

# London Area Travel Survey National Rail Results

## An Introductory Report

Strategic Rail Authority  
Statistics Team

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## Executive Summary

This report summarises the headline results from the National Rail component of the London Area Travel Surveys (LATS) conducted in 2001. The study area comprises most of the London commuter catchment, extending towards Exeter and including Swindon, Rugby, Kettering, Peterborough, Cambridge and Ipswich, as well as all south and east coast railway stations between Essex and Dorset. Issues addressed include journey volumes, origins and destinations, journey purpose, time of travel, access modes to and from stations and demographic characteristics of travellers. Results are representative of an average weekday during a non-holiday period in 2001.

The information referred to in this publication can be made available to public bodies subject to data confidentiality constraints.

For these and all other enquiries, please contact SRA Statistics team on:  
0207 654 6110/ 6072/ 6174.

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## 1. Introduction

Transport needs are dynamic, reflecting changes in the patterns of people's movement as a result of changes in population size and composition, the location of employment and other social and demographic factors. Understanding these travel patterns is of key importance in order to plan services to meet existing and future transport demand.

The main source of information usually used to examine rail travel patterns is ticket sales. However, this approach has several shortcomings in that it gives no information about interaction with other modes of transport and no details of travel within Travelcard zones. It gives very limited information about the true origin and/or destination of the journey. It does not give any information about who is travelling or why a journey is being made.

As an additional way of understanding how demand has changed over time, regular surveys of travel and transport in London and the South East have been carried out since the 1960s to coincide with the national Census of Population. The most recent was carried out in 2001 and results have now become available.

The 2001 London Area Travel Survey was, therefore, the fifth in that series of large-scale surveys carried out roughly every ten years to help understand the changing pattern of travel in the London area. Previous studies had been commissioned by the Greater London Council (1971 and 1981) and by the Department for Transport, with the London Research Centre (1991). In 2001, the Strategic Rail Authority commissioned the national rail element of the survey in conjunction with Transport for London, who carried out similar studies of travellers on different types of transport – buses, underground and road vehicles.

The aim of the LATS survey was to build up a picture of all travel in the London area on a 'typical' travel weekday outside school and public holidays. The rail part of the survey aimed both to contribute rail passenger information to LATS and to update key rail data sources. In addition, the data forms the basis for an updated suite of

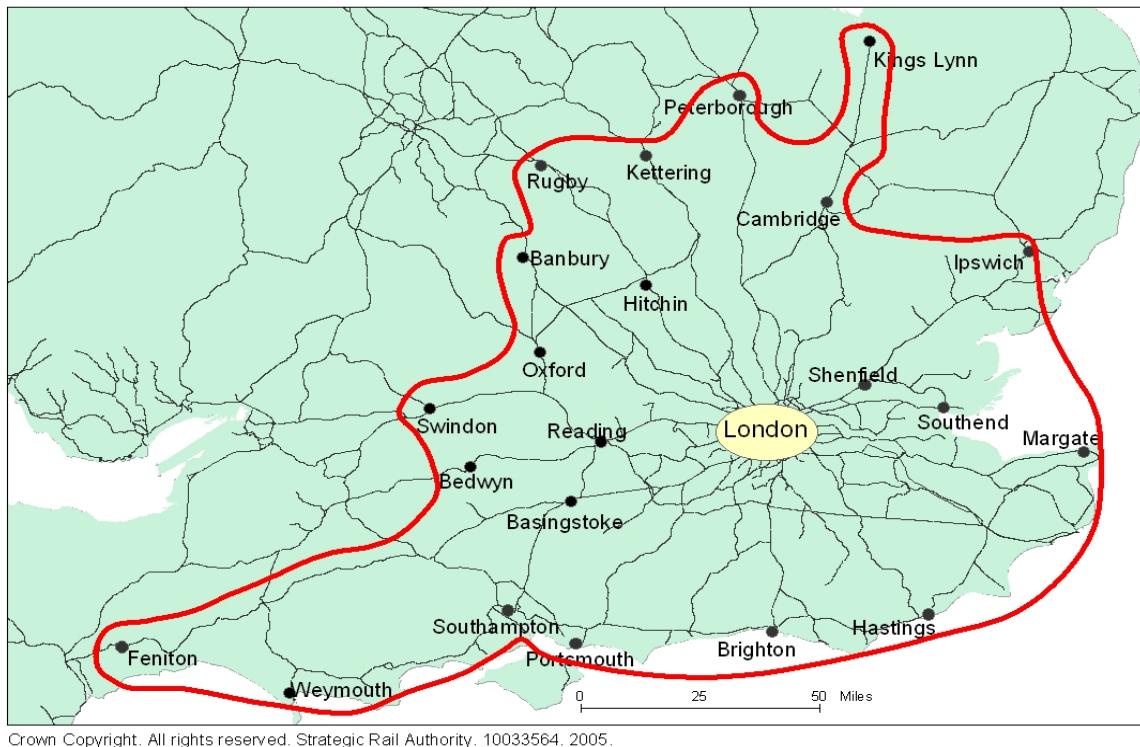
transport planning models, which underpin much of the demand forecasts for future development of the rail network.

This report summarises the findings from the 2001 work. A number of changes have taken place to the transport system in London since the previous survey in 1991 including the privatisation of the National Rail network and the extension of the Docklands Light Railway and the Jubilee line. In addition, rail patronage on services operated by London and South East train operating companies has increased by over 50% since April 1995.

The information presented in the report is intended to give an overall flavour of the results of the survey and to provide information for stakeholders on the nature of data available. Further information is available from SRA Statistics Team on 020 7654 6072/ 6110/ 6174. At the time of writing, railway organisations are changing in response to the Transport Bill passing through Parliament and further information on future arrangements for statistical matters will be available on the SRA and DfT websites.

## 2. Scope and Objectives

The survey of rail passengers covered London and the surrounding area, broadly equivalent to the boundaries of the former Network South East (NSE). A map of the area covered is shown below with boundaries extending as far as Rugby in the North and Pinhoe (near Exeter) in the West.



**Figure 1: Coverage of LATS Survey**

The information which the survey was designed to collect comprised:

- The volume of travel on the national rail system in 2001 within the former Network South East area;
- The origins and destinations of the journeys;
- The time of travel;
- Journey purpose;
- The journey stages before and after the main rail stage;
- The characteristics of the travellers; and
- Information on how other rail travellers interchange with other modes.

### 3. Methodology

The survey was based on a self-completion questionnaire (see Annex 1) which was distributed to passengers. This asked for straightforward information, including:

- Origin address and purpose;
- Destination address and purpose;
- Time of travel;
- Information about the type of ticket purchased;
- Mode of travel to and from railway stations;
- The traveller's home address; and
- A very limited amount of socio-demographic information.

Questionnaires were handed out at stations on a continuous basis and were given to as many passengers as possible as they entered. Around 900 stations were included in the survey, with individual stations covered in a single day.

Questionnaires were handed out for all or part of the day from 6am onwards dependent on the size of the station and passenger flows. The survey was carried out during the week, from Tuesday to Thursday, avoiding weekends and holiday periods. The aim of the survey was to assess travel patterns during a 'typical' working day, and does not account for different patterns of weekend travel or changing seasonal demand.

Questionnaires were recorded by the 15 minute intervals in which they were issued. A count of the overall numbers of passengers entering the station in each interval was also taken. The questionnaire responses were then weighted to the number of passengers in the relevant interval in order to give a representation of the overall passenger volume. In addition, a bias correction survey was also carried out in order to take into account the differences in response rates from different segments of the travelling public. Also, as the surveys were carried out over a considerable period of time, another weighting was created in order to take into account the variation in patronage levels over the course of the year. The results presented in this report take into account all of these factors and represent travel on a typical weekday in 2001, outside school holiday periods.

In order to cover travel in the NSE area undertaken by passengers from outside the area, station surveys were complemented with surveys on intercity trains entering the area. The same questionnaires were handed out to a sample of passengers as the trains crossed into the NSE area.

Overall, approximately three hundred thousand responses were collected from rail passengers. The responses along with the stations counts provide the basis for the results given here.



## 4. Passenger Volume

The information from the returned questionnaires was combined with the station counts and other weighting factors to give an estimate of 1.75 million journeys starting within the survey area on an average weekday in 2001. The table below indicates the destination of these journeys.

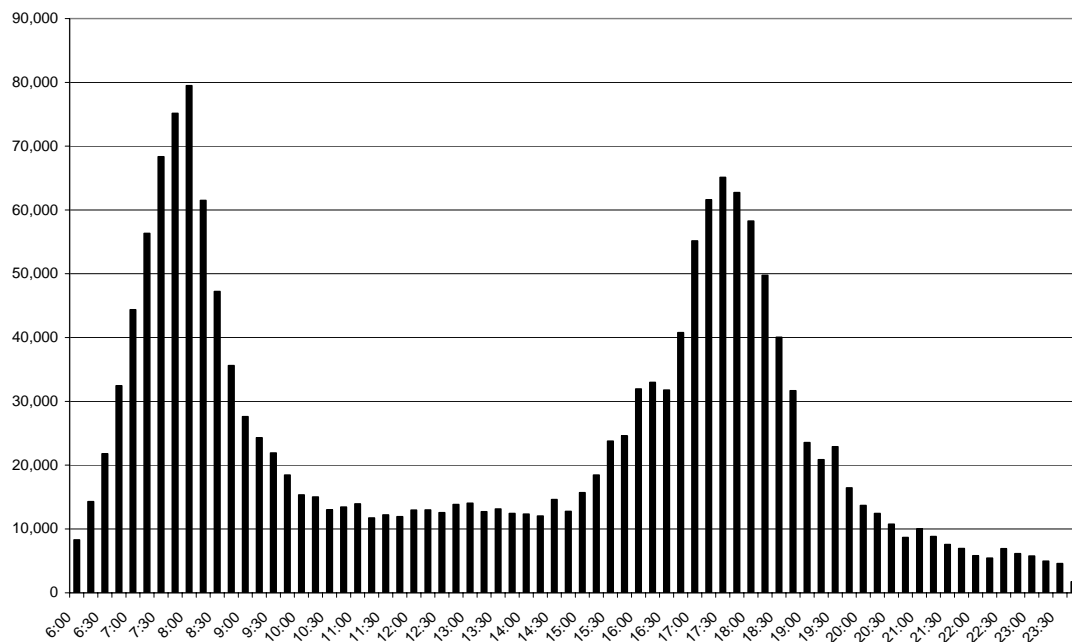
Region	Frequency	%
London	1,127,206	64.5%
South East	332,776	19.0%
East	204,419	11.7%
South West	23,517	1.3%
East Midlands	12,186	0.7%
West Midlands	11,516	0.7%
North West	10,061	0.6%
Yorkshire and the Humber	7,440	0.4%
Wales	2,641	0.2%
North East	2,358	0.1%
Scotland	1,777	0.1%
<b>Total</b>	<b>1,748,582</b>	<b>100%</b>

**Figure 2: Destination of Journeys**

London was the destination for the majority of journeys recorded by the survey with other regions following roughly in order of distance away from the South East. It should be noted that these data only relate to journeys commencing in the study area and do not include information on passengers entering the surveyed area.

## 5. Time of Travel

A majority of rail travel occurs in the morning and evening peaks. The chart below shows the number of passengers boarding trains through the course of the day.



**Figure 3: Time of Travel**

In summary, this graph shows that:

- 35% of journeys began between 6:30 and 10:00;
- 37% of journeys between 16:00 and 20:00; and
- 28% of journeys outside these peak periods.

The morning and evening peaks differed in that the morning peak was of shorter duration with a greater volume of journeys made in a shorter period of time.

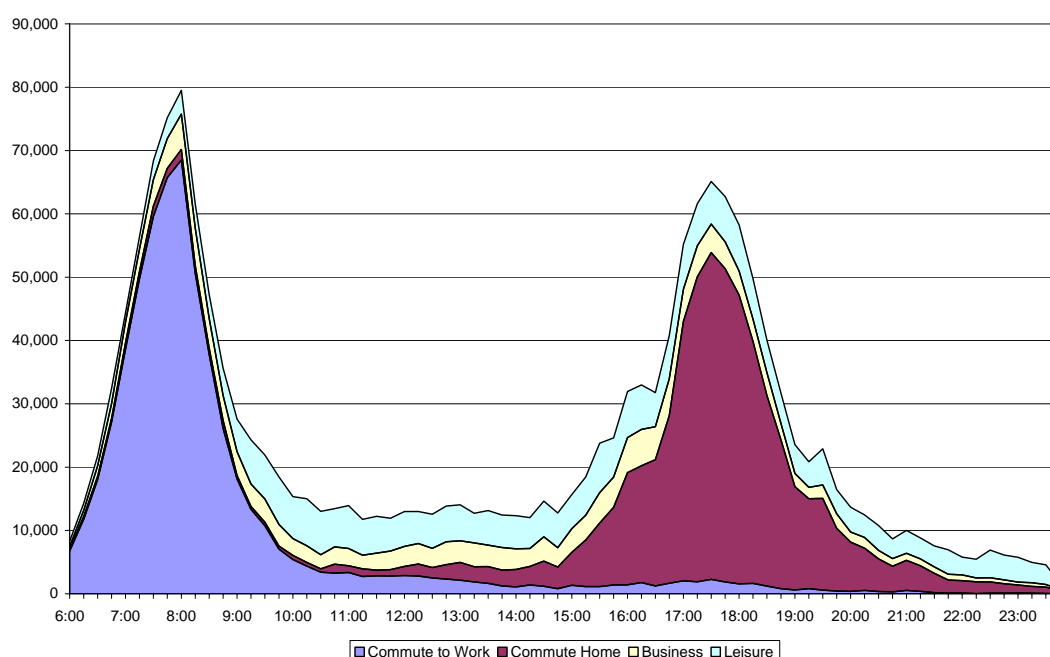
The evening peak does not see such high passenger numbers in each 15-minute interval but overall, it lasts longer than the morning peak with demand tapering off more gradually over the course of the evening.

## 6. Why are people travelling?

A simplification of the journey purpose collected in the survey was used to group rail journeys into one of four categories: commuting to work, commuting from work, business and leisure. Commuting also includes education journeys, for example students travelling to or from school or college.

Purpose	% Journeys
Commute to Work	34%
Commute Home	34%
Business	12%
Leisure	20%

Commuting journeys were split evenly between those travelling to work and those travelling home from work. Business journeys represented 12% of rail travel in the area covered by the survey. Leisure journeys such as shopping trips, holiday journeys, trips to recreation and sporting events and visiting family and friends accounted for the remaining 20%.



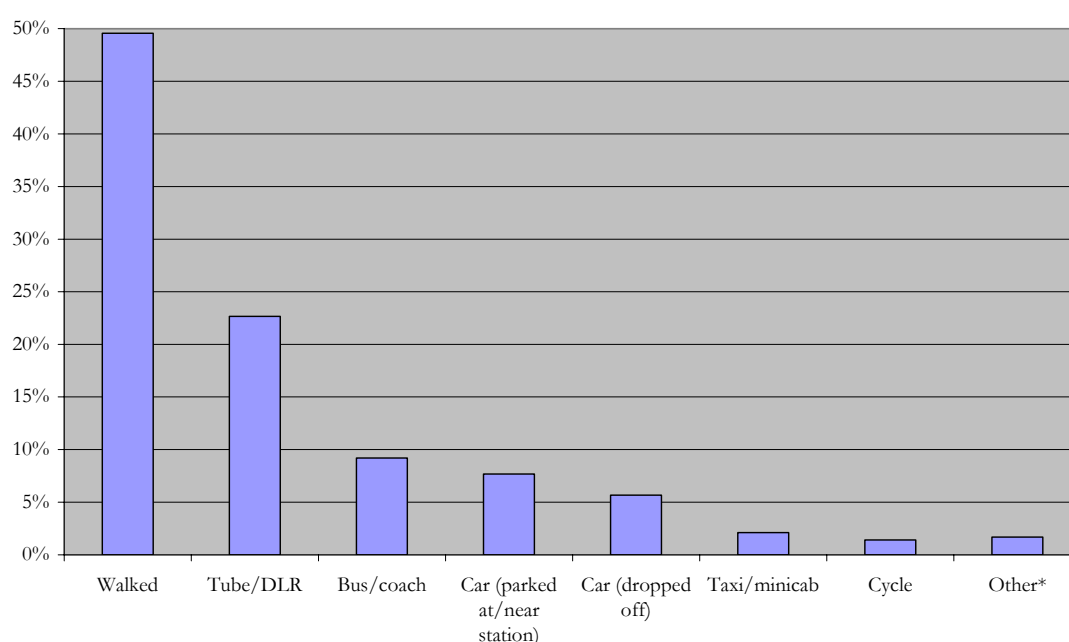
**Figure 4: Journey Volume and Purpose by time of day**

Figure 4 illustrates how the volume of these trips varied across the course of the day. Most journeys to work occurred in the morning and most journeys from work occurred in the evening. Business journeys occurred throughout the day. Leisure journeys show an even volume throughout the day starting from about 9am and tailing off slightly as the day progresses. During the working day (i.e. between the peaks) leisure journeys accounted for the greatest proportion of travel.

## 7. Access and Egress Modes

To help plan railway services and provide appropriate infrastructure at stations, it is important to understand how rail journeys link with other modes of transport.

The questionnaire asked for information about the rest of the passenger's journey beyond the rail network. This included details of where they travelled from before arriving at the railway station and the mode of transport for this 'access' stage of the journey, plus corresponding information about travel from the end of their rail trip to their destination.



**Figure 5: Station Access Mode**

Figure 5 shows that walking was the most frequently used means of travel to stations accounting for 50% of all feeder trips. Tube and bus were the next most popular access modes accounting for 32% of all trips to stations. Cars were used to access the station for 14% of journeys and bicycles were used in just over 1% of journeys.

Access Mode (to station)	Commute to Work	Commute Home	Business	Leisure	Total
Walked	56%	51%	36%	43%	50%
Tube/DLR	5%	35%	33%	25%	23%
Bus/coach	10%	9%	6%	11%	9%
Car (parked at/near station)	15%	0%	10%	7%	8%
Car (dropped off)	10%	1%	6%	6%	6%
Taxi/minicab	1%	1%	6%	4%	2%
Cycle	2%	1%	1%	1%	1%
Other	1%	1%	2%	3%	2%
<b>Total</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>

**Figure 6: Access Mode by Journey Purpose**

Access mode was also assessed in relation to journey purpose. For all journey purposes, walking was still the most common means of access although its relative importance varied. Commuters had the highest levels of walk or cycle trips to stations. Passengers travelling to work were least likely to have used the tube, reflecting the fact that a lot of these journeys took place in the morning, started outside London and involved travel into the capital. The other journey purposes were more likely to be made during the course of the day and to start from within London. The corresponding commuting journeys home show the highest level of tube use suggesting that a large proportion of commuting is focused on central London.

Egress Mode (from station)	Commute to Work	Commute Home	Business	Leisure	Total
Walked	53%	52%	39%	49%	50%
Tube/DLR	33%	4%	22%	18%	19%
Bus/coach	10%	10%	7%	10%	10%
Car (parked at/near station)	0%	18%	15%	7%	10%
Car (dropped off)	0%	7%	5%	5%	4%
Taxi/minicab	1%	2%	8%	5%	3%
Cycle	1%	3%	1%	1%	2%
Other	1%	4%	2%	5%	3%
<b>Total</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>

**Figure 7: Egress Mode by Journey Purpose**

The station egress mode for commuters (Figure 7) was very similar to access mode (Figure 6) but reversed. Business and leisure journeys showed lower levels of tube use reflecting that many of these journeys were ending outside the capital.

Address and station information in the survey was geo-coded, making it possible to determine (crow-fly) distances travelled to stations. Figure 8 shows how this varied across the different journey purposes.

<b>Access Mode (to station)</b>	<b>Commute Home</b>	<b>Commute to Work</b>	<b>Business</b>	<b>Leisure</b>	<b>Total</b>
<b>Walked</b>	1.72	1.78	2.96	2.83	2.06
<b>Bicycle</b>	3.65	3.94	6.41	5.32	4.29
<b>Bus/coach</b>	2.93	3.26	7.57	8.94	4.83
<b>Tube</b>	4.41	8.40	6.77	7.53	5.78
<b>DLR</b>	4.05	4.71	7.81	7.11	4.99
<b>Car (dropped off)</b>	6.79	4.34	10.99	11.76	7.22
<b>Car (parked at/near station)</b>	18.05	6.38	14.82	11.25	8.72
<b>Taxi/minicab</b>	2.91	9.82	11.27	10.83	9.32
<b>Total</b>	<b>2.89</b>	<b>3.39</b>	<b>7.69</b>	<b>6.55</b>	<b>4.42</b>

**Figure 8: Average Distances travelled to stations by mode and journey purpose (kilometres)**

\* Very small sample

Passengers travelled an average of just under four and a half kilometres (three miles) to reach their origin station. The average walk to the station was approximately two kilometres (one and a quarter miles) compared to some eight kilometres (five miles) for driving. Those who were dropped off by car at the station were travelling a slightly shorter distance than those who parked a car at the station.

Comparing distances travelled by purpose, we can see that passengers tend to work closer to their work station than they live to their home station.

Station access mode	East	London	South East
Walked	3.81	1.58	2.59
Bicycle	3.37	5.23	3.77
Bus/coach	9.31	3.85	7.99
Car (dropped off)	6.64	7.03	7.03
Car (parked at/near station)	7.99	10.44	7.69
Taxi/minicab	14.85	5.83	13.31
Overall	6.79	3.69	5.70

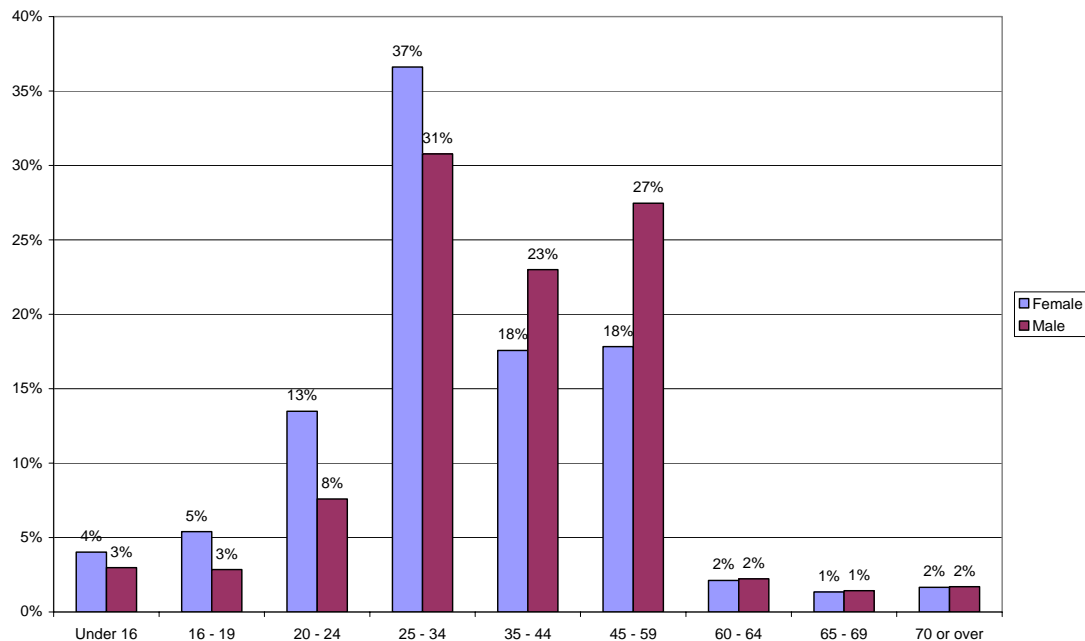
**Figure 9: Average distance travelled by access mode to stations in each Region (kms)**

Figure 9 compares the average distances travelled to reach stations in the three main Government Office Regions covered, although the East of England region was only partially covered by the survey. London passengers travelled the shortest distance to their station whereas passengers from the East travelled the furthest. London does show some differences from the other regions. It had the highest average distance travelled to park at a station, perhaps indicative of people crossing the Greater London boundary to board a train within a Travelcard zone. It also had the longest average cycling distance to stations. In contrast average walk, bus and taxi journeys were smaller than the other regions.



## 8. Passenger Demographics

A limited amount of demographic information about the nature of passengers was also collected in the survey. Approximately 56% of passengers surveyed were male and 44% female.



**Figure 10: Gender and Age Profile**

The chart also shows that male passengers were in general older than female passengers. 59% of female passengers were under 35 years of age compared to only 45% of males.

Journey Purpose	Female	Male
Business	33%	67%
Commute Home	43%	57%
Commute to Work	44%	56%
Leisure	52%	48%
Total	44%	56%

**Figure 11: Journey Purpose by Gender**

For commuting and business purposes more passengers were male than female, whereas for leisure journeys, more passengers were female.

Access to Cars	Commute to Work	Commute Home	Business	Leisure	Total
None	19%	16%	15%	30%	20%
One	48%	48%	39%	41%	45%
Two	26%	29%	37%	23%	28%
Three	5%	5%	7%	5%	5%
More than three	2%	2%	2%	2%	2%
Total	100%	100%	100%	100%	100%

**Figure 12: Household Access to Cars by Journey Purpose**

Figure 12 shows that 20% of all passengers came from a household that did not have access to a car, reflecting that the train may be a primary mode of transport for these people. Four out of every five people did have access to a car, including 35% who had access to more than 1 car. For these people, rail is therefore a choice, indicating that it is a relatively attractive alternative to car use in some circumstances.

Levels of car access varied across the different journey purposes. A fifth of all passengers did not have access to a car or van, however this proportion rose to 30% for leisure passengers. Levels of car ownership were highest for business travellers.

## 9. London Termini

Survey Station	Walked	Tube/DLR	Bus/coach	Car (dropped off)	Car (parked)	Taxi	Bicycle	Other/Missing
Kings Cross	16%	69%	4%	2%	1%	6%	1%	2%
Euston	20%	63%	5%	2%	1%	8%	1%	1%
Paddington	10%	75%	5%	1%	1%	6%	1%	1%
St Pancras	17%	69%	2%	2%	1%	8%	0%	1%
Marylebone	16%	72%	4%	1%	1%	5%	1%	1%
Liverpool St	48%	40%	8%	1%	1%	2%	0%	0%
Fenchurch St	47%	46%	3%	1%	0%	2%	0%	0%
Waterloo	25%	55%	11%	1%	1%	4%	1%	3%
Victoria	29%	53%	13%	1%	1%	2%	1%	1%
Charing Cross	53%	32%	10%	1%	0%	2%	0%	0%
London Bridge	50%	35%	9%	1%	1%	2%	1%	2%

**Figure 13: Access Mode Share for London Termini**

The table above illustrates how passengers accessed the different London termini stations. Car use in London was very small, whilst Tube use was much higher. The table also shows the varying importance of the tube at these stations with Paddington being the most tube dependent – three quarters of its passengers were using it to get there. Charing Cross showed the highest level of passengers walking to the stations with Paddington being the lowest.

Survey station	Business	Commute	Leisure	Total
Kings Cross	203.1	83.2	192.6	142.7
Euston	190.7	65.2	186.6	132.7
Paddington	124.7	55.8	107.4	84.6
St. Pancras	187.0	114.9	181.9	157.4
Marylebone	71.4	52.7	57.2	57.5
Liverpool St.	62.2	44.2	49.2	46.5
Fenchurch St.	39.5	37.1	38.9	37.4
Waterloo	47.6	35.1	38.9	37.7
Victoria	39.2	28.9	35.8	32.0
Charing Cross	32.5	25.3	26.4	26.4
London Bridge	22.3	22.3	18.8	21.7

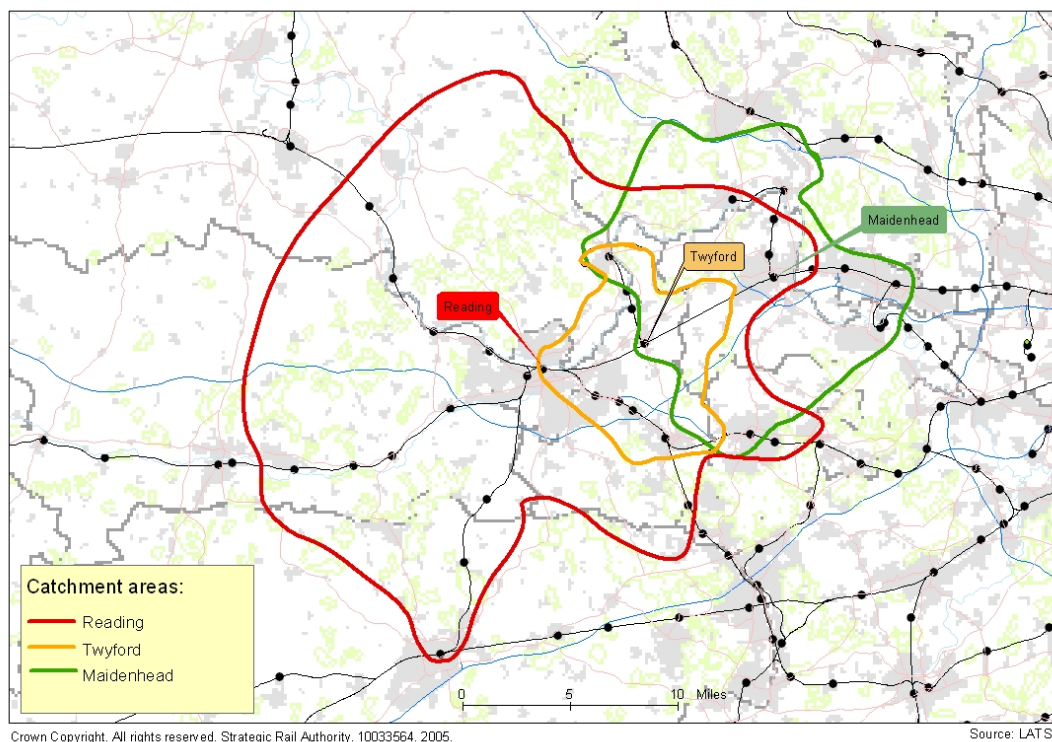
**Figure 14: Average Rail Journey Distance from London Termini by Journey Purpose (kilometres)**

The table above shows the average length of journeys made from a selection of the London Termini. The significant difference in average journey lengths reflects the nature of the services offered at these stations. The longest average journey length was from St Pancras, resulting from the fact that no suburban operator used that station at the time of survey. The average commuting distance from St Pancras was also the highest for similar reasons.

London Bridge and Charing Cross had the shortest average journey length across all purposes, given the large proportion of suburban trains that serve those stations.

## 10. Catchment Analysis

The data collected in the survey contains information of potential use to planning bodies across the area covered by the study. The following section illustrates some of this potential by looking at the catchment of three stations in Berkshire – Reading, Twyford and Maidenhead, situated on the Great Western Mainline. Data is based on information provided by the respondents which has then been geo-coded.

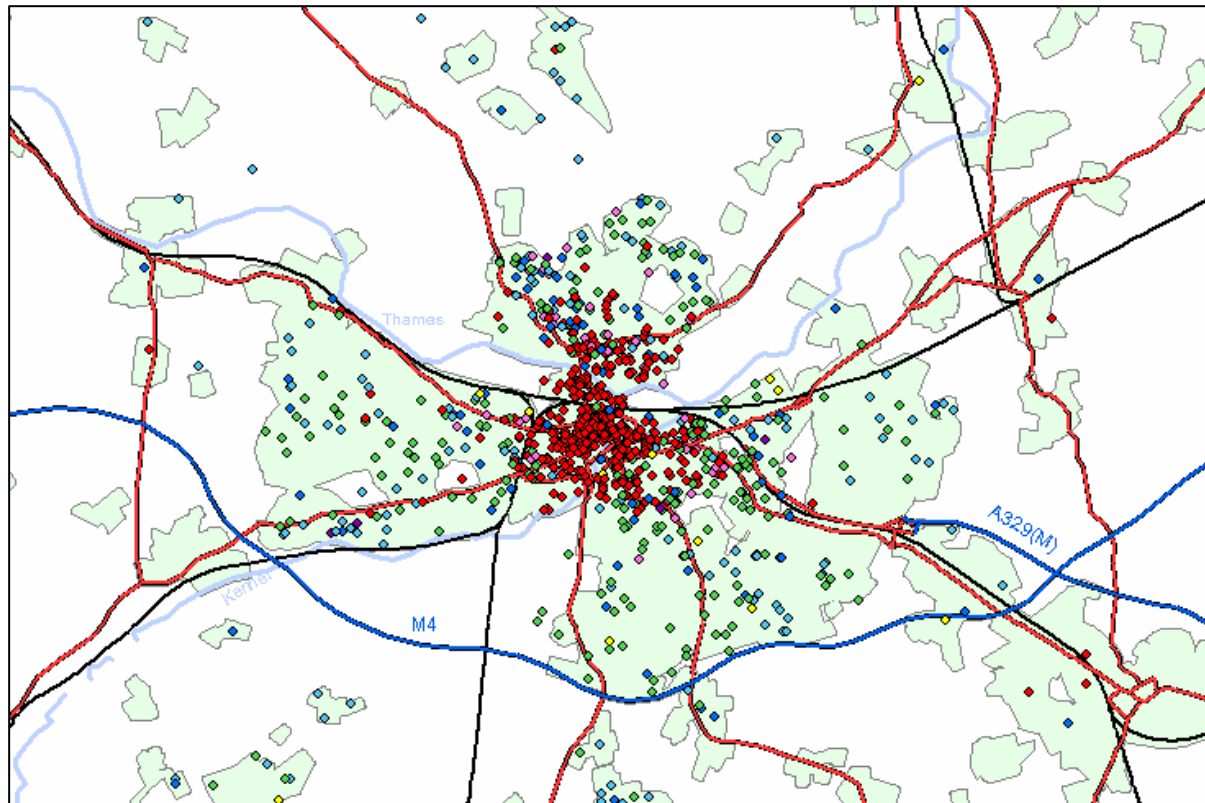


**Figure 15: Catchment Areas of Reading, Twyford and Maidenhead Stations**

Catchment areas are defined as the smallest geographic area including 95% of the recorded origins of passengers using that station. The areas overlap, reflecting differences in the level of service offered at different stations and their accessibility to passengers travelling by different modes. Reading has the largest catchment of the three reflecting its status as the busiest station with direct services to a larger selection of destinations.

The following charts look at the three stations individually and the modes passengers use to access them. In summary, the analysis of Reading, Twyford and Maidenhead data showed three very different patterns of access to the stations.

The dominance of walking at Reading contrasted sharply with much greater use of cars in Maidenhead (where a significant number of shorter journeys were made by car). There was some evidence that passengers were being attracted to Twyford instead of closer stations. These findings raise issues about station planning can affect access patterns.

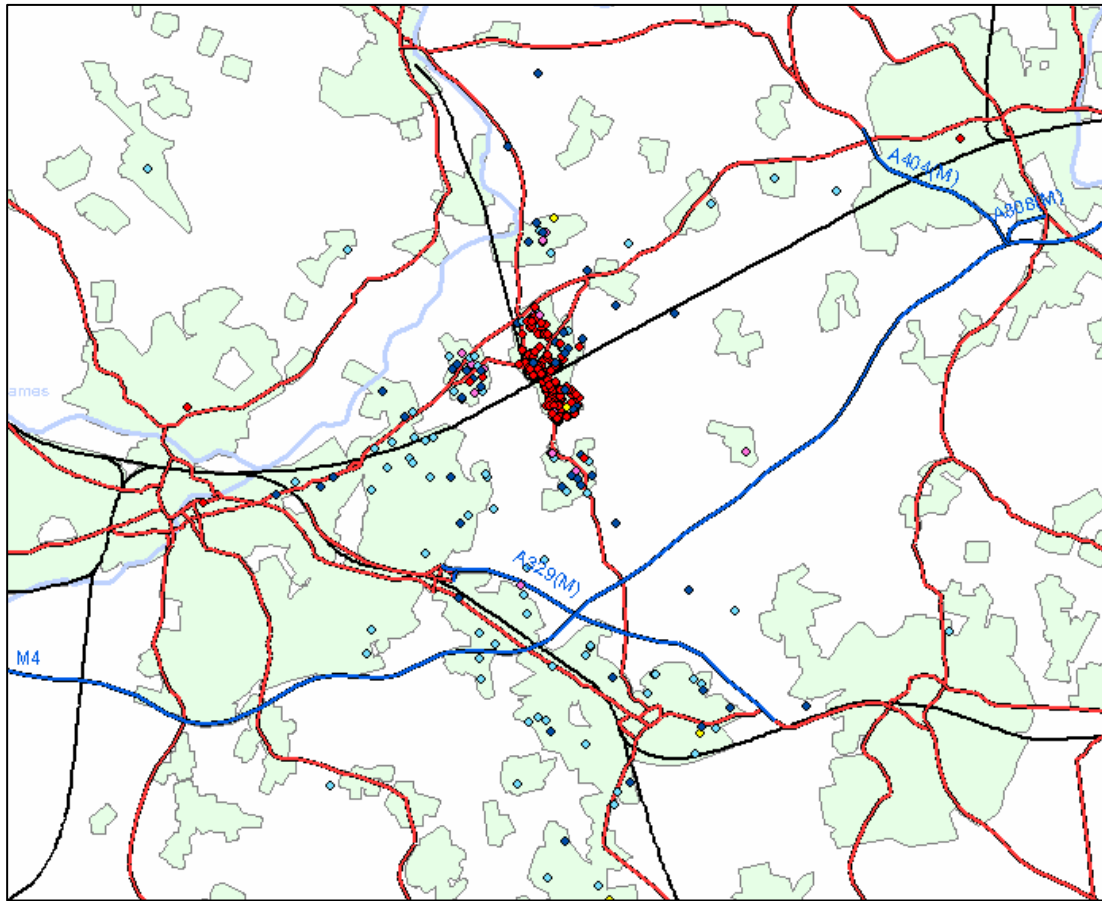


**Key:**

Red	Walked	Yellow	Taxi
Light Blue	Car (dropped off)	Pink	Bicycle
Dark Blue	Car (parked)	Green	Bus

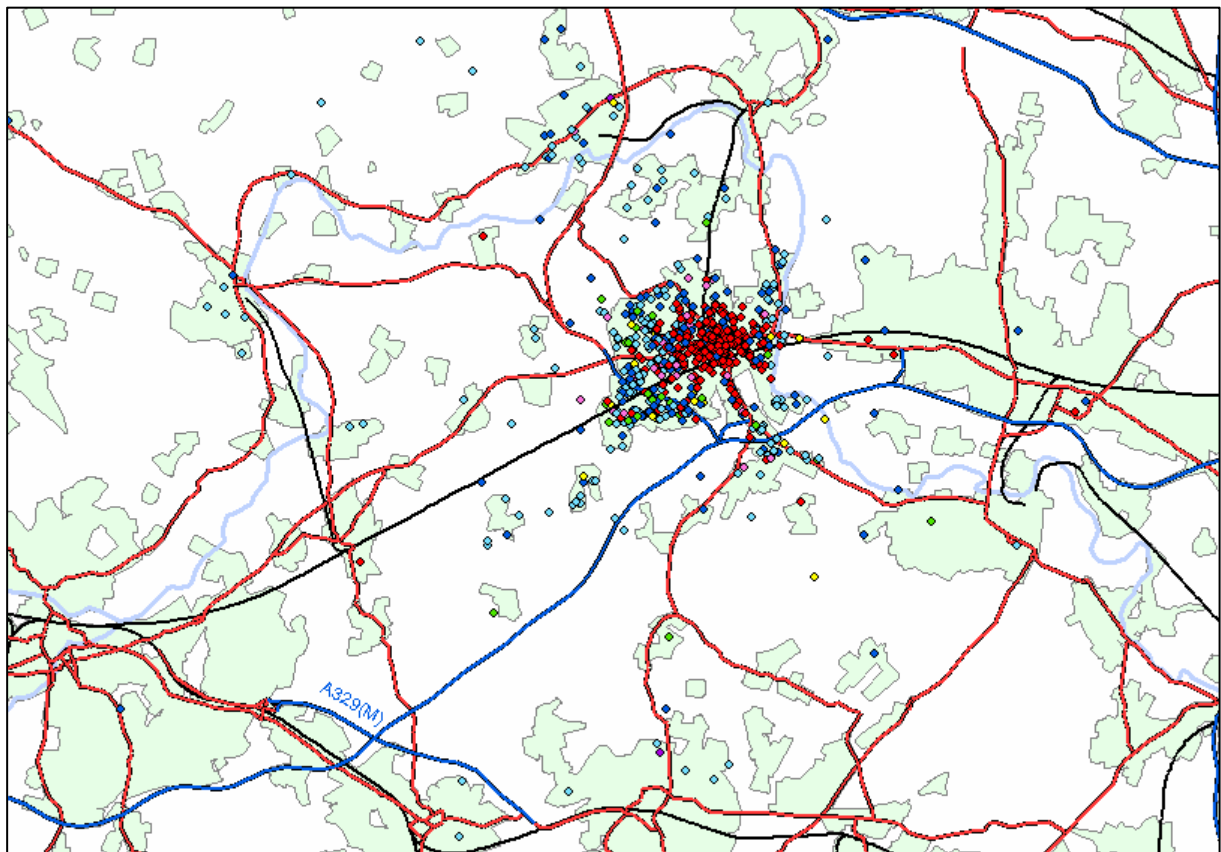
**Figure 16: Origin and Access Mode of Passengers Boarding Trains at Reading**

In general, most passengers using the station have come from within the boundaries of the Borough with a small proportion from neighbouring areas. Reading has as many inbound commuters as outbound and therefore a significant number of these passengers will be people coming from workplaces in the Town Centre making their journeys on foot. Thus there is a high volume of passengers walking to the station. Those using other forms of transport tend to have come from more residential areas further from the station, many of whom will be commuting to London.



**Figure 17: Origin and Access Mode of Passengers Boarding at Twyford**

Twyford station is the next station along the line from Paddington toward London and has a very different service mix. It has local services to and from Henley and well as a mixture of semi-fast and stopping services to and from Paddington. It differs from Reading in that virtually none of the passengers use bus to travel to the station. In addition, there is some evidence of rail-heading from both Wokingham and the Eastern part of Reading. This may be as a consequence of the heavy traffic into Reading, cheaper fares from Twyford and car park provision at the station.



**Figure 18: Origin and Access Mode of Passengers Boarding at Maidenhead**

Services from Maidenhead are similar to those at Twyford. However, Maidenhead differs again in that those walking to the station are centred quite tightly on the station. Maidenhead also has a large proportion of car users. In contrast to the previous two stations, car users come from much closer to the station.