Station Usage 2004/05

A Report for

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AEA TECHNOLOGY
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EXECUTIVE SUMMARY

This report gives details of Station Usage data for the financial year 2004/05. An accompanying spreadsheet contains the data itself. In this report, we give an overview of our analysis and the outcome of several checks that were performed on the results.

Station Usage data consists of estimates of the total numbers of people entering, exiting and interchanging at stations. These results are the most recent in a series we have supplied since 1997/98. The spreadsheet is in a similar format to those provided previously. As requested, two new columns have been included; "County" and "Region".

The Station Usage results are broadly in line with those for earlier years. The total number of entries, exits and interchanges has increased slightly since the last set of data produced for 2002/03. However, overall the changes are similar to those seen in previous years.

This year's work includes some improvements to the methodology. Firstly, making use of the 2001 London Area Transport Survey (LATS) to improve the assumptions about which terminal stations passengers with tickets to London BR or with Travelcards valid in Zone 1 use. Secondly, the use of updated assumptions (taken from MOIRA) when dealing with flows involving a London Travelcard, excluding travel in Zone 1. Both have improved the quality of the station usage figures significantly.

We have undertaken a series of checks on the Station Usage data. Results of some checks are listed in the spreadsheet, but the report gives further details and analysis of these results.

CONTENTS

1. INTRODUCTION

This report accompanies the Station Usage data for 2004/05, provided in the spreadsheet "Station Usage 2004-05.xls". This file lists the entries, exits and interchanges made at stations throughout England, Scotland and Wales in the financial year 2004-2005 (1st April 2004 to 31st March 2005).

The Station Usage spreadsheet takes a similar format to those we have provided in previous years. As requested, two new columns have been included; "County" and "Region".[1] Total entries, exits and interchanges are given for each station. Data for entries and exits are also subdivided by ticket type (full, reduced and season tickets). The spreadsheet also contains results of checks that were requested previously by the SRA on the entries and exits results. Comparative checks have been done using 2002/03 data. It was not possible to compare against the previous years' data, 2003/04, as this has never been created. This has been accounted for when formulating the checks and should be considered at all times.

The remainder of this report falls into four sections:

- Section 2 gives an overview of the entries and exits results
- Section 3 provides an overview of the interchange results
- Section 4 covers the checks on the station usage data
- Lastly, the Appendices give an overview of the ORCATS allocation process, and outlines of the methodologies used in the study.

[1] We have used data on government regions which is accurate to the best of our knowledge.

2. OVERVIEW OF ENTRIES AND EXITS RESULTS

The spreadsheet contains entries and exits results for 2,501 stations. Around 781 million entries, and a similar number of exits, were made in 2004/05 – an increase of 3.9% on the year 2002/03. This is a reasonable growth given we are comparing with the results form 2002/03, two years previous. Growth from 2001/02 to 2002/03 was estimated to be at 2.3%. Table 2.1 below shows data for the 10 stations with the highest numbers of entries and exits for 2004/05.

Table 2.1: Stations with the greatest numbers of Entries and Exits in 2004/05.

Station Name	NLC	Total Entries and Exits
		2004/05
Waterloo	5598	62,388,929
Liverpool Street	6965	50,469,209
Victoria	5426	48,046,867
London Bridge	5148	37,020,060
Charing Cross	5143	28,822,074
Glasgow Central	9813	27,006,323
Euston	1444	26,256,193
Paddington	3087	25,788,145
King's Cross	6121	20,805,979
Manchester Piccadilly	2968	18,958,922

The top ten stations have changed since 2002/03 and in addition only 22% of all entries and exits are made up of the top ten stations. This is a reduction from the 27% from the previous year of 2002/03. The main contributor to these changes is the new improved 2001 LATS methodology employed to assign an appropriate London station in place of the London BR code, on flows where either the origin or destination is London BR or a London Travelcard involving Zone 1. More detail can be found in Section 4.2.

As usual, some stations have been excluded. It is possible that some national rail ticket sales for the following 'joint' national rail and London Underground stations are recorded in the ticketing system, but not all sales are, therefore data capture is low at the following stations, and results can be misleading:

- Farringdon
- South Ruislip
- Greenford
- Old Street
- Highbury & Islington
- Seven Sisters
- Tottenham Hale
- West Ham
- Blackhorse Road
- Croxley Green

There were four new stations this year: Edinburgh Park (8808), Chandlers Ford (5836), Kempton Park (5678) and Glasshoughton (8360).

3. OVERVIEW OF INTERCHANGE RESULTS

In all, around 121 million interchanges were estimated to have been made. This is similar to the number of interchanges were estimated in 2002/03 (120 million). Similarly, 37% of interchanges are estimated to have occurred at the top 10 stations (36% in 2002/03). These ten stations are listed in Table 3.1 below.

Table 3.1: The ten stations with the greatest numbers of interchanges in 2004/05

Station Name	NLC	Total Interchanges 2004/05
Clapham Junction	5595	8,682,661
St.Pancras	1555	8,319,289
London Bridge	5148	6,316,136
Waterloo	5598	3,953,885
East Croydon	5355	3,912,974
Victoria	5426	3,551,921
Glasgow Queen Street	9950	3,224,130
Birmingham New Street	1127	2,868,177
Reading	3149	2,267,360
Liverpool Central	2242	2,025,470

The interchange results were based on the Central Allocations File (CAF), which is an output of the ORCATS system. Since ORCATS is a model, the CAF contains estimates rather than actual journeys. However, it is used throughout the industry, so it is a reasonable source of data. Please refer to Appendix A for more information on ORCATS and the CAF.

The CAF does not contain estimates for flows with very low ticket sales (and hence journeys). Therefore, a small amount of data (around 1.5% of journeys) was necessarily lost in processing.

3.1 New and Discounted Stations

Interchanges occurred at 502 stations in 2004/05. This was similar to the number of interchanges estimated in 2002/03.

There were 9 new interchange stations appearing since 2002/03. These are listed below.

- Hayes and Harlington
- Holytown
- Reading West
- Tring
- Upper Tyndrum
- West Ealing
- Burnley M Road
- Fishguard Harbour
- Upper Warlingham

The most significant of these new interchange stations were

- 3186, Hayes and Harlington, with 56,046 interchanges, or around 153 per day.
- 9738, Holytown, with 8,179 interchanges, or around 22 per day.
- 3160, Reading West with 5,122 interchanges, or around 14 per day

We did not identify reasons for these changes. However, it is important to note that interchanges can change significantly from year to year for a variety of reasons. Factors such as new service patterns, changes in journey times, new rolling stock and marketing can all play a part. Each may alter the opportunities to travel in ORCATS. An interchange at a station may now be feasible, whereas previously it was not. Please refer to Appendix A for more details of the ORCATS allocation process.

Since 2002/03, there have been 6 stations where interchanges no longer occur, (i.e. discontinued interchanges). These are listed below.
Ingatestone
Harpenden
Boston
Morpeth
Thetford
Elmers End

The majority of these, with the exception of Ingatestone where 2,016 interchanges occurred, had extremely low levels of interchanges in 2002/03. These were not investigated further.

4. CHECKS ON STATION USAGE RESULTS

Three specific checks on the data have been carried out. All the stations flagged up by these checks are marked in the accompanying spreadsheet, together with explanations, where possible. In this section, we explain these checks in more detail. We also performed a series of other checks to help validate the results.

In all, 13% of entries and exits occurred at stations that failed at least one of the first two checks conducted. This was a large increase on the figure of 0.8% for 2002/03. This is principally due to methodology changes as described below.

The third check involves identifying Group Stations, so being flagged by this check did not constitute 'failure'.

4.1 Check 1: Unequal Entries & Exits

The first check highlights all the stations at which the number of entries differed significantly from the number of exits. A station was considered to fail this check if either its entries or its exits individually constituted less than 40% of its total entries and exits.

52 stations failed this test. There is an increasing trend in the number of stations failing this check. In 2000/01, 25 stations failed, in 2001/02, 37 failed and in 2002/03, 48 failed. However the number of journeys to and from such stations remains a very low proportion of all journeys.

Of the 52 stations failing the check this year, 25 had less than 10 entries and exits per day on average. These were not investigated in detail, since they have such low usage. The remaining 27, which had significant levels of usage, all fell into at least one of the groups listed below.

4.1.1 London Stations

London stations can fail this check because much travel in London is undertaken using Travelcards or boundary zone tickets. With such tickets, it is not possible to capture all the origin and destination information. We were able to assign some of the journeys to specific stations, but not all journeys can be assigned. Therefore failure at this check implies incomplete capture of information, rather than genuine differences in the numbers of entries and exits.

4.1.2 Group Stations

Group stations are situated in towns that have more than one railway station, and as well as having national location codes (NLCs) for the individual stations, a Group Station exists which covers them all. For example, a customer wishing to travel to Birmingham Snow Hill may receive either a ticket to Snow Hill specifically (NLC 1006), or a ticket to the Group Station, Birmingham BR (NLC 0418).

Since different NLCs may be used for the same journey in these cases, it is more meaningful to consider the total entries and exits across all stations in a Group, in this check. All the stations that failed this check passed when their results were incorporated with the rest of their group.

4.1.3 Single Tickets

14 stations failed the check because there were unbalanced numbers of single tickets issued to and from them. We have not investigated why these stations show this imbalance. The majority of these are stations with low usage.

4.2 Check 2: Large Changes in Usage

The second check identified all stations at which usage has changed significantly since the previous year available, in this case, 2002/03. A station is deemed to fail this test if its number of entries and exits combined is more than 40% higher or lower than its figure in 2002/03. The 40% takes into account a possible continued growth or decline for two years continuously. Only stations whose total entries and exits exceeded 15,000 were considered in this check.

335, or 13% of stations, failed this check. This is an increase in the number of stations failing this check from previous years. There are many reasons why stations can fail this check, most of which have been a factor in previous years. However there are two new contributing factors, both of which have had a significant impact on the station usage figures and thus the results for Check 2. These are listed below and an example of the changes in methodology have been set out.

New Methodology for assigning London termini or Zone 1 Travelcards

A new methodology has been put in place to assign an appropriate London station on flows where either the origin or destination is London BR (NLC=1072) or a London Travelcard involving Zone 1. This has improved the quality of the results thus altering previous trends.

Example

Many tickets to London are sold from a named origin station to the destination 'London Terminals'. Customers travelling on these tickets usually exit at the first London terminus station they reach. However Lennon does not record the name of this station. Since so many tickets are sold to 'London Terminals' destinations and most TOCs operate trains to only a few London terminus stations, it was felt important that these tickets were preserved in the dataset and an assumption be made to capture these flows.

In the previous methodology an assumption would be made about the actual exit points of customers travelling to 'London Terminals'.

For example, c2c operates exclusively into Fenchurch Street, and most South West Trains services terminate at Waterloo. Therefore with each ticket to 'London Terminals', we:

1) Identified the origin station
2) Found the TOC which leases the origin station
3) Assigned the London terminus most closely associated with that TOC, as specified in Appendix B.

The application of this assumption meant that the figures given for London Terminus stations were less accurate than those given for other stations. For example, we assume that all journeys from WAGN stations to 'London Terminals' terminate at King's Cross, so all such journeys are included in the 'exits' figure for this station. In practice, though, WAGN operates services into both King's Cross and Liverpool Street. Therefore in previous versions of station usage the exits for WAGN were overestimated at King's Cross, and underestimated at Liverpool Street.

The new methodology involved analysing survey responses from the 2001 LATS. For journeys from any given station, the percentage of passengers using each London terminus was determined. Entries and exits have then been apportioned accordingly. For example, for all journeys from WAGN stations to 'London Terminals', LATS tells us the split of journeys going to King's Cross and Liverpool Street and exits can be assigned accordingly and accurately.

Stations with small sample sizes were removed from the 2001 LATS data. Where there was insufficient data in LATS to generate the split for a particular station, the previous methodology has been used (as described above).

Updated assumptions for non Zone 1 Travelcards

A new set of assumptions have been used when dealing with Travelcards that did not include Zone 1. This has improved the quality of the results and thus may alter previous trends.

For flows with origin or destination a London Travelcard (excluding zone 1) we use a set of assumptions used in MOIRA[2] to convert the Travelcard into a destination station. These assumptions use the starting station to work out which stations it is possible for the passenger to be travelling to, and also gives the proportion of passengers travelling to each of these stations. This is based on the assumption that a passenger holding a Zones 2-6 Travelcard would travel as far as Zone 2.

Example

If a passenger is travelling from Haslemere to London and the destination is recorded as Travelcard Zone 2, then the assumptions state that a proportion of travellers will alight at Clapham Junction and the remainder will alight at Putney. Similarly, a passenger travelling from Haslemere with a destination of Travelcard Zone 5 is assumed to alight at either East Croydon or Sutton.

In previous versions of station usage data, these assumptions were based on passengers' travel patterns from surveys prior to the existence of London Travelcards. However these assumptions have now been updated using survey responses from the 2001 LATS and contain more realistic assumptions thus increasing their accuracy.

Where there was insufficient data in the 2001 LATS to generate the split for a particular station, only the access or egress at one end of the flow was used, the access or egress at the Travelcard end of the flow was ignored, as we did not know which station would have been used.

As an example, from the previous set of assumptions, a flow originating from Battersea Park had a total of 74 non Zone 1 destinations listed. For the same originating station, the updated assumptions had a total of 19 non Zone 1 destinations. The first 10 rows from each set of assumptions have been provided.

Old Assumptions

Destination station	Full	Reduced	Seasons
Clapham Junction	1%	18%	18%
Kingston	8%	19%	2%
Balham	8%	12%	5%
East Croydon	3%	14%	2%
Wimbledon	1%	1%	12%
West Croydon	13%	0%	2%
Peckham Rye	9%	2%	2%
Clapham High Street	9%	0%	0%
Crystal Palace	3%	5%	1%
New Malden	1%	7%	1%

[2] MOIRA: A model to forecast revenue changes due to timetable changes.

New Assumptions

Destination station	All Ticket Types
Croydon BR	24%
Kingston	13%
Balham	9%
Earlsfield	7%
Denmark Hill	7%
Norbury	7%
Chessington North	5%
Wandsworth Town	5%
Crystal Palace	3%
Clapham Junction	3%

Check 2

Reasons causing stations to fail check 2, including those provided in previous reports, have been listed below for completeness. In addition, where possible a reason was assigned to the stations failing the check. A reason was not identified in every case.

4.2.1 New Station

Stations that are newly opened, or have been opened within the past few years, can reasonably show significant growth.

4.2.2 Group Stations

Stations associated with a Group Station can show large variations in usage figures, which reflect changes in ticket encoding rather than actual difference in customers' journeys. Please refer to Section 4.1.2 for more details. Group stations were also flagged in Check 3 – please refer to Section 4.3.

4.2.3 Gating

Installation of ticket gates can significantly affect not only the usage figures at that station, but also those at neighbouring stations. The gates help to ensure that customers purchase tickets, but customers may also alter their travel patterns to avoid gated stations.

We would expect travel patterns to be most affected in the months following the installation of the gates.

4.2.4 Change in Service Pattern

Alterations in service frequency or stopping pattern would be expected to alter station usage figures. This is particularly apparent where a group of consecutive stations show similar increases or decreases. Again, this can be a long term trend. The West Coast Route Modernisation is an example where station usage estimations can be affected.

4.2.5 Ticket Office Changes/Product changes

Some London stations have both underground and conventional trains operating. Lennon does not capture tickets sold by London Underground, but those sold by TOCs are. Changes in ticket facilities provided by TOCs, for example the provision of ticket machines, can therefore increase the ticket sales captured by the system.

Product changes can have an affect on passengers' purchasing patterns at rail outlets thus affecting station usage data. For example, the introduction of Oyster cards at rail outlets can affect stations inside the Travelcard boundary in the London area

4.2.6 Engineering Work
Significant engineering work can alter customers' travel patterns. The West Coast Route Modernisation and the Cross London blockade are both examples where station usage figures can be affected.

4.2.7 Tourism
Stations near to tourist attractions may show significant changes in usage as a result of weather, promotions or other factors which affect tourists' journeys.

4.2.8 Special Stations
Some stations serve a particular activity or business. Some fluctuation in usage of such stations is reasonable. Such activities include:

- Racecourses
- Exhibition Centre Glasgow
- Airports

4.2.9 Trend of Growth or Decline
For stations with a history of growth or decline, it is reasonable to expect this trend to continue. There are many possible reasons for these trends, such as demographic and employment changes.

4.2.10 Changes in the Sales of Individual Ticket Types
Miscoding of ticket information entered into Lennon can alter station usage results, although this would not be reflecting an actual change in customers' journeys.

4.2.11 Explanations from the TOCs
In 1999/00, we contacted several TOCs in an effort to identify reasons why the remaining stations might be failing. This was not successful, so we have not made such enquiries since.

4.2.12 New Methodology for assigning London termini or Zone 1 Travelcards
A new methodology has been put in place to assign an appropriate London station on flows where either the origin or destination is London BR (NLC=1072) or a London Travelcard involving Zone 1. This has improved the quality of the results thus altering previous trends.

4.2.13 Updated assumptions for non Zone 1 Travelcards
The updated assumptions (taken from MOIRA) used when dealing with Travelcards that did not include Zone 1 has improved the quality of the results and thus may alter previous trends.

4.3 Check 3: Group Stations & London Termini

The third check involved identifying all stations that are part of a group station

4.3.1 Group Stations
All stations that are members of group stations, and therefore have a Group Station NLC associated with them, were identified. They are marked in the spreadsheet with the name and NLC of the group station. The user of this data may wish to filter on 'Group Station NLC' column, or create pivot tables, to investigate the results at a group station level.

APPENDIX A: OVERVIEW OF THE ORCATS ALLOCATION PROCESS

This section gives an outline of the Central Allocations File (CAF), which is used in producing the interchange figures, and the ORCATS process which creates the CAF.

Most of the train tickets that are sold are interavailable – the customer has a choice of routes and operators. For example, when a customer buys a ticket to travel from Leicester to Leeds, that customer may travel on various combinations of Midland Mainline, GNER and Virgin Trains, and may interchange at Doncaster, Sheffield or Derby. The sale of the ticket is captured by Lennon, but unless the ticket has stringent route restrictions, the route actually taken by the customer is not recorded.

The route taken by that particular customer may never be known, but some route options are more attractive than others. The customer is more likely to choose a faster, more frequent service than a slower, less frequent one. This likelihood can be translated into the proportions of customers choosing each route option, on a particular flow. (A 'flow' represents all journeys from a given origin station to a given destination station, irrespective of the route taken.) The revenue received from all customers on that flow should be split between different operators to reflect the proportion of customers which each operator carried.

ORCATS was developed to model the choice made by the customers, and to allow revenue to be split between operators. It applies passenger choice modelling to the train timetable, to determine the relative attractiveness of different route alternatives. It then weights the results by journey mileage.

When a timetable changes, ORCATS works out the possible routes between each origin and destination, and calculates the percentage of the passengers that choose each route based on the services in the new timetable.

The output from ORCATS is the Central Allocations File (CAF). This file lists the proportion of journeys on each flow (or origin-destination pair) estimated to be made by each route alternative. For journeys involving interchanges, each leg of the journey is listed. By combining this information with Lennon data, which contains actual ticket sales figures for all flows, we have estimated the number of interchanges occurring at individual stations.

APPENDIX B: METHODOLOGY FOR ENTRIES AND EXITS

We calculated an estimate of the number of people entering and exiting each of the National Rail stations for the financial year 2004/05.

The entries and exits at each station were derived from the journey data recorded in the Lennon database.

Each year AEAT Rail receives a file from Atos Origin containing the revenue, number of journeys and ticket issues for each flow on the network, for each CTOT (ticket type code). These revenue and journey figures are unallocated, in other words are based on the actual ticket sales before the allocation to the different Train Operating Companies.

A number of National Rail journeys made are not accounted for in this system; this includes, for example, journeys made with a Travelcard purchased from a London Underground station. As a result these journeys have not been included in the entries and exit estimations.[3]

After completing checks on the data, the data was transformed into an origin/destination file, where each record reflected an estimate of the actual journeys undertaken. The file contained the revenue and number of journeys for each flow, where a flow consisted of a unique origin, destination and route code combination.

The number of entries and exits was calculated for a particular station by summing all journeys starting at the station, and all journeys terminating at the station.

The flow data from the origin/destination file was separated into seven categories that are described below. Under each of these categories we describe any manipulation that we undertook on the data in order to establish which station had been used to start or finish a journey.

B.1 Category 1 – Origin and Destination Stations Known

Both the origin and destination were known stations.

B.2 Category 2 – Origin and Destination a Group Station (excluding London BR)

All origins or destinations that were a group station (with the exception of London BR) were changed to the major station within the group. For example, all ticket sales to or from Reading BR are recoded to Reading. These flows are then treated the same as Category 1.

B.3 Category 3 – Origin or Destination was London BR

This category contained all flows that had London BR as either the origin or destination. In order to assign an appropriate London station on flows where either the origin or destination is London BR (NLC=1072) or a London Travelcard involving Zone 1, we analysed responses from the 2001 LATS. For journeys from any given station, we found out what percentage of passengers use each London terminus. Entries and exits were apportioned accordingly.

For example, if the flow was from Ashford International to London BR, we used our pre generated table showing the percentage spilt between the alternative London termini for passengers starting at Ashford International. From this we apportioned the exits between London Bridge, Charing Cross, Victoria and other termini.

[3] As discussed with the ORR, the recent adjustments of journey factors for London Travelcards in Lennon, which affects journeys made on tickets sold by a London Underground station or their agents only, have not had an impact on the station usage data as these journeys are not included in the station usage analysis.

Stations with small sample sizes were removed from the 2001 LATS data. Where there was insufficient data in the 2001 LATS to generate the split for a particular station, the following process was followed: firstly, the non-London station was identified, secondly, the lead Train Operating Company (TOC) of this station was considered and finally, the London terminus most closely associated with that TOC, as summarised in Table B.3.i was assigned.

For example, if the flow was from Maidenhead to London BR, we considered the leading TOC of the starting station, which was First Great Western Link. From this we assigned the London terminus as Paddington.

Table B.3.i

Train Operating Company	London Terminus
First ScotRail	Kings Cross
GNER	Kings Cross
Arriva Trains Northern	Kings Cross
WAGN	Kings Cross
First North Western	Euston
Merseyrail	Euston
Virgin West Coast	Euston
Central	Euston
Silverlink	Euston
Manchester M'link (via Virgin West Coast)	Euston
Midland Main Line	St.Pancras
First Great Western	Paddington
Wessex	Paddington
First Great Western Link	Paddington
Chiltern	Marylebone
First Great Eastern	Liverpool Street
Anglia	Liverpool Street
C2C	Fenchurch Street
Southern	London Bridge
Gatwick Express	Victoria
South Central	Victoria
Thameslink	City Thameslink
South West Trains	Waterloo
Island Line	Waterloo

B.4 Category 4 – Origin or Destination a London Travelcard including Zone 1

All origins and destinations that are London Travelcard Zones that include Zone 1 were converted to 'London BR' under the assumption that they will travel to the same stations as point-to-point passengers and then transfer to another mode. The methodology set out above for Category 3 was then applied.

B.5 Category 5 – Origin or Destination a London Travelcard excluding Zone 1

This category contained all Travelcards that did not include Zone 1, for example Zone R2345 London.

For flows with origin or destination a London Travelcard (excluding zone 1) we use a set of assumptions used in MOIRA[4] to convert the Travelcard into a destination station. These assumptions have been created using survey responses from the 2001 LATS. They use the starting station to work out which stations it is possible for the passenger to be travelling to, and also gives the proportion of passengers travelling to each of these stations. This is based on the assumption that a passenger holding a Zones 2-6 Travelcard would travel as far as Zone 2.

For example, if a passenger is travelling from Haslemere to London and the destination is recorded as Travelcard Zone 2, then the assumptions state that a proportion of travellers will alight at Clapham Junction and the remainder will alight at Putney. Similarly, a passenger travelling from Haslemere with a destination of Travelcard Zone 5 is assumed to alight at either East Croydon or Sutton.

The assumptions used to create the 2004/05 data have been created using 2001 LATS responses. Previous versions of station usage were created using assumptions based on passengers' travel patterns from surveys prior to the existence of London Travelcards. As a result this will produce more accurate estimations of entries and exits.

Where there was insufficient data in the 2001 LATS to generate the split for a particular station, only the access or egress at one end of the flow was used, the access or egress at the Travelcard end of the flow was ignored, as we did not know which station would have been used.

B.6 Category 6 – Origin or Destination a Boundary Zone

For all flows where the origin or destination was a boundary zone in London, we do not know where the passenger started or ended their journey.

Passengers purchasing a ticket starting at a boundary zone will already be in possession of a ticket that is valid out to that boundary zone. We were unable to tell at which station they started their journey, as they used the ticket that they already owned to travel from their starting station to the boundary zone.

For example, a passenger with a zone 1 and 2 Travelcard who wanted to travel from London to Portsmouth would purchase a ticket from boundary zone 2 to Portsmouth. However, we had no way of knowing at which station they started their journey. It could have been any station within Travelcard zones 1 and 2.

There are five different boundary zones: Boundary Zone 2, 3, 4, 5 and 6.

B.7 Category 7 – Non-National Rail Stations and Invalid Flows

This final category contains all those flows for which we could not get any sensible stations usage information and therefore the journeys are excluded from the entries and exits figures.

This includes:

- Invalid flows, in particular flows where the origin station equalled the destination station.
- Flows involving invalid codes that were not proper stations.

It is also worth noting that like last year we also eliminated the stations where predominantly London Transport tickets are sold, such as Old Street and Tottenham Hale.

[4] MOIRA: A model to forecast revenue changes due to timetable changes.

APPENDIX C: METHODOLOGY FOR INTERCHANGES

We obtained an estimate of the number of people interchanging at each station by combining the number of journeys made on each flow from Lennon (from our origin/destination file) with the information in the CAF. The CAF was based on the December 2004 – June 2005 timetable.

The CAF contains:

- Origin and destination.
- Route alternatives for each origin and destination.
- Ticket type data.
- For each flow, the proportion of passengers who choose to travel on each route alternative as calculated by the ORCATS model.

This methodology was the same as that which we employed to calculate the number of passengers interchanging at each of the stations in 2002/03.