

# Time is money

The economic effects of transport delays in Central London

January 2005

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## **Foreword**

The transport system in London has seen notable improvements over the past four years. However, the process of building a 21st century transport system for a 21st century world city has only just begun. There are still significant costs associated with using London's transport system and these need to be reduced further if London is to fulfil its growth potential. This Oxford Economic Forecasting (OEF) report, using a methodology which they trialled on the City of London and have now extended to cover the whole of Central London, provides an estimate of the economic losses imposed on current travellers to London's centre by delays on the transport system.

This is not to imply that all such losses can ever be removed or indeed that they should be. A successful city will be crowded. Such crowding imposes costs that people bear because they value the benefits that are the result. But the costs are nonetheless real. Only by understanding what they are, can we balance them against the costs of the investment required to reduce them.

Since 2000, the Greater London Authority (GLA), Transport for London (TfL) and the Government have started to address the historic backlog of investment in London. In line with a national policy decision to begin to address the crisis in the UK transport system, the 2000 Spending Review virtually doubled the transport grant to London. The additional funds were used efficiently by TfL to start to tackle London's transport crisis, by setting policies and carrying out investment necessary to maximise the efficiency of those parts of the transport system under TfL's control. Notable achievements include transforming the quality of London's bus services, and tackling traffic congestion in Central London through introducing the world's largest congestion charging scheme, as well as a range of other measures such as improving personal security on the network.

Much more work is planned over the coming years. The TfL Business Plan 2005/06-2009/10 sets out an ambitious programme, investing £10 billion over five years. The investment programme includes improvements to all aspects of London's transport network: the Underground, overground rail (where TfL's powers permit), roads, buses and local transport.

This report is part of our continuing effort to ensure that the benefits of investment are more fully understood, and that policy choices are well informed. We commission a variety of studies using different methodologies to ensure that the widest picture is achieved. This report by OEF sets out their best estimates of the costs of delay, but inevitably these are still partial. The concept of delay is a difficult one – in part because it is difficult to precisely define the base from which delays are measured. And those who do not travel because the experience is too difficult also experience costs or disbenefits, but these are particularly difficult to identify and are beyond the scope of this study.

It is also important to recognise that in a constrained system such as transport to Central London, transport improvements can lead to wider benefits, such as allowing employment relocation to preferred locations that increase productivity. The costs of such constraints (and the

benefits of relaxing them by transport improvements) are not considered within the scope of this work.

We hope that this work by OEF will contribute towards increasing the understanding of the London economy and the case for investment in London's transport system.



Bridget Rosewell  
Consultant Chief Economist  
GLA Economics

## Executive summary

In any successful city there is always an inherent trade off between the advantages of activities taking place close together and the economic costs caused by such clustering – higher rents, house prices, congestion and transport costs. This study concentrates on one aspect of this complex issue, namely the economic cost to Central London of delays arising from inefficiencies in the transport system.

Transport within congested urban areas will inevitably be less rapid than elsewhere. This slower speed of transport has a cost in itself, but one that is outweighed by the benefits of urbanisation.

Our approach is to focus on the cost of transport delays over-and-above those that are already allowed for in the normal operation of the transport network (i.e. the cost of additional transport delays when timetables are not met or road traffic travels at slower speeds because of congestion).

The quantifiable economic cost of these transport delays to Central London employees and businesses is estimated to be **£1,190 million a year**. This is equivalent to about £4.6 million per business day or £830 a year for each person working in Central London:

- The majority of the cost of these transport delays – **£870 million a year** – impacts on commuters through lost time spent on delayed trains, tubes or buses or in a traffic jam. This impacts on companies with staff being late or reduced worker productivity due to stress and fatigue.
- Businesses also lose a further **£320 million** a year from staff being delayed while on employers' business, as staff lose effective working time when travelling to and from business meetings.

Over-and-above this is an additional cost of **£560 million** a year in lost time from delays experienced by those travelling to, from or within Central London for non-work (e.g. leisure) purposes such as shopping, education, tourism and visiting friends. This is equivalent to £1.5 million per day.

Combining these different costs – commuters, business and non-work – puts the **total cost** of transport delays in Central London at approximately **£1,750 million a year**, around £6.7 million per business day, or £1,220 a year for each person working in Central London.

These estimates are based around Department for Transport (DfT) guidance on the value of time. However this means our estimate is cautious as workers in Central London earn nearly twice as much per hour as the typical UK employee. If we were to reflect this wage differential in our valuation of the leisure time of employees then our estimate of the overall quantifiable cost of transport delays would be £2,500 million (£1,740 a year per person working in Central London).

**Transport delays impose a number of other substantial costs** on the Central London economy that are not possible to quantify in pure monetary terms:

- Thirteen per cent of companies responding to our survey report that problems with transport in Central London have been a factor causing them to **move operations to another location**. Similarly, thirteen per cent of companies report that they have made **new investments in other locations** as a consequence of the transport problems in Central London, while other companies warn that this could happen in the future.
- Thirty-five per cent of companies report some **loss of business** caused as a result of transport delays. Some of this business may have gone to other firms in Central London, but some is likely to have been lost to competitors in other regions or countries.
- Ninety-four per cent of companies believe that staff **productivity** is either seriously or somewhat reduced by problems faced in commuting. This finding is supported by a second survey we undertook of employees in Central London, with nearly half of respondents reporting that a reduction in their productivity as a result of transport delays is either a serious problem or somewhat of a problem.
- Transport delays undermine the productivity of workers in Central London partly by making them late for work. But companies are also concerned about the effect that they have on the well-being of their employees, with 32 per cent reporting that the **stress and tiredness** caused by commuting difficulties is a serious problem and a further 67 per cent regarding it as somewhat of a problem.
- Fifty-three per cent of companies in our survey also report that transport delays make it harder for them to **recruit and retain staff** in Central London, and that salaries have to be higher to compensate staff for long and uncomfortable journeys. Firms also experience some difficulties with **delivery services** to or from Central London and in getting **repair and maintenance work** done quickly. On occasions, these can lead to major disruptions to company operations.
- Our survey of employees also highlighted significant concerns about the impact of transport delays on **commuters' health and the quality of their family life**. More than 37 per cent of employees report that they would seriously consider looking for a job outside London if transport problems continue to get worse over the next few years. Many also feel that they have to allow extra time for their daily commute, to minimise the risk that transport delays might cause them to be late for work.
- Many companies are seeking to find ways to work around the problems caused by London's transport system. A significant number have responded by **operating flexitime and/or home working**, while nearly a quarter are making significant use of new technologies such as **video-conferencing or email** to avoid some of the effects of transport delays.
- Overall, there is little doubt that the **problem of transport delays** in London is regarded as extremely serious by users. Ninety-four per cent of employees in our

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survey said they considered it to be at least quite serious, and 62 per cent consider it very serious or critical. There was also a wide range of views on what improvements were most needed to the transport system in London, with **a more reliable service being the most desired improvement** according to both companies and employees.

This study has focused on quantifying the cost of transport delays, but it should be recognised that the benefits of the London transport network as a whole are substantially positive. People bear transport costs – and transport delays which are a part of these – because they feel that there are benefits which compensate them. Wages, in particular, tend to be higher to compensate workers for the extra costs they face when locating near Central London.

The Central London economy as a whole also benefits from related economic activities taking place close together. This so-called **agglomeration effect** enables higher productivity and therefore higher wages, encouraging suitably qualified workers to move into or close to Central London. Firms also benefit from proximity to suppliers and customers and from knowledge transfer between each other.

However, the costs identified in this study are considerable and the concerns noted in the surveys are widespread. There is a strong depth of feeling that **transport delays are a serious issue for Central London**, and many employees are tempted by the idea of looking for jobs elsewhere if things worsen. Similarly, some companies also see transport limitations in Central London as a factor behind actual or potential relocation decisions.

Therefore, there appears to be a significant argument for reducing transport delays. Such a reduction is not without additional cost as significant investment to transport infrastructure would be required. **Economic efficiency** dictates balancing these investment costs against the benefits from a reduction in delays to establish an **economic optimum level of delay**. This optimal point is unlikely to be zero as the costs of eliminating all delays would almost certainly be larger than the benefits achieved.

There have been some tentative signs that delays have fallen in the past year or so, but there is still a perception from both employees and employers that delays are very much a significant problem. There appear therefore to be **long-term risks** for the Central London economy if further improvements are not seen in the performance of the transport network.

## 1. Introduction

### 1.1 Study objectives

This study was commissioned by Transport for London (TfL) and the Greater London Authority (GLA) to assess the overall economic cost to Central London of inefficiencies arising from transport system delays. These costs include staff being late for work or for important meetings; delays to a firm's deliveries from suppliers and/or to customers; and reductions in worker productivity due to stress and fatigue.

This study is an extension and update of the work undertaken by Oxford Economic Forecasting (OEF) for the Corporation of London in 2003 that estimated the economic cost of transport delays on the City of London<sup>1</sup>. Compared to the City of London, Central London is between four and five times as big in employment terms and as much as ten times larger in terms of the number of trips undertaken.

Central London is an area approximated by the congestion charging zone with a slight extension of the northern boundary to include Paddington, Marylebone, Euston and King's Cross stations and an extension of the western boundary to include Hyde Park, Belgravia and Pimlico.<sup>2</sup>

### 1.2 Employee and employer surveys

In the study for the Corporation of London we undertook original surveys of employees and companies in May 2003 to establish how important transport delays are to companies and workers of the City of London. The survey of employees assessed the frequency and duration of transport delays faced by employees and their impact on the working day.

To get a sufficient coverage of workers, we undertook the survey of travellers based on workplaces rather than transport interchanges. The survey of companies sought a more strategic view. The intention here was not simply to allow organisations another chance to complain about the transport system, but to consider whether it has a practical impact on companies.

For this study we have built on this approach and repeated the surveys in September 2004, but this time concentrating on the non-City parts of Central London. The responses from the 2003 and 2004 survey have been combined together – the views expressed by individuals and companies have not changed significantly in the past year, and are not significantly different between the City and non-City parts of Central London.

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<sup>1</sup> Oxford Economic Forecasting, July 2003, The Economic Effects of Transport Delays on the City of London

<sup>2</sup> In geographic terms, it is an area within a radius of 1.5 to two miles centred on Aldwych, approximately bounded by the mainline railway stations, and sometimes referred to as the Central Statistical Area.

The combined result is an expanded sample with sufficient coverage of both the City of London and other parts of Central London, comprising of responses from 197 companies and 389 employees<sup>3</sup>.

### 1.3 **Report structure**

The remainder of this report is structured as follows:

- Section 3 discusses the economics of transport delays addressing issues such as the economics of cities, valuation of travel delays and the optimal level of delay.
- Section 4 sets out relevant data on the pattern of transport use in Central London.
- Section 5 looks at the information available on the extent of delays being faced by Central London transport users.
- Section 6 analyses the cost of those delays.
- Section 7 discusses how companies and individuals are responding to delays.
- Section 8 sets out the views of companies and individuals in Central London on the most important improvements needed for the transport system in Central London.
- Section 9 presents a summary of our estimates.

The Appendices provide further details on journeys in Central London, sensitivity tests on our estimates of the cost of transport delays, details of the questions covered in our surveys and of the responses we received.

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<sup>3</sup> More detailed discussion of the survey results and coverage is given in Appendix D.

## 2. Economic issues

### 2.1 The economics of cities

The advantages of related economic activities taking place close together (agglomeration economies) are one of the key driving forces in the development of cities<sup>4</sup>. Agglomeration benefits originate from the positive relationship between city size and productivity, whether from a firm's costs being lower when production is carried out close to other firms, or whether close proximity to customers means increased sales.

The agglomeration effect enables higher productivity and therefore higher wages, encouraging qualified workers to move into or close to Central London. It also leads to firms in similar or related industries clustering together, generating further economic benefits and mutual advantages. Firms have access to specialised inputs and employees, benefit from proximity to both suppliers and networking, and gain from the transfer of knowledge among firms.

But economic costs are higher in cities than less dense parts of the country as a result of higher rents, house prices, congestion and transport costs. It is generally more costly for commuters to access and travel around dense urban cities such as London.

These economic costs are outweighed by the benefits of urbanisation in a successful city. Equally, for individual journeys, the costs from travelling in a dense city are generally outweighed by the benefits. Wages, for example, tend to be higher to compensate workers for the extra costs they face in locating there. Activities are concentrated within cities because of the efficiency gains this brings. Any activities which do not benefit from agglomeration economies are likely to locate or re-locate to cheaper places outside Central London.

### 2.2 The concept and measurement of transport delays

Dense transport networks are developed to meet the need to move people and goods around cities, but transport within congested urban areas will inevitably be less rapid than in uncongested areas. This will be taken into account when operating the transport system (e.g. when designing public transport schedules or road speed limits). This slower speed of transport has a cost in itself, but one that is outweighed by the benefits of urbanisation.

Our approach is to focus on the cost of transport delays over-and-above those that are already allowed for in the 'normal' operation of the transport network (e.g. the cost of additional transport delays when public transport schedules are not met or when road traffic travels at slower speeds because of congestion). This means there is a slight conceptual difference between the way that transport delays are measured across different modes. For public transport modes, the delay is measured by comparing the

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<sup>4</sup> Indeed, the existence of such agglomeration economies is the main economic basis for the existence of cities. See A Venables, 2004, Evaluating urban transport improvements: Cost-benefit analysis in the presence of agglomeration, London School of Economics and Political Science

difference between actual and scheduled services, plus any additional unscheduled waiting time<sup>5</sup> at platforms or bus stops. For travel by car and taxi, the concept of congestion is used with the delay represented by the difference between congested and completely uncongested conditions on the roads.

The uncongested journey time uses the road network at night as the reference point<sup>6</sup>. Some may argue that this is an unrealistic yardstick to measure the performance of an urban road network relative to the method used for public transport travel. In particular, public transport modes may have an allowance for a normal level of delay included in the scheduling of timetables, but no such allowance for a normal level of congestion is included for travel by car and taxi.

Although this may mean an over estimate of the costs for car congestion relative to public transport, we consider it is unlikely to be significant due to a number of mitigating effects. The use of night-time journey speeds already allows for the fact that average speeds will generally be less than theoretical speed limits even when traffic is very light, due to the impact of traffic lights, the density of road junctions, and so on. Recent research by Steer Davies Gleave<sup>7</sup> also shows that time spent waiting in cars could be valued more highly than current values used, further offsetting this effect. Perhaps the biggest problem is that there is no recognised level of or recognised methodology to calculate normal congestion.

Given this discussion and mitigating effects, we consider that our approach provides a reasonable indication of the cost of transport delays by car, but clearly the conceptual differences in methodology should be borne in mind when considering the total economic costs from transport delays.

### **2.3 Valuing the cost of transport delays**

The concept used to value the cost of transport delays is the value of time. The value of time converts time delays into a monetary cost and is compatible with the generalised cost framework underlying most transport models.

The value of time differs according to the purpose for which the trip is taken. Time lost while on employers' business is valued more highly than commuting time which in turn is valued more highly than non-working time.

The value of time assigned to trips on employers' business is based on the opportunity costs of travel from the point of view of the employer. This is essentially the marginal cost of labour to the employer, assumed to be the gross wage of employees affected, plus non-wage costs such as national insurance, pensions and other costs.

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<sup>5</sup> For example, the average waiting time on the bus network in 2003/04 was 4.4 minutes scheduled waiting time and 1.4 minutes excess (unscheduled) waiting time – only the 1.4 minutes are counted as a delay.

<sup>6</sup> See TfL's 'A Measure of Road Traffic Congestion in England, Method and 2000 Baseline figures' for a fuller discussion of how the reference point is measured.

<sup>7</sup> Source: Effect of Road Congestion on Rail Demand: Stated Preference Survey Results (May 2004)

Commuting and other non-work trips take place outside working hours so wage costs are not relevant to the value of time. But people still assign a value to their own time, making choices between faster more expensive journeys and slower cheaper ones. This value of time is estimated through the use of large scale surveys of travellers, who are asked how much money they would pay for different time savings in order to establish the trade off between time and money and hence an appropriate value of time.

#### **2.4 Quantifying the costs of transport delays**

We have produced a quantified estimate of the cost of delays, but it is important to bear in mind that this is a conservative figure for a couple of reasons. Firstly, where we have had to make assumptions in order to complete the quantification we have been cautious. Secondly, it is only feasible to quantify some of the costs involved.

Others costs include qualitative ones such as social costs – stress, health and the impact on family life – which by their very nature are difficult to assign a monetary value. There are also other omissions that should be noted. In particular, the costs of transport delays are estimated only for those people who still use the transport network (i.e. actual travellers) and excludes people who have done the following:

- Relocated to other parts of the UK due to persistent problems, such as delays on London's transport network.
- Changed their employment location to be closer to their home because of the costs of getting into work, of which transport delays are partly a factor.
- Stopped or put off travelling to Central London because significant delays are reported on the radio or television before they set off.

The first and second groups are likely to be the most significant. The final group (people deterred from travelling at a certain time) may still make the journey at another time, so any excluded cost is reduced.

#### **2.5 The issue of economic efficiency**

We have focused specifically on quantifying the cost of transport delays, but it should be recognised that the benefits of the overall London transport network are substantially positive. All trips made by people must have an expected benefit greater than the cost, otherwise they would not travel in the first place. People bear transport costs, and expected transport delays which are a part of these, because they feel that there are potential benefits from the trip which compensate the costs.

Although each trip already has an expected positive benefit, it should be noted that greater economic benefits can be realised if transport delays could be further reduced or even eliminated altogether. Such a reduction in transport delays is not without additional cost, requiring infrastructure improvements to trains, track and signals for example.

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From the travellers point of view the optimal level of delay is zero. However, the investment costs of eliminating all delays is likely to be larger than the benefits (i.e. to develop a network where all trains, signals and tracks never breakdown would probably not be practical let alone possible). In other words, the optimal level of delay for society as a whole is likely to be positive and will be equal to the point at which the marginal investment to improve reliability is equal to the marginal benefit to travellers from that improved reliability.

This issue of economic efficiency is the fundamental concern for policymakers. They need to consider the trade off between investment and transport benefits, evaluating whether the cost of investment to improve reliability produces economic/transport benefits greater than the original cost.

### 3. Transport patterns in Central London

#### Key points

- **The total number** of journeys on different modes of transport – known as trip-stages – in Central London in 2002/03 was 2,235 million. This represents one-quarter of the trip-stages that took place in Greater London.
- **By purpose**, 875 million (39 per cent) were commuting trip-stages, 118 million (five per cent) were trip-stages on employers' business, and 1,241 million trip-stages (56 per cent) were for non-work purposes.
- **By mode**, the Underground accounts for around 38 per cent of Central London trip-stages. National Rail accounts for 18 per cent of trip-stages, cars for 16 per cent, buses for 15 per cent, taxis for one per cent, and other modes – predominately walking – for 11 per cent.
- **For work journeys**, the Underground with a mode share of around 38 per cent accounts for the most trip-stages of 379 million. These work trips represent 45 per cent of trip-stages made on the Underground.
- In terms of **main mode**, National Rail is the most popular for work trips. Around 40 per cent of workers in Central London have their main mode as rail, compared to 31 per cent for Underground.
- **Average journey times to work** are nearly an hour, 57 minutes on average across all modes.

In this section, we describe the current pattern of transport use for journeys to, from and within Central London. We analyse existing surveys on journey mode and average travel times for commuters, those travelling on business and those travelling for non-work<sup>8</sup> purposes.

It is important to note that the statistics in this section mostly refer to the number of trip-stages and *not* the number of trips. A trip-stage is the part of the overall trip which involves travel by a single mode for a single purpose, with a new trip-stage starting each time there is a change of mode. For example, consider a common home-to-work trip to Central London which involves walk, rail, Underground and then walk. This is a four trip-stage journey. Trip-stages are used as the basis for our calculation of the cost of transport delays as the total time lost for each mode can be easily calculated by simply multiplying the average delay for each mode by the number of trip-stages for each mode<sup>9</sup>.

<sup>8</sup> Non-work is sometimes referred to as leisure, but strictly speaking it can include a much wider range of trip-purposes such as visiting friends and relatives, shopping and personal trips. We therefore stick to the convention that these are non-work trips rather than leisure trips.

<sup>9</sup> The alternative option would be to start with the number of trips by 'main mode' of travel. However, the calculation of the overall delay under this approach would be quite complicated requiring, amongst other things, assumptions about the number of transfers between modes and the proportion of the overall journey covered by each of these different modes.

### **3.1 Central London journeys**

A total of some 25.7 million trip-stages took place in Greater London each day in 2002/03 (see Table 3.1). This daily travel figure is partly based on the results of the London Area Transportation Survey (LATS) 2001<sup>10</sup> and partly on published figures from the different public transport operators<sup>11</sup>. The daily figure translates into an annual<sup>12</sup> total for Greater London of 8.6 billion trip-stages.

Of these Greater London trip-stages, around 25.9 per cent or 2,235 million take place to, from or within Central London (Central London journeys<sup>13</sup>). In terms of the mode of travel:

- The most popular mode is the Underground, accounting for about 38 per cent of annual Central London trip-stages (42 per cent when walk is excluded). Around 89 per cent of annual Underground journeys in Greater London are Central London journeys.
- The next most popular mode is National Rail, which accounts for 18 per cent of annual Central London trip-stages (including those made by the Docklands Light Railway).
- The remaining trip-stages use road-based transport modes to travel: around 16 per cent of annual trip-stages are made by private car, 15 per cent are made in buses, one per cent by taxi journeys and one per cent by bicycle.

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<sup>10</sup> This is a combined household and roadside-type survey undertaken roughly every decade in London. Interim results from the 2001 survey were available in 2004 at the time of this report.

<sup>11</sup> For public transport modes, passenger journey figures are sourced directly from the operators themselves who count the number of journeys only on their own services (i.e. other modes of travel before or after their journey on the public transport mode are not counted) and so are therefore trip-stages. For private modes, the issue of trips or trip-stages is less relevant as most people predominately use one mode per trip.

<sup>12</sup> See Appendix A for a detailed discussion on annualisation.

<sup>13</sup> Throughout the rest of this report, trips (or trip-stages) to, from or within Central London are simply referred to as Central London trips (or trip-stages).

**Table 3.1: Number of journeys (trip-stages) in Central and Greater London (2002/03)**

Trip-stage mode	Trip-stages (million)			
	Central London		Greater London	
	Per annum	Daily <sup>14</sup>	Per annum	Daily
Bus	325	0.89	1,534	4.2
Underground	840	2.30	942	2.6
Rail	412	1.13	670	1.8
DLR	15	0.04	45.7	0.1
Car / Motorcycle	362	1.13	3520	11.0
Taxi	26	0.08	64	0.2
Walk	237	0.74	1760	5.5
Bicycle	19	0.06	96	0.3
Total	2,235	6.37	8,632	25.7

Source: London Travel Report 2003

### 3.2 Journey purpose

An important distinction we make when estimating the costs of transport delays is the journey purpose. In standard transport appraisal methodologies working (employers' business) time is valued more highly than commuting time which in turn is valued more highly than non-working time. It is therefore important to segment the number of journeys into employers' business, commuting and non-work purposes.

Work trip-stages, both commuting and employers' business, totalled 993 million per annum in Central London and account for 44 per cent of the annual number of trip-stages (see Table 3.2). Around 118 million of these arise from those travelling on employers' business and 875 million arise from commuters. A further 1,241 million trips are made for non-work purposes<sup>15</sup>.

The most popular mode for both work and non-work Central London trips is the Underground, with a mode share of just over 38 per cent and 37 per cent for work and non-work trips respectively. Together, National Rail and Underground modes account for 60 per cent of work journeys.

<sup>14</sup> Daily trips are for an average day including weekends except for private modes (car, taxi, walk and bicycle) where the figures are for an average weekday only.

<sup>15</sup> A more detailed discussion of the approach used to calculating these trips is given in Appendix A.

**Table 3.2: Central London journeys by purpose**

Trip-stage mode	Trip-stages by journey purpose				
	Work		Work	Non-work	Total
	Employers' Business	Commuting	Total		
Bus	6	108	114	211	325
Underground	33	346	379	460	840
Rail (& DLR)	28	192	220	207	427
Car/Van/Motorcycle	28	128	156	206	362
Taxi	10	0	10	15	26
Other (Walk/Bicycle)	13	102	115	141	256
Total	118	875	993	1,241	2,235

Source: LATS; London Travel Report; Underground Users Survey; OEF estimates

The number of employers' business trips by Underground is sourced directly from a survey undertaken by London Underground<sup>16</sup>. This reports that employers' business trips amount to 3.9 per cent of total trips, implying 33 million employers' business journeys per annum on the Underground.

For the other modes, the split of work trips between employers' business and commuting has been estimated as follows:

- For taxi journeys we assume that all ten million work journeys by taxi are for employers' business rather than commuting, as it is unlikely that many people regularly commute via taxi.
- For car, rail and bus journeys, the estimates are that employers' business trips account for 18 per cent of all work-related car trips, 13 per cent for heavy rail, five per cent for light rail and five per cent for a public service vehicle (i.e. bus)<sup>17</sup>.

The result is that we estimate employers' business to take up five per cent of all trips. Although this is quite a small proportion, it is nonetheless very important to the cost calculation as a much higher value of time is assigned to employers' business trips.

Combining commuting and employers' business, journeys in connection with work account for 52 per cent and 45 per cent of annual journeys for National Rail and Underground respectively. Other modes of transport have less work-related use: for bus 35 per cent of journeys are work-related and for car 43 per cent journeys are work-related.

<sup>16</sup> London Underground, October 2004, Underground Users' Survey 2003/04. The survey is conducted at Underground station platforms and measures usage of each ticket type, purpose of journey, and passenger characteristics.

<sup>17</sup> Department for Transport, June 2004, Values of Time and Operating Costs, Transport Analysis Guidance. These are UK figures, so we have effectively assumed that the ratio of employers' business trips to commuting trips for car, bus and rail is the same in London as in the whole of the UK.

Our own survey of employees in Central London shows a rather higher proportion of trip-stages by National Rail at 30 per cent (see Table 3.3) than this, and a correspondingly lower proportion of trip-stages by the Underground at 25 per cent. The high figure for walking reflects both those who walk to work and, more importantly, those who walk to or from a bus stop or a train or Underground station.

**Table 3.3: Modes used to travel to work**

Mode	Per cent
National Rail	30.2%
Underground/DLR	25.2%
Bus/coach	10.6%
Private car/motorcycle	10.8%
Taxi	0.5%
Bicycle	2.6%
Walk & other	20.1%

Source: OEF employees' survey

### 3.3 Journey time and length

#### (a) Complete end-to-end journeys

The average commuting time into Central London is around 57 minutes. Commuters who use National Rail record the longest travel to work times of 71 minutes. Car journeys take 54 minutes, while Underground and bus passengers have the same journey time of 50 minutes. Of the other road-based commutes, motorbike journeys take three-quarters of an hour and cycling about half an hour. People who walk to work have the shortest travel to work times. See Figure 3.1.

The journey to work in Central London is much higher than the average for London as a whole of 43 minutes (and significantly higher than the 25 minutes for the whole of Great Britain).

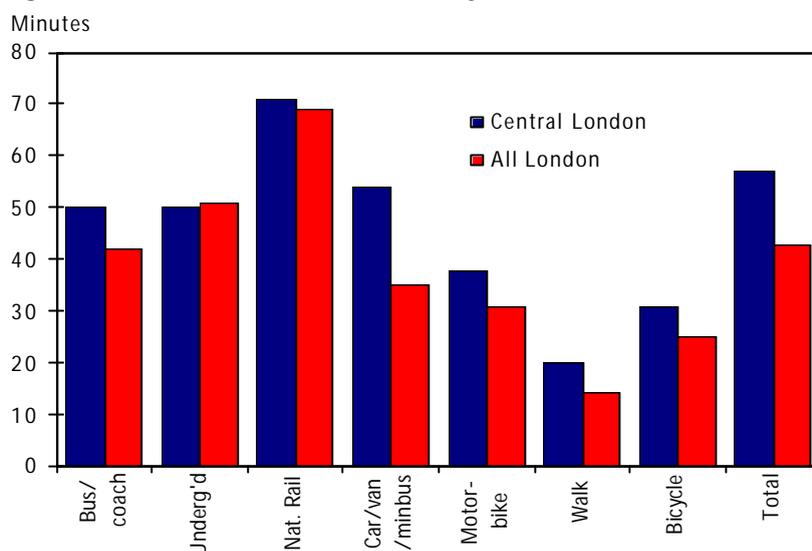
Our own survey shows a very similar average journey time of 59 minutes for the normal journey from home to work, and three minutes longer for the return journey (see Table 3.4). Actual journeys on the days our survey was conducted were, however, on average around five to six minutes (nine to ten per cent) longer than the journey length respondents regarded as usual.

Journeys home from work are slightly longer than journeys to work, both on average and on the survey days. This may reflect the way that problems on the network can build up during the day or the knock-on effects of missing connections for those using more than one mode of travel when the service with the lower frequency (National Rail) is the second rather than the first leg of the journey. It may even be because travellers simply take a more leisurely approach to getting home in the evening. It does not appear to reflect any greater frequency of delays on homeward journeys, since there was no reported difference in how often a month journeys were delayed on morning and evening journeys (6.6 days a month), and on the survey days rather more were

## Time is money: The economic effects of transport delays in Central London

delayed travelling to work (30 per cent) than travelling home (25 per cent) – see Section 4 on the extent of delays.

**Figure 3.1: Travel times to work by main road**



Source: TfL, London Travel Report 2003 (Table 5.3)

**Table 3.4: Average journey length**

	Usual	Survey day
To work	59 mins	65 mins
To home	62 mins	67 mins

Source: OEF employees' survey

### (b) Individual trip-stages

For individual trip-stages the average travel time is considerably smaller as illustrated in Table 3.5 below. The longest stage is National Rail with a typical Greater London journey lasting 30 minutes. A car journey stage takes slightly less at 24 minutes, while Underground and bus journey stages last 15 minutes and 12 minutes respectively.

**Table 3.5: Travel times for individual (trip-stage) journeys for Greater London (2003)**

Mode	Average journey length (kph)	Average speed (kph)	Journey time (minutes)
Bus	3.7	18	12
Underground	7.8	32	15
National Rail	28.3	56	30
DLR	5.1	29	11
Car/Motorcycle	11.6	29	24
Taxi	8.4	23	22
Walk	0.8	5	10
Bicycle	3.2	16	12
Total	8.7	24	22

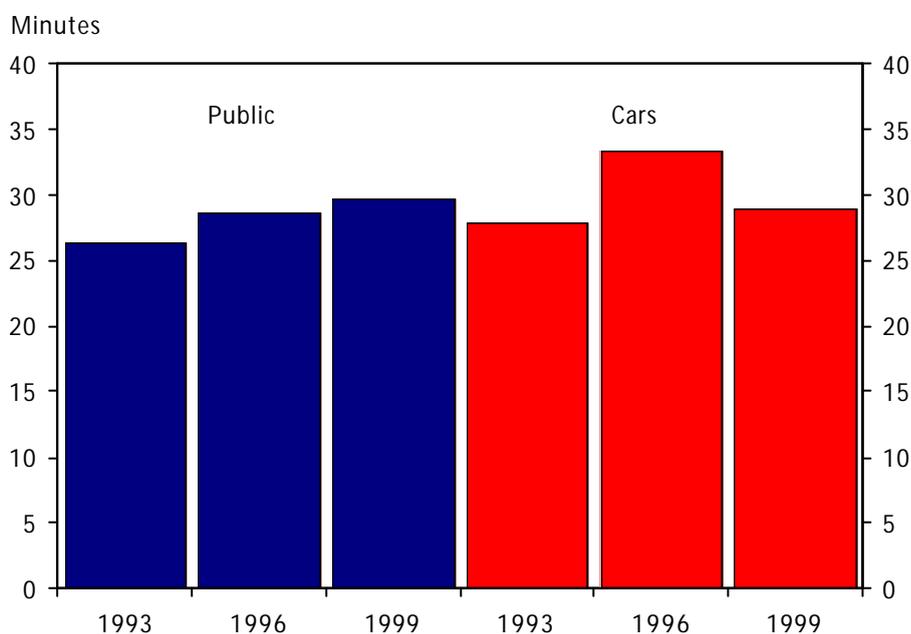
Source: London Travel Report 2003

(c) *Trends in journey times*

A comparison of how journey times have changed over the years supports the widespread impression that the daily commute is getting longer. This could be due to the changes in the efficiency of the transport system but, equally, could be a consequence of people choosing to live further from Central London.

Although the data is quite old, the DfT's annual *Journey Times Survey* which covers both commuting and non-commuting journeys, shows that since the early 1990s average journey times for the same journey in Central London have increased for users of public transport (by 13 per cent) and cars (by four per cent between 1993 and 1999 although 1996 was much higher than 1999).

**Figure 3.2: Average journey times in Central London**



Source: DfT Journey Times Survey

## 4. Extent of delays

### Key points

Transport delays vary by mode as shown by the available performance indicators from TfL, DfT and the Strategic Rail Authority (SRA):

- Underground – journeys took an average of 3.4 minutes longer than scheduled in 2003/04.
- National rail – 20 per cent of trains (22 per cent in the peak) arrived late in 2003/04.
- Cars – One minute, 32 seconds were lost on average per vehicle/km for weekday peak travel as a result of congestion in 2003/04 (one minute, 43 seconds per vehicle/km for weekday off-peak travel).
- Buses – excess waiting time (i.e. time waiting in addition to that planned if buses run to schedule) averaged 1.4 minutes per passenger in 2003/04. In addition to excess waiting time, there are waiting delays on buses from congestion on the roads similar to those affecting cars – one minute and 32 seconds per vehicle/km.

After many years of worsening delays, some modes of travel have recently shown some improvements:

- Excess journey times on the Underground rose from 3.2 minutes per passenger in 1998/09 to a high of 4.2 minutes in 2002/03 but has since improved back to 3.4 in 2003/04.
- Excess waiting times for buses have improved from a high of 2.2 minutes per passenger in 2000/01 to the current figure of 1.4 minutes in 2003/04. The latest figures (quarter 4 of 2003/04) show further improvements with waiting times now down to 1.2 minutes.
- Since the introduction of the congestion charge in Central London, the level of congestion has fallen by 30 per cent (although other factors such as the actual performance of the Central London economy may also have played a part in this reduction). There has also been a 17 per cent increase in average road traffic speeds, which is significant as average speeds have been on a general downward trend over the past 35 years.

Our survey of employees showed:

- Thirty per cent suffered a significant delay on their journey to work on the day covered by their questionnaire, and 25 per cent on their homeward journey.
- Ten per cent travelling on business were late as a result of transport delays, while 32 per cent of incoming visitors were.
- Also, 13 per cent of companies report that transport delays significantly affect the speed and cost of their deliveries, while 31 per cent report that they somewhat affect the quality of repair and maintenance offered by contractors.

- This section describes the extent of delays incurred through travel to, from or within Central London. The information is based on performance indicators by mode of travel and survey evidence on frequency/duration of delays in travelling to/from work for both employers' business and commuting trips. We consider the size of these delays for each of the main transport modes in turn.

#### 4.1 Underground

Information about Underground delays is available in terms of excess journey time which is calculated as the difference in minutes between the average time actually taken for journeys and the time they would have taken if trains had run according to schedule. These are not split by time of day, origin or destination, but provide a clear indication of the significance of delays.

In 2003/04 delays on average added 3.4 minutes to Underground journeys. Excess journey times since 1998 (see Table 4.1) and scheduled journey times have been broadly constant. Although the higher than average excess journey time in 2002/03 of 4.2 minutes, where excess waiting times represented 17 per cent of scheduled times, is partly due to the closure of the Central Line after a derailment, and by industrial action. The excess journey time would have been 3.3 if these effects were excluded.

**Table 4.1 Scheduled and excess journey times on the Underground (minutes)**

	Scheduled	Excess journey Time	Excess (% of scheduled)
1998/99	24.5	3.2	12.8%
1999/00	24.5	3.2	13.1%
2000/01	24.9	3.7	14.8%
2001/02	24.9	3.4	13.8%
2002/03	24.9	4.2	17.0%
2003/04	24.5	3.4	13.7%
2004/05 (to date)	24.6	3.1	12.5%

Source: TfL

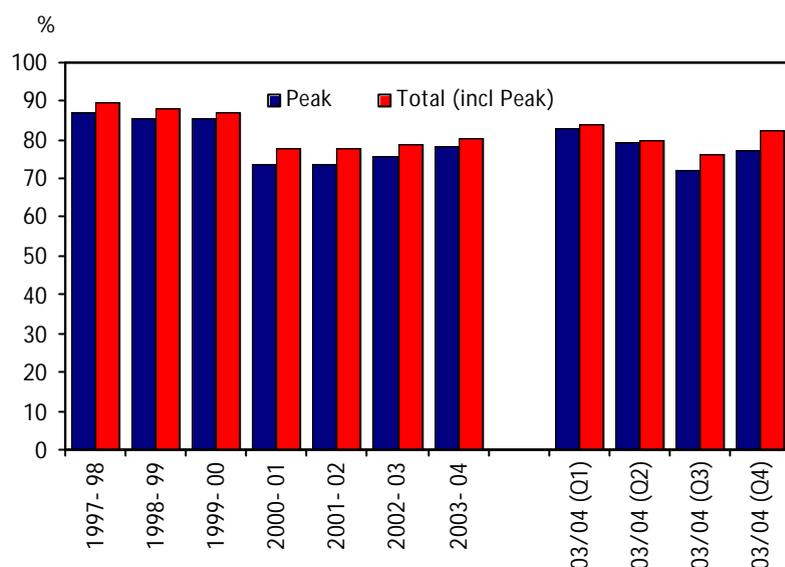
Notes: Scheduled time is defined as total travel time minus excess travel time. 2004/05 figures to date up to period 5.

#### 4.2 National Rail

The percentage of trains in London and the South East (SE) arriving 'on time' has declined from 90 per cent in 1997/98 to 80 per cent in 2003/04 (Figure 4.1). The reliability of peak period services for London and SE operators experienced a similar fall, with on-time trains declining from 87 per cent to 78 per cent over the same period.

Trains are recorded as running 'on time' if they arrive within five minutes or less of schedule for short journeys, and ten minutes or less for long journeys. Therefore, even trains classified as on time will involve an element of delay in some cases.

**Figure 4.1: Trains arriving 'on time' for London and South East services**

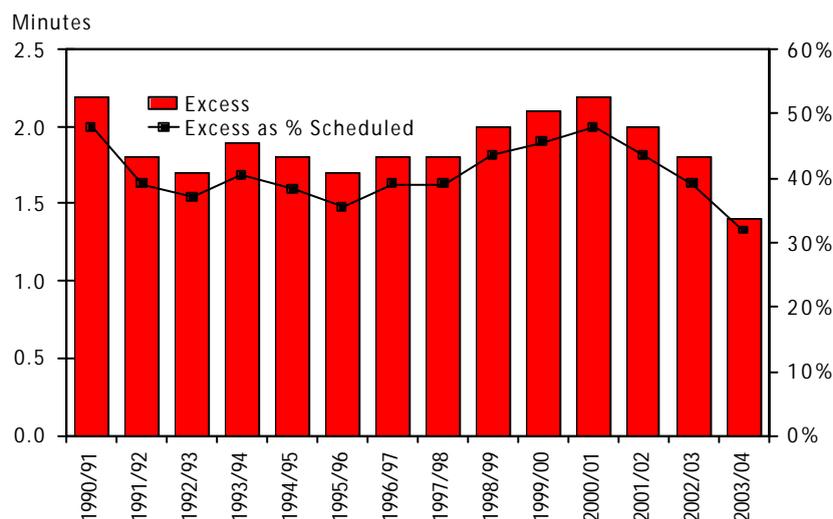


Source: SRA National Rail Trends Yearbook (2003/04)

### 4.3 Bus

Bus users may suffer delays as a result of having to wait longer at bus stops than they would if buses ran to schedule. For high frequency bus routes in London, the average excess waiting time was 1.4 minutes per passenger in 2003/04, 32 per cent of the average scheduled wait<sup>18</sup>. This is some 22 per cent lower than the 1.8 minutes per passenger for the 2002/03 period.

**Figure 4.2: Average excess waiting time**



Source: TfL

<sup>18</sup> In the terminology, actual wait equals scheduled wait plus excess wait.

For the latest performance period (quarter 4 2003/04), the figure has fallen further to 1.18 minutes, only 27 per cent of the average scheduled wait of 5.59 minutes.

The percentage of low frequency bus services which were on time has risen steadily from 63 per cent in 1990/91 to 71 per cent in 2002/03 and to 75 per cent in 2003/04<sup>19</sup>. However, the excess wait time for high frequency services is likely to be much more relevant to bus travellers to, from or within Central London, since:

- A bus passenger is much more likely to travel by high frequency service. Around two-thirds of routes are high frequency routes, and because these services are more frequent many more passengers will travel on these routes.
- Furthermore, the low frequency bus services are much more likely to be in the outskirts of London, rather than Central London.

In addition to this excess waiting time, bus users, like car users, also suffer from the impact of congestion on the roads extending journey times. The presence of separate bus lanes on some roads may mean this delay is smaller on average for buses than for cars. In the absence of any other information though we use the excess journey time estimates for cars described below as a proxy for all road-based transport.

#### **4.4 Cars**

The DfT has designed a measure of congestion on roads in terms of seconds lost per vehicle kilometre – i.e. total time lost compared with ‘uncongested’ traffic speeds, divided by the total volume of traffic measured in vehicle kilometres. Uncongested speeds used as the reference point in this calculation are derived from measuring the same journey times at night when road traffic is at a minimum.

Congestion adds two minutes per vehicle/km to car journeys made at peak times during the week in Central London. Delays during daytime off-peak periods are longer still at 2twominutes 14 seconds per vehicle/km (see Table 4.2). These figures highlight that delivery vehicles, transit coaches and other day-time road users have more of an impact in reducing average traffic speeds in Central London than peak-time commuters who drive to work.

Since the introduction of the congestion charge in Central London, a 30 per cent fall in the average level of congestion within the charging zone has been measured<sup>20</sup>. This implies that congestion in 2004 is likely to add one minute, 32 seconds per vehicle/km in the congestion charging zone (one minute, 43 seconds per vehicle/km for weekday off-peak travel).

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<sup>19</sup> The latest figures for quarter 4 in 2003/04 are slightly better at 76 per cent. Source: TfL, 2004, London Buses Network Performance, Fourth Quarter 2003/04 (3/1/04 to 31/03/04).

<sup>20</sup> Congestion Charging Central London, Impacts monitoring (Second Annual Report, April 2004). The findings from our own survey (Appendix D) also report the extent to which the Congestion Charge has affected journeys.

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Note that the actual impact of the congestion charge could be lower or greater than 30 per cent as other factors, such as the performance of the Central London economy, are likely to also be relevant. A detailed cost-benefit analysis of the actual impact of the congestion charge has been undertaken by TfL<sup>21</sup> with a net benefit of around £50 million estimated. This originates from £180 million in annual benefits (ie £150 million from time savings and £30 million from other net benefits) set against annual costs of £130 million.

**Table 4.2: Congestion in Central London, 2000**

*seconds lost per vehicle kilometre*

	<b>Weekday peak periods</b>	<b>Weekday off-peak</b>	<b>All periods</b>
<b>2000 estimates:</b>			
Central London	120.0	134.3	69.3
Inner London	109.8	68.1	53.7
Outer London	50.1	30.3	27.1
Greater London	65.8	45.5	35.7
<b>2004 estimates:</b>			
Congestion Charge Zone <sup>22</sup>	92.3	103.3	53.3
Central London <sup>23</sup>	98.0	110.0	57.0

Source: DfT, *A measure of road traffic congestion in England: Method and 2000 baseline figures*

TfL also reports average traffic speeds in Central London over the past 35 years for both peak and off-peak travel periods. Average traffic speeds have declined steadily since the 1970s, dropping to around ten miles per hour in the late 1990s. The most recent figures show average speeds of 9.9, 9.0 and 9.6 miles per hour during morning, daytime and evening peak periods respectively (Figure 4.3). Since the introduction of the congestion charge, traffic speeds are estimated to have increased by around 17 per cent<sup>24</sup>.

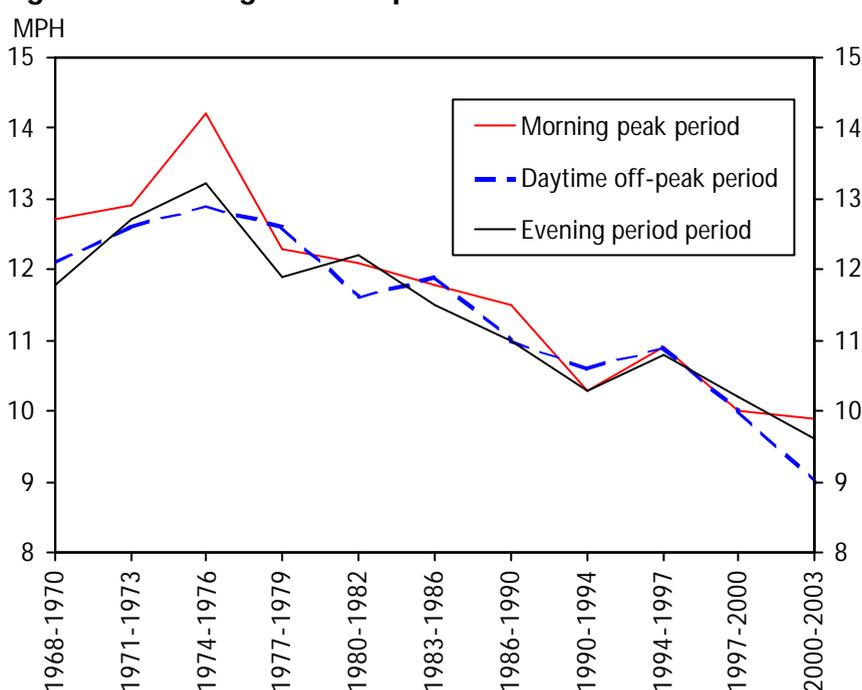
<sup>21</sup> Congestion Charging Central London, Impacts monitoring (Second Annual Report, April 2004).

<sup>22</sup> The 2004 congestion charge zone estimate is the 2000 figure reduced by 30 per cent, as a result of the fall in congestion measured since the introduction of the Congestion Charge.

<sup>23</sup> Assuming that 75 per cent of car journeys to, from or within Central London (by distance) are inside the Congestion Charging Zone.

<sup>24</sup> Greater London Authority, 2001, Draft Mayor's Transport Strategy Revision: Central London Congestion Charging - Westward extension, response from the London Assembly

**Figure 4.3: Average traffic speeds in Central London**



Source: DfT, Survey of Traffic Speeds

#### 4.5 Survey evidence

The surveys were carried out with companies and employees working in Central London to provide additional evidence of the impact of transport delays in Central London. People's perceptions of the delays they have suffered may not always exactly match reality, but even if they do not they are still important as an indication of the frustrations caused by transport delays and the possibility that they will lead individuals or companies to move jobs away from Central London.

##### (a) Frequency of delays

- Our survey of employees shows that 30 per cent of employees suffered a significant delay on their journey to work on the day covered by their questionnaire (Q13a), with the majority of delays occurring on National Rail services – not a surprise given that more respondents used these services than any other mode of travel.
- Slightly fewer (25 per cent) were delayed on their homeward journeys (Q23a).
- The most common reasons for delays were signal failures and train breakdowns, but in over 31 per cent of cases respondents did not know the reason for the delay, which is a common source of frustration.
- To check whether experience on survey days was unusual, we asked how many times on average a month, journeys to work were affected by transport delays (Q13d). Respondents reported on average that they are delayed 6.6 days a month, corresponding quite closely to the percentage affected (30 per cent) on the individual survey days (Q13a).

## Time is money: The economic effects of transport delays in Central London

- Although travellers clearly make some allowance for the possibility of delays in planning journeys, delays still make them late for work on average 4.2 days a month (Q16), or just over 20 per cent of the time.

### (b) *Business travel*

The majority of Central London staff do not need to travel around or from Central London on any particular day. However 14 per cent of respondents still made a business journey on the day they were surveyed (Q 24a) and 11 per cent of respondents had clients or colleagues travelling to them (Q 25a). This relatively small proportion of people making use of business travel is consistent with data on business travel discussed in the previous section; the number of employers' business journeys is 12 per cent of the number of work trips.

Of those making business journeys:

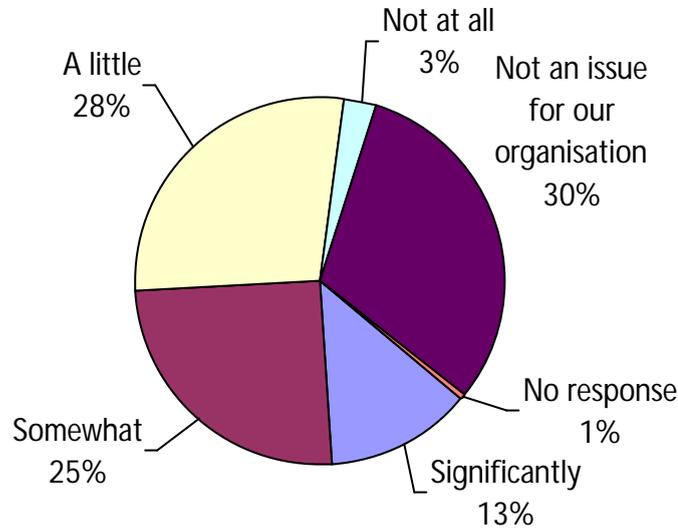
- Fourteen per cent suffered delays on the journeys they made, with ten per cent arriving late as a result.
- Thirty-two per cent of incoming visitors were late as a result of transport delays.
- There was no significant difference of perception between visitors and hosts over the significance of delays. Seventy-eight per cent of those who were late for an appointment and 75 per cent of those whose visitors were late said that the delay mattered.

### (c) *Delivery and maintenance services*

Companies in Central London are not only affected by the impact of transport delays on their staff's journeys to work and on business travel. In addition, Central London firms make substantial use of delivery services (sending or receiving goods) and of out-sourced repair and maintenance services. Our survey shows:

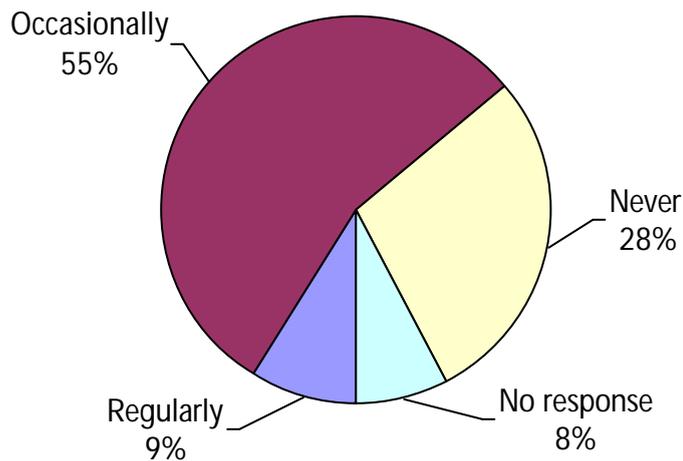
- Thirteen per cent of respondents report that transport delays significantly affect the speed and cost of their deliveries (Figure 4.4) and that nine per cent claim that this has regularly led to major problems for them (e.g. because of missed deadlines or client cancellations), while 55 per cent report that it has occasionally (Figure 4.5).
- Thirty-one per cent of respondents report that transport delays somewhat affect the quality of repair and maintenance service offered by contractors (Figure 4.6).
- Five per cent report that this has regularly led to major disruption in their operations, while 47 per cent report that it has occasionally (Figure 4.7).

**Figure 4.4: Does your organisation find that transport delays affect the speed and cost of deliveries either to your clients or from your suppliers?**



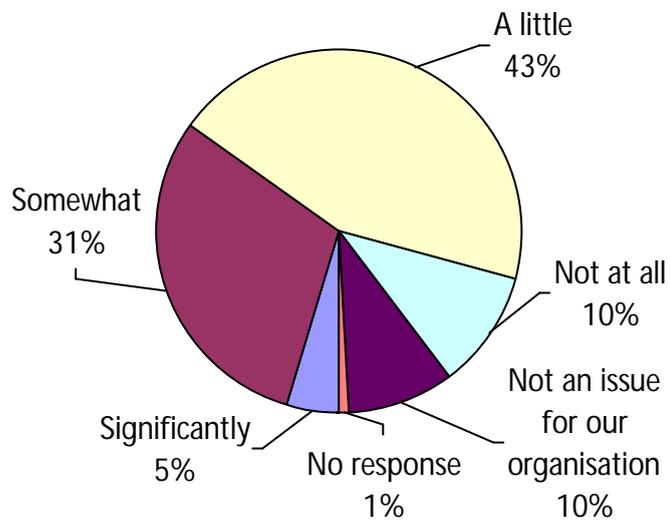
Source: OEF survey of companies

**Figure 4.5: Have such problems led to major problems for your organisation (e.g. deadlines missed, clients cancelled, etc)?**



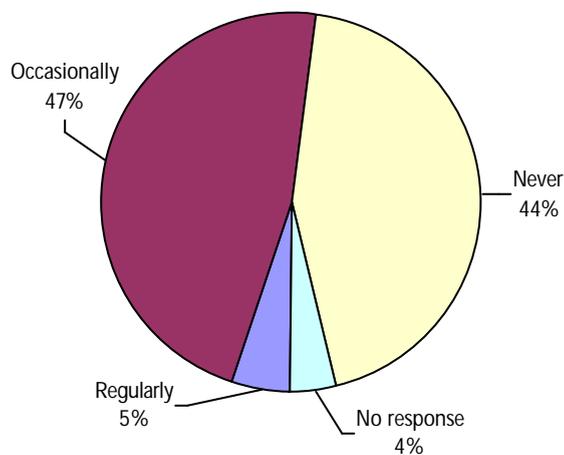
Source: OEF survey of companies

**Figure 4.6: Does your organisation find that transport delays affect the quality of repair and maintenance services offered by your contractors?**



Source: OEF survey of companies

**Figure 4.7: Have such problems led to a major disruption in your operations?**

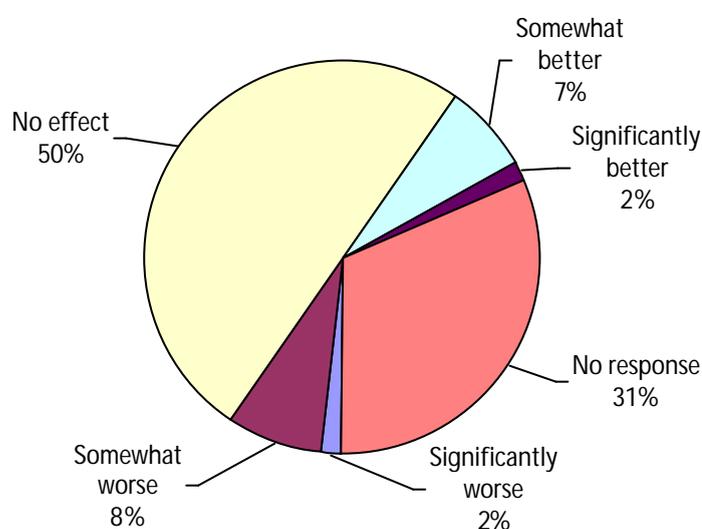


Source: OEF survey of companies

(d) *The impact of the congestion charge*

The introduction of the congestion charge was reported to have had no effect on the journey to work by 50 per cent of people (Q17). Around one-in-ten people found their journey improved while ten per cent said it worsened by the introduction of the congestion charge (Figure 4.8). It is possible, however, that our survey understates the benefit of the congestion charge, since a higher proportion of respondents commute by National Rail than suggested by broader-based surveys such as the Labour Force Survey (LFS).

**Figure 4.8. How has your work journey been affected by the introduction of the congestion charge?**

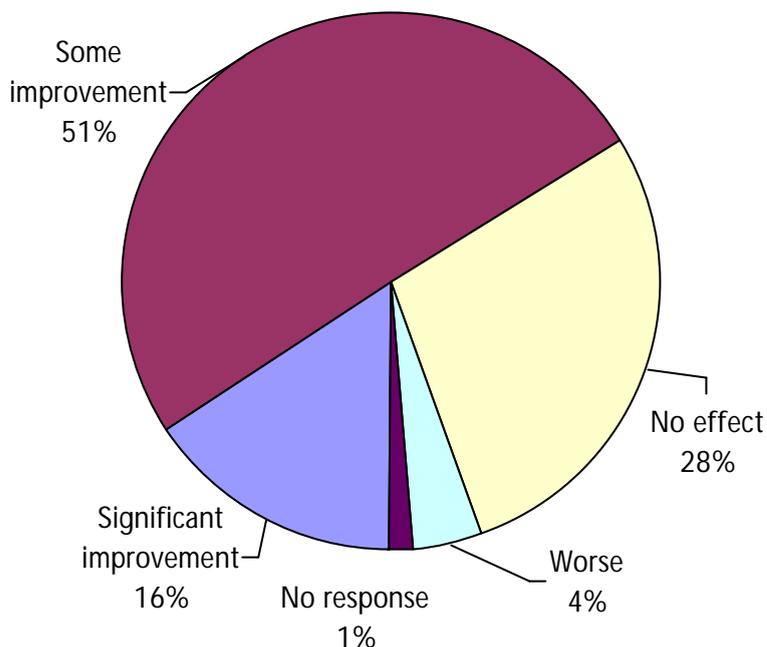


Source: OEF employees' survey

Interestingly, there is a much clearer perception among companies that the congestion charge has affected business travel than there is among employees that it has affected commuting, and there is also a perception that it has led to some improvement in journeys for servicing or deliveries:

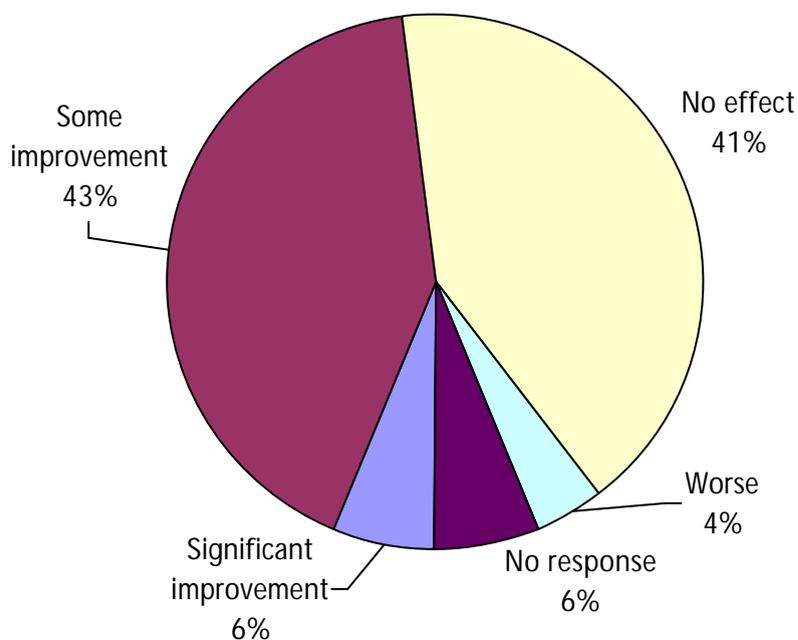
- Sixty-seven per cent of respondents report that the introduction of the congestion charge has led to at least some improvement in business travel in Central London (Figure 4.9).
- About 49 per cent of respondents report that the congestion charge has led to at least some improvement in servicing and deliveries in the Central London (Figure 4.10).

**Figure 4.9: What impact has the introduction of the congestion charge had on business travel in Central London?**



Source: OEF survey of companies

**Figure 4.10: What impact has the introduction of the congestion charge had on journeys for servicing and deliveries in Central London?**



Source: OEF survey of companies

## 5. Cost of delays

### Key points

- On conservative assumptions, the quantifiable cost of transport delays to employees and businesses is put at £1,190 million a year. This is equivalent to £830 a year per person working in Central London or about £4.6 million per business day for Central London as a whole.
- Of these costs, £870 million arises as a cost in the first instance to commuters and £320 million is borne by employers.
- In addition, a further £560 million a year is lost due to delays to non-work trips (e.g. shopping, leisure, social, tourism).
- The overall total cost of transport delays to the Central London economy is therefore £1,750 million, which is equivalent to £1,220 per employee working in Central London or about £6.7 million per business day.
- Alternative assumptions imply the cost could be as much as £2,500 million a year (£1,740 a year per person working in Central London).

There are several other costs of transport delays that we have chosen not to quantify in terms of £million:

- Additional time is wasted allowing for the possibility of delays. Our employee survey suggests that an extra 14 per cent on top of the average travelling time is allowed for by commuters.
- Health and productivity are affected by stress with 38 per cent of respondents to our employee survey saying transport delays create a serious problem or something of a problem for their health, and 61 per cent think the effect on their family life is a problem.
- Companies may need to pay extra to offset the frustrations employees face travelling to and from work.
- Deliveries and servicing suffer; nine per cent of companies regularly had major problems such as missed deadlines or lost clients as a result of transport delays and five per cent reported that their operations regularly suffer major disruption as a result of the impact transport delays have on the quality of repair and maintenance services that their contractors offer.
- Some companies feel the impact of transport delays is too severe and are considering moving or have moved operations elsewhere.

## 5.1 Overview

This section produces a quantified estimate of the cost of travel delays to the Central London economy. It is important to bear in mind that the quantified estimate is a conservative figure; first, because it is only feasible to quantify some of the costs involved and, second, because where we have made assumptions, they have been deliberately cautious in order to allay any concerns that the result may be an exaggeration.

After estimating the economic costs, this section then goes on to discuss other ways in which transport delays impose costs on Central London over-and-above the hours lost by travellers.

The starting point for calculating the cost of delays in Central London is the total **number of trip-stages** made by each transport mode per annum (as set out in Section 4). There are then two stages to our methodology:

- First, multiplication of the number of trip-stages made by each mode by the **average delay per trip-stage** for the relevant mode to give the total time lost per annum by travellers.
- Second, multiplication of the time lost by an appropriate cost – **the value of time** – to give an overall quantitative value of the cost of delays.

In some cases the data we use in our estimates of the direct cost of hours lost as a result of transport delays are not specific to Central London. For example, Underground excess journey time covers the whole network; and excess waiting time for buses covers high frequency services. In both cases, however, we consider these to be reasonable approximations for travel to, from or within Central London.

## 5.2 Average delay times

Table 5.1 summarises our estimates of the average delay per trip-stage by each mode of transport, for work and non-work trips, separated into excess journey times for travelling and excess waiting time for delayed services.

**Table 5.1. Average delays by mode and trip purpose**

	Excess travel time (minutes)		Excess waiting time (minutes)	
	Work / EB	Non-work	Work / EB	Non-work
Bus	5.5	3.0	1.4	1.4
Underground	0.9	0.9	2.4	2.4
Rail	1.7	1.5	1.7	1.5
Car	15.6	7.1	n/a	n/a
Taxi	5.3	2.9	n/a	n/a
<b>All modes</b>	<b>3.8</b>	<b>2.3</b>	<b>1.4</b>	<b>1.3</b>

Source: OEF estimates

Note: EB = Employers' Business

Delays are separated into excess journey time and excess waiting time as a higher value of time is used in our calculations for excess waiting time. This 'weighted' value takes into account that time spent waiting for a delayed service is perceived by users as more serious than additional time spent on the train, due to the additional perceived cost of the stress and uncertainty of waiting for a delayed service.

Excess journey time while travelling is calculated as the difference in minutes between the average time actually taken for journeys and the time they would have taken if services had run according to schedule.

The average delay is greatest for the car mode because of a high delay per kilometre of travel relative to other modes and a journey time which is longer than all other modes except National Rail. Almost all journeys involving a car are single main-mode trips, whereas public transport modes are often part of multi-mode journey. Buses, in particular, are often used to access the Underground or rail modes of transport and as such have a considerably lower trip-stage length.

We now turn to describing the detailed statistics and assumptions we have used to calculate these average delays.

### (a) *Calculating average delays for Rail journeys*

In 2003/04, 19.7 per cent of trains in London and the South East arrived 'late' (22.1 per cent for peak service trains). Trains are recorded as running on time if they arrive within five minutes or less of schedule for short journeys, and ten minutes or less for long journeys.

Assuming journeys are distributed evenly across late running and on-time trains, the proportion of passengers delayed is simply the proportion of late trains. More detailed information on journey times is not collected from which we could estimate the average delay for trains that are classified as late, so we have based our subsequent analysis on what we regard as a fairly conservative assumption that total delays can be estimated by allowing 15 minutes per train arriving 'late'.

Some trains are obviously delayed much longer than this and there are also delays from some trains classified as 'on time' when they arrive less than five minutes after their scheduled time. On the other hand the distribution of arrival times is presumably skewed towards the shorter end of the 'late' category.

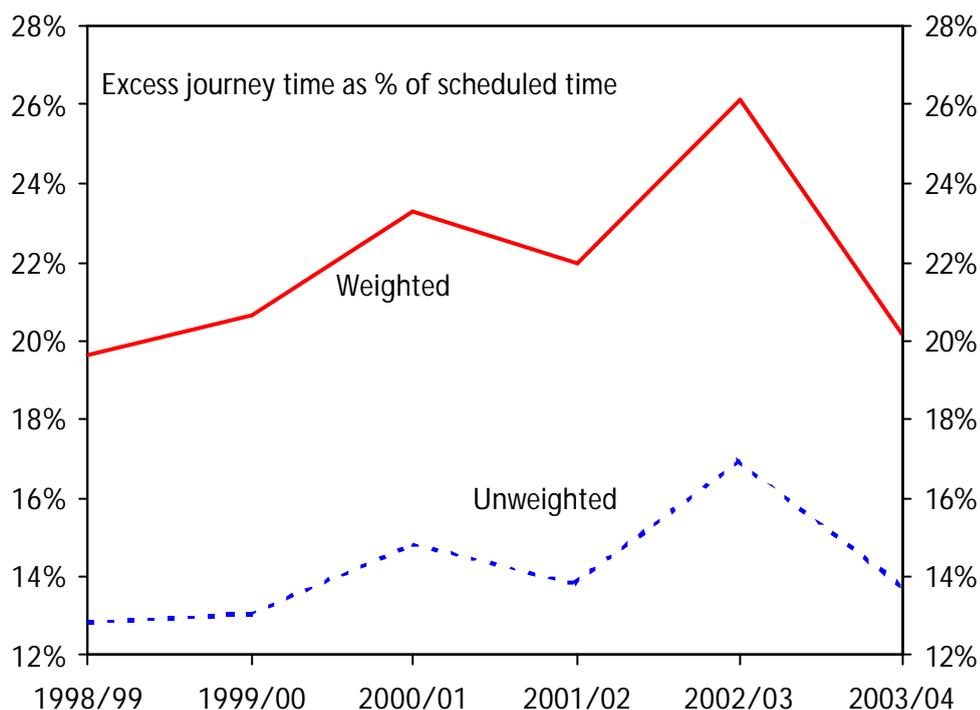
In terms of the split between extra waiting and travelling time, we assume that on average half of the delay is spent waiting for an overdue train and half through extra travelling time.

The average waiting time for all services (both peak and off-peak) is applied to non-work trips, while the average waiting time for peak services is applied to commuter trips. We assume that employer business journeys incur the same delays as commuter journeys.

*(b) Calculating average delays for Underground journeys*

These figures are drawn directly from the TfL performance indicators, which give average excess journey times for Underground trips in 2003/04. Information on delays on the London Underground is also available on a weighted basis, where time spent waiting for a delayed service is given an additional weighting. In 2003/04 delays added 3.36 minutes to Underground journeys and around 7.4 minutes on a weighted basis<sup>25</sup>.

**Figure 5.1: Delays on the Underground**



Source: TfL

In month eight of 2003/04 a considerable amount of the excess journey time was due to the abnormal consequences of industrial action. Without this impact, the average excess journey time for the year would have been 3.2 minutes, which is the figure used in our calculations.

The same average excess delay is assumed to be experienced by work (employers' business and commuting) and non-work travellers on the Underground.

*(c) Calculating average delays for car journeys*

The first step in the calculation is to estimate the average distance travelled (in kilometres). We estimate that the distance of the average car commute is ten kilometres

<sup>25</sup> To calculate this, TfL applies factors to different forms of waiting; e.g. a 2.0 factor is applied to waiting on platforms and 3.0 is applied to waiting time after being unable to board a train. This is slightly different to our methodology, which follows DfT transport appraisal guidance, where a 2.5 factor is applied to all waiting types across all modes (see Section 5.3(d)).

and the average distance of a non-work trip is around eight kilometres, based on analysis of the LATS database.

The total delay is then calculated by multiplying the trip distance by the congestion on roads in terms of seconds lost per vehicle/km<sup>26</sup>. Congestion is measured as the additional time for the journey over the time under 'uncongested' traffic speeds (using night time speeds as the reference point for an uncongested network).

The level of congestion differs according to whether it occurs in Central (inside or outside the congestion charging zone), Inner or Outer London. We therefore estimate the proportion of a trip which takes place in these different parts of London, namely that:

- Thirty per cent of the car journey by distance is spent in Central London, 40 per cent in Inner London and 30 per cent in Outer London<sup>27</sup>.
- Seventy-five per cent of the car journey (within Central London) by distance is spent inside the congestion charging zone<sup>28</sup>.

These proportions are used to calculate an overall average congestion delay indicator for Central, Inner and Outer London which is 90 seconds per vehicle/km for Central London commuting journeys<sup>29</sup> and 50 seconds per vehicle/km for Central London other non-work journeys.

The delay per car commuting journey is then 15.6 minutes and for non-work journeys is 7.1 minutes. For car trips there is no concept of waiting time for a delayed service and so we are only concerned with total excess journey time due to congestion. Employers' business trips are assumed to experience the same average delay as commuter trips.

#### (d) *Calculating average delays for bus journeys*

The average passenger waiting time on routes serviced by bus company London Central in 2003/04 was 1.4 minutes per passenger. In addition to this, we need to estimate the excess time spent by passengers on buses. This is likely to be substantial as TfL reports that between a quarter and a fifth of bus journey time is spent stationary at bus stops.

As a proxy, we use the excess journey time estimates for cars applied to the average length of a bus journey of 3.7kms. For work trips, with the delay per bus 1.5 minutes per km, the delay per passenger trip is 5.5 minutes. The overall delay time (6.9 minutes) is simply the sum of the excess waiting time and the excess travelling time. For leisure

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<sup>26</sup> See Table 4.1 in the previous section.

<sup>27</sup> OEF estimate based on analysis of the LATS database. To arrive at these figures, we modelled the number of trips by different origins and destinations (central, inner, outer and external), the average distances travelled for each of these trip types and the respective distances within each of these areas.

<sup>28</sup> OEF estimate based on analysis of LATS database.

<sup>29</sup> The proportions 30% : 40% : 30% are applied to the seconds lost per vehicle kilometre from congestion 98 : 110 : 50 seconds (see Table 4.2) to give a weighted average of 88.3 seconds (i.e. around 90 seconds). The same approach is used for non-work journeys.

trips, the delay per bus is 0.8 minutes per km, which produces the delay per passenger trip of 3.0 minutes and an overall delay of 4.4 minutes.

### 5.3 Putting a value on an hour lost to transport delays

There are several factors that affect the economic value of each hour lost through transport delays. In particular, whether time lost should be valued as lost leisure time or lost working time; whether extra time spent travelling can be put to profitable use; and whether time spent waiting should be valued differently to additional time spent travelling. The values we use for different trip purposes and types of delay are summarised in Table 5.2.

**Table 5.2. Values of time by purpose and type of delay**

	<b>Journey time</b>	<b>Waiting time</b>
Non-work (leisure)	£4.80	£11.99
Commuting	£9.76	£16.18
Employers' Business	£26.09	£26.09

Source: OEF estimates based on DfT guidance (*The Value of Travel Time Savings*).

The approach we have used to calculate these figures is described below for non-working time, commuting time and employers' business time.

#### (a) *Non-working (leisure) time*

To put a value on the leisure time lost through transport delays we follow guidelines in DfT's *Values of Time and Operating Costs* report<sup>30</sup>. This guidance suggests that non-working time should be valued at £4.46 per hour (2002 prices). Converting to current 2004 prices by scaling this figure by average earnings growth since 2002 – roughly four per cent per year on average – gives £4.80 per hour.

It has been long-standing DfT policy to apply a single standard value of non-working time to all such time irrespective of the value to particular travellers (except in the context of assessing willingness to pay for improvements). This has benefits in terms of practicality, but its use is justified particularly on grounds of equity. DfT's *Values of Time and Operating Costs* report notes that, 'the use of values differentiated by region...rather than a standard value...would therefore raise a mixture of technical, practical and political issues'<sup>31</sup>. We have therefore continued this practice in our 'headline' calculation. The results of a sensitivity test where a higher value of leisure time is used to calculate the cost is given in Appendix B.

#### (b) *Commuting time*

Guidelines from the DfT on the value of travel time savings give a commuting value of time of £5.42 in 2004 prices<sup>32</sup>. This seems an appropriate value for normal commuting time, since workers will typically be expected to be at work for a certain amount of time, and any changes in travel time will affect how much time they are able to spend at

<sup>30</sup> DfT, June 2004, *Values of Time and Operating Costs* (Transport Analysis Guidance, Unit 3.5.6)

<sup>31</sup> DfT, June 2004, *Values of Time and Operating Costs* (Transport Analysis Guidance, Unit 3.5.6)

<sup>32</sup> DfT, June 2004, *Values of Time and Operating Costs* (Transport Analysis Guidance, Unit 3.5.6), updated to 2004 prices from 2002 value of £5.04 per hour.

home before allowing enough time to get to work and how much time they can spend at work to get home by the expected time.

However, this is less clear for unexpected delays in travelling that may well lead to people being late for work. In particular, our survey suggests that a significant proportion of commuting time lost on the way to work should be valued as lost working time rather than lost commuting time:

- Thirty-six per cent of employees who were late for work reported that they achieved less than they would otherwise have done (Q15).
- Forty-eight per cent of employers say they do not expect staff to make up time/work lost through transport delays (Q11), although most employees usually (41 per cent) or sometimes (44 per cent) expect to be able to catch up another day.

Our survey results also provide a guide to the issue of whether extra time spent travelling can be used productively (e.g. for reading reports, making telephone calls). Strikingly, these suggest that no-one who spent time on business travel was able to spend all or most of the time working, and only four per cent reported they were able to spend some of the time working (Q24h). Given that the work that was able to be done may not have been the first choice of work and that unplanned time travelling caused by delays is likely to be even less valuable for working than planned travel time, we do not believe it is appropriate to adjust our estimates of time lost through transport delays to take account of work done while delayed.

Our calculations are based on the assumption derived from these surveys that 42 per cent of time lost through transport delays represents a loss to the employer rather than the employee. This is a simple average of the employees view (36 per cent) and the employers view (48 per cent) of whether output is affected.

However, time lost through travel delays on homeward journeys is valued entirely as lost commuting time. In other words, 21 per cent of total time spent commuting is valued as lost work time. This produces a value of time for transport delays while commuting time of £9.76 per hour.

(c) *Employers' business time*

We follow HM Treasury appraisal guidance and value the hours lost at the opportunity cost to the employer, which is assumed to equal the marginal cost of labour to the employer – that is, the average gross wage of employees affected, plus non-wage costs such as national insurance, pensions and any other costs that vary with hours worked. Under this methodology, we estimate an average wage for people who work in Central London is £811 per week or £21.53 per hour (in 2004), based on the New Earnings Survey<sup>33</sup>. We then scale this figure to reflect hourly non-wage costs. DfT suggest an

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<sup>33</sup> Average of the City of London, City of Westminster and Kensington & Chelsea boroughs weighted by the number of employed people (2003) and then increased to 2004 figures.

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uprating factor of 21.2 per cent to cover these. This gives an average wage of £26.09 per hour for people who work in Central London.

### (d) *Waiting time*

Waiting time delays for public transport for non-work trips are valued as equivalent to 2.5 times<sup>34</sup> the same time spent travelling or being delayed on the mode itself. This factor is applied to better reflect the underlying cost of delays to the traveller. Waiting time delays that represent time lost to the employer, however, are taken as the actual time lost. While time wasted because of delays is frustrating for business travellers, the direct cost to businesses of, say, an additional ten minute wait for a train service is unlikely to be different to a ten minute delay spent on the train<sup>35</sup>. For commuting trips, the 2.5 factor is only applied to 79 per cent of the value of time as 21 per cent of commuting time is valued as lost work time which is not factored.

## 5.4 The overall cost of transport delays to Central London

Combining all these assumptions implies that the overall minimum quantifiable cost of transport delays in Central London to commuters and businesses is £1,190 million per annum. Of this, around £870 million arises as a cost to commuters and £320 million as a cost to businesses.

In addition, there are further costs amounting to £560 million associated with trips for non-work purposes. The overall cost is therefore £1,750 million a year or about £6.7 million per business day.

This represents a costs to commuters and employers of £830 a year per person working in Central London. A further £390 a year per person working in Central London is lost due to delays to non-work trips. The overall total is therefore equivalent to £1,220 a year per person working in Central London. Around 57 per cent of the costs are due to additional excess journey time with the remainder (43 per cent) due to additional waiting time.

**Table 5.3. Summary of costs**

Purpose of trip	Total costs (£ million)	Total costs (%)	Costs per employee (£ million)
Commuting	870	49.5%	605
Employers' business	320	18.3%	225
Leisure (non-work)	560	32.2%	390
<b>Total</b>	<b>1,750</b>	<b>100%</b>	<b>1,220</b>

<sup>34</sup> DfT, June 2004, Values of Time and Operating Costs, Transport Analysis Guidance

<sup>35</sup> This methodology is consistent with the Transport Analysis Guidance. On the subject of lost waiting time due to employers' business trips the guidance states that 'the time spent or saved is assumed to be lost or gained in productive working time – the travel activity taking up the time is therefore deemed irrelevant' (Section 1.2.9).

The estimated cost of transport delays to the commuter and employer in Central London at £830 per working person is 11 per cent higher than the £750 per working person estimated in our previous study for the City of London.

This slightly higher estimate is due to a variety of factors. Among the key changes include the use of a different source of data<sup>36</sup>; a higher value of time for commuting time although this is largely offset by a lower value of working time (due to the relative lower wage rate in Central London compared to the City); modelling of employers' business trips for all modes; and the use of the LATS database to calculate distance travelled by car and by taxi.

Including in our calculations the value of the time people lose as a result of transport delays while travelling on non-work purposes, as well as the time they lose commuting to work or travelling on employers' business, means that the estimated cost of transport delays in Central London per employee increases to £1,220, which is higher than our previous study for the City of London where leisure travel was not a significant factor.

The costs of transport delays are greatest for car journeys with £627 million attributed to this mode. This is mainly because the length of a typical trip-stage is longer for a car journey compared to a public transport journey which may involve two or three separate public transport modes<sup>37</sup>. When all of the costs from public transport modes (bus, rail and Underground) are added up, they come to £1,096 million, 73 per cent higher than car.

**Table 5.4. Summary of costs by mode (£ million)**

	Work (& EB) purpose	Non-work purpose	Total	%
Bus	155	108	263	15.0%
Underground	318	250	568	32.5%
Rail	179	86	265	15.1%
Car	514	113	627	35.8%
Taxi	24	3	27	1.5%
All modes	1,190	560	1,750	100%

Source: OEF estimates

The conservative assumptions we have made in calculating the cost of delays make a big difference to our results. If we were to accept the argument for a higher value of leisure time for Central London workers (see Section 5.3(a)) than the standard appraisal value, then our estimate of the overall quantifiable cost of transport delays in Central London would be £2,500 million, or £1,740 a year per person working in Central London.

<sup>36</sup> Trips by purpose and mode are taken from LATS whereas in the City of London study the number of journeys made was estimated by applying data on modal shares to an estimate of the total number of commuters. In addition, LATS is based on trip-stage data whereas the City of London is based on whole journeys by main mode.

<sup>37</sup> There are also some methodological differences in the way that the delay for car has been calculated. Public transport modes may have an allowance for a normal level of delay in the timetable schedules. However, for travel by car there is not an equivalent concept of normal congestion, with the delay for car being represented by the difference between congested and completely uncongested conditions.

## 5.5 Survey evidence: Additional costs of delays

There are several other costs from transport delays that have not been quantified in the above calculation.

### (a) *Time allowed in case of delays*

Our main calculations only include time that is actually lost in transport delays. However, in many cases the possibility of delays leads to time being wasted because extra time people allow for travelling is not always required. Thirty-nine per cent of employees reported allowing an average of 22 minutes extra time for travelling to work in case of delays (Q14). This is equivalent to an average of an extra 8.5 minutes on all commuter journeys, or 14 per cent on top of the average journey time of around one hour.

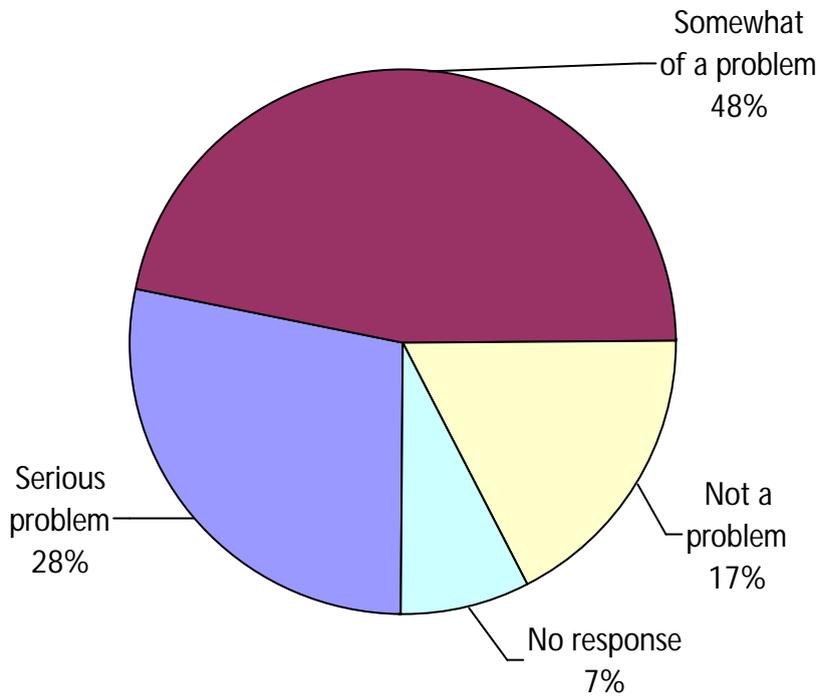
For commuters who are actually delayed, the cost of this time will already be included in our calculations of the cost of transport delays, except when the time allowed was more than the actual delay. For some commuters there is a cost to allowing extra time that turns out not to be needed. It is not clear how the time involved should be evaluated since it is not actually lost. When delays are not actually experienced, the result is that commuters arrive early for work. They may be able to leave earlier as a result, get more done, or use the time as leisure time. Nevertheless, even if there is no direct cost we can attribute to this time, there is little doubt that it has some cost to commuters. They would not allow this extra time in the absence of uncertainty over travel times. Furthermore, this uncertainty can have a major impact on the stress involved in travelling.

For employees travelling on business, extra time allowed for journeys is a direct cost to businesses in terms of lost working time. Our survey of employees shows an average of eight minutes per journey extra allowed for delays. This compares with actual delays experienced of five minutes, although clearly there were employees who allowed extra time that turned out not to be needed.

### (b) *Impacts on health and family life*

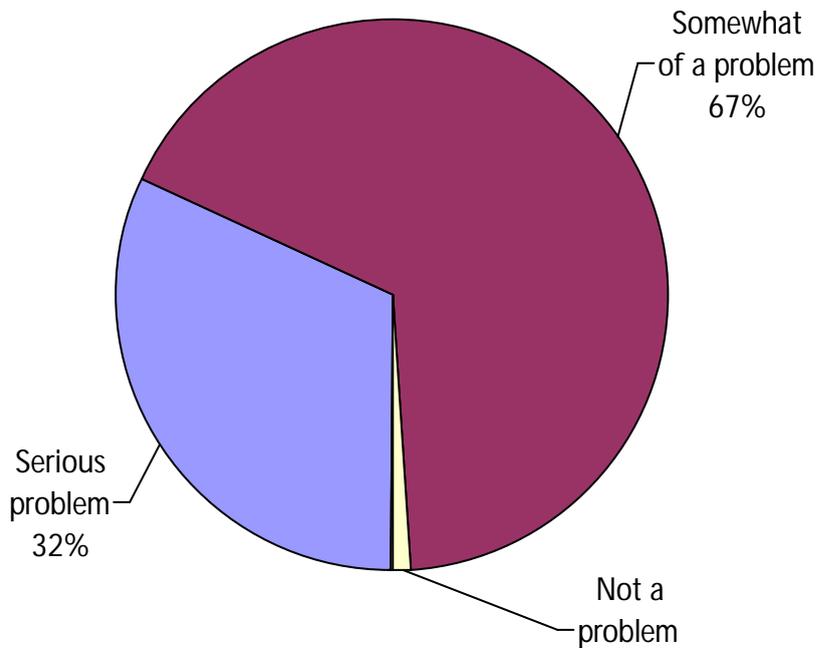
Seventy-six per cent of employees believe transport delays lead them to arrive at work stressed or tired (Figure 5.2), and this clearly has knock-on effects. Indeed, companies see this as even more of a problem than employees do, with 32 per cent regarding stress/tiredness caused by commuting difficulties as a serious problem and a further 67 per cent regarding it as somewhat of a problem (Figure 5.3). A number of individuals responding to the surveys specifically pointed to the uncertainties of commuting as being the cause of the stress and worry involved.

**Figure 5.2: In what ways do problems with London's transport system affect you? I arrive at work stressed/tired:**



Source: OEF employees' survey

**Figure 5.3: Is your organisation affected by problems your staff face in commuting to work? Staff arrive at work stressed/tired:**



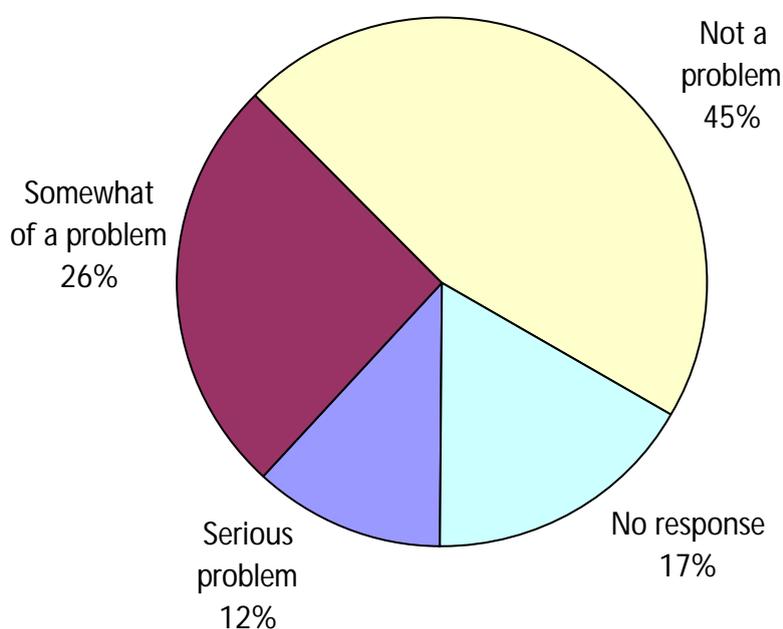
Source: OEF survey of companies

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The time spent commuting and the stress generated can lead to concerns over health. Thirty-eight per cent of employees believe the impact of London's transport system's problems on their health is either a serious or somewhat of a problem (Figure 5.4). At the same time, 56 per cent of companies report that there is a serious or somewhat of a problem with commuting difficulties contributing to staff absence through sickness (Q9).

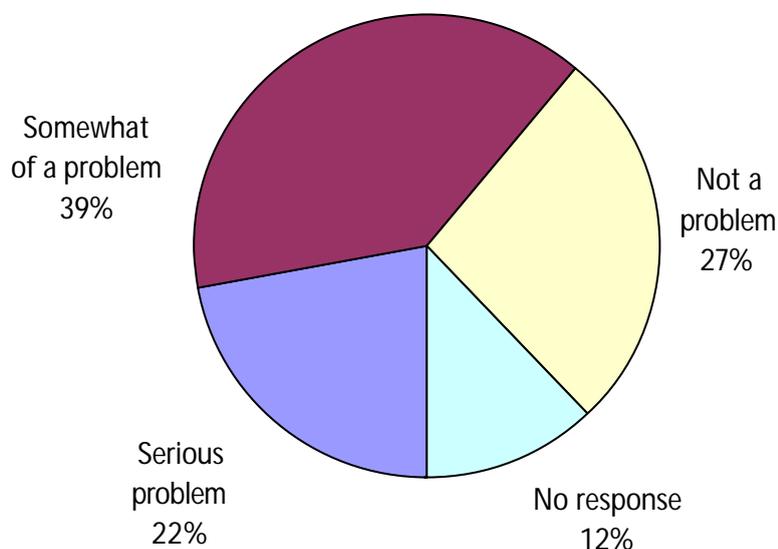
Furthermore, 61 per cent of employees regard the problems with London's transport system as a impacting negatively on their family (Figure 5.5).

**Figure 5.4: In what ways do problems with London's transport system affect you? My health is affected:**



Source: OEF employees' survey

**Figure 5.5: In what ways do problems with London’s transport system affect you? My family life suffers:**



Source: OEF employees’ survey

(c) *Impacts on business operations*

The impact of transport delays on business operations clearly depends on the nature of the business. For some people, not being in the office means work is lost forever – if a trader is not at his or her desk to carry out a trade the business will go elsewhere. For others, it may be more of a case of returning a phone call when they do get to the office.

For travel on company business, companies are most concerned at the time staff waste travelling as delays lengthen journey times, with ten per cent of companies reporting this as a critical problem and a further 34 per cent as very serious (Table 5.5). But there are also other concerns:

- Thirty-two per cent of companies regard it as critical or very serious that transport delays cause staff to be late for or miss meetings with clients.
- Twenty-seven per cent regard it as critical or very serious that clients are late visiting them as a result of transport delays.
- However, fewer (20 per cent) regard it as very serious when staff are late for meetings within their own organisation as a result of transport delays. Companies appear to place greater weight on the direct consequences of problems with staff being late for external meetings than the more indirect effects of being late for internal meetings.

**Table 5.5 How serious are the following problems for your organisation?**  
*% of respondents, employment-weighted*

	<b>Critical</b>	<b>Very serious</b>	<b>Somewhat of a problem</b>	<b>Not a problem</b>	<b>No Response</b>
Longer journey times mean staff waste time travelling	10	34	55	1	1
Transport delays cause staff to be late for/miss meetings with clients	5	27	55	8	0
Transport delays cause clients to be late visiting your organisation	9	18	64	10	0
Transport delays cause staff to be late for/miss meetings with your organisation	1	19	73	6	1

*Source: OEF survey of companies*

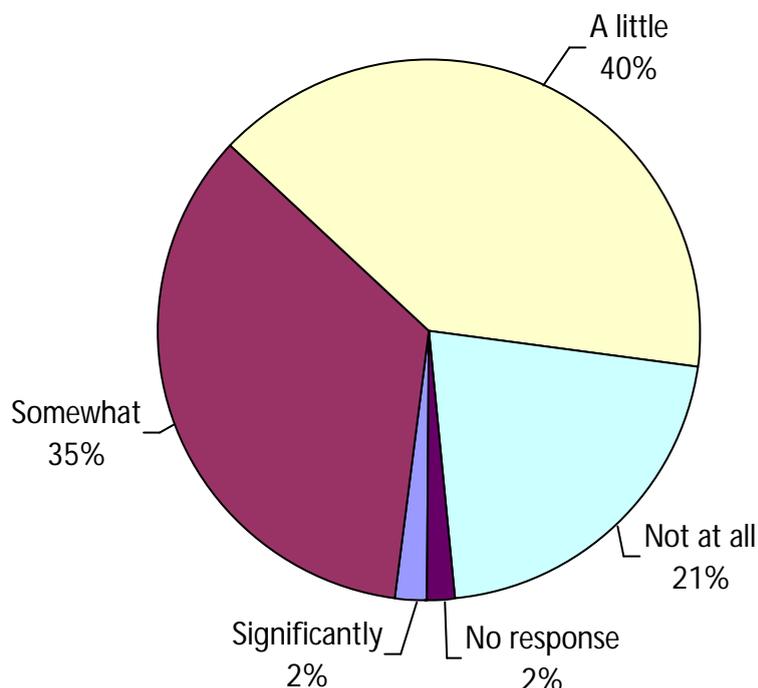
No firms reported that they lost significant amounts of business as a result of transport delays – presumably if this did happen, firms would have been likely to have moved elsewhere. But 35 per cent reported somewhat of a loss of business, 40 per cent a little loss of business, with only one in five companies believing transport delays did not cause any loss of business (Figure 5.6). It is worth bearing in mind when considering the overall cost to Central London of delays, though, that business lost to one company is not necessarily lost to Central London as a whole. In some cases the business is likely to fall to other Central London companies rather than going to other financial or business centres of.

Business operations can also be affected by transport delays when important deliveries are late or when repairs and maintenance do not take place as quickly as they otherwise would. As discussed in Section 4.5(c) (delays in delivery and maintenance services), our survey of companies highlighted the following:

- Nine per cent of firms regularly had major problems such as missed deadlines or lost clients as a result of transport delays affecting the speed or cost of deliveries either to clients or from suppliers.

Five per cent reported that their operations regularly suffer major disruptions as a result of the impact transport delays have on the quality of repair and maintenance services that their contractors offer, while 47 per cent suffered in this way occasionally.

**Figure 5.6: To what extent do these problems cause your organisation to lose business?**



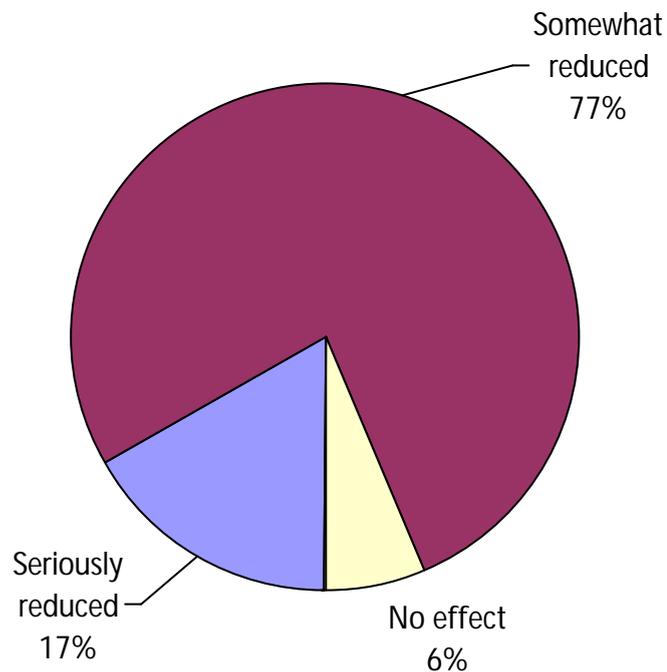
Source: OEF survey of companies

(d) *Impacts on productivity*

Almost all (94 per cent) employers believe staff productivity is either seriously or somewhat reduced by problems faced in commuting (Figure 5.7). Seventy-three per cent of companies (48 per cent unweighted) see this impact to be worse in Central London than in other cities. To some extent, this impact on productivity reflects the time lost, but it can also reflect the condition of staff, with both stress and tiredness reducing their effectiveness. On the other hand, there may be some offsetting effects from the 'Blitz spirit' as teams pull together in trying to offset the impact of difficulties faced, particularly for infrequent, major disruptions.

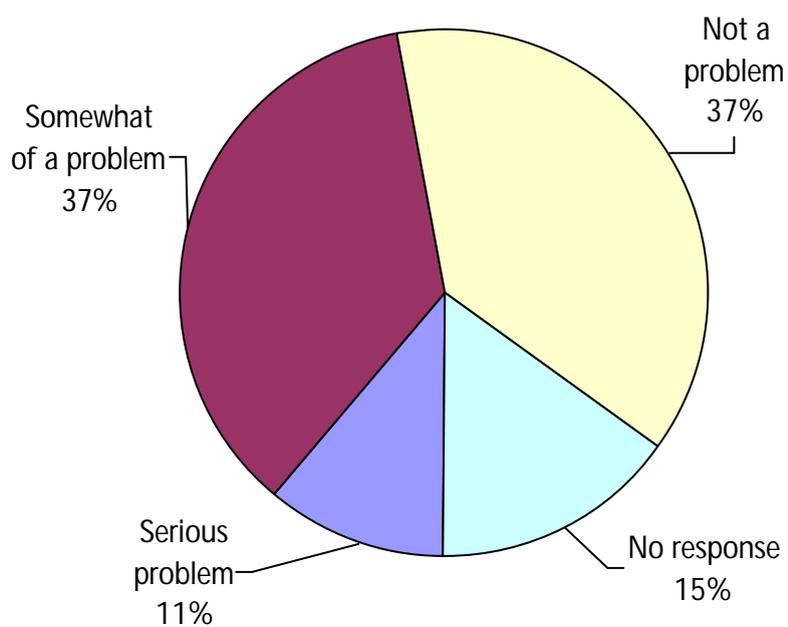
Perhaps it is not surprising that companies are more ready to perceive an effect on productivity than employees are, since many workers would like to think they can compensate for the impact of transport delays. Even so, nearly half of employees (48 per cent) believe that a reduction in their productivity as a result of transport delays is either a serious problem or somewhat of a problem (Figure 5.8).

**Figure 5.7: Do you think that the productivity of your staff is affected by problems they face in commuting to work?**



Source: OEF survey of companies

**Figure 5.8: In what ways do problems with London's transport system affect you? My productivity at work is reduced:**

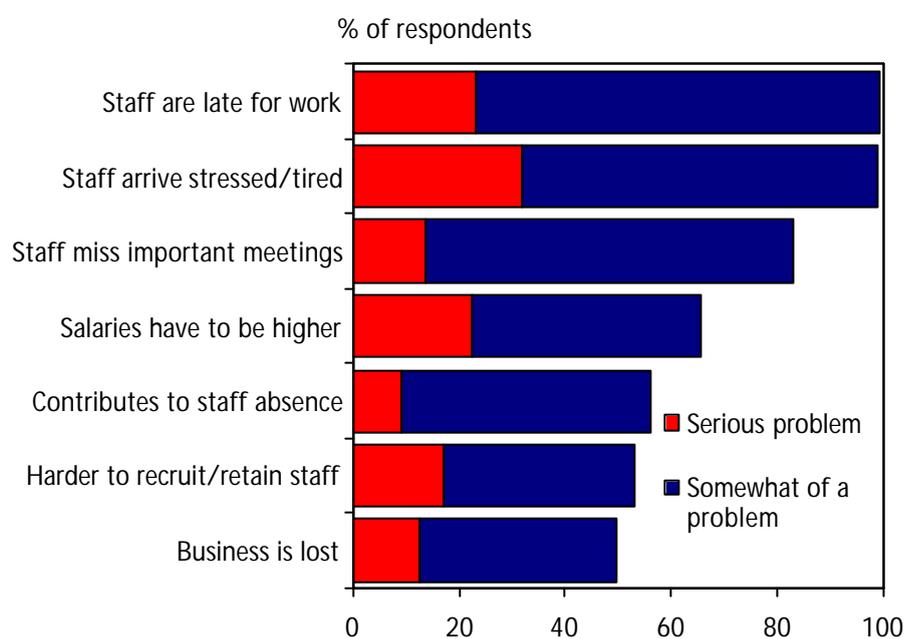


Source: OEF employees' survey

(e) *Impacts on pay*

A further impact on companies from transport delays is that it becomes harder to recruit and retain staff, and salaries have to be higher to compensate staff for long and uncomfortable journeys. Although this was not reported as a problem by as many companies as commented on stress and missed meetings (Figure 5.9), nevertheless 53 per cent of respondents in our survey of companies saw the impact on recruitment and retention as a serious problem or somewhat of a problem, while 65 per cent saw the need to offer higher salaries to compensate as a problem.

**Figure 5.9: Is your organisation affected by problems your staff face in commuting to work?**



Source: OEF survey of companies

## 6. How companies and individuals are responding

### Key points

- Transport delays can be more than just an irritant to companies and individuals. 13 per cent of companies report that problems with transport in Central London have been a factor causing them to move operations to another location, and the same proportion (13 per cent) report that they have made new investments in other locations as a consequence of transport problems.
- Our survey of individuals also highlighted the potential impact transport delays could have on the Central London economy through making it more difficult to attract and retain staff. Although only 21 per cent said they would seriously or possibly consider moving closer to work if transport delays worsened, 62 per cent of employees reported that they would consider looking for a job outside London (37 per cent seriously) and, similarly, 58 per cent would consider looking for a job closer to home. Alternatively, 31 per cent would consider asking for a pay increase to compensate for the additional commuting time.
- Transport delays have led a significant number of companies either to operate flexitime and/or home working, while nearly a quarter are making significant use of new technologies such as video-conferencing or e-mail to avoid the immediate effects of transport delays.

### 6.1 Location decisions of companies

Perhaps the most serious cost to Central London's economy from transport delays would be if companies decided not to locate their business in Central London, or to move existing activities elsewhere. Ultimately, there are many factors behind location and re-location decisions. If, for example, a company decides to shift back-office operations or software development to India due to lower wage costs, then it is unlikely that improvements in Central London's transport networks would lead to that decision's reversal. Nevertheless, 13 per cent of companies report that problems with transport in Central London have led them to move operations to another location (Q7), while 13 per cent report that they have made new investments in other locations as a consequence of transport problems (Q8)<sup>38</sup>.

Clearly transport was only one of the issues involved in these decisions; staff costs and availability, and the rental costs of property, are also cited by most companies as factors prompting these decisions<sup>39</sup>. Nevertheless, the other factors involved are not necessarily independent of transport problems. As discussed above in Section 5.5(e), extra staff costs are one of the costs of transport delays since some potential members of staff will not be prepared to put up with the extra stress of commuting into Central London unless they are offered higher salaries to compensate. Similarly, difficulties with the

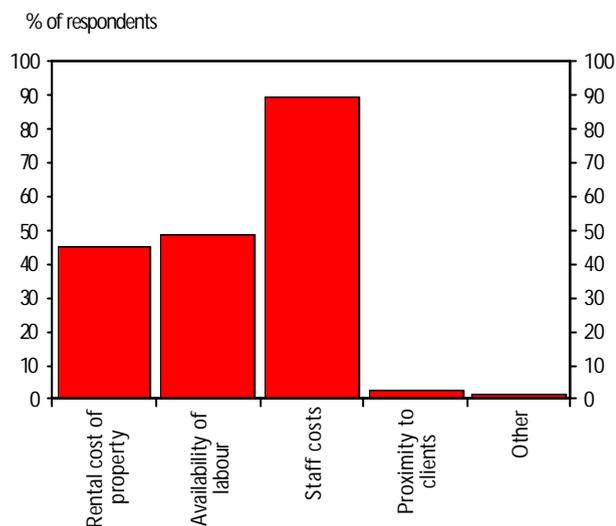
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<sup>38</sup> These companies were much larger employers than the survey's average respondent. The unweighted results are as follows: 5.6 per cent of companies have moved operations to another location and 6.1 per cent have made new investments in other locations.

<sup>39</sup> Indeed, no respondents to the latest (2002) London Employer Survey who were seriously thinking of relocating specifically highlighted transport issues as a reason.

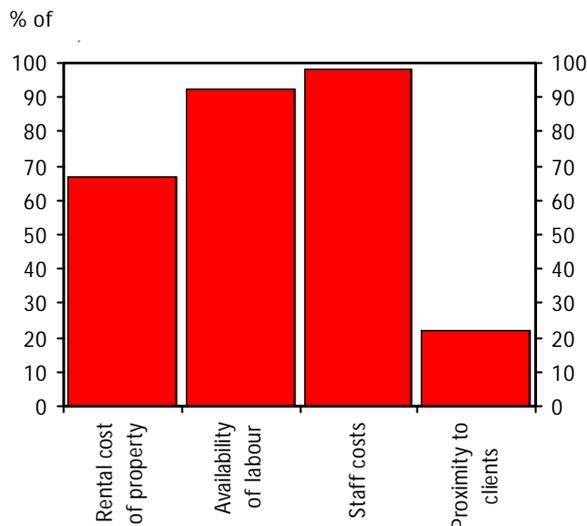
availability of staff may reflect the impact of transport delays on an individual's own location decisions (see Section 6.2 below).

**Figure 6.1: Have problems with transport lead your organisation to move any operation to another location? If yes, what other factors prompted this decision?**



Source: OEF survey of companies

**Figure 6.2: Have problems with transport led your organisation to make new investments in another location? If yes, what other factors prompted this decision?**



Source: OEF survey of companies

In order to provide further insight into the extent to which transport issues may have been a critical factor in location or re-location decisions, we held follow-up discussions with some respondent companies. Although these case studies reinforce the message that there are usually other factors behind relocation decisions, there is also a clear indication that problems with transport can impact on staff availability and costs that contributes to the case for locating elsewhere.

It is also worth noting that, in addition to the companies reporting actual decisions to locate or re-locate outside Central London, there were also companies which issued a warning over the potential impact by answering 'not yet' rather than a straight 'yes' or 'no' to the question on whether transport problems had led them to move operations out of Central London. Our earlier report<sup>40</sup> on the cost of transport delays on the City of London contained several case studies that described the specific impacts of transport delays on organisations.

## 6.2 Location decisions of individuals

Our survey of individuals also highlighted the potential impact that transport delays could have on the Central London economy through making it more difficult to attract and retain staff. Table 6.1 shows that only 21 per cent said they would seriously or possibly consider moving closer to work if transport delays worsened, while 58 per cent would consider looking for a job closer to home (62 per cent for a job outside London)

<sup>40</sup> Oxford Economic Forecasting, July 2003, The Economic Effects of Transport Delays on the City of London

and 31 per cent would consider asking for a pay increase to compensate for the additional commuting time. Often people will consider making a move for some years but the widespread willingness to consider giving up the possible advantages of a job in Central London in response to the stress and time spent commuting suggests this is a real issue for the future of the Central London economy.

**Table 6.1. If transport delays were to get worse over the next few years, which of the following would you consider doing?**

% of respondents

	<b>Seriously consider</b>	<b>Possibly consider</b>	<b>Would not consider</b>	<b>No response</b>
Moving closer to where you work	8	13	56	23
Looking for a job closer to where you live	32	26	25	17
Looking for a job outside London	37	25	23	16
Asking for a pay increase to compensate for additional commuting time	11	20	49	21
Grin and bear it	21	32	23	25

*Source: OEF employees' survey*

### 6.3 Changes in working practices

Clearly, companies are well aware of the difficulties transport delays can cause for their staff and for the smooth running of the company, so it is interesting to look at what steps have been taken to mitigate the problem. One possibility is to enable staff to reduce the amount of peak-time travelling they do by operating a flexitime scheme or allowing staff to work from home for some of the time. There are other possible reasons for making these changes, of course, such as making jobs more attractive to those with childcare responsibilities or reducing the need for expensive office space. Nevertheless, our survey reveals that transport delays have led a significant number of respondents to operate flexitime or home working (see Table 6.2).

Another way in which companies can recognise the high cost of travel for staff working in Central London is to offer staff loans for season tickets or subsidise staff commuting costs in some other way. These are probably more appropriate as a response to high travel costs than to the problem specifically of transport delays, although five per cent of companies report introducing season ticket loans for this reason.

**Table 6.2. Does your organisation do any of the following?**

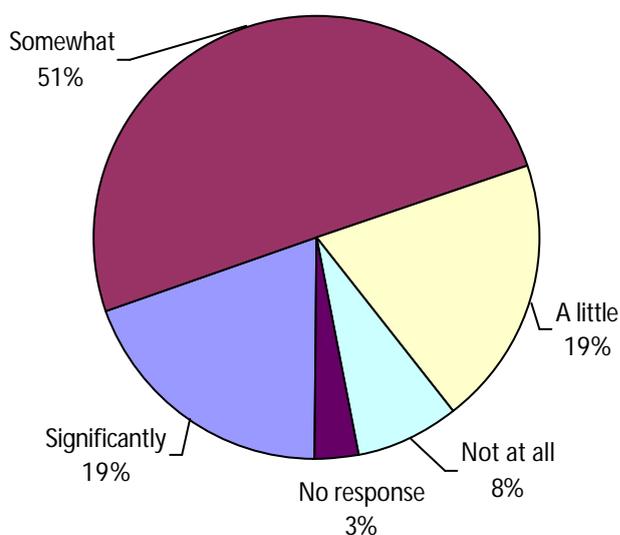
*% of respondents, employment-weighted*

				Was this introduced in response to transport delays?		
	For all staff	For some staff	No response	Yes	No	No response
We operate flexitime working	6	64	30	23	35	42
We allow staff to work from home	4	85	11	30	42	28
We offer loans to staff for seasons tickets	81	9	10	5	63	33
We subsidise staff commuting costs	3	2	95	0	6	94

*Source: OEF survey of companies*

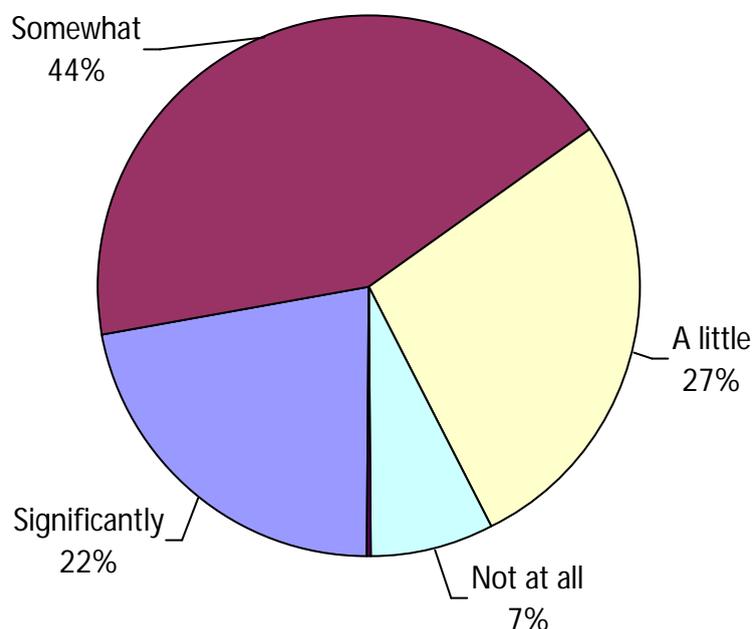
The problem of delays in business travel might be mitigated partly through the use of new technologies that reduce the need for face-to-face meetings, such as video-conferencing or perhaps e-mail, although one would expect the latter in particular to be introduced mostly for other reasons. According to our survey, 19 per cent of firms are using new technologies significantly to avoid the effect of transport delays (Figure 6.3), while 22 per cent expect that transport delays will significantly encourage greater use of such technologies over the next few years (Figure 6.4).

**Figure 6.3: To what extent is your organisation using new technologies to avoid the effects of transport delays?**



*Source: OEF survey of companies*

**Figure 6.4: To what extent do you expect that transport delays will encourage greater use of such technologies by your organisation over the next few years?**



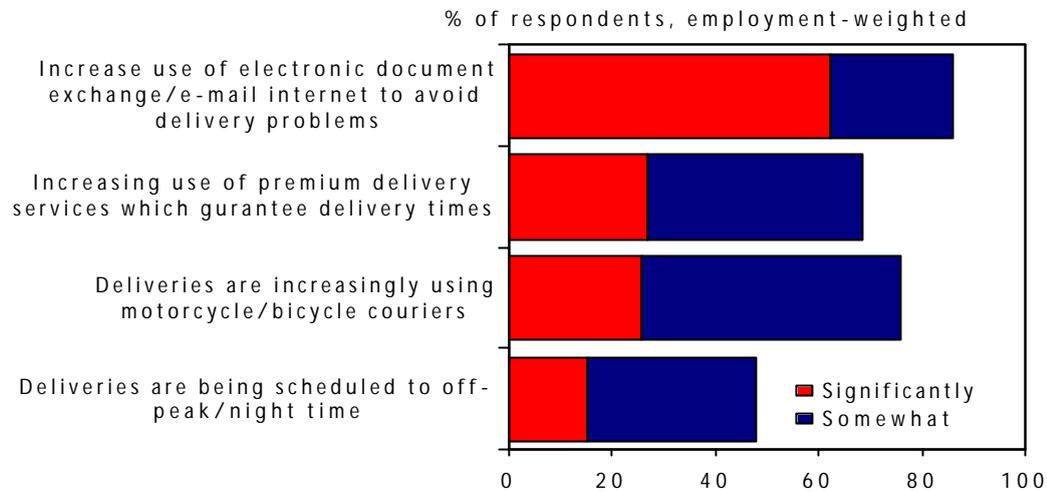
Source: OEF survey of companies

#### 6.4 Response to delays in deliveries and servicing

Where transport delays are affecting the speed and cost of a company's deliveries, whether bringing goods or documents in from suppliers or getting them out to customers, other responses may be appropriate. As Figure 6.5 shows, our survey found the following:

- Seventy-six per cent of companies report increasing their use of motorcycle and bicycle couriers to try and avoid the effect of traffic jams.
- Sixty-eight per cent of companies reported some increased use of premium-priced, guaranteed-delivery services as a result of problems caused by transport delays.
- Sixty-two per cent of firms are responding to transport delays for deliveries by using electronic document exchange or e-mail to a significant extent (this is also probably a result of trying to increase efficiencies more generally).
- As with the use of electronic document exchange and e-mail more generally, it seems likely that it is not just the effect of transport delays that is leading to increased use, but the benefits they allow in increasing efficiency more generally.

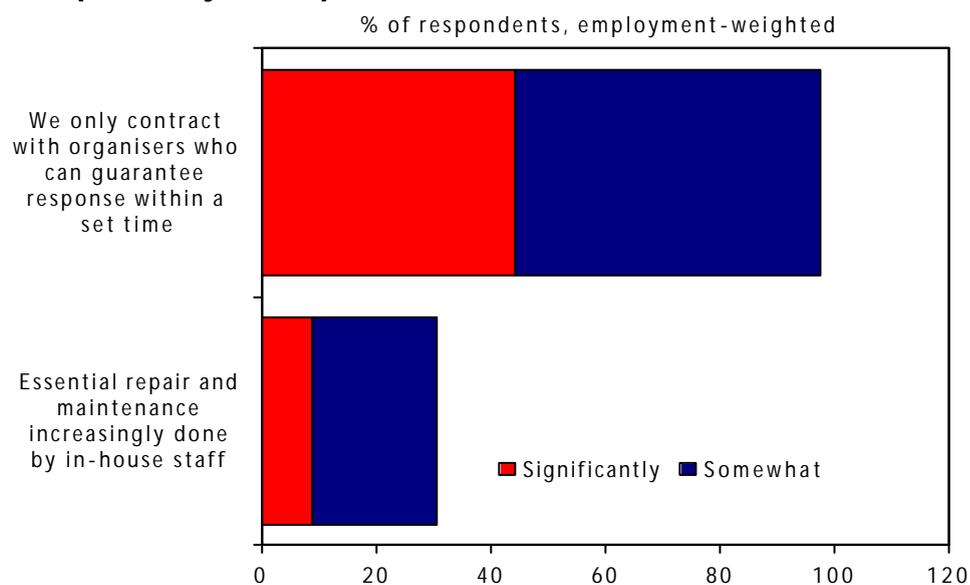
**Figure 6.5: How is your organisation responding to any problems caused by transport delays for deliveries?**



Source: OEF survey of companies

Where transport delays threaten to leave companies without essential maintenance work for longer periods (e.g. when a rapid response to an IT failure is needed), most companies report at least some response in limiting maintenance suppliers to organisations that are prepared to guarantee response times. Thirty per cent of companies reported that they used in-house repair and maintenance services as a response to transport delays, even though it appears to run counter to the modern tendency to outsource non-core activities.

**Figure 6.6: How is your organisation responding to any problems caused by transport delays for repair and maintenance services?**



Source: OEF Survey of companies

## 7. The scale of the problem and the improvements needed

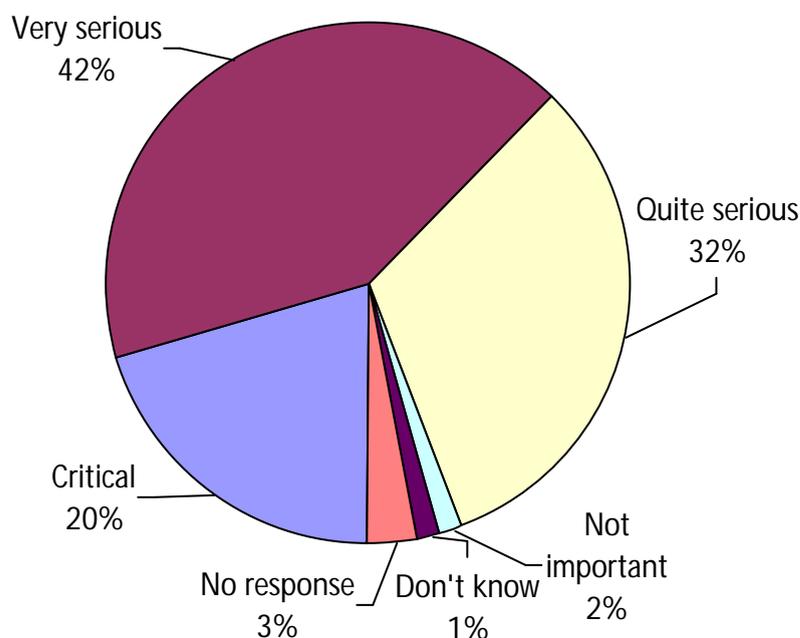
### Key points

- Our surveys also provide a clear indication of the relevance of this study for the economic health of Central London. Ninety-four per cent of employees in our survey said that they consider the problem of transport delays to be at least quite serious, and 62 per cent consider it very serious or critical (Q26).
- Views from employees on the improvements required range from a more reliable service (32 per cent of employees), more comfortable services (29 per cent), increased frequency (28 per cent), action to reduce overcrowding (18 per cent) and more information on delays (12 per cent).
- Companies had an even clearer view. More than twice as many respondents highlighted the need to improve the reliability of London's transport system, compared to those who suggested increased frequency.

### 7.1 Views on the extent of the problem

As figure 7.1 shows, there is no doubt that the problem of transport delays in London is regarded as extremely serious by users: more than 94 per cent of employees said they considered it to be at least quite serious while 62 per cent consider it very serious or critical (Q26).

**Figure 7.1: How serious do you consider is the problem of transport delays in London?**



Source: OEF employers survey

Companies consistently report to the Corporation of London that improving the transport system should be London's policymakers' highest priority. Ninety-five per

cent of companies report that their organisation is affected by problems their staff face in commuting to work.

At the same time, about half of companies responding to our survey of employers consider that travelling from Central London now takes more time and is more unpredictable than five years ago (see Table 7.1). This applies to all types of journeys, whether within Central London or to the rest of the UK or to airports. Most other respondents consider that journeys are either more time-consuming or unpredictable.

The concerns expressed about London's transport infrastructure are consistent with other recent surveys of Central London companies. For example, a survey carried out by the Centre for the Study of Financial Innovation (CSFI) for the Corporation of London on perceptions of London's competitiveness as a financial centre<sup>41</sup>, indicates that transport is the *Achilles heel* of an otherwise very competitive London economy.

In the CSFI survey, London came last in terms of perceptions of public transport (compared with Paris, Frankfurt and New York) to such an extent that the gap between London and the next worst city was larger than that between the highest and the second worst. The survey's findings were summarised by a quotation from a London-based German banker in his response; 'In Frankfurt the stress ends when you leave the office. Here, that's when it starts.' Similarly, OEF's recent study for the Corporation of London on the importance of aviation services for the City of London found that the most important improvement companies would like to see is improved surface access to airports<sup>42</sup>.

In some cases, perceptions may differ from reality as people find it easier to remember travel incidents when there are severe problems on the network rather than the relatively straightforward journeys when services run broadly to schedule. Perceptions nevertheless matter, since these will affect both the willingness of staff to work in Central London and the likelihood that firms will consider locating elsewhere.

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<sup>41</sup> Centre for the Study of Financial Innovation, June 2003, *Sizing up the City – London's ranking as a financial centre*

<sup>42</sup> Oxford Economic Forecasting and the Aviation and Travel Consultancy, December 2002, *Aviation Services for the City of London*

**Table 7.1. How does your organisation think travelling from Central London has changed over the last five years?**

*% of respondents, employment-weighted*

	<b>Journeys take more time</b>	<b>Journey time is increasingly unpredictable</b>	<b>Journeys take more time AND are more unpredictable</b>	<b>No significant change</b>	<b>Improved</b>	<b>No Response</b>
To meetings in Central London	9	21	53	15	2	0
To meetings elsewhere in London	12	21	46	17	3	0
To meetings in other parts of the UK	11	17	46	24	1	2
To the airport (e.g. Heathrow, City)	12	14	43	13	15	3

*Source: OEF survey of companies*

## 7.2 Views on improvements required

Not surprisingly, there is a wide range of views on what improvements are most needed to the transport system in London (Table 7.2):

- Thirty-two per cent of employees consider that a more reliable service is needed, while 29 per cent would like to see more comfortable facilities (e.g. cleaner trains, more seats, better air conditioning) and 28 per cent would like to see increased frequency.
- Other improvements that employees would value include action to reduce overcrowding and more information for travellers when delays occur.
- Companies are even clearer than employees that the reliability of London's transport system needs to be improved. This reinforces the view that the need to allow additional time for journeys in case of delays represents a significant cost to businesses, over and above the costs we have quantified in Section 5.
- Companies place more weight than employees on policies to increase the number of routes served by London's transport network. These responses cover both those wanting to see the gaps filled in around London where train and Underground services do not exist and those stressing the need for better cross-London rail

services from East to West, clearly prompted by the ongoing uncertainties over the future of Crossrail.

**Table 7.2. What improvements would you like to see in London's transport?**

	Ranked by importance	% of employees	% of companies (employment-weighted)
More reliable service	1	32	39
Increased frequency	2	28	16
More routes	3	7	29
More comfort (cleaner, more seats, air conditioning)	4	29	6
Less overcrowding (more capacity)	5	18	12
Significant investment (unspecified)	6	10	14
Lower fares	7	8	13
More information (when things go wrong)	8	12	1
Better enforcement	9	3	8
Congestion Charge	10	5	2
Better organisation	11	6	1
More security	12	6	0
Other	-	7	7

Source: OEF employees' survey and survey of companies

Note: Ranked in order of the average of the employee and company survey.

## 8. Conclusions

On the basis of conservative assumptions outlined in the report, we estimate the quantifiable cost of transport delays to employees and businesses in Central London amounts to £1,190 million. This is equivalent to about £4.5 million per business day or £830 a year for each person working in Central London. Around £870 million of this cost arises from commuting trips and £320 million from trips on employers' business. In addition, there are additional costs of £560 million attributed to people travelling to, from or within Central London for non-work purposes, or around £2.2 million per working day (£1.5 million per day<sup>43</sup>).

The combined cost to Central London from transport delays is £1,750 million which is equivalent to 0.9 per cent of total London GDP<sup>44</sup> or 11 per cent of GDP in London's transport and communication sector. The cost is £1,220 a year for each person working in Central London or £6.7 million per annum per business day

**Table 8.1. Summary of costs**

Purpose	Total costs (£ million)	Total costs (%)	Costs per employee (£)	Costs per working day (£ million)
Commuting	870	49.7%	605	3.3
Employers' business	320	18.3%	225	1.2
Leisure (non-work)	560	32.0%	390	2.2
<b>Total</b>	<b>1,750</b>	<b>100%</b>	<b>1,220</b>	<b>6.7</b>

Alternative assumptions result in a total cost in the range of £1,500 to £2,500 million a year (£1,050-1,740 a year per person working in Central London or £5.8-9.6 million per business day).

The costs of transport delays are greatest for car journeys with 36 per cent of the total or £627 million attributed to this mode. Despite this figure being high relative to other modes, it has fallen somewhat in recent years predominately due to the impact of the congestion charge.

The surveys highlight the potential for lost business, the difficulties created for recruitment and retention, and the fact that some companies have already relocated outside Central London or located new investment elsewhere partly in response to transport difficulties.

Some of this may be inevitable. The Central London economy clearly benefits from strong clustering effects that make it attractive for companies in wholesale financial

<sup>43</sup> Cost per day of £1.5 million is perhaps a better indicator for leisure trips than cost per 'working' day.

<sup>44</sup> On a workplace basis London GDP in 2004 is estimated to be £187 billion in 2004 prices. On a residence basis, as London GDP in 2004 is around £164 billion, costs from transport delays are slightly higher at 1.1 per cent of GDP. Estimates are based on OEF's model of the UK economy.

services and related business services to locate close to one another, and in most cases these advantages outweigh the problems caused by an overloaded or badly running transport network. In general it would not be expected for companies that are dependent on efficient transport distribution networks to locate in city centres.

But companies located in Central London are highly dependent on the transport of staff, if not of goods. Our surveys reveal a strong depth of feeling that transport delays are a serious issue for the operation of the Central London economy with many employees tempted to look for jobs elsewhere if things get any worse. Similarly, some companies also see transport limitations in Central London as a factor behind actual or potential relocation decisions.

In any transport network there will always be some inherent level of transport delays and therefore cost, it is simply not possible, practically or economically, to try to eliminate them entirely. But the costs from transport delays identified in this study are considerable and the concerns noted in the employer and employee surveys are serious and widespread. It is true that there have been some tentative signs that delays have fallen in the past year or so, but given the above circumstances there are still clear long-run risks for the Central London economy if further improvements are not seen in the performance of the transport network.

## Appendix A: Overview of Central London journeys

### Annualisation factors

Daily travel in Central London by different modes was sourced from Table 3.6 in the *London Travel Report 2003*. Daily figures are translated into annual totals using annualisation factors dependent on the mode and/or purpose of the trip (See Table A1). For example, the figures quoted by the *London Travel Report*:

- For daily trips by public transport modes are for an average day including weekends, sourced directly from the transport operators themselves. Therefore the annualisation factor is simply 365.
- For daily trips by private mode – car taxi, walk and bicycle – are for an average weekday (excluding school holidays), which are sourced from the LATS 2001 survey. We estimate that an annualisation factor of 320 is needed to translate these into an annual amount<sup>45</sup>.

Work trips may also be affected by school holidays, but any effect is likely to be offset to some extent by the small number of work trips which take place at the weekend. We have therefore assumed a simple annualisation factor of 260 for work trips (i.e. 52 weeks by five working days).

**Table A1: Annualisation factors used**

Main mode	Total trips	Work trips
Bus	365	260
Underground	365	260
Rail	365	260
Car	320	260
Taxi	320	260
Other (walk/bicycle)	320	260

Source: OEF estimates

### Central London journeys by trip-purpose

Work journeys account for 44 per cent of all Central London journeys per annum, a much higher percentage than the 29 per cent figure for Greater London journeys. Of all work journeys in Greater London, some 40 per cent take place to, from or within Central London.

<sup>45</sup> This is based on the assumptions that there are 190 weekdays during school holiday term time (i.e. 38 weeks by five days) where traffic is the same as the average; 70 weekdays during school holiday where traffic is 80 per cent of the average (i.e. 14 weeks by five days); and 104 weekends (52 weeks by two days) where traffic is 70 per cent of the average.

**Table A2. Work-related journeys in Central and Greater London (2002/03)**

Mode	Work-based journeys per annum			
	Central London journeys		Greater London journeys	
	Per annum	% of total	Per annum	% of total
Bus	114	35%	361	24%
Underground	379	45%	421	45%
Rail	212	52%	322	48%
DLR	8	52%	18	40%
Car / Motorcycle	156	43%	884	25%
Taxi	10	40%	18	28%
Walk	104	44%	452	26%
Bicycle	10	54%	36	38%
Total	993	44%	2,514	29%

Source: London Travel Report 2003; TfL Custom Analysis.

### Main mode of travel to work

Although the Underground has the most number of trip-stages for commuters, National Rail is the main mode of travel for commuters (where the main mode is defined as the mode used for the longest trip-stage of the overall trip). Of those travelling to work in Central London, about 40 per cent have National Rail as the main mode. The Underground and rail network is used by around three-quarters of annual commuting passengers (71 per cent).

**Table A3. Main mode of travel to work (Autumn 2002)**

Main mode	Main mode of travel to work in Central London
Bus (& coach)	10%
Underground and DLR only	31%
National Rail (including transfers to Underground/DLR)	40%
Car (& van)	10%
Motorbike (moped, scooter)	2%
Walk	4%
Bicycle	2%
Taxi	-
Total	100%

Source: London Travel Report 2003, TfL (Table 5.2).

### People entering Central London

As most work journeys take place in the peak period, the main modes for people entering Central London during the morning peak is very similar to the statistics for main mode of travel to work in all of London. Of the 1.069 million people who travel into Central London each day during the peak period, about 42 per cent travel by

## Time is money: The economic effects of transport delays in Central London

National Rail, with slightly less than half of these then transferring onto London Underground or the Docklands Light Railway.

**Table A4. People entering Central London during the morning peak (07:00-10:00)**

<b>Main mode</b>	<b>People entering Central London during the morning peak</b>
Bus (& coach)	9%
Underground and DLR only	36%
National Rail (including transfers to Underground/DLR)	42%
Car (& van)	10%
Motorbike (moped, scooter)	1%
Walk	-
Bicycle	1%
Taxi	1%
Total	100%

Source: London Travel Report 2003, TfL (Table 5.1).

## Appendix B: Sensitivity analysis

### High and low scenarios

High and low sensitivity tests has been defined to test the plausible range of our estimates of the costs from transport delays. The main body of this report refers to our central estimate. The high and low scenarios are defined as follows:

- *Low scenario (lower commuting value of time):* In our base (or central) scenario, we valued a proportion of time (i.e. 21 per cent) lost through transport delays as a loss to the employer rather than the employee. The rationale is that 'unexpected' delays while commuting, where staff are late and do not subsequently make up the lost time, affects employers and is therefore different to normal planned commuting time which does not affect employers. In other words, unexpected delays directly affect a company's output and should be valued at the wage rate in line with the working value of time. We estimated that 21 per cent of delay from commuting should be valued as lost work time meaning that the value of time for transport delays while commuting time is £9.76 per hour. Without this assumption the commuting value of time would be £5.42 and this is the value we use in this low impact sensitivity.
- *High scenario (higher value of leisure time):* The rationale for a higher value of leisure time is that people in London value their time more than other people in the UK because average earnings are higher. Whether one considers the value of leisure time in the context of a trade-off between extra income from extra work and extra utility from extra leisure time, or in terms of willingness to pay for time savings, it is likely that the higher average earnings achieved in Central London would lead to a higher value being placed on leisure time at the margin. If we were to adjust for this, the appropriate value of leisure time in our calculations would be £8.20 an hour, since we estimate average earnings in Central London to be around 1.7 times the national average.

Under the argument for a higher value of leisure time for Central London workers than the standard appraisal value, then our estimate of the overall quantifiable cost of transport delays in Central London increases by 44 per cent to £2,500 million, or £1,740 a year per person working in Central London.

In contrast if we assume that all unexpected delays while commuting should simply be valued at the commuters own willingness-to-pay – in other words have no impact on their employer – then this reduces our estimate by 14 per cent to £1,500 million, or around £1,050 a year per person working in Central London. The figures are summarised in Table B1.

**Table B1. Summary of costs by scenario**

Scenario	Total costs (£ million)	Difference from central scenario	Cost per employee
Low	£1,500	-14%	£1,050
Central	£1,750	-	£1,220
High	£2,500	+43%	£1,740

**Comparison between the 2003 and 2004 study**

Another way of performing sensitivity analysis is to compare the cost estimates from this study with those from the 2003 study, which examined the costs from transport delays in the City of London. This study updates the numbers and expands the study area to encompass the whole of the Central London area. With a greater area, the number of trips undertaken is larger and so the overall total costs of transport delays is greater as illustrated below.

However, estimates are also higher when account is taken of the greater number of trips involved. This is predominately due to the inclusion of leisure or non-work trips. Central London is at the heart of the tourist industry and has a vibrant shopping scene, both of which are clearly not present in the City of London. As a result, non-work trips are a much more important factor.

**Table B2. Comparison of costs by study (£ million)**

	City of London study (2003)	Central London study (2004)	Ratio
Overall costs	£230 million	£1,750 million	7.61
Costs per employee (work)	£750 per employee	£830 per employee	1.11
Costs per employee (non-work)	£0 per employee	£390 per employee	-

On the work side, the cost per employee is also higher but only by about 11 per cent (£830 per employee compared with £750 per employee). This can be put down to various changes in methodology and approach, including:

- A different data source. The City of London study estimated the number of journeys made by applying data on modal shares to an estimate of the total number of commuters, and the number of journeys to and from work each commuter makes in a year. In contrast, the Central London study uses data directly from published sources, particularly LATS data and public transport operators themselves which record travel to Central London, whereas they do not specifically record travel to the City of London<sup>46</sup>.

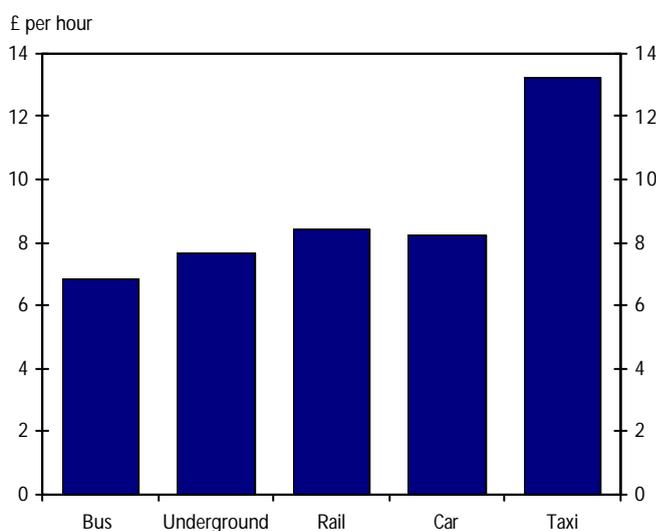
<sup>46</sup> In addition, the results from the LATS survey – a survey undertaken roughly every decade – have only just become available in 2004.

- The use of trip-stages instead of trips by main mode. This concept is used as LATS data itself is based around statistics on trip-stages. A trip-stage is the part of the overall trip which involves travel by a single mode for a single purpose, with a new trip-stage starting each time there is a change of mode. In the Corporation of London study, the journey by main mode concept was used.
- A relatively higher value of time attached to extra commuting time in line with the new appraisal guidance used by DfT in June 2004. This impact however is largely offset by a lower value of working time as people employed in Central London have a lower wage rate than those employed in the City of London.
- Modelling of employers' business trips for all modes. In the City of London study, data on these types of trips was only collected for Underground and taxi trips. All modes have now been modelled. This is particularly significant for car work trips, where we estimate that 18 per cent of car work trips are for the purpose of employers' business.
- Assumptions on distance travelled by car and by taxi. We used the LATS database to directly estimate the average distance travelled to Central London by car and by taxi for work and non-work purposes. Previously in the City of London study, the distance travelled by car was indirectly estimated from data on average journey time and car speeds in Central London.

### Sense checking the value of time estimates

In our methodology we apply separate values of time for each of the three different trip purposes modelled, namely employers' business, commuting and non-work time, although within each trip purpose the value of time is the same across different modes. This means that the overall average value of time for each mode varies due to the different proportions of trips by each purpose (Figure B1). For example, bus travellers have a weighted average value of time of £6.84 per hour, Underground travellers a £7.68 per hour value and rail travellers a £8.42 per hour value.

**Figure B1: Average values of time by mode**



## Appendix C: Glossary and abbreviations

Trip – A trip consists of a series of linked journeys or trip-stages and is a one way movement from an origin to a destination for a specific purpose (e.g. work, shopping).

Trip-stage – The part of the trip which involves travel by a single mode, with a new trip-stage starting each time there is a change of mode. For example, a common home-to-work trip to Central London which involves walk, rail, Underground and then walk, is a four trip-stage journey.

Trip by main mode – The main mode for a trip is defined as the mode used for the longest trip-stage of the journey.

Work (or commuting) trips – A trip to/from the usual place of work from/to home.

Other work trips – A trip to/from the usual place of work but from/to non-home origins or destinations. For example, going back to work after going shopping or going from the leisure centre to work.

Employers' business – A trip which is taken entirely in work time and on behalf of the employer (i.e. this does not include *other work trips* such as visits to the doctor).

Central London – An area approximated by the congestion charging zone with a slight extension of the northern boundary to include Paddington, Marylebone, Euston and King's Cross stations and extension of the western boundary to include Hyde Park, Belgravia and Pimlico. This is sometimes referred to as the Central Statistical Area by TfL.

Value of time – A monetary cost assigned to the time components of a particular journey. The value of time is different for employers' business, commuting and non-working time.

## Abbreviations

DFT	Department for Transport
DLR	Docklands Light Railway
EB	Employers' Business
GLA	Greater London Authority
LATS	London Area Transportation Survey
LFS	Labour Force Survey
OEF	Oxford Economic Forecasting
SE	South East
SRA	Strategic Rail Authority
TfL	Transport for London

## APPENDIX D: OEF surveys' overview

We undertook two surveys as part of this study and combined the results with the two surveys originally undertaken for the Corporation of London in 2003. This yielded a total response of 586 surveys (Table D1), 389 from employees and 197 from companies.

**Table D1: Responses from employee and employer survey**

	Employee survey	Employer survey	Total
City of London study (2003)	273	139	412
Central London study (2004)	116	58	174
Combined survey	389	197	586

Responses were received across a range of different types of job, including senior staff, associate professional and technical staff, and administrative and secretarial staff (Table D2). The results of the survey therefore reflect the views and experience of people doing an appropriate mix of jobs in Central London, rather than those of just one or two specialist functions.

**Table D2: Occupational mix of respondents to survey of employees in Central London**

*% of respondents by Standard Occupational Classification*

Managers & Senior Officials	Professional	Associate Professional & Technical	Admin & Secretarial	Skilled Trade	Personal Services	Sales & Customer Services	No response
42	6	22	27	0	0	2	1

In addition to investigating the impact of transport delays at an individual employee level, we sought a more strategic view from companies. The intention here was not simply to allow organisations another chance to complain about the transport system, but to consider whether it has a practical impact on companies.

The 2003 survey was sent to around 800 Directors of Human Resources or Chief Executives of companies in the City of London and the Central London Business District (CLBD). The 2004 survey was sent to around 600 companies, in predominately non-City Central London locations using Dun & Bradstreet data which is based on Companies House data. The size and sector breakdown of the combined survey is summarised in Table D3.

**Table D3: Number of firms replying to the survey of companies in Central London**

By firm size		By business sector	
Less than 25	37	Banking	50
26-100	49	Insurance	7
101-250	47	Professional Services	42
251-1,000	46	Fund Management	12
1,001-5,000	14	Real Estate	6
5,000 +	4	Other Business Services	80
Total	197	Total	197

The questionnaire for employees and employers is included in Appendix E together with the results. Where the type of question makes it possible, we have added the percentages of respondents giving each answer. For employees this is a simple percentage of all responses received, while for employers the majority of percentages are shown weighted by the number of employees each firm has. In each case, though, we have also added the actual number of employees or companies giving the appropriate response in brackets, in order to give some idea of the likely sampling error that might be attached to the results shown.

## Appendix E: OEF Surveys and responses

The following pages contain copies of the surveys conducted by OEF :

- Confidential survey on the impact of transport delays on employees in central London
- Confidential survey on the impact of transport delays on companies in central London

## **CONFIDENTIAL SURVEY ON THE IMPACT OF TRANSPORT DELAYS ON EMPLOYEES IN CENTRAL LONDON**

**September 2004**

This survey will enable the Transport for London / GLA to understand more fully the impact of transport delays on employees and companies based in Central London.

The questionnaire asks about your experience travelling to/from work and for meetings on one working day. There is also the opportunity for you to add your comments on London's transport system and make suggestions for its improvement.

We would like you to decide on a day for which you will record your travelling experiences. This will be your 'survey day' and can be any working day of your choosing over the next week. Having chosen your survey day, we would ask you to read through the questionnaire in advance so that you are aware of the sort of information we require, and to keep track of the various journeys you make that day to/from and as part of your work.

The questionnaire should take around 5 minutes to complete. Please fill it in as soon as possible after your survey day.

Analysis of the survey will be undertaken by Oxford Economic Forecasting. The information supplied will be treated in the strictest confidence and will remain anonymous.

Please email your completed questionnaire by 30 September to [trawle@oef.co.uk](mailto:trawle@oef.co.uk) ; or by fax back on 01865 268906; or by post to 'London Transport Team', Oxford Economic Forecasting, FREEPOST SCE15649, Oxford OX1 1BR.

Thank you for taking the time to complete the questionnaire.

**A ABOUT YOU AND YOUR ORGANISATION**

1 Name of organisation for which you work.....

2 Address where you usually work.....  
.....

3 Job title.....

4 What are your key responsibilities?.....  
.....

5 What is your home postcode?.....

6 Date for which you are recording your travel experiences (your 'survey day').....

**B YOUR JOURNEY TO WORK**

How do you usually travel to work? (If you use a combination of services, please tick all the boxes that apply)

7 % of respondents (*Number*)

National Rail	<input type="text" value="60"/> (234)	Private Car/Motorcycle	<input type="text" value="22"/> (84)
Underground	<input type="text" value="42"/> (165)	Taxi	<input type="text" value="1"/> (4)
DLR	<input type="text" value="8"/> (30)	Bicycle	<input type="text" value="5"/> (20)
Bus	<input type="text" value="21"/> (80)	Boat	<input type="text" value="0"/> (1)
Coach	<input type="text" value="1"/> (2)	Walk	<input type="text" value="40"/> (155)

8 What time do you usually leave home for work?.....

9 How long does your journey from home to work usually take?.....*0*.....hours.....*59 (average)*.....minutes

**10** What time did you leave home for work on your survey day?.....

**11** How long did your journey from home to work take on your survey day?.....hours.....minutes  
1 5 (average)

**12** Did you use your usual method of commuting on your survey day?

% of respondents (Number)

Yes  (364) No  (21) No response  (4)

If no, please explain how you travelled to work that day  
.....

**13a** Were there any significant delays on your journey to work?

% of respondents (Number)

Yes  (117) No  (266) No response  (6)

If no, go to question 13d

**13b** If yes, which part/parts of your journey were delayed?  
.....

% of respondents (Number)

National Rail	<input type="text" value="57"/> (67)	Private car	<input type="text" value="11"/> (13)
Underground	<input type="text" value="28"/> (33)	Taxi	<input type="text" value="0"/> (0)
DLR	<input type="text" value="3"/> (4)	Bicycle	<input type="text" value="0"/> (0)
Bus	<input type="text" value="10"/> (12)	Boat	<input type="text" value="0"/> (0)
Coach	<input type="text" value="0"/> (0)	Walk	<input type="text" value="1"/> (1)

**13c** Do you know why? Please give reason  
.....

13d

How many times a month on average do you think that your journey to work is affected by transport delays?

6.6

.....days a month on average

14a

Did you allow any extra time for your journey to work in case of delays?

% of respondents (*Number*)

Yes  (153)      No  (231)      No response  (5)

If no, go to question 15

14b

If yes, how much?..... *21.6 minutes (average for yes response)*

15

Did transport delays cause you to be late for work on your survey day?

Yes  (97)      No  (290)      No response  (2)

If no, go to question 16

If yes, how did this affect your working day?

% of respondents (*Number*)

I worked through lunchtime/late to make up the time  (51)

I took work home to catch up  (10)

I worked more efficiently through the day to catch up  (16)

My pay was reduced  (2)

I achieved less than I would otherwise have done  (35)

...in which case, will you be able to catch up on that work on another day?

Yes  (19)      No  (16)      No response  (0)

No response

(3)

**16** How often a month on average do transport delays cause you to be late for work?

.....4.3.....days a month on average

On days when you are late for work because of transport delays, how does this affect your working day?

	Usually	Sometimes	Never	No response
I work through lunchtime/late to make up the time	41 (161)	28 (111)	6 (21)	25 (96)
I take work home to catch up	7 (27)	26 (100)	25 (99)	42 (163)
I work more efficiently through the day to catch up	27 (105)	24 (91)	10 (40)	39 (153)
My pay is reduced	1 (4)	0 (0)	48 (185)	51 (200)
I achieve less than I would otherwise have done	17 (66)	38 (148)	12 (45)	33 (130)
...in which case, are you be able to catch up on that work on another day?	41 (88)	44 (94)	4 (9)	11 (23)

**17** How has your journey to work been affected by

% of respondents (Number)

	Significantly worse	Somewhat worse	No effect	Somewhat better	Significantly better	No response
Introduction of the Congestion Charge	2 (6)	8 (31)	50 (195)	7 (28)	2 (7)	31 (122)

**C YOUR JOURNEY HOME**

**18** What time do you usually leave work to travel home?.....

**19** How long does your journey home from work usually take?.....hours.....minutes  
*1 2 (average)*

**20** What time did you leave work to go home on your survey day?.....

**21** Did you travel home directly from your usual place of work on your survey day?  
% of respondents (*Number*)

Yes  (341) No  (45) No response  (3)

**22** How long did your journey home from work take on your survey day?.....hours.....minutes  
*1 7 (average)*

**23a** Were there are any significant delays to your journey home?  
% of respondents (*Number*)

Yes  (97) No  (280) No response  (12)

If no, go to question 23c

**23b** If yes, do you know why? Please give reason

.....  
.....

**23c** How often a month on average do transport delays affect your journey home from work?  
*6.1*  
.....days a month on average

**D TRAVELLING ON BUSINESS**

**24a**

Did you have to travel around/from City/Central London for a business meeting on your survey day?

% of respondents (Number)

Yes  (53) No  (328) No Response  (8)

If no, go to section E

If yes, to where? (Please specify)

Journey 1.....

Journey 2.....

Journey 3.....

Journey 4.....

Journey 5.....

Journey 6.....

**24b**

How long did your journey to the meeting take?

% of responses for Journey 1 only (Number)

1..... 2..... 3..... 4..... All journeys 26.7 minutes  
.....

24c

How did you travel? (Please tick all that apply)

% of responses (Number)

	Journey 1	Journey 2	Journey 3	Journey 4		Journey 1
National Rail	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	2	(1)
Underground	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	42	(22)
DLR	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	11	(6)
Bus	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	13	(7)
Coach	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0	(0)
Private car / motorcycle	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	9	(5)
Taxi	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	8	(4)
Bicycle	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0	(0)
Walk	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	36	(19)

24d

How much extra time did you allow for your journey in case of delays?

1..... 2..... 3..... 4..... All journeys 8.4 minutes  
 .....  
 .....

24e

Was your journey delayed?

% of yes responses (Number)

	Journey 1	Journey 2	Journey 3	Journey 4		All journeys
Yes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	14	(12)
No	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	86	(71)
No response	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0	(0)
If yes, by how long?	.....	.....	.....	.....		7.5 minutes .....

24f

Were you late for your appointment?

% of yes responses (Number)

	Journey 1	Journey 2	Journey 3	Journey 4	All journeys
Yes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	11 (9)
No	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	89 (77)
No response	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0 (0)

24g

If yes, did this matter?

% of yes responses (Number)

Yes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	78 (7)
No	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	22 (2)
No response	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0 (0)

If so, why? Please specify (eg meeting cancelled, missed flight)

.....

24h

For how much of the time you spent travelling were you able to get on with some work?

% of yes responses (Number)

All	Most	Some	None	No response
0 (0)	4 (2)	19 (10)	73 (39)	4 (2)

**E PEOPLE VISITING YOUR OFFICES**

Did you have clients/colleagues travelling to your offices in Central London to meet you on our survey day?

**25a** % of yes responses (Number)

Yes  (41) No  (333) No response  (15)

If no, go to section F

If yes, from where? (Please specify)

Meeting 1.....

Meeting 2.....

Meeting 3.....

Meeting 4.....

Were any of them late because of transport delays?

**25b** % of yes responses (Number)

	Meeting 1	Meeting 2	Meeting 3	Meeting 4	All meetings
Yes	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text" value="32"/> (17)
No	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text" value="68"/> (36)
No response	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text" value="0"/> (0)

If yes, did this matter?

**25c** % of yes responses (Number)

	Meeting 1	Meeting 2	Meeting 3	Meeting 4	All meetings
Yes	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text" value="71"/> (12)
No	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text" value="24"/> (4)
No response	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text" value="6"/> (1)

If so, why? Please specify (eg had another meeting to attend)

.....

## F YOUR VIEWS ON TRANSPORT IN LONDON

How serious do you consider is the problem of transport delays in London?

26 % of responses (Number)

Critical	Very serious	Quite serious	Not important	Don't know	No response
20 (79)	42 (164)	32 (123)	2 (6)	1 (5)	3 (12)

In what ways do problems with London's transport system affect you?

27 % of responses (Number)

	Serious problem	Somewhat of a problem	Not a problem	No response
I am frequently late for work	8 (29)	48 (188)	32 (126)	12 (46)
I arrive at work stressed/tired	28 (109)	47 (183)	18 (68)	7 (29)
My health is affected	11 (45)	26 (101)	46 (178)	17 (65)
My productivity at work is reduced	11 (42)	36 (142)	38 (147)	15 (58)
My family life suffers	22 (85)	39 (153)	27 (105)	12 (46)
Other (please state).....				

If transport delays were to get worse over the next few years, which of the following would you consider doing?

28 % of responses (Number)

	Seriously consider	Possibly consider	Would not consider	No response
Looking for a job closer to where you live	32 (124)	26 (101)	25 (98)	17 (66)
Looking for a job outside London	36 (142)	25 (98)	23 (88)	16 (61)
Asking for a pay increase to compensate for additional commuting time	11 (43)	20 (77)	49 (189)	20 (80)
Moving closer to where you work	8 (31)	13 (50)	56 (217)	23 (91)
Grin and bear it	20 (80)	32 (125)	23 (88)	25 (96)
Other (please specify).....				

**29** What improvements would you like to see in London's transport?

% of respondents	
More reliable service	32
Increased frequency	28
More routes	7
More comfort (cleaner, more seats, air conditioning)	29
Less overcrowding (more capacity)	18
Significant investment (unspecified)	10
Lower fares	8
More information (when things go wrong)	12
Better enforcement	3
Congestion charge changes	5
Better organisation	6
More security	6
Other	7

**30** Do you have any other comments?

.....

Please return questionnaire to:

Company Contact Details

OR

London Transport Team  
Oxford Economic Forecasting  
FREEPOST SCE15649  
Oxford  
OX1 1BR

Thank you for your assistance

**CONFIDENTIAL SURVEY ON THE IMPACT OF  
TRANSPORT DELAYS ON COMPANIES IN CENTRAL  
LONDON**

**September 2004**

This survey will enable Transport for London / GLA to understand more fully the impact of transport delays on companies based in Central London.

Analysis of the survey will be undertaken by Oxford Economic Forecasting. The information supplied will be treated in the strictest confidence and will remain anonymous.

Please fax back your completed questionnaire by 30 September on 01865 268906; or by post to 'London Transport Team', Oxford Economic Forecasting, FREEPOST SCE15649, Oxford OX1 1BR.

Thank you for taking the time to complete the questionnaire.

**A**

**ABOUT YOU AND YOUR ORGANISATION**

**1**

Name of organisation.....

**2**

Address .....

.....  
.....  
.....

**3**

Contact name.....

Job Title.....

**4**

Contact telephone number.....

Contact e-mail address.....

**5** What is the main business of your organisation in Central London?  
 .....

**6** How many staff does your organisation employ in Central London?

Employment % of respondents (*Number of companies*)

Less than 25	<input type="text" value="19"/> (37)	251-1,000	<input type="text" value="23"/> (46)
26-100	<input type="text" value="25"/> (49)	1,001-5,000	<input type="text" value="7"/> (14)
101-250	<input type="text" value="23"/> (46)	5,000+	<input type="text" value="21"/> (4)

**7a** Have problems with transport in Central London led your organisation to move any operations to another location?

Employment weighted % of respondents (*Number of companies*)

Yes  (11)      No  (184)      No response  (1)

If yes, what problems?.....  
 What operations?.....  
 To where have you relocated those operations?.....

**7b** What other factors prompted this decision?

Employment weighted % of respondents (*Number of companies*)

Rental cost of property	Availability of labour	Staff Costs	Proximity to clients
<input type="text" value="45"/> (5)	<input type="text" value="49"/> (3)	<input type="text" value="90"/> (8)	<input type="text" value="3"/> (2)

Other (please state).....

**8a** Have problems with transport in Central London led your organisation to make new investments in another location rather than in Central London?

Employment weighted % of respondents (*Number of companies*)

Yes  (12)      No  (178)      No response  (6)

If yes, what problems?.....  
 .....  
 Where did you make those investments?.....

What other factors prompted this decision?

8b

Employment weighted % of respondents (*Number of companies*)

Rental cost of property

67 (5)

Availability of labour

92 (6)

Staff Costs

99 (9)

Proximity to clients

22 (1)

Other (please state).....

**B STAFF JOURNEYS TO/FROM WORK**

Is your organisation affected by problems your staff face in commuting to work?

9

Employment weighted % of respondents (*Number of companies*)

Yes 95 (186)

No 4 (8)

No response 1 (2)

If yes, how?

	Serious problem	Somewhat of a problem	Not a problem	No response
Staff are late for work	23 (39)	76 (141)	1 (4)	0 (2)
Staff arrive at work stressed/tired	32 (50)	67 (126)	1 (9)	0 (1)
Commuting problems contribute to staff absence through sickness	9 (16)	47 (85)	35 (71)	9 (14)
Transport problems make it harder to recruit and retain staff	17 (18)	36 (59)	44 (100)	2 (9)
Salaries have to be higher to compensate staff for long and uncomfortable travelling conditions	22 (32)	43 (80)	34 (69)	1 (5)
Staff miss important meetings	14 (27)	69 (99)	16 (55)	1 (5)
Business is lost	13 (18)	37 (57)	44 (91)	6 (20)

Other (please specify).....

10

Do you think that the productivity of your staff is affected by problems they face in commuting to work?

Employment weighted % of respondents (*Number of companies*)

Seriously reduced

17 (27)

Somewhat reduced

77 (144)

No effect

6 (25)

Are the effects of commuting of your staff's productivity any worse in Central London than in other cities?

Employment weighted % of respondents (*Number of companies*)

Yes 73 (93)

No 19 (54)

No response 8 (49)

If yes, in what ways?.....  
.....

11

How does your organisation expect staff to behave if transport delays cause them to be late for work?

Employment weighted % of respondents (*Number of companies*)

Staff are expected to work late to make up time 36 (59)

Staff are expected to take work home to catch up 27 (25)

Staff are expected to work harder through the day but are not required to make up lost time 45 (54)

Company accepts that staff will be late occasionally and does not expect them to make up lost time/work 48 (104)

Staff pay is adjusted to reflect hours worked 2 (7)

No response 0 (2)

12a

Does your organisation do any of the following?

Employment weighted % of respondents (Number of companies)

	For all staff	For some staff	No Response
We operate flexi-time working	6 (17)	64 (75)	30 (104)
We allow staff to work from home	4 (10)	85 (113)	11 (73)
We offer loans to staff for season tickets	81 (139)	9 (19)	10 (38)
We subsidise staff commuting costs	3 (4)	2 (8)	95 (184)

Employment weighted % of respondents (Number of companies)

Was this introduced in response to transport delays?

	Yes	No	No Response
	23 (34)	35 (46)	42 (116)
	30 (48)	42 (57)	28 (91)
	5 (7)	63 (111)	32 (78)
	0 (1)	6 (12)	94 (183)

12b

In what other ways has your organisation responded to problems caused by transport delays?

.....

**C BUSINESS TRAVEL**

13

How does your organisation think travelling from Central London has changed over the last five years?

Employment weighted % of respondents (Number of companies)

	Journeys take more time	Journey time is increasingly unpredictable	Journeys take more time AND are more unpredictable	No significant change	Improved	No response
To meetings in Central London	9 (19)	21 (51)	53 (89)	15 (28)	2 (8)	0 (1)
To meetings elsewhere in London	12 (20)	21 (49)	46 (89)	17 (25)	3 (4)	1 (9)
To meetings in other parts of the UK	11 (16)	17 (41)	46 (73)	24 (44)	1 (2)	2 (20)
To the airport (eg Heathrow, City)	12 (18)	14 (45)	43 (73)	13 (26)	15 (19)	3 (15)

**14a**

How serious are the following problems for your organisation?

Employment weighted % of respondents (*Number of companies*)

	Critical	Very serious	Somewhat of a problem	Not a problem	No response
Transport delays cause staff to be late for / miss meetings with clients	5 (23)	27 (48)	55 (92)	8 (28)	4 (5)
Transport delays cause staff to be late for / miss meetings within your organisation	1 (6)	19 (30)	73 (133)	6 (23)	1 (4)
Longer journey times mean staff waste time travelling	10 (15)	34 (75)	55 (98)	1 (5)	1 (3)
Transport delays cause clients to be late visiting your organisation	9 (10)	18 (36)	64 (125)	10 (24)	0 (1)

**14b**

To what extent do these problems cause your organisation to lose business?

Employment weighted % of respondents (*Number of companies*)

Significantly	Somewhat	A little	Not at all	No response
2 (7)	35 (45)	40 (85)	21 (55)	2 (4)

**15**

What impact has the introduction of the Congestion Charge had on business travel in Central London?

Employment weighted % of respondents (*Number of companies*)

Significant improvement	Some improvement	No effect	Worse	No response
16 (11)	51 (94)	28 (79)	4 (9)	1 (3)

**16**

To what extent is your organisation using new technologies (eg video conferencing, e-mail, internet) to avoid the effects of transport delays?

Employment weighted % of respondents (*Number of companies*)

Significantly	Somewhat	A little	Not at all	No response
19 (37)	51 (75)	19 (58)	8 (24)	3 (2)

17

To what extent do you expect that transport delays will encourage greater use of such technologies by your organisation over the next few years?

Employment weighted % of respondents (*Number of companies*)

Significantly	Somewhat	A little	Not at all	No response
22 (39)	43 (83)	27 (57)	7 (15)	0 (2)

## D SERVICING AND DELIVERIES

18

To what extent does your organisation find that transport delays affect the speed and cost of deliveries either to your clients or from your suppliers?

Employment weighted % of respondents (*Number of companies*)

Significantly	Somewhat	A little	Not at all	Not an issue for our organisation	No response
13 (28)	25 (61)	29 (55)	3 (14)	30 (36)	1 (2)

19

Have such problems led to major problems for your organisation (eg deadlines missed, clients cancelled, etc)?

Employment weighted % of respondents (*Number of companies*)

Regularly	Occasionally	Never	No response
9 (13)	55 (110)	28 (56)	8 (17)

20

To what extent does your organisation find that transport delays affect the quality of repair and maintenance services offered by your contractors (eg for essential computer equipment)?

Employment weighted % of respondents (*Number of companies*)

Significantly	Somewhat	A little	Not at all	Not an issue for our organisation	No response
5 (13)	31 (55)	44 (70)	10 (25)	10 (31)	1 (2)

21

Have such problems led to major disruption in your operations?

Employment weighted % of respondents (*Number of companies*)

Regularly	Occasionally	Never	No response
5 (10)	47 (92)	44 (78)	4 (16)

**22** How is your organisation responding to any problems caused by transport delays?

**Deliveries**

**22a** Employment weighted % of respondents (*Number of companies*)

	Significantly	Somewhat	Not at all	No response
Deliveries are being rescheduled to off-peak/night-time	15 (9)	33 (45)	39 (107)	13 (35)
Deliveries are increasingly using motorcycle/bicycle couriers	26 (49)	50 (92)	13 (28)	12 (27)
Increasing use of premium delivery services which guarantee delivery times	27 (40)	41 (92)	20 (35)	11 (29)
Increasing use of electronic document exchange/e-mail internet to avoid delivery problems	62 (94)	24 (59)	3 (16)	11 (27)
Other (please specify).....				

**22b** Repair and maintenance services  
Employment weighted % of respondents (*Number of companies*)

	Significantly	Somewhat	Not at all	No response
Essential repair and maintenance increasingly done by in-house staff	9 (22)	44 (82)	36 (68)	10 (24)
We only contract with organisations who can guarantee response within a set time	22 (40)	53 (85)	17 (39)	8 (32)
Other (please specify).....				

**23** What impact has the introduction of the Congestion Charge had on journeys for servicing and deliveries in Central London?

Employment weighted % of respondents (*Number of companies*)

Significant improvement	Some improvement	No effect	Worse	No response
6 (4)	42 (76)	41 (91)	4 (12)	6 (13)

**E OTHER COMMENTS**

**24** What improvements would you like to see in London's transport?

<i>% of respondents, employment-weighted</i>	
More reliable service	39
Increased frequency	16
More routes	29
More comfort (cleaner, more seats, air conditioning)	6
Less overcrowding (more capacity)	12
Significant investment (unspecified)	14
Lower fares	13
More information (when things go wrong)	1
Better enforcement	8
Congestion charge changes	2
Better organisation	1
More security	0
Other	7

**25** Do you have any other comments?

.....

Please return questionnaire to:

London Transport Team  
Oxford Economic Forecasting  
FREEPOST SCE15649  
Oxford OX1 1BR

Fax: 01865 202533  
Email:cbarton@oef.co.uk

Thank you for your assistance

## Other formats and languages

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### Chinese

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### Vietnamese

Nếu bạn muốn có văn bản tài liệu này bằng ngôn ngữ của mình, hãy liên hệ theo số điện thoại hoặc địa chỉ dưới đây.

### Greek

Αν θέλετε να αποκτήσετε αντίγραφο του παρόντος εγγράφου στη δική σας γλώσσα, παρακαλείστε να επικοινωνήσετε τηλεφωνικά στον αριθμό αυτό ή ταχυδρομικά στην παρακάτω διεύθυνση.

### Turkish

Bu belgenin kendi dilinizde hazırlanmış bir nüshasını edinmek için, lütfen aşağıdaki telefon numarasını arayınız

### Punjabi

ਜੇ ਤੁਹਾਨੂੰ ਇਸ ਦਸਤਾਵੇਜ਼ ਦੀ ਕਾਪੀ ਤੁਹਾਡੀ ਆਪਣੀ ਭਾਸ਼ਾ ਵਿਚ ਚਾਹੀਦੀ ਹੈ, ਤਾਂ ਹੇਠ ਲਿਖੇ ਨੰਬਰ 'ਤੇ ਫ਼ੋਨ ਕਰੋ ਜਾਂ ਹੇਠ ਲਿਖੇ ਪਤੇ 'ਤੇ ਰਾਬਤਾ ਕਰੋ:

### Hindi

यदि आप इस दस्तावेज की प्रति अपनी भाषा में चाहते हैं, तो कृपया निम्नलिखित नंबर पर फोन करें अथवा नीचे दिये गये पते पर संपर्क करें

### Bengali

আপনি যদি আপনার ভাষায় এই দলিলের প্রতিলিপি (কপি) চান, তা হলে নীচের ফোন নম্বরে বা ঠিকানায় অনুগ্রহ করে যোগাযোগ করুন।

### Urdu

اگر آپ اس دستاویز کی نقل اپنی زبان میں چاہتے ہیں، تو براہ کرم نیچے دئے گئے نمبر پر فون کریں یا دیئے گئے پتے پر رابطہ کریں

### Arabic

إذا أردت نسخة من هذه الوثيقة بلغتك، يرجى الاتصال برقم الهاتف أو مراسلة العنوان أدناه

### Gujarati

જો તમને આ દસ્તાવેજની નકલ તમારી ભાષામાં જોઈતી હોય તો, કૃપા કરી આપેલ નંબર ઉપર ફોન કરો અથવા નીચેના સરનામે સંપર્ક સાધો.

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