# Estimates of station usage

## 1 April 2021 to 31 March 2022

**24 November 2022**

**Background:**

This annual statistical release contains estimates of the total number of people:

- travelling from or to each station in Great Britain (**entries and exits**); and

- changing trains at each station (**interchanges**)

Estimates of station usage are derived from LENNON, the rail industry's ticketing and revenue system, together with some local ticketing data. A number of adjustments are made to the source data to make the estimates as accurate as possible.

**Sources:** LENNON and local ticketing data

**Latest year:** April 2021 to March 2022

**Contents:**
Introduction – p2
Entries and exits – p3
Interchanges – p10
Annexes – p11

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**Next publication:**
November 2023

In Great Britain, **2,570 stations** were served by mainline rail services as at 31 March 2022, including one new station which opened during the year, Soham.

With the easing of pandemic restrictions, a total of 990 million passenger journeys were made between April 2021 and March 2022. This is more than double the 388 million journeys made in the previous year (April 2020 to March 2021). Usage remains lower than the pre-pandemic number of 1,739 million journeys made two years ago (April 2019 to March 2020).

## Most and least used stations

The most used station in the latest year was **London Waterloo** with an estimated **41.4 million entries and exits**. It was the fourth most used station in the previous year (April 2020 to March 2021), but prior to that had been the most used station for 16 consecutive years.

**Table 1 Top five most used stations in Great Britain, 1 April 2021 to 31 March 2022**

| Rank | Station | Entries and exits | Rank one year ago | Rank two years ago |
|---|---|---|---|---|
| 1 | London Waterloo | 41,426,042 | 4 | 1 |
| 2 | London Victoria | 36,776,338 | 2 | 2 |
| 3 | London Bridge | 33,309,348 | 3 | 4 |
| 4 | London Liverpool Street | 32,165,310 | 5 | 3 |
| 5 | Stratford (London) | 28,182,238 | 1 | 8 |

Although they have changed order, the five most used stations in the previous year have remained the top five in the latest year.

**Elton and Orston** in Nottinghamshire was the least used open station in the latest year with 40 recorded entries and exits.

All data tables, a quality and methodology report, frequently asked questions, infographics and an interactive dashboard associated with this release are published on the Estimates of station usage page of the data portal.

# 1. Introduction

## Why estimates?

These statistics on station usage are estimates based primarily on ticket sales. The data sources and methodology used is the best approach possible given Great Britain does not have a fully gated rail network or comprehensive and robust count data at every station.

There are a number of limitations using this approach which users should be aware of:

- Some ticket sales and ticketless travel are not included, which may mean that usage at some stations is *underestimated*. It should be noted that levels of ticketless travel may have changed during the pandemic and those changes may vary substantially by station.

- Some station's entries and exits will be *overestimated* due to the impact of passengers buying 'split tickets' (this is where a passenger completes a single journey using two or more tickets). Rail Delivery Group (RDG) estimate that overall split tickets accounted for around 6% of passenger journeys between April 2021 and March 2022. Total entries and exits at some individual stations will be significantly over estimated due to some passengers not boarding or alighting at the split point and instead staying on the train. The most common ticket split points, and therefore likely to be over estimating station entries and exits the most are (alphabetically): Basingstoke, Croydon BR (East Croydon and West Croydon), Didcot Parkway, Doncaster, Gatwick Airport, Leeds, Milton Keynes Central, Peterborough, Sheffield, and York.

  We are working with RDG to improve the estimates at individual stations by incorporating an adjustment for split ticketing into our methodology for next year's publication (covering usage during the year April 2022 to March 2023).

- Ticket sales data does not always specify precise journey origins and/or destinations, so these are estimated using alternative data sources.

- Methodology improvements e.g. inclusion of ticket sales previously not available means that estimates are not always comparable over time.

Further information on the methodology underlying these statistics and their limitations can be found in Annex 1 and in the Quality and methodology report.

# 2. Station entries and exits

## Stations with the most entries and exits

The most used station in the latest year (April 2021 to March 2022) was **London Waterloo** with **41.4 million entries and exits**. Although this was 29.2 million more entries and exits than the previous year (April 2020 to March 2021) this was 45.5 million (52%) fewer than the 86.9 million entries and exits two years ago (April 2019 to March 2020).

Waterloo 03 by Office of Rail and Road is licenced under CC BY 2.0. Photo taken in 2016.

London Waterloo was the fourth most used station in the previous year (April 2020 to March 2021), but prior to that had been the most used station for 16 consecutive years.

With the easing of restrictions due to the pandemic, passengers increasingly returned to the railway during the latest year and large increases in entries and exits were seen at individual stations compared with the previous year. Although they have changed order, the five most used stations from the previous year, have remained the top five in the latest year. Stratford (London) saw station usage double from 14.0 million to 28.2 million, but dropped from the most used station to the fifth most used station.

The top 10 most used stations in the latest year included London Paddington, London Euston, London Kings Cross (all located in London Travel Area (LTA) Zone 1 and termini stations) and Manchester Piccadilly. These stations which were not in the top 10 most used stations in the previous year, replacing Highbury and Islington, Clapham Junction, Barking, and East Croydon (all London stations outside LTA Zone 1).

**Table 2.1 Top 10 most used stations in Great Britain and outside London, 1 April 2021 to 31 March 2022**

| Rank | All stations in Great Britain | Entries and exits | Rank | Stations outside London only | Entries and exits |
|---|---|---|---|---|---|
| 1 | London Waterloo | 41,426,042 | 1 | Birmingham New Street | 22,682,526 |
| 2 | London Victoria | 36,776,338 | 2 | Manchester Piccadilly | 19,581,442 |
| 3 | London Bridge | 33,309,348 | 3 | Leeds | 19,263,472 |
| 4 | London Liverpool Street | 32,165,310 | 4 | Glasgow Central | 15,322,350 |
| 5 | Stratford (London) | 28,182,238 | 5 | Edinburgh | 13,617,536 |
| 6 | London Paddington | 23,870,510 | 6 | Brighton | 11,228,212 |
| 7 | London Euston | 23,097,606 | 7 | Liverpool Central | 10,747,030 |
| 8 | Birmingham New Street | 22,682,526 | 8 | Liverpool Lime Street | 10,464,212 |
| 9 | London Kings Cross | 20,476,492 | 9 | Reading | 8,818,068 |
| 10 | Manchester Piccadilly | 19,581,442 | 10 | Glasgow Queen Street | 8,467,718 |

Outside of London, Birmingham New Street was again the most used station with 22.7 million entries and exits in the latest year. This was an increase of 209% on the previous year, but 51.2% lower than two years ago (April 2019 to March 2020). Glasgow Queen Street was the only station included in the top 10 most used in the latest year that was not in the top 10 in the previous year, replacing Cambridge.

## Stations with the least entries and exits

The railway station at Heathrow Terminal 4 was closed throughout all of the latest year therefore has no recorded entries and exits. It was temporarily closed in May 2020 and has since reopened in June 2022. Two year ago (April 2019 to March 2020) it had 1.8 million entries and exits.

The least used station that was open in the latest year was **Elton and Orston** with 40 recorded entries and exits. This Nottinghamshire station had the second lowest usage two years ago (April 2019 to March 2020) when it had 68 entries and exits.

Overall there were 6 open stations with fewer than 100 entries and exits in the latest year:

1. Elton and Orston, Nottinghamshire (40 entries and exits)

2. Teesside Airport, Darlington (42)

3. Stanlow and Thornton, Cheshire (44)

4. Denton, Greater Manchester (50)

5. Kirton Lindsey, North Lincolnshire (68)

6. Sugar Loaf, Powys (76)

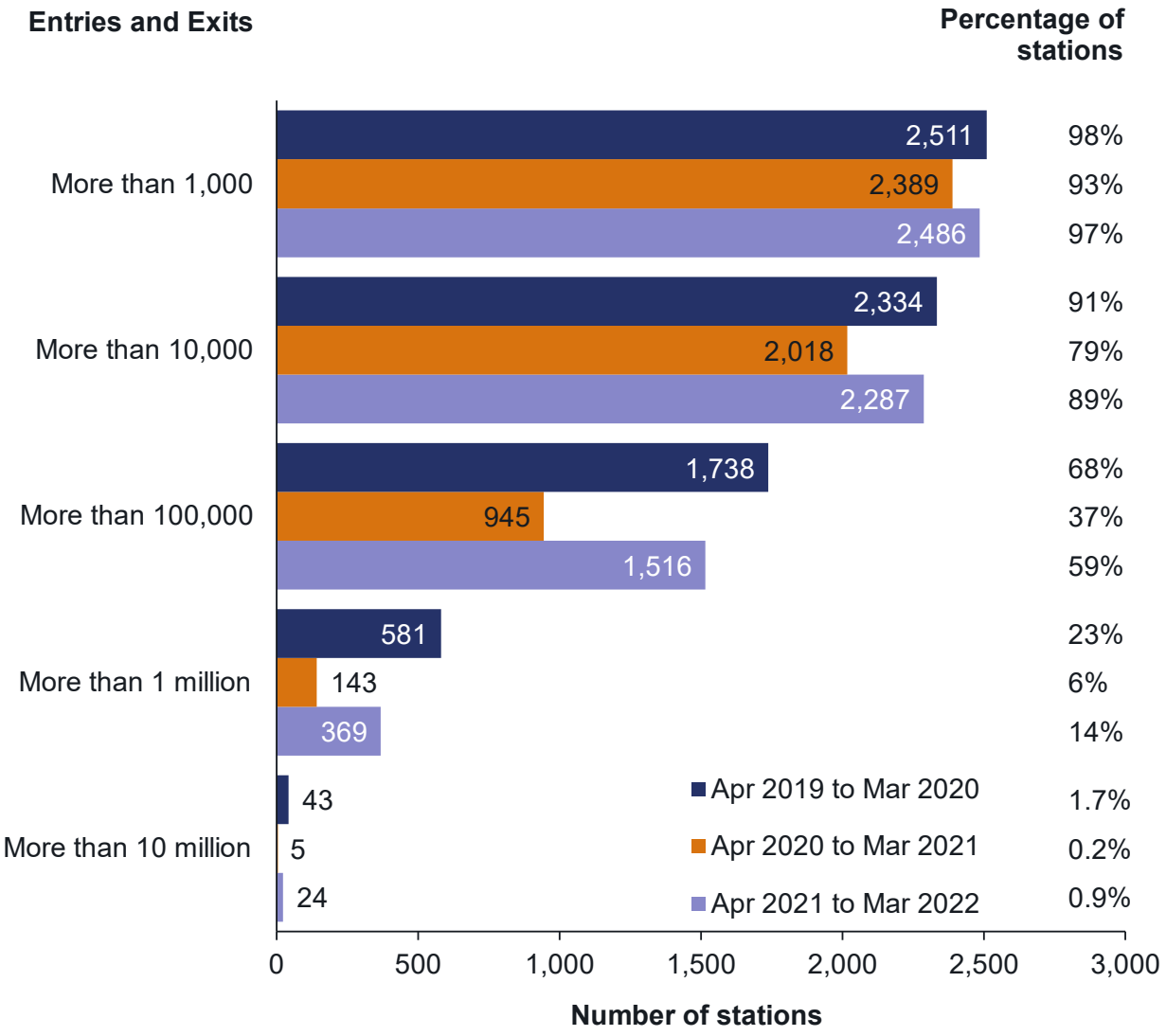
It it worth noting that the weekly service from Kirton Lindsey was suspended between 1 April to 22 May 2021 and again from 1 January 2022 to 31 March 2022. Each of the the four stations with the lowest usage, Elton and Orston, Teesside Airport, Standlow, and Thornton and Denton have historically had low usage. Each of them has appeared on this list more than once in recent years.

In previous years, usage at some of the least used stations presented as part of these statistics have greatly increased the following year. We understand that highlighting the least used stations within these statistics can encourage people to visit them. This year it is hard to judge the impact of this due to usage increasing across the whole network as pandemic restrictions eased.

# Distribution of entries and exits

In the latest year, there were 24 stations in Great Britain with more than 10 million entries and exits. This is compared to just 5 stations the previous year and 43 stations two years ago.

**Figure 2.1 Distribution of entries and exits by station, April 2019 to March 2020, April 2020 to March 2021 and April 2021 to March 2022**

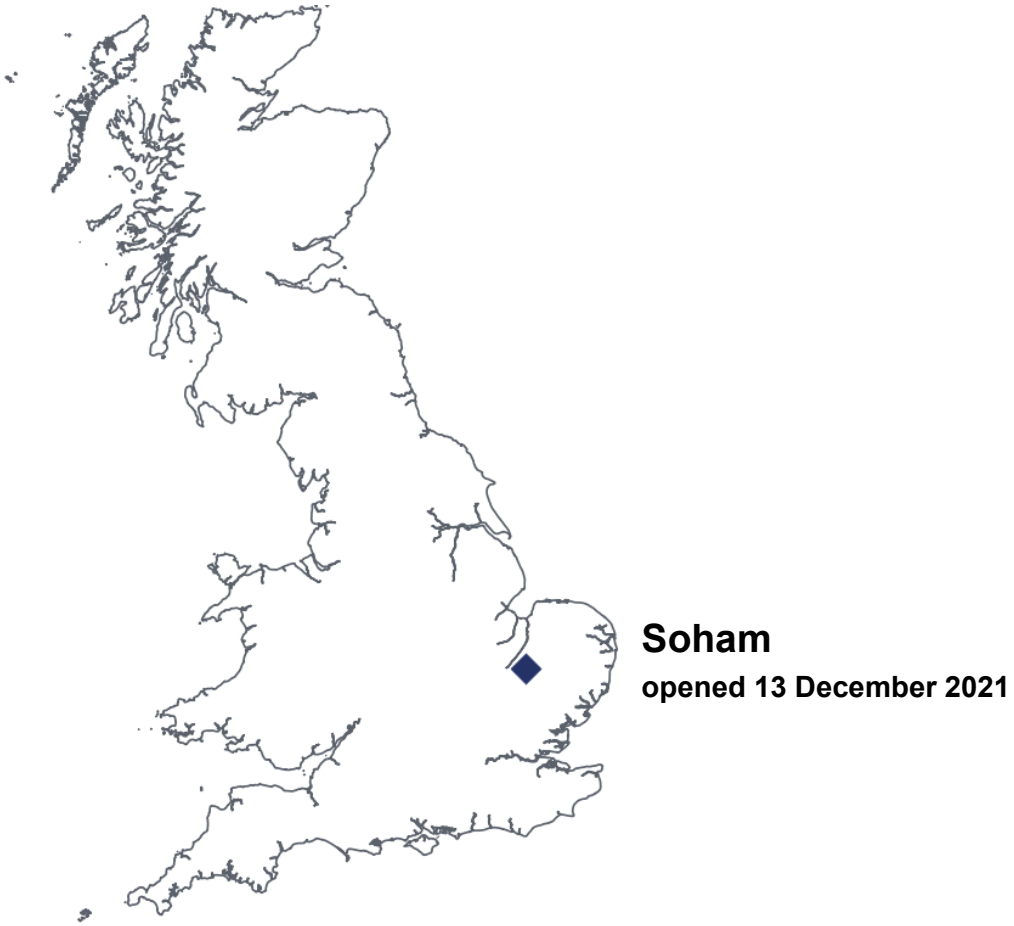


# New and closed stations

Soham (East Cambridgeshire, England) opened on 13 December 2021 and was the only new station to open in the latest year. Soham recorded 14,196 entries and exits over the three and a half months it was open.

No stations permanently closed in the latest year.

**Figure 2.2 Stations opened, Great Britain, 1 April 2021 to 31 March 2022**

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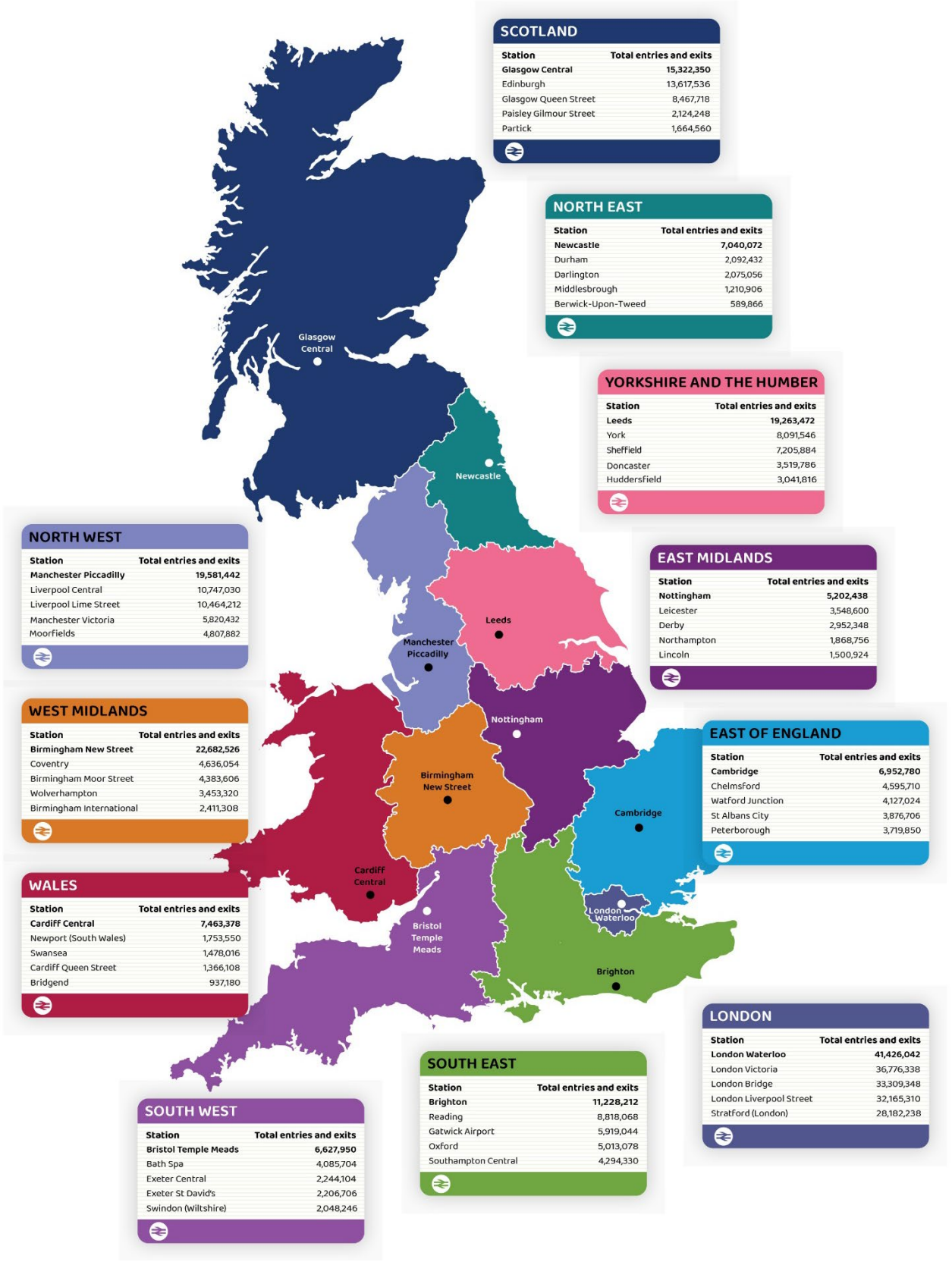
In Great Britain, 2,570 stations were served by mainline rail services as at 31 March 2022, as presented in our latest Rail infrastructure and assets statistics. This publication includes a dataset (Table 6329) containing geographic and other attribute information for each mainline station, including location coordinates (Easting and Northing), county, constituency and station facility owner.

# Stations with the most entries and exits by region

**Figure 2.3 Top five most used stations in each region in England, Wales and Scotland,1 April 2021 to 31 March 2022**



The most used station in each region in the latest year was the same as in the previous year, except in London. The top five most used stations were the same in six out of eleven regions as in the previous year (although usually in a different order). Each of the five regions that had a change only had one different station in their top five.

In comparison to two years ago (April 2019 to March 2020) only the South East of England has had a change in the most used station. Gatwick Airport was the most used station in the region then, but it has been replaced by Brighton in each of the last two years as usage at airport stations has generally not recovered since the pandemic to the same extent as stations overall.

Additional commentary on changes in usage at these and other stations can be found in Table 1410.

# 3. Station interchanges

## Stations with the most interchanges

An interchange is where a passenger needs to transfer from one train to another during their journey from origin to destination station.

In the latest year, the station with the highest number of interchanges was **Clapham Junction**. This station has had the highest number of interchanges each year since the comparable time series began in April 2004.

London Waterloo, which had the most entries and exits in the latest year, had the third highest number of interchanges.

**Table 3.1 Top 10 most used stations in Great Britain and outside London, 1 April 2021 to 31 March 2022**

| Rank | Station | Interchanges |
|---|---|---|
| 1 | Clapham Junction | 14,793,662 |
| 2 | London Bridge | 5,708,557 |
| 3 | London Waterloo | 3,532,033 |
| 4 | Birmingham New Street | 3,508,541 |
| 5 | London Victoria | 3,295,937 |
| 6 | Stratford (London) | 3,184,337 |
| 7 | London Euston | 3,121,082 |
| 8 | London Liverpool Street | 3,015,824 |
| 9 | London St Pancras International | 2,877,861 |
| 10 | East Croydon | 2,603,976 |

These estimates are made using a model which makes assumptions about the route taken travelling between specific origins and destinations and whether that route includes one or more interchanges. In practice, passengers travelling between specific origins and destinations may interchange at a different station to the one assumed by the model. As a result, estimates may be higher or lower than expected. Further information can be found in Annex 1 of this release and in the Quality and methodology report.

# 4. Annexes

## Annex 1 – Quality and methodology

### Data sources and methodology

These statistics on station usage are estimates primarily based on tickets sales, sourced from LENNON (Latest Earnings Networked Nationally OverNight), the rail industry's ticketing and revenue system and local ticketing data. These data sources and the methodology used provide the best approach possible given Great Britain does not have a fully gated rail network or robust count data for every station.

LENNON data feeds into a base matrix which is an input into the MOIRA2.2 rail planning tool. This is supplemented by local ticketing data for Passenger Transport Executive (PTE) areas. These sources are combined, and further adjustments are made to the data to address known issues with the MOIRA2.2 base matrix. These include an allocation of tickets sold to 'London Terminals,' allocation of demand between individual stations in group stations outside of London and a number of cases where adjustments are made to selected stations to account for specific known issues, for example Digby and Sowton. Further information on the data sources and adjustments used to estimate usage at individual stations can be found in Table 1410 (column L).

The resulting dataset is used to produce the Origin Destination Matrix (ODM), a comprehensive matrix of passenger flows throughout Great Britain. The ODM is then used to derive estimates for the number of entries and exits at each station in Great Britain.

Interchanges at stations have been estimated by combining the number of journeys made on each flow (from the ODM) with the information on passenger journeys taken from the Central Allocations File (CAF). The CAF is an output of the ORCATS (Operational Research Computerised Allocation of Tickets to Services) system which predicts passenger choices of rail route and train used.

### Limitations

As the estimates of station usage are primarily based on ticket sales, there are a number of limitations that users should be aware of:

- Some ticket sales (e.g. Eurostar tickets) are not included, which may mean that usage at some stations is underestimated.
- Journeys with no associated ticket sales such as staff travel, and particularly fare evaders, are not included.
- Some station's entries and exits will be overestimated due to the impact of passengers buying 'split tickets', where a passenger completes a single journey with two or more tickets.

- Ticket sales data does not always specify precise journey origins and/or destinations, so these are estimated using alternative data sources.
- Methodology improvements e.g. inclusion of ticket sales previously not available means that estimates are not always comparable over time. Improvements should be taken into account when considering changes in usage between years.
- Assumptions are made about the number of journeys made with multi-use tickets e.g. that each weekly season ticket will be used to make 10.3 journeys.
- Passengers may purchase tickets from/to different stations to the ones they use in practice e.g. to stations at the end of the fare zone.

## Methodology changes

Whilst consistency with past datasets is important to enable comparisons to be made over time, users have indicated that they are keen to see improvements in station usage estimates, even where this reduces consistency with historic data, provided any changes are clearly explained.

Key methodology changes made this year and their impact on station usage estimates are listed below. These changes should be considered when comparing estimates with previous years. Further information is provided in Table 1410 (column K) and the Quality and methodology report.

- An additional 98,200 entries and exits have been added to stations across the Tyne and Wear Passenger Transport Executive (PTE) area as a result of additional tickets being included in the dataset for the first time. This increased usage estimates across the Tyne and Wear PTE area by 1.3%.

- This year an updated distribution has been used for allocating entries and exits for West Yorkshire PTE tickets. The new distribution uses latest year (April 2021 to March 2022) data (replacing the April 2019 to March 2020 data), better reflecting post-pandemic travel patterns. The sample size is also greater than the previous data, covering a full year rather than one week.

- Gateline data has been supplied by Heathrow Airport. This has been used to update the distribution of entries and exits across the three Heathrow stations and enabled a more accurate estimate of usage at each one.

- Following a review of tickets included in the estimates, a number of products were identified for inclusion for the first time. This includes the Derbyshire Wayfarer, Brighton and Worthing Unizone cards and more derivatives of the Bristol Freedom Pass product. This led to an addition of 616,000 entries and exits.

## Revisions

There have been no revisions to previously published data. Details on any previous revisions can be found in the Revisions log.

Further details on data collection, the methodology used to calculate the estimates within this release and limitations of these estimates can be found in the Estimates of station usage quality and methodology report and Frequently Asked Questions document.

## How these statistics can and cannot be used

- Monitoring the number of annual entries and exits or interchanges at individual stations e.g. to understand demand
- Monitoring how usage at individual stations changes over time (subject to methodology changes) and insights as to why
- Comparing the relative usage of stations within local areas, regions or across the whole of Great Britain
- To gauge the use of different ticket types at individual stations e.g. season vs reduced

- Monitoring passenger rail usage at a national level, by train operating company or by ticket type (refer to Passenger rail usage statistics)
- Monitoring the number of passenger journeys between and within regions (refer to Regional rail usage statistics)
- Exploring rail journey flows between origin and destination stations
- Volume of entries compared to exits at an individual station (methodology makes these equal)

# Annex 2 – List of outputs associated with this release and related statistics

## Data tables and other outputs

All tables and other outputs associated with this release can be found on the Estimates of station usage page on the data portal.

(a) Passenger entries and exits and interchanges by station (1 April 2021 to 31 March 2022) – Table 1410 (ods and csv)

(b) Time series of passenger entries and exits and interchanges by station (April 1997 to March 1998 to April 2021 to March 2022) – Table 1415 (ods)

(c) Interactive dashboard (Power BI)

(d) Animated graphics (MP4) and infographics (PDF)

## Related statistics

We publish Passenger rail usage statistics on a quarterly basis. These statistics include estimates of the number of passenger rail journeys in Great Britain, by sector (London and the South East, Regional, and Long distance), by operator and by ticket type. This publication also includes statistics on passenger kilometres and train kilometres.

We also publish annual statistics on Regional rail usage, which includes the number of rail journeys between and within regions. These statistics are also derived from the ODM used to produce these statistics i.e. primarily based on the LENNON ticketing system and local ticketing data.

Network Rail publishes information on station footfall at 18 Network Rail managed stations only. These data are collected using a different method to the statistics in this release and include all people using the stations e.g. visiting shops and restaurants who may not make a rail journey.

The Department for Transport (DfT) publishes Rail passenger numbers and crowding statistics providing information on the number of passengers travelling by rail into and out of major city centres in England and Wales. The statistics represent passengers on National Rail services on a 'typical' weekday. DfT also publish daily estimates of transport use by mode.

# Annex 3 – ORR's statistical publications

## Statistical Releases

This publication is part of ORR's National Statistics accredited releases, which consist of seven annual publications: **Estimates of station usage; Rail industry finance (UK); Rail fares index; Rail safety statistics; Rail infrastructure and assets; Rail emissions; Regional rail usage**; and four quarterly publications: **Passenger rail performance; Freight rail usage and performance; Passenger rail usage; Passenger rail service complaints.**

In addition, ORR also publishes a number of Official Statistics, which consist of five annual publications: **Common Safety Indicators; Passenger satisfaction with complaints handling; Train operating company key statistics; Occupational health**; **Rail statistics compendium;** and four quarterly publications: **Signals passed at danger (SPADS); Delay compensation claims; Disabled Persons Railcards (DPRC); Passenger assistance.**

All the above publications are available on the data portal along with a list of publication dates for the next 12 months.

## National Statistics

The United Kingdom Statistics Authority designated these statistics as National Statistics, in accordance with the Statistics and Registration Service Act 2007 and signifying compliance with the Code of Practice for Official Statistics. National Statistics status means that official statistics meet the highest standards of **trustworthiness**, **quality** and public **value**.

Estimates of station usage statistics were assessed and designated in 2020.

Our other statistical releases were assessed in 2012 and also hold National Statistics status. Since this assessment we have improved the content, presentation and quality of our statistical releases. In addition, in July 2019 we launched our new data portal. Therefore, in late 2019 we worked with the Office for Statistics Regulation (OSR) to conduct a compliance check to ensure we are still meeting the standards of the Code. On 4 November 2019, OSR published a letter confirming that ORR's statistics should continue to be designated as National Statistics. OSR found many positive aspects in the way that we produce and present our statistics and welcomed the range of improvements made since the statistics were last assessed.

For more information on how we adhere to the Code please see our compliance statements. For more details or to provide feedback, please contact the Statistics Head of Profession (Lyndsey Melbourne) at rail.stats@orr.gov.uk.

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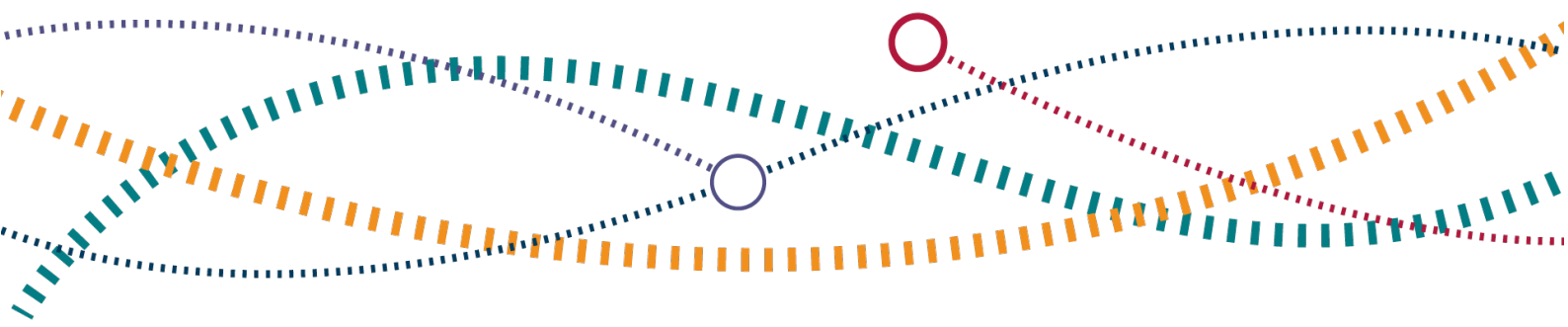
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