth over the period in question. In contrast, economic factors were cited by 41 percent of retailers, compared to 50 percent of service firms.

In contrast to some external indicators, the business surveys suggest that the overall performance of the London economy has been similar to that of the UK as a whole. Roughly equal proportions of respondents reported London performing better and worse than the rest of the UK (13 percent and 15 percent respectively, see Figure 6.6.)

Figure 6.6 Central London business performance compared to other UK locations



Once again the difference in performance between the retail/leisure sectors and the services sector is apparent, though it is more prevalent in the leisure sector. Since the retail sector reports performance both better and worse than the UK as a whole, it would suggest that retail performance over the early part of 2003 did not conform to a coherent pattern. This has implications for analysis of the effect of congestion charging on the retail sector as consensus and clarity will be harder to achieve.

Effects of congestion charging on company policy

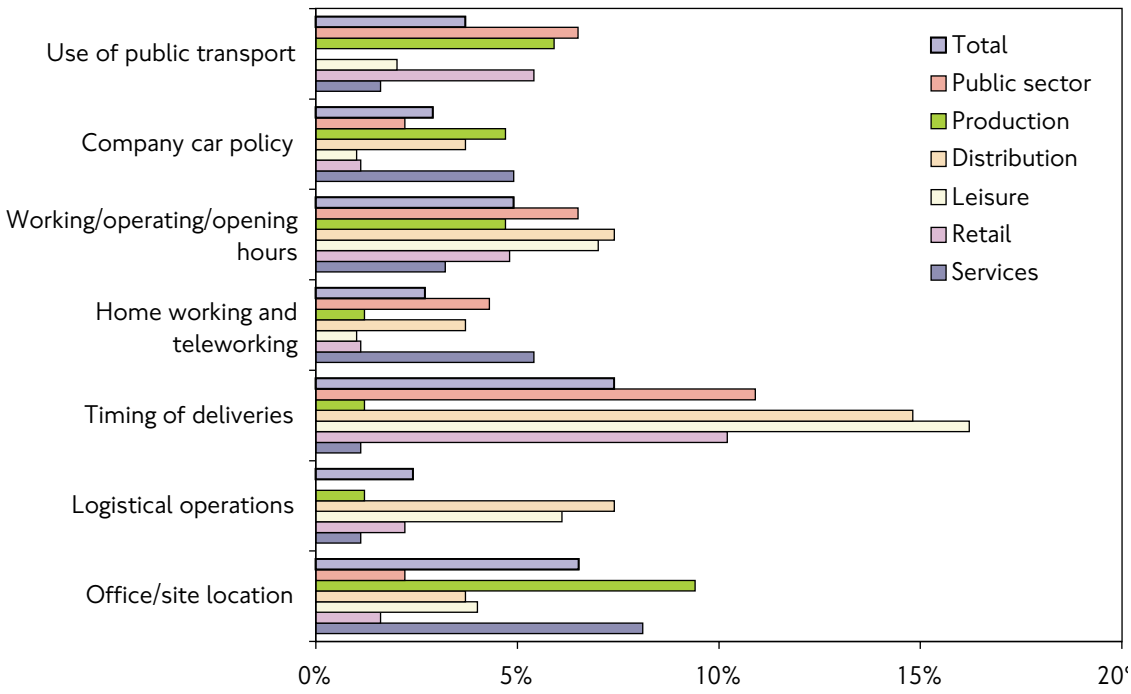
Businesses experiencing significant changes as a result of the congestion charge are likely to introduce or refine policies to cope with the new situation. Nevertheless, it is clear from the Figure 6.7 that in almost all cases, only a very small percentage of respondents have felt it necessary to make changes to the way they operate.

Businesses were asked whether they had 'changed or started the process of changing its policy or practices in any of the following areas in the last six months'. While not specifically linked to the congestion charge, the question would draw out changes influenced by the introduction of congestion charging.

Logically, the area having seen the highest degree of change is the timing of deliveries, either to avoid the congestion charge or to take advantage of the reduced congestion within the zone. This is particularly prevalent in the retail and distribution sectors, as would be expected.

Of equal interest are the very small numbers of respondents considering an office or site change. Only production and services exceed a 5 percent positive response, despite the concerns expressed elsewhere that the charge would drive businesses out of the charging zone.

Figure 6.7 Policy changes in response to congestion charging



Additional questioning regarding how long the respondent had been established in their current site indicates that the sample has a 'churn' rate of around 10 percent; that is 10 percent of businesses will leave the area they are currently located each year, to be replaced by a new business in most cases. This suggests the levels of location change implied by the policy change question are within the naturally occurring levels of business churn.

Figure 6.8 Effect of congestion charging on the cost of running the site/office

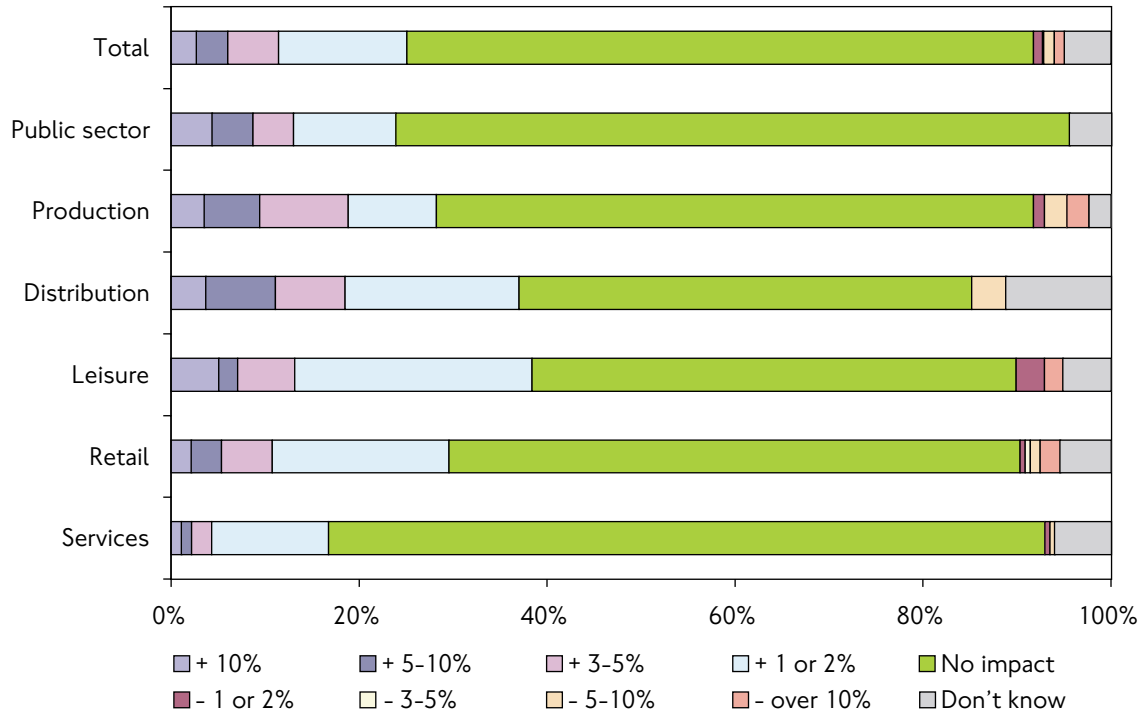
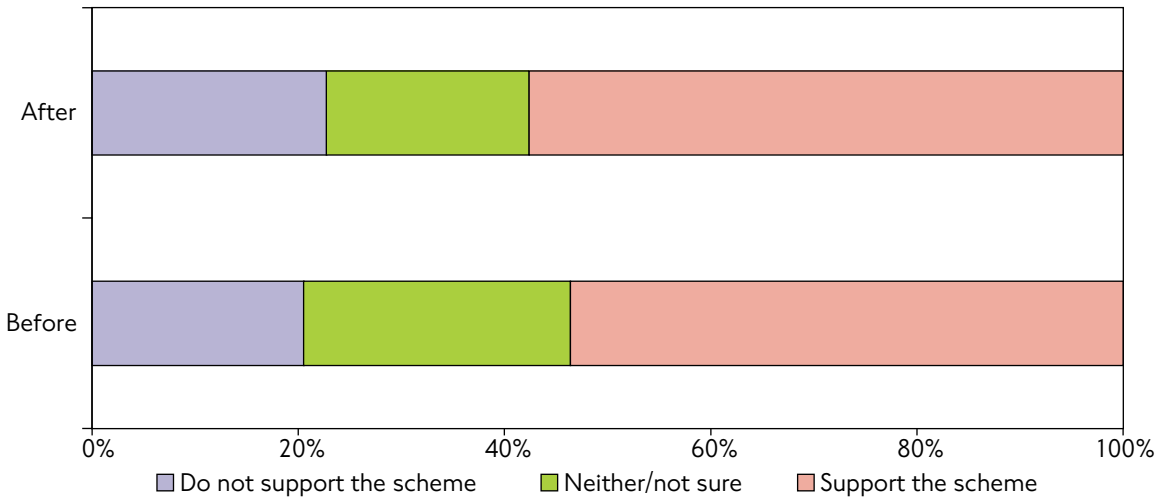


Figure 6.8 shows the majority of respondents view the congestion charge as having little or no effect on the cost of running their office/site.

Figure 6.9 indicates the change in overall attitudes towards the charge.

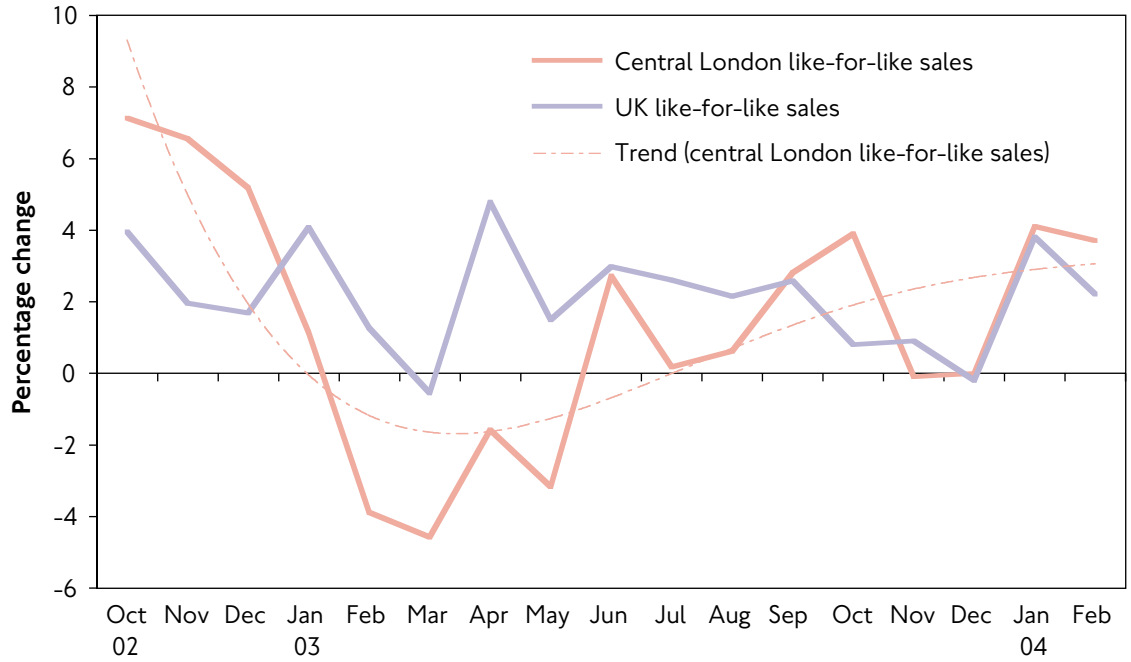
Overall, and based on the premise that congestion charging is accompanied by continued investment in public transport, support for the congestion charge has increased from 54 percent to 58 percent.

Figure 6.9 Support for congestion charging before and after the introduction of the scheme



6.4 Retail in the congestion charging zone

Figure 6.10 Percentage change in year-on-year retail sales value, 2002 to 2004



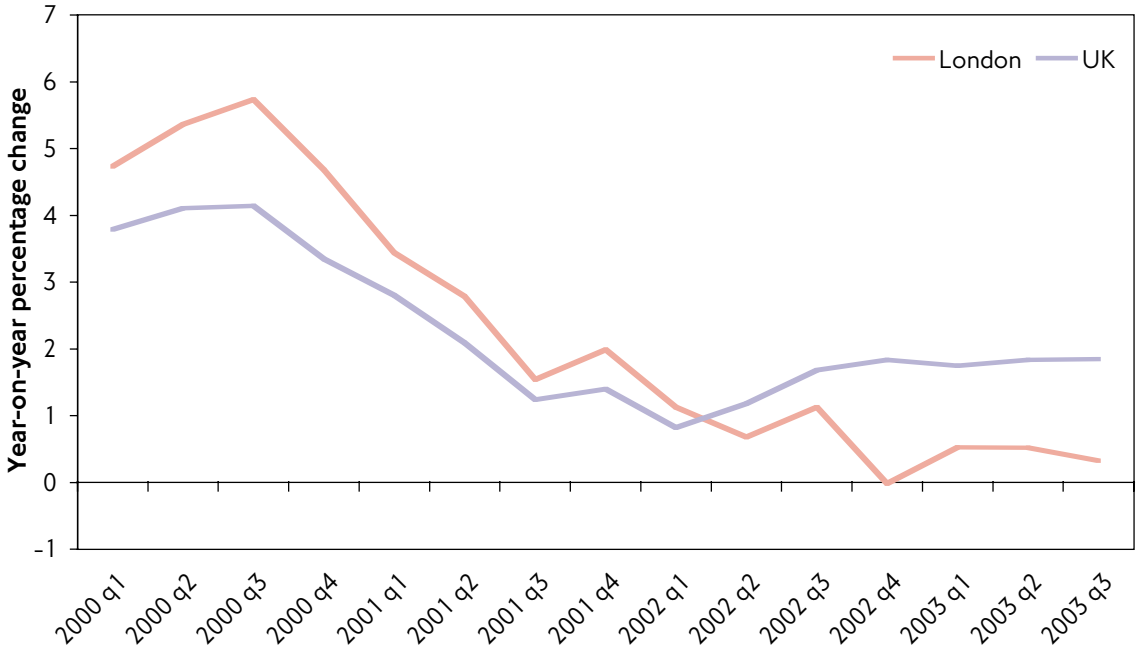
Source: LRC London Retail Sales Monitor, February 2003

It is evident from Figure 6.10 that:

- trends in central London were different to those of the UK as a whole, which showed a stable, if relatively sluggish growth trend
- the decline in central London retail sales growth appears to have started in quarter 4 2002, before the introduction of charging
- data for recent months suggests that retail growth in central London has now re-converged with the UK as a whole, despite the continued operation of congestion charging.

A relative under-performance in retail sales in central London is consistent with the overall economic performance of London during the period under consideration. As Figure 6.11 shows, total economic growth in London fell below the UK average in early 2002 and remained there through 2003. Annual percentage change in Gross Value Add (GVA) is approximately half a percent for much of 2003, well below the UK value of nearly 2 percent.

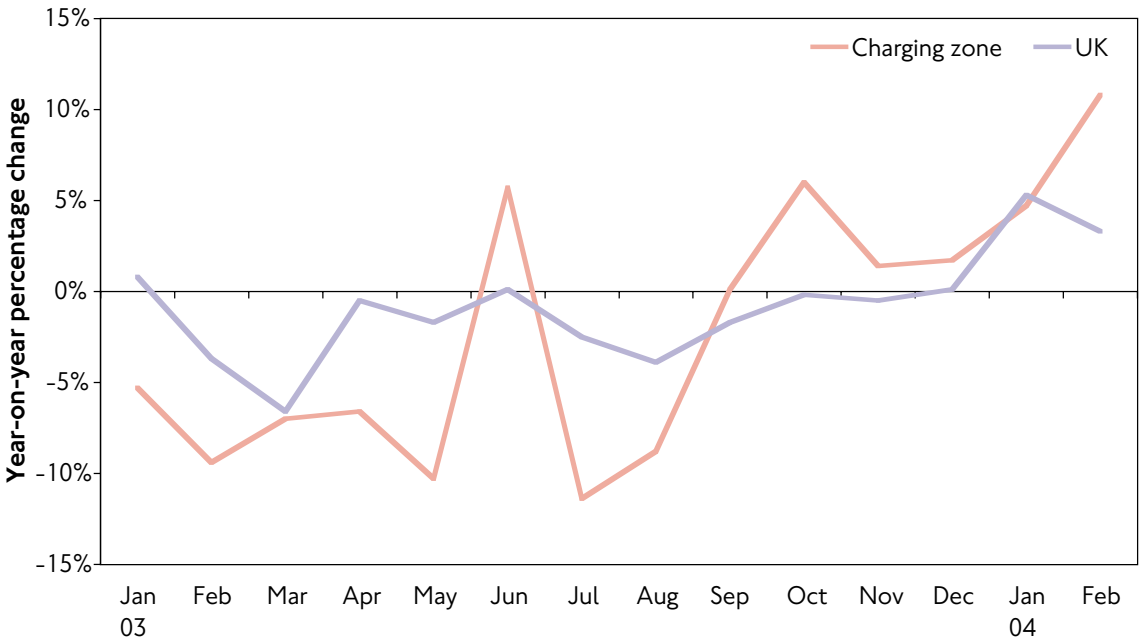
Figure 6.11 UK and London GVA growth 2000-2003



Source: Experian Business Strategies

According to the SPSL Retail Traffic Index for the charging zone (see Figure 6.12), retail performance within the charging zone was well below that of the rest of the UK from before the introduction of charging and for much of 2003. The latter half of the year however saw the charging zone outperforming the rest of the UK and returning to a pattern of year-on-year growth. Indeed, the SPSL index indicates that retail activity has reached the levels previously seen in 2002.

Figure 6.12 SPSL Retail Trade Index – charging zone against rest of UK

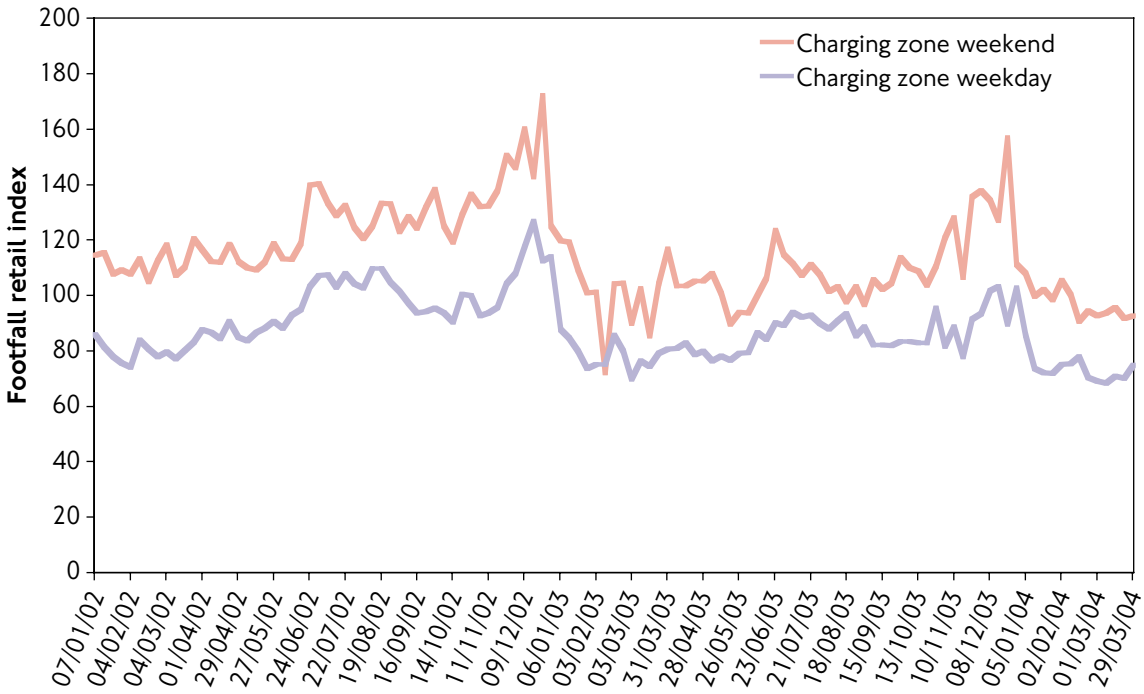


Source: SPSL Retail Trade Index. The index remains provisional until confirmation of sample representation

In contrast, the Footfall index for the congestion charging zone[1] shows 2003 retail activity to be below that seen in 2002 for almost the entire year and does not show the same growth during the last quarter of 2003 as exhibited by the RSM or SPSL indices.

Footfall data can be further broken down to illustrate the relative performance of the congestion charging zone during the week and at weekends. Figure 6.13 below shows separate indices for weekday and weekend performance for the zone. As can be seen, both indices exhibit the same general behaviour over an extended period of time and from well before the introduction of congestion charging.

Figure 6.13 Footfall London congestion charging zone index, weekends and weekdays



Source: Footfall London Congestion Charging Zone Index, April 2003

The comparable performance of the two indices suggests that factors affecting the retail performance of the congestion charging zone apply equally to weekdays and weekends. Since the congestion charge does not apply at the weekend, the Footfall indices appear to demonstrate that congestion charging has had minimal effect on retail performance and that other factors apart from charging are primarily responsible.

In addition, Chapter 3 reveals no significant changes to traffic patterns at weekends that might be attributable to congestion charging, again suggesting that retail performance and road traffic levels in central London are not strongly interrelated.

Further information on shoppers is available from a TfL survey undertaken at the start of 2004. This looked at the characteristics of shoppers in the Oxford Street and Regent Street area of central London, as well as locations outside of the charging zone. The survey focused on the nature of shopping in the context of people's other daily activities, such as work.

[1] Source: London Congestion Zone Footfall Index 26/01/04

Insights from this survey again confirm that congestion charging is unlikely to have had a significant adverse effect on retail in central London. For example:

- Around one-half of the people in Oxford Street and Regent Street are visitors, i.e. non London residents. Up to one-third are UK or overseas tourists, illustrating the importance of visitors to retail performance in these locations;
- Only 40 percent of people in Oxford Street and Regent Street are there *primarily* for shopping. About 45 percent are there for shopping as a *secondary* purpose, for example in conjunction with work (about one-quarter of all people);
- Public transport dominated access to central London. Only three percent of people (Oxford Street) or 8 percent (Regent Street) used car as their main mode of access. Around one-fifth of people in both locations walked all the way from their previous activity (e.g. work);
- The average shopping spend by car users in central London was only around 20 percent higher than those who used other modes. In addition, if car-borne shoppers were less likely to shop in central London, this would be expected to primarily affect those intending to spend less.

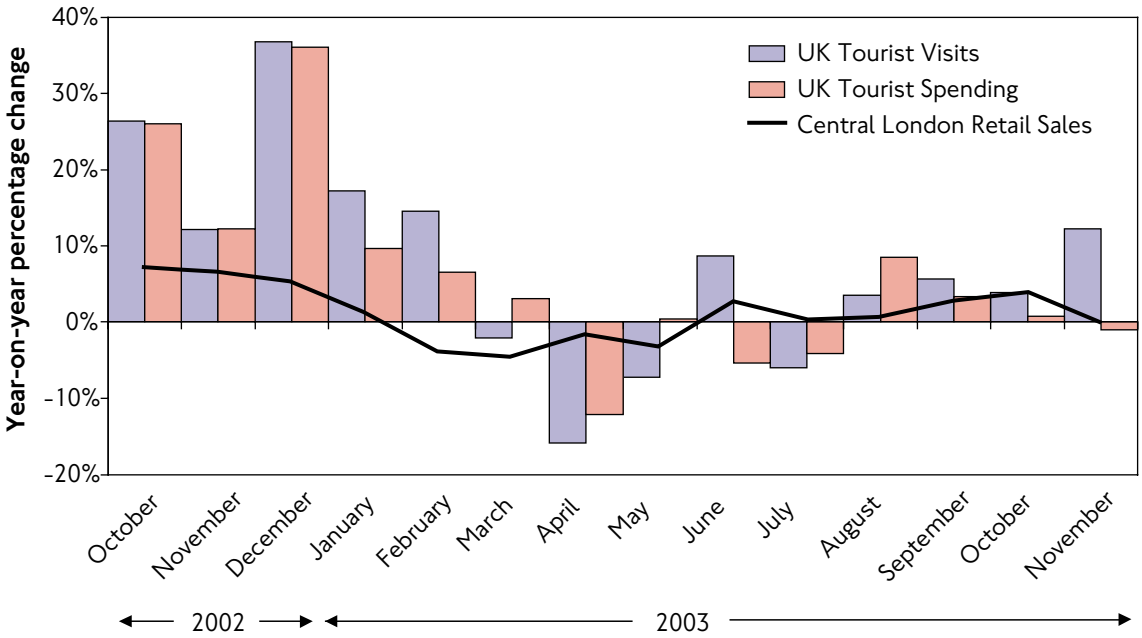
Assessment

The weak performance of the retail sector in the first half of 2003 can be attributed to a number of factors, notably the Central line closure, the Iraq war and the associated increase in the threat of terrorism, the most noticeable effect of which was a reduction in overseas tourists.

Visit Britain estimates that up to 26 percent of total spending by overseas visitors to the UK is retail expenditure. Office of National Statistics data reports that overseas visitors' spending was down by £100 million in the second quarter of 2003 compared to 2002. When coupled with the likely deterrence of domestic tourists due to similar concerns, it is apparent that a significant value of retail expenditure, perhaps 5 percent of sales over this period, was absent from central London during quarter two, 2003.

The nature of this effect can be illustrated by overlaying the central London retail data with UK wide tourist information (Figure 6.14). While the relationship is not directly causal, much of UK tourism activity is focused on central London and central London retailers rely heavily on tourism expenditure. Other data shows that higher-spending North American visitors dipped substantially further than overall visitor numbers and have taken longer to recover.

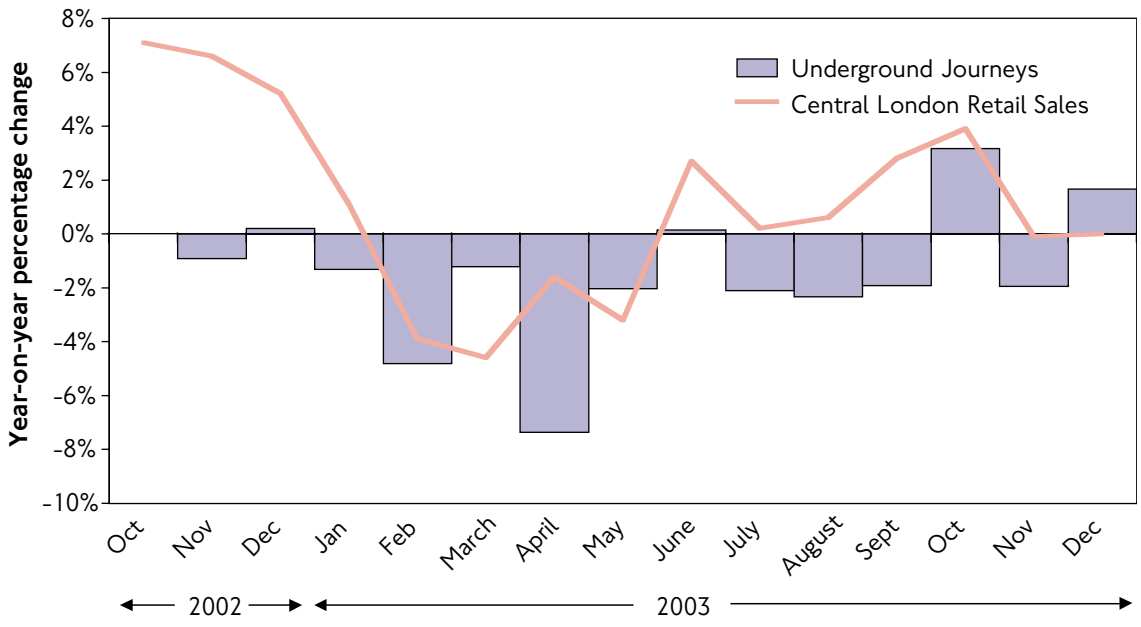
Figure 6.14 Retail sales in central London against tourist visits and tourist spending in the UK



Source: ONS, LRC Retail Sales Monitor

Travel behaviour through 2003 has been discussed extensively elsewhere in this report, but Figure 6.15 below is revealing in demonstrating the clearer nature of the relationship between the decline in Underground travel and the performance of the retail sector.

Figure 6.15 Underground journeys against central London retail sales



Source: TfL Revenue Report, LRC London Retail Sales Monitor

This chart superimposes the Retail Sales Monitor sales index over year-on-year network wide patronage growth. The large decline in Underground travel through the Spring of 2003 (including the Central line closure) coincides with the period of negative sales growth.

This is not a direct relationship since a number of factors are at play; some of the reduction in travel will be due to the reduction in tourism identified earlier, other journeys will have been transferred to alternative means of transport (including buses) and will still be made.

While it remains impossible to precisely quantify the effect of congestion charging on retailers within the charging zone it is clear that the influences outlined above are likely key factors for recent retail trends in central London and they are – for all practical purposes – independent of congestion charging.

External influences

On the domestic front, retailers faced other pressures throughout 2003. An unusually warm Summer kept shoppers of all kinds from the stores, while an exceedingly wet November may be, in part, to blame for the poor performance that month.

The retail sector also faces a number of structural changes, the effects of which have become increasingly apparent over the last 12 months. The continued rise of out-of-town shopping venues, such as Bluewater to the south east of London, has impacted high street retailers across the UK. Furthermore, new prestige locations outside London have enhanced the appeal of regional shopping centres in comparison to London.

Also increasing in importance is 'e-tailing' or internet shopping. Expenditure via these non-traditional outlets has increased in recent years as the market matures. The Interactive Media In Retailing Group quote an annual growth rate of 70 percent across 80 retailers surveyed and a monthly spend of around £1.3 billion nationally (December 2003), representing about 7 percent of all retail sales. While the proportion of retail expenditure via these channels is still small, the impact on traditional retailers is not insignificant, particularly where longer journeys might previously have been made to source items not available locally.

2003 was undoubtedly a tough year for retailers nationally and in central London but external factors independent of the introduction of congestion charging were predominant in driving retail performance through this period within the charging zone.

6.5 Congestion charging and economic impacts: A TfL assessment

Previous chapters of this report have assessed the behavioural change caused by the introduction of congestion charging and the net effect on travel into the charging zone. Of some 65,000 to 70,000 daily car trips that are no longer being made, it has been estimated that only 5,000 individuals are no longer visiting the charging zone as a result of congestion charging, with the majority of ex-car trips having been switched to public transport.

A reduction of 5,000 individuals in the central London daily population of more than 1.5 million people is negligible.

6.6 Cost-benefit analysis of congestion charging in central London

Reduced traffic delays, improved journey time reliability, reduced waiting time at bus stops, lower fuel consumption, less pollution and accidents and a more pleasant environment all have an economic value. These, and other, benefits need to be set against the costs of operating and complying with the scheme, to arrive at an assessment of the overall costs and benefits of congestion charging.

In *Congestion Charging: Six Months On,* TfL presented the following preliminary assessment of costs and benefits of congestion charging. This yields an annual net benefit of around £50 million.

Table 6.1 Preliminary estimates of quantifiable costs and benefits of the central London congestion charging scheme (£ million per year, rounded)

Annual Costs	
TfL administrative and other costs	5
Scheme operation	90
Additional bus costs	20
Chargepayer compliance costs (telephone calls etc.)	15
Total	**130**
Annual Benefits	
Time savings to car and taxi occupants, business use	75
Time savings to car and taxi occupants, private use	40
Time savings to commercial vehicle occupants	20
Time savings to bus passengers	20
Reliability benefits to car, taxi and commercial vehicle occupants	10
Reliability benefits to bus passengers	10
Vehicle fuel and operating savings	10
Accident savings	15
Disbenefit to car occupants transferring to public transport, etc.	-20
Total	**180**
Net annual benefit	**50**

The payment of charges is not included in this analysis, as in cost-benefit terms these are a 'transfer payment'.

Transport for London and GLA Economics will update this assessment in due course as more data becomes available.

7. Accidents, amenity and the environment

7.1 Introduction

This section first considers recent trends in road traffic accidents since the introduction of charging. It then looks at some key results from the on-street public space surveys describing how Londoners and others perceive the general amenity and environment of central London. Finally it examines the impacts of congestion charging on air quality and ambient noise.

The expected environmental impacts of congestion charging were outlined in the *First Annual Monitoring Report*. It was considered that the effects on air quality and noise arising directly from congestion charging would be relatively small. Methodologies for tracking these effects were described, potential difficulties explained, and conditions applying before charging summarised.

7.2 Key findings

- The recent trend of overall year-on-year decreases in road traffic accidents seen across London is to be continuing. There is no evidence of disproportionate changes to the numbers of accidents involving two-wheeled vehicles, and there is some evidence of an accelerated decline in accidents inside the charging zone;
- Surveys of Londoners 'on-street' in and around the charging zone suggest that the beneficial effects of congestion charging and other initiatives on environmental quality are being recognised. However, the relationships between these 'perceptual' indicators and the more 'scientific' evidence is not clear-cut;
- By reducing the overall volumes of traffic within the charging zone, and increasing the efficiency with which it circulates, congestion charging has been directly responsible for reductions of approximately 12 percent in emissions of NO_x and PM_{10} from road traffic within the zone (24-hour annual average day);
- Traffic changes on the Inner Ring Road are estimated to have resulted in very small changes to emissions of NO_x and PM_{10} from road traffic, of less than plus/minus 2 percent respectively. Both here and in the charging zone, beneficial changes to the emissions performance of the vehicle fleet between 2002 and 2003 provide additional 'background' benefits;
- Measurements of actual air quality across London strongly reflect the statistically-unusual weather patterns that prevailed for much of 2003, overwhelming any smaller-scale effects that might have been caused by congestion charging. It is therefore not possible to identify 'congestion charging' effects in the available dataset, either for the charging zone or the Inner Ring Road;

- Traffic changes resulting from charging are estimated to have led to savings of 19 percent in traffic-related emissions of CO_2 and 20 percent in fuel consumed by road transport within the charging zone (24-hour annual average day);
- There is no evidence from sample noise measurements in and around the zone of significant changes in the ambient noise climate.

7.3 Accidents

It was estimated that congestion charging would result in between 150 and 250 fewer reported accidents, involving injury, per year within Greater London. As the scheme was implemented in February 2003 the lag in receiving finalised data means that a full analysis of a year's data will not be possible until around Autumn 2004.

Currently TfL has data up to October 2003 that can be used to identify changes for the 8 month period March to October in and around the charging zone as well as in the rest of Greater London.

Accidents involving personal injury

Table 7.1 indicates that, in the majority of time periods across London, the year-on-year decrease in injury accidents reported to the Police has continued in the months since charging was introduced. Within the charging zone during charging hours the decrease is proportionally greater than elsewhere in London.

Table 7.1 Total reported personal injury road traffic accidents between March and October, 2001 to 2003

		Charging Zone	Inner Ring Road	Rest of London	Total
Mar-Oct 01	**Weekdays 0700-1900**	**1,137**	**376**	**12,490**	**14,003**
	Weekdays 0000-0700;1900-2400	310	142	4,173	4,625
	Weekends all day	340	132	5,489	5,961
	Total	1,787	650	22,152	24,589
Mar-Oct 02	**Weekdays 0700-1900**	**1,020**	**305**	**11,632**	**12,957**
	Weekdays 0000-0700;1900-2400	280	119	4,059	4,458
	Weekends all day	293	136	5,131	5,560
	Total	1,593	560	20,822	22,975
Mar-Oct 03	**Weekdays 0700-1900**	**854**	**308**	**11,106**	**12,268**
	Weekdays 0000-0700;1900-2400	258	110	3,515	3,883
	Weekends all day	275	123	4,641	5,039
	Total	1,387	541	19,262	21,190

Severity of injuries

Table 7.2 shows that in the 8 months since charging was introduced there were three fatal accidents within the zone during charging hours. This is less than during the same time period the two previous years. The reduction in serious and slight injuries through accidents since charging is again greater than the previous year.

Table 7.2 Reported personal injury road traffic accidents within the charging zone between March and October, 0700 to 1900, 2001 to 2003

	Fatal	Serious	Slight
Mar-Oct 01	5	139	993
Mar-Oct 02	5	137	878
Mar-Oct 03	3	116	735

Pedestrian and non-pedestrian involvement

Table 7.3 suggests that charging has had no impact on the relative proportions of pedestrians or vehicles in accidents involving injury. Although the number of accidents has generally been decreasing there is no material change to the proportions of pedestrians injured.

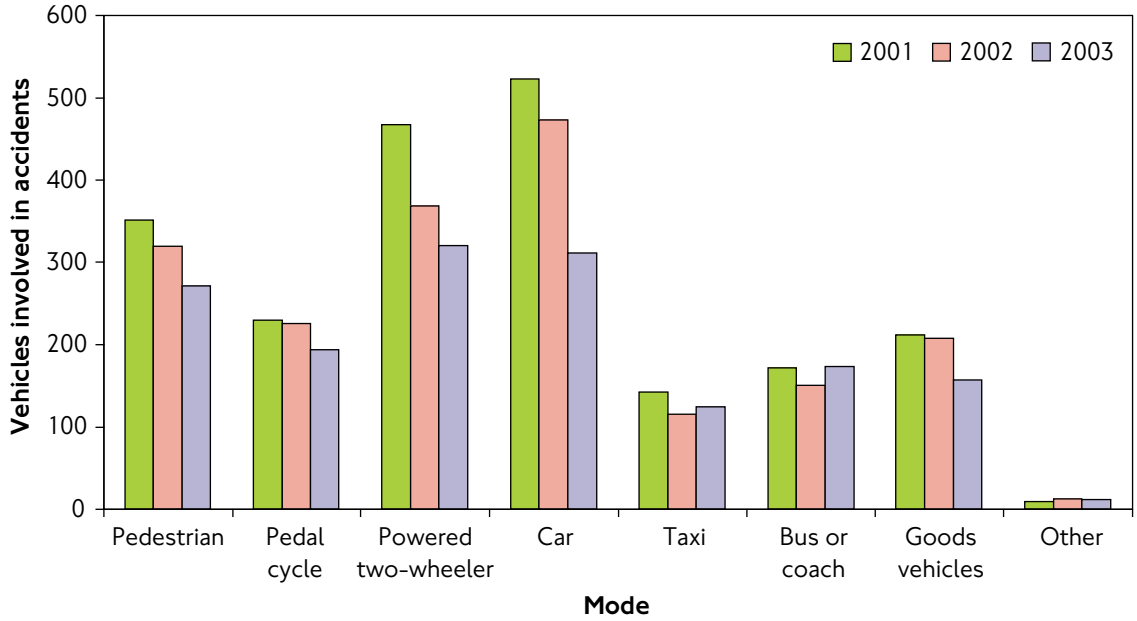
Table 7.3 Accidents involving personal injury between March and October, 0700 to 1900, 2001 to 2003.

	Charging Zone		Inner Ring Road		Rest of London	
	Pedestrian	Non-pedestrian	Pedestrian	Non-pedestrian	Pedestrian	Non-pedestrian
Mar-Oct 01	351 (31%)	786 (69%)	77 (20%)	299 (80%)	2683 (21%)	9807 (79%)
Mar-Oct 02	319 (31%)	701 (69%)	51 (17%)	254 (83%)	2536 (22%)	9096 (78%)
Mar-Oct 03	271 (32%)	583 (68%)	63 (20%)	245 (80%)	2338 (21%)	8768 (79%)

Accident involvement

The types of vehicles involved in accidents reported to the Police is illustrated in Figure 7.1. This is not the same as the number of incidents, as duplication occurs where more than category of road user are involved. As might have been expected with the reduction in the number of cars within the zone there has been a reduction in the number of cars involved in accidents. However, there is also a decrease in the number of two-wheelers involved in accidents despite the increase in their movements within the zone.

Figure 7.1 Accident involvement by vehicle type within the charging zone, 0700 to 1900, March to October, 2001 to 2003



Although it is too early to fully understand the impact of charging on accidents in London, the data that are available show a continuing decrease within the zone and in London overall.

It is worth noting that despite concerns that there could be increases in the involvement of powered two-wheelers due to greater numbers of these vehicles, this has not materialised. Neither has an increase in fatalities or serious injuries due to increased average network traffic speeds.

7.4 Quality of the central London environment

By reducing the amount of traffic in and around the charging zone, congestion charging was expected to contribute to improving the general environmental amenity in the zone. This cannot be measured objectively, but perceptual surveys of individual Londoners 'on the street' can provide a range of feedback through which these effects can be assessed.

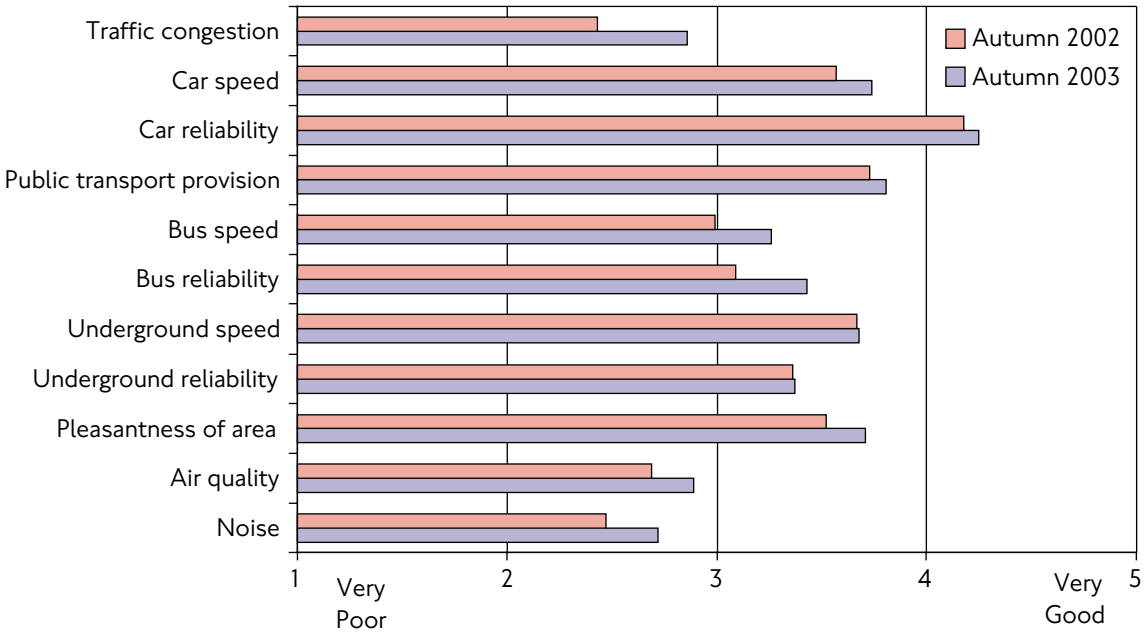
This section looks at some results from two large-scale interview surveys of Londoners conducted at various shopping, tourist, leisure and business locations in and around the charging zone (see *First Annual Monitoring Report*). Surveys were conducted during the Autumn of 2002 and 2003 and included a variety of questions, several of which relate to perceived environmental amenity. Other areas covered by these surveys included:

- Indicative measures of pedestrian activity;
- Access to location;
- Activity at location (e.g. spend);
- Quality of transport;
- Perceived effects of congestion charging.

7.5 Perceived environmental quality

Part of the on street survey asked respondents to 'score', on a scale of 1 (very poor) to 5 (very good), a range of attributes relating to transport and the quality of the local environment at the survey location. Figure 7.2 shows an example of the results from this comparison, showing in this case small but consistent improvement in mean scores for a range of transport and environmental indicators aggregated across all survey locations.

Figure 7.2 Mean ratings for a range of transport and environmental indicators for sites inside the charging zone. Autumn 2002 compared to Autumn 2003



7.6 Perceptions of air quality and noise

Respondents were also asked to rate a number of specific environmental attributes in relation to the location at which they were surveyed. Alongside attributes such as public transport provision and amount of traffic, specific scores of 1 (very poor) to 5 (very good) were sought for air quality and noise. These are summarised in Figures 7.3 and 7.4. These figures show that for all locations the mean ratings for the perception of air quality and noise in the area improved after the introduction of congestion charging, although this was not mentioned to respondents beforehand as a possible factor.

Figure 7.3 Mean ratings of air quality by type of site. Autumn 2002 compared to Autumn 2003

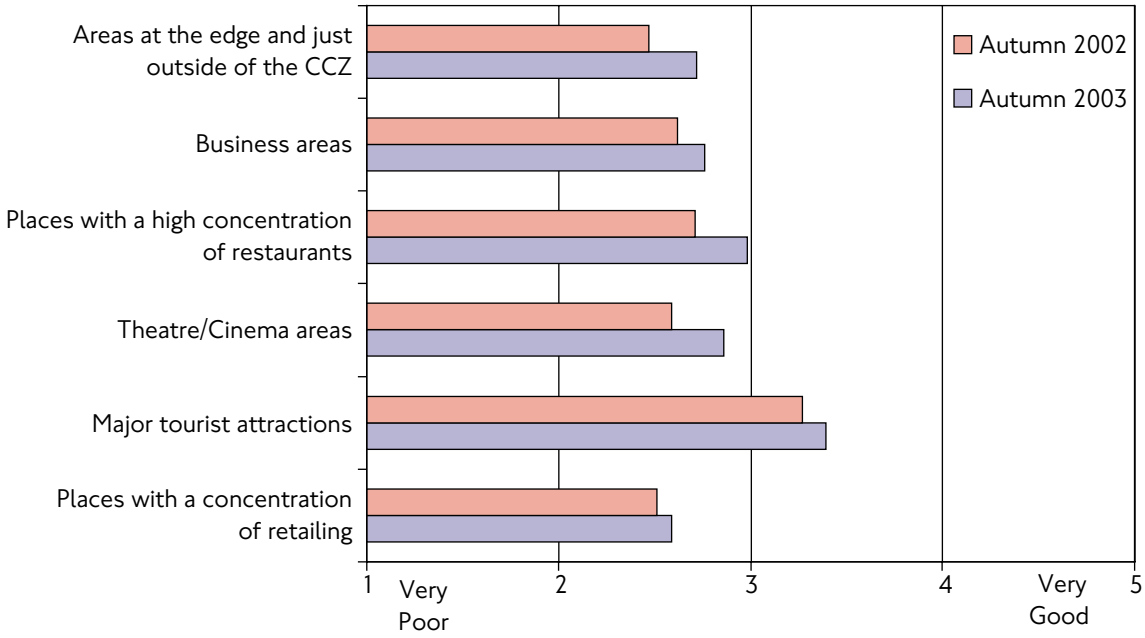
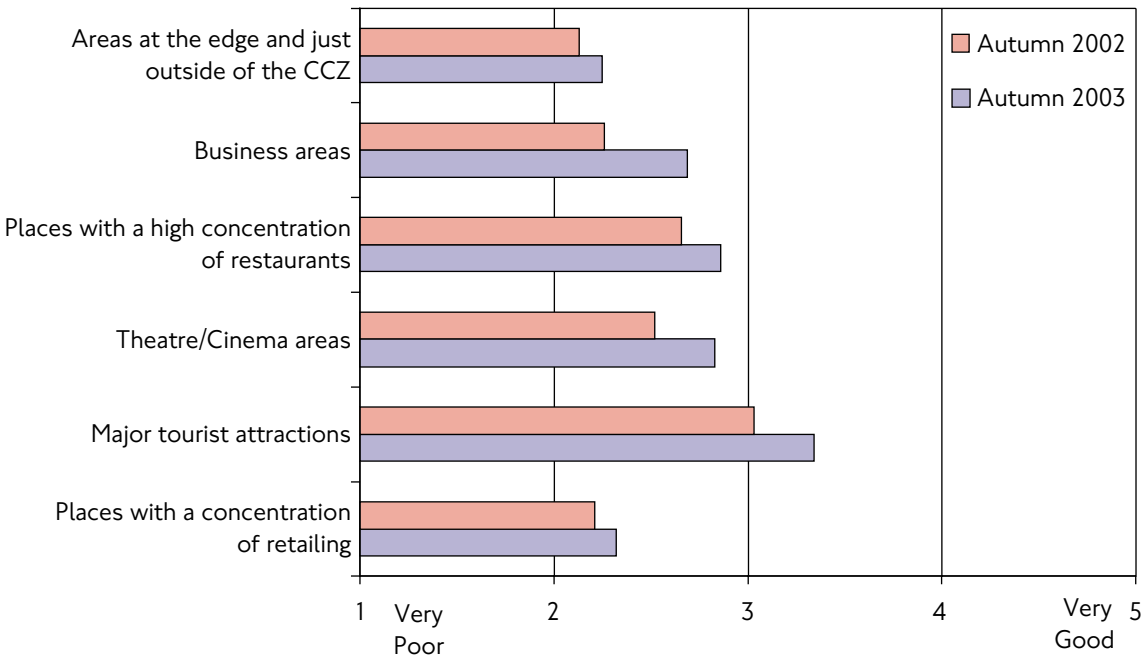


Figure 7.4 Mean ratings of noise by type of site. Autumn 2002 compared to Autumn 2003



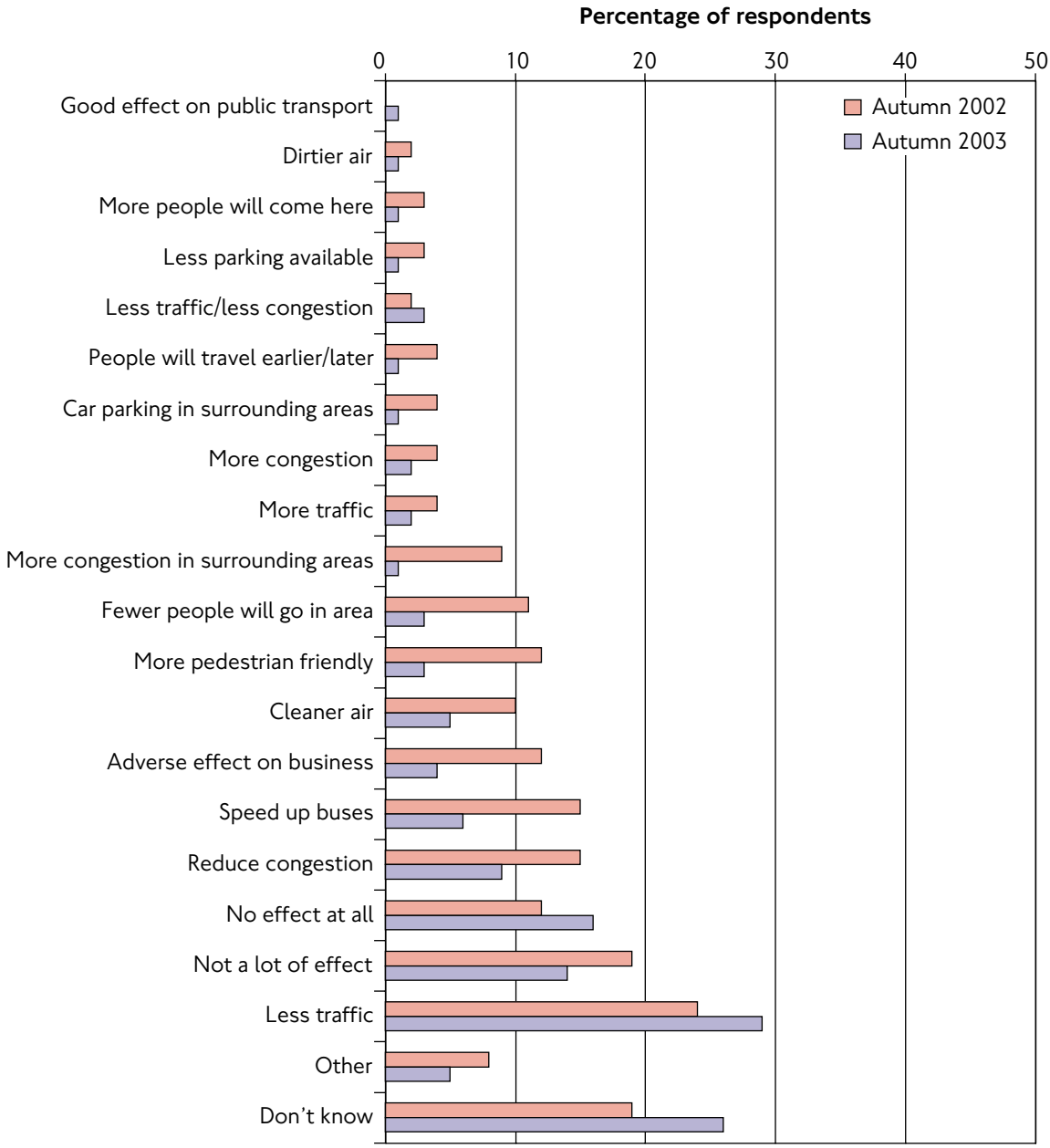
The evidence from direct measurements of air quality and noise described below do not, at first sight, accord very closely with these findings. This is interesting, but not entirely unexpected. For example, people's perception of air quality may be based more on numbers of slow-moving vehicles in their immediate vicinity than, for example, actual prevailing particulate levels. For noise, it is possible that smoother traffic flow alters the noise climate by reducing the incidence of (more annoying) peaks, such as from braking and accelerating, associated with congested stop-start traffic conditions.

7.7 Impact of congestion charging on the locality

In the interview prior to the introduction of charging respondents across the survey locations were invited to comment on the ways in which they expected congestion charging to affect the area (responses were unprompted). In the Autumn 2003 survey following the introduction of charging, respondents were asked how they thought congestion charging had affected the area they were in. Responses (an average of two items per respondent) were coded against a range of possible effects.

Figure 7.5 shows the comparison between how respondents perceived congestion charging would affect the area and how respondents think it has affected the area. Note that this was not a 'panel' survey, and groups of different, but statistically-equivalent individuals were interviewed in each survey.

Figure 7.5 Expected impact of congestion charging on area compared with perceived impact of charging. Autumn 2002 compared to Autumn 2003



As might be expected, these results show a fairly mixed picture. One generalisation that can be made is that the percentage of respondents reporting 'negative' effects was less in the 2003 surveys compared with those who expected potentially negative effects in 2002, before charging.

7.8 Air quality

Congestion charging has changed the volumes and patterns of traffic in and around the charging zone. The main changes have been described in Chapter 3. The key effects during weekday charging hours can be summarised:

- Reduced volumes of traffic within the charging zone moving faster and more efficiently;
- Relatively small traffic impacts on the Inner Ring Road and more widely outside of the charging zone;
- Changes to the composition of traffic, with fewer cars, vans and lorries and more buses, taxis and two-wheelers.

These changes may be expected to affect air quality in the following ways:

- Reduced volume of traffic means that less fuel will be consumed and less polluting emissions produced;
- Faster vehicle speeds and reduced congestion means that the (reduced) volumes of traffic is moving around more efficiently, generating less emissions per unit distance travelled;
- Different vehicle types produce different levels of emissions per unit distance travelled. This means that the impact of changes to cars will be smaller, in relative terms, as compared to equivalent changes in heavier vehicles such as buses and lorries.

As well as these direct effects, changes brought about by charging happen against a backdrop of changes to all other factors affecting air quality. Key examples are:

- Improvements to vehicle technologies and emission/fuel standards that impact as the vehicle fleet is progressively renewed over time; this particularly affects the bus fleet;
- The weather, which can significantly affect the way in which primary emissions from road traffic are 'translated' into air pollution that is measured at air quality monitoring sites;
- Changes to emissions from other sources, for example domestic and commercial heating, both within London and further afield.

The relationship between traffic changes and air quality is therefore not a direct one. It is quite possible, for example, for beneficial changes in emissions to be 'masked' by weather patterns that are particularly conducive to the build-up of pollution or 'importing' pollution from elsewhere, creating temporary 'episodes' or longer-term elevated levels. The problem of detection is further compounded by the fact that congestion charging operates for only about one-third of the hours in the one year. Therefore, the attributable impact of congestion charging on air quality objectives that are framed in terms of running annual means or 'exceedence days' will be further diluted.

To deal with this complexity, a three-stage approach has been adopted.

The first stage is to calculate the impact of charging on vehicle emissions. This takes the observed traffic changes in and around the charging zone, and calculates the changes to emissions in terms of the changing volumes of the main vehicle types and the changing speed profile of the traffic. These calculations take account of aggregate changes to vehicle technologies over the comparison period. Alongside this, parallel calculations look at changes to other quantifiable sources of local emissions, resulting in maps describing changes to emissions that can be disaggregated at various geographic scales. It is therefore possible to quantify aggregate changes to emissions, and to attribute components of the aggregate change to specific causes.

This then provides input data for air quality computer models, which simulate the dispersion and chemical transformation of emissions in the atmosphere. These provide, as output, and according to assumptions about meteorology, 'contour maps' describing pollutant concentrations in terms of the relevant air quality objectives (e.g. annual average concentrations). These can be compared against actual measurements obtained from air quality monitoring sites across London. In this way, progress towards meeting national air quality objectives can be assessed.

Finally, the monitored data itself provides a continuous record of 'actual' air quality experienced by individuals in different locations. For this reason it is often used as the first point of reference for air quality impacts. However, the aggregate change at these sites reflects a combination of many factors, and will not necessarily be a good indicator of changes brought about by any one intervention such as congestion charging. Nor does it readily characterise the overall pollution experienced by an individual who lives in, say, inner London and who works in central London.

The following sections summarise some provisional results from two of these three strands of work in relation to the two pollutants of most interest in London, fine particulate matter (PM_{10}) and nitrogen dioxide (NO_2) with its precursor NO_x (oxides of nitrogen). The present analysis is confined to the charging zone and Inner Ring Road, as the London Atmospheric Emissions Inventory has not yet been updated in respect of changes to emissions in inner and outer London.

7.9 Emissions

This preliminary assessment of emissions changes is based on observed changes to traffic following the introduction of congestion charging in the charging zone and boundary route (Inner Ring Road). The updating cycle for the London Atmospheric Emissions Inventory (on which this analysis is based) is not yet complete in respect of emissions from non-traffic sources, and for areas outside the charging zone.

An incremental approach has been used to identify changes separately attributable to each of the three main influences: changes to traffic flow, changes to speeds and changes to the vehicle stock (reflecting 'turnover' in the vehicle fleet and concomitant improvements to the emissions performance of vehicles). The following four scenarios have therefore been generated (Table 7.4):

Table 7.4 Emissions scenarios

Case	Flows	Speeds	Vehicle stock
Pre-charging	2002	2002	2002
Intermediate 1	2003	2002	2002
Intermediate 2	2003	2003	2002
Post-charging	2003	2003	2003

*Between 2002 (pre-charging) and 2003 (post-charging), total primary emissions of nitrogen oxides in the charging zone from road traffic fell from 810 to 680 tonnes/annum, a total reduction of 16 percent (24-hour annual average day). The equivalent figures for PM_{10} were 47 and 40 tonnes/annum, also a reduction of 16 percent.

*On the Inner Ring Road between 2002 and 2003, total primary emissions of nitrogen oxides from road traffic fell by 4 percent (from 400 to 383 tonnes). For PM_{10} the equivalent figure was a 7 percent decrease (from 22.4 to 20.8 tonnes).

These changes are net effects. It is estimated that traffic changes brought about by charging are responsible for about 75 percent of the reductions in the charging zone for both NO_x and PM_{10}. The remaining 25 percent arises from changes to the vehicle technology mix between 2002 and 2003; the extent to which these are 'relevant' to the charging zone of course being affected by the differential effects of charging on the various vehicle types.

On the Inner Ring Road the effect of vehicle technology changes is more pervasive. Removing these effects from the calculations shows that the traffic and speed changes between 2002 and 2003 results in a small overall increase in emissions of NO_x of 1.5 percent, and a small decrease in emissions of PM_{10} of 1.4 percent.

*Note the absolute emissions values have been revised from the previous version (corrected 28 July 2004). Percentage changes remain unaffected.

Table 7.5 uses each of the scenarios described in Table 7.4, and 'steps through' the main effects, quantifying their contribution to the overall change.

Table 7.5 Principal changes to traffic and their effect on total primary traffic emissions of NO_x and PM_{10}

Percentage change in relation to pre-charging base (100%)	Charging zone NO_x	Charging zone PM_{10}	Inner Ring Road NO_x	Inner Ring Road PM_{10}
Volume change – motorcycles	0	+1	0	+1
Volume change – taxis	+1	+3	0	0
Volume change – car	-6	-4	+1	+1
Volume change – bus and coach	+4	0	+3	0
Volume change – light goods	-1	-2	+1	+2
Volume change – rigid goods	-2	-1	+1	0
Volume change – articulated heavy goods	0	0	0	0
Speed changes (all vehicles)	-8	-9	-4	-5
Percentage change due to traffic and speed changes	**-12**	**-12**	**+2**	**-1**
Emissions factors (fleet turnover and technology mix)	-4	-4	-6	-5
Overall traffic emissions change	**-16**	**-16**	**-4**	**-7**

These changes are generally intuitive, bearing in mind that they reflect annual average conditions, rather than charging hours specifically. In addition, it is the case that increased emissions from increased numbers of some vehicle types are counterbalanced by decreases in emissions per vehicle because of the speed changes (within the speed ranges being considered, vehicles perform more efficiently at higher speeds).

This is particularly so for taxis and buses, although it is likely that limitations associated with the calculations have over-represented this effect for buses, as the extent to which they can 'gain' from increases in overall traffic speed is limited by scheduling considerations.

Gains arising from changes to vehicle technology and fleet renewal are to be expected, given the various statutory and voluntary initiatives that have been put in place as part of the *Air Quality Strategy for England, Wales and Northern Ireland*, and also the Mayor's Air Quality Strategy *Cleaning London's Air*. These are reflected in updated emissions factors and the overall effect is to reduce total emissions of both NO_x and PM_{10} by about 4-5 percent, in the absence of any changes to vehicle numbers or speeds.

7.10 Air quality models

These emission calculations relating to traffic changes in and around the charging zone will be incorporated in a wider update to the London Atmospheric Emissions Inventory, as part of the cycle outlined in the Mayor's Air Quality Strategy. This will be used in due course as a basis for model forecasts of air quality across London, in relation to the prevailing National Air Quality Objectives. As part of this process, this modelling will be made available to the London Boroughs to assist with their air quality management responsibilities.

7.11 Measured air quality

Data for the majority of air quality monitoring sites in London are available through the London Air Quality Network (LAQN). The *First Annual Monitoring Report* set out those sites that would be used for congestion charging purposes (the majority of which have a lengthy time-series of data describing pre-charging conditions), and presented trend data up to September 2002. Importantly, sites are grouped to reflect congestion charging geography ('indicator sites'), and sites well outside of the charging zone are included as 'control sites'. This is to allow the effect of changes to 'background' concentrations (e.g. secondary 'imported' pollution) to be assessed.

This section updates these trends with measured data spanning the introduction of charging up to September 2003 (note there is a relatively prolonged validation period for these data).

Figure 7.6 Recent trends in oxides of nitrogen (NO_x) concentrations at selected air quality monitoring sites

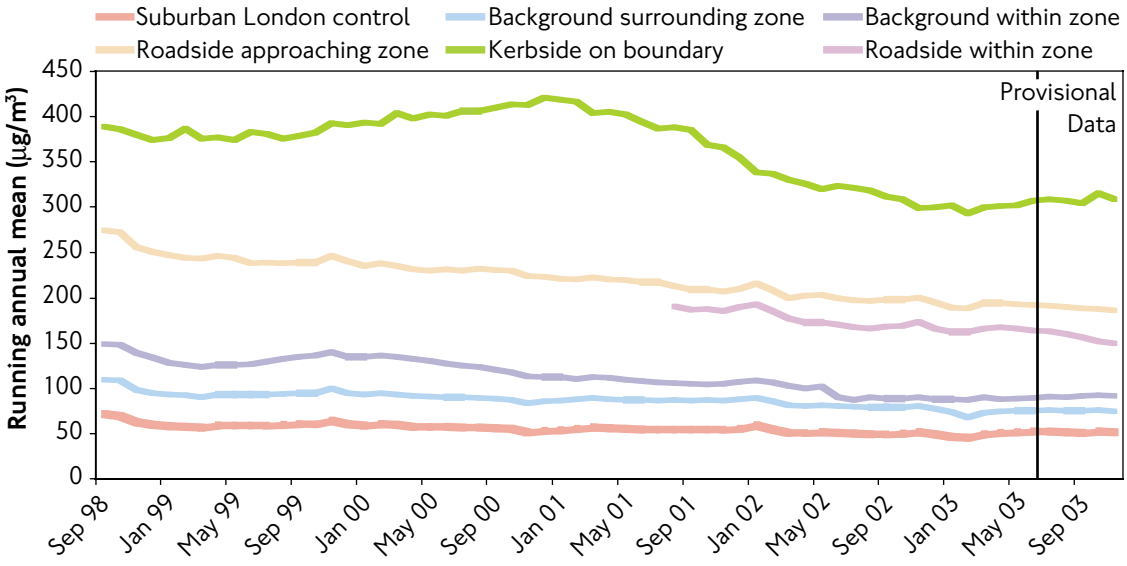


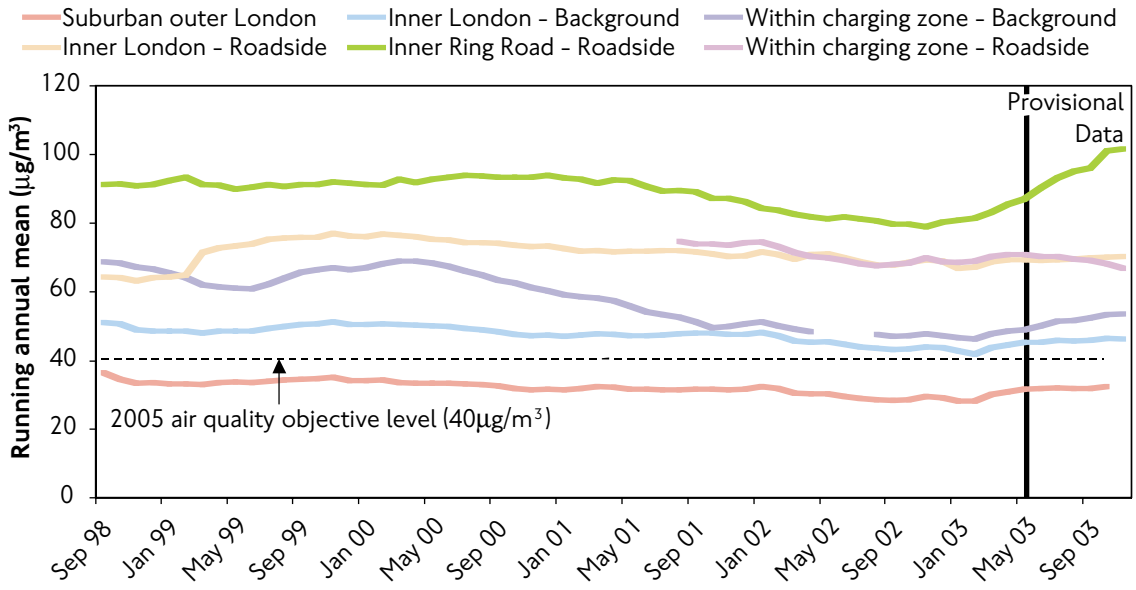
Figure 7.6 shows running annual mean NO_x concentrations for a selection of representative air quality monitoring sites. Up to the end of 2002, all site classes (background, roadside and kerbside) show reductions of between 20 and 40 percent over the review period. This prolonged, steady reduction suggests a significant reduction in primary emissions, most probably reflecting transport emissions abatement e.g. through catalytic converters.

The overall picture since March 2003 (the first running annual mean to include a full month of post-charging data) is interesting in several respects. Relatively stable concentrations have been observed at the three 'background' site classes and, as this trend has been observed throughout London, it is reasonable to attribute it to 'background' meteorological effects, as described below.

Concentrations at inner London sites and the within charging zone roadside site (Shaftesbury Avenue) have continued their downward trend, overriding this slight increase in background levels. Indeed, the rate of reduction at Shaftesbury Avenue appears to have accelerated, which may be evidence of decreased NO_x concentrations close to busy roads within the charging zone due to congestion charging-related traffic changes. However, the lack of other available sites means that this cannot be confirmed or generalised across the charging zone at this stage.

The Inner Ring Road site was affected by the introduction of bus lanes in late 2001. The picture here has been of stable or slightly increasing NO_x concentrations throughout 2003.

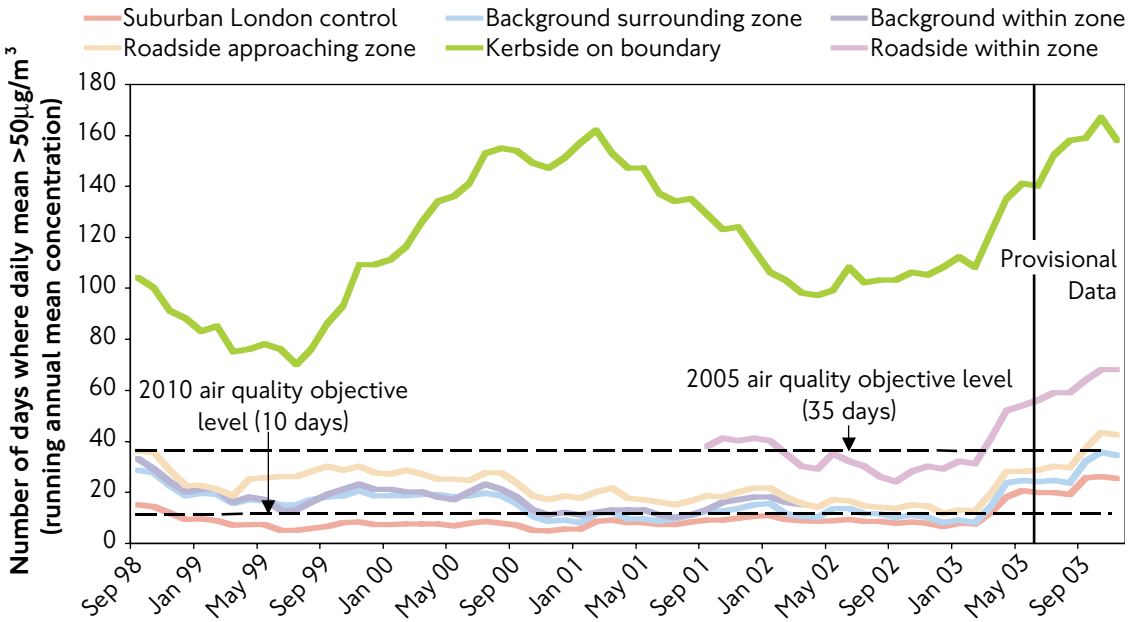
Figure 7.7 Recent trends in nitrogen dioxide (NO_2) concentrations at selected air quality monitoring sites.



NO_2 is largely a secondary pollutant formed by the oxidation of NO by ozone (O_3). As such, emissions are not estimated directly. The degree of oxidation is limited by available ozone, one consequence of which is that the variability of observed concentrations is less than for NO_x. Nevertheless, consistent ratios between NO_x and NO_2 concentrations have been observed. On this basis and in terms of trends shown in Figure 7.7, the general trend of increasing concentrations across London since the start of 2003 is unexpected. There are four observations to make at this stage.

- The hot summer of 2003 and the unusually high proportion of easterly winds (see below) imported record levels of ozone from continental Europe, thus 'facilitating' greater production of NO_2;
- The 'roadside' site within the charging zone is the only one of the indicator classes to show a reduction in NO_2. This is consistent with the observations for NO_x, and may well be attributable to reduced traffic levels within the zone overriding increased 'background' NO_2;
- The annual average NO_x /NO_2 ratio for the Marylebone Road site has fallen sharply from 2001 to 2003. This is mainly due to falling concentrations of NO, but may also indicate increased emissions of primary NO_2. It may have a number of possible causes, which are currently being investigated;
- The emissions estimates described above do not suggest that traffic volume/speed changes at this point are a significant contributory factor. Observed traffic volume changes at this point are similar to the overall average for the Inner Ring Road described in Section 3.

Figure 7.8 Recent trends in fine particulate matter (PM_{10}) exceedence days selected air quality monitoring sites



2003 was a remarkable year for PM_{10} episodes. Prolonged and widespread PM_{10} episodes occurred during February, March, April and August and caused sharp increases in the number of days that measured levels exceeded the air quality Objective across all indicator site classes. This is reflected in the running annual mean trends of exceedence days in Figure 7.8, which show a sharp upwards profile from the start of 2003. There is no evidence of any differential effect for the charging zone or Inner Ring Road indicator sites, suggesting that congestion charging is not a significant factor in explaining these trends.

It is known that a large proportion of PM_{10} in London originates from distant regional sources ('secondary' PM_{10}). At times, this can dwarf the locally-emitted component, to the point that it is likely that each of the major episodes observed in London during 2003 would have occurred to some extent even in the absence of all road traffic. Emissions changes arising from congestion charging can only affect the locally-emitted component during charging hours, and isolating these (relatively small) changes against such a volatile backdrop is not straightforward.

Established analytical techniques have been applied to these data and the following preliminary observations are made:

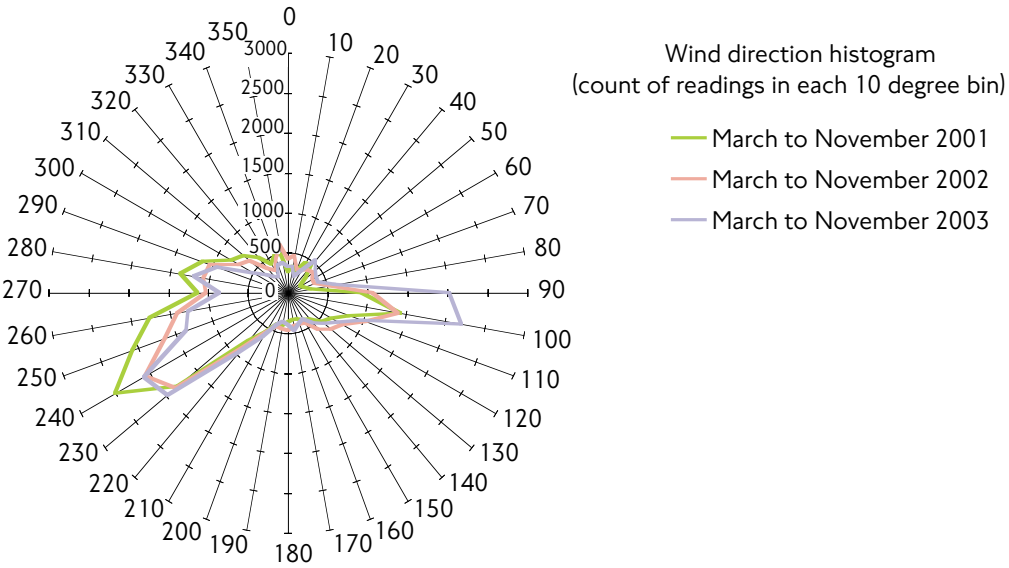
- The elevated levels of PM_{10} during 2003 are largely due to climatic conditions, these being particularly conducive to high levels of secondary PM_{10};
- It is not, at present, possible to detect a 'congestion charging' effect (either positive or negative) from these data at any of the indicator site classes;
- Although the emissions calculations above suggest a small positive effect within the zone, this is overwhelmingly obscured in terms of measured air quality by the magnitude of non-charging-related influences.

7.12 Weather during 2003

The trends described above need to be understood in the wider context of the statistically-unusual weather patterns that prevailed for much of 2003, together with the changes to primary emissions described above.

Figure 7.9 is a wind-rose displaying the proportion of time that winds originated from the different points of the compass. The data comes from a continuous monitoring site in the London Borough of Bexley and covers the period March to November for 2001, 2002 and 2003. During 2003, the proportion of time that winds originated from the east was approximately double that of 2001 and 2002 – a statistically unusual occurrence.

Figure 7.9 Comparative wind rose for 2001, 2002 and 2003 (March-November)



Such conditions imply dry, slow-moving and stable air that is particularly conducive to the build-up of pollution episodes. Furthermore, such air usually originates over continental Europe, and thus already carries a substantial pollution load (particularly ozone and PM_{10}) compared to, for example, northerly or westerly winds originating over the Atlantic.

7.13 Fuel use and carbon dioxide (CO_2)

A by-product of the emissions calculations described above are estimates of change to fuel use and carbon dioxide, an important 'greenhouse gas'. The relevant estimates are given in Table 7.6, showing reductions in fuel consumed and greenhouse gases emitted – valuable contributions to the objectives of the Mayor's Air Quality and Energy Strategies.

Table 7.6 Estimated percentage changes in fuel use and carbon dioxide emissions, 24-hour annual average day 2002 to 2003

Sector	Total change in fuel use	Total change in CO_2 emissions
Charging zone	-20	-19
Inner Ring Road	no change	no change

7.14 Noise

This section presents some indicative results from sample surveys of ambient noise undertaken in and around the charging zone during late 2003. These can be compared against equivalent surveys undertaken before charging during late 2002.

Projections of likely traffic changes arising from congestion charging suggested that changes, either positive or negative, in ambient noise in and around the charging zone were unlikely to be significant. One-day measurements at the small sample of sites described below would not be expected to provide a robust statistical indication of noise levels across the charging zone. Changes at any one site may, of course, be affected by changes in sources of noise other than traffic, and changes between a survey day in any one year and in the next may be affected by factors such as atmospheric conditions, for which it is not possible to fully adjust.

Table 7.7 updates a similar table in the *First Annual Monitoring Report* to include data from surveys undertaken in late 2003/4. L_{den} values for all three years have been added, these incorporating differential weightings for evening and night-time noise, to reflect greater noise sensitivity at these times.

The changes shown are inconclusive. None of the observed differences would be considered to be statistically significant, or within the conscious perceptual range of most people under most circumstances. Certainly, there is no evidence from these data of detrimental change.

Table 7.7 Sample noise measurements dB(A)[(1)]. Congestion charging monitoring sites, winter 2001/2, 2002/3 and 2003/4 compared

Site number	Index	2001/2	2002/3	2003/4	Difference dB(A) 2003 vs. average 2001/2 and 2002/3
Site 5	L_{Aeq}, 16 hour Day	73.0	74.4	73.8	+0.1
	L_{Aeq}, 8 hour Night	71.1	72.9	71.1	-0.9
	L_{den}, normalised	80.4	82.0	81.1	-0.1
	L_{den}, free-field	77.9	79.5	78.6	-0.1
Site 6	L_{Aeq}, 16 hour Day	70.2	69.6	69.1	-0.8
	L_{Aeq}, 8 hour Night	66.9	65.2	66.7	+0.7
	L_{den}, normalised	76.3	74.9	75.9	+0.3
	L_{den}, free-field	76.3	74.9	75.9	+0.3
Site 7	L_{Aeq}, 16 hour Day	57.4	61.0	58.7	-0.5
	L_{Aeq}, 8 hour Night	50.9	52.2	51.1	-0.5
	L_{den}, normalised	65.1	67.4	65.9	-0.4
	L_{den}, free-field	62.6	64.9	63.4	-0.4
Site 16	L_{Aeq}, 16 hour Day	71.7	72.5	72.5	+0.4
	L_{Aeq}, 8 hour Night	72.3	71.5	71.5	-0.4
	L_{den}, normalised	79.1	79.2	79.2	0.0
	L_{den}, free-field	79.1	79.2	78.8	-0.4
Site 19	L_{Aeq}, 16 hour Day	62.6	63.4	62.2	-0.8
	L_{Aeq}, 8 hour Night	57.6	59.1	57.2	-1.2
	L_{den}, normalised	71.1	72.4	70.8	-1.0
	L_{den}, free-field	68.6	69.9	68.3	-1.0

(1) The L_{Aeq} values quoted in Table 7.7 are free-field values normalised to a distance of 10 metres from the kerb

Site 5: Marylebone Road (Inner Ring Road)

Site 6: Farringdon Street (within charging zone)

Site 7: Central Street (within charging zone – 'background' site)

Site 16: New Kent Road (radial road approaching Inner Ring Road)

Site 19: Berkley Square (within charging zone)

8. Scheme operation and enforcement

8.1 Introduction

This section provides an overview of the operation and enforcement of the congestion charging scheme through the first year of the scheme. The effect of the Supplemental Agreement with Capita is also examined.

8.2 Key findings

- Congestion charging launched successfully under world-wide scrutiny and without the operational or technology problems predicted by many commentators;
- Chargepayer preferences for different payment methods were established within the first few weeks of operation and have shown only slow changes since. Use of text messaging (SMS) is increasing at the expense of the retail and call centre payment channels;
- During the first few months of the scheme TfL became aware that the quality of service provided by the main contractor was below the required standard. The Supplemental Agreement with Capita defined an extensive programme of improvements across IT, management, processes and staffing. Along with a tougher quality performance management regime this has resulted in a significant increase in performance across a number of areas, particularly in relation to performance of the call centre, the number and quality of penalty charges being issued and the end to end enforcement process;
- The proportion of recoverable Penalty Charge Notices (PCNs) has increased substantially in line with requirements set out in the Supplemental Agreement;
- Representations against PCNs have reduced as the accuracy of issued PCNs has increased. Chargepayer and Capita errors in entering the correct vehicle, customer and date of entry details have fallen and the effectiveness and quality of the enforcement process has increased;
- Since June 2003 TfL has been increasingly pursuing outstanding debts and persistent evaders. Several hundred vehicles have been immobilised or removed and debt recovery is being pursued for all unpaid PCNs through bailiff action.

8.3 Service provision

Congestion charging launched on 17 February 2003 with no major operational or technology difficulties. During the first few months of the scheme however, TfL became aware that the quality of service provided by the main contractor was below the required standard. For example: callers were not always able to get through to the call centre in a reasonable period of time or were frequently receiving a message stating that the service was busy and to try again later; the number of PCNs being issued did not fully reflect the number of vehicles for which no payment had been received and there were deficiencies in the provision of evidence to appeals.

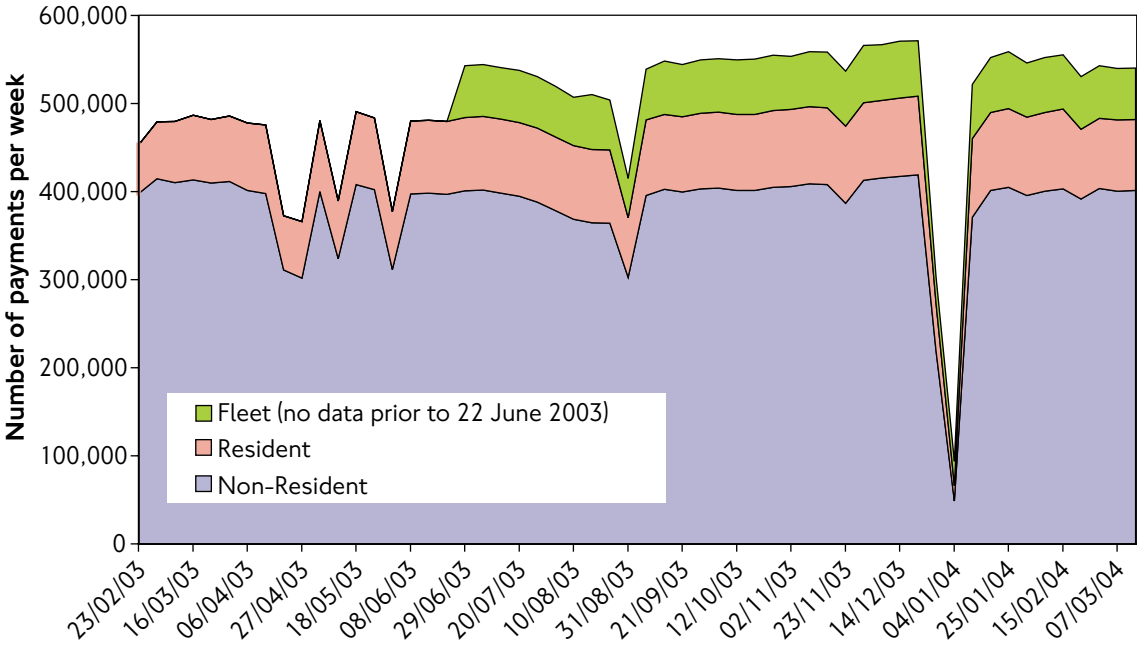
A Supplemental Agreement was agreed with Capita in August 2003 which, along with an ongoing programme of continuous improvement, sought to address these problems. A phased programme of IT, process, management, training and staffing improvements were agreed. All three phases of the agreed measures were delivered as planned in October 2003, January 2004, and March 2004.

The changes made as a result of the Supplemental Agreement have improved the quality of service provision and enforcement although it will not be until at least summer of 2004 that the full effects will be experienced, given the lengthy enforcement process. TfL will continue to monitor the standard of service provision and take steps as required to ensure performance and quality remain at the necessary level.

Congestion charge payments

Charge payments average in the region of 550,000 payments per week.

Figure 8.1 Weekly congestion charge payments

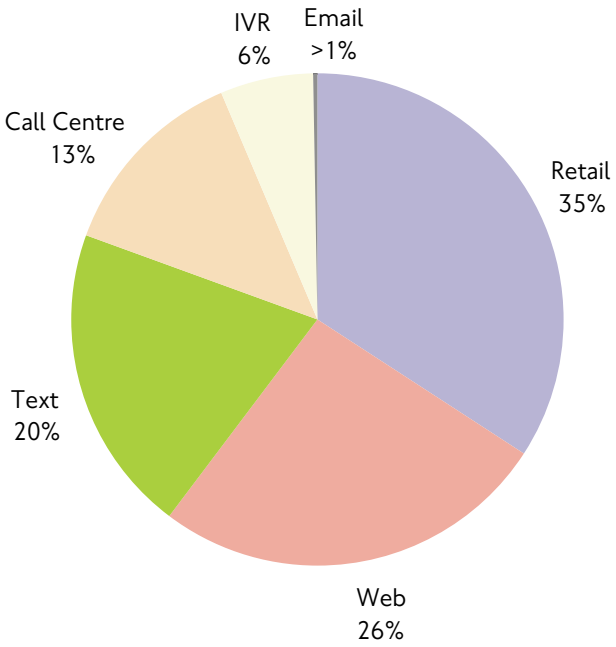


In a typical week, payments comprise around 400,000 non-residential payments, 90,000 residential payments and 60,000 fleet payments.

Seasonal effects are clearly identifiable in Figure 8.1; no charges apply on Public Holidays and the effects of these are also readily apparent.

The split of payments across the various channels available has remained relatively consistent at the levels seen once the initial few weeks of the scheme had passed. The increasing usage of text messages at the expense of retail and call centre channels is apparent, as is a slow resurgence in web-based payments after an initially high demand for this service. This may reflect an increased level of performance through this channel. Postal payments remain negligible. Figure 8.2 shows the payment channel breakdown for the first quarter of 2004.

Figure 8.2 Congestion charge payment channel breakdown quarter one 2004



Call centre

The call centre currently handles around 66,000 calls per week through customer service representatives, of which approximately 65 percent relate to payments and 35 percent to enquiries. Around 35,000 calls a week are handled automatically through Interactive Voice Response (IVR).

Average call time remains close to three minutes as reported in the February update. The number of call attempts where a customer is unable to get through to the call centre has remained close to zero since January 2004. The average queue time over the first quarter of 2004 is approximately 25 seconds.

Overall quality of service has been improved through more staff, better training and monitoring, improved VRM and data checks and more effective complaint handling and escalation delivered as part of the Supplemental Agreement.

Registrations

The number of payment registrations to the end of February 2004 is shown below:

Table 8.1 Payment registrations

Automated fleet accounts	900	
Notification fleet accounts	800	
Text messaging (SMS)	255,400	
Fast track (excluding SMS)	394,600	(includes certain discounts)

The total number of registered fleet vehicles has declined by around 3,000 vehicles over the last few months and at the end of February stood at approximately 122,000.

Registered chargepayer transactions which include those by text messaging (SMS), interactive voice response and those by call centre, web and post where a 'customer number' has been provided, account for 40 percent of payment transactions. Non registered transactions where no 'customer number' is used account for the remaining 60 percent.

Registration for discounts

Cumulative registration totals up to the week ending 7 March are as follows:

Table 8.2 Discount registrations

Blue Badge holders	119,600
Residents of the zone	29,200
Alternative fuel vehicles	5,900
Vehicles with 9+ seats	11,500
Other discounts	1,300

On a typical daily basis, the use of these discounts by vehicles in the congestion charging zone is as follows:

Table 8.3 Typical daily discount usage

Residents of the zone	18,000
Blue Badge holders	8,000
All other discounted vehicles	2,500
Exempt vehicles	7,300

Since most applications for discounts were made between December 2002 and Go-Live, renewals of annual discounts have been staggered across a three-month period in 2004 to ensure quality of service can be maintained. In addition, improved fraud prevention and management has been built in for the future.

8.4 Enforcement operations

There are no tollbooths or barriers around the congestion charging zone and no physical tickets or licences. Instead, drivers or vehicle operators pay to register their vehicle registration number on a database for journeys within the charging zone. Receipts (or receipt numbers) are available through all payment channels as proof of charge payment.

Fixed and mobile cameras capture images of vehicles entering, driving within or leaving the congestion charging zone, and the registration number plates are interpreted by Automatic Number Plate Recognition (ANPR) computer systems.

Once a registration number captured by the cameras has been matched, showing that the appropriate charge for the vehicle has been paid or the vehicle is exempt or 100 percent discounted, the images of the vehicle and related details are automatically deleted from the database in line with data protection legislation. The day following capture, all images of vehicles where no charge has been paid are manually checked against the vehicle make and model details returned by the DVLA before any Penalty Charge Notice (PCN) is issued.

Failure to pay the congestion charge results in a PCN of £80 being issued to the registered keeper of the vehicle. This is reduced to £40 for prompt payment within 14 days. Failure to pay the penalty charge within 28 days results in a charge certificate being issued and the penalty being increased to £120.

Enforcement improvements

Part of the Supplemental Agreement with the service provider, Capita, concerned an extensive programme of phased improvements to the enforcement service, the final element of which was completed on time at the end of March 2004.

Better enforcement processes, additional staff and system improvements were designed to ensure that as many PCNs as possible are issued to those not paying the charge. The enhancements were also designed to improve efficiency and quality in the processing of representations and appeals and to improve compliance. The revised performance regime of Quality Performance Indicators (QPIs) further links payments and penalties to contractual performance with increased focus on the quality of service provided.

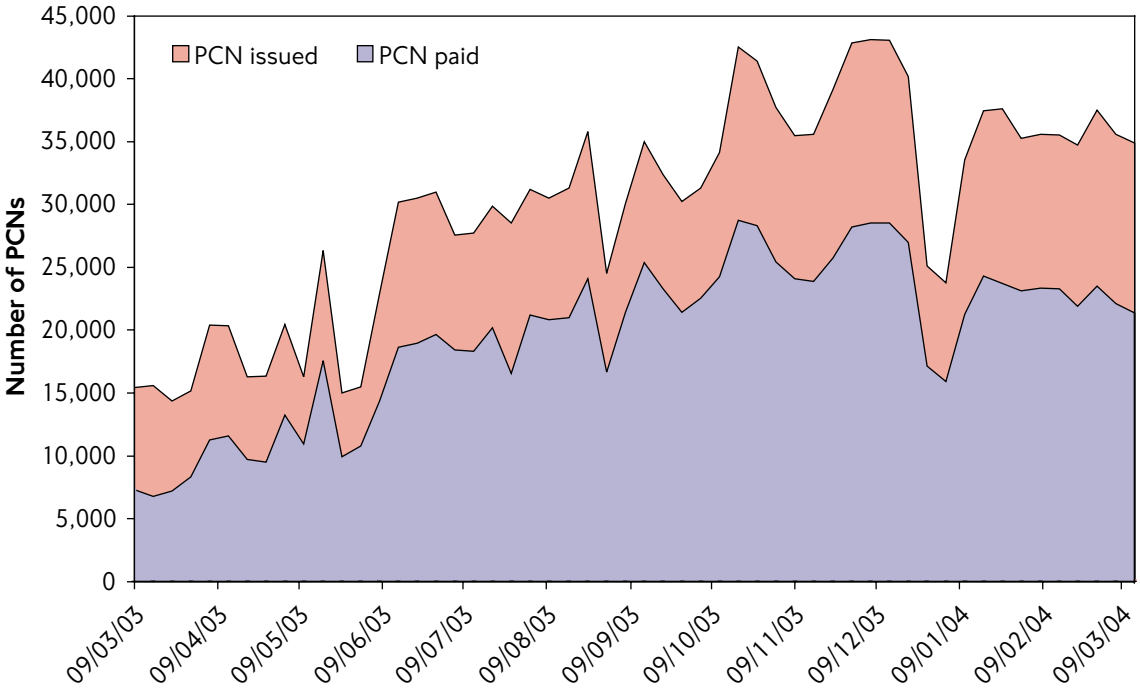
Penalty charge payments

As shown in Figure 8.3, the number of PCNs issued per week has increased over the course of the first twelve months of congestion charging, in line with the requirements of the Supplemental Agreement. In the first quarter of 2004, around 35,000 PCNs have been issued each week.

The overall percentage of PCNs paid has improved in line with the delivery of improvements from the Supplemental Agreement. Some 63 percent of all PCNs issued have been paid; from a 'low' of around 35 percent payment of PCNs issued in February and March 2003, to a current 'high' of around 70 percent payment in September 2003.

It should be noted that due to the 'life cycle' of a PCN there are various stages at which a penalty can be paid before recovery action is required or instigated. The recovery rate of penalties issued in the first two months of 2004 is currently (March 2004) running at 61 percent although it is expected that in future months this will match, if not exceed the 70 percent recovery rate reached in September 2003.

Figure 8.3 Weekly Penalty Charge Notices issued and paid



Current figures show that of the PCNs paid, around 88 percent are paid within the discount period at £40. This would appear to indicate a high acceptance that the contravention was committed. The average payment for all PCNs paid to date is currently around £47.40 but is closer to £50 for those issued in the first six months of operation.

Representations

Representations made against individual PCNs have been reducing month on month since the beginning of congestion charging, from an early level of more than 60 percent of PCNs issued, to a recent level of around 20 percent. This is a direct result of resolution of early registration, VRM, date and other processing errors by Capita; increased familiarity of chargepayers with the system (especially payment of the charge for the correct date of travel and vehicle registration); and improvements in the visual checking process before PCN issue.

The majority of representations being received in the first quarter of 2004 are from those who have received PCNs but who have recently sold or purchased a vehicle which has subsequently or previously incurred a congestion charging penalty. Such representations are not uncommon with parking and bus lane enforcement and are normally as a result of failure by the vendor of a vehicle to update DVLA with the new keeper details in accordance with legal requirements. Assuming the new or previous keeper details are available and the details are updated the representation is accepted and the penalty charge notice is re-issued.

Another major cause of representations is from vehicle hire companies. Legislation provides for circumstances under which vehicle hire companies can transfer liability for charges for vehicles hired on agreements under six months in length to the person hiring the vehicle at the time of the charge. Proposed changes to the relevant regulations are expected to allow the transfer of liability to lease companies who currently are unable to transfer liability in this way. If this were introduced it would allow a further increase in the number of PCNs being reissued to transfer liability to the lessee of the vehicle.

In the early months of operation the key reasons for representations were mainly chargepayer and Capita errors in the processing of payment or discount registrations. Representations made and accepted, where there has been an error by Capita with the issue of a PCN, now account for less than 2 percent of all representations. Work continues to further reduce these and chargepayer errors.

Appeals

Any vehicle keeper who has received a penalty and has had a representation rejected by TfL has the right to appeal to an independent adjudicator. To date, less than 20 percent of those who have had a representation rejected have taken up this facility. The total number of congestion charge related appeals registered with the Parking and Traffic Appeals Service (PATAS) at the end of February 2004 was 39,000, amounting to about 2 percent of all PCNs issued.

To date, TfL has processed some 35,500 appeals received from PATAS. In the early months many of these were not contested by TfL. However, over 8,000 appeals have now been heard by the adjudicators, of which 57 percent have been found in favour of TfL. Increased staff, training, monitoring and performance management, together with improvements to systems and representations processing are expected to continue to reduce the proportion of PCNs that reach appeal.

Debt collection

Where PCNs remain unpaid and where no successful representation or appeal is made they become classed as outstanding. TfL then register the debt at County Court and pass the case to bailiffs for recovery action. This does not result in a County Court Judgement against the debtor.

As at March 2004 approximately 67,000 warrants of execution had been issued to bailiffs since mid-June 2003. This represents some 26 percent of cases where a debt has been registered with the County Court. So far around 8 percent of warrants issued have resulted in payment. This figure is expected to increase over the rest of 2004.

Persistent evasion

Transport for London has powers to remove or immobilise vehicles of persistent evaders, defined as drivers who have failed to pay three or more outstanding PCNs, with no representation or appeal pending. This is additional enforcement aimed at improving compliance that functions in conjunction with the debt recovery process described above.

In order to allow the scheme to settle down, TfL delayed exercising the full powers to clamp and/or remove and impound vehicles for a number of months. However, between September 2003 and the February 2004, over 350 persistent evaders have had their vehicle clamped or removed.

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