



# Investment programme report

Quarter 3 2022/23  
(18 September to 10 December 2022)

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# Introduction

Our investment programme comprises projects to maintain reliability of the network and support growth in the capital



# Purpose and scope

## Purpose

Transport for London (TfL) is part of the Greater London Authority (GLA) family led by Mayor Sadiq Khan. We are the integrated transport authority responsible for delivering the Mayor's aims for transport.

We run most of London's public transport services, including London Underground, London Buses, the DLR, London Overground, TfL Rail, London Trams, London River Services, London Dial-a-Ride, Victoria Coach Station, Santander Cycles and the IFS Cloud Cable Car. The quality and accessibility of these services is fundamental to Londoners' quality of life. By improving and expanding transport, we can make people's lives easier and increase the appeal of sustainable travel.

We are moving ahead with many of London's most significant infrastructure projects, using transport to unlock growth. 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 supply chain creates tens of thousands of jobs and apprenticeships across the country.

## Scope

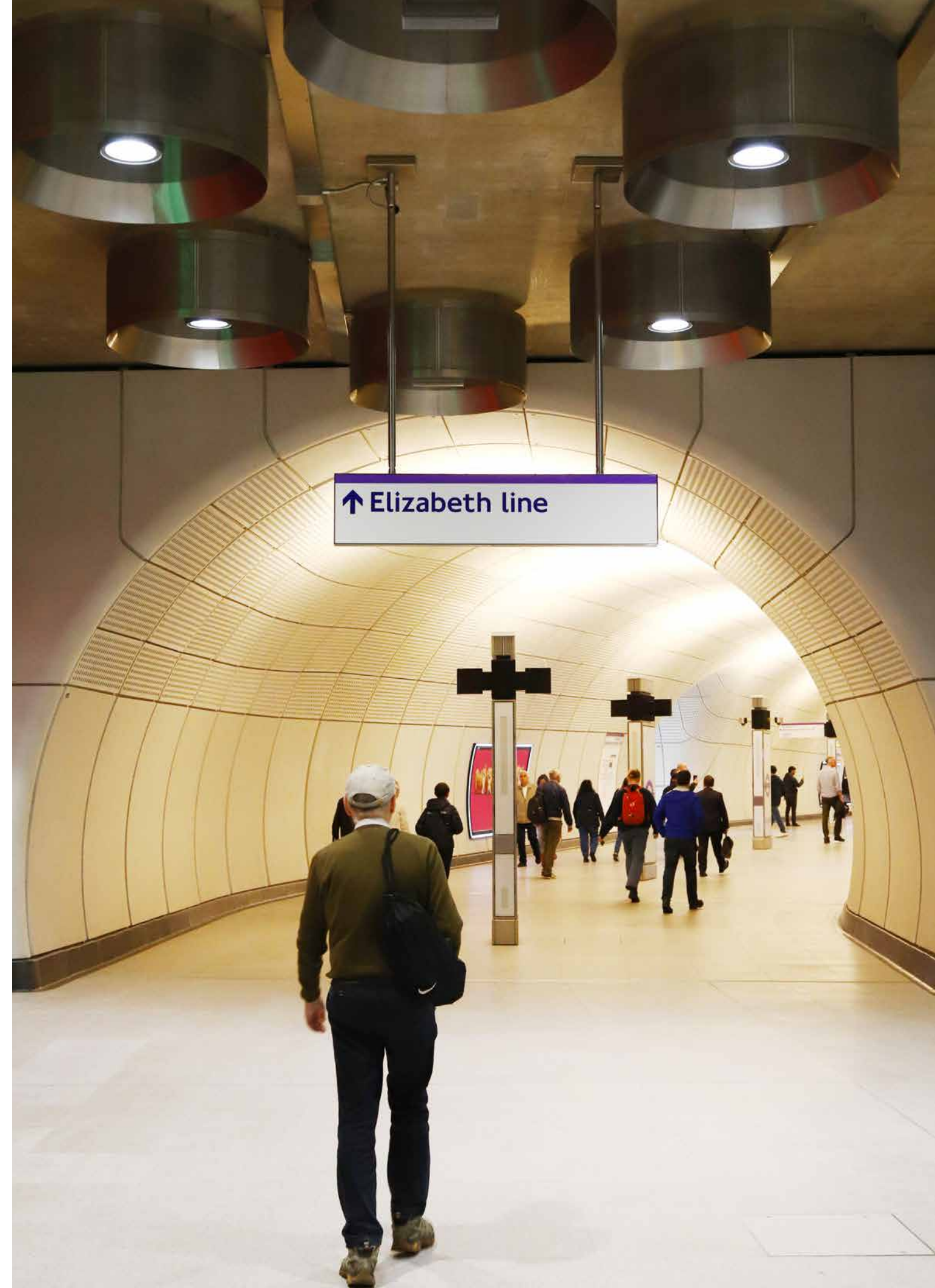
The report gives a progress update on the programmes and major projects that seek authority each year to the Programmes and Investment Committee. It includes programmes comprising renewals and enhancements to maintain reliability and support growth. Renewing and replacing our assets is our required baseline to maintain our current performance in terms of safety, reliability, capacity and asset

condition. Additional enhancements can unlock new capacity and enable us to use our existing network more intensively. This report covers Quarter 3, which runs from 18 September to 10 December 2022. For each key project or programme, the financial and milestone data represent the position at the end of Quarter 3 and includes commentary on key achievements, progress and challenges. It also updates on notable progress since the last report.

The data displayed differs depending on whether the programme or portfolio has a finite scope to deliver:

- For projects with a finite scope, financial records of spend to date, authority and estimated final cost (EFC) are provided which represent the entire duration of the programme or portfolio, except where stated. For these projects, a completion date is also provided, indicating the year and which quarter the specified event will occur
- For ongoing portfolios that aggregate a number of projects, financial records of spend to date and forecast cost are provided for a discrete period of time

Numbers in brackets represent a deficit in the figure or a decrease since the last report, and numbers without brackets represent a surplus in the figure or an increase since the last report. Where financial information is commercially sensitive, it has been redacted. The performance over time graphs illustrates financial performance over the last four quarters. The commentary below the graph explains any specific trends or changes to trends over a snapshot in time.



By expanding our infrastructure we can unlock growth





Our projects help to improve the customer experience

# Investment programme delivery structure

Our investment programme is delivered by the following areas of the business: Major projects, London Underground, Surface transport and Professional services. This is reflected in the structure of this report.

## Major projects

This area is responsible for our largest and most complex projects. It comprises line upgrades, such as the Piccadilly line upgrade and the Four Lines Modernisation programme, as well as network extensions, major station upgrades, the Elizabeth line and Crossrail.

## London Underground

This area covers enhancements, infrastructure renewals, train systems renewals and technology.

## Surface transport

This area comprises healthy streets, air quality, public transport and asset investment.

## Professional services

Our professional services area comprises technology and data, media and our growth fund.

During Quarter 2, on 1 September 2022, we created a new director structure. The changes will see the majority of capital works fall under Capital, the area overseen by the Chief Capital Officer. However, more detailed assessments to determine which teams sit within each director area are still ongoing, so for consistency with Quarter 1 and Quarter 2, there has been no change to how this report is structured.



# Our performance

We measure the safety and milestones progress of our investment programme schemes





# Safety performance

Coronavirus remained the top cause of short-term staff absence but significantly decreased as a proportion of total staff absence, from 44 per cent in Quarter 2 to 27 per cent in Quarter 3. Mental health and musculoskeletal-related health remained the top two causes of long-term absence, which is in line with the national average. Our Occupational Health team continues to run events aimed at giving staff the tools to better look after their mental health.

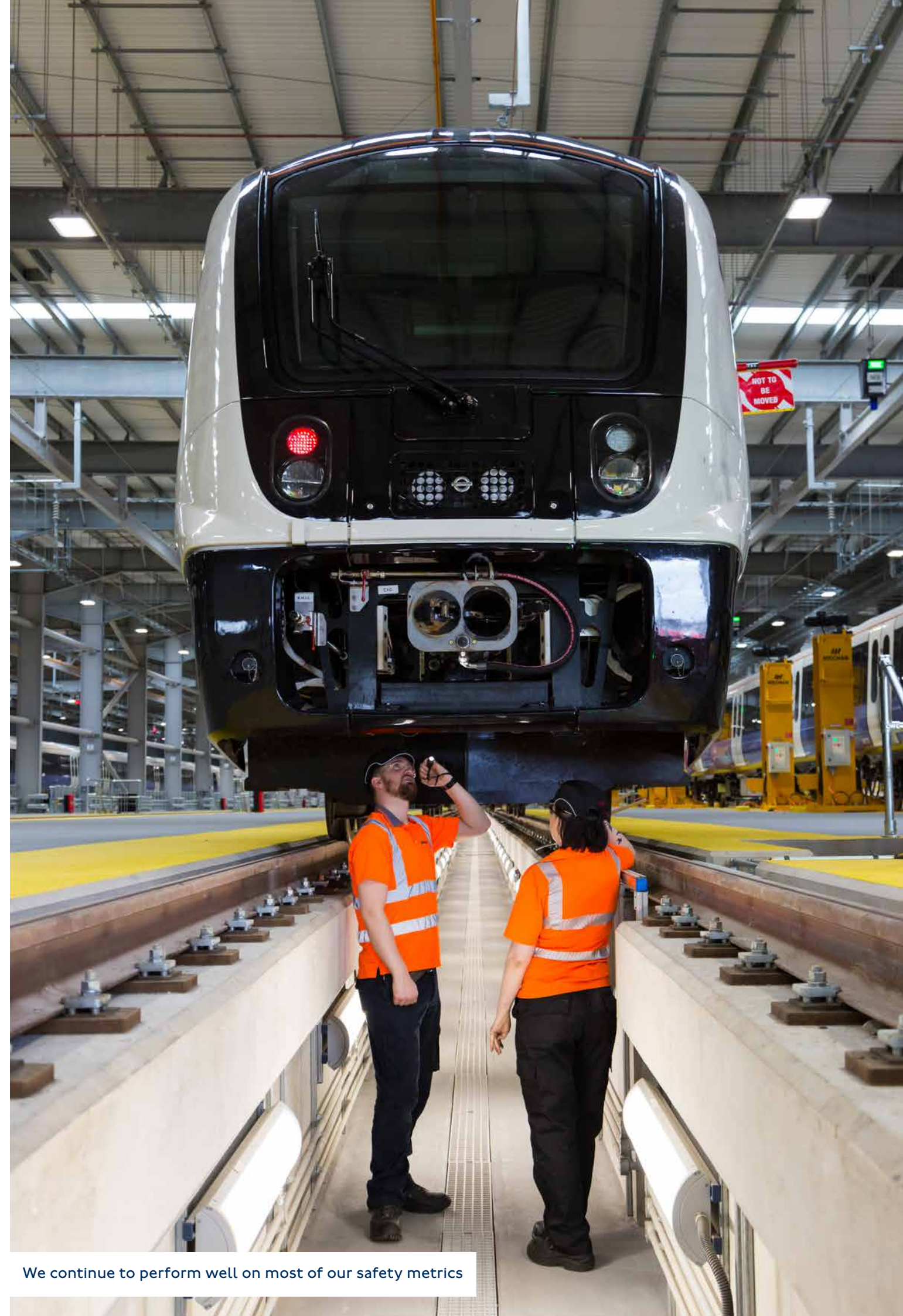
## Capital delivery

Capital works cover a broad range of activities across the Major projects, Project and Programme Delivery, London Underground Capital Delivery and TfL Engineering. Some are essential asset renewals and maintenance to keep our

frontline service operating efficiently. Other activities represent new and significant investments to improve existing infrastructure. Within the Capital area, teams comprise employees from both TfL and supplier organisations. Likewise, work sites may be managed by us or by suppliers acting as our principal contractor. We do not distinguish between hours worked by our staff or by supplier's staff or by incidents within this section of the report.

## Quarterly performance

To enable accurate analysis of data, some of our key measurables are quoted as a frequency rate per 100,000 hours worked. Frequency rates are calculated using a moving annual average based on performance over the previous 13 periods.

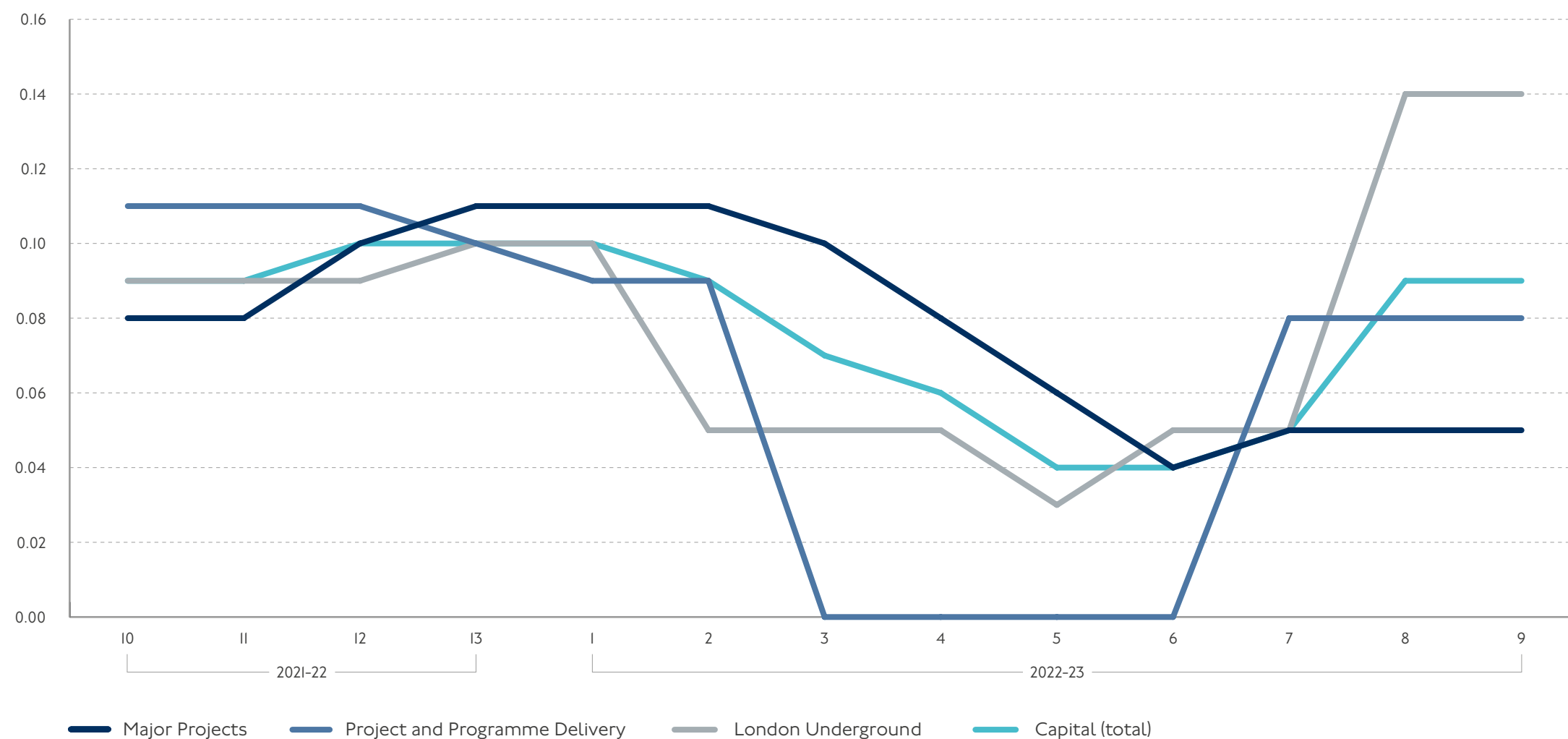


We continue to perform well on most of our safety metrics

In Quarter 3, there was a total of four incidents reported under the Reporting of Injuries, Diseases and Dangerous Occurrences Regulations (RIDDOR) within the Capital area, with the overall rate ending the quarter at 0.08; an increase on Quarter 2.

One of the injuries occurred within our Major Projects and Project and Programme delivery areas with the combined rate ending the quarter at 0.05. While this demonstrates an increase on Quarter 2, overall performance remains below the 2022/23 annual target of 0.10. The three further RIDDOR events this quarter occurred in London Underground, where all the incidents resulted in the person being off work for more than seven days.

**RIDDOR accident frequency rate**  
(per 100,000 hours worked)

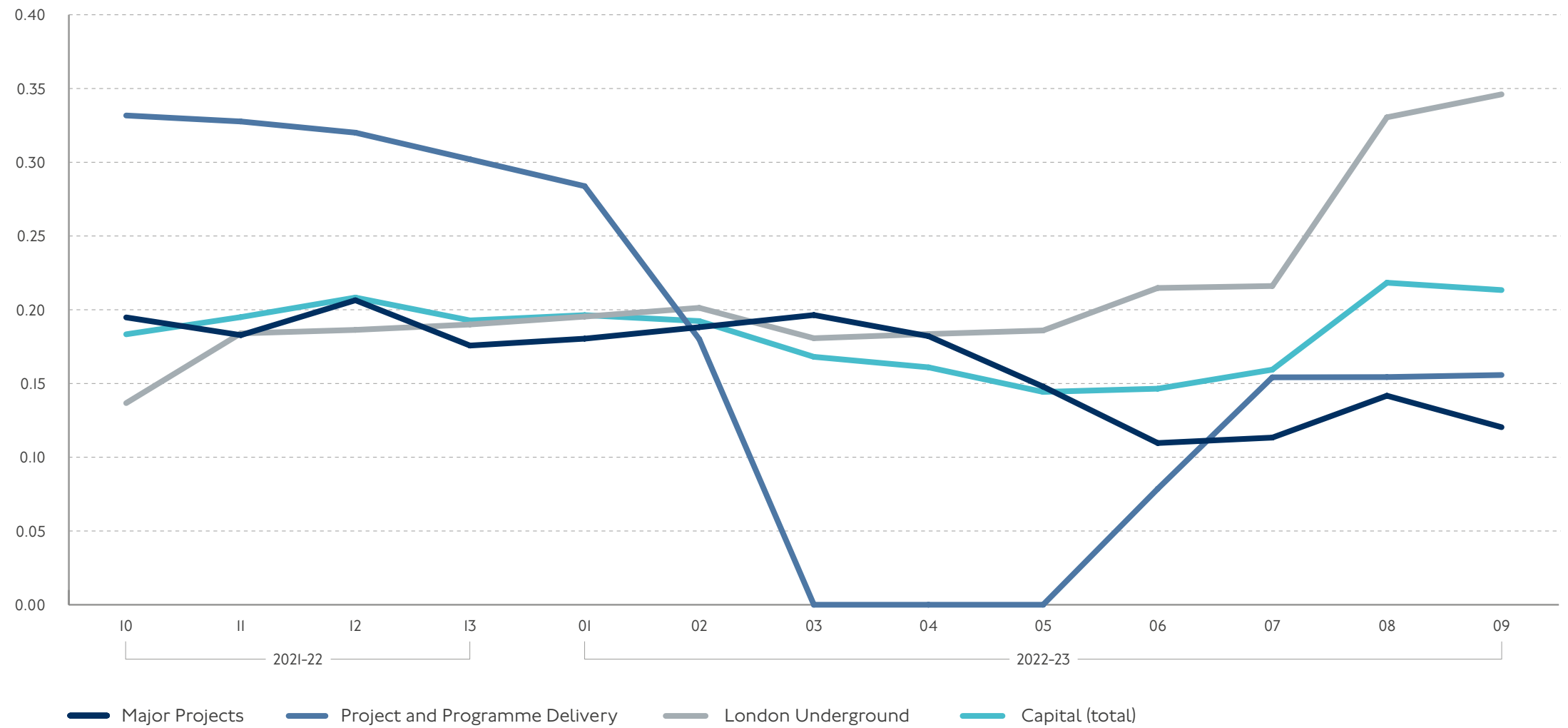




Lost time injuries (LTIs) are injuries which cause an employee to be absent for one or more shifts. There were six LTIs reported in our Capital teams during Quarter 3, an increase of one when compared with Quarter 2. The lost time frequency rate for the Capital area ended the quarter at 0.21, an increase of 0.06.

Two of these LTIs occurred in our Major Projects and the Project and Programme Delivery areas, resulting in a combined LTI rate of 0.12, below the target of 0.25. The four additional LTIs occurred within our London Underground teams.

**Lost time injury frequency rate (LTIFR)**  
(per 100,000 hours worked)



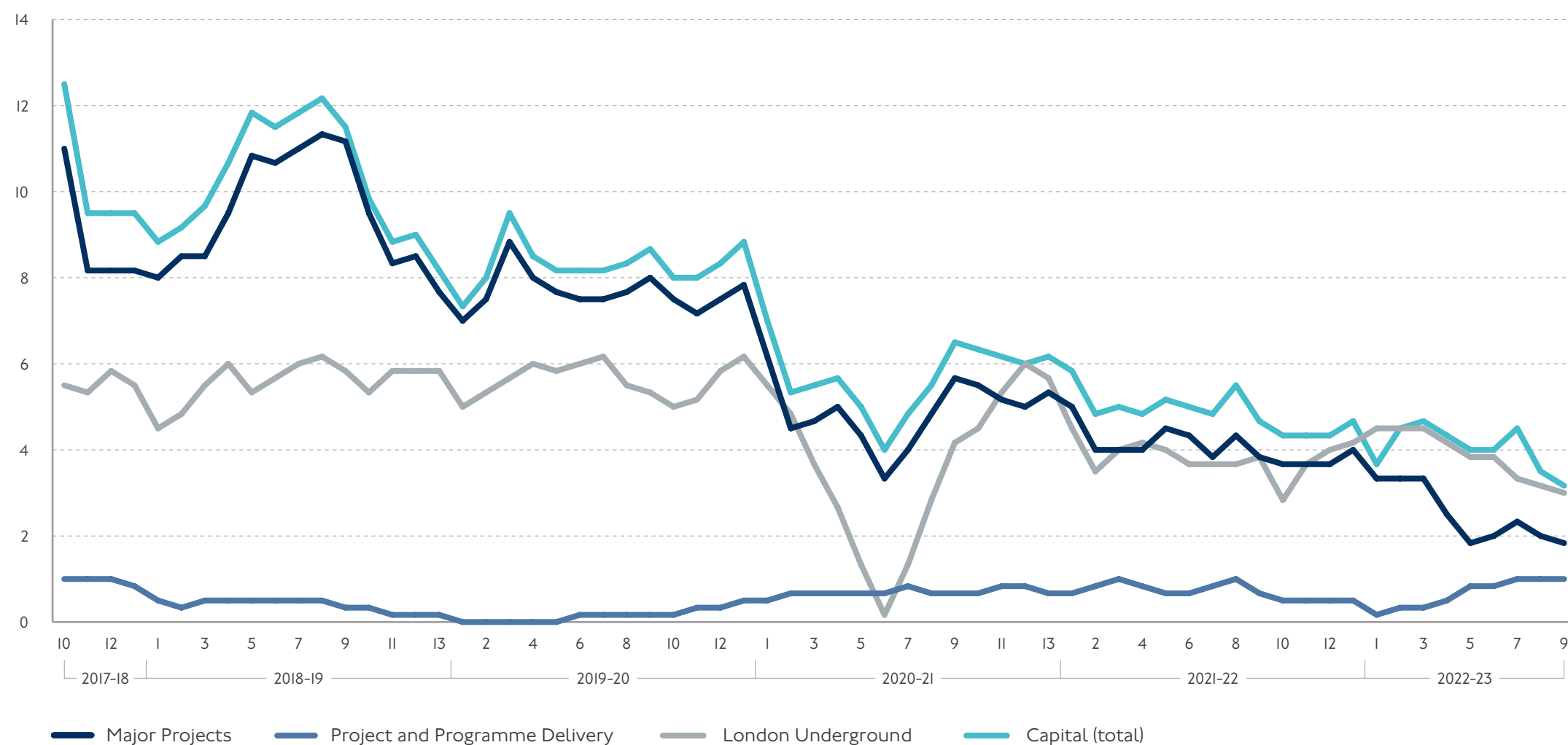


There were fourteen injuries reported in the Capital area during Quarter 3, which is a decrease of ten on the previous quarter. All were classified as minor injuries, which, given the range of activities and working environments our teams operate in, demonstrates a satisfactory degree of risk management. Cuts and abrasions were the top immediate cause of injury, and non-compliance with safe system of work practices was the most common cause.

In our Major Projects and Project and Programme delivery areas, the eight injuries that occurred fall well within our 'stretch target' of five injuries or fewer per four-week period, and the rate remains in line with our drive for improvement from last year.

In the London Underground teams there were five minor injuries reported for the quarter, a decrease of seven based on the last quarter. Within Engineering there was one minor injury reported in the quarter, a decrease of one in comparison with Quarter 2.

**Total Capital workforce injuries**  
(six-period average since 2017/18)







We completed the Hostile Vehicle Mitigation programme

# Schedule performance

We have achieved a number of scheduled milestones throughout the year

## **DLR rolling stock**

In April, dynamic testing (20,000km) started on the new DLR rolling stock.

## **Bank station upgrade**

In May, following a 17-week closure, Bank station reopened with a new Northern line passenger concourse.

## **Piccadilly line upgrade**

In June, the first car body was built and painted in the TfL livery.

## **London Underground**

In June, seven new escalators were installed and brought into customer use.

In August, we completed the heavy overhaul of the first 15 Metropolitan line trains.

## **Barking Riverside**

In July, operational service begun between Barking Riverside and Gospel Oak.

## **Old Street**

In July, the new station entrance at Old Street opened.

## **Westminster Bridge**

In July, we completed construction of the Hostile Vehicle Mitigation programme at Westminster Bridge.

## **A40**

In July, we successfully completed the major joint replacement on the A40 Westway.

## **Borough station**

In August, we completed the lift renewal and ticket hall enhancement at Borough station.

## **Silvertown Tunnel**

In August, we began using the tunnel boring machine to bore in the southbound tunnel.

## **Brompton Road**

In September, a new Brompton Road entrance opened at Knightsbridge station.

## **Major Asset Renewals Programme – Brent Cross**

In October, we received the consultant's submission of the Options Assessment report for Brent Cross.

## **Cycle hire**

In October, we launched e-bikes for hire as part of the cycle hire modernisation project.

## **Road User Charging scheme**

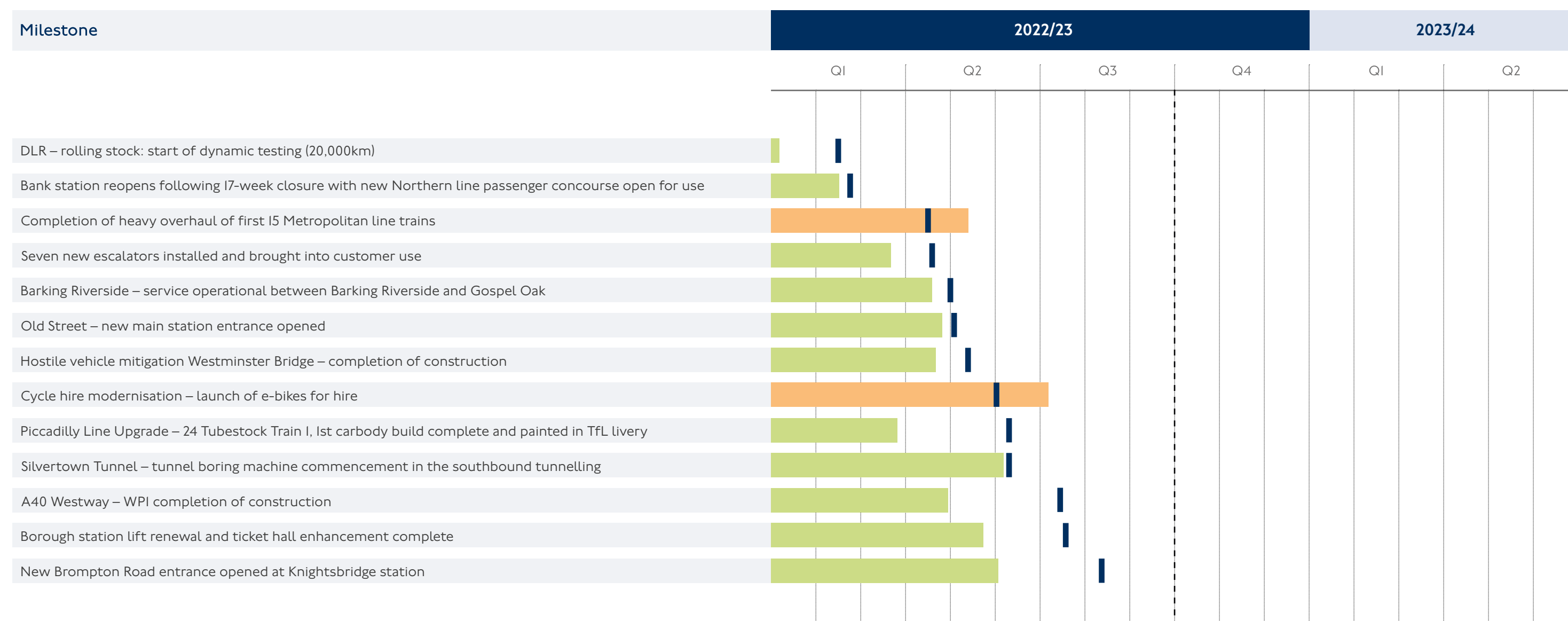
In November, we completed the statutory public consultation on the Road User Charging scheme.



# Strategic milestones

We have delivered 15 out of 21 strategic milestones either on time or early this year

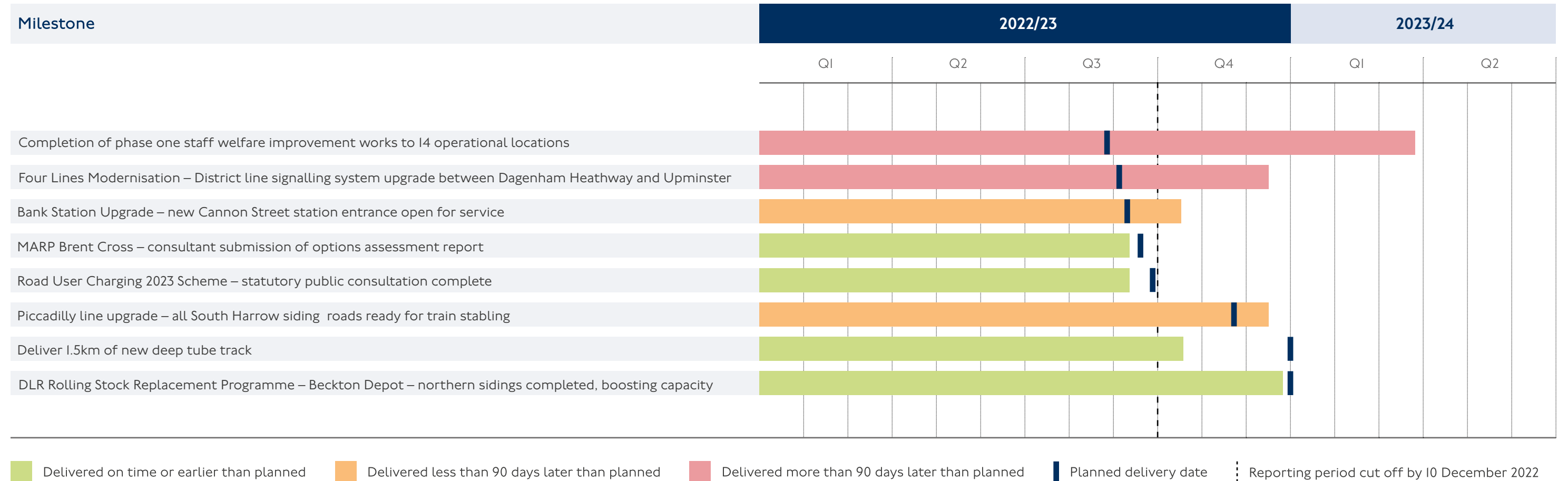
These are our strategic milestones for 2022/23. The hollow box shows when the milestone was due to be met, while the coloured block shows when it was achieved or is forecast to be achieved.



■ Delivered on time or earlier than planned
 ■ Delivered less than 90 days later than planned
 ■ Delivered more than 90 days later than planned
 ■ Planned delivery date
 ⋮ Reporting period cut off by 10 December 2022



## Strategic milestones 2022/23 (continued)





# Milestones forecast to be late

## Four Lines Modernisation

### Signalling system upgrade on the District line passenger services

Since commissioning signal migration area five from Barons Court and Fulham Broadway to Sloane Square on the District and Circle lines in March 2022, the underlying performance of the signalling system has been good. A revenue software uplift was rolled out in November 2022 to address a safety issue identified after signal migration area five entered revenue service. This means temporary mitigation measures can be removed.

Signal migration areas six and seven at the eastern end of the District line are planned to be brought into revenue service in January 2023 and March 2023 respectively.

## Bank station upgrade

### New Cannon Street station entrance open for service

The final phase of testing and commissioning critical systems required to open the new Cannon Street entrance has been delayed owing to ongoing manufacturing and installation issues with the cladding panels. The new entrance is expected to open in early 2023.

## London Underground – Infrastructure renewals – Built environment and civils

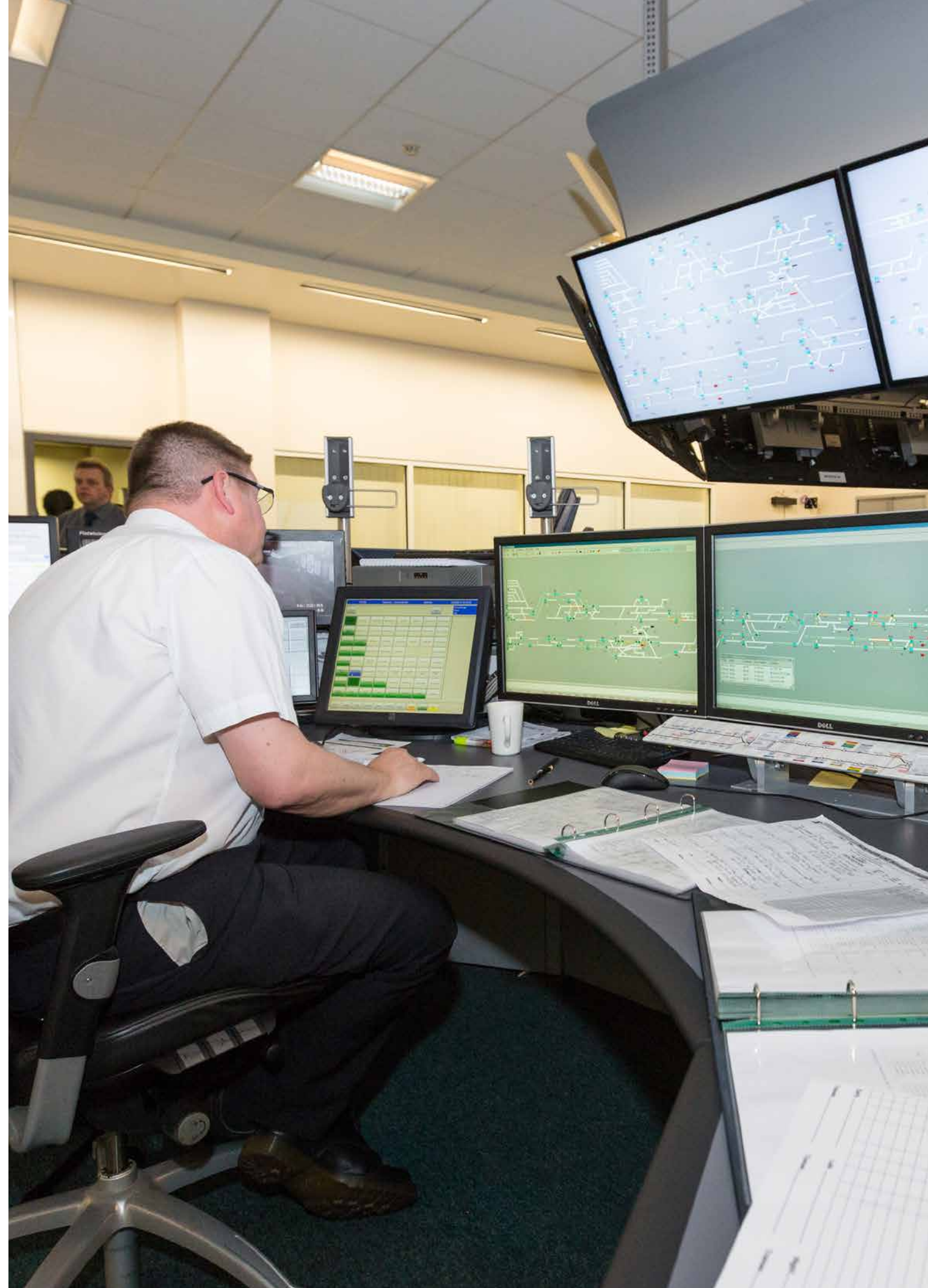
### Completion of phase one staff welfare improvement works

The staff welfare improvement project is under way across a number of locations but has uncovered additional necessary compliance works across most of these locations. This has resulted in additional works and delays. This means the forecast completion date is now late and unrecoverable against the milestone date. Additional costs incurred in this project will need to be offset with other work across the programme.

## London Underground – Train systems – Passenger fleet

### Completion of heavy overhaul of the first 15 Metropolitan line trains

The project delivery timescales were delayed due to the slower than expected ramp up of bogie production. This was in turn due to delays in material deliveries from suppliers and development and approval of work instructions. The production rate was subsequently improved, however, strikes held by the RMT and Aslef unions on 27 and 30 July 2022 further impacted production by two working days during this period, with the final train being completed on 12 August, 28 days later than the target date.



We continue to upgrade our signalling systems



## Major projects

This portfolio contains our largest and most complex projects. It comprises line upgrades such as the Piccadilly line upgrade, the Four Lines Modernisation programme, network extensions, major station upgrades, the Elizabeth line and Crossrail





# Elizabeth line

## Rolling stock

Forecast completion	Gross cost to date (£m)	Gross cost to go (£m)	Gross EFC (£m)	Programme and project authority (£m)	Variance: EFC versus authority (£m)
Q4 2024/25	996	10	1,006	1,149	143
Change since last Investment programme report					
No change	No change	No change	No change	No change	

### Financial commentary

No movement to report.

### Performance over time commentary

The forecast end date represents the delivery of the rolling stock and depot, including all additional changes. Since the authority award in 2013/14, our forecast end date has been delayed by approximately four years owing to delays to the overall Crossrail programme. Our authority increased in 2018/19, when five units were added. Since the authority was awarded in 2013/14, the EFC dropped from £1,090m to £1,006m because the trains have since been part of a sale and leaseback arrangement. They are now being leased from 345 Rail Leasing Limited on a 20-year agreement and the costs charged as operational costs.

### Programme update

#### Class 345 trains

All remaining seven-car Class 345 trains have been converted to nine-cars. An all nine-car Class 345 passenger service is running between Elizabeth line stations from Reading and Heathrow to Abbey Wood, and from Shenfield to Paddington, with a peak service of 22 trains per hour in the central section.

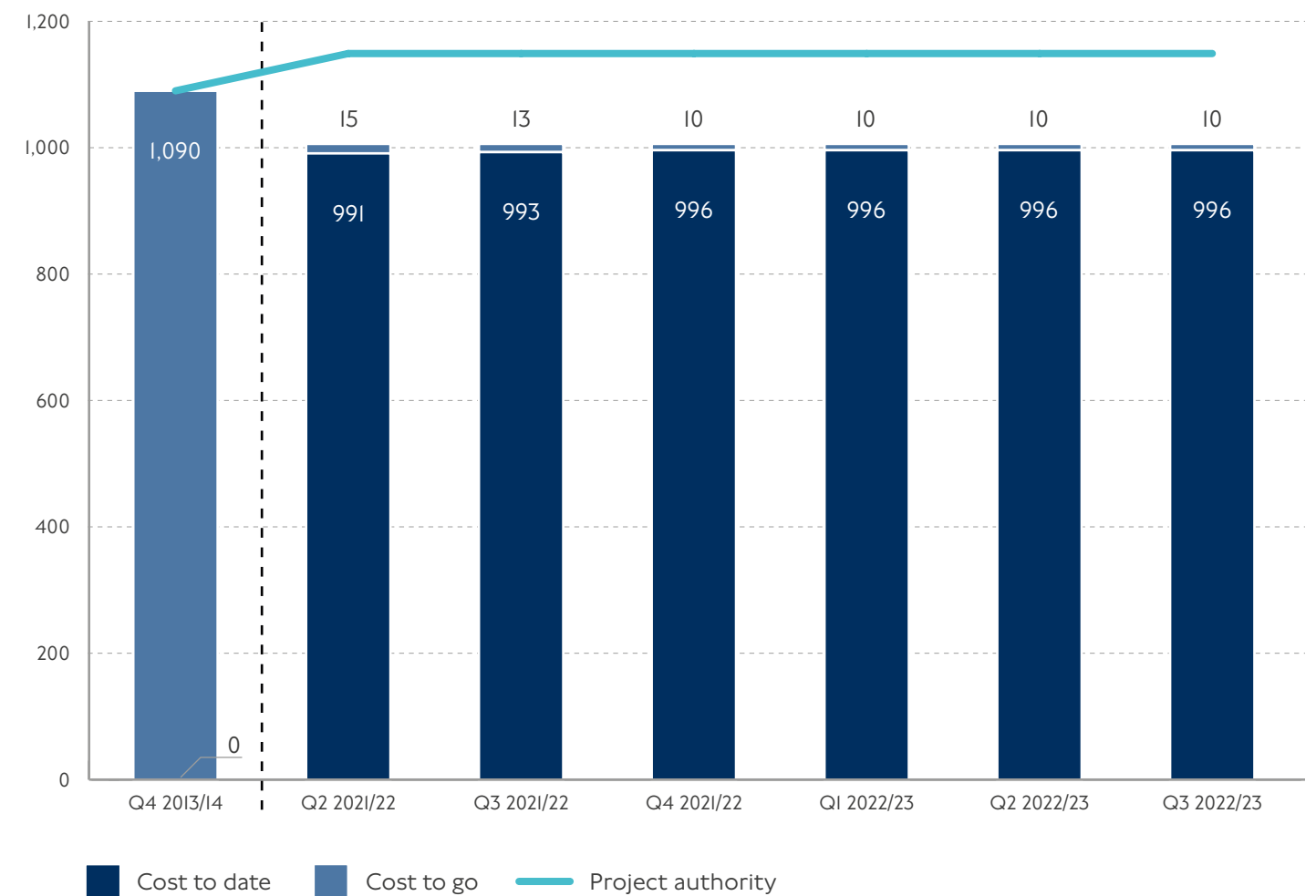
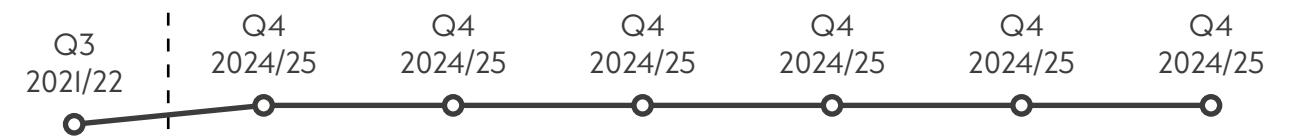
The manufacturers continue to apply incremental updates to the train and signalling system software, and we have provided for this in the rolling stock project forecast through to 2025.

### Challenges

Fleet reliability has improved significantly through Quarter 1 and Quarter 2 but Alstom, the manufacturer, is carrying out further reliability-focused modifications to secure further improvement in Quarter 4.

### Estimated final cost performance over time (£m)

#### Forecast completion date





# Crossrail

Forecast completion	Gross cost to date (£m)	Gross cost to go (£m)	Gross EFC (£m)	Programme and project authority (£m)	Variance: EFC versus authority (£m)
Q1 2023/24	15,781	150	15,931	15,888*	(43)
Change since last Investment programme report					
No change	44	(50)	(6)	99	

## Financial commentary

In Quarter 3, the EFC reduced to £15,931m, £6m lower than the Quarter 2 forecast. This reflects the reduced risk profile after November 2022 when the west and east sections of the railway were integrated with the central section. The £150m cost to go represents all required works to achieve end-to-end integration in May 2023, including signalling, communications and controls software updates in the first half 2023, aligned with the current transition and close out strategy for the programme.

Crossrail continues to be focused on managing the risks associated with implementing the additional functionality required to complete the final integration of the railway, alongside achieving the required level of operational resilience.

## Performance over time commentary

The reported forecast end date represents operation of the full peak timetable. At this point the peak time frequency will increase from 22 to 24 trains per hour

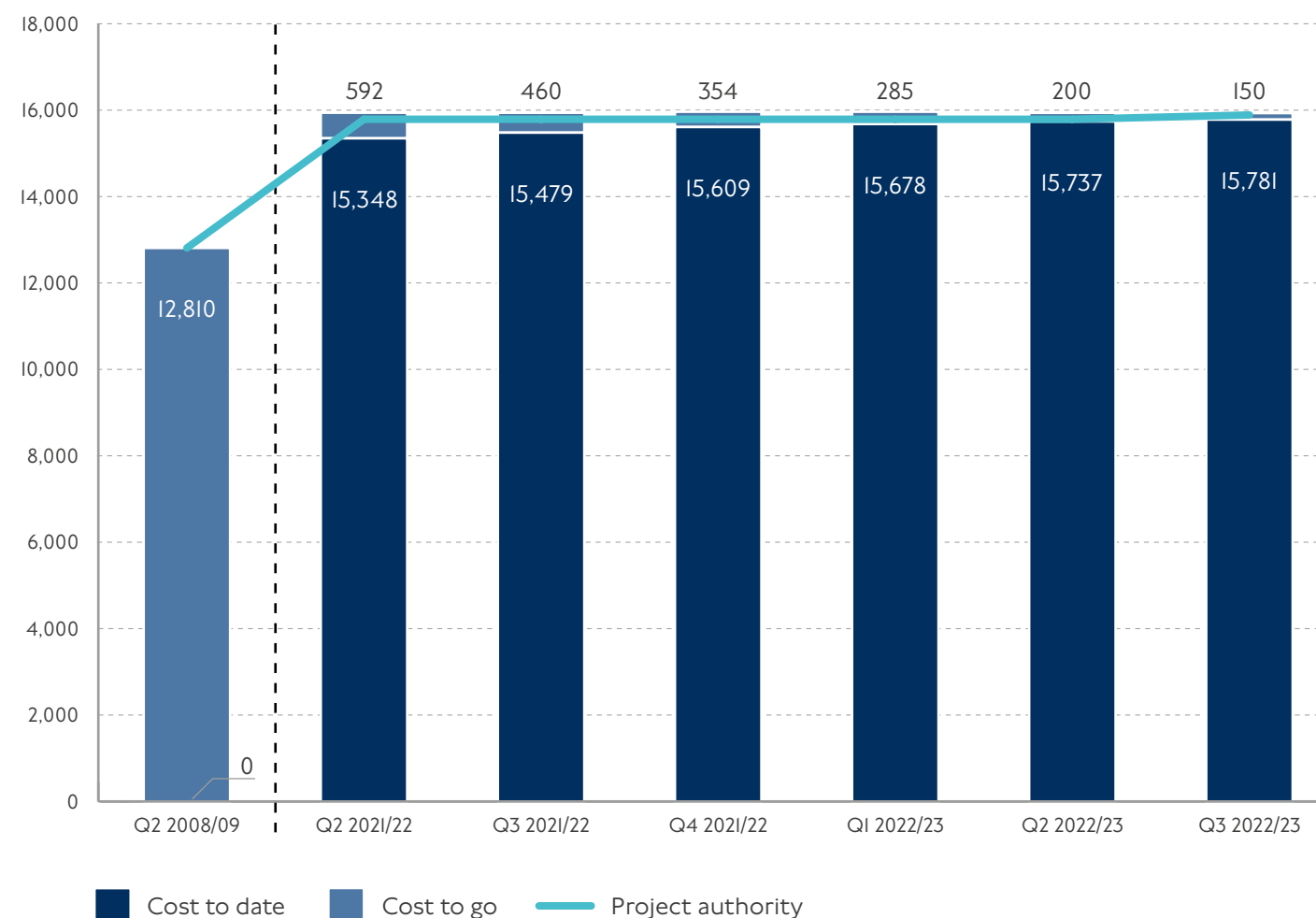
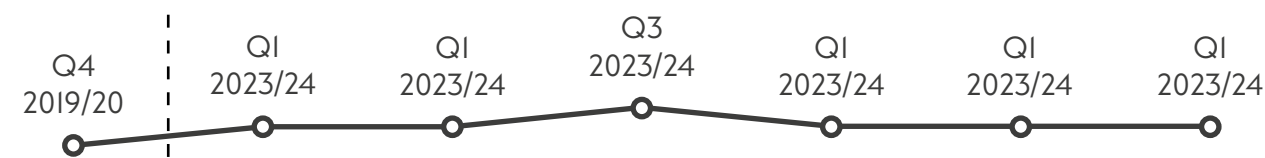
between Paddington and Whitechapel, with 16 trains per hour off-peak. Direct services from Shenfield to Heathrow Airport will also begin. The original forecast end date was autumn 2019. However, the schedule at that time assumed that installation of critical systems, construction of stations, and testing and commissioning could all be completed in parallel towards the latter stages of the programme. This was ultimately not achievable and led to a delay in completion. In addition, the pandemic had an impact on productivity in 2020, although this has been mitigated from a schedule and cost perspective.

Since setting Delivery Control Schedule 1.2 in August 2021, costs have remained largely stable due to active management of the EFC. We have realised several opportunities and risk retirements over this period through focused cost reduction initiatives, delivering as close as possible to the forecast schedule and a revised risk profile. The EFC has therefore been reduced by £31m to £15,931m since the Quarter 1 update.

\* Excludes on-network works carried out by Network Rail

## Estimated final cost performance over time (£m)

### Forecast completion date





### Programme update

The Crossrail project is now in the final phase, with the final stage on track to be delivered by the end of May 2023.

At this point, the line will move to a service frequency of 24 trains per hour in the central section, up from the current 22 trains per hour. This increase will be facilitated by delivery of the auto reverse functionality. This uplift will take place in line with the National Rail timetable change scheduled for 21 May 2023.

A full closure of the Elizabeth line's central section took place during the Christmas period, and this meant that a number of works were successfully completed.



Elizabeth line trains will increase in frequency in May 2023



## Line upgrades

# Four Lines Modernisation

Forecast completion	Gross cost to date (£m)	Gross cost to go (£m)	Gross EFC (£m)	Programme and project authority (£m)	Variance: EFC versus authority (£m)
Q4 2024/25	5,225	248	5,473	5,520	47
Change since last Investment programme report					
No change	25	(25)	No change	No change	

### Financial commentary

The EFC has remained in line with Quarter 2. Inflationary pressures on the heavy lifting shed and staff accommodation block at Neasden depot and increased risk relating to the signalling design in the Uxbridge interoperable area have been offset by small cost reductions/efficiencies in other areas. In addition, an updated inflation rate for the Thales contract using their pay inflation assumptions and our updated Finance Group guidance has helped offset cost pressures.

Our forecast completion date, for when the final signal migration area I4 between Rayners Lane and Uxbridge will be brought into service, remains Quarter 4 2025.

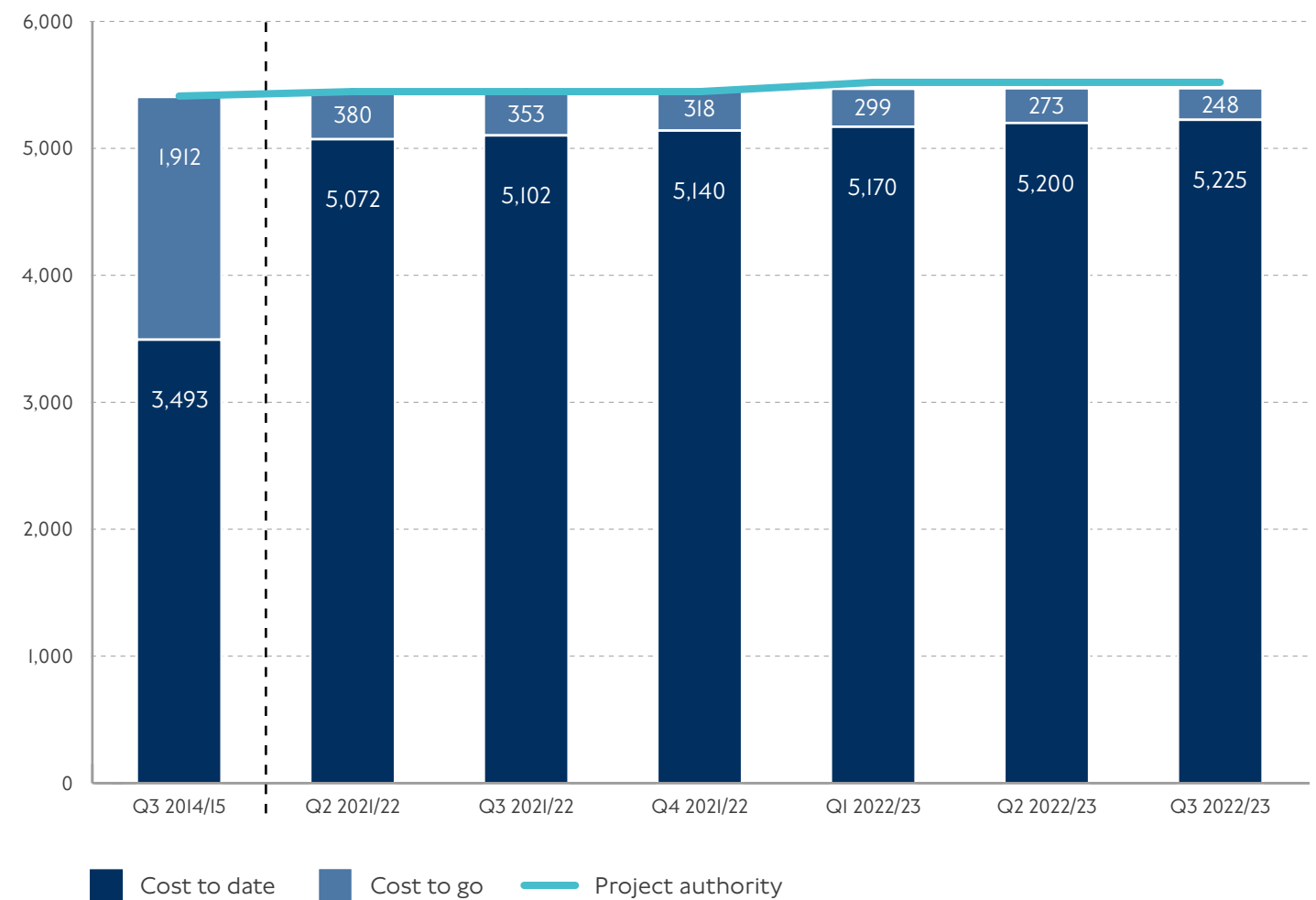
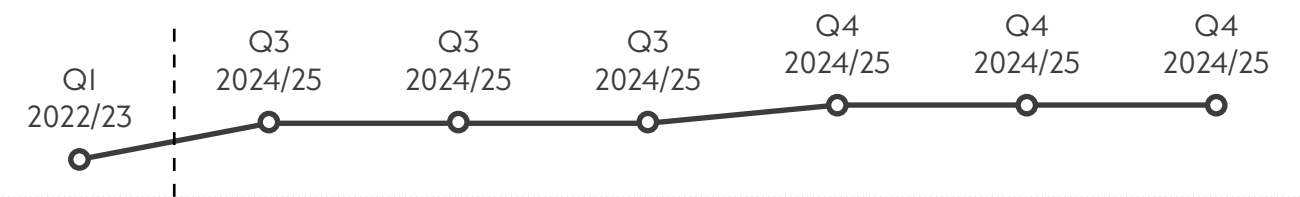
### Performance over time commentary

The forecast completion date shows when the final signal migration area I4, between Rayners Lane and Uxbridge, will be brought into service.

Our forecast completion date for signal migration area I4 has been delayed during 2022, principally owing to challenges with complex software development, testing and commissioning, closure availability and the impact of the coronavirus pandemic.

### Estimated final cost performance over time (£m)

#### Forecast completion date





Our signalling upgrades make journey times quicker for customers

### Programme update

We continue to make good progress on the programme, which is delivered by progressively installing new signalling onto sections of the railway called signal migration areas. The signalling section between Stepney Green and Becontree, called signal migration area six, went live on 15 January. This represented a major achievement for the programme as it completes the roll out of the new signalling on the Hammersmith & City line, further improving reliability for customers.

The area now operating under the new signalling covers 52 stations and four complex junctions, including the entirety of the Circle and Hammersmith & City lines. By way of comparison, the Jubilee line has 27 stations.

We are planning to introduce signal migration area seven from Dagenham Heathway to Upminster in March 2023.

This will extend the roll out of the new signalling system on the District line and connect the first depot to the network. Software development continues for future signalling migration areas covering the Metropolitan line between Finchley Road and Preston Road (signal migration area eight), including the interface with Neasden depot and the Jubilee line.

Design and installation of trackside signalling assets continues on the Uxbridge (signal migration area 14) and Amersham (signal migration areas 13 and nine) branches of the Metropolitan line beyond Preston Road. Installation is targeted for completion in March 2023.

The procurement is in progress for the planned upgrades to the heavy lifting shed at Neasden depot and the new staff accommodation block. When complete in 2024, this facility will enable the planned overhaul of Metropolitan line trains.



## Line upgrades

# DLR rolling stock and systems integration

(includes Housing Infrastructure Fund)

Forecast completion	Gross cost to date (£m)	Gross cost to go (£m)	Gross EFC (£m)	Programme and project authority (£m)	Variance: EFC versus authority (£m)
Q2 2026/27	249	608	857	881	24
<b>Change since last Investment programme report</b>					
No change	30	(15)	15	18	

### Financial commentary

Since the last report, the EFC has increased by £15m to £857m, primarily driven by inflationary pressure on material costs being greater than originally anticipated. However, we continue to review options to mitigate and offset these cost increases.

### Performance over time commentary

The forecast end date has not changed since the last report.

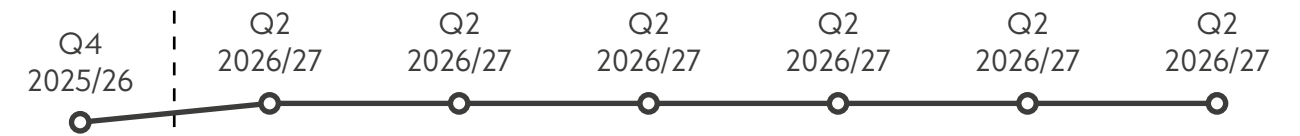
Since the original grant of programme and project authority in 2019, we have received approval from the Government to activate

an option to purchase 11 additional trains which are funded through the Housing Infrastructure Fund. The increase in EFC from Quarter 4 2018/2019 reflects the addition of £261m of grant funding from central government to deliver the Housing Infrastructure Fund scope of works.

We reduced our EFC to reflect procurement savings and by taking a proactive stance for the remaining risk exposure as the rolling stock design approached completion. However, this is offset by countervailing inflationary pressures during 2022.

### Estimated final cost performance over time (£m)

#### Forecast completion date



### **Programme update**

#### **Rolling stock delivery**

The manufacture of the new rolling stock in Spain is continuing to plan with seven trains completed and undergoing testing before delivery of the first train to Beckton.

This arrived in early January 2023, meaning the programme continues to be two months ahead of target performance. We anticipate having completed the manufacture of 12 trains by the end of the 2022/23 financial year.

#### **Beckton depot and network infrastructure**

At Beckton, critical works to complete the changeover of the signalling power supplies on the Northern Sidings works and to install new transformer rectifiers in the substation were successfully completed in line with the revised programme. This is following the cancellation of previous possessions for other operational priorities resulting from Operation London Bridge.

The contract for the maintenance facility building and additional southern sidings have now been awarded. This is the largest procurement of the programme after the rolling stock contract.

In October 2022, we began signalling testing on the DLR network with the existing fleet in preparation for the arrival of the new trains which began in early January 2023.

We have awarded the contract for the design and build for a second entrance at Blackwall station which is essential for unlocking the full fleet roll out.

#### **Housing Infrastructure Funding**

We have received confirmation from the Government to activate an option to purchase 11 additional trains which are funded through the Housing Infrastructure Fund. This will provide additional capacity and unlock further housing benefits in the Royal Docks and Isle of Dogs.



We are ahead of target on our new DLR rolling stock



## Line upgrades

# Piccadilly line upgrade

Forecast completion	Gross cost to date (£m)	Gross cost to go (£m)	Gross EFC (£m)	Programme and project authority (£m)	Variance: EFC versus authority (£m)
Q4 2026/27	582	2,329	2,911	2,994	83
<b>Change since last Investment programme report</b>					
No change	57	(47)	10	No change	

### Financial commentary

Since the last report, our EFC has increased by approximately £10m, and £5m of this relates to the inflationary impact which now supersedes previous assumptions reflecting external market forces. A further £5m increase relates to our South Harrow sidings works which has increased due to increased materials and labour costs required to complete the project. Our forecast completion remains early 2027.

### Performance over time commentary

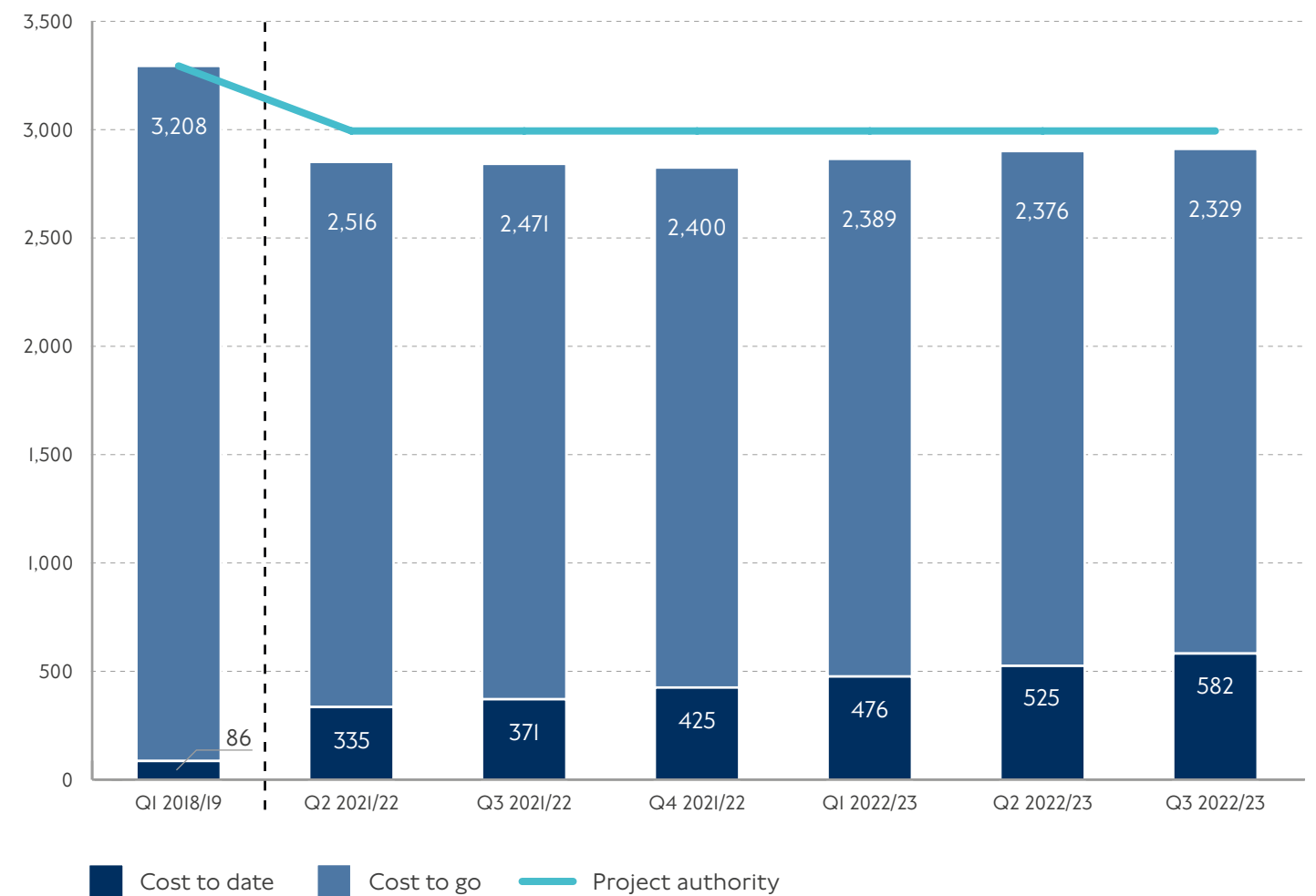
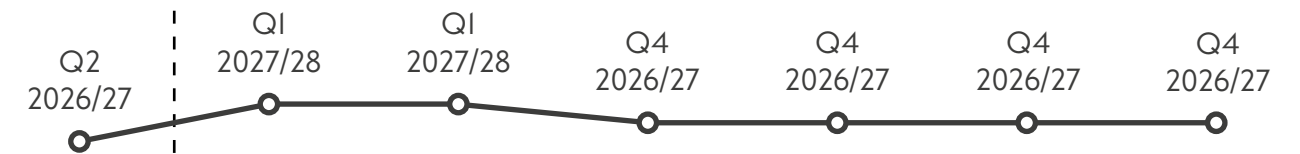
The forecast end date represents the date when the new Piccadilly line trains and all supporting infrastructure will be in operational use. Since authority was originally awarded in May 2018, our forecast end date has been delayed from 2026 to 2027.

This was driven by a decision to defer the start of third party spend by six months, where possible, to help mitigate funding challenges due to the pandemic. As a result of an in-depth review of the critical path activities and driving schedule efficiency, the forecast completion has been brought forward from Quarter I 2027/28 to Quarter 4 2026/27. The new trains are now expected to begin entering service from summer 2025.

Since July 2021, industry price increases have led to updated inflation indices within our business, adding £85m to the overall EFC since the beginning of the financial year. This is being contained within the overall project authority through an ongoing focus on active opportunity management.

### Estimated final cost performance over time (£m)

#### Forecast completion date







A computer-generated image of the new Piccadilly line trains

### Programme update Depots and stabling

Enabling works have begun at Northfields and Cockfosters depots to prepare for the start of major upgrades to provide maintenance facilities for the new trains. Extensive vegetation clearance and ground works have been carried out at Cockfosters to enable construction of a new wheel lathe facility, which forms the first stage of construction at this site.

The depots' concept designs had to be updated as the original wheel lathe design could not be delivered. The programme delays from this, compounded by resource shortages, have caused knock-on impacts to the depots migration plan with this now misaligned to the train introduction need by dates and migration strategy. Full impacts of this, as well as possible mitigations, are being worked through collaboratively between project, Siemens and operations and maintenance colleagues. We expect to have an output with possible options for mitigation in Quarter 4 of 2023.

### New rolling stock

In December, Siemens completed the manufacture of the second in type key motor car shell for the first new Piccadilly line train. This follows the successful assembly of the first intermediate motor cars back in June. This keeps us on target for the first train to be fully formed and ready to start testing from summer 2023.

### Signalling

The legacy signalling team and our internal delivery partners commissioned legacy signalling modifications into service at Holborn station. These are to adjust for trains that are longer and have different sight lines from the driver's cab.

### High voltage power

The direct current power team completed the delivery of the direct current cabling required to connect the new sidings at South Harrow with the substation at Sudbury Hill. In total, the team have now delivered and installed 8.2km of direct current cabling and 1.4km of alternating current cabling. This supports our key milestone to bring all 12 sidings at South Harrow into use to support the upcoming timetable change in May 2023.

### Lighting main upgrade

In September, we awarded Arcadis the contract for the lighting main upgrade concept design work. This will enable Arcadis to produce seven separate concept designs (based on geographical areas of the Piccadilly line which require upgrade).

Once the concept works are complete, the project will progress to tender for design and build works. Completion of the lighting main upgrade is a key deliverable within the infrastructure programme supporting the roll out of the new trains.

### Green agenda

The project team has set key performance indicators across the programme focusing on how they will reduce carbon, the values of which are reported.

Top carbon risks and opportunities are reported in our internal Programme Performance report.

Objectives have been set for all staff to attend carbon literacy training courses to support the delivery of carbon savings within the programme. Work continues on revising the baseline to reflect a developing understanding of the programme.



# Network extensions

## Silvertown Tunnel

Forecast completion	Net cost to date (£m)	Net cost to go (£m)	Net EFC (£m)	Programme and project authority (£m)	Variance: EFC versus authority (£m)
Q1 2025/26	79	107	186	173	(13)
Change since last Investment programme report					
No change	6	(5)	1	No change	

### Financial commentary

The EFC is currently £13m over the approved programme and project authority of £173m, owing to inflation increases and the agreed Safe Stop undertaken because of the coronavirus pandemic. The main change in EFC since the last report is owing to further inflationary pressure. We continue to seek opportunities to reduce cost and risk exposure, including non-essential scope.

### Performance over time commentary

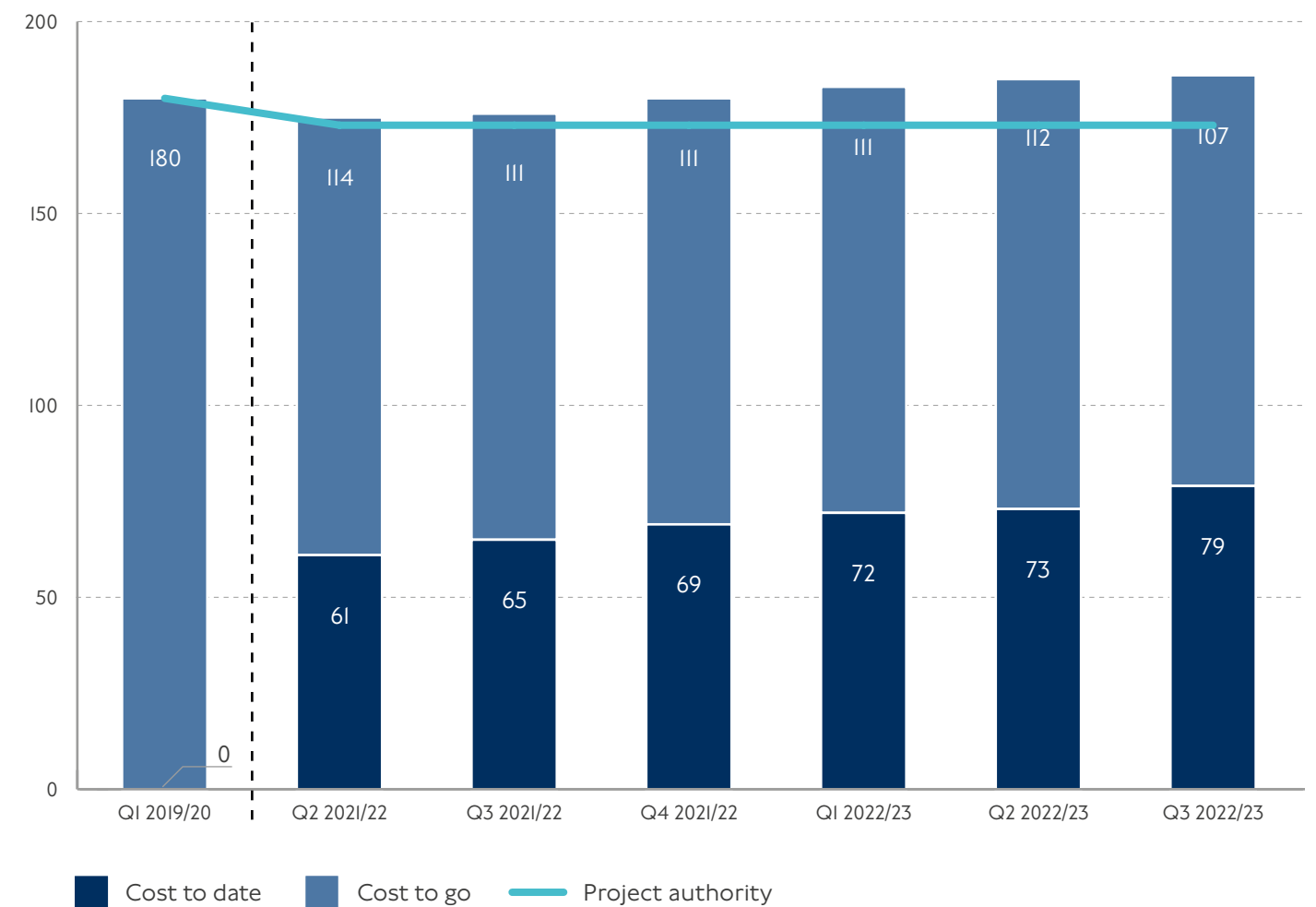
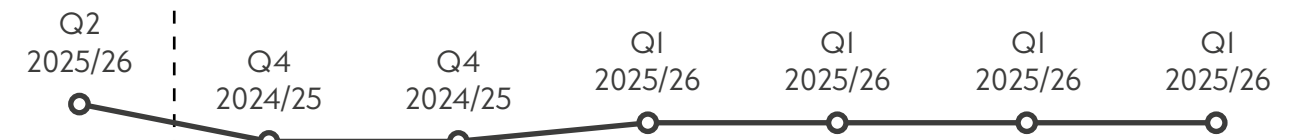
The forecast end date is when the permit from an independent assessor to use the new Silvertown Tunnel is obtained.

In 2020/21, the EFC increased owing to additional costs for the implementation of the Road User Charging infrastructure. However, the EFC was reduced in Quarter 1 2021/22 after this scope and budget were transferred to the Road User Charging portfolio to achieve synergies with our other Road User Charging schemes.

Higher than originally assumed inflationary pressures in 2022/23 have resulted in an increase of around £4m in the EFC. Also, during 2022/23, there have been shortages of skilled labour and supply of construction materials which have resulted in the permit to use date moving from April to June 2025.

### Estimated final cost performance over time (£m)

#### Forecast completion date



All numbers are shown as net of income and third-party contributions



### Programme update

Good progress continues to be made on issuing notices for permanent land acquisition, with these planned to be completed by the end of 2022/23 financial year.

The start of tunnelling began at the end of August 2022 and the tunnel boring machine achieved a peak production of 32 metres per day, an outstanding output for the biggest tunnel boring machine in the UK. It remains on target to arrive safely in the rotation chamber in February 2023, which completes the southbound tunnel drive and marks a significant milestone for this programme. We then will have to turn the machine 180 degrees in the rotation chamber for the northbound tunnel drive, which is another extraordinary piece of engineering.

Our contracts for further transport and traffic monitoring, as well as socioeconomic and environmental monitoring are progressing well, with significant further modelling and analysis work now under way. This will support us in setting the initial user charges at Silvertown and Blackwall tunnels, developing the new cross-river bus services, and enabling a refreshed assessment of the scheme's environmental effects in advance of opening in 2025.



We're working on the southbound section of the Silvertown Tunnel



# Network extensions

## Barking Riverside Extension

Forecast completion	Gross cost to date (£m)	Gross cost to go (£m)	Gross EFC (£m)	Programme and project authority (£m)	Variance: EFC versus authority (£m)
Q2 2022/23	329	(1)	328	329	1
Change since last Investment programme report					
No change	1	(1)	No change	No change	

### Financial commentary

The EFC has remained stable since the last quarterly report.

### Performance over time commentary

Our forecasted end date for when services will run between Gospel Oak and Barking Riverside has been delayed since the programme and project authority was approved in 2018, following the discovery of uncharted utilities and the Safe Stop because of the pandemic. The Safe Stop resulted in rail systems works being replanned and Network Rail possessions rebooked, with the EFC increasing because there are only two opportunities a year for a four-day possession. Signal sighting concerns have resulted in additional works to resolve the issue and have impacted planned completion by the contractor.

### Programme update

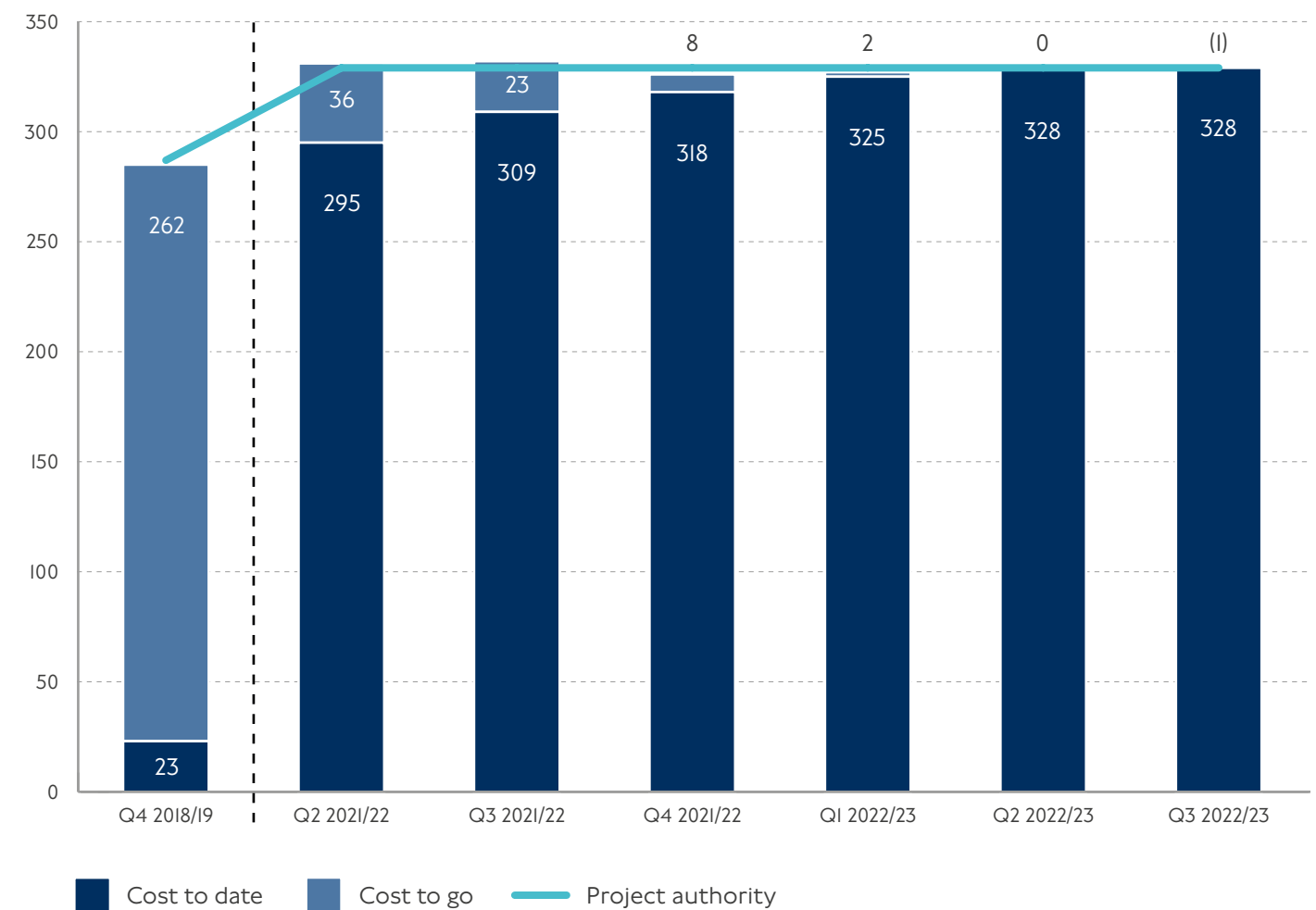
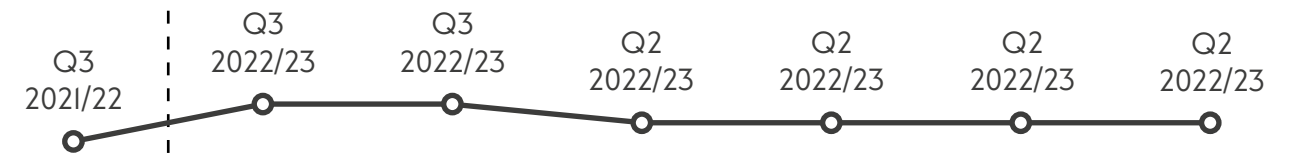
The new extension between Gospel Oak and Barking Riverside opened on 18 July 2022 and has been running a good service.

Asset handover to Network Rail is progressing with track and signals being the last main asset groups still to be transferred to Network Rail. The project team is working with the Network Rail sponsor and maintenance teams to achieve this transfer by February 2023. The transfer of station assets has also begun with London Overground.

The banner repeater signal will be commissioned at the end of January 2023 following confirmation of a possession by Network Rail. The current industrial relations issues within Network Rail increases the risk that the final snags and defects cannot be completed as planned if possessions are cancelled. The project team and Network Rail are working closely to reduce this risk.

### Estimated final cost performance over time (£m)

#### Forecast completion date





## Major station upgrades

# Bank station capacity upgrade

Forecast completion	Gross cost to date (£m)	Gross cost to go (£m)	Gross EFC (£m)	Programme and project authority (£m)	Variance: EFC versus authority (£m)
Q4 2022/23	686	16	702	702	—
<b>Change since last Investment programme report</b>					
1 quarter later	13	(13)	No change	No change	

### Financial commentary

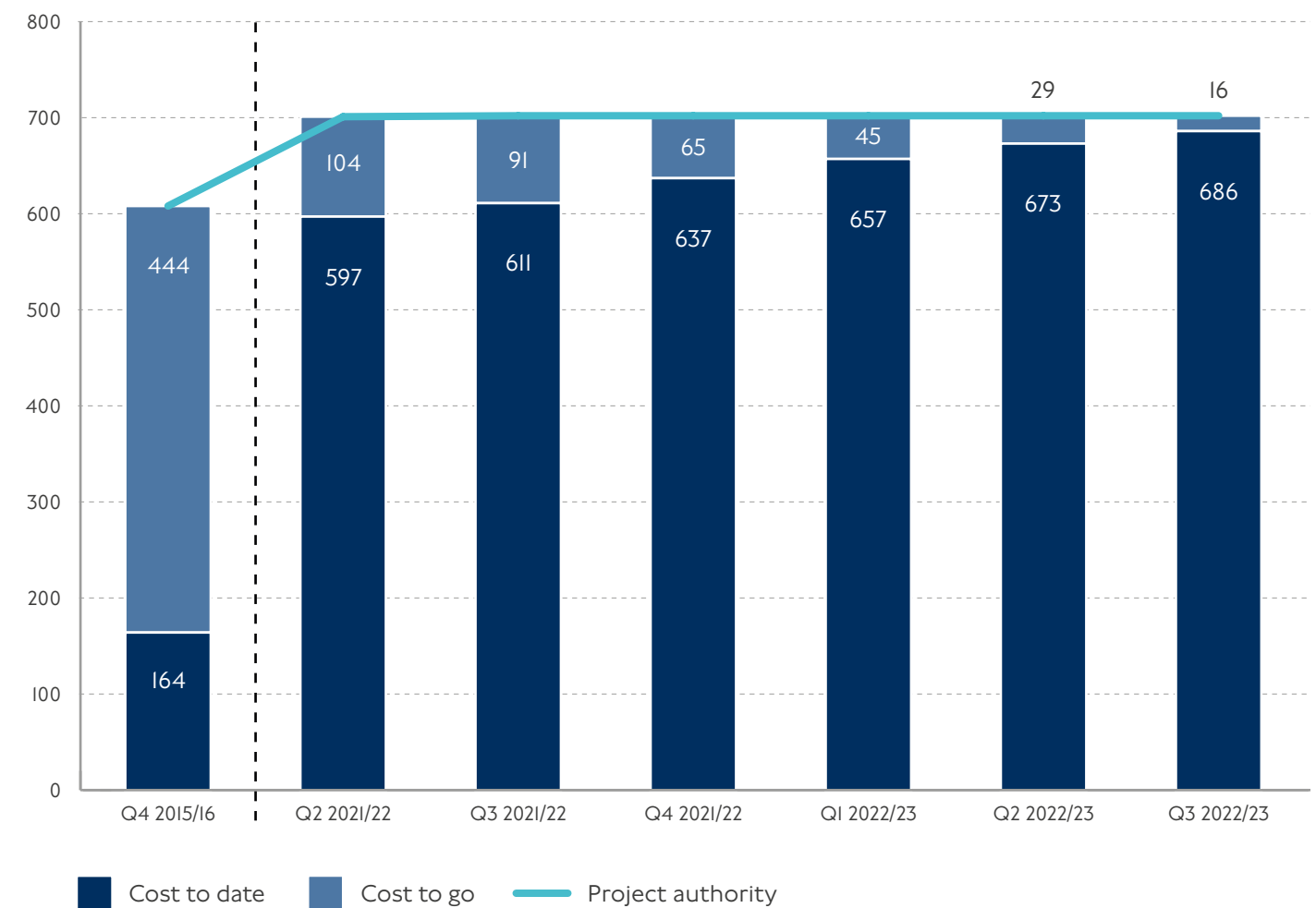
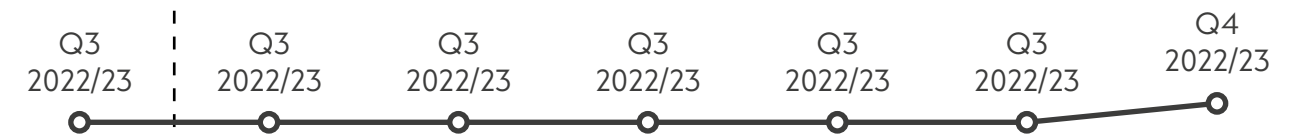
The EFC has remained stable since the last report and spend is in line with current forecasts. The opening of the Cannon Street station entrance has been delayed from December 2022 to early 2023 owing to cladding panel manufacture and installation issues.

### Performance over time commentary

The forecast end date represents the opening of the new Cannon Street ticket hall entrance at Bank station. Our estimated final cost has increased since the authority award in 2016, owing to site works being disrupted by the impact of the terrorist attack at London Bridge, the need for additional scope following the discovery of asbestos, and the impact of the pandemic. The completion of this final section of the project has been delayed from December 2022 to early 2023 due to cladding manufacture and installation issues.

### Estimated final cost performance over time (£m)

#### Forecast completion date





We continue to upgrade Bank station to improve customer flows

### Programme update

Bank station will see its capacity increase by 40 per cent when upgrade work finishes in early 2023. The capacity upgrades are alongside additional upgrades that will improve the passenger flows and overall experience. Improvements include step-free access to the Northern line, improved access to DLR platforms, two new moving walkways, 12 new escalators and two new lifts to serve the Northern line and DLR. There will also be more direct routes within the station and a new station entrance on Cannon Street.

The new interchange routes between the Northern line, Central line and DLR have now been successfully brought into customer use. These new interchanges include six new escalators and two new 100-metre moving walkways, significantly improving journey times for our customers by up to nine minutes between the lines.

The final phase of the project will provide a large new street-level entrance on Cannon Street. This will include six further escalators between street level and the Northern line platform level, step-free access to the Northern line for the first time and improved step-free access to the DLR via new lifts. Works are progressing on this final phase, with the continued installation of the wall cladding and the floor and ceiling finishes. There has been some delay to the installation of the wall cladding which has had a knock-on impact on other elements of the planned work including final testing and commissioning of systems and services. We plan to bring the main entrance into passenger use early in 2023.

Works to demolish the remaining basement levels of the original building in readiness for over-site development are complete.

Alongside the construction work, we have run a communications campaign to raise awareness of the improvements and build excitement for project completion.



# Elephant & Castle

Forecast completion	Gross cost to date (£m)	Gross cost to go (£m)	Gross EFC (£m)	Programme and project authority (£m)	Variance: EFC versus authority (£m)
Q4 2027/28	20	67	87	87	—
<b>Change since last Investment programme report</b>					
No change	3	(4)	(1)	6	

## Financial commentary

In Quarter I the stage one EFC increased by £3m due to applying revised inflation assumptions against specific commodities and using market intelligence. The Programmes and Investment Committee approved an increase to authority of £5.5m in October which is reflected in the above table.

This increase in inflation has not been applied to the cost of the station box being constructed by the developer, as this is a price that was fixed under the development agreement of December 2021. We continue to develop our understanding of the project risks, and actively seek to ensure risk provision is proactively managed and appropriate.

## Performance over time commentary

During 2022/2023, the project EFC increased owing to the impact of inflationary pressures. In October, the Programmes and Investment Committee approved an increase of £5.5m to authority to cover the inflationary increase and bring forward scope from stage two to lower the risk of future communication works. The

EFC will continue to be challenged, and opportunities have been reflected in our decision to engage the construction market much earlier than is the norm, providing suppliers with more time to identify opportunities in a competitive market.

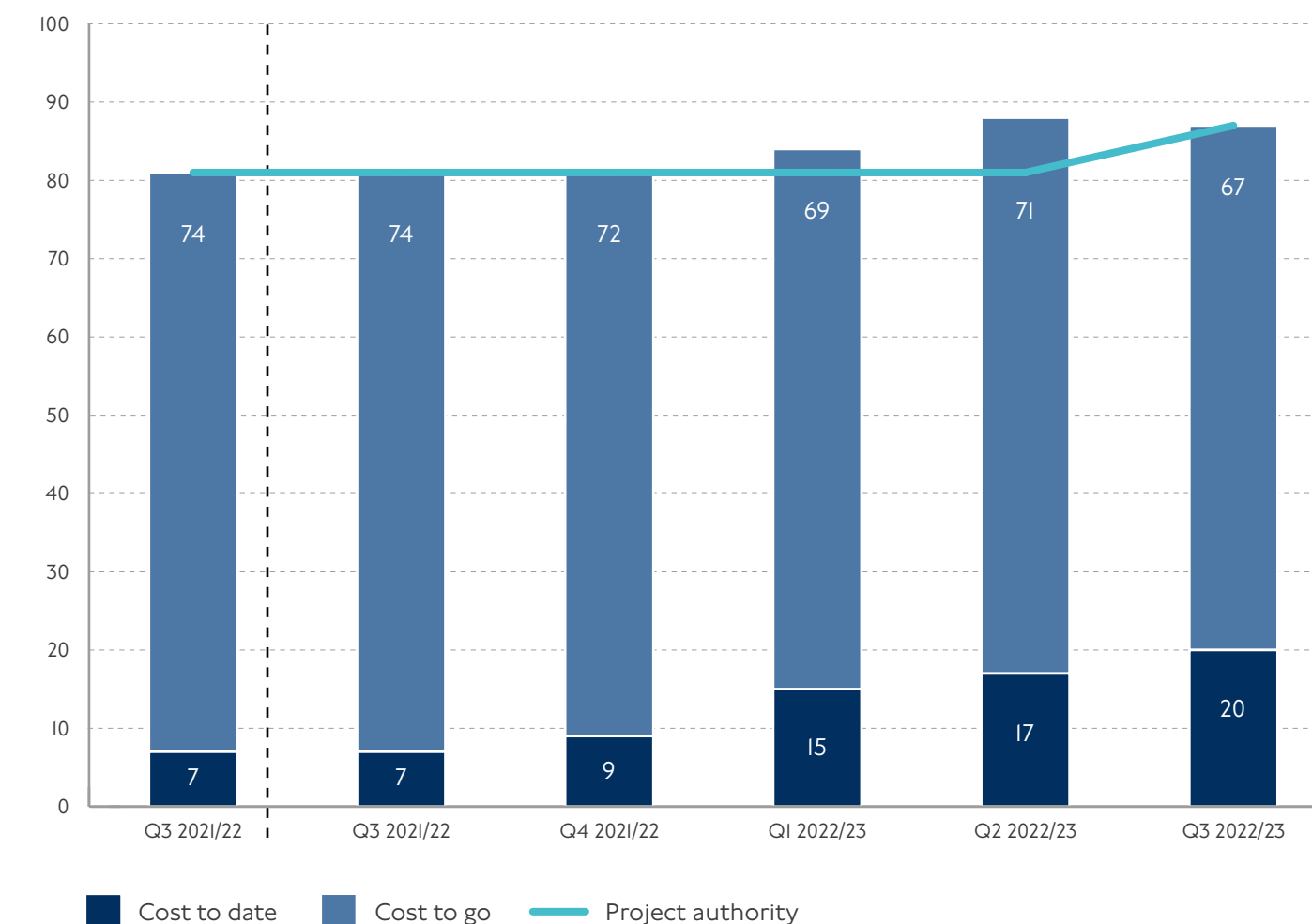
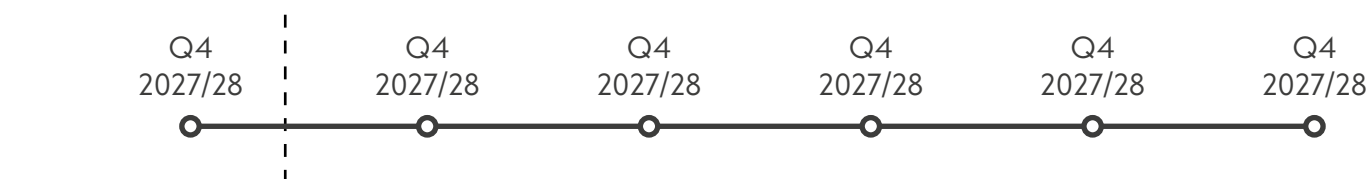
## Programme update

We are pushing ahead with the procurement arrangements for the new tunnels, with an invitation to tender scheduled for May 2023. A contract for essential pre-tunnelling ancillary works has been tendered and responses are currently being analysed. Contract award is planned for February 2023.

Additionally, we are progressing the procurement of a package of work to determine optimal options for the eventual fit-out (known as stage two. Invitations to tender were issued in October 2022 and the contract was awarded in January 2023. A successful bidder has been selected which aligns with the approved procurement strategy. Construction of the station box by the developer continues apace, with station box piling completed.

## Estimated final cost performance over time (£m)

### Forecast completion date



# High Speed 2

Forecast completion	Cost to date (£m)	Cost to go (£m)	EFC (£m)	Programme and project authority (£m)	Variance: EFC versus authority (£m)
Q2 2033/34	28	41	69	34	(35)
<b>Change since last Investment programme report</b>					
No change	2	(2)	No change	No change	

## Financial commentary

Programme and project authority is £35m lower than EFC, as it is granted on an annual basis for the following year's spend. Approval of the authority for the next financial year is planned for summer 2023. All costs are fully reimbursable from the third-party High Speed 2 (HS2) project. As part of the annual Programmes and Investment Committee submission, authority was increased by £6m in May 2022.

The reported forecast end date was amended to 2033 in the last report and still reflects the earliest completion date of works at Euston as advised by HS2 Ltd.

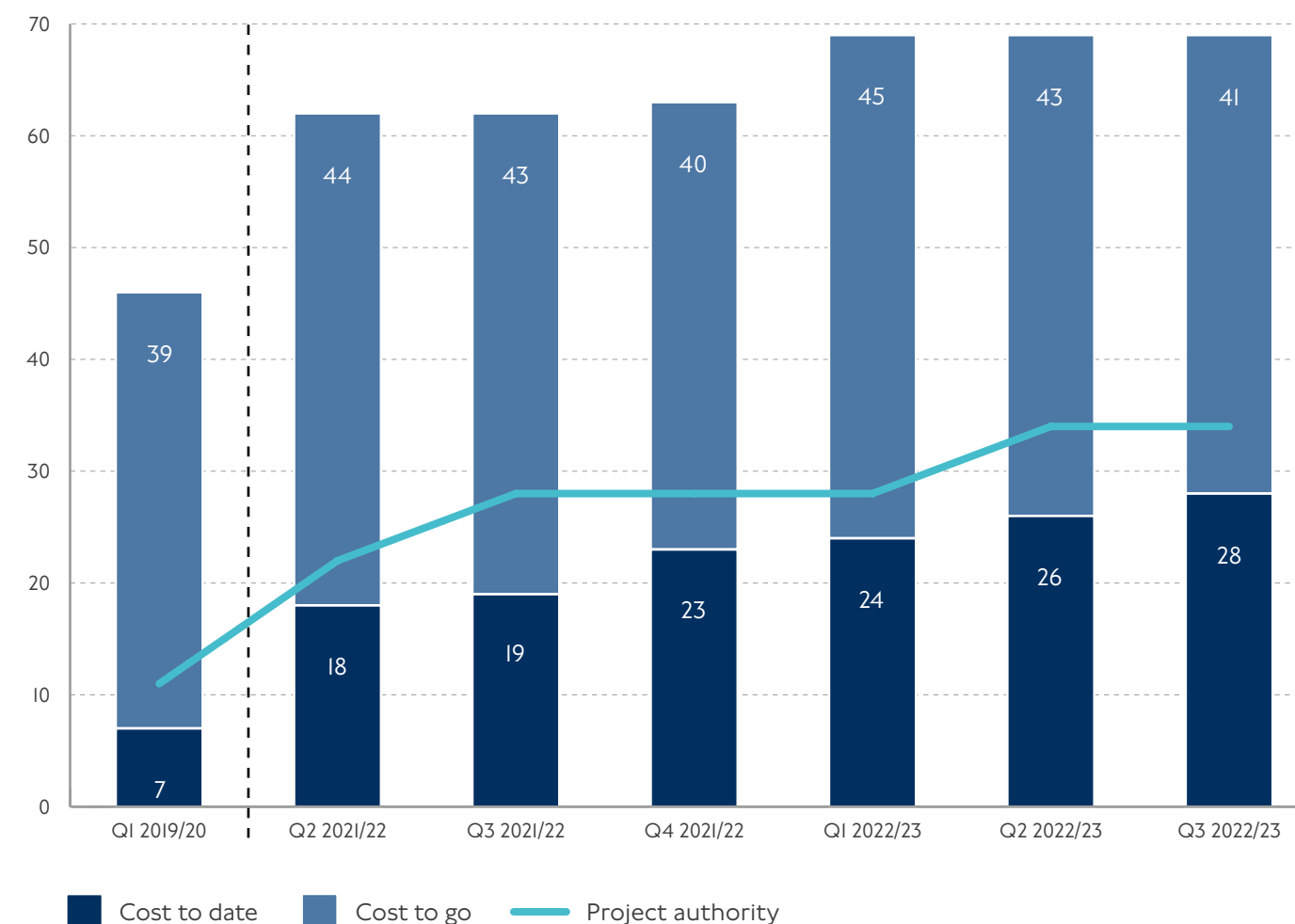
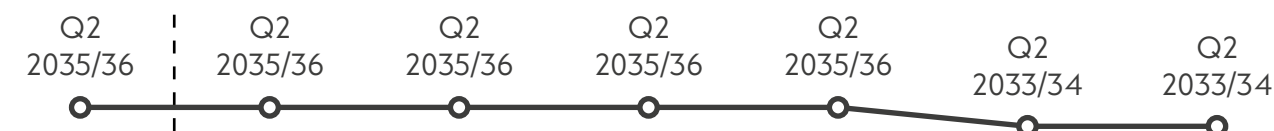
## Performance over time commentary

The forecast end date was amended in Quarter 2 from 2035/36 to 2033/34 to reflect the earliest completion date of works at Euston, as advised by HS2 Ltd. This programme comprises our new assets, infrastructure and operational facilities at Euston and Old Oak Common to interface with the new railway.

Since 2019, the forecast costs have increased due to increased scope being requested by HS2 Ltd, which are fully recoverable. As part of the annual Programmes and Investment Committee submission, the project and programme authority was increased by £6m in May 2022.

## Estimated final cost performance over time (£m)

### Forecast completion date





### Programme update

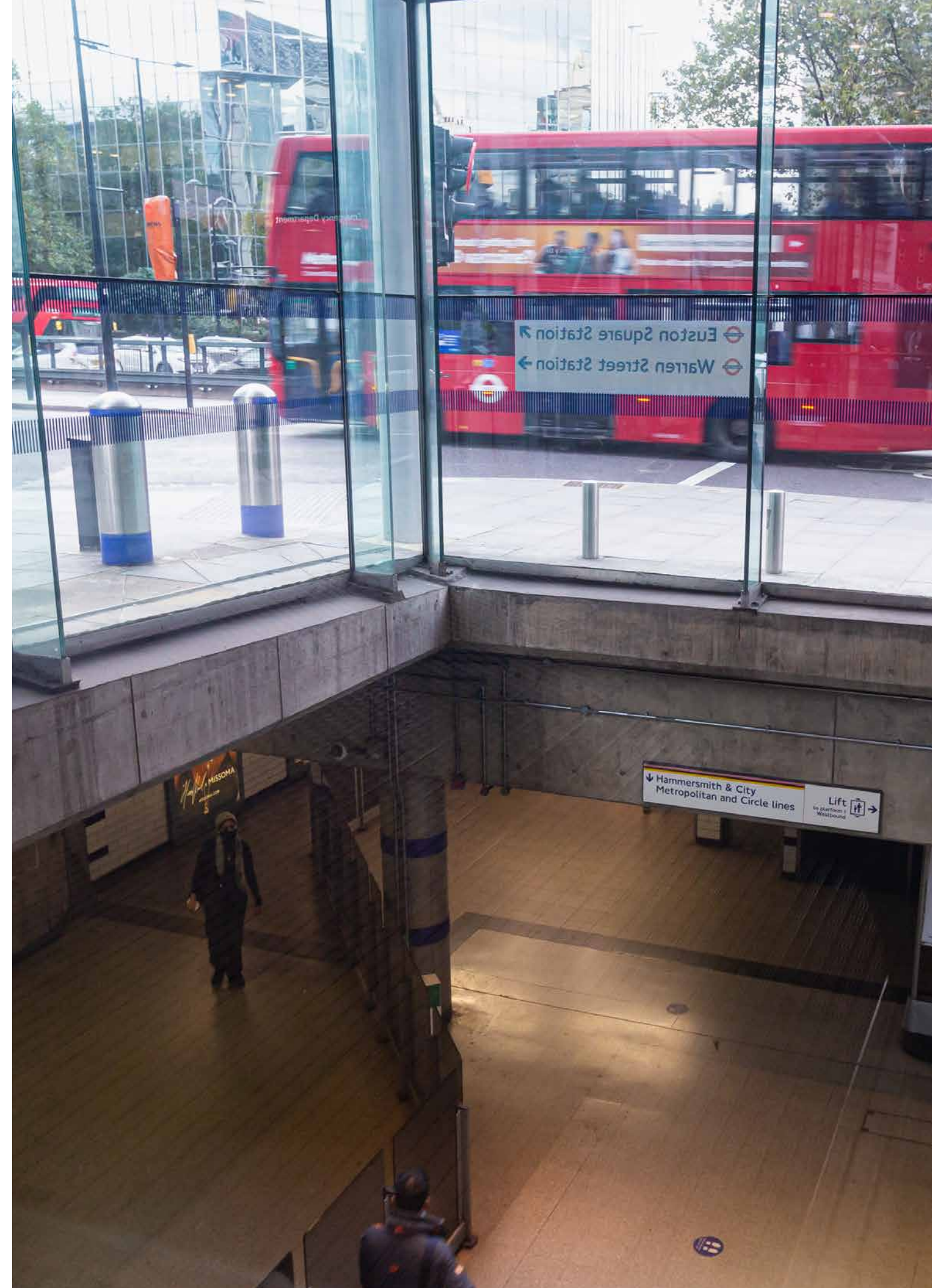
HS2 Ltd's construction of the new Northern line traction substation and ventilation building continues at Euston with construction activity now focused on the basement box sub-structure. Design of the Tube station and interchange box at Euston is progressing, and we continue to attend workshops and support design reviews.

HS2 Ltd is carrying out an assessment of the feasibility of transporting materials by rail or conveyor from Euston, as recommended by Douglas Oakervee in a review commissioned by the Department for Transport (DfT). Outcomes are expected to be shared in early 2023. The Commissioner and Chief Executive of the London Borough of Camden have written to the Chief Executive of HS2 to express our concerns about road safety, air quality and congestion if HS2 continues with its intention to transport spoil by road.

HS2 began carrying out works on Euston Road on 9 January. There will be lane and footway closures on the Euston Road for the next seven years as it completes utilities diversions, and to enable construction of the permanent works for the new Euston Square and Euston London Underground station upgrades. We are working closely with HS2 Ltd on a travel demand management campaign for road users who will be affected and advising customers travelling through the area to check their journeys before they travel, in case of any disruption.

We continue to work with The Euston Partnership to ensure our requirements are met for the future bus station, taxi rank, cycle parking and London Underground station at Euston. Engagement with the partnership on the integrated development of the Euston campus also continues, including the refurbishment of the existing Euston Network Rail station.

At Old Oak Common, we continue to work with HS2 Ltd on the design development of the new surface intermodal area to ensure our requirements are met for buses, cycling and the new Elizabeth line station. Detailed planning and interface work is being developed to consider Network Rail's planned extensive blockade programme over Christmas 2023 to ensure the impacts on our networks, services and programmes across our capital and operations programmes are understood and mitigated where necessary.



HS2 has begun construction works at Euston

# Railway systems enhancements

Forecast completion	Gross cost to date (£m)	Gross cost to go (£m)	Forecast cost (£m)	Programme and project authority (£m)	Variance: EFC versus authority (£m)
2018/19 to 2028/29	148	15	163	171	8
<b>Change since last Investment programme report</b>					
No change	2	(2)	No change	No change	

## Financial commentary

The EFC has remained stable since the last quarterly report and spend is in line with current forecasts.

## Performance over time commentary

Our costs and authority both reduced in Quarter 4 2021/22, driven by the decision to defer the enhanced signalling for the Jubilee line and fleet improvements, and to descope these projects from this programme owing to funding challenges in the wake of the coronavirus pandemic.

## Programme update

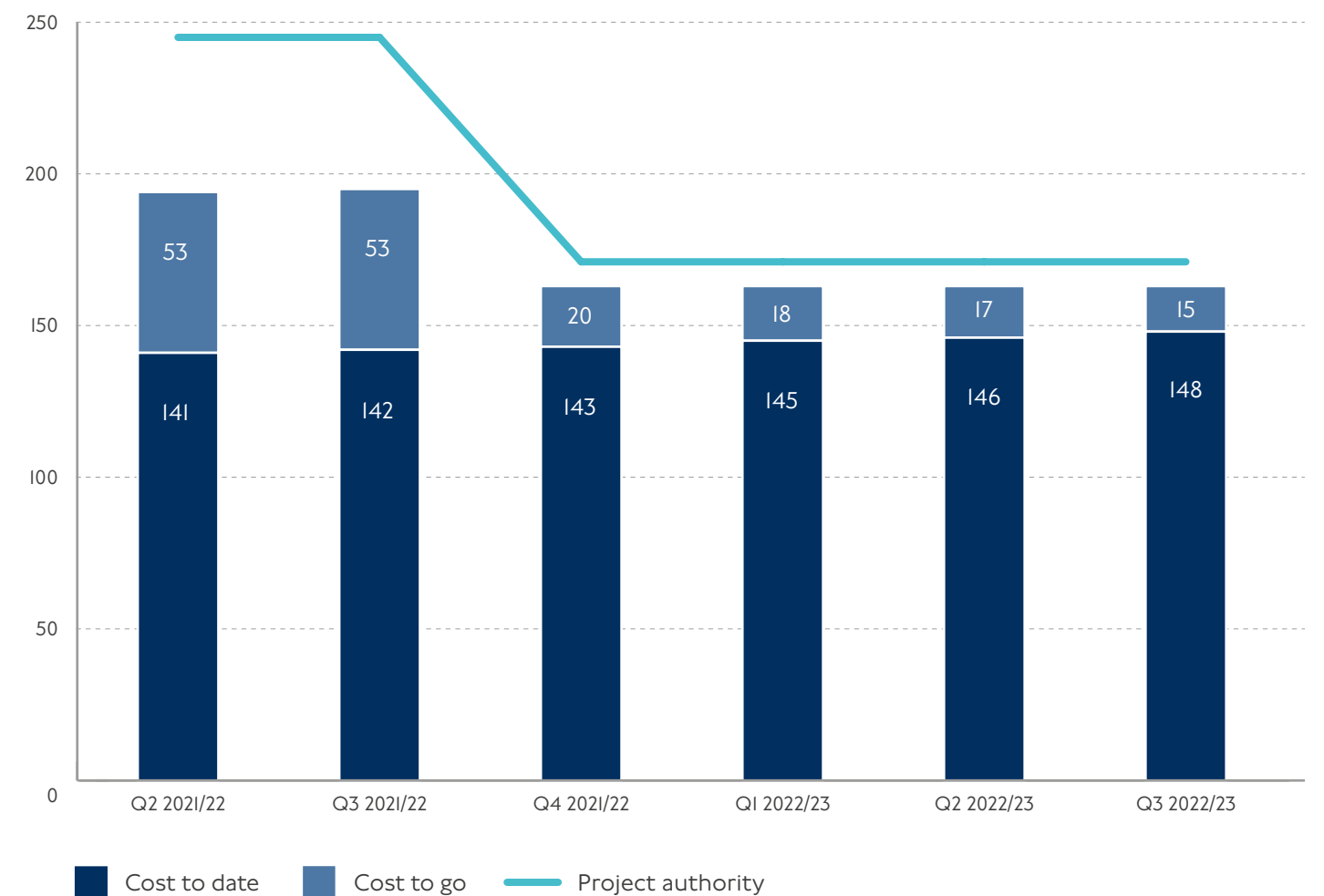
Delivery of the scheduled Northern line signalling software updates continues, with the first release targeted for commissioning on the railway in the second quarter of 2023 and the final in the fourth quarter of 2023. The software updates address residual issues and requirements following completion of the Northern Line Extension and the Bank station closure works.

Delivery of the Jubilee line signalling software updates also continues, with the updates addressing residual issues. The first software release was commissioned onto the railway in Quarter 3 2022, and the final software release is being planned, accounting for dependencies on other projects such as the Four Lines Modernisation programme.

The enhancement work for the Northern line power supply is due to be completed in Quarter I 2023. This will provide system capacity and resilience for reliable services during planned or unplanned outages.

The rolling stock works to enable an increase in entry and exit speeds at Neasden depot are on target for completion in Quarter I 2023. These will support Metropolitan line service uplifts being delivered as part of the Four Lines Modernisation programme.

Estimated final cost performance over time (£m)





# London Underground

We deliver enhancements using internal and third-party investment to provide increased accessibility and station capacity improvements. Our three renewals programmes ensure the safety and reliability of the existing network across infrastructure, train systems and technology





# Train systems

Forecast completion	Cost to date (£m)	Cost to go (£m)	Forecast cost (£m)	Programme and project authority (£m)	Variance: EFC versus authority (£m)
2022/23 to 2027/28	152	1,828	1,980	1,791	(189)
Change since last Investment programme report					
No change	51	(66)	(15)	No change	

## Financial commentary

Forecast cost has been aligned to the 2023 Business Plan, following an exercise to prioritise our spend on renewals across the business. Our forecast through to 2027/28 includes projects in the later years which are not yet fully developed. Authority will be sought for these projects when we have greater certainty of costs and timings.

## Performance over time commentary

Trains systems spend in the quarter was in line with budget, taking our year-to-date spend to £151m. Improved performance reviews are helping us to improve our forecasting, increase our delivery confidence and are the basis for the revised forecast cost in the quarter, which has been reduced by £15m. These reviews enable us to focus on key issues such as identifying cost savings, ensuring we can attract and retain team members with the appropriate skills, cost inflation and supplier performance.

We have delivered £5m of cost reductions in the year so far and have been working with an external expert to review our internal processes and identify further efficiencies which will be applied to other asset areas.

## Programme update

This programme delivers critical renewals across multiple asset groups that form an integrated train system. The programme includes work on track assets, passenger fleets, engineering fleets and signalling assets.

Our track assets are an essential component of a safe and reliable railway. Track is continually degrading and needs rolling maintenance and renewals to keep it in good working order. We must renew two to three per cent of our track every year (based on a 20–60-year lifespan), as well as making ongoing component replacements to maintain safety and reliability. Where possible, we also aim to install high-integrity, low-maintenance modern track forms to replace legacy track, some of which has been in service since the early 1900s. This modern track is more stable and reliable.

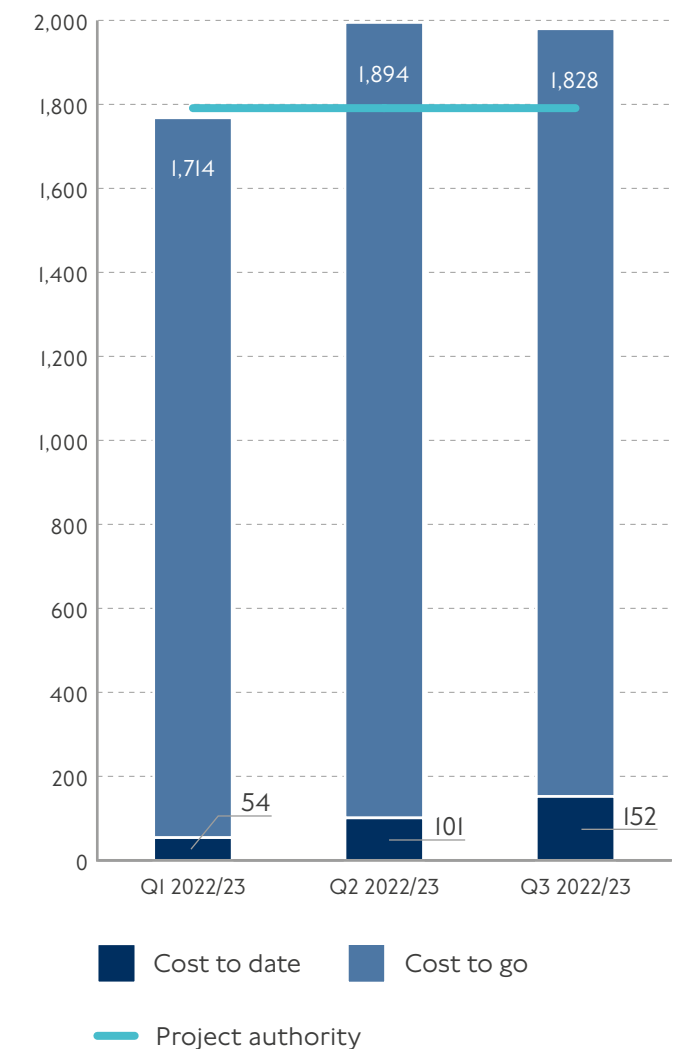
We have more than 600 Tube trains operating across 11 lines, with the oldest trains having entered service in the 1970s. Interventions are based on our long-term fleet cost model, which feeds into our long-term capital plan.

To ensure train fleets remain safe and reliable for an increasing in-service life, we conduct a range of planned interventions consisting of heavy overhauls and renewals (mid-life refurbishments and life-extension projects). In addition, we deliver specific work to improve accessibility and customer satisfaction, such as better lighting and CCTV. These works address changes in regulations arising from safety issues, poor reliability and performance, unacceptable costs or system obsolescence.

Our heavy overhauls work delivers large-scale activities on our existing fleet of passenger rolling stock and rail adhesion trains to ensure all core systems meet the required standards. The work requires each train to be removed from service for several days or weeks, and includes overhauling suspension, wheelsets, motors, brake systems and auxiliary equipment.

Signalling and control upgrades continue to keep our systems up to date and in serviceable condition. This avoids higher costs at a later stage, while also ensuring safety is paramount, continued reliability and that the overall cost is spread across a closely monitored timeline.

Train systems performance over time (£m)







We have converted old rail to a more modern type of track

The engineering vehicle fleet supports the track renewals programme and comprises battery locomotives, wagons for different activities and plant equipment such as cranes and tampers. We aim to improve the reliability of this non-passenger fleet, responding to component obsolescence problems and supporting our overarching aim of mechanising track-based activities where possible. Our intention is to facilitate enhanced productivity and an improved safety culture.

Over the quarter the programme has delivered notable successes, including track renewals exceeding the scorecard levels as a result of increased funding and delivery optimisation; maintaining the high rate of train completions in fleet heavy overhauls; successful deployment of the rail-mounted cranes for renewals projects; and completion of five sites of signalling renewal for the Bakerloo line control system upgrade. In addition, we have completed energy efficient LED lighting conversions on 12 trains in the fleet, which will support lower operating costs and our wider climate adaptation aims.

#### Core track renewals

Between July and September, we converted a total of 1,312 meters of bullhead rail with the more modern flat-bottom form. In addition, we completed 416 meters of deep Tube reconditioning works, bringing the deep Tube total delivered to date to 907 metres against a required scorecard run rate of 750 metres.

#### Points and crossings

As reported previously in July 2022, we installed a new set of points at Tower Hill. In October 2022, the new automatic signalling was commissioned, and the points are now in operational use. The points will provide reversing capability which will improve service recovery during disruptions and reduce the closure limits during engineering works.

#### Victoria line (fleet overhaul and depot signal renewals)

Work continued on upgrading the pressurised ventilation fan system to reduce maintenance costs, with a further nine trains completed, taking the total to 36 of 47 trains. Delivery of the coupler overhauls continued, with an additional 10 completed taking the total to 34 of 47. Door overhauls continued to plan and 14 trains have completed their phase one works.

#### Metropolitan line (fleet overhaul)

Having reviewed the performance and reliability of the Metropolitan line trains, our Engineering team has determined that they can stay in service for longer than previously anticipated before requiring a heavy overhaul. This has meant that we can revise the delivery rate to two trains per period, which aligns with the available in-year budget. The project has delivered six additional bogie overhauls, taking the total to 24 out of 60 trains.

#### District line (fleet overhaul)

Work continued to prepare for the start of bogie overhaul on the District line, which is planned to follow directly after the Metropolitan line overhaul scheduled for completion in summer 2024, albeit the start date has moved to align with the revised delivery rate (as above).



#### Jubilee line (fleet overhaul and component renewal)

The first phase (pull-forward) of the overhaul programme was completed ahead of schedule, and the second, more significant, phase continued. While challenges were faced with materials supply, the first train has now been returned to service and the second train has been lifted. The project has supported mitigations needed to keep the trains in operation until heavy overhaul takes place. A competitive tender to fix the underframe cracking issues has been issued and an investigation into extending the life of train management systems is under way. Delivery of these works is important to improve the recent service performance challenges on the Jubilee line.

#### Piccadilly line (fleet overhaul and signalling renewals)

We have completed new flooring of the trains as part of the life extension works. The disruption to wheel and motor overhauls owing to supply chain issues has been addressed and recovery is under way and anticipated to be complete by the end of the financial year. We have now completed 52 per cent of the second lift cycle to take the fleet to the end of its operational life.

Rewiring of the interlocking machine room at Acton Town has progressed through design and is anticipated to start on site in Quarter 4 2022/23 with the project team in the latter stages of mobilisation.

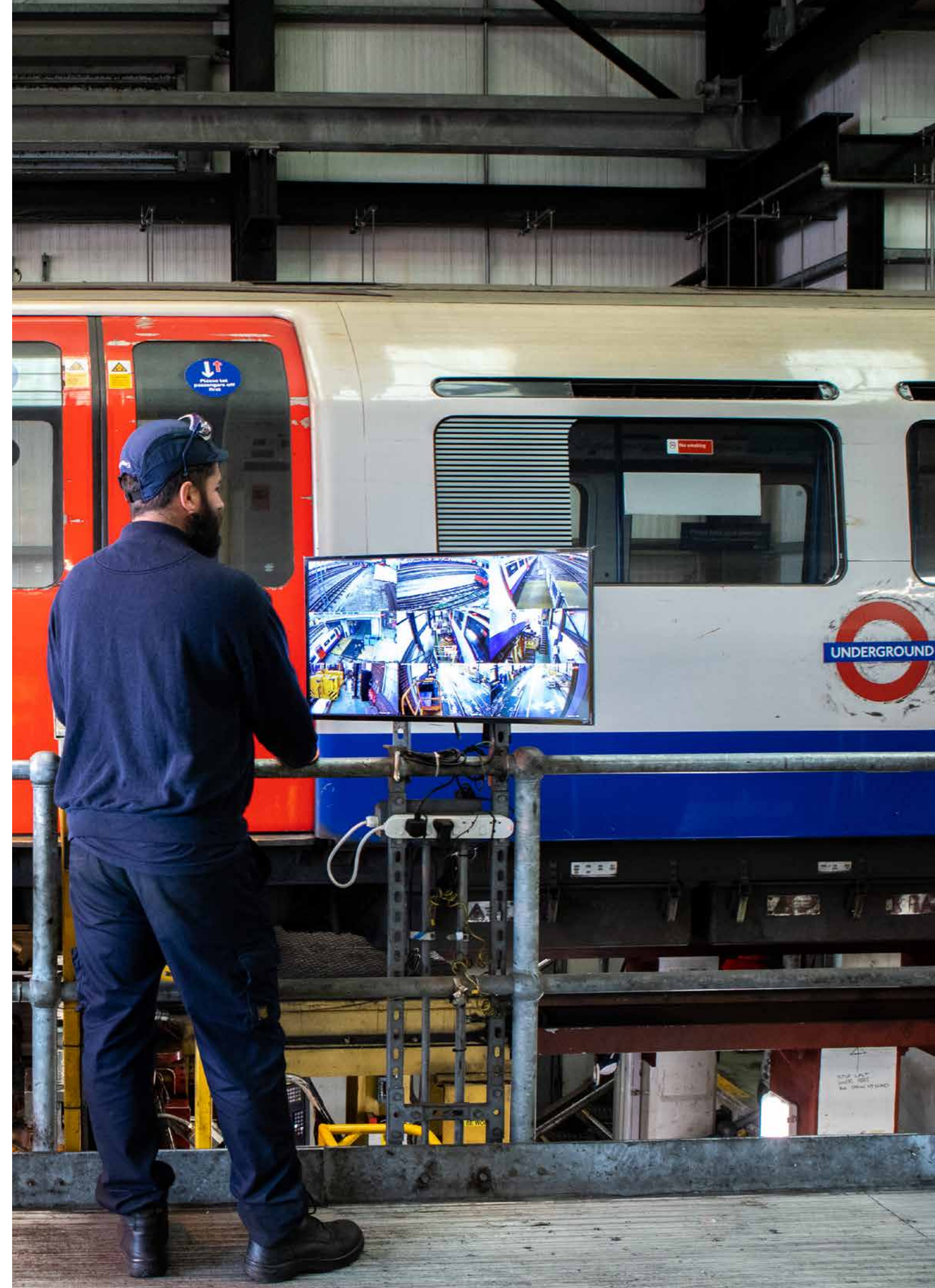
#### Central line (fleet renewals and signalling renewals)

Production readiness of the fleet has entered the final stages for CCTV, LED lighting, and saloon car mechanical systems. The alternating current traction system is in final sign-off stage with the majority of hardware agreed. The outstanding issue is the modification of the auxiliary power units, which are to be reworked with new and improved safer component design. The conditional assessments for the programme lift were completed in January 2023. New doors tender returns are being reviewed and materials for the pull-forward scope have also been procured to support doors overhauls. Delivery of these works are important to mitigate the ongoing service performance challenges on the Central line.

Progress continues on the Central line signalling life-extension projects, with design work continuing for the obsolete systems. Plans are maturing for installation of assets on site in Quarter 4 2022. These works will utilise both internal delivery and our contractor installing assets at different sites to ensure efficient delivery. An outline specification and design has been completed for an enlarged testing facility at Ruislip depot to support the renewed train borne signalling equipment through its life.

#### Bakerloo line (fleet overhaul and LED lighting conversion)

Work has continued on ongoing heavy overhaul activities. There has been some disruption to materials supply, but this is expected to be recovered by the end of the financial year. We have started to install new LED lighting on the 12th train.



We are replacing obsolete systems on the Central line





We monitor and reduce the impacts of poor rail adhesion

#### **Bakerloo, Central and Waterloo & City lines (accessibility)**

The first Bakerloo line train fitted with a wheelchair bay, as well as new grab-poles and floor coverings that comply with the Rail Vehicle Accessibility Regulations. It entered service on 28 October from Stonebridge Park depot.

This marked a new milestone for the line as station platform works have also been completed at Paddington and Oxford Circus. On the Central line the first two trains have wheelchair bays installed as part of fleet renewals programme mentioned above. The Waterloo & City line trains also had multi-purpose bays fitted in Quarter 2 this year.

#### **Depot control systems**

The Northumberland Park depot re-signalling works are informing the emerging depot control strategy which is being aligned across London Underground. This incorporates assumptions and requirements to support the introduction of new trains on the Piccadilly line and the existing systems at depots.

#### **Incremental signalling upgrade**

The procurement of signalling equipment and design works is ongoing for the Bakerloo line control room fit out works and the control system upgrade.

We continue to install the key signalling and control interface equipment in equipment rooms on the Bakerloo line. Five sites have been completed, with Edgware Road and Oxford Circus currently under way.

The design stage of replacement central computers for the Jubilee and Northern lines is progressing well, with initial site works completed to enable further installation at Christmas 2022. The procurement activities leading to award for the replacement of train operator displays on the same lines is also under way with award forecast for Quarter I 2023.

#### **Network wide signalling renewals**

Removal of capacitors containing PCB (Polychlorinated Biphenyl), has been instructed across the London Underground network by the Environment Agency. The removal of these capacitors is under way. New capacitors have been procured and installation is due to start in Quarter 4 2022/23 in late January 2023.

#### **Rail adhesion train (fleet overhaul)**

Preparations for the overhauls to start in the new year have started and are ahead of plan. The timely delivery of this work is essential to ensure the impacts of poor rail adhesion during the leaf fall season are mitigated.

#### **Mechanised track renewal vehicle**

The first live site for our prototype mechanised track renewal vehicle has been booked between South Kensington and Knightsbridge on the Piccadilly line and is expected to start trials in February 2023. Opportunity to use the vehicles for spoil collection at other sites is being explored to reduce reliance on heavy goods vehicles. At the same time, the prototype wagons from the world's largest rolling stock manufacturer in China is undergoing dynamic testing in Chinnor and Tuxford.



### Rail-mounted crane

The rail-mounted cranes from Kirow in Germany were successfully used to replace the traction isolation switches to make them compliant with the Electricity at Work Regulations in Ruislip depot. Tandem lifting approvals are under way, with assurance tests booked at Neasden depot by the Four Lines Modernisation programme.

### Track recording vehicle

Concept design for the track recording vehicle replacement has begun and the draft technical documents for the London Underground engineering review were received in January 2023. Static testing of the modified track recording vehicle has passed on the Circle, District, Hammersmith & City and Metropolitan lines and the programme lift scope has been agreed.

The delivery of the engineering vehicles overhaul programme has been impacted by supply chain issues. Progress was made to close out snagging issues and gradually bring the wagons back to Ruislip depot. The team collaborated with the Four Lines Modernisation project team to confirm the schedule for signalling fitment and overhauls on the Matisa points and crossing tamperers.



We have successfully tested our modified track recording vehicle



# Infrastructure renewals

Forecast completion	Cost to date (£m)	Cost to go (£m)	Forecast cost (£m)	Programme and project authority (£m)	Variance: EFC versus authority (£m)
2022/23 to 2027/28	47	568	615	1,192	577
Change since last Investment programme report					
No change	18	(31)	(13)	No change	

## Financial commentary

Forecast cost is below authority following the consolidation of previous separate asset areas into a single portfolio and alignment to the 2023 Business Plan. Alignment to the Business Plan follows an exercise to prioritise our spend on renewals across the organisation in light of our available funding, and we will continue this process to ensure we deliver the optimal outcomes within our funding constraints. The surplus authority will be addressed in the next Programmes and Investment Committee submission.

## Performance over time commentary

Infrastructure renewals continues to meet budget with spend in the quarter of £18m, after embedding £2.5m of cost savings in-year. Improved performance reviews are helping us to improve our forecasting and increase our delivery confidence. These reviews enable us to better focus on key issues such as identifying cost savings and efficiencies, attracting and retaining people with the appropriate skills, cost inflation and supplier performance, and are the basis for the reduction in forecast cost in the quarter.

## Programme update

The infrastructure renewals programme delivers critical interventions to the assets that support the London Underground network. The programme includes work on the built environment, civils and structures, power assets, as well as lifts, escalators and building systems assets. The work bank is prioritised to address asset condition concerns to maintain the safety and reliability of the railway.

We have 30,000 building and civil assets across the network, providing structural support, stability and protection. The asset base includes more than 16,000 bridges and structures, 235km of embankments and cuttings, as well as tunnels, lighting masks and flood protection assets.

Our complex building systems assets (mechanical, fire, communications, power and electrical) ensure that stations, depots and other sites operate safely and effectively. The work is prioritised on the state of good repair of the assets and to address specific asset condition concerns.

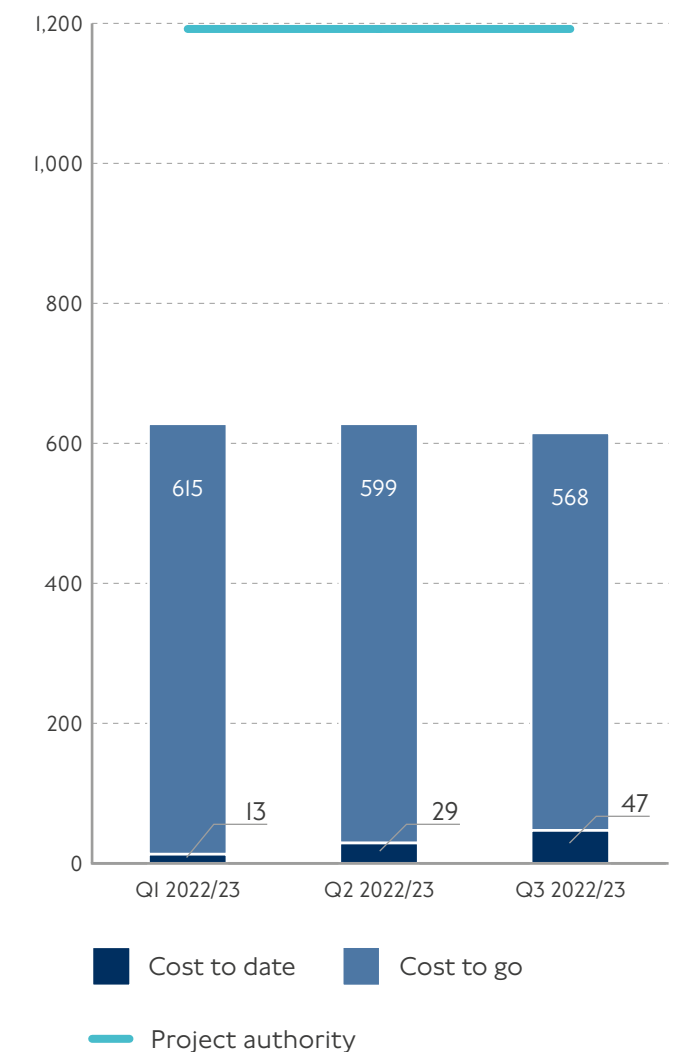
London Underground is the largest consumer of power in London. We operate our own high-voltage distribution network and backup power generation. Based on the state of assets and their expected lifespan, we deliver a rolling programme of renewals to maintain the integrity of power delivery to the railway.

We have 526 escalators, 327 lifts and six passenger conveyors on the London Underground network. These are essential to ensuring customers have safe, reliable and quick access to our services. We deliver a rolling asset renewal programme aiming to deliver renewals and replacement to escalators every 40 years and lifts every 20 to 40 years, depending on the type. This means replacing around 2.5 per cent of escalator and four per cent of our lift assets each year to maintain the current level of good repair.

Key successes across the programme include improved progress on our strategic milestones, forecasting the completion of concrete foundation works 30 days ahead of schedule on our stabilisation project at Grange Hill to Chigwell. This will stabilise a large cutting on the Central line and reduce the risk of asset failure.

The rolling programme of systems works, including lifts and escalators, continues to plan with two Jubilee line escalator works completed this quarter. We are also on track with our work to deliver energy efficient LED lighting changes at 20 stations in the next financial year. This will reduce operating costs and support our wider carbon reduction aims.

Infrastructure renewals performance over time (£m)





### Water ingress remediation

Feasibility surveys for remedial works have been completed at St Paul's and Chancery Lane and options are being finalised. Concept designs at Liverpool Street and Charing Cross are also being completed. Concept design continues for Mayor Sworder's Arches in London Bridge and targeted drainage surveys began in January 2023. A tender is being carried out for tag and trace surveys which we expect to be complete by mid-June 2023.

### Cutting and embankments

Works continue to schedule on stabilising the cutting between Grange Hill and Chigwell on the Central line to ensure the continued safe running of the railway. Piling works are nearly complete and are 30 days ahead of the scheduled strategic milestone target date.

The full project is due to be completed in May 2023, but we are investigating a possible extension to enable associated bridge works to be undertaken which would provide a significant cost saving from integrated delivery.

Works to remediate the cutting between Rickmansworth to Chorleywood (Metropolitan line) are continuing and are due to finish on site in July 2023. Feasibility works for five future interventions to embankments and cuttings continue to progress at priority locations.

### Plaistow roof replacement

Works to replace the life-expired roof at Plaistow substation are progressing ahead of plan. The existing roof has been fully removed and the new roof is due to be installed by summer 2023.

### Welfare facility renewals

Works to improve the condition of welfare facilities and environment for staff are ongoing at several locations, including Piccadilly Circus, Marble Arch and Leicester Square. Delivery timescales have been impacted by additional fire compliance requirements and poor asset condition being discovered during intrusive works.

### King's Cross St Pancras communication systems

Works to replace a range of obsolete communications equipment at King's Cross St Pancras station, including station management systems, video, audio and alarm systems are in the final stage of the systems migration.

### Jubilee line communication systems

Detailed designs are complete for Bermondsey and Canning Town, the final two stations, to replace station information management systems, public address and voice alarm systems, as well as the passenger help point systems. Canada Water and Southwark upgrade works have begun installation works, while site works progress to programme at the remaining four stations: London Bridge, Canary Wharf, North Greenwich and West Ham.

### Jubilee line ventilation systems

We are progressing with works to upgrade the obsolete tunnel ventilation control panels and to refurbish the fans of the staircase pressurisation system at the Jubilee line extension stations (Southwark to Canning Town) and intermediate shafts. Half of the intrusive surveys for this project are now complete. Replacements of the ventilation management systems are progressing to programme.



We're improving our station information systems on the Jubilee line





Our escalator works help increase capacity at stations

#### Smoke and heat ventilation

We are progressing with work replacing and refurbishing life-expired components that form part of the smoke and heat exhaust ventilation systems that are located in the roofs of Bermondsey station and Stratford Market depot. The detailed design for both locations has now been completed and approved.

#### Marylebone escalators

Work is ongoing on the final escalator refurbishment and is due to be finished in early 2023. This will include the completion of the wider station gateline and an additional escalator providing additional station capacity to support any future increase in customer demand.

#### Jubilee line extension escalators

This rolling programme of escalator refurbishments has delivered two further refurbishments in this quarter, taking us to a total of six in the financial year as planned. Works are ongoing on the next three refurbishments at Waterloo and London Bridge. The programme for the remainder of 2022/23 has been re-prioritised based on the latest asset performance data and the opportunity has been taken to replace the obsolete fire detection system on the passenger travellers at Waterloo.

#### Liverpool Street escalators

Works are under way to install 12 sets of fire doors ahead of the replacement of three escalators. Four out of the 12 sets of fire doors have now been installed, with works under way on the next two sets. All works are due to complete in early 2023.

#### Holloway Road lifts

The concept design is now complete and the instruction to design and manufacture the lifts is to be issued imminently. Works are due to start on site in spring 2023.

#### Secondary lifts

There is a programme to replace the existing nine hydraulic lifts with improved traction lifts. This will improve reliability reducing customer disruption and maintenance costs. Instruction to manufacture the first three lifts has been issued to the contractor. Detailed design has started on a further two lifts.

#### Uninterruptable power supply

Works have now completed for tranche one, with all 22 life-expired units replaced and commissioned to ensure a continuous power supply to critical signalling assets on the railway. Procurement for the award of a new contract to replace the next tranche of 31 units is forecast to complete in December which will enable continuous delivery into 2023/24.



### Offline battery power inverters

An offline battery power inverter is a battery system present on all sub-surface stations that powers emergency lighting in the event of a power loss. There are around 260 located across the network and they are a critical asset as failure could result in station closures as emergency evacuation is compromised.

Design works have started with our contractor to mitigate the obsolescence risk of the first 20 units. Internal scoping has begun for further units which are likely needed in the short term while strategy work is progressing on the longer-term solution.

### Traction power

Site work has continued for the replacement of 11 traction isolation switches at Ruislip depot to address equipment non-compliances and removal of operational restrictions. The first depot possession took place in November utilising the newly commissioned Kirow rail-mounted cranes to support the project and provide a cost saving by eliminating the need to use externally provided equipment.

A contract was awarded in May 2022 for the replacement of the direct current traction switchboard at Holborn. Progress is being made on the design, with our contractor beginning detailed site investigations to assess strengthening works required to house the new equipment.

### Power control

The new system for control went live in October 2022 for all lines except the Northern and Central lines, which were always planned to be delivered after the initial commissioning. Following the go live, a number of snags were identified, with 75 per cent of these now closed out. Focus is now on enabling the Central and Northern line commissioning in Quarter 4 2022/23 and Quarter 1 2023/24 respectively.

### LED lighting

Progression of these works continues, with teams mobilising and contracts in place for replacements at King's Cross and two prioritised depots. Conversion of lighting at smaller stations is being delivered internally and is ramping up to previous delivery rates. It is expected that 20 stations will be delivered in the next financial year.



We have been converting lighting in stations to LEDs



# Enhancements

Forecast completion	Cost to date (£m)	Cost to go (£m)	Forecast cost (£m)	Programme and project authority (£m)	Variance: EFC versus authority (£m)
2022/23 to 2027/28	553	56	609	655	46
<b>Change since last Investment programme report</b>					
No change	5	(5)	No change	No change	

## Financial commentary

The enhancements programme reports the gross costs of projects over their whole life. No further programme and project authority has been sought since the last report. Important to note that the cost to go is based on the current business planning assumptions for the prioritisation and affordability of Enhancements.n.

## Performance over time commentary

The enhancements programme has delivered more than £1.3m of efficiencies in the quarter and expects to achieve its full year budget. Continuing focus of cost improvement is expected to yield more savings in future periods.

## Programme update

The enhancements programme covers a range of improvement projects, mainly to stations and depots. We continue to improve stations by carrying out capacity upgrades and delivering projects that increase and improve accessibility and relieve congestion.

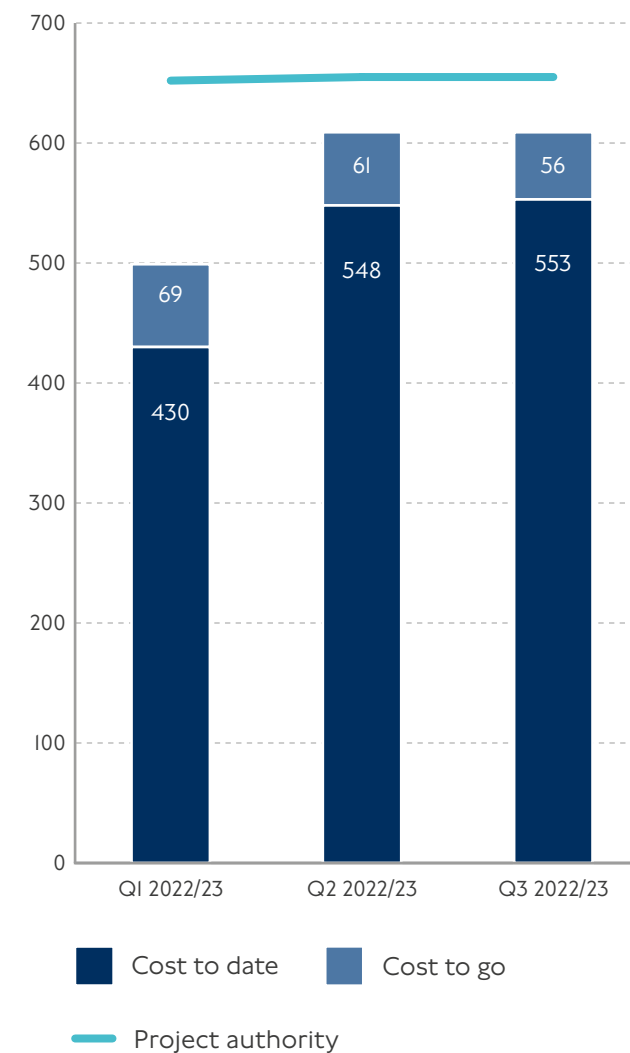
Owing to less funding being available for step-free access improvements and congestion relief schemes, a number of projects are paused while we investigate third-party funded options.

The Programme had a successful quarter with all schemes in delivery showing continued progress, as well achieving significant milestones on new third-party funded opportunities at King's Cross St. Pancras and Hounslow West.

Work is under way to determine the future priorities for step-free access following the publication of the results of our consultation in November that closed earlier this year.

Our draft Business Plan, which was published on 7 December 2022, illustrates the importance of step-free access and includes support towards such schemes, while recognising that in order to maximise value it is necessary to target locations that also attract third-party funding.

Enhancements performance over time (£m)





### Step-free access

We have secured third-party funding to support the design of an improved step-free scheme at Hounslow West and delivery of additional step-free access to King's Cross St. Pancras station.

Following the publication of our step-free access consultation, we are continuing the process to develop a prioritised list of different step-free options. This takes into account the results of the consultation as well as funding considerations and complexity of schemes. This work is forecast to be completed in Quarter 4.

### Tottenham Hale

The project is set to complete snagging on site by the end of 2022/23. Financial close is due in Quarter 1 2023/24. Network Rail continue to plan works to complete the customer corridor connecting the new ticket hall to the Network Rail Access for All bridge.

### Paddington – Bakerloo line

The final structural works to connect the old ticket hall to the new are nearing completion. Step-free access lift installations are also near completion, with fit out and service installations continuing. The project is expecting to open in summer 2023, with testing and commissioning of the enhanced and step-free entrance to begin in spring 2023.

### Colindale

In January, we were successful in securing funding from the Government's Levelling Up Fund. While awaiting the outcome of the funding bid, we have been working closely with the London Borough of Barnet and other partners to prepare for delivery. We will now be refreshing the existing design for this project that will support the development of the local area with an improved station and the provision of step-free access to the Northern line.

### Hounslow West

A new 100 per cent affordable housing development on the site of the station car parks was granted planning consent by the London Borough of Hounslow on 2 December. The scheme is being brought forward by A2Dominion, working with TTL Properties. This will include significant improvements to the station itself. In parallel, a preferred option for upgrading the step-free access provision has been identified and funding options are currently being developed.

### King's Cross St Pancras

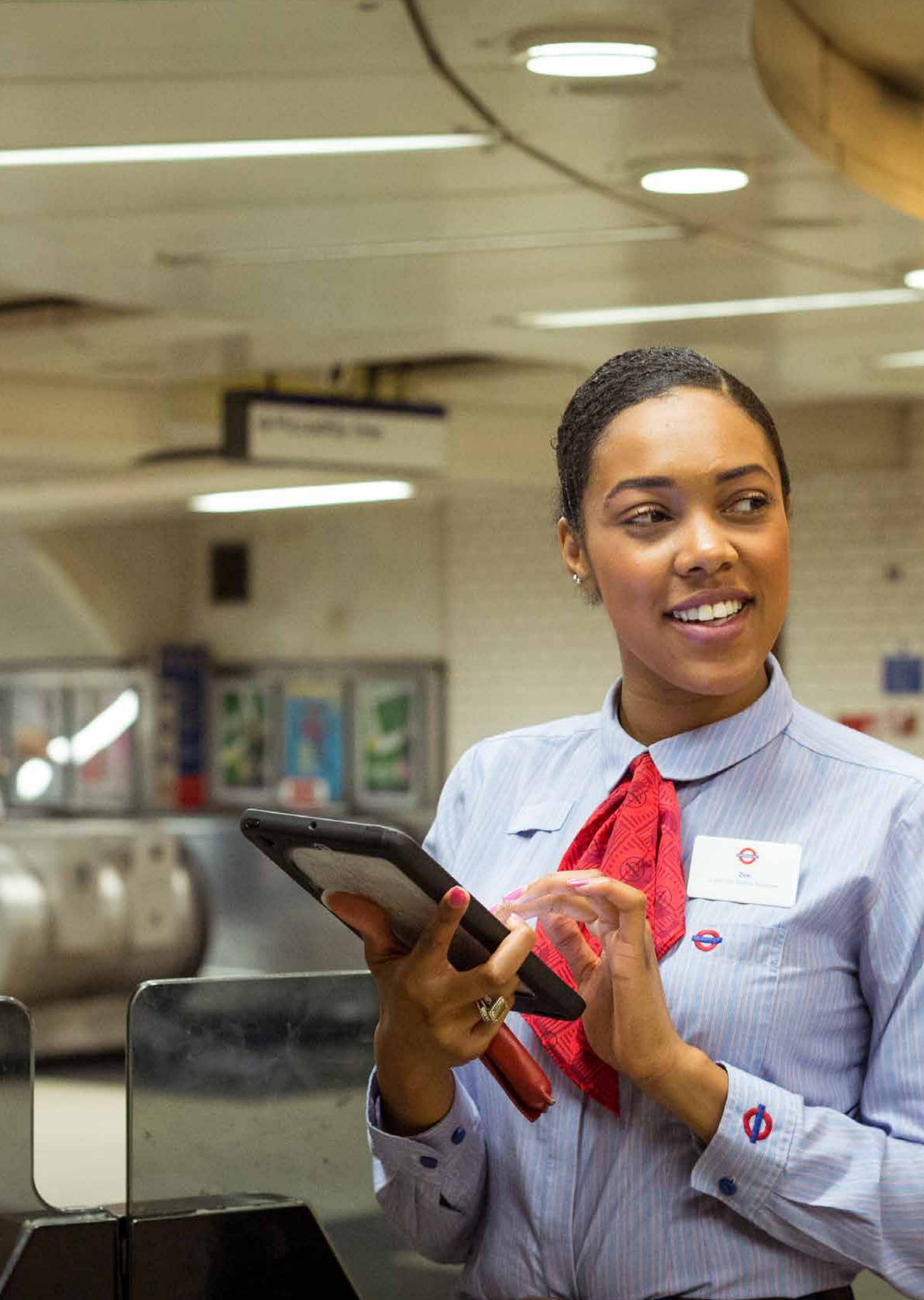
A development agreement was entered into in September 2022 which delivers improvements to the entrance on the south side of Euston Road. The developer has submitted conceptual design proposals for the King's Cross Euston Road entrance and we are working closely with their team to review these. The scheme unlocks a London Underground retail opportunity to mitigate any increase in operational cost as a result of a new lift in place between the street and Tube station.



We are collating a priority list of step-free options

JAY  
by ARICO





Knightsbridge station will have step-free access by summer 2023

#### Knightsbridge

Following the opening of the new Brompton Road entrance last quarter, we are on target to open the new Hooper's Court entrance which will provide step-free access in summer 2023. The project is currently undertaking works to bring the disused sub-level passageway, staircase and cross passageway back into customer use, which have been closed to the public since the 1930s. On completion of these works, these will form part of a new step-free access between street and platform level.

#### Leyton

In January, we were successful in securing funding from the HM Government Levelling up Fund. This will enable us to progress this scheme which will provide step-free access and wider station improvements to support the local area. While awaiting the outcome of the funding bid, we continued to work with our partners at the London Borough of Waltham Forest to finalise the concept design, which is expected to complete later in the financial year.

#### London Bridge

We are working with a third-party developer, Great Portland Estates, to open a new Borough High Street entrance. This would result in reduced journey times and congestion at street level, especially on Borough High Street itself. The project is currently awaiting the outcome of a planning inquiry related to the developer's planning application.

#### West Ham

We are working with a third-party developer, Berkeley Homes, to deliver a new ticket hall to serve the Twelve Trees Park housing development, comprising 3,847 units delivered in four phases. The main construction works associated with the new entrance are progressing well, with the construction of the bridge deck completed and the superstructure to begin being erected in March 2023.

Cable service diversions in the pavement are under way to enable construction of the staircase serving the footbridge linking the street with the podium of the new development. A second footbridge across the railway to the south of the station was installed in October 2022 and is expected to be completed during spring 2023 but will not be brought into public use until the development opens. The main structure of the new road bridge carrying Stephenson Street over the railway began installation in January 2023 and will continue through to summer 2023.

#### Waterloo

As part of a wider redevelopment scheme at Waterloo that will see Elizabeth House demolished, we are progressing agreements to ensure step-free access to the Northern line platforms is secured. This would involve constructing lift shaft structures and connections to the northbound platforms during the progression of the development works. This will enable the future fit-out of the lift shafts after the development, subject to future affordability.



### Stratford

Detailed design of the new south-western entrance nears completion and will enable the work to be on site in early 2023. It is a collaborative venture between the London Legacy Development Corporation, London Borough of Newham and the GLA, which are fully funding the capital works. We are coordinating with Network Rail which is designing a new customer lift for the underpass connecting the Jubilee concourse with other platforms within the station which will reduce congestion in the station and improve reliability.

### Acton warehouse

The demolition contract was awarded in October 2022 and work has started to remove the roof panels and enable service diversions. Demolition of the structure will begin in early 2023 with completion this financial year.

### Substation ventilation

Following the completion of 17 substations which are now fully upgraded, good progress continues to be made at Shepherd's Bush, Victoria and Notting Hill Gate. Development of the final two sites is now at an advanced stage, with the contract awarded for Bouverie Place on 30 June 2022 and Barons Court expected to be awarded in early 2023.



Work will begin in early 2023 on a new entrance at Stratford



# Technology

Forecast completion	Cost to date (£m)	Cost to go (£m)	Forecast cost (£m)	Programme and project authority (£m)	Variance: EFC versus authority (£m)
2022/23 to 2027/28	18	185	203	226	23
<b>Change since last Investment programme report</b>					
No change	7	(147)	(140)	No change	

## Financial commentary

Forecast cost has been aligned to the 2023 Business Plan, which follows an exercise to prioritise our spend across the business in light of our available funding. As a result, the forecast costs have been reduced as future projects which are not yet mature have been removed. These projects will be subject to future prioritisation reviews.

## Performance over time commentary

The portfolio has met our budget in the quarter, with a spend of £7m. Improved performance reviews are helping to drive better confidence in our delivery and the portfolio is expected to meet its full year budget. Forecast costs have been adjusted in light of prioritisation and ongoing deliverability reviews.

## Programme update

Our technology assets include a network-wide radio system and data network, as well as all the software to manage our assets and deliver customer service. The London Underground technology programme is a rolling annualised programme, consisting

predominantly of renewals works, with projects added each year based on prioritisation of business needs.

## Networks and connectivity

We are continuing to work well with our suppliers to upgrade key components of our Connect radio system, focusing now on rolling out new radio hardware base-stations. We have replaced key hardware at more than 200 of the required 293 locations and have met our strategic milestone for this financial year. This work will enable the Connect system to continue to function into the 2030s, and we are now starting work to ensure the long-term future of our operational networks.

We have also delivered Critical Incident Management, a range of interventions that help us to respond effectively to emergencies or safety incidents, at a total of 81 stations. These improvements enable us to effectively manage these stations during a critical incident and other key events. We are continuing to roll out this important safety functionality, and plan to have completed all works by early 2025.

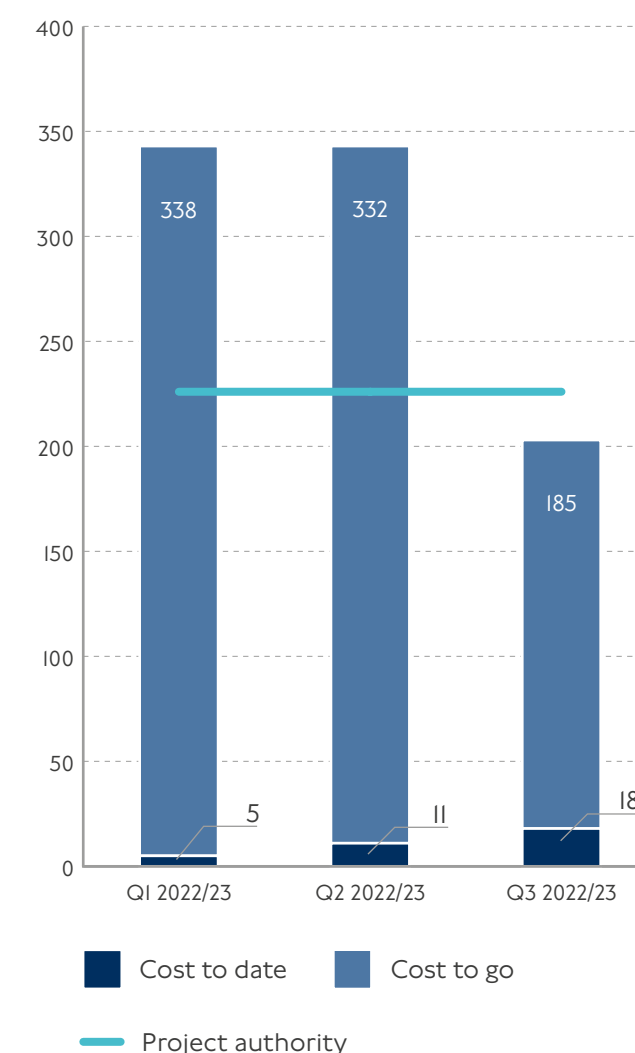
## Assets and staff tools

To improve our approach to asset management and long-term planning, we are consolidating our asset management information systems into a single tool for London Underground and London Trams. We are currently migrating London Underground assets onto this new single platform and have successfully completed the migration of several significant asset classes. Delivery has been delayed by around five months, primarily due to supplier performance. In response, we have brought all remaining elements of scope in-house and are now working to complete delivery in late 2023.

We have finalised the development of our new Competency Management System for train operations and brought this tool into service on the Piccadilly line on 5 December 2022. We are now closely monitoring the benefits of this new system and will use this information to inform a potential expansion of the tool to other areas of the business.

Finally, we have started work with our supplier to enhance our planning systems for station and track works as part of the RailSys project. This work will consolidate our works planning into a single integrated system, thereby improving efficiencies and reducing safety risks.

## Technology performance over time (£m)





# Surface transport

This comprises Healthy Streets, air quality, asset investment, public transport and surface technology





# Healthy Streets

Reporting period	Cost to date (£m)	Cost to go (£m)	Forecast cost (£m)	Programme and project authority (£m)	Variance: Forecast vs authority (£m)
2020/21 to 2024/25	332	410	742	531	(211)
<b>Change since last Investment programme report</b>					
No change	30	145	175	No change	

## Financial commentary

The five-year forecast from 2020/21 to 2024/25 has increased by £175m since the last report to align with the latest Business Plan and to reflect gross expenditure on third-party funded projects.

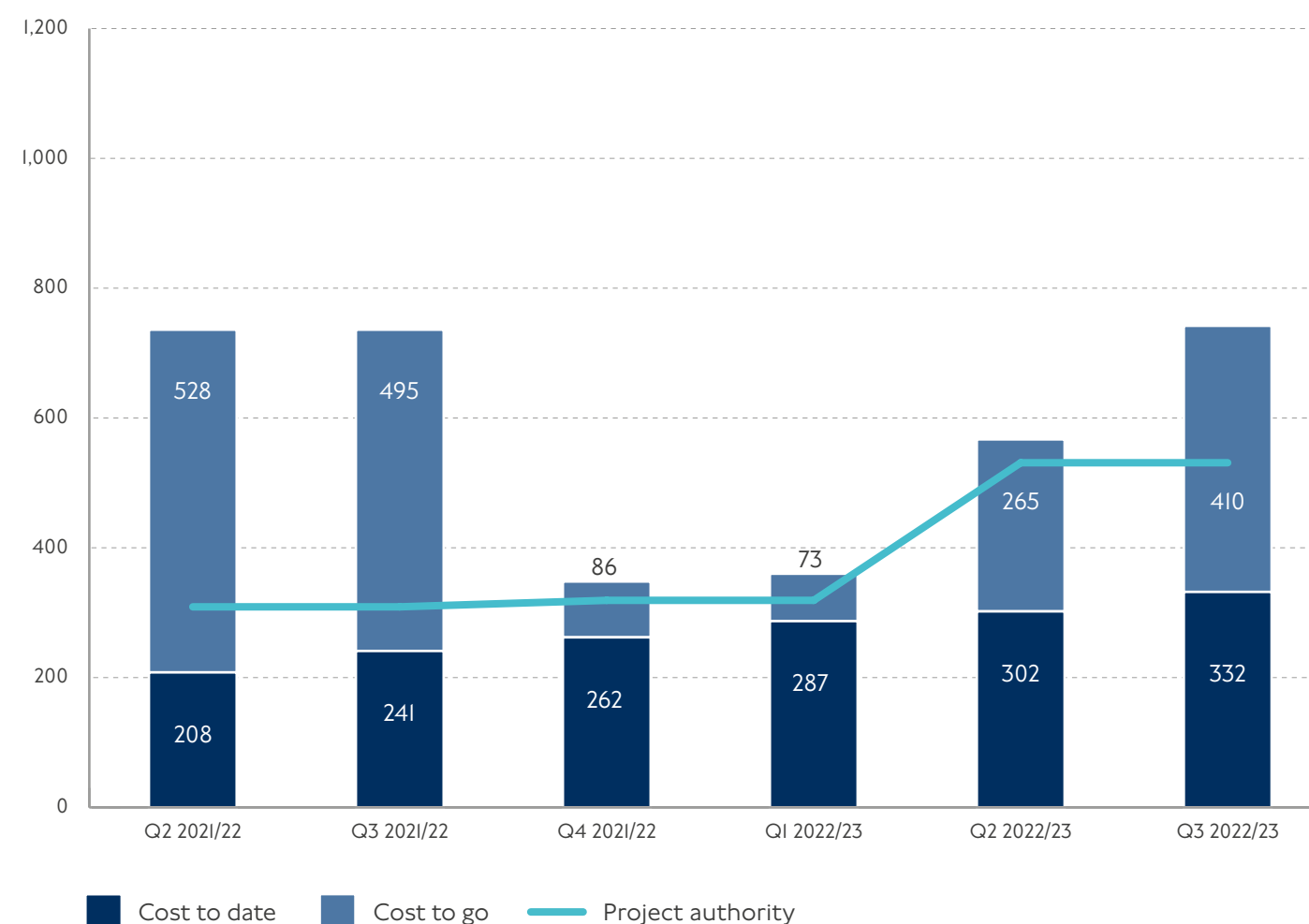
Our capital programme is in line with the funding settlement envelope agreed with Government over the two-year period for 2022/23 and 2023/24. This delivers our committed projects, with additional scope for capital renewals and active travel that have been enabled by the funding agreement. We will continue to provide funding to boroughs for investment in their streets, although this is accounted for as operating expenditure. The total investment in safe and active travel, across both operating and capital expenditure, is an average of £150m per year across the Business Plan 2022/23 to 2025/26.

## Performance over time commentary

Over the last six quarters, forecast spend on Healthy Streets was significantly reduced to reflect our ongoing funding constraints during the coronavirus pandemic as we forecast spend in line with a managed decline scenario. Following the latest funding announcement for Active Travel and 2022/23 to 2025/26 Business Plan, the Healthy Streets forecast has increased to £742m over five years and the projects have been remobilised.

The programme and project authority has remained at £531m following approval at the October 2022 Programmes and Investment Committee meeting. The approval covers forecasted spend to March 2024. The remaining £221m (£742m less £531m) of spend to March 2025 will be requested at a future Programmes and Investment Committee.

Estimated final cost performance over time (£m)





### Programme update

The Healthy Streets programme continues to reduce road danger in line with the Vision Zero action plan, as well as making it easier to walk, cycle and travel by bus across London. It will also accelerate progress towards mode shift, decarbonisation, economic recovery and tackling health inequalities.

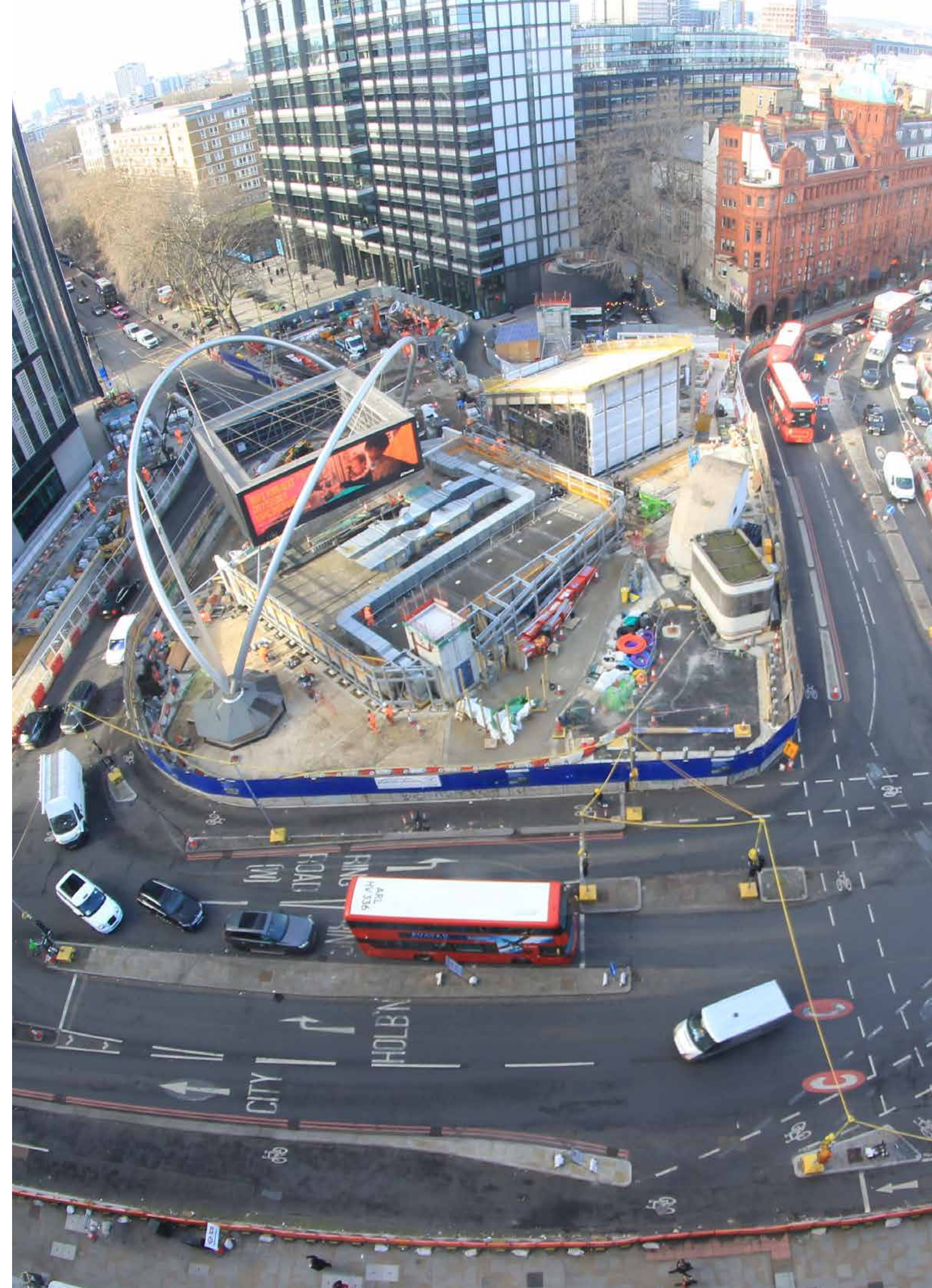
Recent highlights across the programme include the end to five public consultations for the temporary schemes installed as part of London's pandemic response. The responses are being analysed and decisions as to whether to retain, change or remove these temporary schemes will be made in early 2023. The London Borough of Camden carried out a public consultation on proposals for a Healthy Streets and safety scheme at High Holborn, Drake Street and Proctor Street. Works have completed on improvements to the temporary extension of Cycleway 4 through Greenwich and a new section of Cycleway 9 through Watermans Park. Lower speeds have been implemented on the A12 through Gants Hill in Redbridge and we have completed 227 traffic signal timing reviews to enable faster bus progression at junctions, saving more than 5,000 passenger hours every day. The longer-term funding settlement has also meant that boroughs have been able to progress a range of new Healthy Streets investments across the capital, including a cycle cross on Vigo Street across Regents Street to unlock a cycle route between Soho and Mayfair.

### Old Street Roundabout

Construction has continued with the highway works on the four approach arms to the junction, including the infilling of Subway 3 on the south-western side of the junction. Building work to the superstructure for the new main station entrance continues, with the green roof and glazing having started in January.

Works to the existing roof structure have continued, with installation of the external steelwork. Construction of the new passenger and goods lifts has continued with installation of the new lift cars now completed, ahead of standalone testing in spring. Refurbishment of the subsurface concourse area has continued with installation of new mechanical, electrical and communications equipment and installation of new shop fronts for the retail units. The power supply to the new switch-room to enable testing, commissioning and handover of the new assets was completed in January.

Once complete, the new design will make this busy location much safer and more inviting for those using sustainable transport modes. Cyclists will have segregated cycle lanes throughout the junction, and people walking in the area, using the station and changing between lines, will experience a major improvement in the quality of the built environment.



Work has begun on the new Old Street station entrance



#### **Cycleway 4 London Bridge to Greenwich**

Snagging work and pre-handover inspection walks continue along Evelyn Street from Bestwood Street to Deptford Church Street following completion of construction works in September. The project team, representatives from the supply chain and key stakeholders met with the walking and cycling commissioner Will Norman, and Councillor Louise Krupski, Lewisham's Cabinet Member for Environment and Climate, for a press opening event on 27 September. The Royal Borough of Greenwich's works to Creek Road Bridge are scheduled to begin from March 2023. The London Borough of Southwark started works on the temporary scheme for Lower Road in November 2022 between Rotherhithe Roundabout and Surrey Quays Road, which will complete the final section of a protected cycling route between London Bridge and New Charlton.

#### **Cycleway 9 East Kensington Olympia to Brentford**

Snagging works on Hammersmith gyratory were completed on 11 November while those on Chiswick High Road from Chiswick Lane to Goldhawk Road are nearing completion. Works on Chiswick High Road between Chiswick Lane and Heathfield Terrace are being delivered by the London Borough of Hounslow and progressing well following the start on site on 13 October. Owing to the proximity of retailers, the works were paused during the Christmas period and resumed on 3 January.

#### **Cycleway 23 Lea Bridge to Dalston**

The detailed design for Lea Bridge Roundabout is progressing and construction planning is well advanced ahead of planned start on site in early March 2023.

#### **Cycleway 37 Mile End to Westferry Lane**

Detailed design for the permanent scheme at Mile End Road junction is progressing and construction is planned to begin from late February 2023. Detailed design for the temporary to permanent scheme on Burdett Road is progressing and construction is planned to follow Mile End Road junction in November 2023.

#### **Cycleway 50 Finsbury Park to Tottenham Hale**

Detailed design for the TfL Road Network section from Caledonian Road to Finsbury Park is progressing and construction is planned for February 2023.

#### **Responding to the coronavirus pandemic**

The DfT's active travel fund has now delivered more than 25km of new or improved cycling infrastructure. Boroughs worked tirelessly to deliver ambitious schemes within short timescales, significantly expanding London's cycle network. Building on the success of the programme, cycling delivery will continue across London via the borough cycling programme. The programme will see both delivery and design of new cycling schemes by the end of this financial year.

Work continues on the Future of Temporary Schemes programme to determine the next steps for each scheme delivered through the Streetspace for London programme. Recent progress has included public consultations being held for the Park Lane and CS7 Clapham to Oval schemes. We will now review responses and scheme monitoring data to decide on the future for both schemes. We have also recently concluded public consultations for experimental schemes at Mansell Street, Cycleway 8 between Lambeth Bridge to

Chelsea Bridge, A21 Lewisham to Catford, and Bishopsgate.

Works to deliver improvements to the Cycleway 4 Extension scheme between Greenwich and Charlton have now been completed ahead of the scheme's transition from a temporary scheme to an experimental scheme in early 2023. We have also made some further improvements to the Park Lane scheme, including a new toucan crossing at Stanhope Gate to link cyclists from Park Lane to Mayfair.

London boroughs continue to work towards implementation of the new Low Traffic Neighbourhood schemes delivered under the active travel fund. Barking and Dagenham is in the final phase of delivery of its four schemes with Pondfields now complete and Barking Town Centre to follow, and Haringey has delivered Low Traffic Neighbourhoods at Bounds Green and St Anne's (Green Lanes). All schemes delivered through the fund are expected to be complete by the end of this calendar year.

#### **Lowering speed limits**

Lowering the speed of vehicles in London is key to reducing both the likelihood of a collision occurring and the severity of the outcome. The second phase of the programme is under way, and as detailed in the recent Vision Zero progress report, aims to reduce speeds on a further 140km of our roads.

Raised pedestrian crossings will soon be introduced at eight locations in Westminster and Enfield to further reduce danger to people walking and increase compliance with the newly reduced speed limit, as well as introducing accessibility benefits for mobility-impaired customers.

A new 20mph speed limit was introduced on 1.5km of the A205 in Wandsworth in early December 2022 and an extension to the existing 30mph speed limit at Gants Hill town centre came into force in early October 2022. Detailed design work is under way for proposals for a 40mph speed limit on the A4 Bath Road (currently 50mph).

In November 2022, we began local engagement on proposals to introduce a consistent 20mph speed limit across the majority of roads in Camden, Islington, Hackney, Tower Hamlets and Haringey, and detailed design is under way. By April 2023, we plan to reduce the speed limit on a further 28km of our road network.

A further 65km of our roads across the boroughs of Greenwich, Lewisham, Southwark, Lambeth, Wandsworth and RB Kensington and Chelsea is nearing completion of concept design. A new 30mph speed limit on A4180 Ruislip Road in Ealing is in detailed design. These projects are scheduled for delivery by October 2023.

The remaining 12km of our roads are in concept design. This will see new 20mph speed limits on selected roads in Wandsworth, Richmond, Sutton and Merton, as well as the A312 Harlington Road West in Hounslow. A new 30mph speed limit is proposed on the A4 Great West Road in Hounslow and new 40mph speed limits will be introduced on A4 Bath Road in Hillingdon, to complement proposed pedestrian safety improvements, as well as A406 North Circular Road in Enfield and Waltham Forest. These projects are scheduled for delivery by March 2024.





Lowering speed limits is a key way to reduce collisions

### Safer Junctions

In April 2017, the Safer Junctions programme highlighted 73 of the most dangerous junctions on our road network, defined as those with the highest vulnerable road user collision rates. Improvements have been made at 43 of these junctions. Design work continues on the remaining 30 junctions, including detailed design of York Road roundabout and Holloway Road/Drayton Park, which are respectively delivering motorcycle and pedestrian safety measures.

A new 20mph speed limit was introduced in early December 2022 on A205 Upper Richmond Road through the junction with Putney Hill/Putney High Street. This is the first phase of a three-stage approach to reduce road danger at this location.

In November 2022, we began consulting the public on the second phase of improvements at Battersea Bridge junction with Cheyne Walk, which will include new crossings on the remaining arms of the junction, as well as safety improvements for cyclists. In November 2021, a new pedestrian crossing was commissioned at Battersea Bridge, where a person was tragically killed at the beginning of 2021.

We are committed to public engagement on potential changes to 10 further Safer Junctions by the end of 2024.

### Bus Priority Programme

We have been undertaking a desktop assessment to identify additional locations across London where more bus lanes would improve bus reliability and journey times. Through internal consultation and assessment, we have identified around 30km of bus lane based on strategic data and available road space. Two thirds of these locations are on the borough road network and were shared with the boroughs in January to take forward into feasibility. This is to meet the Government target of delivering 25km of new bus lane by March 2025. Currently 2.84km has been delivered and we are on target to deliver a total of 10km by March 2024.

We have worked to reprioritise both the TfL-led and the borough-led bus priority programme. Through consultation with the boroughs, we have been able to fund 85 bus priority schemes in 2022/23. These include some for delivery, starting this financial year, such as Prince Regent Lane in Newham – which will see 600 metres of new bus lane constructed – and funding for design work which will move into construction in 2023/24. We have also been able to offer design support to boroughs through our embedded resource contract.

Changes to 65 of our traffic signals to improve bus journey times have been identified for 2022/23 and 12 upgrades have already been implemented with 53 on track for the end of March. By the end of 2022/23, a total of 1,200 signal timing reviews will be completed.



# Air quality

Reporting period	Cost to date (£m)	Cost to go (£m)	Forecast cost (£m)	Programme and project authority (£m)	Variance: Forecast vs authority (£m)
2020/21 to 2024/25	268	445	714	459	(225)
<b>Change since last Investment programme report</b>					
No change	18	158	177	No change	

## Financial commentary

The five-year forecast cost from 2020/21 to 2024/25 has increased by £177m since the publication of the last report. This is primarily due to the inclusion of the scrappage scheme customer payments following Mayoral approval and funding from the GLA's grant of £110m. The Quarter 3 forecast reflects an increase of £80m for renewal delivery of road user charging schemes such as the re-let of contracts and delivery of the business operations system in-house. This increase is part of the first draft of the renewals prioritisation exercise which was finalised in January 2023. There has also been re-phasing within the portfolio after the go live date was changed from October 2025 to September 2026.

The forecast vs authority variance of £255m includes programme and project authority of £174m to support the delivery of the following road user charging projects: London-wide ULEZ, Scrappage Scheme, Tunnel User Charging and Direct Vision Standard Phase 2. This was approved at the Programmes and Investment Committee meeting on 14 December 2022 (PI0).

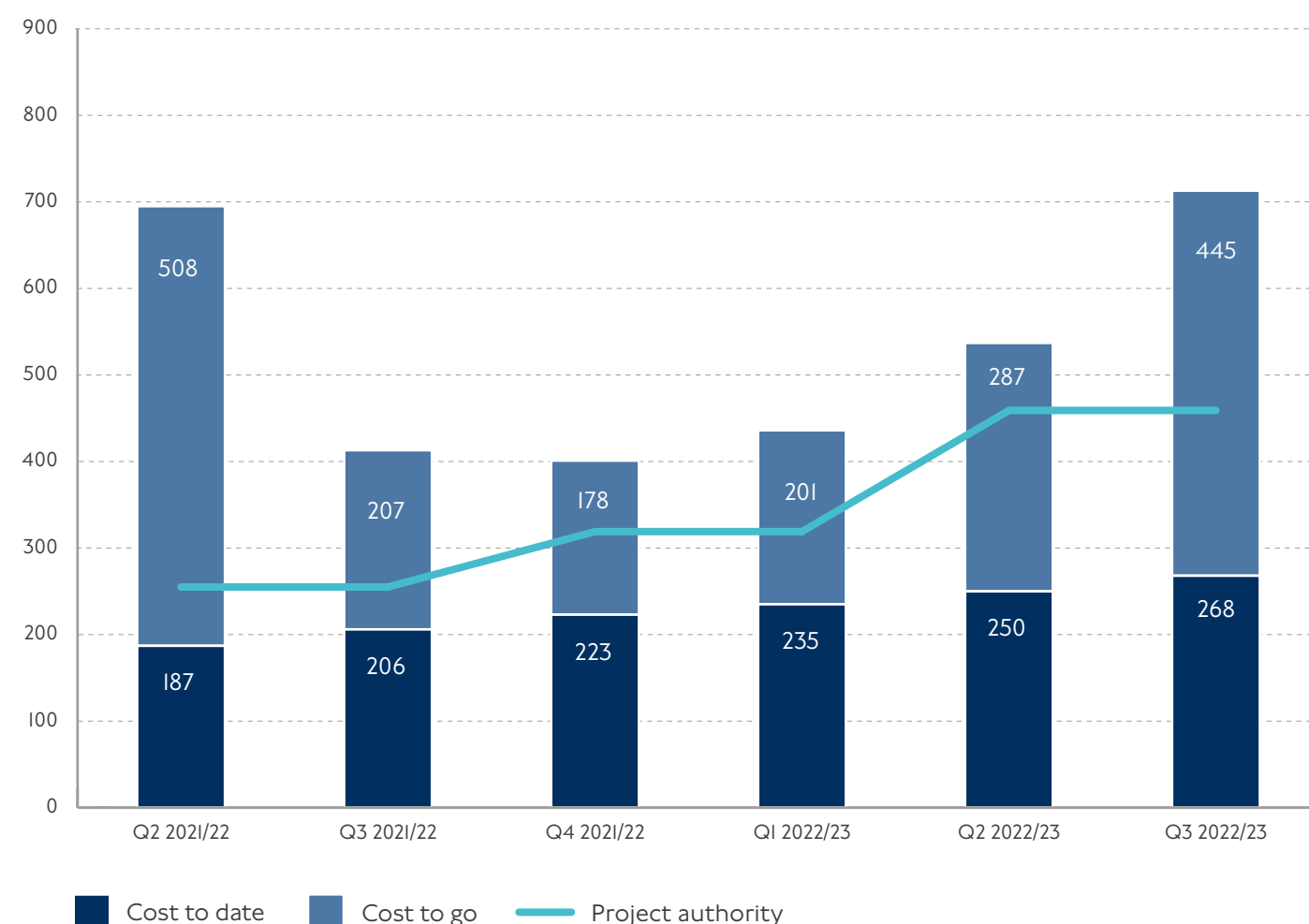
## Performance over time commentary

Over the last six financial quarters, our forecast cost has fluctuated, driven by funding challenges brought about by the pandemic, which has meant several projects had to be put on hold. However, since Quarter 1 2022/23 and the funding agreement that was confirmed in August 2022, the position has improved. The ULEZ expansion for 2023, following Mayoral approval, as well as the associated scrappage scheme, is now part of the portfolio forecast.

Programmes and Investment Committee approved £174m programme and project authority on 14 December 2022, this was a request covering Capita costs for Tunnel User Charging, London-wide ULEZ, Scrappage Scheme and Tech and Data support across Direct Vision Standard Phase 2, London-wide ULEZ and Tunnel User Charging.

A further request will be made next financial year in the Air Quality sub-programme's Programmes and Investment Committee paper in March to further bridge the gap of the £255m.

Estimated final cost performance over time (£m)





### Programme update

#### Electric vehicle infrastructure delivery

It is expected that London will need between 40,000 to 60,000 electric vehicle charging points by 2030, including up to 4,000 rapid chargers. This infrastructure could help support a reduction of carbon dioxide emissions of between 1.5 and 2.6 million tonnes per year. The Mayor has committed to supporting the continued roll out of charging points alongside the private sector, to help meet exponential growth in demand and contribute towards achieving a net zero-carbon London by 2030.

We have now assessed more than 1,600 individual sites across the GLA estate, with the first batch of 25 sites released to the market on 30 November, as planned. As well as evaluating bids from prospective suppliers, we will be looking to accelerate the release of further batches in the new year. We are also exploring options to broaden the numbers of sites that we can release to the market, to help deliver the volume of charging infrastructure set out in the London electric vehicle strategy by 2030.

#### Zero-emission bus fleet

We continue to add zero-emission buses to the London fleet as quickly and affordably as possible, with an aim to make the entire fleet zero-emission by 2034, plus options for bringing this forward towards 2030 if funding for vehicles and infrastructure can be provided by the Government.

There are now more than 915 zero-emission buses in the fleet, operating across multiple bus routes in London, helping to reduce carbon dioxide emissions across the capital. We continue to remain open to trialling new zero-emission technology; the fleet already includes 20 double deck hydrogen fuel cell buses and in October 2022, 18 new double deck buses, which are boosted by a high-powered pantograph ('opportunity' charging infrastructure) located at Bexleyheath bus garage on route 132, joined the fleet. Additionally, in November 2022, we launched one of the new single deck opportunity charged buses that will be used on route 358 from next year, operating with 20 new electric buses and with charging infrastructure at either end of the route – both types of technologies can support longer mileage routes in London.

We are aiming for around 10 per cent of our 9,000-strong fleet to be zero-emission by early 2023, subject to manufacturing supply chains and vehicle delivery, and the essential upgrade of power at multiple bus garage sites around London.

A move towards zero-emission will not only support the Government's wider plans to cut carbon dioxide emission in the UK by 68 per cent compared to 1990 levels by 2030, but support British manufacturing, innovation and jobs – and reduce reliance on vehicles powered by fossil fuels.

#### Road User Charging

On 25 November 2022 the Mayor announced his decision for the Ultra Low Emission Zone (ULEZ) to be expanded London-wide to tackle the triple threats of air pollution, the climate emergency and congestion. The announcement follows a public consultation on the proposals which ran between May and July 2022, in which 59 per cent of respondents agreed that more needed to be done to tackle toxic air.

The ULEZ expansion is forecast to make further progress to reduce air pollution by reducing nitrogen oxides emissions from cars and vans in outer London by 10 and seven per cent respectively, and reducing PM2.5 car exhaust emissions in outer London by nearly 16 per cent, benefiting five million outer London residents. Expanding ULEZ London-wide will save 362 tonnes of nitrogen oxide in outer London, a 57 per cent increase on what the central London ULEZ achieved in its first year of operation. The expansion will come into effect on 29 August 2023 and will operate across all London boroughs up to the GLA boundary.

The ULEZ expansion is now accompanied by a new £110m scrappage scheme which launched on 30 January 2023 and applications are now being accepted to support Londoners on lower incomes, disabled Londoners, charities and small businesses and sole traders. Successful

applicants will receive a grant to scrap or – for the first time – retrofit their vehicle for certain vans and minibuses. Car owners can opt to receive a smaller grant accompanied by up to two free annual bus and tram passes. New measures are also being introduced to support disabled people, including extending the existing exemption periods for London's disabled drivers, and further support is being offered to Londoners through removal of the fee for drivers to sign up to Auto-Pay for the ULEZ and Congestion Charge.



# Asset investment

Reporting period	Cost to date (£m)	Cost to go (£m)	Forecast cost (£m)	Programme and project authority (£m)	Variance: Forecast vs authority (£m)
2020/21 to 2024/25	293	275	567	494	(73)
<b>Change since last Investment programme report</b>					
No change	27	(38)	(11)	No change	

## Financial commentary

The five-year cost forecast from 2020/21 to 2024/25 has reduced by £11m since the publication of the last report, as it was necessary to defer activities under several larger schemes to ensure that an affordable programme aligns with our most critical asset priorities.

This deferral has also lowered the required programme and project authority up to 2024/25 by the portfolio. The current level of programme and project authority granted in May 2022 covers some, but not all, of the expected spend for 2024/25, so further authority is likely to be required to ensure sufficient funding for that period, though the level of funding needed will be kept under constant review.

The portfolio is actively seeking further funding from external sources, such as the DfT's Major Road Network programme, to enable an acceleration of key renewal schemes such as the Gallows Corner flyover and Brent Cross structures.

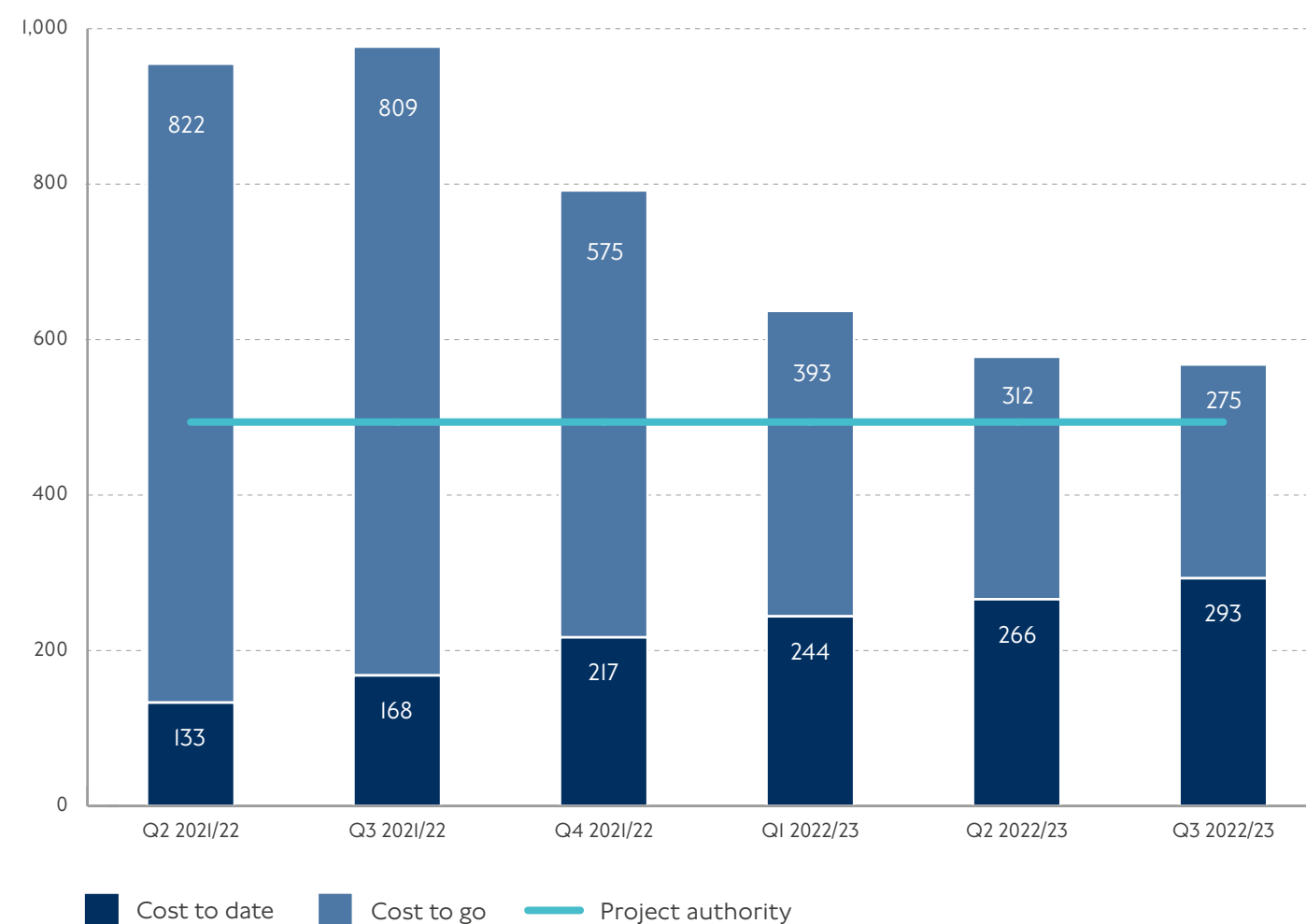
Also, the asset investment portfolio has delivered £5.5m of cost reductions so far this financial year, as project teams found more efficient ways of working and gained increased value for money from suppliers. This represents an improvement on the savings found at this same stage of the previous financial year.

## Performance over time commentary

Over the last six financial quarters, our forecast cost has seen a general decreasing trend, driven by funding challenges following the recent pandemic. This has resulted in several projects being deferred.

Due to the above, our programme and project authority was not required to be increased at the May 2022 Programmes and Investment Committee meeting. This includes all spend up to the end of 2023/24.

Estimated final cost performance over time (£m)





### Programme update

Work is under way to ensure the safety and operability of our highest priority assets that need urgent renewals, including critical tunnels and structures.

### Blackwall Tunnel southbound

The project aims to renew critical systems that support tunnel operation, including lighting, concrete repairs and CCTV. Following detailed modelling assessments, we have selected a preferred construction option: a series of weekend and night closures to minimise impacts on people and goods needing to cross the river. The tender documents for the detailed design and build stages were issued in September. We plan to appoint a contractor to progress the next stages of the project by April 2023, subject to the updated business case demonstrating the scope, cost and programme provides the best value for money solution.

### Gallows Corner

The Gallows Corner flyover is one of our highest-priority assets to renew due to its age, condition and the current restrictions in place. Following the completion of design and feasibility work, we have selected a preferred option to fully refurbish and strengthen the flyover. We have briefed external stakeholders who are supportive of the selected option. The option selected has 30 per cent of the scheme carbon compared to the alternative of a full replacement. We submitted a draft outline business case to the DfT seeking a funding contribution through the Major Road Network Programme and they have sent us comments.

Site investigation works are complete and the result of these are due by early 2023. As assessment of the existing foundations has begun. A separate concept design contract has also been awarded and will utilise the investigation and assessment outputs to ensure a robust design is completed. We are now updating a final version of the outline business case which we will submit to the DfT following completion of the foundations assessment in February 2023.

### A40 Westway

Following the successful completion of the major joint replacement, the project is now focused on delivering the remaining scope and work packages. This includes further joint replacements, parapet renewals and repairs to concrete deterioration.

Concept design work for the remaining elements has been submitted and will be signed off early in the new year. Planning work to determine the best delivery approach for the remaining joints considering asset risk, financial constraints, network access and the route to market is under way and expected to be finished by early 2023.



We continually review critical tunnels and structures





The design of the refurbished Rotherhithe Tunnel is complete

### Rotherhithe Tunnel

We have completed the design work and preparation of tender documents for the detailed design and build procurement stages of the refurbishment project.

However, due to the need to retain sufficient cross river travel opportunities while the works take place at the Blackwall Tunnel, the next nearest road crossing in the east, it is now expected that the full refurbishment of Rotherhithe will not take place until after the Silvertown Tunnel opens in 2025.

A series of short-term capital interventions are being put in place to ensure the tunnel remains safe and operable until the main refurbishment project is progressed. The procurement activity for some of the short-term capital interventions, including the fire main and tunnel lighting, has been completed and a contract awarded to progress feasibility work. Investigations works are being planned and will start in early 2023. Options for delivery will be developed by May 2023 to inform decisions on the best value for money.

### Hammersmith Bridge

We released our third of the share of the costs for the stabilisation works, which meant that the London Borough of Hammersmith & Fulham started works earlier in 2022. These works are expected to be completed in early 2023. Alongside the DfT, we continue to support the borough in developing a business case for the longer-term strengthening works.

### Carriageway renewal

Work to renew a revised target of 230,000 square metres of carriageway continues at pace, with more than 100,000 square metres delivered to date. We have now completed 20 resurfacing schemes, which includes recently completed works on the A127 westbound Southend Arterial Road from Cecil Avenue to Hall Lane, A3 Kingston bypass northbound and A501 Marylebone Road. In the next quarter we plan to deliver more schemes on the network, including A4 Cedars Road, A205 Tulse Hill and A10 Rectory Road. Design work to facilitate future years' renewals is also progressing well with 24 preliminary designs and sixteen detailed designs now completed.



# Public transport

Reporting period	Cost to date (£m)	Cost to go (£m)	Forecast cost (£m)	Programme and project authority (£m)	Variance: Forecast vs authority (£m)
2020/21 to 2024/25	170	295	466	283	(183)
<b>Change since last Investment programme report</b>					
No change	12	(46)	(33)	No change	

## Financial commentary

The £186m variance to forecast versus authority is due to programme and project authority only being sought up to 2023/24 and future known commitments, whereas the forecast cost is to the end of 2024/25 for all known expenditure. There is no change to the programme and project authority approved in the July 2022 Programmes and Investment Committee submission.

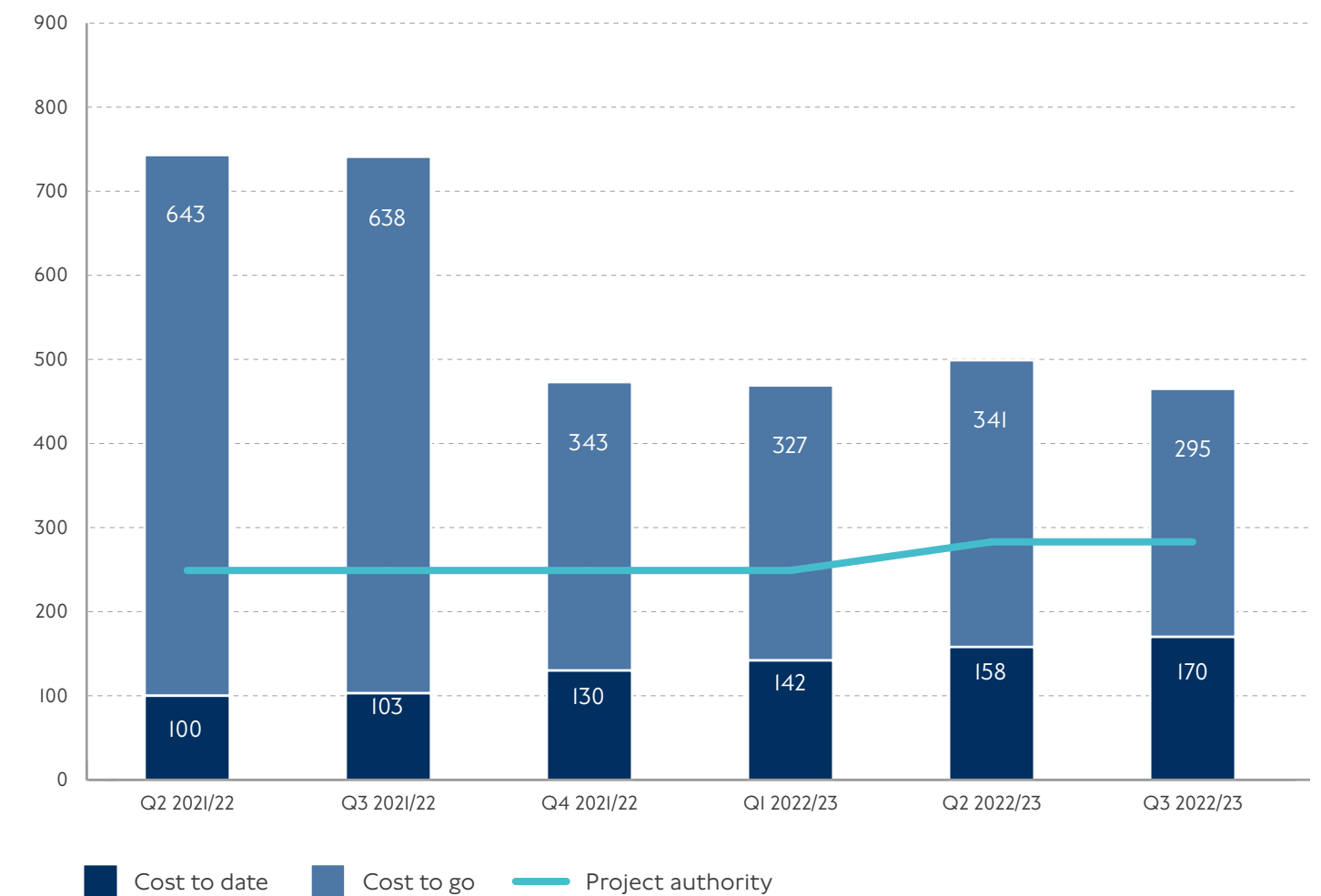
The Quarter 3 forecast reflects an increase of £1m for renewal delivery across the rail network of assets to help ensure our network remains reliable. This increase forms part of the first draft of the renewals prioritisation exercise which was finalised in January 2023.

The East London line Housing Infrastructure Fund programme was granted programme and project authority at the Programmes and Investment Committee meeting in July 2022 of £92.65m for phase one. The workstreams include Surrey Quays, signalling, power and bus upgrades at Canada Water. The Quarter 3 forecast reflects a £45.8m reduction in the five-year view mainly due to £10m slippage on phase one into 2026, in addition, the phase two reported EFC now sits in line with the funding awarded. Funding against phase two, which includes additional train stabling and Surrey Canal station to be confirmed.

## Performance over time commentary

Over the last six financial quarters, our forecast cost has seen a general decreasing trend, driven by funding challenges following the recent pandemic. This has resulted in several projects being deferred.

Estimated final cost performance over time (£m)







We are upgrading signalling and power on the London Overground

### Programme update

#### London Overground

In support of the Housing Infrastructure Programme funded upgrade works on the East London line, we are now at the detailed design stage. Phase one of the two-phased approach includes expansion of the existing Surrey Quays station, together with power and signal upgrades to support significantly more housing in key opportunity areas.

In addition to the main Surrey Quays stations works, as per the Grant Determination Agreement, the team is also progressing traction power and signalling upgrades to support service capability uplift above 16 trains per hour. We entered into the design contract with Network Rail on 7 October for the power upgrade and we are progressing the invitation to tender for the signalling works.

#### Class 710 trains

Manufacturer Alstom has delivered 50 of 54 Class 710 trains to London Overground. The last four trains are expected to be accepted in Quarter 4 2022/23 and Quarter 1 2023/24 dependent on material supply for pre-sale defect rectification and completion of the delayed train control software development testing.

#### London Overground renewals

Renewals delivery has been accelerated during the last quarter with contractual commitments of circa £800,000 agreed. Works delivery has begun for the telephone switching upgrade, lineside and station SCADA renewals and lifts renewals, which together will deliver more than £1.3m of renewal works.

Complex renewal schemes continue to progress well. A number of rooms are nearing completion on the Operational Building Complex accommodation reconfiguration project, with full completion forecast for early March 2023. The detailed design has been completed and accepted for the Class 378 train cab simulator renewal. In addition, a compliant bid has been received for the replacement of the East London line signalling control system through the R for London Infrastructure Improvement Framework (IIF) and is under evaluation.



## DLR

Procurement activities for the renewal portfolio continue, with priority given to critical and safety-related projects. The team, including our contractors, continues to assess the impact of price rises and the availability of materials such as steel and resources in the current volatile market. Retaining key staff is a concern, with several engineers having left the business this period. Recruitment is challenging to attract and retain competent staff in commercial, sponsorship and engineering teams.

The replacement bogie frame project for the B92 train type is progressing well and the software trials will take place from 25 to 27 January 2023. If successful, the full roll out will be delivered over the next 16 weeks. The software install is required on all I10 train units.

High voltage projects were impacted by the UK Power Networks substation fire at Poplar in March 2022, which required some key projects to be re-programmed so as not to impact services. The Poplar transformer has been installed successfully and it is now in service.

Automatic people counters at 26 stations have been installed and commissioned into service across the network. For the renewal of long line public address systems, site installation has begun. This system is used for station announcements, which are essential for evacuations as the majority of DLR stations are unstaffed.

Canary Wharf and Heron Quays low voltage renewals have started works on site after designs approval. We will replace old lighting with new LED fittings and expect to see significant drops in our consequent power usage at these key stations.

The lift system upgrade project continues to make good progress, with more than 80 per cent of the lifts now completed and back into service. Escalator refurbishments at Cutty Sark and Tower Gateway return to service this period. South Quays escalator refurbishment has begun.

Platform surfaces and stair treads have been completed. Works have started on the listed Limehouse arches with agreement reached with the Canal & River Trust to work above their main canal feed into Limehouse Basin.

The GLA-funded Royal Docks stations programme has completed an update of the costs for design and construction works at Pontoon and Royal Victoria which are now being assessed against budget. An options study has also been progressing for the proposed new station at Thames Wharf.



We're installing new software on I10 DLR train units



### London Trams

Our rolling stock replacement programme will replace the life-expired Bombardier CR4000 trams, which are experiencing declining reliability and have one of the lowest states of good repair categorisations across our fleets. Early market engagement is complete, which has informed the procurement strategy. It was confirmed at our internal Investment Group meeting that replacement of the CR4000 trams is the preferred option following the stage gate two review, however, full funding for replacement of the trams, alongside our other rolling stock, has not yet been established.

Initial assessments of infrastructure requirements to facilitate a new fleet have also been completed, which have informed the overall programme update.

Installation work for both the wayside and on-tram upgrades to communications equipment was paused in December 2021 so that the project team could investigate and rectify an increase in the number of communication faults, which are affecting the reliability of tram operations. Wayside site installation works are currently ongoing, which are a precursor to deployment of a correct-side door enable system on the Bombardier CR4000 trams. The wayside installation works were completed in mid-November 2022.

Our renewals programme continues across five asset groups: rolling stock, power, civils, systems, and permanent way infrastructure.

The first phase of the Mitcham-to-Mitcham Junction ballasted track renewal works was completed as planned during a 10-day part closure of the tramway from 4 to 12 April 2022. The second phase was delivered during another 10-day part-closure of the tramway from 22 August to 1 September 2022. The final phase is scheduled for delivery during a planned 12-day closure in February 2023.

The tender process for a new framework contract for embedded track renewals was concluded in June 2022, and the contract was awarded in August 2022. It was originally planned to deliver Church Street track renewal as the first package under this contract in October 2022, however this has now been rescheduled for April 2023 owing to delays for materials with a longer procurement lead time to delivery.

Site work started in April 2022 to replace the retaining wall and step-free access ramp at Birkbeck tram stop. Following completion of site investigations, the current plan is to re-phase the works, with a target start on site in Quarter 1 of 2023/24 and bringing into use by Quarter 2 of 2023.

This is to allow for an additional utilities survey to take place to facilitate lowering of shallow services by the utility companies, and for the contractor to adequately protect mature trees within the worksite.

Following detailed investigations and asset condition assessment, the recommendation to proceed with replacing the underframe of Tram 2547 (Bombardier type tram) was accepted and Alstom instructed to proceed with the works to return the tram to service in August 2023.

A contract was awarded to start the planned works in May 2022 to replace fire doors at the London Trams depot and to ensure compliance with current fire safety standards. However, due to supplier delays, works are now expected to start in February 2023.

The tender process to refurbish key components of the CR4000 Bombardier tram fleet (flooring, doors and rooftop) was concluded in June 2022, and the contract was awarded in August 2022.

The passenger information display on the Stadler Variobahn Trams was replaced in December 2022.

### Woolwich Ferry (London River Services)

The Woolwich Ferry resilience and renewals programme is made up of schemes across several disciplines, which are all currently at various stages of the project delivery life cycle.

The key aim of these schemes is to reduce operating expenses, maximising use of assets and exploiting opportunities to generate additional revenue where possible. Projects in the resilience and renewals work bank will support the delivery of the Woolwich Ferry business strategy, improve operational safety and make the services more reliable.

The focus for the past few periods has been on establishing clear priorities across the work bank. This includes high priority maintenance schemes such as the link-span maintenance contract which is currently out for tender and the dry-dock/refit works, which will procure a contractor before the end of 2022/2023.



# Technology

Reporting period	Gross cost to date (£m)	Gross cost to go (£m)	Forecast cost (£m)	Programme and project authority (£m)	Variance: Forecast vs authority (£m)
2020/21 to 2024/25	73	163	236	173	(63)
<b>Change since last Investment programme report</b>					
No change	8	37	45	No change	

## Financial commentary

The five-year forecast for 2020/21 to 2024/25 has increased by £45m since the last report. This is primarily due to the alignment of the work programme against available funding and this increase forms part of the first draft of the renewals prioritisation exercise expected which was finalised in January 2023.

The £63m variance to forecast versus authority is due to programme and project authority only being sought for 2022/23 and future known commitments whereas the forecast cost is to the end of 2024/25 for all known expenditure.

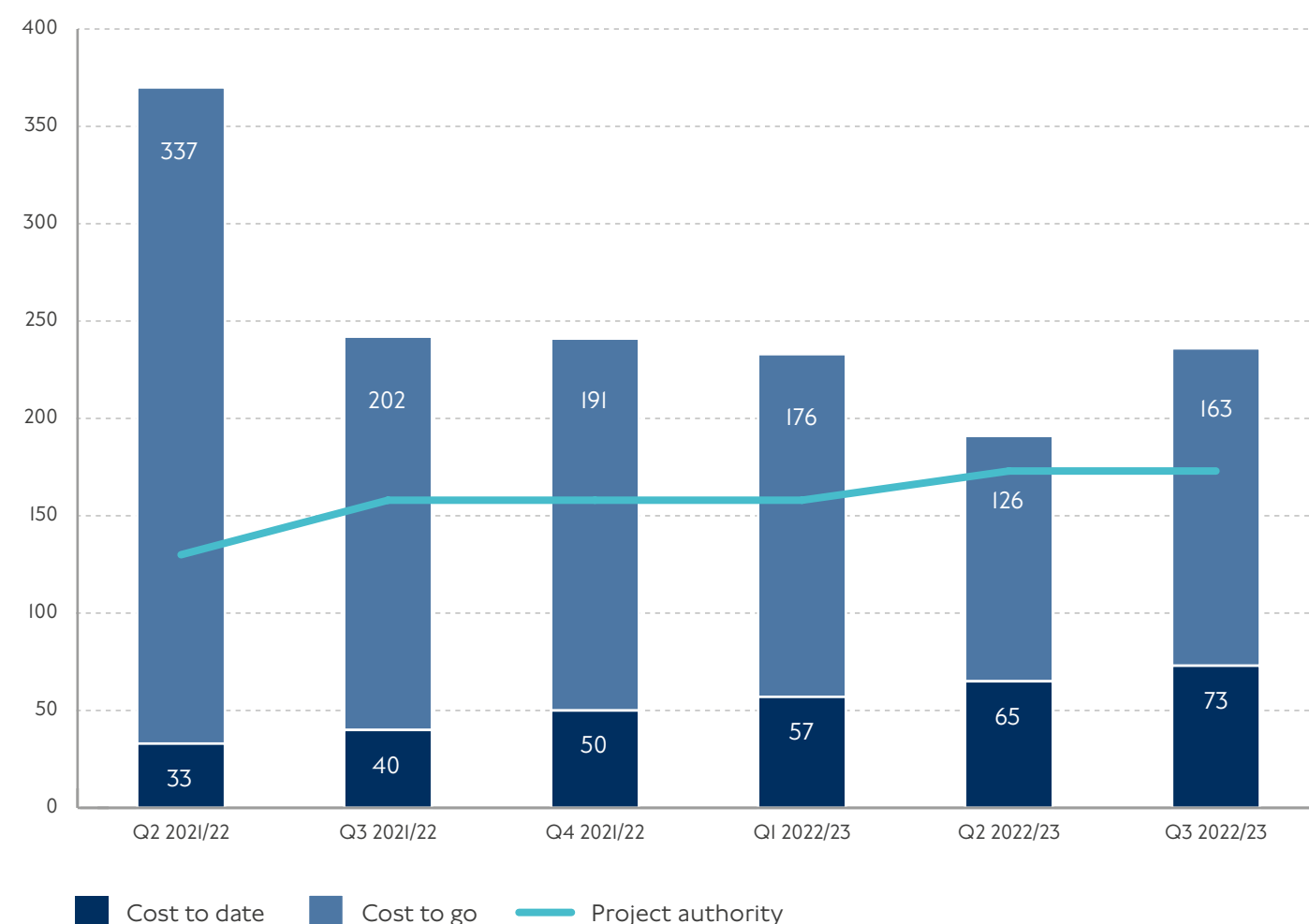
The Technology portfolio continues to face financial constraints and key decisions are needed on prioritisation of schemes in order to meet contractual, legal, safety and regulatory requirements.

## Performance over time commentary

Over the last four quarters, forecast spend for Surface Technology was significantly reduced to reflect our ongoing funding constraints during the coronavirus pandemic as we forecast spend in line with a managed decline scenario. This meant that only the enhancements required to secure legal compliance or future financial sustainability could be progressed.

Further programme and project authority will be sought from the Programmes and Investment Committee in July 2023 which will bridge the gap of £63m.

Estimated final cost performance over time (£m)







We're rolling out enforcement cameras on our roads

### Programme updates Compliance, enforcement and safety technology

We are continuing to progress the roll out of deployable enforcement cameras on our road network. These cameras enable us to target specific safety and non-compliance hot spots and are expected to make a significant contribution to helping us meet our Vision Zero goal. They are currently operational at 43 high-priority locations, selected on the basis of their recent safety and compliance records and have already resulted in more than 50,000 penalty charge notices being issued. We are now closely monitoring changes on driver behaviour and road safety, with early indications suggesting that the cameras have already delivered some significant benefits with improved compliance at multiple sites. To build on this early success we have begun a second phase of camera installations, aiming to further expand their use across London. We have already identified sites for a number of cameras to be installed this financial year and have started site enablement work. This should result in delivery at around 60 more sites by April 2023 and up to an additional 200 by April 2024.

Any money recovered from the penalty charge notices will be reinvested into maintaining a safe and efficient road network for everyone travelling in the capital. The cameras are used for enforcement of civil traffic rules only and are fully compliant with data protection legislation.

### Road technology

We are leading the way in delivering innovative new road management systems. These are delivered within the Surface Intelligent Transport Systems programme and will enable a multi-modal approach to managing the road network. The programme continues to deliver the two core replacement systems, including the real time optimiser to manage traffic lights more effectively and the common operating view incident management system to enable more effective management of incidents. These systems will reduce delay and improve journey times. Both projects are prioritised as operationally critical renewals.

The common operating view incident management system successfully delivered a further release of software (R5.2) on 24 November 2022. One more release is now planned for March 2023 which will see it fully replace the old incident management system. Positive feedback from users continues to be received on the new system and this increases confidence that the old system is on track to be fully decommissioned early next year.

There are two further elements of the Surface Intelligent programme currently paused but we aim to restart in the new financial year (2023/24). These are predictive, which aims to forecast the impact of an incident to improve response times and reduce delays, and video analytics which will provide improved real-time modal data on road usage across London.



### Public transport technology

We are maintaining and developing technology to operate our public transport networks and improve the customer experience. This includes upgrading the critical technology systems that underpin the bus network, such as the iBus system which provides real-time information on bus locations. The tender process to select suppliers for the iBus2 software replacement project is progressing.

We have now concluded the competitive dialogue phase with the iBus2 bidders and responses to the invitation to submit final tenders are expected in early 2023.

Procurement has progressed for a replacement booking and scheduling system for Dial-a-Ride, which will give passengers the option to book online and enable us to deliver more trips with the same number of vehicles. Shortlisted bidders were invited to submit final tender in April 2022. Following this, we have selected a preferred bidder and the contract has now been signed. We expect to begin delivery in late early 2024.

### E-scooter rental trial

The London e-scooter rental trial has been operating for more than 18 months, with 10 participating boroughs making up a continuous trial area. In the period ending 19 December 2022, 85,000 trips were made with a total fleet size of 4,755 vehicles. This brings the total to 2.1 million trips for the trial to date. In response to recently updated DfT guidance that allows e-scooter trials across the UK to run until 31 May 2024, the business launched a competitive procurement to select operators for the next phase of the London trial. The current

contracts with operators Dott, Lime and TIER were extended to continue services until this procurement is complete.

### Santander Cycles

Over the last 12 months, 11.6m hires have taken place with 2022 being a record year for hires.

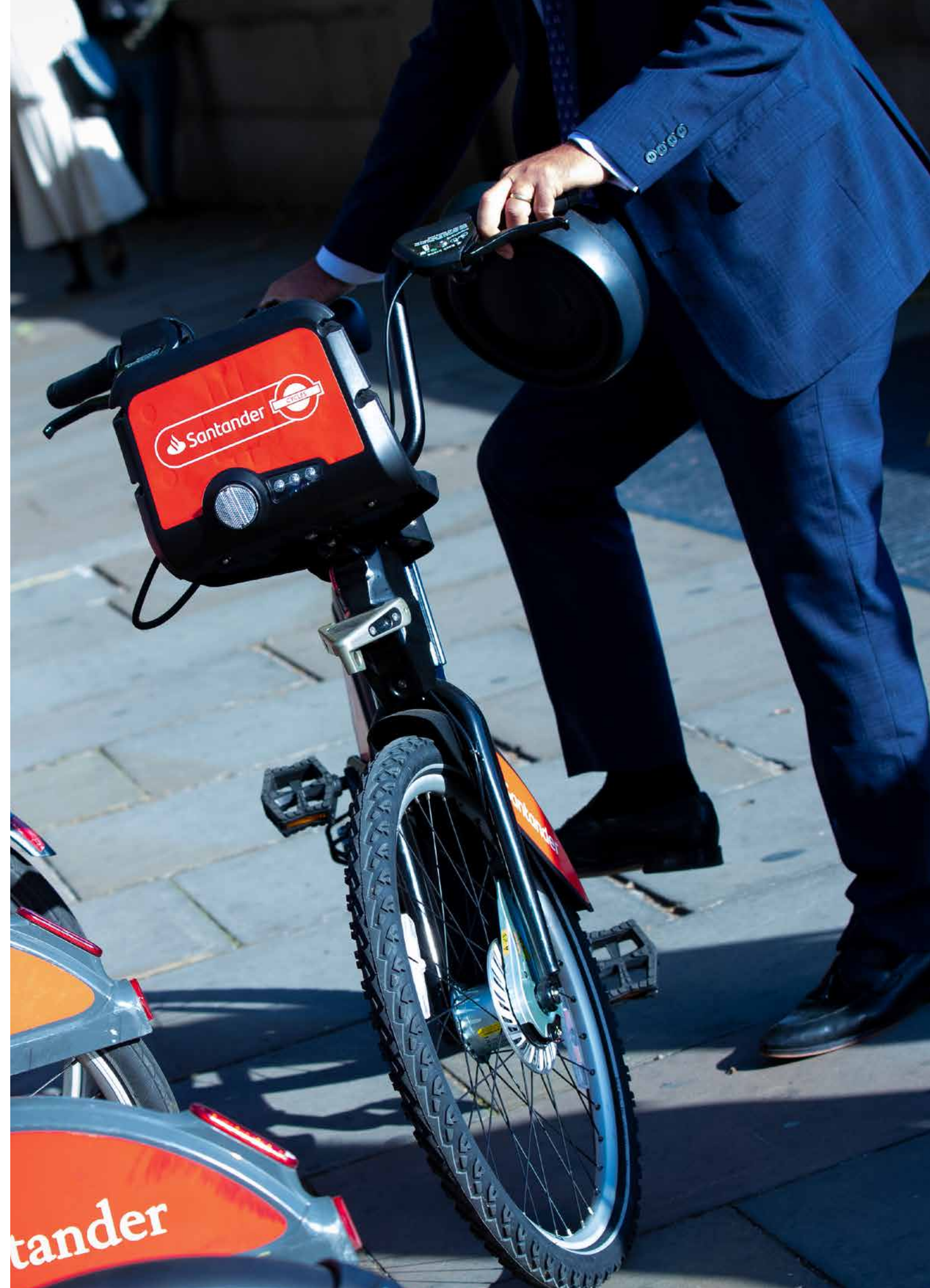
The NHS promotional code that was introduced to support healthcare workers during the pandemic came to an end on 9 September 2022. The code was redeemed more than 160,000 times. This offer has been replaced by a permanent 50 per cent reduction on annual membership.

Seven new docking stations opened between August and December in the London borough of Southwark, extending the reach of the cycle hire scheme to more potential customers. Almost 8,000 hires took place from the seven new stations up to the end of 2022.

Since August 2022, we have launched a new, modern back-office system and 500 e-bikes as part of our Modernise, Electrify, Expand programme. By the end of 2022, approximately 130,000 e-bike trips had taken place since the launch on 6 October 2022, making them a highly popular option for users of the scheme.

On 6 January 2023, we announced that 11,506,889 hires took place across 2022, a new record for the scheme. This is 565,625 hires more than were made in 2021, which was also a record-breaking year for the scheme.

Work has begun on planning for the future of the scheme in response to multiple operating contracts expiring from 2025.



Our new e-bikes are proving to be very popular



# Professional services

This comprises Technology and data, media and the TfL Growth Fund





# Technology and data

Reporting period	Gross cost to date (£m)	Gross cost to go (£m)	Forecast cost (£m)	Programme and project authority (£m)	Variance: Forecast vs authority (£m)
2020/21 to 2023/24	194	147	341	359	18
<b>Change since last Investment programme report</b>					
No change	23	(19)	4	No change	

## Financial commentary

The programme and project authority and forecast figures shown are for financial years 2020/21 to 2023/24 and include additional authority approved by the Programmes and Investment Committee on 2 March 2022. The forecast has increased by £4m since Quarter 2 due to additional funding agreed as part of the Business Plan.

The values are for technology and data-funded projects only and exclude the emergency services network, the public cellular network, telecoms commercialisation projects and work to expand pay as you go.

The forecast to authority variance is predominantly due to the outcome of capital prioritisation and reflects savings and deferrals out of the time frame.

## Performance over time commentary

Costs have remained stable this quarter.

### Progress update

#### Payments

On 21 November we started the deployment of a new revenue inspection device. This is a hand-held unit used by revenue control inspectors on all modes and by on-train staff on the DLR to read Oyster, contactless and ITSO cards, meaning they can detect fare evasion. The new devices are a step-change from the current units, which were deployed in 2015 for the following reasons:

- The devices are based on an off-the-shelf payment terminal, making them much cheaper than the previous ones
- The operating system has been switched to Android, which provides a better user experience and makes future-proofing easier

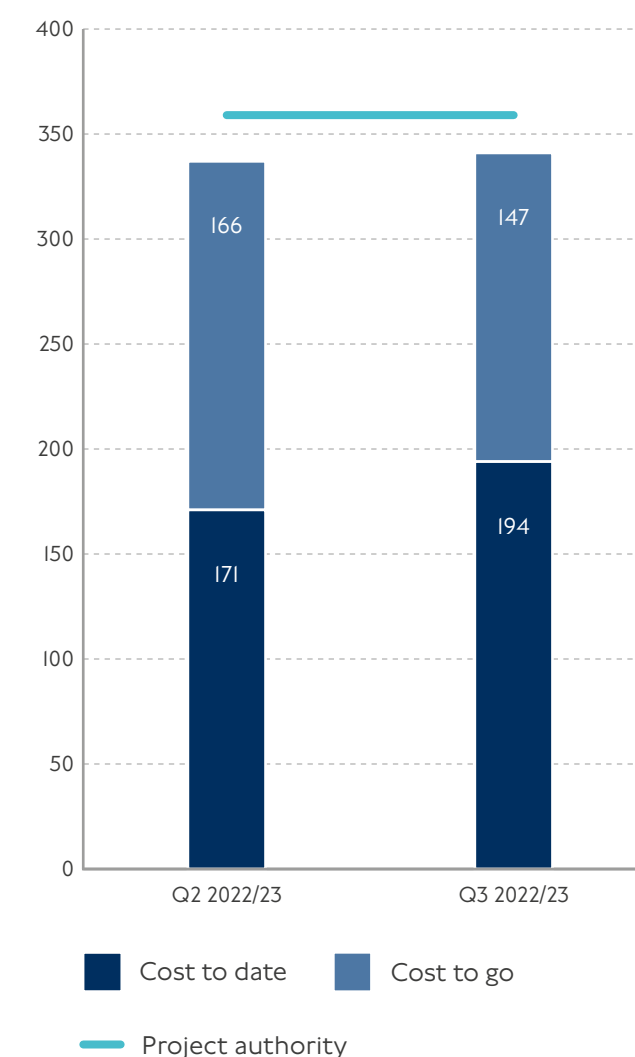
- The new devices are lighter and more ergonomic, making them easier to use
- The battery life has been improved from the previous device, meaning that it can last more than a shift length on a single charge (the current device requires staff to carry spare batteries when they are used heavily)

Following the withdrawal by the Bank of England in September, we completed the work to alter our ticket machines to remove the ability to accept paper £20 notes in November. This means that all paper note acceptance has now been withdrawn

We have completed the competition for a new series of cash-in-transit contracts across London, covering London Underground and DLR stations, the IFS Cloud Cable Car, our Head Office buildings, the Lost Property Office, London Transport Museum, Victoria Coach Station and Visitor Information Centres. The service provides for:

- The collection and counting of cash collected in stations
- Collection of foreign currency
- Processing of surrendered Oyster cards
- Delivery of change to stations

## Technology and data performance over time (£m)





### Digital workplace

The upgrade of our Avaya telephony system has now been completed. The upgrade ensures the system is both compliant and supportable, providing service stability across our hub buildings, operational control centres and contact centres. Further work associated with reducing the number of extensions and handsets associated with the Avaya system is in-flight, which is intended to lead to additional operating expenditure efficiencies and reduction in carbon footprint.

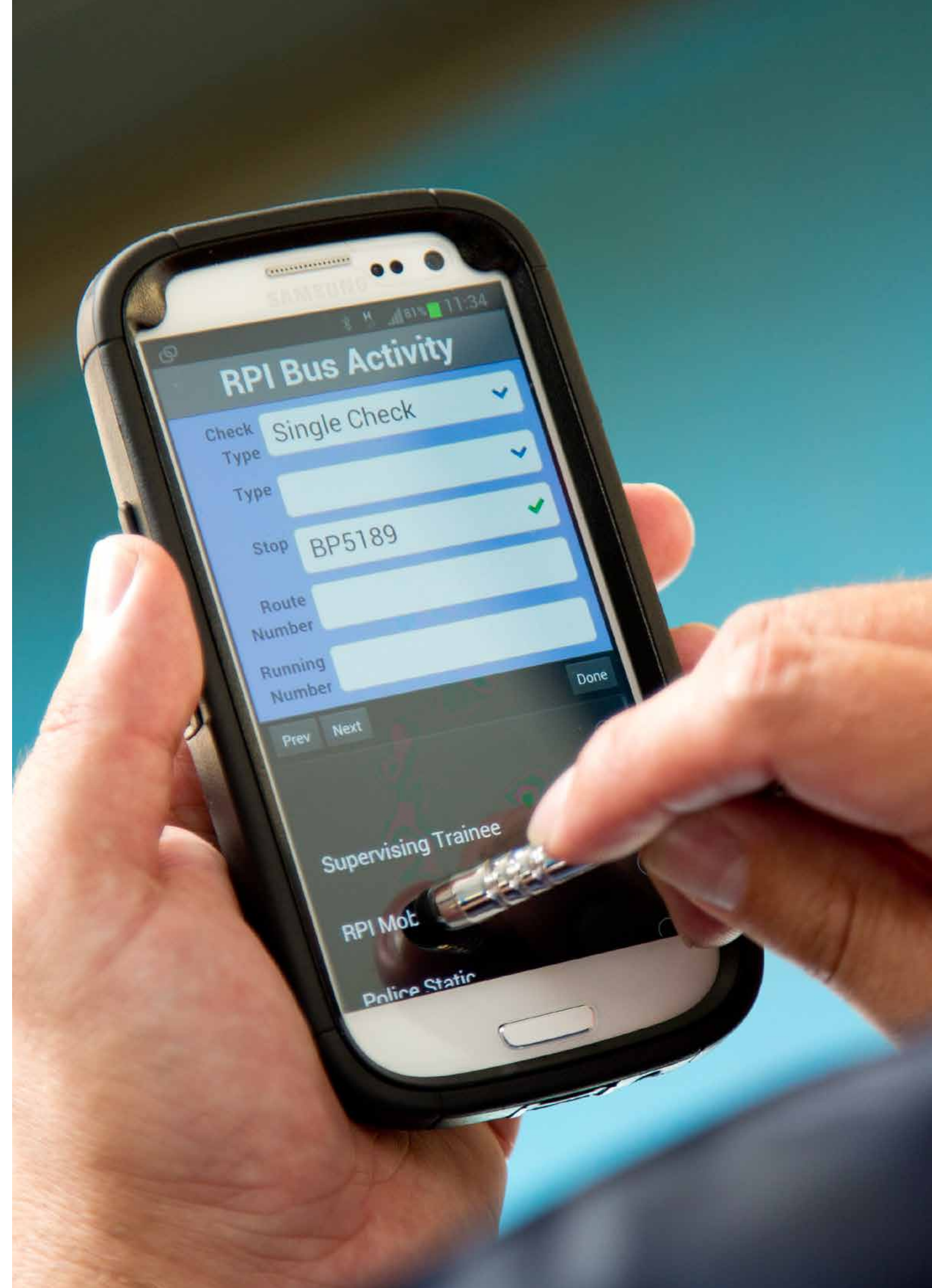
Work is almost complete on delivering Microsoft Teams Direct Routing (the ability to make/receive external calls to landlines and mobiles via Microsoft Teams), which will be offered as a low-cost alternative to a desk phone and/or mobile device to colleagues based on specific criteria relating to their role.

Technology improvements in Smart Meeting Rooms are ongoing, with approximately 60 operational locations completed and hub buildings due to complete in late February 2023. These improvements address issues with the audio, video and user experience, further supporting our hybrid ways of working.

We have now completed negotiations with Microsoft for a new Microsoft Enterprise Agreement, which is effective from December 2022. This is critical to the business as the majority of our IT services are based on Microsoft technology. The contract provides competitive price assurances and flexibility for (up to) the next five years. The terms of the contract have been endorsed by our senior leadership, and the team are now finalising the governance and technical transition activities to begin the new contract.

Progress continues on the Desktop Experience project to deliver a suite of modernised desktop offerings, optimised for hybrid working, allowing migration away from Windows 10 which becomes end of life in late 2025. Some enabling steps are complete, such as standardising all colleagues' Office365 display names and benchmarking existing assets and infrastructure for Windows 11 compatibility.

A third party have now been appointed to assist with the Retention and Compliance project. The primary objective of this initiative is to ensure that the management of our file data (for example documents residing in Office365, network drives, My Documents) and emails adhere to Information Governance and Cyber Security policies, which will be achieved through a combination of tooling and process. The scope of works, and related funding, has been agreed with the third party and the next steps are to agree phasing and priority of work.



We continue to upgrade our technology systems





We are extending mobile coverage to more areas of the Tube

### Hosting

The programme of works to create a modern, serviceable and secure hosting platform in our data centres is almost complete, with 90 per cent of application services and associated data now rehosted (more than 5,000 computer servers and 12 million gigabytes of data). The final tranche will complete early in 2023.

A new customer marketing email platform has been implemented and replaces a previous platform which was not GDPR compliant. We have migrated 12 application services using the previous platform across to this.

### Networks

Work to extend mobile coverage beyond the initial Jubilee line pilot area is progressing well, with the first new coverage area comprising three stations and connecting tunnels on the Central and Northern lines. Interoperability testing and final safety checks have been completed on these lines, and approval for go live was granted on 14 December. The first stations and tunnels in this service expansion went live on the 21 and 22 December. The mobile network operators (3UK, EE, Vodafone and O2) are working to get themselves ready to deliver to their customers and it is likely that ongoing testing by the operators will result in them going live in phases. Currently EE and Vodafone, and 3UK are live at the six new stations, and VMO2 will be going live in March 2023. Once all four operators are live, all future extensions to coverage will be with all four operators at the same time.

We continue to work closely with the Home Office in the delivery of the Emergency Services Network, and we are ahead of their schedule to deliver service.

The Connect Contract has been extended on favourable commercial terms by a further three years to November 2026. The Connect programme continues to replace London Underground's operational radio base stations. This two-year project has now replaced more than 207 of 293 (71 per cent) of our base stations, including those at major stations such as King's Cross.

Our project to replace the end-of-life data network services that underpin virtually all Surface services continues to progress. To date, we have migrated 3,511 of 4,496 (78 per cent) sites on to the new network delivered by Capita.



### Technology services operations

Our projects to help maintain and protect our business-critical services are progressing well. Of note is the progress being made in modernising our IT monitoring systems, with a key workstream to upgrade monitoring of operating systems about to complete. This project continues to improve our monitoring capability through 2023, to minimise any operational impact to technology services and performance.

We have also made good progress with our software licence and service management initiatives. The optimisation of Java licence usage has been completed, with processes put in place to ensure this continues as a business-as-usual activity. Non-compliance with licence usage requirements can lead to multi-million-pound fines. For the required upgrade of our essential IT service management system the options analysis of hosting and support solutions has been completed with procurement under way for the chosen solution. Implementation will begin in the new year, alongside investigation in to how we can integrate with our Service Request Management system.

A strategic initiative for the GLA family that we are central to is the GLA IT Shared Service programme, which will see us assume responsibility for agreed IT systems and services for the GLA, the Mayor's Office for Policing And Crime and the Old Oak and Park Royal Development Corporation.

Actions have been agreed to progress several fundamental scope-related issues and are now being implemented. This will be undertaken in a phased approach with focus on the management of the business change for all affected staff.

### Enterprise resource planning

Our new Procurement and Commercial system (SAP Ariba) went live for 170 users across Operations with the new Guided buying procurement functionality. This has delivered a digital and mobile based online catalogue user experience. Feedback has been very positive, and the project is on track to deploy Guided buying across our 3,000 purchasers at the end of January 2023.

We are replacing our legacy HR SAP solution (for which support ends in 2027) by implementing further modules of SAP SuccessFactors which we call myJourney. Phase 2 of myJourney is now under way. The scope of the project is in two tranches. First, we will replace our core HR system of record and payroll solution, followed by a second tranche that will cover recruitment and onboarding. The project team have selected a delivery partner, Infosys, through competitive tender and secured the necessary software licences. The milestone plan is to have the new HR and payroll system in by Quarter 4 2023/24.

The next key stage of the transformation programme is the upgrade of our core SAP system to the latest version SAP S/4 HANA. Early programme planning has started for this, with two initial projects kicked off to enable some technical pre-requisites and investigate an area of significant historic customisation (The Borough Spend Portal). The programme team have contracted a client-side partner, Resulting IT, to help us scope out the project, understand the key process, system and data differences with the new technology and help us prepare our market tender for an S/4 HANA implementation partner. Resulting IT started work in early December. This work will take until Quarter 2 2023/24 to complete.

### Contact centre operations

Following the historic delivery of a successful outsourcing roadmap, reducing our cost to serve by more than £3m per annum, we are now replacing the outsourcing framework that facilitated this saving. The existing framework expired this year. A replacement is required before the existing contracts expire to continue to leverage the per annum saving, to provide service continuity to the outsourced contracts currently live and to provide a commercial vehicle to outsource any additional work. Following market engagement last year, we have now completed evaluation of bids from the market. We will now take the contract award recommendation through governance.

In addition to providing this critical continuity of service to customers, we are also replacing and improving technology. In our Lost Property Office we are replacing Sherlock, the primary system that catalogues items of lost property. This tool has been out of support for more than a decade, and functionality limitations prevents us from modernising our processes. Following last year's successful tender of the new tool, we have since worked closely with the supplier, Not Lost, to ensure the product is suitably rolled out to all the Operational areas. We have now gone live in the Lost Property Office and have successfully rolled out to Buses too. We have also completed a spend-to-save project to automate customers' contactless payment card enquiries. More than 100,000 customers per year are forecasted to benefit from the quicker automated contact handling which in turn will reduce our cost-to-serve by more than £500,000 per annum.



### Data analytics

Phase one of the CLEO to the Cloud project has passed security testing and is planned for deployment early next year. Progress is on track with no issues reported, which means we will soon move away from the outdated and unsupported on-premises hardware underpinning our CLEO Data Warehouse.

This period we have also received final sign off for ODX Modernisation to go live and be our single source of truth following a significant window of data assurance. This data product was initially developed to support colleagues in our bus planning team look at the usage and impact on our bus network, however over the years this has expanded to be used across the organisation and infers end to end journeys where a journey started as a bus tap.

Following the final migration of Revenue Control reports in October, the Business Objects 5.1.7 project has now been formally closed. The project has successfully migrated and consolidated 190 business reports, mitigating GDPR risk which could have incurred significant penalties. This project also means that a newer, vendor-supported Business Intelligence tool is now being used across 13 business areas which has resulted in improved flexibility and reporting capabilities.

### Digital

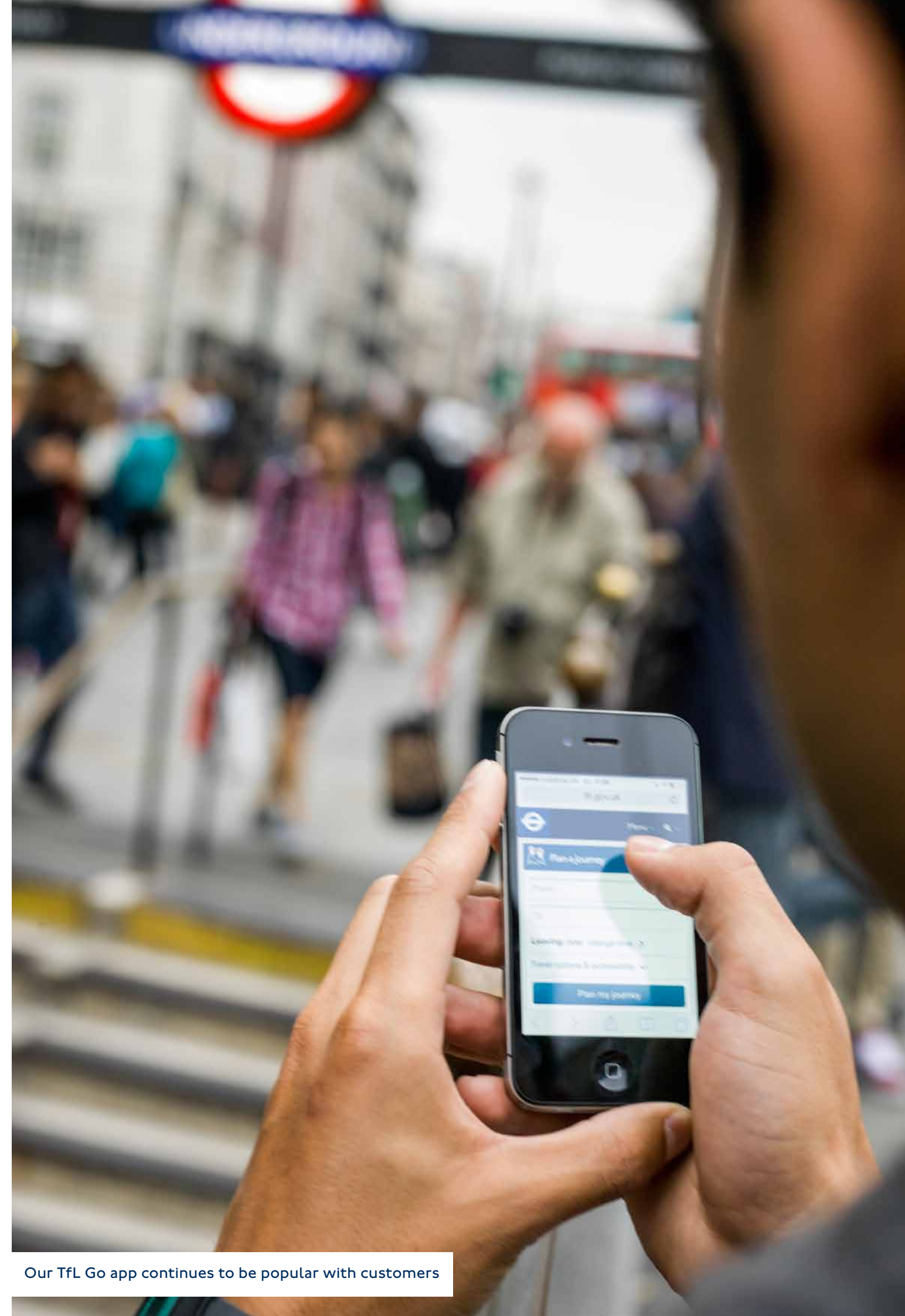
The TfL Go app has now been downloaded 2.75 million times and was used by just under 540,000 customers in November 2022.

We have continued to release regular app updates, improving the information provided during periods of severe disruption. We have also enhanced our routing information so that it links directly with live bus times, and prototyped new features showing the live location of buses. In December we published 'promoted places' content featuring festive days out in London following a successful series of content related to key Elizabeth line stations.

We continue to prepare for the launch of payments functionality which is now scheduled for early 2023 to align with the launch of the new account platform. Customers will be able to plan, pay and travel through one integrated experience. We will first test internally, then widen access to up to 10,000 customers in a beta trial before sharing with all app users.

### Challenges

Global semi-conductor supply issues have distorted our delivery due to long lead times and pricing that increases at short notice. This has impacted our ability to procure and implement new IT infrastructure and increasing project costs. We have put mitigations in place for our known pipeline and live projects in the Networks Transformation programme however, we are still exposed to risk on ad-hoc, small works or emergency works.



Our TfL Go app continues to be popular with customers



# Professional services Growth Fund

Reporting period	Forecast £m
2020/21 to 2029/30	37
Change since last IPR report at P3 22/23	
No change	35

## Financial commentary

In Quarter 3, the forecast for the Growth Fund increased from £2m to £37m. During the Business Plan process, additional funding was identified and prioritised for the Growth Fund which has now been included in the forecast. This money is profiled between 2024/25 and 2026/27 and will be allocated to specific Growth Fund projects over the next few months.

## Programme update

Over the past two years we have not been able to proceed with Growth Fund schemes as they have been contingent on additional funding being made available. Following the funding deal with Government, the 2022 Business Plan has recognised the need for us to continue to leverage third-party income and to support growth and step-free access projects in London.

The Tolworth scheme remains in the Growth Fund budget as a commitment.

## Challenges

The main challenges continue to centre around ongoing funding uncertainty for third-party funded projects, which are necessary to deliver the Mayor's Transport Strategy outcomes in areas of development and high need in London. Several projects with previously complete funding packages are currently at risk due to the programme being reliant on additional funding.

As a result, a number of projects have been delayed or paused in anticipation of funding certainty, while there have been attempts over the last couple of months to secure alternative funding contributions for some critically urgent projects.



Step-free access projects continue to be a top priority



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## About us

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' and helping to create a safer, 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 by walking, cycling or using public transport by 2041. To make this a reality, we prioritise sustainability, health and the quality of people's experience in everything we do.

We run most of London's public transport services, including the London Underground, London Buses, the DLR, London Overground, Elizabeth line, London Trams, London River Services, London Dial-a-Ride, Victoria Coach Station, Santander Cycles and the IFS Cloud Cable Car. The experience, reliability and accessibility of these services is fundamental to Londoners' quality of life.

We manage the city's red route strategic roads and, through collaboration with the London boroughs, we are helping to 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, improve air quality, revitalise town centres, boost businesses and connect communities. As part of this, our expanded Ultra Low Emission Zone and fleets of increasingly environmentally friendly and zero-emission buses are helping to tackle London's toxic air.

During the pandemic, we took a huge range of measures to ensure people were safe while travelling. This included extensive cleaning regimes across the public transport network and working with London's boroughs to introduce the Streetspace for London programme, which provided wider pavements and cycle lanes for people to walk and cycle safely and maintain social distancing. London's recovery is vital to the UK's recovery as life returns to normal. We want to ensure London avoids a car-led recovery and we continue to reassure people the capital and our transport network is safe and ready for them.

We have constructed many of London's most significant infrastructure projects in recent years, using transport to unlock much needed economic growth. This includes major projects like the extension of the Northern line to Battersea Power Station and Nine Elms in south London, as well as our work at Barking Riverside and the Bank station upgrade.

Working with the Government, we opened the Elizabeth line in time for Queen Elizabeth II's Jubilee. This transformational new railway adds 10 per cent to central London's rail capacity and supports the delivery of high-density, mixed-use developments, which are planned around active and sustainable travel to ensure 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 using information, 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. By working together, we can create a better city as London's recovery from the pandemic continues.



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