

Board



Date: 30 January 2018

Item: TfL Health, Safety and Environment Annual Report 2016/17

This paper will be considered in public

1 Summary

- 1.1 The TfL Health, Safety and Environment (HSE) Annual Report describes the HSE performance across all of the TfL businesses. Generally, the report covers the financial year from 1 April 2016 to 31 March 2017. However, the road safety data for Greater London and the Transport for London Road Network (TLRN) covers the calendar year from January to December 2016.
- 1.2 The safety data includes customer, employee and supplier incidents. The health data relates to employee wellbeing but does not cover contractor or customer health issues. The environment data covers London's public transport operations, including taxis and private hire vehicles, plus the activities we and our suppliers undertake.
- 1.3 On 22 November 2017 the Safety, Sustainability and Human Resources Panel considered the draft report. It did not raise any issues for the attention of the Board. Since the review by the Panel, the Annual Report has been updated to include:
- (a) the Commissioner's introduction;
 - (b) additional information on management of mental health (which is now included on page 31); and
 - (c) additional information on the management of the green estate, green infrastructure and drainage (which is now included on page 37).

2 Recommendation

2.1 The Board is asked to approve the content of the report prior to publication.

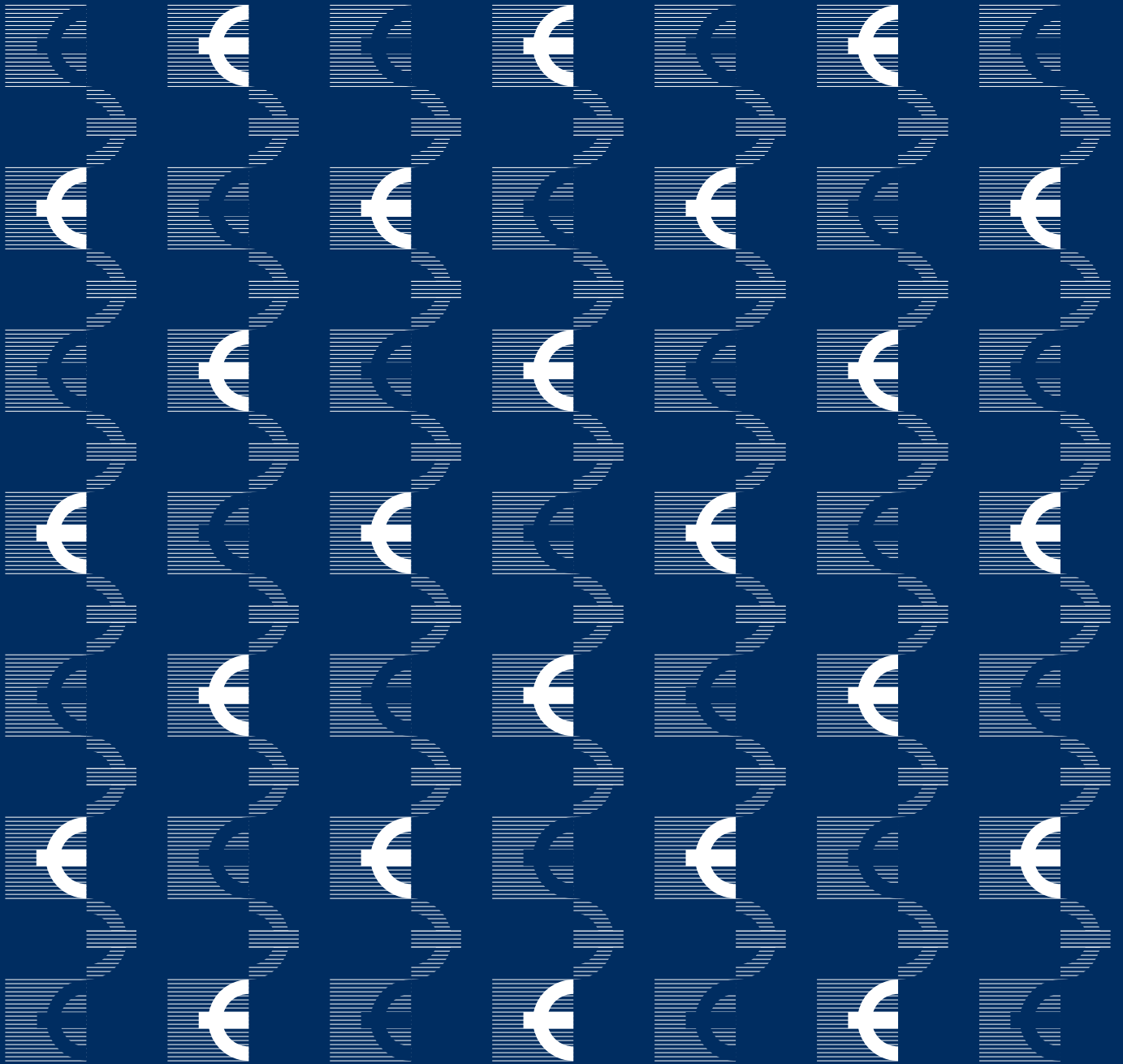
List of appendices to this report:

Appendix 1: Health, Safety and Environmental Annual Report 2016/17

List of Background Papers:

None

Contact Officer: Jill Collis, Director of Health, Safety and Environment
Number: 020 3054 8158
Email: Jill.Collis@tube.tfl.gov.uk



Health, Safety and Environment report

2016/17

MAYOR OF LONDON



**TRANSPORT
FOR LONDON**
EVERY JOURNEY MATTERS

About Transport for London (TfL)

Part of the Greater London Authority family led by Mayor of London Sadiq Khan, we are the integrated transport authority responsible for delivering the Mayor's aims for transport.

We have a key role in shaping what life is like in London, helping to realise the Mayor's vision for a 'City for All Londoners'. We are committed to creating a fairer, greener, healthier and more prosperous city. The Mayor's Transport Strategy sets a target for 80 per cent of all journeys to be made on foot, by cycle or using public transport by 2041. To make this a reality, we prioritise health and the quality of people's experience in everything we do.

We manage the city's 'red route' strategic roads and, through collaboration with the London boroughs, can help shape the character of all London's streets. These are the places where Londoners travel, work, shop and socialise. Making them places for people to walk, cycle and spend time will reduce car dependency and improve air quality, revitalise town centres, boost businesses and connect communities.

We run most of London's public transport services, including the London Underground, London Buses, the Docklands Light Railway, London Overground, TfL Rail, London Trams, London River Services, London Dial-a-Ride, Victoria Coach Station, Santander Cycles and the Emirates Air Line. The quality and accessibility of these services is fundamental to Londoners' quality of life. By improving and expanding public transport, we can make people's lives easier and increase the appeal of sustainable travel over private car use.

We are moving ahead with many of London's most significant infrastructure projects, using transport to unlock growth. We are working with partners on major projects like Crossrail 2 and the Bakerloo line extension that will deliver the new homes and jobs London and the UK need. We are in the final phases of completing the Elizabeth line which, when it opens, will add 10 per cent to London's rail capacity.

Supporting the delivery of high-density, mixed-use developments that are planned around active and sustainable travel will ensure that London's growth is good growth. We also use our own land to provide thousands of new affordable homes and our own supply chain creates tens of thousands of jobs and apprenticeships across the country.

We are committed to being an employer that is fully representative of the community we serve, where everyone can realise their potential. Our aim is to be a fully inclusive employer, valuing and celebrating the diversity of our workforce to improve services for all Londoners.

We are constantly working to improve the city for everyone. This means freezing fares so everyone can afford to use public transport, using data and technology to make services intuitive and easy to use, and doing all we can to make streets and transport services accessible to all. We reinvest every penny of our income to continually improve transport networks for the people who use them every day.

None of this would be possible without the support of boroughs, communities and other partners who we work with to improve our services. We all need to pull together to deliver the Mayor's Transport Strategy; by doing so we can create a better city as London grows.

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About this report

Generally, the report covers the financial year from 1 April 2016 to 31 March 2017. However, the road safety data for Greater London and the Transport for London Road Network (TLRN) covers the calendar year from January to December 2016 in line with national standards.

The safety data includes customer, employee and supplier details. Health data relates to employee wellbeing and includes employee sickness absence, but does not cover contractor or customer health issues.

Environment data covers London's public transport operations, including taxis and private hire vehicles, plus the activities we and our suppliers undertake.

Our continual effort to provide more accurate data means that there are some changes to the figures that we reported last year following further checks. Where possible, data is compared over five years and, where appropriate, comparisons have been made with previous years.

Commissioner's foreword

On 9 November 2016, a tram overturned near Sandilands Junction in Croydon. This resulted in the tragic deaths of Dane Chinnery, Donald Collett, Robert Huxley, Philip Logan, Dorota Rynkiewicz, Philip Seary and Mark Smith. Another 54 people needed hospital treatment. My thoughts remain with all those affected by this terrible incident and we continue to do all we can to provide support to the bereaved families and those injured.

We have since introduced more safety measures to the tram network. These include extra speed restrictions, improved speed monitoring, new speed signs for drivers, upgraded CCTV and an in-cab vigilance system in all trams to alert the driver if signs of fatigue are detected.

Alongside the investigations carried out by the Rail Accident Investigation Branch (RAIB), Office of Rail and Road (ORR), and British Transport Police (BTP), we commissioned an additional internal investigation. We will ensure all the recommendations outlined in the RAIB report, as well as our own, are met. We continue to work with the tram industry to ensure lessons are learned and that we are collectively able to introduce any further measures that could improve the safety of trams across the UK.

As well as the tragic incident at Sandilands, during the period covered by this report, a further four people lost their lives following accidents on the



Tube, London Rail, buses and London Dial-a-Ride. There were also 116 people fatally injured on London's roads in 2016. While this is the lowest level on record, clearly there is so much more to be done to remove all death and serious injury from our roads and rail networks. This is why the Mayor's Vision Zero is so important.

Launched in February, our bus safety programme includes a new safety standard which will apply to all new vehicle design from the end of 2018. This supports Vision Zero and that no loss of life is inevitable or acceptable.

Many road deaths involve heavy good vehicles (HGVs). In January 2017, the Mayor launched the world's first Direct Vision Standard for these vehicles. We are using this pioneering tool to increase the number of HGVs with better direct vision. This will contribute to our target of a 50 per cent reduction in the number of people killed or seriously injured on our roads by 2020. Our Better Junction programme will also improve road and cycle safety with the introduction of 20mph speed limit trials on our Strategic Road Network.

The Mayor's vision for London to be the world's greenest global city was published in the draft London Environment Strategy. Last year the Mayor also launched his ambitious plan of action to address poor air quality. We are making our bus and taxi fleet cleaner and more environmentally friendly by making sure older vehicles are updated to meet latest European emissions standards.

We are also consulting on proposals to introduce the central London Ultra Low Emission Zone in 2019, a year earlier than planned. We aim to halve total particulate matter from our operations by the end of next year. Our nitrogen oxide emissions have reduced by around 6.6 per cent, keeping us on track to meet our target of a 40 per cent reduction by the end of 2017/18.

We have reduced the amount of electricity we use and the amount of CO₂ emissions associated with our activities. This is all despite us now running Night Tube services two days a week, as well as more frequent daytime services.

We are committed to making sure that running the Night Tube does not impact residents. Where we have received complaints about noise, we are working to resolve the issues.

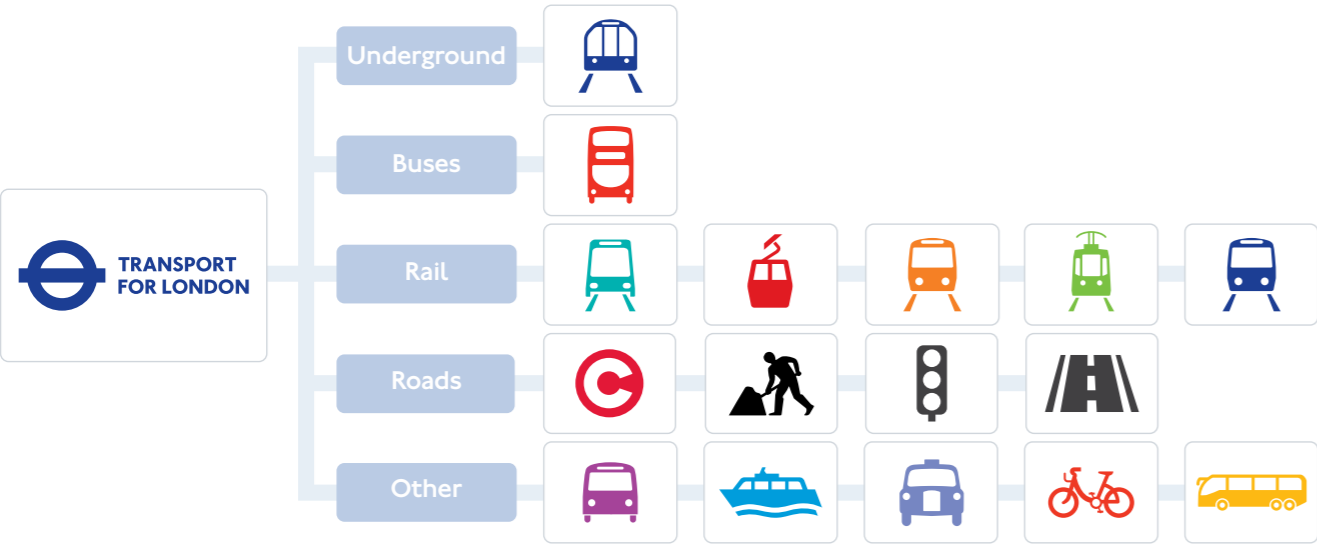
London is one of the greatest cities in the world and everyone using or working on our transport network should be able to do so as safely as possible. Our work on health, safety and the environment is our top priority and always will be.

A handwritten signature in black ink, appearing to read 'Mike Brown'.

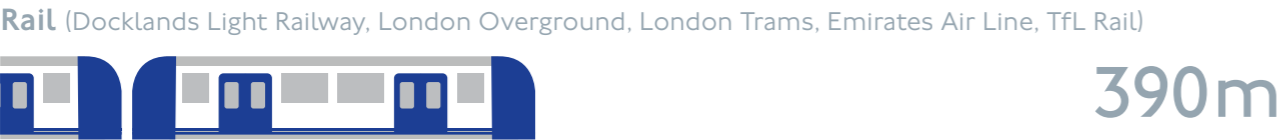
Mike Brown MVO
Commissioner
Transport for London

Our business

How we report on our business



Passenger journeys



* Excluding road journeys and pedestrians

Facts and figures





Pedestrians on Oxford Street

Our approach

Our vision for health, safety and environment is to get everyone home safe and healthy every day.

We want to ensure that:

- Every journey is safe for our customers
- Our employees, agency staff and contractors go home safe and healthy every day
- We maintain our assets and deliver projects safely
- We fulfil our commitments to prevent pollution and nuisance; protect biodiversity; improve air quality; and reduce waste and carbon emissions

An important part of our Health Safety and Environment (HSE) management strategy is measuring and benchmarking our performance internally and against international standards.

Across TfL we use a management maturity model to assess our approaches to HSE management. Developed by the ORR, the model allows us to benchmark our approach to HSE management.

It looks at the five areas of our safety management system: policy; organising for safety; cooperation and competence; planning and implementing; and monitoring, audit and review. The method allows us to identify long-term actions and address root cause barriers to safety improvement. We aspire to achieve excellence in safety management (Level 5) and have set an interim target of achieving Level 4 by the end of 2020.

Our businesses also set HSE targets against a number of indicators to improve our day-to-day performance. These indicators focus on customer and workforce injuries, and include historical incidents and preventative measures. They reflect our continually improving understanding of risks. This has improved trend analysis and better highlights necessary remedial actions.

To complement performance targets, each business area develops HSE improvement plans and objectives to help identify hazards and evaluate how to manage risks. Each area monitors and reviews the plans and tests the control measures. HSE performance is then reported at business unit level and to the appropriate management meetings at all levels of the organisation.

Audits are carried out across TfL to make sure our strategic risks are being monitored and adequately controlled. Where any risk is identified to be below the required standard, a corrective action plan is put in place to make sure improvements are made.

This process of planning, implementing, monitoring and reviewing risks is vital to achieving our vision and creating a safer transport network for London.

Underground and Rail

London Underground, London Overground, DLR, London Trams, TfL Rail and Emirates Air Line



There were 55 incidents that resulted in fatal injury on the London Underground (LU) and TfL Rail network. These have been recorded by the coroner as: suicide (23), open* (six), narrative** (four) and accidental (one). A further 16 fatalities are awaiting the outcome of coroner inquest. There were five fatalities that were confirmed as being related to medical conditions and not connected with our operations.

Most customer accidents occur in three main areas on the LU network: on escalators (40 per cent), stairs (20 per cent) and at the platform train interface (20 per cent). On LU and TfL Rail, a total of 5,074 customers sustained physical injury from accidents in 2016/17, the equivalent to 3.9 injuries per one million journeys. The reasons for these are often related to customer behaviour as well as faults with our assets, so LU's customer safety plan is focused on advising customers to adopt safer behaviours and on making infrastructure changes that will eliminate or reduce the risk.

We have improved escalator safety measures at the 20 stations with the most escalator-related injuries. Many of these are subtle 'nudge' measures,

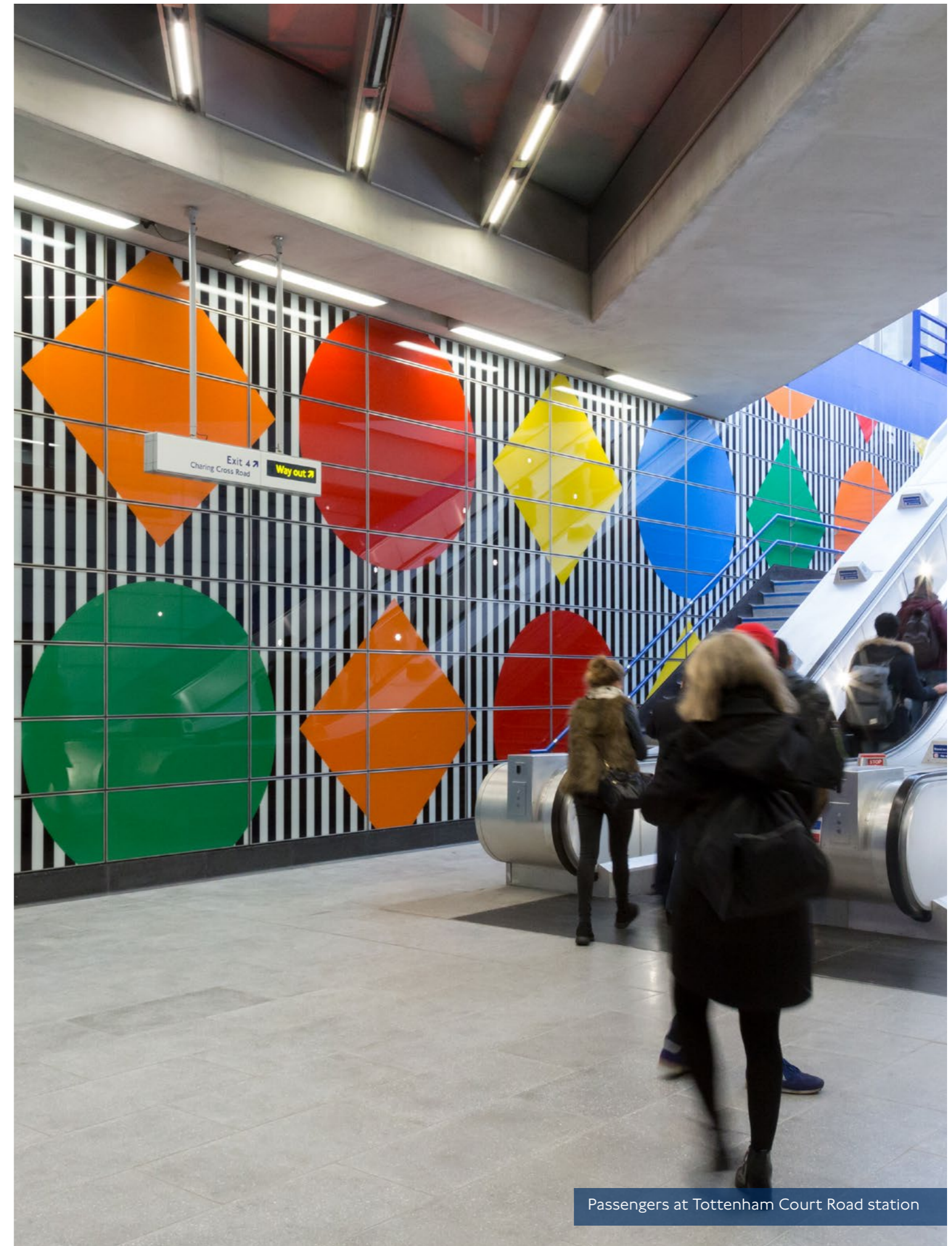
designed to encourage customers towards safer behaviour: holding the handrail; taking care when getting on and off; standing correctly; and using lifts where appropriate. To further reduce incidents, we also have posters aimed at influencing customer behaviour and make regular safety information announcements over public address systems. In busy periods (and where our operations allow) we provide additional employees to help customers on stairs and escalators, and direct customers to lifts where appropriate.

In the medium to long-term, customer safety will be improved further by infrastructure changes, particularly at the platform train interface. This includes reducing the gap between the platform and trains, and ensuring the train operator has a better view of people getting on and off. This is supported with awareness campaigns that encourage customers not to rush to catch their train.

Across the network, colleagues have completed training to help them identify and help distressed or vulnerable people. This has enabled professional help to be provided to individuals when necessary, reducing disruption to other passengers.

* An 'open' conclusion arises in the absence of sufficient evidence to prove cause of death to the necessary standard.

**A 'narrative' conclusion records the coroner's conclusions on the important issues arising in the circumstances by which the deceased came by his or her death.

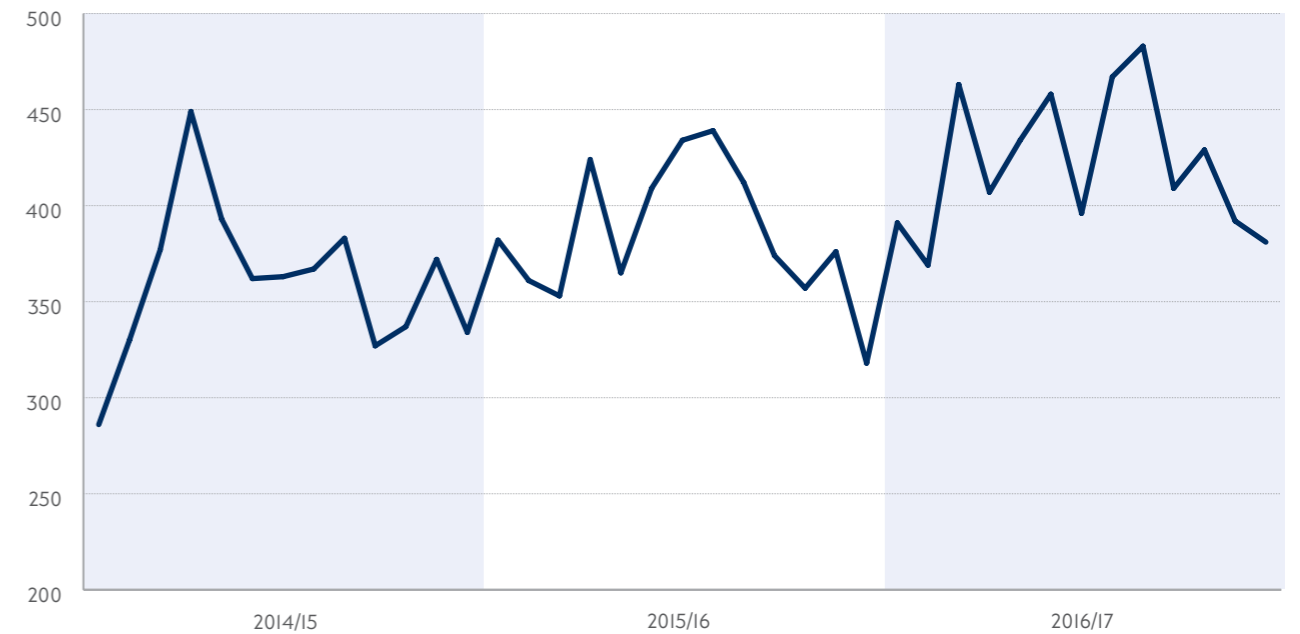


Passengers at Tottenham Court Road station



A Customer Services Assistant helping a passenger at Heathrow Terminals 1,2,3

Number of customers injured on LU, TfL Rail and London Rail



A total of nine incidents resulted in fatal injury on London Rail (London Overground, DLR, London Trams and Emirates Air Line). These have been recorded by the coroner as: suicide (one) and accidental (one). There were seven fatalities that are awaiting the outcome of inquest following the tragic tram overturning at the Sandilands Junction.

On London Rail, there were 408 customer accidental injuries in 2016/17, the equivalent to 1.1 injuries per one million journeys.

Croydon tram derailment

On 9 November 2016 a tram overturned at Sandilands. This tragically resulted in seven people losing their lives and 54 needing hospital treatment. We offered immediate assistance to the families and

the relatives of those who were injured through our Sarah Hope Line, a 24-hour service that offers practical, emotional and financial support.

Following a rigorous safety assessment and taking the advice of an independent panel of tram experts, the tram service resumed across the entire network on 18 November 2016. Before services restarted, and in line with advice in the RAIB's first interim report, additional speed restrictions and associated signs were installed near Sandilands and at other locations. All drivers were fully briefed before services restarted and additional employees from TfL and FirstGroup were made available across the network to provide support and information for customers.

Making the tram service safer remains one of our top priorities. In December 2017, the RAIB published its report of recommendations, and in January 2018 we published our own internal report. We will ensure all the recommendations outlined in the Rail Accident Investigation Branch report and our own are met, and continue to implement improved safety measures.

These include additional speed restrictions, better speed monitoring, new signs for drivers, an upgrade of the CCTV recording system and an in-cab driver monitoring system. This means that drivers will be immediately alerted if any signs of distraction or fatigue are detected. We are also working on an alert system for monitoring and managing tram speed.

Following the incident, information was displayed across the tram network and on our website, with a contact number should anyone have any concerns about safety. We also reviewed all our customer complaints procedures to ensure that any safety issue raised by a customer is dealt with quickly and thoroughly.

Publicity campaigns and school liaison activities are raising awareness of the tram network for those living and working nearby.

Reducing Platform Train Interface (PTI) incidents and falls on the DLR

During 2016/17, we developed a strategy to reduce the number of PTI incidents on the DLR. This will see a number of infrastructure and procedural changes introduced over the coming years. Reducing this risk is also an important element of the contract for the new trains being introduced in 2022.

To further prevent customer injury caused by slips, trips, falls on escalators, DLR is adopting best practice improvements from LU. We have rolled out enhanced safety measures at sites where most escalator related injuries occur.

With the help of the local community and user groups, we have improved safety for mobility scooter users on the DLR network. These include new signs that advise mobility scooter users how to leave lifts safely.

DLR has run a series of passenger engagement roadshows to better understand customer attitudes and behaviours towards their safety. To improve awareness, DLR has increased public address announcements advising customers of platform help and emergency stop points.

Safeguarding vulnerable customers

A training programme to help employees identify and assist distressed or vulnerable people on the London Overground network was introduced this year. This has resulted in more than 50 successful interventions by staff in 2016, enabling professional help to be provided to the individual.



We have developed a strategy to reduce trips and falls on the DLR



Bus passing through Piccadilly Circus

Buses

London Buses 🚌

There were 13 fatalities on the bus network. One was recorded by the coroner as accidental, six are awaiting the outcome of inquest, one is awaiting the outcome of a police investigation, and five are related to medical conditions.

A total of 4,894 customers were injured in accidents in 2016/17. As in LU, slips, trips, and falls are the main causes. A total of 4,734 passengers fell in 2016/17, the equivalent of two falls per one million bus journeys. We continue to encourage people to use the handrails, especially on stairs.

In 2017/18 we will continue to work with operators on our Bus Safety Programme to improve safety and address specific issues, such as falls and bus collisions, which remain stubbornly high.

As part of our commitment to develop our safety improvement plans, we introduced a Safety Performance Index (SPI) at the start of 2017/18. The SPI, which is already in place in our contracted London Rail businesses, uses several indicators to measure HSE performance and allows us to further analyse incidents on buses.

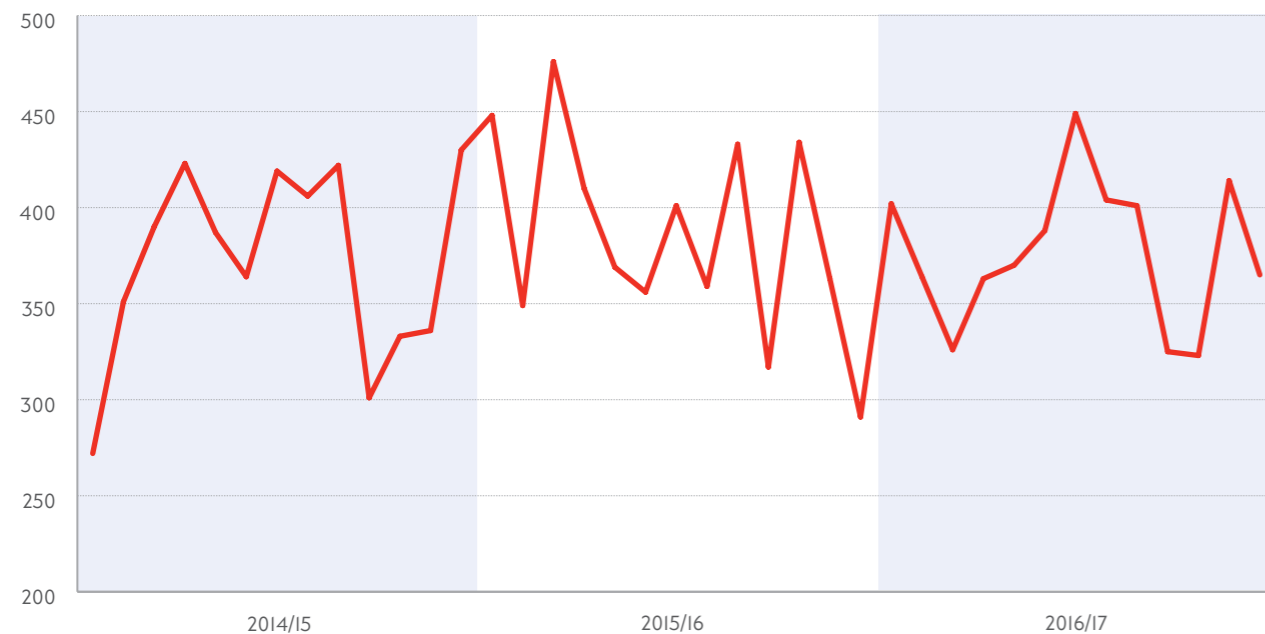
Bus Safety Programme

Launched in February 2016, the programme is contributing to the 'Vision Zero' approach to reducing road danger, as set out in the Mayor's draft transport strategy. It supports the Mayor's aim for no one to be killed in or by a bus by 2030, and for deaths and serious injuries from road collisions to be eliminated from London's streets by 2041.

The programme involves:

- Developing a bus safety standard for London. A revised specification for new vehicles will become part of contracts from the end of 2018. The specification includes new speed-limiting technology from the end of 2017. To support the standard, we are researching and trialling the best technologies that can avoid or reduce the severity of injuries. Technologies will be chosen based on analysis of police investigations into fatal bus collisions that began this year, and the measures that have already improved safety in the freight sector
- Updating our bus contracts to include new safety criteria. Specific measures for monitoring bus safety performance will be introduced by summer 2018

Number of customers injured on buses



- Publishing more bus collision data on our website. All bus-related safety incidents can now be searched by route, borough, operator, incident or injury type on our website. The system produces automated graphs based on the filters selected
- Providing greater transparency on bus collision investigations. Details of fatal incidents, including the investigations and coroner's findings, are now available on our website



A family boarding a bus in East London

Other operations

London Dial-a-Ride, London River Services, Taxi & Private Hire, Santander Cycles, Victoria Coach Station



There was one fatality on the Dial-a-Ride service, recorded by the coroner as accidental. There were no other fatalities in 2016/17.

A total of 162 customers sustained injury from accidents in 2016/17. Dial-a-Ride users and cycle hire customers are the groups most affected. The main causes of injuries are from customers who fall off bikes, boarding Dial-a-Ride buses and are involved in road traffic collisions.

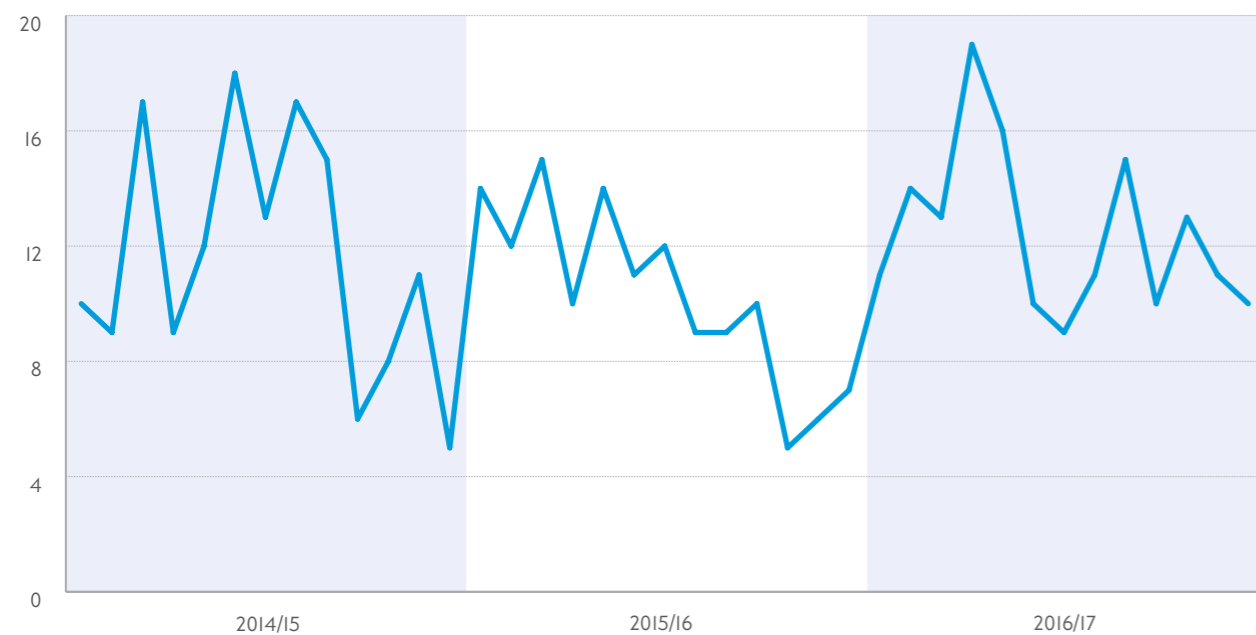
Keeping Taxi and Private Hire services safe

Last year, the Mayor committed to quadruple the size of our Taxi and Private Hire Compliance Unit and asked us to

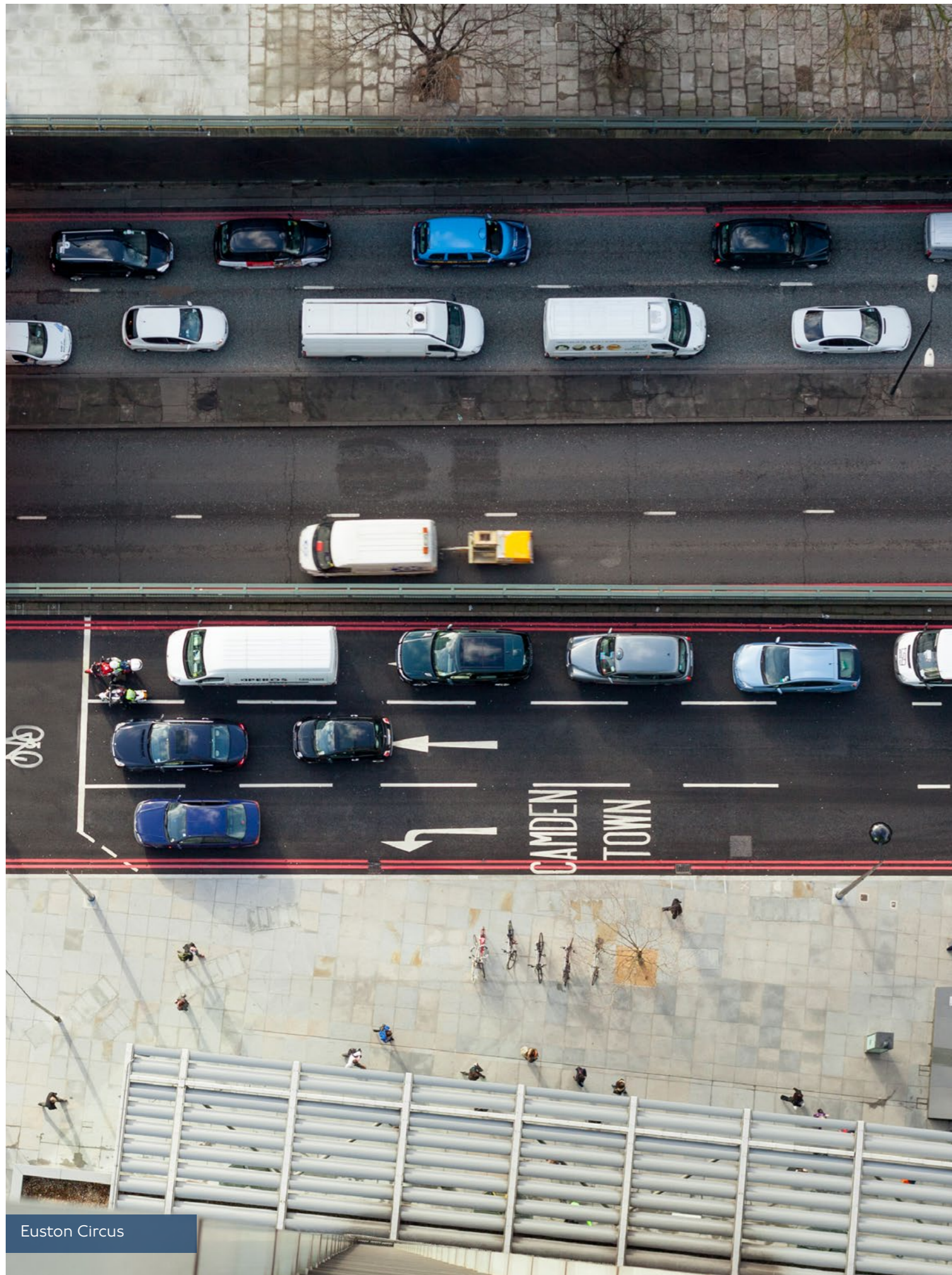
recruit 250 new compliance officers. This has significantly increased our ability to tackle non-compliant and illegal taxi and private hire activity in London.

Compliance levels remain high, at 90 per cent (taxis) and 89 per cent (private hire). Reasons for non compliance include unattended vehicles on ranks, and drivers without identification or not carrying insurance documents. Deterring, detecting and disrupting illegal and non-compliant taxi and private hire activity remains a priority for our Taxi and Private Hire Compliance Officers and the TfL-funded Taxi and Private Hire Policing Team.

Number of customers injured on other operations



Cycle hire customers on the North-South Cycle Superhighway



Euston Circus

Roads

Transport for London Road Network



From 1 January to 31 December 2016, 2,501 people were killed or seriously injured (KSI) on London's roads. Of this total, there were 116 fatalities (which is the lowest level on record) and a 15 per cent reduction compared with 2015 (from 136 fatalities). There were: 97 bus, coach, taxi and private hire vehicle occupant KSIs during 2016; 2,010 vulnerable road user (cyclists, pedestrians and motorcyclists) KSIs; and 292 KSIs involving goods vehicles during 2016.

The Metropolitan Police Service (MPS) introduced a new system for recording road casualties in September 2016. This has led to far more accurate and detailed data being available to inform how we and our partners improve road safety in London. It has also resulted in an increase in the number of injuries being classified as 'serious' rather than 'slight' as the previously system relied on the professional judgement of police officers as to severity of injuries. We are working with the Department for Transport to back-estimate numbers of seriously injured casualties that would have been reported to allow more accurate comparisons to be made.

As a result of the change in recording, there has been a 20 per cent increase in London's KSIs compared with 2015. However, KSIs related to goods vehicles achieved a two per cent reduction compared with 2015. Road safety fact sheets, reports, and data extracts can be found on our website.¹

Safe roads

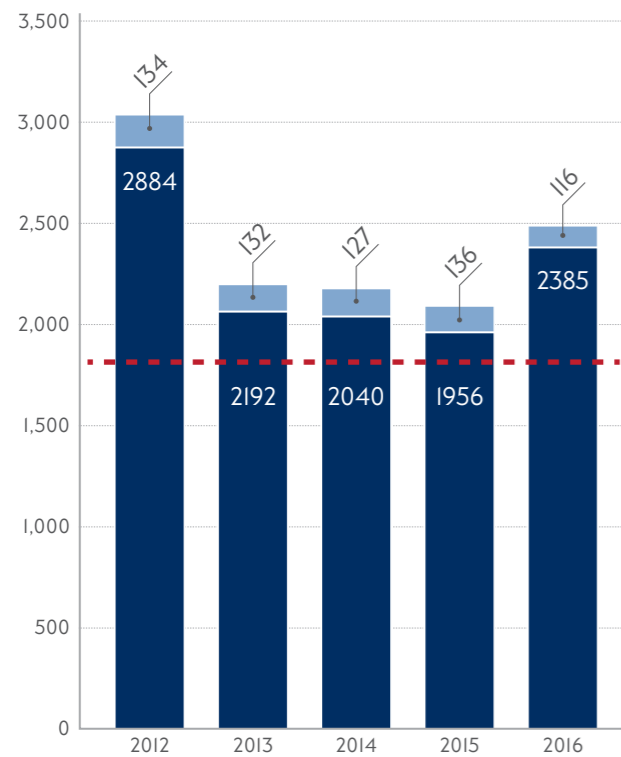
In October 2016 the Mayor of London announced that he was going to adopt a 'Vision Zero' approach to road safety. He believes that no loss of life is inevitable or acceptable, and adopting a Vision Zero approach will put the elimination of road danger at the very heart of the transport system.

We have made a number of safety improvements across the Capital's road network, all of which have helped to make them more reliable, safer and greener. A full list of works that we have completed so far is on our website.²

¹ tfl.gov.uk/corporate/publications-and-reports/road-safety

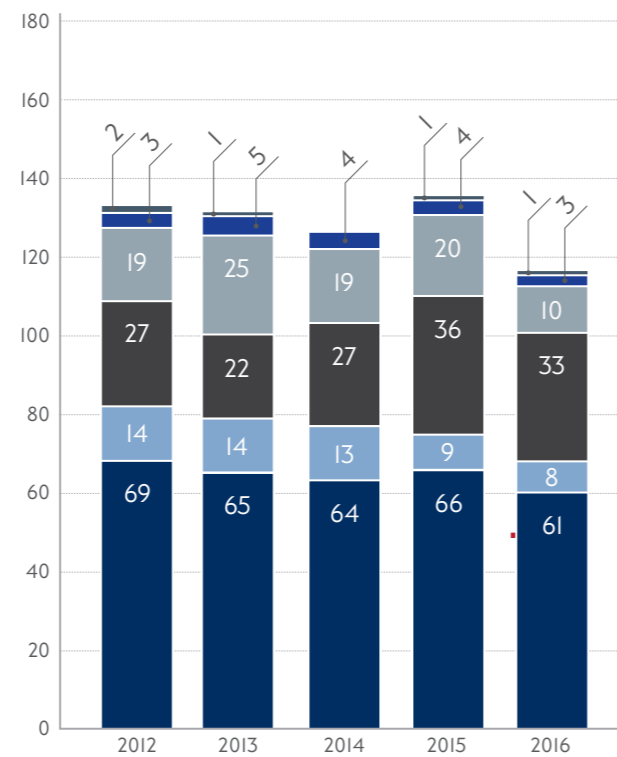
² tfl.gov.uk/campaign/our-plan-for-londons-roads/what-weve-done

Killed or seriously injured Annually*



- Fatal
- Seriously injured
- - - 2020 target

Fatalities by vulnerable road user group Annually



- Pedestrians
- Pedal cyclists
- Powered two-wheeler
- Car occupants
- Other vehicle occupants
- Bus or coach occupants



Cyclists using the East-West Cycle Superhighway

*A change to the recording system was introduced in September 2016.

Better Junctions

The Better Junctions programme continued to make good progress throughout 2016/17. Twelve junctions were significantly upgraded, including schemes on the East-West and North-South Cycle Superhighways, Cycle Superhighway 2 and at Oval and Stockwell.

20mph speed limits

Trials of 20mph speed limits on the Transport for London Road Network took place at a number of locations, including Stamford Street, Southwark Street, Clapham High Street, Brixton Road, Farringdon/King's Cross, Camden Street, Earls Court Road, the A10 corridor in Hackney and Upper Street.

Bridge strike mitigation

We have set up a working group comprising external stakeholders from the haulage industry to tackle the issue of bridge strikes by over-height HGVs across London. The group is working on a number of ideas including the design of a training tool kit for HGV drivers, enforcement through the detection of unreported incidents and follow-up letters including reporting to the Traffic Commissioner. In addition, new over-height detection signs aimed at tackling strikes were put in place in July 2016 on Tulse Hill, Lambeth. This reduced bridge strikes by a third at this location in the seven months following its installation. The system works by pre-warning drivers of a low bridge using flashing signs.

Safe vehicles

Construction Logistics and Community Safety (CLOCS) progress event

The sixth CLOCS conference and exhibition was held at London's ExCeL in March 2017, where we reaffirmed our commitment to the programme and support for the expansion of the scheme beyond London. Those adopting CLOCS outside the Capital provided an update, and organisations making use of procurement to embed work-related road risks shared their experiences. We provided a vision for CLOCS and updated on latest research.

We continued to improve the safety of HGVs and vans used on London's roads.

Dangerous lorries

We launched a Direct Vision Standard consultation in January 2017, which is a pioneering tool that gives a zero to five-star rating to HGVs based on how much the driver can see from the cab. It follows research that shows drivers respond an average 0.7 seconds slower when checking blind spots and monitors, compared with looking directly through the windows. This means an HGV would travel an extra 1.5 metres before seeing a nearby road user. Using this standard, there are plans to ban the most dangerous HGVs from the roads by 2020.

These HGVs, often the largest lorries that are not designed for urban environments, would be 'zero-star rated' by the Direct Vision Standard. We continue to tackle unsafe freight operators, drivers and vehicles with the MPS and City of London Police through the London Freight Enforcement Partnership.

Safe behaviours

Safe Urban Driving

Safe Urban Driving focuses on driving in urban areas and specifically vulnerable road users, such as cyclists and pedestrians. It is the first and original Driver Certificate of Professional Competence (CPC) approved course in the UK to include practical on-road cycle training. During 2016/17, 5,316 people completed TfL-funded approved training. More than 47,000 drivers have been on the course since its launch in 2011.

Road Safety Week

The TfL-funded MPS Roads and Transport Policing Command (RTPC) supported the BRAKE Road Safety Week in November 2016. The focus was on the six elements of the BRAKE pledge – slow, sober, secure, silent, sharp and sustainable.

As part of our commitment to engage with the community, the RTPC holds regular events throughout the year. Exchanging Places, for example, gave cyclists and pedestrians the opportunity to sit in the cab of a large vehicle to better understand what a driver can and can't see. The Community Roadwatch event also allowed members of the public to get involved in enforcing speed limits in their local area. As part of Operation Safeway, more officers from the RTPC were deployed at junctions. Activities targeted speeding, people not wearing seatbelts, using mobile phones at the wheel and driving under the influence of alcohol and drugs.

Sustainable Travel: Active, Responsible, Safe (STARS)

In November 2016, we gave top awards to 34 London schools for championing active and safe travel on the journey

to school, as part of its STARS schools programme. The schools received awards for being the highest performing of more than 1,500 participating London schools, in reducing car use, increasing walking and cycling and using public transport.

The scheme helps primary and secondary school pupils adopt safe and sustainable ways of travelling, such as cycling, walking and using public transport. Now in its 10th year, accreditation to STARS has grown from 180 schools in 2006 to 1,557 in 2016. Schools are judged on their success in changing travel behaviour with each school awarded a Bronze, Silver or Gold accreditation.

Road safety awards

In October 2016, we won the Road Safety, Traffic Management and Enforcement award at the National Transport Awards for the Safer Lorry Scheme.

We have been recognised internationally for our work to improve the safety of cyclists, pedestrians and motorcyclists in London. In December 2016, Prince Michael of Kent awarded us the International Road Safety Award for our ground-breaking work and promising results for reducing death and serious injury. The projects considered included the launch of the Safer Lorry Scheme, the installation of special sensors at pedestrian crossings which adjust crossing times when large groups of people are detected, as well as the trialling of 20mph limits and average speed cameras on key routes.

TfL workforce safety and wellbeing

We aim to eliminate occupational illness and create workplaces that protect employees' health and promote wellbeing.

TfL workforce safety

In December 2016, LU was fined £500,000 following an ORR prosecution. This was as a result of an accident in September 2014 in which an employee fell from a scaffold tower erected to enable the cleaning of a lift shaft at South Kentish Town disused station.

Common causes of employee accidents include slips, trips and falls, workplace violence, and manual handling, often resulting in minor injury. In more than 60 per cent of workforce incidents, lack of personal awareness and behaviours are the main cause.

We are committed to creating the safest possible conditions for our employees. Safety risks are continually reviewed and control measures are put in place to ensure our employees work in a safe environment.

The workforce safety improvement plan for LU focuses on two areas; 'Showing we care' through safety leadership, and 'Making safety personal' for everyone in the workforce. In Surface Transport, the main areas of our improvement plans focus on the prevention of assaults to frontline colleagues, and injury caused by slips, trips and falls. We continue to work with the operators of our contracted bus and rail services to support their own workforce injury reduction plans.

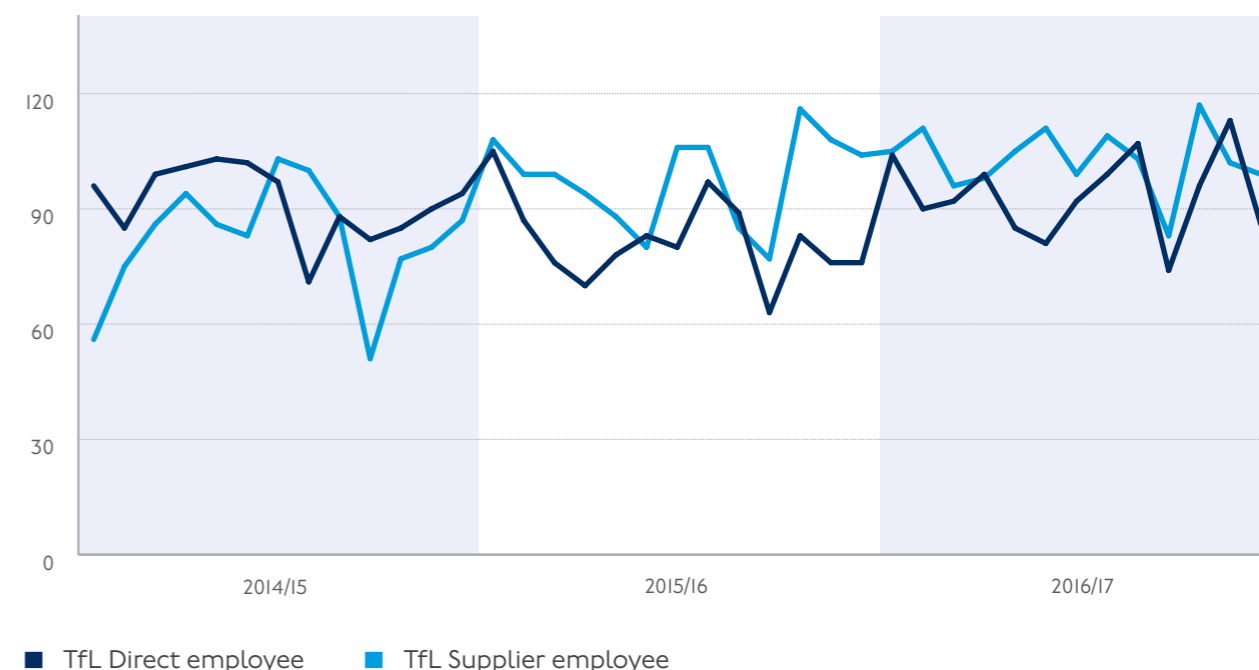
Our 'Go Look See' programme is one of a number of initiatives aimed at preventing reoccurrence. It involves senior managers going to the incident site, discussing the causes with the injured person and the local manager, and agreeing preventative actions.

As part of our strategy to improve the safety of our staff, particularly those working on the frontline, employee injury working groups continue to provide a forum for managers in operational areas to discuss local challenges and interventions. The initiative is helping to foster the sharing of lessons learned and provide opportunities for peer reviews.

Construction supplier safety

We work with our construction supplier teams to ensure they can safely deliver our capital investment and upgrade programme. At a strategic level this is achieved through partnership working with supplier senior leadership teams, to find practical solutions to shared issues. Local site forums implement outputs of the strategic forums. Sessions promote collaboration across the client and principal contractor boundary, and between suppliers on key HSE issues, such as manual handling, decision-making, use of small tools, person/machine interface and mental health awareness, to improve performance.

Number of direct and supplier employee injuries



We set clear health and safety requirements within our contract clauses and monitor performance against them to make sure our suppliers continue to achieve high standards of health, safety and environmental management. To reduce the risk of death or injury from our activity on the roads, we have included work related road risk clauses in all new and existing TfL contracts since February 2012. The standards apply to all lorries and/or vans in our supply chain and require suppliers to undergo independent audits of their transport operations, train their drivers to an approved standard and fit additional safety equipment to vehicles over 3.5 tonnes. To reinforce our commitment to these important risk controls, from January 2017 any deliveries failing to comply with these requirements have been turned away from our sites. This has resulted in a significant

improvement in compliance, with 76 per cent of deliveries fully compliant with our requirements, compared with 18 per cent at the end of 2015/16.

We continue to focus on reducing incidents that result in a reduced supply of household utility services (gas, electricity and water) within our highway works. We have successfully reduced these incidents from 70 in 2015/16 to 49 in 2016/17. This has been achieved through provision of better access to utility information on site and enhanced training and supervision of those working around utilities.

A common area of near miss incidents involving our construction supplier teams is within areas of restricted access (track possessions), where failures in the planning process often lead to increased scope of works. A TfL-wide formal investigation into

track access has concluded. We will launch a pan-TfL Track Access Modernisation programme in winter 2017/18 to eliminate hazards to track workers.

We continue to develop tools to support good HSE management standards. In 2016/17, we improved our incident reporting processes by extending our online incident reporting tool so that all projects can report incidents in real-time. Our suppliers can now also submit performance data via this system each period, which provides a single source of truth and makes data immediately available to all users.

Operational supplier safety

Our operational suppliers are central to our service delivery. In London Rail and Surface Transport, the main customer-facing service is provided by private sector suppliers. The main cause of injury is from work related violence incidents involving direct and supplier employees in frontline customer service.

Incidents tend to be connected with revenue collection and temporary station closures as part of our congestion control plans, mainly resulting in verbal abuse. Our partnerships with the BTP and MPS continued to focus on targeting hotspots, and supporting investigations and court proceedings.

The TfL Workplace Support Team continues to work in partnership with the MPS and BTP in tackling staff assaults. Throughout 2016/17 we continued with Operations Spearhead – an early intervention tactic to prevent low level antisocial incidents escalating

to staff assaults. To further support our workforce, we have continued to provide conflict avoidance training to both new recruits and existing employees, and provide strong management support to enable them to deal with such issues effectively.

Workforce wellbeing

We aim to end occupational illness, and to create workplaces that protect employees' health and promote wellbeing. We identify occupational health risks and introduce practices to control exposure.

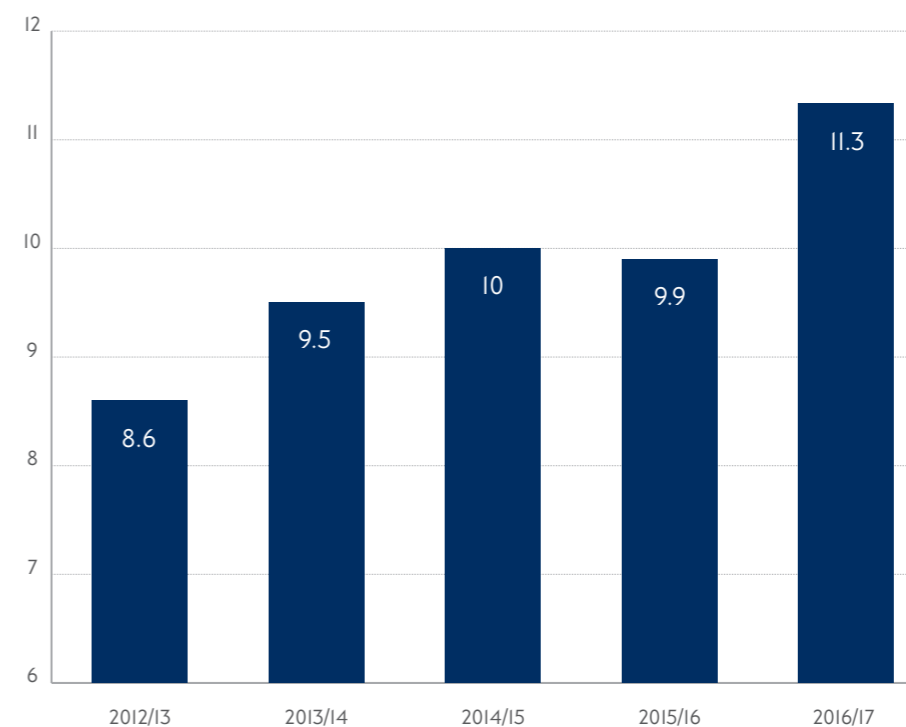
Our Occupational Health team is delivering our five-year Health and Wellbeing Improvement Programme which focuses on working with employees to help them improve musculoskeletal, mental and general health. Achievements in 2016/17 include a walking initiative aimed at increasing employees' physical activity levels and an online healthy eating and hydration programme designed to educate employees about the importance of balanced nutrition.

Enhanced safety arrangements on London Buses

CentreComm, the London Buses control room, has introduced SafeApp which allows employees working remotely to sign-on at the start of their shift using a mobile device, and confirm they are fit and well at the end of their shift. This is particularly useful for employees who are considered mobile and do not operate from a base location. The application also means we can respond to incidents on the network faster, as an employee's proximity to a specific event can be seen from the control room.

Sickness absence

Average number of days sick per TfL employee



Workforce attendance

The average sickness absence is 11.3 days per employee across TfL and our subsidiaries. Musculoskeletal injury and mental health are the main causes, as declared through self-certification and doctors' certificates.

Early referral to our physiotherapy support services for a musculoskeletal injury results in less time off. The average sickness duration is three times less for those employees who are referred within the first month of absence, compared with those who are referred later. We work with line managers to ensure early referral for employees that need physiotherapy support services. In 2016/17 we ran a series of mental health awareness workshops

to educate employees on a range of practices, including getting better sleep, overcoming stress and building resilience. Our team of mental health first aiders are also available to offer peer-to-peer support across the organisation.

Drug and alcohol testing

We enforce a zero-tolerance approach to drug and alcohol misuse. This is enforced through random unannounced testing. Disciplinary action up to and including dismissal is taken against anyone who is found to be in breach of our drugs and alcohol policy. During the year we conducted 883 unannounced screenings, meeting our target to test five per cent of our safety critical workforce. There were 13 failures.

Environment

This section of the report details the environmental impacts of our directly managed activities and operations, such as transport services, construction, maintenance and support functions.

The Mayor's vision was published in the draft London Environment Strategy (LES) earlier this year. It set out his vision for London to be the world's greenest global city. The LES and draft Mayor's Transport Strategy (MTS) set out the actions required to support this vision. We are committed to supporting these measures through the operation of our transport services.

Environmental accreditations

In April 2017 we successfully retained our Carbon Trust Standard accreditation for continual year-on-year office carbon emission improvements. We also achieved accreditation for water management, and our waste management processes were audited.

We published TfL requirements in our management system for use of an externally recognised BREEAM sustainability rating system in our new construction and retrofit of buildings. These complement our use of the civil engineering sustainability rating system CEEQUAL. As a result of using these,

we are seeing good performance. For example our work on the Bakerloo Line Link at Paddington was awarded CEEQUAL 'Excellent' status at its interim assessment.

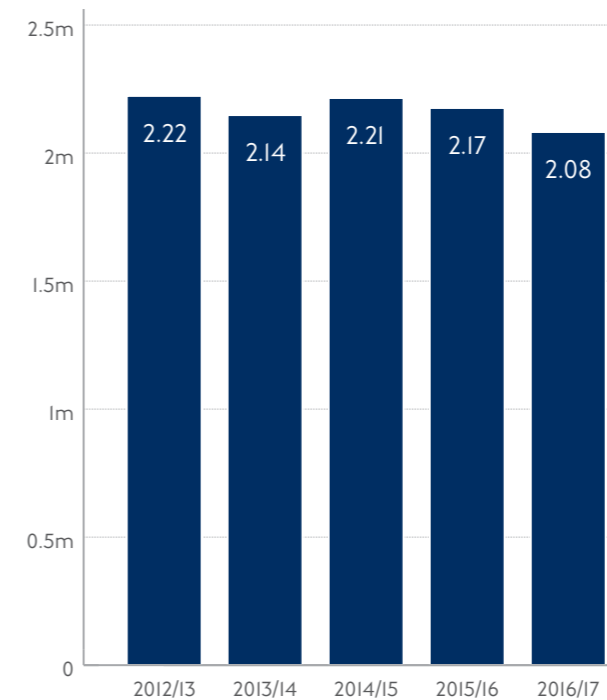
CO₂ emissions and energy use

Our carbon dioxide (CO₂) emissions come from the fuel used to run buses and other vehicles, electricity to power trains and trams, and the energy supplied to our buildings and equipment. Electricity use in 2016/17 fell by 1.56 per cent to 1.69 terawatt hours. Within this overall result, there was an increase from running Night Tube and more frequent services and a reduction from efficient street lighting.

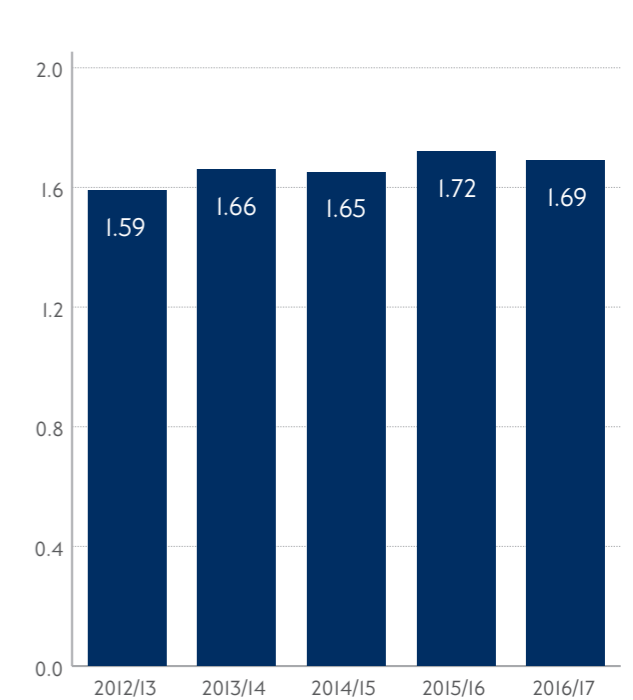
Total CO₂ emissions associated with our activities was 2.08 million tonnes compared with 2.17 million tonnes in 2015/16 – a 4.1 per cent decrease. The main factor has been the reduction in carbon intensity of our electricity supply from National Grid. Continued improvements in the energy efficiency of transport infrastructure and the carbon intensity of the grid are vital to reaching the Mayor's long term goal of a zero carbon city.

*CO₂e is carbon dioxide equivalent – the standard unit for measuring carbon footprints. It expresses the impact of each different greenhouse gas compared with the amount of carbon dioxide that would cause the same warming effect.

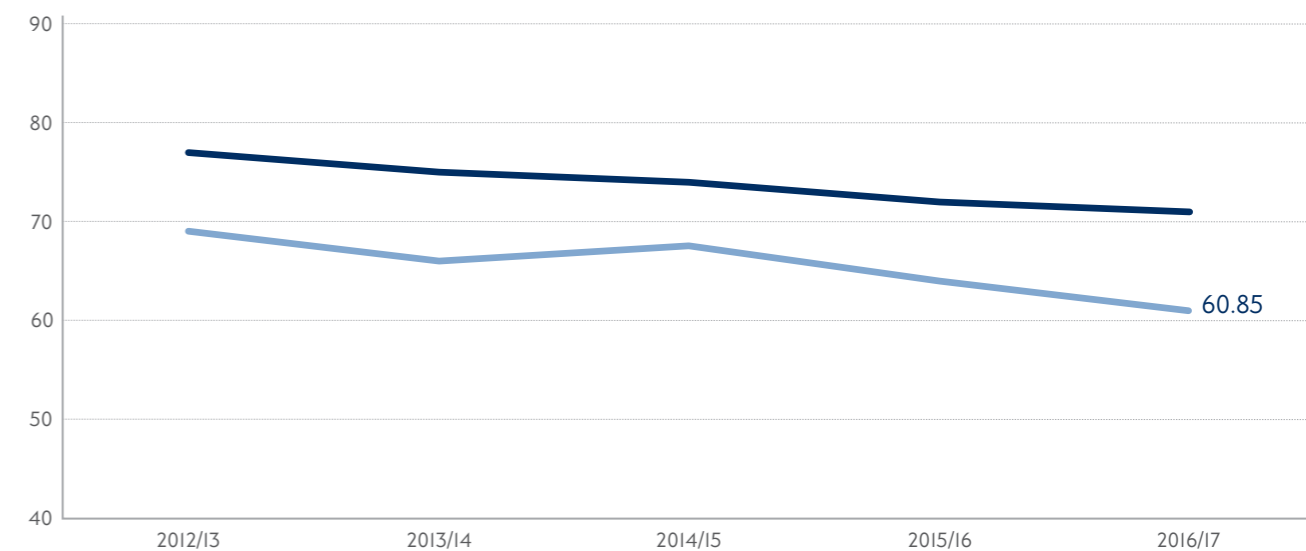
Total carbon emissions (tonnes of CO₂e)*
Annually



Grid electricity usage (TWh)
Annually

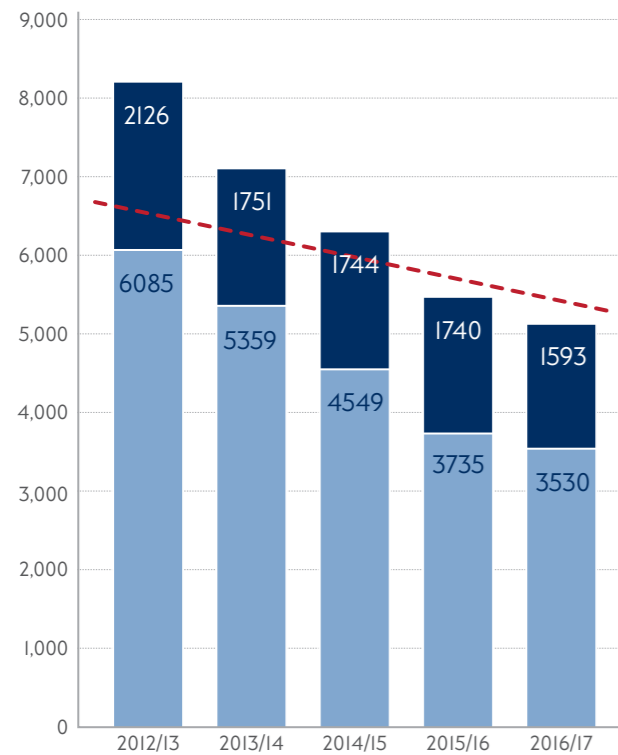


Total carbon emissions grams (g) of CO₂e per passenger km



■ Total TfL CO₂ emissions per passenger km ■ TfL 2018 CO₂ emissions target per passenger km

NO_x emissions (tonnes)

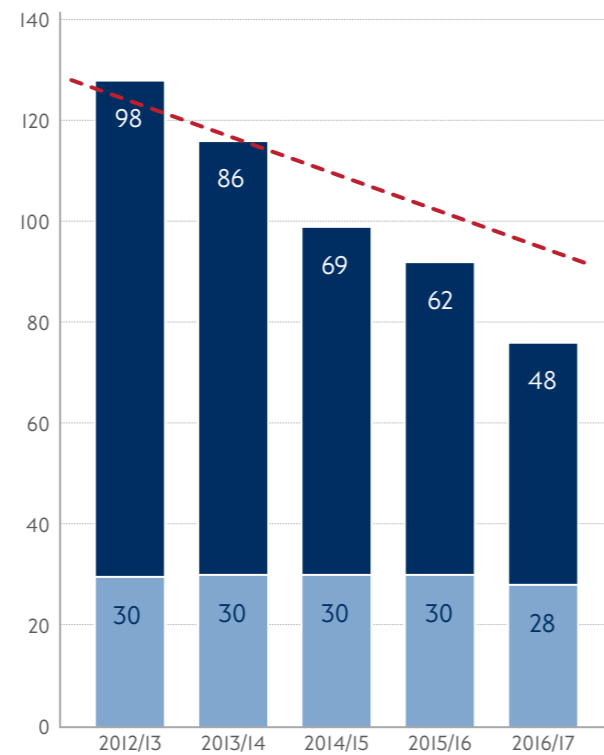


- Public transport services – total amount of NO_x emissions
- Taxi and Private Hire vehicles – total amount of NO_x emissions
- - - Target

Air quality

PM₁₀ is particulate matter up to 10 micrometres in size. We aim to halve PM₁₀ emissions from our operations by 2017/18, against 2005/06 levels. This applies to our public transport services and the taxi and private hire vehicle fleet. Emissions fell from 92 tonnes last year to 75 tonnes.

Particulate matter (PM₁₀) emissions (tonnes)



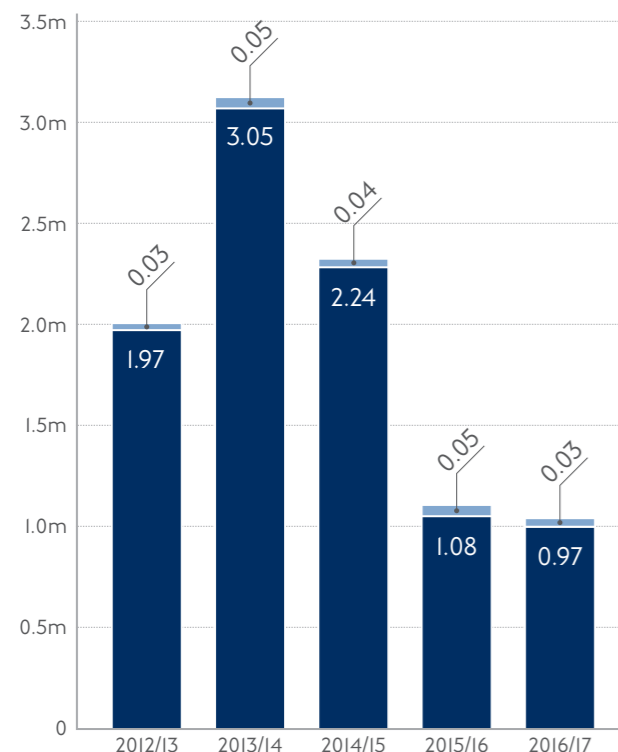
- Public transport services – total amount of PM₁₀ emissions
- Taxi and Private Hire vehicles – total amount of PM₁₀ emissions
- - - Target

Nitric oxide (NO) and nitrogen dioxide (NO₂) are together referred to as oxides of nitrogen (NO_x). We aim to reduce NO_x emissions by 40 per cent from our operations by 2017/18 against 2005/06 levels. Total NO_x emissions fell 6.6 per cent from last year to 5,123 tonnes, keeping us on track to meet our target. NO_x emissions from buses fell 19 per cent from last year owing to cleaner buses and newer vehicles in the private hire fleet.



Buses and taxis on Oxford Street

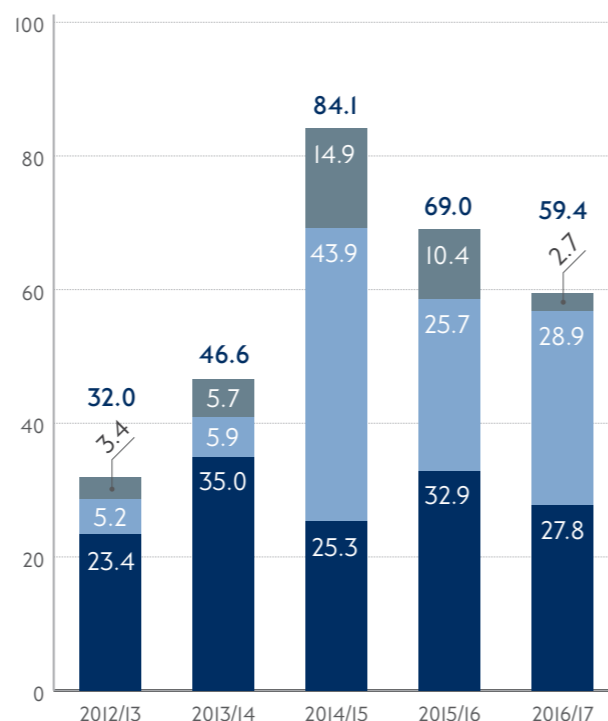
Construction, demolition and excavation (CDE) waste produced (tonnes)



- Amount of CDE waste reused
- Amount of CDE waste sent to landfill

The improvements in emissions are a result of our programmes to use cleaner, hybrid, electric and hydrogen buses and the higher standard Euro engines in taxi and private hire fleets. Our bus fleet now has 1,900 of the latest ultra-low emission Euro VI engine vehicles, most of which are hybrids, which cut harmful emissions and air pollution. By 2037 all buses will be zero emission. The all electric bus routes introduced in the year were the 312, 507, 521 and 360. There were eight zero-emission hydrogen fuel-cell buses

Commercial and industrial (CI) waste produced (tonnes)



- Amount of CI waste recycled
- Amount of CI waste sent to landfill
- Amount of CI waste recovered via energy from waste

on route RVI between Covent Garden and Tower Gateway. The Capital's Low Emission Bus Zone programme was launched in Putney High Street in March – the first of 12 in London. It now has 145 of the cleanest conventional diesel buses on seven bus routes operating in this corridor.

Neighbourhoods of the Future

The Mayor and TfL announced £1.4m of funding for six innovative 'Neighbourhoods of the Future', which will trial electric vehicle charging

technology, new policies, and initiatives that support the growth of clean vehicles and charging infrastructure in London.

Waste management

We produced 0.97 million tonnes of construction, demolition and excavation (CDE) waste this year compared with 1.08 million tonnes in 2015/16. The amount of this waste fluctuates in line with our investment programme works, but we aim to keep the proportion of reused and recycled waste high and constant. In 2016/17, we collected 59.4 tonnes of waste from our stations, maintenance depots and buildings of which 46 per cent was recycled.

Escalator handrail initiative

In 2015 we landfilled 32,000 metres of replaced rubber escalator handrail. Since then, we have trialled and rolled out new polyurethane handrails at 20 sites around the network during 2016/17. As well as being 100 per cent recycled after use, they also bring health, safety and environmental benefits. They have an antibacterial protection system, can be adapted to hold advertising material, are quick and easy to install, have a longer life span than traditional escalator handrails, and are vandal resistant. This initiative won us a 2016/17 Green Apple award for environmental innovation.

Green estate

We work with the London Tree Officers Association, Forestry Commission and Landscape Institute to maintain our 'green estate' on the TLRN. This includes trees, woodland, grass, shrubs, hedges and green walls.

Green infrastructure and drainage

We include sustainable drainage on all new projects. For example, we have installed green roofs on new signalling equipment rooms as part of the Four Lines Modernisation Programme and vegetation on road junction schemes.

In November 2016, we published our updated 'SuDS in London: A Guide'. It shows how to incorporate Sustainable Drainage Systems (SuDS) into streets and public areas. This helps manage surface water run-off and reduce flood risk.

The guide highlights potential opportunities and constraints to encourage authorities and boroughs to consider integrating SuDS.

Bee Friendly

We are promoting the benefits of making our assets greener. An example can be seen at a new community garden at Snaresbrook station on the Central line where there is a bee hotel, herb garden and plenty of plants and flowers to attract a variety of pollinating insects. Employees and members of the Snaresbrook community garden group work together to tend the garden. The project is hoped to be the beginning of a wider initiative to create a bee-friendly corridor across London. The team working with the Bee Friendly Trust and the local community have created a dual-purpose garden – it has improved the station while also providing a valuable habitat for bees, butterflies and other insects.

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